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Report 11413
February 1998

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GenCorp
Aerojet

Integrated Advanced Microwave Sounding Unit-A (AMSU-A)

Performance Verification Report

METSAT (S/N: 107) AMSU-A1 Receiver Assemblies

P/N 1356429-1, S/N: F04, P/N 1356409-1, S/N: F04

T.R.
IN-18

2000 025 595

Contract No. NAS 5-32314
CDRL 208

Submitted to:

National Aeronautics and Space Administration
Goddard Space Flight Center
Greenbelt, Maryland 20771

Submitted by:

Aerojet
1100 West Hollyvale Street
Azusa, California 91702

Aerojet

Report 11413
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Report No. 11413
February, 1999

PERFORMANCE VERIFICATION TEST REPORT METSAT (S/N: 107) AMSU-A1 RECEIVER ASSEMBLIES FOR INTEGRATED ADVANCED MICROWAVE SOUNDING UNIT-A (AMSU-A)

CONTRACT NO. NAS5-32314
CDRL PAR 3.3.2.1

FEBRUARY 1999

SUBMITTED TO

NATIONAL AERONAUTICS AND SPACE ADMINISTERATION
GODDARD SPACE FLIGHT CENTER
GREENBELT, MARYLAND 20771

SUBMITTED BY

AEROJET ELECTRONIC SYSTEMS PLANT
1100 WST HOLLYVALE STREET
AZUSA, CALIFORNIA 91702

Report No. 11413
February, 1999

AMSU-A RECEIVER VERIFICATION TEST REPORT

LEVEL OF ASSEMBLY: SUBASSEMBLY

TEST ITEM: AMSU-A1 RECEIVER ASSEMBLY
P/N: 1356429-1, S/N: F04
P/N: 1356409-1, S/N: F04

TYPE OF HARDWARE: METSAT FLIGHT MODEL (FM)

TYPE OF TEST: FUNCTIONAL PERFORMANCE

VERIFICATION TEST PROCEDURE: AE-26002/6A

TEST FACILITY LOCATION: AESP
AZUSA, CALIFORNIA

SIGNATURE:

TEST ENGINEER: ____________ DATE: 2/19/1999

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1.0 INTRODUCTION

The AMSU-A receiver subsystem comprises two separated receiver assemblies; AMSU-A1 and AMSU-A2 (P/N 1356441-1). The AMSU-A1 receiver contains 13 channels and the AMSU-A2 receiver 2 channels. The AMSU-A1 receiver assembly is further divided into two parts; AMSU-A1-1 (P/N 1356429-1) and AMSU-A1-2 (P/N 1356409-1), which contain 9 and 4 channels, respectively. Figures 1 and 2 illustrate the functional block diagrams of the AMSU-A1 and AMSU-A2 receivers.

The AMSU-A receiver subsystem **is located** in between the antenna and signal processing subsystems of the AMSU-A instrument and comprises the RF and IF components from isolators to attenuators as shown in Figures 1 and 2. It receives the RF signals from the antenna subsystem, down-converts the RF signals to IF signals, amplifies and defines the IF signals to proper power level and frequency bandwidth as specified for each channel, and inputs the IF signals to the signal processing subsystem.

The test reports for the METSAT AMSU-A receiver subsystem are prepared separately for A1 and A2 receivers so that each receiver stands alone during integration of instruments into the spacecraft. This test report presents the test data of the METSAT AMSU-A1 Flight Model No. 4 (FM-4) receiver subsystem. The tests are performed per the Acceptance Test Procedure (ATP) for the AMSU-A Receiver Subsystem, AE-26002/6A. The functional performance tests are conducted either at the component or subsystem level. While the component-level tests are performed over the entire operating temperature range predicted by thermal analysis, most subsystem-level tests are conducted at ambient temperature only. Key performances (bandpass characteristics and noise figure) of the receiver subsystem are verified over the operating temperature.

2.0 REASON FOR TEST

The ATP for the AMSU-A Receiver Subsystem, AE-26002/6A, is prepared to describe in detail the configuration of the test setups and how the tests are to be conducted to verify that the receiver subsystem meets the specifications as required either in the AMSU-A Instrument Performance and Operation Specification, S-480-80, or in AMSU-A Receiver Subsystem Specification, AE-26608, derived by the Aerojet System Engineering. Test results that verify the conformance to the specifications demonstrate the acceptability of that particular receiver subsystem.

3.0 ACCEPTANCE TEST

The acceptance tests for the AMSU-A receiver subsystem are performed either at the component or subsystem level. The component-level tests are conducted per the ATP of

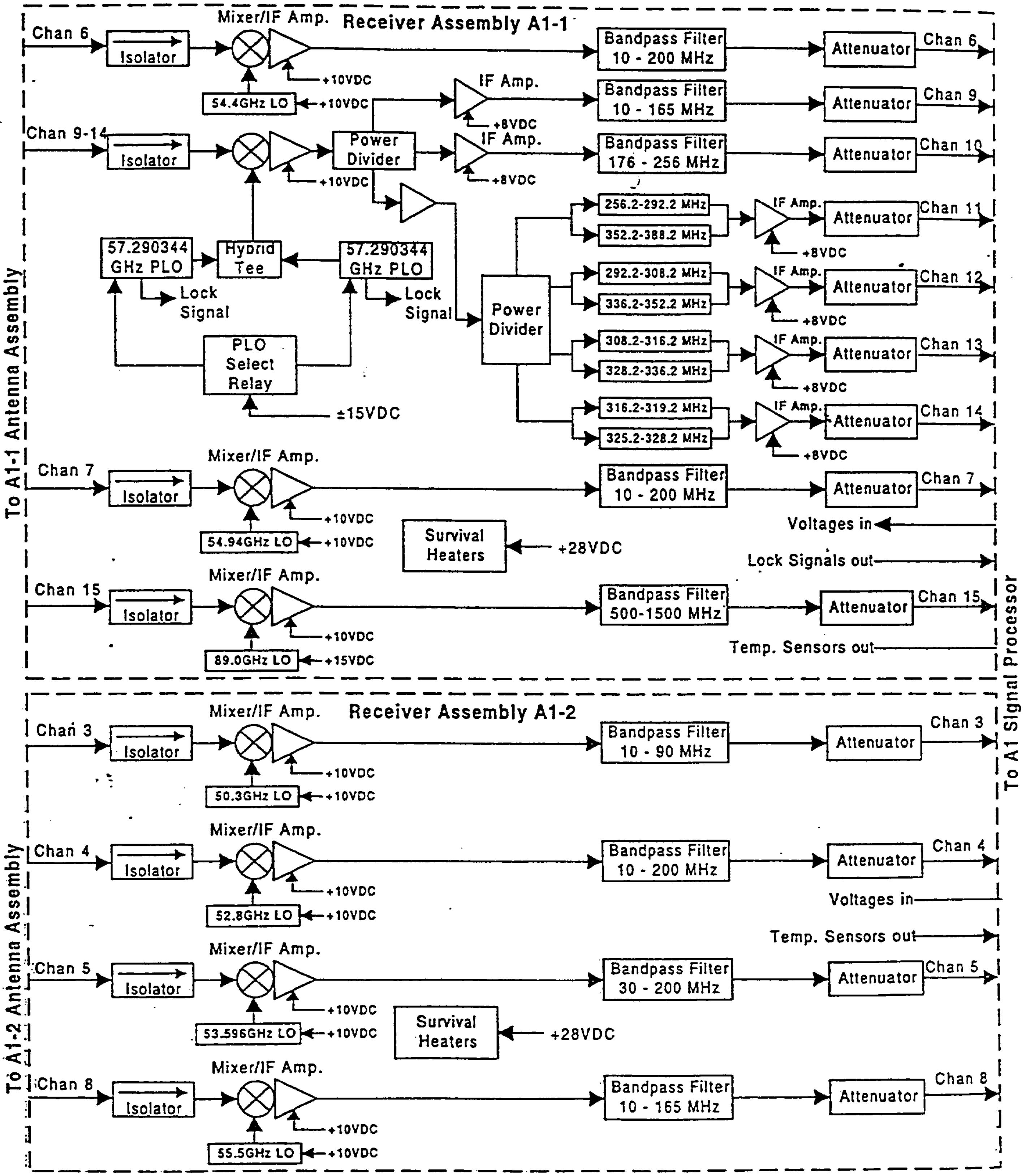

Figure 1. AMSU-A1 Receiver Functional Block Diagram

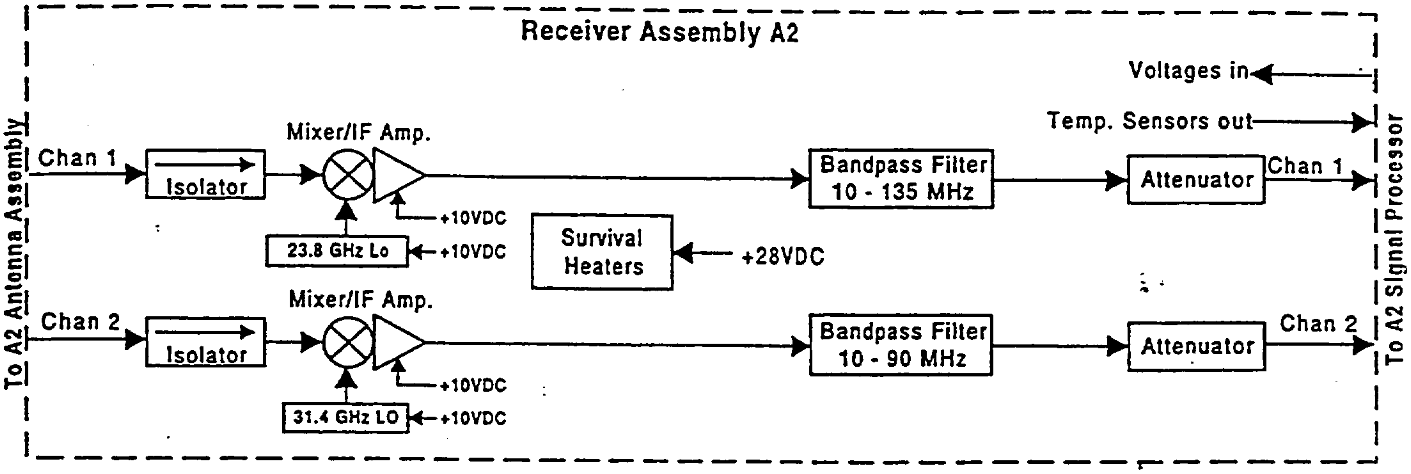

Figure 2. AMSU-A2 Receiver Functional Block Diagram

each component at supplier's facilities. The subsystem-level tests are conducted per the ATP, AE-26002/6A at Aerojet Azusa facility.

The component-level tests include the center frequency, center frequency stability, bandpass characteristics, gain stability, and gain compression. Although the bandpass characteristics can change slightly in subsystem level, these performances are mainly dependent on the component characteristics. The subsystem-level tests include the center frequency, IF output power, bandpass characteristics, noise figure, noise power stability, and the tunable short test.

The subsystem-level tests are performed on AMSU-A1 receivers: AMSU-A1-1 and AMSU-A1-2. However, since the multiplexers of the AMSU-A1 system are inseparably integrated to the receivers, the acceptance tests are conducted with the feedhorns directly connected to respective multiplexers that precede the receiver subsystem. These tests are performed at room ambient temperature.

Wire connections between the D-sub connectors and platinum resistance temperature (PRT) sensors and thermistors, the D-sub connector and PLO lock detection terminals, and the D-sub connector and survival heaters through the thermal switches are verified by measuring either the resistances between the respective two pins or the voltages across the respective two pins. The component bias voltages are verified by measuring the voltages across the two respective banana jacks of the breakout box that are connected to corresponding pins of the D-sub connector.

Because of the failures experienced in previous receivers, preliminary tests are incorporated prior to the acceptance tests from this AMSU-A1 receiver (S/N: FM4). The preliminary tests included the bandpass characteristics, noise figure and noise power stability. These tests were conducted on the receiver by temporarily mounting the components on the receiver shelf without bonding and wiring. High noise figure of 6dB was measured for channel 4 during the preliminary tests of the AMSU-A1-2 receiver. Efforts were made to improve the noise figure by replacing the DRO (P/N: 1336610-4, from S/N: 85042 to S/N: 85044), mixer/IF amplifier (P/N: 1331562-14, from S/N: 7A34 to S/N: 7A44), and isolator (P/N: 1356680-2, from S/N: 09 to S/N: 11), but the problem was finally traced to higher insertion loss of the multiplexer (P/N: 1331507, S/N: 03). The multiplexer (S/N: 03) was replaced by another (S/N: 05) and the replaced unit was sent back to the supplier for repair. The preliminary tests were conducted on channels 6, 7, 9, 10, and 15 for the AMSU-A1-1 receiver. Slightly high noise power stabilities were measured for channels 9 and 10 but lowered by adjusting the LO power level fore these channels.

During the acceptance tests, miswiring to channel 3 mixer/IF amplifier was revealed and corrected by reversing the connections. Other than that, the acceptance tests went smoothly for both AMSU-A1-1 and A1-2 receivers producing test results that meet all specified requirements.

Thermal cycling test was also implemented into the receiver tests starting with this AMSU-A1 receiver (S/N: FM4). Each receiver shelf was subjected to two thermal cycles between -20°C and +50°C and the bandpass characteristics and noise figure of the channels were measured at two temperature extremes of -20°C and +50°C as well as at room ambient temperature. For the A1-1 receiver, the tests were performed for channels 6, 9, and 10 during the first thermal cycle and for channels 7 and 15 during the second cycle. For the A1-2 receiver, the tests were performed for channels 3 and 4 during the first thermal cycle and for channels 5 and 8 during the second cycle. No anomaly was observed during temperature cycling of these receivers.

4.0 ORGANIZATION OF TEST DATA

The test data are organized in the following formats. The test data obtained at the component level are first summarized for each category for all applicable receiver channels. The bandpass characteristics of the filters are summarized only for the data measured at mid-temperature. Supporting component test data over the operating temperature range then follows the summaries.

The subsystem-level test data are organized for each receiver (A1-1 and A1-2), but not necessarily in sequential order of tests performed. Test data recorded in the test sheet as prepared in the ATP and related data plots are included in this test report.

5.0 SUMMARY AND RECOMMENDATIONS

The METSAT AMSU-A1 FM-4 receiver subsystem successfully passed all performance requirements and is delivered to System Engineering for system integration and test. The test data, in most cases, indicated adequate margins for key performance specifications. The tunable short test was not performed on this unit as it was performed on a previous receiver subsystem (S/N: FM-3).

To streamline the receiver tests, preliminary tests and thermal cycling test were incorporated into the AMSU-A1 receiver subsystem starting with this unit (S/N: F04). The preliminary tests were conducted on the receiver by temporarily mounting the components on the receiver shelf without bonding and wiring. In case of a performance anomaly or hardware failure, the problem could be corrected without going through the lengthy processes involved with disassembling and reassembling the completely assembled receiver hardware and associated document preparations as required when it occurs during the acceptance tests. The thermal cycling test was implemented to flush out any receiver failures experienced in system-level tests on previous instruments.
As a consequence of the preliminary tests, the receiver acceptance tests went smoothly without an anomaly or a failure other than a minor miswiring problem.

6.0 TEST DATA

In the following, the component and subsystem-level test data are organized as delineated in Paragraph 4.0.

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COMPONENT-LEVEL TEST DATA

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CENTER FREQUENCY AND FREQUENCY STABILITY

FOR

LOCAL OSCILLATORS (LOs)
(DROs, PLOs, & GDO)

CENTER FREQUENCY OF LOs

Channel No.	3	4	5	6	7	8	9-14 *	15
Specification (GHz)	50.3	52.8	53.596	54.4	54.94	55.5	57.290344	89.0
Setting Accuracy (+/-GHz)	0.002	0.001	0.001	0.001	0.001	0.002	0.000086	0.03
Measured (GHz)	50.30018	52.80074	53.59641	54.40004	54.93930	55.50042	57.290332 57.290346	89.010

* Measured for PLO No. 1 and No. 2.

FREQUENCY STABILITY OF LOs

Channel No.	3	4	5	6	7	8	9-14 *	15
Short-Term Specification (+/-MHz)	8	3	3	3	3	6	0.086	80
Setting Accuracy (+/-MHz)	2	1	1	1	1	2		30
W/ Temp. & Voltage (+/-MHz)	6	2	2	2	2	6		50
Measured (MHz) Total	+0.86, -0.50	+1.06, -0.85	+1.14, -2.77	+1.35, -1.55	+1.01, -0.74	+0.78, -1.06	+0.011, -0.020 +0.013, -0.009	+11., -28.
Long-Term Specification (+/-MHz)	2	2	2	2	2	2	0.114	50
By Design or Analysis ** (+/-MHz)	0.1	0.1	0.1	0.1	0.1	0.1	0.115	76

* Measured for PLO No. 1 and No. 2.

** Based on accelerated life-test data for DROs.

Note: Additional +/-0.1MHz frequency stability reserved for safety margin for channels 11-14.

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Channel 3 LO

DRO (P/N: 1336610-3, S/N: 85093)

TEST DATA SHEET 7.2
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AM   AESD 1336610- 3
SERIAL NUMBER: 85093   QUAL TEST N/A   ACCEPT TEST ✓

Basic Electrical Test; Ref. Test Para. 5.2.2

SPECIFICATION	MEASUREMENT AT Tnom ±1°C	LIMIT
Measurement at Vop=10 VDC		
Temperature	22 °C	Table IIIB
Input Voltage	10 VDC	10.0 ± 0.2 VDC
Input Current	179 mA	Table IIIB
Input Power, P_{diss}	1.79 W DC	P_{diss} max
Frequency, f_{Tnom}	50.30018 GHz	Table IIIB
RF Output Power, P_{Tnom}	12.3 dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.18 MHz	

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.3

Measurement at 9.5 VDC or at 9.5 VDC		
Temperature	22 °C	Table IIIB
Input Voltage	9.5 VDC	9.5 VDC or Para. 5.2.3.2
Input Current	177 mA	Table IIIB
Frequency, f_{meas}	50.30018 GHz	Table IIIB
RF Output Power, P_{meas}	12.2 dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC		
Temperature	22 °C	Table IIIB
Input Voltage	10.5 VDC	10.5 VDC or Para. 5.2.3.3
Input Current	178 mA	Table IIIB
Frequency, f_{meas}	50.30018 GHz	Table IIIB
RF Output Power, P_{meas}	12.2 dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tnom}$,

Δf_V at 9.5 VDC or at 9.5 VDC = 0 MHz
Δf_V at 10.5 VDC or at 10.5 VDC = 0 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$,

ΔP_V at 9.5 VDC or at 9.5 VDC = – 0.1 dB
ΔP_V at 10.5 VDC or at 10.5 VDC = – 0.1 dB

Accept ✓ Reject ______

Test Performed by VH   Date 6-3-98
Litton QA LITTON 160   Date JUN 15 1998

TEST DATA SHEET 7.3
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AM
SERIAL NUMBER: 85093
QUAL TEST N/A
AESD 1336610- 3
ACCEPT TEST ✓

Temperature Testing at T=10°C, Ref. Test Para. 5.2.5.1

SPECIFICATION	MEASUREMENT AT T=10° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	10	°C	10° ± 1°C
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	179	mA	Table IIIB
Input Power, P_{diss}	1.79	W DC	Pdiss max
Frequency, $f_{10°C}$	5030041	GHz	Table IIIB
RF Output Power, $P_{10°C}$	12.2	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.1

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	10	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	176	mA	Table IIIB
Frequency, f_{meas}	50.30041	GHz	Table IIIB
RF Output Power, P_{meas}	12.2	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	10	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	177	mA	Table IIIB
Frequency, f_{meas}	50.30041	GHz	Table IIIB
RF Output Power, P_{meas}	12.2	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{10°C}$:

Δf_V at 9.5 VDC or at 9.5 VDC = 0 MHz
Δf_V at 10.5 VDC or at 10.5 VDC = 0 MHz
Δf_T at 10.0 VDC ($=f_{10°C} - f_{Tnom}$) = 0.23 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{10°C}$:

ΔP_V at 9.5 VDC or at 9.5 VDC = 0 dB
ΔP_V at 10.5 VDC or at 10.5 VDC = 0 dB
ΔP_T at 10.0 VDC ($=P_{10°C} - P_{Tnom}$) = – 0.1 dB

Accept ✓ Reject ____

Test Performed by VN Date 6-3-98
Litton Q.A. Date JUN 15 1998

TEST DATA SHEET 7.4
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AM
AESD 1336610- 3
SERIAL NUMBER: 85093
QUAL TEST N/A
ACCEPT TEST ✓

Temperature Extreme Testing at Tmin, Ref. Test Para. 5.2.5.2

SPECIFICATION	MEASUREMENT AT Tmin ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	-1	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	178	mA	Table IIIB
Input Power, P_{diss}	1.78	W DC	Pdiss max
Frequency, f_{Tmin}	50.30034	GHz	Table IIIB
RF Output Power, P_{Tmin}	12.1	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.2

Measurement at 9.5 VDC or at 9.5 VDC

Temperature	-1	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	175	mA	Table IIIB
Frequency, f_{meas}	50.30037	GHz	Table IIIB
RF Output Power, P_{meas}	12.1	dBm	12 to 17 dBm

Measurement at 10.5 VDC or at 10.5 VDC

Temperature	-1	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	177	mA	Table IIIB
Frequency, f_{meas}	5030037	GHz	Table IIIB
RF Output Power, P_{meas}	12.1	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmin}$:

Δf_V at 9.5 VDC or at 9.5 VDC = 0.03 MHz
Δf_V at 10.5 VDC or at 10.5 VDC = 0.03 MHz
Δf_T at 10.0 VDC ($=f_{Tmin} - f_{Tnom}$) 0.16 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tmin}$:

ΔP_V at 9.5 VDC or at 9.5 VDC = 0 dB
ΔP_V at 10.5 VDC or at 10.5 VDC = 0 dB
ΔP_T at 10.0 VDC ($=P_{Tmin} - P_{Tnom}$) = - 0.2 dB

Accept ✓ Reject

Test Performed by VN Date 6-3-98
Litton Q.A. Date JUN 1 5 1993

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 40 OF 68
56348	A	1300823	B3	

TEST DATA SHEET 7.5
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AM
SERIAL NUMBER: 85093
QUAL TEST N/A
AESD 1336610- 3
ACCEPT TEST ✓

Temperature Testing at T=30°C, Ref. Test Para. 5.2.5.3

SPECIFICATION	MEASUREMENT AT T=30° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	30	°C	30° ± 1°C
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	179	mA	Table IIIB
Input Power, P_{diss}	1.79	W DC	Pdiss max
Frequency, $f_{30°C}$	50.30059	GHz	Table IIIB
RF Output Power, $P_{30°C}$	12.3	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.3

Measurement at 9.5 VDC or at 9.5 VDC

Temperature	30	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	177	mA	Table IIIB
Frequency, f_{meas}	50.30059	GHz	Table IIIB
RF Output Power, P_{meas}	12.3	dBm	12 to 17 dBm

Measurement at 10.5 VDC or at 10.5 VDC

Temperature	30	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	178	mA	Table IIIB
Frequency, f_{meas}	50.30059	GHz	Table IIIB
RF Output Power, P_{meas}	12.3	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{30°C}$:

Δf_V at 9.5 VDC or at 9.5 VDC = 0 MHz
Δf_V at 10.5 VDC or at 10.5 VDC = 0 MHz
Δf_T at 10.0 VDC ($=f_{30°C} - f_{Tnom}$) = 0.41 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{30°C}$:

ΔP_V at 9.5 VDC or at 9.5 VDC = 0 dB
ΔP_V at 10.5 VDC or at 10.5 VDC = 0 dB
ΔP_T at 10.0 VDC ($=P_{30°C} - P_{Tnom}$) = 0 dB

Accept ✓ Reject

Test Performed by VN Date 6-3-98
Litton Q.A. LITTON 16 Date JUN 1 5 1993

TEST DATA SHEET 7.6
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036AM
SERIAL NUMBER: 85093 QUAL TEST N/A
AESD 1336610- 3
ACCEPT TEST ✓

Temperature Extreme Testing at Tmax, Ref. Test Para. 5.2.5.4

SPECIFICATION	MEASUREMENT AT Tmax ±1°C,		LIMIT
Measurement at Vop=10 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	182	mA	Table IIIB
Input Power, P_{diss}	1.82	W DC	Pdiss max
Frequency, f_{Tmax}	50.29983	GHz	Table IIIB
RF Output Power, P_{Tmax}	12.1	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.4

Measurement at 9.5 VDC or at 9.5 VDC

Temperature	44	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
ut Current	180	mA	Table IIIB
requency, f_{meas}	50.29981	GHz	Table IIIB
RF Output Power, P_{meas}	12.1	dBm	12 to 17 dBm

Measurement at 10.5 VDC or at 10.5 VDC

Temperature	44	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	182	mA	Table IIIB
Frequency, f_{meas}	50.29979	GHz	Table IIIB
RF Output Power, P_{meas}	12.1	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmax}$:

Δf_V at 9.5 VDC or at 9.5 VDC = -0.02 MHz
Δf_V at 10.5 VDC or at 10.5 VDC = -0.04 MHz
Δf_T at 10.0V ($=f_{Tmax} - f_{Tnom}$) = -0.35 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$:

ΔP_V at 9.5 VDC or at 9.5 VDC = 0 dB
ΔP_V at 10.5 VDC or at 10.5 VDC = 0 dB
ΔP_T at 10.0 VDC ($=P_{Tmax} - P_{Tnom}$) = -0.2 dB

Accept ✓ Reject

st Performed by VN Date 6-3-98
Litton Q.A. LITTON 150 Date JUN 1 5 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 42 OF 68
56348	A	1300823	B3	

TEST DATA SHEET 7.7
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AM

AESD 1336610- 3

SERIAL NUMBER: 85093

QUAL TEST N/A ACCEPT TEST ✓

Power Supply Immunity, Ref. Test Para. 5.2.4

SPECIFICATION	MEASUREMENT AT Tnom ±1°C		LIMIT
Initial Measurement			
Temperature	22	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	180	mA	Table IIIB
Input Power	1.80	W DC	Pdiss max
Frequency (f_{Tnom})	50.30007	GHz	Table IIIB
RF Output Power	12.2	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.07	MHz	

Performance After Short Circuit on Power Supply; Ref Test Para 5.2.4.2

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	180	mA	Table IIIB
Input Power	1.80	W DC	Pdiss max
Frequency	50.30008	GHz	Table IIIB
RF Output Power	12.2	dBm	12 to 17 dBm

Over Voltage: Ref Test Para 5.2.4.3

Overvoltage Input Voltage	28	VDC	+28V

Performance After Input Overvoltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	180	mA	Table IIIB
Input Power	1.80	W DC	Pdiss max
Frequency	50.30010	GHz	Table IIIB
RF Output Power	12.2	dBm	12 to 17 dBm

Reverse Polarity: Ref Test Para 5.2.4.4

Reverse Input Voltage	-10	VDC	-10.0 ± 0.2 VDC

Performance After Reverse Input Voltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	180	mA	Table IIIB
Input Power	1.80	W DC	Pdiss max
Frequency, f_{Tnom}	50.30014	GHz	Table IIIB
RF Output Power	12.2	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.14	MHz	

Accept ✓ Reject ____

Test Performed by VN Date 6-3-98

Litton Q.A. LITTON M 60 Date JUN 1 5 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 43 OF 68
56348	A	1300823	B3	

TEST DATA SHEET 7.22A
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AM
SERIAL NUMBER: 85093
QUAL TEST N/A
AESD 1336610- 3
ACCEPT TEST ✓

Frequency and Power Hysteresis: Ref Test Para. 5.8

TEST DESCRIPTION			LIMITS
1. Initial Performance at Tnom ± 1°C			
Temperature	22	°C	Tnom ± 1°C
Frequency, f_{Tnom}	50.30014	GHz	Table IIIB
RF Output Power, P_{Tnom}	12.3	dBm	12 to 17 dBm
Input Voltage, V_B	10	VDC	10 ± 0.2 VDC
Input Current. I_B	179	mA	Table IIIB
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.14	MHz	
2. Performance at Tnom ± 1°C after +60°C soak.			
Temperature	22	°C	Tnom ± 1°C
Frequency, f_{meas}	50.30004	GHz	Table IIIB
RF Output Power, P_{meas}	12.1	dBm	12 to 17 dBm
Input Voltage	10	VDC	V_B ± .005 VDC
Input Current	180	mA	Table IIIB
3. Performance at Tnom ± 1°C after -30°C soak.			
Temperature	22	°C	Tnom ± 1°C
Frequency, f_{meas}	50.30037	GHz	Table IIIB
RF Output Power, P_{meas}	12.2	dBm	12 to 17 dBm
Input Voltage	10	VDC	V_B ± .005 VDC
Input Current	180	mA	Table IIIB

Calculate frequency variation. $\Delta f_H = f_{meas} - f_{Tnom}$:
Δf_H after 60°C soak = − 0.1 MHz
Δf_H after -30°C soak = 0.23 MHz

Calculate RF output power variation, $\Delta P_H = P_{meas} - P_{Tnom}$:
ΔP_H = after 60°C soak = − 0.2 dB
ΔP_H = after -30°C soak = − 0.1 dB

Accept ✓ Reject
Test Performed by VN Date 6-3-98
Litton Q.A. Date JUN 15 1998

TEST DATA SHEET 7.23A
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AM
SERIAL NUMBER: 85093
QUAL TEST N/A
AESD 1336610- 3
ACCEPT TEST ✓

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION			LIMITS
Initial Measurement. Ref Test Par. 5.9.1			
Temperature	23	°C	24°C ± 5°C
Frequency	50.30007	GHz	Table IIIB
RF Output Power	12.3	dBm	12 to 17 dBm
Input Voltage	10	VDC	10 ± 0.2 VDC
Input Current	180	mA	Table IIIB
Reference test. Ref. Test Para. 5.9.3			
Frequency, f_{Ref}	50.30007	GHz	Table IIIB
RF Output Power, P_{Ref}	-13.2	dBm	
Load Pulling Test. Ref. Test Para. 5.9.4			
Maximum Frequency, f_{meas}	50.30008	GHz	Table IIIB
Minimum Frequency, f_{meas}	50.30006	GHz	Table IIIB
Maximum RF Output Power P_{meas}	-12.7	dBm	
Minimum RF Output Power, P_{meas}	-13.6	dBm	

Calculate maximum positive (f_{meas} is greater than f_{Ref}) and negative (f_{meas} is less than f_{Ref}) frequency variation, $\Delta f_L = f_{meas} - f_{Ref}$:

Maximum Positive Δf_L = 0.01 MHz
Maximum Negative Δf_L = -0.01 MHz

Calculate maximum positive (P_{meas} is greater than P_{Ref}) and negative (P_{meas} is less than P_{Ref}) RF Output Power Variation. $\Delta P_L = P_{meas} - P_{Ref}$:

Maximum Positive ΔP_L = 0.5 dB
Maximum Negative ΔP_L = -0.4 dB

Accept ✓ Reject

Test Performed by Date 6-3-98
Litton Q.A. Date JUN 15 1998

CODE IDENT NO. 56348	SIZE A	NUMBER 1300823	REV B3	SHEET 60 OF 68

TEST DATA SHEET 7.23B
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AM
SERIAL NUMBER: 85093
QUAL TEST N/A
AESD 1336610- 3
ACCEPT TEST ✓

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION			LIMITS
Output Open and Short. Ref. Test Para. 5.9.5			
Temperature	23	°C	24°C ± 5°C
Frequency:	50.30010	GHz	Table IIIB
RF Output Power:	12.3	dBm	12 to 17 dBm
Input Voltage	10	VDC	10 ± 0.2 VDC
Input Current:	180	mA	Table IIIB
Results:	✓	Acceptable	No Damage or Degradation

Calculate maximum Frequency Accuracy (both positive and negative),
$\Delta f_{acc} = \Delta f_S$ (Use worst-case Δf_S from 7.2, 7.7, and 7.22A) + Δf_H (from 7.22A) + Δf_L (from 7.23A):

Maximum Δf_{acc} =	0.42	MHz (Positive)	Table IIIB
	-0.11	MHz (Negative)	Table IIIB

Calculate maximum Short-term Frequency Stability (both positive and negative),
$\Delta f_{V+T} = \Delta f_V + \Delta f_T$ (Use worst-case Δf_V and Δf_T from 7.2 thru 7.6):

Maximum Δf_{V+T} =	0.44	MHz (Positive)	Table IIIB
	-0.39	MHz (Negative)	Table IIIB

Calculate maximum overall RF Output Power Stability (both positive and negative),
$\Delta P_{OV} = \Delta P_V + \Delta P_T$ (Use worst-case ΔP_V and ΔP_T from 7.2 thru 7.6) + ΔP_H (from 7.22A) + ΔP_L (from 7.23A):

Maximum ΔP_{OV} =	0.5	dB (Positive)	1.0 dB
	-0.9	dB (Negative)	-1.0 dB

Accept ✓ Reject ________

Test Performed by DH Date 6-3-98

Litton Q.A. LITTON 13 Date JUN 15 1998

Report No. 11413
February, 1999

Channel 4 LO

DRO (P/N: 1336610-4, S/N: 85044)

TEST DATA SHEET 7.2
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AF/A
AESD 1336610- 4
SERIAL NUMBER: 85044
QUAL TEST N/A
ACCEPT TEST ✓

Basic Electrical Test; Ref. Test Para. 5.2.2

SPECIFICATION	MEASUREMENT AT Tnom ±1°C	LIMIT
Measurement at Vop=10 VDC		
Temperature	22 °C	Table IIIB
Input Voltage	10 VDC	10.0 ± 0.2 VDC
Input Current	176 mA	Table IIIB
Input Power, P_{diss}	1.76 W DC	P_{diss} max
Frequency, f_{Tnom}	5280074 GHz	Table IIIB
RF Output Power, P_{Tnom}	12.1 dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.74 MHz	

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.3

Measurement at 9.5 VDC or at 9.5 VDC		
Temperature	22 °C	Table IIIB
Input Voltage	9.5 VDC	9.5 VDC or Para. 5.2.3.2
Input Current	174 mA	Table IIIB
Frequency, f_{meas}	5280074 GHz	Table IIIB
RF Output Power, P_{meas}	12.1 dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC		
Temperature	22 °C	Table IIIB
Input Voltage	10.5 VDC	10.5 VDC or Para. 5.2.3.3
Input Current	175 mA	Table IIIB
Frequency, f_{meas}	5280074 GHz	Table IIIB
RF Output Power, P_{meas}	12.1 dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tnom}$,

Δf_V at 9.5 VDC or at 9.5 VDC = 0 MHz
Δf_V at 10.5 VDC or at 10.5 VDC = 0 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$,

ΔP_V at 9.5 VDC or at 9.5 VDC = 0 dB
ΔP_V at 10.5 VDC or at 10.5 VDC = 0 dB

Accept ✓ Reject

Test Performed by JED Date 7-25-98
Litton QA Date JUL 29 1998

TEST DATA SHEET 7.3
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AF/A
SERIAL NUMBER: 85044
QUAL TEST N/A
AESD 1336610- 4
ACCEPT TEST ✓

Temperature Testing at T=10°C, Ref. Test Para. 5.2.5.1

SPECIFICATION	MEASUREMENT AT T=10° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	10	°C	10° ± 1°C
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	176	mA	Table IIIB
Input Power, P_{diss}	1.76	W DC	Pdiss max
Frequency, $f_{10°C}$	5280049	GHz	Table IIIB
RF Output Power, $P_{10°C}$	12.0	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.1

Measurement at 9.5 VDC or at 9.5 VDC

Temperature	10	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	174	mA	Table IIIB
Frequency, f_{meas}	5280049	GHz	Table IIIB
RF Output Power, P_{meas}	12.0	dBm	12 to 17 dBm

Measurement at 10.5 VDC or at 10.5 VDC

Temperature	10	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	174	mA	Table IIIB
Frequency, f_{meas}	5280048	GHz	Table IIIB
RF Output Power, P_{meas}	12.0	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{10°C}$:

Δf_V at 9.5 VDC or at 9.5 VDC = 0 MHz
Δf_V at 10.5 VDC or at 10.5 VDC = - 0.01 MHz
Δf_T at 10.0 VDC ($=f_{10°C} - f_{Tnom}$) = -0.25 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{10°C}$:

ΔP_V at 9.5 VDC or at 9.5 VDC = 0 dB
ΔP_V at 10.5 VDC or at 10.5 VDC = 0 dB
ΔP_T at 10.0 VDC ($=P_{10°C} - P_{Tnom}$) = -0.1 dB

Accept ✓ Reject

Test Performed by JED Date 7-25-98
Litton Q.A. LITTON Date JUL 2 9 1998

TEST DATA SHEET 7.4
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AF/A
SERIAL NUMBER: 85044
QUAL TEST N/A
AESD 1336610- 4
ACCEPT TEST ✓

Temperature Extreme Testing at Tmin, Ref. Test Para. 5.2.5.2

SPECIFICATION	MEASUREMENT AT Tmin ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	-1	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	176	mA	Table IIIB
Input Power, P_{diss}	1.76	W DC	Pdiss max
Frequency, f_{Tmin}	5279994	GHz	Table IIIB
RF Output Power, P_{Tmin}	11.8	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.2

Measurement at 9.5 VDC or at 9.5 VDC

Temperature	-1	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	174	mA	Table IIIB
Frequency, f_{meas}	5279989	GHz	Table IIIB
RF Output Power, P_{meas}	11.8	dBm	12 to 17 dBm

Measurement at 10.5 VDC or at 10.5 VDC

Temperature	-1	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	175	mA	Table IIIB
Frequency, f_{meas}	5279987	GHz	Table IIIB
RF Output Power, P_{meas}	11.8	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmin}$:

Δf_V at 9.5 VDC or at 9.5 VDC = -0.05 MHz
Δf_V at 10.5 VDC or at 10.5 VDC = -0.07 MHz
Δf_T at 10.0 VDC ($=f_{Tmin} - f_{Tnom}$) -0.8 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tmin}$:

ΔP_V at 9.5 VDC or at 9.5 VDC = 0 dB
ΔP_V at 10.5 VDC or at 10.5 VDC = 0 dB
ΔP_T at 10.0 VDC ($=P_{Tmin} - P_{Tnom}$) = -0.3 dB

Accept ✓ Reject

Test Performed by JED Date 7-25-98
Litton Q.A. Date JUL 29 1998

LITTON
M 63

LITTON
Solid State

TEST DATA SHEET 7.5
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AE/A
SERIAL NUMBER: 85044
QUAL TEST N/A
AESD 1336610- 4
ACCEPT TEST ✓

Temperature Testing at T=30°C, Ref. Test Para. 5.2.5.3

SPECIFICATION	MEASUREMENT AT T=30° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	30	°C	30° ± 1°C
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	177	mA	Table IIIB
Input Power, P_{diss}	1.77	W DC	Pdiss max
Frequency, $f_{30°C}$	5280063	GHz	Table IIIB
RF Output Power, $P_{30°C}$	11.8	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.3

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	30	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	175	mA	Table IIIB
Frequency, f_{meas}	5280066	GHz	Table IIIB
RF Output Power, P_{meas}	11.8	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	30	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	176	mA	Table IIIB
Frequency, f_{meas}	5280069	GHz	Table IIIB
RF Output Power, P_{meas}	11.8	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{30°C}$:

Δf_V at 9.5 VDC or at 9.5 VDC = 0.03 MHz
Δf_V at 10.5 VDC or at 10.5 VDC = 0.06 MHz
Δf_T at 10.0 VDC ($=f_{30°C} - f_{Tnom}$) = -0.11 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{30°C}$:

ΔP_V at 9.5 VDC or at 9.5 VDC = 0 dB
ΔP_V at 10.5 VDC or at 10.5 VDC = 0 dB
ΔP_T at 10.0 VDC ($=P_{30°C} - P_{Tnom}$) = -0.3 dB

Accept ✓ Reject

Test Performed by JED Date 7-25-98
Litton Q.A. LITTON Date JUL 2 9 1998

TEST DATA SHEET 7.6
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AF/A
SERIAL NUMBER: 85044
QUAL TEST N/A
AESD 1336610- 4
ACCEPT TEST ✓

Temperature Extreme Testing at Tmax, Ref. Test Para. 5.2.5.4

SPECIFICATION	MEASUREMENT AT Tmax ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	179	mA	Table IIIB
Input Power, P_{diss}	1.79	W DC	Pdiss max
Frequency, f_{Tmax}	5280085	GHz	Table IIIB
RF Output Power, P_{Tmax}	11.8	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.4

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	177	mA	Table IIIB
Frequency, f_{meas}	5280083	GHz	Table IIIB
RF Output Power, P_{meas}	11.8	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	178	mA	Table IIIB
Frequency, f_{meas}	5280082	GHz	Table IIIB
RF Output Power, P_{meas}	11.8	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmax}$:

Δf_V at 9.5 VDC or at 9.5 VDC = -0.02 MHz
Δf_V at 10.5 VDC or at 10.5 VDC = -0.03 MHz
Δf_T at 10.0V ($=f_{Tmax} - f_{Tnom}$) = 0.11 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$:

ΔP_V at 9.5 VDC or at 9.5 VDC = 0 dB
ΔP_V at 10.5 VDC or at 10.5 VDC = 0 dB
ΔP_T at 10.0 VDC ($=P_{Tmax} - P_{Tnom}$) = - 0.3 dB

Accept ✓ Reject

Test Performed by JED Date 715-98
Litton Q.A. LITTON Date JUL 2 9 1998

TEST DATA SHEET 7.7
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AF/A AESD 1336610- 4
SERIAL NUMBER: 85044 QUAL TEST N/A ACCEPT TEST ✓

Power Supply Immunity, Ref. Test Para. 5.2.4

SPECIFICATION	MEASUREMENT AT Tnom ±1°C		LIMIT
Initial Measurement			
Temperature	22	°C	Table IIIB
Input Voltage	10.0	VDC	10.0 ± 0.2 VDC
Input Current	178	mA	Table IIIB
Input Power	1.78	W DC	Pdiss max
Frequency (f_{Tnom})	5280079	GHz	Table IIIB
RF Output Power	12.0	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.79	MHz	

Performance After Short Circuit on Power Supply: Ref Test Para 5.2.4.2

Input Voltage	10.0	VDC	10.0 ± 0.2 VDC
Input Current	177	mA	Table IIIB
Input Power	1.77	W DC	Pdiss max
Frequency	5280071	GHz	Table IIIB
RF Output Power	12.1	dBm	12 to 17 dBm

Over Voltage: Ref Test Para 5.2.4.3

Overvoltage Input Voltage	+28	VDC	+28V

Performance After Input Overvoltage

Input Voltage	10.0	VDC	10.0 ± 0.2 VDC
Input Current	177	mA	Table IIIB
Input Power	1.77	W DC	Pdiss max
Frequency	5280070	GHz	Table IIIB
RF Output Power	12.1	dBm	12 to 17 dBm

Reverse Polarity: Ref Test Para 5.2.4.4

Reverse Input Voltage	-10.0	VDC	-10.0 ± 0.2 VDC

Performance After Reverse Input Voltage

Input Voltage	10.0	VDC	10.0 ± 0.2 VDC
Input Current	176	mA	Table IIIB
Input Power	1.76	W DC	Pdiss max
Frequency, f_{Tnom}	5280070	GHz	Table IIIB
RF Output Power	12.1	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.60	MHz	

Accept ✓ Reject

Test Performed by JED
Date 7-25-98

Litton Q.A. LITTON M.E.O.
Date JUL 2 9 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 43 OF 68
56348	A	1300823	B3	

TEST DATA SHEET 7.22A
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AF/A
SERIAL NUMBER: 85044
QUAL TEST N/A
AESD 1336610- 4
ACCEPT TEST ✓

Frequency and Power Hysteresis: Ref Test Para. 5.8

TEST DESCRIPTION			LIMITS
1. Initial Performance at Tnom ± 1°C			
Temperature	22	°C	Tnom ± 1°C
Frequency, f_{Tnom}	5280084	GHz	Table IIIB
RF Output Power, P_{Tnom}	12.0	dBm	12 to 17 dBm
Input Voltage, V_B	10	VDC	10 ± 0.2 VDC
Input Current, I_B	177	mA	Table IIIB
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.84	MHz	
2. Performance at Tnom ± 1°C after +60°C soak.			
Temperature	22	°C	Tnom ± 1°C
Frequency, f_{meas}	5280078	GHz	Table IIIB
RF Output Power, P_{meas}	12.0	dBm	12 to 17 dBm
Input Voltage	10	VDC	V_B ± .005 VDC
Input Current	178	mA	Table IIIB
3. Performance at Tnom ± 1°C after -30°C soak.			
Temperature	22	°C	Tnom ± 1°C
Frequency, f_{meas}	5280029	GHz	Table IIIB
RF Output Power, P_{meas}	11.6	dBm	12 to 17 dBm
Input Voltage	10	VDC	V_B ± .005 VDC
Input Current	177	mA	Table IIIB

Calculate frequency variation, $\Delta f_H = f_{meas} - f_{Tnom}$:
Δf_H after 60°C soak = -0.06 MHz
Δf_H after -30°C soak = -0.55 MHz

Calculate RF output power variation, $\Delta P_H = P_{meas} - P_{Tnom}$:
ΔP_H = after 60°C soak = 0 dB
ΔP_H = after -30°C soak = -0.4 dB

Accept ✓ Reject

Test Performed by JED Date 7-25-98
Litton Q.A. LITTON M CO Date JUL 29 1998

TEST DATA SHEET 7.23A
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AF/A
SERIAL NUMBER: 85044
QUAL TEST N/A
AESD 1336610- 4
ACCEPT TEST ✓

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION | LIMITS

Initial Measurement. Ref Test Par. 5.9.1

Temperature	23	°C	24°C ± 5°C
Frequency	52.80061	GHz	Table IIIB
RF Output Power	12.1	dBm	12 to 17 dBm
Input Voltage	10	VDC	10 ± 0.2 VDC
Input Current	177	mA	Table IIIB

Reference test. Ref. Test Para. 5.9.3

Frequency, f_{Ref}	52.80061	GHz	Table IIIB
RF Output Power, P_{Ref}	-2.8	dBm	

Load Pulling Test. Ref. Test Para. 5.9.4

Maximum Frequency, f_{meas}	52.80062	GHz	Table IIIB
Minimum Frequency, f_{meas}	52.80061	GHz	Table IIIB
Maximum RF Output Power P_{meas}	-2.7	dBm	
Minimum RF Output Power, P_{meas}	-2.9	dBm	

Calculate maximum positive (f_{meas} is greater than f_{Ref}) and negative (f_{meas} is less than f_{Ref}) frequency variation, $\Delta f_L = f_{meas} - f_{Ref}$:

Maximum Positive Δf_L = 0.01 MHz
Maximum Negative Δf_L = 0 MHz

Calculate maximum positive (P_{meas} is greater than P_{Ref}) and negative (P_{meas} is less than P_{Ref}) RF Output Power Variation, $\Delta P_L = P_{meas} - P_{Ref}$:

Maximum Positive ΔP_L = 0.1 dB
Maximum Negative ΔP_L = - 0.1 dB

Accept ✓ Reject ____

Test Performed by mn Date 7-27-98
Litton Q.A. Date JUL 29 1998

LITTON
Solid State

TEST DATA SHEET 7.23B
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AF/A
SERIAL NUMBER: 85044
QUAL TEST N/A
AESD 1336610- 4
ACCEPT TEST ✓

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION		LIMITS
Output Open and Short. Ref. Test Para. 5.9.5		
Temperature	23 °C	24°C ± 5°C
Frequency:	52.80062 GHz	Table IIIB
RF Output Power:	12.1 dBm	12 to 17 dBm
Input Voltage	10 VDC	10 ± 0.2 VDC
Input Current:	177 mA	Table IIIB
Results:	✓ Acceptable	No Damage or Degradation

Calculate maximum Frequency Accuracy (both positive and negative),
$\Delta f_{acc} = \Delta f_S$ (Use worst-case Δf_S from 7.2, 7.7, and 7.22A) + Δf_H (from 7.22A) + Δf_L (from 7.23A):

Maximum Δf_{acc} =	0.85 MHz (Positive)	Table IIIB
	-0.55 MHz (Negative)	Table IIIB

Calculate maximum Short-term Frequency Stability (both positive and negative),
$\Delta f_{V+T} = \Delta f_V + \Delta f_T$ (Use worst-case Δf_V and Δf_T from 7.2 thru 7.6):

Maximum Δf_{V+T} =	0.17 MHz (Positive)	Table IIIB
	-0.87 MHz (Negative)	Table IIIB

Calculate maximum overall RF Output Power Stability (both positive and negative),
$\Delta P_{OV} = \Delta P_V + \Delta P_T$ (Use worst-case ΔP_V and ΔP_T from 7.2 thru 7.6) + ΔP_H (from 7.22A) + ΔP_L (from 7.23A):

Maximum ΔP_{OV} =	0.4 dB (Positive)	1.0 dB
	-0.8 dB (Negative)	-1.0 dB

Accept ✓ Reject ____

Test Performed by DH Date 7-27-98

Litton Q.A. LITTON Date JUL 29 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 61 OF 68
56348	A	1300823	B3	

Report No. 11413
February, 1999

Channel 5 LO

DRO (P/N: 1336610-5, S/N: 85032)

TEST DATA SHEET 7.2
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036AG/A
AESD 1336610- 5
SERIAL NUMBER: 85032
QUAL TEST N/A
ACCEPT TEST ✓

Basic Electrical Test: Ref. Test Para. 5.2.2

SPECIFICATION	MEASUREMENT AT Tnom ±1°C	LIMIT
Measurement at Vop=10 VDC		
Temperature	22 °C	Table IIIB
Input Voltage	10 VDC	10.0 ± 0.2 VDC
Input Current	177 mA	Table IIIB
Input Power, P_{diss}	1.77 W DC	P_{diss} max
Frequency, f_{Tnom}	53.59641 GHz	Table IIIB
RF Output Power, P_{Tnom}	12.6 dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.41 MHz	

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.3

Measurement at 9.5 VDC or at 9.5 VDC		
Temperature	22 °C	Table IIIB
Input Voltage	9.5 VDC	9.5 VDC or Para. 5.2.3.2
Input Current	175 mA	Table IIIB
quency, f_{meas}	53.59642 GHz	Table IIIB
RF Output Power, P_{meas}	12.6 dBm	12 to 17 dBm

Measurement at 10.5 VDC or at 10.5 VDC		
Temperature	22 °C	Table IIIB
Input Voltage	10.5 VDC	10.5 VDC or Para. 5.2.3.3
Input Current	176 mA	Table IIIB
Frequency, f_{meas}	53.59643 GHz	Table IIIB
RF Output Power, P_{meas}	12.6 dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = \overline{f_{meas}} - f_{Tnom}$,

Δf_V at 9.5 VDC or at 9.5 VDC = 0.01 MHz
Δf_V at 10.5 VDC or at 10.5 VDC = 0.02 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$,

ΔP_V at 9.5 VDC or at 9.5 VDC = 0 dB
ΔP_V at 10.5 VDC or at 10.5 VDC = 0 dB

Accept ✓ Reject

Test Performed by Date 6-3-98
on QA Date JUN 1 5 1998

LITTON

TEST DATA SHEET 7.3
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AG/A
SERIAL NUMBER: 85032
QUAL TEST N/A
AESD 1336610- 5
ACCEPT TEST ✓

Temperature Testing at T=10°C. Ref. Test Para. 5.2.5.1

SPECIFICATION	MEASUREMENT AT T=10° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	10	°C	10° ± 1°C
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	177	mA	Table IIIB
Input Power, P_{diss}	1.77	W DC	Pdiss max
Frequency, $f_{10°C}$	53.59576	GHz	Table IIIB
RF Output Power, $P_{10°C}$	12.3	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.1
Measurement at 9.5 VDC or at 9.5 VDC

Temperature	10	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	174	mA	Table IIIB
Frequency, f_{meas}	53.59576	GHz	Table IIIB
RF Output Power, P_{meas}	12.3	dBm	12 to 17 dBm

Measurement at 10.5 VDC or at 10.5 VDC

Temperature	10	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	175	mA	Table IIIB
Frequency, f_{meas}	53.59576	GHz	Table IIIB
RF Output Power, P_{meas}	12.3	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{10°C}$:
Δf_V at 9.5 VDC or at 9.5 VDC = 0 MHz
Δf_V at 10.5 VDC or at 10.5 VDC = 0 MHz
Δf_T at 10.0 VDC ($=f_{10°C} - f_{Tnom}$) = - 0.65 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{10°C}$:
ΔP_V at 9.5 VDC or at 9.5 VDC = 0 dB
ΔP_V at 10.5 VDC or at 10.5 VDC = 0 dB
ΔP_T at 10.0 VDC ($=P_{10°C} - P_{Tnom}$) = - 0.3 dB

Accept ✓ Reject

Test Performed by VN Date 6-4-98
Litton Q.A. LITTON Date JUN 1 5 1998

LITTON
Solid State

TEST DATA SHEET 7.4
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AG/A
SERIAL NUMBER: 85032
QUAL TEST N/A
AESD 1336610- 5
ACCEPT TEST ✓

Temperature Extreme Testing at Tmin, Ref. Test Para. 5.2.5.2

SPECIFICATION	MEASUREMENT AT Tmin ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	-1	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	175	mA	Table IIIB
Input Power, P_{diss}	1.75	W DC	Pdiss max
Frequency, f_{Tmin}	53.59468	GHz	Table IIIB
RF Output Power, P_{Tmin}	12.2	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.2

Measurement at 9.5 VDC or at 9.5 VDC

Temperature	-1	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	173	mA	Table IIIB
Frequency, f_{meas}	53.59460	GHz	Table IIIB
RF Output Power, P_{meas}	12.2	dBm	12 to 17 dBm

Measurement at 10.5 VDC or at 10.5 VDC

Temperature	-1	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	174	mA	Table IIIB
Frequency, f_{meas}	53.59459	GHz	Table IIIB
RF Output Power, P_{meas}	12.2	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmin}$:

Δf_V at 9.5 VDC or at 9.5 VDC = -0.08 MHz

Δf_V at 10.5 VDC or at 10.5 VDC = -0.09 MHz

Δf_T at 10.0 VDC ($=f_{Tmin} - f_{Tnom}$) -1.73 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tmin}$:

ΔP_V at 9.5 VDC or at 9.5 VDC = 0 dB

ΔP_V at 10.5 VDC or at 10.5 VDC = 0 dB

ΔP_T at 10.0 VDC ($=P_{Tmin} - P_{Tnom}$) = -6.4 dB

Accept ✓ Reject

Test Performed by Date 6-4-98
Litton Q.A. Date JUN 15 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 40 OF 68
56348	A	1300823	B3	

LITTON
Solid State

TEST DATA SHEET 7.5
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 903C AG/A
SERIAL NUMBER: 85032
QUAL TEST N/A
AESD 1336610- 5
ACCEPT TEST ✓

Temperature Testing at T=30°C, Ref. Test Para. 5.2.5.3

SPECIFICATION	MEASUREMENT AT T=30° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	30	°C	30° ± 1°C
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	177	mA	Table IIIB
Input Power, P_{diss}	1.77	W DC	Pdiss max
Frequency, $f_{30^\circ C}$	53.59636	GHz	Table IIIB
RF Output Power, $P_{30^\circ C}$	12.8	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.3

Measurement at 9.5 VDC or at 9.5 VDC

Temperature	30	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	175	mA	Table IIIB
Frequency, f_{meas}	53.59637	GHz	Table IIIB
RF Output Power, P_{meas}	12.8	dBm	12 to 17 dBm

Measurement at 10.5 VDC or at 10.5 VDC

Temperature	30	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	176	mA	Table IIIB
Frequency, f_{meas}	53.59638	GHz	Table IIIB
RF Output Power, P_{meas}	12.8	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{30^\circ C}$:

Δf_V at 9.5 VDC or at 9.5 VDC = 0.01 MHz
Δf_V at 10.5 VDC or at 10.5 VDC = 0.02 MHz
Δf_T at 10.0 VDC ($=f_{30^\circ C} - f_{Tnom}$) = -0.05 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{30^\circ C}$:

ΔP_V at 9.5 VDC or at 9.5 VDC = 0 dB
ΔP_V at 10.5 VDC or at 10.5 VDC = 0 dB
ΔP_T at 10.0 VDC ($=P_{30^\circ C} - P_{Tnom}$) = 0.2 dB

Accept ✓ Reject

Test Performed by
Date 6-4-98

Litton Q.A. LITTON M 60
Date JUN 15 1998

TEST DATA SHEET 7.6
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AG/A
SERIAL NUMBER: 85032
QUAL TEST N/A
AESD 1336610- 5
ACCEPT TEST ✓

Temperature Extreme Testing at Tmax. Ref. Test Para. 5.2.5.4

SPECIFICATION	MEASUREMENT AT Tmax ±1°C	LIMIT
Measurement at Vop=10 VDC		
Temperature	44 °C	Table IIIB
Input Voltage	10 VDC	10.0 ± 0.2 VDC
Input Current	179 mA	Table IIIB
Input Power, P_{diss}	1.79 W DC	Pdiss max
Frequency, f_{Tmax}	53.59694 GHz	Table IIIB
RF Output Power, P_{Tmax}	12.9 dBm	12 to 17 dBm
Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.4		
Measurement at 9.5 VDC or at 9.5 VDC		
Temperature	44 °C	Table IIIB
Input Voltage	9.5 VDC	9.5 VDC or Para 5.2.3.2
Input Current	177 mA	Table IIIB
Frequency, f_{meas}	53.59694 GHz	Table IIIB
RF Output Power, P_{meas}	12.9 dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC		
Temperature	44 °C	Table IIIB
Input Voltage	10.5 VDC	10.5 VDC or Para 5.2.3.3
Input Current	178 mA	Table IIIB
Frequency, f_{meas}	53.59694 GHz	Table IIIB
RF Output Power, P_{meas}	12.9 dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmax}$:

Δf_V at 9.5 VDC or at 9.5 VDC = 0 MHz

Δf_V at 10.5 VDC or at 10.5 VDC = 0 MHz

Δf_T at 10.0V ($=f_{Tmax} - f_{Tnom}$) = 0.53 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$:

ΔP_V at 9.5 VDC or at 9.5 VDC = 0 dB

ΔP_V at 10.5 VDC or at 10.5 VDC = 0 dB

ΔP_T at 10.0 VDC ($=P_{Tmax} - P_{Tnom}$) = 0.3 dB

Accept ✓ Reject

Test Performed by OH Date 6-4-98

Litton Q.A. LITTON M60 Date JUN 1 5 1998

TEST DATA SHEET 7.7
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AG/A AESD 1336610- 5
SERIAL NUMBER: 85032 QUAL TEST N/A ACCEPT TEST ✓

Power Supply Immunity, Ref. Test Para. 5.2.4

SPECIFICATION	MEASUREMENT AT Tnom ±1°C		LIMIT
Initial Measurement			
Temperature	22	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	177	mA	Table IIIB
Input Power	1.77	W DC	Pdiss max
Frequency (f_{Tnom})	53.59656	GHz	Table IIIB
RF Output Power	12.5	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.56	MHz	

Performance After Short Circuit on Power Supply: Ref Test Para 5.2.4.2

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	177	mA	Table IIIB
Input Power	1.77	W DC	Pdiss max
Frequency	53.59656	GHz	Table IIIB
RF Output Power	12.5	dBm	12 to 17 dBm

Over Voltage: Ref Test Para 5.2.4.3

Overvoltage Input Voltage	28	VDC	+28V

Performance After Input Overvoltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	177	mA	Table IIIB
Input Power	1.77	W DC	Pdiss max
Frequency	53.59650	GHz	Table IIIB
RF Output Power	12.5	dBm	12 to 17 dBm

Reverse Polarity: Ref Test Para 5.2.4.4

Reverse Input Voltage	-10	VDC	-10.0 ± 0.2 VDC

Performance After Reverse Input Voltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	177	mA	Table IIIB
Input Power	1.77	W DC	Pdiss max
Frequency, f_{Tnom}	53.59650	GHz	Table IIIB
RF Output Power	12.5	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.56	MHz	

Accept ✓ Reject

Test Performed by VN
Date 6-4-98

Litton Q.A. LITTON MFG
Date JUN 15 1998

TEST DATA SHEET 7.22A
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AG/A
SERIAL NUMBER: 85632
QUAL TEST N/A
AESD 1336610- 5
ACCEPT TEST ✓

Frequency and Power Hysteresis: Ref Test Para. 5.8

TEST DESCRIPTION			LIMITS
1. Initial Performance at Tnom ± 1°C			
Temperature	22	°C	Tnom ± 1°C
Frequency, f_{Tnom}	53.59652	GHz	Table IIIB
RF Output Power, P_{Tnom}	12.5	dBm	12 to 17 dBm
Input Voltage, V_B	10	VDC	10 ± 0.2 VDC
Input Current, I_B	177	mA	Table IIIB
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.52	MHz	
2. Performance at Tnom ± 1°C after +60°C soak.			
Temperature	22	°C	Tnom ± 1°C
quency, f_{meas}	53.59558	GHz	Table IIIB
Output Power, P_{meas}	12.6	dBm	12 to 17 dBm
Input Voltage	10	VDC	V_B ± .005 VDC
Input Current	177	mA	Table IIIB
3. Performance at Tnom ± 1°C after -30°C soak.			
Temperature	22	°C	Tnom ± 1°C
Frequency, f_{meas}	53.59654	GHz	Table IIIB
RF Output Power, P_{meas}	12.5	dBm	12 to 17 dBm
Input Voltage	10	VDC	V_B ± .005 VDC
Input Current	177	mA	Table IIIB

Calculate frequency variation, $\Delta f_H = f_{meas} - f_{Tnom}$:

Δf_H after 60°C soak = - 0.94 MHz

Δf_H after -30°C soak = 0.02 MHz

Calculate RF output power variation, $\Delta P_H = P_{meas} - P_{Tnom}$:

ΔP_H = after 60°C soak = 0.1 dB

ΔP_H = after -30°C soak = 0 dB

Accept ✓ Reject

st Performed by VN Date 6-4-98

itton Q.A. Date JUN 1 5 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 58 OF 68
56348	A	1300823	B3	

LITTON
Solid State

TEST DATA SHEET 7.23A
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AG/A
SERIAL NUMBER: 85032
QUAL TEST N/A
AESD 1336610- 5
ACCEPT TEST ✓

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION			LIMITS
Initial Measurement. Ref Test Par. 5.9.1			
Temperature	21	°C	24°C ± 5°C
Frequency	53.59570	GHz	Table IIIB
RF Output Power	12.9	dBm	12 to 17 dBm
Input Voltage	10	VDC	10 ± 0.2 VDC
Input Current	177	mA	Table IIIB

Reference test. Ref. Test Para. 5.9.3

Frequency, f_{Ref}	53.59570	GHz	Table IIIB
RF Output Power, P_{Ref}	-13.25	dBm	

Load Pulling Test. Ref. Test Para. 5.9.4

Maximum Frequency, f_{meas}	53.59571	GHz	Table IIIB
Minimum Frequency, f_{meas}	53.59569	GHz	Table IIIB
Maximum RF Output Power P_{meas}	-12.8	dBm	
Minimum RF Output Power, P_{meas}	-13.6	dBm	

Calculate maximum positive (f_{meas} is greater than f_{Ref}) and negative (f_{meas} is less than f_{Ref}) frequency variation. $\Delta f_L = f_{meas} - f_{Ref}$:

Maximum Positive Δf_L =	0.01	MHz
Maximum Negative Δf_L =	-0.01	MHz

Calculate maximum positive (P_{meas} is greater than P_{Ref}) and negative (P_{meas} is less than P_{Ref}) RF Output Power Variation. $\Delta P_L = P_{meas} - P_{Ref}$:

Maximum Positive ΔP_L =	+0.45	dB
Maximum Negative ΔP_L =	-0.35	dB

Accept ✓ Reject ________

Test Performed by DH Date 6-2-98
Litton Q.A. Date JUN 15 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 60 OF 68
56348	A	1300823	B3	

TEST DATA SHEET 7.23B
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AG/A
SERIAL NUMBER: 85032 QUAL TEST N/A

AESD 1336610- 5
ACCEPT TEST ✓

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION			LIMITS
Output Open and Short. Ref. Test Para. 5.9.5			
Temperature	21	°C	24°C ± 5°C
Frequency:	53.59573	GHz	Table IIIB
RF Output Power:	12.9	dBm	12 to 17 dBm
Input Voltage	10	VDC	10 ± 0.2 VDC
Input Current:	177	mA	Table IIIB
Results:	✓	Acceptable	No Damage or Degradation

Calculate maximum Frequency Accuracy (both positive and negative),
$\Delta f_{acc} = \Delta f_S$ (Use worst-case Δf_S from 7.2, 7.7, and 7.22A) + Δf_H (from 7.22A) + Δf_L (from 7.23A):

Maximum Δf_{acc} =	0.59	MHz (Positive)	Table IIIB
	- 0.95	MHz (Negative)	Table IIIB

Calculate maximum Short-term Frequency Stability (both positive and negative),
$\Delta f_{V+T} = \Delta f_V + \Delta f_T$ (Use worst-case Δf_V and Δf_T from 7.2 thru 7.6):

Maximum Δf_{V+T} =	0.55	MHz (Positive)	Table IIIB
	- 1.82	MHz (Negative)	Table IIIB

Calculate maximum overall RF Output Power Stability (both positive and negative),
$\Delta P_{OV} = \Delta P_V + \Delta P_T$ (Use worst-case ΔP_V and ΔP_T from 7.2 thru 7.6) + ΔP_H (from 7.22A) + ΔP_L (from 7.23A):

Maximum ΔP_{OV} =	0.85	dB (Positive)	1.0 dB
	-0.75	dB (Negative)	-1.0 dB

Accept ✓ Reject

Test Performed by DH Date 6-4-98

tton Q.A. C9 NOLL Date JUN 1 5 1998

Report No. 11413
February, 1999

Channel 6 LO

DRO (P/N: 1336610-6, S/N: 85027)

TEST DATA SHEET 7.2
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036AH/A
AESD 1336610- 6
SERIAL NUMBER: 85027
QUAL TEST N/A
ACCEPT TEST ✓

Basic Electrical Test; Ref. Test Para. 5.2.2

SPECIFICATION	MEASUREMENT AT Tnom ±1°C	LIMIT
Measurement at Vop=10 VDC		
Temperature	22 °C	Table IIIB
Input Voltage	10 VDC	10.0 ± 0.2 VDC
Input Current	188 mA	Table IIIB
Input Power, P_{diss}	1.88 W DC	P_{diss} max
Frequency, f_{Tnom}	54.40004 GHz	Table IIIB
RF Output Power, P_{Tnom}	12.0 dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	.04 MHz	

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.3

Measurement at 9.5 VDC or at 9.5 VDC		
Temperature	22 °C	Table IIIB
Input Voltage	9.5 VDC	9.5 VDC or Para. 5.2.3.2
Input Current	186 mA	Table IIIB
Frequency, f_{meas}	54.40004 GHz	Table IIIB
RF Output Power, P_{meas}	12.0 dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC		
Temperature	22 °C	Table IIIB
Input Voltage	10.5 VDC	10.5 VDC or Para. 5.2.3.3
Input Current	186 mA	Table IIIB
Frequency, f_{meas}	54.40005 GHz	Table IIIB
RF Output Power, P_{meas}	12.0 dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tnom}$,

Δf_V at 9.5 VDC or at 9.5 VDC = 0 MHz
Δf_V at 10.5 VDC or at 10.5 VDC = 0.01 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$,

ΔP_V at 9.5 VDC or at 9.5 VDC = 0 dB
ΔP_V at 10.5 VDC or at 10.5 VDC = 0 dB

Accept ✓ Reject

Test Performed by Date 6-16-98
Litton QA LITTON 60 Date JUN 30 1998

TEST DATA SHEET 7.3
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AH /A
SERIAL NUMBER: 85027
QUAL TEST N/A
AESD 1336610- 6
ACCEPT TEST ✓

Temperature Testing at T=10°C, Ref. Test Para. 5.2.5.1

SPECIFICATION	MEASUREMENT AT T=10° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	10	°C	10° ± 1°C
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	188	mA	Table IIIB
Input Power, P_{diss}	1.88	W DC	Pdiss max
Frequency, $f_{10°C}$	54.39946	GHz	Table IIIB
RF Output Power, $P_{10°C}$	12.0	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.1
Measurement at 9.5 VDC or at 9.5 VDC

Temperature	10	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	186	mA	Table IIIB
Frequency, f_{meas}	54.39945	GHz	Table IIIB
RF Output Power, P_{meas}	12.0	dBm	12 to 17 dBm

Measurement at 10.5 VDC or at 10.5 VDC

Temperature	10	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	186	mA	Table IIIB
Frequency, f_{meas}	54.39944	GHz	Table IIIB
RF Output Power, P_{meas}	12.0	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{10°C}$:

Δf_V at 9.5 VDC or at 9.5 VDC = -0.01 MHz
Δf_V at 10.5 VDC or at 10.5 VDC = -0.02 MHz
Δf_T at 10.0 VDC ($=f_{10°C} - f_{Tnom}$) = -.58 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{10°C}$:

ΔP_V at 9.5 VDC or at 9.5 VDC = 0 dB
ΔP_V at 10.5 VDC or at 10.5 VDC = 0 dB
ΔP_T at 10.0 VDC ($=P_{10°C} - P_{Tnom}$) = 0 dB

Accept ✓ Reject

Test Performed by SB Date 6-16-98
Litton Q.A. LITTON Date JUN 3 0 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 39 OF 68
56348	A	1300823	B3	

TEST DATA SHEET 7.4
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AH/A
AESD 1336610- 6
SERIAL NUMBER: 85027
QUAL TEST N/A
ACCEPT TEST ✓

Temperature Extreme Testing at Tmin, Ref. Test Para. 5.2.5.2

SPECIFICATION	MEASUREMENT AT Tmin ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	-1	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	187	mA	Table IIIB
Input Power, P_{diss}	1.87	W DC	Pdiss max
Frequency, f_{Tmin}	54.39877	GHz	Table IIIB
RF Output Power, P_{Tmin}	12.0	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.2

Measurement at 9.5 VDC or at 9.5 VDC

Temperature	-1	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	185	mA	Table IIIB
Frequency, f_{meas}	54.39876	GHz	Table IIIB
RF Output Power, P_{meas}	12.0	dBm	12 to 17 dBm

Measurement at 10.5 VDC or at 10.5 VDC

Temperature	-1	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	186	mA	Table IIIB
Frequency, f_{meas}	54.39876	GHz	Table IIIB
RF Output Power, P_{meas}	12.0	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmin}$:

Δf_V at 9.5 VDC or at 9.5 VDC = -0.01 MHz
Δf_V at 10.5 VDC or at 10.5 VDC = -0.01 MHz
Δf_T at 10.0 VDC ($=f_{Tmin} - f_{Tnom}$) -1.27 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tmin}$:

ΔP_V at 9.5 VDC or at 9.5 VDC = 0 dB
ΔP_V at 10.5 VDC or at 10.5 VDC = 0 dB
ΔP_T at 10.0 VDC ($=P_{Tmin} - P_{Tnom}$) = 0 dB

Accept ✓ Reject

Test Performed by SS Date 6-16-98
Litton Q.A. 03 LITTON Date JUN 30 1998

TEST DATA SHEET 7.5
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036AH/A
SERIAL NUMBER: 85027
QUAL TEST N/A
AESD 1336610- 6
ACCEPT TEST ✓

Temperature Testing at T=30°C, Ref. Test Para. 5.2.5.3

SPECIFICATION	MEASUREMENT AT T=30° ±1°C	LIMIT
Measurement at Vop=10 VDC		
Temperature	30 °C	30° ± 1°C
Input Voltage	10 VDC	10.0 ± 0.2 VDC
Input Current	188 mA	Table IIIB
Input Power, P_{diss}	1.88 W DC	Pdiss max
Frequency, $f_{30°C}$	54.40053 GHz	Table IIIB
RF Output Power, $P_{30°C}$	11.9 dBm	12 to 17 dBm
Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.3		
Measurement at 9.5 VDC or at 9.5 VDC		
Temperature	30 °C	Table IIIB
Input Voltage	9.5 VDC	9.5 VDC or Para. 5.2.3.2
Input Current	186 mA	Table IIIB
Frequency, f_{meas}	54.40053 GHz	Table IIIB
RF Output Power, P_{meas}	11.9 dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC		
Temperature	30 °C	Table IIIB
Input Voltage	10.5 VDC	10.5 VDC or Para. 5.2.3.3
Input Current	186 mA	Table IIIB
Frequency, f_{meas}	54.40053 GHz	Table IIIB
RF Output Power, P_{meas}	11.9 dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{30°C}$:

Δf_V at 9.5 VDC or at 9.5 VDC = 0 MHz
Δf_V at 10.5 VDC or at 10.5 VDC = 0 MHz
Δf_T at 10.0 VDC ($=f_{30°C} - f_{Tnom}$) = 0.49 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{30°C}$:

ΔP_V at 9.5 VDC or at 9.5 VDC = 0 dB
ΔP_V at 10.5 VDC or at 10.5 VDC = 0 dB
ΔP_T at 10.0 VDC ($=P_{30°C} - P_{Tnom}$) = 0.2 dB
-0.1

Accept ✓ Reject

Test Performed by 83 Date 6-17-98
Litton Q.A. LITTON M 60 Date JUN 3 0 1998

LITTON
Solid State

TEST DATA SHEET 7.6
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AH/A

SERIAL NUMBER: 85027

QUAL TEST N/A

AESD 1336610- 6

ACCEPT TEST ✓

Temperature Extreme Testing at Tmax, Ref. Test Para. 5.2.5.4

SPECIFICATION	MEASUREMENT AT Tmax ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	187	mA	Table IIIB
Input Power, P_{diss}	1.87	W DC	Pdiss max
Frequency, f_{Tmax}	54.40133	GHz	Table IIIB
RF Output Power, P_{Tmax}	11.7	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.4

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	186	mA	Table IIIB
Frequency, f_{meas}	54.40131	GHz	Table IIIB
RF Output Power, P_{meas}	11.7	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	186	mA	Table IIIB
Frequency, f_{meas}	54.40132	GHz	Table IIIB
RF Output Power, P_{meas}	11.7	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmax}$:

Δf_V at 9.5 VDC or at 9.5 VDC = -0.02 MHz

Δf_V at 10.5 VDC or at 10.5 VDC = -0.01 MHz

Δf_T at 10.0V ($=f_{Tmax} - f_{Tnom}$) = 1.27 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$:

ΔP_V at 9.5 VDC or at 9.5 VDC = 0 dB

ΔP_V at 10.5 VDC or at 10.5 VDC = 0 dB

ΔP_T at 10.0 VDC ($=P_{Tmax} - P_{Tnom}$) = -0.3 dB

Accept ✓ Reject

Test Performed by 83 Date 6-17-98

Litton Q.A. LITTC Date JUN 3 0 1998

LITTON
Solid State

TEST DATA SHEET 7.7
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AH /A
AESD 1336610- 6
SERIAL NUMBER: 85027
QUAL TEST N/A
ACCEPT TEST ✓

Power Supply Immunity, Ref. Test Para. 5.2.4

SPECIFICATION	MEASUREMENT AT Tnom ±1°C		LIMIT
Initial Measurement			
Temperature	22	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	188	mA	Table IIIB
Input Power	1.88	W DC	Pdiss max
Frequency (f_{Tnom})	54.39996	GHz	Table IIIB
RF Output Power	12.0	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	-.04	MHz	

Performance After Short Circuit on Power Supply: Ref Test Para 5.2.4.2

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	188	mA	Table IIIB
Input Power	1.88	W DC	Pdiss max
Frequency	54.39984	GHz	Table IIIB
RF Output Power	12.0	dBm	12 to 17 dBm

Over Voltage: Ref Test Para 5.2.4.3

Overvoltage Input Voltage	28	VDC	+28V

Performance After Input Overvoltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	188	mA	Table IIIB
Input Power	1.88	W DC	Pdiss max
Frequency	54.39984	GHz	Table IIIB
RF Output Power	12.0	dBm	12 to 17 dBm

Reverse Polarity: Ref Test Para 5.2.4.4

Reverse Input Voltage	-10	VDC	-10.0 ± 0.2 VDC

Performance After Reverse Input Voltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	188	mA	Table IIIB
Input Power	1.88	W DC	Pdiss max
Frequency, f_{Tnom}	54.39982	GHz	Table IIIB
RF Output Power	12.0	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	-.18	MHz	

Accept ✓ Reject ____
Test Performed by SB Date 6-17-98
Litton Q.A. LITTON Date JUN 3 0 1998

LITTON
Solid State

TEST DATA SHEET # 7.22A
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AH/A
SERIAL NUMBER: 85027
QUAL TEST N/A
AESD 1336610- 6
ACCEPT TEST ✓

Frequency and Power Hysteresis: Ref Test Para. 5.8

TEST DESCRIPTION			LIMITS
1. Initial Performance at Tnom ± 1°C			
Temperature	22	°C	Tnom ± 1°C
Frequency, f_{Tnom}	54.40004	GHz	Table IIIB
RF Output Power, P_{Tnom}	12.0	dBm	12 to 17 dBm
Input Voltage, V_B	10	VDC	10 ± 0.2 VDC
Input Current, I_B	188	mA	Table IIIB
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	.04	MHz	
2. Performance at Tnom ± 1°C after +60°C soak.			
Temperature	22	°C	Tnom ± 1°C
Frequency, f_{meas}	54.40002	GHz	Table IIIB
RF Output Power, P_{meas}	12.0	dBm	12 to 17 dBm
Input Voltage	10	VDC	V_B ± .005 VDC
Input Current	188	mA	Table IIIB
3. Performance at Tnom ± 1°C after -30°C soak.			
Temperature	22	°C	Tnom ± 1°C
Frequency, f_{meas}	54.39997	GHz	Table IIIB
RF Output Power, P_{meas}	12.0	dBm	12 to 17 dBm
Input Voltage	10	VDC	V_B ± .005 VDC
Input Current	188	mA	Table IIIB

Calculate frequency variation, $\Delta f_H = f_{meas} - f_{Tnom}$:
Δf_H after 60°C soak = -0.02 MHz
Δf_H after -30°C soak = -0.07 MHz

Calculate RF output power variation, $\Delta P_H = P_{meas} - P_{Tnom}$:
ΔP_H = after 60°C soak = 0 dB
ΔP_H = after -30°C soak = 0 dB

Accept ✓ Reject
Test Performed by SB Date 6-17-98
Litton Q.A. LITTON Date JUN 30 1998

LITTON
Solid State

TEST DATA SHEET 7.23A
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AH/A
SERIAL NUMBER: 85027
QUAL TEST N/A
AESD 1336610- 6
ACCEPT TEST ✓

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION		LIMITS
Initial Measurement. Ref Test Par. 5.9.1		
Temperature	22 °C	24°C ± 5°C
Frequency	54.39985 GHz	Table IIIB
RF Output Power	12.0 dBm	12 to 17 dBm
Input Voltage	10 VDC	10 ± 0.2 VDC
Input Current	188 mA	Table IIIB
Reference test. Ref. Test Para. 5.9.3		
Frequency, f_{Ref}	54.39993 GHz	Table IIIB
RF Output Power, P_{Ref}	-6.9 dBm	
Load Pulling Test. Ref. Test Para. 5.9.4		
Maximum Frequency, f_{meas}	54.39994 GHz	Table IIIB
Minimum Frequency, f_{meas}	54.39992 GHz	Table IIIB
Maximum RF Output Power P_{meas}	-6.3 dBm	
Minimum RF Output Power, P_{meas}	-7.3 dBm	

Calculate maximum positive (f_{meas} is greater than f_{Ref}) and negative (f_{meas} is less than f_{Ref}) frequency variation. $\Delta f_L = f_{meas} - f_{Ref}$.

Maximum Positive Δf_L = .01 MHz
Maximum Negative Δf_L = -.01 MHz

Calculate maximum positive (P_{meas} is greater than P_{Ref}) and negative (P_{meas} is less than P_{Ref}) RF Output Power Variation, $\Delta P_L = P_{meas} - P_{Ref}$.

Maximum Positive ΔP_L = 0.6 dB
Maximum Negative ΔP_L = -0.4 dB

Accept ✓ Reject ______

Test Performed by ______ Date 6-18-98
Litton Q.A. ______ Date JUN 30 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 60 OF 68
56348	A	1300823	B3	

TEST DATA SHEET 7.23B
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE9036AH/A
SERIAL NUMBER: 85027
QUAL TEST N/A
AESD 1336610-6
ACCEPT TEST ✓

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION — LIMITS

Output Open and Short. Ref. Test Para. 5.9.5

Temperature	22	°C	24°C ± 5°C
Frequency:	54.39989	GHz	Table IIIB
RF Output Power:	12.0	dBm	12 to 17 dBm
Input Voltage	10.0	VDC	10 ± 0.2 VDC
Input Current:	188	mA	Table IIIB
Results:	✓	Acceptable	No Damage or Degradation

Calculate maximum Frequency Accuracy (both positive and negative),
$\Delta f_{acc} = \Delta f_S$ (Use worst-case Δf_S from 7.2, 7.7, and 7.22A) + Δf_H (from 7.22A) + Δf_L (from 7.23A):

Maximum Δf_{acc} =	0.05	MHz (Positive)	Table IIIB
	-0.12	MHz (Negative)	Table IIIB

Calculate maximum Short-term Frequency Stability (both positive and negative),
$\Delta f_{V+T} = \Delta f_V + \Delta f_T$ (Use worst-case Δf_V and Δf_T from 7.2 thru 7.6):

Maximum Δf_{V+T} =	1.3	MHz (Positive)	Table IIIB
	-1.29	MHz (Negative)	Table IIIB

Calculate maximum overall RF Output Power Stability (both positive and negative),
$\Delta P_{OV} = \Delta P_V \div \Delta P_T$ (Use worst-case ΔP_V and ΔP_T from 7.2 thru 7.6) + ΔP_H (from 7.22A) + ΔP_L (from 7.23A):

Maximum ΔP_{OV} =	0.8	dB (Positive)	1.0 dB
	-0.7	dB (Negative)	-1.0 dB

Accept ✓ Reject

Test Performed by SB Date 6-19-98

Litton Q.A. Date JUN 30 1998

Report No. 11413
February, 1999

Channel 7 LO

DRO (P/N: 1336610-7, S/N: 85020)

TEST DATA SHEET 7.2
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AJ/A
SERIAL NUMBER: 85020 QUAL TEST N/A

AESD 1336610- 7
ACCEPT TEST ✓

Basic Electrical Test: Ref. Test Para. 5.2.2

SPECIFICATION	MEASUREMENT AT Tnom =1°C	LIMIT
Measurement at Vop=10 VDC		
Temperature	22 °C	Table IIIB
Input Voltage	10 VDC	10.0 ± 0.2 VDC
Input Current	189 mA	Table IIIB
Input Power, P_{diss}	1.89 W DC	P_{diss} max
Frequency, f_{Tnom}	54.93930 GHz	Table IIIB
RF Output Power, P_{Tnom}	12.8 dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	-~~0~~0.7 MHz	

Frequency and RF Output Power Variation With Voltage. Ref. Test Para 5.2.3

Measurement at 9.5 VDC or at 9.5 VDC		
Temperature	22 °C	Table IIIB
Input Voltage	9.5 VDC	9.5 VDC or Para. 5.2.3.2
Input Current	187 mA	Table IIIB
Frequency, f_{meas}	54.93930 GHz	Table IIIB
RF Output Power, P_{meas}	12.8 dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC		
Temperature	22 °C	Table IIIB
Input Voltage	10.5 VDC	10.5 VDC or Para. 5.2.3.3
Input Current	187 mA	Table IIIB
Frequency, f_{meas}	54.93931 GHz	Table IIIB
RF Output Power, P_{meas}	12.8 dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tnom}$,

Δf_V at 9.5 VDC or at 9.5 VDC = 0 MHz
Δf_V at 10.5 VDC or at 10.5 VDC = 0.01 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$,

ΔP_V at 9.5 VDC or at 9.5 VDC = 0 dB
ΔP_V at 10.5 VDC or at 10.5 VDC = 0 dB

Accept ✓ Reject ______

Test Performed by VN Date 6-11-98
Litton QA LITTON Date JUN 12 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 38 OF 68
56348	A	1300823	B3	

TEST DATA SHEET 7.3
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AJ/A
SERIAL NUMBER: 85020
QUAL TEST N/A
AESD 1336610- 7
ACCEPT TEST ✓

Temperature Testing at T=10°C. Ref. Test Para. 5.2.5.1

SPECIFICATION	MEASUREMENT AT T=10° ±1°C	LIMIT
Measurement at Vop=10 VDC		
Temperature	10 °C	10° ± 1°C
Input Voltage	10 VDC	10.0 ± 0.2 VDC
Input Current	188 mA	Table IIIB
Input Power, P_{diss}	1.88 W DC	Pdiss max
Frequency, $f_{10°C}$	54.93967 GHz	Table IIIB
RF Output Power, $P_{10°C}$	12.8 dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.1

Measurement at 9.5 VDC or at 9.5 VDC		
Temperature	10 °C	Table IIIB
Input Voltage	9.5 VDC	9.5 VDC or Para. 5.2.3.2
Input Current	186 mA	Table IIIB
Frequency, f_{meas}	54.93967 GHz	Table IIIB
RF Output Power, P_{meas}	12.8 dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC		
Temperature	10 °C	Table IIIB
Input Voltage	10.5 VDC	10.5 VDC or Para. 5.2.3.3
Input Current	186 mA	Table IIIB
Frequency, f_{meas}	54.93967 GHz	Table IIIB
RF Output Power, P_{meas}	12.8 dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{10°C}$:

Δf_V at 9.5 VDC or at 9.5 VDC = 0 MHz
Δf_V at 10.5 VDC or at 10.5 VDC = 0 MHz
Δf_T at 10.0 VDC ($=f_{10°C} - f_{Tnom}$) = 0.37 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{10°C}$:

ΔP_V at 9.5 VDC or at 9.5 VDC = 0 dB
ΔP_V at 10.5 VDC or at 10.5 VDC = 0 dB
ΔP_T at 10.0 VDC ($=P_{10°C} - P_{Tnom}$) = 0 dB

Accept ✓ Reject

Test Performed by VN Date 6-11-98
Litton Q.A. LITTON M 60 Date JUN 1 2 1998

LITTON
Solid State

TEST DATA SHEET 7.4
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AJ/A
SERIAL NUMBER: 85020
QUAL TEST N/A
AESD 1336610- 7
ACCEPT TEST ✓

Temperature Extreme Testing at Tmin. Ref. Test Para. 5.2.5.2

SPECIFICATION	MEASUREMENT AT Tmin ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	-1	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	187	mA	Table IIIB
Input Power. P_{diss}	1.87	W DC	Pdiss max
Frequency, f_{Tmin}	54.94001	GHz	Table IIIB
RF Output Power. P_{Tmin}	12.8	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage. Ref. Test Para 5.2.5.2

Measurement at 9.5 VDC or at 9.5 VDC

Temperature	-1	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	184	mA	Table IIIB
Frequency, f_{meas}	54.94003	GHz	Table IIIB
RF Output Power. P_{meas}	12.8	dBm	12 to 17 dBm

Measurement at 10.5 VDC or at 10.5 VDC

Temperature	-1	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	185	mA	Table IIIB
Frequency, f_{meas}	54.94004	GHz	Table IIIB
RF Output Power. P_{meas}	12.8	dBm	12 to 17 dBm

Calculate Frequency Variation. $\Delta f_V = f_{meas} - f_{Tmin}$:

Δf_V at 9.5 VDC or at 9.5 VDC =	0.02	MHz
Δf_V at 10.5 VDC or at 10.5 VDC =	0.03	MHz
Δf_T at 10.0 VDC (=f_{Tmin} - f_{Tnom})	0.71	MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tmin}$:

ΔP_V at 9.5 VDC or at 9.5 VDC =	0	dB
ΔP_V at 10.5 VDC or at 10.5 VDC =	0	dB
ΔP_T at 10.0 VDC (=P_{Tmin} - P_{Tnom}) =	0	dB

Accept ✓ Reject

Test Performed by VN Date 6-11-98
Litton Q.A. LITTON Date JUN 12 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 40 OF 68
56348	A	1300823	B3	

TEST DATA SHEET 7.5
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AJ/A
SERIAL NUMBER: 85020
QUAL TEST N/A
AESD 1336610- 7
ACCEPT TEST ✓

Temperature Testing at T=30°C, Ref. Test Para. 5.2.5.3

SPECIFICATION	MEASUREMENT AT T=30° ±1°C	LIMIT
Measurement at Vop=10 VDC		
Temperature	30 °C	30° ± 1°C
Input Voltage	10 VDC	10.0 ± 0.2 VDC
Input Current	188 mA	Table IIIB
Input Power, P_{diss}	1.88 W DC	Pdiss max
Frequency, $f_{30°C}$	54.93928 GHz	Table IIIB
RF Output Power, $P_{30°C}$	12.8 dBm	12 to 17 dBm
Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.3		
Measurement at 9.5 VDC or at 9.5 VDC		
Temperature	30 °C	Table IIIB
Input Voltage	9.5 VDC	9.5 VDC or Para. 5.2.3.2
Input Current	186 mA	Table IIIB
Frequency, f_{meas}	54.93928 GHz	Table IIIB
RF Output Power, P_{meas}	12.8 dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC		
Temperature	30 °C	Table IIIB
Input Voltage	10.5 VDC	10.5 VDC or Para. 5.2.3.3
Input Current	187 mA	Table IIIB
Frequency, f_{meas}	54.93927 GHz	Table IIIB
RF Output Power, P_{meas}	12.8 dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{30°C}$:

Δf_V at 9.5 VDC or at 9.5 VDC = 0 MHz
Δf_V at 10.5 VDC or at 10.5 VDC = –0.01 MHz
Δf_T at 10.0 VDC ($=f_{30°C} - f_{Tnom}$) = - 0.02 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{30°C}$:

ΔP_V at 9.5 VDC or at 9.5 VDC = 0 dB
ΔP_V at 10.5 VDC or at 10.5 VDC = 0 dB
ΔP_T at 10.0 VDC ($=P_{30°C} - P_{Tnom}$) = 0 dB

Accept ✓ Reject

Test Performed by VN Date 6-11-98
Litton Q.A. LITTON 60 Date JUN 12 1998

LITTON
Solid State

TEST DATA SHEET 7.6
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AJ/A
SERIAL NUMBER: 85020
QUAL TEST N/A
AESD 1336610- 7
ACCEPT TEST ✓

Temperature Extreme Testing at Tmax. Ref. Test Para. 5.2.5.4

SPECIFICATION	MEASUREMENT AT Tmax ±1°C	LIMIT
Measurement at Vop=10 VDC		
Temperature	44 °C	Table IIIB
Input Voltage	10 VDC	10.0 ± 0.2 VDC
Input Current	189 mA	Table IIIB
Input Power, P_{diss}	1.89 W DC	Pdiss max
Frequency, f_{Tmax}	54.93936 GHz	Table IIIB
RF Output Power, P_{Tmax}	12.7 dBm	12 to 17 dBm
Frequency and RF Output Power Variation With Voltage. Ref. Test Para 5.2.5.4		
Measurement at 9.5 VDC or at 9.5 VDC		
Temperature	44 °C	Table IIIB
Input Voltage	9.5 VDC	9.5 VDC or Para 5.2.3.2
Input Current	187 mA	Table IIIB
Frequency, f_{meas}	54.93934 GHz	Table IIIB
RF Output Power, P_{meas}	12.7 dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC		
Temperature	44 °C	Table IIIB
Input Voltage	10.5 VDC	10.5 VDC or Para 5.2.3.3
Input Current	188 mA	Table IIIB
Frequency, f_{meas}	54.93934 GHz	Table IIIB
RF Output Power, P_{meas}	12.7 dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmax}$:
Δf_V at 9.5 VDC or at 9.5 VDC = -0.02 MHz
Δf_V at 10.5 VDC or at 10.5 VDC = -0.02 MHz
Δf_T at 10.0V ($=f_{Tmax} - f_{Tnom}$) = 0.06 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$:
ΔP_V at 9.5 VDC or at 9.5 VDC = 0 dB
ΔP_V at 10.5 VDC or at 10.5 VDC = 0 dB
ΔP_T at 10.0 VDC ($=P_{Tmax} - P_{Tnom}$) = -0.1 dB

Accept ✓ Reject

Test Performed by VK Date 6-11-98
Litton Q.A. LITTON M 60 Date JUN 12 1998

TEST DATA SHEET 7.7
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AJ/A AESD 1336610- 7
SERIAL NUMBER: 85020 QUAL TEST N/A ACCEPT TEST ✓

Power Supply Immunity, Ref. Test Para. 5.2.4

SPECIFICATION	MEASUREMENT AT Tnom ±1°C		LIMIT
Initial Measurement			
Temperature	22	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDG
Input Current	189	mA	Table IIIB
Input Power	1.89	W DC	Pdiss max
Frequency (f_{Tnom})	54.93956	GHz	Table IIIB
RF Output Power	12.7	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	− 0.44	MHz	

Performance After Short Circuit on Power Supply: Ref Test Para 5.2.4.2

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	189	mA	Table IIIB
Input Power	1.89	W DC	Pdiss max
Frequency	54.93956	GHz	Table IIIB
RF Output Power	12.7	dBm	12 to 17 dBm

Over Voltage: Ref Test Para 5.2.4.3

Overvoltage Input Voltage	28	VDC	-28V

Performance After Input Overvoltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	189	mA	Table IIIB
Input Power	1.89	W DC	Pdiss max
Frequency	54.93957	GHz	Table IIIB
RF Output Power	12.7	dBm	12 to 17 dBm

Reverse Polarity: Ref Test Para 5.2.4.4

Reverse Input Voltage	−10	VDC	-10.0 ± 0.2 VDC

Performance After Reverse Input Voltage

Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	189	mA	Table IIIB
Input Power	1.89	W DC	Pdiss max
Frequency, f_{Tnom}	54 93958	GHz	Table IIIB
RF Output Power	12.7	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	− 0.42	MHz	

Test Performed by VJ
Litton Q.A.

Accept ✓ Reject
Date 6-11-98
Date JUN 12 [illegible]

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 43 OF 68
56348	A	1300823	B3	

TEST DATA SHEET 7.22A
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AJ/A
SERIAL NUMBER: 85020
QUAL TEST N/A
AESD 1336610- 7
ACCEPT TEST ✓

Frequency and Power Hysteresis: Ref Test Para. 5.8

TEST DESCRIPTION			LIMITS
1. Initial Performance at Tnom ± 1°C			
Temperature	22	°C	Tnom ± 1°C
Frequency, f_{Tnom}	54.93930	GHz	Table IIIB
RF Output Power, P_{Tnom}	12.8	dBm	12 to 17 dBm
Input Voltage, V_B	10	VDC	10 ± 0.2 VDC
Input Current, I_B	189	mA	Table IIIB
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	-0.7	MHz	
2. Performance at Tnom ± 1°C after +60°C soak.			
Temperature	22	°C	Tnom ± 1°C
Frequency, f_{meas}	54.93956	GHz	Table IIIB
RF Output Power, P_{meas}	12.8	dBm	12 to 17 dBm
Input Voltage	10	VDC	V_B ± .005 VDC
Input Current	189	mA	Table IIIB
3. Performance at Tnom ± 1°C after -30°C soak.			
Temperature	22	°C	Tnom ± 1°C
Frequency, f_{meas}	54.93944	GHz	Table IIIB
RF Output Power, P_{meas}	127	dBm	12 to 17 dBm
Input Voltage	10	VDC	V_B ± .005 VDC
Input Current	188	mA	Table IIIB

Calculate frequency variation, $\Delta f_H = f_{meas} - f_{Tnom}$:
Δf_H after 60°C soak = 0.26 MHz
Δf_H after -30°C soak = 0.11 MHz

Calculate RF output power variation, $\Delta P_H = P_{meas} - P_{Tnom}$:
ΔP_H = after 60°C soak = 0 dB
ΔP_H = after -30°C soak = -0.1 dB

Accept ✓ Reject

Test Performed by VN Date 6-11-98
Litton Q.A. Date JUN 16 1998

LITTON

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 58 OF 68
56348	A	1300823	B3	

TEST DATA SHEET 7.23A
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AJ/A
SERIAL NUMBER: 85020 QUAL TEST N/A
AESD 1336610- 7
ACCEPT TEST ✓

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION			LIMITS
Initial Measurement. Ref Test Par. 5.9.1			
Temperature	23	°C	24°C ± 5°C
Frequency	54.93982	GHz	Table IIIB
RF Output Power	12.9	dBm	12 to 17 dBm
Input Voltage	10	VDC	10 ± 0.2 VDC
Input Current	189	mA	Table IIIB
Reference test. Ref. Test Para. 5.9.3			
Frequency, f_{Ref}	54.93982	GHz	Table IIIB
RF Output Power, P_{Ref}	- 13.0	dBm	
Load Pulling Test. Ref. Test Para. 5.9.4			
Maximum Frequency, f_{meas}	54.93983	GHz	Table IIIB
Minimum Frequency, f_{meas}	54.93982	GHz	Table IIIB
Maximum RF Output Power P_{meas}	-12.4	dBm	
Minimum RF Output Power, P_{meas}	-13.3	dBm	

Calculate maximum positive (f_{meas} is greater than f_{Ref}) and negative (f_{meas} is less than f_{Ref}) frequency variation. $\Delta f_L = f_{meas} - f_{Ref}$:

Maximum Positive Δf_L = 0.01 MHz
Maximum Negative Δf_L = 0 MHz

Calculate maximum positive (P_{meas} is greater than P_{Ref}) and negative (P_{meas} is less than P_{Ref}) RF Output Power Variation. $\Delta P_L = P_{meas} - P_{Ref}$:

Maximum Positive ΔP_L = 0.6 dB
Maximum Negative ΔP_L = - 0.3 dB

Accept ✓ Reject

Test Performed by DH Date 6-11-98
Litton Q.A. Date JUN 16 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 60 OF 68
56348	A	1300823	B3	

TEST DATA SHEET 7.23B
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AJ/A
SERIAL NUMBER: 85020
QUAL TEST N/A
AESD 1336610- 7
ACCEPT TEST ✓

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION			LIMITS
Output Open and Short. Ref. Test Para. 5.9.5			
Temperature	23	°C	24°C ± 5°C
Frequency:	54.93982	GHz	Table IIIB
RF Output Power:	12.9	dBm	12 to 17 dBm
Input Voltage	10	VDC	10 ± 0.2 VDC
Input Current:	189	mA	Table IIIB
Results:	✓	Acceptable	No Damage or Degradation

Calculate maximum Frequency Accuracy (both positive and negative),
$\Delta f_{acc} = \Delta f_S$ (Use worst-case Δf_S from 7.2, 7.7, and 7.22A) + Δf_H (from 7.22A) + Δf_L (from 7.23A):

Maximum Δf_{acc} =	0.27	MHz (Positive)	Table IIIB
	-0.7	MHz (Negative)	Table IIIB

Calculate maximum Short-term Frequency Stability (both positive and negative),
$\Delta f_{V+T} = \Delta f_V + \Delta f_T$ (Use worst-case Δf_V and Δf_T from 7.2 thru 7.6):

Maximum Δf_{V+T} =	0.74	MHz (Positive)	Table IIIB
	-0.02	MHz (Negative)	Table IIIB

Calculate maximum overall RF Output Power Stability (both positive and negative).
$\Delta P_{OV} = \Delta P_V + \Delta P_T$ (Use worst-case ΔP_V and ΔP_T from 7.2 thru 7.6) + ΔP_H (from 7.22A) + ΔP_L (from 7.23A):

Maximum ΔP_{OV} =	0.6	dB (Positive)	1.0 dB
	-0.5	dB (Negative)	-1.0 dB

Accept ✓ Reject

Test Performed by DM Date 6-11-98

JUN 1 6 1998

Litton Q.A. 09 Date

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 61 OF 68
56348	A	1300823	B3	

Report No. 11413
February, 1999

Channel 8 LO

DRO (P/N: 1336610-8, S/N: 85078)

TEST DATA SHEET 7.2
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036AK/A
AESD 1336610- 8
SERIAL NUMBER: 85078
QUAL TEST N/A
ACCEPT TEST ✓

Basic Electrical Test; Ref. Test Para. 5.2.2

SPECIFICATION	MEASUREMENT AT Tnom ±1°C	LIMIT
Measurement at Vop=10 VDC		
Temperature	22 °C	Table IIIB
Input Voltage	10 VDC	10.0 ± 0.2 VDC
Input Current	181 mA	Table IIIB
Input Power, P_{diss}	1.81 W DC	P_{diss} max
Frequency, f_{Tnom}	55.50042 GHz	Table IIIB
RF Output Power, P_{Tnom}	13.3 dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	1.42 MHz	

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.3

Measurement at 9.5 VDC or at 9.5 VDC		
Temperature	22 °C	Table IIIB
Input Voltage	9.5 VDC	9.5 VDC or Para. 5.2.3.2
Input Current	179 mA	Table IIIB
Frequency, f_{meas}	55.50042 GHz	Table IIIB
RF Output Power, P_{meas}	13.3 dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC		
Temperature	22 °C	Table IIIB
Input Voltage	10.5 VDC	10.5 VDC or Para. 5.2.3.3
Input Current	179 mA	Table IIIB
Frequency, f_{meas}	55.50041 GHz	Table IIIB
RF Output Power, P_{meas}	13.3 dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tnom}$,

Δf_V at 9.5 VDC or at 9.5 VDC = 0 MHz
Δf_V at 10.5 VDC or at 10.5 VDC = −0.01 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$,

ΔP_V at 9.5 VDC or at 9.5 VDC = 0 dB
ΔP_V at 10.5 VDC or at 10.5 VDC = 0 dB

Accept ✓ Reject ____

Test Performed by SB Date 6-19-98
Litton QA Date JUN 30 1998

LITTC
M 6

TEST DATA SHEET 7.3
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AK/A
SERIAL NUMBER: 8 5078
QUAL TEST N/A
AESD 1336610- 8
ACCEPT TEST ✓

Temperature Testing at T=10°C, Ref. Test Para. 5.2.5.1

SPECIFICATION	MEASUREMENT AT T=10° ±1°C	LIMIT
Measurement at Vop=10 VDC		
Temperature	10 °C	10° ± 1°C
Input Voltage	10 VDC	10.0 ± 0.2 VDC
Input Current	180 mA	Table IIIB
Input Power, P_{diss}	1.80 W DC	Pdiss max
Frequency, $f_{10°C}$	55.50046 GHz	Table IIIB
RF Output Power, $P_{10°C}$	13.3 dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.1

Measurement at 9.5 VDC or at 9.5 VDC		
Temperature	10 °C	Table IIIB
Input Voltage	9.5 VDC	9.5 VDC or Para. 5.2.3.2
Input Current	177 mA	Table IIIB
Frequency, f_{meas}	55.50045 GHz	Table IIIB
RF Output Power, P_{meas}	13.3 dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC		
Temperature	10 °C	Table IIIB
Input Voltage	10.5 VDC	10.5 VDC or Para. 5.2.3.3
Input Current	178 mA	Table IIIB
Frequency, f_{meas}	55.50045 GHz	Table IIIB
RF Output Power, P_{meas}	13.3 dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{10°C}$:

Δf_V at 9.5 VDC or at 9.5 VDC = -0.01 MHz
Δf_V at 10.5 VDC or at 10.5 VDC = -0.01 MHz
Δf_T at 10.0 VDC ($=f_{10°C} - f_{Tnom}$) = +0.04 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{10°C}$:

ΔP_V at 9.5 VDC or at 9.5 VDC = 0 dB
ΔP_V at 10.5 VDC or at 10.5 VDC = 0 dB
ΔP_T at 10.0 VDC ($=P_{10°C} - P_{Tnom}$) = 0 dB

Accept ✓ Reject

Test Performed by SB Date 6-19-98
Litton Q.A. Date JUN 30 1998

TEST DATA SHEET 7.4
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AK/A
SERIAL NUMBER: 85078
QUAL TEST N/A
AESD 1336610- 8
ACCEPT TEST ✓

Temperature Extreme Testing at Tmin, Ref. Test Para. 5.2.5.2

SPECIFICATION	MEASUREMENT AT Tmin ±1°C	LIMIT
Measurement at Vop=10 VDC		
Temperature	-1 °C	Table IIIB
Input Voltage	10 VDC	10.0 ± 0.2 VDC
Input Current	179 mA	Table IIIB
Input Power, P_{diss}	1.79 W DC	Pdiss max
Frequency, f_{Tmin}	55.50030 GHz	Table IIIB
RF Output Power, P_{Tmin}	13.3 dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.2
Measurement at 9.5 VDC or at 9.5 VDC

Temperature	-1 °C	Table IIIB
Input Voltage	9.5 VDC	9.5 VDC or Para 5.2.3.2
Input Current	176 mA	Table IIIB
Frequency, f_{meas}	55.50027 GHz	Table IIIB
RF Output Power, P_{meas}	13.3 dBm	12 to 17 dBm

Measurement at 10.5 VDC or at 10.5 VDC

Temperature	-1 °C	Table IIIB
Input Voltage	10.5 VDC	10.5 VDC or Para 5.2.3.3
Input Current	177 mA	Table IIIB
Frequency, f_{meas}	55.50026 GHz	Table IIIB
RF Output Power, P_{meas}	13.3 dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmin}$:
Δf_V at 9.5 VDC or at 9.5 VDC = -0.03 MHz
Δf_V at 10.5 VDC or at 10.5 VDC = -0.04 MHz
Δf_T at 10.0 VDC (=$f_{Tmin} - f_{Tnom}$) -0.12 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tmin}$:
ΔP_V at 9.5 VDC or at 9.5 VDC = 0 dB
ΔP_V at 10.5 VDC or at 10.5 VDC = 0 dB
ΔP_T at 10.0 VDC (=$P_{Tmin} - P_{Tnom}$) = 0 dB

Accept ✓ Reject

Test Performed by Date 6-19-98
Litton Q.A. LITTON Date JUN 30 1998

TEST DATA SHEET 7.5
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AK/A
SERIAL NUMBER: 85078
QUAL TEST N/A
AESD 1336610- 8
ACCEPT TEST ✓

Temperature Testing at T=30°C, Ref. Test Para. 5.2.5.3

SPECIFICATION	MEASUREMENT AT T=30° ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	30	°C	30° ± 1°C
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	182	mA	Table IIIB
Input Power, P_{diss}	1.82	W DC	Pdiss max
Frequency, $f_{30°C}$	55.50050	GHz	Table IIIB
RF Output Power, $P_{30°C}$	13.2	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.3

Measurement at 9.5 VDC or at 9.5 VDC			
Temperature	30	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para. 5.2.3.2
Input Current	180	mA	Table IIIB
Frequency, f_{meas}	55.50048	GHz	Table IIIB
RF Output Power, P_{meas}	13.2	dBm	12 to 17 dBm
Measurement at 10.5 VDC or at 10.5 VDC			
Temperature	30	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para. 5.2.3.3
Input Current	180	mA	Table IIIB
Frequency, f_{meas}	55.50048	GHz	Table IIIB
RF Output Power, P_{meas}	13.2	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{30°C}$:

Δf_V at 9.5 VDC or at 9.5 VDC = -0.02 MHz
Δf_V at 10.5 VDC or at 10.5 VDC = -0.02 MHz
Δf_T at 10.0 VDC ($=f_{30°C} - f_{Tnom}$) = 0.08 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{30°C}$:

ΔP_V at 9.5 VDC or at ________ VDC = -0- dB
ΔP_V at 10.5 VDC or at ________ VDC = -0- dB
ΔP_T at 10.0 VDC ($=P_{30°C} - P_{Tnom}$) = -0.1 dB

Accept ✓ Reject ________

Test Performed by ________ Date 6-19-98
Litton Q.A. ________ Date JUN 30 1998

TEST DATA SHEET 7.6
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AK/A
AESD 1336610- 8 ✓
SERIAL NUMBER: 85078
QUAL TEST N/A
ACCEPT TEST ✓

Temperature Extreme Testing at Tmax, Ref. Test Para. 5.2.5.4

SPECIFICATION	MEASUREMENT AT Tmax ±1°C		LIMIT
Measurement at Vop=10 VDC			
Temperature	44	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	182	mA	Table IIIB
Input Power, P_{diss}	1.82	W DC	Pdiss max
Frequency, f_{Tmax}	55.50035	GHz	Table IIIB
RF Output Power, P_{Tmax}	13.1	dBm	12 to 17 dBm

Frequency and RF Output Power Variation With Voltage, Ref. Test Para 5.2.5.4

Measurement at 9.5 VDC or at 9.5 VDC

Temperature	44	°C	Table IIIB
Input Voltage	9.5	VDC	9.5 VDC or Para 5.2.3.2
Input Current	181	mA	Table IIIB
Frequency, f_{meas}	55.50034	GHz	Table IIIB
RF Output Power, P_{meas}	13.1	dBm	12 to 17 dBm

Measurement at 10.5 VDC or at 10.5 VDC

Temperature	44	°C	Table IIIB
Input Voltage	10.5	VDC	10.5 VDC or Para 5.2.3.3
Input Current	181	mA	Table IIIB
Frequency, f_{meas}	55.50032	GHz	Table IIIB
RF Output Power, P_{meas}	13.1	dBm	12 to 17 dBm

Calculate Frequency Variation, $\Delta f_V = f_{meas} - f_{Tmax}$:

Δf_V at 9.5 VDC or at 9.5 VDC = -0.01 MHz
Δf_V at 10.5 VDC or at 10.5 VDC = -0.03 MHz
Δf_T at 10.0V ($=f_{Tmax} - f_{Tnom}$) = -0.07 MHz

Calculate RF Output Power Variation, $\Delta P_V = P_{meas} - P_{Tnom}$:

ΔP_V at 9.5 VDC or at 9.5 VDC = -0- dB
ΔP_V at 10.5 VDC or at 10.5 VDC = -0- dB
ΔP_T at 10.0 VDC ($=P_{Tmax} - P_{Tnom}$) = -0.2 dB

Accept ✓ Reject

Test Performed by S3 Date 6-19-98
Litton Q.A. LITTON Date JUN 30 1998

LITTON
Solid State

TEST DATA SHEET 7.7
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AK/A
AESD 1336610-8
SERIAL NUMBER: 85078
QUAL TEST N/A
ACCEPT TEST ✓

Power Supply Immunity, Ref. Test Para. 5.2.4

SPECIFICATION	MEASUREMENT AT Tnom ±1°C		LIMIT
Initial Measurement			
Temperature	22	°C	Table IIIB
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	182	mA	Table IIIB
Input Power	1.82	W DC	Pdiss max
Frequency (f_{Tnom})	55.50064	GHz	Table IIIB
RF Output Power	13.2	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	.64	MHz	
Performance After Short Circuit on Power Supply: Ref Test Para 5.2.4.2			
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	182	mA	Table IIIB
Input Power	1.82	W DC	Pdiss max
Frequency	55.50062	GHz	Table IIIB
RF Output Power	13.2	dBm	12 to 17 dBm
Over Voltage: Ref Test Para 5.2.4.3			
Overvoltage Input Voltage	28	VDC	+28V
Performance After Input Overvoltage			
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	181	mA	Table IIIB
Input Power	1.81	W DC	Pdiss max
Frequency	55.50058	GHz	Table IIIB
RF Output Power	13.3	dBm	12 to 17 dBm
Reverse Polarity: Ref Test Para 5.2.4.4			
Reverse Input Voltage	-10	VDC	-10.0 ± 0.2 VDC
Performance After Reverse Input Voltage			
Input Voltage	10	VDC	10.0 ± 0.2 VDC
Input Current	181	mA	Table IIIB
Input Power	1.81	W DC	Pdiss max
Frequency, f_{Tnom}	55.50055	GHz	Table IIIB
RF Output Power	13.3	dBm	12 to 17 dBm
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	.55	MHz	

Accept ✓ Reject
Test Performed by SG
Date 6-19-98
Litton Q.A. LITTON
Date JUN 30 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 43 OF 68
56348	A	1300823	B3	

TEST DATA SHEET 7.22A
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LSE 9036 AK/A
SERIAL NUMBER: 85078
QUAL TEST N/A
AESD 1336610- 8
ACCEPT TEST ✓

Frequency and Power Hysteresis: Ref Test Para. 5.8

TEST DESCRIPTION		LIMITS
1. Initial Performance at Tnom ± 1°C		
Temperature	22 °C	Tnom ± 1°C
Frequency, f_{Tnom}	55.50069 GHz	Table IIIB
RF Output Power, P_{Tnom}	13.2 dBm	12 to 17 dBm
Input Voltage, V_B	10 VDC	10 ± 0.2 VDC
Input Current, I_B	182 mA	Table IIIB
Frequency Setting Accuracy, Δf_S (= f_{Tnom}-F_o)	0.69 MHz	
2. Performance at Tnom ± 1°C after +60°C soak.		
Temperature	22 °C	Tnom ± 1°C
Frequency, f_{meas}	55499801 GHz	Table IIIB
RF Output Power, P_{meas}	13.2 dBm	12 to 17 dBm
Input Voltage	10 VDC	V_B ± .005 VDC
Input Current	184 mA	Table IIIB
3. Performance at Tnom ± 1°C after -30°C soak.		
Temperature	22 °C	Tnom ± 1°C
Frequency, f_{meas}	55.50068 GHz	Table IIIB
RF Output Power, P_{meas}	13.3 dBm	12 to 17 dBm
Input Voltage	10 VDC	V_B ± .005 VDC
Input Current	181 mA	Table IIIB

Calculate frequency variation, $\Delta f_H = f_{meas} - f_{Tnom}$:
Δf_H after 60°C soak = -0.89 MHz
Δf_H after -30°C soak = -0.01 MHz

Calculate RF output power variation, $\Delta P_H = P_{meas} - P_{Tnom}$:
ΔP_H = after 60°C soak = 0 dB
ΔP_H = after -30°C soak = 0.1 dB

Accept ✓ Reject
Test Performed by JED Date 6-26-98
Litton Q.A. LITTON 60 Date JUN 30 1998

TEST DATA SHEET 7.23A
FUNCTIONAL PERFORMANCE TESTS
INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 7036 AK/A
SERIAL NUMBER: 85078
QUAL TEST N/A
AESD 1336610- 8
ACCEPT TEST ✓

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION			LIMITS
Initial Measurement. Ref Test Par. 5.9.1			
Temperature	22	°C	24°C ± 5°C
Frequency	5550046	GHz	Table IIIB
RF Output Power	13.2	dBm	12 to 17 dBm
Input Voltage	10.0	VDC	10 ± 0.2 VDC
Input Current	182	mA	Table IIIB
Reference test. Ref. Test Para. 5.9.3			
Frequency, f_{Ref}	5550007	GHz	Table IIIB
RF Output Power, P_{Ref}	-1.7	dBm	
Load Pulling Test. Ref. Test Para. 5.9.4			
Maximum Frequency, f_{meas}	5550008	GHz	Table IIIB
Minimum Frequency, f_{meas}	5550006	GHz	Table IIIB
Maximum RF Output Power P_{meas}	-1.2	dBm	
Minimum RF Output Power, P_{meas}	-2.1	dBm	

Calculate maximum positive (f_{meas} is greater than f_{Ref}) and negative (f_{meas} is less than f_{Ref}) frequency variation, $\Delta f_L = f_{meas} - f_{Ref}$:

Maximum Positive Δf_L = 0.01 MHz
Maximum Negative Δf_L = -0.01 MHz

Calculate maximum positive (P_{meas} is greater than P_{Ref}) and negative (P_{meas} is less than P_{Ref}) RF Output Power Variation, $\Delta P_L = P_{meas} - P_{Ref}$:

Maximum Positive ΔP_L = 0.5 dB
Maximum Negative ΔP_L = - 0.4 dB

Accept ✓ Reject

Test Performed by JED Date 6-27-98
Litton Q.A. LITTON QA 08 Date JUN 3 0 1998

CODE IDENT NO.	SIZE	NUMBER	REV	SHEET 60 OF 68
56348	A	1300823	B3	

LITTON
Solid State

TEST DATA SHEET 7.23B
FUNCTIONAL PERFORMANCE TESTS

INITIAL DATA SET N/A FINAL DATA SET ✓

LITTON TYPE LS E 9036 AK/A
AESD 1336610- 8
SERIAL NUMBER: 85078
QUAL TEST N/A
ACCEPT TEST ✓

Frequency Pulling and Load VSWR 2.5:1 max. all phases. Ref Test Para. 5.9

TEST DESCRIPTION			LIMITS
Output Open and Short. Ref. Test Para. 5.9.5			
Temperature	22	°C	24°C ± 5°C
Frequency:	555007	GHz	Table IIIB
RF Output Power:	13.3	dBm	12 to 17 dBm
Input Voltage	10.0	VDC	10 ± 0.2 VDC
Input Current:	181	mA	Table IIIB
Results:	✓	Acceptable	No Damage or Degradation

Calculate maximum Frequency Accuracy (both positive and negative),
$\Delta f_{acc} = \Delta f_S$ (Use worst-case Δf_S from 7.2, 7.7, and 7.22A) + Δf_H (from 7.22A) + Δf_L (from 7.23A):

Maximum Δf_{acc} =	0.68	MHz (Positive)	Table IIIB
	- 0.10	MHz (Negative)	Table IIIB

Calculate maximum Short-term Frequency Stability (both positive and negative),
$\Delta f_{V+T} = \Delta f_V + \Delta f_T$ (Use worst-case Δf_V and Δf_T from 7.2 thru 7.6):

Maximum Δf_{V+T} =	0.12	MHz (Positive)	Table IIIB
	- 1.01	MHz (Negative)	Table IIIB

Calculate maximum overall RF Output Power Stability (both positive and negative),
$\Delta P_{OV} = \Delta P_V + \Delta P_T$ (Use worst-case ΔP_V and ΔP_T from 7.2 thru 7.6) + ΔP_H (from 7.22A) + ΔP_L (from 7.23A):

Maximum ΔP_{OV} =	0.5	dB (Positive)	1.0 dB
	- 0.7	dB (Negative)	-1.0 dB

Accept ✓ Reject

Test Performed by JED Date 6-27-98

Litton Q.A. Date JUN 30 1998

LITTON
160

Report No. 11413
February, 1999

Channels 9-14 LOs

PLO No. 1 (P/N: 1348360-1, S/N: F09)

PLO N0. 2 (P/N: 1348360-1, S/N: F10)

Summary of Test Results for AMSU-A Phase Locked Oscillator Testing
Serial Numbers F09 and F10

Paragraph	Description	Requirements	F09	F10
3.2.1.1	Input Voltage and Current	600 mA max, +15V 100 mA max, -15V	522 mA for +15V, 64 mA for -15V	533 mA for +15V, 70 mA for -15V
3.2.1.2	Operating Temperature	+1°C to 44°C	-24°C to +60°C	0°C to 57°C
3.2.1.3	Start-up	All loads, +60°C and -30°C; in vacuum	Verified at +60 and -30°C, ambient	Verified at +60 and -30°C, ambient
3.2.1.4 & 3.2.1.5	Frequency Stability from 57.290344 GHz	±200 kHz	+0kHz, -33 kHz	+16 kHz, -0 kHz
3.2.1.6	RF Output Power	17 to 20 dBm	18.1 dBm	17.9 dBm
3.2.1.7	Output Power Stability	<1.5 dB	1.4 dB	1.5 dB
3.2.1.8	Load VSWR	2.01:1 or less	Verified	Verified
3.2.1.9	AM Noise	<-130 dBc/Hz @ 1 MHz	-145 dBc/Hz @ 1MHz	-140 dBc/Hz @ 1Mhz
3.2.1.10	FM Noise	<-100 dBc/Hz @ 1 MHz	-104 dBc/Hz @ 1 MHz	-105 dBc/Hz @ 1 MHz
3.2.1.11	Spurious and Sub-Harmonic Signals	<-90 dBc	< -90 dBc	< -90 dBc
3.2.1.12	Harmonics	<-30 dBc	-40 dBc	- 70 dBc
3.2.1.14	Warm-up Time	< 30 minutes	Verified	Verified
3.2.1.15	Grounding and Shielding		By Design	By Design
3.2.1.16	Input Voltage Protection		By Design	By Design
3.2.1.17	Reverse Polarity Protection		By Design	By Design
Environmental Testing				
Microphonics		AE-26633	TCXO Test	TCXO Test
Radiation Hardness		AE-26633	By Analysis	By Analysis
EMI/RFI		AE-26633	Not Required	Not Required
Vibration		AE-26633	Acceptance Level	Acceptance Level
Thermal Vacuum		AE-26633	Verified at Ambient Pressure Only	Verified at Ambient Pressure Only
Weight		2.0 lbs	2.0 lbs	2.0 lbs

TEST DATA SHEET 6C (Sheet 1 of 4)

Functional Testing (Paragraph 4.2.1)

Post-Thermal Cycling CPT

Test Setup Verified: ____________
Signature

Paragraph 4.2.1.3, Functional Testing:

Step	Test	Expected	Measured	Pass/ Fail
1	Potential Difference from ± 15 V RTN to:			
	PLO Base Plate	< 1.0 Vac	0.03 Vac	Pass
	Spectrum Analyzer	< 1.0 Vac	0.02 Vac	Pass
	Frequency Counter Chassis	< 1.0 Vac	0.1 Vac	Pass
	Power Meter Chassis	< 1.0 Vac	0.07 Vac	Pass
4	Evacuate vacuum chamber and record pressure	$<10^{-2}$ torr	Pressure = N/A	*
5	Thermal couple readings	TC1 = 22 ± 2 °C	TC1 = 24.0 °C	Pass
			TC2 = 23.9 °C	N/A
			TC3 = 23.1 °C	N/A
6	DRO L/A	0 to 1V	DRO L/A = 87m V	Pass
	PLO L/A	S/N: F06, F08 = 14.6 ± 0.4V S/N: F07 = 0 to 1V S/N: F05, F09 - F14 = 4.3 to 4.7V	PLO L/A = 4.53 V	Pass
	Is PLO locked?	Yes	Yes yes No ____	Pass
7	PLO Frequency	57.290344 ± .0002 GHz	Freq. = 57.290331910 GHz	
	PLO Power	17 to 20 dBm	P = 18.11 dBm	Pass
8	Input Voltage and Current		11-17-98	
	VM1 Voltage	+15 ± 0.1 V	VM1 = +15.19 V	Pass
	VM2 Voltage	-15 ± 0.1 V	VM2 = -15.14 V 11-17-98	Pass
	IM1 Current	600 mA max.	IM1 = 522 mA	Pass
	IM2 Current	100 mA max.	IM2 = ~63.9 mA	Pass
	DRO L/A Voltage	0 to 1V	DRO L/A = 86.6m V	Pass
	PLO L/A Voltage	S/N: F06, F07, F08 = 14.6 ± 0.4V S/N: F05, F09 - F14 = 4.3 to 4.7V	PLO L/A = 4.53 V	Pass
12	RF Output Power and Frequency	17 to 20 dBm	P = 18.11 dBm	Pass
		57.290344 ± .0002 GHz	Freq. = 57.290331910 GHz	Pass
	Baseplate Temp. (TC1)	TC1 = 22 ±2°C	TC1 = 23.4 °C	Pass

*Record data only if performing test under vacuum

KHZ
Jse

TEST DATA SHEET 6C (Sheet 2 of 4)
Functional Testing (Paragraph 4.2.1)

Post-Thermal Cycling CPT

Paragraph 4.2.1.3 (Cont):

Step	Test	Expected	Measured	Pass/ Fail
13	Frequency vs. Voltage			
	± 15 V Supplies	+15.2 ± 0.05 V	+Voltage = 15.2 V	Pass
	-	-15.2 ± 0.05 V	-Voltage = −15.2 V	〃
		57.290344 ± .0002 GHz	Freq. = 57.290332214 GHz	
		17 to 20 dBm	P = 18.15 dBm	
14	Frequency vs. Voltage			
	± 15 V Supplies	+14.8 ± 0.05 V	+Voltage = 14.8 V	
		-14.8 ± 0.05 V	-Voltage = −14.8 V	
		57.290344 ± .0002 GHz	Freq. = 57.290332156 GHz	
		17 to 20 dBm	P = 18.18 dBm	
15	Spurious and Sub	-200 to -90 dBc	see plots	✓
16	Power level of 114.58 GHz signal	<-10 dBm	−37.33 dBm	Pass
17	Load VSWR and Frequency Pulling			
	2:1 mismatch over 1λ	N/A	Worst Case Freq = 7 hz	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power = 1.0 dB Peak	N/A
18	Operating Temperature @ 1°C baseplate	TC1 = 1 ±2°C	TC1 = 2.7°C	Pass
			TC2 = 2.8°C	N/A
			TC3 = 1.9°C	N/A
		0 - 1V	DRO L/A = 71.8mV	Pass
		S/N: F06, F07, F08 = 14.6 ± 0.4V S/N: F05, F09 - F14 = 4.3 to 4.7V	PLO L/A = 4.53 V	Pass
19	Input Voltage and Current			
	VM1 Voltage	+15 ± 0.1 V	VM1 = 15.0 V	
	VM2 Voltage	-15 ± 0.1 V	VM2 = −15.0 V	
	IM1 Current	600 mA max.	IM1 = 508 mA	
	IM2 Current	100 mA max.	IM2 = 62 mA	
	DRO L/A Voltage	0 to 1V	DRO L/A = 71.8mV	
	PLO L/A Voltage	S/N: F06, F07, F08 = 14.6 ± 0.4V S/N: F05, F09 - F14 = 4.3 to 4.7V	PLO L/A = 4.53V	
	RF Output Power	17 to 20 dBm	Power = 19.09 dBm	✓
	Frequency	57.290344 ± .0002 GHz	Freq. = 57.290324398 GHz	Pass

TEST DATA SHEET 6C (Sheet 3 of 4)

Functional Testing (Paragraph 4.2.1)

Post-Thermal Cycling CPT

Paragraph 4.2.1.3 (Cont):

Step	Test	Expected	Measured	Pass/ Fail
19	Frequency vs. Voltage			
(Cont)	± 15 V Supplies	+15.2 ± 0.05 V	+Voltage = +15.2 V	Pass
		-15.2 ± 0.05 V	-Voltage = -15.2 V	
		57.290344 ± .0002 GHz	Freq. = 57.290324394 GHz	
		17 to 20 dBm	Power = 18.82 dBm	
	Frequency vs. Voltage			
	± 15 V Supplies	+14.8 ± 0.05 V	+Voltage = +14.8 V	
		-14.8 ± 0.05 V	-Voltage = -14.8 V	
		57.290344 ± .0002 GHz	Freq. = 57.290324236 GHz	
		17 to 20 dBm	Power = 18.62 dBm	
	Spurious and Sub	-200 to -90 dBc	See plots	
	Power level of 114.58 GHz signal	<-10 dBm	~20 dBm	Pass
	Load VSWR and Frequency Pulling			
	2:1 mismatch over 1λ	N/A	Worst Case Freq = 6kz	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power = 0.7 dB	N/A
21	Operating Temperature @ +44°C Baseplate	TC1 = 44 ±2°C	TC1 = 44°C	Pass
			TC2 = 43.9°C	N/A
			TC3 = 43.8°C	N/A
		0 - 1V	DRO L/A = 139m V	Pass
		S/N: F06, F07, F08 = 14.6 ± 0.4V S/N: F05, F09 - F14 = 4.3 to 4.7V	PLO L/A = 4.54 V	
22	Input Voltage and Current			
	VM1 Voltage	+15 ± 0.1 V	VM1 = 15.0 V	
	VM2 Voltage	-15 ± 0.1 V	VM2 = -15.0 V	
	IM1 Current	600 mA max.	IM1 = 534 mA	
	IM2 Current	100 mA max.	IM2 = ~65 mA	
	DRO L/A Voltage	0 to 1V	DRO L/A = 140 m V	
	PLO L/A Voltage	S/N: F06, F07, F08 = 14.6 ± 0.4V S/N: F05, F09 - F14 = 4.3 to 4.7V	PLO L/A = 4.54 V	
	RF Output Power and	17 to 20 dBm	Power = 17.66 dBm	
	Frequency	57.290344 ± .0002 GHz	Freq. = 57.290325503 GHz	Pass

Hz
sec

TEST DATA SHEET 6C (Sheet 4 of 4)

Functional Testing (Paragraph 4.2.1)

Post-Thermal Cycling CPT

Paragraph 4.2.1.3 (Cont):

Step	Test	Expected	Measured	Pass/Fail
22	Frequency vs. Voltage			
(Cont)	± 15 V Supplies	+15.2 ± 0.05 V	+Voltage = 15.2 V	Pass
		-15.2 ± 0.05 V	-Voltage = -15.2 V	
		57.290344 ± .0002 GHz	Freq. = 57.290325594 GHz	
		17 to 20 dBm	Power = 17.36 dBm	
	Frequency vs. Voltage			
	± 15 V Supplies	+14.8 ± 0.05 V	+Voltage = 14.8 V	
		-14.8 ± 0.05 V	-Voltage = -14.8 V	
		57.290344 ± .0002 GHz	Freq. = 57. ~~17.58~~ 9 290325059 GHz	
		17 to 20 dBm	Power = 17.58 dBm	
	Spurious and Sub	-200 to -90 dBc	see plots	
	Power level of 114.58 GHz signal	<-10 dBm	-19 dBm	Pass
	Load VSWR and Frequency Pulling			
	2:1 mismatch over 1λ	N/A	Worst Case Freq = 7 Hz	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power = 1.0 dB	N/A

Shop Order No.: 538596

Operation: 0170

Unit Serial No.: F09

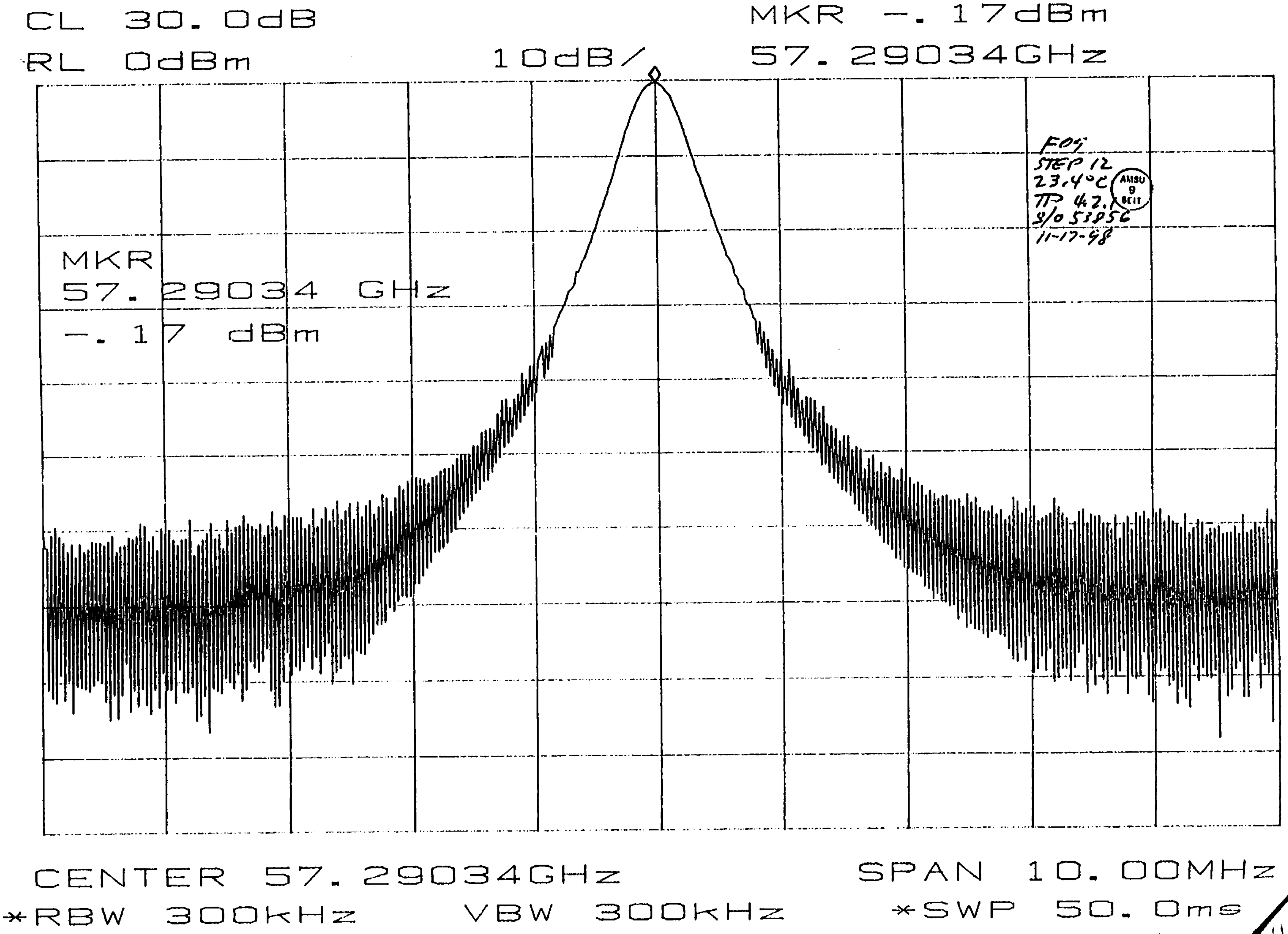
Date: 11-17-98

AMSU 9 SEIT

Test Engineer:

Quality Control: 100704 268 NOV 18

Govt. Rep.: DCMC 11/18/98



FOS
STEP 12
23.4°C
TP 42.1
S/0 53856
11-17-98

AMSU
8
SEIT

TEST DATA SHEET 7 (Sheet 1 of 3)
Temperature Cycling (Paragraph 4.2.2)

Test Setup Verified: /
Signature

Temperature Cycle	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	Cycle 6
Frequency 57.290344 GHz ±200 kHz	57.290327 490 GHz	57.290328 285 GHz	57.290330 856 GHz		N	
Output Power 17 to 20 dBm	17.95dBm	17.8dBm	17.59 dBm		A	
Frequency 57.290344 GHz ±200 kHz	57.290335 074 GHz	57.290335 877 GHz	57.290338 062 GHz			
Output Power 17 to 20 dBm	18.03dBm	18.05dBm	17.85dBm			

11/18/98

	Beginning of cycle 3
ambient → freq	= 57.290330050 GHz
P_o	= 17.7 dBm

freq	= 57.290338062
ambient → P_o	= 17.85 dBm

Shop Order No.: 538596

Operation: 0170

Unit Serial No.: F09

Date: 11-13-98

Test Engineer:

Quality Control: 7A 268 NOV 18 '98

Govt. Rep.: W. DCMC 11/18/98

TEST DATA SHEET 6C (Sheet 1 of 4)

Functional Testing (Paragraph 4.2.1)

Post-Thermal Cycling CPT

Test Setup Verified: ____________
Signature

Paragraph 4.2.1.3, Functional Testing:

Step	Test	Expected	Measured	Pass/ Fail
1	Potential Difference from ± 15 V RTN to:			
	PLO Base Plate	< 1.0 Vac	0.01 V	Pass
	Spectrum Analyzer	< 1.0 Vac	0.02V	Pass
	Frequency Counter Chassis	< 1.0 Vac	0.06 V	Pass
	Power Meter Chassis	< 1.0 Vac	0.02V	Pass
4	Evacuate vacuum chamber and record pressure	$<10^{-2}$ torr	Pressure = _______ torr	*
5	Thermal couple readings	TC1 = 22 ± 2 °C	TC1 = 23.4 °C	
			TC2 = 24.0 °C	N/A
			TC3 = 22.9 °C	N/A
6	DRO L/A	0 to 1V	DRO L/A = 73m V	Pass
	PLO L/A	S/N: F06, F08 = 14.6 ± 0.4V S/N: F07 = 0 to 1V S/N: F05, F09 - F14 = 4.3 to 4.7V	PLO L/A = 4.54 V	Pass
	Is PLO locked?	Yes	Yes ✓ No ______	Pass
7	PLO Frequency	57.290344 ± .0002 GHz	Freq. = 57.290346129 GHz	Pass
	PLO Power	17 to 20 dBm	P = 17.9 dBm	Pass
8	Input Voltage and Current			
	VM1 Voltage	+15 ± 0.1 V	VM1 = +15.18 V	Pass
	VM2 Voltage	-15 ± 0.1 V	VM2 = -15.20 V	Pass
	IM1 Current	600 mA max.	IM1 = 533 mA	Pass
	IM2 Current	100 mA max.	IM2 = -70.2 mA	Pass
	DRO L/A Voltage	0 to 1V	DRO L/A = 73m V	Pass
	PLO L/A Voltage	S/N: F06, F07, F08 = 14.6 ± 0.4V S/N: F05, F09 - F14 = 4.3 to 4.7V	PLO L/A = 4.54 V	Pass
12	RF Output Power and Frequency	17 to 20 dBm	P = 17.9 dBm	Pass
		57.290344 ± .0002 GHz	Freq. = 57.290346129 GHz	Pass
	Baseplate Temp. (TC1)	TC1 = 22 ±2°C	TC1 = 23.6 °C	Pass

*Record data only if performing test under vacuum

TEST DATA SHEET 6C (Sheet 2 of 4)
Functional Testing (Paragraph 4.2.1)

Post-Thermal Cycling CPT

Paragraph 4.2.1.3 (Cont):

Step	Test	Expected	Measured	Pass/ Fail
13	Frequency vs. Voltage			
	± 15 V Supplies	+15.2 ± 0.05 V	+Voltage = +15.20 V	Pass
	-	-15.2 ± 0.05 V	-Voltage = -15.20 V	Pass
		57.290344 ± .0002 GHz	Freq. = 57.290346067 GHz	Pass
		17 to 20 dBm	P = 17.83 dBm	Pass
14	Frequency vs. Voltage			
	± 15 V Supplies	+14.8 ± 0.05 V	+Voltage = 14.80 V	Pass
		-14.8 ± 0.05 V	-Voltage = -14.80 V	Pass
		57.290344 ± .0002 GHz	Freq. = 57.290354965 GHz	Pass
		17 to 20 dBm	P = 17.81 dBm	Pass
15	Spurious and Sub	-200 to -90 dBc	See PLOT	Pass
16	Power level of 114.58 GHz signal	<-10 dBm	-70.33 dBm	Pass
17	Load VSWR and Frequency Pulling			
	2:1 mismatch over 1λ	N/A	Worst Case Freq = 6 Hz	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power = 0.7 dB Peak	N/A
18	Operating Temperature @ 1°C baseplate	TC1 = 1 ±2°C	TC1 = 1.7°C	
			TC2 = 2.4°C	N/A
			TC3 = 1.1°C	N/A
		0 - 1V	DRO L/A = 60m V	Pass
		S/N: F06, F07, F08 = 14.6 ± 0.4V S/N: F05, F09 - F14 = 4.3 to 4.7V	PLO L/A = 4.55 V	Pass
19	Input Voltage and Current			
	VM1 Voltage	+15 ± 0.1 V	VM1 = +15.0 V	Pass
	VM2 Voltage	-15 ± 0.1 V	VM2 = -15.0 V	Pass
	IM1 Current	600 mA max.	IM1 = 520 mA	Pass
	IM2 Current	100 mA max.	IM2 = ~68.7 mA	Pass
	DRO L/A Voltage	0 to 1V	DRO L/A = 60 m V	Pass
	PLO L/A Voltage	S/N: F06, F07, F08 = 14.6 ± 0.4V S/N: F05, F09 - F14 = 4.3 to 4.7V	PLO L/A = 4.55 V	Pass
	RF Output Power	17 to 20 dBm	Power = 18.75 dBm	Pass
	Frequency	57.290344 ± .0002 GHz	Freq. = 57.290 339351 GHz	Pass

TEST DATA SHEET 6C (Sheet 3 of 4)

Functional Testing (Paragraph 4.2.1)

Post-Thermal Cycling CPT

Paragraph 4.2.1.3 (Cont):

Step	Test	Expected	Measured	Pass/ Fail
19 (Cont)	Frequency vs. Voltage			
	± 15 V Supplies	+15.2 ± 0.05 V	+Voltage = +15,23 V	Pass
		-15.2 ± 0.05 V	-Voltage = -15.23 V	Pass
		57.290344 ± .0002 GHz	Freq. = 57,290337429 GHz	Pass
		17 to 20 dBm	Power = 18.2 dBm	Pass
	Frequency vs. Voltage			
	± 15 V Supplies	+14.8 ± 0.05 V	+Voltage = +14.85 V	Pass
		-14.8 ± 0.05 V	-Voltage = -14.85 V	Pass
		57.290344 ± .0002 GHz	Freq. = 57.290 331111 GHz	Pass
		17 to 20 dBm	Power = 18.6 dBm	Pass
	Spurious and Sub	-200 to -90 dBc	see plot	Pass
	Power level of 114.58 GHz signal	<-10 dBm	-69 dBm	Pass
	Load VSWR and Frequency Pulling			
	2:1 mismatch over 1λ	N/A	Worst Case Freq = 5 Hz	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power = 0.7 dB	N/A
21	Operating Temperature @ +44°C Baseplate	TC1 = 44 ±2°C	TC1 = 43.3	
			TC2 = 43.2	N/A
			TC3 = 42.8	N/A
		0 - 1V	DRO L/A = 110 m V	Pass
		S/N: F06, F07, F08 = 14.6 ± 0.4V S/N: F05, F09 - F14 = 4.3 to 4.7V	PLO L/A = 4.55 V	Pass
22	Input Voltage and Current			
	VM1 Voltage	+15 ± 0.1 V	VM1 = +15.0 V	Pass
	VM2 Voltage	-15 ± 0.1 V	VM2 = -15.0 V	Pass
	IM1 Current	600 mA max.	IM1 = 543 mA	Pass
	IM2 Current	100 mA max.	IM2 = -71.3 mA	Pass
	DRO L/A Voltage	0 to 1V	DRO L/A = 110 m V	Pass
	PLO L/A Voltage	S/N: F06, F07, F08 = 14.6 ± 0.4V S/N: F05, F09 - F14 = 4.3 to 4.7V	PLO L/A = 4.55 V	Pass
	RF Output Power and	17 to 20 dBm	Power = 17.1 dBm	Pass
	Frequency	57.290344 ± .0002 GHz	Freq. = 57.290341590 GHz	Pass

TEST DATA SHEET 6C (Sheet 4 of 4)

Functional Testing (Paragraph 4.2.1)

Post-Thermal Cycling CPT

Paragraph 4.2.1.3 (Cont):

Step	Test	Expected	Measured	Pass/Fail
22 (Cont)	Frequency vs. Voltage			
	± 15 V Supplies	+15.2 ± 0.05 V	+Voltage = +15.24 V	Pass
		-15.2 ± 0.05 V	-Voltage = 15.26 V	Pass
		57.290344 ± .0002 GHz	Freq. = 57.290342419 GHz	Pass
		17 to 20 dBm	Power = 17.1 dBm	Pass
	Frequency vs. Voltage			
	± 15 V Supplies	+14.8 ± 0.05 V	+Voltage = +14.85 V	Pass
		-14.8 ± 0.05 V	-Voltage = -14.84 V	Pass
		57.290344 ± .0002 GHz	Freq. = 57.290342793 GHz	Pass
		17 to 20 dBm	Power = 17.1 dBm	Pass
	Spurious and Sub	-200 to -90 dBc	See plots	Pass
	Power level of 114.58 GHz signal	<-10 dBm	-69 dBm	Pass
	Load VSWR and Frequency Pulling			
	2:1 mismatch over 1λ	N/A	Worst Case Freq = 0.5 Hz	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power = 0.6 dB	N/A

Shop Order No.: 538595

Operation: 0170

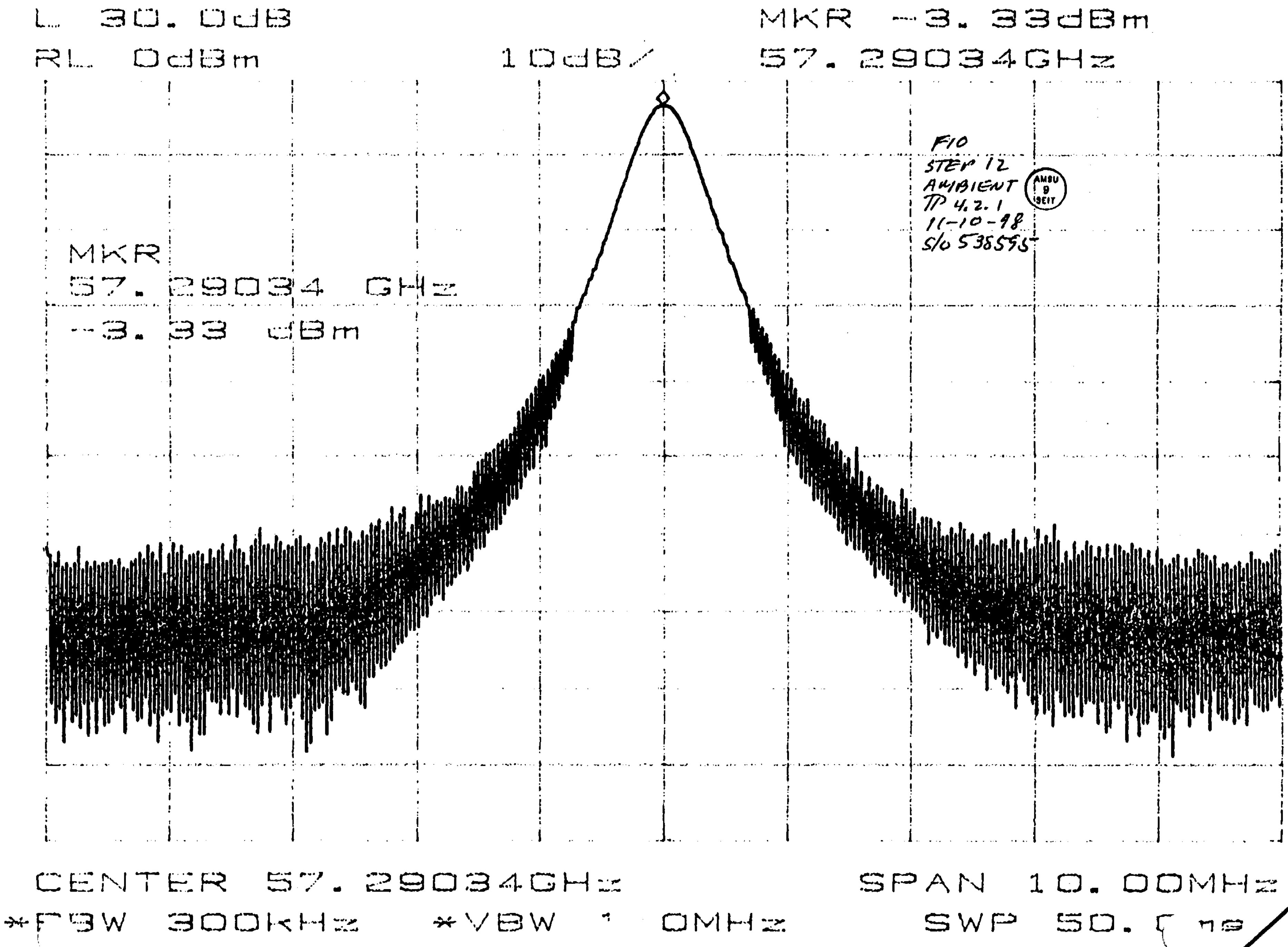
Unit Serial No.: F10

Date: 11-10-98

Test Engineer: AMSU 9 SEIT

Quality Control: TA 268 NOV 10 '98

Govt. Rep.: 11/11/98



F10
STEP 12
AMBIENT
TP 4.2.1
11-10-98
S/0 538595

AMSU 9 SEIT

TEST DATA SHEET 7 (Sheet 1 of 3)
Temperature Cycling (Paragraph 4.2.2)

Test Setup Verified: GWBurgess
Signature

Temperature Cycle	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	Cycle 6
Frequency 57.290344 GHz ±200 kHz	57.290 338 986 GHz	57.290336 775 GHz	57.290343 942 GHz		NB	QC 28
Output Power 17 to 20 dBm	17.85 dBm	17.8 dBm	17.8 dBm		11-5-98	
Frequency 57.290344 GHz ±200 kHz	57.290343 GHz	57.290347 GHZ	57.290348 725 GHz			
Output Power 17 to 20 dBm	17.80 dBm	17.83 dBm	17.9 dBm			

Shop Order No.: 538595

Operation: 0170

Unit Serial No.: F10

Date: 11-5-98

Test Engineer: GWBurgess

Quality Control: 7A 268 NOV 10 '98

Govt. Rep.: 11/11/98

Report No. 11413
February, 1999

Channel 15 LO

GDO (P/N: 1336610-10, S/N: FM5)

AMSU-A GDO Data Sheet 1

Sequence Description: +20.5C Comp
Millitech Part Number 9050160001; Serial Number FM5
Aerojet Part Number 1336610-10

Date: 7/14/97
Operator: CBY
QC Verify Set-up:

MTC A4 QA

A. Output Power direct: +16.06 dBm; Output Power in test set-up: +13.75 dBm
Output Power Delta: 2.31 dB

B. Unit Temperature: +20.5 °C; Vacuum level: 30 mTorr

C. Baseline Measurements

Vb (volts)	15.0	14.25	15.75	min limit	max limit	Pass/Fail
Vb meas. (Volts)	+15.00	+14.25	+15.75	-.05	+.05	Pass
Ib (mA)	182	182	182	–	230	Pass
fo (GHz)	89.010	89.010	89.010	–	–	
Po (dBm, meas)	+13.70	13.70	13.69			
Po (dBm, corr)	16.01	16.01	16.00	13	17	Pass

D. Frequency Pulling, Vb = 15.0 volts; measured 15.00 V

Fref (GHz)	89.010			min limit	max limit	Pass/Fail
Fmax (GHz)	89.012	+Δ (MHz)	+ 2	–	+ 5 MHz	Pass
Fmin (GHz)	89.008	- Δ (MHz)	– 2	-5 MHz	–	Pass

E. Power Pulling

Pref (dBm)	-6.06			min limit	max limit	Pass/Fail
Pmax (dBm)	-5.89	+Δ (dB)	+0.17	–	+0.2dB	Pass
Pmin (dBm)	-6.23	- Δ (dB)	-0.17	-0.2 dB	–	Pass

F. Turn-on current

Vb (volts)	15.0	min limit	max limit	Pass/Fail
Measured Vb	15.00			Pass
Turn-on current (mA)	182	–	345	Pass
time to peak (ms)	11.2			
time to settle (ms)	11.2			

G. Unit Temperature: +20.5 °C Vacuum level: 23 mTorr

DATA SHEET ACCEPT/REJECT

Accept	MTC A4 QA	Reject	
		Test Failure Report No.	
		Report Date	

SIZE	CAGE CODE	DWG. NO.	
A	8V456	TP501600-2	
SCALE		REV. LTR. A00	SHEET 29 OF 41

AMSU-A GDO Data Sheet 1

Sequence Description: +43°C Comp
Millitech Part Number 9050160001; Serial Number FM5
Aerojet Part Number 1336610-10

Date: 7/21/97
Operator: CSY
QC Verify Set-up: MTC A4 QA

A. Output Power direct: 15.95 dBm; Output Power in test set-up: 13.64 dBm
Output Power Delta: 2.31 dB

B. Unit Temperature: +43 °C; Vacuum level: 40 mTorr

C. Baseline Measurements

Vb (volts)	15.0	14.25	15.75	min limit	max limit	Pass/Fail
Vb meas. (Volts)	+15.00	+14.25	+15.75	-.05	+.05	Pass
Ib (mA)	190	190	190	–	230	Pass
fo (GHz)	88.995	88.995	88.995	–	–	
Po (dBm, meas)	+13.34	+13.34	+13.34			
Po (dBm, corr)	+15.65	+15.65	+15.65	13	17	Pass

D. Frequency Pulling, Vb = 15.0 volts; measured 15.00 V

Fref (GHz)	88.995			min limit	max limit	Pass/Fail
Fmax (GHz)	88.999	+Δ (MHz)	+3	–	+ 5 MHz	Pass
Fmin (GHz)	88.992	- Δ (MHz)	-3	-5 MHz	–	Pass

E. Power Pulling

Pref (dBm)	-6.34			min limit	max limit	Pass/Fail
Pmax (dBm)	-6.16	+Δ (dB)	+0.18	–	+0.2dB	Pass
Pmin (dBm)	-6.52	- Δ (dB)	-0.18	-0.2 dB	–	Pass

F. Turn-on current

Vb (volts)	15.0	min limit	max limit	Pass/Fail
Measured Vb	+15.00			Pass
Turn-on current (mA)	190	–	345	Pass
time to peak (ms)	9.8			
time to settle (ms)	9.8			

G. Unit Temperature: +43 °C Vacuum level: 40 mTorr

DATA SHEET ACCEPT/REJECT

Accept	MTC A4 QA	*Reject*	
		Test Failure Report No.	
		Report Date	

SIZE	CAGE CODE	DWG. NO.	
A	8V456	TP501600-2	
SCALE	REV. LTR. A00		SHEET 29 OF 41

AMSU-A GDO Data Sheet 1

Sequence Description: -2°C Comp
Date: 7/25/97 - 7/27/97
Millitech Part Number 9050160001; Serial Number FM5
Operator: CBZ
Aerojet Part Number 1336610-10
QC Verify Set-up: MTC A4 QA

A. Output Power direct: 15.95 dBm; Output Power in test set-up: 13.64 dBm
Output Power Delta: 2.31 dB

B. Unit Temperature: -2 °C; Vacuum level: 20 mTorr

C. Baseline Measurements

Vb (volts)	15.0	14.25	15.75	min limit	max limit	Pass/Fail
Vb meas. (Volts)	+15.00	+14.25	+15.75	-.05	+.05	Pass
Ib (mA)	175	175	175	–	230	Pass
fo (GHz)	89.011	89.011	89.011	–	–	
Po (dBm, meas)	13.59	13.59	13.59			
Po (dBm, corr)	15.90	15.90	15.90	13	17	Pass

D. Frequency Pulling, Vb = 15.0 volts; measured +15.00V

Fref (GHz)	89.011			min limit	max limit	Pass/Fail
Fmax (GHz)	89.012	+Δ (MHz)	+1	–	+ 5 MHz	Pass
Fmin (GHz)	89.010	- Δ (MHz)	-1	-5 MHz	–	Pass

E. Power Pulling

Pref (dBm)	-6.05			min limit	max limit	Pass/Fail
Pmax (dBm)	-5.87	+Δ (dB)	+0.18	–	+0.2dB	Pass
Pmin (dBm)	-6.21	- Δ (dB)	-0.16	-0.2 dB	–	Pass

F. Turn-on current

Vb (volts)	15.0	min limit	max limit	Pass/Fail
Measured Vb	+15.00			Pass
Turn-on current (mA)	175	–	345	Pass
time to peak (ms)	10.0			
time to settle (ms)	10.0			

G. Unit Temperature: -2 °C Vacuum level: 20 mTorr

DATA SHEET ACCEPT/REJECT

Accept	MTC A4 QA	*Reject*	
		Test Failure Report No.	
		Report Date	

SIZE	CAGE CODE	DWG. NO.	
A	8V456	TP501600-2	
SCALE	REV. LTR.		SHEET
	A00		29 OF 41

AMSU-A GDO Data Calculation Sheet 8

Sequence Description: Frequency Accuracy & Stability Calculations Date: 7/29/97
Millitech Part Number 9050160001; Serial Number FM5 Operator: CS7
Aerojet Part Number 1336610-10

A. Frequency Accuracy from Thermal Vacuum, CPT and Final LPT Data

	Parameter, Vb = 15.0 volts	Data Sheet, Section	Date, mm/dd/yy	Measurement
1	+Δ, pulling, +20.5°C, MHz	1, D	7/14/97	+2
2	- Δ, pulling, + 20.5°C, MHz	1, D	7/14/97	-2
3	+Δ, pulling, +43°C	1, D	7/21/97	+3
4	-Δ, pulling, +43°C	1, D	7/21/97	-3
5	+Δ, pulling, -2°C	1, D	7/25/97	+1
6	-Δ, pulling, -2°C	1, D	7/25/97	-1
7	Set point w / max Hysteresis, GHz	6, E	7/7/97	89.010
8	Set point w / min Hysteresis, GHz	6, E	7/7/97	88.990
9	(Maximum of lines 1, 3, and 5) +7	89.013		89.013 GHz
10	(Maximum of lines 2, 4, and 6) +8	88.987		88.987 GHz

B. Frequency Accuracy Result

	Result	min limit	max limit	Pass/Fail
A9, GHz	89.013	–	89.030	Pass
A10, GHz	88.987	88.970	–	Pass

CONTINUED, GO TO NEXT PAGE

AMSU-A GDO Data Calculation Sheet 8, continued

Sequence Description: Frequency Accuracy & Stability Calculations Date: 7/29/97
Millitech Part Number 9050160001; Serial Number FM5 Operator: CSY
Aerojet Part Number 1336610-10

C. Frequency Stability from Comprehensive Performance Test Data

	Bias Voltage, volts	Data Sheet, Section	Date, mm/dd/yy	Tcase, °C	Measurement, GHz
1	14.25	1, C	7/14/97	+20.5	89.010
2	15.0	1, C	7/14/97	+20.5	89.010
3	15.75	1, C	7/14/97	+20.5	89.010
4	14.25	1, C	7/25/97	-2	89.011
5	15.0	1, C	7/25/97	-2	89.011
6	15.75	1, C	7/25/97	-2	89.011
7	14.25	1, C	7/21/97	+43	88.995
8	15.0	1, C	7/21/97	+43	88.995
9	15.75	1, C	7/21/97	+43	88.995
10	((Maximum of 1 through 9) -C2)		* 1000 MHz		+ 1 MHz
11	((Minimum of 1 through 9) -C2)		* 1000 MHz		-15 MHz

D. Frequency Stability Result

	Result	min limit	max limit	Pass/Fail
C10, MHz	+1	–	+50	Pass
C11, MHz	-15	-50	–	Pass

DATA SHEET ACCEPT/REJECT

Accept	MTC 14 QA	*Reject*	
		Test Failure Report No.	
		Report Date	

Report No. 11413
February, 1999

REFER TO TEST DATA OF SAW FILTERS PREPARED IN THE SECTION OF BANDPASS CHARACTERISTICS

FREQUENCY STABILITY OF SAW FILTERS

Channel No.	11	12	13	14
Specification (+/-MHz)	0.9	0.9	0.2	0.2
Short-Term Measured (MHz)	+0.658, -0.543	+0.189, -0.284	+0.00, -0.059	+0.049, -0.00
Long-Term By Analysis (+/-MHz)	+0.02	+0.02	+0.02	+0.02
Total	+0.678, -0.543	+0.209, -0.284	+0.02, -0.059	+0.069, -0.00

Note: Additional +/-0.1 MHz frequency stability reserved for safety margin for channels 11-14.

Report No. 11413
February, 1999

BANDPASS CHARACTERISTICS
FOR
IF FILTERS AND SAW FILTERS

3 dB BANDWIDTH OF IF FILTERS

Channel No.	3	4	5	6	7	8	9	10	15
Specification (MHz)	90	200	170	200	200	165	165	78	6000
3 dB bandwidth (MHz) *	82	192	170	192	192	157	157	78	1020
f_L - f_H (MHz)	8-90	8-200	30-200	8-200	8-200	8-165	8-165	178-256	490-1510
Measured (MHz)									
3 dB bandwidth (MHz)	80.12	190.20	167.86	189.97	190.15	155.06	155.06	75.98	995.47
f_L - f_H (MHz)	8.84-89.96	9.04-199.24	31.40-199.26	9.14-199.11	9.13-199.28	9.19-164.25	9.16-164.22	179.34-255.32	490.78-1486.25

* Actual specifications for IF filters.

3 dB BANDWIDTH FOR SAW FILTERS

Channel No.	11	12	13	14
Specification				
3 dB Bandwidth (MHz)	72	32	16	6
f_{L1} - f_{H1} (MHz)	256.2-292.2	292.2-308.2	308.2-316.2	316.2-319.2
f_{L2} - f_{H2} (MHz)	352.2-388.2	336.2-352.2	328.2-336.2	325.2-328.2
Measured				
3 dB Bandwidth (MHz)	70.189	30.904	15.676	5.905
f_{L1} - f_{H1} (MHz)	256.937-291.835	292.551-307.988	308.247-316.070	316.274-319.223
f_{L2} - f_{H2} (MHz)	352.592-387.883	336.297-351.764	328.234-336.087	325.256-328.212

Report No. 11413
February, 1999

Channel 3 Bandpass Filter

IF Filter (S/N: 1331559-3, S/N: P229-007)

APPENDIX C **ACCEPTANCE TEST REPORT**

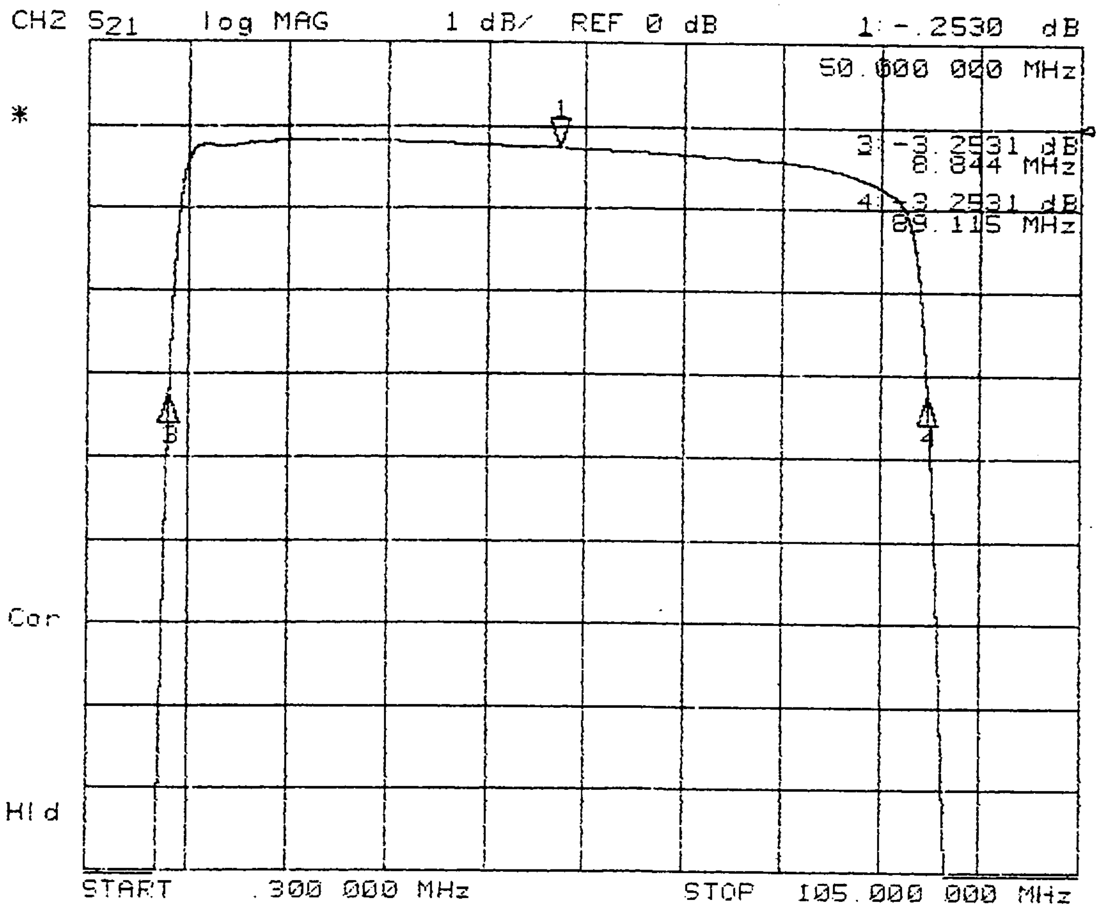
BANDPASS FILTER MODEL HL50-80-10SS1 S/N P229-067
AEROJET 1331559-3 REV. E

3.0 dB BANDWIDTH

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.3	-10°C	+15°C	+40°C
{7} UPPER 3.0 dB BANDEDGE	89.12 MHz (88.0-90.0)	88.96 Mhz (88.0-90.0)	88.81 MHz (88.0-90.0)
{8} LOWER 3.0 dB BANDEDGE	8.84 MHz (8.0-10.0)	8.84 Mhz (8.0-10.0)	8.83 MHz (8.0-10.0)
{9} 3.0 dB RELATIVE BANDWIDTH	80.28 MHz (78.0-82.0)	80.12 Mhz (78.0-82.0)	79.98 MHz (78.0-82.0)
{10} ADD {7} AND {8} ÷ 2 =	48.98 MHz (50.0 NOM)	48.90 MHz (50.0 NOM)	48.82 Mhz (50.0 NOM)
{10a} RECORD MEASURED TEMPERATURE	-12.8 °C (-15.0 TO -10.0)	+15.6 °C (12.5 TO 17.5)	-42.9 °C (40.0 TO 45.0)
{6} ATTACH TRANSMISSION LOSS PERFORMANCE X-Y PLOT	✓ (√)	✓ (√)	✓ (√)

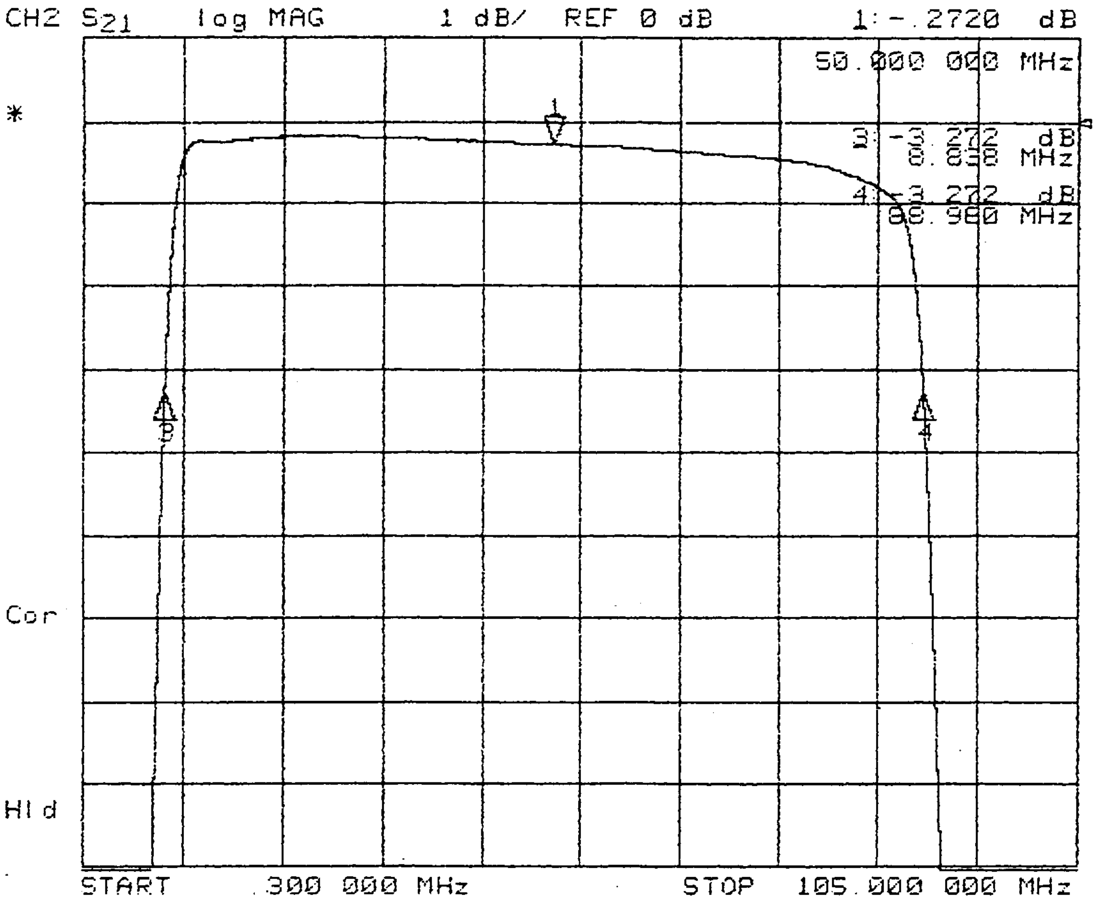
PASSBAND RIPPLE

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.4	-10°C	+15°C	+40°C
{11a} MIN INSERTION LOSS FREQ	24.90 MHz	24.90 Mhz	23.86 MHz
MIN INSERTION LOSS PERFORMANCE	-0.16 dB	-0.17 dB	-0.18 dB
{11b} 75% BW LOWER BANDEDGE FREQ	10.91 MHz	10.84 Mhz	10.79 MHz
75% BW LOWER BANDEDGE I.L. PERF	-0.40 dB	-0.42 dB	-0.44 dB
{11c} 75% BW UPPER BANDEDGE FREQ	70.91 MHz	70.84 Mhz	70.79 MHz
75% BW UPPER BANDEDGE I.L. PERF	-0.39 dB	-0.42 dB	-0.44 dB
{11d} PERFORMANCE DELTA (I.L. @ {11b} - I.L. @ {11a})	0.24 dB	0.25 dB	0.26 dB
{11e} PERFORMANCE DELTA (I.L. @ {11c} - I.L. @ {11a})	0.23 dB	0.25 dB	0.26 dB



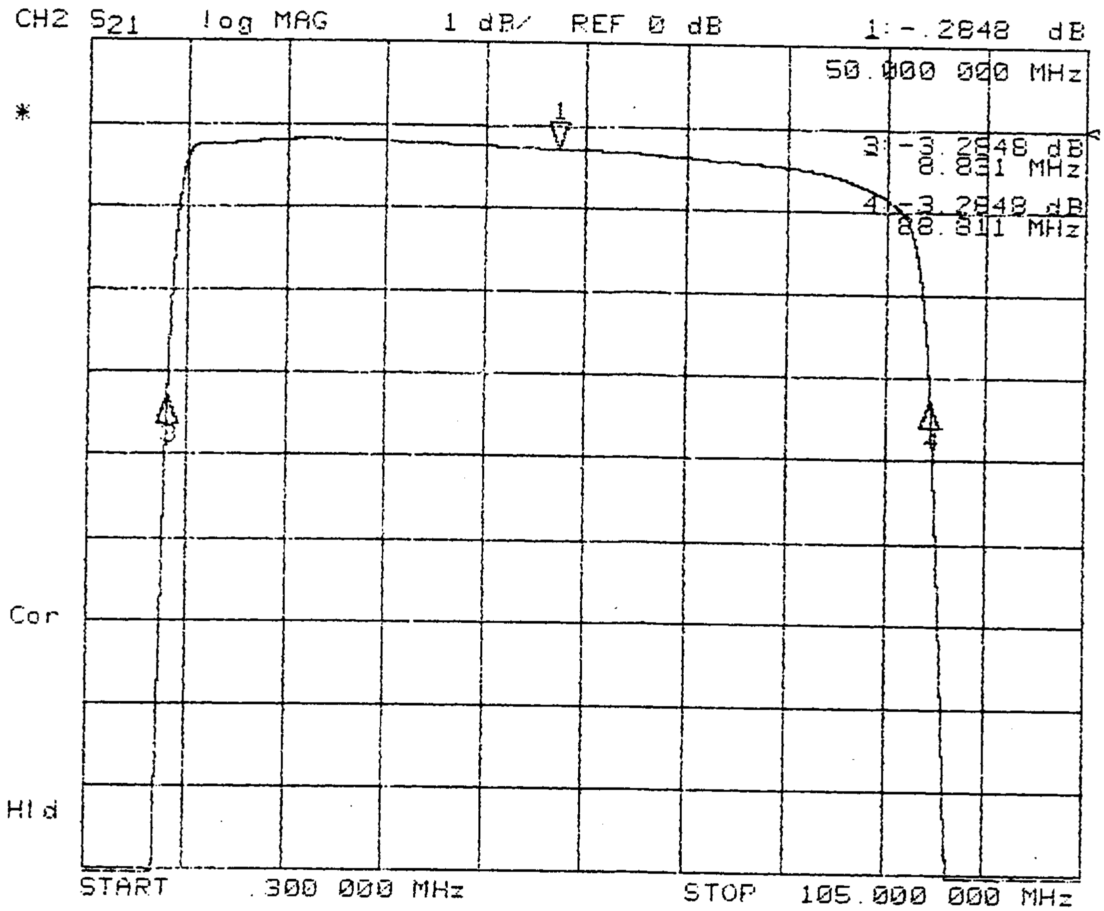
FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P229-007
-10C DATA
OPR: R. HOGGATT DATE DEC 18 1996

MARKER PARAMETERS	Channel 1	Channel 2
MARKER 1	14.000000 MHz OFF	50.000000 MHz -.2530 dB
MARKER 2	86.000000 MHz OFF	48.979993 MHz OFF
MARKER 3	20.000000 MHz OFF	8.844553 MHz -3.2531 dB
MARKER 4	80.000000 MHz OFF	89.115434 MHz -3.2531 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P229-007
+15C DATA
OPR: R. HOGGATT DATE DEC 1 8 1996

```
MARKER PARAME                                    hannel 2

MARKER 1                    14.000000 MHz       50.000000 MHz
                         OFF                 -.2720 dB

MARKER 2                    86.000000 MHz       48.899670 MHz
                         OFF                 OFF

MARKER 3                    20.000000 MHz        8.838653 MHz
                         OFF                 -3.272 dB

MARKER 4                    80.000000 MHz       88.960688 MHz
                         OFF                 -3.272 dB

MKR STIMULUS OFFSET          0.000000 MHz       89.425802 MHz
                          0 dB               -3.2342 dB


REFERENCE MARKER          OFF                 OFF
PLACEMENT                CONTINUOUS          CONTINUOUS
MARKER SEARCH             OFF                 OFF
TARGET VALUE             -14 dB              -3 dB
MARKER WIDTH VALUE       -3 dB               -3 dB
                          OFF                 OFF
MARKER TRACKING           OFF                 OFF
```



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P229-007
+40C DATA
OPR: R. HOGGATT DATE DEC 1 8 1996

```
MARKER PARAMET                                              nel 2

MARKER 1                         14.000000 MHz          50.000000 MHz
                              OFF                     -.2848 dB

MARKER 2                         85.000000 MHz          48.821378 MHz
                              OFF                     OFF

MARKER 3                         20.000000 MHz           8.831021 MHz
                              OFF                     -3.2848 dB

MARKER 4                         80.000000 MHz          88.811736 MHz
                              OFF                     -3.2848 dB

MKR STIMULUS OFFSET               0.000000 MHz          89.425802 MHz
                               0 dB                   -3.2342 dB

REFERENCE MARKER               OFF                     OFF
PLACEMENT                     CONTINUOUS              CONTINUOUS
MARKER SEARCH                  OFF                     OFF
TARGET VALUE                  -14 dB                  -3 dB
MARKER WIDTH VALUE            -3 dB                   -3 dB
                               OFF                     OFF
MARKER TRACKING                OFF                     OFF
```

ACCEPTANCE TEST REPORT

BANDPASS FILTER MODEL HL50-80-10SS1 S/N P229-007
AEROJET 1331559-3 REV. E

PASSBAND RIPPLE (CON'T)

{11f} RECORD PASS/FAIL (0.5 dB MAX)	[✓ PASS]/FAIL	[✓ PASS]/FAIL	[✓ PASS]/FAIL
{11g) ATTACH PASSBAND RIPPLE PERFORMANCE X-Y PLOT(S)	✓ (√)	✓ (√)	✓ (√)

OUT-OF-BAND REJECTION

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.5 Fc=50.0 MHz. REF {5A} FOR INSERTION LOSS @ Fc	-10°C	+15°C	+40°C
{12} WORST CASE REJECTION FROM 0.300 MHz TO 1.0 MHz	>100 dB (40.0 dB MIN)	>100 dB (40.0 dB MIN)	>100 dB (40.0 dB MIN)
{13a} WORST CASE REJECTION FROM 102.0 MHz TO 1000.0 MHz	-58.0 dB (40.0 dB MIN)	-58.9 dB (40.0 dB MIN)	-59.9 dB (40.0 dB MIN)
{13c} RECORD MEASURED TEMPERATURE	-12.8 °C (-15.0 TO -10.0)	+15.3 °C (12.5 TO 17.5)	+43.0 °C (40.0 TO 45.0)
{14} ATTACH REJECTION PERFORMANCE X-Y PLOT(S)	✓ (√) ✓ (√)	✓ (√) ✓ (√)	✓ (√) ✓ (√)

Dn 6

TEST PERFORMED BY R. HOGGATT DATE 12/18/96

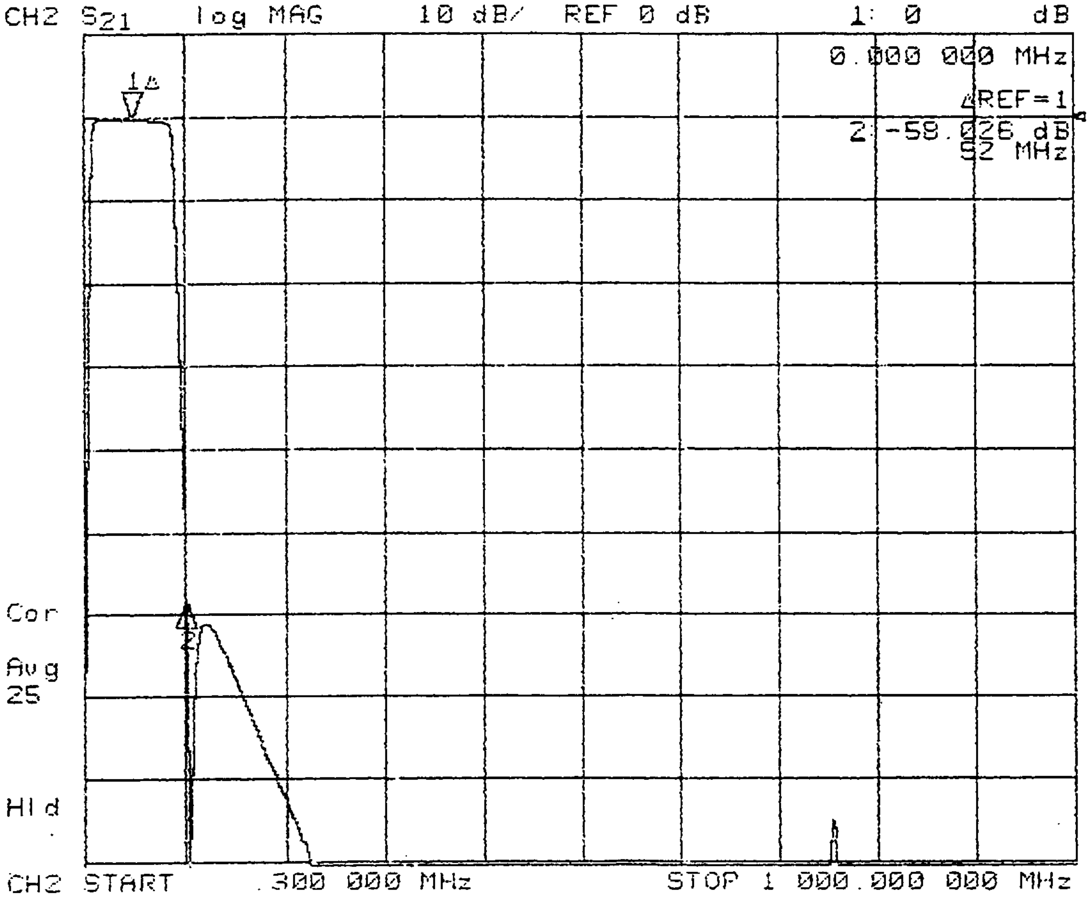
NOTE IF TEST WITNESSED BY AESD: Not witnessed this time. DLD

***** END OF FUNCTIONAL PERFORMANCE TEST ****

OUTLINE AND MOUNTING DIMENSIONS VERIFICATION

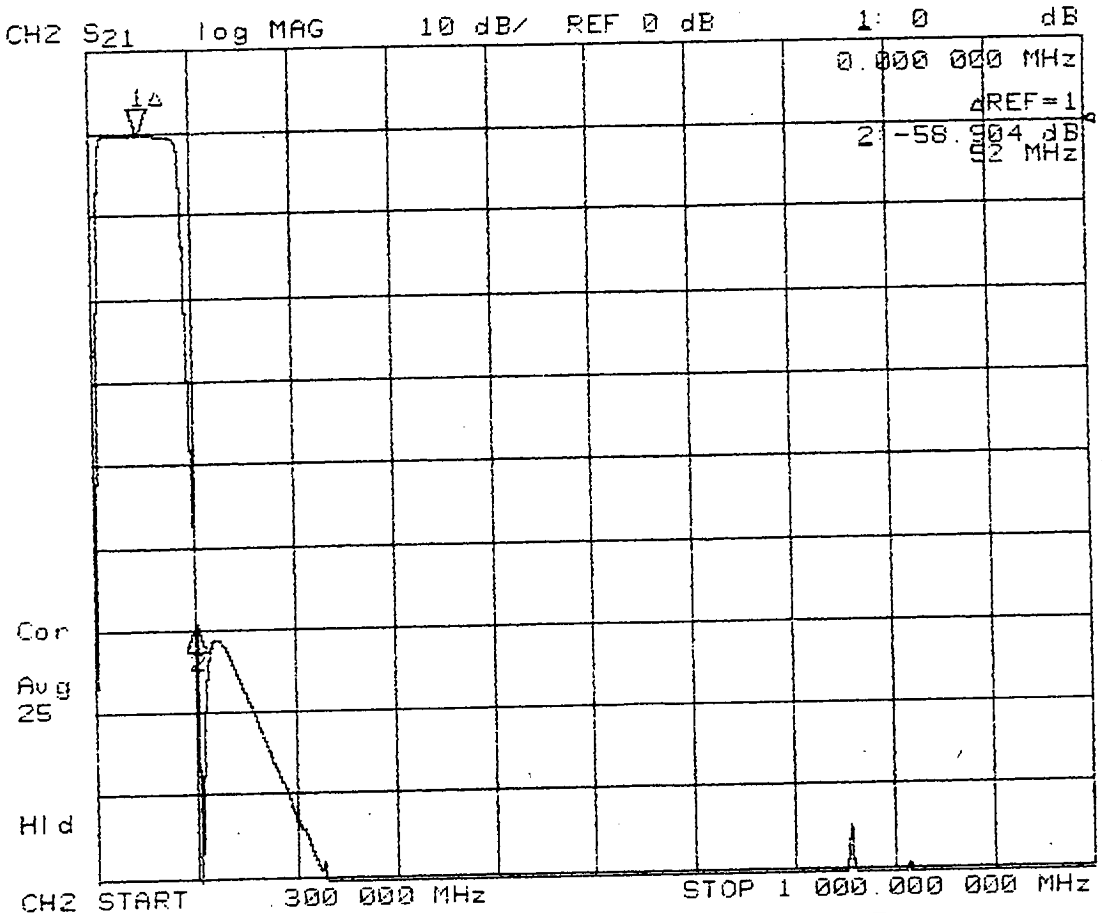
{16} REFERENCE CUSTOMER DRAWING 1331559

DESCRIPTION OF MEASUREMENT	DIMENSION AND TOLERANCE	ACTUAL MEASUREMENT
OVER ALL LENGTH	3.50 ± .03	3.501
MOUNTING HOLE CENTER	0.125 ± .010	0.127
BETWEEN UPPER MOUNTING HOLES	3.250	3.251
BETWEEN LOWER MOUNTING HOLES	3.250	3.254



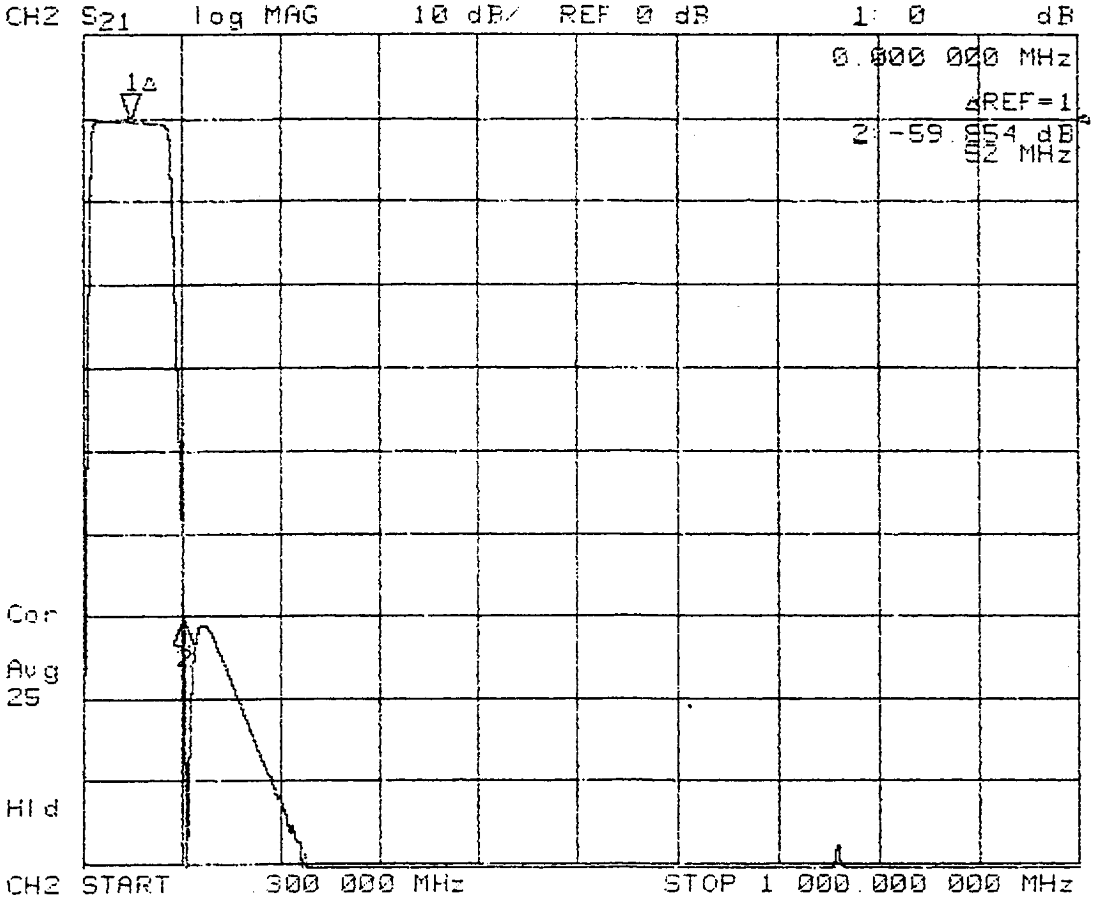
FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P229-007
-10C DATA
OPR: R. HOGGATT DATE DEC 18 1996

```
MARKER PARAMETERS                   Channel 1             Channel 2

MARKER 1                          1.000000 MHz        50.000000 MHz
                            OFF                      0 dB

MARKER 2                          5.000000 MHz       102.000000 MHz
                            OFF                     -58.026 dB

MARKER 3                          5.000000 MHz       102.000000 MHz
                            OFF                     OFF

MARKER 4                          5.000000 MHz      1000.000000 MHz
                            OFF                     OFF

MKR STIMULUS OFFSET               0.000000 MHz         0.000000 MHz
                              0 dB                   0 dB

REFERENCE MARKER              OFF                   MARKER 1
PLACEMENT                   CONTINUOUS              CONTINUOUS
MARKER SEARCH                 OFF                    OFF
TARGET VALUE                -3 dB                   -3 dB
MARKER WIDTH VALUE          -3 dB                   -3 dB
                              OFF                    OFF
MARKER TRACKING               OFF                    OFF
```



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P229-007
+15C DATA
OPR: R. HOGGATT DATE DEC 1 8 1996

```
MARKER PARAMETERS              Channel 1               Channel 2

MARKER 1                        1.000000 MHz            50.000000 MHz
                            OFF                       0 dB

MARKER 2                        5.000000 MHz           102.000000 MHz
                            OFF                      -58.904 dB

MARKER 3                        5.000000 MHz           102.000000 MHz
                            OFF                      OFF

MARKER 4                        5.000000 MHz          1000.000000 MHz
                            OFF                      OFF

MKR STIMULUS OFFSET             0.000000 MHz             0.000000 MHz
                             0 dB                     0 dB

REFERENCE MARKER              OFF                     MARKER 1
PLACEMENT                    CONTINUOUS               CONTINUOUS
MARKER SEARCH                 OFF                      OFF
TARGET VALUE                 -3 dB                    -3 dB
MARKER WIDTH VALUE           -3 dB                    -3 dB
                              OFF                      OFF
MARKER TRACKING               OFF                      OFF
```



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P229-007
+40C DATA
OPR: R. HOGGATT DATE DEC 1 8 1996

MARKER PARAMETERS	Channel 1	Channel 2
MARKER 1	1.000000 MHz OFF	50.000000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	102.000000 MHz -59.854 dB
MARKER 3	5.000000 MHz OFF	102.000000 MHz OFF
MARKER 4	5.000000 MHz OFF	1000.000000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB OFF	-3 dB OFF
MARKER TRACKING	OFF	OFF

APPENDIX C

ACCEPTANCE TEST REPORT

BANDPASS FILTER MODEL HL50-80-10SS1 S/N P229-007
AEROJET 1331559-3 REV. E

BANDPASS CHARACTERISTICS MEASUREMENT

PER ATP PARA 4.6
(REF: AE-24687, PARA 4.8.2)

RECORD THE AMBIENT ROOM TEMPERATURE. +22.9 °C (+19°C TO +29.0°C)

{15} ATTACH PASSBAND PERFORMANCE X-Y PLOT ✓ (√)

{24} TEST POINT MATRIX

REF	FREQ	UNIT	VALUE	REF	FREQ	UNIT	VALUE
F1	0.5	MHz	-109.1 dB	F11	(*) 60.0	MHz	-0.34 dB
F2	1.0	MHz	-97.0 dB	F12	(*) 70.0	MHz	-0.43 dB
F3	5.0	MHz	-30.3 dB	F13	80.0	MHz	-0.61 dB
F4	7.5	MHz	-9.77 dB	F14	85.0	MHz	-0.88 dB
F5	10.0	MHz	-1.30 dB	F15	90.0	MHz	-6.28 dB
F6	15.0	MHz	-0.27 dB	F16	100.0	MHz	-47.5 dB
F7	20.0	MHz	-0.19 dB	F17	200.0	MHz	-82.7 dB
F8	(*) 30.0	MHz	-0.18 dB	F18	300.0	MHz	-101.5 dB
F9	(*) 40.0	MHz	-0.24 dB	F19	500.0	MHz	-100.9 dB
F10	50.0	MHz	-0.27 dB	F20	1000.0	MHz	-110.2 dB

TEST PERFORMED BY: R. Hoggatt DA 5 DATE 12/18/96

NOTE IF TEST WITNESSED BY AESD. Not witnessed this time. DLD

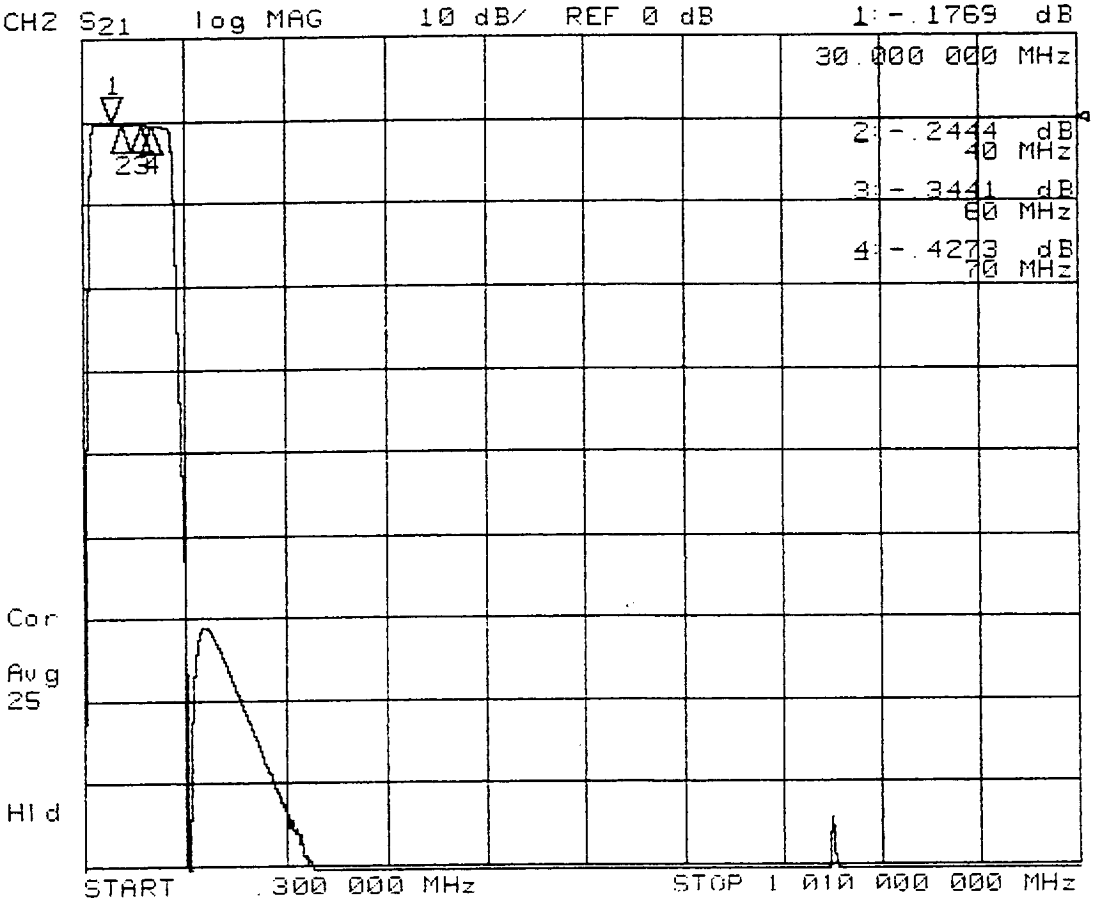
***** END OF BANDPASS CHARACTERISTICS TEST *****

FUNCTIONAL PERFORMANCE TEST

ACCEPTANCE TEST PROCEDURE
63-0005-02 PARA 4.1

BRIEF TEST DESCRIPTION: THE TESTS DESCRIBED IN APPENDIX C PAGE 10 THRU PAGE 13 ARE PERFORMED TO DOCUMENT THE FUNCTIONAL PERFORMANCE OF THE UNIT AT THE CONCLUSION OF ALL ENVIRONMENTAL TESTING. THE TESTS ARE AS FOLLOWS AND IN ANY SEQUENCE:

a.) VSWR PER ATP PARA 4.5.1.
b.) INSERTION LOSS PER ATP PARA 4.5.2
c.) INSERTION LOSS VS TEMPERATURE PER ATP PARA 4.5.6.
d.) 3.0 dB BANDWIDTH PER ATP PARA 4.5.3.
e.) CENTER FREQUENCY (fc) PER ATP PARA 4.5.7 (PART OF 3.0 dB B/W TEST)
f.) PASSBAND RIPPLE PER ATP PARA 4.5.4 (PART OF INSERTION LOSS TEST).
g.) OUT-OF-BAND REJECTION PER ATP PARA 4.5.5.



POST THERMAL CYCLE
PASSBAND CHARACTERISTICS
SERIAL NO. P229-007
AMBIENT
OPR: R. HOGGATT DATE DEC 18 1996

MARKER PARAMETERS	Channel 1	Channel 2
MARKER 1	30.000000 MHz OFF	30.000000 MHz -.1769 dB
MARKER 2	40.000000 MHz OFF	40.000000 MHz -.2444 dB
MARKER 3	60.000000 MHz OFF	60.000000 MHz -.3441 dB
MARKER 4	70.000000 MHz OFF	70.000000 MHz -.4273 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB OFF	-3 dB OFF
MARKER TRACKING	OFF	OFF

Report No. 11413
February, 1999

Channel 4 Bandpass Filter

IF Filter (S/N: 1331559-2, S/N: P228-012)

APPENDIX B

ACCEPTANCE TEST REPORT

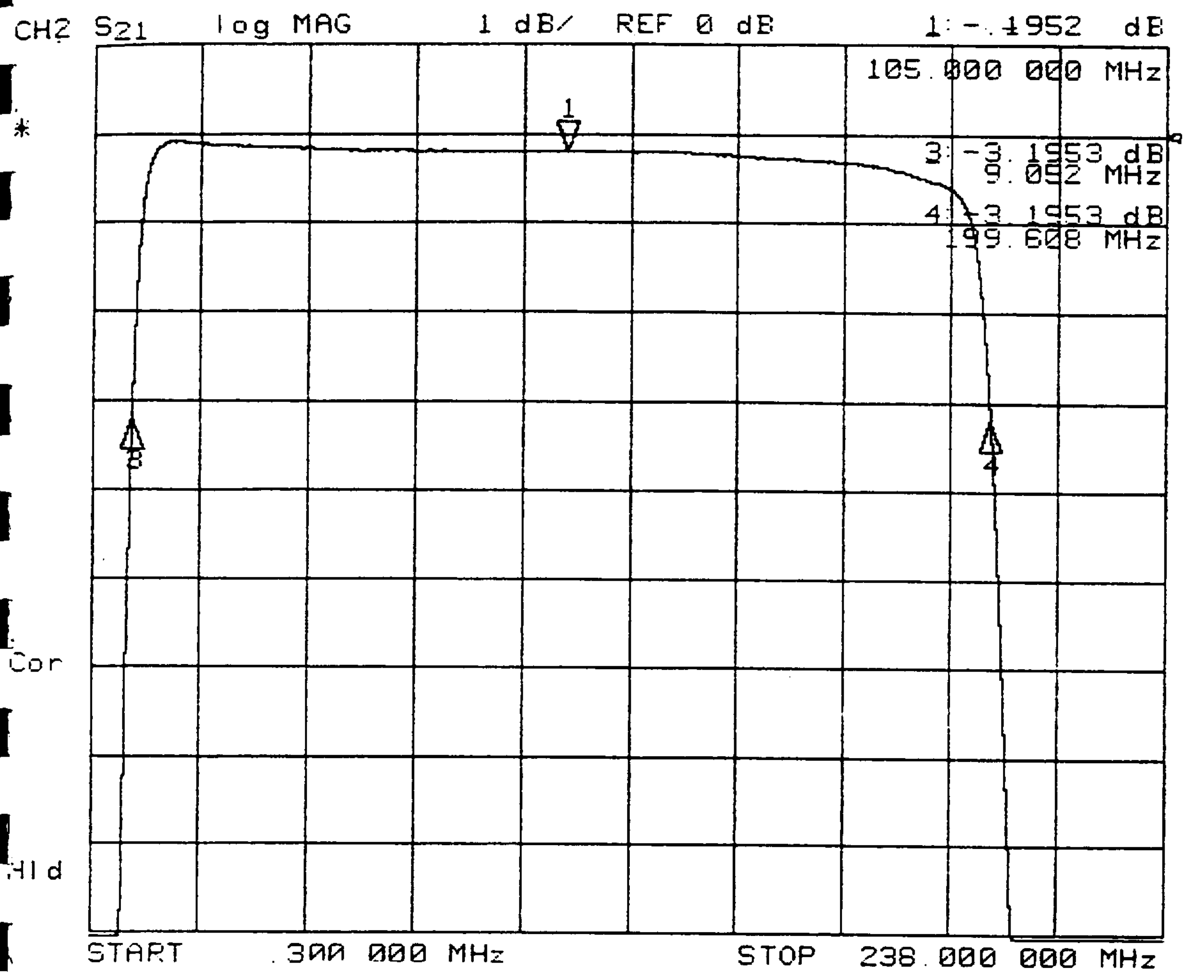
BANDPASS FILTER MODEL HL105-190-10SS1 S/N P228-012
AEROJET 1331559-2 REV. F

3.0 dB BANDWIDTH

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.3	-10°C	+15°C	+40°C
{7} UPPER 3.0 dB BANDEDGE	199.61 MHz (198.0-200.0)	199.24 Mhz (198.0-200.0)	198.89 MHz (1480.01500.0)
{8} LOWER 3.0 dB BANDEDGE	9.05 MHz (8.0-10.0)	9.04 Mhz (8.0-10.0)	9.03 MHz (8.0-10.0)
{9} 3.0 dB RELATIVE BANDWIDTH	190.56 MHz (188.0-192.0)	190.20 Mhz (188.0-192.0)	189.86 MHz (188.0-192.0)
{10} ADD {7} AND {8} ÷ 2 =	104.33 MHz (105.0 NOM)	104.14 MHz (105.0 NOM)	103.96 Mhz (105.0 NOM)
{10a} RECORD MEASURED TEMPERATURE	-14.4 °C (-15.0 TO -10.0)	+15.8 °C (12.5 TO 17.5)	+43.4 °C (40.0 TO 45.0)
{6} ATTACH TRANSMISSION LOSS PERFORMANCE X-Y PLOT	✓ (√)	✓ (√)	✓ (√)

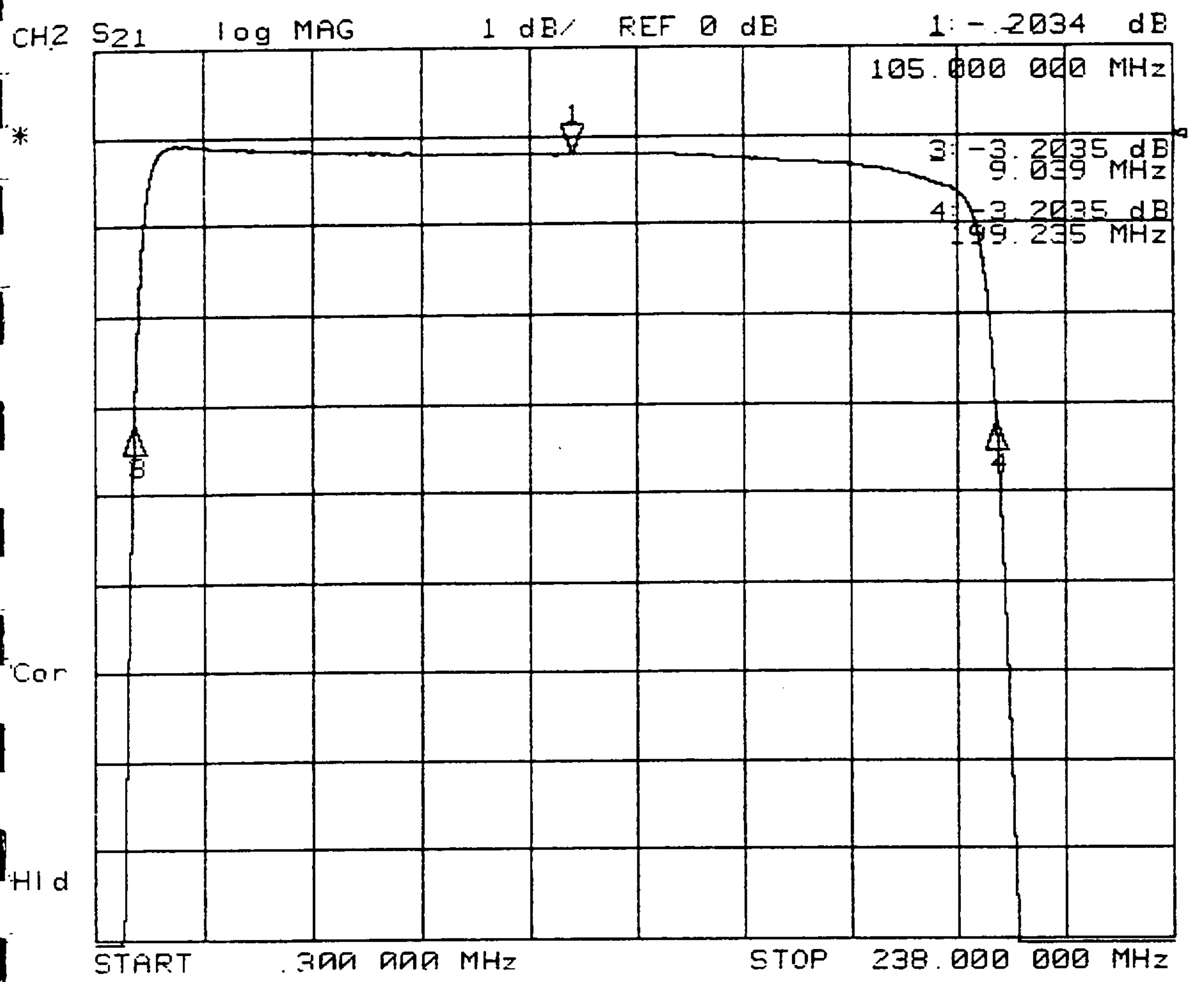
PASSBAND RIPPLE

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.4	-10°C	+15°C	+40°C
{11a} MIN INSERTION LOSS FREQ	18.13 MHz	19.91 Mhz	16.94 MHz
MIN INSERTION LOSS PERFORMANCE	-0.08 dB	-0.08 dB	-0.08 dB
{11b} 75% BW LOWER BANDEDGE FREQ	13.48 MHz	13.34 Mhz	13.25 MHz
75% BW LOWER BANDEDGE I.L. PERF	-0.28 dB	-0.29 dB	-0.30 dB
{11c} 75% BW UPPER BANDEDGE FREQ	155.98 MHz	155.84 Mhz	155.75 MHz
75% BW UPPER BANDEDGE I.L. PERF	-0.28 dB	-0.29 dB	-0.30 dB
{11d} PERFORMANCE DELTA (I.L. @ {11b} - I.L. @ {11a})	0.20 dB	0.21 dB	0.22 dB
{11e} PERFORMANCE DELTA (I.L. @ {11c} - I.L. @ {11a})	0.20 dB	0.21 dB	0.22 dB



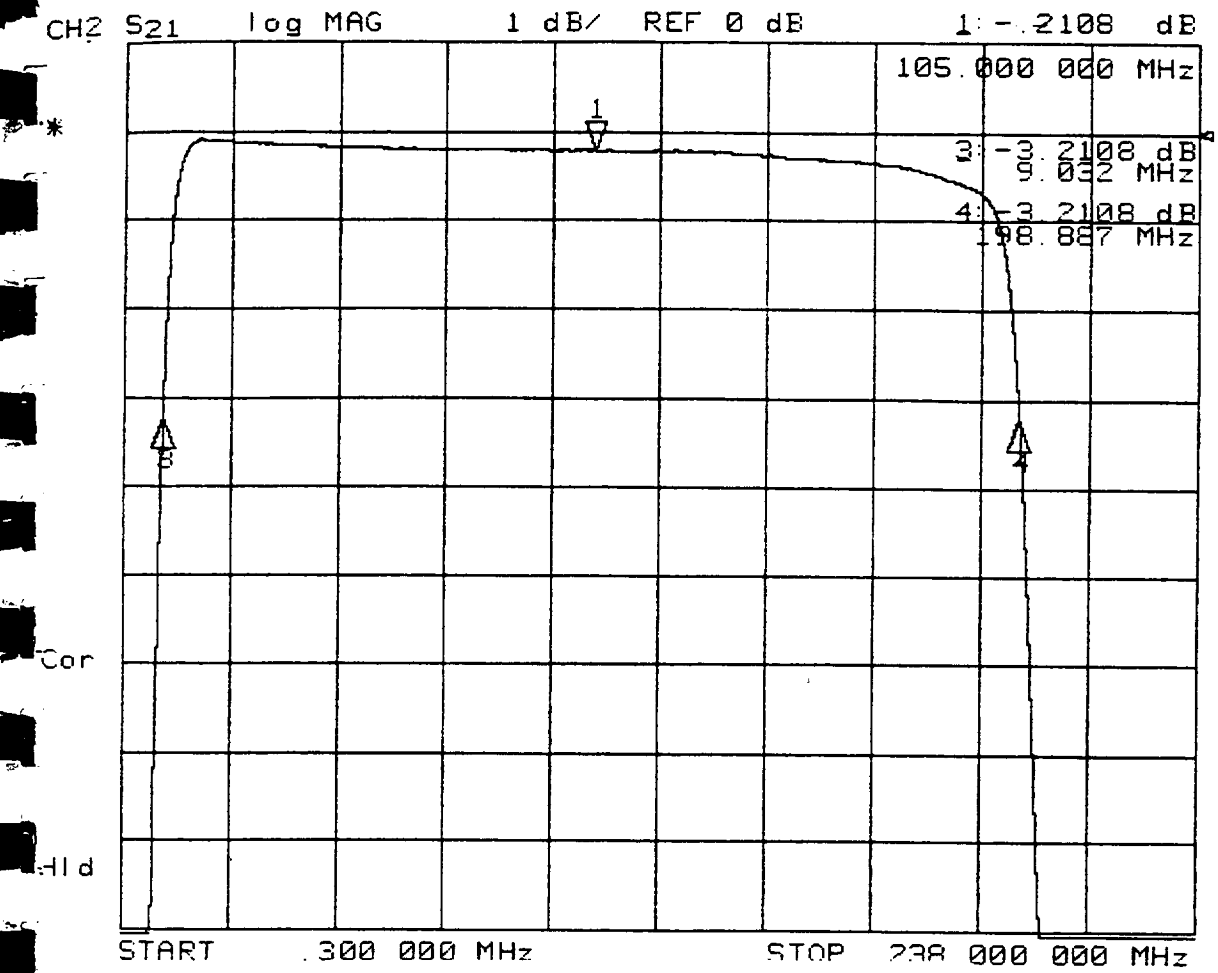
FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P228-012
-10C DATA

```
MARKER PARAMETE      OPR: R. HOGGATT  DATE DEC 28 1996  nnel 2

MARKER 1                               19.500000 MHz       105.000000 MHz
                                   OFF                     -.1952 dB

MARKER 2                              190.500000 MHz       104.330236 MHz
                                   OFF                     OFF

MARKER 3                               33.750000 MHz         9.052347 MHz
                                   OFF                     -3.1953 dB

MARKER 4                              176.250000 MHz       199.608126 MHz
                                   OFF                     -3.1953 dB

MKR STIMULUS OFFSET                     0.000000 MHz        89.425802 MHz
                                    0 dB                   -3.2342 dB

REFERENCE MARKER                    OFF                     OFF
PLACEMENT                          CONTINUOUS              CONTINUOUS
MARKER SEARCH                       OFF                     OFF
TARGET VALUE                       -14 dB                  -3 dB
MARKER WIDTH VALUE                 -3 dB                   -3 dB
                                    OFF                     OFF
MARKER TRACKING                     OFF                     OFF
```



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P228-012
+15C DATA
OPR: R. HOGGATT DATE DEC 28 1996

```
MARKER PARAMET                                         annel 2

MARKER 1                       19.500000 MHz        105.000000 MHz
                           OFF                      -.2034 dB

MARKER 2                      190.500000 MHz        104.137374 MHz
                           OFF                      OFF

MARKER 3                       33.750000 MHz          9.039544 MHz
                           OFF                      -3.2035 dB

MARKER 4                      176.250000 MHz        199.235204 MHz
                           OFF                      -3.2035 dB

MKR STIMULUS OFFSET             0.000000 MHz         89.425802 MHz
                            0 dB                    -3.2342 dB

REFERENCE MARKER            OFF                      OFF
PLACEMENT                  CONTINUOUS               CONTINUOUS
MARKER SEARCH               OFF                      OFF
TARGET VALUE               -14 dB                   -3 dB
MARKER WIDTH VALUE         -3 dB                    -3 dB
                            OFF                      OFF
MARKER TRACKING             OFF                      OFF
```



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P228-012
+40C DATA
OPR: R. HOGGATT DATE DEC 28 1996

```
MARKER PARAMET                                            annel 2

MARKER 1                         19.500000 MHz      105.000000 MHz
                             OFF                    -.2108 dB

MARKER 2                        190.500000 MHz      103.959768 MHz
                             OFF                    OFF

MARKER 3                         33.750000 MHz        9.032209 MHz
                             OFF                    -3.2108 dB

MARKER 4                        176.250000 MHz      198.887327 MHz
                             OFF                    -3.2108 dB

MKR STIMULUS OFFSET               0.000000 MHz       89.425802 MHz
                              0 dB                  -3.2342 dB

REFERENCE MARKER              OFF                    OFF
PLACEMENT                    CONTINUOUS             CONTINUOUS
MARKER SEARCH                 OFF                    OFF
TARGET VALUE                 -14 dB                 -3 dB
MARKER WIDTH VALUE           -3 dB                  -3 dB
                              OFF                    OFF
MARKER TRACKING               OFF                    OFF
```

APPENDIX B **ACCEPTANCE TEST REPORT**

BANDPASS FILTER MODEL HL105-190-10SS1 S/N P228-012
AEROJET 1331559-2 REV. E

PASSBAND RIPPLE (CON'T)

{11f} RECORD PASS/FAIL (0.5 dB MAX)	[✓ PASS] FAIL	[✓ PASS] FAIL	[✓ PASS] FAIL
{11g} ATTACH PASSBAND RIPPLE PERFORMANCE X-Y PLOT(S)	✓ (√)	✓ (√)	✓ (√)

OUT-OF-BAND REJECTION

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.5 Fc=105.0 MHz. REF {5A} FOR INSERTION LOSS @ Fc	-10°C	+15°C	+40°C
{12} WORST CASE REJECTION FROM 0.300 MHz TO 1.0 MHz	-59.0 dB (40.0 dB MIN)	-59.0 dB (40.0 dB MIN)	-59.0 dB (40.0 dB MIN)
{13a} WORST CASE REJECTION FROM 228.5 MHz TO 1000.0 MHz	-42.5 dB (40.0 dB MIN)	-42.6 dB (40.0 dB MIN)	-42.6 dB (40.0 dB MIN)
{13c} RECORD MEASURED TEMPERATURE	-14.5 °C (-15.0 TO -10.0)	+15.7 °C (12.5 TO 17.5)	+43.5 °C (40.0 TO 45.0)
{14} ATTACH REJECTION PERFORMANCE X-Y PLOT(S)	✓ (√) ✓ (√)	✓ (√) ✓ (√)	✓ (√) ✓ (√)

DA 5

TEST PERFORMED BY R. Hoggatt DATE 12/25/96

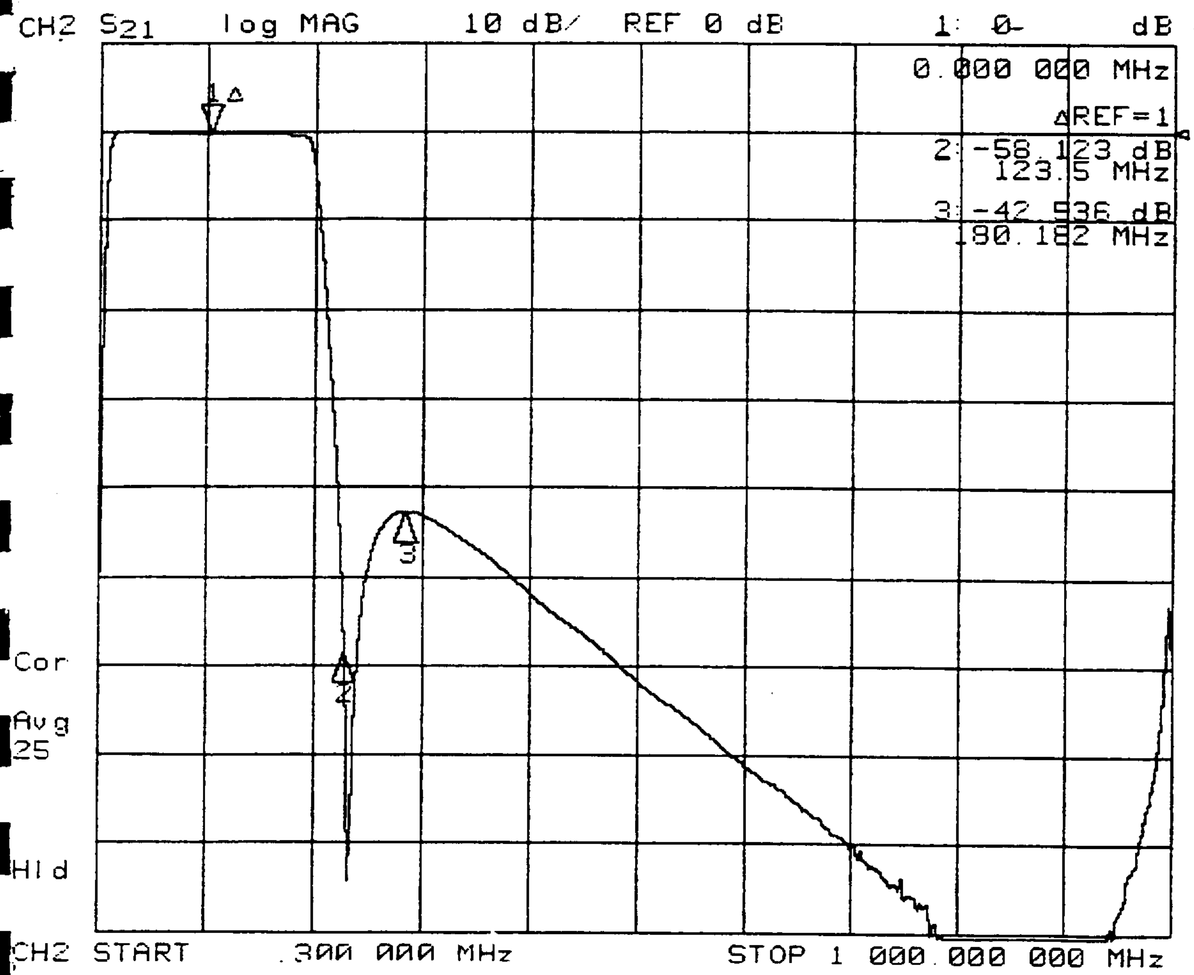
NOTE IF TEST WITNESSED BY AESD: ________ GSI: _ Not witnessed this time. DLD

***** END OF FUNCTIONAL PERFORMANCE TEST ****

OUTLINE AND MOUNTING DIMENSIONS VERIFICATION

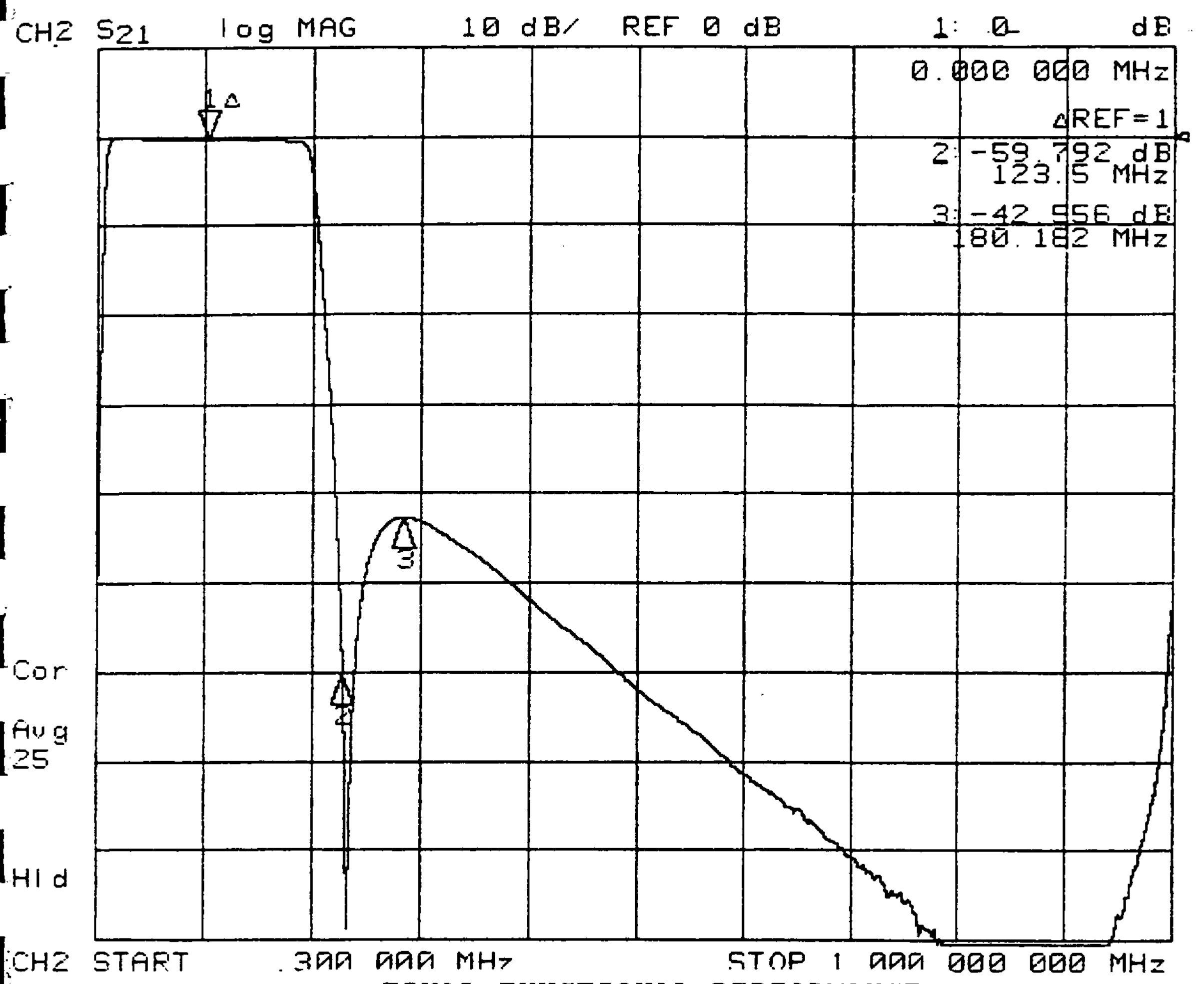
{16} REFERENCE CUSTOMER DRAWING 1331559

DESCRIPTION OF MEASUREMENT	DIMENSION AND TOLERANCE	ACTUAL MEASUREMENT
OVER ALL LENGTH	3.50 ± .03	3.502
MOUNTING HOLE CENTER	0.125 ± .010	0.127 ~~[illegible]~~ GC
BETWEEN UPPER MOUNTING HOLES	3.250	3.250
BETWEEN LOWER MOUNTING HOLES	3.250	3.250



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P228-012
-10C DATA
OPR: R. HOGGATT DATE DEC 28 1996

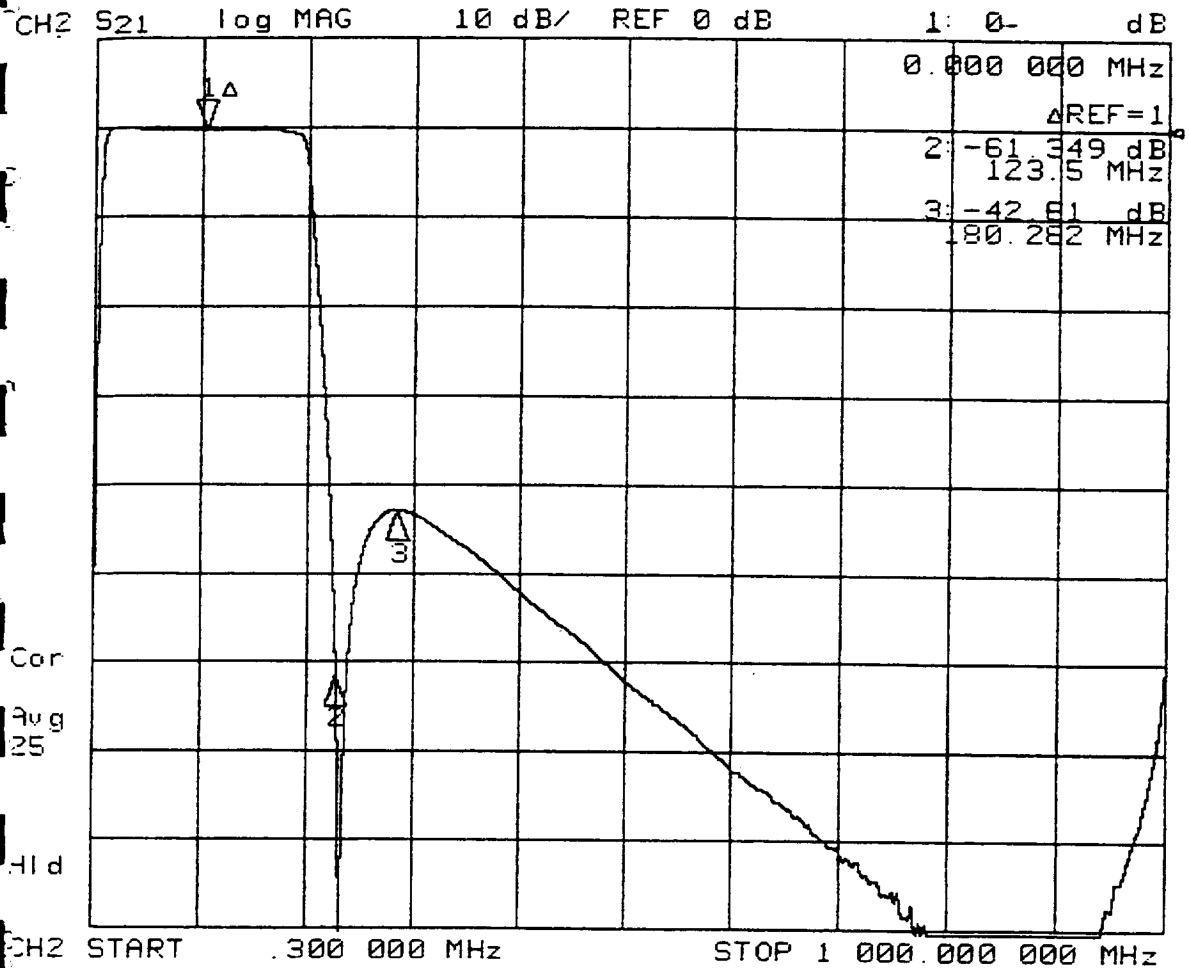
```
MARKER PARAMET                                             annel  2

MARKER 1                          1.000000 MHz      105.000000 MHz
                           OFF                       0 dB

MARKER 2                          5.000000 MHz      228.500000 MHz
                           OFF                      -58.123 dB

MARKER 3                          5.000000 MHz      285.182992 MHz
                           OFF                      -42.536 dB

MARKER 4                          5.000000 MHz         .300000 MHz
                           OFF                      OFF

MKR STIMULUS OFFSET               0.000000 MHz        0.000000 MHz
                            0 dB                     0 dB

REFERENCE MARKER            OFF                     MARKER 1
PLACEMENT                  CONTINUOUS               CONTINUOUS
MARKER SEARCH               OFF                      OFF
TARGET VALUE               -3 dB                    -3 dB
MARKER WIDTH VALUE         -3 dB                    -3 dB
                            OFF                      OFF
MARKER TRACKING             OFF                      OFF
```



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P228-012
+15C DATA

MARKER PARAMET OPR: R. HOGGATT DATE DEC 28 1996 annel 2

MARKER 1	1.000000 MHz OFF	105.000000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	228.500000 MHz -59.792 dB
MARKER 3	5.000000 MHz OFF	285.182992 MHz -42.556 dB
MARKER 4	5.000000 MHz OFF	.300000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P228-012
+40C DATA
OPR: R. HOGGATT DATE DEC 28 1996

```
MARKER PARAMET                                            annel 2

MARKER 1                          1.000000 MHz      105.000000 MHz
                             OFF                     0 dB

MARKER 2                          5.000000 MHz      228.500000 MHz
                             OFF                    -61.349 dB

MARKER 3                          5.000000 MHz      285.282962 MHz
                             OFF                    -42.61 dB

MARKER 4                          5.000000 MHz         .300000 MHz
                             OFF                    OFF

MKR STIMULUS OFFSET               0.000000 MHz        0.000000 MHz
                              0 dB                   0 dB

REFERENCE MARKER              OFF                   MARKER 1
PLACEMENT                    CONTINUOUS             CONTINUOUS
MARKER SEARCH                 OFF                    OFF
TARGET VALUE                 -3 dB                  -3 dB
MARKER WIDTH VALUE           -3 dB                  -3 dB
                              OFF                    OFF
MARKER TRACKING               OFF                    OFF
```

ACCEPTANCE TEST REPORT

BANDPASS FILTER MODEL HL105-190-10SS1 S/N P228-012
AEROJET 1331559-2 REV. E

BANDPASS CHARACTERISTICS MEASUREMENT

PER ATP PARA 4.6
(REF: AE-24687, PARA 4.8.2)

RECORD THE AMBIENT ROOM TEMPERATURE: +22.6 °C (+19°C TO +29.0°C)

{15} ATTACH PASSBAND PERFORMANCE X-Y PLOT ✓ (√)

{24} TEST POINT MATRIX

REF	FREQ	UNIT	VALUE	REF	FREQ	UNIT	VALUE
F1	0.5	MHz	-83.6 dB	F11	(*) 130.0	MHz	-0.19 dB
F2	1.0	MHz	-66.7 dB	F12	(*) 150.0	MHz	-0.25 dB
F3	5.0	MHz	-17.5 dB	F13	180.0	MHz	-0.44 dB
F4	7.5	MHz	-7.14 dB	F14	190.0	MHz	-0.63 dB
F5	10.0	MHz	-1.65 dB	F15	200.0	MHz	-3.97 dB
F6	20.0	MHz	-0.08 dB	F16	250.0	MHz	-49.0 dB
F7	40.0	MHz	-0.11 dB	F17	300.0	MHz	-43.2 dB
F8	(*) 60.0	MHz	-0.16 dB	F18	400.0	MHz	-52.0 dB
F9	(*) 80.0	MHz	-0.19 dB	F19	500.0	MHz	-61.9 dB
F10	105.0	MHz	-0.19 dB	F20	1000.0	MHz	-57.5 dB

DA

TEST PERFORMED BY: R. Hoggan DATE 12/27/96

NOTE IF TEST WITNESSED BY AESD__________ GSI _ Not witnessed this time. DLD

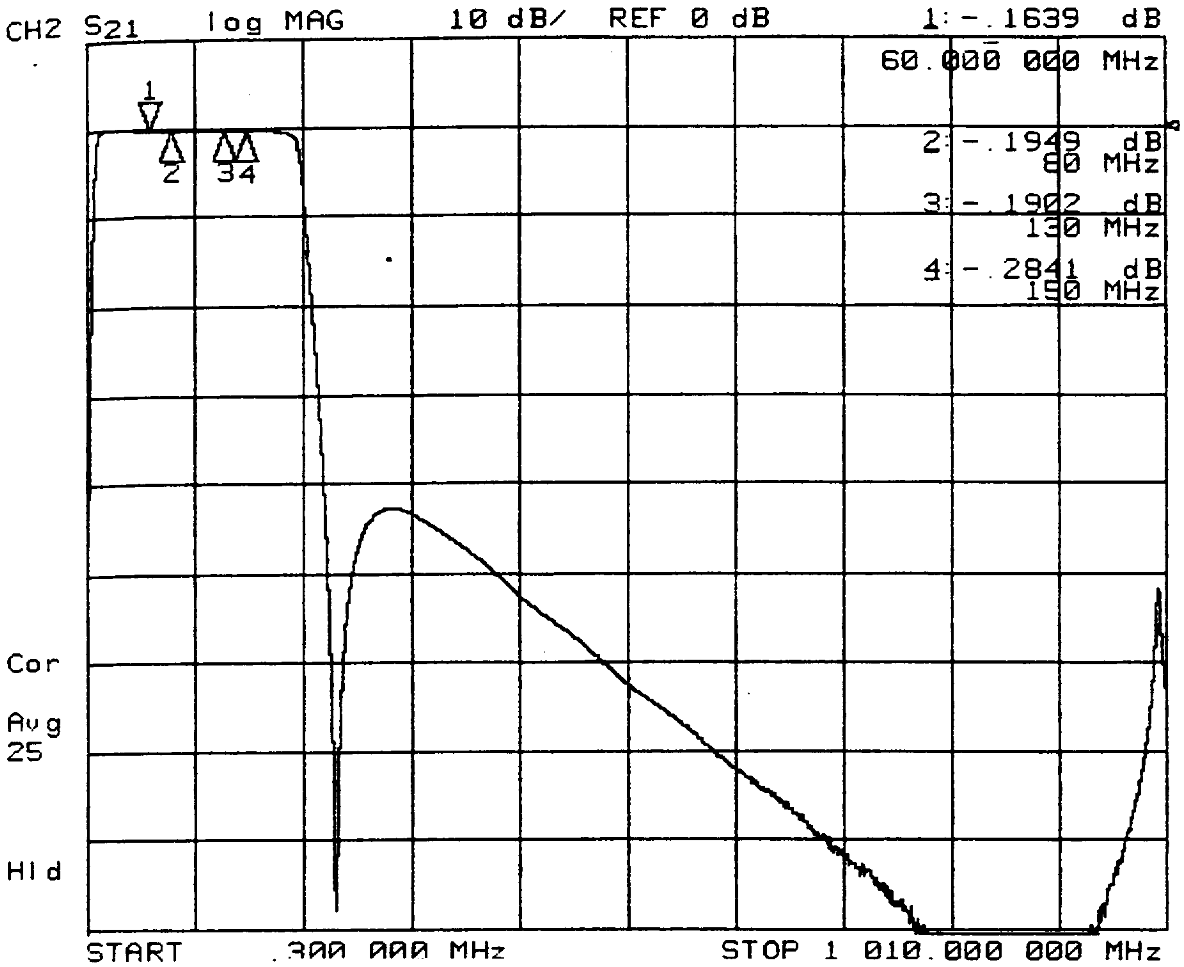
***** END OF BANDPASS CHARACTERISTICS TEST *****

FUNCTIONAL PERFORMANCE TEST

ACCEPTANCE TEST PROCEDURE
63-0005-02 PARA 4.1

BRIEF TEST DESCRIPTION: THE TESTS DESCRIBED IN APPENDIX B PAGE 10 THRU PAGE 13 ARE PERFORMED TO DOCUMENT THE FUNCTIONAL PERFORMANCE OF THE UNIT AT THE CONCLUSION OF ALL ENVIRONMENTAL TESTING. THE TESTS ARE AS FOLLOWS AND IN ANY SEQUENCE:

a.) VSWR PER ATP PARA 4.5.1.
b.) INSERTION LOSS PER ATP PARA 4.5.2
c.) INSERTION LOSS VS TEMPERATURE PER ATP PARA 4.5.6.
d.) 3.0 dB BANDWIDTH PER ATP PARA 4.5.3.
e.) CENTER FREQUENCY (fc) PER ATP PARA 4.5.7 (PART OF 3.0 dB B/W TEST)
f.) PASSBAND RIPPLE PER ATP PARA 4.5.4 (PART OF INSERTION LOSS TEST).
g.) OUT-OF-BAND REJECTION PER ATP PARA 4.5.5.



POST THERMAL CYCLE
PASSBAND CHARACTERISTICS
SERIAL NO. P228-012
AMBIENT
OPR: R. HOGGATT DATE DEC 27 1996

MARKER PARAME annel 2

MARKER 1	17.750000 MHz OFF	60.000000 MHz -.1639 dB
MARKER 2	157.250000 MHz OFF	80.000000 MHz -.1949 dB
MARKER 3	29.375000 MHz OFF	130.000000 MHz -.1902 dB
MARKER 4	145.625000 MHz OFF	150.000000 MHz -.2841 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB OFF	-3 dB OFF
MARKER TRACKING	OFF	OFF

Report No. 11413
February, 1999

Channel 5 Bandpass Filter

IF Filter (S/N: 1331559-5, S/N: P231-005)

APPENDIX E

ACCEPTANCE TEST REPORT

BANDPASS FILTER MODEL HL115-170-10SS1 S/N P231-005
AEROJET 1331559-5 REV. E

3.0 dB BANDWIDTH

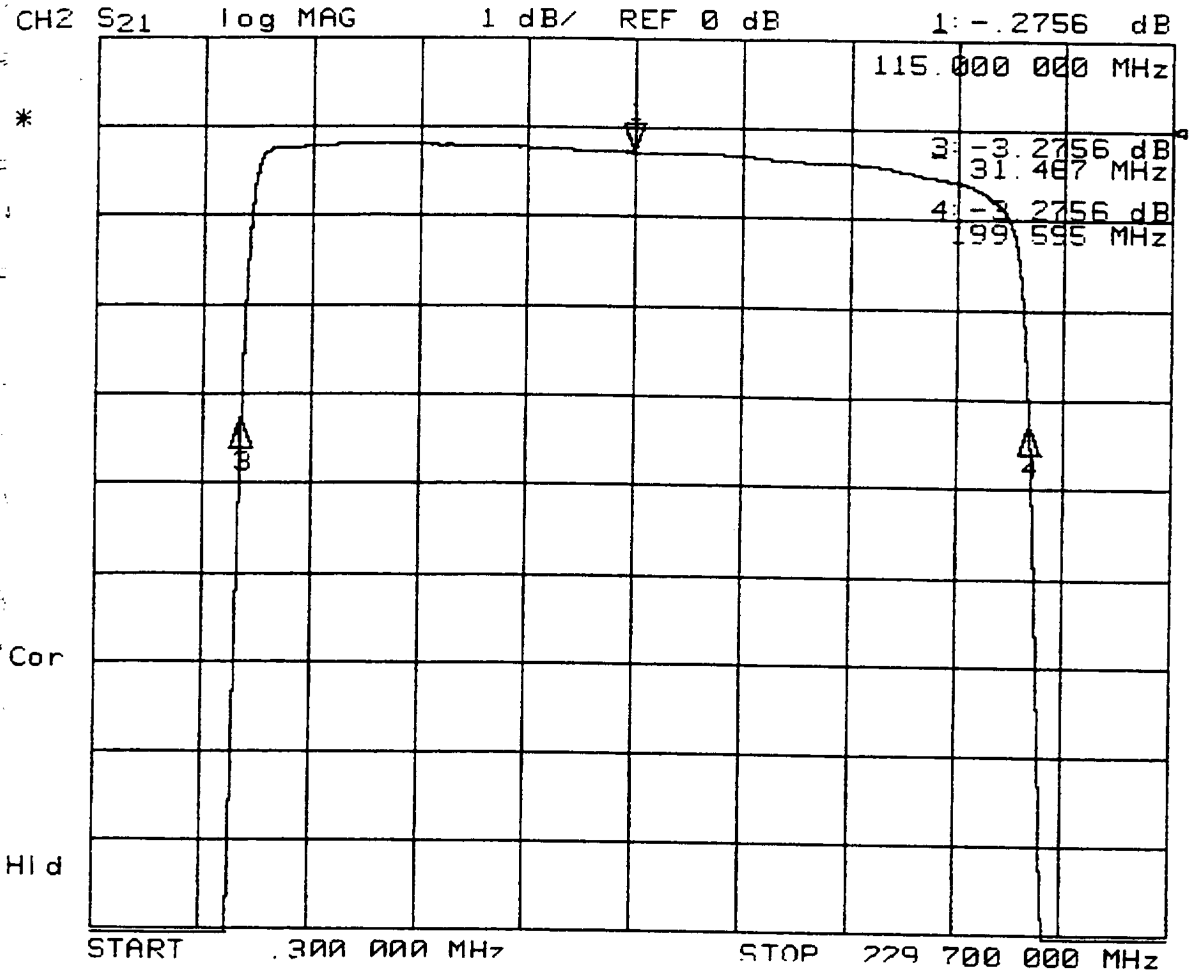
ACCEPTANCE TEST PROCEDURE 63-0005-010 PARA 4.5.3	-10°C	+15°C	+40°C
{7} UPPER 3.0 dB BANDEDGE	199.60 MHz (198.0-200.0)	199.26 Mhz (198.0-200.0)	198.93 MHz (198.0-200.0)
{8} LOWER 3.0 dB BANDEDGE	31.47 MHz (30.0-32.0)	31.40 Mhz (30.0-32.0)	31.34 MHz (30.0-32.0)
{9} 3.0 dB RELATIVE BANDWIDTH	168.13 MHz (166.0-170.0)	167.86 Mhz (166.0-170.0)	167.59 MHz (166.0-170.0)
{10} ADD {7} AND {8} ÷ 2 =	115.54 MHz (115.0 NOM)	115.33 MHz (115.0 NOM)	115.20 Mhz (115.0 NOM)
{10a} RECORD MEASURED TEMPERATURE	-13.1 °C (-15.0 TO -10.0)	+15.8 °C (12.5 TO 17.5)	+42.3 °C (40.0 TO 45.0)
{6} ATTACH TRANSMISSION LOSS PERFORMANCE X-Y PLOT	✓ (√)	✓ (√)	✓ (√)

PASSBAND RIPPLE

ACCEPTANCE TEST PROCEDURE 63-0005-010 PARA 4.5.4	-10°C	+15°C	+40°C
{11a} MIN INSERTION LOSS FREQ	59.94 MHz	57.08 Mhz	59.94 MHz
MIN INSERTION LOSS PERFORMANCE	-0.20 dB	-0.21 dB	-0.22 dB
{11b} 75% BW LOWER BANDEDGE FREQ	35.29 MHz	35.15 Mhz	35.03 MHz
75% BW LOWER BANDEDGE I.L. PERF	-0.40 dB	-0.42 dB	-0.44 dB
{11c} 75% BW UPPER BANDEDGE FREQ	162.79 MHz	162.65 Mhz	162.53 MHz
75% BW UPPER BANDEDGE I.L. PERF	-0.40 dB	-0.42 dB	-0.44 dB
{11d} PERFORMANCE DELTA (I.L. @ {11b} - I.L. @ {11a})	0.20 dB	0.21 dB	0.22 dB
{11e} PERFORMANCE DELTA (I.L. @ {11c} - I.L. @ {11a})	0.20 dB	0.21 dB	0.22 dB

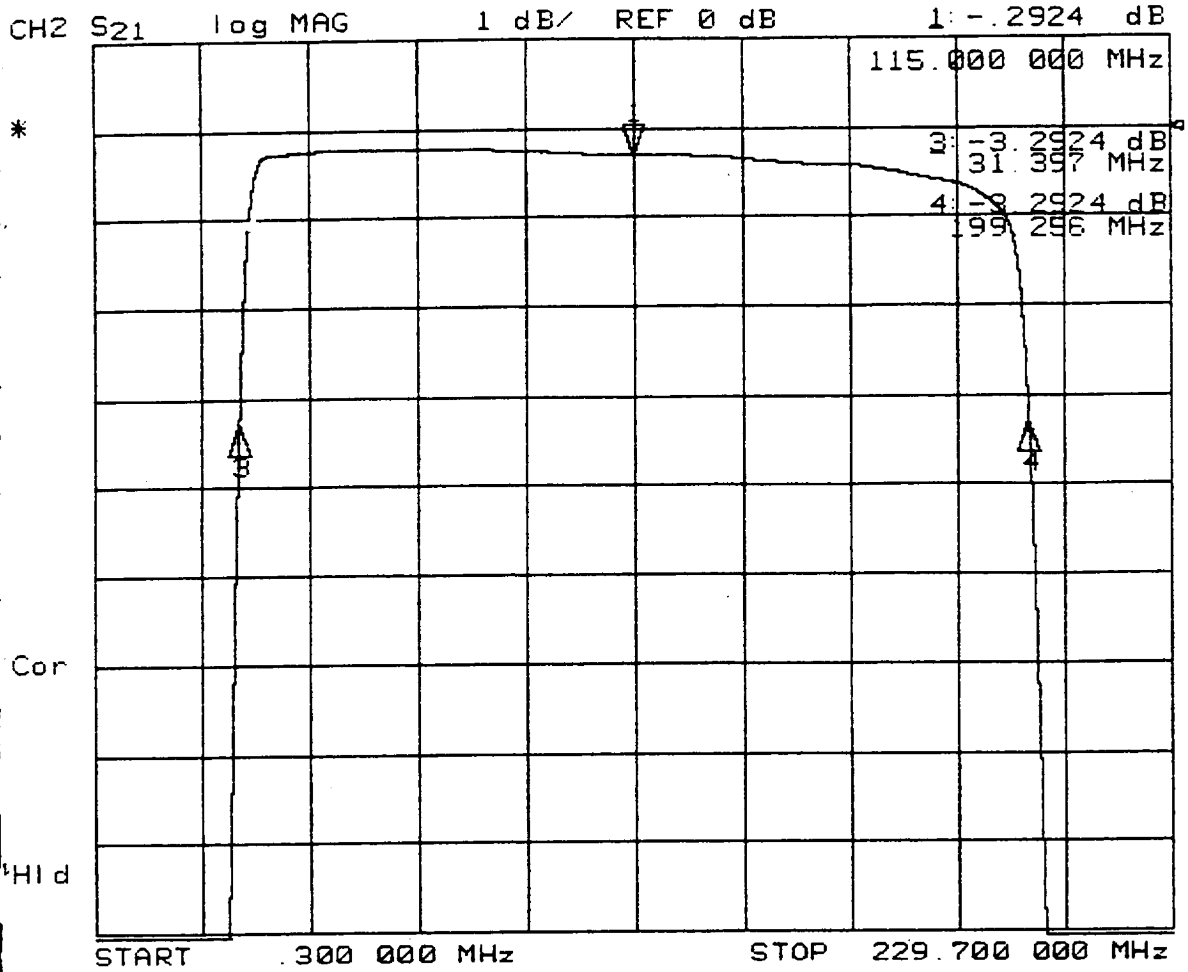
Prepared in accordance with MIL-STD-100

CONTRACT NO.	SIZE A	CAGE CODE 57032	DWG. NO. 63-0005-02	REV. J
DADEN-ANTHONY ASSOCIATES INC.	FILE: ACAD/63/0502APEJ.DOC		SHEET	13



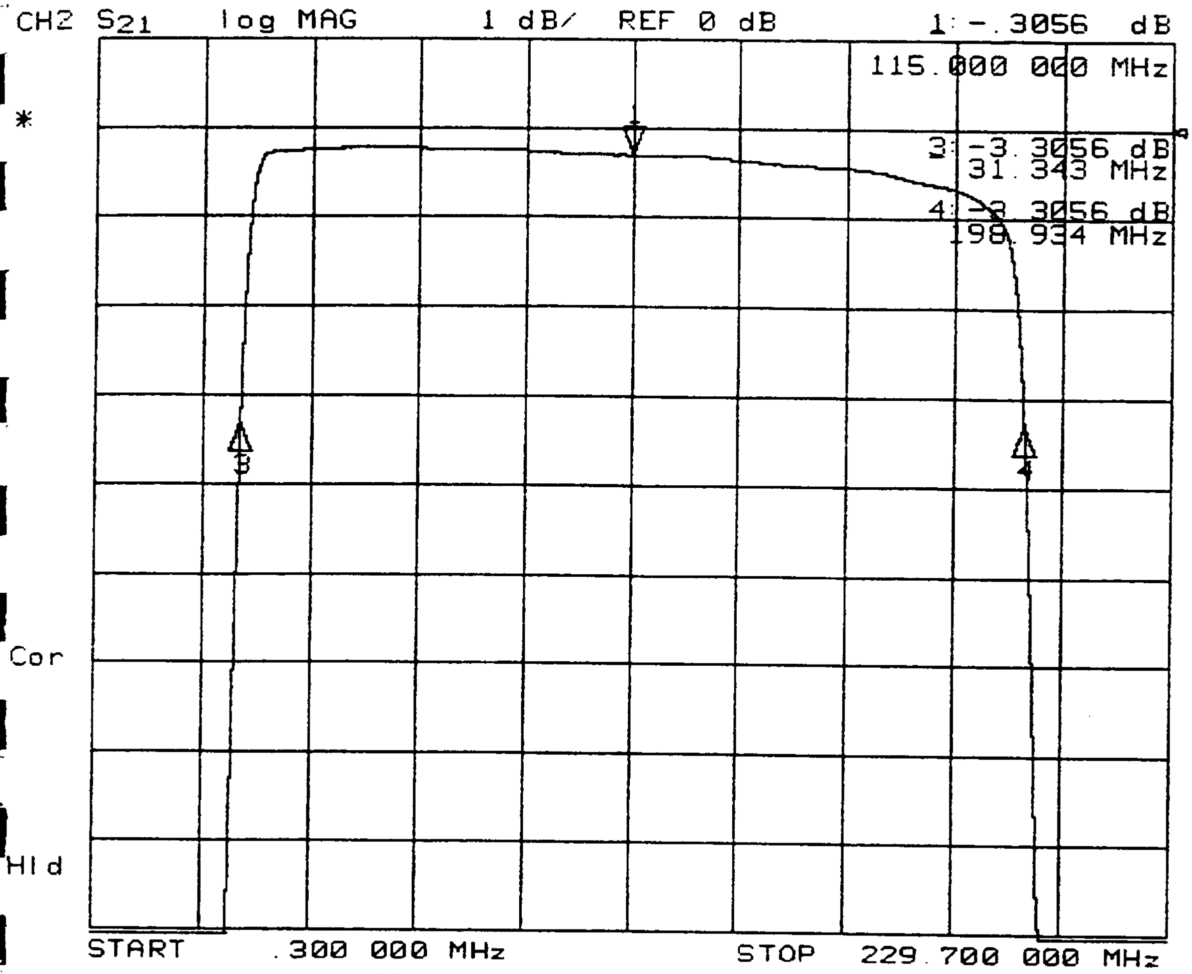
FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P231-005
-10C DATA
OPR: R. HOGGATT DATE DEC 21 1996

```
MARKER PARAMET                                               annel 2

MARKER 1                          38.500000 MHz       115.000000 MHz
                               OFF                   -.2756 dB

MARKER 2                         191.500000 MHz       115.531602 MHz
                               OFF                   OFF

MARKER 3                          51.250000 MHz        31.467571 MHz
                               OFF                   -3.2756 dB

MARKER 4                         178.750000 MHz       199.595633 MHz
                               OFF                   -3.2756 dB

MKR STIMULUS OFFSET                0.000000 MHz        89.425802 MHz
                                0 dB                 -3.2342 dB


REFERENCE MARKER                OFF                   OFF
PLACEMENT                      CONTINUOUS            CONTINUOUS
MARKER SEARCH                   OFF                   OFF
TARGET VALUE                   -14 dB                -3 dB
MARKER WIDTH VALUE             -3 dB                 -3 dB
                                OFF                   OFF
MARKER TRACKING                 OFF                   OFF
```



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P231-005
+15C DATA
OPR: R. HOGGATT DATE DEC 2 1 1996

```
MARKER PARAMET                                         annel 2

MARKER 1                    38.500000 MHz        115.000000 MHz
                         OFF                     -.2924 dB

MARKER 2                   191.500000 MHz        115.327465 MHz
                         OFF                     OFF

MARKER 3                    51.250000 MHz         31.397986 MHz
                         OFF                     -3.2924 dB

MARKER 4                   178.750000 MHz        199.256945 MHz
                         OFF                     -3.2924 dB

MKR STIMULUS OFFSET          0.000000 MHz         89.425802 MHz
                          0 dB                   -3.2342 dB


REFERENCE MARKER          OFF                     OFF
PLACEMENT                CONTINUOUS              CONTINUOUS
MARKER SEARCH             OFF                     OFF
TARGET VALUE             -14 dB                  -3 dB
MARKER WIDTH VALUE       -3 dB                   -3 dB
                          OFF                     OFF
MARKER TRACKING           OFF                     OFF
```



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P231-005
+40C DATA
OPR: R. HOGGATT DATE DEC 21 1996

MARKER PARAMET annel 2

MARKER 1	38.500000 MHz OFF	115.000000 MHz -.3056 dB
MARKER 2	191.500000 MHz OFF	115.139264 MHz OFF
MARKER 3	51.250000 MHz OFF	31.343540 MHz -3.3056 dB
MARKER 4	178.750000 MHz OFF	198.934989 MHz -3.3056 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

APPENDIX E

ACCEPTANCE TEST REPORT

BANDPASS FILTER MODEL HL115-170-10SS1 S/N P231-005
AEROJET 1331559-5 REV. E

PASSBAND RIPPLE (CON'T)

{11f} RECORD PASS/FAIL (0.5 dB MAX)	[✓ PASS]/FAIL	[✓ PASS]/FAIL	[✓ PASS]/FAIL
{11g) ATTACH PASSBAND RIPPLE PERFORMANCE X-Y PLOT(S)	✓ (√)	✓ (√)	___ (√)

OUT-OF-BAND REJECTION

ACCEPTANCE TEST PROCEDURE 63-0005-010 PARA 4.5.5 Fc=115.0 MHz REF {5A} FOR INSERTION LOSS @ Fc	-10°C	+15°C	+40°C
{12} WORST CASE REJECTION FROM 0.300 MHz TO 4.5 MHz	>90 dB (40.0 dB MIN)	>90 dB (40.0 dB MIN)	>90 dB (40.0 dB MIN)
{13a} WORST CASE REJECTION FROM 225.5 MHz TO 1000.0 MHz	-59.7 dB (40.0 dB MIN)	-60.5 dB (40.0 dB MIN)	-61.8 dB (40.0 dB MIN)
{13c} RECORD MEASURED TEMPERATURE	-13.4 °C (-15.0 TO -10.0)	+15.8 °C (12.5 TO 17.5)	+42.3 °C (40.0 TO 45.0)
{14} ATTACH REJECTION PERFORMANCE X-Y PLOT(S)	✓ (√)	✓ (√)	✓ (√)

TEST PERFORMED BY R. Hoggatt DA 5 DATE 12/21/96

NOTE IF TEST WITNESSED BY AESD: ________ GSI: Not witnessed this time. DLD

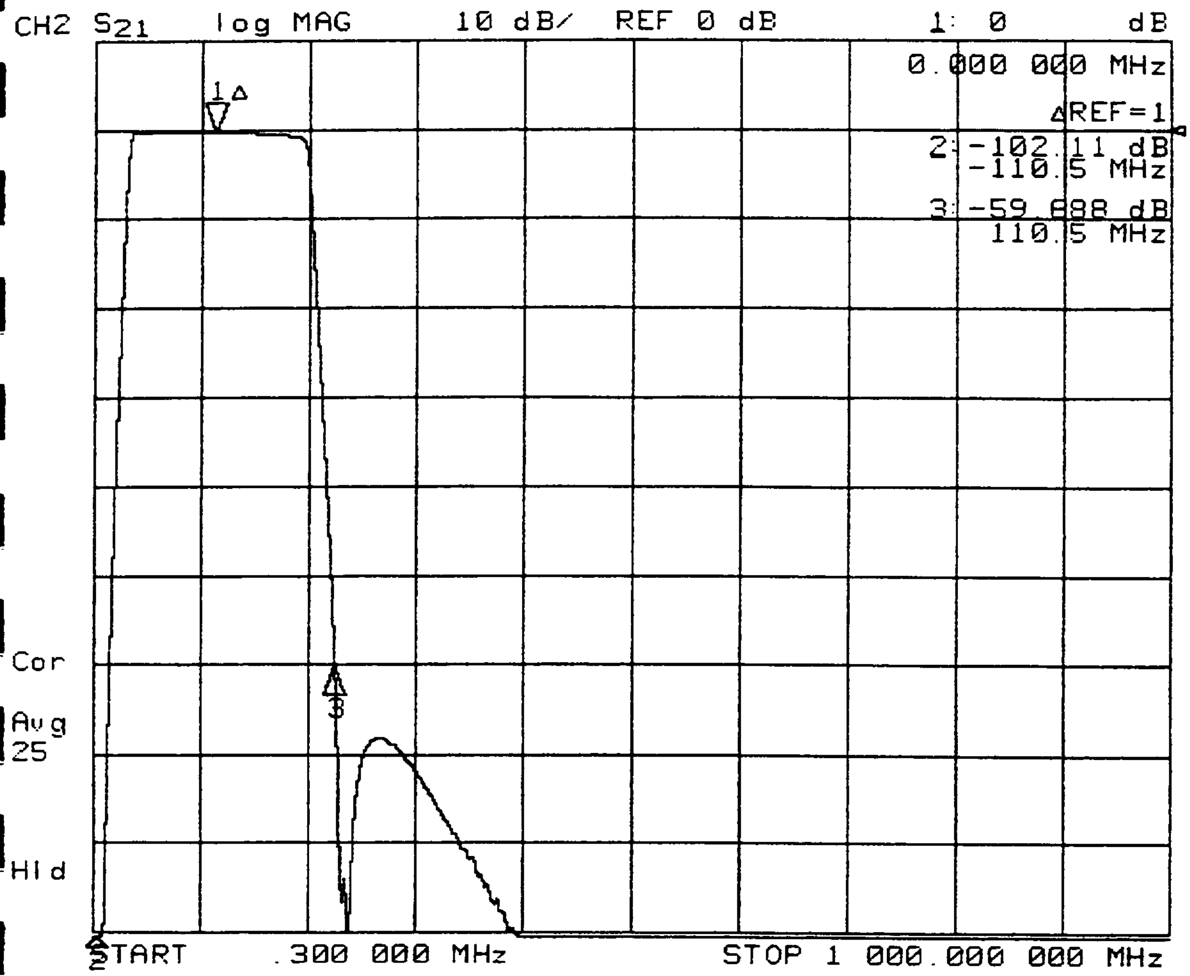
***** END OF FUNCTIONAL PERFORMANCE TEST ****

OUTLINE AND MOUNTING DIMENSIONS VERIFICATION

{16} REFERENCE CUSTOMER DRAWING 1331559

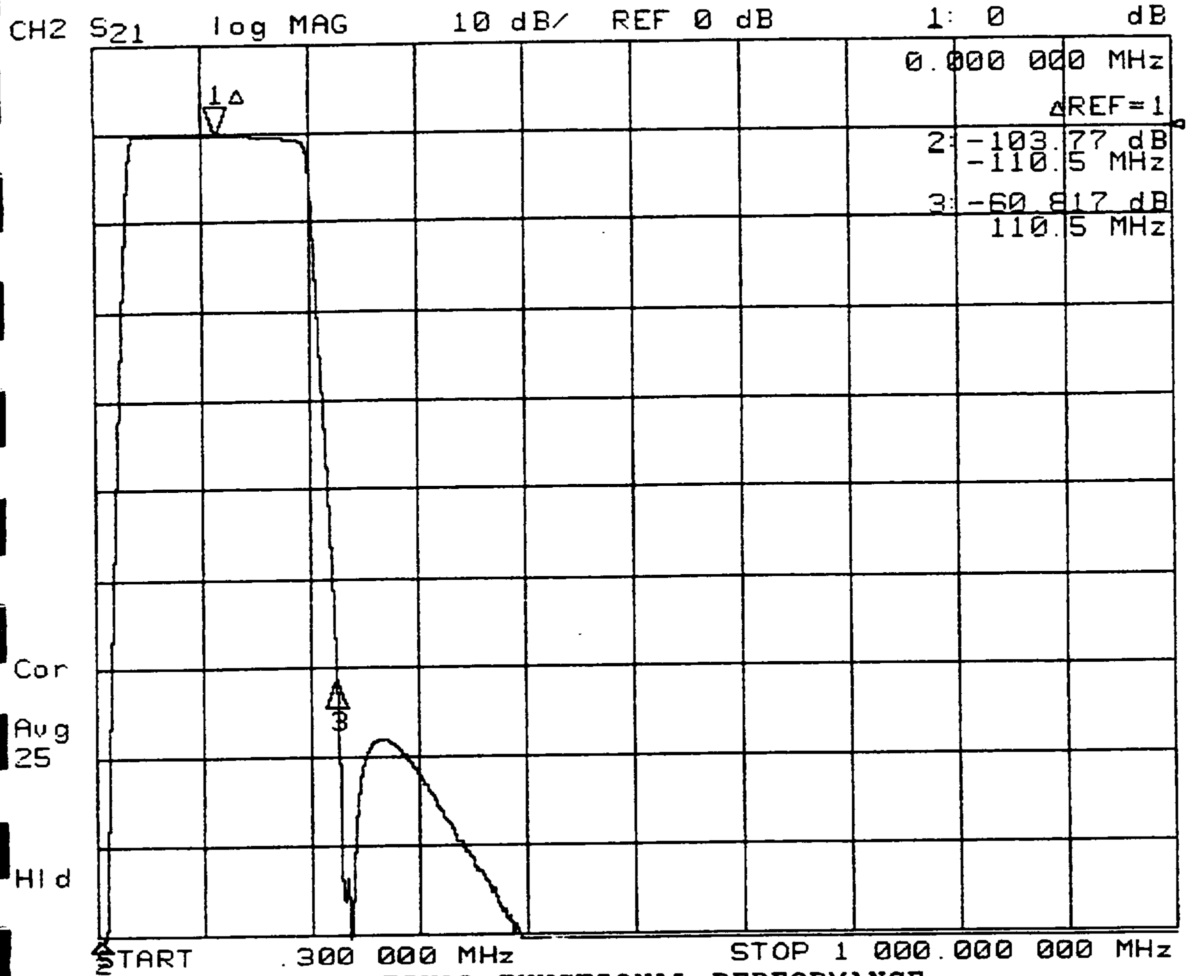
DESCRIPTION OF MEASUREMENT	DIMENSION AND TOLERANCE	ACTUAL MEASUREMENT
OVER ALL LENGTH	3.50 ± .03	3.499
MOUNTING HOLE CENTER	0.125 ± .010	0.125
BETWEEN UPPER MOUNTING HOLES	3.250	3.250
BETWEEN LOWER MOUNTING HOLES	3.250	3.251

Prepared in accordance with MIL-STD-100



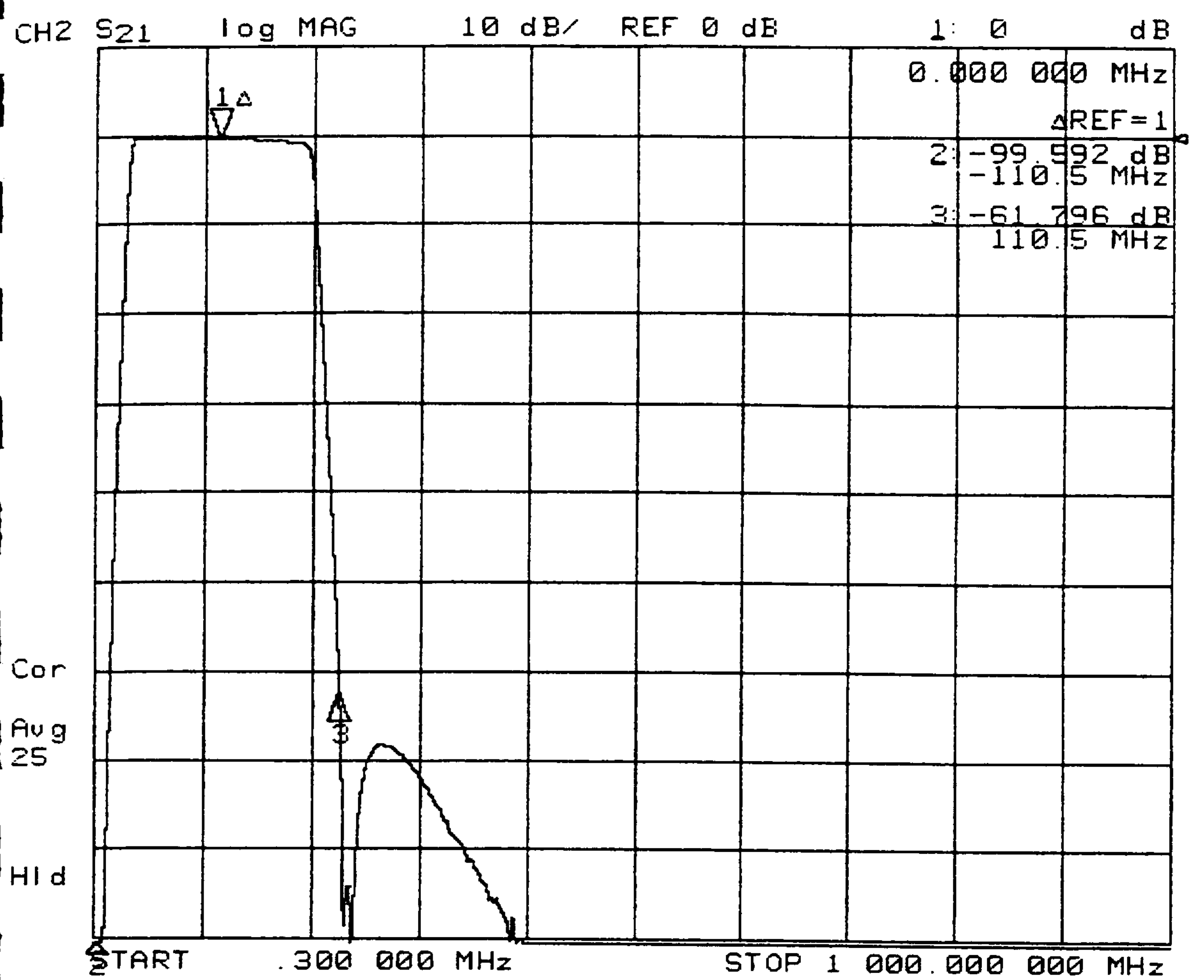
FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P231-005
-10C DATA
OPR: R. HOGGATT DATE DEC 2 1 1996

```
MARKER PARAMET                                            annel 2

MARKER 1                      1000.000000 MHz      115.000000 MHz
                             OFF                   0 dB

MARKER 2                      1000.000000 MHz        4.500000 MHz
                             OFF                  -102.11 dB

MARKER 3                      1000.000000 MHz      225.500000 MHz
                             OFF                  -59.688 dB

MARKER 4                      1000.000000 MHz     1000.000000 MHz
                             OFF                  OFF

MKR STIMULUS OFFSET              0.000000 MHz        0.000000 MHz
                              0 dB                 0 dB


REFERENCE MARKER              OFF                 MARKER 1
PLACEMENT                    CONTINUOUS           CONTINUOUS
MARKER SEARCH                 OFF                  OFF
TARGET VALUE                 -3 dB                -3 dB
MARKER WIDTH VALUE           -3 dB                -3 dB
                              OFF                  OFF
MARKER TRACKING               OFF                  OFF
```



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P231-005
+15C DATA
OPR: R. HOGGATT DATE DEC 2 1 1996

```
MARKER PARAMET                                        annel 2

MARKER 1                  1000.000000 MHz      115.000000 MHz
                         OFF                   0 dB

MARKER 2                  1000.000000 MHz        4.500000 MHz
                         OFF                  -103.77 dB

MARKER 3                  1000.000000 MHz      225.500000 MHz
                         OFF                  -60.817 dB

MARKER 4                  1000.000000 MHz     1000.000000 MHz
                         OFF                  OFF

MKR STIMULUS OFFSET          0.000000 MHz        0.000000 MHz
                          0 dB                 0 dB


REFERENCE MARKER          OFF                 MARKER 1
PLACEMENT                CONTINUOUS           CONTINUOUS
MARKER SEARCH             OFF                  OFF
TARGET VALUE             -3 dB                -3 dB
MARKER WIDTH VALUE       -3 dB                -3 dB
                          OFF                  OFF
MARKER TRACKING           OFF                  OFF
```



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P231-005
+40C DATA
MARKER PARAME **OPR: R. HOGGATT DATE** DEC 2 1 1996 annel 2

```
MARKER 1                          1000.000000 MHz      115.000000 MHz
                                  OFF                  0 dB

MARKER 2                          1000.000000 MHz        4.500000 MHz
                                  OFF                 -99.592 dB

MARKER 3                          1000.000000 MHz      225.500000 MHz
                                  OFF                 -61.796 dB

MARKER 4                          1000.000000 MHz     1000.000000 MHz
                                  OFF                 OFF

MKR STIMULUS OFFSET                  0.000000 MHz        0.000000 MHz
                                   0 dB                0 dB


REFERENCE MARKER                   OFF                MARKER 1
PLACEMENT                         CONTINUOUS          CONTINUOUS
MARKER SEARCH                      OFF                 OFF
TARGET VALUE                      -3 dB               -3 dB
MARKER WIDTH VALUE                -3 dB               -3 dB
                                   OFF                 OFF
MARKER TRACKING                    OFF                 OFF
```

BANDPASS FILTER MODEL HL115-170-10SS1 S/N P231-005
AEROJET 1331559-5 REV. E

BANDPASS CHARACTERISTICS MEASUREMENT

PER ATP PARA 4.6
(REF: AE-24687 PARA 4.8.2)

RECORD THE AMBIENT ROOM TEMPERATURE +22.0 °C (+19°C TO +29.0°C)

{15} ATTACH PASSBAND PERFORMANCE X-Y PLOT ✓ (√)

{24} TEST POINT MATRIX

REF	FREQ	UNIT	VALUE	REF	FREQ	UNIT	VALUE
F1	0.5	MHz	-107.7 dB	F11	(*) 130.0	MHz	-0.31 dB
F2	1.0	MHz	-107.3 dB	F12	(*) 155.0	MHz	-0.44 dB
F3	10.0	MHz	-91.2 dB	F13	180.0	MHz	-0.63 dB
F4	20.0	MHz	-39.9 dB	F14	190.0	MHz	-0.80 dB
F5	30.0	MHz	-6.67 dB	F15	200.0	MHz	-4.30 dB
F6	40.0	MHz	-0.25 dB	F16	210.0	MHz	-25.2 dB
F7	50.0	MHz	-0.24 dB	F17	300.0	MHz	-71.9 dB
F8	(*) 75.0	MHz	-0.24 dB	F18	400.0	MHz	-92.7 dB
F9	(*) 100.0	MHz	-0.29 dB	F19	500.0	MHz	-99.3 dB
F10	115.0	MHz	-0.31 dB	F20	1000.0	MHz	-107.9 dB

TEST PERFORMED BY: R. Hoggatt DA 5 DATE 12/21/96

NOTE IF TEST WITNESSED BY AESD ____________ GSI - Not witnessed this time. DLD

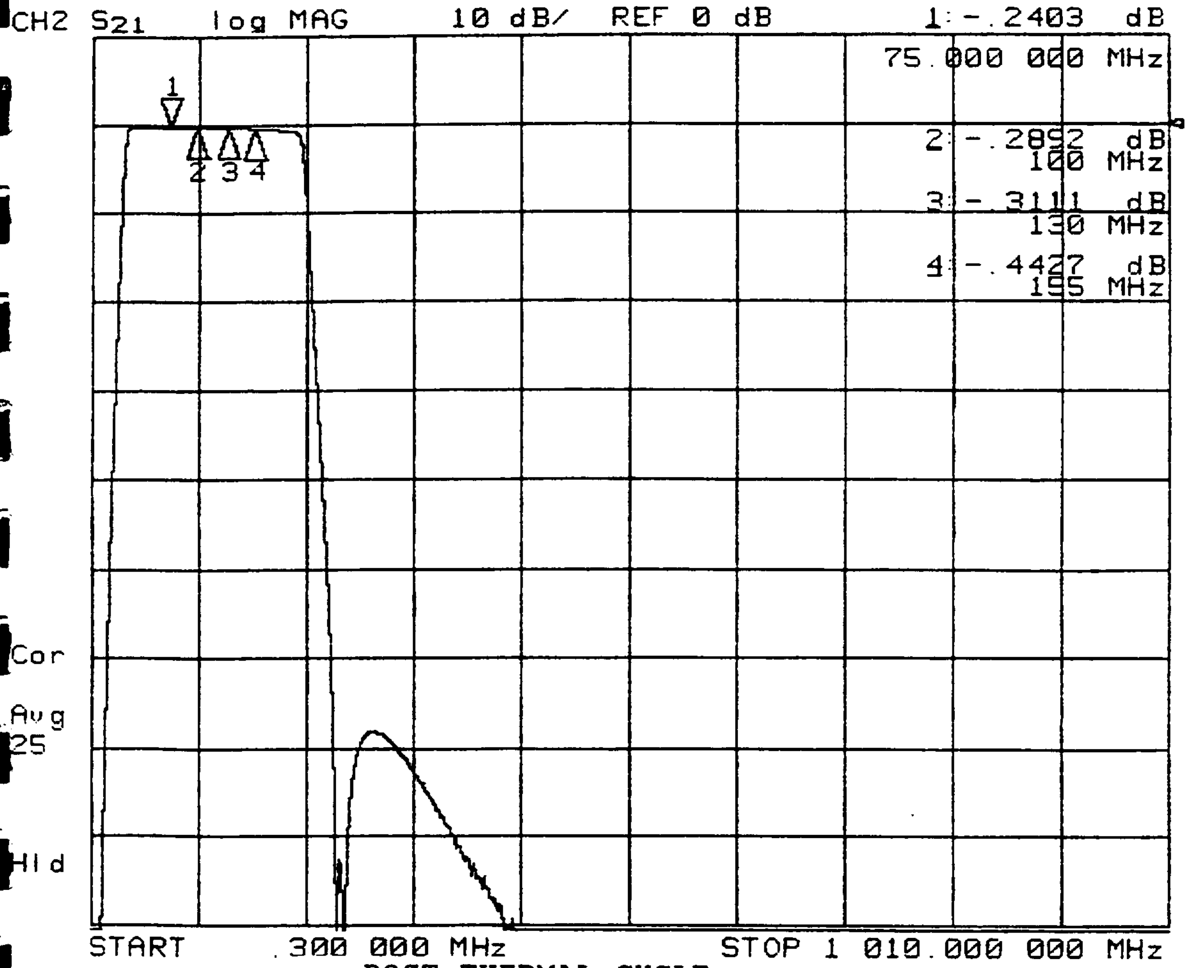
***** END OF BANDPASS CHARACTERISTICS TEST *****

FUNCTIONAL PERFORMANCE TEST

ACCEPTANCE TEST PROCEDURE
63-0005-010 PARA 4.1

BRIEF TEST DESCRIPTION: THE TESTS DESCRIBED IN APPENDIX E PAGE 10 THRU PAGE 13 ARE PERFORMED TO DOCUMENT THE FUNCTIONAL PERFORMANCE OF THE UNIT AT THE CONCLUSION OF ALL ENVIRONMENTAL TESTING. THE TESTS ARE AS FOLLOWS AND IN ANY SEQUENCE:

a.) VSWR PER ATP PARA 4.5.1.
b.) INSERTION LOSS PER ATP PARA 4.5.2
c.) INSERTION LOSS VS TEMPERATURE PER ATP PARA 4.5.6.
d.) 3.0 dB BANDWIDTH PER ATP PARA 4.5.3.
e.) CENTER FREQUENCY (fc) PER ATP PARA 4.5.7 (PART OF 3.0 dB B/W TEST)
f.) PASSBAND RIPPLE PER ATP PARA 4.5.4 (PART OF INSERTION LOSS TEST).
g.) OUT-OF-BAND REJECTION PER ATP PARA 4.5.5.



POST THERMAL CYCLE
PASSBAND CHARACTERISTICS
SERIAL NO. P231-005
AMBIENT
OPR: R. HOGGATT DATE DEC 21 1996

MARKER PARAME annel 2

MARKER 1	17.750000 MHz OFF	75.000000 MHz -.2403 dB
MARKER 2	157.250000 MHz OFF	100.000000 MHz -.2892 dB
MARKER 3	29.375000 MHz OFF	130.000000 MHz -.3111 dB
MARKER 4	145.625000 MHz OFF	155.000000 MHz -.4427 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

Report No. 11413
February, 1999

Channel 6 Bandpass Filter

IF Filter (S/N: 1331559-2, S/N: P228-005)

APPENDIX B

ACCEPTANCE TEST REPORT

BANDPASS FILTER MODEL HL105-190-10SS1 S/N P228-005
AEROJET 1331559-2 REV. E

3.0 dB BANDWIDTH

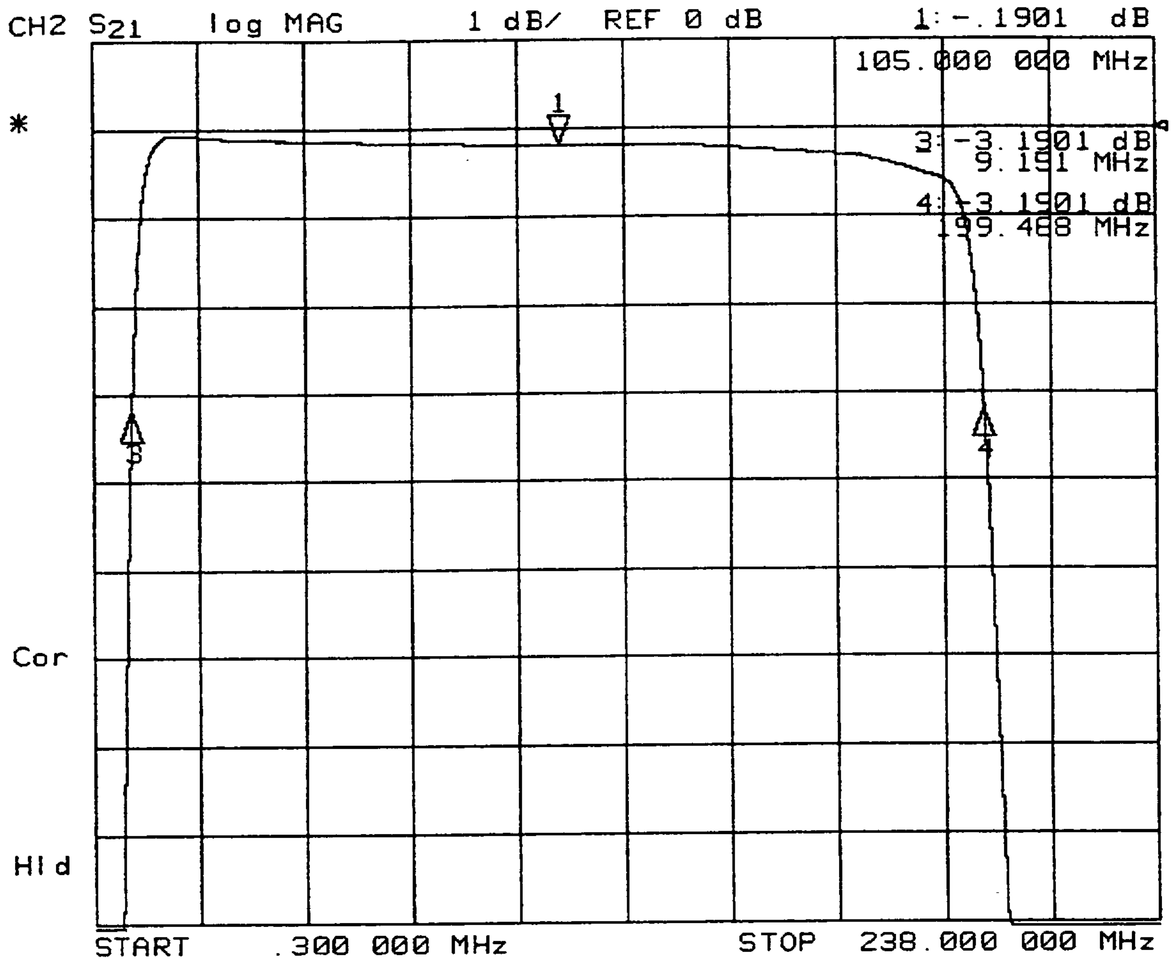
ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.3	-10°C	+15°C	+40°C
{7} UPPER 3.0 dB BANDEDGE	199.47 MHz (198.0-200.0)	199.11 Mhz (198.0-200.0)	198.78 MHz (1480.01500.0)
{8} LOWER 3.0 dB BANDEDGE	9.15 MHz (8.0-10.0)	9.14 Mhz (8.0-10.0)	9.13 MHz (8.0-10.0)
{9} 3.0 dB RELATIVE BANDWIDTH	190.32 MHz (188.0-192.0)	189.97 Mhz (188.0-192.0)	189.65 MHz (188.0-192.0)
{10} ADD {7} AND {8} ÷ 2 =	104.31 MHz (105.0 NOM)	104.13 MHz (105.0 NOM)	103.96 Mhz (105.0 NOM)
{10a} RECORD MEASURED TEMPERATURE	-13.4 °C (-15.0 TO -10.0)	+15.0 °C (12.5 TO 17.5)	+43.0 °C (40.0 TO 45.0)
{6} ATTACH TRANSMISSION LOSS PERFORMANCE X-Y PLOT	✓ (√)	✓ (√)	✓ (√)

PASSBAND RIPPLE

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.4	-10°C	+15°C	+40°C
{11a} MIN INSERTION LOSS FREQ	19.32 MHz	19.91 Mhz	19.32 MHz
MIN INSERTION LOSS PERFORMANCE	-0.07 dB	-0.08 dB	-0.08 dB
{11b} 75% BW LOWER BANDEDGE FREQ	13.84 MHz	13.68 Mhz	13.58 MHz
75% BW LOWER BANDEDGE I.L. PERF	-0.26 dB	-0.28 dB	-0.30 dB
{11c} 75% BW UPPER BANDEDGE FREQ	156.34 MHz	156.18 Mhz	156.08 MHz
75% BW UPPER BANDEDGE I.L. PERF	-0.26 dB	-0.28 dB	-0.30 dB
{11d} PERFORMANCE DELTA (I.L. @ {11b} - I.L. @ {11a})	0.19 dB	0.20 dB	0.22 dB
{11e} PERFORMANCE DELTA (I.L. @ {11c} - I.L. @ {11a})	0.19 dB	0.20 dB	0.22 dB

Prepared in accordance with MIL-STD-100

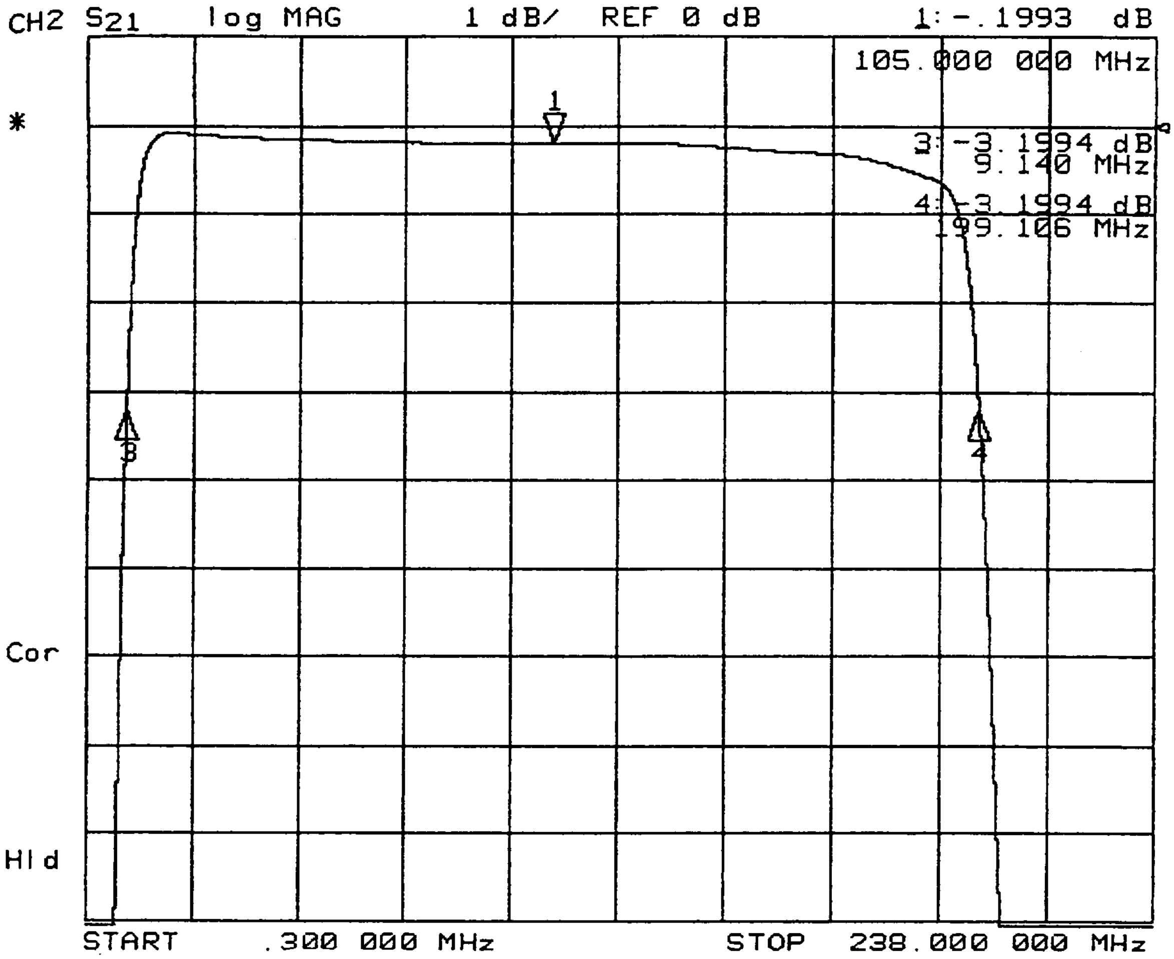
CONTRACT NO.	SIZE A	CAGE CODE 57032	DWG. NO. 63-0005-02	REV. J
DADEN-ANTHONY ASSOCIATES INC.	FILE: ACAD/63/0502APBJ.DOC		SHEET 13	



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P228-005
-10C DATA

MARKER PARAMET OPR: R. HOGGATT DATE DEC 27 1996 annel 2

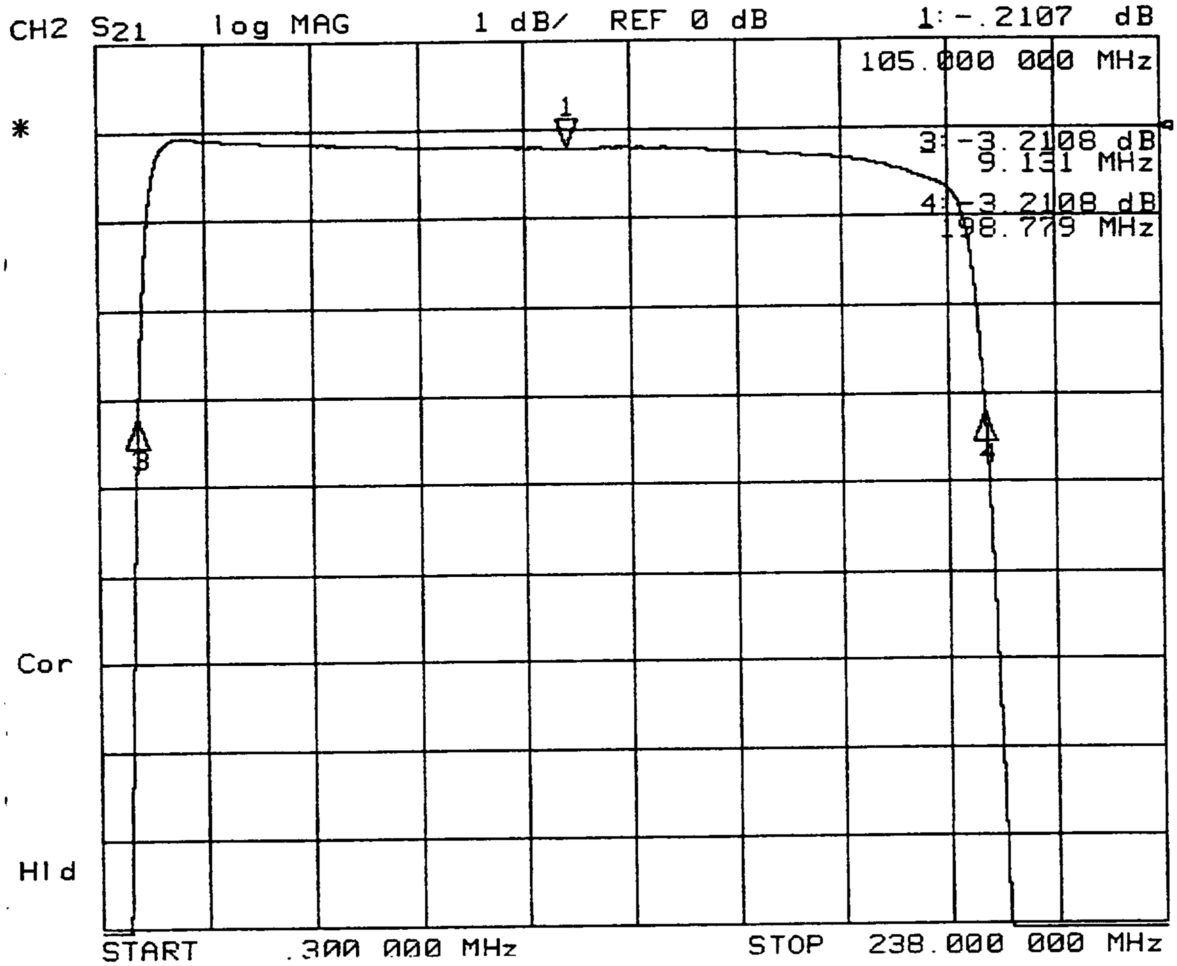
MARKER 1	19.500000 MHz OFF	105.000000 MHz -.1901 dB
MARKER 2	190.500000 MHz OFF	104.309850 MHz OFF
MARKER 3	33.750000 MHz OFF	9.151394 MHz -3.1901 dB
MARKER 4	176.250000 MHz OFF	199.468307 MHz -3.1901 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB OFF	-3 dB OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P228-005
+15C DATA
OPR: R. HOGGATT DATE DEC 27 1996

MARKER PARAMET annel 2

MARKER 1	19.500000 MHz OFF	105.000000 MHz -.1993 dB
MARKER 2	190.500000 MHz OFF	104.123676 MHz OFF
MARKER 3	33.750000 MHz OFF	9.140910 MHz -3.1994 dB
MARKER 4	176.250000 MHz OFF	199.106443 MHz -3.1994 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P228-005
+40C DATA
OPR: R. HOGGATT DATE DEC 27 1996

```
MARKER PARAMET                                                  annel 2

MARKER 1                              19.500000 MHz        105.000000 MHz
                                     OFF                   -.2107 dB

MARKER 2                             190.500000 MHz        103.955639 MHz
                                     OFF                   OFF

MARKER 3                              33.750000 MHz          9.131686 MHz
                                     OFF                   -3.2108 dB

MARKER 4                             176.250000 MHz        198.779593 MHz
                                     OFF                   -3.2108 dB

MKR STIMULUS OFFSET                    0.000000 MHz         89.425802 MHz
                                      0 dB                 -3.2342 dB


REFERENCE MARKER                      OFF                   OFF
PLACEMENT                            CONTINUOUS            CONTINUOUS
MARKER SEARCH                         OFF                   OFF
TARGET VALUE                         -14 dB                -3 dB
MARKER WIDTH VALUE                   -3 dB                 -3 dB
                                      OFF                   OFF
MARKER TRACKING                       OFF                   OFF
```

BANDPASS FILTER MODEL HL105-190-10SS1 S/N P228-005
AEROJET 1331559-2 REV. E

PASSBAND RIPPLE (CON'T)

{11f} RECORD PASS/FAIL (0.5 dB MAX)	[✓ PASS]/FAIL	[✓ PASS]/FAIL	[✓ PASS]/FAIL
{11g) ATTACH PASSBAND RIPPLE PERFORMANCE X-Y PLOT(S)	✓ (√)	✓ (√)	✓ (√)

OUT-OF-BAND REJECTION

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.5 Fc=105.0 MHz. REF {5A} FOR INSERTION LOSS @ Fc	-10°C	+15°C	+40°C
{12} WORST CASE REJECTION FROM 0.300 MHz TO 1.0 MHz	-59.3 dB (40.0 dB MIN)	-59.2 dB (40.0 dB MIN)	-59.2 dB (40.0 dB MIN)
{13a} WORST CASE REJECTION FROM 228.5 MHz TO 1000.0 MHz	-42.6 dB (40.0 dB MIN)	-42.6 dB (40.0 dB MIN)	-42.7 dB (40.0 dB MIN)
{13c} RECORD MEASURED TEMPERATURE	-13.6 °C (-15.0 TO -10.0)	+15.0 °C (12.5 TO 17.5)	+43.1 °C (40.0 TO 45.0)
{14} ATTACH REJECTION PERFORMANCE X-Y PLOT(S)	✓ (√) ✓ (√)	✓ (√) ✓ (√)	✓ (√) ✓ (√)

TEST PERFORMED BY R. Hoggatt DA 5 DATE 12/27/96

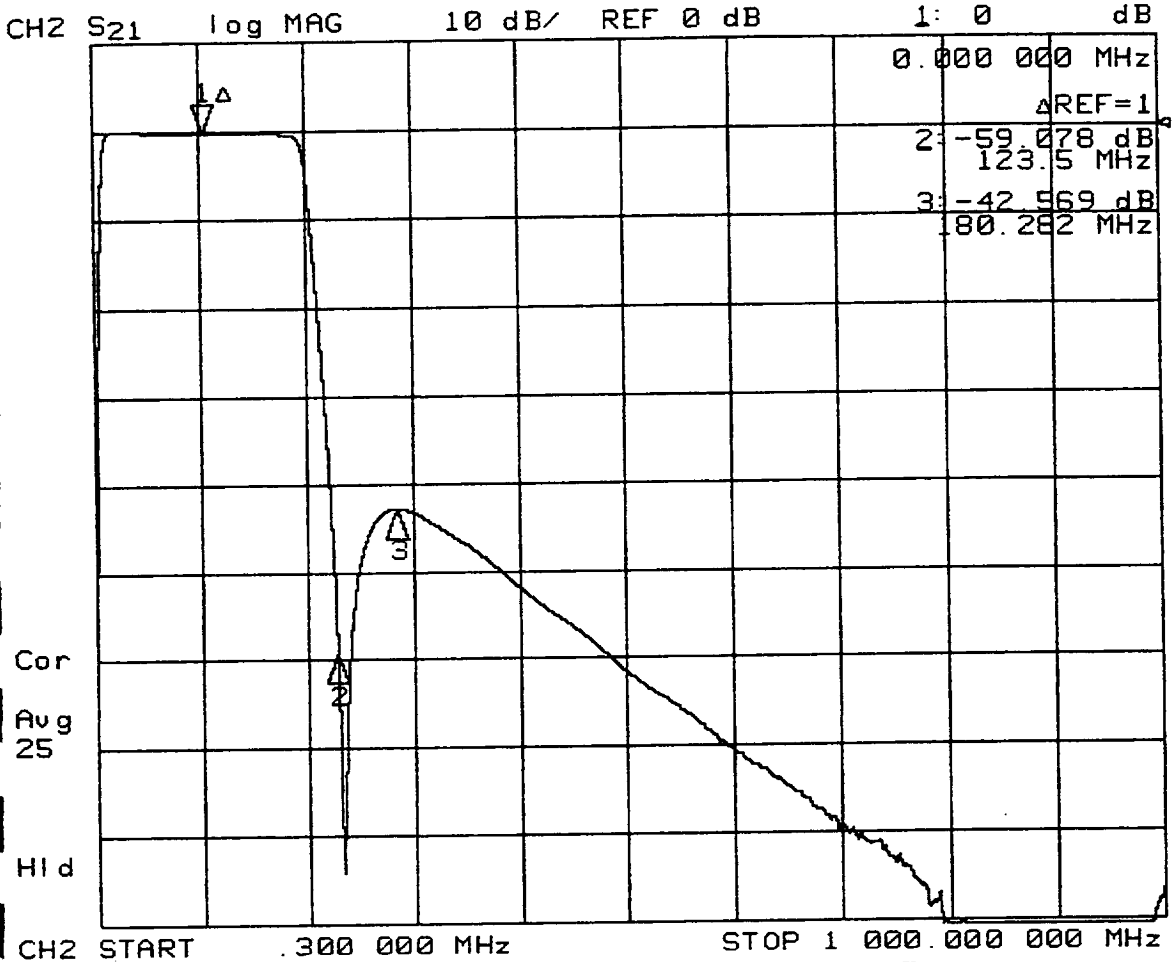
NOTE IF TEST WITNESSED BY AESD: ________ GSI: _ Not witnessed this time. DLD

***** END OF FUNCTIONAL PERFORMANCE TEST ****

OUTLINE AND MOUNTING DIMENSIONS VERIFICATION

{16} REFERENCE CUSTOMER DRAWING 1331559

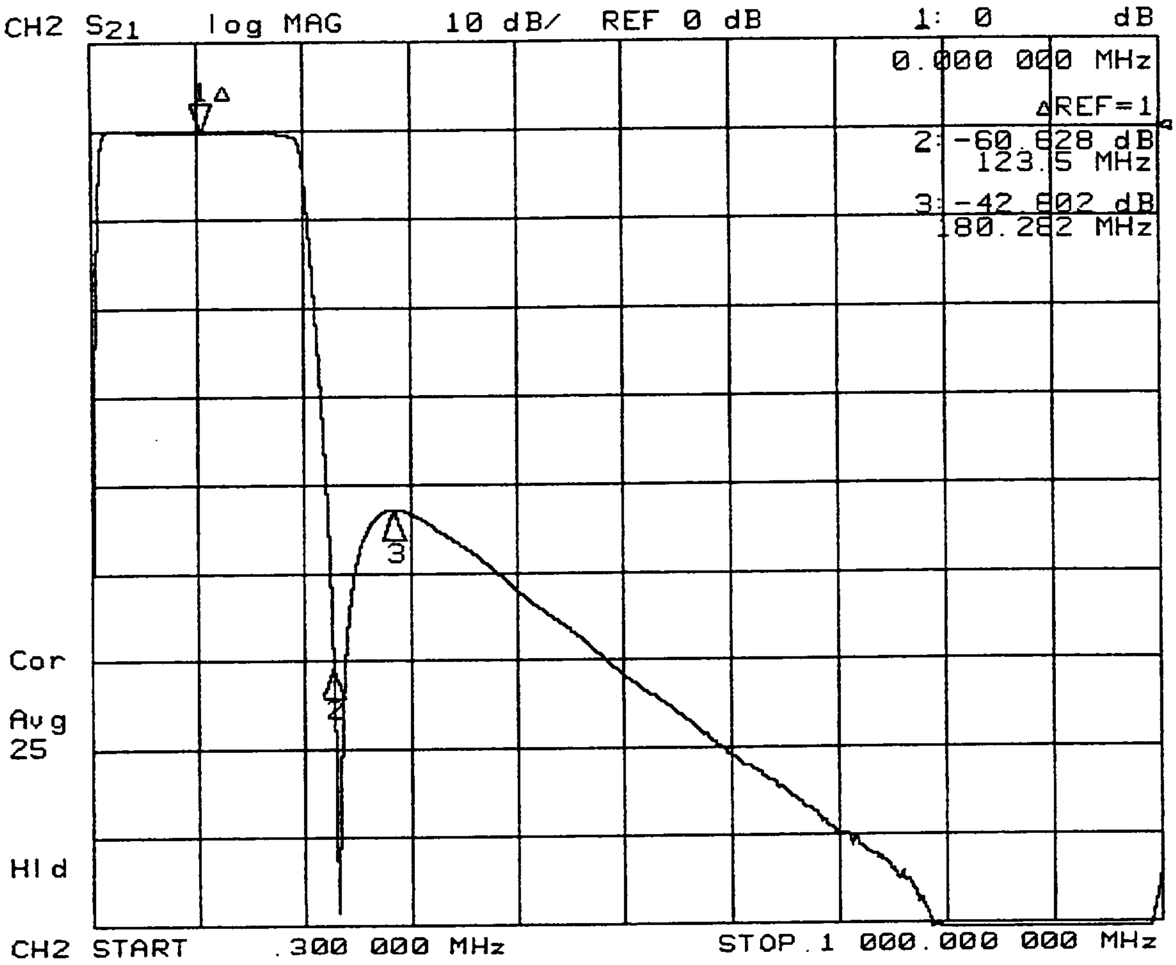
DESCRIPTION OF MEASUREMENT	DIMENSION AND TOLERANCE	ACTUAL MEASUREMENT
OVER ALL LENGTH	3.50 ± .03	3.500
MOUNTING HOLE CENTER	0.125 ± .010	0.127
BETWEEN UPPER MOUNTING HOLES	$\boxed{3.250}$	3.250
BETWEEN LOWER MOUNTING HOLES	$\boxed{3.250}$	3.249



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P228-005
-10C DATA
OPR: R. HOGGATT DATE DEC 27 1996

MARKER PARAMET annel 2

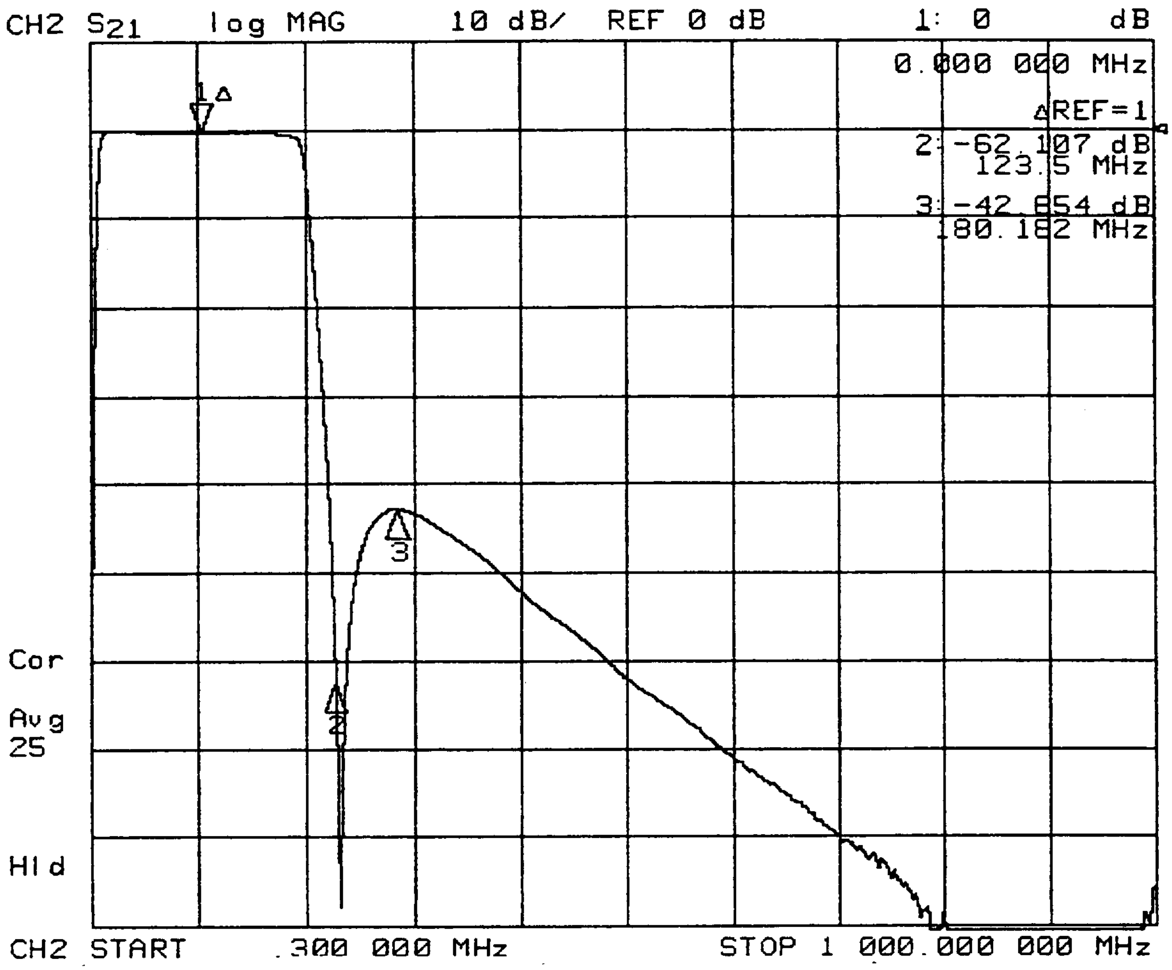
MARKER 1	1.000000 MHz OFF	105.000000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	228.500000 MHz -59.078 dB
MARKER 3	5.000000 MHz OFF	285.282962 MHz -42.569 dB
MARKER 4	5.000000 MHz OFF	.300000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB OFF	-3 dB OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P228-005
+15C DATA

MARKER PARAMET **OPR: R. HOGGATT DATE** DEC 27 1996 annel 2

MARKER 1	1.000000 MHz OFF	105.000000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	228.500000 MHz -60.628 dB
MARKER 3	5.000000 MHz OFF	285.282962 MHz -42.602 dB
MARKER 4	5.000000 MHz OFF	.300000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB OFF	-3 dB OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P228-005
+40C DATA
OPR: R. HOGGATT DATE DEC 27 1996

```
MARKER PARAMET                                          annel  2

MARKER 1                          1.000000 MHz        105.000000 MHz
                              OFF                      0 dB

MARKER 2                          5.000000 MHz        228.500000 MHz
                              OFF                    -62.107 dB

MARKER 3                          5.000000 MHz        285.182992 MHz
                              OFF                    -42.654 dB

MARKER 4                          5.000000 MHz           .300000 MHz
                              OFF                    OFF

MKR STIMULUS OFFSET               0.000000 MHz          0.000000 MHz
                               0 dB                    0 dB

REFERENCE MARKER               OFF                   MARKER 1
PLACEMENT                     CONTINUOUS             CONTINUOUS
MARKER SEARCH                  OFF                    OFF
TARGET VALUE                  -3 dB                  -3 dB
MARKER WIDTH VALUE            -3 dB                  -3 dB
                               OFF                    OFF
MARKER TRACKING                OFF                    OFF
```

APPENDIX B **ACCEPTANCE TEST REPORT**

BANDPASS FILTER MODEL HL105-190-10SS1 S/N P228-005
AEROJET 1331559-2 REV. E

BANDPASS CHARACTERISTICS MEASUREMENT

PER ATP PARA 4.6
(REF: AE-24687, PARA 4.8.2)

RECORD THE AMBIENT ROOM TEMPERATURE.+22.5 °C (+19°C TO +29.0°C)

{15} ATTACH PASSBAND PERFORMANCE X-Y PLOT ✓ (√)

{24} TEST POINT MATRIX

REF	FREQ	UNIT	VALUE	REF	FREQ	UNIT	VALUE
F1	0.5	MHz	-82.7 dB	F11	(*) 130.0	MHz	-0.21 dB
F2	1.0	MHz	-66.3 dB	F12	(*) 150.0	MHz	-0.29 dB
F3	5.0	MHz	-17.8 dB	F13	180.0	MHz	-0.46 dB
F4	7.5	MHz	-7.40 dB	F14	190.0	MHz	-0.66 dB
F5	10.0	MHz	-1.79 dB	F15	200.0	MHz	-4.11 dB
F6	20.0	MHz	-0.08 dB	F16	250.0	MHz	-48.8 dB
F7	40.0	MHz	-0.11 dB	F17	300.0	MHz	-43.3 dB
F8	(*) 60.0	MHz	-0.17 dB	F18	400.0	MHz	-52.0 dB
F9	(*) 80.0	MHz	-0.20 dB	F19	500.0	MHz	-61.8 dB
F10	105.0	MHz	-0.22 dB	F20	1000.0	MHz	-85.9 dB

TEST PERFORMED BY: R. HOGGATT DA 5 DATE 12/27/96

NOTE IF TEST WITNESSED BY AESD__________ GSI Not witnessed this time. DLD

***** END OF BANDPASS CHARACTERISTICS TEST *****

FUNCTIONAL PERFORMANCE TEST

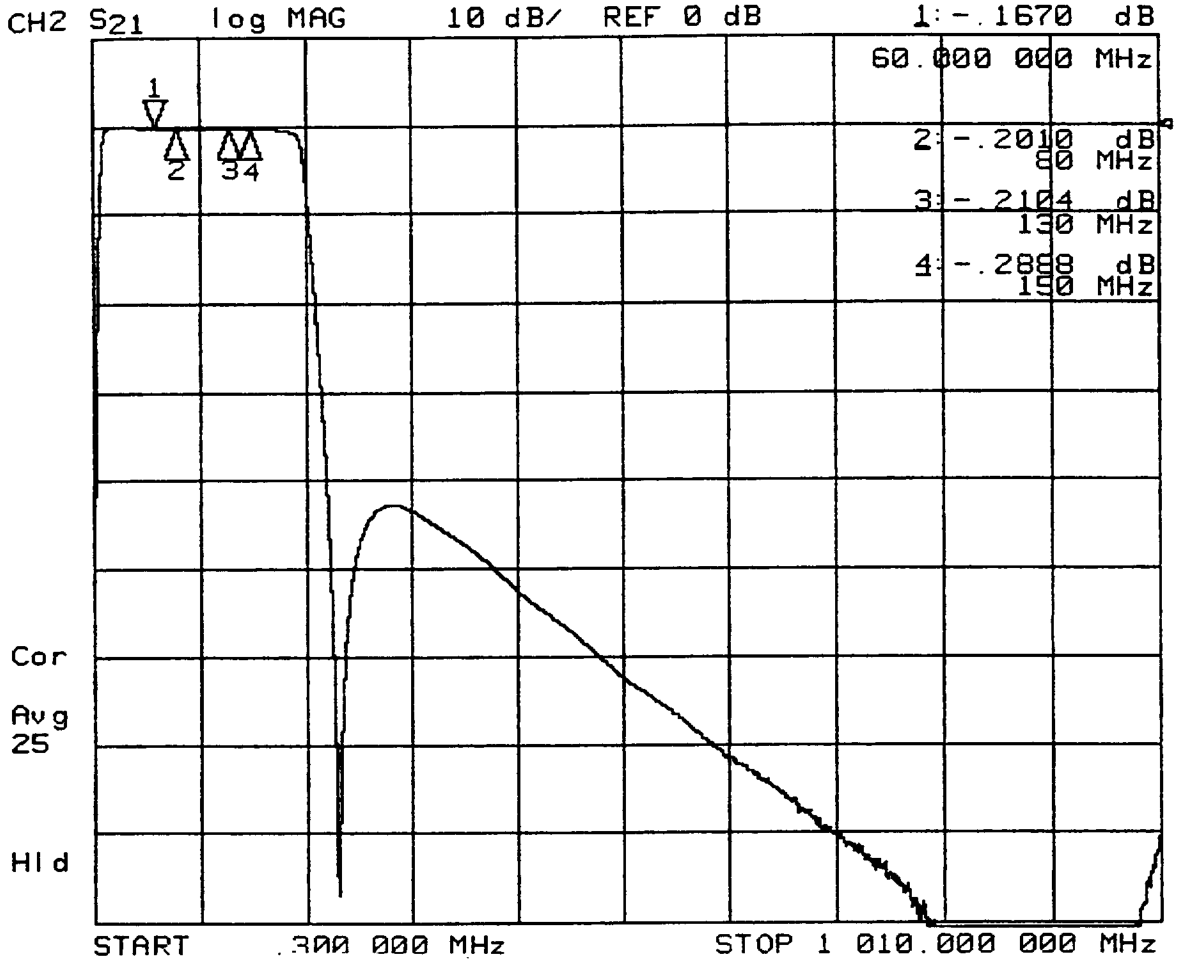
ACCEPTANCE TEST PROCEDURE
63-0005-02 PARA 4.1

BRIEF TEST DESCRIPTION: THE TESTS DESCRIBED IN APPENDIX B PAGE 10 THRU PAGE 13 ARE PERFORMED TO DOCUMENT THE FUNCTIONAL PERFORMANCE OF THE UNIT AT THE CONCLUSION OF ALL ENVIRONMENTAL TESTING. THE TESTS ARE AS FOLLOWS AND IN ANY SEQUENCE:

a.) VSWR PER ATP PARA 4.5.1.
b.) INSERTION LOSS PER ATP PARA 4.5.2
c.) INSERTION LOSS VS TEMPERATURE PER ATP PARA 4.5.6.
d.) 3.0 dB BANDWIDTH PER ATP PARA 4.5.3.
e.) CENTER FREQUENCY (fc) PER ATP PARA 4.5.7 (PART OF 3.0 dB B/W TEST)
f.) PASSBAND RIPPLE PER ATP PARA 4.5.4 (PART OF INSERTION LOSS TEST).
g.) OUT-OF-BAND REJECTION PER ATP PARA 4.5.5.

Prepared in accordance with MIL-STD-100

CONTRACT NO.	SIZE A	CAGE CODE 57032	DWG. NO. 63-0005-02	REV. J
DADEN-ANTHONY ASSOCIATES INC.	FILE: ACAD/63/0502APBJ.DOC		SHEET	11



POST THERMAL CYCLE
PASSBAND CHARACTERISTICS
SERIAL NO. P228-005
AMBIENT

MARKER PARAME OPR: R. HOGGATT DATE DEC 27 1996 annel 2

MARKER 1	17.750000 MHz OFF	60.000000 MHz -.1670 dB
MARKER 2	157.250000 MHz OFF	80.000000 MHz -.2010 dB
MARKER 3	29.375000 MHz OFF	130.000000 MHz -.2104 dB
MARKER 4	145.625000 MHz OFF	150.000000 MHz -.2888 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB OFF	-3 dB OFF
MARKER TRACKING	OFF	OFF

Report No. 11413
February, 1999

Channel 7 Bandpass Filter

IF Filter (S/N: 1331559-2, S/N: P228-007)

APPENDIX B **ACCEPTANCE TEST REPORT**

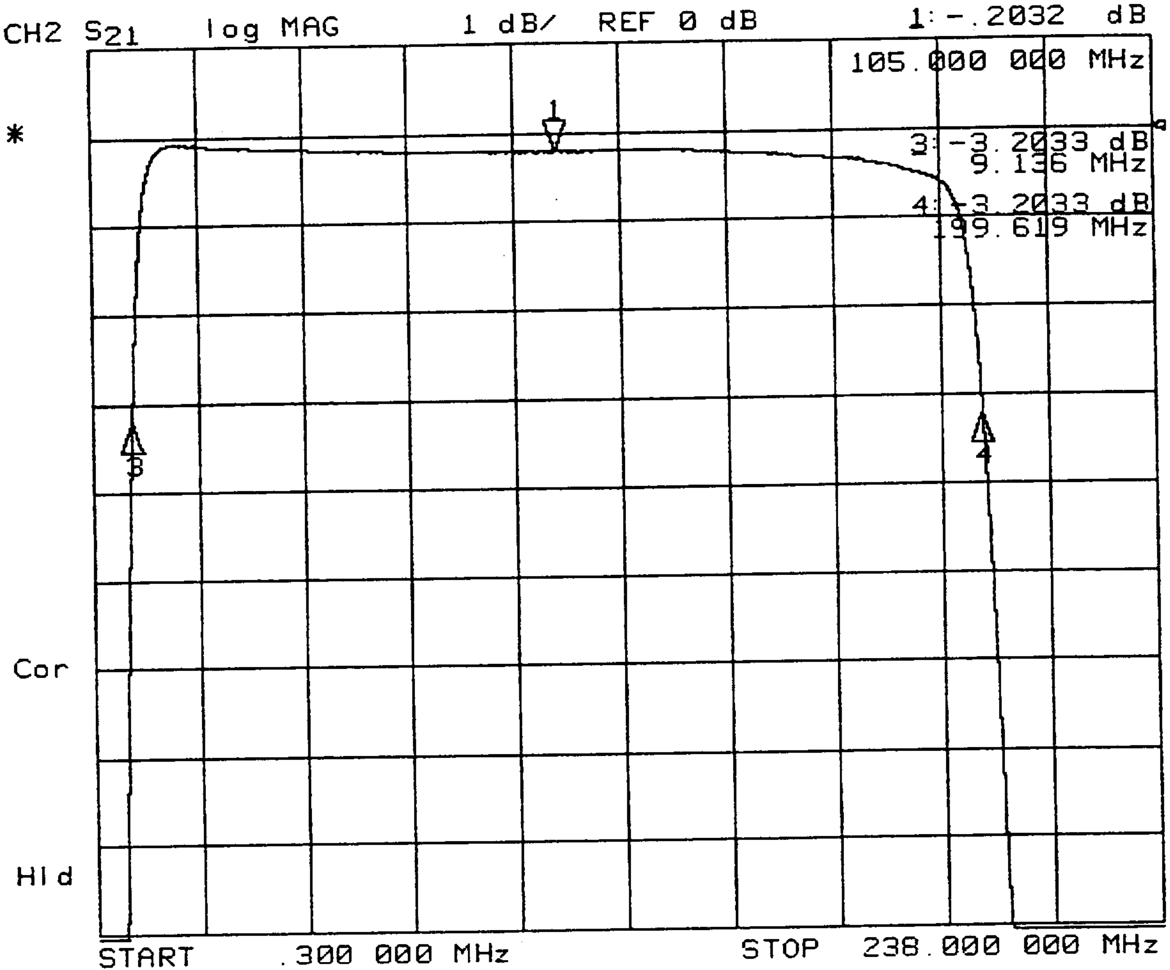
BANDPASS FILTER MODEL HL105-190-10SS1 S/N P228-007
AEROJET 1331559-2 REV. E

3.0 dB BANDWIDTH

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.3	-10°C	+15°C	+40°C
{7} UPPER 3.0 dB BANDEDGE	199.62 MHz (198.0-200.0)	199.28 Mhz (198.0-200.0)	198.97 MHz (1480.01500.0)
{8} LOWER 3.0 dB BANDEDGE	9.14 MHz (8.0-10.0)	9.13 Mhz (8.0-10.0)	9.11 MHz (8.0-10.0)
{9} 3.0 dB RELATIVE BANDWIDTH	190.48 MHz (188.0-192.0)	190.15 Mhz (188.0-192.0)	198.86 MHz (188.0-192.0)
{10} ADD {7} AND {8} ÷ 2 =	104.38 MHz (105.0 NOM)	104.21 MHz (105.0 NOM)	104.04 Mhz (105.0 NOM)
{10a} RECORD MEASURED TEMPERATURE	-12.7 °C (-15.0 TO -10.0)	+15.7 °C (12.5 TO 17.5)	+42.8 °C (40.0 TO 45.0)
{6} ATTACH TRANSMISSION LOSS PERFORMANCE X-Y PLOT	✓ (√)	✓ (√)	✓ (√)

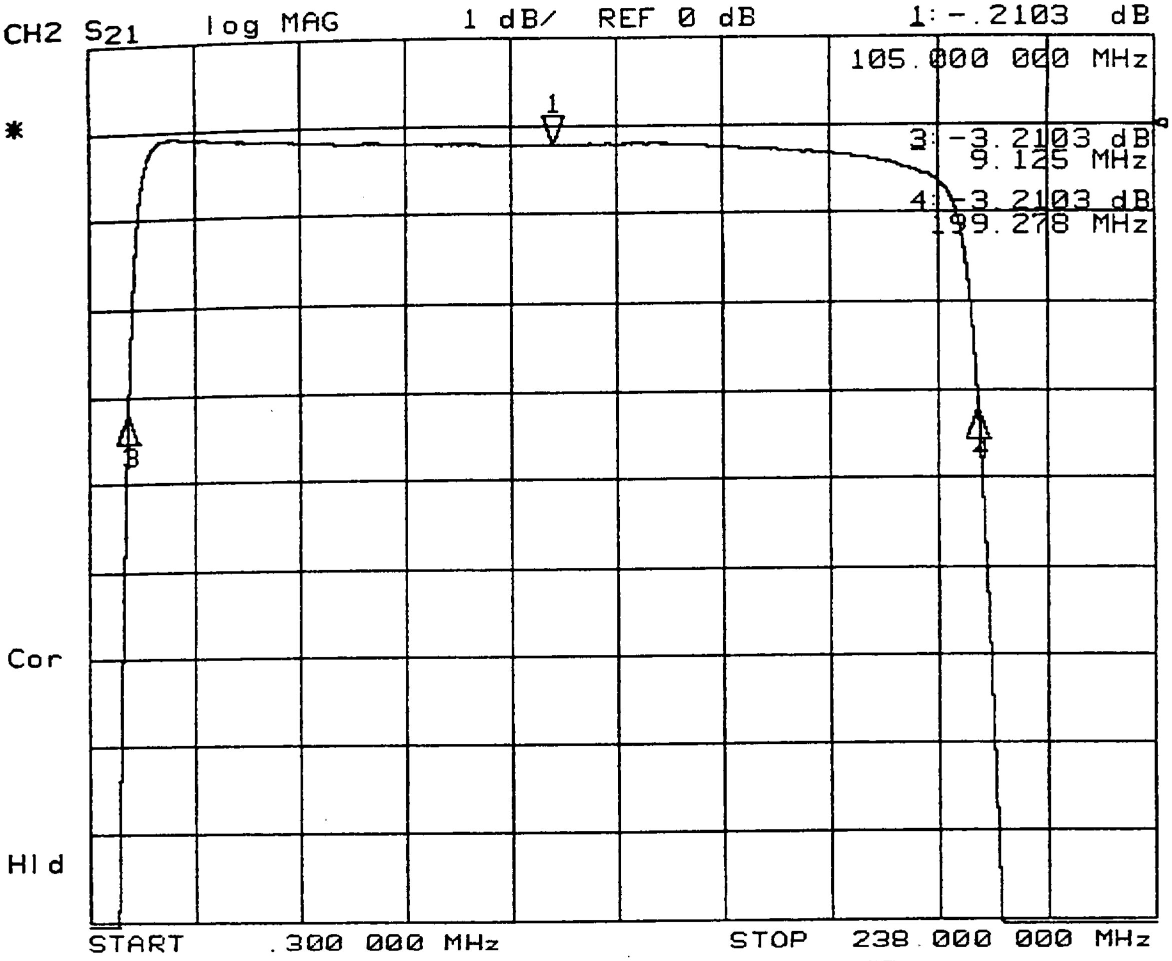
PASSBAND RIPPLE

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.4	-10°C	+15°C	+40°C
{11a} MIN INSERTION LOSS FREQ	19.91 MHz	19.32 Mhz	19.32 MHz
MIN INSERTION LOSS PERFORMANCE	-0.07 dB	-0.08 dB	-0.08 dB
{11b} 75% BW LOWER BANDEDGE FREQ	13.77 MHz	13.73 Mhz	13.62 MHz
75% BW LOWER BANDEDGE I.L. PERF	-0.27 dB	-0.28 dB	-0.29 dB
{11c} 75% BW UPPER BANDEDGE FREQ	156.27 MHz	156.23 Mhz	156.12 MHz
75% BW UPPER BANDEDGE I.L. PERF	-0.27 dB	-0.28 dB	-0.29 dB
{11d} PERFORMANCE DELTA (I.L. @ {11b} - I.L. @ {11a})	0.20 dB	0.20 dB	0.21 dB
{11e} PERFORMANCE DELTA (I.L. @ {11c} - I.L. @ {11a})	0.20 dB	0.20 dB	0.21 dB



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P228-007
-10C DATA

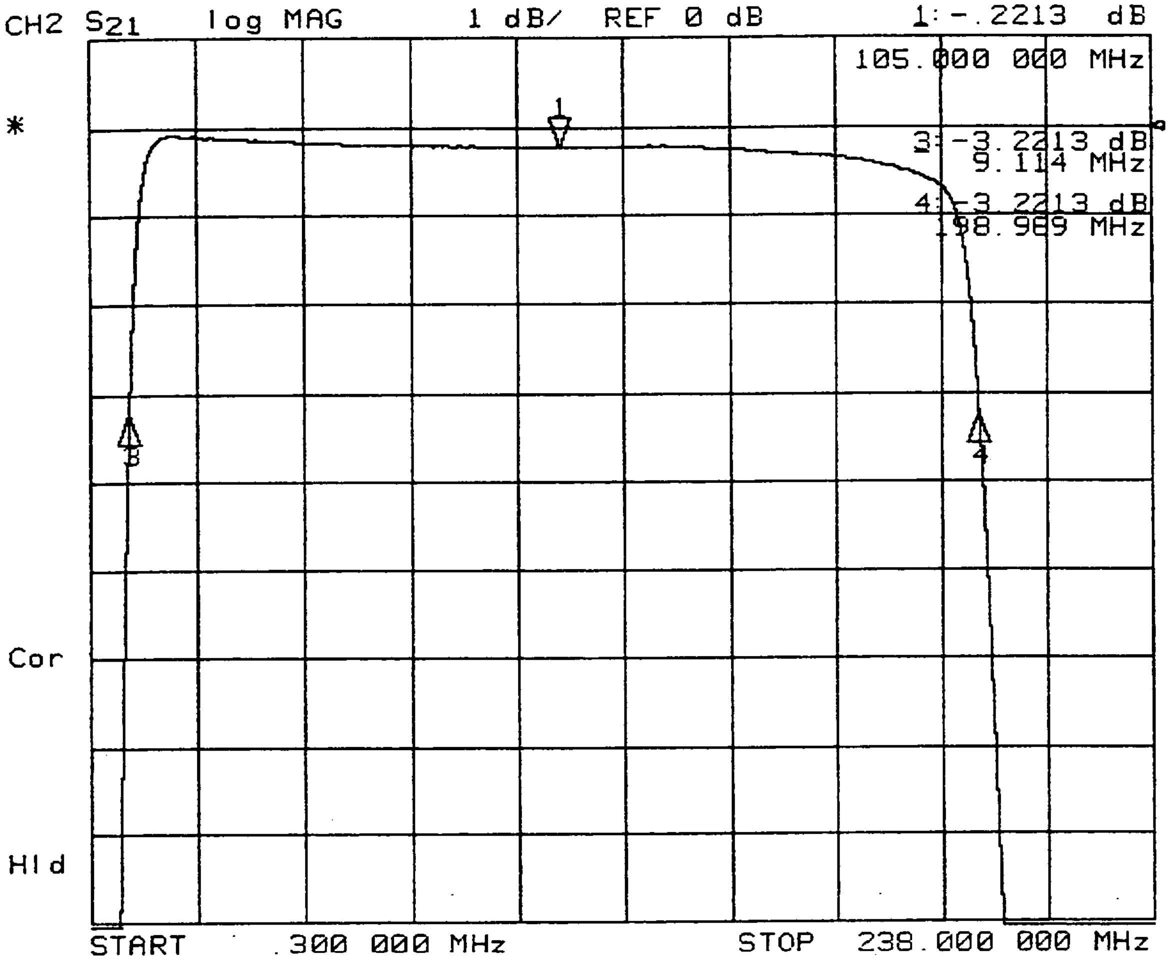
```
MARKER PARAME1        OPR: R. HOGGATT  DATE DEC 28 1996   annel 2

MARKER 1                          19.500000 MHz       105.000000 MHz
                                OFF                  -.2032 dB

MARKER 2                         190.500000 MHz       104.378379 MHz
                                OFF                  OFF

MARKER 3                          33.750000 MHz         9.136880 MHz
                                OFF                  -3.2033 dB

MARKER 4                         176.250000 MHz       199.619879 MHz
                                OFF                  -3.2033 dB

MKR STIMULUS OFFSET                0.000000 MHz        89.425802 MHz
                                 0 dB                -3.2342 dB


REFERENCE MARKER                 OFF                  OFF
PLACEMENT                       CONTINUOUS           CONTINUOUS
MARKER SEARCH                    OFF                  OFF
TARGET VALUE                    -14 dB               -3 dB
MARKER WIDTH VALUE              -3 dB                -3 dB
                                 OFF                  OFF
MARKER TRACKING                  OFF                  OFF
```



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P228-007
+15C DATA
OPR: R. HOGGATT DATE DEC 28 1996

MARKER PARAME annel 2

MARKER 1	19.500000 MHz OFF	105.000000 MHz -.2103 dB
MARKER 2	190.500000 MHz OFF	104.201929 MHz OFF
MARKER 3	33.750000 MHz OFF	9.125757 MHz -3.2103 dB
MARKER 4	176.250000 MHz OFF	199.278101 MHz -3.2103 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB OFF	-3 dB OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P228-007
+40C DATA

```
MARKER PARAMET       OPR: R. HOGGATT   DATE DEC 28 1996  annel  2

MARKER 1                         19.500000 MHz        105.000000 MHz
                              OFF                     -.2213 dB

MARKER 2                        190.500000 MHz        104.042260 MHz
                              OFF                     OFF

MARKER 3                         33.750000 MHz          9.114905 MHz
                              OFF                     -3.2213 dB

MARKER 4                        176.250000 MHz        198.969616 MHz
                              OFF                     -3.2213 dB

MKR STIMULUS OFFSET               0.000000 MHz         89.425802 MHz
                               0 dB                   -3.2342 dB


REFERENCE MARKER               OFF                     OFF
PLACEMENT                     CONTINUOUS              CONTINUOUS
MARKER SEARCH                  OFF                     OFF
TARGET VALUE                  -14 dB                  -3 dB
MARKER WIDTH VALUE            -3 dB                   -3 dB
                               OFF                     OFF
MARKER TRACKING                OFF                     OFF
```

APPENDIX B **ACCEPTANCE TEST REPORT**

BANDPASS FILTER MODEL HL105-190-10SS1 S/N P228-007
AEROJET 1331559-2 REV. E

PASSBAND RIPPLE (CON'T)

{11f} RECORD PASS/FAIL (0.5 dB MAX)	[✓ PASS]/FAIL	[✓ PASS]/FAIL	[✓ PASS]/FAIL
{11g) ATTACH PASSBAND RIPPLE PERFORMANCE X-Y PLOT(S)	✓ (√)	✓ (√)	✓ (√)

OUT-OF-BAND REJECTION

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.5 Fc=105.0 MHz. REF {5A} FOR INSERTION LOSS @ Fc	-10°C	+15°C	+40°C
{12} WORST CASE REJECTION FROM 0.300 MHz TO 1.0 MHz	-59.2 dB (40.0 dB MIN)	-59.2 dB (40.0 dB MIN)	-59.1 dB (40.0 dB MIN)
{13a} WORST CASE REJECTION FROM 228.5 MHz TO 1000.0 MHz	-42.9 dB (40.0 dB MIN)	-42.9 dB (40.0 dB MIN)	-43.0 dB (40.0 dB MIN)
{13c} RECORD MEASURED TEMPERATURE	-12.5 °C (-15.0 TO -10.0)	+15.6 °C (12.5 TO 17.5)	+42.9 °C (40.0 TO 45.0)
{14} ATTACH REJECTION PERFORMANCE X-Y PLOT(S)	✓ (√) ✓ (√)	✓ (√) ✓ (√)	✓ (√) ✓ (√)

DA 5

TEST PERFORMED BY R. Hoggatt DATE 12/28/96

NOTE IF TEST WITNESSED BY AESD: ________ GSI: _ Not witnessed this time. DLD

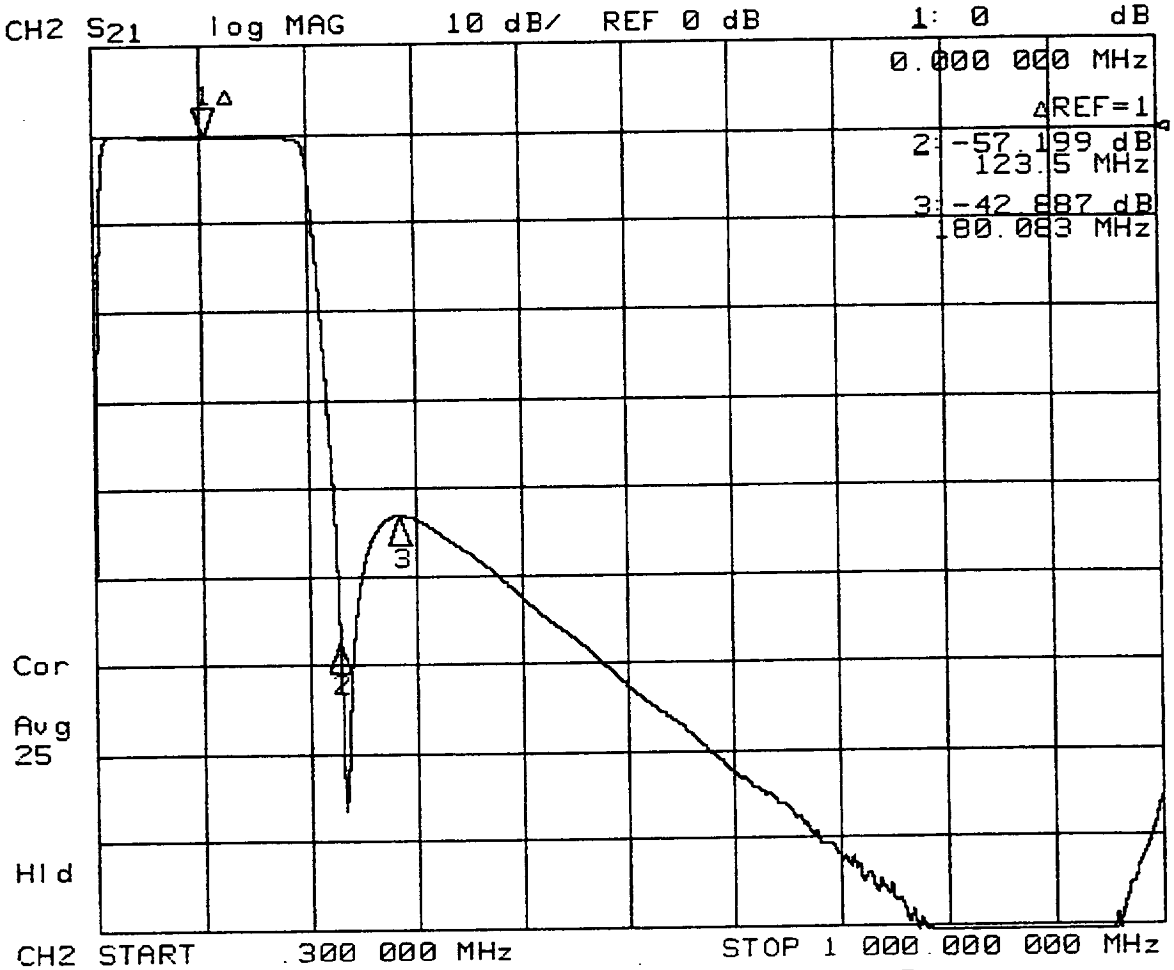
***** END OF FUNCTIONAL PERFORMANCE TEST ****

OUTLINE AND MOUNTING DIMENSIONS VERIFICATION
{16} REFERENCE CUSTOMER DRAWING 1331559

DESCRIPTION OF MEASUREMENT	DIMENSION AND TOLERANCE	ACTUAL MEASUREMENT
OVER ALL LENGTH	3.50 ± .03	3.500
MOUNTING HOLE CENTER	0.125 ± .010	0.125
BETWEEN UPPER MOUNTING HOLES	3.250	3.251
BETWEEN LOWER MOUNTING HOLES	3.250	3.251

Prepared in accordance with MIL-STD-100

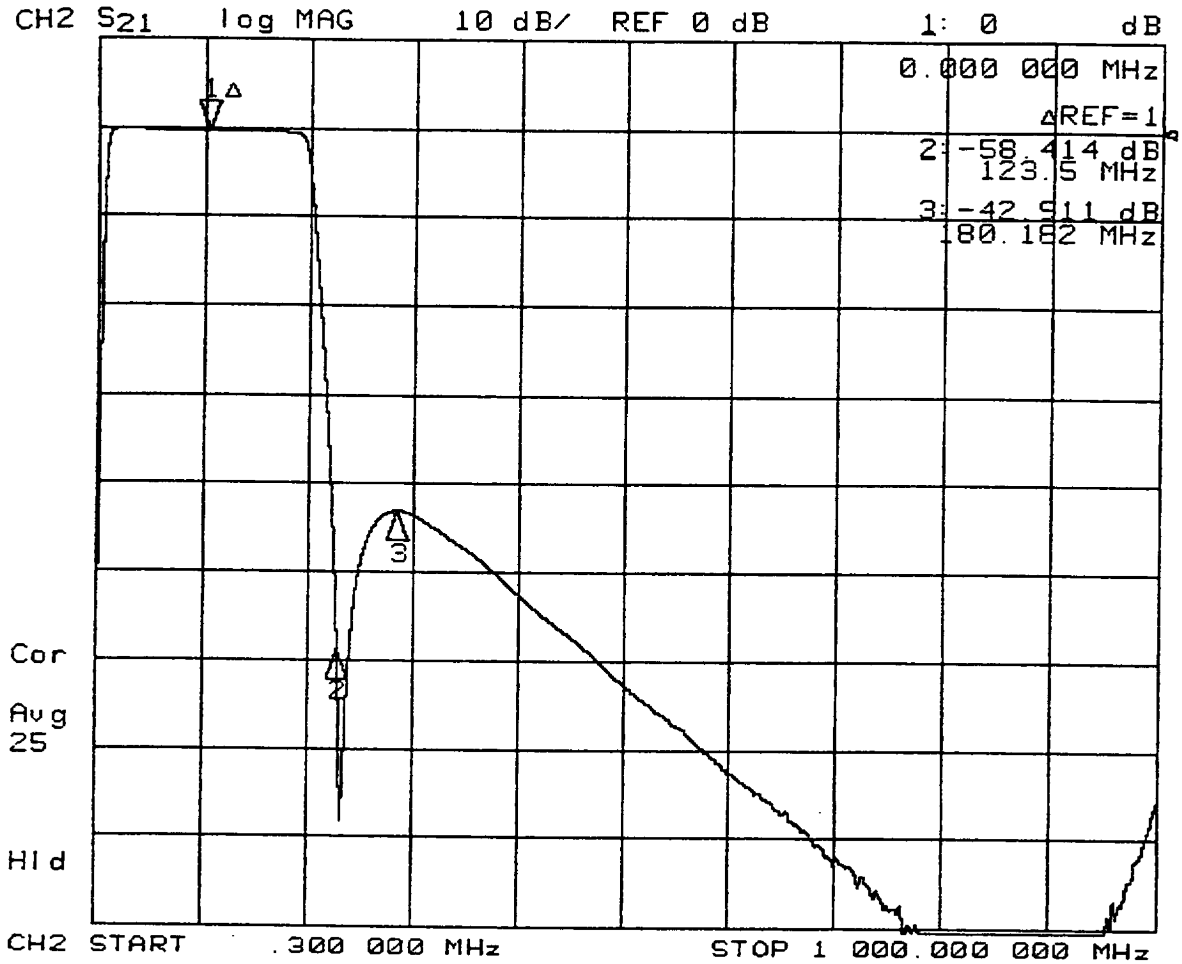
CONTRACT NO.	SIZE A	CAGE CODE 57032	DWG. NO. 63-0005-02	REV. J
DADEN-ANTHONY ASSOCIATES INC.	FILE: ACAD/63/0502APBJ.DOC		SHEET 14	



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P228-007
-10C DATA
OPR: R. HOGGATT DATE DEC 28 1996

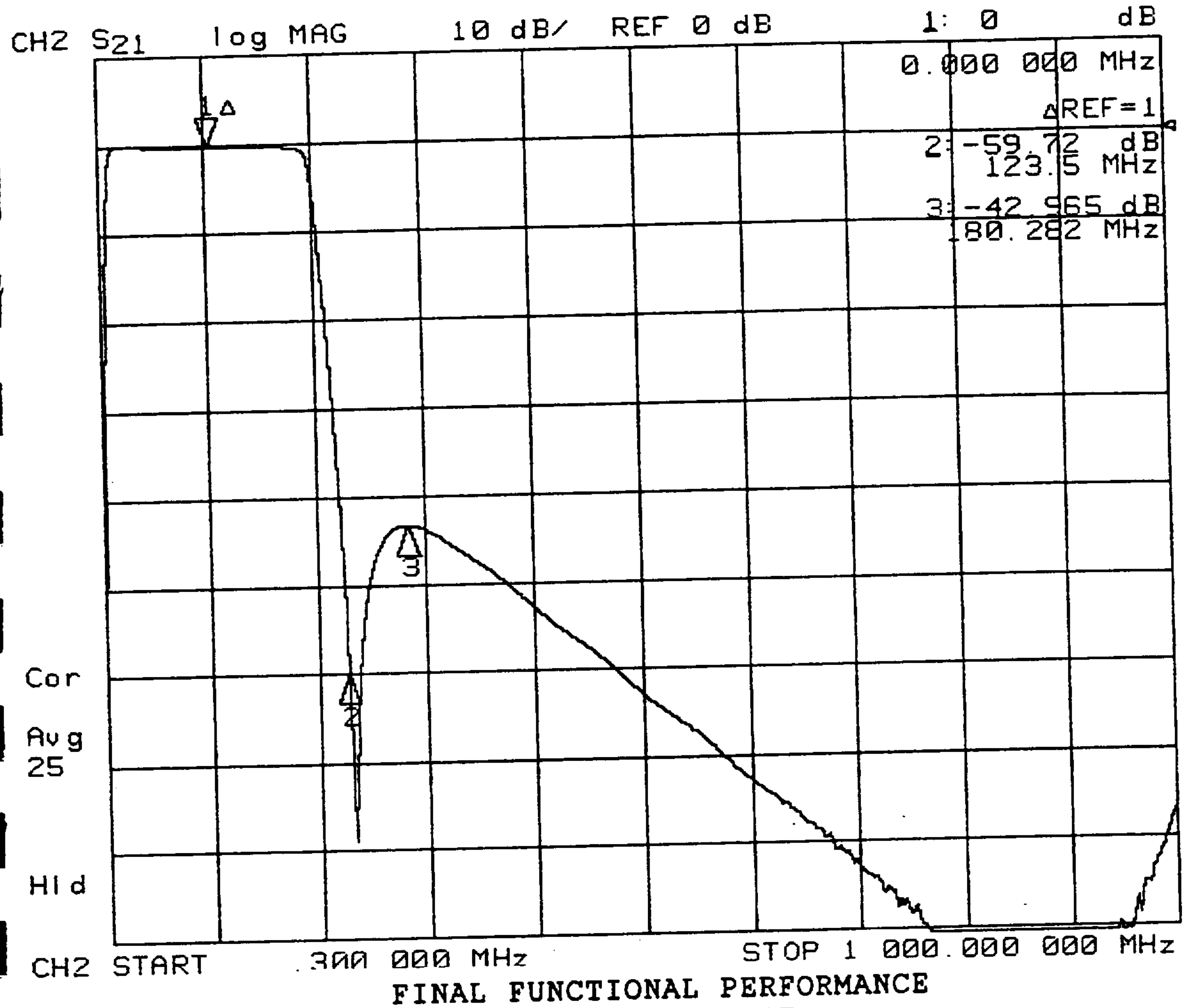
MARKER PARAMET annel 2

MARKER 1	1.000000 MHz OFF	105.000000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	228.500000 MHz -57.199 dB
MARKER 3	5.000000 MHz OFF	285.083022 MHz -42.887 dB
MARKER 4	5.000000 MHz OFF	.300000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB OFF	-3 dB OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P228-007
+15C DATA
OPR: R. HOGGATT DATE DEC 28 1996

```
MARKER PARAME1                                          annel 2

MARKER 1                        1.000000 MHz      105.000000 MHz
                           OFF                     0 dB

MARKER 2                        5.000000 MHz      228.500000 MHz
                           OFF                    -58.414 dB

MARKER 3                        5.000000 MHz      285.182992 MHz
                           OFF                    -42.911 dB

MARKER 4                        5.000000 MHz         .300000 MHz
                           OFF                    OFF

MKR STIMULUS OFFSET             0.000000 MHz        0.000000 MHz
                            0 dB                   0 dB

REFERENCE MARKER            OFF                   MARKER 1
PLACEMENT                  CONTINUOUS             CONTINUOUS
MARKER SEARCH               OFF                    OFF
TARGET VALUE               -3 dB                  -3 dB
MARKER WIDTH VALUE         -3 dB                  -3 dB
                            OFF                    OFF
MARKER TRACKING             OFF                    OFF
```



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P228-007
+40C DATA
OPR: R. HOGGATT DATE DEC 28 1996

```
MARKER PARAME                                             annel 2

MARKER 1                            1.000000 MHz       105.000000 MHz
                               OFF                      0 dB

MARKER 2                            5.000000 MHz       228.500000 MHz
                               OFF                     -59.72 dB

MARKER 3                            5.000000 MHz       285.282962 MHz
                               OFF                     -42.965 dB

MARKER 4                            5.000000 MHz          .300000 MHz
                               OFF                     OFF

MKR STIMULUS OFFSET                 0.000000 MHz         0.000000 MHz
                                0 dB                    0 dB


REFERENCE MARKER                 OFF                   MARKER 1
PLACEMENT                      CONTINUOUS              CONTINUOUS
MARKER SEARCH                    OFF                    OFF
TARGET VALUE                    -3 dB                  -3 dB
MARKER WIDTH VALUE              -3 dB                  -3 dB
                                 OFF                    OFF
MARKER TRACKING                  OFF                    OFF
```

BANDPASS FILTER MODEL HL105-190-10SS1 S/N P228-007
AEROJET 1331559-2 REV. E

BANDPASS CHARACTERISTICS MEASUREMENT

PER ATP PARA 4.6
(REF: AE-24687, PARA 4.8.2)

RECORD THE AMBIENT ROOM TEMPERATURE. +22.9 °C (+19°C TO +29.0°C)

{15} ATTACH PASSBAND PERFORMANCE X-Y PLOT ✓ (√)

{24} TEST POINT MATRIX

REF	FREQ	UNIT	VALUE	REF	FREQ	UNIT	VALUE
F1	0.5	MHz	-81.8 dB	F11	(*) 130.0	MHz	-0.20 dB
F2	1.0	MHz	-65.8 dB	F12	(*) 150.0	MHz	-0.27 dB
F3	5.0	MHz	-17.7 dB	F13	180.0	MHz	-0.43 dB
F4	7.5	MHz	-7.34 dB	F14	190.0	MHz	-0.61 dB
F5	10.0	MHz	-1.77 dB	F15	200.0	MHz	-3.94 dB
F6	20.0	MHz	-0.07 dB	F16	250.0	MHz	-49.2 dB
F7	40.0	MHz	-0.10 dB	F17	300.0	MHz	-43.6 dB
F8	(*) 60.0	MHz	-0.17 dB	F18	400.0	MHz	-52.7 dB
F9	(*) 80.0	MHz	-0.21 dB	F19	500.0	MHz	-62.7 dB
F10	105.0	MHz	-0.22 dB	F20	1000.0	MHz	-76.0 dB

TEST PERFORMED BY: R. Hoggatt DATE 12/27/96

NOTE IF TEST WITNESSED BY AESD ___________ GSI _ Not witnessed this time. DLD

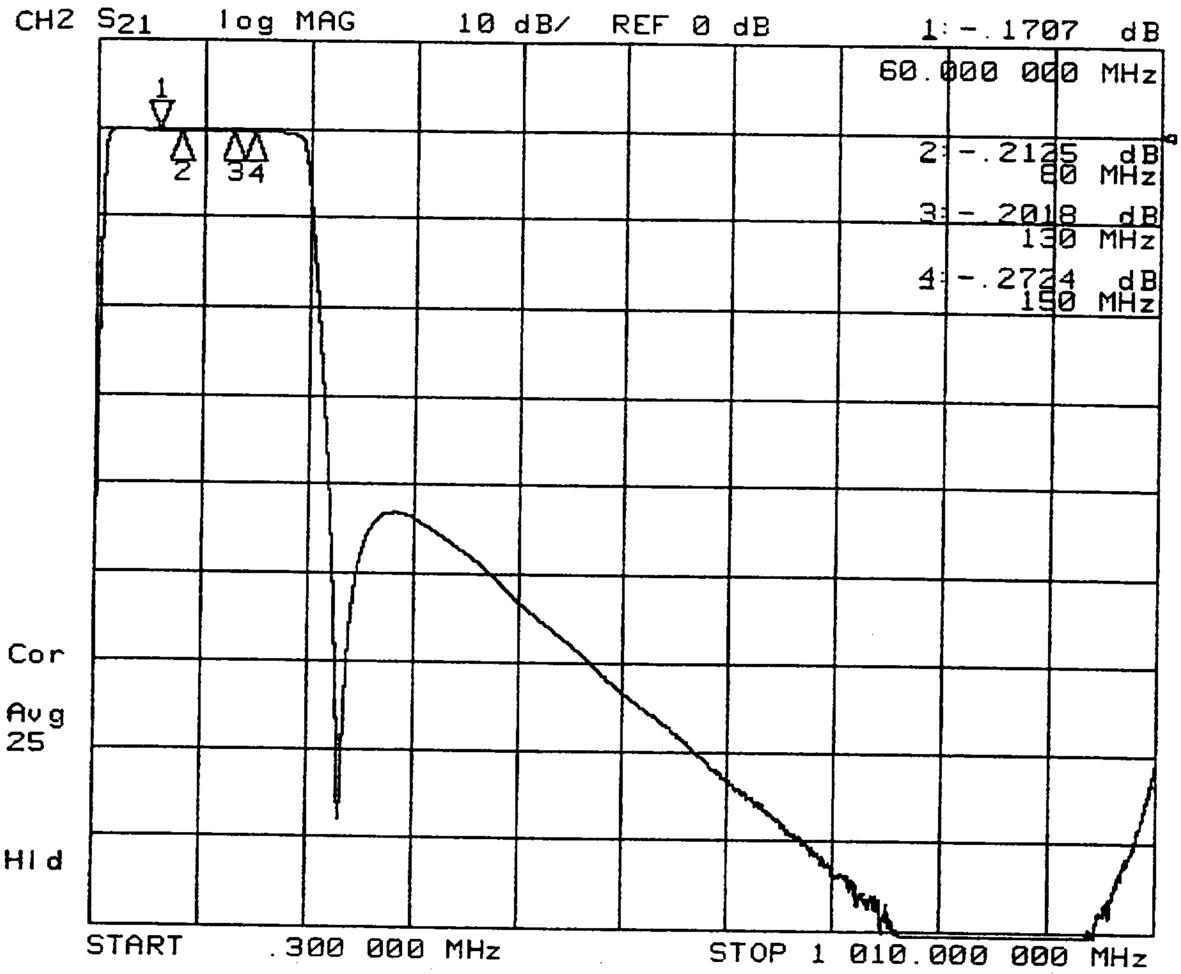
***** END OF BANDPASS CHARACTERISTICS TEST *****

FUNCTIONAL PERFORMANCE TEST

ACCEPTANCE TEST PROCEDURE
63-0005-02 PARA 4.1

BRIEF TEST DESCRIPTION: THE TESTS DESCRIBED IN APPENDIX B PAGE 10 THRU PAGE 13 ARE PERFORMED TO DOCUMENT THE FUNCTIONAL PERFORMANCE OF THE UNIT AT THE CONCLUSION OF ALL ENVIRONMENTAL TESTING. THE TESTS ARE AS FOLLOWS AND IN ANY SEQUENCE:

a.) VSWR PER ATP PARA 4.5.1.
b.) INSERTION LOSS PER ATP PARA 4.5.2
c.) INSERTION LOSS VS TEMPERATURE PER ATP PARA 4.5.6.
d.) 3.0 dB BANDWIDTH PER ATP PARA 4.5.3.
e.) CENTER FREQUENCY (fc) PER ATP PARA 4.5.7 (PART OF 3.0 dB B/W TEST)
f.) PASSBAND RIPPLE PER ATP PARA 4.5.4 (PART OF INSERTION LOSS TEST).
g.) OUT-OF-BAND REJECTION PER ATP PARA 4.5.5.



POST THERMAL CYCLE
PASSBAND CHARACTERISTICS
SERIAL NO. P228-007
AMBIENT
OPR: R. HOGGATT DATE DEC 27 1996

MARKER PARAME annel 2

MARKER 1	17.750000 MHz OFF	60.000000 MHz -.1707 dB
MARKER 2	157.250000 MHz OFF	80.000000 MHz -.2125 dB
MARKER 3	29.375000 MHz OFF	130.000000 MHz -.2018 dB
MARKER 4	145.625000 MHz OFF	150.000000 MHz -.2724 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

Report No. 11413
February, 1999

Channel 8 Bandpass Filter

IF Filter (S/N: 1331559-4, S/N: P230-007)

APPENDIX D

ACCEPTANCE TEST REPORT

BANDPASS FILTER MODEL HL87.5-155-10SS1 S/N P230-007
AEROJET 1331559-4 REV. E

3.0 dB BANDWIDTH

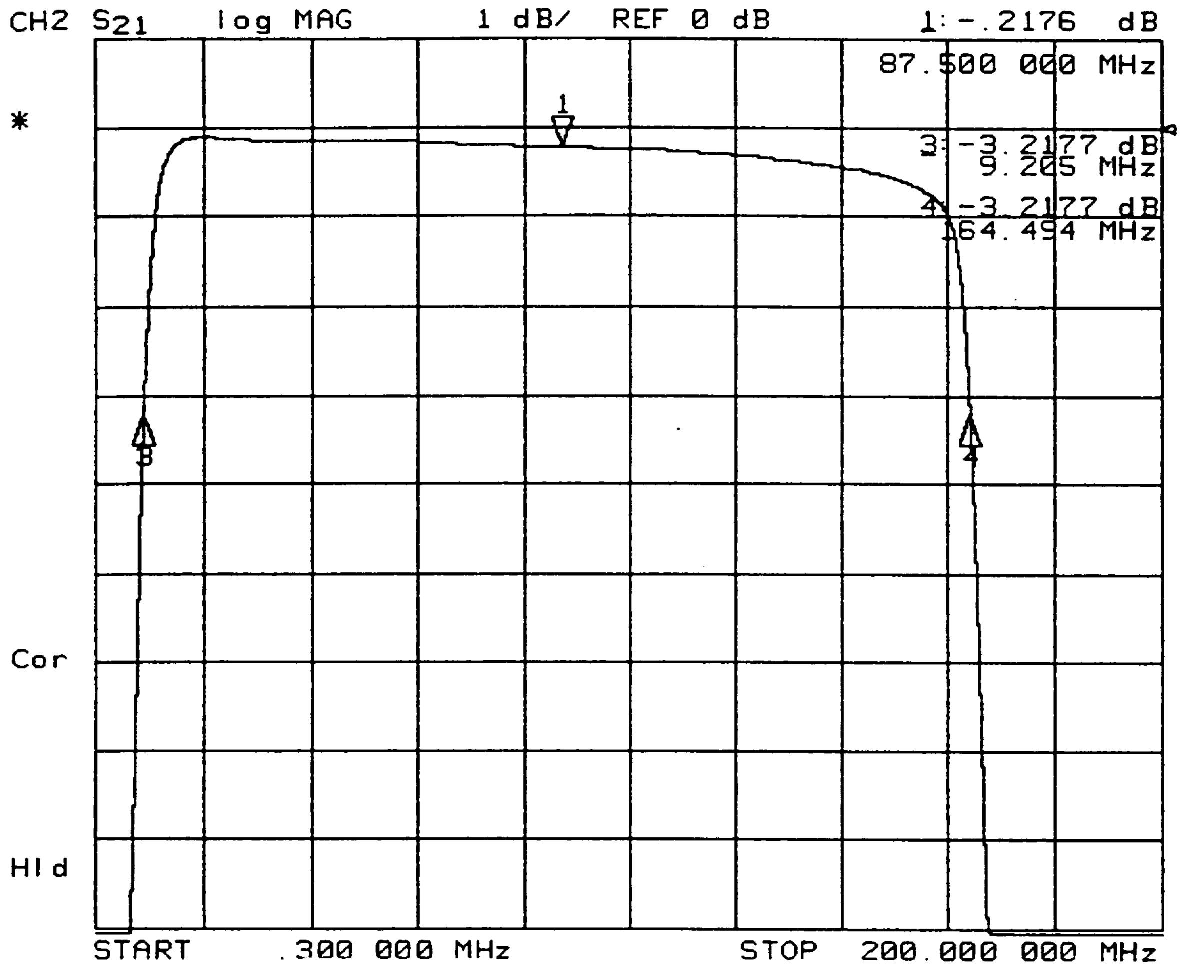
ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.3	-10°C	+15°C	+40°C
{7} UPPER 3.0 dB BANDEDGE	164.49 MHz (163.0-165.0)	164.25 Mhz (163.0-165.0)	163.97 MHz (163.0-165.0)
{8} LOWER 3.0 dB BANDEDGE	9.21 MHz (8.0-10.0)	9.19 Mhz (8.0-10.0)	9.18 MHz (8.0-10.0)
{9} 3.0 dB RELATIVE BANDWIDTH	155.28 MHz (153.0-157.0)	155.06 Mhz (153.0-157.0)	154.79 MHz (153.0-157.0)
{10} ADD {7} AND {8} ÷ 2 =	86.85 MHz (87.5 NOM)	86.72 MHz (87.5 NOM)	86.58 Mhz (87.5 NOM)
{10a} RECORD MEASURED TEMPERATURE	-12.0 °C (-15.0 TO -10.0)	+12.8 °C (12.5 TO 17.5)	+43.0 °C (40.0 TO 45.0)
{6} ATTACH TRANSMISSION LOSS PERFORMANCE X-Y PLOT	✓ (√)	✓ (√)	✓ (√)

PASSBAND RIPPLE

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.4	-10°C	+15°C	+40°C
{11a} MIN INSERTION LOSS FREQ	19.27 MHz	19.27 Mhz	19.27 MHz
MIN INSERTION LOSS PERFORMANCE	-0.10 dB	-0.11 dB	-0.11 dB
{11b} 75% BW LOWER BANDEDGE FREQ	13.38 MHz	13.25 Mhz	13.13 MHz
75% BW LOWER BANDEDGE I.L. PERF	-0.36 dB	-0.39 dB	-0.41 dB
{11c} 75% BW UPPER BANDEDGE FREQ	129.63 MHz	129.50 Mhz	129.38 MHz
75% BW UPPER BANDEDGE I.L. PERF	-0.36 dB	-0.39 dB	-0.41 dB
{11d} PERFORMANCE DELTA (I.L. @ {11b} - I.L. @ {11a})	0.26 dB	0.28 dB	0.30 dB
{11e} PERFORMANCE DELTA (I.L. @ {11c} - I.L. @ {11a})	0.26 dB	0.28 dB	0.30 dB

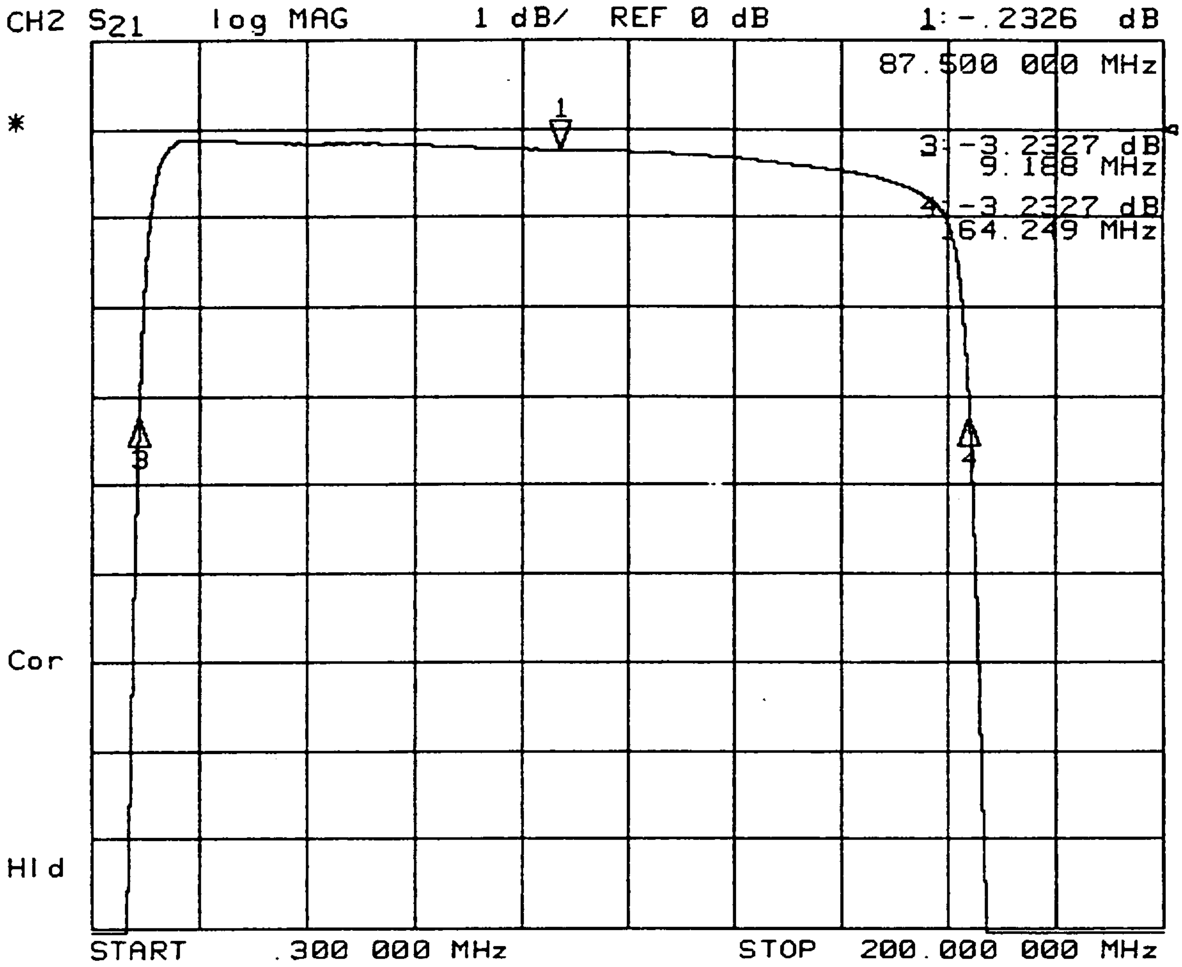
Prepared in accordance with MIL-STD-100

CONTRACT NO.	SIZE A	CAGE CODE 57032	DWG. NO. 63-0005-02	REV. J
DADEN-ANTHONY ASSOCIATES INC.	FILE: ACAD/63/0502APDJ.DOC		SHEET	12



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P230-007
-10C DATA
OPR: R. HOGGATT DATE DEC 20 1996

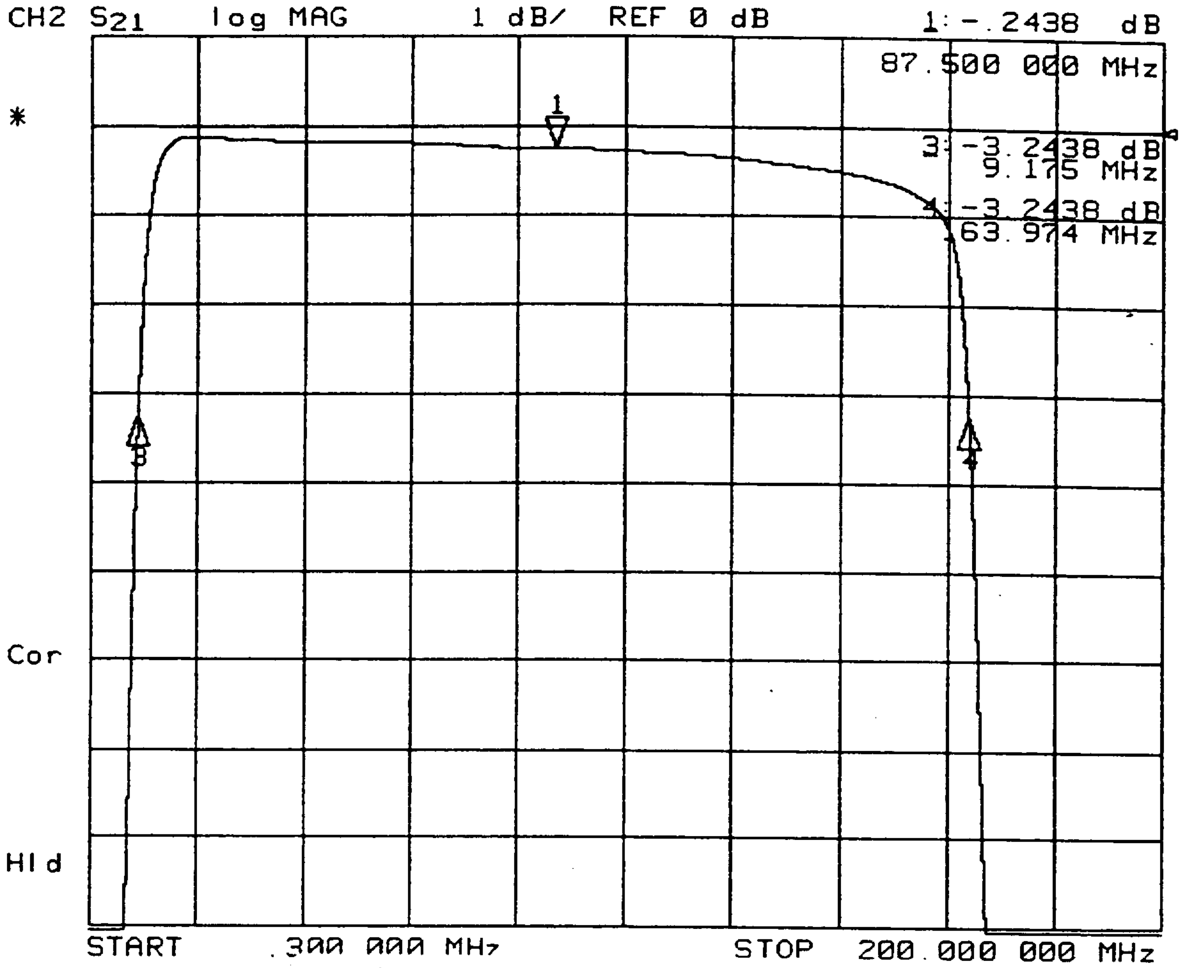
MARKER PARAMET		annel 2
MARKER 1	17.750000 MHz OFF	87.500000 MHz -.2176 dB
MARKER 2	157.250000 MHz OFF	86.849896 MHz OFF
MARKER 3	29.375000 MHz OFF	9.205676 MHz -3.2177 dB
MARKER 4	145.625000 MHz OFF	164.494116 MHz -3.2177 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB OFF	-3 dB OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P230-007
+15C DATA
OPR: R. HOGGATT DATE DEC 20 1996

MARKER PARAMET annel 2

MARKER 1	17.750000 MHz OFF	87.500000 MHz -.2326 dB
MARKER 2	157.250000 MHz OFF	86.719334 MHz OFF
MARKER 3	29.375000 MHz OFF	9.188803 MHz -3.2327 dB
MARKER 4	145.625000 MHz OFF	164.249866 MHz -3.2327 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB OFF	-3 dB OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P230-007
+40C DATA
OPR: R. HOGGATT DATE DEC 2 0 1996

```
MARKER PARAMET                                      nnel 2

MARKER 1                     17.750000 MHz      87.500000 MHz
                          OFF                  -.2438 dB

MARKER 2                    157.250000 MHz      86.575045 MHz
                          OFF                  OFF

MARKER 3                     29.375000 MHz       9.175568 MHz
                          OFF                  -3.2438 dB

MARKER 4                    145.625000 MHz     163.974523 MHz
                          OFF                  -3.2438 dB

MKR STIMULUS OFFSET           0.000000 MHz      89.425802 MHz
                           0 dB                -3.2342 dB


REFERENCE MARKER           OFF                  OFF
PLACEMENT                 CONTINUOUS           CONTINUOUS
MARKER SEARCH              OFF                  OFF
TARGET VALUE              -14 dB               -3 dB
MARKER WIDTH VALUE        -3 dB                -3 dB
                           OFF                  OFF
MARKER TRACKING            OFF                  OFF
```

APPENDIX D **ACCEPTANCE TEST REPORT**

BANDPASS FILTER MODEL HL87.5-155-10SS1 S/N P230-007
AEROJET 1331559-4 REV. E

PASSBAND RIPPLE (CON'T)

{11f} RECORD PASS/FAIL (0.5 dB MAX)	[✓ PASS]/FAIL	[✓ PASS]/FAIL	[✓ PASS]/FAIL
{11g} ATTACH PASSBAND RIPPLE PERFORMANCE X-Y PLOT(S)	✓ (√)	✓ (√)	✓ (√)

OUT-OF-BAND REJECTION

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.5 Fc=87.5 MHz. REF {5A} FOR INSERTION LOSS @ Fc	-10°C	+15°C	+40°C
{12} WORST CASE REJECTION FROM 0.300 MHz TO 1.0 MHz	-60.5 dB (40.0 dB MIN)	-60.5 dB (40.0 dB MIN)	-60.4 dB (40.0 dB MIN)
{13a} WORST CASE REJECTION FROM 188.25 MHz TO 1000.0 MHz	-61.5 dB (40.0 dB MIN)	-62.4 dB (40.0 dB MIN)	-63.5 dB (40.0 dB MIN)
{13c} RECORD MEASURED TEMPERATURE	-12.3 °C (-15.0 TO -10.0)	+12.8 °C (12.5 TO 17.5)	+43.2 °C (40.0 TO 45.0)
{14} ATTACH REJECTION PERFORMANCE X-Y PLOT(S)	✓ (√) ✓ (√)	✓ (√) ✓ (√)	✓ (√) ✓ (√)

DA 5

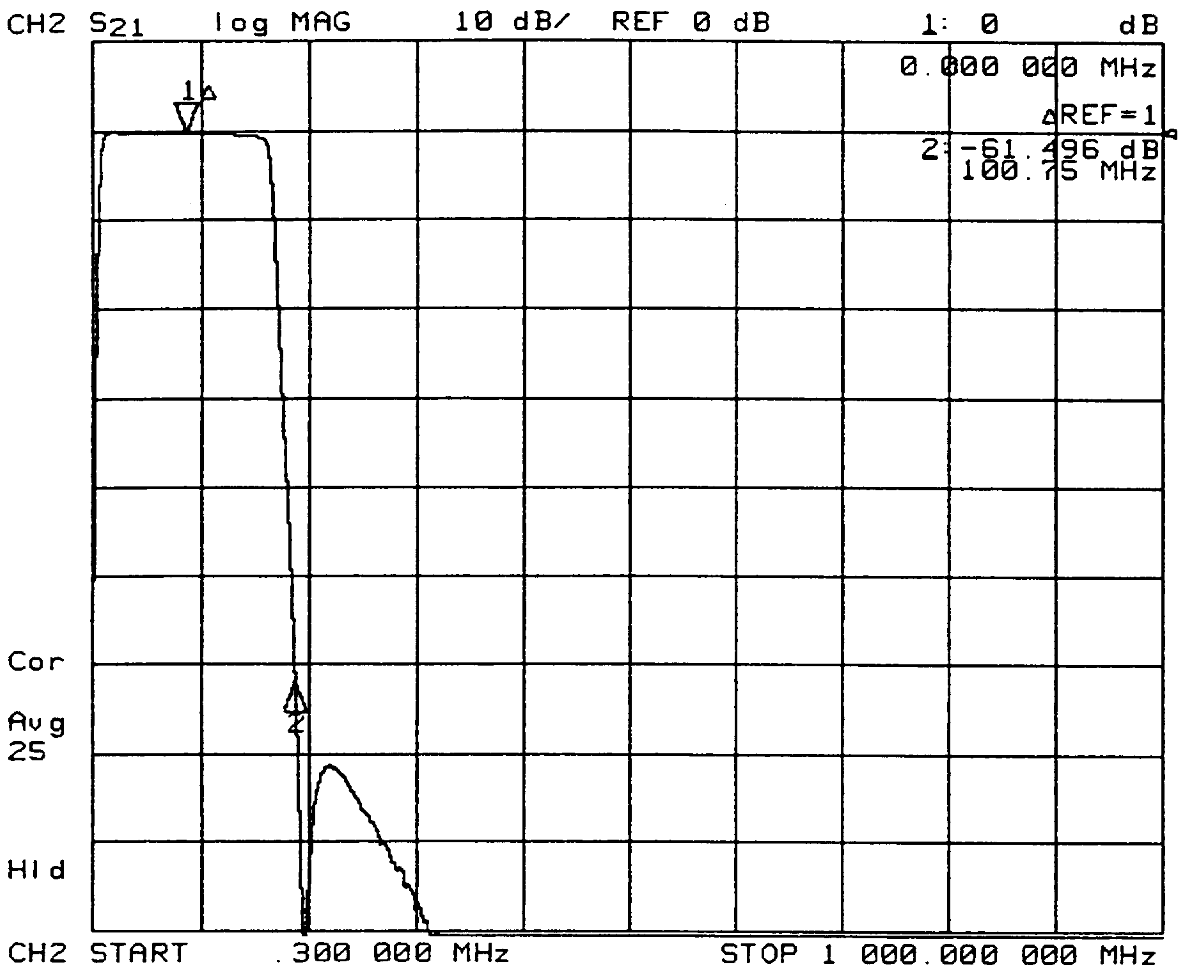
TEST PERFORMED BY R. Hoggan DATE 12/20/96

NOTE IF TEST WITNESSED BY AESD: Not witnessed this time. DLD

***** END OF FUNCTIONAL PERFORMANCE TEST ****

OUTLINE AND MOUNTING DIMENSIONS VERIFICATION
{16} REFERENCE CUSTOMER DRAWING 1331559

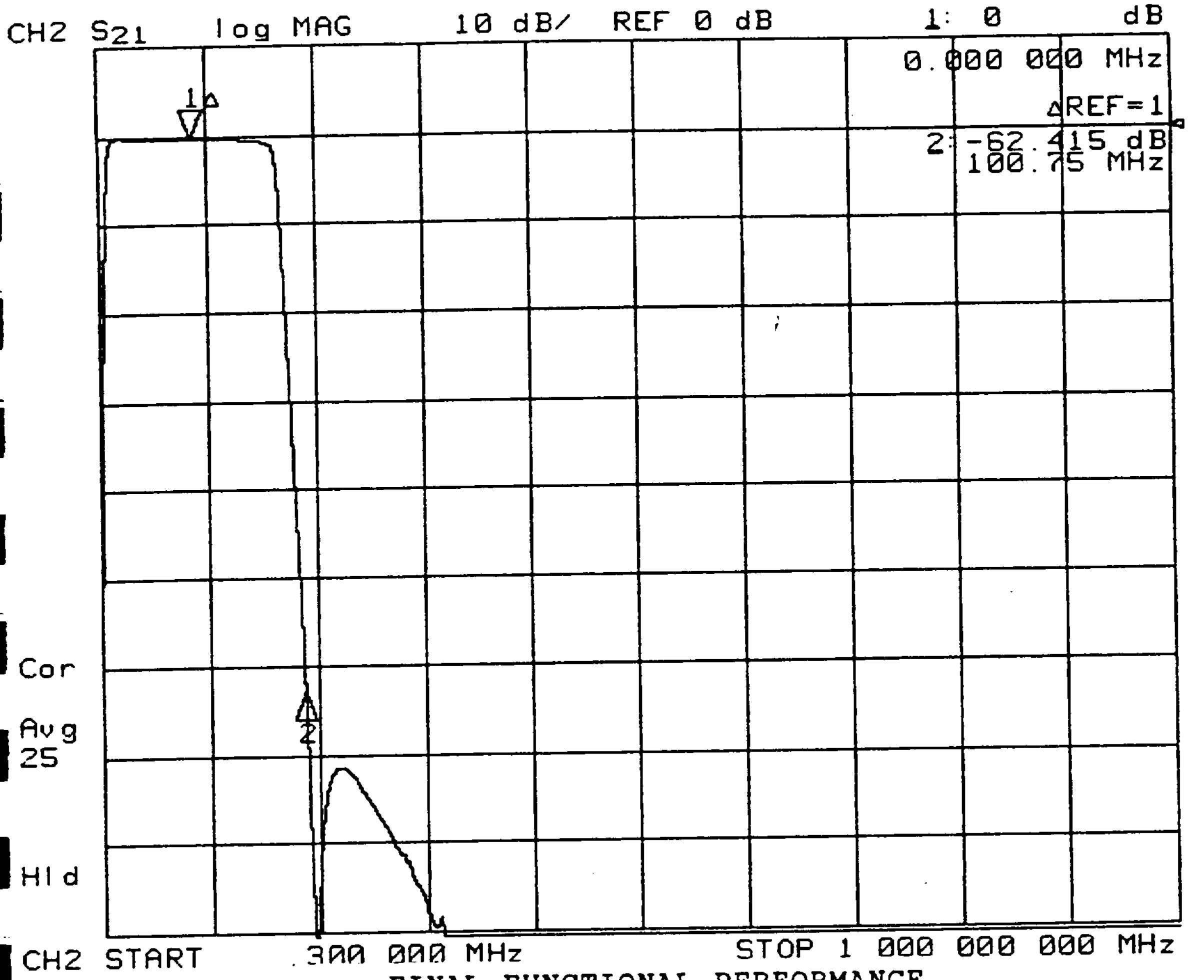
DESCRIPTION OF MEASUREMENT	DIMENSION AND TOLERANCE	ACTUAL MEASUREMENT
OVER ALL LENGTH	3.50 ± .03	3.501
MOUNTING HOLE CENTER	0.125 ± .010	0.126 [illegible] JC
BETWEEN UPPER MOUNTING HOLES	3.250	3.250
BETWEEN LOWER MOUNTING HOLES	3.250	3.250



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P230-007
-10C DATA
OPR: R. HOGGATT DATE DEC 2 0 1996

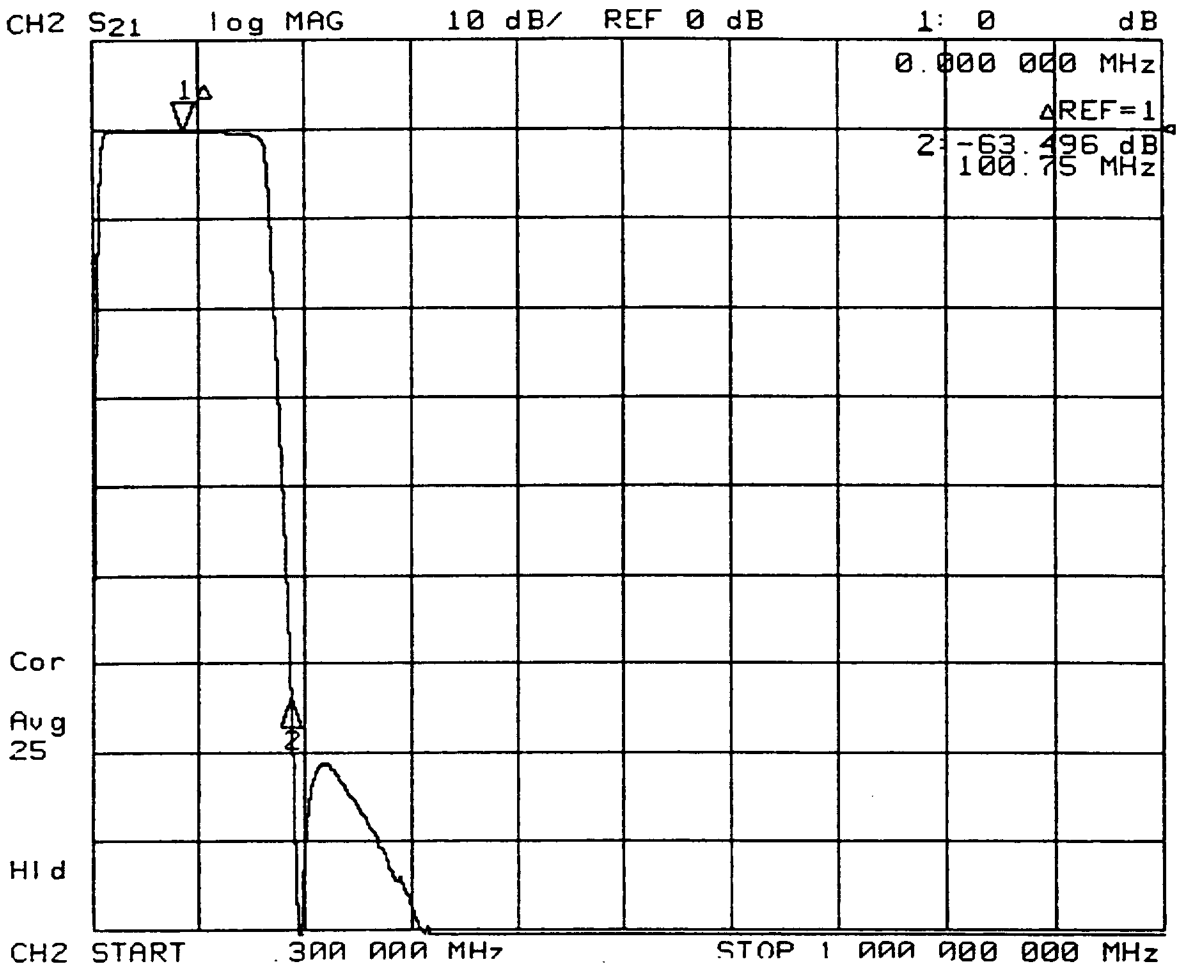
MARKER PARAMET nnel 2

MARKER 1	1.000000 MHz OFF	87.500000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	188.250000 MHz -61.496 dB
MARKER 3	5.000000 MHz OFF	188.250000 MHz OFF
MARKER 4	5.000000 MHz OFF	1000.000000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB OFF	-3 dB OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P230-007
+15C DATA
OPR: R. HOGGATT DATE DEC 20 1996

```
MARKER PARAME1                                          annel  2

MARKER 1                          1.000000 MHz       87.500000 MHz
                            OFF                       0 dB

MARKER 2                          5.000000 MHz      188.250000 MHz
                            OFF                     -62.415 dB

MARKER 3                          5.000000 MHz      188.250000 MHz
                            OFF                     OFF

MARKER 4                          5.000000 MHz     1000.000000 MHz
                            OFF                     OFF

MKR STIMULUS OFFSET               0.000000 MHz        0.000000 MHz
                              0 dB                    0 dB


REFERENCE MARKER              OFF                   MARKER 1
PLACEMENT                   CONTINUOUS              CONTINUOUS
MARKER SEARCH                 OFF                    OFF
TARGET VALUE                -3 dB                   -3 dB
MARKER WIDTH VALUE          -3 dB                   -3 dB
                              OFF                    OFF
MARKER TRACKING               OFF                    OFF
```



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P230-007
+40C DATA
OPR: R. HOGGATT DATE DEC 2 0 1996

```
MARKER PARAMET                                          nnel 2

MARKER 1                          1.000000 MHz      87.500000 MHz
                              OFF                   0 dB

MARKER 2                          5.000000 MHz     188.250000 MHz
                              OFF                 -63.496 dB

MARKER 3                          5.000000 MHz     188.250000 MHz
                              OFF                 OFF

MARKER 4                          5.000000 MHz    1000.000000 MHz
                              OFF                 OFF

MKR STIMULUS OFFSET               0.000000 MHz       0.000000 MHz
                               0 dB                 0 dB


REFERENCE MARKER               OFF                MARKER 1
PLACEMENT                     CONTINUOUS          CONTINUOUS
MARKER SEARCH                  OFF                 OFF
TARGET VALUE                  -3 dB               -3 dB
MARKER WIDTH VALUE            -3 dB               -3 dB
                               OFF                 OFF
MARKER TRACKING                OFF                 OFF
```

ACCEPTANCE TEST REPORT

BANDPASS FILTER MODEL HL87.5-155-10SS1 S/N P230-007
AEROJET 1331559-4 REV. E

BANDPASS CHARACTERISTICS MEASUREMENT

PER ATP PARA 4.6
(REF: AE-24687, PARA 4.8.2)

RECORD THE AMBIENT ROOM TEMPERATURE. +23.0 °C (+19°C TO +29.0°C)

{15} ATTACH PASSBAND PERFORMANCE X-Y PLOT ✓ (√)

{24} TEST POINT MATRIX

REF	FREQ	UNIT	VALUE	REF	FREQ	UNIT	VALUE
F1	0.5	MHz	-84.4 dB	F11	(*) 100.0	MHz	-0.26 dB
F2	1.0	MHz	-67.7 dB	F12	(*) 125.0	MHz	-0.35 dB
F3	5.0	MHz	-15.6 dB	F13	150.0	MHz	-0.60 dB
F4	7.5	MHz	-7.72 dB	F14	160.0	MHz	-1.06 dB
F5	10.0	MHz	-1.57 dB	F15	165.0	MHz	-4.29 dB
F6	15.0	MHz	-0.24 dB	F16	170.0	MHz	-15.5 dB
F7	25.0	MHz	-0.13 dB	F17	200.0	MHz	-84.8 dB
F8	(*) 50.0	MHz	-0.18 dB	F18	300.0	MHz	-87.5 dB
F9	(*) 75.0	MHz	-0.22 dB	F19	500.0	MHz	-106.6 dB
F10	87.5	MHz	-0.27 dB	F20	1000.0	MHz	-101.2 dB

DA 5

TEST PERFORMED BY: R. HOGGAT DATE 12/20/96

NOTE IF TEST WITNESSED BY AESD Not witnessed this time. DLD

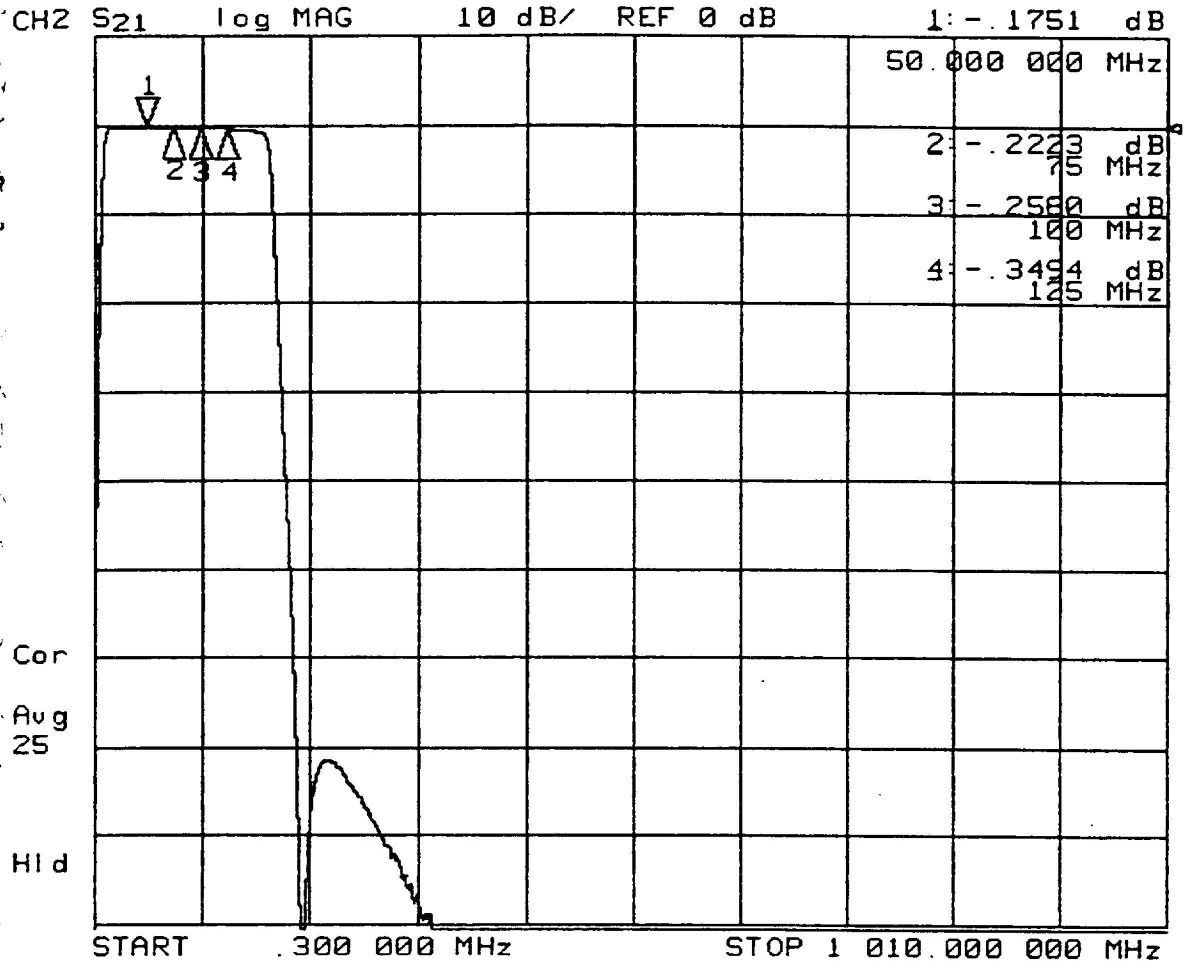
***** END OF BANDPASS CHARACTERISTICS TEST *****

FUNCTIONAL PERFORMANCE TEST

ACCEPTANCE TEST PROCEDURE
63-0005-02 PARA 4.1

BRIEF TEST DESCRIPTION: THE TESTS DESCRIBED IN APPENDIX D PAGE 10 THRU PAGE 13 ARE PERFORMED TO DOCUMENT THE FUNCTIONAL PERFORMANCE OF THE UNIT AT THE CONCLUSION OF ALL ENVIRONMENTAL TESTING. THE TESTS ARE AS FOLLOWS AND IN ANY SEQUENCE:

a .) CENTER FREQUENCY (fc) PER ATP PARA 4.5.7 (PART OF 3.0 dB B/W TEST)
b.) 3.0 dB BANDWIDTH PER ATP PARA 4.5.3.
c.) OUT-OF-BAND REJECTION PER ATP PARA 4.5.5.
d) INSERTION LOSS PER ATP PARA 4.5.2
e) INSERTION LOSS VS TEMPERATURE PER ATP PARA 4.5.6.
f.) PASSBAND RIPPLE PER ATP PARA 4.5.4 (PART OF INSERTION LOSS TEST).
g.) VSWR PER ATP PARA 4.5.1.



POST THERMAL CYCLE
PASSBAND CHARACTERISTICS
SERIAL NO. P230-007
AMBIENT
OPR: R. HOGGATT DATE DEC 2 0 1996

MARKER PARAME annel 2

MARKER 1	17.750000 MHz OFF	50.000000 MHz -.1751 dB
MARKER 2	157.250000 MHz OFF	75.000000 MHz -.2223 dB
MARKER 3	29.375000 MHz OFF	100.000000 MHz -.2560 dB
MARKER 4	145.625000 MHz OFF	125.000000 MHz -.3494 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

Report No. 11413
February, 1999

Channel 9 Bandpass Filter

IF Filter (S/N: 1331559-4, S/N: P230-013)

APPENDIX D **ACCEPTANCE TEST REPORT**

BANDPASS FILTER MODEL HL87.5-155-10SS1 S/N P230-013
AEROJET 1331559-4 REV. E

3.0 dB BANDWIDTH

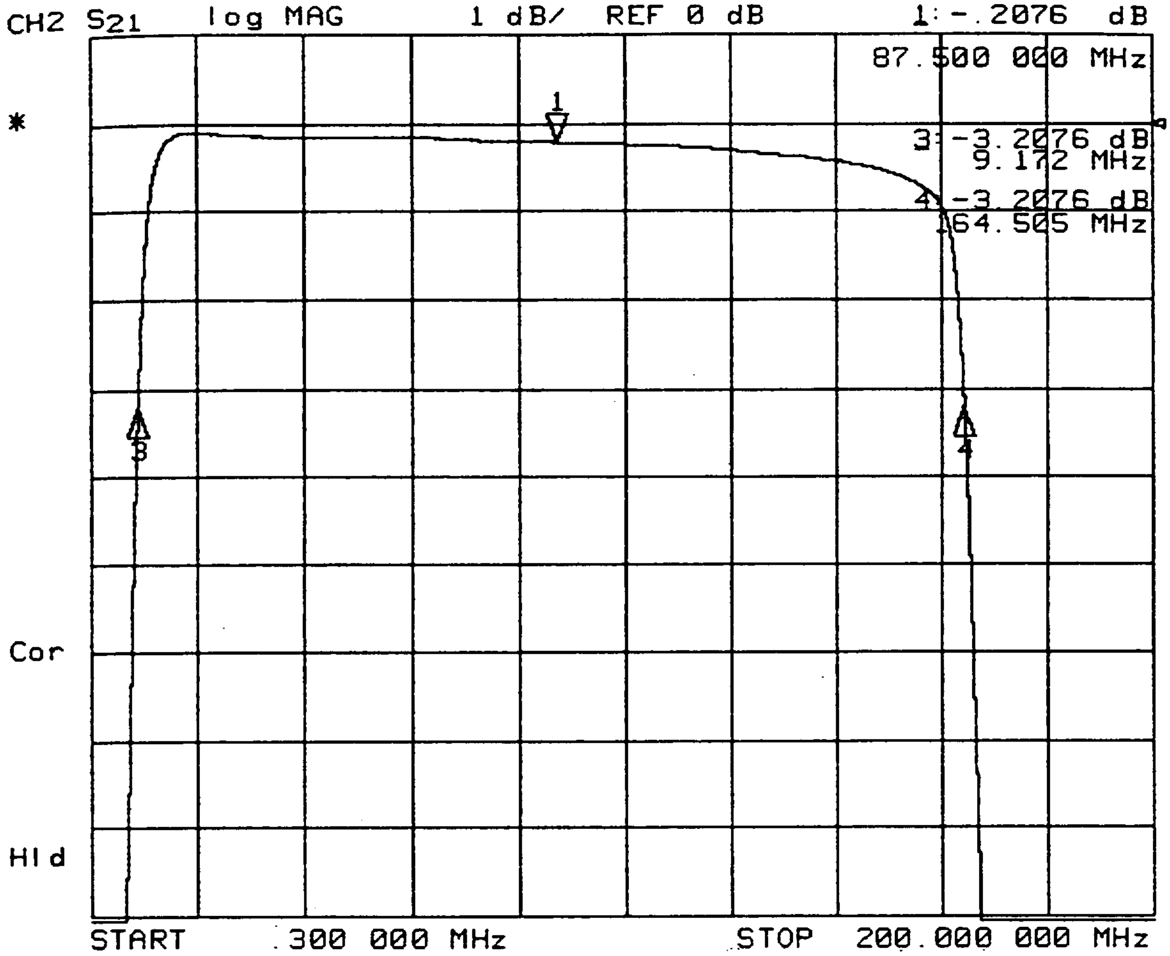
ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.3	-10°C	+15°C	+40°C
{7} UPPER 3.0 dB BANDEDGE	164.51 MHz (163.0-165.0)	164.22 Mhz (163.0-165.0)	163.96 MHz (163.0-165.0)
{8} LOWER 3.0 dB BANDEDGE	9.17 MHz (8.0-10.0)	9.16 Mhz (8.0-10.0)	9.14 MHz (8.0-10.0)
{9} 3.0 dB RELATIVE BANDWIDTH	155.34 MHz (153.0-157.0)	155.06 Mhz (153.0-157.0)	154.82 MHz (153.0-157.0)
{10} ADD {7} AND {8} ÷ 2 =	86.84 MHz (87.5 NOM)	86.69 MHz (87.5 NOM)	86.55 Mhz (87.5 NOM)
{10a} RECORD MEASURED TEMPERATURE	-12.7 °C (-15.0 TO -10.0)	+15.0 °C (12.5 TO 17.5)	+43.1 °C (40.0 TO 45.0)
{6} ATTACH TRANSMISSION LOSS PERFORMANCE X-Y PLOT	✓ (√)	✓ (√)	✓ (√)

PASSBAND RIPPLE

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.4	-10°C	+15°C	+40°C
{11a} MIN INSERTION LOSS FREQ	19.27 MHz	19.27 Mhz	19.27 MHz
MIN INSERTION LOSS PERFORMANCE	-0.16 dB	-0.10 dB	-0.16 dB
{11b} 75% BW LOWER BANDEDGE FREQ	13.21 MHz	13.08 Mhz	12.94 MHz
75% BW LOWER BANDEDGE I.L. PERF	-0.35 dB	-0.37 dB	-0.39 dB
{11c} 75% BW UPPER BANDEDGE FREQ	129.46 MHz	129.33 Mhz	129.19 MHz
75% BW UPPER BANDEDGE I.L. PERF	-0.35 dB	-0.37 dB	-0.39 dB
{11d} PERFORMANCE DELTA (I.L. @ {11b} - I.L. @ {11a})	0.25 dB	0.27 dB	0.29 dB
{11e} PERFORMANCE DELTA (I.L. @ {11c} - I.L. @ {11a})	0.25 dB	0.27 dB	0.29 dB

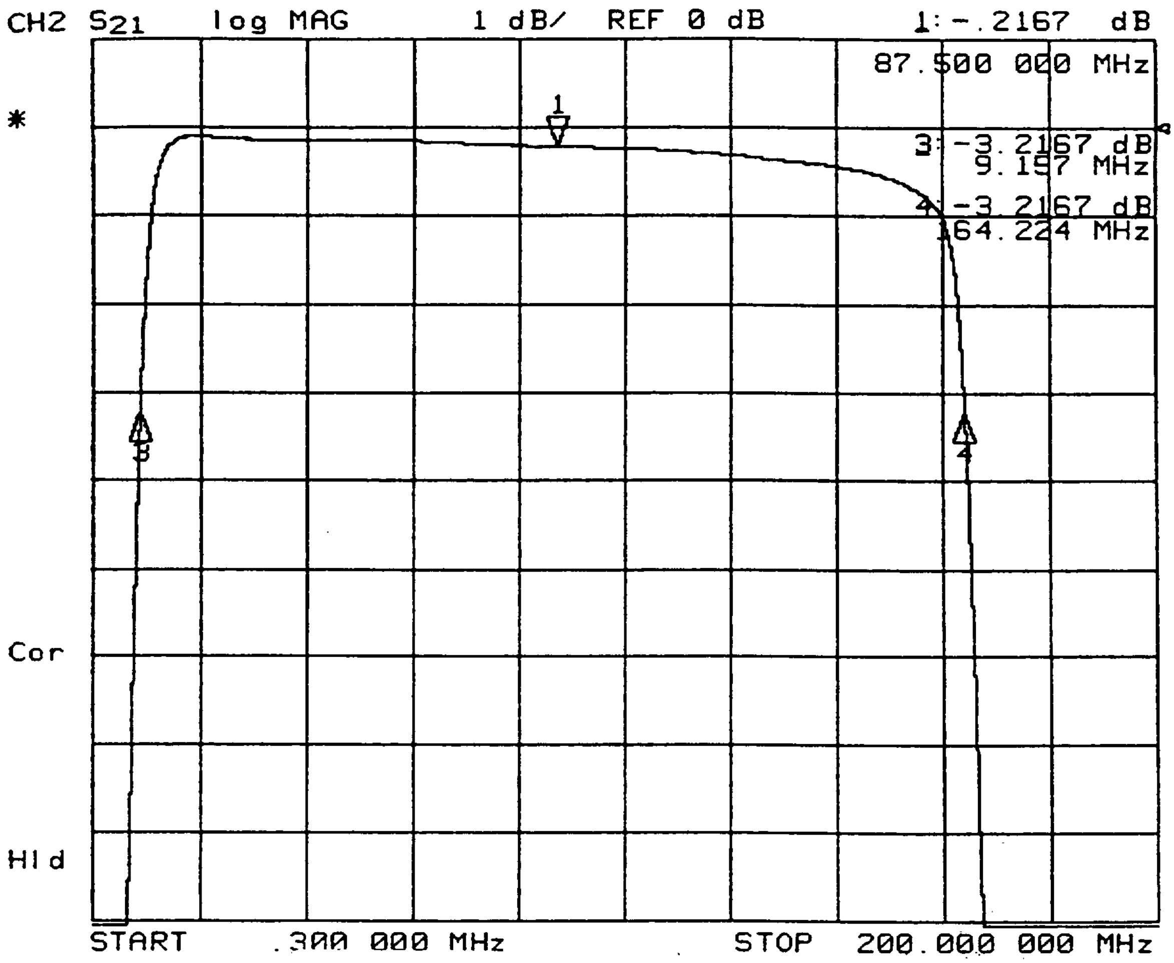
Prepared in accordance with MIL-STD-100

CONTRACT NO.	SIZE A	CAGE CODE 57032	DWG. NO. 63-0005-02	REV. J
DADEN-ANTHONY ASSOCIATES INC.	FILE: ACAD/63/0502APDJ.DOC		SHEET	12



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P230-013
-10C DATA
OPR: R. HOGGATT DATE DEC 2 0 1996

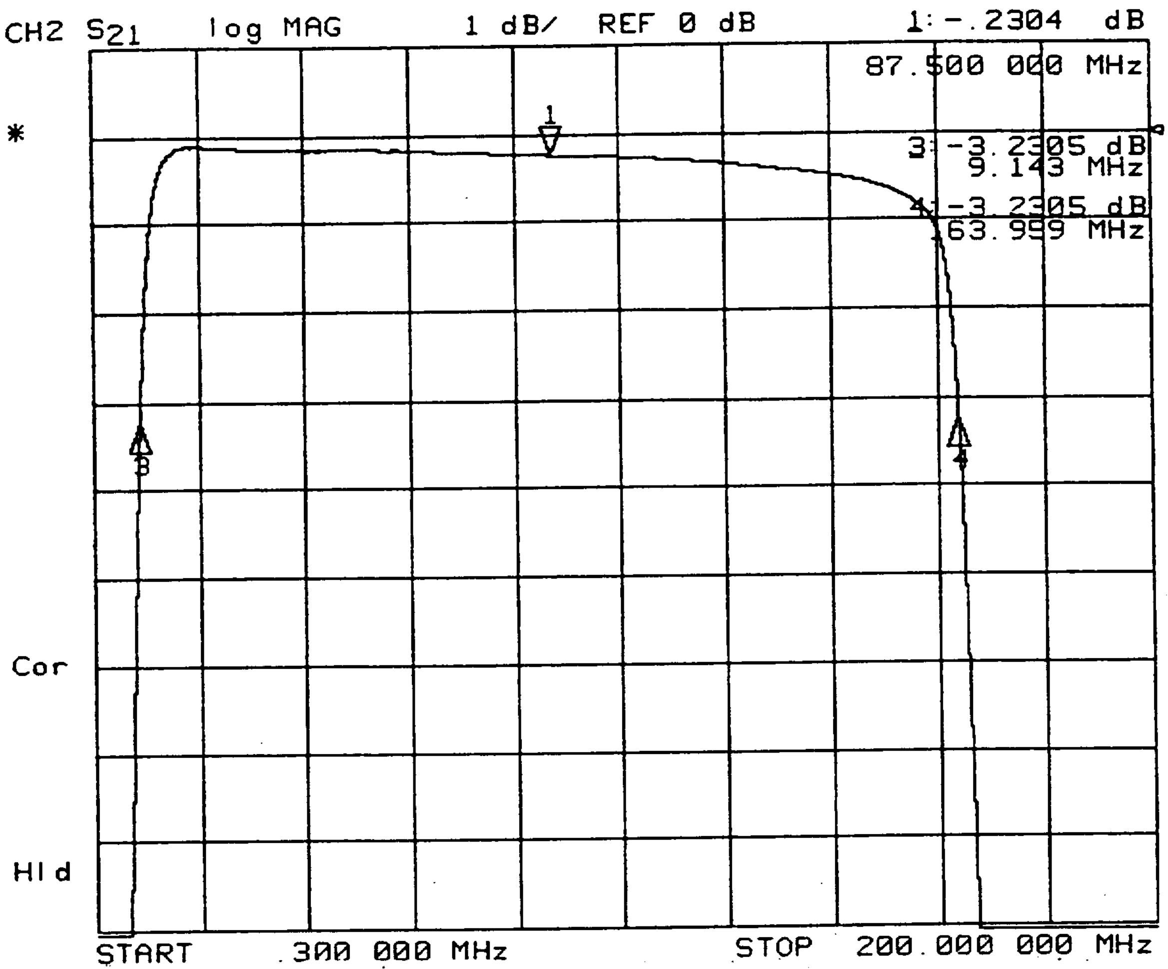
```
MARKER PARAMET                                       ınnel 2

MARKER 1                         17.750000 MHz        87.500000 MHz
                              OFF                   -.2076 dB

MARKER 2                        157.250000 MHz        86.838840 MHz
                              OFF                   OFF

MARKER 3                         29.375000 MHz         9.172203 MHz
                              OFF                   -3.2076 dB

MARKER 4                        145.625000 MHz       164.505477 MHz
                              OFF                   -3.2076 dB

MKR STIMULUS OFFSET               0.000000 MHz        89.425802 MHz
                               0 dB                 -3.2342 dB


REFERENCE MARKER               OFF                   OFF
PLACEMENT                     CONTINUOUS            CONTINUOUS
MARKER SEARCH                  OFF                   OFF
TARGET VALUE                  -14 dB                -3 dB
MARKER WIDTH VALUE            -3 dB                 -3 dB
                               OFF                   OFF
MARKER TRACKING                OFF                   OFF
```



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P230-013
+15C DATA

MARKER PARAMET OPR: R. HOGGATT DATE DEC 2 0 1996 annel 2

MARKER 1	17.750000 MHz OFF	87.500000 MHz -.2167 dB
MARKER 2	157.250000 MHz OFF	86.690727 MHz OFF
MARKER 3	29.375000 MHz OFF	9.157001 MHz -3.2167 dB
MARKER 4	145.625000 MHz OFF	164.224453 MHz -3.2167 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P230-013
+40C DATA
OPR: R. HOGGATT DATE DEC 2 0 1996

MARKER PARAMET		annel 2
MARKER 1	17.750000 MHz OFF	87.500000 MHz -.2304 dB
MARKER 2	157.250000 MHz OFF	86.551719 MHz OFF
MARKER 3	29.375000 MHz OFF	9.143762 MHz -3.2305 dB
MARKER 4	145.625000 MHz OFF	163.959677 MHz -3.2305 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB OFF	-3 dB OFF
MARKER TRACKING	OFF	OFF

APPENDIX D **ACCEPTANCE TEST REPORT**

BANDPASS FILTER MODEL HL87.5-155-10SS1 S/N P230-013
AEROJET 1331559-4 REV. E

PASSBAND RIPPLE (CON'T)

{11f} RECORD PASS/FAIL (0.5 dB MAX)	[✓ PASS]/FAIL	[✓ PASS]/FAIL	[✓ PASS]/FAIL
{11g) ATTACH PASSBAND RIPPLE PERFORMANCE X-Y PLOT(S)	✓ (√)	✓ (√)	✓ (√)

OUT-OF-BAND REJECTION

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.5 Fc=87.5 MHz. REF {5A} FOR INSERTION LOSS @ Fc	-10°C	+15°C	+40°C
{12} WORST CASE REJECTION FROM 0.300 MHz TO 1.0 MHz	-60.6 dB (40.0 dB MIN)	-60.5 dB (40.0 dB MIN)	-60.5 dB (40.0 dB MIN)
{13a} WORST CASE REJECTION FROM 188.25 MHz TO 1000.0 MHz	-63.5 dB (40.0 dB MIN)	-64.5 dB (40.0 dB MIN)	-65.5 dB (40.0 dB MIN)
{13c} RECORD MEASURED TEMPERATURE	-12.8 °C (-15.0 TO -10.0)	+15.1 °C (12.5 TO 17.5)	+43.0 °C (40.0 TO 45.0)
{14} ATTACH REJECTION PERFORMANCE X-Y PLOT(S)	✓ (√) ✓ (√)	✓ (√) ✓ (√)	✓ (√) ✓ (√)

TEST PERFORMED BY R. Hoggatt DATE 12/20/96

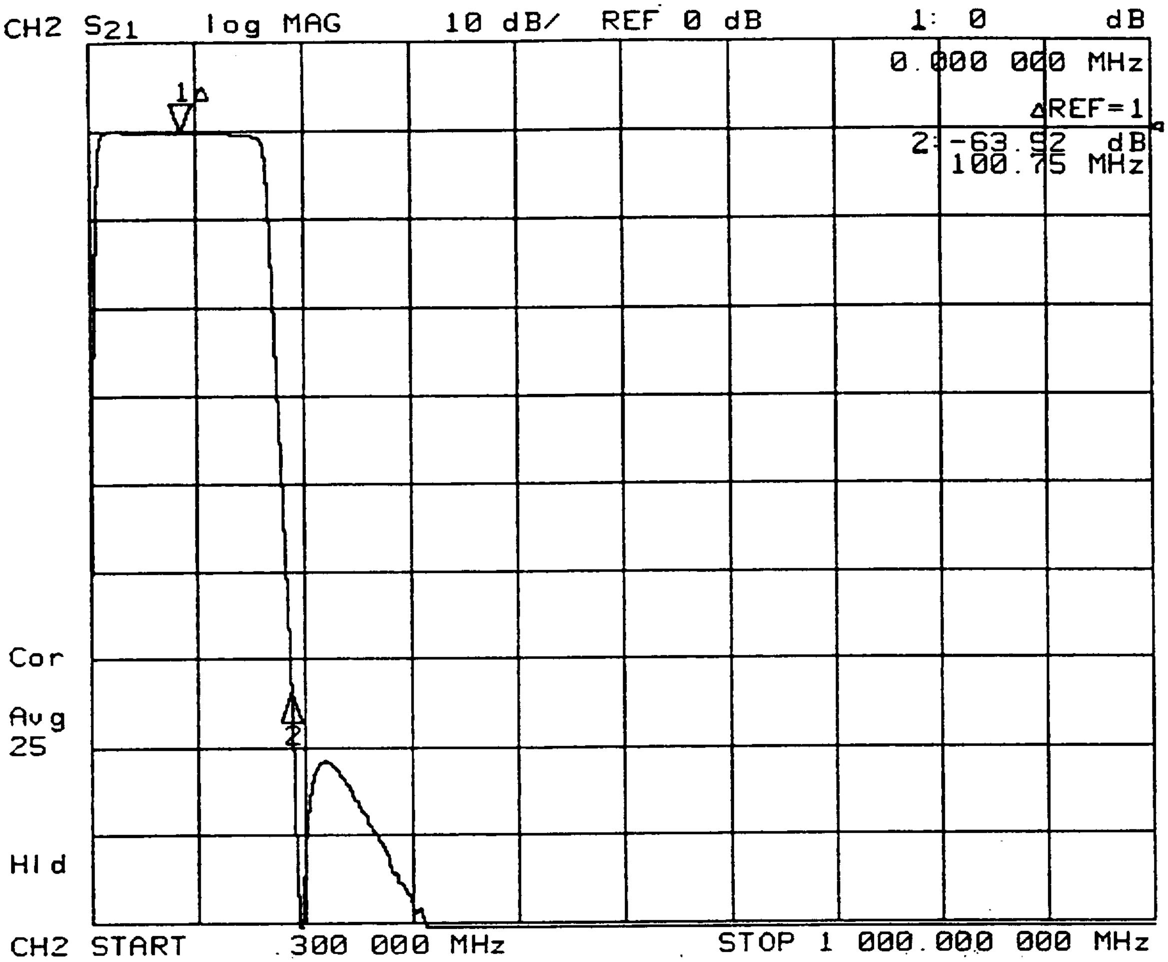
NOTE IF TEST WITNESSED BY AESD: ________ GSI: Not witnessed this time. DLD

***** END OF FUNCTIONAL PERFORMANCE TEST ****

OUTLINE AND MOUNTING DIMENSIONS VERIFICATION

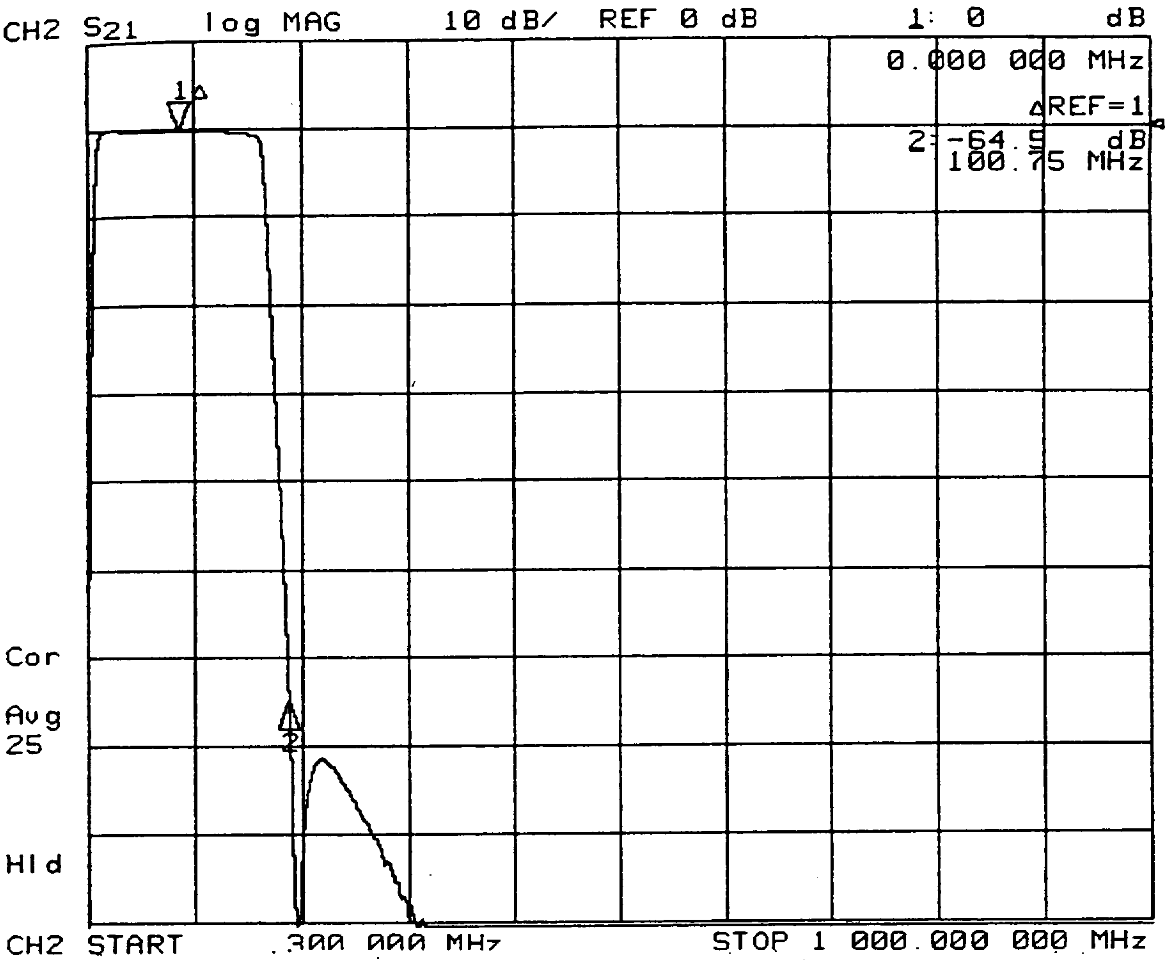
{16} REFERENCE CUSTOMER DRAWING 1331559

DESCRIPTION OF MEASUREMENT	DIMENSION AND TOLERANCE	ACTUAL MEASUREMENT
OVER ALL LENGTH	3.50 ± .03	3.503
MOUNTING HOLE CENTER	0.125 ± .010	0.128
BETWEEN UPPER MOUNTING HOLES	3.250	3.250
BETWEEN LOWER MOUNTING HOLES	3.250	3.250



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P230-013
-10C DATA
OPR: R. HOGGATT DATE DEC 20 1996

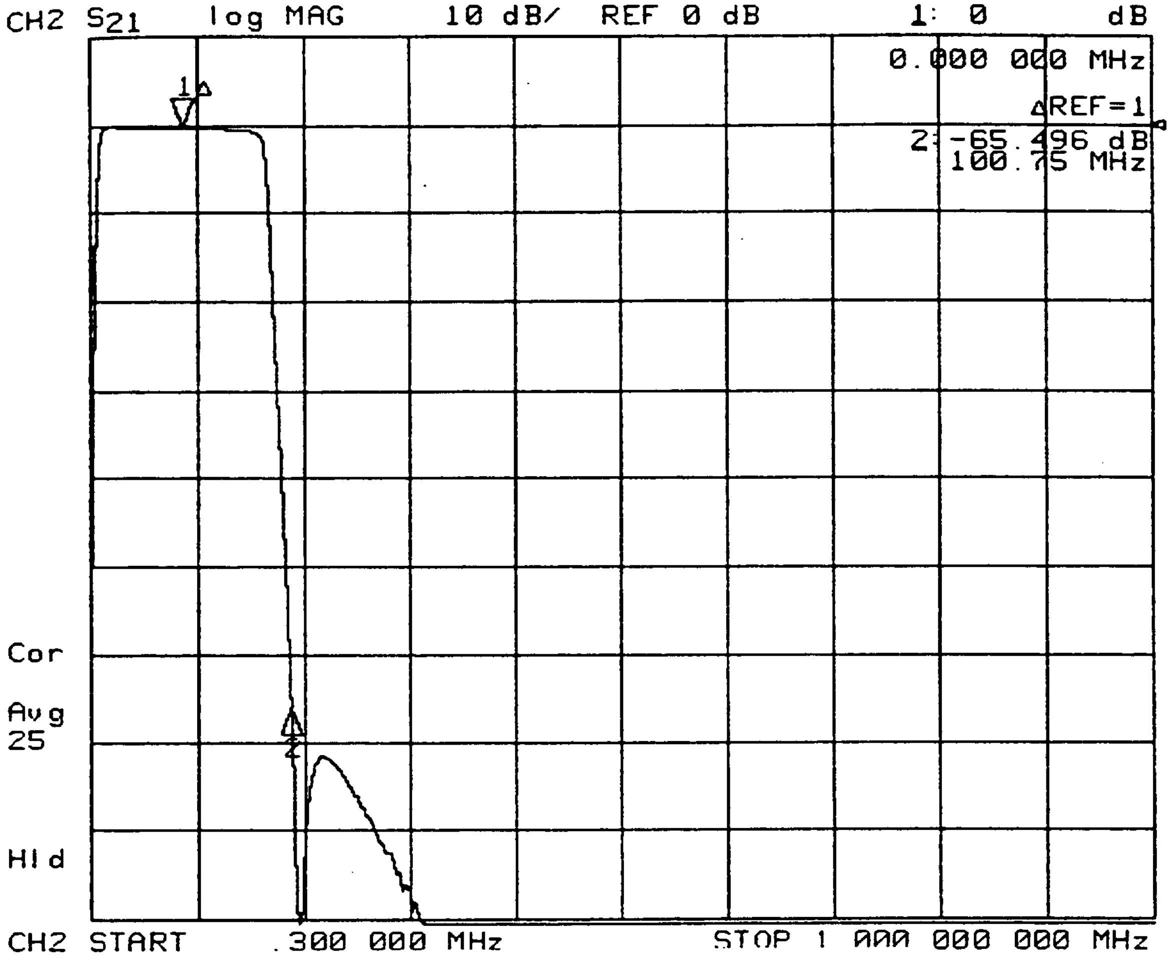
```
MARKER PARAMETE                                                   nnel 2

MARKER 1                              1.000000 MHz      87.500000 MHz
                                 OFF                     0 dB

MARKER 2                              5.000000 MHz     188.250000 MHz
                                 OFF                   -63.52 dB

MARKER 3                              5.000000 MHz     188.250000 MHz
                                 OFF                   OFF

MARKER 4                              5.000000 MHz    1000.000000 MHz
                                 OFF                   OFF

MKR STIMULUS OFFSET                   0.000000 MHz       0.000000 MHz
                                  0 dB                   0 dB


REFERENCE MARKER                  OFF                  MARKER 1
PLACEMENT                        CONTINUOUS            CONTINUOUS
MARKER SEARCH                     OFF                   OFF
TARGET VALUE                     -3 dB                 -3 dB
MARKER WIDTH VALUE               -3 dB                 -3 dB
                                  OFF                   OFF
MARKER TRACKING                   OFF                   OFF
```



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P230-013
+15C DATA

MARKER PARAMET OPR: R. HOGGATT DATE DEC 2 0 1996 annel 2

MARKER 1	1.000000 MHz OFF	87.500000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	188.250000 MHz -64.5 dB
MARKER 3	5.000000 MHz OFF	188.250000 MHz OFF
MARKER 4	5.000000 MHz OFF	1000.000000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P230-013
+40C DATA
OPR: R. HOGGATT DATE DEC 2 0 1996

MARKER PARAME annel 2

MARKER 1	1.000000 MHz OFF	87.500000 MHz 0 dB
MARKER 2	5.000000 MHz OFF	188.250000 MHz -65.496 dB
MARKER 3	5.000000 MHz OFF	188.250000 MHz OFF
MARKER 4	5.000000 MHz OFF	1000.000000 MHz OFF
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB OFF	-3 dB OFF
MARKER TRACKING	OFF	OFF

APPENDIX D **ACCEPTANCE TEST REPORT**

BANDPASS FILTER MODEL HL87.5-155-10SS1 S/N P230-013
AEROJET 1331559-4 REV. E

BANDPASS CHARACTERISTICS MEASUREMENT

PER ATP PARA 4.6
(REF: AE-24687, PARA 4.8.2)

RECORD THE AMBIENT ROOM TEMPERATURE. +22.3 °C (+19°C TO +29.0°C)

{15} ATTACH PASSBAND PERFORMANCE X-Y PLOT ✓ (√)

{24} TEST POINT MATRIX

REF	FREQ	UNIT	VALUE	REF	FREQ	UNIT	VALUE
F1	0.5	MHz	-83.9 dB	F11	(*) 100.0	MHz	-0.24 dB
F2	1.0	MHz	-67.5 dB	F12	(*) 125.0	MHz	-0.33 dB
F3	5.0	MHz	-18.7 dB	F13	150.0	MHz	-0.58 dB
F4	7.5	MHz	-7.70 dB	F14	160.0	MHz	-1.02 dB
F5	10.0	MHz	-1.80 dB	F15	165.0	MHz	-4.34 dB
F6	15.0	MHz	-0.21 dB	F16	170.0	MHz	-16.1 dB
F7	25.0	MHz	-0.11 dB	F17	200.0	MHz	-83.2 dB
F8	(*) 50.0	MHz	-0.16 dB	F18	300.0	MHz	-87.7 dB
F9	(*) 75.0	MHz	-0.20 dB	F19	500.0	MHz	-107.7 dB
F10	87.5	MHz	-0.26 dB	F20	1000.0	MHz	-105.3 dB

TEST PERFORMED BY: R. Hoggatt DA 5 DATE 12/20/96

NOTE IF TEST WITNESSED BY AESD ____________ GSI. Not witnessed this time. DLD

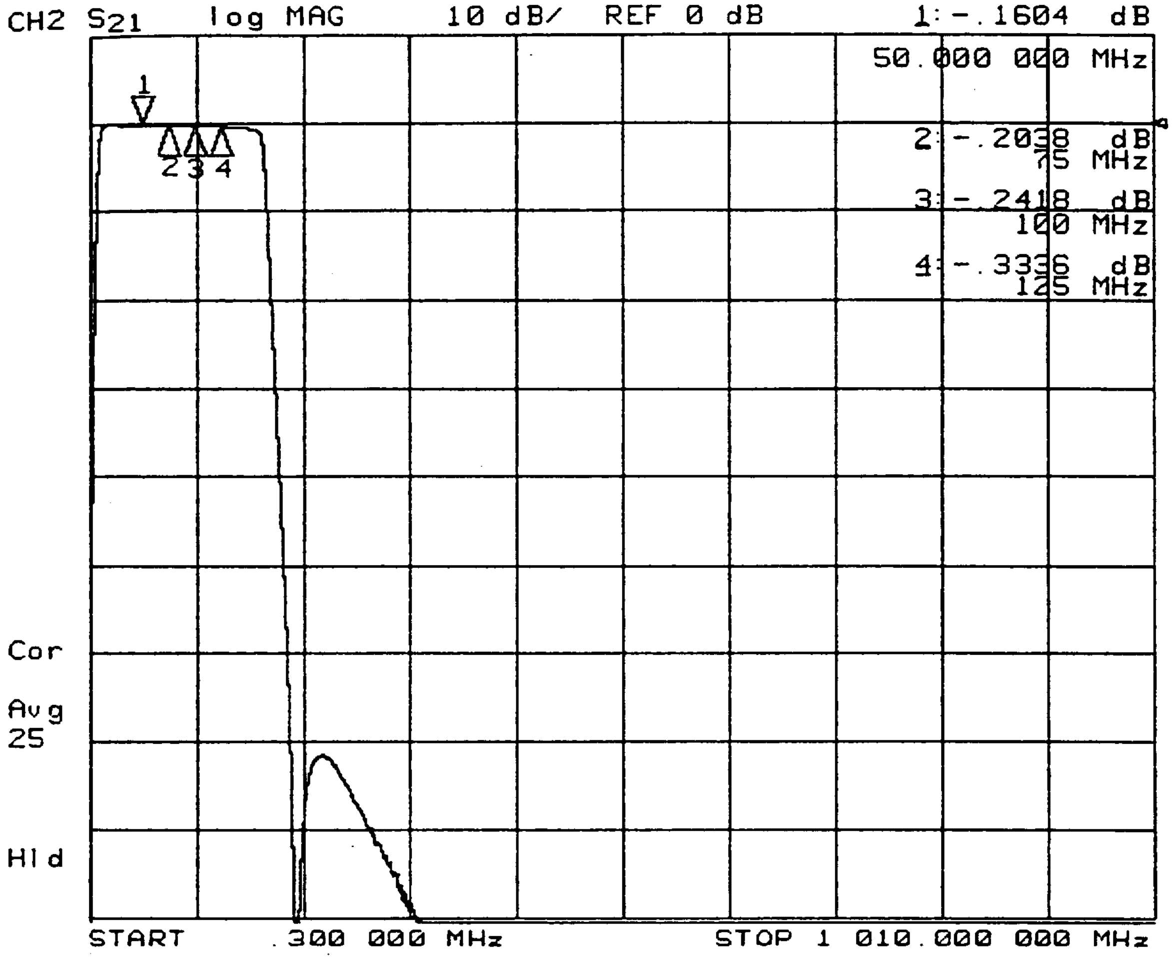
***** END OF BANDPASS CHARACTERISTICS TEST *****

FUNCTIONAL PERFORMANCE TEST

ACCEPTANCE TEST PROCEDURE
63-0005-02 PARA 4.1

BRIEF TEST DESCRIPTION: THE TESTS DESCRIBED IN APPENDIX D PAGE 10 THRU PAGE 13 ARE PERFORMED TO DOCUMENT THE FUNCTIONAL PERFORMANCE OF THE UNIT AT THE CONCLUSION OF ALL ENVIRONMENTAL TESTING. THE TESTS ARE AS FOLLOWS AND IN ANY SEQUENCE:

a .) CENTER FREQUENCY (fc) PER ATP PARA 4.5.7 (PART OF 3.0 dB B/W TEST)
b.) 3.0 dB BANDWIDTH PER ATP PARA 4.5.3.
c.) OUT-OF-BAND REJECTION PER ATP PARA 4.5.5.
d) INSERTION LOSS PER ATP PARA 4.5.2
e) INSERTION LOSS VS TEMPERATURE PER ATP PARA 4.5.6.
f.) PASSBAND RIPPLE PER ATP PARA 4.5.4 (PART OF INSERTION LOSS TEST).
g.) VSWR PER ATP PARA 4.5.1.



POST THERMAL CYCLE
PASSBAND CHARACTERISTICS
SERIAL NO. P230-013
AMBIENT
OPR: R. HOGGATT DATE DEC 2 0 1996

```
MARKER PARAME1                                          annel 2

MARKER 1                       17.750000 MHz        50.000000 MHz
                            OFF                   -.1604 dB

MARKER 2                      157.250000 MHz        75.000000 MHz
                            OFF                   -.2038 dB

MARKER 3                       29.375000 MHz       100.000000 MHz
                            OFF                   -.2418 dB

MARKER 4                      145.625000 MHz       125.000000 MHz
                            OFF                   -.3336 dB

MKR STIMULUS OFFSET             0.000000 MHz        89.425802 MHz
                             0 dB                 -3.2342 dB


REFERENCE MARKER             OFF                   OFF
PLACEMENT                   CONTINUOUS            CONTINUOUS
MARKER SEARCH                OFF                   OFF
TARGET VALUE                -14 dB                -3 dB
MARKER WIDTH VALUE          -3 dB                 -3 dB
                             OFF                   OFF
MARKER TRACKING              OFF                   OFF
```

Report No. 11413
February, 1999

Channel 10 Bandpass Filter

IF Filter (S/N: 1331559-7, S/N: P233-004)

APPENDIX G

ACCEPTANCE TEST REPORT

BANDPASS FILTER MODEL FX217-78-10SS1 S/N P233-004
AEROJET 1331559-7 REV. E

3.0 dB BANDWIDTH

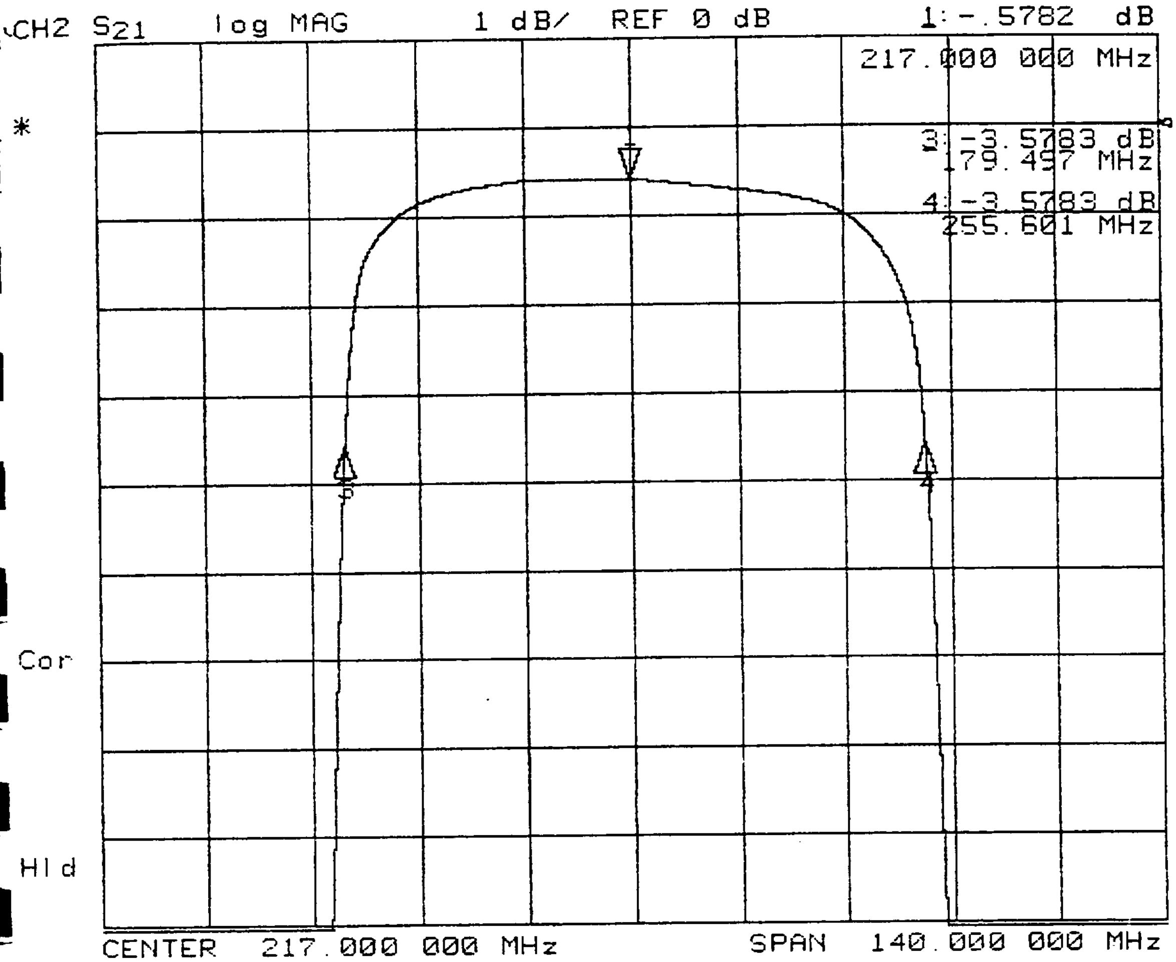
ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.3	-10°C	+15°C	+40°C
{7} UPPER 3.0 dB BANDEDGE	255.60 MHz (254.0-256.0)	255.32 Mhz (254.0-256.0)	254.94 MHz (254.0-256.0)
{8} LOWER 3.0 dB BANDEDGE	179.50 MHz (178.0-180.0)	179.34 Mhz (178.0-180.0)	179.17 MHz (178.0-180.0)
{9} 3.0 dB RELATIVE BANDWIDTH	76.10 MHz (74.0-78.0)	75.98 Mhz (74.0-78.0)	75.77 MHz (74.0-78.0)
{10} ADD {7} AND {8} ÷ 2 =	217.55 MHz (217.0 NOM)	217.33 MHz (217.0 NOM)	217.06 Mhz (217.0 NOM)
{10a} RECORD MEASURED TEMPERATURE	-12.1 °C (-15.0 TO -10.0)	+14.6 °C (12.5 TO 17.5)	+43.3 °C (40.0 TO 45.0)
{6} ATTACH TRANSMISSION LOSS PERFORMANCE X-Y PLOT	✓ (√)	✓ (√)	✓ (√)

PASSBAND RIPPLE

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.4	-10°C	+15°C	+40°C
{11a} MIN. INSERTION LOSS FREQ	211.05 MHz	211.05 Mhz	213.50 MHz
MIN INSERTION LOSS PERFORMANCE	-0.57 dB	-0.60 dB	-0.63 dB
{11b} 75% BW LOWER BANDEDGE FREQ	186.60 MHz	186.40 Mhz	186.22 MHz
75% BW LOWER BANDEDGE I.L. PERF	-0.98 dB	-1.04 dB	-1.10 dB
{11c} 75% BW UPPER BANDEDGE FREQ	245.10 MHz	244.90 Mhz	244.72 MHz
75% BW UPPER BANDEDGE I.L. PERF	-0.98 dB	-1.04 dB	-1.10 dB
{11d} PERFORMANCE DELTA (I.L. @ {11b} - I.L. @ {11a})	0.41 dB	0.44 dB	0.47 dB
{11e} PERFORMANCE DELTA (I.L. @ {11c} - I.L. @ {11a})	0.41 dB	0.44 dB	0.47 dB

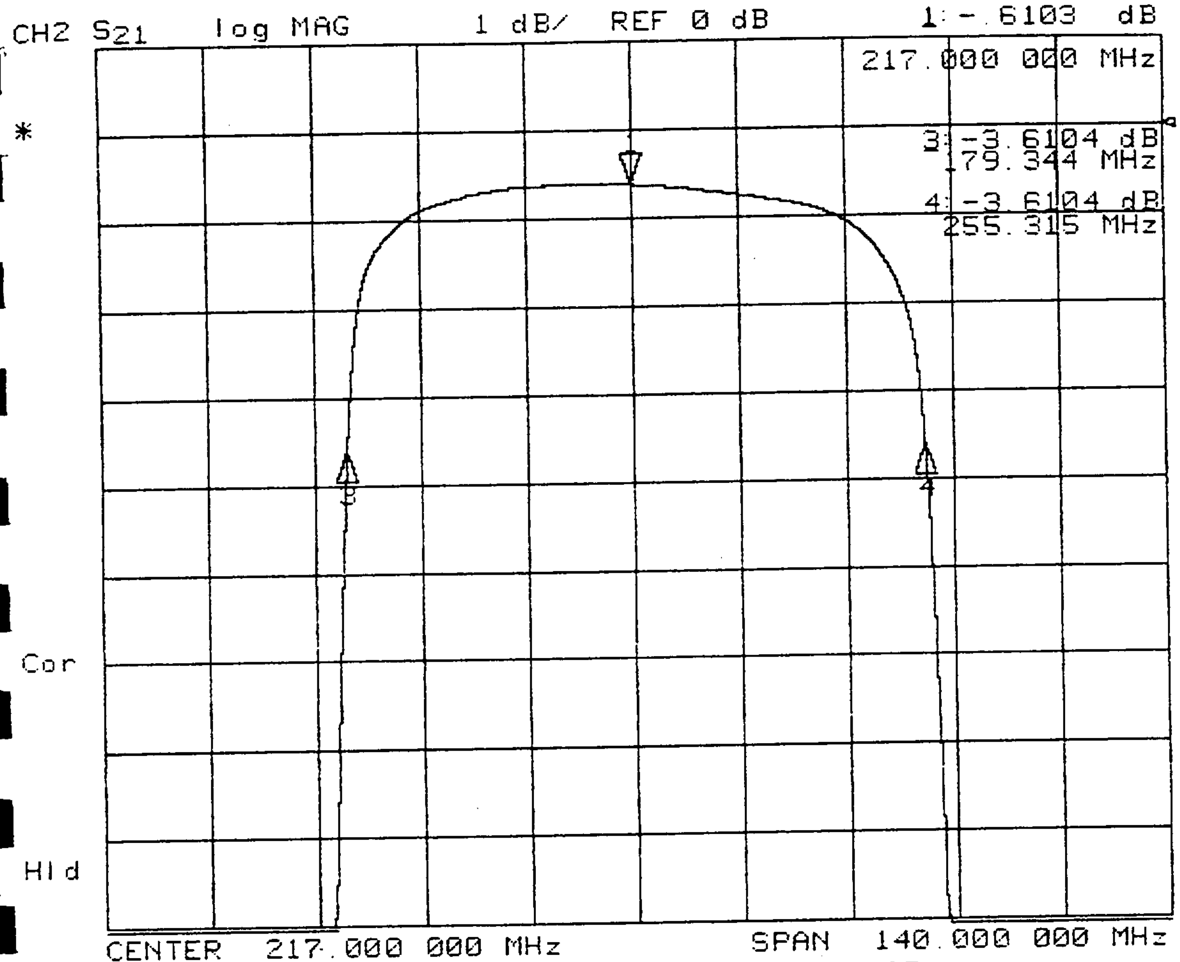
Prepared in accordance with MIL-STD-100

CONTRACT NO.	SIZE A	CAGE CODE 57032	DWG. NO. 63-0005-02	REV. J
DADEN-ANTHONY ASSOCIATES INC.	FILE: ACAD/63/0502APGJ.DOC		SHEET	12



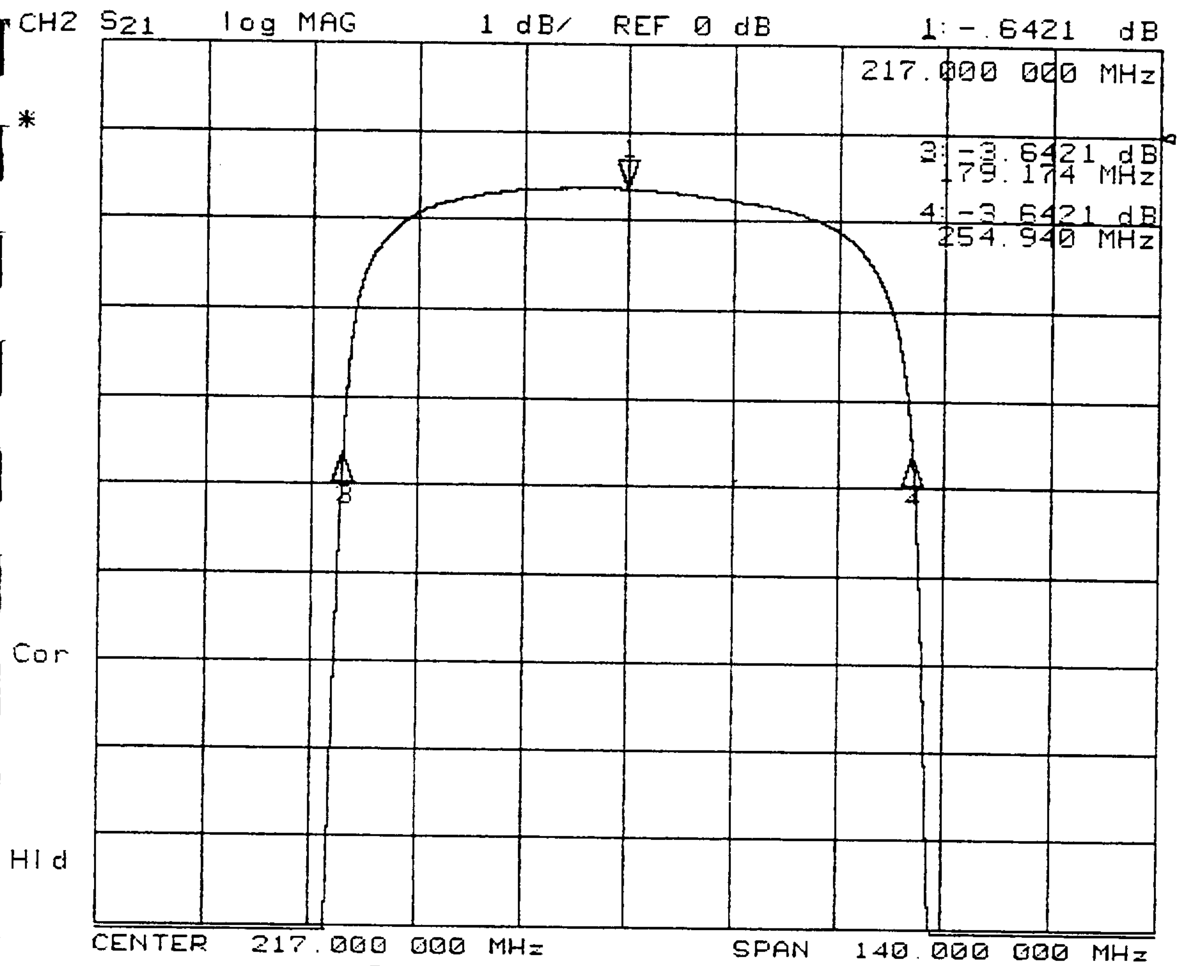
FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P233-004
-10C DATA
OPR: R. HOGGATT DATE JAN 3 1 1997

```
MARKER PARAMET                                          annel 2

MARKER 1                        181.900000 MHz      217.000000 MHz
                               OFF                 -.5782 dB

MARKER 2                        252.100000 MHz      217.549616 MHz
                               OFF                 OFF

MARKER 3                        187.750000 MHz      179.497512 MHz
                               OFF                 -3.5783 dB

MARKER 4                        246.250000 MHz      255.601720 MHz
                               OFF                 -3.5783 dB

MKR STIMULUS OFFSET               0.000000 MHz       89.425802 MHz
                                 0 dB              -3.2342 dB

REFERENCE MARKER                 OFF                 OFF
PLACEMENT                      CONTINUOUS          CONTINUOUS
MARKER SEARCH                    OFF                 OFF
TARGET VALUE                   -14 dB              -3 dB
MARKER WIDTH VALUE             -3 dB               -3 dB
                                 OFF                 OFF
MARKER TRACKING                  OFF                 OFF
```



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P233-004
+15C DATA
OPR: R. HOGGATT DATE JAN 3 1 1997

```
MARKER PARAME1                                              annel 2

MARKER 1                      181.900000 MHz       217.000000 MHz
                             OFF                  -.6103 dB

MARKER 2                      252.100000 MHz       217.330146 MHz
                             OFF                  OFF

MARKER 3                      187.750000 MHz       179.344796 MHz
                             OFF                  -3.6104 dB

MARKER 4                      246.250000 MHz       255.315497 MHz
                             OFF                  -3.6104 dB

MKR STIMULUS OFFSET             0.000000 MHz        89.425802 MHz
                               0 dB               -3.2342 dB


REFERENCE MARKER              OFF                  OFF
PLACEMENT                    CONTINUOUS           CONTINUOUS
MARKER SEARCH                 OFF                  OFF
TARGET VALUE                 -14 dB               -3 dB
MARKER WIDTH VALUE           -3 dB                -3 dB
                              OFF                  OFF
MARKER TRACKING               OFF                  OFF
```



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P233-004
+40C DATA
MARKER PARAME OPR: R. HOGGATT DATE JAN 31 1997 annel 2

MARKER 1	181.900000 MHz OFF	217.000000 MHz -.6421 dB
MARKER 2	252.100000 MHz OFF	217.057616 MHz OFF
MARKER 3	187.750000 MHz OFF	179.174428 MHz -3.6421 dB
MARKER 4	246.250000 MHz OFF	254.940804 MHz -3.6421 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	89.425802 MHz -3.2342 dB
REFERENCE MARKER	OFF	OFF
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-14 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

ACCEPTANCE TEST REPORT

BANDPASS FILTER MODEL FX217-78-10SS1 S/N P233-004
AEROJET 1331559-7 REV. E

PASSBAND RIPPLE (CON'T)

{11f} RECORD PASS/FAIL (0.7 dB MAX)	[✓ PASS]/FAIL	[✓ PASS]/FAIL	[✓ PASS]/FAIL
{11g) ATTACH PASSBAND RIPPLE PERFORMANCE X-Y PLOT(S)	✓ (√)	✓ (√)	✓ (√)

OUT-OF-BAND REJECTION

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.5 Fc=217.0 MHz. REF {5A} FOR INSERTION LOSS @ Fc	-10°C	+15°C	+40°C
{12} WORST CASE REJECTION FROM 0.300 MHz TO 166.3 MHz	-43.8 dB (40.0 dB MIN)	-43.9 dB (40.0 dB MIN)	-44.1 dB (40.0 dB MIN)
{13a} WORST CASE REJECTION FROM 267.7 MHz TO 1000.0 MHz	-43.2 dB (40.0 dB MIN)	-43.7 dB (40.0 dB MIN)	-43.6 dB (40.0 dB MIN)
{13c} RECORD MEASURED TEMPERATURE	-12.3 °C (-15.0 TO -10.0)	+14.6 °C (12.5 TO 17.5)	+43.3 °C (40.0 TO 45.0)
{14} ATTACH REJECTION PERFORMANCE X-Y PLOTS	✓ (√)	✓ (√)	✓ (√)

TEST PERFORMED BY R. Hoggatt DATE 1/31/97 DA 5

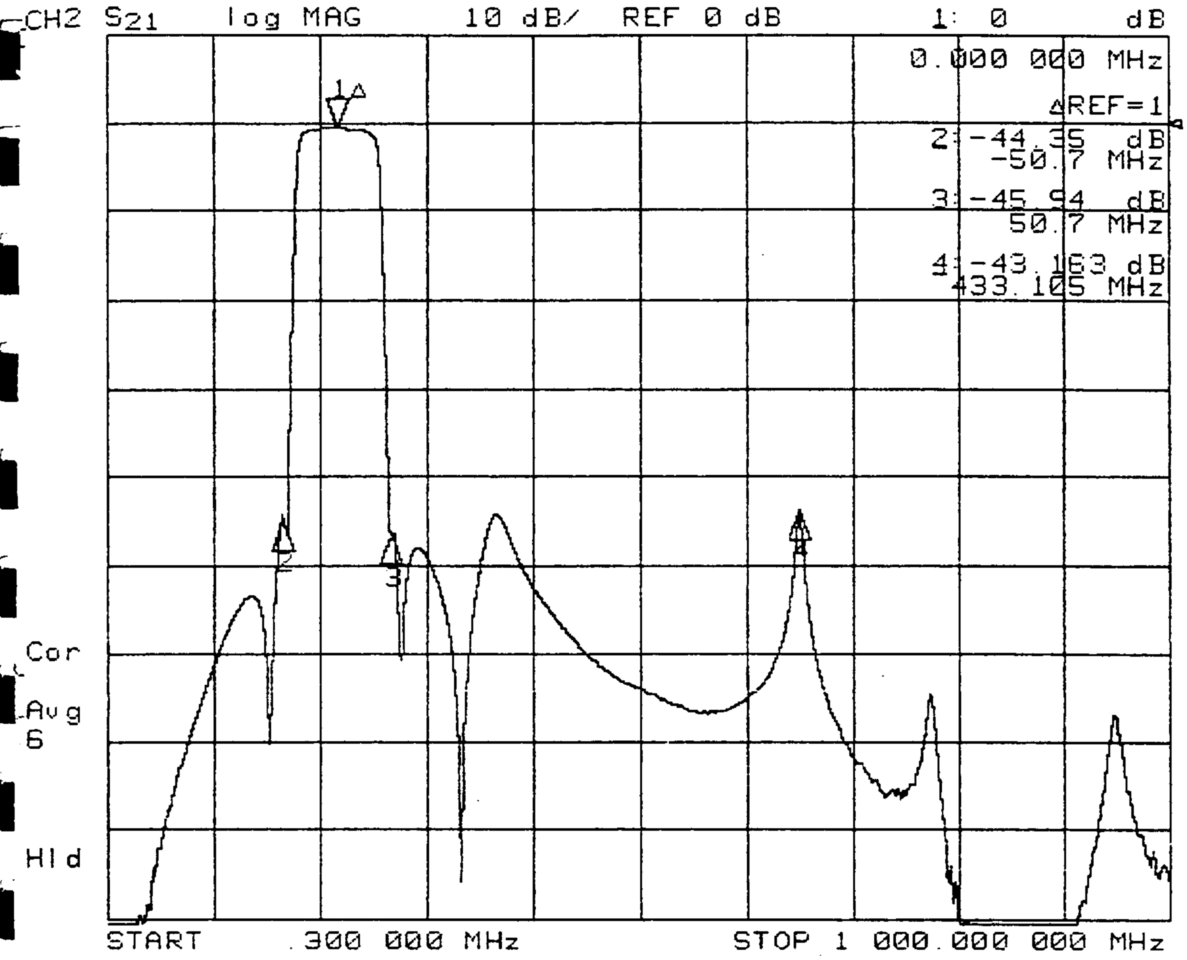
NOTE IF TEST WITNESSED BY AESD: ________ GSI: ________ Not Witnessed this time. DLD

***** END OF FUNCTIONAL PERFORMANCE TEST ****

OUTLINE AND MOUNTING DIMENSIONS VERIFICATION

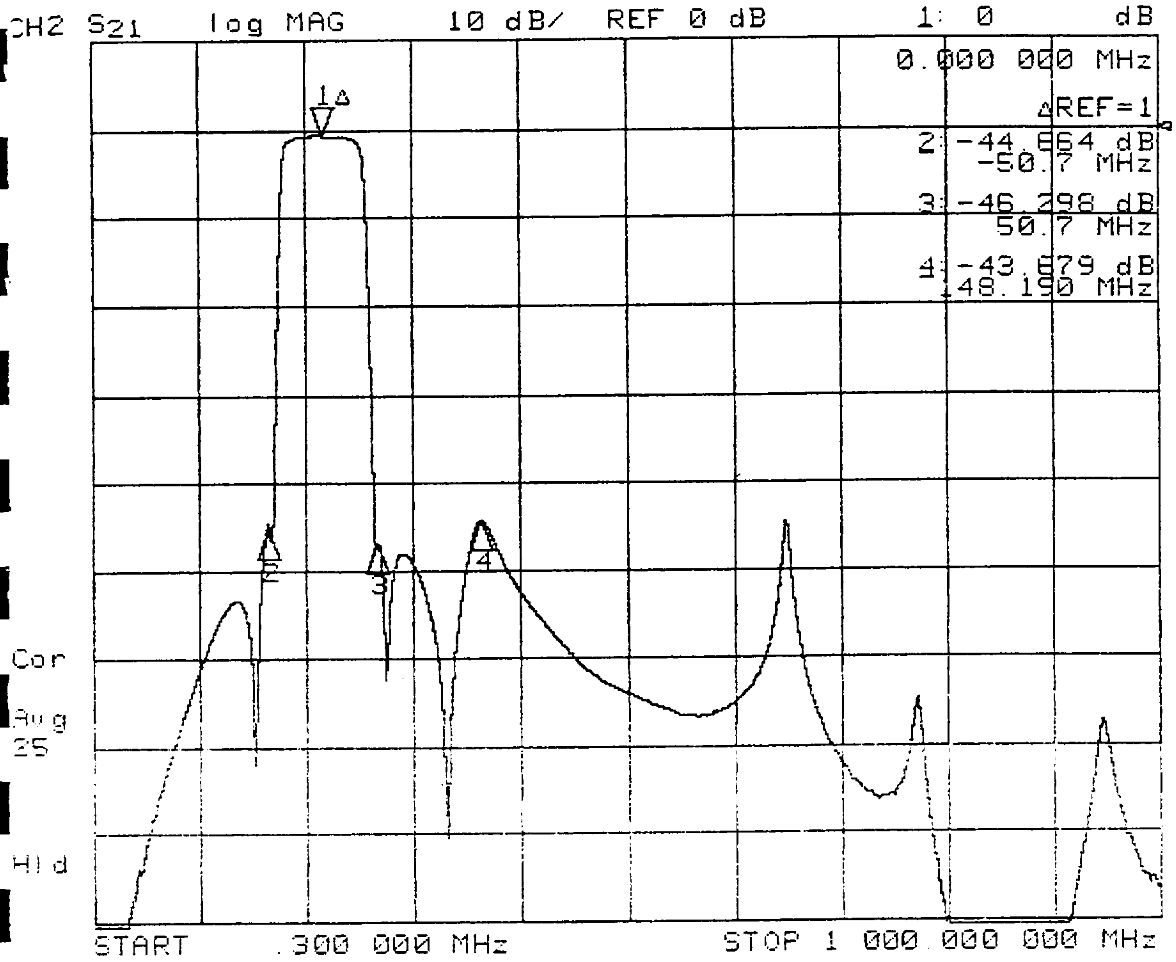
{16} REFERENCE CUSTOMER DRAWING 1331559

DESCRIPTION OF MEASUREMENT	DIMENSION AND TOLERANCE	ACTUAL MEASUREMENT
OVER ALL LENGTH	5.50 ± .03	5.505
MOUNTING HOLE CENTER	0.125 ± .010	.125
BETWEEN UPPER MOUNTING HOLES	5.250	~~5.245~~ 5.245 DW
BETWEEN LOWER MOUNTING HOLES	5.250	5.246



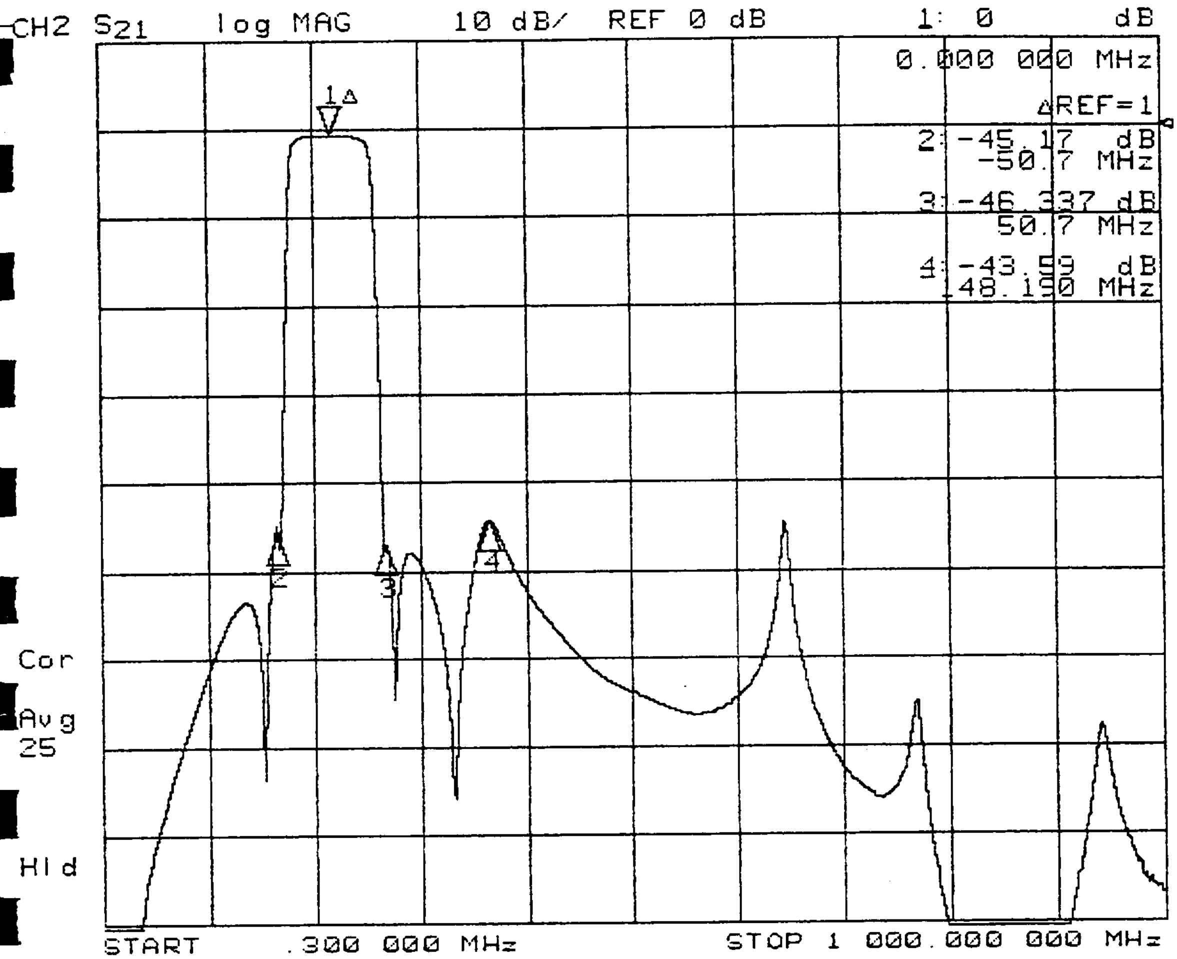
FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P233-004
-10C DATA
OPR: R. HOGGATT DATE JAN 31 1997

MARKER PARAMET		nnel 2
MARKER 1	1000.000000 MHz OFF	217.000000 MHz 0 dB
MARKER 2	1000.000000 MHz OFF	166.300000 MHz -44.35 dB
MARKER 3	1000.000000 MHz OFF	267.700000 MHz -45.94 dB
MARKER 4	1000.000000 MHz OFF	650.105021 MHz -43.163 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P233-004
+15C DATA
OPR: R. HOGGATT DATE JAN 3 1 1997

MARKER PARAMET		innel 2
MARKER 1	1000.000000 MHz OFF	217.000000 MHz 0 dB
MARKER 2	1000.000000 MHz OFF	166.300000 MHz -44.664 dB
MARKER 3	1000.000000 MHz OFF	267.700000 MHz -46.298 dB
MARKER 4	1000.000000 MHz OFF	365.190551 MHz -43.679 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P233-004
+40C DATA
OPR: R. HOGGATT DATE JAN 3 1 1997

```
MARKER PARAMET                                                annel 2

MARKER 1                  1000.000000 MHz        217.000000 MHz
                         OFF                     0 dB

MARKER 2                  1000.000000 MHz        166.300000 MHz
                         OFF                    -45.17 dB

MARKER 3                  1000.000000 MHz        267.700000 MHz
                         OFF                    -46.337 dB

MARKER 4                  1000.000000 MHz        365.190589 MHz
                         OFF                    -43.59 dB

MKR STIMULUS OFFSET          0.000000 MHz          0.000000 MHz
                          0 dB                   0 dB

REFERENCE MARKER          OFF                   MARKER 1
PLACEMENT                CONTINUOUS             CONTINUOUS
MARKER SEARCH             OFF                    OFF
TARGET VALUE             -3 dB                  -3 dB
MARKER WIDTH VALUE       -3 dB                  -3 dB
                          OFF                    OFF
MARKER TRACKING           OFF                    OFF
```

ACCEPTANCE TEST REPORT

BANDPASS FILTER MODEL FX217-78-10SS1 S/N P233-004
AEROJET 1331559-7 REV. E

BANDPASS CHARACTERISTICS MEASUREMENT

PER ATP PARA 4.6
(REF: AE-24687, PARA 4.8.2)

RECORD THE AMBIENT ROOM TEMPERATURE +24.4 °C (+19°C TO +29.0°C)

{15} ATTACH PASSBAND PERFORMANCE X-Y PLOT ✓ (√)

{24} TEST POINT MATRIX

REF	FREQ	UNIT	VALUE	REF	FREQ	UNIT	VALUE
F1	1.0	MHz	-102.4 dB	F11	217.0	MHz	-0.60 dB
F2	10.0	MHz	-107.1 dB	F12	(*) 224.0	MHz	-0.64 dB
F3	100.0	MHz	-61.6 dB	F13	(*) 230.0	MHz	-0.69 dB
F4	150.0	MHz	-61.3 dB	F14	240.0	MHz	-0.87 dB
F5	170.0	MHz	-46.3 dB	F15	250.0	MHz	-1.51 dB
F6	178.0	MHz	-7.33 dB	F16	256.0	MHz	-5.79 dB
F7	184.0	MHz	-1.35 dB	F17	264.0	MHz	-39.3 dB
F8	194.0	MHz	-0.75 dB	F18	300.0	MHz	-49.1 dB
F9	(*) 204.0	MHz	-0.63 dB	F19	500.0	MHz	-63.9 dB
F10	(*) 210.0	MHz	-0.59 dB	F20	1000.0	MHz	-86.5 dB

TEST PERFORMED BY: R. Hoggatt DATE 1/31/97 DA 5

NOTE IF TEST WITNESSED BY AESD ________ GSI ________

Not Witnessed
this time. DLD

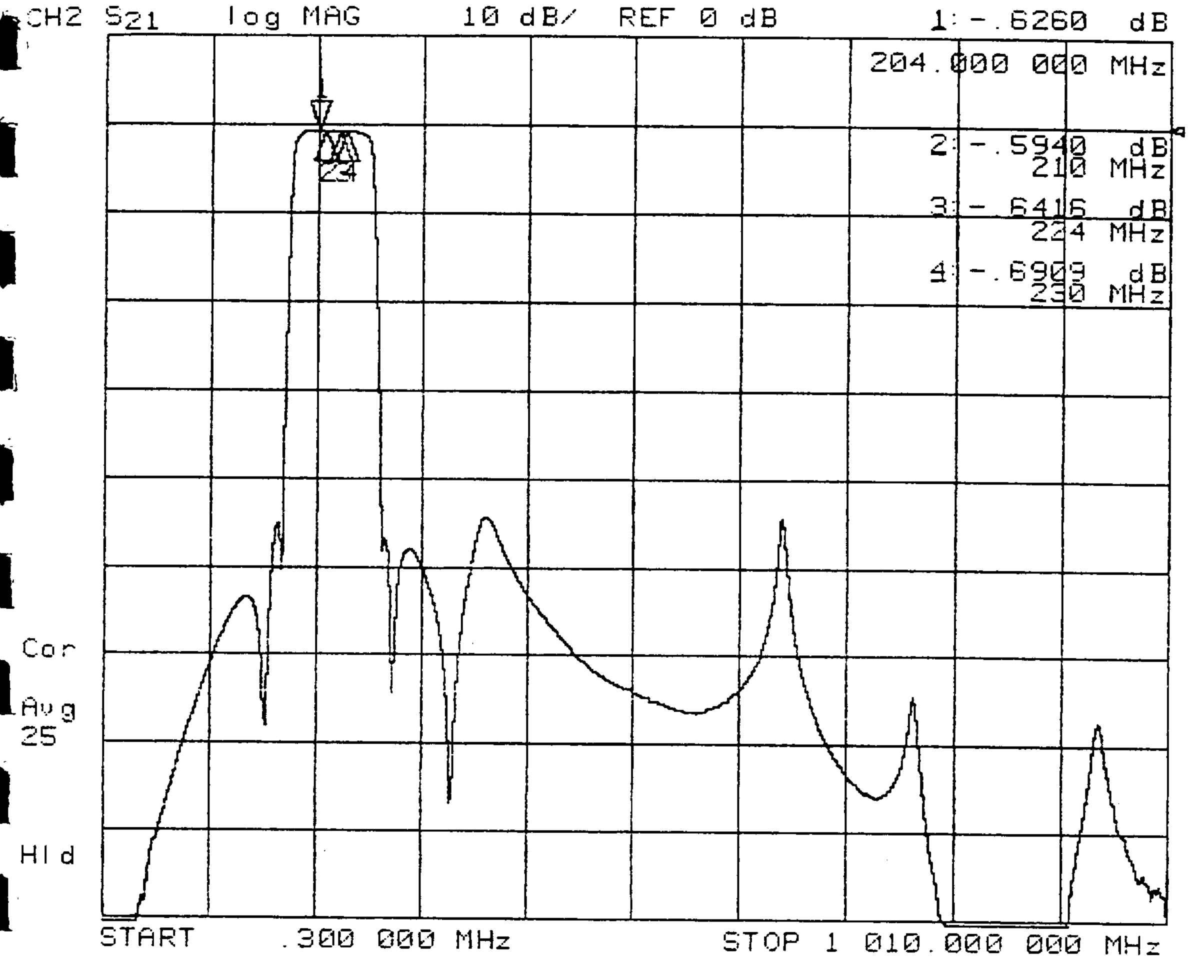
***** END OF BANDPASS CHARACTERISTICS TEST *****

FUNCTIONAL PERFORMANCE TEST

ACCEPTANCE TEST PROCEDURE
63-0005-02 PARA 4.1

BRIEF TEST DESCRIPTION: THE TESTS DESCRIBED IN APPENDIX G PAGE 10 THRU PAGE 13 ARE PERFORMED TO DOCUMENT THE FUNCTIONAL PERFORMANCE OF THE UNIT AT THE CONCLUSION OF ALL ENVIRONMENTAL TESTING. THE TESTS ARE AS FOLLOWS AND IN ANY SEQUENCE:

a.) VSWR PER ATP PARA 4.5.1.
b.) INSERTION LOSS PER ATP PARA 4.5.2
c.) INSERTION LOSS VS TEMPERATURE PER ATP PARA 4.5.6.
d.) 3.0 dB BANDWIDTH PER ATP PARA 4.5.3.
e.) CENTER FREQUENCY (fc) PER ATP PARA 4.5.7 (PART OF 3.0 dB B/W TEST)
f.) PASSBAND RIPPLE PER ATP PARA 4.5.4 (PART OF INSERTION LOSS TEST).
g.) OUT-OF-BAND REJECTION PER ATP PARA 4.5.5.



POST THERMAL CYCLE
PASSBAND CHARACTERISTICS
SERIAL NO. P233-004
AMBIENT
OPR: R. HOGGATT DATE JAN 3 1 1997

```
MARKER PARAMET                                             annel 2

MARKER 1                       1000.000000 MHz        204.000000 MHz
                              OFF                    -.6270 dB

MARKER 2                       1000.000000 MHz        210.000000 MHz
                              OFF                    -.5940 dB

MARKER 3                       1000.000000 MHz        224.000000 MHz
                              OFF                    -.6416 dB

MARKER 4                       1000.000000 MHz        230.000000 MHz
                              OFF                    -.6909 dB

MKR STIMULUS OFFSET               0.000000 MHz          0.000000 MHz
                               0 dB                   0 dB

REFERENCE MARKER               OFF                    OFF
PLACEMENT                     CONTINUOUS             CONTINUOUS
MARKER SEARCH                  OFF                    OFF
TARGET VALUE                  -3 dB                  -3 dB
MARKER WIDTH VALUE            -3 dB                  -3 dB
                               OFF                    OFF
MARKER TRACKING                OFF                    OFF
```

Report No. 11413
February, 1999

Channel 11 Bandpass Filter

SAW Filter (S/N: 1331576-1, S/N: B03)

ELECTRICAL TEST DATA SHEET

AEROJET PART: 1331576-1 PHONON PART: 100823 SERIAL: B03

TESTED BY: DP TITLE: [illegible] DATE: 10/[illegible]/97 TIME: [illegible]

TEST: FINAL FUNCTIONAL

EQUIPMENT: HP 8753D SERIAL: 3410A07982 CAL DUE: 12/10/97

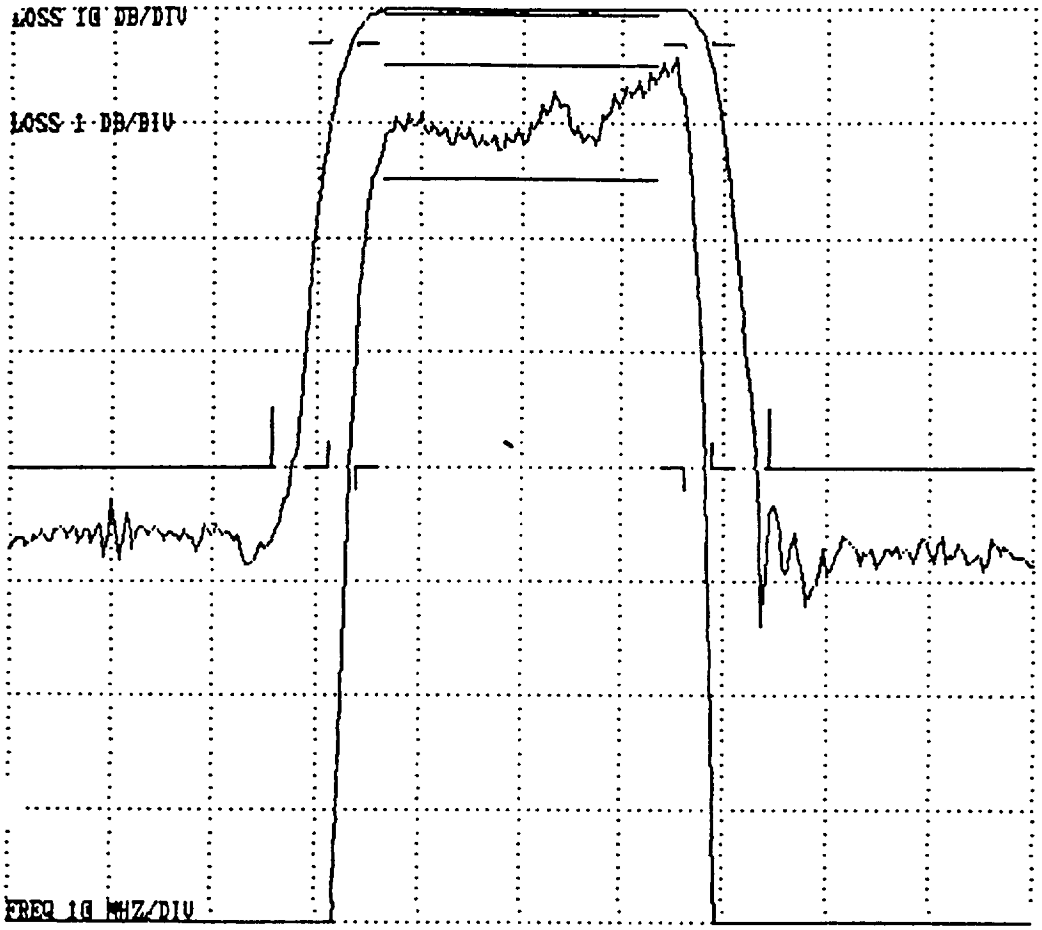
HP 3478A SERIAL: 2136A03127 CAL DUE: 7/7/98

PARAGRAPH		REQUIREMENT TITLE		DATA		P/F
REQ.	Q/ATP					
3.2.1.1	5.2.1	OPERATING TEMPERATURE		-4.7	C	P
3.2.1.3	5.2.3	CENTER FREQUENCY &				
3.2.1.4		CENTER FREQUENCY STABILITY				
		LO: 273.335/275.065 MHz		274.835	MHz	P
		HI: 369.335/371.065 MHz		370.858	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:				
		LO: 34/36 MHz		34.963	MHz	P
		HI: 34/36 MHz		35.341	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY				
		LO: /0.5 dB		0.4	dB	P
		HI: /0.5 dB		0.3	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE				
		260.7-287.7 MHz: /1.0 dB		0.6	dB	P
		356.7-383.7 MHz: /1.0 dB		0.5	dB	P
3.2.1.8	5.2.7	INSERTION LOSS				
		LO: 27.8/30.2 dB		28.4	dB	P
		HI: 27.8/30.2 dB		28.5	dB	P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION				
		LO: -0.4/0.4 dB		-0.1	dB	P
		HI: -0.4/0.4 dB		0.1	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE				
		LO,HI: /0.5 dB		0.1	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION				
		BAND	PEAK(dB)	WIDTH(MHz)		
		WIDE: 1-225,420-1000 MHz:	45.2	0.000		
		DUAL: 225.000-249.935, 298.465-345.935, 394.465-420.00 MHz:	42.4	0.000		
		PEAK: 35.0/ dB	42.4 dB			P
		WIDTH: /7.2 MHz		0.000	MHz	P
3.2.1.12	5.2.11	SHAPE FACTOR				
		LO: /1.30 Unitless		1.30	Unitless	P
		HI: /1.30 Unitless		1.26	Unitless	P
3.2.1.14	5.2.12	VSWR (RETURN LOSS) 260.7-287.7,356.7-383.7 MHz				
		DUAL S11: 7.5/ dB		12.0	dB	P
		DUAL S22: 7.5/ dB		10.5	dB	P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS				
		CENTER FREQUENCY: -0.2/0.2 MHz		0	MHz	
		3 dB BANDWIDTH: -0.72/0.72 MHz		0	MHz	
		INSERTION LOSS: -0.5/0.5 dB		0	dB	
NONE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)		P	DP	

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 6Y858
TEL: 203-651-0211
FAX: 203-651-8618

```
PHONON CORPORATION
FILE=1AC8B03A.DAT  08:54:21  10-28-1997
PN_100828_823 FINAL_FUNCTIONAL TEMP:C FLIGHT3_FUNCT3 /N DUAL_SXX
10-23-1997 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 274.2   WIDTH= 100   INCR.= .4   SYSTEM BANDWIDTH= 27
REFERENCES: LOSS(DB)= 28.38314   PHASE(DEG)=-53898.78   DELAY(US)= 0   SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .167253   PHASE(DEG)= 1172.369
.OT SCALES: LOSS 10 DB/DIV  LOSS 1 DB/DIV  VS.  FREQ 10 MHZ/DIV
```



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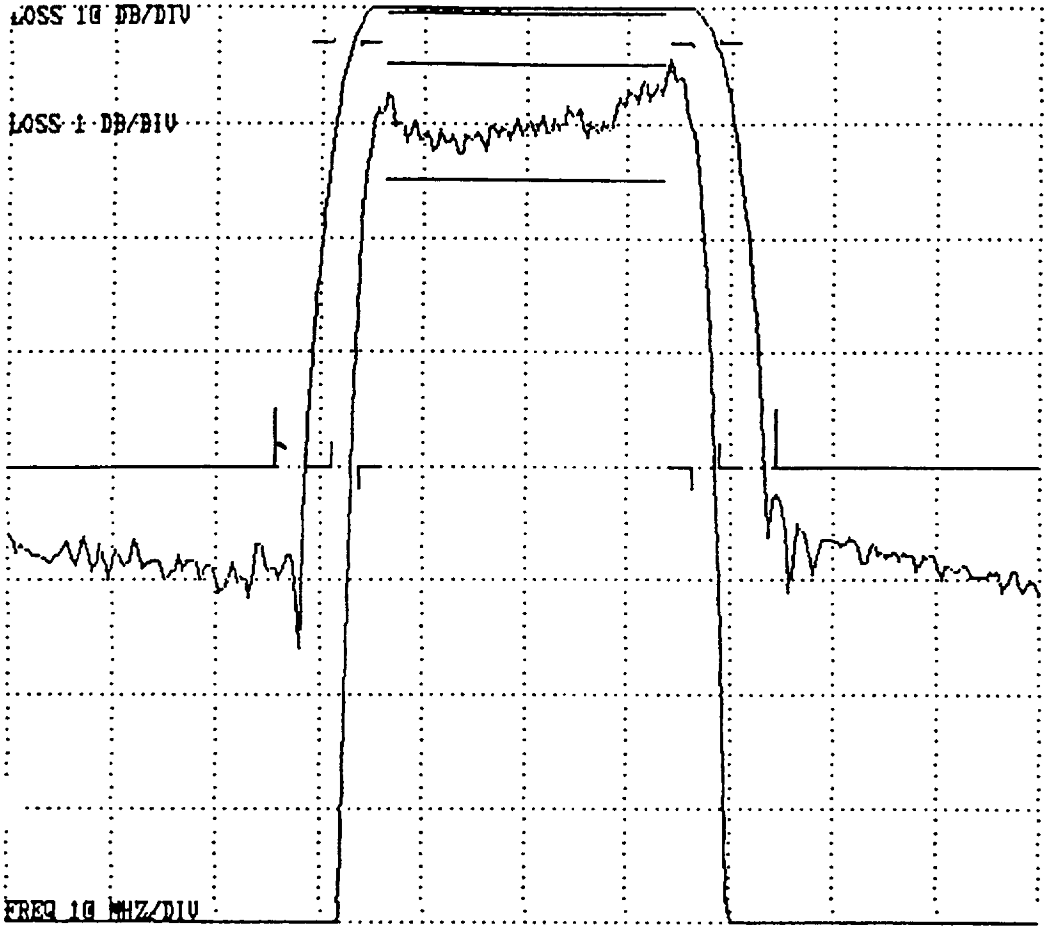
PEAK: LEVEL(DB)= 27.80254  FREQ(MHZ)= 289.3011  DELAY(US)=-.4195124  SIDELOBE(DB)=-43.51648
ENERGY: LEVEL(DB)= 28.52853  CENTER(MHZ)= 275.1333  WIDTH(MHZ)= 36.50653  SKEW(MHZ)=-.514603
 L(DB)    LO(MHZ)     HI(MHZ)    CTR(MHZ)    WID(MHZ) AV-CTR(MHZ) AV-WID(MHZ) AV-SL(DB)  LOX(MHZ)    HIX(MHZ)
 -0.58   289.30106   289.30106   289.30106    0.00000   289.30106    0.00000    0.00000  289.30106   289.30106
  0.50   259.39005   290.96060   275.17532   31.57056   275.33286   31.78303  -12.91031  259.39005   290.96060
  1.00   258.73251   291.36230   275.04742   32.62979   275.33554   32.46771  -13.78188  258.73251   291.36230
  2.00   257.92606   291.92490   274.92548   33.99884   275.32108   33.64267  -16.01550  257.92606   291.92490
  3.00   257.35327   292.31616   274.83472   34.96289   275.19760   34.30381  -18.15461  257.35327   292.31616
  4.00   256.91467   292.63440   274.77454   35.71973   275.19147   34.63564  -19.85340  256.91467   292.63440
  5.00   256.55911   292.90070   274.72992   36.34158   275.12183   34.76588  -20.75171  256.55911   292.90070
  6.00   256.26099   293.12421   274.69260   36.86322   275.18079   34.88089  -21.75907  256.26099   293.12421
 10.00   255.39572   293.90140   274.64856   38.50568   275.13397   35.20095  -27.75864  255.39572   293.90140
 20.00   253.87450   295.24823   274.56137   41.37373   275.13403   35.29353  -37.24678  253.87450   295.24823
 30.00   253.03766   296.20090   274.61926   43.16324   275.13367   35.30259  -44.42536  253.03766   296.20090
 40.00   251.80464   297.31668   274.56067   45.51204   275.13354   35.30339  -46.36879  251.80464   297.31668
BAND(MHZ)   260.700   287.700
LMIN(DB)        -0.44
LMAX(DB)         0.24
LDEL(DB)         0.68
PMIN(DEG)    -1998.03
PMAX(DEG)     1997.38
PDEL(DEG)     3995.41
File: 1AC8B03A.DAT     Passband Symmetry =  0.4 dB
```

```
PHONON CORPORATION
FILE=1CC8B03A.DAT  08:54:38  10-28-1997
PN_100828_823 FINAL_FUNCTIONAL TEMP:C FLIGHT3_FUNCT3 /N DUAL_SXX
10-23-1997 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 370.2   WIDTH= 100   INCR.= .4   SYSTEM BANDWIDTH= 27
REFERENCES: LOSS(DB)= 28.46087   PHASE(DEG)=-61191.61   DELAY(US)= 0   SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .1524634   PHASE(DEG)= 1129.057
 .OT SCALES: LOSS 10 DB/DIV  LOSS 1 DB/DIV  VS.  FREQ 10 MHZ/DIV
```



```
PEAK: LEVEL(DB)= 27.90187  FREQ(MHZ)= 384.2006  DELAY(US)=-.4062741  SIDELOBE(DB)=-42.89388
ENERGY: LEVEL(DB)= 28.58864  CENTER(MHZ)= 371.1011  WIDTH(MHZ)= 36.8871  SKEW(MHZ)=-.3520845
 L(DB)     LO(MHZ)     HI(MHZ)    CTR(MHZ)    WID(MHZ) AV-CTR(MHZ) AV-WID(MHZ) AV-SL(DB)  LOX(MHZ)    HIX(MHZ)
 -0.56   384.20062   384.20062   384.20062     0.00000   384.20062     0.00000    0.00000   384.20062   384.20062
  0.50   354.49826   387.02179   370.76001    32.52353   371.02386    32.97110  -13.77400   354.49826   387.02179
  1.00   354.11926   387.48840   370.80383    33.36914   371.01730    33.62530  -14.85364   354.11926   387.48840
  2.00   353.60828   388.09531   370.85181    34.48703   371.02109    34.19163  -16.07844   353.60828   388.09531
  3.00   353.18768   388.52826   370.85797    35.34058   371.02463    34.65882  -17.49293   353.18768   388.52826
  4.00   352.87164   388.94504   370.90833    36.07339   371.03036    35.02833  -19.11136   352.87164   388.94504
  5.00   352.58954   389.28635   370.93793    36.69681   371.04205    35.30993  -20.98541   352.58954   389.28635
  6.00   352.34213   389.57361   370.95789    37.23148   371.10214    35.42587  -22.07453   352.34213   389.57361
 10.00   351.60675   390.39960   371.00317    38.79285   371.09824    35.70012  -27.19496   351.60675   390.39960
 20.00   350.34558   391.79144   371.06851    41.44586   371.10001    35.80545  -36.84013   350.34558   391.79144
 30.00   349.38263   392.78772   371.08517    43.40509   371.10107    35.81643  -46.70313   349.38263   392.78772
 40.00   348.80222   393.32141   371.06183    44.51920   371.10114    35.81673  -47.82705   348.80222   393.32141
BAND(MHZ)    356.700   383.700
LMIN(DB)         -0.36
LMAX(DB)          0.27
LDEL(DB)          0.63
PMIN(DEG)     -1930.46
PMAX(DEG)      1919.84
PDEL(DEG)      3850.30
File: 1CC8B03A.DAT     Passband Symmetry =  0.3 dB
```

ELECTRICAL TEST DATA SHEET

AEROJET PART: 1331576-1 PHONON PART: 100823 SERIAL: B03

TESTED BY: [illegible] TITLE: [illegible] DATE: [illegible] TIME: [illegible]

TEST: FINAL FUNCTIONAL

EQUIPMENT: HP 8753D SERIAL: 3410A07982 CAL DUE: 12/10/97

HP 3478A SERIAL: 2136A03127 CAL DUE: 7/7/98

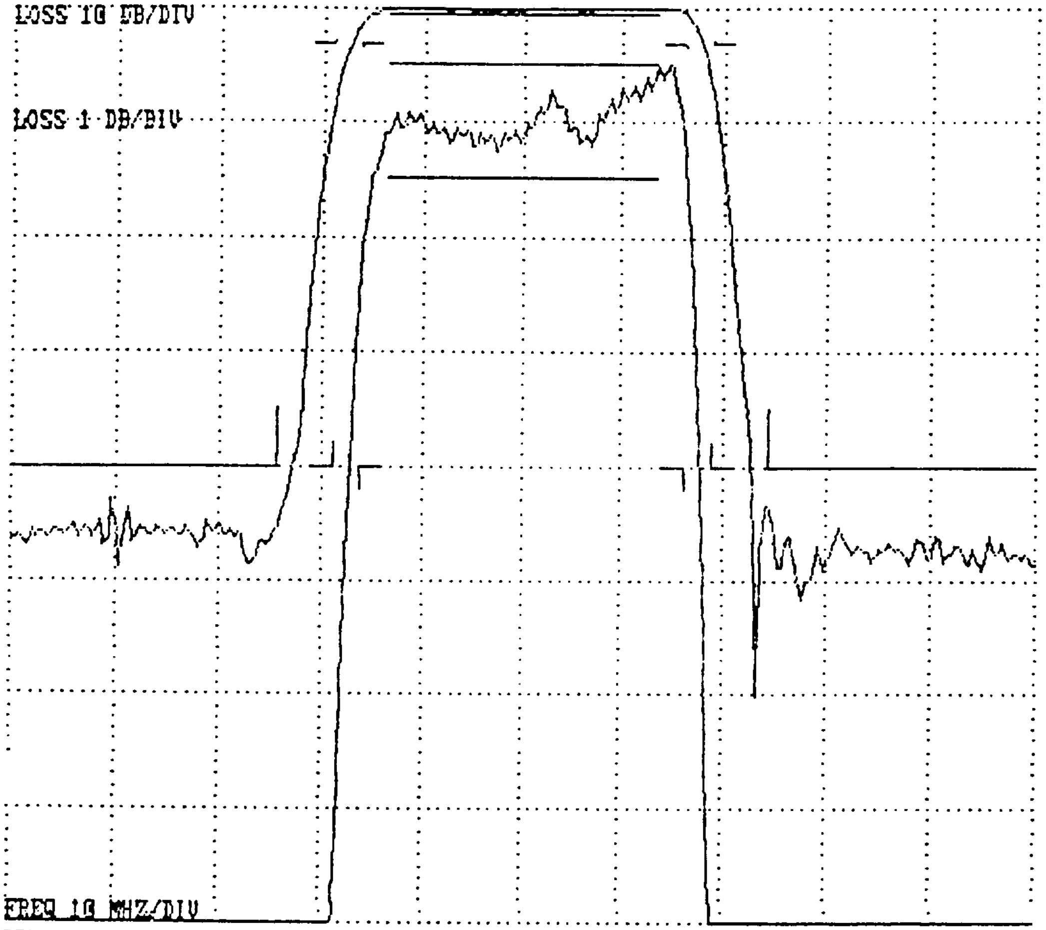
PARAGRAPH		REQUIREMENT TITLE		DATA		P/F
REQ.	Q/ATP					
3.2.1.1	5.2.1	OPERATING TEMPERATURE		14.9 C		P
3.2.1.3	5.2.3	CENTER FREQUENCY &				
3.2.1.4		CENTER FREQUENCY STABILITY				
		LO: 273.335/275.065 MHz		274.386 MHz		P
		HI: 369.335/371.065 MHz		370.238 MHz		P
3.2.1.5	5.2.4	3 dB BANDWIDTH:				
		LO: 34/36 MHz		34.899 MHz		P
		HI: 34/36 MHz		35.291 MHz		P
3.2.1.6	5.2.5	PASSBAND SYMMETRY				
		LO: /0.5 dB		0.3 dB		P
		HI: /0.5 dB		0.2 dB		P
3.2.1.7	5.2.6	PASSBAND RIPPLE				
		260.7-287.7 MHz: /1.0 dB		0.6 dB		P
		356.7-383.7 MHz: /1.0 dB		0.5 dB		P
3.2.1.8	5.2.7	INSERTION LOSS				
		LO: 27.8/30.2 dB		28.5 dB		P
		HI: 27.8/30.2 dB		28.4 dB		P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION				
		LO: -0.4/0.4 dB		0.0 dB		P
		HI: -0.4/0.4 dB		0.0 dB		P
3.2.1.10	5.2.9	AMPLITUDE BALANCE				
		LO,HI: /0.5 dB		0.1 dB		P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION				
		BAND	PEAK(dB)		WIDTH(MHz)	
		WIDE: 1-225,420-1000 MHz:	45.2		0.000	
		DUAL: 225.000-249.935, 298.465-345.935, 394.465-420.00 MHz:	42.4		0.000	
		PEAK: 35.0/ dB	42.4 dB			P
		WIDTH: /7.2 MHz			0.000 MHz	P
3.2.1.12	5.2.11	SHAPE FACTOR				
		LO: /1.30 Unitless		1.30 Unitless		P
		HI: /1.30 Unitless		1.26 Unitless		P
3.2.1.14	5.2.12	VSWR (RETURN LOSS)				
		260.7-287.7,356.7-383.7 MHz				
		DUAL S11: 7.5/ dB		12.7 dB		P
		DUAL S22: 7.5/ dB		10.4 dB		P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS				
		CENTER FREQUENCY: -0.2/0.2 MHz		0.016 MHz		P
		3 dB BANDWIDTH: -0.72/0.72 MHz		0.009 MHz		P
		INSERTION LOSS: -0.5/0.5 dB		0 dB		P
NONE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)		P DP		

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 6Y858
TEL: 203-651-0211
FAX: 203-651-8618

PHONON CORPORATION

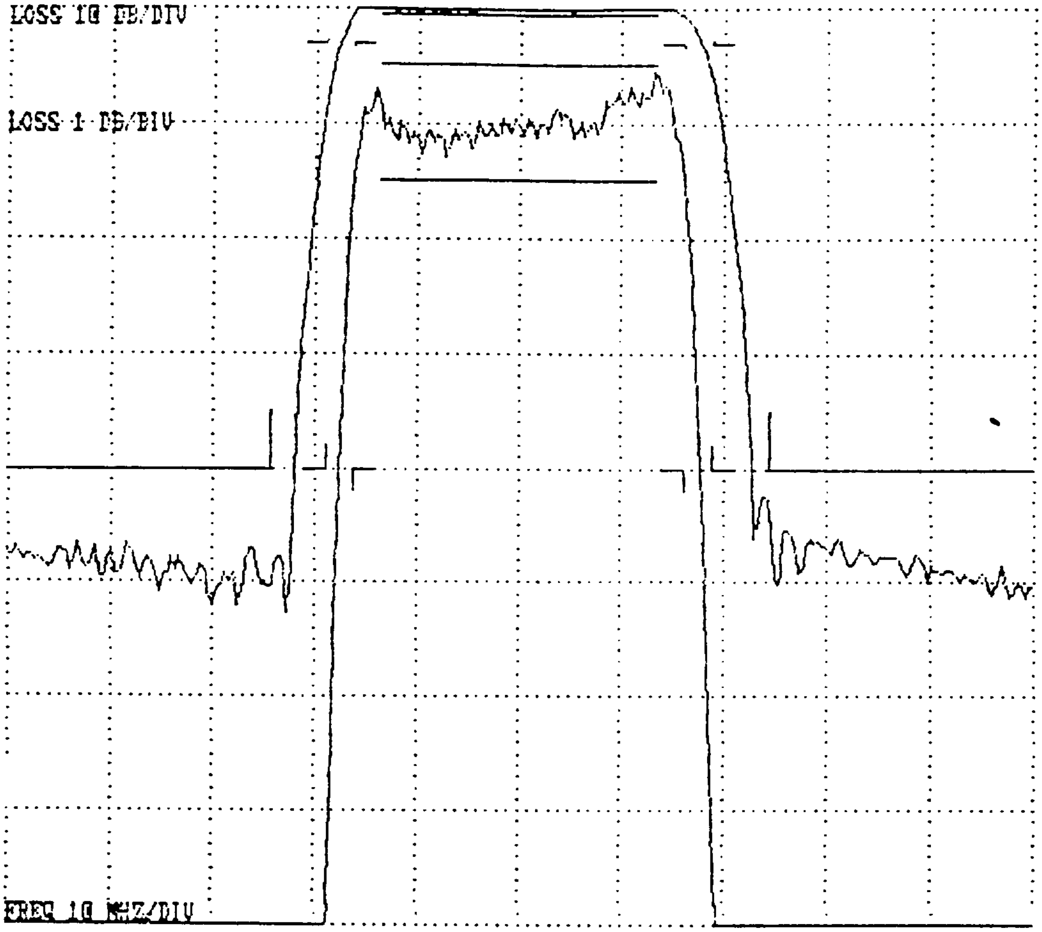
```
FILE=1AR8B03A.DAT  09:14:47  10-28-1997
PN_100828_823 FINAL_FUNCTIONAL TEMP:R FLIGHT3_FUNCT3 /N DUAL_SXX
10-23-1997 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 274.2   WIDTH= 100   INCR.= .4   SYSTEM BANDWIDTH= 27
REFERENCES: LOSS(DB)= 28.52073   PHASE(DEG)=-55530.74   DELAY(US)= 0   SLOPE(US/MHZ)= 0
 MS ERRORS: LOSS(DB)= .1623913   PHASE(DEG)= 1174.236
 LOT SCALES: LOSS 10 DB/DIV  LOSS 1 DB/DIV  VS.  FREQ 10 MHZ/DIV
```



```
PEAK: LEVEL(DB)= 27.99685  FREQ(MHZ)= 288.8315  DELAY(US)=-.4191471  SIDELOBE(DB)=-43.39276
ENERGY: LEVEL(DB)= 28.67975  CENTER(MHZ)= 274.6476  WIDTH(MHZ)= 36.46923  SKEW(MHZ)=-.457341
 L(DB)     LO(MHZ)     HI(MHZ)     CTR(MHZ)     WID(MHZ) AV-CTR(MHZ) AV-WID(MHZ) AV-SL(DB)  LOX(MHZ)     HIX(MHZ)
 -0.52    288.83145   288.83145   288.83145     0.00000   288.83145     0.00000     0.00000   288.83145   288.83145
  0.50    258.97787   290.46780   274.72284    31.48393   274.89038    31.69238   -12.98503   258.97787   290.46780
  1.00    258.30176   290.87149   274.58661    32.56973   274.88800    32.36905   -13.85985   258.30176   290.87149
  2.00    257.50409   291.44968   274.47687    33.94559   274.86368    33.52849   -16.10470   257.50409   291.44968
  3.00    256.93671   291.83533   274.38602    34.89862   274.73370    34.18233   -18.26951   256.93671   291.83533
  4.00    256.49368   292.15924   274.32648    35.66556   274.64380    34.35263   -19.05144   256.49368   292.15924
  5.00    256.13690   292.41360   274.27527    36.27670   274.65146    34.63902   -20.91871   256.13690   292.41360
  6.00    255.84021   292.65176   274.24597    36.81155   274.70645    34.74549   -21.87951   255.84021   292.65176
 10.00    254.97766   293.42502   274.20135    38.44736   274.65228    35.05886   -27.95840   254.97766   293.42502
 20.00    253.45700   294.77661   274.11682    41.31961   274.64886    35.14732   -37.43073   253.45700   294.77661
 30.00    252.61900   295.74387   274.18143    43.12486   274.64780    35.15554   -43.69241   252.61900   295.74387
 40.00    251.35533   296.87003   274.11267    45.51469   274.64783    35.15673   -46.40009   251.35533   296.87003
BAND(MHZ)   260.700   287.700
LMIN(DB)         -0.39
LMAX(DB)          0.25
LDEL(DB)          0.64
PMIN(DEG)     -1999.03
PMAX(DEG)      2002.51
 DEL(DEG)      4001.54
 le: 1AR8B03A.DAT     Passband Symmetry =  0.3 dB
```

PHONON CORPORATION

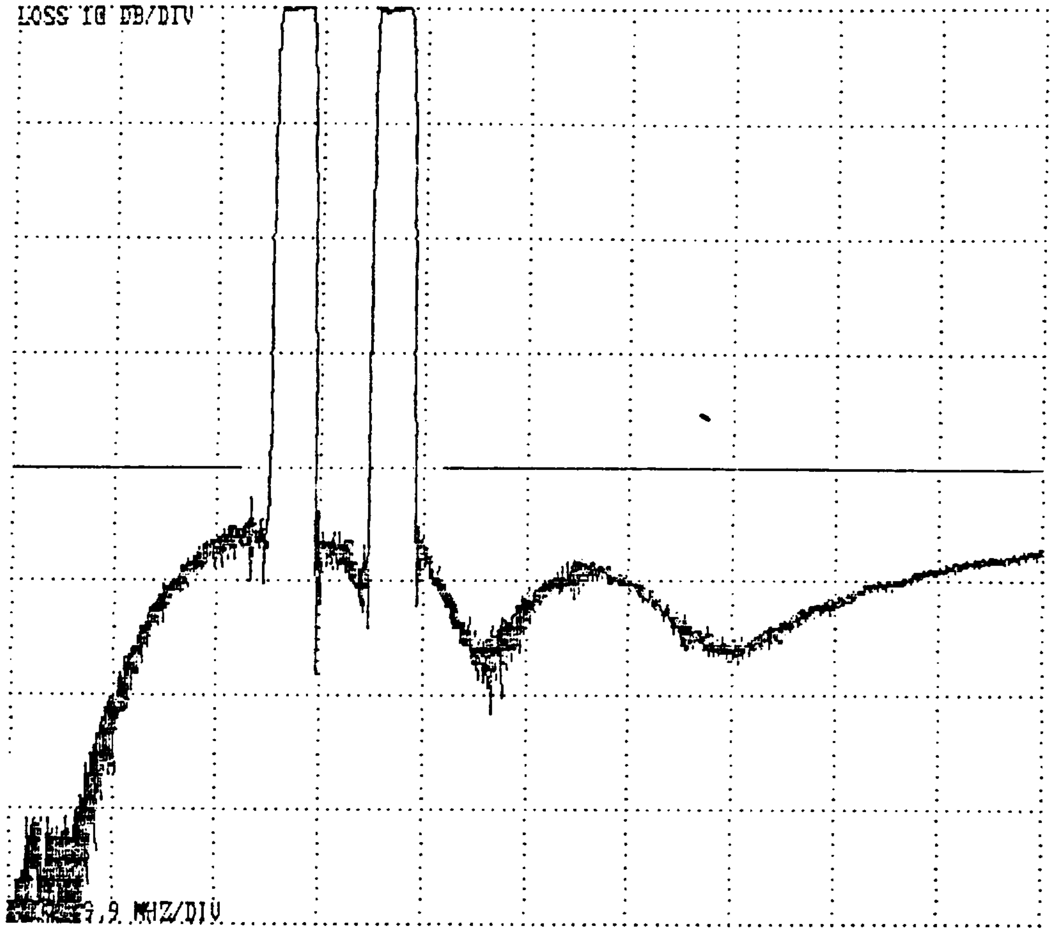
```
FILE=1CR8B03A.DAT  09:16:01  10-28-1997
PN_100828_823 FINAL_FUNCTIONAL TEMP:R FLIGHT3_FUNCT3 /N DUAL_SXX
10-23-1997 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 370.2   WIDTH= 100   INCR.= .4   SYSTEM BANDWIDTH= 27
REFERENCES: LOSS(DB)= 28.40574   PHASE(DEG)=-62841.14   DELAY(US)= 0   SLOPE(US/MHZ)= 0
 MS ERRORS: LOSS(DB)= .1447831   PHASE(DEG)= 1131.03
 LOT SCALES: LOSS 10 DB/DIV  LOSS 1 DB/DIV  VS.  FREQ 10 MHZ/DIV
```



```
PEAK: LEVEL(DB)= 27.94081  FREQ(MHZ)= 383.5507  DELAY(US)=-.4077598  SIDELOBE(DB)=-42.64866
ENERGY: LEVEL(DB)= 28.54845  CENTER(MHZ)= 370.4323  WIDTH(MHZ)= 36.86098  SKEW(MHZ)=-.2677197
 L(DB)     LO(MHZ)    HI(MHZ)    CTR(MHZ)    WID(MHZ) AV-CTR(MHZ) AV-WID(MHZ) AV-SL(DB)  LOX(MHZ)    HIX(MHZ)
 -0.46    383.55066  383.55066  383.55066    0.00000  383.55066     0.00000     0.00000  383.55066  383.55066
  0.50    353.87311  386.33102  370.10205   32.45792  370.36908    32.51811   -13.33641  353.87311  386.33102
  1.00    353.53833  386.81036  370.17435   33.27203  370.35669    33.20163   -14.34587  353.53833  386.81036
  2.00    353.01898  387.45499  370.23700   34.43600  370.48462    34.06599   -16.14244  353.01898  387.45499
  3.00    352.59198  387.88345  370.23773   35.29147  370.35931    34.72739   -18.39550  352.59198  387.88345
  4.00    352.28180  388.30161  370.29169   36.01981  370.44568    34.89637   -19.20515  352.28180  388.30161
  5.00    352.00000  388.65530  370.32764   36.65530  370.43588    35.17787   -21.12831  352.00000  388.65530
  6.00    351.75717  388.94501  370.35107   37.18784  370.38049    35.28275   -22.13405  351.75717  388.94501
 10.00    351.01746  389.78760  370.40253   38.77014  370.42920    35.51081   -25.89313  351.01746  389.78760
 20.00    349.76459  391.17426  370.46942   41.40967  370.43143    35.66169   -38.79520  349.76459  391.17426
 30.00    348.80640  392.17654  370.49146   43.37015  370.43216    35.66792   -45.63982  348.80640  392.17654
 40.00    348.19073  392.72549  370.45813   44.53476  370.43228    35.66861   -48.10805  348.19073  392.72549
BAND(MHZ)    356.700   383.700
LMIN(DB)          -0.45
LMAX(DB)           0.28
LDEL(DB)           0.73
PMIN(DEG)      -1932.73
PMAX(DEG)       1925.15
PDEL(DEG)       3857.68
 ile: 1CR8B03A.DAT     Passband Symmetry =  0.2 dB
```

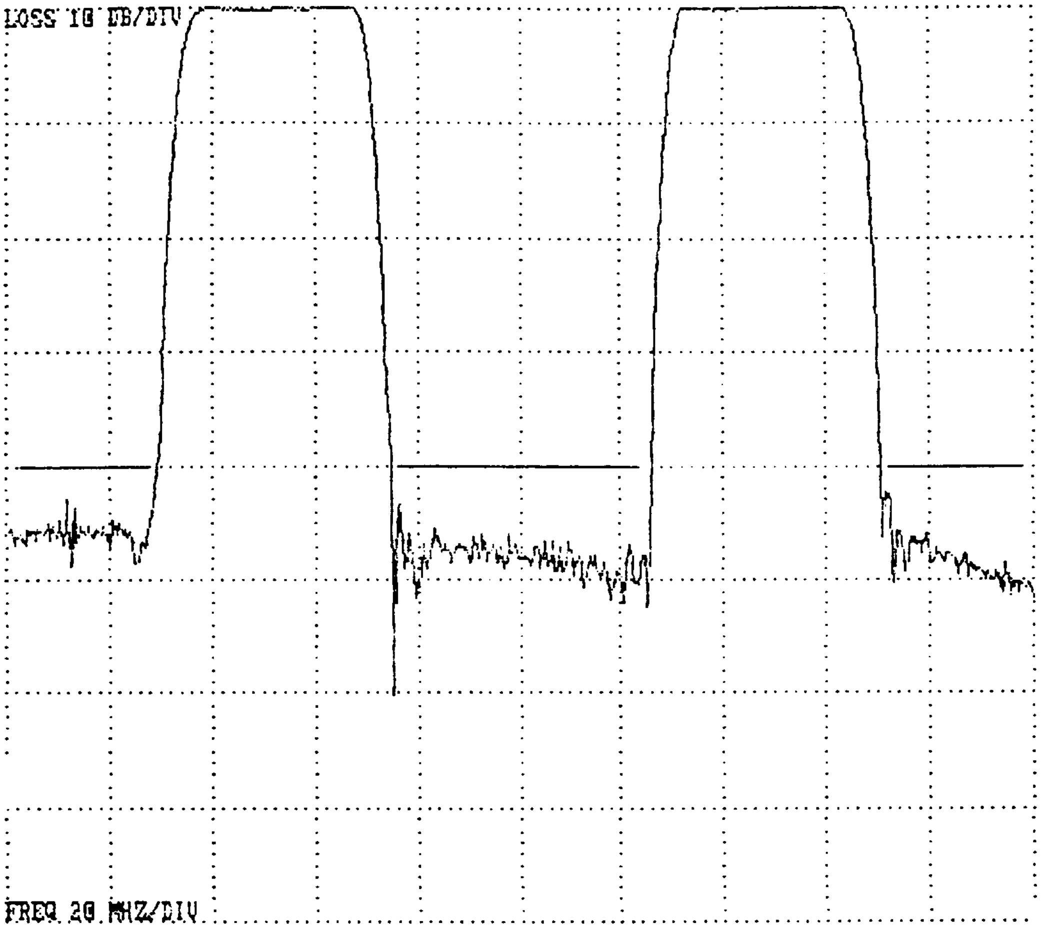
PHONON CORPORATION

```
FILE=1ER8823A.DAT  09:17:10  10-28-1997
PN_100828_823 FINAL_FUNCTIONAL TEMP:R FLIGHT3_FUNCT3 /N WIDE_S21
10-23-1997 HP8753,SSREF,SSREF
FREQUENCY(MHZ): CENTER= 500.5   WIDTH= 999   INCR.= .208125   SYSTEM BANDWIDTH= 999
REFERENCES: LOSS(DB)= 28.46323   PHASE(DEG)=-10137.98   DELAY(US)= .0511545   SLOPE(US/MHZ)= 0
MS ERRORS: LOSS(DB)= 16.34892   PHASE(DEG)= 4165.185
LOT SCALES: LOSS 10 DB/DIV  VS.  FREQ 99.9 MHZ/DIV
```



```
PEAK: LEVEL(DB)= 27.9902  FREQ(MHZ)= 288.8195  DELAY(US)=-.3216076  SIDELOBE(DB)=-42.76309
ENERGY: LEVEL(DB)= 28.71495  CENTER(MHZ)= 322.4307  WIDTH(MHZ)= 73.32967  SKEW(MHZ)= 3.453759
 L(DB)    LO(MHZ)    HI(MHZ)    CTR(MHZ)   WID(MHZ) AV-CTR(MHZ) AV-WID(MHZ) AV-SL(DB)  LOX(MHZ)   HIX(MHZ)
 -0.48   288.81955  288.81955  288.81955   0.00000  288.81955    0.00000    0.00000  288.81955  288.81955
  0.50   259.11450  290.42316  274.76883  31.30855  275.05991   30.92927  -14.02961  259.11450  386.18835
  1.00   258.39307  290.81100  274.60205  32.41794  274.87054   31.98620  -14.14625  258.39307  386.64908
  2.00   257.52838  291.42102  274.47470  33.89264  274.78470   33.03291  -14.26353  257.52838  387.38171
  3.00   256.95645  291.80908  274.38275  34.85263  274.71964   33.61094  -14.32917  256.95645  387.81760
  4.00   256.50668  292.13727  274.32196  35.63058  274.67014   33.88848  -14.35967  256.50668  388.24298
  5.00   256.15414  292.40701  274.28058  36.25287  274.67014   34.17970  -14.39283  256.15414  388.60187
  6.00   255.85474  292.63733  274.24603  36.78259  274.66818   34.29170  -14.40435  255.85474  388.90292
 10.00   254.98589  293.41281  274.19934  38.42693  274.64529   34.54037  -14.42797  254.98589  389.76309
 20.00   253.46227  294.77307  274.11768  41.31081  274.64481   34.67558  -14.43189  253.46227  391.15274
 30.00   252.61890  295.72415  274.17151  43.10526  274.64413   34.68423  -14.42484  252.61890  392.16281
 40.00   251.36394  296.83344  274.09869  45.46950  274.64420   34.68489  -14.41417  251.36394  392.71570
BAND(MHZ)      1.000   225.000   420.000  1000.000
LMIN(DB)          45.15     -0.48     47.10
LMAX(DB)          95.06     57.98     61.59
LDEL(DB)          49.91     58.46     14.47
PMIN(DEG)       3434.19  -3783.19  -3312.89
PMAX(DEG)       7098.78   7528.90   7315.59
PDEL(DEG)       3664.59  11312.09  10628.48
 ILE: 1ER8B03A.DAT  Out-of-band Rejection: PEAK= 45.2 dB  WIDTH=   0.000 MHz
```

```
PHONON CORPORATION
FILE=1FR8B03A.DAT  09:17:49  10-28-1997
PN_100828_823 FINAL_FUNCTIONAL TEMP:R FLIGHT3_FUNCT3 /N DUAL_SXX
10-23-1997 HP8753,SSREF,SSREF
FREQUENCY(MHZ): CENTER= 322.2   WIDTH= 200   INCR.= .4   SYSTEM BANDWIDTH= 200
REFERENCES: LOSS(DB)= 28.46323   PHASE(DEG)=-59374.18   DELAY(US)= .2186431   SLOPE(US/MHZ)= 0
 S ERRORS: LOSS(DB)= 22.57773   PHASE(DEG)= 940.4073
 LOT SCALES: LOSS 10 DB/DIV  VS.  FREQ 20 MHZ/DIV
```



```
PEAK: LEVEL(DB)= 27.94081  FREQ(MHZ)= 383.5507  DELAY(US)= 2.952753E-02  SIDELOBE(DB)=-42.84866
ENERGY: LEVEL(DB)= 28.61226  CENTER(MHZ)= 323.5196  WIDTH(MHZ)= 73.31353  SKEW(MHZ)=-1.816307
 L(DB)     LO(MHZ)     HI(MHZ)    CTR(MHZ)    WID(MHZ) AV-CTR(MHZ) AV-WID(MHZ) AV-SL(DB)  LOX(MHZ)    HIX(MHZ)
 -0.52   383.55069   383.55069   383.55069     0.00000   383.55069     0.00000     0.00000   383.55069   383.55069
  0.50   353.81171   386.38266   370.09717    32.57095   370.36908    32.95141    -6.46354   259.34509   386.38266
  1.00   353.50333   386.86954   370.18643    33.36621   370.35669    33.64404    -6.52304   258.37491   386.86954
  2.00   352.99127   387.47955   370.23541    34.48828   370.35715    34.77341    -6.62767   257.53857   387.47955
  3.00   352.57413   387.90866   370.24139    35.33453   370.35928    35.19012    -6.65593   256.96661   387.90866
  4.00   352.26395   388.32397   370.29395    36.06003   370.44568    35.36135    -6.65771   256.51465   388.32397
  5.00   351.98511   388.67331   370.32922    36.68820   370.43598    35.64660    -6.67614   256.15540   388.67331
  6.00   351.74411   388.96030   370.35220    37.21619   370.38049    35.75288    -6.67524   255.85590   388.96030
 10.00   351.00791   389.79828   370.40305    38.79047   370.42920    35.98398    -6.66184   254.98796   389.79828
 20.00   349.75858   391.18164   370.47009    41.42307   370.43140    36.13687    -6.60960   253.46346   391.18164
 30.00   348.80197   392.18060   370.49127    43.37863   370.43216    36.14318    -6.55664   252.62312   392.18060
 40.00   348.18851   392.72806   370.45828    44.53955   370.43228    36.14389    -6.52450   251.36688   392.72806
BAND(MHZ)    260.700    287.700    356.700    383.700
LMIN(DB)          -0.33      -0.44      -0.50
LMAX(DB)           0.31      60.22       0.22
LDEL(DB)           0.64      60.66       0.73
PMIN(DEG)      -1254.75   -1962.21    -582.54
PMAX(DEG)        668.80    1886.44    1197.36
PDEL(DEG)       1923.56    3848.64    1779.89
 LE: 1FR8B03A.DAT  Out-of-band Rejection: PEAK= 42.4 dB  WIDTH=   0.000 MHz
```

```
PHONON CORPORATION
FILE: 1FR8B03A.DAT (+SSCF)
PN_100828_823 FINAL_FUNCTIONAL TEMP:R FLIGHT3_FUNCT3 /N DUAL_SXX
10-23-1997 HP8753,SSREF,SSREF,SSCF
REFERENCES: LOSS(DB)=  28.46323  PHASE(DEG)= -59374.18
            DELAY(US)=  .2186431  SLOPE(US/MHZ)=  0

BANDPASS CHARACTERISTICS MEASUREMENT
FREQUENCY(MHZ)      LOSS(DB)     PHASE(DEG)
-------------------------------------------
  240.600            45.97          569.06
  248.760            46.76         1200.42
  256.920             3.09          958.52
  265.080             0.06          372.80
  273.240             0.15         -224.78
  281.400             0.16         -821.71
  289.560            -0.15        -1409.45
  297.720            49.70        -1818.87
  305.880            46.13        -1231.96
  314.040            48.18         -612.76
  322.200            47.60            8.99
  330.360            47.82          627.53
  338.520            49.47         1262.34
  346.680            47.63         1882.46
  354.840            -0.12         1339.07
  363.000             0.22          796.17
  371.160            -0.11          244.19
  379.320            -0.22         -305.57
  387.480             1.98         -846.07
  395.640            47.32        -1159.38
  403.800            47.33         -553.29
-------------------------------------------
```

ELECTRICAL TEST DATA SHEET

AEROJET PART: 1331576-1   PHONON PART: 100823   SERIAL: B03
TESTED BY: [illegible]   TITLE: [illegible]   DATE: [illegible]   TIME: [illegible]
TEST: FINAL FUNCTIONAL
EQUIPMENT: HP 8753D   SERIAL: 3410A07982   CAL DUE: 12/10/97
HP 3478A   SERIAL: 2136A03127   CAL DUE: 7/7/98

PARAGRAPH		REQUIREMENT TITLE		DATA		P/F
REQ.	Q/ATP					
3.2.1.1	5.2.1	OPERATING TEMPERATURE		35.3	C	P
3.2.1.3	5.2.3	CENTER FREQUENCY &				
3.2.1.4		CENTER FREQUENCY STABILITY				
		LO: 273.335/275.065 MHz		273.962	MHz	P
		HI: 369.335/371.065 MHz		369.657	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:				
		LO: 34/36 MHz		34.840	MHz	P
		HI: 34/36 MHz		35.226	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY				
		LO: /0.5 dB		0.4	dB	P
		HI: /0.5 dB		0.2	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE				
		260.7-287.7 MHz: /1.0 dB		0.6	dB	P
		356.7-383.7 MHz: /1.0 dB		0.4	dB	P
3.2.1.8	5.2.7	INSERTION LOSS				
		LO: 27.8/30.2 dB		28.7	dB	P
		HI: 27.8/30.2 dB		28.4	dB	P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION				
		LO: -0.4/0.4 dB		0.1	dB	P
		HI: -0.4/0.4 dB		-0.0	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE				
		LO, HI: /0.5 dB		0.3	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION				
		BAND	PEAK (dB)	WIDTH (MHz)		
		WIDE: 1-225, 420-1000 MHz:	44.7	0.000		
		DUAL: 225.000-249.935, 298.465-345.935, 394.465-420.00 MHz:	43.1	0.000		
		PEAK: 35.0/ dB	43.1 dB			P
		WIDTH: /7.2 MHz		0.000	MHz	P
3.2.1.12	5.2.11	SHAPE FACTOR				
		LO: /1.30 Unitless		1.31	Unitless	F
		HI: /1.30 Unitless		1.26	Unitless	P
3.2.1.14	5.2.12	VSWR (RETURN LOSS)				
		260.7-287.7, 356.7-383.7 MHz				
		DUAL S11: 7.5/ dB		12.9	dB	P
		DUAL S22: 7.5/ dB		10.0	dB	P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS				
		CENTER FREQUENCY: -0.2/0.2 MHz		0	MHz	P
		3 dB BANDWIDTH: -0.72/0.72 MHz		0	MHz	P
		INSERTION LOSS: -0.5/0.5 dB		0	dB	P
NONE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)		~~F~~ DP		P DP

Acceptable Per SDAR 97-222
2-5
1-14-98

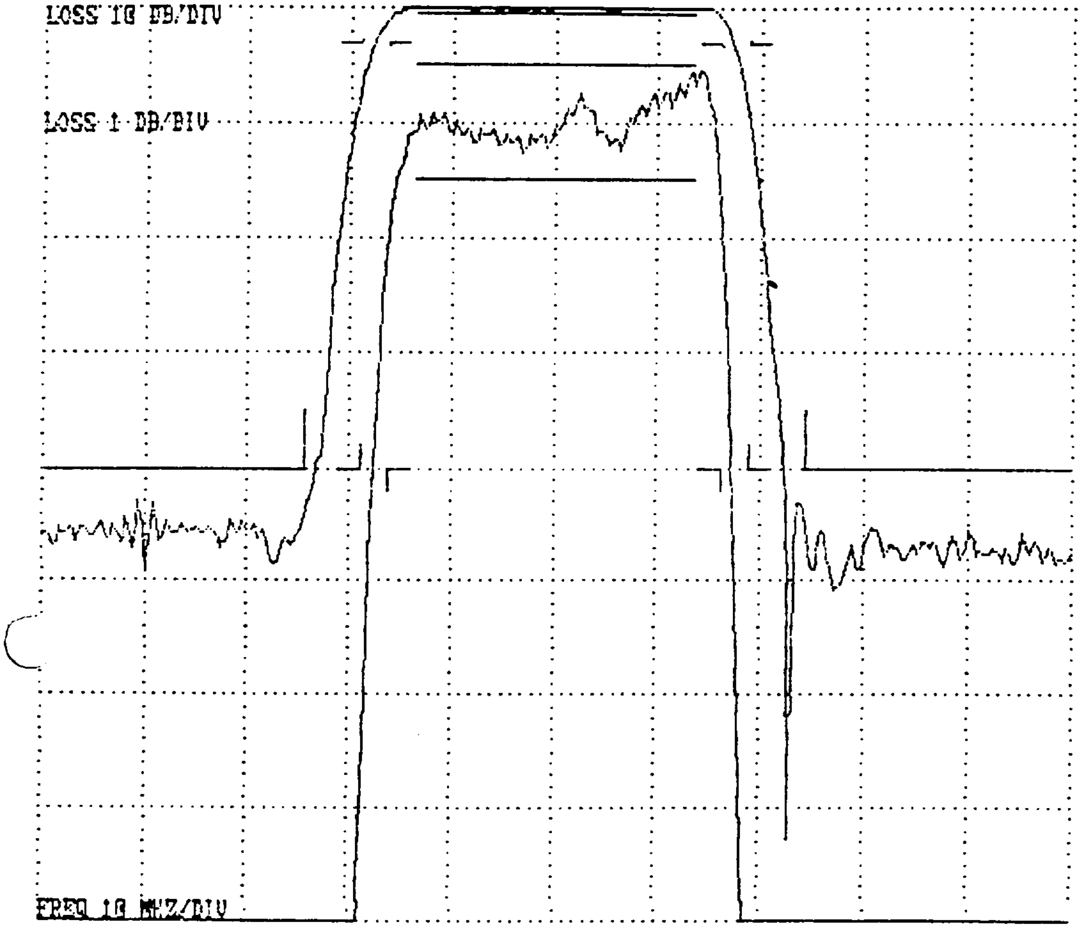
Per SDAR 97-222
QC 2-5 1-14-98

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 6Y858
TEL: 203-651-0211
FAX: 203-651-8618

PHONON CORPORATION

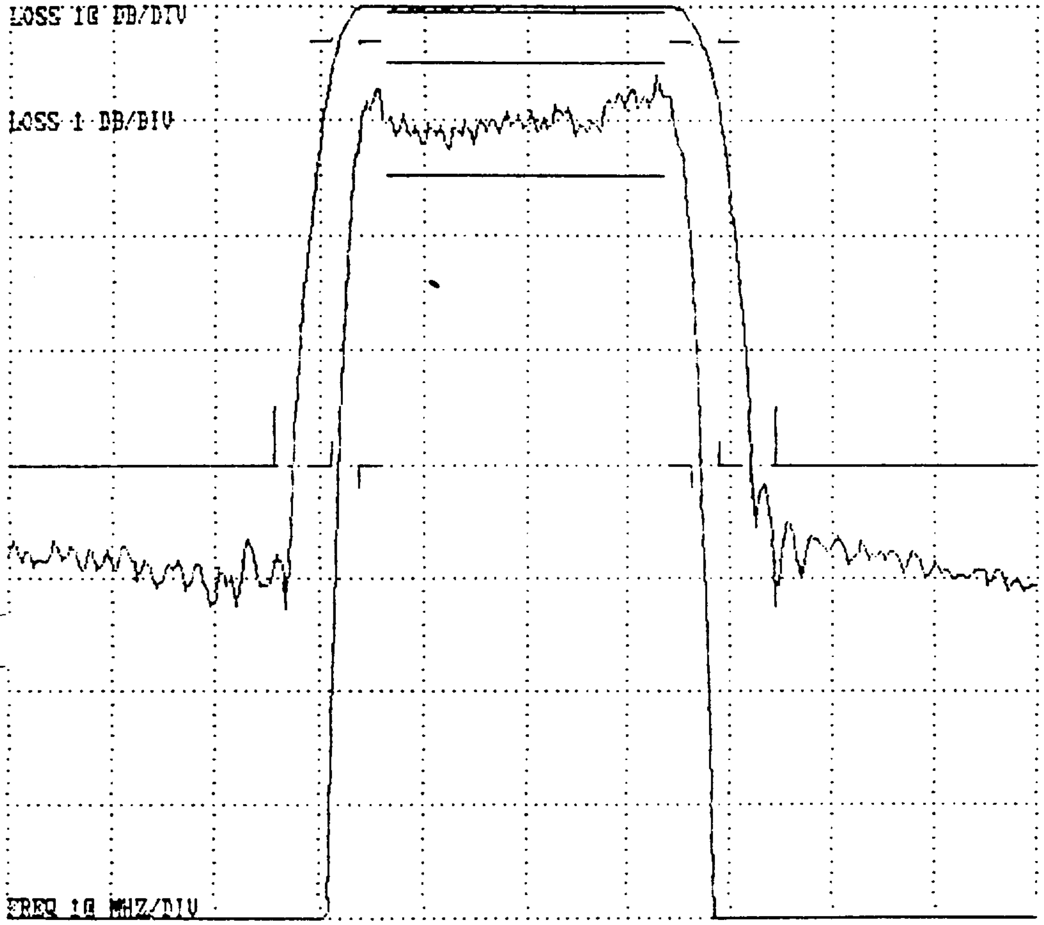
```
FILE=1AH8B03A.DAT  09:37:01  10-28-1997
  _100828_823 FINAL_FUNCTIONAL TEMP:H FLIGHT3_FUNCT3 /N DUAL_SXX
10-23-1997 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 274.2   WIDTH= 100   INCR.= .4   SYSTEM BANDWIDTH= 27
REFERENCES: LOSS(DB)= 28.66347   PHASE(DEG)=-54415.22   DELAY(US)= 0   SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .1605556   PHASE(DEG)= 1175.957
PLOT SCALES: LOSS 10 DB/DIV  LOSS 1 DB/DIV  VS.  FREQ 10 MHZ/DIV
```



```
PEAK: LEVEL(DB)= 28.1961  FREQ(MHZ)= 288.3701  DELAY(US)=-.419409  SIDELOBE(DB)=-43.41243
ENERGY: LEVEL(DB)= 28.83453  CENTER(MHZ)= 274.1954  WIDTH(MHZ)= 36.43219  SKEW(MHZ)=-.4063132
 L(DB)     LO(MHZ)     HI(MHZ)    CTR(MHZ)     WID(MHZ) AV-CTR(MHZ) AV-WID(MHZ) AV-SL(DB)  LOX(MHZ)     HIX(MHZ)
 -0.47    288.37006   288.37006   288.37006     0.00020   288.37006     0.00000     0.00000   288.37006   288.37006
  0.50    258.59406   290.01035   274.30219    31.41629   274.45514    31.60976   -13.05315   258.59406   290.01035
  1.00    257.90808   290.41101   274.15955    32.50293   274.45081    32.28034   -12.93349   257.90808   290.41101
  2.00    257.10995   291.00391   274.05695    33.89395   274.42245    33.42522   -16.19049   257.10995   291.00391
  3.00    256.54199   291.38193   273.96198    34.83994   274.18973    33.87395   -17.55515   256.54199   291.38193
  4.00    256.09796   291.70941   273.90369    35.61145   274.20013    34.24214   -19.17766   256.09796   291.70941
  5.00    255.74228   291.96640   273.85434    36.22412   274.20535    34.52197   -21.05706   255.74228   291.96640
  6.00    255.44510   292.20834   273.82672    36.76324   274.25806    34.62340   -21.99823   255.44510   292.20834
 10.00    254.58380   292.98004   273.78192    38.39624   274.18060    34.89066   -26.63951   254.58380   292.98004
 20.00    253.06262   294.33499   273.69879    41.27237   274.19561    35.01477   -37.58452   253.06262   294.33499
 30.00    252.22723   295.31247   273.76984    43.08524   274.19559    25.02262   -43.67920   252.22723   295.31247
 40.00    250.93283   296.48178   273.70731    45.54895   274.19559    35.02377   -46.22178   250.93283   296.48178
BAND(MHZ)    260.700   287.700
LMIN(DB)         -0.43
 MAX(DB)          0.25
  EL(DB)          0.68
PMIN(DEG)     -2002.03
PMAX(DEG)      2006.24
PDEL(DEG)      4008.26
File: 1AH8B03A.DAT     Passtand Symmetry =  0.4 dB
```

PHONON CORPORATION

```
E=1CH8B03A.DAT  09:30:15  10-28-1997
  _100828_823 FINAL_FUNCTIONAL TEMP:H FLIGHT3_FUNCT3 /N DUAL_SXX
10-23-1997 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 370.2   WIDTH= 100   INCR.= .4   SYSTEM BANDWIDTH= 27
REFERENCES: LOSS(DB)= 28.36107   PHASE(DEG)=-61743.8   DELAY(US)= 0   SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .1309599   PHASE(DEG)= 1132.885
PLOT SCALES: LOSS 10 DB/DIV  LOSS 1 DB/DIV  VS.  FREQ 10 MHZ/DIV
```



```
PEAK: LEVEL(DB)= 27.97114  FREQ(MHZ)= 382.9987  DELAY(US)=-.4069082  SIDELOBE(DB)=-42.13871
ENERGY: LEVEL(DB)= 28.51924  CENTER(MHZ)= 369.7909  WIDTH(MHZ)= 36.83355  SKEW(MHZ)=-.1801905
 L(DB)     LO(MHZ)     HI(MHZ)    CTR(MHZ)    WID(MHZ) AV-CTR(MHZ) AV-WID(MHZ) AV-SL(DB)  LOX(MHZ)    HIX(MHZ)
 -0.39   382.99866   382.99866   382.99866     0.00000   382.99866     0.00000    0.00000   382.99866   382.99865
  0.50   353.33405   385.63470   369.48438    32.30066   369.53207    32.41645  -13.41817   353.33405   385.63470
  1.00   352.96243   386.14270   369.55255    33.18027   369.53995    33.08407  -14.41511   352.96243   386.14270
  2.00   352.45337   386.82294   369.63815    34.36957   369.70004    33.94769  -16.24256   352.45337   386.82294
  3.00   352.04453   387.27017   369.65735    35.22565   369.70355    34.40205  -17.67136   352.04453   387.27017
  4.00   351.71277   387.69473   369.70374    35.98196   369.71100    34.75925  -19.29943   351.71277   387.69473
  5.00   351.44037   388.05029   369.74533    36.60992   369.78848    34.90878  -20.21269   351.44037   388.05029
  6.00   351.19778   388.34546   369.77161    37.14767   369.78394    35.14376  -22.30031   351.19778   388.34546
 10.00   350.46744   389.18655   369.82700    38.71912   369.78458    35.40566  -27.46640   350.46744   389.18655
 20.00   349.21472   390.58643   369.90057    41.37170   369.78922    35.50475  -37.12363   349.21472   390.58643
 30.00   348.25946   391.59598   369.92773    43.33652   369.79092    35.51470  -45.80727   348.25946   391.59598
 40.00   347.65298   392.13977   369.89535    44.48679   369.79080    35.51531  -48.00566   347.65298   392.13977
BAND(MHZ)    356.700   383.700
LMIN(DB)          -0.39
[illegible]AX(DB)          0.26
[illegible]EL(DB)          0.65
PMIN(DEG)      -1935.29
PMAX(DEG)       1928.58
PDEL(DEG)       3353.87
File: 1CH8B03A.DAT      Passband Symmetry =  0.2 dB
```

Report No. 11413
February, 1999

Channel 12 Bandpass Filter

SAW Filter (S/N: 1331576-2, S/N: B03)

ELECTRICAL TEST DATA SHEET

AEROJET PART: 1331576-2 PHONON PART: 100824 SERIAL: B03
TESTED BY: DC TITLE: Test DATE: 10/23/97 TIME: 3:00pm
TEST: FINAL FUNCTIONAL
EQUIPMENT: HP 8753D SERIAL: 3410A07982 CAL DUE: 12/10/97
HP 3478A SERIAL: 2136A03127 CAL DUE: 7/7/98

PARAGRAPH REQ.	Q/ATP	REQUIREMENT TITLE	DATA		P/F
3.2.1.1	5.2.1	OPERATING TEMPERATURE	-4.7	C	P
3.2.1.3 3.2.1.4	5.2.3	CENTER FREQUENCY & CENTER FREQUENCY STABILITY			
		LO: 299.335/301.065 MHz	300.389	MHz	P
		HI: 343.335/345.065 MHz	344.155	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:			
		LO: 15/16 MHz	15.443	MHz	P
		HI: 15/16 MHz	15.468	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY			
		LO: /0.5 dB	0.2	dB	P
		HI: /0.5 dB	0.3	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE			
		294.2-306.2 MHz: /1.0 dB	0.5	dB	P
		338.2-350.2 MHz: /1.0 dB	0.7	dB	P
3.2.1.8	5.2.7	INSERTION LOSS			
		LO: 27.8/30.2 dB	28.5	dB	P
		HI: 27.8/30.2 dB	29.0	dB	P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION			
		LO: -0.4/0.4 dB	-0.2	dB	P
		HI: -0.4/0.4 dB	0.1	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE			
		LO,HI: /0.5 dB	0.5	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION			

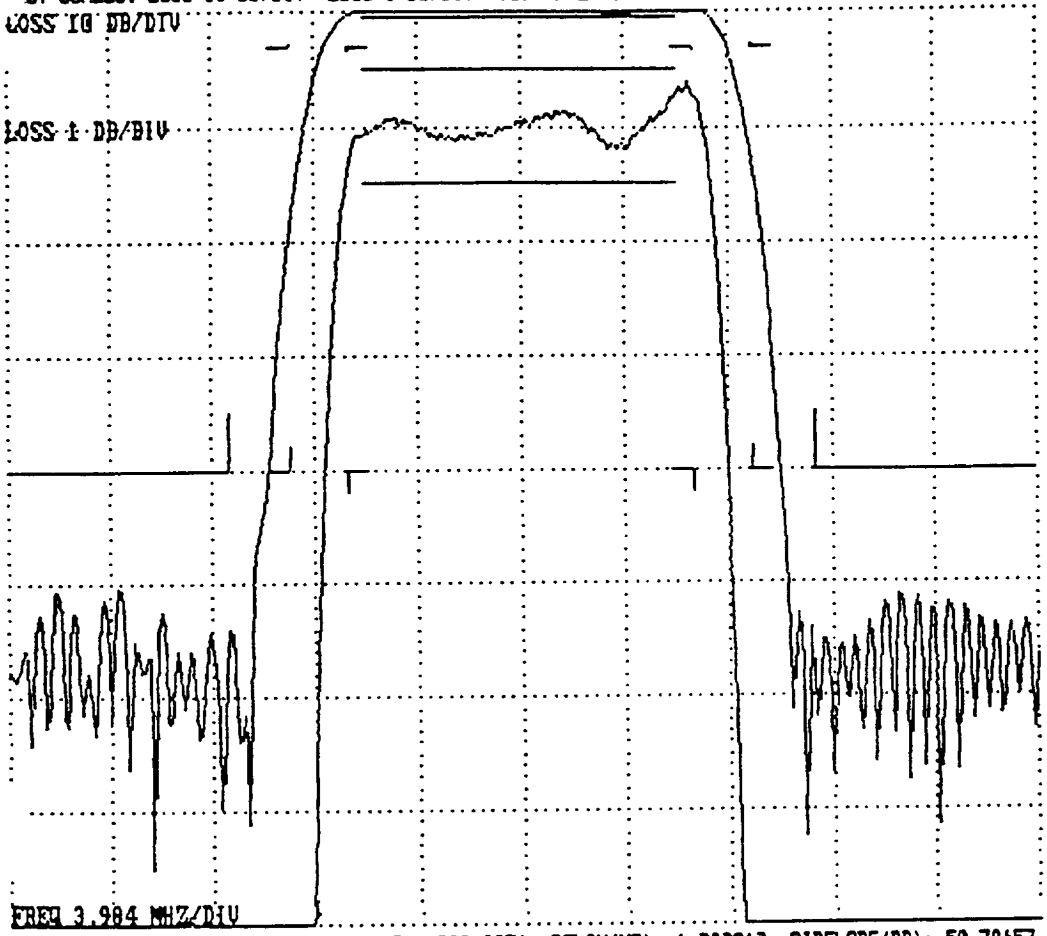
BAND	PEAK(dB)	WIDTH(MHz)	P/F
WIDE: 1-286,359-1000 MHz:	43.4	0.000	
DUAL: 286.000-288.935, 311.465-332.935, 355.465-359.00 MHz:	46.3	0.000	
PEAK: 35.0/ dB	43.4 dB		P
WIDTH: /3.2 MHz		0.000 MHz	P

PARAGRAPH REQ.	Q/ATP	REQUIREMENT TITLE	DATA		P/F
3.2.1.12	5.2.11	SHAPE FACTOR			
		LO: /1.30 Unitless	1.27	Unitless	P
		HI: /1.30 Unitless	1.30	Unitless	P
3.2.1.14	5.2.12	VSWR (RETURN LOSS) 294.2-306.2,338.2-350.2 MHz			
		DUAL S11: 7.5/ dB	18.4	dB	P
		DUAL S22: 7.5/ dB	9.1	dB	P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS			
		CENTER FREQUENCY: -0.2/0.2 MHz	0	MHz	P
		3 dB BANDWIDTH: -0.32/0.32 MHz	0	MHz	P
		INSERTION LOSS: -0.5/0.5 dB	0	dB	P
NONE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)	P	DP	

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 6Y858
TEL: 203-651-0211
FAX: 203-651-8618

```
FILE=2AC8B03A.DAT  08:58:23  10-28-1997
PN_100830_824 FINAL_FUNCTIONAL TEMP:C FLIGHT3_FUNCT3 /N DUAL_SXX
10-23-1997 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 300.2   WIDTH= 39.84   INCR.= .12   SYSTEM BANDWIDTH= 12
REFERENCES: LOSS(DB)= 28.45777   PHASE(DEG)=-8080.462   DELAY(US)= 0   SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= 9.661405E-02   PHASE(DEG)= 1737.076
 DT SCALES: LOSS 10 DB/DIV  LOSS 1 DB/DIV  VS.  FREQ 3.984 MHZ/DIV
```



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PEAK: LEVEL(DB)= 28.07163  FREQ(MHZ)= 306.6671  DELAY(US)=-1.383913  SIDELOBE(DB)=-50.78457
ENERGY: LEVEL(DB)= 28.62002  CENTER(MHZ)= 300.4357  WIDTH(MHZ)= 16.15138  SKEW(MHZ)=-6.645541E-02
 L(DB)     LO(MHZ)     HI(MHZ)    CTR(MHZ)    WID(MHZ) AV-CTR(MHZ) AV-WID(MHZ) AV-SL(DB)  LOX(MHZ)    HIX(MHZ)
 -0.39   306.66705   306.66705   306.66705     0.00000   306.66705     0.00000     0.00000   306.66705   306.66705
  0.50   293.44077   307.49362   300.46719    14.05286   300.49045    14.06942   -12.40328   293.44077   307.49362
  1.00   293.19470   307.66907   300.43188    14.47437   300.48953    14.47357   -13.70652   293.19470   307.66907
  2.00   292.87848   307.91385   300.39618    15.03537   300.44604    14.89115   -15.71887   292.87848   307.91385
  3.00   292.66721   308.11038   300.38879    15.44318   300.44641    15.02696   -16.63440   292.66721   308.11038
  4.00   292.48895   308.26031   300.37463    15.77136   300.44568    15.24409   -18.85284   292.48895   308.26031
  5.00   292.34415   308.38889   300.36652    16.04474   300.44446    15.32590   -20.10944   292.34415   308.38889
  6.00   292.22247   308.50037   300.36142    16.27789   300.44305    15.39121   -21.49402   292.22247   308.50037
 10.00   291.84964   308.86328   300.35645    17.01364   300.43924    15.50695   -26.43457   291.84964   308.86328
 20.00   291.24100   309.44934   300.34515    18.20834   300.43616    15.55562   -37.96266   291.24100   309.44934
 30.00   290.79880   309.84351   300.32117    19.04471   300.43570    15.55883   -48.90445   290.79880   309.84351
 40.00   290.44385   310.12030   300.28207    19.67645   300.43567    15.55904   -55.53081   290.44385   310.12030
BAND(MHZ)    294.200   306.200
LMIN(DB)         -0.29
LMAX(DB)          0.18
LDEL(DB)          0.48
PMIN(DEG)     -2976.83
PMAX(DEG)      2981.22
PDEL(DEG)      5958.05
File: 2AC8B03A.DAT     Passband Symmetry =  0.2 dB
```
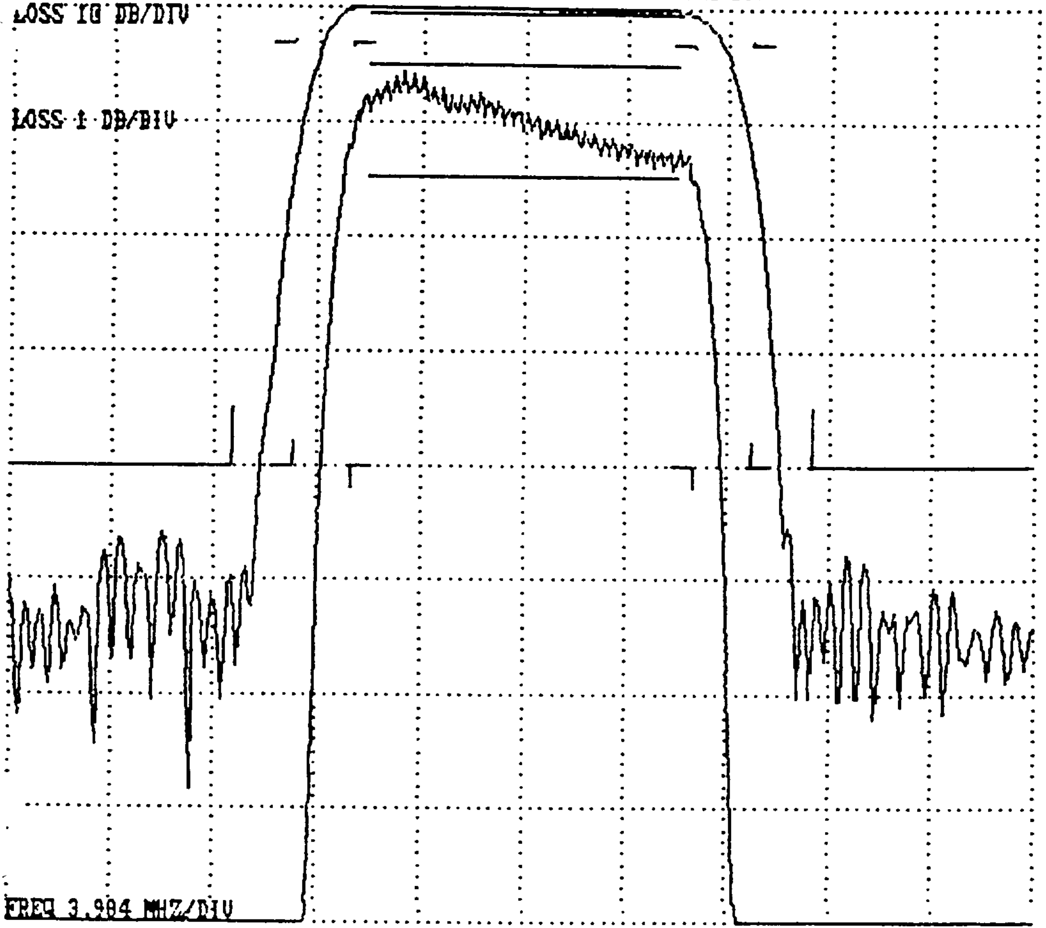

```
FILE=2CC8B03A.DAT  08:59:43  10-28-1997
PN_100830_824 FINAL_FUNCTIONAL TEMP:C FLIGHT3_FUNCT3 /N DUAL_SXX
10-23-1997 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 344.2   WIDTH= 39.84   INCR.= .12   SYSTEM BANDWIDTH= 12
REFERENCES: LOSS(DB)= 28.97806   PHASE(DEG)=-22734.77   DELAY(US)= 0   SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .221858   PHASE(DEG)= 1715.118
  OT SCALES: LOSS 10 DB/DIV  LOSS 1 DB/DIV  VS.  FREQ 3.984 MHZ/DIV
```



```
PEAK: LEVEL(DB)= 28.54077  FREQ(MHZ)= 339.4977  DELAY(US)=-1.375975  SIDELOBE(DB)=-45.88854
ENERGY: LEVEL(DB)= 29.18458  CENTER(MHZ)= 343.9922  WIDTH(MHZ)= 16.2153  SKEW(MHZ)= .3055571
 L(DB)    LO(MHZ)     HI(MHZ)    CTR(MHZ)    WID(MHZ) AV-CTR(MHZ) AV-WID(MHZ) AV-SL(DB)  LOX(MHZ)    HIX(MHZ)
 -0.44   339.49771   339.49771   339.49771    0.00000   339.49771    0.00000    0.00000   339.49771   339.49771
  0.50   337.18463   350.69611   343.94037   13.51147   343.79486   13.53075  -11.36506   337.18463   350.69611
  1.00   336.93463   351.27496   344.10480   14.34033   343.90799   14.14272  -12.88154   336.93463   351.27496
  2.00   336.63333   351.64612   344.13971   15.01279   343.96036   14.73372  -15.34571   336.63333   351.64612
  3.00   336.42117   351.88885   344.15503   15.46768   343.99414   14.93089  -16.63640   336.42117   351.88885
  4.00   336.24860   352.08023   344.16443   15.83163   343.96756   15.09299  -18.15788   336.24860   352.08023
  5.00   336.11166   352.23260   344.17212   16.12094   343.97043   15.17966  -19.26129   336.11166   352.23260
  6.00   335.98969   352.37668   344.18317   16.38699   343.99057   15.28146  -21.15227   335.98969   352.37668
 10.00   335.60181   352.79132   344.19656   17.18951   343.99075   15.40173  -25.75460   335.60181   352.79132
 20.00   334.97394   353.44586   344.20990   18.47192   343.99277   15.45837  -37.43365   334.97394   353.44586
 30.00   334.54675   353.87585   344.21130   19.32910   343.99219   15.46180  -46.57365   334.54675   353.87585
 40.00   334.03793   354.19659   344.11725   20.15866   343.99216   15.46214  -52.55842   334.03793   354.19659
BAND(MHZ)   338.200   350.200
LMIN(DB)        -0.43
LMAX(DB)         0.42
LDEL(DB)         0.85
PMIN(DEG)    -2938.72
PMAX(DEG)     2943.91
PDEL(DEG)     5882.64
File: 2CC8B03A.DAT     Passband Symmetry =  0.3 dB
```

ELECTRICAL TEST DATA SHEET

AEROJET PART: 1331576-2 PHONON PART: 100824 SERIAL: B03
TESTED BY: DJO TITLE: Test DATE: 12/23/97 TIME: 5:00 pm
TEST: FINAL FUNCTIONAL
EQUIPMENT: HP 8753D SERIAL: 3410A07982 CAL DUE: 12/10/97
HP 3478A SERIAL: 2136A03127 CAL DUE: 7/7/98

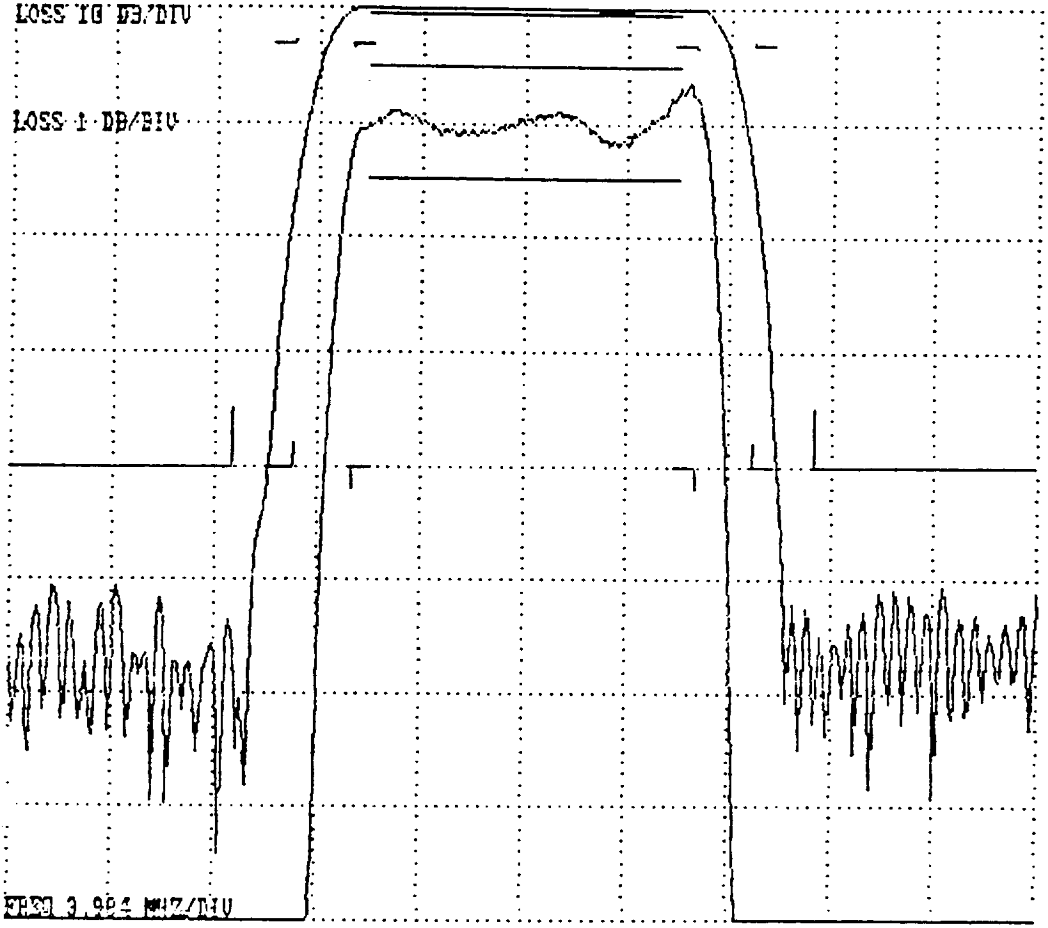
PARAGRAPH		REQUIREMENT TITLE		DATA		P/F
REQ.	Q/ATP					
3.2.1.1	5.2.1	OPERATING TEMPERATURE		14.9	C	P
3.2.1.3	5.2.3	CENTER FREQUENCY &				
3.2.1.4		CENTER FREQUENCY STABILITY				
		LO: 299.335/301.065 MHz		300.270	MHz	P
		HI: 343.335/345.065 MHz		344.030	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:				
		LO: 15/16 MHz		15.438	MHz	P
		HI: 15/16 MHz		15.468	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY				
		LO: /0.5 dB		0.1	dB	P
		HI: /0.5 dB		0.3	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE				
		294.2-306.2 MHz: /1.0 dB		0.5	dB	P
		338.2-350.2 MHz: /1.0 dB		0.7	dB	P
3.2.1.8	5.2.7	INSERTION LOSS				
		LO: 27.8/30.2 dB		28.6	dB	P
		HI: 27.8/30.2 dB		28.9	dB	P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION				
		LO: -0.4/0.4 dB		0.0	dB	P
		HI: -0.4/0.4 dB		0.0	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE				
		LO,HI: /0.5 dB		0.2	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION				
		BAND	PEAK(dB)	WIDTH(MHz)		
		WIDE: 1-286,359-1000 MHz:	43.8	0.000		
		DUAL: 286.000-288.935, 311.465-332.935, 355.465-359.00 MHz:	45.5	0.000		
		PEAK: 35.0/ dB	43.8 dB			P
		WIDTH: /3.2 MHz		0.000	MHz	P
3.2.1.12	5.2.11	SHAPE FACTOR				
		LO: /1.30 Unitless		1.27	Unitless	P
		HI: /1.30 Unitless		1.30	Unitless	P
3.2.1.14	5.2.12	VSWR (RETURN LOSS)				
		294.2-306.2,338.2-350.2 MHz				
		DUAL S11: 7.5/ dB		17.6	dB	P
		DUAL S22: 7.5/ dB		8.8	dB	P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS				
		CENTER FREQUENCY: -0.2/0.2 MHz		0.011	MHz	P
		3 dB BANDWIDTH: -0.32/0.32 MHz		0.003	MHz	P
		INSERTION LOSS: -0.5/0.5 dB		0	dB	P
NONE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)		P	DP	

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 6Y858
TEL: 203-651-0211
FAX: 203-651-8618

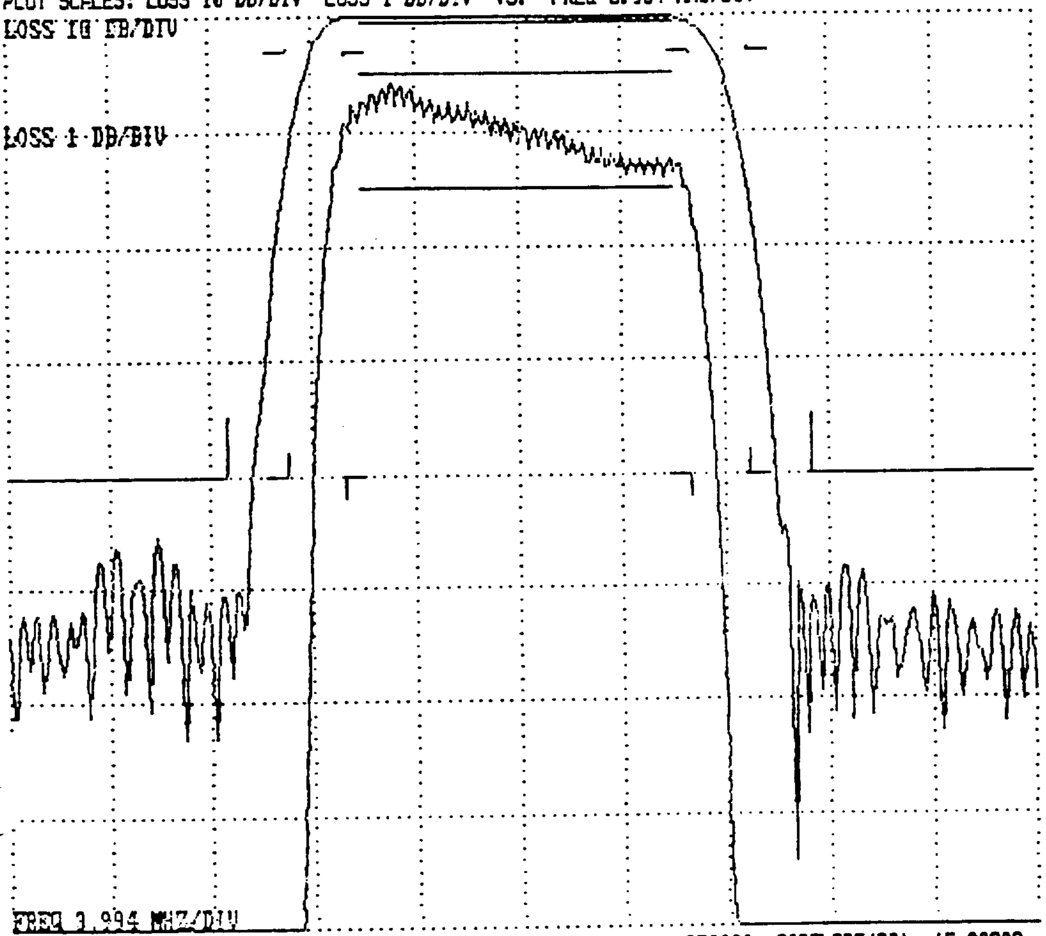
PHONON CORPORATION

```
FILE=2AR8B03A.DAT  09:19:48  10-28-1997
PN_100830_824 FINAL_FUNCTIONAL TEMP:R FLIGHT3_FUNCT3 /N DUAL_SXX
10-23-1997 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 300.2   WIDTH= 39.84   INCR.= .12   SYSTEM BANDWIDTH= 12
 FERENCES: LOSS(DB)= 28.65   PHASE(DEG)= 972.4457   DELAY(US)= 0   SLOPE(US/MHZ)= 0
 MS ERRORS: LOSS(DB)= 9.510472E-02   PHASE(DEG)= 1737.789
PLOT SCALES: LOSS 10 DB/DIV  LOSS 1 DB/DIV  VS.  FREQ 3.984 MHZ/DIV
```



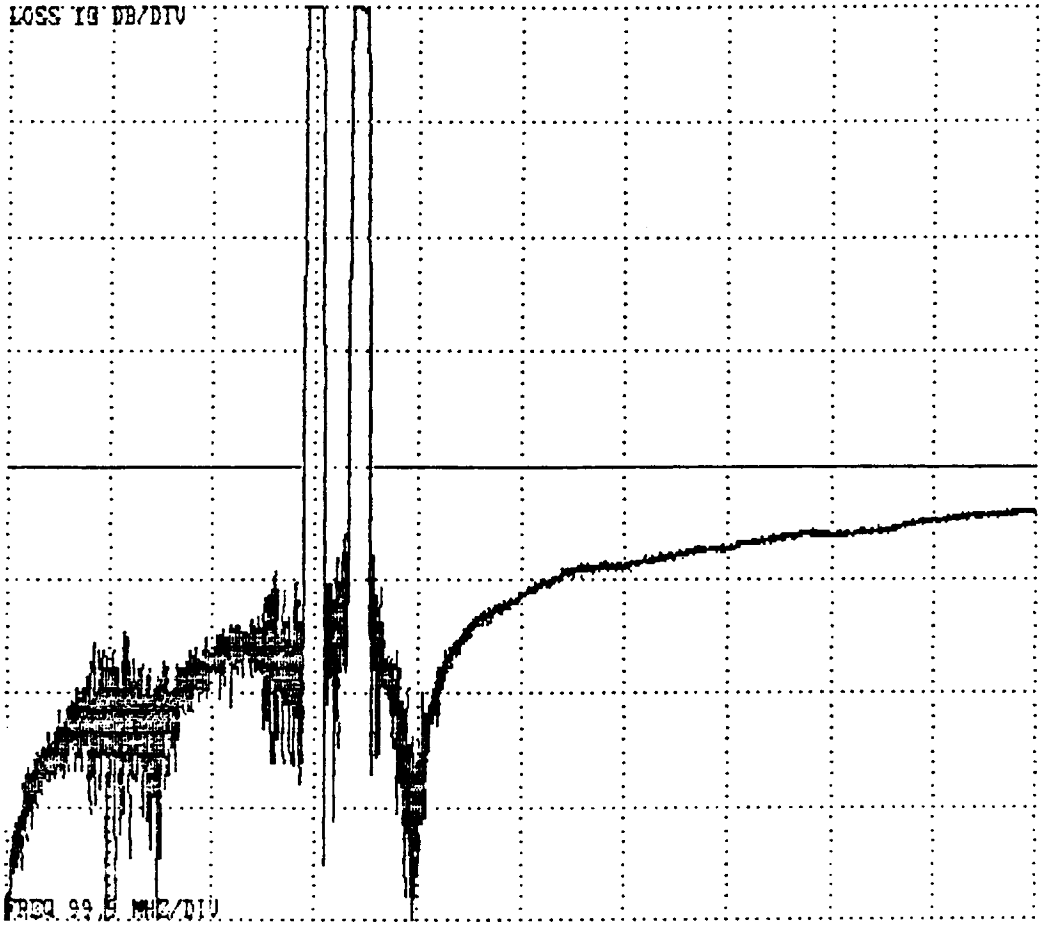
```
PEAK: LEVEL(DB)= 28.28858  FREQ(MHZ)= 306.5452  DELAY(US)=-1.384238  SIDELOBE(DB)=-50.85873
ENERGY: LEVEL(DB)= 28.81652  CENTER(MHZ)= 300.3002  WIDTH(MHZ)= 16.14604  SKEW(MHZ)=-3.684266E-02
 L(DB)    LO(MHZ)    HI(MHZ)    CTR(MHZ)    WID(MHZ) AV-CTR(MHZ) AV-WID(MHZ) AV-SL(DB)  LOX(MHZ)    HIX(MHZ)
 -0.36   306.54520  306.54520  306.54520    0.00000   306.54520    0.00000    0.00000  306.54520  306.54520
  0.50   293.31757  307.36661  300.34210   14.04904   300.35190   14.05571  -12.42358  293.31757  307.36661
  1.00   293.07474  307.54587  300.31030   14.47113   300.35110   14.45929  -13.73183  293.07474  307.54587
  2.00   292.76331  307.79340  300.27835   15.03009   300.34677   14.80025  -15.28426  292.76331  307.79340
  3.00   292.55084  307.98846  300.26965   15.43762   300.30896   15.01123  -16.67405  292.55084  307.98846
  4.00   292.37625  308.13821  300.25723   15.76196   300.30875   15.22713  -18.90290  292.37625  308.13821
  5.00   292.23163  308.26721  300.24942   16.03558   300.30783   15.30828  -20.16402  292.23163  308.26721
  6.00   292.10941  308.37894  300.24417   16.26953   300.30657   15.37304  -21.55428  292.10941  308.37894
 10.00   291.73706  308.74130  300.23920   17.00424   300.30338   15.48749  -26.51933  291.73706  308.74130
 20.00   291.12888  309.32761  300.22824   18.19873   300.30063   15.53528  -38.09986  291.12888  309.32761
 30.00   290.68567  309.71988  300.20276   19.03421   300.30020   15.53838  -48.90663  290.68567  309.71988
 40.00   290.32700  310.00381  300.16541   19.67682   300.30017   15.53859  -55.00367  290.32700  310.00381
BAND(MHZ)    294.200   306.200
LMIN(DB)           -0.31
LMAX(DB)            0.19
LDEL(DB)            0.51
PMIN(DEG)       -2978.39
PMAX(DEG)        2982.53
 DEL(DEG)        5960.92
ile: 2AR8B03A.DAT     Passband Symmetry =  0.1 dB
```

```
PHONON  CORPORATION
FILE=2CR8803A.DAT  09:21:19  10-28-1997
PN_100830_824 FINAL_FUNCTIONAL TEMP:R FLIGHT3_FUNCT3 /N DUAL_SXX
10-23-1997 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 344.2   WIDTH= 39.84   INCR.= .12   SYSTEM BANDWIDTH= 12
 FERENCES: LOSS(DB)= 28.8976   PHASE(DEG)=-13332.93   DELAY(US)= 0   SLOPE(US/MHZ)= 0
S ERRORS: LOSS(DB)= .2239998   PHASE(DEG)= 1715.951
PLOT SCALES: LOSS 10 DB/DIV  LOSS 1 DB/DIV  VS.  FREQ 3.984 MHZ/DIV
```



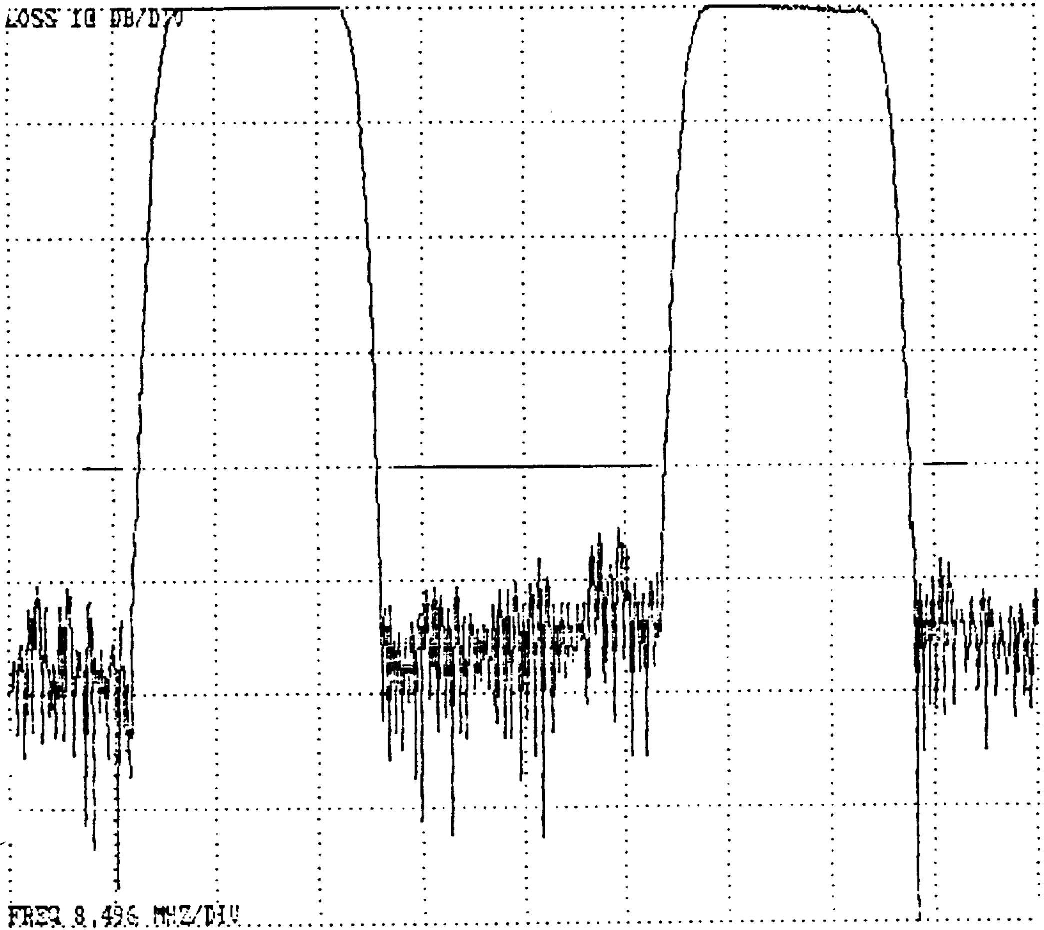
```
PEAK: LEVEL(DB)= 28.4593  FREQ(MHZ)= 339.3463  DELAY(US)=-1.372686  SIDELOBE(DB)=-45.28989
ENERGY: LEVEL(DB)= 29.09898  CENTER(MHZ)= 343.8686  WIDTH(MHZ)= 16.20952  SKEW(MHZ)= .3003789
 L(DB)    LO(MHZ)     HI(MHZ)    CTR(MHZ)    WID(MHZ) AV-CTR(MHZ) AV-WID(MHZ) AV-SL(DB)  LOX(MHZ)    HIX(MHZ)
 -0.43   339.34625   339.34625   339.34625    0.00000   339.34625    0.00000    0.00000   339.34625   339.34625
  0.50   337.05765   350.79678   343.92722   13.73914   343.73187   13.55256  -11.57983   337.05765   350.79678
  1.00   336.81821   351.15018   343.98419   14.33197   343.79099   14.15954  -12.89623   336.81821   351.15018
  2.00   336.51978   351.52325   344.02151   15.00348   343.84258   14.74986  -15.36736   336.51978   351.52325
  3.00   336.29654   351.76407   344.03030   15.46753   343.87579   14.94650  -16.65949   336.29654   351.76407
  4.00   336.12576   351.94791   344.03683   15.82214   343.84857   15.10838  -18.18425   336.12576   351.94791
  5.00   335.98566   352.10199   344.04382   16.11633   343.85074   15.19454  -19.29424   335.98566   352.10199
  6.00   335.86328   352.24500   344.05414   16.38171   343.86996   15.29550  -21.18332   335.86328   352.24500
 10.00   335.47318   352.65631   344.06476   17.18314   343.86862   15.41495  -25.78654   335.47318   352.65631
 20.00   334.84439   353.30917   344.07678   18.46478   343.86868   15.46998  -36.27317   334.84439   353.30917
 30.00   334.41599   353.74435   344.08017   19.32837   343.86865   15.47459  -46.57380   334.41599   353.74435
 40.00   333.89548   354.06628   343.98090   20.17081   343.86862   15.47493  -52.27547   333.89548   354.06628
BAND(MHZ)    338.200   350.200
LMIN(DB)         -0.41
LMAX(DB)          0.41
LDEL(DB)          0.82
PMIN(DEG)     -2939.91
PMAX(DEG)      2946.04
 DEL(DEG)      5885.95
File: 2CR8803A.DAT     Passband Symmetry =  0.3 dB
```

```
PHONON  CORPORATION
FILE=2ER8B03A.DAT  09:22:37  10-28-1997
PN_100830_824 FINAL_FUNCTIONAL TEMP:R FLIGHT3_FUNCT3 /N WIDE_S21
10-23-1997 HP8753,SSREF,SSREF
FREQUENCY(MHZ): CENTER= 500.5   WIDTH= 999   INCR.= .208125   SYSTEM BANDWIDTH= 999
 FERENCES: LOSS(DB)= 28.7688   PHASE(DEG)=-9529.098   DELAY(US)= 8.685259E-02   SLOPE(US/MHZ)= 0
 AS ERRORS: LOSS(DB)= 12.49813   PHASE(DEG)= 7405.112
 LOT SCALES: LOSS 10 DB/DIV  VS.  FREQ 99.9 MHZ/DIV
```



```
PEAK: LEVEL(DB)= 28.27649  FREQ(MHZ)= 306.5159  DELAY(US)=-1.204869  SIDELOBE(DB)=-44.2636
ENERGY: LEVEL(DB)= 28.90917  CENTER(MHZ)= 321.8334  WIDTH(MHZ)= 32.36321  SKEW(MHZ)= 87.92751
 L(DB)    LO(MHZ)     HI(MHZ)    CTR(MHZ)    WID(MHZ) AV-CTR(MHZ) AV-WID(MHZ) AV-SL(DB)  LOX(MHZ)    HIX(MHZ)
 -0.49   306.51593   306.51593   306.51593    0.00000   306.51593    0.00000    0.00000   306.51593   306.51593
  0.50   293.25125   307.42050   300.33588   14.16925   300.41092   14.54825  -17.68515   293.25125   350.63895
  1.00   293.03741   307.58118   300.30930   14.54376   300.40323   14.89768  -17.77492   293.03741   351.10892
  2.00   292.74072   307.81799   300.27936   15.07727   300.32236   15.33535  -17.88972   292.74072   351.50906
  3.00   292.52881   308.00632   300.26758   15.47751   300.32025   15.55458  -17.94788   292.52881   351.74805
  4.00   292.35596   308.15073   300.25336   15.79477   300.27695   15.63982  -17.97000   292.35596   351.94217
  5.00   292.21558   308.28030   300.24792   16.06473   300.31598   15.71734  -17.99031   292.21558   352.09567
  6.00   292.10162   308.39200   300.24683   16.29037   300.28488   15.77748  -18.00608   292.10162   352.23724
 10.00   291.72720   308.74994   300.23859   17.02274   300.29514   15.92044  -18.04293   291.72720   352.64902
 20.00   291.12183   309.33429   300.22806   18.21246   300.29971   15.96792  -18.05107   291.12183   353.30270
 30.00   290.68304   309.71948   300.20074   19.03543   300.30002   15.97050  -18.04815   290.68304   353.74460
 40.00   290.32364   310.01520   300.16943   19.69156   300.30002   15.97063  -18.04528   290.32364   354.06445
BAND(MHZ)      1.000    286.000    359.000  1000.000
LMIN(DB)           49.33     -0.49     43.77
LMAX(DB)           83.10     75.09    103.44
LDEL(DB)           33.77     75.58     59.67
PMIN(DEG)        5024.34  -6738.12  -6554.34
PMAX(DEG)        9999.00   9999.00   9999.00
 DEL(DEG)        4974.66  16737.12  16553.34
 ILE: 2ER8B03A.DAT  Out-of-band Rejection: PEAK= 43.8 dB  WIDTH=   0.000 MHz
```

```
PHONON CORPORATION
FILE=2FR8B03A.DAT  09:23:16  10-28-1997
PN_100830_824 FINAL_FUNCTIONAL TEMP:R FLIGHT3_FUNCT3 /N DUAL_SXX
10-23-1997 HP8753,SSREF,SSREF
FREQUENCY(MHZ): CENTER= 322.2   WIDTH= 84.96   INCR.= .12   SYSTEM BANDWIDTH= 85
 FERENCES: LOSS(DB)= 28.7688   PHASE(DEG)=-6105.639   DELAY(US)= .9089838   SLOPE(US/MHZ)= 0
.AS ERRORS: LOSS(DB)= 26.71645   PHASE(DEG)= 1096.566
PLOT SCALES: LOSS 10 DB/DIV  VS.  FREQ 8.496 MHZ/DIV
```



```
PEAK: LEVEL(DB)= 29.28753  FREQ(MHZ)= 306.5566  DELAY(US)= .4341048  SIDELOBE(DB)=-45.27062
ENERGY: LEVEL(DB)= 28.94621  CENTER(MHZ)= 321.4445  WIDTH(MHZ)= 32.32167  SKEW(MHZ)= 1.220756
 L(DB)    LO(MHZ)     HI(MHZ)    CTR(MHZ)    WID(MHZ) AV-CTR(MHZ) AV-WID(MHZ) AV-SL(DB)  LOX(MHZ)    HIX(MHZ)
 -0.48   306.55658   306.55658   306.55658    0.00000  306.55658    0.00000     0.00000  306.55658   306.55658
  0.50   293.25256   307.40955   300.33105   14.15699  300.33487   14.55404    -6.33990  293.25256   350.48154
  1.00   293.02954   307.58160   300.30557   14.55206  300.33523   14.95495    -6.42264  293.02954   351.09778
  2.00   292.73795   307.81735   300.27765   15.07941  300.33270   15.29812    -6.48101  292.73795   351.48917
  3.00   292.52853   308.00815   300.26834   15.47961  300.29913   15.48963    -6.51207  292.52853   351.73462
  4.00   292.35840   308.15369   300.25604   15.79529  300.30051   15.60090    -6.52354  292.35340   351.92838
  5.00   292.21513   308.28152   300.24864   16.06540  300.32053   15.73141    -6.54347  292.21613   352.08279
  6.00   292.09576   308.39203   300.24390   16.29626  300.30154   15.76827    -6.53940  292.09576   352.22824
 10.00   291.72748   308.75046   300.23895   17.02298  300.30136   15.90446    -6.53220  291.72748   352.64655
 20.00   291.12234   309.33340   300.22767   18.21106  300.30045   15.96494    -6.47312  291.12234   353.30310
 30.00   290.67957   309.72589   300.20273   19.04633  300.30023   15.96937    -6.41981  290.67957   353.73880
 40.00   290.32410   310.00543   300.16476   19.68134  300.30017   15.96959    -6.37791  290.32410   354.06119
BAND(MHZ)    294.200   306.200   338.200   350.200
LMIN(DB)          -0.41     -0.47     -0.35
LMAX(DB)           0.08     72.55      0.53
LDEL(DB)           0.49     73.02      0.88
PMIN(DEG)      -1482.14  -2243.94   -638.51
PMAX(DEG)        531.21   2091.60   1300.40
 DEL(DEG)       2013.35   4335.53   1938.91
FILE: 2FR0203A.DAT  Out-of-band Rejection: PEAK= 45.5 dB  WIDTH=   0.020 MHz
```

```
PHONON CORPORATION
FILE: 2FR8223A.DAT (+SSCF)
PN_100830_024 FINAL_FUNCTIONAL TEMP:R FLIGHT3_FUNCT3 /N DUAL_SXX
10-23-1997 HP8753,SSREF,SSREF,SSCF
REFERENCES: LOSS(DB)=  28.7688  PHASE(DEG)= -6105.639
            DELAY(US)=  .9089838  SLOPE(US/MHZ)=  0

BANDPASS CHARACTERISTICS MEASUREMENT
FREQUENCY(MHZ)       LOSS(DB)      PHASE(DEG)
------------------------------------------------
  285.400             57.73           455.49
  289.080             62.27          1251.64
  292.760              1.89           781.92
  296.440             -0.13           156.62
  300.120             -0.14          -467.34
  303.800              0.07         -1090.64
  307.480              0.70         -1713.83
  311.160             52.23         -2243.01
  314.840             55.32         -1462.10
  318.520             57.06          -574.64
  322.200             52.27           624.13
  325.880             52.23          1122.95
  329.560             51.27          1547.05
  333.240             51.60          2084.44
  336.920              0.97          1521.57
  340.600             -0.03           919.59
  344.280              0.20           319.09
  347.960              0.44          -282.33
  351.640              2.61          -878.40
  355.320             54.62         -1112.49
  359.000             55.23          -667.49
------------------------------------------------
```

ELECTRICAL TEST DATA SHEET

AEROJET PART: 1331576-2 PHONON PART: 100824 SERIAL: B03
TESTED BY: [illegible] TITLE: Test DATE: 10/23/97 TIME: [illegible]
TEST: FINAL FUNCTIONAL
EQUIPMENT: HP 8753D SERIAL: 3410A07982 CAL DUE: 12/10/97
HP 3478A SERIAL: 2136A03127 CAL DUE: 7/7/98

PARAGRAPH		REQUIREMENT TITLE	DATA		P/F
REQ.	Q/ATP				
3.2.1.1	5.2.1	OPERATING TEMPERATURE	35.3	C	P
3.2.1.3 3.2.1.4	5.2.3	CENTER FREQUENCY & CENTER FREQUENCY STABILITY			
		LO: 299.335/301.065 MHz	300.158	MHz	P
		HI: 343.335/345.065 MHz	343.916	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:			
		LO: 15/16 MHz	15.432	MHz	P
		HI: 15/16 MHz	15.464	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY			
		LO: /0.5 dB	0.1	dB	P
		HI: /0.5 dB	0.3	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE			
		294.2-306.2 MHz: /1.0 dB	0.4	dB	P
		338.2-350.2 MHz: /1.0 dB	0.6	dB	P
3.2.1.8	5.2.7	INSERTION LOSS			
		LO: 27.8/30.2 dB	28.9	dB	P
		HI: 27.8/30.2 dB	28.8	dB	P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION			
		LO: -0.4/0.4 dB	0.2	dB	P
		HI: -0.4/0.4 dB	-0.0	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE			
		LO,HI: /0.5 dB	0.0	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION			

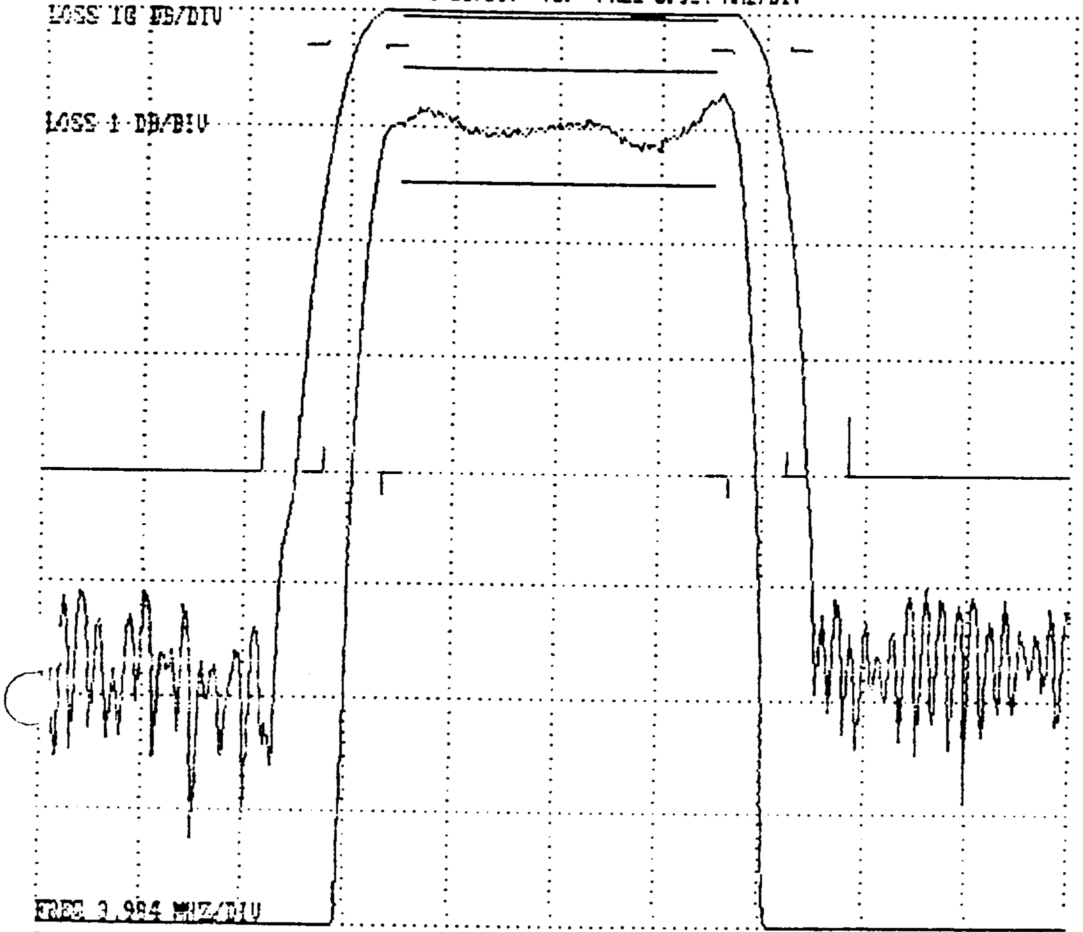
BAND	PEAK(dB)	WIDTH(MHz)	P/F
WIDE: 1-286,359-1000 MHz:	44.1	0.000	
DUAL: 286.000-288.935, 311.465-332.935, 355.465-359.00 MHz:	45.3	0.000	
PEAK: 35.0/ dB	44.1 dB		P
WIDTH: /3.2 MHz		0.000 MHz	P

PARAGRAPH		REQUIREMENT TITLE	DATA		P/F
REQ.	Q/ATP				
3.2.1.12	5.2.11	SHAPE FACTOR			
		LO: /1.30 Unitless	1.28	Unitless	P
		HI: /1.30 Unitless	1.30	Unitless	P
3.2.1.14	5.2.12	VSWR (RETURN LOSS) 294.2-306.2,338.2-350.2 MHz			
		DUAL S11: 7.5/ dB	17.0	dB	P
		DUAL S22: 7.5/ dB	8.5	dB	P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS			
		CENTER FREQUENCY: -0.2/0.2 MHz	0	MHz	P
		3 dB BANDWIDTH: -0.32/0.32 MHz	0	MHz	P
		INSERTION LOSS: -0.5/0.5 dB	0	dB	P
NONE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)	P DP		

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

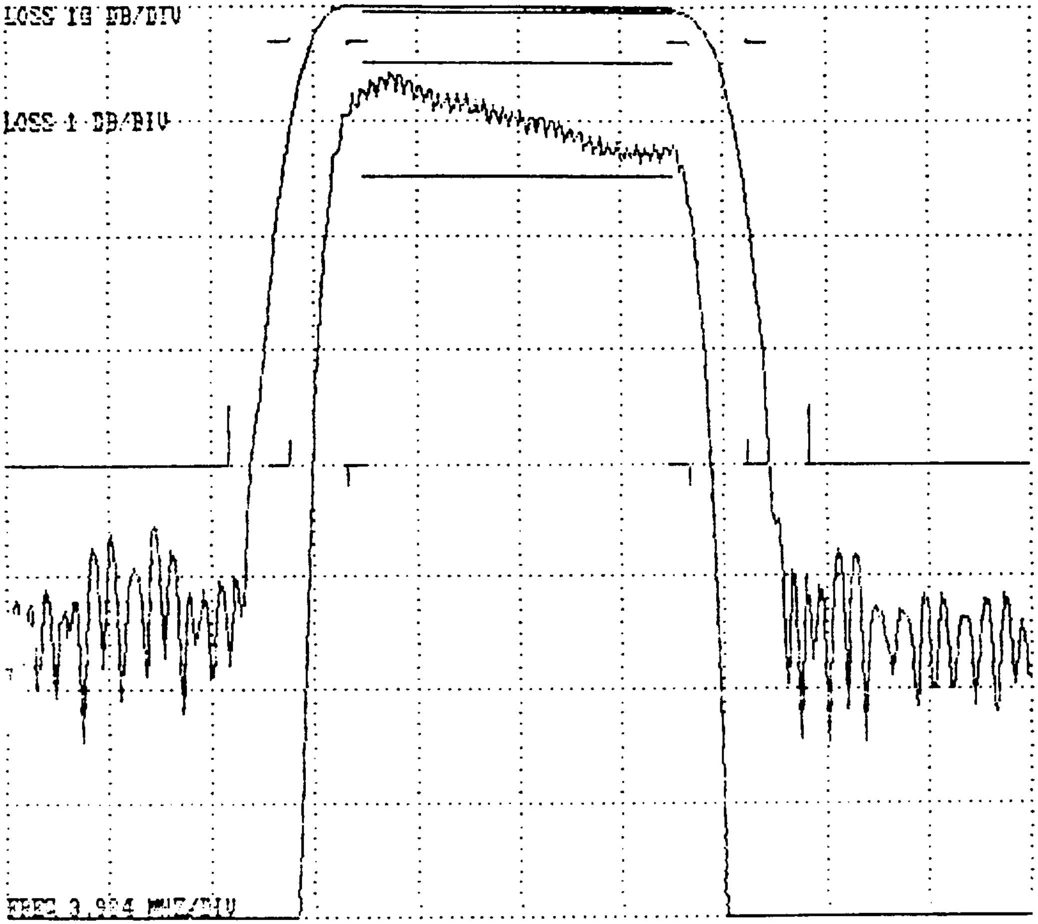
CAGE: 6Y858
TEL: 203-651-0211
FAX: 203-651-8618

```
PHONON  CORPORATION
FILE=2AH8B03A.DAT  09:42:01  10-28-1997
  _100830_B24 FINAL_FUNCTIONAL TEMP:H FLIGHT3_FUNCT3 /N DUAL_SXX
10-23-1997 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 300.2   WIDTH= 39.84   INCR.= .12   SYSTEM BANDWIDTH= 12
REFERENCES: LOSS(DB)= 28.89006   PHASE(DEG)= 5202.996   DELAY(US)= 0   SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= 9.136671E-02   PHASE(DEG)= 1738.449
PLOT SCALES: LOSS 10 DB/DIV  LOSS 1 DB/DIV  VS.  FREQ 3.984 MHZ/DIV
```



```
PEAK: LEVEL(DB)= 26.55986  FREQ(MHZ)= 306.4265  DELAY(US)=-1.384636  SIDELOBE(DB)=-50.43873
ENERGY: LEVEL(DB)= 29.05861  CENTER(MHZ)= 300.1667  WIDTH(MHZ)= 16.14074  SKEW(MHZ)=-2.026192E-03
 L(DB)    LO(MHZ)    HI(MHZ)    CTR(MHZ)    WID(MHZ) AV-CTR(MHZ) AV-WID(MHZ) AV-SL(DB)  LOX(MHZ)   HIX(MHZ)
 -0.33   306.42651  306.42651  306.42651    0.00000  306.42651    0.00000    0.00000  306.42651  306.42651
  0.50   293.19342  307.24475  300.21909   14.05133  300.21033   14.04903  -12.43979  293.19342  307.24475
  1.00   292.95923  307.42703  300.19312   14.46780  300.21021   14.45248  -13.75468  292.95923  307.42703
  2.00   292.65121  307.67804  300.16461   15.02682  300.20706   14.79297  -15.31470  292.65121  307.67804
  3.00   292.44177  307.87338  300.15759   15.43161  300.17041   15.00310  -16.70984  292.44177  307.87338
  4.00   292.26730  308.02307  300.14520   15.75577  300.17159   15.21818  -18.95151  292.26730  308.02307
  5.00   292.12381  308.15125  300.13751   16.02744  300.17145   15.29884  -20.22044  292.12381  308.15125
  6.00   292.00195  308.26218  300.13208   16.26022  300.17090   15.36304  -21.61810  292.00195  308.26218
 10.00   291.63049  308.62521  300.12787   16.99472  300.16904   15.47623  -26.61302  291.63049  308.62521
 20.00   291.02142  309.20905  300.11523   18.18762  300.16711   15.52306  -38.24784  291.02142  309.20905
 30.00   290.57312  309.59500  300.08405   19.02183  300.16678   15.52605  -48.99874  290.57312  309.59500
 40.00   290.21198  309.89456  300.05328   19.68259  300.16675   15.52525  -54.88008  290.21198  309.89456
BAND(MHZ)   294.200   306.200
LMIN(DB)          -0.26
LMAX(DB)           0.19
LREL(DB)           0.45
PMIN(DEG)      -2979.67
PMAX(DEG)       2983.82
PREL(DEG)       5963.49
File: 2AH8B03A.DAT     Passband Symmetry =  0.1 dB
```

```
PHONON CORPORATION
E=2CH8203A.DAT  09:43:21  10-28-1997
  _100822_824 FINAL_FUNCTIONAL TEMP:H FLIGHT3_FUNCT3 /N DUAL_SXX
10-23-1997 HP8753,SSCF,SSFFIX,SSREF
 REQUENCY(MHZ): CENTER= 344.2   WIDTH= 39.84   INCR.= .12   SYSTEM BANDWIDTH= 12
REFERENCES: LOSS(DB)= 28.84936   PHASE(DEG)=-9471.255   DELAY(US)= 0   SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .2215999   PHASE(DEG)= 1716.711
PLOT SCALES: LOSS 10 DB/DIV  LOSS 1 DB/DIV  VS.  FREQ 3.984 MHZ/DIV
```



```
PEAK: LEVEL(DB)= 28.41407  FREQ(MHZ)= 339.1938  DELAY(US)=-1.373398  SIDELOBE(DB)=-45.43355
ENERGY: LEVEL(DB)= 29.04476  CENTER(MHZ)= 343.7561  WIDTH(MHZ)= 15.20261  SKEW(MHZ)= .2956218
 L(DB)     LO(MHZ)     HI(MHZ)     CTR(MHZ)     WID(MHZ) AV-CTR(MHZ) AV-WID(MHZ) AV-SL(DB)  LOX(MHZ)    HIX(MHZ)
 -0.44    339.19382   339.19382   339.19382     0.00000   339.19382     0.00000     0.00000   339.19382   339.19382
  0.50    336.93842   350.68607   343.81225    13.74765   343.67035    13.77727   -11.84870   336.93842   350.68607
  1.00    336.71991   351.03586   343.87787    14.31595   343.67590    14.17880   -12.91387   336.71991   351.03586
  2.00    336.41400   351.40649   343.91025    14.99249   343.76639    14.69428   -14.96733   336.41400   351.40649
  3.00    336.18436   351.64795   343.91614    15.46359   343.76273    14.96532   -16.69384   336.18436   351.64795
  4.00    336.01367   351.82538   343.91953    15.81171   343.73590    15.12590   -18.21922   336.01367   351.82538
  5.00    335.87161   351.98322   343.92743    16.11160   343.73819    15.21144   -19.32874   335.87161   351.98322
  6.00    335.75049   352.12433   343.93741    16.37384   343.75754    15.31209   -21.22972   335.75049   352.12433
 10.00    335.35565   352.53159   343.94360    17.17593   343.75632    15.43032   -25.83394   335.35565   352.53159
 20.00    334.72360   353.18259   343.95361    18.45999   343.75620    15.48475   -36.30404   334.72360   353.18359
 30.00    334.29248   353.62585   343.95917    19.33337   343.75610    15.48934   -46.66121   334.29248   353.62585
 40.00    333.76270   353.92856   343.84564    20.16585   343.75607    15.48969   -52.55684   333.76270   353.92856
BAND(MHZ)    338.200    350.200
LMIN(DB)           -0.43
 MAX(DB)            0.37
  L(DB)             0.80
PMIN(DEG)       -2940.56
 MAX(DEG)        2945.52
PDEL(DEG)        5237.08
File: 2CH8203A.DAT     Passband Symmetry =  0.3 dB
```

Report No. 11413
February, 1999

Channel 13 Bandpass Filter

SAW Filter (S/N: 1331576-3, S/N: B06)

ELECTRICAL TEST DATA SHEET

AEROJET PART: 1331576-3 PHONON PART: 100825 SERIAL: B06

TESTED BY: 210 TITLE: Test Tech DATE: 5/12/99 TIME: 11:00 Am

TEST: FINAL FUNCTIONAL

EQUIPMENT: HP 8753D SERIAL: 3410A04374 CAL DUE: 1/29/99

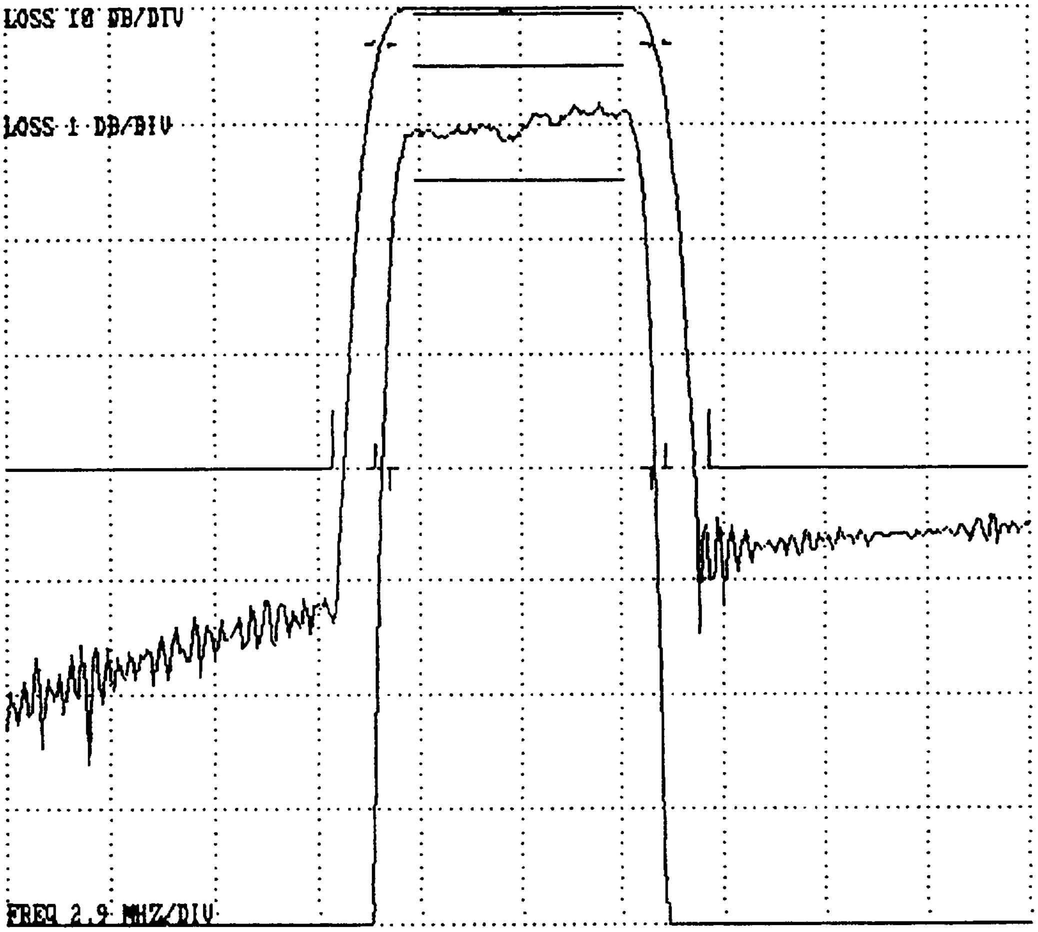
HP 3478A SERIAL: 2136A03127 CAL DUE: 7/7/98

PARAGRAPH		REQUIREMENT TITLE		DATA		P/F
REQ.	Q/ATP					
3.2.1.1	5.2.1	OPERATING TEMPERATURE		-5.4	C	P
3.2.1.3	5.2.3	CENTER FREQUENCY &				
3.2.1.4		CENTER FREQUENCY STABILITY				
		LO: 312.035/312.365 MHz		312.141	MHz	P
		HI: 332.035/332.365 MHz		332.146	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:				
		LO: 7.8/8.0 MHz		7.823	MHz	P
		HI: 7.8/8.0 MHz		7.851	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY				
		LO: /0.5 dB		0.2	dB	P
		HI: /0.5 dB		0.2	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE				
		309.2-315.2 MHz: /1.0 dB		0.3	dB	P
		329.2-335.2 MHz: /1.0 dB		0.3	dB	P
3.2.1.8	5.2.7	INSERTION LOSS				
		LO: 27.8/30.2 dB		28.8	dB	P
		HI: 27.8/30.2 dB		28.8	dB	P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION				
		LO: -0.4/0.4 dB		-0.2	dB	P
		HI: -0.4/0.4 dB		-0.2	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE				
		LO,HI: /0.5 dB		0.0	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION				
		BAND	PEAK(dB)	WIDTH(MHz)		
		WIDE: 1-303,342-1000 MHz:	44.6	0.000		
		DUAL: 303.000-306.835, 317.565-326.835, 337.565-342.00 MHz:	42.8	0.000		
		PEAK: 35.0/ dB	42.8 dB			P
		WIDTH: /1.6 MHz		0.000	MHz	P
3.2.1.12	5.2.11	SHAPE FACTOR				
		LO: /1.30 Unitless		1.28	Unitless	P
		HI: /1.30 Unitless		1.27	Unitless	P
3.2.1.14	5.2.12	VSWR (RETURN LOSS) 309.2-315.2,329.2-335.2 MHz				
		DUAL S11: 7.5/ dB		10.0	dB	P
		DUAL S22: 7.5/ dB		9.8	dB	P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS				
		CENTER FREQUENCY: -0.1/0.1 MHz		0	MHz	P
		3 dB BANDWIDTH: -0.16/0.16 MHz		0	MHz	P
		INSERTION LOSS: -0.5/0.5 dB		0	dB	P
NONE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)		P DP		

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 6Y858
TEL: 203-651-0211
FAX: 203-651-8618

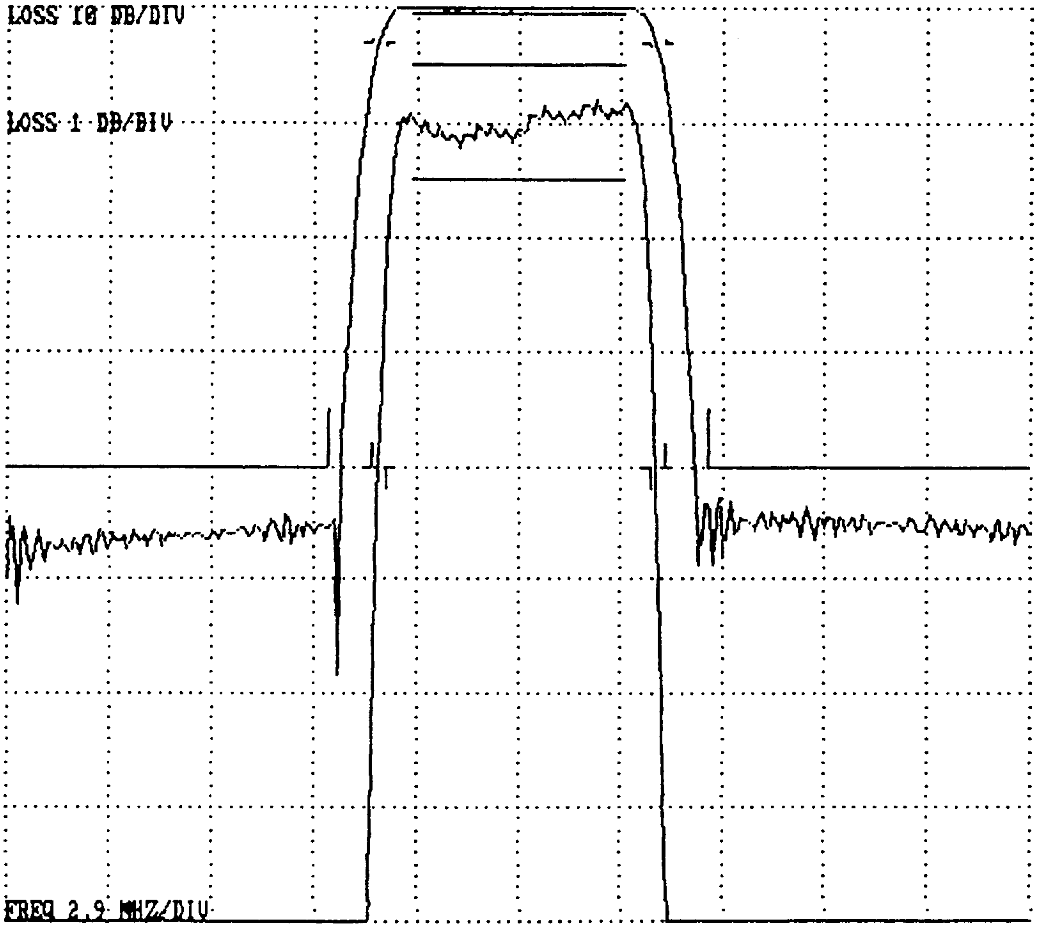
```
PHONON  CORPORATION
FILE=3AC8B06A.DAT  14:32:54  05-12-1998
PN_100832_825 FINAL_FUNCTIONAL TEMP:C FLIGHT6_3FUNCT /N DUAL_SXX
05-12-1998 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 312.2   WIDTH= 29   INCR.= .1   SYSTEM BANDWIDTH= 6
REFERENCES: LOSS(DB)= 28.83232   PHASE(DEG)=-5843.767   DELAY(US)= 0   SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= 8.573858E-02   PHASE(DEG)= 1647.183
PLOT SCALES: LOSS 10 DB/DIV  LOSS 1 DB/DIV  VS.  FREQ 2.9 MHZ/DIV
```



```
PEAK: LEVEL(DB)= 28.65966  FREQ(MHZ)= 314.4997  DELAY(US)=-2.686205  SIDELOBE(DB)=-44.45791
ENERGY: LEVEL(DB)= 29.0311  CENTER(MHZ)= 312.1744  WIDTH(MHZ)= 8.200358  SKEW(MHZ)=-4.966622E-02
 L(DB)     LO(MHZ)     HI(MHZ)     CTR(MHZ)     WID(MHZ) AV-CTR(MHZ) AV-WID(MHZ)  AV-SL(DB)  LOX(MHZ)      HIX(MHZ)
 -0.17    314.49973   314.49973   314.49973     0.00000  314.49973     0.00000     0.00   314.49973    314.49973
  0.50    308.65982   315.69141   312.17560     7.03159  312.18292     6.97960   -14.12   308.65982    315.69141
  1.00    308.50833   315.80157   312.15497     7.29324  312.22321     7.23368   -15.61   308.50833    315.80157
  2.00    308.34918   315.95367   312.15143     7.60449  312.18271     7.44997   -17.49   308.34918    315.95367
  3.00    308.22986   316.05240   312.14111     7.82254  312.18216     7.56522   -18.99   308.22986    316.05240
  4.00    308.14468   316.13245   312.13855     7.98776  312.18045     7.65615   -20.76   308.14468    316.13245
  5.00    308.07251   316.20380   312.13815     8.13129  312.17865     7.72316   -22.79   308.07251    316.20380
  6.00    308.00964   316.26862   312.13913     8.25897  312.17865     7.72316   -22.76   308.00964    316.26862
 10.00    307.80646   316.45871   312.13257     8.65225  312.17633     7.79963   -27.81   307.80646    316.45871
 20.00    307.49643   316.77780   312.13712     9.28137  312.17377     7.83158   -40.21   307.49643    316.77780
 30.00    307.29834   316.96558   312.13196     9.66724  312.17407     7.83309   -47.12   307.29834    316.96558
 40.00    307.14081   317.16711   312.15396    10.02631  312.17410     7.83321   -48.59   307.14081    317.16711
BAND(MHZ)    309.200   315.200
LMIN(DB)          -0.17
LMAX(DB)           0.15
LDEL(DB)           0.32
PMIN(DEG)      -2806.78
PMAX(DEG)       2901.61
PDEL(DEG)       5708.39
File: 3AC8B06A.DAT     Passband Symmetry =  0.2 dB
```

PHONON CORPORATION

```
FILE=3CC8B06A.DAT  14:33:49  05-12-1998
PN_100832_825 FINAL_FUNCTIONAL TEMP:C FLIGHT6_3FUNCT /N DUAL_SXX
05-12-1998 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 332.2   WIDTH= 29   INCR.= .1   SYSTEM BANDWIDTH= 6
REFERENCES: LOSS(DB)= 28.79356   PHASE(DEG)=-15342.11   DELAY(US)= 0   SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .1013191   PHASE(DEG)= 1627.012
PLOT SCALES: LOSS 10 DB/DIV  LOSS 1 DB/DIV  VS.  FREQ 2.9 MHZ/DIV
```



```
PEAK: LEVEL(DB)= 28.59534  FREQ(MHZ)= 334.416  DELAY(US)=-2.650382  SIDELOBE(DB)=-43.04966
ENERGY: LEVEL(DB)= 28.97094  CENTER(MHZ)= 332.1737  WIDTH(MHZ)= 8.224448  SKEW(MHZ)=-4.889898E-02
 L(DB)    LO(MHZ)     HI(MHZ)    CTR(MHZ)     WID(MHZ) AV-CTR(MHZ) AV-WID(MHZ)  AV-SL(DB)  LOX(MHZ)      HIX(MHZ)
 -0.20   334.41599   334.41599   334.41599     0.00000   334.41599     0.00000     0.00   334.41599    334.41599
  0.50   328.59702   335.70795   332.15247     7.11093   332.17783     7.18710   -14.92   328.59702    335.70795
  1.00   328.46155   335.81100   332.13629     7.34946   332.17615     7.35002   -16.01   328.46155    335.81100
  2.00   328.32263   335.97549   332.14905     7.65286   332.17480     7.49530   -17.29   328.32263    335.97549
  3.00   328.22028   336.07153   332.14590     7.85126   332.17422     7.61563   -18.81   328.22028    336.07153
  4.00   328.13327   336.15265   332.14294     8.01938   332.17346     7.70989   -20.56   328.13327    336.15265
  5.00   328.06186   336.22803   332.14496     8.16617   332.17249     7.78038   -22.60   328.06186    336.22803
  6.00   328.00269   336.29648   332.14960     8.29379   332.17249     7.78038   -22.58   328.00269    336.29648
 10.00   327.82910   336.48111   332.15509     8.65201   332.17276     7.86089   -27.74   327.82910    336.48111
 20.00   327.53558   336.80145   332.16852     9.26587   332.17392     7.89333   -40.01   327.53558    336.80145
 30.00   327.30267   337.00214   332.15240     9.69946   332.17365     7.89463   -44.54   327.30267    337.00214
 40.00   327.18765   337.17792   332.18280     9.99026   332.17358     7.89479   -45.62   327.18765    337.17792
BAND(MHZ)    329.200    335.200
LMIN(DB)          -0.20
LMAX(DB)           0.20
LDEL(DB)           0.40
PMIN(DEG)      -2771.49
PMAX(DEG)       2866.98
PDEL(DEG)       5638.48
File: 3CC8B06A.DAT     Passband Symmetry =  0.2 dB
```

ELECTRICAL TEST DATA SHEET

AEROJET PART: 1331576-3 PHONON PART: 100825 SERIAL: B06
TESTED BY: 210 TITLE: Test tech DATE: 5/12/98 TIME: 11:00 am
TEST: FINAL FUNCTIONAL
EQUIPMENT: HP 8753D SERIAL: 3410A04374 CAL DUE: 1/29/99
HP 3478A SERIAL: 2136A03127 CAL DUE: 7/7/98

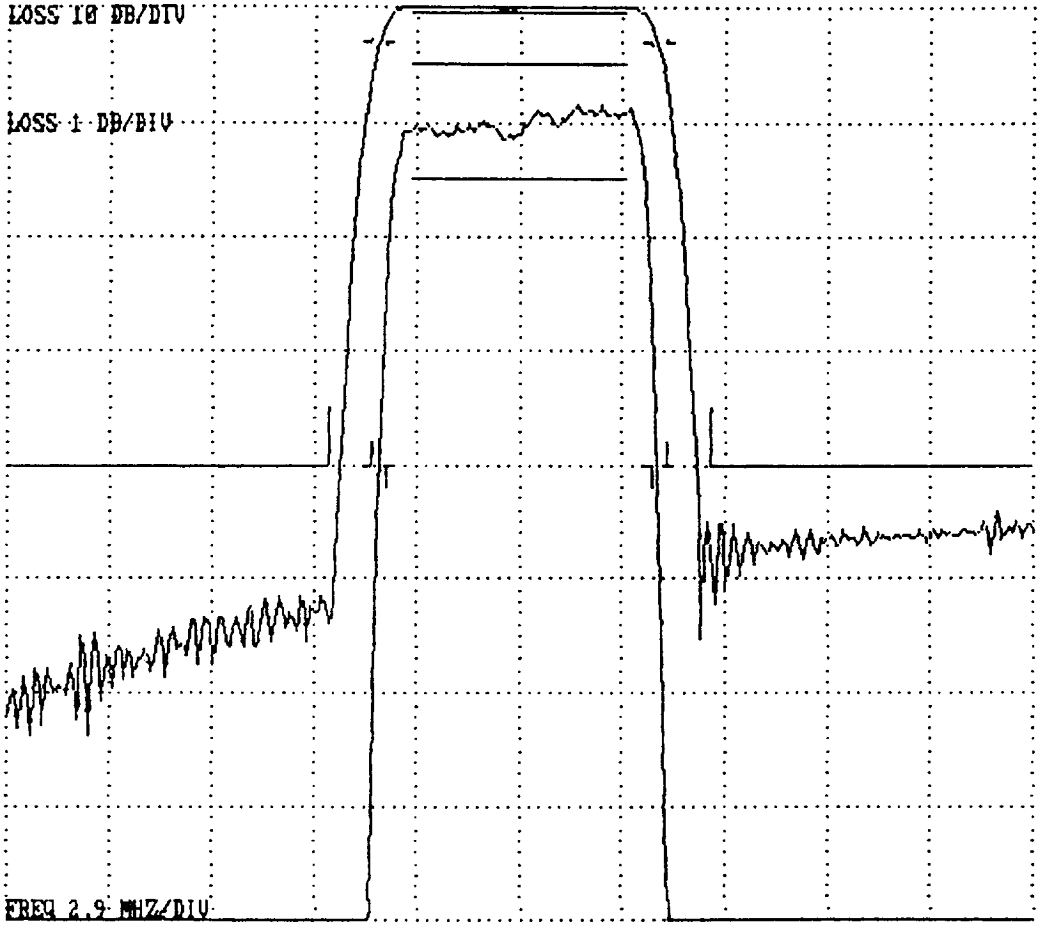
PARAGRAPH REQ.	Q/ATP	REQUIREMENT TITLE		DATA		P/F
3.2.1.1	5.2.1	OPERATING TEMPERATURE		14.9	C	P
3.2.1.3	5.2.3	CENTER FREQUENCY &				
3.2.1.4		CENTER FREQUENCY STABILITY				
		LO: 312.035/312.365 MHz		312.159	MHz	P
		HI: 332.035/332.365 MHz		332.160	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:				
		LO: 7.8/8.0 MHz		7.824	MHz	P
		HI: 7.8/8.0 MHz		7.854	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY				
		LO: /0.5 dB		0.2	dB	P
		HI: /0.5 dB		0.2	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE				
		309.2-315.2 MHz: /1.0 dB		0.3	dB	P
		329.2-335.2 MHz: /1.0 dB		0.3	dB	P
3.2.1.8	5.2.7	INSERTION LOSS				
		LO: 27.8/30.2 dB		29.0	dB	P
		HI: 27.8/30.2 dB		29.0	dB	P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION				
		LO: -0.4/0.4 dB		0.0	dB	P
		HI: -0.4/0.4 dB		0.0	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE				
		LO,HI: /0.5 dB		0.0	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION				
		BAND	PEAK(dB)	WIDTH(MHz)		
		WIDE: 1-303,342-1000 MHz:	44.4	0.000		
		DUAL: 303.000-306.835, 317.565-326.835, 337.565-342.00 MHz:	42.7	0.000		
		PEAK: 35.0/ dB	42.7 dB			P
		WIDTH: /1.6 MHz		0.000	MHz	P
3.2.1.12	5.2.11	SHAPE FACTOR				
		LO: /1.30 Unitless		1.28	Unitless	P
		HI: /1.30 Unitless		1.27	Unitless	P
3.2.1.14	5.2.12	VSWR (RETURN LOSS) 309.2-315.2,329.2-335.2 MHz				
		DUAL S11: 7.5/ dB		10.4	dB	P
		DUAL S22: 7.5/ dB		10.1	dB	P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS				
		CENTER FREQUENCY: -0.1/0.1 MHz		+0.004	MHz	P
		3 dB BANDWIDTH: -0.16/0.16 MHz		+0.001	MHz	P
		INSERTION LOSS: -0.5/0.5 dB		+0.0	dB	P
NONE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)		P DP		

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 6Y858
TEL: 203-651-0211
FAX: 203-651-8618

PHONON CORPORATION

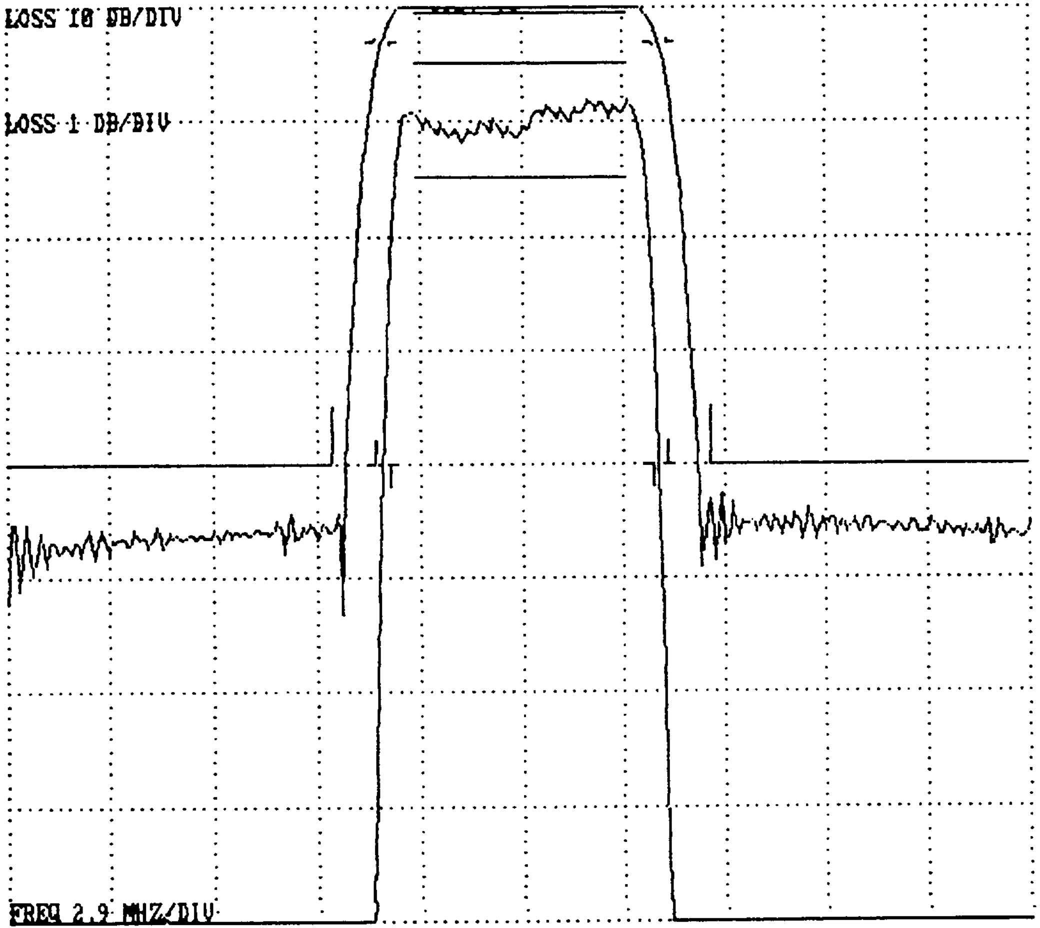
```
FILE=3AR8B06A.DAT  14:47:49  05-12-1998
PN_100832_825 FINAL_FUNCTIONAL TEMP:R FLIGHT6_3FUNCT /N DUAL_SXX
05-12-1998 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 312.2   WIDTH= 29   INCR.= .1   SYSTEM BANDWIDTH= 6
REFERENCES: LOSS(DB)= 29.04078   PHASE(DEG)=-6198.474   DELAY(US)= 0   SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= 8.266806E-02   PHASE(DEG)= 1647.062
PLOT SCALES: LOSS 10 DB/DIV  LOSS 1 DB/DIV  VS.  FREQ 2.9 MHZ/DIV
```



```
PEAK: LEVEL(DB)= 28.87538  FREQ(MHZ)= 313.7936  DELAY(US)=-2.691881  SIDELOBE(DB)=-44.35662
ENERGY: LEVEL(DB)= 29.23862  CENTER(MHZ)= 312.1893  WIDTH(MHZ)= 8.200592  SKEW(MHZ)=-4.676313E-02
 L(DB)    LO(MHZ)     HI(MHZ)     CTR(MHZ)     WID(MHZ) AV-CTR(MHZ) AV-WID(MHZ)  AV-SL(DB)  LOX(MHZ)     HIX(MHZ)
 -0.17   313.79358   313.79358   313.79358     0.00000   313.79358     0.00000      0.00   313.79358   313.79358
  0.50   308.67395   315.71048   312.19220     7.03653   312.22726     7.07014    -14.60   308.67395   315.71048
  1.00   308.52905   315.81650   312.17279     7.28745   312.22452     7.23650    -15.61   308.52905   315.81650
  2.00   308.36462   315.97153   312.16809     7.60690   312.18658     7.45141    -17.48   308.36462   315.97153
  3.00   308.24673   316.07025   312.15851     7.82352   312.18790     7.56708    -18.99   308.24673   316.07025
  4.00   308.16156   316.14963   312.15558     7.98807   312.18835     7.65841    -20.77   308.16156   316.14963
  5.00   308.08890   316.22104   312.15497     8.13214   312.18854     7.72536    -22.80   308.08890   316.22104
  6.00   308.02765   316.28479   312.15622     8.25714   312.18854     7.72536    -22.77   308.02765   316.28479
 10.00   307.82385   316.47659   312.15021     8.65274   312.18912     7.80175    -27.84   307.82385   316.47659
 20.00   307.51297   316.79514   312.15405     9.28217   312.18909     7.83249    -38.34   307.51297   316.79514
 30.00   307.31943   316.97916   312.14929     9.65973   312.18909     7.83494    -46.28   307.31943   316.97916
 40.00   307.15411   317.19232   312.17322    10.03821   312.18909     7.83513    -48.66   307.15411   317.19232
BAND(MHZ)    309.200   315.200
LMIN(DB)          -0.17
LMAX(DB)           0.15
LDEL(DB)           0.32
PMIN(DEG)      -2806.36
PMAX(DEG)       2901.44
PDEL(DEG)       5707.80
File: 3AR8B06A.DAT     Passband Symmetry =  0.2 dB
```

PHONON CORPORATION

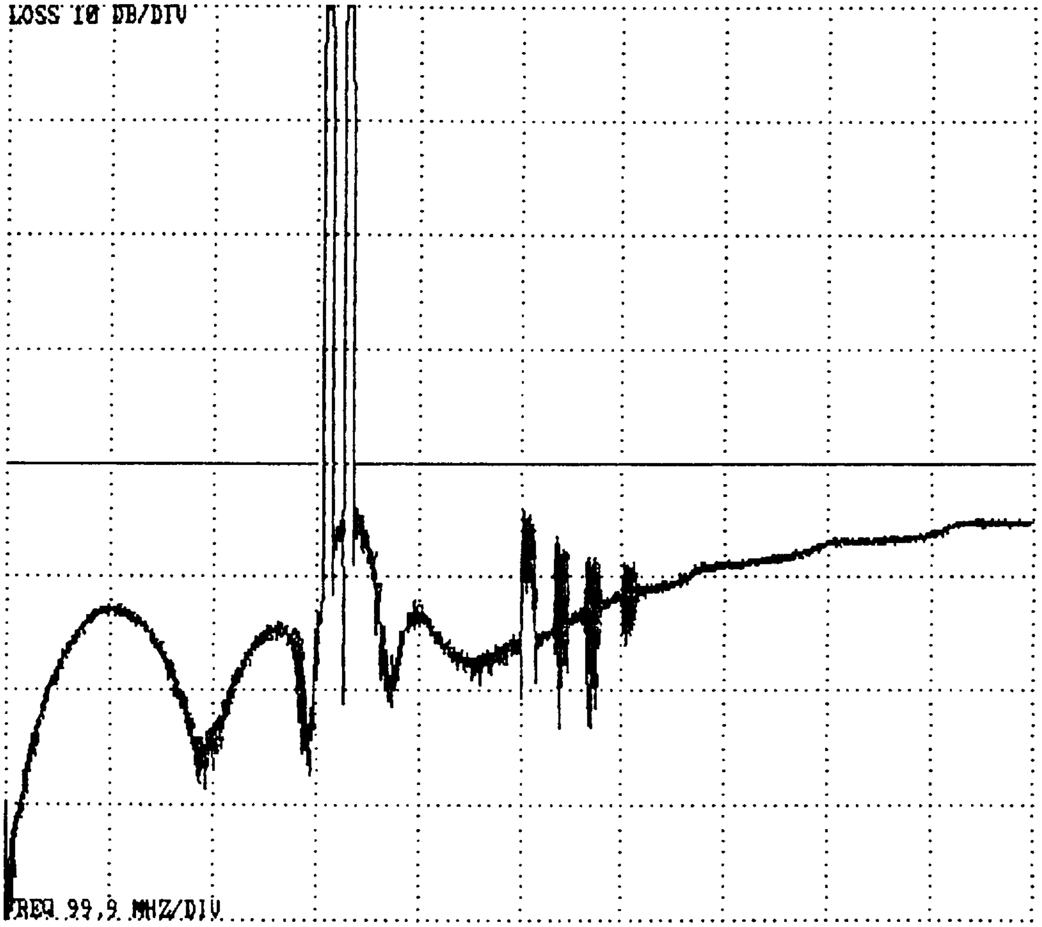
```
FILE=3CR8B06A.DAT  14:48:53  05-12-1998
PN_100832_825 FINAL_FUNCTIONAL TEMP:R FLIGHT6_3FUNCT /N DUAL_SXX
05-12-1998 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 332.2   WIDTH= 29   INCR.= .1   SYSTEM BANDWIDTH= 6
REFERENCES: LOSS(DB)= 28.99405   PHASE(DEG)=-16058.15   DELAY(US)= 0   SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= 9.774687E-02   PHASE(DEG)= 1626.932
PLOT SCALES: LOSS 10 DB/DIV  LOSS 1 DB/DIV  VS.  FREQ 2.9 MHZ/DIV
```



```
PEAK: LEVEL(DB)= 28.8065  FREQ(MHZ)= 335.2218  DELAY(US)=-2.650909  SIDELOBE(DB)=-42.93839
ENERGY: LEVEL(DB)= 29.17088  CENTER(MHZ)= 332.1854  WIDTH(MHZ)= 8.224408  SKEW(MHZ)=-4.578783E-02
 L(DB)     LO(MHZ)     HI(MHZ)     CTR(MHZ)     WID(MHZ) AV-CTR(MHZ) AV-WID(MHZ)  AV-SL(DB)  LOX(MHZ)    HIX(MHZ)
 -0.19    335.22183   335.22183   335.22183     0.00000   335.22183     0.00000     0.00    335.22183   335.22183
  0.50    328.60297   335.71899   332.16098     7.11603   332.22223     7.09915   -14.41    328.60297   335.71899
  1.00    328.47522   335.82651   332.15088     7.35129   332.17691     7.35138   -16.01    328.47522   335.82651
  2.00    328.33734   335.99008   332.16370     7.65274   332.17685     7.49618   -17.29    328.33734   335.99008
  3.00    328.23355   336.08722   332.16040     7.85367   332.17822     7.61641   -18.80    328.23355   336.08722
  4.00    328.14676   336.16644   332.15662     8.01968   332.17917     7.71106   -20.56    328.14676   336.16644
  5.00    328.07626   336.24179   332.15903     8.16553   332.17975     7.78144   -22.61    328.07626   336.24179
  6.00    328.01791   336.30923   332.16357     8.29132   332.19345     7.80744   -23.70    328.01791   336.30923
 10.00    327.84161   336.49673   332.16919     8.65512   332.18271     7.86160   -27.71    327.84161   336.49673
 20.00    327.54953   336.81470   332.18213     9.26517   332.18555     7.89438   -40.21    327.54953   336.81470
 30.00    327.31540   337.00891   332.16217     9.69351   332.18533     7.89563   -44.85    327.31540   337.00891
 40.00    327.19791   337.20151   332.19971    10.00360   332.18533     7.89578   -45.97    327.19791   337.20151
BAND(MHZ)    329.200   335.200
LMIN(DB)          -0.18
LMAX(DB)           0.18
LDEL(DB)           0.36
PMIN(DEG)      -2771.30
PMAX(DEG)       2866.68
PDEL(DEG)       5637.98
File: 3CR8B06A.DAT     Passband Symmetry =  0.2 dB
```

PHONON CORPORATION

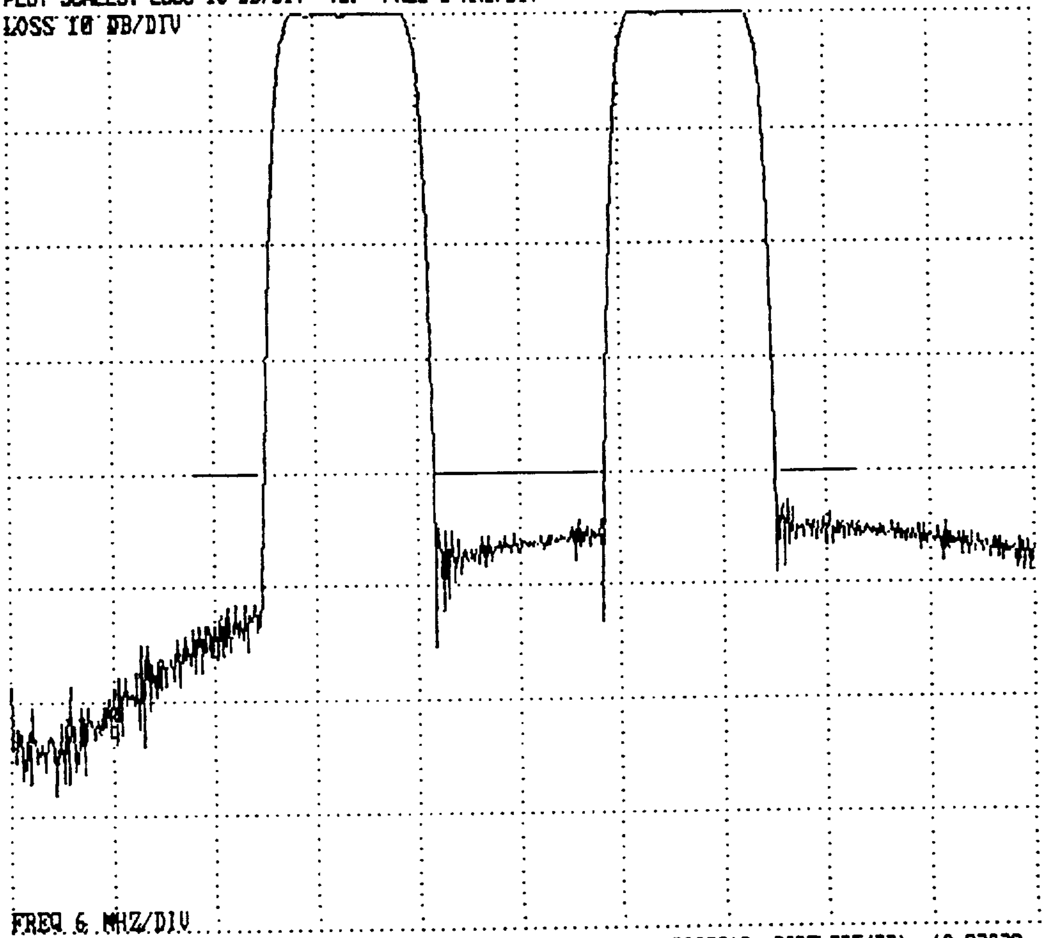
```
FILE=3ER8B06A.DAT  14:49:50  05-12-1998
PN_100832_825 FINAL_FUNCTIONAL TEMP:R FLIGHT6_3FUNCT /N WIDE_S21
05-12-1998 HP8753,SSREF,SSREF
FREQUENCY(MHZ): CENTER= 500.5   WIDTH= 999   INCR.= .208125   SYSTEM BANDWIDTH= 999
REFERENCES: LOSS(DB)= 29.01741   PHASE(DEG)=-34641.38   DELAY(US)= 4.78902   SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= 9.295705   PHASE(DEG)= 5597.914
PLOT SCALES: LOSS 10 DB/DIV  VS.  FREQ 99.9 MHZ/DIV
```



```
PEAK: LEVEL(DB)= 28.80541  FREQ(MHZ)= 334.3615  DELAY(US)= 6.920135  SIDELOBE(DB)=-43.53982
ENERGY: LEVEL(DB)= 29.20327  CENTER(MHZ)= 322.5316  WIDTH(MHZ)= 16.44444  SKEW(MHZ)= 309.4956
 L(DB)     LO(MHZ)      HI(MHZ)     CTR(MHZ)     WID(MHZ) AV-CTR(MHZ) AV-WID(MHZ)  AV-SL(DB)  LOX(MHZ)     HIX(MHZ)
 -0.21    334.36154    334.36154    334.36154     0.00000   334.36154     0.00000      0.00   334.36154    334.36154
  0.50    328.59302    335.73032    332.16168     7.13730   332.24985     7.12029    -20.60   308.67282    335.73032
  1.00    328.47141    335.83728    332.15436     7.36588   332.15714     7.30530    -20.70   308.53323    335.83728
  2.00    328.32574    335.98495    332.15533     7.65921   332.16180     7.60820    -20.85   308.36609    335.98495
  3.00    328.22571    336.09116    332.15845     7.86545   332.21613     7.71510    -20.91   308.24689    336.09116
  4.00    328.14706    336.17654    332.16180     8.02948   332.16965     7.80480    -20.96   308.16571    336.17654
  5.00    328.07941    336.24823    332.16382     8.16882   332.16965     7.80480    -20.96   308.09970    336.24823
  6.00    328.02011    336.30554    332.16284     8.28543   332.19928     7.86129    -20.99   308.03372    336.30554
 10.00    327.83313    336.49783    332.16547     8.66470   332.18872     7.92302    -21.02   307.82516    336.49783
 20.00    327.54736    336.79831    332.17285     9.25095   332.18356     7.94334    -21.03   307.51749    336.79831
 30.00    327.33295    337.03369    332.18332     9.70074   332.18378     7.94422    -21.03   307.31543    337.03369
 40.00    327.26813    337.20847    332.23828     9.94034   332.18384     7.94431    -21.03   307.15579    337.20847
BAND(MHZ)      1.000    303.000   342.000  1000.000
LMIN(DB)           52.41     -0.21     44.39
LMAX(DB)          103.67     61.02     63.24
LDEL(DB)           51.26     61.22     18.85
PMIN(DEG)       -7552.33  -7642.31  -5835.55
PMAX(DEG)       -5476.81   7298.44   7248.83
PDEL(DEG)        2075.51  14940.75  13084.38
FILE: 3ER8B06A.DAT  Out-of-band Rejection: PEAK= 44.4 dB  WIDTH=   0.000 MHz
```

PHONON CORPORATION

```
FILE=3FR8B06A.DAT  14:50:15  05-12-1998
PN_100832_825 FINAL_FUNCTIONAL TEMP:R FLIGHT6_3FUNCT /N DUAL_SXX
05-12-1998 HP8753,SSREF,SSREF
FREQUENCY(MHZ): CENTER= 322.2   WIDTH= 60   INCR.= .1   SYSTEM BANDWIDTH= 60
REFERENCES: LOSS(DB)= 29.01741   PHASE(DEG)=-10958.83   DELAY(US)= 1.17228   SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= 23.46757   PHASE(DEG)= 1677.553
PLOT SCALES: LOSS 10 DB/DIV  VS.  FREQ 6 MHZ/DIV
```



```
PEAK: LEVEL(DB)= 28.8065  FREQ(MHZ)= 335.2218  DELAY(US)=-.3063913  SIDELOBE(DB)=-42.93839
ENERGY: LEVEL(DB)= 29.20428  CENTER(MHZ)= 322.28  WIDTH(MHZ)= 16.42383  SKEW(MHZ)=-.1680302
 L(DB)     LO(MHZ)     HI(MHZ)     CTR(MHZ)     WID(MHZ) AV-CTR(MHZ) AV-WID(MHZ)  AV-SL(DB)  LOX(MHZ)    HIX(MHZ)
 -0.21    335.22183   335.22183   335.22183     0.00000   335.22183     0.00000      0.00   335.22183   335.22183
  0.50    328.59567   335.72403   332.15985     7.12836   332.17743     7.22685     -7.94   308.68509   335.72403
  1.00    328.47031   335.83157   332.15094     7.36127   332.17691     7.39104     -8.01   308.53436   335.83157
  2.00    328.33478   335.99283   332.16382     7.65805   332.17685     7.53662     -8.06   308.36780   335.99283
  3.00    328.23132   336.08945   332.16040     7.85812   332.17822     7.65749     -8.11   308.24918   336.08945
  4.00    328.14493   336.16824   332.15659     8.02332   332.17917     7.75265     -8.15   308.16333   336.16824
  5.00    328.07480   336.24350   332.15915     8.16870   332.17975     7.82341     -8.17   308.09033   336.24350
  6.00    328.01663   336.31067   332.16364     8.29404   332.19345     7.84955     -8.18   308.02908   336.31067
 10.00    327.84067   336.49765   332.16916     8.65698   332.18271     7.90401     -8.18   307.82483   336.49765
 20.00    327.54904   336.81512   332.18207     9.26608   332.18555     7.93696     -8.14   307.51355   336.81512
 30.00    327.31494   337.00949   332.16223     9.69455   332.18533     7.93822     -8.11   307.31982   337.00949
 40.00    327.19772   337.20178   332.19977    10.00406   332.18533     7.93837     -8.08   307.15482   337.20178
BAND(MHZ)    309.200    315.200    329.200    335.200
LMIN(DB)           -0.14      -0.11      -0.20
LMAX(DB)            0.18      55.30       0.16
LDEL(DB)            0.32      55.41       0.36
PMIN(DEG)       -1097.23   -2168.51   -2066.56
PMAX(DEG)        2121.11    2127.53    1081.50
PDEL(DEG)        3218.34    4296.03    3148.06
FILE: 3FR8B06A.DAT  Out-of-band Rejection: PEAK= 42.7 dB  WIDTH=   0.000 MHz
```

```
PHONON CORPORATION
FILE: 3FR8B06A.DAT (+SSCF)
PN_100832_825 FINAL_FUNCTIONAL TEMP:R FLIGHT6_3FUNCT /N DUAL_SXX
05-12-1998 HP8753,SSREF,SSREF,SSCF
REFERENCES: LOSS(DB)=  29.01741  PHASE(DEG)= -10958.83
            DELAY(US)=  1.17228  SLOPE(US/MHZ)=  0

BANDPASS CHARACTERISTICS MEASUREMENT
FREQUENCY(MHZ)       LOSS(DB)      PHASE(DEG)
-------------------------------------------------
  304.600             52.53         2294.91
  306.360             52.49         3042.72
  308.120              4.55         2766.17
  309.880              0.13         1804.16
  311.640              0.12          845.21
  313.400             -0.02         -113.16
  315.160             -0.05        -1075.30
  316.920             26.61        -2032.66
  318.680             46.70        -1518.77
  320.440             46.14         -779.33
  322.200             46.81          -34.07
  323.960             46.20          697.90
  325.720             44.52         1428.58
  327.480             23.27         2008.18
  329.240             -0.09         1060.29
  331.000              0.01          120.60
  332.760             -0.07         -817.63
  334.520             -0.18        -1756.56
  336.280              5.52        -2694.77
  338.040             46.94        -2764.92
  339.800             45.24        -2027.58
-------------------------------------------------
```

ELECTRICAL TEST DATA SHEET

AEROJET PART: 1331576-3 PHONON PART: 100825 SERIAL: B06
TESTED BY: 210 TITLE: test tech DATE: 5/12/98 TIME: 11:00 am
TEST: FINAL FUNCTIONAL
EQUIPMENT: HP 8753D SERIAL: 3410A04374 CAL DUE: 1/29/99
HP 3478A SERIAL: 2136A03127 CAL DUE: 7/7/98

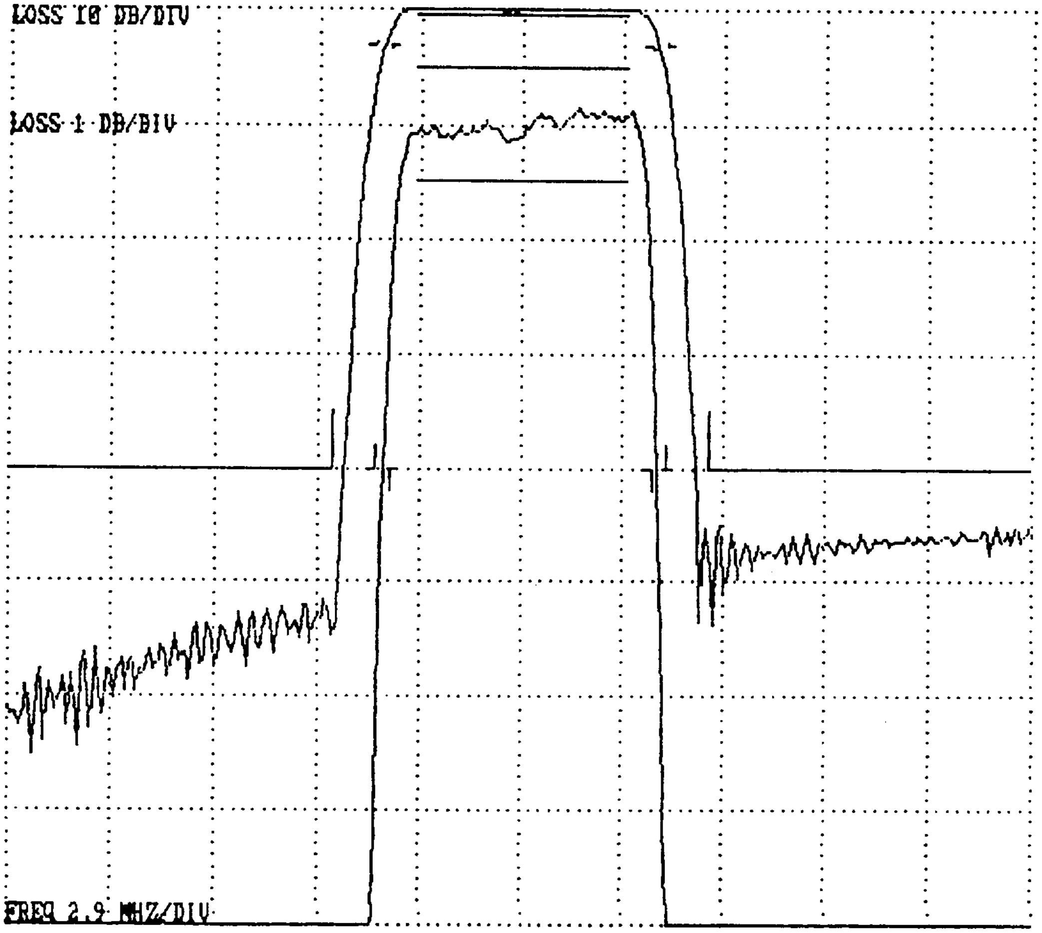
PARAGRAPH		REQUIREMENT TITLE		DATA		P/F
REQ.	Q/ATP					
3.2.1.1	5.2.1	OPERATING TEMPERATURE		35.5	C	P
3.2.1.3	5.2.3	CENTER FREQUENCY &				
3.2.1.4		CENTER FREQUENCY STABILITY				
		LO: 312.035/312.365 MHz		312.165	MHz	P
		HI: 332.035/332.365 MHz		332.164	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:				
		LO: 7.8/8.0 MHz		7.824	MHz	P
		HI: 7.8/8.0 MHz		7.854	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY				
		LO: /0.5 dB		0.2	dB	P
		HI: /0.5 dB		0.2	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE				
		309.2-315.2 MHz: /1.0 dB		0.3	dB	P
		329.2-335.2 MHz: /1.0 dB		0.3	dB	P
3.2.1.8	5.2.7	INSERTION LOSS				
		LO: 27.8/30.2 dB		29.2	dB	P
		HI: 27.8/30.2 dB		29.2	dB	P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION				
		LO: -0.4/0.4 dB		0.2	dB	P
		HI: -0.4/0.4 dB		0.2	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE				
		LO,HI: /0.5 dB		0.0	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION				
		BAND	PEAK(dB)	WIDTH(MHz)		
		WIDE: 1-303,342-1000 MHz:	43.8	0.000		
		DUAL: 303.000-306.835,				
		317.565-326.835,				
		337.565-342.00 MHz:	42.9	0.000		
		PEAK: 35.0/ dB	42.9 dB			P
		WIDTH: /1.6 MHz		0.000	MHz	P
3.2.1.12	5.2.11	SHAPE FACTOR				
		LO: /1.30 Unitless		1.28	Unitless	P
		HI: /1.30 Unitless		1.27	Unitless	P
3.2.1.14	5.2.12	VSWR (RETURN LOSS)				
		309.2-315.2,329.2-335.2 MHz				
		DUAL S11: 7.5/ dB		10.7	dB	P
		DUAL S22: 7.5/ dB		10.2	dB	P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS				
		CENTER FREQUENCY: -0.1/0.1 MHz		0	MHz	P
		3 dB BANDWIDTH: -0.16/0.16 MHz		0	MHz	P
		INSERTION LOSS: -0.5/0.5 dB		0	dB	P
NONE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)		P DP		

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 6Y858
TEL: 203-651-0211
FAX: 203-651-8618

PHONON CORPORATION

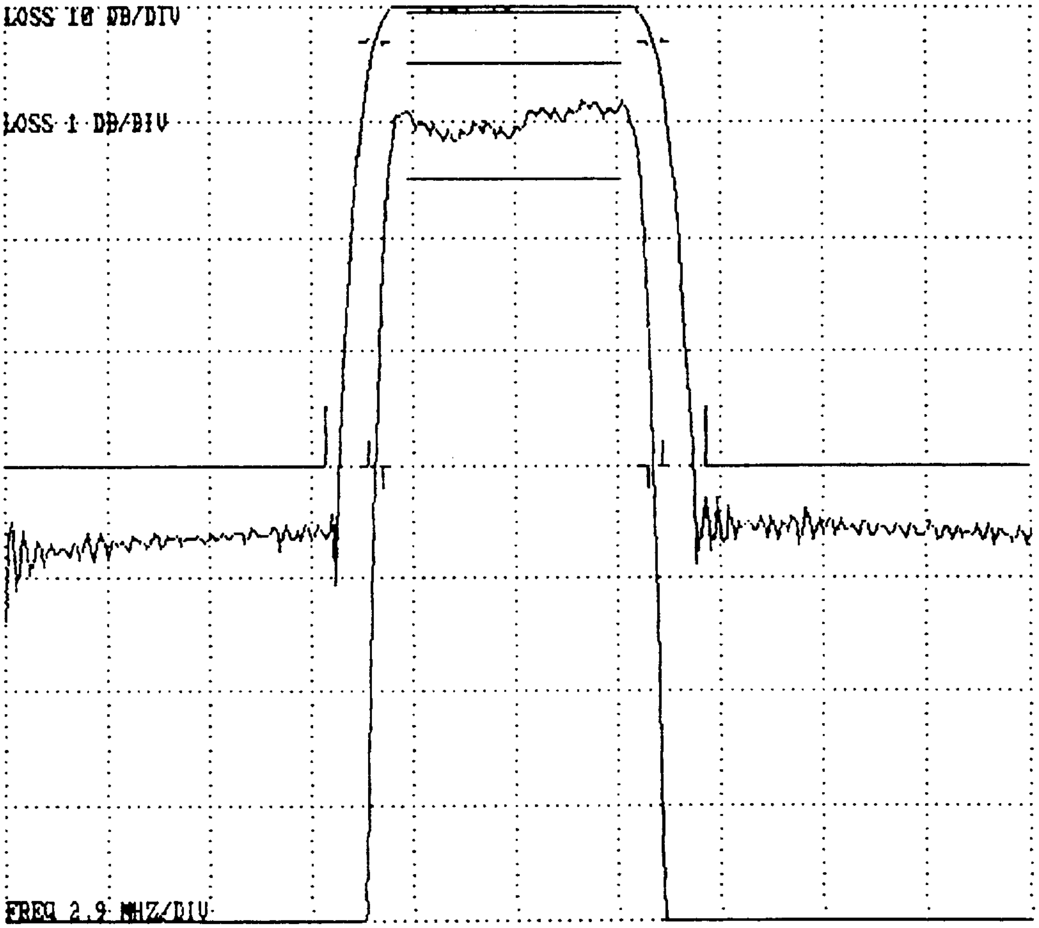
```
FILE=3AH8B06A.DAT  15:03:03  05-12-1998
PN_100832_825 FINAL_FUNCTIONAL TEMP:H FLIGHT6_3FUNCT /N DUAL_SXX
05-12-1998 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 312.2   WIDTH= 29   INCR.= .1   SYSTEM BANDWIDTH= 6
REFERENCES: LOSS(DB)= 29.19427   PHASE(DEG)=-5345.849   DELAY(US)= 0   SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= 8.059902E-02   PHASE(DEG)= 1647.017
PLOT SCALES: LOSS 10 DB/DIV  LOSS 1 DB/DIV  VS.  FREQ 2.9 MHZ/DIV
```



```
PEAK: LEVEL(DB)= 29.02553  FREQ(MHZ)= 313.8011  DELAY(US)=-2.691813  SIDELOBE(DB)=-45.20214
ENERGY: LEVEL(DB)= 29.39207  CENTER(MHZ)= 312.1943  WIDTH(MHZ)= 8.200588  SKEW(MHZ)=-4.543471E-02
 L(DB)    LO(MHZ)     HI(MHZ)    CTR(MHZ)     WID(MHZ) AV-CTR(MHZ) AV-WID(MHZ)  AV-SL(DB)  LOX(MHZ)     HIX(MHZ)
 -0.17   313.80109   313.80109   313.80109     0.00000  313.80109     0.00000       0.00   313.80109   313.80109
  0.50   308.67880   315.71707   312.19794     7.03827  312.22708     7.07033     -14.60   308.67880   315.71707
  1.00   308.53601   315.82318   312.17960     7.28717  312.22485     7.23696     -15.62   308.53601   315.82318
  2.00   308.36972   315.97757   312.17365     7.60785  312.18784     7.45133     -17.48   308.36972   315.97757
  3.00   308.25259   316.07651   312.16455     7.82391  312.18979     7.56713     -18.99   308.25259   316.07651
  4.00   308.16721   316.15524   312.16122     7.98804  312.19098     7.65855     -20.77   308.16721   316.15524
  5.00   308.09436   316.22638   312.16037     8.13202  312.19183     7.72545     -22.80   308.09436   316.22638
  6.00   308.03342   316.28970   312.16156     8.25629  312.19183     7.72545     -22.77   308.03342   316.28970
 10.00   307.82996   316.48294   312.15643     8.65298  312.19330     7.80187     -27.84   307.82996   316.48294
 20.00   307.51816   316.80078   312.15948     9.28262  312.19452     7.83359     -40.19   307.51816   316.80078
 30.00   307.32657   316.98343   312.15500     9.65686  312.19400     7.83505     -46.43   307.32657   316.98343
 40.00   307.15808   317.19846   312.17828    10.04037  312.19403     7.83524     -48.86   307.15808   317.19846
BAND(MHZ)    309.200   315.200
LMIN(DB)          -0.17
LMAX(DB)           0.15
LDEL(DB)           0.32
PMIN(DEG)      -2806.20
PMAX(DEG)       2901.34
PDEL(DEG)       5707.54
```

PHONON CORPORATION

```
FILE=3CH8B06A.DAT  15:03:58  05-12-1998
PN_100832_825 FINAL_FUNCTIONAL TEMP:H FLIGHT6_3FUNCT /N DUAL_SXX
05-12-1998 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 332.2   WIDTH= 29   INCR.= .1   SYSTEM BANDWIDTH= 6
REFERENCES: LOSS(DB)= 29.15387   PHASE(DEG)=-15207.19   DELAY(US)= 0   SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= 9.613725E-02   PHASE(DEG)= 1626.906
PLOT SCALES: LOSS 10 DB/DIV  LOSS 1 DB/DIV  VS.  FREQ 2.9 MHZ/DIV
```



```
PEAK: LEVEL(DB)= 28.96626  FREQ(MHZ)= 334.126  DELAY(US)=-2.647151  SIDELOBE(DB)=-43.14718
ENERGY: LEVEL(DB)= 29.3311  CENTER(MHZ)= 332.1887  WIDTH(MHZ)= 8.223755  SKEW(MHZ)=-4.503227E-02
 L(DB)    LO(MHZ)     HI(MHZ)     CTR(MHZ)     WID(MHZ) AV-CTR(MHZ) AV-WID(MHZ)  AV-SL(DB)  LOX(MHZ)     HIX(MHZ)
 -0.19   334.12601   334.12601   334.12601     0.00000   334.12601     0.00000     0.00    334.12601    334.12601
  0.50   328.60614   335.72177   332.16394     7.11563   332.22229     7.09874   -14.41    328.60614    335.72177
  1.00   328.48059   335.83081   332.15570     7.35022   332.17746     7.35081   -16.02    328.48059    335.83081
  2.00   328.34140   335.99310   332.16724     7.65170   332.17780     7.49510   -17.30    328.34140    335.99310
  3.00   328.23700   336.09128   332.16412     7.85428   332.17957     7.61522   -18.81    328.23700    336.09128
  4.00   328.15027   336.16980   332.16003     8.01953   332.18097     7.70997   -20.57    328.15027    336.16980
  5.00   328.08011   336.24481   332.16248     8.16470   332.18192     7.78029   -22.62    328.08011    336.24481
  6.00   328.02237   336.31189   332.16711     8.28952   332.19577     7.80654   -23.72    328.02237    336.31189
 10.00   327.84506   336.50076   332.17291     8.65570   332.19107     7.87024   -29.18    327.84506    336.50076
 20.00   327.55356   336.81854   332.18604     9.26498   332.18881     7.89305   -40.26    327.55356    336.81854
 30.00   327.31912   337.00885   332.16400     9.68973   332.18866     7.89430   -44.99    327.31912    337.00885
 40.00   327.20779   337.20828   332.20804    10.00049   332.18863     7.89444   -46.03    327.20779    337.20828
BAND(MHZ)    329.200   335.200
LMIN(DB)          -0.18
LMAX(DB)           0.17
LDEL(DB)           0.35
PMIN(DEG)      -2771.28
PMAX(DEG)       2866.59
PDEL(DEG)       5637.87
```

Report No. 11413
February, 1999

Channel 14 Bandpass Filter

SAW Filter (S/N: 1331576-4, S/N: B07)

ELECTRICAL TEST DATA SHEET

AEROJET PART: 1331576-4 PHONON PART: 100826 SERIAL: B07
TESTED BY: 210 TITLE: test tech DATE: 5/12/99 TIME: 11:00 AM
TEST: FINAL FUNCTIONAL
EQUIPMENT: HP 8753D SERIAL: 3410A04374 CAL DUE: 1/29/99
HP 3478A SERIAL: 2136A03127 CAL DUE: 7/7/98

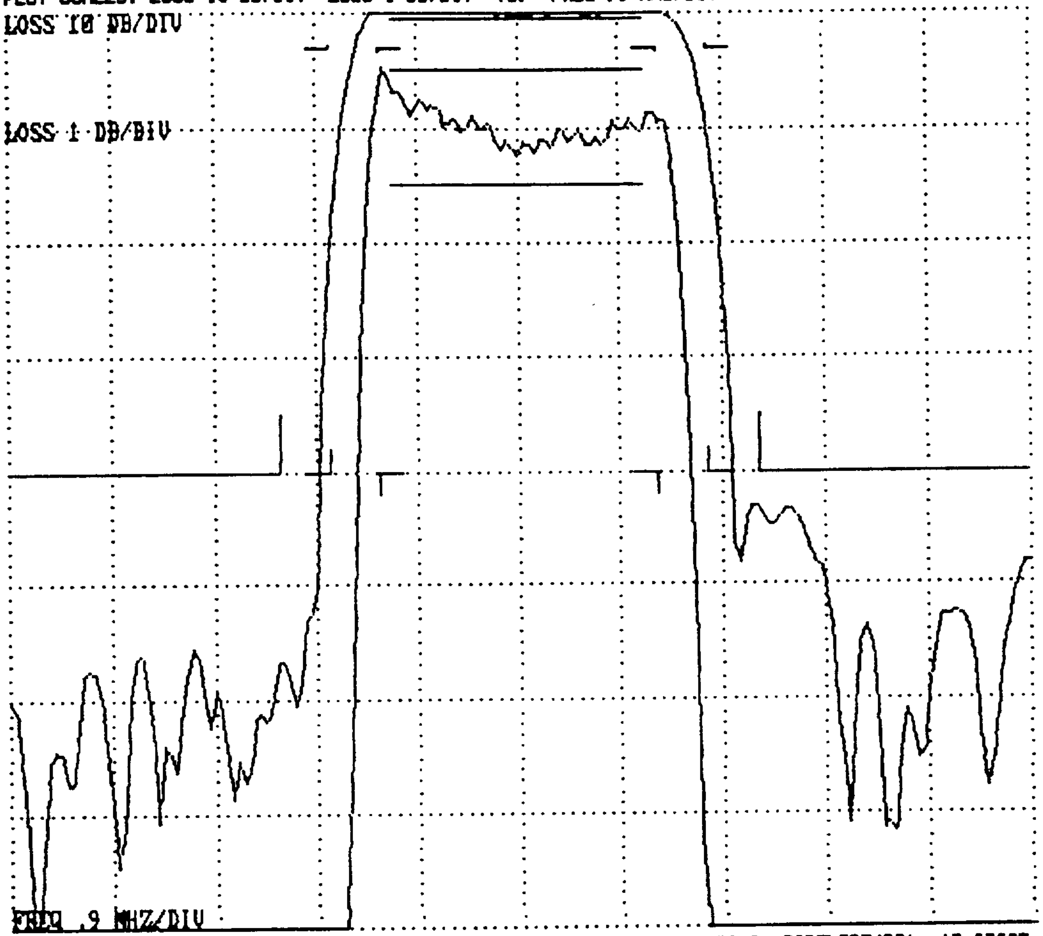
PARAGRAPH		REQUIREMENT TITLE		DATA		P/F
REQ.	Q/ATP					
3.2.1.1	5.2.1	OPERATING TEMPERATURE		-5.4	C	P
3.2.1.3	5.2.3	CENTER FREQUENCY &				
3.2.1.4		CENTER FREQUENCY STABILITY				
		LO: 317.535/317.865 MHz		317.739	MHz	P
		HI: 326.535/326.865 MHz		326.726	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:				
		LO: 2.8/3.0 MHz		2.949	MHz	P
		HI: 2.8/3.0 MHz		2.955	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY				
		LO: /0.5 dB		0.1	dB	P
		HI: /0.5 dB		0.4	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE				
		316.575-318.825 MHz: /1.0 dB		0.5	dB	P
		325.575-327.825 MHz: /1.0 dB		0.6	dB	P
3.2.1.8	5.2.7	INSERTION LOSS				
		LO: 27.8/30.2 dB		28.3	dB	P
		HI: 27.8/30.2 dB		28.4	dB	P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION				
		LO: -0.4/0.4 dB		-0.2	dB	P
		HI: -0.4/0.4 dB		-0.2	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE				
		LO,HI: /0.5 dB		0.1	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION				
		BAND	PEAK(dB)	WIDTH(MHz)		
		WIDE: 1-313,331-1000 MHz:	46.2	0.000		
		DUAL: 313.000-315.585, 319.815-324.585, 328.815-331.0 MHz:	41.2	0.000		
		PEAK: 35.0/ dB	41.2 dB			P
		WIDTH: /0.6 MHz		0.000	MHz	P
3.2.1.12	5.2.11	SHAPE FACTOR				
		LO: /1.30 Unitless		1.24	Unitless	P
		HI: /1.30 Unitless		1.25	Unitless	P
3.2.1.14	5.2.12	VSWR (RETURN LOSS)				
		316.575-318.825,325.575-327.825 MHz				
		DUAL S11: 7.5/ dB		10.1	dB	P
		DUAL S22: 7.5/ dB		10.6	dB	P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS				
		CENTER FREQUENCY: -0.1/0.1 MHz		0	MHz	P
		3 dB BANDWIDTH: -0.06/0.06 MHz		0	MHz	P
		INSERTION LOSS: -0.5/0.5 dB		0	dB	P
NONE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)		P QP		

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 6Y858
TEL: 203-651-0211
FAX: 203-651-8618

PHONON CORPORATION

FILE=4AC8B07A.DAT 14:36:31 05-12-1998
PN_100834_026 FINAL_FUNCTIONAL TEMP:C FLIGHT6_3FUNCT /N DUAL_SXX
05-12-1998 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 317.7 WIDTH= 9 INCR.= .05 SYSTEM BANDWIDTH= 2.25
REFERENCES: LOSS(DB)= 28.32325 PHASE(DEG)=-34837.23 DELAY(US)= 0 SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .1399004 PHASE(DEG)= 743.4576
PLOT SCALES: LOSS 10 DB/DIV LOSS 1 DB/DIV VS. FREQ .9 MHZ/DIV



PEAK: LEVEL(DB)= 27.78894 FREQ(MHZ)= 316.5139 DELAY(US)=-3.117018 SIDELOBE(DB)=-43.63625
ENERGY: LEVEL(DB)= 28.45176 CENTER(MHZ)= 317.7242 WIDTH(MHZ)= 3.07466 SKEW(MHZ)= .0260149

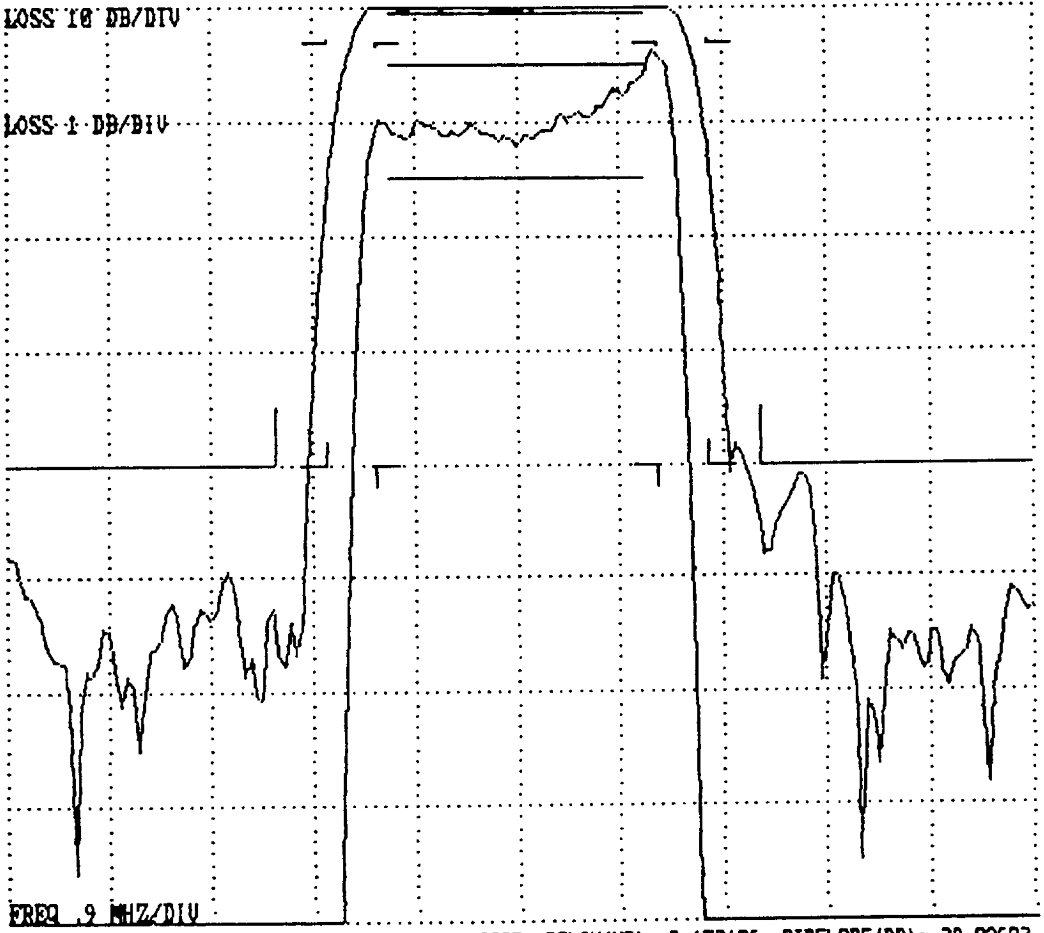
L(DB)	LO(MHZ)	HI(MHZ)	CTR(MHZ)	WID(MHZ)	AV-CTR(MHZ)	AV-WID(MHZ)	AV-SL(DB)	LOX(MHZ)	HIX(MHZ)
-0.53	316.51389	316.51389	316.51389	0.00000	316.51389	0.00000	0.00	316.51389	316.51389
0.50	316.36353	319.07782	317.72067	2.71429	317.70914	2.71757	-13.75	316.36353	319.07782
1.00	316.33813	319.12003	317.72906	2.78189	317.70947	2.80199	-15.35	316.33813	319.12003
2.00	316.29654	319.17740	317.73697	2.88086	317.71161	2.87010	-17.30	316.29654	319.17740
3.00	316.26450	319.21344	317.73895	2.94894	317.72586	2.89781	-18.45	316.26450	319.21344
4.00	316.23807	319.24423	317.74115	3.00616	317.71463	2.92000	-19.68	316.23807	319.24423
5.00	316.21512	319.27115	317.74313	3.05603	317.72458	2.93906	-21.15	316.21512	319.27115
6.00	316.19522	319.29437	317.74481	3.09915	317.71771	2.95237	-22.61	316.19522	319.29437
10.00	316.13248	319.36554	317.74902	3.23306	317.72394	2.97717	-28.70	316.13248	319.36554
20.00	316.03070	319.47577	317.75323	3.44507	317.72409	2.98449	-40.33	316.03070	319.47577
30.00	315.96542	319.54288	317.75415	3.57745	317.72415	2.98492	-47.70	315.96542	319.54288
40.00	315.93069	319.57837	317.75452	3.64767	317.72415	2.98498	-51.83	315.93069	319.57837

BAND(MHZ)	316.575	318.825
LMIN(DB)	-0.33	
LMAX(DB)	0.24	
LDEL(DB)	0.57	
PMIN(DEG)	-1257.81	
PMAX(DEG)	1259.41	
PDEL(DEG)	2517.22	

File: 4AC8B07A.DAT Passband Symmetry = 0.1 dB

PHONON CORPORATION

```
FILE=4CC8B07A.DAT  14:37:25  05-12-1998
PN_100834_826 FINAL_FUNCTIONAL TEMP:C FLIGHT6_3FUNCT /N DUAL_SXX
05-12-1998 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 326.7   WIDTH= 9   INCR.= .05   SYSTEM BANDWIDTH= 2.25
REFERENCES: LOSS(DB)= 28.41616   PHASE(DEG)=-42626.11   DELAY(US)= 0   SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .1508651   PHASE(DEG)= 742.3995
PLOT SCALES: LOSS 10 DB/DIV  LOSS 1 DB/DIV  VS.  FREQ .9 MHZ/DIV
```



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PEAK: LEVEL(DB)= 27.79443  FREQ(MHZ)= 327.9095  DELAY(US)=-3.173496  SIDELOBE(DB)=-38.92693
ENERGY: LEVEL(DB)= 28.52077  CENTER(MHZ)= 326.7529  WIDTH(MHZ)= 3.07267  SKEW(MHZ)=-4.118835E-02
 L(DB)     LO(MHZ)     HI(MHZ)     CTR(MHZ)     WID(MHZ) AV-CTR(MHZ) AV-WID(MHZ)  AV-SL(DB)  LOX(MHZ)     HIX(MHZ)
 -0.62    327.90952   327.90952   327.90952     0.00000  327.90952     0.00000     0.00   327.90952   327.90952
  0.50    325.37891   328.10413   326.74152     2.72522  326.77692     2.77282   -14.46   325.37891   328.10413
  1.00    325.33890   328.13141   326.73517     2.79251  326.75586     2.81434   -15.29   325.33890   328.13141
  2.00    325.28555   328.17224   326.72888     2.88669  326.75613     2.88442   -17.29   325.28555   328.17224
  3.00    325.24829   328.20340   326.72583     2.95511  326.75580     2.93555   -19.79   325.24829   328.20340
  4.00    325.21838   328.22894   326.72366     3.01056  326.75580     2.93555   -19.75   325.21838   328.22894
  5.00    325.19339   328.25104   326.72223     3.05765  326.75500     2.96841   -22.84   325.19339   328.25104
  6.00    325.17160   328.27087   326.72125     3.09927  326.75500     2.96841   -22.81   325.17160   328.27087
 10.00    325.10297   328.33386   326.71841     3.23090  326.75421     2.98665   -26.55   325.10297   328.33386
 20.00    324.99121   328.43369   326.71246     3.44247  326.75278     2.99897   -39.90   324.99121   328.43369
 30.00    324.91660   328.49176   326.70416     3.57516  326.75284     2.99942   -46.31   324.91660   328.49176
 40.00    324.86041   328.54584   326.70313     3.68542  326.75287     2.99948   -49.10   324.86041   328.67215
BAND(MHZ)     325.575    327.825
LMIN(DB)           -0.40
LMAX(DB)            0.21
LDEL(DB)            0.61
PMIN(DEG)       -1261.72
PMAX(DEG)        1253.30
PDEL(DEG)        2515.02
File: 4CC8B07A.DAT     Passband Symmetry =  0.4 dB
```

ELECTRICAL TEST DATA SHEET

AEROJET PART: 1331576-4 PHONON PART: 100826 SERIAL: B07
TESTED BY: 210 TITLE: test tech DATE: 5/12/98 TIME: 11:21AM
TEST: FINAL FUNCTIONAL
EQUIPMENT: HP 8753D SERIAL: 3410A04374 CAL DUE: 1/29/99
HP 3478A SERIAL: 2136A03127 CAL DUE: 7/7/98

PARAGRAPH		REQUIREMENT TITLE		DATA		P/F
REQ.	Q/ATP					
3.2.1.1	5.2.1	OPERATING TEMPERATURE		14.9	C	P
3.2.1.3	5.2.3	CENTER FREQUENCY &				
3.2.1.4		CENTER FREQUENCY STABILITY				
		LO: 317.535/317.865 MHz		317.749	MHz	P
		HI: 326.535/326.865 MHz		326.734	MHz	P
3.2.1.5	5.2.4	3 dB BANDWIDTH:				
		LO: 2.8/3.0 MHz		2.949	MHz	P
		HI: 2.8/3.0 MHz		2.956	MHz	P
3.2.1.6	5.2.5	PASSBAND SYMMETRY				
		LO: /0.5 dB		0.1	dB	P
		HI: /0.5 dB		0.3	dB	P
3.2.1.7	5.2.6	PASSBAND RIPPLE				
		316.575-318.825 MHz: /1.0 dB		0.6	dB	P
		325.575-327.825 MHz: /1.0 dB		0.5	dB	P
3.2.1.8	5.2.7	INSERTION LOSS				
		LO: 27.8/30.2 dB		28.5	dB	P
		HI: 27.8/30.2 dB		28.6	dB	P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION				
		LO: -0.4/0.4 dB		0.0	dB	P
		HI: -0.4/0.4 dB		0.0	dB	P
3.2.1.10	5.2.9	AMPLITUDE BALANCE				
		LO,HI: /0.5 dB		0.1	dB	P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION				
		BAND	PEAK(dB)	WIDTH(MHz)		
		WIDE: 1-313,331-1000 MHz:	45.8	0.000		
		DUAL: 313.000-315.585, 319.815-324.585, 328.815-331.0 MHz:	41.5	0.000		
		PEAK: 35.0/ dB	41.5 dB			P
		WIDTH: /0.6 MHz		0.000	MHz	P
3.2.1.12	5.2.11	SHAPE FACTOR				
		LO: /1.30 Unitless		1.24	Unitless	P
		HI: /1.30 Unitless		1.24	Unitless	P
3.2.1.14	5.2.12	VSWR (RETURN LOSS) 316.575-318.825,325.575-327.825 MHz				
		DUAL S11: 7.5/ dB		9.8	dB	P
		DUAL S22: 7.5/ dB		10.7	dB	P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS				
		CENTER FREQUENCY: -0.1/0.1 MHz		+0.001	MHz	P
		3 dB BANDWIDTH: -0.06/0.06 MHz		+0.001	MHz	P
		INSERTION LOSS: -0.5/0.5 dB		-0.1	dB	P
NONE	5.2.15	DATA SHEET SUMMARY (PASS/FAIL)		P DP		

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 6Y858
TEL: 203-651-0211
FAX: 203-651-8618

PHONON CORPORATION

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FILE=4AR8B07A.DAT  14:51:36  05-12-1998
PN_100834_826 FINAL_FUNCTIONAL TEMP:R FLIGHT6_3FUNCT /N DUAL_SXX
05-12-1998 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 317.7   WIDTH= 9   INCR.= .05   SYSTEM BANDWIDTH= 2.25
REFERENCES: LOSS(DB)= 28.53073   PHASE(DEG)=-13974.78   DELAY(US)= 0   SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .1477551   PHASE(DEG)= 743.5222
PLOT SCALES: LOSS 10 DB/DIV  LOSS 1 DB/DIV  VS.  FREQ .9 MHZ/DIV
```

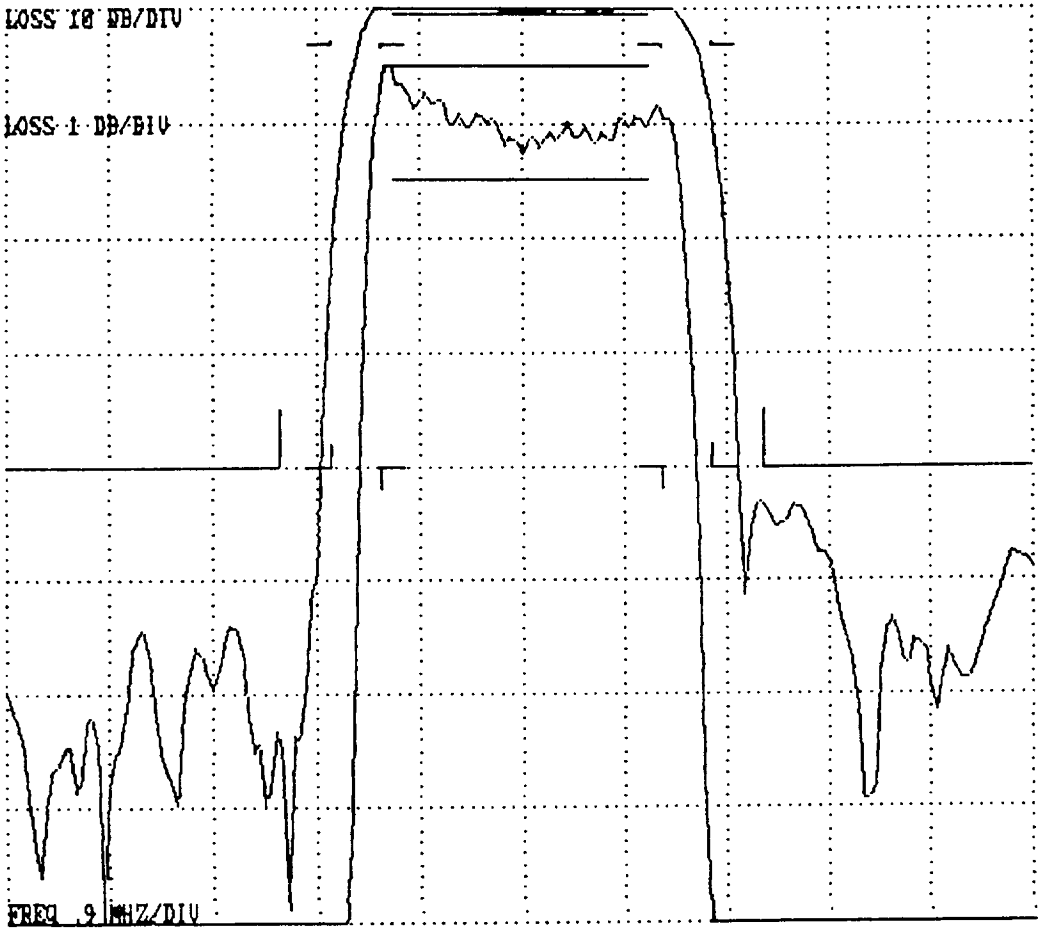

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PEAK: LEVEL(DB)= 27.99149  FREQ(MHZ)= 316.5255  DELAY(US)=-3.117981  SIDELOBE(DB)=-43.67954
ENERGY: LEVEL(DB)= 28.65812  CENTER(MHZ)= 317.7325  WIDTH(MHZ)= 3.074391  SKEW(MHZ)= 2.849905E-02
 L(DB)    LO(MHZ)     HI(MHZ)     CTR(MHZ)     WID(MHZ) AV-CTR(MHZ) AV-WID(MHZ)  AV-SL(DB)  LOX(MHZ)     HIX(MHZ)
 -0.54   316.52551   316.52551   316.52551     0.00000   316.52551    0.00000     0.00    316.52551    316.52551
  0.50   316.37161   319.08722   317.72943     2.71561   317.70813    2.71781   -13.74    316.37161    319.08722
  1.00   316.34555   319.12982   317.73767     2.78427   317.70984    2.80181   -15.33    316.34555    319.12982
  2.00   316.30688   319.18744   317.74716     2.88055   317.72864    2.83888   -16.24    316.30688    319.18744
  3.00   316.27438   319.22330   317.74884     2.94891   317.72870    2.89864   -18.46    316.27438    319.22330
  4.00   316.24802   319.25540   317.75171     3.00739   317.72925    2.93973   -21.20    316.24802    319.25540
  5.00   316.22546   319.28186   317.75366     3.05640   317.72925    2.93973   -21.17    316.22546    319.28186
  6.00   316.20569   319.30487   317.75528     3.09918   317.73627    2.95295   -22.62    316.20569    319.30487
 10.00   316.14359   319.37637   317.75998     3.23279   317.73123    2.97755   -28.63    316.14359    319.37637
 20.00   316.04285   319.48712   317.76498     3.44427   317.73233    2.98495   -39.87    316.04285    319.48712
 30.00   315.97943   319.55359   317.76651     3.57416   317.73251    2.98547   -50.11    315.97943    319.55359
 40.00   315.93561   319.59668   317.76614     3.66107   317.73251    2.98548   -51.13    315.93561    319.59668
BAND(MHZ)    316.575   318.825
LMIN(DB)           -0.35
LMAX(DB)            0.26
LDEL(DB)            0.61
PMIN(DEG)      -1257.60
PMAX(DEG)       1259.66
PDEL(DEG)       2517.25
File: 4AR8B07A.DAT     Passband Symmetry =  0.1 dB
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PHONON CORPORATION

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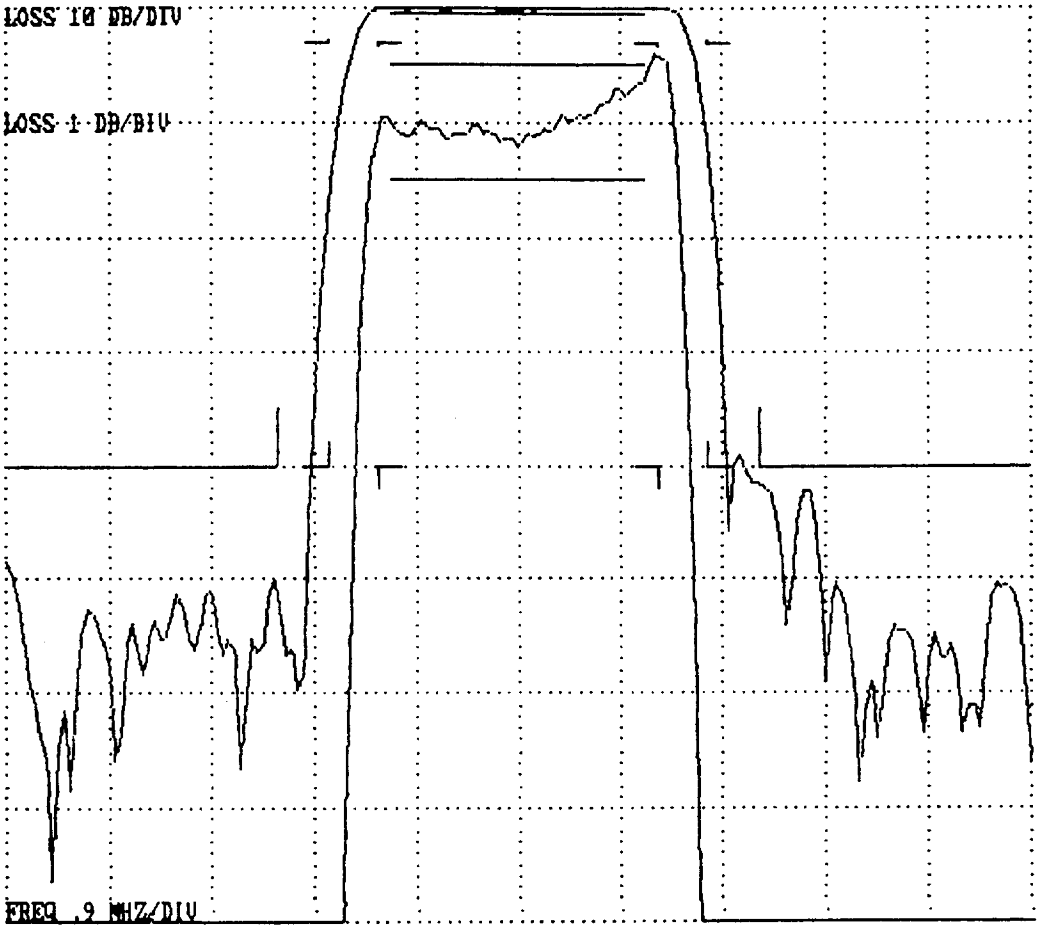
FILE=4CR8B07A.DAT  14:52:39  05-12-1998
PN_100834_826 FINAL_FUNCTIONAL TEMP:R FLIGHT6_3FUNCT /N DUAL_SXX
05-12-1998 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 326.7   WIDTH= 9   INCR.= .05   SYSTEM BANDWIDTH= 2.25
REFERENCES: LOSS(DB)= 28.62934   PHASE(DEG)=-22125.69   DELAY(US)= 0   SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .1420983   PHASE(DEG)= 742.4323
PLOT SCALES: LOSS 10 DB/DIV  LOSS 1 DB/DIV  VS.  FREQ .9 MHZ/DIV
```



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PEAK: LEVEL(DB)= 28.02169  FREQ(MHZ)= 327.9149  DELAY(US)=-3.180725  SIDELOBE(DB)=-39.7959
ENERGY: LEVEL(DB)= 28.73317  CENTER(MHZ)= 326.7597  WIDTH(MHZ)= 3.073618  SKEW(MHZ)=-3.895556E-02
 L(DB)    LO(MHZ)     HI(MHZ)     CTR(MHZ)      WID(MHZ) AV-CTR(MHZ) AV-WID(MHZ)  AV-SL(DB)  LOX(MHZ)     HIX(MHZ)
 -0.61   327.91489   327.91489   327.91489     0.00000   327.91489     0.00000     0.00    327.91489   327.91489
  0.50   325.38547   328.11307   326.74927     2.72760   326.77631     2.77421   -14.45    325.38547   328.11307
  1.00   325.34451   328.14026   326.74237     2.79575   326.75577     2.81469   -15.26    325.34451   328.14026
  2.00   325.29358   328.18130   326.73743     2.88773   326.75757     2.88518   -17.26    325.29358   328.18130
  3.00   325.25641   328.21228   326.73434     2.95587   326.77127     2.91283   -18.40    325.25641   328.21228
  4.00   325.22690   328.23770   326.73230     3.01080   326.75888     2.93675   -19.73    325.22690   328.23770
  5.00   325.20190   328.25980   326.73083     3.05789   326.76773     2.95432   -21.08    325.20190   328.25980
  6.00   325.18021   328.27966   326.72992     3.09946   326.75955     2.96983   -22.81    325.18021   328.27966
 10.00   325.11157   328.34256   326.72705     3.23099   326.75983     2.98816   -26.56    325.11157   328.34256
 20.00   324.99979   328.44257   326.72119     3.44278   326.75949     3.00037   -39.41    324.99979   328.44257
 30.00   324.92542   328.50073   326.71307     3.57532   326.75967     3.00093   -48.37    324.92542   328.50073
 40.00   324.86914   328.53189   326.70050     3.66275   326.75967     3.00095   -49.46    324.86914   328.67825
BAND(MHZ)    325.575   327.825
LMIN(DB)          -0.34
LMAX(DB)           0.21
LDEL(DB)           0.55
PMIN(DEG)      -1261.26
PMAX(DEG)       1253.88
PDEL(DEG)       2515.13
File: 4CR8B07A.DAT     Passband Symmetry =  0.3 dB
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PHONON  CORPORATION
FILE=4ER8B07A.DAT  14:53:36  05-12-1998
PN_100834_826 FINAL_FUNCTIONAL TEMP:R FLIGHT6_3FUNCT /N WIDE_S21
05-12-1998 HP8753,SSREF,SSREF
FREQUENCY(MHZ): CENTER= 500.5   WIDTH= 999   INCR.= .208125   SYSTEM BANDWIDTH= 999
REFERENCES: LOSS(DB)= 28.58003   PHASE(DEG)= 7150.532   DELAY(US)= 4.726672   SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= 7.736833   PHASE(DEG)= 9968.86
PLOT SCALES: LOSS 10 DB/DIV  VS.  FREQ 99.9 MHZ/DIV
```

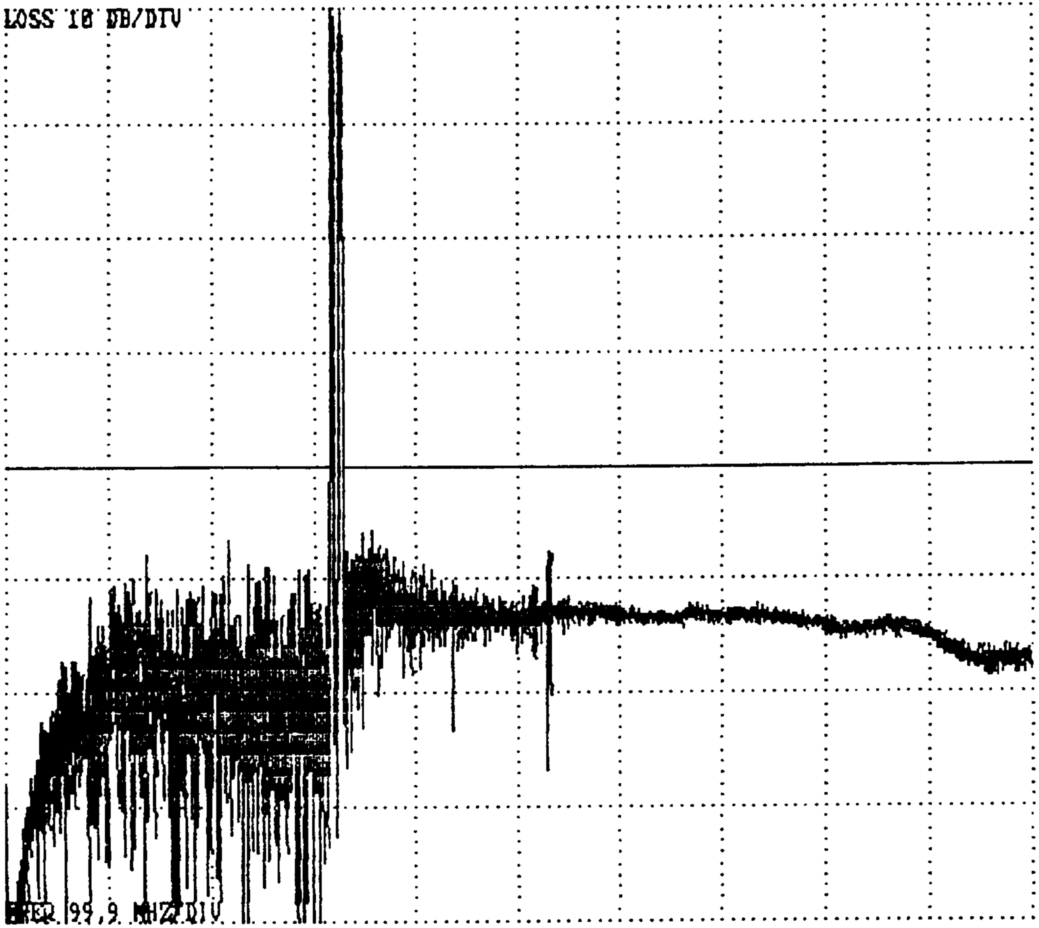

```
PEAK: LEVEL(DB)= 27.7775  FREQ(MHZ)= 316.5941  DELAY(US)= 6.322772  SIDELOBE(DB)=-42.94913
ENERGY: LEVEL(DB)= 28.70038  CENTER(MHZ)= 322.3362  WIDTH(MHZ)= 6.158492  SKEW(MHZ)= 333.9534
 L(DB)    LO(MHZ)    HI(MHZ)    CTR(MHZ)     WID(MHZ) AV-CTR(MHZ) AV-WID(MHZ)  AV-SL(DB)  LOX(MHZ)    HIX(MHZ)
 -0.80   316.59412  316.59412  316.59412     0.00000  316.59412     0.00000     0.00   316.59412  316.59412
  0.50   316.36227  319.09967  317.73096     2.73740  317.74506     2.76235   -24.90   316.59412  328.11877
  1.00   316.33847  319.14319  317.74084     2.80472  317.74506     2.76235   -24.90   316.59412  328.14368
  2.00   316.30469  319.19357  317.74915     2.88889  317.67761     2.89850   -25.08   316.30469  328.17819
  3.00   316.27338  319.22656  317.74997     2.95319  317.73270     3.00564   -25.23   316.27338  328.20721
  4.00   316.24292  319.25906  317.75098     3.01614  317.73270     3.00564   -25.23   316.24292  328.23364
  5.00   316.21674  319.29242  317.75458     3.07568  317.73270     3.00564   -25.23   316.21674  328.25717
  6.00   316.19504  319.32053  317.75778     3.12549  317.73270     3.00564   -25.23   316.19504  328.27802
 10.00   316.13568  319.38940  317.76254     3.25372  317.73270     3.00564   -25.23   316.13568  328.34235
 20.00   316.06494  319.46198  317.76346     3.39703  317.73215     3.02283   -25.26   316.06494  328.43112
 30.00   316.00900  319.51495  317.76196     3.50595  317.73215     3.02283   -25.26   316.00900  328.50574
 40.00   315.95306  319.56796  317.76050     3.61490  317.73215     3.02283   -25.26   315.95306  328.58035
BAND(MHZ)     1.000    313.000    331.000  1000.000
LMIN(DB)          46.67      -0.61      45.77
LMAX(DB)          97.82      73.56      66.73
LDEL(DB)          51.15      74.17      20.96
PMIN(DEG)      -9999.00     610.01   -9999.00
PMAX(DEG)       3885.80    4399.46    4225.90
PDEL(DEG)      13884.80    3789.45   14224.90
FILE: 4ER8B07A.DAT  Out-of-band Rejection: PEAK= 45.8 dB  WIDTH=   0.000 MHz
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PHONON CORPORATION
FILE=4FR8B07A.DAT  14:54:01  05-12-1998
PN_100834_826 FINAL_FUNCTIONAL TEMP:R FLIGHT6_3FUNCT /N DUAL_SXX
05-12-1998 HP8753,SSREF,SSREF
FREQUENCY(MHZ): CENTER= 322.2   WIDTH= 30   INCR.= .05   SYSTEM BANDWIDTH= 30
REFERENCES: LOSS(DB)= 28.58003   PHASE(DEG)=-18374.3   DELAY(US)= 2.346957   SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= 24.29301   PHASE(DEG)= 1053.715
PLOT SCALES: LOSS 10 DB/DIV  VS.  FREQ 3 MHZ/DIV
```

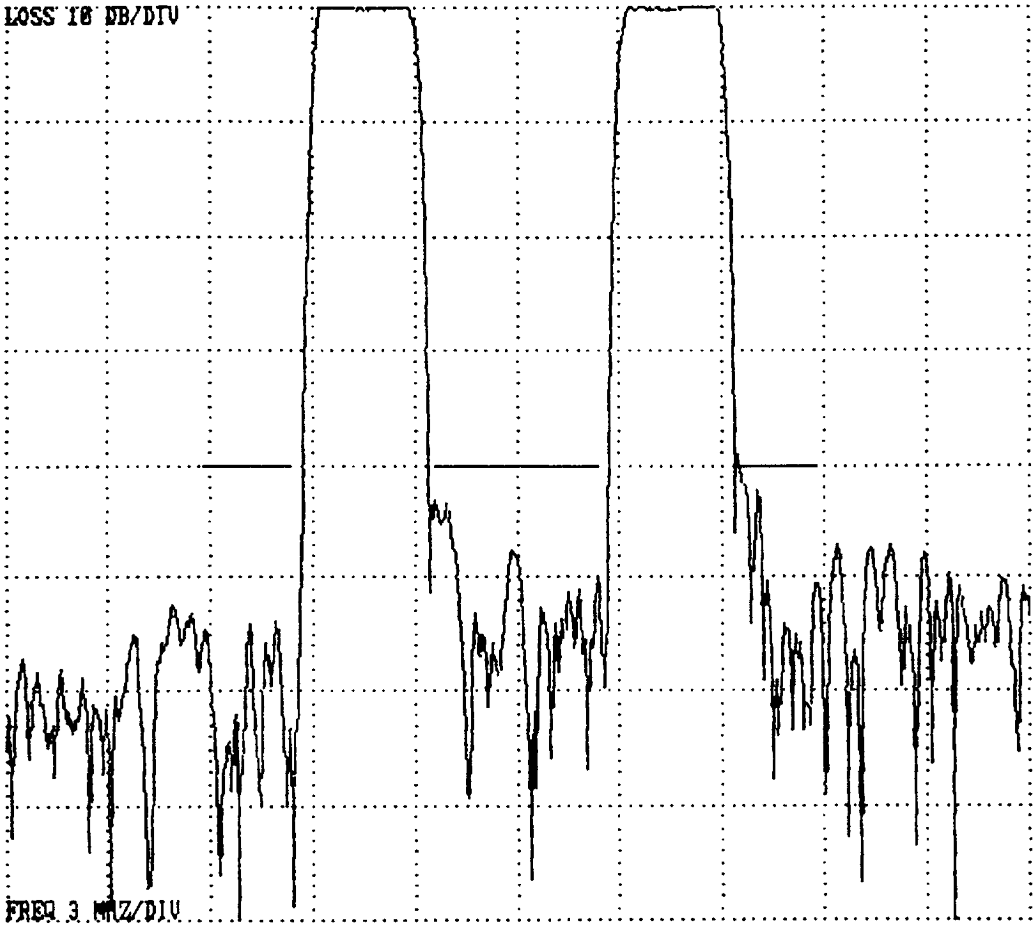

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PEAK: LEVEL(DB)= 27.99147  FREQ(MHZ)= 316.5255  DELAY(US)= 1.575934  SIDELOBE(DB)=-39.82612
ENERGY: LEVEL(DB)= 28.69518  CENTER(MHZ)= 322.2066  WIDTH(MHZ)= 6.147625  SKEW(MHZ)= 7.672201E-02
 L(DB)    LO(MHZ)     HI(MHZ)     CTR(MHZ)     WID(MHZ) AV-CTR(MHZ) AV-WID(MHZ)  AV-SL(DB)  LOX(MHZ)     HIX(MHZ)
 -0.59   316.52548   316.52548   316.52548     0.00000   316.52548     0.00000      0.00   316.52548   316.52548
  0.50   316.36847   319.09195   317.73022     2.72348   317.70813     2.74883     -9.26   316.36847   328.11002
  1.00   316.34363   319.13345   317.73853     2.78983   317.70984     2.83380     -9.37   316.34363   328.13785
  2.00   316.30499   319.18967   317.74731     2.88467   317.72864     2.87129     -9.40   316.30499   328.17953
  3.00   316.27295   319.22491   317.74893     2.95197   317.72867     2.93173     -9.48   316.27295   328.21091
  4.00   316.24683   319.25677   317.75180     3.00995   317.72925     2.97329     -9.53   316.24683   328.23654
  5.00   316.22443   319.28305   317.75372     3.05862   317.72925     2.97329     -9.52   316.22443   328.25876
  6.00   316.20474   319.30594   317.75534     3.10120   317.73627     2.98666     -9.53   316.20474   328.27875
 10.00   316.14291   319.37711   317.76001     3.23419   317.73123     3.01154     -9.55   316.14291   328.34189
 20.00   316.04245   319.48752   317.76498     3.44507   317.73233     3.01902     -9.53   316.04245   328.44220
 30.00   315.97916   319.55380   317.76648     3.57465   317.73248     3.01955     -9.50   315.97916   328.50058
 40.00   315.93542   319.59686   317.76614     3.66144   317.73248     3.01956     -9.49   315.93542   328.67654
BAND(MHZ)    316.575   318.825   325.575   327.825
LMIN(DB)           -0.40     -0.21     -0.29
LMAX(DB)            0.21     76.46      0.26
LDEL(DB)            0.61     76.67      0.55
PMIN(DEG)         269.24   -324.87   -281.18
PMAX(DEG)         927.70    535.77    375.16
PDEL(DEG)         658.46    860.64    656.34
FILE: 4FRBB07A.DAT  Out-of-band Rejection: PEAK= 41.5 dB  WIDTH=   0.000 MHz
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PHONON CORPORATION
FILE: 4FR8B07A.DAT (+SSCF)
PN_100834_826 FINAL_FUNCTIONAL TEMP:R FLIGHT6_3FUNCT /N DUAL_SXX
05-12-1998 HP8753,SSREF,SSREF,SSCF
REFERENCES: LOSS(DB)=  28.58003  PHASE(DEG)= -18374.3
            DELAY(US)=  2.346957  SLOPE(US/MHZ)=  0

BANDPASS CHARACTERISTICS MEASUREMENT
FREQUENCY(MHZ)      LOSS(DB)      PHASE(DEG)
--------------------------------------------
  315.000             59.46         1584.89
  315.720             62.90         1205.10
  316.440             -0.23          971.31
  317.160             -0.13          759.61
  317.880              0.12          543.58
  318.600             -0.09          327.38
  319.320              6.67          123.92
  320.040             44.17          154.74
  320.760             69.24         -177.90
  321.480             56.46         -205.67
  322.200             48.67          -79.31
  322.920             52.61          -59.78
  323.640             53.24           76.77
  324.360             55.19           72.18
  325.080             12.38          511.92
  325.800              0.09          317.25
  326.520              0.18          104.38
  327.240             -0.02         -111.08
  327.960             -0.52         -328.98
  328.680             40.03         -687.55
  329.400             58.90        -1004.62
--------------------------------------------
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PHONON CORPORATION

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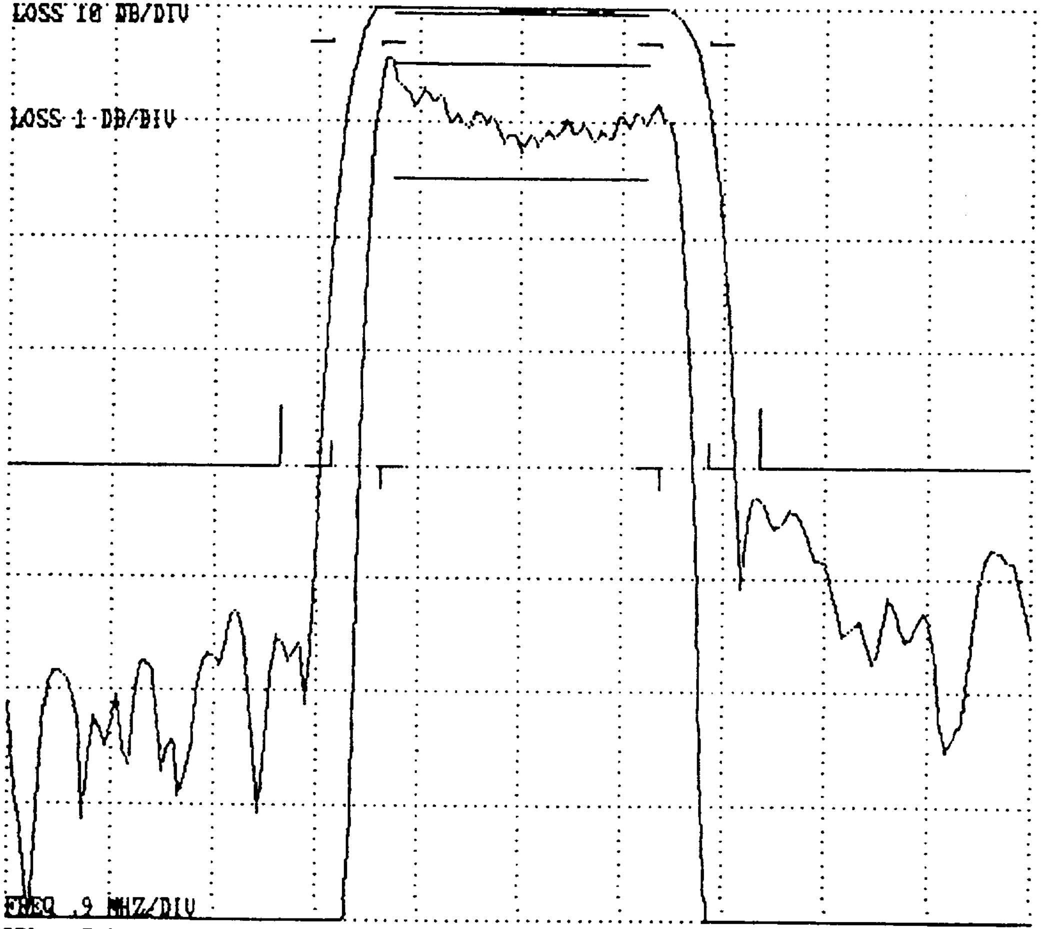
FILE=4AH8B07A.DAT  15:06:40  05-12-1998
PN_100834_826 FINAL_FUNCTIONAL TEMP:H FLIGHT6_3FUNCT /N DUAL_SXX
05-12-1998 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 317.7   WIDTH= 9   INCR.= .05   SYSTEM BANDWIDTH= 2.25
REFERENCES: LOSS(DB)= 28.698   PHASE(DEG)= 6275.75   DELAY(US)= 0   SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .1496918   PHASE(DEG)= 743.5699
PLOT SCALES: LOSS 10 DB/DIV  LOSS 1 DB/DIV  VS.  FREQ .9 MHZ/DIV
```



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PEAK: LEVEL(DB)= 28.13216  FREQ(MHZ)= 316.5264  DELAY(US)=-3.120572  SIDELOBE(DB)=-43.20459
ENERGY: LEVEL(DB)= 28.8234  CENTER(MHZ)= 317.732  WIDTH(MHZ)= 3.073824  SKEW(MHZ)= 2.912465E-02
 L(DB)    LO(MHZ)    HI(MHZ)    CTR(MHZ)    WID(MHZ) AV-CTR(MHZ) AV-WID(MHZ)  AV-SL(DB)  LOX(MHZ)    HIX(MHZ)
 -0.57   316.52637  316.52637  316.52637    0.00000   316.52637     0.00000     0.00   316.52637  316.52637
  0.50   316.37097  319.08740  317.72919    2.71643   317.70734     2.71878   -13.74   316.37097  319.08740
  1.00   316.34561  319.12967  317.73764    2.78406   317.70908     2.80282   -15.33   316.34561  319.12967
  2.00   316.30707  319.18762  317.74734    2.88055   317.72787     2.83983   -16.24   316.30707  319.18762
  3.00   316.27472  319.22354  317.74915    2.94882   317.72797     2.89961   -18.47   316.27472  319.22354
  4.00   316.24850  319.25568  317.75208    3.00717   317.72861     2.94064   -21.21   316.24850  319.25568
  5.00   316.22610  319.28201  317.75406    3.05591   317.72861     2.94064   -21.18   316.22610  319.28201
  6.00   316.20636  319.30499  317.75568    3.09863   317.73563     2.95388   -22.63   316.20636  319.30499
 10.00   316.14417  319.37659  317.76038    3.23242   317.73068     2.97833   -28.61   316.14417  319.37659
 20.00   316.04242  319.48752  317.76495    3.44510   317.73181     2.98574   -39.72   316.04242  319.48752
 30.00   315.97754  319.55399  317.76575    3.57645   317.73199     2.98628   -49.60   315.97754  319.[illegible]99
 40.00   315.92661  319.59750  317.76205    3.67090   317.73196     2.98629   -50.87   315.92661  319.[illegible]
BAND(MHZ)    316.575   318.825
LMIN(DB)         -0.37
LMAX(DB)          0.25
LDEL(DB)          0.62
PMIN(DEG)     -1257.40
PMAX(DEG)      1260.10
PDEL(DEG)      2517.50
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PHONON  CORPORATION
FILE=4CH8B07A.DAT  15:07:34  05-12-1998
PN_100834_826 FINAL_FUNCTIONAL TEMP:H FLIGHT6_3FUNCT /N DUAL_SXX
05-12-1998 HP8753,SSCF,SSFFIX,SSREF
FREQUENCY(MHZ): CENTER= 326.7   WIDTH= 9   INCR.= .05   SYSTEM BANDWIDTH= 2.25
REFERENCES: LOSS(DB)= 28.78711   PHASE(DEG)=-1157.034   DELAY(US)= 0   SLOPE(US/MHZ)= 0
RMS ERRORS: LOSS(DB)= .1441652   PHASE(DEG)= 742.4888
PLOT SCALES: LOSS 10 DB/DIV  LOSS 1 DB/DIV  VS.  FREQ .9 MHZ/DIV
```
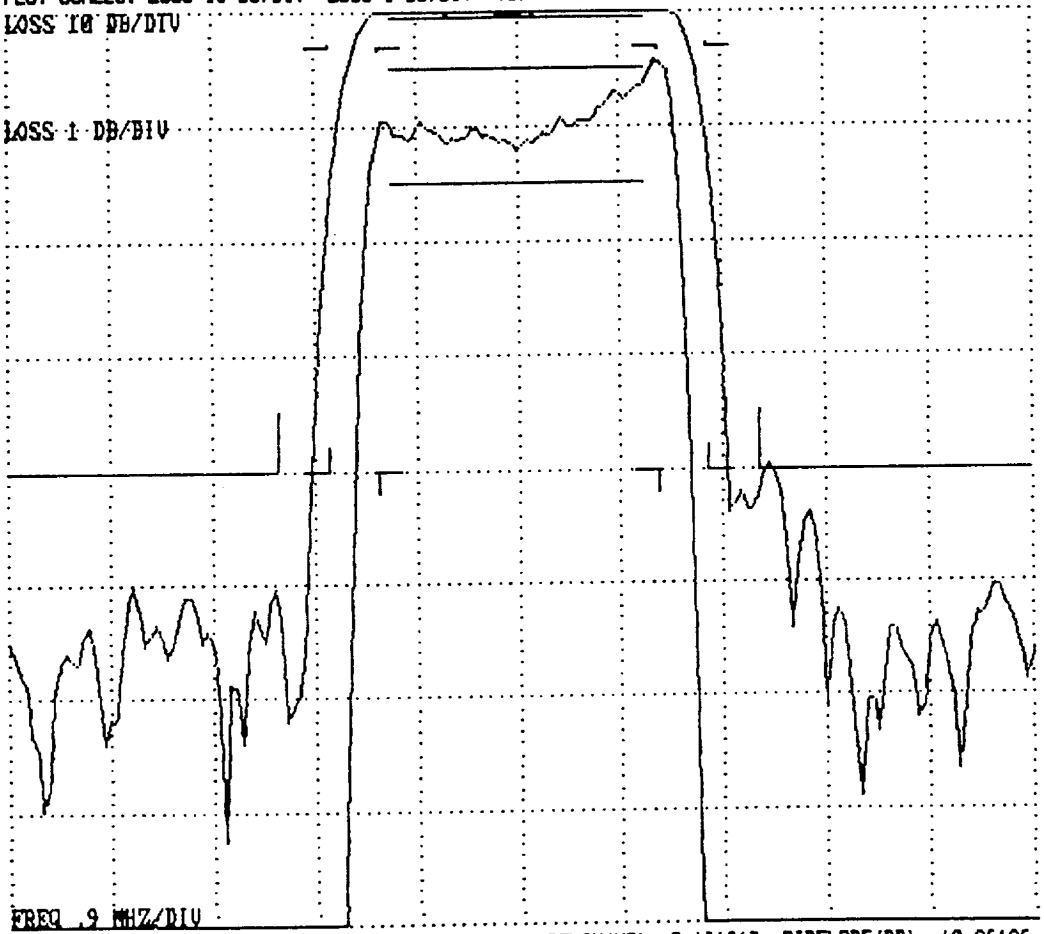



```
PEAK: LEVEL(DB)= 28.19925  FREQ(MHZ)= 327.9158  DELAY(US)=-3.181213  SIDELOBE(DB)=-40.26126
ENERGY: LEVEL(DB)= 28.89385  CENTER(MHZ)= 326.7574  WIDTH(MHZ)= 3.072987  SKEW(MHZ)=-3.803705E-02
 L(DB)     LO(MHZ)     HI(MHZ)     CTR(MHZ)     WID(MHZ) AV-CTR(MHZ) AV-WID(MHZ) AV-SL(DB) LOX(MHZ)     HIX(MHZ)
 -0.59    327.91577   327.91577   327.91577     0.00000  327.91577     0.00000     0.00   327.91577   327.91577
  0.50    325.38412   328.11005   326.74707     2.72592  326.77527     2.77244   -14.47   325.38412   328.11005
  1.00    325.34451   328.13770   326.74109     2.79318  326.75467     2.81310   -15.29   325.34451   328.13770
  2.00    325.29251   328.17899   326.73575     2.88647  326.75616     2.88329   -17.29   325.29251   328.17899
  3.00    325.25543   328.21011   326.73279     2.95468  326.76965     2.91047   -18.41   325.25543   328.21011
  4.00    325.22586   328.23563   326.73074     3.00977  326.75717     2.93456   -19.76   325.22586   328.23563
  5.00    325.20087   328.25769   326.72928     3.05682  326.76587     2.95175   -21.09   325.20087   328.25769
  6.00    325.17911   328.27756   326.72833     3.09845  326.75760     2.96742   -22.84   325.17911   328.27756
 10.00    325.11044   328.34058   326.72552     3.23013  326.75769     2.98561   -26.59   325.11044   328.34058
 20.00    324.99878   328.44174   326.72028     3.44296  326.75717     2.99775   -39.46   324.99878   328.44174
 30.00    324.92514   328.50189   326.71350     3.57675  326.75735     2.99831   -48.69   324.92514   328.50189
 40.00    324.87088   328.53659   326.70374     3.66571  326.75732     2.99833   -49.88   324.87088   328.92914
BAND(MHZ)    325.575   327.825
LMIN(DB)          -0.34
LMAX(DB)           0.21
LDEL(DB)           0.55
PMIN(DEG)      -1260.85
PMAX(DEG)       1254.32
PDEL(DEG)       2515.17
File: 4CH8B07A.DAT      Passband Symmetry =  0.3 dB
```

Report No. 11413
February, 1999

Channel 15 Bandpass Filter

IF Filter (S/N: 1331559-1, S/N: 227-008)

APPENDIX A **ACCEPTANCE TEST REPORT**

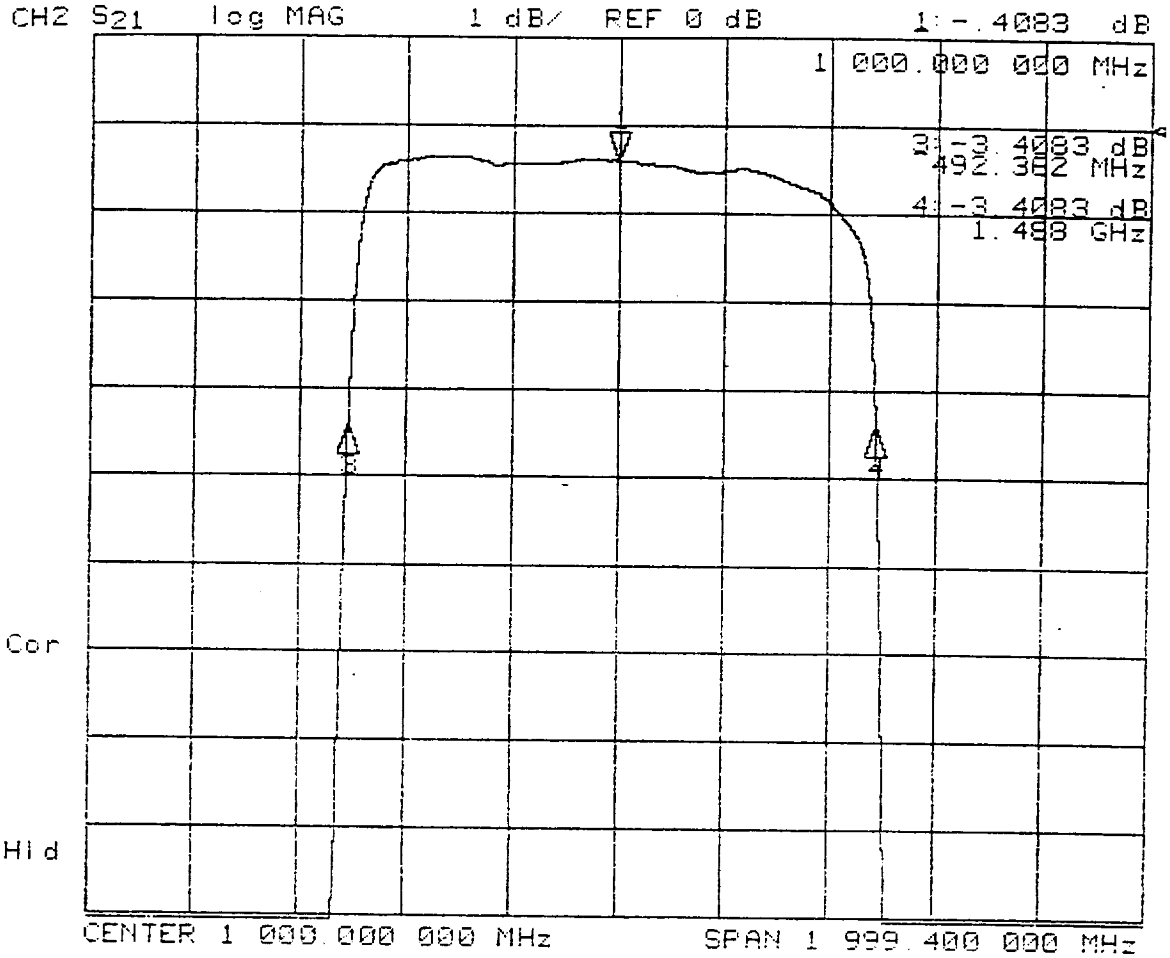
BANDPASS FILTER MODEL HL1000-1000-10SS1 S/N P227-008
AEROJET 1331559-1 REV. E

3.0 dB BANDWIDTH

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.3	-10°C	+15°C	+40°C
{7} UPPER 3.0 dB BANDEDGE	1488.83 MHz (1480.0-1500.0)	1487.33 Mhz (1480.0-1500.0)	1486.25 MHz (1480.01500.0)
{8} LOWER 3.0 dB BANDEDGE	492.36 MHz (480.0-500.0)	491.57 Mhz (480.0-500.0)	490.78 MHz (480.0-500.0)
{9} 3.0 dB RELATIVE BANDWIDTH	996.47 MHz (980.0-1020.0)	995.76 Mhz (980.0-1020.0)	995.47 MHz (980.0-1020.0)
{10} ADD {7} AND {8} ÷ 2 =	990.60 MHz (1000.0 NOM)	989.45 MHz (1000.0 NOM)	988.52 Mhz (1000.0 NOM)
{10a} RECORD MEASURED TEMPERATURE	-13.0 °C (-15.0 TO -10.0)	+17.2 °C (12.5 TO 17.5)	+41.6 °C (40.0 TO 45.0)
{6} ATTACH TRANSMISSION LOSS PERFORMANCE X-Y PLOT	✓ (√)	✓ (√)	✓ (√)

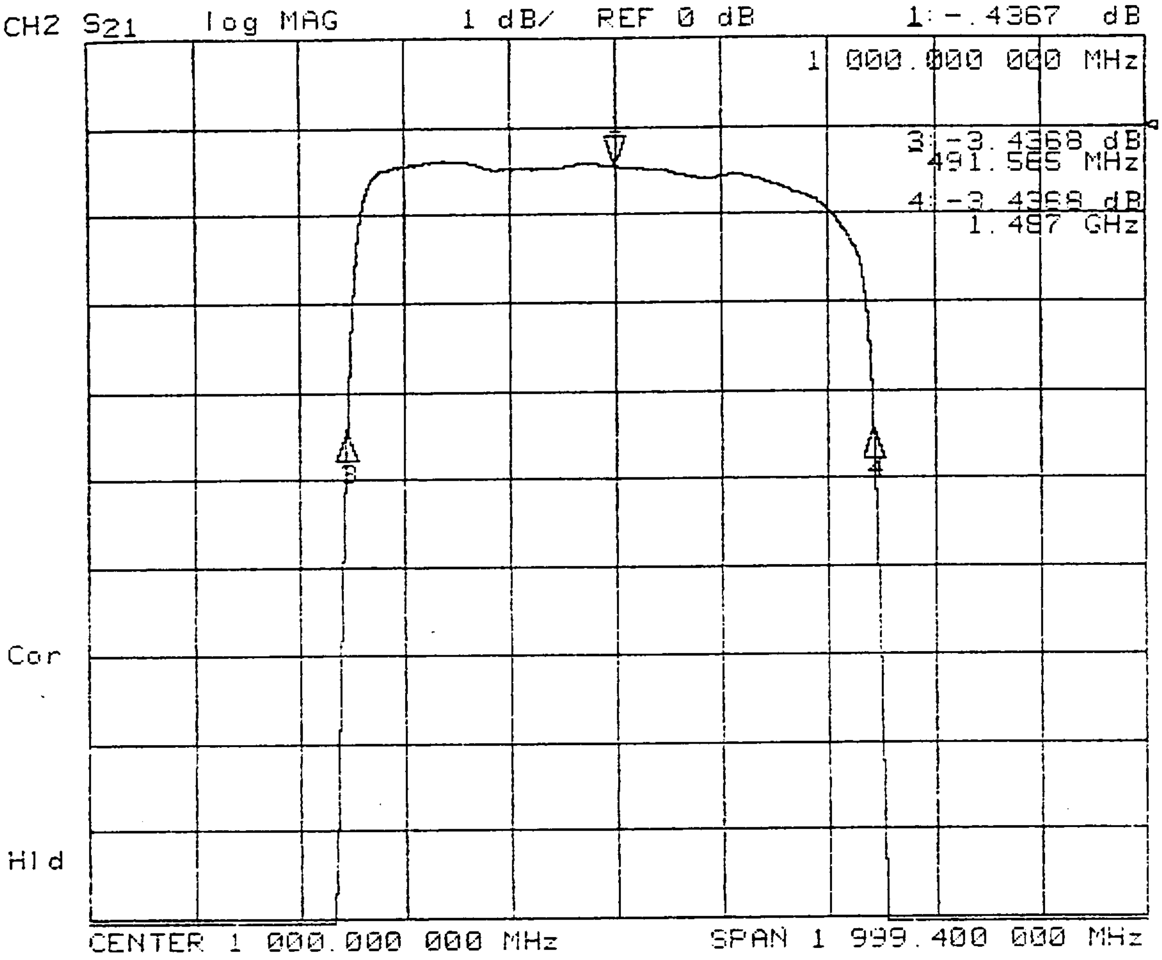
PASSBAND RIPPLE

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.4	-10°C	+15°C	+40°C
{11a} MIN INSERTION LOSS FREQ	675.10 MHz	675.10 Mhz	695.09 MHz
MIN INSERTION LOSS PERFORMANCE	-0.36 dB	-0.37 dB	-0.39 dB
{11b} 75% BW LOWER BANDEDGE FREQ	539.13 MHz	535.58 Mhz	533.45 MHz
75% BW LOWER BANDEDGE I.L. PERF	-0.56 dB	-0.62 dB	-0.66 dB
{11c} 75% BW UPPER BANDEDGE FREQ	1289.13 MHz	1285.58 Mhz	1283.45 MHz
75% BW UPPER BANDEDGE I.L. PERF	-0.56 dB	-0.62 dB	-0.66 dB
{11d} PERFORMANCE DELTA (I.L. @ {11b} - I.L. @ {11a})	0.20 dB	0.25 dB	0.27 dB
{11e} PERFORMANCE DELTA (I.L. @ {11c} - I.L. @ {11a})	0.20 dB	0.25 dB	0.27 dB



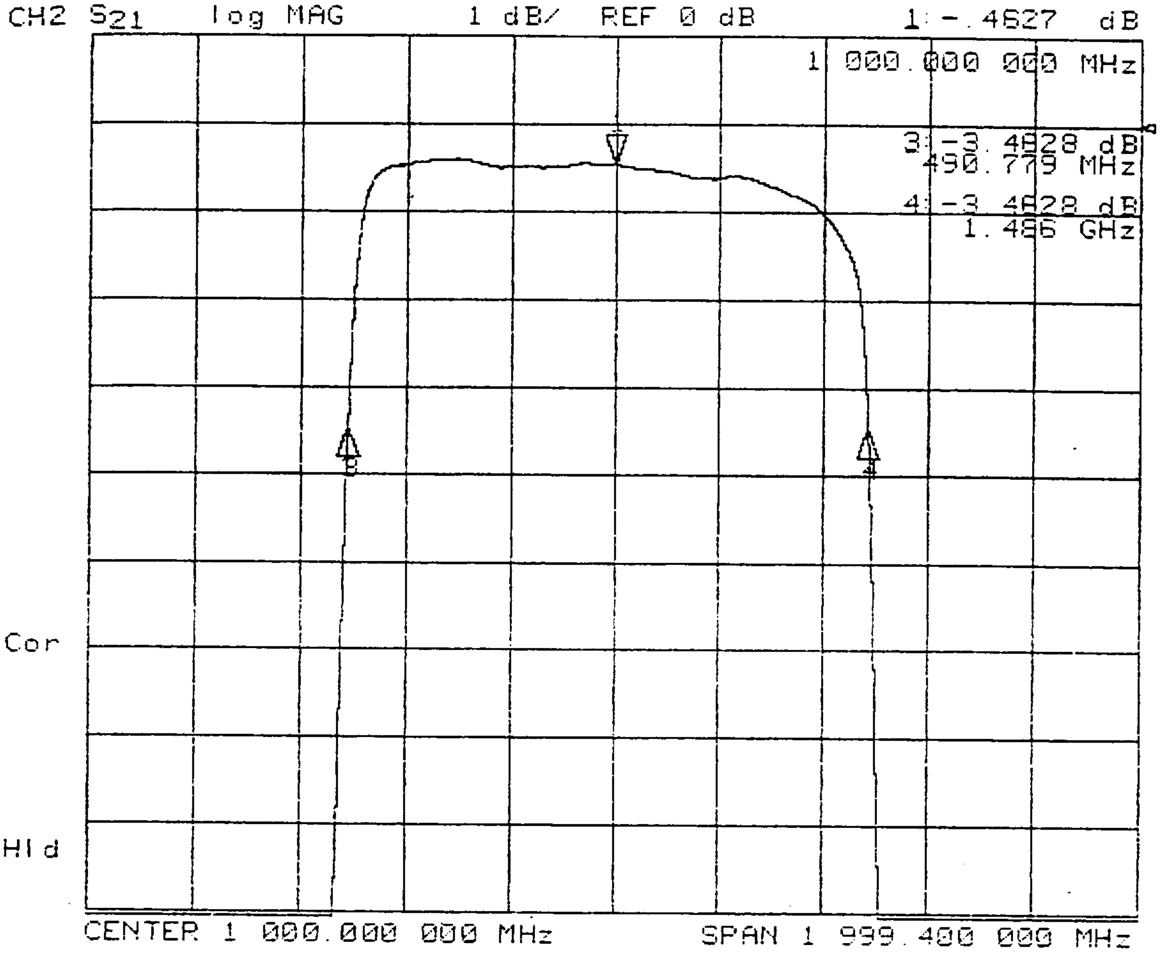
FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P227-008
-10C DATA
OPR: R. HOGGATT DATE FEB 04 1997

```
MARKER PARAMET                                            annel 2

MARKER 1                       550.000000 MHz      1000.000000 MHz
                             OFF                  -.4083 dB

MARKER 2                      1450.000000 MHz       990.596655 MHz
                             OFF                  OFF

MARKER 3                       625.000000 MHz       492.362913 MHz
                             OFF                  -3.4083 dB

MARKER 4                      1375.000000 MHz      1488.830397 MHz
                             OFF                  -3.4083 dB

MKR STIMULUS OFFSET              0.000000 MHz         0.000000 MHz
                              0 dB                 0 dB

REFERENCE MARKER              OFF                  OFF
PLACEMENT                    CONTINUOUS           CONTINUOUS
MARKER SEARCH                 OFF                  OFF
TARGET VALUE                 -3 dB                -3 dB
MARKER WIDTH VALUE           -3 dB                -3 dB
                              OFF                  OFF
MARKER TRACKING               OFF                  OFF
```



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P227-008
+15C DATA
OPR: R. HOGGATT DATE FEB 04 1997

```
MARKER PARAMET                                          annel 2

MARKER 1                       550.000000 MHz     1000.000000 MHz
                             OFF                  -.4367 dB

MARKER 2                      1450.000000 MHz      989.445538 MHz
                             OFF                  OFF

MARKER 3                       625.000000 MHz      491.565545 MHz
                             OFF                  -3.4368 dB

MARKER 4                      1375.000000 MHz     1487.325531 MHz
                             OFF                  -3.4368 dB

MKR STIMULUS OFFSET              0.000000 MHz        0.000000 MHz
                               0 dB                 0 dB

REFERENCE MARKER               OFF                  OFF
PLACEMENT                    CONTINUOUS           CONTINUOUS
MARKER SEARCH                  OFF                  OFF
TARGET VALUE                 -3 dB                -3 dB
MARKER WIDTH VALUE           -3 dB                -3 dB
                               OFF                  OFF
MARKER TRACKING                OFF                  OFF
```



FINAL FUNCTIONAL PERFORMANCE
TRANSMISSION LOSS
SERIAL NO. P227-008
+40C DATA
OPR: R. HOGGATT DATE FEB 04 1997

```
MARKER PARAMET                                               annel 2

MARKER 1                        550.000000 MHz      1000.000000 MHz
                               OFF                  -.4627 dB

MARKER 2                       1450.000000 MHz       988.515733 MHz
                               OFF                  OFF

MARKER 3                        625.000000 MHz       490.779215 MHz
                               OFF                  -3.4628 dB

MARKER 4                       1375.000000 MHz      1486.252251 MHz
                               OFF                  -3.4628 dB

MKR STIMULUS OFFSET               0.000000 MHz         0.000000 MHz
                                0 dB                 0 dB

REFERENCE MARKER                OFF                  OFF
PLACEMENT                      CONTINUOUS           CONTINUOUS
MARKER SEARCH                   OFF                  OFF
TARGET VALUE                   -3 dB                -3 dB
MARKER WIDTH VALUE             -3 dB                -3 dB
                                OFF                  OFF
MARKER TRACKING                 OFF                  OFF
```

APPENDIX A **ACCEPTANCE TEST REPORT**

BANDPASS FILTER MODEL HL1000-1000-10SS1 S/N P227-008
AEROJET 1331559-1 REV. E

PASSBAND RIPPLE (CON'T)

{11f} RECORD PASS/FAIL (0.5 dB MAX)	[✓ PASS]/FAIL	[✓ PASS]/FAIL	[✓ PASS]/FAIL
{11g) ATTACH PASSBAND RIPPLE PERFORMANCE X-Y PLOT(S)	✓ (√)	✓ (√)	✓ (√)

OUT-OF-BAND REJECTION

ACCEPTANCE TEST PROCEDURE 63-0005-02 PARA 4.5.5 Fc=1000.0 MHz. REF {5A} FOR INSERTION LOSS @ Fc	-10°C	+15°C	+40°C
{12} WORST CASE REJECTION FROM 0.300 MHz TO 350.0 MHz	-67.4 dB (40.0 dB MIN)	-67.1 dB (40.0 dB MIN)	-66.2 dB (40.0 dB MIN)
{13a} WORST CASE REJECTION FROM 1650.0 MHz TO 3000.0 MHz	-64.1 dB (40.0 dB MIN)	-64.2 dB (40.0 dB MIN)	-64.4 dB (40.0 dB MIN)
{13b} WORST CASE REJECTION FROM 3000.0 MHz TO 8000.0 MHz	-48.0 dB (40.0 dB MIN)	-48.2 dB (40.0 dB MIN)	-48.6 dB (40.0 dB MIN)
{13c} RECORD MEASURED TEMPERATURE	-13.0 °C (-15.0 TO -10.0)	+17.2 °C (12.5 TO 17.5)	+41.6 °C (40.0 TO 45.0)
{14} ATTACH REJECTION PERFORMANCE X-Y PLOT(S)	✓ (√)	✓ (√)	✓ (√)

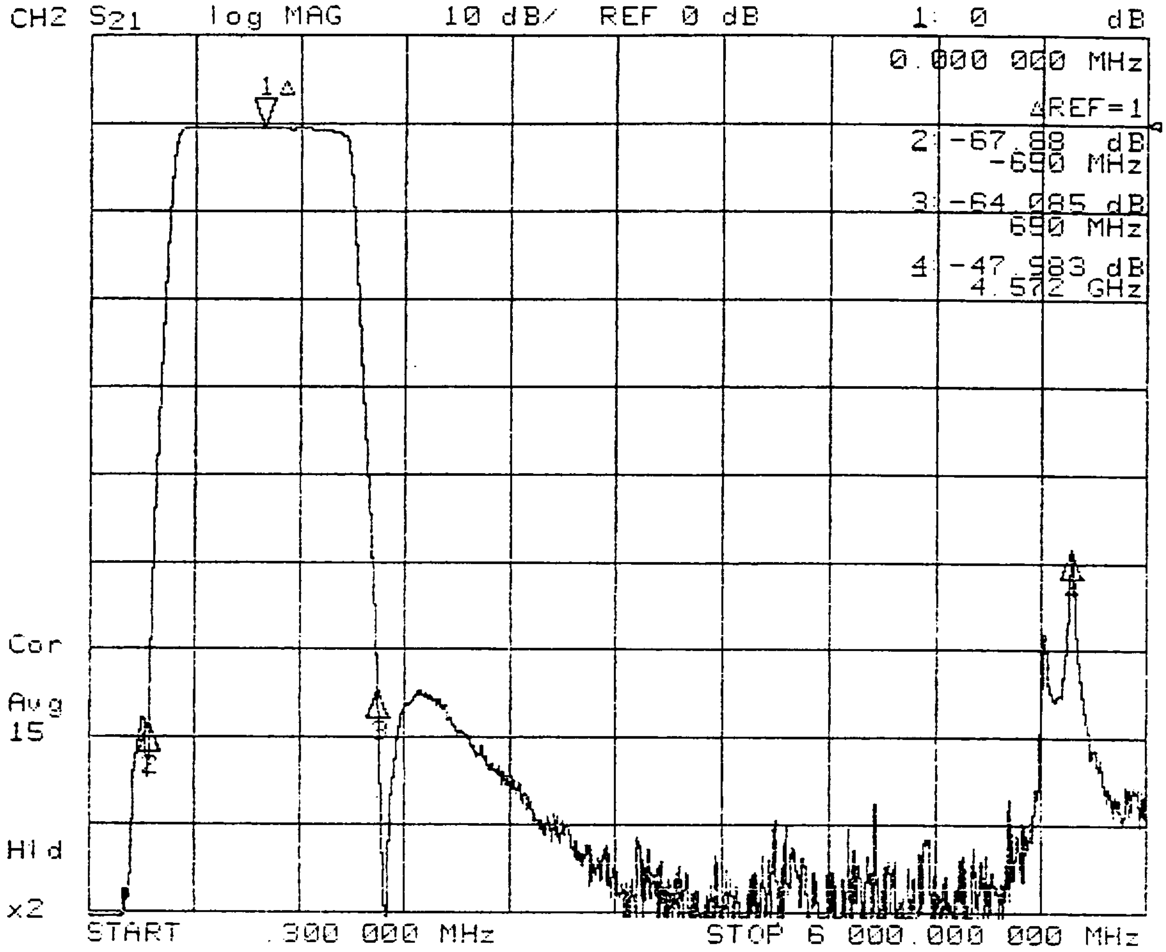
TEST PERFORMED BY R. Hoggatt DATE 2/4/97 QA 5

NOTE IF TEST WITNESSED BY AESD: ________ GSI: _____ Not Witnessed this time. DLD

***** END OF FUNCTIONAL PERFORMANCE TEST ****

OUTLINE AND MOUNTING DIMENSIONS VERIFICATION
{16} REFERENCE CUSTOMER DRAWING 1331559

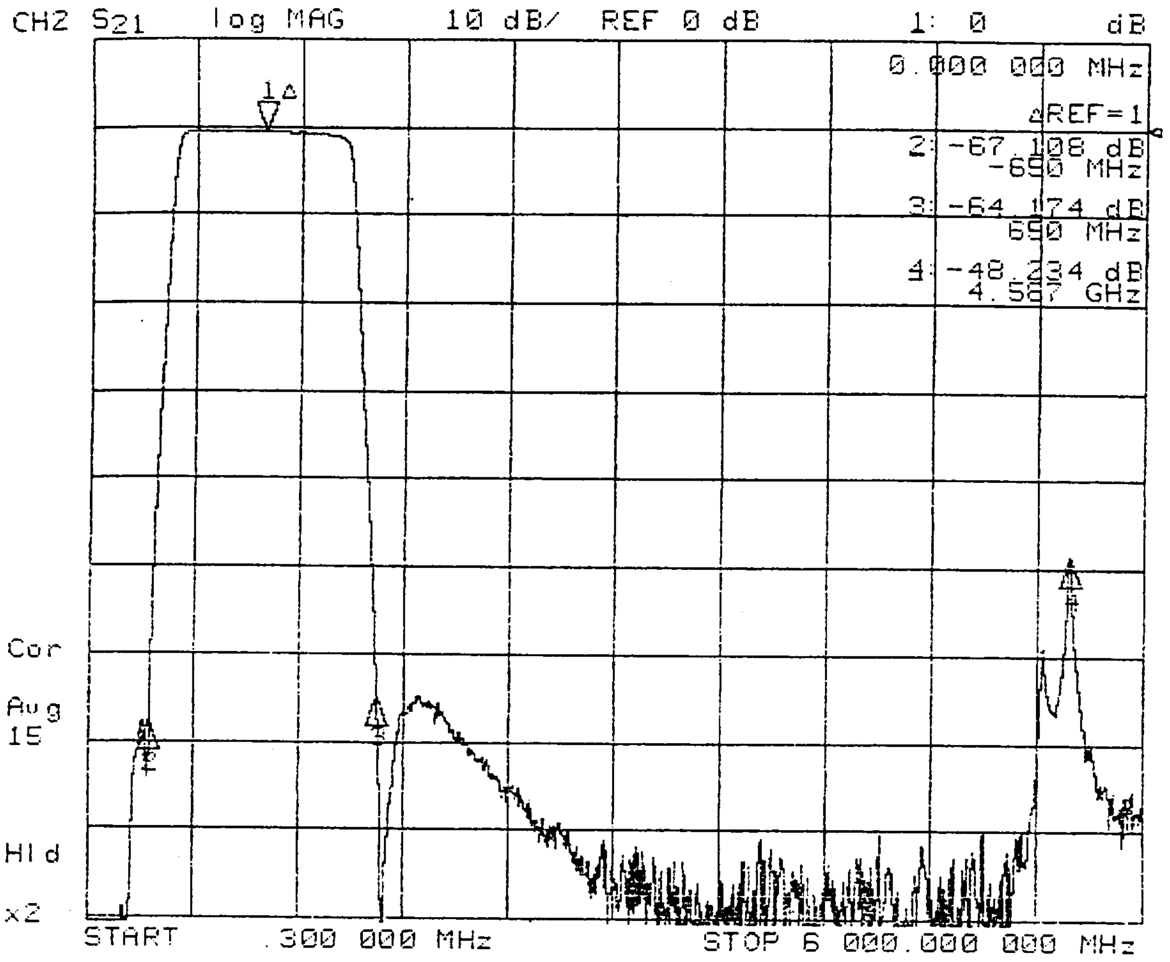
DESCRIPTION OF MEASUREMENT	DIMENSION AND TOLERANCE	ACTUAL MEASUREMENT
OVER ALL LENGTH	3.50 ± .03	3.502
MOUNTING HOLE CENTER	0.125 ± .010	.125
BETWEEN UPPER MOUNTING HOLES	3.250	3.252
BETWEEN LOWER MOUNTING HOLES	3.250	3.249



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P227-008
-10C DATA
OPR: R. HOGGATT DATE FEB 04 1997

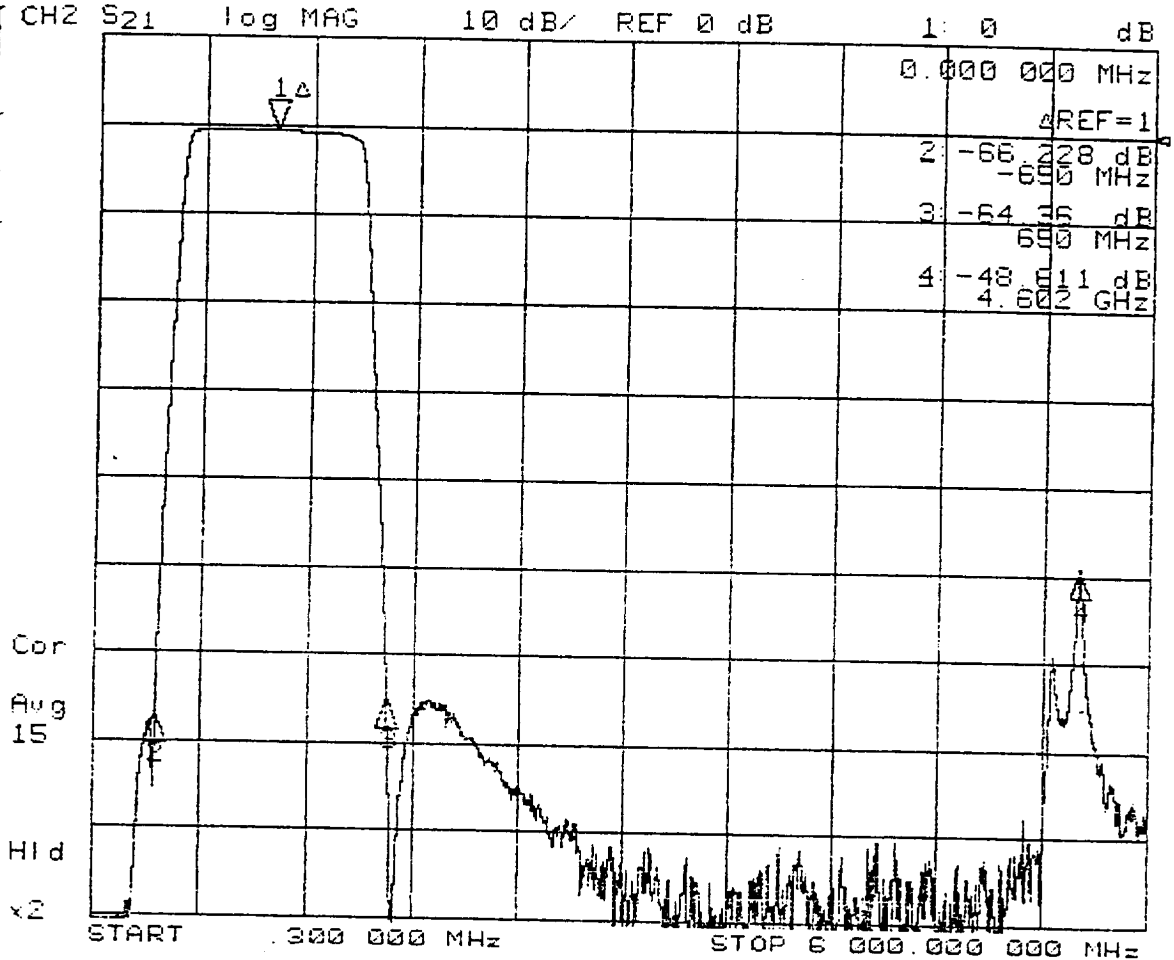
MARKER PARAMET annel 2

MARKER 1	1000.000000 MHz OFF	1000.000000 MHz 0 dB
MARKER 2	1000.000000 MHz OFF	350.000000 MHz -67.88 dB
MARKER 3	1000.000000 MHz OFF	1650.000000 MHz -64.085 dB
MARKER 4	1000.000000 MHz OFF	5572.755874 MHz -47.983 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P227-008
+15C DATA
OPR: R. HOGGATT DATE FEB 04 1997

```
MARKER PARAMET                                              annel 2

MARKER 1                        1000.000000 MHz      1000.000000 MHz
                                OFF                   0 dB

MARKER 2                        1000.000000 MHz       350.000000 MHz
                                OFF                  -67.108 dB

MARKER 3                        1000.000000 MHz      1650.000000 MHz
                                OFF                  -64.174 dB

MARKER 4                        1000.000000 MHz      5587.155241 MHz
                                OFF                  -48.234 dB

MKR STIMULUS OFFSET                0.000000 MHz         0.000000 MHz
                                 0 dB                 0 dB

REFERENCE MARKER                 OFF                  MARKER 1
PLACEMENT                       CONTINUOUS           CONTINUOUS
MARKER SEARCH                    OFF                   OFF
TARGET VALUE                    -3 dB                -3 dB
MARKER WIDTH VALUE              -3 dB                -3 dB
                                 OFF                   OFF
MARKER TRACKING                  OFF                   OFF
```



FINAL FUNCTIONAL PERFORMANCE
REJECTION PERFORMANCE
SERIAL NO. P227-008
+40C DATA
OPR: R. HOGGATT DATE FEB 04 1997

MARKER PARAMET annel 2

MARKER 1	1000.000000 MHz OFF	1000.000000 MHz 0 dB
MARKER 2	1000.000000 MHz OFF	350.000000 MHz -66.228 dB
MARKER 3	1000.000000 MHz OFF	1650.000000 MHz -64.36 dB
MARKER 4	1000.000000 MHz OFF	5602.754367 MHz -48.611 dB
MKR STIMULUS OFFSET	0.000000 MHz 0 dB	0.000000 MHz 0 dB
REFERENCE MARKER	OFF	MARKER 1
PLACEMENT	CONTINUOUS	CONTINUOUS
MARKER SEARCH	OFF	OFF
TARGET VALUE	-3 dB	-3 dB
MARKER WIDTH VALUE	-3 dB	-3 dB
	OFF	OFF
MARKER TRACKING	OFF	OFF

APPENDIX A

ACCEPTANCE TEST REPORT

BANDPASS FILTER MODEL HL1000-1000-10SS1 S/N P227-008
AEROJET 1331559-1 REV. E

BANDPASS CHARACTERISTICS MEASUREMENT

PER ATP PARA 4.6
(REF: AE-24687, PARA 4.8.2)

RECORD THE AMBIENT ROOM TEMPERATURE. +22.0 °C (+19°C TO +29.0°C)

{15} ATTACH PASSBAND PERFORMANCE X-Y PLOT ✓ (√)

{24} TEST POINT MATRIX

REF	FREQ	UNIT	VALUE	REF	FREQ	UNIT	VALUE
F1	1.0	MHz	-88.1 dB	F11	1000.0	MHz	-0.50 dB
F2	10.0	MHz	-91.2 dB	F12	(*) 1100.0	MHz	-0.56 dB
F3	100.0	MHz	-88.4 dB	F13	(*) 1200.0	MHz	-0.62 dB
F4	300.0	MHz	-69.1 dB	F14	1300.0	MHz	-0.72 dB
F5	400.0	MHz	-35.3 dB	F15	1400.0	MHz	-1.62 dB
F6	500.0	MHz	-2.27 dB	F16	1500.0	MHz	-6.48 dB
F7	600.0	MHz	-0.49 dB	F17	1600.0	MHz	-42.7 dB
F8	700.0	MHz	-0.44 dB	F18	1700.0	MHz	-84.7 dB
F9	(*) 800.0	MHz	-0.52 dB	F19	2000.0	MHz	-66.7 dB
F10	(*) 900.0	MHz	-0.51 dB	F20	5000.0	MHz	-85.7 dB

TEST PERFORMED BY: R. Hoggatt DATE 2/4/97 DA 5

NOTE IF TEST WITNESSED BY AESD________ GSI ________ Not Witnessed this time. DLD

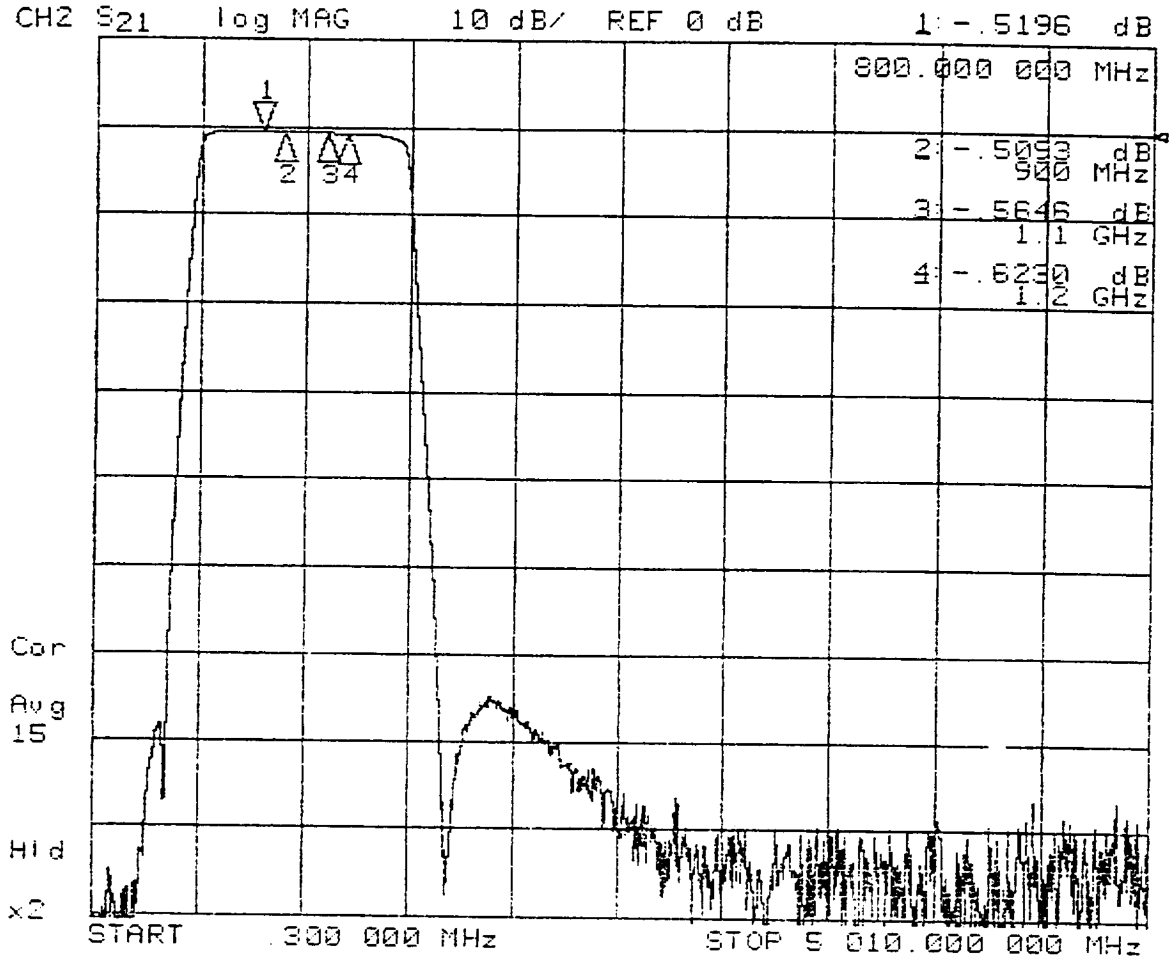
***** END OF BANDPASS CHARACTERISTICS TEST *****

FUNCTIONAL PERFORMANCE TEST

ACCEPTANCE TEST PROCEDURE
63-0005-02 PARA 4.1

BRIEF TEST DESCRIPTION: THE TESTS DESCRIBED IN APPENDIX A PAGE 10 THRU PAGE 13 ARE PERFORMED TO DOCUMENT THE FUNCTIONAL PERFORMANCE OF THE UNIT AT THE CONCLUSION OF ALL ENVIRONMENTAL TESTING. THE TESTS ARE AS FOLLOWS AND IN ANY SEQUENCE:

a.) VSWR PER ATP PARA 4.5.1.
b.) INSERTION LOSS PER ATP PARA 4.5.2
c.) INSERTION LOSS VS TEMPERATURE PER ATP PARA 4.5.6.
d.) 3.0 dB BANDWIDTH PER ATP PARA 4.5.3.
e.) CENTER FREQUENCY (fc) PER ATP PARA 4.5.7 (PART OF 3.0 dB B/W TEST)
f.) PASSBAND RIPPLE PER ATP PARA 4.5.4 (PART OF INSERTION LOSS TEST).
g.) OUT-OF-BAND REJECTION PER ATP PARA 4.5.5.



POST THERMAL CYCLE
PASSBAND CHARACTERISTICS
SERIAL NO. P227-008
AMBIENT
OPR: R. HOGGATT DATE FEB 04 1997

```
MARKER PARAMET                                         annel 2

MARKER 1                     1000.000000 MHz       800.000000 MHz
                            OFF                  - 5196 dB

MARKER 2                     1000.000000 MHz       900.000000 MHz
                            OFF                  -.5093 dB

MARKER 3                     1000.000000 MHz      1100.000000 MHz
                            OFF                  -.5646 dB

MARKER 4                     1000.000000 MHz      1200.000000 MHz
                            OFF                  -.6230 dB

MKR STIMULUS OFFSET             0.000000 MHz         0.000000 MHz
                             0 dB                  0 dB


REFERENCE MARKER             OFF                   OFF
PLACEMENT                   CONTINUOUS            CONTINUOUS
MARKER SEARCH                OFF                   OFF
TARGET VALUE                -3 dB                 -3 dB
MARKER WIDTH VALUE          -3 dB                 -3 dB
                             OFF                   OFF
MARKER TRACKING              OFF                   OFF
```

Report No. 11413
February, 1999

GAIN STABILITY AND GAIN COMPRESSION

FOR

MIXER/AMPLIFIERS AND IF AMPLIFIERS

GAIN-TEMPERATURE SENSITIVITY FOR MIXER/AMPLIFIERS AND IF AMPLIFIERS

Channel No.	3	4	5	6	7	8	9	10	11	12	13	14	15
Specification (+/-dB/°C)	0.02	0.02	0.02	0.02	0.02	0.02	0.04	0.04	0.06	0.06	0.06	0.06	0.02
Measured (dB/°C)	-0.015	-0.011	-0.015	-0.017	-0.017	-0.017	-0.024 +0.005	-0.024 +0.005	-0.024 +0.003 +0.005, -0.014	-0.024 +0.003 -0.011	-0.024 +0.003 -0.014	-0.024 +0.003 -0.018	-0.017
Total (dB/°C)	-0.015	-0.011	-0.015	-0.017	-0.0171	-0.017	+0.005, -0.024	+0.005, -0.024	+0.008, -0.038	+0.003, -0.035	+0.003, -0.038	+0.003, -0.042	-0.017

Report No. 11413
February, 1999

Channel 3 Mixer/Amplifier

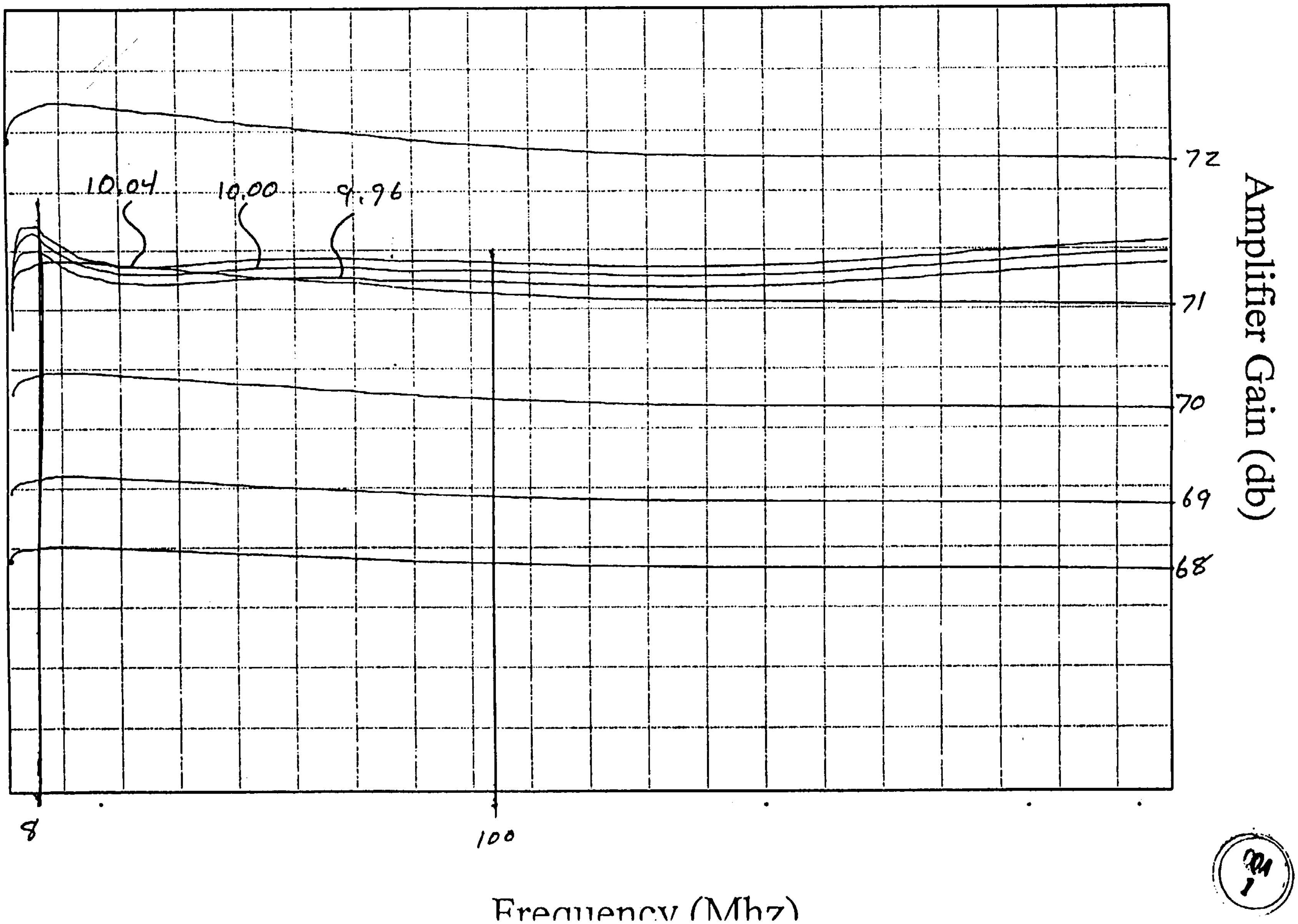
Mixer/Amplifier (P/N: 1331562-13, S/N: 7A33)

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-13
Serial No. 7A33
Date 6-5-98
Tested By 77Y

Amb Temp +23°C



TEST DATA SHEET NO. 6. AMPLIFIER TESTS

GAIN FLATNESS TEST: ATP PARAGRAPH 5.1.3

GAIN FLATNESS (dB)ppK	SPEC. GAIN FLATNESS (dB)ppK	ACC	REJ
0.17	0.50	QA 1	

GAIN VERSUS VOLTAGE SENSITIVITY TEST: ATP PARAGRAPH 5.1.4

ECN
CAMSU-1352

AMPLIFIER VOLTAGE	GAIN READING (dBm)	ΔG/ΔV	SPEC. ΔG/ΔV	ACC	REJ
9.96	71.06	2.25	2.0		QA 1
10.00	71.15				
10.04	71.24				
ΔGv =	0.18 dB				

		DATE	ACC	REJ
PART NO. 1331562-13G	SPACEK QA	6-29-98		QA 1

SER NO. 7A33

TEST FAILURE:

TESTED BY: 77H

FAILURE ANALYSIS NO.

END DATE: 6-5-98

END TIME: 1600

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

TEST DATA SHEET NO. 7. AMPLIFIER TESTS

GAIN VERSUS TEMPERATURE SENSITIVITY TEST: ATP PARAGRAPH 5.1.5

Nominal Temperature (°C)	Relative Gain	ΔG/ΔT	SPEC	ACC	REJ
T1 −6	G_{T1} 71.70	▨	▨		
▨	▨	* 0.014	0.035dB/°C	QA 1	
T2 +8	G_{T2} 71.50	▨	▨		
▨	▨	* 0.022	0.020dB/°C	QA 1	
T3 +28	G_{T3} 71.06	▨	▨		
▨	▨	* 0.023	0.035dB/°C	QA 1	
T4 +40	G_{T4} 70.79	▨	▨		

• Perform the following calculations and record on the TDS

$$\Delta G/\Delta T = \frac{G_{Ti} - G_{Ti+1}}{T_i - T_{i+1}} \qquad i = 1,2,3,4 \qquad \Delta G_T = \underline{0.91}\ \text{dB}$$

$\Delta G_{TOTAL} = \Delta G_V + \Delta G_T + 0.4 =$ 1.49 dB Spec 1.4dB ACC_____ REJ QA 1

ECN
CAMSU-1352

	DATE	ACC	REJ
SPACEK QA	6-29-98		QA 1

PART NO. 1331562-136

SER NO. 7A33

TESTED BY:

END DATE: 6-5-98

END TIME: 1600

TEST FAILURE: __________

FAILURE ANALYSIS NO. __________

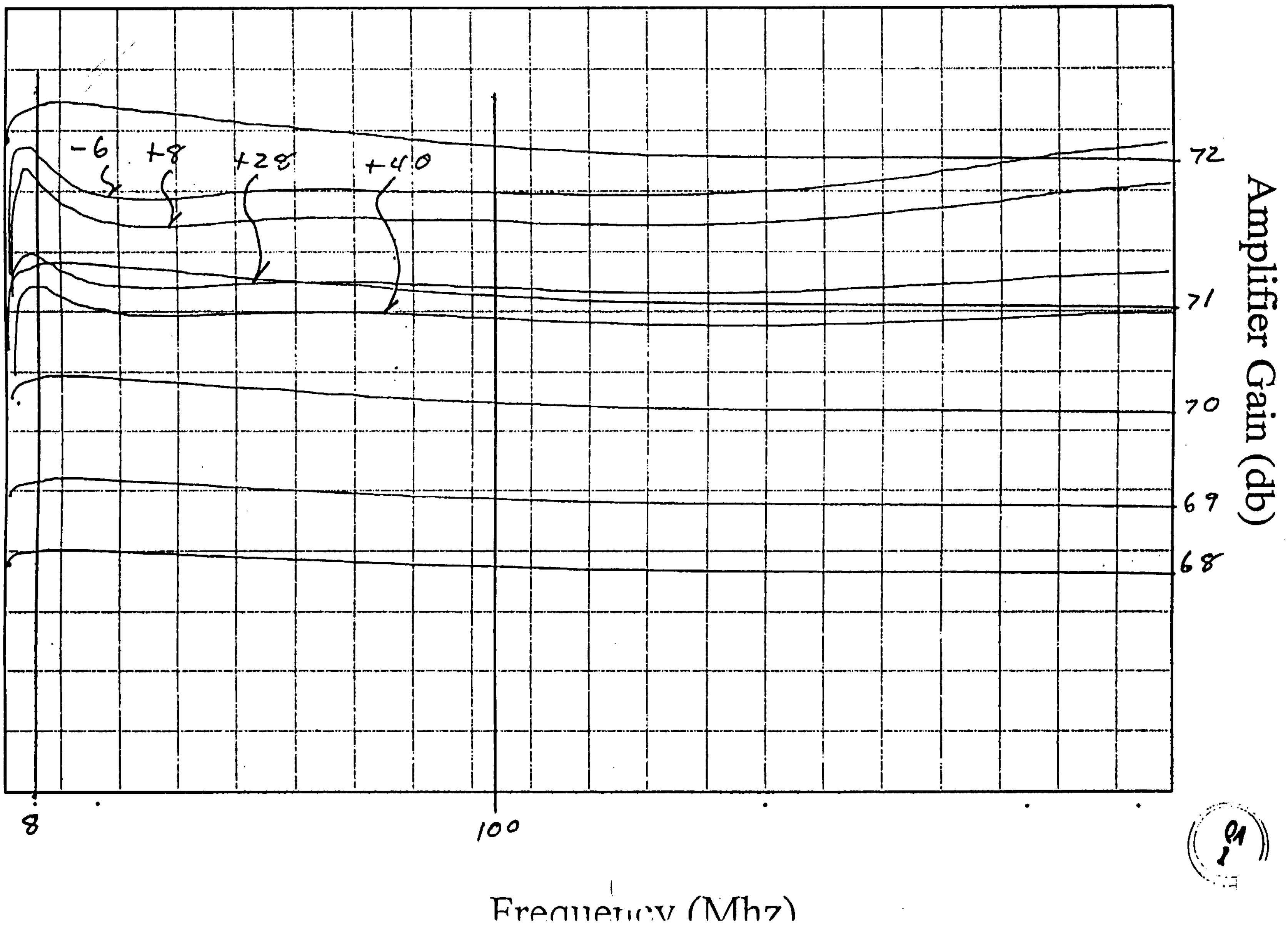
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-13
Serial No. 7A33
Date 6-5-98
Tested By 77Y

Amb Temp +23°c



TEST DATA SHEET NO. 8. AMPLIFIER TESTS

OUTPUT 1.0 dB COMPRESSION POINT TEST: ATP PARAGRAPH 5.1.6

DASH #															
11	12	13	14	15	16	17	18	19	20	FREQ. (MHz)	P2 COMP (dBm)	OUTPUT COMP. at+10(dBm)	SPEC. COMP. PT.(dBm)	ACC	REJ
X	X	X	X		X	X	X	X		10	-2.5	0.5	1.0	04 1	
				X						20					
	X	X								50	-2.6	0.4	1.0	04 1	
X	X	X	X	X	X	X	X			100	-2.6	0.4	1.0	04 1	
X										150					
			X	X	X	X	X	X		200					
								X		400					
									X	500					
									X	1000					
									X	1500					

AMPLIFIER NOISE FIGURE AND TOTAL POWER TEST: ATP PARAGRAPH 5.1.7

DATE: 6-5-98 AMBIENT ROOM TEMPERATURE °C: 23°c

AMPLIFIER OUTPUT POWER AMBIENT (dBm)	AMPLIFIER OUTPUT POWER (-77 K)(dBm)	Y FACTOR (dB)	AMPLIFIER NOISE FIGURE (dB)
-24.0	-27.8	3.8	1.04

Above data taken with Daden filter attached (except -19) .

Intermediate test results for information only

PART NO. 1331562-136	SPACEK QA	DATE 6-29-98	ACC 04 1	REJ	
SER NO. 7A33	TEST FAILURE:				
TESTED BY: 777	FAILURE ANALYSIS NO.				
END DATE: 6-5-98					
END TIME: 1600					

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

TEST DATA SHEET NO. 13. MIXER-AMPLIFIER ASSEMBLY TESTS

NOISE FIGURE, TOTAL POWER AND CURRENT VS. TEMPERATURE TEST: ATP PARA 5.4.8.

DATE: 6-24-98 AMBIENT ROOM TEMPERATURE °C: +21

UUT TEMP °C.	UUT CURRENT	MIXER-AMP. OUTPUT POWER (AMBIENT) (dBm)	MIXER-AMP. OUTPUT POWER (77 DEG K) (dBm)	Y FACTOR (dB)	MIXER-AMP. NOISE FIGURE (dB)	SPEC. MIXER-AMP. NOISE FIGURE (dB)	ACC	REJ
-6	43.3	-22.50	-24.35	1.85	3.3	3.8	QA 1	
+8	43.4	-22.70	-24.50	1.80	3.4	3.8	QA 1	
+28	43.6	-23.00	-24.80	1.80	3.4	3.8	QA 1	
+40	43.7	-23.20	-25.00	1.80	3.4	3.8	QA 1	

Noise figure change 0.1 dB Spec is .5dB peak to peak on -20 ACC QA 1 REJ ______

NOTE: *Above data to be taken with the Daden filter, except on the -19 unit.*

NEΔT-NOISE POWER STABILITY TEST: ATP PARAGRAPH 5.4.9

Date: 6-23-98 Ambient Room Temperature °C: 25

Attach computer generated *NEΔT* spreadsheet to this test data sheet.

Record the calculated Nps(K) from spreadsheet data: 0.057

Record Nps(K) 0.08 for dash number from Aerojet specification AE-24869, Table II.
Accept units if calculated Nps(K) is less than or equal to specified Nps(K), otherwise reject.

ACC QA 1 REJ ______

PART NO. 1331562-13B

SER NO. 7A33

TESTED BY:

END DATE: 6-24-98

END TIME: 1600

SPACEK QA

DATE	ACC	REJ
6-29-98	QA 1	

TEST FAILURE: ______

FAILURE ANALYSIS NO. ______

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

Report No. 11413
February, 1999

Channel 4 Mixer/Amplifier

Mixer/Amplifier (P/N: 1331562-14, S/N: 7A44)

TEST DATA SHEET NO. 6. AMPLIFIER TESTS

GAIN FLATNESS TEST: ATP PARAGRAPH 5.1.3

GAIN FLATNESS (dB)ppK	SPEC. GAIN FLATNESS (dB)ppK	ACC	REJ
0.52	~~1.0~~ TTT 0.5	QA 1	

GAIN VERSUS VOLTAGE SENSITIVITY TEST: ATP PARAGRAPH 5.1.4

ECN
CAMSU-125

AMPLIFIER VOLTAGE	GAIN READING (dBm)	ΔG/ΔV	SPEC. ΔG/ΔV	ACC	REJ
9.96	71.14	2.13	2.0	QA 1	
10.00	71.22				
10.04	71.31				
ΔGv =	0.17 dB				

PART NO. 1331562-14E

SER NO. 7A44

TESTED BY: TTT

END DATE: 6-6-98

END TIME: 1600

	DATE	ACC	REJ
SPACEK QA	6-8-98	QA 1	
TEST FAILURE:			
FAILURE ANALYSIS NO.			

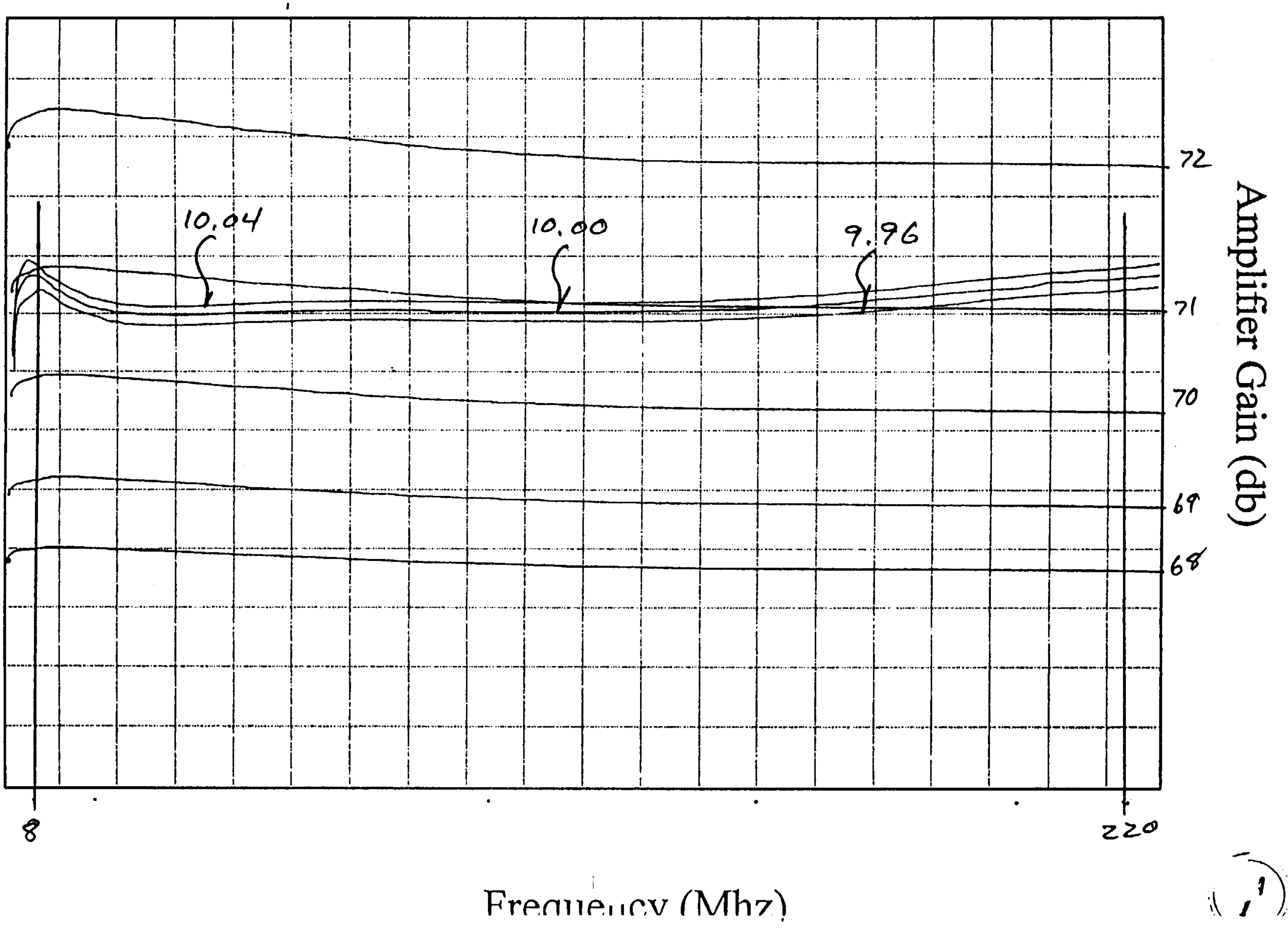
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-14G
Serial No. 7A44
Date 6-6-98
Tested By

Amb Temp +23°c



TEST DATA SHEET NO. 7. AMPLIFIER TESTS

GAIN VERSUS TEMPERATURE SENSITIVITY TEST: ATP PARAGRAPH 5.1.5

Nominal Temperature (°C)	Relative Gain	ΔG/ΔT	SPEC	ACC	REJ
T1 -6	G_{T1} 71.94			QA 1	
		* 0.021	0.035dB/°C		
T2 +8	G_{T2} 71.64				
		* 0.024	0.020dB/°C		QA 1
T3 +28	G_{T3} 71.16				
		* 0.030	0.035dB/°C	QA 1	
T4 +40	G_{T4} 70.80				

* Perform the following calculations and record on the TDS

$$\Delta G/\Delta T = \frac{G_{Ti} - G_{Ti+1}}{T_i - T_{i+1}} \quad i = 1,2,3,4 \qquad \Delta G_T = \underline{1.14}\ \text{dB}$$

$\Delta G_{TOTAL} = \Delta G_V + \Delta G_T + 0.4 =$ 1.71 dB Spec 1.4dB ACC____ REJ QA 1

ECN
CAMGV 1852

DATE ACC REJ

PART NO. 1331562- 14 E

SPACEK QA 6-8-98 ___ QA 1

SER NO. 7A44

TEST FAILURE: ________

TESTED BY: 777

FAILURE ANALYSIS NO. ________

END DATE: 6-6-98

END TIME: 1600

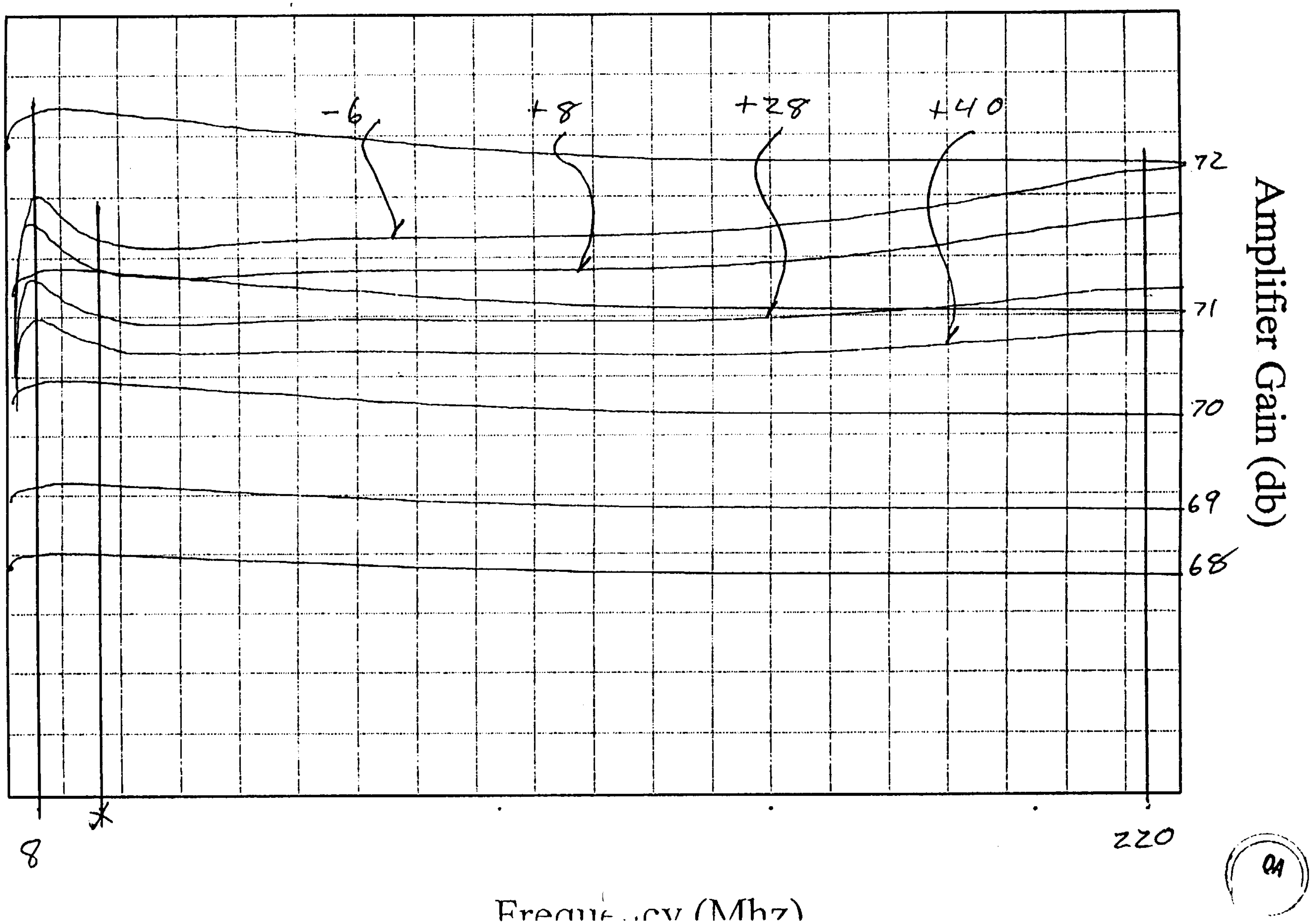
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-14G
Serial No. 7A44
Date 6-6-98
Tested By 77K

Amb Temp 23°C



QA

TEST DATA SHEET NO. 8. AMPLIFIER TESTS

OUTPUT 1.0 dB COMPRESSION POINT TEST: ATP PARAGRAPH 5.1.6

DASH #

11	12	13	14	15	16	17	18	19	20	FREQ. (MHz)	P2 COMP (dBm)	OUTPUT COMP. at+10(dBm)	SPEC. COMP. PT.(dBm)	ACC	REJ
X	X	X	X		X	X	X	X		10	-2.2	0.8	1.0	QA 1	
				X						20					
	X	X								50					
X	X	X	X	X	X	X	X			100	-2.3	0.70	1.0	QA 1	
X										150					
			X	X	X	X	X	X		200	-2.3	0.7	1.0	QA 1	
								X		400					
									X	500					
									X	1000					
									X	1500					

AMPLIFIER NOISE FIGURE AND TOTAL POWER TEST: ATP PARAGRAPH 5.1.7

DATE: 6-5-98 AMBIENT ROOM TEMPERATURE °C: 23°C

AMPLIFIER OUTPUT POWER AMBIENT (dBm)	AMPLIFIER OUTPUT POWER (-77 K)(dBm)	Y FACTOR (dB)	AMPLIFIER NOISE FIGURE (dB)
-20.4	-24.0	3.6	1.19

Above data taken with Daden filter attached (except -19).

Intermediate test results for information only

		DATE	ACC	REJ
PART NO. 1331562-14G	SPACEK QA	6-8-98	QA	
SER NO. 7A44	TEST FAILURE:			
TESTED BY:	FAILURE ANALYSIS NO.			

END DATE: 6-5-98

END TIME: 1600

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

TEST DATA SHEET NO. 13. MIXER-AMPLIFIER ASSEMBLY TESTS

NOISE FIGURE, TOTAL POWER AND CURRENT VS. TEMPERATURE TEST: ATP PARA 5.4.8.

DATE: 8-20-98 AMBIENT ROOM TEMPERATURE °C: +21

UUT TEMP °C.	UUT CURRENT	MIXER-AMP. OUTPUT POWER (AMBIENT) (dBm)	MIXER-AMP. OUTPUT POWER (77 DEG K) (dBm)	Y FACTOR (dB)	MIXER-AMP. NOISE FIGURE (dB)	SPEC. MIXER-AMP. NOISE FIGURE (dB)	ACC	REJ
-6	43.3	-18.40	-20.08	1.68	3.70	3.8	QA 1	
+8	43.4	-18.50	-20.15	1.65	3.75	3.8	QA 1	
+28	43.6	-18.80	-20.45	1.65	3.75	3.8	QA 1	
+40	43.7	-19.10	-20.73	1.63	3.80	3.8	QA 1	

Noise figure change 0.1 dB Spec is .5dB peak to peak on -20 ACC QA 1 REJ______

NOTE: *Above data to be taken with the Daden filter, except on the -19 unit.*

NE∆T-NOISE POWER STABILITY TEST: ATP PARAGRAPH 5.4.9

Date: 8/24/98 Ambient Room Temperature °C: +24

Attach computer generated *NE∆T* spreadsheet to this test data sheet.

Record the calculated Nps(K) from spreadsheet data: 0.055

Record Nps(K) 0.08 for dash number from Aerojet specification AE-24869, Table II.
Accept units if calculated Nps(K) is less than or equal to specified Nps(K), otherwise reject.

ACC QA 1 REJ ______

PART NO. 1331562-146

SER NO. 7A44

TESTED BY:

END DATE: 8-20-98

END TIME: 1600

SPACEK QA DATE 8-21-98 ACC QA 1 REJ ___

TEST FAILURE: __________

FAILURE ANALYSIS NO. __________

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

Report No. 11413
February, 1999

Channel 5 Mixer/Amplifier

Mixer/Amplifier (P/N: 1331562-15, S/N: 7A35)

TEST DATA SHEET NO. 6. AMPLIFIER TESTS

GAIN FLATNESS TEST: ATP PARAGRAPH 5.1.3

GAIN FLATNESS (dB)ppK	SPEC. GAIN FLATNESS (dB)ppK	ACC	REJ
0.37	0,5	QA 1	

GAIN VERSUS VOLTAGE SENSITIVITY TEST: ATP PARAGRAPH 5.1.4

AMPLIFIER VOLTAGE	GAIN READING (dBm)	$\Delta G/\Delta V$	SPEC. $\Delta G/\Delta V$	ACC	REJ
9.96	71.23	2.13	2.0		QA 1
10.00	71.32				
10.04	71.40				

ΔG_v = 0.17 dB

ECN
CAMSU.1352

	DATE	ACC	REJ
SPACEK QA	6-29-98		QA 1

PART NO. 1331562-15G

SER NO. 7A35

TESTED BY:

END DATE: 6-5-98

END TIME: 1600

TEST FAILURE:

FAILURE ANALYSIS NO.

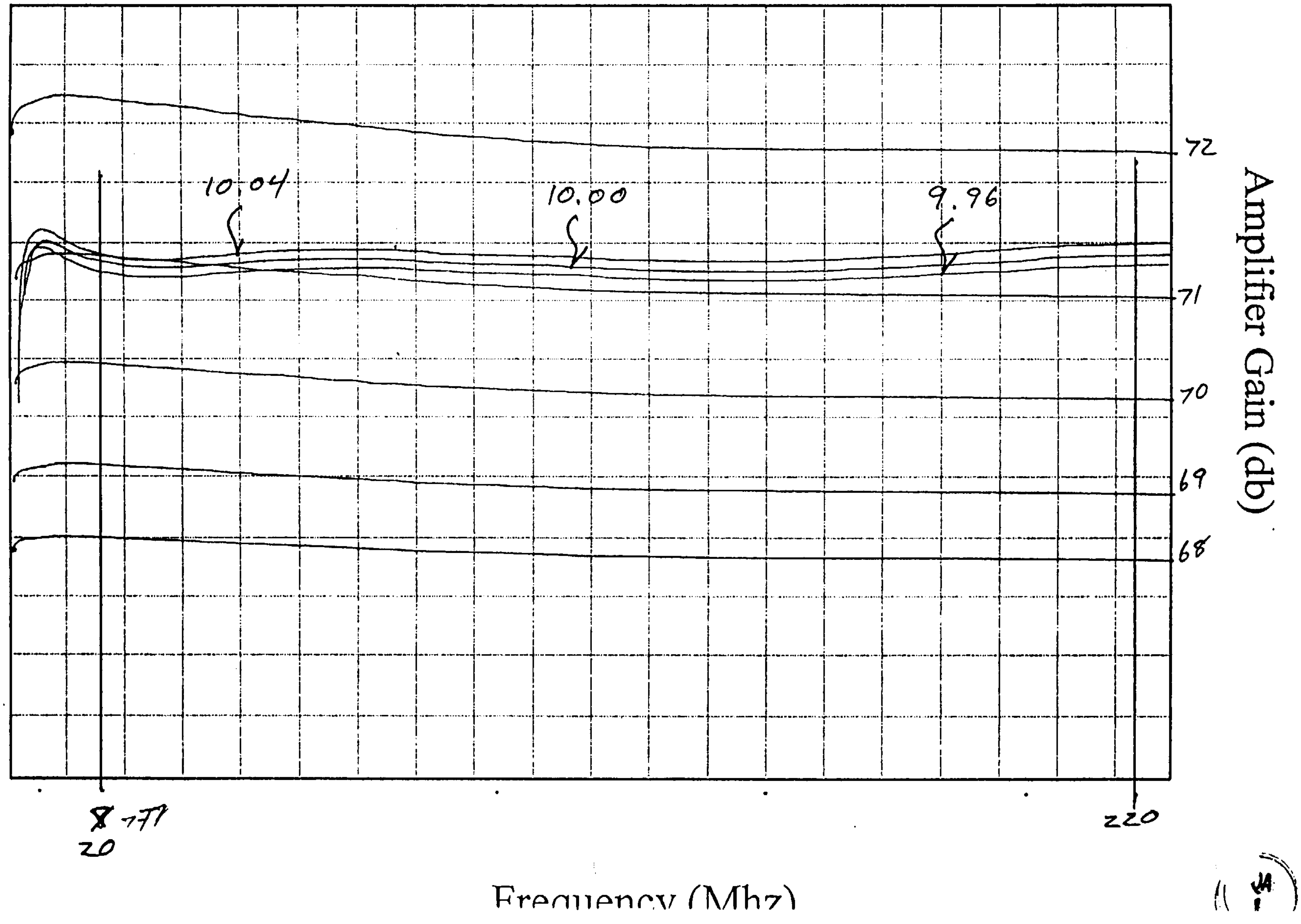
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Amb Temp +23°c

Model No. 1331562-15G
Serial No. 7A 35
Date 6-6-98
Tested By 777



TEST DATA SHEET NO. 7. AMPLIFIER TESTS

GAIN VERSUS TEMPERATURE SENSITIVITY TEST: ATP PARAGRAPH 5.1.5

Nominal Temperature (°C)	Relative Gain	ΔG/ΔT	SPEC	ACC	REJ
T1 -6	G_{T1} 71,97				
		* 0.017	0.035dB/°C	QA 1	
T2 +8	G_{T2} 71,73				
		* 0.022	0.020dB/°C		QA 1
T3 +28	G_{T3} 71,29				
		* 0.033	0.035dB/°C	QA 1	
T4 +40	G_{T4} 70.89				

ECN
CAMSU-1352

* Perform the following calculations and record on the TDS

$$\Delta G/\Delta T = \frac{G_{Ti} - G_{Ti+1}}{T_i - T_{i+1}} \qquad i = 1,2,3,4 \qquad \Delta G_T = \text{1.08 dB}$$

$\Delta G_{TOTAL} = \Delta G_V + \Delta G_T + 0.4 =$ 1.65 dB Spec 1.4dB ACC____ REJ QA 1

ECN
CAMSU-1352

DATE ACC REJ

PART NO. 1331562-15B

SPACEK QA 6-29-98 QA 1

SER NO. 7A35

TEST FAILURE: ____

TESTED BY: 777

FAILURE ANALYSIS NO. ____

END DATE: 6-5-98

END TIME: 1600

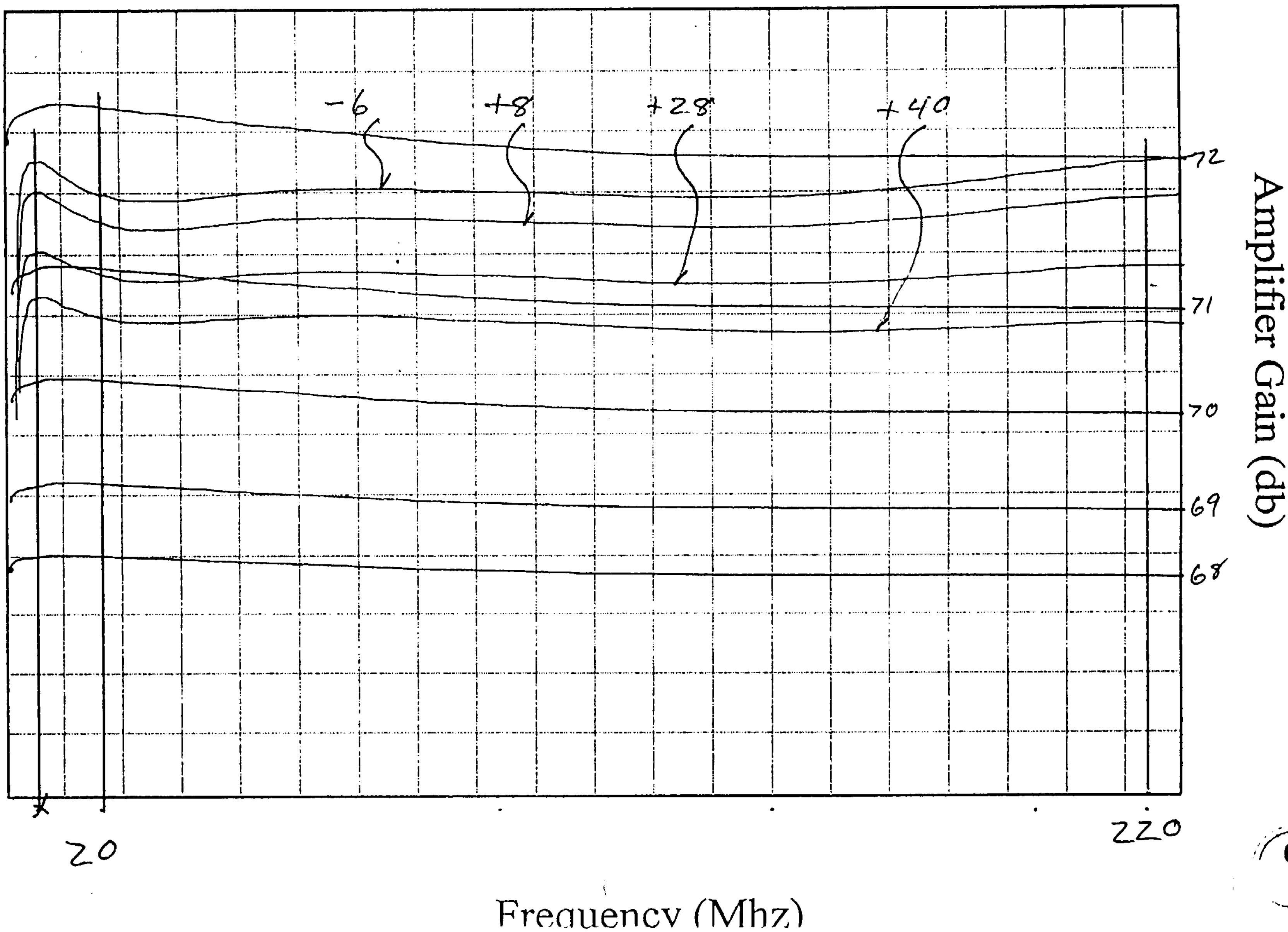
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Amb Temp 23'C

Model No. 1331562-156
Serial No. 7A35
Date 6-6-98
Tested By 77K



QA
1

TEST DATA SHEET NO. 8. AMPLIFIER TESTS

OUTPUT 1.0 dB COMPRESSION POINT TEST: ATP PARAGRAPH 5.1.6

DASH #

11	12	13	14	15	16	17	18	19	20	FREQ. (MHz)	P2 COMP (dBm)	OUTPUT COMP. at+10(dBm)	SPEC. COMP. PT.(dBm)	ACC	REJ
X	X	X	X		X	X	X	X		10					
				X						20	-2,2	0.8	1.0	QA 1	
	X	X								50	~~-2.2~~ 77Y	~~0.8~~			
X	X	X	X	X	X	X	X			100	-2,2	0.8	1.0	QA 1	
X										150					
			X	X	X	X	X	X		200	-2,2	0.8	1.0	QA 1	
								X		400					
									X	500					
									X	1000					
									X	1500					

AMPLIFIER NOISE FIGURE AND TOTAL POWER TEST: ATP PARAGRAPH 5.1.7

DATE: 6-5-98 AMBIENT ROOM TEMPERATURE °C: 23°C

AMPLIFIER OUTPUT POWER AMBIENT (dBm)	AMPLIFIER OUTPUT POWER (-77 K)(dBm)	Y FACTOR (dB)	AMPLIFIER NOISE FIGURE (dB)
-20.9	-24.6	3,7	1,11

Above data taken with Daden filter attached (except -19) .

Intermediate test results for information only

			DATE	ACC	REJ
PART NO. 1331562-15G		SPACEK QA	6-29-98	QA 1	

SER NO. 7A35

TEST FAILURE:

TESTED BY: 77Y

FAILURE ANALYSIS NO.

END DATE: 6-5-98

END TIME: 77Y

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

TEST DATA SHEET NO. 13. MIXER-AMPLIFIER ASSEMBLY TESTS

NOISE FIGURE, TOTAL POWER AND CURRENT VS. TEMPERATURE TEST: ATP PARA 5.4.8.

DATE: 6-24-98 AMBIENT ROOM TEMPERATURE °C: +21

UUT TEMP °C.	UUT CURRENT	MIXER-AMP. OUTPUT POWER (AMBIENT) (dBm)	MIXER-AMP. OUTPUT POWER (77 DEG K) (dBm)	Y FACTOR (dB)	MIXER-AMP. NOISE FIGURE (dB)	SPEC. MIXER-AMP. NOISE FIGURE (dB)	ACC	REJ
-6	43.7	-19.10	-21.00	1.90	3.2	3.8	QA 1	
+8	43.7	-19.30	-21.20	1.90	3.2	3.8	QA 1	
+28	43.9	-19.60	-21.50	1.90	3.2	3.8	QA 1	
+40	43.9	-19.80	-21.65	1.85	3.3	3.8	QA 1	

Noise figure change 0.1 dB Spec is .5dB peak to peak on -20 ACC QA 1 REJ______

NOTE: *Above data to be taken with the Daden filter, except on the -19 unit.*

NEΔT-NOISE POWER STABILITY TEST: ATP PARAGRAPH 5.4.9

Date: 6-22-98 Ambient Room Temperature °C: 24

Attach computer generated *NEΔT* spreadsheet to this test data sheet.

Record the calculated Nps(K) from spreadsheet data: 0.038

Record Nps(K) 0.08 for dash number from Aerojet specification AE-24869, Table II.
Accept units if calculated Nps(K) is less than or equal to specified Nps(K), otherwise reject.

ACC QA 1 REJ _____

PART NO. 1331562-15B

SER NO. 7A35

TESTED BY:

END DATE: 6-25-98

END TIME: 1600

SPACEK QA DATE 6-2998 ACC QA 1 REJ ____

TEST FAILURE: _________

FAILURE ANALYSIS NO. _________

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

Report No. 11413
February, 1999

Channel 6 Mixer/Amplifier

Mixer/Amplifier (P/N: 1331562-16, S/N: 7A36)

TEST DATA SHEET NO. 6. AMPLIFIER TESTS

GAIN FLATNESS TEST: ATP PARAGRAPH 5.1.3

GAIN FLATNESS (dB)ppK	SPEC. GAIN FLATNESS (dB)ppK	ACC	REJ
0,50	0,50	QA 1	

GAIN VERSUS VOLTAGE SENSITIVITY TEST: ATP PARAGRAPH 5.1.4

AMPLIFIER VOLTAGE	GAIN READING (dBm)	$\Delta G/\Delta V$	SPEC. $\Delta G/\Delta V$	ACC	REJ
9.96	71.01	2.25	2.0		QA 1
10.00	71.10				
10.04	71.19				
ΔGv =	0.18 dB				

ECN
CAMSU-1352

		DATE	ACC	REJ
PART NO. 1331562-16E	SPACEK QA	6-29-98		QA 1

SER NO. 7A36

TEST FAILURE:

TESTED BY: 777

FAILURE ANALYSIS NO.

END DATE: 6-5-98

END TIME: 1600

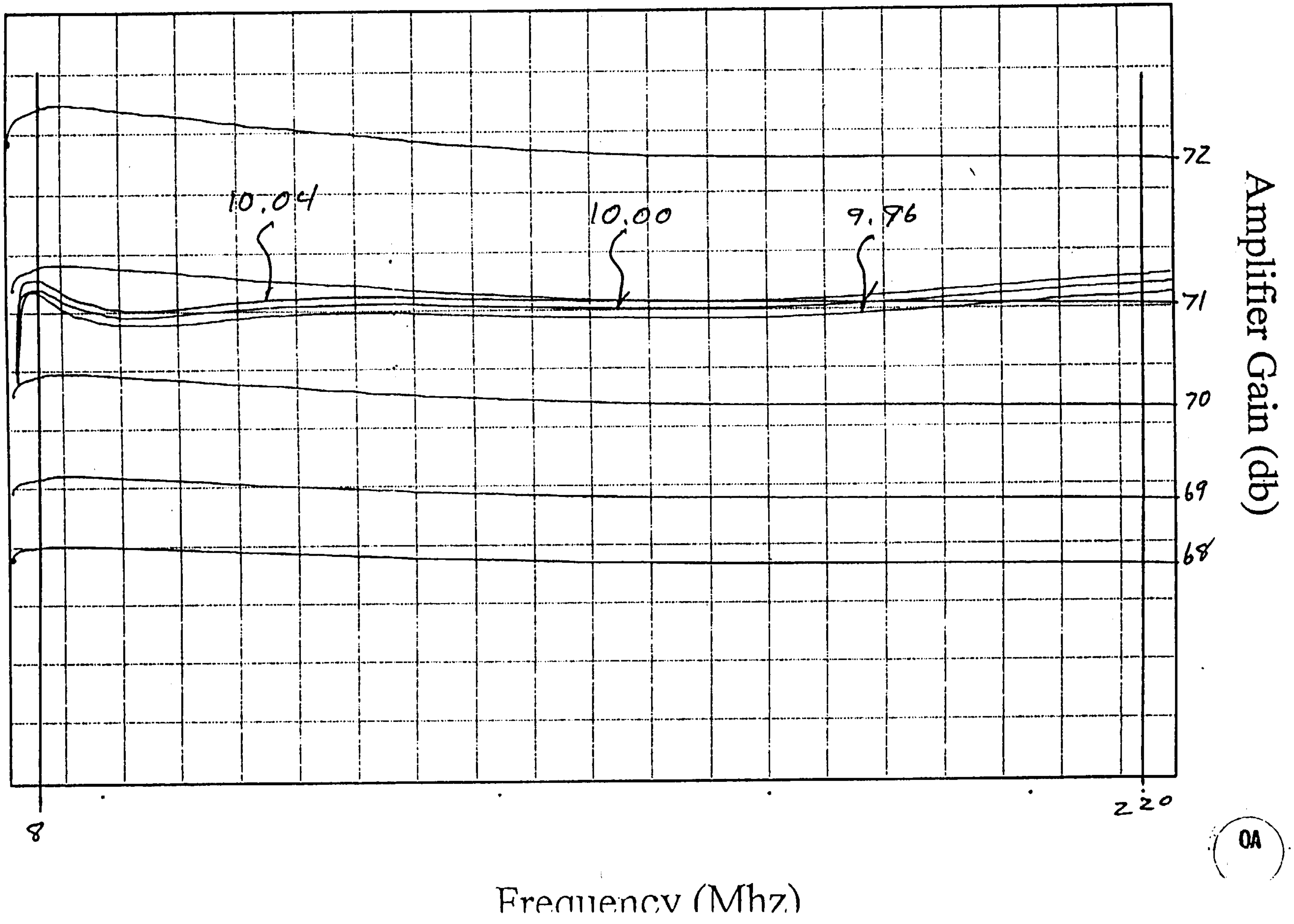
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-16G
Serial No. 7A 36
Date 6-6-98
Tested By 77V

Amb Temp +23'c



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TEST DATA SHEET NO. 7. AMPLIFIER TESTS

GAIN VERSUS TEMPERATURE SENSITIVITY TEST: ATP PARAGRAPH 5.1.5

Nominal Temperature (°C)	Relative Gain	ΔG/ΔT	SPEC	ACC	REJ
T1 -6	G_{T1} 71.78				
		* 0.016	0.035dB/°C	QA 1	
T2 +8	G_{T2} 71.55				
		* 0.025	0.020dB/°C		QA 1
T3 +28	G_{T3} 71.06				
		* 0.035	0.035dB/°C	QA 1	
T4 +40	G_{T4} 70.64				

ECN CAMSU-1352

* Perform the following calculations and record on the TDS

$$\Delta G/\Delta T = \frac{G_{Ti} - G_{Ti+1}}{T_i - T_{i+1}} \qquad i = 1,2,3,4 \qquad \Delta G_T = 1.14 \text{ dB}$$

$\Delta G_{TOTAL} = \Delta G_V + \Delta G_T + 0.4 =$ 1.72 dB Spec 1.4dB ACC_____ REJ QA 1

ECN CAMSU-1352

DATE ACC REJ

PART NO. 1331562-165 SPACEK QA 6-29-98 ___ QA 1

SER NO. 7A36 TEST FAILURE: _________

TESTED BY: 777 FAILURE ANALYSIS NO. _________

END DATE: 6-5-98

END TIME: 1600

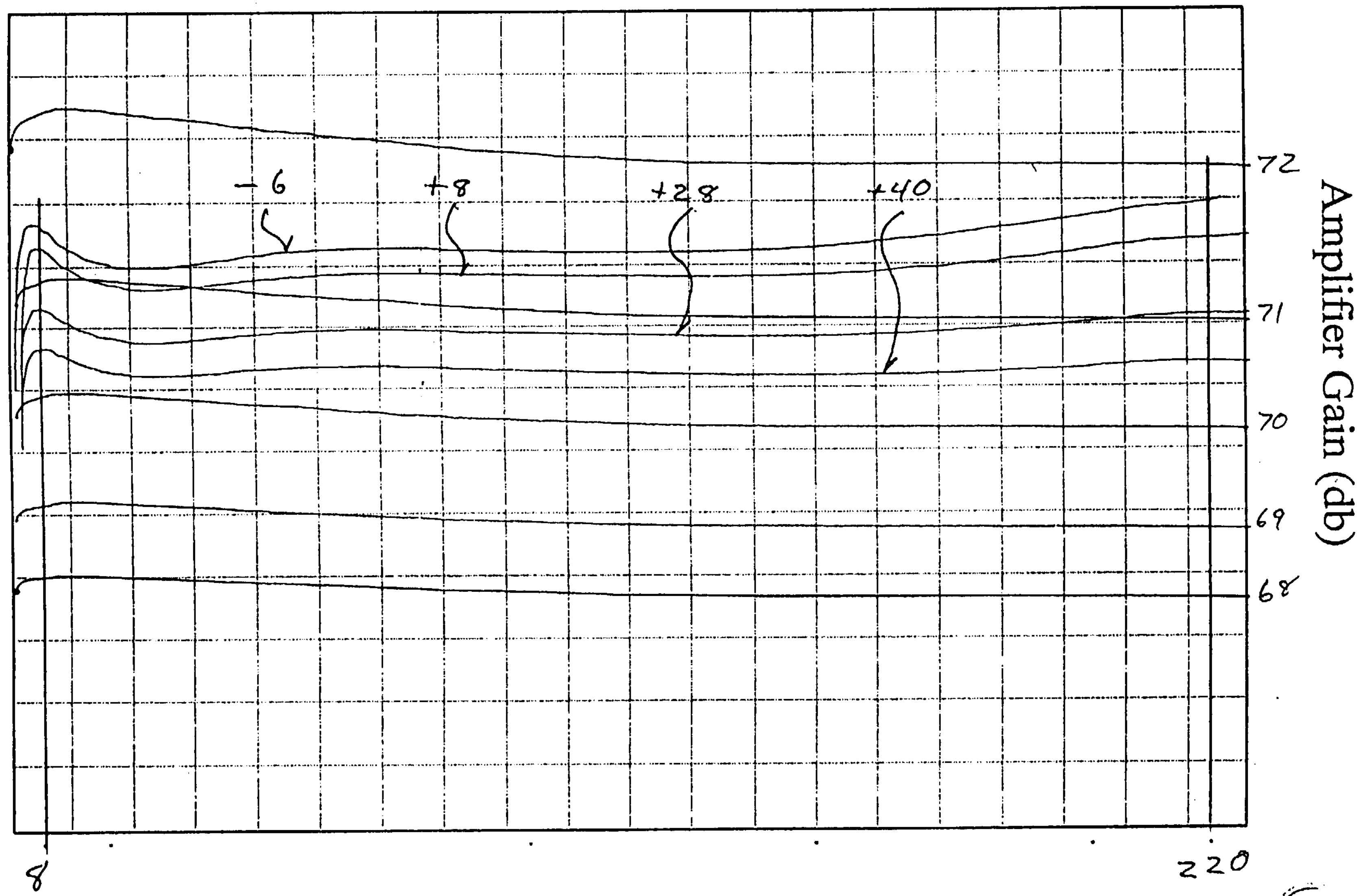
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-16G
Serial No. 7A36
Date 6-6-98
Tested By

Amb Temp 23°C



TEST DATA SHEET NO. 8. AMPLIFIER TESTS

OUTPUT 1.0 dB COMPRESSION POINT TEST: ATP PARAGRAPH 5.1.6

DASH #

11	12	13	14	15	16	17	18	19	20	FREQ. (MHz)	P2 COMP (dBm)	OUTPUT COMP. at+10(dBm)	SPEC. COMP. PT.(dBm)	ACC	REJ
X	X	X	X		X	X	X	X		10	-2.6	0.4	1.0	S-	
				X						20					
	X	X								50					
X	X	X	X	X	X	X	X			100	-2.7	0.3	1.0	S-	
X										150					
			X	X	X	X	X	X		200	-2.7	0.3	1.0	S-	
								X		400					
									X	500					
									X	1000					
									X	1500					

AMPLIFIER NOISE FIGURE AND TOTAL POWER TEST: ATP PARAGRAPH 5.1.7

DATE: 6-5-98 AMBIENT ROOM TEMPERATURE °C: 23°C

AMPLIFIER OUTPUT POWER AMBIENT (dBm)	AMPLIFIER OUTPUT POWER (-77 K)(dBm)	Y FACTOR (dB)	AMPLIFIER NOISE FIGURE (dB)
-20.5	-24.1	3.6	1.19

Above data taken with Daden filter attached (except -19).

Intermediate test results for information only

		DATE	ACC	REJ
PART NO. 1331562-16B	SPACEK QA	6-29-98	S-	

SER NO. 7A36

TEST FAILURE:

TESTED BY: 777

FAILURE ANALYSIS NO.

END DATE: 6-5-98

END TIME: 1600

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

TEST DATA SHEET NO. 13. MIXER-AMPLIFIER ASSEMBLY TESTS

NOISE FIGURE, TOTAL POWER AND CURRENT VS. TEMPERATURE TEST: ATP PARA 5.4.8.

DATE: 6-24-98 AMBIENT ROOM TEMPERATURE °C: +21

UUT TEMP °C.	UUT CURRENT	MIXER-AMP. OUTPUT POWER (AMBIENT) (dBm)	MIXER-AMP. OUTPUT POWER (77 DEG K) (dBm)	Y FACTOR (dB)	MIXER-AMP. NOISE FIGURE (dB)	SPEC. MIXER-AMP. NOISE FIGURE (dB)	ACC	REJ
-6	43.5	-18.70	-20.50	1.80	3.4	3.8	QA 1	
+8	43.6	-18.90	-20.70	1.80	3.4	3.8	QA 1	
+28	43.7	-19.20	-21.00	1.80	3.4	3.8	QA 1	
+40	43.8	-19.50	-21.20	1.70	3.6	3.8	QA 1	

Noise figure change 0.2 dB Spec is .5dB peak to peak on -20 ACC QA 1 REJ ______

NOTE: *Above data to be taken with the Daden filter, except on the -19 unit.*

NEΔT-NOISE POWER STABILITY TEST: ATP PARAGRAPH 5.4.9

Date: 6-22-98 Ambient Room Temperature °C: 24

Attach computer generated *NEΔT* spreadsheet to this test data sheet.

Record the calculated Nps(K) from spreadsheet data: 0.058

Record Nps(K) 0.08 for dash number from Aerojet specification AE-24869, Table II.
Accept units if calculated Nps(K) is less than or equal to specified Nps(K), otherwise reject.

ACC QA 1 REJ ______

				DATE	ACC	REJ
PART NO. 1331562-16G		SPACEK QA		6-29-98	QA 1	
SER NO. 7A36		TEST FAILURE:				
TESTED BY:		FAILURE ANALYSIS NO.				
END DATE: 6-25-98						
END TIME: 1600						

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

Report No. 11413
February, 1999

Channel 7 Mixer/Amplifier

Mixer/Amplifier (P/N: 1331562-17, S/N: 7A47)

TEST DATA SHEET NO. 6. AMPLIFIER TESTS

GAIN FLATNESS TEST: ATP PARAGRAPH 5.1.3

GAIN FLATNESS (dB)ppK	SPEC. GAIN FLATNESS (dB)ppK	ACC	REJ
0.43	0.50	QA 1	

GAIN VERSUS VOLTAGE SENSITIVITY TEST: ATP PARAGRAPH 5.1.4

AMPLIFIER VOLTAGE	GAIN READING (dBm)	ΔG/ΔV	SPEC. ΔG/ΔV	ACC	REJ
9.96	71.14	2.0	2.0	QA 1	
10.00	71.22				
10.04	71.30				
ΔGv =	0.16 dB				

	DATE	ACC	REJ
SPACEK QA	6-8-98	QA 1	

PART NO. 1331562-17B

SER NO. 7A47

TESTED BY:

END DATE: 6-6-98

END TIME: 1600

TEST FAILURE:

FAILURE ANALYSIS NO.

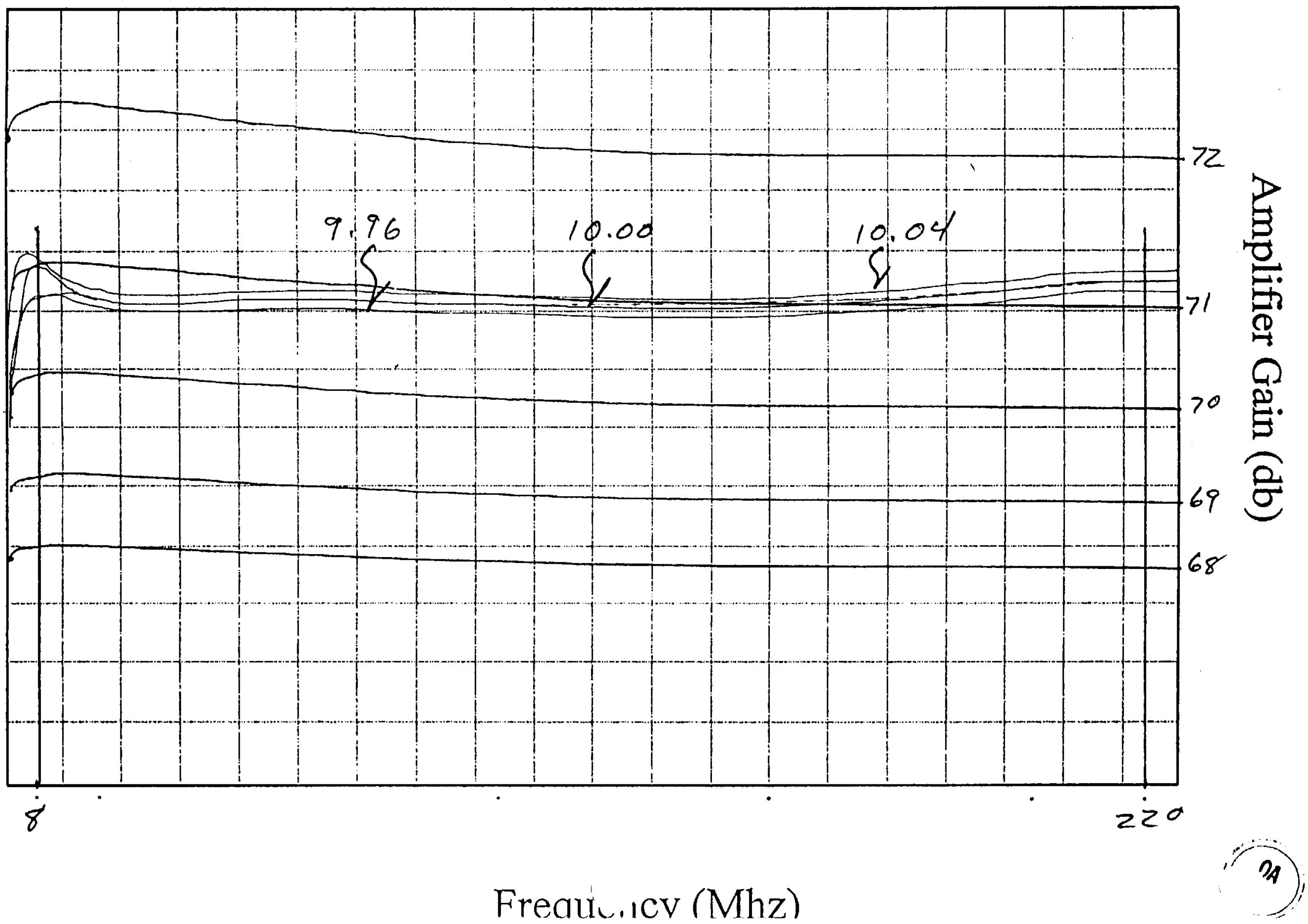
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-176
Serial No. 7A47
Date 6-6-98
Tested By 777

Amb Temp 23°c



9A

TEST DATA SHEET NO. 7. AMPLIFIER TESTS

GAIN VERSUS TEMPERATURE SENSITIVITY TEST: ATP PARAGRAPH 5.1.5

Nominal Temperature (°C)	Relative Gain	ΔG/ΔT	SPEC	ACC	REJ
T1 -6	G_{T1} 72.0				
		* 0.022	0.035dB/°C	QA 1	
T2 +8	G_{T2} 71.69				
		* 0.026	0.020dB/°C		QA 1
T3 +28	G_{T3} 71.18				
		* 0.023	0.035dB/°C	QA 1	
T4 +40	G_{T4} 70.90				

* Perform the following calculations and record on the TDS

$$\Delta G/\Delta T = \frac{G_{Ti} - G_{Ti+1}}{T_i - T_{i+1}} \qquad i = 1,2,3,4$$

ΔG_T = 1.1 dB

$\Delta G_{TOTAL} = \Delta G_V + \Delta G_T + 0.4 =$ 1.66 dB Spec 1.4dB ACC_____ REJ QA 1

ECN
CAMSU [illegible]

DATE	ACC	REJ
6-8-98		QA 1

ENGINEERING DATA ONLY. SEE AE24869 PARA. 3.2.1.15.1

PART NO. 1331562-17B

SPACEK QA

SER NO. 7A47

TEST FAILURE: __________

TESTED BY:

FAILURE ANALYSIS NO. __________

END DATE: 6-6-98

END TIME: 1600

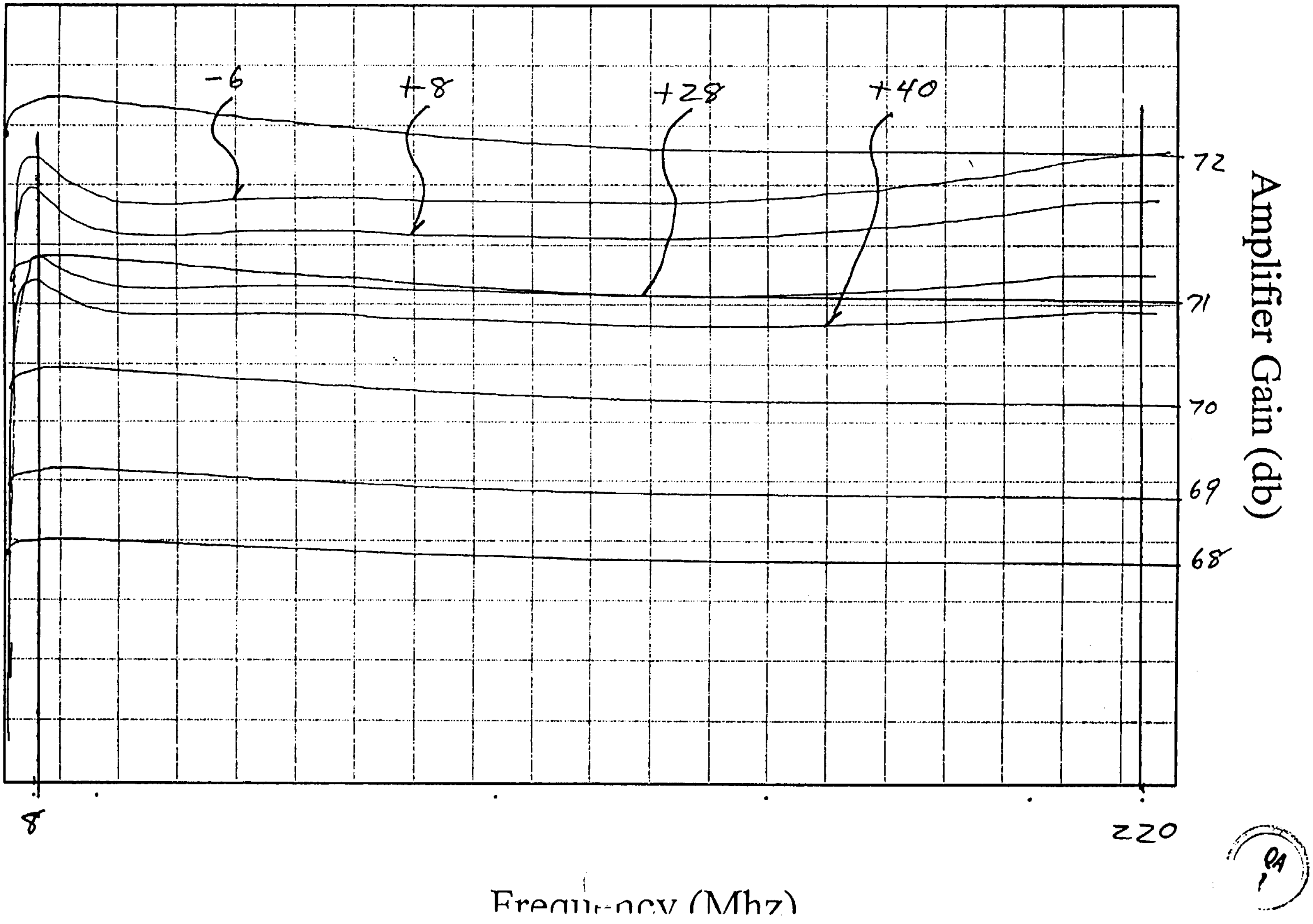
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-176
Serial No. 7A47
Date 6-6-98
Tested By 77k

Amb Temp 23°C



TEST DATA SHEET NO. 8. AMPLIFIER TESTS

OUTPUT 1.0 dB COMPRESSION POINT TEST: ATP PARAGRAPH 5.1.6

DASH #

11	12	13	14	15	16	17	18	19	20	FREQ. (MHz)	P2 COMP (dBm)	OUTPUT COMP. at+10(dBm)	SPEC. COMP. PT.(dBm)	ACC	REJ
X	X	X	X		X	X	X	X		10	-2.6	0.4	1.0	QA 1	
				X						20					
	X	X								50					
X	X	X	X	X	X	X	X			100	-2.7	0.3	1.0	QA 1	
X										150					
			X	X	X	X	X	X		200	-2.6	0.4	1.0	QA 1	
								X		400					
									X	500					
									X	1000					
									X	1500					

AMPLIFIER NOISE FIGURE AND TOTAL POWER TEST: ATP PARAGRAPH 5.1.7

DATE: 6-5-98 AMBIENT ROOM TEMPERATURE °C: 23°C

AMPLIFIER OUTPUT POWER AMBIENT (dBm)	AMPLIFIER OUTPUT POWER (-77 K)(dBm)	Y FACTOR (dB)	AMPLIFIER NOISE FIGURE (dB)
-20.2	-23.8	3.6	1.19

Above data taken with Daden filter attached (except -19) .

Intermediate test results for information only

PART NO. 1331562-17G

SPACEK QA DATE 6-8-98 ACC QA 1 REJ

SER NO. 7A47

TEST FAILURE: ______

TESTED BY: ______

FAILURE ANALYSIS NO. ______

END DATE: 6-5-98

END TIME: 1600

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

TEST DATA SHEET NO. 13. MIXER-AMPLIFIER ASSEMBLY TESTS

NOISE FIGURE, TOTAL POWER AND CURRENT VS. TEMPERATURE TEST: ATP PARA 5.4.8.

DATE: 8-20-98 AMBIENT ROOM TEMPERATURE °C: +21

UUT TEMP °C.	UUT CURRENT	MIXER-AMP. OUTPUT POWER (AMBIENT) (dBm)	MIXER-AMP. OUTPUT POWER (77 DEG K) (dBm)	Y FACTOR (dB)	MIXER-AMP. NOISE FIGURE (dB)	SPEC. MIXER-AMP. NOISE FIGURE (dB)	ACC	REJ
-6	43.6	-19.00	-21.10	2.1	2.9	3.8	QA 1	
+8	43.6	-19.20	-21.30	2.1	2.9	3.8	QA 1	
+28	43.7	-19.60	-21.70	2.1	2.9	3.8	QA 1	
+40	43.8	-19.80	-21.90	2.1	2.9	3.8	QA 1	

Noise figure change 0 dB Spec is .5dB peak to peak on -20 ACC QA 1 REJ______

NOTE: *Above data to be taken with the Daden filter, except on the -19 unit.*

NEΔT-NOISE POWER STABILITY TEST: ATP PARAGRAPH 5.4.9

Date: 8-25-98 Ambient Room Temperature °C: 25

Attach computer generated *NEΔT* spreadsheet to this test data sheet.

Record the calculated Nps(K) from spreadsheet data: 0.049

Record Nps(K) 0.08 for dash number from Aerojet specification AE-24869, Table II. Accept units if calculated Nps(K) is less than or equal to specified Nps(K), otherwise reject.

ACC QA 1 REJ ______

PART NO. 1331562-176 SPACEK QA DATE 8-21-98 ACC QA 1 REJ ______

SER NO. 7A47 TEST FAILURE: ________

TESTED BY: ________ FAILURE ANALYSIS NO. ________

END DATE: 8-20-98

END TIME: 1600

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

Report No. 11413
February, 1999

Channel 8 Mixer/Amplifier

Mixer/Amplifier (P/N: 1331562-18, S/N: 7A28)

TEST DATA SHEET NO. 6. AMPLIFIER TESTS

GAIN FLATNESS TEST: ATP PARAGRAPH 5.1.3

GAIN FLATNESS (dB)ppK	SPEC. GAIN FLATNESS (dB)ppK	ACC	REJ
0.50	0.50	QA 1	

GAIN VERSUS VOLTAGE SENSITIVITY TEST: ATP PARAGRAPH 5.1.4

AMPLIFIER VOLTAGE	GAIN READING (dBm)	ΔG/ΔV	SPEC. ΔG/ΔV	ACC	REJ
9.96	70.08	1.75	2.0	QA 1	
10.00	70.15				
10.04	70.22				
ΔGv =	0.14 dB				

	DATE	ACC	REJ
SPACEK QA	6-29-98	QA 1	

PART NO. 1331562-18B

SER NO. 7A28

TESTED BY:

END DATE: 6-5-98

END TIME: 1600

TEST FAILURE:

FAILURE ANALYSIS NO.

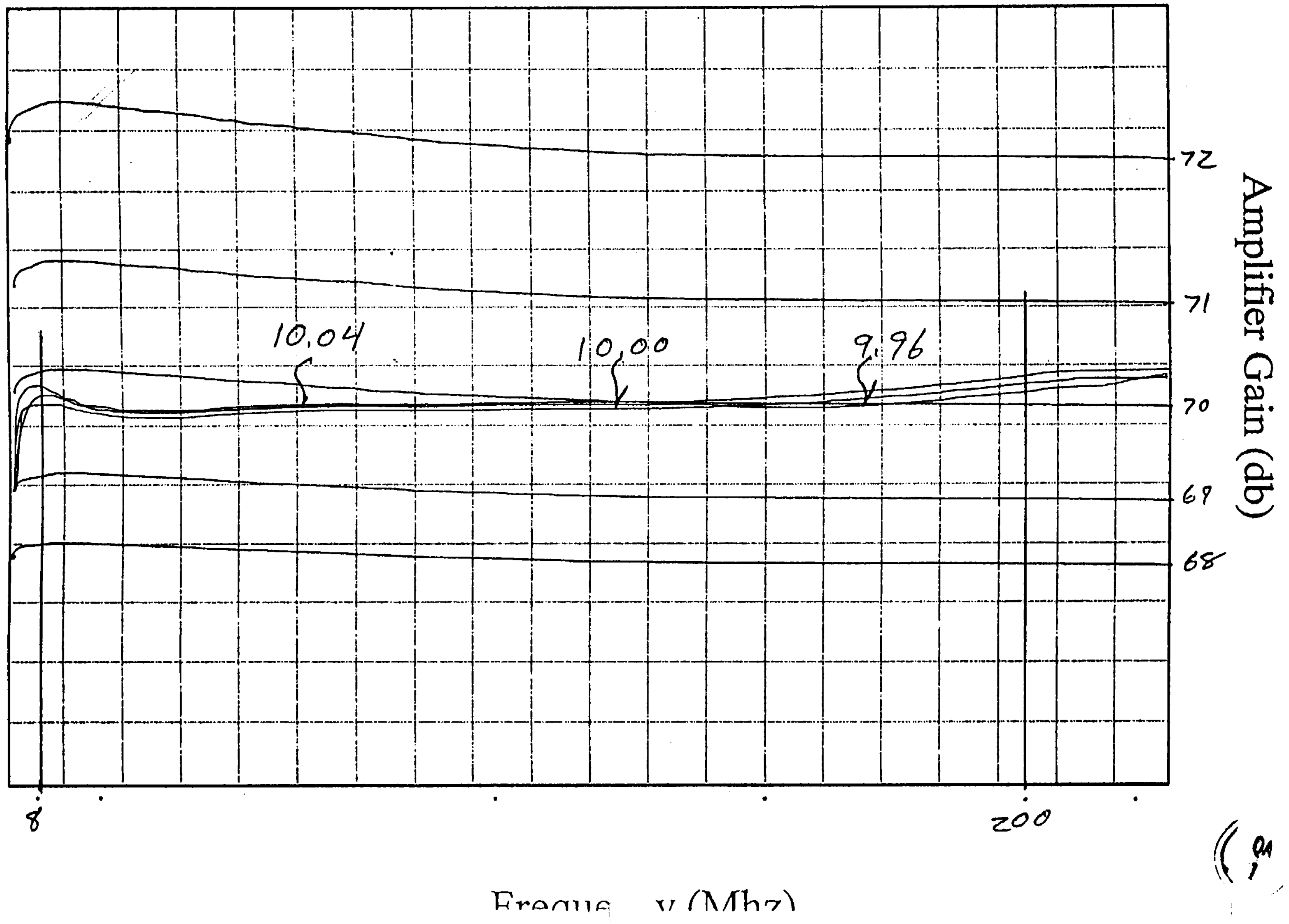
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-186
Serial No. 7A28
Date 6-6-98
Tested By ZJY

Amb Temp 23°c



QA 1

TEST DATA SHEET NO. 7. AMPLIFIER TESTS

GAIN VERSUS TEMPERATURE SENSITIVITY TEST: ATP PARAGRAPH 5.1.5

Nominal Temperature (°C)	Relative Gain	ΔG/ΔT	SPEC	ACC	REJ
T1 −6	G_{T1} 70.95	▨	▨		
▨	▨	* 0.018	0.035dB/°C	QA 1	
T2 +8	G_{T2} 70.70	▨	▨		
▨	▨	* 0.027	0.020dB/°C		QA 1
T3 +28	G_{T3} 70.17	▨	▨		
▨	▨	* 0.027	0.035dB/°C	QA 1	
T4 +40	G_{T4} 69.85	▨	▨		

ECN
CAMSU-135

* Perform the following calculations and record on the TDS

$$\Delta G/\Delta T = \frac{G_{Ti} - G_{Ti+1}}{T_i - T_{i+1}} \quad i = 1,2,3,4$$

ΔG_T = 1.1 dB

$\Delta G_{TOTAL} = \Delta G_V + \Delta G_T + 0.4 =$ 1.64 dB Spec 1.4dB ACC____ REJ QA 1

ECN
CAMSU-135

DATE ACC REJ

PART NO. 1331562-18B

SPACEK QA 6-29-98 ___ QA 1

SER NO. 7A28

TEST FAILURE: ________

TESTED BY:

FAILURE ANALYSIS NO. ________

END DATE: 6-5-98

END TIME: 1600

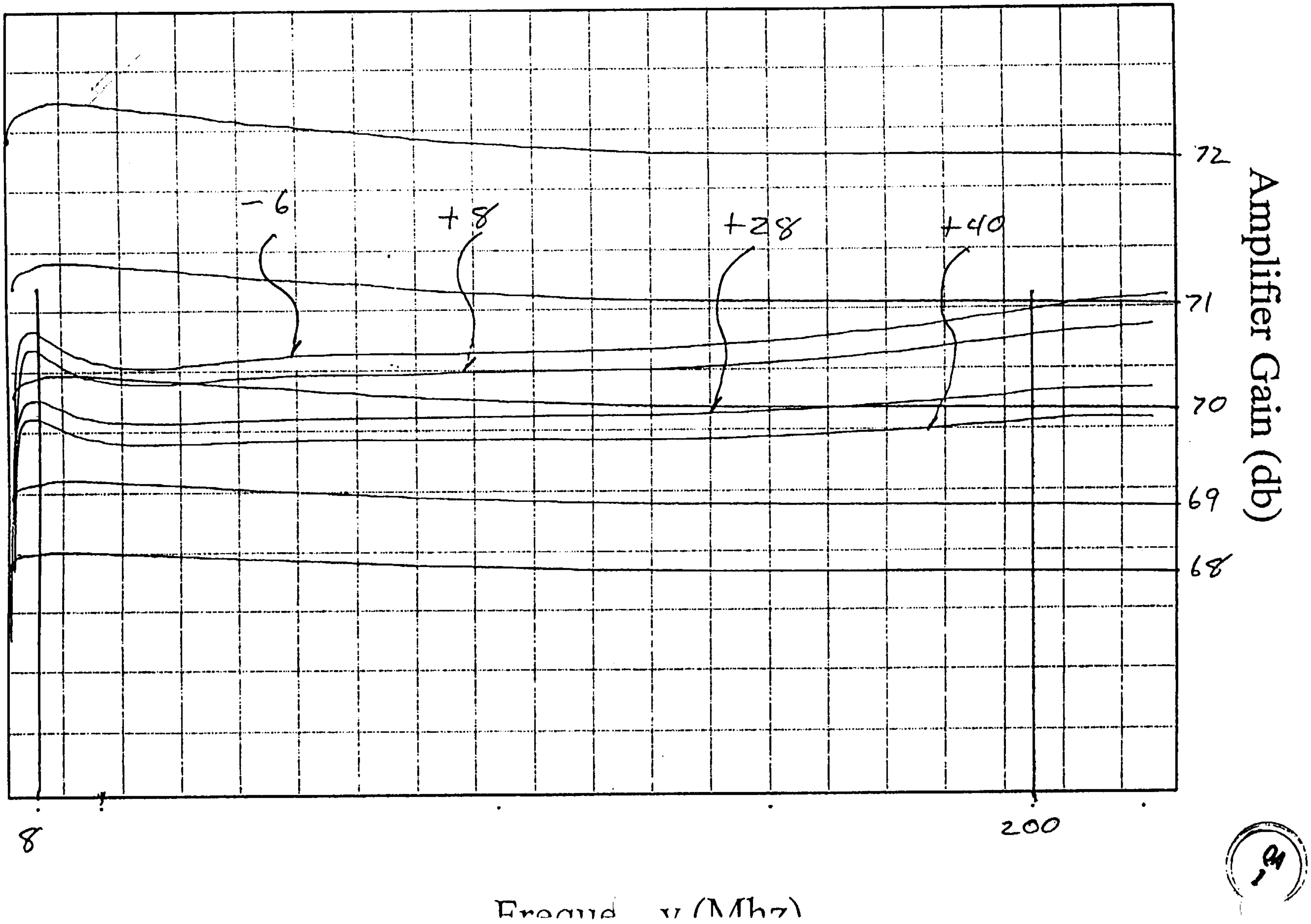
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-18 G
Serial No. 7A28
Date 6-6-98
Tested By 777

Amb Temp 23°C



TEST DATA SHEET NO. 8. AMPLIFIER TESTS

OUTPUT 1.0 dB COMPRESSION POINT TEST: ATP PARAGRAPH 5.1.6

DASH #															
11	12	13	14	15	16	17	18	19	20	FREQ. (MHz)	P2 COMP (dBm)	OUTPUT COMP. at+10(dBm)	SPEC. COMP. PT.(dBm)	ACC	REJ
X	X	X	X		X	X	X	X		10	-2.3	0.7	1.0		
				X						20					
	X	X								50					
X	X	X	X	X	X	X	X			100	-2.4	0.6	1.0		
X										150					
			X	X	X	X	X	X		200	-2.4	0.6	1.0		
								X		400					
									X	500					
									X	1000					
									X	1500					

AMPLIFIER NOISE FIGURE AND TOTAL POWER TEST: ATP PARAGRAPH 5.1.7

DATE: 5-6-98 AMBIENT ROOM TEMPERATURE °C: 23

AMPLIFIER OUTPUT POWER AMBIENT (dBm)	AMPLIFIER OUTPUT POWER (-77 K)(dBm)	Y FACTOR (dB)	AMPLIFIER NOISE FIGURE (dB)
-21.4	-25.0	3.6	1.19

Above data taken with Daden filter attached (except -19) .

Intermediate test results for information only

			DATE	ACC	REJ
PART NO.	1331562-18G	SPACEK QA	6-29-98		
SER NO.	7A28	TEST FAILURE:			
TESTED BY:	JFH	FAILURE ANALYSIS NO.			
END DATE:	6-5-98				
END TIME:	1600				

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

TEST DATA SHEET NO. 13. MIXER-AMPLIFIER ASSEMBLY TESTS

NOISE FIGURE, TOTAL POWER AND CURRENT VS. TEMPERATURE TEST: ATP PARA 5.4.8.

DATE: 6-24-98 AMBIENT ROOM TEMPERATURE °C: +21

UUT TEMP °C.	UUT CURRENT	MIXER-AMP. OUTPUT POWER (AMBIENT) (dBm)	MIXER-AMP. OUTPUT POWER (77 DEG K) (dBm)	Y FACTOR (dB)	MIXER-AMP. NOISE FIGURE (dB)	SPEC. MIXER-AMP. NOISE FIGURE (dB)	ACC	REJ
-6	45.1	-19.70	-21.50	1.80	3.4	3.8	QA 1	
+8	45.2	-19.80	-21.55	1.75	3.5	3.8	QA 1	
+28	45.3	-20.20	-21.95	1.75	3.5	3.8	QA 1	
+40	45.4	-20.50	-22.20	1.70	3.6	3.8	QA 1	

Noise figure change 0.2 dB Spec is .5dB peak to peak on -20 ACC QA 1 REJ ______

NOTE: *Above data to be taken with the Daden filter, except on the -19 unit.*

NEΔT-NOISE POWER STABILITY TEST: ATP PARAGRAPH 5.4.9

Date: 6-20-98 Ambient Room Temperature °C: 24

Attach computer generated *NEΔT* spreadsheet to this test data sheet.

Record the calculated Nps(K) from spreadsheet data: 0.045

Record Nps(K) 0.08 for dash number from Aerojet specification AE-24869, Table II.
Accept units if calculated Nps(K) is less than or equal to specified Nps(K), otherwise reject.

ACC QA 1 REJ ______

				DATE	ACC	REJ
PART NO.	1331562-186	SPACEK QA		6-29-98	QA 1	
SER NO.	7A28	TEST FAILURE:				
TESTED BY:		FAILURE ANALYSIS NO.				
END DATE:	6-25-98					
END TIME:	1600					

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

Report No. 11413
February, 1999

Channels 9-14 Mixer/Amplifier

Mixer/Amplifier (P/N: 1331562-19, S/N: 7A39)

TEST DATA SHEET NO. 6. AMPLIFIER TESTS

GAIN FLATNESS TEST: ATP PARAGRAPH 5.1.3

GAIN FLATNESS (dB)ppK	SPEC. GAIN FLATNESS (dB)ppK	ACC	~~REJ~~
0.70	0.50		QA 1

GAIN VERSUS VOLTAGE SENSITIVITY TEST: ATP PARAGRAPH 5.1.4

AMPLIFIER VOLTAGE	GAIN READING (dBm)	ΔG/ΔV	SPEC. ΔG/ΔV	ACC	REJ
9.96	61.15	2.0	2.0	QA 1	
10.00	61.23				
10.04	61.32				
ΔGv =	0.16 dB				

ECN
CAMSU-1352

	DATE	ACC	REJ
SPACEK QA	6-30-98		QA 1

PART NO. 1331562-19B

SER NO. 7A39

TESTED BY: 777

END DATE: 6-5-98

END TIME: 1600

TEST FAILURE:

FAILURE ANALYSIS NO.

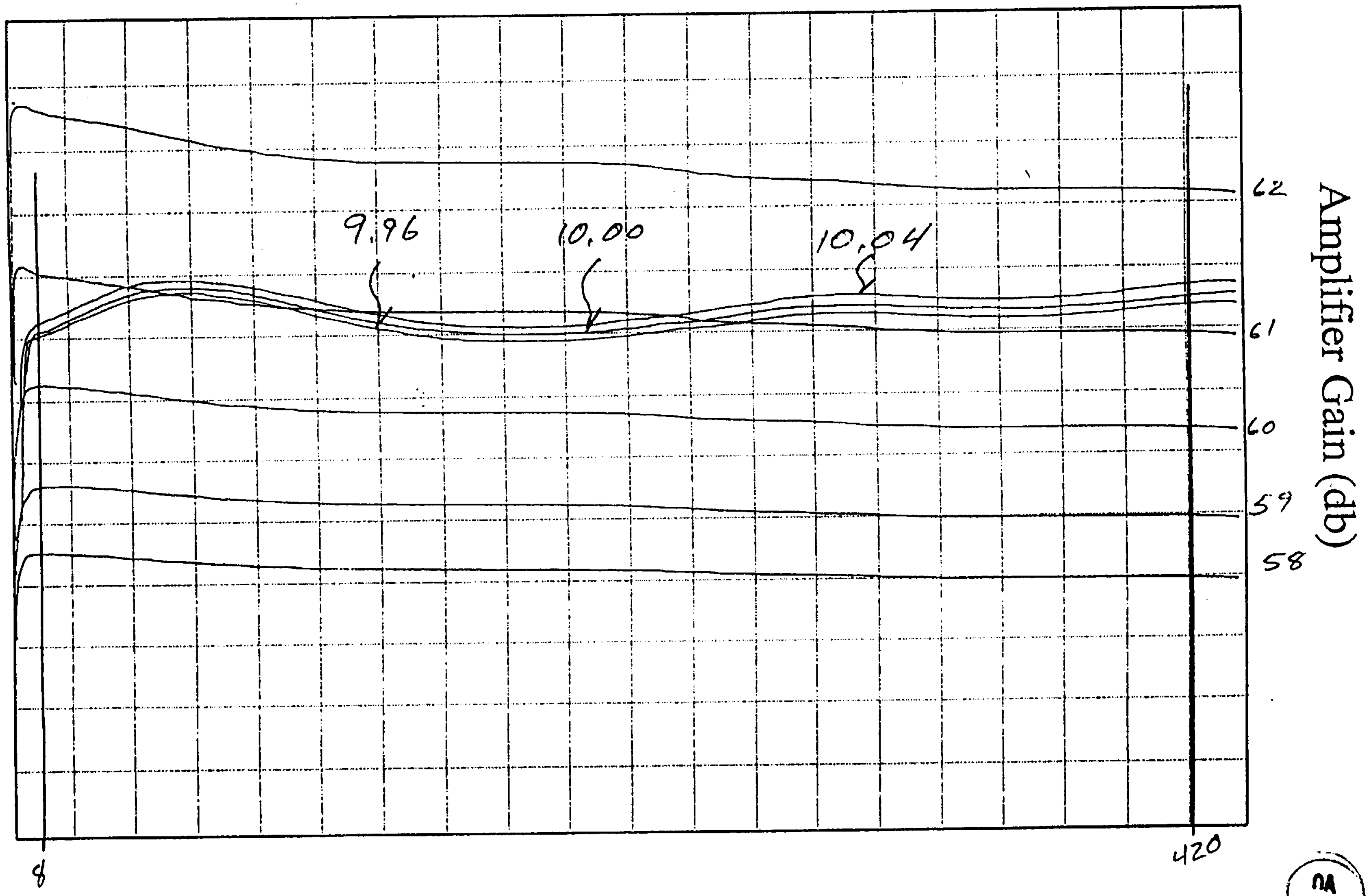
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-19 G
Serial No. 7A 39
Date 5-27-98
Tested By 77Z

Amb Temp 23'c



NA

TEST DATA SHEET NO. 7. AMPLIFIER TESTS

GAIN VERSUS TEMPERATURE SENSITIVITY TEST: ATP PARAGRAPH 5.1.5

Nominal Temperature (°C)	Relative Gain	ΔG/ΔT	SPEC	ACC	REJ
T1 -6	GT1 62.27	▨	▨		
▨	▨	* 0.028	0.035dB/°C	QA 1	
T2 +8	GT2 61.88	▨	▨		
▨	▨	* 0.036	0.020dB/°C		QA 1
T3 +28	GT3 61.17	▨	▨		
▨	▨	* 0.049	0.035dB/°C		QA 1
T4 +40	GT4 60.58	▨	▨		

ECN
CAMSU - 1352

• Perform the following calculations and record on the TDS

$$\Delta G/\Delta T = \frac{G_{Ti} - G_{Ti+1}}{T_i - T_{i+1}} \quad i = 1,2,3,4$$

ΔG_T = ~~1.69~~ 0.037 dB

$\Delta G_{TOTAL} = \Delta G_V + \Delta G_T + 0.4$ = 2.25 dB Spec 1.4dB ACC____ REJ QA 1

ECN
CAMSU-1352

	DATE	ACC	REJ
SPACEK QA	6-30-98		QA 1

PART NO. 1331562-196

SER NO. 7A39

TESTED BY:

END DATE: 6-5-98

END TIME: 1600

TEST FAILURE: ________

FAILURE ANALYSIS NO. ________

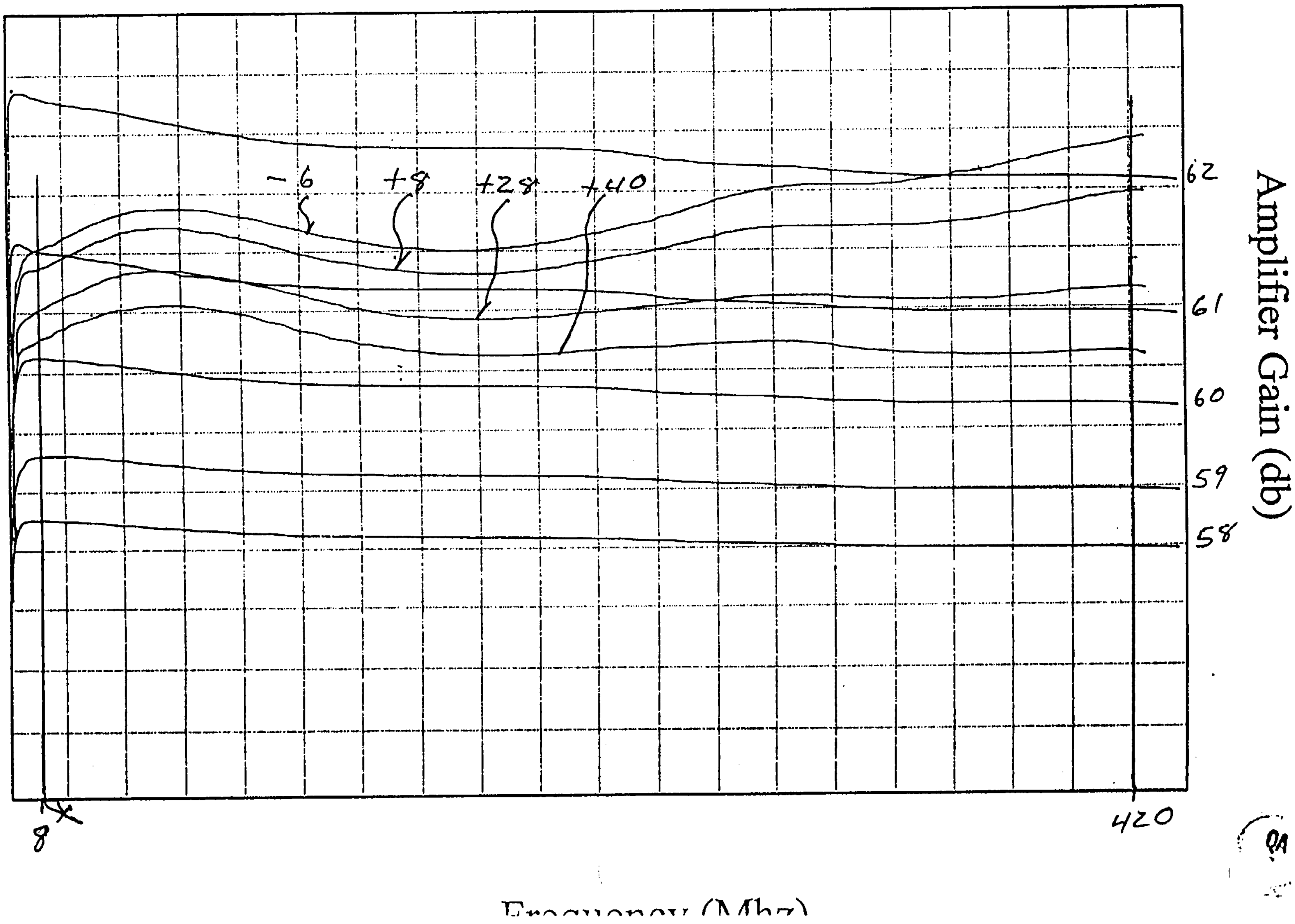
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 133/562-196
Serial No. 7A39
Date 5-27-98
Tested By 77

Amb Temp 23°C



QA

TEST DATA SHEET NO. 8. AMPLIFIER TESTS

OUTPUT 1.0 dB COMPRESSION POINT TEST: ATP PARAGRAPH 5.1.6

DASH #

11	12	13	14	15	16	17	18	19	20	FREQ. (MHz)	P2 COMP (dBm)	OUTPUT COMP. at+10(dBm)	SPEC. COMP. PT.(dBm)	ACC	REJ
X	X	X	X		X	X	X	X		10	-2.5	0.5	1,0		
				X						20					
	X	X								50					
X	X	X	X	X	X	X	X			100					
X										150					
			X	X	X	X	X	X		200	-2,5	0,5	1.0		
								X		400	-2,3	0,7	1.0		
									X	500					
									X	1000					
									X	1500					

AMPLIFIER NOISE FIGURE AND TOTAL POWER TEST: ATP PARAGRAPH 5.1.7

DATE: 6-5-98 AMBIENT ROOM TEMPERATURE °C: 23°C

AMPLIFIER OUTPUT POWER AMBIENT (dBm)	AMPLIFIER OUTPUT POWER (-77 K)(dBm)	Y FACTOR (dB)	AMPLIFIER NOISE FIGURE (dB)
-25.4	-28,9	3,5	1,27

Above data taken with Daden filter attached (except -19) .

Intermediate test results for information only

PART NO. 1331562-19G

SER NO. 7A39

TESTED BY: 777

END DATE: 6-5-98

END TIME: 1600

	DATE	ACC	REJ
SPACEK QA	6-30-98		

TEST FAILURE:

FAILURE ANALYSIS NO.

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

TEST DATA SHEET NO. 13. MIXER-AMPLIFIER ASSEMBLY TESTS

NOISE FIGURE, TOTAL POWER AND CURRENT VS. TEMPERATURE TEST: ATP PARA 5.4.8.

DATE: 6-24-98 AMBIENT ROOM TEMPERATURE °C: +21

UUT TEMP °C.	UUT CURRENT	MIXER-AMP. OUTPUT POWER (AMBIENT) (dBm)	MIXER-AMP. OUTPUT POWER (77 DEG K) (dBm)	Y FACTOR (dB)	MIXER-AMP. NOISE FIGURE (dB)	SPEC. MIXER-AMP. NOISE FIGURE (dB)	ACC	REJ
-6	51.0	-24.20	-26.10	1.90	3.2	3.8	QA 1	
+8	51.0	-24.50	-26.40	1.90	3.2	3.8	QA 1	
+28	51.0	-24.90	-26.80	1.90	3.2	3.8	QA 1	
+40	51.2	-25.30	-27.15	1.85	3.3	3.8	QA 1	

Noise figure change 0.1 dB Spec is .5dB peak to peak on -20 ACC QA 1 REJ ______

NOTE: *Above data to be taken with the Daden filter, except on the -19 unit.*

NEΔT-NOISE POWER STABILITY TEST: ATP PARAGRAPH 5.4.9

Date: 6-22-98 Ambient Room Temperature °C: 24

Attach computer generated *NEΔT* spreadsheet to this test data sheet.

Record the calculated Nps(K) from spreadsheet data: 0.042

Record Nps(K) 0.07 for dash number from Aerojet specification AE-24869, Table II. Accept units if calculated Nps(K) is less than or equal to specified Nps(K), otherwise reject.

ACC QA 1 REJ ______

PART NO. 1331562-19B

SER NO. 7A39

TESTED BY:

END DATE: 6-26-98

END TIME: 1600

SPACEK QA DATE 6-30-98 ACC QA 1 REJ ______

TEST FAILURE: ______

FAILURE ANALYSIS NO. ______

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

Report No. 11413
February, 1999

Channel 9 Amplifier

IF Amplifier (P/N:1331579-8, S/N: 105)

APPENDIX C
ATP1772 DATA SHEET
MODEL NUMBER VD722301
AEROJET P/N 1331579-8

S/N 105

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.1.1	Examination of Product		Accept X Reject ____			12-5-96
4.2.2	* Current Limiting	200 mA maximum Reg. VOLTAGE= 6.64 VDC Total R= 57.0 ohm max. current draw =	116.5 mA			
4.4	Electrical Test					9-19-96
4.4.1	* Polarity Reversal Protection	No Damage	Current 35.4 mA Accept X Reject ____			12-5-96
	Short Open Protection	No Damage	Accept X Reject ____			12-5-96
	Output Coupling	Output shall be AC coupled	Accept X Reject ____			12-5-96
4.4.2	Gain vs. Freq. 5 MHz to 200 MHz	14.5dB Min., 15.5dB Max. -4°C to +40°C Attach x-y plot	Max 15.24 dB Min 15.09 dB Accept X Reject ____	Max 15.18 dB Min 15.02 dB Accept X Reject ____	Max 15.27 dB Min 15.12 dB Accept X Reject ____	12-5-96
	Gain Flatness	.5 dB Maximum Worse Case	Accept X Reject ____ 0.15 dB	Accept X Reject ____ 0.17 dB	Accept X Reject ____ 0.18 dB	12-5-96
	Gain Temp. Sensitivity	±.22 dB from -4°C to +40°C Worse Case	Accept X Reject ____	Accept X Reject ____ 0.10 dB	Accept X Reject ____ 0.05 dB	12-5-96
4.4.3	Gain-Voltage Sensitivity Input Currents	≤.5dB/v Worse Case ± .2dB for 7.6 to 8.4 Vdc 40ma MAX. 7.6v 8.0v 8.4v Attach X-Y Plot	0.05 dB 34.5 mA 35.4 mA 35.8 mA Accept X Reject ____	0.03 dB 31.4 mA 32.0 mA 32.7 mA Accept X Reject ____	0.02 dB 37.2 mA 37.9 mA ~~SH37.9~~ mA Accept X Reject ____	38.5mA 12-5-96

NOTE: * TEST REQUIRED ON PROTOFLIGHT UNIT ONLY

Amplica, Inc.
Newbury Park, CA 91320

DRAWN	SIZE A	FSCM NO. 51025	ATP1772	REV. B
ISSUED	SCALE		SHEET 34 OF 38	

ELECTRICAL TEST DATA SHEET

AEROJET PART: 1331576-4 PHONON PART: 100826 SERIAL:B07
TESTED BY: 210 TITLE: test tech DATE: 5/12/98 TIME: 11:00 am
TEST: FINAL FUNCTIONAL
EQUIPMENT: HP 8753D SERIAL:3410A04374 CAL DUE:1/29/99
HP 3478A SERIAL:2136A03127 CAL DUE:7/7/98

PARAGRAPH		REQUIREMENT TITLE	DATA		P/F
REQ.	Q/ATP				
3.2.1.1	5.2.1	OPERATING TEMPERATURE	35.5 C		P
3.2.1.3	5.2.3	CENTER FREQUENCY &			
3.2.1.4		CENTER FREQUENCY STABILITY			
		LO: 317.535/317.865 MHz	317.749 MHz		P
		HI: 326.535/326.865 MHz	326.733 MHz		P
3.2.1.5	5.2.4	3 dB BANDWIDTH:			
		LO: 2.8/3.0 MHz	2.949 MHz		P
		HI: 2.8/3.0 MHz	2.955 MHz		P
3.2.1.6	5.2.5	PASSBAND SYMMETRY			
		LO: /0.5 dB	0.1 dB		P
		HI: /0.5 dB	0.3 dB		P
3.2.1.7	5.2.6	PASSBAND RIPPLE			
		316.575-318.825 MHz: /1.0 dB	0.6 dB		P
		325.575-327.825 MHz: /1.0 dB	0.5 dB		P
3.2.1.8	5.2.7	INSERTION LOSS			
		LO: 27.8/30.2 dB	28.7 dB		P
		HI: 27.8/30.2 dB	28.8 dB		P
3.2.1.9	5.2.8	INSERTION LOSS VARIATION			
		LO: -0.4/0.4 dB	0.2 dB		P
		HI: -0.4/0.4 dB	0.2 dB		P
3.2.1.10	5.2.9	AMPLITUDE BALANCE			
		LO,HI: /0.5 dB	0.1 dB		P
3.2.1.11	5.2.10	OUT-OF-BAND REJECTION			
		BAND	PEAK(dB)	WIDTH(MHz)	
		WIDE: 1-313,331-1000 MHz:	46.2	0.000	
		DUAL: 313.000-315.585, 319.815-324.585, 328.815-331.0 MHz:	39.7	0.042	
		PEAK: 35.0/ dB	39.7 dB		P
		WIDTH: /0.6 MHz		0.042 MHz	P
3.2.1.12	5.2.11	SHAPE FACTOR			
		LO: /1.30 Unitless	1.24 Unitless		P
		HI: /1.30 Unitless	1.24 Unitless		P
3.2.1.14	5.2.12	VSWR (RETURN LOSS)			
		316.575-318.825,325.575-327.825 MHz			
		DUAL S11: 7.5/ dB	9.6 dB		P
		DUAL S22: 7.5/ dB	10.7 dB		P
4.8.2	5.2.14	LIMITED FUNCTIONAL TESTS			
		CENTER FREQUENCY: -0.1/0.1 MHz	0 MHz		P
		3 dB BANDWIDTH: -0.06/0.06 MHz	0 MHz		P
		INSERTION LOSS: -0.5/0.5 dB	0 dB		P
NONE	5.2.15	DATA SHEET SUMMARY			
		[✓ PASS]/FAIL)	P		DP

3/22/99

PHONON CORPORATION
7 HERMAN DRIVE
SIMSBURY, CT 06070

CAGE: 6Y858
TEL: 203-651-0211
FAX: 203-651-8618

APPENDIX C
ATP1774 DATA SHEET
MODEL NUMBER UD114302
AEROJET P/N 1331579-10

S/N 105

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.4.7	Compression	1 dB maximum Compression AT +10 dBm Output Power	Accept ✓ Reject ___			
		255 MHz	0.70 dB	0.90 dB	0.65 dB	
		322.5 MHz	0.60 dB	0.70 dB	0.58 dB	
		390 MHz	0.65 dB	0.82 dB	0.60 dB	12-4-96
4.4.8	Stability	Unconditionally Stable	Accept ✓ Reject ___			12-3-96
4.4.9	Start-up	Capable of starting operation at -30°C and +60°C with a maximum current draw of 50 mA	Accept ✓ Reject ___			
		Maximum Current	42.1 mA			12-5-96

NOTE: Review all recorded data and signify acceptance below.

Technician ______ T143 Date: 12-5-96

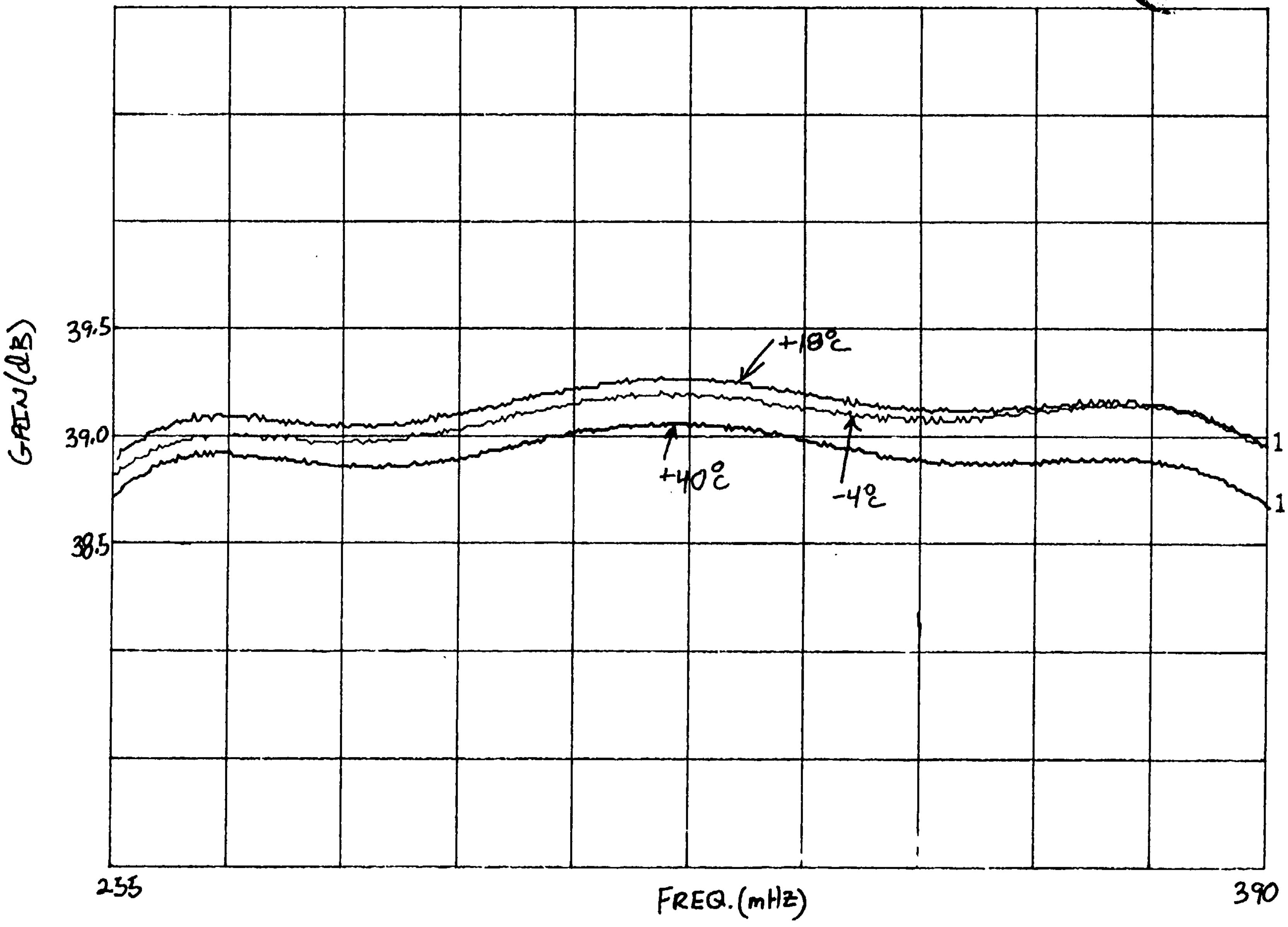
Quality Assurance ______ A23 Date: 12/9/96

CSI: ______ Date: 12-9-96

GSI: ______ 3387 Date: 2/10/97

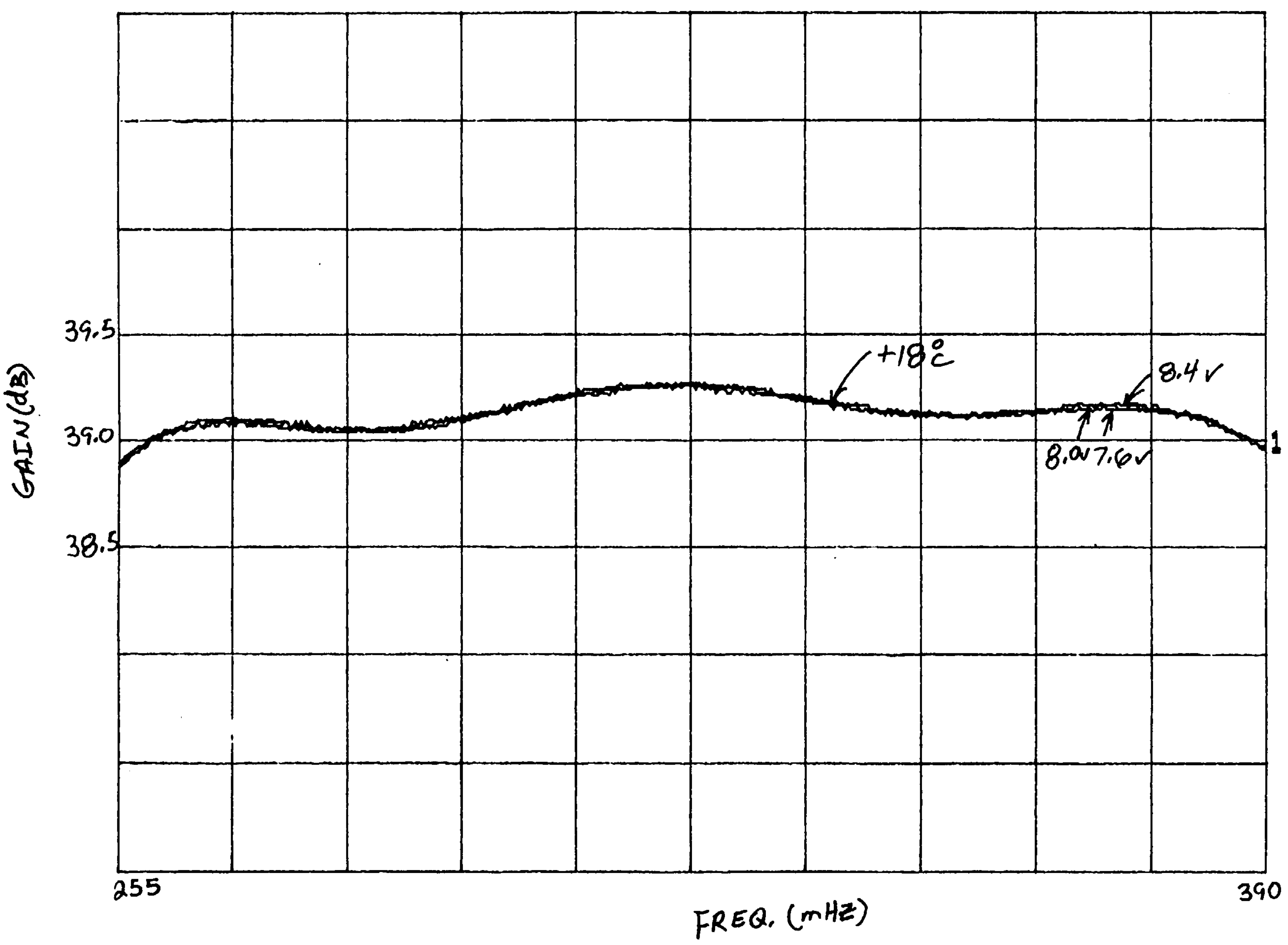
MODEL UD114302 S/N 105
GAIN VS FREQUENCY
VERTICAL CALIBRATION .5 dB INCH
TEMPERATURE As NOTED DEG.C.
TECH T143 SW DATE 12-3-96

P/N 1331579 – 10



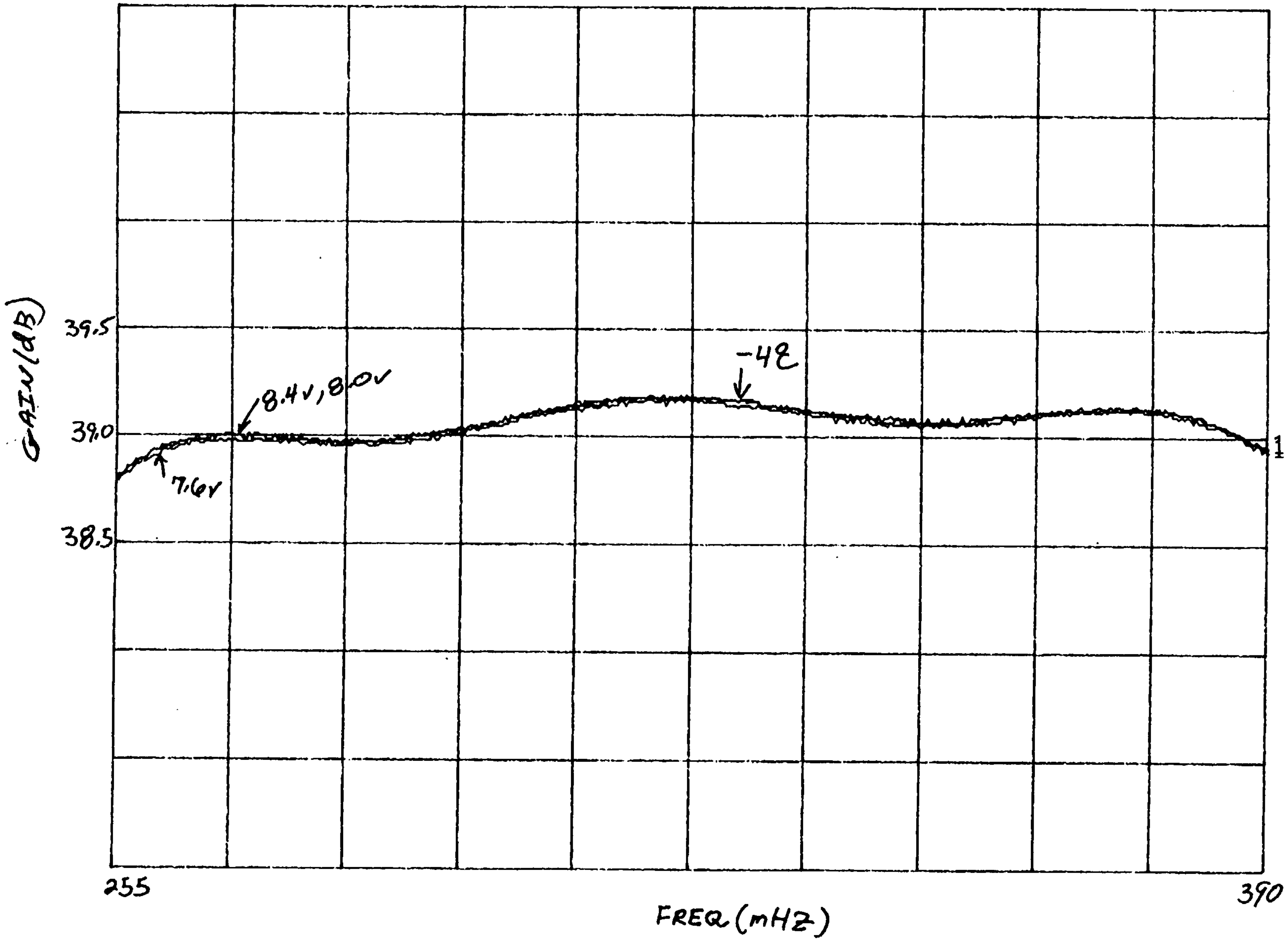
GAIN-VOLTAGE SENS/ITY VS. FREQ.
VERTICAL CALIBRATION 0.5 dB INCH
TEMPERATURE as noted DEG.C.
TECH ⓉT143 SH DATE 12-3-90

P/N 1331579-10



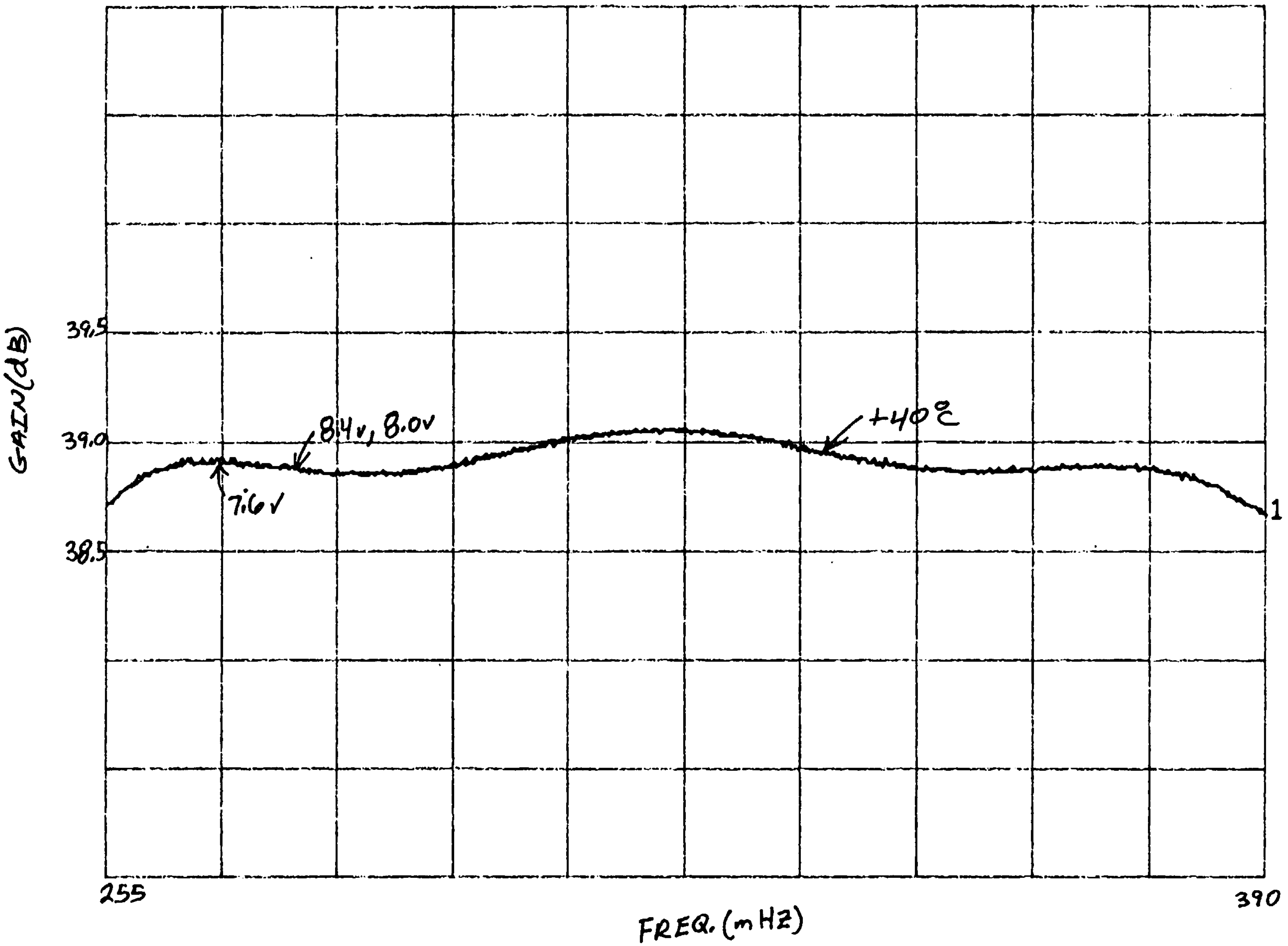
GAIN-VOLTAGE SENSITIVITY VS. FREQ.
VERTICAL CALIBRATION 0.5 dB INCH
TEMPERATURE as noted DEG.C.
TECH T14 SH DATE 12-3-96

P/N 1331579-10



GAIN-VOLTAGE SENSITIVITY VS. FREQ.
VERTICAL CALIBRATION 0.5 dB INCH
TEMPERATURE as noted DEG.C.
TECH T14 SW DATE 12-3 86

P/N 1331579-10



Report No. 11413
February, 1999

Channel 12 Amplifier

IF Amplifier (P/N:1331579-11, S/N: 111)

APPENDIX C
ATP1775 DATA SHEET
MODEL NUMBER UD415301
AEROJET P/N 1331579-11

S/N 111

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.1.1	Examination of Product		Accept X Reject ___			5-7-97
4.2.2	* Current Limiting	200 mA maximum Reg. VOLTAGE= N/A VDC Total R= N/A ohm max. current draw =	N/A mA			
4.4	Electrical Test					5-7-97
4.4.1	* Polarity Reversal Protection	No Damage	Current N/A mA Accept N/A Reject ___			5-7-97
	Short Open Protection	No Damage	Accept X Reject ___			5-7-97
	Output Coupling	Output shall be AC coupled	Accept X Reject ___			5-7-97
4.4.2	Gain vs. Freq. 290 MHz to 355 MHz	42.5dB Min., 43.5dB Max. -4°C to +40°C Attach x-y plot	Max 43.11 dB Min 42.84 dB Accept X Reject ___	Max 43.15 dB Min 42.85 dB Accept X Reject ___	Max 42.92 dB Min 42.66 dB Accept X Reject ___	5-7-97
	Gain Flatness	.5 dB Maximum Worse Case	Accept X Reject ___ 0.27 dB	Accept X Reject ___ 0.30 dB	Accept X Reject ___ 0.26 dB	5-7-97
	Gain Temp. Sensitivity	±.44 dB from -4°C to +40°C Worse Case	Accept X Reject ___	Accept X Reject ___ 0.06 dB	Accept X Reject ___ 0.21 dB	5-7-97
4.4.3	Gain-Voltage Sensitivity Input Currents	≤.5dB/v Worse Case ± .2dB for 7.6 to 8.4 Vdc 50ma MAX. 7.6v 8.0v 8.4v Attach X-Y Plot	0.03 dB 40.7 mA 41.4 mA 42.0 mA Accept X Reject ___	0.04 dB 39.4 mA 40.1 mA 40.7 mA Accept X Reject ___	0.04 dB 41.9 mA 42.6 mA 43.2 mA Accept X Reject ___	5-7-97

NOTE: * TEST REQUIRED ON PROTOFLIGHT UNIT ONLY

APPENDIX C
ATP1775 DATA SHEET
MODEL NUMBER UD415301
AEROJET P/N 1331579-11

S/N 111

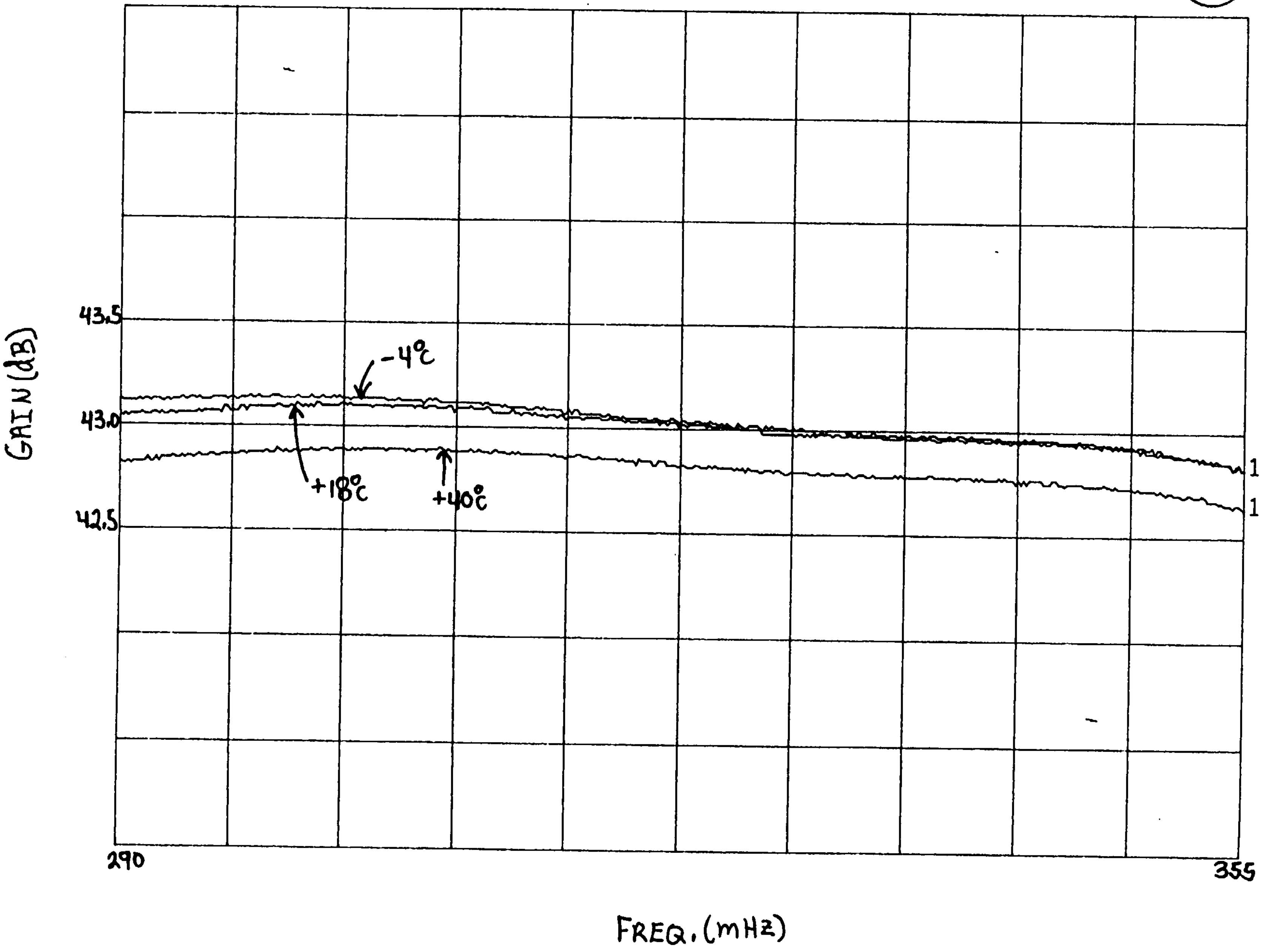
PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.4.7	Compression	1 dB maximum Compression AT +10 dBm Output Power	Accept X Reject ___			
		290 MHz 322.5 MHz 355 MHz	0,40 dB 0,40 dB 0,45 dB	0,40 dB 0,45 dB 0.55 dB	0.40 dB 0.40 dB 0.40 dB	5-7-97
4.4.8	Stability	Unconditionally Stable	Accept X Reject ___			5-7-97
4.4.9	Start-up	Capable of starting operation at -30°C and +60°C with a maximum current draw of 55 mA	Accept X Reject ___			
		Maximum Current	44.0 mA			5-8-97

NOTE: Review all recorded data and signify acceptance below.

Technician ______ T143 Date: 5-8-97
Quality Assurance ______ Date: 5-12-97
CSI: ______ QC 176 Date: 5-14-97
GSI: ______ 3387 Date: 5/9/97

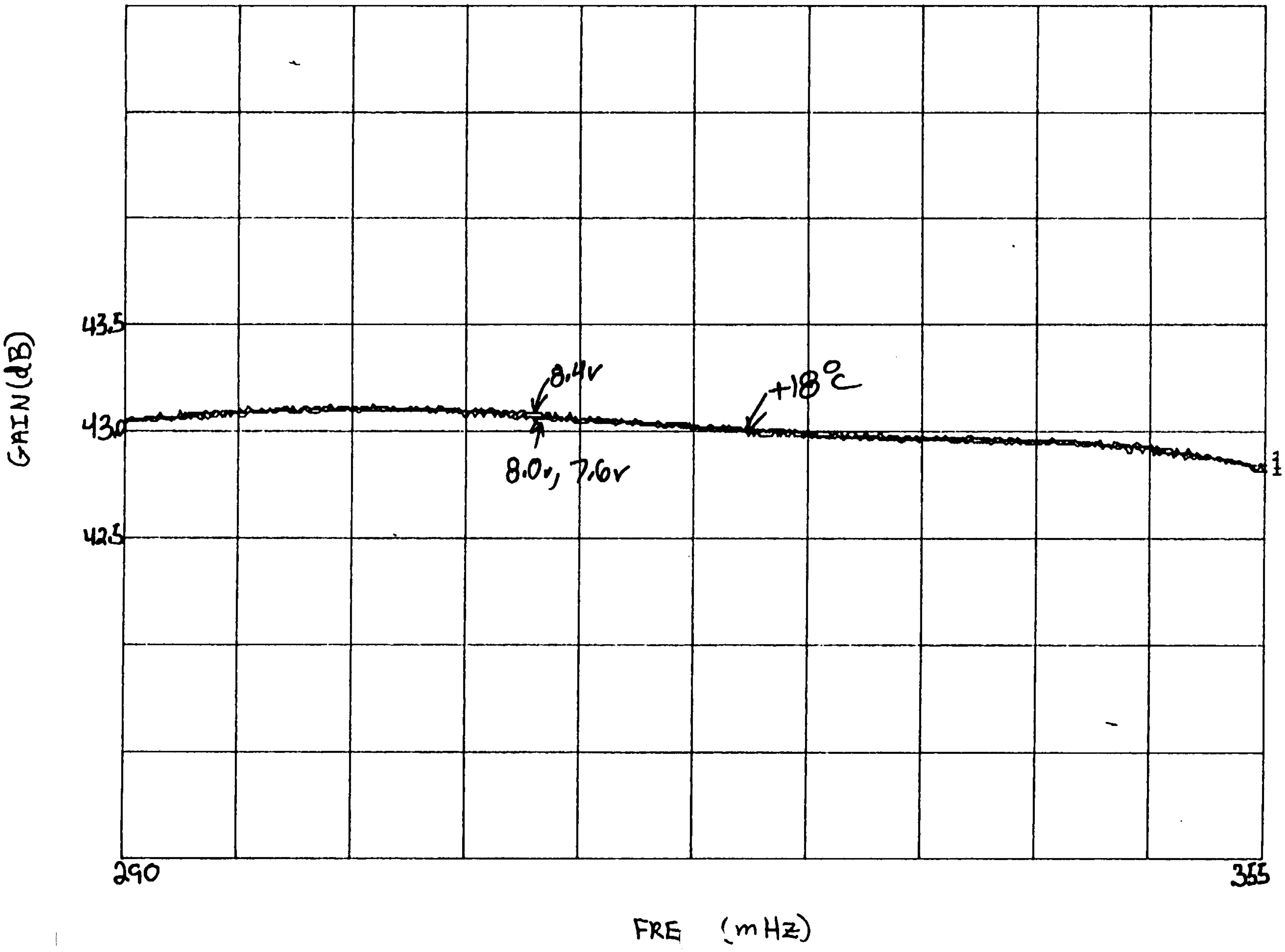
MODEL UD4153d /N 111
GAIN VS FREQUENCY
VERTICAL CALIBRATION .5 dB INCH
TEMPERATURE As NOTED DEG.C.
TECH SW T143 DATE 5-7-97

P/N 1331579 - 11



MODEL UD415301 S/N 111
GAIN-VOLTAGE SENSITIVITY VS. FREQ.
VERTICAL CALIBRATION 0.5 dB INCH
TEMPERATURE as noted DEG.C.
TECH SAD (T143) DATE 5-7-97

P/N 1331579-11



MODEL UD41530 S/N 111

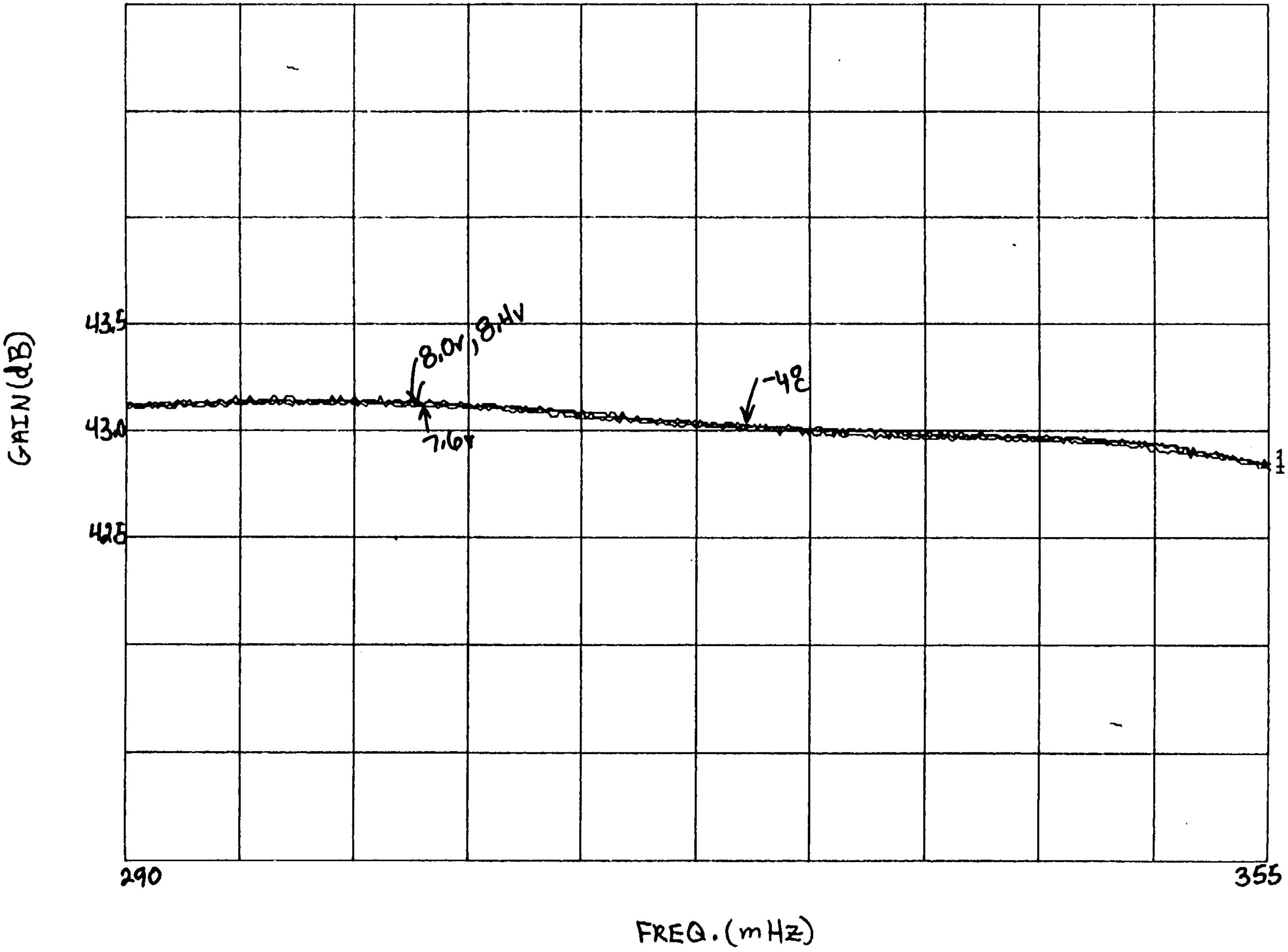
GAIN-VOLTAGE SENSITIVITY VS. FREQ.

VERTICAL CALIBRATION 0.5dB INCH

TEMPERATURE AS NOTED DEG.C.

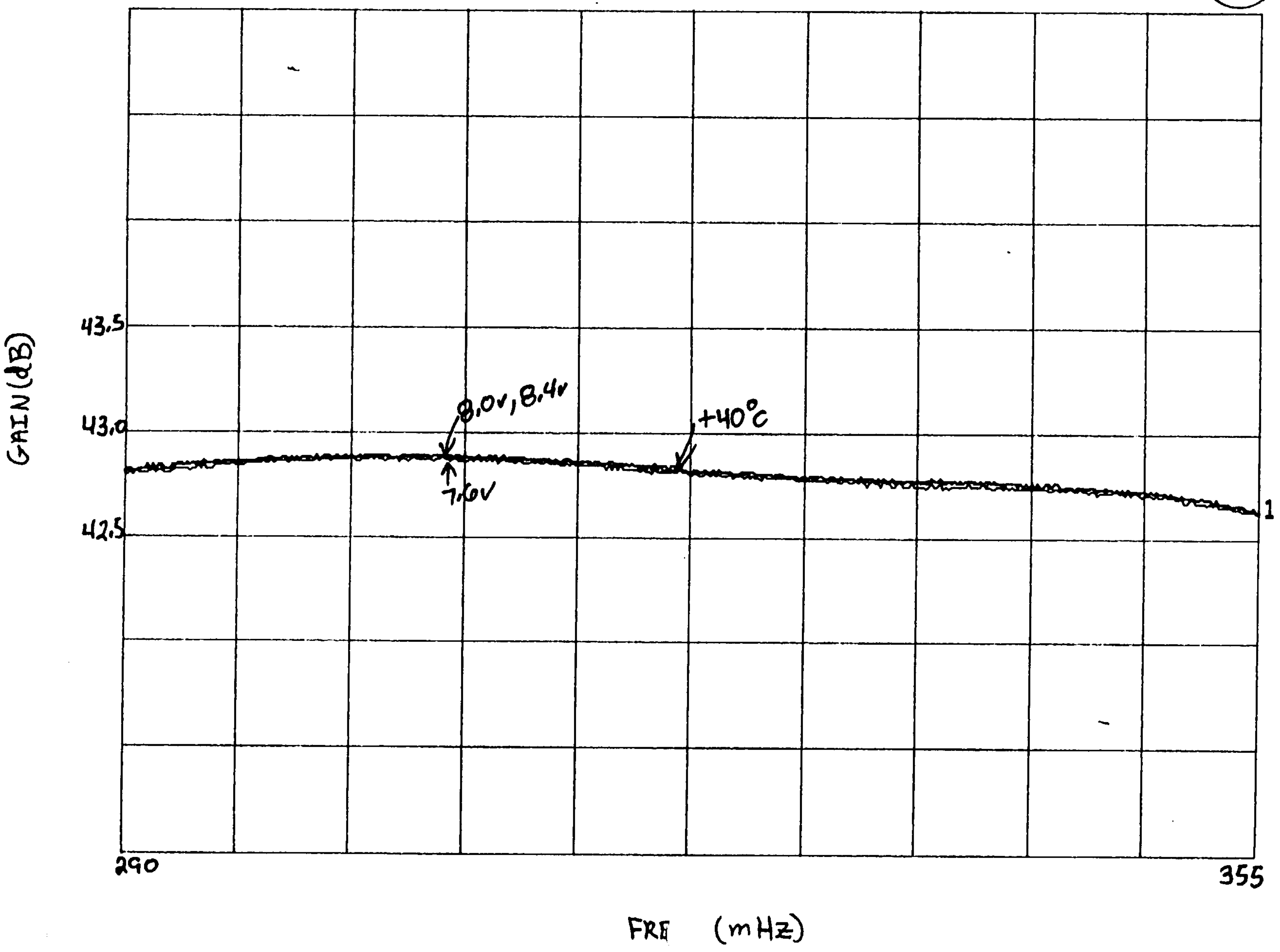
TECH SH T147 DATE 5-7-97

P/N 1331579-11



MODEL UD415301 S/N 111
GAIN-VOLTAGE SENSITIVITY VS. FREQ.
VERTICAL CALIBRATION 0.5dB INCH
TEMPERATURE AS NOTED DEG.C.
TECH SM (T14) DATE 5-7-97

P/N 1331579-11



Report No. 11413
February, 1999

Channel 13 Amplifier

IF Amplifier (P/N:1331579-12, S/N: 105)

APPENDIX C
ATP1776 DATA SHEET
MODEL NUMBER UD315301
AEROJET P/N 1331579-12

S/N 105

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.1.1	Examination of Product		Accept X Reject ____			12-496
4.2.2	* Current Limiting	200 mA maximum Reg. VOLTAGE= 6.57 VDC Total R= 53.2 ohm max. current draw =	123.5 mA			9-19-96
4.4	Electrical Test					
4.4.1	* Polarity Reversal Protection	No Damage	Current 40.1 mA Accept X Reject ____			12-496
	Short Open Protection	No Damage	Accept X Reject ____			12-4.96
	Output Coupling	Output shall be AC coupled	Accept X Reject ____			12-4-96
4.4.2	Gain vs. Freq. 305 MHz to 340 MHz	44.5dB Min., 45.5dB Max. -4°C to +40°C Attach x-y plot	Max 45.16 dB Min 44.92 dB Accept X Reject ____	Max 45.20 dB Min 44.98 dB Accept X Reject ____	Max 44.93 dB Min 44.65 dB Accept X Reject ____	12-4-96
	Gain Flatness	.5 dB Maximum Worse Case	Accept X Reject ____ 0.25 dB	Accept X Reject ____ 0.23 dB	Accept X Reject ____ 0.28 dB	12-4-96
	Gain Temp. Sensitivity	$\pm$.44 dB from -4°C to +40°C Worse Case	Accept X Reject ____	Accept X Reject ____ 0.30 dB	Accept X Reject ____ 0.09 dB	12-4-96
4.4.3	Gain-Voltage Sensitivity Input Currents	$\leq$.5dB/v Worse Case $\pm$ .2dB for 7.6v 7.6 to 8.4 Vdc 8.0v 50ma MAX. 8.4v Attach X-Y Plot	.02 dB 39.4 mA 40.1 mA 40.7 mA Accept X Reject ____	.03 dB 37.7 mA 38.4 mA 39.0 mA Accept X Reject ____	.03 dB 41.0 mA 41.5 mA 42.1 mA Accept X Reject ____	12-4-96

NOTE: * TEST REQUIRED ON PROTOFLIGHT UNIT ONLY

APPENDIX C
ATP1772 DATA SHEET
MODEL NUMBER VD722301
AEROJET P/N 1331579-8

S/N 105

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.4.7	Compression	1 dB maximum Compression AT +10 dBm Output Power	Accept ✓ Reject ___			
		5 MHz	.20 dB	.25 dB	.15 dB	
		102.5 MHz	.20 dB	.40 dB	.20 dB	12/4/96
		200 MHz	.20 dB	.25 dB	.20 dB	
4.4.8	Stability	Stable with the input terminated into a 2.5:1 mismatch and the output at all impedance's.	Accept X Reject ___			12-5-96
4.4.9	Start-up	Capable of starting operation at -30°C and +60°C with a maximum current draw of 45 mA	Accept X Reject ___			
		Maximum Current	40.4 mA			12-5-96

NOTE: Review all recorded data and signify acceptance below.

Technician T143 Date: 12-5-96

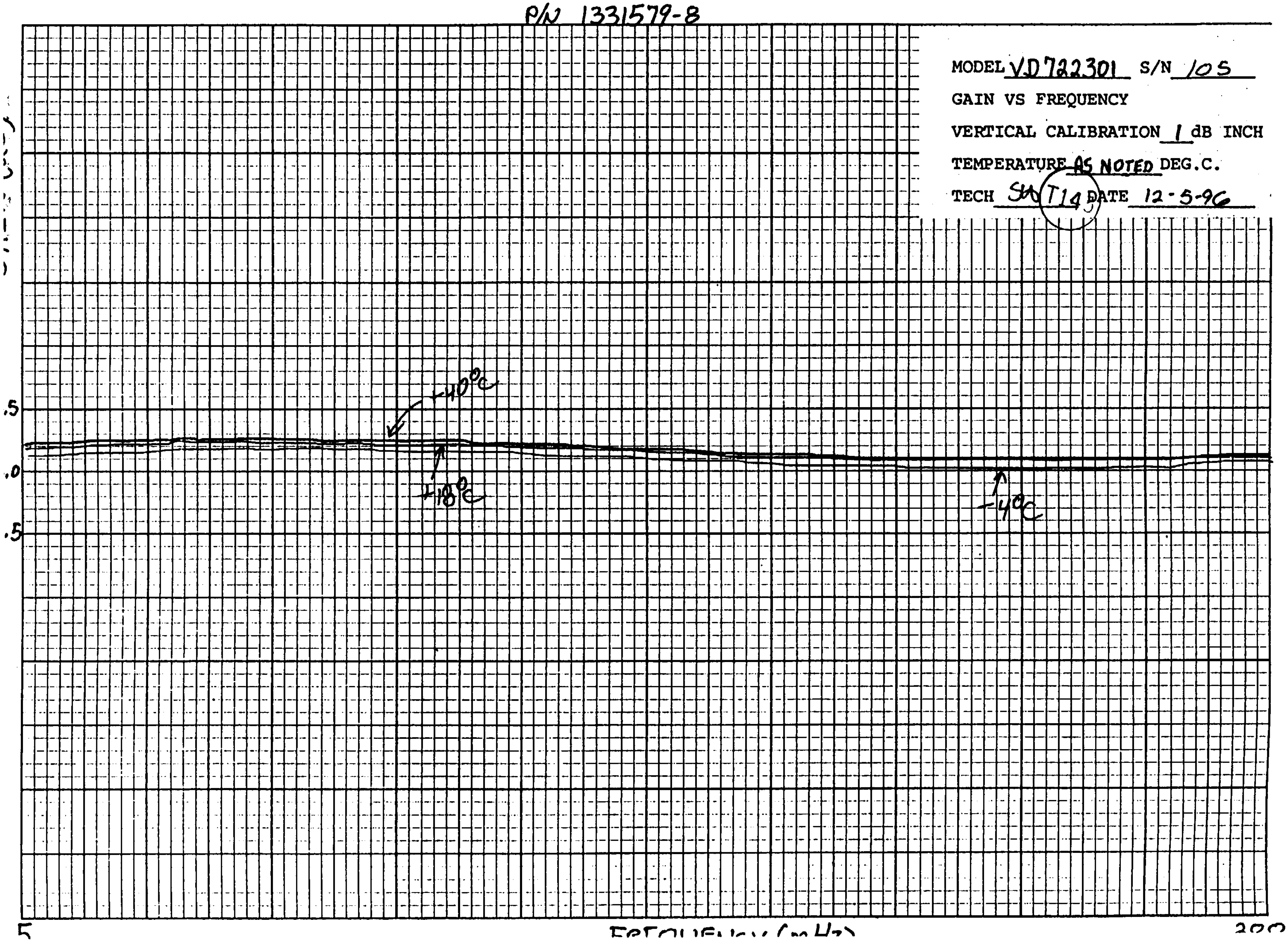
Quality Assurance A23 Date: 12/9/96

CSI: Date: 12-9-96

GSI: Date: 2/10/97

HEWLETT-PACKARD 9270-1008

P/N 1331579-8



MODEL VD722301 S/N 105
GAIN VS FREQUENCY
VERTICAL CALIBRATION 1 dB INCH
TEMPERATURE AS NOTED DEG.C.
TECH SW T14 DATE 12-5-96

P/N 1331579-8

MODEL VD722301 S/N 105

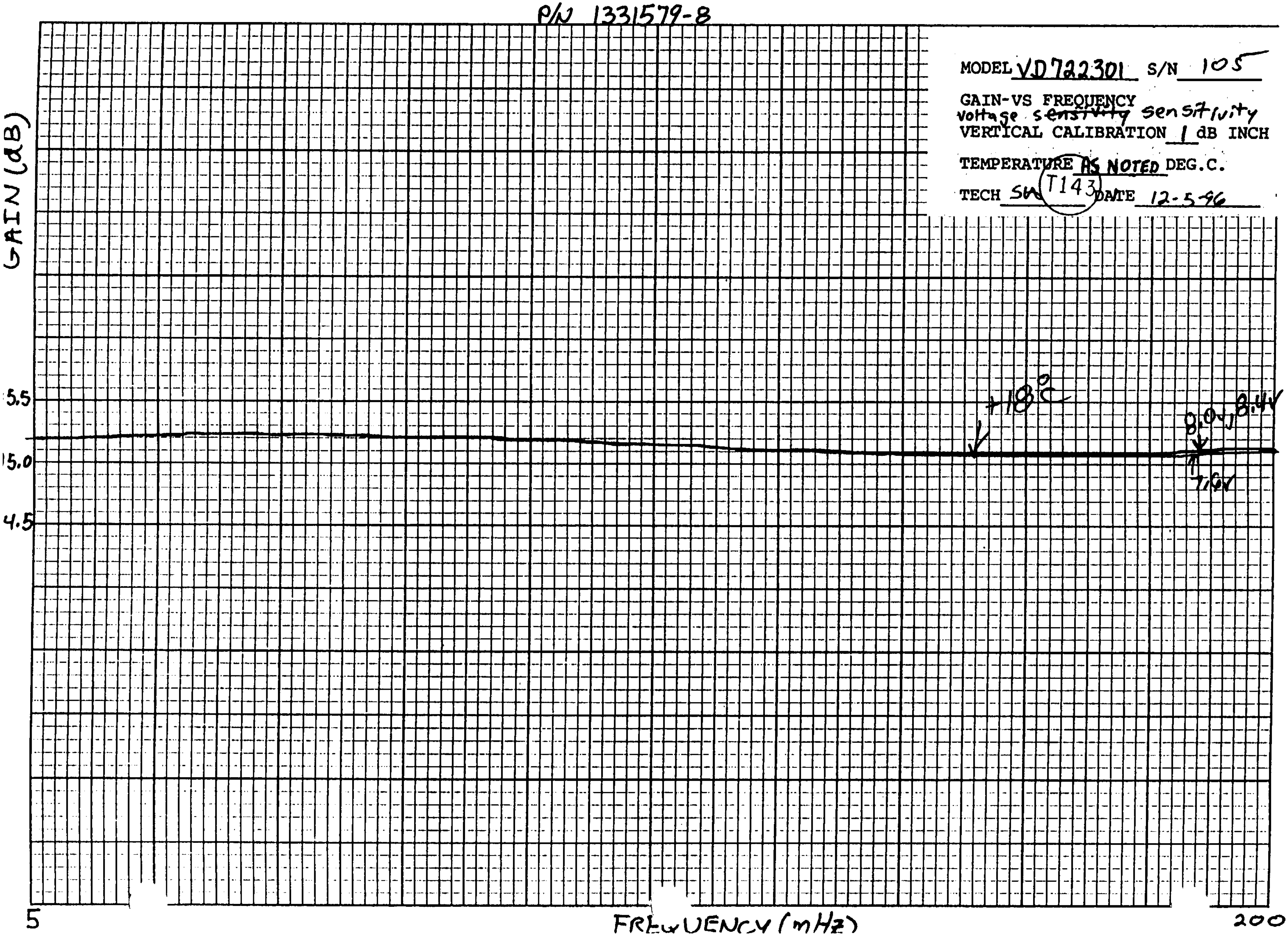
GAIN-VS FREQUENCY

voltage ~~sensitivity~~ sensitivity

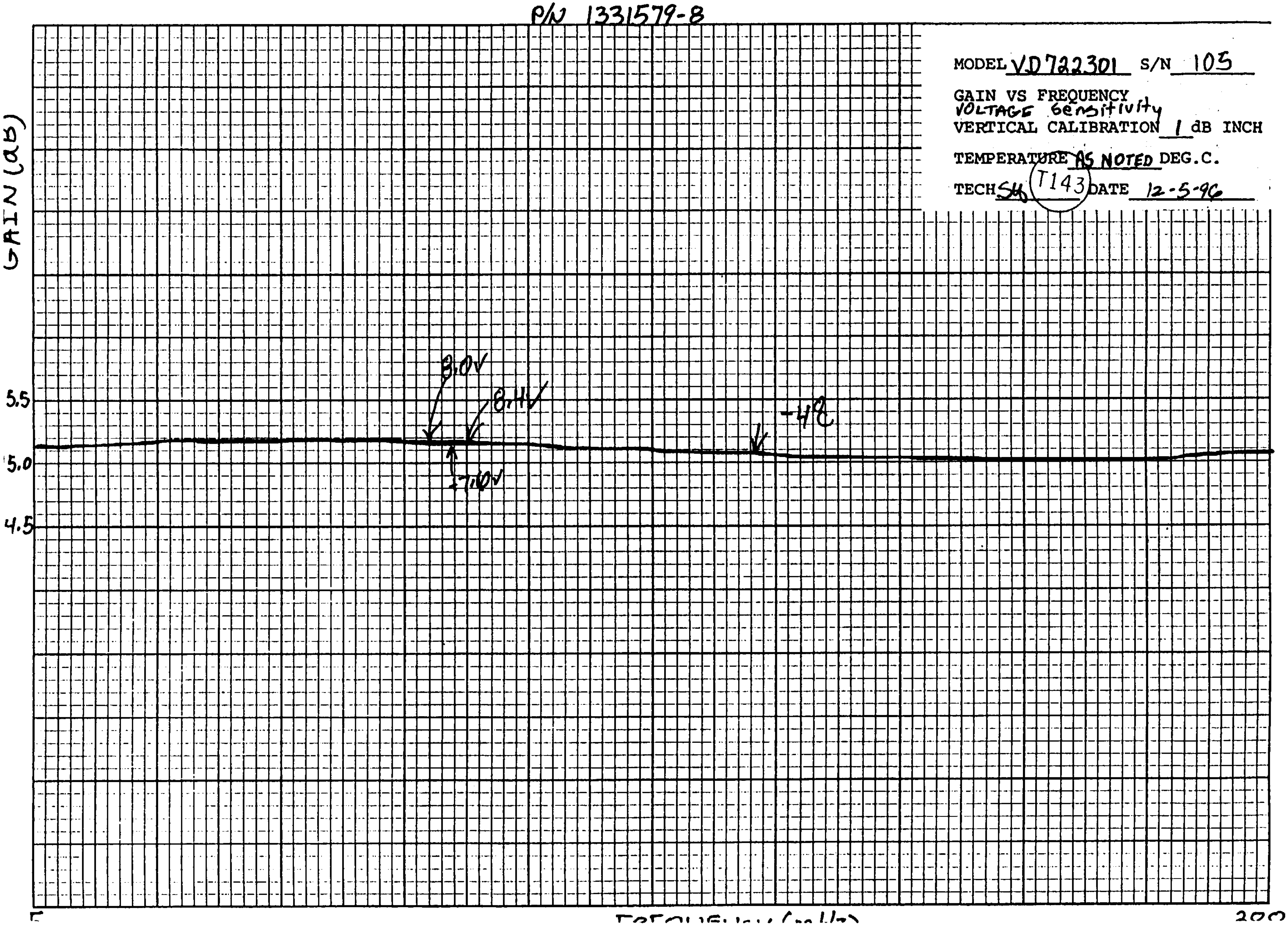
VERTICAL CALIBRATION 1 dB INCH

TEMPERATURE AS NOTED DEG.C.

TECH SW T143 DATE 12-5-96



P/N 1331579-8



MODEL VD722301 S/N 105

GAIN VS FREQUENCY
VOLTAGE Sensitivity
VERTICAL CALIBRATION 1 dB INCH

TEMPERATURE AS NOTED DEG.C.

TECH SH T143 DATE 12-5-96

HEWLETT-PACKARD 9270-1006

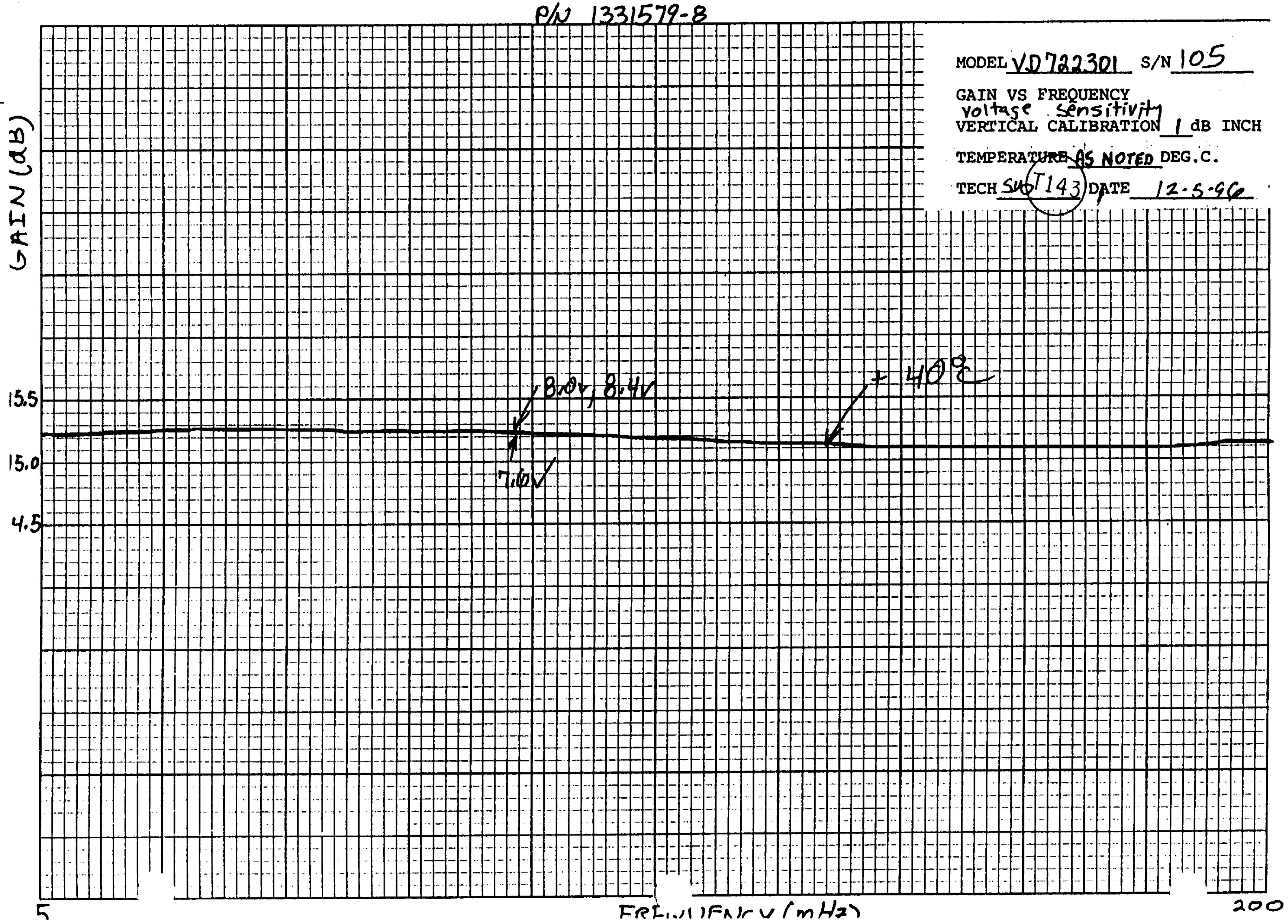
P/N 1331579-8

MODEL VD722301 S/N 105

GAIN VS FREQUENCY
voltage sensitivity
VERTICAL CALIBRATION 1 dB INCH

TEMPERATURE AS NOTED DEG.C.

TECH SWT143 DATE 12-5-96



Report No. 11413
February, 1999

Channel 10 Amplifier

IF Amplifier (P/N:1331579-9, S/N: 111)

APPENDIX C
ATP1773 DATA SHEET
MODEL NUMBER VD622301
AEROJET P/N 1331579-9

S/N 111

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.1.1	Examination of Product		Accept X Reject ____			5-7-97
4.2.2	* Current Limiting	200 mA maximum Reg. VOLTAGE= N/A VDC Total R= N/A ohm max. current draw =	N/A mA			5-7-97
4.4	Electrical Test					
4.4.1	* Polarity Reversal Protection	No Damage	Current N/A mA Accept N/A Reject ____			5-7-97
	Short Open Protection	No Damage	Accept X Reject ____			5-7-97
	Output Coupling	Output shall be AC coupled	Accept X Reject ____			5-7-97
4.4.2	Gain vs. Freq. 150 MHz to 300 MHz	17.5dB Min., 18.5dB Max. -4°C to +40°C Attach x-y plot	Max 18.13 dB Min 18.00 dB Accept X Reject ____	Max 18.05 dB Min 17.92 dB Accept X Reject ____	Max 18.16 dB Min 18.01 dB Accept X Reject ____	5-7-97
	Gain Flatness	.5 dB Maximum Worse Case	Accept X Reject ____ 0.13 dB	Accept X Reject ____ 0.13 dB	Accept X Reject ____ 0.15 dB	5-7-97
	Gain Temp. Sensitivity	±.22 dB from -4°C to +40°C Worse Case	Accept X Reject ____	Accept X Reject ____ 0.09 dB	Accept X Reject ____ 0.05 dB	5-7-97
4.4.3	Gain-Voltage Sensitivity Input Currents	≤.5dB/v Worse Case ± .2dB for 7.6 to 8.4 Vdc 40ma MAX. 7.6v 8.0v 8.4v Attach X-Y Plot	0.01 dB 33.4 mA 34.4 mA 34.7 mA Accept X Reject ____	0.01 dB 30.7 mA 31.4 mA 32.0 mA Accept X Reject ____	0.01 dB 36.2 mA 36.9 mA 37.5 mA Accept X Reject ____	5-7-97

NOTE: * TEST REQUIRED ON PROTOFLIGHT UNIT ONLY

Amplica, Inc. Newbury Park, CA 91320				
DRAWN	SIZE A	FSCM NO. 51025	ATP1773	REV.
ISSUED	SCALE		SHEET 34 OF 38	

APPENDIX C
ATP1773 DATA SHEET
MODEL NUMBER VD622301
AEROJET P/N 1331579-9

S/N 111

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.4.7	Compression	1 dB maximum Compression AT +10 dBm Output Power	Accept X Reject ___			
		150 MHz 225 MHz 300 MHz	0.30 dB 0.25 dB 0.30 dB	0.40 dB 0.40 dB 0.40 dB	0.25 dB 0.20 dB 0.30 dB	5-7-97
4.4.8	Stability	Stable with the input terminated into a 2.5:1 mismatch and the output at all impedance's.	Accept X Reject ___			5-7-97
4.4.9	Start-up	Capable of starting operation at -30°C and +60°C with a maximum current draw of 45 mA	Accept X Reject ___			
		Maximum Current	39.1 mA			5-8-97

NOTE: Review all recorded data and signify acceptance below.

Technician JHoffman T143 Date: 5-8-97
Quality Assurance Steve Luna Date: 5-12-97
CSI: Mike Date: 5-14-97
GSI: QC 176 Date: 5/9/97

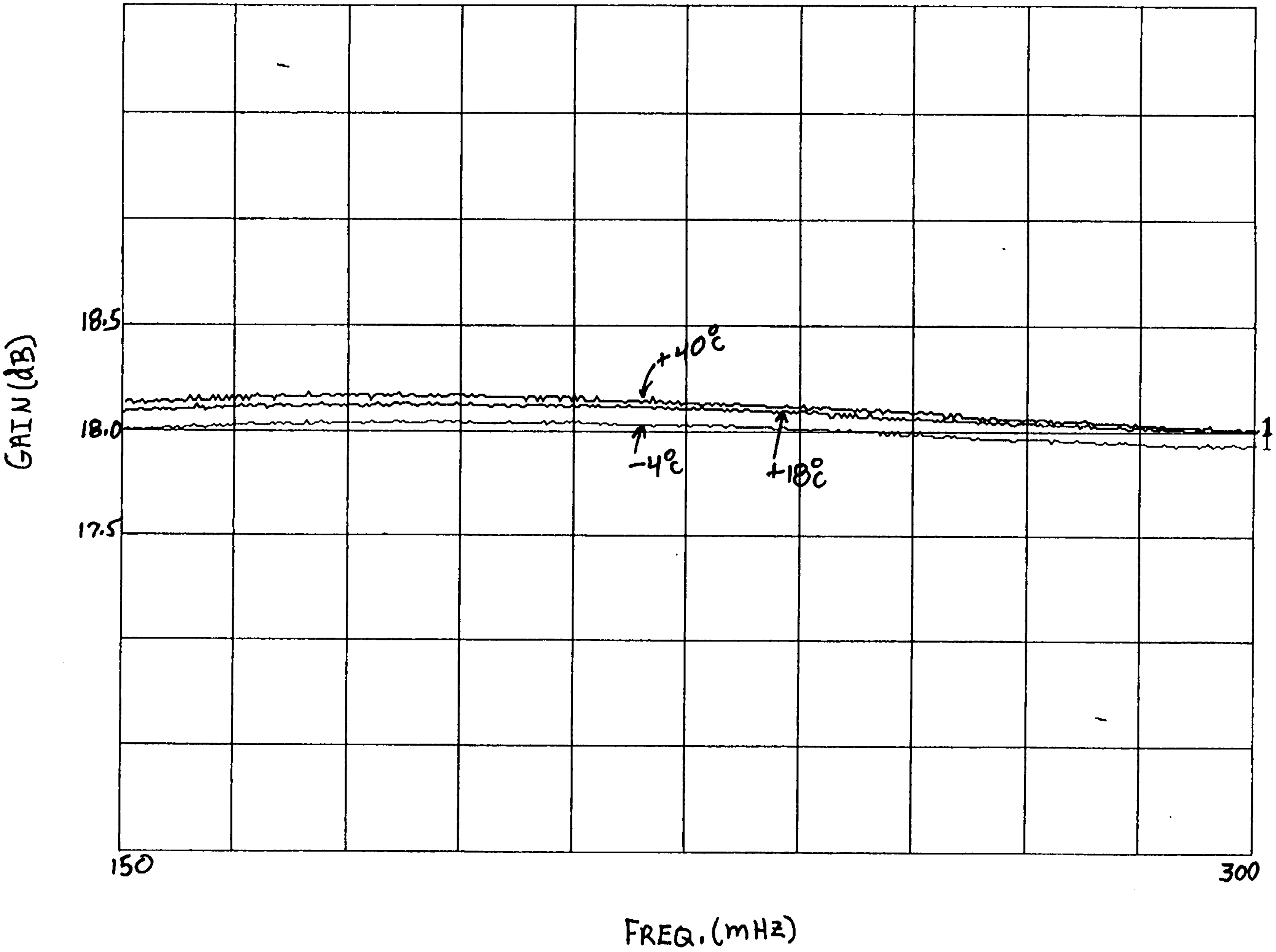
Amplica, Inc.
Newbury Park, CA 91320

DRAWN	SIZE A	FSCM NO. 51025	ATP1773	REV.
ISSUED	SCALE		SHEET 36 OF 38	

MODEL VD6223C S/N 111
GAIN VS FREQUENCY
VERTICAL CALIBRATION .5 dB INCH
TEMPERATURE AS NOTED DEG.C.
TECH SD DATE 5-7-97

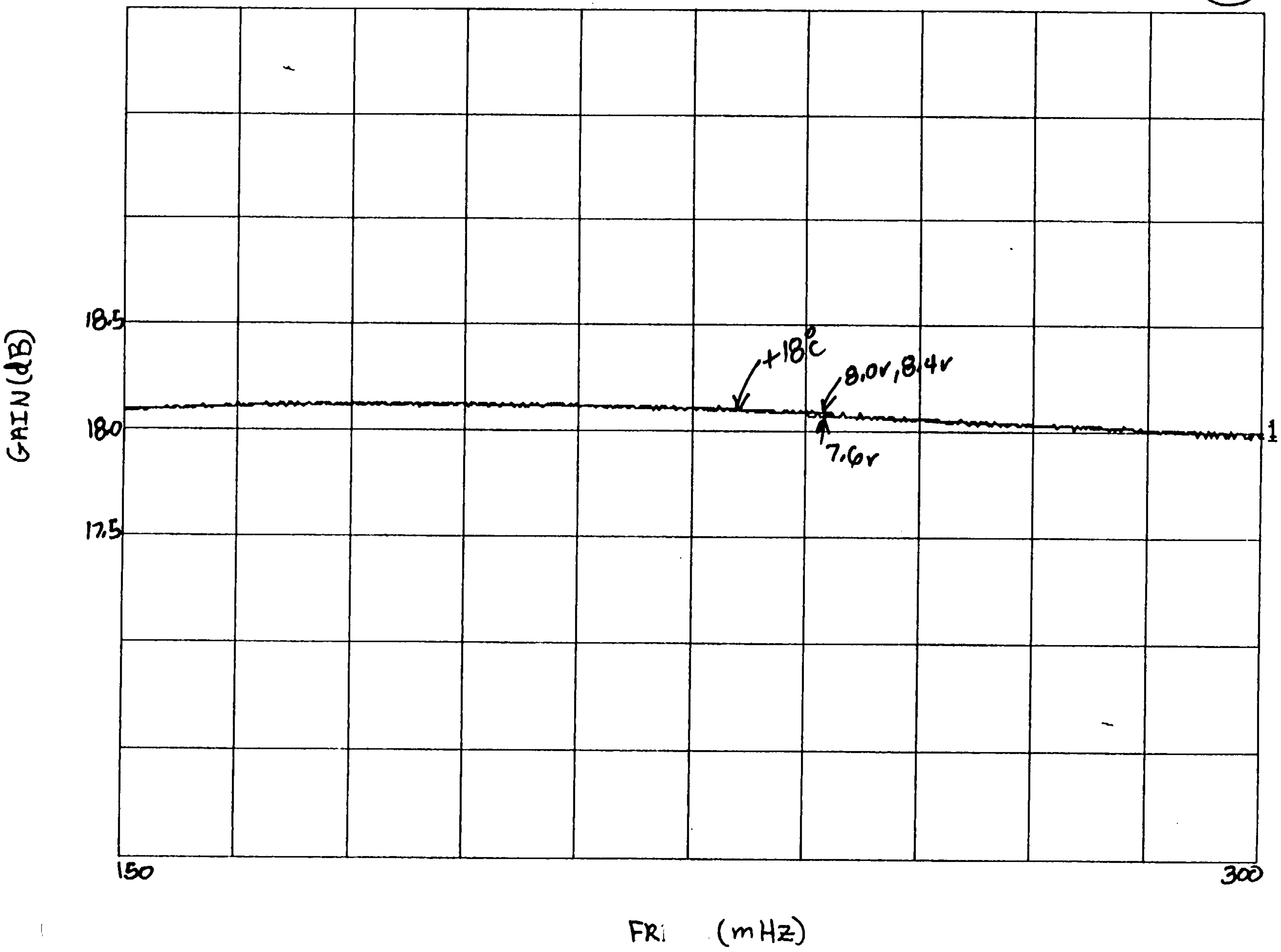
1143

P/N 1331579-9



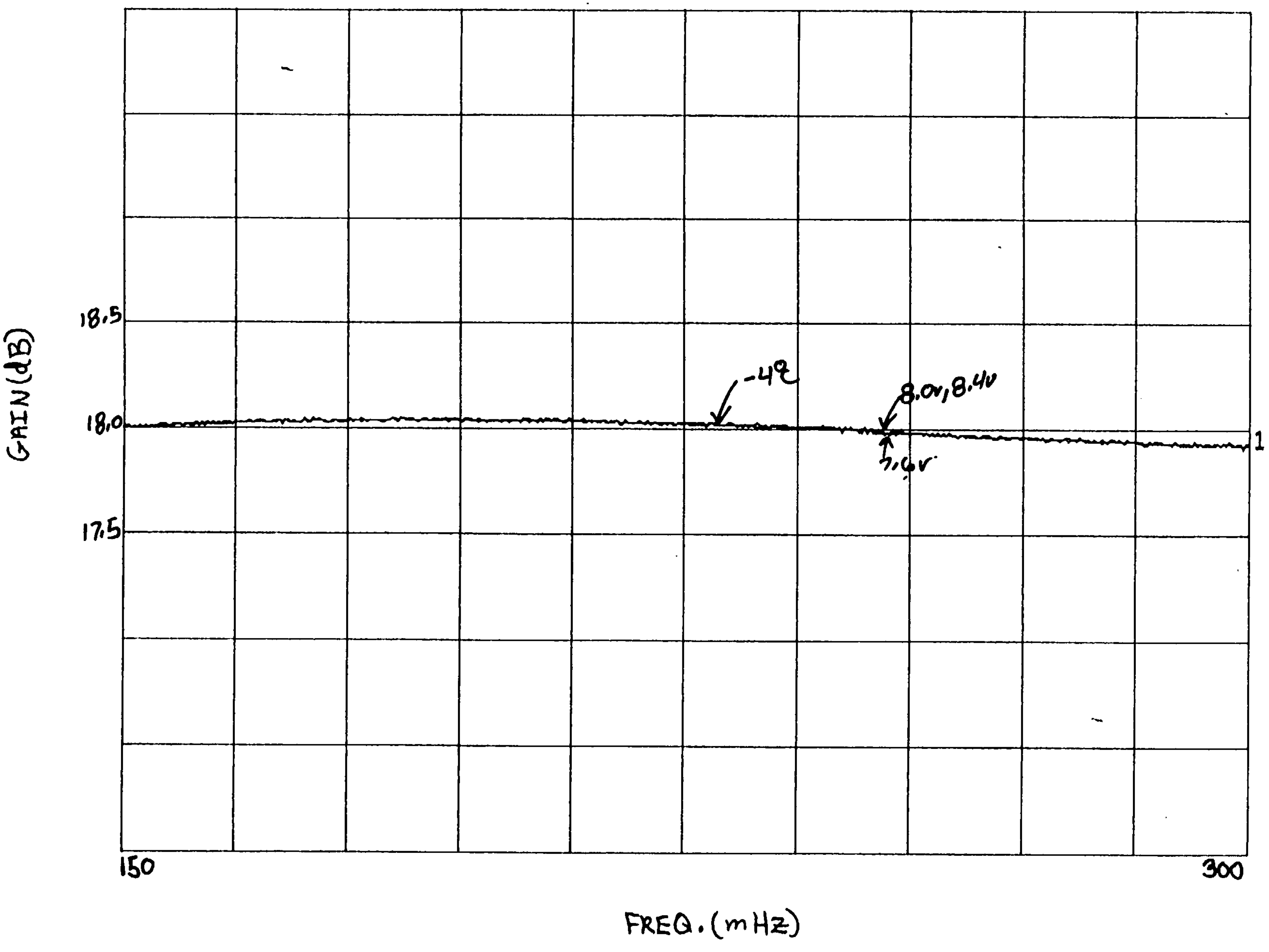
MODEL VD622301 S/N 111
GAIN-VOLTAGE SENSITIVITY VS. FREQ.
VERTICAL CALIBRATION 0.5dB INCH
TEMPERATURE AS NOTED DEG.C.
TECH SWS T143 DATE 5-7-97

P/N 1331579-9



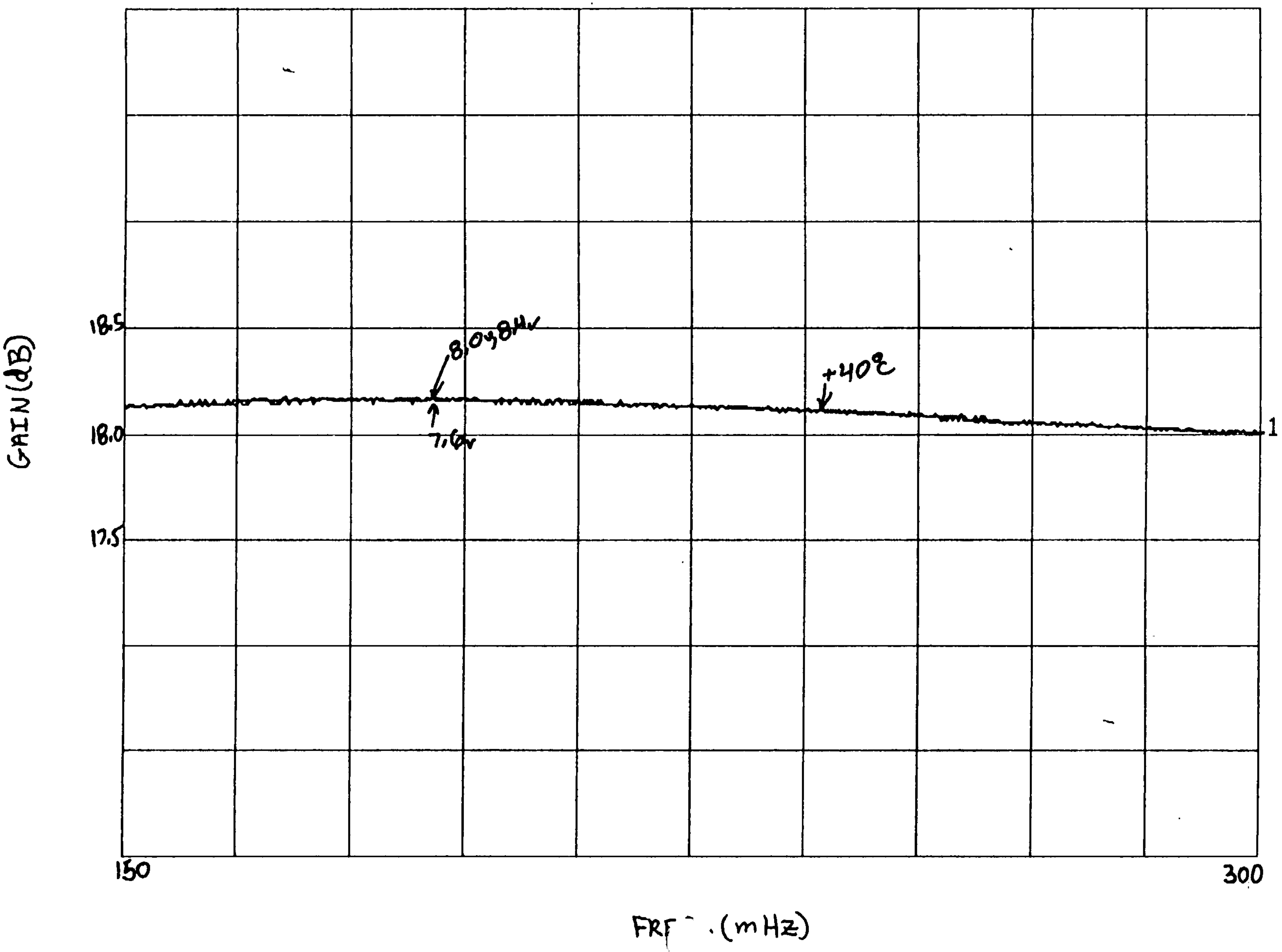
MODEL VD62239 S/N 111
GAIN-VOLTAGE SENSITIVITY VS. FREQ.
VERTICAL CALIBRATION 0.5dB INCH
TEMPERATURE AS NOTED DEG.C.
TECH SW (T143) DATE 5-7-97

P/N 1331579-9



MODEL VD622301 S/N 111
GAIN-VOLTAGE SENSITIVITY VS. FREQ.
VERTICAL CALIBRATION 0.5dB INCH
TEMPERATURE AS NOTED DEG.C.
TECH SA T14 DATE 5-7-97

P/N 1331579-9



Report No. 11413
February, 1999

Channels 11-14 Amplifier

IF Amplifier (P/N:1331579-7, S/N: 111)

APPENDIX C
ATP1771 DATA SHEET
MODEL NUMBER UD122301
AEROJET P/N 1331579-7

S/N 111

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.1.1	Examination of Product		Accept X Reject			5-7-97
4.2.2	* Current Limiting	200 mA maximum Reg. VOLTAGE= N/A VDC Total R= N/A ohm max. current draw =	N/A mA			
4.4	Electrical Test					5-7-97
4.4.1	* Polarity Reversal Protection	No Damage	Current N/A mA Accept N/A Reject			5-7-97
	Short Open Protection	No Damage	Accept X Reject			5-7-97
	Output Coupling	Output shall be AC coupled	Accept X Reject			5-7-97
4.4.2	Gain vs. Freq. 255 MHz to 390 MHz	14.5dB Min., 15.5dB Max. -4°C to +40°C Attach x-y plot	Max 15.14 dB Min 14.76 dB Accept X Reject	Max 15.13 dB Min 14.75 dB Accept X Reject	Max 15.18 dB Min 14.70 dB Accept X Reject	5-7-97
	Gain Flatness	.5 dB Maximum Worse Case	Accept X Reject 0.38 dB	Accept X Reject 0.38 dB	Accept X Reject 0.48 dB	5-7-97
	Gain Temp. Sensitivity	±.22 dB from -4°C to +40°C Worse Case	Accept X Reject	Accept X Reject 0.04 dB	Accept X Reject 0.06 dB	5-7-97
4.4.3	Gain-Voltage Sensitivity Input Currents	≤.5dB/v Worse Case ± .2dB for 7.6 to 8.4 Vdc 40ma MAX. 7.6v 8.0v 8.4v Attach X-Y Plot	0.01 dB 33.8 mA 34.5 mA 35.1 mA Accept X Reject	0.01 dB 30.6 mA 31.3 mA 31.9 mA Accept X Reject	0.01 dB 36.6 mA 37.3 mA 37.9 mA Accept X Reject	5-7-97

NOTE: * TEST REQUIRED ON PROTOFLIGHT UNIT ONLY

APPENDIX C
ATP1771 DATA SHEET
MODEL NUMBER UD122301
AEROJET P/N 1331579-7

S/N 111

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.4.7	Compression	1 dB maximum Compression AT +10 dBm Output Power	Accept ✓ Reject			
		255 MHz	0.15 dB	0.20 dB	0.15 dB	
		322.5 MHz	0.20 dB	0.20 dB	0.20 dB	
		390 MHz	0.20 dB	0.20 dB	0.20 dB	5-7-97
4.4.8	Stability	Stable with the input terminated into a 2.5:1 mismatch and the output at all impedance's.	Accept ✓ Reject			5-7-97
4.4.9	Start-up	Capable of starting operation at -30°C and +60°C with a maximum current draw of 45 mA	Accept X Reject			
		Maximum Current	39.7 mA			5-8-97

NOTE: Review all recorded data and signify acceptance below.

Technician SHoffm (T143) Date: 5-8-97
Quality Assurance Date: 5-12-97
CSI: (QC 176) Date: MAY 14 '97
GSI: Date: 5/9/97

Amplica, Inc.
Newbury Park, CA 91320

DRAWN
ISSUED

SIZE A | FSCM NO. 51025 | ATP1771 | REV.
SCALE | SHEET 37 OF 39

FORM 153

TEST DATA SHEET 10 (Sheet 19 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 28.0 °C PLO No. 1

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
10		4.16				0.066			
		4.14				0.124			
		4.16				0.094			
		4.15				0.050			
		4.15				0.044			
		4.16				0.076			
		4.16				0.129			
		4.16				0.108			
		4.15				0.112			
		4.16				0.083			
	4.7		4.15	Pass	0.12		0.088	0.085	Pass

Pass = P, Fail = F

Part No.: 1356429-1

Serial No.: F04

Test Engineer: Y. Trinh

Quality Assurance: 268 JAN 22 '99

Date: 1/20/99

FOR REFERENCE ONLY

```
          AMSU-A TEST

A1-1, S/N: F04, CH10, PLO #1, NF & NPS DATA, TB=28 C, 1/20/99

SEQ TEMP_TEST TEST TEMP   VOLTAGE       STD_DEV        NF (dB)        NPS(K)
 1  WARM TEST  295.15   -.92993372    .00027515     -----------    ----------
 2  COLD TEST   79.15   -.66573550    .00022788     4.15626031      .06625112
 3  WARM TEST  295.15   -.92979144    .00030368     -----------    ----------
 4  COLD TEST   79.15   -.66473903    .00020445     4.14147690      .12386157
 5  WARM TEST  295.15   -.92983311    .00028714     -----------    ----------
 6  COLD TEST   79.15   -.66576672    .00017937     4.15796961      .09440677
 7  WARM TEST  295.15   -.92976379    .00025561     -----------    ----------
 8  COLD TEST   79.15   -.66535218    .00019614     4.15193098      .05023328
 9  WARM TEST  295.15   -.92931463    .00026820     -----------    ----------
10  COLD TEST   79.15   -.66509460    .00019298     4.15298736      .04387995
11  WARM TEST  295.15   -.92931425    .00024599     -----------    ----------
12  COLD TEST   79.15   -.66522410    .00017985     4.15513565      .07559061
13  WARM TEST  295.15   -.92931068    .00030614     -----------    ----------
14  COLD TEST   79.15   -.66528762    .00019421     4.15622973      .12850343
15  WARM TEST  295.15   -.92978137    .00029393     -----------    ----------
16  COLD TEST   79.15   -.66588181    .00018455     4.16048963      .10757693
17  WARM TEST  295.15   -.92948809    .00029639     -----------    ----------
18  COLD TEST   79.15   -.66526258    .00021578     4.15371296      .11200331
19  WARM TEST  295.15   -.92978638    .00028159     -----------    ----------
20  COLD TEST   79.15   -.66575518    .00023875     4.15833263      .08251617

CH. 10 ,75.8 MHz     MHz

NOISE FIGURE AVERAGE (dB) =     4.15445543252

NOISE POWER STABILITY (K) =     .0884823143342

NOISE POWER STABILITY DELTA (K) =        .0846234868218

NPS_MAX (K) =         .12850343401         NPS_MIN (K) =     .0438799471885

INTEGRATION TIME =   .165
```

TEST DATA SHEET 10 (Sheet 5 of 30)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 29 °C PLO No. 1

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V)		T_C(°C)	V_C (V)	
					Mean	Standard Deviation		Mean	Standard Deviation
LO	11	Positive +15.13	528.7	22.0	-1.035	.000319	-194.0	-.7518	.000338
				22.0	-1.035	.000334	-194.0	-.7536	.000221
				22.0	-1.035	.000313	-194.0	-.7525	.000234
				22.0	-1.035	.000329	-194.0	-.7519	.000245
		Negative -15.13	-64.6	22.0	-1.035	.000236	-194.0	-.75098	.000215
				22.0	-1.035	.000321	-194.0	-.7513	.000228
				22.0	-1.035	.000315	-194.0	-.7530	.000223
				22.0	-1.034	.000267	-194.0	-.7532	.000226
				22.0	-1.034	.000334	-194.0	-.7517	.000280
				22.0	-1.035	.000304	-194.0	-.7534	.000239
Mixer/ Amps	All	9.93	244.5						
IF Amps	All	7.94	263.6						

Part No.: 1356429 -1

Serial No.: F04

Test Engineer: Y. Trinh

Quality Assurance: 7A 268 JAN 22 '99

Date: 1/20/99

TEST DATA SHEET 10 (Sheet 20 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 29.0 °C PLO No. 1

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
11		4.32				0.070			
		4.35				0.103			
		4.33				0.051			
		4.32				0.092			
		4.31				0.081			
		4.32				0.074			
		4.34				0.058			
		4.35				0.115			
		4.33				0.103			
		4.34				0.022			
	4.7		4.33	Pass	.12		0.077	0.093	Pass

Pass = P, Fail = F

Part No.: 1356429-1

Serial No.: F04

Test Engineer: Y. Trinh

Quality Assurance: QA 268 JAN 22 '99

Date: 1/20/99

```
            AMSU-A TEST

A1-1, S/N: F04, CH11, PLO #1, NF & NPS DATA, TB=29 C, 1/20/99

SEQ TEMP_TEST TEST TEMP   VOLTAGE        STD_DEV         NF (dB)        NPS(K)
 1  WARM TEST  295.15  -1.03486435     .00031907      -----------     ----------
 2  COLD TEST   79.15   -.75177976     .00033819      4.32181177      .06998727
 3  WARM TEST  295.15  -1.03479022     .00033396      -----------     ----------
 4  COLD TEST   79.15   -.75361098     .00022095      4.35102022      .10349517
 5  WARM TEST  295.15  -1.03491872     .00031285      -----------     ----------
 6  COLD TEST   79.15   -.75251825     .00023385      4.33261832      .05117268
 7  WARM TEST  295.15  -1.03480918     .00032854      -----------     ----------
 8  COLD TEST   79.15   -.75187798     .00024526      4.32394793      .09211026
 9  WARM TEST  295.15  -1.03492600     .00028629      -----------     ----------
10  COLD TEST   79.15   -.75097724     .00021483      4.30874755      .08134840
11  WARM TEST  295.15  -1.03472427     .00032070      -----------     ----------
12  COLD TEST   79.15   -.75131673     .00022823      4.31623570      .07421372
13  WARM TEST  295.15  -1.03469441     .00031491      -----------     ----------
14  COLD TEST   79.15   -.75299140     .00022271      4.34248038      .05845799
15  WARM TEST  295.15  -1.03443642    ✓.00026651      -----------     ----------
16  COLD TEST   79.15   -.75315140     .00022596      4.34788128      .11463650
17  WARM TEST  295.15  -1.03436399     .00033400      -----------     ----------
18  COLD TEST   79.15   -.75165388     .00027997      4.32548425      .10324300
19  WARM TEST  295.15  -1.03503738     .00030430      -----------     ----------
20  COLD TEST   79.15   -.75339667     .00023910      4.34489596      .02200463

CH. 11 ,69.5 MHz      MHz

NOISE FIGURE AVERAGE (dB) =     4.33153407694

NOISE POWER STABILITY (K) =    .077066962665

NOISE POWER STABILITY DELTA (K) =        .0926318668716

NPS_MAX (K) =         .114636496656        NPS_MIN (K) =     .0220046297846

INTEGRATION TIME =   .165
```

TEST DATA SHEET 10 (Sheet 6 of 30)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 29.0 °C PLO No. 1

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V)		T_C(°C)	V_C (V)	
					Mean	Standard Deviation		Mean	Standard Deviation
LO	12	Positive +15.13	528.7	22.0	-1.007	.000424	-194.0	-.7310	.000305
				22.0	-1.007	.000401	-194.0	-.7325	.000334
				22.0	-1.007	.000441	-194.0	-.7317	.000311
				22.0	-1.006	.000435	-194.0	-.7308	.000294
				22.0	-1.006	.000437	-194.0	-.7324	.000335
		Negative -15.13	-64.6	22.0	-1.007	.000420	-194.0	-.7301	.000362
				22.0	-1.006	.000502	-194.0	-.7302	.000302
				22.0	-1.006	.000509	-194.0	-.7320	.000298
				22.0	-1.006	.000454	-194.0	-.7310	.000377
				22.0	-1.006	.000430	-194.0	-.7311	.000394
Mixer/ Amps	All	9.93	244.5						
IF Amps	All	7.94	263.6						

Part No.: 1356429-1

Serial No.: F04

Test Engineer: Y. Trinh

Quality Assurance: 7A 268 JAN 22 '99

Date: 1/20/99

TEST DATA SHEET 10 (Sheet 21 of 30)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 29.0 °C PLO No. 1

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
12		4.31				0.110			
		4.34				0.155			
		4.33				0.055			
		4.32				0.078			
		4.34				0.073			
		4.30				0.118			
		4.31				0.180			
		4.34				0.192			
		4.32				0.067			
		4.32				0.094			
	4.7		4.32	Pass	0.18		0.112	0.137	Pass

Pass = P, Fail = F

Part No.: 1356429-1

Serial No.: F04

Test Engineer: Y. Trinh

Quality Assurance: TA 268 JAN 22 '99

Date: 1/20/99

FOR REFERENCE ONLY

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           AMSU-A TEST

A1-1, S/N: F04, CH12, PLO #1, NF & NPS DATA, TB=29 C, 1/20/99

SEQ TEMP_TEST TEST TEMP    VOLTAGE        STD_DEV          NF (dB)          NPS(K)
 1  WARM TEST  295.15  -1.00711026     .00042417        -----------      ----------
 2  COLD TEST   79.15   -.73100990     .00030465        4.31217736        .10970022
 3  WARM TEST  295.15  -1.00680082     .00040065        -----------      ----------
 4  COLD TEST   79.15   -.73254708     .00033417        4.34016918        .15541412
 5  WARM TEST  295.15  -1.00661811     .00044093        -----------      ----------
 6  COLD TEST   79.15   -.73173740     .00031086        4.32939394        .05536532
 7  WARM TEST  295.15  -1.00647216     .00043530        -----------      ----------
 8  COLD TEST   79.15   -.73075014     .00029436        4.31540101        .07770602
 9  WARM TEST  295.15  -1.00646005     .00043662        -----------      ----------
10  COLD TEST   79.15   -.73243967     .00033460        4.34241055        .07348052
11  WARM TEST  295.15  -1.00653784     .00041998        -----------      ----------
12  COLD TEST   79.15   -.73011741     .00036222        4.30462708        .11842266
13  WARM TEST  295.15  -1.00646268     .00050231        -----------      ----------
14  COLD TEST   79.15   -.73015601     .00030184        4.30610021        .17994821
15  WARM TEST  295.15  -1.00632655    ✓.00050859        -----------      ----------
16  COLD TEST   79.15   -.73199601     .00029777        4.33688552        .19188468
17  WARM TEST  295.15  -1.00636786     .00045439        -----------      ----------
18  COLD TEST   79.15   -.73102472     .00037714        4.32095910        .06650466
19  WARM TEST  295.15  -1.00624981     .00042991        -----------      ----------
20  COLD TEST   79.15   -.73109956     .00039402        4.32350979        .09425242

CH. 12 ,30.8 MHz      MHz

NOISE FIGURE AVERAGE (dB) =     4.32318303277

NOISE POWER STABILITY (K) =     .112267883398

NOISE POWER STABILITY DELTA (K) =         .136519363942

NPS_MAX (K) =         .191884684617         NPS_MIN (K) =      .0553653206754

INTEGRATION TIME =   .165
```

TEST DATA SHEET 10 (Sheet 7 of 30)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 29.0 °C PLO No. 1

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V)		T_C(°C)	V_C (V)	
					Mean	Standard Deviation		Mean	Standard Deviation
LO	13	Posi-tive +15.13	528.7	22.0	-1.065	.000633	-194.0	-.7723	.000437
				22.0	-1.065	.000636	-194.0	-.7722	.000522
				22.0	-1.064	.000656	-194.0	-.7741	.000536
				22.0	-1.064	.000634	-194.0	-.7719	.000502
				22.0	-1.064	.000697	-194.0	-.7722	.000500
		Nega-tive -15.13	-64.6	22.0	-1.064	.000673	-194.0	-.7738	.000506
				22.0	-1.064	.000652	-194.0	-.7718	.000455
				22.0	-1.064	.000621	-194.0	-.7734	.000452
				22.0	-1.064	.000612	-194.0	-.7732	.000474
				22.0	-1.064	.000583	-194.0	-.7732	.000442
Mixer/ Amps	All	9.93	244.5						
IF Amps	All	7.94	268.6						

Part No.: 1356429-1

Serial No.: F04

Test Engineer: Y. Trinh

Quality Assurance: TA 268 JAN 28 '99

Date: 1/20/99

TEST DATA SHEET 10 (Sheet 22 of 30)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 29.0 °C PLO No. 1

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
13		4.31				0.139			
		4.31				0.131			
		4.34				0.057			
		4.30				0.136			
		4.31				0.166			
		4.34				0.098			
		4.31				0.076			
		4.33				0.167			
		4.33				0.183			
		4.33				0.230			
	4.7		4.32	Pass	0.24		0.138	0.173	Pass

Pass = P, Fail = F

Part No.: 1356429-1

Serial No.: F04

Test Engineer: Y. Trinh

Quality Assurance: 268 JAN 22 '99

Date: 1/20/99

FOR REFERENCE ONLY

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            AMSU-A TEST

A1-1, S/N: F04, CH13, PLO #1, NF & NPS DATA, TB=29 C, 1/20/99

SEQ TEMP_TEST TEST TEMP   VOLTAGE       STD_DEV        NF (dB)         NPS(K)
 1  WARM TEST  295.15  -1.06468546   .00063308      ----------      ---------
 2  COLD TEST   79.15   -.77234873   .00048729      4.30541200      .13901387
 3  WARM TEST  295.15  -1.06450933   .00063597      ----------      ---------
 4  COLD TEST   79.15   -.77221963   .00052190      4.30539206      .13134396
 5  WARM TEST  295.15  -1.06435001   .00065580      ----------      ---------
 6  COLD TEST   79.15   -.77412253   .00053614      4.33568951      .05689866
 7  WARM TEST  295.15  -1.06429485   .00063403      ----------      ---------
 8  COLD TEST   79.15   -.77189784   .00050176      4.30290653      .13597329
 9  WARM TEST  295.15  -1.06415580   .00069738      ----------      ---------
10  COLD TEST   79.15   -.77216305   .00050020      4.30838348      .16636833
11  WARM TEST  295.15  -1.06389976   .00067297      ----------      ---------
12  COLD TEST   79.15   -.77382198   .00050637      4.33609516      .09805376
13  WARM TEST  295.15  -1.06392446   .00065200      ----------      ---------
14  COLD TEST   79.15   -.77178671   .00045514      4.30526274      .07561831
15  WARM TEST  295.15  -1.06390528   .00062070      ----------      ---------
16  COLD TEST   79.15   -.77336826   .00045215      4.32920272      .16671734
17  WARM TEST  295.15  -1.06379528   .00061231      ----------      ---------
18  COLD TEST   79.15   -.77319468   .00047425      4.32779419      .18288380
19  WARM TEST  295.15  -1.06357429   .00058312      ----------      ---------
20  COLD TEST   79.15   -.77323387   .00044187      4.33080156      .22961304

CH. 13 ,15.75 MHz    MHz

NOISE FIGURE AVERAGE (dB) =    4.31871495703

NOISE POWER STABILITY (K) =    .138248437045

NOISE POWER STABILITY DELTA (K) =        .172714378344

NPS_MAX (K) =        .229613041511          NPS_MIN (K) =      .0568986631671

INTEGRATION TIME =   .165
```

TEST DATA SHEET 10 (Sheet 8 of 30)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 29.0 °C PLO No. 1

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V)		T_C(°C)	V_C (V)	
					Mean	Standard Deviation		Mean	Standard Deviation
LO	14	Positive +15.13	528.7	22.0	-1.077	.00108	-194.0	-.7814	.000786
				22.0	-1.077	.00111	-194.0	-.7829	.000722
				22.0	-1.076	.00105	-194.0	-.7823	.000729
				22.0	-1.076	.00112	-194.0	-.7799	.000717
				22.0	-1.076	.00935	-194.0	-.7804	.000816
		Negative -15.13	-64.6	22.0	-1.076	.00107	-194.0	-.7807	.000833
				22.0	-1.076	.000977	-194.0	-.7796	.000800
				22.0	-1.076	.00103	-194.0	-.7799	.000665
				22.0	-1.076	.00107	-194.0	-.7303	.000808
				22.0	-1.076	.00112	-194.0	-.7819	.000779
Mixer/ Amps	All	9.93	244.5						
IF Amps	All	7.94	268.6						

Part No.: 1356429-1

Serial No.: F04

Test Engineer: Y. Trinh

Quality Assurance: QA 268 JAN 22 '99

Date: 1/20/99

TEST DATA SHEET 10 (Sheet 23 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: ______ Signature

Baseplate Temperature (T_B) 29.0 °C PLO No. 1

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
14		4.31				0.122			
		4.33				0.166			
		4.33				0.220			
		4.29				0.199			
		4.30				0.408			
		4.31				0.146			
		4.29				0.350			
		4.29				0.259			
		4.30				0.152			
		4.32				0.200			
	4.7		4.31	Pass	0.36		0.222	0.286	Pass

Pass = P, Fail = F

Part No.: 1356429-1

Serial No.: F04

Test Engineer: ______

Quality Assurance: QA 268 JAN 22 99

Date: 1/20/99

FOR REFERENCE ONLY

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            AMSU-A TEST

A1-1, S/N: F04, CH14, PLO #1, NF & NPS DATA, TB=29 C, 1/20/99

SEQ TEMP_TEST TEST TEMP   VOLTAGE       STD_DEV         NF (dB)         NPS(K)
 1  WARM TEST  295.15  -1.07697646    .00107684      ----------      ----------
 2  COLD TEST   79.15   -.78135737    .00078640      4.30677888       .12191844
 3  WARM TEST  295.15  -1.07684776    .00111264      ----------      ----------
 4  COLD TEST   79.15   -.78287814    .00072248      4.33071624       .16564416
 5  WARM TEST  295.15  -1.07647048    .00104710      ----------      ----------
 6  COLD TEST   79.15   -.78230248    .00072949      4.32623546       .22015901
 7  WARM TEST  295.15  -1.07627659    .00112262      ----------      ----------
 8  COLD TEST   79.15   -.77994584    .00071675      4.29342578       .19881784
 9  WARM TEST  295.15  -1.07635106    .00093494      ----------      ----------
10  COLD TEST   79.15   -.78042692    .00081645      4.29973077       .40766906
11  WARM TEST  295.15  -1.07616134    .00107050      ----------      ----------
12  COLD TEST   79.15   -.78068973    .00083337      4.30565032       .14558910
13  WARM TEST  295.15  -1.07622153    .00097682      ----------      ----------
14  COLD TEST   79.15   -.77960570    .00079974      4.28899836       .35043401
15  WARM TEST  295.15  -1.07629519    .00102932      ----------      ----------
16  COLD TEST   79.15   -.77994202    .00066452      4.29317047       .25915505
17  WARM TEST  295.15  -1.07606276    .00106863      ----------      ----------
18  COLD TEST   79.15   -.78030771    .00080835      4.30105843       .15223992
19  WARM TEST  295.15  -1.07618226    .00112237      ----------      ----------
20  COLD TEST   79.15   -.78191554    .00077923      4.32359820       .19973398

CH. 14 ,5.92 MHz      MHz

NOISE FIGURE AVERAGE (dB) =     4.30695929943

NOISE POWER STABILITY (K) =     .222136056532

NOISE POWER STABILITY DELTA (K) =        .285750620816

NPS_MAX (K) =        .407669064423        NPS_MIN (K) =      .121918443607

INTEGRATION TIME =   .165
```

TEST DATA SHEET 10 (Sheet 9 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 29.0 °C

PLO No. 2

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V)		T_C(°C)	V_C (V)	
					Mean	Standard Deviation		Mean	Standard Deviation
LO	9	Positive +15.13	537.9	22.0	-1.135	.000221	-194.0	-.8139	.000258
				22.0	-1.134	.000245	-194.0	-.8163	.000260
				22.0	-1.134	.000249	-194.0	-.8137	.000209
				22.0	-1.134	.000227	-194.0	-.8111	.000189
		Negative -15.13	-70.5	22.0	-1.134	.000239	-194.0	-.8126	.000213
				22.0	-1.134	.000221	-194.0	-.8135	.000226
				22.0	-1.133	.000274	-194.0	-.8136	.000270
				22.0	-1.133	.000245	-194.0	-.8111	.000226
				22.0	-1.133	.000247	-194.0	-.8115	.000203
				22.0	-1.133	.000218	-194.0	-.8120	.000222
Mixer/ Amps	All	9.94	244.5						
IF Amps	All	7.94	268.1						

Part No.: 1356429-1

Serial No.: F04

Test Engineer: Y. Trinh

Quality Assurance: 7A 268 JAN 28 '99

Date: 1/21/99

TEST DATA SHEET 10 (Sheet 24 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 29.0 °C PLO No. 2

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
9		4.18				0.029			
		4.21				0.067			
		4.18				0.072			
		4.15				0.020			
		4.17				0.055			
		4.18				0.029			
		4.19				0.105			
		4.15				0.065			
		4.16				0.068			
		4.17				0.036			
	4.7		4.17	Pass	.08		0.055	0.085	Pass

Pass = P, Fail = F

Part No.: 1356429-1

Serial No.: F04

Test Engineer: Y. Trinh

Quality Assurance: TA 268 JAN 22 '99

Date: 1/21/99

FOR REFERENCE ONLY

AMSU-A TEST

A1-1, S/N: F04, CH9, PLO #2, NF & NPS DATA, TB=29 C, 1/21/99

SEQ	TEMP_TEST	TEST TEMP	VOLTAGE	STD_DEV	NF (dB)	NPS(K)
1	WARM TEST	295.15	-1.13470870	.00022092	-----------	----------
2	COLD TEST	79.15	-.81389588	.00025811	4.17750956	.02906862
3	WARM TEST	295.15	-1.13433972	.00024548	-----------	----------
4	COLD TEST	79.15	-.81631049	.00026005	4.21419009	.06662805
5	WARM TEST	295.15	-1.13432654	.00024943	-----------	----------
6	COLD TEST	79.15	-.81368763	.00020945	4.17840761	.07247807
7	WARM TEST	295.15	-1.13375494	.00022690	-----------	----------
8	COLD TEST	79.15	-.81106045	.00018926	4.14826149	.02004619
9	WARM TEST	295.15	-1.13365421	.00023924	-----------	----------
10	COLD TEST	79.15	-.81263320	.00021332	4.17060774	.05490071
11	WARM TEST	295.15	-1.13356034	.00022082	-----------	----------
12	COLD TEST	79.15	-.81352903	.00022643	4.18374664	.02869195
13	WARM TEST	295.15	-1.13331272	.00027355	-----------	----------
14	COLD TEST	79.15	-.81363316	.00026999	4.18759973	.10529023
15	WARM TEST	295.15	-1.13329750	.00024494	-----------	----------
16	COLD TEST	79.15	-.81107838	.00022608	4.15294310	.06516934
17	WARM TEST	295.15	-1.13291233	.00024672	-----------	----------
18	COLD TEST	79.15	-.81146372	.00020332	4.16192513	.06838521
19	WARM TEST	295.15	-1.13270164	.00021812	-----------	----------
20	COLD TEST	79.15	-.81198267	.00022223	4.17104811	.03637291

CH. 9 ,154 MHz MHz

NOISE FIGURE AVERAGE (dB) = 4.17466073354

NOISE POWER STABILITY (K) = .0547031274103

NOISE POWER STABILITY DELTA (K) = .0852440430194

NPS_MAX (K) = .105290231007 NPS_MIN (K) = .0200461879878

INTEGRATION TIME = .165

TEST DATA SHEET 10 (Sheet 10 of 30)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 29.0 °C PLO No. 2

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V)		T_C(°C)	V_C (V)	
					Mean	Standard Deviation		Mean	Standard Deviation
LO	10	Positive +15.13	537.9	22.0	-1.047	.000297	-194.0	-.7521	.000222
				22.0	-1.046	.000300	-194.0	-.7527	.000217
				22.0	-1.045	.000360	-194.0	-.7523	.000203
				22.0	-1.046	.000312	-194.0	-.7519	.000221
		Negative -15.13	-70.5	22.0	-1.046	.000296	-194.0	-.7505	.000199
				22.0	-1.046	.000295	-194.0	-.7509	.000284
				22.0	-1.046	.000365	-194.0	-.7512	.000215
				22.0	-1.045	.000341 ~~.000215~~ T. Trinh	-194.0	-.7523	.000198
				22.0	-1.045	.000383	-194.0	-.7519	.000224
				22.0	-1.045	.000327	-194.0	-.7512	.000210
Mixer/ Amps	All	9.94	244.5						
IF Amps	All	7.94	268.1						

Part No.: 1356429-1

Serial No.: F04

Test Engineer: Y. Trinh

Quality Assurance: 7A 268 JAN 28 '99

Date: 1/21/99

TEST DATA SHEET 10 (Sheet 25 of 30)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 29.0 °C PLO No. 2

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
10		4.05				0.039			
		4.06				0.161			
		4.06				0.081			
		4.05				0.081			
		4.06				0.058			
		4.06				0.068			
		4.07				0.129			
		4.06				0.127			
		4.05				0.051			
		4.06				0.095			
	4.7		4.06	Pass	0.12		0.089	0.122	Pass

Pass = P, Fail = F

Part No.: 135629-1

Serial No.: F04

Test Engineer: Y. Trinh

Quality Assurance: TA 258 JAN 22 '99

Date: 1/21/99

FOR REFERENCE ONLY

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          AMSU-A TEST

A1-1, S/N: F04, CH10, PLO #2, NF & NPS DATA, TB=29 C, 1/21/99

SEQ TEMP_TEST TEST TEMP   VOLTAGE       STD_DEV        NF (dB)        NPS(K)
 1  WARM TEST  295.15   -.94099605    .00027051     -----------     ----------
 2  COLD TEST   79.15   -.66695940    .00022649     4.04808889      .03916203
 3  WARM TEST  295.15   -.94106590    .00033527     -----------     ----------
 4  COLD TEST   79.15   -.66764620    .00018791     4.05827038      .16130715
 5  WARM TEST  295.15   -.94141469    .00028526     -----------     ----------
 6  COLD TEST   79.15   -.66777144    .00019930     4.05631687      .08129722
 7  WARM TEST  295.15   -.94116512    .00024522     -----------     ----------
 8  COLD TEST   79.15   -.66724170    .00017103     4.05068199      .08118184
 9  WARM TEST  295.15   -.94130421    .00025562     -----------     ----------
10  COLD TEST   79.15   -.66779057    .00025962     4.05787539      .05809652
11  WARM TEST  295.15   -.94145823    .00027973     -----------     ----------
12  COLD TEST   79.15   -.66781883    .00018545     4.05658064      .06824236
13  WARM TEST  295.15   -.94128942    .00031172     -----------     ----------
14  COLD TEST   79.15   -.66823458    .00019017     4.06514851      .12857465
15  WARM TEST  295.15   -.94121122    .00031087     -----------     ----------
16  COLD TEST   79.15   -.66791485    .00018474     4.06091870      .12720478
17  WARM TEST  295.15   -.94111837    .00027378     -----------     ----------
18  COLD TEST   79.15   -.66723577    .00017972     4.05111663      .05130170
19  WARM TEST  295.15   -.94093186    .00029205     -----------     ----------
20  COLD TEST   79.15   -.66754614    .00017518     4.05819088      .09545233

CH. 10 ,75.9 MHz      MHz

NOISE FIGURE AVERAGE (dB) =    4.05632159868

NOISE POWER STABILITY (K) =    .089182058938

NOISE POWER STABILITY DELTA (K) =        .122145118973

NPS_MAX (K) =         .161307152913        NPS_MIN (K) =     .0391620339398

INTEGRATION TIME =   .165
```

TEST DATA SHEET 10 (Sheet 11 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 29.0 °C PLO No. 2

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V)		T_C(°C)	V_C (V)	
					Mean	Standard Deviation		Mean	Standard Deviation
LO	11	Positive +15.13	537.9	22.0	-1.047	.000297	-194.0	-.7521	.000222
				22.0	-1.046	.000300	-194.0	-.7527	.000217
				22.0	-1.045	.000360	-194.0	-.7523	.000203
				22.0	-1.046	.000313	-194.0	-.7519	.000221
		Negative -15.13	-70.5	22.0	-1.046	.000296	-194.0	-.7505	.000199
				22.0	-1.046	.000295	-194.0	-.7509	.000284
				22.0	-1.046	.000365	-194.0	-.7512	.000215
				22.0	-1.045	.000341	-194.0	-.7523	.000198
				22.0	-1.045	.000383	-194.0	-.7519	.000224
				22.0	-1.045	.000327	-194.0	-.7512	.000210
Mixer/ Amps	All	9.94	244.5						
IF Amps	All	7.94	268.1						

Part No.: 135429-1

Serial No.: F04

Test Engineer: Y. Trinh

Quality Assurance: 7A 268 JAN 22 '99

Date: 1/21/99

TEST DATA SHEET 10 (Sheet 26 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified:____________________ Baseplate Temperature (T$_B$) ________°C PLO No. 2

Signature

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
11		4.20				0.062			
		4.21				0.052			
		4.21				0.138			
		4.21				0.039			
		4.18				0.064			
		4.19				0.066			
		4.20				0.143			
		4.21				0.108			
		4.21				0.168			
		4.20				0.082			
	4.7		4.20	Pass	.12		0.092	0.129	Pass

Pass = P, Fail = F

Part No.: 1356429 -1

Serial No.: F04

Test Engineer: Y. Trinh

Quality Assurance: TL 253 JAN 28 '99

Date: 1/21/99

FOR REFERENCE ONLY

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AMSU-A TEST

A1-1, S/N: F04, CH11, PLO #2, NF & NPS DATA, TB=29 C, 1/21/99

SEQ TEMP_TEST TEST TEMP   VOLTAGE        STD_DEV        NF (dB)         NPS(K)
 1  WARM TEST  295.15  -1.04683165     .00029669      ----------      ---------
 2  COLD TEST   79.15   -.75210394     .00022247      4.19586513      .06187184
 3  WARM TEST  295.15  -1.04602228     .00030005      ----------      ---------
 4  COLD TEST   79.15   -.75265688     .00021716      4.21273976      .05192198
 5  WARM TEST  295.15  -1.04549390     .00036043      ----------      ---------
 6  COLD TEST   79.15   -.75232031     .00020296      4.21339032      .13784180
 7  WARM TEST  295.15  -1.04552831     .00031261      ----------      ---------
 8  COLD TEST   79.15   -.75185075     .00022101      4.20602484      .03897366
 9  WARM TEST  295.15  -1.04575478     .00029563      ----------      ---------
10  COLD TEST   79.15   -.75048636     .00019919      4.18335084      .06359486
11  WARM TEST  295.15  -1.04573561     .00029479      ----------      ---------
12  COLD TEST   79.15   -.75086245     .00028366      4.18912761      .06573289
13  WARM TEST  295.15  -1.04560408     .00036469      ----------      ---------
14  COLD TEST   79.15   -.75117549     .00021468      4.19517456      .14314074
15  WARM TEST  295.15  -1.04542043     .00034092      ----------      ---------
16  COLD TEST   79.15   -.75233371     .00019776      4.21437873      .10763742
17  WARM TEST  295.15  -1.04534434     .00038333      ----------      ---------
18  COLD TEST   79.15   -.75190489     .00022352      4.20880174      .16794882
19  WARM TEST  295.15  -1.04536337     .00032746      ----------      ---------
20  COLD TEST   79.15   -.75122989     .00020957      4.19855260      .08160395

CH. 11 ,69.8 MHz     MHz

NOISE FIGURE AVERAGE (dB) =    4.20175292273

NOISE POWER STABILITY (K) =    .0920267954857

NOISE POWER STABILITY DELTA (K) =        .128975163975

NPS_MAX (K) =        .167948819866         NPS_MIN (K) =     .0389736558911

INTEGRATION TIME =   .165
```

TEST DATA SHEET 10 (Sheet 12 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 29.0 °C PLO No. 2

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V)		T_C(°C)	V_C (V)	
					Mean	Standard Deviation		Mean	Standard Deviation
LO	12	Positive +15.13	537.9	22.0	-1.022	.000454	-194.0	-.7326	.000316
				22.0	-1.019	.000414	-194.0	-.7324	.000296
				22.0	-1.018	.000432	-194.0	-.7310	.000340
				22.0	-1.018	.000447	-194.0	-.7315	.000398
				22.0	-1.018	.000474	-194.0	-.7300	.000333
		Negative -15.13	-70.5	22.0	-1.017	.000432	-194.0	-.7312	.000324
				22.0	-1.018	.000486	-194.0	-.7304	.000362
				22.0	-1.018	.000465	-194.0	-.7294	.000336
				22.0	-1.018	.000454	-194.0	-.7314	.000319
				22.0	-1.018	.000492	-194.0	-.7296	.000324
Mixer/ Amps	All	9.94	244.5						
IF Amps	All	7.94	268.1						

Part No.: 135649-1

Serial No.: F04

Test Engineer: Y. Trinh

Quality Assurance: TA 268 JAN 22 '99

Date: 1/21/99

TEST DATA SHEET 10 (Sheet 27 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 29.0 °C PLO No. 2

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
12		4.17				0.024			
		4.20				0.137			
		4.19				0.100			
		4.20				0.049			
		4.18				0.110			
		4.20				0.098			
		4.18				0.134			
		4.17				0.084			
		4.20				0.033			
		4.17				0.147			
	4.7		4.19	Pass	0.18		0.092	0.124	Pass

Pass = P, Fail = F

Part No.: 135429-1

Serial No.: F04

Test Engineer: Y. Trinh

Quality Assurance: 268 JAN 22 '99

Date: 1/21/99

FOR REFERENCE ONLY

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              AMSU-A TEST

A1-1, S/N: F04, CH12, PLO #2, NF & NPS DATA, TB=29 C, 1/21/99

SEQ TEMP_TEST TEST TEMP   VOLTAGE       STD_DEV        NF (dB)        NPS(K)
 1  WARM TEST  295.15  -1.02161365    .00045427      ----------     ----------
 2  COLD TEST   79.15   -.73256917    .00031649      4.17438176     .02350585
 3  WARM TEST  295.15  -1.01910688    .00041400      ----------     ----------
 4  COLD TEST   79.15   -.73235149    .00029630      4.19840477     .13677768
 5  WARM TEST  295.15  -1.01836082    .00043165      ----------     ----------
 6  COLD TEST   79.15   -.73096200    .00033950      4.18540311     .10010049
 7  WARM TEST  295.15  -1.01792865    .00044688      ----------     ----------
 8  COLD TEST   79.15   -.73147634    .00039815      4.19797062     .04880153
 9  WARM TEST  295.15  -1.01770612    .00047448      ----------     ----------
10  COLD TEST   79.15   -.72997558    .00033347      4.17754731     .10964528
11  WARM TEST  295.15  -1.01736624    .00043206      ----------     ----------
12  COLD TEST   79.15   -.73123589    .00032394      4.20047124     .09839411
13  WARM TEST  295.15  -1.01769834    .00048560      ----------     ----------
14  COLD TEST   79.15   -.73037148    .00036248      4.18365260     .13449355
15  WARM TEST  295.15  -1.01783468    .00046538      ----------     ----------
16  COLD TEST   79.15   -.72939579    .00033622      4.16734862     .08448377
17  WARM TEST  295.15  -1.01774182    .00045423      ----------     ----------
18  COLD TEST   79.15   -.73142681    .00031928      4.19926417     .03777182
19  WARM TEST  295.15  -1.01770357    .00049221      ----------     ----------
20  COLD TEST   79.15   -.72962024    .00032413      4.17217858     .14706104

CH. 12 ,30.8 MHz     MHz

NOISE FIGURE AVERAGE (dB) =    4.1856787714

NOISE POWER STABILITY (K) =    .0921035105212

NOISE POWER STABILITY DELTA (K) =       .123555193509

NPS_MAX (K) =        .147061038766       NPS_MIN (K) =     .0235058452575

INTEGRATION TIME =   .165
```

TEST DATA SHEET 10 (Sheet 13 of 30)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 30.0 °C PLO No. 2

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V)		T_C(°C)	V_C (V)	
					Mean	Standard Deviation		Mean	Standard Deviation
LO	13	Positive +15.13	538.3	22.0	-1.080	.000737	-194.0	-.7804	.000441
				22.0	-1.081	.000674	-194.0	-.7801	.000513
				22.0	-1.080	.000678	-194.0	-.7765	.000482
				22.0	-1.080	.000638	-194.0	-.7757	.000478
				22.0	-1.080	.000663	-194.0	-.7753	.000460
		Negative -15.13	-70.6	22.0	-1.080	.000648	-194.0	-.7756	.000422
				22.0	-1.081	.000643	-194.0	-.7771	.000510
				22.0	-1.080	.000663	-194.0	-.7751	.000469
				22.0	-1.080	.000591	-194.0	-.7773	.000464
				22.0	-1.080	.000657	-194.0	-.7761	.000450
Mixer/ Amps	All	9.94	244.6						
IF Amps	All	7.94	268.0						

Part No.: 1356429-1

Serial No.: F04

Test Engineer: Y. Trinh

Quality Assurance: 268 JAN 22 '99

Date: 1/21/99

TEST DATA SHEET 10 (Sheet 28 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 30.0 °C PLO No. 2

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
13		4.26				0.222			
		4.25				0.058			
		4.20				0.078			
		4.19				0.144			
		4.18				0.063			
		4.19				0.119			
		4.21				0.132			
		4.18				0.064			
		4.21				0.223			
		4.20				0.087			
	4.7		4.21	Pass	0.24		0.119	0.165	Pass

Pass = P, Fail = F

Part No.: 135429-1

Serial No.: F04

Test Engineer: Y. Trinh

Quality Assurance: 892 JAN 22 '99

Date: 1/21/99

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          AMSU-A TEST

A1-1, S/N: F04, CH 13, PLO #2, NF &NPS DATA, TB=30C, 1/21/99

SEQ TEMP_TEST TEST TEMP   VOLTAGE      STD_DEV        NF (dB)       NPS(K)
 1  WARM TEST  295.15  -1.08042737   .00073664      ----------    ----------
 2  COLD TEST   79.15   -.78035466   .00044056      4.25539404     .22171611
 3  WARM TEST  295.15  -1.08061382   .00067411      ----------    ----------
 4  COLD TEST   79.15   -.78006660   .00051345      4.24924043     .05794170
 5  WARM TEST  295.15  -1.08049372   .00067810      ----------    ----------
 6  COLD TEST   79.15   -.77648406   .00048188      4.19867376     .07782467
 7  WARM TEST  295.15  -1.08045890   .00063766      ----------    ----------
 8  COLD TEST   79.15   -.77566790   .00047810      4.18730997     .14380464
 9  WARM TEST  295.15  -1.08031592   .00066308      ----------    ----------
10  COLD TEST   79.15   -.77526717   .00045960      4.18303532     .06331142
11  WARM TEST  295.15  -1.08036614   .00064753      ----------    ----------
12  COLD TEST   79.15   -.77563159   .00042182      4.18774446     .11949408
13  WARM TEST  295.15  -1.08065655   .00064289      ----------    ----------
14  COLD TEST   79.15   -.77710763   .00051034      4.20596401     .13245461
15  WARM TEST  295.15  -1.08021050   .00066288      ----------    ----------
16  COLD TEST   79.15   -.77507786   .00046872      4.18140634     .06398658
17  WARM TEST  295.15  -1.08020954   .00059144      ----------    ----------
18  COLD TEST   79.15   -.77725671   .00046360      4.21274937     .22294581
19  WARM TEST  295.15  -1.08004034   .00065749      ----------    ----------
20  COLD TEST   79.15   -.77613362   .00045035      4.19831954     .08747903

CH. 13 ,15.8 MHz      MHz

NOISE FIGURE AVERAGE (dB) =     4.20605619777

NOISE POWER STABILITY (K) =     .119095865519

NOISE POWER STABILITY DELTA (K) =        .165004117053

NPS_MAX (K) =         .222945812076        NPS_MIN (K) =     .0579416950224

INTEGRATION TIME =   .165
```

TEST DATA SHEET 10 (Sheet 14 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 30.0 °C PLO No. 2

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V)		T_C(°C)	V_C (V)	
					Mean	Standard Deviation		Mean	Standard Deviation
LO	14	Positive +15.13	538.3	22.0	-1.095	.000956	-194.0	-.7876	.000784
				22.0	-1.095	.001152	-194.0	-.7873	.000735
				22.0	-1.094	.001078	-194.0	-.7866	.000739
				22.0	-1.094	.001120	-194.0	-.7846	.000755
				22.0	-1.094	.001110	-194.0	-.7861	.000808
		Negative -15.13	-70.6	22.0	-1.094	.001099	-194.0	-.7845	.000838
				22.0	-1.094	.001185	-194.0	-.7858	.000665
				22.0	-1.094	.001073	-194.0	-.7857	.000765
				22.0	-1.093	.000910	-194.0	-.7835	.000718
				22.0	-1.093	.001132	-194.0	-.7853	.000776
Mixer/ Amps	All	9.94	244.6						
IF Amps	All	7.94	268.0						

Part No.: 1356429-1

Serial No.: F04

Test Engineer: Y. Trinh

Quality Assurance: 897 VL JAN 28 '99

Date: 1/21/99

TEST DATA SHEET 10 (Sheet 29 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 30.0 °C PLO No. 2

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
14		4.21				0.393			
		4.21				0.222			
		4.20				0.178			
		4.18				0.121			
		4.20				0.062			
		4.18				0.087			
		4.20				0.297			
		4.20				0.190			
		4.17				0.439			
		4.20				0.169			
	4.7		4.19	Pass	0.36		0.216	0.377	Pass

Pass = P, Fail = F

Part No.: 135429-1

Serial No.: F04

Test Engineer: Y. Trinh

Quality Assurance: QA 258 JAN 22 '99

Date: 1/21/99

FOR REFERENCE ONLY

AMSU-A TEST

A1-1, S/N: F06, CH 14, PLO #2, NF & NPS DATA, TB=30°C, 1/21/99

```
SEQ TEMP_TEST TEST TEMP   VOLTAGE       STD_DEV        NF (dB)       NPS(K)
                                                      ----------    ----------
 1  WARM TEST  295.15  -1.09458406     .00095603
 2  COLD TEST   79.15   -.78764650     .00078403     4.21341475     .39343855
                                                      ----------    ----------
 3  WARM TEST  295.15  -1.09487371     .00115216
 4  COLD TEST   79.15   -.78730380     .00073492     4.20557327     .22235529
                                                      ----------    ----------
 5  WARM TEST  295.15  -1.09434013     .00107796
 6  COLD TEST   79.15   -.78659626     .00073863     4.20096971     .17761434
                                                      ----------    ----------
 7  WARM TEST  295.15  -1.09366300     .00112012
 8  COLD TEST   79.15   -.78461970     .00075517     4.17984038     .12139468
                                                      ----------    ----------
 9  WARM TEST  295.15  -1.09376118     .00111017
10  COLD TEST   79.15   -.78613388     .00080828     4.20031243     .06184138
                                                      ----------    ----------
11  WARM TEST  295.15  -1.09352156     .00109937
12  COLD TEST   79.15   -.78454235     .00083771     4.18018180     .08727032
                                                      ----------    ----------
13  WARM TEST  295.15  -1.09369559     .00118474
14  COLD TEST   79.15   -.78577271     .00066491     4.19585128     .29680980
                                                      ----------    ----------
15  WARM TEST  295.15  -1.09365015     .00107279
16  COLD TEST   79.15   -.78573639     .00076487     4.19579913     .19030858
                                                      ----------    ----------
17  WARM TEST  295.15  -1.09334391     .00090979
18  COLD TEST   79.15   -.78354152     .00071752     4.16783784     .43879324
                                                      ----------    ----------
19  WARM TEST  295.15  -1.09291719     .00113165
20  COLD TEST   79.15   -.78527770     .00077566     4.19676407     .16879106

CH. 14 ,5.92 MHz      MHz

NOISE FIG AVERAGE (dB) =        4.19367389253

NOISE POWER STABILITY (K) =     .215861724956

NOISE POWER STABILITY DELTA (K) =        .376951858241

NPS_MAX (K) =         .438793240857         NPS_MIN (K) =      .0618413826159

INTEGRATION TIME =    .165


HIT CONTINUE KEY OR TYPE 'CONT'
```

TEST DATA SHEET 10 (Sheet 15 of 30)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 29.0 °C

Compo-nent	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V)		T_C(°C)	V_C (V)	
					Mean	Standard Deviation		Mean	Standard Deviation
LO	15	14.88	184.1	22.0	-.9402	.0000872	-194.0	-.7673	.0000670
				22.0	-.9396	.0000857	-194.0	-.7668	.0000733
				22.0	-.9394	.0000900	-194.0	-.7667	.0000682
				22.0	-.9394	.0000851	-194.0	-.7665	.0000614
				22.0	-.9392	.0000855	-194.0	-.7665	.0000787
				22.0	-.9391	.0000797	-194.0	-.7665	.0000669
				22.0	-.9391	.0000101	-194.0	-.7665	.0000690
				22.0	-.9391	.0000750	-194.0	-.7665	.0000108
				22.0	-.9391	.0000103	-194.0	-.7668	.0000912
				22.0	-.9393	.0000871	-194.0	-.7660	.0000925
Mixer/ Amps	All	9.94	244.5						
IF Amps	All	7.94	268.1						

Part No.: 135429-1

Serial No.: F04

Test Engineer: Y. Trinh

Quality Assurance: 7A 268 JAN 22 '99

Date: 1/19/99

TEST DATA SHEET 10 (Sheet 30 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: ____________ Baseplate Temperature (T_B) 29.0 °C
Signature

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
15		6.05				0.058			
		6.06				0.054			
		6.06				0.065			
		6.05				0.053			
		6.06				0.054			
		6.06				0.038			
		6.06				0.036			
		6.06				0.017			
		6.07				0.090			
		6.06				0.058			
	9.05		6.06	Pass	0.15		0.057	0.073	Pass

Pass = P, Fail = F

Part No.: 135429-1

Serial No.: F04

Test Engineer: ____________

Quality Assurance: TA 268 JAN 22 '99

Date: 1/19/99

FOR REFERENCE ONLY

```
               AMSU-A TEST

A1-1, S/N: F04, CH15, NF & NPS DATA, TB=29 C, 1/19/99

SEQ TEMP_TEST TEST TEMP   VOLTAGE       STD_DEV        NF (dB)        NPS(K)
 1  WARM TEST  295.15   -.94024146    .00008720      ----------     ----------
 2  COLD TEST   79.15   -.76727692    .00006697      6.05429065      .05802968
 3  WARM TEST  295.15   -.93956458    .00008565      ----------     ----------
 4  COLD TEST   79.15   -.76683318    .00007331      6.05703274      .05449619
 5  WARM TEST  295.15   -.93943028    .00009001      ----------     ----------
 6  COLD TEST   79.15   -.76665069    .00006819      6.05519256      .06455285
 7  WARM TEST  295.15   -.93943524    .00008513      ----------     ----------
 8  COLD TEST   79.15   -.76654092    .00006137      6.05231999      .05316478
 9  WARM TEST  295.15   -.93922374    .00008551      ----------     ----------
10  COLD TEST   79.15   -.76651938    .00007879      6.05613310      .05421678
11  WARM TEST  295.15   -.93913816    .00007970      ----------     ----------
12  COLD TEST   79.15   -.76649036    .00006690      6.05716426      .03793917
13  WARM TEST  295.15   -.93906146    .00010052      ----------     ----------
14  COLD TEST   79.15   -.76648257    .00006901      6.05854954      .08555734
15  WARM TEST  295.15   -.93906817    .00007499      ----------     ----------
16  COLD TEST   79.15   -.76649573    .00010839      6.05874381      .01736258
17  WARM TEST  295.15   -.93912209    .00010299      ----------     ----------
18  COLD TEST   79.15   -.76678864    .00009122      6.06503926      .09016081
19  WARM TEST  295.15   -.93931148    .00008713      ----------     ----------
20  COLD TEST   79.15   -.76660153    .00009248      6.05639927      .05808662

CH. 15 ,984 MHz      MHz

NOISE FIGURE AVERAGE (dB) =    6.0570877119

NOISE POWER STABILITY (K) =    .0573566802912

NOISE POWER STABILITY DELTA (K) =        .0727982275804

NPS_MAX (K) =        .0901608119468        NPS_MIN (K) =      .0173625843665

INTEGRATION TIME =    .165
```

TEST DATA SHEET 16

Temperature Sensor and Thermistor Test Data (Paragraph 3.6.1) (A1-1)

Test Setup Verified: ________ Signature   Baseplate Temperature (T_B) 23 °C

Reference Designation	Specification	Measured Value		Pass/Fail
RT 40	2200 ± 100 Ω	2171	Ω	P
RT 45	2200 ± 100 Ω	2169	Ω	P
RT 11	2200 ± 100 Ω	2168	Ω	P
RT 13	2200 ± 100 Ω	2169	Ω	P
RT 15	2200 ± 100 Ω	2169	Ω	P
RT 14	2200 ± 100 Ω	2168	Ω	P
RT 20	2200 ± 100 Ω	2167	Ω	P
RT 21	2200 ± 100 Ω	2168	Ω	P
RT 23	2200 ± 100 Ω	2167	Ω	P
RT 24	2200 ± 100 Ω	2169	Ω	P
RT 25	2200 ± 100 Ω	2169	Ω	P
RT 26	2200 ± 100 Ω	2168	Ω	P
RT 27	2200 ± 100 Ω	2171	Ω	P
RT 28	2200 ± 100 Ω	2168	Ω	P
RT 29	2200 ± 100 Ω	2166	Ω	P
RT 30	2200 ± 100 Ω	2166	Ω	P
RT 31	2200 ± 100 Ω	2167	Ω	P
RT 34	2200 ± 100 Ω	2170	Ω	P
TB 56	3000 ± 100 Ω	3004	Ω	P
TB 57	3000 ± 100 Ω	3012	Ω	P
TB 53	4.1 – 4.6 V	4.34	V	P

Pass = P,   Fail = F

Part No.: 135429-1

Serial No.: F04

Test Engineer: ________

Quality Assurance: 74 268 JAN 22 '99

Date: 1/18/99

TEST DATA SHEET 19

Survival Heater and Thermal Switch Test Data (Paragraph 3.6.2) (A1-1)

Test Setup Verified: ____________ Baseplate Temperature (T_B) 23 °C
Signature

	Open Switch		Closed Switch		
Reference Designation	**>10 MΩ**	**Pass/Fail**	**Specification**	**Measured Value**	**Pass/Fail**
HR1/TS1	>10MΩ	P	25 - 35 Ω	31.2 Ω	P
	>10MΩ	P		32.6 Ω	P
HR2/TS2	>10MΩ	P		31.3Ω	P
	>10MΩ	P		31.2Ω	P

Pass = P, Fail = F

Part No.: 1356429-1

Serial No.: F04

Test Engineer:

Quality Assurance: TA 268 JAN 22 '99

Date: 1/18/99

TEST DATA SHEET 22 (Sheet 1 of 3)
Bias Voltage Verification Test Data (Paragraph 3.6.3) (A1-1)

Test Setup Verified:
Signature

Baseplate Temperature (T_B) 23 °C

Reference Designation	Specification	Measured Value (V)	Pass/Fail
Mixer/IF AMP Ch 6, 7, 15, 9-14	+10 ±0.1	9.92	P
DRO Ch 7	+10 ±0.1	9.93	P
DRO Ch 15	+15 ±0.15	14.87	P
PLO +15	+15 ±0.15	15.08	P
PLO -15	-15 ±0.15	-15.14	P
IF AMP Ch 9-14	+8 ±0.08	7.93	P
DRO Ch 6	+10 ±0.1	9.94	P

Part No.: 1356429-1

Serial No.: F04

Test Engineer:

7A
268

Quality Assurance: JAN 22 '99

Date: 1/18/99

7.0 ASSEMBLY INSTALLATION AND REPLACEMENT LOG

The assembly installation and replacement for this receiver subsystem are logged in the following pages.

F04

GENCORP AEROJET	**MANUFACTURING ASSEMBLY INSTRUCTIONS (M.A.I.)**		PAGE 1 OF 6
	PART DESCRIPTION RECEIVER ASSEMBLY (A1-2)	PART NUMBER 1356409-1	
PLANNED BY B. MULLIGAN	DATE 6/10/98	REVISION 01	NEXT ASSEMBLY 1331720-2/1356008-1

OPER 0004

ASSEMBLY INSTALLATION AND REPLACEMENT LOG

INITIAL INSTALLATION							REPLACEMENT			
ITEM NO.	PART NUMBER	REV	DESCRIPTION	S/N	MFG	INSP	REV	S/N	MFG	INSI
17	1356680-1	B	ISOLATOR, CH 3	008	MFG 145 8-24-98	7A 228				
18	1356680-2	B	ISOLATOR, CH 4	009	MFG 145 8-24-98	7A 228	B	11	11/5/98	7A 228 [illegible]-98
19	1356680-3	B	ISOLATOR, CH 5	006	MFG 145 8-24-98	7A 228				
20	1356680-6	B	ISOLATOR, CH 8	06	MFG 145 8-24-98	7A 228				
22	1331507-1	G	MULTIPLEXER	~~4~~	MFG 145 8-24-98	G	G	5 ~~3~~	11/5/98	7A 228 12-3
23	1331509-1	G	WAVEGUIDE ATTENUATOR	104	MFG 145 8-24-98	7A 228				
24	1331509-2	G	WAVEGUIDE ATTENUATOR	105	MFG 145 8-24-98	7A 228				
25	1331509-3	E	WAVEGUIDE ATTENUATOR	107 ~~105~~	8-24-98 MFG 145	7A 228				
26	1331509-6	G	WAVEGUIDE ATTENUATOR	LC Than 9-9-98 102	8-24-98 MFG 145	7A 228				
28	1336610-3	F	STABLE OSCILLATOR	85093	8-24-98 MFG 145	7A 228				
29	1336610-4	F	STABLE OSCILLATOR	85042	8-24-98 MFG 145	7A 228	F	85044	11/5/98	7A 228 12-2-98
30	1336610-5	F	STABLE OSCILLATOR	85032	MFG 145 8-24-98	7A 228				

NOTES:

1. THIS LOG SHALL BE COMPLETED AT THE TIME THAT THE COMPONENT(S) OR PART(S) ARE BEING INSTALLED INTO THE ASSEMBLY. EACH LINE SHALL BE ENTERED AND STAMPED BY THE OPERATOR THAT INSTALLED THE COMPONENT(S) OR PART(S)
2. IF A COMPONENT(S) OR PART(S) ARE REMOVED AND REPLACED, RECORD THE REPLACEMENT PART ON IT'S RESPECTIVE LINE.
3. IF A COMPONENT(S) OR PART(S) HAVE BEEN REMOVED AND REPLACED MORE THAN ONCE, RECORD THE REPLACEMENT PAR NUMBER AT THE END OF THE ASSEMBLY LOG.

GENCORP AEROJET	MANUFACTURING ASSEMBLY INSTRUCTIONS (M.A.I.)			PAGE	OF
	PART DESCRIPTION RECEIVER ASSEMBLY (A1-2)		PART NUMBER 1356409-1	2	6
PLANNED BY B. MULLIGAN	DATE 6/10/98	REVISION 01	NEXT ASSEMBLY 1331720-2/1356008-1	OPER 0004	

ASSEMBLY INSTALLATION AND REPLACEMENT LOG

INITIAL INSTALLATION							REPLACEMENT			
ITEM NO.	PART NUMBER	REV	DESCRIPTION	S/N	MFG	INSP	REV	S/N	MFG	INS
31	1336610-8	F	STABLE OSCILLATOR	85078	8-24-98 MFG 145	7A 228				
37	1331562-13	G	MIXER/AMP CH 3	7A33	8-24-98 MFG 145	7A 228				
38	1331562-14	G	MIXER/AMP CH 4	7A34 ~~7A37~~ Le Thai 8-24-98	MFG 145	7A 228	G	7A44	11/5/98 95 T	7A 228
39	1331562-15	G	MIXER/AMP CH 5	7A35 ~~7A34~~ Le Thai 8-24-98	MFG 145	7A 228				
40	1331562-18	G	MIXER/AMP CH 8	7A28	8-24-98 MFG 145	7A 228				
86	1331559-2	E	FILTER, IF BAND PASS	P228 -012	8-24-98 MFG 145	7A 228				
87	1331559-3	E	FILTER, IF BAND PASS	P229- 007	8-24-98 MFG 145	7A 228				
88	1331559-4	E	FILTER, IF BAND PASS	P230 -007	8-24-98 MFG 145	7A 228				
89	1331559-5	E	FILTER, IF BAND PASS	P231 005	8-24-98 MFG 145	7A 228				

NOTES:

1. THIS LOG SHALL BE COMPLETED AT THE TIME THAT THE COMPONENT(S) OR PART(S) ARE BEING INSTALLED INTO THE ASSEMBLY. EACH LINE SHALL BE ENTERED AND STAMPED BY THE OPERATOR THAT INSTALLED THE COMPONENT(S) OR PART(S)
2. IF A COMPONENT(S) OR PART(S) ARE REMOVED AND REPLACED, RECORD THE REPLACEMENT PART ON IT'S RESPECTIVE LINE.
3. IF A COMPONENT(S) OR PART(S) HAVE BEEN REMOVED AND REPLACED MORE THAN ONCE, RECORD THE REPLACEMENT PAR NUMBER AT THE END OF THE ASSEMBLY LOG.

GENCORP	**MANUFACTURING ASSEMBLY INSTRUCTIONS (M.A.I.)**		PAGE _	O
AEROJET	PART DESCRIPTION RECEIVER ASSEMBLY (A1-2)	PART NUMBER 1356409-1	3	
PLANNED BY B. MULLIGAN	DATE 6/10/98	REVISION 01	NEXT ASSEMBLY 1331720-2/1356008-1	OPER 0004

ASSEMBLY INSTALLATION AND REPLACEMENT LOG

INITIAL INSTALLATION							REPLACEMENT			
ITEM NO.	PART NUMBER	REV	DESCRIPTION	S/N	MFG	INSP	REV	S/N	MFG	IN

NOTES:

1. THIS LOG SHALL BE COMPLETED AT THE TIME THAT THE COMPONENT(S) OR PART(S) ARE BEING INSTALLED INTO THE ASSEMBLY. EACH LINE SHALL BE ENTERED AND STAMPED BY THE OPERATOR THAT INSTALLED THE COMPONENT(S) OR PART(S)
2. IF A COMPONENT(S) OR PART(S) ARE REMOVED AND REPLACED, RECORD THE REPLACEMENT PART ON IT'S RESPECTIVE LINE.
3. IF A COMPONENT(S) OR PART HAVE BEEN REMOVED AND REPLACED MORE THAN ONC RECORD THE REPLACEMENT NUMBER AT THE END OF THE ASSEMBLY LOG.

GENCORP **AEROJET**	**MANUFACTURING ASSEMBLY INSTRUCTIONS (M.A.L)**			PAGE	OF
	PART DESCRIPTION RECEIVER ASSEMBLY (A1-2)		PART NUMBER 1356409-1	4	6
PLANNED BY B. MULLIGAN	DATE 6/10/98	REVISION 01	NEXT ASSEMBLY 1331720-2/1356008-1	OPER 0004	

ASSEMBLY INSTALLATION AND REPLACEMENT LOG

INITIAL INSTALLATION							REPLACEMENT			
ITEM NO.	PART NUMBER	REV	DESCRIPTION	S/N	MFG	INSP	REV	S/N	MFG	IN

NOTES:

1. THIS LOG SHALL BE COMPLETED AT THE TIME THAT THE COMPONENT(S) OR PART(S) ARE BEING INSTALLED INTO THE ASSEMBLY. EACH LINE SHALL BE ENTERED AND STAMPED BY THE OPERATOR THAT INSTALLED THE COMPONENT(S) OR PART(S)
2. IF A COMPONENT(S) OR PART(S) ARE REMOVED AND REPLACED, RECORD THE REPLACEMENT PART ON IT'S RESPECTIVE LINE.
3. IF A COMPONENT(S) OR PART(S HAVE BEEN REMOVED AND REPLACED MORE THAN ONCE, RECORD THE REPLACEMENT P NUMBER AT THE END OF THE ASSEMBLY LOG.

GENCORP AEROJET	MANUFACTURING ASSEMBLY INSTRUCTIONS (M.A.I.)			PAGE	OF
	PART DESCRIPTION RECEIVER ASSEMBLY (A1-2)		PART NUMBER 1356409-1	5	6
PLANNED BY B. MULLIGAN	DATE 6/10/98	REVISION 01	NEXT ASSEMBLY 1331720-2/1356008-1	OPER 0004	

ASSEMBLY INSTALLATION AND REPLACEMENT LOG
TEMPERATURE SENSORS & THERMISTORS

SENSOR	INITIAL INSTALLATION			REPLACEMENT		
	S/N	MFG	INSP	S/N	MFG	INSP
RT12	1256	10-1-98 MFG 145	7A 228			
RT17	1253	10-1-98 MFG 145	7A 222			
RT18	1254	10-1-98 MFG 145	7A 228			
RT19	1261	10-1-98 MFG 145	7A 222			
RT22	1282	MFG 145 10-1-98	7A 228			
RT33	1259	MFG 145 10-1-98	7A 222			
RT41	1258	MFG 145 10-1-98	7A 228			
RT42	1283	MFG 145 10-1-98	7A [illegible]			
RT43	1285	MFG 145 10-1-98	7A 228			
RT44	1284	MFG 145 10-1-98	7A 222			

SENSOR	INITIAL INSTALLATION			REPLACEMEN		
	S/N	MFG	INSP	S/N	MFG	I
TB54	201	10-1-98 MFG 145	[illegible]			
TB58	F88	10-1-98 MFG 145	[illegible]			
TB59	F74	MFG 145 10-1-98	7A 228			

NOTES:

1. THIS LOG SHALL BE COMPLETED AT THE TIME THAT THE COMPONENT(S) OR PART(S) ARE BEING INSTALLED INTO THE ASSEMBLY. EACH LINE SHALL BE ENTERED AND STAMPED BY THE OPERATOR THAT INSTALLED THE COMPONENT(S) OR PART(S)
2. IF A COMPONENT(S) OR PART(S) ARE REMOVED AND REPLACED, RECORD THE REPLACEMENT PART ON IT'S RESPECTIVE LINE.
3. IF A COMPONENT(S) OR PART(S) I BEEN REMOVED AND REPLACED MORE THAN ONCE, RECORD THE REPLACEMENT PART NUMBER A THE END OF THE ASSEMBLY LOC

GENCORP AEROJET	MANUFACTURING ASSEMBLY INSTRUCTIONS (M.A.I.)		PAGE	OF
	PART DESCRIPTION RECEIVER ASSEMBLY (A1-2)	PART NUMBER 1356409-1	6	6

PLANNED BY	DATE	REVISION	NEXT ASSEMBLY	OPER
B. MULLIGAN	6/10/98	01	1331720-2/1356008-1	0004

ASSEMBLY INSTALLATION AND REPLACEMENT LOG

IF ATTENUATORS

ATTEN-UATOR	REF MODULE	VALUE	S/N	MFG	INSP	VALUE	S/N	MFG	INSP
A18	A5	4dB	1014	Y. Trinh 12/22/98	7A 228				
A19	A9	8dB	040	Y. Trinh 12/22/98	7A 228				
A20	A13	8dB	035	Y. Trinh 12/22/98	7A 228				
A21	A17	5dB	053	Y. Trinh 12/22/98	7A 228				

NOTES:

1. THIS LOG SHALL BE COMPLETED AT THE TIME THAT THE COMPONENT(S) OR PART(S) ARE BEING INSTALLED INTO THE ASSEMBLY. EACH LINE SHALL BE ENTERED AND STAMPED BY THE OPERATOR THAT INSTALLED THE COMPONENT(S) OR PART(S)
2. IF A COMPONENT(S) OR PART(S) ARE REMOVED AND REPLACED, RECORD THE REPLACEMENT PART ON IT'S RESPECTIVE LINE.
3. IF A COMPONENT(S) OR PART(S) H BEEN REMOVED AND REPLACED THAN ONCE, RECORD THE REPLACEMENT PART NUMBER A END OF THE ASSEMBLY LOG.

F04

GENCORP AEROJET	MANUFACTURING ASSEMBLY INSTRUCTIONS (M.A.I.)		PAGE	OF
	PART DESCRIPTION RECEIVER ASSEMBLY (A1-1)	PART NUMBER 1356429-1	1	6

PLANNED BY	DATE	REVISION	NEXT ASSEMBLY	OPER
B. MULLIGAN	7/17/98	01	1331720-2/1356008-1	0004

ASSEMBLY INSTALLATION AND REPLACEMENT LOG

INITIAL INSTALLATION							REPLACEMENT			
ITEM NO.	PART NUMBER	REV	DESCRIPTION	S/N	MFG	INSP	REV	S/N	MFG	INS
9	1356680-4	B	ISOLATOR, CHAN 6	05	8-16-98	7A 228				
10	1356680-5	B	ISOLATOR, CHAN 7	12	9-29-98	7A 228				
11	1356680-7	B	ISOLATOR, CHAN 9-14	08	8-10-98	7A 228				
12	1356680-8	B	ISOLATOR, CHAN 15	11	8-10-98	7A 228				
14	1331509-4	G	WAVEGUIDE ATTENUATOR	103	8-4-98	7A 228				
15	1331509-5	G	WAVEGUIDE ATTENUATOR	103	8-17-98	7A 228				
16	1331509-7	E	WAVEGUIDE ATTENUATOR	107	11/13/98	7A 228				
~~17~~	~~1331509-8~~		~~WAVEGUIDE ATTENUATOR~~							
18	1331509-9	E	WAVEGUIDE ATTENUATOR	104	8-4-98	7A 228				
19	1331510-1	E	WAVEGUIDE A-1 (CHAN 9)	103	11/13/98	7A 228				
20	1336610-6	F	STABLE OSCILLATOR (A39)	85027	8-4-98	7A 228				
21	1336610-7	F	STABLE OSCILLATOR (A34)	85020	8-17-98	7A 228				

NOTES:

1. THIS LOG SHALL BE COMPLETED AT THE TIME THAT THE COMPONENT(S) OR PART(S) ARE BEING INSTALLED INTO THE ASSEMBLY. EACH LINE SHALL BE ENTERED AND STAMPED BY THE OPERATOR THAT INSTALLED THE COMPONENT(S) OR PART(S)
2. IF A COMPONENT(S) OR PART(S) ARE REMOVED AND REPLACED, RECORD THE REPLACEMENT PART ON IT'S RESPECTIVE LINE.
3. IF A COMPONENT(S) OR PART(S) HAVE BEEN REMOVED AND REPLACED MORE THAN ONCE, RECORD THE REPLACEMENT PA NUMBER AT THE END OF THE ASSEMBLY LOG .

GENCORP AEROJET	MANUFACTURING ASSEMBLY INSTRUCTIONS (M.A.I.)		PAGE 2 OF 6
	PART DESCRIPTION RECEIVER ASSEMBLY (A1-1)	PART NUMBER 1356429-1	
PLANNED BY B. MULLIGAN	DATE 7/17/98 REVISION 01	NEXT ASSEMBLY 1331720-2/1356008-1	OPER 0004

ASSEMBLY INSTALLATION AND REPLACEMENT LOG

INITIAL INSTALLATION							REPLACEMENT			
ITEM NO.	PART NUMBER	REV	DESCRIPTION	S/N	MFG	INSP	REV	S/N	MFG	INS
22	1336610-10	E	STABLE OSCILLATOR (A29)	FM5	8-4-98 95 T	7A 228				
23	1356669-1	B	POWER DIVIDER, 3 WAY	P234 08	8-26-98 95 T	7A 228				
25	1331546-1	G	MULTIPLEXER	04	8-10-98 95 T	7A 228				
26	1348360-~~1~~ 4	P	PLO ASSEMBLY A65 ~~(A65)~~ ~~A66~~	F06	10-28-98 95 T	7A 228	P	F09	11/31/98 95 T	7A 22
26	1348360-~~1~~ 4	P	PLO ASSEMBLY A66 ~~(A66)~~ ~~A65~~	F10	11/13/98 95 T	7A 228				
27	1331554-1	F	HYBRID TEE (A63)	03	12-7-98 95 T	7A 228				
31	1331562-16	G	MIXER/AMP CHAN 6	7A36	8-13-98 95 T	7A 228	~~G~~	~~7A47~~	9-29-98 95 T	
32	1331562-17	G	MIXER/AMP CHAN 7	7A39	8-14-98 95 T	7A 228	G	7A47	9-29-98 95 T	
33	1331562-19	G	MIXER/AMP CHAN 9-14	7A39	12-7-98	7A 228				
34	1331562-20	G	MIXER/AMP CHAN 15 (A25)	7A40	8-10-98 95 T	7A 228				
35	1331576-1	C	SAW FILTER	B03	8-26-98 95 T	7A 229				
36	1331576-2	C	SAW FILTER	B03	8-26-98 95 T	7A 228				

NOTES:

1. THIS LOG SHALL BE COMPLETED AT THE TIME THAT THE COMPONENT(S) OR PART(S) ARE BEING INSTALLED INTO THE ASSEMBLY. EACH LINE SHALL BE ENTERED AND STAMPED BY THE OPERATOR THAT INSTALLED THE COMPONENT(S) OR PART(S)
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GENCORP AEROJET	MANUFACTURING ASSEMBLY INSTRUCTIONS (M.A.I.)		PAGE	OF
	PART DESCRIPTION RECEIVER ASSEMBLY (A1-1)	PART NUMBER 1356429-1	3	6

PLANNED BY	DATE	REVISION	NEXT ASSEMBLY	OPER
B. MULLIGAN	7/17/98	01	1331720-2/1356008-1	0004

ASSEMBLY INSTALLATION AND REPLACEMENT LOG

INITIAL INSTALLATION							REPLACEMENT			
ITEM NO.	PART NUMBER	REV	DESCRIPTION	S/N	MFG	INSP	REV	S/N	MFG	INSP
37	1331576-3	C	SAW FILTER	B06	8-26-98 95 T	7A 228				
38	1331576-4	C	SAW FILTER	B07	8-26-98 95 T	7A 228				
39	1356670-1	C	POWER DIVIDER 4-WAY	P235 07	8-27-98 95 T	7A 228				
40	1331579-7	G	AMPLIFIER, IF	111	8-26-98 95 T	7A 228				
41	1331579-8	F	AMPLIFIER, IF	105	8-26-98 95 T	7A 228				
42	1331579-9	G	AMPLIFIER, IF	111	8-26-98 95 T	7A 228				
43	1331579-10	F	AMPLIFIER, IF	105	8-26-98 95 T	7A 228				
44	1331579-11	G	AMPLIFIER, IF	111	8-26-98 95 T	7A 228				
45	1331579-12	F	AMPLIFIER, IF	105	8-26-98 95 T	7A 228				
46	1331579-13	G	AMPLIFIER, IF	111	8-26-98 95 T	7A 228				
A-32 54 A37 54	1331559-2	E	FILTER, I.F. BAND PASS	007 005	12/1/98 95 T	7A 228				
55	1331559-1	E	FILTER, I.F. BAND PASS	008	12/1/98	7A 228				

NOTES:

1. THIS LOG SHALL BE COMPLETED AT THE TIME THAT THE COMPONENT(S) OR PART(S) ARE BEING INSTALLED INTO THE ASSEMBLY. EACH LINE SHALL BE ENTERED AND STAMPED BY THE OPERATOR THAT INSTALLED THE COMPONENT(S) OR PART(S)
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GENCORP AEROJET	MANUFACTURING ASSEMBLY INSTRUCTIONS (M.A.I.)			PAGE	OF
	PART DESCRIPTION RECEIVER ASSEMBLY (A1-1)		PART NUMBER 1356429-1	4	6
PLANNED BY B. MULLIGAN	DATE 7/17/98	REVISION 01	NEXT ASSEMBLY 1331720-2/1356008-1	OPER 0004	

ASSEMBLY INSTALLATION AND REPLACEMENT LOG

INITIAL INSTALLATION							REPLACEMENT			
ITEM NO.	PART NUMBER	REV	DESCRIPTION	S/N	MFG	INSP	REV	S/N	MFG	INS
56	1331559-7	E	FILTER, I.F. BAND PASS	004	12-3-97 95 T	[illegible]				
57	1331559-4	E	FILTER, I.F. BAND PASS	013	12/3/97 95 T	[illegible]				
160	1357410-1	NA	RELAY	NA	NA					
95	1331509-10		WAVEGUIDE ATTENUATOR	103	10-28-97 95 T	[illegible]				

NOTES:

1. THIS LOG SHALL BE COMPLETED AT THE TIME THAT THE COMPONENT(S) OR PART(S) ARE BEING INSTALLED INTO THE ASSEMBLY. EACH LINE SHALL BE ENTERED AND STAMPED BY THE OPERATOR THAT INSTALLED THE COMPONENT(S) OR PART(S)
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GENCORP AEROJET	MANUFACTURING ASSEMBLY INSTRUCTIONS (M.A.I.)		PAGE 5	OF 6
	PART DESCRIPTION RECEIVER ASSEMBLY (A1-1)	PART NUMBER 1356429-1		

PLANNED BY	DATE	REVISION	NEXT ASSEMBLY	OPER
B. MULLIGAN	7/17/98	01	1331720-2/1356008-1	0004

ASSEMBLY INSTALLATION AND REPLACEMENT LOG
TEMPERATURE SENSORS & THERMISTORS

SENSOR	INITIAL INSTALLATION			REPLACEMENT		
	S/N	MFG	INSP	S/N	MFG	INSP
RT11	1264					
RT13	1344					
RT14	1246					
RT15	1255					
RT20	1266					
RT21	1249					
RT23	1243					
RT24	1244					
RT25	1263					
RT26	1265					
RT27	1271					

SENSOR	INITIAL INSTALLATION			REPLACEMENT		
	S/N	MFG	INSP	S/N	MFG	IN
RT28	1245					
RT29	1260					
RT30	1262					
RT31	1247					
RT34	1257					
RT40	1350					
RT45	1267					
TB53	141	1-4-99 95 T	TA 228			
TB56	F36	1-4-99 95 T	TA 228			
TB57 ●	F29	1-4-99 95 T	TA 228			

NOTES:

1. THIS LOG SHALL BE COMPLETED AT THE TIME THAT THE COMPONENT(S) OR PART(S) ARE BEING INSTALLED INTO THE ASSEMBLY. EACH LINE SHALL BE ENTERED AND STAMPED BY THE OPERATOR THAT INSTALLED THE COMPONENT(S) OR PART(S)
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3. IF A COMPONENT(S) OR PART(S) H BEEN REMOVED AND REPLACED MORE THAN ONCE, RECORD THE REPLACEMENT PART NUMBER AT THE END OF THE ASSEMBLY LOG.

GENCORP AEROJET	MANUFACTURING ASSEMBLY INSTRUCTIONS (M.A.I.)			PAGE	OF
	PART DESCRIPTION RECEIVER ASSEMBLY (A1-1)		PART NUMBER 1356429-1	6	6
PLANNED BY B. MULLIGAN	DATE 7/17/98	REVISION 01	NEXT ASSEMBLY 1331720-2/1356008-1	OPER 0004	

ASSEMBLY INSTALLATION AND REPLACEMENT LOG
IF ATTENUATORS

ATTEN-UATOR	ON MODULE	VALUE	S/N	MFG	INSP	VALUE	S/N	MFG	INSP
A26	A25 CH15	-4	001	2-1-99 Kutt Allard	TA 226				
A32	A31 CH7	-16	042						
A37	A36 CH6	-16	051						
A47	A46 CH 9	-10	025		2.2.99				
A50	A49 CH10	-10	014						
A53	A52 CH11	-14	003						
A56	A55 CH12	-14	~~008~~ 004						
A59	A58 CH13	-12	008						
A62	A61 CH 14	-12	021	Kutt Allard 2-1-99	TA 228				

NOTES:

1. THIS LOG SHALL BE COMPLETED AT THE TIME THAT THE COMPONENT(S) OR PART(S) ARE BEING INSTALLED INTO THE ASSEMBLY. EACH LINE SHALL BE ENTERED AND STAMPED BY THE OPERATOR THAT INSTALLED THE COMPONENT(S) OR PART(S)
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3. IF A COMPONENT(S) OR PART(S BEEN REMOVED AND REPLACE THAN ONCE, RECORD THE REPLACEMENT PART NUMBER END OF THE ASSEMBLY LOG.

GENCORP
AEROJET

AEROJET, AZUSA OPERATIONS
Azusa, California
CAGE Code 70143

ENGINEERING CHANGE NOTICE

ADVANCE REL. INCORPORATE SHEET 1 OF 2

1. PROGRAM COMBINED AMSU	2. ECN NUMBER CAMSU- 1352	3. CONTRACT NUMBER NAS 5-32314	4. PREPARED BY / DATE / EXT R. KAPPER/10-27-97/1107	5. DOCUMENT NUMBER AE-24869	6. NEW REV. C

7. CHANGE CLASS: IA [✓ IB] II

CCR # _______

8. MULTIPLE DOCUMENTS AFFECTED: YES [✓ NO]

9. CHG TYPE: [✓ DOC CHG] HARDWARE SOFTWARE

10. HARDWARE

PART NUMBER(S)	CURR REV MAND	CURR REV LTST	NEW REV MAND	NEW REV LTST	EFFECTIVITY ☑ END ITEM S/N ☐ PART SERIAL/LOT	DATE
NA					1054 UP	6/25/98

11. DOCUMENT TITLE: PRODUCT SPECIFICATION, BALANCED MIXER/IF AMP

12. DESCRIPTION OF CHANGE

ITEM ZONE

3.2.1.15.1 GAIN VERSUS TEMPERATURE...
(ADD) ENGINEERING DATA ONLY AT THE AMPLIFIER LEVEL. REQUIREMENT AT THE MIXER/AMP LEVEL IS .02 dB/°C FROM -2°C TO +38°C.

3.2.1.15.2 GAIN VERSUS OPERATING VOLTAGE...
(ADD) ENGINEERING DATA ONLY AT THE AMPLIFIER LEVEL. TEST DATA TO BE UTILIZED TO DETERMINE COMPLIANCE WITH PARAGRAPH 3.2.1.15.

___ Urgent [✓ Routine]

13. SIGNATURES		DATE
Design Verif., Dwg.	N/A RDK	
Qual Eng		10/28/97
PTL (Eng)	Ron Kapper	10/28/97
Mfg Eng	Ron Kapper for B. Mullican	10/28/97
Systems Eng		10/[illegible]
NASA T.O.	See attached	
Des. Assur.	N/A RDK	
Matls.	N/A RDK	
Design Verif., Specs.		11/12/97

14. JUSTIFICATION / REASON FOR CHANGE
CORRECTIVE ACTION FOR PREVIOUS SOARS

16. REMARKS/SPECIAL INSTRUCTIONS/TECHNICAL EVALUATION
NO TECHNICAL IMPACT

15. DISPOSITION OF MATERIAL	USE AS IS	MODIFY	SCRAP	RETURN TO STORES
ON ORDER				
IN STOCK		N/A		
INSTALLED				

20. CONFIGURATION MGR.

21. DIST. CODE: U

22. REL. DATE

17. NASA CONCURRENCE OF CLASSIFICATIONS
DATE: 11/5/97

18. CHANGE CODE: A 0 3

19. PCCB CHAIRMAN / PMO:
APPROVE ✓
DISAPPROVE
DEFER
DATE: 11/5/97

23. INCORPORATION DATE
Inc. By ....
Design Verif. ....

96/10/17

GENCORP AEROJET

AEROJET, AZUSA OPERATIONS
Azusa, California
CAGE Code 70143

ENGINEERING CHANGE NOTICE

ADVANCE REL. INCORPORATE SHEET 1 OF 2

1. PROGRAM: COMBINED AMSU
2. ECN NUMBER: CAMSU- 1352
3. CONTRACT NUMBER: NAS 5-32314
4. PREPARED BY / DATE / EXT: R. KAPPER/10-27-97/1107
5. DOCUMENT NUMBER: AE-24869
6. NEW REV.: C
7. CHANGE CLASS: IA [✓ IB] II
CCR # ______
8. MULTIPLE DOCUMENTS AFFECTED: YES [✓ NO]
9. CHG TYPE: [✓ DOC CHG] HARDWARE SOFTWARE

10. HARDWARE PART NUMBER(S)	CURR REV MAND	CURR REV LTST	NEW REV MAND	NEW REV LTST	/ EFFECTIVITY	DATE
					☑ END ITEM S/N ☐ PART SERIAL/LOT	
NA					105 & UP	

11. DOCUMENT TITLE: PRODUCT SPECIFICATION, BALANCED MIXER/IF AMP

12. DESCRIPTION OF CHANGE

ITEM	ZONE	
/ 3.2.1.15.1		GAIN VERSUS TEMPERATURE...
	(ADD)	ENGINEERING DATA ONLY AT THE AMPLIFIER LEVEL. REQUIREMENT AT THE MIXER/AMP LEVEL IS .02 dB/°C FROM -2°C TO +38°C.
/ 3.2.1.15.2		GAIN VERSUS OPERATING VOLTAGE...
	(ADD)	ENGINEERING DATA ONLY AT THE AMPLIFIER LEVEL. TEST DATA TO BE UTILIZED TO DETERMINE COMPLIANCE WITH PARAGRAPH 3.2.1.15.

___ Urgent X Routine

13. SIGNATURES		DATE
Design Verif., Dwg.	N/A RDK	
Qual Eng		10/28/97
PTL (Eng)	Bob Kapper	10/28/97
Mfg Eng	Bob Kapper for B. Millikan	10/28/97
Systems Eng		10/30/97
NASA TR	E. Kusnehan	11/12/97
Des. Assur.	N/A RDK	
Matls.	N/A RDK	
Design Spec.	N/A	

14. JUSTIFICATION / REASON FOR CHANGE: CORRECTIVE ACTION FOR PREVIOUS SOARS

15. DISPOSITION OF MATERIAL	USE AS IS	MODIFY	SCRAP	RETURN TO STORES
ON ORDER		N/A		
IN STOCK				
INSTALLED				

16. REMARKS/SPECIAL INSTRUCTIONS/TECHNICAL EVALUATION: NO TECHNICAL IMPACT

17. NASA CONCURRENCE OF CLASSIFICATION:
DATE: 11/5/97

18. CHANGE CODE: A+0/3

19. PCCB CHAIRMAN / PMO:
APPROVE
DISAPPROVE
DEFER
DATE: 11/5/97

20. CONFIGURATION MGR.
21. DIST. CODE:
22. REL. DATE

23. INCORPORATION DATE
Inc. By ....
Design Verif. ....

3/17

GENCORP
AEROJET

DOCUMENT APPROVAL SHEET

TITLE Performance Verification Report METSAT (S/N: 107) AMSU-A1 Receiver Assemblies, P/N 1356429-1, S/N: F04 and P/N 1356409-1, S/N: F04	DOCUMENT NO. Report 11413 February 1999

INPUT FROM: D. Pines	CDRL: 208	SPECIFICATION ENGINEER: N/A	DATE
CHECKED BY: N/A	DATE	JOB NUMBER: N/A	DATE

APPROVED SIGNATURES	DEPT. NO.	DATE
Product Team Leader (D. Pines) Derek R Pines	8661	3/1/99
Systems Engineer (R. Platt) Robert W Platt	8341	3/9/99
Design Assurance (E. Lorenz) E Lorenz	8331	3/2/99
Quality Assurance (R. Taylor) RM Taylor	7831	4/9/99
PMO/Technical (P. Patel) P.K. Patel	8341	4/11/99
Released: Configuration Management (J. Cavanaugh) J Cavanaugh	8361	4/12/99

By my signature, I certify the above document has been reviewed by me and concurs with the technical requirements related to my area of responsibility.

(Data Center) FINAL

Please return this sheet and the reproducible master to Jim Kirk (Bldg. 1/Dept. 8631), ext. 2081.

NASA
National Aeronautics and Space Administration

Report Documentation Page

1. Report No. ---	2. Government Accession No. ---	3. Recipient's Catalog No. ---

4. Title and Subtitle
Integrated Advanced Microwave Sounding Unit-A (AMSU-A), Performance Verification Report

5. Report Date
February 1999

6. Performing Organization Code
---

7. Author(s)
D. Pines

8. Performing Organization Report No.
11413

10. Work Unit No.
---

9. Performing Organization Name and Address
Aerojet
1100 W. Hollyvale
Azusa, CA 91702

11. Contract or Grant No.
NAS 5-32314

12. Sponsoring Agency Name and Address
NASA
Goddard Space Flight Center
Greenbelt, Maryland 20771

13. Type of Report and Period Covered
Final

14. Sponsoring Agency Code
---

15. Supplementary Notes
---

16. ABSTRACT (*Maximum 200 words*)

This is the Performance Verification Report, METSAT (S/N: 107) AMSU-A1 Receiver Assemblies, P/N 1356429-1, S/N: F04, P/N 1356409-1, S/N: F04, for the Integrated Advanced Microwave Sounding Unit-A (AMSU-A).

17. Key Words (Suggested by Author(s))
EOS
Microwave System

18. Distribution Statement
Unclassified --- Unlimited

19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of pages	22. Price ---

NASA FORM 1626 OCT 86

PREPARATION OF THE REPORT DOCUMENTATION PAGE

The last page of a report facing the third cover is the Report Documentation Page, RDP. Information presented on this page is used in announcing and cataloging reports as well as preparing the cover and title page. Thus, it is important that the information be correct. Instructions for filing in each block of the form are as follows:

Block 1. Report No. NASA report series number, if preassigned.

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Block 3. Recipient's Catalog No.. Reserved for use by each report recipient.

Block 4. Title and Subtitle. Typed in caps and lower case with dash or period separating subtitle from title.

Block 5. Report Date. Approximate month and year the report will be published.

Block 6. Performing Organization Code . Leave blank.

Block 7. Authors. Provide full names exactly as they are to appear on the title page. If applicable, the word editor should follow a name.

Block 8. Performing Organization Report No. NASA installation report control number and, if desired, the non-NASA performing organization report control number.

Block 9. Performing Organization Name and Address. Provide affiliation (NASA program office, NASA installation, or contractor name) of authors.

Block 10. Work Unit No. Provide Research and Technology Objectives and Plants (RTOP) number.

Block 11. Contract or Grant No. Provide when applicable.

Block 12. Sponsoring Agency Name and Address. National Aeronautics and Space Administration, Washington, D.C. 20546-0001. If contractor report, add NASA installation or HQ program office.

Block 13. Type of Report and Period Covered. NASA formal report series; for Contractor Report also list type (interim, final) and period covered when applicable.

Block 14. Sponsoring Agency Code. Leave blank.

Block 15. Supplementary Notes. Information not included elsewhere: affiliation of authors if additional space is required for Block 9, notice of work sponsored by another agency, monitor of contract, information about supplements (file, data tapes, etc.) meeting site and date for presented papers, journal to which an article has been submitted, note of a report made from a thesis, appendix by author other than shown in Block 7.

Block 16. Abstract. The abstract should be informative rather than descriptive and should state the objectives of the investigation, the methods employed (e.g., simulation, experiment, or remote sensing), the results obtained, and the conclusions reached.

Block 17. Key Words. Identifying words or phrases to be used in cataloging the report.

Block 18. Distribution Statement. Indicate whether report is available to public or not. If not to be controlled, use "Unclassified-Unlimited." If controlled availability is required, list the category approved on the Document Availability Authorization Form (see NHB 2200.2, Form FF427). Also specify subject category (see "Table of Contents" in a current issue of STAR) in which report is to be distributed.

Block 19. Security Classification (of the report). Self-explanatory.

Block 20. Security Classification (of this page). Self-explanatory.

Block 21. No. of Pages. Count front matter pages beginning with iii, text pages including internal blank pages, and the RDP, but not the title page or the back of the title page.

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GENCORP
AEROJET

AEROJET, Azusa Operations

ENGINEERING CHANGE NOTICE

Continuation Sheet

2. ECN NUMBER CAMSU-1352	SHEET 2 OF 2	
5. DOCUMENT NUMBER AE-24864		6. REV. C

12. DESCRIPTION OF CHANGE (CONTINUED)

ITEM ZONE

3.2.1.12 LO/RF ISOLATION - THE ISOLATION... FOR P/N 1331562-11
(ADD): AND 27.5 dB FOR P/N 1331562-12

(WAS: 1.5:1) (WAS: 1.5:1)
3.2.1.16 IMPEDANCE - THE VOLTAGE... 1.7:1 OVER THE RF... 1.7:1
OVER THE SPECIFIED IF RANGE...

7/1/98

AEROJET ELECTROSYSTEMS COMPANY

SUPPLIER'S DISCREPANCY ACTION REQUEST

FOR AEROJET USE

1. SUPPLIER'S SDAR NO.: 17
2. AEROJET SDAR NO.: 98-0779
3. DATE SUBMITTED: 6-30-98
DATE RECEIVED: 7-1-98

TO BE COMPLETED BY SUPPLIER (Please Type or Print) THE SUPPLIER ACCEPTS FULL RESPONSIBILITY FOR ACCURACY OF INFORMATION BELOW

SUPPLIER'S NAME AND ADDRESS:
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara, CA 93101

4. SUPPLIER'S CODE: 86472
5. BUYER'S CODE: 45
6. CONTRACT NO.: NAS 532514
7. WORK ORDER NO.: 4510901100
8. P.O. NUMBER: PB5101
9. PART NUMBER: 1331562-11, 18, 19, 20.
C/L
10. PART NAME: Mixer-Amplifier
11. NEXT ASSY:
12. QTY. on Order: 70
13. QTY. of Shpt: 20
14. QTY. DAR'D:
15. PREVIOUS SDAR (DATE & NO.): 6/9/98

16. Serial Nos.:
7A34
7A38
7A39
7A40
7A29
7A30

17. CONDITIONS:

Mixer-Amplifiers measure high for gain flatness:

SN:	Measures:		Spec:
7A34	0.55	dB ppk	0,~~9~~50
7A38	0.60	"	"
7A39	0.70	"	"
7A40	1.38	"	1.00
7A29	0.6959	"	0.50
7A30	1.10	"	1.00

18. ACTION REQUESTED:

Approve use as is.

19. CAUSE & CORRECTIVE ACTION:

After spending several weeks trying to improve this parameter it became apparent that we had reached a limit in improving the gain flatness.

Corrective action is not possible without remaking the amplifiers.

(Attach Extra Sheets, Photographs, Sketches, etc. as Necessary)

SIGNATURE OF SUPPLIER'S AUTHORIZED REPRESENTATIVE: Bill Newman

22. SDAR COPIES REQUIRED:

23. SPACEK

24. MODEL:

TO BE COMPLETED BY AEROJET (Please Type or Print)

COMMENTS OF SQA (or SPVR Receiving Inspection)/DATE

REMARKS OF SQA (or SPVR Receiving Inspection) DATE: [illegible] 7/1/98

SIGNATURE OF GOVT. REP. AT SOURCE (if Req'd) DATE

SIGNATURE OF ENGR: DATE: 7-1-98

DISPOSITION:

Use As Is. Engineering has reviewed the noted discrepancies and determined that based on testing of 2 units over temperature with other flight components where the flatness did not affect the performance of the Receiver channels, accepting these units there will be no affect on the form, fit or function of the next assembly, See Attachment #1

Sys. Engr P.R. Patel

QUALITY CONTROL: J. Hiri DATE: 7/16/98

ENGINEERING: DATE: 7/28/98

CUSTOMER: DATE: 8/5/98

SPECIAL INSTRUCTIONS TO SUPPLIER

1. FINAL APPROVAL OF THIS REQUEST SHALL APPLY ONLY TO THE ITEMS SPECIFIED HEREIN AND SHALL NOT ESTABLISH A PRECEDENT. ALL FINDINGS WILL BE SUBJECT TO VERIFICATION AND FINAL APPROVAL AT AEROJET.
2. WITHHOLD SHIPMENT PENDING RECEIPT OF APPROVED SDAR, FOR SHIPMENT, SEGREGATE MATERIAL SPECIFIED HEREON AND ATTACH COPY OF APPROVED SDAR.

Attachment # 1
SDAR 98-119

Hui, Joseph

From: Kapper, Ron
Sent: Tuesday, July 14, 1998 4:06 PM
To: Hui, Joseph
Subject: RECOMMENDED DISPOSITION OF SDAR #98-119

Subject SDAR deals with Mixers manufactured by Spacek. The Mixers have out of tolerance Gain Flatness. Two Mixers(S/Ns 7A34 and 7A40) from this group were tested over temperature with other flight components and the flatness did not affect the performance of the Receiver channels; flatness problems tend to be integrated out. It is interesting to note that these flatness readings are an improvement over KLM worst case readings of .8 dB and 1.7 dB respectively.
Based on the testing, the Receiver Team recommends a "use as is" disposition of the SDAR.

Ron Kapper
Receiver Team Leader

7/1/98

AEROJET ELECTROSYSTEMS COMPANY

30-436 Rev. 6-85

PPLIER'S DISCREPANCY ACTION REQUEST

FOR SUPPLIER USE	FOR AESC USE
1. SUPPLIER SDAR S/N 24	2. AESC SDAR S/N 98-121
2. DATE SUBMITTED 6-30-98	3. DATE RECEIVED 7-1-98

BE COMPLETED BY SUPPLIER (Please Type or Print) THE SUPPLIER ACCEPTS FULL RESPONSIBILITY FOR ACCURACY OF INFORMATION BELOW:

PPLIER'S NAME AND ADDRESS
pacek Labs, Inc.
12 E. Gutierrez St.
nta Barbara, CA 93101

4. SUPPLIER'S CODE: 86472

5. BUYER'S CODE: 46

6. CONTRACT NO.: NAS 532314

7. WORK ORDER NO.: 4510901100

8. P.O. NUMBER: P85101

9. PART NUMBER: 1331562- 12,14, 16,19

C/L:

10. PART NAME: Mixer-Amplifier

11. NEXT ASSY.:

12. QTY. on Order: 70

13. QTY. of Shpt: 20

14. QTY. PAST DUE:

15. PREVIOUS SDAR (DATE & NO.): 23 6/30/98

17. Ser'l No.:
7A22
7A24
7A26
7A39

18. CONDITION:

Mixer-amplifier gain versus temperature measured high during ATP test 5.1.5.

SN:	Measured Gain Sensitivity	Gain Sensitivity Spec.
7A22	1.58 dB	1.4 dB
7A24	1.50 "	1.4 "
7A26	1.47 "	1.4 "
7A39	1.68 "	1.4 "

19. ACTION REQUESTED:

Approve use as is.

20. CAUSE & CORRECTION ACTION: (Include Identity Data, Serial Numbers or Quantity of Parts Affected)

This condition is probably due to the interaction of individual components within the amplifier, or mixer-amplifier combination.

No corrective action is possible without remaking the amplifier from scratch.

No corrective action is recommended.

(Attach Extra Sheets, Photographs, Sketches, etc., as Necessary)

SIGNATURE OF SUPPLIER'S AUTHORIZED REPRESENTATIVE: Bill Newman

22. SDAR COPIES REQUIRED:

23. SPACEK

24. MODEL:

BE COMPLETED BY AESC (Please Type or Print)

COMMENTS OF SQR (or SPVR Receiving Inspection)/BUYER

SIGNATURE OF SQR (or SPVR Receiving Inspection) DATE

27. SIGNATURE OF GOVT. REP. AT SOURCE (If Req'd) DATE

28. SIGNATURE OF BUYER: J. L. McKay DATE 7-1-98

DISPOSITION:

THE SDAR HAVE BEEN WITHDRAWN BY SUPPLIER, CANCELED, SEE ATTACHED MEMO.

QUALITY CONTROL: J. Hui DATE 8/30/98

33. ENGINEERING: N/R DATE

34. CUSTOMER: N/R DATE

35. N/R

SPECIAL INSTRUCTIONS TO SUPPLIER

FINAL APPROVAL OF THIS REQUEST SHALL APPLY ONLY TO THE ITEMS SPECIFIED HEREIN AND SHALL NOT ESTABLISH A PRECEDENT. ALL FINDINGS WILL BE SUBJECT TO VERIFICATION AND FINAL APPROVAL AT AESC.

WITHHOLD SHIPMENT PENDING RECEIPT OF APPROVED SDAR. FOR SHIPMENT, SEGREGATE MATERIAL SPECIFIED HEREON AND ATTACH COPY OF APPROVED SDAR.

cc: R. Kapper
M. Goldsmith
J. Hui
— File —

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY
212 EAST GUTIERREZ STREET
TA BARBARA, CALIFORNIA 93101
(805) 564-4404
FAX: (805) 966-3249

FROM: Bill Neiman
DELIVER TO:
COMPANY: Aerojet
FAX #: 626 812 8108
NAME: Pat McKay

DATE: 8/18/98
PAGE: 1 OF 1

AGE:

Reference: PO# 85101

Subject: Request Aerojet withdraw Spacek SDAR# 24.

Gentlemen,

Please withdraw Spacek SDARs 24. This SDAR is no longer required since Aerojet product specification AE24869 rev C paragraph 3.2.1.15.1 changed it from acceptance test requirement to engineering data only.

For clarifications please call me at (805) 564-4404.

Sincerely,

Bill Neiman

From: Kapper, Ron
Sent: Thursday, July 09, 1998 12:45 PM
To: Hui, Joseph
Subject: SDAR #98-126

This SDAR should be cancelled. The "C" revision of the Mixer specification, AE-24869 makes this requirement "engineering data only."

AEROJET ELECTROSYSTEMS COMPANY

AESC Rev. 6-85

SUPPLIER'S DISCREPANCY ACTION REQUEST

FOR SUPPLIER USE	FOR AESC USE
1. SUPPLIER'S SDAR NO. 29	2. AESC SDAR NO. 98-155
3. DATE SUBMITTED 8/31/98	4. DATE RECEIVED

TO BE COMPLETED BY SUPPLIER (Please Type or Print) THE SUPPLIER ACCEPTS FULL RESPONSIBILITY FOR ACCURACY OF INFORMATION BELOW

SUPPLIER'S NAME AND ADDRESS
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara, CA 93101

4. SUPPLIER'S CODE: 86472
5. BUYER'S CODE: 46
6. CONTRACT NO.: NAS 532314
7. WORK ORDER NO.:
8. P.O. NUMBER: P85101
9. PART NUMBER: 1331562-11
C/L:
10. PART NAME: Mixer-Amplifier
11. NEXT ASSY.:
12. QTY. on Order: 70
13. QTY. at Dept.: 40
14. QTY. PAST DUE:
15. PREVIOUS SDAR (DATE & NO.): 8/27/98 SDAR# 28

QTY. 5

17. Ser/l Nos.: 7A41, 7A44, 7A48, 7A49, 7A50

18. CONDITION:
The gain flatness on these mixer-amplifier serial numbers are measuring as follows:

Dash #	S/N	Measured ppk Gain Flatness	ppk Spec
-11	7A41	0.65dB	0.5dB
-14	7A44	0.52dB	"
-18	7A48	0.60dB	"
-19	7A49	0.75dB	"
-20	7A50	1.42dB	1.0dB

19. ACTION REQUESTED:
Approve use as is.

20. CAUSE & CORRECTIVE ACTION: (Include Effectivity Date, Serial Numbers or Quantity of Parts Affected)
After considerable tuning effort the gain flatness of these amplifiers could not be improved.
No corrective action is possil without ordering more lots of TO-8 amplifier cans in order t have a larger selection to pi from during tuning.
Delivery of new lots TO-8 amplifiers would take between 6 and 9 months and this would not absolutely guarantee this condition would go away.

(Attach Extra Sheets, Photographs, Sketches, etc., as Necessary)

SIGNATURE OF SUPPLIER'S AUTHORIZED REPRESENTATIVE: Bill Neuman
22. SDAR COPIES REQUIRED:
23.
24. MODEL

TO BE COMPLETED BY AESC (Please Type or Print)

COMMENTS OF SQA (or SPVR Receiving Inspection)/BUYER

SIGNATURE OF SQA (or SPVR Receiving Inspection) DATE
27. SIGNATURE OF GOVT. REP. AT SOURCE (If Req'd) DATE
SIGNATURE OF BUYER: DATE 9/1/98

DISPOSITION:
7A44-14 is rejected. S.K.

All other units may be used as is. Minor impact on system level performance.

R G Platt 9/9/98

QUALITY CONTROL: Taylor DATE 9-10-98
33. ENGINEERING: DATE 9/10/98
34. CUSTOMER: S. [illegible] DATE 9/11/98
35.

SPECIAL INSTRUCTIONS TO SUPPLIER: concurred [illegible] 9/11/98

- FINAL APPROVAL OF THIS REQUEST SHALL APPLY ONLY TO THE ITEMS SPECIFIED HEREIN AND SHALL NOT ESTABLISH A PRECEDENT. ALL FINDINGS WILL BE SUBJECT TO VERIFICATION AND FINAL APPROVAL AT AESC.
- WITHHOLD SHIPMENT PENDING RECEIPT OF APPROVED SDAR. FOR SHIPMENT, SEGREGATE MATERIAL SPECIFIED HEREON AND ATTACH COPY OF APPROVED SDAR.

Report No. 11413
February, 1999

Channel 15 Mixer/Amplifier

Mixer/Amplifier (P/N: 1331562-20, S/N: 7A40)

TEST DATA SHEET NO. 6. AMPLIFIER TESTS

GAIN FLATNESS TEST: ATP PARAGRAPH 5.1.3

GAIN FLATNESS (dB)ppK	SPEC. GAIN FLATNESS (dB)ppK	ACC	REJ
1.38	1,00		QA 1

GAIN VERSUS VOLTAGE SENSITIVITY TEST: ATP PARAGRAPH 5.1.4

AMPLIFIER VOLTAGE	GAIN READING (dBm)	ΔG/ΔV	SPEC. ΔG/ΔV	ACC	REJ
9.96	58.66	1.25	2.0	QA 1	
10.00	58.72				
10.04	58.76				
ΔGv =	0.10 dB				

KZN
CAM5U1352

	DATE	ACC	REJ
SPACEK QA	6-30-98		QA 1

PART NO. 1331562-206

SER NO. 7A40

TESTED BY: 777

END DATE: 6-5-98

END TIME: 1600

TEST FAILURE:

FAILURE ANALYSIS NO.

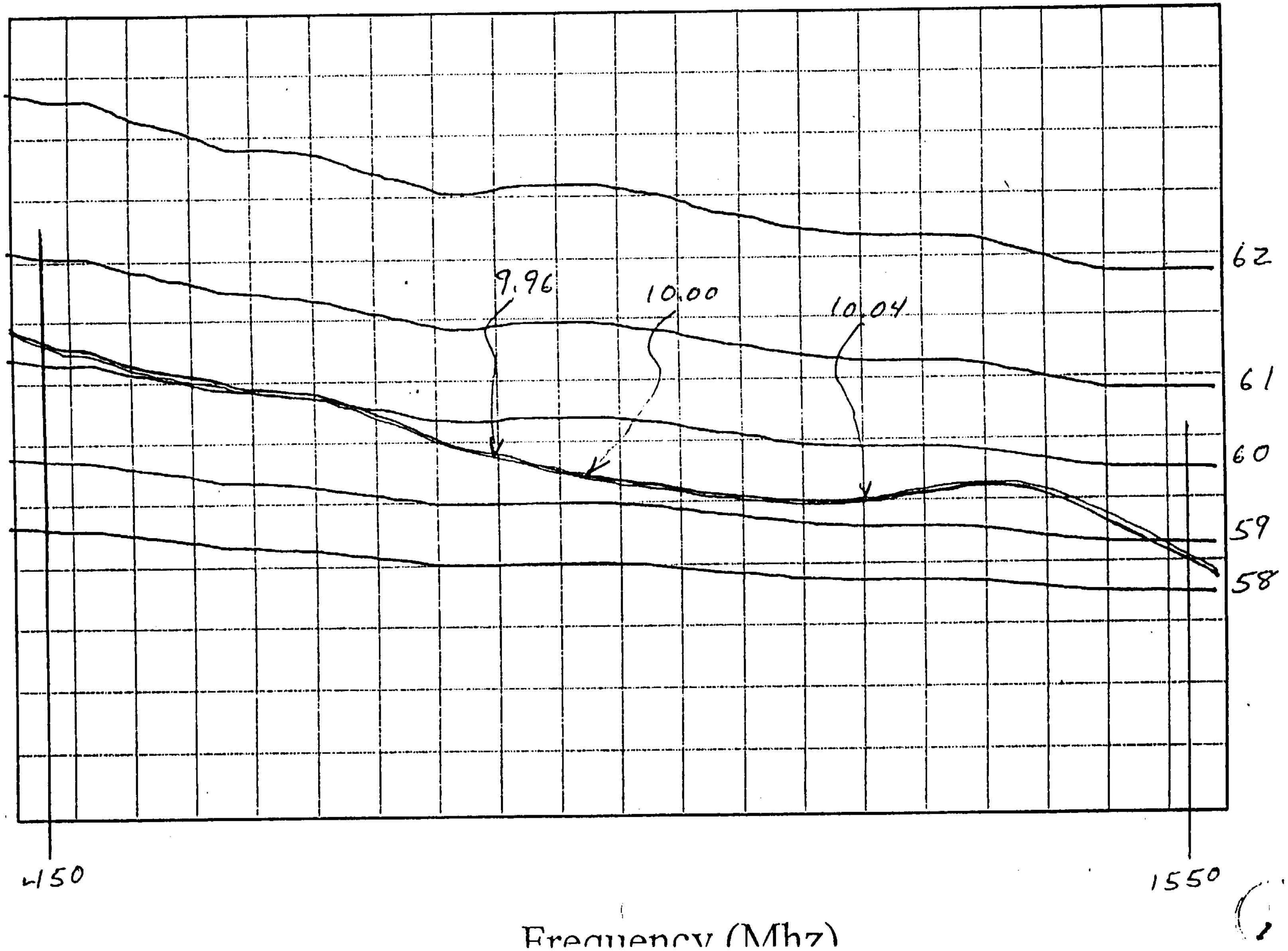
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-206
Serial No. 7A40
Date 5-27-98
Tested By 77P

Amb Temp +23°C



TEST DATA SHEET NO. 7. AMPLIFIER TESTS

GAIN VERSUS TEMPERATURE SENSITIVITY TEST: ATP PARAGRAPH 5.1.5

Nominal Temperature (°C)	Relative Gain	ΔG/ΔT	SPEC	ACC	REJ
T1 -6	GT1 60.45				
		* 0.084	0.035dB/°C		QA 1
T2 +8	GT2 59.28				
		* 0.034	0.020dB/°C		QA 1
T3 +28	GT3 58.60				
		* 0.075	0.035dB/°C		QA 1
T4 +40	GT4 57.70				

* Perform the following calculations and record on the TDS

$$\Delta G/\Delta T = \frac{G_{Ti} - G_{Ti+1}}{T_i - T_{i+1}} \quad i = 1,2,3,4 \qquad \Delta G_T = \underline{2.75}\ \text{dB}$$

$\Delta G_{TOTAL} = \Delta G_V + \Delta G_T + 0.4 = \underline{3.25}$ dB Spec 1.4dB ACC_____ REJ QA 1 ECN CAMSU-1352

DATE ACC REJ

PART NO. 1331562-205 SPACEK QA 6-30-98 ____ QA 1

SER NO. 7A40 TEST FAILURE: __________

TESTED BY: 777 FAILURE ANALYSIS NO. __________

END DATE: 6-5-98

END TIME: 1600

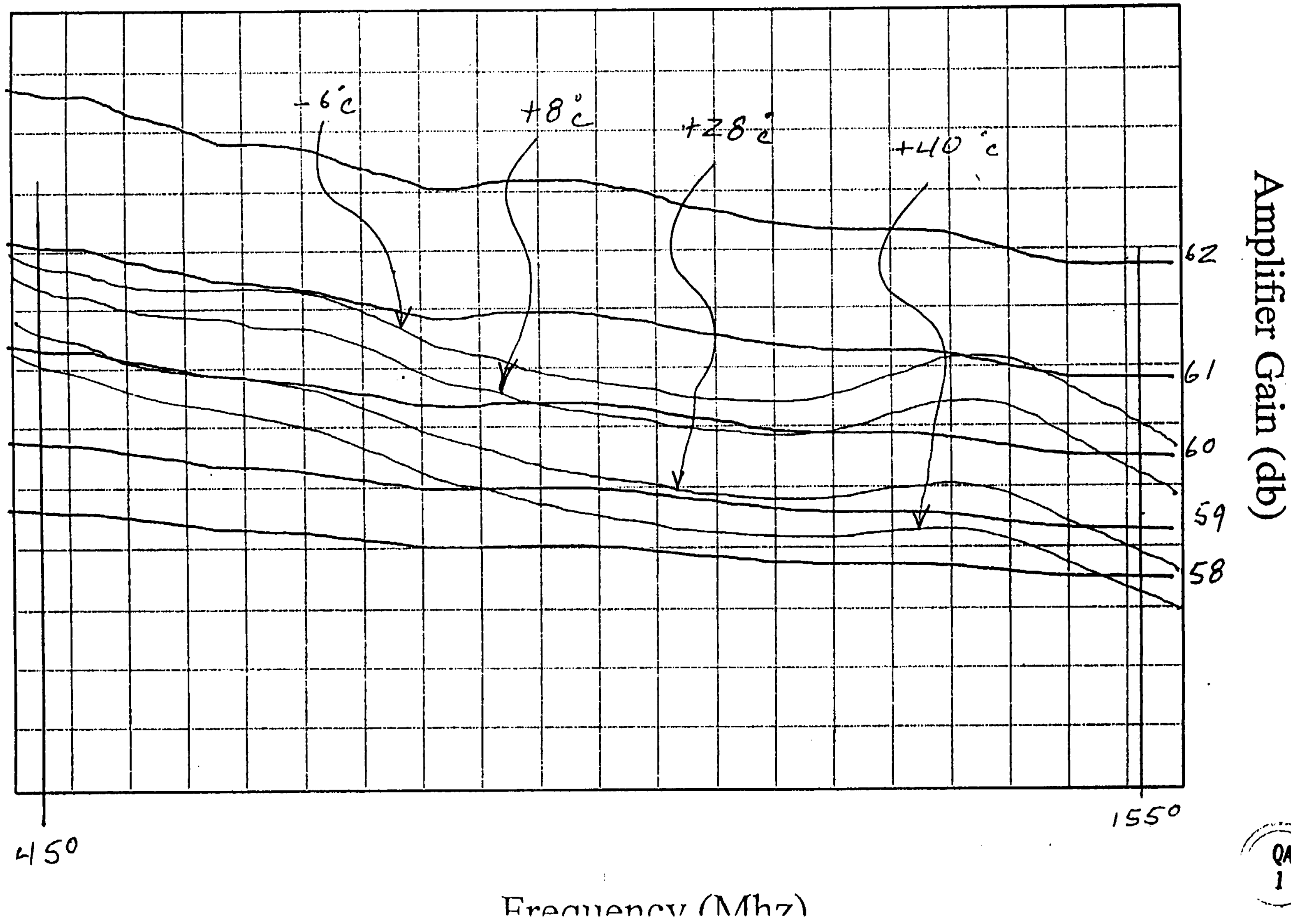
Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

SPACEK LABS, INC.
MM-WAVE TECHNOLOGY

Amplifier Gain

Model No. 1331562-206
Serial No. 7A40
Date 5-27-98
Tested By 77Z

Amb Temp______



QA
1

TEST DATA SHEET NO. 8. AMPLIFIER TESTS

OUTPUT 1.0 dB COMPRESSION POINT TEST: ATP PARAGRAPH 5.1.6

DASH #															
11	12	13	14	15	16	17	18	19	20	FREQ. (MHz)	P2 COMP (dBm)	OUTPUT COMP. at+10(dBm)	SPEC. COMP. PT.(dBm)	ACC	REJ
X	X	X	X		X	X	X	X		10					
				X						20					
	X	X								50					
X	X	X	X	X	X	X	X			100					
X										150					
			X	X	X	X	X	X		200					
								X		400					
									X	500	-2.7	0.3	1.0	QA 1	
									X	1000	-2.6	0.4	1.0	QA 1	
									X	1500	-2.6	0.4	1.0	QA 1	

AMPLIFIER NOISE FIGURE AND TOTAL POWER TEST: ATP PARAGRAPH 5.1.7

DATE: 6-5-98 AMBIENT ROOM TEMPERATURE °C: 23°

AMPLIFIER OUTPUT POWER AMBIENT (dBm)	AMPLIFIER OUTPUT POWER (-77 K)(dBm)	Y FACTOR (dB)	AMPLIFIER NOISE FIGURE (dB)
-25.1	-27.0	2.9	1.83

Above data taken with Daden filter attached (except -19) .

Intermediate test results for information only

			DATE	ACC	REJ
PART NO. 1331562-206		SPACEK QA	6-30-98	QA 1	

SER NO. 7A40

TEST FAILURE: ________

TESTED BY: ________

FAILURE ANALYSIS NO. ________

END DATE: 6-5-98

END TIME: 1600

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

TEST DATA SHEET NO. 13. MIXER-AMPLIFIER ASSEMBLY TESTS

NOISE FIGURE, TOTAL POWER AND CURRENT VS. TEMPERATURE TEST: ATP PARA 5.4.8.

DATE: 6-24-98 AMBIENT ROOM TEMPERATURE °C: +21

UUT TEMP °C.	UUT CURRENT	MIXER-AMP. OUTPUT POWER (AMBIENT) (dBm)	MIXER-AMP. OUTPUT POWER (77 DEG K) (dBm)	Y FACTOR (dB)	MIXER-AMP. NOISE FIGURE (dB)	SPEC. MIXER-AMP. NOISE FIGURE (dB)	ACC	REJ
-6	109	-24.20	-25.45	1.25	4.8	6.5	QA 1	
+8	110	-24.40	-25.60	1.20	4.9	6.5	QA 1	
+28	111	-24.60	-25.80	1.20	4.9	6.5	QA 1	
+40	111	-25.00	-26.15	1.15	5.1	6.5	QA 1	

Noise figure change 0.3 dB Spec is .5dB peak to peak on -20 ACC QA 1 REJ______

NOTE: *Above data to be taken with the Daden filter, except on the -19 unit.*

NEΔT-NOISE POWER STABILITY TEST: ATP PARAGRAPH 5.4.9

Date: 6-22-98 Ambient Room Temperature °C: 24

Attach computer generated *NEΔT* spreadsheet to this test data sheet.

Record the calculated Nps(K) from spreadsheet data: 0.059

Record Nps(K) 0.15 for dash number from Aerojet specification AE-24869, Table II.
Accept units if calculated Nps(K) is less than or equal to specified Nps(K), otherwise reject.

ACC QA 1 REJ ____

PART NO. 1331562-206
SER NO. 7A40
TESTED BY:
END DATE: 6-25-98
END TIME: 1600

	DATE	ACC	REJ
SPACEK QA	6-30-98	QA 1	
TEST FAILURE:			
FAILURE ANALYSIS NO.			

Spacek Labs, Inc.
212 E. Gutierrez St.
Santa Barbara,CA,93101

Report No. 11413
February, 1999

SUBSYSTEM-LEVEL TEST DATA

CENTER FREQUENCY OF LOs

Channel No.	3	4	5	6	7	8	9-14 ***	15
Specification (GHz) * Setting Accuracy (+/-GHz)	50.3 0.008	52.8 0.003	53.596 0.003	54.4 0.003	54.94 0.003	55.5 0.008	57.290344 0.000086	89.0 0.08
Measured (GHz) **	50.2996	52.8005	53.5958	54.4002	54.9398	55.5006	57.290341 57.290346	89.0009

* Specification in vacuum condition.

** Measured at ambient pressure (standard atmosphere).

*** Measured data for PLO No. 1 and No.2.

Report No. 11413
February, 1999

TEST DATA

FOR

AMSU-A1-2 (P/N: 1356409-1, S/N: F04)

TEST DATA SHEET 2

LO Frequency Test Data (Paragraph 3.5.1) (A1-2)

Test Setup Verified: ____________ Signature   Baseplate Temperature (T_B) 23 °C

Component	Channel No.	V_b(V)	I_b(mA)	P_{dc}(mW)			f_o(GHz)		
				Required (Max)	Measured	Pass/ Fail	Required	Measured	Pass/ Fail
LO	3	9.98	179.3	2,700	1789.4		50.300 ± 0.008	50.2996	P
	4	10.03	176.5	2,700	1770.3		52.800 ± 0.003	52.8005	P
	5	10.00	176.7	2,700	1767.0		53.596 ± 0.003	53.5958	P
	8	9.99	181.5	2,700	1813.2		55.500 ± 0.008	55.5006	P
Mixer/ Amps	All	10.02	179.4	1,800	1797.6				
TOTAL				12,600	8937.5				

Pass = P, Fail = F

Part No.: 1356409-1

Serial No.: F04

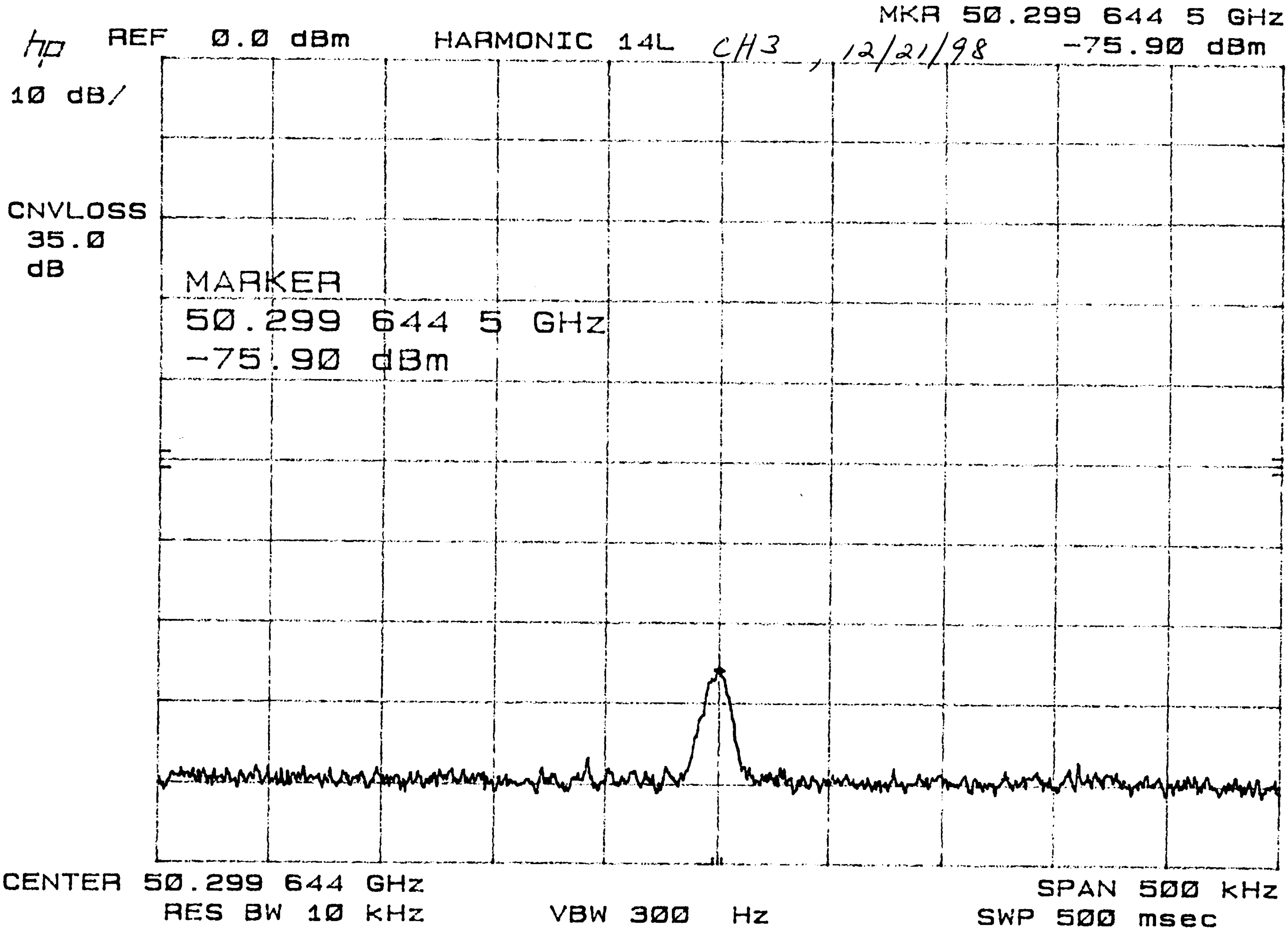
Test Engineer:

Quality Assurance: TA 228 12/23/98

Date: 12/21/98

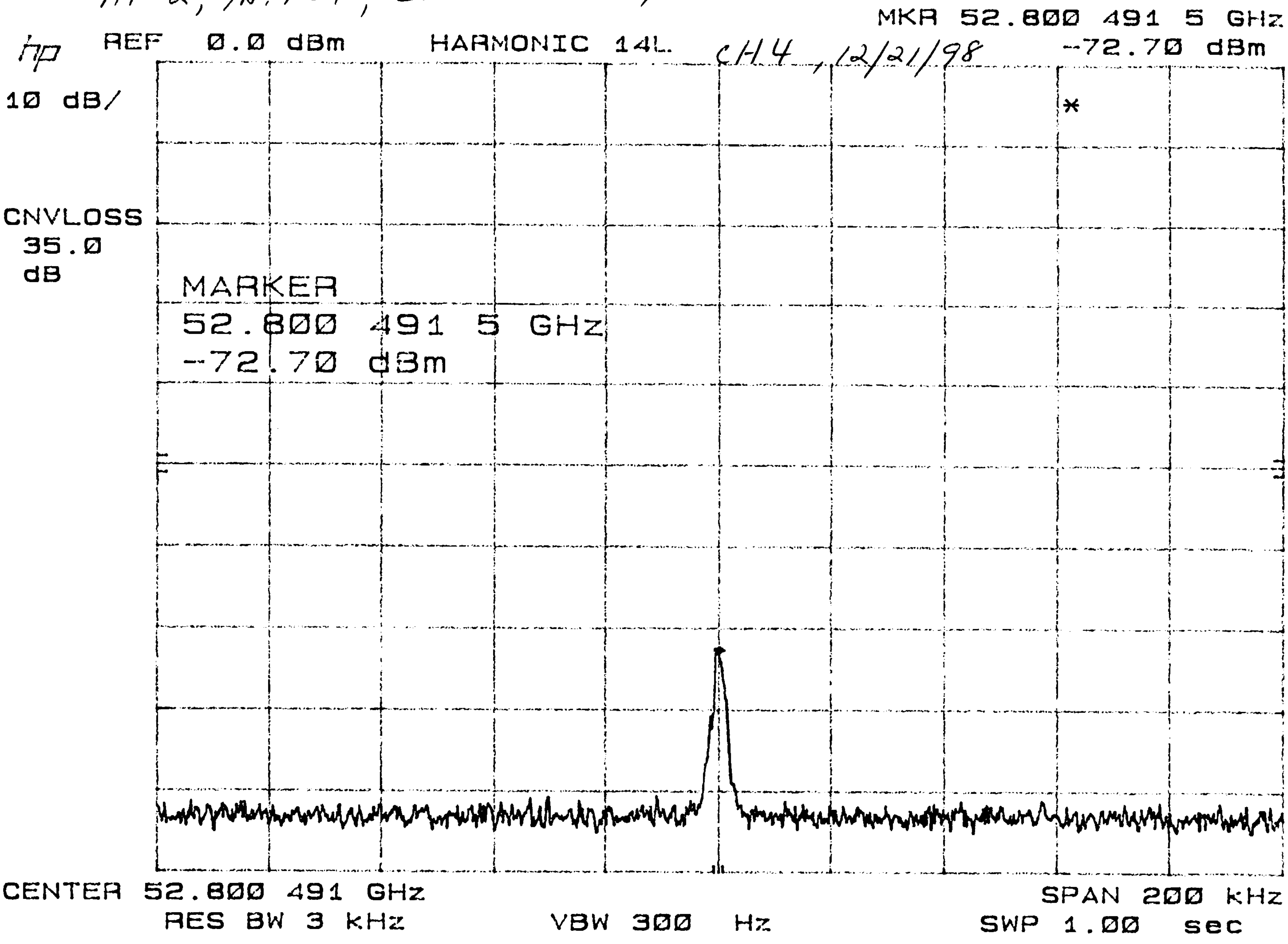
FOR REFERENCE ONLY

A1-2, S/N: F04, LO FREQUENCY



CH3, 12/21/98

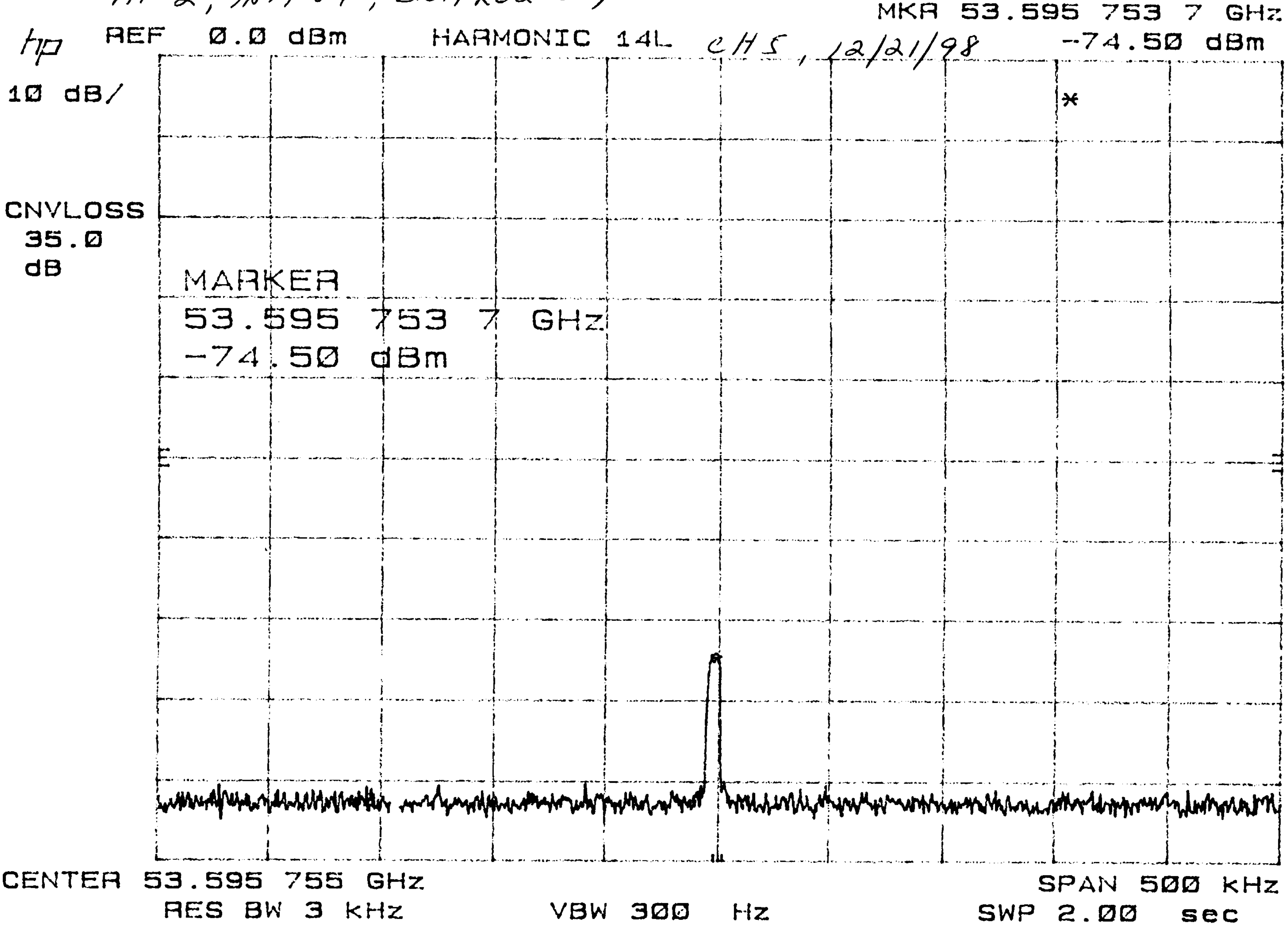
A1-2, S/N: F04, L.O. FREQ(NCY



CH4, 12/21/98

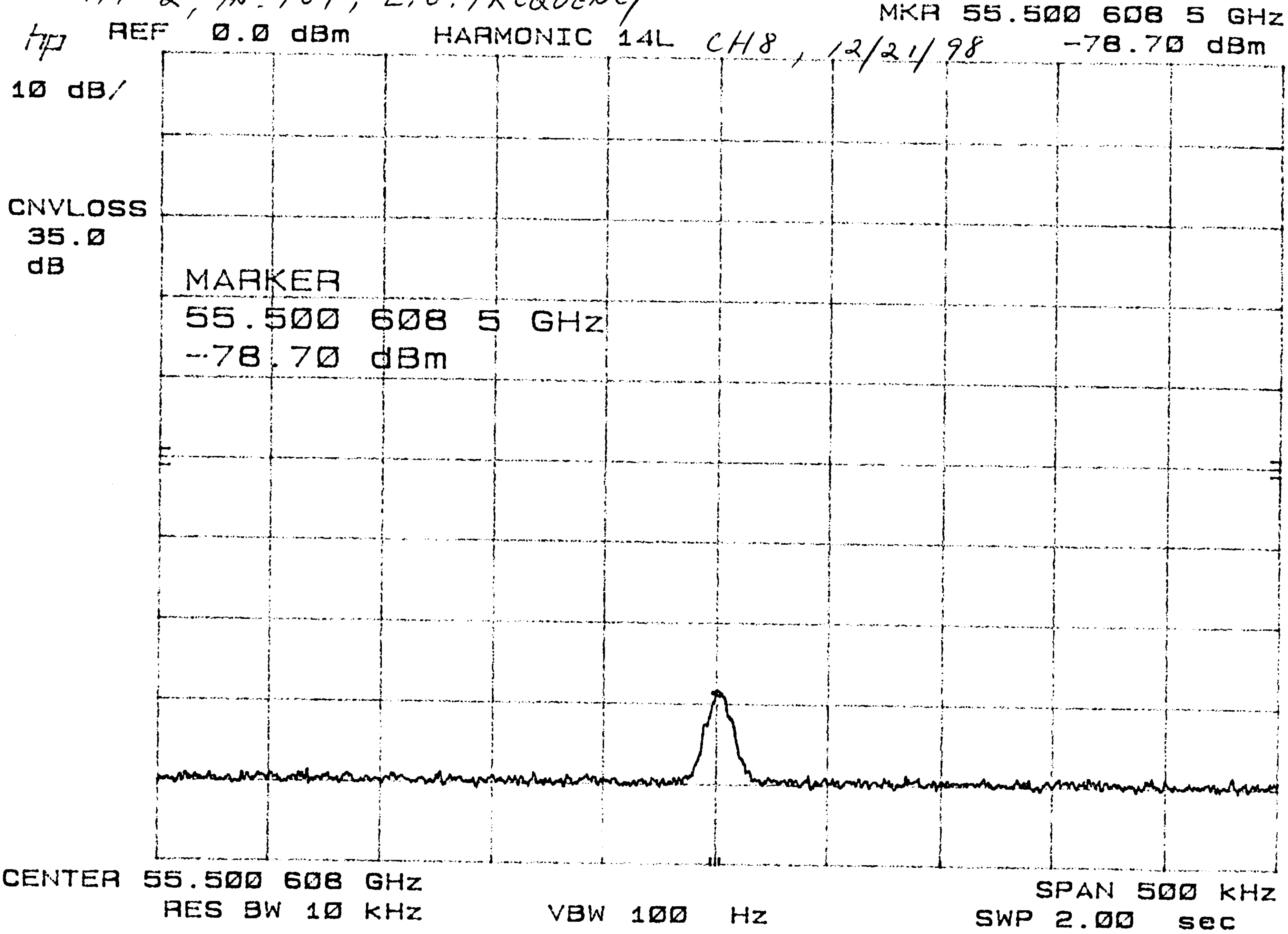
A1-2, S/N: F04, L.O. FREQUENY

CHS, 12/21/98



A1-2, S/N: F04, L.O. FREQUENCY

CH8, 12/21/98



TEST DATA SHEET 5

IF Output Test Data (Paragraph 3.5.2) (A1-2)

Test Setup Verified: ______ Signature   Baseplate Temperature (T_B) 24 °C

Compo-nent	Channel No.	V_b(V)	I_b(mA)	P_o(dBm)	Atten (dB)	P_o(dBm)		
						Required	Measured	Pass/ Fail
LO	3	9.98	179.3	-22.70	4	−27.0 ± 1.0	-26.78	P
	4	10.03	176.5	-18.98	8	−27.0 ± 1.0	-27.12	P
	5	10.00	176.7	-19.12	8	−27.0 ± 1.0	-27.29	P
	8	9.99	181.5	-22.05	5	−27.0 ± 1.0	-27.00	P
Mixer/ Amps	All	10.02	179.4					

Pass = P,   Fail = F

Part No.: 1356409-1

Serial No.: F04

Test Engineer:

Quality Assurance: 7A 223 12/23/98

Date: 12/21/98

TEST DATA SHEET 8 (Sheet 1 of 2)
Bandpass Characteristics Test Data (Paragraph 3.5.3) (A1-2)

Test Setup Verified: ____________ Baseplate Temperature (T_B) 22 °C
Signature

Component	Channel No.	V_b(V)	I_b(mA)	3 dB BW Frequency (MHz)		3 dB BW Frequency (MHz)		Pass/ Fail
				Lower	Higher	Required Max.	Measured	
LO	3	9.98	179.4	8.9	88.2	90	79.3	P
	4	10.03	176.6	7.2	198.8	200	191.6	P
	5	10.00	176.7	31.0	199.0	170	168.0	P
	8	9.99	181.6	8.1	163.7	163	155.6	P
Mixer/ Amps	All	10.02	174.9					

Part No.: 1356409-1

Serial No.: F04

Test Engineer: ____________

Quality Assurance: 228 12/23/98

Date: 12/22/98

TEST DATA SHEET 8 (Sheet 2 of 2)
Bandpass Characteristics Test Data (Paragraph 3.5.3) (A1-2)

Test Setup Verified: ____________ Baseplate Temperature (T_B) 23 °C
Signature

Compo- nent	Channel No.	V_b(V)	I_b(mA)	40 dB BW Frequency (MHz)		40 dB BW Frequency (MHz) (Ref. Only)		Pass/ Fail
				Lower	Higher	Required Max.	Measured	
LO	3	9,98	179.4	3,6	98,1	234	94.5	P
	4	10,03	176.6	2.3	223.0	234	220.7	P
	5	10.00	176.7	19.3	217.3	221	198.0	P
	8	9.99	181.6	2.2	182.0	429	179.8	P
Mixer/ Amps	All	10,02	174.9					

Part No.: 1356409-1

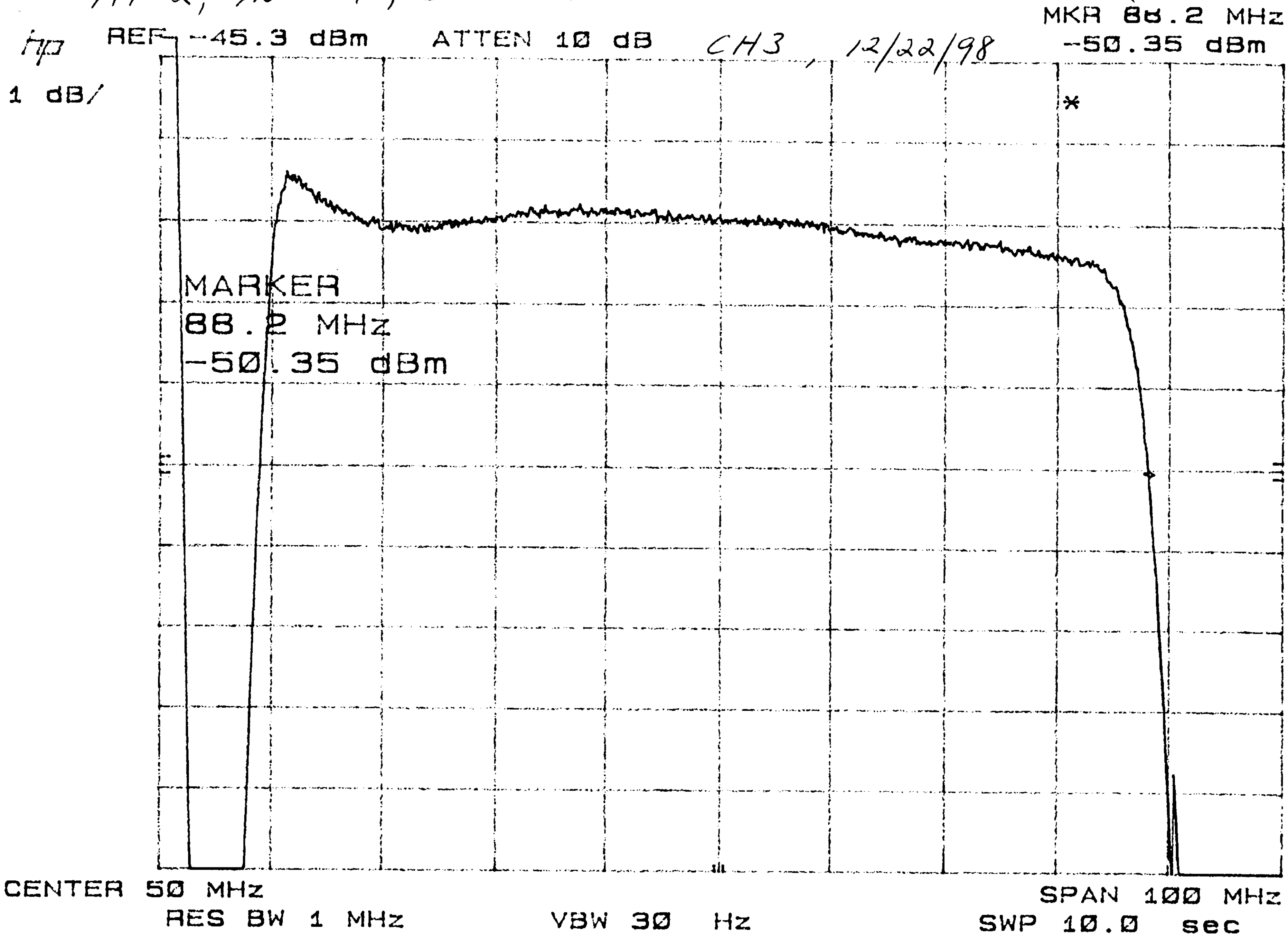
Serial No.: F04

Test Engineer:

Quality Assurance: 7A 12/22/98

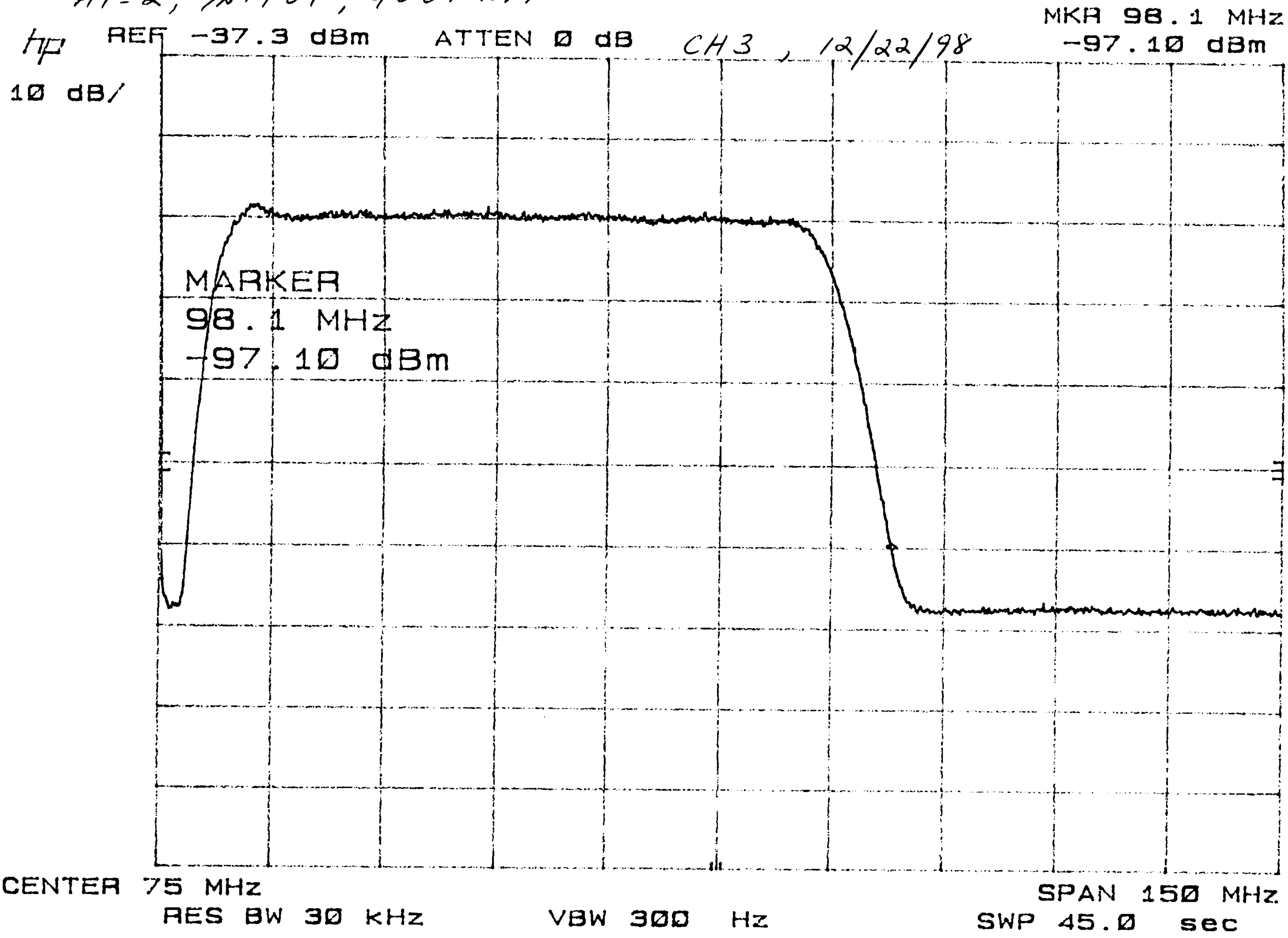
Date: 12/22/98

A1-2, S/N: F04, 3 dB B1



CH3, 12/22/98

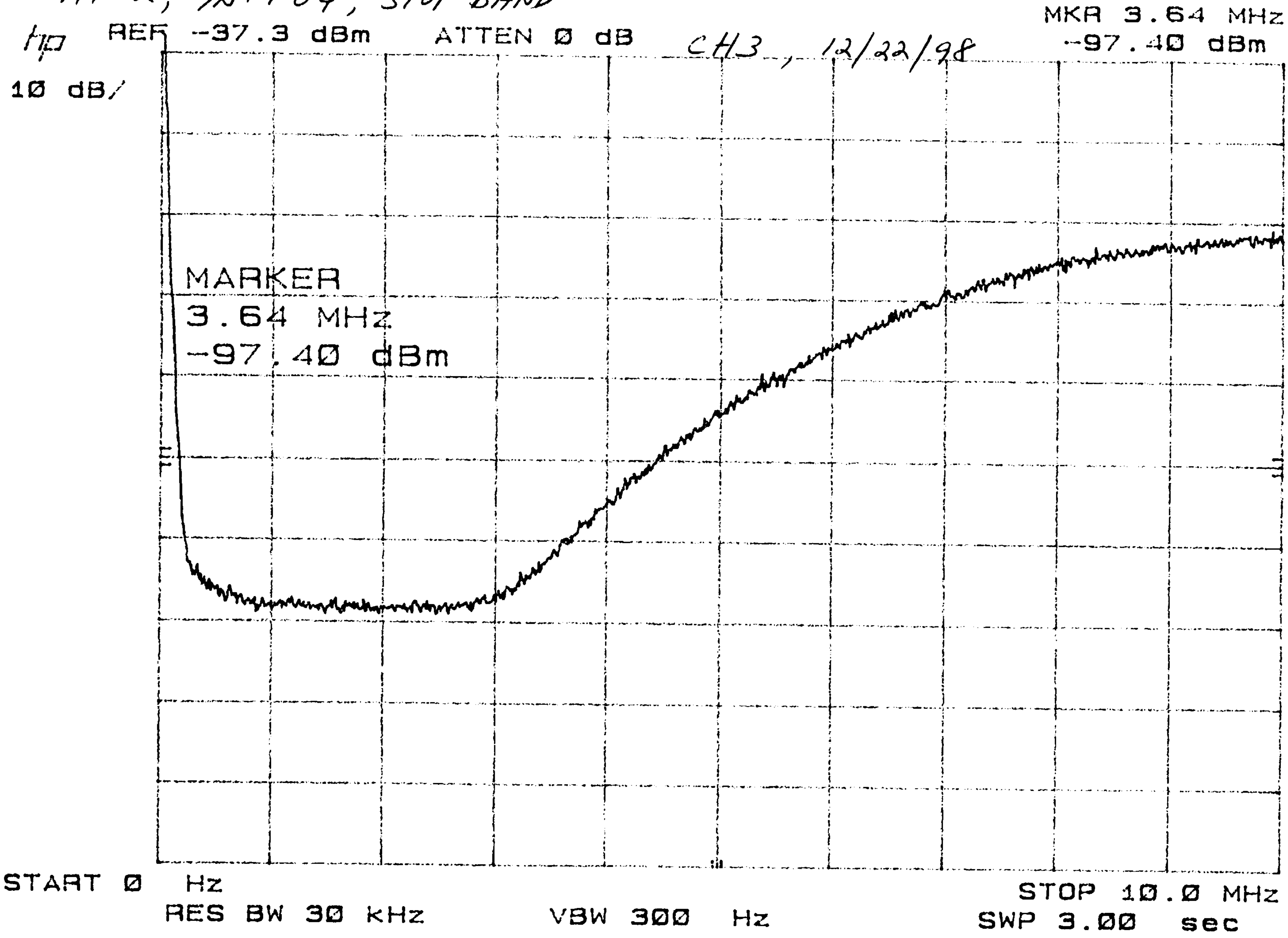
A1-2, S/N: F04, 40 dB BPF



CH3, 12/22/98

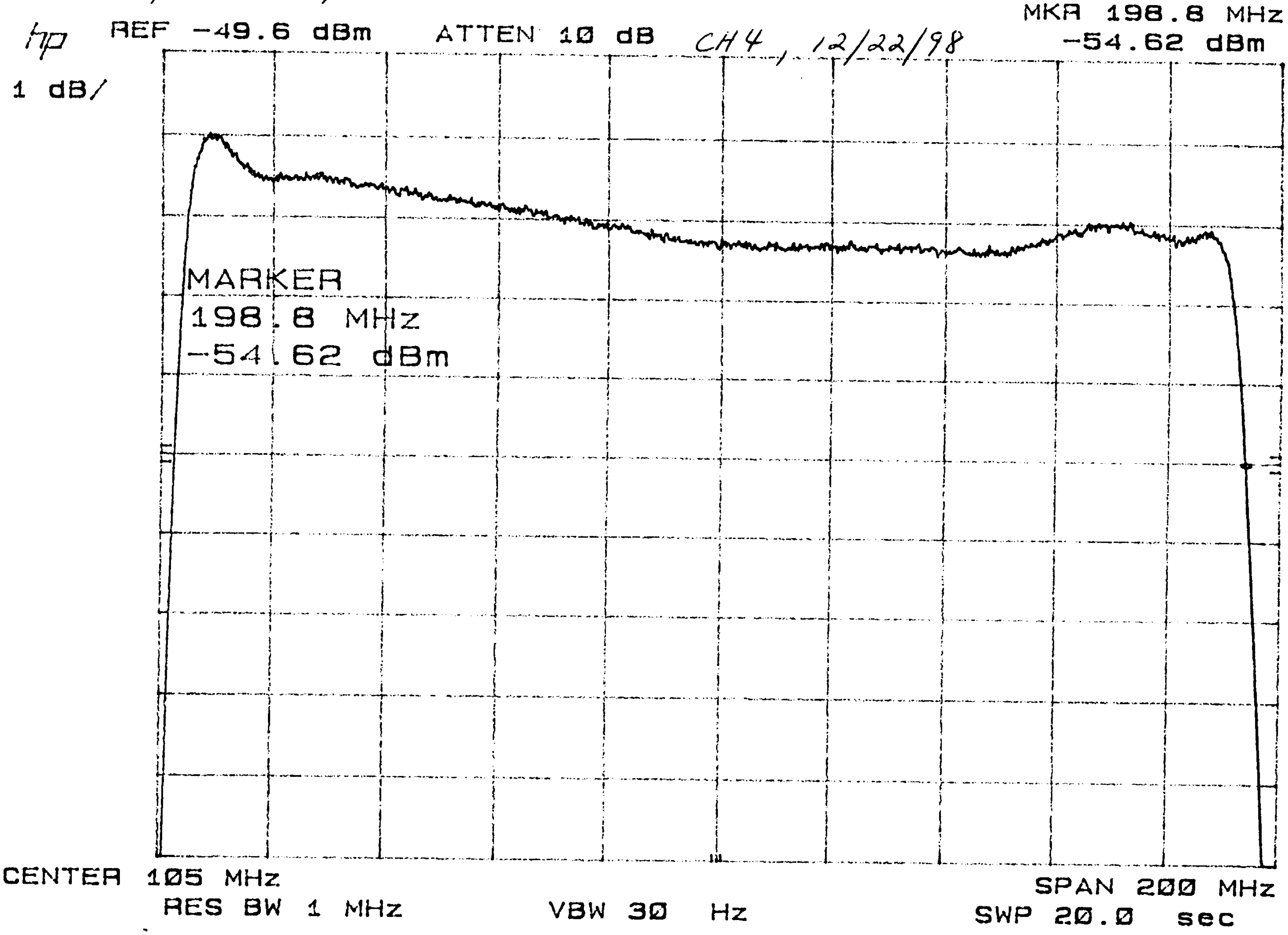
A1-2, S/N: F04, STOP BAND

CH3, 12/22/98

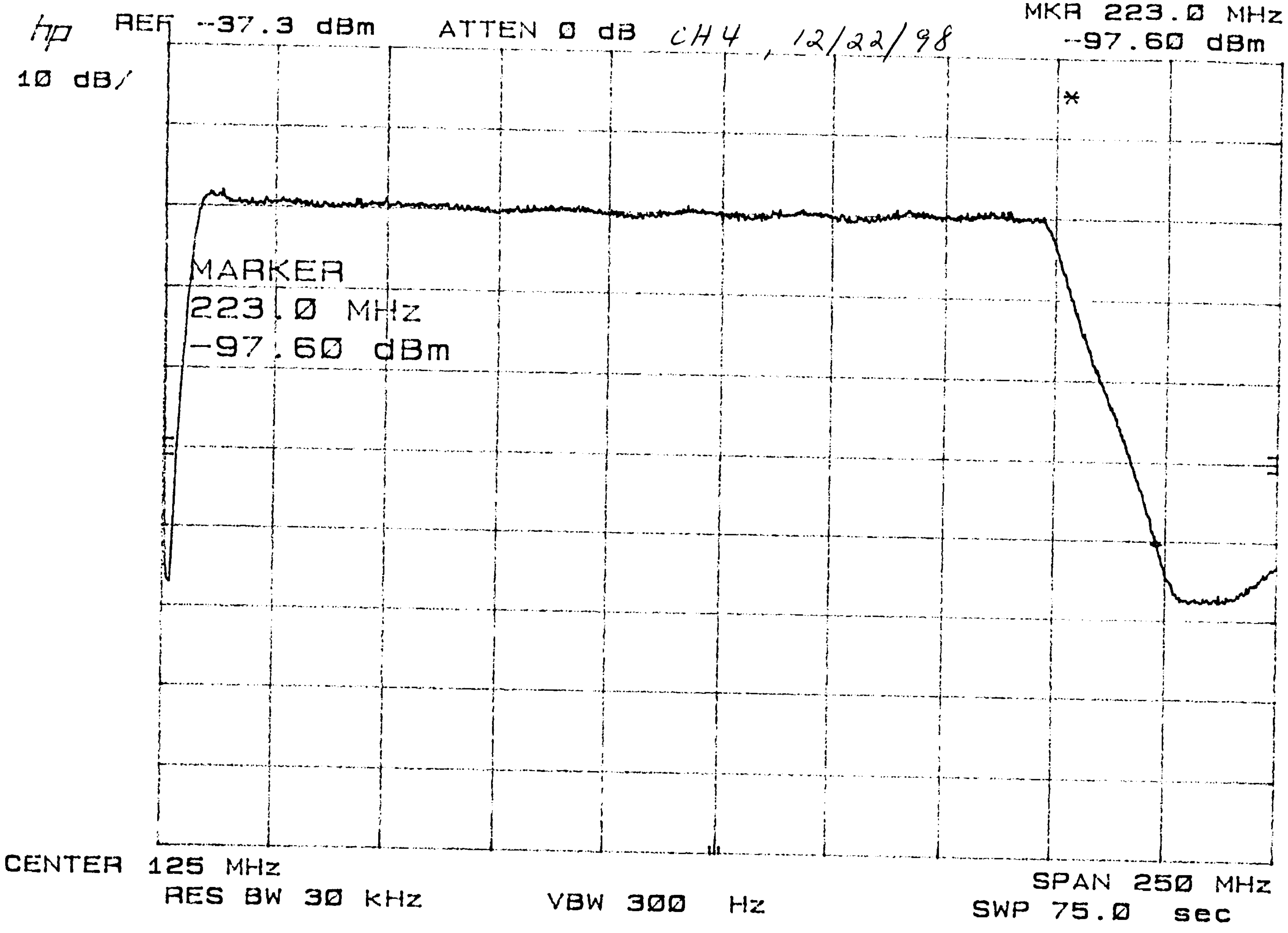


A1-2, S/N: F04, 3dB BPF

CH4, 12/22/98



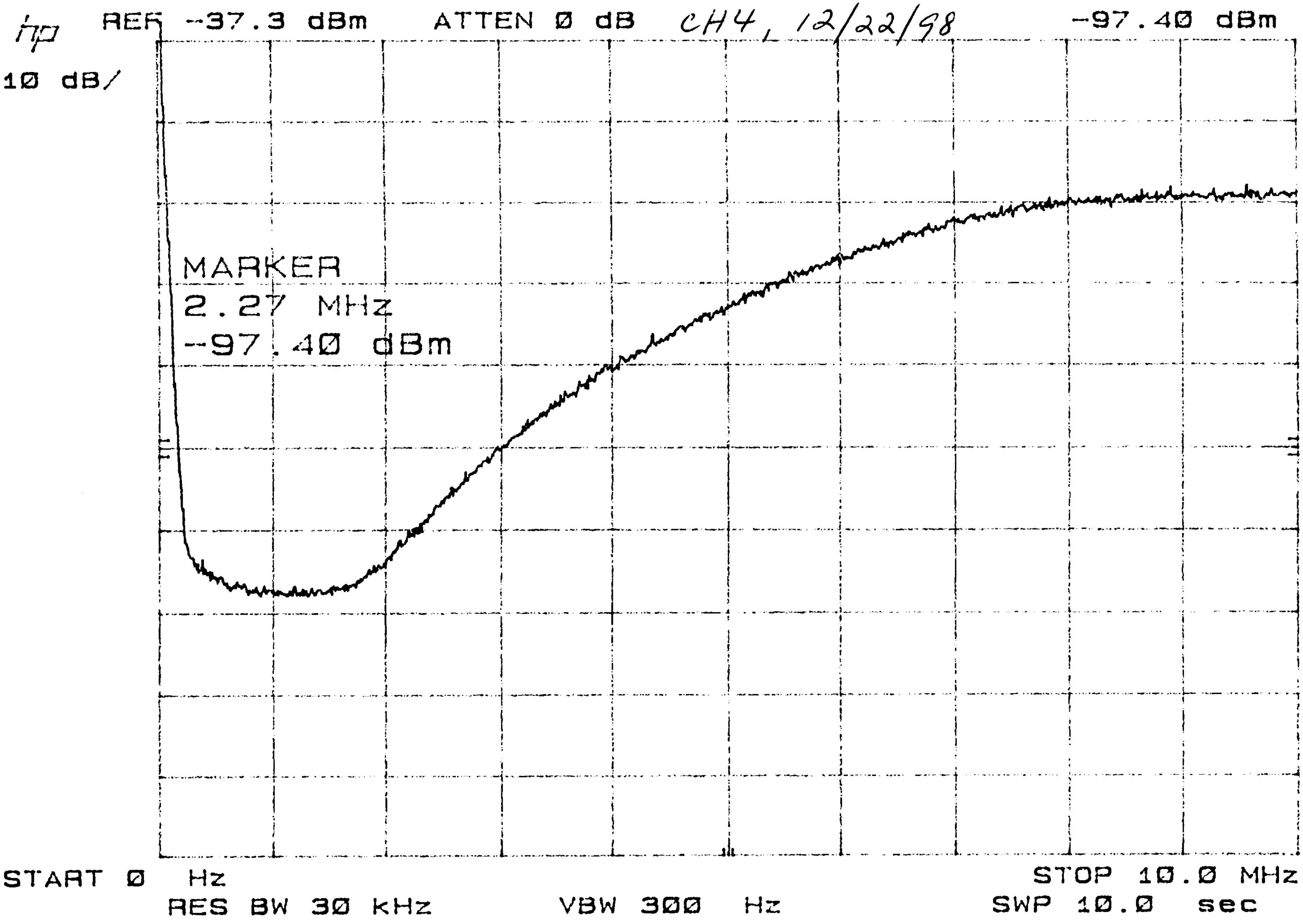
A1-2, S/N: F04, 40dB BI, CH4, 12/22/98



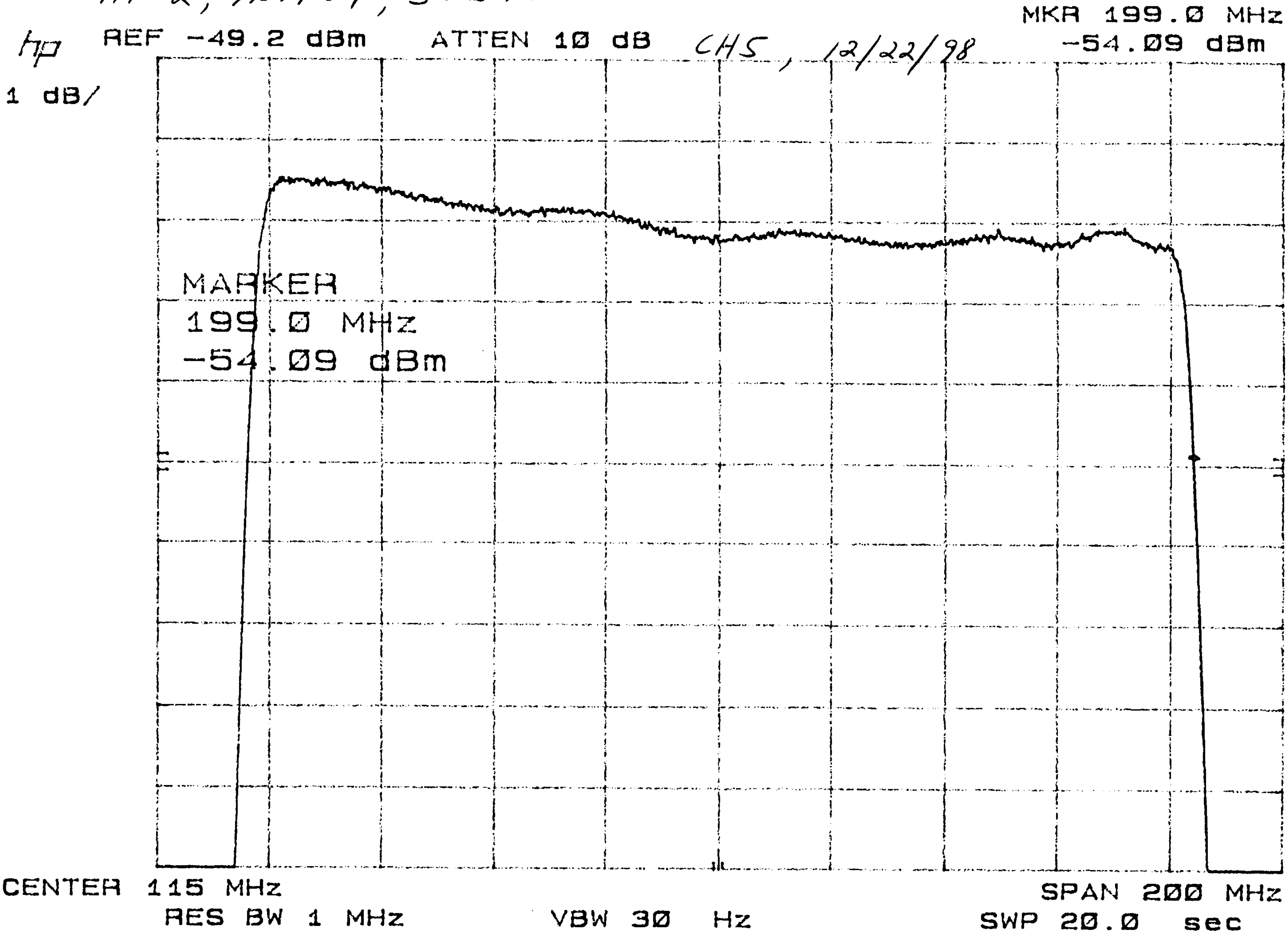
FOR REFERENCE ONLY

A1-2, S/N:F04, STOP BAND

CH4, 12/22/98



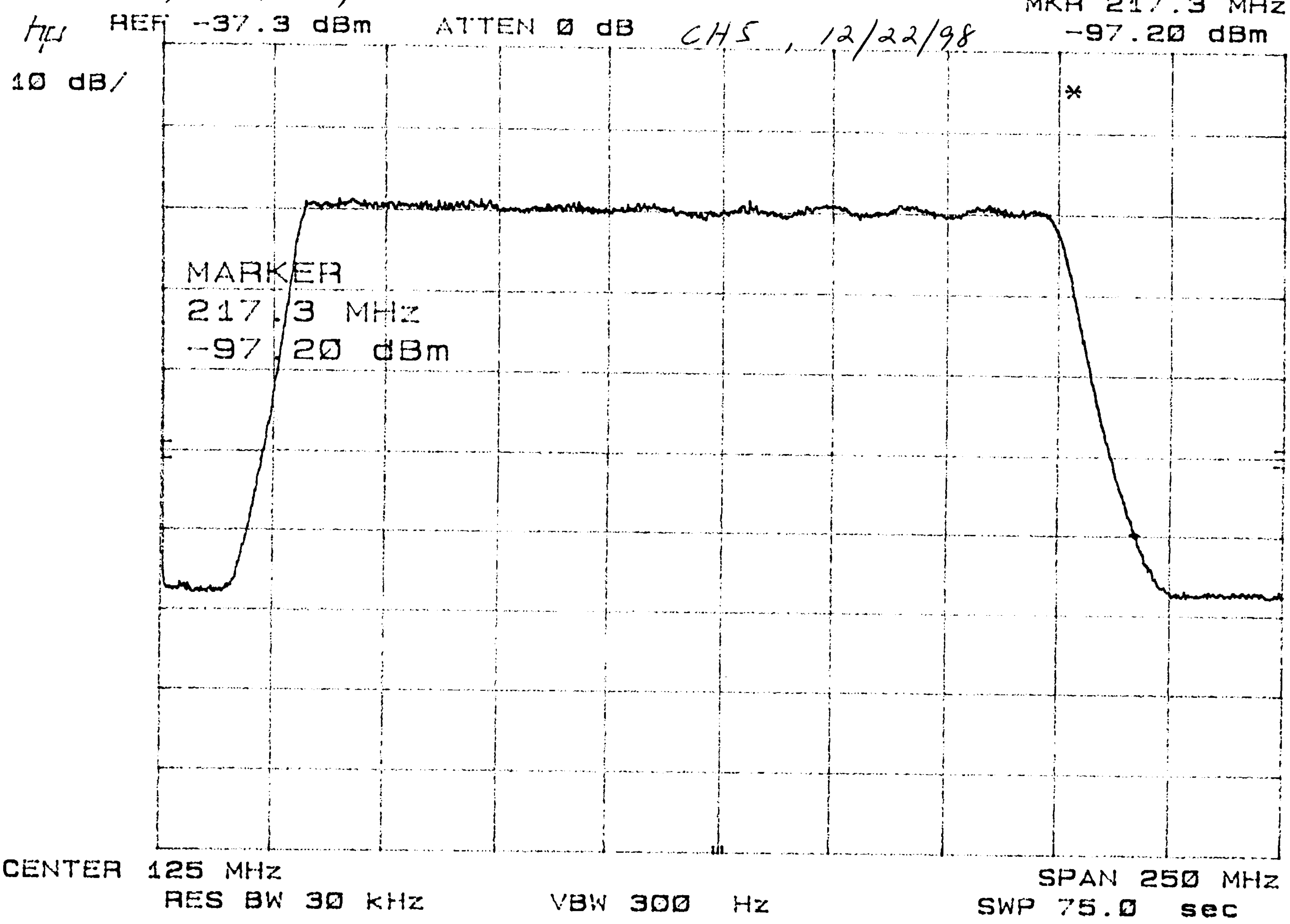
A1-2, S/N: F04, 3 dB BPF



CHS, 12/22/98

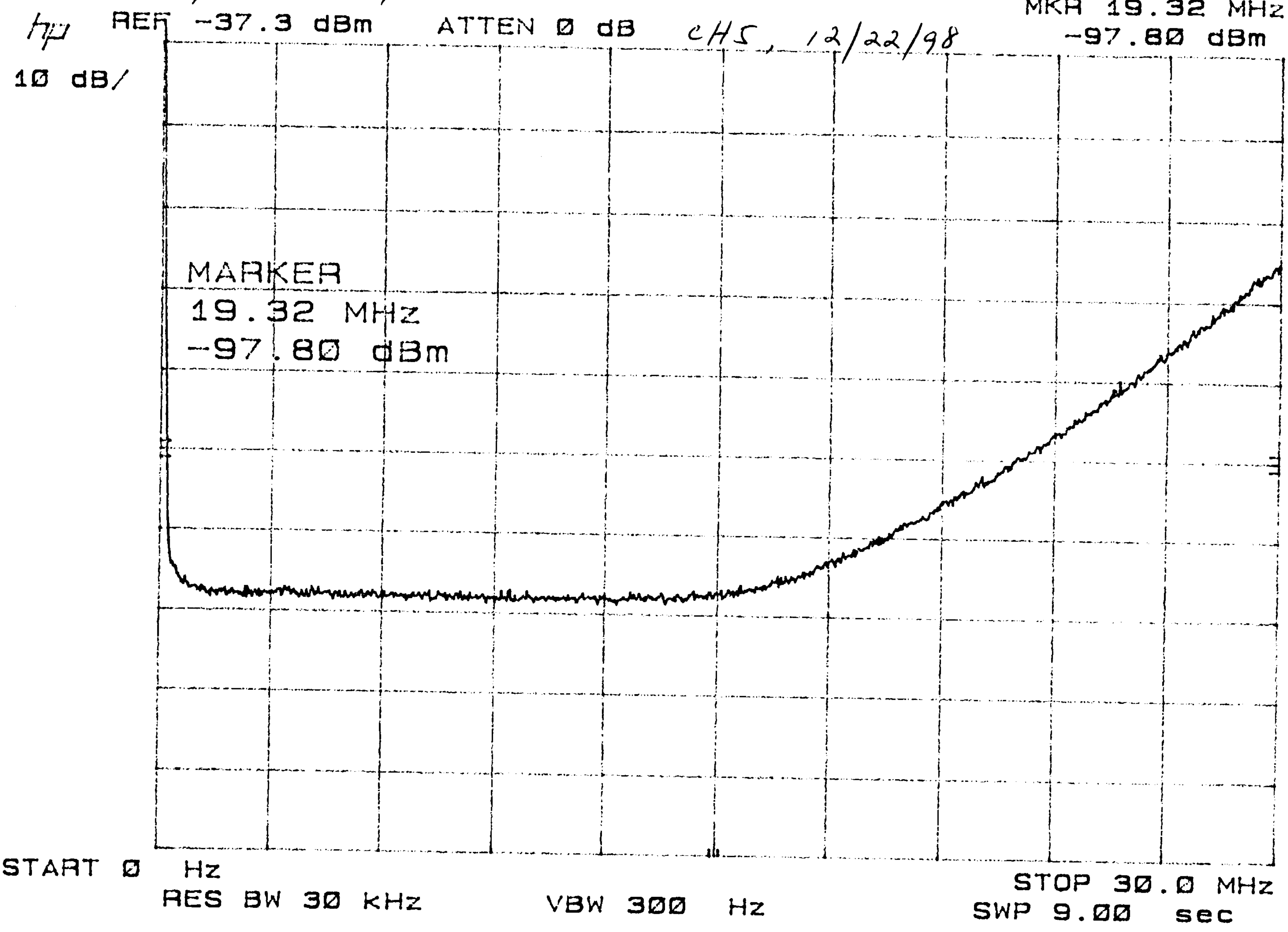
A1-2, S/N: F04, 40 dB BPF

CHS, 12/22/98



FOR REFERENCE

A1-2, S/N: F04, STOP BAND

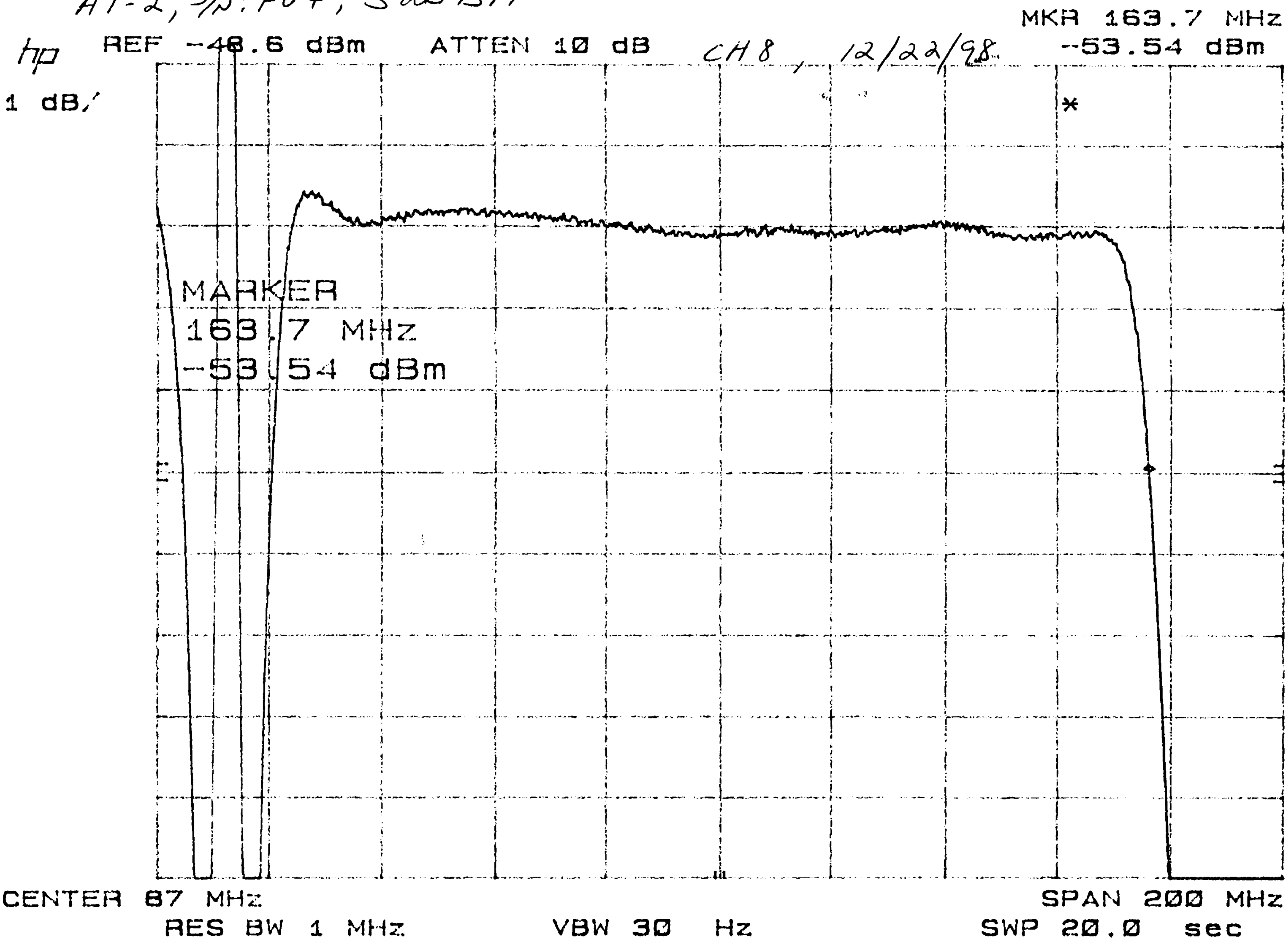


CHS, 12/22/98

FOR REFERENCE ONLY

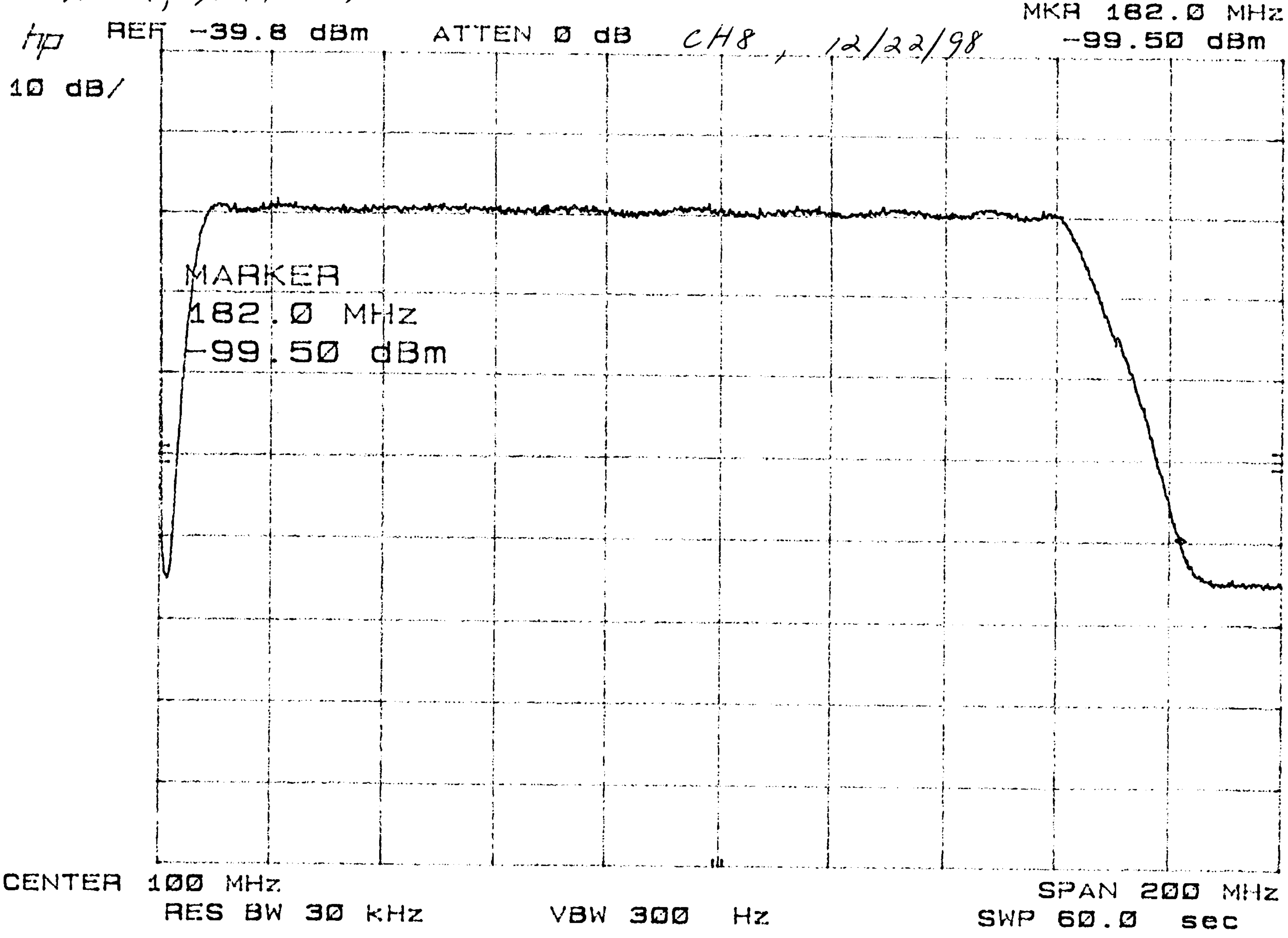
A1-2, S/N: F04, 3 dB BPF

CH 8, 12/22/98



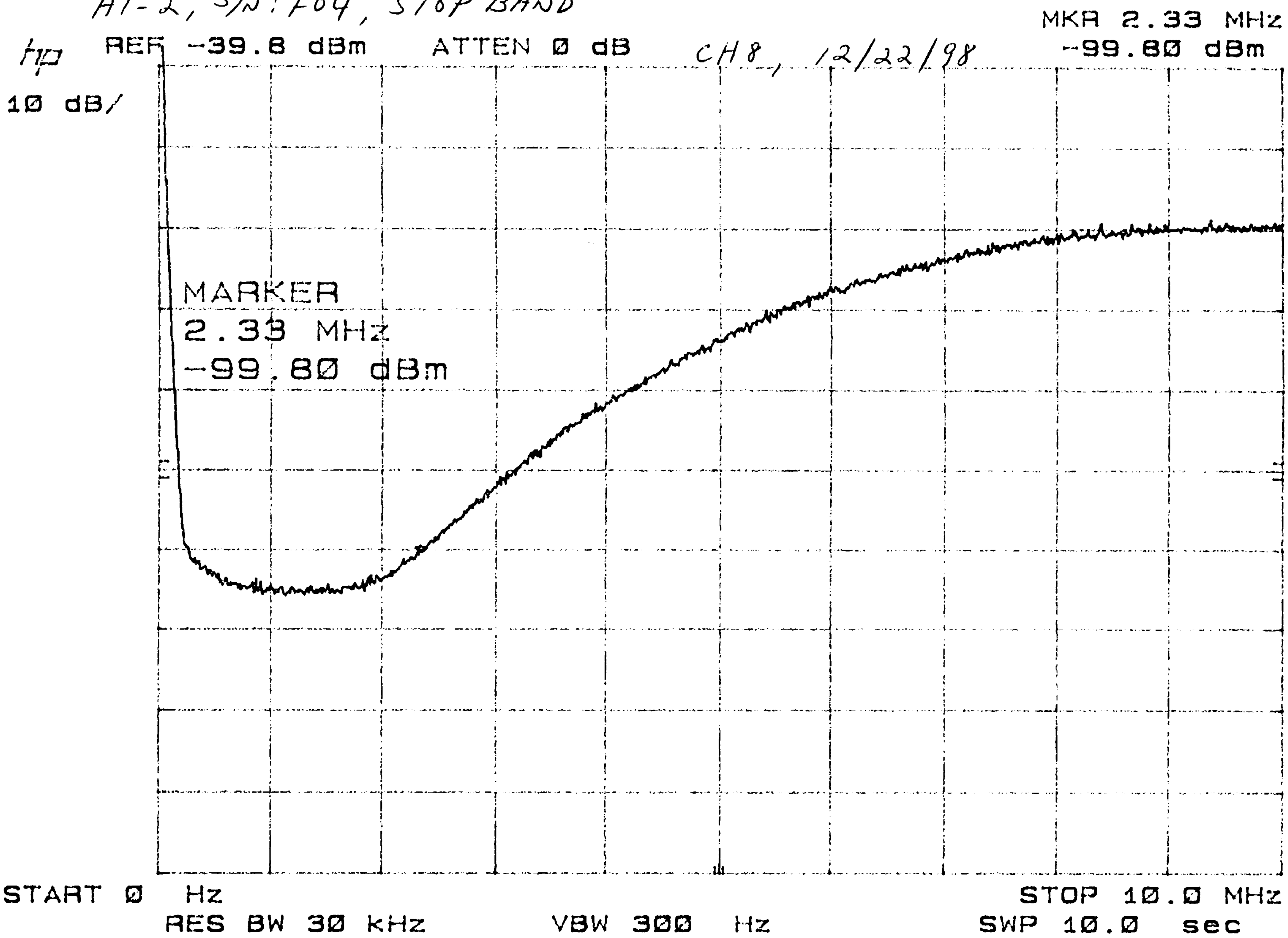
FOR REFERENCE ONLY

A1-2, S/N: F04, 40dB BPF



CH8, 12/22/98

A1-2, S/N: F04, STOP BAND



CH8, 12/22/98

TEST DATA SHEET 11 (Sheet 1 of 8)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-2)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 25.0 °C

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V)		T_C(°C)	V_C (V)	
					Mean	Standard Deviation		Mean	Standard Deviation
LO	3	9.98	179.4	21.0	-.9853	.000264	-194.0	-.7047	.000216
				21.0	-.9852	.000249	-194.0	-.7046	.000184
				21.0	-.9850	.000285	-194.0	-.7059	.000225
				21.0	-.9852	.000253	-194.0	-.7043	.000182
				21.0	-.9852	.000287	-194.0	-.7054	.000193
				21.0	-.9851	.000322	-194.0	-.7060	.000209
				21.0	-.9853	.000279	-194.0	-.7044	.000200
				21.0	-.9854	.000266	-194.0	-.7050	.000225
				21.0	-.9853	.000264	-194.0	-.7053	.000191
				21.0	-.9853	.000278	-194.0	-.7041	.000191
Mixer/ Amps	All	10.02	174.9						

Part No.: 1356409-1

Serial No.: F04

Test Engineer: Y. Trinh

Quality Assurance: 7A 228 12/23/98

Date: 12/22/98

TEST DATA SHEET 11 (Sheet 5 of 8)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-2)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 25.0 °C

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
3		4.13				0.051			
		4.13				0.085			
		4.15				0.064			
		4.13				0.067			
		4.14				0.069			
		4.15				0.132			
		4.13				0.045			
		4.14				0.044			
		4.14				0.052			
		4.12				0.043			
	5.1		4.14	P	0.12		0.065	0.089	P

Pass = P, Fail = F

Part No.: 1356409-1

Serial No.: F04

Test Engineer: Y. Trinh

Quality Assurance: TA 228 12/23/98

Date: 12/22/98

FOR REFERENCE ONLY

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            AMSU-A TEST

A1-2, S/N: F04, CH3, NF & NPS DATA, TB=25 C,  12/22/98

SEQ TEMP_TEST TEST TEMP   VOLTAGE        STD_DEV        NF (dB)        NPS(K)
 1  WARM TEST  294.15   -.98527314     .00025426     ----------     ---------
 2  COLD TEST   79.15   -.70471343     .00021579     4.13179165      .05060716
 3  WARM TEST  294.15   -.98520341     .00024954     ----------     ---------
 4  COLD TEST   79.15   -.70455342     .00018354     4.13006753      .08534383
 5  WARM TEST  294.15   -.98504543     .00029454     ----------     ---------
 6  COLD TEST   79.15   -.70595331     .00022545     4.15211076      .06352271
 7  WARM TEST  294.15   -.98521239     .00025772     ----------     ---------
 8  COLD TEST   79.15   -.70429497     .00018159     4.12594687      .06744373
 9  WARM TEST  294.15   -.98523886     .00029700     ----------     ---------
10  COLD TEST   79.15   -.70538452     .00019327     4.14231053      .06948873
11  WARM TEST  294.15   -.98514937     .00032209     ----------     ---------
12  COLD TEST   79.15   -.70595527     .00020927     4.15270820      .13241290
13  WARM TEST  294.15   -.98525759     .00027953     ----------     ---------
14  COLD TEST   79.15   -.70438509     .00019565     4.12694695      .04491240
15  WARM TEST  294.15   -.98535034     .00025517     ----------     ---------
16  COLD TEST   79.15   -.70499044     .00022503     4.13536960      .04443613
17  WARM TEST  294.15   -.98527130     .00026386     ----------     ---------
18  COLD TEST   79.15   -.70531044     .00019075     4.14110449      .05192212
19  WARM TEST  294.15   -.98524917     .00027919     ----------     ---------
20  COLD TEST   79.15   -.70413541     .00019054     4.12307104      .04329116

CH. 3 ,79.3 MHz      MHz

NOISE FIGURE AVERAGE (dB) =    4.13814235129

NOISE POWER STABILITY (K) =    .05533807743

NOISE POWER STABILITY DELTA (K) =        .0891218442899

NPS_MAX (K) =        .13241290054         NPS_MIN (K) =     .0432911592711

INTEGRATION TIME =   .165
```

TEST DATA SHEET 11 (Sheet 2 of 8)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-2)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 25.0 °C

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V)		T_C(°C)	V_C (V)	
					Mean	Standard Deviation		Mean	Standard Deviation
LO	4	10.03	176.6	21.0	-.9744	.000174	-194.0	-.730	.000156
				21.0	-.9744	.000172	-194.0	-.7292	.000166
				21.0	-.9744	.000190	-194.0	-.7293	.000156
				21.0	-.9745	.000198	-194.0	-.7294	.000143
				21.0	-.9744	.000202	-194.0	-.7305	.000153
				21.0	-.9743	.000197	-194.0	-.7301	.000174
				21.0	-.9745	.000185	-194.0	-.7297	.000151
				21.0	-.9746	.000206	-194.0	-.7303	.000203
				21.0	-.9746	.000178	-194.0	-.7298	.000153
				21.0	-.9747	.000220	-194.0	-.7302	.000159
Mixer/ Amps	All	10.02	174.9						

Part No.: 1356409-1

Serial No.: F04

Test Engineer: Y. Trinh

Quality Assurance 7A 228 12/23/98

Date: 12/22/98

TEST DATA SHEET 11 (Sheet 6 of 8)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-2)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 25.0 °C

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
4		4.68				0.012			
		4.67				0.017			
		4.67				0.069			
		4.67				0.085			
		4.69				0.092			
		4.69				0.083			
		4.68				0.056			
		4.69				0.099			
		4.68				0.036			
		4.69				0.119			
	4.95		4.68	P	0.08		0.067	0.107	P

Pass = P, Fail = F

Part No.: 1356409-1

Serial No.: F04

Test Engineer: Y. Trinh

Quality Assurance: 12/23/98

Date: 12/22/98

FOR REFERENCE ONLY

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              AMSU-A TEST

A1-2, S/N: F04, CH4, NF & NPS DATA, TB=25 C,  12/22/98

SEQ TEMP_TEST TEST TEMP   VOLTAGE       STD_DEV        NF (dB)          NPS(K)
 1  WARM TEST  294.15   -.97438750    .00017387      -----------      ----------
 2  COLD TEST   79.15   -.72974001    .00015642      4.68121515       .01239725
 3  WARM TEST  294.15   -.97439364    .00017220      -----------      ----------
 4  COLD TEST   79.15   -.72921710    .00016567      4.67181552       .01708067
 5  WARM TEST  294.15   -.97443526    .00019028      -----------      ----------
 6  COLD TEST   79.15   -.72930352    .00015577      4.67279937       .06890054
 7  WARM TEST  294.15   -.97445261    .00019828      -----------      ----------
 8  COLD TEST   79.15   -.72943636    .00014333      4.67493375       .08453066
 9  WARM TEST  294.15   -.97442401    .00020226      -----------      ----------
10  COLD TEST   79.15   -.73046852    .00015819      4.69374025       .09190974
11  WARM TEST  294.15   -.97434244    .00019705      -----------      ----------
12  COLD TEST   79.15   -.73006970    .00017377      4.58770341       .08256971
13  WARM TEST  294.15   -.97448376    .00018467      -----------      ----------
14  COLD TEST   79.15   -.72973840    .00015132      4.67990085       .05601065
15  WARM TEST  294.15   -.97455342    .00020646      -----------      ----------
16  COLD TEST   79.15   -.73032116    .00020308      4.68937150       .09875497
17  WARM TEST  294.15   -.97462524    .00017809      -----------      ----------
18  COLD TEST   79.15   -.72976501    .00015837      4.67848662       .03588580
19  WARM TEST  294.15   -.97466699    .00022017      -----------      ----------
20  COLD TEST   79.15   -.73023819    .00015870      4.68636950       .11939765

CH. 4 ,191.6 MHz     MHz

NOISE FIGURE AVERAGE (dB) =    4.68163932648

NOISE POWER STABILITY (K) =    .06674376204

NOISE POWER STABILITY DELTA (K) =        .107000404541

NPS_MAX (K) =         .119397649691         NPS_MIN (K) =     .0123972451495

INTEGRATION TIME =   .165
```

TEST DATA SHEET 11 (Sheet 3 of 8)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-2)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 25.0 °C

Compo-nent	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V)		T_C(°C)	V_C (V)	
					Mean	Standard Deviation		Mean	Standard Deviation
LO	5	10.00	176.7	21.0	-.9493	.000181	-194.0	-.6719	.000148
				21.0	-.9493	.000179	-194.0	-.6717	.000164
				21.0	-.9495	.000214	-194.0	-.6716	.000158
				21.0	-.9495	.000195	-194.0	-.6714	.000180
				21.0	-.9496	.000206	-194.0	-.6717	.000151
				21.0	-.9497	.000222	-194.0	-.6716	.000153
				21.0	-.9497	.000179	-194.0	-.6722	.000136
				21.0	-.9497	.000192	-194.0	-.6724	.000144
				21.0	-.9497	.000186	-194.0	-.6720	.000133
				21.0	-.9497	.000209	-194.0	-.6724	.000163
Mixer/ Amps	All	10.02	174.9						

Part No.: 1356409-1

Serial No.: F04

Test Engineer: Y. Trinh

Quality Assurance: 12/23/98 TA 228

Date: 12/22/98

TEST DATA SHEET 11 (Sheet 7 of 8)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-2)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 25.0 °C

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
5		4.02				0.007			
		4.02				0.018			
		4.01				0.089			
		4.01				0.057			
		4.01				0.076			
		4.01				0.10 ~~0.01~~ Trinh			
		4.02				0.019			
		4.02				0.050			
		4.01				0.036			
		4.02				0.081			
	5.1		4.02	P	0.08		0.053	0.093	P

Pass = P, Fail = F

Part No.: 1356409-1

Serial No.: F04

Test Engineer: Y. Trinh

Quality Assurance: TA 228 12/23/98

Date: 12/22/98

FOR REFERENCE ONLY

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                AMSU-A TEST

A1-2, S/N: F04, CH5, NF & NPS DATA, TB=25 C,  12/22/98

SEQ TEMP_TEST TEST TEMP   VOLTAGE       STD_DEV         NF (dB)        NPS(K)
 1  WARM TEST  294.15   -.94931847    .00018051     -----------    ----------
 2  COLD TEST   79.15   -.67189504    .00014788     4.01852550     .00660966
 3  WARM TEST  294.15   -.94934731    .00017887     -----------    ----------
 4  COLD TEST   79.15   -.67170797    .00016442     4.01526038     .01761196
 5  WARM TEST  294.15   -.94952639    .00021399     -----------    ----------
 6  COLD TEST   79.15   -.67161185    .00015786     4.01175699     .08910400
 7  WARM TEST  294.15   -.94951039    .00019468     -----------    ----------
 8  COLD TEST   79.15   -.67135165    .00017966     4.00784739     .05667526
 9  WARM TEST  294.15   -.94955077    .00020559     -----------    ----------
10  COLD TEST   79.15   -.67174925    .00015118     4.01364577     .07637518
11  WARM TEST  294.15   -.94966885    .00022157     -----------    ----------
12  COLD TEST   79.15   -.67164377    .00015277     4.01067536     .09950416
13  WARM TEST  294.15   -.94967535    .00017865     -----------    ----------
14  COLD TEST   79.15   -.67220061    .00013625     4.01935948     .01928504
15  WARM TEST  294.15   -.94971600    .00019168     -----------    ----------
16  COLD TEST   79.15   -.67235030    .00014437     4.02126300     .05024625
17  WARM TEST  294.15   -.94974569    .00018645     -----------    ----------
18  COLD TEST   79.15   -.67195209    .00013809     4.01465665     .03649639
19  WARM TEST  294.15   -.94965965    .00020854     -----------    ----------
20  COLD TEST   79.15   -.67235084    .00016323     4.02189972     .08115175

CH. 5 ,168 MHz        MHz

NOISE FIGURE AVERAGE (dB) =    4.01549230858

NOISE POWER STABILITY (K) =    .0533049642645

NOISE POWER STABILITY DELTA (K) =        .092894499988

NPS_MAX (K) =         .0995041638064       NPS_MIN (K) =     .00660966381841

INTEGRATION TIME =   .165
```

TEST DATA SHEET 11 (Sheet 4 of 8)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-2)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 25.0 °C

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	8	9.99	181.6	21.0	-.9555	.000205	-194.0	-.6967	.000150
				21.0	-.9552	.000220	-194.0	-.6965	.000132
				21.0	-.9551	.000194	-194.0	-.6967	.000157
				21.0	-.9552	.000233	-194.0	-.6963	.000167
				21.0	-.9551	.000184	-194.0	-.6966	.000153
				21.0	-.9554	.000227	-194.0	-.6969	.000165
				21.0	-.9552	.000207	-194.0	-.6958	.000161
				21.0	-.9555	.000202	-194.0	-.6963	.000149
				21.0	-.9555	.000206	-194.0	-.6966	.000168
				21.0	-.9553	.000206	-194.0	-.6970	.000236
Mixer/ Amps	All	10.02	174.9						

Part No.: 1356409-1

Serial No.: F04

Test Engineer: Y. Trinh

Quality Assurance: QA 228 12/23/98

Date: 12/22/98

TEST DATA SHEET 11 (Sheet 8 of 8)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-2)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 25.0 °C

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
8		4.35				0.066			
		4.35				0.095			
		4.36				0.037			
		4.35				0.113			
		4.35				0.034			
		4.36				0.105			
		4.34				0.070			
		4.34				0.06			
		4.35				0.068			
		4.36				0.07			
	5.0		4.35	P	0.08		0.072	0.079	P

Pass = P, Fail = F

Part No.: 1356409-1

Serial No.: F04

Test Engineer: Y. Trinh

Quality Assurance: 12/23/98

Date: 12/22/98

FOR REFERENCE ONLY

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          AMSU-A TEST

A1-2, S/N: F04, CH8, NF & NPS DATA, TB=25 C,  12/22/98

SEQ TEMP_TEST TEST TEMP   VOLTAGE       STD_DEV         NF (dB)          NPS(K)
 1  WARM TEST  294.15   -.95549754    .00020455       -----------      ----------
 2  COLD TEST   79.15   -.69672619    .00015048       4.35077603        .06583409
 3  WARM TEST  294.15   -.95522862    .00022036       -----------      ----------
 4  COLD TEST   79.15   -.69653979    .00018227       4.35093954        .09482390
 5  WARM TEST  294.15   -.95508963    .00019363       -----------      ----------
 6  COLD TEST   79.15   -.69669555    .00015738       4.35528146        .03685593
 7  WARM TEST  294.15   -.95522161    .00023272       -----------      ----------
 8  COLD TEST   79.15   -.69630865    .00016723       4.34712670        .11330405
 9  WARM TEST  294.15   -.95508681    .00018392       -----------      ----------
10  COLD TEST   79.15   -.69656857    .00015331       4.35317137        .03431587
11  WARM TEST  294.15   -.95537548    .00022680       -----------      ----------
12  COLD TEST   79.15   -.69690413    .00016496       4.35528260        .10484557
13  WARM TEST  294.15   -.95524885    .00020669       -----------      ----------
14  COLD TEST   79.15   -.69581443    .00016144       4.33846706        .07021698
15  WARM TEST  294.15   -.95553465    .00020192       -----------      ----------
16  COLD TEST   79.15   -.69627677    .00014873       4.34274497        .05984435
17  WARM TEST  294.15   -.95546808    .00020573       -----------      ----------
18  COLD TEST   79.15   -.69656876    .00016824       4.34848284        .06831324
19  WARM TEST  294.15   -.95529852    .00020633       -----------      ----------
20  COLD TEST   79.15   -.69701375    .00023633       4.35808350        .06976906

CH. 8 ,155.6 MHz      MHz

NOISE FIGURE AVERAGE (dB) =    4.35003939333

NOISE POWER STABILITY (K) =    .0718123038955

NOISE POWER STABILITY DELTA (K) =        .0789881763778

NPS_MAX (K) =         .113304047064        NPS_MIN (K) =     .0343158706866

INTEGRATION TIME =   .165
```

TEST DATA SHEET 17

Temperature Sensor and Thermistor Test Data (Paragraph 3.6.1) (A1-2)

Test Setup Verified: ____________
Signature

Baseplate Temperature (TB) 20 °C

Reference Designation	Specification	Measured Value	Pass/Fail
RT 41	2200 ± 100 Ω	2145 Ω	P
RT 42	2200 ± 100 Ω	2147 Ω	P
RT 43	2200 ± 100 Ω	2144 Ω	P
RT 44	2200 ± 100 Ω	2147 Ω	P
RT 12	2200 ± 100 Ω	2143 Ω	P
RT 17	2200 ± 100 Ω	2144 Ω	P
RT 18	2200 ± 100 Ω	2143 Ω	P
RT 19	2200 ± 100 Ω	2143 Ω	P
RT 22	2200 ± 100 Ω	2148 Ω	P
RT 33	2200 ± 100 Ω	2142 Ω	P
TB 58	3000 ± 100 Ω	3070 Ω	P
TB 59	3000 ± 100 Ω	3072 Ω	P
TB 54	4.1 – 4.6 V	4.29 V	P

Pass = P, Fail = F

Part No.: 1356409-1

Serial No.: F04

Test Engineer: ____________

Quality Assurance: TA 228 12/23/98

Date: 12/21/98

TEST DATA SHEET 20

Survival Heater and Thermal Switch Test Data (Paragraph 3.6.2) (A1-2)

Test Setup Verified: T.Tng
Signature

Baseplate Temperature (T_B) 20 °C

Reference Designation	Open Switch		Closed Switch		
	>10 MΩ	Pass/Fail	Specification	Measured Value	Pass/Fail
HR1/TS1	>10MΩ	P	40 - 48 Ω	45.6Ω	P
	>10MΩ	P		44.4Ω	P
HR2/TS2	>10MΩ	P		45.2Ω	P
	>10MΩ	P		44.2Ω	P

Pass = P, Fail = F

Part No.: 1356409-1

Serial No.: F04

Test Engineer:

Quality Assurance: TA 228 12/23/98

Date: 12/21/98

TEST DATA SHEET 22 (Sheet 2 of 3)
Bias Voltage Verification Test Data (Paragraph 3.6.3) (A1-2)

Test Setup Verified: ____________ Signature

Baseplate Temperature (T_B) 20 °C

Reference Designation	Specification	Measured Value (V)	Pass/Fail
Mixer/IF AMP Ch 3, 4, 5, 8	+10 ±0.1	10,01 V	P
DRO Ch 5	+10 ±0.1	9.99 V	P
DRO Ch 4	+10 ±0.1	10.01 V	P
DRO Ch 3	+10 ±0.1	9.97 V	P
DRO Ch 8	+10 ±0.1	9.98 V	P

Part No.: 1356409-1

Serial No.: F04

Test Engineer:

Quality Assurance: 7A 228 12/23/98

Date: 12/21/98

Report No. 11413
February, 1999

TEST DATA

FOR

AMSU-A1-1 (P/N: 1356429-1, S/N: F04)

TEST DATA SHEET 1

LO Frequency Test Data (Paragraph 3.5.1) (A1-1)

Test Setup Verified: ____________ Signature

Baseplate Temperature (T_B) 26 °C

Component	Channel No.		V_b(V)	I_b(mA)	P_{dc}(mW)			f_o(GHz)		
					Required (Max)	Measured	Pass/ Fail	Required	Measured	Pass/ Fail
LO	6		9.97	187.4	2,700	1868.4	P	54.400 ± 0.003	54.4002	P
	7		9.93	187.8	2,700	1864.9	P	54.940 ± 0.003	54.9398	P
	LO No. 1	9	Positive 15.13	525.5	9,000 (13,500)*	7950.8	P	57.290344 ± 0.000086		
		10								
		11							57.290341	P
		12	Negative -15.13	-64.3	1,500	972.8	P			
		13								
		14								
	LO No. 2	9	Positive 15.13	533.4	9,000 (13,500)*	8070.3	P	57.290344 ± 0.000086		
		10								
		11							57.290346	P
		12	Negative -15.13	-70.1	1,500	1060.6	P			
		13								
		14								
		15	14.88	183.1	3500	2724.5	P	88.980 ± 0.080	89.0009	P
Mixer/ Amps	All		9.94	244.2	2,550	2427.3				
IF Amps	All		7.95	266.4	5,500	2117.9				
TOTAL			Primary (LO #1)		24,510 (29,010)*	19926.6				
			Redundancy (LO #2)		24,510 (29,010)*	20133.9				

* Indicates required values for the PLO specified in AE-26660.

Pass = P, Fail = F

PLO 1 Lock Detect ☑

PLO 2 Lock Detect ☑

Part No.: 135629-1

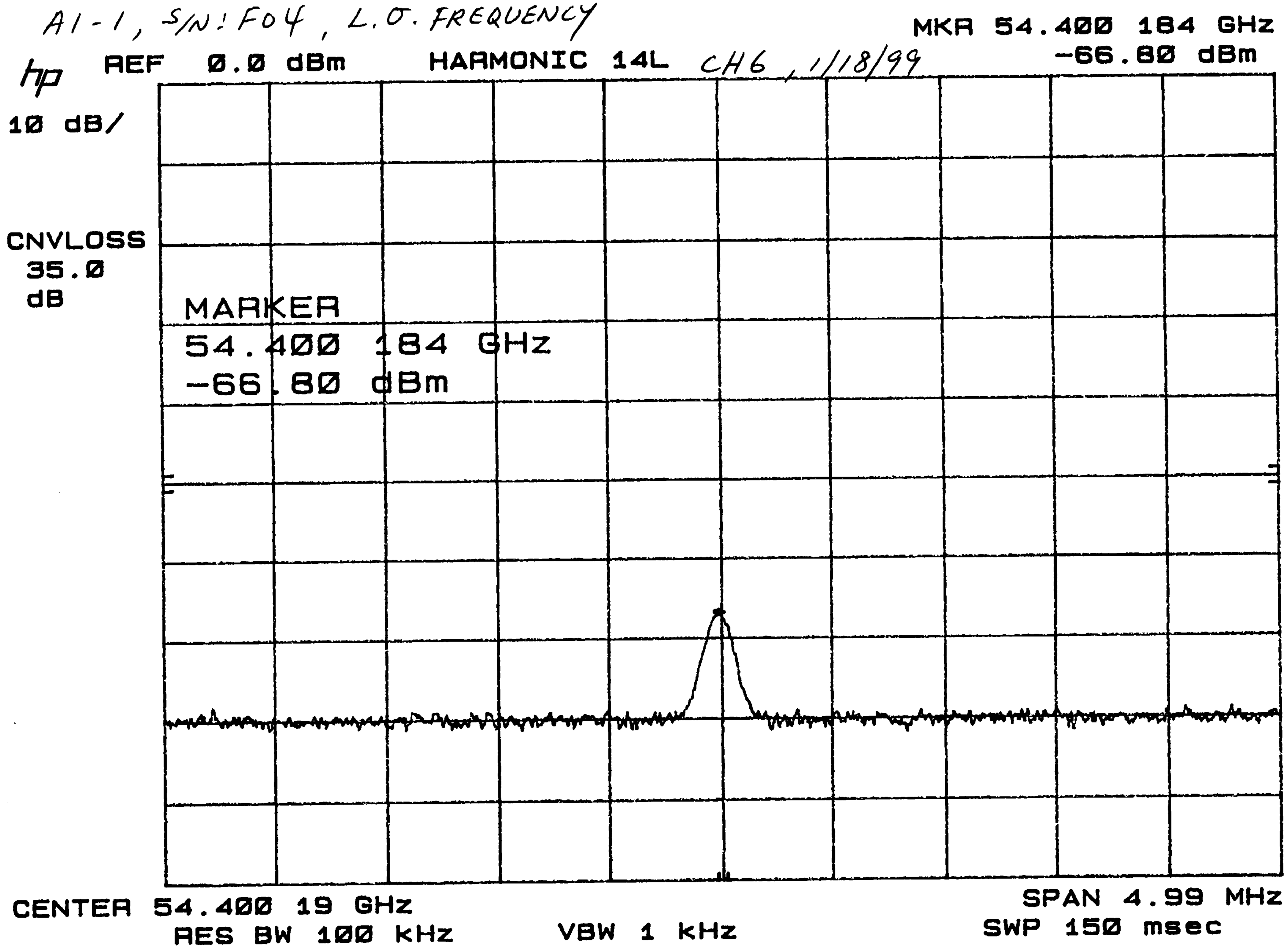
Serial No.: F04

Test Engineer: ____________

Quality Assurance: ____________

Date: 1/18/99

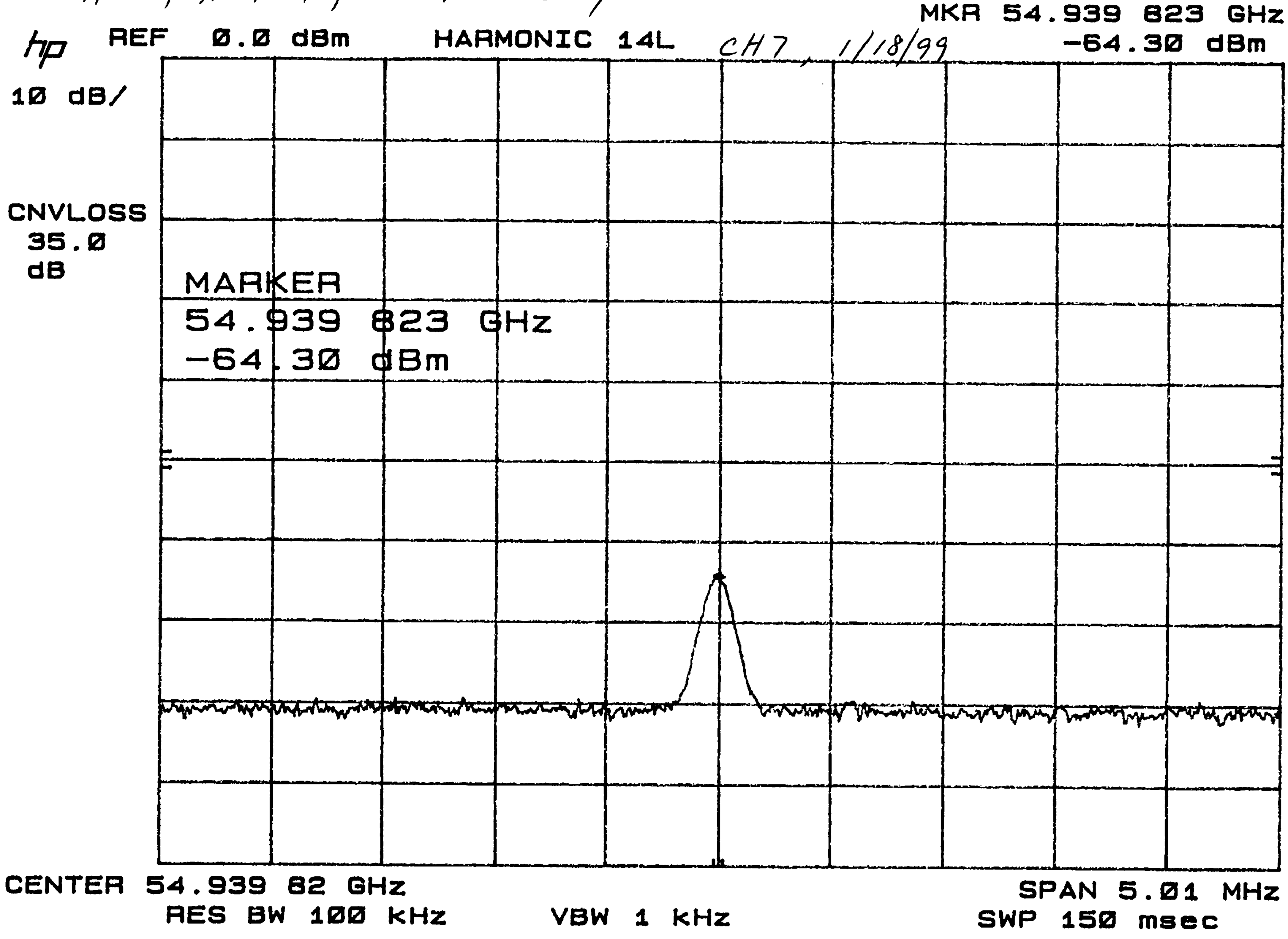
FOR REFERENCE ONLY


A1-1, S/N: F04, L.O. FREQUENCY

CH6, 1/18/99

A1-1, S/N: F04, L.O. FREQUENCY

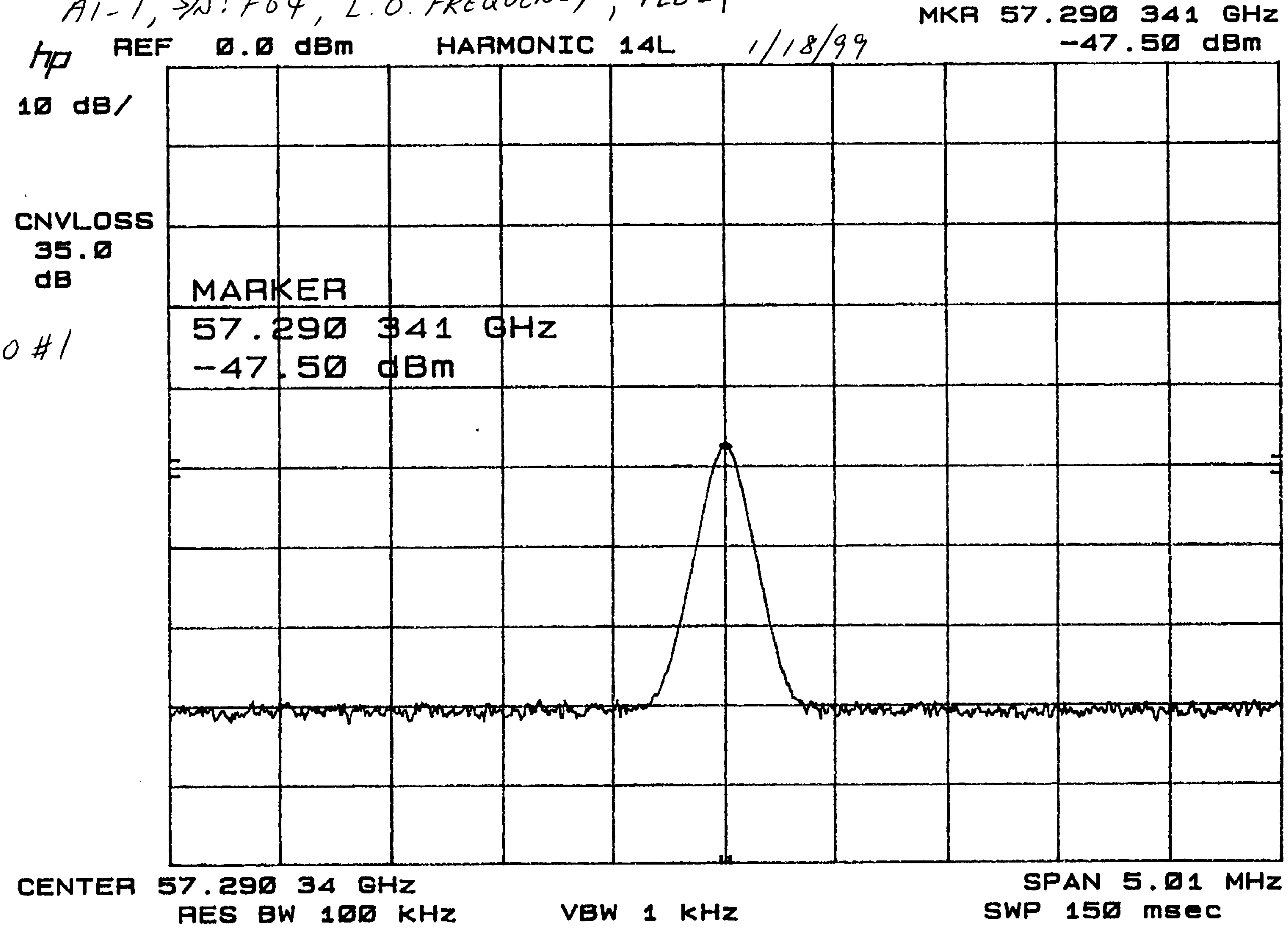
FOR REFERENCE ONLY



CH7, 1/18/99

FOR REFERENCE ONLY

A1-1, S/N: F04, L.O. FREQUENCY, PLD #1

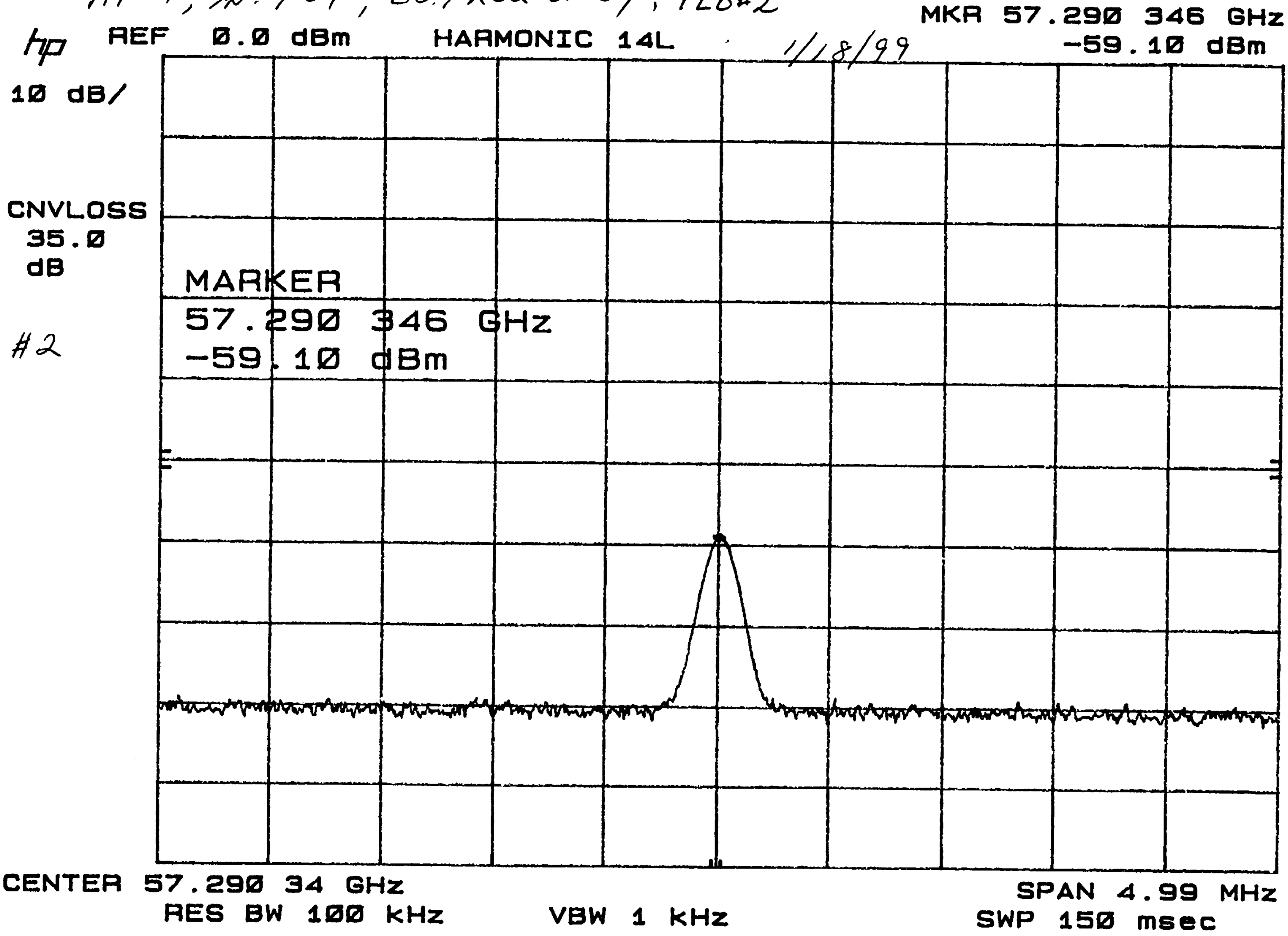


1/18/99

PLO #1

A1-1, S/N: F04, LO. FREQUENCY, PLO#2

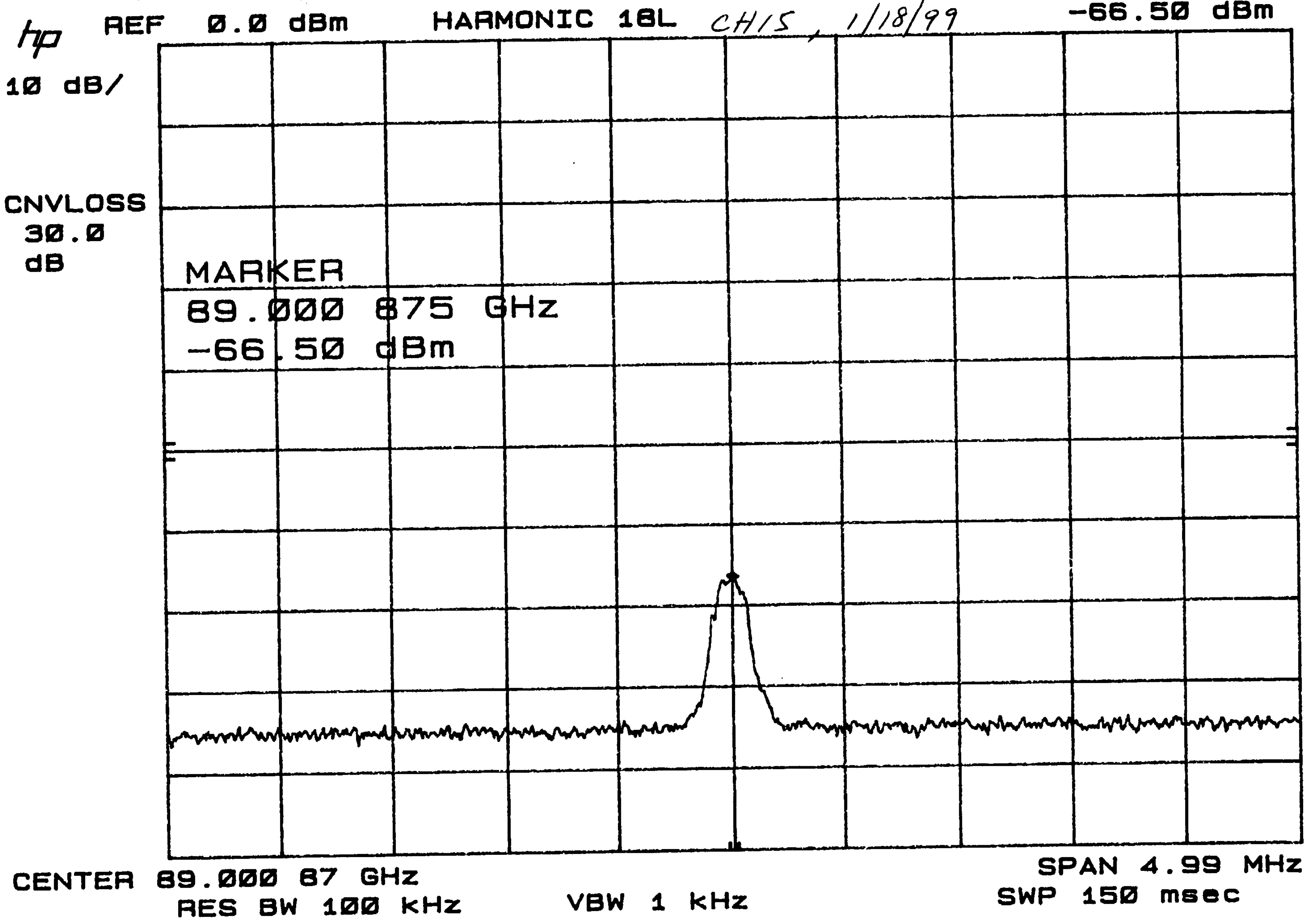
1/18/99



PLO #2

FOR REFERENCE ONLY

A1-1, S/N: F04, L.O. FREQUENCY



CH15, 1/18/99

TEST DATA SHEET 4
IF Output Power Test Data (Paragraph 3.5.2) (A1-1)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 27.0 °C

Compo-nent	Channel No.		V_b(V)	I_b(mA)	P_o(dBm)	Atten (dB)	P_o(dBm)		
							Required	Measured	Pass/ Fail
LO	6		9.97	187.4	-19.01	8	-27.0 ± 1.0	-27.20	P
	7		9.93	187.8	-19.15	8	-27.0 ± 1.0	-27.34	P
	LO No. 1	9	Positive +15.13	527.3	-21.43	5	-27.0 ± 1.0	-26.46	P
		10			-22.34	5	-27.0 ± 1.0	-27.28	P
		11			-19.77	7	-27.0 ± 1.0	-26.96	P
		12	Negative -15.13	-64.4	-19.94	7	-27.0 ± 1.0	-27.10	P
		13			-20.78	6	-27.0 ± 1.0	-26.72	P
		14			-20.67	6	-27.0 ± 1.0	-26.64	P
	LO No. 2	9	Positive +15.13	536.2			-27.0 ± 1.0	-26.36	P
		10					-27.0 ± 1.0	-27.20	P
		11					-27.0 ± 1.0	-26.91	P
		12	Negative -15.13	-70.4			-27.0 ± 1.0	-27.04	P
		13					-27.0 ± 1.0	-26.68	P
		14					-27.0 ± 1.0	-26.58	P
	15		14.88	183.8	-24.66	2	-27.0 ± 1.0	-26.59	P
Mixer/ Amps	All		9.93	244.4					
IF Amps	All		7.95	267.7					

Pass = P, Fail = F

Part No.: 1356429-1

Serial No.: F04

Test Engineer: Y. Trinh

Quality Assurance:

Date: 1/18/99

TEST DATA SHEET 7 (Sheet 1 of 2)
Bandpass Characteristics Test Data (Paragraph 3.5.3) (A1-1)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 29.0 °C

Component	Channel No.	V_b(V)	I_b(mA)	3 dB BW Frequency (MHz)		3 dB BW Frequency (MHz)		Pass/Fail
				Lower	Higher	Required MAX	Measured	
LO	6	9.97	187.3	7.6	200.2	200	192.6	P
	7	9.93	187.9	7.0	199.0	200	192.0	P
LO No. 1	9	Positive +15.13	527.3	9.1	162.9	165	153.3	P
	10			179.7	255.5	78	75.8	P
				257.0	291.6	36	34.6	P
	11			352.7	387.6	36	34.9	P
	12	Negative -15.13	-64.4	292.5	307.9	16	15.4	P
				336.1	351.5	16	15.4	P
	13			308.3	316.2	8	7.9	P
				328.3	336.15	8	7.85	P
				316.28	319.24	3	2.96	P
	14			325.28	328.24	3	2.96	P
LO No. 2	9	Positive +15.13	537.6	8.9	162.9	165	154.0	P
	10			179.6	255.5	78	75.9	P
				256.8	291.6	36	34.8	P
	11			352.5	387.5	36	35.0	P
	12	Negative -15.13	-70.5	292.5	307.9	16	15.4	P
				336.1	351.5	16	15.4	P
	13			308.3	316.2	8	7.9	P
				328.3	336.2	8	7.9	P
	14			316.28	319.24	3	2.96	P
				325.28	328.24	3	2.96	P
	15	14.88	183.6	431.0	1,465.0	1000	984.0	P
Mixer/Amps	All							
IF Amps	All							

Part No.: 1356429-1

Serial No.: F04

Test Engineer: Y. Trinh

Quality Assurance: 7A 268 JAN 22 '99

Date: 1/19/99

TEST DATA SHEET 7 (Sheet 2 of 2)
Bandpass Characteristics Test Data (Paragraph 3.5.3) (A1-1)

Test Setup Verified: Y.
Signature

Baseplate Temperature (T_B) 29.0 °C

Component		Channel No.	V_b(V)	I_b(mA)	40 dB BW Frequency (MHz)		40 dB BW Frequency (MHz)		Pass/Fail
					Lower	Higher	Required MAX (Ref Only)	Measured	
LO		6	9.97	187.3	2.3	221.0	520	218.7	P
		7	9.93	187.9	2.0	221.5	520	219.5	P
	LO No. 1	9	Positive +15.13	527.3	2.2	179.4	429	177.2	P
		10			170.4	264.4	101	94.0	P
		11			N/A	N/A	47	N/A	N/A
		12	Negative -15.13	-64.4	N/A	N/A	21	N/A	N/A
		13			N/A	N/A	10	N/A	N/A
		14			N/A	N/A	4	N/A	N/A
	LO No. 2	9	Positive +15.13	537.6	2.0	179.6	429	177.6	P
		10			170.4	264.4	101	94.0	P
		11			N/A	N/A	47	N/A	N/A
		12	Negative -15.13	-70.5	N/A	N/A	21	N/A	N/A
		13			N/A	N/A	10	N/A	N/A
		14			N/A	N/A	4	N/A	N/A
		15	14.88	183.6	N/A	N/A	7800	N/A	N/A
Mixer/Amps		All							
IF Amps		All							

Part No.: 1356429-1

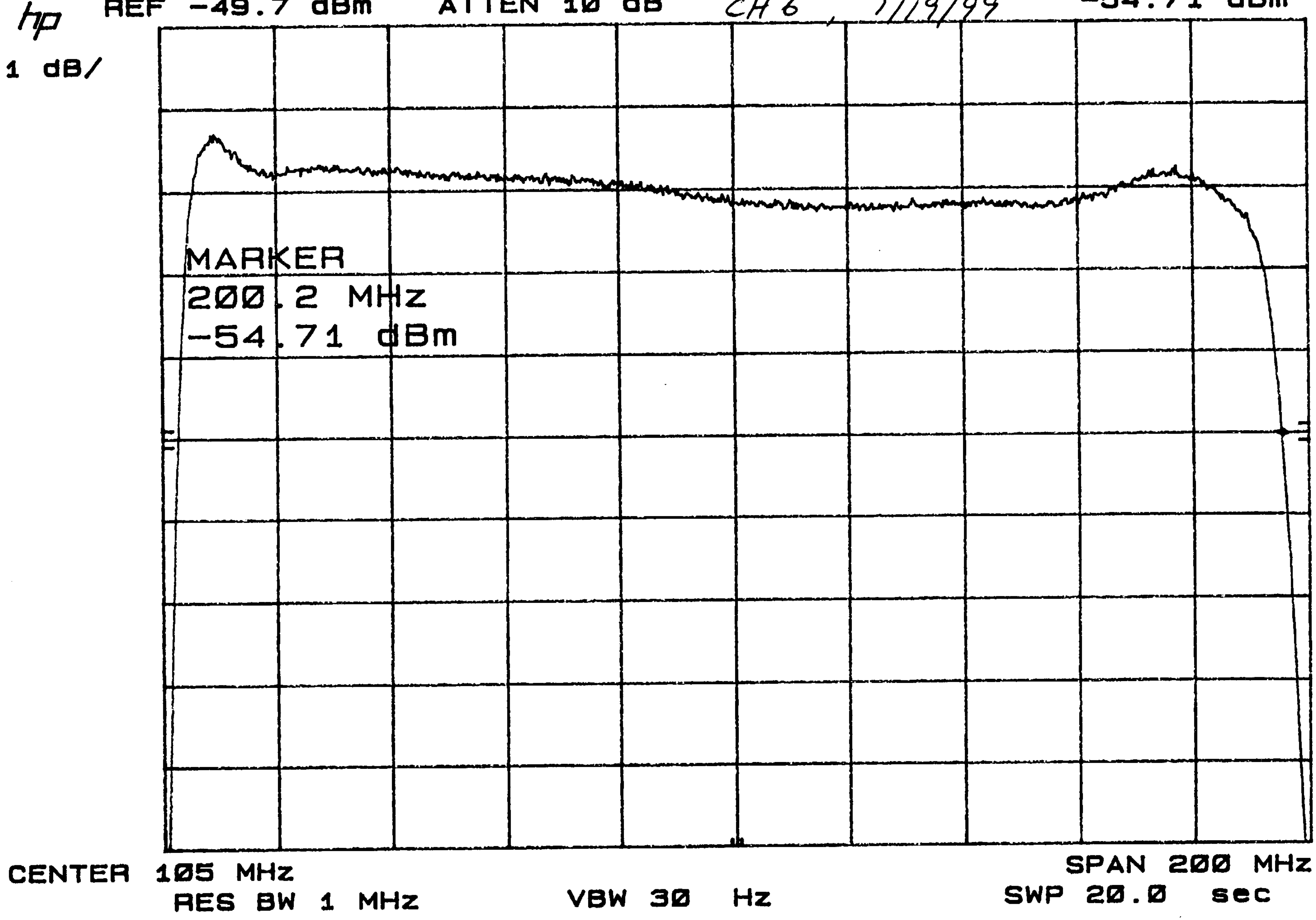
Serial No.: F04

Test Engineer: Y.

Quality Assurance: TA 268 JAN 28 '99

Date: 1/19/99

FOR REFERENCE ONLY



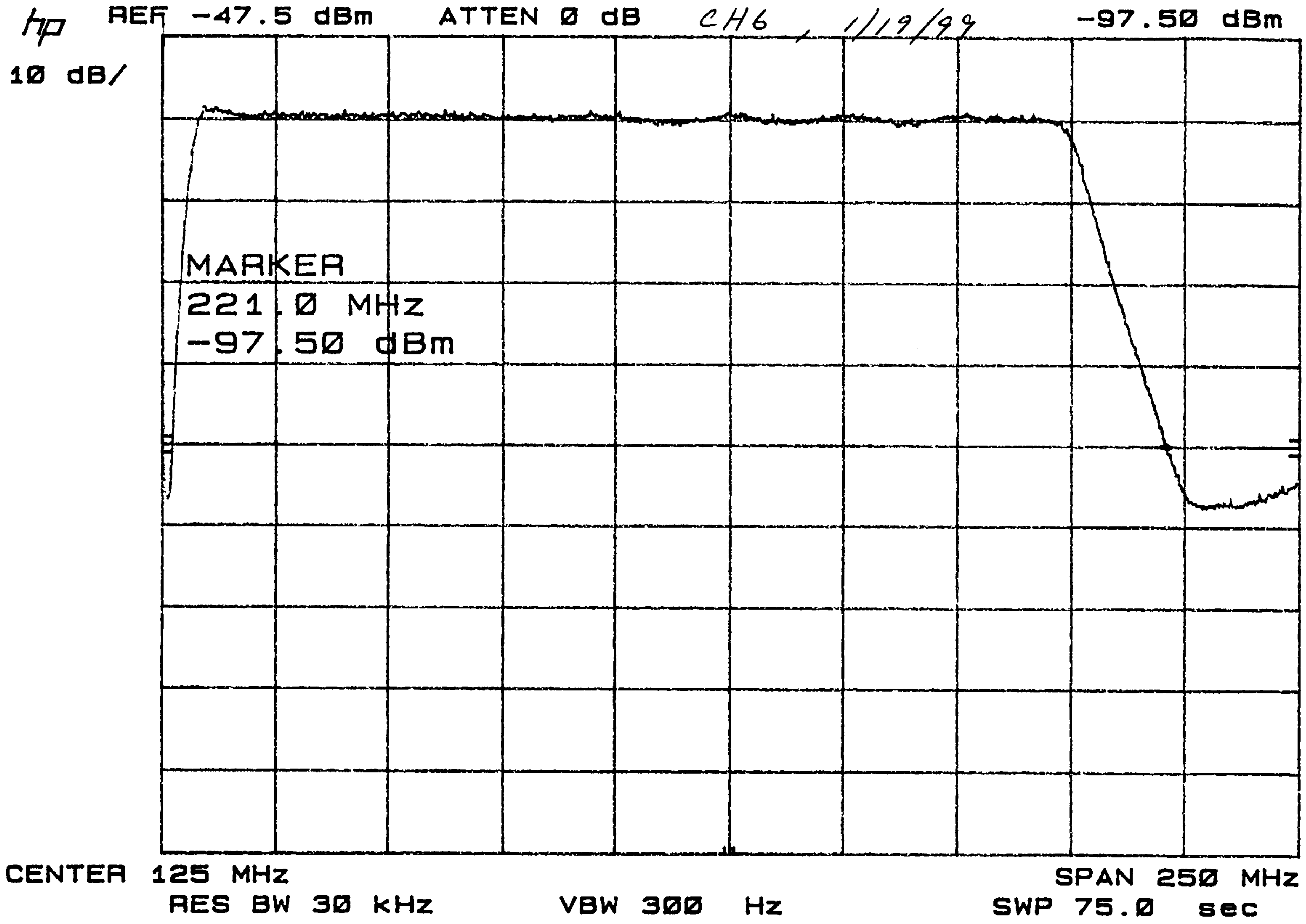
A1-1, S/N: F04, 3 dB BPF

CH6, 1/19/99

FOR REFERENCE ONLY

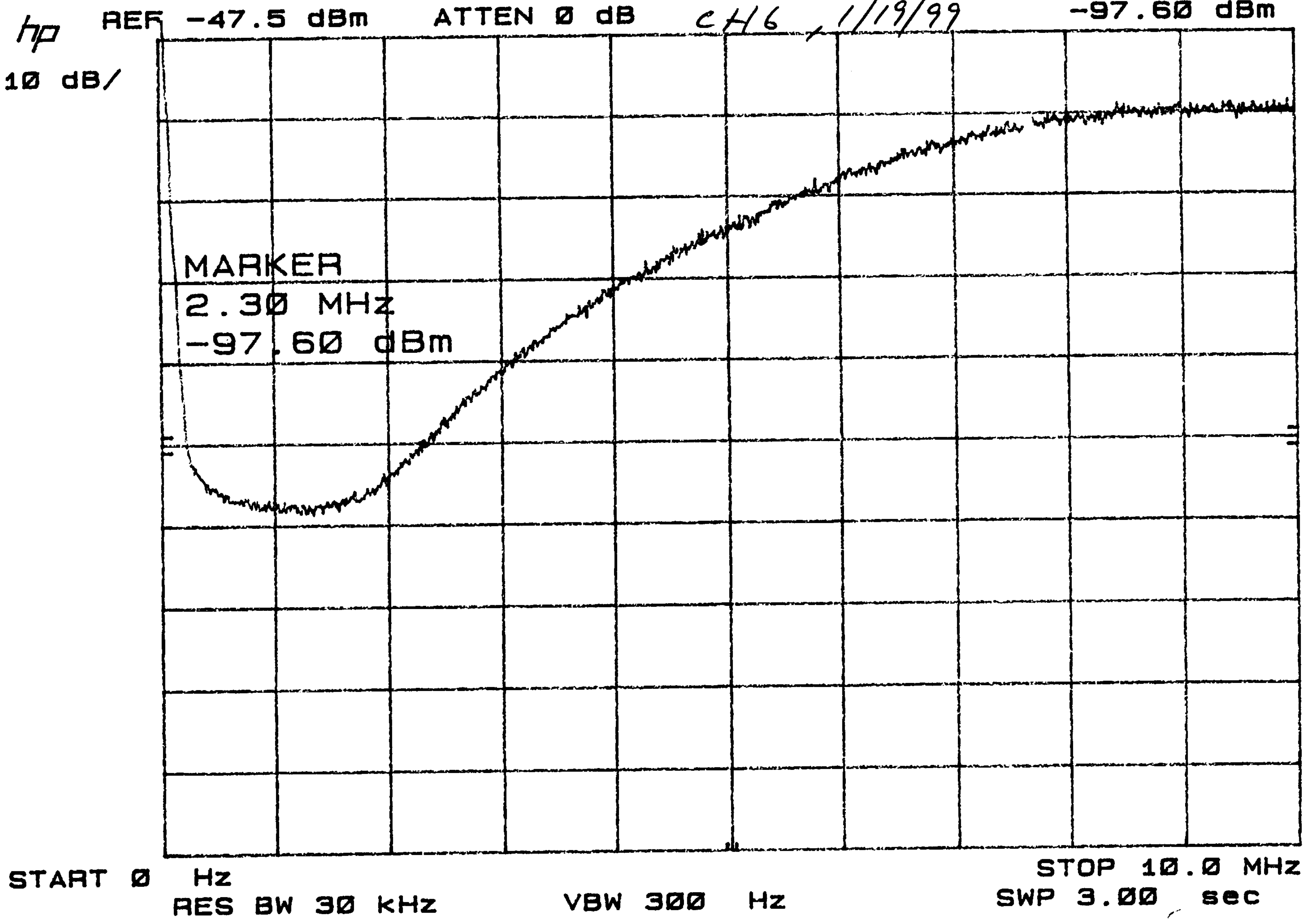
A1-1, S/N: F04, 40 dB, BPF

CH6, 1/19/99



FOR REFERENCE ONLY

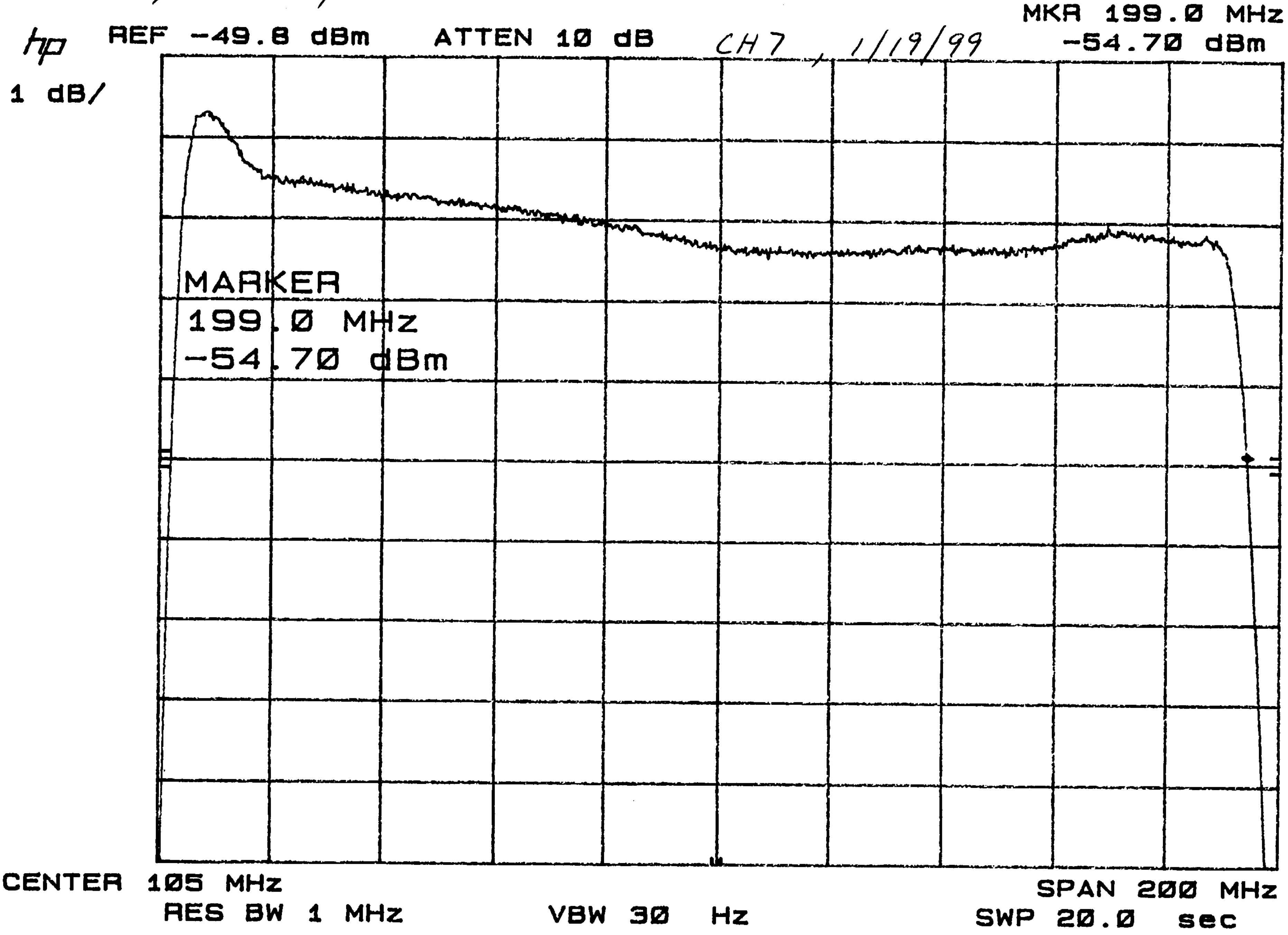
A1-1, S/N: F04, STOP BAND



CH6, 1/19/99

FOR REFERENCE ONLY

AI-1, S/N: F04, 3 dB BPF

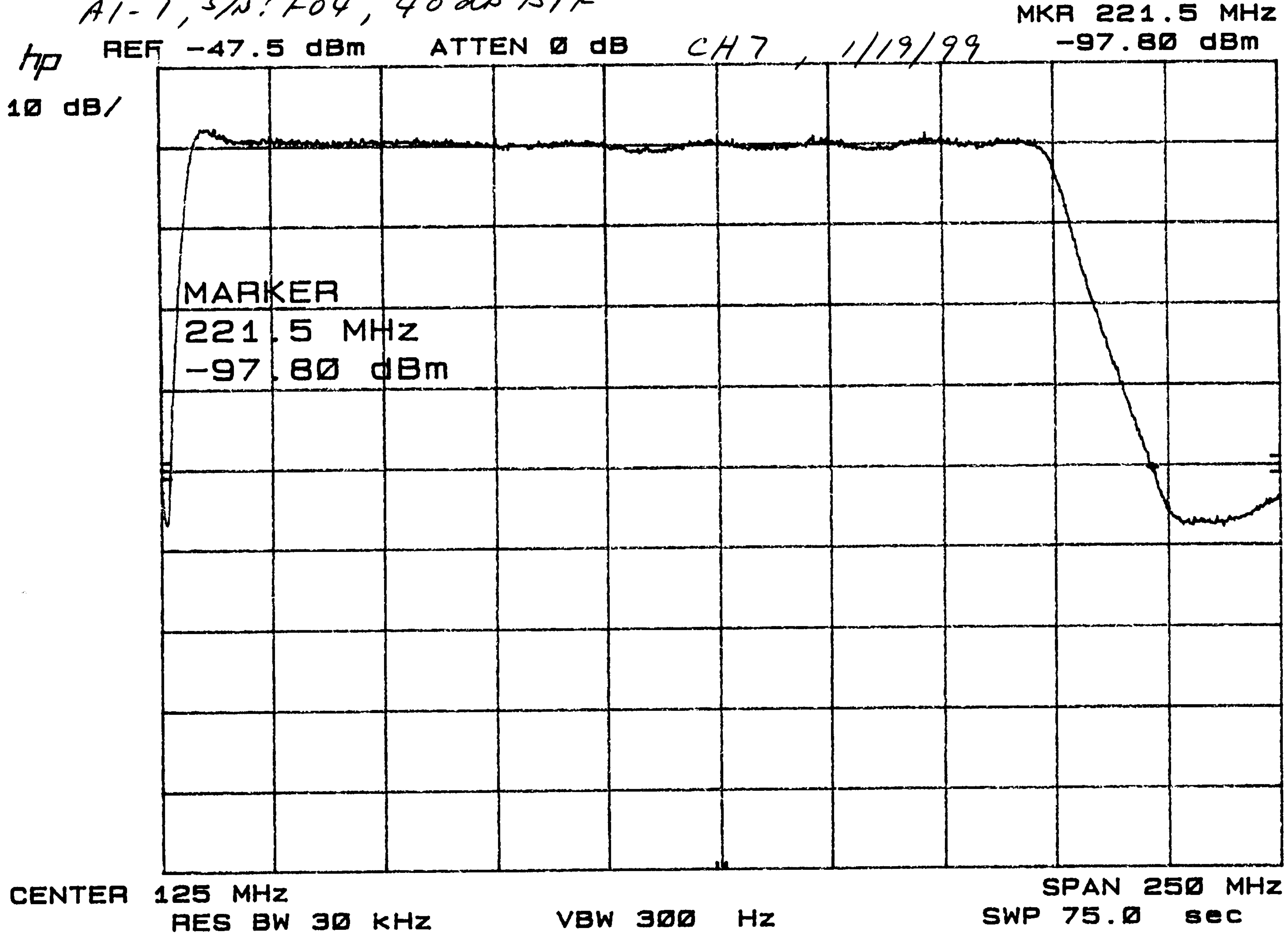


CH7, 1/19/99

FOR REFERENCE ONLY

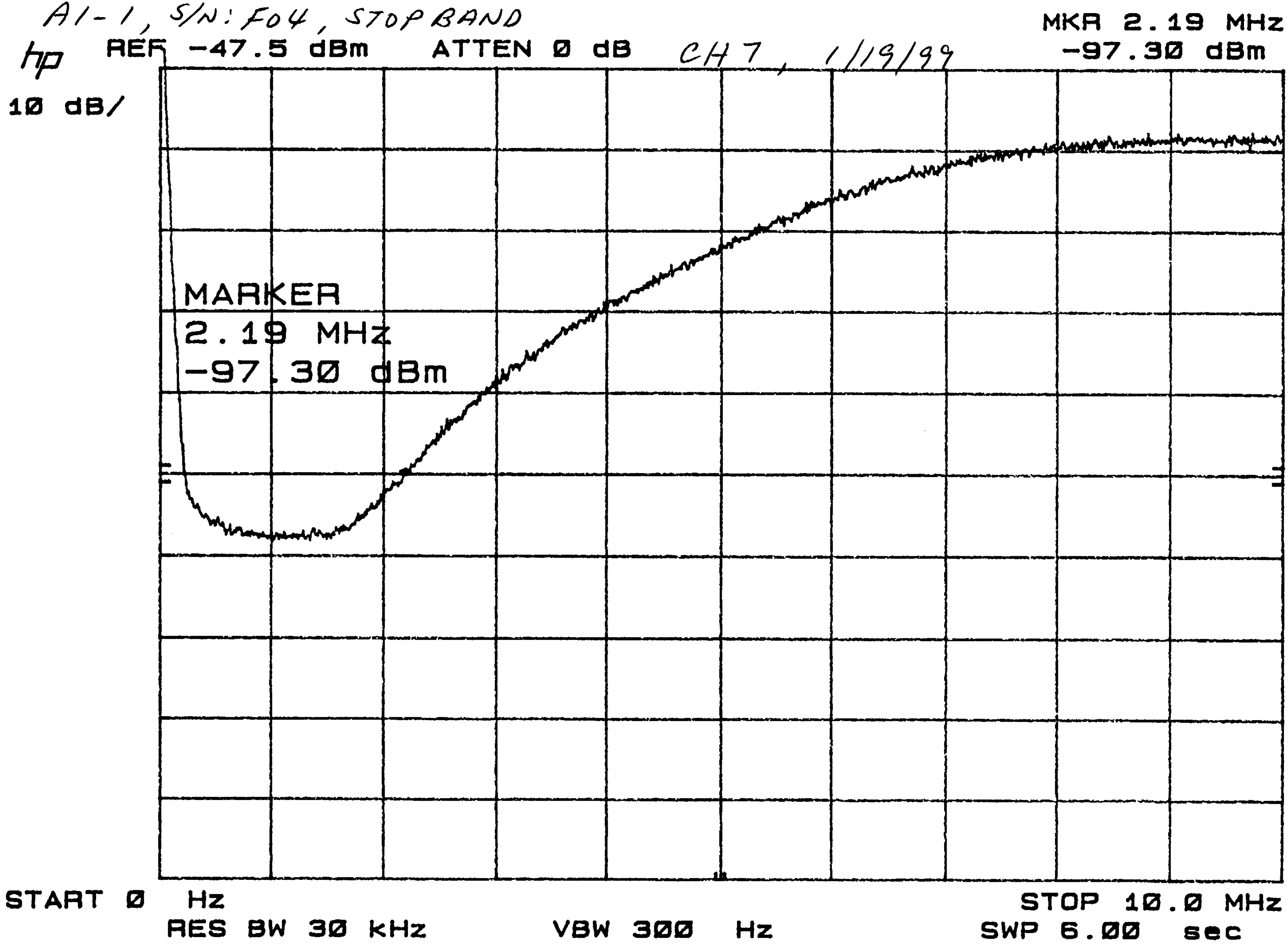
A1-1, S/N: F04, 40dB BPF

CH7, 1/19/99



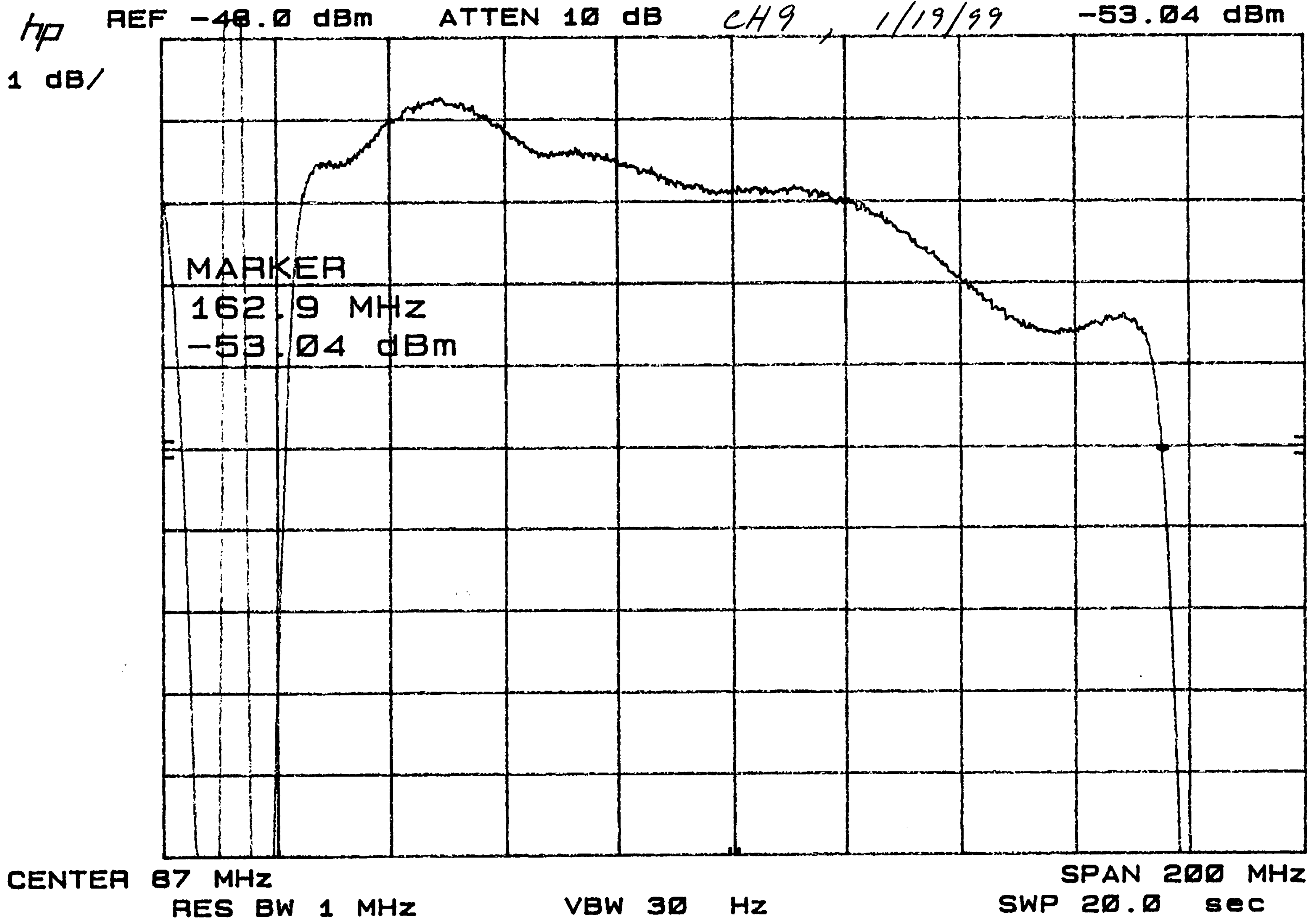
FOR REFERENCE ONLY

A1-1, S/N: F04, STOP BAND CH 7, 1/19/99



FOR REFERENCE ONLY

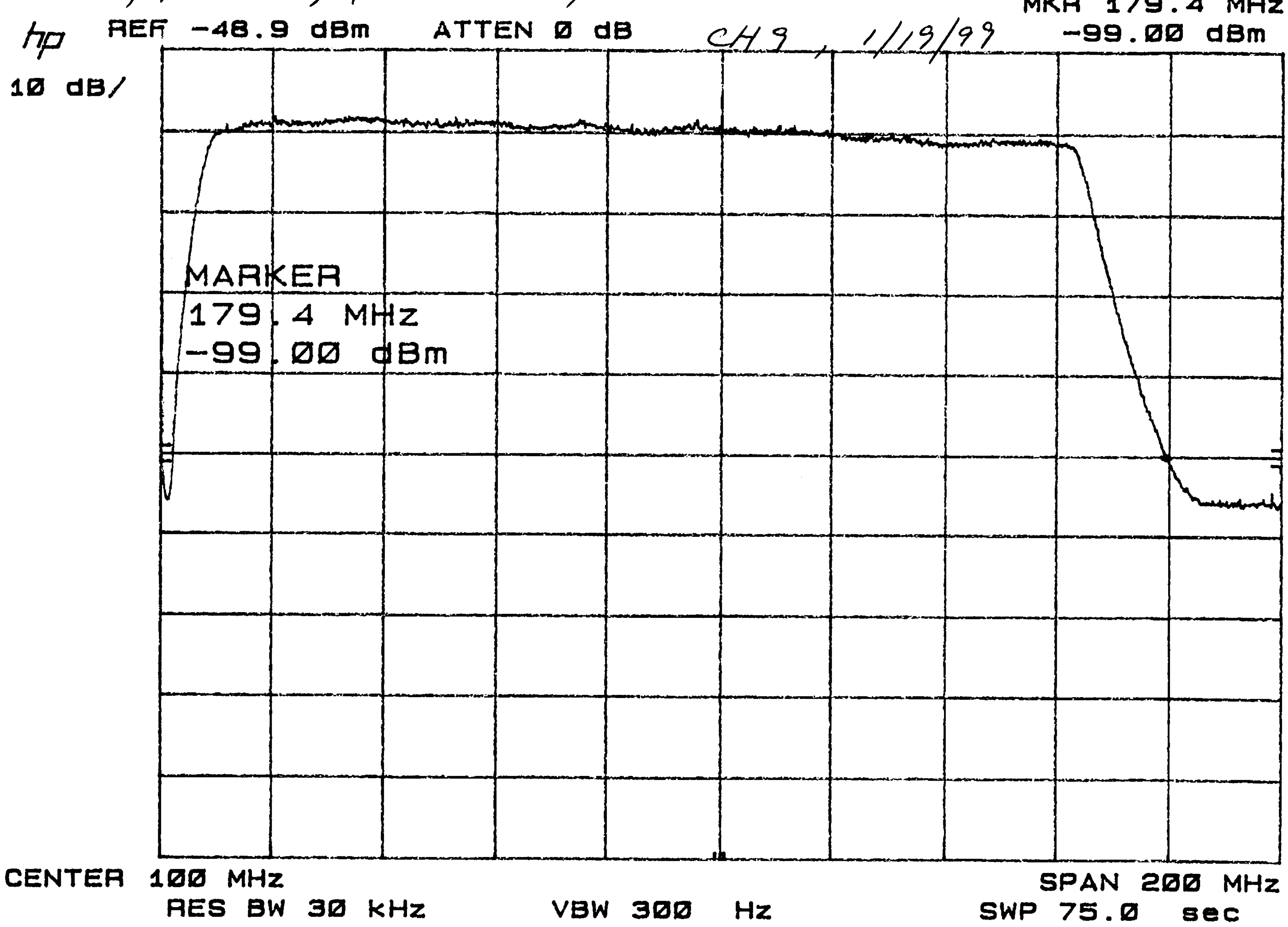
A1-1, S/N: F04, 3dB BPF, PLO #1 CH9, 1/19/99



FOR REFERENCE ONLY

A1-1, S/N: F04, 40 dB BPF, PLO #1

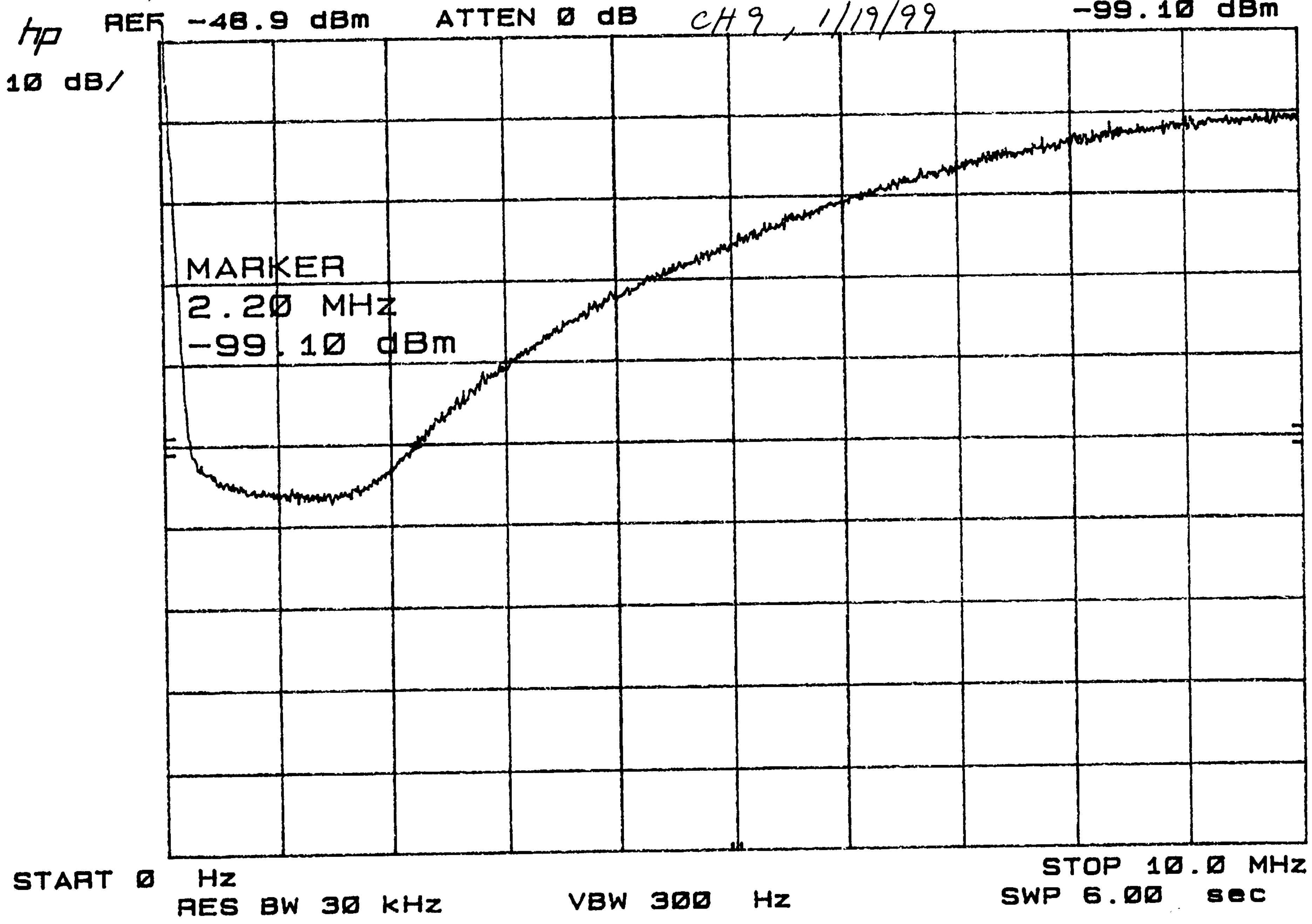
CH9, 1/19/99



FOR REFERENCE ONLY

A1-1, S/N: F04, STOP BAND, PLO #1

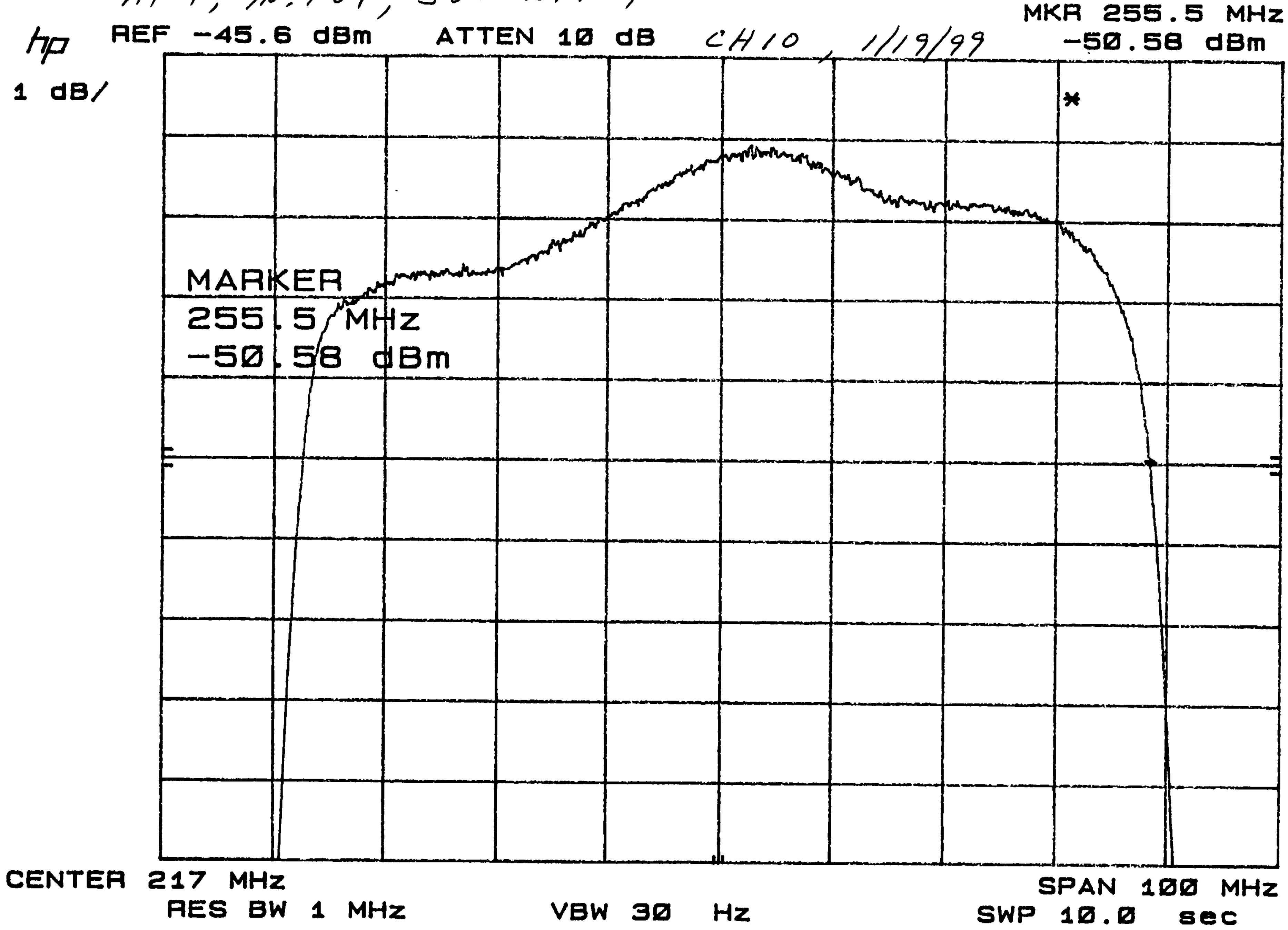
CH9, 1/19/99



FOR REFERENCE ONLY

A1-1, S/N: F04, 3 dB BPF, PLO #1

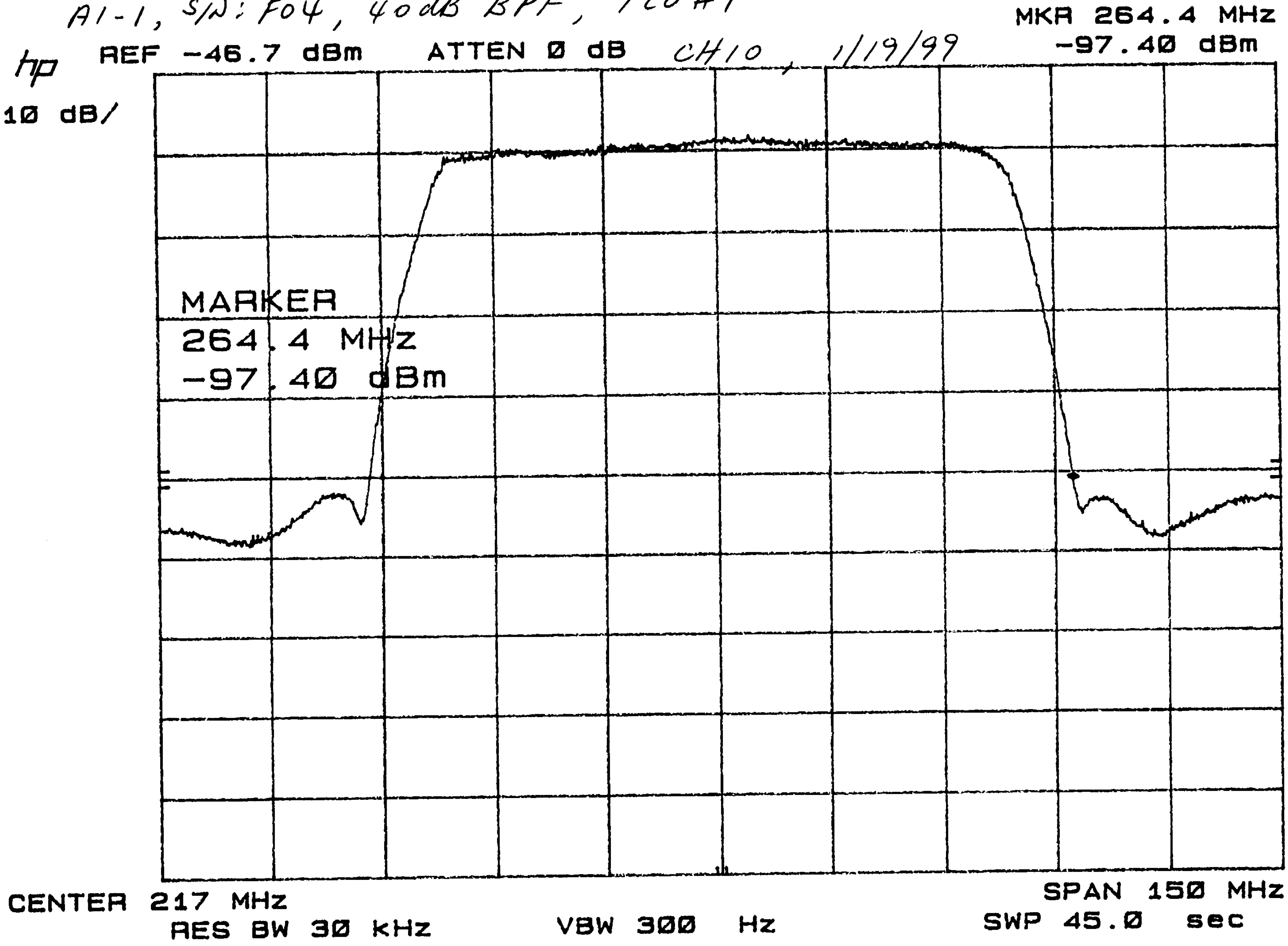
CH10, 1/19/99



FOR REFERENCE ONLY

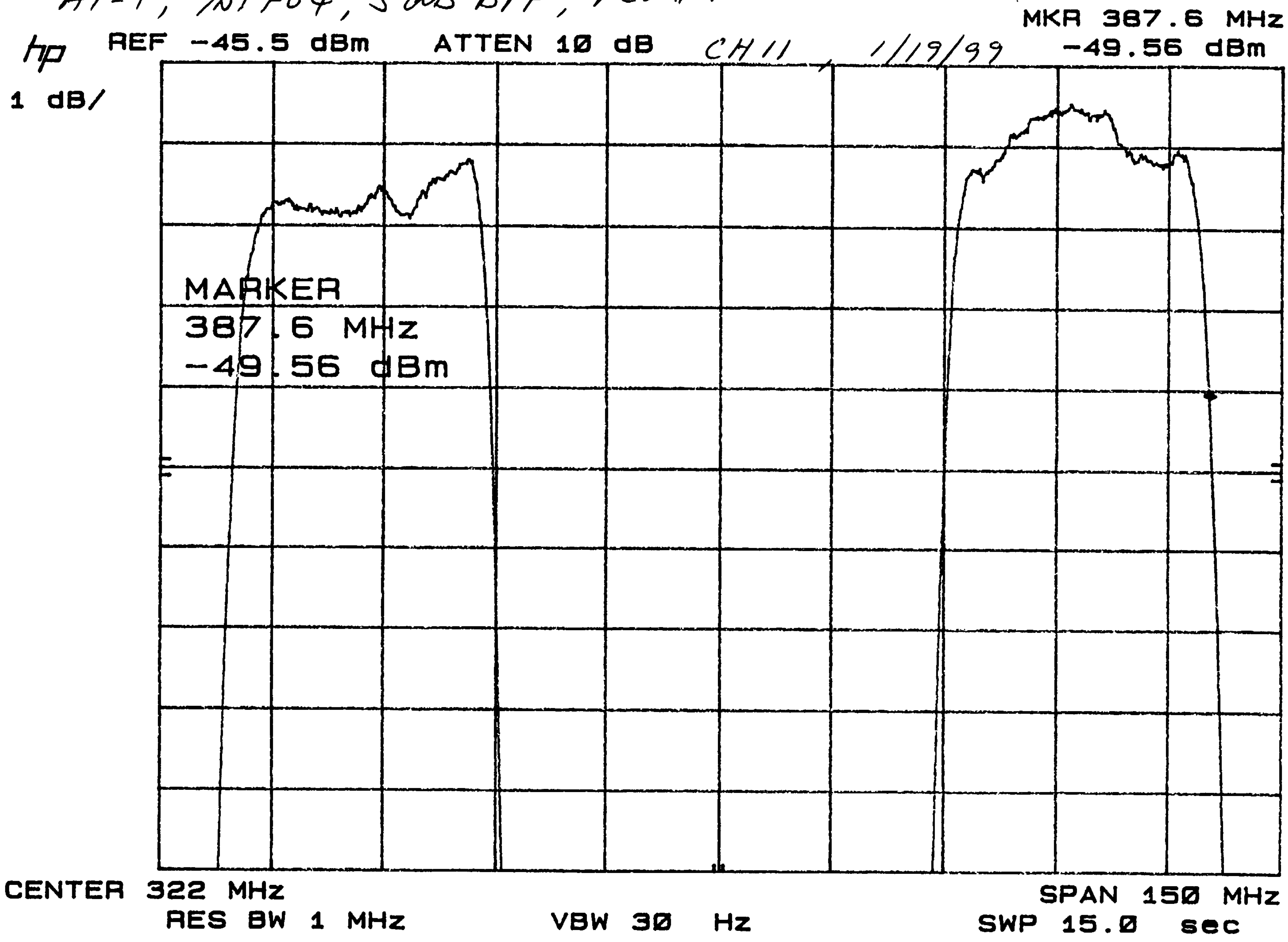
A1-1, S/N: F04, 40dB BPF, PLO #1

CH10, 1/19/99



FOR REFEREN(ONLY

A1-1, S/N1 F04, 3 dB BPF, PLO #1



CH11, 1/19/99

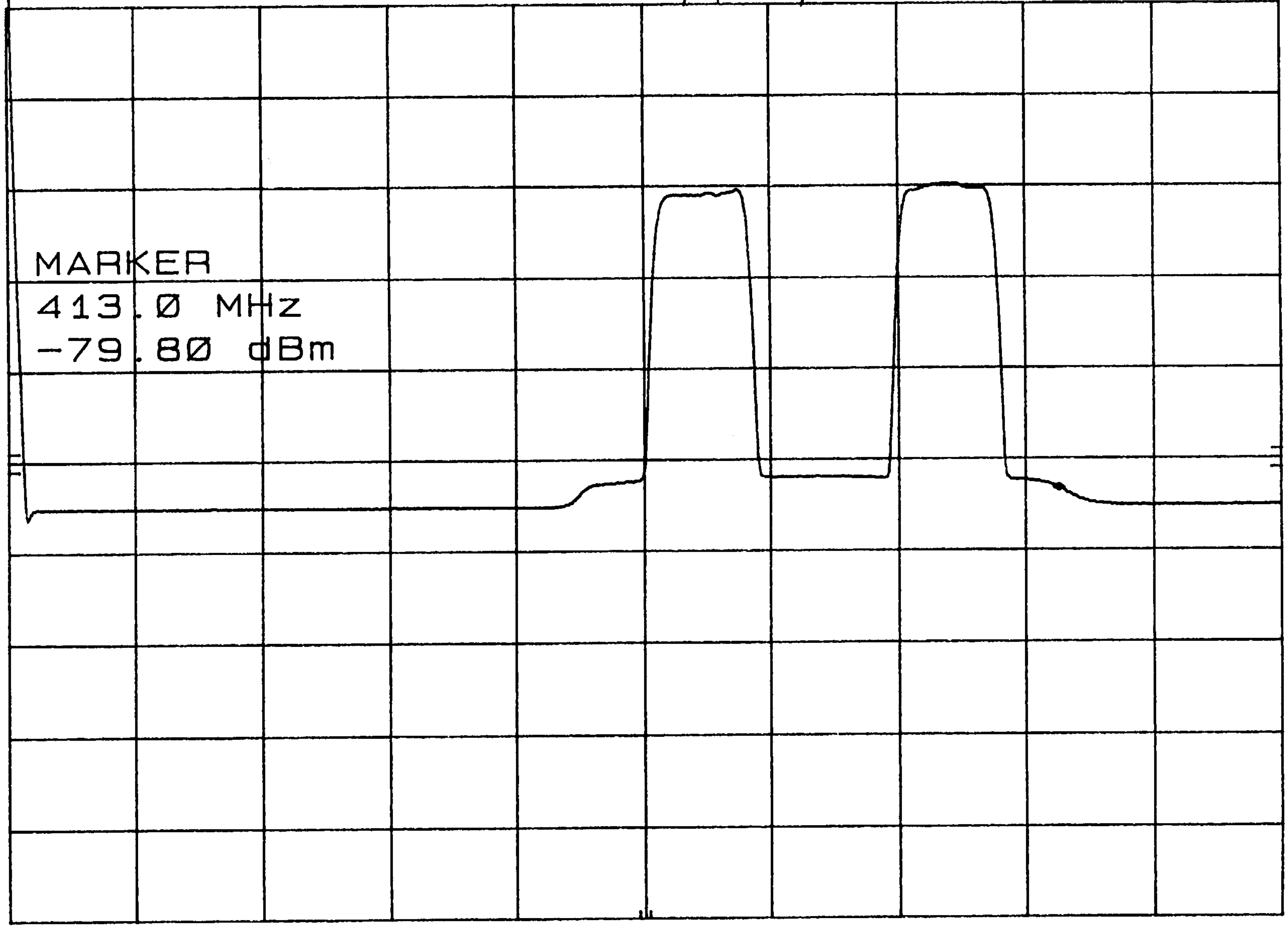
1/19/99 A1-1 S/N: F04

FOR REFERENCE ONLY

MKR 413.0 MHz
-79.80 dBm

hp REF -26.6 dBm ATTEN 10 dB Chan 11, 40 dB, PLO#1

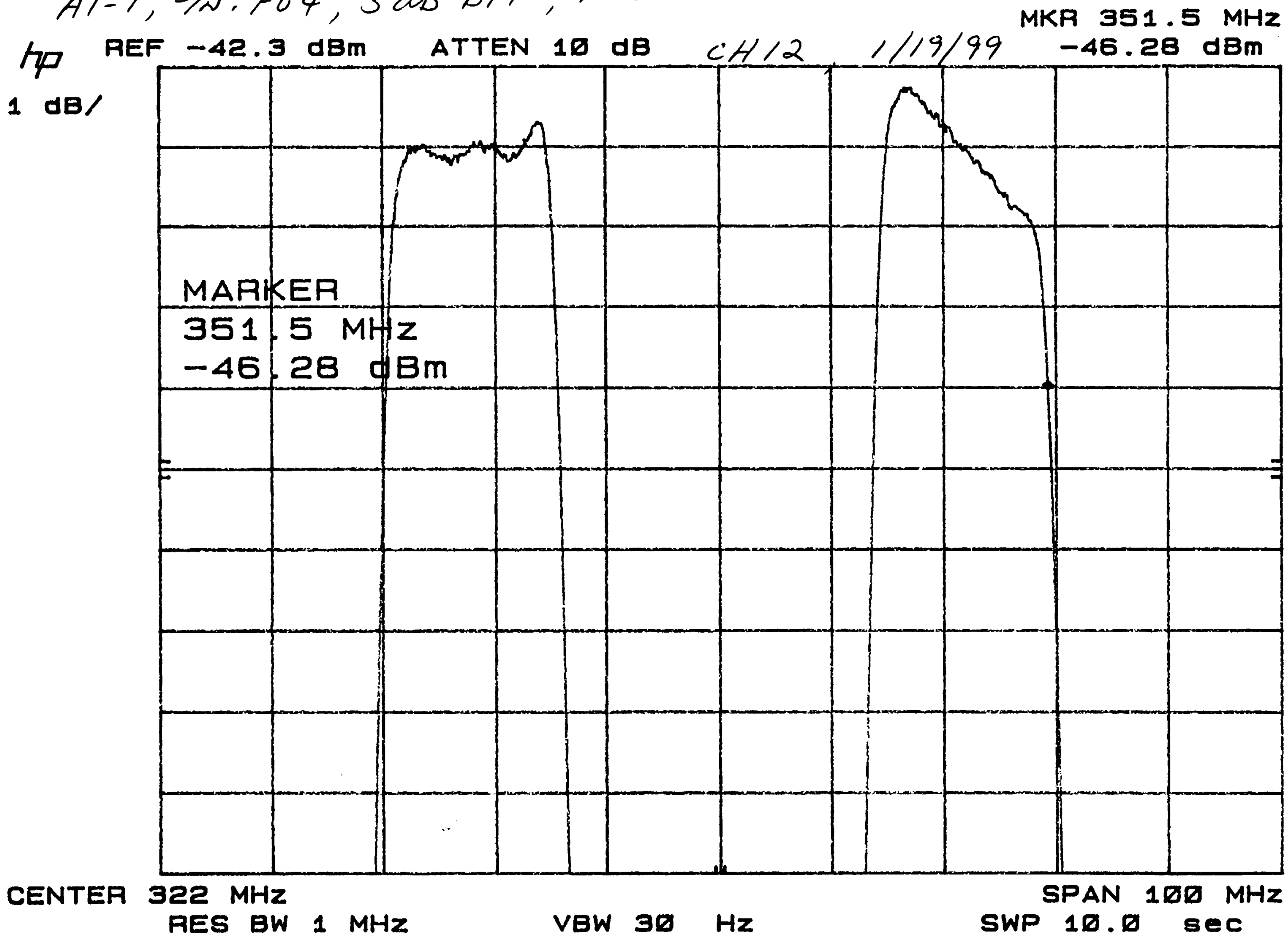
10 dB/



CENTER 250 MHz
RES BW 1 MHz VBW 30 Hz

SPAN 500 MHz
SWP 50.0 sec

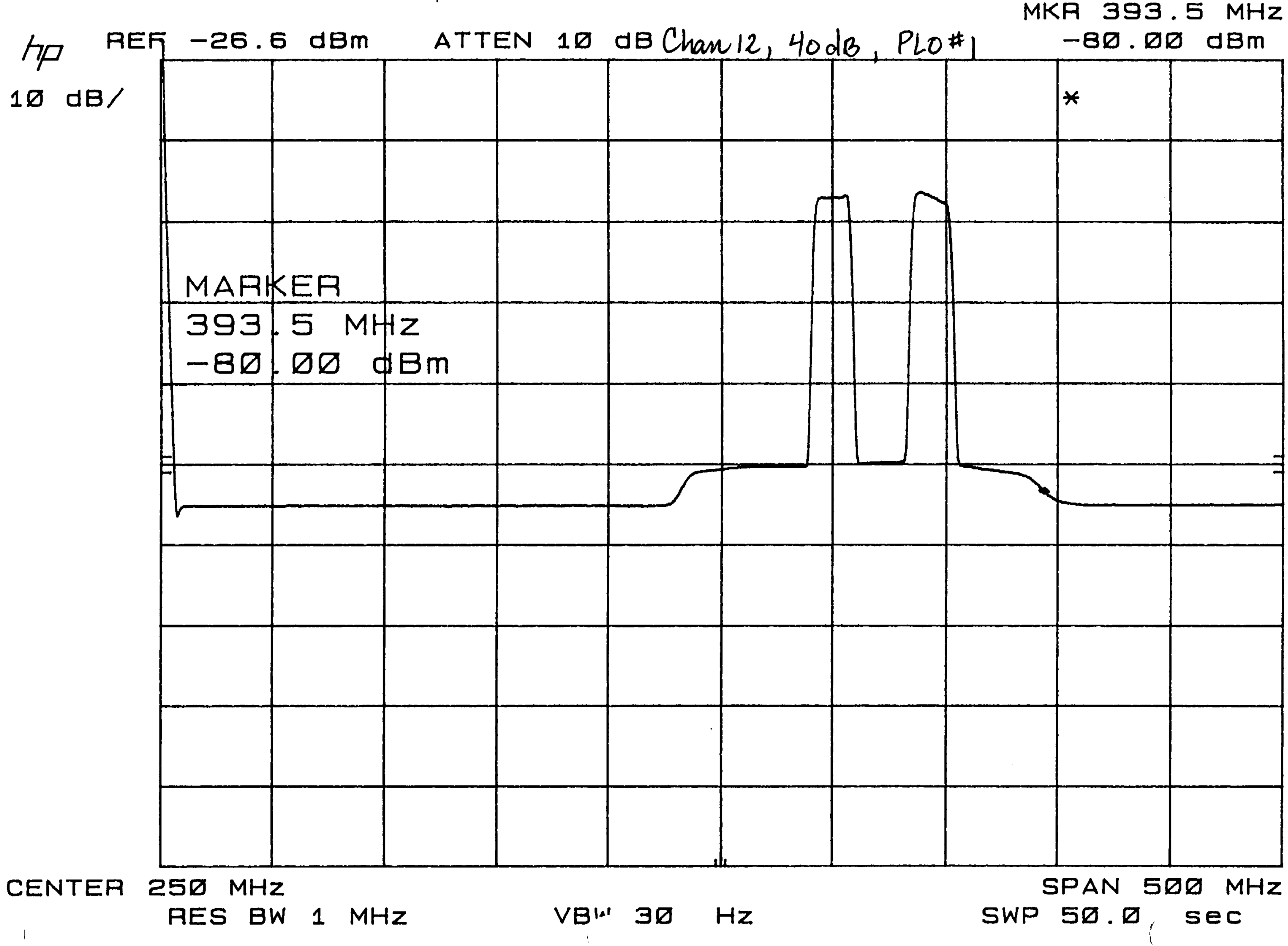
A1-1, S/N: F04, 3dB BPF, LO #1



CH12, 1/19/99

1/19/99 A1-1, S/N: F04

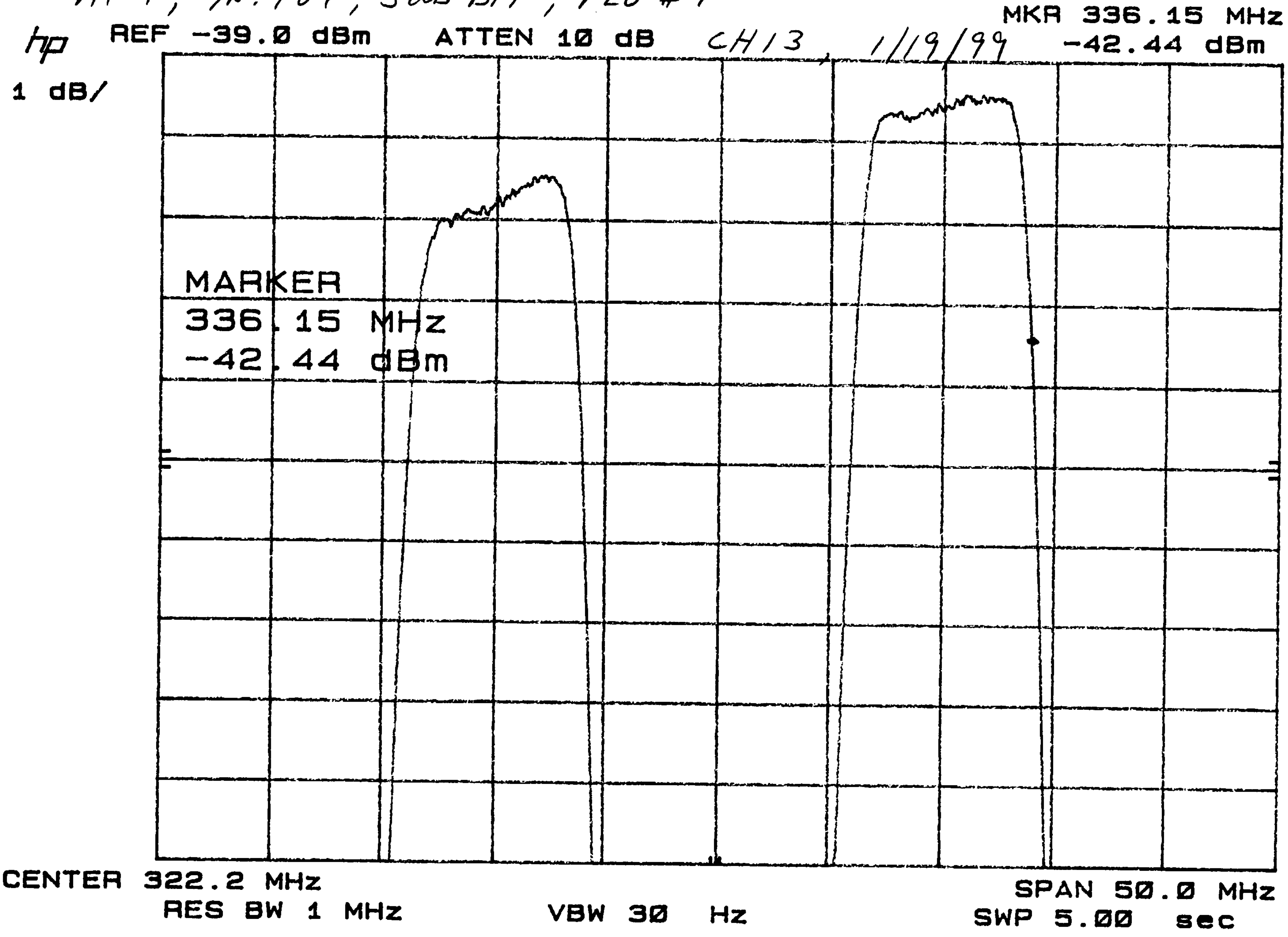
FOR REFERENCE ONL:



Chan 12, 40dB, PLO#1

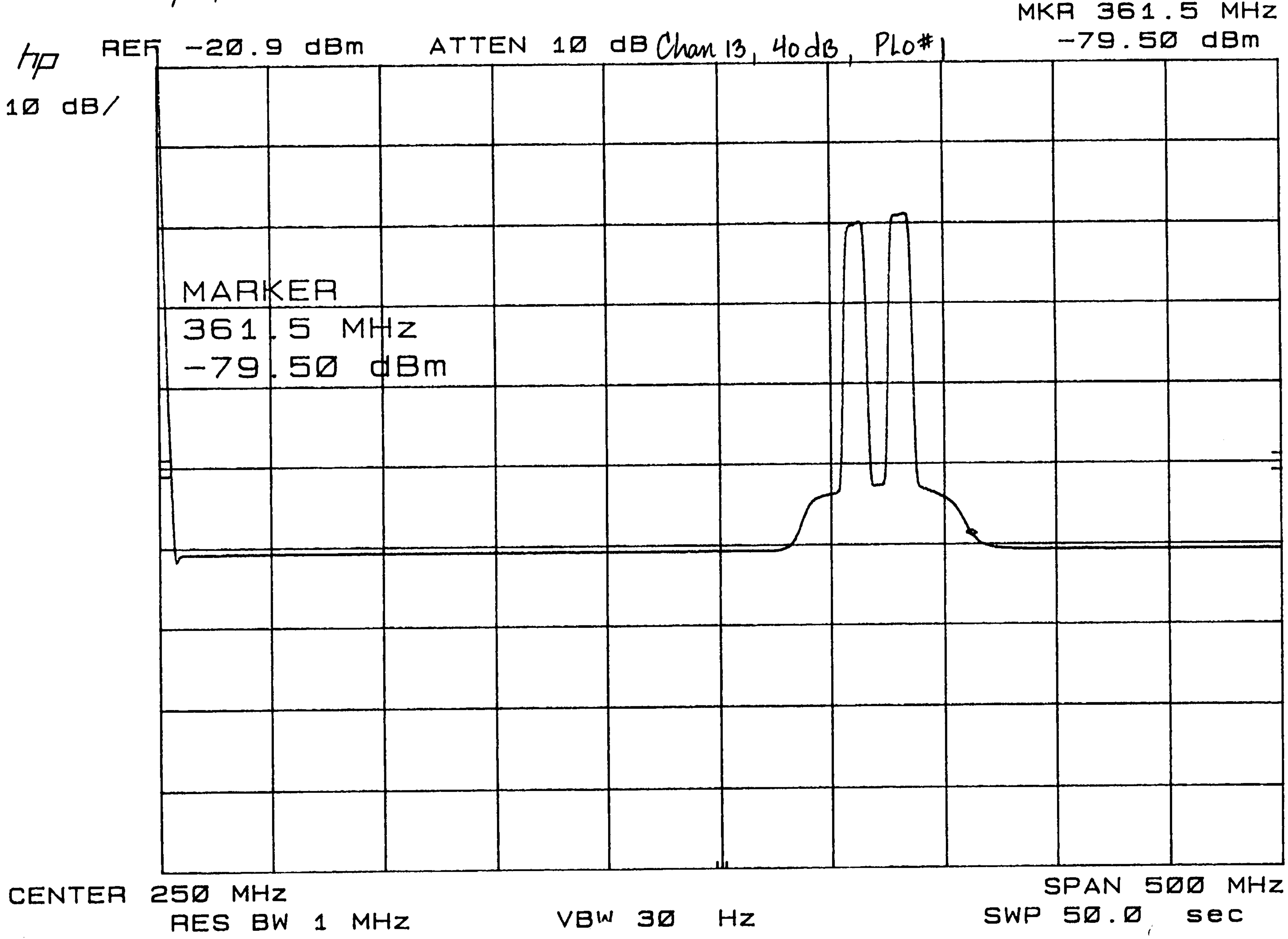
FOR REFERENCE ONLY

A1-1, S/N: F04, 3dB BPF, PLO # 1 CH13, 1/19/99



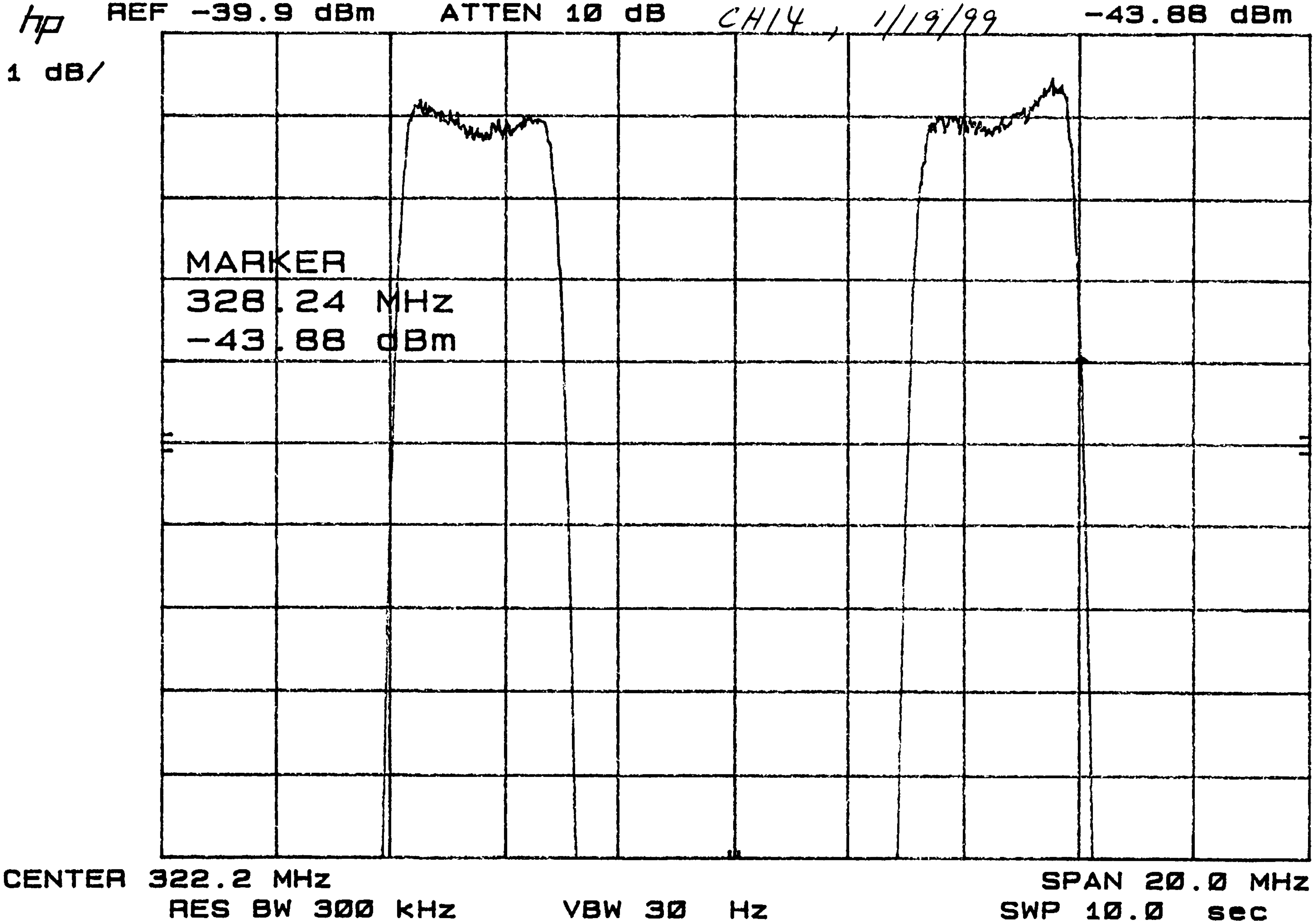
1/19/99 AI-1, S/N: F04

FOR REFERENCE ONLY



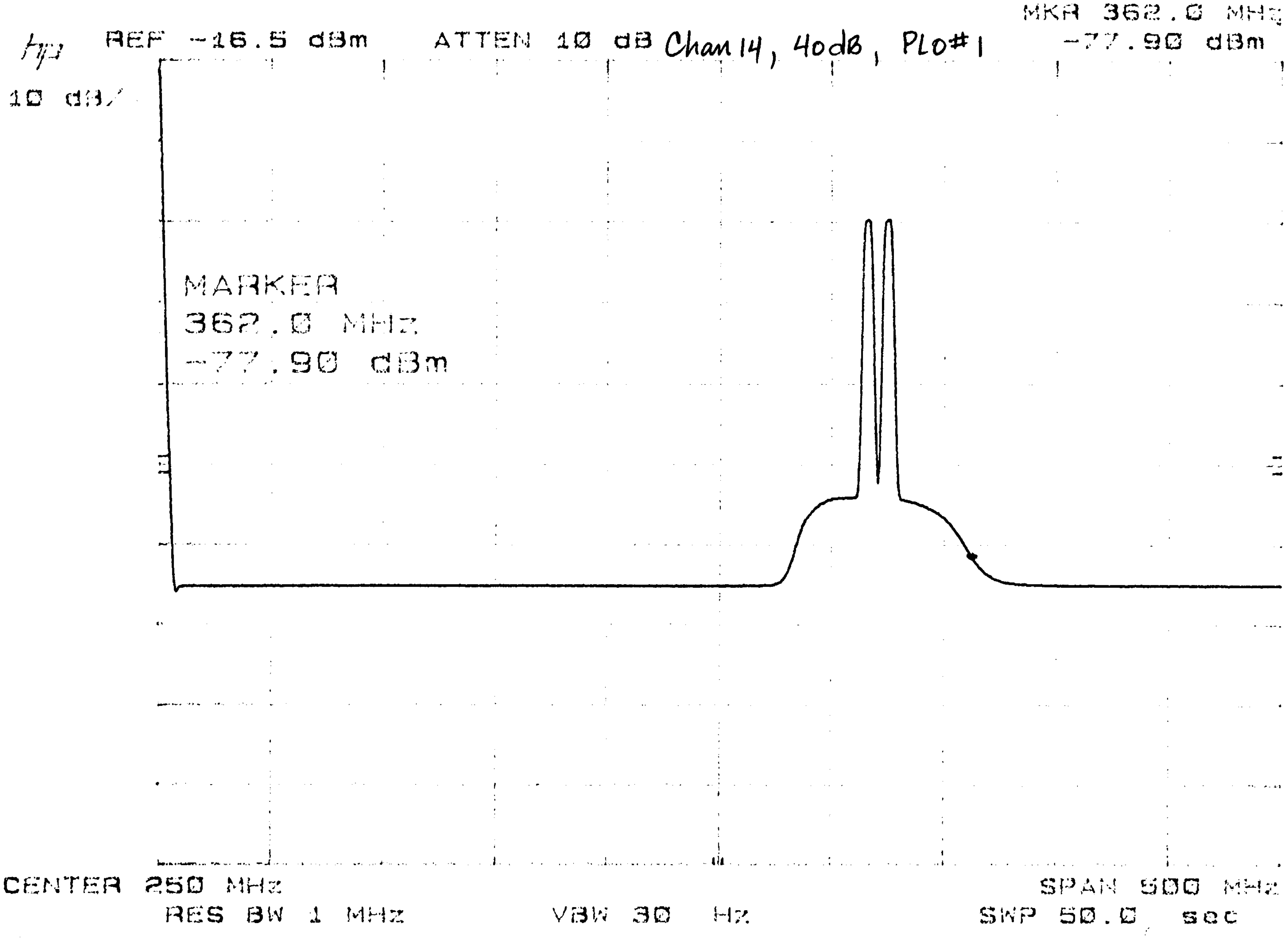
FOR REFEREN(ONLY

A1-1, S/N: F04, 3 dB BPF, PLO #1   CH14, 1/19/99



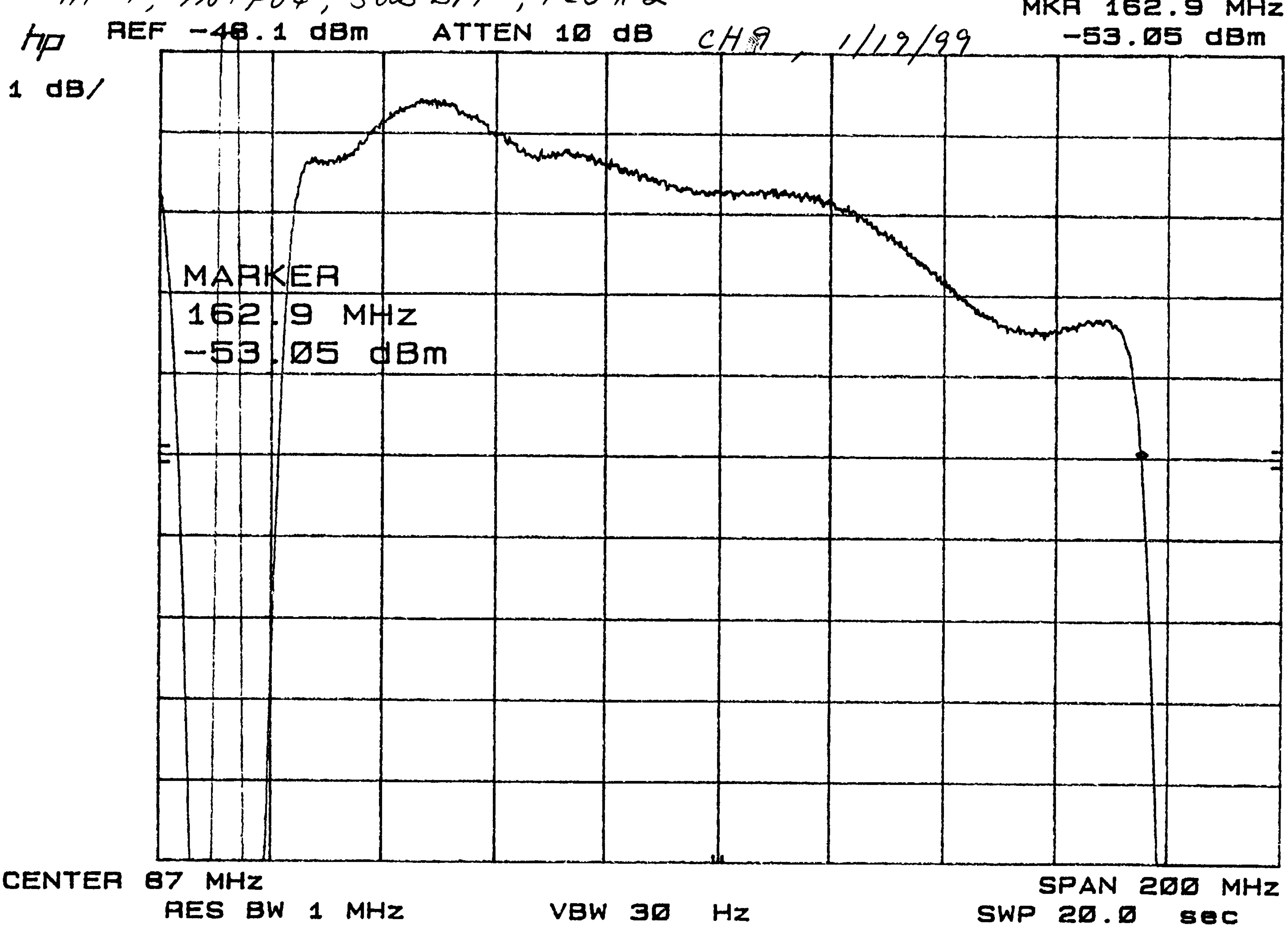
FOR REFERENCE ONLY

1/19/99 AI-1, S/N: F04



Chan 14, 40dB, PLO#1

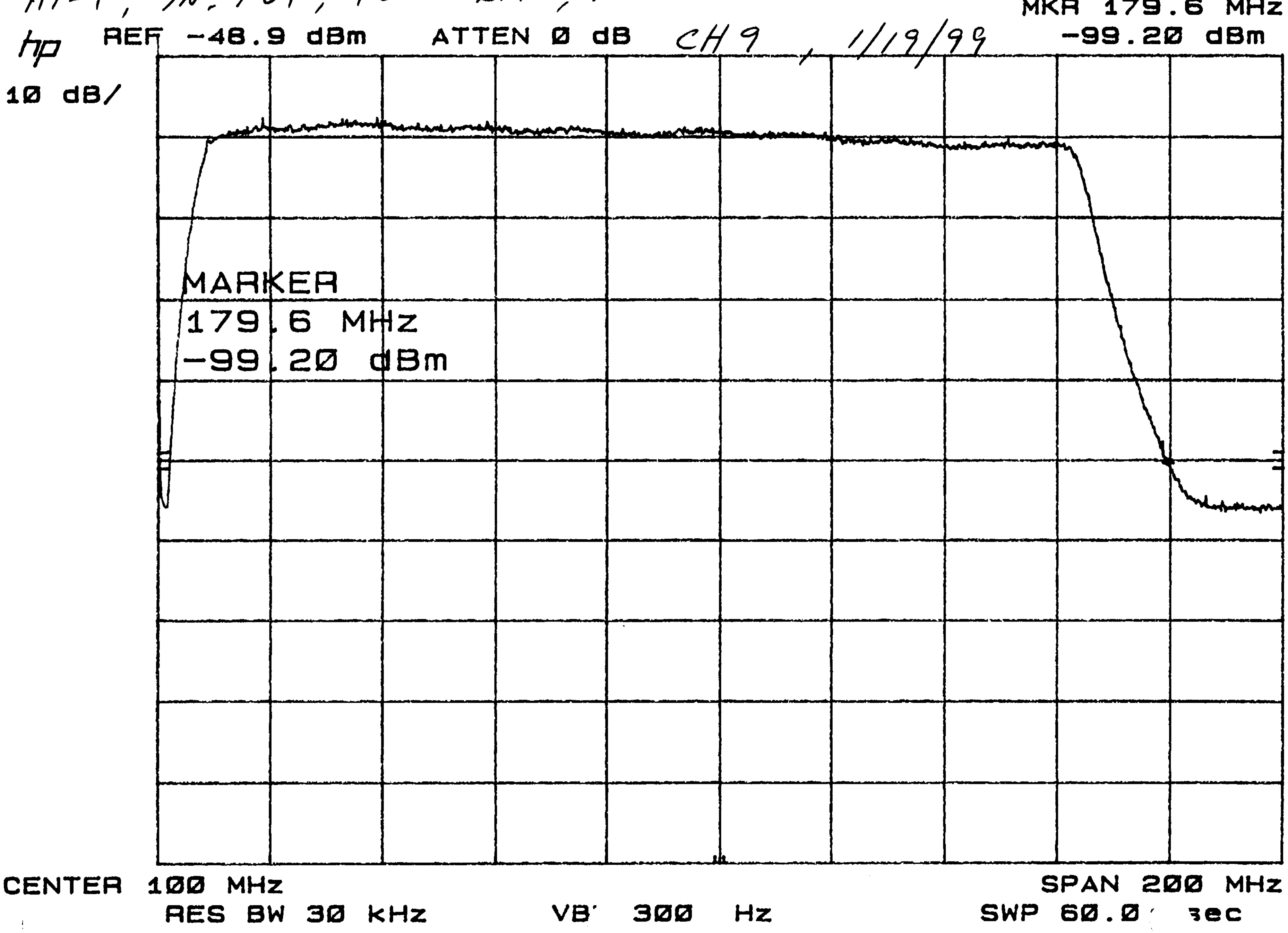
A1-1, S/N: F04, 3dB BPF, PLO #2 CH9, 1/12/99



FOR REFERENCE ONLY

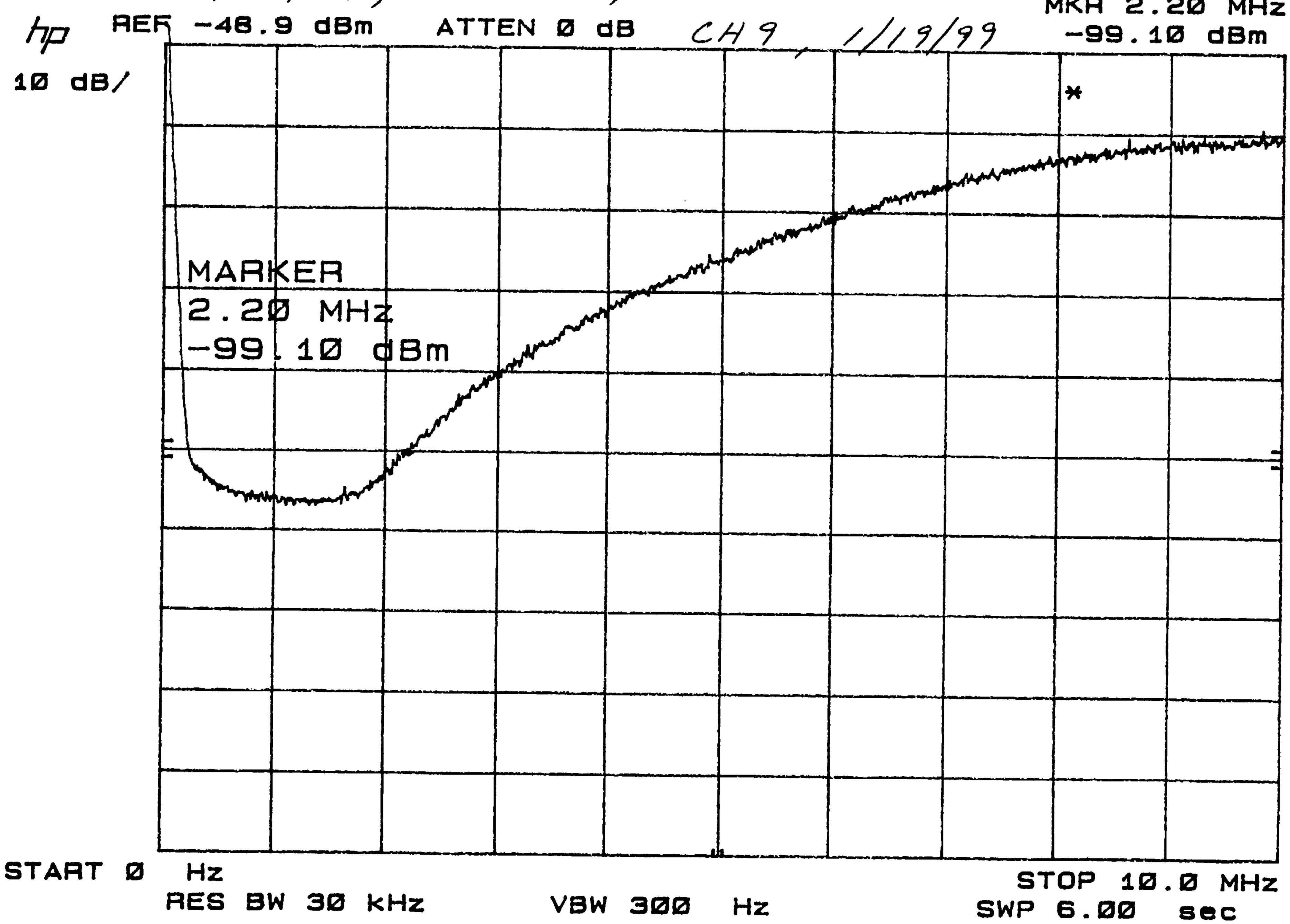
A1-1, S/N: F04, 40dB BPF, PLO #2

CH9, 1/19/99



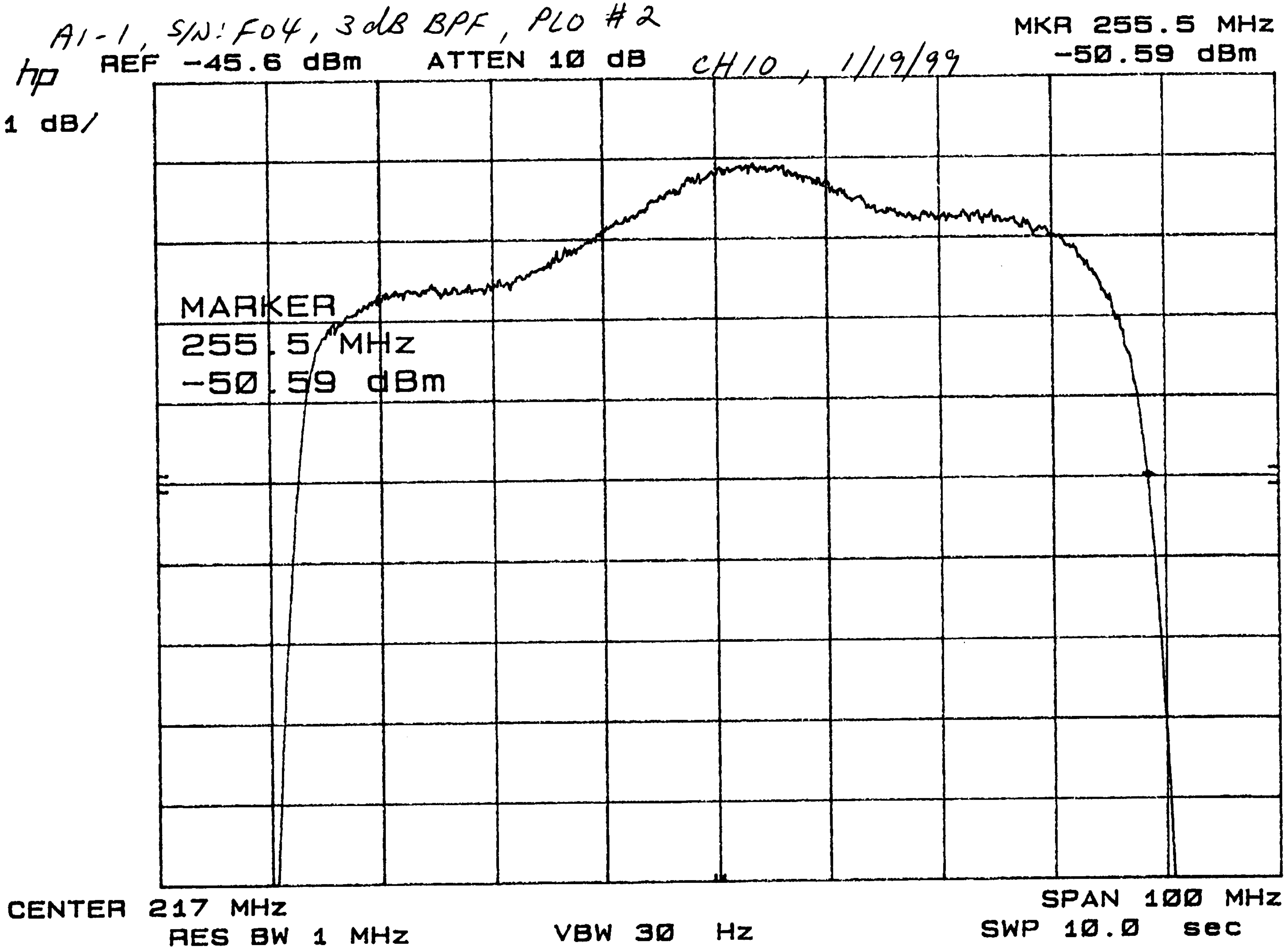
FOR REFERENCE ONLY

A1-1, S/N: F04, STOP BAND, PLO #2



CH9, 1/19/99

FOR REFERENCE ONLY



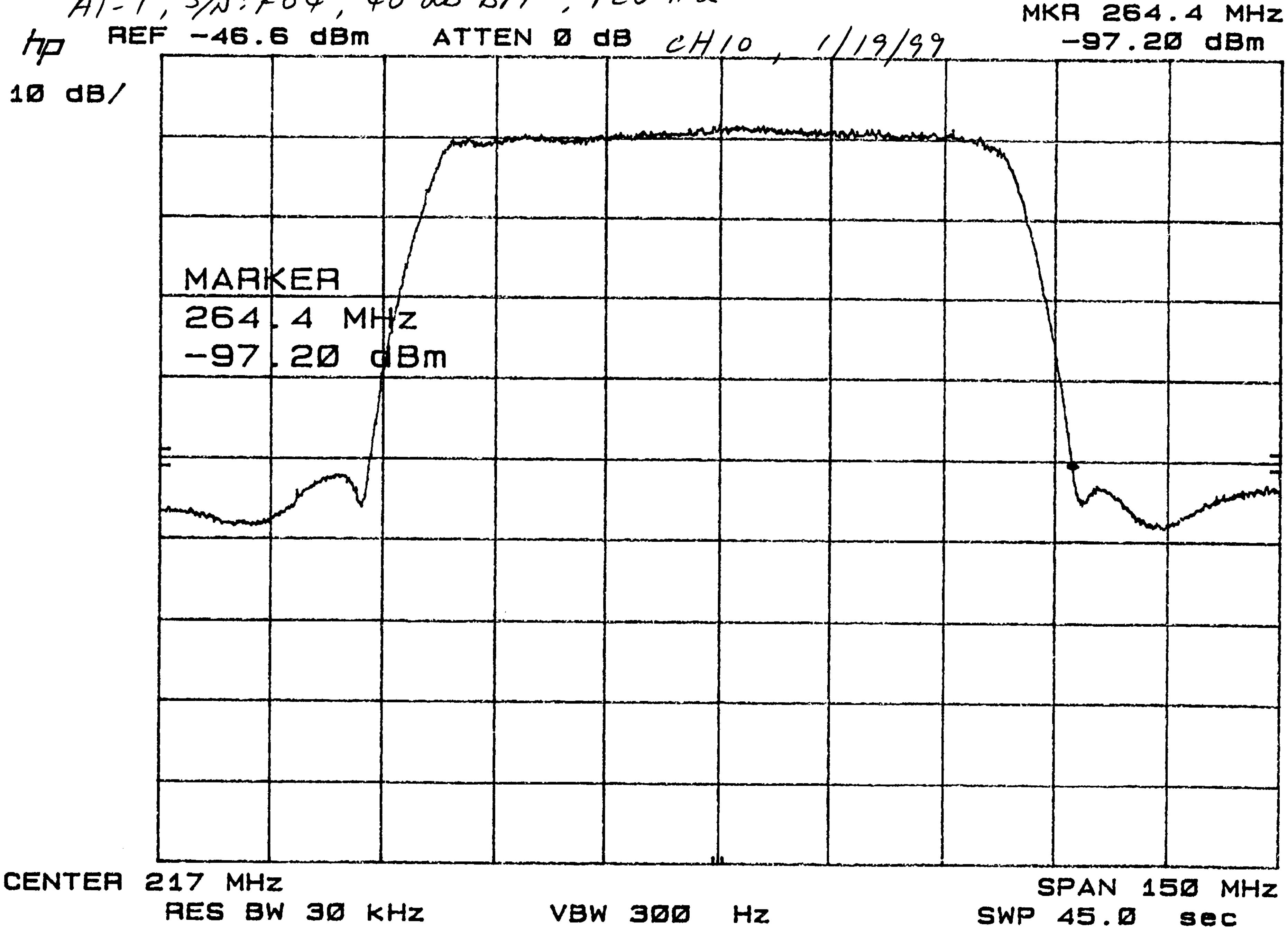
A1-1, S/N: F04, 3dB BPF, PLO #2

CH10, 1/19/99

FOR REFERENCE ONLY

A1-1, S/N: F04, 40 dB BPF, PLO #2

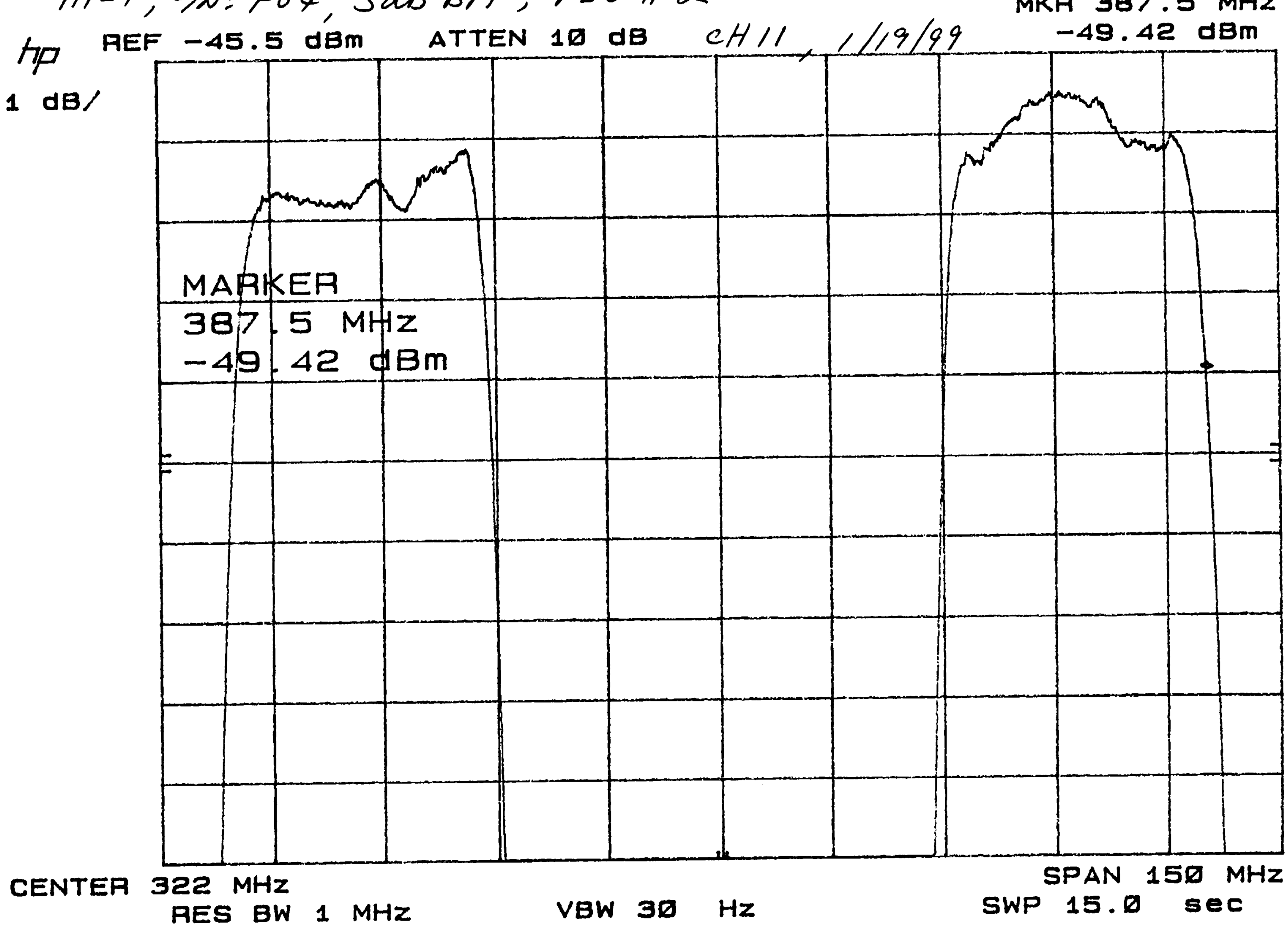
CH10, 1/19/99



FOR REFERENCE ONLY

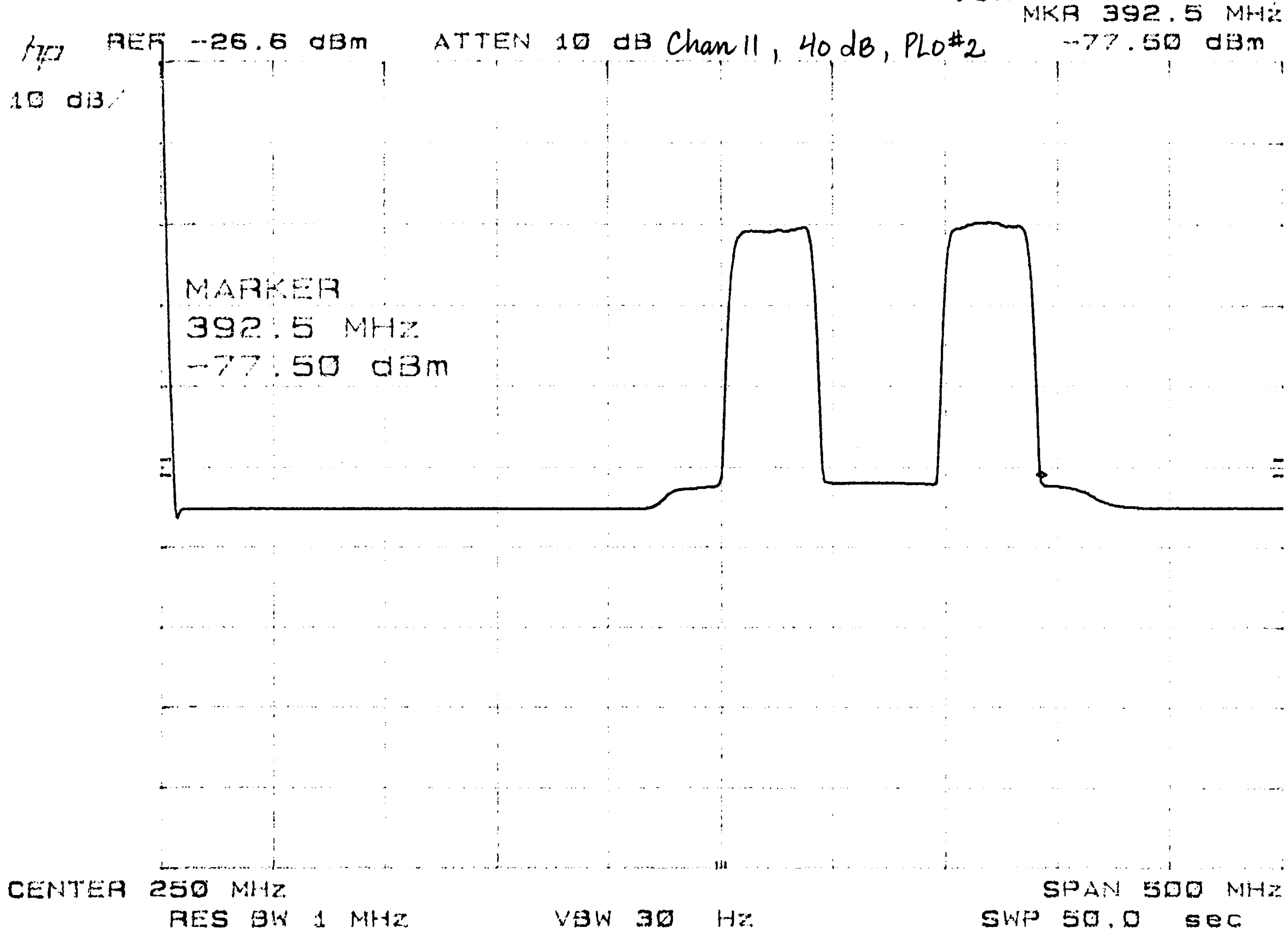
A1-1, S/N: F04, 3dB BPF, PLO #2

cH11, 1/19/99



1/19/99 A1-1, S/N: F04

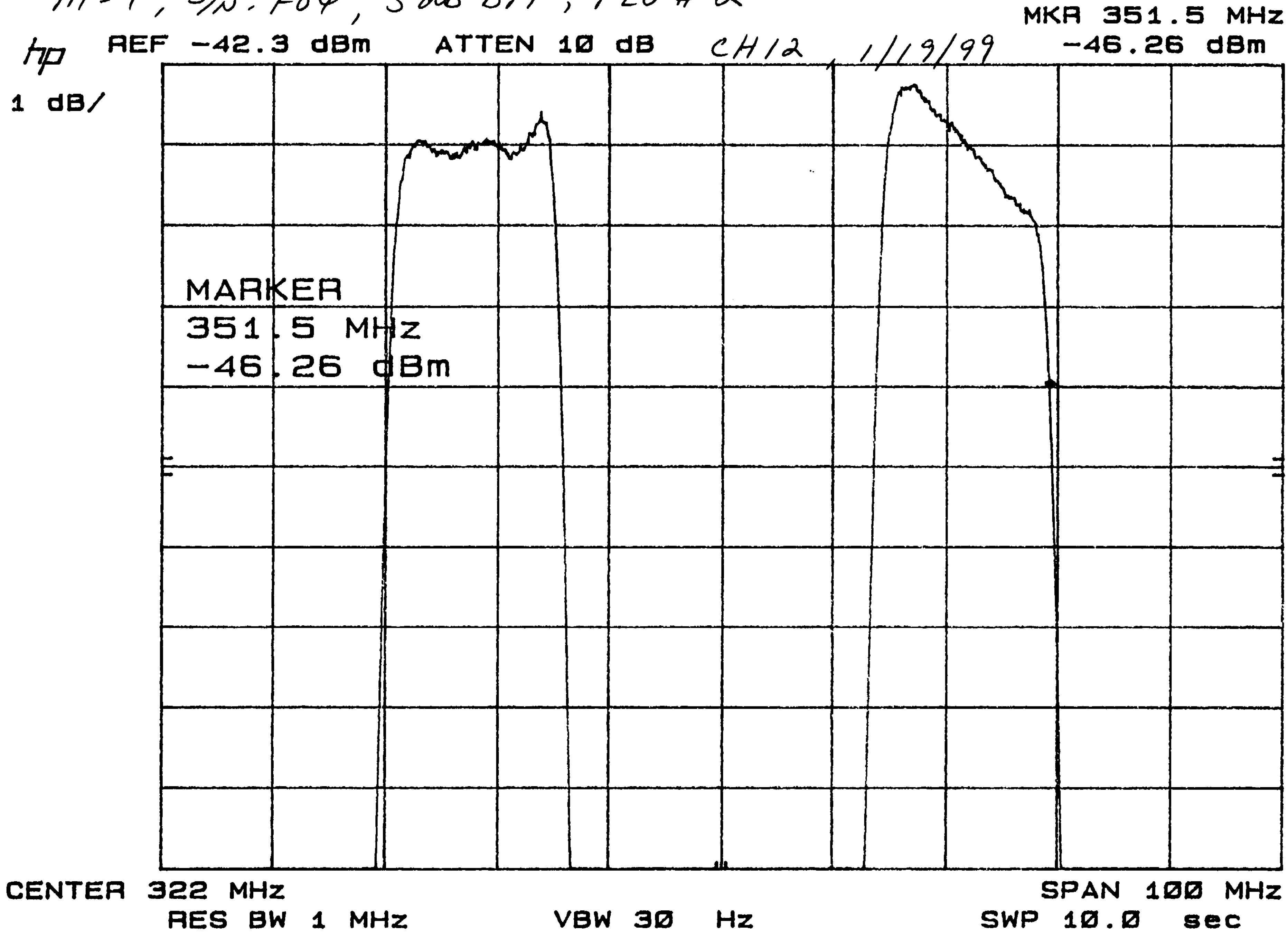
FOR REFERENCE ONLY



FOR REFERENCE ONLY

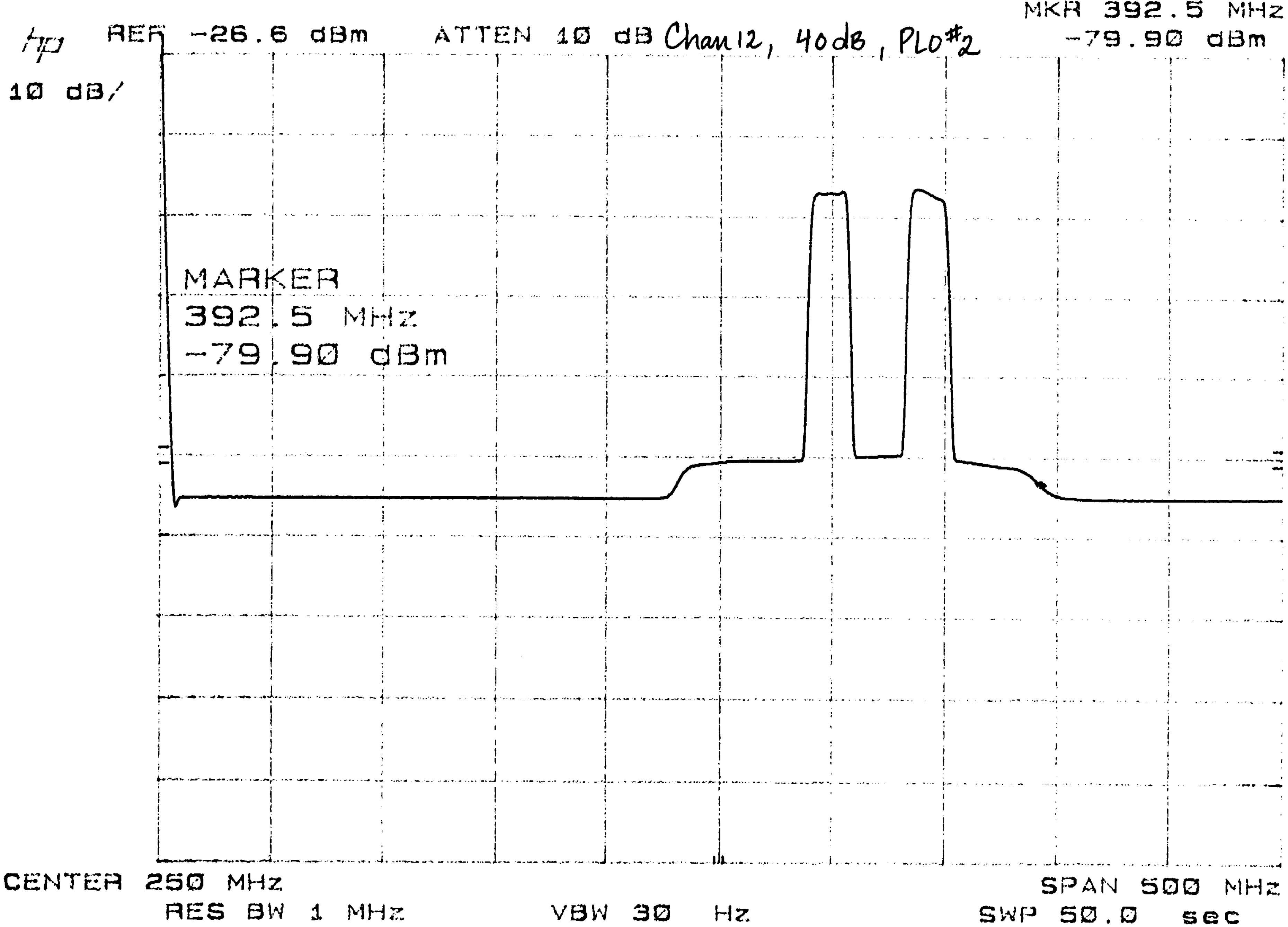
A1-1, S/N: F04, 3 dB BPF, PLO # 2

CH12, 1/19/99



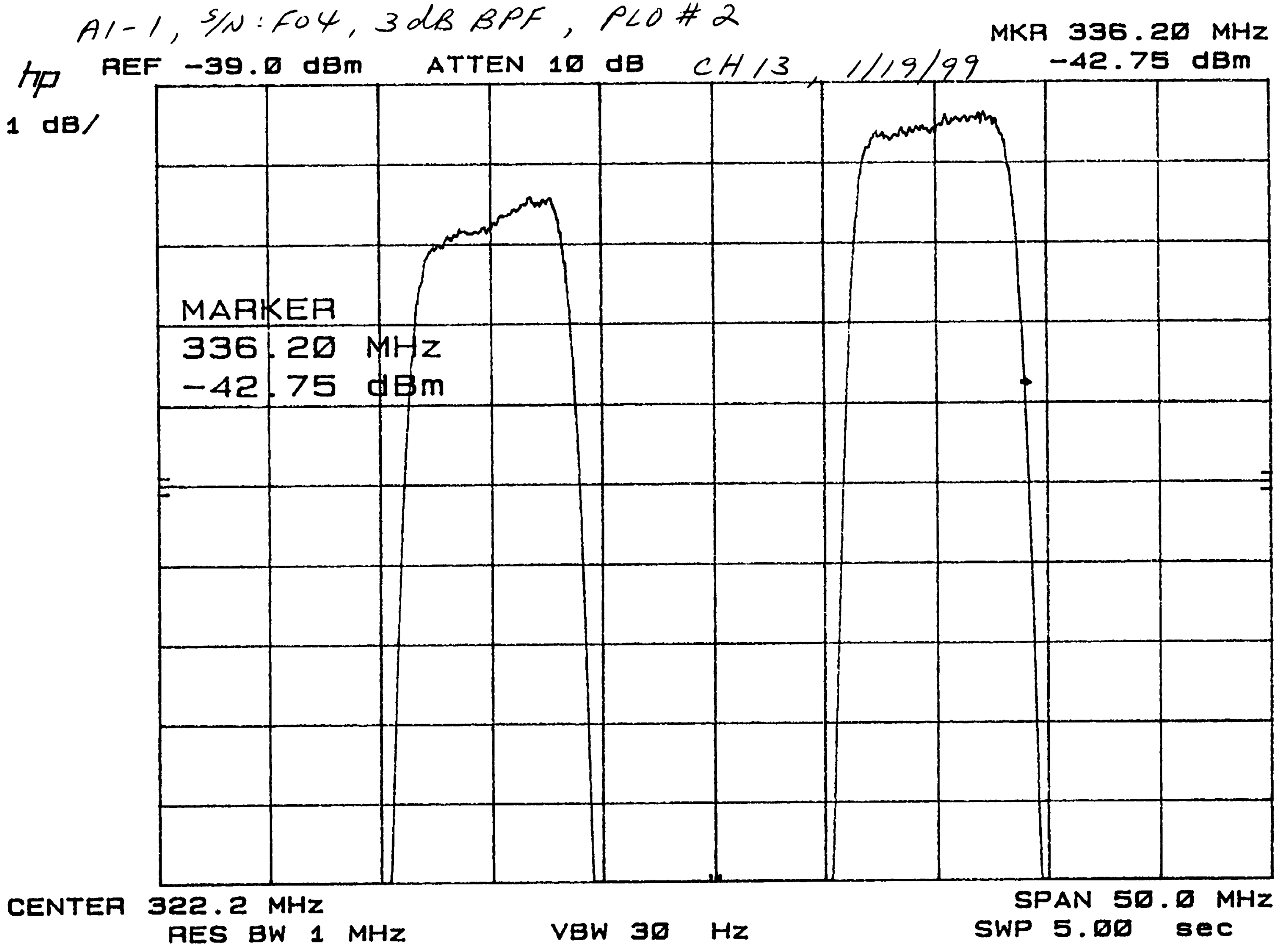
1/19/99 A1-1, S/N: F04

FOR REFERENCE ONLY



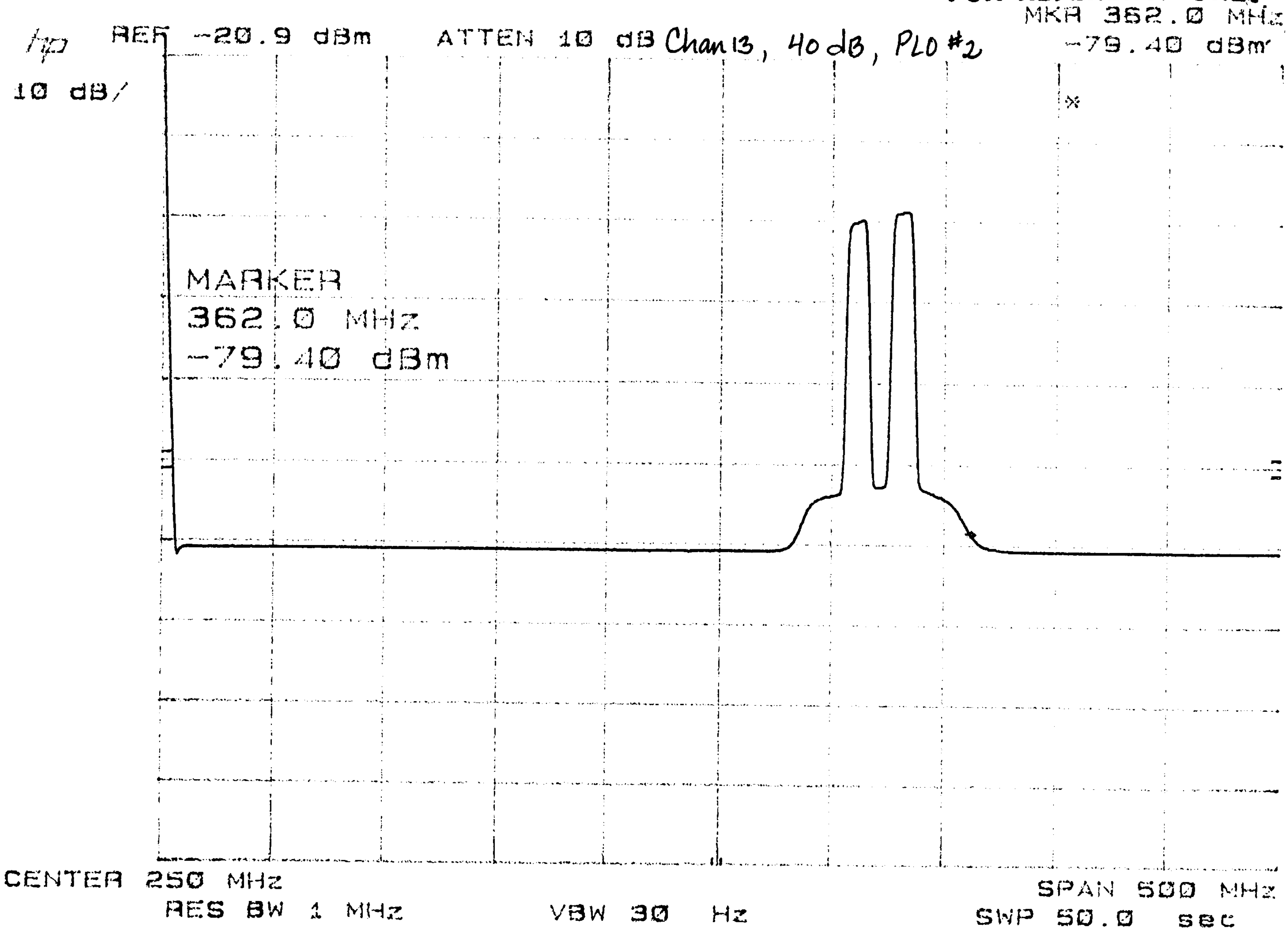
Chan12, 40dB, PLO#2

FOR REFERENCE ONLY


A1-1, S/N: F04, 3dB BPF, PLO #2 CH13, 1/19/99

1/19/99 AI-1, S/N: F04

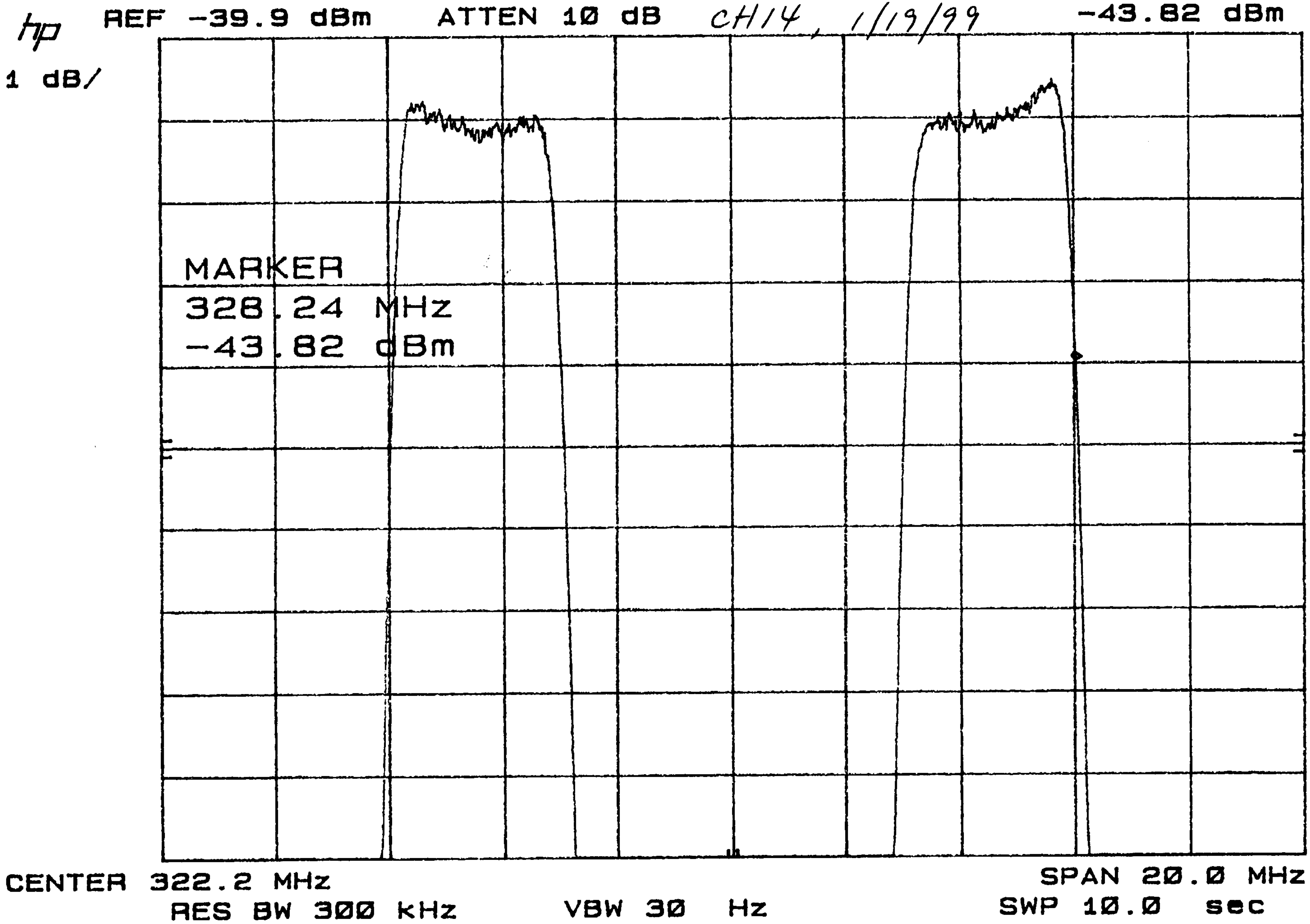
FOR REFERENCE ONLY



Chan13, 40dB, PLO #2

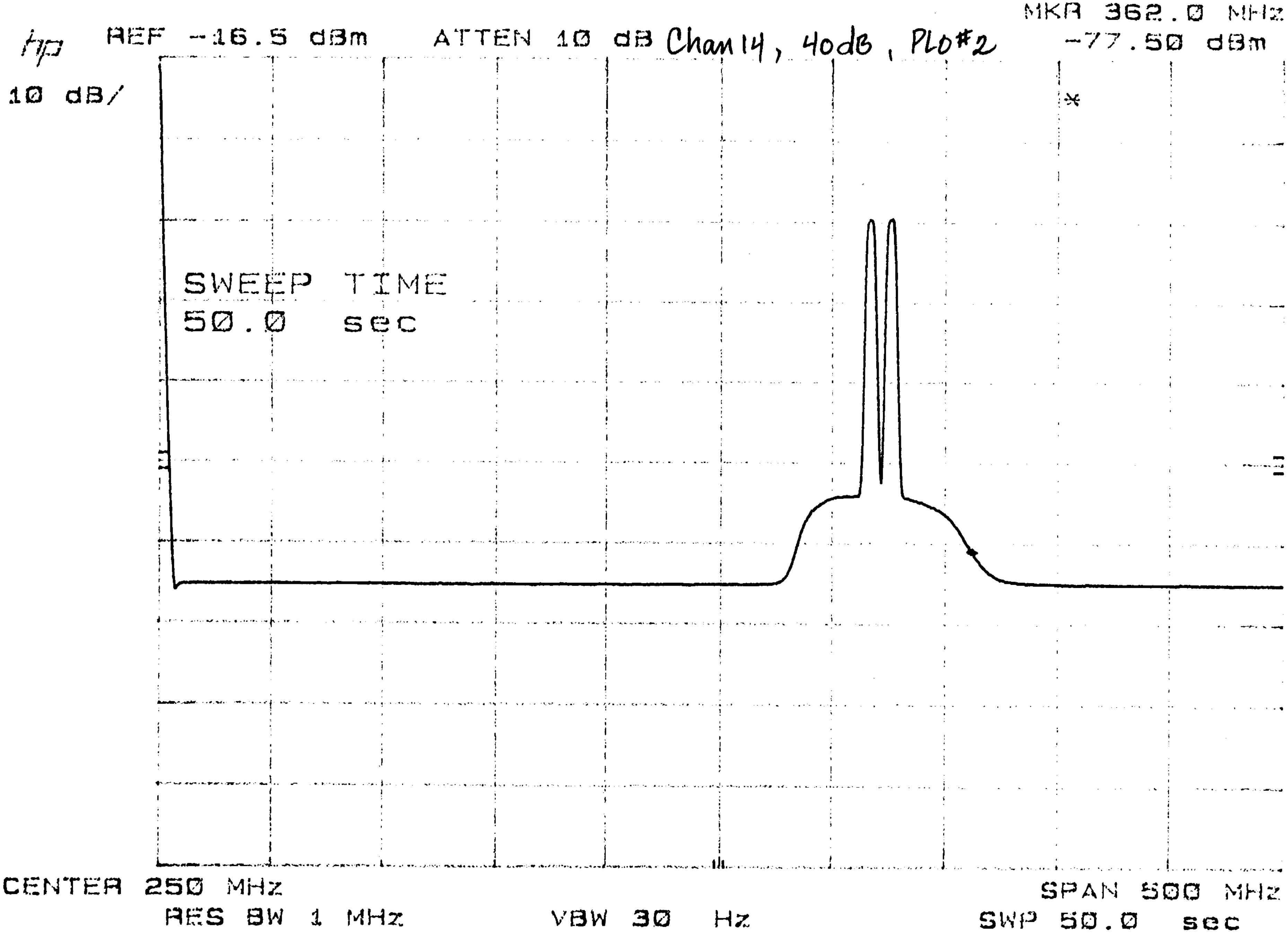
FOR REFERENCE ONLY

A1-1, S/N: F04, 3dB BPF, PLO # 2 CH14, 1/19/99



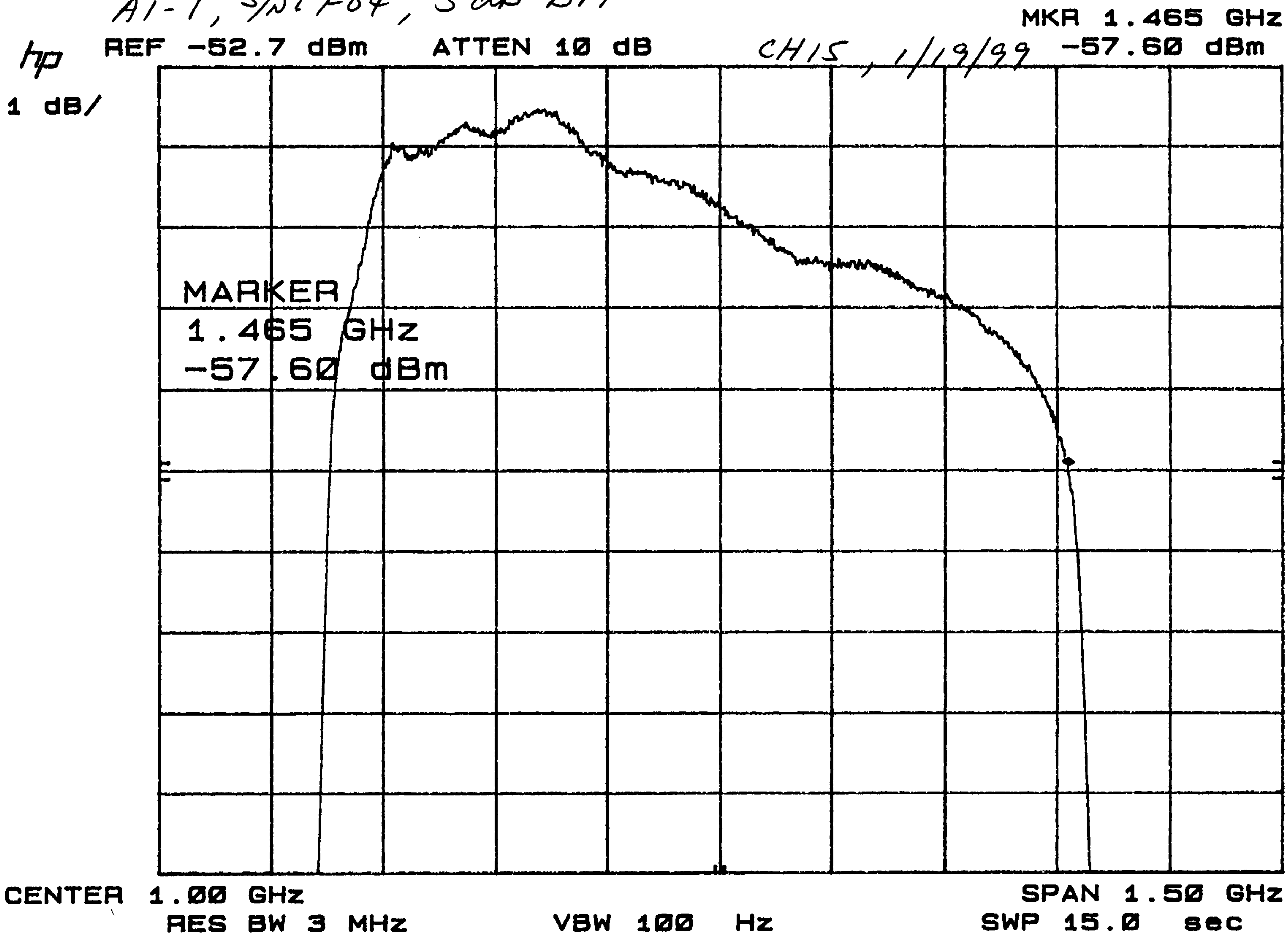
1/19/99 A1-1, S/N: F04

FOR REFERENCE ONLY



Chan14, 40dB, PLo#2

FOR REFERENCE ONLY



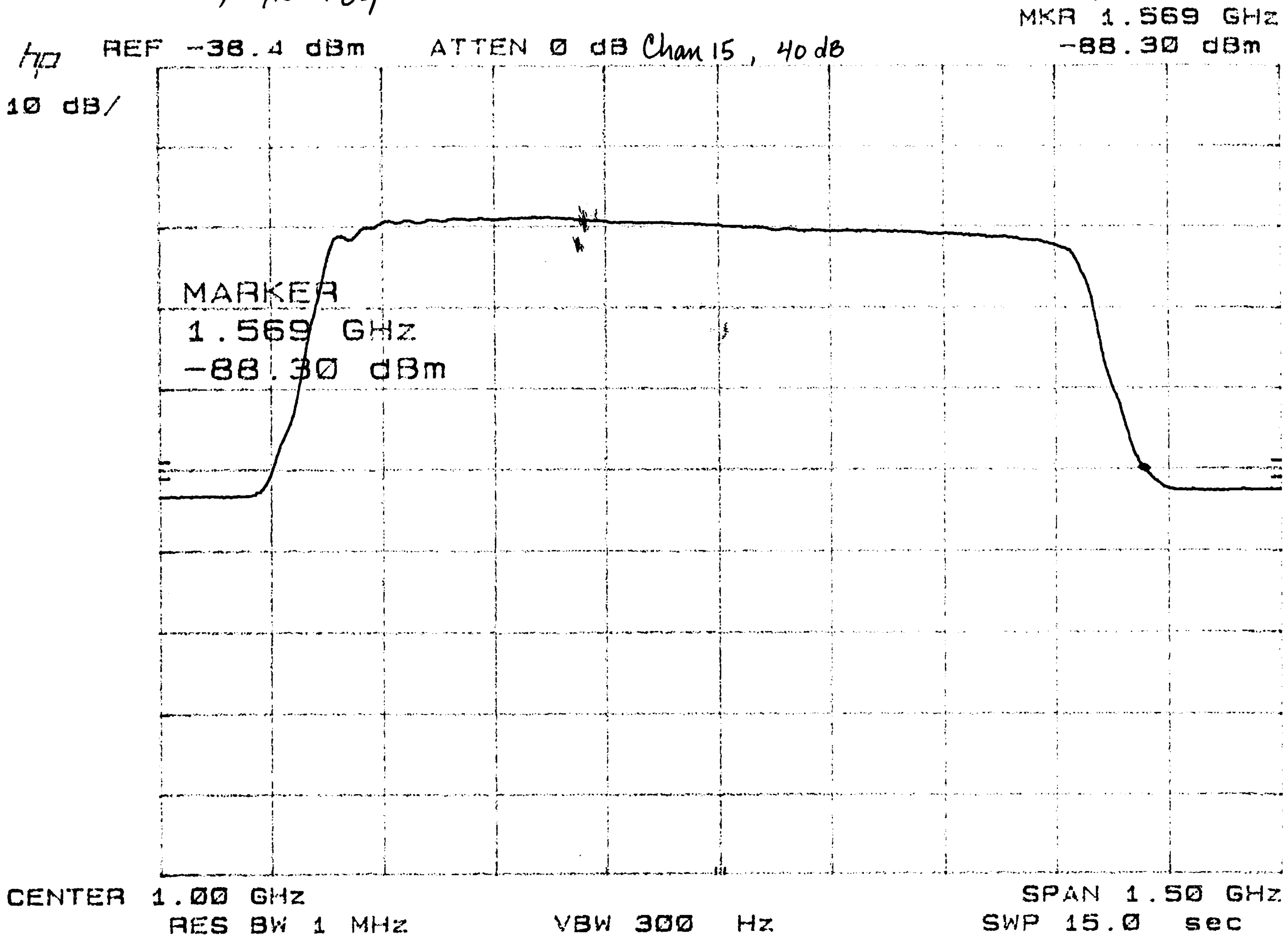
A1-1, S/N: F04, 3 dB BPF

CH15, 1/19/99

FOR REFERENCE ONLY 1/19/99

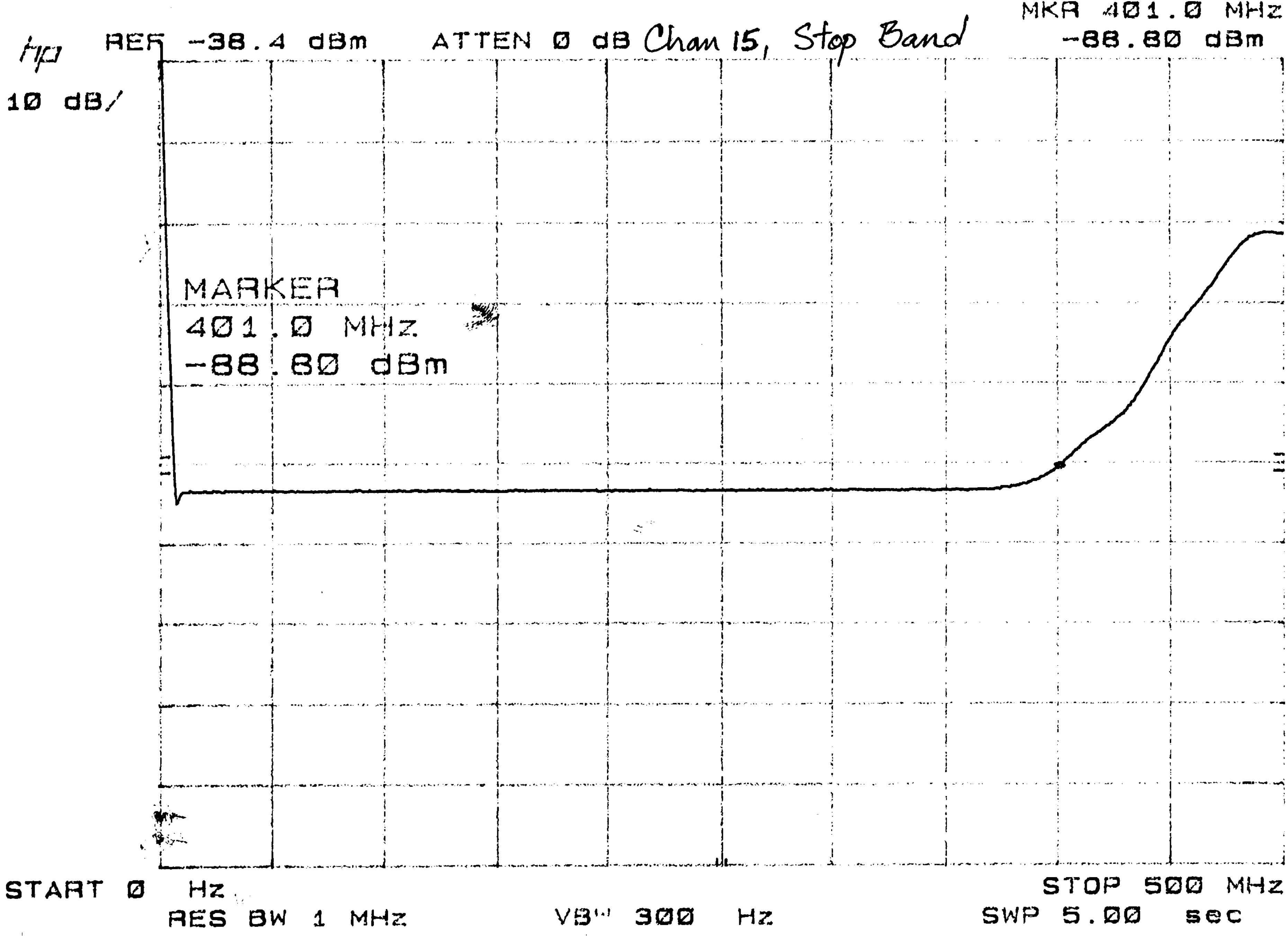
Al-1, S/N: F04

Chan 15, 40 dB



1/19/99 Al-1, S/N: F04

FOR REFERENCE ONLY



Chan 15, Stop Band

TEST DATA SHEET 10 (Sheet 1 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 29.0 °C

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V)		T_C(°C)	V_C (V)	
					Mean	Standard Deviation		Mean	Standard Deviation
LO	6	9.97	187.3	22.0	-.9822	.000197	-194.0	-.7213	.000180
				22.0	-.9817	.000185	-194.0	-.7214	.000150
				22.0	-.9813	.000193	-194.0	-.7209	.000131
				22.0	-.9811	.000203	-194.0	-.7209	.000171
				22.0	-.9809	.000192	-194.0	-.7211	.000151
				22.0	-.9808	.000169	-194.0	-.7212	.000152
				22.0	-.9808	.000184	-194.0	-.7206	.000170
				22.0	-.9807	.000209	-194.0	-.7209	.000157
				22.0	-.9804	.000191	-194.0	-.7204	.000165
				22.0	-.9804	.000196	-194.0	-.7203	.000139
Mixer/ Amps	All	9.94	244.5						
IF Amps	All	7.94	268.1						

Part No.: 135642?-1

Serial No.: F04

Test Engineer: Y. Trinh

Quality Assurance: 7A 268 JAN 22 '99

Date: 1/19/99

TEST DATA SHEET 10 (Sheet 16 of 30)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 29.0 °C

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
6		4.45				0.076			
		4.46				0.052			
		4.45				0.069			
		4.46				0.036			
		4.46				0.068			
		4.47				0.034			
		4.46				0.049			
		4.46				0.096			
		4.46				0.065			
		4.46				0.075			
	5.15		4.46	Pass	.08		0.067	0.062	Pass

Pass = P, Fail = F

Part No.: 135429-1

Serial No.: F04

Test Engineer: Y. Trinh

Quality Assurance: TA 268 JAN 22 '99

Date: 1/19/99

FOR REFERENCE ONLY

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              AMSU-A TEST

A1-1, S/N: F04, CH6, NF & NPS DATA, TB=29 C, 1/19/99

SEQ TEMP_TEST TEST TEMP   VOLTAGE        STD_DEV        NF (dB)         NPS(K)
 1  WARM TEST  295.15   -.98217913     .00019718      ----------      ----------
 2  COLD TEST   79.15   -.72128743     .00018015      4.45026965       .07644458
 3  WARM TEST  295.15   -.98169856     .00018498      ----------      ----------
 4  COLD TEST   79.15   -.72138225     .00015006      4.45778072       .05175531
 5  WARM TEST  295.15   -.98125995     .00019313      ----------      ----------
 6  COLD TEST   79.15   -.72087939     .00013113      4.45474891       .06940050
 7  WARM TEST  295.15   -.98108205     .00020261      ----------      ----------
 8  COLD TEST   79.15   -.72090035     .00017074      4.45729565       .08612225
 9  WARM TEST  295.15   -.98094113     .00019221      ----------      ----------
10  COLD TEST   79.15   -.72108981     .00015053      4.46222106       .06786527
11  WARM TEST  295.15   -.98084742     .00016915      ----------      ----------
12  COLD TEST   79.15   -.72124655     .00015234      4.46601798       .03392415
13  WARM TEST  295.15   -.98077229     .00018387      ----------      ----------
14  COLD TEST   79.15   -.72056637     .00017012      4.45550863       .04937263
15  WARM TEST  295.15   -.98066227     .00020898      ----------      ----------
16  COLD TEST   79.15   -.72089959     .00015691      4.46246948       .09629580
17  WARM TEST  295.15   -.98042905     .00019089      ----------      ----------
18  COLD TEST   79.15   -.72035082     .00016474      4.45612409       .06535363
19  WARM TEST  295.15   -.98041874     .00019597      ----------      ----------
20  COLD TEST   79.15   -.72034021     .00013910      4.45607306       .07501606

CH. 6 ,192.6 MHz     MHz

NOISE FIGURE AVERAGE (dB) =    4.45785306607

NOISE POWER STABILITY (K) =    .0671550194977

NOISE POWER STABILITY DELTA (K) =        .0623716540723

NPS_MAX (K) =        .0962958048243       NPS_MIN (K) =     .033924150752

INTEGRATION TIME =   .165
```

TEST DATA SHEET 10 (Sheet 2 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 29.0 °C

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V)		T_C(°C)	V_C (V)	
					Mean	Standard Deviation		Mean	Standard Deviation
LO	7	9.93	187.9	22.0	-.9549	.000171	-194.0	-.6638	.000140
				22.0	-.9548	.000164	-194.0	-.6632	.000150
				22.0	-.9546	.000196	-194.0	-.6632	.000138
				22.0	-.9547	.000169	-194.0	-.6637	.000139
				22.0	-.9548	.000191	-194.0	-.6629	.000144
				22.0	-.9548	.000190	-194.0	-.6636	.000135
				22.0	-.9544	.000219	-194.0	-.6632	.000211
				22.0	-.9544	.000174	-194.0	-.6640	.000143
				22.0	-.9545	.000174	-194.0	-.6632	.000154
				22.0	-.9547	.000164	-194.0	-.6640	.000151
Mixer/ Amps	All	9.94	244.5						
IF Amps	All	7.94	268.1						

Part No.: 135629-1

Serial No.: F04

Test Engineer: Y. Trinh

Quality Assurance: 7A 268 JAN 22 '99

Date: 1/19/99

TEST DATA SHEET 10 (Sheet 17 of 30)

Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh (Signature)   Baseplate Temperature (T_B) 29.0 °C

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
7		3.85				0.018			
		3.84				0.031			
		3.84				0.073			
		3.85				0.007			
		3.84				0.064			
		3.85				0.063			
		3.84				0.103			
		3.86				0.029			
		3.84				0.027			
		3.85				0.033			
	5.15		3.85	Pass	.08		0.045	0.096	Pass

Pass = P,   Fail = F

Part No.: 135429-1

Serial No.: F04

Test Engineer: Y. Trinh

Quality Assurance: 7A 268 JAN 28 '99

Date: 1/19/99

FOR REFERENCE ONLY

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           AMSU-A TEST

A1-1, S/N: F04, CH7, NF & NPS DATA, TB=29 C, 1/19/99

SEQ TEMP_TEST TEST TEMP    VOLTAGE       STD_DEV         NF (dB)        NPS(K)
 1  WARM TEST  295.15   -.95491893    .00017141      -----------     ----------
 2  COLD TEST   79.15   -.66380651    .00014034      3.84793308      .01811970
 3  WARM TEST  295.15   -.95476302    .00016439      -----------     ----------
 4  COLD TEST   79.15   -.66320572    .00014987      3.84053822      .03098816
 5  WARM TEST  295.15   -.95464500    .00019609      -----------     ----------
 6  COLD TEST   79.15   -.66319541    .00013807      3.84161401      .07293375
 7  WARM TEST  295.15   -.95470803    .00016939      -----------     ----------
 8  COLD TEST   79.15   -.66371674    .00013936      3.84878743      .00660552
 9  WARM TEST  295.15   -.95475314    .00019056      -----------     ----------
10  COLD TEST   79.15   -.66293378    .00014425      3.83656259      .06427281
11  WARM TEST  295.15   -.95475732    .00019000      -----------     ----------
12  COLD TEST   79.15   -.66357020    .00013512      3.84607011      .06348874
13  WARM TEST  295.15   -.95442901   ✓.00021913      -----------     ----------
14  COLD TEST   79.15   -.66316868    .00021191      3.84346576      .10293127
15  WARM TEST  295.15   -.95444482    .00017397      -----------     ----------
16  COLD TEST   79.15   -.66402812    .00014302      3.85622792      .02891605
17  WARM TEST  295.15   -.95446243    .00017355      -----------     ----------
18  COLD TEST   79.15   -.66316612    .00015445      3.84307868      .02739131
19  WARM TEST  295.15   -.95465280    .00016357      -----------     ----------
20  COLD TEST   79.15   -.66400907    .00015064      3.85376265      .03333611

CH. 7 ,192 MHz        MHz

NOISE FIGURE AVERAGE (dB) =     3.84580783281

NOISE POWER STABILITY (K) =     .0448983424104

NOISE POWER STABILITY DELTA (K) =        .0963257478551

NPS_MAX (K) =         .102931269688        NPS_MIN (K) =      .00660552183272

INTEGRATION TIME =   .165
```

TEST DATA SHEET 10 (Sheet 3 of 30)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 28.0 °C PLO No. 1

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V)		T_C(°C)	V_C (V)	
					Mean	Standard Deviation		Mean	Standard Deviation
LO	9	Positive +15.13	527.3	22.0	-1.118	.000234	-194.0	-.8105	.000187
				22.0	-1.117	.000235	-194.0	-.8091	.000159
				22.0	-1.117	.000235	-194.0	-.8093	.000229
				22.0	-1.116	.000260	-194.0	-.8084	.000168
		Negative -15.13	-64.4	22.0	-1.116	.000229	-194.0	-.8072	.000172
				22.0	-1.116	.000228	-194.0	-.8063	.000181
				22.0	-1.115	.000259	-194.0	-.8081	.000192
				22.0	-1.115	.000247	-194.0	-.8072	.000223
				22.0	-1.115	.000263	-194.0	-.8068	.000195
				22.0	-1.114	.000234	-194.0	-.8061	.000234
Mixer/ Amps	All	9.93	244.4						
IF Amps	All	7.95	267.9						

Part No.: 1356429-1

Serial No.: F04

Test Engineer: Y. Trinh

Quality Assurance: TA 268 JAN 22 '99

Date: 1/20/99

TEST DATA SHEET 10 (Sheet 18 of 30)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 28.0 °C

PLO No. 1

Channel No.	NF (dB)				NPS (K)				
	Required (Max)	Measured	Average	Pass/Fail	Required (Max)	Measured	Average	Delta	Pass/Fail
9		4.30				0.052			
		4.29				0.055			
		4.30				0.056			
		4.28				0.095			
		4.27				0.041			
		4.26				0.036			
		4.29				0.094			
		4.28				0.078			
		4.28				0.10			
		4.27				0.055			
	4.7		4.28	Pass	.08		0.066	0.064	Pass

Pass = P, Fail = F

Part No.: 135429-1

Serial No.: F04

Test Engineer: Y. Trinh

Quality Assurance: TA 268 JAN 22 '99

Date: 1/20/99

FOR REFERENCE ONLY

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            AMSU-A TEST

A1-1, S/N: F04, CH9, PLO #1, NF & NPS DATA, TB=28 C, 1/20/99

SEQ TEMP_TEST TEST TEMP   VOLTAGE        STD_DEV          NF (dB)          NPS(K)
 1  WARM TEST  295.15  -1.11750210    .00023373      -----------      ----------
 2  COLD TEST   79.15   -.81053300    .00018717      4.30355731        .05180401
 3  WARM TEST  295.15  -1.11693235    .00023507      -----------      ----------
 4  COLD TEST   79.15   -.80911380    .00015892      4.28924732        .05479231
 5  WARM TEST  295.15  -1.11664461    .00023532      -----------      ----------
 6  COLD TEST   79.15   -.80933921    .00022878      4.29541478        .05551623
 7  WARM TEST  295.15  -1.11638862    .00025958      -----------      ----------
 8  COLD TEST   79.15   -.80841930    .00016792      4.28497788        .09480005
 9  WARM TEST  295.15  -1.11614168    .00022935      -----------      ----------
10  COLD TEST   79.15   -.80723534    .00017192      4.27072960        .04142532
11  WARM TEST  295.15  -1.11590156    .00022755      -----------      ----------
12  COLD TEST   79.15   -.80628368    .00018135      4.25973041        .03632097
13  WARM TEST  295.15  -1.11536411    .00025877      -----------      ----------
14  COLD TEST   79.15   -.80807730    .00019204      4.29066331        .09414654
15  WARM TEST  295.15  -1.11493984    .00024745      -----------      ----------
16  COLD TEST   79.15   -.80723663    .00022304      4.28308011        .07768764
17  WARM TEST  295.15  -1.11480871    .00026314      -----------      ----------
18  COLD TEST   79.15   -.80678432    .00019466      4.27800497        .09983266
19  WARM TEST  295.15  -1.11443113    .00023455      -----------      ----------
20  COLD TEST   79.15   -.80607751    .00023392      4.27185391        .05458948

CH. 9 ,153.8 MHz     MHz

NOISE FIGURE AVERAGE (dB) =    4.28274344382

NOISE POWER STABILITY (K) =    .0660915215585

NOISE POWER STABILITY DELTA (K) =        .0635116882923

NPS_MAX (K) =        .0998326583991        NPS_MIN (K) =     .0363209701068

INTEGRATION TIME =   .165
```

TEST DATA SHEET 10 (Sheet 4 of 30)
Noise Figure and Noise Power Stability Test Data (Paragraph 3.5.4) (A1-1)

Test Setup Verified: Y. Trinh
Signature

Baseplate Temperature (T_B) 28.0 °C PLO No. 1

Component	Channel No.	V_b(V)	I_b(mA)	T_H(°C)	V_H (V) Mean	V_H (V) Standard Deviation	T_C(°C)	V_C (V) Mean	V_C (V) Standard Deviation
LO	10	Positive +15.13	527.3	22.0	-.9299	.000275	-194.0	-.6657	.000228
				22.0	-.9298	.000304	-194.0	-.6647	.000204
				22.0	-.9298	.000287	-194.0	-.6658	.000179
				22.0	-.9298	.000256	-194.0	-.6654	.000196
		Negative -15.13	-64.4	22.0	-.9293	.000268	-194.0	-.6651	.000193
				22.0	-.9293	.000246	-194.0	-.6652	.000180
				22.0	-.9293	.000306	-194.0	-.6653	.000194
				22.0	-.9298	.000294	-194.0	-.6659	.000185
				22.0	-.9295	.000296	-194.0	-.6653	.000216
				22.0	-.9298	.000282	-194.0	-.6658	.000239
Mixer/ Amps	All	9.93	244.4						
IF Amps	All	7.95	267.9						

Part No.: 1356429-1

Serial No.: F04

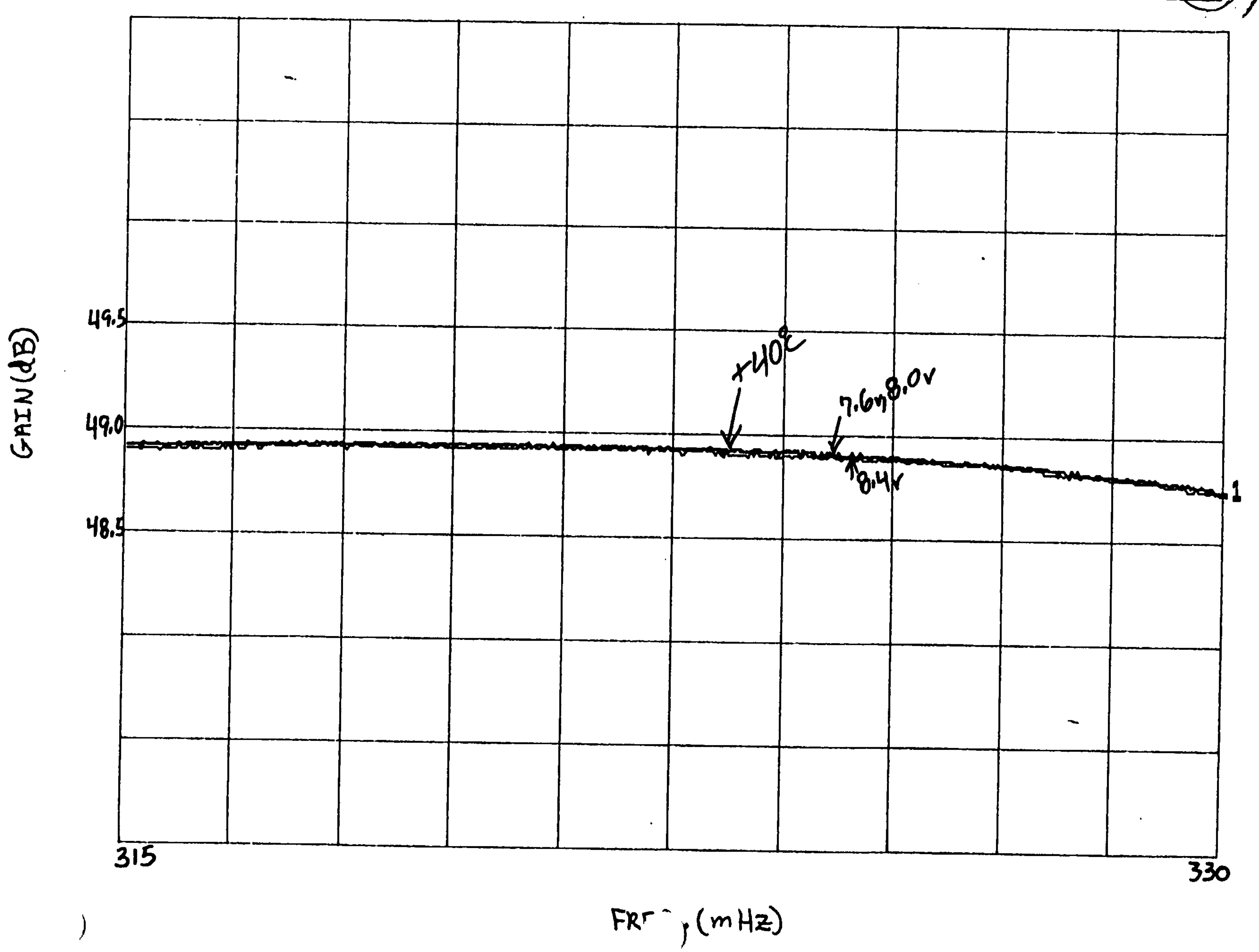
Test Engineer: Y. Trinh

Quality Assurance: TA 268 JAN 28 '99

Date: 1/20/99

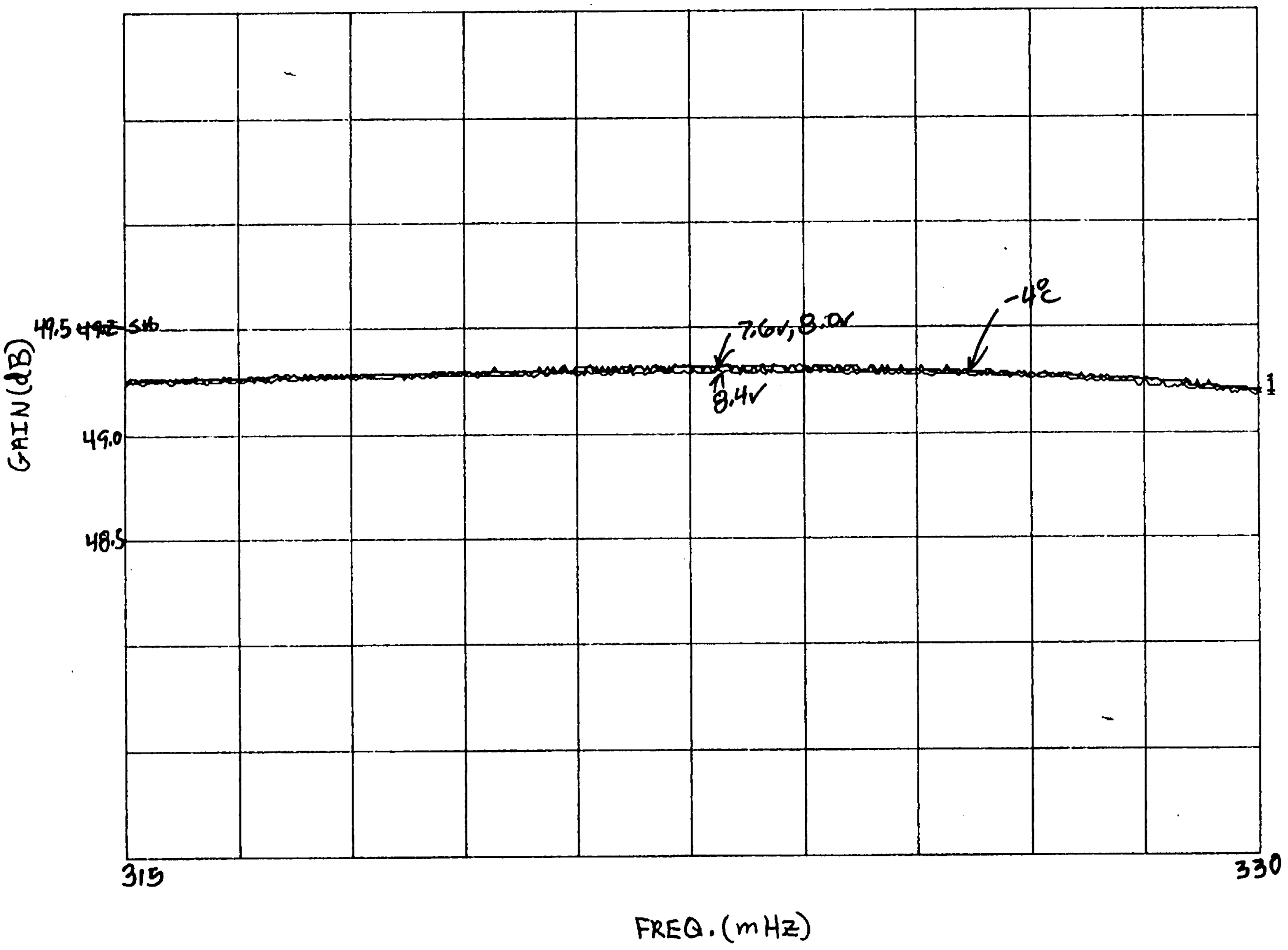
MODEL UD315302 S/N 111
GAIN-VOLTAGE SENSITIVITY VS. FREQ.
VERTICAL CALIBRATION 0.5dB INCH
TEMPERATURE as NOTED DEG.C.
TECH SU DATE 5-8-92
114

P/N 1331579-13



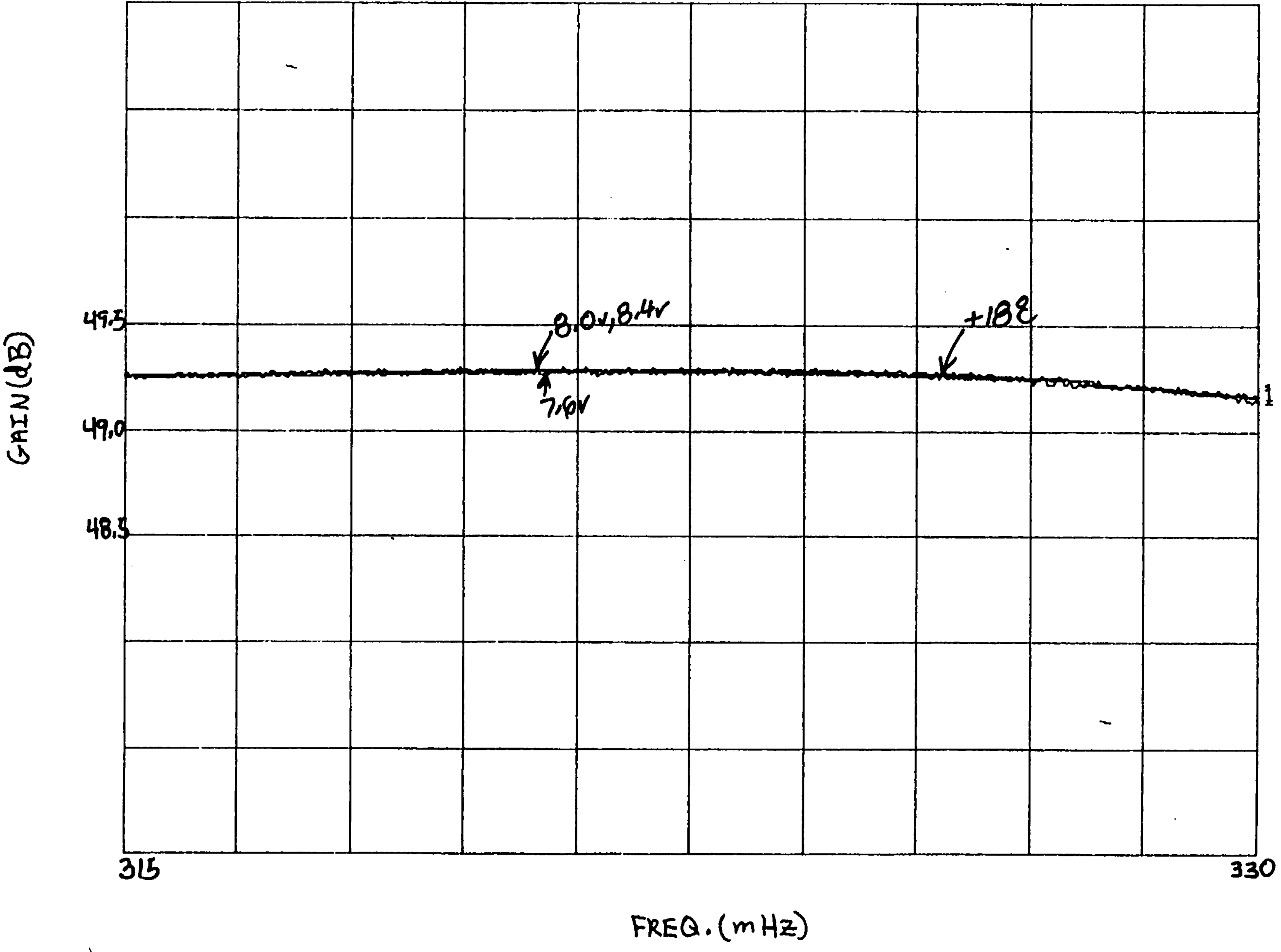
GAIN-VOLTAGE SE[illegible]IVITY VS. FREQ.
VERTICAL CALIBRATION 0.5 dB INCH
TEMPERATURE as noted DEG.C.
TECH SU (T143) DATE 5-8-97

P/N 1331579-13



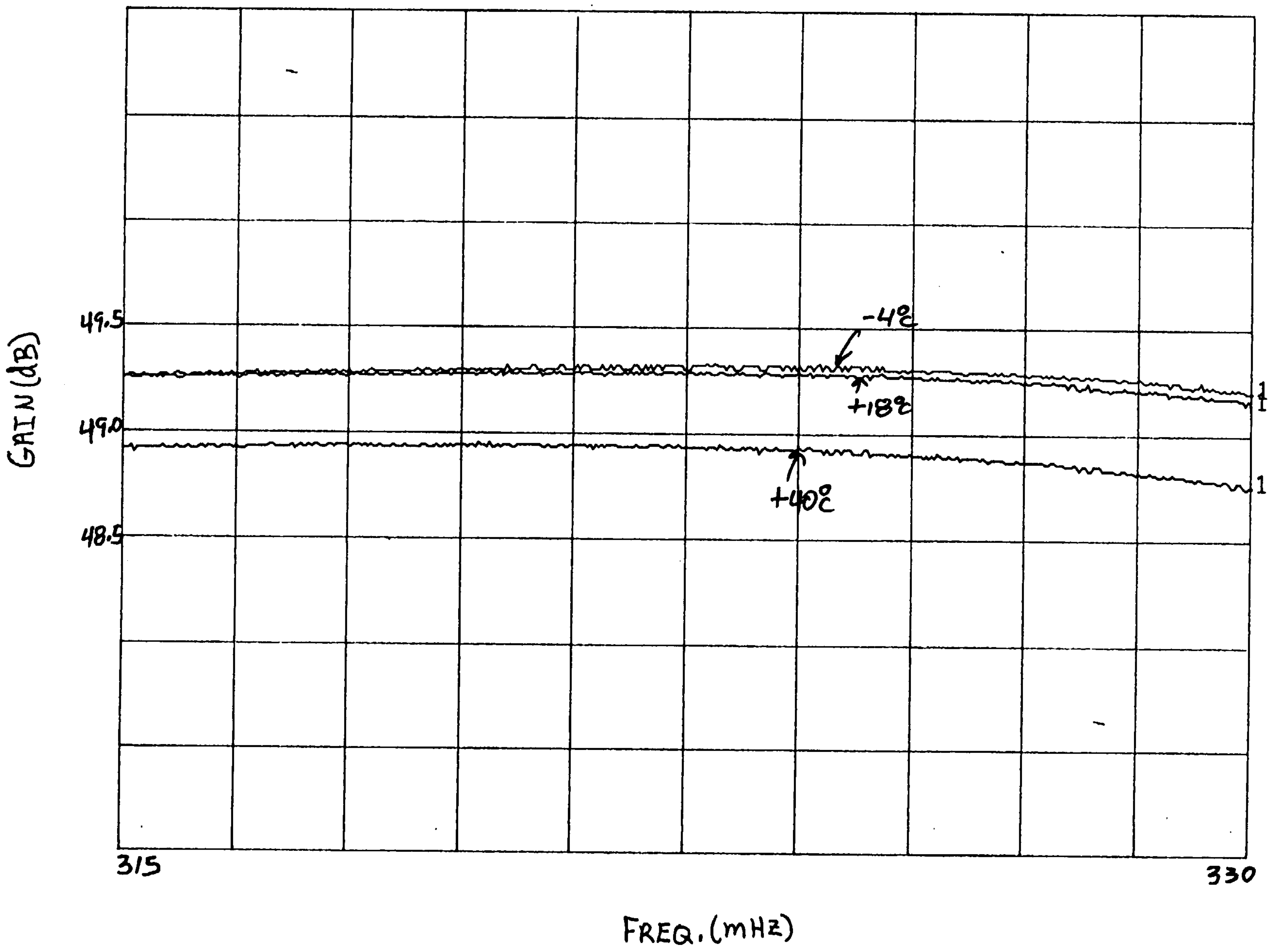
GAIN-VOLTAGE SENSITIVITY VS. FREQ.
VERTICAL CALIBRATION 0.5dB INCH
TEMPERATURE AS NOTED DEG.C.
TECH SW T143 DATE 5-8-97

P/N 1331579-13



GAIN VS FREQUEN
VERTICAL CALIBRATION .5 dB INCH
TEMPERATURE AS NOTED DEG.C.
TECH SW T143 DATE 5-8-97

P/N 1331579-13



APPENDIX C
ATP1777 DATA SHEET
MODEL NUMBER UD315302
AEROJET P/N 1331579-13

S/N 111

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.4.7	Compression	1 dB maximum Compression AT +10 dBm Output Power	Accept X Reject ___			
		315 MHz	0.60 dB	0.65 dB	0.55 dB	
		322.5 MHz	0.60 dB	0.60 dB	0.55 dB	
		330 MHz	0.60 dB	0.60 dB	0.55 dB	5-8-97
4.4.8	Stability	Unconditionally Stable	Accept X Reject ___			5-8-97
4.4.9	Start-up	Capable of starting operation at -30°C and +60°C with a maximum current draw of 60 mA	Accept X Reject ___			
		Maximum Current	51.2 mA			5-8-97

NOTE: Review all recorded data and signify acceptance below.

Technician T143 Date: 5-8-97
Quality Assurance Date: 5-12-97
CSI: Mike Date: 5-14-97
GSI: QC 176 Date: 5/9/97

Amplica, Inc.
Newbury Park, CA 91320

DRAWN	SIZE A	FSCM NO. 51025	ATP1777	REV
ISSUED	SCALE		SHEET 37 OF 39	

APPENDIX C
ATP1777 DATA SHEET
MODEL NUMBER UD315302
AEROJET P/N 1331579-13

S/N 111

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.1.1	Examination of Product		Accept X Reject ___			5-8-97
4.2.2	* Current Limiting	200 mA maximum Reg. VOLTAGE= N/A VDC Total R= N/A ohm max. current draw =	N/A mA			
4.4	Electrical Test					5-8-97
4.4.1	* Polarity Reversal Protection	No Damage	Current N/A mA Accept N/A Reject ___			5-8-97
	Short Open Protection	No Damage	Accept X Reject ___			5-8-97
	Output Coupling	Output shall be AC coupled	Accept X Reject ___			5-8-97
4.4.2	Gain vs. Freq. 315 MHz to 330 MHz	48.5dB Min., 49.5dB Max. -4°C to +40°C Attach x-y plot	Max 49.30dB Min 49,15dB Accept X Reject ___	Max 49.33 dB Min 49.20 dB Accept X Reject ___	Max 48.96dB Min 48.76dB Accept X Reject ___	5-8-97
	Gain Flatness	.5 dB Maximum Worse Case	Accept X Reject ___ 0,15 dB	Accept X Reject ___ 0,13 dB	Accept X Reject ___ 0.20 dB	5-8-97
	Gain Temp. Sensitivity	±.44 dB from -4°C to +40°C Worse Case	Accept X Reject ___	Accept X Reject ___ 0.05 dB	Accept X Reject ___ 0.39 dB	5-8-97
4.4.3	Gain-Voltage Sensitivity Input Currents	≤.5dB/v Worse Case ± .2dB for 7.6 to 8.4 Vdc 55ma MAX. 7.6v 8.0v 8.4v Attach X-Y Plot	0,03 dB 47,8 mA 48.5mA 49,1 mA Accept X Reject ___	0,04 dB 46.5 mA 47,2 mA 47,8 mA Accept X Reject ___	0.04 dB 48,9 mA 49,6 mA 50,2 mA Accept X Reject ___	5-8-97

NOTE: * TEST REQUIRED ON PROTOFLIGHT UNIT ONLY

Amplica, Inc.
Newbury Park, CA 91320

DRAWN	SIZE A	FSCM NO. 51025	ATP1777	REV.
ISSUED	SCALE		SHEET 35 OF 39	

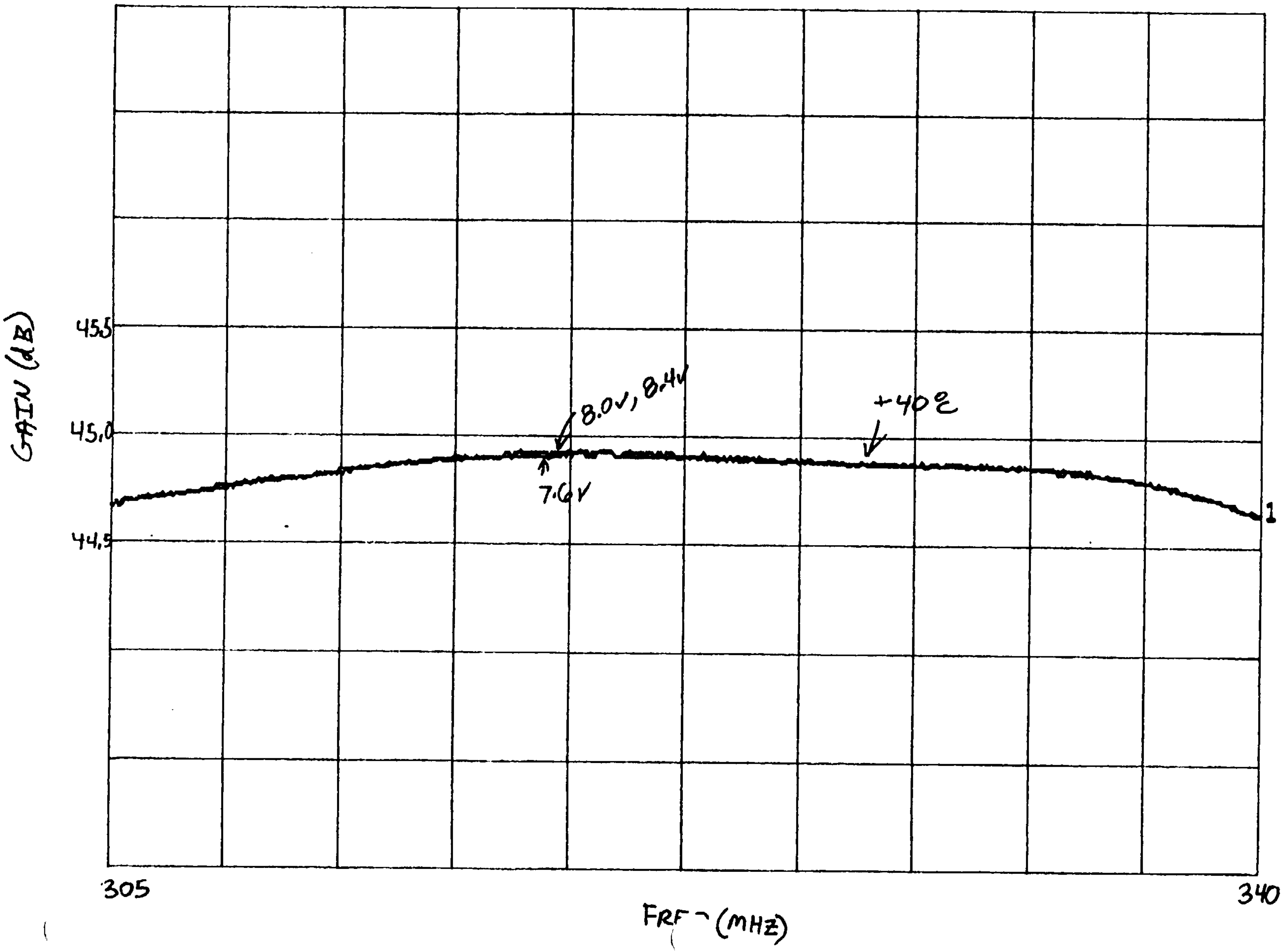
Report No. 11413
February, 1999

Channel 14 Amplifier

IF Amplifier (P/N:1331579-13, S/N: 111)

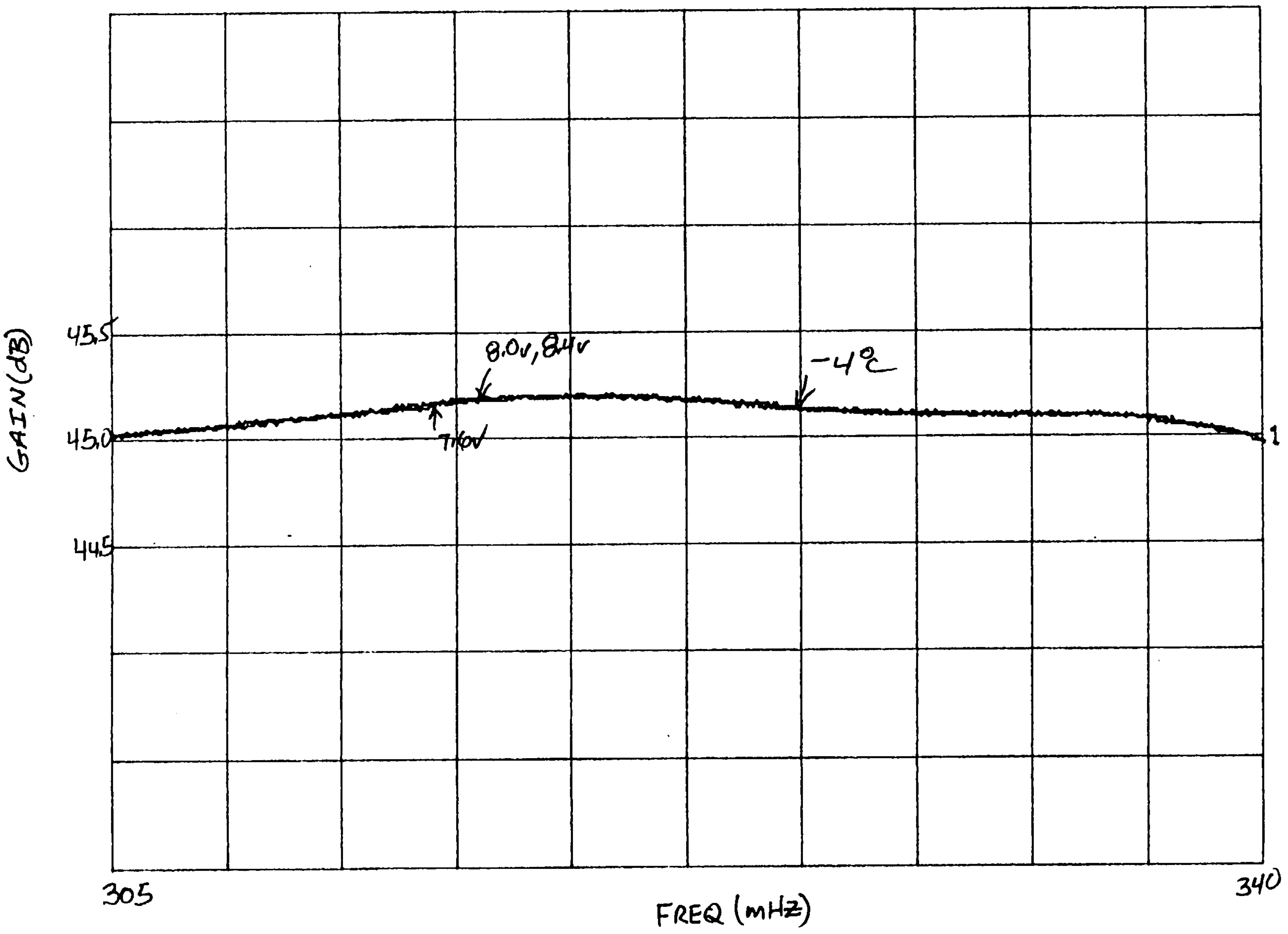
MODEL [illegible] S/N [illegible]
GAIN-VOLTAGE SENSITIVITY VS. FREQ.
VERTICAL CALIBRATION 0.5 dB INCH
TEMPERATURE as noted DEG.C.
TECH SW (T143) DATE 12-4-96

P/N 1331579-12



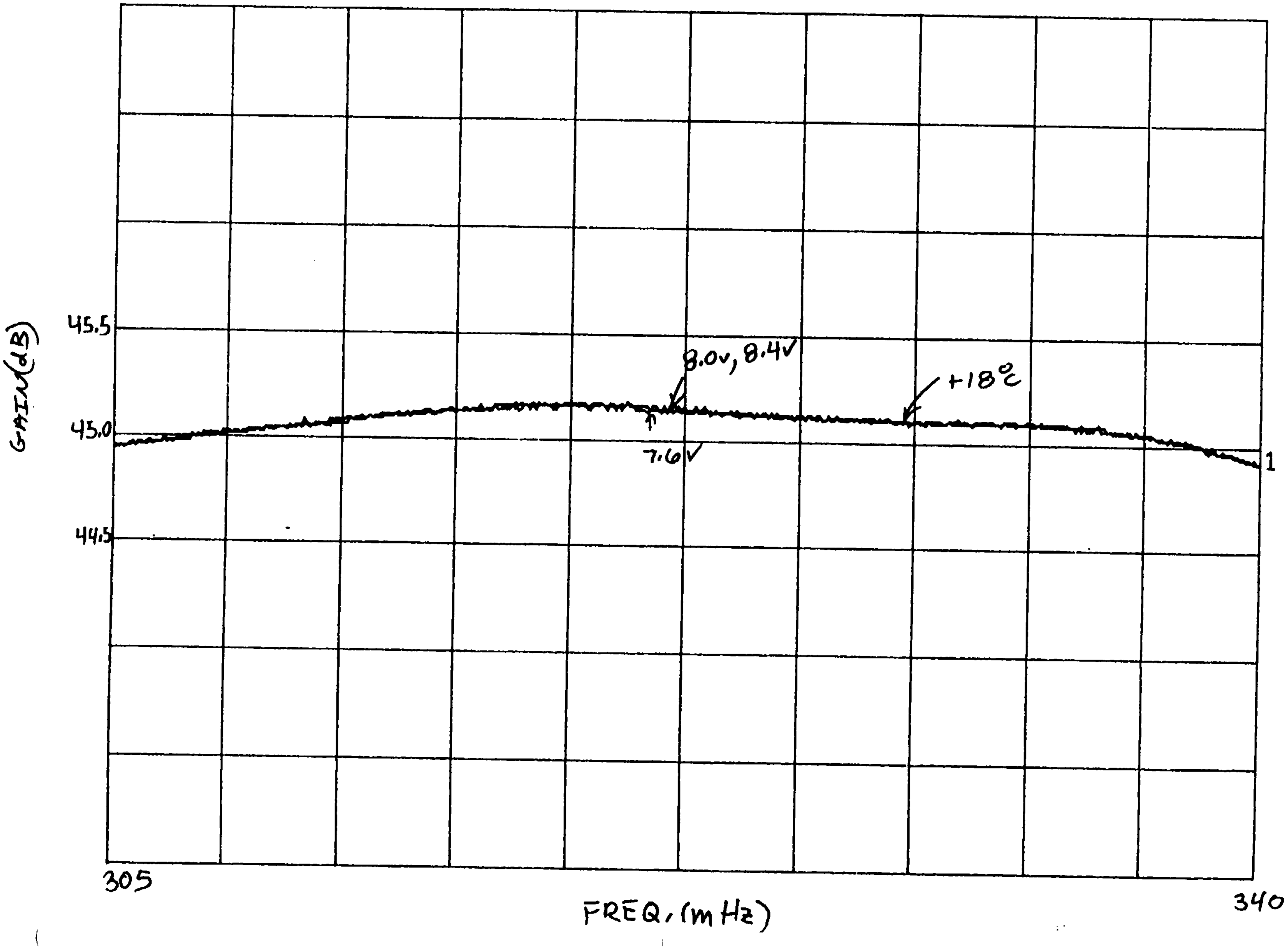
MODEL VD31550 S/N 105
GAIN-VOLTAGE SENS...VITY VS. FREQ.
VERTICAL CALIBRATION 0.5 dB INCH
TEMPERATURE as noted DEG.C.
TECH Sbb (T143) DATE 12-4-96

P/N 1331579-12



GAIN-VOLTAGE SENSITIVITY VS. FREQ.
VERTICAL CALIBRATION 0.5 dB INCH
TEMPERATURE as noted DEG.C.
TECH SW J143 DATE 12-4-96

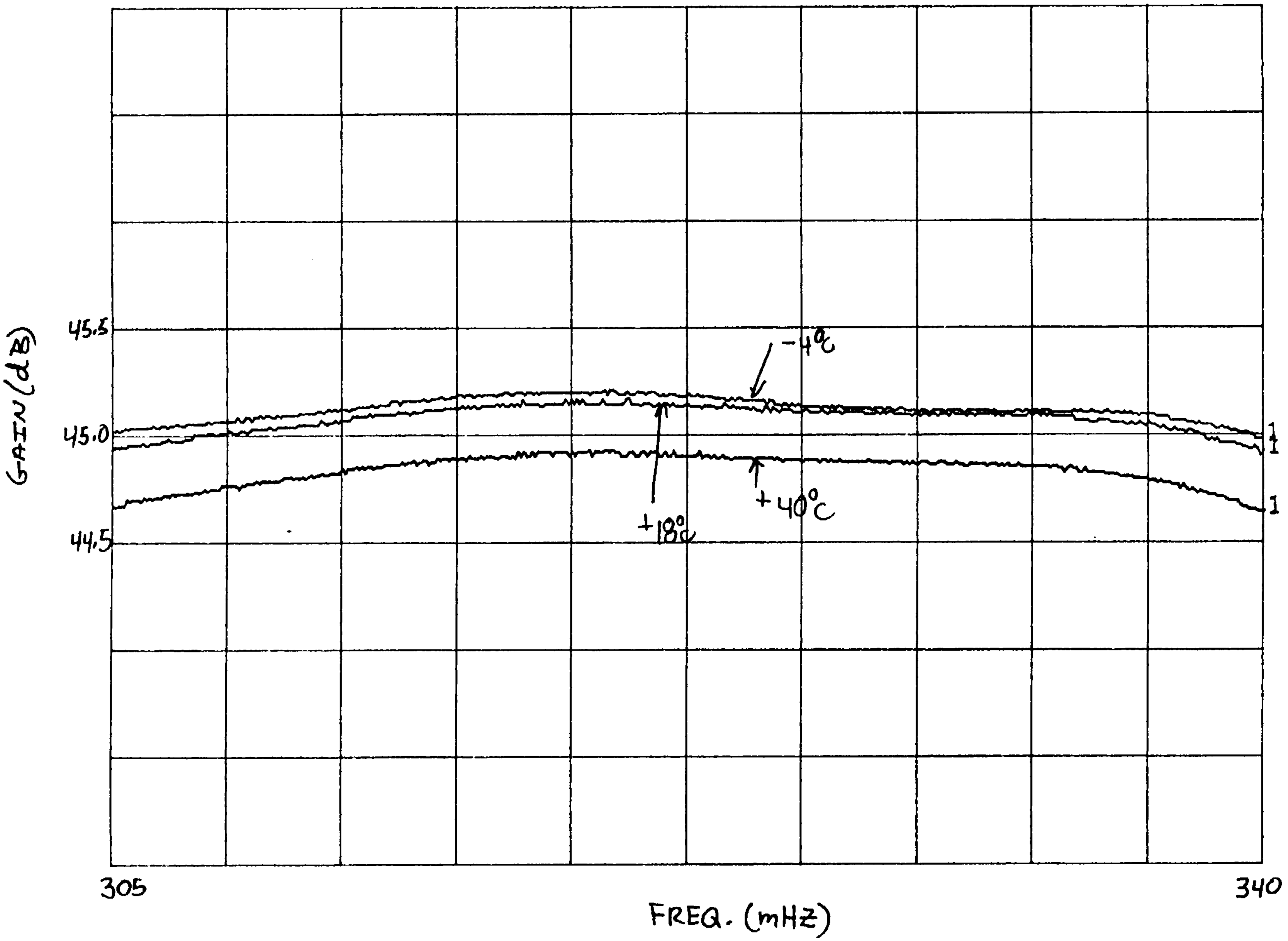
P/N 1331579-12



MODEL UD315301 105
GAIN VS FREQUENCY
VERTICAL CALIBRATION .5 dB INCH
TEMPERATURE AS NOTED DEG.C.
TECH SK DATE 12-4-96

T143

P/N 1331579-12



APPENDIX C
ATP1776 DATA SHEET
MODEL NUMBER UD315301
AEROJET P/N 1331579-12

S/N 105

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.4.7	Compression	1 dB maximum Compression AT +10 dBm Output Power	Accept ✓ Reject ___			
		305 MHz	.50 dB	.60 dB	.45 dB	
		322.5 MHz	.50 dB	.60 dB	.50 dB	12/4/96
		340 MHz	.60 dB	.65 dB	.60 dB	
4.4.8	Stability	Unconditionally Stable	Accept X Reject ___			12-4-96
4.4.9	Start-up	Capable of starting operation at -30°C and +60°C with a maximum current draw of 55 mA	Accept X Reject ___			
		Maximum Current	43.7 mA			12-5-96

NOTE: Review all recorded data and signify acceptance below.

Technician T143 Date: 12-5-96
Quality Assurance A23 Date: 12/9/96
CSI: Date: 12-9-96
GSI: 397 Date: 2/10/97

Amplica, Inc.
Newbury Park, CA 91320

DRAWN	SIZE A	FSCM NO. 51025	ATP1776	REV. B
ISSUED	SCALE		SHEET 37 OF 39	

APPENDIX C
ATP1774 DATA SHEET
MODEL NUMBER UD114302
AEROJET P/N 1331579-10

S/N 105

PARA	TEST	SPECIFICATION	+18°C	-4°C	+40°C	DATE
4.1.1	Examination of Product		Accept ✗ Reject ___			12-3-96
4.2.2	* Current Limiting	200 mA maximum Reg. VOLTAGE= 6.43 VDC Total R= 50.5 ohm max. current draw =	127.3 mA			
4.4	Electrical Test					9-19-96
4.4.1	* Polarity Reversal Protection	No Damage	Current 38.6 mA Accept ✗ Reject ___			12-3-96
	Short Open Protection	No Damage	Accept ✗ Reject ___			12-3-96
	Output Coupling	Output shall be AC coupled	Accept ✗ Reject ___			12-3-96
4.4.2	Gain vs. Freq. 255 MHz to 390 MHz	38.5dB Min., 39.5dB Max. -4°C to +40°C Attach x-y plot	Max 39.27 dB Min 38.88 dB Accept ✗ Reject ___	Max 39.20 dB Min 38.84 dB Accept ✗ Reject ___	Max 39.07 dB Min 38.68 dB Accept ✗ Reject ___	12-3-96
	Gain Flatness	.5 dB Maximum Worse Case	Accept ✗ Reject ___ 0.37 dB	Accept ✗ Reject ___ 0.38 dB	Accept ✗ Reject ___ 0.40 dB	12-3-96
	Gain Temp. Sensitivity	±.44 dB from -4°C to +40°C Worse Case	Accept ✗ Reject ___	Accept ✗ Reject ___ 0.11 dB	Accept ✗ Reject ___ 0.30 dB	12-3-96
4.4.3	Gain-Voltage Sensitivity Input Currents	≤.5dB/v Worse Case ± .2dB for 7.6 to 8.4 Vdc 45ma MAX. 7.6v 8.0v 8.4v Attach X-Y Plot	0.03 dB 38.0 mA 38.6 mA 39.3 mA Accept ✗ Reject ___	0.03 dB 36.2 mA 36.9 mA 37.5 mA Accept ✗ Reject ___	0.01 dB 39.3 mA 40.0 mA 40.6 mA Accept ✗ Reject ___	12-3-96

NOTE: * TEST REQUIRED ON PROTOFLIGHT UNIT ONLY

Amplica, Inc.
Newbury Park, CA 91320

DRAWN	SIZE A	FSCM NO. 51025	ATP1774	REV. B
ISSUED	SCALE		SHEET 35 OF 39	

PM '53

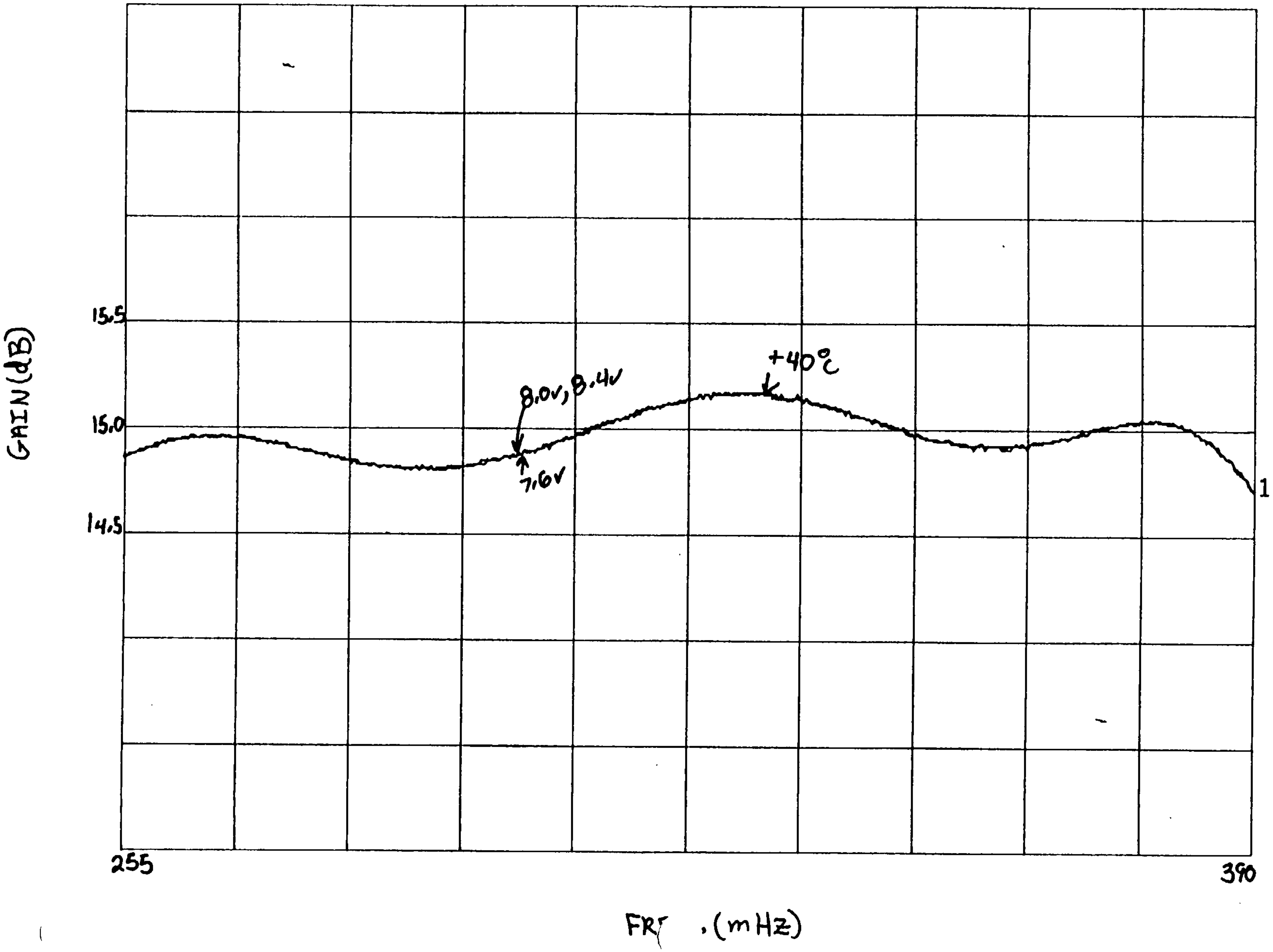
Report No. 11413
February, 1999

Channel 11 Amplifier

IF Amplifier (P/N:1331579-10, S/N: 105)

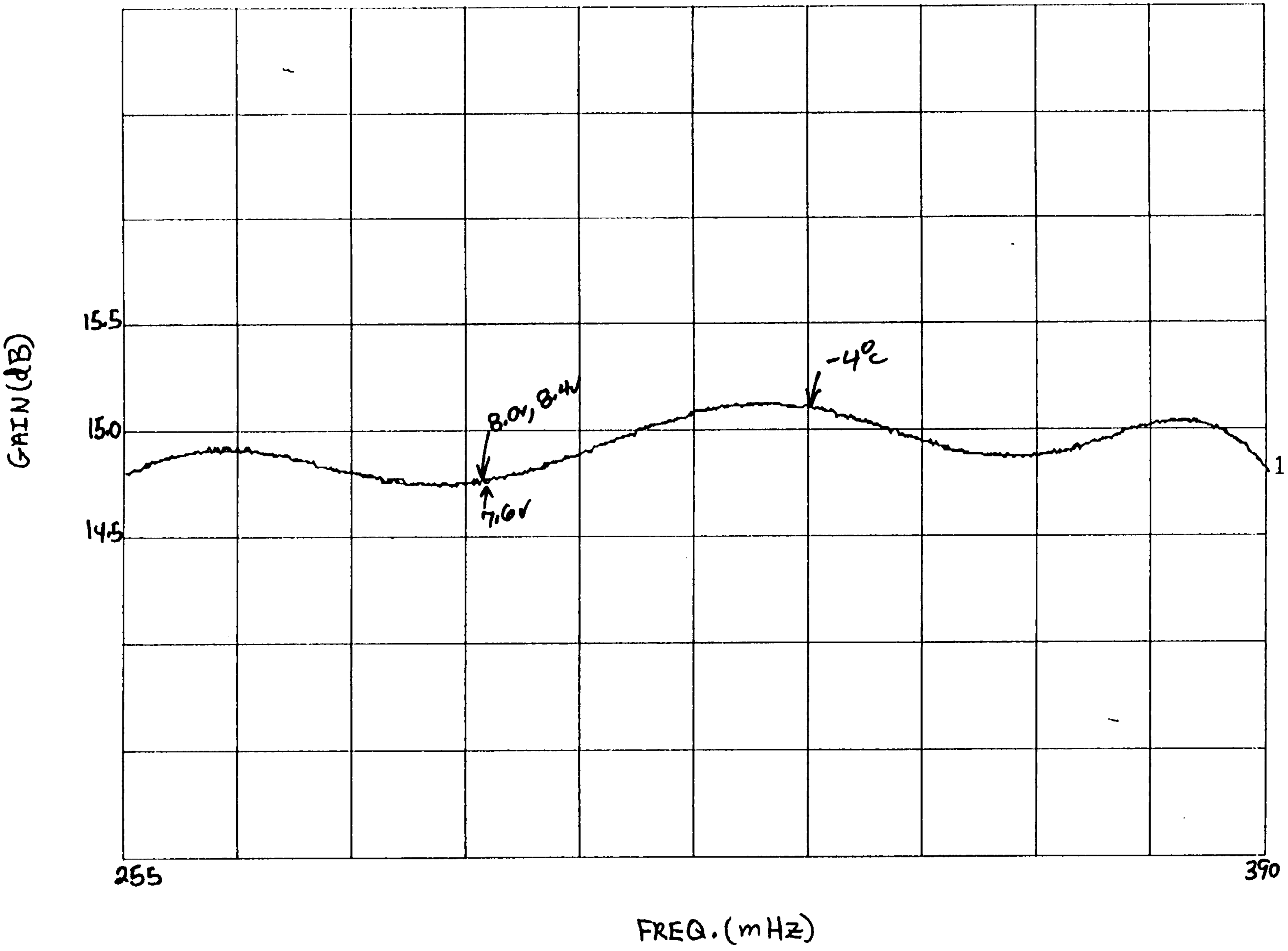
MODEL UD122301 S/N 111
GAIN-VOLTAGE SENSITIVITY VS. FREQ.
VERTICAL CALIBRATION 0.5dB INCH
TEMPERATURE AS NOTED DEG.C.
TECH SW T143 DATE 5-7-97

P/N 1331579-7



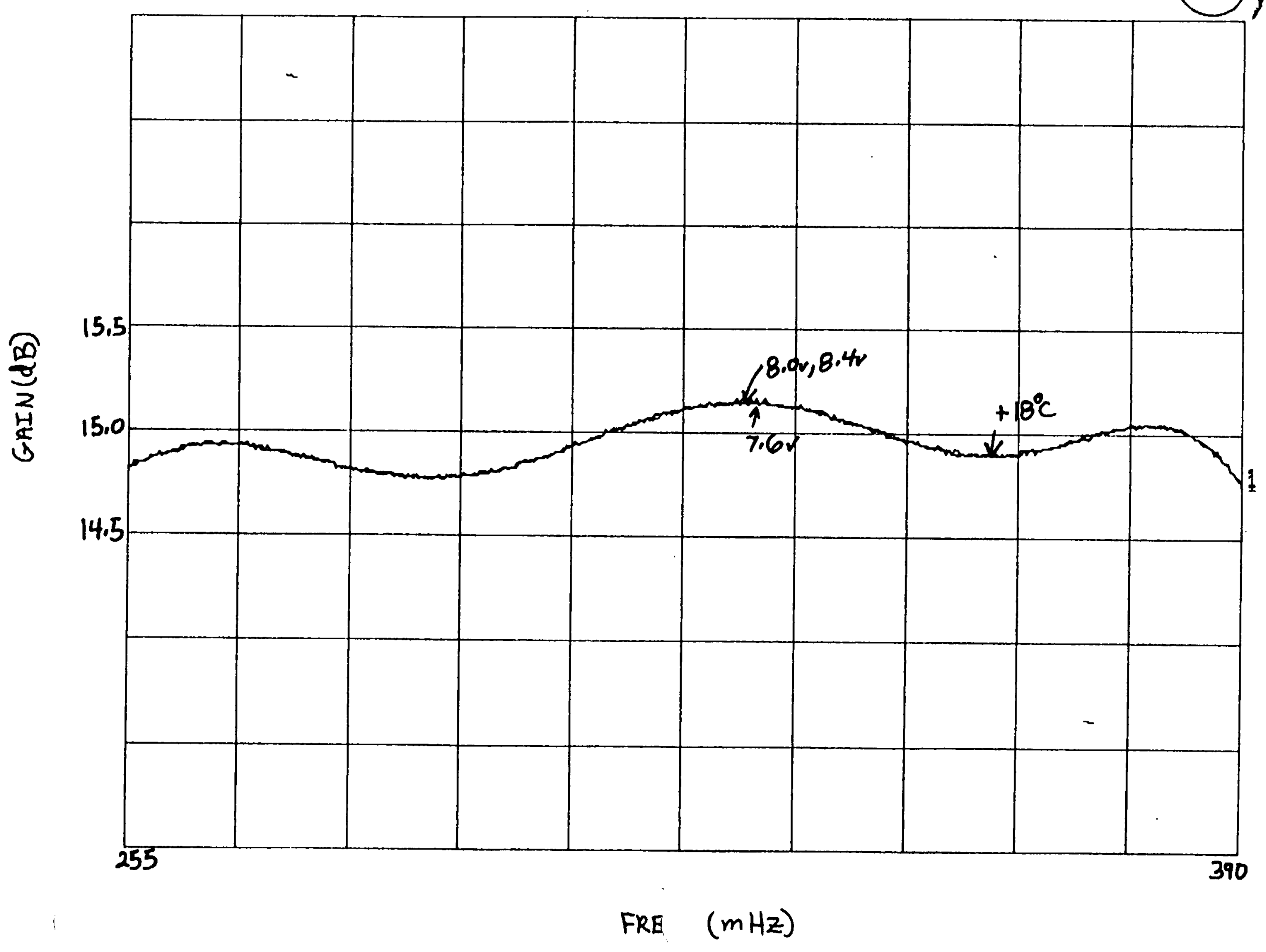
MODEL UD12230 S/N 111
GAIN-VOLTAGE SENSITIVITY VS. FREQ.
VERTICAL CALIBRATION 0.5dB INCH
TEMPERATURE as NOTED DEG.C.
TECH JAT 14.3 DATE 5-7-97

P/N 1331579-7



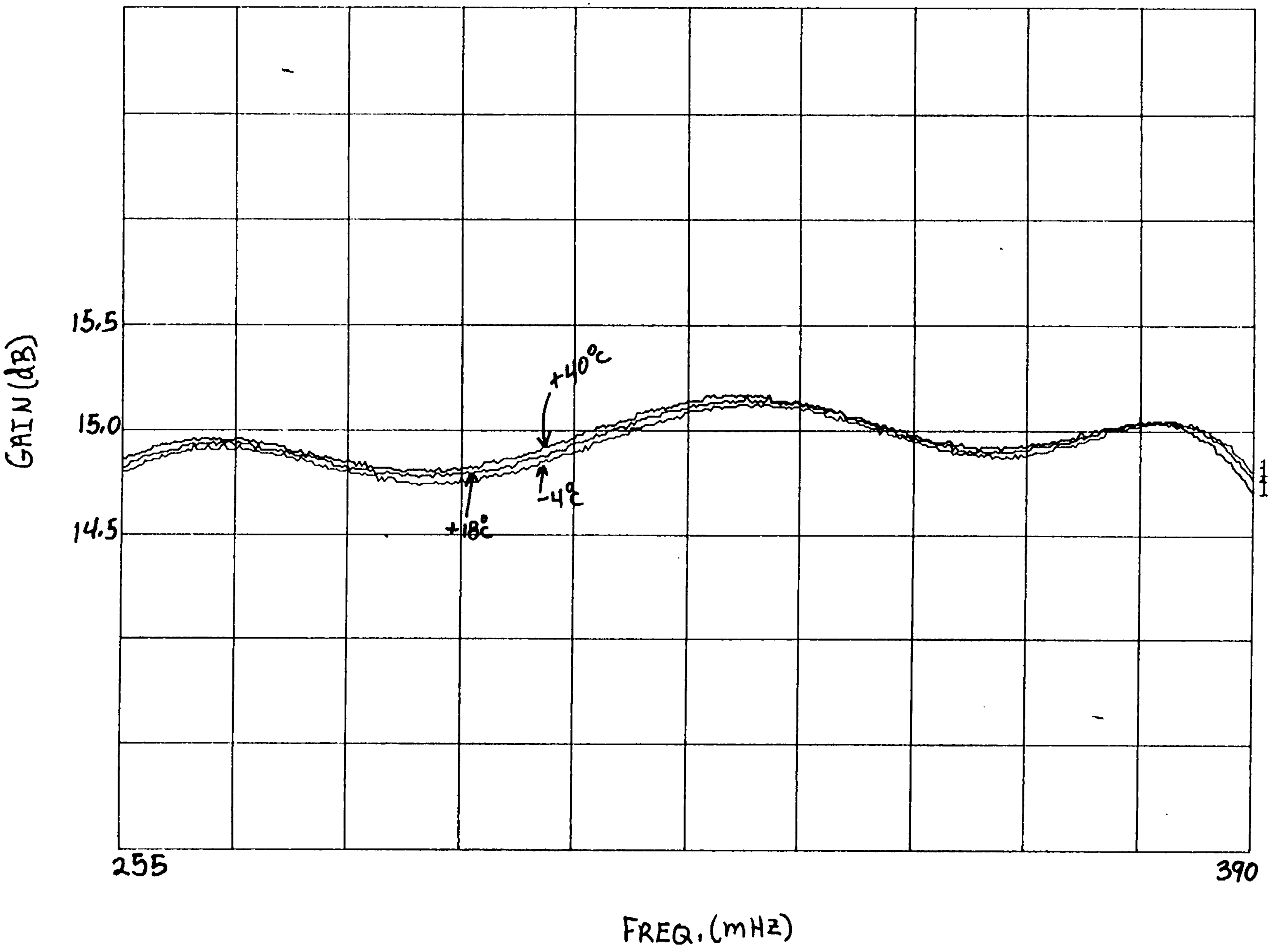
MODEL UD122-301 S/N 111
GAIN-VOLTAGE SENSITIVITY VS. FREQ.
VERTICAL CALIBRATION 0.5dB INCH
TEMPERATURE AS NOTED DEG.C.
TECH SW T143 DATE 5-7-97

P/N 1331579-7



MODEL UD12230 /N 111
GAIN VS FREQUENCY
VERTICAL CALIBRATION .5 dB INCH
TEMPERATURE AS NOTED DEG.C.
TECH SW (T143) DATE 5-7-97

P/N 1331579-7



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