



JD746A/JD786A CellAdvisor™ RF Analyzer

	JD746A	JD786A
Spectrum Analyzer:	100 kHz to 4 GHz	9 kHz to 8 GHz
Cable and Antenna Analyzer:	5 MHz to 4 GHz	5 MHz to 6 GHz
RF Power Meter:	10 MHz to 4 GHz	10 MHz to 8 GHz

JD746A/JD786A Introduction



JD746A RF Analyzer



JD786A RF Analyzer

The JD746A/JD786A RF Analyzer is the optimal test tool for installing and maintaining cell sites. It contains all the features and capabilities required to perform field testing of cell sites.

Equipped with one-button standards-based measurements for wireless signals, the analyzer offers a full scope of RF performance measurements. Its combined functionality includes spectrum analysis, cable and antenna analysis, an RF/optical power meter, interference analysis, and a channel scanner.

Standard features include:

- Spectrum analyzer
- Cable and antenna analyzer
- RF power meter

Advanced features include:

- Interference analysis
- Channel scanner
- 2-port transmission
- CW signal generator
- GPS receiver
- Built-in bias-tee
- Optical power meter

Highlights and capabilities include:

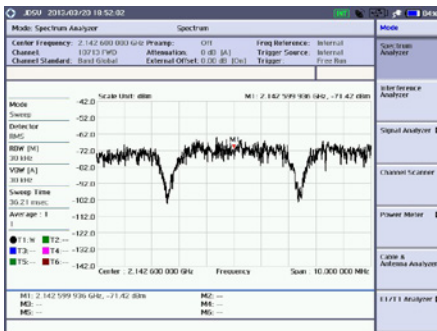
- Passive intermodulation (PIM) detection*
- Dual spectrum*
- Spectrum replay
- Dual spectrogram*
- Remote control
- Coverage mapping

*Only available for the JD746A.

JD746A/JD786A Features



The outdoor display mode enables easier reading in direct sunlight.



Outdoor display mode

Easy User Interface

The analyzer provides a consistent, intuitive interface throughout its various functions giving users a common, easy-to-use menu structure.

The analyzer's built-in help system guides users through each measurement task. They can save a screenshot of any function as a graphic file for report generation and save traces for post-analysis to the instrument's internal memory or to an external USB memory device. Stored data can be easily transferred to a PC using the USB or Ethernet port.

Users can edit file names using the instrument's rotary knob that also conveniently functions as an enter button when selecting alphanumeric characters.

Designed for Field Use

The compact, lightweight analyzer is especially convenient for users who perform field measurements.

Its bright, multimode, 8-inch color display enables clear visibility indoors and outdoors.

The operating temperature ranges from -10 to 55°C ; and, its rugged bumper protects the instrument to external impacts exceeding the MIL-PRF-28800F class 2 specification.

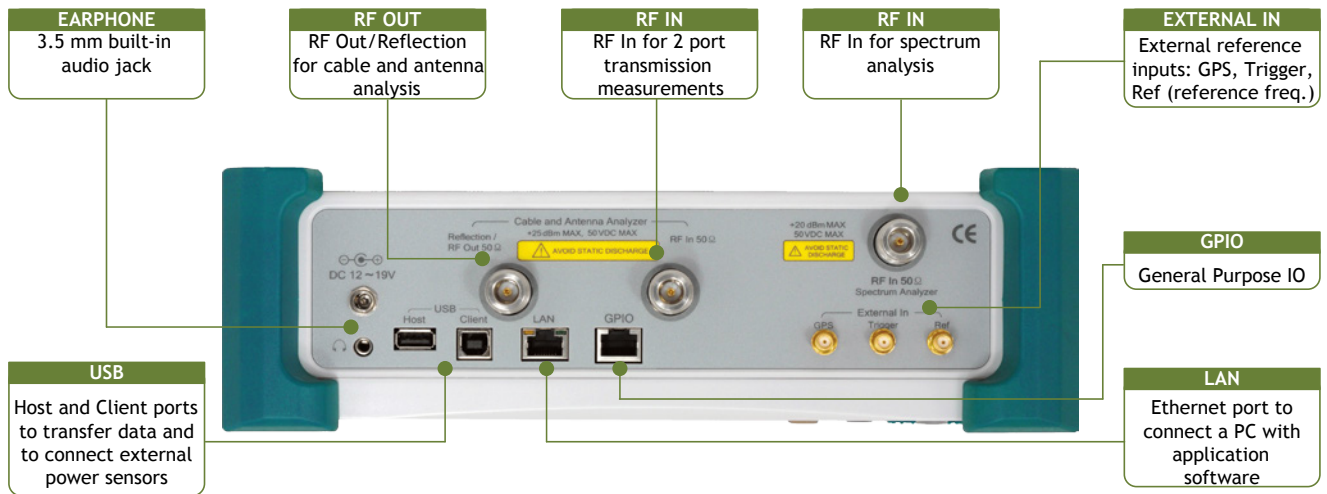
The instrument's internal battery provides up to three hours of continuous operation. When extended operation is necessary, a secondary battery can be installed in seconds. Alternatively, it is equipped with DC adapters for vehicles and AC adapters for standard line power.

Convenience is absolutely necessary in the field. The analyzer is equipped with powerful one-button measurements for channel power, occupied bandwidth, spectrum emission mask, adjacent channel power ratio, and spurious emissions.

Multilanguage User Interface

The instruments' graphical user interface adapts to different languages for localization worldwide.

JD746A/JD786A Integrated Functionality



Spectrum Analyzer 100 kHz to 4 GHz (JD746A) 9 kHz to 8 GHz (JD786A) Built-in pre-amplifier Zero span with gate sweep	Locates and identifies various signals over frequency ranges up to 4 GHz/8 GHz. Detects signals as low as -160 dBm/ -165 dBm with better than 1 dB measurement accuracy. Triggers pulse or burst signal such as WiMAX, GSM, and TD-SCDMA.
Cable and Antenna Analyzer 5 MHz to 4 GHz (JD746A) 5 MHz to 6 GHz (JD786A)	Provides cable and antenna characterization for proper power transfer from the radio to the antenna. Locates failure points for effective troubleshooting. Verifies conformance to cable specifications.
RF Power Meter 10 MHz to 4 GHz (JD746A) 10 MHz to 8 GHz (JD786A)	Integrated RF power meter eliminates the need for a separate instrument and measures power with or without a power sensor.
2-Port Transmission Measurements (option 001)	Verifies passive and active devices, such as filters and amplifiers.
Bias-Tee (option 002)	Supplies up to 32 VDC built-in bias to active devices, such as amplifiers.
CW Signal Generator (option 003)	Provides a sine wave or continuous wave (CW) source for measurements such as isolating a repeater.
GPS Receiver and Antenna (option 010)	Provides geographical location, highly accurate frequency, and time for precise measurements.
Interference Analyzer (option 011)	Provides the required spectrogram and multisignal RSSI parameters to properly monitor, identify, and locate interference signals. In addition, it can generate a variable audible tone based on signal strength.
Channel Scanner (option 012)	Intuitive graphical representation of the signal's power for each of the 20 user-definable carriers (frequencies or channels) for quick identification of improper power levels.
Optical Power Meter (option 013)	Measures optical power for all single-mode and multimode connectors via an optional optical power sensor (MP60 or MP80).

Spectrum Analyzer

The analyzer is the most flexible general purpose spectrum analysis test tool for monitoring and analyzing the RF spectrum. The spectrum analysis function performs these one-button standards-based wireless-signal power measurements:

- Channel Power
- Occupied Bandwidth
- Spectrum Emission Mask
- Adjacent Channel Power
- Spurious Emissions
- Field Strength
- AM/FM Audio Demodulation
- Route Map
- PIM Detect*
- Dual Spectrum*

Capabilities

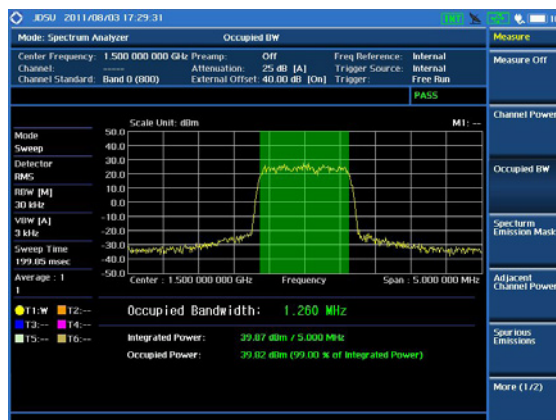
- Built-in preamplifier
- Zero span with gated sweep
- AM/FM audio demodulation
- Multiple detectors: normal, RMS, sample, negative, peak
- Advanced marker: frequency counter noise marker
- Limit line
- Up to 6 markers and 6 traces

Measurements

Channel Power measures the power level, spectral density, and peak-to-average ratio (PAR) of the signal in a specified channel bandwidth, showing pass/fail for the defined power.



Occupied BW measures the frequency bandwidth that contains the specified percentage of the power, the total integrated power, and the occupied power with pass/fail results for the defined bandwidth.



*Only available for the JD746A.

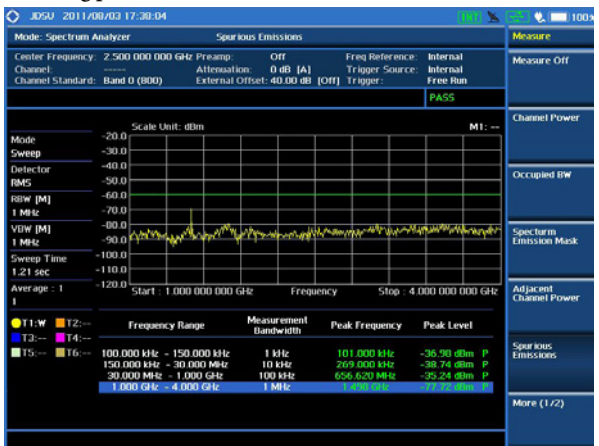
Adjacent Channel Power (ACP) measures the amount of RF power leakage in adjacent channels and its ratios, with pass/fail results for the defined test condition.



Spectrum Emission Mask (SEM) compares the total power level within the defined carrier bandwidth and the given offset frequencies to defined mask limits with pass/fail results.



Spurious Emissions measurements identify and determine the power level of spurious emissions in certain frequency bands, showing pass/fail results based on the defined mask limits.



Field Strength quickly and conveniently measures and analyzes field strength to user-definable multisegment lines. Measuring field strength is easy once the user specifies the antenna factors in the analyzer.

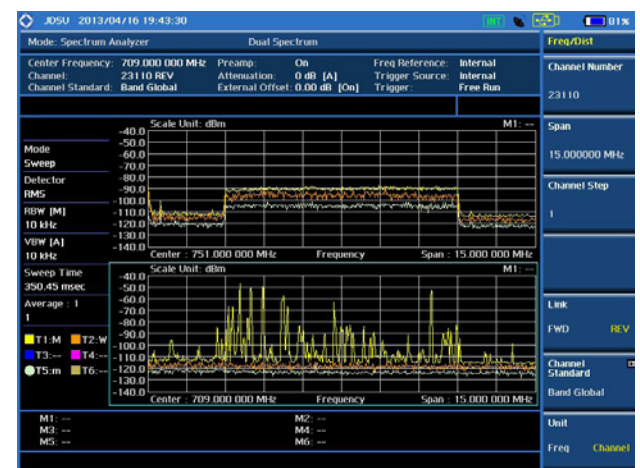
AM/FM Audio Demodulation identifies interfering signals. The AM/FM signal can be demodulated into the instrument's built-in speaker or through a headset.

The spectrum analyzer can simultaneously operate with the CW signal generator. It easily fulfills the >100 dB guideline required for measuring repeater and antenna isolation.

PIM Detection* identifies passive intermodulation in the uplink band caused when signals are combined from two or more carriers and are transmitted on a single nonlinear feed line.



Dual Spectrum* lets users view the spectrum activity for two different uplink and downlink spectrum bands on one screen simultaneously rather than switching between screens.



*Only available for the JD746A.

Cable and Antenna Analyzer

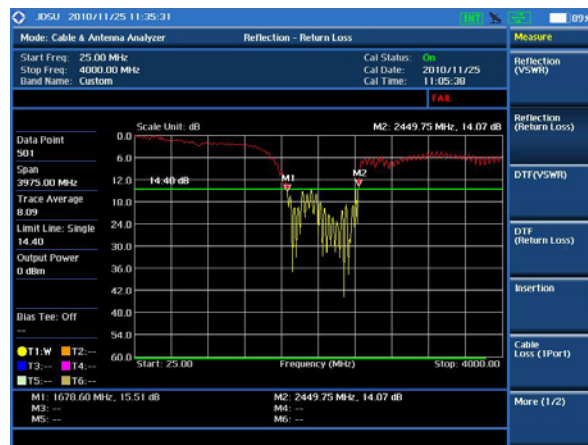
The analyzer performs cable and antenna measurements to verify the base station's infrastructure, including feed lines, connectors, antennas, cables, jumpers, amplifiers, and filters.

Capabilities

- Reflection
 - Voltage standing-wave ratio (VSWR)
 - Return loss
- DTF
 - VSWR
 - Return loss
- Cable loss (1-port)
- Port phase
- Smith chart
- 2-port transmission measurements (option 001)
- Scalar measurements
- Vector measurements

Measurements

Reflection – Return Loss measures complete cell-site transmission line impedance performance across a specific frequency range in VSWR or return loss.



DTF – Return Loss measures fault locations in the cell-site transmission system indicating signal discontinuities in VSWR or return loss. This distance-to-fault measurement precisely pinpoints the location of such things as damaged or degraded antennas, connectors, amplifiers, filters, and duplexers.



Cable Loss (1 port) measures the signal loss through a cable or other devices over a defined frequency range by connecting one end of the cable to the instrument measurement port and terminating the other end of the cable with a short, or leaving it open altogether.



Smith Chart measures impedance and phase to properly tune RF devices.

Smith Chart also displays impedance-matching characteristics in cable and antenna systems or filter and duplexer devices.



1 port Phase measures S_{11} phase to tune antennas and to phase-match cables.



2 Port Measurement (Scalar) (option 001) have vector and scalar measurements. Scalar measurement provides greater dynamic range (>100dB); vector measurement provides greater accuracy and faster test time.



Insertion Gain/Loss measures the characteristics of passive and active devices such as filters, jumpers, splitters, and amplifiers and verifies antenna or sector-to-sector isolation.

2 Port Phase in Vector Measurements measure S_{21} phase to characterize transmission devices such as filters and amplifiers.

The optional built-in bias-tee supplies power to active devices through the instrument's RF In port, eliminating the need for an external power supply.

Power Meters

The analyzer is equipped with an RF power meter and optionally an optical power meter.

The RF power meter performs two different methods of power measurement. The first is an internal power measurement for standard power testing without the assistance of external power sensors and the second interfaces with an external power sensor for high-accuracy power measurements.

The optical power meter measures optical power for single-mode and multimode connectors via an external optical power sensor.

RF Power Meter (standard)

Internal Power Measurement

- Frequency range: 10 MHz to 4 GHz/8 GHz
- Dynamic range: -120 to +20 dBm/+25 dBm
- Measurement type: RMS or peak

External Power Measurement

- JD732B: Terminating power sensor (average)
- JD734B: Terminating power sensor (peak)
- JD736B: Terminating power sensor (average and peak)
 - Frequency range: 20 MHz to 3.8 GHz
 - Dynamic range: -30 to +20 dBm
- JD731B: Directional (through line) power sensor
 - Frequency range: 300 MHz to 3.8 GHz
 - Dynamic range: average 0.15 to 150 W, peak 4 to 400 W
 - Measurement:
 - ▷ Forward average power
 - ▷ Reverse average power
 - ▷ Forward peak power
 - ▷ VSWR
- JD733A: Directional (through line) power sensor
 - Frequency range: 150 MHz to 3.5 GHz
 - Dynamic range: average/Peak 0.1 to 50 W
 - Measurement:
 - ▷ Forward average power
 - ▷ Reverse average power
 - ▷ Forward peak power
 - ▷ VSWR

Optical Power Meter (optional)

Miniature USB 2.0 Optical Power Sensors

- MP-60
 - Wavelength range: 780 to 1650 nm
 - Dynamic range: 1300, 1310, 1490, 1550 nm: -50 to +10 dBm
850 nm: -45 to +10 dBm
- MP-80
 - Wavelength range: 780 to 1650 nm
 - Dynamic range: 1300, 1550 nm: -35 to +23 dBm; 850 nm: -30 to +23 dBm

The power meter analysis has user-definable pass/fail limits and displays test results in dBm and watts. Power measurements can be set as absolute measurements displayed in dBm or as relative measurements displayed in dB.



Terminating RF power sensor



Directional RF power sensor



Optical power sensor

The analyzer displays power levels in two formats, as a real-time value in an analog meter and as a power-level trend through time in a histogram chart.

JD730-series high-precision RF power sensors measure RF power connected via USB to the analyzer.

The analyzer controls terminating power sensors (JD732B, JD734B, and JD736B), making it a highly accurate RF power meter for out-of-service applications up to 3.8 GHz with a measurement range of -30 to +20 dBm.

The analyzer controls directional power sensors (JD731B and JD733A) measuring output power and impedance matching for in-service systems. These power sensors can handle up to 150 W of power, eliminating the need for attenuators.

The analyzer controls optical power sensors (MP-series) to measure optical power quickly and easily in single-mode or multimode.

This optical power meter offers a well-organized solution for fiber inspection.

Interference Analyzer



The Interference Analyzer (option 011) function is extremely effective for locating and identifying periodic or intermittent RF interference. Interference signals derive from several kinds of licensed or unlicensed transmitters that cause dropped calls and poor service quality.

- Spectrum analyzer
 - Sound indicator
 - AM/FM audio demodulation
 - Interference ID
 - Spectrum recorder
- Spectrogram
- Receive signal strength indicator (RSSI)
- Interference finder
- Spectrum replayer
- Dual spectrogram*

Measurements

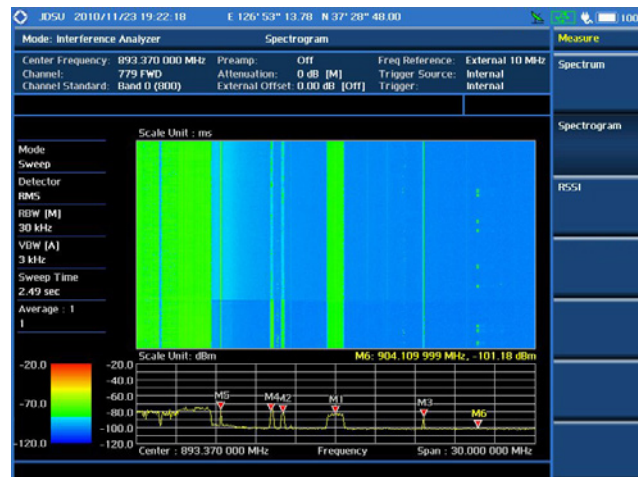
A spectrum analyzer capable of performing spectrum clearance, capturing just the events where the received signal exceeds the defined power limit.

Audible Tone volume is proportional to the signal's power strength. In addition, a built-in AM/FM audio demodulator conveniently identifies AM/FM signals.

Interference ID automatically classifies interfering signals and lists the possible signal types corresponding to the signal selected.

Spectrogram captures spectrum activity over time and uses various colors to differentiate spectrum power levels.

The spectrogram is effective for identifying periodic or intermittent signals. Post-processing analysis can be made for each measurement over time using a time cursor.



*Only available for the JD746A.

RSSI is a multisignal tracking metric that is particularly useful for measuring power-level variations over time.

The RSSI measurement lets you assign a power limit line for audible alarms and increase alarm counters every time a signal exceeds a defined limit line.

For long-term analysis, the Spectrogram and RSSI measurements can be automatically saved into an external USB memory. Post-analysis can be performed with JDViewer application software.



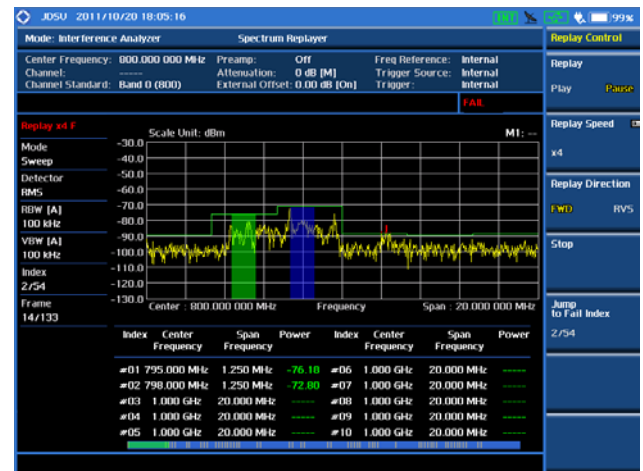
Interference Finder is an automatic triangulation algorithm that uses GPS coordinates to locate possible interference sources based on three measurements.

The interference finder calculates possible interference locations using its inscribed circle or circumscribed circle based on measured intersection points.

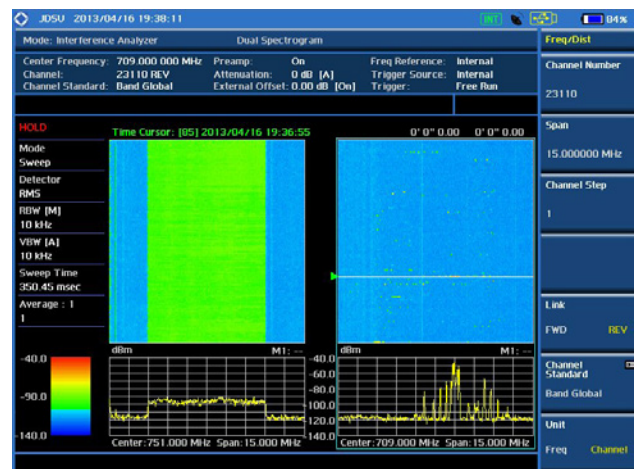


Spectrum Replayer lets users retrieve and replay recorded spectrum analyzer traces in interference analysis mode. These traces can be played back in the Spectrogram or RSSI.

Users can configure the limit line to create failure points when signals exceed it. The failure points are clearly displayed on the trace timeline for quick access during playback.



Dual Spectrogram* captures the spectral activities for two different bands over time to identify periodic or intermittent band signals.



*Only available for the JD746A.

Channel Scanner

The Channel Scanner function (option 012) can measure up to 20 independent channels for any cellular technology at any channel or frequency.

The function simply shows the power level for each signal type.



Channel Scanner function

GPS Receiver and Antenna

The GPS receiver (option 010) gives the location (latitude, longitude, and altitude) and timing for highly-accurate frequency measurements to independently verify base-station timing.



Analyzer with GPS antenna

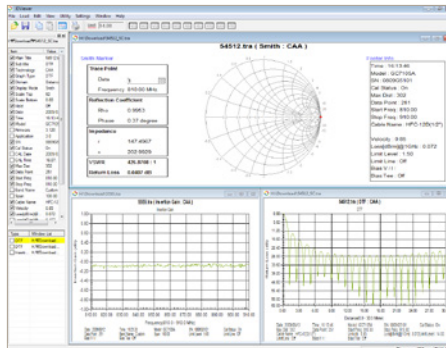
Application Software

JDViewer Features

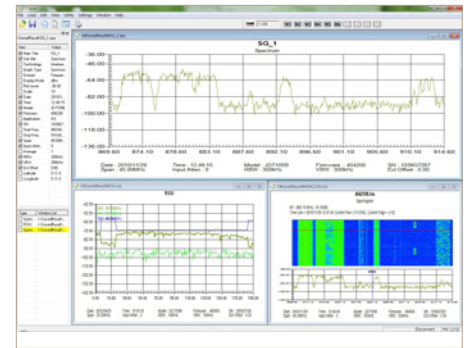
- Communicates with the analyzer via LAN or USB
- Retrieves measured or saved measurements
- Exports measurement results
- Generates and prints configurable reports
- Creates a composite file of multiple spectrogram traces
- Analyzes measurement results allowing for assignment of multiple markers and limit lines
- Creates user-defined settings for channel power, occupied bandwidth, SEM, and ACLR
- Registers and edits user-definable cable types and frequency bands

The analyzer communicates with two Windows-based applications:

- JDViewer — for post-processing, report generation, personalized settings, and coverage map creation
- JDRemote — for full remote control



JDViewer VSWR, DTF, Smith chart



JDViewer spectrum, spectrogram, and RSSI



JDViewer route mapping

JDRemote Features

- This capability permits full remote control of the instrument through a software client.



Analyzer with JDRemote



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