

## 4.5 6dB Bandwidth

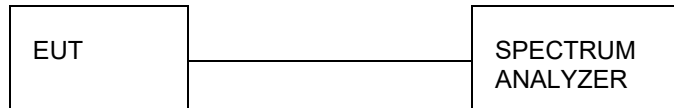
### Limit

For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz

### Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 KHz RBW and 300 KHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

### Test Configuration



### Test Results

Type	Channel	6dB Bandwidth (MHz)	Limit (KHz)	Result
802.11b	01	15.040	≥500	Pass
	06	12.040		
	11	13.880		
802.11g	01	16.360	≥500	Pass
	06	16.360		
	11	16.360		
802.11n(HT20)	01	17.320	≥500	Pass
	06	17.320		
	11	17.560		
802.11n(HT40)	03	31.520	≥500	Pass
	06	31.360		
	09	31.920		

Note:

- 1) Measured peak power spectrum density at difference data rate for each mode and recorded worst case for each mode.
- 2) Test results including cable loss;
- 3) Worst case data at 1Mbps at IEEE 802.11b; 6Mbps at IEEE 802.11g; 6.5Mbps at IEEE 802.11n HT20; 13.5Mbps at IEEE 802.11n HT40.

Please refer to following plots;

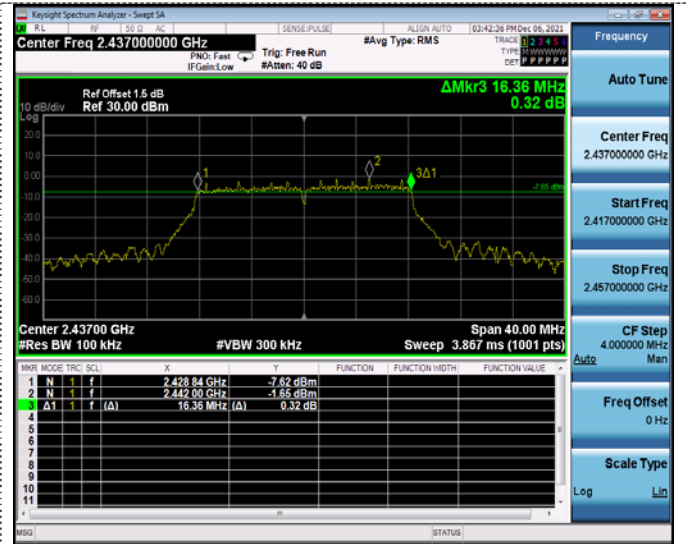
802.11b

802.11g



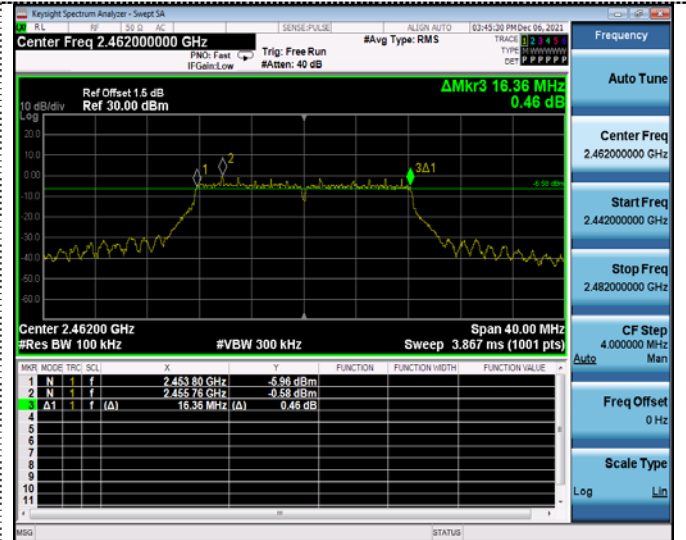
CH01

CH01



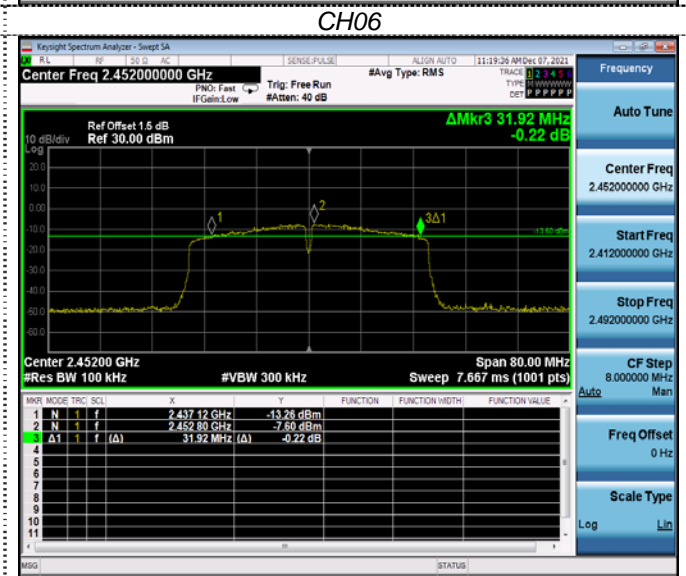
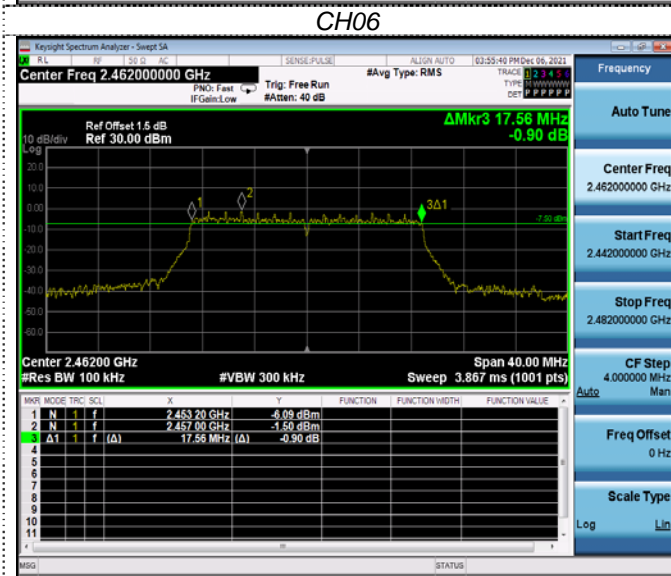
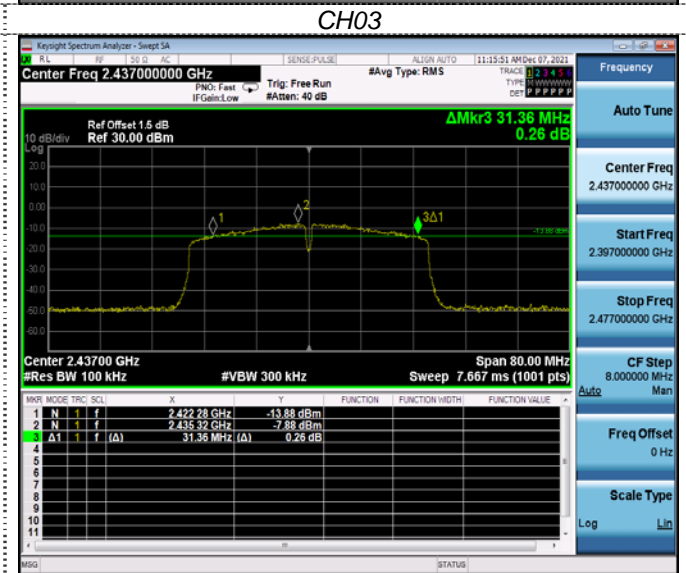
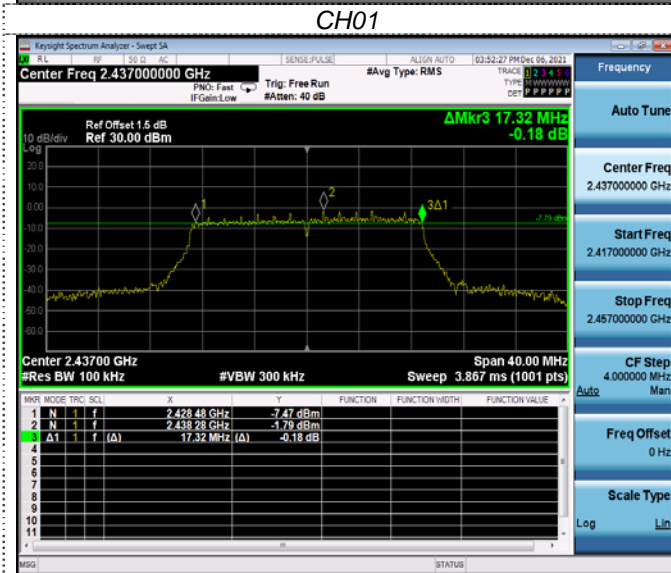
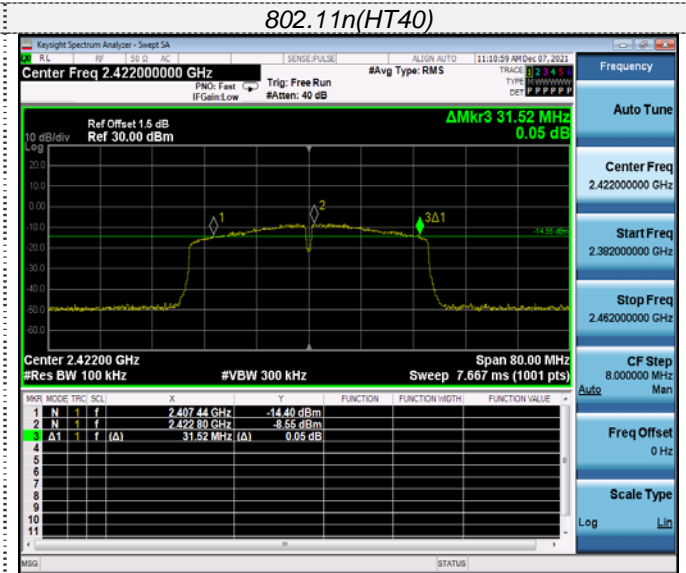
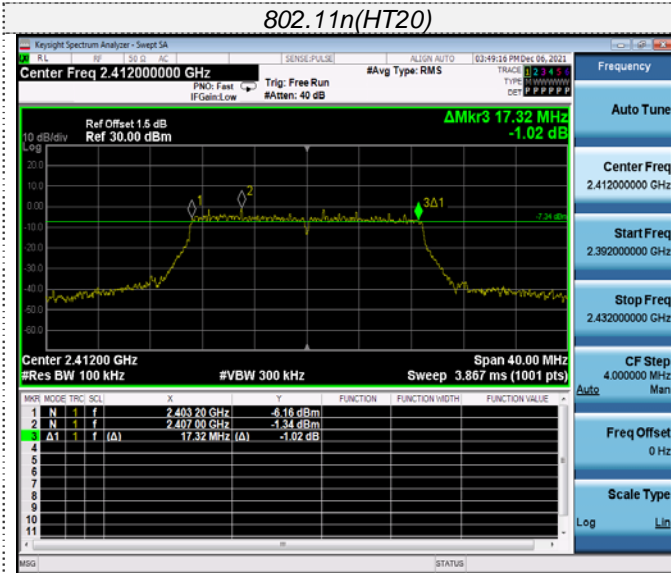
CH06

CH06



CH11

CH11



CH11

CH09

## 4.6 Out-of-band Emissions

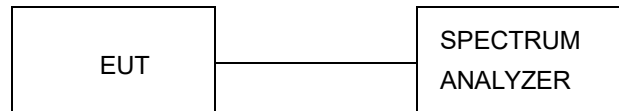
### Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

### Test Procedure

Connect the transmitter output to spectrum analyzer using a low loss RF cable, and set the spectrum analyzer to RBW=100 kHz, VBW= 300 kHz, peak detector, and max hold. Measurements utilizing these settings are made of the in-band reference level, bandedge and out-of-band emissions.

### Test Configuration



### Test Results

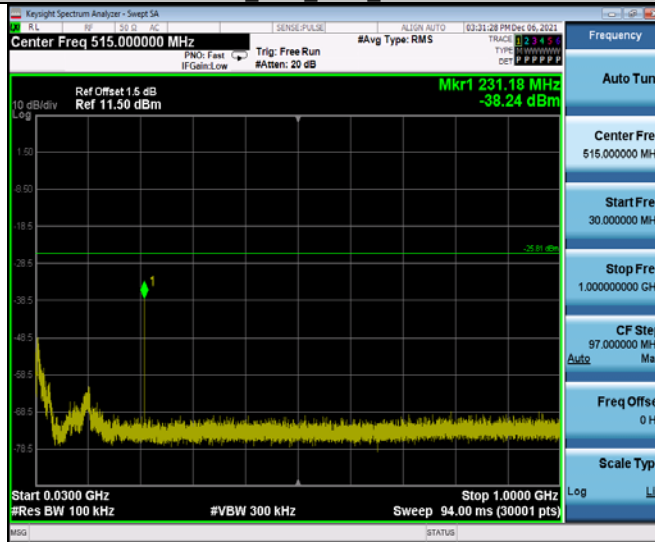
Remark: The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and bandedge measurement data. And record the worst data in the report.

Test plot as follows:

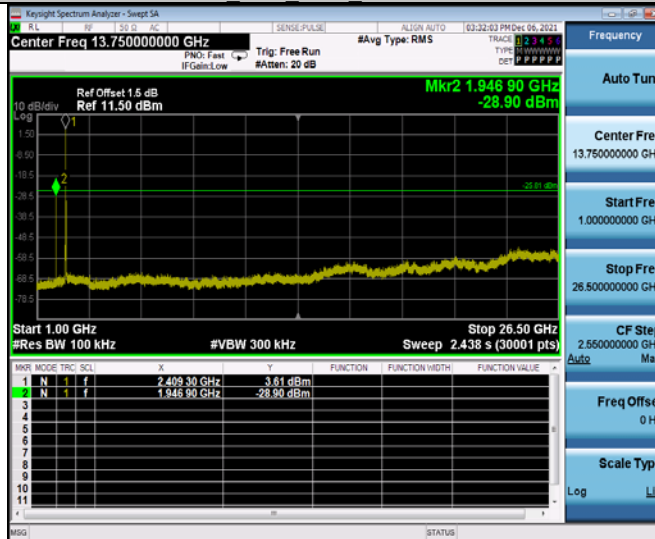
11B Ant1 2412 0~Reference



11B Ant1 2412 30~1000



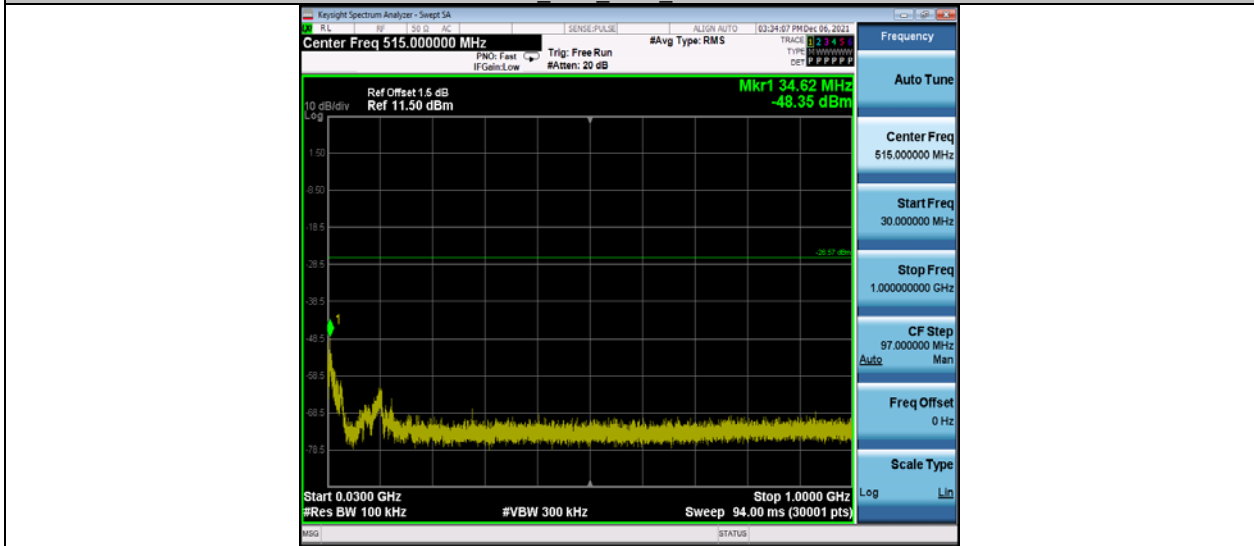
11B Ant1 2412 1000~26500



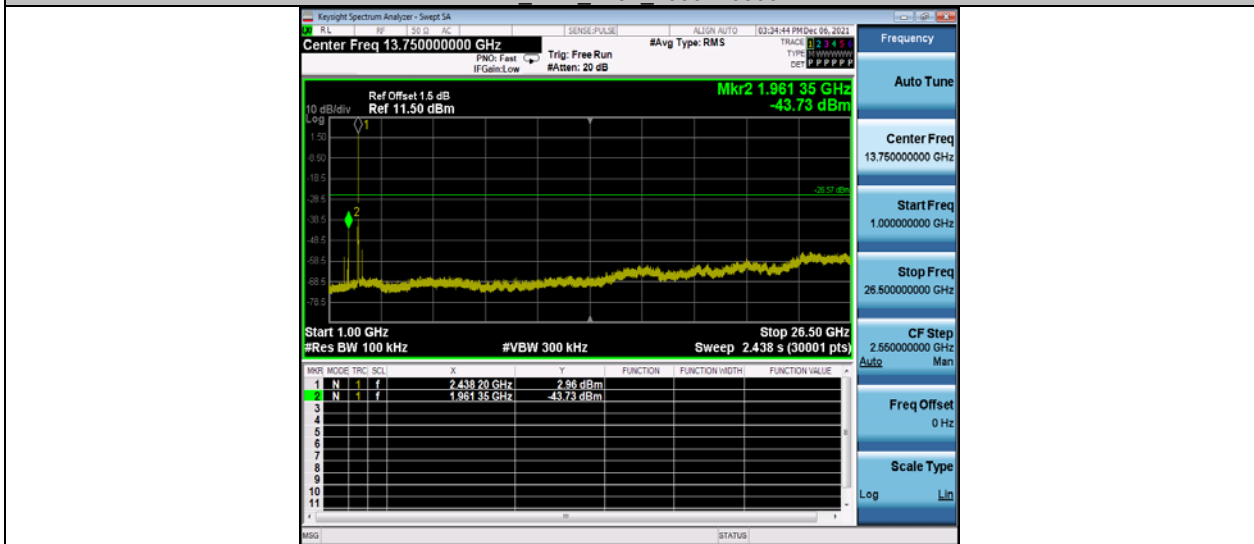
11B Ant1 2437 0~Reference



11B Ant1 2437 30~1000



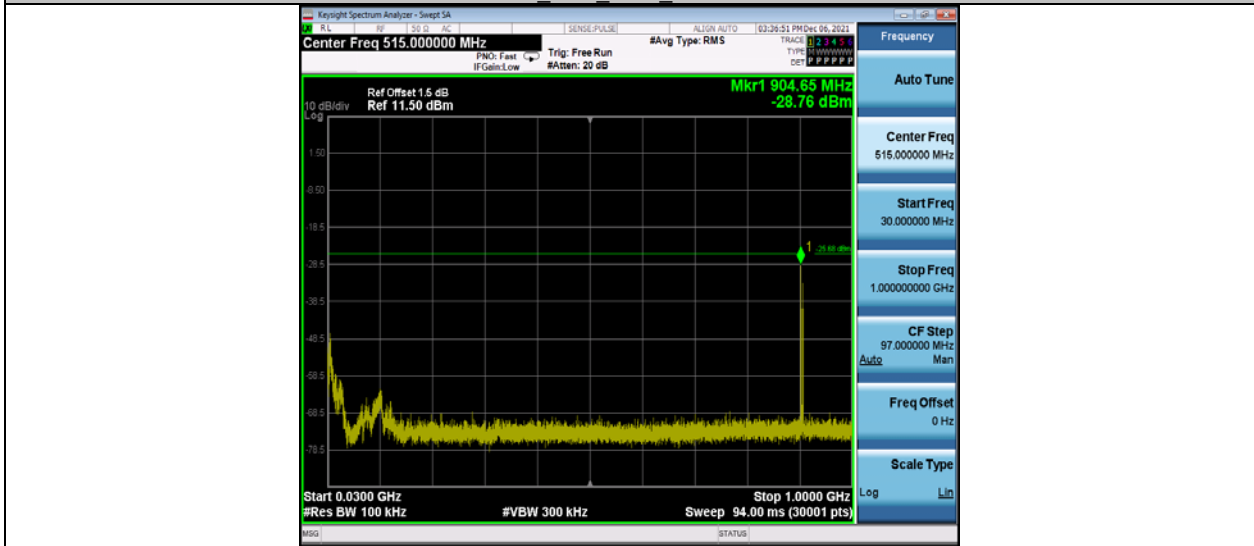
11B Ant1 2437 1000~26500



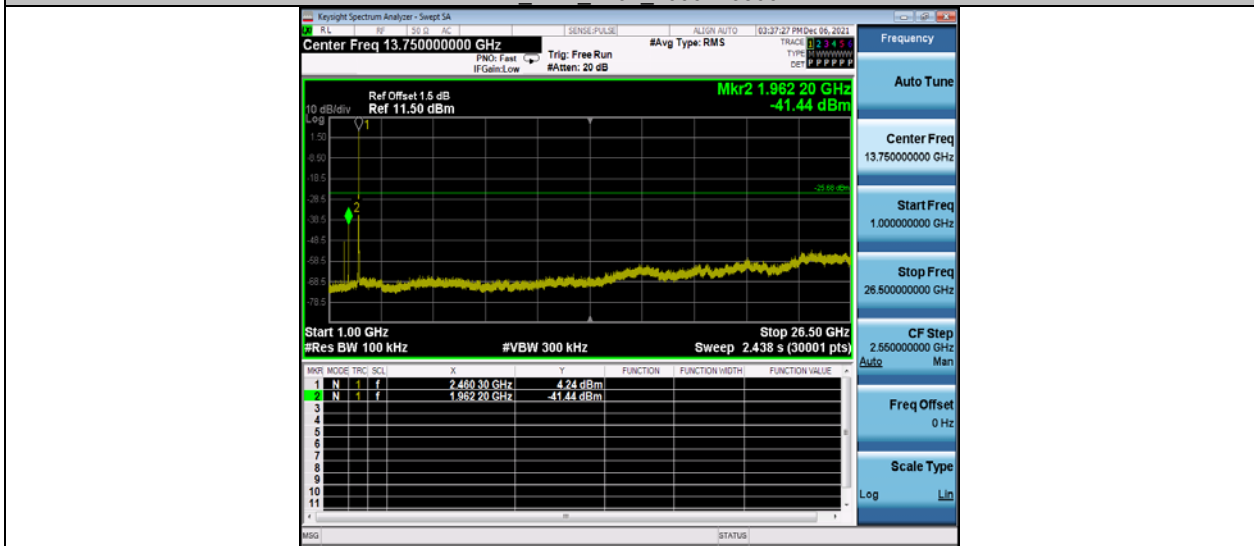
11B Ant1 2462 0~Reference



11B Ant1\_2462\_30~1000



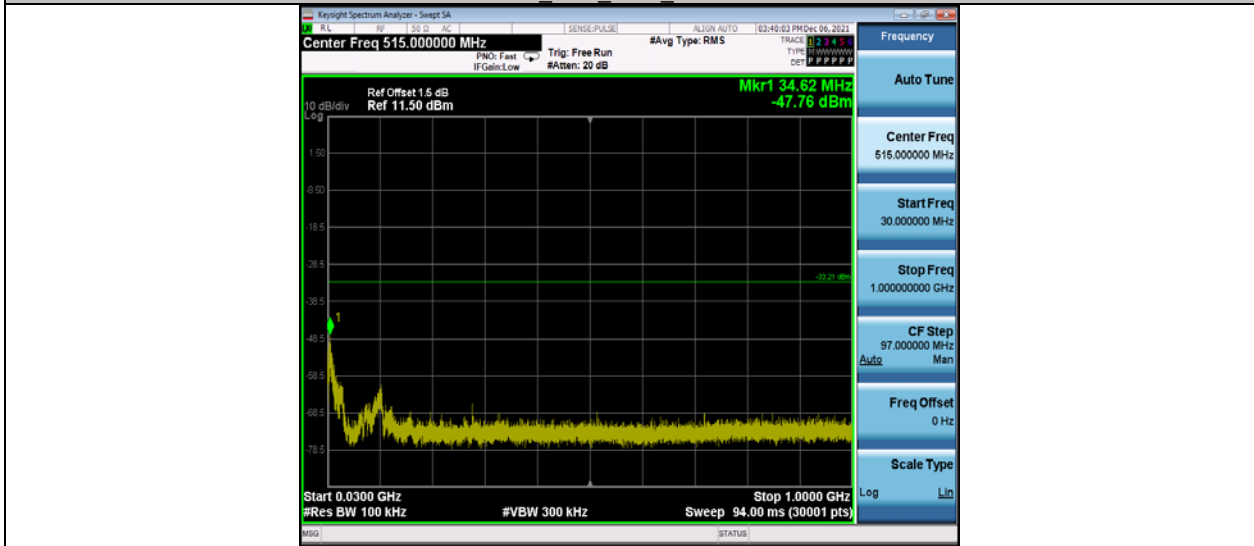
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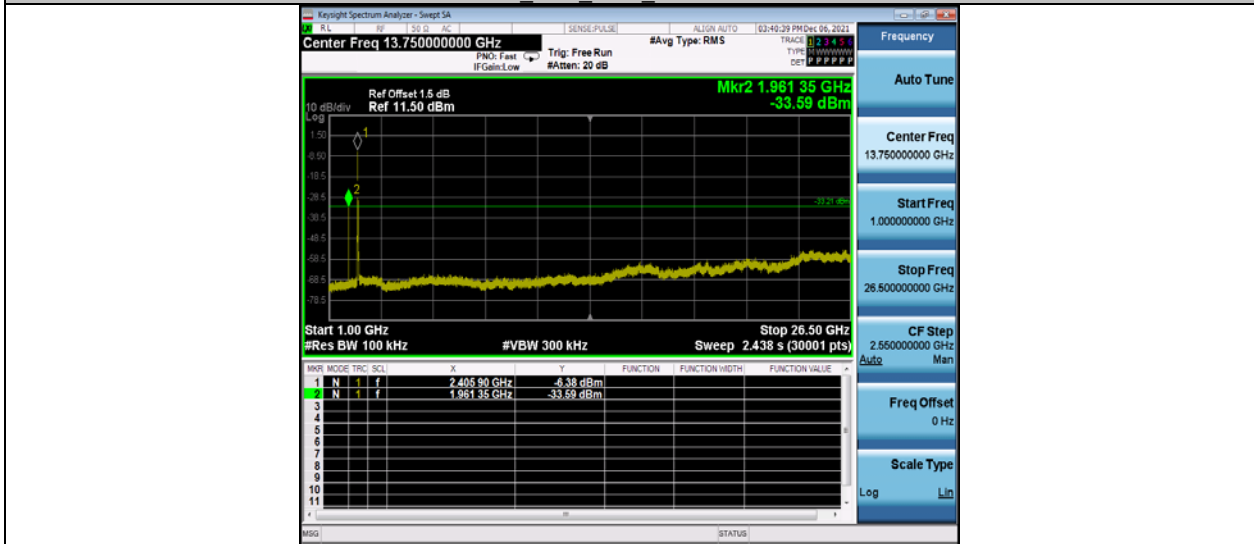
11G Ant1\_2412\_0~Reference



11G\_Ant1\_2412\_30~1000

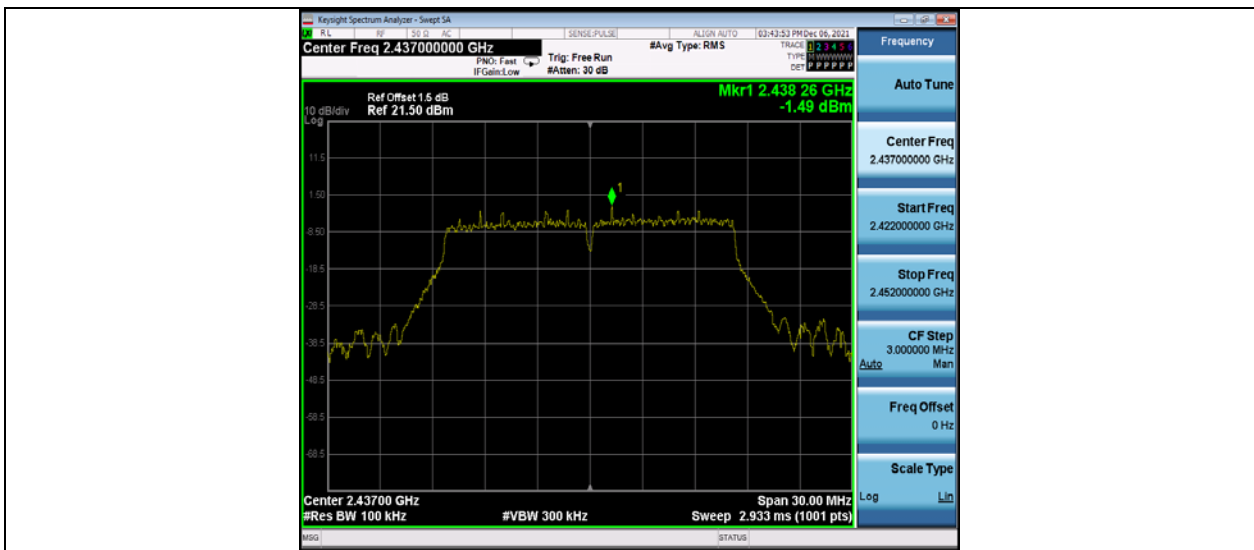


11G\_Ant1\_2412\_1000~26500

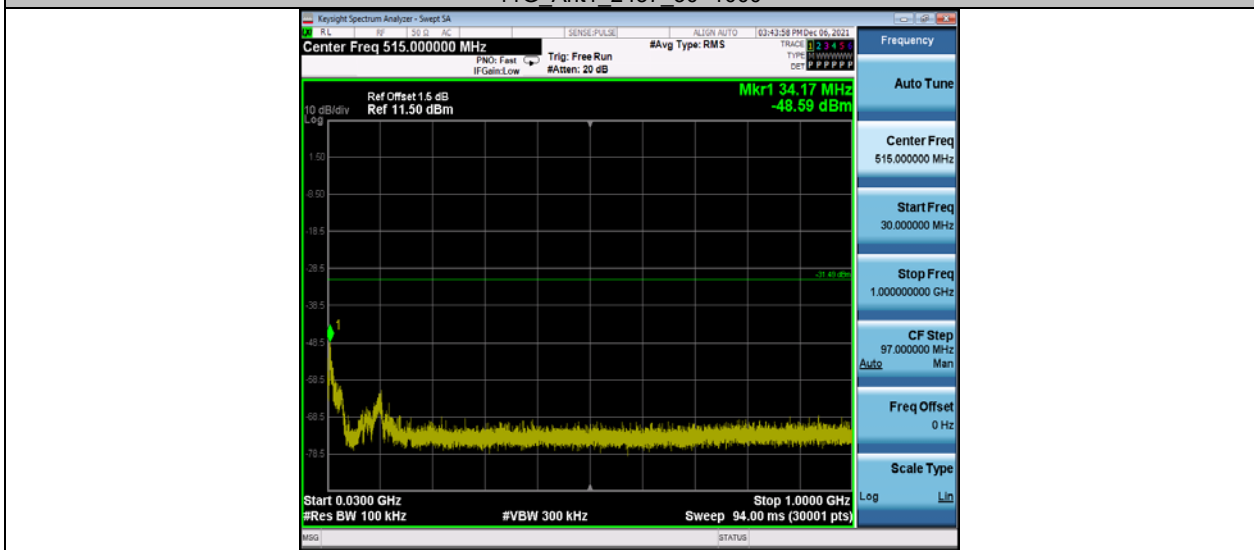


11G\_Ant1\_2437\_0~Reference

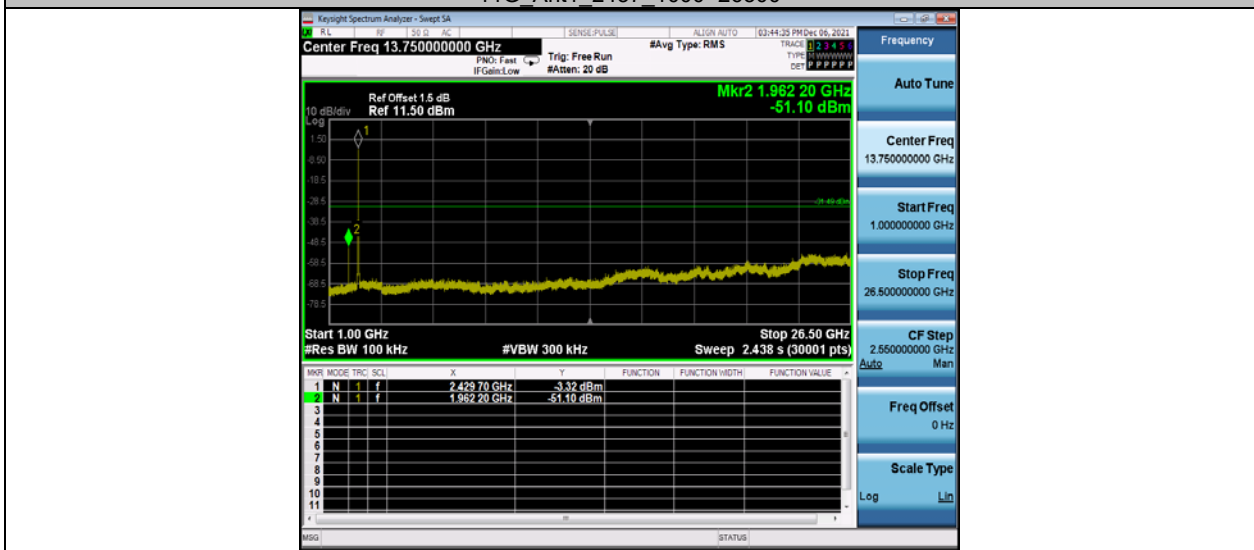




11G Ant1\_2437\_30~1000



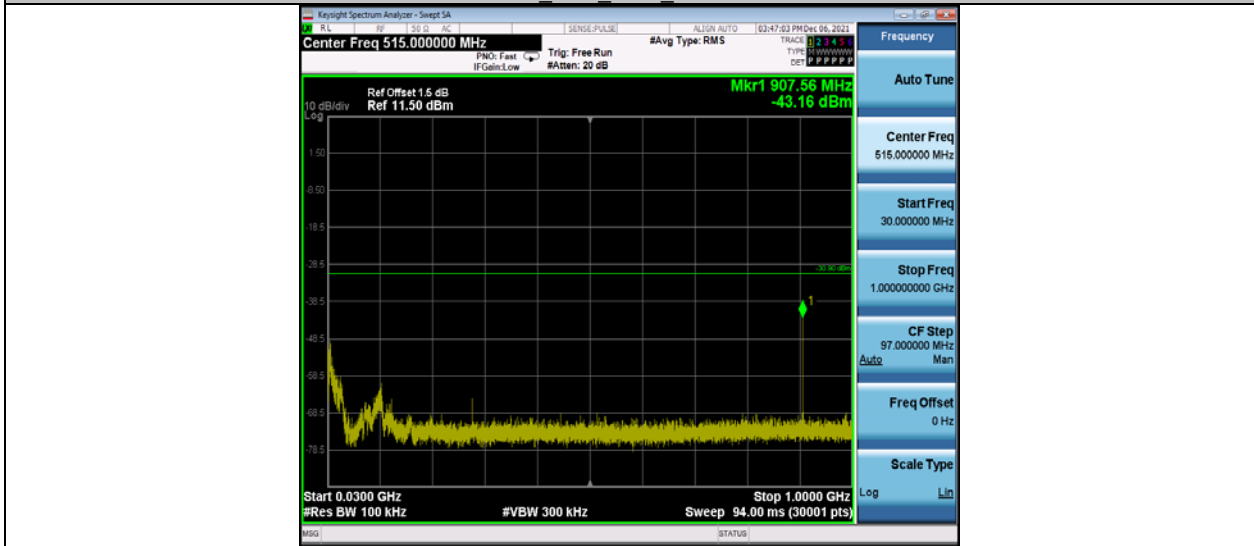
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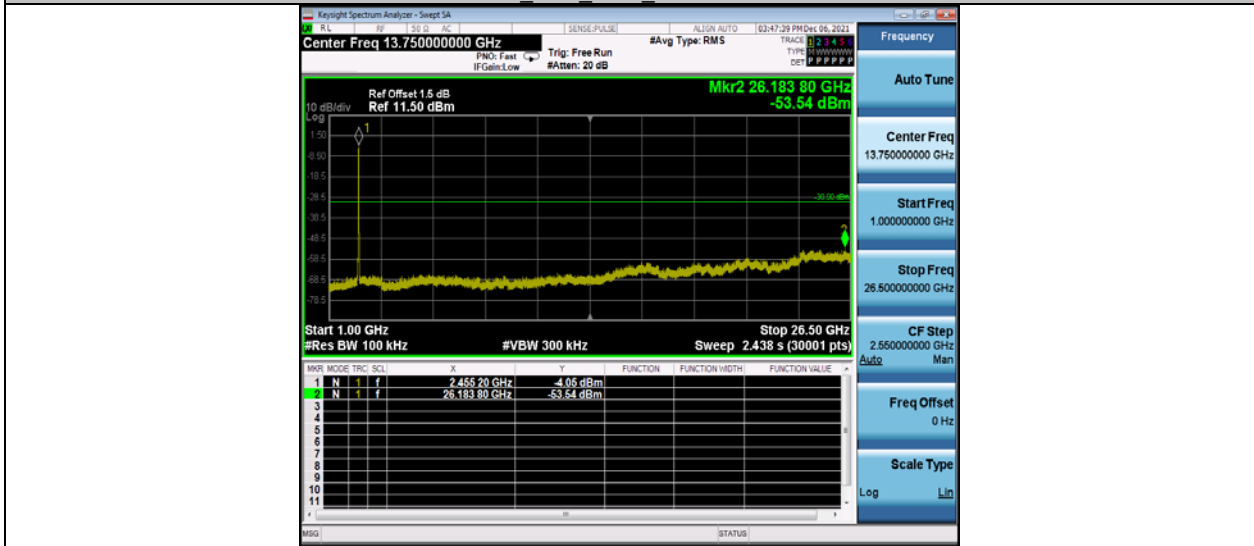
11G Ant1\_2462\_0~Reference



11G Ant1\_2462\_30~1000



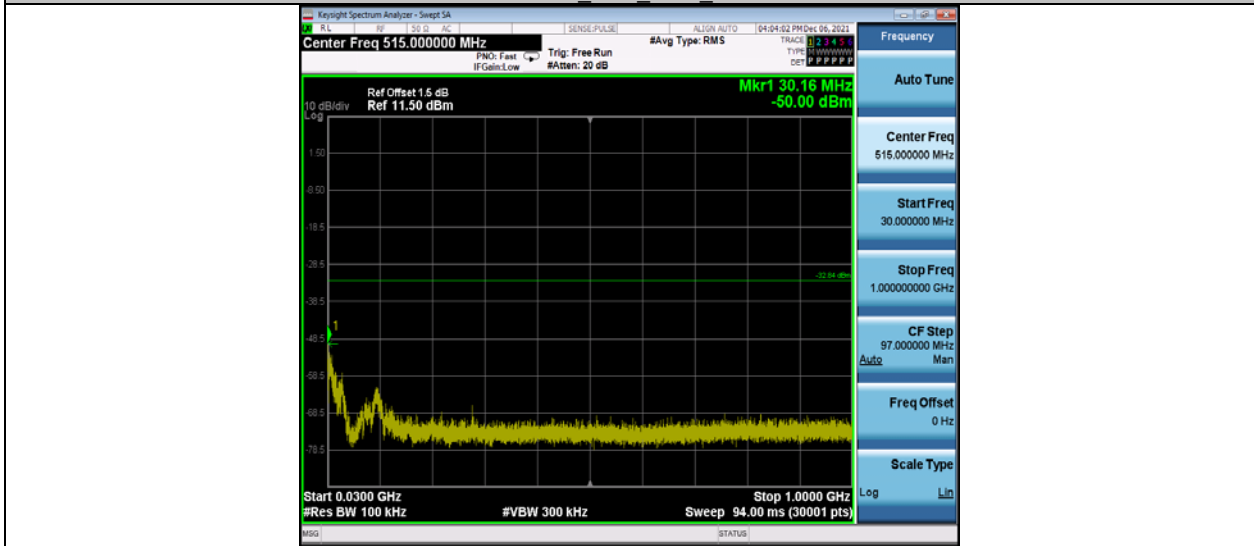
11G Ant1\_2462\_1000~26500



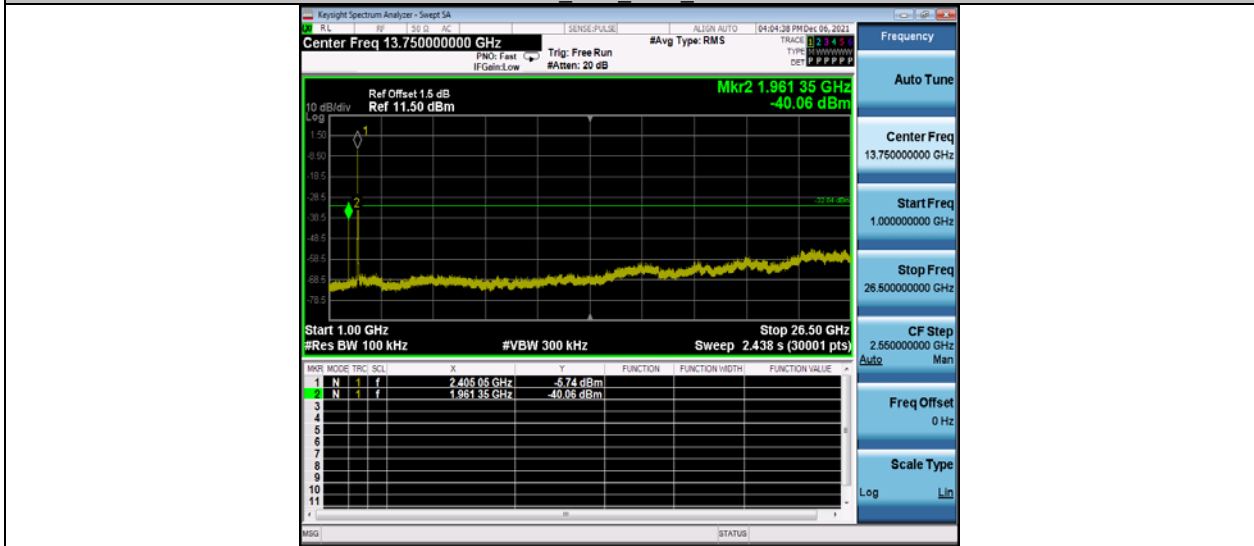
11N20SISO Ant1\_2412\_0~Reference



11N20SISO Ant1 2412 30~1000



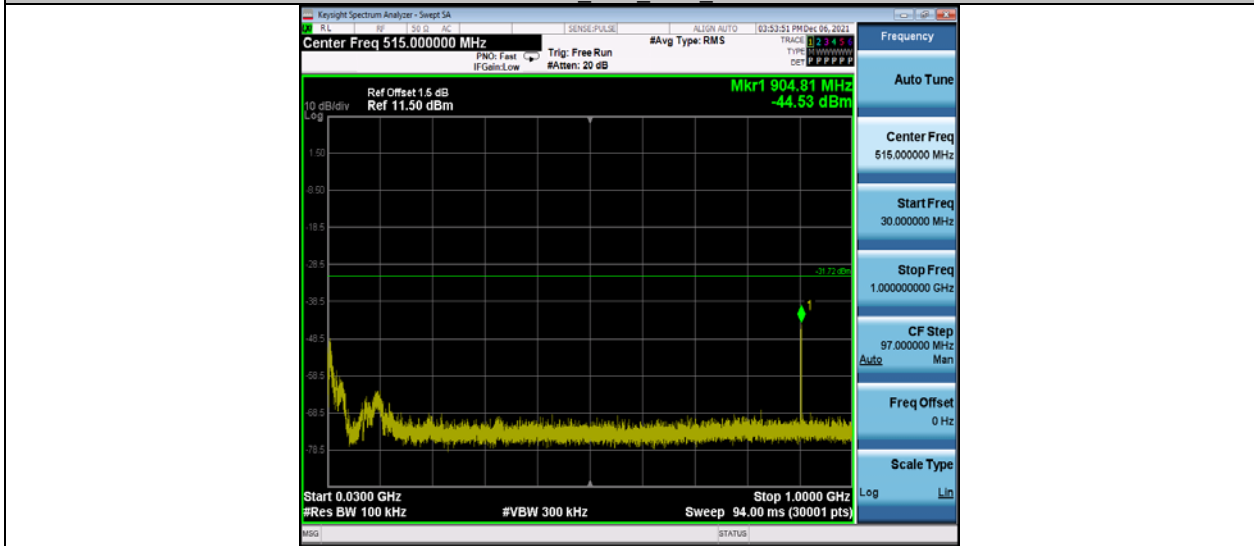
11N20SISO Ant1 2412 1000~26500



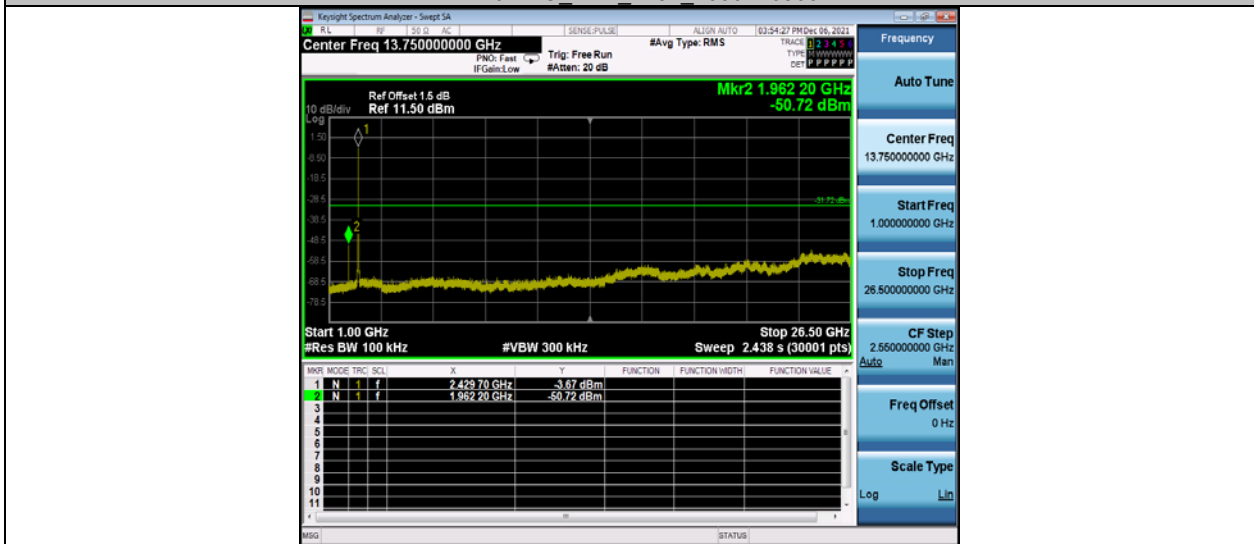
11N20SISO Ant1 2437 0~Reference



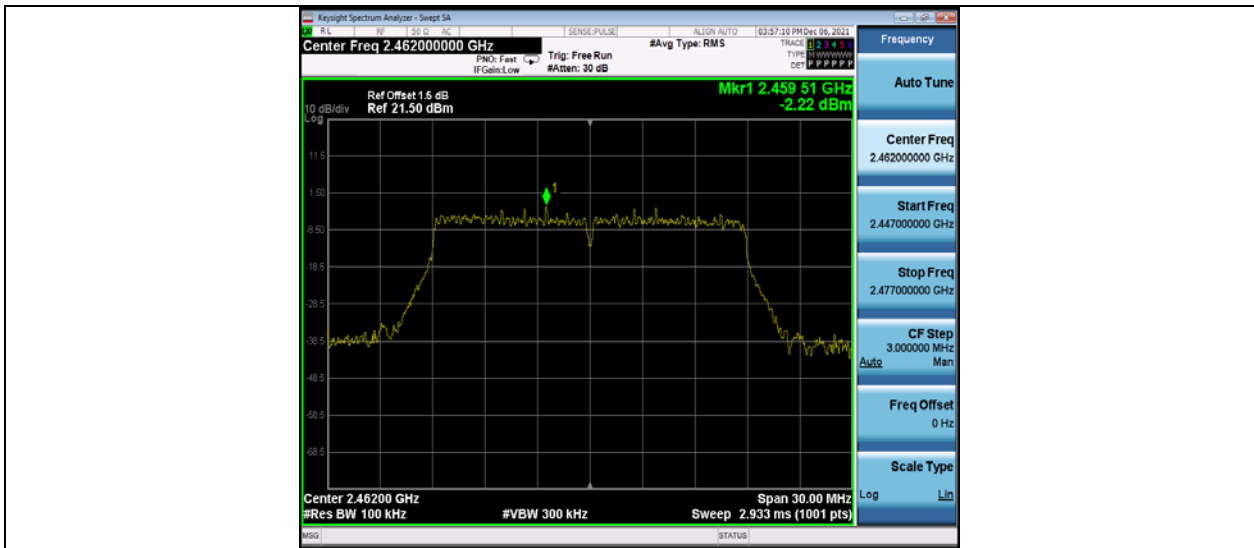
11N20SISO Ant1 2437 30~1000



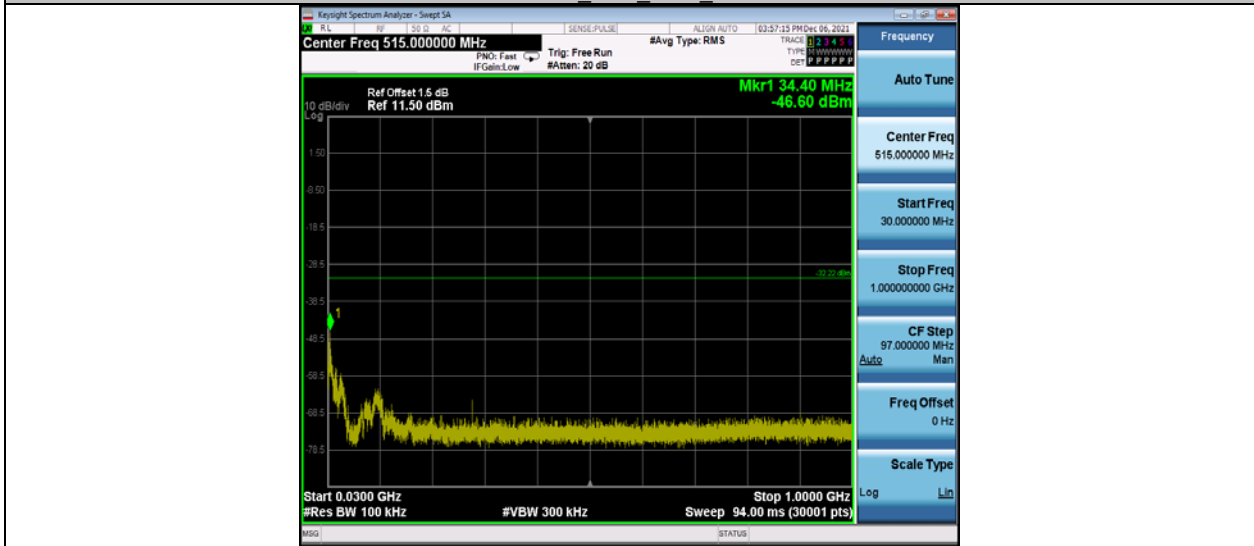
11N20SISO Ant1 2437 1000~26500



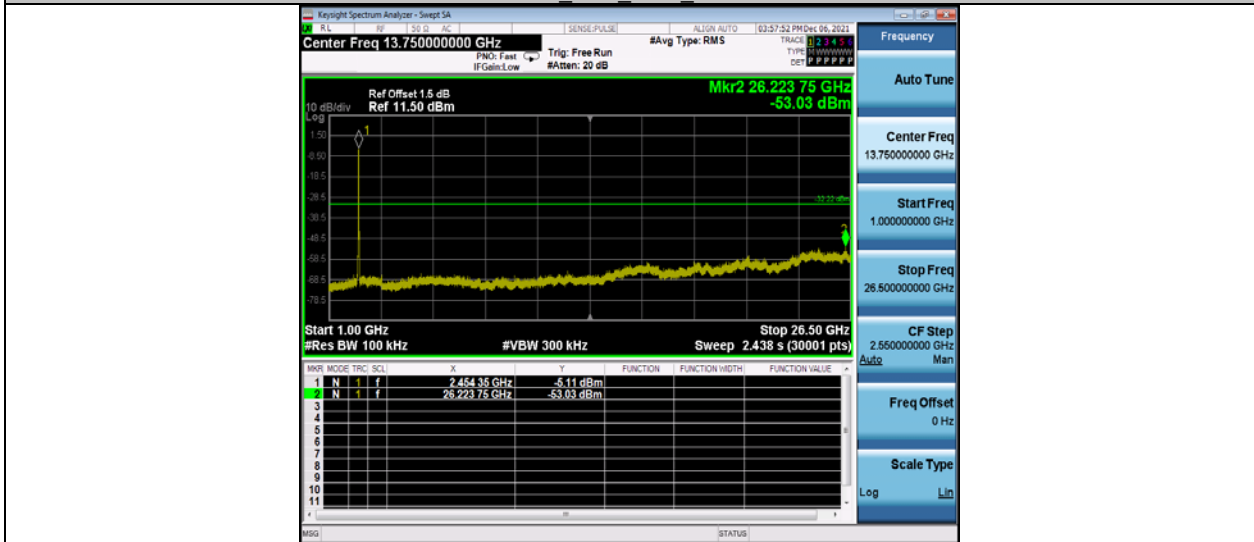
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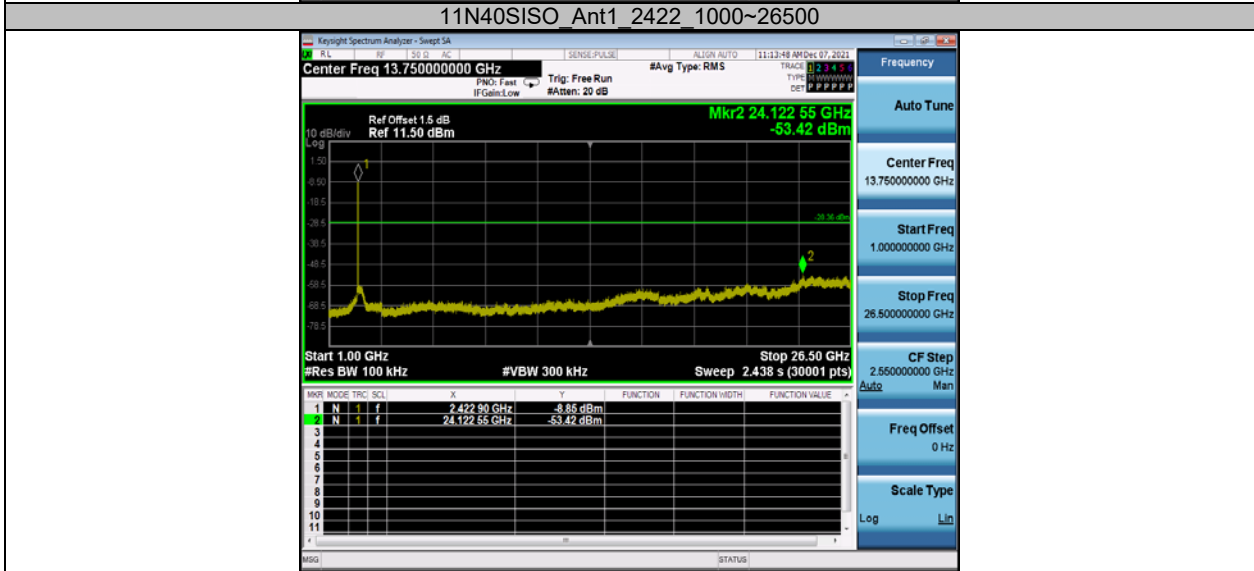
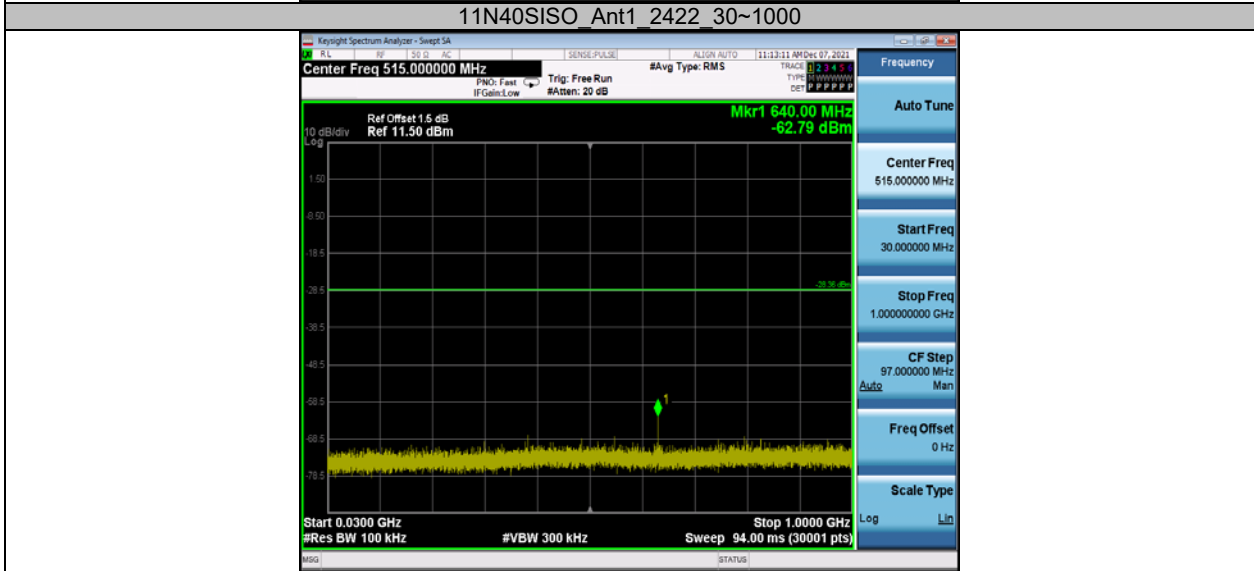
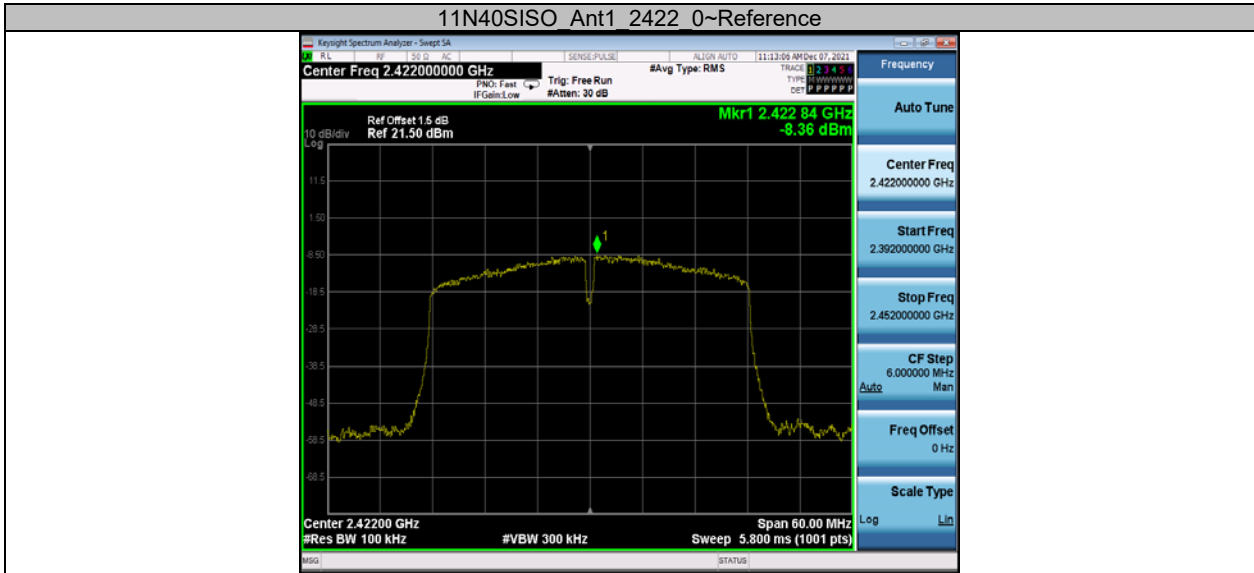


11N20SISO Ant1 2462 30~1000



11N20SISO Ant1 2462 1000~26500

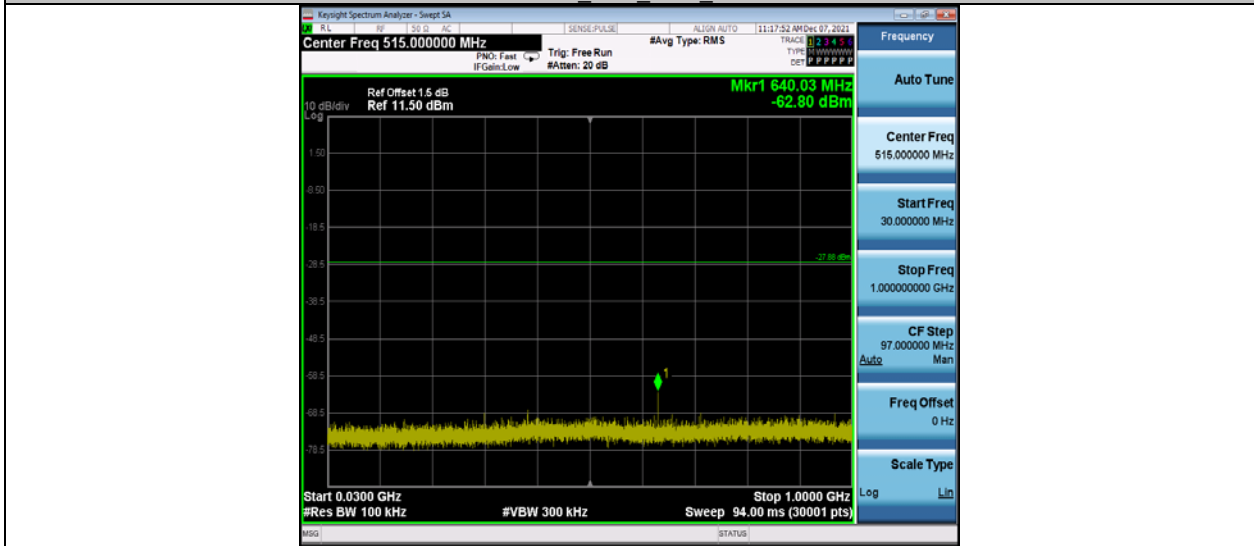




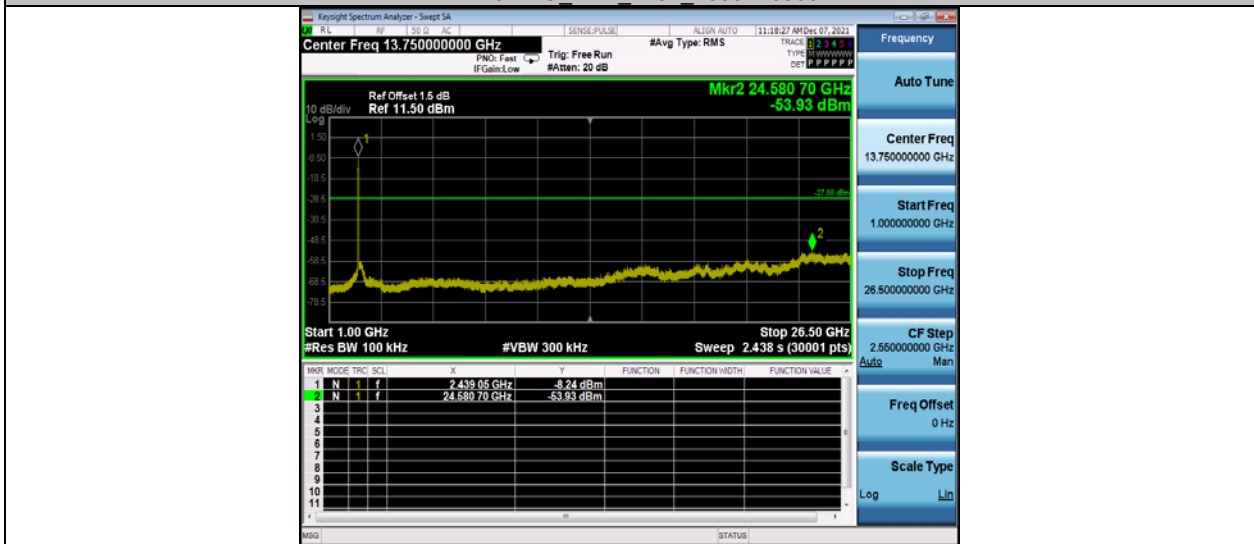
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11N40SISO Ant1 2437 30~1000



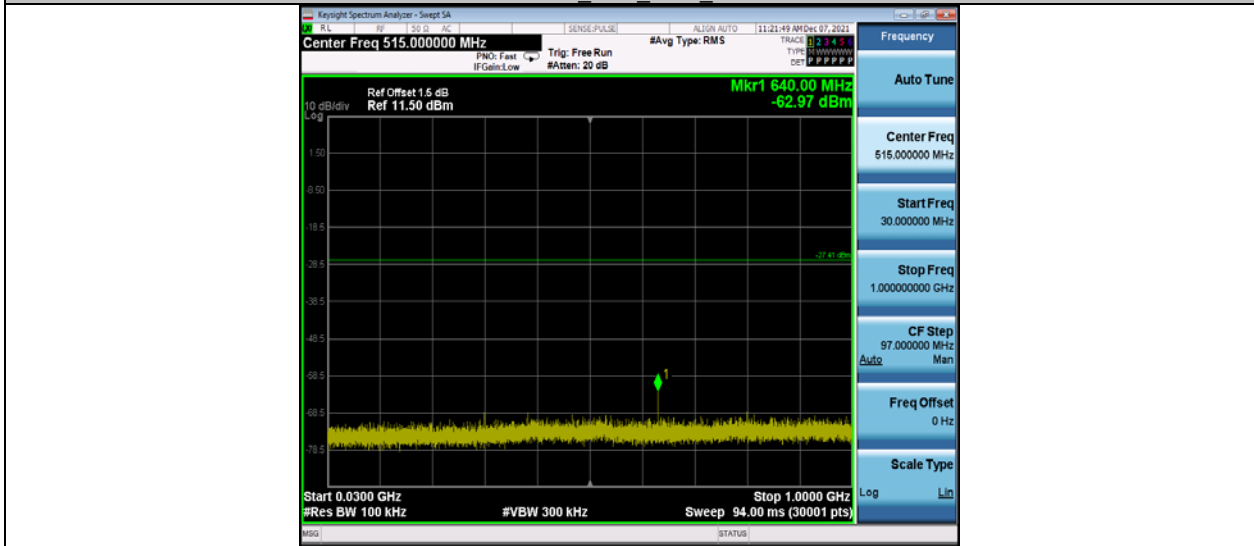
11N40SISO Ant1 2437 1000~26500



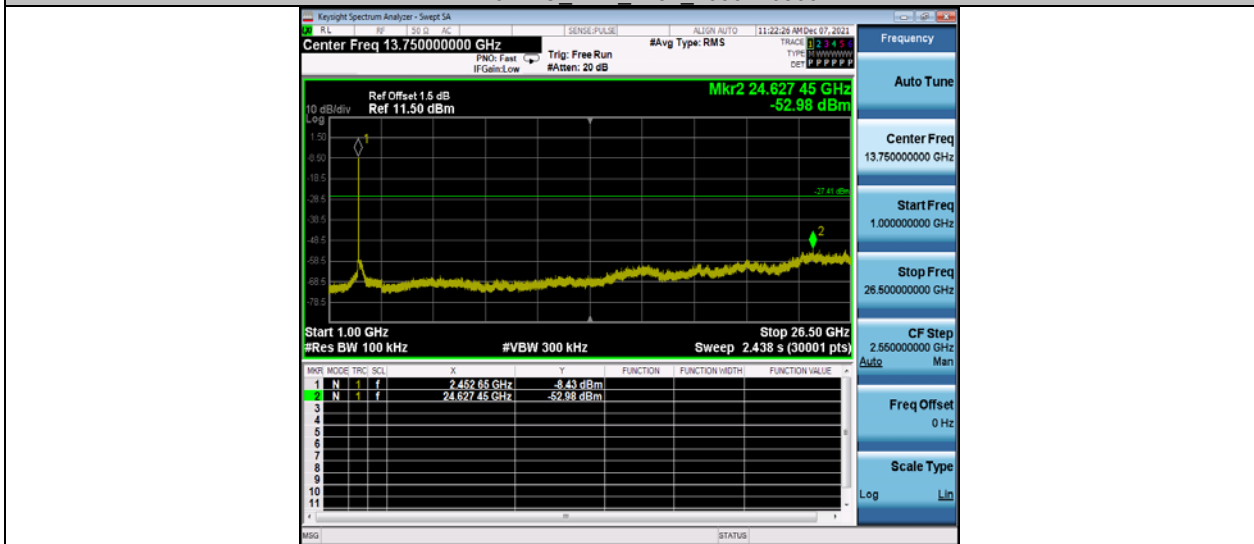
11N40SISO Ant1 2452 0~Reference



11N40SISO\_Ant1 2452 30~1000



11N40SISO\_Ant1 2452 1000~26500





**Band-edge Measurements for RF Conducted Emissions:**

**802.11b**



Left bandedge



Right bandedge

**802.11g**



Left bandedge



Right bandedge

802.11n(HT20)



Left bandedge



Right bandedge

802.11n(HT40)



Left bandedge



Right bandedge

## 4.7 Antenna Requirement

### Standard Applicable

**For intentional device, according to FCC 47 CFR Section 15.203:**

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited

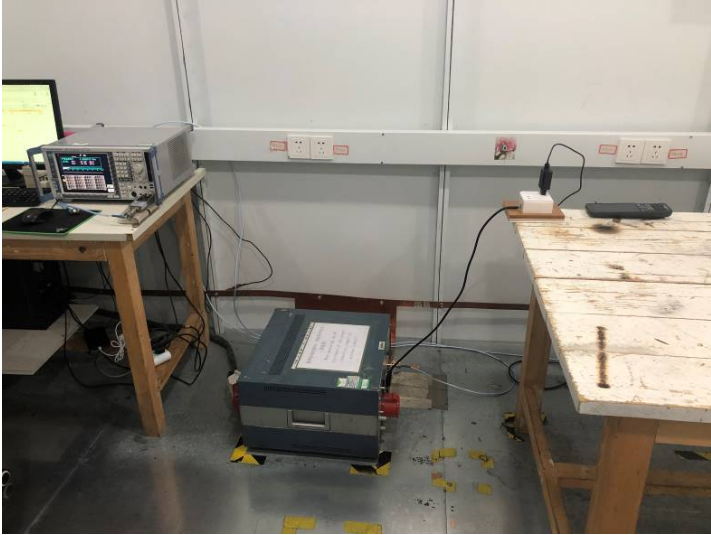
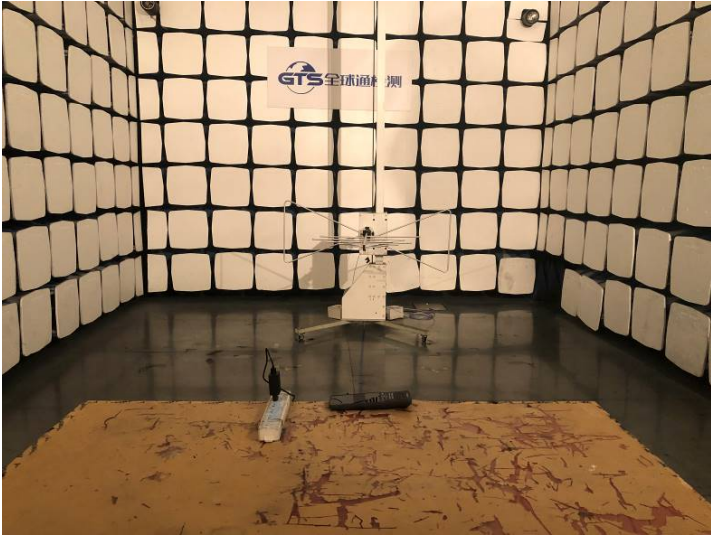
**FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1) (I):**

(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

### Test Result:

The maximum gain of antenna was 0.00 dBi for 2.4GHz WIFI.

**5 Test Setup Photos of the EUT**



## **6 Photos of the EUT**

Reference to the test report No. GTS20211222005-1-4

**\*\*\*\*\* End of Report \*\*\*\*\***