

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

Ant 1:

Type	Channel	6dB Bandwidth (MHz)	Limit (KHz)	Result
802.11b	01	8.640	≥500	Pass
	06	8.560		
	11	9.080		
802.11g	01	15.760	≥500	Pass
	06	15.720		
	11	15.680		
802.11n(HT20)	01	15.760	≥500	Pass
	06	15.960		
	11	16.120		
802.11n(HT40)	03	35.920	≥500	Pass
	06	35.120		
	09	30.080		
802.11ax(HT20)	01	15.640	≥500	Pass
	06	15.880		
	11	16.120		
802.11ax(HT40)	03	35.840	≥500	Pass
	06	35.120		
	09	30.000		

Ant 2:

Type	Channel	6dB Bandwidth (MHz)	Limit (KHz)	Result
802.11b	01	9.560	≥500	Pass
	06	10.040		
	11	9.120		
802.11g	01	15.720	≥500	Pass
	06	15.720		
	11	15.720		
802.11n(HT20)	01	15.880	≥500	Pass
	06	16.160		
	11	16.080		
802.11n(HT40)	03	35.360	≥500	Pass
	06	35.120		
	09	30.000		
802.11ax(HT20)	01	15.560	≥500	Pass
	06	15.920		
	11	15.920		
802.11ax(HT40)	03	35.760	≥500	Pass
	06	35.120		
	09	30.080		

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/ax HT20; 13.5Mbps at IEEE 802.11n/ax HT40;
- Please refer to following plots;

Ant1:

802.11b



802.11g



CH01



CH01



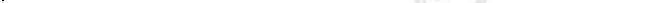
CH06



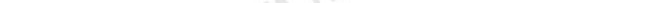
CH06



CH11



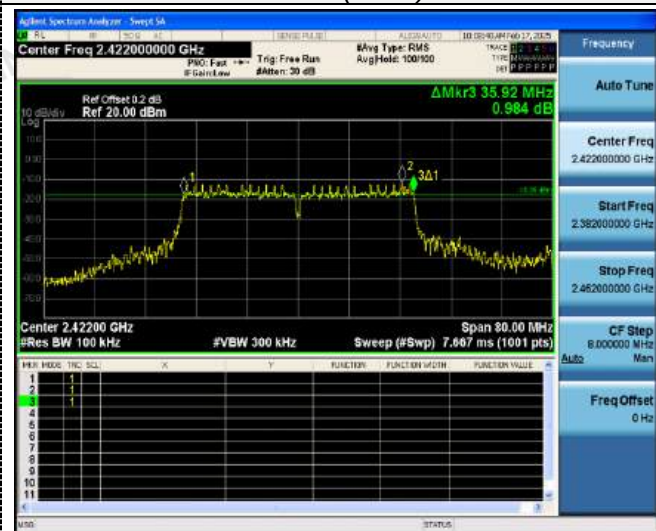
CH11



802.11n(HT20)



802.11n(HT40)



CH01



CH03



CH06



CH06



CH11

CH09

802.11ax(HT20)



802.11ax(HT40)



CH01



CH03



CH06



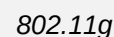
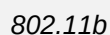
CH06



CH11

CH09

Ant 2:



CH01



CH01



CH06



CH06



CH11



CH11

802.11n(HT20)



802.11n(HT40)



CH01



CH03



CH06



CH06



CH11

CH09

802.11ax(HT20)



802.11ax(HT40)



CH01



CH03



CH06



CH06



CH11

CH09

4.6 Out-of-band Emissions

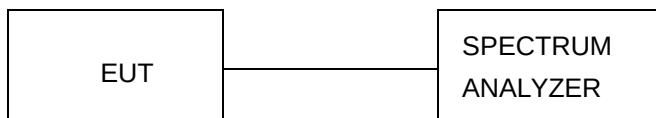
Limit

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, band edge 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 band edge measurement data. And record the worst data in the report.

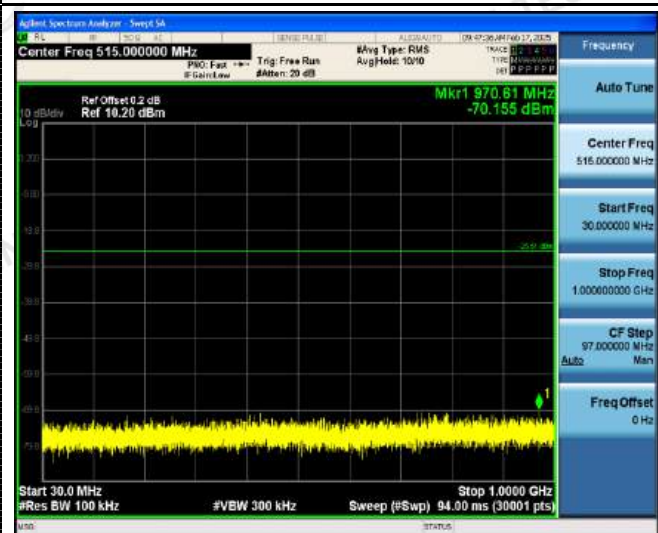
Test plot as follows:

Ant1:

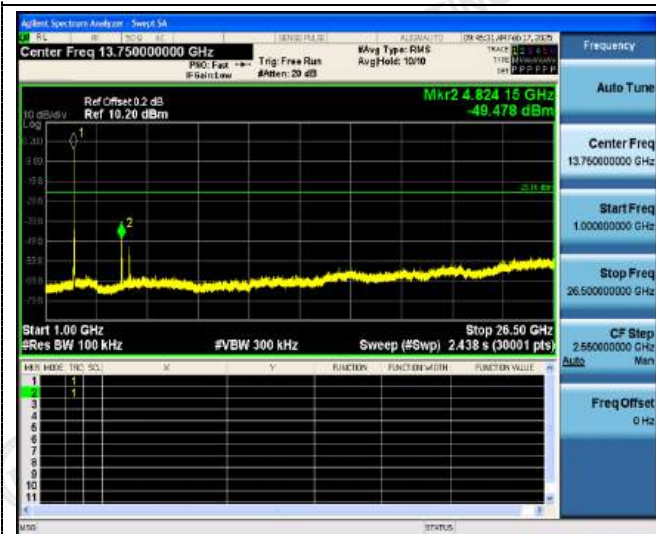
802.11b

Reference
CH01Reference
CH06

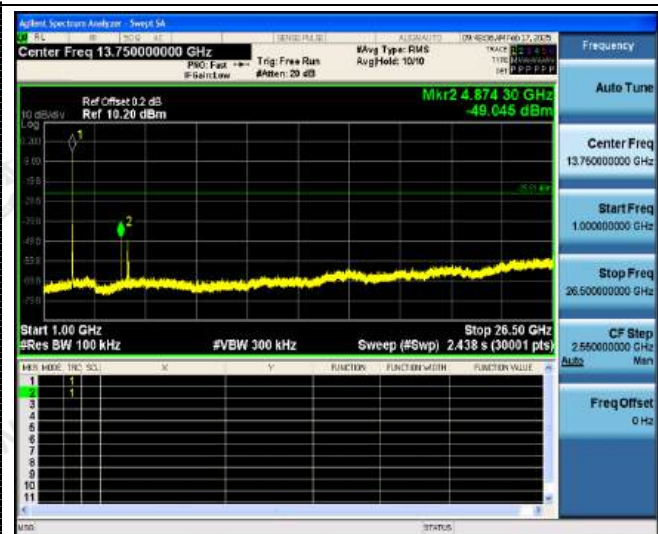
30MHz-1GHz



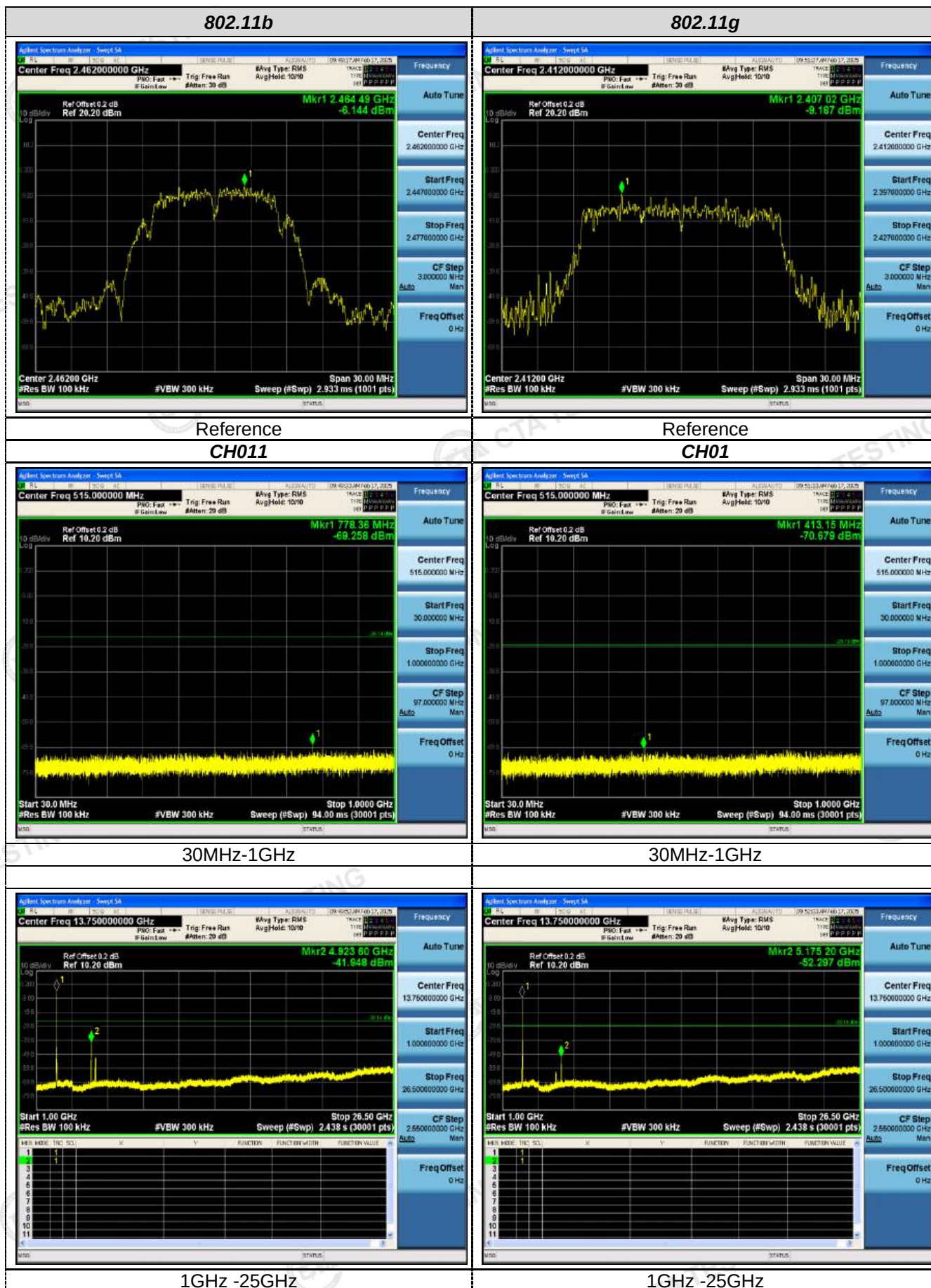
30MHz-1GHz



1GHz -25GHz



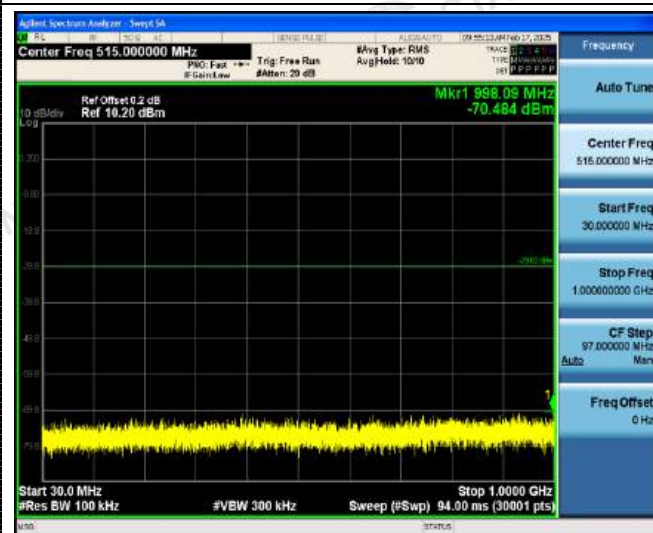
1GHz -25GHz



802.11g

Reference
CH06Reference
CH11

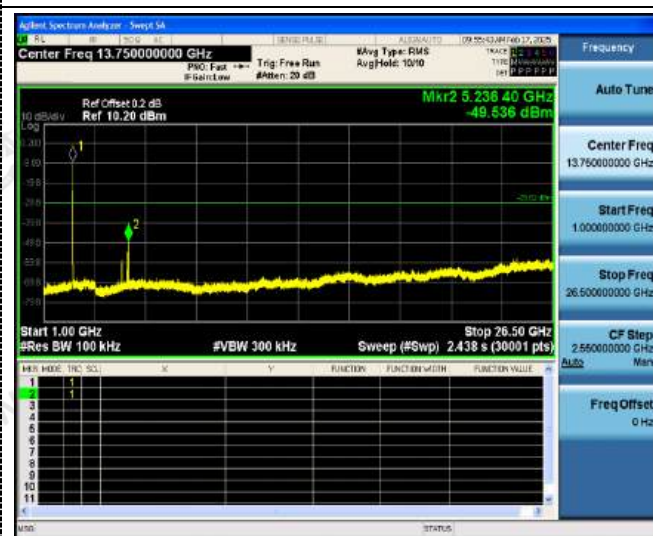
30MHz-1GHz



30MHz-1GHz

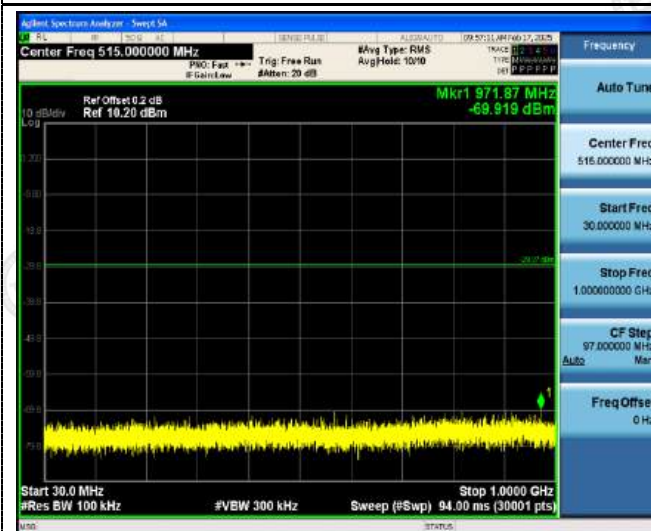


1GHz -25GHz

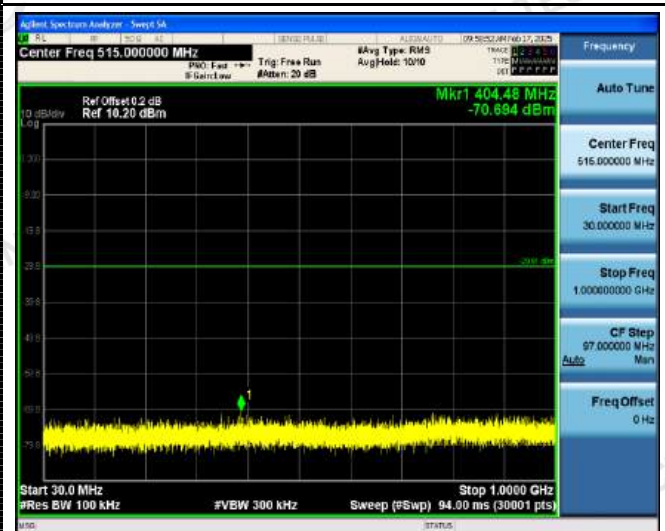


1GHz -25GHz

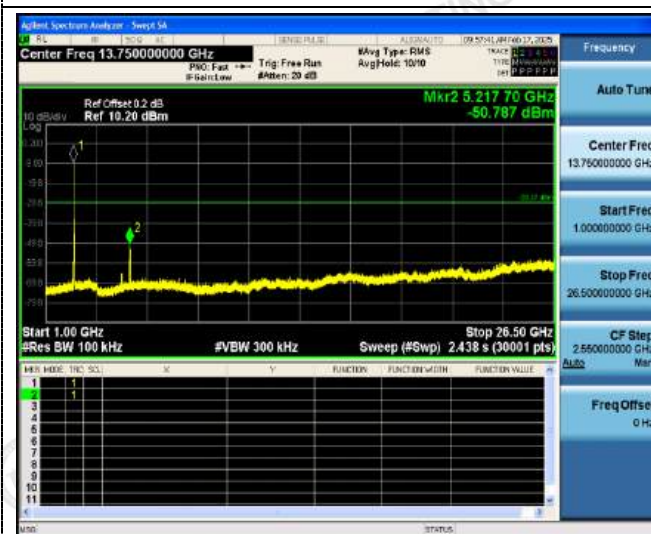
802.11n20

Reference
CH01Reference
CH06

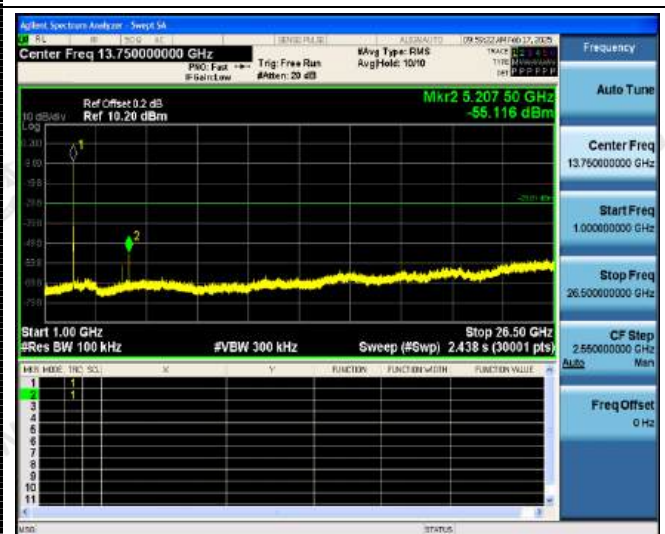
30MHz-1GHz



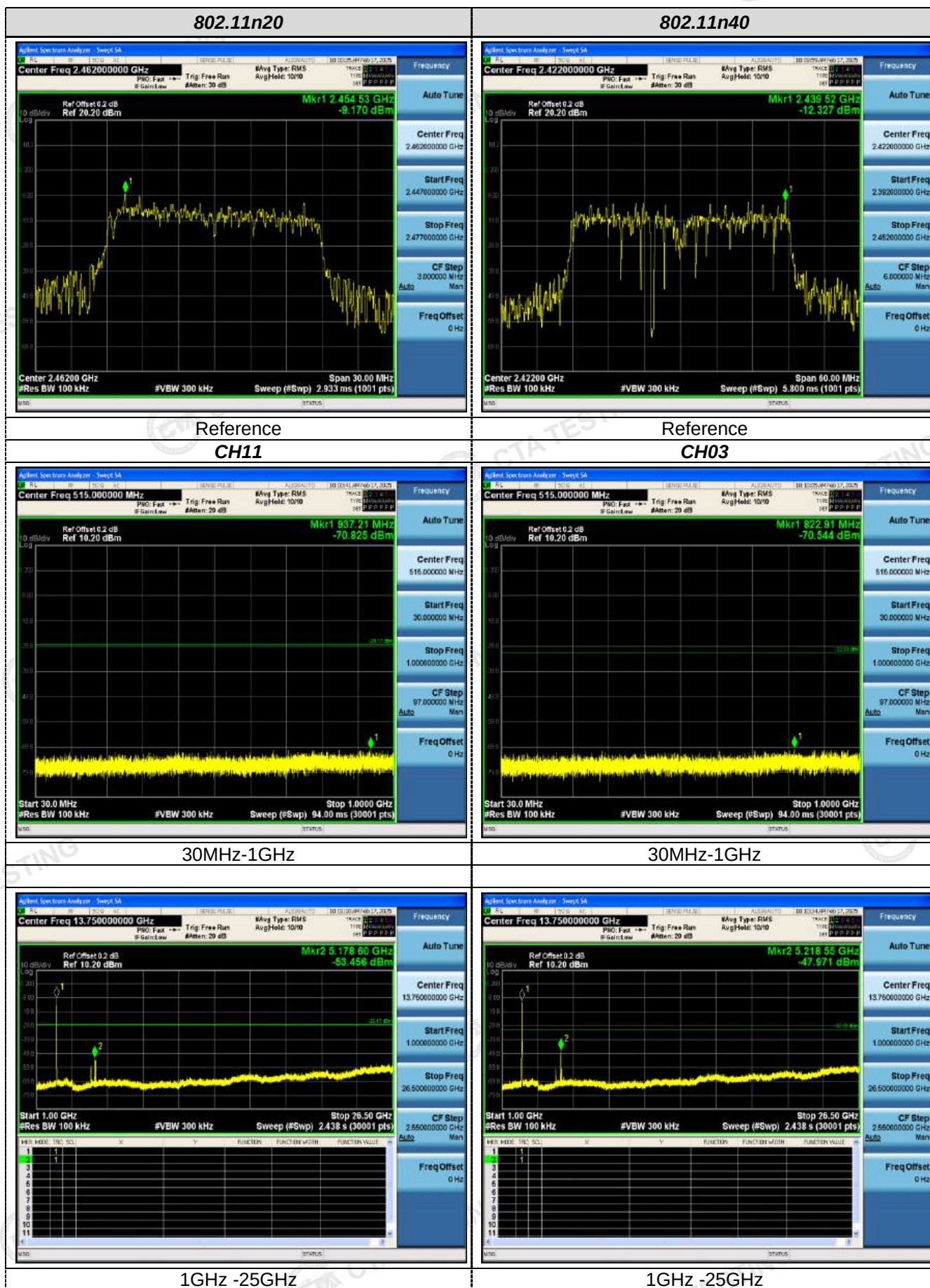
30MHz-1GHz



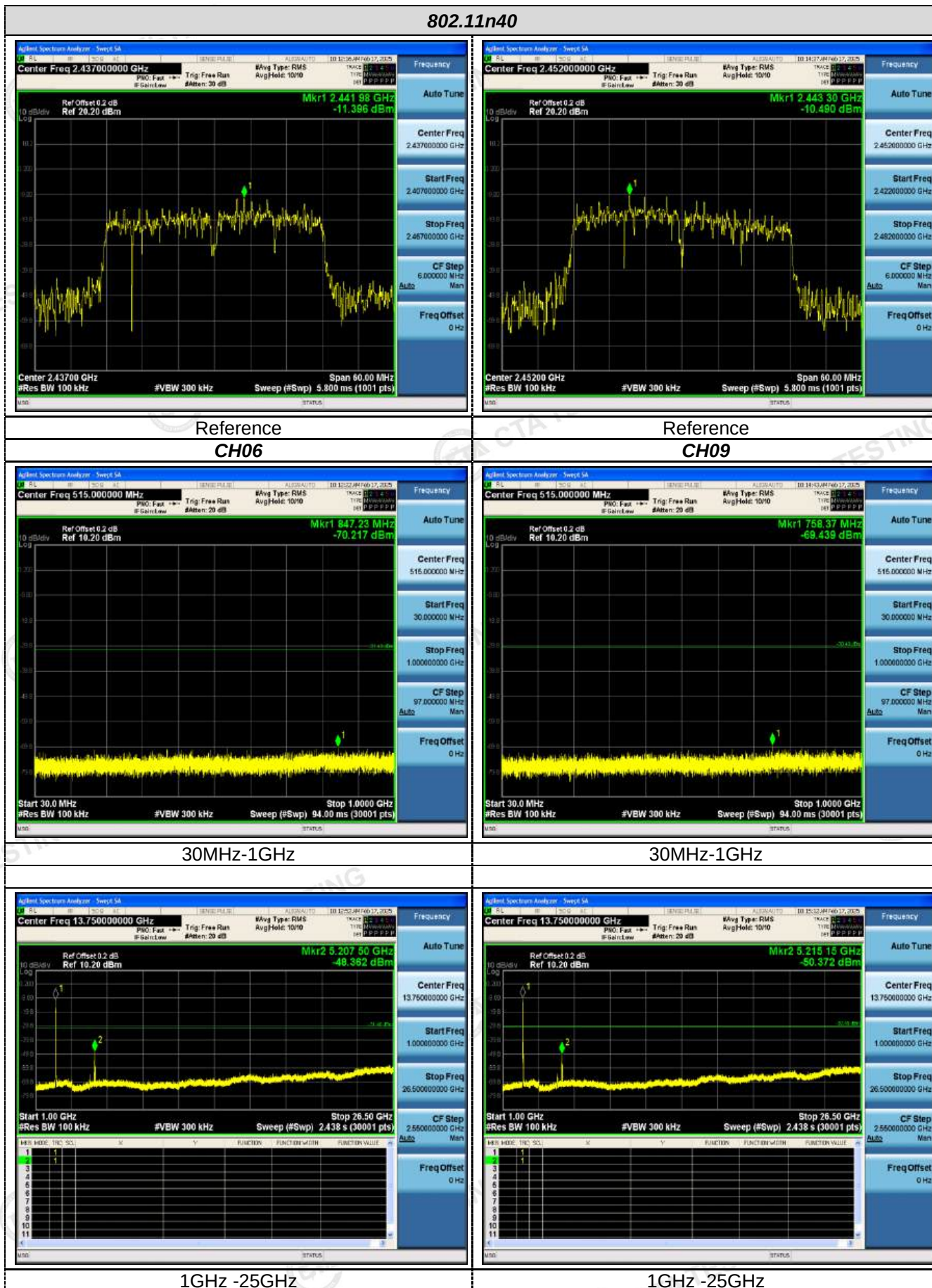
1GHz -25GHz



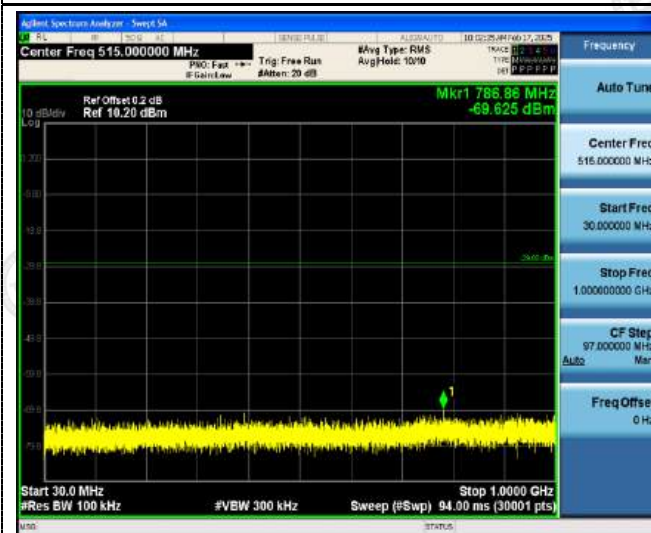
1GHz -25GHz



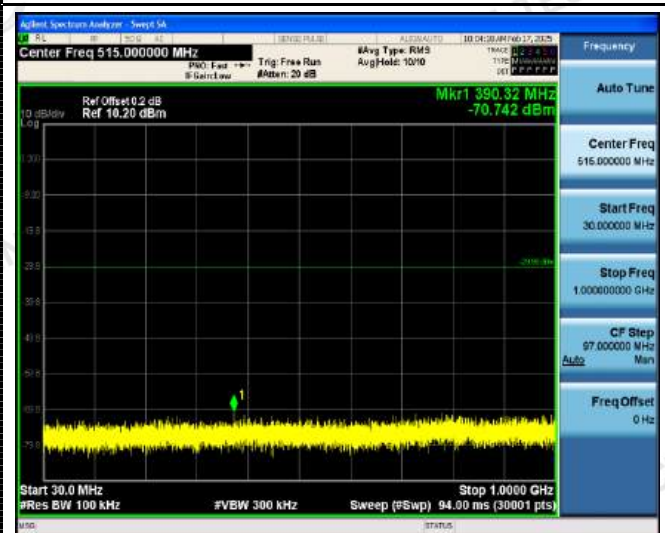
802.11n40



802.11ax20

Reference
CH01Reference
CH06

30MHz-1GHz



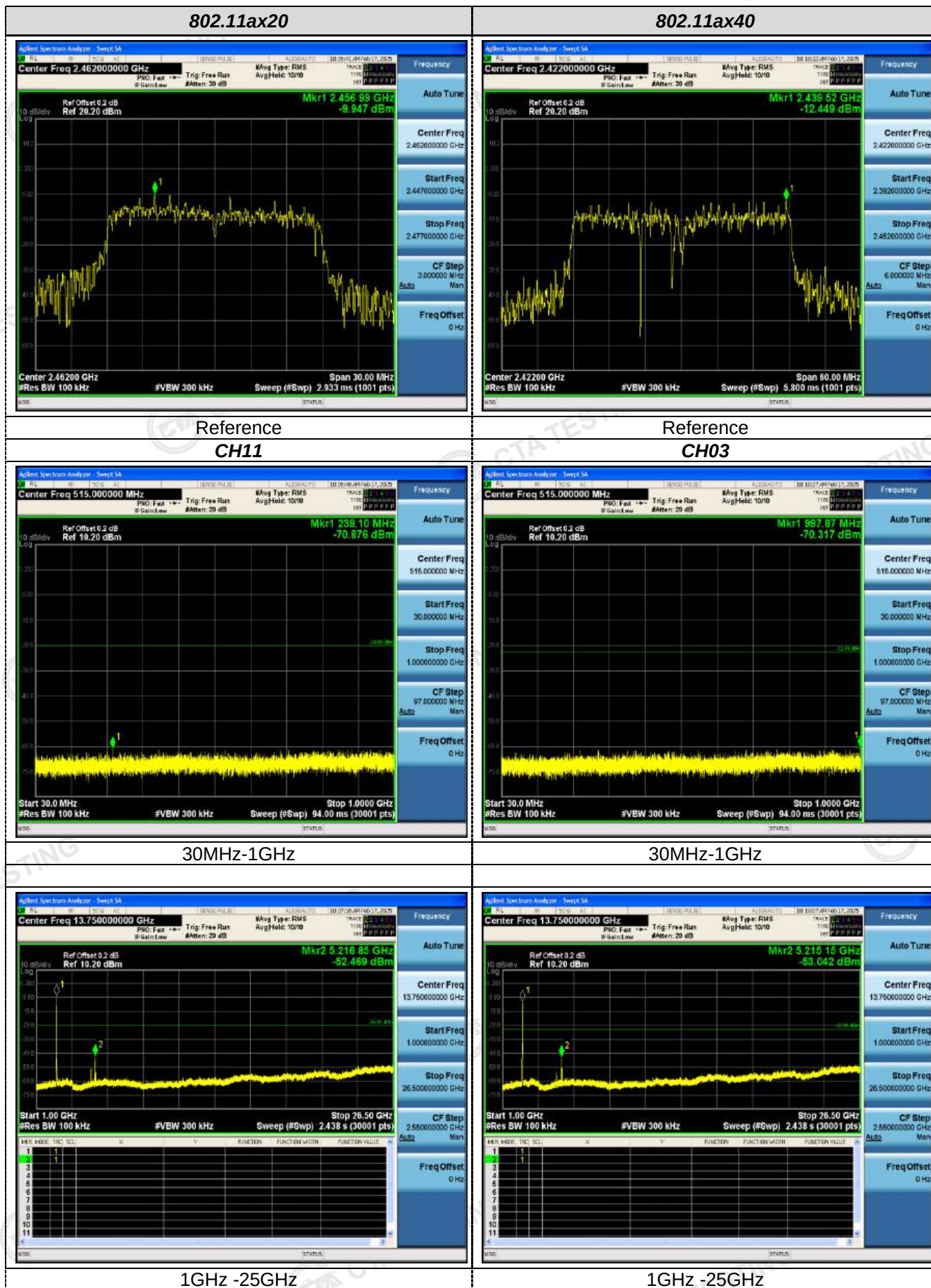
30MHz-1GHz



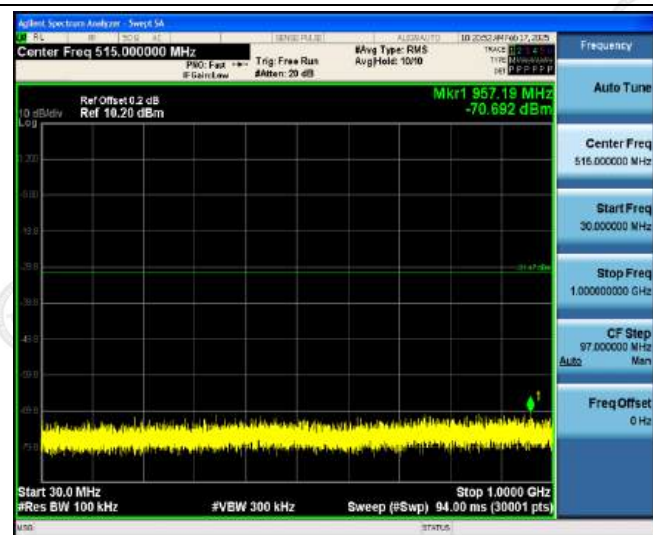
1GHz -25GHz



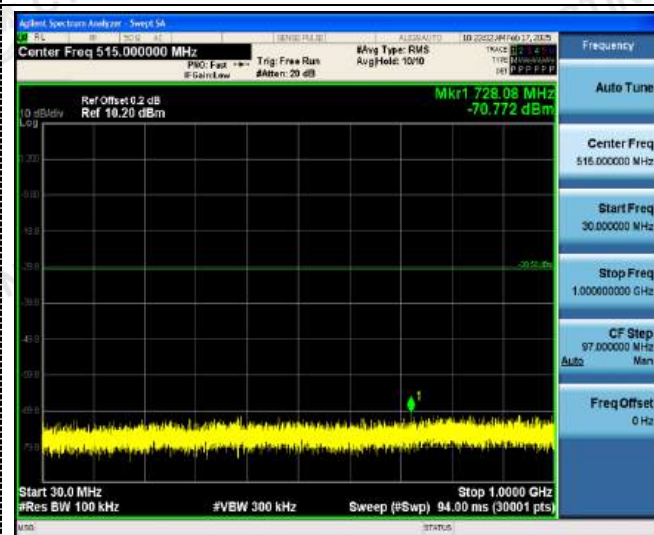
1GHz -25GHz



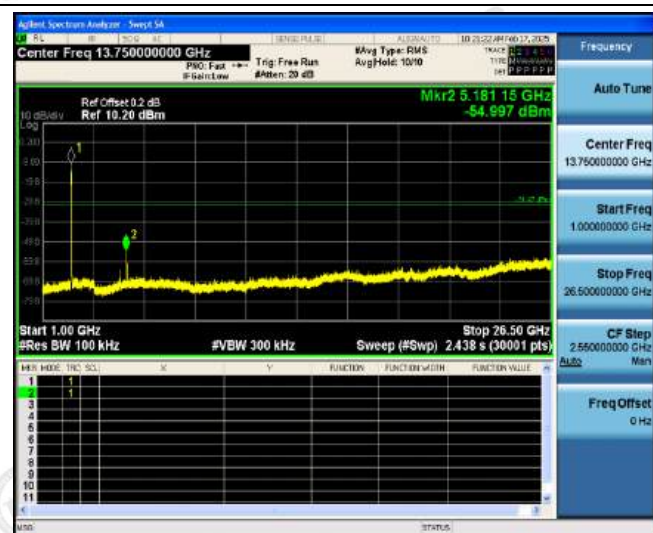
802.11ax40

Reference
CH06Reference
CH09

30MHz-1GHz



30MHz-1GHz



1GHz -25GHz



1GHz -25GHz

Ant2:

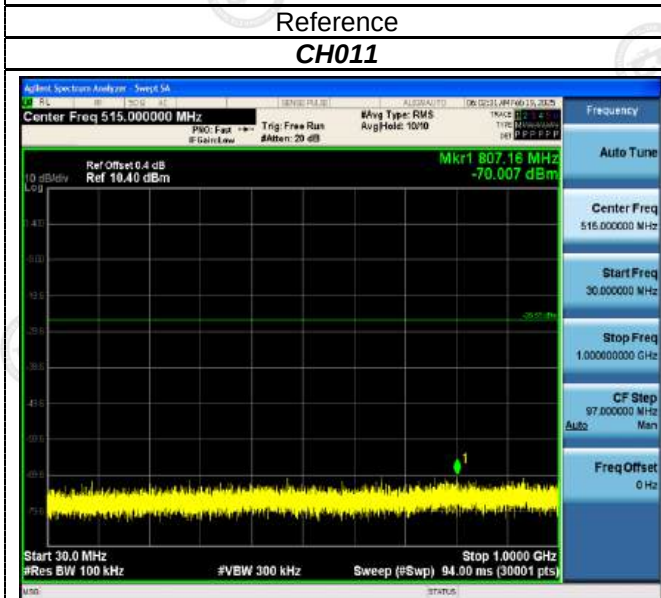
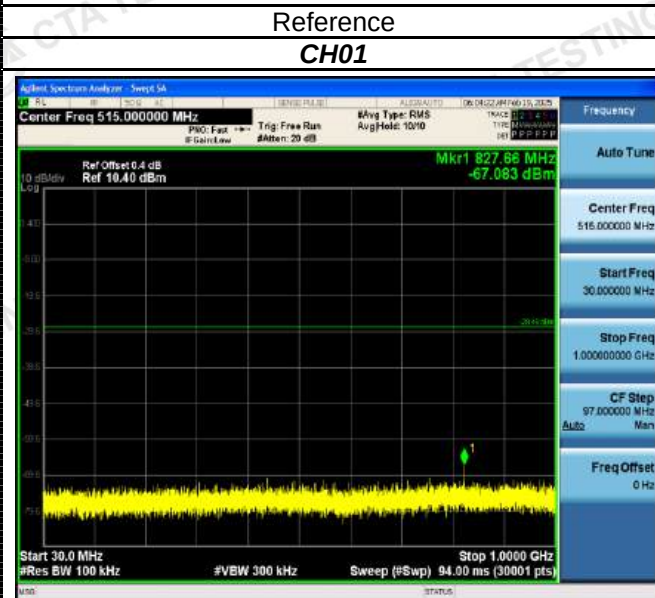
802.11b



802.11b

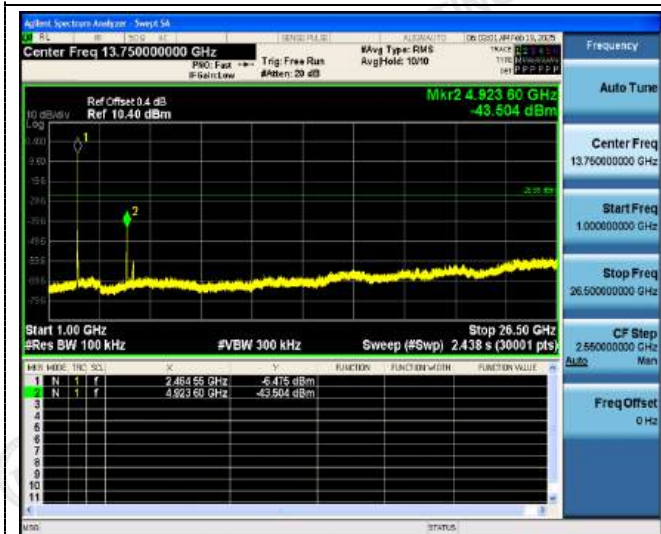


802.11g

Reference
CH011Reference
CH01

30MHz-1GHz

30MHz-1GHz



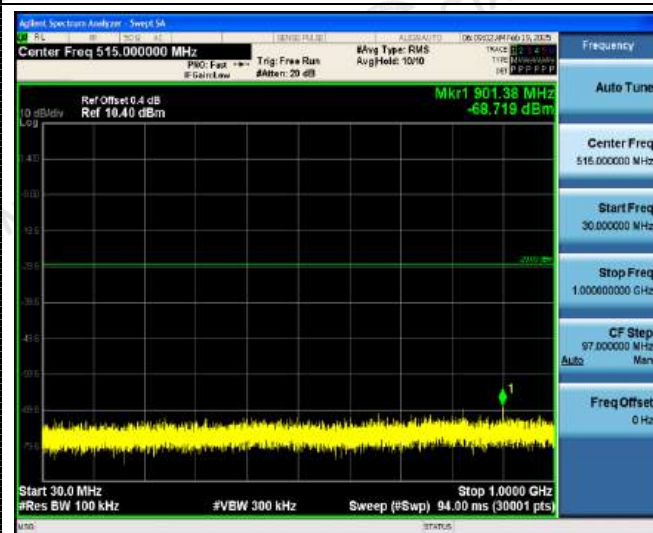
1GHz -25GHz

1GHz -25GHz

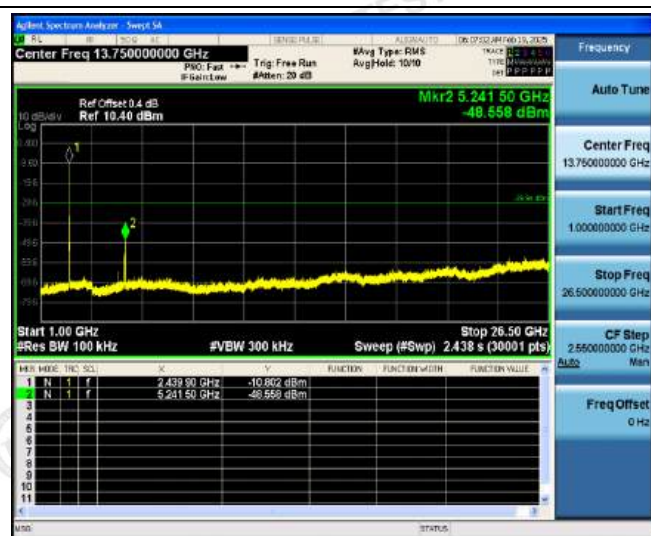
802.11g

Reference
CH06Reference
CH11

30MHz-1GHz



30MHz-1GHz

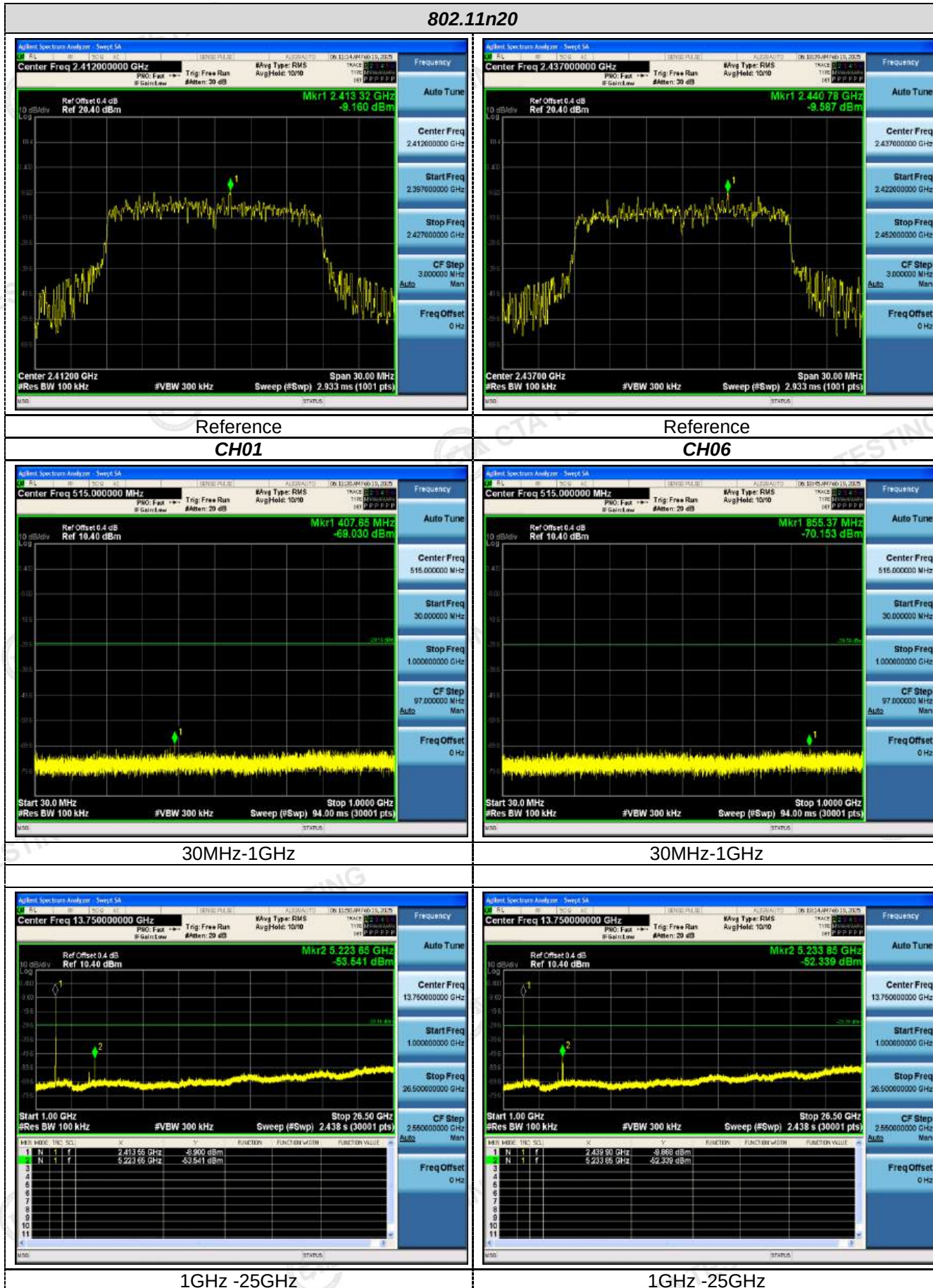


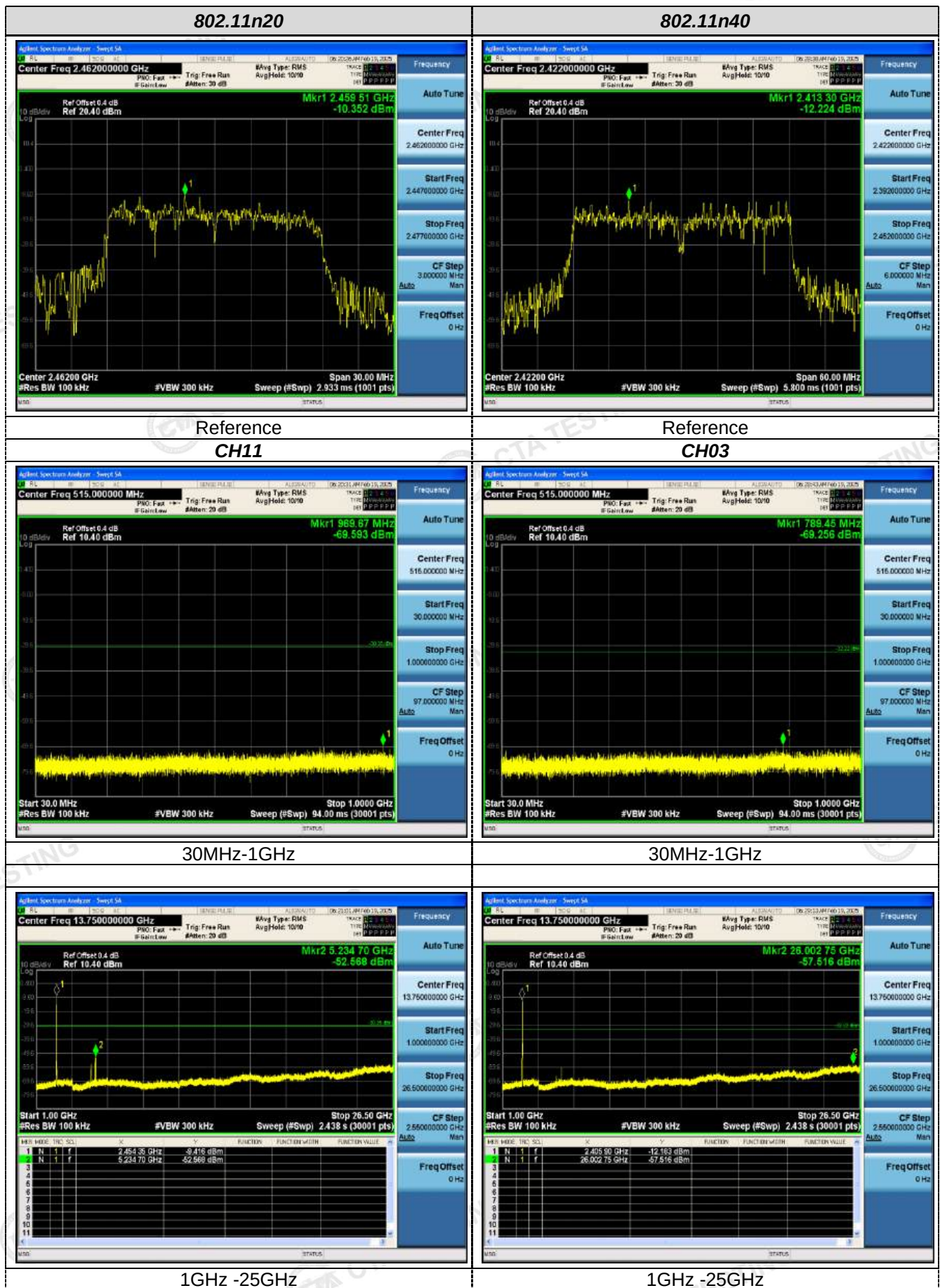
1GHz -25GHz



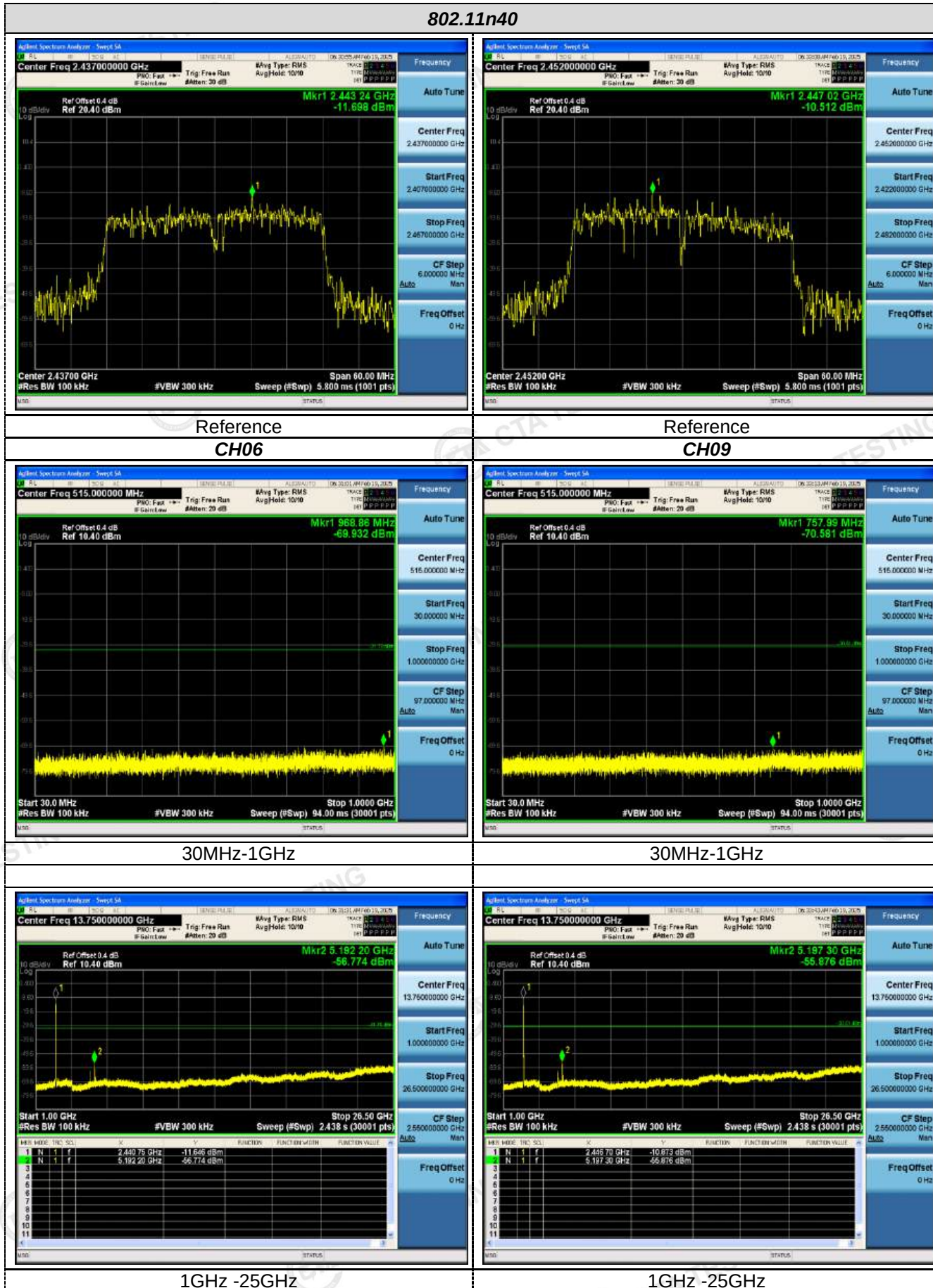
1GHz -25GHz

802.11n20

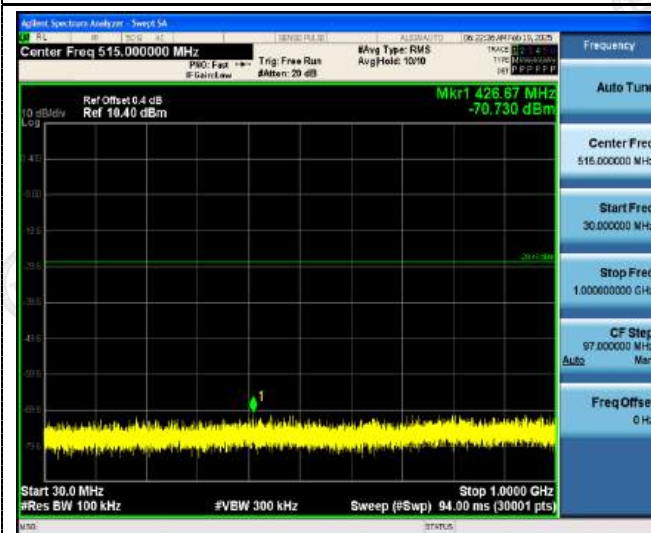




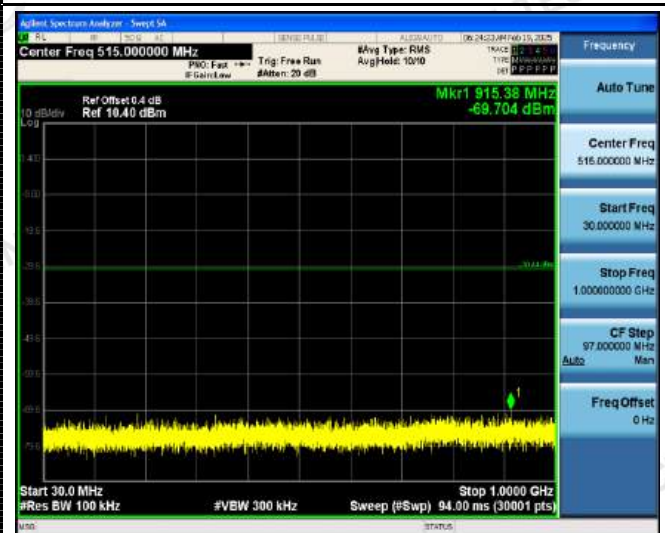
802.11n40



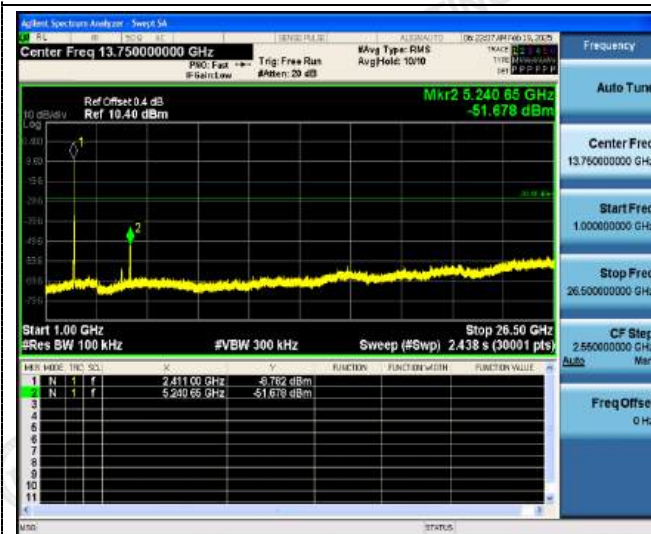
802.11ax20

Reference
CH01Reference
CH06

30MHz-1GHz



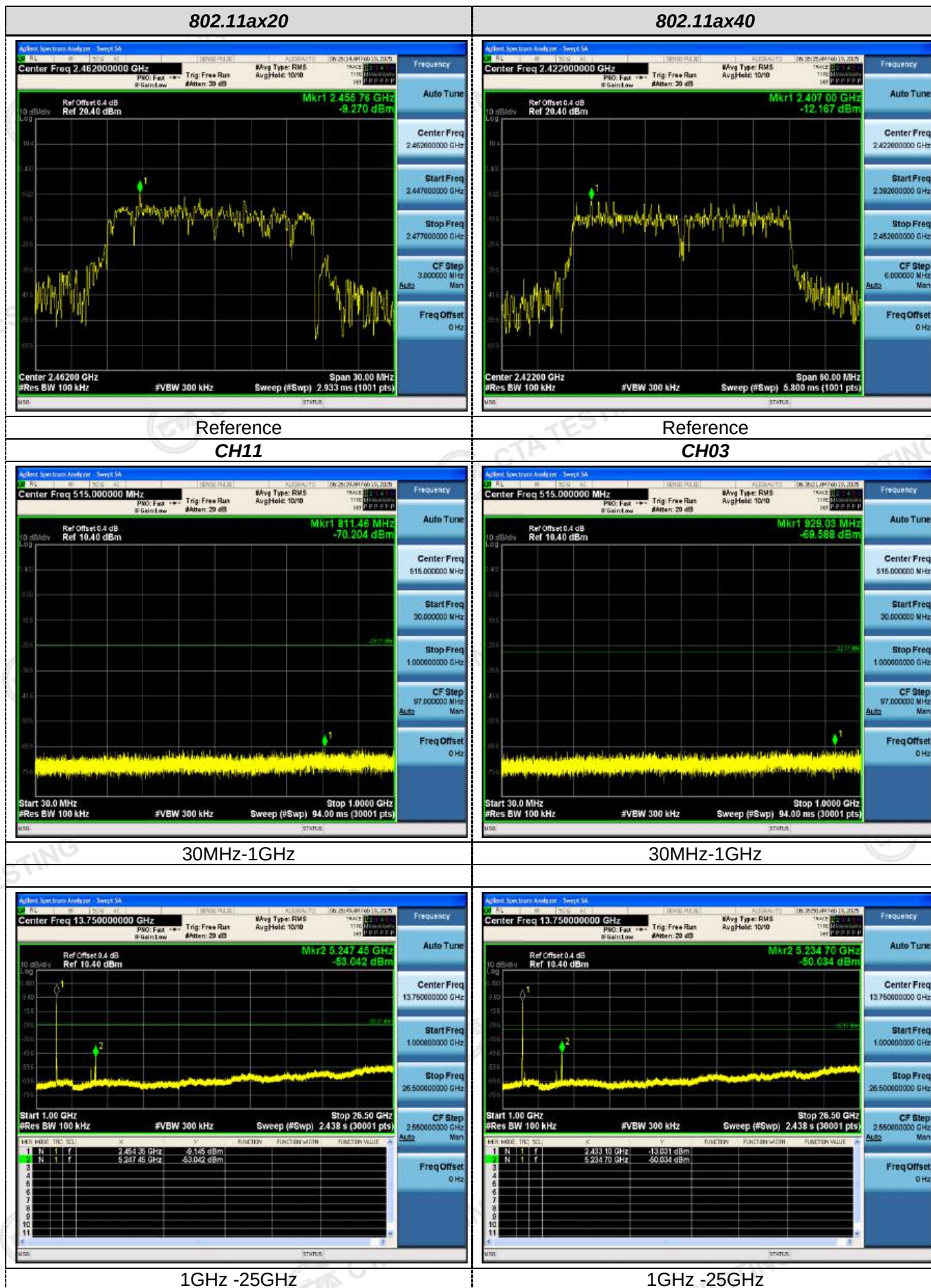
30MHz-1GHz



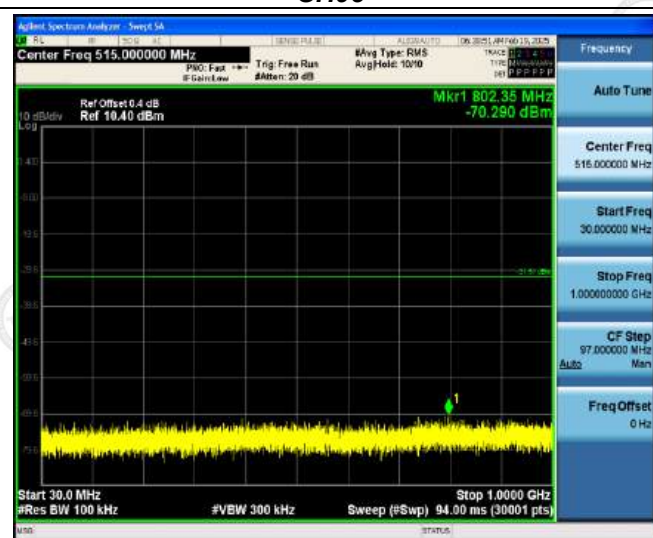
1GHz -25GHz



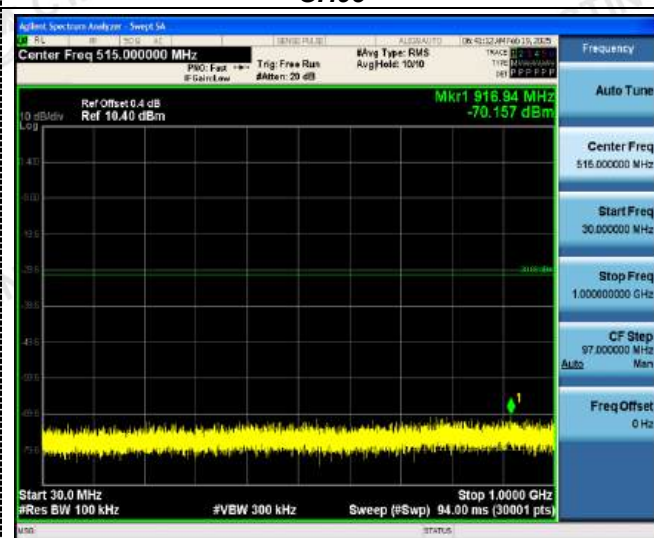
1GHz -25GHz



802.11ax40

Reference
CH06Reference
CH09

30MHz-1GHz



30MHz-1GHz



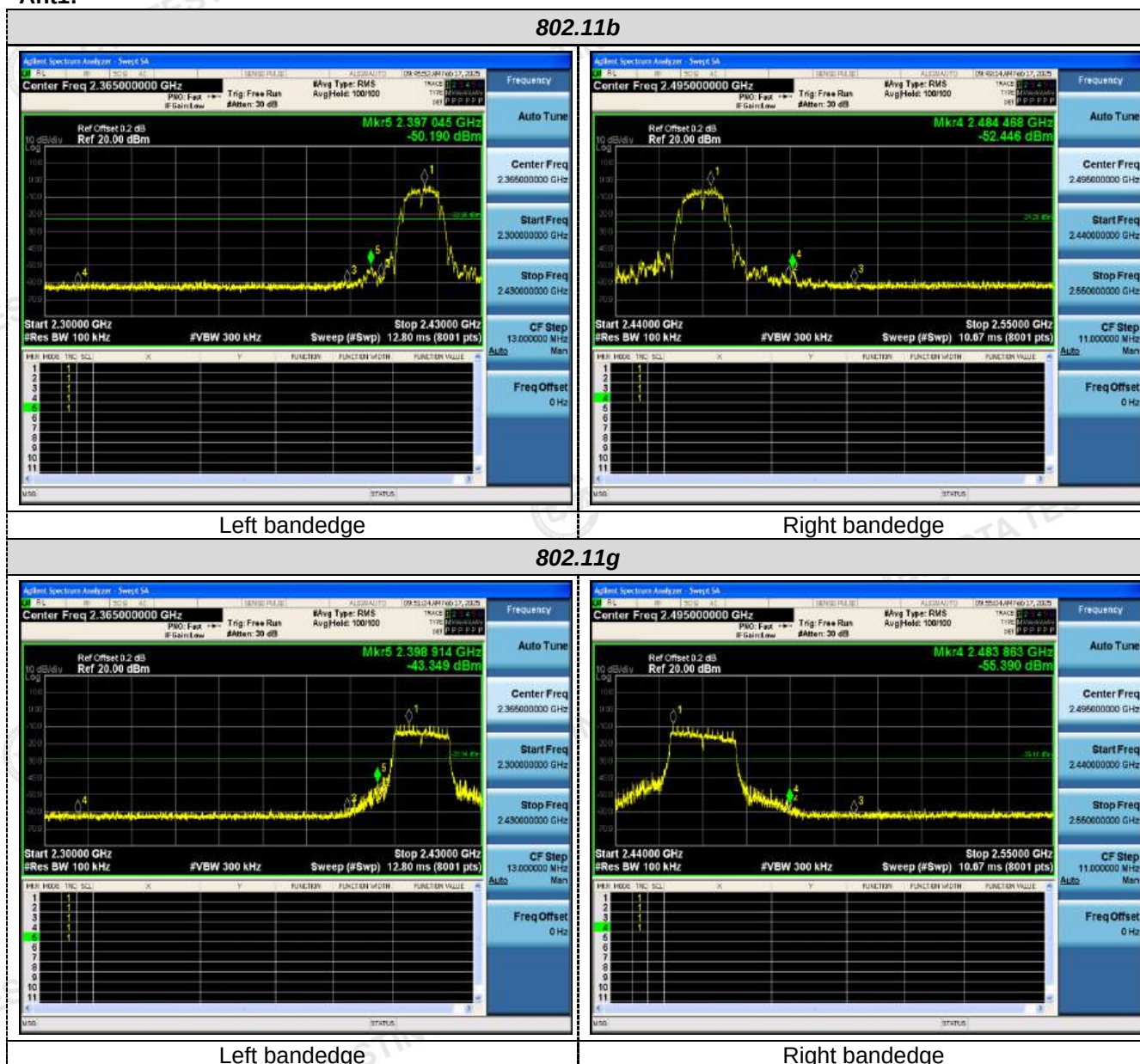
1GHz -25GHz



1GHz -25GHz

Band-edge Measurements for RF Conducted Emissions:

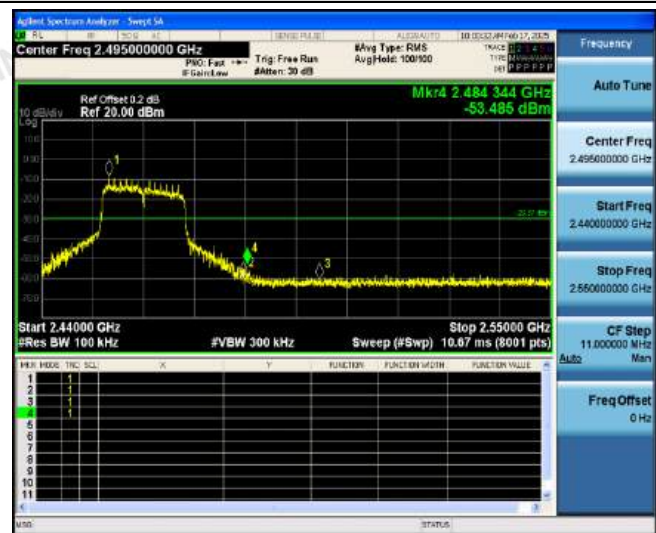
Ant1:



802.11n(HT20)



Left bandedge



Right bandedge

802.11n(HT40)

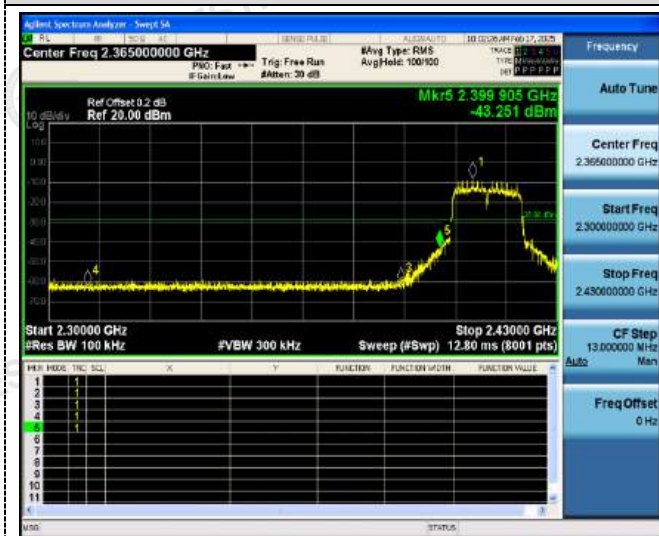


Left bandedge



Right bandedge

802.11ax(HT20)



Left bandedge



Right bandedge

802.11ax(HT40)



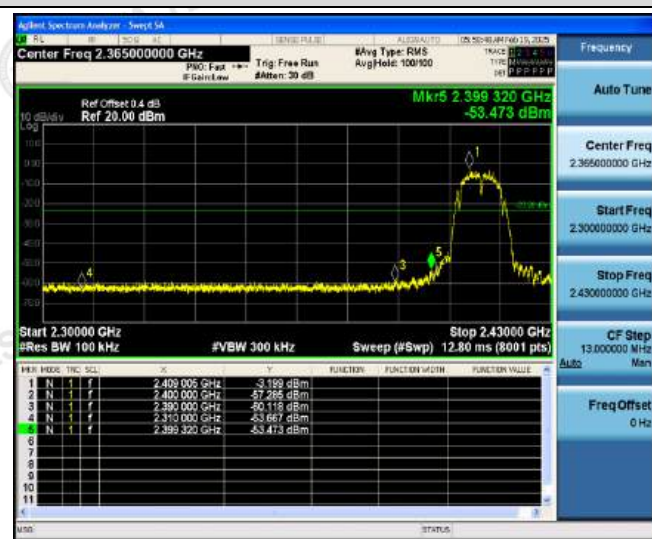
Left bandedge



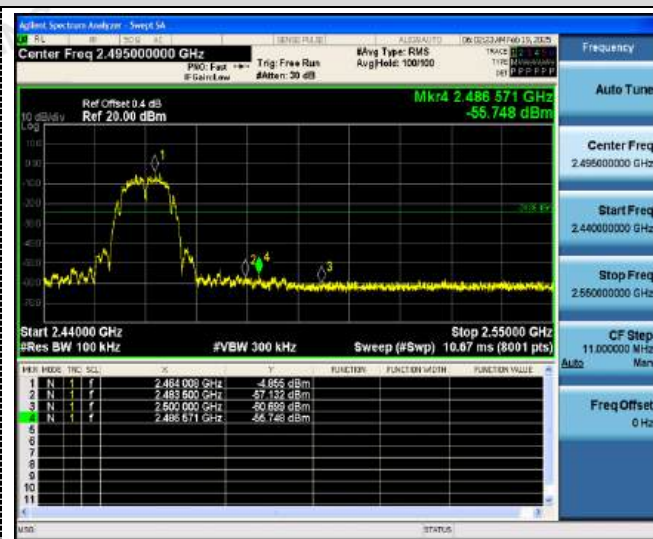
Right bandedge

Ant2:

802.11b



Left bandedge



Right bandedge

802.11g



Left bandedge

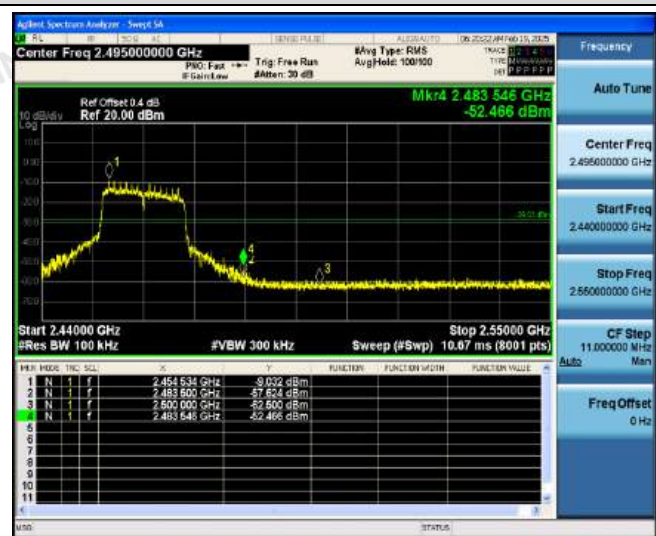


Right bandedge

802.11n(HT20)



Left bandedge

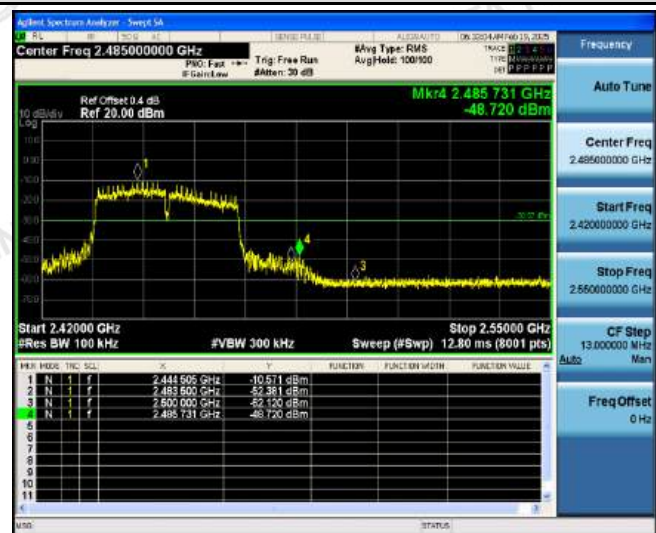


Right bandedge

802.11n(HT40)



Left bandedge



Right bandedge

802.11ax(HT20)



Left bandedge



Right bandedge

802.11ax(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):

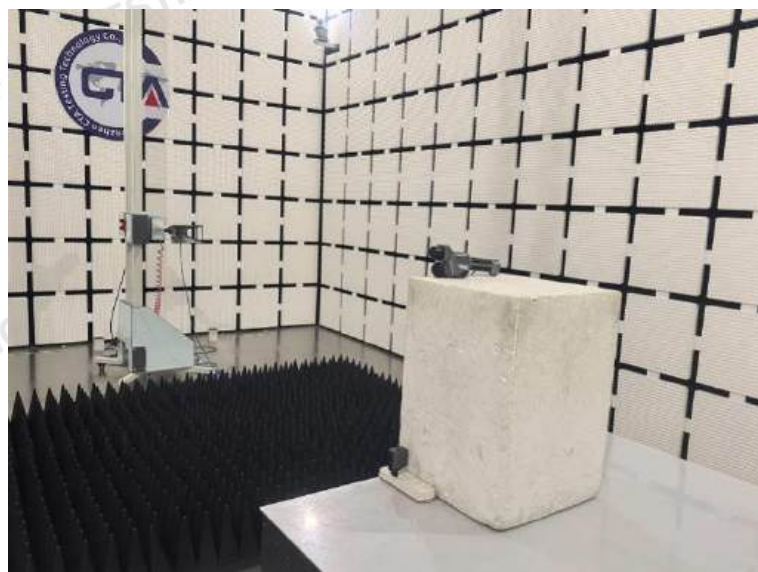
(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional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

Test Result:

The maximum gain of antennas 1 and 2 is 3.09 dBi

Remark: The antenna gain is provided by the customer, if the data provided by the customer is not accurate, Shenzhen CTA Testing Technology Co., Ltd. does not assume any responsibility.

5 Test Setup Photos of the EUT



6 Photos of the EUT

Reference to the test report No. CTA25020700201.

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