



## FCC PART 15.407

### TEST REPORT

For

## Crestron Electronics Inc

15 Volvo Drive, Rockleigh, New Jersey, 07647, USA

**FCC ID: EROAM-3100**

<b>Report Type:</b> Original Report	<b>Product Type:</b> Wireless Presentation System
<b>Report Number:</b>	RSZ210118001-00C
<b>Report Date:</b>	2021-04-02
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## GENERAL INFORMATION

### Product Description for Equipment under Test (EUT)

Product	Wireless Presentation System
Tested Model	M202018001
SKU	AM-3100-WF(For US), AM-3100-WF-I(For World)
Frequency Range	5G Wi-Fi: 5150-5250MHz; 5250-5350MHz; 5470-5725MHz; 5725-5850MHz
Maximum Conducted Average Output Power	5150-5250 MHz: 13.5 dBm (802.11a), 13.9dBm(802.11n20), 16.2dBm(802.11n40) 13.6dBm (802.11ac20), 16.8dBm(802.11 ac40), 18.42dBm(802.11 ac80) 11.9dBm (802.11ax20), 15.5dBm(802.11 ax40), 17.5dBm(802.11 ax80) 5250-5350MHz: 12.8dBm (802.11a), 13.9dBm(802.11n20), 16.6dBm(802.11n40) 14.0dBm (802.11ac20), 16.6dBm(802.11 ac40), 18.45dBm(802.11 ac80) 12.0dBm (802.11ax20), 14.7dBm(802.11 ax40), 17.8dBm(802.11 ax80) 5470-5725MHz: 13.0dBm (802.11a), 14.0dBm(802.11n20), 17.0dBm(802.11n40) 13.7dBm (802.11ac20), 16.4dBm(802.11 ac40), 18.44dBm(802.11 ac80) 11.0dBm (802.11ax20), 15.5dBm(802.11 ax40), 17.9dBm(802.11 ax80) 5725-5850 MHz: 15.2dBm (802.11a), 15.2dBm(802.11n20), 15.8dBm(802.11n40) 14.7dBm (802.11ac20), 15.9dBm(802.11 ac40), 17.2dBm(802.11 ac80) 15.0dBm (802.11ax20), 16.0dBm(802.11 ax40), 17.4dBm(802.11 ax80)
Modulation Technique	OFDM
Antenna Specification*	ANT 1: 5.5dBi ANT 2: 5.5dBi(provided by the applicant)
Voltage Range	DC 24V from adapter or DC 48V from POE
Date of Test	2021-01-26 to 2021-04-02
Sample serial number	RSZ210118001-RF-S1 ( Assigned by BAACL, Shenzhen)
Received date	2021-01-18
Sample/EUT Status	Good condition
Applicant	Crestron Electronics Inc
Applicant Address	15 Volvo Drive, Rockleigh, New Jersey, 07647, USA
Manufacturer	Crestron Electronics Inc
Manufacturer Address	15 Volvo Drive, Rockleigh, New Jersey, 07647, USA

### Objective

This test report is in accordance with Part 2-Subpart J, Part 15-Subparts A and E of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart E, section 15.203, 15.205, 15.207, 15.209 and 15.407 rules.

## Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices. And KDB789033 D02 General U-NII Test Procedures New Rules v02r01.

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

## Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		±5%
RF Output Power with Power meter		±0.73dB
RF conducted test with spectrum		±1.6dB
AC Power Lines Conducted Emissions		±1.95dB
Emissions, Radiated	Below 1GHz	±4.75dB
	Above 1GHz	±4.88dB
Temperature		±1 °C
Humidity		±6%
Supply voltages		±0.4%

*Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.*

## Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 5F(B-West) ,6F,7F,the 3rd Phase of Wan Li Industrial Building D,Shihua Rd, FuTian Free Trade Zone, Shenzhen, China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 342867, the FCC Designation No.: CN1221.

The test site has been registered with ISED Canada under ISED Canada Registration Number 3062B.

## SYSTEM TEST CONFIGURATION

### Description of Test Configuration

The system was configured for testing in an engineering mode, which was provided by manufacturer.

The EUT can operate in 802.11 a/n20/n40/ac20/ac40/ac80/ax20/ax40/ax80 modes.

The EUT has two integral antennas arrangement, the Wi-Fi can transmit on both antennas in MIMO mode.

For 5150-5250MHz Band, 7 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	44	5220
38	5190	46	5230
40	5200	48	5240
42	5210	/	/

For 5250-5350MHz Band, 7 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
52	5260	60	5300
54	5270	62	5310
56	5280	64	5320
58	5290	/	/

For 5470-5725MHz Band, 18 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
100	5500	124	5620
102	5510	126	5630
104	5520	128	5640
106	5530	132	5660
108	5540	134	5670
110	5550	136	5680
112	5560	140	5700
116	5580	/	/
118	5590	/	/
120	5600	/	/
122	5610	/	/

For 5725-5850MHz Band, 8 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	157	5785
151	5755	159	5795
153	5765	161	5805
155	5775	165	5825

**EUT Exercise Software**

“SecureCRT”\* was used. Test frequencies and power level were configured as below:

U-NII	Mode	Frequency (MHz)	Data Rate	Power Level*
5150 – 5250MHz	802.11 a	5180	6Mbps	9
		5200	6Mbps	10
		5240	6Mbps	9
	802.11 n20	5180	MCS0	10
		5200	MCS0	10
		5240	MCS0	10
	802.11 n40	5190	MCS0	13
		5230	MCS0	13
	802.11 ac20	5180	MCS0	10
		5200	MCS0	10
		5240	MCS0	10
	802.11 ac40	5190	MCS0	14
		5230	MCS0	13
	802.11 ac80	5210	MCS0	15
	802.11 ax20	5180	MCS0	9
		5200	MCS0	8
		5240	MCS0	8
	802.11 ax40	5190	MCS0	13
5230		MCS0	11	
802.11 ax80	5210	MCS0	15	

U-NII	Mode	Frequency (MHz)	Data Rate	Power Level*
5250 – 5350MHz	802.11 a	5260	6Mbps	10
		5280	6Mbps	10
		5320	6Mbps	10
	802.11 n20	5260	MCS0	11
		5280	MCS0	11
		5320	MCS0	11
	802.11 n40	5270	MCS0	13
		5310	MCS0	13
	802.11 ac20	5260	MCS0	11
		5280	MCS0	10
		5320	MCS0	10
	802.11 ac40	5270	MCS0	14
		5310	MCS0	13
	802.11 ac80	5290	MCS0	17
	802.11 ax20	5260	MCS0	9
		5280	MCS0	8
		5320	MCS0	8
	802.11 ax40	5270	MCS0	13
5310		MCS0	12	
802.11 ax80	5290	MCS0	15	



U-NII	Mode	Frequency (MHz)	Data Rate set	Power Level*
5470 – 5725MHz	802.11 a	5500	6Mbps	8
		5580	6Mbps	9
		5700	6Mbps	10
	802.11 n20	5500	MCS0	9
		5580	MCS0	10
		5700	MCS0	10
	802.11 n40	5510	MCS0	14
		5550	MCS0	13
		5670	MCS0	13
	802.11 ac20	5500	MCS0	9
		5580	MCS0	9
		5700	MCS0	10
	802.11 ac40	5510	MCS0	12
		5550	MCS0	13
		5670	MCS0	12
	802.11 ac80	5530	MCS0	15
		5610	MCS0	15
	802.11 ax20	5500	MCS0	7
		5580	MCS0	7
		5700	MCS0	8
	802.11 ax40	5510	MCS0	12
5550		MCS0	11	
5670		MCS0	12	
802.11 ax80	5530	MCS0	14	
	5610	MCS0	14	
5725 – 5850MHz	802.11 ac80	5785	MCS0	14
	802.11 ax80	5785	MCS0	14
	The power level of 802.11 a/n20/n40/ac20/ac40 /ax20/ax40 is default			

The worse-case data rates are determined to be as follows for each mode based upon investigations by measuring the average power and PSD across all data rated bandwidths, and modulations.

The software and power level was provided by the applicant.

**Duty cycle**

Test Result: Pass. Please refer to the Appendix.

**Equipment Modifications**

No modification was made to the EUT tested.

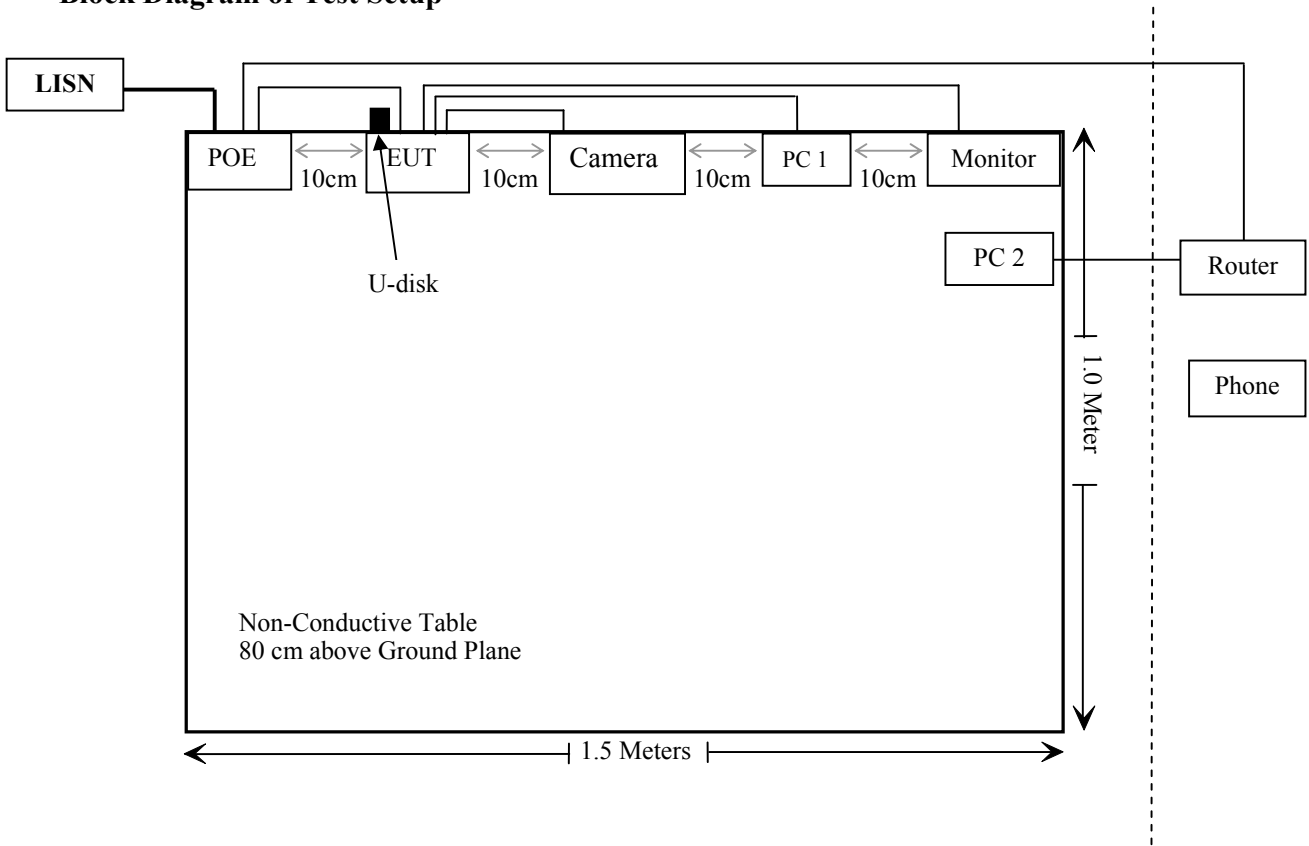
**Support Equipment List and Details**

Manufacturer	Description	Model	Serial Number
GOSPELL	POE	G0720-480-050	G0720-480-050
Dell	PC 1	Latitude E5430	26913508589
Dell	PC 2	Latitude E5430	42332463482
HIKVISION	Router	DS-3WR03-E	10021642429
SAMSUNG	Monitor	S24E390HL	ZZFRH4ZN303357K
IN ONE SMART TECHNOLOGY (H.K.) LTD	Phone	E11	101642
Grandstream	Camera	GUV3105	Grandstream
Kingston	USB disk	DTSE9H/16G	Kingston

**External I/O Cable**

Cable Description	Length (m)	From Port	To
Un-shielded Detachable AC Cable	1.0	LISN	POE
Un-shielded Detachable RJ45Cable	1.0	POE	EUT
Un-shielded Detachable RJ45 Cable	1.0	Router	PC 2
Un-shielded Detachable RJ45 Cable	5.0	POE	Router
UnShielded Detachable HDMI Cable	1.0	EUT	Monitor
Un-shielded Detachable USB Cable	1.2	EUT	Camera
Un-shielded Detachable USB Cable	2.0	EUT	PC 1

**Block Diagram of Test Setup**



**SUMMARY OF TEST RESULTS**

FCC Rules	Description of Test	Result
§1.1307 (b) (1) & §2.1091	Maximum Permissible exposure (MPE)	Compliance
§15.203	Antenna Requirement	Compliance
§15.407(b)(6)& §15.207(a)	Conducted Emissions	Compliance
§15.205& §15.209 &§15.407(b) (1), (2), (3), (4), (6) (7)	Undesirable Emission& Restricted Bands	Compliance
§15.407(a) (1), (5),(e)	26 dB Emission Bandwidth & 6dB Bandwidth	Compliance
§15.407(a)(1),(2), (3)	Conducted Transmitter Output Power	Compliance
§15.407 (a)(1), (2), (3)	Power Spectral Density	Compliance
§15.407 (h)	Transmit Power Control (TPC)	Not Applicable
§15.407 (h)	Dynamic Frequency Selection (DFS)	Compliance*

Not Applicable: the EUT has no TPC function which was declared by the applicant.

Compliance\*: Please refer to the DFS report: RSZ210118003-00.

**TEST EQUIPMENT LIST**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
<b>AC Line Conducted test</b>					
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2020/08/04	2021/08/03
Rohde & Schwarz	LISN	ENV216	101613	2020/08/04	2021/08/03
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2020/11/29	2021/11/28
Unknown	CE Cable	CE Cable	UF A210B-1-0720-504504	2020/11/29	2021/11/28
Rohde & Schwarz	CE Test software	EMC 32	V8.53.0	NCR	NCR
<b>Radiated Emission Test</b>					
R&S	EMI Test Receiver	ESR3	102455	2020/08/04	2021/08/03
Sonoma instrument	Pre-amplifier	310 N	186238	2020/08/04	2021/08/03
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2020/12/22	2023/12/21
Unknown	Cable 2	RF Cable 2	F-03-EM197	2020/11/29	2021/11/28
Unknown	Cable	Chamber Cable 1	F-03-EM236	2020/11/29	2021/11/28
Rohde & Schwarz	Auto test software	EMC 32	V9.10	NCR	NCR
Rohde & Schwarz	Spectrum Analyzer	FSV40-N	102259	2020/08/04	2021/08/03
COM-POWER	Pre-amplifier	PA-122	181919	2020/11/29	2021/11/28
Quinstar	Amplifier	QLW-18405536-J0	15964001002	2020/11/29	2021/11/28
Sunol Sciences	Horn Antenna	3115	9107-3694	2021/01/15	2024/01/14
Insulted Wire Inc.	RF Cable	SPS-2503-3150	02222010	2020/11/29	2021/11/28
Unknown	RF Cable	W1101-EQ1 OUT	F-19-EM005	2020/11/29	2021/11/28
Unknown	Signal Cable	RG-214	2	2020/11/29	2021/11/28
SNSD	Band Reject filter	BSF5150-5850MN-0899-004	5G filter	2020/04/20	2021/04/20
Ducommun Technologies	Horn antenna	ARH-4223-02	1007726-02 1304	2020/12/06	2023/12/05
Ducommun Technologies	Horn antenna	ARH-2823-02	1007726-02 1302	2020/12/06	2023/12/05
<b>RF Conducted Test</b>					
Tonscend Corporation	RF control Unit	JS0806-2	19D8060154	2020/08/04	2021/08/03
Rohde & Schwarz	Signal and Spectrum Analyzer	FSV40	101473	2020/08/04	2021/08/03
Unknown	RF Cable	Unknown	2301 276	2020/11/29	2021/11/28

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

**1.1307 (b) (1) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)**

**Applicable Standard**

According to subpart 1.1307 (b)(1), 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for General Population/Uncontrolled Exposure

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Ave. eraging Time (Minutes)
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f <sup>2</sup> )	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz

\* = Plane-wave equivalent power density

**Result**

**Calculated Formulary:**

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

S = power density (in appropriate units, e.g. mW/cm<sup>2</sup>)

P = power input to the antenna (in appropriate units, e.g., mW).

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

Mode	Frequency (MHz)	Antenna Gain		Tune up conducted power		Evaluation Distance (cm)	Power Density (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )
		(dBi)	(numeric)	(dBm)	(mW)			
Bluetooth	2402-2480	4.0	2.51	9.0	7.94	20	0.004	1
BLE	2402-2480	4.0	2.51	8.0	6.31	20	0.003	1
2.4G Wi-Fi	2412-2462	4.0	2.51	26.0	398.11	20	0.199	1
5G Wi-Fi	5150-5250	5.5	3.55	19.0	79.43	20	0.056	1
	5250-5350	5.5	3.55	19.0	79.43	20	0.056	1
	5470-5725	5.5	3.55	19.0	79.43	20	0.056	1
	5725-5850	5.5	3.55	18.0	63.10	20	0.045	1

Note: 1. the tune up conducted power was declared by the applicant  
 2. The Bluetooth can transmit at the same time with Wi-Fi, the 2.4G Wi-Fi can't transmit at the same time with the 5G Wi-Fi.

**Simultaneous transmitting consideration:**

The ratio=MPEWi-Fi/limit + MPEBT/limit=0.199/1+0.004/1=0.203 < 1.0

So simultaneous exposure comply with the limit.

To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 20cm from nearby persons.

**Result: Compliance**

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## **FCC §15.203 – ANTENNA REQUIREMENT**

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### **Applicable Standard**

According to § 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 shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

- a. Antenna must be permanently attached to the unit.
  - b. Antenna must use a unique type of connector to attach to the EUT.
- Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

And according to FCC 47 CFR section 15.407 (a), if the transmitting antennas of directional gain greater than 6dBi are used, the transmit power and power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### **Antenna Connector Construction**

The EUT has two internal antennas arrangement for 5G Wi-Fi, which was permanently attached and the antenna gain is 5.5dBi, fulfill the requirement of this section. Please refer to the EUT photos.

**Result:** Compliance.

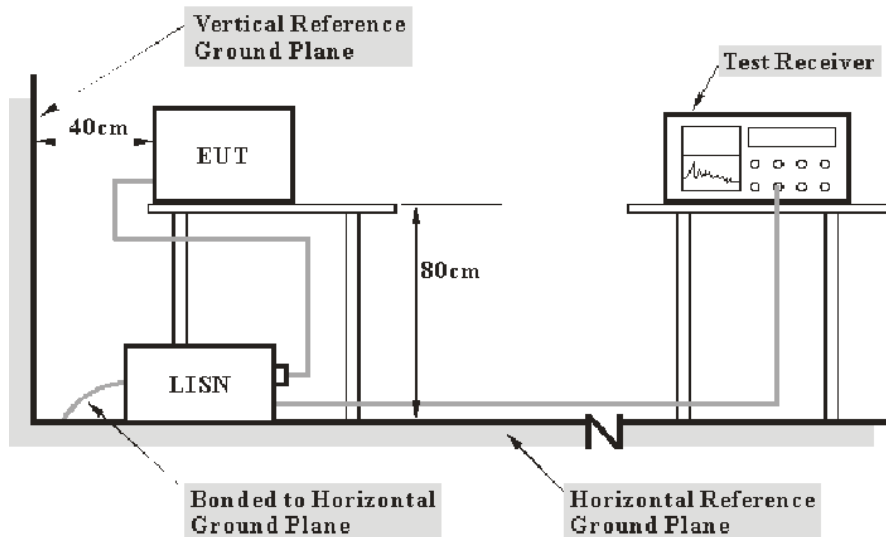


**FCC §15.407 (b) (6) §15.207 (a) – CONDUCTED EMISSIONS**

**Applicable Standard**

FCC §15.207, §15.407(b) (6)

**EUT Setup**



- Note: 1. Support units were connected to second LISN.  
 2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

**EMI Test Receiver Setup**

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

**Test Procedure**

During the conducted emission test, the adapter was connected to the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and Average detection mode.

**Test Data**

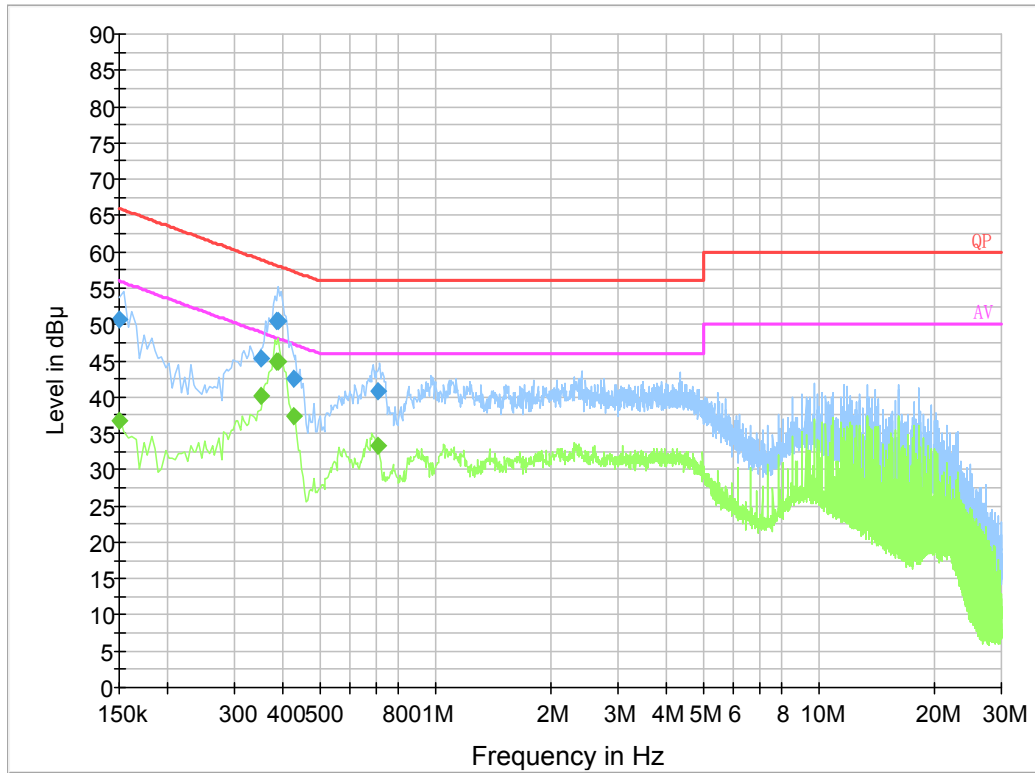
**Environmental Conditions**

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	65 %
<b>ATM Pressure:</b>	101.0 kPa

*The testing was performed by Haiguo Li on 2021-04-02.*

*EUT operation mode: Transmitting*

**AC 120V/60 Hz, Line:**



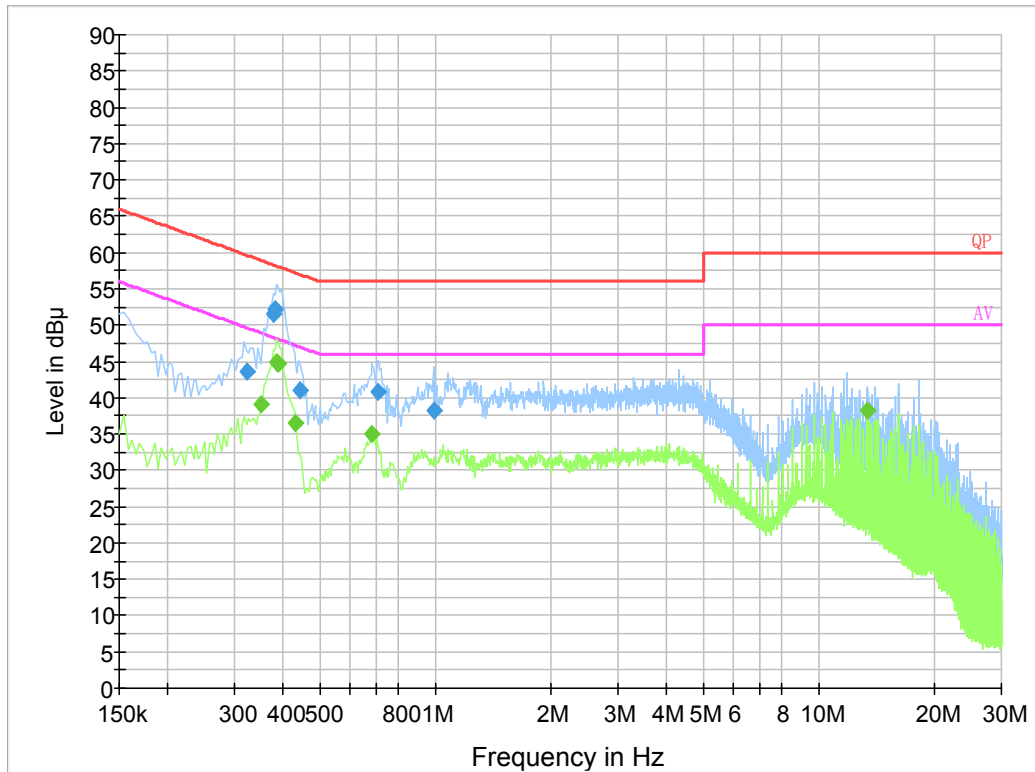
**Final Result 1**

Frequency (MHz)	QuasiPeak (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.150000	50.6	0.200	L1	19.8	15.4	66.0
0.352750	45.4	9.000	L1	19.9	13.5	58.9
0.387730	50.5	9.000	L1	19.9	7.6	58.1
0.388150	50.5	9.000	L1	19.9	7.6	58.1
0.427490	42.6	9.000	L1	19.9	14.7	57.3
0.711230	40.8	9.000	L1	19.8	15.2	56.0

**Final Result 2**

Frequency (MHz)	Average (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.150000	36.7	9.000	L1	19.8	19.3	56.0
0.352750	40.2	9.000	L1	19.9	8.7	48.9
0.387730	44.8	9.000	L1	19.9	3.3	48.1
0.388150	44.8	9.000	L1	19.9	3.3	48.1
0.427490	37.5	9.000	L1	19.9	9.8	47.3
0.711230	33.4	9.000	L1	19.8	12.6	46.0

**AC 120V/60 Hz, Neutral:**



**Final Result 1**

Frequency (MHz)	QuasiPeak (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.322770	43.7	9.000	N	19.8	15.9	59.6
0.380210	51.5	9.000	N	19.8	6.8	58.3
0.384150	52.2	9.000	N	19.8	5.9	58.2
0.443370	41.1	9.000	N	19.8	15.9	57.0
0.711350	40.9	9.000	N	19.8	15.1	56.0
0.995150	38.2	9.000	N	19.8	17.8	56.0

**Final Result 2**

Frequency (MHz)	Average (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.350000	39.0	9.000	N	19.9	10.0	49.0
0.386000	44.9	9.000	N	19.8	3.3	48.1
0.390000	44.8	9.000	N	19.8	3.3	48.1
0.434000	36.5	9.000	N	19.8	10.7	47.2
0.682000	35.0	9.000	N	19.8	11.0	46.0
13.358000	38.3	9.000	N	19.9	11.7	50.0

**§15.205 & §15.209 & §15.407(B) (1), (2), (3), (4),(6),(7) – UNDESIRABLE EMISSION**

**Applicable Standard**

FCC §15.407 (b) (1), (2), (3), (4), (6), (7); §15.209; §15.205;

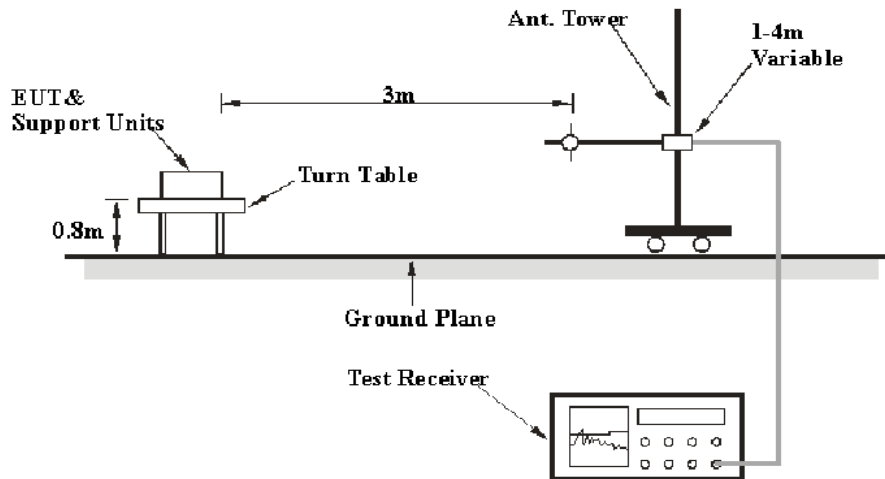
(b) Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

- (1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (4) For transmitters operating in the 5.725-5.85 GHz band:
  - (i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

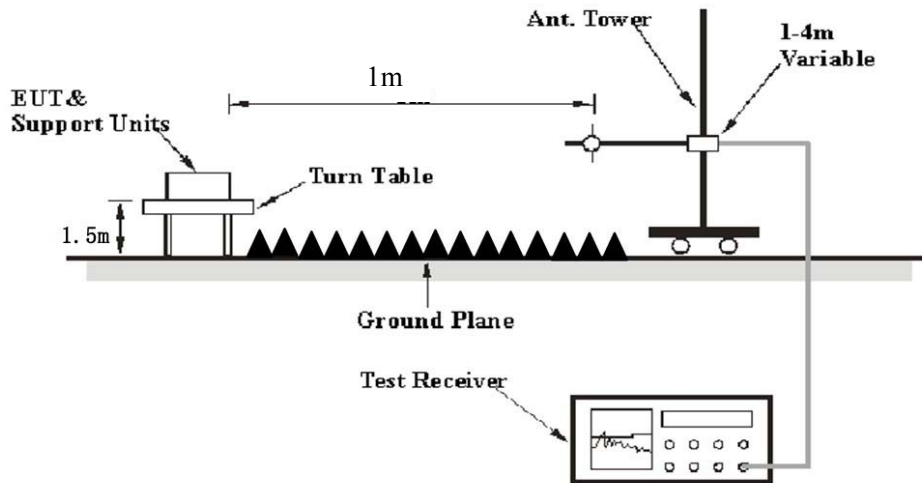
Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.

**EUT Setup**

**Below 1 GHz:**



**Above 1 GHz:**



The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC 15.209 and FCC 15.407 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

**EMI Test Receiver & Spectrum Analyzer Setup**

The system was investigated from 30 MHz to 40 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Measurement
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	PK
	1MHz	10 Hz <sup>Note 1</sup>	/	Ave.erage
	1MHz	> 1/T <sup>Note 2</sup>	/	Ave.erage

Note 1: when duty cycle is no less than 98%

Note 2: when duty cycle is less than 98%

**Test Procedure**

**Radiated Spurious Emission**

During the radiated emission test, the adapter was connected to the AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all the installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1GHz, peak and Ave.erage detection modes for frequencies above 1GHz.

## Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

## Test Data

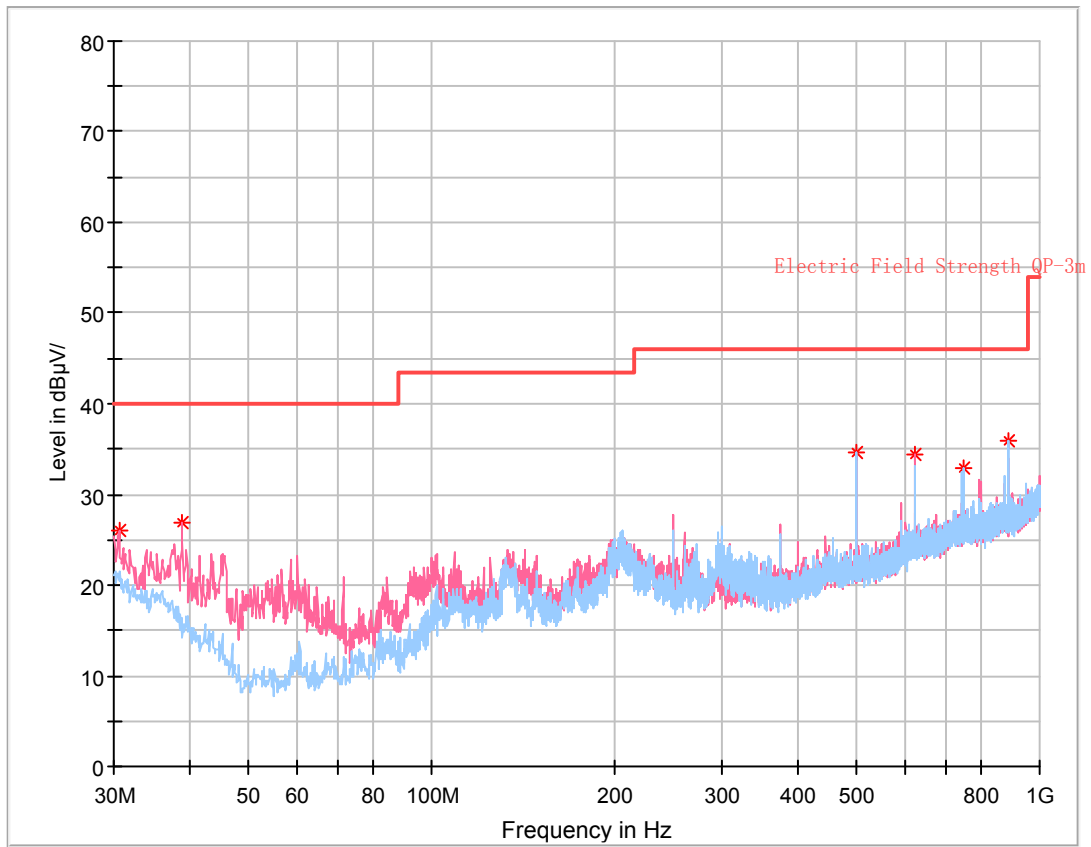
### Environmental Conditions

<b>Temperature:</b>	21.7~23°C
<b>Relative Humidity:</b>	44~56%
<b>ATM Pressure:</b>	100.9~101.2 kPa

*The testing was performed by Kilroy Deng on 2021-04-02 for below 1GHz and by Troy Wang on 2021-01-26 for above 1GHz.*

*EUT operation mode: Transmitting*

**30 MHz – 1 GHz:** (worst case is 802.11ac20 mode 5260 MHz)



**Critical\_Freqs**

Frequency (MHz)	MaxPeak (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
749.982500	32.85	46.00	13.15	300.0	H	26.0	-0.5
499.965000	34.58	46.00	11.42	300.0	H	47.0	-5.1
890.996250	35.99	46.00	10.01	400.0	H	17.0	0.9
38.851250	26.95	40.00	13.05	100.0	V	124.0	-9.7
624.973750	34.50	46.00	11.50	100.0	V	185.0	-2.7
30.606250	25.92	40.00	14.08	100.0	V	216.0	-4.0



**1 ~ 40 GHz:**

**Note: The test distance is 1m, so the correct factor from 3m to 1m is  $20\log(3/1)=9.5\text{dB}$  which was added into the final limit.**

**5150-5250 MHz:**

Frequency (MHz)	Receiver		Turn-Table Angle Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part15.407	
	Reading (dBµV)	Detector (PK/QP/AV)		Height (m)	Polar (H / V)			Limit (dBµV/m)	Margin (dB)
802.11A									
5180 MHz									
5148.63	42.83	PK	197	1.8	V	38.36	81.19	83.5	2.31
5148.63	20.58	Ave.	197	1.8	V	38.36	58.94	63.5	4.56
5353.28	32.18	PK	49	2.4	V	39.09	71.27	83.5	12.23
5353.28	18.23	Ave.	49	2.4	V	39.09	57.32	63.5	6.18
10360.00	42.58	PK	49	2.0	V	17.42	60.00	77.7	17.70
5200 MHz									
10400.00	42.55	PK	174	1.6	V	17.52	60.07	77.7	17.63
5240 MHz									
5149.68	32.04	PK	102	1.5	V	38.36	70.40	83.5	13.10
5149.68	17.17	Ave.	102	1.5	V	38.36	55.53	63.5	7.97
5351.44	31.96	PK	320	1.5	V	39.09	71.05	83.5	12.45
5351.44	17.30	Ave.	320	1.5	V	39.09	56.39	63.5	7.11
10480.00	42.47	PK	319	1.6	V	17.25	59.72	77.7	17.98
802.11n20									
5180 MHz									
5146.59	44.28	PK	355	2.2	V	38.36	82.64	83.5	0.86
5146.59	21.69	Ave.	355	2.2	V	38.36	60.05	63.5	3.45
5351.27	32.68	PK	150	1.3	V	39.09	71.77	83.5	11.73
5351.27	18.32	Ave.	150	1.3	V	39.09	57.41	63.5	6.09
10360.00	42.21	PK	300	1.7	V	17.42	59.63	77.7	18.07
5200 MHz									
10400.00	41.38	PK	235	1.4	V	17.52	58.90	77.7	18.80
5240 MHz									
5142.68	33.24	PK	254	1.6	V	38.36	71.60	83.5	11.90
5142.68	18.35	Ave.	254	1.6	V	38.36	56.71	63.5	6.79
5353.22	32.75	PK	109	2.0	V	39.09	71.84	83.5	11.66
5353.22	18.32	Ave.	109	2.0	V	39.09	57.41	63.5	6.09
10480.00	42.85	PK	171	2.4	V	17.25	60.10	77.7	17.60

Frequency (MHz)	Receiver		Turn-Table Angle Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part15.407	
	Reading (dBµV)	Detector (PK/QP/AV)		Height (m)	Polar (H / V)			Limit (dBµV/m)	Margin (dB)
802.11N40									
5190 MHz									
5149.85	40.66	PK	255	1.2	V	38.36	79.02	83.5	4.48
5149.85	23.44	Ave.	255	1.2	V	38.36	61.80	63.5	1.70
5354.16	32.23	PK	175	1.1	V	39.09	71.32	83.5	12.18
5354.16	18.42	Ave.	175	1.1	V	39.09	57.51	63.5	5.99
10380.00	41.61	PK	271	1.0	V	17.42	59.03	77.7	18.67
5230 MHz									
5149.37	31.54	PK	221	1.0	V	38.36	69.90	83.5	13.60
5149.37	16.94	Ave.	221	1.0	V	38.36	55.30	63.5	8.20
5352.21	31.91	PK	287	1.5	V	39.09	71.00	83.5	12.50
5352.21	17.08	Ave.	287	1.5	V	39.09	56.17	63.5	7.33
10460.00	41.47	PK	286	1.9	V	17.15	58.62	77.7	19.08
802.11AC20									
5180 MHz									
5147.85	43.24	PK	257	1.2	V	38.36	81.60	83.5	1.90
5147.85	20.96	Ave.	257	1.2	V	38.36	59.32	63.5	4.18
5352.26	32.57	PK	74	2.4	V	39.09	71.66	83.5	11.84
5352.26	18.29	Ave.	74	2.4	V	39.09	57.38	63.5	6.12
10360.00	41.56	PK	134	1.7	V	17.42	58.98	77.7	18.72
5200 MHz									
10400.00	50.17	PK	314	1.9	V	17.52	67.69	77.7	10.01
5240 MHz									
5145.64	32.29	PK	11	2.4	V	38.36	70.65	83.5	12.85
5145.64	18.25	Ave.	11	2.4	V	38.36	56.61	63.5	6.89
5354.28	33.14	PK	262	1.6	V	39.09	72.23	83.5	11.27
5354.28	18.27	Ave.	262	1.6	V	39.09	57.36	63.5	6.14
10480.00	41.35	PK	48	2.3	H	16.98	58.33	77.7	19.37

Frequency (MHz)	Receiver		Turn-Table Angle Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part15.407	
	Reading (dBµV)	Detector (PK/QP/AV)		Height (m)	Polar (H / V)			Limit (dBµV/m)	Margin (dB)
802.11AC40									
5190 MHz									
5148.36	40.78	PK	2	1.8	V	38.36	79.14	83.5	4.36
5148.36	23.51	Ave.	2	1.8	V	38.36	61.87	63.5	1.63
5355.17	31.54	PK	155	1.5	V	39.09	70.63	83.5	12.87
5355.17	18.37	Ave.	155	1.5	V	39.09	57.46	63.5	6.04
10380.00	42.63	PK	27	1.3	V	17.42	60.05	77.7	17.65
5230 MHz									
5147.49	32.68	PK	108	2.5	V	38.36	71.04	83.5	12.46
5147.49	18.39	Ave.	108	2.5	V	38.36	56.75	63.5	6.75
5352.28	32.42	PK	197	1.4	V	39.09	71.51	83.5	11.99
5352.28	18.34	Ave.	197	1.4	V	39.09	57.43	63.5	6.07
10460.00	42.96	PK	132	1.2	V	17.15	60.11	77.7	17.59
802.11AC80									
5210MHz									
5143.93	41.18	PK	107	1.9	V	38.36	79.54	83.5	3.96
5143.93	23.13	Ave.	107	1.9	V	38.36	61.49	63.5	2.01
5354.27	32.64	PK	307	1.3	V	39.09	71.73	83.5	11.77
5354.27	18.61	Ave.	307	1.3	V	39.09	57.70	63.5	5.80
10420.00	41.87	PK	109	2.0	V	17.52	59.39	77.7	18.31

Frequency (MHz)	Receiver		Turn-Table Angle Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part15.407	
	Reading (dBµV)	Detector (PK/QP/AV)		Height (m)	Polar (H / V)			Limit (dBµV/m)	Margin (dB)
802.11ax20									
5180 MHz									
5146.98	43.98	PK	345	1.7	V	38.36	82.34	83.5	1.16
5146.98	21.01	Ave.	345	1.7	V	38.36	59.37	63.5	4.13
5354.04	32.45	PK	117	1.3	V	39.09	71.54	83.5	11.96
5354.04	18.32	Ave.	117	1.3	V	39.09	57.41	63.5	6.09
10360.00	41.48	PK	328	1.8	V	17.42	58.90	77.7	18.80
5200MHz									
10400.00	41.87	PK	58	2.2	V	17.52	59.39	77.7	18.31
5240 MHz									
5146.59	32.53	PK	81	2.0	V	38.36	70.89	83.5	12.61
5146.59	18.22	Ave.	81	2.0	V	38.36	56.58	63.5	6.92
5352.06	32.87	PK	242	1.1	V	39.09	71.96	83.5	11.54
5352.06	18.19	Ave.	242	1.1	V	39.09	57.28	63.5	6.22
10480.00	42.20	PK	1	2.5	V	17.25	59.45	77.7	18.25
802.11ax40									
5190 MHz									
5146.81	40.81	PK	288	2.0	V	38.36	79.17	83.5	4.33
5146.81	23.35	Ave.	288	2.0	V	38.36	61.71	63.5	1.79
5353.61	32.69	PK	207	1.6	V	39.09	71.78	83.5	11.72
5353.61	18.46	Ave.	207	1.6	V	39.09	57.55	63.5	5.95
10380.00	41.03	PK	302	2.0	V	17.42	58.45	77.7	19.25
5230 MHz									
5148.42	32.55	PK	145	1.5	V	38.36	70.91	83.5	12.59
5148.42	18.53	Ave.	145	1.5	V	38.36	56.89	63.5	6.61
5356.47	32.48	PK	74	1.2	V	39.09	71.57	83.5	11.93
5356.47	18.51	Ave.	74	1.2	V	39.09	57.60	63.5	5.90
10460.00	41.13	PK	268	2.5	V	17.15	58.28	77.7	19.42
802.11ax80									
5210 MHz									
5146.52	40.01	PK	231	1.6	V	38.36	78.37	83.5	5.13
5146.52	22.94	Ave.	231	1.6	V	38.36	61.30	63.5	2.20
5352.48	32.77	PK	294	2.0	V	39.09	71.86	83.5	11.64
5352.48	18.62	Ave.	294	2.0	V	39.09	57.71	63.5	5.79
10420.00	42.29	PK	303	2.5	V	17.52	59.81	77.7	17.89

**5250-5350 MHz:**

Frequency (MHz)	Receiver		Turn-Table Angle Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part15.407	
	Reading (dBµV)	Detector (PK/QP/AV)		Height (m)	Polar (H / V)			Limit (dBµV/m)	Margin (dB)
802.11A									
5260 MHz									
5149.07	31.45	PK	261	1.3	V	38.36	69.81	83.5	13.69
5149.07	17.51	Ave.	261	1.3	V	38.36	55.87	63.5	7.63
5352.42	32.16	PK	324	1.1	V	39.09	71.25	83.5	12.25
5352.42	17.52	Ave.	324	1.1	V	39.09	56.61	63.5	6.89
10520.00	42.02	PK	10	1.5	V	17.25	59.27	77.7	18.43
5280 MHz									
10560.00	43.57	PK	220	2.4	V	17.91	61.48	77.7	16.22
5320 MHz									
5148.63	33.18	PK	12	1.2	V	38.36	71.54	83.5	11.96
5148.63	18.61	Ave.	12	1.2	V	38.36	56.97	63.5	6.53
5352.15	39.93	PK	211	1.5	V	39.09	79.02	83.5	4.48
5352.15	19.49	Ave.	211	1.5	V	39.09	58.58	63.5	4.92
10640.00	43.36	PK	39	1.4	V	18.01	61.37	83.5	22.13
10640.00	29.41	Ave.	39	1.4	V	18.01	47.42	63.5	16.08
802.11n20									
5260 MHz									
5148.53	32.51	PK	281	2.4	V	38.36	70.87	83.5	12.63
5148.53	18.31	Ave.	281	2.4	V	38.36	56.67	63.5	6.83
5352.08	31.97	PK	326	1.5	V	39.09	71.06	83.5	12.44
5352.08	18.27	Ave.	326	1.5	V	39.09	57.36	63.5	6.14
10520.00	42.50	PK	130	2.1	V	17.25	59.75	77.7	17.95
5280 MHz									
10560.00	42.14	PK	226	1.2	V	17.91	60.05	77.7	17.65
5320 MHz									
5146.64	32.45	PK	95	1.9	V	38.36	70.81	83.5	12.69
5146.64	18.35	Ave.	95	1.9	V	38.36	56.71	63.5	6.79
5350.81	36.11	PK	214	1.7	V	39.09	75.20	83.5	8.30
5350.81	19.24	Ave.	214	1.7	V	39.09	58.33	63.5	5.17
10640.00	43.47	PK	43	1.0	V	18.01	61.48	83.5	22.02
10640.00	29.05	Ave.	43	1.0	V	18.01	47.06	63.5	16.44

Frequency (MHz)	Receiver		Turn-Table Angle Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part15.407	
	Reading (dBµV)	Detector (PK/QP/AV)		Height (m)	Polar (H / V)			Limit (dBµV/m)	Margin (dB)
802.11N40									
5270 MHz									
5146.83	32.35	PK	51	1.1	V	38.36	70.71	83.5	12.79
5146.83	18.23	Ave.	51	1.1	V	38.36	56.59	63.5	6.91
5352.24	31.99	PK	222	1.9	V	39.09	71.08	83.5	12.42
5352.24	18.18	Ave.	222	1.9	V	39.09	57.27	63.5	6.23
10540.00	42.51	PK	121	1.6	V	17.25	59.76	77.7	17.94
5310 MHz									
5148.84	32.63	PK	356	1.9	V	38.36	70.99	83.5	12.51
5148.84	18.25	Ave.	356	1.9	V	38.36	56.61	63.5	6.89
5350.20	41.32	PK	226	2.1	V	39.09	80.41	83.5	3.09
5350.20	22.05	Ave.	226	2.1	V	39.09	61.14	63.5	2.36
10620.00	42.21	PK	359	2.1	V	18.01	60.22	83.5	23.28
10620.00	29.68	Ave.	359	2.1	V	18.01	47.69	63.5	15.81
802.11AC20									
5260 MHz									
5148.24	32.91	PK	127	2.3	V	38.36	71.27	83.5	12.23
5148.24	18.17	Ave.	127	2.3	V	38.36	56.53	63.5	6.97
5353.38	32.42	PK	162	1.6	V	39.09	71.51	83.5	11.99
5353.38	18.05	Ave.	162	1.6	V	39.09	57.14	63.5	6.36
10520.00	43.29	PK	139	1.7	V	17.25	60.54	77.7	17.16
5280 MHz									
10560.00	42.01	PK	126	2.1	V	17.91	59.92	77.7	17.78
5320 MHz									
5146.83	32.75	PK	180	1.5	V	38.36	71.11	83.5	12.39
5146.83	18.21	Ave.	180	1.5	V	38.36	56.57	63.5	6.93
5354.41	31.98	PK	23	2.4	V	39.09	71.07	83.5	12.43
5354.41	18.19	Ave.	23	2.4	V	39.09	57.28	63.5	6.22
10640.00	43.09	PK	4	2.2	V	18.01	61.10	83.5	22.40
10640.00	30.55	Ave.	4	2.2	V	18.01	48.56	63.5	14.94

Frequency (MHz)	Receiver		Turn-Table Angle Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part15.407	
	Reading (dBµV)	Detector (PK/QP/AV)		Height (m)	Polar (H / V)			Limit (dBµV/m)	Margin (dB)
802.11AC40									
5270 MHz									
5148.51	32.36	PK	253	1.2	V	38.36	70.72	83.5	12.78
5148.51	18.35	Ave.	253	1.2	V	38.36	56.71	63.5	6.79
5354.19	32.81	PK	326	2.4	V	39.09	71.90	83.5	11.60
5354.19	18.26	Ave.	326	2.4	V	39.09	57.35	63.5	6.15
10540.00	42.39	PK	150	2.1	V	17.25	59.64	77.7	18.06
5310 MHz									
5145.53	32.75	PK	100	2.0	V	38.36	71.11	83.5	12.39
5145.53	18.27	Ave.	100	2.0	V	38.36	56.63	63.5	6.87
5350.14	41.24	PK	298	2.3	V	39.09	80.33	83.5	3.17
5350.14	22.03	Ave.	298	2.3	V	39.09	61.12	63.5	2.38
10620.00	42.70	PK	163	1.4	V	18.01	60.71	83.5	22.79
10620.00	30.08	Ave.	163	1.4	V	18.01	48.09	63.5	15.41
802.11AC80									
5290 MHz									
5148.52	32.89	PK	89	1.4	V	38.36	71.25	83.5	12.25
5148.52	18.53	Ave.	89	1.4	V	38.36	56.89	63.5	6.61
5350.14	41.57	PK	50	1.7	V	39.09	80.66	83.5	2.84
5350.14	22.82	Ave.	50	1.7	V	39.09	61.91	63.5	1.59
10580.00	42.42	PK	89	1.1	V	17.91	60.33	77.7	17.37

Frequency (MHz)	Receiver		Turn-Table Angle Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part15.407	
	Reading (dBµV)	Detector (PK/QP/AV)		Height (m)	Polar (H / V)			Limit (dBµV/m)	Margin (dB)
802.11ax20									
5260 MHz									
5145.64	32.14	PK	36	2.3	V	38.36	70.50	83.5	13.00
5145.64	18.41	Ave.	36	2.3	V	38.36	56.77	63.5	6.73
5353.75	32.63	PK	30	1.2	V	39.09	71.72	83.5	11.78
5353.75	18.38	Ave.	30	1.2	V	39.09	57.47	63.5	6.03
10520.00	42.73	PK	135	2.2	V	17.25	59.98	77.7	17.72
5280 MHz									
10560.00	42.75	PK	273	1.3	V	17.91	60.66	77.7	17.04
5320 MHz									
5147.79	32.87	PK	8	2.2	V	38.36	71.23	83.5	12.27
5147.79	18.56	Ave.	8	2.2	V	38.36	56.92	63.5	6.58
5351.89	40.12	PK	337	2.1	V	39.09	79.21	83.5	4.29
5351.89	22.35	Ave.	233	2.2	V	39.09	61.44	63.5	2.06
10640.00	43.85	PK	7	1.7	V	18.01	61.86	83.5	21.64
10640.00	29.58	Ave.	7	1.7	V	18.01	47.59	63.5	15.91
802.11Ax40									
5270 MHz									
5145.37	32.28	PK	112	2.4	V	38.36	70.64	83.5	12.86
5145.37	18.19	Ave.	112	2.4	V	38.36	56.55	63.5	6.95
5356.05	32.46	PK	14	2.2	V	39.09	71.55	83.5	11.95
5356.05	18.12	Ave.	14	2.2	V	39.09	57.21	63.5	6.29
10540.00	43.90	PK	136	2.3	V	17.25	61.15	77.7	16.55
5310 MHz									
5147.34	32.42	PK	257	2.2	V	38.36	70.78	83.5	12.72
5147.34	18.28	Ave.	257	2.2	V	38.36	56.64	63.5	6.86
5350.17	40.96	PK	210	1.6	V	39.09	80.05	83.5	3.45
5350.17	21.68	Ave.	210	1.6	V	39.09	60.77	63.5	2.73
10620.00	43.01	PK	83	1.5	V	18.01	61.02	83.5	22.48
10620.00	30.18	Ave.	83	1.5	V	18.01	48.19	63.5	15.31
802.11Ax80									
5290 MHz									
5145.68	32.47	PK	238	1.9	V	38.36	70.83	83.5	12.67
5145.68	18.56	Ave.	238	1.9	V	38.36	56.92	63.5	6.58
5350.01	41.61	PK	280	1.6	V	39.09	80.70	83.5	2.80
5350.01	22.75	Ave.	280	1.6	V	39.09	61.84	63.5	1.66
10580.00	43.42	PK	270	1.1	V	17.91	61.33	77.7	16.37



**5470-5725MHz:**

Frequency (MHz)	Receiver		Turn-Table Angle Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part15.407	
	Reading (dBµV)	Detector (PK/QP/AV)		Height (m)	Polar (H / V)			Limit (dBµV/m)	Margin (dB)
802.11A									
5500 MHz									
5464.26	36.79	PK	333	2.0	V	39.37	76.16	77.7	1.54
5726.58	32.41	PK	247	1.3	V	39.49	71.90	77.7	5.80
11000.00	43.11	PK	196	1.2	V	17.66	60.77	83.5	22.73
11000.00	29.67	Ave.	196	1.2	V	17.66	47.33	63.5	16.17
5580 MHz									
11160.00	43.88	PK	247	2.2	V	17.39	61.27	83.5	22.23
11160.00	30.73	Ave.	247	2.2	V	17.39	48.12	63.5	15.38
5700 MHz									
5468.42	32.48	PK	220	2.2	V	39.37	71.85	77.7	5.85
5725.72	36.82	PK	92	1.3	V	39.49	76.31	77.7	1.39
11400.00	43.62	PK	332	1.7	V	17.73	61.35	83.5	22.15
11400.00	30.92	Ave.	332	1.7	V	17.73	48.65	63.5	14.85
802.11n20									
5500 MHz									
5462.45	36.65	PK	93	2.4	V	39.37	76.02	77.7	1.68
5728.94	32.48	PK	202	1.8	V	39.49	71.97	77.7	5.73
11000.00	43.77	PK	12	2.4	V	17.66	61.43	83.5	22.07
11000.00	30.41	Ave.	12	2.4	V	17.66	48.07	63.5	15.43
5580 MHz									
11160.00	43.44	PK	318	1.6	V	17.39	60.83	83.5	22.67
11160.00	29.02	Ave.	318	1.6	V	17.39	46.41	63.5	17.09
5700 MHz									
5468.42	32.72	PK	114	2.2	V	39.37	72.09	77.7	5.61
5725.14	36.89	PK	221	1.3	V	39.49	76.38	77.7	1.32
11400.00	43.70	PK	303	1.5	V	17.73	61.43	83.5	22.07
11400.00	29.55	Ave.	303	1.5	V	17.73	47.28	63.5	16.22

Frequency (MHz)	Receiver		Turn-Table Angle Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part15.407	
	Reading (dBµV)	Detector (PK/QP/AV)		Height (m)	Polar (H / V)			Limit (dBµV/m)	Margin (dB)
802.11n40									
5510 MHz									
5468.27	36.08	PK	93	2.1	V	39.37	75.45	77.7	2.25
5728.42	32.74	PK	148	1.3	V	39.49	72.23	77.7	5.47
11020.00	42.91	PK	200	2.2	V	17.66	60.57	83.5	22.93
11020.00	30.54	Ave.	200	2.2	V	17.66	48.20	63.5	15.30
5550 MHz									
11100.00	43.15	PK	234	2.1	V	16.72	59.87	83.5	23.63
11100.00	29.09	Ave.	234	2.1	V	16.72	45.81	63.5	17.69
5670 MHz									
5469.73	31.98	PK	182	1.9	V	39.37	71.35	77.7	6.35
5729.62	36.95	PK	78	1.2	V	39.49	76.44	77.7	1.26
11340.00	42.46	PK	178	1.8	V	17.43	59.89	83.5	23.61
11340.00	30.24	Ave.	178	1.8	V	17.43	47.67	63.5	15.83
802.11AC20									
5500 MHz									
5469.92	36.44	PK	25	1.2	V	39.37	75.81	77.7	1.89
5728.86	31.89	PK	107	1.5	V	39.49	71.38	77.7	6.32
11000.00	42.44	PK	308	2.1	V	17.66	60.10	83.5	23.40
11000.00	29.54	Ave.	308	2.1	V	17.66	47.20	63.5	16.30
5580 MHz									
11160.00	42.67	PK	196	1.3	V	17.39	60.06	83.5	23.44
11160.00	29.27	Ave.	196	1.3	V	17.39	46.66	63.5	16.84
5700 MHz									
5463.59	32.18	PK	87	1.9	V	39.37	71.55	77.7	6.15
5725.33	36.62	PK	154	2.0	V	39.49	76.11	77.7	1.59
11400.00	42.19	PK	45	1.9	V	17.73	59.92	83.5	23.58
11400.00	29.33	Ave.	45	1.9	V	17.73	47.06	63.5	16.44

Frequency (MHz)	Receiver		Turn-Table Angle Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part15.407	
	Reading (dBµV)	Detector (PK/QP/AV)		Height (m)	Polar (H / V)			Limit (dBµV/m)	Margin (dB)
802.11AC40									
5510 MHz									
5468.43	36.93	PK	271	2.0	V	39.37	76.30	77.7	1.40
5725.67	32.58	PK	19	1.2	V	39.49	72.07	77.7	5.63
11020.00	42.30	PK	347	1.1	V	17.66	59.96	83.5	23.54
11020.00	30.88	Ave.	347	1.1	V	17.66	48.54	63.5	14.96
5550 MHz									
11100.00	42.74	PK	217	2.0	V	16.72	59.46	83.5	24.04
11100.00	30.67	Ave.	217	2.0	V	16.72	47.39	63.5	16.11
5670 MHz									
5468.24	32.71	PK	212	1.3	V	39.37	72.08	77.7	5.62
5725.36	37.12	PK	145	1.6	V	39.49	76.61	77.7	1.09
11340.00	42.48	PK	68	1.5	V	17.43	59.91	83.5	23.59
11340.00	30.78	Ave.	68	1.5	V	17.43	48.21	63.5	15.29
802.11AC80									
5530 MHz									
5465.07	37.32	PK	127	1.7	V	39.37	76.69	77.7	1.01
5725.67	33.24	PK	4	1.6	V	39.49	72.73	77.7	4.97
11060.00	43.94	PK	293	2.2	V	16.72	60.66	83.5	22.84
11060.00	29.28	Ave.	293	2.2	V	16.72	46.00	63.5	17.50
5610 MHz									
5746.84	32.37	PK	184	2.3	V	39.49	71.86	77.7	5.84
5727.81	36.87	PK	248	1.1	V	39.49	76.36	77.7	1.34
11220.00	43.20	PK	355	2.0	V	17.39	60.59	83.5	22.91
11220.00	29.02	Ave.	355	2.0	V	17.39	46.41	63.5	17.09

Frequency (MHz)	Receiver		Turn-Table Angle Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part15.407	
	Reading (dBµV)	Detector (PK/QP/AV)		Height (m)	Polar (H / V)			Limit (dBµV/m)	Margin (dB)
802.11ax20									
5500 MHz									
5469.53	36.94	PK	34	2.1	V	39.37	76.31	77.7	1.39
5728.49	32.65	PK	325	2.4	V	39.49	72.14	77.7	5.56
11000.00	43.02	PK	86	1.5	V	17.66	60.68	83.5	22.82
11000.00	30.55	Ave.	86	1.5	V	17.66	48.21	63.5	15.29
5580 MHz									
11160.00	42.87	PK	71	2.2	V	17.39	60.26	83.5	23.24
11160.00	30.73	Ave.	71	2.2	V	17.39	48.12	63.5	15.38
5700 MHz									
5469.53	32.44	PK	77	1.5	V	39.37	71.81	77.7	5.89
5725.63	36.98	PK	198	1.3	V	39.49	76.47	77.7	1.23
11400.00	43.15	PK	13	1.4	V	17.73	60.88	83.5	22.62
11400.00	29.68	Ave.	13	1.4	V	17.73	47.41	63.5	16.09
802.11ax40									
5510 MHz									
5468.96	37.17	PK	101	1.7	V	39.37	76.54	77.7	1.16
5729.43	32.52	PK	303	2.2	V	39.49	72.01	77.7	5.69
11020.00	42.79	PK	150	2.0	V	17.66	60.45	83.5	23.05
11020.00	30.23	Ave.	150	2.0	V	17.66	47.89	63.5	15.61
5550 MHz									
11100.00	43.77	PK	172	1.5	V	16.72	60.49	83.5	23.01
11100.00	30.20	Ave.	172	1.5	V	16.72	46.92	63.5	16.58
5670 MHz									
5466.45	32.44	PK	247	2.3	V	39.37	71.81	77.7	5.89
5725.39	36.87	PK	9	1.4	V	39.49	76.36	77.7	1.34
11340.00	43.43	PK	328	2.5	V	17.43	60.86	83.5	22.64
11340.00	29.58	Ave.	328	2.5	V	17.43	47.01	63.5	16.49
802.11ax80									
5530 MHz									
5466.36	37.22	PK	205	2.0	V	39.37	76.59	77.7	1.11
5726.42	31.86	PK	344	1.7	V	39.49	71.35	77.7	6.35
11060.00	43.70	PK	66	2.1	V	16.72	60.42	83.5	23.08
11060.00	29.96	Ave.	66	2.1	V	16.72	46.68	63.5	16.82
5610MHz									
5468.62	32.45	PK	9	2.3	V	39.37	71.82	77.7	5.88
5728.41	36.76	PK	274	1.0	V	39.49	76.25	77.7	1.45
11220.00	43.27	PK	269	2.1	V	17.39	60.66	83.5	22.84
11220.00	29.61	Ave.	269	2.1	V	17.39	47.00	63.5	16.50

**5725-5850 MHz:**

Frequency (MHz)	Receiver		Turn-Table Angle Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part15.407	
	Reading (dBµV)	Detector (PK/QP/AV)		Height (m)	Polar (H / V)			Limit (dBµV/m)	Margin (dB)
802.11A									
5745 MHz									
5631.73	33.31	PK	173	1.6	V	39.46	72.77	77.7	4.93
5694.90	37.12	PK	108	2.4	V	39.49	76.61	110.93	34.32
5716.61	40.28	PK	75	1.6	V	39.49	79.77	119.35	39.58
5724.95	44.58	PK	223	1.1	V	39.49	84.07	131.59	47.52
11490.00	41.84	PK	255	1.6	V	17.47	59.31	83.5	24.19
11490.00	29.72	Ave.	255	1.6	V	17.47	47.19	63.5	16.31
5785 MHz									
11570.00	42.99	PK	32	2.4	V	17.51	60.50	83.5	23.00
11570.00	30.80	Ave.	32	2.4	V	17.51	48.31	63.5	15.19
5825 MHz									
5850.80	35.85	PK	141	2.4	V	39.87	75.72	129.88	54.16
5862.45	35.12	PK	164	2.3	V	39.87	74.99	118.21	43.22
5892.62	34.69	PK	358	2.5	V	39.87	74.56	101.66	27.10
5970.69	32.75	PK	180	2.1	V	39.84	72.59	77.7	5.11
11650.00	42.64	PK	13	2.4	V	16.18	58.82	83.5	24.68
11650.00	30.46	Ave.	13	2.4	V	16.18	46.64	63.5	16.86
802.11N20									
5745 MHz									
5641.14	31.34	PK	153	2.5	V	39.46	70.80	77.7	6.90
5698.44	35.36	PK	318	2.1	V	39.49	74.85	113.55	38.70
5718.84	43.38	PK	136	1.4	V	39.49	82.87	119.98	37.11
5724.51	45.01	PK	349	1.8	V	39.49	84.50	130.58	46.08
11490.00	42.73	PK	28	1.5	V	17.47	60.20	83.5	23.30
11490.00	30.58	Ave.	28	1.5	V	17.47	48.05	63.5	15.45
5785 MHz									
11570.00	42.49	PK	276	2.4	V	17.51	60.00	83.5	23.50
11570.00	29.74	Ave.	276	2.4	V	17.51	47.25	63.5	16.25
5825 MHz									
5850.28	37.93	PK	329	1.4	V	39.87	77.80	131.06	53.26
5861.56	34.82	PK	355	1.7	V	39.87	74.69	118.46	43.77
5892.40	34.89	PK	264	2.5	V	39.87	74.76	101.82	27.06
5964.83	34.44	PK	239	1.5	V	39.84	74.28	77.7	3.42
11650.00	42.95	PK	147	1.6	V	16.18	59.13	83.5	24.37
11650.00	30.20	Ave.	147	1.6	V	16.18	46.38	63.5	17.12

Frequency (MHz)	Receiver		Turn-Table Angle Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part15.407	
	Reading (dBµV)	Detector (PK/QP/AV)		Height (m)	Polar (H / V)			Limit (dBµV/m)	Margin (dB)
802.11N40									
5755 MHz									
5638.09	35.94	PK	172	1.7	V	39.46	75.40	77.7	2.30
5683.25	36.26	PK	187	1.8	V	39.49	75.75	102.3	26.55
5717.83	45.61	PK	99	1.4	V	39.49	85.10	119.69	34.59
5724.19	46.98	PK	109	1.9	V	39.49	86.47	129.85	43.38
11510.00	41.99	PK	144	2.1	V	17.47	59.46	83.5	24.04
11510.00	29.39	Ave.	144	2.1	V	17.47	46.86	63.5	16.64
5795 MHz									
5850.79	36.62	PK	318	1.6	V	39.87	76.49	129.9	53.41
5860.77	34.62	PK	161	2.2	V	39.87	74.49	118.68	44.19
5910.78	34.39	PK	259	1.9	V	39.87	74.26	88.22	13.96
5940.67	32.52	PK	64	1.2	V	39.97	72.49	77.7	5.21
11590.00	41.86	PK	130	1.0	V	17.51	59.37	83.5	24.13
11590.00	30.38	Ave.	130	1.0	V	17.51	47.89	63.5	15.61
802.11AC20									
5745 MHz									
5638.24	32.74	PK	216	2.2	V	39.46	72.20	77.7	5.50
5696.78	37.83	PK	70	2.0	V	39.49	77.32	112.32	35.00
5717.82	43.68	PK	119	2.3	V	39.49	83.17	119.69	36.52
5724.08	44.03	PK	148	2.0	V	39.49	83.52	129.6	46.08
11490.00	42.46	PK	68	2.4	V	17.47	59.93	83.5	23.57
11490.00	29.78	Ave.	68	2.4	V	17.47	47.25	63.5	16.25
5785 MHz									
11570.00	41.29	PK	150	1.5	V	17.51	58.80	83.5	24.70
11570.00	30.60	Ave.	150	1.5	V	17.51	48.11	63.5	15.39
5825 MHz									
5850.02	35.67	PK	337	1.5	V	39.87	75.54	131.65	56.11
5857.59	33.78	PK	65	1.1	V	39.87	73.65	119.57	45.92
5924.39	33.50	PK	335	1.8	V	39.97	73.47	78.15	4.68
5962.59	34.68	PK	357	2.2	V	39.84	74.52	77.7	3.18
11650.00	42.16	PK	254	2.1	V	16.18	58.34	83.5	25.16
11650.00	30.32	Ave.	254	2.1	V	16.18	46.50	63.5	17.00

Frequency (MHz)	Receiver		Turn-Table Angle Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part15.407	
	Reading (dBµV)	Detector (PK/QP/AV)		Height (m)	Polar (H / V)			Limit (dBµV/m)	Margin (dB)
802.11AC40									
5755 MHz									
5638.75	36.04	PK	244	1.9	V	39.46	75.50	77.7	2.20
5696.74	44.37	PK	23	2.1	V	39.49	83.86	112.29	28.43
5718.01	45.85	PK	263	1.1	V	39.49	85.34	119.74	34.40
5724.55	47.38	PK	289	2.1	V	39.49	86.87	130.67	43.80
11510.00	42.54	PK	231	1.1	V	17.47	60.01	83.5	23.49
11510.00	29.95	Ave.	231	1.1	V	17.47	47.42	63.5	16.08
5795 MHz									
5851.11	36.99	PK	103	2.1	V	39.87	76.86	129.17	52.31
5859.91	35.80	PK	273	2.5	V	39.87	75.67	118.93	43.26
5877.06	34.68	PK	80	2.2	V	39.87	74.55	113.18	38.63
5950.72	34.83	PK	136	1.5	V	39.84	74.67	77.7	3.03
11590.00	42.60	PK	25	1.1	V	17.51	60.11	83.5	23.39
11590.00	30.97	Ave.	25	1.1	V	17.51	48.48	63.5	15.02
802.11AC80									
5775 MHz									
5644.13	36.34	PK	332	1.7	V	39.46	75.80	77.7	1.90
5699.60	44.55	PK	92	2.1	V	39.49	84.04	114.4	30.36
5712.15	44.24	PK	215	1.4	V	39.49	83.73	118.1	34.37
5724.19	46.02	PK	225	2.3	V	39.49	85.51	129.85	44.34
5851.35	41.02	PK	32	1.1	V	39.87	80.89	128.62	47.73
5855.15	38.39	PK	317	1.0	V	39.87	78.26	120.26	42.00
5915.99	35.71	PK	95	2.3	V	39.87	75.58	84.37	8.79
5955.79	33.98	PK	9	2.0	V	39.84	73.82	77.7	3.88
11550.00	41.68	PK	301	1.6	V	17.51	59.19	83.5	24.31
11550.00	30.18	Ave.	301	1.6	V	17.51	47.69	63.5	15.81

Frequency (MHz)	Receiver		Turn-Table Angle Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part15.407	
	Reading (dBµV)	Detector (PK/QP/AV)		Height (m)	Polar (H / V)			Limit (dBµV/m)	Margin (dB)
802.11ax20									
5745 MHz									
5621.45	31.95	PK	170	1.3	V	39.46	71.41	77.7	6.29
5696.42	35.87	PK	209	2.1	V	39.49	75.36	112.05	36.69
5719.14	43.97	PK	99	1.2	V	39.49	83.46	120.06	36.60
5721.58	42.98	PK	148	1.2	V	39.49	82.47	123.09	40.62
11490.00	41.52	PK	204	1.6	V	17.47	58.99	83.5	24.51
11490.00	30.15	Ave.	204	1.6	V	17.47	47.62	63.5	15.88
5785 MHz									
11570.00	42.92	PK	106	1.3	V	17.51	60.43	83.5	23.07
11570.00	30.45	Ave.	106	1.3	V	17.51	47.96	63.5	15.54
5825 MHz									
5850.25	37.18	PK	23	2.2	V	39.87	77.05	131.13	54.08
5869.02	35.29	PK	355	2.2	V	39.87	75.16	116.37	41.21
5906.59	34.48	PK	115	2.0	V	39.87	74.35	91.12	16.77
5960.21	32.86	PK	308	1.6	V	39.84	72.70	77.7	5.00
11650.00	41.85	PK	86	1.7	V	16.18	58.03	83.5	25.47
11650.00	30.54	Ave.	86	1.7	V	16.18	46.72	63.5	16.78
802.11ax40									
5775 MHz									
5645.04	34.32	PK	175	2.1	V	39.46	73.78	77.7	3.92
5699.93	43.43	PK	318	1.9	V	39.49	82.92	114.65	31.73
5719.04	47.46	PK	213	2.3	V	39.49	86.95	120.03	33.08
5724.01	46.74	PK	325	2.1	V	39.49	86.23	129.44	43.21
11510.00	42.07	PK	121	1.8	V	17.47	59.54	83.5	23.96
11510.00	30.09	Ave.	121	1.8	V	17.47	47.56	63.5	15.94
5795 MHz									
5850.85	34.79	PK	352	1.3	V	39.87	74.66	129.76	55.10
5860.11	35.93	PK	108	1.8	V	39.87	75.80	118.87	43.07
5887.84	33.27	PK	106	1.8	V	39.87	73.14	105.2	32.06
5930.39	34.68	PK	254	1.3	V	39.97	74.65	77.7	3.05
11590.00	41.98	PK	220	2.4	V	17.51	59.49	83.5	24.01
11590.00	29.18	Ave.	220	2.4	V	17.51	46.69	63.5	16.81



Frequency (MHz)	Receiver		Turn-Table Angle Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part15.407	
	Reading (dBµV)	Detector (PK/QP/AV)		Height (m)	Polar (H / V)			Limit (dBµV/m)	Margin (dB)
802.11ax80									
5775 MHz									
5648.96	37.16	PK	164	1.8	V	39.46	76.62	77.7	1.08
5695.33	42.66	PK	36	1.5	V	39.49	82.15	111.24	29.09
5713.68	44.02	PK	268	1.9	V	39.49	83.51	118.53	35.02
5724.99	45.96	PK	189	2.3	V	39.49	85.45	131.68	46.23
5852.49	41.84	PK	101	2.1	V	39.87	81.71	126.02	44.31
5855.56	39.19	PK	247	1.3	V	39.87	79.06	120.14	41.08
5877.86	35.42	PK	51	1.4	V	39.87	75.29	112.58	37.29
5956.80	33.88	PK	163	1.4	V	39.84	73.72	77.7	3.98
11550.00	41.11	PK	292	1.9	V	17.51	58.62	83.5	24.88
11550.00	30.12	Ave.	292	1.9	V	17.51	47.63	63.5	15.87

**Note:**

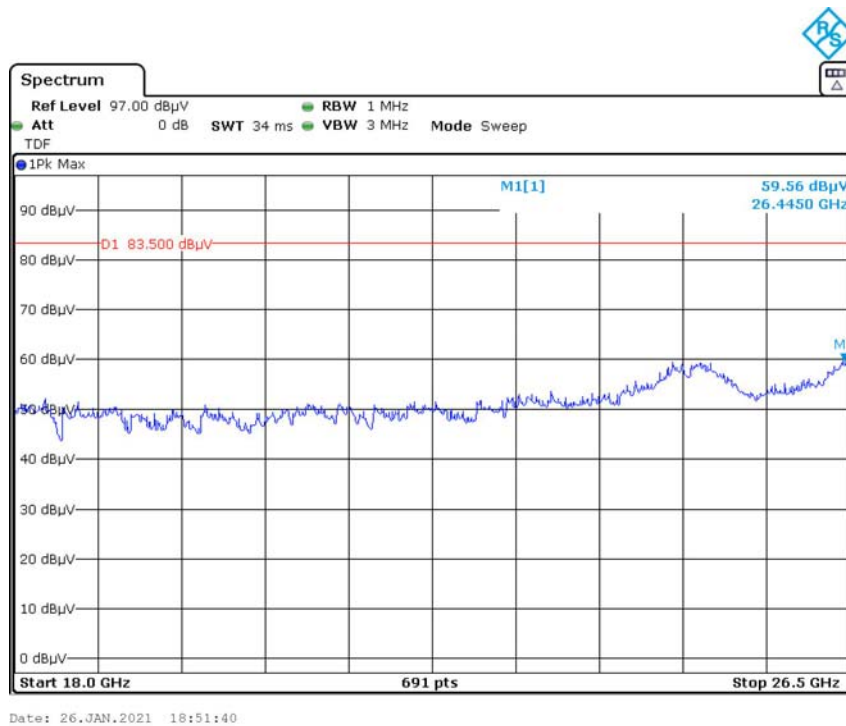
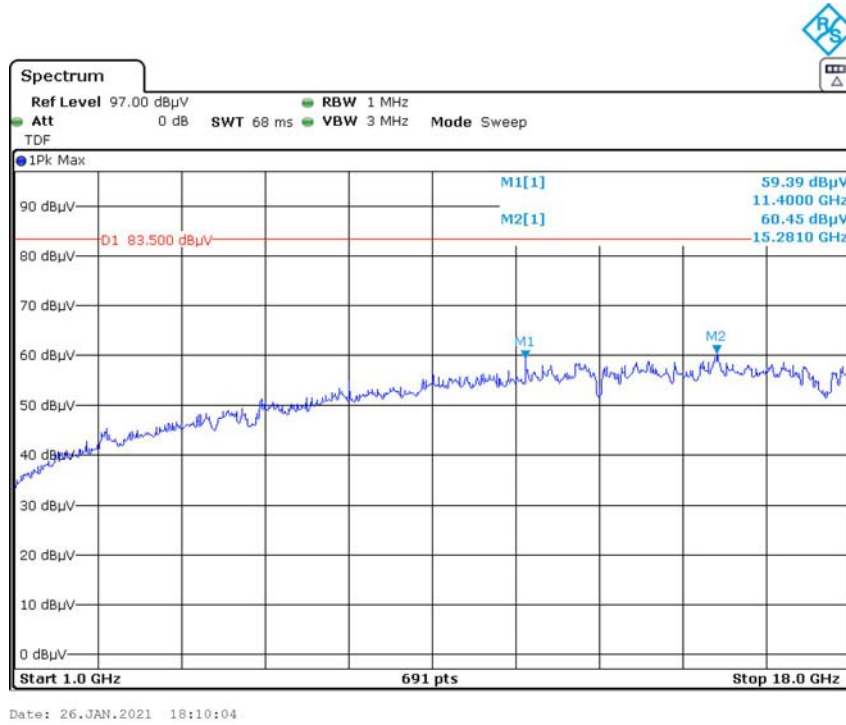
Corrected Amplitude = Corrected Factor + Reading

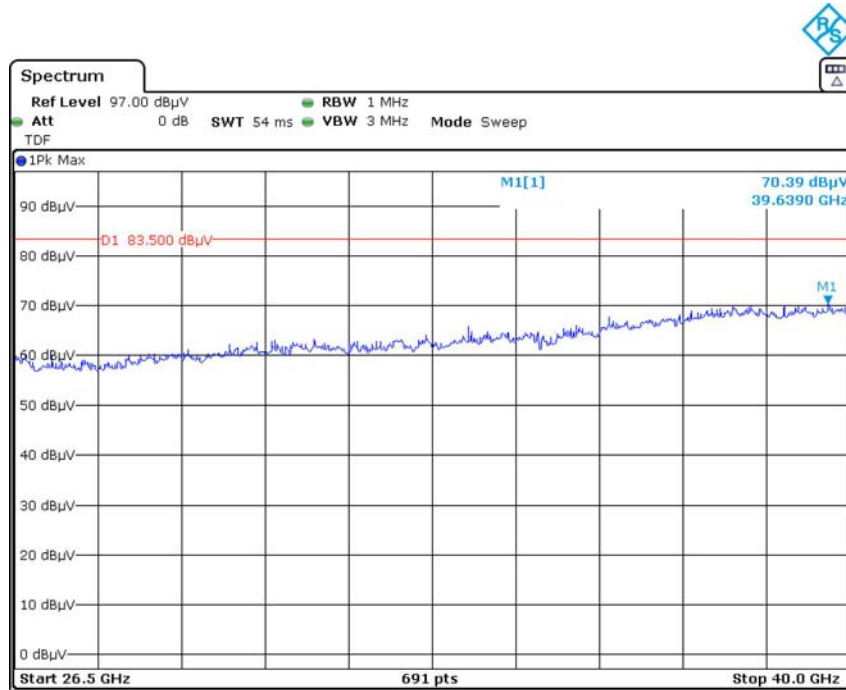
Corrected Factor=Antenna factor (RX) + Cable Loss – Amplifier Factor

Margin = Limit- Corr. Amplitude

All other spurious emissions are 20 dB below the limit or are on the system noise floor level.

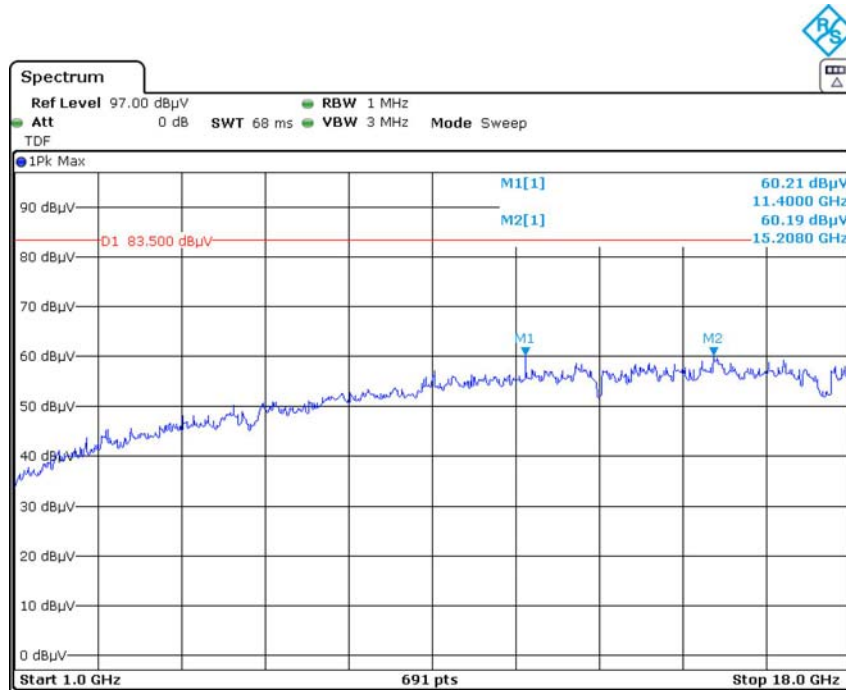
**Peak  
Pre-scan with 802.11a 5700MHz  
Horizontal**



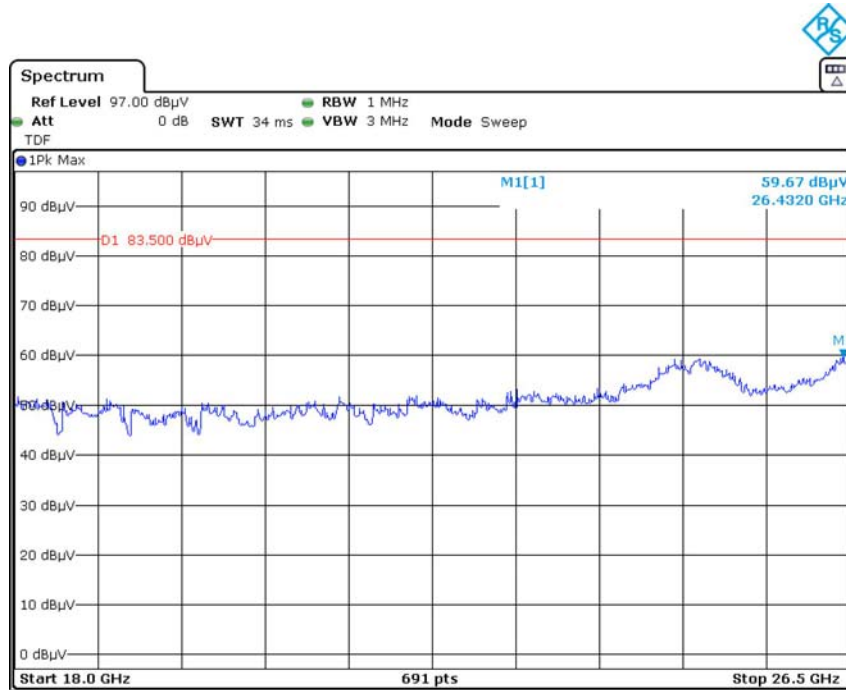


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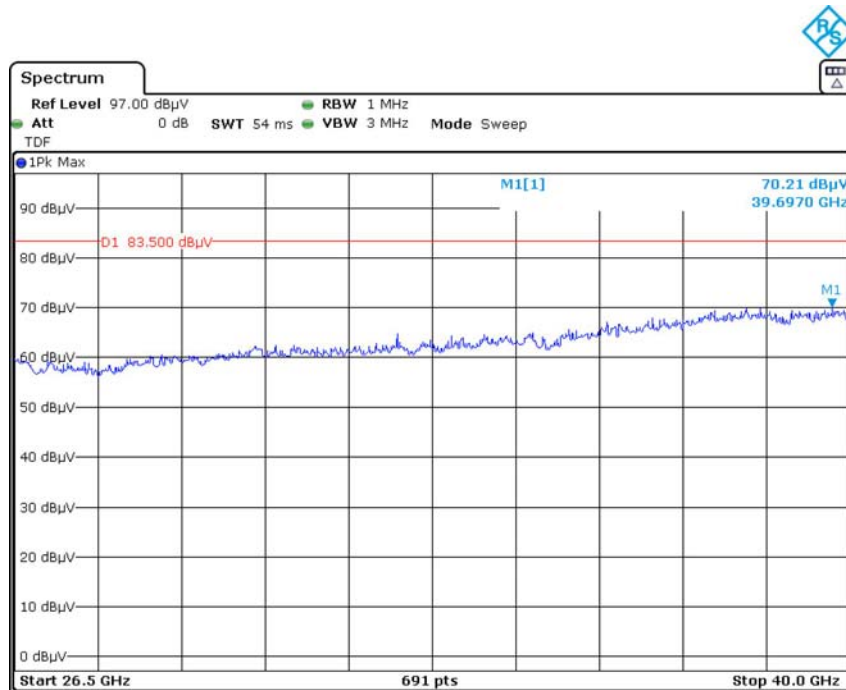
Vertical



Date: 26.JAN.2021 17:57:41

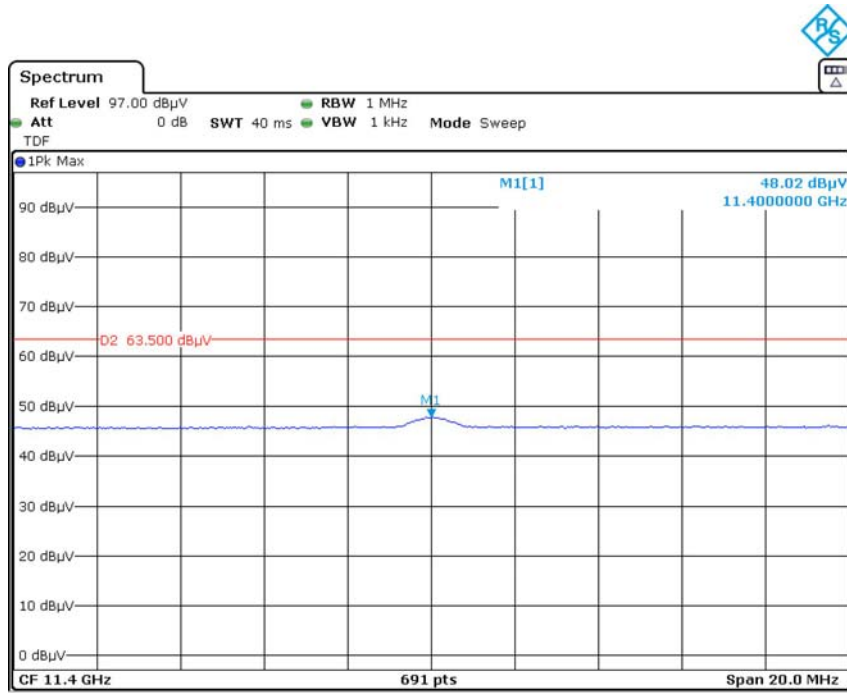


Date: 26.JAN.2021 18:45:02

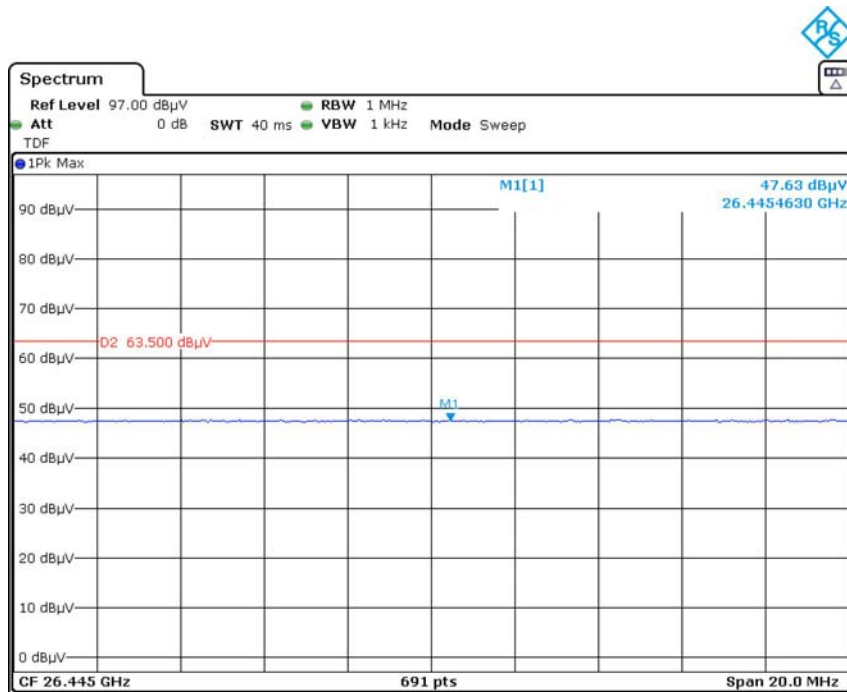


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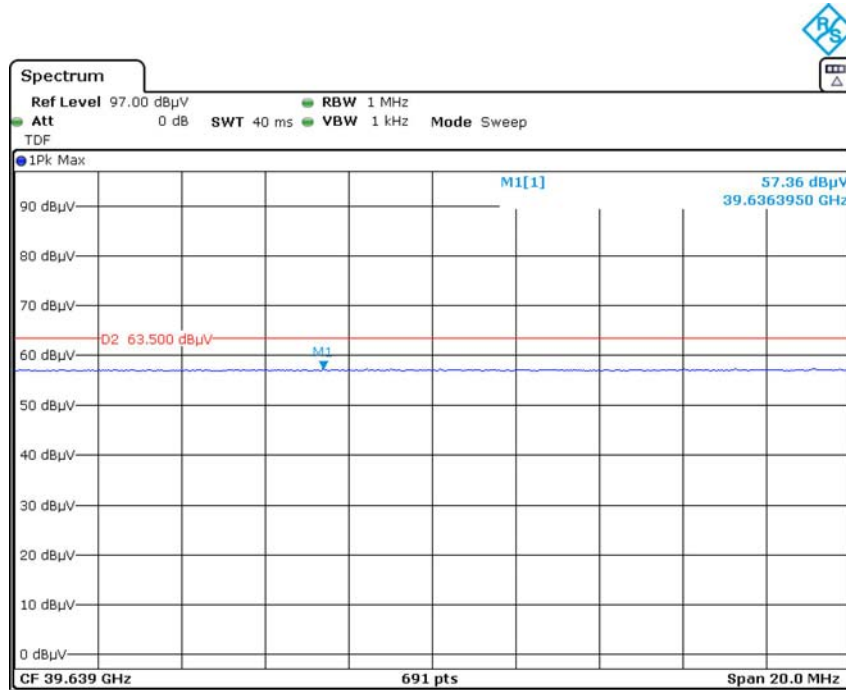
### Average Horizontal



Date: 26.JAN.2021 18:14:33

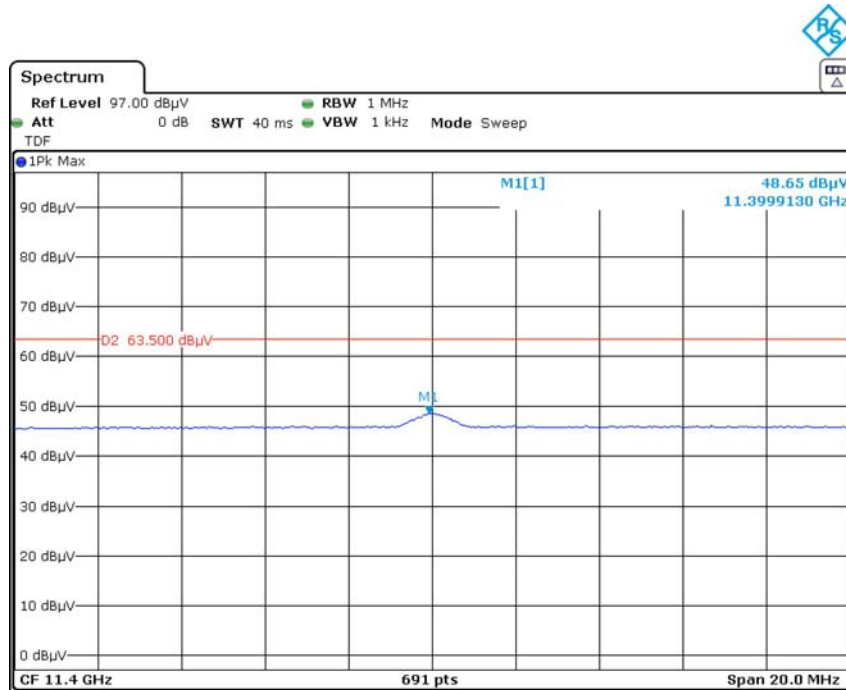


Date: 26.JAN.2021 18:54:59

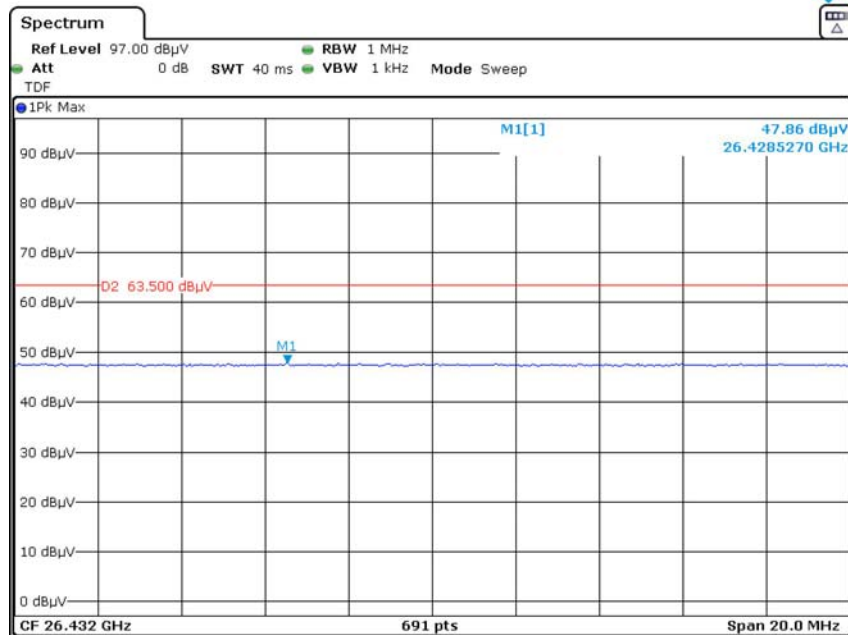


Date: 26.JAN.2021 19:10:50

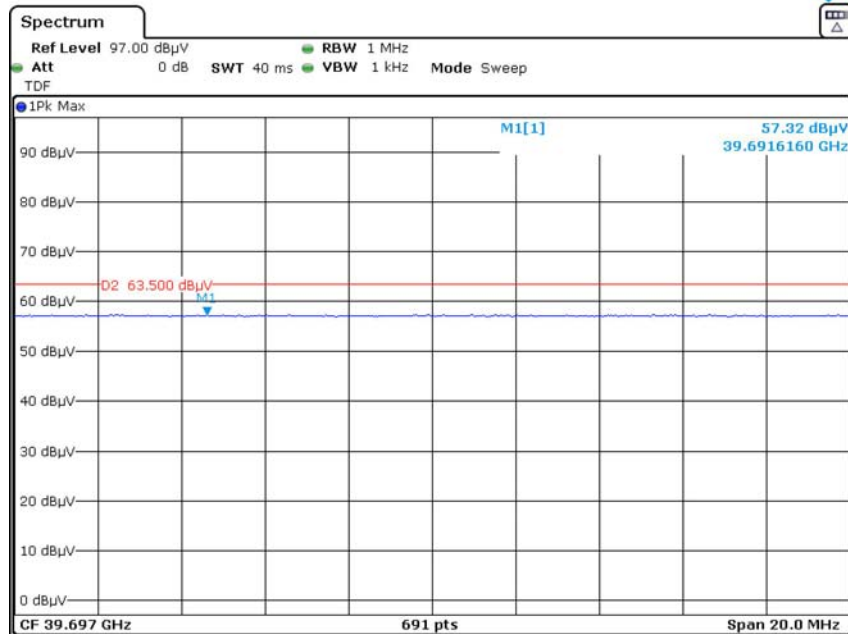
### Vertical



Date: 26.JAN.2021 18:04:04



Date: 26.JAN.2021 18:48:21



Date: 26.JAN.2021 19:01:50

## FCC §15.407(1), (5),(e) – 26 dB & 6dB EMISSION BANDWIDTH

### Applicable Standard

The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

### Test Procedure

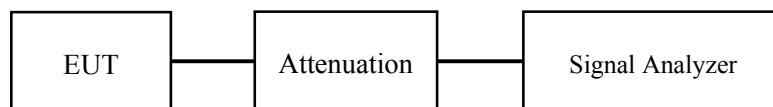
#### 1. Emission Bandwidth (EBW)

- a) Set RBW = approximately 1% of the emission bandwidth.
- b) Set the VBW > RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

#### 2. Minimum Emission Bandwidth for the band 5.725-5.85 GHz

Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.725-5.85 GHz. The following procedure shall be used for measuring this bandwidth:

- a) Set RBW = 100 kHz.
- b) Set the video bandwidth (VBW)  $\geq 3 \times$  RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Sweep = auto couple.
- f) Allow the trace to stabilize.
- g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.





**Test Data**

**Environmental Conditions**

<b>Temperature:</b>	24 °C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	101.0 kPa

*The testing was performed by Coco Liu from 2021-03-06 to 2021-03-11.*

*EUT operation mode: Transmitting*

**Test Result: Pass**

*Please refer to the Appendix.*

## FCC §15.407(a)(1)(2)(3) – CONDUCTED TRANSMITTER OUTPUT POWER

### Applicable Standard

For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

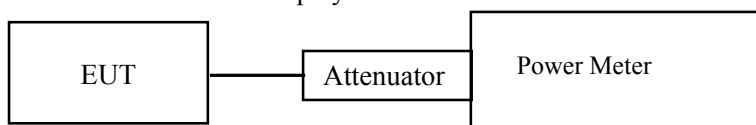
For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

### Test Procedure

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to one test equipment.
3. Add a correction factor to the display.



**Test Data**

**Environmental Conditions**

<b>Temperature:</b>	24 °C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	101.0 kPa

*The testing was performed by Coco Liu from 2021-03-08 to 2021-03-11.*

*EUT operation mode: Transmitting*

**Test Result: Pass**

*Please refer to the Appendix.*

## **FCC §15.407(a) (1) (2) (3) - POWER SPECTRAL DENSITY**

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

### **Test Procedure**

For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, “provided that the measured power is integrated over the full reference bandwidth” to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 kHz bandwidth, the following adjustments to the procedures apply:

- a) Set  $RBW \geq 1/T$ , where T is defined in section II.B.1.a).
- b) Set  $VBW \geq 3 \text{ RBW}$ .
- c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add  $10 \log (500 \text{ kHz}/RBW)$  to the measured result, whereas  $RBW (< 500 \text{ kHz})$  is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
- d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add  $10 \log (1\text{MHz}/RBW)$  to the measured result, whereas  $RBW (< 1 \text{ MHz})$  is the reduced resolution bandwidth of spectrum analyzer set during measurement.
- e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

**Test Data**

**Environmental Conditions**

<b>Temperature:</b>	24 °C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	101.0 kPa

*The testing was performed by Coco Liu from 2021-03-08 to 2021-03-11.*

*EUT operation mode: Transmitting*

**Test Result: Pass**

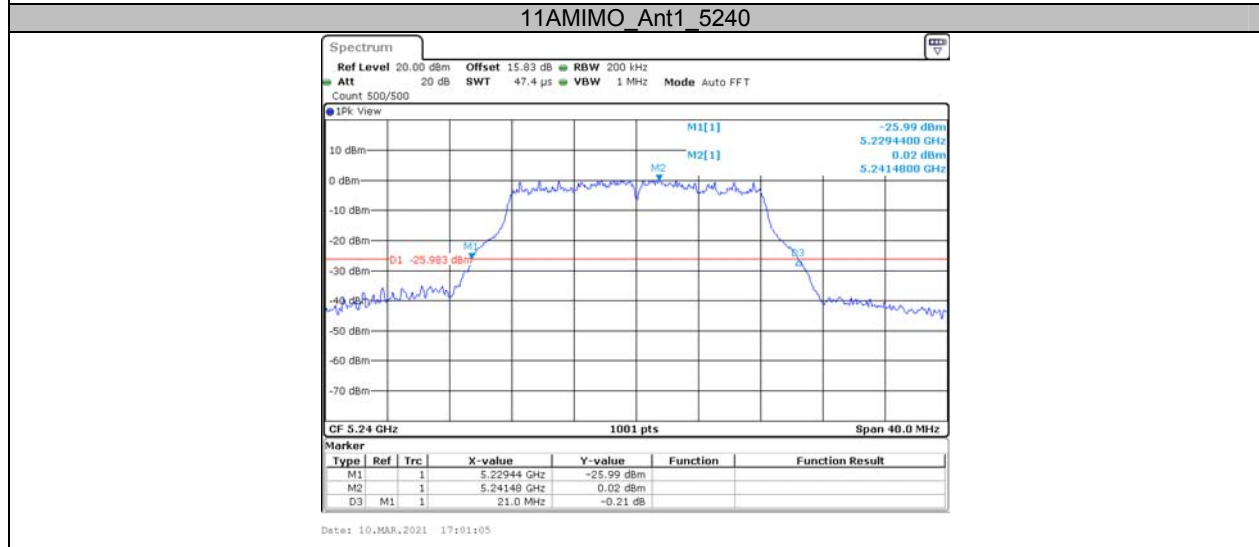
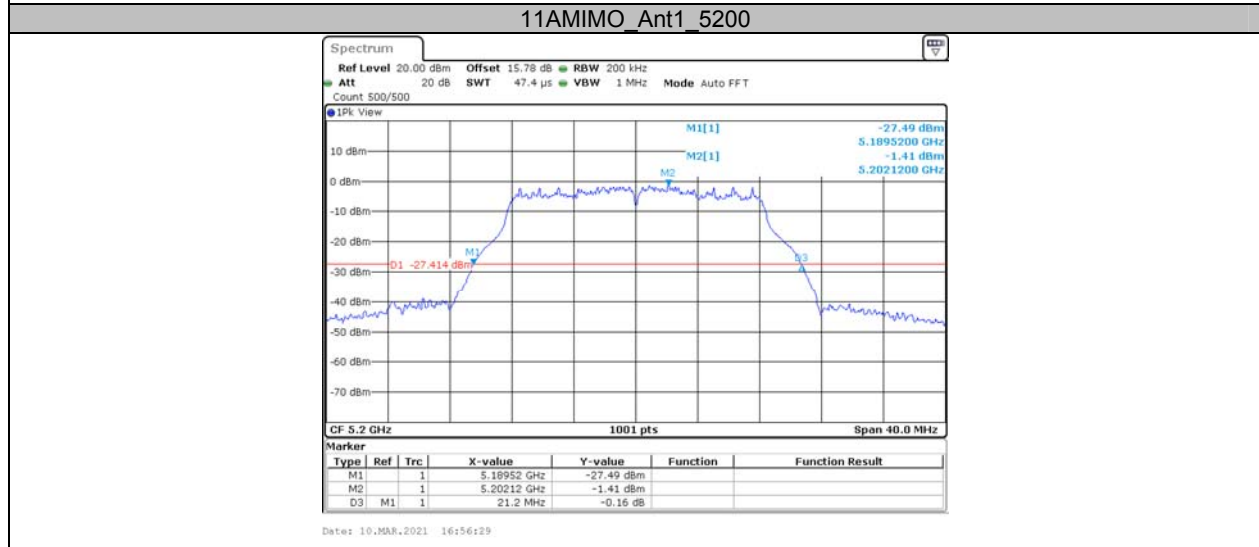
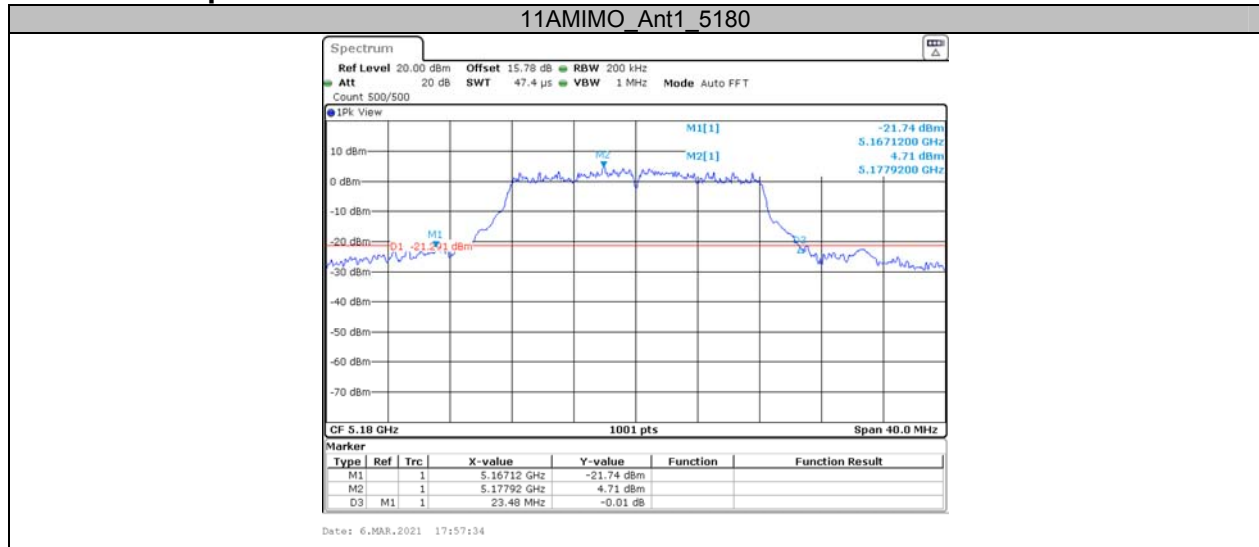
*Please refer to the Appendix.*

**APPENDIX****Appendix A1: Emission Bandwidth  
Test Result**

TestMode	Antenna	Channel	26db EBW [MHz]	Limit[MHz]	Verdict
11AMIMO	Ant1	5180	23.48	---	PASS
	Ant1	5200	21.20	---	PASS
	Ant1	5240	21.00	---	PASS
	Ant1	5260	21.16	---	PASS
	Ant1	5280	20.96	---	PASS
	Ant1	5320	21.00	---	PASS
	Ant1	5500	21.16	---	PASS
	Ant1	5580	21.16	---	PASS
11N20MIMO	Ant1	5700	21.16	---	PASS
	Ant1	5180	21.56	---	PASS
	Ant1	5200	21.40	---	PASS
	Ant1	5240	21.52	---	PASS
	Ant1	5260	21.36	---	PASS
	Ant1	5280	21.52	---	PASS
	Ant1	5320	21.20	---	PASS
	Ant1	5500	21.40	---	PASS
11N40MIMO	Ant1	5580	21.56	---	PASS
	Ant1	5700	21.32	---	PASS
	Ant1	5190	40.32	---	PASS
	Ant1	5230	40.16	---	PASS
	Ant1	5270	40.56	---	PASS
	Ant1	5310	40.40	---	PASS
11AC20MIMO	Ant1	5510	47.04	---	PASS
	Ant1	5550	40.40	---	PASS
	Ant1	5670	51.36	---	PASS
	Ant1	5180	21.44	---	PASS
	Ant1	5200	21.52	---	PASS
	Ant1	5240	21.16	---	PASS
	Ant1	5260	33.16	---	PASS
	Ant1	5280	21.36	---	PASS
11AC40MIMO	Ant1	5320	21.36	---	PASS
	Ant1	5500	21.68	---	PASS
	Ant1	5580	21.32	---	PASS
	Ant1	5700	21.32	---	PASS
	Ant1	5190	40.40	---	PASS
	Ant1	5230	40.00	---	PASS
	Ant1	5270	40.64	---	PASS
	Ant1	5310	41.60	---	PASS
11AC80MIMO	Ant1	5510	44.32	---	PASS
	Ant1	5550	40.72	---	PASS
	Ant1	5670	44.96	---	PASS
	Ant1	5210	81.92	---	PASS
11AX20MIMO	Ant1	5290	118.40	---	PASS
	Ant1	5530	113.12	---	PASS
	Ant1	5610	95.52	---	PASS
	Ant1	5180	21.00	---	PASS
	Ant1	5200	21.56	---	PASS
	Ant1	5240	21.20	---	PASS
	Ant1	5260	21.00	---	PASS
11AX20MIMO	Ant1	5280	20.96	---	PASS
	Ant1	5320	21.32	---	PASS
	Ant1	5500	21.20	---	PASS
	Ant1	5580	21.28	---	PASS

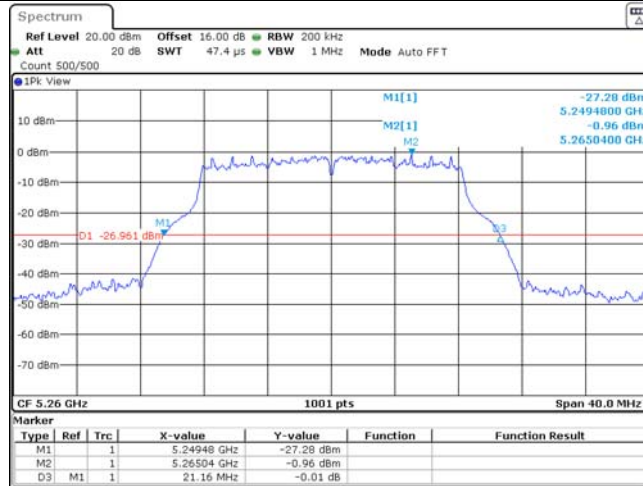
	Ant1	5700	21.12	---	PASS
11AX40MIMO	Ant1	5190	40.56	---	PASS
	Ant1	5230	40.48	---	PASS
	Ant1	5270	40.64	---	PASS
	Ant1	5310	40.40	---	PASS
	Ant1	5510	40.72	---	PASS
	Ant1	5550	40.64	---	PASS
	Ant1	5670	40.64	---	PASS
11AX80MIMO	Ant1	5210	83.84	---	PASS
	Ant1	5290	101.44	---	PASS
	Ant1	5530	109.12	---	PASS
	Ant1	5610	82.24	---	PASS

Test Graphs



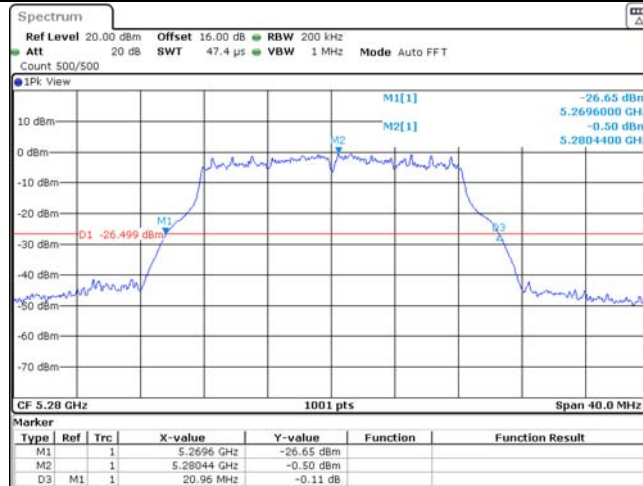


11AMIMO Ant1\_5260



Date: 9.MAR.2021 15:42:45

11AMIMO\_Ant1\_5280

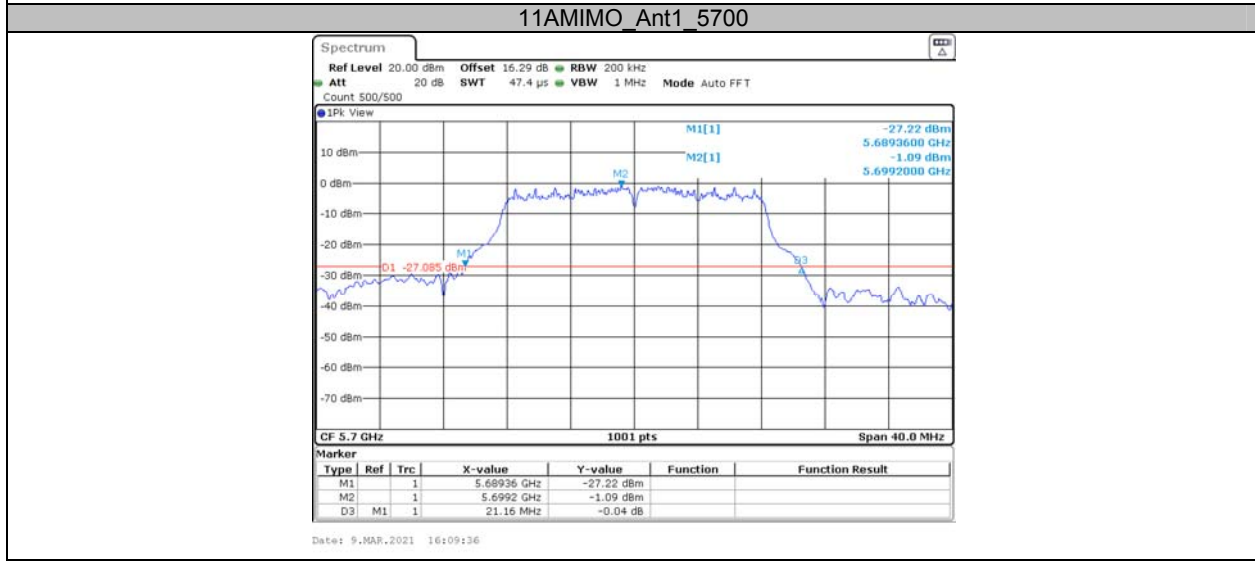
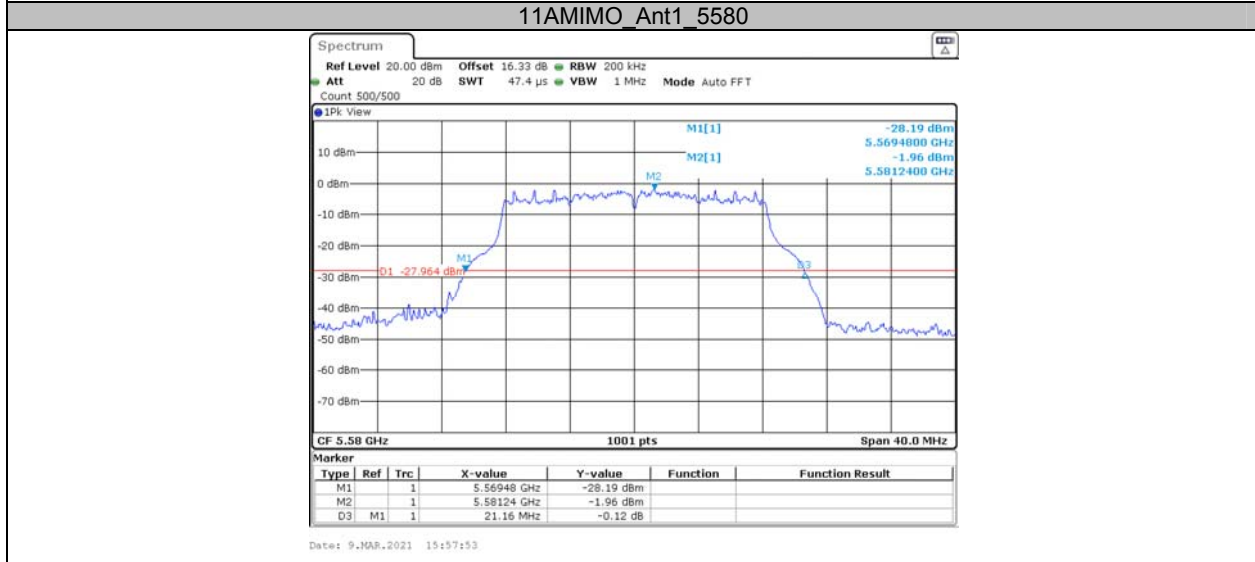
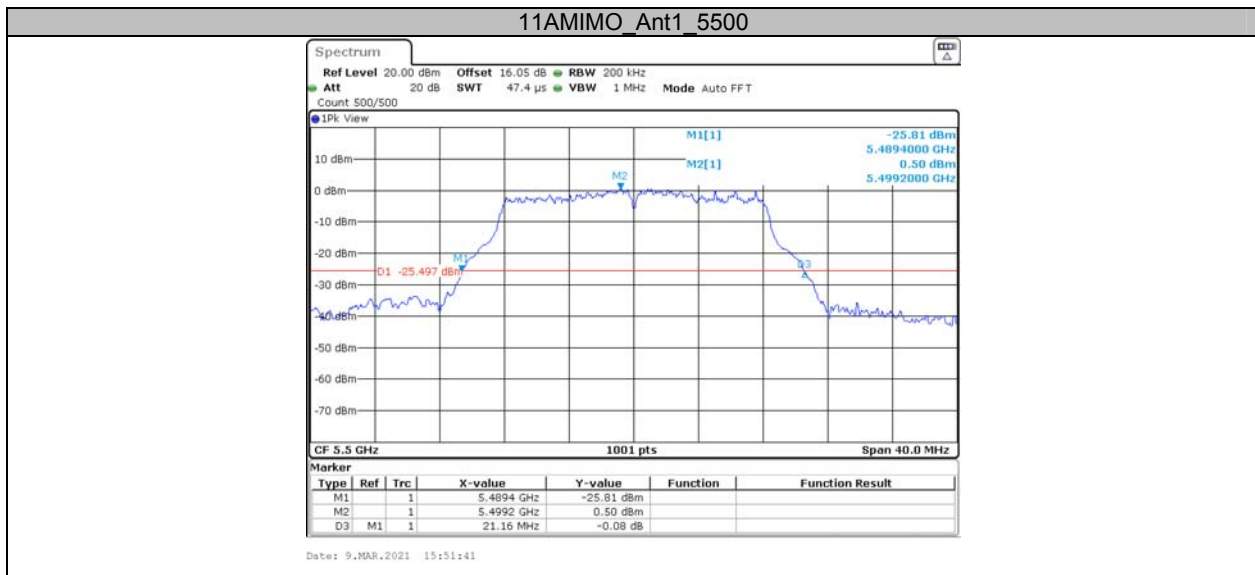


Date: 9.MAR.2021 15:47:27

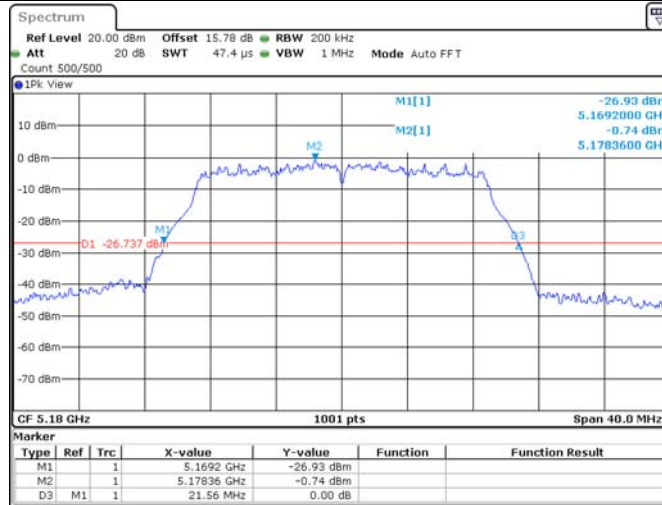
11AMIMO\_Ant1\_5320



Date: 9.MAR.2021 15:49:04



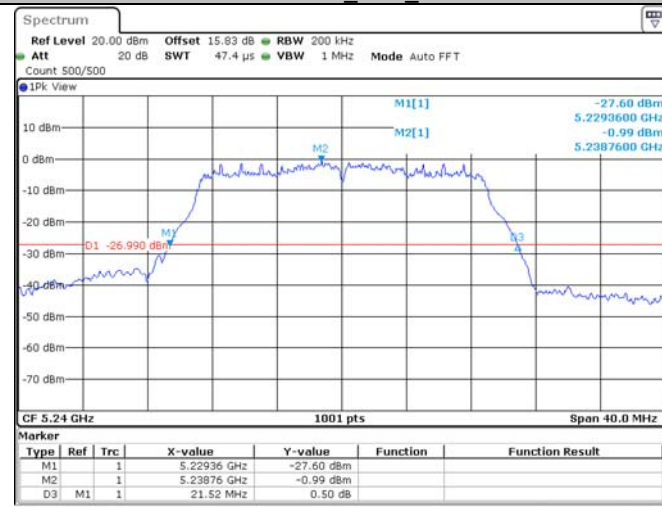
11N20MIMO Ant1 5180

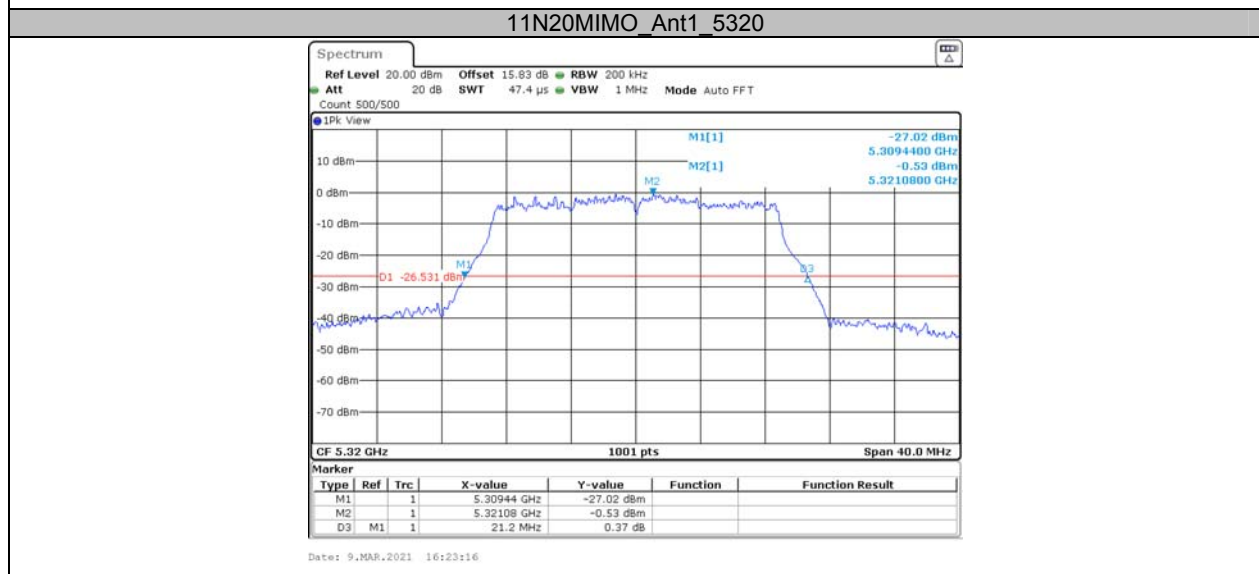
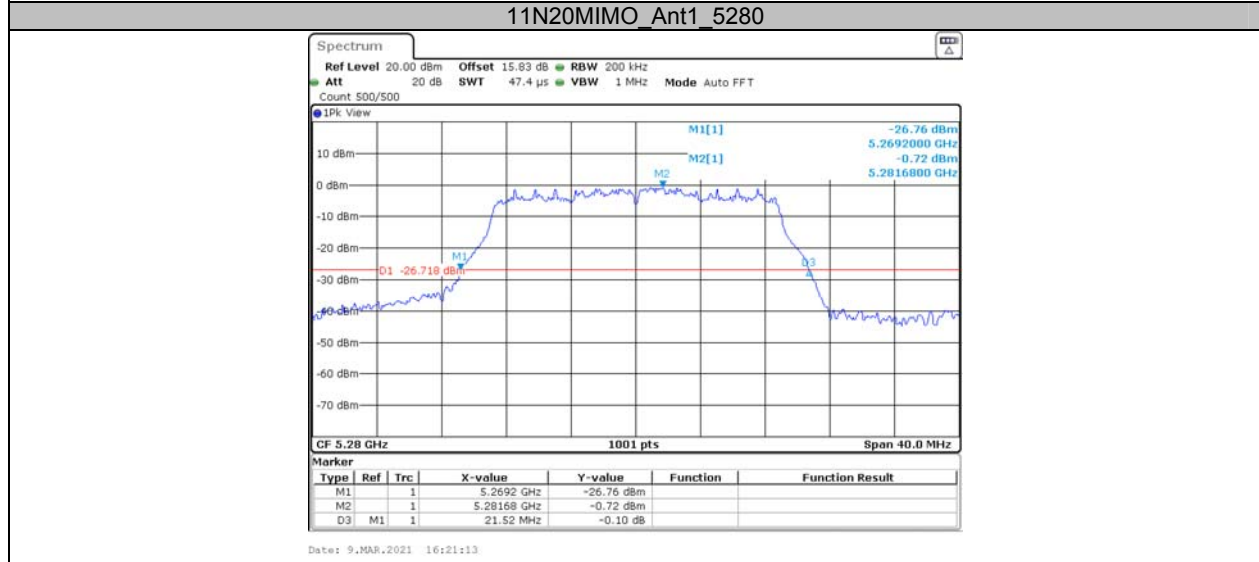
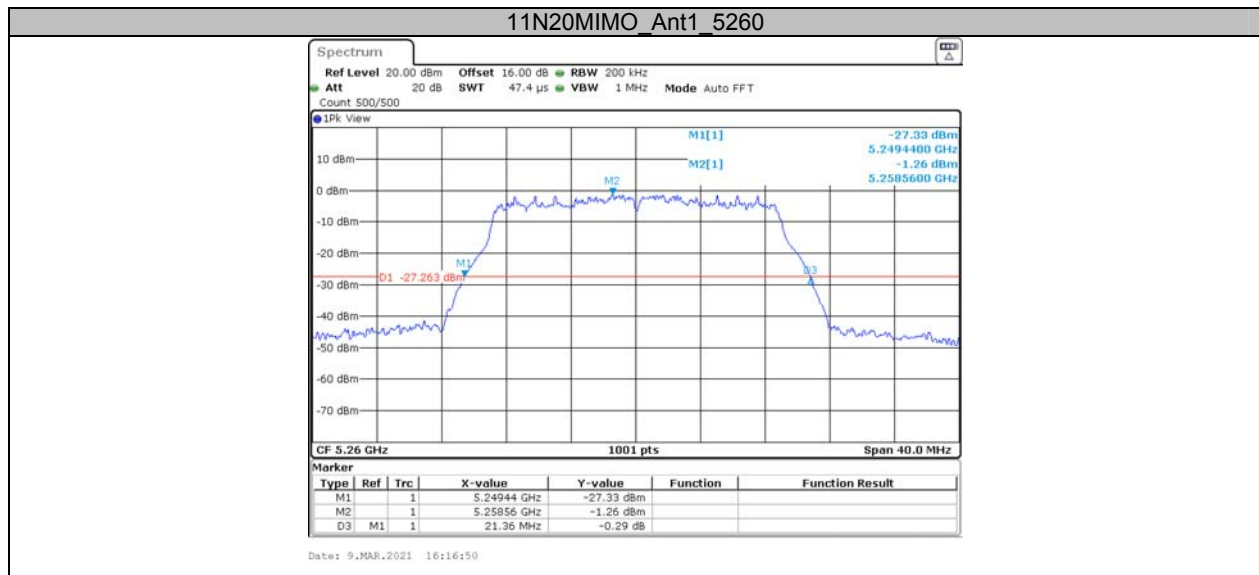


11N20MIMO Ant1 5200

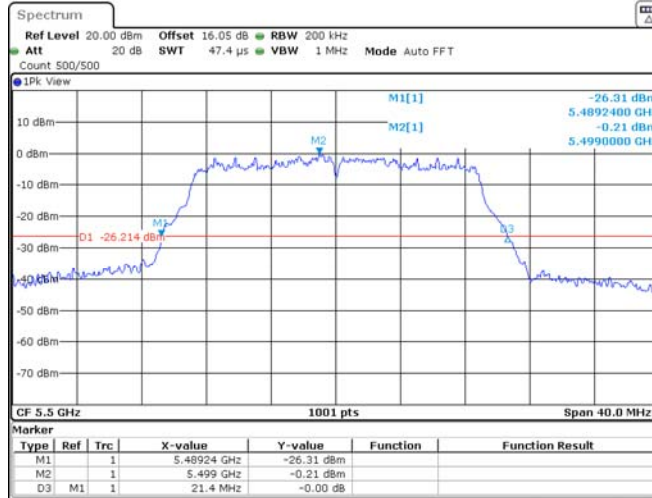


11N20MIMO Ant1 5240

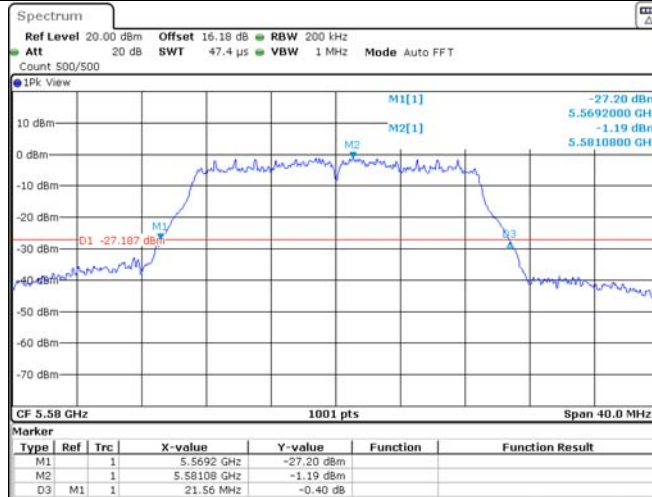




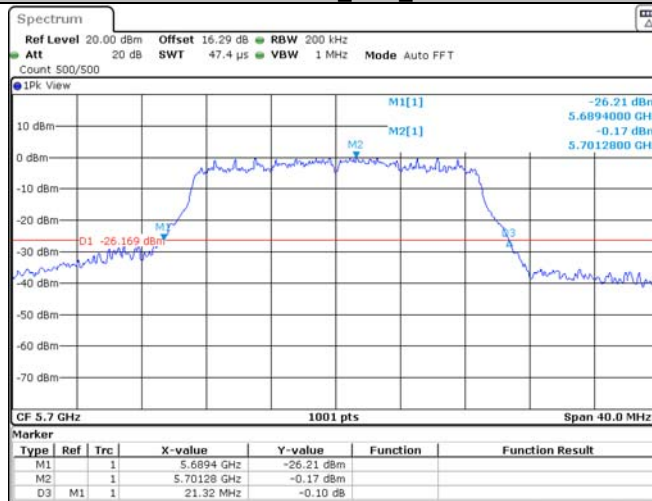
11N20MIMO\_Ant1\_5500

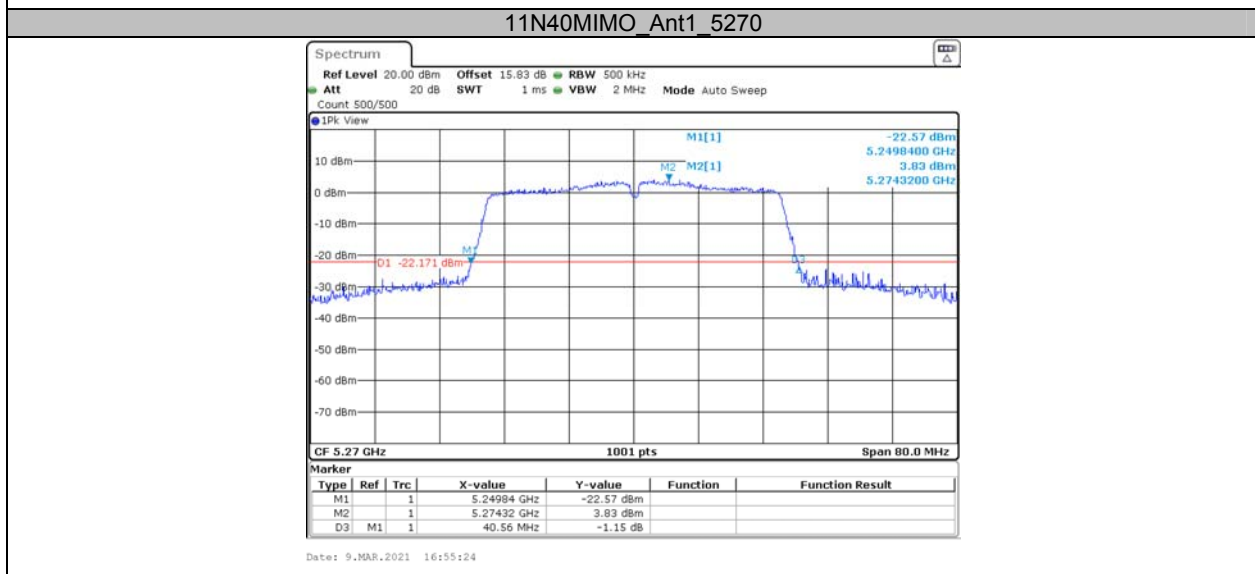
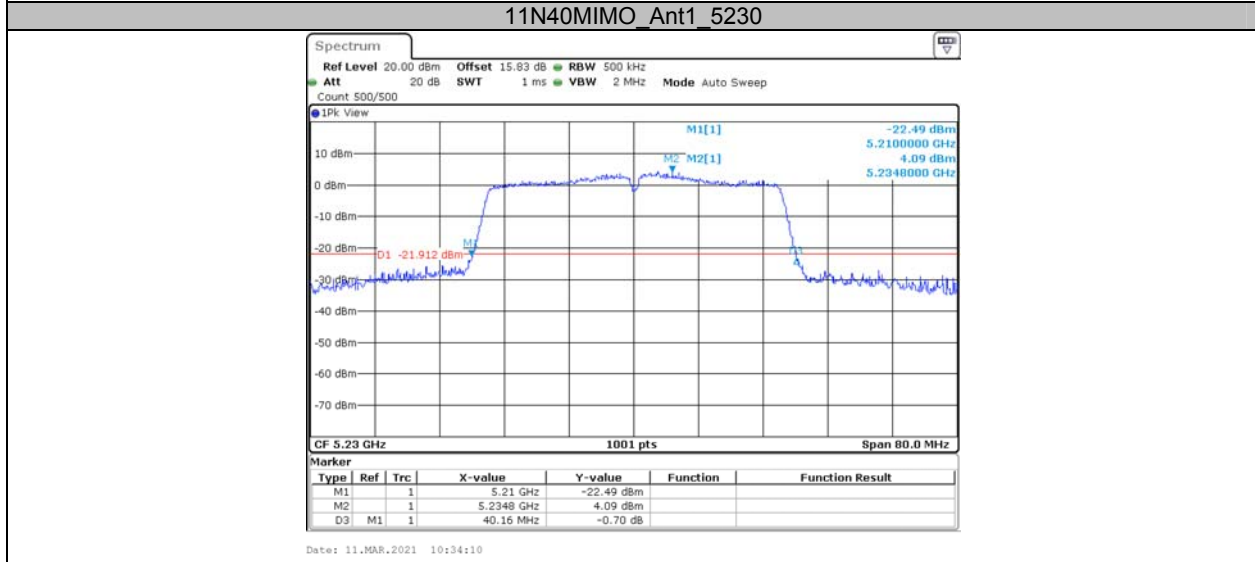
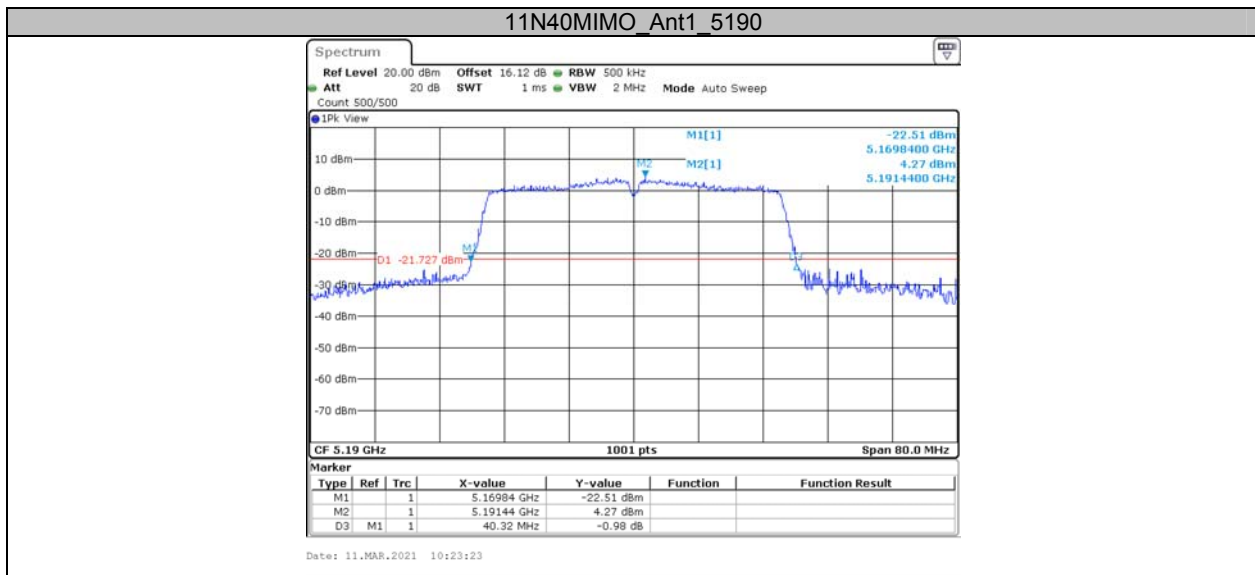


11N20MIMO\_Ant1\_5580

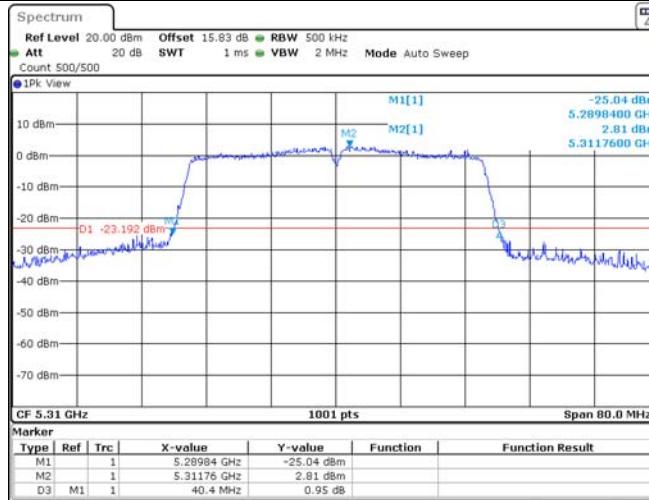


11N20MIMO\_Ant1\_5700

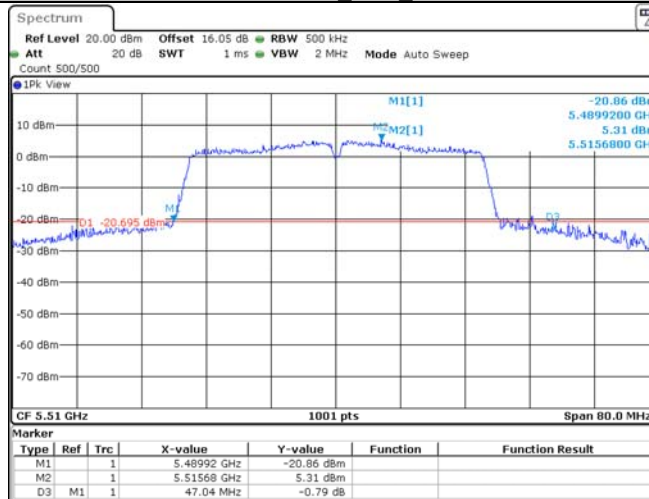




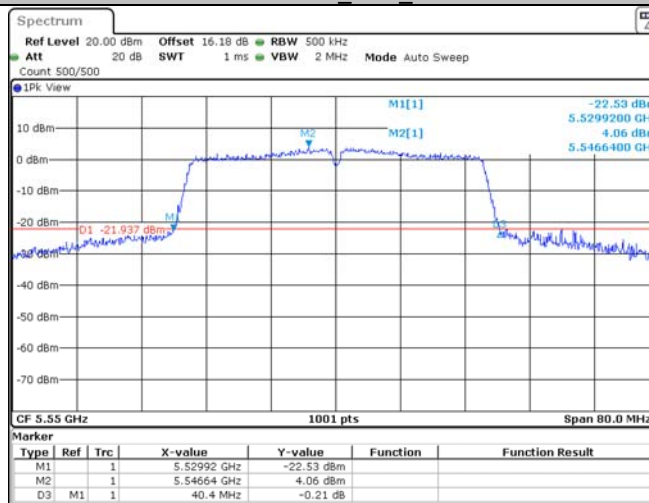
11N40MIMO\_Ant1\_5310



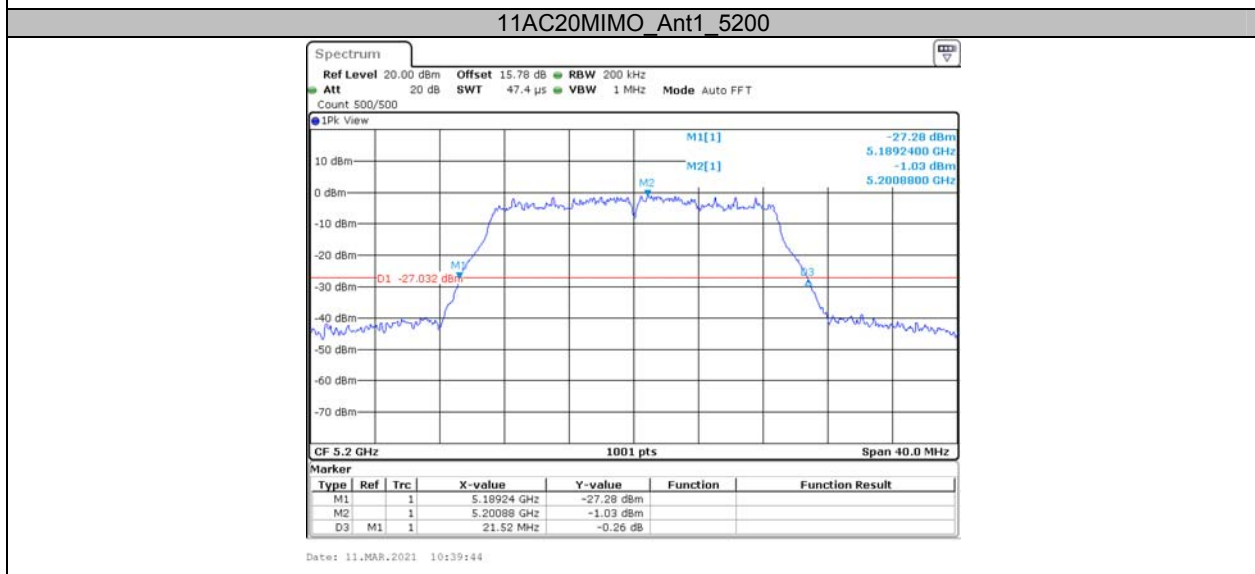
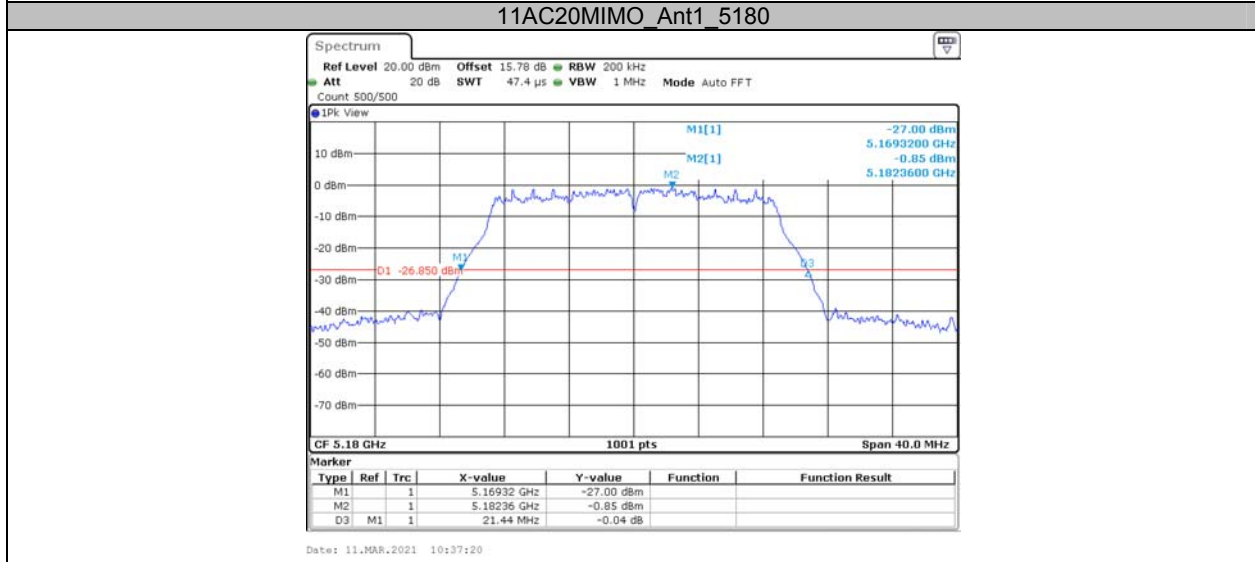
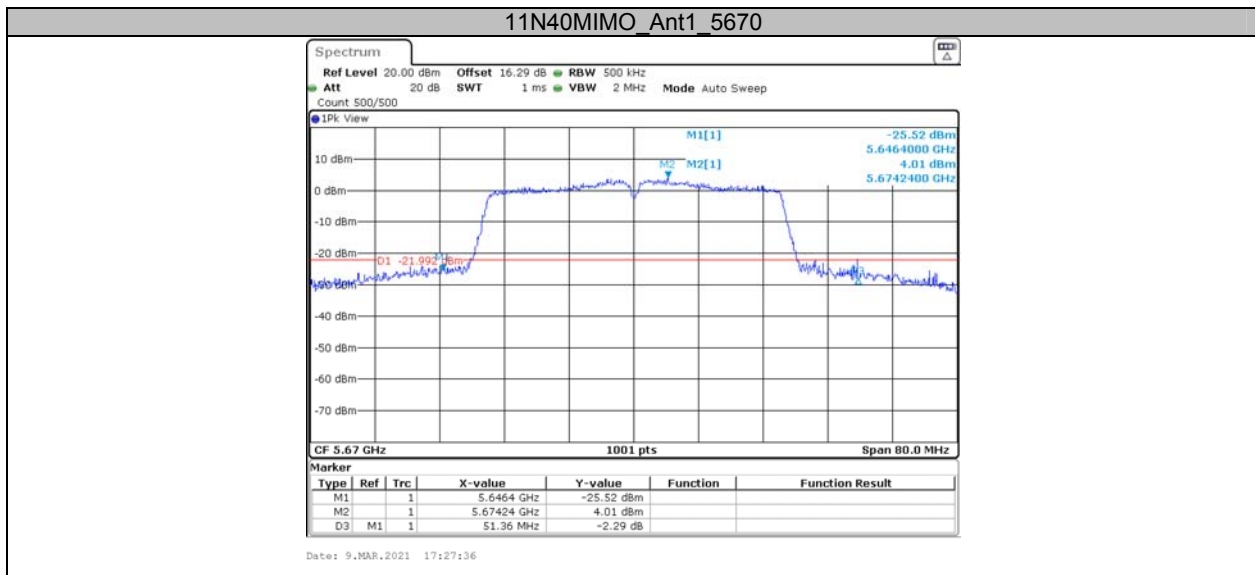
11N40MIMO\_Ant1\_5510



11N40MIMO\_Ant1\_5550

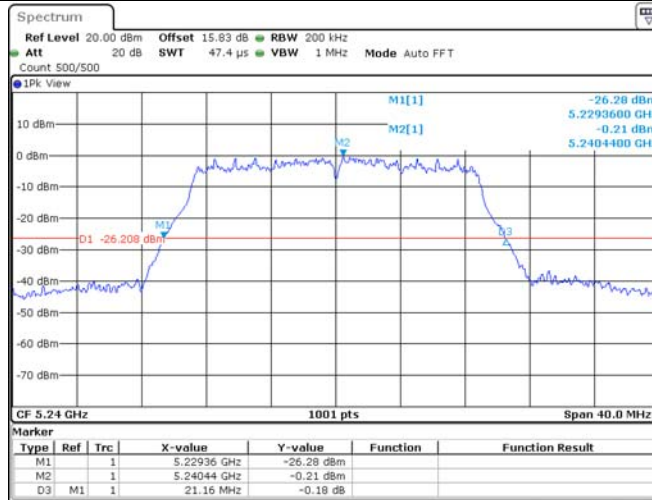




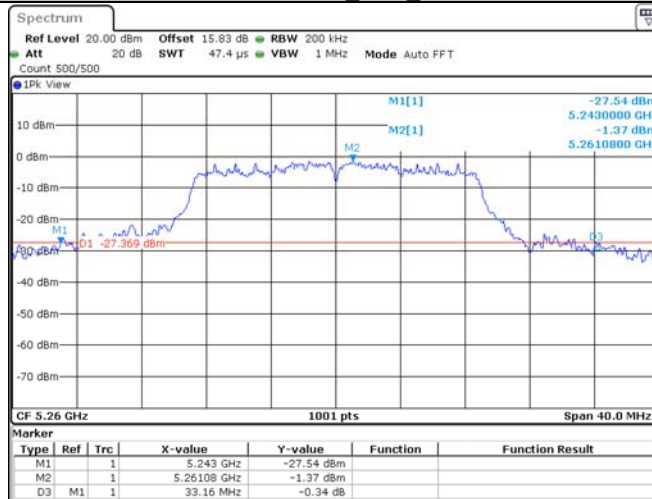




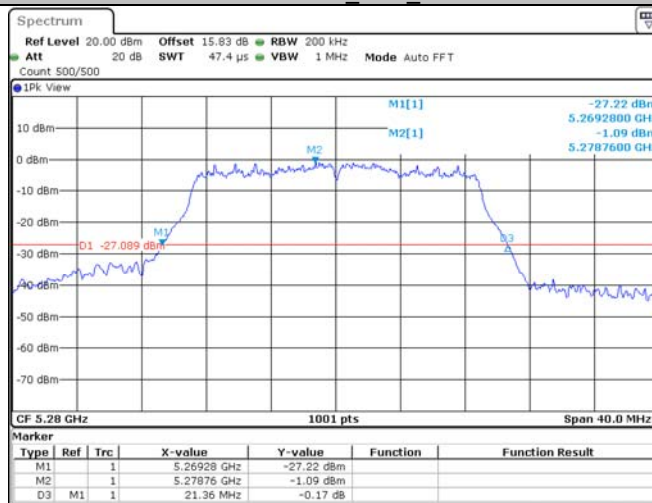
11AC20MIMO Ant1\_5240



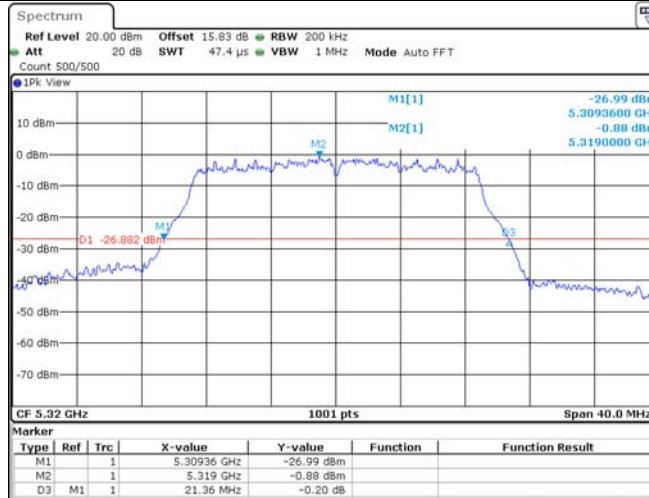
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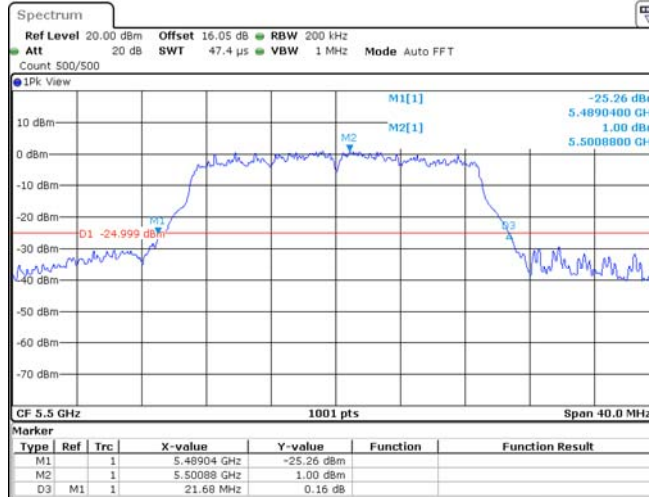
11AC20MIMO Ant1\_5280



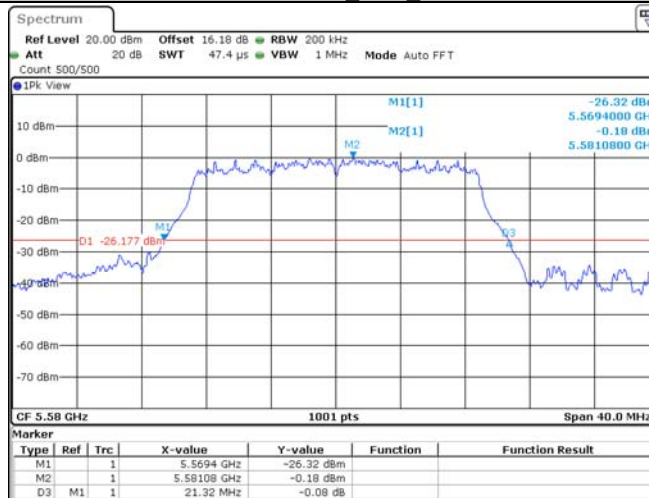
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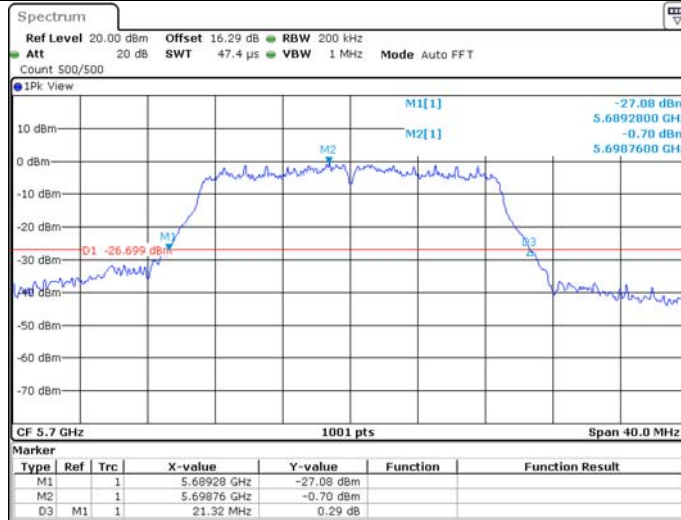
11AC20MIMO\_Ant1\_5500



11AC20MIMO\_Ant1\_5580

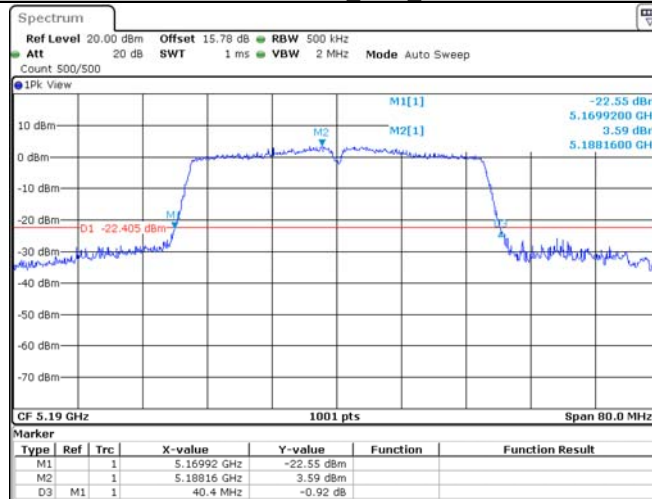


11AC20MIMO Ant1 5700



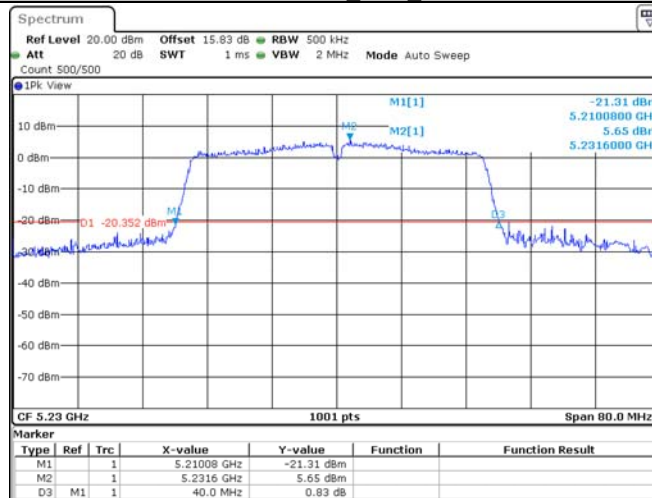
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11AC40MIMO Ant1 5190



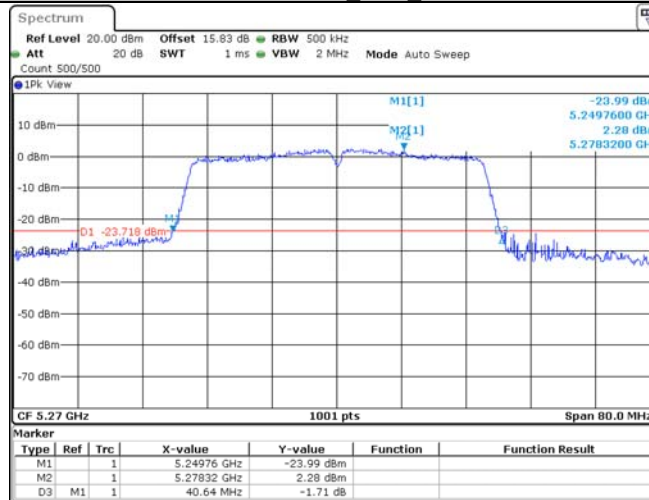
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11AC40MIMO Ant1 5230



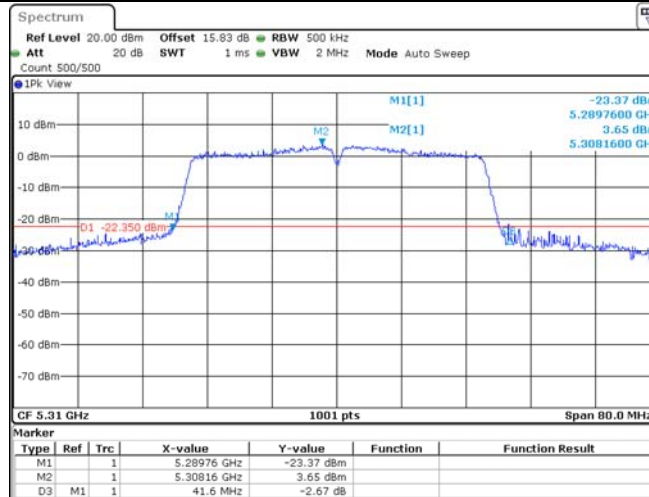
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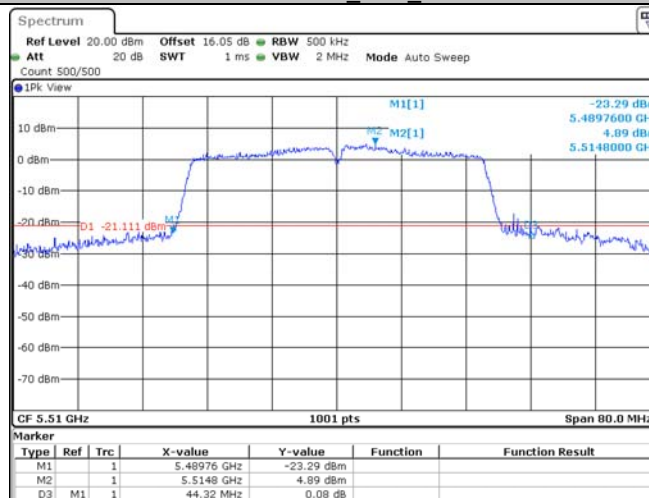
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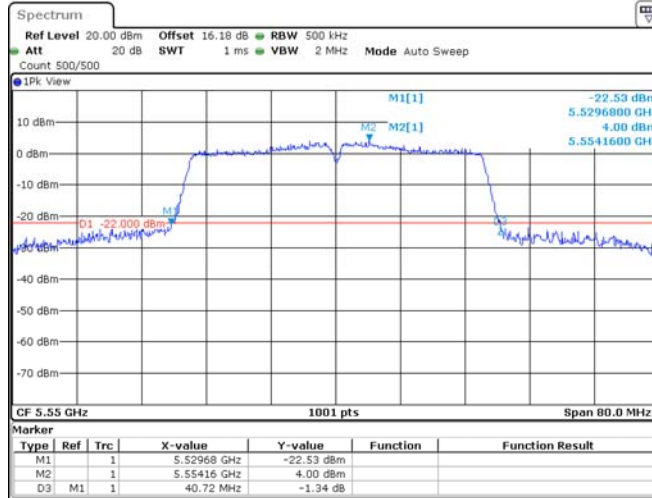
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11AC40MIMO\_Ant1\_5510

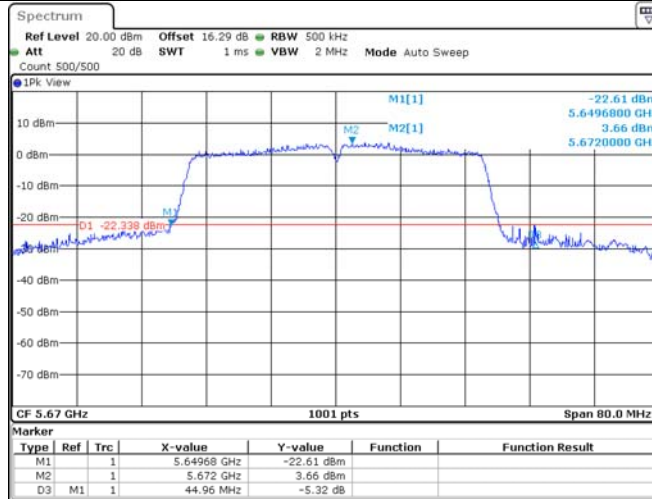


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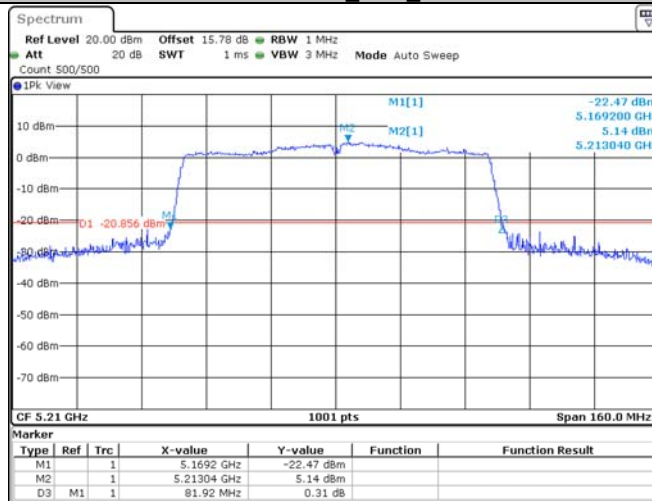
11AC40MIMO Ant1 5550

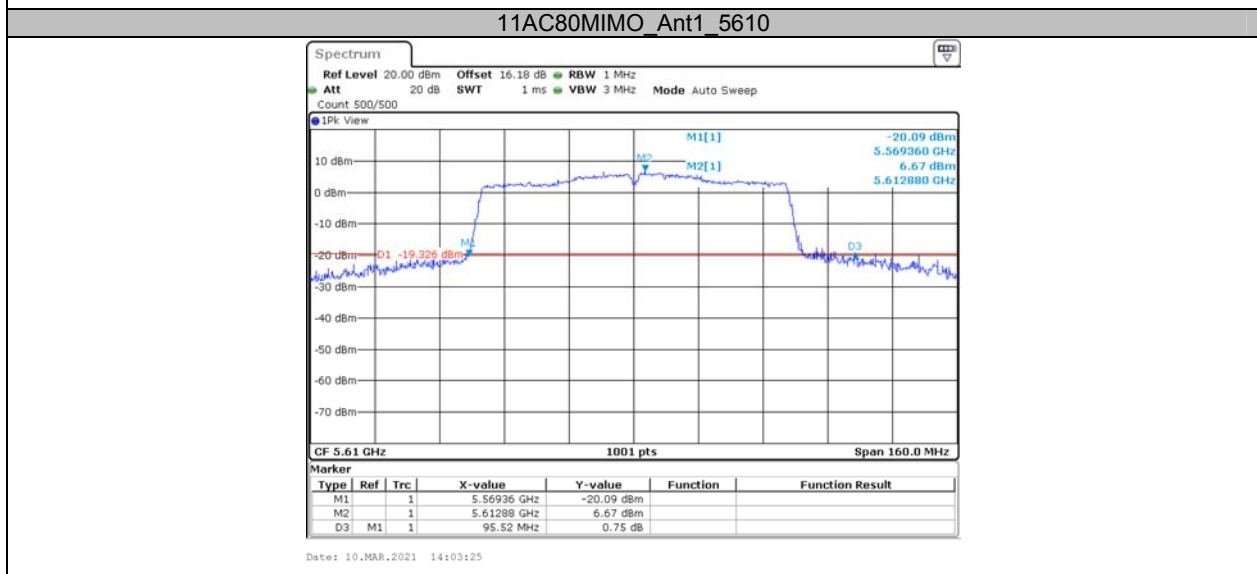
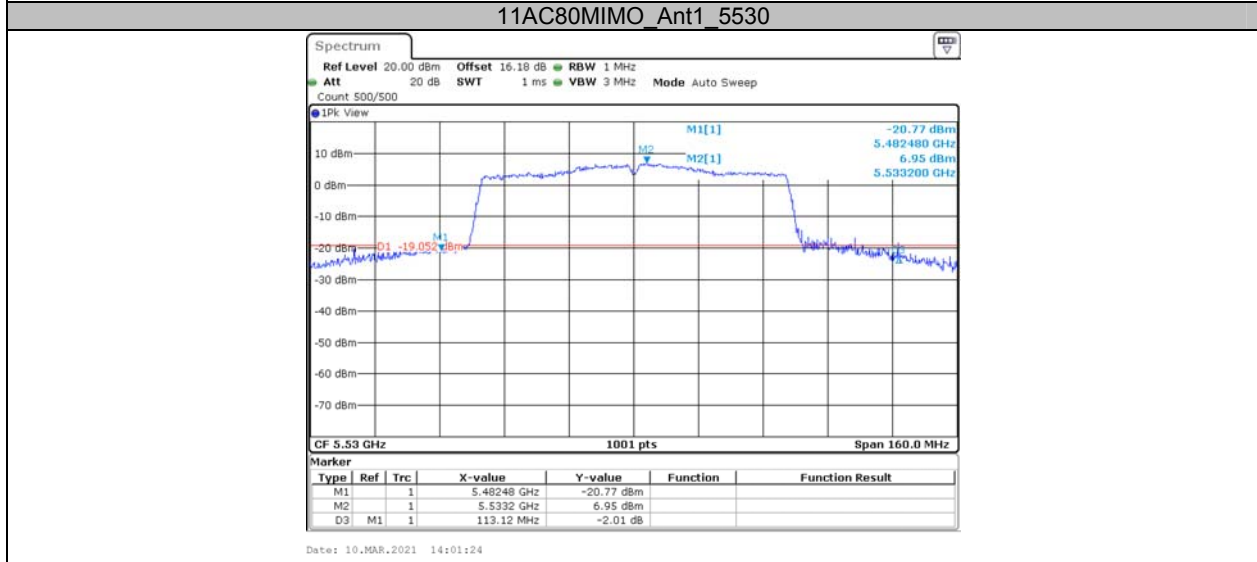
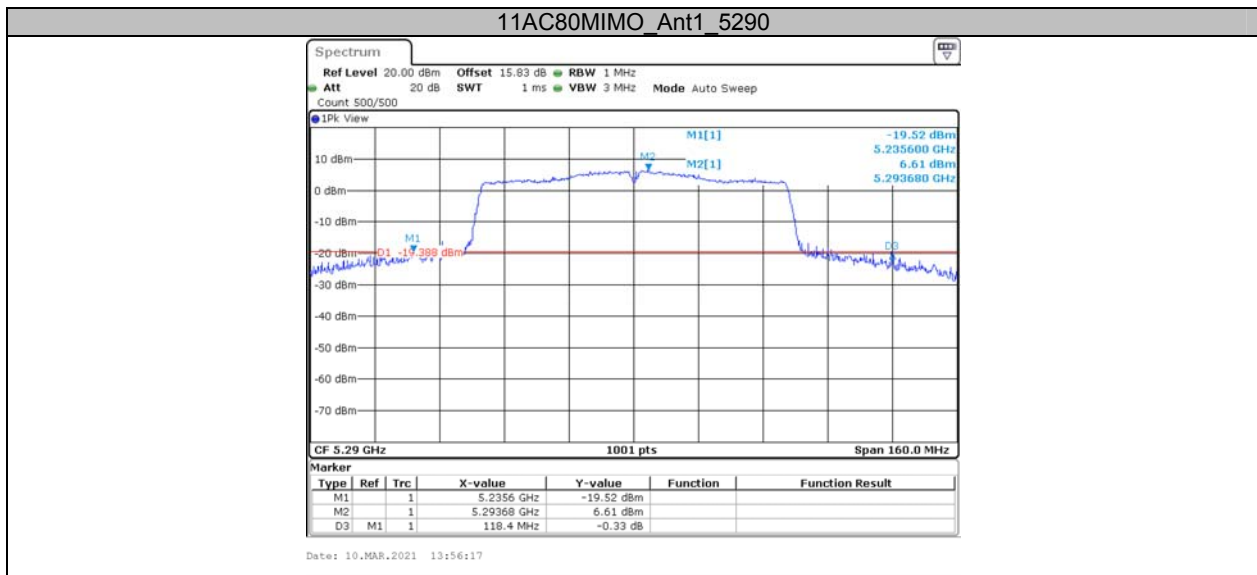


11AC40MIMO Ant1 5670

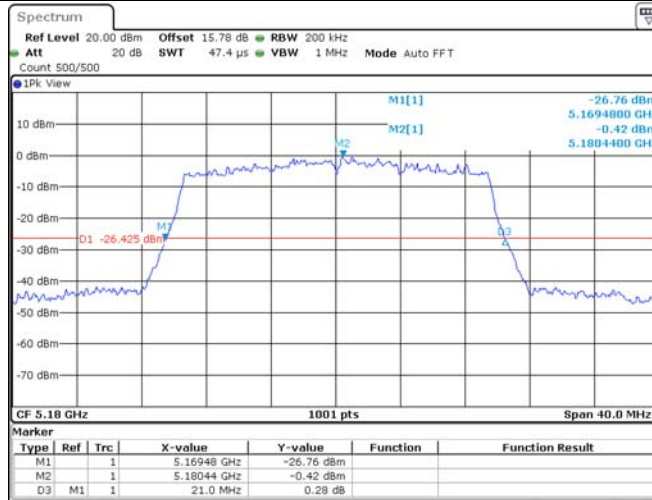


11AC80MIMO Ant1 5210

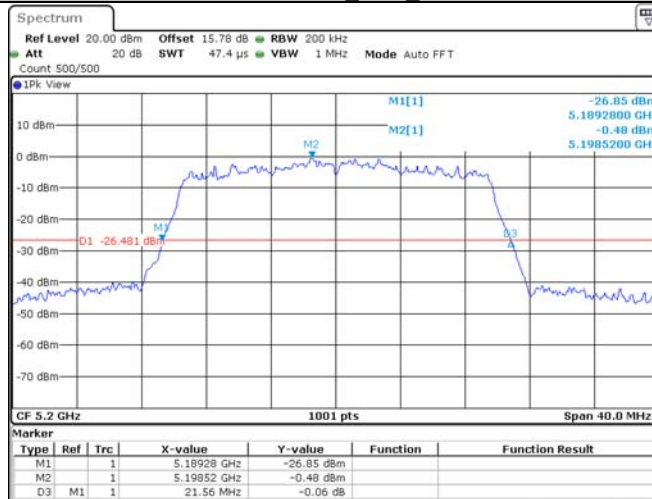




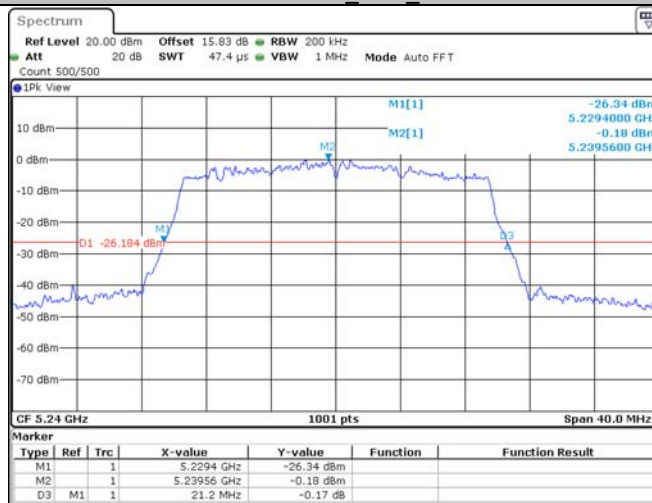
11AX20MIMO Ant1\_5180



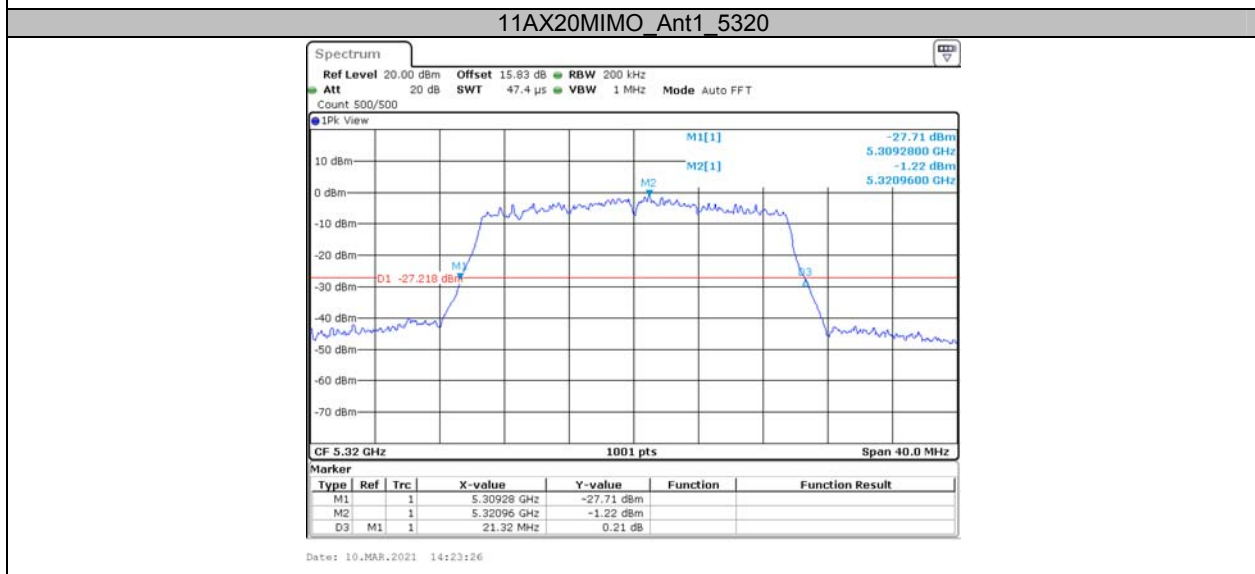
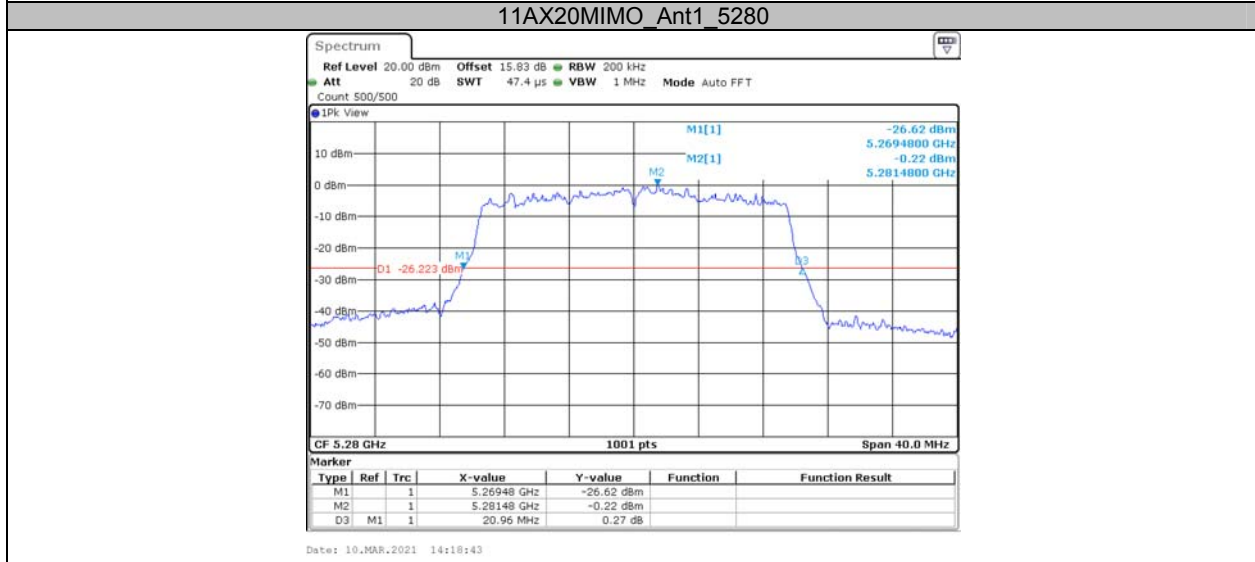
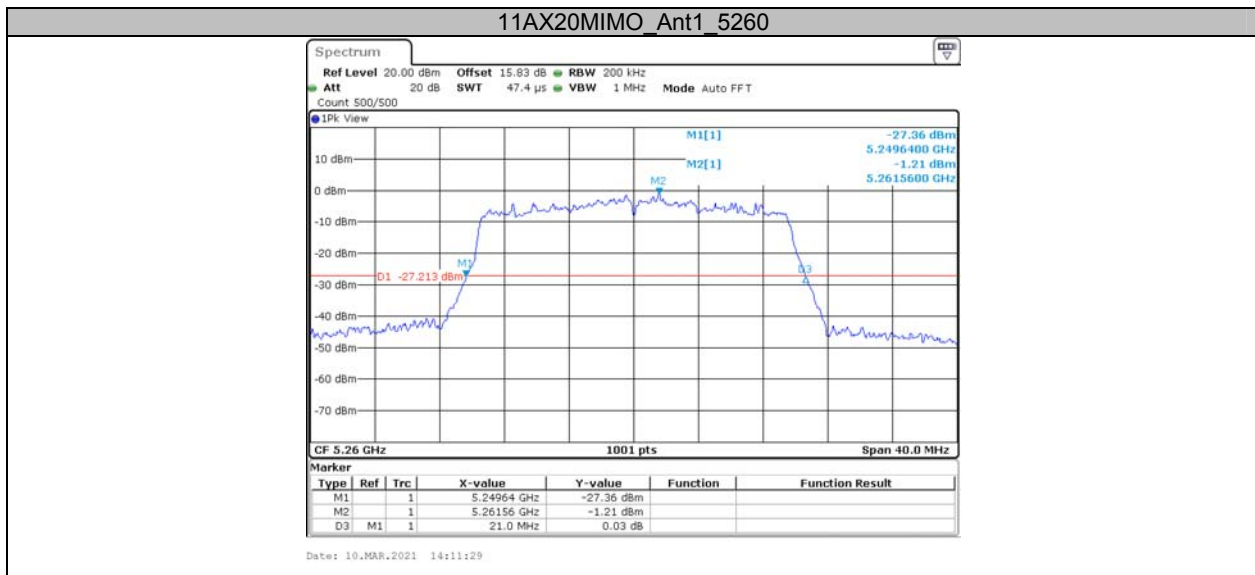
11AX20MIMO Ant1\_5200



11AX20MIMO Ant1\_5240

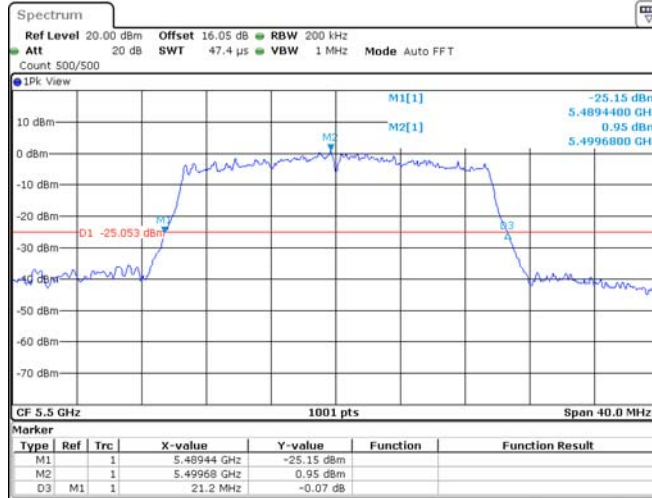






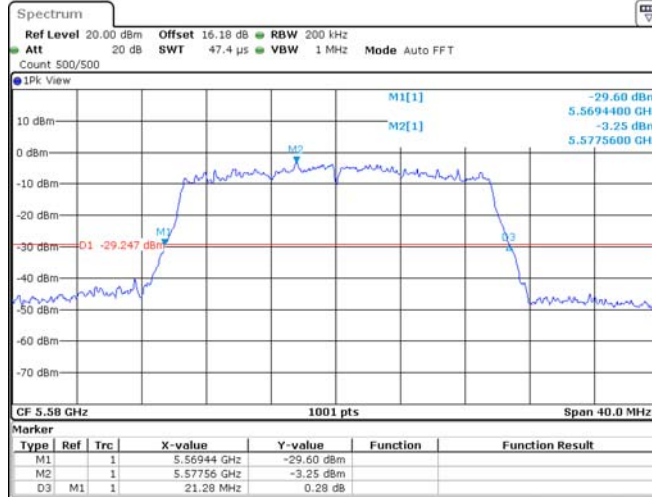


11AX20MIMO Ant1\_5500



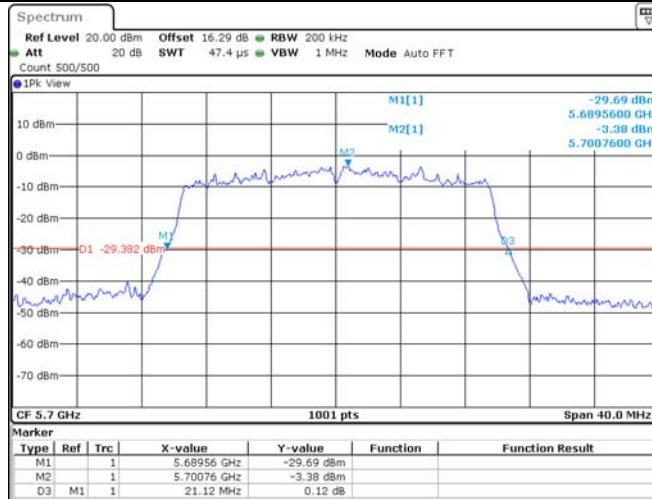
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11AX20MIMO Ant1\_5580

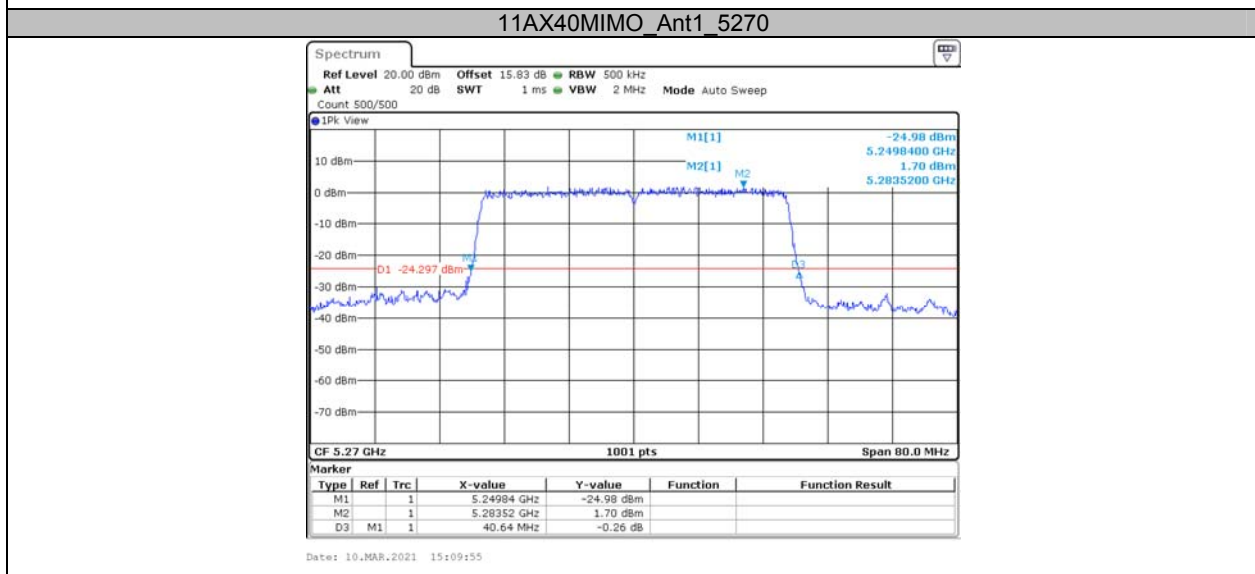
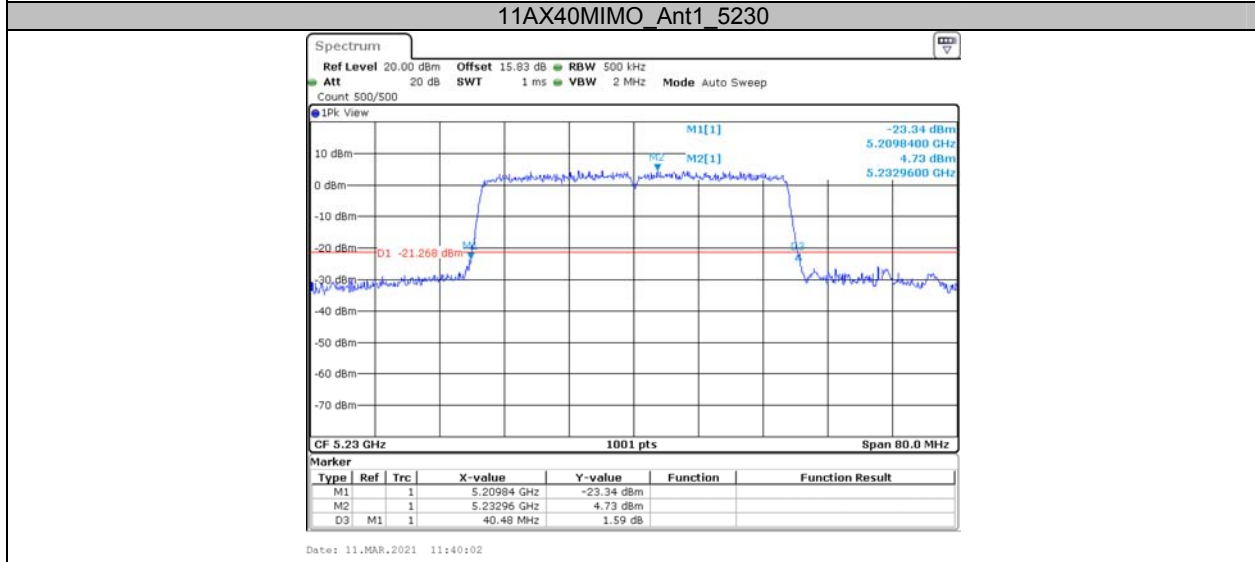
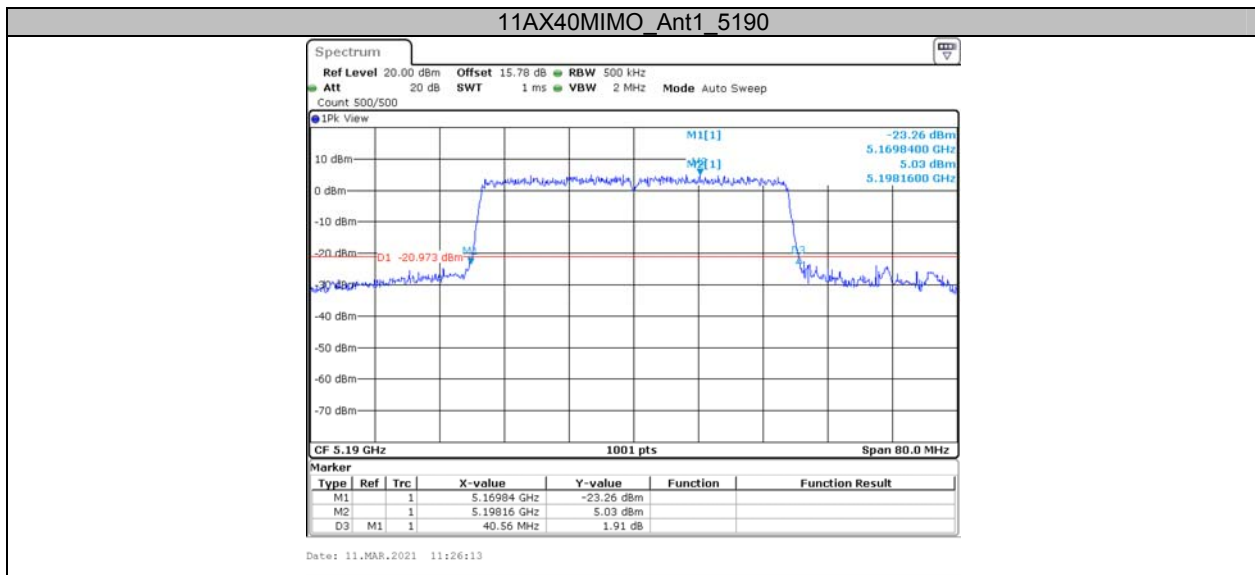


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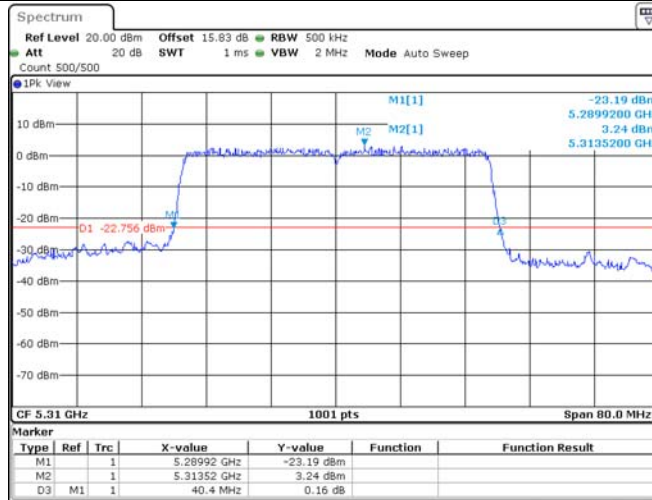
11AX20MIMO Ant1\_5700



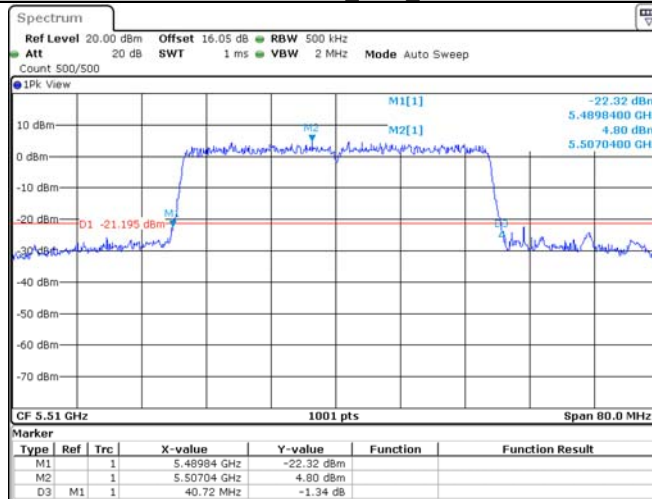
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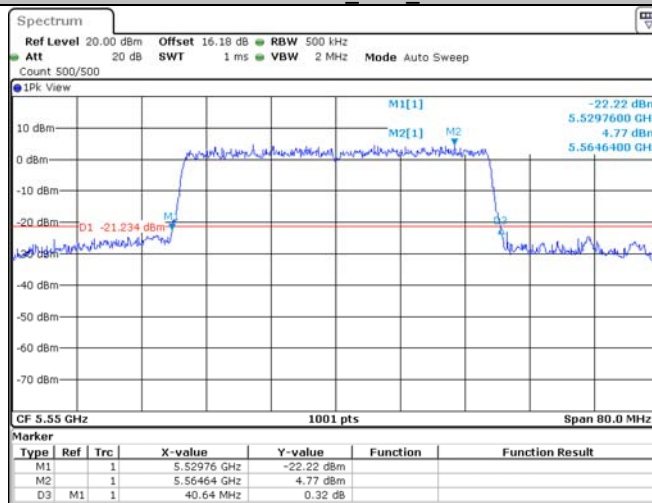
11AX40MIMO Ant1\_5310



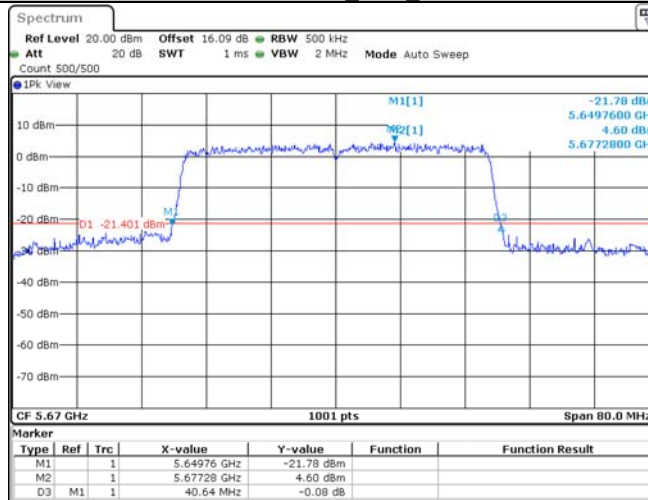
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11AX40MIMO Ant1\_5550

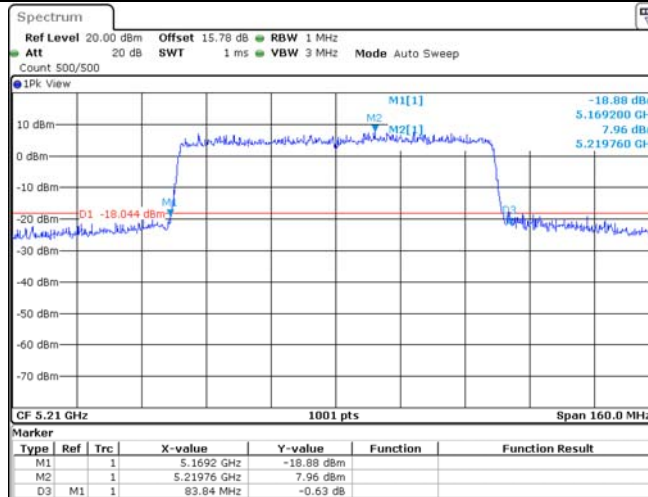


11AX40MIMO\_Ant1\_5670



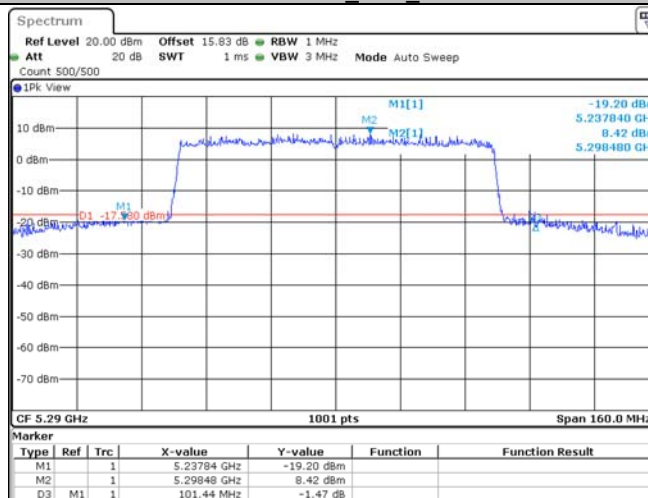
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11AX80MIMO\_Ant1\_5210



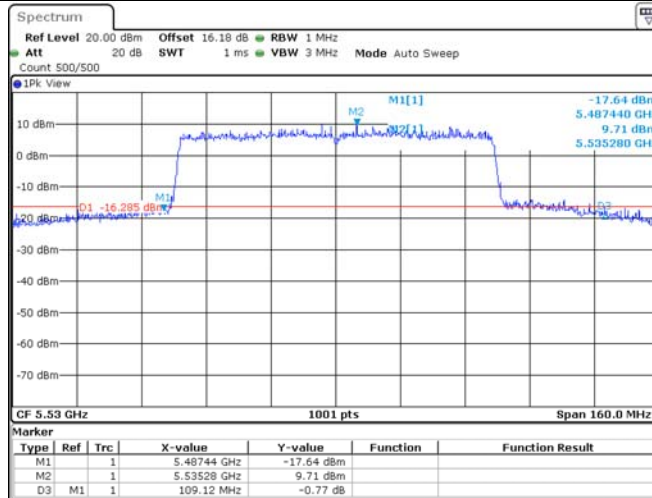
Date: 11.MAR.2021 11:43:37

11AX80MIMO\_Ant1\_5290

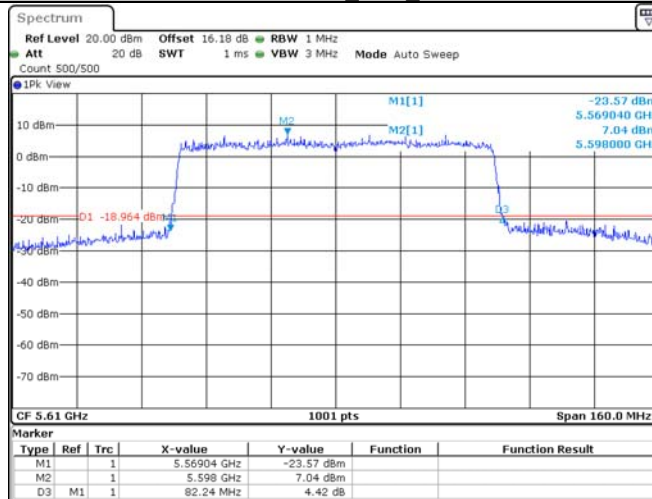


Date: 10.MAR.2021 15:31:38

11AX80MIMO Ant1\_5530



11AX80MIMO\_Ant1\_5610

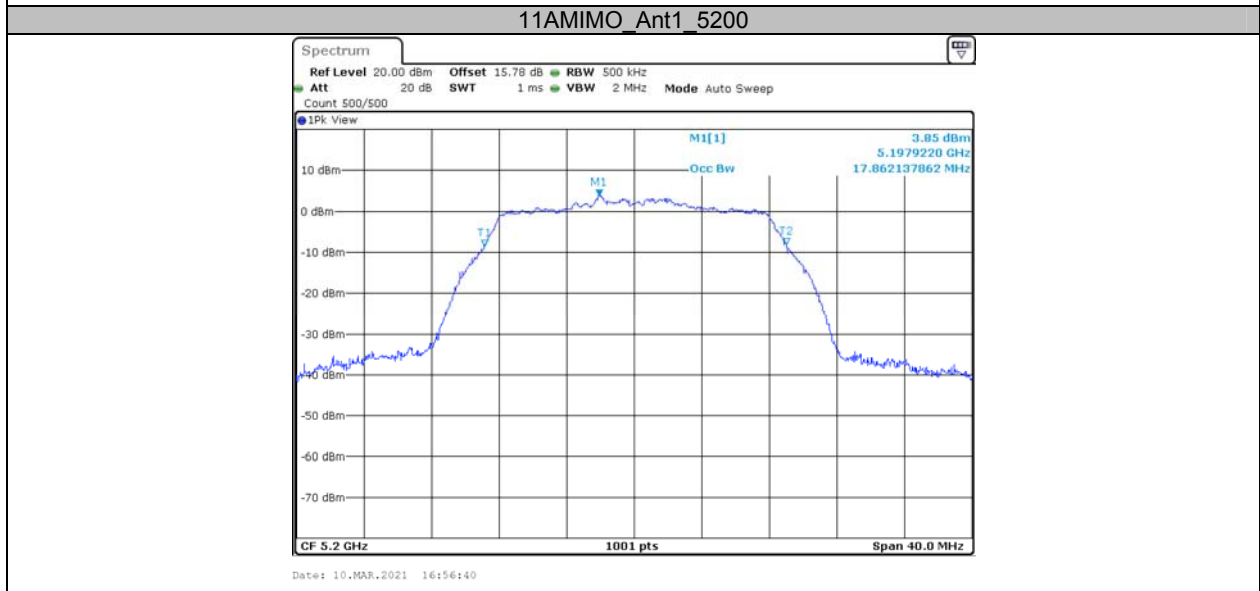
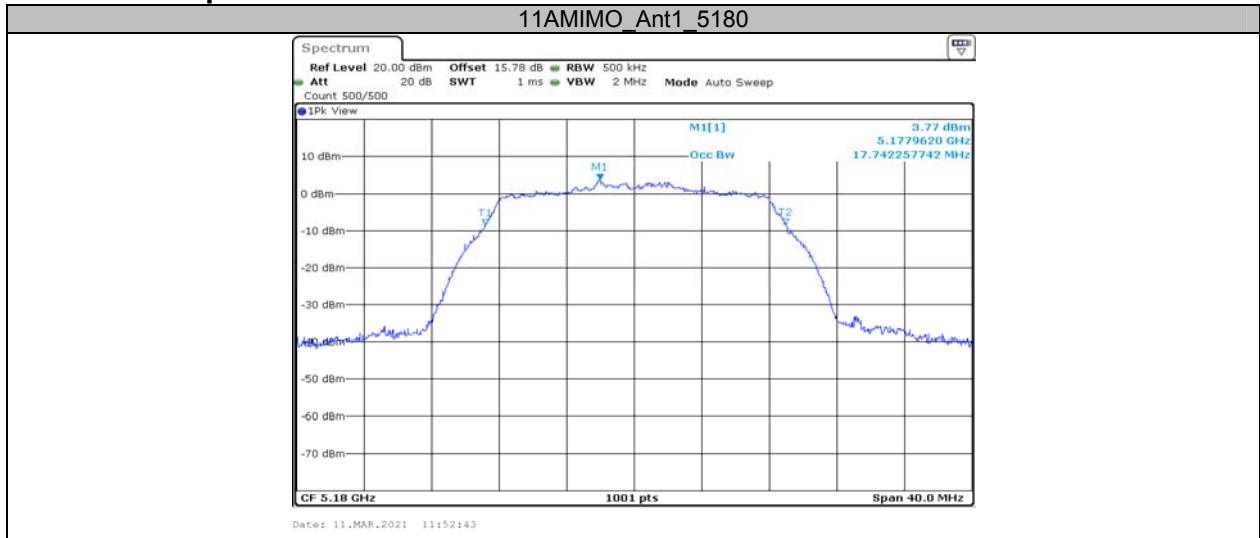


**Appendix A2: Occupied channel bandwidth  
Test Result**

TestMode	Antenna	Channel	OCB [MHz]	Limit[MHz]	Verdict
11AMIMO	Ant1	5180	17.742	---	PASS
		5200	17.862	---	PASS
		5240	17.822	---	PASS
		5260	17.822	---	PASS
		5280	17.742	---	PASS
		5320	17.782	---	PASS
		5500	17.862	---	PASS
		5580	17.782	---	PASS
		5700	18.062	---	PASS
		5745	17.862	---	PASS
		5785	17.862	---	PASS
		5825	17.862	---	PASS
11N20MIMO	Ant1	5180	18.661	---	PASS
		5200	18.741	---	PASS
		5240	18.741	---	PASS
		5260	18.701	---	PASS
		5280	18.661	---	PASS
		5320	18.621	---	PASS
		5500	18.781	---	PASS
		5580	18.701	---	PASS
		5700	18.861	---	PASS
		5745	18.741	---	PASS
		5785	18.861	---	PASS
		5825	18.741	---	PASS
11N40MIMO	Ant1	5190	36.763	---	PASS
		5230	36.683	---	PASS
		5270	36.763	---	PASS
		5310	36.763	---	PASS
		5510	36.923	---	PASS
		5550	36.843	---	PASS
		5670	36.923	---	PASS
		5755	36.923	---	PASS
		5795	36.843	---	PASS
11AC20MIMO	Ant1	5180	18.621	---	PASS
		5200	18.661	---	PASS
		5240	18.661	---	PASS
		5260	18.701	---	PASS
		5280	18.741	---	PASS
		5320	18.701	---	PASS
		5500	18.701	---	PASS
		5580	18.741	---	PASS
		5700	18.781	---	PASS
		5745	18.661	---	PASS
		5785	18.661	---	PASS
		5825	18.661	---	PASS
11AC40MIMO	Ant1	5190	36.763	---	PASS
		5230	36.763	---	PASS
		5270	36.763	---	PASS
		5310	36.923	---	PASS
		5510	36.923	---	PASS
		5550	36.843	---	PASS
		5670	36.843	---	PASS
		5755	37.083	---	PASS
		5795	36.843	---	PASS
11AC80MIMO	Ant1	5210	76.084	---	PASS
		5290	76.404	---	PASS

		5530	76.404	---	PASS
		5610	76.084	---	PASS
		5775	76.244	---	PASS
11AX20MIMO	Ant1	5180	19.061	---	PASS
		5200	19.141	---	PASS
		5240	19.061	---	PASS
		5260	19.061	---	PASS
		5280	19.061	---	PASS
		5320	19.061	---	PASS
		5500	19.101	---	PASS
		5580	19.101	---	PASS
		5700	19.141	---	PASS
		5745	19.141	---	PASS
		5785	19.141	---	PASS
		5825	19.061	---	PASS
		11AX40MIMO	Ant1	5190	37.882
5230	37.882			---	PASS
5270	37.882			---	PASS
5310	37.882			---	PASS
5510	37.882			---	PASS
5550	38.042			---	PASS
5670	37.882			---	PASS
5755	37.962			---	PASS
5795	37.962			---	PASS
11AX80MIMO	Ant1	5210	77.842	---	PASS
		5290	77.842	---	PASS
		5530	78.322	---	PASS
		5610	77.682	---	PASS
		5775	78.002	---	PASS

Test Graphs

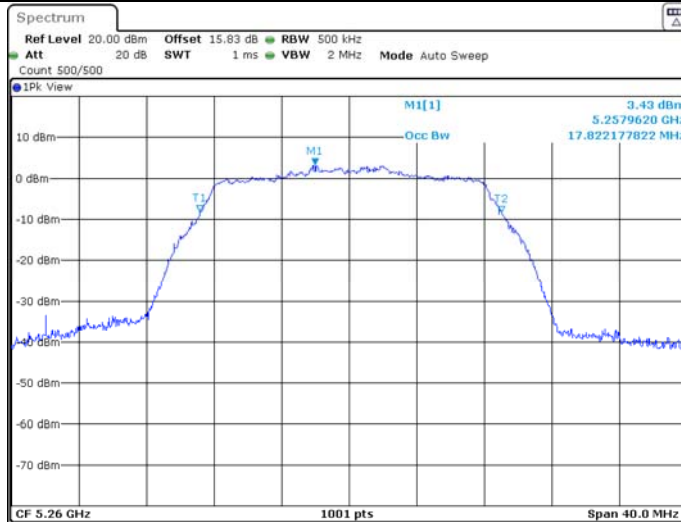




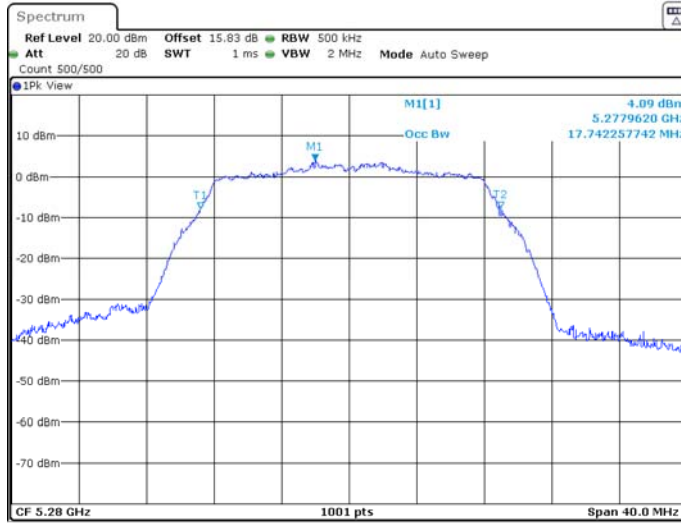
11AMIMO\_Ant1\_5240



11AMIMO\_Ant1\_5260

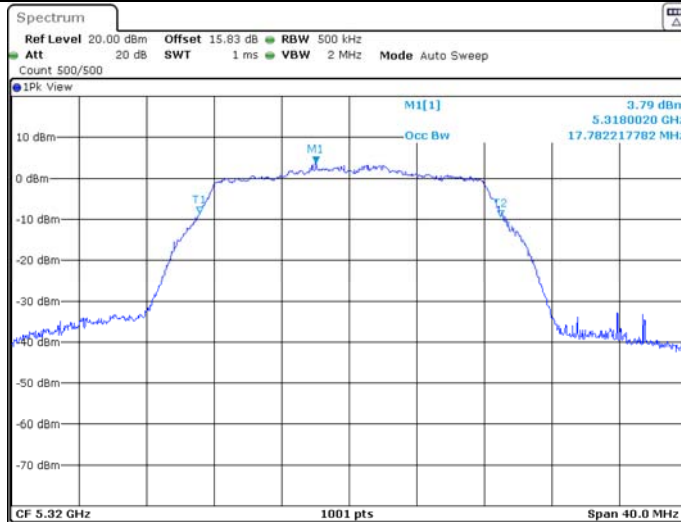


11AMIMO\_Ant1\_5280



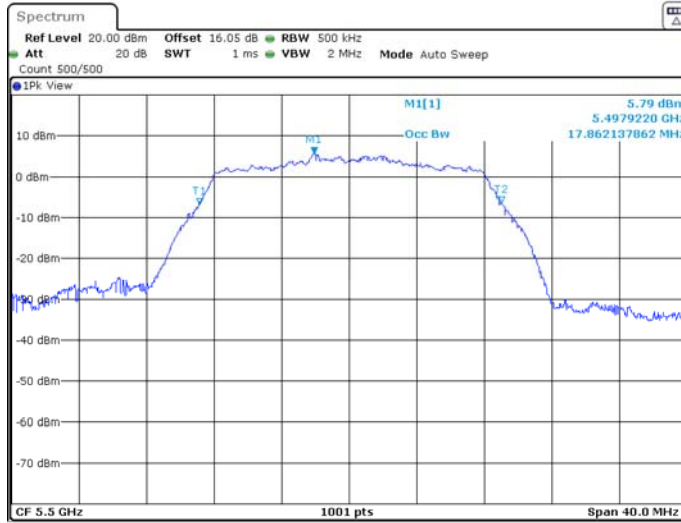
Date: 9.MAR.2021 15:46:28

11AMIMO\_Ant1\_5320



Date: 9.MAR.2021 15:49:14

11AMIMO\_Ant1\_5500



11AMIMO\_Ant1\_5580

