



FCC PART 15.407

TEST REPORT

For

Grandstream Networks, Inc.

126 Brookline Ave, 3rd Floor Boston, MA 02215, USA

FCC ID: YZZGWN7664

Report Type: Original Report	Product Type: 802.11ax 4x4:4 Wi-Fi 6 Access Point
Report Number: SZ1210805-32865E-RF-00	
Report Date: 2021-09-14	
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	802.11ax 4×4:4 Wi-Fi 6 Access Point
Tested Model	GWN7664
Frequency Range	5G Wi-Fi: 5150-5250MHz; 5250-5350MHz; 5470-5725MHz; 5725-5850MHz
Mode	802.11a/n20/n40/ac20/ac40/ac80/ax20/ax40/ax80
Maximum Conducted Average Output Power	5150-5250 MHz: 21.9dBm 5250-5350MHz: 15.7dBm 5470-5725MHz: 18.5dBm 5725-5850 MHz: 25.4dBm
Modulation Technique	OFDM, OFDMA
Antenna Specification*	Antenna gain:4.5dBi Beamforming gain: 0dBi (It is provided by the manufacturer)
Voltage Range	DC 48V from PoE
Sample serial number	SZ1210805-32865E-RF-S1(Assigned by BAACL, Shenzhen)
Received date	2021-07-03
Sample/EUT Status	Good condition
Applicant	Grandstream Networks, Inc.
Applicant Address	126 Brookline Ave, 3rd Floor Boston, MA 02215, USA
Manufacturer	Grandstream Networks, Inc.
Manufacturer Address	126 Brookline Ave, 3rd Floor Boston, MA 02215, 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. Each test item follows test standards and with no deviation.

Measurement Uncertainty

Item	Frequency Range		Expanded Measurement uncertainty
Radiated Disturbance	30MHz~200MHz	Horizontal	4.46dB(k=2, 95% level of confidence)
	30MHz~200MHz	Vertical	4.53dB(k=2, 95% level of confidence)
	200MHz~1000MHz	Horizontal	4.85dB(k=2, 95% level of confidence)
	200MHz~1000MHz	Vertical	4.76dB(k=2, 95% level of confidence)
	1GHz~6GHz	/	5.02dB(k=2, 95% level of confidence)
	6GHz~18GHz	/	5.11dB(k=2, 95% level of confidence)
Occupied Channel Bandwidth			±5%
RF Output Power with Power meter			0.74dB(k=2, 95% level of confidence)
RF conducted test with spectrum			1.30dB(k=2, 95% level of confidence)
AC Power Lines Conducted Emissions			1.75dB(k=2, 95% level of confidence)
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 device supports Beamforming (except the 802.11a mode) and Non-beamforming modes. The two modes have same output power and the beamforming gain is 0dBi, which is declared by manufacturer. So all the test were performed at non-beamforming mode only.

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 802.11a, 802.11n20/ac20/ax20 mode: channel 36, 40, 48 were tested; For 802.11n40/ac40/ax40 mode: channel 38, 46 were tested. For 802.11ac80/ax80 mode, channel 42 was tested.

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 802.11a, 802.11n20/ac20/ax20 mode: channel 52, 56, 64 were tested; For 802.11n40/ac40/ax40 mode: channel 54, 62 were tested. For 802.11ac80/ax80 mode, channel 58 was tested.

For 5470-5725MHz Band, 21 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	138	5690
116	5580	140	5700
118	5590	142	5710
120	5600	144	5720
122	5610	/	/

For 802.11a, 802.11n20/ac20/ax20 mode: channel 100, 116, 140 were tested; For 802.11n40/ac40/ax40 mode: channel 102, 110, 134 were tested. For 802.11ac80/ax80 mode, channel 106, 122 was tested.

Channel 144 for 802.11a/n20/ac20/ax20, Channel 142 for 802.11n40/ac40/ax40, Channel 138 for 802.11ac80/ax80 cross the band U-NII 2C to U-NII 3, were choose to test for compliance requirement.

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

For 802.11a, 802.11n20/ac20/ax20 mode: channel 149, 157, 165 were tested; For 802.11n40/ac40/ax40 mode: channel 151, 159 were tested. For 802.11ac80/ax80 mode, channel 155 was tested.

EUT Exercise Software

“QRCT 4”* exercise software was used. The software and power level was provided by the manufacturer.

The worst case was performed under:

U-NII	Mode	Frequency (MHz)	Data Rate	Power Level*
5150 – 5250MHz	802.11 a	5180	6Mbps	13
		5200	6Mbps	13
		5240	6Mbps	14
	802.11 n20	5180	MCS0	13
		5200	MCS0	13
		5240	MCS0	14
	802.11 n40	5190	MCS0	15
		5230	MCS0	16
	802.11 ac20	5180	MCS0	14
		5200	MCS0	14
		5240	MCS0	14
	802.11 ac40	5190	MCS0	15
		5230	MCS0	16
	802.11 ac80	5210	MCS0	11
	802.11 ax20	5180	MCS0	13
		5200	MCS0	13
		5240	MCS0	13
	802.11 ax40	5190	MCS0	13
5230		MCS0	15	
802.11 ax80	5210	MCS0	11	

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

U-NII	Mode	Frequency (MHz)	Data Rate set	Power Level*
5470 – 5725MHz	802.11 a	5500	6Mbps	9
		5580	6Mbps	9
		5700	6Mbps	9
	802.11 n20	5500	MCS0	8
		5580	MCS0	8
		5700	MCS0	9
	802.11 n40	5510	MCS0	11
		5550	MCS0	12
		5670	MCS0	12
	802.11 ac20	5500	MCS0	8
		5580	MCS0	8
		5700	MCS0	9
	802.11 ac40	5510	MCS0	11
		5550	MCS0	11
		5670	MCS0	12
	802.11 ac80	5530	MCS0	14
		5610	MCS0	14
	802.11 ax20	5500	MCS0	8
		5580	MCS0	8
		5700	MCS0	8
	802.11 ax40	5510	MCS0	11
5550		MCS0	11	
5670		MCS0	12	
802.11 ax80	5530	MCS0	13	
	5610	MCS0	14	

U-NII	Mode	Frequency (MHz)	Data Rate	Power Level*
5725 – 5850MHz	802.11 a	5745	6Mbps	19.5
		5785	6Mbps	19.5
		5825	6Mbps	19.5
	802.11 n20	5745	MCS0	19.5
		5785	MCS0	19.5
		5825	MCS0	19.5
	802.11 n40	5755	MCS0	20
		5795	MCS0	20
	802.11 ac20	5745	MCS0	19.5
		5785	MCS0	19.5
		5825	MCS0	19.5
	802.11 ac40	5755	MCS0	20
		5795	MCS0	20
	802.11 ac80	5775	MCS0	19.5
	802.11 ax20	5745	MCS0	19.5
		5785	MCS0	19.5
		5825	MCS0	19.5
	802.11 ax40	5755	MCS0	20
5795		MCS0	20	
802.11 ax80	5775	MCS0	19.5	

The worse-case data rates are determined to be as follows for each mode based upon investigations by measuring the output power and PSD across all data rated bandwidths, and modulations. The device supports SISO and MIMO in all modes, per pretest, the MIMO mode was the worst mode for all the modes. All the antenna ports have the same power level.

Duty cycle

Test Result: Pass. Please refer to the Appendix.

Equipment Modifications

No modification was made to the EUT tested.

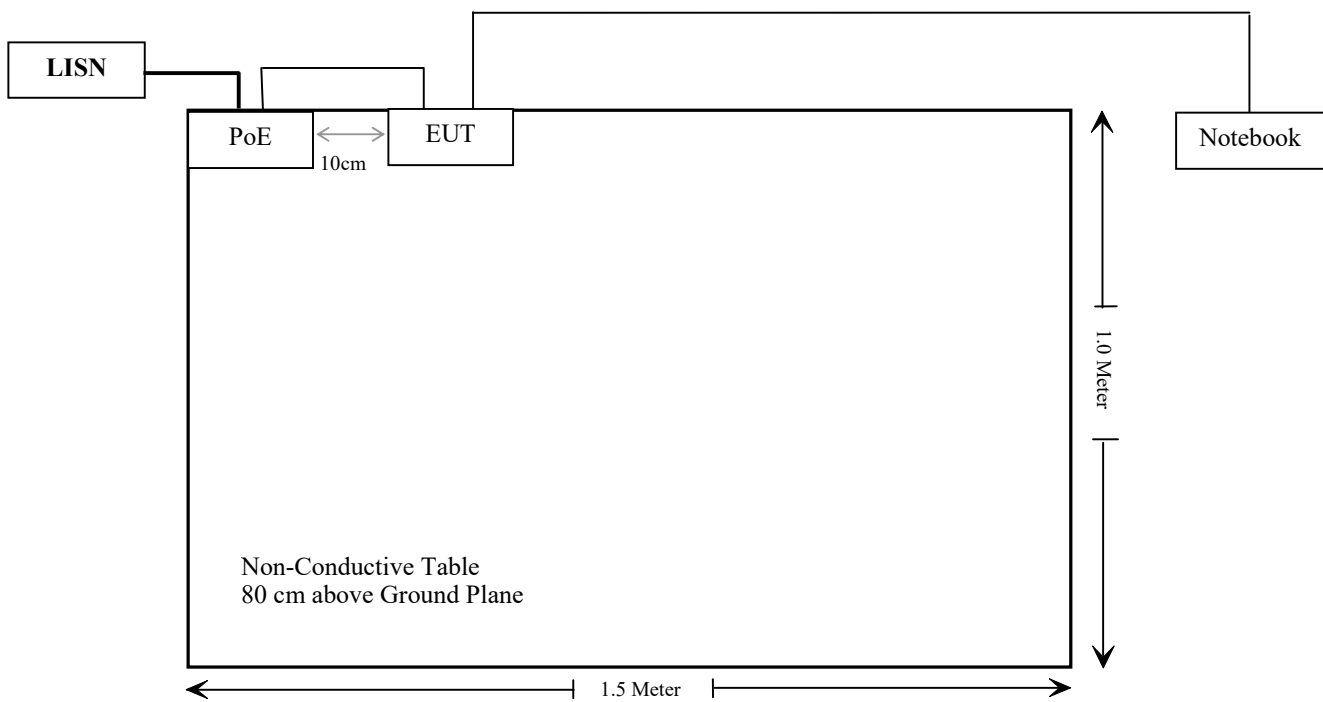
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Unknown	PoE	VX-PI1000GB	1712083039
DELL	Notebook	Latitude E6410	11429208685

External I/O Cable

Cable Description	Length (m)	From Port	To
Un-Shielded Detachable AC Cable	1.2	LISN	PoE
Un-Shielded Detachable RJ45 Cable	1.5	PoE	EUT
Un-Shielding Detachable RJ45 Cable	3.1	EUT	Notebook

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)	Compliant
§15.203	Antenna Requirement	Compliant
§15.407(b)(9)& §15.207(a)	Conducted Emissions	Compliant
§15.205& §15.209 &§15.407(b)	Undesirable Emission& Restricted Bands	Compliant
§15.407(a) (e)	26 dB Emission Bandwidth & 6dB Bandwidth	Compliant
§15.407(a)	Conducted Transmitter Output Power	Compliant
§15.407 (a)	Power Spectral Density	Compliant
§15.407 (h)	Transmit Power Control (TPC)	Not Applicable
§15.407 (h)	Dynamic Frequency Selection (DFS)	Compliant*

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

Compliant*: Please refer to the DFS report: SZ1210805-32865E-RFB.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
AC Line Conducted test					
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2021/07/07	2022/07/06
Rohde & Schwarz	LISN	ENV216	101613	2021/07/07	2022/07/06
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
Radiated Emission Test					
R&S	EMI Test Receiver	ESR3	102455	2021/07/06	2022/07/05
Sonoma instrument	Pre-amplifier	310 N	186238	2021/08/03	2022/08/02
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2020/12/22	2023/12/21
Unknown	Cable	Chamber Cable 1	F-03-EM236	2021/08/03	2022/08/02
Unknown	Cable	Chamber Cable 4	EC-007	2021/08/03	2022/08/02
Rohde & Schwarz	Auto test software	EMC 32	V9.10.00	NCR	NCR
Rohde & Schwarz	Spectrum Analyzer	FSV40-N	102259	2021/07/06	2022/07/05
COM-POWER	Pre-amplifier	PA-122	181919	2020/11/29	2021/11/28
A.H.System	Pre-amplifier	PAM-1840VH	190	2021/08/03	2022/08/02
Sunol Sciences	Horn Antenna	3115	9107-3694	2021/01/15	2024/01/14
the electro-Mechanics Co	Horn Antenna	3116	9510-2270	2019/10/13	2022/10/12
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	2021/04/20	2022/04/20
RF Conducted Test					
Tonscend	RF control Unit	JS0806-2	19D8060154	2021/07/06	2022/07/05
Rohde & Schwarz	Signal and Spectrum Analyzer	FSV40	101473	2021/07/06	2022/07/05

* **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 ²)	Averaging Time (Minutes)
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	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

a)

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/cm²)

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 ²)	MPE Limit (mW/cm ²)
		(dBi)	(numeric)	(dBm)	(mW)			
2.4G Wi-Fi	2412-2462	9.5	8.91	27.0	501.19	35	0.290	1
5G Wi-Fi	5150-5250	10.5	11.22	22.0	158.49	35	0.116	1
5G Wi-Fi	5250-5350	10.5	11.22	16.0	39.81	35	0.029	1
5G Wi-Fi	5470-5725	10.5	11.22	19.0	79.43	35	0.058	1
5G Wi-Fi	5725-5850	10.5	11.22	26.0	398.11	35	0.290	1

- Note: 1. The tune up conducted power was declared by the applicant.
 2. The 2.4G Wi-Fi can transmit at the same time with the 5G Wi-Fi.
 3. For the 2.4G Wi-Fi, as it can support the beam-forming function, so the antenna gain should add the $10\lg 4, 3.5\text{dBi}+10\lg 4=9.5\text{dBi}$.
 4. For the 5G Wi-Fi, as it can support the beam-forming function, so the antenna gain should add the $10\lg 4, 4.5\text{dBi}+10\lg 4=10.5\text{dBi}$.

Simultaneous transmitting consideration (worst case):

$$\text{The ratio}=\text{MPE}_{2.4\text{G Wi-Fi}}/\text{limit}+\text{MPE}_{5\text{G Wi-Fi}}/\text{limit}=0.290+0.290=0.580<1.0$$

To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 35cm from nearby persons.

Result: Pass

FCC §15.203 – ANTENNA REQUIREMENT

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:

- b. Antenna must be permanently attached to the unit.
- c. 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 four internal antennas arrangement for 2.4G Wi-Fi and four internal antennas for 5G Wi-Fi which were permanently attached. Please refer to the EUT photos.

Type	Antenna Gain	Impedance	Frequency Range
PIFA	3.5dBi	50 Ω	2412-2462MHz
PIFA	4.5dBi	50 Ω	5150-5850MHz

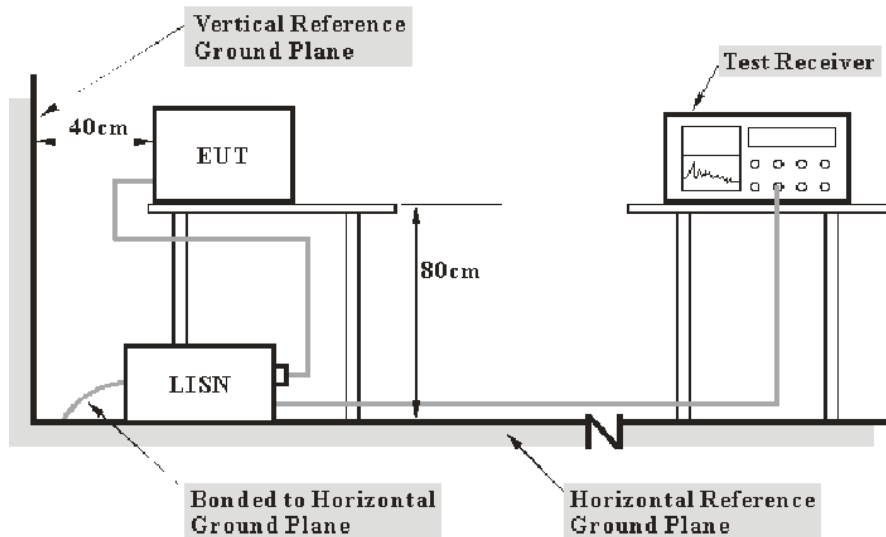
Result: Compliant.

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

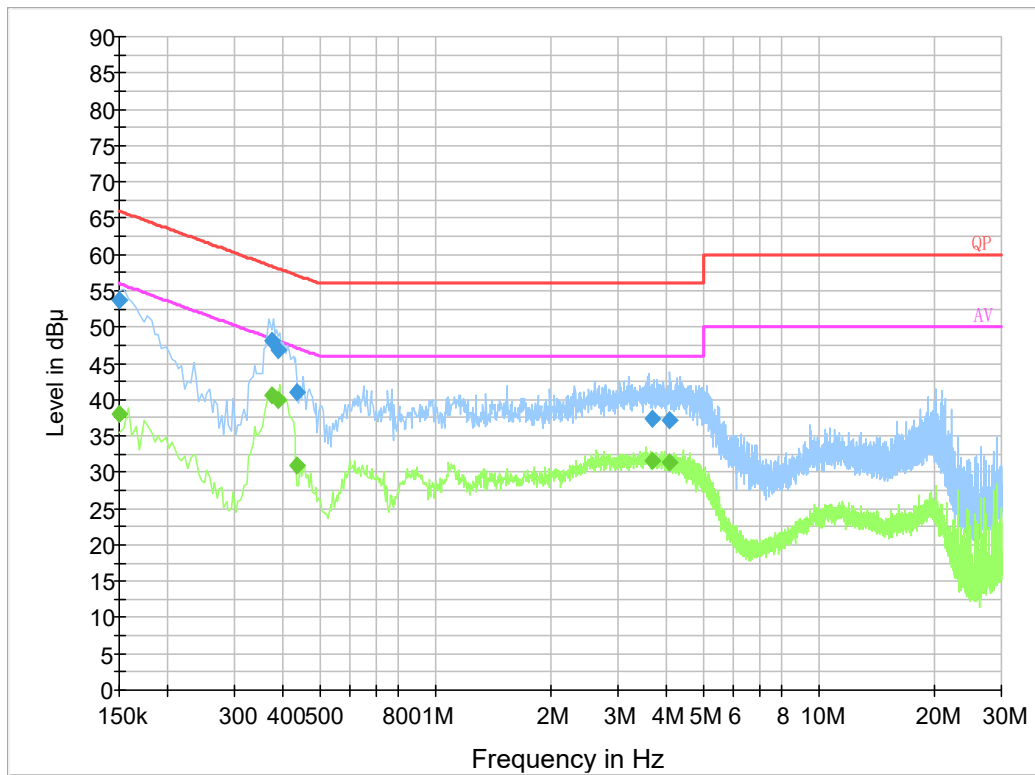
Environmental Conditions

Temperature:	25 °C
Relative Humidity:	65 %
ATM Pressure:	101.0 kPa

The testing was performed by Haiguo Li on 2021-08-12.

EUT operation mode: Transmitting

AC 120V/60 Hz, Line:



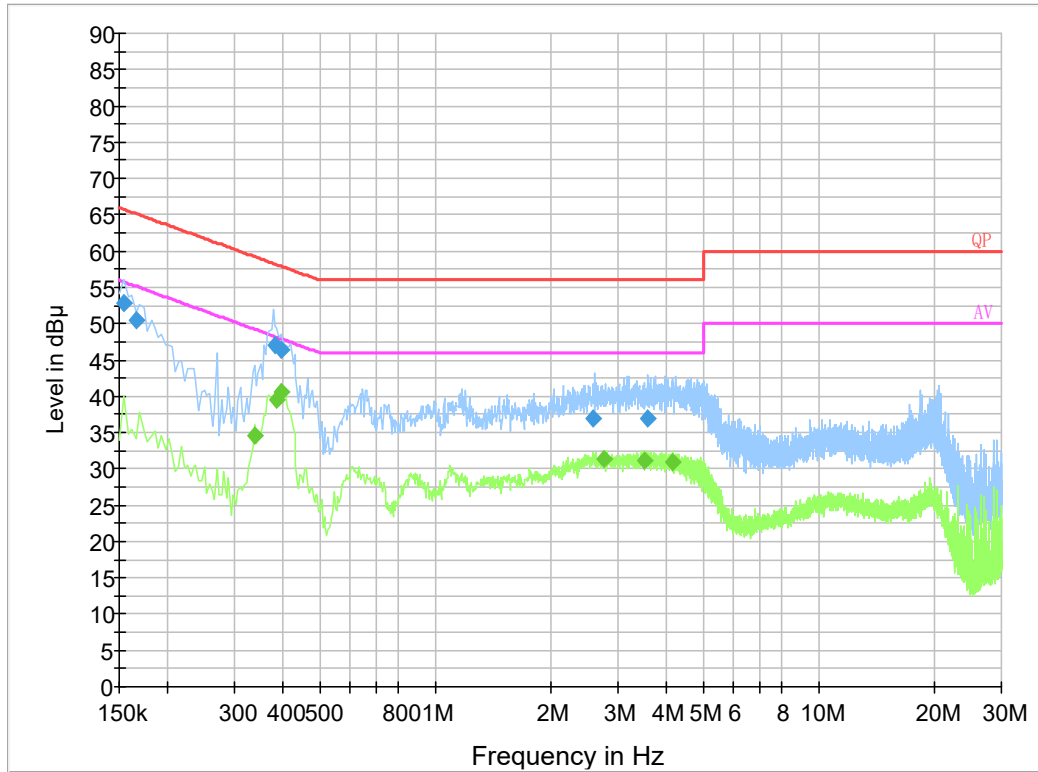
Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.150000	53.6	9.000	L1	19.8	12.4	66.0
0.375550	48.1	9.000	L1	19.9	10.3	58.4
0.388090	46.8	9.000	L1	19.9	11.3	58.1
0.435490	41.0	9.000	L1	19.8	16.1	57.1
3.679610	37.3	9.000	L1	19.9	18.7	56.0
4.092470	37.2	9.000	L1	19.9	18.8	56.0

Final Result 2

Frequency (MHz)	Average (dB μ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.150000	38.0	9.000	L1	19.8	18.0	56.0
0.375550	40.5	9.000	L1	19.9	7.9	48.4
0.388090	40.0	9.000	L1	19.9	8.1	48.1
0.435490	31.0	9.000	L1	19.8	16.1	47.1
3.679610	31.5	9.000	L1	19.9	14.5	46.0
4.092470	31.4	9.000	L1	19.9	14.6	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)
0.154000	52.9	9.000	N	19.8	12.9	65.8
0.165500	50.5	9.000	N	19.8	14.7	65.2
0.383670	47.1	9.000	N	19.8	11.1	58.2
0.396030	46.4	9.000	N	19.8	11.5	57.9
2.590850	36.9	9.000	N	19.8	19.1	56.0
3.584030	36.9	9.000	N	19.9	19.1	56.0

Final Result 2

Frequency (MHz)	Average (dB μ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.338000	34.6	9.000	N	19.8	14.7	49.3
0.386000	39.5	9.000	N	19.8	8.6	48.1
0.398000	40.6	9.000	N	19.8	7.3	47.9
2.766000	31.4	9.000	N	19.9	14.6	46.0
3.510000	31.2	9.000	N	19.9	14.8	46.0
4.158000	30.9	9.000	N	19.9	15.1	46.0

§15.205 & §15.209 & §15.407(B)– UNDESIRABLE EMISSION

Applicable Standard

FCC §15.407 (b); §15.209; §15.205;

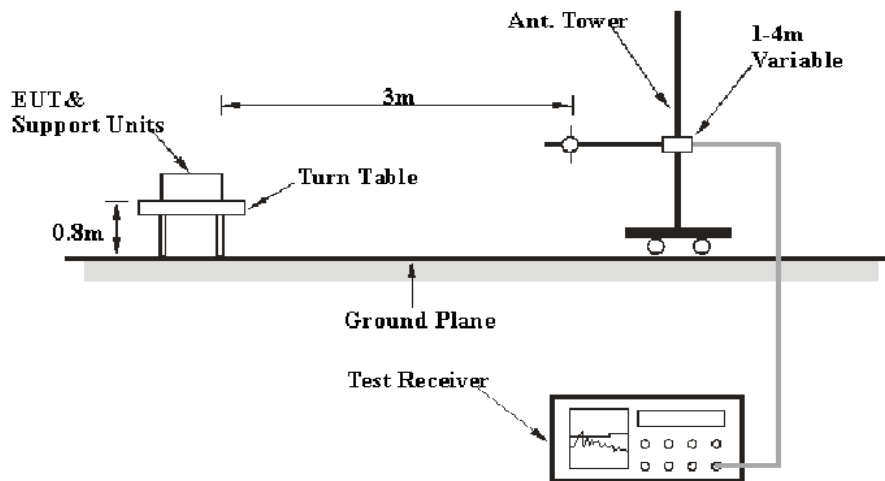
(b) Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

- (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.

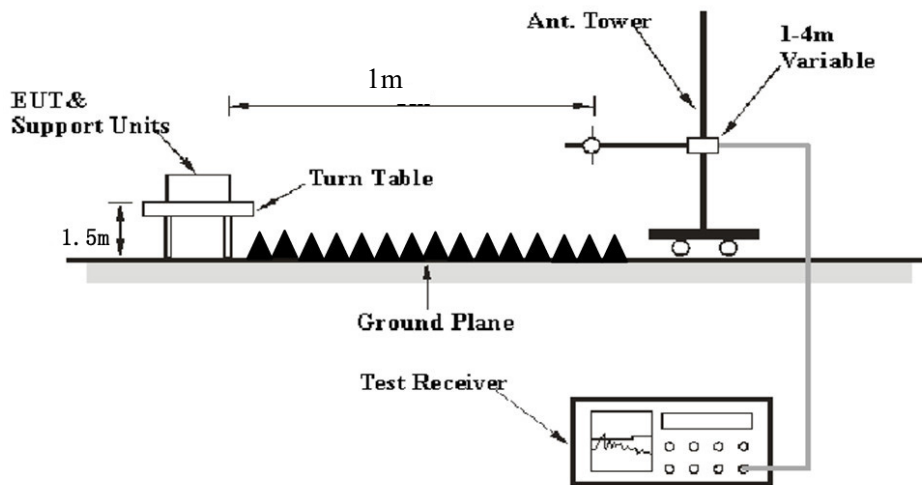
Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.

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 ^{Note 1}	/	Average
	1MHz	> 1/T ^{Note 2}	/	Average

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 Average 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

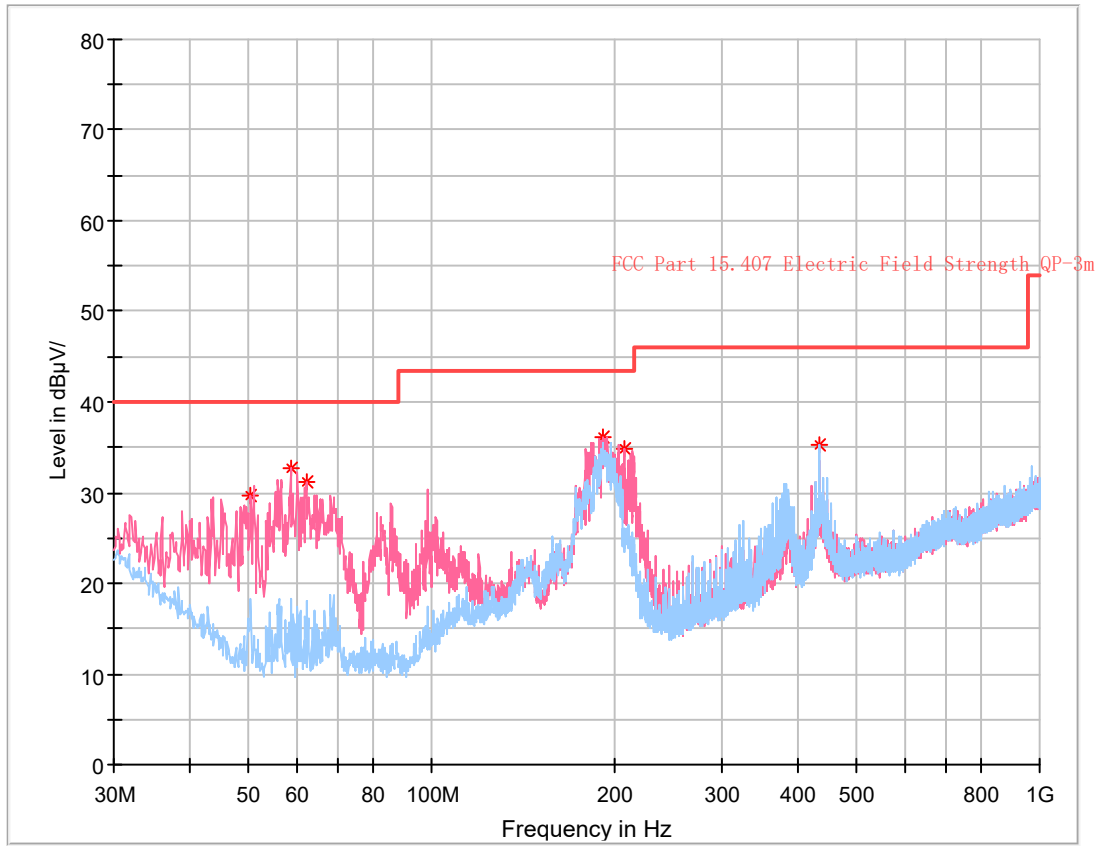
Environmental Conditions

Temperature:	28.7~30 °C
Relative Humidity:	44~52 %
ATM Pressure:	101~101.1 kPa

The testing was performed by William Wang on 2021-08-13 for below 1GHz and by Dio Ding on 2021-08-22 for above 1GHz.

EUT operation mode: Transmitting

30 MHz – 1 GHz:



Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
50.370000	29.67	40.00	10.33	100.0	V	146.0	-16.7
58.736250	32.62	40.00	7.38	100.0	V	0.0	-16.5
62.131250	31.23	40.00	8.77	100.0	V	0.0	-16.4
191.990000	36.22	43.50	7.28	100.0	V	0.0	-12.1
207.267500	34.92	43.50	8.58	100.0	V	295.0	-11.2
435.217500	35.21	46.00	10.79	100.0	H	265.0	-6.1

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 Part 15.407	
	Reading (dBµV)	PK/QP/Ave.		Height (m)	Polar (H / V)			Limit (dBµV/m)	Margin (dB)
802.11a									
5180 MHz									
5142.98	35.23	PK	322	2.2	V	38.36	73.59	83.5	9.91
5142.98	21.57	Ave.	322	2.2	V	38.36	59.93	63.5	3.57
5375.55	31.53	PK	97	2.3	V	39.09	70.62	83.5	12.88
5375.55	20.29	Ave.	97	2.3	V	39.09	59.38	63.5	4.12
10360.00	44.01	PK	281	1.7	V	17.42	61.43	77.7	16.27
15540.00	46.54	Ave.	245	1.9	V	17.54	64.08	83.5	19.42
15540.00	30.01	PK	245	1.9	V	17.54	47.55	63.5	15.95
5200 MHz									
10400.00	43.25	PK	78	1.9	V	17.52	60.77	77.7	16.93
15600.00	45.40	PK	225	1.9	V	18.68	64.08	83.5	19.42
15600.00	30.23	Ave.	225	1.9	V	18.68	48.91	63.5	14.59
5240 MHz									
5050.76	32.06	PK	108	2.4	V	38.16	70.22	83.5	13.28
5050.76	20.11	Ave.	108	2.4	V	38.16	58.27	63.5	5.23
5434.93	32.04	PK	153	2.5	V	39.29	71.33	83.5	12.17
5434.93	19.90	Ave.	153	2.5	V	39.29	59.19	63.5	4.31
10480.00	44.25	PK	255	1.2	V	17.25	61.50	77.7	16.20
15720.00	44.35	PK	285	2.5	V	17.86	62.21	83.5	21.29
15720.00	29.91	Ave.	285	2.5	V	17.86	47.77	63.5	15.73

Frequency (MHz)	Receiver		Turn-Table Angle Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part15.407	
	Reading (dBµV)	PK/QP/Ave.		Height (m)	Polar (H / V)			Limit (dBµV/m)	Margin (dB)
802.11n20									
5180 MHz									
5145.77	35.29	PK	181	1.0	V	38.36	73.65	83.5	9.85
5145.77	21.37	Ave.	181	1.0	V	38.36	59.73	63.5	3.77
5377.46	32.93	PK	63	1.9	V	39.09	72.02	83.5	11.48
5377.46	19.82	Ave.	63	1.9	V	39.09	58.91	63.5	4.59
10360.00	43.29	PK	220	1.8	V	17.42	60.71	77.7	16.99
15540.00	48.67	PK	158	1.4	V	17.54	66.21	83.5	17.29
15540.00	30.59	Ave.	158	1.4	V	17.54	48.13	63.5	15.37
5200 MHz									
10400.00	43.01	PK	223	2.1	V	17.52	60.53	77.7	17.17
15600.00	47.14	PK	358	1.6	V	18.68	65.82	83.5	17.68
15600.00	29.92	Ave.	358	1.6	V	18.68	48.60	63.5	14.90
5240 MHz									
5045.12	30.82	PK	46	2.2	V	38.14	68.96	83.5	14.54
5045.12	19.53	Ave.	46	2.2	V	38.14	57.67	63.5	5.83
5430.31	32.36	PK	332	1.0	V	39.19	71.55	83.5	11.95
5430.31	20.04	Ave.	332	1.0	V	39.19	59.23	63.5	4.27
10480.00	43.62	PK	281	2.4	V	17.25	60.87	77.7	16.83
15720.00	44.21	PK	246	1.4	V	17.86	62.07	83.5	21.43
15720.00	29.51	Ave.	246	1.4	V	17.86	47.37	63.5	16.13
802.11n40									
5190 MHz									
5147.65	34.95	PK	81	1.0	V	38.36	73.31	83.5	10.19
5147.65	20.67	Ave.	81	1.0	V	38.36	59.03	63.5	4.47
5375.87	31.45	PK	181	1.3	V	39.09	70.54	83.5	12.96
5375.87	18.15	Ave.	181	1.3	V	39.09	57.24	63.5	6.26
10380.00	43.6	PK	53	2.1	V	17.42	61.02	77.7	16.68
5230 MHz									
5104.38	31.48	PK	186	1.4	V	38.26	69.74	83.5	13.76
5104.38	19.1	Ave.	186	1.4	V	38.26	57.36	63.5	6.14
5404.84	31.64	PK	91	1.6	V	39.19	70.83	83.5	12.67
5404.84	18.78	Ave.	91	1.6	V	39.19	57.97	63.5	5.53
10460.00	43.35	PK	31	2.0	V	17.15	60.50	77.7	17.20

Frequency (MHz)	Receiver		Turn-Table Angle Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part15.407	
	Reading (dBµV)	PK/QP/Ave.		Height (m)	Polar (H / V)			Limit (dBµV/m)	Margin (dB)
802.11ac20									
5180 MHz									
5149.53	34.28	PK	222	1.7	V	38.36	72.64	83.5	10.86
5149.53	21.79	Ave.	1	1.2	V	38.36	60.15	63.5	3.35
5366.32	32.03	PK	193	1.7	V	39.09	71.12	83.5	12.38
5366.32	19.51	Ave.	193	1.7	V	39.09	58.60	63.5	4.90
10360.00	43.2	PK	201	1.9	V	17.42	60.62	77.7	17.08
15540.00	47.85	PK	355	2.5	V	17.54	65.39	83.5	18.11
15540.00	29.19	Ave.	355	2.5	V	17.54	46.73	63.5	16.77
5200 MHz									
10400.00	43.16	PK	31	1.1	V	17.52	60.68	77.7	17.02
15600.00	45.72	PK	251	1.9	V	18.68	64.40	83.5	19.10
15600.00	28.49	Ave.	251	1.9	V	18.68	47.17	63.5	16.33
5240 MHz									
5051.70	31.22	PK	158	2.1	V	38.16	69.38	83.5	14.12
5051.70	19.85	Ave.	158	2.1	V	38.16	58.01	63.5	5.49
5436.84	32.26	PK	184	2.4	V	39.29	71.55	83.5	11.95
5436.84	19.47	Ave.	184	2.4	V	39.29	58.76	63.5	4.74
10480.00	43.42	PK	138	2.5	V	17.25	60.67	77.7	17.03
15720.00	44.54	PK	216	1.1	V	17.86	62.40	83.5	21.10
15720.00	29.49	Ave.	216	1.1	V	17.86	47.35	63.5	16.15

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									
5145.77	36.59	PK	349	2.0	V	38.36	74.95	83.5	8.55
5145.77	21.16	Ave.	349	2.0	V	38.36	59.52	63.5	3.98
5421.71	31.29	PK	293	1.3	V	39.19	70.48	83.5	13.02
5421.71	18.25	Ave.	293	1.3	V	39.19	57.44	63.5	6.06
10380.00	43.15	PK	324	2.1	V	17.42	60.57	77.7	17.13
5230 MHz									
5025.36	31.77	PK	112	1.7	V	38.14	69.91	83.5	13.59
5025.36	19.18	Ave.	112	1.7	V	38.14	57.32	63.5	6.18
5351.51	35.39	PK	53	2.1	V	39.09	74.48	83.5	9.02
5351.51	18.7	Ave.	53	2.1	V	39.09	57.79	63.5	5.71
10460.00	43.02	PK	210	2.2	V	17.15	60.17	77.7	17.53
802.11ac80									
5210MHz									
5145.77	35.28	PK	54	2.4	V	38.36	73.64	83.5	9.86
5145.77	21.36	Ave.	16	1.9	V	38.36	59.72	63.5	3.78
5444.16	31.27	PK	212	1.4	V	39.29	70.56	83.5	12.94
5444.16	18.03	Ave.	212	1.4	V	39.29	57.32	63.5	6.18
10420.00	43.67	PK	102	1.7	V	17.52	61.19	77.7	16.51

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									
5149.53	34.21	PK	257	2.1	V	38.36	72.57	83.5	10.93
5149.53	20.49	Ave.	317	1.0	V	38.36	58.85	63.5	4.65
5377.46	31.4	PK	22	1.9	V	39.09	70.49	83.5	13.01
5377.46	19.17	Ave.	22	1.9	V	39.09	58.26	63.5	5.24
10360.00	43.32	PK	135	1.5	V	17.42	60.74	77.7	16.96
15540.00	49.09	PK	269	1.9	V	17.54	66.63	83.5	16.87
15540.00	30.88	Ave.	269	1.9	V	17.54	48.42	63.5	15.08
5200MHz									
10400.00	43.19	PK	67	2.4	V	17.52	60.71	77.7	16.99
15600.00	47.66	PK	121	2.0	V	18.68	66.34	83.5	17.16
15600.00	30.05	Ave.	121	2.0	V	18.68	48.73	63.5	14.77
5240 MHz									
5028.18	32.22	PK	235	1.6	V	38.14	70.36	83.5	13.14
5028.18	19.21	Ave.	235	1.6	V	38.14	57.35	63.5	6.15
5434.61	33.55	PK	134	2.4	V	39.29	72.84	83.5	10.66
5434.61	19.38	Ave.	134	2.4	V	39.29	58.67	63.5	4.83
10480.00	43.62	PK	98	1.2	V	17.25	60.87	77.7	16.83
15720.00	45.3	PK	21	1.2	V	17.86	63.16	83.5	20.34
15720.00	29.85	Ave.	21	1.2	V	17.86	47.71	63.5	15.79

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)
802.11ax40									
5190 MHz									
5149.53	34.82	PK	77	1.9	V	38.36	73.18	83.5	10.32
5149.53	21.08	Ave.	206	2.3	V	38.36	59.44	63.5	4.06
5383.83	30.69	PK	273	2.4	V	39.09	69.78	83.5	13.72
5383.83	18.12	Ave.	273	2.4	V	39.09	57.21	63.5	6.29
10380.00	43.51	PK	43	1.3	V	17.42	60.93	77.7	16.77
5230 MHz									
5031.01	31.24	PK	181	2.4	V	38.14	69.38	83.5	14.12
5031.01	19.34	Ave.	181	2.4	V	38.14	57.48	63.5	6.02
5350.08	36.55	PK	218	1.3	V	39.09	75.64	83.5	7.86
5350.08	18.55	Ave.	218	1.3	V	39.09	57.64	63.5	5.86
10460.00	43.05	PK	209	2.5	V	17.15	60.20	77.7	17.50
802.11ax80									
5210 MHz									
5139.18	36.09	PK	198	1.1	V	38.36	74.45	83.5	9.05
5139.18	21.21	Ave.	250	1.6	V	38.36	59.57	63.5	3.93
5446.71	31.32	PK	4	1.3	V	39.29	70.61	83.5	12.89
5446.71	17.77	Ave.	4	1.3	V	39.29	57.06	63.5	6.44
10420.00	43.18	PK	45	1.6	V	17.52	60.70	77.7	17.00

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									
5147.64	32.85	PK	251	1.4	V	38.36	71.21	83.5	12.29
5147.64	17.81	Ave.	251	1.4	V	38.36	56.17	63.5	7.33
5355.76	32.41	PK	201	1.0	V	39.09	71.50	83.5	12.00
5355.76	17.48	Ave.	201	1.0	V	39.09	56.57	63.5	6.93
10520.00	43.95	PK	281	1.3	V	17.25	61.20	77.7	16.50
5280 MHz									
10560.00	44.14	PK	77	1.3	V	17.91	62.05	77.7	15.65
5320 MHz									
5076.16	31.86	PK	56	1.7	V	38.26	70.12	83.5	13.38
5076.16	18.85	Ave.	56	1.7	V	38.26	57.11	63.5	6.39
5353.26	37.47	PK	37	1.2	V	39.09	76.56	83.5	6.94
5353.26	21.24	Ave.	37	1.2	V	39.09	60.33	63.5	3.17
10640.00	44.65	PK	243	2.0	V	18.01	62.66	83.5	20.84
10640.00	38.14	Ave.	243	2.0	V	18.01	56.15	63.5	7.35
802.11n20									
5260 MHz									
5073.34	31.25	PK	178	2.0	V	38.26	69.51	83.5	13.99
5073.34	19.61	Ave.	178	2.0	V	38.26	57.87	63.5	5.63
5353.90	31.26	PK	147	1.2	V	39.09	70.35	83.5	13.15
5353.90	18.44	Ave.	147	1.2	V	39.09	57.53	63.5	5.97
10520.00	44.07	PK	156	1.2	V	17.25	61.32	77.7	16.38
5280 MHz									
10560.00	44.16	PK	131	2.1	V	17.91	62.07	77.7	15.63
5320 MHz									
5032.89	31.32	PK	140	2.5	V	38.14	69.46	83.5	14.04
5032.89	18.89	Ave.	140	2.5	V	38.14	57.03	63.5	6.47
5356.61	35.15	PK	89	1.0	V	39.09	74.24	83.5	9.26
5356.61	19.8	Ave.	89	1.0	V	39.09	58.89	63.5	4.61
10640.00	44.86	PK	260	2.2	V	18.01	62.87	83.5	20.63
10640.00	38.06	Ave.	260	2.2	V	18.01	56.07	63.5	7.43

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									
4978.33	30.59	PK	250	2.0	V	38.04	68.63	83.5	14.87
4978.33	19.19	Ave.	250	2.0	V	38.04	57.23	63.5	6.27
5390.67	35.9	PK	301	1.4	V	39.19	75.09	83.5	8.41
5390.67	18.69	Ave.	301	1.4	V	39.19	57.88	63.5	5.62
10540.00	43.83	PK	196	1.2	V	17.25	61.08	77.7	16.62
5310 MHz									
5094.03	30.54	PK	277	1.8	V	38.26	68.80	83.5	14.70
5094.03	18.06	Ave.	277	1.8	V	38.26	56.32	63.5	7.18
5350.07	32.92	PK	69	1.4	V	39.09	72.01	83.5	11.49
5350.07	20.47	Ave.	69	1.4	V	39.09	59.56	63.5	3.94
10620.00	43.87	PK	45	1.6	V	18.01	61.88	83.5	21.62
10620.00	35.86	Ave.	45	1.6	V	18.01	53.87	63.5	9.63
802.11ac20									
5260 MHz									
5065.81	31.01	PK	262	2.2	V	38.16	69.17	83.5	14.33
5065.81	18.58	Ave.	262	2.2	V	38.16	56.74	63.5	6.76
5449.57	32.7	PK	3	1.2	V	39.29	71.99	83.5	11.51
5449.57	18.62	Ave.	3	1.2	V	39.29	57.91	63.5	5.59
10520.00	44.21	PK	213	2.3	V	17.25	61.46	77.7	16.24
5280 MHz									
10560.00	43.91	PK	283	1.4	V	17.91	61.82	77.7	15.88
5320 MHz									
5129.78	31.14	PK	74	2.1	V	38.36	69.50	83.5	14.00
5129.78	18.89	Ave.	74	2.1	V	38.36	57.25	63.5	6.25
5361.22	34.05	PK	181	2.3	V	39.09	73.14	83.5	10.36
5361.22	20.16	Ave.	181	2.3	V	39.09	59.25	63.5	4.25
10640.00	44.54	PK	93	2.2	V	18.01	62.55	83.5	20.95
10640.00	37.71	Ave.	93	2.2	V	18.01	55.72	63.5	7.78

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									
5088.39	31.8	PK	168	2.2	V	38.26	70.06	83.5	13.44
5088.39	19.33	Ave.	168	2.2	V	38.26	57.59	63.5	5.91
5390.04	37.28	PK	196	1.7	V	39.19	76.47	83.5	7.03
5390.04	18.75	Ave.	196	1.7	V	39.19	57.94	63.5	5.56
10540.00	44.39	PK	121	1.8	V	17.25	61.64	77.7	16.06
5310 MHz									
5103.44	30.3	PK	220	2.1	V	38.26	68.56	83.5	14.94
5103.44	18.21	Ave.	220	2.1	V	38.26	56.47	63.5	7.03
5354.06	33.87	PK	317	2.4	V	39.09	72.96	83.5	10.54
5354.06	21.18	Ave.	317	2.4	V	39.09	60.27	63.5	3.23
10620.00	45.27	PK	342	2.2	V	18.01	63.28	83.5	20.22
10620.00	38.76	Ave.	342	2.2	V	18.01	56.77	63.5	6.73
802.11ac80									
5290 MHz									
5116.61	30.51	PK	68	1.1	V	38.36	68.87	83.5	14.63
5116.61	18.15	Ave.	68	1.1	V	38.36	56.51	63.5	6.99
5354.22	35.26	PK	35	2.0	V	38.36	73.62	83.5	9.88
5354.22	20.75	Ave.	35	2.0	V	38.36	59.11	63.5	4.39
10580.00	44.6	PK	208	1.8	V	17.91	62.51	77.7	15.19
802.11ax20									
5260 MHz									
5074.28	32.25	PK	120	1.3	V	38.26	70.51	83.5	12.99
5074.28	19.49	Ave.	120	1.3	V	38.26	57.75	63.5	5.75
5449.57	32.4	PK	314	2.1	V	39.29	71.69	83.5	11.81
5449.57	18.97	Ave.	314	2.1	V	39.29	58.26	63.5	5.24
10520.00	44.38	PK	37	1.3	V	17.25	61.63	77.7	16.07
5280 MHz									
10560.00	44.89	PK	119	1.7	V	17.91	62.80	77.7	14.90
5320 MHz									
4805.25	31.22	PK	130	1.7	V	37.80	69.02	83.5	14.48
4805.25	19.27	Ave.	130	1.7	V	37.80	57.07	63.5	6.43
5352.47	39.12	PK	80	2.3	V	39.09	78.21	83.5	5.29
5352.47	21.4	Ave.	80	2.3	V	39.09	60.49	63.5	3.01
10640.00	45.55	PK	286	1.2	V	18.01	63.56	83.5	19.94
10640.00	38.37	Ave.	286	1.2	V	18.01	56.38	63.5	7.12

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/A V)		Height (m)	Polar (H / V)			Limit (dBµV/m)	Margin (dB)
802.11ax40									
5270 MHz									
5149.53	36.48	PK	75	2.5	V	38.36	74.84	83.5	8.66
5149.53	19.32	Ave.	75	2.5	V	38.36	57.68	63.5	5.82
5389.24	36.73	PK	107	1.0	V	39.19	75.92	83.5	7.58
5389.24	19.35	Ave.	107	1.0	V	39.19	58.54	63.5	4.96
10540.00	44.06	PK	65	2.1	V	17.25	61.31	77.7	16.39
5310 MHz									
5046.06	29.99	PK	274	1.7	V	38.14	68.13	83.5	15.37
5046.06	18.03	Ave.	274	1.7	V	38.14	56.17	63.5	7.33
5350.09	34.58	PK	146	2.3	V	39.09	73.67	83.5	9.83
5350.09	21.29	Ave.	146	2.3	V	39.09	60.38	63.5	3.12
10620.00	45.18	PK	92	1.3	V	18.01	63.19	83.5	20.31
10620.00	37.95	Ave.	92	1.3	V	18.01	55.96	63.5	7.54
802.11ax80									
5290 MHz									
5073.34	30.52	PK	12	1.5	V	38.26	68.78	83.5	14.72
5073.34	18.35	Ave.	12	1.5	V	38.26	56.61	63.5	6.89
5350.24	36.18	PK	197	1.5	V	38.36	74.54	83.5	8.96
5350.24	20.59	Ave.	197	1.5	V	38.36	58.95	63.5	4.55
10580.00	44.74	PK	24	1.2	V	17.91	62.65	77.7	15.05

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									
5464.23	32.63	PK	304	1.1	V	39.37	72.00	77.7	5.70
5729.24	32.12	PK	9	1.4	V	39.49	71.61	77.7	6.09
11000.00	45.57	PK	327	1.2	V	17.66	63.23	83.5	20.27
11000.00	38.62	Ave.	327	1.2	V	17.66	56.28	63.5	7.22
5580 MHz									
11160.00	45.41	PK	193	2.1	V	17.39	62.80	83.5	20.70
11160.00	39.42	Ave.	193	2.1	V	17.39	56.81	63.5	6.69
5700 MHz									
5467.65	31.26	PK	318	1.7	V	39.37	70.63	77.7	7.07
5739.20	32.81	PK	339	1.5	V	39.49	72.30	77.7	5.40
11400.00	47.21	PK	320	1.6	V	17.73	64.94	83.5	18.56
11400.00	39.65	Ave.	320	1.6	V	17.73	57.38	63.5	6.12
5720 MHz									
11440.00	44.14	PK	359	2.3	V	17.73	61.87	83.5	21.63
11440.00	32.09	Ave.	359	2.3	V	17.73	49.82	63.5	13.68

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)
802.11n20									
5500 MHz									
5462.49	32.01	PK	98	2.1	V	39.37	71.38	77.7	6.32
5744.84	32.44	PK	135	1.8	V	39.49	71.93	77.7	5.77
11000.00	47.34	PK	140	1.3	V	17.66	65.00	83.5	18.50
11000.00	42.56	Ave.	140	1.3	V	17.66	60.22	63.5	3.28
5580 MHz									
11600.00	45.62	PK	146	1.3	V	17.51	63.13	83.5	20.37
11600.00	37.63	Ave.	146	1.3	V	17.51	55.14	63.5	8.36
5700 MHz									
5460.30	31.51	PK	99	2.1	V	39.37	70.88	77.7	6.82
5740.27	32.68	PK	185	1.1	V	39.49	72.17	77.7	5.53
11400.00	48.35	PK	314	2.5	V	17.73	66.08	83.5	17.42
11400.00	40.36	Ave.	314	2.5	V	17.73	58.09	63.5	5.41
5720 MHz									
11440.00	46.65	PK	330	1.3	V	17.73	64.38	83.5	19.12
11440.00	39.71	Ave.	330	1.3	V	17.73	57.44	63.5	6.06

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									
5466.82	33.71	PK	168	1.2	V	39.37	73.08	77.7	4.62
5744.67	33.85	PK	135	2.4	V	39.49	73.34	77.7	4.36
11020.00	46.77	PK	14	2.2	V	17.66	64.43	83.5	19.07
11020.00	42.04	Ave.	14	2.2	V	17.66	59.70	63.5	3.80
5550 MHz									
11100.00	45.78	PK	300	1.3	V	16.72	62.50	83.5	21.00
11100.00	40.24	Ave.	300	1.3	V	16.72	56.96	63.5	6.54
5670 MHz									
5461.63	31.87	PK	210	1.5	V	39.37	71.24	77.7	6.46
5733.61	33.69	PK	333	1.1	V	39.49	73.18	77.7	4.52
11340.00	45.87	PK	42	2.4	V	17.43	63.30	83.5	20.20
11340.00	35.26	Ave.	42	2.4	V	17.43	52.69	63.5	10.81
5710 MHz									
11420.00	46.53	PK	53	2.5	V	17.73	64.26	83.5	19.24
11420.00	40.2	Ave.	53	2.5	V	17.73	57.93	63.5	5.57

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)
802.11ac20									
5500 MHz									
5460.11	31.78	PK	299	1.5	V	39.37	71.15	77.7	6.55
5738.18	34.27	PK	11	2.2	V	39.49	73.76	77.7	3.94
11000.00	47.53	PK	122	2.3	V	17.66	65.19	83.5	18.31
11000.00	42.14	Ave.	278	2.0	V	17.66	59.80	63.5	3.70
5580 MHz									
11160.00	45.19	PK	12	1.5	V	17.39	62.58	83.5	20.92
11160.00	39.18	Ave.	12	1.5	V	17.39	56.57	63.5	6.93
5700 MHz									
5461.11	31.15	PK	291	2.1	V	39.37	70.52	77.7	7.18
5725.07	33.85	PK	278	2.4	V	39.49	73.34	77.7	4.36
11400.00	48.51	PK	255	2.2	V	17.73	66.24	83.5	17.26
11400.00	41.55	Ave.	255	2.2	V	17.73	59.28	63.5	4.22
5720 MHz									
11440.00	47.13	PK	142	1.3	V	17.73	64.86	83.5	18.64
11440.00	39.7	Ave.	142	1.3	V	17.73	57.43	63.5	6.07

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									
5463.38	33.23	PK	104	1.5	V	39.37	72.60	77.7	5.10
5737.20	32.3	PK	338	1.5	V	39.49	71.79	77.7	5.91
11020.00	46.53	PK	281	1.8	V	17.66	64.19	83.5	19.31
11020.00	41.24	Ave.	281	1.8	V	17.66	58.90	63.5	4.60
5550 MHz									
11100.00	46.13	PK	172	2.3	V	16.72	62.85	83.5	20.65
11100.00	40.67	Ave.	172	2.3	V	16.72	57.39	63.5	6.11
5670 MHz									
5462.63	31.18	PK	74	1.9	V	39.37	70.55	77.7	7.15
5725.22	32.66	PK	3	1.2	V	39.49	72.15	77.7	5.55
11340.00	46.65	PK	322	2.3	V	17.43	64.08	83.5	19.42
11340.00	41.01	Ave.	322	2.3	V	17.43	58.44	63.5	5.06
5710 MHz									
11420.00	45.67	PK	335	2.5	V	17.73	63.40	83.5	20.10
11420.00	37.79	Ave.	335	2.5	V	17.73	55.52	63.5	7.98
802.11ac80									
5530 MHz									
5464.49	35.83	PK	9	2.3	V	39.37	75.20	77.7	2.50
5744.18	35.97	PK	277	2.1	V	39.49	75.46	77.7	2.24
11060.00	46.6	PK	61	1.6	V	16.72	63.32	83.5	20.18
11060.00	41.12	Ave.	61	1.6	V	16.72	57.84	63.5	5.66
5610 MHz									
5469.59	32.25	PK	206	1.5	V	39.37	71.62	77.7	6.08
5742.44	32.82	PK	48	2.1	V	39.49	72.31	77.7	5.39
11220.00	44.67	PK	250	1.6	V	17.39	62.06	83.5	21.44
11220.00	38.38	Ave.	250	1.6	V	17.39	55.77	63.5	7.73
5690 MHz									
11380.00	47.54	PK	348	1.5	V	17.73	65.27	83.5	18.23
11380.00	41.13	Ave.	348	1.5	V	17.73	58.86	63.5	4.64

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									
5461.23	32.58	PK	16	2.2	V	39.37	71.95	77.7	5.75
5739.40	33.67	PK	326	2.0	V	39.49	73.16	77.7	4.54
11000.00	46.39	PK	21	2.2	V	17.66	64.05	83.5	19.45
11000.00	41.07	Ave.	21	2.2	V	17.66	58.73	63.5	4.77
5580 MHz									
11160.00	47.1	PK	74	1.1	V	17.39	64.49	83.5	19.01
11160.00	41.79	Ave.	74	1.1	V	17.39	59.18	63.5	4.32
5700 MHz									
5468.20	31.9	PK	186	1.4	V	39.37	71.27	77.7	6.43
5726.49	34.73	PK	256	2.1	V	39.49	74.22	77.7	3.48
11400.00	47.85	PK	170	1.9	V	17.73	65.58	83.5	17.92
11400.00	41.26	Ave.	170	1.9	V	17.73	58.99	63.5	4.51
5720 MHz									
11440.00	46.92	PK	261	1.8	V	17.73	64.65	83.5	18.85
11440.00	39.89	Ave.	261	1.8	V	17.73	57.62	63.5	5.88

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)
802.11ax40									
5510 MHz									
5467.73	32.89	PK	7	1.3	V	39.37	72.26	77.7	5.44
5735.02	33.57	PK	157	1.6	V	39.49	73.06	77.7	4.64
11020.00	47.13	PK	27	1.3	V	17.66	64.79	83.5	18.71
11020.00	41.69	Ave.	27	1.3	V	17.66	59.35	63.5	4.15
5550 MHz									
11100.00	46.64	PK	317	1.2	V	16.72	63.36	83.5	20.14
11100.00	40.79	Ave.	317	1.2	V	16.72	57.51	63.5	5.99
5670 MHz									
5461.17	32.06	PK	91	1.2	V	39.37	71.43	77.7	6.27
5748.99	33.75	PK	265	2.3	V	39.49	73.24	77.7	4.46
11340.00	47.83	PK	15	1.5	V	17.43	65.26	83.5	18.24
11340.00	42.06	Ave.	15	1.5	V	17.43	59.49	63.5	4.01
5710 MHz									
11420.00	46.91	PK	77	1.9	V	17.73	64.64	83.5	18.86
11420.00	38.43	Ave.	77	1.9	V	17.73	56.16	63.5	7.34
802.11ax80									
5530 MHz									
5462.93	34.22	PK	37	1.4	V	39.37	73.59	77.7	4.11
5748.99	33.97	PK	288	1.6	V	39.49	73.46	77.7	4.24
11060.00	45.62	PK	130	1.7	V	16.72	62.34	83.5	21.16
11060.00	39.97	Ave.	130	1.7	V	16.72	56.69	63.5	6.81
5610 MHz									
5466.23	32.83	PK	190	1.2	V	39.37	72.20	77.7	5.50
5730.83	34.79	PK	151	1.4	V	39.49	74.28	77.7	3.42
11220.00	47.65	PK	124	2.2	V	17.39	65.04	83.5	18.46
11220.00	40.9	Ave.	124	2.2	V	17.39	58.29	63.5	5.21
5690 MHz									
11380.00	48.23	PK	132	1.2	V	17.73	65.96	83.5	17.54
11380.00	41.79	Ave.	132	1.2	V	17.73	59.52	63.5	3.98

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									
5647.79	30.76	PK	180	2.0	V	39.46	70.22	77.7	7.48
5695.46	32.17	PK	63	2.2	V	39.49	71.66	111.34	39.68
5702.10	41.70	PK	176	1.6	V	39.49	81.19	115.29	34.10
5724.30	46.59	PK	183	1.9	V	39.49	86.08	130.11	44.03
11490.00	43.75	PK	125	2.2	V	17.47	61.22	83.5	22.28
11490.00	32.64	Ave.	125	2.2	V	17.47	50.11	63.5	13.39
5785 MHz									
11570.00	42.83	PK	83	1.8	V	17.51	60.34	83.5	23.16
11570.00	31.14	Ave.	83	1.8	V	17.51	48.65	63.5	14.85
5825 MHz									
5853.18	45.77	PK	166	1.0	V	39.87	85.64	124.44	38.80
5860.73	34.63	PK	74	1.6	V	39.87	74.50	118.69	44.19
5883.52	33.24	PK	126	1.3	V	39.87	73.11	108.4	35.29
5937.38	33.30	PK	100	2.3	V	39.97	73.27	77.7	4.43
11650.00	43.90	PK	102	1.3	V	16.18	60.08	83.5	23.42
11650.00	32.67	Ave.	102	1.3	V	16.18	48.85	63.5	14.65

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)
802.11n20									
5745 MHz									
5647.69	31.25	PK	310	1.1	V	39.46	70.71	77.7	6.99
5695.12	32.28	PK	86	1.5	V	39.49	71.77	111.09	39.32
5719.27	41.89	PK	227	1.8	V	39.49	81.38	120.09	38.71
5724.08	47.15	PK	58	1.8	V	39.49	86.64	129.61	42.97
11490.00	43.69	PK	241	1.3	V	17.47	61.16	83.5	22.34
11490.00	32.76	Ave.	241	1.3	V	17.47	50.23	63.5	13.27
5785 MHz									
11570.00	42.69	PK	10	1.4	V	17.51	60.20	83.5	23.30
11570.00	30.03	Ave.	10	1.4	V	17.51	47.54	63.5	15.96
5825 MHz									
5854.12	49.43	PK	78	1.7	V	39.87	89.30	122.3	33.00
5858.53	33.17	PK	150	1.6	V	39.87	73.04	119.31	46.27
5879.06	33.25	PK	96	2.4	V	39.87	73.12	111.69	38.57
5931.41	33.22	PK	128	2.2	V	39.97	73.19	77.7	4.51
11650.00	43.52	PK	239	1.5	V	16.18	59.70	83.5	23.80
11650.00	32.90	Ave.	239	1.5	V	16.18	49.08	63.5	14.42
802.11n40									
5755 MHz									
5646.01	31.11	PK	183	1.7	V	39.46	70.57	77.7	7.13
5699.54	38.29	PK	171	1.7	V	39.49	77.78	114.36	36.58
5700.44	47.05	PK	165	2.3	V	39.49	86.54	114.82	28.28
5723.64	52.39	PK	244	1.1	V	39.49	91.88	128.6	36.72
11510.00	43.11	PK	162	2.2	V	17.47	60.58	83.5	22.92
11510.00	31.17	Ave.	162	2.2	V	17.47	48.64	63.5	14.86
5795 MHz									
5854.31	36.47	PK	283	1.1	V	39.87	76.34	121.86	45.52
5856.08	34.82	PK	333	2.1	V	39.87	74.69	120	45.31
5885.18	33.28	PK	334	1.6	V	39.87	73.15	107.17	34.02
5930.05	32.87	PK	189	1.9	V	39.97	72.84	77.7	4.86
11590.00	43.60	PK	260	1.3	V	17.51	61.11	83.5	22.39
11590.00	30.69	Ave.	260	1.3	V	17.51	48.20	63.5	15.30

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)
802.11ac20									
5745 MHz									
5646.42	31.58	PK	224	1.3	V	39.46	71.04	77.7	6.66
5698.10	33.14	PK	11	1.6	V	39.49	72.63	113.29	40.66
5710.13	43.21	PK	293	1.9	V	39.49	82.70	117.54	34.84
5722.90	48.62	PK	317	1.8	V	39.49	88.11	126.91	38.80
11490.00	43.75	PK	356	2.1	V	17.47	61.22	83.5	22.28
11490.00	32.57	Ave.	356	2.1	V	17.47	50.04	63.5	13.46
5785 MHz									
11570.00	43.19	PK	173	1.3	V	17.51	60.70	83.5	22.80
11570.00	31.21	Ave.	173	1.3	V	17.51	48.72	63.5	14.78
5825 MHz									
5854.25	48.77	PK	358	2.4	V	39.87	88.64	122.01	33.37
5854.52	35.07	PK	180	1.7	V	39.87	74.94	120.43	45.49
5877.26	33.24	PK	291	1.7	V	39.87	73.11	113.03	39.92
5933.61	32.28	PK	340	2.0	V	39.97	72.25	77.7	5.45
11650.00	43.61	PK	66	1.7	V	16.18	59.79	83.5	23.71
11650.00	32.92	Ave.	66	1.7	V	16.18	49.10	63.5	14.40
802.11ac40									
5755 MHz									
5645.39	32.48	PK	12	1.7	V	39.46	71.94	77.7	5.76
5699.86	37.56	PK	289	2.2	V	39.49	77.05	114.6	37.55
5718.39	47.26	PK	251	2.4	V	39.49	86.75	119.85	33.10
5722.36	50.29	PK	229	1.3	V	39.49	89.78	125.68	35.90
11510.00	43.33	PK	317	1.1	V	17.47	60.80	83.5	22.70
11510.00	30.52	Ave.	317	1.1	V	17.47	47.99	63.5	15.51
5795 MHz									
5853.30	38.91	PK	85	2.3	V	39.87	78.78	124.17	45.39
5862.07	33.83	PK	69	1.1	V	39.87	73.70	118.32	44.62
5886.43	34.55	PK	193	1.5	V	39.87	74.42	106.24	31.82
5939.22	31.94	PK	169	2.4	V	39.97	71.91	77.7	5.79
11590.00	43.28	PK	315	1.2	V	17.51	60.79	83.5	22.71
11590.00	30.66	Ave.	315	1.2	V	17.51	48.17	63.5	15.33

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)
802.11ac80									
5775 MHz									
5648.11	30.73	PK	143	1.7	V	39.46	70.19	77.7	7.51
5699.38	35.92	PK	19	1.2	V	39.49	75.41	114.24	38.83
5715.33	44.41	PK	158	1.3	V	39.49	83.90	118.99	35.09
5724.76	46.48	PK	275	1.2	V	39.49	85.97	131.15	45.18
5854.83	38.91	PK	313	1.4	V	39.87	78.78	120.7	41.92
5858.69	42.28	PK	300	2.4	V	39.87	82.15	119.27	37.12
5888.64	37.23	PK	153	2.3	V	39.87	77.10	104.61	27.51
5935.89	31.65	PK	270	2.4	V	39.97	71.62	77.7	6.08
11550.00	43.51	PK	231	2.4	V	17.51	61.02	83.5	22.48
11550.00	30.68	Ave.	231	2.4	V	17.51	48.19	63.5	15.31
802.11ax20									
5745 MHz									
5644.32	32.13	PK	152	2.0	V	39.46	71.59	77.7	6.11
5697.03	33.21	PK	252	1.1	V	39.49	72.70	112.5	39.80
5702.89	45.29	PK	327	2.3	V	39.49	84.78	115.51	30.73
5724.12	48.62	PK	94	1.7	V	39.49	88.11	129.7	41.59
11490.00	43.85	PK	140	2.3	V	17.47	61.32	83.5	22.18
11490.00	32.96	Ave.	140	2.3	V	17.47	50.43	63.5	13.07
5785 MHz									
11570.00	43.88	PK	240	1.2	V	17.51	61.39	83.5	22.11
11570.00	31.57	Ave.	240	1.2	V	17.51	49.08	63.5	14.42
5825 MHz									
5852.88	40.39	PK	39	1.1	V	39.87	80.26	125.14	44.88
5864.07	33.96	PK	263	1.2	V	39.87	73.83	117.76	43.93
5887.17	32.66	PK	125	1.0	V	39.87	72.53	105.69	33.16
5934.36	32.14	PK	220	1.1	V	39.97	72.11	77.7	5.59
11650.00	43.64	PK	217	2.4	V	16.18	59.82	83.5	23.68
11650.00	32.68	Ave.	217	2.4	V	16.18	48.86	63.5	14.64

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)
802.11ax40									
5755 MHz									
5645.61	31.85	PK	86	2.0	V	39.46	71.31	77.7	6.39
5695.50	37.58	PK	251	1.5	V	39.49	77.07	111.37	34.30
5717.49	49.55	PK	27	2.1	V	39.49	89.04	119.6	30.56
5723.22	53.24	PK	255	1.4	V	39.49	92.73	127.65	34.92
11510.00	43.96	PK	198	2.2	V	17.47	61.43	83.5	22.07
11510.00	30.72	Ave.	198	2.2	V	17.47	48.19	63.5	15.31
5795 MHz									
5854.45	37.75	PK	105	1.9	V	39.87	77.62	121.56	43.94
5861.75	33.91	PK	197	1.9	V	39.87	73.78	118.41	44.63
5889.68	34.05	PK	221	1.8	V	39.87	73.92	103.84	29.92
5937.79	32.28	PK	136	1.1	V	39.97	72.25	77.7	5.45
11590.00	43.81	PK	228	1.4	V	17.51	61.32	83.5	22.18
11590.00	30.68	Ave.	228	1.4	V	17.51	48.19	63.5	15.31
802.11ax80									
5775 MHz									
5648.69	31.72	PK	137	1.5	V	39.46	71.18	77.7	6.52
5696.77	36.14	PK	108	2.0	V	39.49	75.63	112.31	36.68
5718.14	46.85	PK	154	1.7	V	39.49	86.34	119.78	33.44
5723.19	48.22	PK	19	1.7	V	39.49	87.71	127.56	39.85
5852.61	40.21	PK	131	2.0	V	39.87	80.08	125.75	45.67
5856.27	40.28	PK	160	2.2	V	39.87	80.15	119.94	39.79
5885.66	36.54	PK	88	2.4	V	39.87	76.41	106.81	30.40
5939.86	32.19	PK	99	1.6	V	39.97	72.16	77.7	5.54
11550.00	43.95	PK	353	1.7	V	17.51	61.46	83.5	22.04
11550.00	30.87	Ave.	353	1.7	V	17.51	48.38	63.5	15.12

Note:

Corrected Amplitude = Corrected Factor + Reading

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

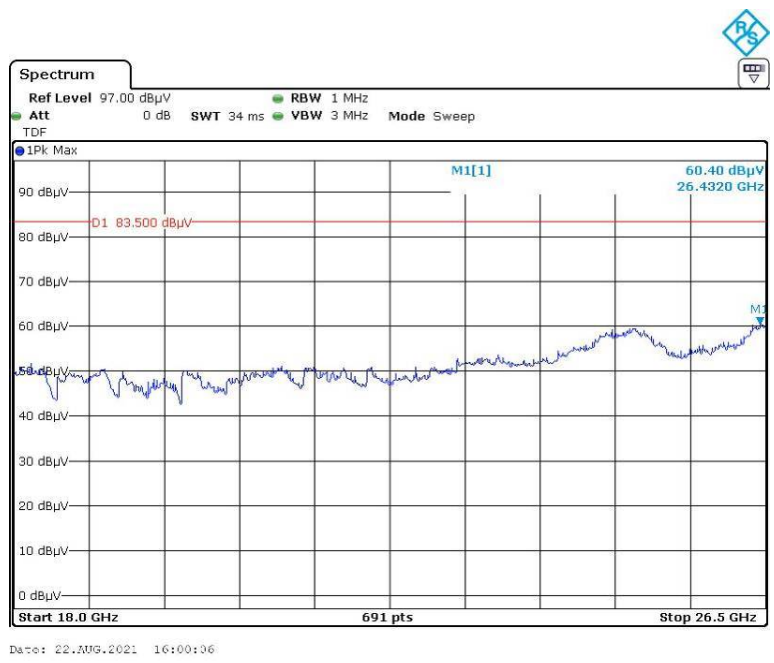
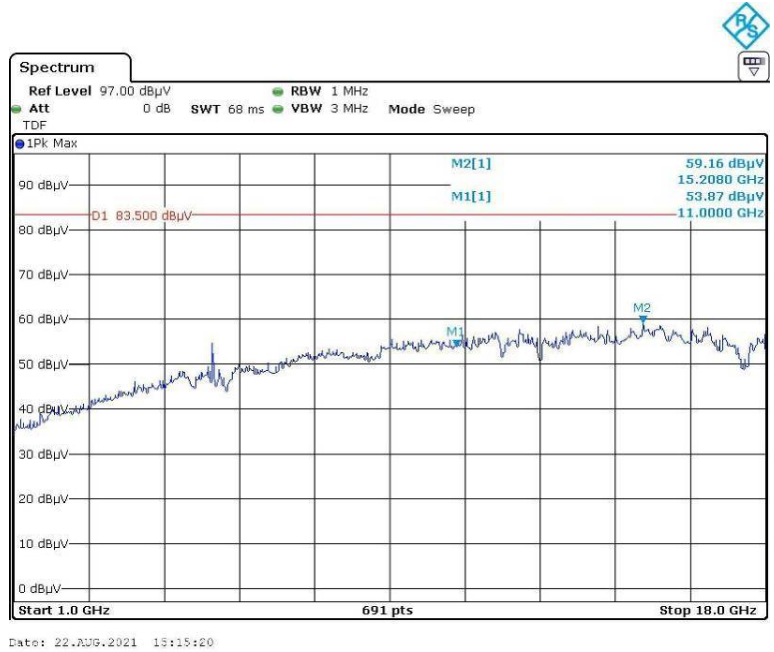
Margin = Limit- Corr. Amplitude

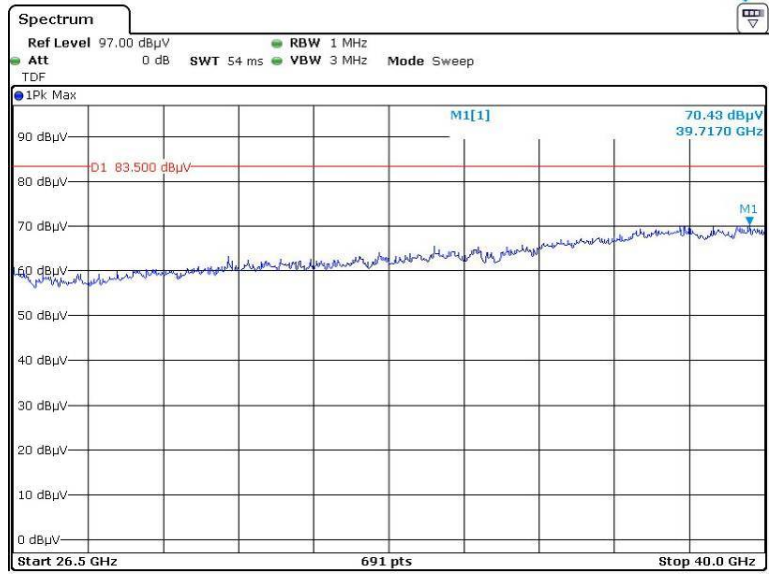
All other spurious emissions are 20 dB below the limit or are on the system noise floor level.

2.4G Wi-Fi (802.11b mode, 2462MHz) & 5G Wi-Fi (802.11n20 mode, 5500MHz) Simultaneously Transmission

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Test Distance (m)
	Reading (dBµV)	PK/QP/Ave.		Height (m)	Polar (H/V)					
193.7	23.29	QP	78	1.6	H	-11.8	35.09	43.5	8.41	3
193.7	25.57	QP	325	2.2	V	-11.8	37.37	43.5	6.13	3
4924.00	45.70	PK	50	2.4	V	6.76	52.46	74	21.54	3
4924.00	36.99	Ave.	50	2.4	V	6.76	43.75	54	10.25	3
11000.00	47.68	PK	104	1.5	V	17.66	65.34	83.5	18.16	1
11000.00	42.79	Ave.	104	1.5	V	17.66	60.45	63.5	3.05	1

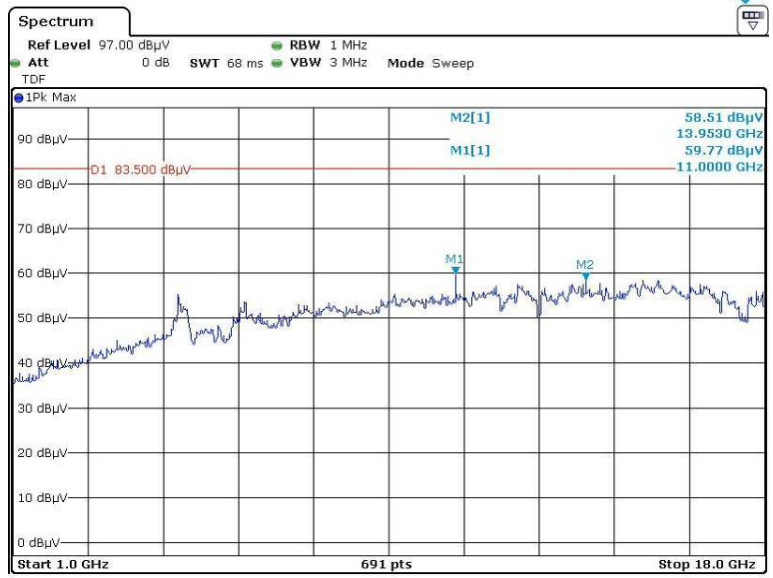
Peak Pre-scan with 802.11n20 5500MHz Horizontal



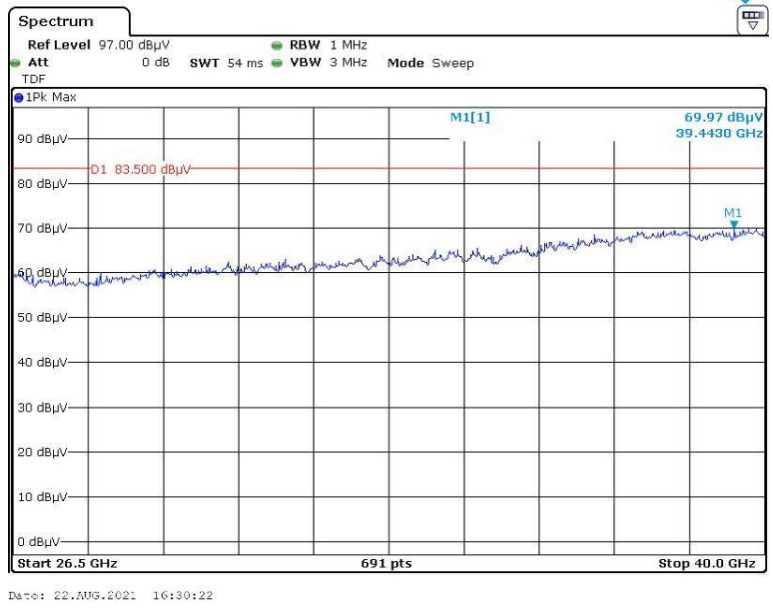
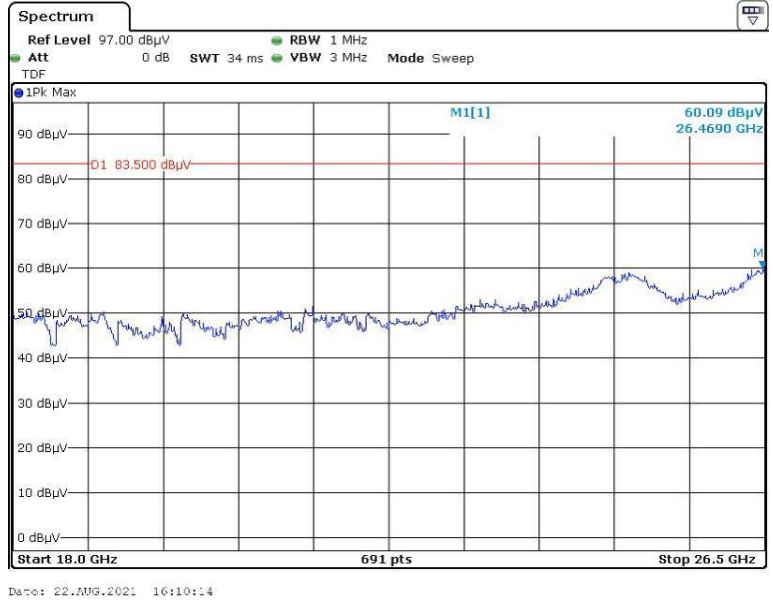


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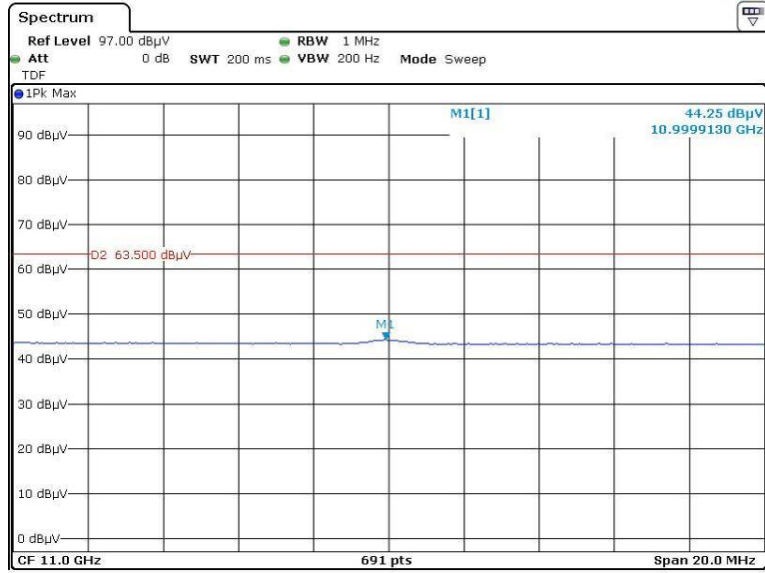
Vertical



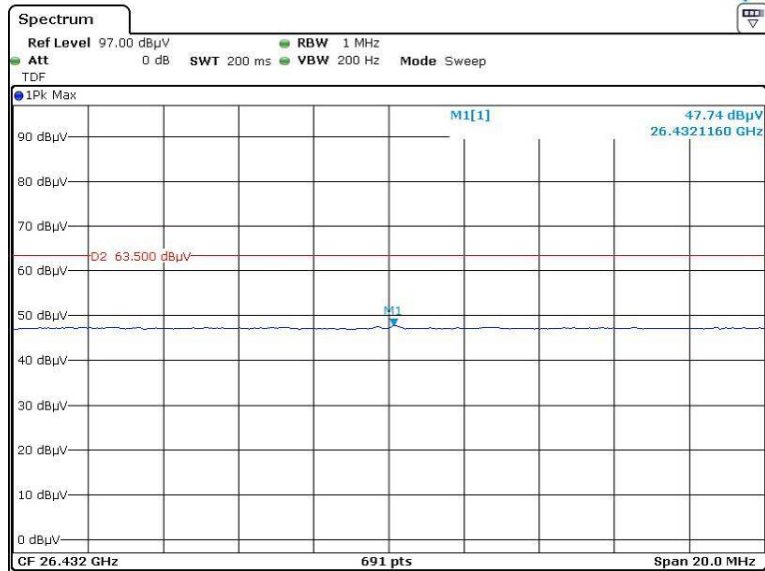
Date: 22.AUG.2021 15:25:05



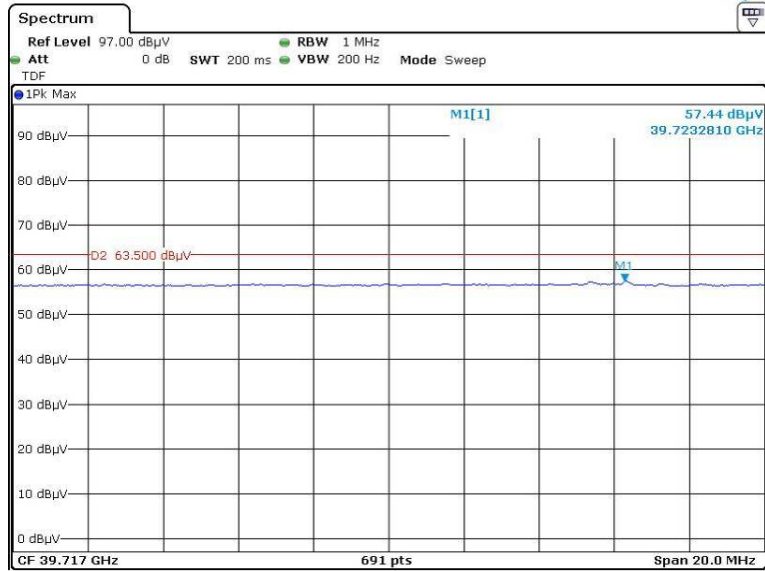
Average Horizontal



Date: 22.AUG.2021 15:20:28

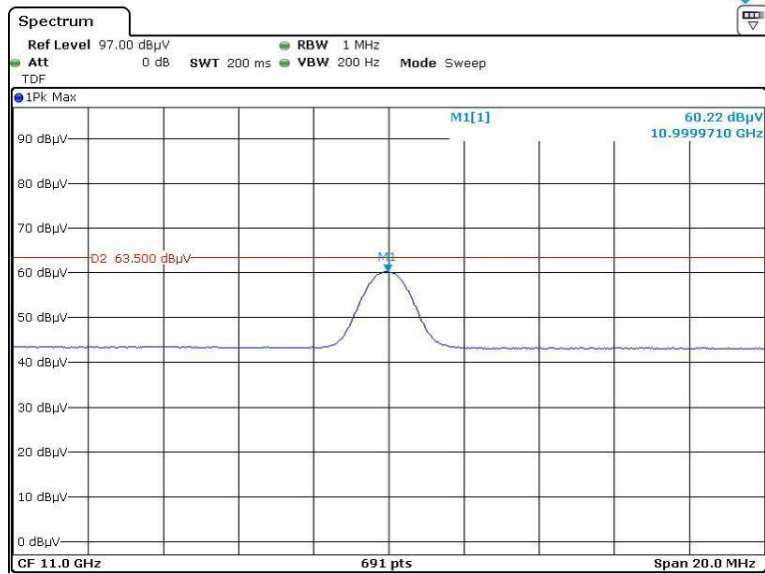


Date: 22.AUG.2021 16:05:08

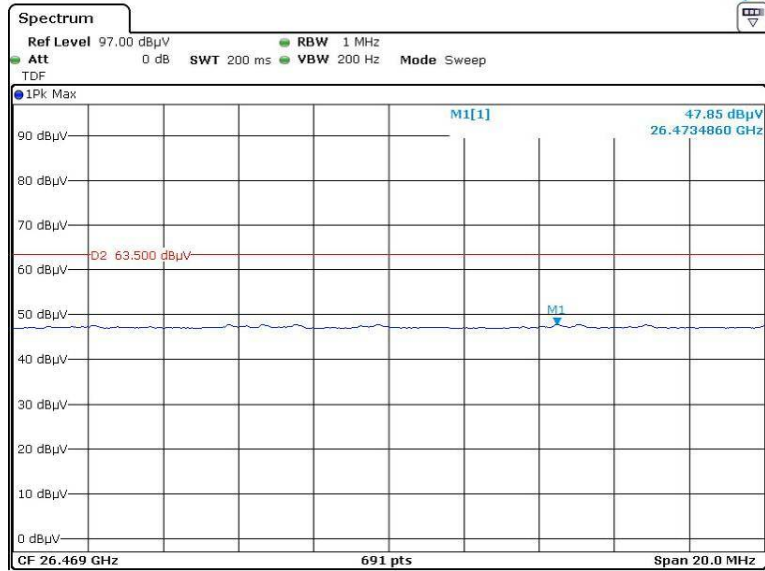


Date: 22.AUG.2021 16:25:27

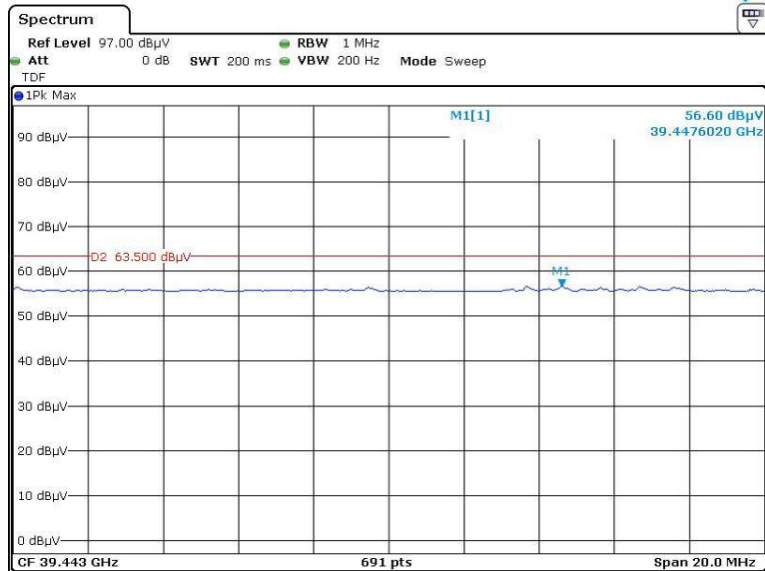
Vertical



Date: 22.AUG.2021 15:30:20



Date: 22.May.2021 16:15:19



Date: 22.May.2021 16:34:51

FCC §15.407(a),(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

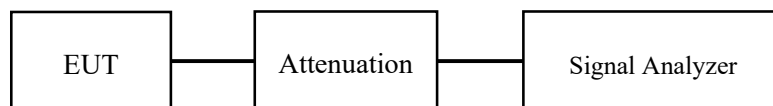
1. Emission Bandwidth (EBW)

- Set RBW = approximately 1% of the emission bandwidth.
- Set the VBW > RBW.
- Detector = Peak.
- Trace mode = max hold.
- 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:

- Set RBW = 100 kHz.
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Allow the trace to stabilize.
- 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

Temperature:	25 °C
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

The testing was performed by Carl Yang from 2021-08-25 to 2021-09-04.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the Appendix.

FCC §15.407(a) – 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.

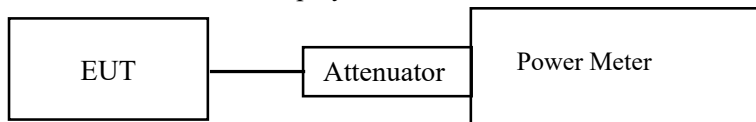
For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting 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

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



Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

The testing was performed by Carl Yang from 2021-08-25 to 2021-09-07.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the Appendix.

FCC §15.407(a) - 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 ($< 1 \text{ MHz}$, or $< 500 \text{ kHz}$) and integrated over 1 MHz, or 500 kHz bandwidth, the following adjustments to the procedures apply:

- a) Set $\text{RBW} \geq 1/T$, where T is defined in section II.B.1.a).
- b) Set $\text{VBW} \geq 3 \text{ RBW}$.
- c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add $10 \log (500 \text{ kHz}/\text{RBW})$ 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 $10 \log (1\text{MHz}/\text{RBW})$ 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

Temperature:	25 °C
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

The testing was performed by Carl Yang from 2021-08-25 to 2021-09-07.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the Appendix.

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

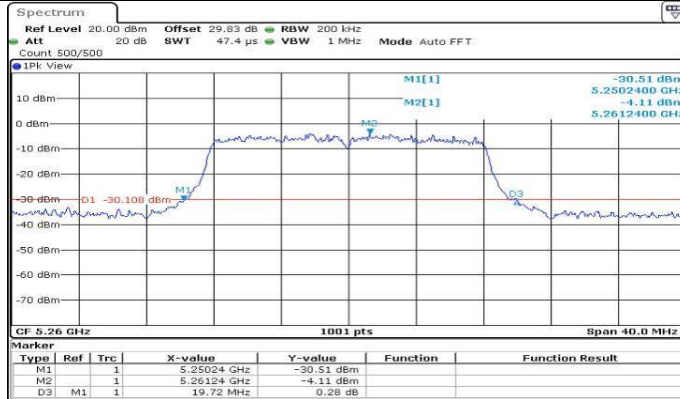
TestMode	Antenna	Channel	26db EBW [MHz]	Limit[MHz]	Verdict
11A-CDD	Ant1	5180	19.120	---	PASS
	Ant1	5200	19.280	---	PASS
	Ant1	5240	19.120	---	PASS
	Ant1	5260	19.720	---	PASS
	Ant1	5280	20.040	---	PASS
	Ant1	5320	19.400	---	PASS
	Ant1	5500	19.600	---	PASS
	Ant1	5580	19.720	---	PASS
	Ant1	5700	19.840	---	PASS
11N20MIMO	Ant1	5720	19.480	---	PASS
	Ant1	5180	20.160	---	PASS
	Ant1	5200	20.200	---	PASS
	Ant1	5240	20.120	---	PASS
	Ant1	5260	21.480	---	PASS
	Ant1	5280	20.960	---	PASS
	Ant1	5320	21.480	---	PASS
	Ant1	5500	20.680	---	PASS
	Ant1	5580	21.080	---	PASS
11N40MIMO	Ant1	5700	21.440	---	PASS
	Ant1	5720	22.000	---	PASS
	Ant1	5190	40.800	---	PASS
	Ant1	5230	40.240	---	PASS
	Ant1	5270	41.360	---	PASS
	Ant1	5310	40.960	---	PASS
	Ant1	5510	41.120	---	PASS
11AC20MIMO	Ant1	5550	41.680	---	PASS
	Ant1	5670	41.680	---	PASS
	Ant1	5710	41.360	---	PASS
	Ant1	5180	20.440	---	PASS
	Ant1	5200	20.160	---	PASS
	Ant1	5240	20.600	---	PASS
	Ant1	5260	22.120	---	PASS
	Ant1	5280	20.800	---	PASS
	Ant1	5320	20.920	---	PASS
11AC40MIMO	Ant1	5500	21.160	---	PASS
	Ant1	5580	21.240	---	PASS
	Ant1	5700	21.000	---	PASS
	Ant1	5720	20.760	---	PASS
	Ant1	5190	40.560	---	PASS
	Ant1	5230	40.720	---	PASS
	Ant1	5270	41.680	---	PASS
11AC80MIMO	Ant1	5310	40.720	---	PASS
	Ant1	5510	40.800	---	PASS
	Ant1	5550	41.440	---	PASS
	Ant1	5670	41.280	---	PASS
	Ant1	5710	65.280	---	PASS
	Ant1	5210	81.760	---	PASS
	Ant1	5290	82.560	---	PASS
11AC80MIMO	Ant1	5530	83.040	---	PASS
	Ant1	5610	82.240	---	PASS
	Ant1	5690	83.520	---	PASS

11AX20MIMO	Ant1	5180	20.880	---	PASS
	Ant1	5200	20.800	---	PASS
	Ant1	5240	21.240	---	PASS
	Ant1	5260	21.320	---	PASS
	Ant1	5280	21.080	---	PASS
	Ant1	5320	21.280	---	PASS
	Ant1	5500	20.760	---	PASS
	Ant1	5580	21.640	---	PASS
	Ant1	5700	24.280	---	PASS
11AX40MIMO	Ant1	5720	21.640	---	PASS
	Ant1	5190	41.280	---	PASS
	Ant1	5230	41.120	---	PASS
	Ant1	5270	41.200	---	PASS
	Ant1	5310	41.600	---	PASS
	Ant1	5510	41.200	---	PASS
	Ant1	5550	41.360	---	PASS
	Ant1	5670	42.000	---	PASS
11AX80MIMO	Ant1	5710	41.600	---	PASS
	Ant1	5210	82.400	---	PASS
	Ant1	5290	83.360	---	PASS
	Ant1	5530	83.040	---	PASS
	Ant1	5610	82.400	---	PASS
	Ant1	5690	82.880	---	PASS

Test Graphs

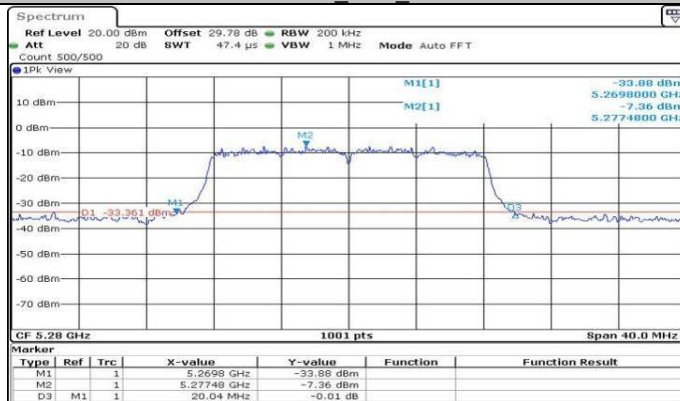


11A-CDD Ant1 5260



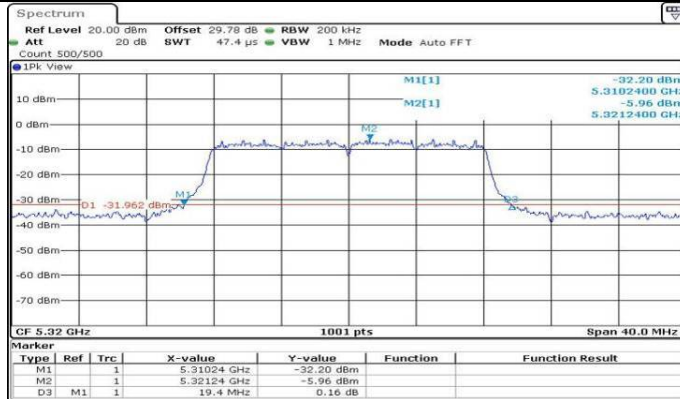
Date: 28.AUG.2021 15:24:37

11A-CDD Ant1 5280



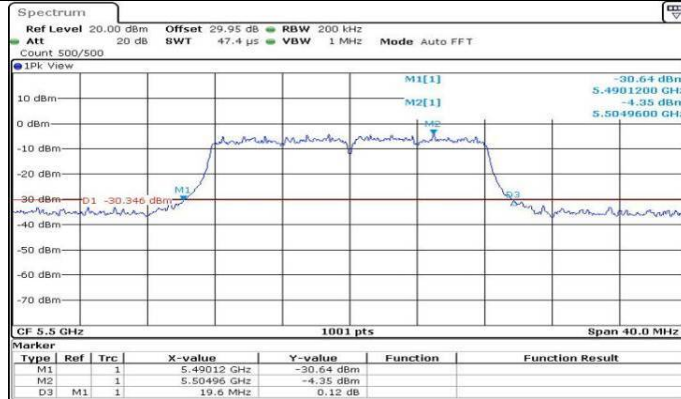
Date: 31.AUG.2021 16:14:59

11A-CDD Ant1 5320

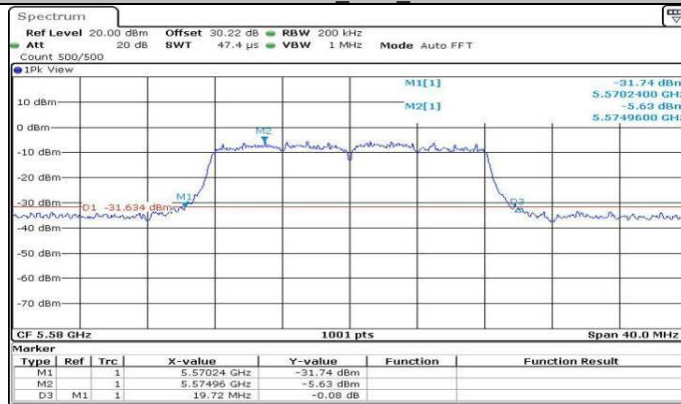


Date: 31.AUG.2021 16:32:23

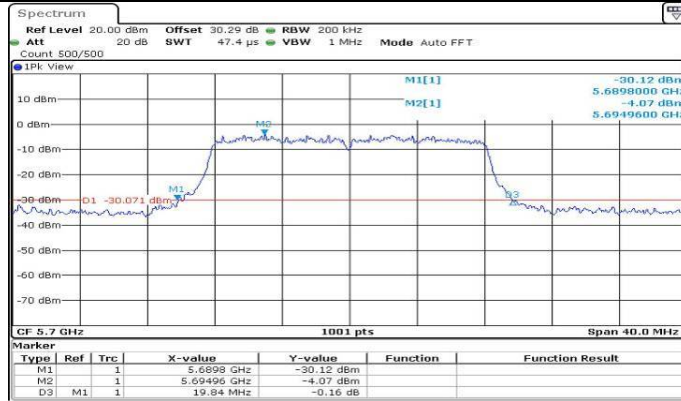
11A-CDD Ant1 5500



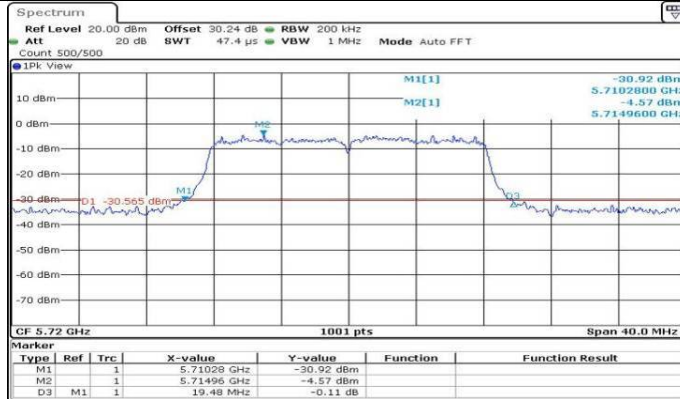
11A-CDD Ant1 5580



11A-CDD Ant1 5700

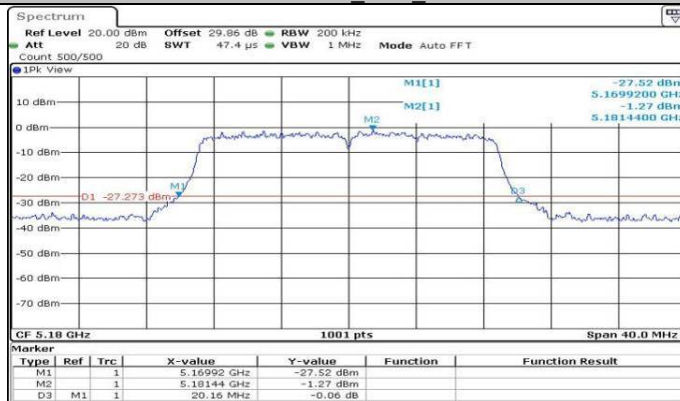


11A-CDD Ant1 5720



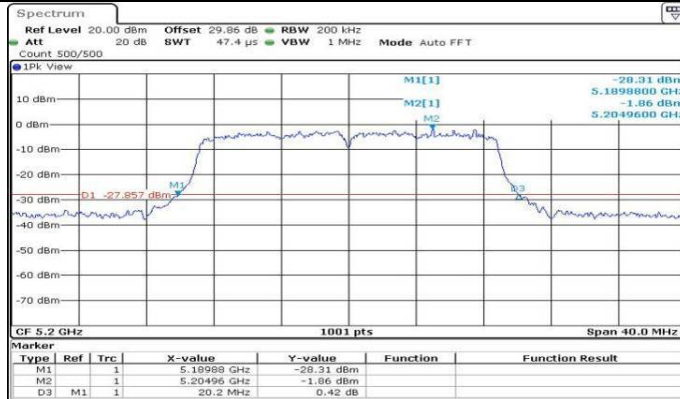
Date: 4.SEP.2021 17:37:57

11N20MIMO Ant1 5180



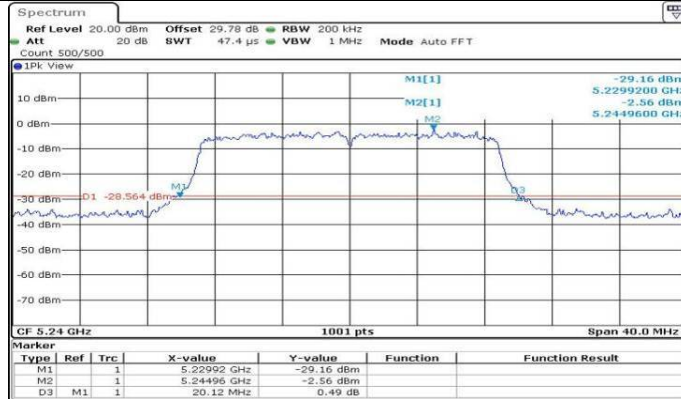
Date: 28.AUG.2021 15:33:57

11N20MIMO Ant1 5200

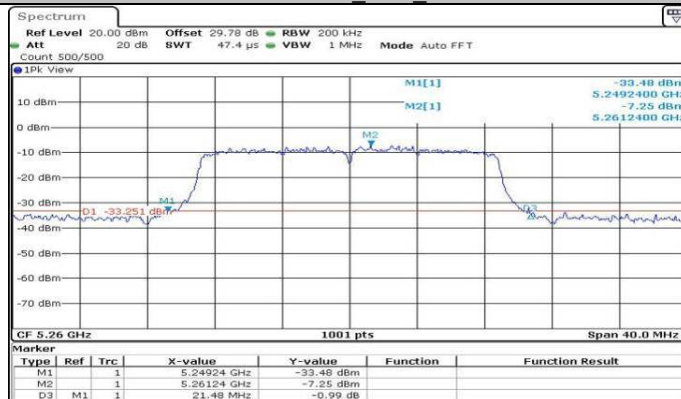


Date: 28.AUG.2021 15:44:02

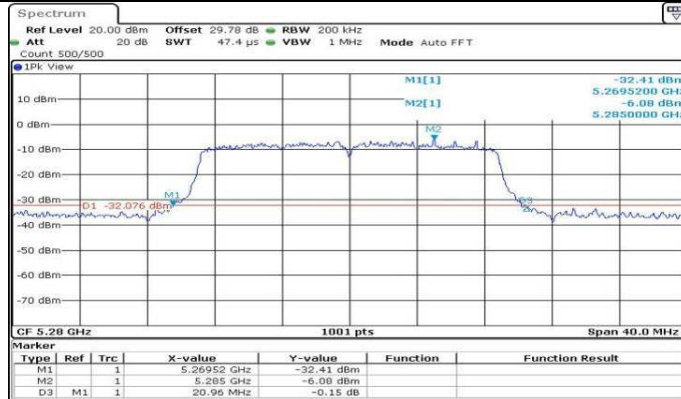
11N20MIMO Ant1 5240



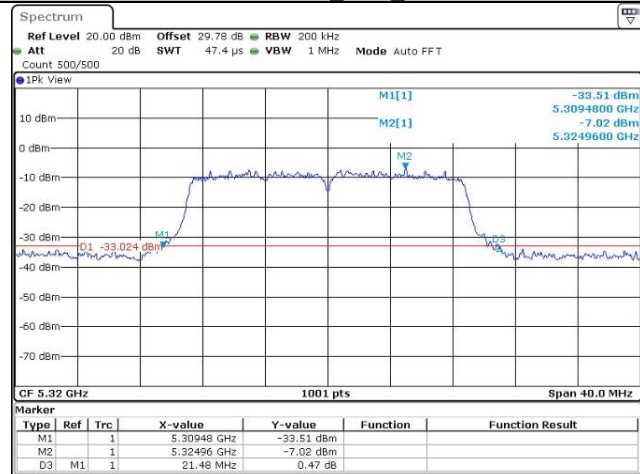
11N20MIMO Ant1 5260



11N20MIMO Ant1 5280

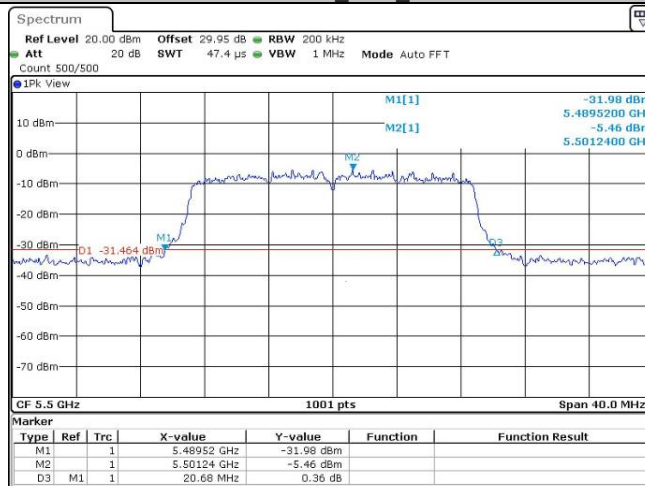


11N20MIMO Ant1 5320



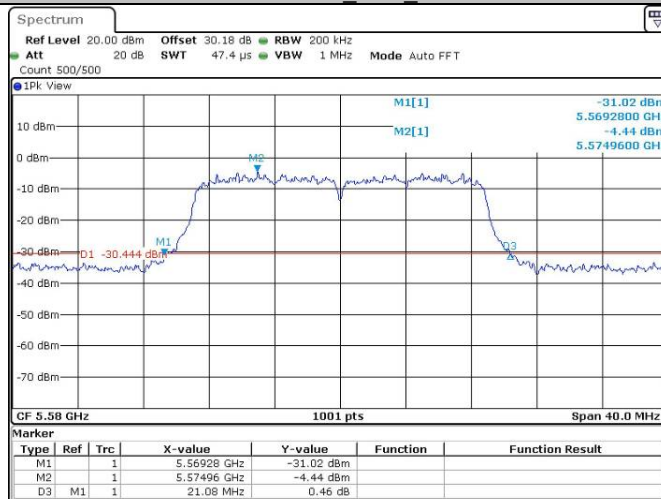
Date: 3.SEP.2021 09:51:57

11N20MIMO Ant1 5500



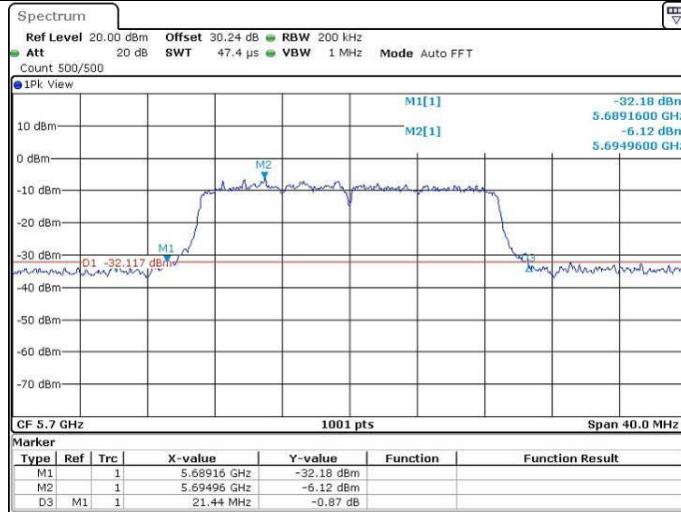
Date: 3.SEP.2021 10:00:23

11N20MIMO Ant1 5580

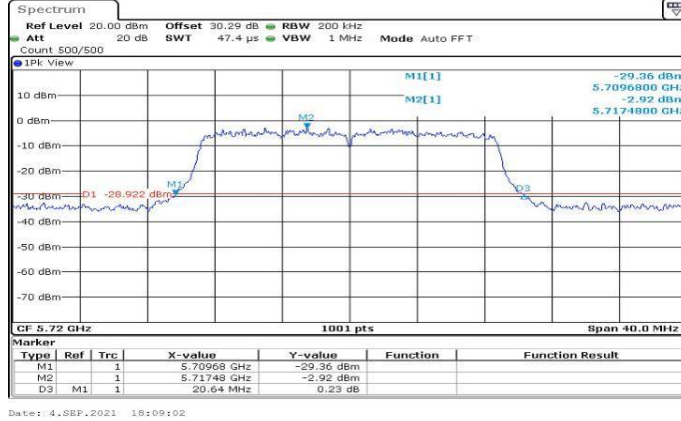


Date: 3.SEP.2021 10:08:02

11N20MIMO Ant1 5700



11N20MIMO Ant1 5720



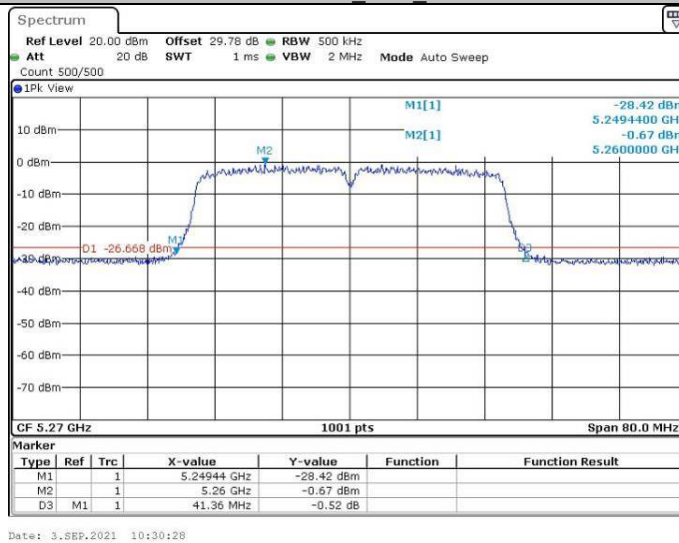
11N40MIMO Ant1 5190



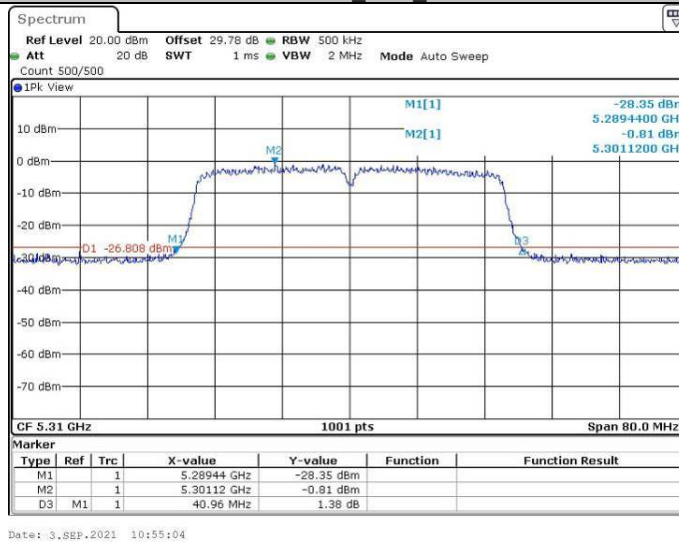
11N40MIMO Ant1 5230



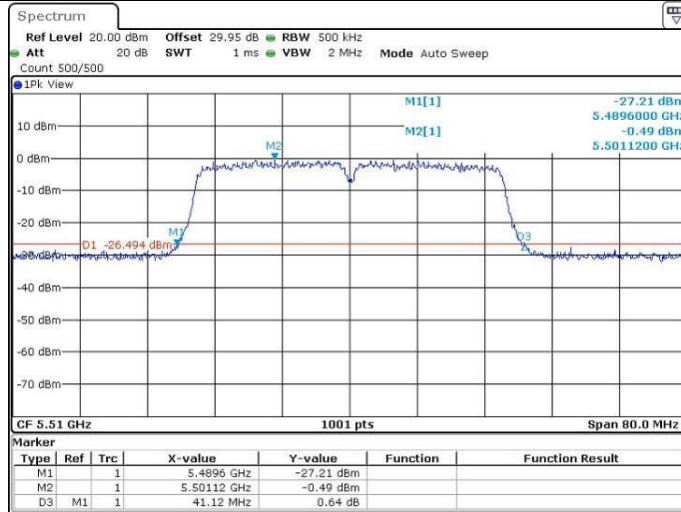
11N40MIMO Ant1 5270



11N40MIMO Ant1 5310

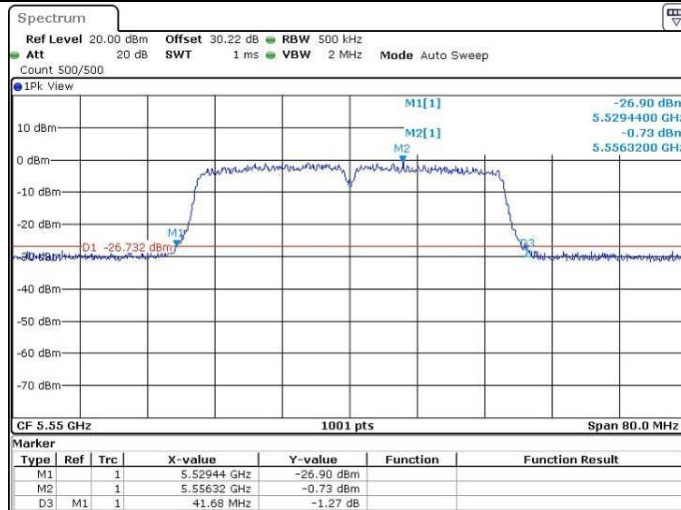


11N40MIMO Ant1_5510



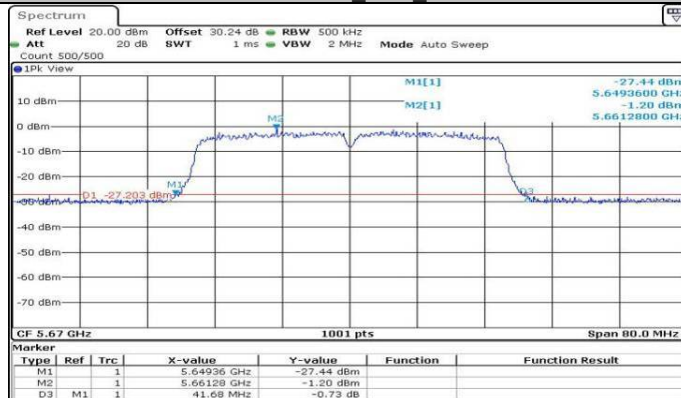
Date: 3.SEP.2021 11:07:52

11N40MIMO Ant1_5550



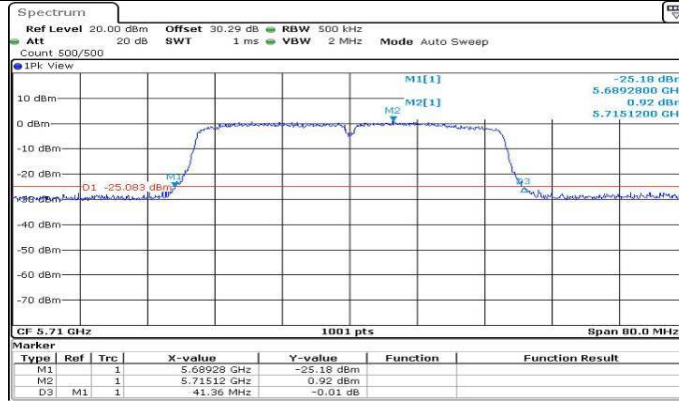
Date: 3.SEP.2021 11:16:19

11N40MIMO Ant1_5670

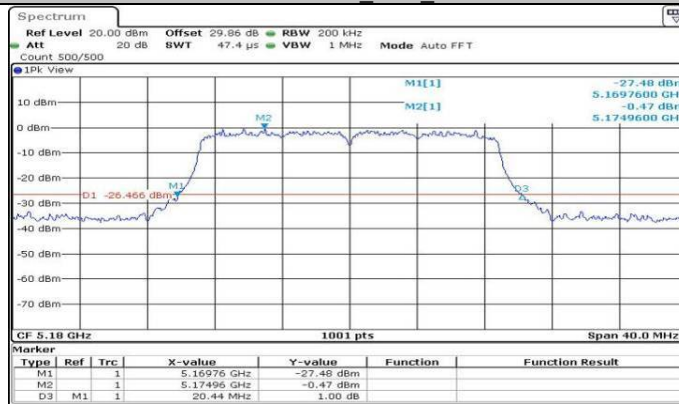


Date: 1.SEP.2021 11:37:11

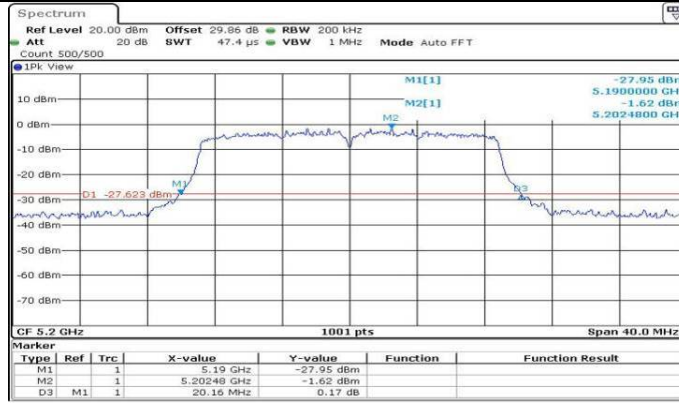
11N40MIMO Ant1 5710



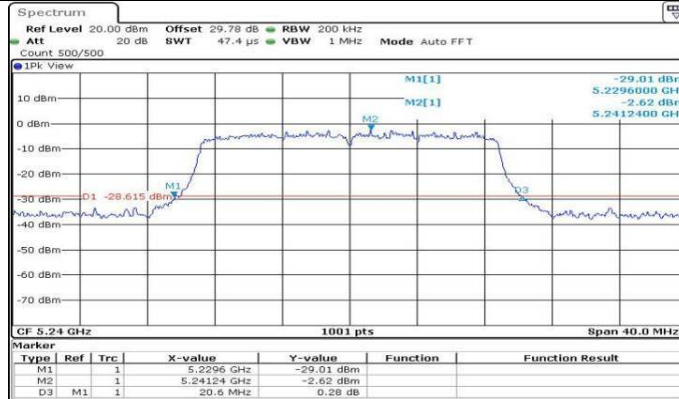
11AC20MIMO Ant1 5180



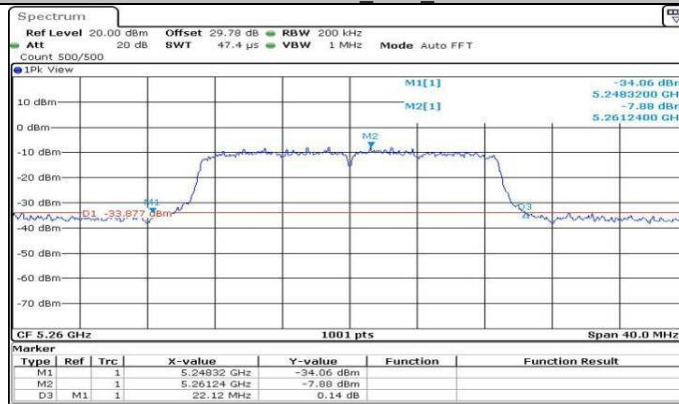
11AC20MIMO Ant1 5200



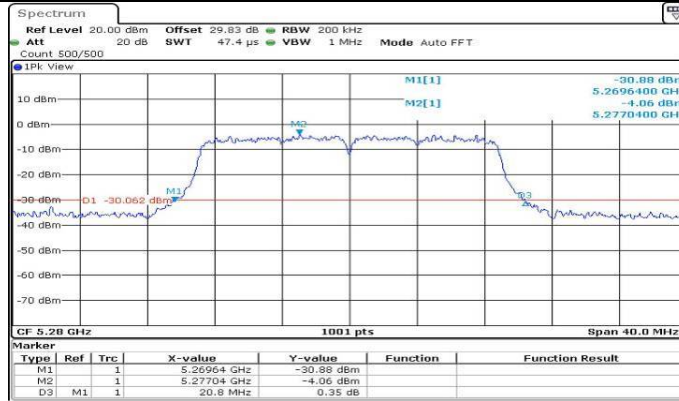
11AC20MIMO Ant1 5240



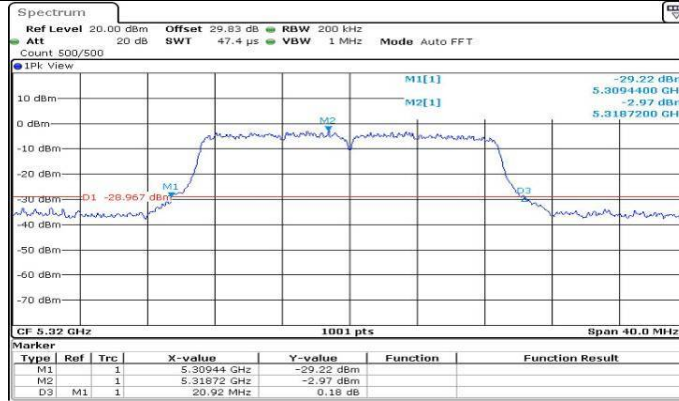
11AC20MIMO Ant1 5260



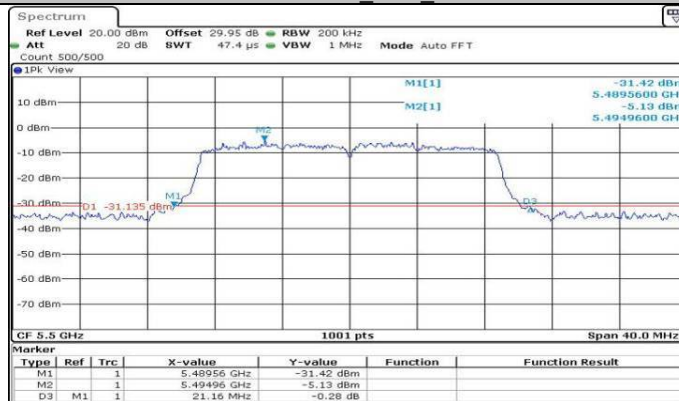
11AC20MIMO Ant1 5280



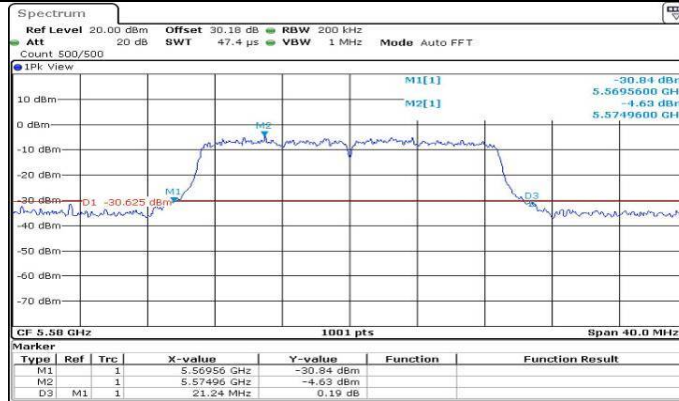
11AC20MIMO Ant1 5320



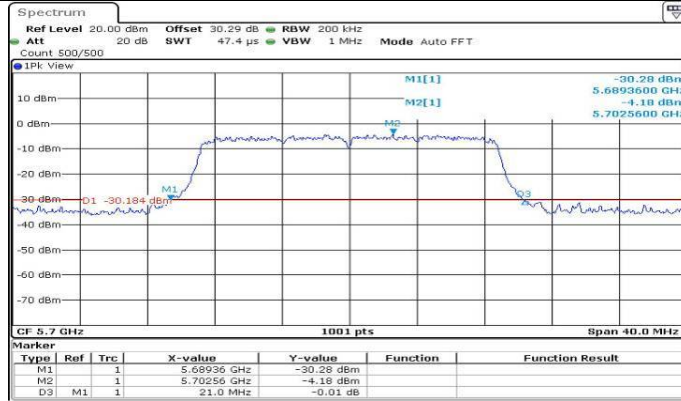
11AC20MIMO Ant1 5500



11AC20MIMO Ant1 5580

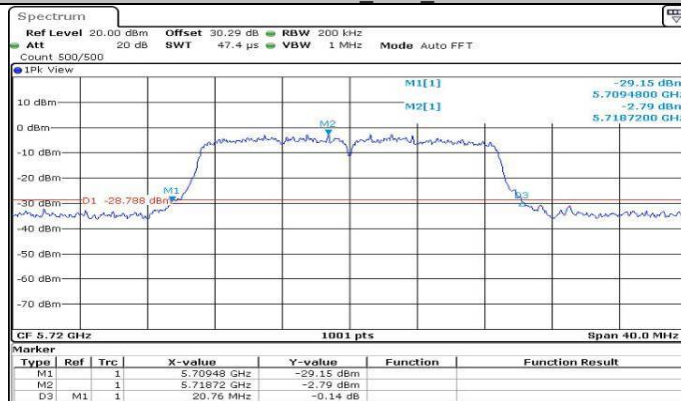


11AC20MIMO Ant1 5700



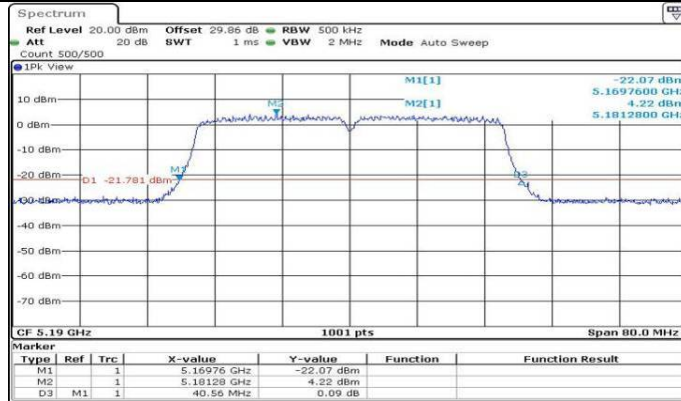
Date: 1.SEP.2021 14:01:12

11AC20MIMO Ant1_5720



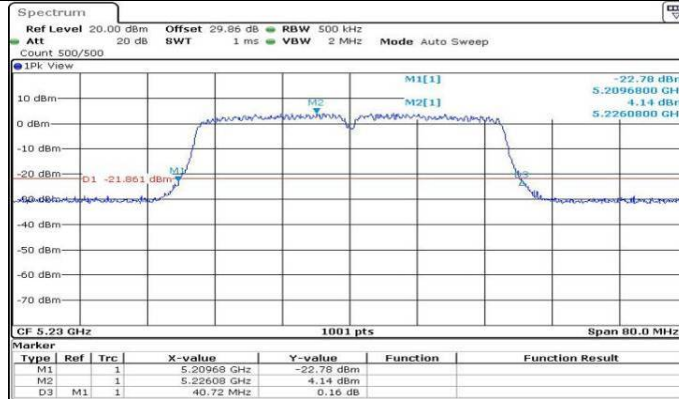
Date: 4.SEP.2021 18:18:19

11AC40MIMO Ant1 5190



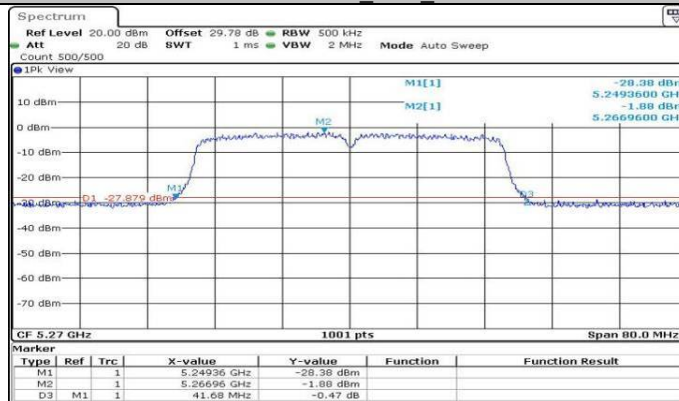
Date: 28.AUG.2021 17:14:53

11AC40MIMO Ant1 5230



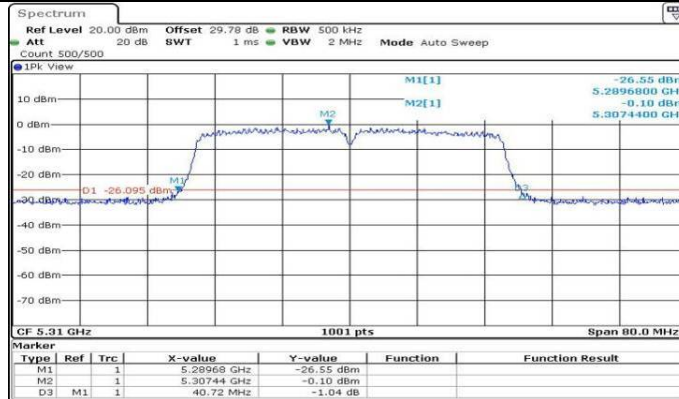
Date: 30.AUG.2021 15:24:34

11AC40MIMO Ant1 5270



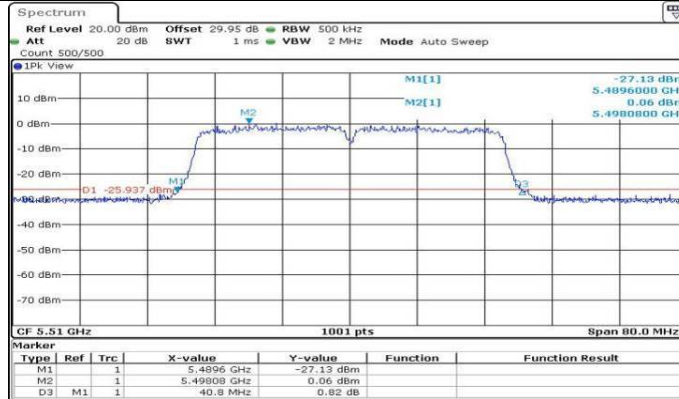
Date: 1.SEP.2021 14:08:45

11AC40MIMO Ant1 5310



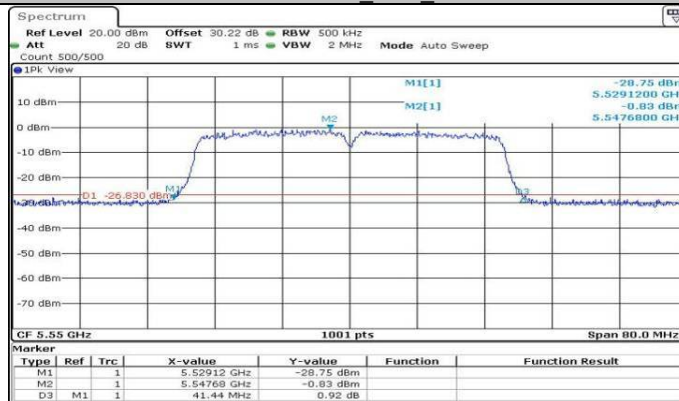
Date: 1.SEP.2021 14:20:13

11AC40MIMO Ant1 5510



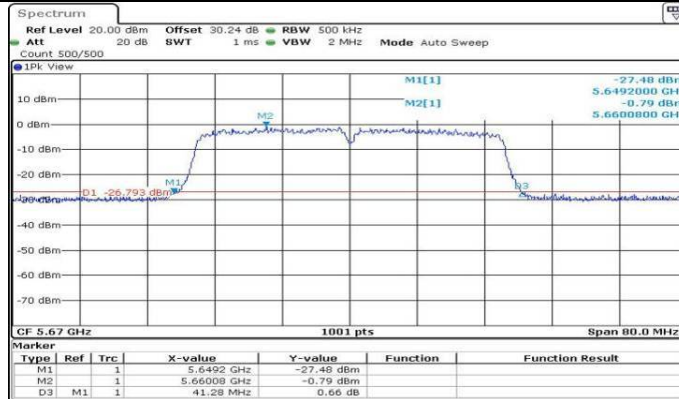
Date: 1.SEP.2021 14:28:21

11AC40MIMO Ant1 5550



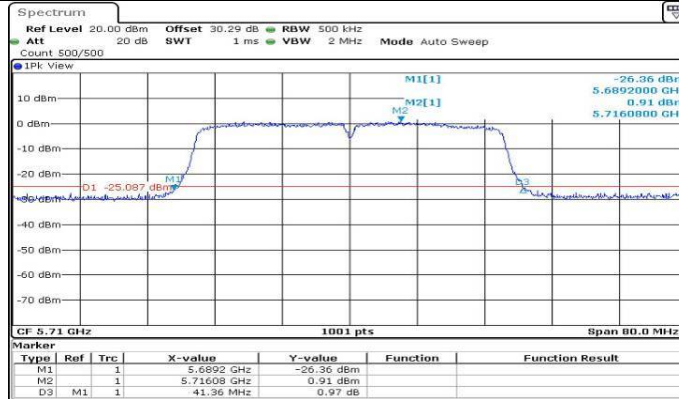
Date: 1.SEP.2021 14:35:12

11AC40MIMO Ant1 5670

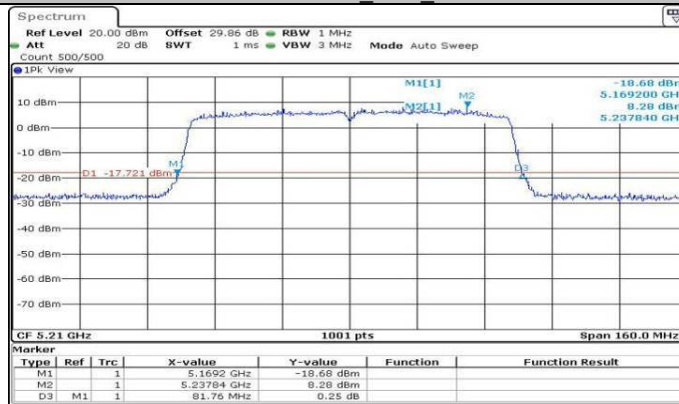


Date: 25.AUG.2021 15:24:03

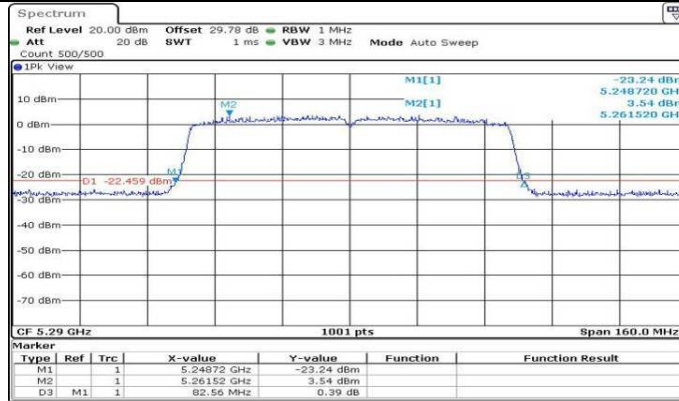
11AC40MIMO Ant1 5710



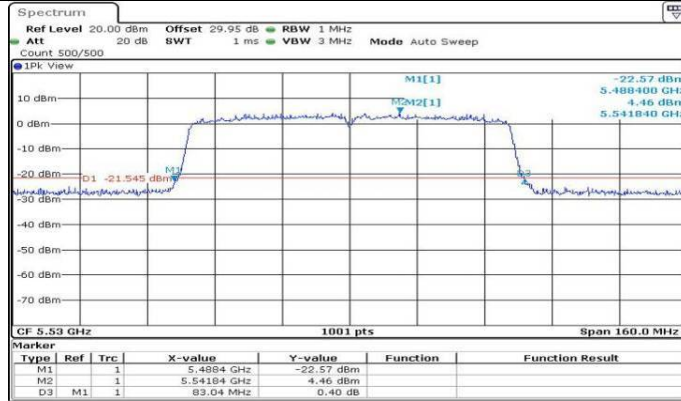
11AC80MIMO Ant1 5210



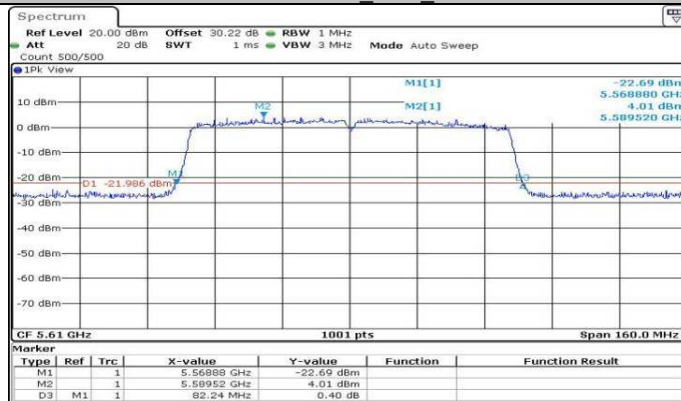
11AC80MIMO Ant1 5290



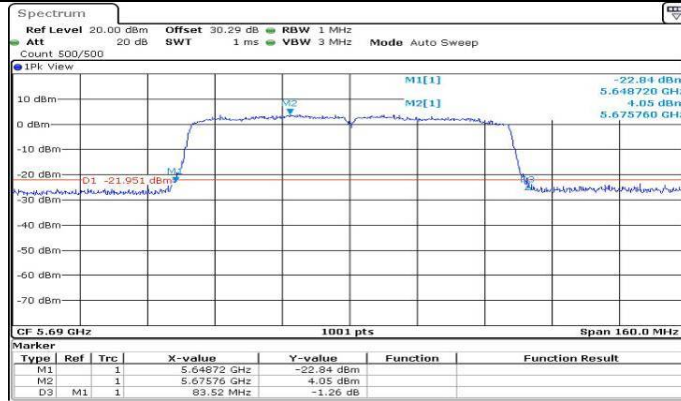
11AC80MIMO Ant1 5530



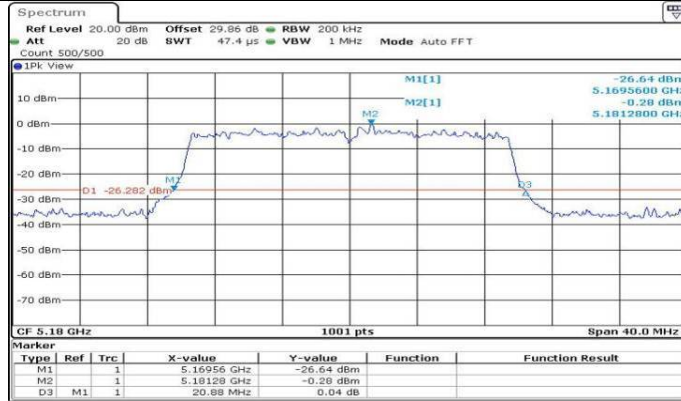
11AC80MIMO Ant1 5610



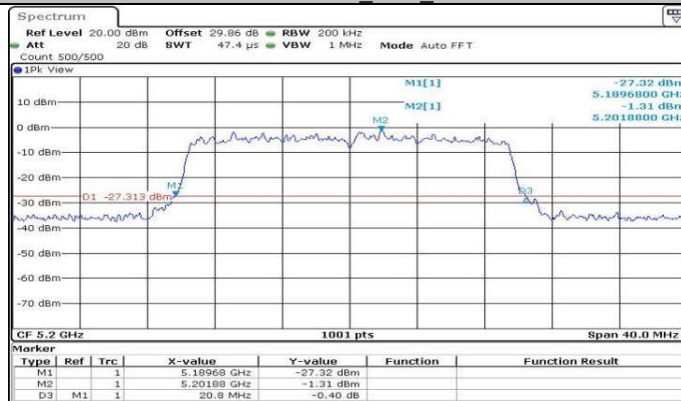
11AC80MIMO Ant1 5690



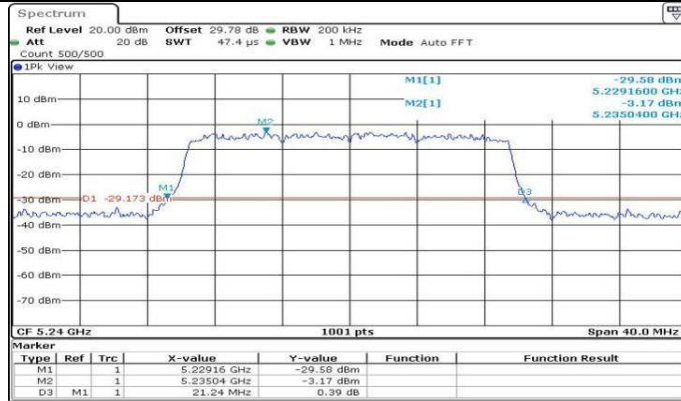
11AX20MIMO Ant1 5180



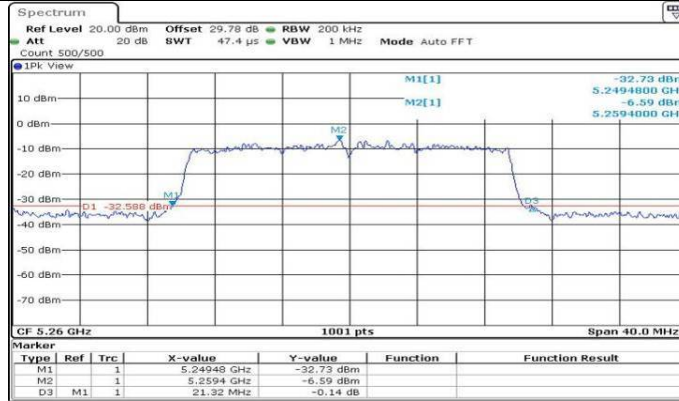
11AX20MIMO Ant1 5200



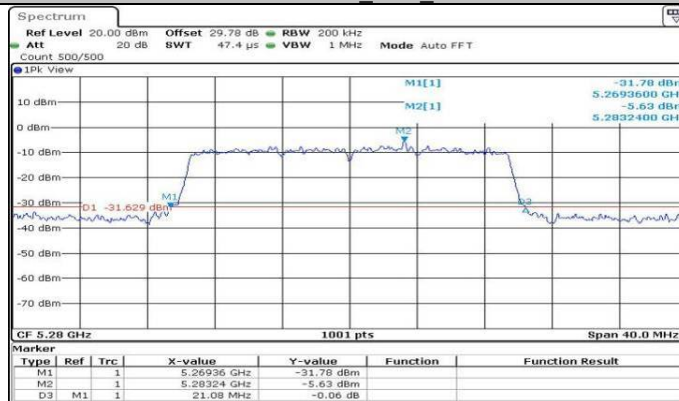
11AX20MIMO Ant1 5240



11AX20MIMO Ant1 5260



11AX20MIMO Ant1 5280



11AX20MIMO Ant1 5320

