




FCC PART 15.407 TEST REPORT

For

Thundercomm Technology Co., Ltd

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Robotics RB5
Tested Model	TurboX C865 Dev Kit
Frequency Range	5G Wi-Fi: 5150-5250MHz; 5250-5350MHz; 5470-5730MHz; 5725-5850MHz
Maximum Conducted Average Output Power	5150-5250 MHz: 14.76dBm (802.11a), 14.8dBm(802.11n20), 16.4dBm(802.11n40) 14.8dBm (802.11ac20), 15.5dBm(802.11 ac40), 14.0dBm(802.11 ac80) 14.3dBm (802.11ax20), 12.9dBm(802.11 ax40), 13.9dBm(802.11 ax80) 5250-5350MHz: 14.76dBm (802.11a), 14.7dBm(802.11n20), 16.2dBm(802.11n40) 14.7dBm (802.11ac20), 15.3dBm(802.11 ac40), 14.0dBm(802.11 ac80) 14.2dBm (802.11ax20), 12.0dBm(802.11 ax40), 14.1dBm(802.11 ax80) 5470-5725MHz: 16.16dBm (802.11a), 16.6dBm(802.11n20), 18.6dBm(802.11n40) 16.7dBm (802.11ac20), 17.8dBm(802.11 ac40), 17.1dBm(802.11 ac80) 16.8 dBm (802.11ax20), 19.2dBm(802.11 ax40), 18.5dBm(802.11 ax80) 5725-5850 MHz: 11.66dBm (802.11a), 14.2dBm(802.11n20), 13.8dBm(802.11n40) 14.2dBm (802.11ac20), 12.9dBm(802.11 ac40), 12.7dBm(802.11 ac80) 13.7dBm (802.11ax20), 13.7dBm(802.11 ax40), 13.3dBm(802.11 ax80)
Modulation Technique	OFDM
Antenna Gain*	Antenna 0: 0dBi; Antenna 1: -3dBi (It is provided by the applicant)
Voltage Range	DC12V from adapter
Date of Test	2021-04-09 to 2021-07-20
Sample serial number	RSZ200701002-RF-S1(Assigned by BACL, Shenzhen)
Received date	2020-07-01
Sample/EUT Status	Good condition
Adapter Information	Model:LYD1202500B Input :100-240V,0.68A,50/60Hz Output:12.0V,2.5A

Objective

This type approval report is prepared 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

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 802.11a/n20/n40/ac20/ac40/ac80/ax20/ax40/ax80 modes.

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, 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 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

EUT Exercise Software

QRCT.EXE was used. Test frequencies and power level were configured as below:

U-NII	Mode	Frequency (MHz)	Rate (Mbps)	Power Level
5150 – 5250MHz	802.11 a	5180	6	17
		5200	6	17
		5240	6	17
	802.11 n20	5180	MCS0	15
		5200	MCS0	15
		5240	MCS0	15
	802.11 n40	5190	MCS0	16
		5230	MCS0	16
	802.11 ac20	5180	MCS0	15
		5200	MCS0	15
		5240	MCS0	15
	802.11 ac40	5190	MCS0	15
		5230	MCS0	15
	802.11 ac80	5210	MCS0	14
	802.11ax20	5180	MCS11	14
		5200	MCS11	14
		5240	MCS11	14
	802.11ax40	5190	MCS11	15
5230		MCS11	15	
802.11ax80	5210	MCS11	14	

U-NII	Mode	Frequency (MHz)	Rate (Mbps)	Power Level
5250 – 5350MHz	802.11 a	5260	6	17
		5280	6	17
		5320	6	17
	802.11 n20	5260	MCS0	15
		5280	MCS0	15
		5320	MCS0	15
	802.11 n40	5270	MCS0	16
		5310	MCS0	16
	802.11 ac20	5260	MCS0	15
		5280	MCS0	15
		5320	MCS0	15
	802.11 ac40	5270	MCS0	15
		5310	MCS0	15
	802.11 ac80	5290	MCS0	14
	802.11ax20	5260	MCS11	14
		5280	MCS11	14
		5320	MCS11	14
	802.11ax40	5270	MCS11	15
5310		MCS11	15	
802.11ax80	5290	MCS11	14	
5470 – 5725MHz	802.11 a	5500	6	18
		5600	6	17
		5720	6	17
	802.11 n20	5500	MCS0	15
		5600	MCS0	15
		5720	MCS0	15
	802.11 n40	5510	MCS0	16
		5550	MCS0	16
		5710	MCS0	16
	802.11 ac20	5500	MCS0	15
		5600	MCS0	15
		5720	MCS0	15
	802.11 ac40	5510	MCS0	15
		5550	MCS0	15
		5710	MCS0	15
	802.11 ac80	5530	MCS0	14
		5610	MCS0	14
		5690	MCS0	14
802.11ax20	5500	MCS11	14	
	5600	MCS11	14	
	5720	MCS11	14	

U-NII	Mode	Frequency (MHz)	Rate (Mbps)	Power Level
5470 – 5725MHz	802.11ax40	5510	MCS11	15
		5550	MCS11	15
		5710	MCS11	15
	802.11ax80	5530	MCS11	14
		5610	MCS11	14
		5690	MCS11	14
5725 – 5850MHz	802.11 a	5745	6	17
		5785	6	17
		5825	6	17
	802.11 n20	5745	MCS0	17
		5785	MCS0	17
		5825	MCS0	17
	802.11 n40	5755	MCS0	16
		5795	MCS0	16
	802.11 ac20	5745	MCS0	17
		5785	MCS0	17
		5825	MCS0	17
	802.11 ac40	5755	MCS0	15
		5795	MCS0	15
	802.11 ac80	5775	MCS0	15
	802.11ax20	5745	MCS11	16
		5785	MCS11	16
		5825	MCS11	16
	802.11ax40	5755	MCS11	15
		5795	MCS11	15
	802.11ax80	5775	MCS11	15

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 for 802.11a mode and MIMO for other modes, per pretest, the MIMO mode was the worst mode for all the modes except the 802.11a mode. The device not support Beamforming mode.

Duty cycle

Test Result: Compliant. Please refer to the Appendix.

Equipment Modifications

No modification was made to the EUT tested.

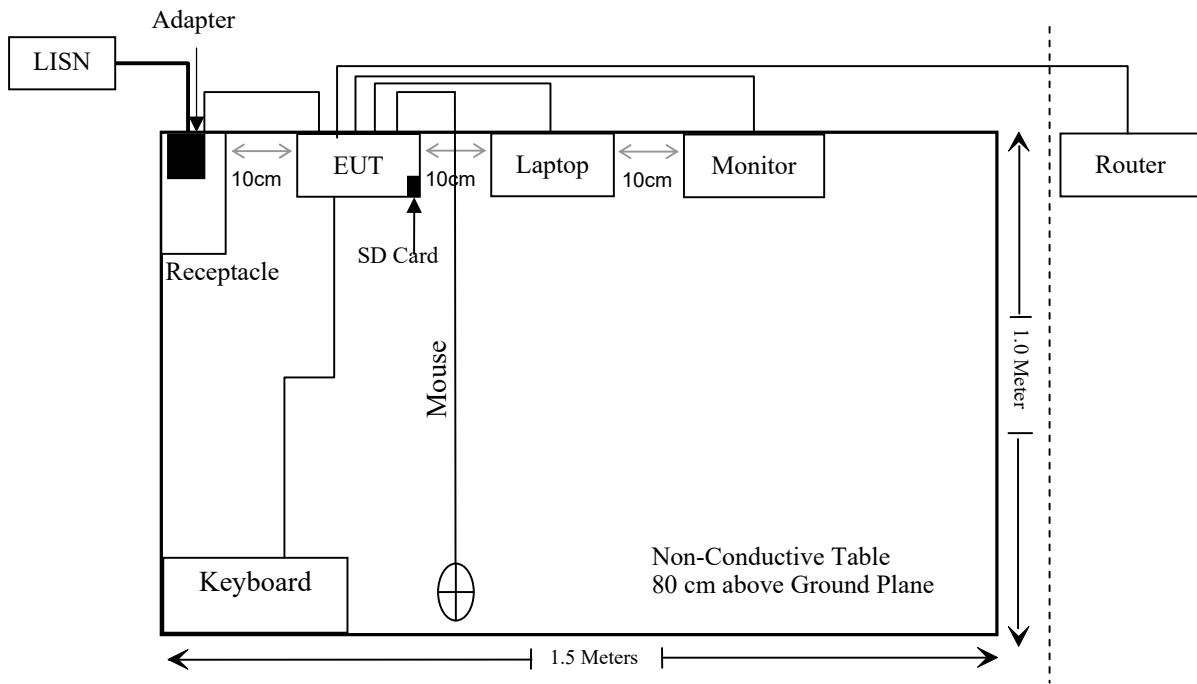
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DELL	Laptop	Latitude E6520	H067T A00
SAMSUNG	Monitor	S24E390HL	ZZFRH4ZN303357K
TCL	Monitor	L32F3301B	RD851P2
HIKVISION	Router	DS-3WR03-E	10021642429
maxin	Keyborad	KEY-663	1210001678
DELL	Mouse	M-U0026	DZL-M-U0026(B)
Sandisk	SD Card	SDSDUNG-128G-ZN61N	SD012463

External I/O Cable

Cable Description	Length (m)	From/Port	To
Un-shielding Un-Detachable AC Cable	1.0	Receptacle	LISN
Un-shielding Un-Detachable DC Cable	1.2	Adapter	EUT
Un-Shielding Detachable USB to Type-C Cable	1.0	EUT	Laptop
Un-Shielding Detachable HDMI Cable	2.5	EUT	Monitor
Un-Shielding Detachable RJ45 Cable	10	EUT	Router
Un-shielding Un-Detachable USB Cable	1.2	EUT	Mouse
Un-shielding Un-Detachable USB Cable	1.2	EUT	Keyboard

Block Diagram of Test Setup For conducted emission



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: A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Emissions Test					
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	2019/11/29	2020/11/28
Unknow	CE Cable	CE Cable	UF A210B-1-0720-504504	2019/11/29	2020/11/28
Rohde & Schwarz	CE Test software	EMC 32	V8.53.0	NCR	NCR
Radiated Emission Test					
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	A040904-1	2017/12/22	2020/12/21
COM-POWER	Dipole Antenna	AD-100	721027	NCR	NCR
Unknown	Cable 2	RF Cable 2	F-03-EM197	2019/11/29	2020/11/28
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	2019/11/29	2020/11/28
COM-POWER	Pre-amplifier	PA-122	181919	2020/11/29	2021/11/28
Quinstar	Amplifier	QLW-18405536-J0	15964001002	2019/11/29	2020/11/28
Quinstar	Amplifier	QLW-18405536-J0	15964001002	2020/11/29	2021/11/28
Sunol Sciences	Horn Antenna	DRH-118	A052604	2017/12/22	2020/12/21
Ducommun Technologies	Horn antenna	ARH-4223-02	1007726-021304	2017/12/06	2020/12/05
Ducommun Technologies	Horn antenna	ARH-4223-02	1007726-021304	2020/12/06	2023/12/05
Ducommun Technologies	Horn antenna	ARH-2823-02	1007726-021302	2017/12/06	2020/12/05
Ducommun Technologies	Horn antenna	ARH-2823-02	1007726-021302	2020/12/06	2023/12/05
Insulated Wire Inc.	RF Cable	SPS-2503-3150	02222010	2019/11/29	2020/11/28
Insulated Wire Inc.	RF Cable	SPS-2503-3150	02222010	2020/11/29	2021/11/28
Unknown	RF Cable	W1101-EQ1 OUT	F-19-EM005	2019/11/29	2020/11/28
Unknown	RF Cable	W1101-EQ1 OUT	F-19-EM005	2020/11/29	2021/11/28
SNSD	Band Reject filter	BSF5150-5850MN-0899-004	5G filter	2020/04/20	2021/04/20
RF Condeut Test					
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

* **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

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)			
Bluetooth	2402-2480	-3.0	0.50	2.0	1.58	20	0.00016	1
BLE	2402-2480	-3.0	0.50	6.0	3.98	20	0.0004	1
2.4G Wi-Fi	2412-2462	-3.0	0.50	23.0	199.53	20	0.0198	1
5G Wi-Fi	5150-5250	0	1.0	17.0	51.12	20	0.0102	1
	5250-5350	0	1.0	17.0	51.12	20	0.0102	1
	5470-5725	0	1.0	19.0	79.43	20	0.0158	1
	5725-5850	0	1.0	15.0	31.62	20	0.0063	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. The Bluetooth can't transmit at the same time with Wi-Fi.

Simultaneous transmitting consideration:

The ratio= $MPE_{2.4G}/limit + MPE_{5G}/limit = 0.0198 + 0.0158 = 0.0356 < 1.0$

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

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:

- 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 PCB antennas arrangement which was permanently attached for 5G Wi-Fi. The antenna gain is 0dBi for antenna 0, -3dBi for antenna 1, fulfill the requirement of this section. Please refer to the EUT photos.

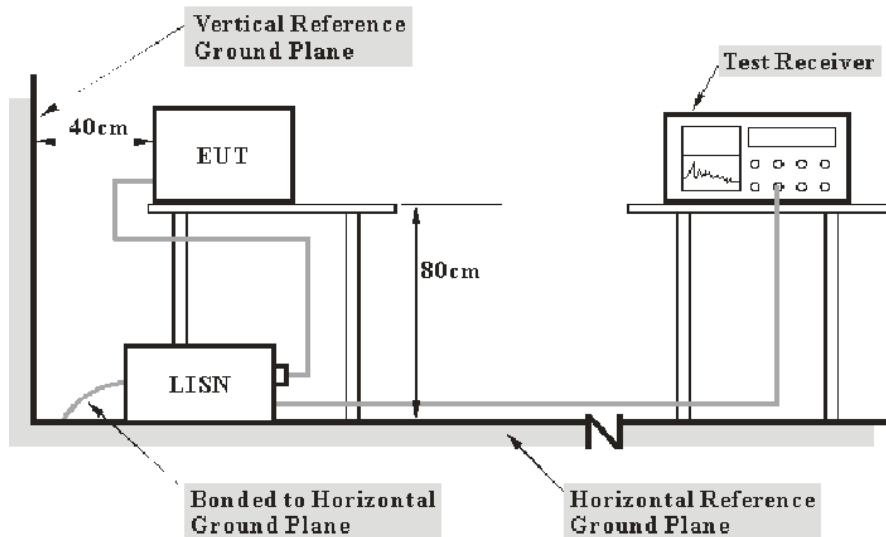
Result: Compliance.

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 Results Summary

According to the EUT complied with the FCC Part 15.207.

Test Data

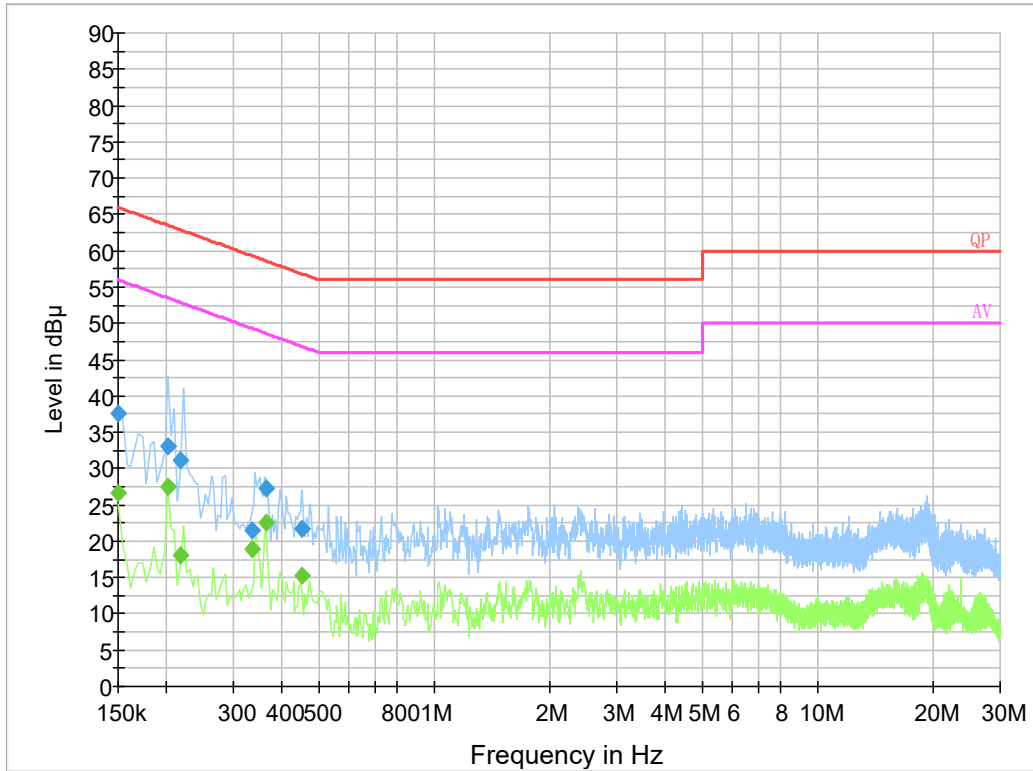
Environmental Conditions

Temperature:	26 °C
Relative Humidity:	57 %
ATM Pressure:	101.0 kPa

The testing was performed by Haiguo Li on 2021-07-20.

EUT operation mode: Transmitting (worst case is 802.11ac20 mode 5785 MHz)

AC 120V/60 Hz, Line



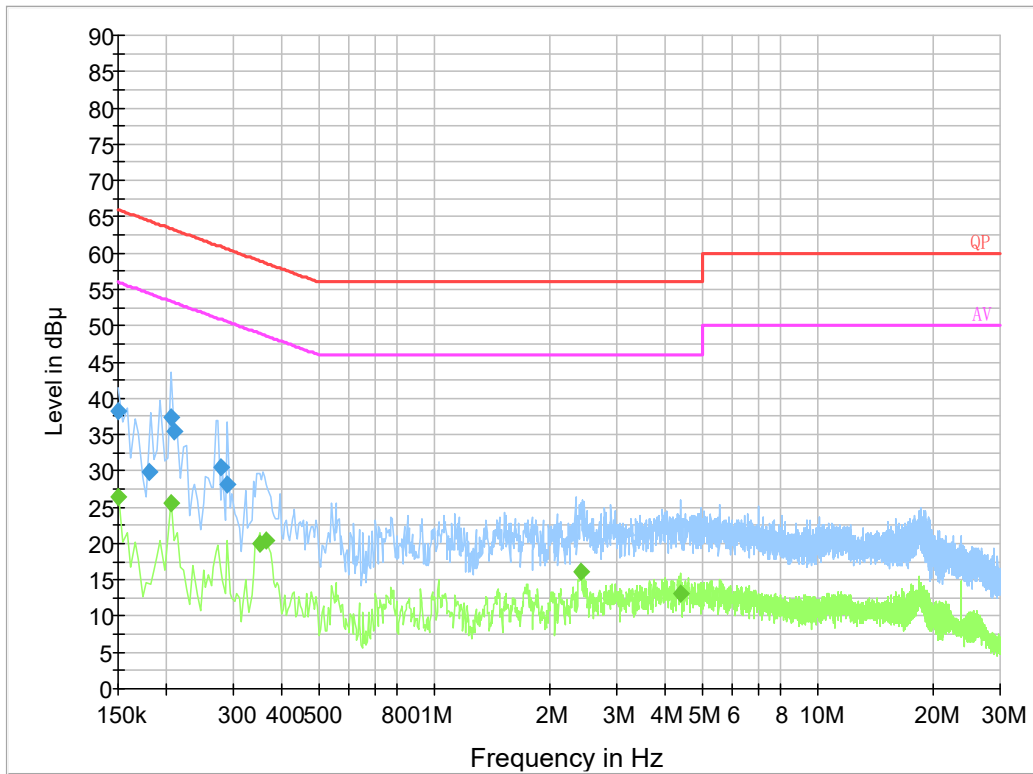
Final Result 1

Frequency (MHz)	QuasiPeak (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.150000	37.5	9.000	L1	19.8	28.5	66.0
0.201500	33.1	9.000	L1	19.8	30.4	63.5
0.217500	31.1	9.000	L1	19.8	31.8	62.9
0.336870	21.5	9.000	L1	19.8	37.8	59.3
0.364570	27.4	9.000	L1	19.9	31.2	58.6
0.451190	21.6	9.000	L1	19.8	35.3	56.9

Final Result 2

Frequency (MHz)	Average (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.150000	26.6	9.000	L1	19.8	29.4	56.0
0.201500	27.5	9.000	L1	19.8	26.0	53.5
0.217500	18.1	9.000	L1	19.8	34.8	52.9
0.336870	18.9	9.000	L1	19.8	30.4	49.3
0.364570	22.6	9.000	L1	19.9	26.0	48.6
0.451190	15.2	9.000	L1	19.8	31.7	46.9

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)
0.150000	38.2	9.000	N	19.8	27.8	66.0
0.181500	29.8	9.000	N	19.8	34.6	64.4
0.205500	37.3	9.000	N	19.8	26.1	63.4
0.210500	35.5	9.000	N	19.8	27.7	63.2
0.277500	30.6	9.000	N	19.7	30.3	60.9
0.289500	28.2	9.000	N	19.7	32.3	60.5

Final Result 2

Frequency (MHz)	Average (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.150000	26.4	9.000	N	19.8	29.6	56.0
0.206000	25.5	9.000	N	19.8	27.9	53.4
0.350000	19.9	9.000	N	19.9	29.1	49.0
0.366000	20.4	9.000	N	19.9	28.2	48.6
2.414000	16.0	9.000	N	19.8	30.0	46.0
4.406000	13.2	9.000	N	19.9	32.8	46.0

§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;

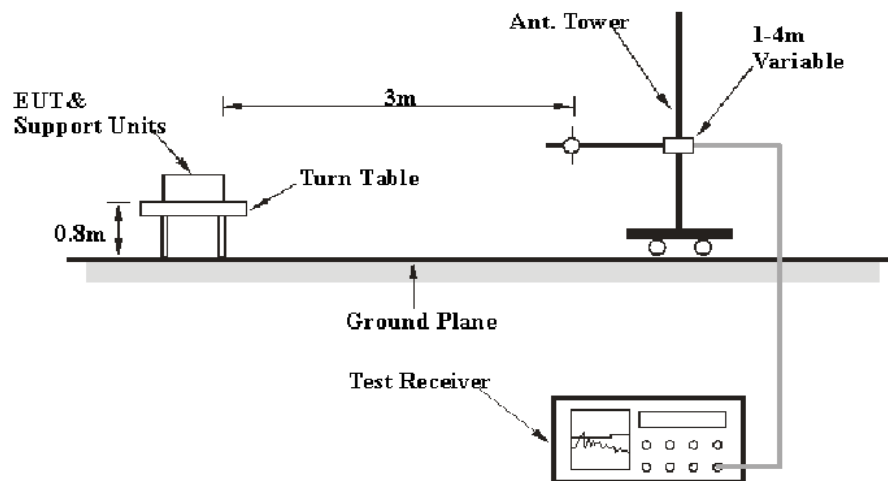
(b) Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

- (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.

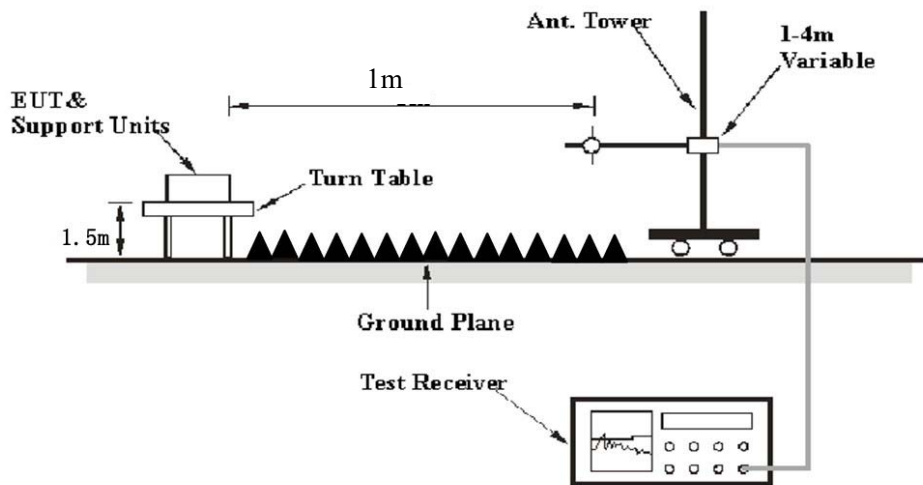
Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.

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 ^{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 Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart E, section 15.205, 15.209 and 15.407 rules.

Test Data

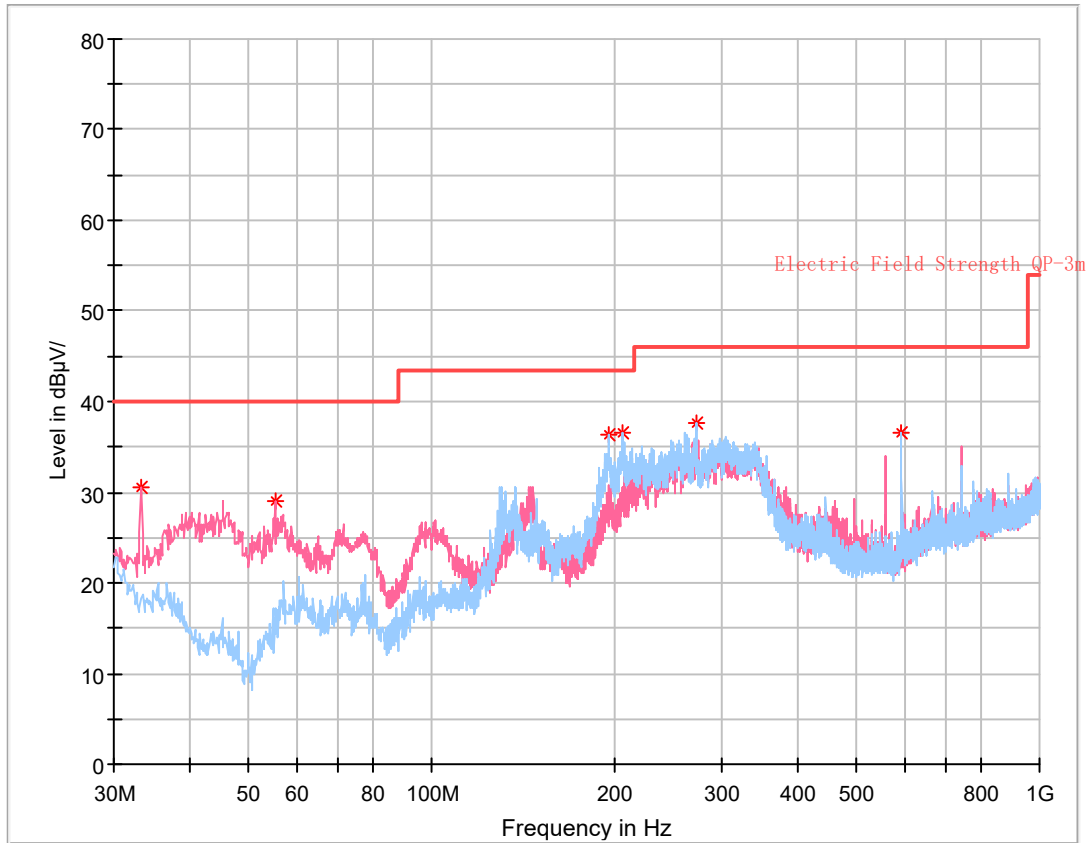
Environmental Conditions

Temperature:	26.7~29°C
Relative Humidity:	50~51 %
ATM Pressure:	101.0~101.2 kPa

The testing was performed by Cloud Qiu on 2021-07-19 for below 1GHz and by Alan He on 2021-04-10 for above 1GHz.

EUT operation mode: Transmitting

30 MHz~1 GHz: (the worst case at 802.11n20 mode, 2412MHz+802.11ac20 mode 5785 MHz)



Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
33.273750	30.60	40.00	9.40	100.0	V	115.0	-6.1
55.220000	28.94	40.00	11.06	100.0	V	23.0	-16.6
195.627500	36.43	43.50	7.07	100.0	H	189.0	-11.6
205.448750	36.50	43.50	7.00	100.0	H	228.0	-11.1
272.378750	37.53	46.00	8.47	100.0	H	199.0	-11.0
594.055000	36.56	46.00	9.44	100.0	H	199.0	-4.5

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		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407/205/209	
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11a(Antenna 0 is the worst case)									
5180 MHz									
5145.61	31.76	PK	325	1.1	H	38.36	70.12	83.5	13.38
5145.61	17.26	Ave.	249	1.8	H	38.36	55.62	63.5	7.88
5350.68	31.66	PK	136	1.4	H	39.09	70.75	83.5	12.75
5350.68	17.08	Ave.	136	1.4	H	39.09	56.17	63.5	7.33
10360.00	43.12	PK	219	1.4	H	17.42	60.54	77.7	17.16
5200 MHz									
10400.00	42.15	PK	176	2.5	H	17.52	59.67	77.7	18.03
5240 MHz									
5146.41	30.54	PK	179	2.1	H	38.36	68.90	83.5	14.60
5146.41	17.24	Ave.	179	2.1	H	38.36	55.60	63.5	7.90
5355.61	31.09	PK	296	1.5	H	39.09	70.18	83.5	13.32
5355.61	17.09	Ave.	296	1.5	H	39.09	56.18	63.5	7.32
10480.00	42.14	PK	74	1.2	H	17.25	59.39	77.7	18.31
802.11n20 (MIMO mode is the worst case)									
5180 MHz									
5143.96	31.99	PK	169	2.0	H	38.36	70.35	83.5	13.15
5143.96	17.23	Ave.	169	2.0	H	38.36	55.59	63.5	7.91
5352.98	30.86	PK	222	1.5	H	39.09	69.95	83.5	13.55
5352.98	17.06	Ave.	222	1.5	H	39.09	56.15	63.5	7.35
10360.00	42.37	PK	229	2.0	H	17.42	59.79	77.7	17.91
5200 MHz									
10400.00	42.21	PK	138	1.8	H	17.52	59.73	77.7	17.97
5240 MHz									
5142.82	31.88	PK	279	1.6	H	38.36	70.24	83.5	13.26
5142.82	17.22	Ave.	279	1.6	H	38.36	55.58	63.5	7.92
5357.69	30.86	PK	178	1.7	H	39.09	69.95	83.5	13.55
5357.69	17.09	Ave.	178	1.7	H	39.09	56.18	63.5	7.32
10480.00	42.61	PK	248	2.0	H	17.25	59.86	77.7	17.84

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part 15.407/205/209	
	Reading (dBµV)	PK/QP/Ave.		Height (m)	Polar (H / V)			Limit (dBµV/m)	Margin (dB)
802.11ac20(MIMO mode is the worst case)									
5180 MHz									
5141.25	31.44	PK	248	1.9	H	38.36	69.80	83.5	13.70
5141.25	17.22	Ave.	248	1.9	H	38.36	55.58	63.5	7.92
5358.49	31.55	PK	37	2.5	H	39.09	70.64	83.5	12.86
5358.49	17.30	Ave.	37	2.5	H	39.09	56.39	63.5	7.11
10360.00	42.15	PK	209	2.5	H	17.42	59.57	77.7	18.13
5200 MHz									
10400.00	42.10	PK	23	1.6	H	17.52	59.62	77.7	18.08
5240 MHz									
5142.24	31.44	PK	160	1.4	H	38.36	69.80	83.5	13.70
5142.24	17.24	Ave.	160	1.4	H	38.36	55.60	63.5	7.90
5351.68	31.53	PK	88	1.4	H	39.09	70.62	83.5	12.88
5351.68	17.31	Ave.	88	1.4	H	39.09	56.40	63.5	7.10
10480.00	42.23	PK	342	1.9	H	17.25	59.48	77.7	18.22
802.11n40 (MIMO mode is the worst case)									
5190 MHz									
5145.19	31.89	PK	174	1.3	H	38.36	70.25	83.5	13.25
5145.19	17.21	Ave.	174	1.3	H	38.36	55.57	63.5	7.93
5351.36	31.62	PK	302	2.3	H	39.09	70.71	83.5	12.79
5351.36	17.11	Ave.	302	2.3	H	39.09	56.20	63.5	7.30
10380.00	42.25	PK	299	1.0	H	17.42	59.67	77.7	18.03
5230 MHz									
5149.51	31.84	PK	280	1.0	H	38.36	70.20	83.5	13.30
5149.51	17.24	Ave.	280	1.0	H	38.36	55.57	63.5	7.90
5357.64	31.87	PK	290	1.1	H	39.09	70.96	83.5	12.54
5357.64	17.09	Ave.	290	1.1	H	39.09	56.18	63.5	7.32
10460.00	42.34	PK	186	1.3	H	17.15	59.49	77.7	18.21
802.11ac40(MIMO mode is the worst case)									
5190 MHz									
5143.36	31.56	PK	111	1.3	H	38.36	69.92	83.5	13.58
5143.36	17.21	Ave.	111	1.3	H	38.36	55.57	63.5	7.93
5359.74	31.48	PK	167	1.0	H	39.09	70.57	83.5	12.93
5359.74	17.20	Ave.	167	1.0	H	39.09	56.29	63.5	7.21
10380.00	42.17	PK	179	1.2	H	17.42	59.59	77.7	18.11
5230 MHz									
5143.38	31.96	PK	201	1.2	H	38.36	70.32	83.5	13.18
5143.38	17.26	Ave.	201	1.2	H	38.36	55.62	63.5	7.88
5359.62	31.84	PK	227	1.5	H	39.09	70.93	83.5	12.57
5359.62	17.19	Ave.	227	1.5	H	39.09	56.28	63.5	7.22
10460.00	42.11	PK	88	2.0	H	17.15	59.26	77.7	18.44
802.11ac80(MIMO mode is the worst case)									
5210MHz									
5142.17	31.24	PK	67	1.6	H	38.36	69.60	83.5	13.90
5142.17	17.16	Ave.	67	1.6	H	38.36	55.52	63.5	7.98
5351.93	31.87	PK	179	2.4	H	39.09	70.96	83.5	12.54
5351.93	17.09	Ave.	179	2.4	H	39.09	56.18	63.5	7.32
10420.00	42.21	PK	291	2.3	H	17.52	59.73	77.7	17.97

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part 15.407/205/209	
	Reading (dBµV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBµV/m)	Margin (dB)
802.11ax20(MIMO mode is the worst case)									
5180 MHz									
5143.94	30.83	PK	177	1.9	H	38.36	69.19	83.5	14.31
5143.94	17.11	Ave.	177	1.9	H	38.36	55.47	63.5	8.03
5351.28	30.87	PK	115	2.0	H	39.09	69.96	83.5	13.54
5351.28	17.1	Ave.	115	2.0	H	39.09	56.19	63.5	7.31
10360.00	42.12	PK	148	1.9	H	17.42	59.54	77.7	18.16
5200 MHz									
10400.00	42.34	PK	287	2.1	H	17.52	59.86	77.7	17.84
5240 MHz									
5143.94	31.34	PK	64	1.9	H	38.36	69.70	83.5	13.80
5143.94	17.14	Ave.	64	1.9	H	38.36	55.50	63.5	8.00
5359.66	31.35	PK	34	1.1	H	39.09	70.44	83.5	13.06
5359.66	17.13	Ave.	34	1.1	H	39.09	56.22	63.5	7.28
10480.00	42.55	PK	96	2.0	H	17.25	59.80	77.7	17.90
802.11ax40 (MIMO mode is the worst case)									
5190 MHz									
5149.47	31.69	PK	54	2.3	H	38.36	70.05	83.5	13.45
5149.47	17.14	Ave.	54	2.3	H	38.36	55.50	63.5	8.00
5354.58	31.83	PK	306	1.1	H	39.09	70.92	83.5	12.58
5354.58	17.16	Ave.	306	1.1	H	39.09	56.25	63.5	7.25
10380.00	42.19	PK	104	1.2	H	17.42	59.61	77.7	18.09
5230 MHz									
5145.64	31.69	PK	218	1.3	H	38.36	70.05	83.5	13.45
5145.64	17.14	Ave.	218	1.3	H	38.36	55.50	63.5	8.00
5358.91	31.83	PK	101	2.2	H	39.09	70.92	83.5	12.58
5358.91	17.16	Ave.	101	2.2	H	39.09	56.25	63.5	7.25
10460.00	42.37	PK	169	1.5	H	17.15	59.52	77.7	18.18
802.11AX80 (MIMO mode is the worst case)									
5210MHZ									
5141.89	31.43	PK	255	1.5	H	38.36	69.79	83.5	13.71
5141.89	17.22	Ave.	255	1.5	H	38.36	55.57	63.5	7.92
5353.84	31.80	PK	61	1.5	H	39.09	70.89	83.5	12.61
5353.84	17.28	Ave.	61	1.5	H	39.09	56.37	63.5	7.13
10420.00	42.29	PK	303	2.5	V	17.52	59.81	77.7	17.89

5250-5350 MHz:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407/205/209	
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
802.11a (Antenna 0 is the worst case)									
5260 MHz									
5140.98	31.93	PK	39	2.0	H	38.36	70.29	83.5	13.21
5140.98	17.08	Ave.	39	2.0	H	38.36	55.44	63.5	8.06
5350.82	31.31	PK	335	2.2	H	39.09	70.40	83.5	13.10
5350.82	17.28	Ave.	335	2.2	H	39.09	56.37	63.5	7.13
10520.00	42.19	PK	158	2.1	H	17.25	59.44	77.7	18.26
5280 MHz									
10560.00	42.14	PK	100	1.5	H	17.91	60.05	77.7	17.65
5320 MHz									
5144.32	31.22	PK	85	1.2	H	38.36	69.58	83.5	13.92
5144.32	17.14	Ave.	85	1.2	H	38.36	55.50	63.5	8.00
5350.90	31.13	PK	313	2.1	H	39.09	70.22	83.5	13.28
5350.90	17.02	Ave.	313	2.1	H	39.09	56.11	63.5	7.39
10640.00	42.36	PK	69	1.8	H	18.01	60.37	83.5	23.13
10640.00	27.43	Ave.	282	1.8	H	18.01	45.44	63.5	18.06
802.11n20 (MIMO mode is the worst case)									
5260 MHz									
5142.03	31.03	PK	47	1.9	H	38.36	69.39	83.5	14.11
5142.03	17.17	Ave.	47	1.9	H	38.36	55.53	63.5	7.97
5350.59	31.68	PK	69	1.2	H	39.09	70.77	83.5	12.73
5350.59	17.11	Ave.	69	1.2	H	39.09	56.20	63.5	7.30
10520.00	42.01	PK	229	1.6	H	17.25	59.26	77.7	18.44
5280 MHz									
10560.00	42.33	PK	46	1.6	H	17.91	60.24	77.7	17.46
5320 MHz									
5147.56	31.44	PK	159	1.8	H	38.36	69.80	83.5	13.70
5147.56	17.12	Ave.	159	1.8	H	38.36	55.48	63.5	8.02
5359.08	31.57	PK	185	2.2	H	39.09	70.66	83.5	12.84
5359.08	17.28	Ave.	185	2.2	H	39.09	56.37	63.5	7.13
10640.00	42.08	PK	288	1.5	H	18.01	60.09	83.5	23.41
10640.00	27.43	Ave.	288	1.5	H	18.01	45.44	63.5	18.06

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407/205/209	
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
802.11ac20 (MIMO mode is the worst case)									
5260 MHz									
5140.42	31.05	PK	148	1.7	H	38.36	69.41	83.5	14.09
5140.42	17.17	Ave.	148	1.7	H	38.36	55.53	63.5	7.97
5352.07	31.50	PK	152	1.4	H	39.09	70.59	83.5	12.91
5352.07	17.25	Ave.	152	1.4	H	39.09	56.34	63.5	7.16
10520.00	42.42	PK	321	1.1	H	17.25	59.67	77.7	18.03
5280 MHz									
10560.00	42.03	PK	242	1.4	H	17.91	59.94	77.7	17.76
5320 MHz									
5149.79	31.66	PK	132	1.8	H	38.36	70.02	83.5	13.48
5149.79	17.23	Ave.	132	1.8	H	38.36	55.59	63.5	7.91
5350.58	31.71	PK	154	2.0	H	39.09	70.80	83.5	12.70
5350.58	17.11	Ave.	154	2.0	H	39.09	56.20	63.5	7.30
10640.00	42.34	PK	260	1.1	H	18.01	60.35	83.5	23.15
10640.00	27.12	Ave.	260	1.1	H	18.01	45.13	63.5	18.37
802.11n40(MIMO mode is the worst case)									
5270 MHz									
5143.42	31.59	PK	138	2.3	H	38.36	69.95	83.5	13.55
5143.42	17.28	Ave.	138	2.3	H	38.36	55.64	63.5	7.86
5353.12	31.80	PK	35	1.1	H	39.09	70.89	83.5	12.61
5353.12	17.07	Ave.	35	1.1	H	39.09	56.16	63.5	7.34
10540.00	42.08	PK	324	2.2	H	17.25	59.33	77.7	18.37
5310 MHz									
5145.85	31.91	PK	24	1.1	H	38.36	70.27	83.5	13.23
5145.85	17.13	Ave.	24	1.1	H	38.36	55.49	63.5	8.01
5356.50	31.55	PK	71	1.3	H	39.09	70.64	83.5	12.86
5356.50	17.14	Ave.	71	1.3	H	39.09	56.23	63.5	7.27
10620.00	42.05	PK	154	1.2	H	18.01	60.06	83.5	23.44
10620.00	27.31	Ave.	154	1.2	H	18.01	45.32	63.5	18.18

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407/205/209	
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
802.11ac40(MIMO mode is the worst case)									
5270 MHz									
5140.76	31.15	PK	23	1.5	H	38.36	69.51	83.5	13.99
5140.76	17.11	Ave.	23	1.5	H	38.36	55.47	63.5	8.03
5352.91	31.86	PK	331	2.2	H	39.09	70.95	83.5	12.55
5352.91	17.21	Ave.	331	2.2	H	39.09	56.30	63.5	7.20
10540.00	42.39	PK	150	2.1	V	17.25	59.64	77.7	18.06
5310 MHz									
5147.05	31.62	PK	138	1.6	H	38.36	69.98	83.5	13.52
5147.05	17.20	Ave.	138	1.6	H	38.36	55.56	63.5	7.94
5354.55	31.62	PK	72	2.3	H	39.09	70.71	83.5	12.79
5354.55	17.10	Ave.	72	2.3	H	39.09	56.19	63.5	7.31
10620.00	42.24	PK	242	2.2	H	18.01	60.25	83.5	23.25
10620.00	27.24	Ave.	242	2.2	H	18.01	45.25	63.5	18.25
802.11ac80(MIMO mode is the worst case)									
5290MHz									
5142.07	31.04	PK	18	1.5	H	38.36	69.40	83.5	14.10
5142.07	17.18	Ave.	18	1.5	H	38.36	55.54	63.5	7.96
5358.91	31.70	PK	171	1.1	H	39.09	70.79	83.5	12.71
5358.91	17.02	Ave.	171	1.1	H	39.09	56.11	63.5	7.39
10580.00	42.12	PK	193	1.3	H	17.91	60.03	77.7	17.67

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407/205/209	
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
802.11ax20 (MIMO mode is the worst case)									
5260 MHz									
5140.79	31.39	PK	6	1.7	H	38.36	69.75	83.5	13.75
5140.79	17.04	Ave.	6	1.7	H	38.36	55.40	63.5	8.10
5357.32	31.14	PK	273	1.0	H	39.09	70.23	83.5	13.27
5357.32	17.26	Ave.	273	1.0	H	39.09	56.35	63.5	7.15
10520.00	42.02	PK	34	1.4	H	17.25	59.27	77.7	18.43
5280 MHz									
10560.00	42.47	PK	219	1.6	H	17.91	60.38	77.7	17.32
5320 MHz									
5145.71	31.46	PK	239	1.5	H	38.36	69.82	83.5	13.68
5145.71	17.19	Ave.	239	1.5	H	38.36	55.55	63.5	7.95
5353.95	31.02	PK	43	2.4	H	39.09	70.11	83.5	13.39
5353.95	17.26	Ave.	43	2.4	H	39.09	56.35	63.5	7.15
10640.00	42.36	PK	40	2.1	H	18.01	60.37	83.5	23.13
10640.00	27.33	Ave.	40	2.1	H	18.01	45.34	63.5	18.16
802.11x40 (MIMO mode is the worst case)									
5270 MHz									
5148.51	31.81	PK	42	2.0	H	38.36	70.17	83.5	13.33
5148.51	17.10	Ave.	42	2.0	H	38.36	55.46	63.5	8.04
5357.97	31.17	PK	104	1.6	H	39.09	70.26	83.5	13.24
5357.97	17.27	Ave.	104	1.6	H	39.09	56.36	63.5	7.14
10540.00	42.41	PK	62	1.1	H	17.25	59.66	77.7	18.04
5310 MHz									
5140.99	31.37	PK	192	1.6	H	38.36	69.73	83.5	13.77
5140.99	17.00	Ave.	192	1.6	H	38.36	55.36	63.5	8.14
5358.60	31.55	PK	237	1.1	H	39.09	70.64	83.5	12.86
5358.60	17.27	Ave.	237	1.1	H	39.09	56.36	63.5	7.14
10620.00	42.03	PK	98	1.1	H	18.01	60.04	83.5	23.46
10620.00	27.17	Ave.	98	1.1	H	18.01	45.18	63.5	18.32

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part 15.407/205/209	
	Reading (dBµV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBµV/m)	Margin (dB)
802.11ax80 (MIMO mode is the worst case)									
5290MHz									
5144.27	31.84	PK	48	2.2	H	38.36	70.20	83.5	13.30
5144.27	17.14	Ave.	48	2.2	H	38.36	55.50	63.5	8.00
5358.95	31.61	PK	206	1.5	H	39.09	70.70	83.5	12.80
5358.95	17.19	Ave.	206	1.5	H	39.09	56.28	63.5	7.22
10580.00	42.47	PK	333	1.7	H	17.91	60.38	77.7	17.32

5470-5725MHz:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407/205/209	
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
802.11a(Antenna 0 is the worst case)									
5500 MHz									
5462.26	32.13	PK	100	1.2	H	39.37	71.50	77.7	6.20
5729.75	32.42	PK	338	1.1	H	39.49	71.91	77.7	5.79
11000.00	42.07	PK	23	2.2	H	17.66	59.73	83.5	23.77
11000.00	28.24	Ave.	23	2.2	H	17.66	45.90	63.5	17.60
5600 MHz									
11200.00	42.03	PK	253	1.9	H	17.39	59.42	83.5	24.08
11200.00	28.04	Ave.	253	1.9	H	17.39	45.43	63.5	18.07
5720MHz									
5463.49	32.67	PK	4	1.0	H	39.37	72.04	77.7	5.66
5853.26	32.92	PK	177	1.3	H	39.87	72.79	77.7	4.91
11440.00	42.17	PK	147	2.4	H	17.73	59.90	83.5	23.60
11440.00	28.18	Ave.	147	2.4	H	17.73	45.91	63.5	17.59
802.11n20 (MIMO mode is the worst case)									
5500 MHz									
5468.30	32.98	PK	300	2.3	H	39.37	72.35	77.7	5.35
5727.56	32.03	PK	42	1.5	H	39.49	71.52	77.7	6.18
11000.00	41.52	PK	163	1.2	H	17.66	59.18	83.5	24.32
11000.00	27.83	Ave.	163	1.2	H	17.66	45.49	63.5	18.01
5600 MHz									
11200.00	41.98	PK	156	2.2	H	17.39	59.37	83.5	24.13
11200.00	27.82	Ave.	156	2.2	H	17.39	45.21	63.5	18.29
5720MHz									
5469.04	32.76	PK	249	1.0	H	39.37	72.13	77.7	5.57
5852.46	32.84	PK	172	2.4	H	39.87	72.71	77.7	4.99
11440.00	41.80	PK	182	1.3	H	17.73	59.53	83.5	23.97
11440.00	27.78	Ave.	182	1.3	H	17.73	45.51	63.5	17.99

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part 15.407/205/209	
	Reading (dBµV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBµV/m)	Margin (dB)
802.11ac20 (MIMO mode is the worst case)									
5500 MHz									
5465.20	32.16	PK	90	2.3	H	39.37	71.53	77.7	6.17
5730.39	32.78	PK	78	2.2	H	39.49	72.27	77.7	5.43
11000.00	41.98	PK	112	1.3	H	17.66	59.64	83.5	23.86
11000.00	27.63	Ave.	112	1.3	H	17.66	45.29	63.5	18.21
5600 MHz									
11200.00	42.19	PK	169	2.3	H	17.39	59.58	83.5	23.92
11200.00	28.42	Ave.	169	2.3	H	17.39	45.81	63.5	17.69
5720 MHz									
5464.70	32.38	PK	259	2.3	H	39.37	71.75	77.7	5.95
5852.34	32.04	PK	100	1.5	H	39.87	71.91	77.7	5.79
11440.00	42.22	PK	241	1.9	H	17.73	59.95	83.5	23.55
11440.00	28.07	Ave.	241	1.9	H	17.73	45.80	63.5	17.70
802.11N40(MIMO mode is the worst case)									
5510 MHz									
5468.94	32.22	PK	181	1.5	H	39.37	71.59	77.7	6.11
5758.50	32.74	PK	227	2.0	H	39.61	72.35	77.7	5.35
11020.00	41.75	PK	134	1.9	H	17.66	59.41	83.5	24.09
11020.00	27.65	Ave.	134	1.9	H	17.66	45.31	63.5	18.19
11020.00	26.47	Ave.	11	1.0	H	17.66	44.13	63.5	19.37

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part 15.407/205/209	
	Reading (dBµV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBµV/m)	Margin (dB)
5550 MHZ									
11100.00	41.77	PK	6	2.0	H	16.72	58.49	83.5	25.01
11100.00	28.08	Ave.	6	2.0	H	16.72	44.80	63.5	18.70
5710 MHZ									
5466.53	32.41	PK	308	1.8	H	39.37	71.78	77.7	5.92
5851.36	32.44	PK	355	1.2	H	39.87	72.31	77.7	5.39
11420.00	41.84	PK	51	1.6	H	17.73	59.57	83.5	23.93
11420.00	27.85	Ave.	51	1.6	H	17.73	45.58	63.5	17.92
802.11AC40 (MIMO mode is the worst case)									
5510 MHz									
5463.12	32.73	PK	49	2.3	H	39.37	72.10	77.7	5.60
5852.51	32.55	PK	338	1.1	H	39.87	72.42	77.7	5.28
11020.00	42.13	PK	29	1.9	H	17.66	59.79	83.5	23.71
11020.00	28.18	Ave.	29	1.9	H	17.66	45.84	63.5	17.66
5550MHz									
11100.00	41.94	PK	334	2.3	H	16.72	58.66	83.5	24.84
11100.00	27.70	Ave.	334	2.3	H	16.72	44.42	63.5	19.08
5710 MHz									
5468.89	32.48	PK	343	1.2	H	39.37	71.85	77.7	5.85
5848.51	32.55	Ave.	159	2.0	H	39.61	72.16	77.7	5.54
11420.00	41.70	PK	282	1.1	H	17.73	59.43	83.5	24.07
11420.00	27.98	Ave.	282	1.1	H	17.73	45.71	63.5	17.79

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part 15.407/205/209	
	Reading (dBµV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBµV/m)	Margin (dB)
802.11AC80 (MIMO mode is the worst case)									
5530 MHZ									
5466.05	32.69	PK	132	2.3	H	39.37	72.06	77.7	5.64
5733.97	32.51	PK	263	1.8	H	39.49	72.00	77.7	5.70
11060.00	41.94	PK	287	1.3	H	16.72	58.66	83.5	24.84
11060.00	28.01	Ave.	287	1.3	H	16.72	44.73	63.5	18.77
5610 MHZ									
11220.00	41.76	PK	316	1.5	H	17.39	59.15	83.5	24.35
11220.00	27.66	Ave.	316	1.5	H	17.39	45.05	63.5	18.45
5690 MHZ									
5466.52	32.32	PK	170	2.1	H	39.37	71.69	77.7	6.01
5854.88	32.52	PK	50	2.4	H	39.87	72.39	77.7	5.31
11380.00	41.82	PK	288	2.5	H	17.73	59.55	83.5	23.95
11380.00	27.79	Ave.	288	2.5	H	17.73	45.52	63.5	17.98

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part 15.407/205/209	
	Reading (dBµV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBµV/m)	Margin (dB)
802.11AX20 (MIMO mode is the worst case)									
5500 MHz									
5466.34	32.20	PK	166	1.2	H	39.37	71.57	77.7	6.13
5728.62	32.64	PK	240	2.0	H	39.49	72.13	77.7	5.57
11000.00	41.58	PK	72	2.3	H	17.66	59.24	83.5	24.26
11000.00	27.75	Ave.	72	2.3	H	17.66	45.41	63.5	18.09
5600 MHz									
11200.00	41.75	PK	311	1.2	H	17.39	59.14	83.5	24.36
11200.00	27.77	Ave.	311	1.2	H	17.39	45.16	63.5	18.34
5720 MHz									
5466.12	32.04	PK	320	1.9	H	39.37	71.41	77.7	6.29
5851.83	32.53	PK	114	2.1	H	39.87	72.40	77.7	5.30
11440.00	41.92	PK	73	1.0	H	17.73	59.65	83.5	23.85
11440.00	27.86	Ave.	73	1.0	H	17.73	45.59	63.5	17.91
802.11AX40 (MIMO mode is the worst case)									
5510 MHz									
5463.98	32.34	PK	84	2.0	H	39.37	71.71	77.7	5.99
5757.57	32.99	PK	287	1.9	H	39.61	72.60	77.7	5.10
11020.00	41.95	PK	83	1.3	H	17.66	59.61	83.5	23.89
11020.00	28.01	Ave.	83	1.3	H	17.66	45.67	63.5	17.83

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part 15.407/205/209	
	Reading (dBµV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBµV/m)	Margin (dB)
5550 MHZ									
11100.00	41.99	PK	282	1.9	H	16.72	58.71	83.5	24.79
11100.00	27.82	Ave.	282	1.9	H	16.72	44.54	63.5	18.96
5710 MHZ									
5462.83	32.14	PK	231	2.3	H	39.37	71.51	77.7	6.19
5855.49	32.30	PK	61	1.3	H	39.87	72.17	77.7	5.53
11420.00	41.79	PK	77	1.4	H	17.73	59.52	83.5	23.98
11420.00	28.03	Ave.	77	1.4	H	17.73	45.76	63.5	17.74
802.11AX80 (MIMO mode is the worst case)									
5530 MHZ									
5462.07	32.69	PK	212	1.4	H	39.37	72.06	77.7	5.64
5728.17	32.94	PK	217	2.2	H	39.49	72.43	77.7	5.27
11060.00	41.54	PK	265	2.4	H	16.72	58.26	83.5	25.24
11060.00	27.79	Ave.	265	2.4	H	16.72	44.51	63.5	18.99
5610 MHZ									
11220.00	41.61	PK	119	1.6	H	17.39	59.00	83.5	24.50
11220.00	27.66	Ave.	119	1.6	H	17.39	45.05	63.5	18.45
5690 MHZ									
5463.01	32.51	PK	33	1.3	H	39.37	71.88	77.7	5.82
5853.55	32.72	PK	93	1.8	H	39.87	72.59	77.7	5.11
11380.00	41.48	PK	215	2.4	H	17.73	59.21	83.5	24.29
11380.00	27.39	Ave.	215	2.4	H	17.73	45.12	63.5	18.38

5725-5850 MHz:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407/205/209	
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
802.11A (Antenna 0 is the worst case)									
5745 MHz									
5649.39	30.62	PK	81	1.5	H	39.46	70.08	77.7	7.62
5696.02	32.23	PK	300	2.2	H	39.49	71.72	111.76	40.04
5711.33	33.20	PK	163	1.3	H	39.49	72.69	117.87	45.18
5724.84	33.06	PK	359	1.8	H	39.49	72.55	131.33	58.78
11490.00	43.89	PK	232	2.3	H	17.47	61.36	83.5	22.14
11490.00	28.27	Ave.	232	2.3	H	17.47	45.74	63.5	17.76
5785 MHz									
11570.00	44.13	PK	202	1.2	H	17.51	61.64	83.5	21.86
11570.00	28.35	Ave.	202	1.2	H	17.51	45.86	63.5	17.64
5825 MHz									
5853.26	32.67	PK	203	1.6	H	39.87	72.54	124.27	51.73
5864.70	33.32	PK	293	2.3	H	39.87	73.19	117.58	44.39
5875.98	33.31	PK	116	1.7	H	39.87	73.18	113.97	40.79
5924.58	32.79	PK	26	2.2	H	39.97	72.76	77.7	4.94
11650.00	43.92	PK	275	1.2	H	16.18	60.10	83.5	23.40
11650.00	28.41	Ave.	275	1.2	H	16.18	44.59	63.5	18.91
802.11n20 (MIMO mode is the worst case)									
5745 MHz									
5649.86	31.25	PK	253	1.5	H	39.46	70.71	77.7	6.99
5695.41	32.62	PK	69	2.0	H	39.49	72.11	111.3	39.19
5717.13	33.43	PK	212	2.1	H	39.49	72.92	119.5	46.58
5724.90	33.15	PK	156	1.0	H	39.49	72.64	131.48	58.84
11490.00	43.62	PK	101	1.5	H	17.47	61.09	83.5	22.41
11490.00	28.74	Ave.	101	1.5	H	17.47	46.21	63.5	17.29
5785 MHz									
11570.00	43.88	PK	13	2.2	H	17.51	61.39	83.5	22.11
11570.00	28.94	Ave.	13	2.2	H	17.51	46.45	63.5	17.05
5825 MHz									
5853.34	34.47	PK	69	1.2	H	39.87	74.34	124.08	49.74
5855.01	33.48	PK	77	1.3	H	39.87	73.35	120.3	46.95
5882.14	33.54	PK	229	2.0	H	39.87	73.41	109.42	36.01
5926.47	33.21	PK	194	1.5	H	39.97	73.18	77.7	4.52
11650.00	43.67	PK	247	1.0	H	16.18	59.85	83.5	23.65
11650.00	28.79	Ave.	247	1.0	H	16.18	44.97	63.5	18.53

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part 15.407/205/209	
	Reading (dBµV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBµV/m)	Margin (dB)
802.11AC20 (MIMO mode is the worst case)									
5745 MHz									
5649.30	31.14	PK	56	1.2	H	39.46	70.60	77.7	7.10
5696.77	32.67	PK	263	2.4	H	39.49	72.16	112.31	40.15
5712.41	33.38	PK	243	1.6	H	39.49	72.87	118.17	45.30
5723.67	33.26	PK	0	1.8	H	39.49	72.75	128.67	55.92
11490.00	43.61	PK	186	2.0	H	17.47	61.08	83.5	22.42
11490.00	28.87	Ave.	186	2.0	H	17.47	46.34	63.5	17.16
5785 MHz									
11570.00	43.68	PK	261	1.2	H	17.51	61.19	83.5	22.31
11570.00	28.92	Ave.	261	1.2	H	17.51	46.43	63.5	17.07
5825 MHz									
5852.90	32.64	PK	255	1.1	H	39.87	72.51	125.1	52.59
5857.44	33.61	PK	55	2.3	H	39.87	73.48	119.62	46.14
5881.91	33.45	PK	332	1.0	H	39.87	73.32	109.59	36.27
5930.50	32.41	PK	210	1.1	H	39.97	72.38	77.7	5.32
11650.00	43.79	PK	302	2.2	H	16.18	59.97	83.5	23.53
11650.00	29.03	Ave.	302	2.2	H	16.18	45.21	63.5	18.29
802.11N40 (MIMO mode is the worst case)									
5755 MHz									
5646.11	31.48	PK	12	1.6	H	39.46	70.94	77.7	6.76
5699.47	32.57	PK	64	2.2	H	39.49	72.06	114.31	42.25
5706.52	33.32	PK	101	1.0	H	39.49	72.81	116.53	43.72
5722.82	33.19	PK	97	1.3	H	39.49	72.68	126.73	54.05
11510.00	43.56	PK	107	1.9	H	17.47	61.03	83.5	22.47
11510.00	29.04	Ave.	107	1.9	H	17.47	46.51	63.5	16.99
5795 MHz									
5854.62	32.42	PK	195	1.8	H	39.87	72.29	121.17	48.88
5855.54	33.64	PK	161	1.4	H	39.87	73.51	120.15	46.64
5884.13	33.39	PK	80	1.0	H	39.87	73.26	107.94	34.68
5937.11	32.49	PK	63	1.7	H	39.97	72.46	77.7	5.24
11590.00	43.82	PK	228	1.0	H	17.51	61.33	83.5	22.17
11590.00	29.23	Ave.	228	1.0	H	17.51	46.74	63.5	16.76

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part 15.407/205/209	
	Reading (dBµV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBµV/m)	Margin (dB)
802.11AC40 (MIMO mode is the worst case)									
5755 MHZ									
5644.98	31.62	PK	324	2.5	H	39.46	71.08	77.7	6.62
5698.05	32.85	PK	312	1.5	H	39.49	72.34	113.26	40.92
5703.35	33.49	PK	346	2.1	H	39.49	72.98	115.64	42.66
5724.96	33.33	PK	232	2.1	H	39.49	72.82	131.61	58.79
11510.00	43.81	PK	252	2.4	H	17.47	61.28	83.5	22.22
11510.00	29.24	Ave.	252	2.4	H	17.47	46.71	63.5	16.79
5795 MHZ									
5854.41	33.16	PK	266	2.2	H	39.87	73.03	121.63	48.60
5864.67	33.84	PK	53	1.2	H	39.87	73.71	117.59	43.88
5884.98	33.51	PK	123	2.2	H	39.87	73.38	107.32	33.94
5928.00	32.16	PK	139	2.1	H	39.97	72.13	77.7	5.57
11590.00	43.74	PK	298	2.0	H	17.51	61.25	83.5	22.25
11590.00	29.17	Ave.	298	2.0	H	17.51	46.68	63.5	16.82
802.11AC80 (MIMO mode is the worst case)									
5775 MHZ									
5645.59	31.55	PK	277	1.3	H	39.46	71.01	77.7	6.69
5696.35	32.81	PK	88	2.3	H	39.49	72.30	112	39.70
5711.18	33.56	PK	329	2.0	H	39.49	73.05	117.83	44.78
5722.54	33.27	PK	74	1.7	H	39.49	72.76	126.09	53.33
5853.34	33.05	PK	209	2.0	H	39.87	72.92	124.08	51.16
5861.66	33.75	PK	60	1.7	H	39.87	73.62	118.44	44.82
5878.64	33.54	PK	293	2.4	H	39.87	73.41	112	38.59
5938.64	32.03	PK	25	2.3	H	39.97	72.00	77.7	5.70
11550.00	43.83	PK	166	1.4	H	17.51	61.34	83.5	22.16
11550.00	29.04	Ave.	166	1.4	H	17.51	46.55	63.5	16.95

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part 15.407/205/209	
	Reading (dBµV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBµV/m)	Margin (dB)
802.11AX20 (MIMO mode is the worst case)									
5745 MHz									
5646.32	31.42	PK	323	2.2	H	39.46	70.88	77.7	6.82
5697.59	32.89	PK	130	2.1	H	39.49	72.38	112.92	40.54
5719.22	33.72	PK	108	1.3	H	39.49	73.21	120.08	46.87
5722.21	33.34	PK	316	2.1	H	39.49	72.83	125.34	52.51
11490.00	44.02	PK	279	2.0	H	17.47	61.49	83.5	22.01
11490.00	29.31	Ave.	279	2.0	H	17.47	46.78	63.5	16.72
5785 MHz									
11570.00	43.89	PK	288	1.1	H	17.51	61.40	83.5	22.10
11570.00	29.24	Ave.	288	1.1	H	17.51	46.75	63.5	16.75
5825 MHz									
5854.80	33.41	PK	238	2.0	H	39.87	73.28	120.75	47.47
5859.33	33.82	PK	56	1.7	H	39.87	73.69	119.09	45.40
5880.23	33.56	PK	234	2.1	H	39.87	73.43	110.83	37.40
5927.47	31.86	PK	69	2.0	H	39.97	71.83	77.7	5.87
11650.00	43.85	PK	175	2.1	H	16.18	60.03	83.5	23.47
11650.00	29.21	Ave.	175	2.1	H	16.18	45.39	63.5	18.11
802.11AX40 (MIMO mode is the worst case)									
5755 MHz									
5644.98	31.62	PK	324	2.5	H	39.46	71.08	77.7	6.62
5698.05	32.85	PK	312	1.5	H	39.49	72.34	113.26	40.92
5703.35	33.49	PK	346	2.1	H	39.49	72.98	115.64	42.66
5724.96	33.33	PK	232	2.1	H	39.49	72.82	131.61	58.79
11510.00	43.57	PK	174	1.1	H	17.47	61.04	83.5	22.46
11510.00	29.13	Ave.	174	1.1	H	17.47	46.60	63.5	16.90
5795 MHz									
5854.41	33.16	PK	266	2.2	H	39.87	73.03	121.63	48.60
5864.67	33.84	PK	53	1.2	H	39.87	73.71	117.59	43.88
5884.98	33.51	PK	123	2.2	H	39.87	73.38	107.32	33.94
5928.00	32.16	PK	139	2.1	H	39.97	72.13	77.7	5.57
11590.00	43.66	PK	182	2.2	H	17.51	61.17	83.5	22.33
11590.00	29.15	Ave.	182	2.2	H	17.51	46.66	63.5	16.84

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407/205/209	
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
802.11AX80 (MIMO mode is the worst case)									
5775 MHZ									
5646.72	31.37	PK	344	2.3	H	39.46	70.83	77.7	6.87
5697.06	32.83	PK	107	2.5	H	39.49	72.32	112.52	40.20
5709.04	33.78	PK	171	2.2	H	39.49	73.27	117.23	43.96
5722.26	33.29	PK	169	1.5	H	39.49	72.78	125.45	52.67
5853.05	33.63	PK	343	2.3	H	39.87	73.50	124.75	51.25
5859.80	33.75	PK	329	1.2	H	39.87	73.62	118.96	45.34
5884.17	33.42	PK	38	2.0	H	39.87	73.29	107.91	34.62
5924.88	31.82	PK	168	1.5	H	39.97	71.79	77.7	5.91
11550.00	43.74	PK	220	1.6	H	17.51	61.25	83.5	22.25
11550.00	28.97	Ave.	220	1.6	H	17.51	46.48	63.5	17.02

Note:

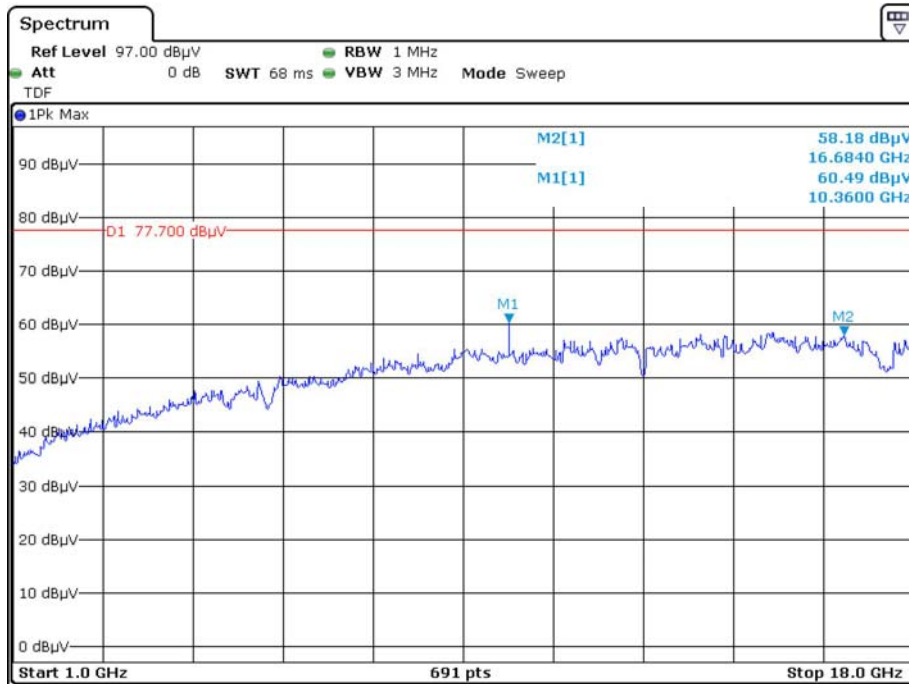
Corrected Amplitude = Corrected Factor + Reading

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

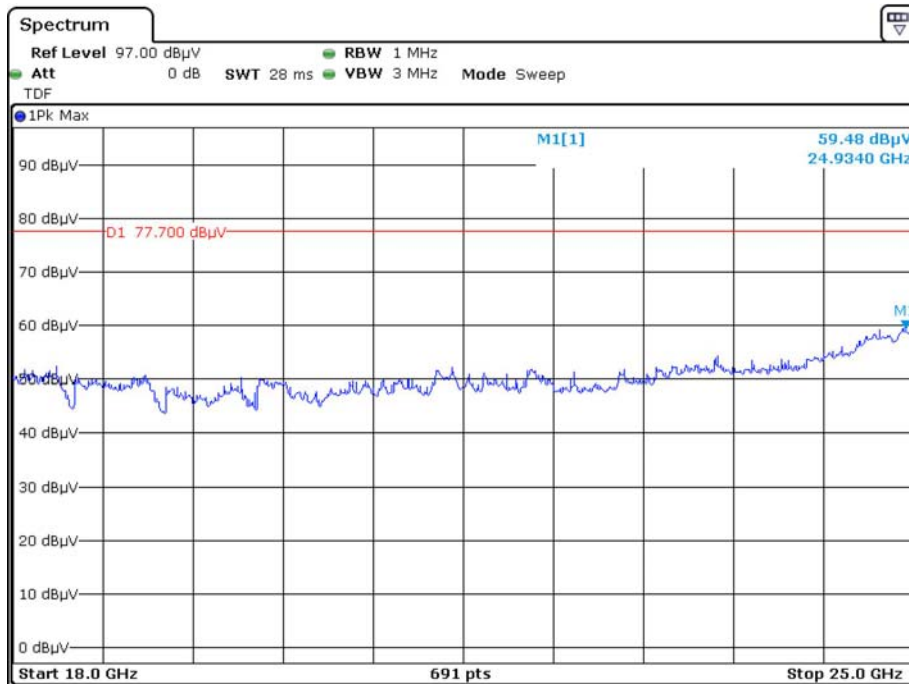
Margin = Limit- Corr. Amplitude

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

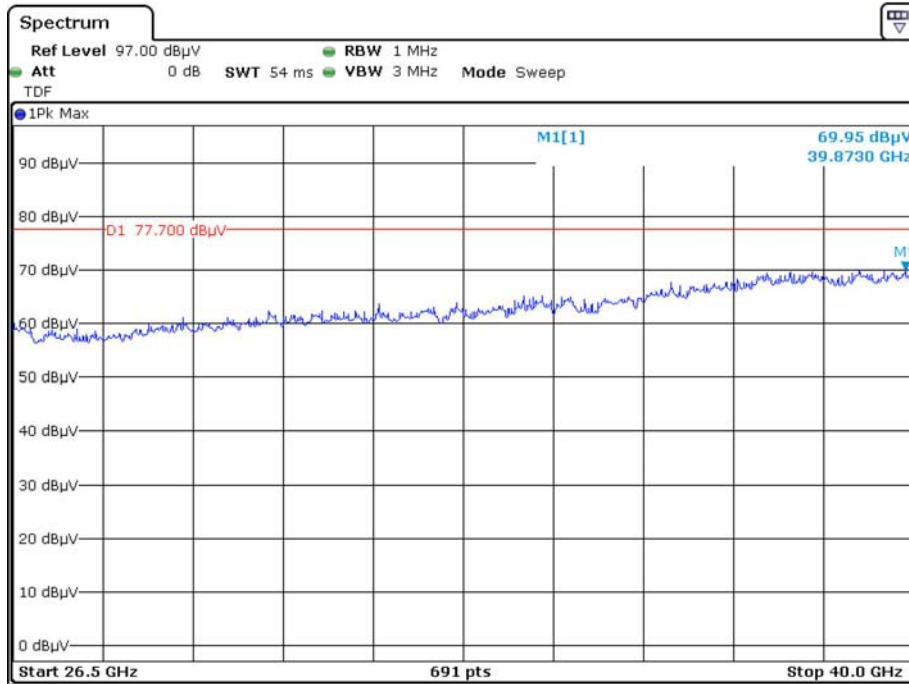
Peak
Pre-scan with 802.11a 5180MHz
Horizontal



Date: 10.APR.2021 18:55:34

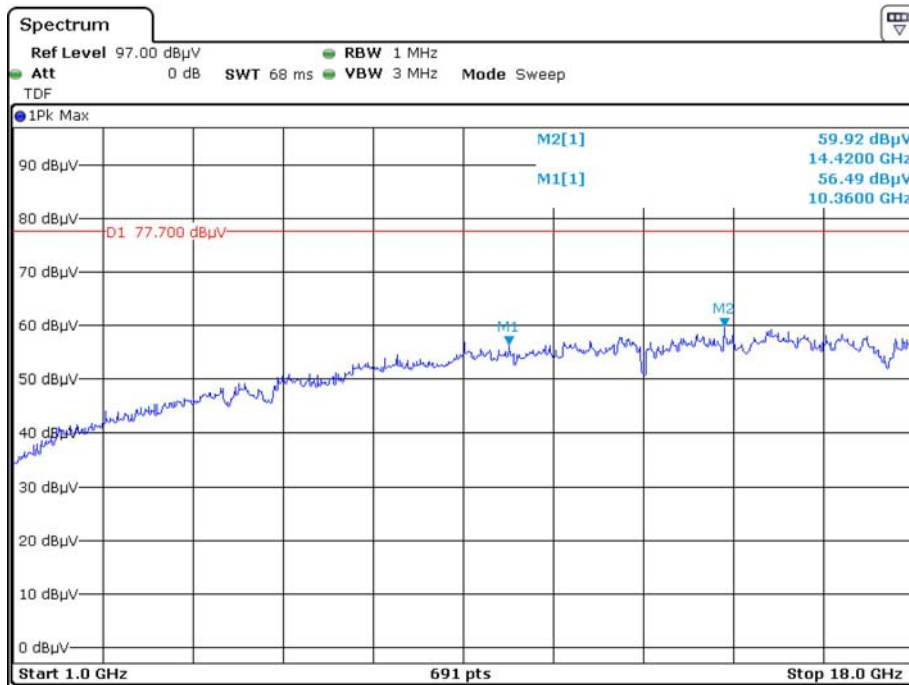


Date: 10.APR.2021 19:31:16

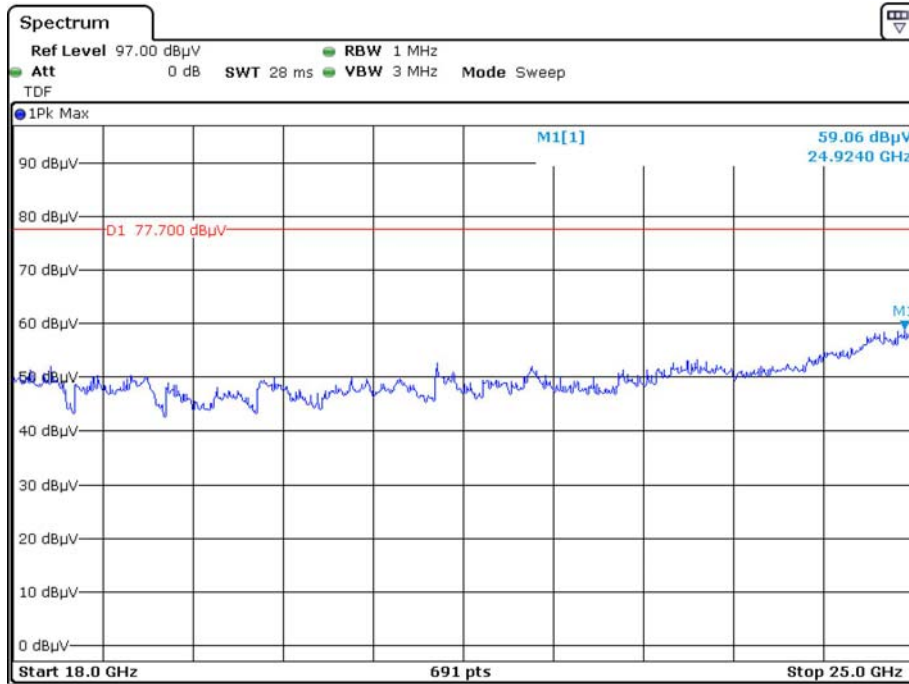


Date: 10.APR.2021 19:41:12

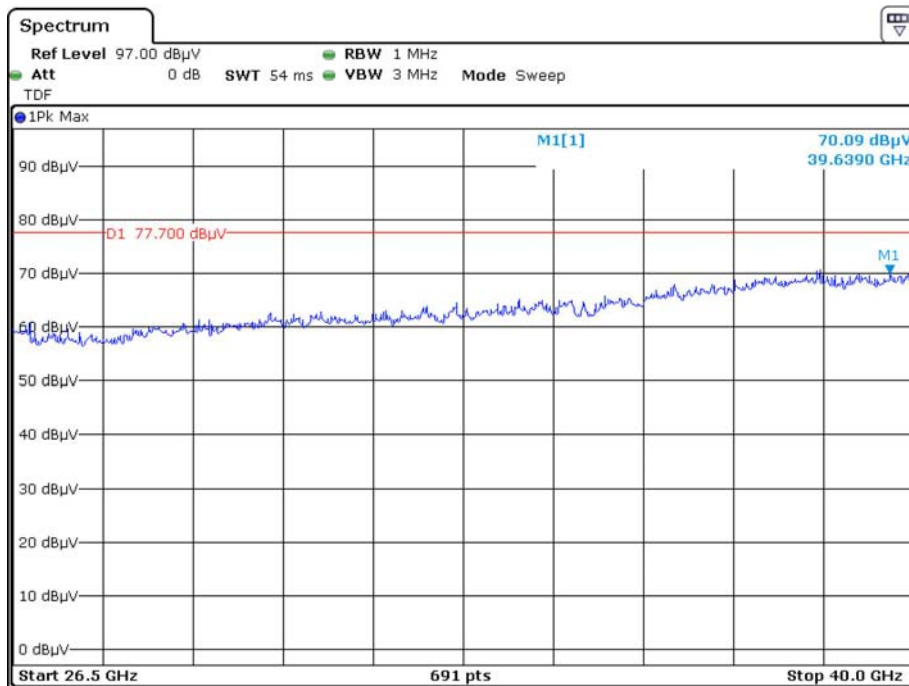
Vertical



Date: 10.APR.2021 19:02:10



Date: 10.APR.2021 19:35:36



Date: 10.APR.2021 19:46:42

FCC §15.407(a) (1) – 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

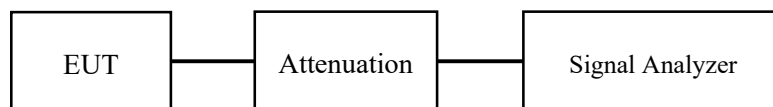
1. Emission Bandwidth (EBW)

- 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 5.715-5.85 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

Temperature:	27 °C
Relative Humidity:	57 %
ATM Pressure:	101.0 kPa

The testing was performed by Bravos Zhao on 2021-07-19.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the Appendix

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

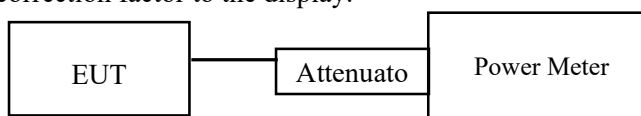
Applicable Standard

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 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

Temperature:	27 °C
Relative Humidity:	57 %
ATM Pressure:	101.0 kPa

The testing was performed by Bravos Zhao on 2021-07-19.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the Appendix

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

Applicable Standard

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 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 $VBW \geq 3 RBW$.
- 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

Temperature:	27 °C
Relative Humidity:	57 %
ATM Pressure:	101.0 kPa

The testing was performed by Bravos Zhao on 2021-07-19.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the Appendix

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

Test Mode	Antenna	Channel	26db EBW [MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	19.040	---	PASS
	Ant0	5180	18.760	---	PASS
	Ant1	5200	18.960	---	PASS
	Ant0	5200	18.800	---	PASS
	Ant1	5240	19.040	---	PASS
	Ant0	5240	18.880	---	PASS
	Ant1	5260	19.040	---	PASS
	Ant0	5260	18.640	---	PASS
	Ant1	5280	19.120	---	PASS
	Ant0	5280	18.720	---	PASS
	Ant1	5320	19.000	---	PASS
	Ant0	5320	18.840	---	PASS
	Ant1	5500	19.040	---	PASS
	Ant0	5500	18.840	---	PASS
	Ant1	5600	18.960	---	PASS
	Ant0	5600	18.840	---	PASS
	Ant1	5720	18.840	---	PASS
	Ant0	5720	18.760	---	PASS
Ant1	5720 UNII-2C	14.4	---	PASS	
Ant0	5720 UNII-2C	14.36	---	PASS	
Ant1	5720 UNII-3	4.44	---	PASS	
Ant0	5720 UNII-3	4.4	---	PASS	
11N20MIMO	Ant1	5180	19.680	---	PASS
	Ant0	5180	19.920	---	PASS
	Ant1	5200	19.840	---	PASS
	Ant0	5200	19.720	---	PASS
	Ant1	5240	19.960	---	PASS
	Ant0	5240	19.640	---	PASS
	Ant1	5260	19.800	---	PASS
	Ant0	5260	19.760	---	PASS
	Ant1	5280	19.880	---	PASS
	Ant0	5280	19.960	---	PASS
	Ant1	5320	20.160	---	PASS
	Ant0	5320	19.760	---	PASS
	Ant1	5500	19.800	---	PASS
	Ant0	5500	19.720	---	PASS
	Ant1	5600	19.800	---	PASS
	Ant0	5600	19.840	---	PASS
	Ant1	5720	20.040	---	PASS
	Ant0	5720	19.760	---	PASS
Ant1	5720 UNII-2C	14.84	---	PASS	
Ant0	5720 UNII-2C	14.84	---	PASS	
Ant1	5720 UNII-3	5.2	---	PASS	
Ant0	5720 UNII-3	4.92	---	PASS	
11N40MIMO	Ant1	5190	39.200	---	PASS
	Ant0	5190	39.760	---	PASS
	Ant1	5230	39.200	---	PASS
	Ant0	5230	39.920	---	PASS
	Ant1	5270	39.200	---	PASS
	Ant0	5270	39.840	---	PASS
	Ant1	5310	39.440	---	PASS
	Ant0	5310	39.920	---	PASS
Ant1	5510	39.040	---	PASS	

	Ant0	5510	40.000	---	PASS
	Ant1	5550	39.040	---	PASS
	Ant0	5550	39.680	---	PASS
	Ant1	5710	39.360	---	PASS
	Ant0	5710	39.760	---	PASS
	Ant1	5710 UNII-2C	34.6	---	PASS
	Ant0	5710 UNII-2C	34.84	---	PASS
	Ant1	5710 UNII-3	4.76	---	PASS
	Ant0	5710 UNII-3	4.92	---	PASS
11AC20MIMO	Ant1	5180	19.640	---	PASS
	Ant0	5180	19.920	---	PASS
	Ant1	5200	19.640	---	PASS
	Ant0	5200	19.920	---	PASS
	Ant1	5240	19.760	---	PASS
	Ant0	5240	19.760	---	PASS
	Ant1	5260	19.960	---	PASS
	Ant0	5260	19.640	---	PASS
	Ant1	5280	19.680	---	PASS
	Ant0	5280	19.680	---	PASS
	Ant1	5320	20.080	---	PASS
	Ant0	5320	19.880	---	PASS
	Ant1	5500	19.560	---	PASS
	Ant0	5500	19.880	---	PASS
	Ant1	5600	20.360	---	PASS
	Ant0	5600	19.680	---	PASS
	Ant1	5720	19.800	---	PASS
	Ant0	5720	20.200	---	PASS
	Ant1	5720 UNII-2C	14.88	---	PASS
	Ant0	5720 UNII-2C	15.28	---	PASS
Ant1	5720 UNII-3	4.92	---	PASS	
Ant0	5720 UNII-3	4.92	---	PASS	
11AC40MIMO	Ant1	5190	39.120	---	PASS
	Ant0	5190	40.080	---	PASS
	Ant1	5230	39.280	---	PASS
	Ant0	5230	40.080	---	PASS
	Ant1	5270	39.440	---	PASS
	Ant0	5270	39.920	---	PASS
	Ant1	5310	39.440	---	PASS
	Ant0	5310	40.000	---	PASS
	Ant1	5510	39.360	---	PASS
	Ant0	5510	40.000	---	PASS
	Ant1	5550	39.040	---	PASS
	Ant0	5550	39.920	---	PASS
	Ant1	5710	39.360	---	PASS
	Ant0	5710	40.160	---	PASS
	Ant1	5710 UNII-2C	34.68	---	PASS
	Ant0	5710 UNII-2C	35	---	PASS
Ant1	5710 UNII-3	4.68	---	PASS	
Ant0	5710 UNII-3	5.16	---	PASS	
11AC80MIMO	Ant1	5210	82.080	---	PASS
	Ant0	5210	82.400	---	PASS
	Ant1	5290	82.080	---	PASS
	Ant0	5290	82.400	---	PASS
	Ant1	5530	82.240	---	PASS
	Ant0	5530	83.040	---	PASS
	Ant1	5610	81.920	---	PASS
	Ant0	5610	82.400	---	PASS
	Ant1	5690	82.240	---	PASS
	Ant0	5690	82.560	---	PASS
	Ant1	5690 UNII-2C	76.12	---	PASS
	Ant0	5690 UNII-2C	76.12	---	PASS

	Ant1	5690 UNII-3	6.12	---	PASS
	Ant0	5690 UNII-3	6.44	---	PASS
11AX20MIMO	Ant1	5180	21.320	---	PASS
	Ant0	5180	21.200	---	PASS
	Ant1	5200	21.640	---	PASS
	Ant0	5200	21.040	---	PASS
	Ant1	5240	21.240	---	PASS
	Ant0	5240	21.040	---	PASS
	Ant1	5260	21.600	---	PASS
	Ant0	5260	21.360	---	PASS
	Ant1	5280	21.920	---	PASS
	Ant0	5280	21.600	---	PASS
	Ant1	5320	21.240	---	PASS
	Ant0	5320	21.200	---	PASS
	Ant1	5500	21.400	---	PASS
	Ant0	5500	21.120	---	PASS
	Ant1	5600	21.880	---	PASS
	Ant0	5600	21.120	---	PASS
	Ant1	5720	21.280	---	PASS
	Ant0	5720	21.920	---	PASS
	Ant1	5720 UNII-2C	15.56	---	PASS
	Ant0	5720 UNII-2C	15.96	---	PASS
Ant1	5720 UNII-3	5.72	---	PASS	
Ant0	5720 UNII-3	5.96	---	PASS	
11AX40MIMO	Ant1	5190	44.560	---	PASS
	Ant0	5190	44.400	---	PASS
	Ant1	5230	44.400	---	PASS
	Ant0	5230	44.320	---	PASS
	Ant1	5270	44.160	---	PASS
	Ant0	5270	44.960	---	PASS
	Ant1	5310	45.200	---	PASS
	Ant0	5310	44.240	---	PASS
	Ant1	5510	44.400	---	PASS
	Ant0	5510	43.920	---	PASS
	Ant1	5550	44.240	---	PASS
	Ant0	5550	45.440	---	PASS
	Ant1	5710	43.920	---	PASS
	Ant0	5710	44.640	---	PASS
	Ant1	5710 UNII-2C	37.08	---	PASS
	Ant0	5710 UNII-2C	37.24	---	PASS
Ant1	5710 UNII-3	6.84	---	PASS	
Ant0	5710 UNII-3	7.4	---	PASS	
11AX80MIMO	Ant1	5210	88.960	---	PASS
	Ant0	5210	87.840	---	PASS
	Ant1	5290	89.120	---	PASS
	Ant0	5290	88.640	---	PASS
	Ant1	5530	88.480	---	PASS
	Ant0	5530	88.640	---	PASS
	Ant1	5610	89.280	---	PASS
	Ant0	5610	87.840	---	PASS
	Ant1	5690	88.480	---	PASS
	Ant0	5690	89.440	---	PASS
	Ant1	5690 UNII-2C	80.28	---	PASS
	Ant0	5690 UNII-2C	80.6	---	PASS
	Ant1	5690 UNII-3	8.2	---	PASS
	Ant0	5690 UNII-3	8.84	---	PASS

Test Graphs

