



FCC RF Test Report

APPLICANT : MTRLC LLC
EQUIPMENT : D3.1 Cable Modem plus AX3000 Router
BRAND NAME : Motorola
MODEL NAME : G11
FCC ID : 2AF5PG11
STANDARD : FCC Part 15 Subpart E §15.407
CLASSIFICATION : (NII) Unlicensed National Information Infrastructure
TEST DATE(S) : Dec. 29, 2022 ~ Feb. 06, 2023

We, Sporton International Inc. (ShenZhen), would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (ShenZhen), the test report shall not be reproduced except in full.

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Approved by: Jason Jia



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People's Republic of China



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR2D1901B	Rev. 01	Initial issue of report	Feb. 20, 2023



SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit for U-NII-1/2A/2C	Limit for U-NII-3	Result	Remark
3.1	2.1049 & 15.403(i)	6dB, 26dB & 99% Bandwidth	-	6dB Bandwidth > 500kHz	Pass	-
3.2	15.407(a)	Maximum Conducted Output Power/EIRP	≤ 30 dBm for UNII-1, and 24 dBm for UNII-2A/2C	≤ 30 dBm	Pass	-
3.3	15.407(a)	Power Spectral Density	≤ 17 dBm/MHz for UNII-1, and 11 dBm/MHz for UNII-2A/2C	≤ 30 dBm/500kHz	Pass	-
3.4	15.407(b)	Unwanted Emissions	15.407(b) & 15.209(a)	15.407(b)(4)(i) & 15.209(a)	Pass	Under limit 0.10 dB at 5445.760 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	15.207(a)	Pass	Under limit 11.50 dB at 12.850 MHz
3.6	15.203 & 15.407(a)	Antenna Requirement	N/A	N/A	Pass	-

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.



1 General Description

1.1 Applicant

MTRLC LLC
275 Turnpike Street Suite 101 Canton, MA 02021

1.2 Manufacturer

MTRLC LLC
275 Turnpike Street Suite 101 Canton, MA 02021

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	D3.1 Cable Modem plus AX3000 Router
Brand Name	Motorola
Model Name	G11
FCC ID	2AF5PG11
HW Version	REV1.0
SW Version	G11-22.3.3 DAG
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.



1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Frequency Range	5180 MHz ~ 5240 MHz 5260 MHz ~ 5320 MHz 5500 MHz ~ 5700 MHz 5745 MHz ~ 5825 MHz
Maximum Output Power to Antenna	<CDD Mode> <5180 MHz ~ 5240 MHz> 802.11a : 27.69 dBm / 0.5875 W 802.11n HT20 : 28.15 dBm / 0.6531 W 802.11n HT40 : 29.59 dBm / 0.9099 W 802.11ac VHT20: 28.11 dBm / 0.6471 W 802.11ac VHT40: 29.54 dBm / 0.8995 W 802.11ac VHT80: 22.39 dBm / 0.1734 W 802.11ax HE20: 28.29 dBm / 0.6745 W 802.11ax HE40: 29.63 dBm / 0.9183 W 802.11ax HE80: 22.41 dBm / 0.1742 W 802.11ax HE160: 17.81 dBm / 0.0604 W <5260 MHz ~ 5320 MHz> 802.11a : 21.81 dBm / 0.1517 W 802.11n HT20 : 22.60 dBm / 0.1820 W 802.11n HT40 : 23.68 dBm / 0.2333 W 802.11ac VHT20: 22.57 dBm / 0.1807 W 802.11ac VHT40: 23.63 dBm / 0.2307 W 802.11ac VHT80: 19.70 dBm / 0.0933 W 802.11ax HE20: 22.73 dBm / 0.1875 W 802.11ax HE40: 23.73 dBm / 0.2360 W 802.11ax HE80: 20.05 dBm / 0.1012 W 802.11ax HE160: 17.81 dBm / 0.0604 W <5500 MHz ~ 5700 MHz > 802.11a : 21.90 dBm / 0.1549 W 802.11n HT20 : 22.31 dBm / 0.1702 W 802.11n HT40 : 23.79 dBm / 0.2393 W 802.11ac VHT20: 22.28 dBm / 0.1690 W 802.11ac VHT40: 23.72 dBm / 0.2355 W 802.11ac VHT80: 23.61 dBm / 0.2296 W 802.11ax HE20: 22.44 dBm / 0.1754 W 802.11ax HE40: 23.83 dBm / 0.2415 W 802.11ax HE80: 23.78 dBm / 0.2388 W 802.11ax HE160: 20.69 dBm / 0.1172 W <5745 MHz ~ 5825 MHz> 802.11a : 28.99 dBm / 0.7925 W 802.11n HT20 : 29.65 dBm / 0.9226 W 802.11n HT40 : 28.86 dBm / 0.7691 W 802.11ac VHT20: 29.60 dBm / 0.9120 W 802.11ac VHT40: 28.84 dBm / 0.7656 W 802.11ac VHT80: 25.07 dBm / 0.3214 W 802.11ax HE20: 29.73 dBm / 0.9397 W 802.11ax HE40: 28.88 dBm / 0.7727 W 802.11ax HE80: 25.10 dBm / 0.3236 W

99% Occupied Bandwidth	<5180 MHz ~ 5240 MHz> 802.11a : 18.10 MHz 802.11ax HE20: 19.66 MHz 802.11ax HE40: 42.52 MHz 802.11ax HE80: 77.36 MHz 802.11ax HE160: 156.32 MHz <5260 MHz ~ 5320 MHz> 802.11a : 17.78 MHz 802.11ax HE20: 19.38 MHz 802.11ax HE40: 37.80 MHz 802.11ax HE80: 77.36 MHz 802.11ax HE160: 78.00 MHz <5500 MHz ~ 5700 MHz> 802.11a : 17.74 MHz 802.11ax HE20: 19.42 MHz 802.11ax HE40: 37.72 MHz 802.11ax HE80: 77.68 MHz 802.11ax HE160: 155.68 MHz <5745 MHz ~ 5825 MHz> 802.11a : 23.02 MHz 802.11ax HE20: 23.06 MHz 802.11ax HE40: 47.79 MHz 802.11ax HE80: 90.95 MHz		
Antenna Type / Gain	<5180 MHz ~ 5240 MHz> <Ant. 1/2> : Dipole Antenna with gain 3.5 dBi <5260 MHz ~ 5320 MHz> <Ant. 1/2> : Dipole Antenna with gain 3.5 dBi <5500 MHz ~ 5700 MHz> <Ant. 1/2> : Dipole Antenna with gain 3.5 dBi <5745 MHz ~ 5825 MHz> <Ant. 1/2> : Dipole Antenna with gain 3.5 dBi		
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac/ax : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM / 1024QAM)		
Antenna Function Description		Ant. 1	Ant. 2
	802.11a/n/ac/ax SISO	V	V
	802.11a/n/ac/ax CDD/Beamforming	V	

Note:

1. For WLAN SISO & MIMO mode, the whole testing has assessed only MIMO mode by referring to the higher normal conducted power.
2. For 802.11n HT20 / ac VHT20 / ax HE20 and 802.11n HT40 / ac VHT40 / ax HE40 and 802.11ac VHT80 / ax HE80 mode the whole testing have assessed only 802.11ax HE20/ HE40/HE80 by referring to the higher output power for OB/PSD/RSE testing.
3. The TxBF Power/EIRP of EUT will less than CDD mode power/EIRP when Beamforming mode is active. So we only evaluate CDD mode by referring to their maximum conducted power/EIRP.
4. The device does not support partial RU for 802.11ax mode.
5. The device support TPC mechanism.



1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Testing Location

Sporton International Inc. (ShenZhen) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Test Firm	Sporton International Inc. (ShenZhen)		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	CO01-SZ TH01-SZ	CN1256	421272

Test Firm	Sporton International Inc. (ShenZhen)		
Test Site Location	101, 1st Floor, Block B, Building 1, No. 2, Tengfeng 4th Road, Fenghuang Community, Fuyong Street, Baoan District, Shenzhen City Guangdong Province China 518103 TEL: +86-755-33202398		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	03CH03-SZ	CN1256	421272

1.7 Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH03-SZ	AUDIX	E3	6.2009-8-24
2.	CO01-SZ	AUDIX	E3	6.120613b



1.8 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR Part 15 Subpart E
- ♦ FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
- ♦ FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ♦ ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

- a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Y plane) were recorded in this report.
- b. AC power line Conducted Emission was tested under maximum output power.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5180-5240 MHz U-NII-1	36	5180	44	5220
	38*	5190	46*	5230
	40	5200	48	5240
	42 [#]	5210		

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5260-5320 MHz U-NII-2A	52	5260	60	5300
	54*	5270	62*	5310
	56	5280	64	5320
	58 [#]	5290		

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5470-5725 MHz U-NII-2C	100	5500	114 ^s	5570
	102*	5510	116	5580
	104	5520	132	5660
	106 [#]	5530	134*	5670
	108	5540	136	5680
	110*	5550	140	5700
	112	5560		

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5745-5825 MHz U-NII-3	149	5745	157	5785
	151 [*]	5755	159 [*]	5795
	153	5765	161	5805
	155 [#]	5775	165	5825

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
TDWR Channel	118 [*]	5590	124	5620
	120	5600	126 [*]	5630
	122 [#]	5610	128	5640

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
Straddle Channel	50 ^{\$}	5250		

Note:

1. The above Frequency and Channel in "^{*}" were 802.11n HT40 and 802.11ac VHT40 and 802.11ax HE40.
2. The above Frequency and Channel in "[#]" were 802.11ac VHT80 and 802.11ax HE80.
3. The above Frequency and Channel in "^{\$}" were 802.11ax HE160.

2.2 Test Mode

Final test modes are considering the modulation and worse data rates as below table.

CDD Mode

Modulation	Data Rate
802.11a	6 Mbps
802.11ax HE20	MCS0
802.11ax HE40	MCS0
802.11ax HE80	MCS0
802.11ax HE160	MCS0

AC Conducted Emission	Mode 1 : EUT + WIFI(5G) Link + Power from Adapter
Remark: For Radiated Test Cases, The tests were performance with Adapter.	



Ch. #		U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
		802.11a	802.11a	802.11a	802.11a
L	Low	36	52	100	149
M	Middle	44	60	116	157
H	High	48	64	140	165

Ch. #		U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
		802.11ax HE20	802.11ax HE20	802.11ax HE20	802.11ax HE20
L	Low	36	52	100	149
M	Middle	44	60	116	157
H	High	48	64	140	165

Ch. #		U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
		802.11ax HE40	802.11ax HE40	802.11ax HE40	802.11ax HE40
L	Low	38	54	102	151
M	Middle	-	-	110	-
H	High	46	62	134	159

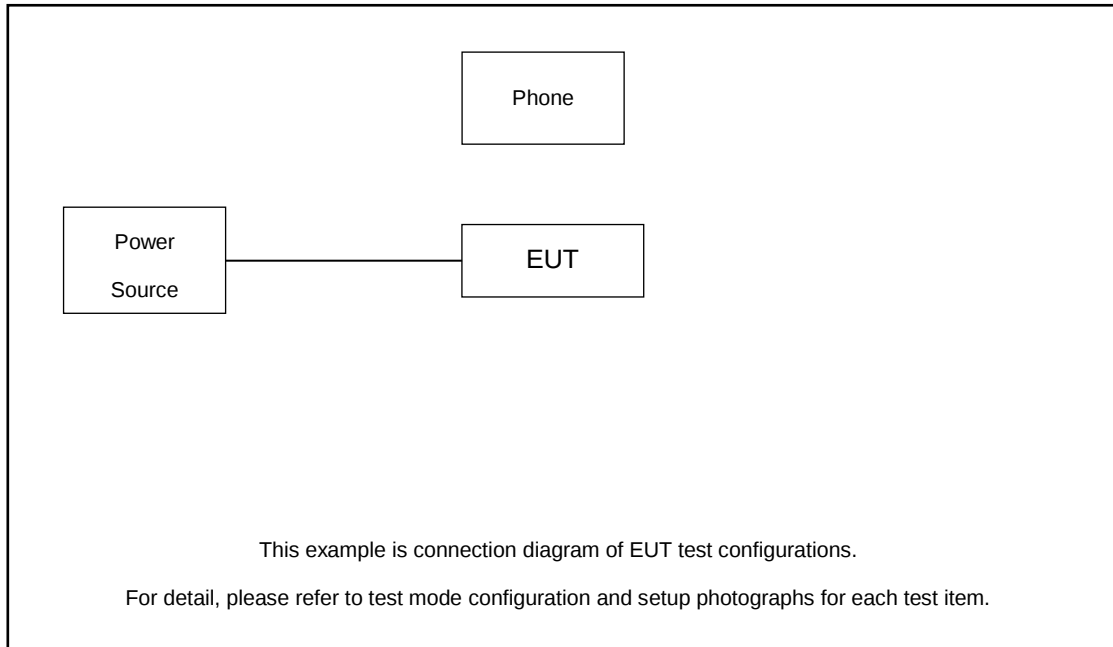
Ch. #		U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
		802.11ax HE80	802.11ax HE80	802.11ax HE80	802.11ax HE80
L	Low	-	-	106	-
M	Middle	42	58	-	155
H	High	-	-	-	-

Ch. #		U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
		802.11ax HE160	802.11ax HE160	802.11ax HE160	802.11ax HE160
M	Middle	50		114	-

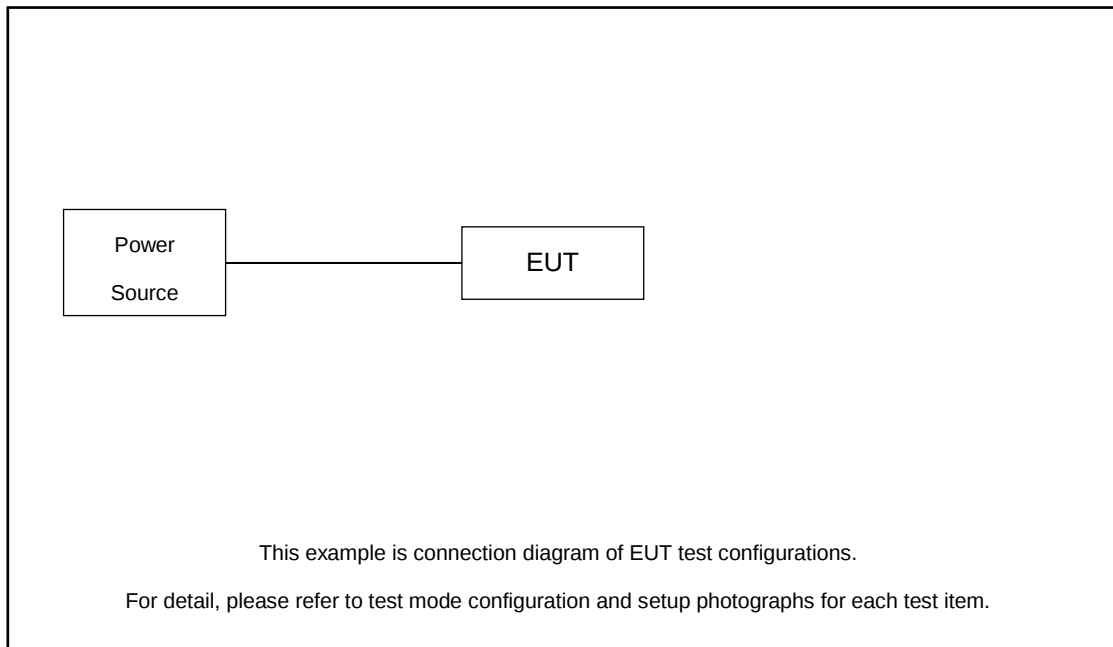
Remark: For radiation spurious emission, the final modulation and the worst data rate was reference the max RF conducted power.

2.3 Connection Diagram of Test System

For Conducted Emission:



For Radiated Emission:





2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Phone	NA	NA	NA	NA	NA

2.5 EUT Operation Test Setup

For WLAN RF test items, an engineering test program was provided and enabled to make EUT continuously transmit/receive.

For AC power line conducted emissions, the EUT was set to connect with phone under large package sizes transmission.

2.6 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example :

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 5.0 dB and 20dB attenuator.

$$\begin{aligned}\text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)} \\ &= 5.0 + 20 = 25.0 \text{ (dB)}\end{aligned}$$



3 Test Result

3.1 6dB and 26dB and 99% Occupied Bandwidth Measurement

3.1.1 Description of 6dB and 26dB and 99% Occupied Bandwidth

The minimum 6 dB bandwidth shall be at least 500 kHz.

26dB and 99% Occupied bandwidth are reporting only.

3.1.2 Measuring Instruments

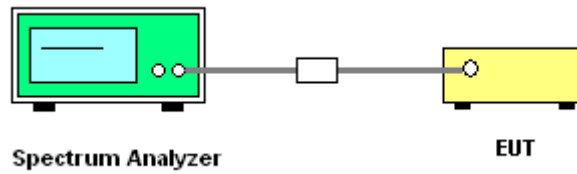
The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

☒	Section C) Bandwidth Measurement 1. Emission Bandwidth (EBW) and 99% OBW
	1. Set RBW = approximately 1% of the emission bandwidth. 2. Set the VBW > RBW. 3. Detector = Peak. 4. Trace mode = max hold 5. Measure the maximum width of the emission that is 26 dB down from the peak 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%. 6. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set to 1%~5% of the OBW and set the Video bandwidth (VBW) $\geq 3 * RBW$. 7. Measure and record the results in the test report.
☒	Section C) Bandwidth Measurement 2. Minimum Emission Bandwidth for the band 5.725 - 5.85 GHz
	1. Set RBW = 100kHz. 2. Set the VBW $\geq 3 * RBW$. 3. Detector = Peak. 4. Trace mode = max hold 5. Measure the maximum width of the emission that is 6 dB down from the peak of the emission. 6. Measure and record the results in the test report.

3.1.4 Test Setup



3.1.5 Test Result of 6dB & 26dB & 99% Bandwidth

Please refer to Appendix A.

3.2 Maximum Conducted Output Power Measurement

3.2.1 Limit of Maximum Conducted Output Power

<FCC 14-30 CFR 15.407>

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.

For the 5.25–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm $10 \log B$, where B is the 26 dB emission bandwidth in megahertz.

For the band 5.725–5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Note that U-NII-2 band, devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

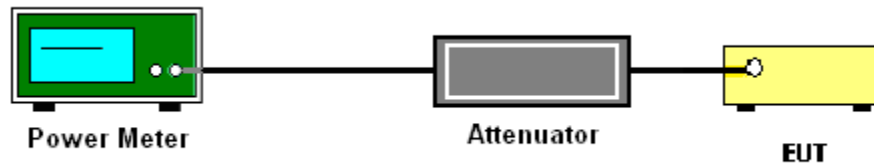
3.2.3 Test Procedures

The testing follows Method PM of FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

Method PM (Measurement using an RF average power meter):

1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit continuously with a consistent duty cycle at its maximum power control level.
3. Measure the average power of the transmitter, and the average power is corrected with duty factor, $10 \log(1/x)$, where x is the duty cycle.
4. For MIMO mode, the measure-and-sum technique should be used for measuring the in-band transmit power of a device.

3.2.4 Test Setup



3.2.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.



3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

<FCC 14-30 CFR 15.407>

For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band.

For the 5.25–5.725 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

For the band 5.725–5.85 GHz, 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, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.



3.3.3 Test Procedures

The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r04.

Section F) Maximum power spectral density.

For devices operating in the bands 5.15 - 5.25 GHz, 5.25 - 5.35 GHz, and 5.47 - 5.725 GHz

Method SA-2

(trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction).

- Measure the duty cycle.
- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 1 MHz.
- Set VBW $\geq$ 3 MHz.
- Number of points in sweep $\geq$ 2 Span / RBW.
- Sweep time = auto.
- Detector = RMS
- Trace average at least 100 traces in power averaging mode.
- Add $10 \log(1/x)$, where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, add $10 \log(1/0.25) = 6$ dB if the duty cycle is 25 percent.

For devices operating in the band 5.725 - 5.85 GHz

Method SA-2

(trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction).

- Measure the duty cycle.
- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 500KHz (or 300 kHz if the SA can't set RBW=500KHz).
- Set VBW $\geq$ 1 MHz.
- Number of points in sweep $\geq$ 2 Span / RBW.
- Sweep time = auto.
- Detector = RMS
- Trace average at least 100 traces in power averaging mode.
- If the SA can't set RBW=500KHz, then add $10 \log(500\text{kHz}/\text{RBW})$ to the test result.
- Add $10 \log(1/x)$, where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, add $10 \log(1/0.25) = 6$ dB if the duty cycle is 25 percent.

1. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
2. Each plot has already offset with cable loss, and attenuator loss. Measure the PPSD and record it.
3. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

Method (a): Measure and sum the spectra across the outputs.

The total final Power Spectral Density is the bin-by-bin summation to obtain the combined spectrum. For the device with 2 transmitter outputs. The spectrum measurements of the individual outputs are all performed with the same span and number of points, the spectrum value in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 to obtain the value for the first frequency bin of the summed spectrum.

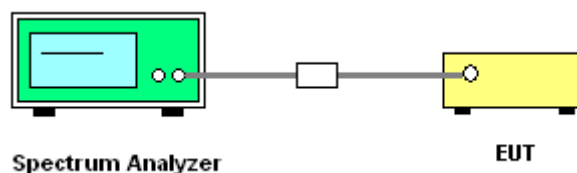
Method (b): Measure and sum spectral maxima across the outputs.

The measurement on each individual output were performed with the same span and number on each individual output. The maximum value (peak) of each spectrum is determined. These maximum values are then summed mathematically in linear power units across the outputs.

Method (c): Measure and add $10 \log(N_{\text{ANT}})$ dB, where N_{ANT} is the number of outputs.

The measurement on each individual output were performed with the same span and number on each individual output. The quantity $10 \log(N_{\text{ANT}})$ dB is added to each spectrum value before comparing to the emission limit.

3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

3.4 Unwanted Emissions Measurement

This section as specified in FCC Part 15.407(b) is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement. The unwanted emissions shall comply with 15.407(b)(1) to (6), and restricted bands per FCC Part 15.205.

3.4.1 Limit of Unwanted Emissions

- (1) For transmitters operating in the 5150-5250 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of -27dBm/MHz.

For transmitters operating in the 5250-5350 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5250-5350 MHz band that generate emissions in the 5150-5250 MHz band must meet all applicable technical requirements for operation in the 5150-5250 MHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5150-5250 MHz band.

For transmitters operating in the 5470-5600 MHz and 5650-5725MHz band: all emissions outside of the 5470-5600 MHz and 5650-5725MHz band shall not exceed an EIRP of -27 dBm/MHz.

- (2) For transmitters operating in the 5.725-5.85 GHz band:
- 15.407(b)(4)(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.

(3) Unwanted spurious emissions fallen in restricted bands shall comply with the general field strength limits as below table,

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

(4) EIRP (dBm)	Field Strength at 3m (dBμV/m)
- 27	68.3

Note: The following formula is used to convert the EIRP to field strength.

$$\text{EIRP} = E_{\text{Meas}} + 20\log(d_{\text{Meas}}) - 104.77$$

where

EIRP is the equivalent isotropically radiated power, in dBm

E_{Meas} is the field strength of the emission at the measurement distance, in dBμV/m

d_{Meas} is the measurement distance, in m

3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

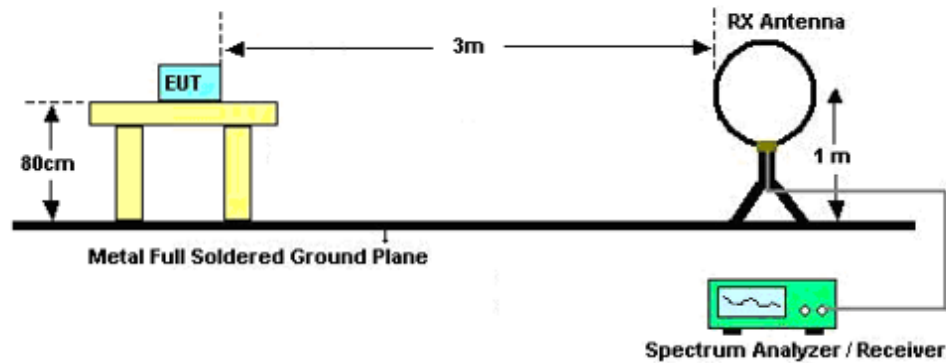
3.4.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r04.
Section G) Unwanted emissions measurement.
 - (1) Procedure for Unwanted Emissions Measurements Below 1000MHz
 - RBW = 120 kHz
 - VBW = 300 kHz
 - Detector = Peak
 - Trace mode = max hold
 - (2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz
 - RBW = 1 MHz
 - VBW $\geq$ 3 MHz
 - Detector = Peak
 - Sweep time = auto
 - Trace mode = max hold
 - (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz
 - RBW = 1 MHz
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW $\geq$ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
 - (4) Procedures for Average Unwanted Emissions Measurements Above 1000MHz
 - RBW = 1 MHz
 - VBW = 3 MHz
 - Detector = power averaging (rms), set span/(# of points in sweep) $\geq$ RBW/2.
 - Averaging type = power averaging(RMS)
 - The correction factor shall be offset is $10 \log (1/x)$, where x is the duty cycle.
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.

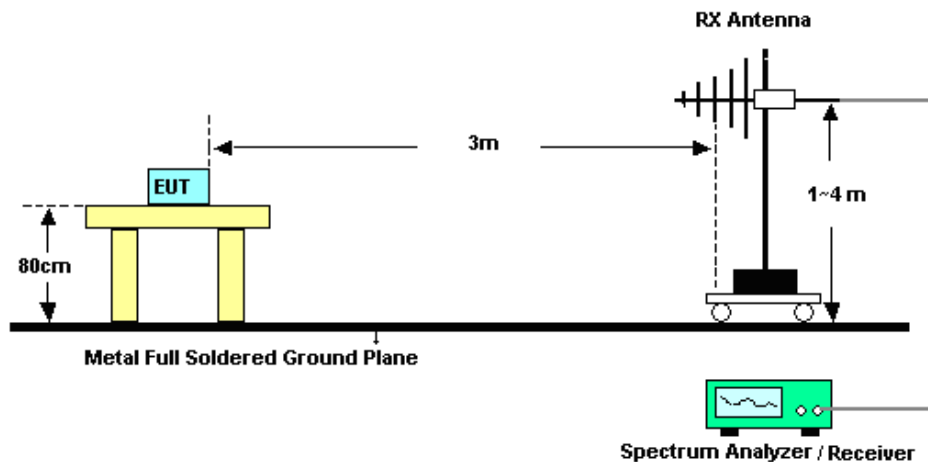
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

3.4.4 Test Setup

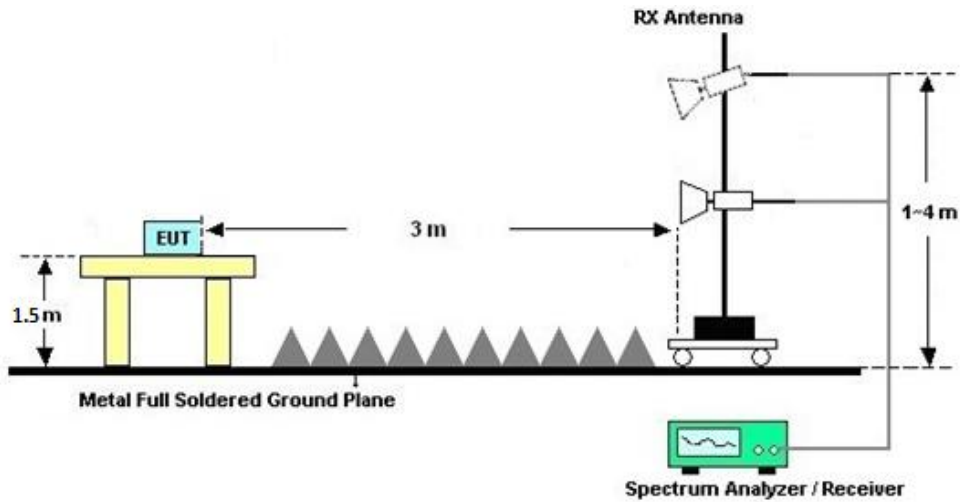
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.4.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

3.4.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C&D.

3.4.7 Duty Cycle

Please refer to Appendix E.

3.4.8 Test Result of Radiated Spurious Emissions (30MHz ~ 10th Harmonic)

Please refer to Appendix C&D.

3.5 AC Conducted Emission Measurement

3.5.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

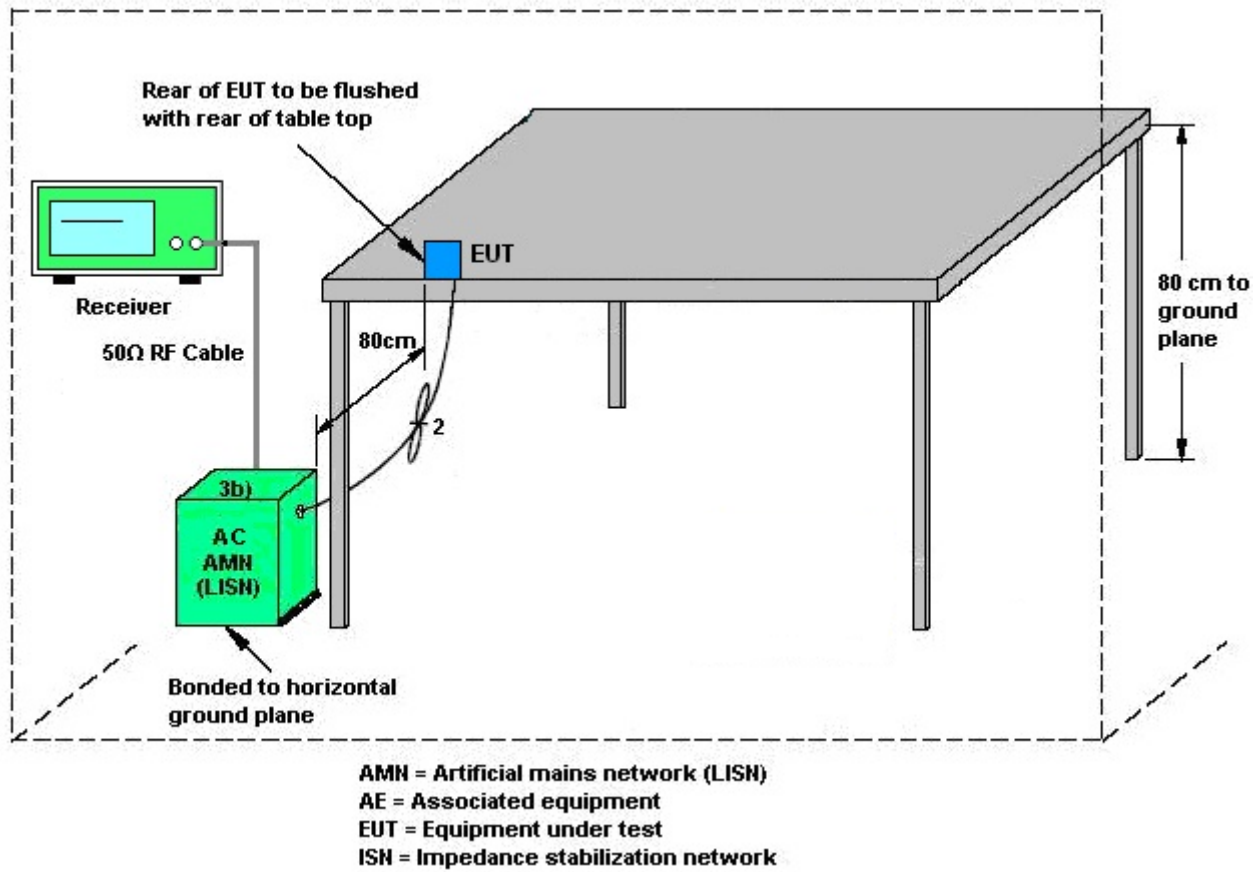
3.5.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.5.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

3.5.4 Test Setup



3.5.5 Test Result of AC Conducted Emission

Please refer to Appendix B.

3.6 Antenna Requirements

3.6.1 Standard Applicable

According to FCC 47 CFR Section 15.407(a)(1)(2) ,if transmitting antenna directional gain is greater than 6 dBi, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.6.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.6.3 Antenna Gain

<CDD Modes >

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

For power, the directional gain G_{ANT} is set equal to the antenna having the highest gain, i.e.,

Directional gain = $G_{ANT\ MAX}(Ant.1\ Gain, Ant.2\ Gain, \dots) + \text{Array Gain}$, as following table for Power, where Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

For PSD, the directional gain calculation is following,

Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{Gn/20})^2 / N_{ANT}]$ dBi, as following table for PSD.

N_{ANT} = number of transmit antennas

N_{SS} = number of spatial streams. (The worst case directional gain will occur when $N_{SS} = 1$).

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi,

The directional gain "DG" is calculated as following table.

<CDD Modes>						
	Ant. 1	Ant. 2	DG for Power	DG for PSD	Power Limit Reduction	PSD Limit Reduction
	(dBi)	(dBi)	(dBi)	(dBi)	(dB)	(dB)
UNII-1	3.50	3.50	3.50	6.51	0.00	0.51
UNII-2A	3.50	3.50	3.50	6.51	0.00	0.51
UNII-2C	3.50	3.50	3.50	6.51	0.00	0.51
UNII-3	3.50	3.50	3.50	6.51	0.00	0.51

Power limit reduction = Composite gain – 6dBi, (min = 0)

PSD limit reduction = Composite gain + PSD Array gain – 6dBi, (min = 0)

TXBF modes

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

$$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

where

Each antenna is driven by no more than one spatial stream;

N_{SS} = the number of independent spatial streams of data;

N_{ANT} = the total number of antennas

$g_{j,k} = 10^{G_k / 20}$ if the k th antenna is being fed by spatial stream j , or zero if it is not;
 G_k is the gain in dBi of the k th antenna.

The EUT supports beamforming for 802.11a/an/ac/ax modes.

The directional gain calculation is following F)2)e)ii) of KDB 662911 D01 v02r01.

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi,

The directional gain “DG” is calculated as following table.

			DG	DG	Power	PSD
			for	for	Limit	Limit
	Ant 1	Ant 2	Power	PSD	Reduction	Reduction
	(dBi)	(dBi)	(dBi)	(dBi)	(dB)	(dB)
UNII-1	3.50	3.50	6.51	6.51	0.51	0.51
UNII-2A	3.50	3.50	6.51	6.51	0.51	0.51
UNII-2C	3.50	3.50	6.51	6.51	0.51	0.51
UNII-3	3.50	3.50	6.51	6.51	0.51	0.51

Power Limit Reduction = DG(Power) – 6dBi, (min = 0)

PSD Limit Reduction = DG(PSD) – 6dBi, (min = 0)



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101078	10Hz~40GHz	Apr. 07, 2022	Dec. 29, 2022~ Feb. 06, 2023	Apr. 08, 2023	Conducted (TH01-SZ)
Pulse Power Sensor	Anritsu	MA2411B	1339473	30MHz~40GHz	Dec. 27, 2022	Dec. 29, 2022~ Feb. 06, 2023	Dec. 26, 2023	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1542004	50MHz Bandwidth	Dec. 27, 2022	Dec. 29, 2022~ Feb. 06, 2023	Dec. 26, 2023	Conducted (TH01-SZ)
EMI Test Receiver&SA	KEYSIGHT	N9038A	MY544500 83	20Hz~8.4GHz	Apr. 06, 2022	Jan. 09, 2023~ Jan. 31, 2023	Apr. 05, 2023	Radiation (03CH03-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY551502 46	10Hz~44GHz;	Apr. 06, 2022	Jan. 09, 2023~ Jan. 31, 2023	Apr. 05, 2023	Radiation (03CH03-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	Jul. 28, 2022	Jan. 09, 2023~ Jan. 31, 2023	Jul. 27, 2023	Radiation (03CH03-SZ)
Bilog Antenna	TeseQ	CBL6112D	35408	30MHz~2GHz	Aug. 09, 2021	Jan. 09, 2023~ Jan. 31, 2023	Aug. 08, 2023	Radiation (03CH03-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-135 5	1GHz~18GHz	Apr. 08, 2022	Jan. 09, 2023~ Jan. 31, 2023	Apr. 07, 2023	Radiation (03CH03-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Jul. 06, 2022	Jan. 09, 2023~ Jan. 31, 2023	Jul. 05, 2023	Radiation (03CH03-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18GHz~40GHz	Apr. 10, 2022	Jan. 09, 2023~ Jan. 31, 2023	Apr. 09, 2023	Radiation (03CH03-SZ)
Amplifier	Burgeon	BPA-530	102211	0.01Hz ~3000MHz	Oct. 19, 2022	Jan. 09, 2023~ Jan. 31, 2023	Oct. 18, 2023	Radiation (03CH03-SZ)
HF Amplifier	MITEQ	AMF-7D-0010 1800-30-10P-R	1943528	1GHz~18GHz	Oct. 19, 2022	Jan. 09, 2023~ Jan. 31, 2023	Oct. 18, 2023	Radiation (03CH03-SZ)
Amplifier	Agilent Technologies	83017A	MY395013 02	500MHz~26.5G Hz	Dec. 26, 2022	Jan. 09, 2023~ Jan. 31, 2023	Dec. 25, 2023	Radiation (03CH03-SZ)
AC Power Source	Chroma	61601	616010002 729	1 N/A	Nov. 10, 2022	Jan. 09, 2023~ Jan. 31, 2023	Nov. 09, 2023	Radiation (03CH03-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Jan. 09, 2023~ Jan. 31, 2023	NCR	Radiation (03CH03-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Jan. 09, 2023~ Jan. 31, 2023	NCR	Radiation (03CH03-SZ)
EMI Receiver	R&S	ESR7	101630	9kHz~7GHz;	Jul. 07, 2022	Jan. 10, 2023	Jul. 06, 2023	Conduction (CO01-SZ)
AC LISN	R&S	ENV216	100063	9kHz~30MHz	Sep. 15, 2022	Jan. 10, 2023	Sep. 14, 2023	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	EMCO	3816/2SH	00103892	9kHz~30MHz	Oct. 17, 2022	Jan. 10, 2023	Oct. 16, 2023	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000 891	100Vac~250Vac	Jul. 07, 2022	Jan. 10, 2023	Jul. 06, 2023	Conduction (CO01-SZ)

NCR: No Calibration Required

5 Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.10-2013. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Conducted Measurement

Test Item	Uncertainty
Conducted Power	± 1.34 dB
Conducted Emissions	± 1.34 dB
Occupied Channel Bandwidth	± 0.13 %
Conducted Power Spectral Density	± 1.32 dB

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.2dB
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.0dB
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.9dB
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.0dB
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Appendix A. Conducted Test Results

Test Engineer:	Zhang Xue Yi	Temperature:	24~26	°C
Test Date:	2022/12/29~2023/2/6	Relative Humidity:	50~53	%

TEST RESULTS DATA
Average Power Table

FCC U-NII-1															
Mod.	Data Rate	NTX	CH.	RU Config	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		Pass/Fail
						Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	
11a	6Mbps	2	36	Full	5180	2.48	2.66	19.32	20.11	22.74	30.00		3.50		Pass
11a	6Mbps	2	40	Full	5200	2.48	2.66	22.86	23.42	26.16	30.00		3.50		Pass
11a	6Mbps	2	44	Full	5220	2.48	2.66	24.34	24.87	27.62	30.00		3.50		Pass
11a	6Mbps	2	48	Full	5240	2.48	2.66	24.34	24.99	27.69	30.00		3.50		Pass
HT20	MCS0	2	36	Full	5180	2.34	2.34	18.83	19.67	22.28	30.00		3.50		Pass
HT20	MCS0	2	40	Full	5200	2.34	2.34	21.43	21.64	24.55	30.00		3.50		Pass
HT20	MCS0	2	44	Full	5220	2.34	2.34	24.97	25.31	28.15	30.00		3.50		Pass
HT20	MCS0	2	48	Full	5240	2.34	2.34	24.98	25.28	28.14	30.00		3.50		Pass
HT40	MCS0	2	38	Full	5190	2.63	2.63	18.20	19.64	21.99	30.00		3.50		Pass
HT40	MCS0	2	46	Full	5230	2.63	2.63	26.40	26.74	29.59	30.00		3.50		Pass
VHT20	MCS0	2	36	Full	5180	0.79	0.79	18.87	19.64	22.28	30.00		3.50		Pass
VHT20	MCS0	2	40	Full	5200	0.79	0.79	21.28	21.53	24.42	30.00		3.50		Pass
VHT20	MCS0	2	44	Full	5220	0.79	0.79	24.95	25.25	28.11	30.00		3.50		Pass
VHT20	MCS0	2	48	Full	5240	0.79	0.79	24.94	25.23	28.10	30.00		3.50		Pass
VHT40	MCS0	2	38	Full	5190	0.97	0.90	18.17	19.62	21.97	30.00		3.50		Pass
VHT40	MCS0	2	46	Full	5230	0.97	0.90	26.38	26.68	29.54	30.00		3.50		Pass
VHT80	MCS0	2	42	Full	5210	0.97	0.97	18.91	19.80	22.39	30.00		3.50		Pass
HE20	MCS0	2	36	Full	5180	0.39	0.40	19.16	19.98	22.60	30.00		3.50		Pass
			40	Full	5200	0.39	0.40	21.76	21.95	24.87	30.00		3.50		Pass
			44	Full	5220	0.39	0.40	25.07	25.47	28.29	30.00		3.50		Pass
			48	Full	5240	0.39	0.40	25.07	25.48	28.29	30.00		3.50		Pass
HE40	MCS0	2	38	Full	5190	0.40	0.40	18.22	19.66	22.01	30.00		3.50		Pass
			46	Full	5230	0.40	0.40	26.46	26.78	29.63	30.00		3.50		Pass
HE80	MCS0	2	42	Full	5210	0.43	0.56	18.94	19.82	22.41	30.00		3.50		Pass
HE160	MCS0	2	50	Full	5250	0.56	0.43	14.56	15.02	17.81	30.00		3.50		Pass

TEST RESULTS DATA
Average Power Table

FCC UNII-2A																	
Mod.	Data Rate	NTx	CH.	RU Config	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		EIRP Power Limit (dBm)	Pass/Fail	Power Setting
						Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2			
11a	6Mbps	2	52	Full	5260	2.48	2.66	18.57	19.01	21.81	23.98	3.50	30	Pass	74		
11a	6Mbps	2	60	Full	5300	2.48	2.66	18.56	18.93	21.76	23.98	3.50	30	Pass	74		
11a	6Mbps	2	64	Full	5320	2.48	2.66	18.56	18.90	21.74	23.98	3.50	30	Pass	74		
HT20	MCS0	2	52	Full	5260	2.34	2.34	19.46	19.72	22.60	23.98	3.50	30	Pass	76		
HT20	MCS0	2	60	Full	5300	2.34	2.34	19.33	19.58	22.47	23.98	3.50	30	Pass	76		
HT20	MCS0	2	64	Full	5320	2.34	2.34	18.73	19.17	21.97	23.98	3.50	30	Pass	75		
HT40	MCS0	2	54	Full	5270	2.63	2.63	20.45	20.87	23.68	23.98	3.50	30	Pass	84		
HT40	MCS0	2	62	Full	5310	2.63	2.63	16.92	17.55	20.26	23.98	3.50	30	Pass	70		
VHT20	MCS0	2	52	Full	5260	0.79	0.79	19.43	19.69	22.57	23.98	3.50	30	Pass	76		
VHT20	MCS0	2	60	Full	5300	0.79	0.79	19.30	19.55	22.44	23.98	3.50	30	Pass	76		
VHT20	MCS0	2	64	Full	5320	0.79	0.79	18.85	19.17	22.03	23.98	3.50	30	Pass	75		
VHT40	MCS0	2	54	Full	5270	0.97	0.90	20.41	20.82	23.63	23.98	3.50	30	Pass	84		
VHT40	MCS0	2	62	Full	5310	0.97	0.90	16.89	17.37	20.15	23.98	3.50	30	Pass	70		
VHT80	MCS0	2	58	Full	5290	0.97	0.97	15.97	17.31	19.70	23.98	3.50	30	Pass	62		
HE20	MCS0	2	52	Full	5260	0.39	0.40	19.60	19.83	22.73	23.98	3.50	30	Pass	76		
			60	Full	5300	0.39	0.40	19.47	19.69	22.59	23.98	3.50	30	Pass	76		
			64	Full	5320	0.39	0.40	19.08	19.46	22.28	23.98	3.50	30	Pass	75		
HE40	MCS0	2	54	Full	5270	0.40	0.40	20.51	20.91	23.73	23.98	3.50	30	Pass	84		
			62	Full	5310	0.40	0.40	17.20	17.71	20.47	23.98	3.50	30	Pass	70		
HE80	MCS0	2	58	Full	5290	0.43	0.56	16.17	17.77	20.05	23.98	3.50	30	Pass	62		
HE160	MCS0	2	50	Full	5250	0.56	0.43	14.56	15.02	17.81	23.98	3.50	30	Pass	53		

TEST RESULTS DATA
Average Power Table

FCC UNII-2C																	
Mod.	Data Rate	NTX	CH.	RU Config	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		EIRP Power Limit (dBm)	Pass/Fail	Power Setting
						Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2			
11a	6Mbps	2	100	Full	5500	2.48	2.66	18.04	19.21	21.68	23.98		3.50		30	Pass	72
11a	6Mbps	2	116	Full	5580	2.48	2.66	17.96	19.09	21.57	23.98		3.50		30	Pass	72
11a	6Mbps	2	140	Full	5700	2.48	2.66	18.34	19.37	21.90	23.98		3.50		30	Pass	74
HT20	MCS0	2	100	Full	5500	2.34	2.34	18.86	19.70	22.31	23.98		3.50		30	Pass	74
HT20	MCS0	2	116	Full	5580	2.34	2.34	18.78	19.77	22.31	23.98		3.50		30	Pass	74
HT20	MCS0	2	140	Full	5700	2.34	2.34	18.05	18.98	21.55	23.98		3.50		30	Pass	72
HT40	MCS0	2	102	Full	5510	2.63	2.63	18.65	19.11	21.90	23.98		3.50		30	Pass	73
HT40	MCS0	2	110	Full	5550	2.63	2.63	20.21	20.91	23.59	23.98		3.50		30	Pass	82
HT40	MCS0	2	134	Full	5670	2.63	2.63	19.98	21.45	23.79	23.98		3.50		30	Pass	82
VHT20	MCS0	2	100	Full	5500	0.79	0.79	18.83	19.66	22.28	23.98		3.50		30	Pass	74
VHT20	MCS0	2	116	Full	5580	0.79	0.79	18.73	19.72	22.27	23.98		3.50		30	Pass	74
VHT20	MCS0	2	140	Full	5700	0.79	0.79	18.08	18.89	21.52	23.98		3.50		30	Pass	72
VHT40	MCS0	2	102	Full	5510	0.97	0.90	18.60	19.05	21.84	23.98		3.50		30	Pass	73
VHT40	MCS0	2	110	Full	5550	0.97	0.90	20.17	20.90	23.56	23.98		3.50		30	Pass	82
VHT40	MCS0	2	134	Full	5670	0.97	0.90	19.92	21.38	23.72	23.98		3.50		30	Pass	82
VHT80	MCS0	2	106	Full	5530	0.97	0.97	18.27	19.23	21.79	23.98		3.50		30	Pass	71
VHT80	MCS0	2	122	Full	5610	0.97	0.97	20.08	21.06	23.61	23.98		3.50		30	Pass	82
HE20	MCS0	2	100	Full	5500	0.39	0.40	19.00	19.81	22.43	23.98		3.50		30	Pass	74
			116	Full	5580	0.39	0.40	18.92	19.88	22.44	23.98		3.50		30	Pass	74
			140	Full	5700	0.39	0.40	18.40	19.33	21.90	23.98		3.50		30	Pass	72
HE40	MCS0	2	102	Full	5510	0.40	0.40	18.93	19.33	22.15	23.98		3.50		30	Pass	73
			110	Full	5550	0.40	0.40	20.27	20.95	23.63	23.98		3.50		30	Pass	82
			134	Full	5670	0.40	0.40	20.14	21.41	23.83	23.98		3.50		30	Pass	82
HE80	MCS0	2	106	Full	5530	0.43	0.56	18.29	19.64	22.03	23.98		3.50		30	Pass	71
			122	Full	5610	0.43	0.56	20.41	21.11	23.78	23.98		3.50		30	Pass	82
HE160	MCS0	2	114	Full	5570	0.56	0.43	17.01	18.26	20.69	23.98		3.50		30	Pass	68

TEST RESULTS DATA
Average Power Table

Band IV															
Mod.	Data Rate	N _{TX}	CH.	RU Config	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		Pass/Fail
						Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	
11a	6Mbps	2	149	Full	5745	2.48	2.66	25.24	26.61	28.99	30.00		3.50		Pass
11a	6Mbps	2	157	Full	5785	2.48	2.66	25.12	26.59	28.93	30.00		3.50		Pass
11a	6Mbps	2	165	Full	5825	2.48	2.66	25.03	26.46	28.81	30.00		3.50		Pass
HT20	MCS0	2	149	Full	5745	2.34	2.34	25.47	26.60	29.08	30.00		3.50		Pass
HT20	MCS0	2	157	Full	5785	2.34	2.34	25.44	26.51	29.02	30.00		3.50		Pass
HT20	MCS0	2	165	Full	5825	2.34	2.34	25.60	27.48	29.65	30.00		3.50		Pass
HT40	MCS0	2	151	Full	5755	2.63	2.63	24.62	25.58	28.14	30.00		3.50		Pass
HT40	MCS0	2	159	Full	5795	2.63	2.63	25.47	26.20	28.86	30.00		3.50		Pass
VHT20	MCS0	2	149	Full	5745	0.79	0.79	25.44	26.55	29.04	30.00		3.50		Pass
VHT20	MCS0	2	157	Full	5785	0.79	0.79	25.42	26.47	28.99	30.00		3.50		Pass
VHT20	MCS0	2	165	Full	5825	0.79	0.79	25.54	27.43	29.60	30.00		3.50		Pass
VHT40	MCS0	2	151	Full	5755	0.97	0.90	24.60	25.55	28.11	30.00		3.50		Pass
VHT40	MCS0	2	159	Full	5795	0.97	0.90	25.45	26.18	28.84	30.00		3.50		Pass
VHT80	MCS0	2	155	Full	5775	0.97	0.97	21.22	22.77	25.07	30.00		3.50		Pass
HE20	MCS0	2	149	Full	5745	0.39	0.40	25.55	26.67	29.16	30.00		3.50		Pass
HE20	MCS0	2	157	Full	5785	0.39	0.40	25.52	26.58	29.09	30.00		3.50		Pass
HE20	MCS0	2	165	Full	5825	0.39	0.40	25.68	27.55	29.73	30.00		3.50		Pass
HE40	MCS0	2	151	Full	5755	0.40	0.40	24.65	25.61	28.17	30.00		3.50		Pass
HE40	MCS0	2	159	Full	5795	0.40	0.40	25.49	26.22	28.88	30.00		3.50		Pass
HE80	MCS0	2	155	Full	5775	0.43	0.56	21.25	22.80	25.10	30.00		3.50		Pass

TEST RESULTS DATA
Average Power Table

FCC U-NII-1																	
Mod.	Data Rate	Nrx	CH.	RU Config	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)			Pass/Fail	Power Setting
						Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2			
11a	6Mbps	2	36	Full	5180	2.48	2.66	15.88	16.71	19.33	29.49	6.51			Pass	64	
11a	6Mbps	2	40	Full	5200	2.48	2.66	19.33	20.04	22.71	29.49	6.51			Pass	87	
11a	6Mbps	2	44	Full	5220	2.48	2.66	20.94	21.44	24.21	29.49	6.51			Pass	92	
11a	6Mbps	2	48	Full	5240	2.48	2.66	20.91	21.59	24.27	29.49	6.51			Pass	92	
HT20	MCS0	2	36	Full	5180	2.34	2.34	15.42	16.31	18.90	29.49	6.51			Pass	61	
HT20	MCS0	2	40	Full	5200	2.34	2.34	18.03	18.24	21.15	29.49	6.51			Pass	81	
HT20	MCS0	2	44	Full	5220	2.34	2.34	21.57	21.90	24.75	29.49	6.51			Pass	94	
HT20	MCS0	2	48	Full	5240	2.34	2.34	21.63	21.85	24.75	29.49	6.51			Pass	94	
HT40	MCS0	2	38	Full	5190	2.63	2.63	14.77	16.23	18.57	29.49	6.51			Pass	60	
HT40	MCS0	2	46	Full	5230	2.63	2.63	22.96	23.33	26.16	29.49	6.51			Pass	100	
VHT20	MCS0	2	36	Full	5180	0.79	0.79	15.47	16.24	18.88	29.49	6.51			Pass	61	
VHT20	MCS0	2	40	Full	5200	0.79	0.79	17.88	18.13	21.02	29.49	6.51			Pass	81	
VHT20	MCS0	2	44	Full	5220	0.79	0.79	21.57	21.85	24.72	29.49	6.51			Pass	94	
VHT20	MCS0	2	48	Full	5240	0.79	0.79	21.54	21.85	24.71	29.49	6.51			Pass	94	
VHT40	MCS0	2	38	Full	5190	0.97	0.90	14.76	16.21	18.56	29.49	6.51			Pass	60	
VHT40	MCS0	2	46	Full	5230	0.97	0.90	22.97	23.25	26.12	29.49	6.51			Pass	100	
VHT80	MCS0	2	42	Full	5210	0.97	0.97	15.49	16.38	18.97	29.49	6.51			Pass	59	
HE20	MCS0	2	36	Full	5180	0.39	0.40	15.76	16.58	19.20	29.49	6.51			Pass	61	
			40	Full	5200	0.39	0.40	18.36	18.55	21.47	29.49	6.51			Pass	81	
			44	Full	5220	0.39	0.40	21.67	22.07	24.89	29.49	6.51			Pass	94	
			48	Full	5240	0.39	0.40	21.67	22.08	24.89	29.49	6.51			Pass	94	
HE40	MCS0	2	38	Full	5190	0.40	0.40	14.81	16.25	18.60	29.49	6.51			Pass	60	
			46	Full	5230	0.40	0.40	23.05	23.36	26.22	29.49	6.51			Pass	100	
HE80	MCS0	2	42	Full	5210	0.43	0.56	15.55	16.40	19.01	29.49	6.51			Pass	59	
HE160	MCS0	2	50	Full	5250	0.56	0.43	11.11	11.57	14.36	29.49	6.51			Pass	39	

TEST RESULTS DATA
Average Power Table

FCC U-NII-2A																	
Mod.	Data Rate	N _{TX}	CH.	RU Config	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		EIRP Power Limit (dBm)	Pass/Fail	Power Setting
						Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2			
11a	6Mbps	2	52	Full	5260	2.48	2.66	15.17	15.58	18.39	23.47		6.51		30	Pass	60
11a	6Mbps	2	60	Full	5300	2.48	2.66	15.13	15.53	18.35	23.47		6.51		30	Pass	60
11a	6Mbps	2	64	Full	5320	2.48	2.66	15.16	15.47	18.33	23.47		6.51		30	Pass	60
HT20	MCS0	2	52	Full	5260	2.34	2.34	16.03	16.32	19.19	23.47		6.51		30	Pass	62
HT20	MCS0	2	60	Full	5300	2.34	2.34	15.92	16.22	19.08	23.47		6.51		30	Pass	62
HT20	MCS0	2	64	Full	5320	2.34	2.34	15.37	15.79	18.60	23.47		6.51		30	Pass	61
HT40	MCS0	2	54	Full	5270	2.63	2.63	17.04	17.46	20.27	23.47		6.51		30	Pass	70
HT40	MCS0	2	62	Full	5310	2.63	2.63	13.51	14.14	16.85	23.47		6.51		30	Pass	56
VHT20	MCS0	2	52	Full	5260	0.79	0.79	16.05	16.29	19.18	23.47		6.51		30	Pass	62
VHT20	MCS0	2	60	Full	5300	0.79	0.79	15.90	16.15	19.04	23.47		6.51		30	Pass	62
VHT20	MCS0	2	64	Full	5320	0.79	0.79	15.42	15.72	18.58	23.47		6.51		30	Pass	61
VHT40	MCS0	2	54	Full	5270	0.97	0.90	17.02	17.43	20.24	23.47		6.51		30	Pass	70
VHT40	MCS0	2	62	Full	5310	0.97	0.90	13.48	13.96	16.74	23.47		6.51		30	Pass	56
VHT80	MCS0	2	58	Full	5290	0.97	0.97	12.55	13.89	16.28	23.47		6.51		30	Pass	48
HE20	MCS0	2	52	Full	5260	0.39	0.40	16.20	16.43	19.33	23.47		6.51		30	Pass	62
			60	Full	5300	0.39	0.40	16.07	16.29	19.19	23.47		6.51		30	Pass	62
			64	Full	5320	0.39	0.40	15.68	16.06	18.88	23.47		6.51		30	Pass	61
HE40	MCS0	2	54	Full	5270	0.40	0.40	17.10	17.50	20.32	23.47		6.51		30	Pass	70
			62	Full	5310	0.40	0.40	13.76	14.30	17.05	23.47		6.51		30	Pass	56
HE80	MCS0	2	58	Full	5290	0.43	0.56	12.75	14.35	16.63	23.47		6.51		30	Pass	48
HE160	MCS0	2	50	Full	5250	0.56	0.43	11.11	11.57	14.36	23.47		6.51		30	Pass	39

TEST RESULTS DATA
Average Power Table

FCC U-NII-2C																	
Mod.	Data Rate	N _{TX}	CH.	RU Config	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		EIRP Power Limit (dBm)	Pass/Fail	Power Setting
						Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2			
11a	6Mbps	2	100	Full	5500	2.48	2.66	14.64	15.78	18.26	23.47		6.51		30	Pass	58
11a	6Mbps	2	116	Full	5580	2.48	2.66	14.53	15.69	18.16	23.47		6.51		30	Pass	58
11a	6Mbps	2	140	Full	5700	2.48	2.66	14.94	15.94	18.48	23.47		6.51		30	Pass	60
HT20	MCS0	2	100	Full	5500	2.34	2.34	15.46	16.28	18.90	23.47		6.51		30	Pass	60
HT20	MCS0	2	116	Full	5580	2.34	2.34	15.40	16.35	18.91	23.47		6.51		30	Pass	60
HT20	MCS0	2	140	Full	5700	2.34	2.34	14.65	15.58	18.15	23.47		6.51		30	Pass	58
HT40	MCS0	2	102	Full	5510	2.63	2.63	15.21	15.73	18.49	23.47		6.51		30	Pass	59
HT40	MCS0	2	110	Full	5550	2.63	2.63	16.80	17.47	20.16	23.47		6.51		30	Pass	68
HT40	MCS0	2	134	Full	5670	2.63	2.63	16.54	17.92	20.30	23.47		6.51		30	Pass	68
VHT20	MCS0	2	100	Full	5500	0.79	0.79	15.43	16.26	18.88	23.47		6.51		30	Pass	60
VHT20	MCS0	2	116	Full	5580	0.79	0.79	15.34	16.34	18.88	23.47		6.51		30	Pass	60
VHT20	MCS0	2	140	Full	5700	0.79	0.79	14.68	15.49	18.12	23.47		6.51		30	Pass	58
VHT40	MCS0	2	102	Full	5510	0.97	0.90	15.19	15.62	18.42	23.47		6.51		30	Pass	59
VHT40	MCS0	2	110	Full	5550	0.97	0.90	16.85	17.45	20.17	23.47		6.51		30	Pass	68
VHT40	MCS0	2	134	Full	5670	0.97	0.90	16.49	17.85	20.23	23.47		6.51		30	Pass	68
VHT80	MCS0	2	106	Full	5530	0.97	0.97	14.85	15.81	18.37	23.47		6.51		30	Pass	57
VHT80	MCS0	2	122	Full	5610	0.97	0.97	16.78	17.70	20.27	23.47		6.51		30	Pass	68
HE20	MCS0	2	100	Full	5500	0.39	0.40	15.60	16.41	19.03	23.47		6.51		30	Pass	60
			116	Full	5580	0.39	0.40	15.52	16.48	19.04	23.47		6.51		30	Pass	60
			140	Full	5700	0.39	0.40	15.00	15.93	18.50	23.47		6.51		30	Pass	58
HE40	MCS0	2	102	Full	5510	0.40	0.40	15.52	15.91	18.73	23.47		6.51		30	Pass	59
			110	Full	5550	0.40	0.40	16.86	17.54	20.22	23.47		6.51		30	Pass	68
			134	Full	5670	0.40	0.40	16.83	18.03	20.48	23.47		6.51		30	Pass	68
HE80	MCS0	2	106	Full	5530	0.43	0.56	14.84	16.29	18.64	23.47		6.51		30	Pass	57
			122	Full	5610	0.43	0.56	17.11	17.81	20.48	23.47		6.51		30	Pass	68
HE160	MCS0	2	114	Full	5570	0.56	0.43	13.53	14.79	17.21	23.47		6.51		30	Pass	54

TEST RESULTS DATA
Average Power Table

U-NII-3																
Mod.	Data Rate	NTx	CH.	RU Config	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		Pass/Fail	Power Setting
						Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	2	149	Full	5745	2.48	2.66	21.87	23.21	25.60	29.49		6.51		Pass	100
11a	6Mbps	2	157	Full	5785	2.48	2.66	21.74	23.22	25.55	29.49		6.51			100
11a	6Mbps	2	165	Full	5825	2.48	2.66	21.62	23.05	25.40	29.49		6.51			100
HT20	MCS0	2	149	Full	5745	2.34	2.34	22.15	23.28	25.76	29.49		6.51			100
HT20	MCS0	2	157	Full	5785	2.34	2.34	22.12	23.19	25.70	29.49		6.51			100
HT20	MCS0	2	165	Full	5825	2.34	2.34	22.28	24.16	26.33	29.49		6.51			102
HT40	MCS0	2	151	Full	5755	2.63	2.63	21.33	22.29	24.85	29.49		6.51			94
HT40	MCS0	2	159	Full	5795	2.63	2.63	22.18	22.91	25.57	29.49		6.51			98
VHT20	MCS0	2	149	Full	5745	0.79	0.79	22.14	23.25	25.74	29.49		6.51			100
VHT20	MCS0	2	157	Full	5785	0.79	0.79	22.12	23.17	25.69	29.49		6.51			100
VHT20	MCS0	2	165	Full	5825	0.79	0.79	22.24	24.13	26.30	29.49		6.51			102
VHT40	MCS0	2	151	Full	5755	0.97	0.90	21.31	22.26	24.82	29.49		6.51			94
VHT40	MCS0	2	159	Full	5795	0.97	0.90	22.14	22.89	25.54	29.49		6.51			98
VHT80	MCS0	2	155	Full	5775	0.97	0.97	17.86	19.41	21.71	29.49		6.51			74
HE20	MCS0	2	149	Full	5745	0.39	0.40	22.24	23.38	25.86	29.49		6.51			100
HE20	MCS0	2	157	Full	5785	0.39	0.40	22.25	23.26	25.79	29.49		6.51			100
HE20	MCS0	2	165	Full	5825	0.39	0.40	22.37	24.24	26.42	29.49		6.51		102	
HE40	MCS0	2	151	Full	5755	0.40	0.40	21.37	22.34	24.89	29.49		6.51		94	
HE40	MCS0	2	159	Full	5795	0.40	0.40	22.21	22.91	25.59	29.49		6.51		98	
HE80	MCS0	2	155	Full	5775	0.43	0.56	17.93	19.42	21.75	29.49		6.51		74	



26DB Emission Bandwidth

Test Result

TestMode	Antenna	Freq(MHz)	26dB EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A-CDD	Ant1	5180	21.36	5169.38	5190.74	---	---
	Ant2	5180	21.06	5169.38	5190.44	---	---
	Ant1	5220	22.14	5208.90	5231.04	---	---
	Ant2	5220	27.24	5207.28	5234.52	---	---
	Ant1	5240	22.08	5228.90	5250.98	---	---
	Ant2	5240	29.04	5225.36	5254.40	---	---
	Ant1	5260	21.36	5249.38	5270.74	---	---
	Ant2	5260	21.06	5249.38	5270.44	---	---
	Ant1	5300	21.30	5289.38	5310.68	---	---
	Ant2	5300	21.18	5289.32	5310.50	---	---
	Ant1	5320	21.72	5309.02	5330.74	---	---
	Ant2	5320	21.24	5309.32	5330.56	---	---
	Ant1	5500	21.66	5489.08	5510.74	---	---
	Ant2	5500	21.12	5489.32	5510.44	---	---
	Ant1	5580	21.36	5569.38	5590.74	---	---
	Ant2	5580	21.18	5569.32	5590.50	---	---
	Ant1	5700	21.54	5689.20	5710.74	---	---
	Ant2	5700	21.18	5689.26	5710.44	---	---
	Ant1	5745	27.60	5731.74	5759.34	---	---
	Ant2	5745	38.52	5725.32	5763.84	---	---
	Ant1	5785	29.10	5770.72	5799.82	---	---
	Ant2	5785	39.72	5765.74	5805.46	---	---
	Ant1	5825	29.34	5810.42	5839.76	---	---
	Ant2	5825	38.58	5805.86	5844.44	---	---
11AX20MIMO	Ant1	5180	21.66	5169.08	5190.74	---	---
	Ant2	5180	21.54	5169.20	5190.74	---	---
	Ant1	5220	31.20	5203.32	5234.52	---	---
	Ant2	5220	34.50	5202.54	5237.04	---	---
	Ant1	5240	30.48	5223.74	5254.22	---	---
	Ant2	5240	35.76	5222.96	5258.72	---	---
	Ant1	5260	21.66	5249.02	5270.68	---	---
	Ant2	5260	21.66	5249.08	5270.74	---	---
	Ant1	5300	21.60	5289.08	5310.68	---	---



	Ant2	5300	21.48	5289.20	5310.68	---	---
	Ant1	5320	21.78	5309.02	5330.80	---	---
	Ant2	5320	21.48	5309.14	5330.62	---	---
	Ant1	5500	21.72	5488.90	5510.62	---	---
	Ant2	5500	21.30	5489.38	5510.68	---	---
	Ant1	5580	21.72	5568.96	5590.68	---	---
	Ant2	5580	21.54	5569.20	5590.74	---	---
	Ant1	5700	21.84	5688.90	5710.74	---	---
	Ant2	5700	21.66	5689.08	5710.74	---	---
	Ant1	5745	36.90	5727.06	5763.96	---	---
	Ant2	5745	45.42	5722.62	5768.04	---	---
	Ant1	5785	37.02	5766.22	5803.24	---	---
	Ant2	5785	46.68	5761.54	5808.22	---	---
	Ant1	5825	39.72	5804.48	5844.20	---	---
	Ant2	5825	47.10	5801.18	5848.28	---	---
11AX40MIMO	Ant1	5190	40.08	5169.96	5210.04	---	---
	Ant2	5190	39.96	5169.96	5209.92	---	---
	Ant1	5230	80.64	5188.96	5269.60	---	---
	Ant2	5230	81.36	5189.80	5271.16	---	---
	Ant1	5270	40.08	5249.84	5289.92	---	---
	Ant2	5270	40.08	5249.96	5290.04	---	---
	Ant1	5310	40.20	5289.84	5330.04	---	---
	Ant2	5310	39.84	5290.08	5329.92	---	---
	Ant1	5510	40.08	5489.84	5529.92	---	---
	Ant2	5510	40.08	5489.96	5530.04	---	---
	Ant1	5550	40.32	5529.84	5570.16	---	---
	Ant2	5550	40.08	5529.96	5570.04	---	---
	Ant1	5670	40.20	5649.84	5690.04	---	---
	Ant2	5670	40.08	5649.96	5690.04	---	---
	Ant1	5755	69.84	5718.40	5788.24	---	---
	Ant2	5755	84.24	5716.24	5800.48	---	---
	Ant1	5795	73.56	5754.56	5828.12	---	---
	Ant2	5795	86.64	5753.96	5840.60	---	---
11AX80MIMO	Ant1	5210	81.36	5169.44	5250.80	---	---
	Ant2	5210	81.12	5169.44	5250.56	---	---
	Ant1	5290	81.12	5249.44	5330.56	---	---
	Ant2	5290	81.84	5248.96	5330.80	---	---
	Ant1	5530	81.84	5488.96	5570.80	---	---



	Ant2	5530	81.60	5489.20	5570.80	---	---
	Ant1	5610	81.12	5569.20	5650.32	---	---
	Ant2	5610	81.60	5569.20	5650.80	---	---
	Ant1	5775	80.88	5734.44	5815.32	---	---
	Ant2	5775	81.84	5733.96	5815.80	---	---
11AX160MIMO	Ant1	5250	163.84	5168.72	5332.56	---	---
	Ant2	5250	163.20	5168.08	5331.28	---	---
	Ant1	5250_UNII-1	81.28	5168.72	5250	---	---
	Ant2	5250_UNII-1	81.92	5168.08	5250	---	---
	Ant1	5250_UNII-2A	82.56	5250	5332.56	---	---
	Ant2	5250_UNII-2A	81.28	5250	5331.28	---	---
	Ant1	5570	163.84	5488.08	5651.92	---	---
	Ant2	5570	163.20	5488.72	5651.92	---	---



Test Graphs

