



FCC RF Test Report

APPLICANT : Motorola Mobility LLC
EQUIPMENT : Mobile Cellular Phone
BRAND NAME : Motorola
MODEL NAME : XT2451-1, XT2451-2
FCC ID : IHDT56AP9
STANDARD : FCC Part 15 Subpart E §15.407
CLASSIFICATION : (NII) Unlicensed National Information Infrastructure
TEST DATE(S) : Feb. 19, 2024 ~ Apr. 10, 2024

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
FR420703F	Rev. 01	Initial issue of report	Apr. 12, 2024



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	≤ 24 dBm	≤ 30 dBm	Pass	-
3.3	15.407(a)	Power Spectral Density	≤ 11 dBm/MHz	≤ 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 3.02 dB at 5727.860 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	15.207(a)	Pass	Under limit 12.08 dB at 0.150 MHz
3.6	15.203 & 15.407(a)	Antenna Requirement	15.203 & 15.407(a)	15.203 & 15.407(a)	Pass	-

Conformity Assessment Condition:

- The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
- The measurement uncertainty please refer to each test result in the section "Measurement Uncertainty"

Disclaimer:

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.



1 General Description

1.1 Applicant

Motorola Mobility LLC
222 W,Merchandise Mart Plaza, Chicago IL 60654 USA

1.2 Manufacturer

Motorola Mobility LLC
222 W,Merchandise Mart Plaza, Chicago IL 60654 USA

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Cellular Phone
Brand Name	Motorola
Model Name	XT2451-1, XT2451-2
FCC ID	IHDT56AP9
IMEI Code	Conducted: 350431590014232/350431590014240 Conduction: 350431590015254/350431590015262 Radiation: 350431590015650/350431590015668
HW Version	DVT2
SW Version	U3UX34.16
EUT Stage	Identical Prototype

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. The two model names are only for market segment, no other difference.



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 ~ 5720 MHz 5745 MHz ~ 5825 MHz
Maximum Output Power to Antenna	<p>MIMO <Ant. 5 + 7></p> <p><5180 MHz ~ 5240 MHz> 802.11a : 20.24 dBm / 0.1057 W 802.11n HT20 : 20.68 dBm / 0.1169 W 802.11n HT40 : 21.48 dBm / 0.1406 W 802.11ac VHT80: 19.86 dBm / 0.0968 W 802.11ac VHT160: 19.57 dBm / 0.0906 W 802.11ax HE20: 20.84 dBm / 0.1213 W 802.11ax HE40: 21.44 dBm / 0.1393 W 802.11ax HE80: 20.42 dBm / 0.1102 W 802.11ax HE160: 19.20 dBm / 0.0832 W 802.11be EHT20: 20.88 dBm / 0.1225 W 802.11be EHT40: 21.26 dBm / 0.1337 W 802.11be EHT80: 19.53 dBm / 0.0897 W 802.11be EHT160: 18.24 dBm / 0.0667 W</p> <p><5260 MHz ~ 5320 MHz> 802.11a : 21.56 dBm / 0.1432 W 802.11n HT20 : 21.60 dBm / 0.1445 W 802.11n HT40 : 21.55 dBm / 0.1429 W 802.11ac VHT80: 19.08 dBm / 0.0809 W 802.11ax HE20: 21.70 dBm / 0.1479 W 802.11ax HE40: 21.59 dBm / 0.1442 W 802.11ax HE80: 18.98 dBm / 0.0791 W 802.11be EHT20: 21.64 dBm / 0.1459 W 802.11be EHT40: 21.49 dBm / 0.1409 W 802.11be EHT80: 18.54 dBm / 0.0714 W</p> <p><5500 MHz ~ 5720 MHz > 802.11a : 21.30 dBm / 0.1349 W 802.11n HT20 : 21.25 dBm / 0.1334 W 802.11n HT40 : 21.52 dBm / 0.1419 W 802.11ac VHT80: 20.40 dBm / 0.1096 W 802.11ac VHT160: 19.65 dBm / 0.0923 W 802.11ax HE20: 21.41 dBm / 0.1384 W 802.11ax HE40: 21.46 dBm / 0.1400 W 802.11ax HE80: 20.49 dBm / 0.1119 W 802.11ax HE160: 19.73 dBm / 0.0940 W 802.11be EHT20: 21.45 dBm / 0.1396 W 802.11be EHT40: 21.31 dBm / 0.1352 W 802.11be EHT80: 20.54 dBm / 0.1132 W 802.11be EHT160: 19.47 dBm / 0.0885 W</p> <p><5745 MHz ~ 5825 MHz> 802.11a : 21.19 dBm / 0.1315 W 802.11n HT20 : 21.18 dBm / 0.1312 W 802.11n HT40 : 21.24 dBm / 0.1330 W 802.11ac VHT80: 20.14 dBm / 0.1033 W 802.11ax HE20: 21.04 dBm / 0.1271 W 802.11ax HE40: 21.29 dBm / 0.1346 W</p>



	802.11ax HE80: 20.21 dBm / 0.1050 W 802.11be EHT20: 21.28 dBm / 0.1343 W 802.11be EHT40: 21.04 dBm / 0.1271 W 802.11be EHT80: 20.32 dBm / 0.1076 W
99% Occupied Bandwidth	<p><5180 MHz ~ 5240 MHz> 802.11a : 18.621 MHz 802.11n HT20 : 19.341 MHz 802.11n HT40 : 39.481 MHz 802.11ac VHT80 : 77.522 MHz 802.11ac VHT160 : 158.561 MHz 802.11ax HE20: 19.58 MHz 802.11ax HE40: 38.841 MHz 802.11ax HE80: 78.641 MHz 802.11ax HE160: 159.52 MHz 802.11be EHT20: 19.54 MHz 802.11be EHT40: 39.321 MHz 802.11be EHT80: 78.322 MHz 802.11be EHT160: 159.52 MHz</p> <p><5260 MHz ~ 5320 MHz> 802.11a : 19.341 MHz 802.11n HT20 : 19.301 MHz 802.11n HT40 : 38.601 MHz 802.11ac VHT80 : 77.522 MHz 802.11ax HE20: 19.66 MHz 802.11ax HE40: 38.841 MHz 802.11ax HE80: 78.162 MHz 802.11be EHT20: 19.5 MHz 802.11be EHT40: 38.681 MHz 802.11be EHT80: 78.482 MHz</p> <p><5500 MHz ~ 5720 MHz> 802.11a : 18.821 MHz 802.11n HT20 : 19.141 MHz 802.11n HT40 : 38.282 MHz 802.11ac VHT80 : 77.522 MHz 802.11ac VHT160 : 158.881 MHz 802.11ax HE20: 19.66 MHz 802.11ax HE40: 38.921 MHz 802.11ax HE80: 78.482 MHz 802.11ax HE160: 159.52 MHz 802.11be EHT20: 19.54 MHz 802.11be EHT40: 38.681 MHz 802.11be EHT80: 79.121 MHz 802.11be EHT160: 159.84 MHz</p> <p><5745 MHz ~ 5825 MHz> 802.11a : 18.621 MHz 802.11n HT20 : 19.181 MHz 802.11n HT40 : 37.722 MHz 802.11ac VHT80 : 77.363 MHz 802.11ax HE20: 19.62 MHz 802.11ax HE40: 39.081 MHz 802.11ax HE80: 78.641 MHz 802.11be EHT20: 19.5 MHz 802.11be EHT40: 38.841 MHz 802.11be EHT80: 78.482 MHz</p>



Antenna Type / Gain	<p><5180 MHz ~ 5240 MHz> <Ant. 5>: Loop Antenna with gain -3.10 dBi <Ant. 7>: IFA Antenna with gain -3.01 dBi</p> <p><5260 MHz ~ 5320 MHz> <Ant. 5>: Loop Antenna with gain -2.60 dBi <Ant. 7>: IFA Antenna with gain -2.87 dBi</p> <p><5500 MHz ~ 5720 MHz> <Ant. 5>: Loop Antenna with gain -2.70 dBi <Ant. 7>: IFA Antenna with gain -3.25 dBi</p> <p><5745 MHz ~ 5825 MHz> <Ant. 5>: Loop Antenna with gain -2.00 dBi <Ant. 7>: IFA Antenna with gain -2.50 dBi</p>
Type of Modulation	<p>802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)</p> <p>802.11ac: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)</p> <p>802.11ax : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM / 1024QAM)</p> <p>802.11be: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM / 1024QAM / 4096QAM)</p>

Note:

1. The device support WLAN MIMO mode only.
2. For 802.11n HT20 / ac VHT20 and 802.11n HT40 / ac VHT40 mode, the whole testing has assessed only 802.11n HT20/ HT40 by referring to their higher conducted power.
3. 802.11ax/be support OFDMA full RU tone and partial RU tone, both full RU and partial RU-left (for low CH) and partial RU-right (for high CH) test output power, the full RU power > partial RU, therefore the full RU perform full, and partial RU verify PSD/bandedge/spurious.
4. 802.11be support small size RU, Large size RU and Puncturing modes as below, which is less than full RU conducted power, therefore these partial RU only assess Power Density/RSE.

<Small size RU 52+26 Tone>:

Bandwidth	Tones		Index		For test modes configure
20MHz	26	52	1	38	1
20MHz	52	26	38	4	2
20MHz	52	26	39	7	3

<Small size RU 106+26 Tone>:

Bandwidth	Tones		Index		For test modes configure
20MHz	106	26	53	4	1
20MHz	26	106	4	54	2



<Large size RU 484+242 tone> & <80M BW Puncturing 20MHz>:

Bandwidth	Tones		Index		For test modes configure
80MHz	242	484	62	66	1
80MHz	242	484	61	66	2
80MHz	484	242	65	64	3
80MHz	484	242	65	63	4

<Large size RU 996+484 tone> & <160M BW Puncturing 40MHz>:

Bandwidth	Tones		Index		For test modes configure
160MHz	484-Left	996-Right	66-Left	67-Right	1
160MHz	484-Left	996-Right	65-Left	67-Right	2
160MHz	996-Left	484-Right	67-Left	66-Right	3
160MHz	996-Left	484-Right	67-Left	65-Right	4

<160M BW Puncturing 20MHz>:

Bandwidth	Tones			Index			For test modes configure
160MHz	242-Left	484-Left	996-Right	62-Left	66-Left	67-Right	1
160MHz	242-Left	484-Left	996-Right	61-Left	66-Left	67-Right	2
160MHz	484-Left	242-Left	996-Right	65-Left	64-Left	67-Right	3
160MHz	484-Left	242-Left	996-Right	65-Left	63-Left	67-Right	4
160MHz	996-Left	242-Right	484-Right	67-Left	62-Right	66-Right	5
160MHz	996-Left	242-Right	484-Right	67-Left	61-Right	66-Right	6
160MHz	996-Left	484-Right	242-Right	67-Left	65-Right	64-Right	7
160MHz	996-Left	484-Right	242-Right	67-Left	65-Right	63-Right	8

Only the worse cases are shown in this report.

- The worse cases of RSE for partial RU, Large size RU and small size RU are shown in this report.

1.5 Modification of EUT

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

1.6 Specification of Accessory

Specification of Accessory				
Battery 1	Brand Name	Motorola(ATL)	Model Name	QR10
Battery 2	Brand Name	Motorola(ATL)	Model Name	QR30
USB Cable 1	Brand Name	Motorola(SAIBAO)	Model Name	SC18D86731
USB Cable 2	Brand Name	Motorola(Luxshare)	Model Name	SC18E08103



1.7 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 518103 People's Republic of China TEL: +86-755-86066985		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	03CH04-SZ	CN1256	421272

1.8 Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH04-SZ	AUDIX	E3	6.2009-8-24
2.	CO01-SZ	AUDIX	E3	6.120613b



1.9 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 (X 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	50 ^{##}	5250

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)
5500-5700MHz U-NII-2C	100	5500	112	5560
	102*	5510	116	5580
	104	5520	132	5660
	106 [#]	5530	134*	5670
	108	5540	136	5680
	110*	5550	140	5700

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
	-	-	114 ^{##}	5570

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
Straddle Channel	138 [#]	5690	144	5720
	142*	5710	-	-

Note:

1. The above Frequency and Channel in "*" are 40MHz bandwidth.
2. The above Frequency and Channel in "#n" are 80MHz bandwidth.
3. The above Frequency and Channel in "##n" are 160MHz bandwidth.



2.2 Test Mode

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

MIMO Mode

Modulation	Data Rate
802.11a	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0
802.11ac VHT80	MCS0
802.11ac VHT160	MCS0
802.11ax HE20	MCS0
802.11ax HE40	MCS0
802.11ax HE80	MCS0
802.11ax HE160	MCS0
802.11be EHT20	MCS0
802.11be EHT40	MCS0
802.11be EHT80	MCS0
802.11be EHT160	MCS0

AC Conducted Emission	Mode 1 : GSM850 Idle + BT Link + WLAN Link(5G) + USB Cable 1(Charging from Adapter) + Battery
Remark:	
<ol style="list-style-type: none"> For Radiated Test Cases, the tests were performance with Adapter, Battery and USB Cable 1. Fold Up mode is verified worse case of Open modes for RSE testing. 	



Ch. #		U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
		20M BW	20M BW	20M BW	20M BW
L	Low	36	52	100	149
M	Middle	44	60	116	157
H	High	48	64	140	165
Straddle		-	-	144	-

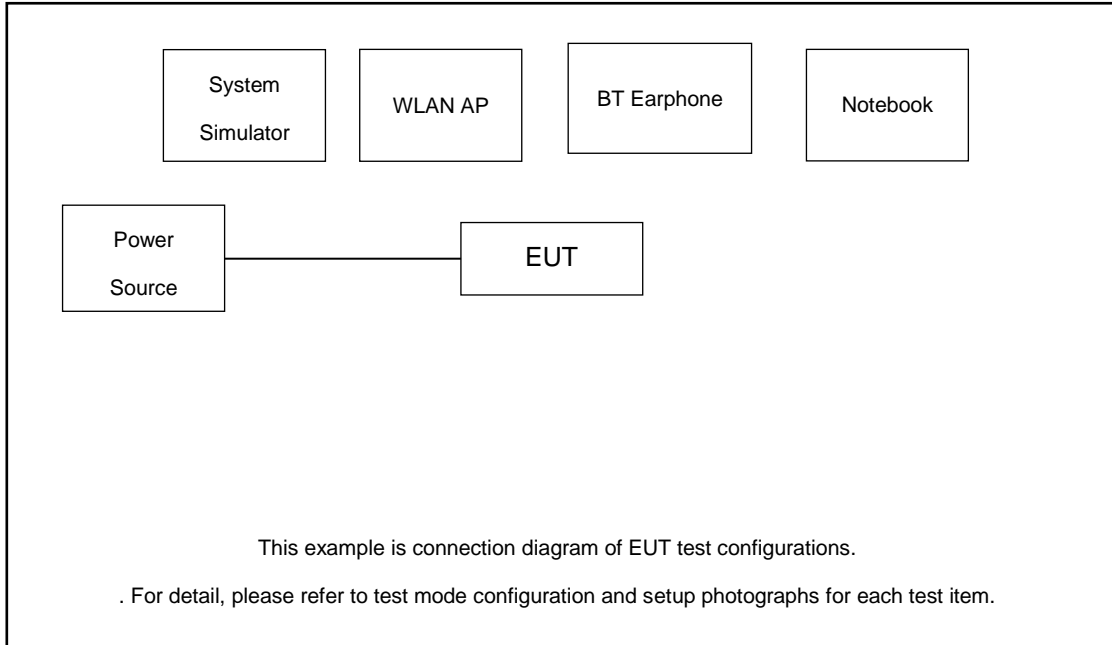
Ch. #		U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
		40M BW	40M BW	40M BW	40M BW
L	Low	38	54	102	151
M	Middle	-	-	110	-
H	High	46	62	134	159
Straddle		-	-	142	-

Ch. #		U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
		80M BW	80M BW	80M BW	80M BW
L	Low	-	-	106	-
M	Middle	42	58	-	155
H	High	-	-	122	-
Straddle		-	-	138	-

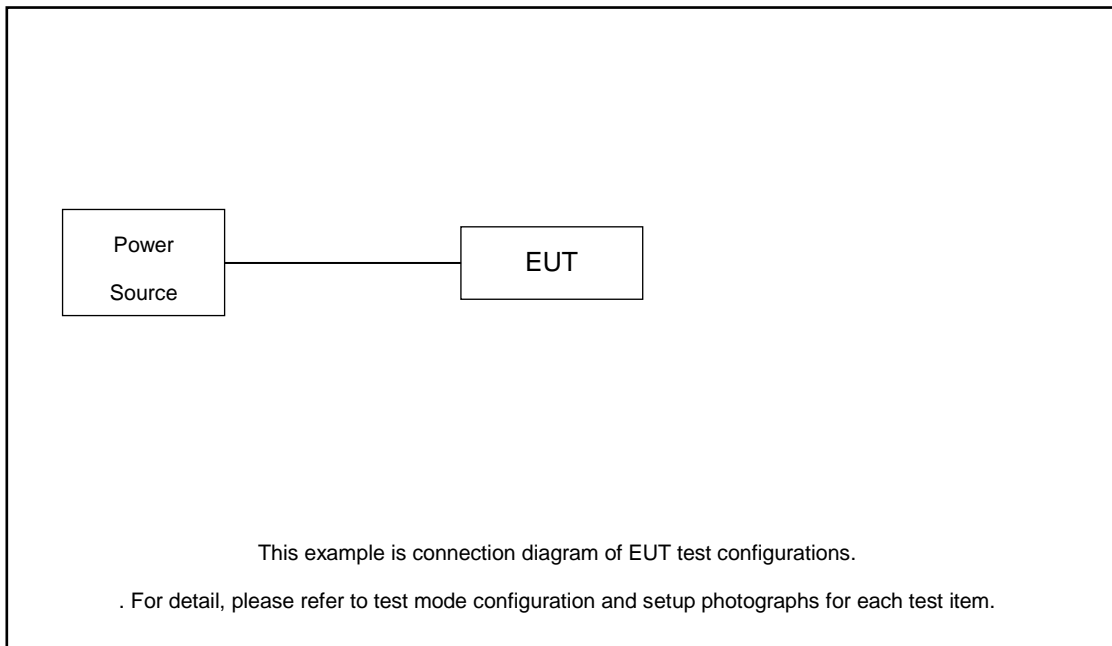
Ch. #		U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
		160M BW		160M BW	160M BW
M	Middle	50		114	-

2.3 Connection Diagram of Test System

For AC 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.	Base Station	Anritsu	MT8820C	N/A	N/A	Unshielded,1.8m
2.	Notebook	DELL	Inspiron 15-7570	Fcc DoC	N/A	shielded cable DC O/P 1.8m Unshielded AC I/P cable 1.8m
3.	Bluetooth Earphone	Samsung	EO-MG900	N/A	N/A	N/A
4.	AC Adapter	Moto	N/A	N/A	N/A	N/A
5.	WLAN AP	Dlink	DIR-820L	KA21R820LA1	N/A	Unshielded,1.8m

2.5 EUT Operation Test Setup

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

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.

$$\text{Offset} = \text{RF cable loss} + \text{attenuator factor}.$$

Following shows an offset computation example with cable loss 5.02 dB and 10dB attenuator.

$$\begin{aligned} \text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)}. \\ &= 5.02 + 10 = 15.02 \text{ (dB)} \end{aligned}$$



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

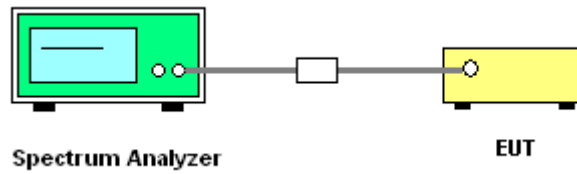
The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedures

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

<input checked="" type="checkbox"/>	Section C) Bandwidth Measurement 1. Emission Bandwidth (EBW) and 99% OBW
	<ol style="list-style-type: none"> Set RBW = approximately 1% of the emission bandwidth. Set the VBW > RBW. Detector = Peak. Trace mode = max hold Measure the maximum width of the emission that is 26 dB down from the 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%. 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) ≥ 3 * RBW. Measure and record the results in the test report.
<input checked="" type="checkbox"/>	Section C) Bandwidth Measurement 2. Minimum Emission Bandwidth for the band 5.725 - 5.85 GHz
	<ol style="list-style-type: none"> Set RBW = 100kHz. Set the VBW ≥ 3 x RBW. Detector = Peak. Trace mode = max hold Measure the maximum width of the emission that is 6 dB down from the peak of the emission. Measure and record the results in the test report.

3.1.4 Test Setup



3.1.5 Test Result of 6dB and 26dB and 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 mobile and portable 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.

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 $11 \text{ dBm} + 10 \log_{10} B$, 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.

For Straddle Channel, According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, If the power and PSD of the devices are uniform and comply with the lower limits specified for the U-NII-2 bands, a single measurement over the entire emission bandwidth can be performed to show compliance.

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):

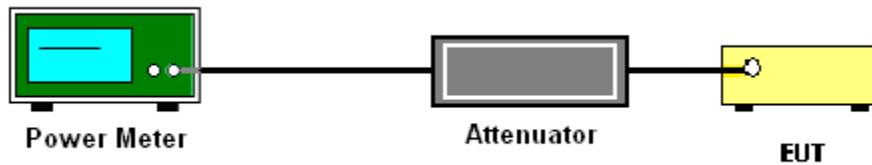
1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit continuously with a consistent duty cycle at its maximum power control level.
3. Measure the average power of the transmitter, and the average power is corrected with duty

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.

For Straddle Channel, According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, If the power and PSD of the devices are uniform and comply with the lower limits specified for the U-NII-2 bands, a single measurement over the entire emission bandwidth can be performed to show compliance.

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 mobile and portable client devices in the 5.15–5.25 GHz band, the maximum power spectral density shall not exceed 11dBm 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.

For Straddle Channel, According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, If the power and PSD of the devices are uniform and comply with the lower limits specified for the U-NII-2 bands, a single measurement over the entire emission bandwidth can be performed to show compliance.

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 UNII-1/2A/2C

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 UNII-3

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.

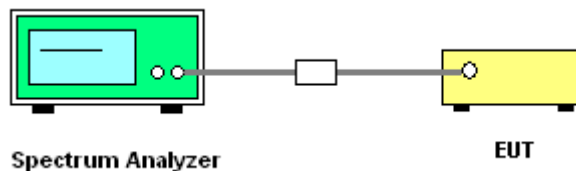
Method (a): Measure and sum the spectra across the outputs for UNII-1/2A/2C.

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 for UNII-3

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.

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.

$$EIRP = E_{Meas} + 20\log (d_{Meas}) - 104.7$$

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.

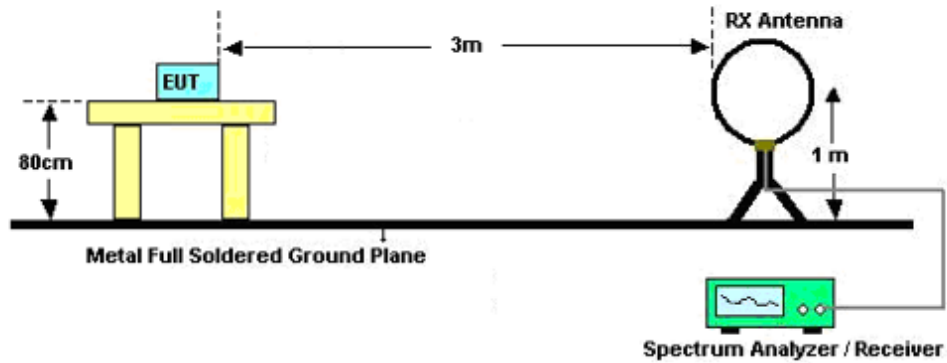


3.4.3 Test Procedures

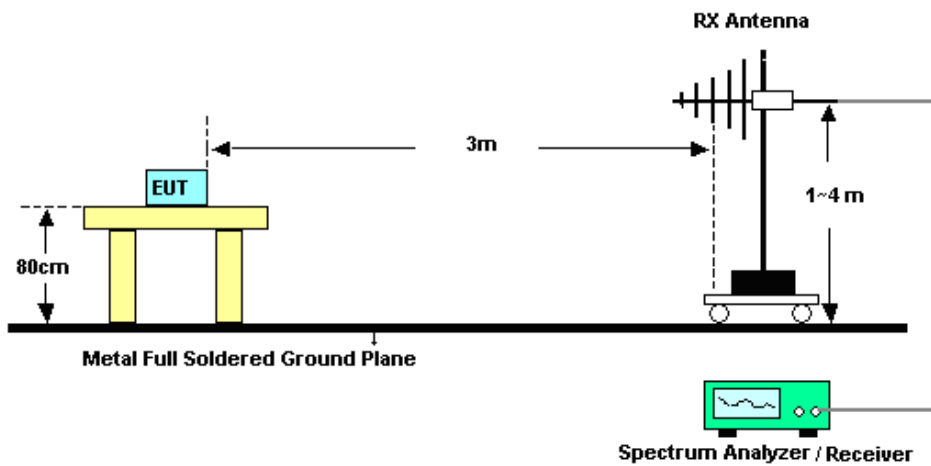
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r04. Section G) Unwanted emissions measurement.
 - (1) Procedure for Unwanted Emissions Measurements Below 1000MHz
 - RBW = 120 kHz
 - VBW = 300 kHz
 - Detector = Peak
 - Trace mode = max hold
 - (2) Procedure for Peak 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.
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

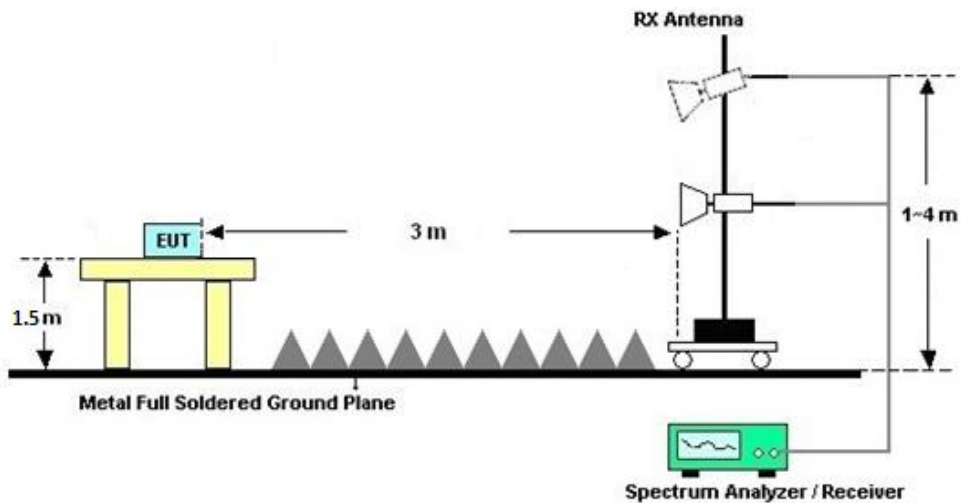
For radiated emissions below 30MHz



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.

3.4.7 Duty Cycle

Please refer to Appendix D.

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

Please refer to Appendix C.



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 (dBµV)	
	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.

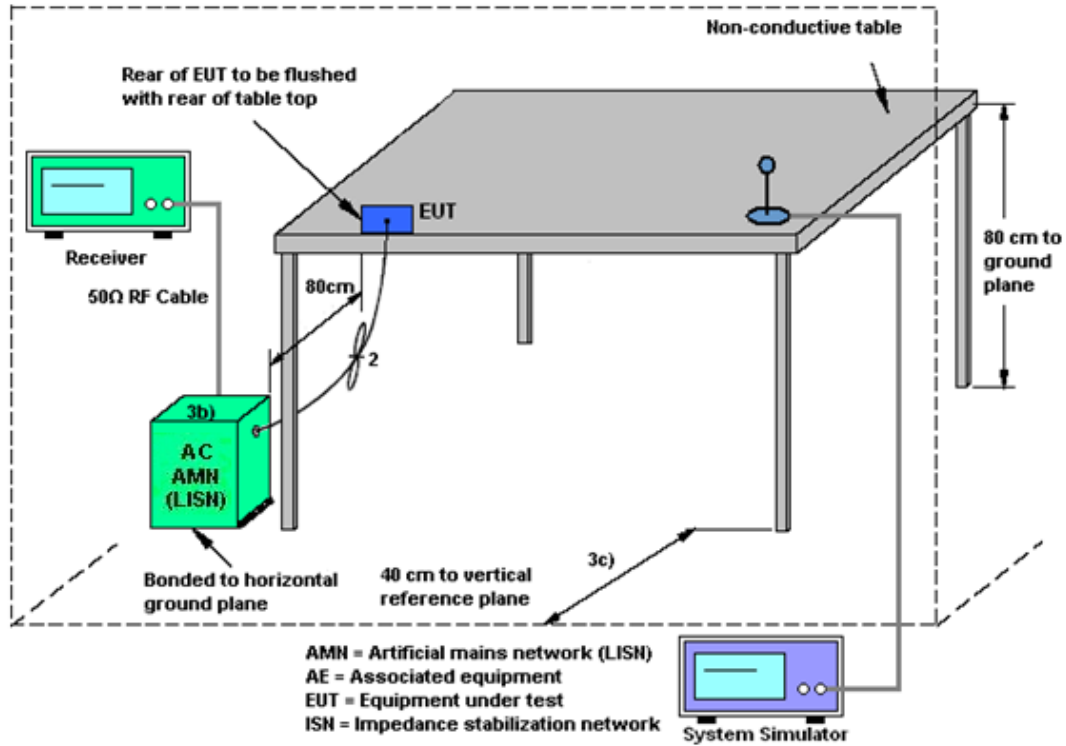
3.5.2 Measuring Instruments

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

Directional gain = GANT + Array Gain, where Array Gain is as follows.

For power spectral density (PSD) measurements on all devices,

Array Gain = 10 log(NANT/NSS=1) dB.

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 4.

Directional gain may be calculated by using the formulas applicable to equal gain antennas with GANT set equal to the gain of the antenna having the highest gain;

The EUT supports CDD mode.

For power, the directional gain GANT is set equal to the antenna having the highest gain, i.e., F)2)f)i).

For PSD, the directional gain calculation is following F)2)f)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.

<CDD Modes>						
			DG	DG	Power	PSD
			for	for	Limit	Limit
	Ant. 7	Ant. 5	Power	PSD	Reduction	Reduction
	(dBi)	(dBi)	(dBi)	(dBi)	(dB)	(dB)
UNII-1	-3.01	-3.10	-3.01	-0.04	0.00	0.00
UNII-2A	-2.87	-2.60	-2.60	0.28	0.00	0.00
UNII-2C	-3.25	-2.70	-2.70	0.04	0.00	0.00
UNII-3	-2.50	-2.00	-2.00	0.76	0.00	0.00



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. 06, 2023	Mar. 02, 2024~ Mar. 20, 2024	Apr. 05, 2024	Conducted (TH01-SZ)
Pulse Power Sensor	Anritsu	MA2411B	1339473	30MHz~40GHz	Dec. 29, 2023	Mar. 02, 2024~ Mar. 20, 2024	Dec. 28, 2024	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1218010	50MHz Bandwidth	Aug. 21, 2023	Mar. 02, 2024~ Mar. 20, 2024	Aug. 20, 2024	Conducted (TH01-SZ)
EMI Test Receiver	R&S	ESR7	101404	9kHz~7GHz	Oct. 18, 2023	Mar. 02, 2024~ Apr. 10, 2024	Oct. 17, 2024	Radiation (03CH04-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY5515021 3	10Hz~44GHz	Jul. 07, 2023	Mar. 02, 2024~ Apr. 10, 2024	Jul. 06, 2024	Radiation (03CH04-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	Jun. 28, 2022	Mar. 02, 2024~ Apr. 10, 2024	Jun. 27, 2024	Radiation (03CH04-SZ)
Bilog Antenna	TeseQ	CBL6111D	41909	30MHz~1GHz	May 14, 2023	Mar. 02, 2024~ Apr. 10, 2024	May 13, 2024	Radiation (03CH04-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-1474	1GHz~18GHz	Jul. 07, 2023	Mar. 02, 2024~ Apr. 10, 2024	Jul. 06, 2024	Radiation (03CH04-SZ)
Horn Antenna	SCHWARZBECK	BBHA9170	9170#679	15GHz~40GHz	Jul. 08, 2023	Mar. 02, 2024~ Apr. 10, 2024	Jul. 07, 2024	Radiation (03CH04-SZ)
Amplifier	Burgeon	BPA-530	102211	0.01Hz ~3000MHz	Oct. 18, 2023	Mar. 02, 2024~ Apr. 10, 2024	Oct. 17, 2024	Radiation (03CH04-SZ)
HF Amplifier	MITEQ	AMF-7D-0010 1800-30-10P-R	1943528	1GHz~18GHz	Oct. 18, 2023	Mar. 02, 2024~ Apr. 10, 2024	Oct. 17, 2024	Radiation (03CH04-SZ)
HF Amplifier	MITEQ	TTA1840-35-H G	1871923	18GHz~40GHz	Jul. 07, 2023	Mar. 02, 2024~ Apr. 10, 2024	Jul. 06, 2024	Radiation (03CH04-SZ)
Amplifier	Agilent Technologies	83017A	MY5728013 6	500MHz~26.5G Hz	Aug. 21, 2023	Mar. 02, 2024~ Apr. 10, 2024	Aug. 20, 2024	Radiation (03CH04-SZ)
AC Power Source	APC	AFV-S-600B	F119050019	N/A	Oct. 18, 2023	Mar. 02, 2024~ Apr. 10, 2024	Oct. 17, 2024	Radiation (03CH04-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Mar. 02, 2024~ Apr. 10, 2024	NCR	Radiation (03CH04-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Mar. 02, 2024~ Apr. 10, 2024	NCR	Radiation (03CH04-SZ)
EMI Receiver	R&S	ESR7	101630	9kHz~7GHz;	Jul. 06, 2023	Feb. 19, 2024	Jul. 05, 2024	Conduction (CO01-SZ)
AC LISN	R&S	ENV216	100063	9kHz~30MHz	Aug. 21, 2023	Feb. 19, 2024	Aug. 20, 2024	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	EMCO	3816/2SH	00103892	9kHz~30MHz	Oct. 16, 2023	Feb. 19, 2024	Oct. 15, 2024	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	6160200008 91	100Vac~250Vac	Jul. 07, 2023	Feb. 19, 2024	Jul. 06, 2024	Conduction (CO01-SZ)

NCR: No Calibration Required



5 Measurement Uncertainty

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 Spurious Emission & Bandedge	±1.34 dB
Occupied Channel Bandwidth	±0.012 MHz
Conducted Power	±1.34 dB
Conducted Power Spectral Density	±1.32 dB
Frequency	±1.3 Hz

Uncertainty of AC Conducted Emission Measurement (0.15 MHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.7 dB
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Uncertainty of Radiated Emission Measurement (9 KHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.8 dB
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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))	5.1 dB
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Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.8 dB
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Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.1 dB
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----- THE END -----



Appendix A. Conducted Test Results

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Zhang Xue Yi	Temperature:	21~25	°C
Test Date:	2024/03/02-2024/03/20	Relative Humidity:	51~54	%

TEST RESULTS DATA
Average Power Table

FCC Band I																	
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 7	Ant 5	Ant 7	Ant 5	SUM	Ant 7	Ant 5	Ant 7	Ant 5			
11a	6Mbps	2	36	Full	5180	0.04	0.04	17.18	17.10	20.15	24.00	-3.01		Pass	17.5		
11a	6Mbps	2	44	Full	5220	0.04	0.04	17.15	17.22	20.20	24.00	-3.01		Pass	17.5		
11a	6Mbps	2	48	Full	5240	0.04	0.04	17.21	17.25	20.24	24.00	-3.01		Pass	17.5		
HT20	MCS0	2	36	Full	5180	0.00	0.01	17.52	17.55	20.54	24.00	-3.01		Pass	18		
HT20	MCS0	2	44	Full	5220	0.00	0.01	17.63	17.58	20.61	24.00	-3.01		Pass	18		
HT20	MCS0	2	48	Full	5240	0.00	0.01	17.66	17.69	20.68	24.00	-3.01		Pass	18		
HT40	MCS0	2	38	Full	5190	0.02	0.00	17.10	16.98	20.05	24.00	-3.01		Pass	17		
HT40	MCS0	2	46	Full	5230	0.02	0.00	18.40	18.54	21.48	24.00	-3.01		Pass	18		
VHT80	MCS0	2	42	Full	5210	0.03	0.03	16.76	16.93	19.86	24.00	-3.01		Pass	16.5		
VHT160	MCS0	2	50	Full	5250	0.08	0.05	16.45	16.66	19.57	24.00	-3.01		Pass	16		
HE20	MCS0	2	36	Full	5180	0.00	0.00	17.85	17.62	20.75	24.00	-3.01		Pass	18		
				26/0		0.00	0.00	7.07	7.33	10.21	24.00	-3.01		Pass	8		
				52/37		0.00	0.00	10.43	10.27	13.36	24.00	-3.01		Pass	11		
				106/53		0.00	0.00	13.67	13.31	16.50	24.00	-3.01		Pass	14		
				44		Full	5220	0.00	0.00	17.88	17.75	20.83	24.00	-3.01		Pass	18
48	Full	5240	0.00	0.00	17.83	17.82	20.84	24.00	-3.01		Pass	18					
HE40	MCS0	2	38	Full	5190	0.02	0.02	17.16	17.06	20.12	24.00	-3.01		Pass	17		
			46	Full	5230	0.02	0.02	18.35	18.51	21.44	24.00	-3.01		Pass	18		
HE80	MCS0	2	42	Full	5210	0.00	0.00	17.31	17.51	20.42	24.00	-3.01		Pass	17		
HE160	MCS0	2	50	Full	5250	0.00	0.01	16.11	16.27	19.20	24.00	-3.01		Pass	15.5		

TEST RESULTS DATA
Average Power Table

FCC Band II															Power Setting		
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
						Ant 7	Ant 5	Ant 7	Ant 5	SUM	Ant 7	Ant 5	Ant 7	Ant 5			
11a	6Mbps	2	52	Full	5260	0.04	0.04	18.16	18.91	21.56	23.98	-2.60	26.99	Pass	18.5		
11a	6Mbps	2	60	Full	5300	0.04	0.04	18.07	18.71	21.41	23.98	-2.60	26.99	Pass	18.5		
11a	6Mbps	2	64	Full	5320	0.04	0.04	17.87	18.76	21.35	23.98	-2.60	26.99	Pass	18.5		
HT20	MCS0	2	52	Full	5260	0.00	0.01	18.13	19.01	21.60	23.98	-2.60	26.99	Pass	18.5		
HT20	MCS0	2	60	Full	5300	0.00	0.01	18.03	18.63	21.35	23.98	-2.60	26.99	Pass	18.5		
HT20	MCS0	2	64	Full	5320	0.00	0.01	17.72	18.71	21.25	23.98	-2.60	26.99	Pass	18.5		
HT40	MCS0	2	54	Full	5270	0.02	0.00	18.22	18.83	21.55	23.98	-2.60	26.99	Pass	18		
HT40	MCS0	2	62	Full	5310	0.02	0.00	16.43	17.16	19.82	23.98	-2.60	26.99	Pass	16.5		
VHT80	MCS0	2	58	Full	5290	0.03	0.03	15.64	16.45	19.08	23.98	-2.60	26.99	Pass	15.5		
HE20	MCS0	2	52	Full	5260	0.00	0.00	18.36	19.00	21.70	23.98	-2.60	26.99	Pass	18.5		
			60	Full	5300	0.00	0.00	18.23	18.80	21.53	23.98	-2.60	26.99	Pass	18.5		
			64	Full	5320	0.00	0.00	17.86	18.92	21.43	23.98	-2.60	26.99	Pass	18.5		
				26/8		0.00	0.00	8.10	9.19	11.69	23.98	-2.60	26.99	Pass	9		
				52/40		0.00	0.00	10.04	11.47	13.82	23.98	-2.60	26.99	Pass	11		
				106/54		0.00	0.00	13.07	14.28	16.73	23.98	-2.60	26.99	Pass	14		
HE40	MCS0	2	54	Full	5270	0.02	0.02	18.24	18.89	21.59	23.98	-2.60	26.99	Pass	18		
HE40	MCS0	2	62	Full	5310	0.02	0.02	16.98	17.70	20.37	23.98	-2.60	26.99	Pass	17		
HE80	MCS0	2	58	Full	5290	0.00	0.00	15.62	16.30	18.98	23.98	-2.60	26.99	Pass	15.5		

TEST RESULTS DATA
Average Power Table

FCC Band III																	
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 7	Ant 5	Ant 7	Ant 5	SUM	Ant 7	Ant 5	Ant 7	Ant 5			
11a	6Mbps	2	100	Full	5500	0.04	0.04	18.00	18.32	21.17	23.98	-2.70	26.99	Pass	18.5		
11a	6Mbps	2	116	Full	5580	0.04	0.04	18.29	18.29	21.30	23.98	-2.70	26.99	Pass	18.5		
11a	6Mbps	2	140	Full	5700	0.04	0.04	18.13	18.24	21.20	23.98	-2.70	26.99	Pass	18.5		
11a	6Mbps	2	144	Full	5720	0.04	0.04	18.12	18.30	21.22	23.98	-2.70	26.99	Pass	18.5		
HT20	MCS0	2	100	Full	5500	0.00	0.01	17.93	18.20	21.08	23.98	-2.70	26.99	Pass	18.5		
HT20	MCS0	2	116	Full	5580	0.00	0.01	18.23	18.26	21.25	23.98	-2.70	26.99	Pass	18.5		
HT20	MCS0	2	140	Full	5700	0.00	0.01	18.08	18.21	21.15	23.98	-2.70	26.99	Pass	18.5		
HT20	MCS0	2	144	Full	5720	0.00	0.01	18.05	18.33	21.20	23.98	-2.70	26.99	Pass	18.5		
HT40	MCS0	2	102	Full	5510	0.02	0.00	17.57	18.12	20.87	23.98	-2.70	26.99	Pass	17.5		
HT40	MCS0	2	110	Full	5550	0.02	0.00	18.18	18.55	21.38	23.98	-2.70	26.99	Pass	18		
HT40	MCS0	2	134	Full	5670	0.02	0.00	18.24	18.76	21.52	23.98	-2.70	26.99	Pass	18		
HT40	MCS0	2	142	Full	5710	0.02	0.00	18.17	18.57	21.39	23.98	-2.70	26.99	Pass	18		
VHT80	MCS0	2	106	Full	5530	0.03	0.03	17.10	17.38	20.25	23.98	-2.70	26.99	Pass	17		
VHT80	MCS0	2	122	Full	5610	0.03	0.03	17.06	17.47	20.28	23.98	-2.70	26.99	Pass	17		
VHT80	MCS0	2	138	Full	5690	0.03	0.03	17.06	17.69	20.40	23.98	-2.70	26.99	Pass	17		
VHT160	MCS0	2	114	Full	5570	0.08	0.05	16.44	16.82	19.65	23.98	-2.70	26.99	Pass	16		
HE20	MCS0	2	100	Full	5500	0.00	0.00	18.03	18.42	21.24	23.98	-2.70	26.99	Pass	18.5		
				26/0		0.00	0.00	7.34	8.60	11.03	23.98	-2.70	26.99	Pass	8.5		
				52/37		0.00	0.00	10.26	11.05	13.68	23.98	-2.70	26.99	Pass	11		
				106/53		0.00	0.00	13.33	14.09	16.74	23.98	-2.70	26.99	Pass	14		
			116	Full	5580	0.00	0.00	18.42	18.38	21.41	23.98	-2.70	26.99	Pass	18.5		
			140	Full	5700	0.00	0.00	18.18	18.43	21.32	23.98	-2.70	26.99	Pass	18.5		
				26/8		0.00	0.00	8.47	8.53	11.51	23.98	-2.70	26.99	Pass	9		
				52/40		0.00	0.00	11.05	11.44	14.26	23.98	-2.70	26.99	Pass	11.5		
				106/54		0.00	0.00	14.20	14.73	17.48	23.98	-2.70	26.99	Pass	14.5		
			144	Full	5720	0.00	0.00	18.16	18.41	21.30	23.98	-2.70	26.99	Pass	18.5		
HE40	MCS0	2	102	Full	5510	0.02	0.02	16.13	16.75	19.46	23.98	-2.70	26.99	Pass	16		
			110	Full	5550	0.02	0.02	18.24	18.57	21.42	23.98	-2.70	26.99	Pass	18		
			134	Full	5670	0.02	0.02	18.19	18.69	21.46	23.98	-2.70	26.99	Pass	18		
			142	Full	5710	0.02	0.02	18.15	18.63	21.41	23.98	-2.70	26.99	Pass	18		
HE80	MCS0	2	106	Full	5530	0.00	0.00	16.76	17.03	19.91	23.98	-2.70	26.99	Pass	16.5		
			122	Full	5610	0.00	0.00	17.27	17.61	20.45	23.98	-2.70	26.99	Pass	17		
			138	Full	5690	0.00	0.00	17.21	17.74	20.49	23.98	-2.70	26.99	Pass	17		
HE160	MCS0	2	114	Full	5570	0.00	0.01	16.59	16.84	19.73	23.98	-2.70	26.99	Pass	16		

TEST RESULTS DATA
Average Power Table

Band IV																
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 7	Ant 5	Ant 7	Ant 5	SUM	Ant 7	Ant 5	Ant 7	Ant 5		
11a	6Mbps	2	149	Full	5745	0.04	0.04	18.04	18.31	21.19	30.00	-2.00		Pass	18.5	
11a	6Mbps	2	157	Full	5785	0.04	0.04	17.94	18.12	21.04	30.00	-2.00		Pass	18.5	
11a	6Mbps	2	165	Full	5825	0.04	0.04	17.93	18.41	21.19	30.00	-2.00		Pass	18.5	
HT20	MCS0	2	149	Full	5745	0.00	0.01	18.05	18.29	21.18	30.00	-2.00		Pass	18.5	
HT20	MCS0	2	157	Full	5785	0.00	0.01	17.97	18.20	21.10	30.00	-2.00		Pass	18.5	
HT20	MCS0	2	165	Full	5825	0.00	0.01	17.95	18.37	21.17	30.00	-2.00		Pass	18.5	
HT40	MCS0	2	151	Full	5755	0.02	0.00	18.14	18.32	21.24	30.00	-2.00		Pass	18	
HT40	MCS0	2	159	Full	5795	0.02	0.00	18.03	18.32	21.19	30.00	-2.00		Pass	18	
VHT80	MCS0	2	155	Full	5775	0.03	0.03	17.03	17.22	20.14	30.00	-2.00		Pass	17	
HE20	MCS0	2	149	Full	5745	0.00	0.00	17.88	18.10	21.00	30.00	-2.00		Pass	18.5	
HE20	MCS0	2	149	26/0	5745	0.00	0.00	8.07	8.17	11.13	30.00	-2.00		Pass	8.5	
HE20	MCS0	2	149	52/37	5745	0.00	0.00	11.03	11.17	14.11	30.00	-2.00		Pass	11.5	
HE20	MCS0	2	149	106/53	5745	0.00	0.00	14.18	14.29	17.25	30.00	-2.00		Pass	14.5	
HE20	MCS0	2	157	Full	5785	0.00	0.00	17.77	18.01	20.90	30.00	-2.00		Pass	18.5	
HE20	MCS0	2	165	Full	5825	0.00	0.00	17.76	18.29	21.04	30.00	-2.00		Pass	18.5	
HE20	MCS0	2	165	26/8	5825	0.00	0.00	7.37	7.68	10.54	30.00	-2.00		Pass	8	
HE20	MCS0	2	165	52/40	5825	0.00	0.00	10.40	10.84	13.64	30.00	-2.00		Pass	11	
HE20	MCS0	2	165	106/54	5825	0.00	0.00	13.51	14.12	16.84	30.00	-2.00		Pass	14	
HE40	MCS0	2	151	Full	5755	0.02	0.02	18.12	18.43	21.29	30.00	-2.00		Pass	18	
HE40	MCS0	2	159	Full	5795	0.02	0.02	17.99	18.32	21.17	30.00	-2.00		Pass	18	
HE80	MCS0	2	155	Full	5775	0.00	0.00	17.10	17.30	20.21	30.00	-2.00		Pass	17	

TEST RESULTS DATA
Average Power Table

FCC Band I																	
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 7	Ant 5	Ant 7	Ant 5	SUM	Ant 7	Ant 5	Ant 7	Ant 5			
EHT20	MCS0	2	36	Full	5180	0.01	0.02	17.75	17.68	20.72	24.00	-3.01	Pass	18			
				26/0		0.01	0.02	7.60	7.97	10.80	24.00	-3.01	Pass	8.5			
				52/37		0.01	0.02	10.41	10.27	13.35	24.00	-3.01	Pass	11			
				106/53		0.01	0.02	13.68	13.42	16.56	24.00	-3.01	Pass	14			
				44		Full	5220	0.01	0.02	17.87	17.80	20.84	24.00	-3.01	Pass	18	
				48		Full	5240	0.01	0.02	17.86	17.88	20.88	24.00	-3.01	Pass	18	
EHT40	MCS0	2	38	Full	5190	0.02	0.00	16.59	16.25	19.43	24.00	-3.01	Pass	16.5			
			46	Full	5230	0.00	0.00	18.22	18.29	21.26	24.00	-3.01	Pass	18			
EHT80	MCS0	2	42	Full	5210	0.02	0.02	16.46	16.58	19.53	24.00	-3.01	Pass	16			
EHT160	MCS0	2	50	Full	5250	0.02	0.01	15.13	15.33	18.24	24.00	-3.01	Pass	15			

TEST RESULTS DATA
Average Power Table

FCC Band II																	
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 7	Ant 5	Ant 7	Ant 5	SUM	Ant 7	Ant 5	Ant 7	Ant 5			
EHT20	MCS0	2	52	Full	5260	0.01	0.02	18.39	18.86	21.64	23.98	-2.60	26.99	Pass	18.5		
			60	Full	5300	0.01	0.02	18.28	18.83	21.57	23.98	-2.60	26.99	Pass	18.5		
			64	Full	5320	0.01	0.02	17.99	18.89	21.47	23.98	-2.60	26.99	Pass	18.5		
				26/8		0.01	0.02	7.45	8.68	11.12	23.98	-2.60	26.99	Pass	8.5		
				52/40		0.01	0.02	10.25	11.45	13.90	23.98	-2.60	26.99	Pass	11		
106/54	0.01	0.02	13.17	14.55	16.92	23.98	-2.60	26.99	Pass	14							
EHT40	MCS0	2	54	Full	5270	0.02	0.00	18.04	18.88	21.49	23.98	-2.60	26.99	Pass	18		
			62	Full	5310	0.02	0.00	15.79	16.73	19.29	23.98	-2.60	26.99	Pass	16		
EHT80	MCS0	2	58	Full	5290	0.02	0.02	15.26	15.79	18.54	23.98	-2.60	26.99	Pass	15		

TEST RESULTS DATA
Average Power Table

FCC Band III																	
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 7	Ant 5	Ant 7	Ant 5	SUM	Ant 7	Ant 5	Ant 7	Ant 5			
EHT20	MCS0	2	100	Full	5500	0.01	0.02	18.10	18.49	21.31	23.98	-2.70	26.99	Pass	18.5		
				26/0		0.01	0.02	7.56	8.54	11.09	23.98	-2.70	26.99	Pass	8.5		
				52/37		0.01	0.02	10.74	11.57	14.19	23.98	-2.70	26.99	Pass	11.5		
				106/53		0.01	0.02	13.30	14.04	16.70	23.98	-2.70	26.99	Pass	14		
			116	Full	5580	0.01	0.02	18.40	18.49	21.45	23.98	-2.70	26.99	Pass	18.5		
				26/8	5700	0.01	0.02	18.21	18.43	21.33	23.98	-2.70	26.99	Pass	18.5		
			140	26/8	5700	0.01	0.02	7.58	8.02	10.82	23.98	-2.70	26.99	Pass	8		
				52/40		0.01	0.02	10.51	10.85	13.69	23.98	-2.70	26.99	Pass	11		
				106/54		0.01	0.02	13.68	14.32	17.02	23.98	-2.70	26.99	Pass	14		
				144		Full	5720	0.01	0.02	18.13	18.46	21.31	23.98	-2.70	26.99	Pass	18.5
EHT40	MCS0	2	102	Full	5510	0.02	0.00	17.33	17.94	20.65	23.98	-2.70	26.99	Pass	17.5		
			110	Full	5550	0.02	0.00	18.10	18.32	21.22	23.98	-2.70	26.99	Pass	18		
			134	Full	5670	0.02	0.00	18.03	18.56	21.31	23.98	-2.70	26.99	Pass	18		
			142	Full	5710	0.02	0.00	18.05	18.49	21.28	23.98	-2.70	26.99	Pass	18		
EHT80	MCS0	2	106	Full	5530	0.02	0.02	16.88	17.10	20.00	23.98	-2.70	26.99	Pass	16.5		
			122	Full	5610	0.02	0.02	17.30	17.75	20.54	23.98	-2.70	26.99	Pass	17		
			138	Full	5690	0.02	0.02	17.37	17.69	20.54	23.98	-2.70	26.99	Pass	17		
EHT160	MCS0	2	114	Full	5570	0.02	0.01	16.40	16.51	19.47	23.98	-2.70	26.99	Pass	16		

TEST RESULTS DATA
Average Power Table

Band IV																
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 7	Ant 5	Ant 7	Ant 5	SUM	Ant 7	Ant 5	Ant 7	Ant 5		
EHT20	MCS0	2	149	Full	5745	0.01	0.02	18.14	18.40	21.28	30.00	-2.00		Pass	18.5	
EHT20	MCS0	2	149	26/0	5745	0.01	0.02	7.55	7.59	10.58	30.00	-2.00		Pass	8	
EHT20	MCS0	2	149	52/37	5745	0.01	0.02	11.07	11.23	14.16	30.00	-2.00		Pass	11.5	
EHT20	MCS0	2	149	106/53	5745	0.01	0.02	13.68	13.80	16.75	30.00	-2.00		Pass	14	
EHT20	MCS0	2	157	Full	5785	0.01	0.02	18.06	18.31	21.20	30.00	-2.00		Pass	18.5	
EHT20	MCS0	2	165	Full	5825	0.01	0.02	18.06	18.44	21.26	30.00	-2.00		Pass	18.5	
EHT20	MCS0	2	165	26/8	5825	0.01	0.02	6.88	7.31	10.11	30.00	-2.00		Pass	7.5	
EHT20	MCS0	2	165	52/40	5825	0.01	0.02	10.41	10.87	13.66	30.00	-2.00		Pass	11	
EHT20	MCS0	2	165	106/54	5825	0.01	0.02	13.57	14.06	16.83	30.00	-2.00		Pass	14	
EHT40	MCS0	2	151	Full	5755	0.02	0.00	17.95	18.12	21.04	30.00	-2.00		Pass	18	
EHT40	MCS0	2	159	Full	5795	0.02	0.00	17.84	18.04	20.95	30.00	-2.00		Pass	18	
EHT80	MCS0	2	155	Full	5775	0.02	0.02	17.17	17.45	20.32	30.00	-2.00		Pass	17	



Emission Bandwidth

Test Result

TestMode	Antenna	Freq(MHz)	26dB EBW [MHz]	FL[MHz]	FH[MHz]
11A-CDD	Ant7	5180	23.90	5167.60	5191.50
		5220	24.10	5207.50	5231.60
		5240	24.50	5227.20	5251.70
		5260	30.90	5244.30	5275.20
		5300	28.70	5285.80	5314.50
		5320	26.00	5307.20	5333.20
		5500	24.60	5487.30	5511.90
		5580	24.50	5567.50	5592.00
		5700	24.60	5687.20	5711.80
		5720	24.60	5707.40	5732.00
		5745	24.60	5732.50	5757.10
		5785	24.50	5772.60	5797.10
		5825	24.80	5812.30	5837.10
11N20MIMO	Ant7	5180	24.40	5167.40	5191.80
		5220	26.80	5206.10	5232.90
		5240	30.00	5226.10	5256.10
		5260	29.00	5246.00	5275.00
		5300	32.70	5281.80	5314.50
		5320	28.60	5304.40	5333.00
		5500	24.80	5487.40	5512.20
		5580	29.90	5566.10	5596.00
		5700	24.80	5687.20	5712.00
		5720	24.90	5707.30	5732.20
		5745	26.20	5732.00	5758.20
5785	24.90	5772.70	5797.60		
5825	24.50	5812.60	5837.10		
11N40MIMO	Ant7	5190	46.80	5167.40	5214.20
		5230	80.60	5188.00	5268.60
		5270	88.80	5223.80	5312.60
		5310	45.60	5287.20	5332.80
		5510	48.40	5486.20	5534.60
		5550	54.60	5525.60	5580.20
		5670	58.00	5639.40	5697.40
		5710	57.40	5680.80	5738.20
		5755	63.00	5727.40	5790.40
5795	69.00	5761.00	5830.00		
11AC80MIMO	Ant7	5210	92.80	5163.60	5256.40



		5290	90.00	5244.40	5334.40
		5530	87.20	5486.00	5573.20
		5610	90.40	5564.80	5655.20
		5690	89.60	5646.00	5735.60
		5775	90.40	5731.40	5821.80
11AC160MIMO	Ant7	5250	177.60	5162.00	5339.60
		5570	176.80	5482.80	5659.60
11AX20MIMO	Ant7	5180	24.20	5167.60	5191.80
		5220	24.40	5207.30	5231.70
		5240	24.20	5227.60	5251.80
		5260	25.10	5247.10	5272.20
		5300	33.40	5282.50	5315.90
		5320	24.90	5306.80	5331.70
		5500	23.70	5488.10	5511.80
		5580	24.80	5567.30	5592.10
		5700	24.30	5687.50	5711.80
		5720	24.00	5707.90	5731.90
		5745	24.70	5732.60	5757.30
		5785	24.20	5772.80	5797.00
		5825	24.40	5812.70	5837.10
11AX40MIMO	Ant7	5190	45.20	5167.60	5212.80
		5230	50.20	5205.40	5255.60
		5270	45.00	5247.40	5292.40
		5310	45.40	5287.20	5332.60
		5510	43.40	5488.20	5531.60
		5550	45.40	5527.20	5572.60
		5670	48.00	5647.20	5695.20
		5710	46.60	5686.00	5732.60
		5755	49.00	5732.20	5781.20
		5795	52.40	5772.20	5824.60
11AX80MIMO	Ant7	5210	90.00	5164.80	5254.80
		5290	85.60	5248.00	5333.60
		5530	88.80	5486.40	5575.20
		5610	87.60	5566.00	5653.60
		5690	89.20	5645.60	5734.80
		5775	90.80	5731.00	5821.80
11AX160MIMO	Ant7	5250	176.00	5162.80	5338.80
		5570	177.60	5482.00	5659.60
11BE20MIMO	Ant7	5180	24.80	5167.10	5191.90
		5220	24.90	5207.00	5231.90
		5240	25.30	5227.10	5252.40
		5260	24.30	5247.60	5271.90



		5300	24.80	5287.00	5311.80
		5320	25.70	5306.40	5332.10
		5500	24.80	5487.10	5511.90
		5580	24.90	5567.70	5592.60
		5700	24.60	5687.40	5712.00
		5720	24.50	5707.50	5732.00
		5745	24.10	5732.90	5757.00
		5785	24.70	5772.60	5797.30
		5825	24.60	5812.60	5837.20
11BE40MIMO	Ant7	5190	44.80	5167.40	5212.20
		5230	59.60	5199.60	5259.20
		5270	66.40	5241.00	5307.40
		5310	44.80	5287.60	5332.40
		5510	45.20	5487.40	5532.60
		5550	45.00	5527.60	5572.60
		5670	45.40	5647.40	5692.80
		5710	45.00	5687.80	5732.80
		5755	48.00	5732.40	5780.40
5795	45.20	5772.20	5817.40		
11BE80MIMO	Ant7	5210	90.40	5164.00	5254.40
		5290	87.60	5246.80	5334.40
		5530	87.60	5486.40	5574.00
		5610	91.20	5565.60	5656.80
		5690	88.80	5646.00	5734.80
		5775	87.60	5731.00	5818.60
11BE160MIMO	Ant7	5250	176.80	5162.80	5339.60
		5570	176.00	5482.80	5658.80



Test Graphs

