



FCC RF Test Report

APPLICANT : Motorola Mobility LLC
EQUIPMENT : Mobile Cellular Phone
BRAND NAME : Motorola
MODEL NAME : XT2205-3
FCC ID : IHDT56AE8
STANDARD : FCC Part 15 Subpart E §15.407
CLASSIFICATION : (NII) Unlicensed National Information Infrastructure
TEST DATE(S) : May 12, 2022 ~ Jun. 07, 2022

We, Sporton International Inc. (Kunshan), 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.

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

Jason Jia

Approved by: Jason Jia



Sporton International Inc. (Kunshan)

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People's Republic of China**



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR240834-01D	Rev. 01	Initial issue of report	Jun. 20, 2022



SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
4.1	15.407(a)	Maximum Conducted Output Power	≤ 24 dBm	Pass	-
4.2	15.407(b)	Unwanted Emissions	15.407(b) & 15.209(a)	Pass	Under limit 3.22 dB at 5149.920 MHz
4.3	15.203 & 15.407(a)	Antenna Requirement	15.203 & 15.407(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

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	XT2205-3
FCC ID	IHDT56AE8
IMEI Code	Radiation: 351397430011580
HW Version	DVT2
SW Version	S2ST32.37
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		
Antenna Type / Gain	<5180 MHz ~ 5240 MHz> <Ant. 1> : Loop Antenna with gain -6.5 dBi <Ant. 2> : ILA Antenna with gain -6.0 dBi <5260 MHz ~ 5320 MHz> <Ant. 1> : Loop Antenna with gain -6.5 dBi <Ant. 2> : ILA Antenna with gain -6.0 dBi <5500 MHz ~ 5700 MHz> <Ant. 1> : Loop Antenna with gain -7.5 dBi <Ant. 2> : ILA Antenna with gain -6.0 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
	802.11 a/n/ac/ax MIMO	V	V

Note:



1. WLAN operation in 5600 MHz ~ 5650 MHz is notched.
2. For 802.11n HT20/HT40 & 802.11ac VHT20/VHT40 mode, the whole testing have assessed only 802.11n HT20/HT40 by referring to the higher output power.
3. 802.11ax 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 power/RSE, the full RU power > partial RU, therefore the full RU perform full test and Partial RU verified power/RSE.
4. WIFI MIMO only support STBC by manufacturer declared.
5. WLAN 5G Ant. 1 / Ant. 2 corresponding to EUT Photo Ant. 2 / Ant. 9.

1.5 Modification of EUT

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

1.6 Specification of Accessory

Specification of Accessory				
AC Adapter 1	Brand Name	Motorola(Salom)	Model Name	MC-301
AC Adapter 2	Brand Name	Motorola(Acbel)	Model Name	MC-301
Battery	Brand Name	Motorola(ATL)	Model Name	NF50
USB Cable 1	Brand Name	Motorola(Saibao)	Model Name	SC18D13215
USB Cable 2	Brand Name	Motorola(Cabletech)	Model Name	SC18D13216
USB Cable 3	Brand Name	Motorola(Luxshare)	Model Name	SC18D13217

1.7 Testing Location

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	03CH05-KS 03CH07-KS 03CH08-KS	CN1257	314309



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.
	TH01-SZ	CN1256	421272

Test data subcontracted: conducted power of this report

1.8 Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH05-KS	AUDIX	E3	6.2009-8-24al
2.	03CH07-KS	AUDIX	E3	6.2009-8-24al
3.	03CH08-KS	AUDIX	E3	6.2009-8-24

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 Re-use of Measured Data

2.1 Introduction Section

This application re-uses data collected on a similar device. The subject device of this application (Model: XT2205-3, FCC ID: IHDT56AE8) is electrically identical to the reference device (Model: XT2205-1, XT2205-2, FCC ID: IHDT56AE7) for the portions of the circuitry corresponding to the data being re-used. Based on their similarity, the FCC Part 15E (equipment class: NII) reuse the original model's result and do spot-check, following the FCC KDB 484596 D01 v01.

The applicant takes full responsibility that the test data as referenced in this report represent compliance for this FCC ID: IHDT56AE8 .

2.2 Model Difference Information

The main difference between FCC ID: IHDT56AE7 and FCC ID: IHDT56AE8 is as below:

- Add mmWave function.
- Remove some band

Other differences and all the details of similarity and difference can be found in the confidential documents (XT2205-3_Operational Description of Product Equality Declaration).

The re-used RF data includes the following bands provided in Appendix D (Sporton RF Report No. FR240834F&FZ240834 for the reference device Model: XT2205-1, XT2205-2, FCC ID: IHDT56AE7).

2.3 Reference detail Section:

Rule Part	Equipment Class	Frequency Band (MHz)	Reference FCC ID(Parent)	Type Grant/ Permissive Change	Reference Title	FCC ID Filling (Variant)	Report Title/Section
15E	NII	5150~5250	IHDT56AE7	Original Grant	FR240834F	IHDT56AE8	All sections applicable except for RSE
	NII	5250~5350	IHDT56AE7	Original Grant	FR240834F	IHDT56AE8	
	NII	5470~5725	IHDT56AE7	Original Grant	FR240834F	IHDT56AE8	
	DFS	5250~5350 5470~5725	IHDT56AE7	Original Grant	FZ240834	IHDT56AE8	All sections applicable



2.4 Spot Check Verification Data Section

Conducted power test against the variant model based on the worst-case condition from the original model was performed in this filing to demonstrate the test data from original model remains representative for the variant model

Summary for power and RSE spot check for each rule entry and technology is listed as below:

Test Item	Mode	IHDT56AE7 Parent Worst Result	IHDT56AE8 Variant Check Result	Difference (dB)
Conducted Power (dBm)	802.11a CH48	20.50	19.66	-0.84
	802.11n20 CH48	20.40	19.62	-0.78
	802.11n 40 CH46	20.61	19.78	-0.83
	802.11ac20 CH48	20.32	19.66	-0.66
	802.11ac40 CH46	20.52	19.92	-0.60
	802.11ac80 CH42	15.05	14.36	-0.69
	802.11ax20 CH100	18.62	17.99	-0.63
	802.11ax40 CH110	18.66	18.01	-0.65
	802.11ax80 CH106	14.52	14.03	-0.49

Conclusion:

Based on the spot check test result, the test data from the original model is representative for the variant model. The power level spot check are shown within expected level compliant to limit line.

The same DFS detection EUD mechanism/software is used in the variant. Hence, there is no spot check data for DFS EUD hand-shaking mechanism.

We confirm that the test data reuse policy of FCC KDB 484596 D01 Referencing Test Data v01 has been followed and the test data as referenced from the parent model report represents compliance with new FCC ID.



3 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:, 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.

3.1 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)
5500- 5700 MHz MHz 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

Note:

1. The above Frequency and Channel in "*" were 802.11n HT40 and 802.11ac VHT40.
2. The above Frequency and Channel in "[#]" were 802.11ac VHT80.



3.2 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
802.11ax HE20	MCS0
802.11ax HE40	MCS0
802.11ax HE80	MCS0

RSE Co-location

802.11ac VHT80 CH42 + 5GNR n5 Link

Remark:

1. The RSE are tested with accessories from the worst case of Part 15B report.
2. RSE Co-location mode are combination from the worst WLAN TX mode and WWAN Link mode.

Ch. #		U-NII-1:5180-5240 MHz	U-NII-2A:5260-5320 MHz	U-NII-2C:5500- 5700 MHz
		802.11a	802.11a	802.11a
L	Low	36	52	100
M	Middle	44	60	116
H	High	48	64	140

Ch. #		U-NII-1:5180-5240 MHz	U-NII-2A:5260-5320 MHz	U-NII-2C:5500- 5700 MHz
		802.11n HT20	802.11n HT20	802.11n HT20
L	Low	36	52	100
M	Middle	44	60	116
H	High	48	64	140

Ch. #		U-NII-1:5180-5240 MHz	U-NII-2A:5260-5320 MHz	U-NII-2C:5500- 5700 MHz
		802.11n HT40	802.11n HT40	802.11n HT40
L	Low	38	54	102
M	Middle	-	-	110
H	High	46	62	134



Ch. #		U-NII-1:5180-5240 MHz	U-NII-2A:5260-5320 MHz	U-NII-2C:5500- 5700 MHz
		802.11ac VHT80	802.11ac VHT80	802.11ac VHT80
L	Low	-	-	106
M	Middle	42	58	-
H	High	-	-	-

Ch. #		U-NII-1 : 5150-5250 MHz	U-NII-2A : 5250-5350 MHz	U-NII-2C : 5470-5725MHz
		802.11ax HE20	802.11ax HE20	802.11ax HE20
L	Low	36	52	100
M	Middle	44	60	116
H	High	48	64	140

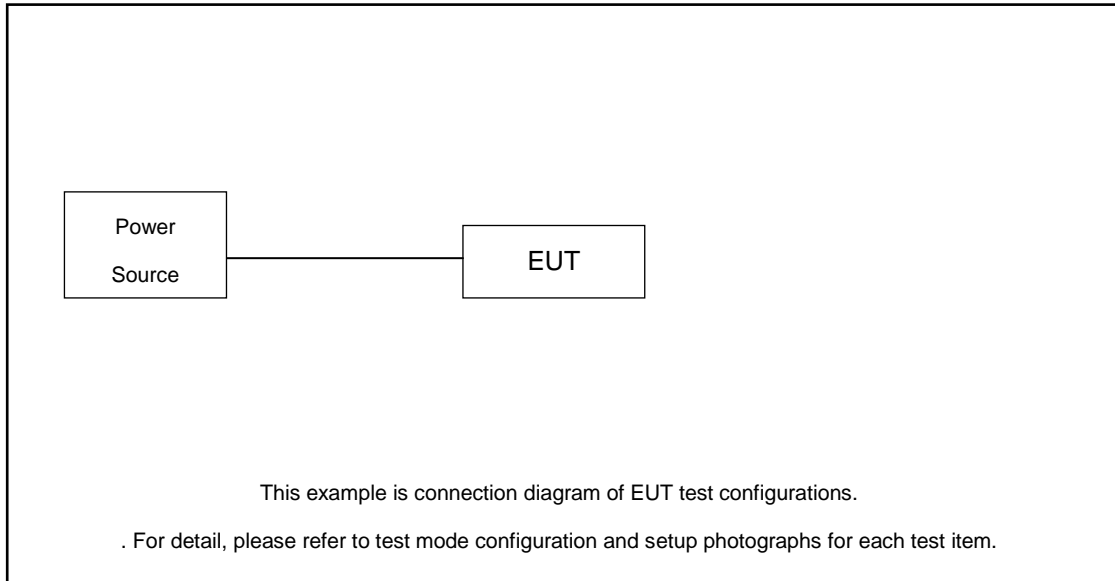
Ch. #		U-NII-1 : 5150-5250 MHz	U-NII-2A : 5250-5350 MHz	U-NII-2C : 5470-5725MHz
		802.11ax HE40	802.11ax HE40	802.11ax HE40
L	Low	38	54	102
M	Middle	-	-	110
H	High	46	62	134

Ch. #		U-NII-1 : 5150-5250 MHz	U-NII-2A : 5250-5350 MHz	U-NII-2C : 5470-5725MHz
		802.11ax HE80	802.11ax HE80	802.11ax HE80
L	Low	-	-	106
M	Middle	42	58	-
H	High	-	-	-

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

3.3 Connection Diagram of Test System

For Radiated Emission



3.4 EUT Operation Test Setup

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



4 Test Result

4.1 Maximum Conducted Output Power Measurement

4.1.1 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 $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz.

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.

4.1.2 Measuring Instruments

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

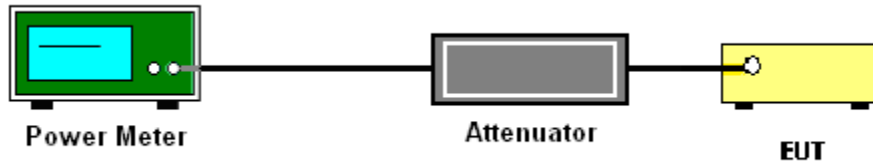
4.1.3 Test Procedures

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.

4.1.4 Test Setup



4.1.5 Test Result of Maximum Conducted Output Power

Please refer to Spot Check Verification Data Section.



4.2 Unwanted Emissions Measurement

This section is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement.

4.2.1 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 5470-5725 MHz band: all emissions outside of the 5470-5725 MHz band shall not exceed an EIRP of -27 dBm/MHz.

- (2) 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



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

4.2.2 Measuring Instruments

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

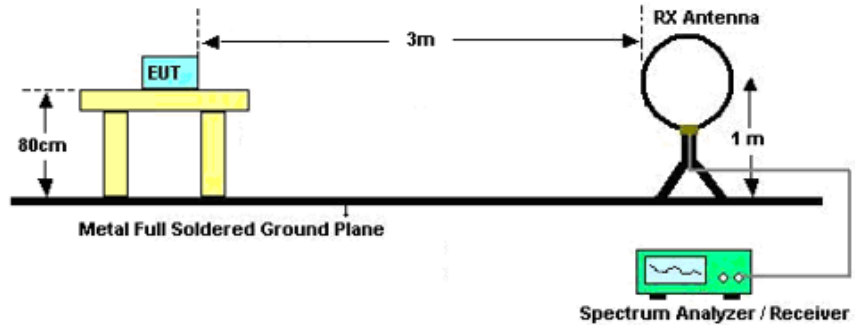


4.2.3 Test Procedures

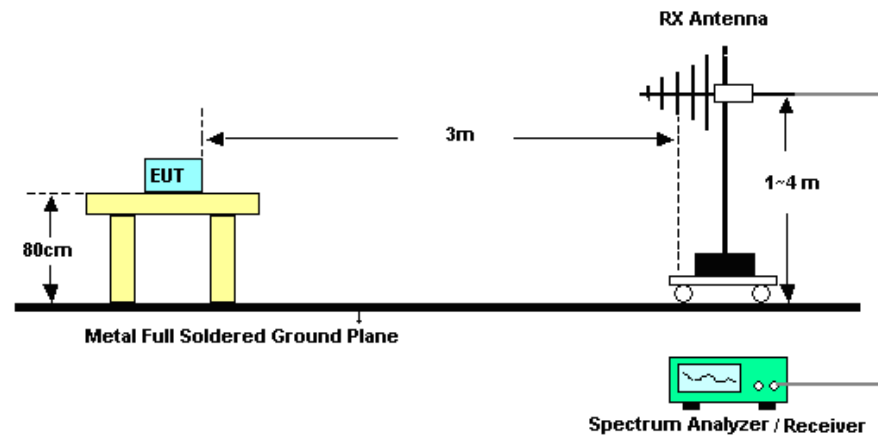
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section G) Unwanted emissions measurement.
 - (1) Procedure for Unwanted Emissions Measurements Below 1000MHz
 - RBW = 120 kHz
 - VBW = 300 kHz
 - Detector = Peak
 - Trace mode = max hold
 - (2) Procedure for Peak 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.
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 peak 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.

4.2.4 Test Setup

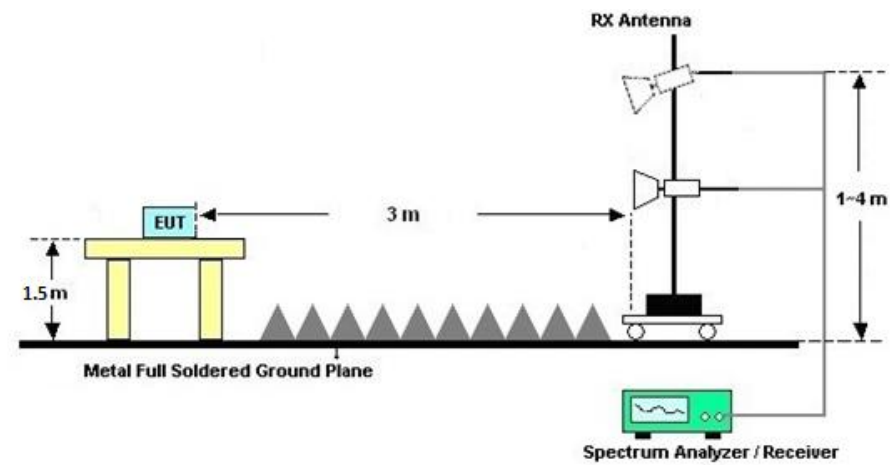
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz





4.2.5 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.

4.2.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix A.

4.2.7 Duty Cycle

Please refer to Appendix B.

4.2.8 Test Result of Radiated Spurious Emissions (30MHz ~ 10th Harmonic or 40GHz, whichever is lower)

Please refer to Appendix A.



4.3 Antenna Requirements

4.3.1 Standard Applicable

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.

4.3.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

4.3.3 Antenna Gain

<STBC Modes>

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

Basic methodology with NANT transmit antennas, each with the same directional gain GANT dBi, being driven by NANT transmitter outputs of equal power, and If all transmit signals are completely uncorrelated with each other,

Directional gain = GANT Max

<STBC Modes>						
			DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
	Ant. 1 (dBi)	Ant. 2 (dBi)				
Band I	-6.50	-6.00	-6.00	-6.00	0.00	0.00
Band II	-6.50	-6.00	-6.00	-6.00	0.00	0.00
Band III	-7.50	-6.00	-6.00	-6.00	0.00	0.00

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

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



5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Pulse Power Sensor	Anritsu	MA2411B	1339473	30MHz~40GHz	Dec. 28, 2021	Jun. 07, 2022	Dec. 27, 2022	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1542004	50MHz Bandwidth	Dec. 28, 2021	Jun. 07, 2022	Dec. 27, 2022	Conducted (TH01-SZ)
EMI Test Receiver	Keysight	N9038A	MY56400004	3Hz~8.5GHz;Max x 30dBm	Oct. 16, 2021	May 12, 2022	Oct. 15, 2022	Radiation (03CH05-KS)
EXA Spectrum Analyzer	Keysight	N9010B	MY57471084	10Hz-44G,MAX 30dB	Jul. 12, 2021	May 12, 2022	Jul. 11, 2022	Radiation (03CH05-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Nov. 08, 2021	May 12, 2022	Nov. 07, 2022	Radiation (03CH05-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 05, 2022	May 12, 2022	Jan. 04, 2023	Radiation (03CH05-KS)
Amplifier	MITEQ	EM18G40GG A	060728	18~40GHz	Jan. 05, 2022	May 12, 2022	Jan. 04, 2023	Radiation (03CH05-KS)
high gain Amplifier	MITEQ	AMF-7D-0010 1800-30-10P	2012228	1Ghz-18Ghz	Oct. 16, 2021	May 12, 2022	Oct. 15, 2022	Radiation (03CH05-KS)
Amplifier	Keysight	83017A	MY53270316	500MHz~26.5GHz	Oct. 16, 2021	May 12, 2022	Oct. 15, 2022	Radiation (03CH05-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	May 12, 2022	NCR	Radiation (03CH05-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	May 12, 2022	NCR	Radiation (03CH05-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	May 12, 2022	NCR	Radiation (03CH05-KS)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz;Max 30dBm	Oct. 16, 2021	May 12, 2022	Oct. 15, 2022	Radiation (03CH07-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55370528	10Hz-44G,MAX 30dB	Oct. 16, 2021	May 12, 2022	Oct. 15, 2022	Radiation (03CH07-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Oct. 30, 2021	May 12, 2022	Oct. 29, 2022	Radiation (03CH07-KS)
high gain Amplifier	MITEQ	AMF-7D-0010 1800-30-10P	2025788	1Ghz-18Ghz	Jul. 30, 2021	May 12, 2022	Jul. 29, 2023	Radiation (03CH07-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 05, 2022	May 12, 2022	Jan. 04, 2023	Radiation (03CH07-KS)
Amplifier	Keysight	83017A	MY53270316	500MHz~26.5GHz	Oct. 16, 2021	May 12, 2022	Oct. 15, 2022	Radiation (03CH07-KS)
Amplifier	MITEQ	EM18G40GG A	060728	18~40GHz	Jan. 05, 2022	May 12, 2022	Jan. 04, 2023	Radiation (03CH07-KS)
AC Power Source	Chroma	61601	616010002473	N/A	NCR	May 12, 2022	NCR	Radiation (03CH07-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	May 12, 2022	NCR	Radiation (03CH07-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	May 12, 2022	NCR	Radiation (03CH07-KS)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz;Max 30dBm	Oct. 16, 2021	May 12, 2022	Oct. 15, 2022	Radiation (03CH08-KS)
EXA Spectrum Analyzer	Keysight	N9010B	MY57471084	10Hz-44G,MAX 30dB	Jul. 12, 2021	May 12, 2022	Jul. 11, 2022	Radiation (03CH08-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 30, 2021	May 12, 2022	Oct. 29, 2022	Radiation (03CH08-KS)
Bilog Ante1ma	TESEQ& VGT	CBL 61110	59915	30MHz-1GHz	Sep. 02, 2021	May 12, 2022	Sep. 01, 2022	Radiation (03CH08-KS)
Amplifier	SONOMA	310N	413741	9KHz-1GHz	Jan. 05, 2022	May 12, 2022	Jan. 04, 2023	Radiation (03CH08-KS)
AC Power Source	Chroma	61601	616010002473	N/A	NCR	May 12, 2022	NCR	Radiation (03CH08-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	May 12, 2022	NCR	Radiation (03CH08-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	May 12, 2022	NCR	Radiation (03CH08-KS)

NCR: No Calibration Required



6 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.

For 03CH08-KS

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.9dB
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For 03CH05-KS

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.0dB
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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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For 03CH07-KS

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.0dB
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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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----- THE END -----



Appendix A. Radiated Spurious Emission

Only the worst results of each operation mode are shown in the report.

UNII-1 - 5150~5250MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI Ant.	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 36 5180MHz		5148	61.33	-12.67	74	53.04	34.42	10.6	36.73	100	120	P	H
		5148	49.98	-4.02	54	41.69	34.42	10.6	36.73	100	120	A	H
	*	5176	109.44	-	-	101.04	34.45	10.64	36.69	100	120	P	H
		5176	102.03	-	-	93.63	34.45	10.64	36.69	100	120	A	H
		5138.08	55.1	-18.9	74	46.83	34.41	10.6	36.74	355	102	P	V
		5147.68	44.51	-9.49	54	36.22	34.42	10.6	36.73	355	102	A	V
	*	5176	103.43	-	-	95.03	34.45	10.64	36.69	355	102	P	V
		5176	96.22	-	-	87.82	34.45	10.64	36.69	355	102	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII-1 5150~5250MHz

WIFI 802.11a (Harmonic @ 3m)

WIFI Ant.	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 36 5180MHz		10355	45.02	-23.28	68.3	59.23	37.38	15.44	67.03	300	0	P	H
		10355	47.97	-20.33	68.3	62.18	37.38	15.44	67.03	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



UNII-1 5150~5250MHz
WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI Ant. 2+9	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 38 5190MHz		5149.68	59.49	-14.51	74	51.2	34.42	10.6	36.73	100	120	P	H
		5149.92	50.19	-3.81	54	41.9	34.42	10.6	36.73	100	120	A	H
	*	5188	103.38	-	-	94.98	34.45	10.64	36.69	100	120	P	H
		5188	97.19	-	-	88.79	34.45	10.64	36.69	100	120	A	H
		5361.48	48.58	-25.42	74	39.74	34.59	10.76	36.51	100	120	P	H
		5366.88	39.75	-14.25	54	30.91	34.59	10.76	36.51	100	120	A	H
		5149.68	57.13	-16.87	74	48.84	34.42	10.6	36.73	299	101	P	V
		5149.9	44.78	-9.22	54	36.49	34.42	10.6	36.73	299	101	A	V
	*	5188	97.62	-	-	89.22	34.45	10.64	36.69	299	101	P	V
		5188	90.75	-	-	82.35	34.45	10.64	36.69	299	101	A	V
	5366.52	47.87	-26.13	74	39.03	34.59	10.76	36.51	299	101	P	V	
	5375.34	39.45	-14.55	54	30.61	34.59	10.76	36.51	299	101	A	V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII-1 5150~5250MHz
WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI Ant. 2+9	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 38 5190MHz		10377	45.39	-22.91	68.3	59.52	37.41	15.47	67.01	300	0	P	H
		10377	46.54	-21.76	68.3	60.67	37.41	15.47	67.01	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



UNII-1 5150~5250MHz
WIFI 802.11ac VHT80 (Band Edge @ 3m)

WIFI Ant. 2+9	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT80 CH 42 5210MHz		5149.92	59.7	-14.3	74	51.41	34.42	10.6	36.73	122	218	P	H
		5149.92	50.78	-3.22	54	42.49	34.42	10.6	36.73	122	218	A	H
	*	5218	98.45	-	-	89.97	34.47	10.67	36.66	122	218	P	H
		5218	91.79	-	-	83.31	34.47	10.67	36.66	122	218	A	H
		5375.16	49.29	-24.71	74	40.45	34.59	10.76	36.51	122	218	P	H
		5354.28	40.76	-13.24	54	31.95	34.58	10.75	36.52	122	218	A	H
		5116	55.03	-18.97	74	46.82	34.39	10.58	36.76	318	102	P	V
		5149.92	46.29	-7.71	54	38	34.42	10.6	36.73	318	102	A	V
	*	5218	92.4	-	-	83.92	34.47	10.67	36.66	318	102	P	V
		5218	85.07	-	-	76.59	34.47	10.67	36.66	318	102	A	V
	5387.94	49.48	-24.52	74	40.59	34.61	10.77	36.49	318	102	P	V	
	5372.64	40.19	-13.81	54	31.35	34.59	10.76	36.51	318	102	A	V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII-1 5150~5250MHz
WIFI 802.11ac VHT80 (Harmonic @ 3m)

WIFI Ant. 2+9	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT80 CH 42 5210MHz		10421	45.56	-22.74	68.3	59.61	37.43	15.51	66.99	300	0	P	H
		10421	44.27	-24.03	68.3	58.32	37.43	15.51	66.99	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



UNII-1 - 5150~5250MHz

WIFI 802.11ax HE20 Full (Band Edge @ 3m)

WIFI Ant. 2+9	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ax HE20 Full CH 36 5180MHz		5146.24	58.06	-15.94	74	49.77	34.42	10.6	36.73	100	215	P	H
		5148.8	47.88	-6.12	54	39.59	34.42	10.6	36.73	100	215	A	H
	*	5182	107.39	-	-	98.99	34.45	10.64	36.69	100	215	P	H
		5182	99.89	-	-	91.49	34.45	10.64	36.69	100	215	A	H
		5148.64	55.09	-18.91	74	46.8	34.42	10.6	36.73	312	77	P	V
		5148.8	43.56	-10.44	54	35.27	34.42	10.6	36.73	312	77	A	V
	*	5182	99.96	-	-	91.56	34.45	10.64	36.69	312	77	P	V
		5182	92.69	-	-	84.29	34.45	10.64	36.69	312	77	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII-1 5150~5250MHz

WIFI 802.11ax HE20 Full (Harmonic @ 3m)

WIFI Ant. 2+9	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ax HE20 Full CH 36 5180MHz		10355	45.69	-22.61	68.3	59.9	37.38	15.44	67.03	300	0	P	H
		10355	46.09	-22.21	68.3	60.3	37.38	15.44	67.03	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



UNII-1 5150~5250MHz
WIFI 802.11ax HE40 Full (Band Edge @ 3m)

WIFI Ant. 2+9	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ax HE40 Full CH 38 5190MHz		5149.98	60.26	-13.74	74	51.97	34.42	10.6	36.73	100	116	P	H
		5149.92	49.95	-4.05	54	41.66	34.42	10.6	36.73	100	116	A	H
	*	5182	103.85	-	-	95.45	34.45	10.64	36.69	100	116	P	H
		5182	96.79	-	-	88.39	34.45	10.64	36.69	100	116	A	H
		5373.54	49.29	-24.71	74	40.45	34.59	10.76	36.51	100	116	P	H
		5377.86	40.03	-13.97	54	31.15	34.61	10.76	36.49	100	116	A	H
		5149.98	51.87	-22.13	74	43.58	34.42	10.6	36.73	299	87	P	V
		5149.9	43.19	-10.81	54	34.9	34.42	10.6	36.73	299	87	A	V
	*	5188	97.45	-	-	89.05	34.45	10.64	36.69	299	87	P	V
		5188	89.19	-	-	80.79	34.45	10.64	36.69	299	87	A	V
	5381.82	48.32	-25.68	74	39.43	34.61	10.77	36.49	299	87	P	V	
	5355.18	39.83	-14.17	54	31.02	34.58	10.75	36.52	299	87	A	V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII-1 5150~5250MHz
WIFI 802.11ax HE40 Full (Harmonic @ 3m)

WIFI Ant. 2+9	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ax HE40 Full CH 38 5190MHz		10377	45.03	-23.27	68.3	59.16	37.41	15.47	67.01	300	0	P	H
		10377	45.14	-23.16	68.3	59.27	37.41	15.47	67.01	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



UNII-1 5150~5250MHz
WIFI 802.11ax HE40 Partial 242 (Band Edge @ 3m)

Table with 14 columns: WIFI Ant. 2+9, Note, Frequency (MHz), Level (dBµV/m), Over Limit (dB), Limit Line (dBµV/m), Read Level (dBµV), Antenna Factor (dB/m), Path Loss (dB), Preamp Factor (dB), Ant Pos (cm), Table Pos (deg), Peak Avg. (P/A), Pol. (H/V). Rows include test results for frequencies like 5148.16, 5149.92, 5188, 5395.5, 5352.3, 5149.12, 5149.12, 5170, 5170, 5360.76, 5351.58.

Remark

- 1. No other spurious found.
2. All results are PASS against Peak and Average limit line.



UNII-1 5150~5250MHz
WIFI 802.11ax HE80 Full (Band Edge @ 3m)

WIFI Ant. 2+9	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ax HE80 Full CH 42 5210MHz		5138.4	58.92	-15.08	74	50.65	34.41	10.6	36.74	100	119	P	H
		5148.64	49.72	-4.28	54	41.43	34.42	10.6	36.73	100	119	A	H
	*	5236	99.28	-	-	90.75	34.49	10.68	36.64	100	119	P	H
		5236	91.95	-	-	83.42	34.49	10.68	36.64	100	119	A	H
		5362.2	49.46	-24.54	74	40.62	34.59	10.76	36.51	100	119	P	H
		5382	40.53	-13.47	54	31.64	34.61	10.77	36.49	100	119	A	H
		5148.8	52.74	-21.26	74	44.45	34.42	10.6	36.73	388	93	P	V
		5149.28	43.87	-10.13	54	35.58	34.42	10.6	36.73	388	93	A	V
	*	5218	93.38	-	-	84.9	34.47	10.67	36.66	388	93	P	V
		5218	84.79	-	-	76.31	34.47	10.67	36.66	388	93	A	V
	5390.28	49.26	-24.74	74	40.37	34.61	10.77	36.49	388	93	P	V	
	5369.22	40.25	-13.75	54	31.41	34.59	10.76	36.51	388	93	A	V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII-1 5150~5250MHz
WIFI 802.11ax HE80 Full (Harmonic @ 3m)

WIFI Ant. 2+9	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ax HE80 Full CH 42 5210MHz		10421	45.27	-23.03	68.3	59.32	37.43	15.51	66.99	300	0	P	H
		10421	44.97	-23.33	68.3	59.02	37.43	15.51	66.99	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



UNII-1 5150~5250MHz
WIFI 802.11ax HE80 Partial 484 (Band Edge @ 3m)

WIFI Ant. 2+9	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ax HE80 Partial 484/65 CH 42 5210MHz		5146.24	57.07	-16.93	74	48.78	34.42	10.6	36.73	100	217	P	H
		5148.8	47.89	-6.11	54	39.6	34.42	10.6	36.73	100	217	A	H
		5194	102.29	-	-	93.85	34.46	10.66	36.68	100	217	P	H
		5194	94.54	-	-	86.1	34.46	10.66	36.68	100	217	A	H
		5375.88	48.56	-25.44	74	39.72	34.59	10.76	36.51	100	217	P	H
		5375.34	40.02	-13.98	54	31.18	34.59	10.76	36.51	100	217	A	H
		5146.08	52.31	-21.69	74	44.02	34.42	10.6	36.73	301	75	P	V
		5148.64	43.09	-10.91	54	34.8	34.42	10.6	36.73	301	75	A	V
		5188	94.25	-	-	85.85	34.45	10.64	36.69	301	75	P	V
		5188	86.21	-	-	77.81	34.45	10.64	36.69	301	75	A	V
		5366.88	48.78	-25.22	74	39.94	34.59	10.76	36.51	301	75	P	V
		5372.64	39.68	-14.32	54	30.84	34.59	10.76	36.51	301	75	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



UNII-2C 5470~5725MHz

WIFI 802.11ax HE20 Partial 106 (Band Edge @ 3m)

WIFI Ant. 2+9	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ax		5725	59.24	-9.06	68.3	49.69	34.97	11.18	36.6	100	117	P	H
HE20		5704	108.2	-	-	98.67	34.95	11.16	36.58	100	117	P	H
Partial		5704	100.49	-	-	90.96	34.95	11.16	36.58	100	117	A	H
106/54		5729.16	54.04	-14.26	68.3	44.49	34.97	11.18	36.6	315	71	P	V
CH 140		5704	103.55	-	-	94.02	34.95	11.16	36.58	315	71	P	V
5700MHz		5704	93.53	-	-	84	34.95	11.16	36.58	315	71	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Emission below 1GHz
5GHz WIFI 802.11ac VHT80 (LF)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
2+9		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
5GHz 802.11ac VHT80 LF		30	20.12	-19.88	40	26.61	25.5	0.71	32.7	-	-	P	H
		121.18	13.83	-29.67	43.5	27.17	17.85	1.67	32.86	-	-	P	H
		296.75	18.3	-27.7	46	28.43	20.15	2.63	32.91	-	-	P	H
		410.24	20.8	-25.2	46	27.6	22.89	3.09	32.78	-	-	P	H
		607.15	24.34	-21.66	46	27.56	25.55	3.76	32.53	-	-	P	H
		815.7	28.02	-17.98	46	29.2	26.99	4.36	32.53	-	-	P	H
		33.88	25.32	-14.68	40	34.04	23.42	0.71	32.85	-	-	P	V
		77.53	15.69	-24.31	40	33.48	13.78	1.33	32.9	-	-	P	V
		277.35	16.66	-29.34	46	27.27	19.84	2.54	32.99	-	-	P	V
		473.29	21.71	-24.29	46	27.12	24.02	3.32	32.75	-	-	P	V
		671.17	24.86	-21.14	46	27.82	25.82	3.96	32.74	-	-	P	V
	816.67	28.29	-17.71	46	29.46	27	4.36	32.53	-	-	P	V	
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



Co-location Mode

UNII-1 - 5150~5250MHz

802.11ac VHT80 CH42 + 5GNR n5 Link (Band Edge @ 3m)

WIFI Ant.	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT80 CH 42 5210MHz		5149.12	60.84	-13.16	74	45.13	34.4	10.62	29.31	100	119	P	H
		5148.64	50.75	-3.25	54	35.04	34.4	10.62	29.31	100	119	A	H
	*	5194	97.22	-	-	81.42	34.5	10.64	29.34	100	119	P	H
		5194	89.91	-	-	74.11	34.5	10.64	29.34	100	119	A	H
		5370.84	55.87	-18.13	74	40.04	34.5	10.85	29.52	100	119	P	H
		5355.54	47.11	-6.89	54	31.3	34.5	10.83	29.52	100	119	A	H
		5141.92	59.33	-14.67	74	43.59	34.4	10.62	29.28	291	100	P	V
		5117.28	49.8	-4.2	54	34.12	34.33	10.61	29.26	291	100	A	V
	*	5212	92.66	-	-	76.86	34.5	10.66	29.36	291	100	P	V
		5212	85.34	-	-	69.54	34.5	10.66	29.36	291	100	A	V
		5377.68	55.49	-18.51	74	39.67	34.5	10.87	29.55	291	100	P	V
	5354.82	47	-7	54	31.19	34.5	10.83	29.52	291	100	A	V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII-1 5150~5250MHz

802.11ac VHT80 CH42 + 5GNR n5 Link (Harmonic @ 3m)

WIFI Ant.	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT80 CH 42 5210MHz		10421	43.33	-24.97	68.3	56.67	37.47	15.59	66.4	300	360	P	H
		10421	45.16	-23.14	68.3	58.5	37.47	15.59	66.4	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Note symbol

*	Fundamental Frequency which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is over limit line.
P/A	Peak or Average
H/V	Horizontal or Vertical



A calculation example for radiated spurious emission is shown as below:

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
2+9		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 01													
2412MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)
2. Level(dBμV/m) = Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
3. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)
= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)
= 55.45 (dBμV/m)
2. Over Limit(dB)
= Level(dBμV/m) – Limit Line(dBμV/m)
= 55.45(dBμV/m) – 74(dBμV/m)
= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)
= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)
= 43.54 (dBμV/m)
2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)
= 43.54(dBμV/m) – 54(dBμV/m)
= -10.46(dB)

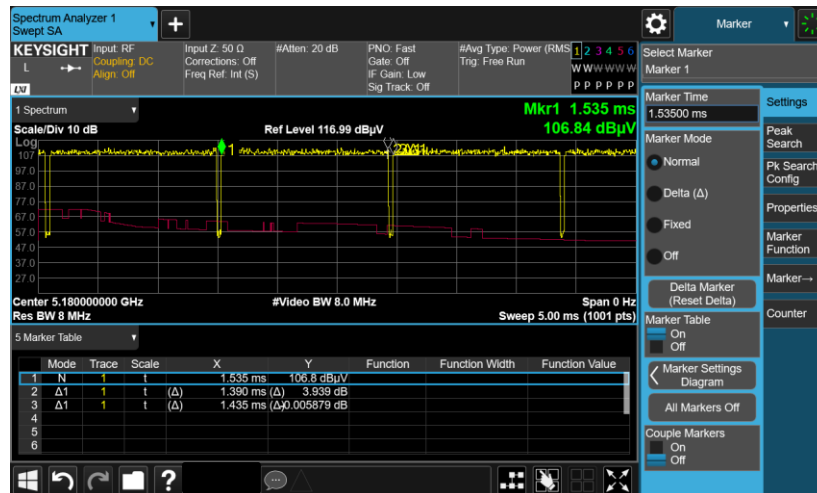
Both peak and average measured complies with the limit line, so test result is “PASS”.



Appendix B. Duty Cycle Plots

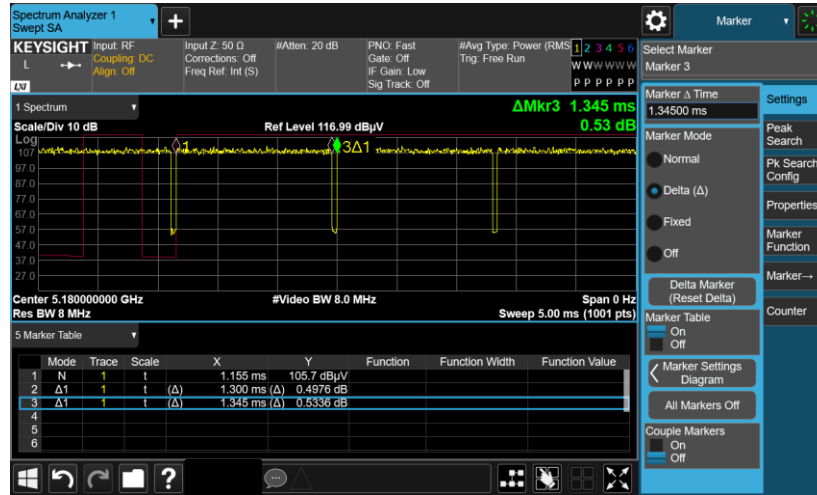
Antenna	Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
1+2	802.11a	96.86	1.390	0.719	0.75KHz
1+2	802.11an HT20	96.65	1.300	0.769	0.82KHz
1+2	802.11an HT40	94.12	0.644	1.553	1.6KHz
1+2	802.11ac VHT80	88.01	0.323	3.096	3.3KHz
1+2	802.11ax HE20	96.02	1.014	0.986	1KHz
1+2	802.11ax HE40	92.39	0.534	1.873	2KHz
1+2	802.11ax HE80	86.71	0.287	3.484	3.6KHz

802.11a

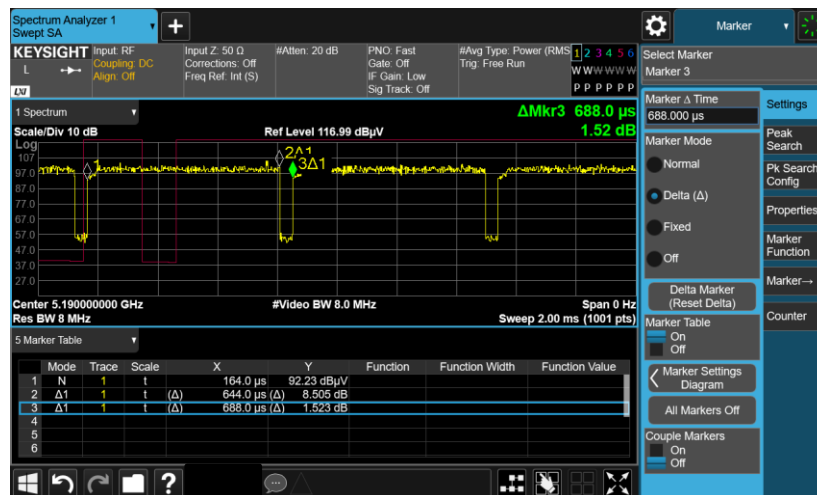




802.11an HT20

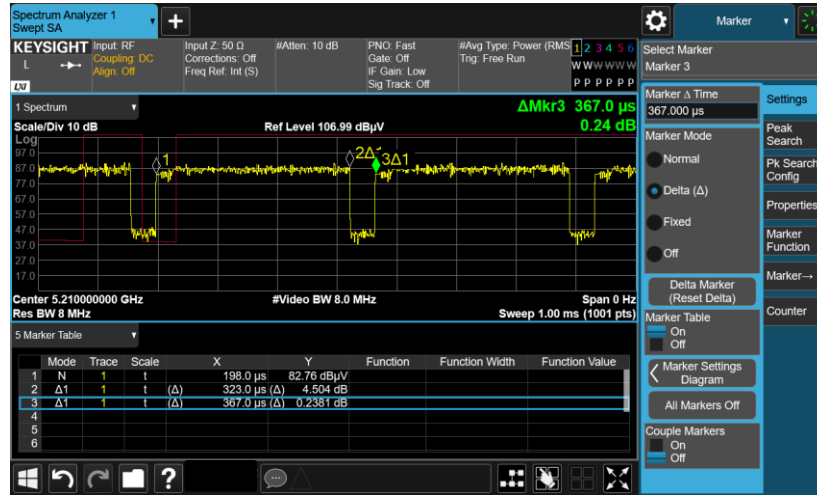


802.11an HT40

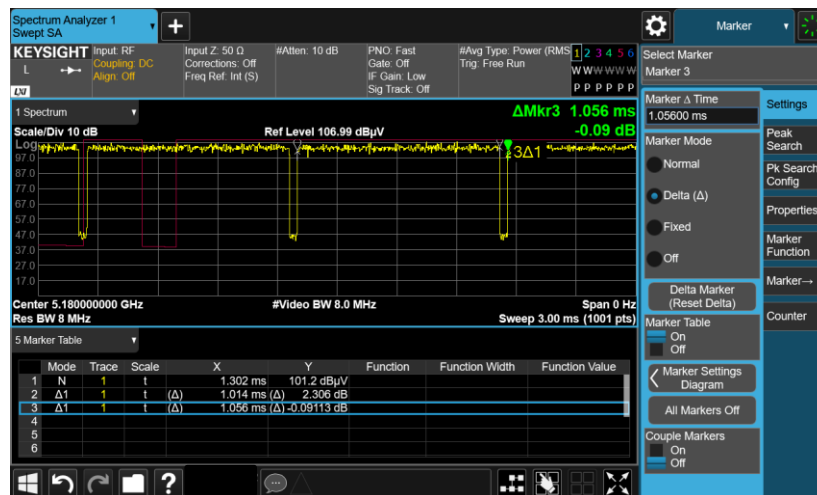




802.11ac VHT80

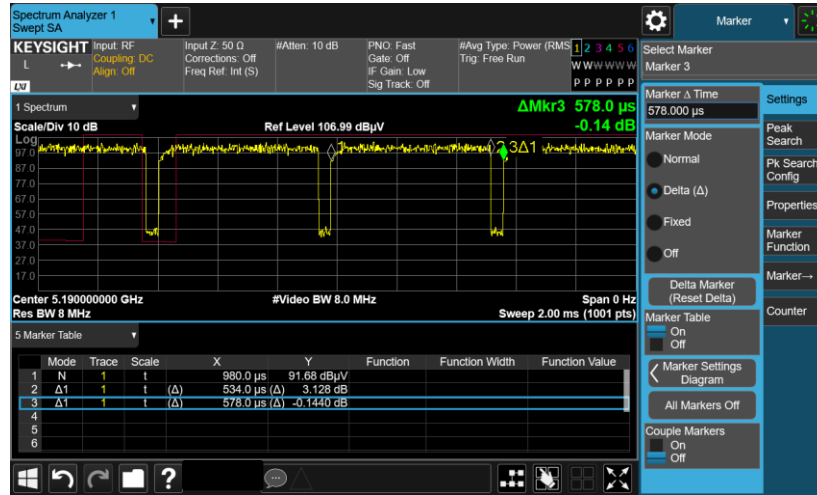


802.11ax HE20

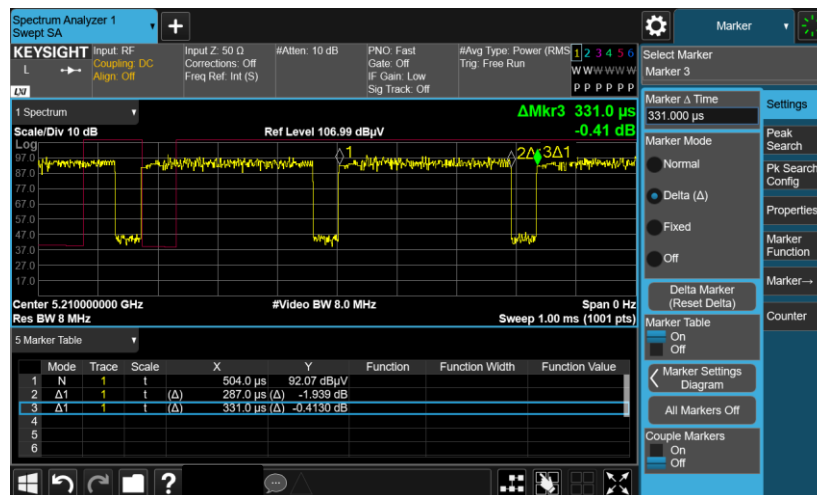




802.11ax HE40



802.11ax HE80





Appendix D. Reference Report

Please refer to Sporton report number FR240834F&FZ240834 which is issued separately.