



FCC RF Test Report

APPLICANT : Assured Wireless Corporation
EQUIPMENT : Cellular Wi-Fi Router
BRAND NAME : Assured Wireless
MODEL NAME : AW12Fi
FCC ID : 2A7ABAW12FI
STANDARD : FCC Part 15 Subpart E §15.407
CLASSIFICATION : (NII) Unlicensed National Information Infrastructure
TEST DATE(S) : Oct. 27, 2022 ~ Nov. 15, 2022

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.

Jason Jia

Approved by: Jason Jia



Sporton International Inc. (ShenZhen)

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People's Republic of China



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR292702C	Rev. 01	Initial issue of report	Dec. 26, 2022

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.403(i)	6dB, 26dB and 99% Occupied Bandwidth	> 500kHz	Pass	-
3.2	15.407(a)	Maximum Conducted Output Power	≤ 30 dBm	Pass	-
3.3	15.407(a)	Power Spectral Density	≤ 30 dBm/500kHz	Pass	-
3.4	15.407(b)	Unwanted Emissions	15.407(b)(4)(i) & 15.209(a)	Pass	Under limit 3.73 dB at 11570.000 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 12.19 dB at 0.150 MHz
3.6	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

Assured Wireless Corporation

16885 W. Bernardo Dr., Suite 300, San Diego, CA 92127

1.2 Manufacturer

Assured Wireless Corporation

16885 W. Bernardo Dr., Suite 300, San Diego, CA 92127

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Cellular Wi-Fi Router
Brand Name	Assured Wireless
Model Name	AW12Fi
FCC ID	2A7ABAW12FI
HW Version	P2
SW Version	CPEWT_AW12Fi_v1.0.8
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 Channel Frequency Range	5745 MHz ~ 5825 MHz
Maximum Output Power	<MIMO Ant.1+2> 802.11a : 21.87 dBm / 0.1538 W 802.11n HT20 : 21.78 dBm / 0.1507 W 802.11n HT40 : 21.80 dBm / 0.1514 W 802.11ac VHT20: 22.22 dBm / 0.1667 W 802.11ac VHT40: 21.49 dBm / 0.1409 W 802.11ac VHT80: 21.41 dBm / 0.1384 W
99% Occupied Bandwidth	802.11a : 16.93 MHz 802.11n HT40 : 36.36 MHz 802.11ac VHT20 : 17.83 MHz 802.11ac VHT80 : 76.00 MHz
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Antenna Type / Gain	<Ant. 1> : Fixed External Antenna with gain 3.97 dBi <Ant. 2> : Fixed External Antenna with gain 3.97 dBi

Note:

- For 802.11n HT20 / ac VHT20 and 802.11n HT40 / ac VHT40 mode, the whole testing have assessed only 802.11ac VHT20 / 802.11n HT40 by referring to their maximum conducted power.
- WIFI MIMO only supports STBC mode by manufacturer declared.



3. For WLAN SISO & MIMO (STBC) mode, the whole testing has assessed only MIMO mode by referring to the higher normal conducted power.

1.5 Modification of EUT

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

1.6 Testing Location

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

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

Test Firm	Sporton International Inc. (ShenZhen)		
Test Site Location	101, 1st Floor, Block B, Building 1, No. 2, Tengfeng 4th Road, Fenghuang Community, Fuyong Street, Baoan District, Shenzhen City Guangdong Province China 518103 TEL: +86-755-33202398		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	03CH01-SZ	CN1256	421272

1.7 Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH01-SZ	AUDIX	E3	6.2009-8-24
2.	CO01-SZ	AUDIX	E3	6.120613b



1.8 Applicable Standards

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

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

Remark:

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

2 Test Configuration of Equipment Under Test

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

2.1 Carrier Frequency and Channel

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

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.

2.2 Test Mode

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

MIMO Mode

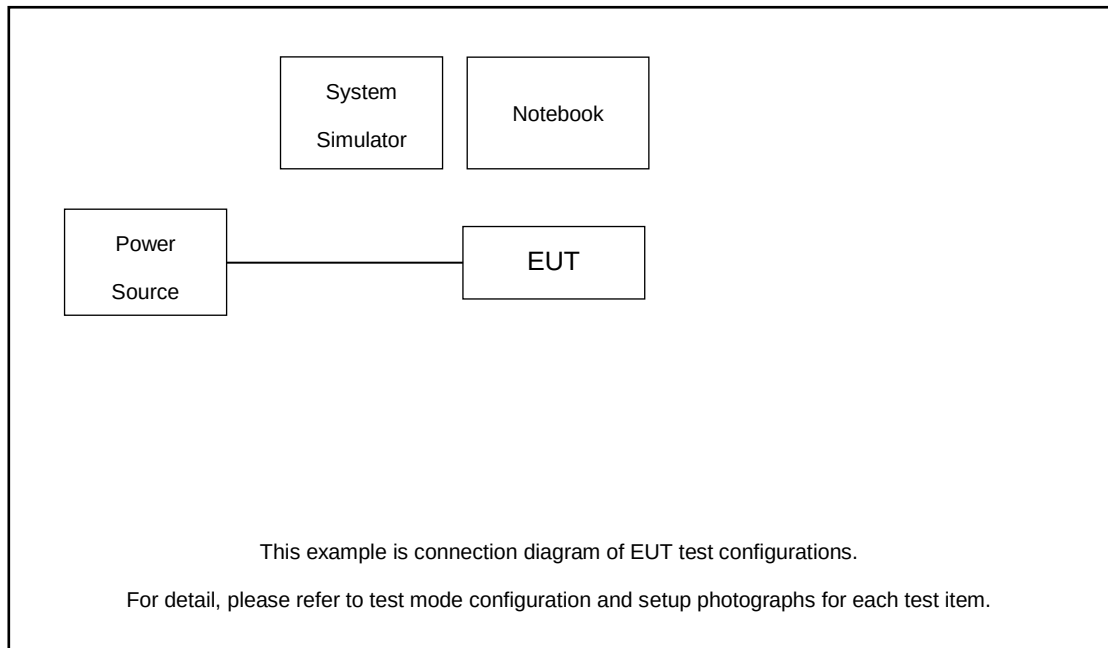
Modulation	Data Rate
802.11a	6 Mbps
802.11n HT40	MCS8
802.11ac VHT20	MCS0
802.11ac VHT80	MCS0

AC Conducted Emission	Mode 1 : GSM 850 Idle + WLAN Link(5G) + AC Adapter
Remark: For Radiated Test Cases, The tests were performance with Adapter.	

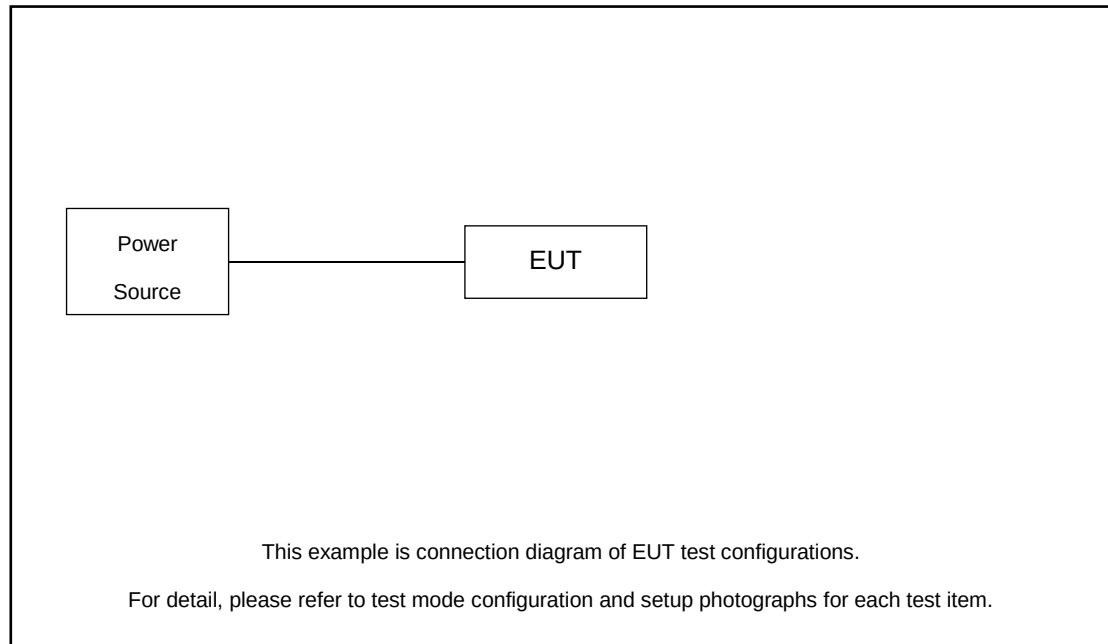
Ch. #		U-NII-3 : 5745-5825 MHz			
		802.11a	802.11ac VHT20	802.11n HT40	802.11ac VHT80
L	Low	149	149	151	-
M	Middle	157	157	-	155
H	High	165	165	159	-

2.3 Connection Diagram of Test System

For Conducted Emission:



For Radiated Emission:



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Base Station(LTE)	Anritsu	MT8820C	N/A	N/A	Unshielded,1.8m
2.	Notebook	DELL	Latitude 3400	N/A	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m

2.5 EUT Operation Test Setup

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

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

2.6 Measurement Results Explanation Example

For all conducted test items:

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

Example :

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

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 2.2 dB and 10dB attenuator.

$$\begin{aligned}
 \text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)}. \\
 &= 2.2 + 10 = 12.2 \text{ (dB)}
 \end{aligned}$$

3 Test Result

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

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

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

26dB and 99% Occupied bandwidth are reporting only.

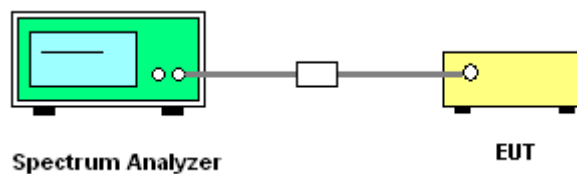
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

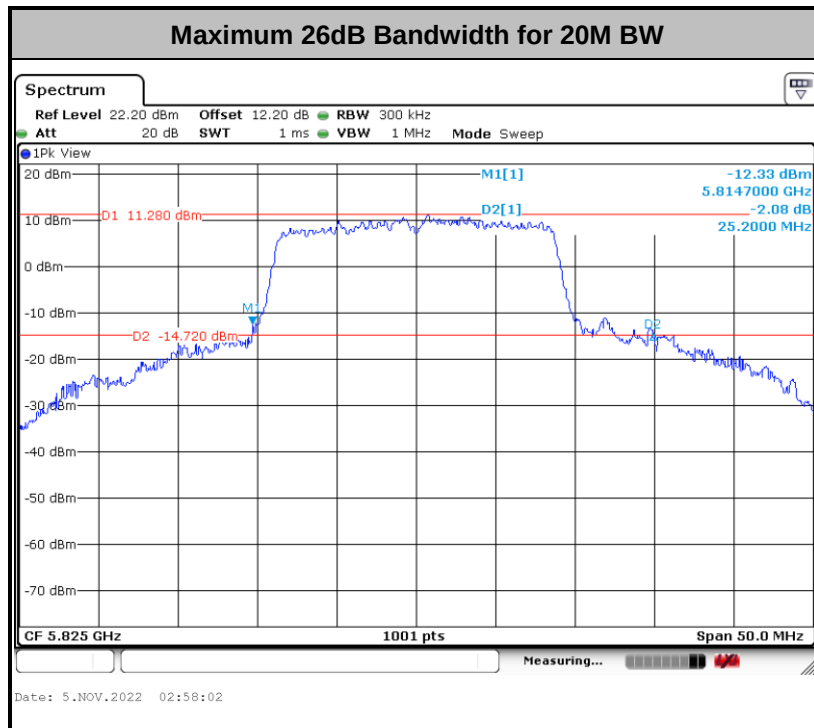
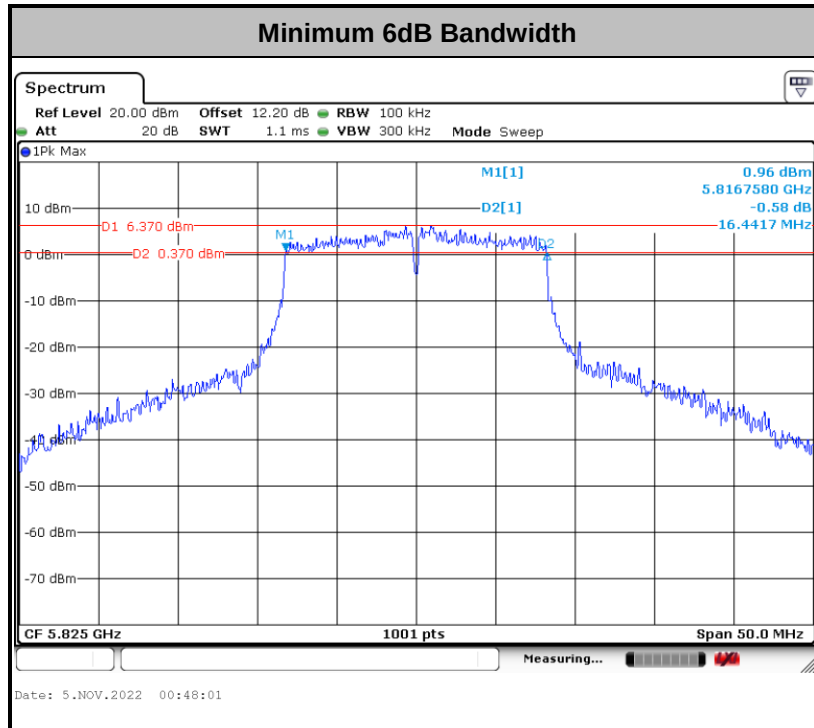
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
Section C) Emission bandwidth for the band 5.725-5.85GHz
2. For 6dB BW, Set RBW = 100kHz.
For 26dB BW, Set RBW = approximately 1% of the emission bandwidth.
For 99% OBW, Set RBW = 1% to 5% of the OBW.
3. For 26dB BW, Set the VBW > RBW.
For 6dB BW & 99% OBW, Set the VBW $\geq 3 \times$ RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 6 dB down from the peak of the emission.
7. Measure and record the results in the test report.

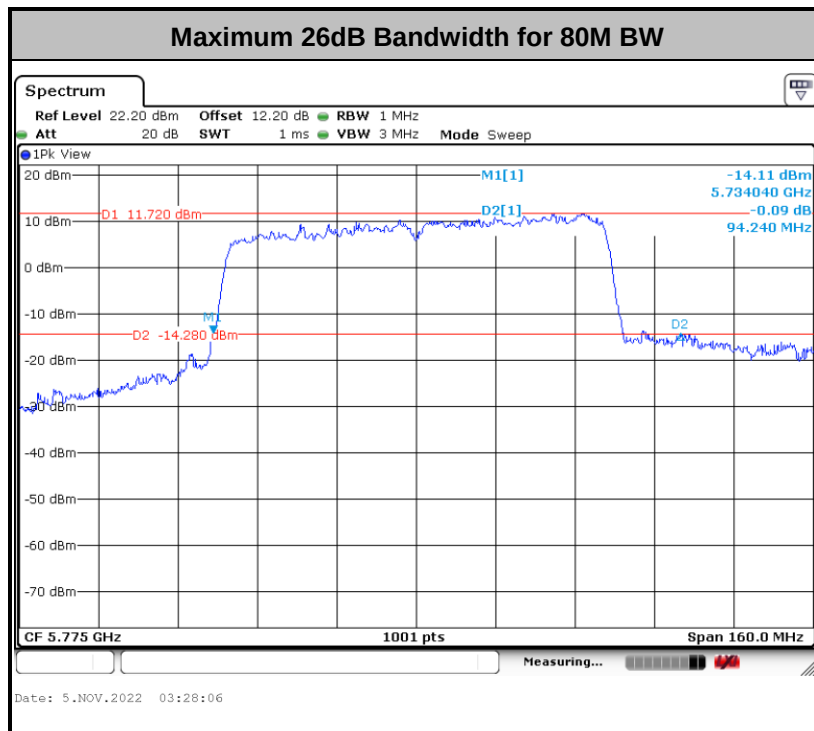
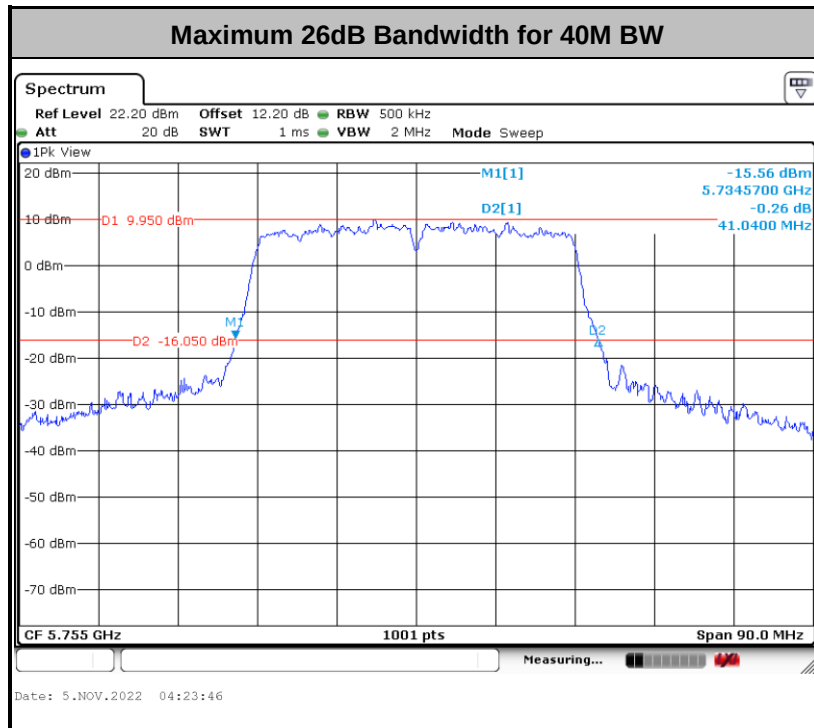
3.1.4 Test Setup

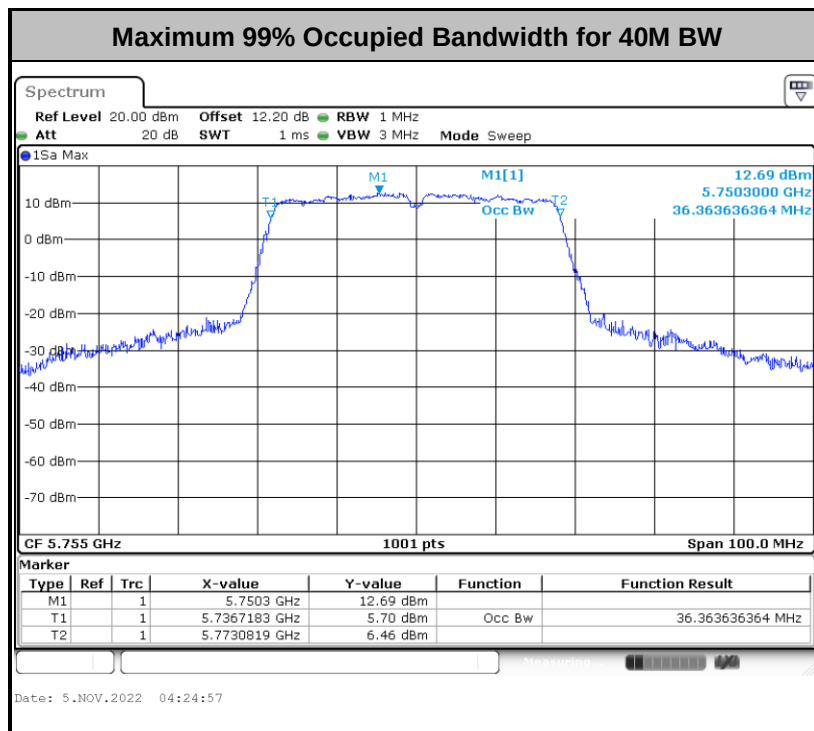
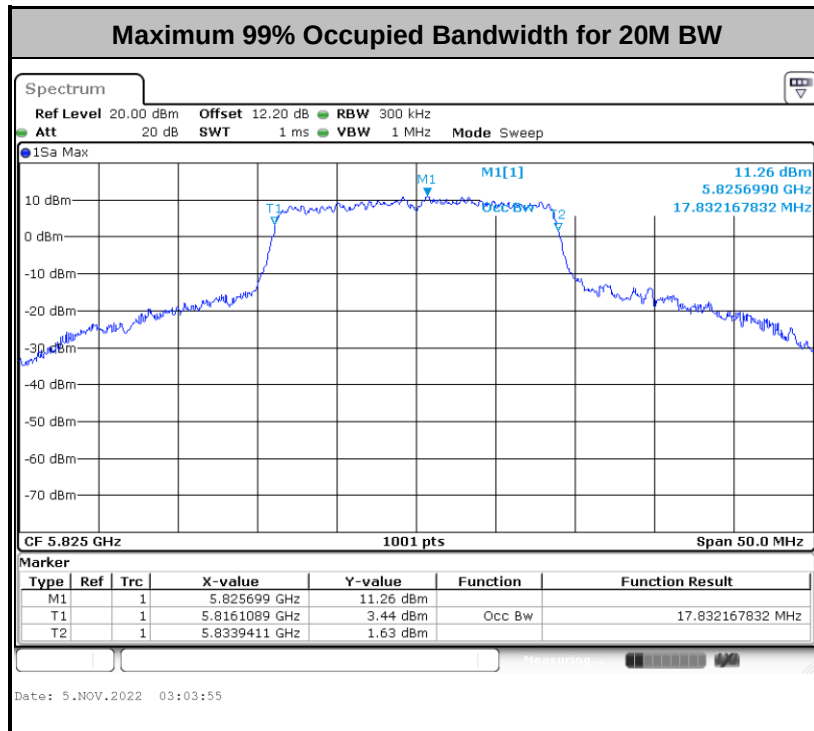


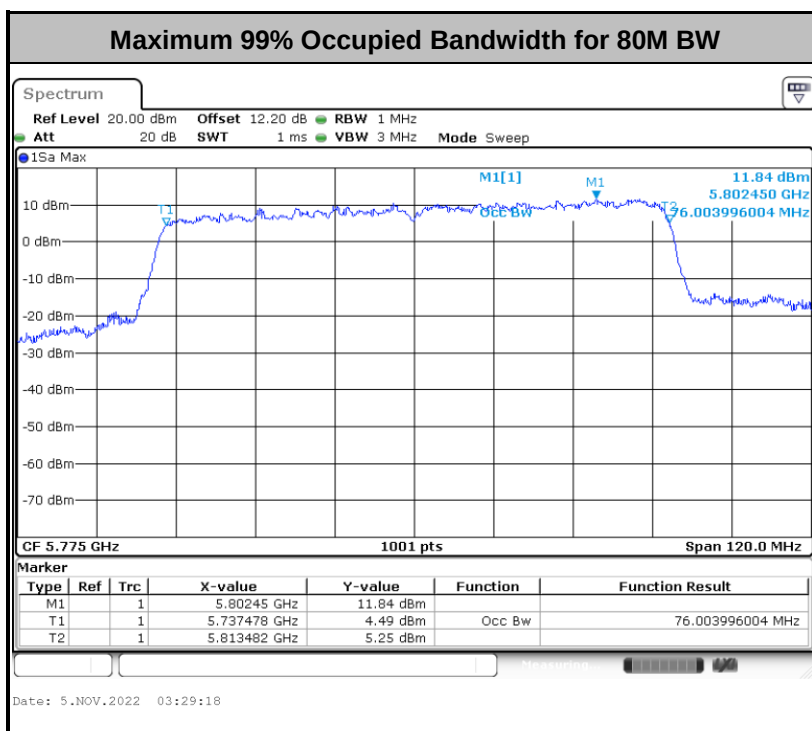
3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.









Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

3.2 Maximum Conducted Output Power Measurement

3.2.1 Limit of Maximum Conducted Output Power

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

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

3.2.2 Measuring Instruments

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

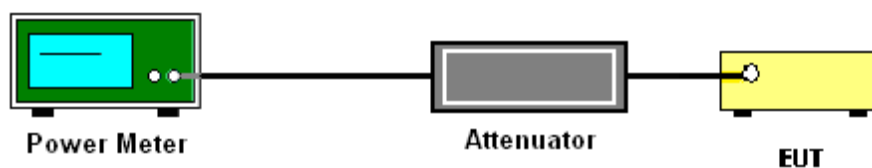
3.2.3 Test Procedures

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

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

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

3.2.4 Test Setup



3.2.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.



3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

For the band 5.725–5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band.

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

3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
Section F) Maximum power spectral density.

Method SA-2

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

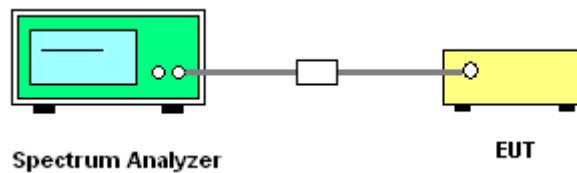
- Measure the duty cycle.
- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 500KHz (or 300 kHz if the SA can't set RBW=500KHz).
- Set VBW $\geq$ 1 MHz.
- Number of points in sweep $\geq$ 2 Span / RBW.
- Sweep time = auto.
- Detector = RMS
- Trace average at least 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 (c): Measure and add $10 \log(N_{\text{ANT}})$ dB.

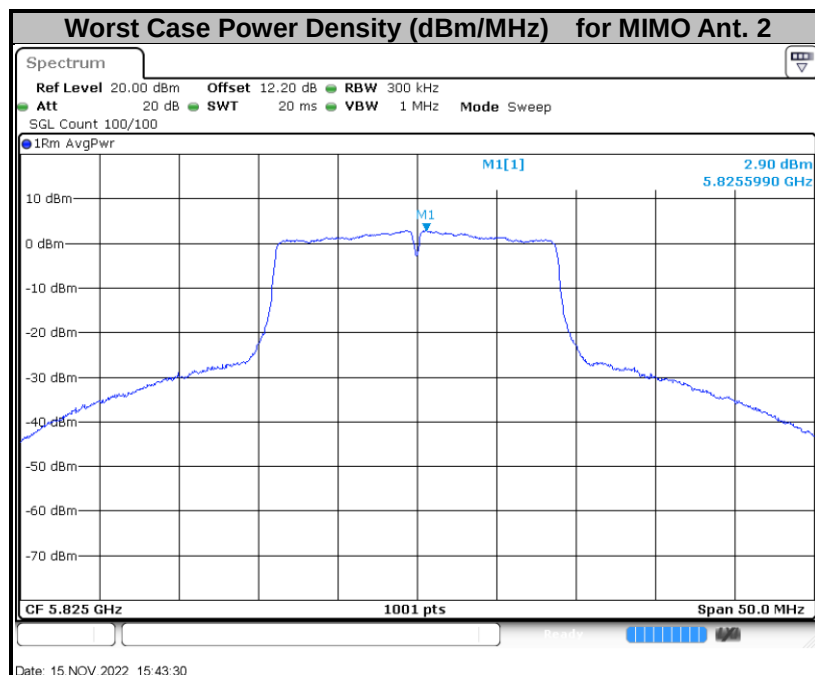
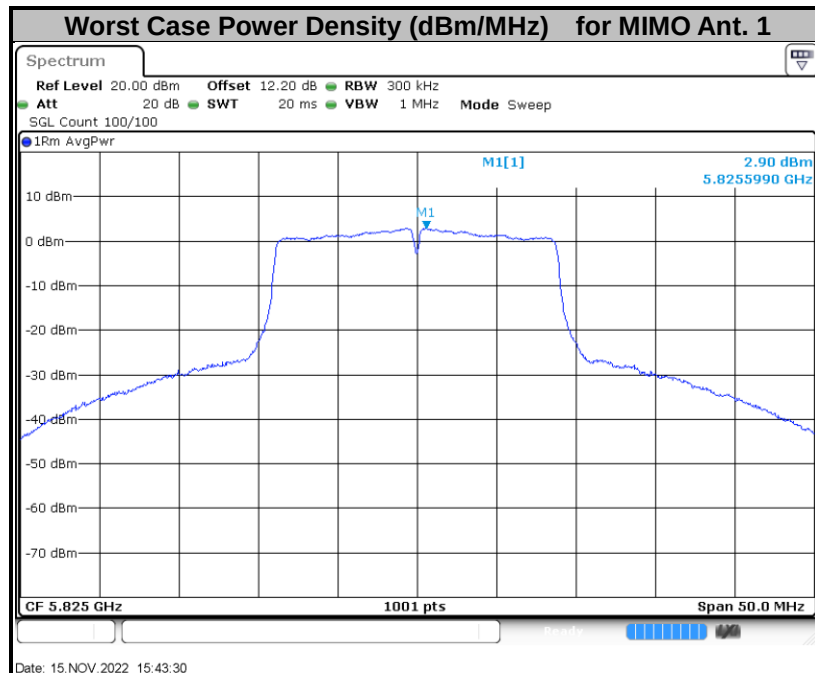
With this technique, spectrum measurements are performed at each output of the device, but rather than summing the spectra or the spectral peaks across the outputs, the quantity $10 \log(N_{\text{ANT}})$ dB is added to each spectrum value before comparing to the emission limit. The addition of $10 \log(N_{\text{ANT}})$ dB serves to apportion the emission limit among the N_{ANT} outputs so that each output is permitted to contribute no more than $1/N_{\text{ANT}}^{\text{th}}$ of the PSD limit.

3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.



Note: SUM Average Power Density (dB) = max(ant.1, ant.2) + 10log2 + Factor

3.4 Unwanted Emissions Measurement

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

3.4.1 Limit of Unwanted Emissions

- (1) 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.

- (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.

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

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.

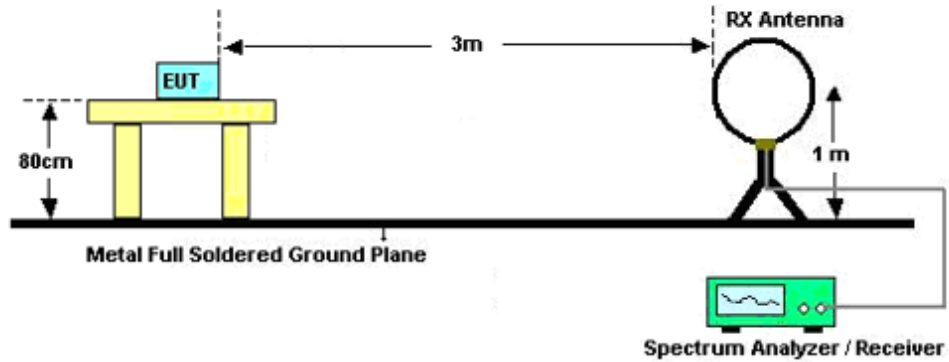


3.4.3 Test Procedures

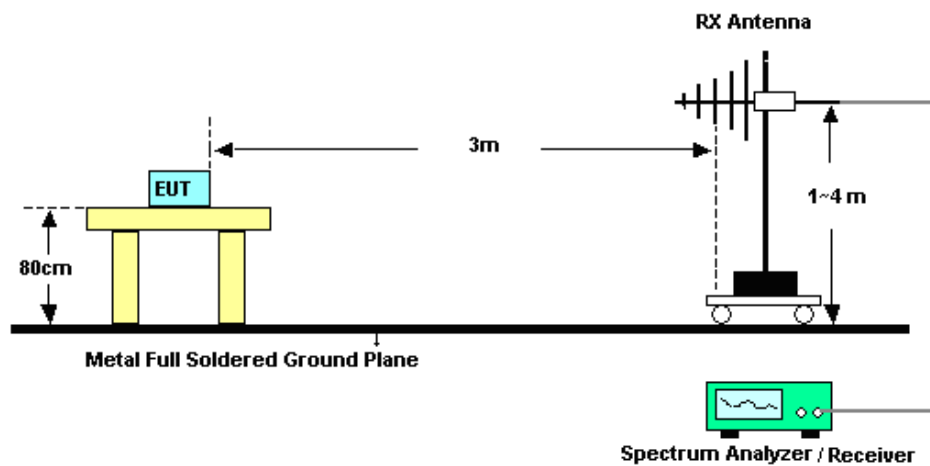
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
Section G) Unwanted emissions measurement.
 - (1) Procedure for Unwanted Emissions Measurements Below 1000MHz
 - RBW = 120 kHz
 - VBW = 300 kHz
 - Detector = Peak
 - Trace mode = max hold
 - (2) Procedure for Peak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

3.4.4 Test Setup

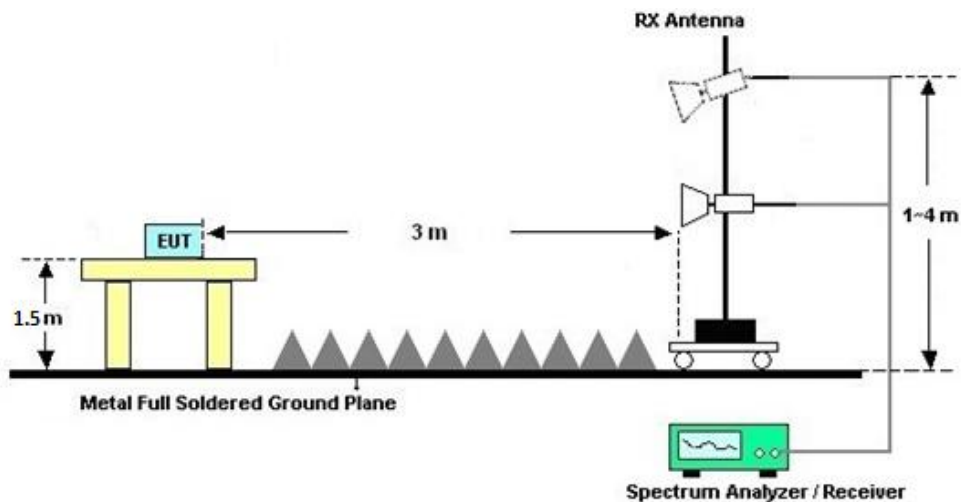
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.4.5 Test Results of Radiated 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 Band Edges

Please refer to Appendix C.

3.4.7 Duty Cycle

Please refer to Appendix D.

3.4.8 Test Result of Unwanted Radiated Emission (30MHz ~ 10th Harmonic or 40GHz, whichever is lower)

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.

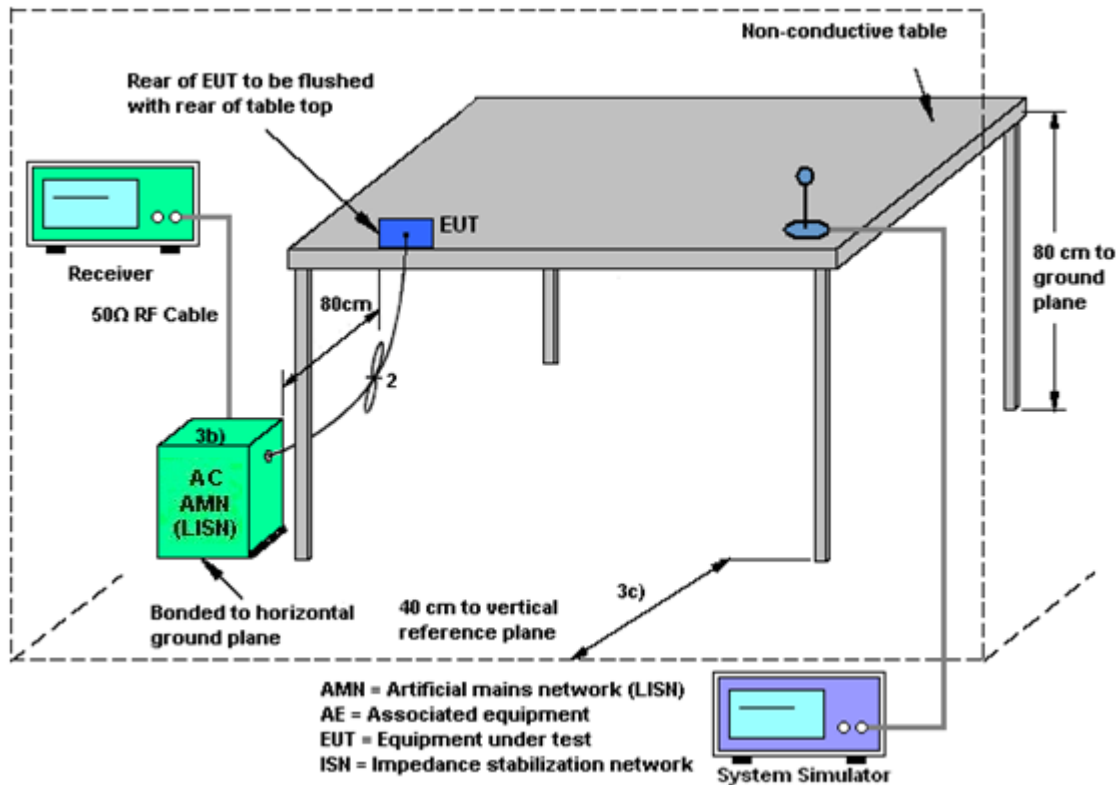
3.5.2 Measuring Instruments

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

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

<STBC Modes>

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

Basic methodology with N_{ANT} transmit antennas, each with the same directional gain G_{ANT} dBi, being driven by N_{ANT} transmitter outputs of equal power, and If antenna gains are not equal and each transmit antenna can be driven by more than one spatial stream, directional gain may be calculated by either of the following two formulas:

Directional gain = G_{ANT} Max

<STBC Modes>						
			DG for	DG for	Power Limit	PSD Limit
	Ant. 1 (dBi)	Ant. 2 (dBi)	Power (dBi)	PSD (dBi)	Reduction (dB)	Reduction (dB)
Band IV	3.97	3.97	3.97	3.97	0.00	0.00

$Power\ Limit\ Reduction = DG(Power) - 6dBi, (min = 0)$

$PSD\ Limit\ Reduction = DG(PSD) - 6dBi, (min = 0)$



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101078	10Hz~40GHz	Apr. 07, 2022	Nov. 05, 2022~ Nov. 15, 2022	Apr. 08, 2023	Conducted (TH01-SZ)
Pulse Power Sensor	Anritsu	MA2411B	1339473	30MHz~40GHz	Dec. 28, 2021	Nov. 05, 2022~ Nov. 15, 2022	Dec. 27, 2022	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1542004	50MHz Bandwidth	Dec. 28, 2021	Nov. 05, 2022~ Nov. 15, 2022	Dec. 27, 2022	Conducted (TH01-SZ)
EMI Test Receiver&SA	Agilent	N9038A	MY52260185	20Hz~26.5GHz	Dec. 27, 2021	Nov. 10, 2022	Dec. 26, 2022	Radiation (03CH01-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY55150213	10Hz~44GHz	Jul. 07, 2022	Nov. 10, 2022	Jul. 06, 2023	Radiation (03CH01-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	Jul. 28, 2022	Nov. 10, 2022	Jul. 27, 2023	Radiation (03CH01-SZ)
Bilog Antenna	TeseQ	CBL6112D	35407	30MHz~2GHz	Sep. 28, 2021	Nov. 10, 2022	Sep. 27, 2023	Radiation (03CH01-SZ)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00119436	1GHz~18GHz	Jul. 07, 2022	Nov. 10, 2022	Jul. 06, 2023	Radiation (03CH01-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18GHz~40GHz	Apr. 10, 2022	Nov. 10, 2022	Apr. 09, 2023	Radiation (03CH01-SZ)
LF Amplifier	Burgeon	BPA-530	102209	0.01~3000Mhz	Apr. 06, 2022	Nov. 10, 2022	Apr. 05, 2023	Radiation (03CH01-SZ)
HF Amplifier	MITEQ	AMF-7D-0010 1800-30-10P-R	1943528	1GHz~18GHz	Oct. 19, 2022	Nov. 10, 2022	Oct. 18, 2023	Radiation (03CH01-SZ)
HF Amplifier	KEYSIGHT	83017A	MY53270105	0.5GHz~26.5GHz	Oct. 19, 2022	Nov. 10, 2022	Oct. 18, 2023	Radiation (03CH01-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Jul. 06, 2022	Nov. 10, 2022	Jul. 05, 2023	Radiation (03CH01-SZ)
AC Power Source	Chroma	61601	616010001985	N/A	Nov. 10, 2022	Nov. 10, 2022	Nov. 09, 2023	Radiation (03CH01-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Nov. 10, 2022	NCR	Radiation (03CH01-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Nov. 10, 2022	NCR	Radiation (03CH01-SZ)
EMI Receiver	R&S	ESR7	101630	9kHz~7GHz;	Jul. 07, 2022	Oct. 27, 2022	Jul. 06, 2023	Conduction (CO01-SZ)
AC LISN	R&S	ENV216	100063	9kHz~30MHz	Sep. 15, 2022	Oct. 27, 2022	Sep. 14, 2023	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	EMCO	3816/2SH	00103892	9kHz~30MHz	Oct. 17, 2022	Oct. 27, 2022	Oct. 16, 2023	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000891	100Vac~250Vac	Jul. 07, 2022	Oct. 27, 2022	Jul. 06, 2023	Conduction (CO01-SZ)

NCR: No Calibration Required

5 Uncertainty of Evaluation

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

Uncertainty of Conducted Measurement

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

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

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.2dB
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	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))	4.3dB
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----- THE END -----



Appendix A. Conducted Test Results

Report Number : FR292702C

Test Engineer:	Chen Ran	Temperature:	21~25	°C
Test Date:	2022/10/27~2022/11/15	Relative Humidity:	51~54	%

TEST RESULTS DATA
6dB and 26dB EBW and 99% OBW

Band IV													
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)		26dB Bandwidth (MHz)		6 dB Bandwidth (MHz)		6 dB Bandwidth Min. Limit (MHz)		Pass/Fail
					Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	
11a	6Mbps	2	149	5745	16.88	16.93	20.15	23.20	16.50	16.49	0.5		Pass
11a	6Mbps	2	157	5785	16.83	16.88	20.00	21.30	16.45	16.45	0.5		Pass
11a	6Mbps	2	165	5825	16.58	16.63	19.60	20.25	16.50	16.44	0.5		Pass
HT40	MCS8	2	151	5755	36.36	36.16	41.04	40.23	36.27	35.89	0.5		Pass
HT40	MCS8	2	159	5795	36.36	36.36	40.95	40.41	36.27	35.64	0.5		Pass
VHT20	MCS0	2	149	5745	17.68	17.68	20.35	20.40	17.60	17.60	0.5		Pass
VHT20	MCS0	2	157	5785	17.63	17.68	20.35	20.60	17.60	17.70	0.5		Pass
VHT20	MCS0	2	165	5825	17.63	17.83	20.30	25.20	17.60	17.60	0.5		Pass
VHT80	MCS0	2	155	5775	75.76	76.00	82.40	94.24	75.52	74.88	0.5		Pass

TEST RESULTS DATA
Average Power Table

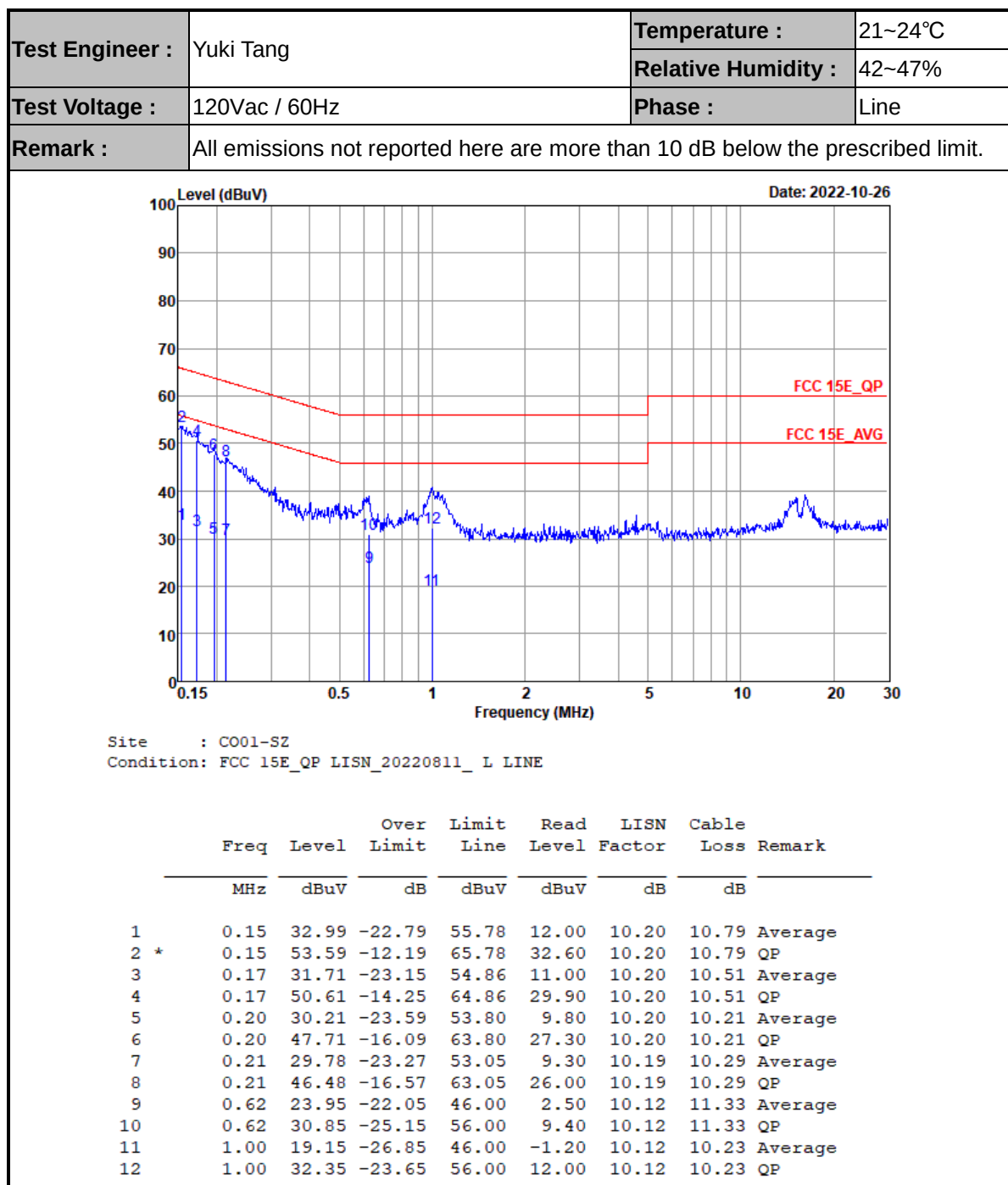
Band IV														
Mod.	Data Rate	Ntx	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		Pass/Fail
					Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	
11a	6Mbps	2	149	5745	0.00	0.00	18.66	18.74	21.71	30.00	3.97			Pass
11a	6Mbps	2	157	5785	0.00	0.00	18.79	18.93	21.87	30.00	3.97			Pass
11a	6Mbps	2	165	5825	0.00	0.00	18.72	18.83	21.79	30.00	3.97			Pass
HT20	MCS8	2	149	5745	0.00	0.00	18.70	18.84	21.78	30.00	3.97			Pass
HT20	MCS8	2	157	5785	0.00	0.00	18.61	18.62	21.63	30.00	3.97			Pass
HT20	MCS8	2	165	5825	0.00	0.00	18.59	18.66	21.64	30.00	3.97			Pass
HT40	MCS8	2	151	5755	0.00	0.00	18.81	18.74	21.79	30.00	3.97			Pass
HT40	MCS8	2	159	5795	0.00	0.00	18.70	18.88	21.80	30.00	3.97			Pass
VHT20	MCS0	2	149	5745	0.00	0.00	19.25	19.16	22.22	30.00	3.97			Pass
VHT20	MCS0	2	157	5785	0.00	0.00	19.13	19.13	22.14	30.00	3.97			Pass
VHT20	MCS0	2	165	5825	0.00	0.00	19.08	19.17	22.14	30.00	3.97			Pass
VHT40	MCS0	2	151	5755	0.00	0.00	18.23	18.46	21.36	30.00	3.97			Pass
VHT40	MCS0	2	159	5795	0.00	0.00	18.39	18.56	21.49	30.00	3.97			Pass
VHT80	MCS0	2	155	5775	0.00	0.00	18.33	18.47	21.41	30.00	3.97			Pass

TEST RESULTS DATA
Power Spectral Density

Band IV																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		10log (500kHz /RBW) Factor (dB)		Average Power Density (dBm/500kHz)			Average PSD Limit (dBm/500kHz)		DG (dBi)		Pass /Fail
					Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	
11a	6Mbps	2	149	5745	0.00	0.00	2.22		1.99	2.23	7.46	30.00		3.97		Pass
11a	6Mbps	2	157	5785	0.00	0.00	2.22		1.83	2.47	7.70	30.00		3.97		Pass
11a	6Mbps	2	165	5825	0.00	0.00	2.22		1.96	2.04	7.27	30.00		3.97		Pass
HT40	MCS8	2	151	5755	0.00	0.00	2.22		-1.69	-1.46	3.77	30.00		3.97		Pass
HT40	MCS8	2	159	5795	0.00	0.00	2.22		-1.04	-0.92	4.31	30.00		3.97		Pass
VHT20	MCS0	2	149	5745	0.00	0.00	2.22		2.59	2.40	7.82	30.00		3.97		Pass
VHT20	MCS0	2	157	5785	0.00	0.00	2.22		2.36	2.84	8.07	30.00		3.97		Pass
VHT20	MCS0	2	165	5825	0.00	0.00	2.22		2.47	2.90	8.13	30.00		3.97		Pass
VHT80	MCS0	2	155	5775	0.00	0.00	2.22		-5.02	-3.97	1.26	30.00		3.97		Pass

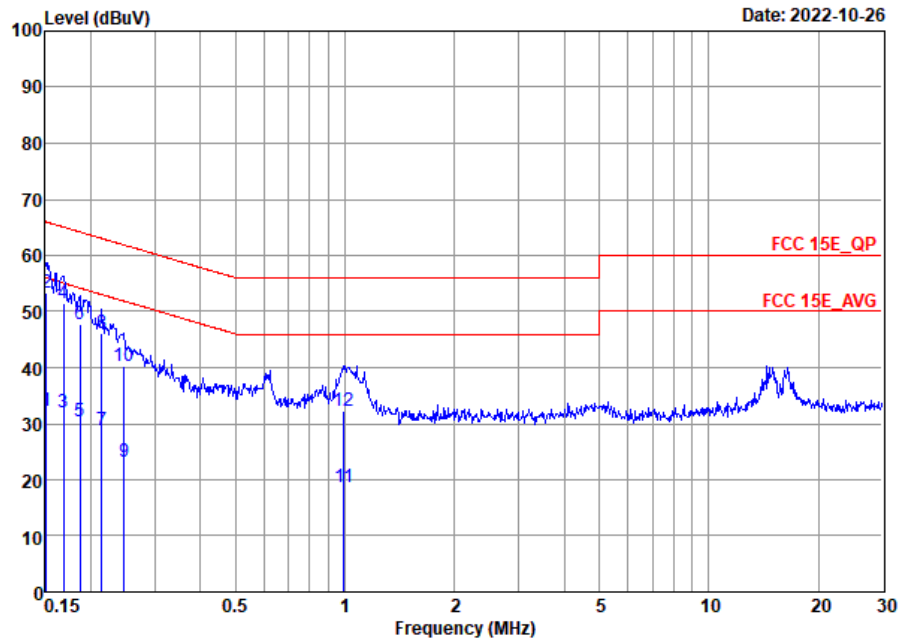


Appendix B. AC Conducted Emission Test Results





Test Engineer :	Yuki Tang	Temperature :	21~24°C
		Relative Humidity :	42~47%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-SZ
Condition: FCC 15E_QP LISN_20220811_ N NEUTRAL

	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.15	32.16	-23.80	55.96	11.00	10.31	10.85	Average
2 *	0.15	53.36	-12.60	65.96	32.20	10.31	10.85	QP
3	0.17	32.08	-22.95	55.03	11.20	10.31	10.57	Average
4	0.17	51.38	-13.65	65.03	30.50	10.31	10.57	QP
5	0.19	30.50	-23.70	54.20	9.90	10.29	10.31	Average
6	0.19	47.80	-16.40	64.20	27.20	10.29	10.31	QP
7	0.21	28.76	-24.29	53.05	8.20	10.27	10.29	Average
8	0.21	46.16	-16.89	63.05	25.60	10.27	10.29	QP
9	0.25	23.20	-28.66	51.86	2.41	10.25	10.54	Average
10	0.25	40.20	-21.66	61.86	19.41	10.25	10.54	QP
11	0.99	18.66	-27.34	46.00	-1.80	10.21	10.25	Average
12	0.99	32.26	-23.74	56.00	11.80	10.21	10.25	QP

Note:

1. Level(dBμV) = Read Level(dBμV) + LISN Factor(dB) + Cable Loss(dB)
2. Over Limit(dB) = Level(dBμV) – Limit Line(dBμV)



Appendix C. Radiated Spurious Emission

U-NII-3 - 5725~5850MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 149 5745MHz		5611.2	53.19	-15.11	68.3	39.12	34.96	11.71	32.6	100	228	P	H
		5673.2	53.24	-32.22	85.46	39.13	35.04	11.67	32.6	100	228	P	H
		5720	54.36	-56.44	110.8	40.19	35.11	11.66	32.6	100	228	P	H
		5723.6	60.53	-58.48	119.01	46.36	35.11	11.66	32.6	100	228	P	H
		5745	98.78	-	-	84.6	35.14	11.64	32.6	100	228	P	H
		5745	91.69	-	-	77.51	35.14	11.64	32.6	100	228	A	H
		5642.8	52.71	-15.59	68.3	38.62	35	11.69	32.6	299	100	P	V
		5698.4	52.27	-51.75	104.02	38.12	35.08	11.67	32.6	299	100	P	V
		5720	58.69	-52.11	110.8	44.52	35.11	11.66	32.6	299	100	P	V
		5724	65.19	-54.73	119.92	51.02	35.11	11.66	32.6	299	100	P	V
		5745	106.27	-	-	92.09	35.14	11.64	32.6	299	100	P	V
		5745	99.42	-	-	85.24	35.14	11.64	32.6	299	100	A	V



WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Margin (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 165 5825MHz		5825	100.02	-	-	85.81	35.26	11.55	32.6	100	225	P	H
		5825	92.69	-	-	78.48	35.26	11.55	32.6	100	225	A	H
		5850.4	52.9	-68.39	121.29	38.66	35.29	11.55	32.6	100	225	P	H
		5860.2	51.86	-57.48	109.34	37.67	35.3	11.49	32.6	100	225	P	H
		5894.8	51.8	-38.71	90.51	37.63	35.35	11.42	32.6	100	225	P	H
		5945	51.93	-16.37	68.3	37.75	35.42	11.36	32.6	100	225	P	H
		5825	108.45	-	-	94.24	35.26	11.55	32.6	263	107	P	V
		5825	101.6	-	-	87.39	35.26	11.55	32.6	263	107	A	V
		5850	60.93	-61.27	122.2	46.69	35.29	11.55	32.6	263	107	P	V
		5855.4	57.63	-53.06	110.69	43.38	35.3	11.55	32.6	263	107	P	V
		5892.6	53.05	-39.09	92.14	38.81	35.35	11.49	32.6	263	107	P	V
		5942.4	52.23	-16.07	68.3	38.05	35.42	11.36	32.6	263	107	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



U-NII-3 5725~5850MHz

WIFI 802.11a (Harmonic @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Margin (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 149 5745MHz		11490	53.52	-20.48	74	49.9	39.79	14.84	51.01	-	-	P	H
		17235	50.85	-17.45	68.3	44.29	42.41	17.56	53.41	-	-	P	H
		11490	55.75	-18.25	74	52.13	39.79	14.84	51.01	119	165	P	V
		11490	44.21	-9.79	54	40.59	39.79	14.84	51.01	119	165	A	V
		17235	50.74	-17.56	68.3	44.18	42.41	17.56	53.41	-	-	P	V
802.11a CH 157 5785MHz		11570	58.3	-15.7	74	54.55	39.86	14.88	50.99	187	214	P	H
		11570	48.67	-5.33	54	44.92	39.86	14.88	50.99	187	214	A	H
		17355	50.67	-17.63	68.3	44.03	42.36	17.6	53.32	-	-	P	H
		11570	59.89	-14.11	74	56.14	39.86	14.88	50.99	115	166	P	V
		11570	50.27	-3.73	54	46.52	39.86	14.88	50.99	115	166	A	V
		17355	50.56	-17.74	68.3	43.92	42.36	17.6	53.32	-	-	P	V
802.11a CH 165 5825MHz		11650	57.46	-16.54	74	53.58	39.92	14.93	50.97	200	215	P	H
		11650	48.25	-5.75	54	44.37	39.92	14.93	50.97	200	215	A	H
		17475	50.29	-18.01	68.3	43.58	42.31	17.63	53.23	-	-	P	H
		11650	58.22	-15.78	74	54.34	39.92	14.93	50.97	114	166	P	V
		11650	50.25	-3.75	54	46.37	39.92	14.93	50.97	114	166	A	V
		17475	50.53	-17.77	68.3	43.82	42.31	17.63	53.23	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



U-NII-3 5725~5850MHz

WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Margin (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 151 5755MHz		5612	52.66	-15.64	68.3	38.59	34.96	11.71	32.6	100	49	P	H
		5685	52.54	-41.62	94.16	38.41	35.06	11.67	32.6	100	49	P	H
		5716	62.61	-47.07	109.68	48.45	35.1	11.66	32.6	100	49	P	H
		5723.4	64.44	-54.11	118.55	50.27	35.11	11.66	32.6	100	49	P	H
		5755	97.58	-	-	83.38	35.16	11.64	32.6	100	49	P	H
		5755	91.44	-	-	77.24	35.16	11.64	32.6	100	49	A	H
		5851	51.23	-68.69	119.92	36.99	35.29	11.55	32.6	100	49	P	H
		5855.8	51.33	-59.25	110.58	37.14	35.3	11.49	32.6	100	49	P	H
		5876.4	53.88	-50.28	104.16	39.66	35.33	11.49	32.6	100	49	P	H
		5946	52.46	-15.84	68.3	38.28	35.42	11.36	32.6	100	49	P	H
		5631.6	52.2	-16.1	68.3	38.13	34.98	11.69	32.6	249	352	P	V
		5697.8	56.09	-47.49	103.58	41.94	35.08	11.67	32.6	249	352	P	V
		5718.6	71.54	-38.87	110.41	57.37	35.11	11.66	32.6	249	352	P	V
		5724.8	75.13	-46.61	121.74	60.96	35.11	11.66	32.6	249	352	P	V
		5755	107.55	-	-	93.35	35.16	11.64	32.6	249	352	P	V
		5755	100.47	-	-	86.27	35.16	11.64	32.6	249	352	A	V
		5853.4	56.16	-58.29	114.45	41.92	35.29	11.55	32.6	249	352	P	V
		5856	55.8	-54.72	110.52	41.61	35.3	11.49	32.6	249	352	P	V
		5877.6	53.43	-49.84	103.27	39.21	35.33	11.49	32.6	249	352	P	V
		5938.4	52.76	-15.54	68.3	38.59	35.41	11.36	32.6	249	352	P	V



WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Margin (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 159 5795MHz		5606.4	52.82	-15.48	68.3	38.76	34.95	11.71	32.6	106	24	P	H
		5697.4	54.63	-48.66	103.29	40.48	35.08	11.67	32.6	106	24	P	H
		5720	57.87	-52.93	110.8	43.7	35.11	11.66	32.6	106	24	P	H
		5724.2	57.9	-62.48	120.38	43.73	35.11	11.66	32.6	106	24	P	H
		5795	100.05	-	-	85.82	35.21	11.62	32.6	106	24	P	H
		5795	93.87	-	-	79.64	35.21	11.62	32.6	106	24	A	H
		5853.2	55.49	-59.41	114.9	41.25	35.29	11.55	32.6	106	24	P	H
		5866.6	55.15	-52.4	107.55	40.95	35.31	11.49	32.6	106	24	P	H
		5879.6	53.14	-48.64	101.78	38.92	35.33	11.49	32.6	106	24	P	H
		5931.4	53.14	-15.16	68.3	38.92	35.4	11.42	32.6	106	24	P	H
		5634	53.44	-14.86	68.3	39.36	34.99	11.69	32.6	271	305	P	V
		5691.8	58.27	-40.9	99.17	44.13	35.07	11.67	32.6	271	305	P	V
		5717.8	60.67	-49.51	110.18	46.51	35.1	11.66	32.6	271	305	P	V
		5724.6	61.12	-60.17	121.29	46.95	35.11	11.66	32.6	271	305	P	V
		5795	107.28	-	-	93.05	35.21	11.62	32.6	271	305	P	V
		5795	100.99	-	-	86.76	35.21	11.62	32.6	271	305	A	V
		5852	59.08	-58.56	117.64	44.84	35.29	11.55	32.6	271	305	P	V
		5856.8	57.89	-52.41	110.3	43.7	35.3	11.49	32.6	271	305	P	V
		5882.2	57.02	-42.83	99.85	42.79	35.34	11.49	32.6	271	305	P	V
		5948.8	53.98	-14.32	68.3	39.79	35.43	11.36	32.6	271	305	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



U-NII-3 5725~5850MHz

WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Margin (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 151 5755MHz		11510	52.29	-21.71	74	48.64	39.81	14.84	51	-	-	P	H
		17265	50.64	-17.66	68.3	44.06	42.39	17.58	53.39	-	-	P	H
		11510	55.59	-18.41	74	51.94	39.81	14.84	51	121	166	P	V
		11510	46.22	-7.78	54	42.57	39.81	14.84	51	121	166	A	V
		17265	50.67	-17.63	68.3	44.09	42.39	17.58	53.39	-	-	P	V
802.11n HT40 CH 159 5795MHz		11590	53.48	-20.52	74	49.68	39.87	14.91	50.98	-	-	P	H
		17385	49.45	-18.85	68.3	42.78	42.35	17.61	53.29	-	-	P	H
		11590	55.28	-18.72	74	51.48	39.87	14.91	50.98	122	166	P	V
		11590	47.66	-6.34	54	43.86	39.87	14.91	50.98	122	166	A	V
		17385	49.78	-18.52	68.3	43.11	42.35	17.61	53.29	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



U-NII-3 5725~5850MHz

WIFI 802.11ac VHT20 (Band Edge @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Margin (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 VHT20 CH 149 5745MHz		5609	52.68	-15.62	68.3	38.62	34.95	11.71	32.6	100	153	P	H
		5668.4	51.96	-29.96	81.92	37.85	35.04	11.67	32.6	100	153	P	H
		5719.4	53.27	-57.36	110.63	39.1	35.11	11.66	32.6	100	153	P	H
		5724.2	61.21	-59.17	120.38	47.04	35.11	11.66	32.6	100	153	P	H
		5745	98.91	-	-	84.73	35.14	11.64	32.6	100	153	P	H
		5745	91.73	-	-	77.55	35.14	11.64	32.6	100	153	A	H
		5609	52.36	-15.94	68.3	38.3	34.95	11.71	32.6	297	102	P	V
		5689.2	52.4	-44.86	97.26	38.27	35.06	11.67	32.6	297	102	P	V
		5718.2	58.41	-51.89	110.3	44.24	35.11	11.66	32.6	297	102	P	V
		5724.2	67.65	-52.73	120.38	53.48	35.11	11.66	32.6	297	102	P	V
		5745	106.53	-	-	92.35	35.14	11.64	32.6	297	102	P	V
		5745	99.6	-	-	85.42	35.14	11.64	32.6	297	102	A	V



WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Margin (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 VHT20 CH 165 5825MHz		5825	100.38	-	-	86.17	35.26	11.55	32.6	100	64	P	H
		5825	92.9	-	-	78.69	35.26	11.55	32.6	100	64	A	H
		5850	53.82	-68.38	122.2	39.58	35.29	11.55	32.6	100	64	P	H
		5873	52.48	-53.28	105.76	38.27	35.32	11.49	32.6	100	64	P	H
		5892	51.41	-41.17	92.58	37.17	35.35	11.49	32.6	100	64	P	H
		5931.8	52.36	-15.94	68.3	38.14	35.4	11.42	32.6	100	64	P	H
		5825	108.93	-	-	94.72	35.26	11.55	32.6	262	349	P	V
		5825	102.7	-	-	88.49	35.26	11.55	32.6	262	349	A	V
		5854.6	59.78	-51.93	111.71	45.53	35.3	11.55	32.6	262	349	P	V
		5855.2	56.5	-54.24	110.74	42.25	35.3	11.55	32.6	262	349	P	V
		5885.4	52.82	-44.66	97.48	38.59	35.34	11.49	32.6	262	349	P	V
		5929.2	52.31	-15.99	68.3	38.09	35.4	11.42	32.6	262	349	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



U-NII-3 5725~5850MHz

WIFI 802.11ac VHT20 (Harmonic @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Margin (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 VHT20 CH 149 5745MHz		11490	56.34	-17.66	74	52.72	39.79	14.84	51.01	189	214	P	H
		11490	45.24	-8.76	54	41.62	39.79	14.84	51.01	189	214	A	H
		17235	49.91	-18.39	68.3	43.35	42.41	17.56	53.41	-	-	P	H
		11490	58.15	-15.85	74	54.53	39.79	14.84	51.01	117	165	P	V
		11490	47.02	-6.98	54	43.4	39.79	14.84	51.01	117	165	A	V
		17235	50.15	-18.15	68.3	43.59	42.41	17.56	53.41	-	-	P	V
802.11ac VHT20 CH 157 5785MHz		11570	51.04	-22.96	74	47.29	39.86	14.88	50.99	-	-	P	H
		17355	50.67	-17.63	68.3	44.03	42.36	17.6	53.32	-	-	P	H
		11570	50.9	-23.1	74	47.15	39.86	14.88	50.99	-	-	P	V
		17355	49.93	-18.37	68.3	43.29	42.36	17.6	53.32	-	-	P	V
802.11ac VHT20 CH 165 5825MHz		11650	49.95	-24.05	74	46.07	39.92	14.93	50.97	-	-	P	H
		17475	49.86	-18.44	68.3	43.15	42.31	17.63	53.23	-	-	P	H
		11650	50.59	-23.41	74	46.71	39.92	14.93	50.97	-	-	P	V
		17475	49.51	-18.79	68.3	42.8	42.31	17.63	53.23	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



U-NII-3 5725~5850MHz

WIFI 802.11ac VHT80 (Band Edge @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Margin (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 155 5775MHz		5649.6	53.08	-15.22	68.3	38.98	35.01	11.69	32.6	100	48	P	H
		5698.4	61.15	-42.87	104.02	47	35.08	11.67	32.6	100	48	P	H
		5717.2	68.46	-41.56	110.02	54.3	35.1	11.66	32.6	100	48	P	H
		5724.2	70	-50.38	120.38	55.83	35.11	11.66	32.6	100	48	P	H
		5775	99.04	-	-	84.81	35.19	11.64	32.6	100	48	P	H
		5775	92.91	-	-	78.68	35.19	11.64	32.6	100	48	A	H
		5850.2	67.69	-54.05	121.74	53.45	35.29	11.55	32.6	100	48	P	H
		5856.4	66.45	-43.96	110.41	52.26	35.3	11.49	32.6	100	48	P	H
		5875	57.73	-47.47	105.2	43.51	35.33	11.49	32.6	100	48	P	H
		5934.2	51.7	-16.6	68.3	37.53	35.41	11.36	32.6	100	48	P	H
		5650	57.16	-11.14	68.3	43.06	35.01	11.69	32.6	251	351	P	V
		5698.2	71.53	-32.35	103.88	57.38	35.08	11.67	32.6	251	351	P	V
		5718.8	77.25	-33.21	110.46	63.08	35.11	11.66	32.6	251	351	P	V
		5724.2	78.64	-41.74	120.38	64.47	35.11	11.66	32.6	251	351	P	V
		5775	108.94	-	-	94.71	35.19	11.64	32.6	251	351	P	V
		5775	102.88	-	-	88.65	35.19	11.64	32.6	251	351	A	V
		5850.2	80.83	-40.91	121.74	66.59	35.29	11.55	32.6	251	351	P	V
		5857	79.32	-30.92	110.24	65.13	35.3	11.49	32.6	251	351	P	V
		5875	69.45	-35.75	105.2	55.23	35.33	11.49	32.6	251	351	P	V
		5930.2	56.7	-11.6	68.3	42.48	35.4	11.42	32.6	251	351	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

**U-NII-3 5725~5850MHz****WIFI 802.11ac VHT80 (Harmonic @ 3m)**

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Margin (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		11550	52.69	-21.31	74	48.96	39.84	14.88	50.99	-	-	P	H
VHT80		17325	50.82	-17.48	68.3	44.2	42.37	17.6	53.35	-	-	P	H
CH 155		11550	53.77	-20.23	74	50.04	39.84	14.88	50.99	-	-	P	V
5775MHz		17325	50.75	-17.55	68.3	44.13	42.37	17.6	53.35	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Emission below 1GHz

WIFI 802.11a (LF @ 3m)

WIFI	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a LF		53.28	21.3	-18.7	40	35.13	19.47	1.67	34.97	-	-	P	H
		124.09	26.51	-16.99	43.5	42.23	16.86	2.17	34.75	-	-	P	H
		305.48	27.6	-18.4	46	39.71	19.25	3.24	34.6	-	-	P	H
		571.26	25.16	-20.84	46	31.17	24.99	3.54	34.54	-	-	P	H
		693.48	27.69	-18.31	46	31.38	26.99	3.73	34.41	-	-	P	H
		915.61	30.98	-15.02	46	31.85	28.98	4.45	34.3	-	-	P	H
		46.49	30.72	-9.28	40	44.45	19.62	1.61	34.96	-	-	P	V
		123.12	38.24	-5.26	43.5	54.04	16.78	2.17	34.75	-	-	P	V
		258.92	23.75	-22.25	46	37.54	17.84	3.05	34.68	-	-	P	V
		486.87	24.01	-21.99	46	31.91	23.2	3.4	34.5	-	-	P	V
		664.38	27.93	-18.07	46	32.21	26.5	3.69	34.47	-	-	P	V
		871.96	30.36	-15.64	46	31.54	28.72	4.4	34.3	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against 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 Margin line.
P/A	P eak or A verage
H/V	H orizontal or V ertical



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

WIFI	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(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. Margin (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. Margin (dB)
 = Level(dBμV/m) – Limit Line(dBμV/m)
 = 55.45(dBμV/m) – 74(dBμV/m)
 = -18.55(dB)

For Average Limit @ 2390MHz:

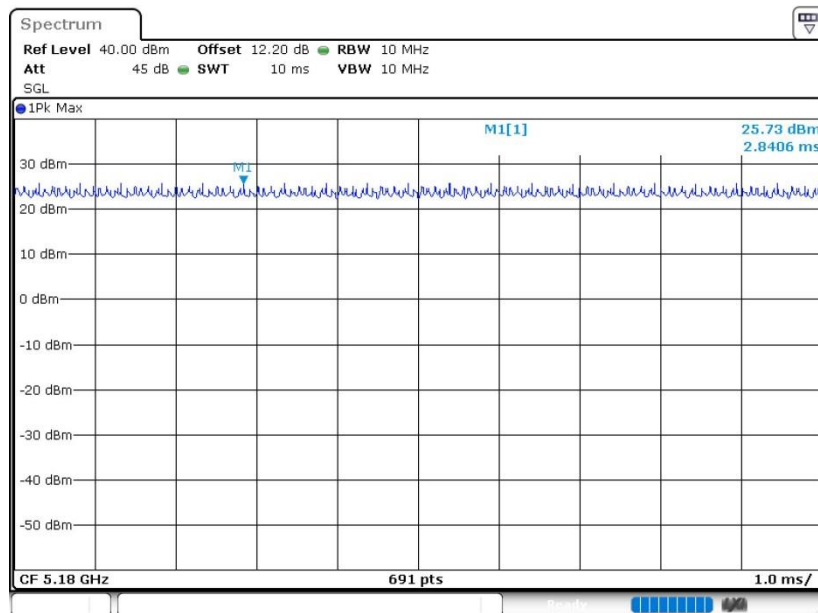
1. Level(dBμV/m)
 = Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
 = 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)
 = 43.54 (dBμV/m)
2. Margin (dB) = Level(dBμV/m) – Limit Line(dBμV/m)
 = 43.54(dBμV/m) – 54(dBμV/m)
 = -10.46(dB)

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

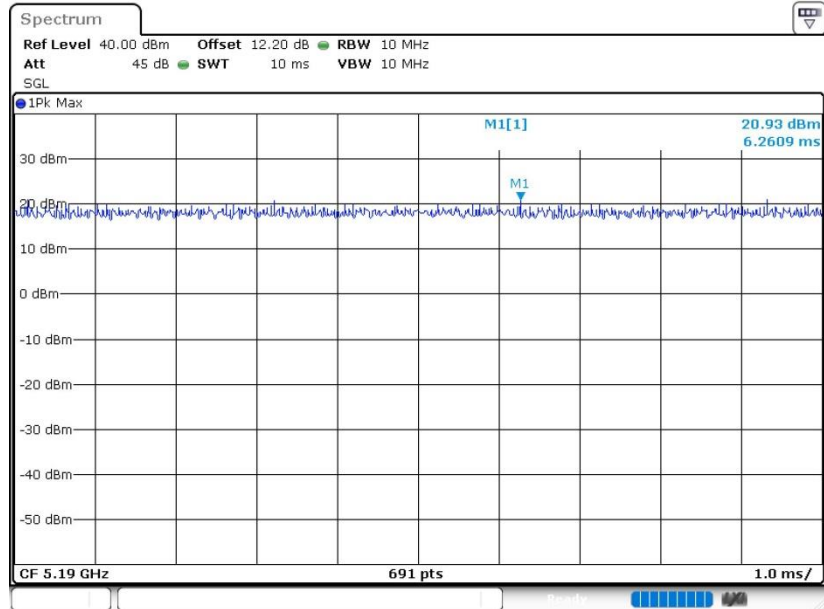
Appendix D. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
1+2	802.11a	100	-	-	10Hz
1+2	802.11an HT40	100	-	-	10Hz
1+2	802.11ac VHT20	100	-	-	10Hz
1+2	802.11ac VHT80	100	-	-	10Hz

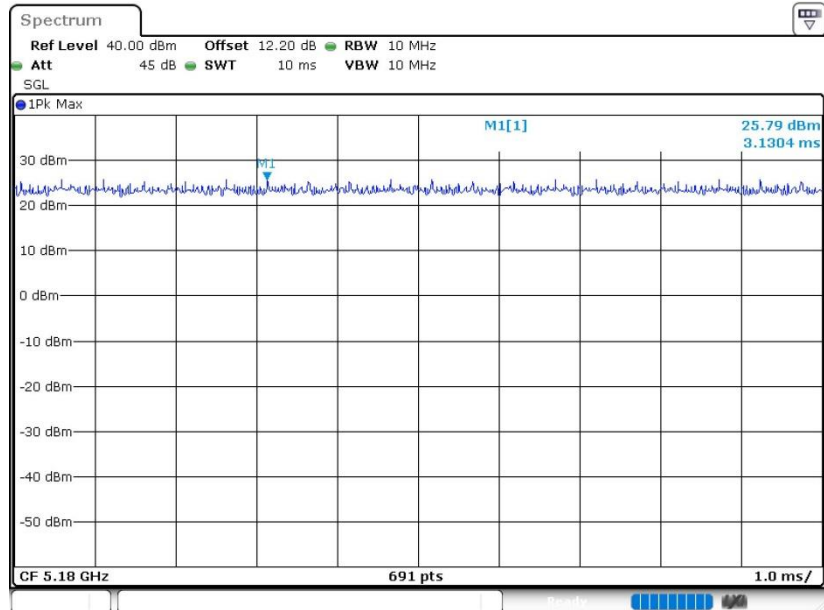
802.11a



802.11an HT40



802.11ac VHT20





802.11ac VHT80

