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. 26, 2022 ~ Nov. 10, 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

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People's Republic of China

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR292702B	Rev. 01	Initial issue of report	Dec. 26, 2022

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	2.1049 & 15.403(i)	26dB & 99% Bandwidth	-	Report only	-
3.2	15.407(a)	Maximum Conducted Output Power	≤ 30 dBm	Pass	-
3.3	15.407(a)	Power Spectral Density	≤ 17 dBm/MHz	Pass	-
3.4	15.407(b)	Unwanted Emissions	15.407(b) & 15.209(a)	Pass	Under limit 0.99 dB at 5135.200 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 12.15 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 Frequency Range	5180 MHz ~ 5240 MHz
Maximum Output Power to Antenna	**<MIMO Ant.1+2>** 802.11a : 21.88 dBm / 0.1542 W 802.11n HT20 : 21.85 dBm / 0.1531 W 802.11n HT40 : 21.90 dBm / 0.1549 W 802.11ac VHT20 : 22.50 dBm / 0.1778 W 802.11ac VHT40 : 21.39 dBm / 0.1377 W 802.11ac VHT80 : 18.64 dBm / 0.0731 W
99% Occupied Bandwidth	802.11a : 17.03 MHz 802.11n VHT20 : 17.68 MHz 802.11n HT40 : 36.46 MHz 802.11ac VHT80 : 75.04 MHz
Antenna Type / Gain	<Ant. 1> : External Antenna type with gain 4.72 dBi <Ant. 2> : External Antenna type with gain 4.72 dBi
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)

Note:

1. 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.
2. 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)
5180-5240 MHz U-NII-1	36	5180	44	5220
	38*	5190	46*	5230
	40	5200	48	5240
	42#	5210		

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

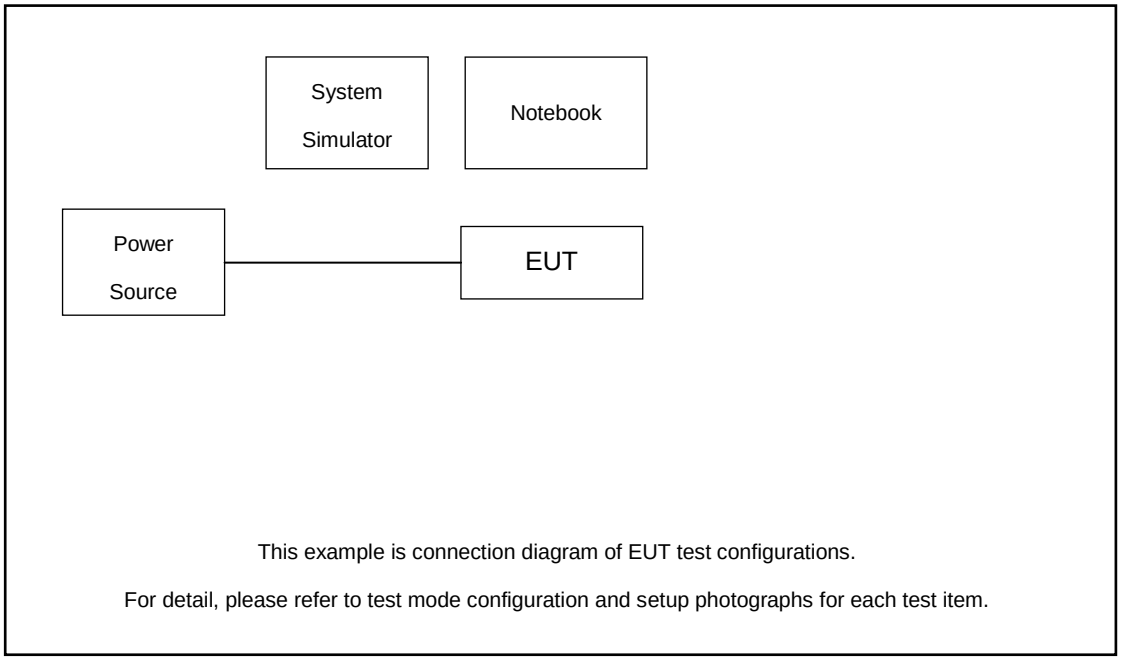
Test Cases	
AC Conducted Emission	Mode 1 : GSM 850 Idle + WLAN Link(5G) + AC Adapter
Remark: For Radiated Test Cases, The tests were performance with Adapter.	

Co-location
802.11ac VHT80 CH42 TX + LTE B14 Link

Ch. #		U-NII-1	U-NII-1	U-NII-1	U-NII-1
		802.11a	802.11ac VHT20	802.11n HT40	802.11ac VHT80
L	Low	36	36	38	-
M	Middle	44	44	-	42
H	High	48	48	46	-

2.3 Connection Diagram of Test System

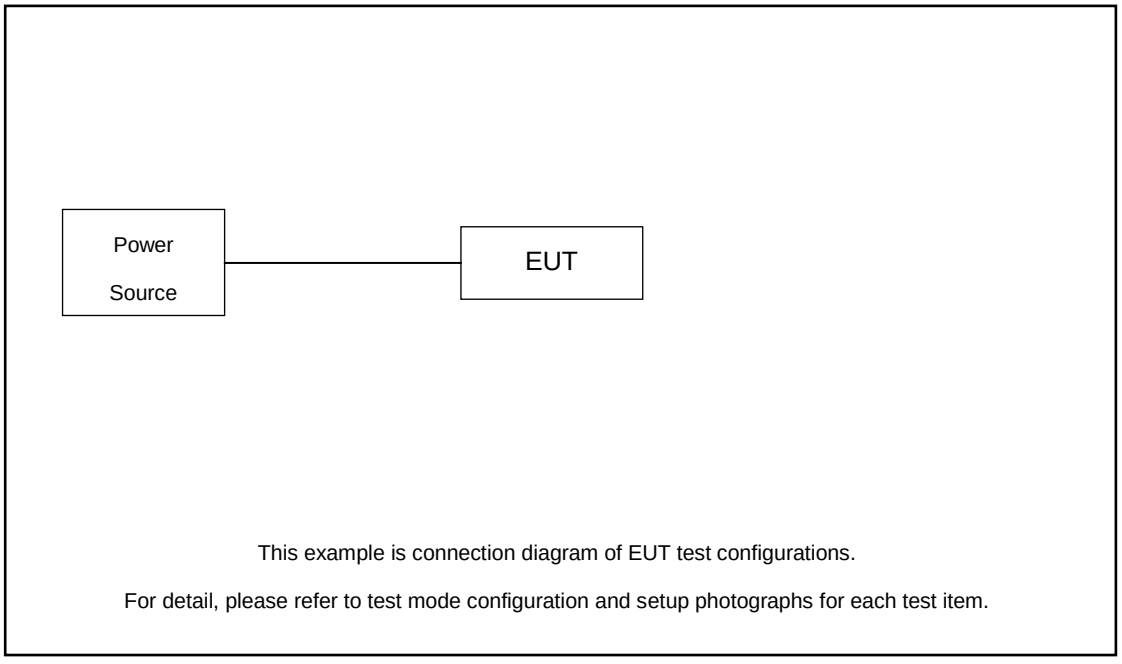
For Conducted Emission:



This example is connection diagram of EUT test configurations.

For detail, please refer to test mode configuration and setup photographs for each test item.

For Radiated Emission:



This example is connection diagram of EUT test configurations.

For detail, please refer to test mode configuration and setup photographs for each test item.

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 42.2 dB and 10dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 2.2 + 10 = 12.2 (dB)

3 Test Result

3.1 26dB & 99% Occupied Bandwidth Measurement

3.1.1 Description of 26dB & 99% Occupied Bandwidth

This section is for reporting purpose only.

There is no restriction limits for bandwidth.

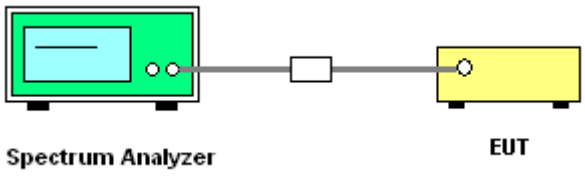
3.1.2 Measuring Instruments

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
2. Set RBW = approximately 1% of the emission bandwidth.
3. Set the VBW > RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
7. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1% to 5% of the OBW and set the Video bandwidth (VBW) ≥ 3 * RBW.
8. Measure and record the results in the test report.

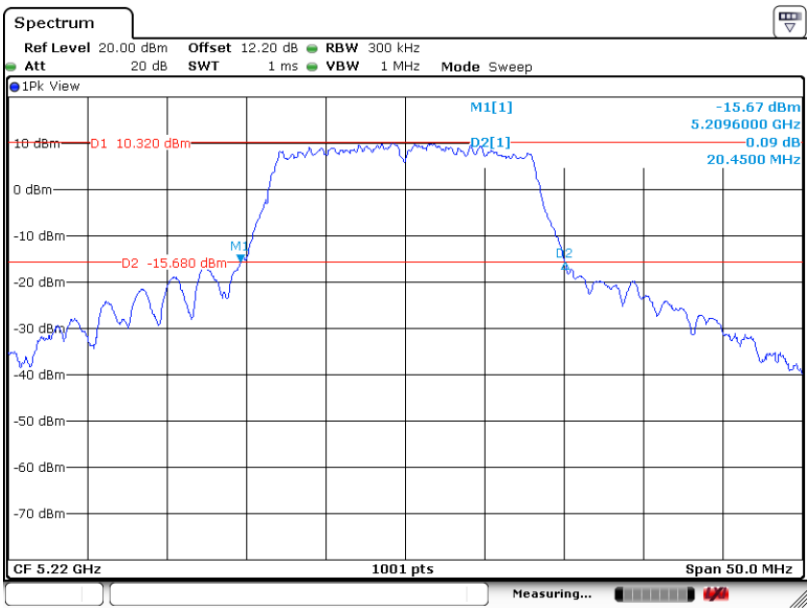
3.1.4 Test Setup



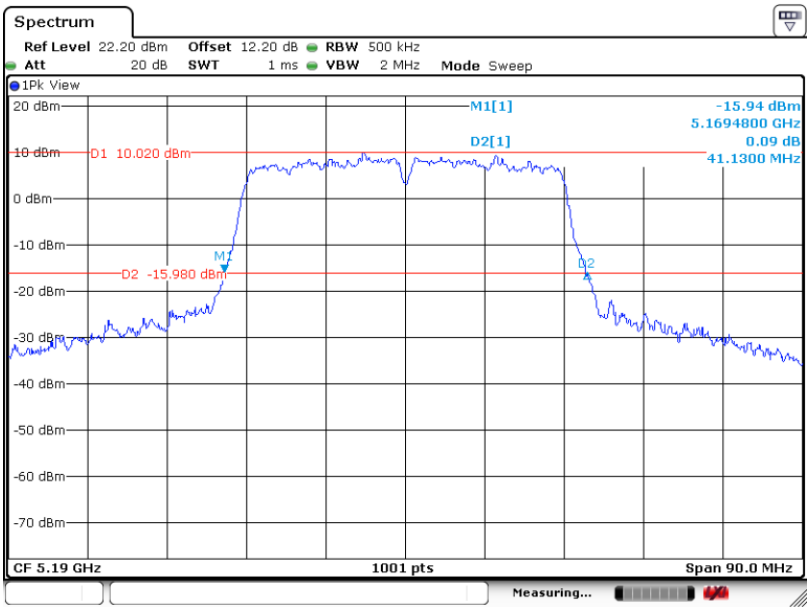
3.1.5 Test Result of 26dB & 99% Occupied Bandwidth

Please refer to Appendix A.

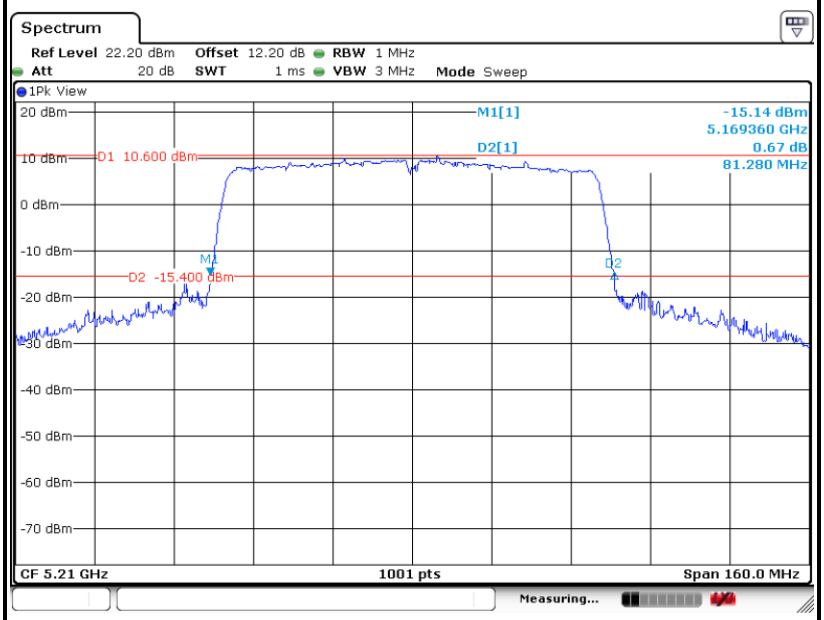
Maximum 26dB Bandwidth for 20M BW



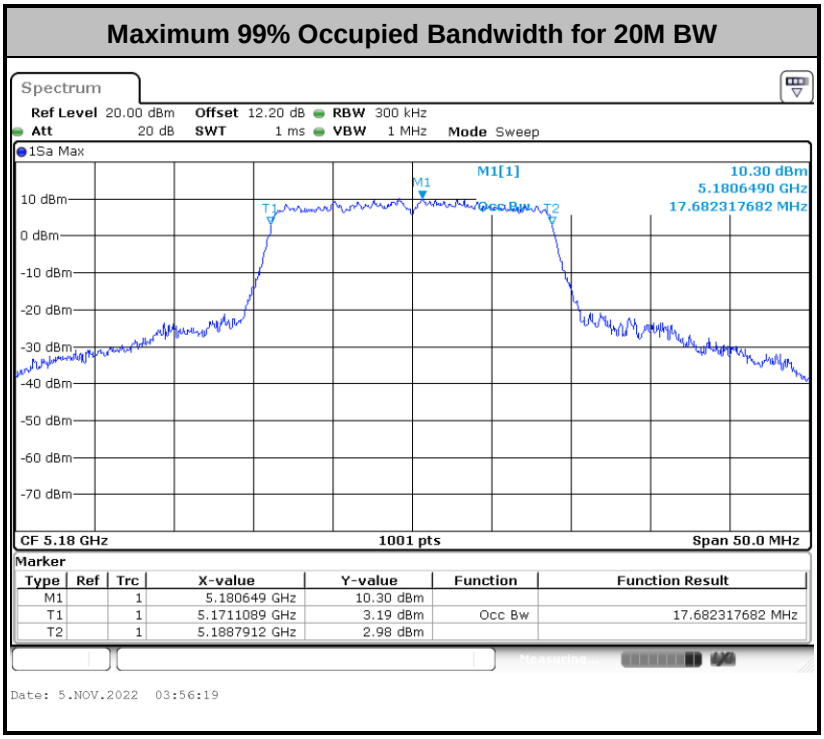
Maximum 26dB Bandwidth for 40M BW



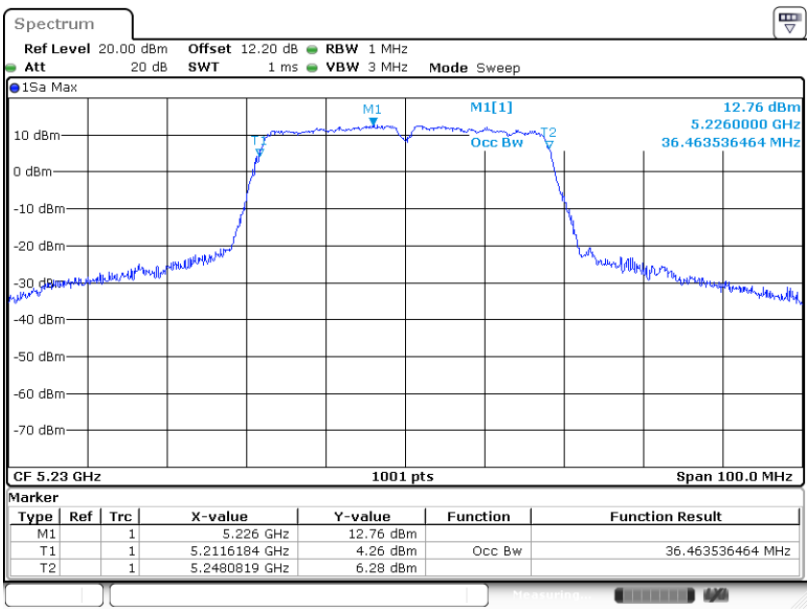
Maximum 26dB Bandwidth for 80M BW



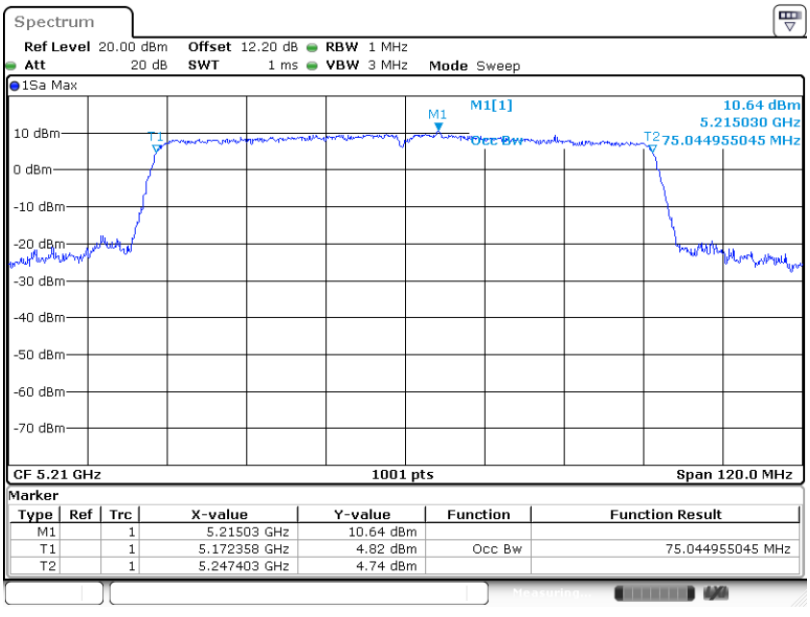
Maximum 99% Occupied Bandwidth for 20M BW



Maximum 99% Occupied Bandwidth for 40M BW



Maximum 99% Occupied Bandwidth for 80M BW



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

<FCC 14-30 CFR 15.407>

For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

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.

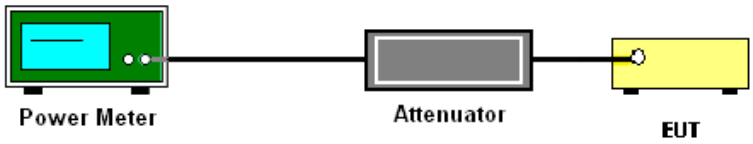
3.2.3 Test Procedures

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

<FCC 14-30 CFR 15.407>

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

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).

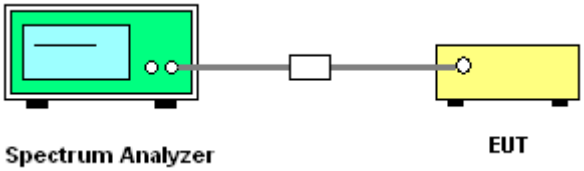
- Measure the duty cycle.
- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 1 MHz.
- Set VBW ≥ 3 MHz.
- Number of points in sweep ≥ 2 Span / RBW.
- Sweep time = auto.
- Detector = RMS
- Trace average at least 100 traces in power averaging mode.
- Add 10 log(1/x),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

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

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

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

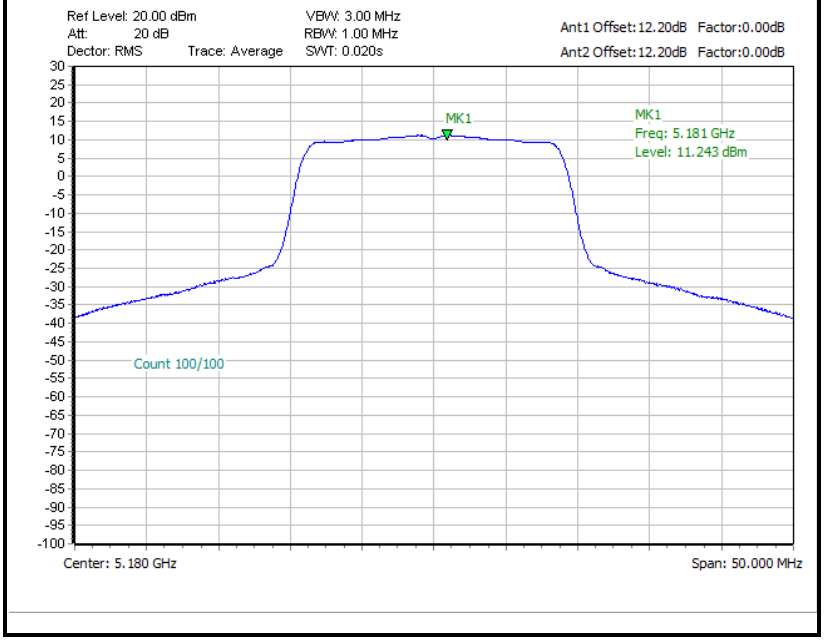
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

Worst Case Power Density (dBm/MHz)



Note: Average Power Density (dB) = Measured value+ Duty 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 5150-5250 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of –27dBm/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

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 ≥ 3 MHz
   - Detector = Peak
   - Sweep time = auto
   - Trace mode = max hold

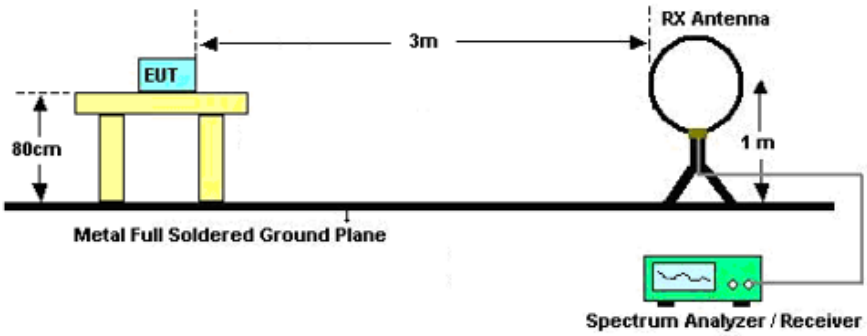
   (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

   - RBW = 1 MHz
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 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.

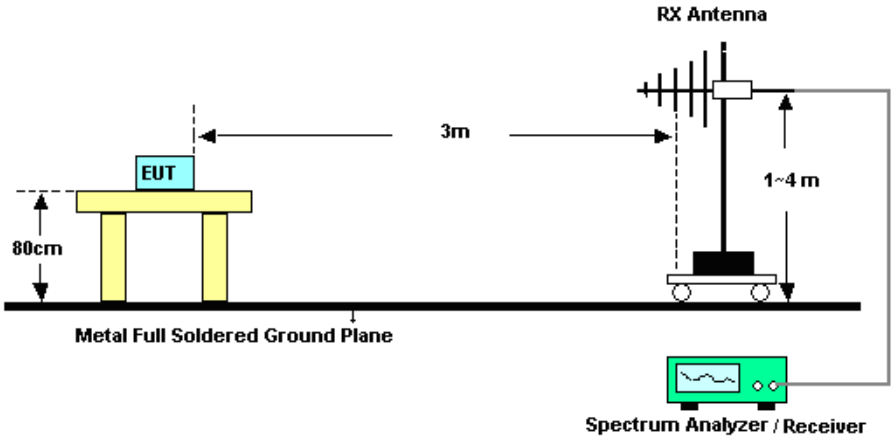
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband 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

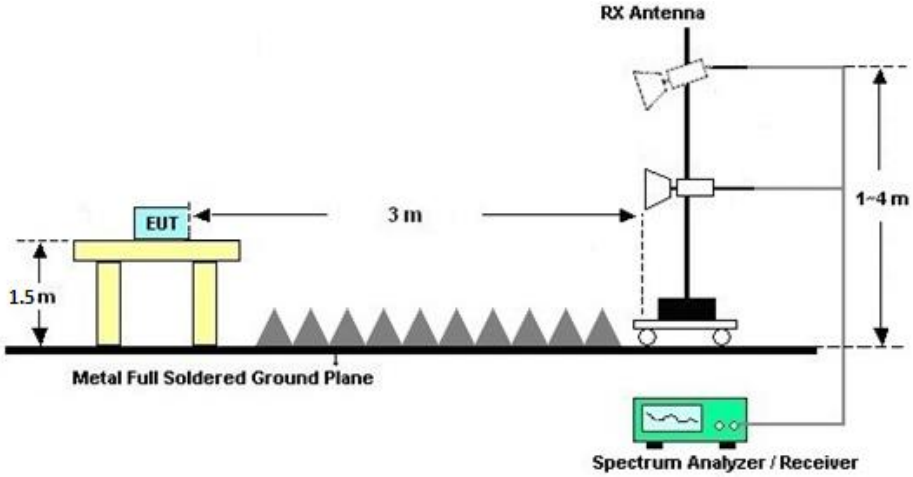
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

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

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

3.4.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C.

3.4.7 Duty Cycle

Please refer to Appendix D.

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

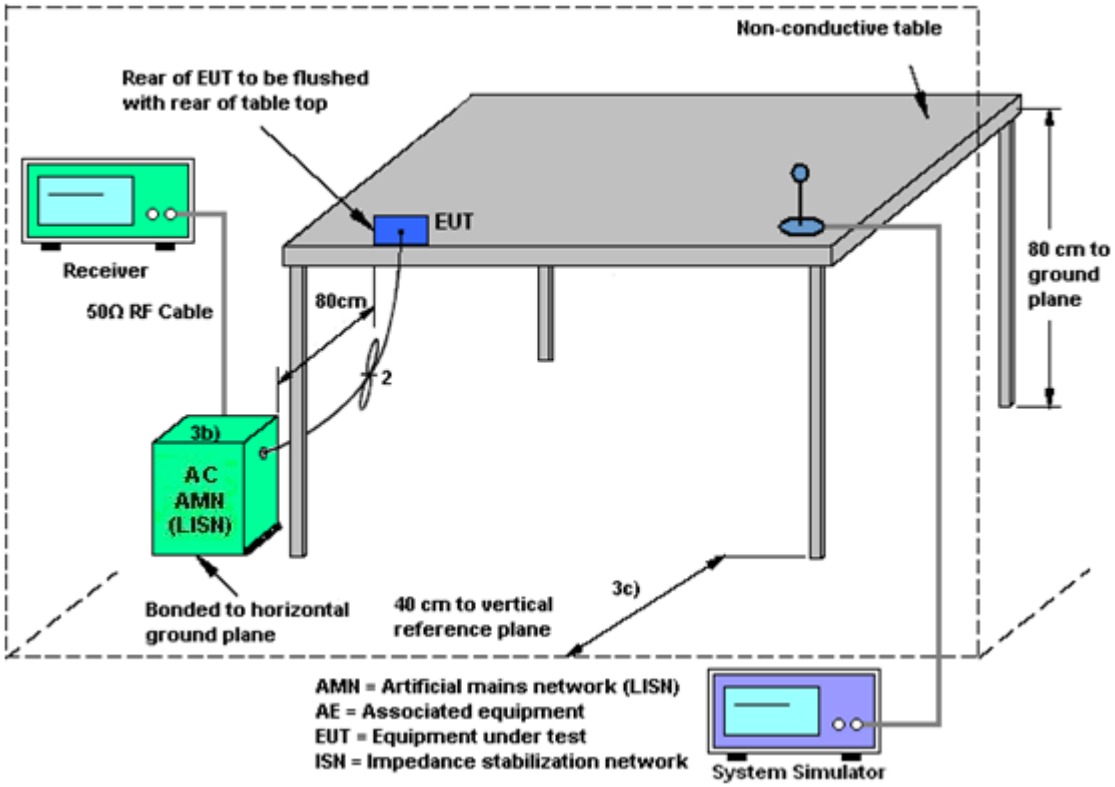
3.5.2 Measuring Instruments

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 all transmit signals are completely uncorrelated with each other,

Directional gain = G_{ANT} Max

<STBC Modes>

	Ant. 1 (dBi)	Ant. 2 (dBi)	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
Band I	4.72	4.72	4.72	4.72	0.00	0.00

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

PSD limit reduction = Composite gain + PSD Array gain – 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	Apr. 08, 2023	Conducted (TH01-SZ)
Pulse Power Senor	Anritsu	MA2411B	1339473	30MHz~40GHz	Dec. 28, 2021	Nov. 05, 2022	Dec. 27, 2022	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1542004	50MHz Bandwidth	Dec. 28, 2021	Nov. 05, 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, 2024	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-00101800-30-10P-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. 26, 2022	Jul. 06, 2023	Conduction (CO01-SZ)
AC LISN	R&S	ENV216	100063	9kHz~30MHz	Sep. 15, 2022	Oct. 26, 2022	Sep. 14, 2023	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	EMCO	3816/2SH	00103892	9kHz~30MHz	Oct. 17, 2022	Oct. 26, 2022	Oct. 16, 2023	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000891	100Vac~250Vac	Jul. 07, 2022	Oct. 26, 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

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.2dB

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

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

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

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

---------- THE END ----------

Appendix A. Conducted Test Results

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Chen Ran	Temperature:	21~25	°C
Test Date:	2022/11/5	Relative Humidity:	51~54	%

TEST RESULTS DATA
26dB and 99% OBW

Band I								
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)		26 dB Bandwidth (MHz)	
					Ant 1	Ant 2	Ant 1	Ant 2
11a	6Mbps	2	36	5180	16.98	16.98	20.25	20.30
11a	6Mbps	2	44	5220	16.88	16.88	20.20	20.45
11a	6Mbps	2	48	5240	16.98	17.03	20.40	20.40
HT40	MCS8	2	38	5190	36.36	36.26	41.13	40.23
HT40	MCS8	2	46	5230	36.46	36.16	41.13	40.23
VHT20	MCS0	2	36	5180	17.68	17.68	20.35	20.40
VHT20	MCS0	2	44	5220	17.68	17.68	20.25	20.35
VHT20	MCS0	2	48	5240	17.63	17.68	20.25	20.25
VHT80	MCS0	2	42	5210	75.04	74.81	81.28	81.28

Report Number : FR292702B

TEST RESULTS DATA
Average Power Table

FCC Band I														
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	36	5180	0.00	0.00	18.70	18.89	21.81	30.00		4.72		Pass
11a	6Mbps	2	44	5220	0.00	0.00	18.77	18.97	21.88	30.00		4.72		Pass
11a	6Mbps	2	48	5240	0.00	0.00	18.69	18.79	21.75	30.00		4.72		Pass
HT20	MCS8	2	36	5180	0.00	0.00	18.77	18.90	21.85	30.00		4.72		Pass
HT20	MCS8	2	44	5220	0.00	0.00	18.57	18.83	21.71	30.00		4.72		Pass
HT20	MCS8	2	48	5240	0.00	0.00	18.62	18.88	21.76	30.00		4.72		Pass
HT40	MCS8	2	38	5190	0.00	0.00	18.70	19.07	21.90	30.00		4.72		Pass
HT40	MCS8	2	46	5230	0.00	0.00	18.63	18.83	21.74	30.00		4.72		Pass
VHT20	MCS0	2	36	5180	0.00	0.00	19.32	19.66	22.50	30.00		4.72		Pass
VHT20	MCS0	2	44	5220	0.00	0.00	19.15	19.46	22.32	30.00		4.72		Pass
VHT20	MCS0	2	48	5240	0.00	0.00	19.15	19.44	22.31	30.00		4.72		Pass
VHT40	MCS0	2	38	5190	0.00	0.00	18.28	18.48	21.39	30.00		4.72		Pass
VHT40	MCS0	2	46	5230	0.00	0.00	18.18	18.35	21.28	30.00		4.72		Pass
VHT80	MCS0	2	42	5210	0.00	0.00	15.53	15.72	18.64	30.00		4.72		Pass

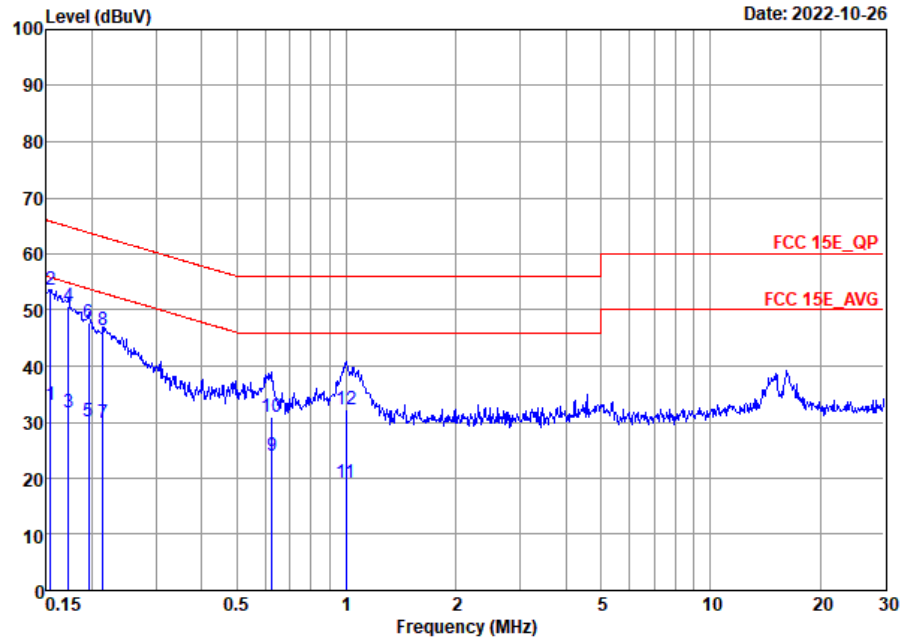
Report Number : FR292702B

TEST RESULTS DATA
Power Spectral Density

FCC Band I															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Power Density (dBm/MHz)			Average PSD Limit (dBm/MHz)		DG (dBi)			Pass /Fail
					Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	2	36	5180	0.00	0.00			10.56	17.00		4.72			Pass
11a	6Mbps	2	44	5220	0.00	0.00			10.89	17.00		4.72			Pass
11a	6Mbps	2	48	5240	0.00	0.00			10.83	17.00		4.72			Pass
HT40	MCS8	2	38	5190	0.00	0.00			7.64	17.00		4.72			Pass
HT40	MCS8	2	46	5230	0.00	0.00			7.55	17.00		4.72			Pass
VHT20	MCS0	2	36	5180	0.00	0.00			11.24	17.00		4.72			Pass
VHT20	MCS0	2	44	5220	0.00	0.00			11.10	17.00		4.72			Pass
VHT20	MCS0	2	48	5240	0.00	0.00			10.83	17.00		4.72			Pass
VHT80	MCS0	2	42	5210	0.00	0.00			4.96	17.00		4.72			Pass

Appendix B. AC Conducted Emission Test Results

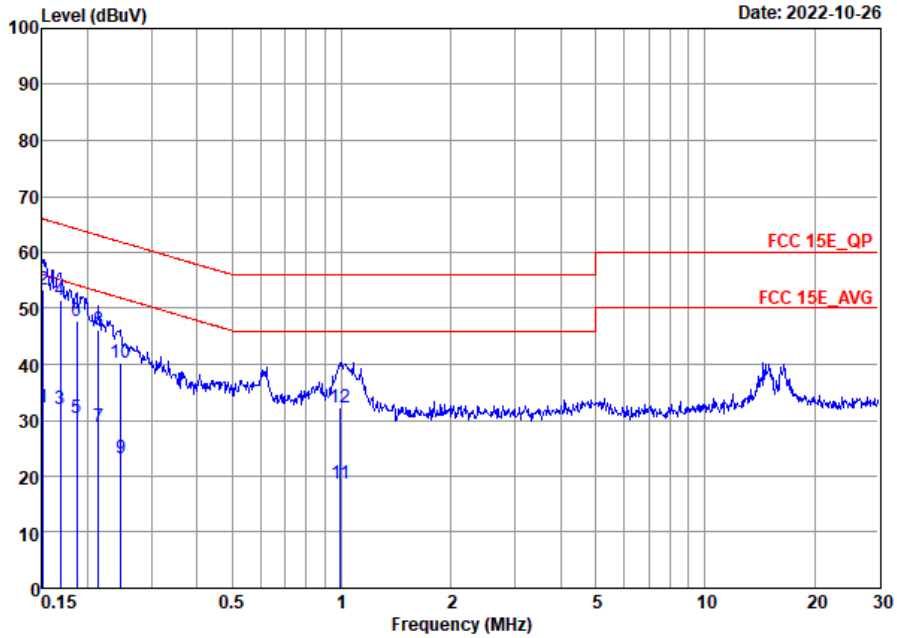
Test Engineer :	Yuki Tang	**Temperature :**	21~24℃
		Relative Humidity :	42~47%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-SZ
Condition: FCC 15E QP LISN_20220811_ L LINE

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.15	32.99	-22.79	55.78	12.00	10.20	10.79	Average
2	*	0.15	53.59	-12.19	65.78	32.60	10.20	10.79	QP
3		0.17	31.71	-23.15	54.86	11.00	10.20	10.51	Average
4		0.17	50.61	-14.25	64.86	29.90	10.20	10.51	QP
5		0.20	30.21	-23.59	53.80	9.80	10.20	10.21	Average
6		0.20	47.71	-16.09	63.80	27.30	10.20	10.21	QP
7		0.21	29.78	-23.27	53.05	9.30	10.19	10.29	Average
8		0.21	46.48	-16.57	63.05	26.00	10.19	10.29	QP
9		0.62	23.95	-22.05	46.00	2.50	10.12	11.33	Average
10		0.62	30.85	-25.15	56.00	9.40	10.12	11.33	QP
11		1.00	19.15	-26.85	46.00	-1.20	10.12	10.23	Average
12		1.00	32.35	-23.65	56.00	12.00	10.12	10.23	QP

Test Engineer :	Yuki Tang	**Temperature :**	21~24℃
		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	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	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

Test Engineer :	Zhaohui Liang	Temperature :	22~25°C
		Relative Humidity :	48~52%

U-NII-1 - 5150~5250MHz

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 36 5180MHz		5128.44	52.41	-21.59	74	38.98	34.87	11.09	32.53	100	66	P	H
		5150	41.8	-12.2	54	28.37	34.87	11.09	32.53	100	66	A	H
		5180	94.14	-	-	80.75	34.86	11.07	32.54	100	66	P	H
		5180	86.95	-	-	73.56	34.86	11.07	32.54	100	66	A	H
		5148.72	60.7	-13.3	74	47.27	34.87	11.09	32.53	172	254	P	V
		5150	49.97	-4.03	54	36.54	34.87	11.09	32.53	172	254	A	V
		5180	110.71	-	-	97.32	34.86	11.07	32.54	172	254	P	V
		5180	104.08	-	-	90.69	34.86	11.07	32.54	172	254	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

U-NII-1 5150~5250MHz

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 36 5180MHz		10360	54.09	-14.21	68.3	51.55	39.44	14.15	51.05	-	-	P	H
		15540	50.89	-23.11	74	44.88	41.82	16.85	52.66	-	-	P	H
		10360	58.41	-9.89	68.3	55.87	39.44	14.15	51.05	-	-	P	V
		15540	51.58	-22.42	74	45.57	41.82	16.85	52.66	-	-	P	V
802.11a CH 44 5220MHz		10440	53.69	-14.61	68.3	51.08	39.48	14.2	51.07	-	-	P	H
		15660	52.07	-21.93	74	46.1	41.9	16.95	52.88	-	-	P	H
		10440	57.42	-10.88	68.3	54.81	39.48	14.2	51.07	-	-	P	V
		15660	50.25	-23.75	74	44.28	41.9	16.95	52.88	-	-	P	V
802.11a CH 48 5240MHz		10480	52.78	-15.52	68.3	50.16	39.49	14.22	51.09	-	-	P	H
		15720	51.18	-22.82	74	45.27	41.93	16.98	53	-	-	P	H
		10480	55.96	-12.34	68.3	53.34	39.49	14.22	51.09	-	-	P	V
		15720	51.01	-22.99	74	45.1	41.93	16.98	53	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

U-NII-1 5150~5250MHz

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 38 5190MHz		5141.7	54.2	-19.8	74	40.77	34.87	11.09	32.53	100	139	P	H
		5149.76	43.68	-10.32	54	30.25	34.87	11.09	32.53	100	139	A	H
		5190	95.72	-	-	82.33	34.86	11.07	32.54	100	139	P	H
		5190	88.54	-	-	75.15	34.86	11.07	32.54	100	139	A	H
		5356.68	50.8	-23.2	74	37.61	34.83	10.93	32.57	100	139	P	H
		5458.32	40.28	-13.72	54	27	34.81	11.06	32.59	100	139	A	H
		5148.2	62.9	-11.1	74	49.47	34.87	11.09	32.53	194	87	P	V
		5149.24	52.79	-1.21	54	39.36	34.87	11.09	32.53	194	87	A	V
		5190	109.18	-	-	95.79	34.86	11.07	32.54	194	87	P	V
		5190	101.62	-	-	88.23	34.86	11.07	32.54	194	87	A	V
		5379.92	52.8	-21.2	74	39.63	34.82	10.93	32.58	194	87	P	V
		5350	41.7	-12.3	54	28.51	34.83	10.93	32.57	194	87	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

U-NII-1 5150~5250MHz

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		10380	51.16	-17.14	68.3	48.58	39.45	14.18	51.05	-	-	P	H
HT40		15570	50	-24	74	44	41.84	16.88	52.72	-	-	P	H
CH 38		10380	54.59	-13.71	68.3	52.01	39.45	14.18	51.05	-	-	P	V
5190MHz		15570	50.28	-23.72	74	44.28	41.84	16.88	52.72	-	-	P	V
802.11n		10460	51.26	-17.04	68.3	48.64	39.48	14.22	51.08	-	-	P	H
HT40		15690	49.98	-24.02	74	44.03	41.91	16.98	52.94	-	-	P	H
CH 46		10460	55.18	-13.12	68.3	52.56	39.48	14.22	51.08	-	-	P	V
5230MHz		15690	50.05	-23.95	74	44.1	41.91	16.98	52.94	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

U-NII-1 5150~5250MHz

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 36 5180MHz		5149.24	55.44	-18.56	74	42.01	34.87	11.09	32.53	100	61	P	H
		5150	43.47	-10.53	54	30.04	34.87	11.09	32.53	100	61	A	H
		5180	98.96	-	-	85.57	34.86	11.07	32.54	100	61	P	H
		5180	91.85	-	-	78.46	34.86	11.07	32.54	100	61	A	H
		5149.76	64.98	-9.02	74	51.55	34.87	11.09	32.53	170	94	P	V
		5150	51.47	-2.53	54	38.04	34.87	11.09	32.53	170	94	A	V
		5180	111.85	-	-	98.46	34.86	11.07	32.54	170	94	P	V
		5180	104.72	-	-	91.33	34.86	11.07	32.54	170	94	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

U-NII-1 5150~5250MHz

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		10360	54.18	-14.12	68.3	51.64	39.44	14.15	51.05	-	-	P	H
VHT20		15540	51.52	-22.48	74	45.51	41.82	16.85	52.66	-	-	P	H
CH 36		10360	58.6	-9.7	68.3	56.06	39.44	14.15	51.05	-	-	P	V
5180MHz		15540	51.45	-22.55	74	45.44	41.82	16.85	52.66	-	-	P	V
802.11ac		10440	54.94	-13.36	68.3	52.33	39.48	14.2	51.07	-	-	P	H
VHT20		15660	50.72	-23.28	74	44.75	41.9	16.95	52.88	-	-	P	H
CH 44		10440	59.66	-8.64	68.3	57.05	39.48	14.2	51.07	-	-	P	V
5220MHz		15660	50.97	-23.03	74	45	41.9	16.95	52.88	-	-	P	V
802.11ac		10480	54.59	-13.71	68.3	51.97	39.49	14.22	51.09	-	-	P	H
VHT20		15720	50.07	-23.93	74	44.16	41.93	16.98	53	-	-	P	H
CH 48		10480	58.87	-9.43	68.3	56.25	39.49	14.22	51.09	-	-	P	V
5240MHz		15720	50.72	-23.28	74	44.81	41.93	16.98	53	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

U-NII-1 5150~5250MHz

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 42 5210MHz		5148.46	54.2	-19.8	74	40.77	34.87	11.09	32.53	100	61	P	H
		5150	43.77	-10.23	54	30.34	34.87	11.09	32.53	100	61	A	H
		5210	89.88	-	-	76.51	34.86	11.05	32.54	100	61	P	H
		5210	82.56	-	-	69.19	34.86	11.05	32.54	100	61	A	H
		5365.68	51.18	-22.82	74	37.99	34.83	10.93	32.57	100	61	P	H
		5427.84	40.18	-13.82	54	26.9	34.81	11.06	32.59	100	61	A	H
		5141.18	63.93	-10.07	74	50.5	34.87	11.09	32.53	185	252	P	V
		5135.2	53.01	-0.99	54	39.58	34.87	11.09	32.53	185	252	A	V
		5210	102.38	-	-	89.01	34.86	11.05	32.54	185	252	P	V
		5210	95.63	-	-	82.26	34.86	11.05	32.54	185	252	A	V
		5376.24	52.28	-21.72	74	39.11	34.82	10.93	32.58	185	252	P	V
		5354.88	41.71	-12.29	54	28.52	34.83	10.93	32.57	185	252	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

U-NII-1 5150~5250MHz

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		10420	50.92	-17.38	68.3	48.32	39.47	14.2	51.07	-	-	P	H
VHT80		15630	50.47	-23.53	74	44.53	41.88	16.91	52.85	-	-	P	H
CH 42		10420	50.75	-17.55	68.3	48.15	39.47	14.2	51.07	-	-	P	V
5210MHz		15630	50.46	-23.54	74	44.52	41.88	16.91	52.85	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

U-NII-1 - 5150~5250MHz

Emission below 1GHz

5GHz WIFI 802.11ac VHT80 (LF)

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)
5GHz 802.11ac VHT80 LF		54.25	21.47	-18.53	40	35.33	19.42	1.68	34.96	-	-	P	H
		122.15	27.43	-16.07	43.5	43.33	16.7	2.16	34.76	-	-	P	H
		303.54	27.22	-18.78	46	39.39	19.2	3.23	34.6	-	-	P	H
		463.59	24.02	-21.98	46	32.16	22.91	3.45	34.5	-	-	P	H
		686.69	28.27	-17.73	46	32.11	26.87	3.72	34.43	-	-	P	H
		865.17	30.05	-15.95	46	31.21	28.75	4.39	34.3	-	-	P	H
		52.31	30.38	-9.62	40	44.17	19.53	1.66	34.98	-	-	P	V
		125.06	37.39	-6.11	43.5	53.02	16.94	2.18	34.75	-	-	P	V
		250.19	23.84	-22.16	46	37.96	17.57	3.01	34.7	-	-	P	V
		454.86	23.6	-22.4	46	31.83	22.81	3.46	34.5	-	-	P	V
		685.72	27.54	-18.46	46	31.4	26.85	3.72	34.43	-	-	P	V
		852.56	30.47	-15.53	46	31.6	28.79	4.38	34.3	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

Co-location

WIFI 802.11ac VHT20 CH42 + LTE B14 Link

U-NII-1 5150~5250MHz

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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac CH42 5210MHz & LTE Band14	*	5101.4	53.47	-20.53	74	39.99	34.88	11.12	32.52	338	233	P	H
	*	5101.4	44.27	-9.73	54	30.79	34.88	11.12	32.52	338	233	A	H
		5210	92.85	-	-	79.48	34.86	11.05	32.54	338	233	P	H
		5210	86.61	-	-	73.24	34.86	11.05	32.54	338	233	A	H
		5400.96	50.63	-23.37	74	37.49	34.82	10.9	32.58	338	233	P	H
		5455.68	40.14	-13.86	54	26.86	34.81	11.06	32.59	338	233	A	H
	*	5135.2	61.69	-12.31	74	48.26	34.87	11.09	32.53	182	252	P	V
	*	5150	53.3	-0.7	54	39.87	34.87	11.09	32.53	182	252	A	V
		5210	100.11	-	-	86.74	34.86	11.05	32.54	182	252	P	V
		5210	93.74	-	-	80.37	34.86	11.05	32.54	182	252	A	V
		5447.28	51.98	-22.02	74	38.7	34.81	11.06	32.59	182	252	P	V
		5353.44	40.43	-13.57	54	27.24	34.83	10.93	32.57	182	252	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

U-NII-1 5150~5250MHz

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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac CH42 5210MHz & LTE Band14		1577	52.76	-21.24	74	49.82	29.54	6.52	33.12	-	-	P	H
		2365.5	46.57	-27.43	74	39.38	32.2	7.69	32.7	-	-	P	H
		3154	52.64	-15.66	68.3	41.73	34.49	8.88	32.46	-	-	P	H
		10420	49.92	-18.38	68.3	47.32	39.47	14.2	51.07	-	-	P	H
		15630	49.95	-24.05	74	44.01	41.88	16.91	52.85	-	-	P	H
		1577	52.77	-21.23	74	49.83	29.54	6.52	33.12	-	-	P	V
		2365.5	45.29	-28.71	74	38.1	32.2	7.69	32.7	-	-	P	V
		3154	51.89	-16.41	68.3	40.98	34.49	8.88	32.46	-	-	P	V
		10420	50.31	-17.99	68.3	47.71	39.47	14.2	51.07	-	-	P	V
		15630	50.46	-23.54	74	44.52	41.88	16.91	52.85	-	-	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 **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 CH 01 2412MHz		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
		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)

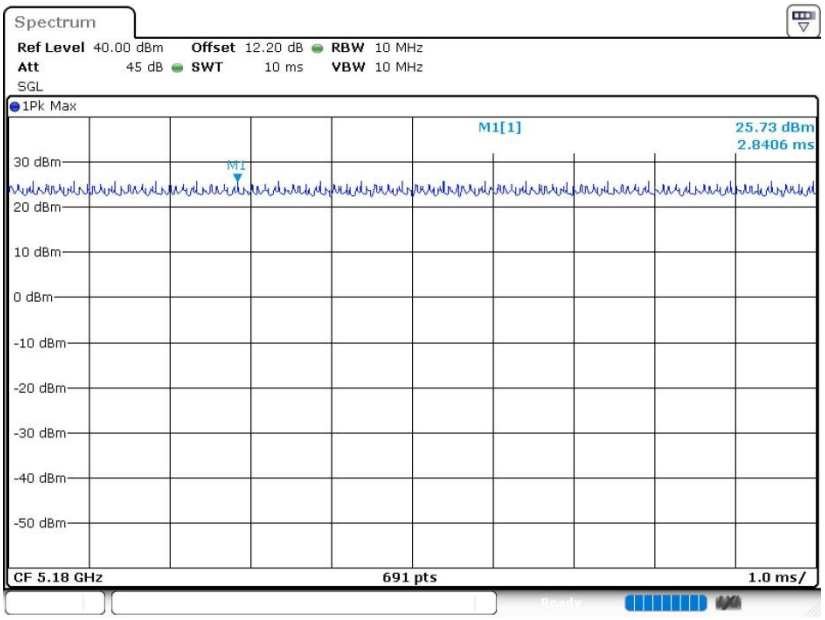
= -10.46(dB)

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

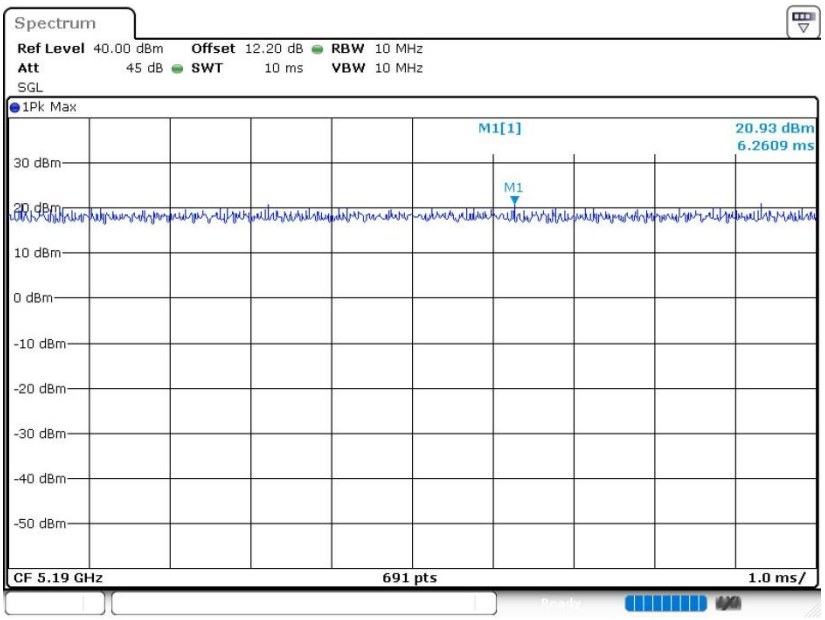
Appendix D. Duty Cycle Plots

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

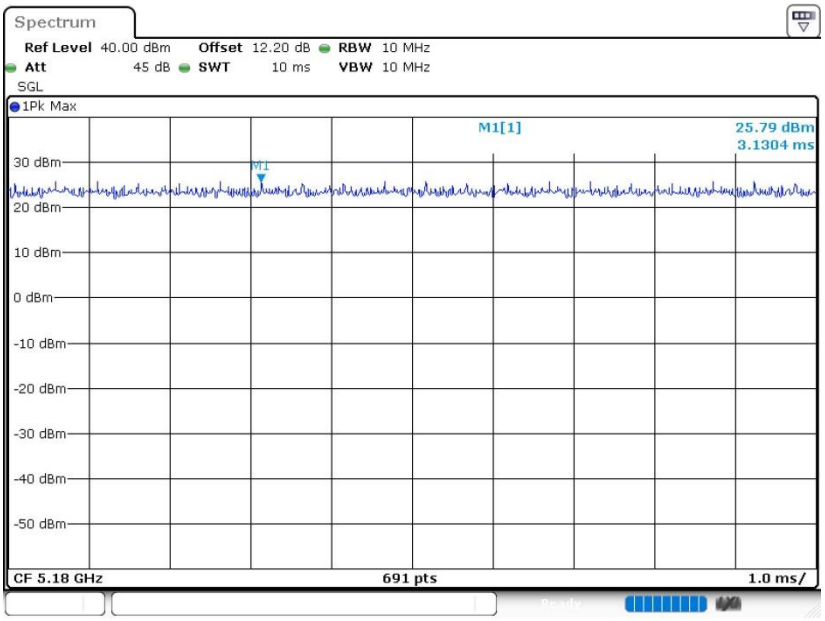
802.11a



802.11an HT40



802.11ac VHT20



802.11ac VHT80