FCC RF Test Report

APPLICANT	:	Inseego Corp.
EQUIPMENT	:	wireless device
BRAND NAME	:	Inseego
MODEL NAME	:	FX20003
FCC ID	:	PKRISGFX20003
STANDARD	:	FCC Part 15 Subpart C §15.247
CLASSIFICATION	:	(DTS) Digital Transmission System

The product was received on Aug. 28, 2020 and testing was completed on Nov. 24, 2020. We, Sporton International (Kunshan) Inc., 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.

This product installed a RF module (Brand Name: Inseego, Model Name: MD2000, FCC ID: PKRISGMD2000) during the test.

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

Jason Jia

Reviewed by: Jason Jia / Supervisor

James Huang

Approved by: James Huang / Manager

ACCREDITED Cert #5145.02

Sporton International (Kunshan) Inc.
No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300
People's Republic of China

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR082812A	Rev. 01	Initial issue of report	Nov. 26, 2020

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	6dB Bandwidth	≥ 0.5MHz	Pass	-
3.2	15.247(b)	Power Output Measurement	≤ 30dBm	Pass	-
3.3	15.247(e)	Power Spectral Density	≤ 8dBm/3kHz	Pass	-
3.4	15.247(d)	Conducted Band Edges	≤ 30dBc	Pass	-
		Conducted Spurious Emission		Pass	-
3.5	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 0.20 dB at 2483.500 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 21.81 dB at 0.151 MHz
3.7	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

1 General Description

1.1 Applicant

Inseego Corp.
9710 Scranton Road, Suite 200 San Diego, CA 92121

1.2 Manufacturer

MeiG Smart Technology Co., Ltd
Floor 2, Office Building No.5, Lingxia Road, Fenghuang Community, Fuyong Street, Bao 'an District, Shenzhen

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	wireless device
Brand Name	Inseego
Model Name	FX20003
FCC ID	PKRISGFX20003
EUT supports Radios application	WCDMA/LTE/5G NR/GNSS WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 2.4GHz 802.11ac VHT20/VHT40 WLAN 2.4GHz 802.11ax HE20/HE40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 WLAN 5GHz 802.11ax HE20/HE40/HE80
IMEI Code	Conducted: N/A Conduction: 990016670003480 Radiation: 990016670003415
HW Version	Rev1
SW Version	1
EUT Stage	Identical Prototype

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. This product installed a RF module (Brand Name: Inseego, Model Name: MD2000) during the test, conducted test items of 802.11b, RSE and conduction are tested in this report. The maximum power of host is lower than and very close to the module, therefore, the other conducted test results are referred to module RF report FR090125A.

1.4 Product Specification of Equipment Under Test

<table>
<tr><th colspan="2">Standards-related Product Specification</th></tr>
<tr><td>Tx/Rx Channel Frequency Range</td><td>2412 MHz ~ 2462 MHz</td></tr>
<tr><td>Maximum Output Power to antenna</td><td>MIMO <Ant. 1+2>
802.11b : 18.99 dBm (0.0793 W)</td></tr>
<tr><td>Antenna Type / Gain</td><td>Ant. 1: IFA Antenna with gain 0.50 dBi
Ant. 2: Monopole Antenna with gain 2.55 dBi</td></tr>
<tr><td>Type of Modulation</td><td>802.11b : DSSS (DBPSK / DQPSK / CCK)
802.11g/n/ac/ax : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM / 1024QAM)</td></tr>
<tr><td>Antenna Function for Transmitter</td><td>
<table>
<tr><td></td><td>Ant. 1</td><td>Ant. 2</td></tr>
<tr><td>802.11 b/g/n/ac/ax SISO</td><td>V</td><td>V</td></tr>
<tr><td>802.11 b/g/n/ac/ax MIMO</td><td colspan="2">V</td></tr>
</table>
</td></tr>
</table>

Note:

1. For SISO & MIMO mode, the whole testing has assessed only MIMO mode by referring to their higher conducted power.
2. For RSE testing, 802.11n HT20 / ac VHT20 / ax HE20 and 802.11n HT40 / ac VHT40 / ax HE40 mode, the whole testing have assessed only 802.11ax HE20/ HE40 by referring to their maximum conducted power and Partial RU were verified for Radiated Band edge which is lower conducted power than full RU mode.

1.5 Modification of EUT

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

1.6 Testing Location

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

Test Firm	Sporton International (Kunshan) Inc.		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	CO01-KS 03CH05-KS TH01-KS	CN1257	314309

1.7 Test Software

Item	Site	Manufacture	Name	Version
1.	03CH05-KS	AUDIX	E3	6.2009-8-24al
2.	CO01-KS	AUDIX	E3	6.2009-8-24

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 C §15.247
- FCC KDB 558074 D01 15.247 Meas Guidance v05r02
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ANSI C63.10-2013

Remark:

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

2 Test Configuration of Equipment Under Test

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

b. AC power line Conducted Emission was tested under maximum output power.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
2400-2483.5 MHz	1	2412	7	2442
	2	2417	8	2447
	3	2422	9	2452
	4	2427	10	2457
	5	2432	11	2462
	6	2437		

2.2 Test Mode

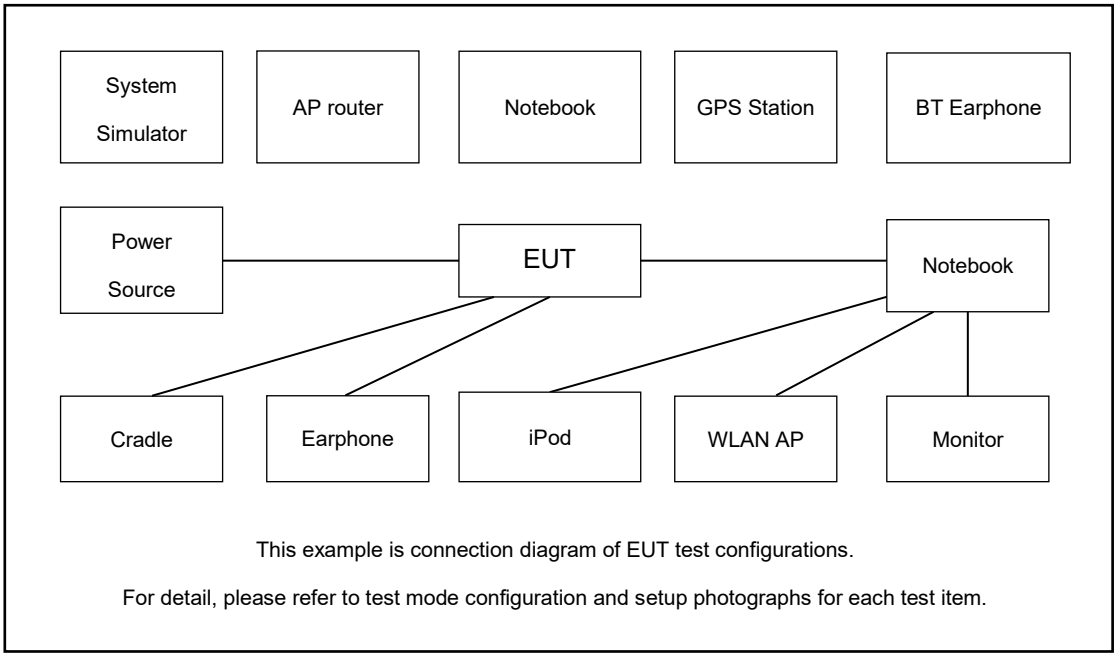
Final test modes are considering the modulation and worse data rates as below table.

MIMO Antenna

Modulation	Data Rate
802.11b	1 Mbps
802.11g	6 Mbps
802.11ax HE20	MCS0
802.11ax HE40	MCS0

Test Cases	
AC Conducted Emission	Mode 1 :WLAN Link(2.4G) + LAN Link + Adapter
Remark: For Radiated Test Cases, The tests were performed with Adapter.	

2.3 Connection Diagram of Test System



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.	Notebook	Lenovo	G480	QDS-BRCM1050I	N/A	shielded cable DC O/P 1.8m , Unshielded AC I/P cable 1.8m
2.	Notebook	Lenovo	V130-15IKB005	N/A	N/A	shielded cable DC O/P 1.8m , Unshielded AC I/P cable 1.8m
3.	Hard DISK	WD	C6B	N/A	N/A	N/A
4.	Earphone	Lenovo	P121	N/A	Unshielded,1.2m	N/A

2.5 EUT Operation Test Setup

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

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 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.
Offset = RF cable loss.
Following shows an offset computation example with cable loss 5.80 dB.

Offset(dB) = RF cable loss(dB).
= 5.80 (dB)

3 Test Result

3.1 6dB Bandwidth Measurement

3.1.1 Limit of 6dB Bandwidth

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

3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

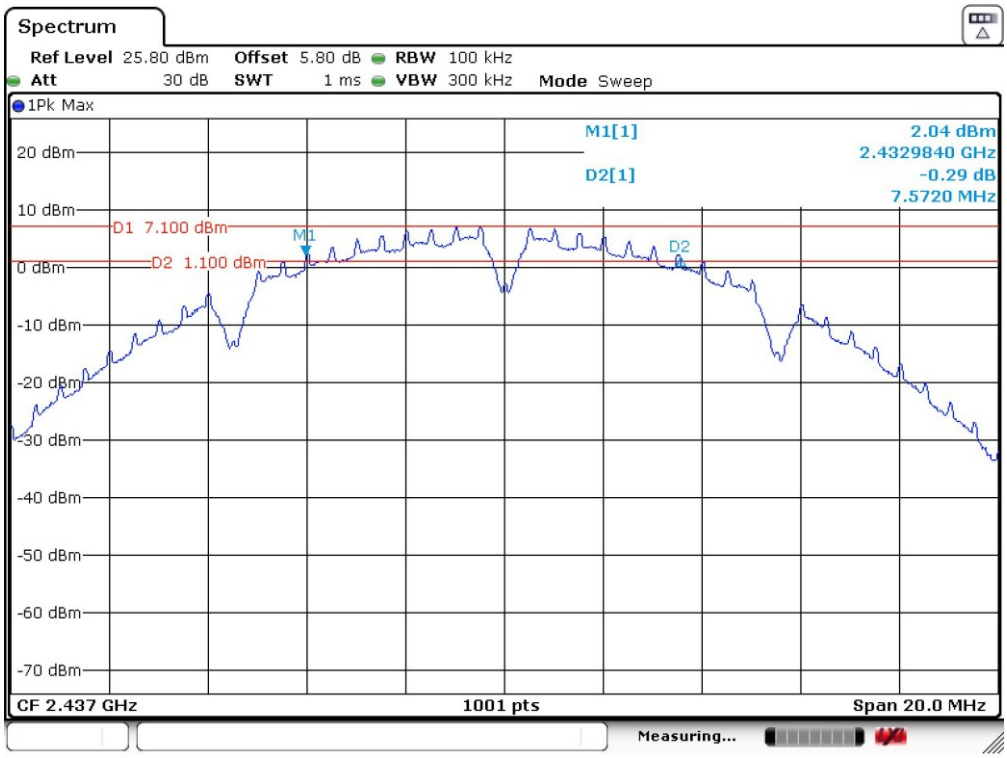
1. The testing follows ANSI C63.10-2013 clause 11.8
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6 dB bandwidth must be greater than 500 kHz.
5. 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.

Minimum 6dB Bandwidth



3.2 Output Power Measurement

3.2.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for output power is 30dBm. If transmitting antenna with directional gain greater than 6dBi is used, the output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

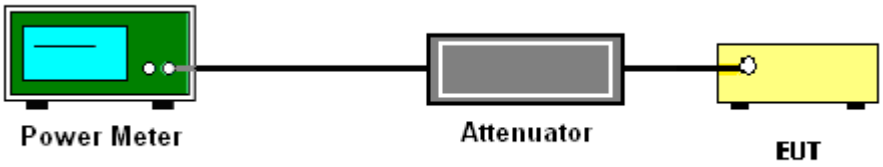
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

1. The testing follows the Measurement Procedure of ANSI C63.10-2013 clause 11.9.1.3 PKPM1 Peak power meter or ANSI C63.10-2013 clause 11.9.2.3.2 Method AVGPM-G method.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.
5. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

3.2.4 Test Setup



3.2.5 Test Result of Average output Power

Please refer to Appendix A.

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

The peak power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.

3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

1. The testing follows Measurement Procedure of ANSI C63.10-2013 clause 11.10.2 Method PKPSD.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. Video bandwidth VBW = 10 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)
5. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level.
6. Measure and record the results in the test report.
7. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

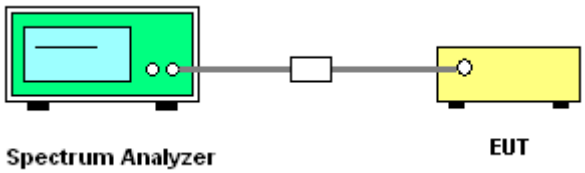
   If measurements performed using method (2) plus 10 log (N) exceeds the emission limit, the test should choose method (1) before declaring that the device fails the emission limit.

   Method (1): Measure and sum the spectra across the outputs.

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

   Method (2): Measure and add 10 log (N) dB, where N is the number of outputs. (N=2)

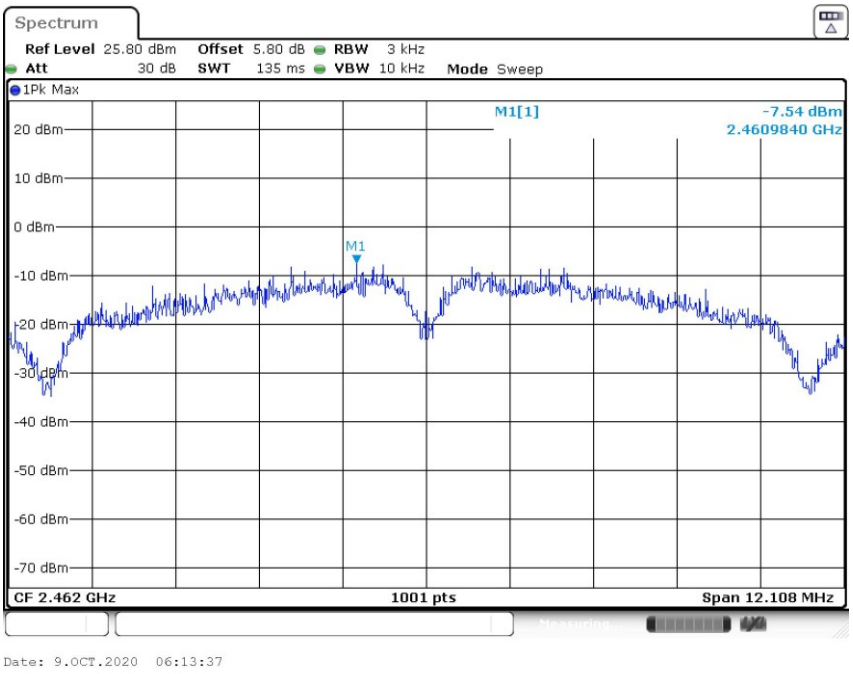
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

Worst Case Power Density (dBm/3kHz)



3.4 Conducted Band Edges and Spurious Emission Measurement

3.4.1 Limit of Conducted Band Edges and Spurious Emission Measurement

In any 100 kHz bandwidth outside of the authorized frequency band, the emissions which fall in the non-restricted bands shall be attenuated at least 20 dB / 30dB relative to the maximum PSD level in 100 kHz by RF conducted measurement.

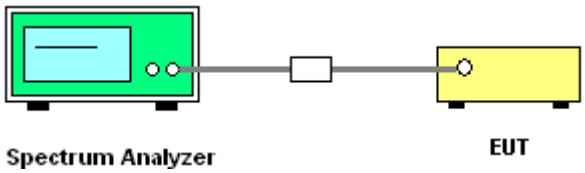
3.4.2 Measuring Instruments

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

3.4.3 Test Procedures

1. The testing follows ANSI C63.10-2013 clause 11.13
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB per 15.247(d).
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.4.4 Test Setup

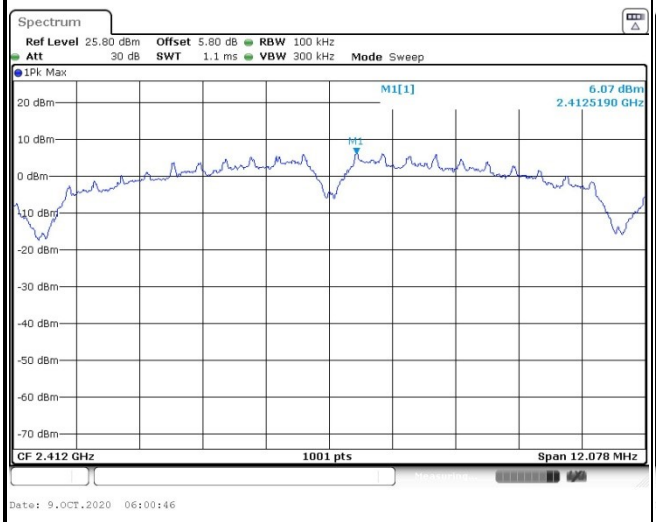
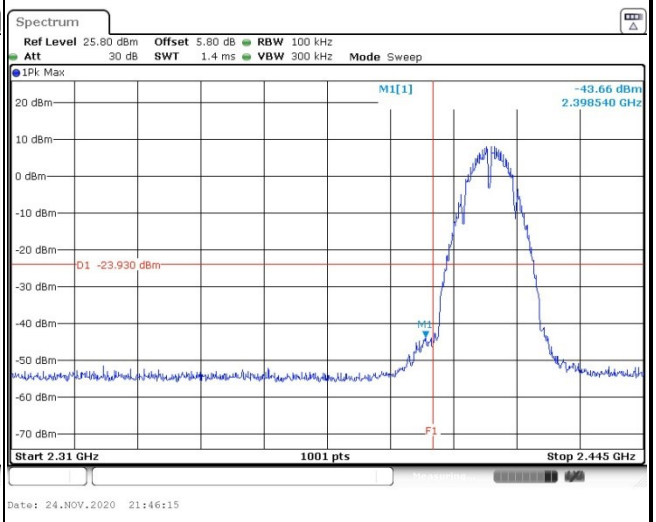
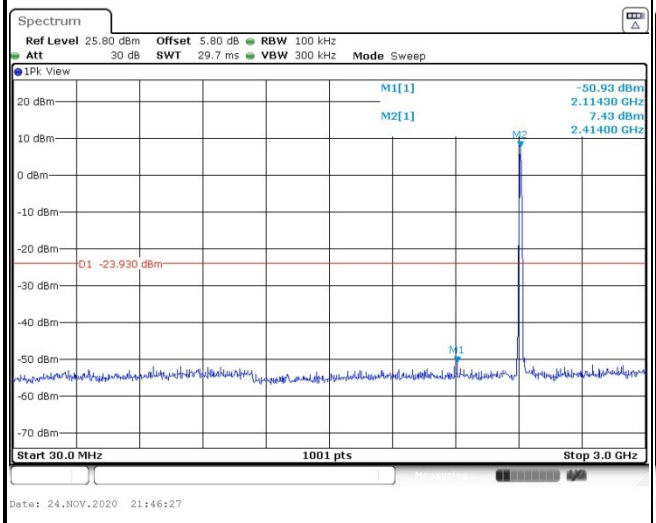
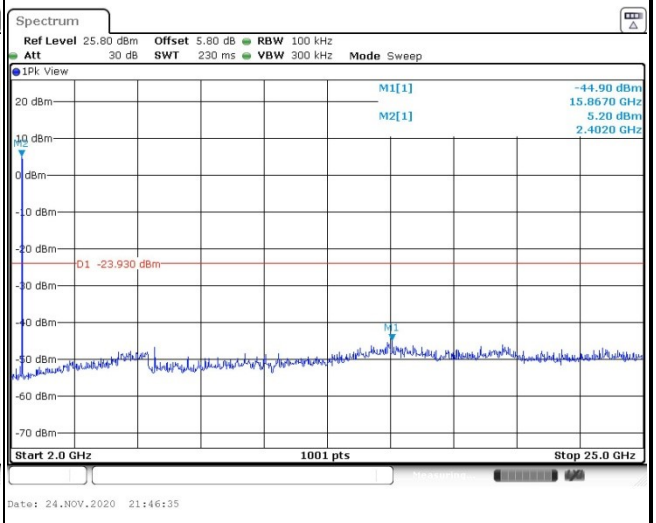


3.4.5 Test Result of Conducted Band Edges and Spurious Emission

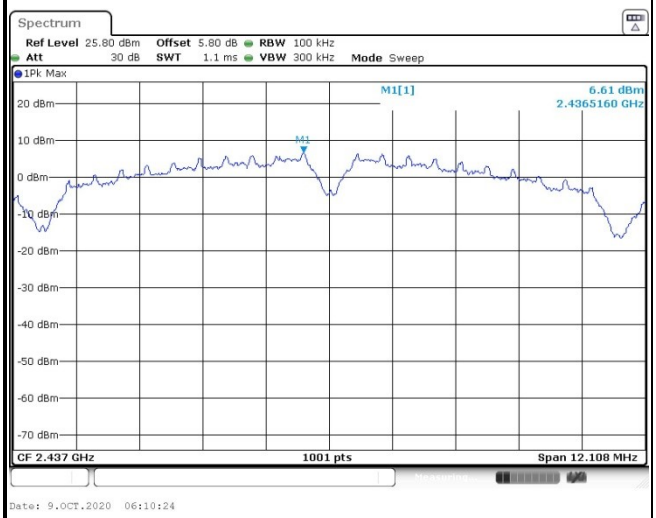
Test Engineer :	Albert shi	**Temperature :**	0~40℃
		Relative Humidity :	51~54%

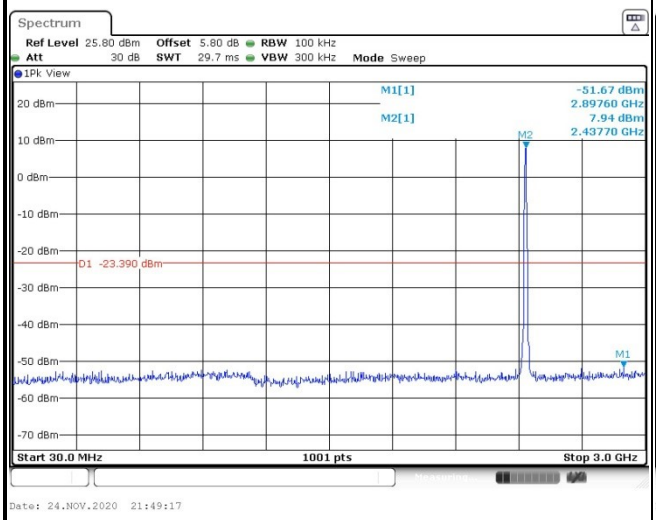
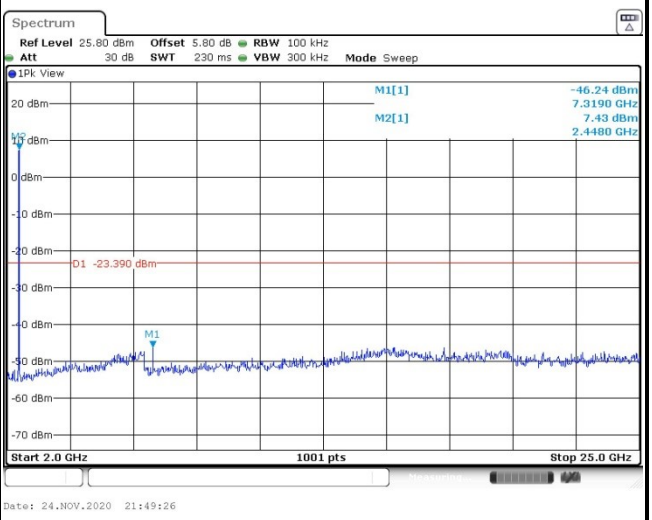
Number of TX = 2, Ant. 1 (Measured)

Test Mode :	802.11b	**Test Channel :**	01

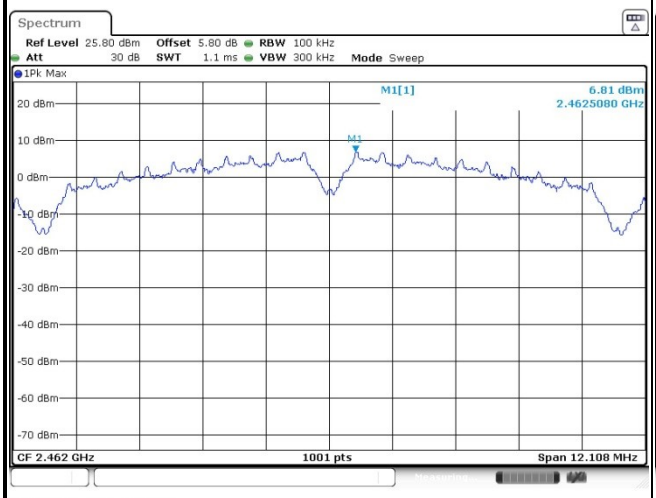
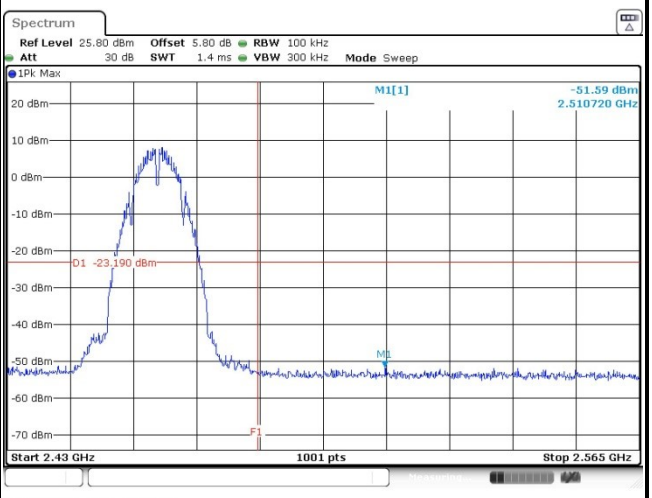
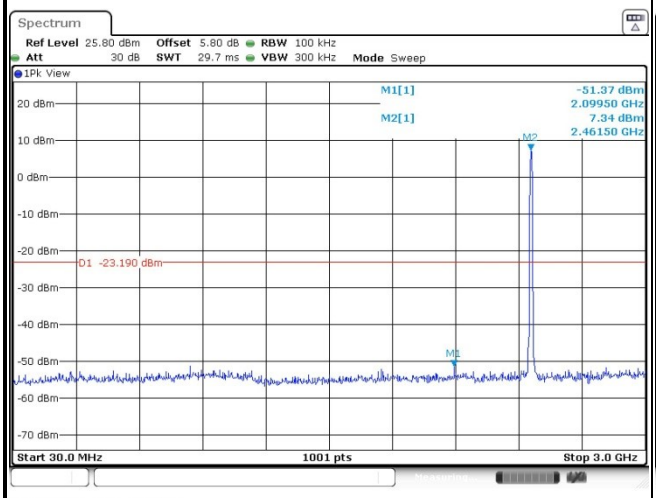
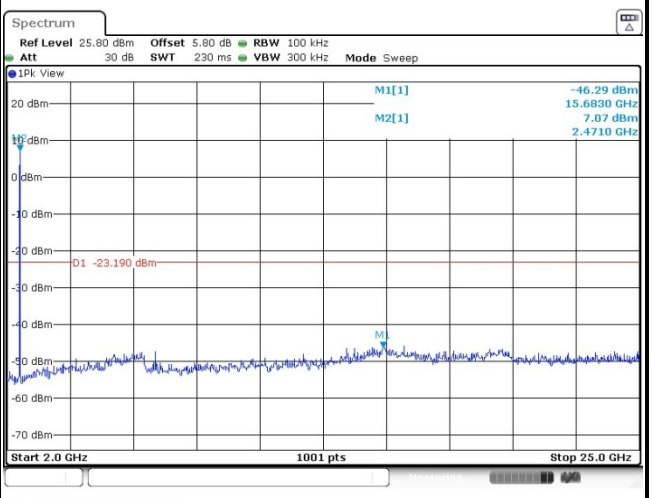
100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

Test Mode :	802.11b	Test Channel :	06

100kHz PSD reference Level	-
	-

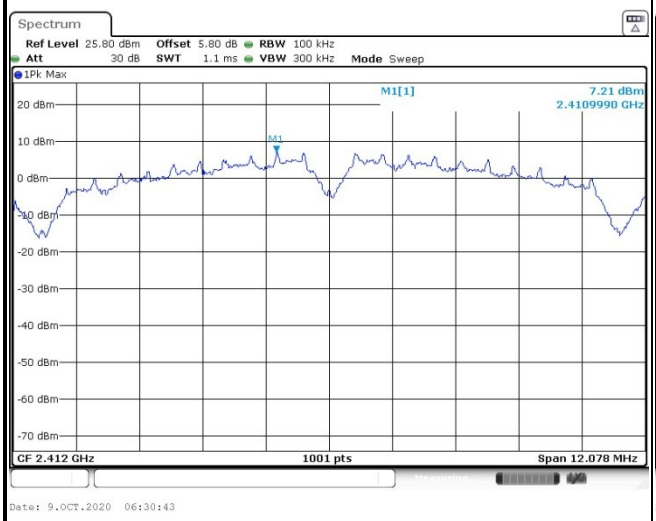
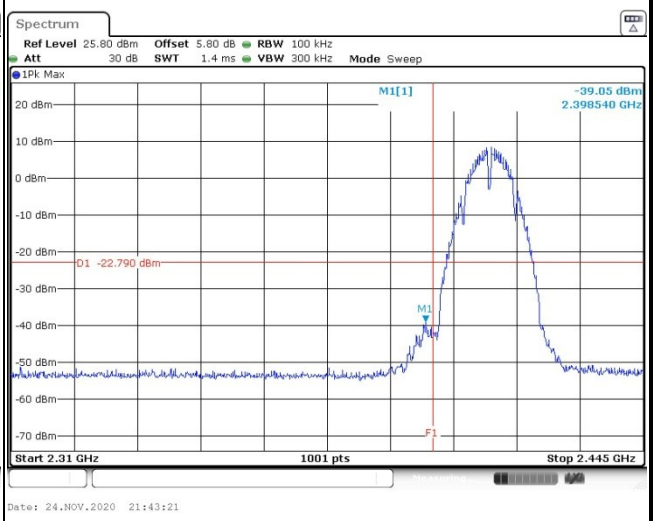
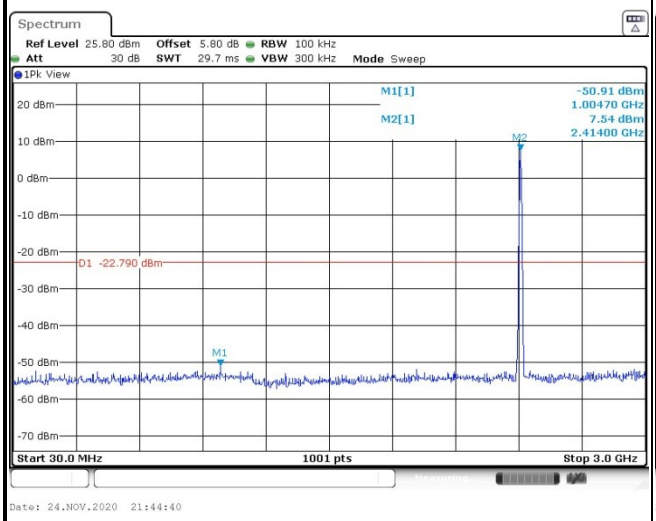
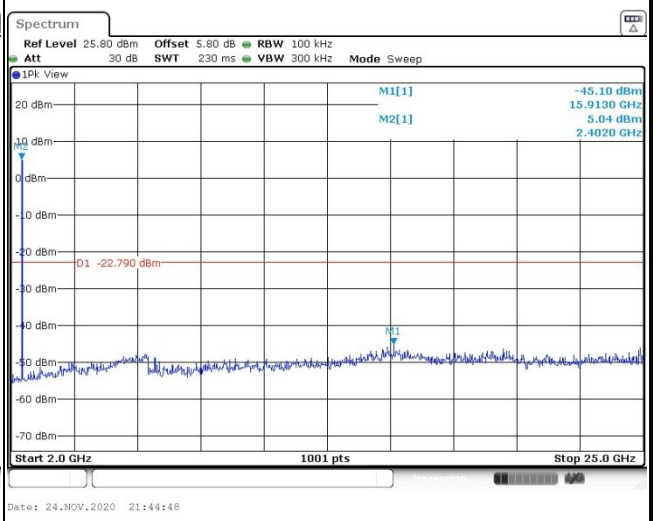
Spurious Emission 30MHz~3GHz	Spurious Emission 2GHz~25GHz
	

Test Mode :	802.11b	Test Channel :	11

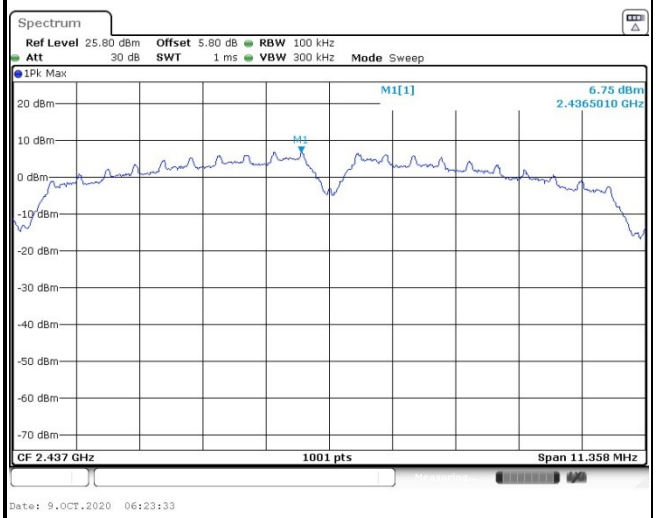
100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

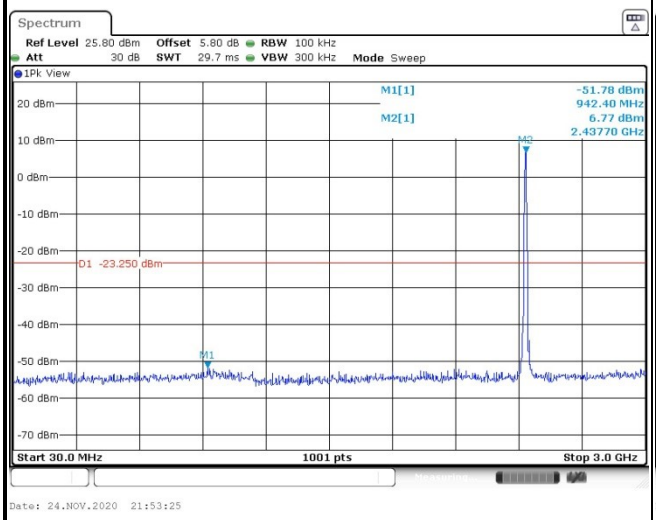
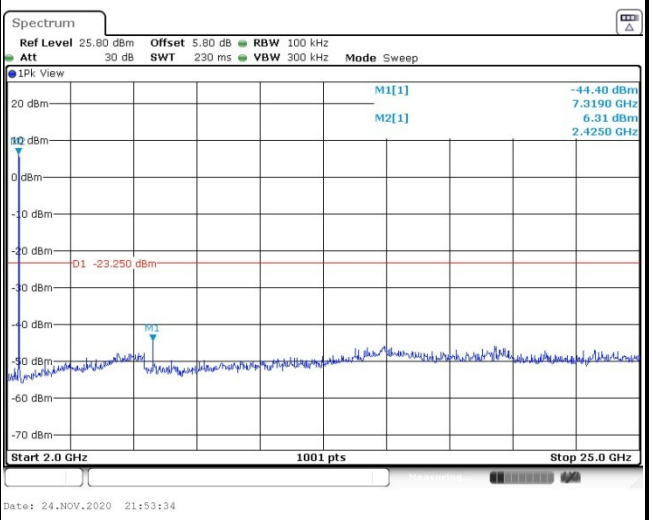
Number of TX = 2, Ant. 2 (Measured)

Test Mode :	802.11b	Test Channel :	01

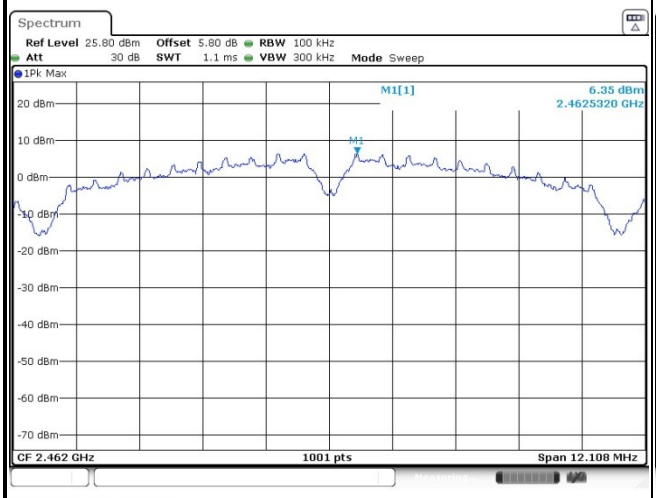
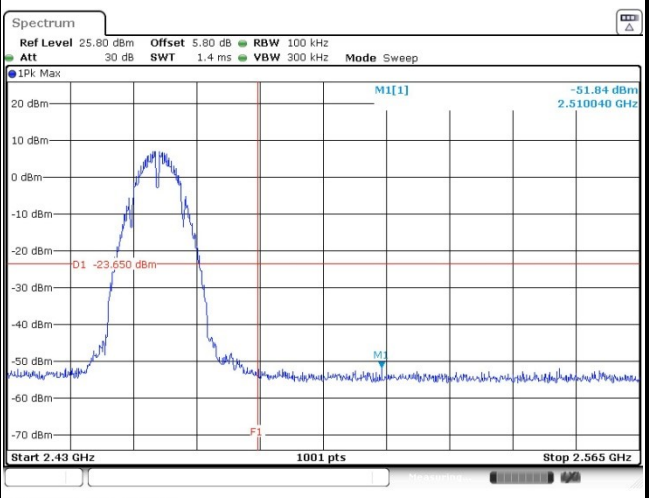
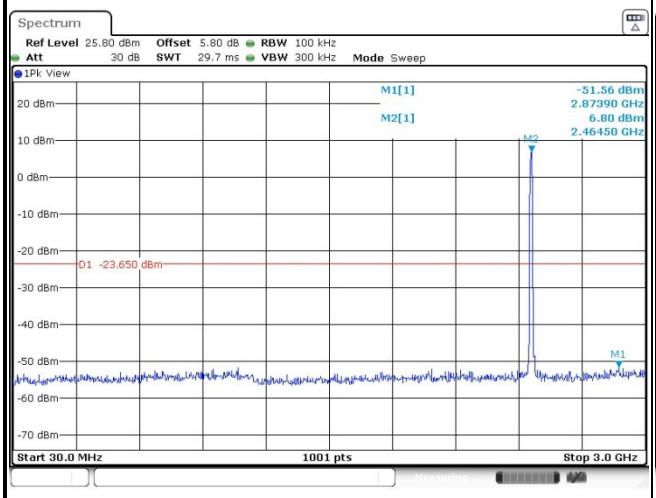
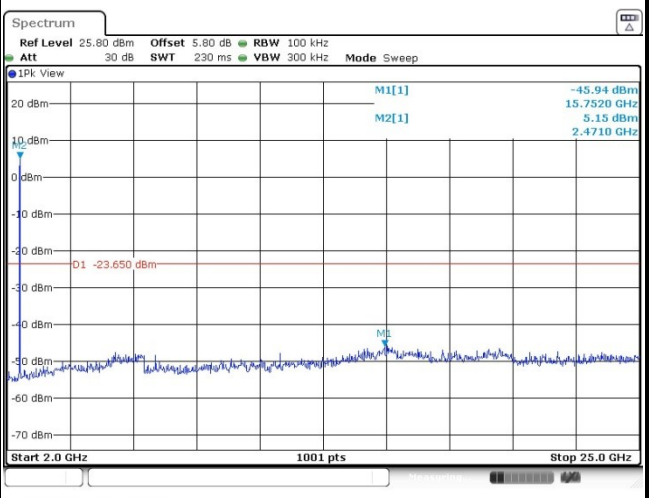
100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

Test Mode :	802.11b	Test Channel :	06

100kHz PSD reference Level	-
	-

Spurious Emission 30MHz~3GHz	Spurious Emission 2GHz~25GHz
	

Test Mode :	802.11b	Test Channel :	11

100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

3.5 Radiated Band Edges and Spurious Emission Measurement

3.5.1 Limit of Radiated band edge and Spurious Emission Measurement

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the limits as below.

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

3.5.2 Measuring Instruments

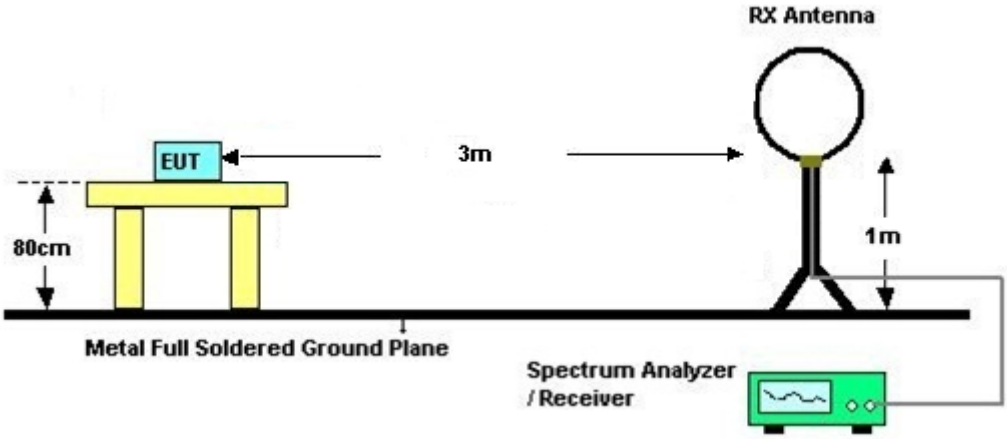
The measuring equipment is listed in the section 4 of this test report.

3.5.3 Test Procedures

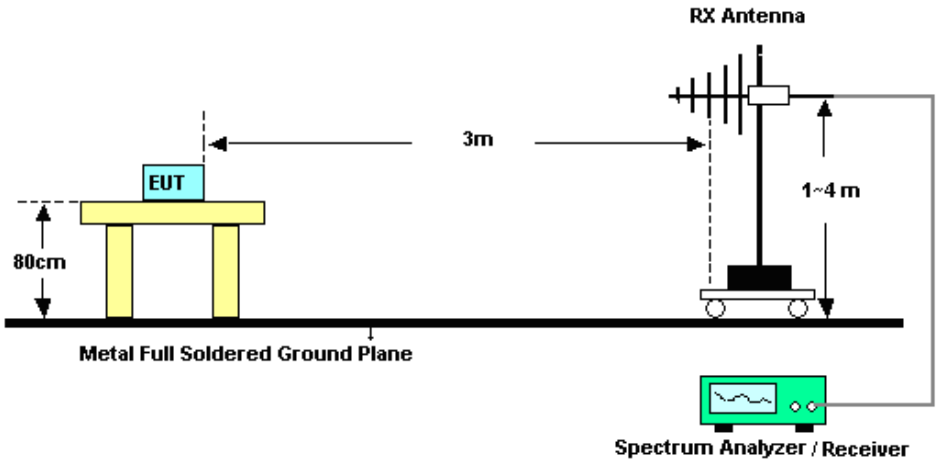
1. The testing follows ANSI C63.10-2013 clause 11.11 & 11.12
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. 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.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
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.
8. Use the following spectrum analyzer settings:
   (1) Span shall wide enough to fully capture the emission being measured;
   (2) Set RBW=100 kHz for f < 1 GHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
   (3) Set RBW = 1 MHz, VBW= 3MHz for f ≥ 1 GHz for peak measurement.
   For average measurement:
   - 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.

3.5.4 Test Setup

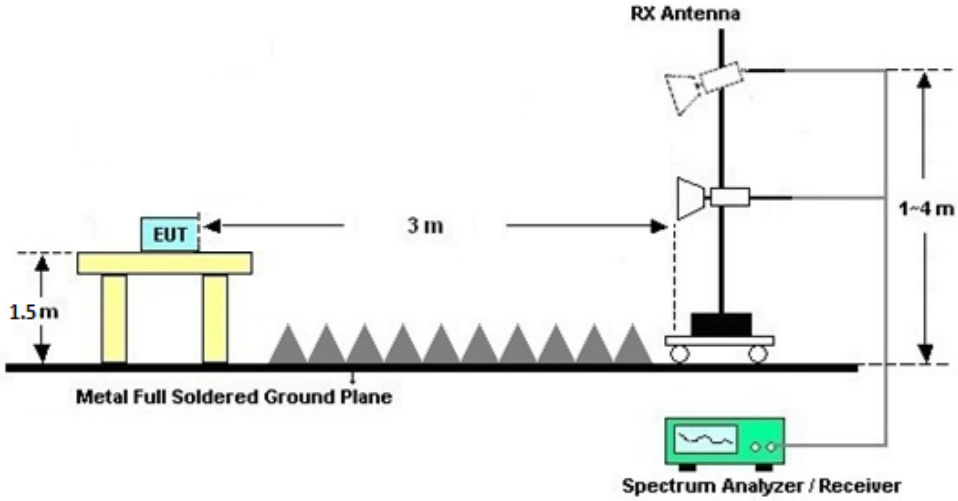
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

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.

3.5.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C.

3.5.7 Duty Cycle

Please refer to Appendix D.

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

Please refer to Appendix C.

3.6 AC Conducted Emission Measurement

3.6.1 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.

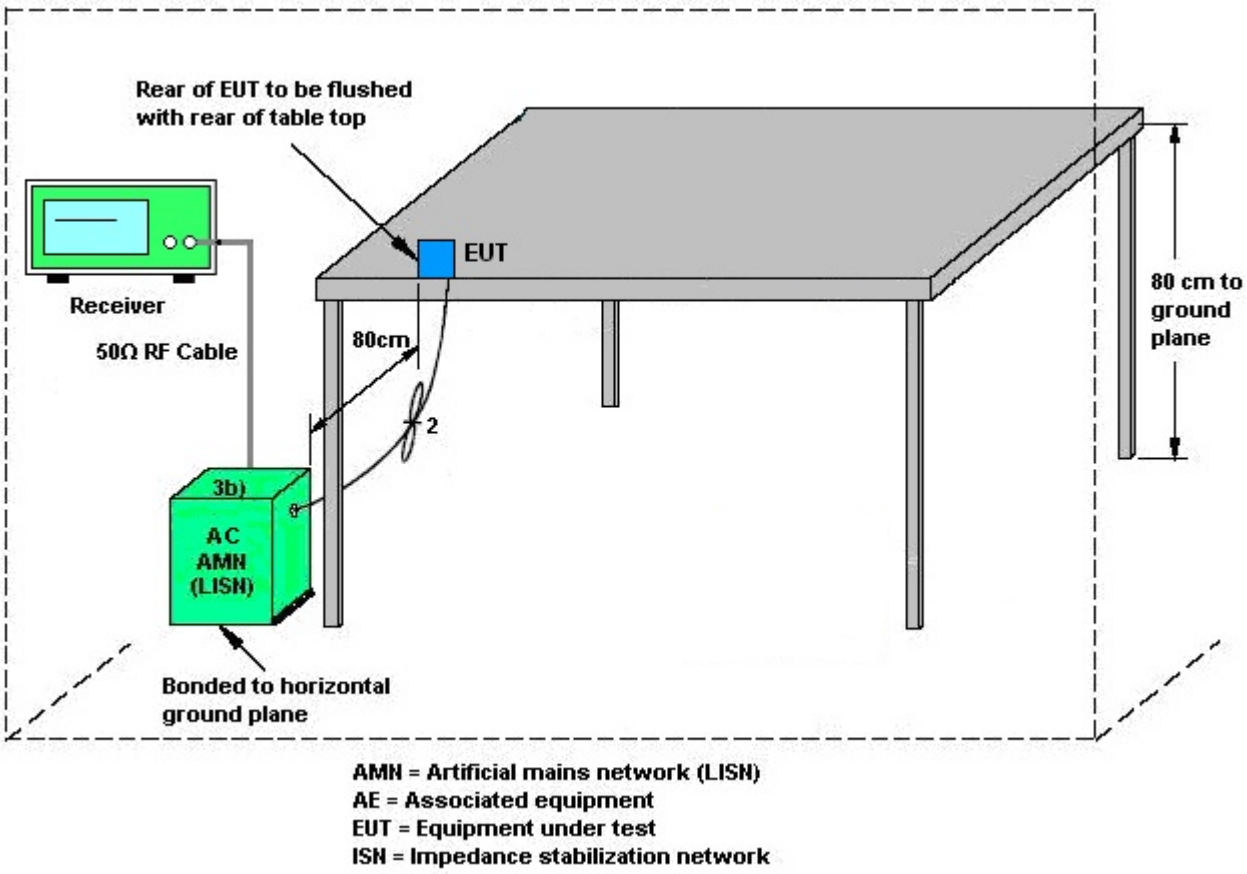
3.6.2 Measuring Instruments

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

3.6.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it 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 (IF bandwidth = 9kHz) with Maximum Hold Mode.

3.6.4 Test Setup



AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

3.6.5 Test Result of AC Conducted Emission

Please refer to Appendix B.

3.7 Antenna Requirements

3.7.1 Standard Applicable

If directional gain of transmitting Antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. The use of a permanently attached Antenna or of an Antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the rule.

3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.7.3 Antenna Gain

<CDD Modes >

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows.

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

Array Gain = 10 log(N_{ANT}/N_{SS}=1) dB.

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$.

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

The EUT supports CDD mode.

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

For PSD, the directional gain calculation is following F)2)f)ii) of KDB 662911 D01 v02r01.

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

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

	Ant. 1 (dBi)	Ant. 2 (dBi)	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
2.4 GHz	0.50	2.55	2.55	4.60	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	101040	10Hz~40GHz	Nov. 02, 2019	Oct. 09, 2020~ Nov. 24, 2020	Nov. 01, 2020	Conducted (TH01-KS)
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Nov. 01, 2020		Oct. 31, 2021	Conducted (TH01-KS)
Pulse Power Senor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 15, 2020	Oct. 09, 2020~ Nov. 24, 2020	Jan. 14, 2021	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 08, 2020	Oct. 09, 2020~ Nov. 24, 2020	Jan. 07, 2021	Conducted (TH01-KS)
EMI Test Receiver	Keysight	N9038A	MY56400004	3Hz~8.5GHz;Max 30dBm	Oct. 18, 2019	Oct. 05, 2020	Oct. 17, 2020	Radiation (03CH05-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz-44G,MAX 30dB	Apr.15, 2020	Oct. 05, 2020	Apr. 14, 2021	Radiation (03CH05-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Nov. 10, 2019	Oct. 05, 2020	Nov. 09, 2020	Radiation (03CH05-KS)
Bilog Antenna	TeseQ	CBL6111D	49922	30MHz-1GHz	May 30, 2020	Oct. 05, 2020	May 29, 2021	Radiation (03CH05-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00218652	1GHz~18GHz	Apr. 26, 2020	Oct. 05, 2020	Apr. 25, 2021	Radiation (03CH05-KS)
SHF-EHF Horn	Com-power	AH-840	101115	18GHz~40GHz	Nov. 10, 2019	Oct. 05, 2020	Nov. 09, 2020	Radiation (03CH05-KS)
Amplifier	SONOMA	310N	187289	9KHz-1GHz	Apr. 14, 2020	Oct. 05, 2020	Apr. 13, 2021	Radiation (03CH05-KS)
Amplifier	MITEQ	EM18G40GGA	060728	18~40GHz	Jan. 08, 2020	Oct. 05, 2020	Jan. 07, 2021	Radiation (03CH05-KS)
high gain Amplifier	MITEQ	AMF-7D-00101800-30-10P	2012228	1Ghz-18Ghz	Oct. 18, 2019	Oct. 05, 2020	Oct. 17, 2020	Radiation (03CH05-KS)
Amplifier	Keysight	83017A	MY53270316	500MHz~26.5GHz	Oct. 18, 2019	Oct. 05, 2020	Oct. 17, 2020	Radiation (03CH05-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Oct. 05, 2020	NCR	Radiation (03CH05-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Oct. 05, 2020	NCR	Radiation (03CH05-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Oct. 05, 2020	NCR	Radiation (03CH05-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	Apr. 14, 2020	Oct. 16, 2020	Apr. 13, 2021	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060103	9kHz~30MHz	Oct. 18, 2019	Oct. 16, 2020	Oct. 17, 2020	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060105	9kHz~30MHz	Oct. 28, 2019	Oct. 16, 2020	Oct. 27, 2020	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 18, 2019	Oct. 16, 2020	Oct. 17, 2020	Conduction (CO01-KS)

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 Emission Measurement (150kHz ~ 30MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.9dB**

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

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

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))	**5.0dB**

Appendix A. Conducted Test Results

Report Number : FR082812A

Test Engineer:	Albert Shi	Temperature:	0-40	°C
Test Date:	2020/10/9~2020/11/24	Relative Humidity:	51~54	%

Report Number : FR082812A

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

2.4GHz Band										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)		6dB BW (MHz)		6dB BW Limit (MHz)	Pass/Fail
					Ant 1	Ant 2	Ant 1	Ant 2		
11b	1Mbps	2	1	2412	12.89	13.14	8.05	8.05	0.50	Pass
11b	1Mbps	2	6	2437	13.09	13.04	8.07	7.57	0.50	Pass
11b	1Mbps	2	11	2462	12.99	12.99	8.07	8.07	0.50	Pass

Report Number : FR082812A

TEST RESULTS DATA
Peak Output Power

2.4GHz Band																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	
11b	1Mbps	2	1	2412	15.91	16.05	18.99	30.00		1.99		20.98		36.00		Pass
11b	1Mbps	2	6	2437	15.78	15.95	18.88	30.00		1.99		20.87		36.00		Pass
11b	1Mbps	2	11	2462	16.14	15.82	18.99	30.00		1.99		20.98		36.00		Pass

Note: Measured power (dBm) has offset with cable loss.

Report Number : FR082812A

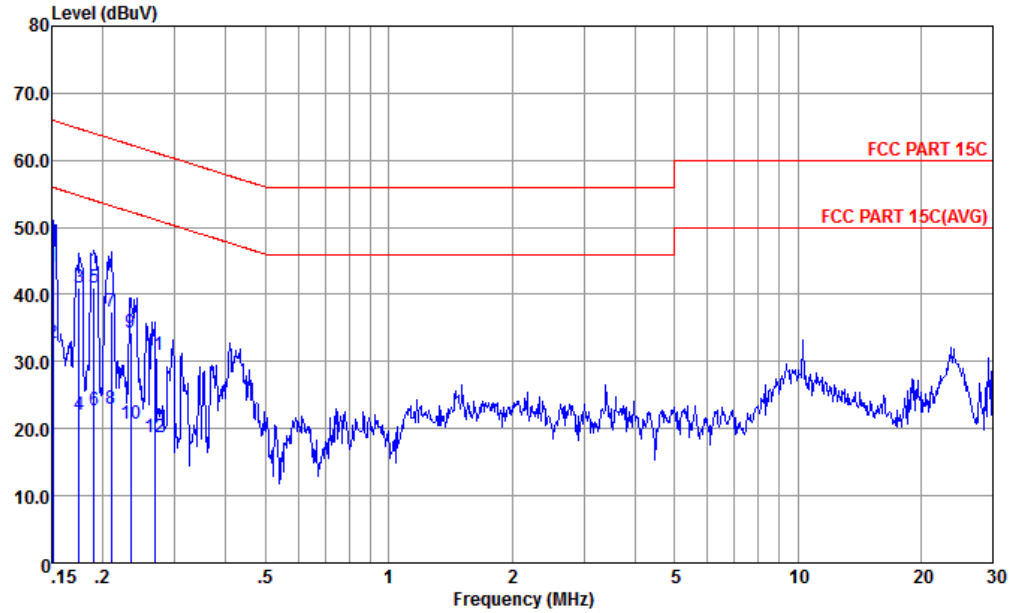
TEST RESULTS DATA
Peak Power Spectral Density

2.4GHz Band												
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm/3kHz)			DG (dBi)		Peak PSD Limit (dBm/3kHz)		Pass/Fail
					Ant 1	Ant 2	Worse + 3.01	Ant 1	Ant 2	Ant 1	Ant 2	
11b	1Mbps	2	1	2412	-8.93	-8.18	-5.17	1.99		8.00		Pass
11b	1Mbps	2	6	2437	-8.53	-8.44	-5.43	1.99		8.00		Pass
11b	1Mbps	2	11	2462	-7.54	-7.81	-4.53	1.99		8.00		Pass

Measured power density (dBm) has offset with cable loss.

Appendix B. AC Conducted Emission Test Results

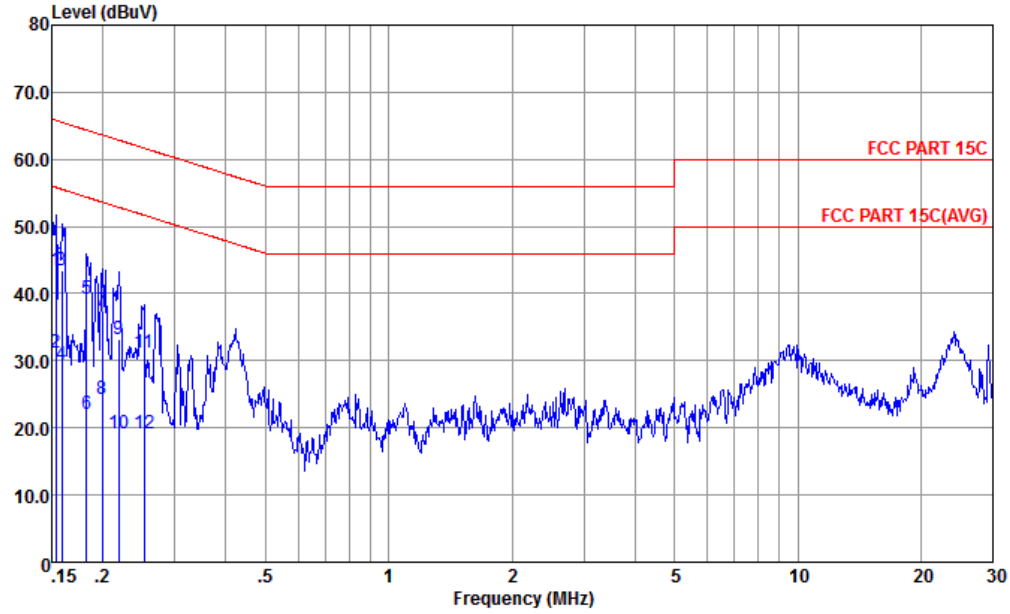
Test Engineer :	Amos Zhang	**Temperature :**	25.3~26.2℃
		Relative Humidity :	38~40%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line



Site : CO01-KS
Condition : FCC PART 15C LISN-L-191028-CN02 LINE

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	*	0.151	44.15	-21.81	65.96	33.60	0.07	10.48	QP
2		0.151	32.85	-23.11	55.96	22.30	0.07	10.48	Average
3		0.175	41.00	-23.72	64.72	30.50	0.08	10.42	QP
4		0.175	22.10	-32.62	54.72	11.60	0.08	10.42	Average
5		0.190	41.07	-22.95	64.02	30.61	0.08	10.38	QP
6		0.190	22.67	-31.35	54.02	12.21	0.08	10.38	Average
7		0.209	37.35	-25.88	63.23	26.90	0.09	10.36	QP
8		0.209	22.95	-30.28	53.23	12.50	0.09	10.36	Average
9		0.234	34.34	-27.96	62.30	23.91	0.09	10.34	QP
10		0.234	20.74	-31.56	52.30	10.31	0.09	10.34	Average
11		0.267	31.02	-30.18	61.20	20.60	0.10	10.32	QP
12		0.267	18.62	-32.58	51.20	8.20	0.10	10.32	Average

Test Engineer :	Amos Zhang	**Temperature :**	25.3~26.2℃
		Relative Humidity :	38~40%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral



Site : CO01-KS
Condition : FCC PART 15C LISN-N-191028-CN02 NEUTRAL

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.153	43.42	-22.40	65.82	32.80	0.15	10.47	QP
2		0.153	31.22	-24.60	55.82	20.60	0.15	10.47	Average
3	*	0.159	43.51	-22.01	65.52	32.90	0.15	10.46	QP
4		0.159	29.51	-26.01	55.52	18.90	0.15	10.46	Average
5		0.182	39.16	-25.21	64.37	28.60	0.16	10.40	QP
6		0.182	22.06	-32.31	54.37	11.50	0.16	10.40	Average
7		0.200	37.43	-26.19	63.62	26.90	0.17	10.36	QP
8		0.200	24.33	-29.29	53.62	13.80	0.17	10.36	Average
9		0.219	33.13	-29.75	62.88	22.61	0.17	10.35	QP
10		0.219	19.13	-33.75	52.88	8.61	0.17	10.35	Average
11		0.252	31.11	-30.58	61.69	20.60	0.18	10.33	QP
12		0.252	19.11	-32.58	51.69	8.60	0.18	10.33	Average

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

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	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)
802.11b CH 01 2412MHz		2312.47	54.91	-19.09	74	48.08	31.15	7.36	31.68	153	353	P	H
		2389.95	44.17	-9.83	54	37.12	31.2	7.5	31.65	153	353	A	H
	*	2414	107.53	-	-	100.34	31.31	7.53	31.65	153	353	P	H
	*	2414	104.56	-	-	97.37	31.31	7.53	31.65	153	353	A	H
		2352.38	55.65	-18.35	74	48.7	31.18	7.44	31.67	100	86	P	V
		2389.95	44.12	-9.88	54	37.07	31.2	7.5	31.65	100	86	A	V
	*	2414	106.89	-	-	99.7	31.31	7.53	31.65	100	86	P	V
	*	2414	103.87	-	-	96.68	31.31	7.53	31.65	100	86	A	V
802.11b CH 06 2437MHz		2371.1	55.31	-18.69	74	48.31	31.19	7.47	31.66	171	356	P	H
		2389.95	43.93	-10.07	54	36.88	31.2	7.5	31.65	171	356	A	H
		2500	56.76	-17.24	74	48.76	31.89	7.67	31.56	171	356	P	H
		2483.5	44.9	-9.1	54	37.07	31.77	7.64	31.58	171	356	A	H
	*	2436	108.41	-	-	101.03	31.43	7.56	31.61	171	356	P	H
	*	2436	105.16	-	-	97.78	31.43	7.56	31.61	171	356	A	H
		2320.53	55.46	-18.54	74	48.59	31.16	7.38	31.67	156	83	P	V
		2389.56	43.86	-10.14	54	36.81	31.2	7.5	31.65	156	83	A	V
		2496.76	55.63	-18.37	74	47.63	31.89	7.67	31.56	156	83	P	V
		2483.62	44.88	-9.12	54	37.05	31.77	7.64	31.58	156	83	A	V
	*	2436	108.05	-	-	100.67	31.43	7.56	31.61	156	83	P	V
	*	2436	104.93	-	-	97.55	31.43	7.56	31.61	156	83	A	V

802.11b CH 11 2462MHz		2491.6	56.38	-17.62	74	48.38	31.89	7.67	31.56	167	360	P	H
		2483.56	45.09	-8.91	54	37.26	31.77	7.64	31.58	167	360	A	H
	*	2464	107.39	-	-	99.72	31.66	7.61	31.6	167	360	P	H
	*	2464	104.3	-	-	96.63	31.66	7.61	31.6	167	360	A	H
		2494.72	55.99	-18.01	74	47.99	31.89	7.67	31.56	142	82	P	V
		2483.8	44.93	-9.07	54	37.1	31.77	7.64	31.58	142	82	A	V
	*	2464	106.36	-	-	98.69	31.66	7.61	31.6	142	82	P	V
	*	2464	103.38	-	-	95.71	31.66	7.61	31.6	142	82	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Harmonic @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 01 2412MHz		4824	39.87	-34.13	74	55.39	33.72	10.8	60.04	300	0	P	H
		4824	39.45	-34.55	74	54.97	33.72	10.8	60.04	300	360	P	V
802.11b CH 06 2437MHz		4872	40.63	-33.37	74	56.02	33.77	10.87	60.03	300	0	P	H
		7308	43.62	-30.38	74	54.89	35.86	13.38	60.51	300	0	P	H
		4872	40.58	-33.42	74	55.97	33.77	10.87	60.03	300	360	P	V
		7308	43.96	-30.04	74	55.23	35.86	13.38	60.51	300	360	P	V
802.11b CH 11 2462MHz		4926	41.27	-32.73	74	56.53	33.82	10.94	60.02	300	0	P	H
		7386	43.79	-30.21	74	54.85	36.01	13.46	60.53	300	0	P	H
		4926	41.22	-32.78	74	56.48	33.82	10.94	60.02	300	360	P	V
		7386	43.03	-30.97	74	54.09	36.01	13.46	60.53	300	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11g (Band Edge @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz		2389.82	55.97	-18.03	74	48.92	31.2	7.5	31.65	151	353	P	H
		2389.95	44.88	-9.12	54	37.83	31.2	7.5	31.65	151	353	A	H
	*	2418	106.47	-	-	99.26	31.31	7.53	31.63	151	353	P	H
	*	2418	98.79	-	-	91.58	31.31	7.53	31.63	151	353	A	H
		2389.69	56.41	-17.59	74	49.36	31.2	7.5	31.65	173	88	P	V
		2389.3	45.16	-8.84	54	38.11	31.2	7.5	31.65	173	88	A	V
	*	2418	106.89	-	-	99.68	31.31	7.53	31.63	173	88	P	V
	*	2418	99.36	-	-	92.15	31.31	7.53	31.63	173	88	A	V
802.11g CH 06 2437MHz		2388.78	54.81	-19.19	74	47.76	31.2	7.5	31.65	146	354	P	H
		2389.69	43.81	-10.19	54	36.76	31.2	7.5	31.65	146	354	A	H
		2489.26	56.19	-17.81	74	48.21	31.89	7.67	31.58	146	354	P	H
		2483.68	44.8	-9.2	54	36.97	31.77	7.64	31.58	146	354	A	H
	*	2432	107.21	-	-	99.85	31.43	7.56	31.63	146	354	P	H
	*	2432	99.18	-	-	91.82	31.43	7.56	31.63	146	354	A	H
		2330.28	54.98	-19.02	74	48.11	31.16	7.38	31.67	100	89	P	V
		2389.95	43.85	-10.15	54	36.8	31.2	7.5	31.65	100	89	A	V
		2499.76	56.43	-17.57	74	48.43	31.89	7.67	31.56	100	89	P	V
		2497	44.8	-9.2	54	36.8	31.89	7.67	31.56	100	89	A	V
	*	2436	108.21	-	-	100.83	31.43	7.56	31.61	100	89	P	V
	*	2434	100.22	-	-	92.86	31.43	7.56	31.63	100	89	A	V

802.11g CH 11 2462MHz		2483.68	56.6	-17.4	74	48.77	31.77	7.64	31.58	168	360	P	H
		2483.5	46.2	-7.8	54	38.37	31.77	7.64	31.58	168	360	A	H
	*	2462	106.61	-	-	98.94	31.66	7.61	31.6	168	360	P	H
	*	2464	98.34	-	-	90.67	31.66	7.61	31.6	168	360	A	H
		2484.1	57.81	-16.19	74	49.98	31.77	7.64	31.58	150	85	P	V
		2483.5	46.59	-7.41	54	38.76	31.77	7.64	31.58	150	85	A	V
	*	2464	107.35	-	-	99.68	31.66	7.61	31.6	150	85	P	V
	*	2464	99.5	-	-	91.83	31.66	7.61	31.6	150	85	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11g (Harmonic @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz		4824	38.99	-35.01	74	54.51	33.72	10.8	60.04	300	0	P	H
		4824	39.14	-34.86	74	54.66	33.72	10.8	60.04	300	360	P	V
802.11g CH 06 2437MHz		4872	40.4	-33.6	74	55.79	33.77	10.87	60.03	300	0	P	H
		7308	42.07	-31.93	74	53.34	35.86	13.38	60.51	300	0	P	H
		4872	39.93	-34.07	74	55.32	33.77	10.87	60.03	300	360	P	V
		7308	42.61	-31.39	74	53.88	35.86	13.38	60.51	300	360	P	V
802.11g CH 11 2462MHz		4926	40.41	-33.59	74	55.67	33.82	10.94	60.02	300	0	P	H
		7386	42.5	-31.5	74	53.56	36.01	13.46	60.53	300	0	P	H
		4926	40.52	-33.48	74	55.78	33.82	10.94	60.02	300	360	P	V
		7386	42.51	-31.49	74	53.57	36.01	13.46	60.53	300	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

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

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		2389.3	60.48	-13.52	74	53.43	31.2	7.5	31.65	150	353	P	H
		2389.95	48.52	-5.48	54	41.47	31.2	7.5	31.65	150	353	A	H
802.11ax	*	2414	109.33	-	-	102.14	31.31	7.53	31.65	150	353	P	H
HE20 Full	*	2416	98.65	-	-	91.44	31.31	7.53	31.63	150	353	A	H
CH 01		2389.04	59.24	-14.76	74	52.19	31.2	7.5	31.65	100	84	P	V
2412MHz		2389.95	48.01	-5.99	54	40.96	31.2	7.5	31.65	100	84	A	V
	*	2418	109.17	-	-	101.96	31.31	7.53	31.63	100	84	P	V
	*	2416	98.47	-	-	91.26	31.31	7.53	31.63	100	84	A	V
		2483.86	58.83	-15.17	74	51	31.77	7.64	31.58	191	360	P	H
		2483.5	47.45	-6.55	54	39.62	31.77	7.64	31.58	191	360	A	H
8802.11ax	*	2466	108.52	-	-	100.85	31.66	7.61	31.6	191	360	P	H
HE20 Full	*	2464	98.29	-	-	90.62	31.66	7.61	31.6	191	360	A	H
CH 11		2483.74	58.11	-15.89	74	50.28	31.77	7.64	31.58	141	82	P	V
2462MHz		2483.5	46.97	-7.03	54	39.14	31.77	7.64	31.58	141	82	A	V
	*	2464	107.75	-	-	100.08	31.66	7.61	31.6	141	82	P	V
	*	2464	97.56	-	-	89.89	31.66	7.61	31.6	141	82	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11 ax HE40 Full (Band Edge @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		2389.56	63.96	-10.04	74	56.91	31.2	7.5	31.65	195	355	P	H
		2389.95	53.07	-0.93	54	46.02	31.2	7.5	31.65	195	355	A	H
		2484.94	56.72	-17.28	74	48.89	31.77	7.64	31.58	195	355	P	H
		2483.5	45.08	-8.92	54	37.25	31.77	7.64	31.58	195	355	A	H
802.11ax	*	2420	107.61	-	-	100.25	31.43	7.56	31.63	195	355	P	H
HE40 Full	*	2424	96.65	-	-	89.29	31.43	7.56	31.63	195	355	A	H
CH 03		2389.82	62.67	-11.33	74	54.62	32.2	7.5	31.65	100	341	P	V
2422MHz		2389.95	51.68	-2.32	54	43.63	32.2	7.5	31.65	100	341	A	V
		2499.7	56.21	-17.79	74	48	32.1	7.67	31.56	100	341	P	V
		2483.5	45.03	-8.97	54	36.85	32.12	7.64	31.58	100	341	A	V
	*	2434	107.62	-	-	99.52	32.17	7.56	31.63	100	341	P	V
	*	2428	97.02	-	-	88.92	32.17	7.56	31.63	100	341	A	V
		2361.35	55.11	-18.89	74	48.15	31.18	7.44	31.66	166	360	P	H
		2389.82	44.04	-9.96	54	36.99	31.2	7.5	31.65	166	360	A	H
		2484.58	65.64	-8.36	74	57.81	31.77	7.64	31.58	166	360	P	H
		2483.5	53.8	-0.2	54	45.97	31.77	7.64	31.58	166	360	A	H
802.11ax	*	2462	105.57	-	-	97.9	31.66	7.61	31.6	166	360	P	H
HE40 Full	*	2464	95.39	-	-	87.72	31.66	7.61	31.6	166	360	A	H
CH 09		2388.39	55.79	-18.21	74	47.74	32.2	7.5	31.65	117	343	P	V
2452MHz		2389.82	44.69	-9.31	54	36.64	32.2	7.5	31.65	117	343	A	V
		2485	66.06	-7.94	74	57.88	32.12	7.64	31.58	117	343	P	V
		2483.5	53.04	-0.96	54	44.86	32.12	7.64	31.58	117	343	A	V
	*	2462	106.32	-	-	98.18	32.13	7.61	31.6	117	343	P	V
	*	2462	95.62	-	-	87.48	32.13	7.61	31.6	117	343	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

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

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		2389.3	60.82	-13.18	74	52.77	32.2	7.5	31.65	143	93	P	H
802.11ax		2389.17	44.86	-9.14	54	36.81	32.2	7.5	31.65	143	93	A	H
HE20		2408	109.84	-	-	101.78	32.18	7.53	31.65	143	93	P	H
Partial		2410	100.24	-	-	92.18	32.18	7.53	31.65	143	93	A	H
106/53		2389.04	60.41	-13.59	74	52.36	32.2	7.5	31.65	100	36	P	V
CH 01		2389.82	45.03	-8.97	54	36.98	32.2	7.5	31.65	100	36	A	V
2412MHz		2408	110.51	-	-	102.45	32.18	7.53	31.65	100	36	P	V
		2410	101.57	-	-	93.51	32.18	7.53	31.65	100	36	A	V
		2483.56	62.99	-11.01	74	54.81	32.12	7.64	31.58	299	93	P	H
802.11ax		2483.86	45.25	-8.75	54	37.07	32.12	7.64	31.58	299	93	A	H
HE20		2466	109.32	-	-	101.18	32.13	7.61	31.6	299	93	P	H
Partial		2466	98.88	-	-	90.74	32.13	7.61	31.6	299	93	A	H
106/54		2483.74	61.55	-12.45	74	53.37	32.12	7.64	31.58	100	37	P	V
CH 11		2483.56	45.33	-8.67	54	37.15	32.12	7.64	31.58	100	37	A	V
2462MHz		2466	111.14	-	-	103	32.13	7.61	31.6	100	37	P	V
		2464	101.41	-	-	93.27	32.13	7.61	31.6	100	37	A	V

2.4GHz 2400~2483.5MHz

WIFI 802.11ax HE40 Partial 242 (Band Edge @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		2388.39	69.89	-4.11	74	61.84	32.2	7.5	31.65	113	96	P	H
		2387.87	49.03	-4.97	54	40.98	32.2	7.5	31.65	113	96	A	H
		2484.34	56.26	-17.74	74	48.08	32.12	7.64	31.58	113	96	P	H
802.11ax		2484.88	44.78	-9.22	54	36.6	32.12	7.64	31.58	113	96	A	H
HE40		2420	108.38	-	-	100.28	32.17	7.56	31.63	113	96	P	H
Partial		2420	98.2	-	-	90.1	32.17	7.56	31.63	113	96	A	H
242/61		2387.09	72.38	-1.62	74	64.33	32.2	7.5	31.65	100	37	P	V
CH 03		2387.35	50.25	-3.75	54	42.2	32.2	7.5	31.65	100	37	A	V
2422MHz		2488.12	58.09	-15.91	74	49.9	32.1	7.67	31.58	100	37	P	V
		2484.22	44.78	-9.22	54	36.6	32.12	7.64	31.58	100	37	A	V
		2418	110.51	-	-	102.43	32.18	7.53	31.63	100	37	P	V
		2420	98.93	-	-	90.83	32.17	7.56	31.63	100	37	A	V
		2334.57	55.75	-18.25	74	47.95	32.06	7.41	31.67	109	94	P	H
		2388.26	44.51	-9.49	54	36.46	32.2	7.5	31.65	109	94	A	H
		2487.1	72.37	-1.63	74	64.19	32.12	7.64	31.58	109	94	P	H
802.11ax		2486.08	49.43	-4.57	54	41.25	32.12	7.64	31.58	109	94	A	H
HE40		2466	107.84	-	-	99.7	32.13	7.61	31.6	109	94	P	H
Partial		2464	97.51	-	-	89.37	32.13	7.61	31.6	109	94	A	H
242/62		2386.96	56.24	-17.76	74	48.19	32.2	7.5	31.65	100	38	P	V
CH 09		2388.39	44.53	-9.47	54	36.48	32.2	7.5	31.65	100	38	A	V
2452MHz		2487.34	71.42	-2.58	74	63.24	32.12	7.64	31.58	100	38	P	V
		2485.84	49.48	-4.52	54	41.3	32.12	7.64	31.58	100	38	A	V
		2464	109.33	-	-	101.19	32.13	7.61	31.6	100	38	P	V
		2464	99.04	-	-	90.9	32.13	7.61	31.6	100	38	A	V

Emission below 1GHz

2.4GHz WIFI 802.11ax HE40 (LF)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11ax HE40 LF		30	19.49	-20.51	40	25.35	25.1	1.24	32.2	-	-	P	H
		65.89	14.64	-25.36	40	32.67	12.26	1.83	32.12	-	-	P	H
		157.07	19.16	-24.34	43.5	31.75	16.68	2.83	32.1	-	-	P	H
		186.17	17.47	-26.03	43.5	31.57	14.92	3.08	32.1	-	-	P	H
		853.53	27.16	-18.84	46	23.7	29.28	6.57	32.39	100	0	P	H
		991.27	28.51	-25.49	54	22.89	30.67	7.07	32.12	-	-	P	H
		54.25	20.69	-19.31	40	37.83	13.4	1.66	32.2	-	-	P	V
		77.53	26.95	-13.05	40	43.85	13.3	2	32.2	100	0	P	V
		152.22	25.93	-17.57	43.5	38.27	16.98	2.78	32.1	-	-	P	V
		165.8	26.26	-17.24	43.5	39.43	16.02	2.91	32.1	-	-	P	V
		903.97	27.76	-18.24	46	23.96	29.25	6.75	32.2	-	-	P	V
		973.81	28.37	-25.63	54	22.7	30.81	7.01	32.15	-	-	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 **over limit** 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	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	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. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

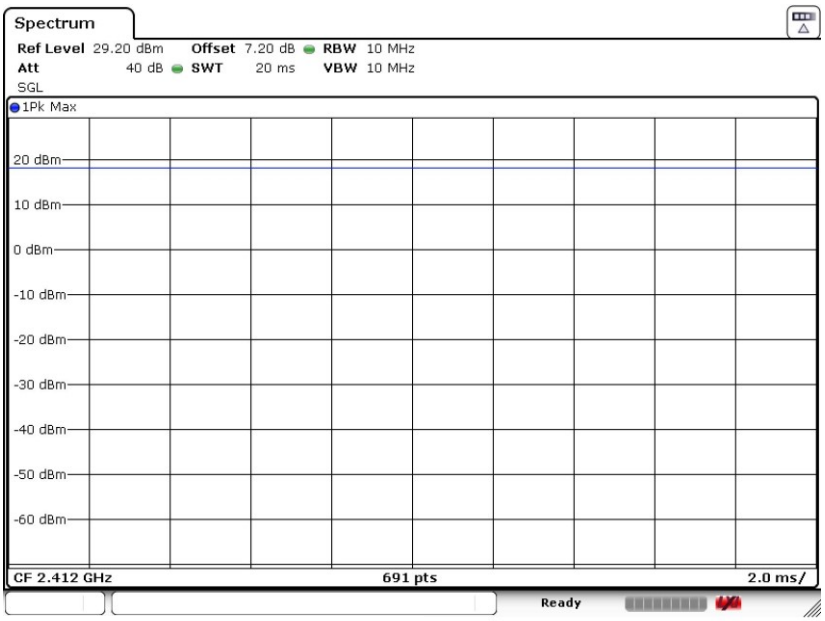
= -10.46(dB)

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

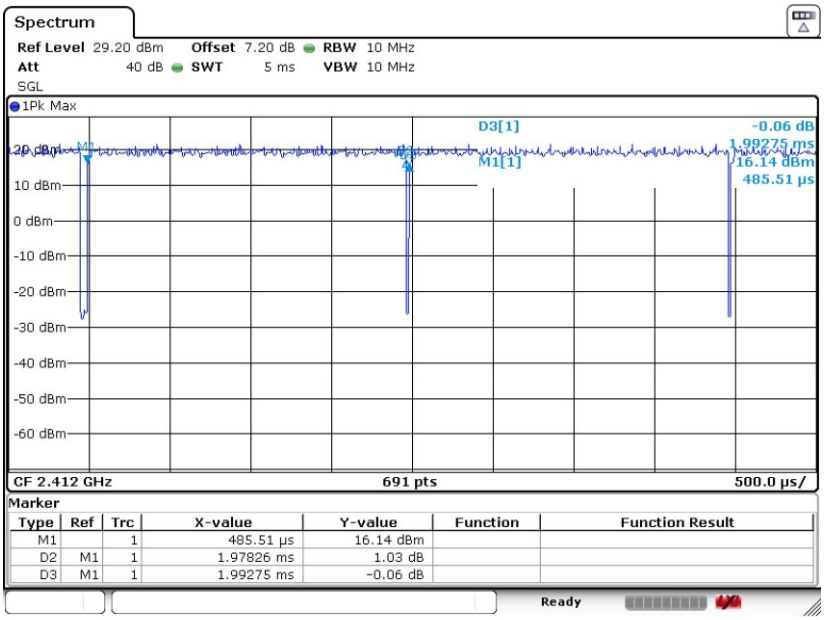
Appendix D. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
1+2	802.11b	100	-	-	10Hz
1+2	802.11g	99.27	-	-	10Hz
1+2	802.11ax HE20	100	-	-	10Hz
1+2	802.11ax HE40	100	-	-	10Hz

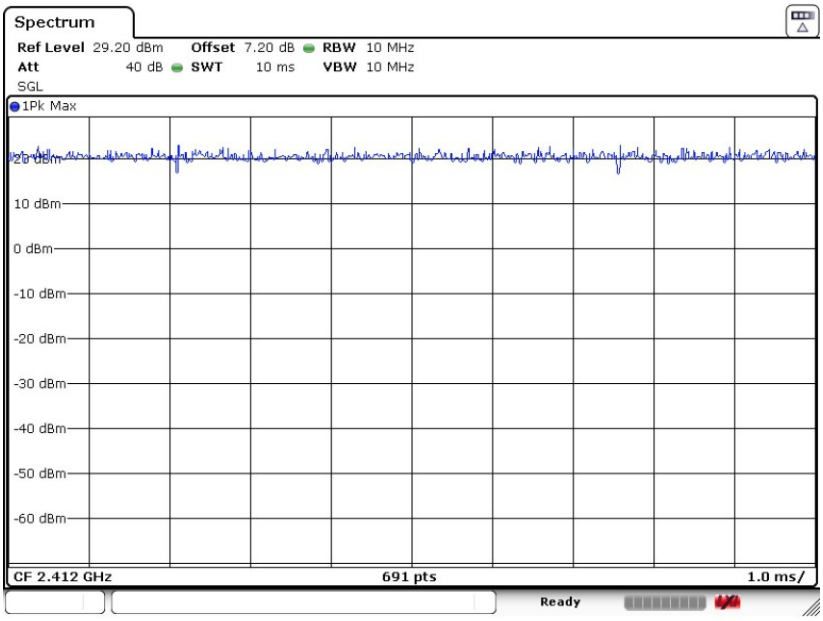
802.11b



802.11g



802.11ax HE20



802.11ax HE40