FCC RF Test Report

APPLICANT	:	Xiaomi Communications Co., Ltd.
EQUIPMENT	:	Mobile Phone
BRAND NAME	:	Redmi
MODEL NAME	:	2201117TG
FCC ID	:	2AFZZ117TG
STANDARD	:	FCC Part 15 Subpart E §15.407
CLASSIFICATION	:	(NII) Unlicensed National Information Infrastructure
TEST DATE(S)	:	Nov. 01, 2021 ~ Nov. 16, 2021

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.

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

Alex Wang

Approved by: Alex Wang / Manager

ACCREDITED
Cert #5145.02

Sporton International (Kunshan) Inc.
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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR1O2302E	Rev. 01	Initial issue of report	Nov. 23, 2021

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.403(i)	6dB, 26dB and 99% Occupied Bandwidth	> 500kHz	Pass	-
3.2	15.407(a)	Maximum Conducted Output Power	≤ 30 dBm	Pass	-
3.3	15.407(a)	Power Spectral Density	≤ 30 dBm/500kHz	Pass	-
3.4	15.407(b)	Unwanted Emissions	15.407(b)(4)(i) &15.209(a)	Pass	Under limit 3.47 dB at 7740.740 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 13.18 dB at 11.498 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

Xiaomi Communications Co., Ltd.
#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085

1.2 Manufacturer

Xiaomi Communications Co., Ltd.
#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Phone
Brand Name	Redmi
Model Name	2201117TG
FCC ID	2AFZZ117TG
IMEI Code	Conducted: NA Conduction: 861312050047122/861312050047130 Radiation: 861312050047544/861312050051744
HW Version	P1.1
SW Version	MIUI12.5
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Channel Frequency Range	5745 MHz ~ 5825 MHz
Maximum Output Power	**<5745 MHz ~ 5825 MHz>** 802.11a : 14.15 dBm / 0.0260 W 802.11n HT20 : 13.95 dBm / 0.0248 W 802.11n HT40 : 14.39 dBm / 0.0275 W 802.11ac VHT20: 13.94 dBm / 0.0248 W 802.11ac VHT40: 14.48 dBm / 0.0281 W 802.11ac VHT80: 14.24 dBm / 0.0265 W
99% Occupied Bandwidth	802.11a : 17.38 MHz 802.11n HT20 : 18.53 MHz 802.11ac VHT40 : 36.26 MHz 802.11ac VHT80 : 74.93 MHz
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Antenna Type / Gain	PIFA Antenna with gain -1.46 dBi

Note: For 802.11n HT20 / ac VHT20 and 802.11n HT40 / ac VHT40 mode, the whole testing have assessed only 802.11n HT20/VHT40 by referring to their maximum conducted power.

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	Manufacturer	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 E
- FCC KDB 789033 D02 General UNII Test Procedures New Rules 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 (Z 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)
5725-5850 MHz U-NII-3	149	5745	157	5785
	151*	5755	159*	5795
	153	5765	161	5805
	155#	5775	165	5825

Note:

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

2.2 Test Mode

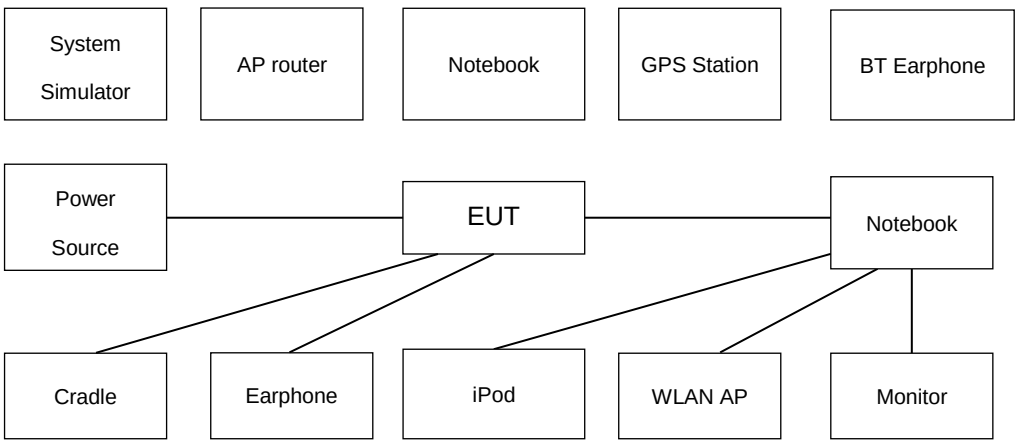
Final test modes are considering the modulation and worse data rates as below table.

Modulation	Data Rate
802.11a	6 Mbps
802.11n HT20	MCS0
802.11ac VHT40	MCS0
802.11ac VHT80	MCS0

AC Conducted Emission	Mode 1 : GSM 850 Idle + Bluetooth Link + WLAN Link(5G) + USB Cable 1(Charging from Adapter) + Earphone + Battery
Remark: For Radiated Test Cases, The tests were performance with Adapter, Earphone, USB Cable 1 and Sample 1	

Ch. #		U-NII-3 : 5725-5850 MHz			
		802.11a	802.11n HT20	802.11ac VHT40	802.11ac VHT80
L	Low	149	149	151	-
M	Middle	157	157	-	155
H	High	165	165	159	-

2.3 Connection Diagram of Test System



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.	LTE Base Station	Anritus	MT8821C	N/A	N/A	Unshielded,1.8m
2.	Bluetooth Earphone	Xiaomi	LYEJ02LM	N/A	N/A	N/A
3.	Notebook	Lenovo	G480	QDS-BRCM1050I	N/A	shielded cable DC O/P 1.8m , Unshielded AC I/P cable 1.8m
4.	WLAN AP	D-link	DIR-655	KA21R655B1	N/A	Unshielded,1.8m
5.	Earphone	MI	EM023	N/A	N/A	N/A
6.	SD Card	Kingston	8GB	N/A	N/A	N/A

2.5 EUT Operation Test Setup

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

For AC power line conducted emissions, the EUT was set to connect with the WLAN AP 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 + attenuator factor.

Following shows an offset computation example with cable loss 7.7 dB

Offset(dB) = RF cable loss(dB)

= 7.7 (dB)

3 Test Result

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

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

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

26dB and 99% Occupied bandwidth are reporting only.

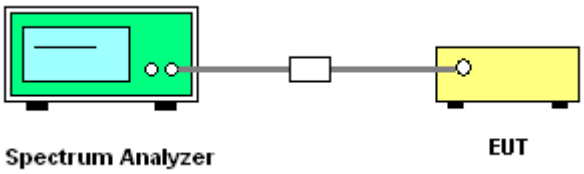
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section C) Emission bandwidth for the band 5.725-5.85GHz
2. Set RBW = 100kHz.
3. Set the VBW ≥ 3 x RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 6 dB down from the peak of the emission.
7. Measure and record the results in the test report.

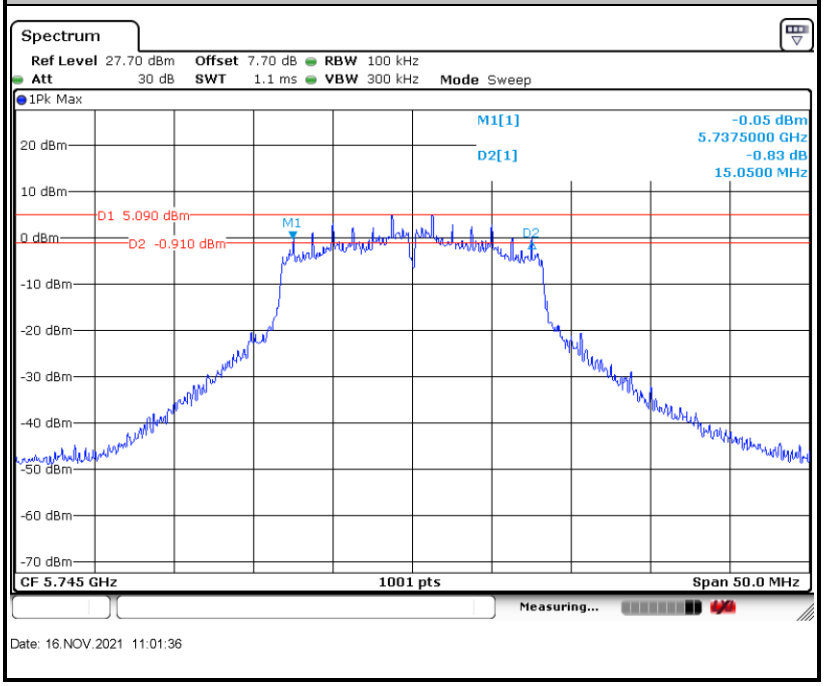
3.1.4 Test Setup



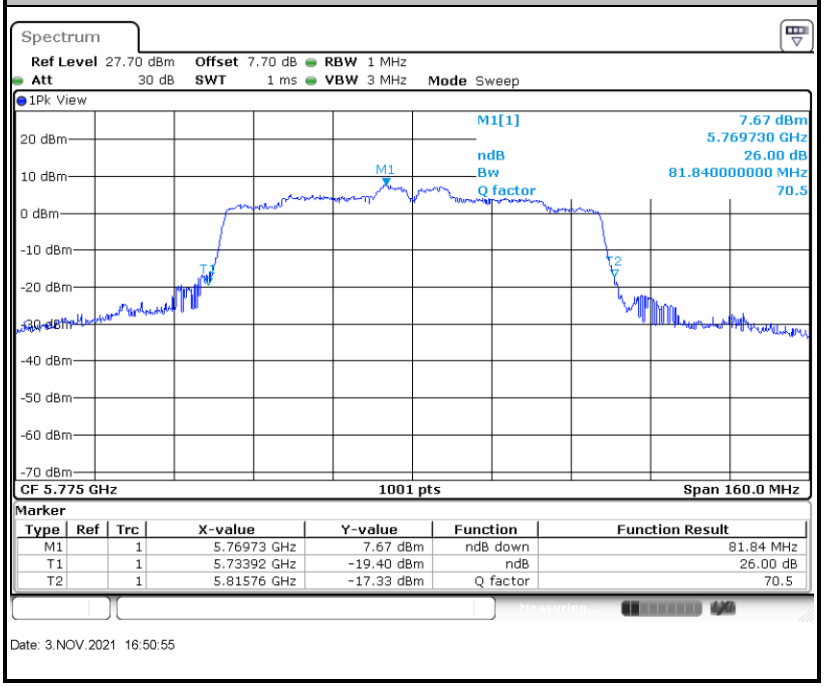
3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.

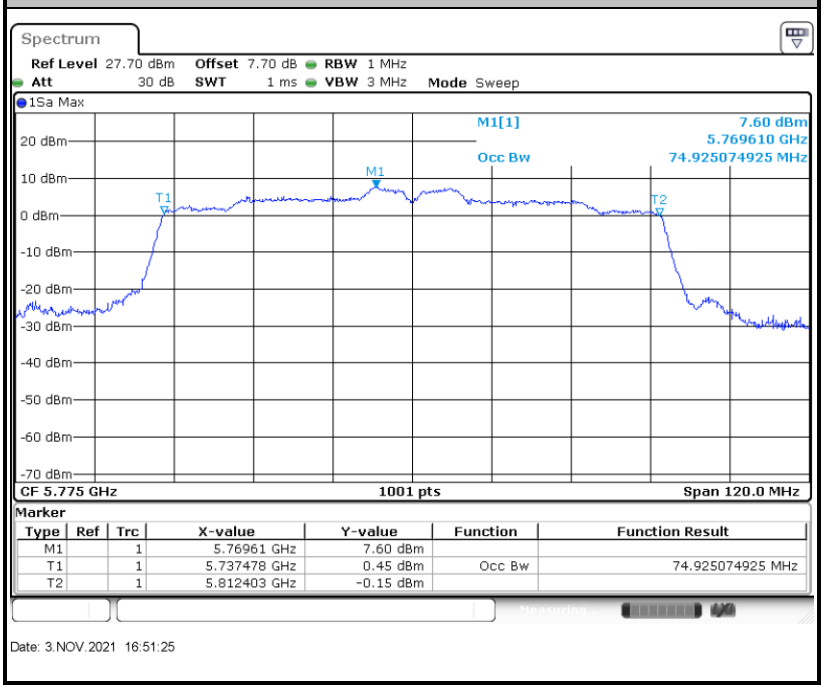
Minimum 6dB Bandwidth



Maximum 26dB Bandwidth



Maximum 99% Occupied Bandwidth



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

3.2 Maximum Conducted Output Power Measurement

3.2.1 Limit of Maximum Conducted Output Power

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

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

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

3.2.2 Measuring Instruments

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

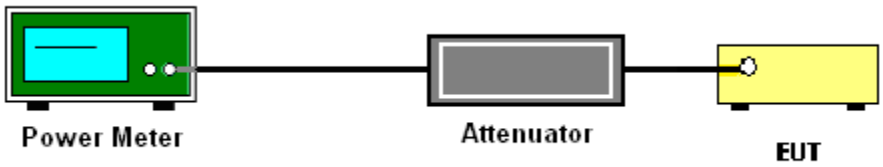
3.2.3 Test Procedures

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

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

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

3.2.4 Test Setup



3.2.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

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

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

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

3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

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

Section F) Maximum power spectral density.

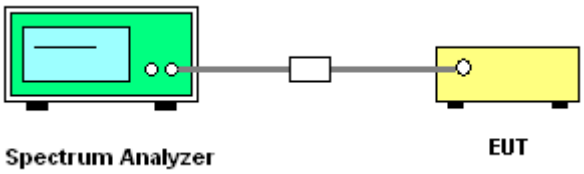
 # Method SA-2 #

(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 = 300 kHz.
- Set VBW ≥ 1 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(500kHz/RBW) to the test result.
- Add 10 log(1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, add 10 log(1/0.25) = 6 dB if the duty cycle is 25 percent.

1. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
2. Each plot has already offset with cable loss, and attenuator loss. Measure the PPSD and record it.

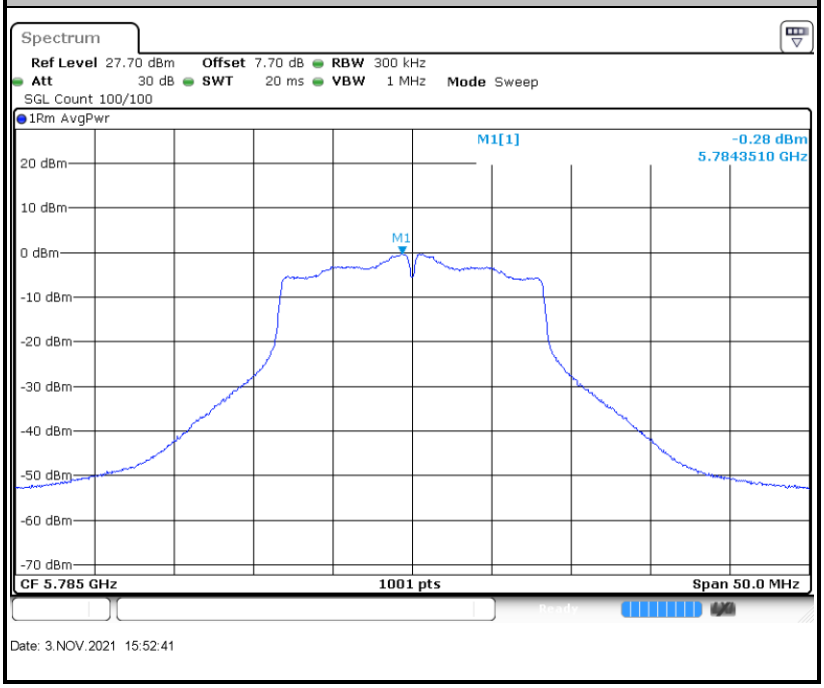
3.3.4 Test Setup



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 5.725-5.85 GHz band:

15.407(b)(4)(i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

(2) Unwanted spurious emissions fallen in restricted bands shall comply with the general field strength limits as below table,

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

EIRP (dBm)	Field Strength at 3m (dBµV/m)
- 27	68.3

Note: The following formula is used to convert the EIRP to field strength.

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

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

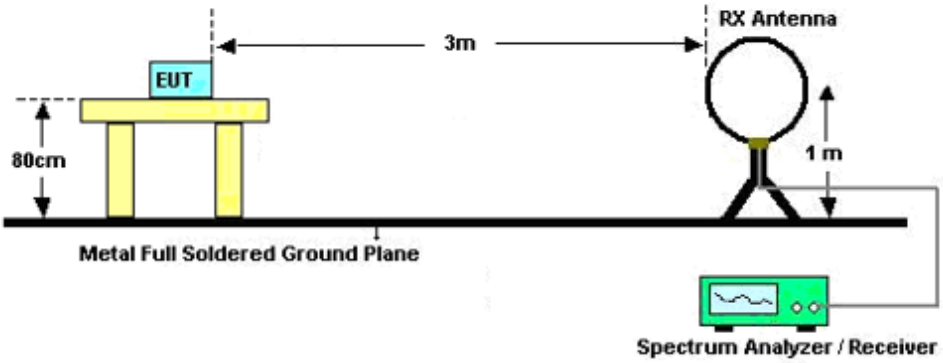
   (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

   - 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.

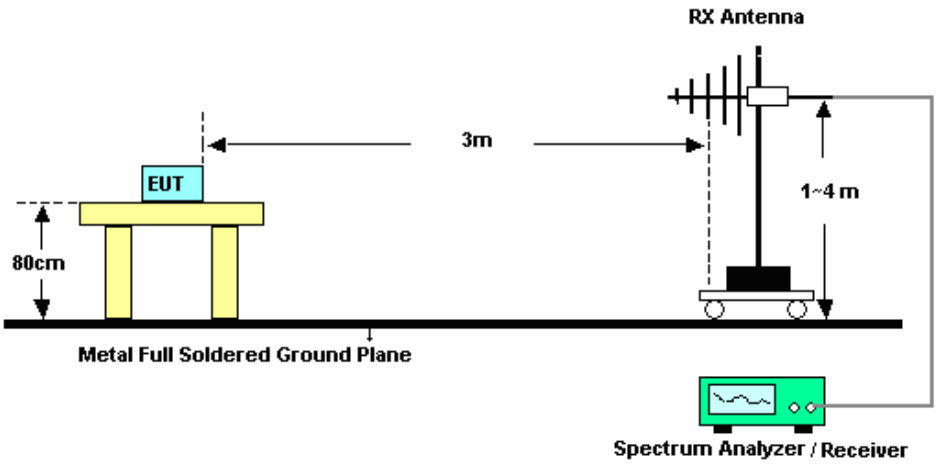
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband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

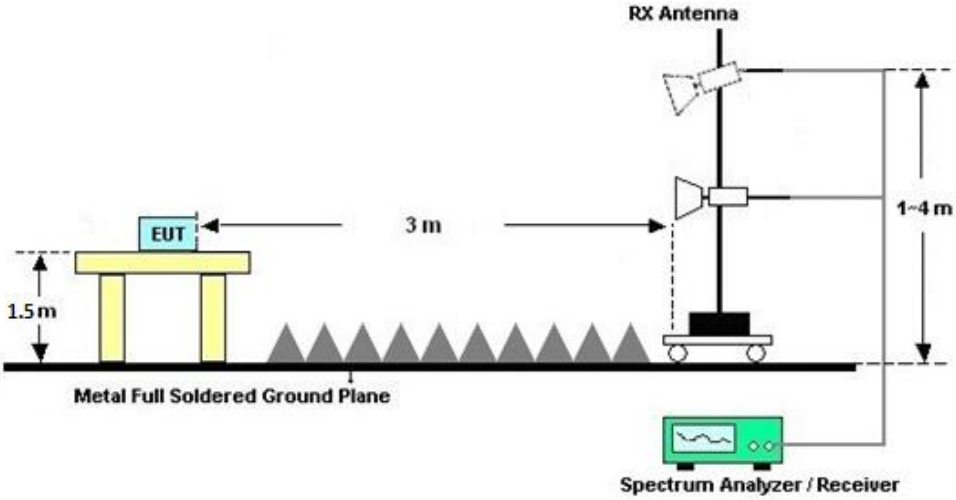
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

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

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

3.4.6 Test Result of Radiated Band Edges

Please refer to Appendix C.

3.4.7 Duty Cycle

Please refer to Appendix D.

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

Please refer to Appendix C.

3.5 AC Conducted Emission Measurement

3.5.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

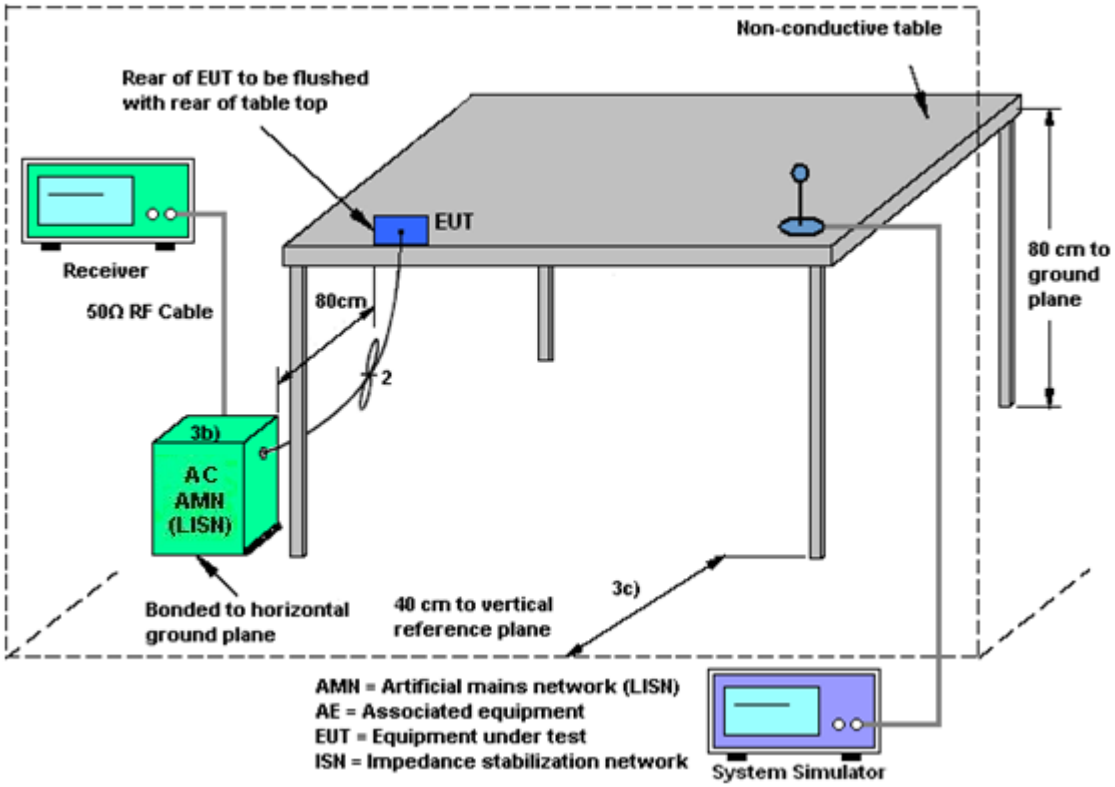
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

3.5.4 Test Setup



3.5.5 Test Result of AC Conducted Emission

Please refer to Appendix B.

3.6 Antenna Requirements

3.6.1 Standard Applicable

If transmitting antenna directional gain is greater than 6 dBi, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.6.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.6.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

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	Oct. 14, 2021	Nov. 01, 2021~ Nov. 16, 2021	Oct. 13, 2022	Conducted (TH01-KS)
Pulse Power Senor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 07, 2021	Nov. 01, 2021~ Nov. 16, 2021	Jan. 06, 2022	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 07, 2021	Nov. 01, 2021~ Nov. 16, 2021	Jan. 06, 2022	Conducted (TH01-KS)
EMI Test Receiver	Keysight	N9038A	MY56400004	3Hz~8.5GHz;Max 30dBm	Oct. 16, 2021	Nov. 09, 2021	Oct. 15, 2022	Radiation (03CH05-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz-44G,MAX 30dB	Apr.13, 2021	Nov. 09, 2021	Apr. 12, 2022	Radiation (03CH05-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 30, 2021	Nov. 09, 2021	Oct. 29, 2022	Radiation (03CH05-KS)
Bilog Antenna	TeseQ	CBL6111D	49922	30MHz-1GHz	Jun. 04 ,2021	Nov. 09, 2021	Jun. 03, 2022	Radiation (03CH05-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00218652	1GHz~18GHz	Apr. 24, 2021	Nov. 09, 2021	Apr. 23, 2022	Radiation (03CH05-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 06, 2021	Nov. 09, 2021	Jan. 05, 2022	Radiation (03CH05-KS)
Amplifier	SONOMA	310N	187289	9KHz-1GHz	Apr. 12, 2021	Nov. 09, 2021	Apr. 11, 2022	Radiation (03CH05-KS)
Amplifier	MITEQ	EM18G40GGA	060728	18~40GHz	Jan. 07, 2021	Nov. 09, 2021	Jan. 06, 2022	Radiation (03CH05-KS)
high gain Amplifier	MITEQ	AMF-7D-00101800-30-10P	2012228	1Ghz-18Ghz	Oct. 16, 2021	Nov. 09, 2021	Oct. 15, 2022	Radiation (03CH05-KS)
Amplifier	Keysight	83017A	MY53270316	500MHz~26.5GHz	Oct. 16, 2021	Nov. 09, 2021	Oct. 15, 2022	Radiation (03CH05-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Nov. 09, 2021	NCR	Radiation (03CH05-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Nov. 09, 2021	NCR	Radiation (03CH05-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Nov. 09, 2021	NCR	Radiation (03CH05-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	Apr. 21, 2021	Nov. 13, 2021	Apr. 20, 2022	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060103	9kHz~30MHz	Oct. 14, 2021	Nov. 13, 2021	Oct. 13, 2022	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060105	9kHz~30MHz	Apr. 13, 2021	Nov. 13, 2021	Apr. 12, 2022	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 14, 2021	Nov. 13, 2021	Oct. 13, 2022	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))	**2.94dB**

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**

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

Appendix A. Conducted Test Results

Report Number : FR1O2302E

Test Engineer:	Jack Fan / You Zhou	Temperature:	21~25	°C
Test Date:	2021/11/1~2021/11/16	Relative Humidity:	51~54	%

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

U-NII-3									
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)	26 dB Bandwidth (MHz)	6 dB Bandwidth (MHz)	6dB Bandwidth min. Limit (MHz)	Pass/Fail
11a	6M bps	1	149	5745	17.28	22.58	15.05	0.5	Pass
11a	6Mbps	1	157	5785	17.38	22.33	15.10	0.5	Pass
11a	6Mbps	1	161	5805	17.33	22.18	15.10	0.5	Pass
HT20	MCS 0	1	149	5745	18.48	23.48	15.10	0.5	Pass
HT20	MCS 0	1	157	5785	18.53	23.28	15.05	0.5	Pass
HT20	MCS 0	1	161	5805	18.53	23.08	15.09	0.5	Pass
VHT40	MCS 0	1	151	5755	36.06	41.00	31.32	0.5	Pass
VHT40	MCS 0	1	159	5795	36.26	41.00	35.01	0.5	Pass
VHT80	MCS 0	1	155	5775	74.93	81.84	71.36	0.5	Pass

TEST RESULTS DATA
Average Power Table

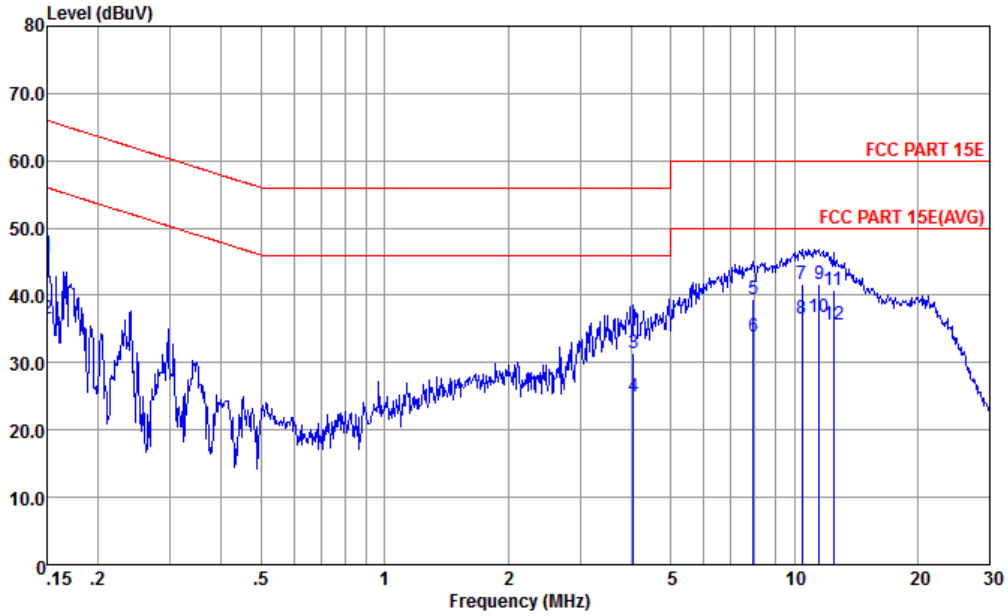
U-NII-3										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)		Pass/Fail
11a	6M bps	1	149	5745	0.11	14.15	30.00	-1.46		Pass
11a	6Mbps	1	157	5785	0.11	14.03	30.00	-1.46		Pass
11a	6Mbps	1	161	5805	0.11	13.64	30.00	-1.46		Pass
HT20	MCS 0	1	149	5745	0.12	13.95	30.00	-1.46		Pass
HT20	MCS 0	1	157	5785	0.12	13.89	30.00	-1.46		Pass
HT20	MCS 0	1	161	5805	0.12	13.45	30.00	-1.46		Pass
HT40	MCS 0	1	151	5755	0.23	14.39	30.00	-1.46		Pass
HT40	MCS 0	1	159	5795	0.23	14.17	30.00	-1.46		Pass
VHT20	MCS 0	1	149	5745	0.11	13.94	30.00	-1.46		Pass
VHT20	MCS 0	1	157	5785	0.11	13.87	30.00	-1.46		Pass
VHT20	MCS 0	1	161	5805	0.11	13.57	30.00	-1.46		Pass
VHT40	MCS 0	1	151	5755	0.24	14.48	30.00	-1.46		Pass
VHT40	MCS 0	1	159	5795	0.24	14.18	30.00	-1.46		Pass
VHT80	MCS 0	1	155	5775	0.47	14.24	30.00	-1.46		Pass

TEST RESULTS DATA
Power Spectral Density

U-NII-3										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	10log (500kHz /RBW) Factor (dB)	Average Power Density (dBm/500kHz)	Average PSD Limit (dBm/500kHz)	DG (dBi)	Pass/Fail
11a	6M bps	1	149	5745	0.11	2.22	2.02	30.00	-1.46	Pass
11a	6Mbps	1	157	5785	0.11	2.22	2.05	30.00	-1.46	Pass
11a	6Mbps	1	161	5805	0.11	2.22	1.98	30.00	-1.46	Pass
HT20	MCS 0	1	149	5745	0.12	2.22	1.64	30.00	-1.46	Pass
HT20	MCS 0	1	157	5785	0.12	2.22	1.69	30.00	-1.46	Pass
HT20	MCS 0	1	161	5805	0.12	2.22	1.61	30.00	-1.46	Pass
VHT40	MCS 0	1	151	5755	0.24	2.22	-0.53	30.00	-1.46	Pass
VHT40	MCS 0	1	159	5795	0.24	2.22	-0.87	30.00	-1.46	Pass
VHT80	MCS 0	1	155	5775	0.47	2.22	-3.24	30.00	-1.46	Pass

Appendix B. AC Conducted Emission Test Results

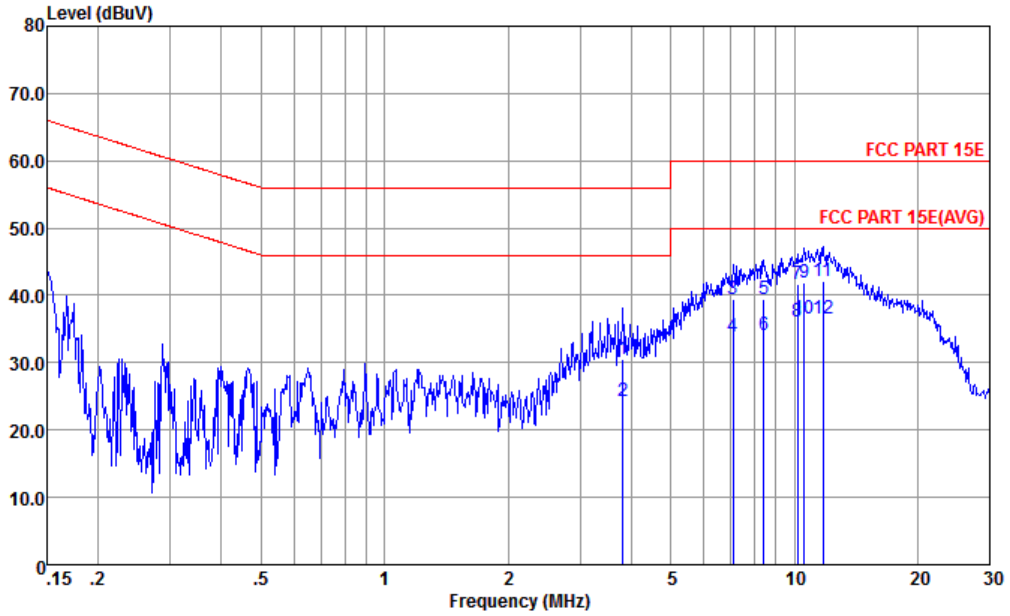
Test Engineer :	Amos Zhang	**Temperature :**	25.3~26.2℃
		Relative Humidity :	38~40%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-KS
Condition : FCC PART 15E LISN-L-060105-CN02 LINE
Project : (FZ) 1O2302
mode : Mode 1
: 861312050047122/861312050047130 #15

		Freq MHz	Level dBuV	Over Limit dB	Limit Line dBuV	Read Level dBuV	LISN Factor dB	Cable Loss dB	Remark
1		0.150	45.65	-20.35	66.00	35.10	0.07	10.48	QP
2		0.150	36.45	-19.55	56.00	25.90	0.07	10.48	Average
3		4.049	31.46	-24.54	56.00	20.61	0.60	10.25	QP
4		4.049	24.96	-21.04	46.00	14.11	0.60	10.25	Average
5		7.935	39.36	-20.64	60.00	28.19	0.85	10.32	QP
6		7.935	33.76	-16.24	50.00	22.59	0.85	10.32	Average
7		10.452	41.66	-18.34	60.00	30.30	1.01	10.35	QP
8		10.452	36.46	-13.54	50.00	25.10	1.01	10.35	Average
9		11.498	41.72	-18.28	60.00	30.20	1.16	10.36	QP
10	*	11.498	36.82	-13.18	50.00	25.30	1.16	10.36	Average
11		12.449	40.85	-19.15	60.00	29.20	1.28	10.37	QP
12		12.449	35.55	-14.45	50.00	23.90	1.28	10.37	Average

Test Engineer :	Amos Zhang	**Temperature :**	25.3~26.2℃
		Relative Humidity :	38~40%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-KS
Condition : FCC PART 15E LISN-N-060105-CN02 NEUTRAL
Project : (FZ) 1O2302
mode : Mode 1
: 861312050047122/861312050047130 #15

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	3.820	30.59	-25.41	56.00	19.60	0.74	10.25	QP
2	3.820	24.29	-21.71	46.00	13.30	0.74	10.25	Average
3	7.100	39.39	-20.61	60.00	28.10	0.99	10.30	QP
4	7.100	33.89	-16.11	50.00	22.60	0.99	10.30	Average
5	8.412	39.52	-20.48	60.00	28.11	1.09	10.32	QP
6	8.412	34.02	-15.98	50.00	22.61	1.09	10.32	Average
7	10.179	41.77	-18.23	60.00	30.20	1.23	10.34	QP
8	10.179	36.17	-13.83	50.00	24.60	1.23	10.34	Average
9	10.564	41.84	-18.16	60.00	30.20	1.29	10.35	QP
10	10.564	36.44	-13.56	50.00	24.80	1.29	10.35	Average
11	11.745	42.04	-17.96	60.00	30.20	1.48	10.36	QP
12 *	11.745	36.44	-13.56	50.00	24.60	1.48	10.36	Average

Note:

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

Appendix B. Radiated Spurious Emission

UNII 3 - 5725~5850MHz

WIFI 802.11a (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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 149 5745MHz		5613.2	56.43	-11.87	68.3	41.53	35.47	12.05	32.62	272	72	P	H
		5699.2	56.08	-48.63	104.71	41.12	35.59	12.12	32.75	272	72	P	H
		5719.2	55.43	-55.25	110.68	40.49	35.65	12.15	32.86	272	72	P	H
		5724.8	56.56	-65.28	121.84	41.62	35.65	12.15	32.86	272	72	P	H
		5746	103.28	-	-	88.41	35.68	12.16	32.97	272	72	P	H
		5746	96.37	-	-	81.5	35.68	12.16	32.97	272	72	A	H
		5612.8	56.68	-11.62	68.3	41.78	35.47	12.05	32.62	100	268	P	V
		5664.4	56.51	-22.48	78.99	41.52	35.53	12.09	32.63	100	268	P	V
		5720	57.56	-53.34	110.9	42.62	35.65	12.15	32.86	100	268	P	V
		5724.8	60.08	-61.76	121.84	45.14	35.65	12.15	32.86	100	268	P	V
		5746	109.3	-	-	94.43	35.68	12.16	32.97	100	268	P	V
		5746	101.67	-	-	86.8	35.68	12.16	32.97	100	268	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 161 5805MHz		5851.2	54.75	-64.81	119.56	40.06	35.87	12.25	33.43	249	68	P	H
		5857.6	55.47	-54.7	110.17	40.74	35.9	12.26	33.43	249	68	P	H
		5908	55.46	-25.38	80.84	40.81	35.88	12.31	33.54	249	68	P	H
		5963.6	55.77	-12.53	68.3	41.23	35.85	12.35	33.66	249	68	P	H
		5806	102.74	-	-	87.91	35.81	12.22	33.2	249	68	P	H
		5806	95.61	-	-	80.78	35.81	12.22	33.2	249	68	A	H
		5852.8	55	-60.92	115.92	40.31	35.87	12.25	33.43	100	257	P	V
		5867.6	56.07	-51.3	107.37	41.34	35.9	12.26	33.43	100	257	P	V
		5875.6	55.8	-49.05	104.85	41.12	35.89	12.28	33.49	100	257	P	V
		5937.2	55.96	-12.34	68.3	41.37	35.87	12.32	33.6	100	257	P	V
		5806	108.21	-	-	93.38	35.81	12.22	33.2	100	257	P	V
		5806	100.8	-	-	85.97	35.81	12.22	33.2	100	257	A	V
Remark	3. No other spurious found. 4. All results are PASS against Peak and Average limit line.												

UNII 3 5725~5850MHz

WIFI 802.11a (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 149 5745MHz		7660.66	47.5	-26.5	74	57.24	36.73	14.11	60.58	300	0	P	H
		11490	45.05	-28.95	74	49.17	38.69	17.62	60.43	300	0	P	H
		7660.66	49.67	-24.33	74	59.41	36.73	14.11	60.58	300	0	P	V
		11489.48	45.06	-28.94	74	49.18	38.69	17.62	60.43	300	0	P	V
802.11a CH 157 5785MHz		7715.715	48.12	-25.88	74	57.75	36.77	14.18	60.58	300	0	P	H
		11570	45.43	-28.57	74	49.39	38.74	17.68	60.38	300	0	P	H
		7715.715	52.73	-21.27	74	62.36	36.77	14.18	60.58	114	94	P	V
		7715.715	50.39	-3.61	54	60.02	36.77	14.18	60.58	114	94	A	V
		11569.56	44.23	-29.77	74	48.19	38.74	17.68	60.38	300	0	P	V
802.11a CH 161 5805MHz		7740.74	49.15	-24.85	74	58.72	36.8	14.22	60.59	300	0	P	H
		11610	44.48	-29.52	74	48.38	38.76	17.7	60.36	300	0	P	H
		7740.74	53.28	-20.72	74	62.85	36.8	14.22	60.59	117	92	P	V
		7740.74	50.53	-3.47	54	60.1	36.8	14.22	60.59	117	92	A	V
		11609.61	45.79	-28.21	74	49.69	38.76	17.7	60.36	300	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII 3 5725~5850MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 149 5745MHz		5621.6	56.23	-12.07	68.3	41.31	35.48	12.06	32.62	287	73	P	H
		5678	55.88	-33.18	89.06	40.85	35.56	12.1	32.63	287	73	P	H
		5716.4	56.79	-53.1	109.89	41.9	35.62	12.13	32.86	287	73	P	H
		5722.8	57.87	-59.41	117.28	42.93	35.65	12.15	32.86	287	73	P	H
		5746	103.18	-	-	88.31	35.68	12.16	32.97	287	73	P	H
		5746	95.91	-	-	81.04	35.68	12.16	32.97	287	73	A	H
		5640.4	56.58	-11.72	68.3	41.52	35.5	12.08	32.52	100	263	P	V
		5658.4	55.76	-18.78	74.54	40.66	35.53	12.09	32.52	100	263	P	V
		5720	56.25	-54.65	110.9	41.31	35.65	12.15	32.86	100	263	P	V
		5724	64.46	-55.56	120.02	49.52	35.65	12.15	32.86	100	263	P	V
		5746	107.65	-	-	92.78	35.68	12.16	32.97	100	263	P	V
		5746	101.34	-	-	86.47	35.68	12.16	32.97	100	263	A	V
Remark	3. No other spurious found. 4. All results are PASS against Peak and Average limit line.												

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 161 5805MHz		5852.8	56.02	-59.9	115.92	41.33	35.87	12.25	33.43	248	69	P	H
		5866.4	56.29	-51.42	107.71	41.56	35.9	12.26	33.43	248	69	P	H
		5876.8	55.97	-47.99	103.96	41.29	35.89	12.28	33.49	248	69	P	H
		5927.6	55.9	-12.4	68.3	41.31	35.87	12.32	33.6	248	69	P	H
		5806	102.1	-	-	87.27	35.81	12.22	33.2	248	69	P	H
		5806	95.2	-	-	80.37	35.81	12.22	33.2	248	69	A	H
		5852.8	54.5	-61.42	115.92	39.81	35.87	12.25	33.43	100	259	P	V
		5868	55.54	-51.72	107.26	40.81	35.9	12.26	33.43	100	259	P	V
		5906.4	55.85	-26.18	82.03	41.2	35.88	12.31	33.54	100	259	P	V
		5962	55.29	-13.01	68.3	40.75	35.85	12.35	33.66	100	259	P	V
		5806	107.23	-	-	92.4	35.81	12.22	33.2	100	259	P	V
		5806	100.44	-	-	85.61	35.81	12.22	33.2	100	259	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII 3 5725~5850MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 149 5745MHz		7660.66	47.17	-26.83	74	56.91	36.73	14.11	60.58	300	0	P	H
		11490	45.18	-28.82	74	49.3	38.69	17.62	60.43	300	0	P	H
		7660.66	52.61	-21.39	74	62.35	36.73	14.11	60.58	119	94	P	V
		7660.66	49.39	-4.61	54	59.13	36.73	14.11	60.58	119	94	A	V
		11489.48	45.3	-28.7	74	49.42	38.69	17.62	60.43	300	0	P	V
802.11n HT20 CH 157 5785MHz		7715.715	49.71	-24.29	74	59.34	36.77	14.18	60.58	300	0	P	H
		11570	45.4	-28.6	74	49.36	38.74	17.68	60.38	300	0	P	H
		7715.715	52.89	-21.11	74	62.52	36.77	14.18	60.58	100	93	P	V
		7715.715	50.49	-3.51	54	60.12	36.77	14.18	60.58	100	93	A	V
		11569.56	44.96	-29.04	74	48.92	38.74	17.68	60.38	300	0	P	V
802.11n HT20 CH 161 5805MHz		7740.74	48.63	-25.37	74	58.2	36.8	14.22	60.59	300	0	P	H
		11610	44.71	-29.29	74	48.61	38.76	17.7	60.36	300	0	P	H
		7740.74	52.43	-21.57	74	62	36.8	14.22	60.59	119	93	P	V
		7740.74	49.94	-4.06	54	59.51	36.8	14.22	60.59	119	93	A	V
		11609.61	45.15	-28.85	74	49.05	38.76	17.7	60.36	300	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII 3 5725~5850MHz

WIFI 802.11ac VHT40 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT40 CH 151 5755MHz		5625.2	56.16	-12.14	68.3	41.24	35.48	12.06	32.62	234	70	P	H
		5651.6	56.03	-13.46	69.49	40.93	35.53	12.09	32.52	234	70	P	H
		5716.8	62.97	-47.04	110.01	48.08	35.62	12.13	32.86	234	70	P	H
		5724.4	64.63	-56.3	120.93	49.69	35.65	12.15	32.86	234	70	P	H
		5851.2	55.31	-64.25	119.56	40.62	35.87	12.25	33.43	234	70	P	H
		5863.6	55.78	-52.71	108.49	41.05	35.9	12.26	33.43	234	70	P	H
		5894	55.82	-35.38	91.2	41.14	35.88	12.29	33.49	234	70	P	H
		5933.2	55.43	-12.87	68.3	40.84	35.87	12.32	33.6	234	70	P	H
		5752	101.86	-	-	86.93	35.72	12.18	32.97	234	70	P	H
		5752	94.44	-	-	79.51	35.72	12.18	32.97	234	70	A	H
		5613.2	56.81	-11.49	68.3	41.91	35.47	12.05	32.62	100	280	P	V
		5699.6	56.69	-48.32	105.01	41.73	35.59	12.12	32.75	100	280	P	V
		5717.2	67.22	-42.9	110.12	52.33	35.62	12.13	32.86	100	280	P	V
		5724.4	68.66	-52.27	120.93	53.72	35.65	12.15	32.86	100	280	P	V
		5850.8	55.07	-65.41	120.48	40.38	35.87	12.25	33.43	100	280	P	V
		5874.8	55.73	-49.63	105.36	41.05	35.89	12.28	33.49	100	280	P	V
		5910.4	56.09	-22.98	79.07	41.44	35.88	12.31	33.54	100	280	P	V
		5945.6	55.65	-12.65	68.3	41.05	35.86	12.34	33.6	100	280	P	V
		5752	106.63	-	-	91.7	35.72	12.18	32.97	100	280	P	V
		5752	99.54	-	-	84.61	35.72	12.18	32.97	100	280	A	V

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT40 CH 159 5795MHz		5606.4	56.73	-11.57	68.3	41.93	35.47	12.05	32.72	243	70	P	H
		5663.2	56.44	-21.66	78.1	41.45	35.53	12.09	32.63	243	70	P	H
		5717.2	55.32	-54.8	110.12	40.43	35.62	12.13	32.86	243	70	P	H
		5721.2	55.88	-57.76	113.64	40.94	35.65	12.15	32.86	243	70	P	H
		5852	55.39	-62.35	117.74	40.7	35.87	12.25	33.43	243	70	P	H
		5871.6	55.53	-50.72	106.25	40.85	35.89	12.28	33.49	243	70	P	H
		5880.8	55.12	-45.87	100.99	40.44	35.89	12.28	33.49	243	70	P	H
		5950	55.55	-12.75	68.3	41.01	35.86	12.34	33.66	243	70	P	H
		5794	101.81	-	-	87.02	35.78	12.21	33.2	243	70	P	H
		5794	93.62	-	-	78.83	35.78	12.21	33.2	243	70	A	H
		5622	56.73	-11.57	68.3	41.81	35.48	12.06	32.62	100	278	P	V
		5664.4	55.92	-23.07	78.99	40.93	35.53	12.09	32.63	100	278	P	V
		5719.6	56.05	-54.74	110.79	41.11	35.65	12.15	32.86	100	278	P	V
		5724	55.14	-64.88	120.02	40.2	35.65	12.15	32.86	100	278	P	V
		5852	56.29	-61.45	117.74	41.6	35.87	12.25	33.43	100	278	P	V
		5862	56.16	-52.78	108.94	41.43	35.9	12.26	33.43	100	278	P	V
		5884.4	56.56	-41.76	98.32	41.88	35.89	12.28	33.49	100	278	P	V
		5944.4	55.44	-12.86	68.3	40.84	35.86	12.34	33.6	100	278	P	V
		5794	105.86	-	-	91.07	35.78	12.21	33.2	100	278	P	V
		5794	98.53	-	-	83.74	35.78	12.21	33.2	100	278	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII 3 5725~5850MHz

WIFI 802.11ac VHT40 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT40 CH 151 5755MHz		7675.675	47.54	-26.46	74	57.24	36.75	14.13	60.58	300	0	P	H
		11510	45.1	-28.9	74	49.2	38.7	17.63	60.43	300	0	P	H
		7675.675	49.83	-24.17	74	59.53	36.75	14.13	60.58	300	0	P	V
		11509.5	44.67	-29.33	74	48.77	38.7	17.63	60.43	300	0	P	V
802.11ac VHT40 CH 159 5795MHz		7725.725	48.31	-25.69	74	57.91	36.79	14.2	60.59	300	0	P	H
		11590	45.41	-28.59	74	49.34	38.75	17.69	60.37	300	0	P	H
		7725.725	51.75	-22.25	74	61.35	36.79	14.2	60.59	120	89	P	V
		7725.725	49.52	-4.48	54	59.12	36.79	14.2	60.59	120	89	A	V
		11589.58	44.57	-29.43	74	48.5	38.75	17.69	60.37	300	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII 3 5725~5850MHz

WIFI 802.11ac VHT80 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT80 CH 155 5775MHz		5618	55.93	-12.37	68.3	41.01	35.48	12.06	32.62	290	358	P	H
		5699.6	58.36	-46.65	105.01	43.4	35.59	12.12	32.75	290	358	P	H
		5720	64.2	-46.7	110.9	49.26	35.65	12.15	32.86	290	358	P	H
		5720.8	66.3	-46.42	112.72	51.36	35.65	12.15	32.86	290	358	P	H
		5850.4	56.34	-65.05	121.39	41.65	35.87	12.25	33.43	290	358	P	H
		5856.4	56.85	-53.66	110.51	42.12	35.9	12.26	33.43	290	358	P	H
		5905.2	56.7	-26.21	82.91	42.05	35.88	12.31	33.54	290	358	P	H
		5969.6	54.98	-13.32	68.3	40.44	35.85	12.35	33.66	290	358	P	H
		5770	97.62	--	-	82.77	35.75	12.19	33.09	290	358	P	H
		5770	90.46	-	-	75.61	35.75	12.19	33.09	290	358	A	H
		5640.8	56.81	-11.49	68.3	41.75	35.5	12.08	32.52	100	298	P	V
		5700	66.52	-38.78	105.3	51.56	35.59	12.12	32.75	100	298	P	V
		5717.6	72.17	-38.06	110.23	57.23	35.65	12.15	32.86	100	298	P	V
		5722	72.35	-43.11	115.46	57.41	35.65	12.15	32.86	100	298	P	V
		5853.6	62.04	-52.05	114.09	47.31	35.9	12.26	33.43	100	298	P	V
		5855.6	63.58	-47.15	110.73	48.85	35.9	12.26	33.43	100	298	P	V
		5878.8	57.87	-44.61	102.48	43.19	35.89	12.28	33.49	100	298	P	V
		5927.6	56.11	-12.19	68.3	41.52	35.87	12.32	33.6	100	298	P	V
		5770	105.36	-	-	90.51	35.75	12.19	33.09	100	298	P	V
		5770	96.85	-	-	82	35.75	12.19	33.09	100	298	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

UNII 3 5725~5850MHz

WIFI 802.11ac VHT80 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT80 CH 155 5775MHz		7700.7	47.5	-26.5	74	57.16	36.76	14.16	60.58	300	0	P	H
		11550	45.13	-28.87	74	49.13	38.73	17.66	60.39	300	0	P	H
		7700.7	51.83	-22.17	74	61.49	36.76	14.16	60.58	107	92	P	V
		7700.7	49.56	-4.44	54	59.22	36.76	14.16	60.58	107	93	A	V
		11549.54	44.59	-29.41	74	48.59	38.73	17.66	60.39	300	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

WIFI 802.11a (LF @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a LF		43.58	26.2	-13.8	40	39.76	17.32	0.78	31.66	-	-	P	H
		92.08	22.77	-20.73	43.5	37.3	15.86	1.51	31.9	-	-	P	H
		169.68	27.46	-16.04	43.5	40.54	16.15	2.1	31.33	-	-	P	H
		221.09	22.51	-23.49	46	34.69	16.77	2.4	31.35	-	-	P	H
		304.51	23.16	-22.84	46	32.66	19.31	2.83	31.64	-	-	P	H
		832.19	28.68	-17.32	46	28.79	26.48	4.7	31.29	-	-	P	H
		43.58	33.03	-6.97	40	46.09	17.82	0.78	31.66	-	-	P	V
		83.35	22.32	-17.68	40	38.08	14.6	1.38	31.74	-	-	P	V
		161.92	23.09	-20.41	43.5	35.14	17.22	2.05	31.32	-	-	P	V
		217.21	19.4	-26.6	46	31	17.37	2.38	31.35	-	-	P	V
		519.85	26.33	-19.67	46	29.03	25.05	3.7	31.45	-	-	P	V
		832.19	32.47	-13.53	46	31.97	27.09	4.7	31.29	-	-	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		(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)

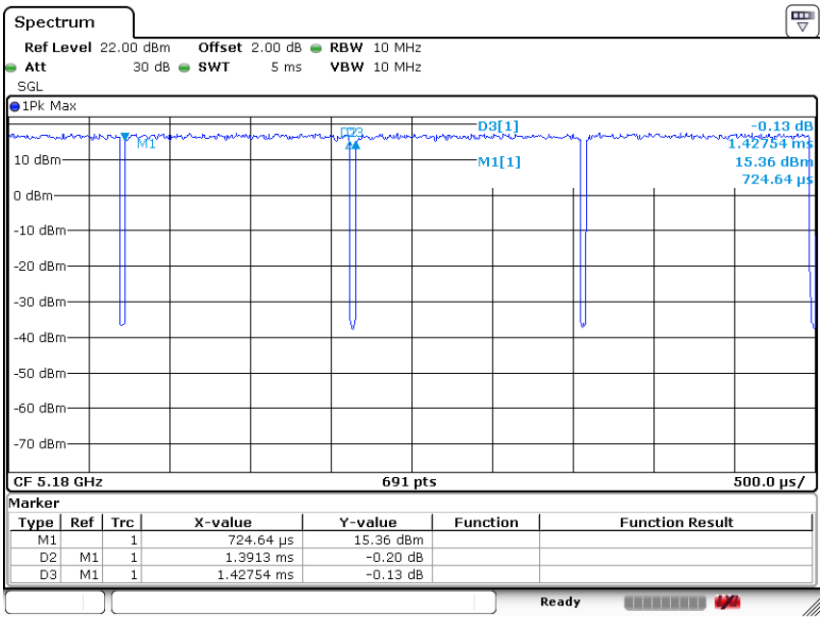
= -10.46(dB)

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

Appendix D. Duty Cycle Plots

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11a	97.46	1.391	0.719	0.75KHz
802.11n HT20	97.30	1.304	0.767	0.82KHz
802.11ac VHT40	94.55	0.654	1.530	1.6KHz
802.11ac VHT80	89.64	0.326	3.067	3.2KHz

802.11a



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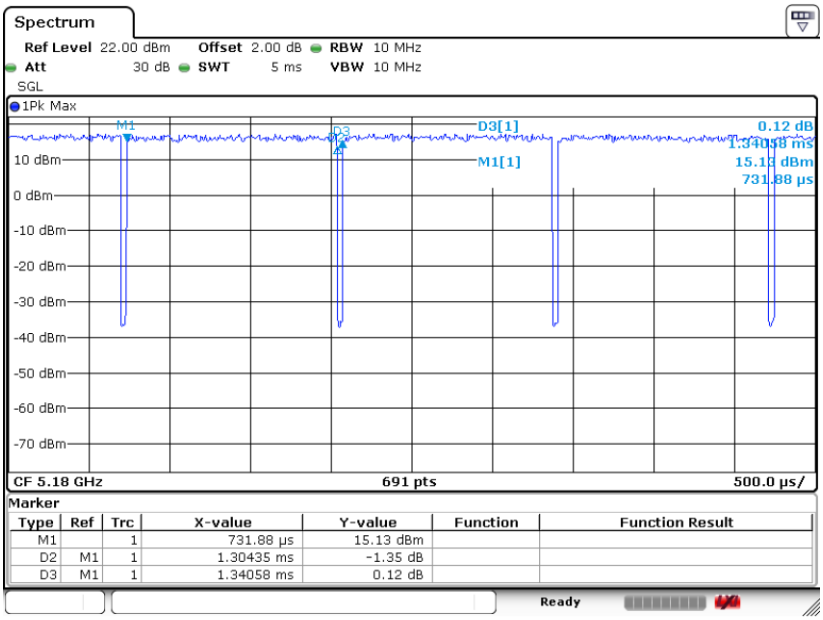
802.11n HT20



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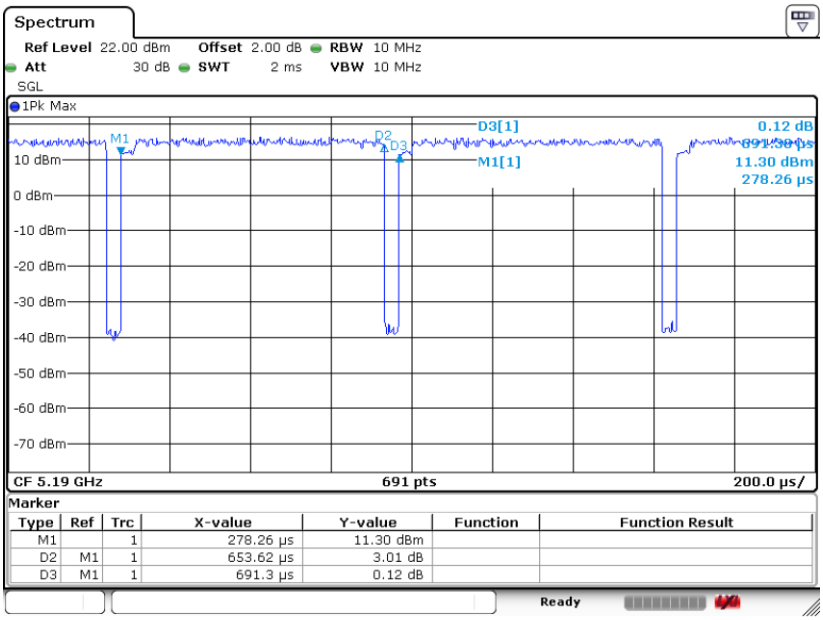
802.11ac VHT40



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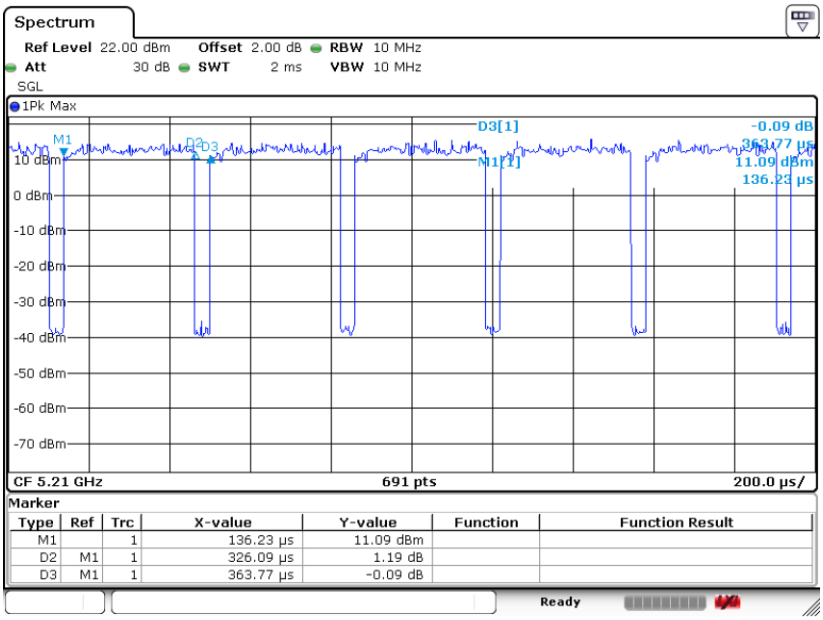
802.11ac VHT80



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