FCC RF Test Report

APPLICANT	:	Motorola Mobility LLC
EQUIPMENT	:	Mobile Cellular Phone
BRAND NAME	:	Motorola
MODEL NAME	:	XT2128-2
FCC ID	:	IHDT56ZQ3
STANDARD	:	FCC Part 15 Subpart E §15.407
CLASSIFICATION	:	(NII) Unlicensed National Information Infrastructure

The product was completed on Feb. 19, 2021. We, Sporton International (ShenZhen) 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 (ShenZhen) Inc., the test report shall not be reproduced except in full.

Reviewed by: Derreck Chen / Supervisor

Approved by: Eric Shih / Manager

ACCREDITED
Cert #5145.01

Sporton International (ShenZhen) Inc.

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TABLE OF CONTENTS

REVISION HISTORY **3**
SUMMARY OF TEST RESULT **4**
1 GENERAL DESCRIPTION **5**
1.1 Applicant 5
1.2 Manufacturer 5
1.3 Product Feature of Equipment Under Test 5
1.4 Product Specification of Equipment Under Test 6
1.5 Specification of Accessory 7
1.6 Modification of EUT 7
1.7 Testing Location 8
1.8 Test Software 8
1.9 Applicable Standards 9
2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST **10**
2.1 Carrier Frequency and Channel 10
2.2 Test Mode 11
2.3 Connection Diagram of Test System 12
2.4 Support Unit used in test configuration and system 12
2.5 EUT Operation Test Setup 13
2.6 Measurement Results Explanation Example 13
3 TEST RESULT **14**
3.1 6dB and 26dB and 99% Occupied Bandwidth Measurement 14
3.2 Maximum Conducted Output Power Measurement 17
3.3 Power Spectral Density Measurement 18
3.4 Unwanted Emissions Measurement 20
3.5 AC Conducted Emission Measurement 25
3.6 Automatically Discontinue Transmission 27
3.7 Antenna Requirements 28
4 LIST OF MEASURING EQUIPMENT **29**
5 UNCERTAINTY OF EVALUATION **30**
APPENDIX A. CONDUCTED TEST RESULTS
APPENDIX B. AC CONDUCTED EMISSION TEST RESULT
APPENDIX C. RADIATED SPURIOUS EMISSION
APPENDIX D. DUTY CYCLE PLOTS
APPENDIX E. SETUP PHOTOGRAPHS

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR120201F	Rev. 01	Initial issue of report	Mar. 04, 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 9.06 dB at 152.220 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 12.01 dB at 0.610 MHz
3.6	15.407(c)	Automatically Discontinue Transmission	Discontinue Transmission	Pass	-
3.7	15.203 & 15.407(a)	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

Motorola Mobility LLC
222 W, Merchandise Mart Plaza, Chicago IL 60654 USA

1.2 Manufacturer

Motorola Mobility LLC
222 W, Merchandise Mart Plaza, Chicago IL 60654 USA

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Cellular Phone
Brand Name	Motorola
Model Name	XT2128-2
FCC ID	IHDT56ZQ3
EUT supports Radios application	GSM/WCDMA/LTE/NFC WLAN 2.4GHz 802.11b/g/n HT20 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE FM Receiver and GNSS
IMEI Code	Conducted: 354244970711699/354244970711707 Conduction: 354244970700254/354244970700262 Radiation: 354244970700270/354244970700288
HW Version	DVT2
SW Version	RTA31.09
EUT Stage	Production Unit

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 : 16.47 dBm / 0.0444 W 802.11n HT20 : 16.37 dBm / 0.0434 W 802.11n HT40 : 16.13 dBm / 0.0410 W 802.11ac VHT20: 16.30 dBm / 0.0427 W 802.11ac VHT40: 16.11 dBm / 0.0408 W 802.11ac VHT80: 15.70 dBm / 0.0372 W
99% Occupied Bandwidth	802.11a : 17.08 MHz 802.11n HT20 : 18.03 MHz 802.11n HT40 : 36.56 MHz 802.11ac VHT80 : 76.84 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 -4.30 dBi

Note: For 802.11n HT20 / ac VHT20 and 802.11n HT40 / ac VHT40 mode, the whole testing has assessed only 802.11n HT20/ 11n HT40 by referring to the higher output power.

1.5 Specification of Accessory

Specification of Accessory				
AC Adapter 1(US)	**Brand Name**	Motorola (Chenyang)	**Model Name**	MC-101
AC Adapter 1(EU)	**Brand Name**	Motorola (Chenyang)	**Model Name**	MC-102
AC Adapter 1(UK)	**Brand Name**	Motorola (Chenyang)	**Model Name**	MC-103
AC Adapter 1(AU)	**Brand Name**	Motorola (Chenyang)	**Model Name**	MC-105
AC Adapter 2(US)	**Brand Name**	Motorola (Salcomp)	**Model Name**	MC-101
AC Adapter 2(EU)	**Brand Name**	Motorola (Salcomp)	**Model Name**	MC-102
AC Adapter 2(UK)	**Brand Name**	Motorola (Salcomp)	**Model Name**	MC-103
AC Adapter 2(AU)	**Brand Name**	Motorola (Salcomp)	**Model Name**	MC-105
AC Adapter 3(US)	**Brand Name**	Motorola (Aohai)	**Model Name**	MC-101
AC Adapter 3(EU)	**Brand Name**	Motorola (Aohai)	**Model Name**	MC-102
Battery	**Brand Name**	Motorola (Sunwoda)	**Model Name**	JK50
Earphone 1	**Brand Name**	Motorola (Juwei)	**Model Name**	JWEP1123-T03
Earphone 2	**Brand Name**	Motorola (Juwei)	**Model Name**	JWEP1182-T03H
Earphone 3	**Brand Name**	Motorola (New Leader)	**Model Name**	NLD-EM313A-11SF
Earphone 4	**Brand Name**	Motorola (LIANYUN)	**Model Name**	SH38C81577
Earphone 5	**Brand Name**	Motorola (Lianchuang)	**Model Name**	SH38C81576
USB Cable 1	**Brand Name**	Motorola (Chuangyitong)	**Model Name**	88806-025
USB Cable 2	**Brand Name**	Motorola (Yihuaxing)	**Model Name**	T365-011B
USB Cable 3	**Brand Name**	Motorola (I SHENG)	**Model Name**	SC18C28955

1.6 Modification of EUT

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

1.7 Testing Location

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

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

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

1.8 Test Software

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

1.9 Applicable Standards

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

- 47 CFR Part 15 Subpart E
- FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
- 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)
5745-5825 MHz Band 4 (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

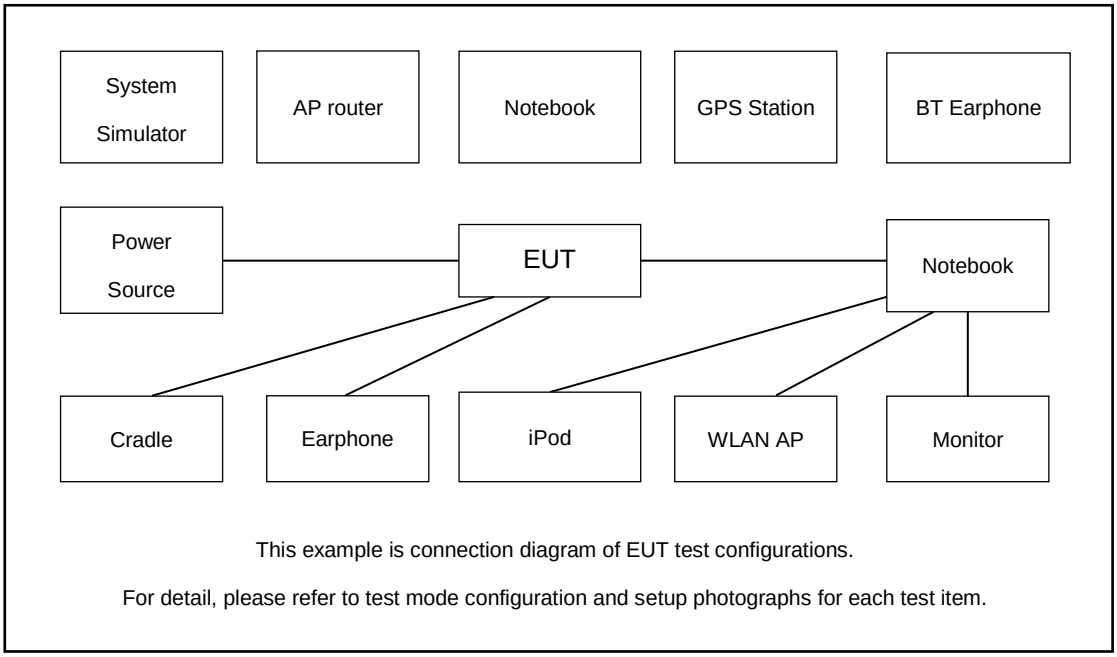
Final test modes are considering the modulation and worse data rates as below table.

Modulation	Data Rate
802.11a	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0
802.11ac VHT80	MCS0

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

Ch. #		Band IV : 5745-5825 MHz			
		802.11a	802.11n HT20	802.11n HT40	802.11ac VHT80
L	Low	149	149	151	-
M	Middle	157	157	-	155
H	High	165	165	159	-

2.3 Connection Diagram of Test System



This example is connection diagram of EUT test configurations.

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

2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Base Station	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8m
2.	WLAN AP	D-Link	DIR-820L	KA2IR820LA1	N/A	Unshielded, 1.8m
3.	Bluetooth Earphone	Samsung	EO-MG900	PYAHS-107W	N/A	N/A
4.	Notebook	Lenovo	E540	FCC DoC	N/A	AC I/P : Unshielded, 1.2m DC O/P : Shielded, 1.8m

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 and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example :

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

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 2.8 dB and 20dB attenuator.

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

= 2.8 + 10 = 22.8 (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.

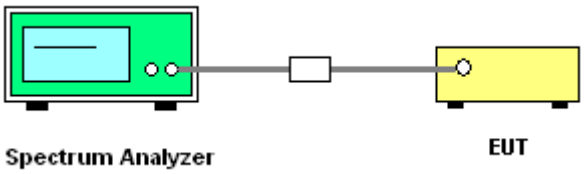
3.1.2 Measuring Instruments

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.

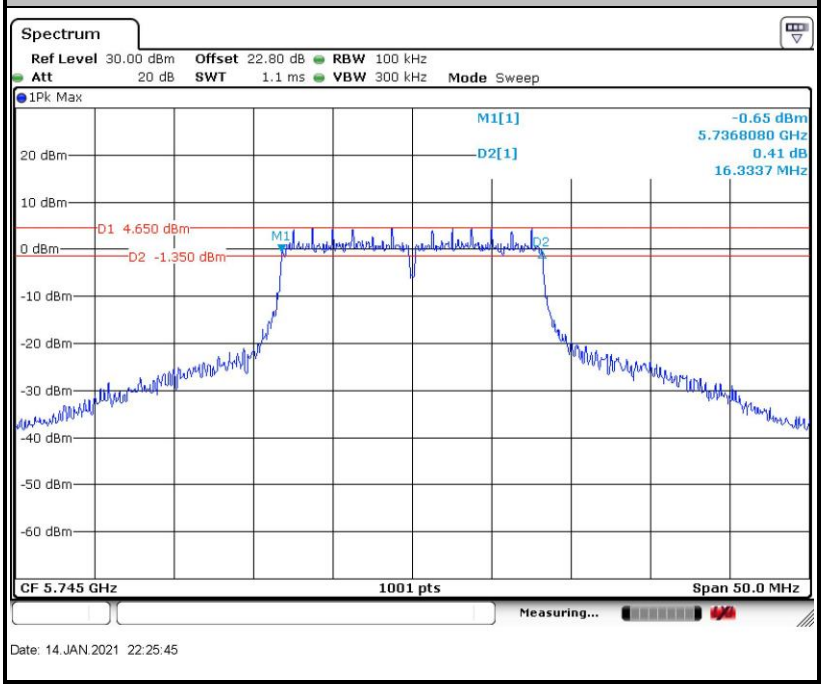
3.1.4 Test Setup



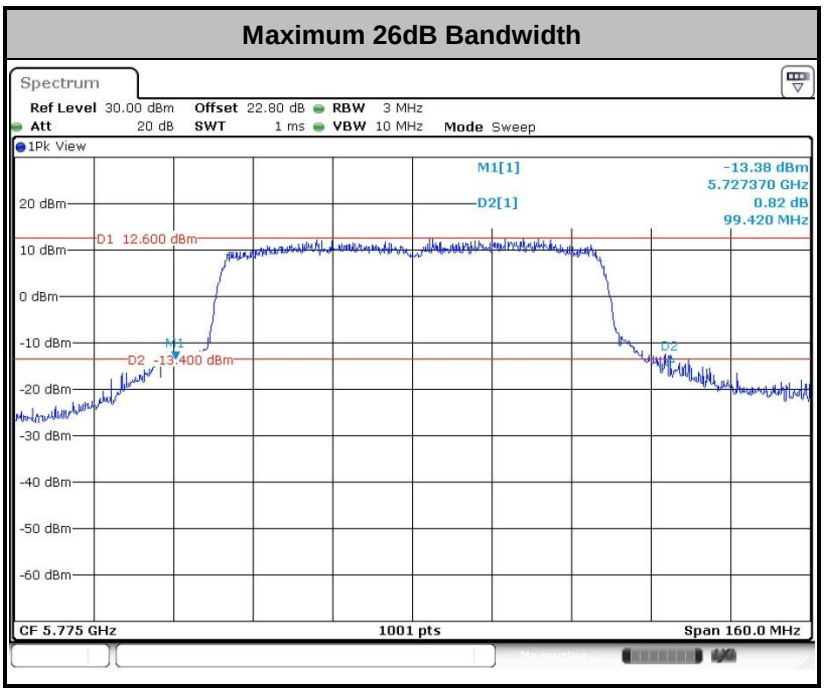
3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.

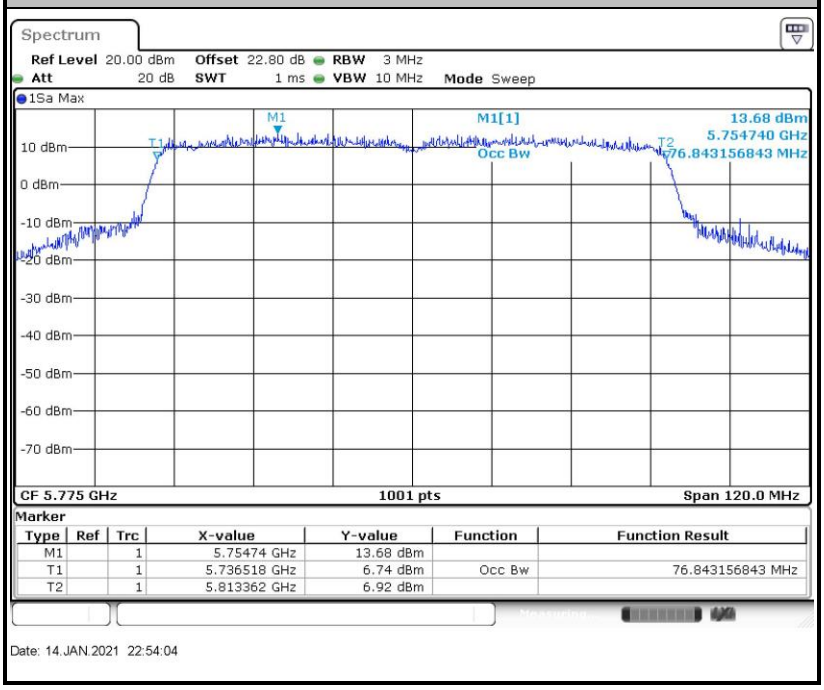
Minimum 6dB Bandwidth



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.

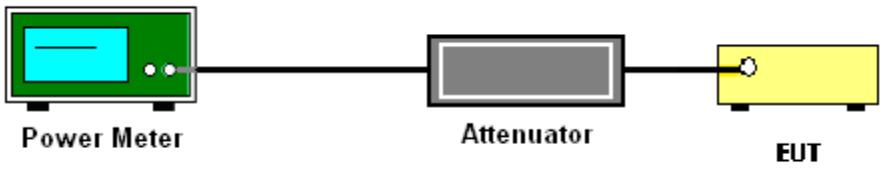
3.2.3 Test Procedures

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.

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.

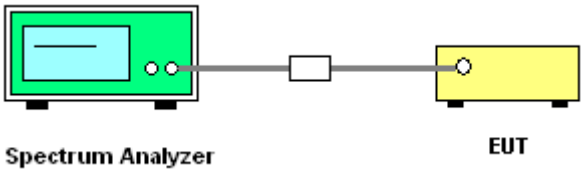
 # Method SA-2 #

(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.

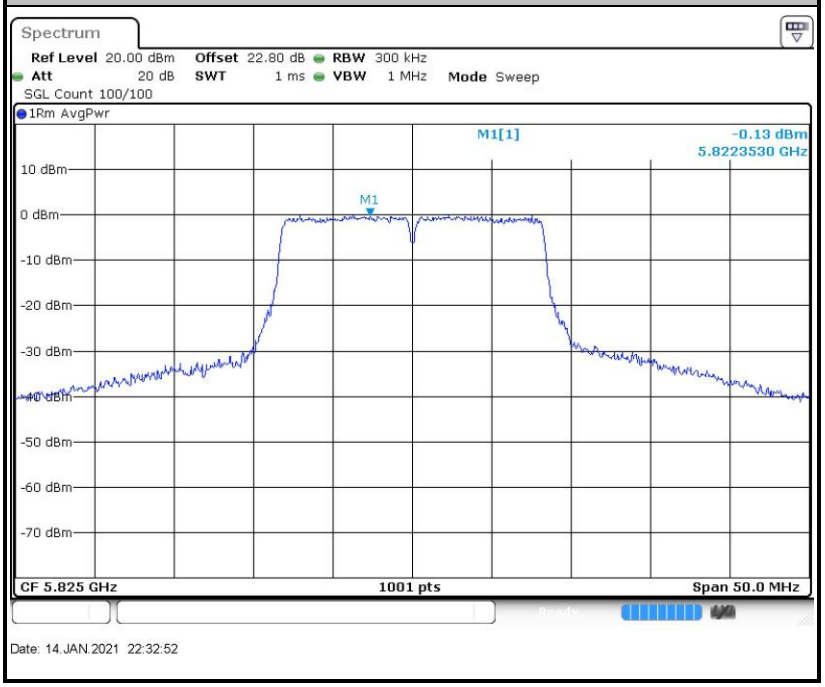
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

Worst Case Power Density (dBm/300kHz)



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

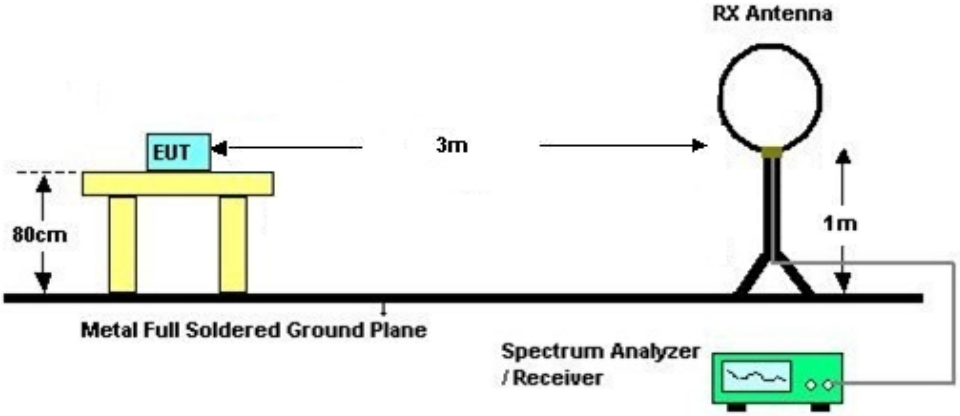
   (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

   - 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.

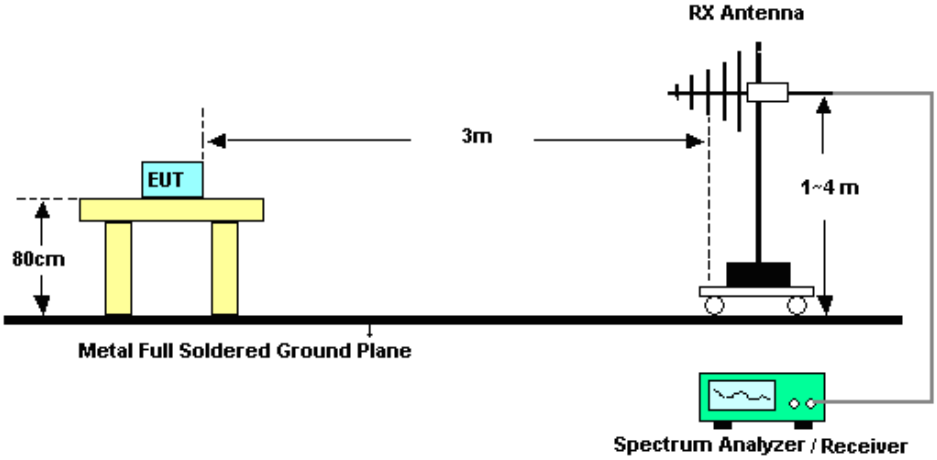
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband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

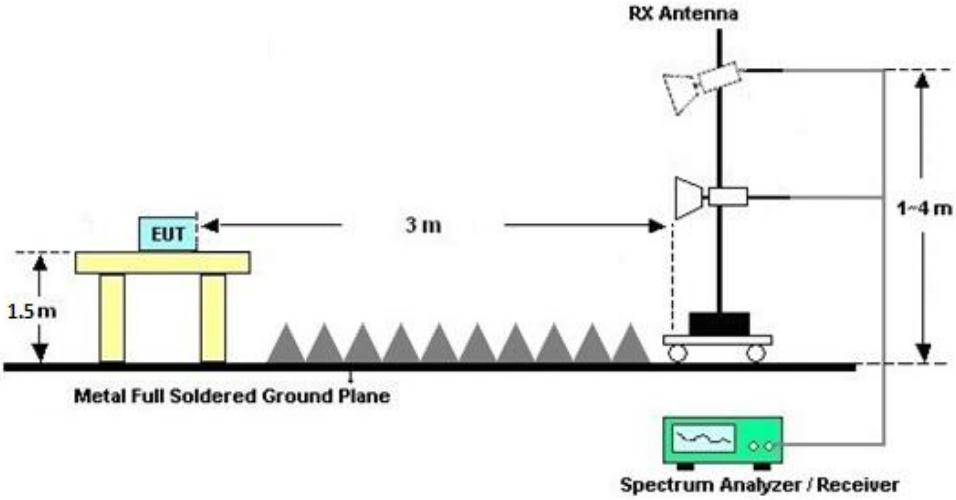
For radiated emissions below 30MHz



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.

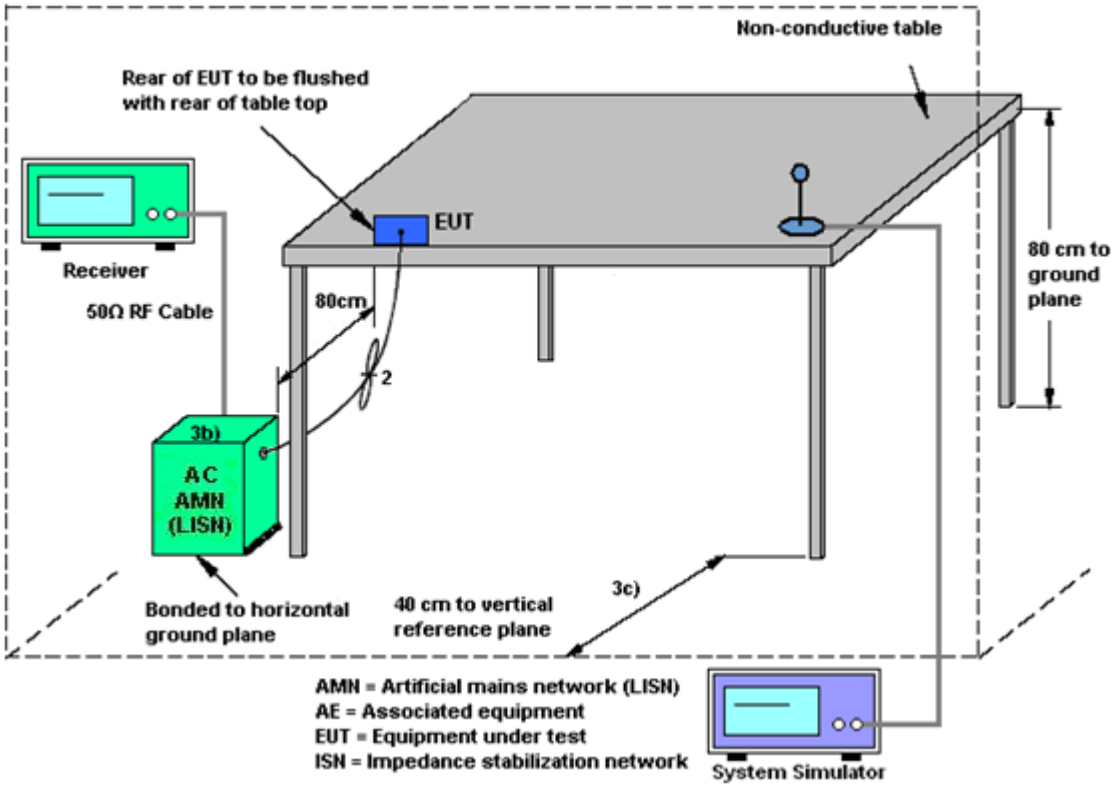
3.5.2 Measuring Instruments

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 Automatically Discontinue Transmission

3.6.1 Limit of Automatically Discontinue Transmission

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization to describe how this requirement is met.

3.6.2 Measuring Instruments

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

3.6.3 Test Result of Automatically Discontinue Transmission

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.

3.7 Antenna Requirements

3.7.1 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.

3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.7.3 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	101078	10Hz~40GHz	Apr. 17, 2020	Jan. 14, 2021	Apr. 16, 2021	Conducted (TH01-SZ)
Pulse Power Senor	Anritsu	MA2411B	1207253	30MHz~40GHz	Dec. 25, 2020	Jan. 14, 2021	Dec. 24, 2021	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1218010	50MHz Bandwidth	Dec. 25, 2020	Jan. 14, 2021	Dec. 24, 2021	Conducted (TH01-SZ)
EMI Test Receiver&SA	Agilent	N9038A	MY52260185	20Hz~26.5GHz	Jul. 21, 2020	Feb. 19, 2021	Jul. 20, 2021	Radiation (03CH01-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY55150213	10Hz~44GHz	Jul. 21, 2020	Feb. 19, 2021	Jul. 20, 2021	Radiation (03CH01-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	Jun. 22, 2020	Feb. 19, 2021	Jun. 21, 2021	Radiation (03CH01-SZ)
Bilog Antenna	TeseQ	CBL6112D	35407	30MHz-2GHz	Jul. 15, 2020	Feb. 19, 2021	Jul. 14, 2021	Radiation (03CH01-SZ)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00119436	1GHz~18GHz	Jul. 25, 2020	Feb. 19, 2021	Jul. 24, 2021	Radiation (03CH01-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18Ghz-40GHz	Apr. 23, 2020	Feb. 19, 2021	Apr. 22, 2021	Radiation (03CH01-SZ)
LF Amplifier	Burgeon	BPA-530	102209	0.01~3000Mhz	Apr. 17, 2020	Feb. 19, 2021	Apr. 16, 2021	Radiation (03CH01-SZ)
HF Amplifier	MITEQ	AMF-7D-00101800-30-10P-R	1943528	1GHz~18GHz	Oct. 17, 2020	Feb. 19, 2021	Oct. 16, 2021	Radiation (03CH01-SZ)
HF Amplifier	KEYSIGHT	83017A	MY53270104	0.5GHz~26.5Ghz	Dec. 27, 2020	Feb. 19, 2021	Dec. 26, 2021	Radiation (03CH01-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Jul. 21, 2020	Feb. 19, 2021	Jul. 20, 2021	Radiation (03CH01-SZ)
AC Power Source	Chroma	61601	616010001985	N/A	NCR	Feb. 19, 2021	NCR	Radiation (03CH01-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Feb. 19, 2021	NCR	Radiation (03CH01-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Feb. 19, 2021	NCR	Radiation (03CH01-SZ)
EMI Receiver	R&S	ESR7	101630	9kHz~7GHz;	Dec. 25, 2020	Jan. 13, 2021	Dec. 24, 2021	Conduction (CO01-SZ)
AC LISN	EMCO	3816/2 LISN	00103912	9kHz~30MHz	Dec. 25, 2020	Jan. 13, 2021	Dec. 24, 2021	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	EMCO	3816/2SH	00103892	9kHz~30MHz	Oct. 15, 2020	Jan. 13, 2021	Oct. 14, 2021	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000891	100Vac~250Vac	Jul. 21, 2020	Jan. 13, 2021	Jul. 20, 2021	Conduction (CO01-SZ)

NCR: No Calibration Required

5 Uncertainty of Evaluation

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

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.7dB**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.7dB**

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

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

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

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

Appendix A. Conducted Test Results

Report Number : FR120201F

Test Engineer:	2021/1/14	Temperature:	21~25	°C
Test Date:	Zhang Xue Yi	Relative Humidity:	51~54	%

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

Band IV									
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)	26 dB Bandwidth (MHz)	6 dB Bandwidth (MHz)	6dB Bandwidth min. Limit (MHz)	Pass/Fail
11a	6M bps	1	149	5745	17.08	35.91	16.33	0.5	Pass
11a	6Mbps	1	157	5785	17.08	34.52	16.33	0.5	Pass
11a	6Mbps	1	165	5825	16.98	36.76	16.33	0.5	Pass
HT20	MCS 0	1	149	5745	18.03	41.66	17.28	0.5	Pass
HT20	MCS 0	1	157	5785	17.93	41.86	17.48	0.5	Pass
HT20	MCS 0	1	165	5825	17.93	38.11	17.53	0.5	Pass
HT40	MCS 0	1	151	5755	36.56	61.14	35.69	0.5	Pass
HT40	MCS 0	1	159	5795	36.56	54.13	35.60	0.5	Pass
VHT80	MCS 0	1	155	5775	76.84	99.42	75.76	0.5	Pass

Report Number : FR120201F

TEST RESULTS DATA
Average Power Table

Band IV										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)		Pass/Fail
11a	6M bps	1	149	5745	0.40	16.07	30.00	-4.30		Pass
11a	6Mbps	1	157	5785	0.40	15.81	30.00	-4.30		Pass
11a	6Mbps	1	165	5825	0.40	16.47	30.00	-4.30		Pass
HT20	MCS 0	1	149	5745	0.43	16.37	30.00	-4.30		Pass
HT20	MCS 0	1	157	5785	0.43	16.07	30.00	-4.30		Pass
HT20	MCS 0	1	165	5825	0.43	15.84	30.00	-4.30		Pass
HT40	MCS 0	1	151	5755	0.81	16.13	30.00	-4.30		Pass
HT40	MCS 0	1	159	5795	0.81	15.85	30.00	-4.30		Pass
VHT20	MCS 0	1	149	5745	0.41	16.30	30.00	-4.30		Pass
VHT20	MCS 0	1	157	5785	0.41	16.06	30.00	-4.30		Pass
VHT20	MCS 0	1	165	5825	0.41	15.83	30.00	-4.30		Pass
VHT40	MCS 0	1	151	5755	0.80	16.11	30.00	-4.30		Pass
VHT40	MCS 0	1	159	5795	0.80	15.80	30.00	-4.30		Pass
VHT80	MCS 0	1	155	5775	1.50	15.70	30.00	-4.30		Pass

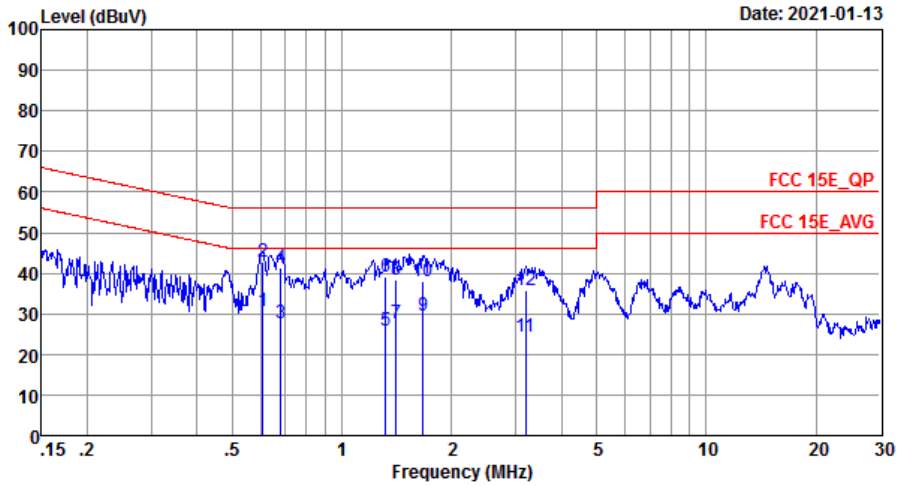
Report Number : FR120201F

TEST RESULTS DATA
Power Spectral Density

Band IV										
Mod.	Data Rate	N_{TX}	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	0.40	2.22	2.11	30.00	-4.30	Pass
11a	6Mbps	1	157	5785	0.40	2.22	1.92	30.00	-4.30	Pass
11a	6Mbps	1	165	5825	0.40	2.22	2.49	30.00	-4.30	Pass
HT20	MCS 0	1	149	5745	0.43	2.22	2.16	30.00	-4.30	Pass
HT20	MCS 0	1	157	5785	0.43	2.22	1.83	30.00	-4.30	Pass
HT20	MCS 0	1	165	5825	0.43	2.22	1.60	30.00	-4.30	Pass
HT40	MCS 0	1	151	5755	0.81	2.22	-0.94	30.00	-4.30	Pass
HT40	MCS 0	1	159	5795	0.81	2.22	-1.06	30.00	-4.30	Pass
VHT80	MCS 0	1	155	5775	1.50	2.22	-4.62	30.00	-4.30	Pass

Appendix B. AC Conducted Emission Test Results

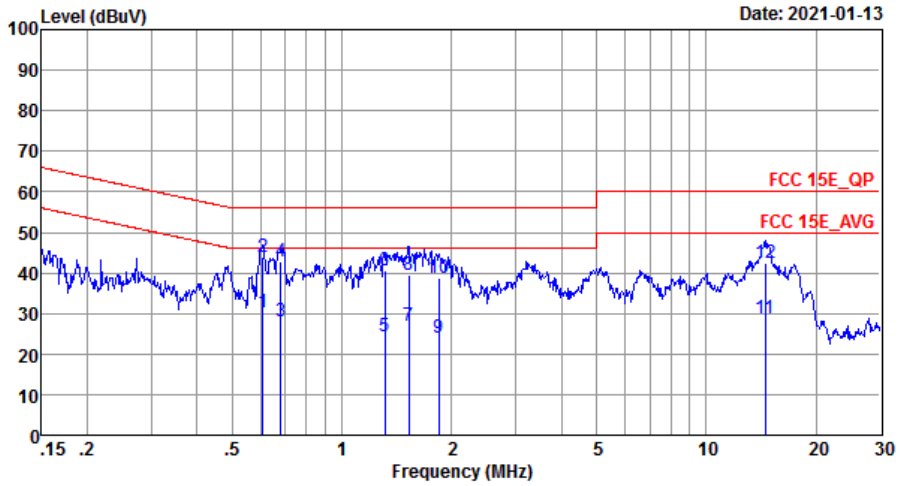
Test Engineer :	Yan Zheng	**Temperature :**	22~25℃
		Relative Humidity :	50~55%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line



Site : CO01-SZ
Condition: FCC 15E_QP LISN_20200719_L LINE

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.61	30.59	-15.41	46.00	20.50	0.02	10.07	Average
2	*	0.61	42.89	-13.11	56.00	32.80	0.02	10.07	QP
3		0.68	27.79	-18.21	46.00	17.70	0.02	10.07	Average
4		0.68	41.39	-14.61	56.00	31.30	0.02	10.07	QP
5		1.32	25.94	-20.06	46.00	15.80	0.09	10.05	Average
6		1.32	39.24	-16.76	56.00	29.10	0.09	10.05	QP
7		1.41	27.74	-18.26	46.00	17.60	0.09	10.05	Average
8		1.41	38.44	-17.56	56.00	28.30	0.09	10.05	QP
9		1.67	29.35	-16.65	46.00	19.20	0.10	10.05	Average
10		1.67	37.85	-18.15	56.00	27.70	0.10	10.05	QP
11		3.19	24.46	-21.54	46.00	14.20	0.16	10.10	Average
12		3.19	35.66	-20.34	56.00	25.40	0.16	10.10	QP

Test Engineer :	Yan Zheng	**Temperature :**	22~25℃
		Relative Humidity :	50~55%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral



Site : CO01-SZ
Condition: FCC 15E_QP LISN_20200719_N NEUTRAL

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.61	30.19	-15.81	46.00	20.10	0.02	10.07	Average
2	*	0.61	43.99	-12.01	56.00	33.90	0.02	10.07	QP
3		0.68	27.89	-18.11	46.00	17.80	0.02	10.07	Average
4		0.68	42.89	-13.11	56.00	32.80	0.02	10.07	QP
5		1.31	24.30	-21.70	46.00	14.20	0.05	10.05	Average
6		1.31	40.70	-15.30	56.00	30.60	0.05	10.05	QP
7		1.53	26.90	-19.10	46.00	16.80	0.05	10.05	Average
8		1.53	39.30	-16.70	56.00	29.20	0.05	10.05	QP
9		1.85	23.90	-22.10	46.00	13.80	0.05	10.05	Average
10		1.85	38.60	-17.40	56.00	28.50	0.05	10.05	QP
11		14.52	28.80	-21.20	50.00	18.19	0.32	10.29	Average
12		14.52	42.40	-17.60	60.00	31.79	0.32	10.29	QP

Note:

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

Appendix C. Radiated Spurious Emission

Band 4 - 5725~5850MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable 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		5639.2	49.69	-18.61	68.3	40.75	32.2	9.84	33.1	103	44	P	H
		5668	48.83	-32.79	81.62	39.81	32.2	9.92	33.1	103	44	P	H
		5719	65.16	-45.36	110.52	56.05	32.2	10.01	33.1	103	44	P	H
		5724.2	68.95	-51.43	120.38	59.84	32.2	10.01	33.1	103	44	P	H
	*	5745	106.27	-	-	97.08	32.2	10.09	33.1	103	44	P	H
		5745	99.64	-	-	90.45	32.2	10.09	33.1	103	44	A	H
		5605	48.48	-19.82	68.3	39.62	32.2	9.76	33.1	100	230	P	V
		5692.2	47.59	-51.88	99.47	38.57	32.2	9.92	33.1	100	230	P	V
		5718	58.67	-51.57	110.24	49.56	32.2	10.01	33.1	100	230	P	V
		5722.6	60.19	-56.54	116.73	51.08	32.2	10.01	33.1	100	230	P	V
	*	5745	98.04	-	-	88.85	32.2	10.09	33.1	100	230	P	V
		5745	91.51	-	-	82.32	32.2	10.09	33.1	100	230	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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 157 5785MHz		5633	48.8	-19.5	68.3	39.86	32.2	9.84	33.1	102	48	P	H
		5687	48.34	-47.3	95.64	39.32	32.2	9.92	33.1	102	48	P	H
		5715	47.98	-61.42	109.4	38.87	32.2	10.01	33.1	102	48	P	H
		5724.8	48.21	-73.53	121.74	39.1	32.2	10.01	33.1	102	48	P	H
	*	5785	106.34	-	-	97.07	32.2	10.17	33.1	102	48	P	H
		5785	99.12	-	-	89.85	32.2	10.17	33.1	102	48	A	H
		5850	48.99	-73.21	122.2	39.56	32.28	10.25	33.1	102	48	P	H
		5866.6	48.51	-59.04	107.55	38.98	32.3	10.33	33.1	102	48	P	H
		5900.8	49.71	-36.41	86.12	40.04	32.35	10.42	33.1	102	48	P	H
		5935.4	48.69	-19.61	68.3	38.89	32.4	10.5	33.1	102	48	P	H
		5622.8	48.91	-19.39	68.3	39.97	32.2	9.84	33.1	109	238	P	V
		5673.2	48.43	-37.03	85.46	39.41	32.2	9.92	33.1	109	238	P	V
		5705.8	47.36	-59.47	106.83	38.25	32.2	10.01	33.1	109	238	P	V
		5725	47.35	-74.85	122.2	38.24	32.2	10.01	33.1	109	238	P	V
	*	5785	99.66	-	-	90.39	32.2	10.17	33.1	109	238	P	V
		5785	92.52	-	-	83.25	32.2	10.17	33.1	109	238	A	V
		5853	47.18	-68.18	115.36	37.75	32.28	10.25	33.1	109	238	P	V
		5872.4	47.92	-58.01	105.93	38.38	32.31	10.33	33.1	109	238	P	V
		5878	49.44	-53.54	102.98	39.89	32.32	10.33	33.1	109	238	P	V
		5948.4	48.96	-19.34	68.3	39.14	32.42	10.5	33.1	109	238	P	V

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 165 5825MHz	*	5825	106.83	-	-	97.44	32.24	10.25	33.1	100	52	P	H
		5825	99.45	-	-	90.06	32.24	10.25	33.1	100	52	A	H
		5851.6	76.3	-42.25	118.55	66.87	32.28	10.25	33.1	100	52	P	H
		5855.8	73.02	-37.56	110.58	63.51	32.28	10.33	33.1	100	52	P	H
		5875.2	60.33	-44.72	105.05	50.79	32.31	10.33	33.1	100	52	P	H
		5932.4	50.31	-17.99	68.3	40.59	32.4	10.42	33.1	100	52	P	H
	*	5825	99.57	-	-	90.18	32.24	10.25	33.1	109	242	P	V
		5825	92.8	-	-	83.41	32.24	10.25	33.1	109	242	A	V
		5854.6	67.63	-44.08	111.71	58.2	32.28	10.25	33.1	109	242	P	V
		5859	62.15	-47.53	109.68	52.63	32.29	10.33	33.1	109	242	P	V
		5879.6	55.48	-46.31	101.79	45.93	32.32	10.33	33.1	109	242	P	V
		5936.8	48.72	-19.58	68.3	38.91	32.41	10.5	33.1	109	242	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 149 5745MHz		11490	48.19	-25.81	74	47.69	40.5	12.88	52.88	165	110	P	H
		17235	49.58	-18.72	68.3	43	43.2	15.71	52.33	170	155	P	H
		11490	48.35	-25.65	74	47.85	40.5	12.88	52.88	165	110	P	V
		17235	50.45	-17.85	68.3	43.87	43.2	15.71	52.33	170	155	P	V
802.11a CH 157 5785MHz		11570	47.9	-26.1	74	47.45	40.32	12.93	52.8	175	198	P	H
		17355	48	-20.3	68.3	41.08	43.61	15.8	52.49	189	185	P	H
		11570	48.18	-25.82	74	47.73	40.32	12.93	52.8	175	198	P	V
		17355	48.29	-20.01	68.3	41.37	43.61	15.8	52.49	189	185	P	V
802.11a CH 165 5825MHz		11650	47.99	-26.01	74	47.6	40.11	12.99	52.71	154	342	P	H
		17475	48	-20.3	68.3	40.75	44.01	15.89	52.65	110	350	P	H
		11650	47.96	-26.04	74	47.57	40.11	12.99	52.71	154	342	P	V
		17475	50.13	-18.17	68.3	42.88	44.01	15.89	52.65	110	350	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 149 5745MHz		5628	47.8	-20.5	68.3	38.86	32.2	9.84	33.1	105	57	P	H
		5697.2	49.15	-53.99	103.14	40.13	32.2	9.92	33.1	105	57	P	H
		5718.6	69	-41.41	110.41	59.89	32.2	10.01	33.1	105	57	P	H
		5724.6	71.9	-49.39	121.29	62.79	32.2	10.01	33.1	105	57	P	H
	*	5745	106.09	-	-	96.9	32.2	10.09	33.1	105	57	P	H
		5745	98.97	-	-	89.78	32.2	10.09	33.1	105	57	A	H
		5630.2	48.63	-19.67	68.3	39.69	32.2	9.84	33.1	112	239	P	V
		5655.2	48.41	-23.74	72.15	39.47	32.2	9.84	33.1	112	239	P	V
		5714.6	55.23	-54.06	109.29	46.12	32.2	10.01	33.1	112	239	P	V
		5724.6	67.22	-54.07	121.29	58.11	32.2	10.01	33.1	112	239	P	V
	*	5745	98.81	-	-	89.62	32.2	10.09	33.1	112	239	P	V
		5745	92.73	-	-	83.54	32.2	10.09	33.1	112	239	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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 157 5785MHz		5614.4	48.84	-19.46	68.3	39.98	32.2	9.76	33.1	100	45	P	H
		5682	49.09	-42.86	91.95	40.07	32.2	9.92	33.1	100	45	P	H
		5715.6	48.36	-61.21	109.57	39.25	32.2	10.01	33.1	100	45	P	H
		5723	48.9	-68.74	117.64	39.79	32.2	10.01	33.1	100	45	P	H
	*	5785	106.44	-	-	97.17	32.2	10.17	33.1	100	45	P	H
		5785	99.51	-	-	90.24	32.2	10.17	33.1	100	45	A	H
		5852	47.67	-69.97	117.64	38.24	32.28	10.25	33.1	100	45	P	H
		5871.4	48.43	-57.78	106.21	38.89	32.31	10.33	33.1	100	45	P	H
		5879	48.53	-53.71	102.24	38.98	32.32	10.33	33.1	100	45	P	H
		5933.4	48.29	-20.01	68.3	38.57	32.4	10.42	33.1	100	45	P	H
		5602.4	47.98	-20.32	68.3	39.12	32.2	9.76	33.1	100	236	P	V
		5690.6	48.31	-49.98	98.29	39.29	32.2	9.92	33.1	100	236	P	V
		5704.6	47.46	-59.03	106.49	38.35	32.2	10.01	33.1	100	236	P	V
		5722.6	47.88	-68.85	116.73	38.77	32.2	10.01	33.1	100	236	P	V
	*	5785	100.02	-	-	90.75	32.2	10.17	33.1	100	236	P	V
		5785	92.81	-	-	83.54	32.2	10.17	33.1	100	236	A	V
		5850.4	47.39	-73.9	121.29	37.96	32.28	10.25	33.1	100	236	P	V
		5867.6	48.57	-58.7	107.27	39.04	32.3	10.33	33.1	100	236	P	V
		5915.8	48.63	-26.44	75.07	38.94	32.37	10.42	33.1	100	236	P	V
		5939.8	48.32	-19.98	68.3	38.51	32.41	10.5	33.1	100	236	P	V

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 165 5825MHz	*	5825	105.7	-	-	96.31	32.24	10.25	33.1	100	54	P	H
		5825	99.61	-	-	90.22	32.24	10.25	33.1	100	54	A	H
		5853.2	69.25	-45.65	114.9	59.82	32.28	10.25	33.1	100	54	P	H
		5855	62.58	-48.22	110.8	53.15	32.28	10.25	33.1	100	54	P	H
		5875.6	52.6	-52.16	104.76	43.06	32.31	10.33	33.1	100	54	P	H
		5944.2	48.99	-19.31	68.3	39.17	32.42	10.5	33.1	100	54	P	H
	*	5825	99.38	-	-	89.99	32.24	10.25	33.1	125	254	P	V
		5825	92.91	-	-	83.52	32.24	10.25	33.1	125	254	A	V
		5850.4	64.37	-56.92	121.29	54.94	32.28	10.25	33.1	125	254	P	V
		5857.6	59.19	-50.88	110.07	49.67	32.29	10.33	33.1	125	254	P	V
		5903	49	-35.5	84.5	39.33	32.35	10.42	33.1	125	254	P	V
		5931.6	50.4	-17.9	68.3	40.68	32.4	10.42	33.1	125	254	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n		11490	48.54	-25.46	74	48.04	40.5	12.88	52.88	126	154	P	H
HT20		17235	47.82	-20.48	68.3	41.24	43.2	15.71	52.33	174	118	P	H
CH 149		11490	47.88	-26.12	74	47.38	40.5	12.88	52.88	180	196	P	V
5745MHz		17235	48.9	-19.4	68.3	42.32	43.2	15.71	52.33	129	137	P	V
802.11n		11570	49.14	-24.86	74	48.69	40.32	12.93	52.8	142	196	P	H
HT20		17355	48.81	-19.49	68.3	41.89	43.61	15.8	52.49	115	214	P	H
CH 157		11570	48.77	-25.23	74	48.32	40.32	12.93	52.8	119	180	P	V
5785MHz		17355	49	-19.3	68.3	42.08	43.61	15.8	52.49	169	277	P	V
802.11n		11650	50.07	-23.93	74	49.68	40.11	12.99	52.71	196	314	P	H
HT20		17475	49.34	-18.96	68.3	42.09	44.01	15.89	52.65	124	316	P	H
CH 165		11650	47.33	-26.67	74	46.94	40.11	12.99	52.71	181	294	P	V
5825MHz		17475	48.78	-19.52	68.3	41.53	44.01	15.89	52.65	164	349	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

WIFI 802.11n HT40 (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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 151 5755MHz		5646	49.09	-19.21	68.3	40.15	32.2	9.84	33.1	114	41	P	H
		5696.4	54.37	-48.18	102.55	45.35	32.2	9.92	33.1	114	41	P	H
		5720	67.61	-43.19	110.8	58.5	32.2	10.01	33.1	114	41	P	H
		5725	71.74	-50.46	122.2	62.63	32.2	10.01	33.1	114	41	P	H
	*	5755	102.85	-	-	93.66	32.2	10.09	33.1	114	41	P	H
		5755	96.71	-	-	87.52	32.2	10.09	33.1	114	41	A	H
		5851.6	48.34	-70.21	118.55	38.91	32.28	10.25	33.1	114	41	P	H
		5874.8	48.54	-56.72	105.26	39	32.31	10.33	33.1	114	41	P	H
		5897.6	48.66	-39.82	88.48	38.99	32.35	10.42	33.1	114	41	P	H
		5937.8	50.44	-17.86	68.3	40.63	32.41	10.5	33.1	114	41	P	H
		5648.8	48.56	-19.74	68.3	39.62	32.2	9.84	33.1	132	249	P	V
		5697.2	49.43	-53.71	103.14	40.41	32.2	9.92	33.1	132	249	P	V
		5720	63.35	-47.45	110.8	54.24	32.2	10.01	33.1	132	249	P	V
		5720.2	65.48	-45.78	111.26	56.37	32.2	10.01	33.1	132	249	P	V
	*	5755	95.33	-	-	86.14	32.2	10.09	33.1	132	249	P	V
		5755	89.3	-	-	80.11	32.2	10.09	33.1	132	249	A	V
		5853.2	48.35	-66.55	114.9	38.92	32.28	10.25	33.1	132	249	P	V
		5875	48.02	-57.18	105.2	38.48	32.31	10.33	33.1	132	249	P	V
		5906	49.02	-33.27	82.29	39.34	32.36	10.42	33.1	132	249	P	V
		5942.8	49.86	-18.44	68.3	40.05	32.41	10.5	33.1	132	249	P	V

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 159 5795MHz		5620.6	48.2	-20.1	68.3	39.34	32.2	9.76	33.1	100	48	P	H
		5674.8	48.98	-37.66	86.64	39.96	32.2	9.92	33.1	100	48	P	H
		5719.2	52.89	-57.69	110.58	43.78	32.2	10.01	33.1	100	48	P	H
		5721.2	51.75	-61.79	113.54	42.64	32.2	10.01	33.1	100	48	P	H
	*	5795	103.22	-	-	93.95	32.2	10.17	33.1	100	48	P	H
		5795	95.72	-	-	86.45	32.2	10.17	33.1	100	48	A	H
		5851	55.84	-64.08	119.92	46.41	32.28	10.25	33.1	100	48	P	H
		5856.4	55.39	-55.02	110.41	45.88	32.28	10.33	33.1	100	48	P	H
		5879	50.41	-51.83	102.24	40.86	32.32	10.33	33.1	100	48	P	H
		5941.8	48.34	-19.96	68.3	38.53	32.41	10.5	33.1	100	48	P	H
		5628.8	48.84	-19.46	68.3	39.9	32.2	9.84	33.1	100	238	P	V
		5680.8	48.21	-42.86	91.07	39.19	32.2	9.92	33.1	100	238	P	V
		5715.2	47.87	-61.59	109.46	38.76	32.2	10.01	33.1	100	238	P	V
		5721	49.04	-64.04	113.08	39.93	32.2	10.01	33.1	100	238	P	V
	*	5795	97.07	-	-	87.8	32.2	10.17	33.1	100	238	P	V
		5795	90.48	-	-	81.21	32.2	10.17	33.1	100	238	A	V
		5850.2	50.14	-71.6	121.74	40.71	32.28	10.25	33.1	100	238	P	V
		5856.8	51.07	-59.23	110.3	41.55	32.29	10.33	33.1	100	238	P	V
		5923.4	49.66	-19.82	69.48	39.95	32.39	10.42	33.1	100	238	P	V
		5943.2	49.22	-19.08	68.3	39.41	32.41	10.5	33.1	100	238	P	V

Remark

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

Band 4 5725~5850MHz

WIFI 802.11n HT40 (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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n		11510	48.33	-25.67	74	47.88	40.47	12.88	52.9	181	296	P	H
HT40		17265	47.83	-20.47	68.3	41.16	43.3	15.74	52.37	147	329	P	H
CH 151		11510	48.99	-25.01	74	48.54	40.47	12.88	52.9	155	84	P	V
5755MHz		17265	47.92	-20.38	68.3	41.25	43.3	15.74	52.37	158	193	P	V
802.11n		11590	48.3	-25.7	74	47.85	40.27	12.96	52.78	152	321	P	H
HT40		17385	49.09	-19.21	68.3	42.09	43.71	15.83	52.54	126	226	P	H
CH 159		11590	49.24	-24.76	74	48.79	40.27	12.96	52.78	115	236	P	V
5795MHz		17385	47.66	-20.64	68.3	40.66	43.71	15.83	52.54	141	292	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT80 CH 155 5775MHz		5621.8	56.98	-11.32	68.3	48.04	32.2	9.84	33.1	100	48	P	H
		5694.4	63.84	-37.24	101.08	54.82	32.2	9.92	33.1	100	48	P	H
		5716.4	68.37	-41.42	109.79	59.26	32.2	10.01	33.1	100	48	P	H
		5724.2	71.36	-49.02	120.38	62.25	32.2	10.01	33.1	100	48	P	H
	*	5775	99.63	-	-	90.44	32.2	10.09	33.1	100	48	P	H
		5775	92.35	-	-	83.16	32.2	10.09	33.1	100	48	A	H
		5851.4	67.35	-51.66	119.01	57.92	32.28	10.25	33.1	100	48	P	H
		5859.2	66.51	-43.11	109.62	56.99	32.29	10.33	33.1	100	48	P	H
		5876.6	60.06	-43.95	104.01	50.52	32.31	10.33	33.1	100	48	P	H
		5928.2	53.53	-14.77	68.3	43.82	32.39	10.42	33.1	100	48	P	H
		5628.4	50.18	-18.12	68.3	41.24	32.2	9.84	33.1	102	236	P	V
		5685.6	58.99	-35.62	94.61	49.97	32.2	9.92	33.1	102	236	P	V
		5716.8	60.31	-49.6	109.91	51.2	32.2	10.01	33.1	102	236	P	V
		5721.8	61.47	-53.43	114.9	52.36	32.2	10.01	33.1	102	236	P	V
	*	5775	92.92	-	-	83.73	32.2	10.09	33.1	102	236	P	V
		5775	85.7	-	-	76.51	32.2	10.09	33.1	102	236	A	V
		5850.6	58.44	-62.39	120.83	49.01	32.28	10.25	33.1	102	236	P	V
		5867	59.07	-48.37	107.44	49.54	32.3	10.33	33.1	102	236	P	V
		5882.2	57.44	-42.43	99.87	47.89	32.32	10.33	33.1	102	236	P	V
		5926.2	49.37	-18.93	68.3	39.66	32.39	10.42	33.1	102	236	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac		11550	45.56	-28.44	74	43.46	38.99	20.79	57.68	160	360	P	H
VHT80		17325	48.44	-19.86	68.3	39.97	41.57	24.75	57.85	170	360	P	H
CH 155		11550	45.89	-28.11	74	43.79	38.99	20.79	57.68	142	326	P	V
5775MHz		17325	48.34	-19.96	68.3	39.87	41.57	24.75	57.85	133	329	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

Emission below 1GHz

5GHz WIFI 802.11ac VHT80 (LF @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable 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)
5GHz 802.11ac VHT80 LF		43.58	28.47	-11.53	40	41.34	20.1	2.07	35.04	-	-	P	H
		81.41	27.37	-12.63	40	44.95	15.19	2.39	35.16	-	-	P	H
		152.22	34.44	-9.06	43.5	47.68	19.3	2.56	35.1	100	124	P	H
		200.72	29.69	-13.81	43.5	45.6	16.44	2.75	35.1	-	-	P	H
		269.59	29.84	-16.16	46	42.96	18.86	2.98	34.96	-	-	P	H
		984.48	30.93	-23.07	54	30.81	30.09	4.16	34.13	-	-	P	H
		36.79	30.43	-9.57	40	44.09	19.36	1.98	35	-	-	P	V
		159.98	34.34	-9.16	43.5	47.53	19.32	2.59	35.1	100	169	P	V
		198.78	31.66	-11.84	43.5	47.55	16.46	2.75	35.1	-	-	P	V
		233.7	26.69	-19.31	46	41.18	17.72	2.82	35.03	-	-	P	V
		327.79	24.38	-21.62	46	35.57	20.5	3.21	34.9	-	-	P	V
		916.58	29.2	-16.8	46	29.88	29.39	4.2	34.27	-	-	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	Cable	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. Level(dBμV/m) =

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

2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Cable 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) + Cable 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)

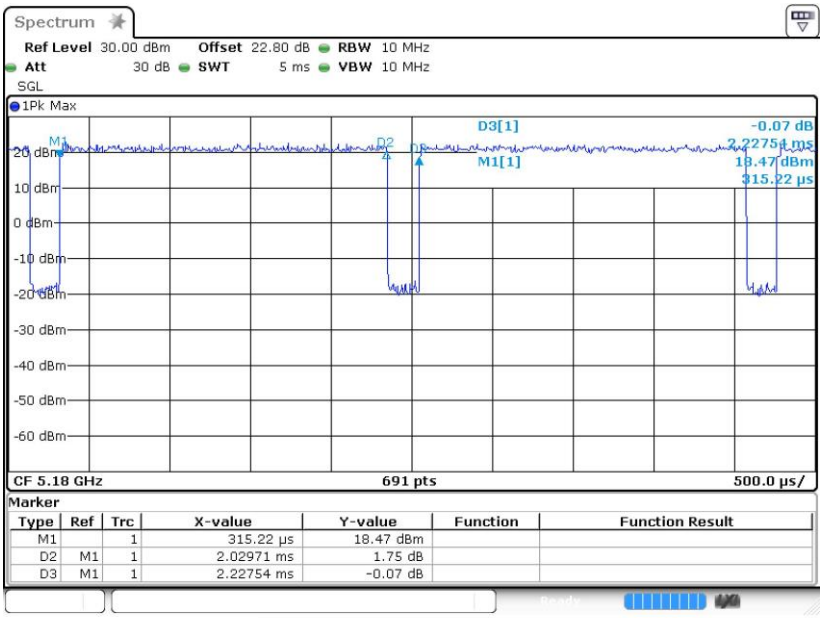
= -10.46(dB)

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

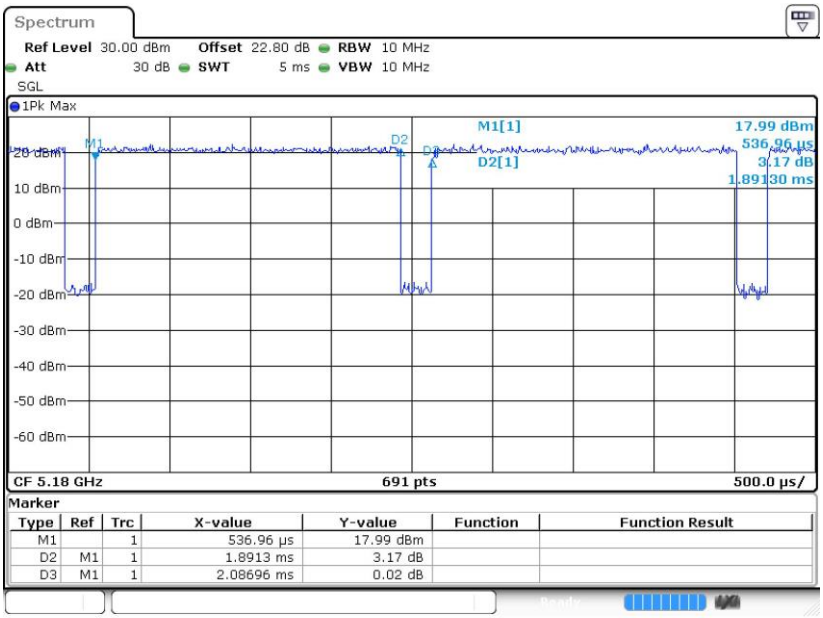
Appendix D. Duty Cycle Plots

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11a	91.12	2.0297	0.4927	1kHz
802.11n HT20	90.62	1.8913	0.5287	1kHz
802.11n HT40	82.96	0.9312	1.0739	3kHz
802.11ac VHT80	70.79	0.4565	2.1905	3kHz

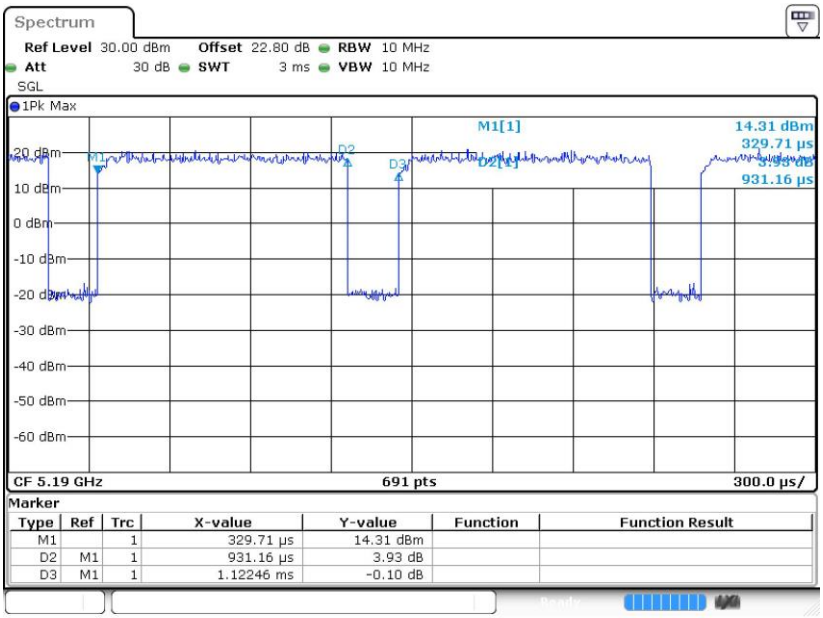
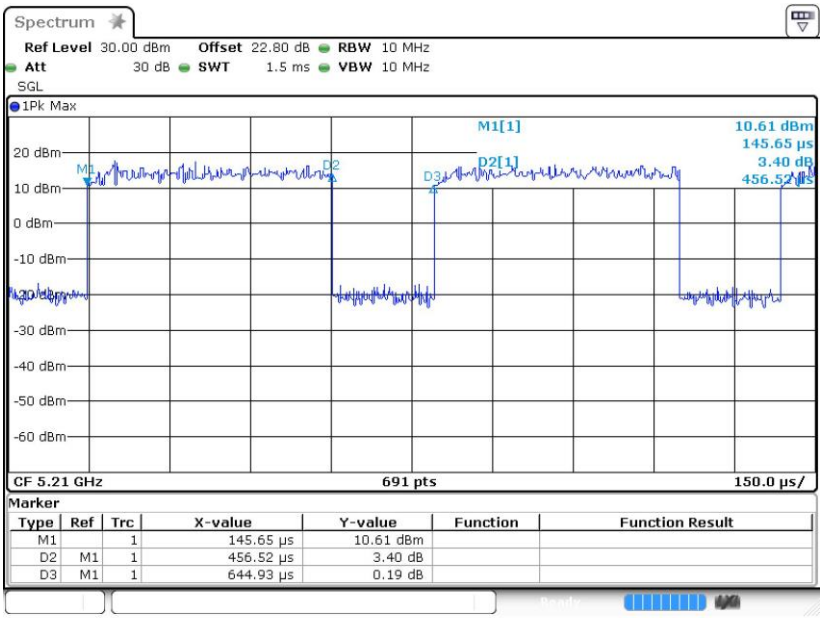
802.11a



802.11n HT20



802.11n HT40



802.11ac VHT80