FCC RF Test Report

APPLICANT	:	Motorola Mobility LLC
EQUIPMENT	:	Mobile Cellular Phone
BRAND NAME	:	Motorola
MODEL NAME	:	XT2165-1, XT2165-2
FCC ID	:	IHDT56ZP4
STANDARD	:	FCC Part 15 Subpart E §15.407
CLASSIFICATION	:	(NII) Unlicensed National Information Infrastructure
TEST DATE(S)	:	Aug. 20, 2021 ~ Sep. 08, 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.
1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055
People's Republic of China

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR170628-01F	Rev. 01	Initial issue of report	Sep. 16, 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 7.56 dB at 45.520 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 19.66 dB at 0.640 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

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	XT2165-1, XT2165-2
FCC ID	IHDT56ZP4
IMEI Code	Conducted: 355570490008623 Conduction: 355570490006130 Radiation: 357571280016279
HW Version	DVT2
SW Version	RRQ31.Q3-51
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 : 18.05 dBm / 0.0638 W 802.11n HT20 : 17.93 dBm / 0.0621 W 802.11n HT40 : 17.01 dBm / 0.0502 W 802.11ac VHT20: 17.95 dBm / 0.0624 W 802.11ac VHT40: 17.15 dBm / 0.0519 W 802.11ac VHT80: 16.12 dBm / 0.0409 W
99% Occupied Bandwidth	802.11a : 19.53 MHz 802.11ac VHT20 : 20.02 MHz 802.11ac VHT40 : 37.26 MHz 802.11ac VHT80 : 75.40 MHz
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Antenna Type / Gain	FPC Antenna with gain -6.00 dBi

Note: For 802.11n HT20 / ac VHT20 and 802.11n HT40 / ac VHT40 mode, the whole testing have assessed only 802.11n VHT20/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 (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 DFS01-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.**
	03CH02-SZ	CN1256	421272

1.7 Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH02-SZ	AUDIX	E3	6.2009-8-24a
2.	CO01-SZ	AUDIX	E3	6.120613b

1.8 Applicable Standards

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

- 47 CFR Part 15 Subpart E
- FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
- 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.

1.9 Specification of Accessory

Specification of Accessory				
AC Adapter 1(US)	**Brand Name**	Motorola (AOHAI)	**Model Name**	MC-101
AC Adapter 2(US)	**Brand Name**	Motorola (Salcomp)	**Model Name**	MC-101
AC Adapter 3(US)	**Brand Name**	Motorola (Chenyang)	**Model Name**	MC-101
Battery	**Brand Name**	Motorola (Sunwoda)	**Model Name**	JK50
USB Cable 1	**Brand Name**	Motorola(Cabletech)	**Model Name**	SC18C49697
USB Cable 2	**Brand Name**	Motorola(Saibao)	**Model Name**	SC18C24367
USB Cable 3	**Brand Name**	Motorola(Luxshare)	**Model Name**	SC18C24368
USB Cable 4	**Brand Name**	Motorola(Saibao)	**Model Name**	SC18D22297
USB Cable 5	**Brand Name**	Motorola(Luxshare)	**Model Name**	SC18D22299
USB Cable 6	**Brand Name**	Motorola(Cabletech)	**Model Name**	SC18D22298

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
802.11ac VHT20	MCS0
802.11ac VHT40	MCS0
802.11ac VHT80	MCS0

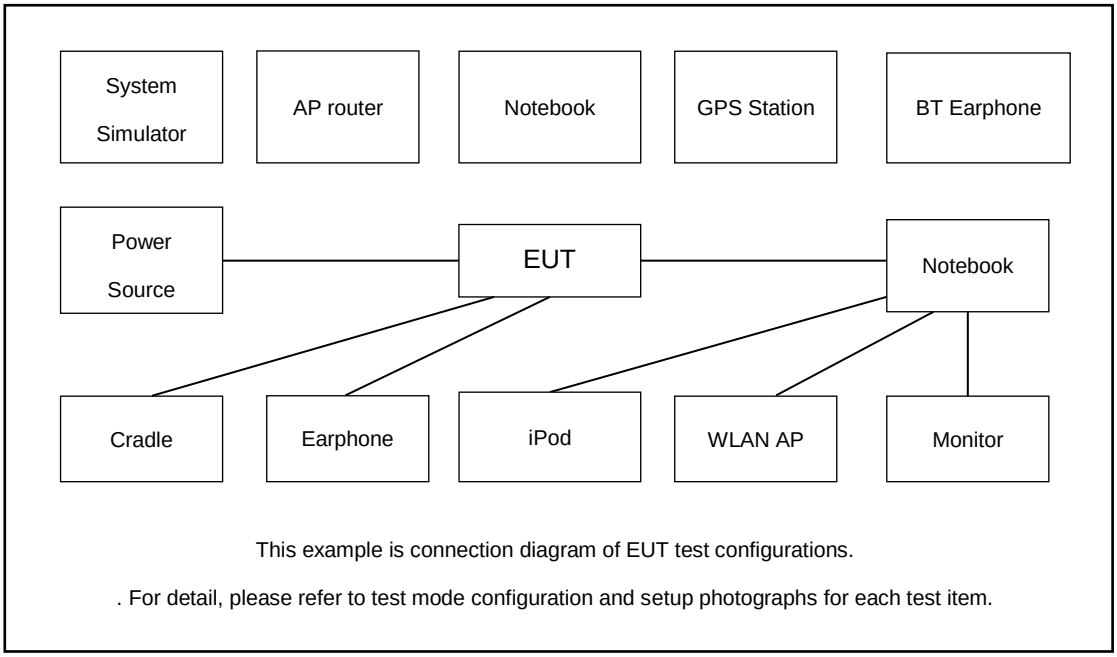
AC Conducted Emission	Mode 1 : GSM 850 Idle + Bluetooth Link + WLAN Link(5G)+ Battery + Earphone + USB Cable 2(Charging from Adapter 1)

Remark:

1. For Radiated Test Cases, The tests were performance with Adapter 1, Battery, Earphone, USB Cable 1.

Ch. #		U-NII-3：5725-5850 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(LTE)	Anritsu	MT8820C	N/A	N/A	Unshielded,1.8m
2.	WLAN AP	Dlink	DIR-820L	KA2IR820LA1	N/A	Unshielded,1.8m
3.	NOTE BOOK	Lenovo	E540	FCC DoC	NOTE BOOK	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
4.	Earphone	Apple	MC690ZP/A	N/A	N/A	N/A
5.	Bluetooth Earphone	Samsung	EO-MG900	PYAHS-107W	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 continuous 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 3.3 dB and 10dB attenuator.

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

= 3.3 + 10 = 13.3 (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.

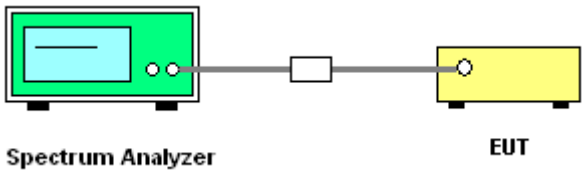
3.1.2 Measuring Instruments

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.

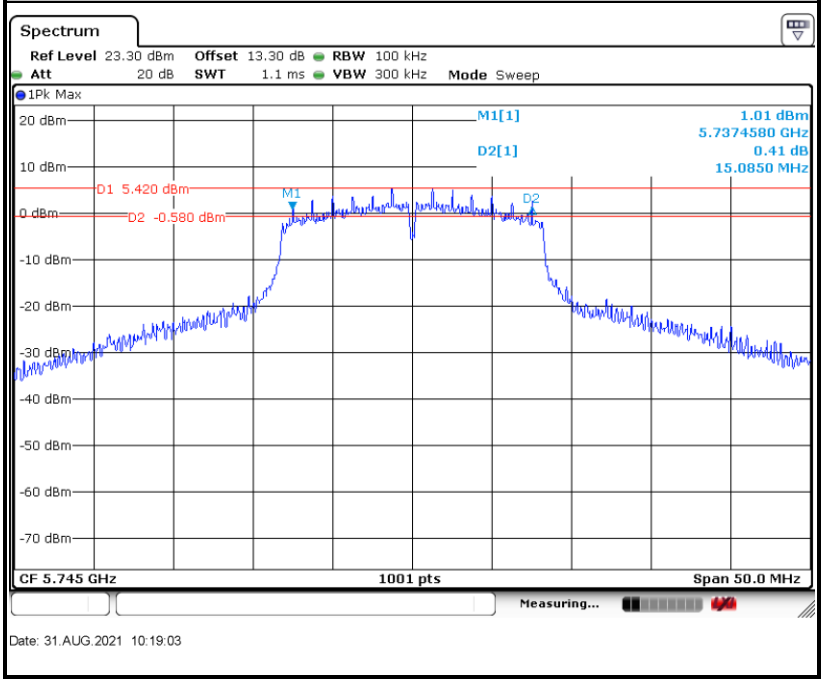
3.1.4 Test Setup



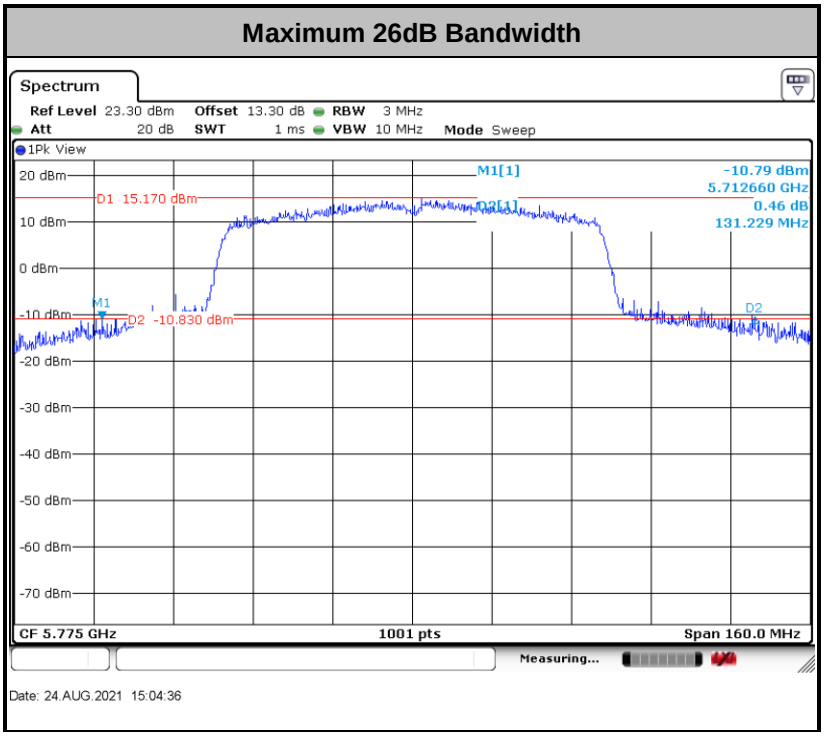
3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.

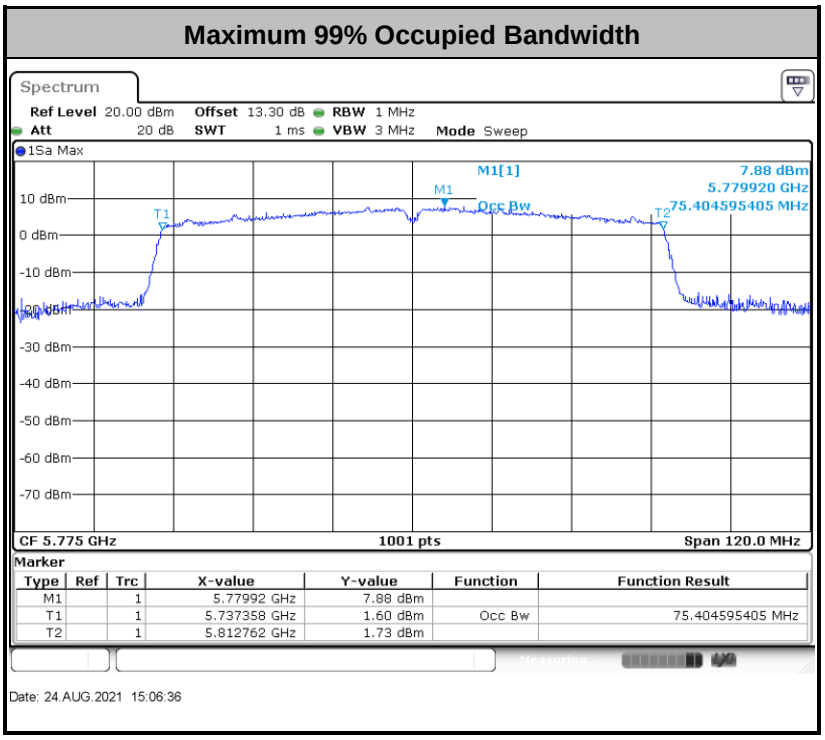
Minimum 6dB Bandwidth



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.

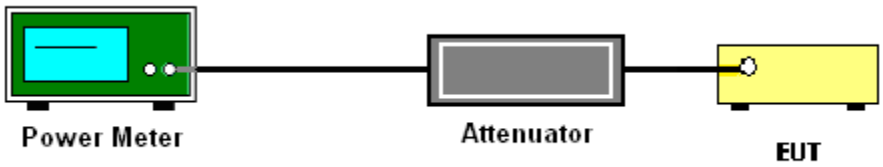
<TXBF Modes>

The testing follows Method PM-G of FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01 for TXBF modes.

Method PM-G (Measurement using a gated RF average power meter):

1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit at its maximum power control level.
3. Measure the average power of the transmitter
4. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

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 #

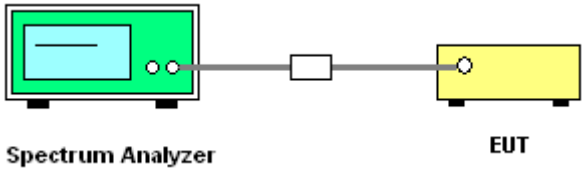
(trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction).

- 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.

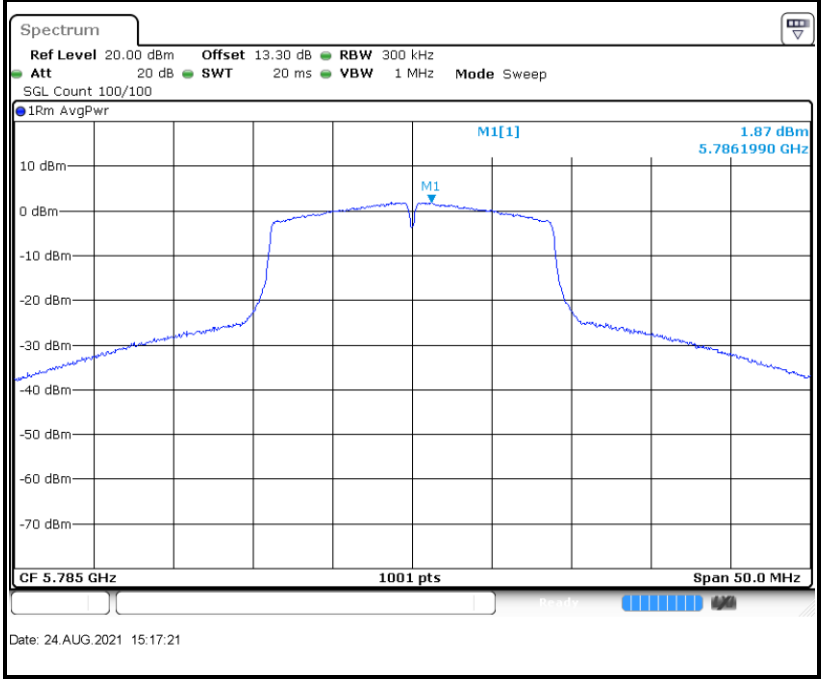
3.3.4 Test Setup



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

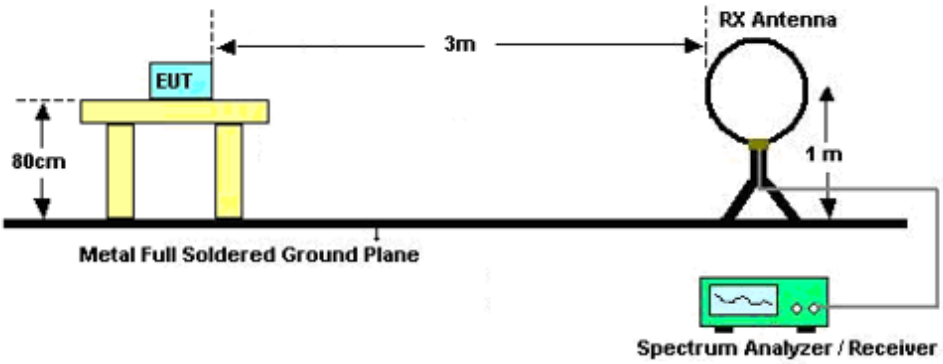
   - RBW = 1 MHz
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

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.

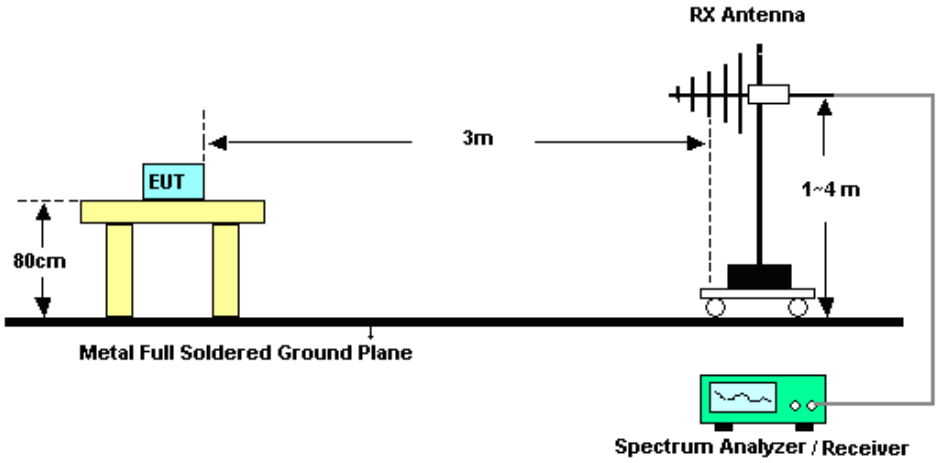
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst 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

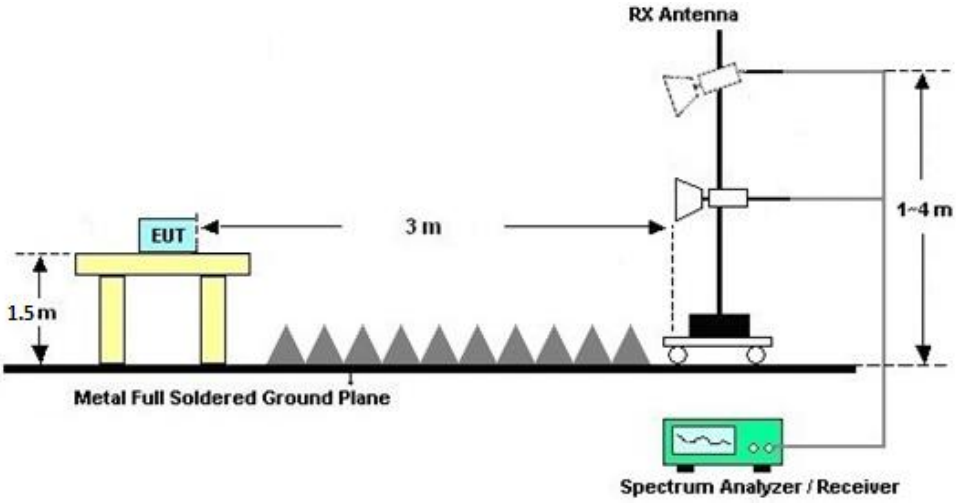
For radiated emissions below 30MHz



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.

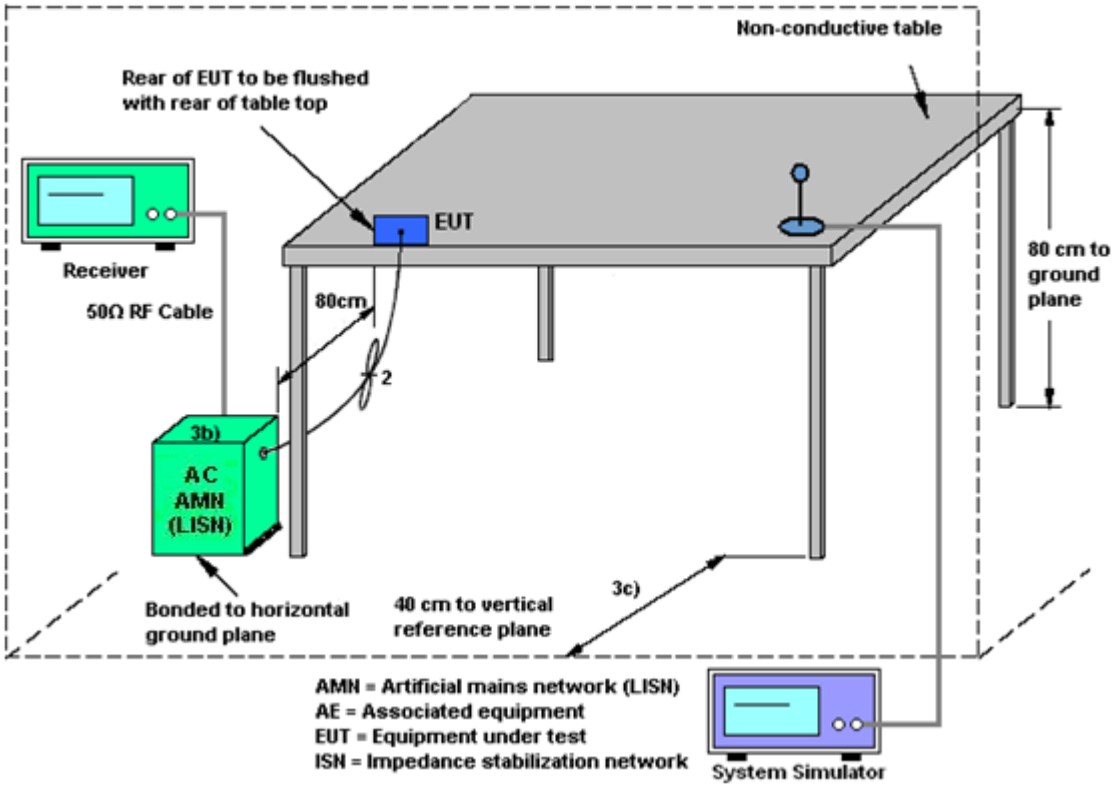
3.5.2 Measuring Instruments

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
EMI Receiver	R&S	ESR7	101630	9kHz~7GHz;	Mar. 08, 2021	Aug. 20, 2021	Mar. 07, 2022	Conduction (CO01-SZ)
AC LISN	EMCO	3816/2 LISN	00103912	9kHz~30MHz	Dec. 25, 2020	Aug. 20, 2021	Dec. 24, 2021	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	EMCO	3816/2SH	00103892	9kHz~30MHz	Oct. 15, 2020	Aug. 20, 2021	Oct. 14, 2021	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000891	100Vac~250Vac	Jul. 14, 2021	Aug. 20, 2021	Jul. 13, 2022	Conduction (CO01-SZ)
Spectrum Analyzer	R&S	FSV40	101078	10Hz~40GHz	Apr. 08, 2021	Aug. 24, 2021~ Aug. 31, 2021	Apr. 07, 2022	Conducted (TH01-SZ)
Pulse Power Senor	Anritsu	MA2411B	1207253	30MHz~40GHz	Dec. 25, 2020	Aug. 24, 2021~ Aug. 31, 2021	Dec. 24, 2021	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1218010	50MHz Bandwidth	Dec. 25, 2020	Aug. 24, 2021~ Aug. 31, 2021	Dec. 24, 2021	Conducted (TH01-SZ)
Thermal Chamber	Ten Billion Hongzhangroup	LP-150U	H2014081803	-40~+150°C	Jul. 14, 2021	Aug. 24, 2021~ Aug. 31, 2021	Jul. 13, 2022	Conducted (TH01-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY55150213	10Hz~44GHz	Jul. 13, 2021	Sep. 07, 2021	Jul. 13, 2022	Radiation (03CH02-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	Jun. 22, 2020	Sep. 07, 2021	Jun. 21, 2022	Radiation (03CH02-SZ)
Bilog Antenna	TeseQ	CBL6112D	35407	30MHz-2GHz	Jul. 15, 2021	Sep. 07, 2021	Jul. 14, 2022	Radiation (03CH02-SZ)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00119436	1GHz~18GHz	Jul. 25, 2021	Sep. 07, 2021	Jul. 24, 2022	Radiation (03CH02-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Jul. 13, 2021	Sep. 07, 2021	Jul. 13, 2022	Radiation (03CH02-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18Ghz-40GHz	Apr. 11, 2021	Sep. 07, 2021	Apr. 10, 2022	Radiation (03CH02-SZ)
LF Amplifier	Burgeon	BPA-530	102211	0.01~3000Mhz	Oct. 16, 2020	Sep. 07, 2021	Oct. 15, 2021	Radiation (03CH02-SZ)
HF Amplifier	MITEQ	AMF-7D-00101800-30-10P-R	1943528	1GHz~18GHz	Oct. 16, 2020	Sep. 07, 2021	Oct. 15, 2021	Radiation (03CH02-SZ)
HF Amplifier	KEYSIGHT	83017A	MY53270105	0.5GHz~26.5Ghz	Oct. 16, 2020	Sep. 07, 2021	Oct. 15, 2021	Radiation (03CH02-SZ)
AC Power Source	Chroma	61601	616010002470	N/A	NCR	Sep. 07, 2021	NCR	Radiation (03CH02-SZ)
Turn Table	Chaintek	T-200	N/A	0~360 degree	NCR	Sep. 07, 2021	NCR	Radiation (03CH02-SZ)
Antenna Mast	Chaintek	MBS-400	N/A	1 m~4 m	NCR	Sep. 07, 2021	NCR	Radiation (03CH02-SZ)
Signal Analyzer	R&S	FSV7	101473	10Hz~7GHz	Dec. 25, 2020	Aug. 24, 2021~ Sep. 08, 2021	Dec. 24, 2021	Conducted (DFS01-SZ)
MXG-B RF Vector Signal Generator	Keysight	N5182B	MY56200424	9kHz~6GHz	Dec. 30, 2020	Aug. 24, 2021~ Sep. 08, 2021	Dec. 29, 2021	Conducted (DFS01-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))	**2.2dB**

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))	**5.1dB**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.1dB**

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

Appendix A. Conducted Test Results

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Chen Hong	Temperature:	21~25	°C
Test Date:	2021/8/24~2021/8/31	Relative Humidity:	51~54	%

Report Number : FR170628-01F

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	19.53	40.65	15.09	0.5	Pass
11a	6Mbps	1	157	5785	19.38	39.45	15.09	0.5	Pass
11a	6Mbps	1	165	5825	19.03	40.50	15.09	0.5	Pass
VHT20	MCS 0	1	149	5745	19.98	41.55	15.09	0.5	Pass
VHT20	MCS 0	1	157	5785	20.02	41.05	15.39	0.5	Pass
VHT20	MCS 0	1	165	5825	19.53	40.45	15.09	0.5	Pass
VHT40	MCS 0	1	151	5755	37.26	68.49	35.10	0.5	Pass
VHT40	MCS 0	1	159	5795	36.96	68.22	35.10	0.5	Pass
VHT80	MCS 0	1	155	5775	75.40	131.23	75.16	0.5	Pass

Report Number : FR170628-01F

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	0.14	17.97	30.00	-6.00		Pass
11a	6Mbps	1	157	5785	0.14	18.02	30.00	-6.00		Pass
11a	6Mbps	1	165	5825	0.14	18.05	30.00	-6.00		Pass
HT20	MCS 0	1	149	5745	0.15	17.93	30.00	-6.00		Pass
HT20	MCS 0	1	157	5785	0.15	17.90	30.00	-6.00		Pass
HT20	MCS 0	1	165	5825	0.15	17.89	30.00	-6.00		Pass
HT40	MCS 0	1	151	5755	0.27	17.01	30.00	-6.00		Pass
HT40	MCS 0	1	159	5795	0.27	16.94	30.00	-6.00		Pass
VHT20	MCS 0	1	149	5745	0.13	17.94	30.00	-6.00		Pass
VHT20	MCS 0	1	157	5785	0.13	17.95	30.00	-6.00		Pass
VHT20	MCS 0	1	165	5825	0.13	17.91	30.00	-6.00		Pass
VHT40	MCS 0	1	151	5755	0.27	17.15	30.00	-6.00		Pass
VHT40	MCS 0	1	159	5795	0.27	17.03	30.00	-6.00		Pass
VHT80	MCS 0	1	155	5775	0.56	16.12	30.00	-6.00		Pass

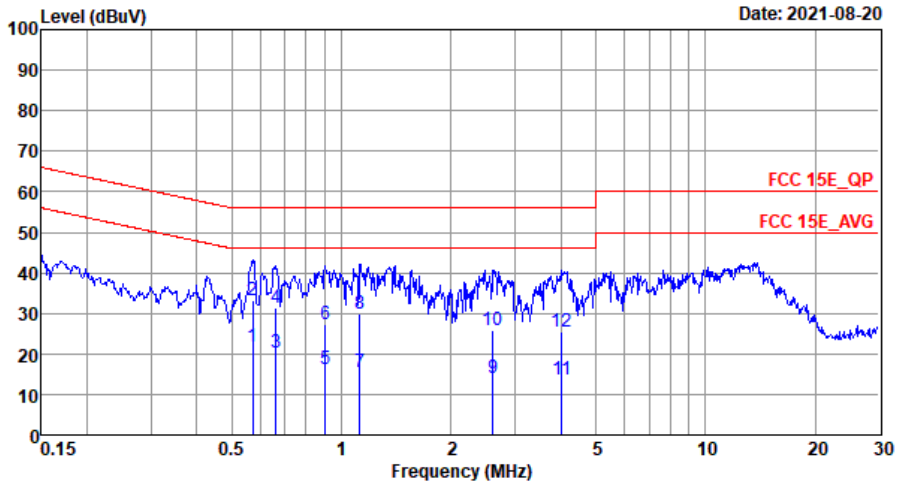
Report Number : FR170628-01F

TEST RESULTS DATA
Power Spectral Density

Band IV										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	10log (500kHz /RBW) Factor (dB)	Average Power Density (dBm/500kHz)	Average PSD Limit (dBm/500kHz)	DG (dBi)	Pass/Fail
11a	6M bps	1	149	5745	0.14	2.22	3.18	30.00	-6.00	Pass
11a	6Mbps	1	157	5785	0.14	2.22	3.14	30.00	-6.00	Pass
11a	6Mbps	1	165	5825	0.14	2.22	3.68	30.00	-6.00	Pass
VHT20	MCS 0	1	149	5745	0.13	2.22	3.82	30.00	-6.00	Pass
VHT20	MCS 0	1	157	5785	0.13	2.22	4.22	30.00	-6.00	Pass
VHT20	MCS 0	1	165	5825	0.13	2.22	4.01	30.00	-6.00	Pass
VHT40	MCS 0	1	151	5755	0.27	2.22	-0.03	30.00	-6.00	Pass
VHT40	MCS 0	1	159	5795	0.27	2.22	0.13	30.00	-6.00	Pass
VHT80	MCS 0	1	155	5775	0.56	2.22	-3.47	30.00	-6.00	Pass

Appendix B. AC Conducted Emission Test Results

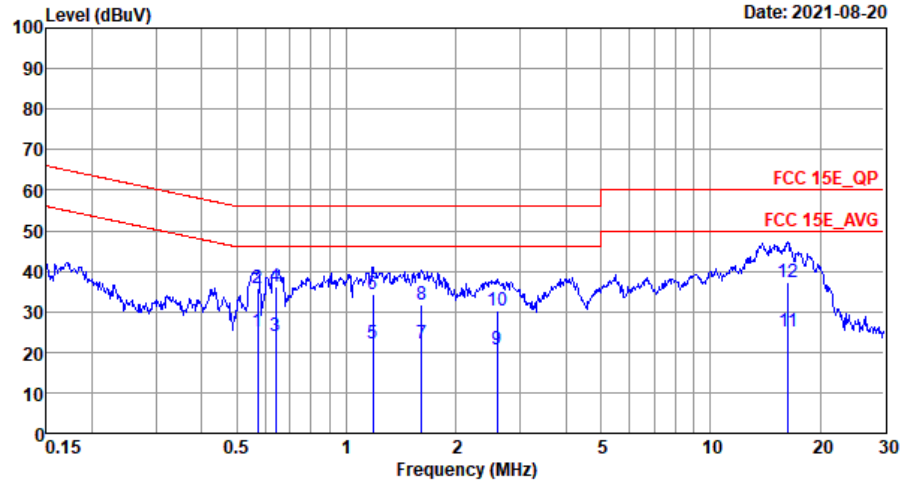
Test Engineer :	Xie YuQiang	Temperature :	22~25℃
		Relative Humidity :	50~55%
Test Voltage :	120Vac / 60Hz	Phase :	Line



Site : CO01-SZ
Condition: FCC 15E_QP LISN_20201030_L LINE

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.57	21.84	-24.16	46.00	11.70	0.10	10.04	Average
2	*	0.57	33.34	-22.66	56.00	23.20	0.10	10.04	QP
3		0.66	20.24	-25.76	46.00	10.10	0.10	10.04	Average
4		0.66	31.24	-24.76	56.00	21.10	0.10	10.04	QP
5		0.90	16.12	-29.88	46.00	6.00	0.10	10.02	Average
6		0.90	27.22	-28.78	56.00	17.10	0.10	10.02	QP
7		1.12	15.53	-30.47	46.00	5.40	0.10	10.03	Average
8		1.12	29.73	-26.27	56.00	19.60	0.10	10.03	QP
9		2.61	13.93	-32.07	46.00	3.70	0.08	10.15	Average
10		2.61	25.93	-30.07	56.00	15.70	0.08	10.15	QP
11		4.03	13.79	-32.21	46.00	3.50	0.04	10.25	Average
12		4.03	25.49	-30.51	56.00	15.20	0.04	10.25	QP

Test Engineer :	Xie YuQiang	**Temperature :**	22~25℃
		Relative Humidity :	50~55%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-SZ
Condition: FCC 15E_QP LISN_20201030_N NEUTRAL

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.57	25.04	-20.96	46.00	14.90	0.10	10.04	Average
2		0.57	35.94	-20.06	56.00	25.80	0.10	10.04	QP
3		0.64	24.04	-21.96	46.00	13.90	0.10	10.04	Average
4	*	0.64	36.34	-19.66	56.00	26.20	0.10	10.04	QP
5		1.18	22.13	-23.87	46.00	11.99	0.10	10.04	Average
6		1.18	34.33	-21.67	56.00	24.19	0.10	10.04	QP
7		1.61	22.26	-23.74	46.00	12.10	0.09	10.07	Average
8		1.61	31.86	-24.14	56.00	21.70	0.09	10.07	QP
9		2.59	20.53	-25.47	46.00	10.30	0.08	10.15	Average
10		2.59	30.33	-25.67	56.00	20.10	0.08	10.15	QP
11		16.31	25.23	-24.77	50.00	14.30	0.57	10.36	Average
12		16.31	37.13	-22.87	60.00	26.20	0.57	10.36	QP

Note:

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

Appendix C. Radiated Spurious Emission

U-NII-3 - 5725~5850MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	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		5615.2	49.4	-18.9	68.3	37.49	34.3	10.56	32.95	106	280	P	H
		5696.6	56.94	-45.76	102.7	44.77	34.5	10.59	32.92	106	280	P	H
		5719.8	69.57	-41.17	110.74	57.3	34.57	10.61	32.91	106	280	P	H
		5724.8	75.31	-46.43	121.74	63.04	34.57	10.61	32.91	106	280	P	H
	*	5745	107.95	-	-	95.63	34.6	10.62	32.9	106	280	P	H
		5745	100.44	-	-	88.12	34.6	10.62	32.9	106	280	A	H
		5628.2	50.28	-18.02	68.3	38.35	34.3	10.58	32.95	257	268	P	V
		5698.6	57.35	-46.82	104.17	45.18	34.5	10.59	32.92	257	268	P	V
		5719	67.88	-42.64	110.52	55.61	34.57	10.61	32.91	257	268	P	V
		5724.6	72.13	-49.16	121.29	59.86	34.57	10.61	32.91	257	268	P	V
	*	5745	106.78	-	-	94.46	34.6	10.62	32.9	257	268	P	V
		5745	98.44	-	-	86.12	34.6	10.62	32.9	257	268	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		5648.2	51.47	-16.83	68.3	39.53	34.3	10.58	32.94	110	286	P	H
		5688	50.96	-45.41	96.37	38.79	34.5	10.59	32.92	110	286	P	H
		5714.4	53.74	-55.49	109.23	41.51	34.53	10.61	32.91	110	286	P	H
		5722.2	51.19	-64.63	115.82	38.92	34.57	10.61	32.91	110	286	P	H
	*	5785	107.76	-	-	95.33	34.67	10.64	32.88	110	286	P	H
		5785	100.55	-	-	88.12	34.67	10.64	32.88	110	286	A	H
		5850	52.35	-69.85	122.2	39.63	34.9	10.68	32.86	110	286	P	H
		5857	52.17	-58.07	110.24	39.39	34.93	10.71	32.86	110	286	P	H
		5911.8	51.19	-26.75	77.94	38.24	35.03	10.75	32.83	110	286	P	H
		5941.6	51.5	-16.8	68.3	38.44	35.1	10.78	32.82	110	286	P	H
		5647.8	51.4	-16.9	68.3	39.46	34.3	10.58	32.94	210	249	P	V
		5657.8	52.21	-21.87	74.08	40.26	34.3	10.58	32.93	210	249	P	V
		5717.6	51.17	-58.96	110.13	38.9	34.57	10.61	32.91	210	249	P	V
		5723.2	51.16	-66.94	118.1	38.89	34.57	10.61	32.91	210	249	P	V
	*	5785	104.91	-	-	92.48	34.67	10.64	32.88	210	249	P	V
		5785	97.55	-	-	85.12	34.67	10.64	32.88	210	249	A	V
		5851.2	51.16	-68.3	119.46	38.44	34.9	10.68	32.86	210	249	P	V
		5873.4	51.37	-54.28	105.65	38.54	34.97	10.71	32.85	210	249	P	V
		5876.8	51.78	-52.08	103.86	38.95	34.97	10.71	32.85	210	249	P	V
		5942.2	52.66	-15.64	68.3	39.6	35.1	10.78	32.82	210	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)
802.11a CH 165 5825MHz	*	5825	107.12	-	-	94.48	34.83	10.68	32.87	111	288	P	H
		5825	99.76	-	-	87.12	34.83	10.68	32.87	111	288	A	H
		5850	65.79	-56.41	122.2	53.07	34.9	10.68	32.86	111	288	P	H
		5855.2	67.23	-43.51	110.74	54.48	34.93	10.68	32.86	111	288	P	H
		5878.4	54.05	-48.62	102.67	41.22	34.97	10.71	32.85	111	288	P	H
		5937.6	51.48	-16.82	68.3	38.45	35.07	10.78	32.82	111	288	P	H
	*	5825	103.54	-	-	90.9	34.83	10.68	32.87	207	253	P	V
		5825	95.76	-	-	83.12	34.83	10.68	32.87	207	253	A	V
		5851.6	64.47	-54.08	118.55	51.75	34.9	10.68	32.86	207	253	P	V
		5855	60.89	-49.91	110.8	48.14	34.93	10.68	32.86	207	253	P	V
		5888.2	51.98	-43.42	95.4	39.11	35	10.71	32.84	207	253	P	V
		5933.2	50.92	-17.38	68.3	37.93	35.07	10.75	32.83	207	253	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

U-NII-3 5725~5850MHz

WIFI 802.11a (Harmonic @ 3m)

WIFI Ant. 1	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	52.14	-21.86	74	59.24	38.34	12.32	57.76	152	360	P	H
		11490	44.26	-9.74	54	51.36	38.34	12.32	57.76	152	360	A	H
		17235	53	-15.3	68.3	53.12	42.27	15.58	57.97	152	96	P	H
		11490	49.11	-24.89	74	56.21	38.34	12.32	57.76	120	79	P	V
		17235	52.75	-15.55	68.3	52.87	42.27	15.58	57.97	179	86	P	V
802.11a CH 157 5785MHz		11570	51.6	-22.4	74	58.54	38.42	12.31	57.67	186	156	P	H
		11570	45.37	-8.63	54	52.31	38.42	12.31	57.67	186	156	A	H
		17355	53.74	-14.56	68.3	53.79	42.1	15.65	57.8	189	143	P	H
		11570	51.7	-22.3	74	58.64	38.42	12.31	57.67	186	156	P	V
		11570	43.19	-10.81	54	50.13	38.42	12.31	57.67	186	156	A	V
		17355	53.41	-14.89	68.3	53.46	42.1	15.65	57.8	189	143	P	V
802.11a CH 165 5825MHz		11650	52.62	-21.38	74	59.37	38.48	12.36	57.59	156	347	P	H
		11650	45.1	-8.9	54	51.85	38.48	12.36	57.59	156	347	A	H
		17475	50.86	-17.44	68.3	50.77	41.94	15.79	57.64	150	360	P	H
		11650	50.19	-23.81	74	56.94	38.48	12.36	57.59	186	42	P	V
		17475	50.62	-17.68	68.3	50.53	41.94	15.79	57.64	175	175	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

U-NII-3 5725~5850MHz

WIFI 802.11ac VHT20 (Band Edge @ 3m)

WIFI Ant. 1	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)
		5608.8	50.99	-17.31	68.3	39.08	34.3	10.56	32.95	113	287	P	H
		5698.2	62.09	-41.79	103.88	49.92	34.5	10.59	32.92	113	287	P	H
		5716.6	70.04	-39.81	109.85	57.81	34.53	10.61	32.91	113	287	P	H
		5722.6	74.29	-42.44	116.73	62.02	34.57	10.61	32.91	113	287	P	H
802.11ac	*	5745	109.37	-	-	97.05	34.6	10.62	32.9	113	287	P	H
VHT20		5745	102.85	-	-	90.53	34.6	10.62	32.9	113	287	A	H
CH 149		5610.6	50.68	-17.62	68.3	38.77	34.3	10.56	32.95	259	262	P	V
5745MHz		5699.4	61.48	-43.28	104.76	49.31	34.5	10.59	32.92	259	262	P	V
		5718.4	66.88	-43.47	110.35	54.61	34.57	10.61	32.91	259	262	P	V
		5725	74.33	-47.87	122.2	62.06	34.57	10.61	32.91	259	262	P	V
	*	5745	107.63	-	-	95.31	34.6	10.62	32.9	259	262	P	V
		5745	99.21	-	-	86.89	34.6	10.62	32.9	259	262	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)
		5646.6	50.52	-17.78	68.3	38.58	34.3	10.58	32.94	112	286	P	H
		5660.8	52.26	-24.04	76.3	40.3	34.3	10.59	32.93	112	286	P	H
		5706.6	52.85	-54.2	107.05	40.62	34.53	10.61	32.91	112	286	P	H
		5722	55.05	-60.31	115.36	42.78	34.57	10.61	32.91	112	286	P	H
	*	5785	108.06	-	-	95.63	34.67	10.64	32.88	112	286	P	H
		5785	100.06	-	-	87.63	34.67	10.64	32.88	112	286	A	H
		5851.6	53.24	-65.31	118.55	40.52	34.9	10.68	32.86	112	286	P	H
		5855.6	52.73	-57.9	110.63	39.95	34.93	10.71	32.86	112	286	P	H
802.11ac		5898.2	52.41	-35.58	87.99	39.5	35	10.75	32.84	112	286	P	H
VHT20		5931.4	51.21	-17.09	68.3	38.22	35.07	10.75	32.83	112	286	P	H
CH 157		5618.2	52.33	-15.97	68.3	40.42	34.3	10.56	32.95	259	262	P	V
5785MHz		5697	52.25	-50.75	103	40.08	34.5	10.59	32.92	259	262	P	V
		5708.4	53.42	-54.13	107.55	41.19	34.53	10.61	32.91	259	262	P	V
		5723.2	53.26	-64.84	118.1	40.99	34.57	10.61	32.91	259	262	P	V
	*	5785	106.8	-	-	94.37	34.67	10.64	32.88	259	262	P	V
		5785	98.79	-	-	86.36	34.67	10.64	32.88	259	262	A	V
		5852	52.71	-64.93	117.64	39.99	34.9	10.68	32.86	259	262	P	V
		5862	53.72	-55.12	108.84	40.93	34.93	10.71	32.85	259	262	P	V
		5877	51.81	-51.9	103.71	38.98	34.97	10.71	32.85	259	262	P	V
		5948.4	52.09	-16.21	68.3	39.03	35.1	10.78	32.82	259	262	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)
802.11ac VHT20 CH 165 5825MHz	*	5825	108.56	-	-	95.92	34.83	10.68	32.87	104	280	P	H
		5825	100.27	-	-	87.63	34.83	10.68	32.87	104	280	A	H
		5853.4	65.79	-48.66	114.45	53.07	34.9	10.68	32.86	104	280	P	H
		5860.4	65.04	-44.25	109.29	52.25	34.93	10.71	32.85	104	280	P	H
		5880.4	52.13	-49.06	101.19	39.3	34.97	10.71	32.85	104	280	P	H
		5940.6	51.54	-16.76	68.3	38.48	35.1	10.78	32.82	104	280	P	H
	*	5825	105.77	-	-	93.13	34.83	10.68	32.87	258	262	P	V
		5825	98.5	-	-	85.86	34.83	10.68	32.87	258	262	A	V
		5852.6	65.91	-50.36	116.27	53.19	34.9	10.68	32.86	258	262	P	V
		5855.4	64.37	-46.32	110.69	51.62	34.93	10.68	32.86	258	262	P	V
		5875.2	55.35	-49.7	105.05	42.52	34.97	10.71	32.85	258	262	P	V
		5944.2	50.98	-17.32	68.3	37.92	35.1	10.78	32.82	258	262	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

U-NII-3 5725~5850MHz

WIFI 802.11ac VHT20 (Harmonic @ 3m)

WIFI Ant. 1	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		11490	50.35	-23.65	74	57.45	38.34	12.32	57.76	163	196	P	H
VHT20		17235	53.82	-14.48	68.3	53.94	42.27	15.58	57.97	175	153	P	H
CH 149		11490	50.42	-23.58	74	57.52	38.34	12.32	57.76	164	301	P	V
5745MHz		17235	53.17	-15.13	68.3	53.29	42.27	15.58	57.97	170	360	P	V
802.11ac		11570	50.28	-23.72	74	57.22	38.42	12.31	57.67	186	175	P	H
VHT20		17355	53.48	-14.82	68.3	53.53	42.1	15.65	57.8	154	245	P	H
CH 157		11570	49.42	-24.58	74	56.36	38.42	12.31	57.67	186	154	P	V
5785MHz		17355	53.41	-14.89	68.3	53.46	42.1	15.65	57.8	189	143	P	V
802.11ac		11650	49.97	-24.03	74	56.72	38.48	12.36	57.59	156	347	P	H
VHT20		17475	54.62	-13.68	68.3	54.53	41.94	15.79	57.64	150	360	P	H
CH 165		11650	50.09	-23.91	74	56.84	38.48	12.36	57.59	186	42	P	V
5825MHz		17475	53.67	-14.63	68.3	53.58	41.94	15.79	57.64	175	175	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

U-NII-3 5725~5850MHz

WIFI 802.11ac 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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		5637.4	52.22	-16.08	68.3	40.28	34.3	10.58	32.94	105	73	P	H
		5697.4	65.61	-37.68	103.29	53.44	34.5	10.59	32.92	105	73	P	H
		5718	77.03	-33.21	110.24	64.76	34.57	10.61	32.91	105	73	P	H
		5724.8	76.92	-44.82	121.74	64.65	34.57	10.61	32.91	105	73	P	H
	*	5755	106.73	-	-	94.38	34.63	10.62	32.9	105	73	P	H
		5755	99.48	-	-	87.13	34.63	10.62	32.9	105	73	A	H
		5852.2	54.87	-62.31	117.18	42.15	34.9	10.68	32.86	105	73	P	H
		5869.8	54.49	-52.16	106.65	41.7	34.93	10.71	32.85	105	73	P	H
802.11ac		5876.4	52.64	-51.52	104.16	39.81	34.97	10.71	32.85	105	73	P	H
VHT40		5934.4	51.96	-16.34	68.3	38.93	35.07	10.78	32.82	105	73	P	H
CH 151		5644.2	53.29	-15.01	68.3	41.35	34.3	10.58	32.94	104	91	P	V
5755MHz		5698	65.3	-38.43	103.73	53.13	34.5	10.59	32.92	104	91	P	V
		5719.4	76.61	-34.02	110.63	64.34	34.57	10.61	32.91	104	91	P	V
		5723.6	77.12	-41.89	119.01	64.85	34.57	10.61	32.91	104	91	P	V
	*	5755	106.31	-	-	93.96	34.63	10.62	32.9	104	91	P	V
		5755	98.6	-	-	86.25	34.63	10.62	32.9	104	91	A	V
		5853.6	57.86	-56.13	113.99	45.11	34.93	10.68	32.86	104	91	P	V
		5856.2	53.72	-56.74	110.46	40.94	34.93	10.71	32.86	104	91	P	V
		5876.2	53.03	-51.28	104.31	40.2	34.97	10.71	32.85	104	91	P	V
		5925.8	52.13	-16.17	68.3	39.14	35.07	10.75	32.83	104	91	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)
802.11ac VHT40 CH 159 5795MHz		5624.2	51.06	-17.24	68.3	39.13	34.3	10.58	32.95	255	62	P	H
		5692.4	52.36	-47.25	99.61	40.19	34.5	10.59	32.92	255	62	P	H
		5718.8	57.32	-53.14	110.46	45.05	34.57	10.61	32.91	255	62	P	H
		5720	55.5	-55.3	110.8	43.23	34.57	10.61	32.91	255	62	P	H
	*	5795	105.84	-	-	93.38	34.7	10.64	32.88	255	62	P	H
		5795	97.59	-	-	85.13	34.7	10.64	32.88	255	62	A	H
		5852	61.88	-55.76	117.64	49.16	34.9	10.68	32.86	255	62	P	H
		5858.4	60.45	-49.4	109.85	47.66	34.93	10.71	32.85	255	62	P	H
		5884	54.49	-44.03	98.52	41.65	34.97	10.71	32.84	255	62	P	H
		5925.4	51.36	-16.94	68.3	38.37	35.07	10.75	32.83	255	62	P	H
		5642	50.96	-17.34	68.3	39.02	34.3	10.58	32.94	105	79	P	V
		5691.8	52.49	-46.68	99.17	40.32	34.5	10.59	32.92	105	79	P	V
		5718.8	57.52	-52.94	110.46	45.25	34.57	10.61	32.91	105	79	P	V
		5720.8	56.88	-55.74	112.62	44.61	34.57	10.61	32.91	105	79	P	V
	*	5795	104.67	-	-	92.21	34.7	10.64	32.88	105	79	P	V
		5795	98.59	-	-	86.13	34.7	10.64	32.88	105	79	A	V
		5851.8	60.91	-57.19	118.1	48.19	34.9	10.68	32.86	105	79	P	V
		5858	59.36	-50.6	109.96	46.57	34.93	10.71	32.85	105	79	P	V
		5882.6	55.53	-44.03	99.56	42.7	34.97	10.71	32.85	105	79	P	V
		5943.4	51.45	-16.85	68.3	38.39	35.1	10.78	32.82	105	79	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

U-NII-3 5725~5850MHz

WIFI 802.11ac 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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac		11510	50.08	-23.92	74	57.12	38.36	12.34	57.74	160	360	P	H
VHT40		17265	53.45	-14.85	68.3	53.64	42.22	15.51	57.92	170	360	P	H
CH 151		11510	49.38	-24.62	74	56.42	38.36	12.34	57.74	176	186	P	V
5755MHz		17265	53.55	-14.75	68.3	53.74	42.22	15.51	57.92	189	163	P	V
802.11ac		11590	50.28	-23.72	74	57.19	38.43	12.31	57.65	173	38	P	H
VHT40		17385	53.86	-14.44	68.3	53.77	42.05	15.79	57.75	186	153	P	H
CH 159		11590	50.46	-23.54	74	57.37	38.43	12.31	57.65	170	300	P	V
5795MHz		17385	53.54	-14.76	68.3	53.45	42.05	15.79	57.75	150	200	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

U-NII-3 5725~5850MHz

WIFI 802.11ac VHT80 (Band Edge @ 3m)

WIFI Ant. 1	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		5649.8	53.92	-14.38	68.3	41.98	34.3	10.58	32.94	104	63	P	H
		5699.8	66.41	-38.64	105.05	54.22	34.5	10.61	32.92	104	63	P	H
		5718.6	71.33	-39.08	110.41	59.06	34.57	10.61	32.91	104	63	P	H
		5724.8	69.99	-51.75	121.74	57.72	34.57	10.61	32.91	104	63	P	H
	*	5775	100.78	-	-	88.38	34.67	10.62	32.89	104	63	P	H
		5775	92.52	-	-	80.12	34.67	10.62	32.89	104	63	A	H
		5853.4	66.14	-48.31	114.45	53.42	34.9	10.68	32.86	104	63	P	H
		5869.2	66.67	-40.15	106.82	53.88	34.93	10.71	32.85	104	63	P	H
		5875.2	61.03	-44.02	105.05	48.2	34.97	10.71	32.85	104	63	P	H
		5931.4	55.76	-12.54	68.3	42.77	35.07	10.75	32.83	104	63	P	H
		5650	55.99	-12.31	68.3	44.05	34.3	10.58	32.94	104	91	P	V
		5695.4	67.72	-34.1	101.82	55.55	34.5	10.59	32.92	104	91	P	V
		5705.4	67.46	-39.25	106.71	55.23	34.53	10.61	32.91	104	91	P	V
		5723.8	71.81	-47.65	119.46	59.54	34.57	10.61	32.91	104	91	P	V
	*	5775	99.8	-	-	87.4	34.67	10.62	32.89	104	91	P	V
		5775	92.52	-	-	80.12	34.67	10.62	32.89	104	91	A	V
		5852.2	65.66	-51.52	117.18	52.94	34.9	10.68	32.86	104	91	P	V
		5868.8	63.49	-43.44	106.93	50.7	34.93	10.71	32.85	104	91	P	V
		5877.8	59.46	-43.66	103.12	46.63	34.97	10.71	32.85	104	91	P	V
		5931.4	51.83	-16.47	68.3	38.84	35.07	10.75	32.83	104	91	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

U-NII-3 5725~5850MHz

WIFI 802.11ac VHT80 (Harmonic @ 3m)

WIFI Ant. 1	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	49.41	-24.59	74	56.39	38.4	12.32	57.7	150	224	P	H
VHT80		17325	52.43	-15.87	68.3	52.61	42.15	15.52	57.85	120	310	P	H
CH 155		11550	49.14	-24.86	74	56.12	38.4	12.32	57.7	160	360	P	V
5775MHz		17325	53.31	-14.99	68.3	53.49	42.15	15.52	57.85	170	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

5GHz WIFI 802.11a (LF @ 3m)

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)
5GHz 802.11a LF		30	22.7	-17.3	40	29.37	25.2	0.53	32.4	-	-	P	H
		157.07	30.92	-12.58	43.5	45.12	16.7	1.28	32.18	125	198	P	H
		277.35	29.01	-16.99	46	40.39	18.64	1.73	31.75	-	-	P	H
		567.38	27.67	-18.33	46	29.63	26.38	2.49	30.83	-	-	P	H
		749.74	29.26	-16.74	46	29.21	28.3	2.85	31.1	-	-	P	H
		962.17	32.78	-21.22	54	29.67	31.24	3.25	31.38	-	-	P	H
		45.52	32.44	-7.56	40	47.58	16.6	0.66	32.4	121	136	P	V
		145.43	22.57	-20.93	43.5	36.14	17.4	1.23	32.2	-	-	P	V
		281.23	24.76	-21.24	46	36.02	18.74	1.74	31.74	-	-	P	V
		583.87	29.41	-16.59	46	31.65	26	2.53	30.77	-	-	P	V
		770.11	30.46	-15.54	46	30.35	28.4	2.89	31.18	-	-	P	V
		978.66	32.92	-21.08	54	29.84	31.04	3.28	31.24	-	-	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)

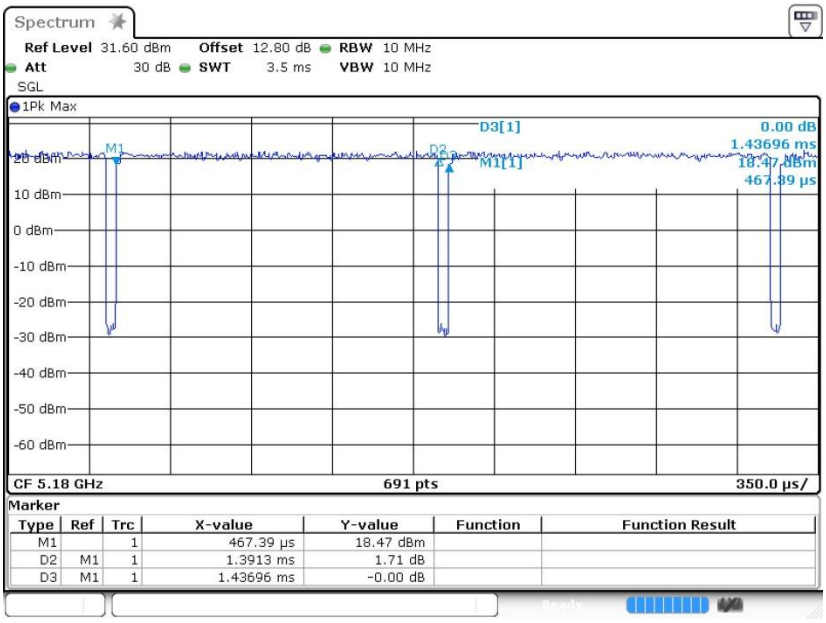
= -10.46(dB)

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

Appendix D. Duty Cycle Plots

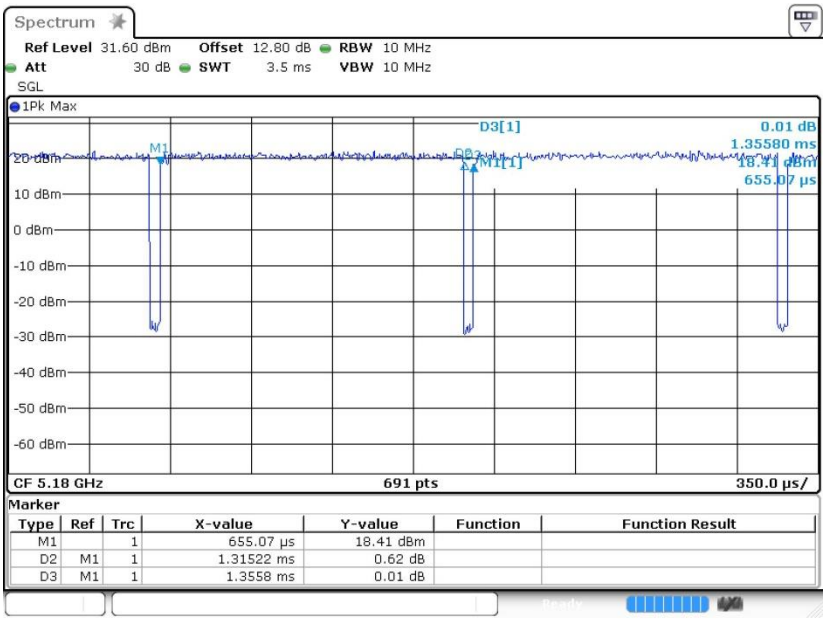
Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11a	96.82	1.39	0.72	1KHz
802.11ac VHT20	97.00	1.32	0.76	1KHz
802.11ac VHT40	93.97	0.66	1.53	3KHz
802.11ac VHT80	87.84	0.32	3.08	10KHZ

802.11a



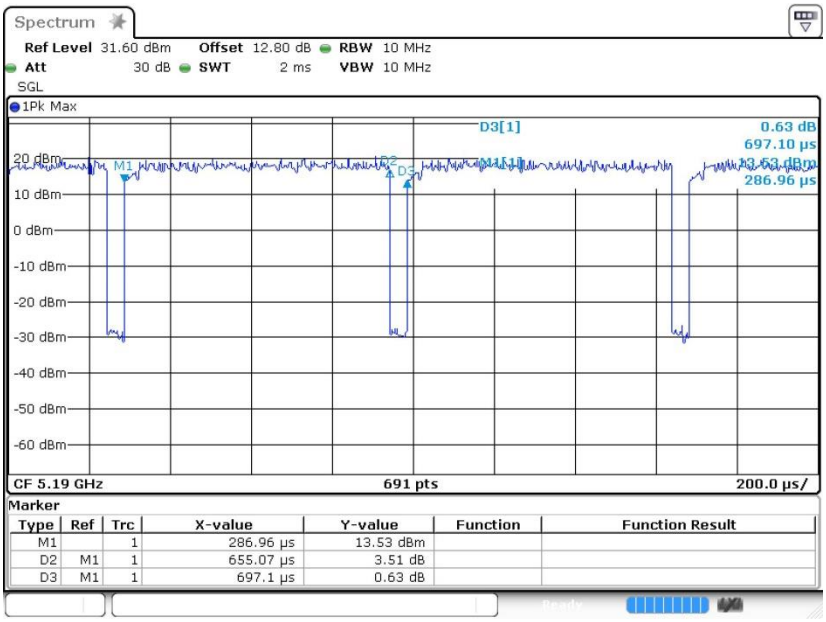
Date: 18.AUG.2021 10:23:55

802.11ac VHT20



Date: 18.AUG.2021 10:31:57

802.11ac VHT40



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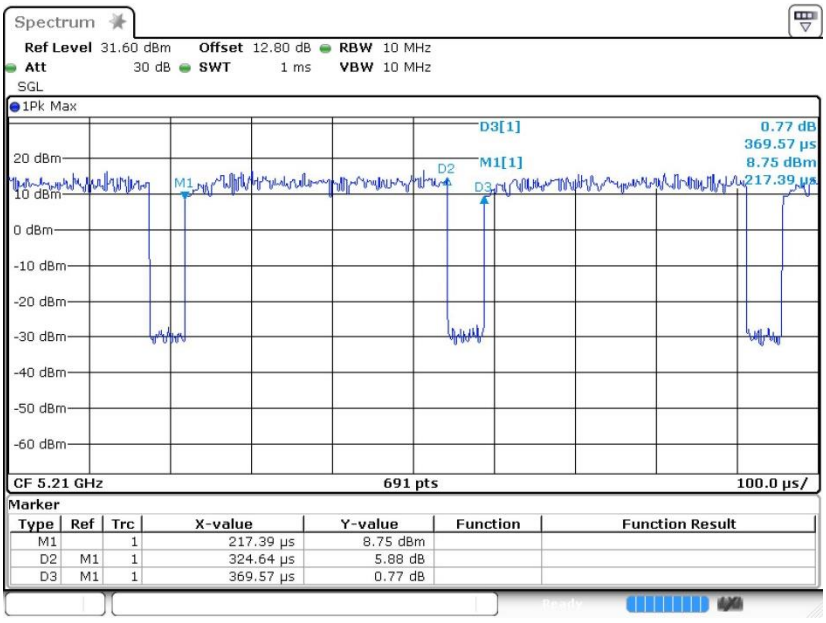
802.11ac VHT80



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