FCC RF Test Report

APPLICANT	:	**Xiaomi Communications Co., Ltd.**
EQUIPMENT	:	**Mobile Phone**
BRAND NAME	:	**MI**
MODEL NAME	:	**M1803E1A**
FCC ID	:	**2AFZZ-XME1A**
STANDARD	:	**FCC Part 15 Subpart E §15.407**
CLASSIFICATION	:	**(NII) Unlicensed National Information Infrastructure**

The product was received on Apr. 20, 2018 and testing was completed on Jun. 07, 2018. We, SPORTON INTERNATIONAL 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 INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager

SPORTON INTERNATIONAL INC.

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR842002F	Rev. 01	Initial issue of report	Jun. 11, 2018

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 7.97 dB at 48.360 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 13.51 dB at 0.152 MHz
3.6	15.407(c)	Automatically Discontinue Transmission	Discontinue Transmission	Pass	-
3.7	15.203 & 15.407(a)	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Xiaomi Communications Co., Ltd.
The Rainbow City of China Resources,NO.68,Qinghe Middle Street,Haidian District,Beijing,China

1.2 Manufacturer

Xiaomi Communications Co., Ltd.
The Rainbow City of China Resources,NO.68,Qinghe Middle Street,Haidian District,Beijing,China

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Phone
Brand Name	MI
Model Name	M1803E1A
FCC ID	2AFZZ-XME1A
EUT supports Radios application	CDMA/EV-DO/GSM/GPRS/EGPRS/WCDMA/HSPA/ DC-HSDPA/HSPA+(16QAM uplink is not supported)/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 v3.0 + EDR/Bluetooth v4.0 LE/ Bluetooth v4.2 LE/ Bluetooth v5.0 LE
IMEI Code	Conducted: 867252030137219 Conduction: 867252030157993/867252030158009 Radiation: 867252030134935
HW Version	P2
SW Version	MIUI 9
EUT Stage	Identical Prototype

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. There are two types of EUT, the difference between two samples is for memory, the sample 1 is 6+64GB capacity and the sample 2 is 6+128GB capacity. According to the difference, we only choose sample 1 to perform full test.

1.4 Product Specification of Equipment Under Test

<table>
<tr><th colspan="2">Standards-related Product Specification</th></tr>
<tr><td>Tx/Rx Channel Frequency Range</td><td>5745 MHz ~ 5825 MHz</td></tr>
<tr><td>Maximum Output Power</td><td><5745 MHz ~ 5825 MHz>
<Ant. 1>
802.11a : 15.08 dBm / 0.0322 W
802.11n HT20 : 14.11 dBm / 0.0258 W
802.11n HT40 : 13.44 dBm / 0.0221 W
802.11ac VHT20: 14.10 dBm / 0.0257 W
802.11ac VHT40: 13.36 dBm / 0.0217 W
802.11ac VHT80: 12.24 dBm / 0.0167 W
<Ant. 2>
802.11a : 14.64 dBm / 0.0291 W
802.11n HT20 : 13.42 dBm / 0.0220 W
802.11n HT40 : 12.77 dBm / 0.0189 W
802.11ac VHT20: 13.40 dBm / 0.0219 W
802.11ac VHT40: 12.73 dBm / 0.0187 W
802.11ac VHT80: 11.57 dBm / 0.0144 W
MIMO <Ant. 1+2>
802.11a : 17.88 dBm / 0.0614 W
802.11n HT20 : 16.77 dBm / 0.0475 W
802.11n HT40 : 16.18 dBm / 0.0415 W
802.11ac VHT20: 16.76 dBm / 0.0474 W
802.11ac VHT40: 16.17 dBm / 0.0414 W
802.11ac VHT80: 15.11 dBm / 0.0324 W</td></tr>
<tr><td>99% Occupied Bandwidth</td><td>802.11a : 17.55 MHz
802.11ac VHT20 : 18.65 MHz
802.11ac VHT40 : 36.70 MHz
802.11ac VHT80 : 75.84 MHz</td></tr>
<tr><td>Type of Modulation</td><td>802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)
802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)</td></tr>
<tr><td>Antenna Type</td><td>Ant. 1 : Dipole Antenna
Ant. 2 : PIFA Antenna</td></tr>
<tr><td>Antenna Gain</td><td>Ant. 1 : -0.13 dBi
Ant. 2 : -0.38 dBi</td></tr>
<tr><td>Antenna Function Description</td><td>
<table>
<tr><td></td><td>Ant. 1</td><td>Ant. 2</td></tr>
<tr><td>802.11 a/n/ac SISO</td><td>V</td><td>V</td></tr>
<tr><td>802.11 a/n/ac MIMO</td><td>V</td><td>V</td></tr>
</table>
</td></tr>
</table>

Note:

1. For SISO & MIMO mode, the whole testing has assessed only MIMO mode by referring to their higher conducted power.
2. For 802.11n HT20 / ac VHT20 and 802.11n HT40 / ac VHT40 mode, the whole testing have assessed only 802.11an HT20/ HT40 by referring to their maximum conducted power.
3. For 802.11a / an HT20 MIMO mode, the whole testing has assessed only 802.11a mode by referring to their higher conducted power for RSE testing.

1.5 Modification of EUT

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

1.6 Testing Location

SPORTON INTERNATIONAL INC. is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and under the FCC-recognized accredited testing laboratories by Mutual Recognition Agreement (MRA) in FCC Test.

Test Site	SPORTON INTERNATIONAL INC.	
Test Site Location	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978	
Test Site No.	**Sporton Site No.**	
	TH05-HY	CO05-HY

Note: The test site complies with ANSI C63.4 2014 requirement.

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No.58, Aly. 75, Ln. 564 Wenha 3rd Rd. Guishan Dist. Taoyuan City Taiwan TEL: +886-3-327-3456 FAX: +886-3-328-4978		
Test Site No.	**Sporton Site No.**	**FCC designation No.**	**FCC Test Firm Registration No.**
	03CH13-HY	TW0007	214511

Note: The test site complies with ANSI C63.4 2014 requirement.

1.7 Applicable Standards

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

- FCC Part 15 Subpart E
- FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ANSI C63.10-2013

Remark:

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

2 Test Configuration of Equipment Under Test

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

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

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5725-5850 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

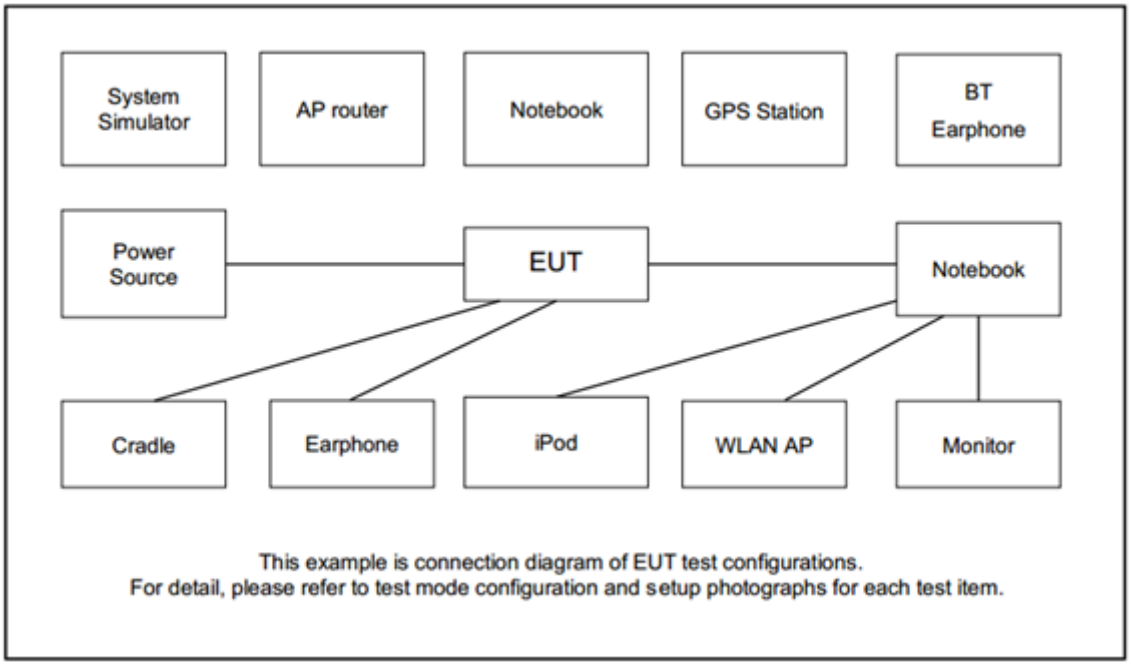
Final test modes are considering the modulation and worse data rates as below table.

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

AC Conducted Emission	Mode 1 : GSM850 Idle + Bluetooth Link + WLAN Link(5GHz) + Camera(Rear) + USB Cable 1(Charging from Adapter) + SIM 1
Remark: For Radiated Test Cases, The tests were performed with Adapter and USB Cable 1.	

Ch. #		Band IV：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



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
2.	WLAN AP	ASUS	RT-AC66U	MSQ-RTAC66U	N/A	Unshielded,1.8m
3.	NOTE BOOK	Dell	Latitude E6320	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
4.	Bluetooth Earphone	Sony Ericsson	MW600	PY700A2029	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 Notebook under large package sizes transmission.

2.6 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example:

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

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 8 dB and 20dB attenuator.

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

= 8 + 20 = 28 (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.

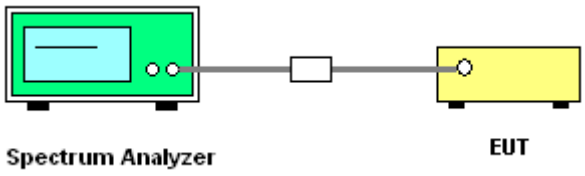
3.1.2 Measuring Instruments

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.

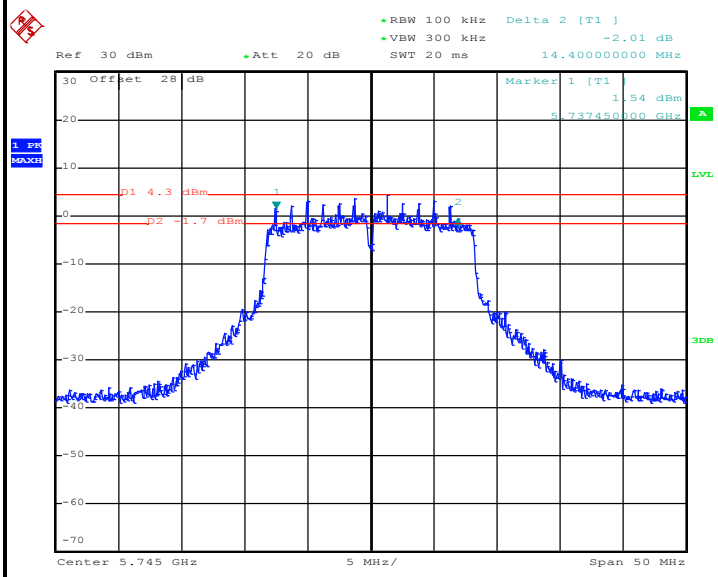
3.1.4 Test Setup



3.1.5 Test Result of 6dB Bandwidth

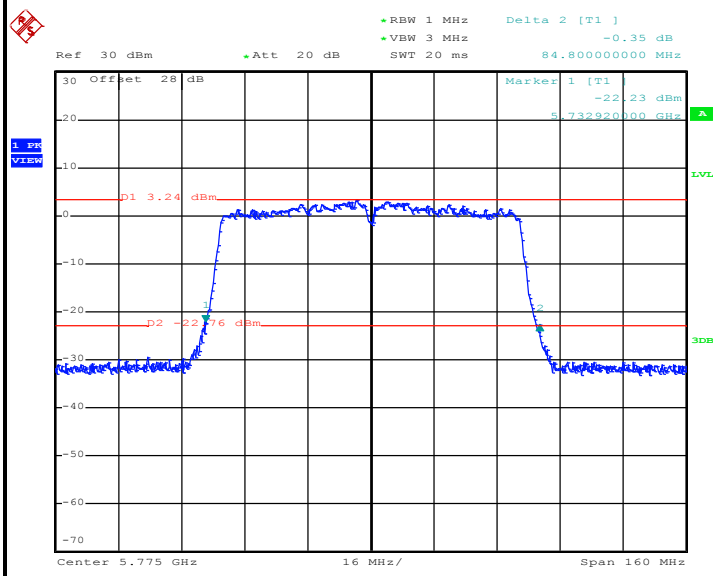
Please refer to Appendix A.

Minimum 6dB Bandwidth



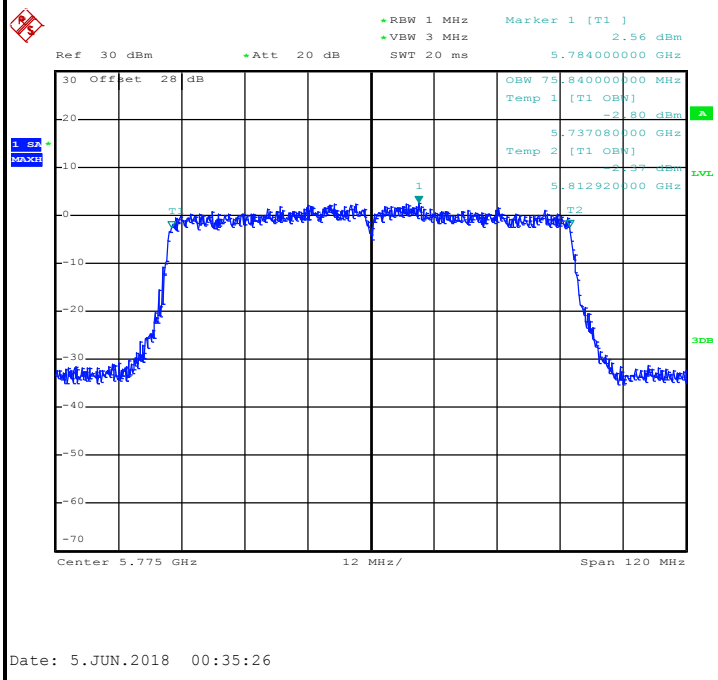
Date: 5.JUN.2018 00:04:24

Maximum 26dB Bandwidth



Date: 5.JUN.2018 00:30:10

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.

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.

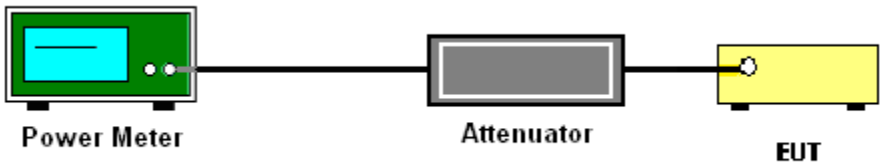
3.2.3 Test Procedures

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.

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).

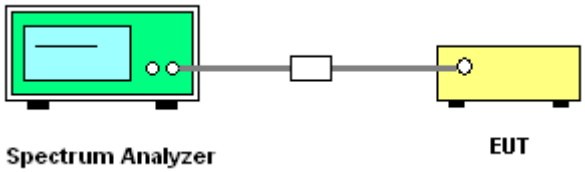
- Measure the duty cycle.
- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 300 kHz.
- Set VBW ≥ 1 MHz.
- Number of points in sweep ≥ 2 Span / RBW.
- Sweep time = auto.
- Detector = RMS
- Trace average at least 100 traces in power averaging mode.
- Add 10 log(500kHz/RBW) 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. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

   Method (c): Measure and add 10 log(N_{ANT}) dB.

   With this technique, spectrum measurements are performed at each output of the device, but rather than summing the spectra or the spectral peaks across the outputs, the quantity 10 log(N_{ANT}) dB is added to each spectrum value before comparing to the emission limit. The addition of 10 log(N_{ANT}) dB serves to apportion the emission limit among the N_{ANT} outputs so that each output is permitted to contribute no more than $1/N_{ANT}$ th of the PSD limit.

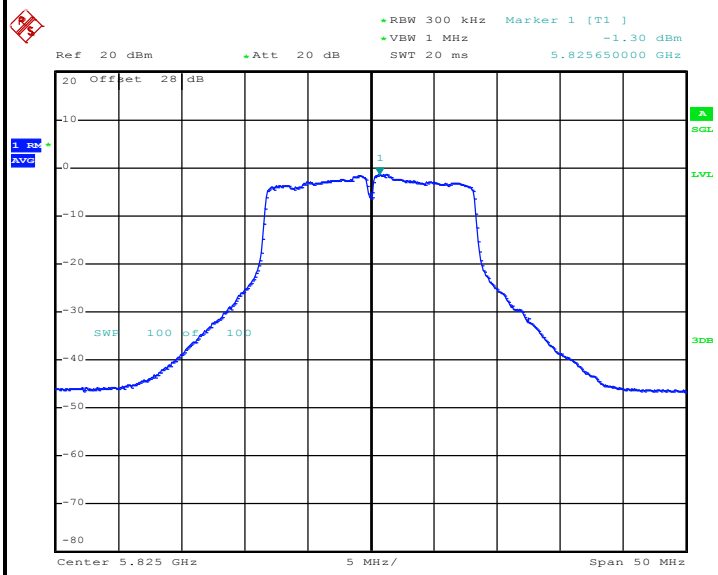
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

Worst Case Power Density (dBm/MHz)



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	68.2

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) ANSI C63.10-2013 clause 12.7.3 note 97

As specified by regulatory requirements, emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit. However, an out-of-band emission that complies with both the average and peak general regulatory limits is not required to satisfy the peak emission limit.

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.

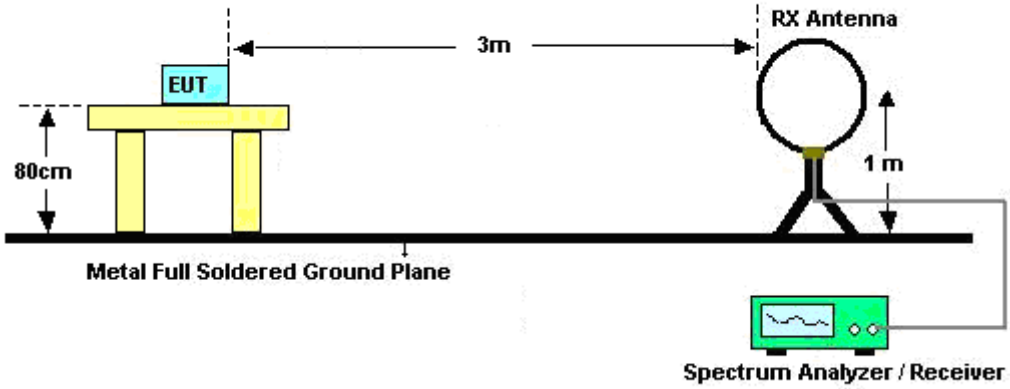
   (1) Procedure for Unwanted Emissions Measurements Below 1000MHz
   - RBW = 120 kHz
   - VBW = 300 kHz
   - Detector = Peak
   - Trace mode = max hold

   (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

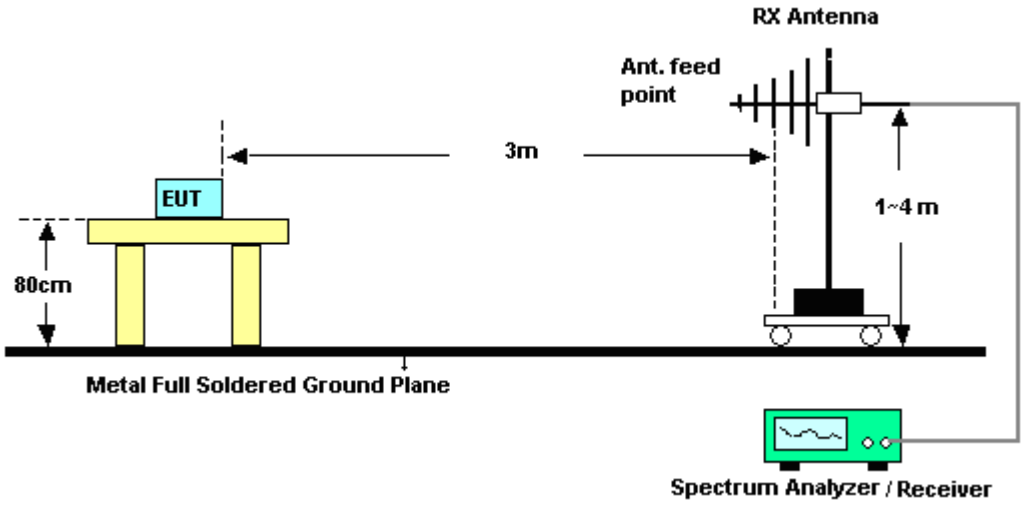
   (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz
   - RBW = 1 MHz
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting 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 average 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

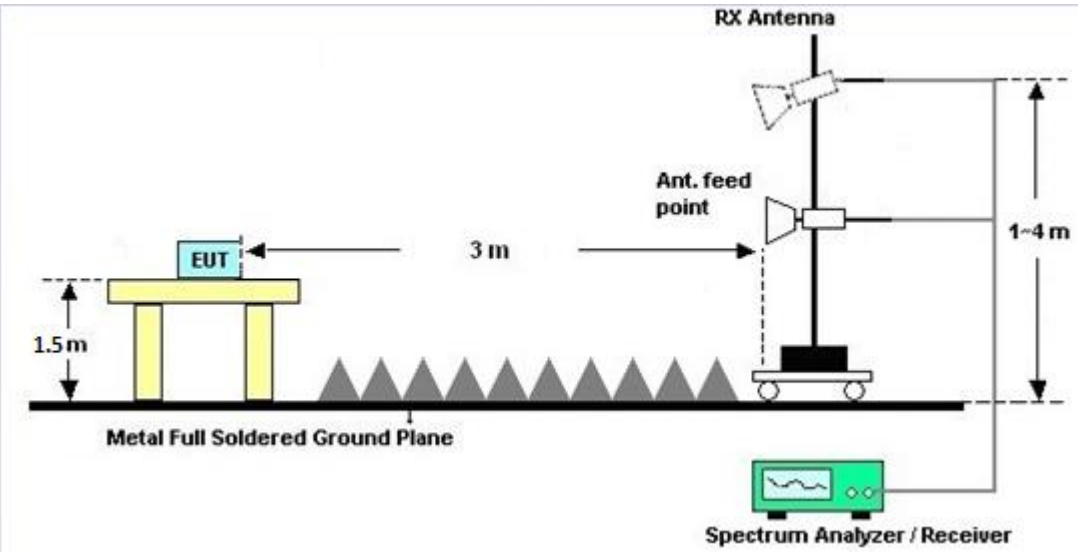
For radiated emissions below 30MHz



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)

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.

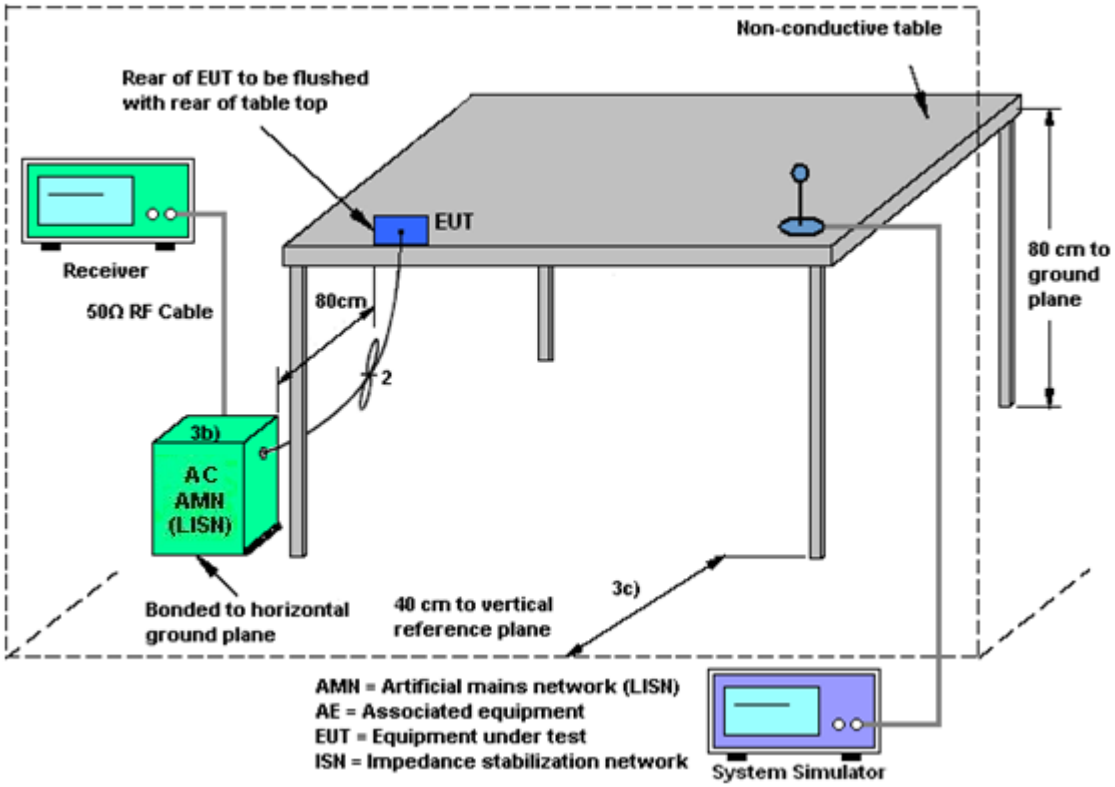
3.5.2 Measuring Instruments

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

<CDD Modes >

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

Directional gain = GANT + Array Gain, where Array Gain is as follows.

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

Array Gain = 10 log(NANT/NSS=1) dB.

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 4.

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

The EUT supports CDD mode.

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

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

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

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

	Ant 1 (dBi)	Ant 2 (dBi)	for Power (dBi)	for PSD (dBi)	Limit Reduction (dB)	Limit Reduction (dB)
Band IV	-0.13	-0.38	-0.13	2.76	0.00	0.00

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

PSD limit reduction = Composite gain + PSD Array gain – 6dBi, (min = 0)

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Hygrometer	Testo	608-H1	34893241	N/A	Mar. 06, 2018	May 23, 2018~ Jun. 05, 2018	Mar. 05, 2019	Conducted (TH05-HY)
Power Meter	Anritsu	ML2495A	0932001	N/A	Sep. 26, 2017	May 23, 2018~ Jun. 05, 2018	Sep. 25, 2018	Conducted (TH05-HY)
Power Sensor	Anritsu	MA2411B	0846202	300MHz~40GHz	Sep. 26, 2017	May 23, 2018~ Jun. 05, 2018	Sep. 25, 2018	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP30	101067	9kHz ~ 30GHz	Nov. 13, 2017	May 23, 2018~ Jun. 05, 2018	Nov. 12, 2018	Conducted (TH05-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Nov. 10, 2017	Jun. 01, 2018~ Jun. 05, 2018	Nov. 09, 2018	Radiation (03CH13-HY)
Bilog Antenna	TESEQ	CBL 6111D&00800 N1D01N-06	40103&07	30MHz to 1GHz	Jan. 10, 2018	Jun. 01, 2018~ Jun. 05, 2018	Jan. 09, 2019	Radiation (03CH13-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1241	1GHz ~ 18GHz	Jun. 15, 2017	Jun. 01, 2018~ Jun. 05, 2018	Jun. 14, 2018	Radiation (03CH13-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170584	18GHz- 40GHz	Nov. 27, 2017	Jun. 01, 2018~ Jun. 05, 2018	Nov. 26, 2018	Radiation (03CH13-HY)
Amplifier	Sonoma-Instrument	310 N	187282	9KHz~1GHz	Jan. 19, 2018	Jun. 01, 2018~ Jun. 05, 2018	Jan. 18, 2020	Radiation (03CH13-HY)
Preamplifier	MITEQ	AMF-7D-00101800-30-10P	1590074	1GHz~18GHz	May. 21, 2018	Jun. 01, 2018~ Jun. 05, 2018	May. 20, 2019	Radiation (03CH13-HY)
Preamplifier	Keysight	83017A	MY53270147	1GHz~26.5GHz	Feb. 02, 2018	Jun. 01, 2018~ Jun. 05, 2018	Feb. 01, 2019	Radiation (03CH13-HY)
Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz, VSWR : 2.5:1 max	Jul. 18, 2017	Jun. 01, 2018~ Jun. 05, 2018	Jul. 17, 2018	Radiation (03CH13-HY)
EMI Test Receiver	Agilent	N9038A(MXE)	MY53290053	20Hz to 26.5GHz	Jan. 16, 2018	Jun. 01, 2018~ Jun. 05, 2018	Jan. 15, 2019	Radiation (03CH13-HY)
Spectrum Analyzer	Keysight	N9010A	MY55370526	10Hz~44GHz	Mar. 15, 2018	Jun. 01, 2018~ Jun. 05, 2018	Mar. 14, 2019	Radiation (03CH13-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1m~4m	NCR	Jun. 01, 2018~ Jun. 05, 2018	NCR	Radiation (03CH13-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	NCR	Jun. 01, 2018~ Jun. 05, 2018	NCR	Radiation (03CH13-HY)
Filter	Wainwright	WLKS1200-8SS	SN3	1.2G Low Pass	Nov. 21, 2017	Jun. 01, 2018~ Jun. 05, 2018	Nov. 20, 2018	Radiation (03CH13-HY)
Filter	Woken	WHKX8-5272.5-6750-18000-40ST	SN2	6.75G Highpass	Jul. 17, 2017	Jun. 01, 2018~ Jun. 05, 2018	Jul. 16, 2018	Radiation (03CH13-HY)
Controller	EMEC	EM1000	N/A	Control Turn table & Ant Mast	NCR	Jun. 01, 2018~ Jun. 05, 2018	NCR	Radiation (03CH13-HY)
Hygrometer	TECPEL	DTM-303B	TP157151	N/A	May. 19, 2018	Jun. 01, 2018~ Jun. 05, 2018	May. 18, 2019	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 126E	MY1082/26EA	30M~18GHz	Oct. 17, 2017	Jun. 01, 2018~ Jun. 05, 2018	Oct. 16, 2018	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	505134/2	30M~40GHz	Oct. 17, 2017	Jun. 01, 2018~ Jun. 05, 2018	Oct. 16, 2018	Radiation (03CH13-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	NCR	Jun. 07, 2018	NCR	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	3.6GHz	Dec. 08, 2017	Jun. 07, 2018	Dec. 07, 2018	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34913912	N/A	Mar. 06, 2018	Jun. 07, 2018	Mar. 05, 2019	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Nov. 30, 2017	Jun. 07, 2018	Nov. 29, 2018	Conduction (CO05-HY)
LF Cable	HUBER + SUHNER	RG-214/U	LF01	N/A	Jan. 03, 2018	Jun. 07, 2018	Jan. 02, 2019	Conduction (CO05-HY)
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100851	N/A	Jan. 03, 2018	Jun. 07, 2018	Jan. 02, 2019	Conduction (CO05-HY)

NCR: No Calibration Required

5 Uncertainty of Evaluation

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))	**4.9dB**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.4dB**

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. Test Result of Conducted Test Items

Test Engineer:	Kai Liao/Shiang Wang/ Luffy Lin	Temperature:	21~25	°C
Test Date:	2018/5/23 ~ 2018/06/05	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)		26dB Bandwidth (MHz)		6 dB Bandwidth (MHz)		6 dB Bandwidth Min. Limit (MHz)		Pass/Fail
					Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	
11a	6Mbps	2	149	5745	17.45	17.45	24.30	23.80	14.40	15.66	0.5		Pass
11a	6Mbps	2	157	5785	17.55	17.40	24.50	24.50	15.10	15.10	0.5		Pass
11a	6Mbps	2	165	5825	17.50	17.55	24.50	24.20	15.60	15.40	0.5		Pass
HT20	MCS0	2	149	5745	18.60	18.55	25.20	25.26	15.05	15.00	0.5		Pass
HT20	MCS0	2	157	5785	18.65	18.60	26.20	25.10	16.00	15.36	0.5		Pass
HT20	MCS0	2	165	5825	18.65	18.55	25.44	24.80	15.94	15.40	0.5		Pass
HT40	MCS0	2	151	5755	36.70	36.50	41.99	41.94	35.10	35.10	0.5		Pass
HT40	MCS0	2	159	5795	36.60	36.70	42.12	41.76	35.10	35.86	0.5		Pass
VHT80	MCS0	2	155	5775	75.84	75.72	84.80	83.52	75.17	75.20	0.5		Pass

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
					Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	
11a	6Mbps	1	149	5745	0.10	0.10	15.08	14.60		30.00	30.00	-0.13	-0.38	Pass
11a	6Mbps	1	157	5785	0.10	0.10	15.00	14.63		30.00	30.00	-0.13	-0.38	Pass
11a	6Mbps	1	165	5825	0.10	0.10	14.83	14.64		30.00	30.00	-0.13	-0.38	Pass
HT20	MCS0	1	149	5745	0.09	0.09	13.88	13.37		30.00	30.00	-0.13	-0.38	Pass
HT20	MCS0	1	157	5785	0.09	0.09	14.11	13.29		30.00	30.00	-0.13	-0.38	Pass
HT20	MCS0	1	165	5825	0.09	0.09	13.92	13.42		30.00	30.00	-0.13	-0.38	Pass
HT40	MCS0	1	151	5755	0.18	0.18	13.26	12.73		30.00	30.00	-0.13	-0.38	Pass
HT40	MCS0	1	159	5795	0.18	0.18	13.44	12.77		30.00	30.00	-0.13	-0.38	Pass
VHT20	MCS0	1	149	5745	0.09	0.09	13.86	13.34		30.00	30.00	-0.13	-0.38	Pass
VHT20	MCS0	1	157	5785	0.09	0.09	14.10	13.26		30.00	30.00	-0.13	-0.38	Pass
VHT20	MCS0	1	165	5825	0.09	0.09	13.89	13.40		30.00	30.00	-0.13	-0.38	Pass
VHT40	MCS0	1	151	5755	0.18	0.18	13.18	12.70		30.00	30.00	-0.13	-0.38	Pass
VHT40	MCS0	1	159	5795	0.18	0.18	13.36	12.73		30.00	30.00	-0.13	-0.38	Pass
VHT80	MCS0	1	155	5775	0.36	0.36	12.24	11.57		30.00	30.00	-0.13	-0.38	Pass
11a	6Mbps	2	149	5745	0.08	0.08	15.10	14.63	17.88	30.00		-0.13		Pass
11a	6Mbps	2	157	5785	0.08	0.08	15.01	14.64	17.84	30.00		-0.13		Pass
11a	6Mbps	2	165	5825	0.08	0.08	14.86	14.68	17.78	30.00		-0.13		Pass
HT20	MCS0	2	149	5745	0.09	0.11	13.93	13.41	16.69	30.00		-0.13		Pass
HT20	MCS0	2	157	5785	0.09	0.11	14.14	13.34	16.77	30.00		-0.13		Pass
HT20	MCS0	2	165	5825	0.09	0.11	13.97	13.51	16.76	30.00		-0.13		Pass
HT40	MCS0	2	151	5755	0.18	0.18	13.29	12.77	16.05	30.00		-0.13		Pass
HT40	MCS0	2	159	5795	0.18	0.18	13.51	12.80	16.18	30.00		-0.13		Pass
VHT20	MCS0	2	149	5745	0.17	0.17	13.92	13.40	16.68	30.00		-0.13		Pass
VHT20	MCS0	2	157	5785	0.17	0.17	14.13	13.33	16.76	30.00		-0.13		Pass
VHT20	MCS0	2	165	5825	0.17	0.17	13.94	13.50	16.74	30.00		-0.13		Pass
VHT40	MCS0	2	151	5755	0.35	0.36	13.27	12.76	16.03	30.00		-0.13		Pass
VHT40	MCS0	2	159	5795	0.35	0.36	13.50	12.79	16.17	30.00		-0.13		Pass
VHT80	MCS0	2	155	5775	0.61	0.61	12.36	11.84	15.11	30.00		-0.13		Pass

Report Number : FR842002F

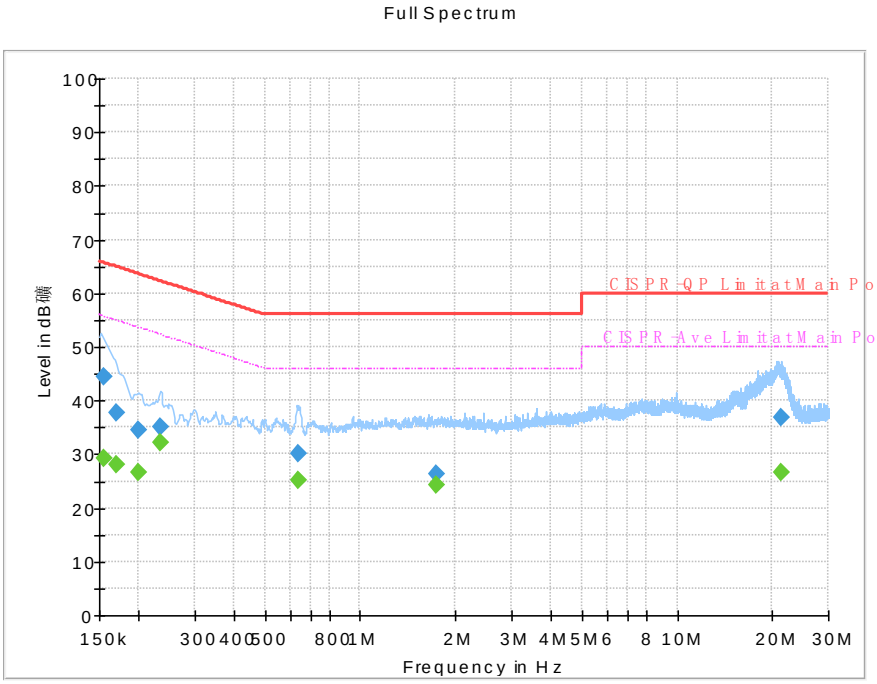
TEST RESULTS DATA
Power Spectral Density

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
					Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	
11a	6Mbps	2	149	5745	0.08	0.08	2.22		0.88	0.41	3.89	30.00		2.76		Pass
11a	6Mbps	2	157	5785	0.08	0.08	2.22		0.72	0.40	3.73	30.00		2.76		Pass
11a	6Mbps	2	165	5825	0.08	0.08	2.22		1.00	0.55	4.01	30.00		2.76		Pass
HT20	MCS0	2	149	5745	0.09	0.11	2.22		-0.70	-1.14	2.31	30.00		2.76		Pass
HT20	MCS0	2	157	5785	0.09	0.11	2.22		-1.05	-0.84	2.17	30.00		2.76		Pass
HT20	MCS0	2	165	5825	0.09	0.11	2.22		-0.85	-0.84	2.17	30.00		2.76		Pass
HT40	MCS0	2	151	5755	0.18	0.18	2.22		-4.36	-4.87	-1.35	30.00		2.76		Pass
HT40	MCS0	2	159	5795	0.18	0.18	2.22		-4.62	-4.88	-1.61	30.00		2.76		Pass
VHT80	MCS0	2	155	5775	0.61	0.61	2.22		-7.71	-8.41	-4.70	30.00		2.76		Pass

Note: PSD Sum = Max PSD(Ant. 1, Ant. 2) + 10 log (n)

Appendix B. AC Conducted Emission Test Results

Test Engineer :	Arthur Hsieh	Temperature :	21~25℃
		Relative Humidity :	51~55%
Test Voltage :	120Vac / 60Hz	Phase :	Line

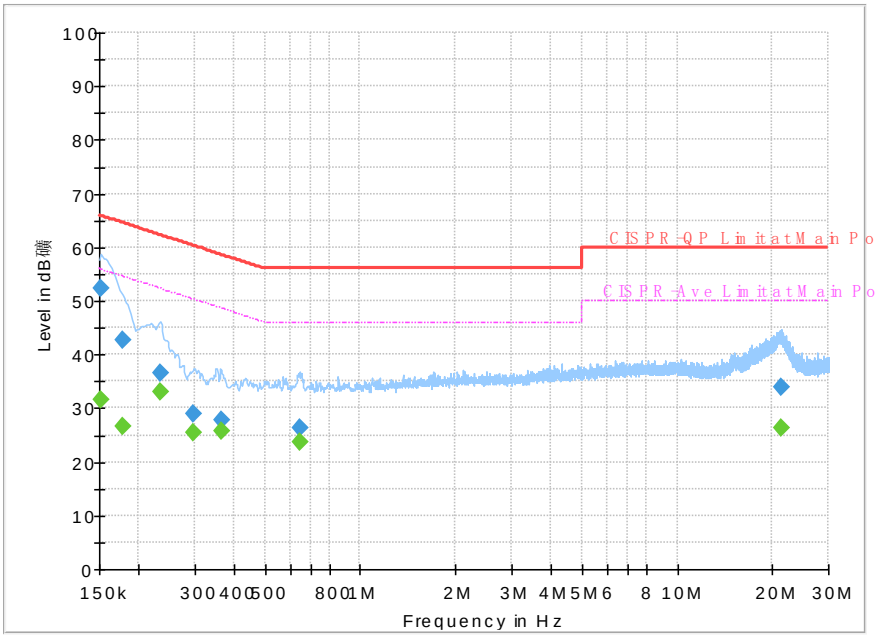


Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.154500	---	29.20	55.75	26.55	L1	OFF	19.5
0.154500	44.49	---	65.75	21.26	L1	OFF	19.5
0.170250	---	28.05	54.95	26.90	L1	OFF	19.5
0.170250	37.60	---	64.95	27.35	L1	OFF	19.5
0.199500	---	26.74	53.63	26.89	L1	OFF	19.5
0.199500	34.42	---	63.63	29.21	L1	OFF	19.5
0.233250	---	32.19	52.33	20.14	L1	OFF	19.5
0.233250	35.00	---	62.33	27.33	L1	OFF	19.5
0.636000	---	25.08	46.00	20.92	L1	OFF	19.6
0.636000	30.05	---	56.00	25.95	L1	OFF	19.6
1.743000	---	24.18	46.00	21.82	L1	OFF	19.6
1.743000	26.29	---	56.00	29.71	L1	OFF	19.6
21.286500	---	26.75	50.00	23.25	L1	OFF	20.3
21.286500	36.92	---	60.00	23.08	L1	OFF	20.3

Test Engineer :	Arthur Hsieh	Temperature :	21~25℃
		Relative Humidity :	51~55%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral

Full Spectrum



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	---	31.49	55.88	24.39	N	OFF	19.5
0.152250	52.37	---	65.88	13.51	N	OFF	19.5
0.177000	---	26.60	54.63	28.03	N	OFF	19.5
0.177000	42.67	---	64.63	21.96	N	OFF	19.5
0.233250	---	32.95	52.33	19.38	N	OFF	19.5
0.233250	36.58	---	62.33	25.75	N	OFF	19.5
0.298500	---	25.39	50.28	24.89	N	OFF	19.5
0.298500	29.03	---	60.28	31.25	N	OFF	19.5
0.363750	---	25.68	48.64	22.96	N	OFF	19.5
0.363750	27.72	---	58.64	30.92	N	OFF	19.5
0.642750	---	23.66	46.00	22.34	N	OFF	19.6
0.642750	26.36	---	56.00	29.64	N	OFF	19.6
21.286500	---	26.24	50.00	23.76	N	OFF	20.4
21.286500	33.91	---	60.00	26.09	N	OFF	20.4

Appendix C. Radiated Spurious Emission

Test Engineer :	Alex Jheng/ Fu Chen/ Wilson Wu	**Temperature :**	24.5~25°C
		Relative Humidity :	47~50%

Band 4 - 5725~5850MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 149 5745MHz		5606.4	52.7	-15.5	68.2	40.99	32.5	8.85	29.64	189	303	P	H
		5695.8	53.25	-48.85	102.1	41.5	32.59	8.83	29.67	189	303	P	H
		5706.8	54.52	-52.59	107.11	42.77	32.61	8.82	29.68	189	303	P	H
		5725	57.09	-65.11	122.2	45.33	32.62	8.82	29.68	189	303	P	H
	*	5745	108.75	-	-	96.99	32.64	8.81	29.69	189	303	P	H
	*	5745	101.02	-	-	89.26	32.64	8.81	29.69	189	303	A	H
		5619.8	53.18	-15.02	68.2	41.45	32.52	8.85	29.64	100	348	P	V
		5657.6	53.03	-20.82	73.85	41.29	32.56	8.84	29.66	100	348	P	V
		5717	53.02	-56.94	109.96	41.27	32.61	8.82	29.68	100	348	P	V
		5725	54.55	-67.65	122.2	42.79	32.62	8.82	29.68	100	348	P	V
	*	5745	104.28	-	-	92.52	32.64	8.81	29.69	100	348	P	V
	*	5745	96.41	-	-	84.65	32.64	8.81	29.69	100	348	A	V

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 157 5785MHz		5636.8	51.99	-16.21	68.2	40.26	32.54	8.84	29.65	184	302	P	H
		5689.4	52.36	-45.02	97.38	40.61	32.59	8.83	29.67	184	302	P	H
		5720	53.24	-57.56	110.8	41.48	32.62	8.82	29.68	184	302	P	H
		5720	53.24	-57.56	110.8	41.48	32.62	8.82	29.68	184	302	P	H
	*	5785	108.21	-	-	96.45	32.68	8.8	29.72	184	302	P	H
	*	5785	100.63	-	-	88.87	32.68	8.8	29.72	184	302	A	H
		5852.8	52.12	-63.7	115.82	40.27	32.74	8.85	29.74	184	302	P	H
		5859.4	53.78	-55.79	109.57	41.92	32.76	8.85	29.75	184	302	P	H
		5916.8	52.74	-21.51	74.25	40.79	32.81	8.91	29.77	184	302	P	H
		5937	53.15	-15.05	68.2	41.17	32.83	8.93	29.78	184	302	P	H
		5614.6	53.63	-14.57	68.2	41.92	32.5	8.85	29.64	120	348	P	V
		5699.8	52.92	-52.13	105.05	41.18	32.59	8.82	29.67	120	348	P	V
		5703.8	52.84	-53.43	106.27	41.08	32.61	8.82	29.67	120	348	P	V
		5724	51.56	-68.36	119.92	39.8	32.62	8.82	29.68	120	348	P	V
	*	5785	104.27	-	-	92.51	32.68	8.8	29.72	120	348	P	V
	*	5785	96.64	-	-	84.88	32.68	8.8	29.72	120	348	A	V
		5853.8	52.51	-61.03	113.54	40.64	32.76	8.85	29.74	120	348	P	V
		5871.6	53.3	-52.85	106.15	41.4	32.78	8.87	29.75	120	348	P	V
		5880.6	52.8	-48.24	101.04	40.89	32.78	8.88	29.75	120	348	P	V
		5926.2	52.97	-15.23	68.2	41	32.83	8.91	29.77	120	348	P	V

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 165 5825MHz	*	5825	107.99	-	-	96.17	32.73	8.82	29.73	179	312	P	H
	*	5825	100.64	-	-	88.82	32.73	8.82	29.73	179	312	A	H
		5851	53.46	-66.46	119.92	41.61	32.74	8.85	29.74	179	312	P	H
		5867.4	54.61	-52.72	107.33	42.73	32.76	8.87	29.75	179	312	P	H
		5904.2	53.39	-30.16	83.55	41.45	32.8	8.9	29.76	179	312	P	H
		5933	52.62	-15.58	68.2	40.65	32.83	8.91	29.77	179	312	P	H
	*	5825	104.26	-	-	92.44	32.73	8.82	29.73	115	348	P	V
	*	5825	97.41	-	-	85.59	32.73	8.82	29.73	115	348	A	V
		5850	52.38	-69.82	122.2	40.53	32.74	8.85	29.74	115	348	P	V
		5869.4	53.05	-53.72	106.77	41.17	32.76	8.87	29.75	115	348	P	V
		5877.2	53.31	-50.26	103.57	41.41	32.78	8.87	29.75	115	348	P	V
		5925.4	53.2	-15	68.2	41.23	32.83	8.91	29.77	115	348	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+2	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 149 5745MHz		11490	46.72	-27.28	74	55.46	39.91	12.75	61.4	100	0	P	H
		17235	48.91	-19.29	68.2	50.74	40.56	15.11	57.5	100	0	P	H
		11490	48.14	-25.86	74	56.88	39.91	12.75	61.4	100	0	P	V
		17235	49.57	-18.63	68.2	51.4	40.56	15.11	57.5	100	0	P	V
802.11a CH 157 5785MHz		11570	47.43	-26.57	74	56.41	39.73	12.79	61.5	100	0	P	H
		17355	47.97	-20.23	68.2	49.07	40.84	15.15	57.09	100	0	P	H
		11570	46.65	-27.35	74	55.63	39.73	12.79	61.5	100	0	P	V
		17355	49.28	-18.92	68.2	50.38	40.84	15.15	57.09	100	0	P	V
802.11a CH 165 5825MHz		11650	48.3	-25.7	74	57.51	39.57	12.83	61.61	100	0	P	H
		17475	49.62	-18.58	68.2	49.98	41.12	15.2	56.68	100	0	P	H
		11650	47.73	-26.27	74	56.94	39.57	12.83	61.61	100	0	P	V
		17475	49.68	-18.52	68.2	50.04	41.12	15.2	56.68	100	0	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+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		5633.4	52.5	-15.7	68.2	40.77	32.54	8.84	29.65	193	303	P	H
		5688.4	53.33	-43.31	96.64	41.58	32.59	8.83	29.67	193	303	P	H
		5717.6	53.8	-56.33	110.13	42.04	32.62	8.82	29.68	193	303	P	H
		5723.2	54.18	-63.92	118.1	42.42	32.62	8.82	29.68	193	303	P	H
	*	5755	103.07	-	-	91.29	32.66	8.81	29.69	193	303	P	H
	*	5755	95.81	-	-	84.03	32.66	8.81	29.69	193	303	A	H
		5850.2	52.18	-69.56	121.74	40.33	32.74	8.85	29.74	193	303	P	H
		5871.2	52.42	-53.84	106.26	40.52	32.78	8.87	29.75	193	303	P	H
802.11n		5912.8	53.01	-24.19	77.2	41.07	32.81	8.9	29.77	193	303	P	H
HT40		5931.8	52.17	-16.03	68.2	40.2	32.83	8.91	29.77	193	303	P	H
CH 151		5630.4	52.47	-15.73	68.2	40.76	32.52	8.84	29.65	105	10	P	V
5755MHz		5690.4	52.14	-45.98	98.12	40.39	32.59	8.83	29.67	105	10	P	V
		5718.4	51.99	-58.36	110.35	40.23	32.62	8.82	29.68	105	10	P	V
		5722	52.17	-63.19	115.36	40.41	32.62	8.82	29.68	105	10	P	V
	*	5755	99.98	-	-	88.2	32.66	8.81	29.69	105	10	P	V
	*	5755	91.87	-	-	80.09	32.66	8.81	29.69	105	10	A	V
		5853.6	52.29	-61.7	113.99	40.42	32.76	8.85	29.74	105	10	P	V
		5873.6	52.27	-53.32	105.59	40.37	32.78	8.87	29.75	105	10	P	V
		5893.8	52.31	-38.94	91.25	40.39	32.8	8.88	29.76	105	10	P	V
		5946	52.67	-15.53	68.2	40.67	32.85	8.93	29.78	105	10	P	V

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		5614.8	53.04	-15.16	68.2	41.33	32.5	8.85	29.64	200	317	P	H
		5694.8	53.16	-48.21	101.37	41.41	32.59	8.83	29.67	200	317	P	H
		5716.6	53.28	-56.57	109.85	41.53	32.61	8.82	29.68	200	317	P	H
		5720.2	52.46	-58.8	111.26	40.7	32.62	8.82	29.68	200	317	P	H
	*	5795	104.31	-	-	92.54	32.69	8.8	29.72	200	317	P	H
	*	5795	96.91	-	-	85.14	32.69	8.8	29.72	200	317	A	H
		5853	52.86	-62.5	115.36	41.01	32.74	8.85	29.74	200	317	P	H
		5866.6	54.48	-53.07	107.55	42.6	32.76	8.87	29.75	200	317	P	H
802.11n		5896	53.39	-36.23	89.62	41.47	32.8	8.88	29.76	200	317	P	H
HT40		5927.2	54.02	-14.18	68.2	42.05	32.83	8.91	29.77	200	317	P	H
CH 159		5602.2	52.13	-16.07	68.2	40.41	32.5	8.85	29.63	106	10	P	V
5795MHz		5660.4	52.79	-23.13	75.92	41.05	32.56	8.84	29.66	106	10	P	V
		5713.4	51.85	-57.1	108.95	40.1	32.61	8.82	29.68	106	10	P	V
		5723.6	51.68	-67.33	119.01	39.92	32.62	8.82	29.68	106	10	P	V
	*	5795	101.92	-	-	90.15	32.69	8.8	29.72	106	10	P	V
	*	5795	94.4	-	-	82.63	32.69	8.8	29.72	106	10	A	V
		5852.2	52.28	-64.9	117.18	40.43	32.74	8.85	29.74	106	10	P	V
		5871.8	53.82	-52.27	106.09	41.92	32.78	8.87	29.75	106	10	P	V
		5913.4	53.67	-23.09	76.76	41.73	32.81	8.9	29.77	106	10	P	V
		5942.4	51.97	-16.23	68.2	39.97	32.85	8.93	29.78	106	10	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+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		5644.2	53.41	-14.79	68.2	41.68	32.54	8.84	29.65	194	317	P	H
		5700	52.29	-52.91	105.2	40.55	32.59	8.82	29.67	194	317	P	H
		5719.8	54.36	-56.38	110.74	42.6	32.62	8.82	29.68	194	317	P	H
		5720.2	53.91	-57.35	111.26	42.15	32.62	8.82	29.68	194	317	P	H
	*	5775	99.19	-	-	87.42	32.68	8.8	29.71	194	317	P	H
	*	5775	93.02	-	-	81.25	32.68	8.8	29.71	194	317	A	H
		5851.2	55.28	-64.18	119.46	43.43	32.74	8.85	29.74	194	317	P	H
		5860.8	53.08	-56.09	109.17	41.22	32.76	8.85	29.75	194	317	P	H
802.11ac		5913.8	53.27	-23.19	76.46	41.33	32.81	8.9	29.77	194	317	P	H
VHT80		5932.2	52.83	-15.37	68.2	40.86	32.83	8.91	29.77	194	317	P	H
CH 155		5610.6	52.31	-15.89	68.2	40.6	32.5	8.85	29.64	182	20	P	V
5775MHz		5683	52.32	-40.34	92.66	40.59	32.57	8.83	29.67	182	20	P	V
		5714	53.74	-55.38	109.12	41.99	32.61	8.82	29.68	182	20	P	V
		5720.2	52.02	-59.24	111.26	40.26	32.62	8.82	29.68	182	20	P	V
	*	5775	95.87	-	-	84.11	32.68	8.8	29.72	182	20	P	V
	*	5775	89.44	-	-	77.68	32.68	8.8	29.72	182	20	A	V
		5853.2	52.21	-62.69	114.9	40.36	32.74	8.85	29.74	182	20	P	V
		5861.4	53.93	-55.08	109.01	42.05	32.76	8.87	29.75	182	20	P	V
		5883.4	52.77	-46.19	98.96	40.87	32.78	8.88	29.76	182	20	P	V
		5928.2	51.88	-16.32	68.2	39.91	32.83	8.91	29.77	182	20	P	V

Remark

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

Emission below 1GHz

5GHz WIFI 802.11n HT40 (LF @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
5GHz 802.11n HT40 LF		48.09	23.17	-16.83	40	39.2	15.3	0.99	32.32	-	-	P	H
		77.52	23.11	-16.89	40	40.73	13.4	1.28	32.3	-	-	P	H
		101.55	32.86	-10.64	43.5	47.49	16.3	1.36	32.29	100	0	P	H
		845.3	31.48	-14.52	46	30.76	29	3.49	31.77	-	-	P	H
		919.5	32.67	-13.33	46	31.08	29.33	3.6	31.34	-	-	P	H
		955.2	34.55	-11.45	46	30.94	30.91	3.71	31.01	-	-	P	H
		48.36	32.03	-7.97	40	48.06	15.3	0.99	32.32	100	0	P	V
		99.12	29.55	-13.95	43.5	44.46	16.03	1.35	32.29	-	-	P	V
		176.61	26.55	-16.95	43.5	41.79	15.35	1.68	32.27	-	-	P	V
		829.2	31.47	-14.53	46	31.41	28.46	3.45	31.85	-	-	P	V
		880.3	36.15	-9.85	46	35.26	28.97	3.53	31.61	-	-	P	V
		947.5	33.92	-12.08	46	30.79	30.5	3.71	31.08	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

Note symbol

*	**Fundamental Frequency** which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is **over limit** line.
P/A	**P**eak or **A**verage
H/V	**H**orizontal or **V**ertical

A calculation example for radiated spurious emission is shown as below:

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)
2. Level(dBμV/m) = Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
3. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

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

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

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

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

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

= 43.54 (dBμV/m)

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

= 43.54(dBμV/m) – 54(dBμV/m)

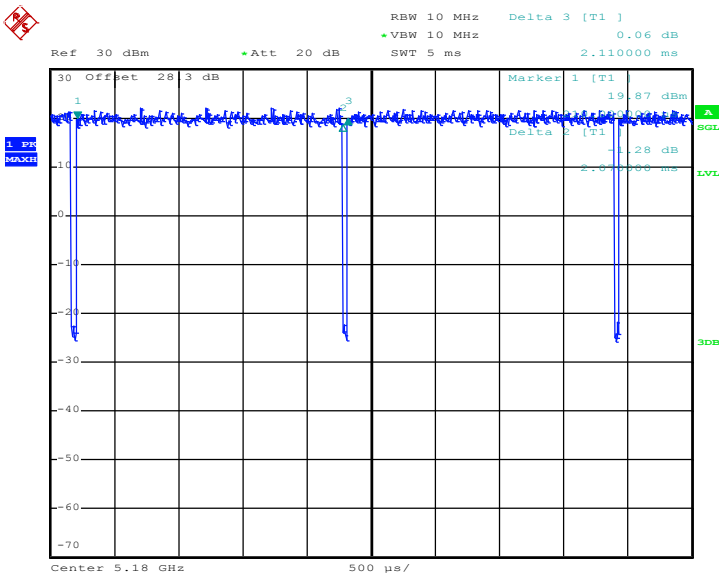
= -10.46(dB)

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

Appendix D. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
1+2	802.11a	98.10	-	-	10Hz
1+2	802.11n HT40	92.22	0.498	2.01	3kHz
1+2	802.11ac VHT80	86.99	0.254	3.94	10kHz

802.11a



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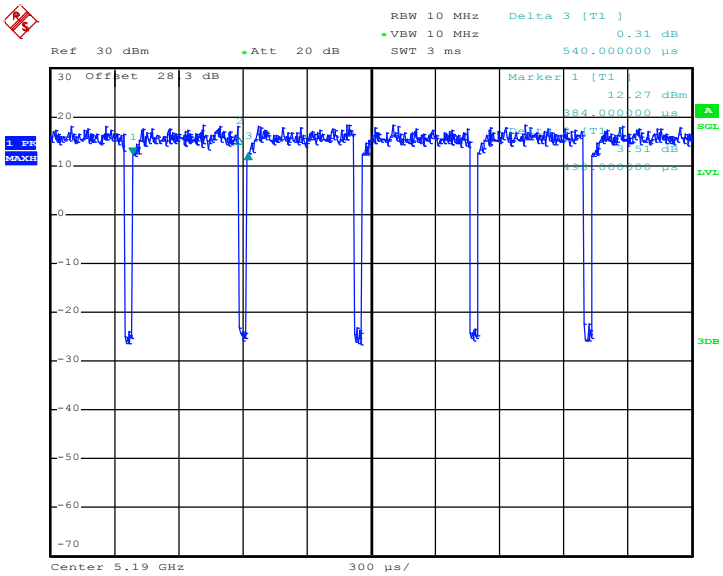
802.11ac HT40



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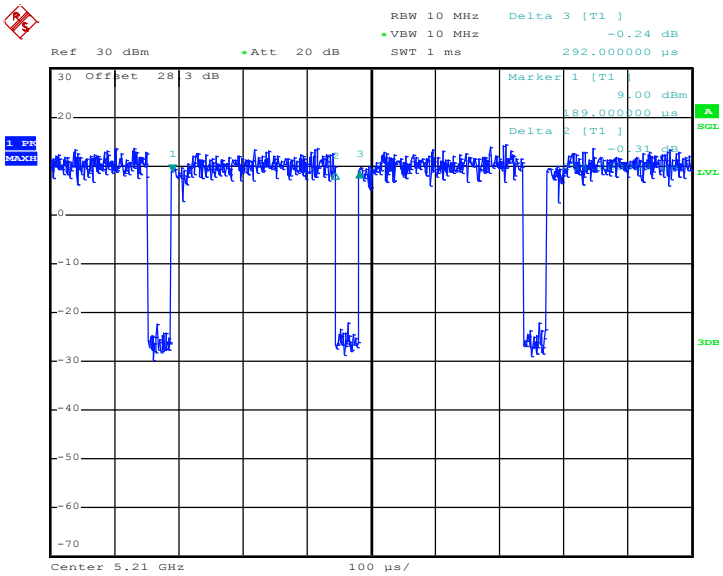
802.11ac VHT80



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