FCC RF Test Report

APPLICANT	:	**Xiaomi Communications Co., Ltd.**
EQUIPMENT	:	**Mobile Phone**
BRAND NAME	:	**MI**
MODEL NAME	:	**M1903F11G**
FCC ID	:	**2AFZZ-XMSF11G**
STANDARD	:	**FCC Part 15 Subpart E §15.407**
CLASSIFICATION	:	**(NII) Unlicensed National Information Infrastructure**

The product was received on May 24, 2019 and testing was completed on Jun. 21, 2019. We, Sporton International (Kunshan) Inc., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

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

Jason Jia

Reviewed by: Jason Jia / Supervisor

James Huang

Approved by: James Huang / Manager

ACCREDITED
Cert #5145.02

Sporton International (Kunshan) Inc.
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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR921903-02E	Rev. 01	Initial issue of report	Jul. 08, 2019

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	2.1049 & 15.403(i)	26dB & 99% Bandwidth	-	Pass	-
3.2	15.407(a)	Maximum Conducted Output Power	≤ 24 dBm	Pass	-
3.3	15.407(a)	Power Spectral Density	≤ 11 dBm	Pass	-
3.4	15.407(b)	Unwanted Emissions	15.407(b) & 15.209(a)	Pass	Under limit 3.20 dB at 5149.980 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 4.37 dB at 0.178 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 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Phone
Brand Name	MI
Model Name	M1903F11G
FCC ID	2AFZZ-XMSF11G
EUT supports Radios application	GSM/GPRS/EGPRS/WCDMA/HSPA/ DC-HSDPA/HSPA+/LTE/NFC WLAN 2.4GHz 802.11b/g/n HT20 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth BR /EDR/ LE FM Receiver / GNSS
IMEI Code	Conducted : 865110040182176/ 865110040182184 Conduction : 865110040182333/ 865110040182341 Radiation : 865110040181772/ 865110040181780
HW Version	P2.2
SW Version	MIUI 10
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.

1.3 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Frequency Range	5180 MHz ~ 5240 MHz 5260 MHz ~ 5320 MHz 5500 MHz ~ 5700 MHz
Maximum Output Power to Antenna	**MIMO <Ant 1+2>** **<5180 MHz ~ 5240 MHz>** 802.11a : 19.79 dBm / 0.0953 W 802.11n HT20 : 20.26 dBm / 0.1062 W 802.11n HT40 : 16.78 dBm / 0.0476 W 802.11ac VHT20 : 20.36 dBm / 0.1086 W 802.11ac VHT40 : 17.00 dBm / 0.0501 W 802.11ac VHT80 : 16.20 dBm / 0.0417 W **<5260 MHz ~ 5320 MHz>** 802.11a : 19.74 dBm / 0.0942 W 802.11n HT20 : 18.96 dBm / 0.0787 W 802.11n HT40 : 16.67 dBm / 0.0465 W 802.11ac VHT20 : 19.19 dBm / 0.0830 W 802.11ac VHT40 : 16.85 dBm / 0.0484 W 802.11ac VHT80 : 14.20 dBm / 0.0263 W **<5500 MHz ~ 5700 MHz >** 802.11a : 19.94 dBm / 0.0986 W 802.11n HT20 : 20.44 dBm / 0.1107 W 802.11n HT40 : 16.90 dBm / 0.0490 W 802.11ac VHT20 : 20.50 dBm / 0.1122 W 802.11ac VHT40 : 17.10 dBm / 0.0513 W 802.11ac VHT80 : 15.52 dBm / 0.0356 W
99% Occupied Bandwidth	**MIMO <Ant 1+2 >** **<5180 MHz ~ 5240 MHz>** 802.11a : 17.58 MHz 802.11ac VHT20 : 18.83 MHz 802.11ac VHT40 : 36.56 MHz 802.11ac VHT80 : 75.64 MHz **<5260 MHz ~ 5320 MHz>** 802.11a : 17.53 MHz 802.11ac VHT20 : 18.73 MHz 802.11ac VHT40 : 36.76 MHz 802.11ac VHT80 : 75.64 MHz **<5500 MHz ~ 5700 MHz >** 802.11a : 18.98 MHz 802.11ac VHT20 : 18.68 MHz 802.11ac VHT40 : 36.86 MHz 802.11ac VHT80 : 75.52 MHz
Antenna Type / Gain	**<5150 MHz ~ 5250 MHz>** <Ant. 1> : IFA Antenna with gain -2.30 dBi <Ant. 2> : IFA Antenna with gain -0.30 dBi **<5250 MHz ~ 5350 MHz>** <Ant. 1> : IFA Antenna with gain -1.50 dBi <Ant. 2> : IFA Antenna with gain -0.10 dBi **<5470 MHz ~ 5725 MHz>** <Ant. 1> : IFA Antenna with gain -0.50 dBi <Ant. 2> : IFA Antenna with gain -0.10 dBi

<table>
<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 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>-</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 802.11an HT20 / ac VHT20 and 802.11an HT40 / ac VHT40 mode, the whole testing have assessed only 802.11ac VHT20/ VHT40 by referring to their maximum conducted power.
2. For WLAN SISO & MIMO mode, the whole testing has assessed only MIMO mode by referring to their higher conducted power.

1.4 Modification of EUT

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

1.5 Testing Location

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

Test Firm	Sporton International (Kunshan) Inc.		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	CO01-KS 03CH02-KS TH01-KS	CN1257	314309

1.6 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.
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ANSI C63.10-2013

Remark:

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

2 Test Configuration of Equipment Under Test

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

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

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5180-5240 MHz Band 1 (U-NII-1)	36	5180	44	5220
	38*	5190	46*	5230
	40	5200	48	5240
	42#	5210		

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5260-5320 MHz Band 2 (U-NII-2A)	52	5260	60	5300
	54*	5270	62*	5310
	56	5280	64	5320
	58#	5290		

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5500-5700 MHz Band 3 (U-NII-2C)	100	5500	112	5560
	102*	5510	116	5580
	104	5520	132	5660
	106#	5530	134*	5670
	108	5540	136	5680
	110*	5550	140	5700

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
TDWR Channel	118*	5590	124	5620
	120	5600	126*	5630
	122#	5610	128	5640

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.

MIMO Mode

Modulation	Data Rate
802.11a	6 Mbps
802.11ac VHT20	MCS0
802.11ac VHT40	MCS0
802.11ac VHT80	MCS0

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

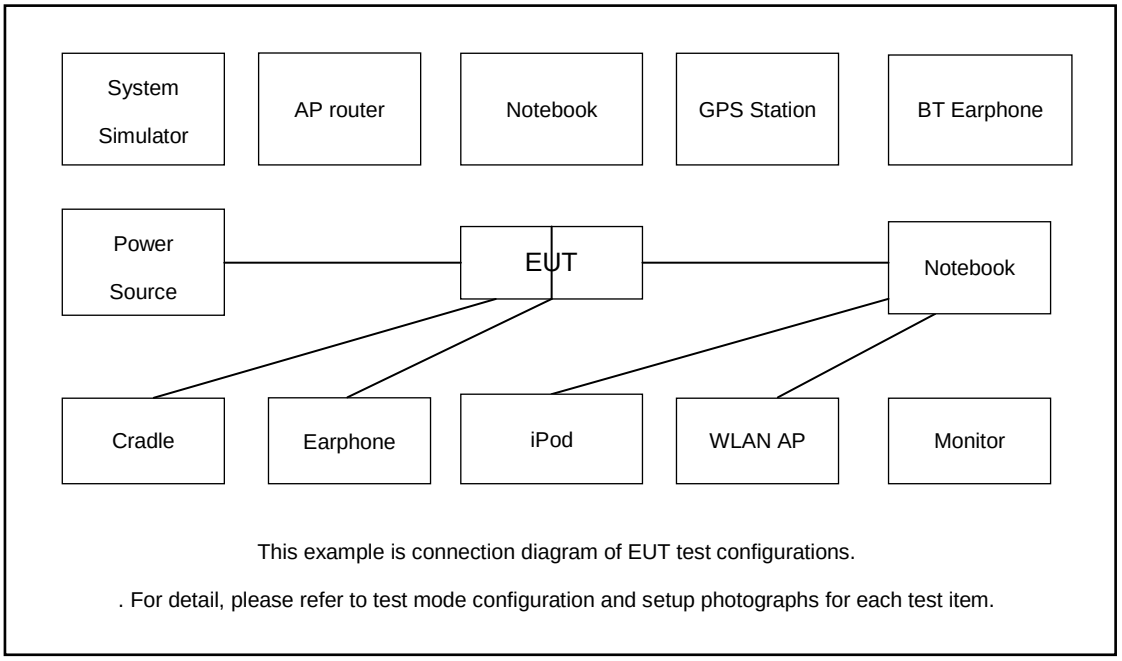
Ch. #		Band I：5180-5240 MHz	Band II：5260-5320 MHz	Band III：5500-5700MHz
		802.11a	802.11a	802.11a
L	Low	36	52	100
M	Middle	44	60	116
H	High	48	64	140

Ch. #		Band I：5180-5240 MHz	Band II：5260-5320 MHz	Band III：5500-5700MHz
		802.11ac VHT20	802.11ac VHT20	802.11ac VHT20
L	Low	36	52	100
M	Middle	44	60	116
H	High	48	64	140

Ch. #		Band I：5180-5240 MHz	Band II：5260-5320 MHz	Band III：5500-5700MHz
		802.11ac VHT40	802.11ac VHT40	802.11ac VHT40
L	Low	38	54	102
M	Middle	-	-	110
H	High	46	62	134

Ch. #		Band I：5180-5240 MHz	Band II：5260-5320 MHz	Band III：5500-5700MHz
		802.11ac VHT80	802.11ac VHT80	802.11ac VHT80
L	Low	-	-	106
M	Middle	42	58	-
H	High	-	-	122

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.	Base Station	Anritsu	MT8820C	N/A	N/A	Unshielded,1.8m
2.	Bluetooth Earphone	Xiaomi	LYEJ02LM	N/A	N/A	N/A
3.	Notebook	Lenovo	G480	N/A	N/A	shielded cable DC O/P 1.8m , Unshielded AC I/P cable 1.8m
4.	WLAN AP	D-Link	DIR-855	KA2DIR855A2	N/A	Unshielded,1.8m
5.	Earphone	Lenovo	SH100	N/A	Unshielded,1.2m	N/A

2.5 EUT Operation Test Setup

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

For AC power line conducted emissions, the EUT was set to connect with the WLAN AP under large package sizes transmission.

2.6 Measurement Results Explanation Example

For all conducted test items:

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

Example :

The spectrum analyzer offset is derived from RF cable loss

Offset = RF cable loss

Following shows an offset computation example with cable loss 7.6 dB.

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

= 7.6 (dB)

3 Test Result

3.1 26dB & 99% Occupied Bandwidth Measurement

3.1.1 Description of 26dB & 99% Occupied Bandwidth

This section is for reporting purpose only.

There is no restriction limits for bandwidth.

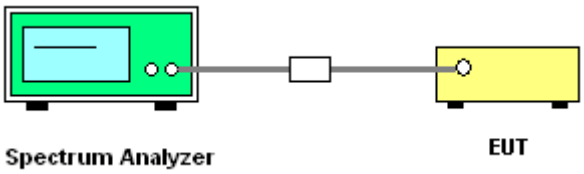
3.1.2 Measuring Instruments

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
2. Set RBW = approximately 1% of the emission bandwidth.
3. Set the VBW > RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
7. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1MHz and set the Video bandwidth (VBW) ≥ 3 * RBW.
8. Measure and record the results in the test report.

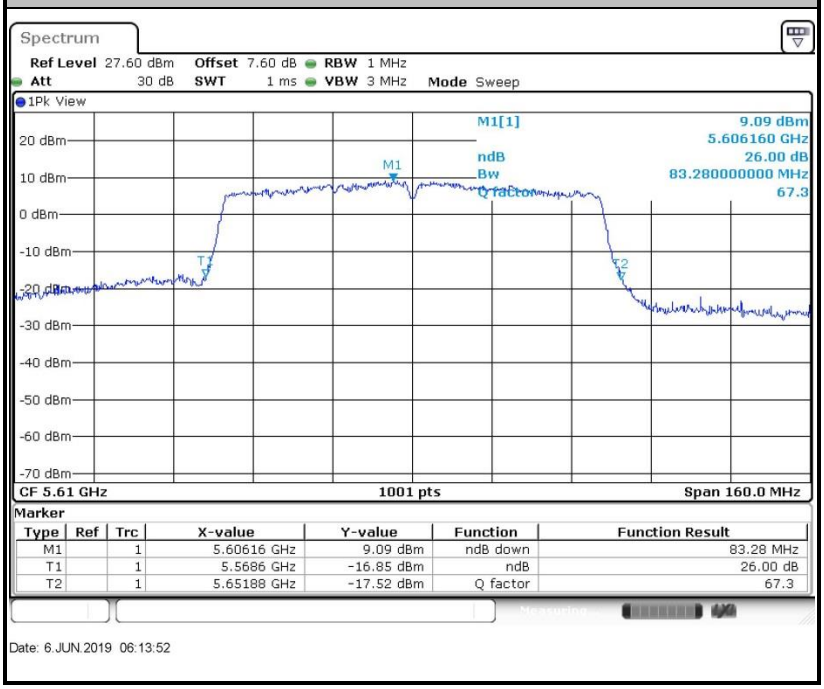
3.1.4 Test Setup



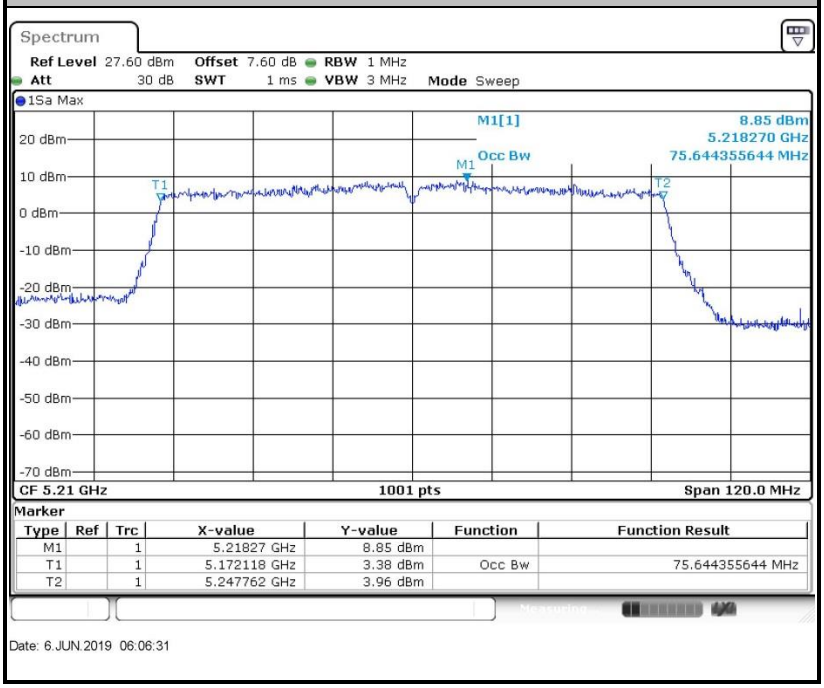
3.1.5 Test Result of 26dB & 99% Occupied Bandwidth

Please refer to Appendix A.

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

<FCC 14-30 CFR 15.407>

For mobile and portable client devices in the 5.15–5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW.

For the 5.25–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm 10 log B, where B is the 26 dB emission bandwidth in megahertz.

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.

Note that U-NII-2 band, devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

3.2.2 Measuring Instruments

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

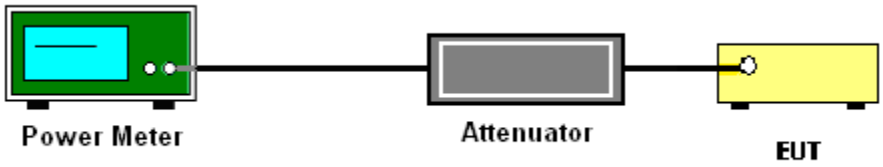
3.2.3 Test Procedures

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

<FCC 14-30 CFR 15.407>

For mobile and portable client devices in the 5.15–5.25 GHz band, the maximum power spectral density shall not exceed 11dBm in any 1 megahertz band.

For the 5.25–5.725 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz 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).

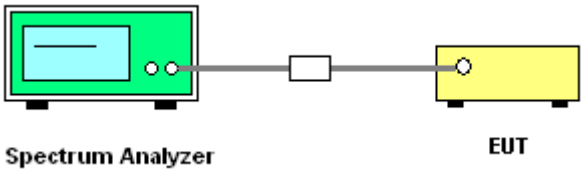
- Measure the duty cycle.
- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 1 MHz.
- Set VBW ≥ 3 MHz.
- Number of points in sweep ≥ 2 Span / RBW.
- Sweep time = auto.
- Detector = RMS
- Trace average at least 100 traces in power averaging mode.
- Add 10 log(1/x), 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 (a): Measure and sum the spectra across the outputs.

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

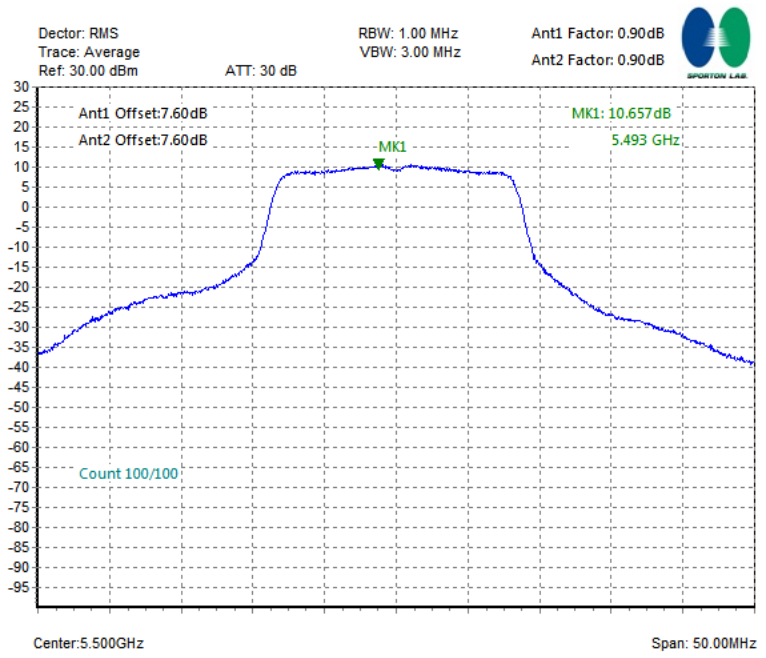
3.3.4 Test Setup



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 5150-5250 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of –27dBm/MHz.

For transmitters operating in the 5250-5350 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5250-5350 MHz band that generate emissions in the 5150-5250 MHz band must meet all applicable technical requirements for operation in the 5150-5250 MHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5150-5250 MHz band.

For transmitters operating in the 5470-5600 MHz and 5650-5725MHz band: all emissions outside of the 5470-5600 MHz and 5650-5725MHz band shall not exceed an EIRP of -27 dBm/MHz.

(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) 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.

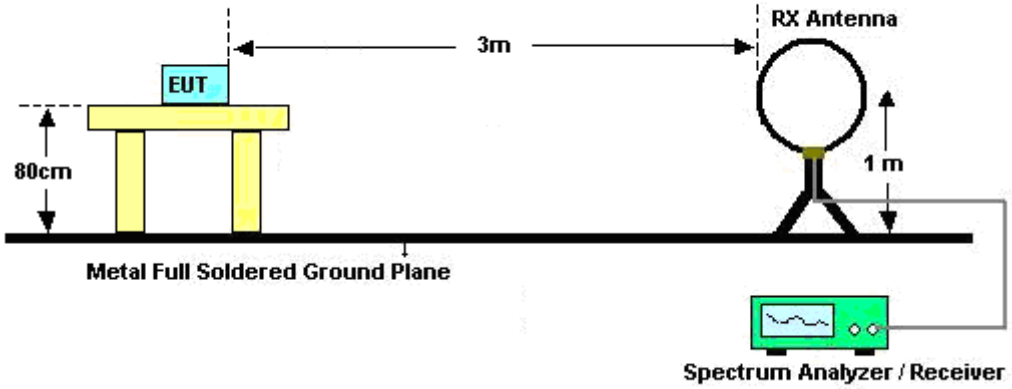
   (1) Procedure for Unwanted Emissions Measurements Below 1000MHz
   - RBW = 120 kHz
   - VBW = 300 kHz
   - Detector = Peak
   - Trace mode = max hold

   (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

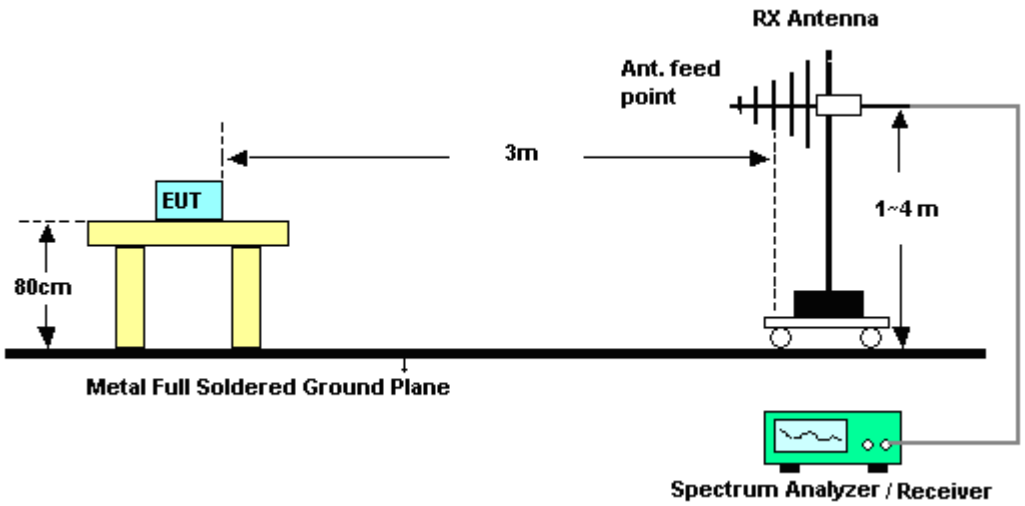
   (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz
   - RBW = 1 MHz
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting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

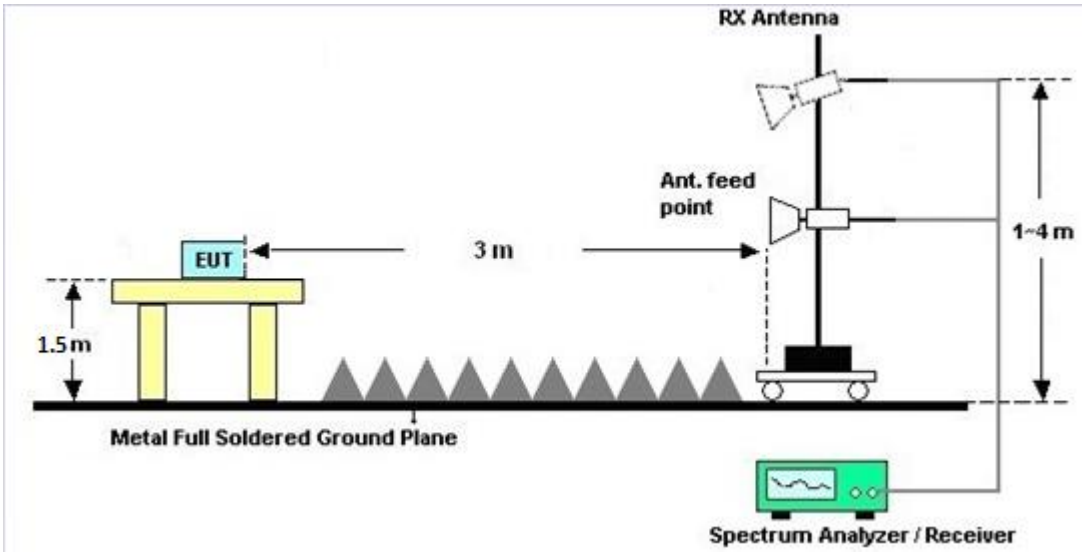
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.4.5 Test Results of Radiated Spurious 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 Spurious at Band Edges

Please refer to Appendix C.

3.4.7 Duty Cycle

Please refer to Appendix D.

3.4.8 Test Result of Radiated Spurious Emissions (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.

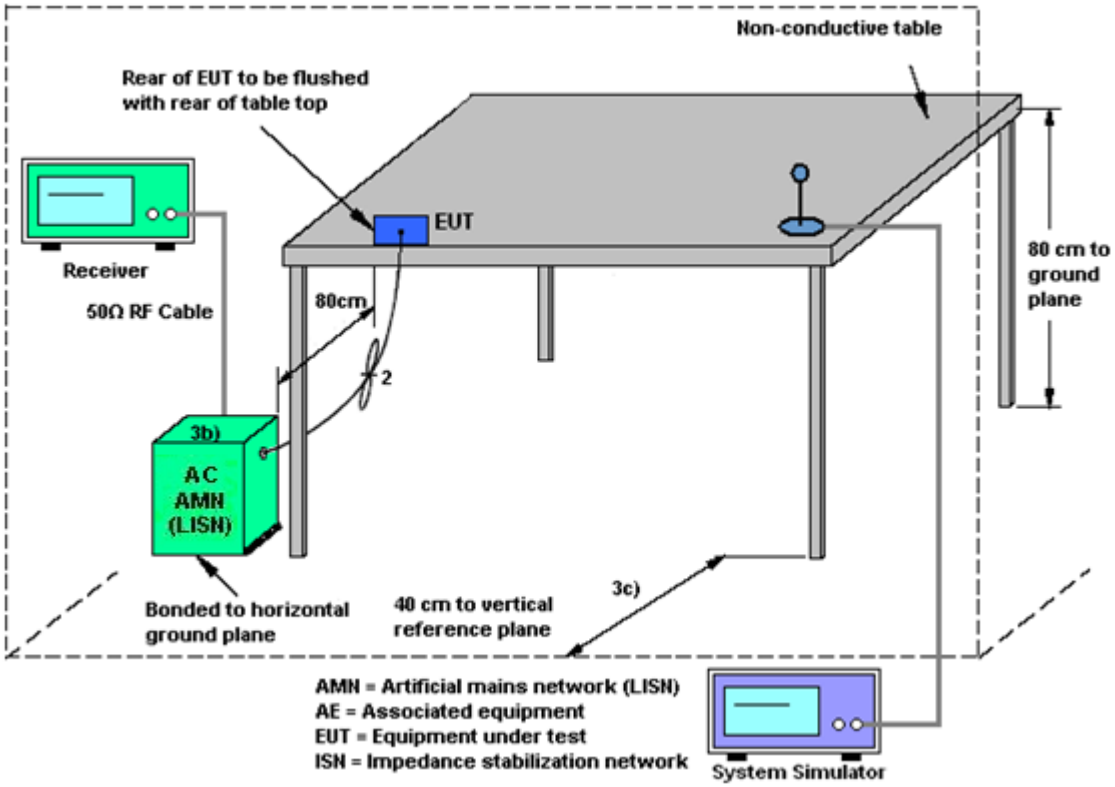
3.5.2 Measuring Instruments

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 GANT is set equal to the antenna having the highest gain, i.e., F)2)f)i).

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

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

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

	Ant. 1 (dBi)	Ant. 2 (dBi)	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
Band I	-2.30	-0.30	-0.30	1.77	0.00	0.00
Band II	-1.50	-0.10	-0.10	2.24	0.00	0.00
Band III	-0.50	-0.10	-0.10	2.71	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
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Aug. 07, 2018	Jun. 06, 2019	Aug. 06, 2019	Conducted (TH01-KS)
Pulse Power Senor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 14, 2019	Jun. 06, 2019	Jan. 13, 2020	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 14, 2019	Jun. 06, 2019	Jan. 13, 2020	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz;Max 30dBm	Aug. 06, 2018	Jun. 21, 2019	Aug. 05, 2019	Radiation (03CH02-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz-44G,MAX 30dB	Apr. 15, 2019	Jun. 21, 2019	Apr. 16, 2020	Radiation (03CH02-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 19, 2018	Jun. 21, 2019	Oct. 18, 2019	Radiation (03CH02-KS)
Bilog Antenna	TeseQ	CBL6112D	23182	30MHz-2GHz	Dec. 29, 2018	Jun. 21, 2019	Dec. 28, 2019	Radiation (03CH02-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75959	1GHz~18GHz	Jan. 27, 2019	Jun. 21, 2019	Jan. 26, 2020	Radiation (03CH02-KS)
high gain Amplifier	MITEQ	AMF-7D-00101800-30-10P	2025788	100MHz-18GHz	Apr. 18, 2019	Jun. 21, 2019	Apr. 17, 2020	Radiation (03CH02-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 05, 2019	Jun. 21, 2019	Jan. 04, 2020	Radiation (03CH02-KS)
Amplifier	SONOMA	310N	187289	9KHz-1GHz	Aug. 06, 2018	Jun. 21, 2019	Aug. 05, 2019	Radiation (03CH02-KS)
Amplifier	Keysight	83017A	MY57280106	500MHz~26.5GHz	Apr. 15, 2019	Jun. 21, 2019	Apr. 14, 2020	Radiation (03CH02-KS)
Amplifier	MITEQ	TTA1840-35-HG	1887435	18~40GHz	Jan. 14, 2019	Jun. 21, 2019	Jan. 13, 2020	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	616010002473	N/A	NCR	Jun. 21, 2019	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Jun. 21, 2019	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Jun. 21, 2019	NCR	Radiation (03CH02-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	Apr. 16, 2019	Jun. 06, 2019	Apr. 15, 2020	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 12, 2018	Jun. 06, 2019	Oct. 11, 2019	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Nov. 19, 2018	Jun. 06, 2019	Nov. 18, 2019	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 12, 2018	Jun. 06, 2019	Oct. 11, 2019	Conduction (CO01-KS)

NCR: No Calibration Required

5 Uncertainty of Evaluation

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

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

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

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.9dB**

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

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

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

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

Appendix A. Conducted Test Results

Test Engineer:	Lex Wu	Temperature:	21~25	°C
Test Date:	2019/6/6	Relative Humidity:	51~54	%

TEST RESULTS DATA
26dB and 99% OBW

Band I														
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)		26 dB Bandwidth (MHz)		IC 99% Bandwidth Power Limit (dBm)		IC 99% Bandwidth EIRP Limit (dBm)			Note
					Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	2	36	5180	17.58	17.48	24.23	23.18	-		22.43			
11a	6Mbps	2	44	5220	17.48	17.48	23.38	23.13	-		22.43			
11a	6Mbps	2	48	5240	17.48	17.43	22.93	22.83	-		22.41			
VHT20	MCS0	2	36	5180	18.58	18.83	23.53	26.12	-		22.69			
VHT20	MCS0	2	44	5220	18.63	18.48	23.88	23.23	-		22.67			
VHT20	MCS0	2	48	5240	18.58	18.48	24.08	23.23	-		22.67			
VHT40	MCS0	2	38	5190	36.56	36.56	41.45	41.99	-		23.01			
VHT40	MCS0	2	46	5230	36.56	36.46	41.99	41.99	-		23.01			
VHT80	MCS0	2	42	5210	75.64	75.52	83.28	82.80	-		23.01			

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TEST RESULTS DATA
Average Power Table

FCC Band I															
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	2	36	5180	0.09	0.09	17.02	16.24	19.66	24.00		-0.30			Pass
11a	6Mbps	2	44	5220	0.09	0.09	16.97	16.58	19.79	24.00		-0.30			Pass
11a	6Mbps	2	48	5240	0.09	0.09	17.04	16.46	19.77	24.00		-0.30			Pass
HT20	MCS0	2	36	5180	0.06	0.06	17.31	16.64	20.00	24.00		-0.30			Pass
HT20	MCS0	2	44	5220	0.06	0.06	17.53	16.94	20.26	24.00		-0.30			Pass
HT20	MCS0	2	48	5240	0.06	0.06	17.28	16.66	20.00	24.00		-0.30			Pass
HT40	MCS0	2	38	5190	0.16	0.16	14.21	13.27	16.78	24.00		-0.30			Pass
HT40	MCS0	2	46	5230	0.16	0.16	14.17	13.05	16.66	24.00		-0.30			Pass
VHT20	MCS0	2	36	5180	0.16	0.16	17.44	16.81	20.14	24.00		-0.30			Pass
VHT20	MCS0	2	44	5220	0.16	0.16	17.63	17.07	20.36	24.00		-0.30			Pass
VHT20	MCS0	2	48	5240	0.16	0.16	17.42	16.79	20.12	24.00		-0.30			Pass
VHT40	MCS0	2	38	5190	0.30	0.33	14.41	13.52	17.00	24.00		-0.30			Pass
VHT40	MCS0	2	46	5230	0.30	0.33	14.38	13.32	16.89	24.00		-0.30			Pass
VHT80	MCS0	2	42	5210	0.57	0.62	13.47	12.89	16.20	24.00		-0.30			Pass

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TEST RESULTS DATA
Power Spectral Density

FCC Band I															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Power Density (dBm/MHz)			Average PSD Limit (dBm/MHz)		DG (dBi)			Pass /Fail
					Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	2	36	5180	0.09	0.09			10.43	11.00		1.77			Pass
11a	6Mbps	2	44	5220	0.09	0.09			10.39	11.00		1.77			Pass
11a	6Mbps	2	48	5240	0.09	0.09			10.57	11.00		1.77			Pass
VHT20	MCS0	2	36	5180	0.16	0.16			9.09	11.00		1.77			Pass
VHT20	MCS0	2	44	5220	0.16	0.16			9.69	11.00		1.77			Pass
VHT20	MCS0	2	48	5240	0.16	0.16			9.35	11.00		1.77			Pass
VHT40	MCS0	2	38	5190	0.30	0.33			3.68	11.00		1.77			Pass
VHT40	MCS0	2	46	5230	0.30	0.33			3.52	11.00		1.77			Pass
VHT80	MCS0	2	42	5210	0.57	0.62			-0.58	11.00		1.77			Pass

TEST RESULTS DATA
26dB and 99% OBW

Band II																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)		26 dB Bandwidth (MHz)		IC 99% Bandwidth Power Limit (dBm)		IC 99% Bandwidth EIRP Limit (dBm)		FCC 26dB Bandwidth Power Limit (dBm)		Note
					Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	
11a	6Mbps	2	52	5260	17.48	17.53	22.58	23.28	23.43		29.43		23.98		
11a	6Mbps	2	60	5300	17.53	17.43	23.58	22.78	23.41		29.41		23.98		
11a	6Mbps	2	64	5320	17.53	17.48	23.38	24.03	23.43		29.43		23.98		
VHT20	MCS0	2	52	5260	18.63	18.43	24.08	23.28	23.66		29.66		23.98		
VHT20	MCS0	2	60	5300	18.63	18.48	23.83	23.38	23.67		29.67		23.98		
VHT20	MCS0	2	64	5320	18.73	18.53	24.73	23.18	23.68		29.68		23.98		
VHT40	MCS0	2	54	5270	36.76	36.46	41.63	41.63	23.98		30.00		23.98		
VHT40	MCS0	2	62	5310	36.46	36.36	41.72	41.45	23.98		30.00		23.98		
VHT80	MCS0	2	58	5290	75.64	75.52	83.28	82.64	23.98		30.00		23.98		

TEST RESULTS DATA
Average Power Table

FCC Band II															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		EIRP Power Limit (dBm)	Pass/Fail
					Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	2	52	5260	0.09	0.09	17.03	16.36	19.72	23.98		-0.10		26.99	Pass
11a	6Mbps	2	60	5300	0.09	0.09	17.06	16.30	19.71	23.98		-0.10		26.99	Pass
11a	6Mbps	2	64	5320	0.09	0.09	17.10	16.33	19.74	23.98		-0.10		26.99	Pass
HT20	MCS0	2	52	5260	0.06	0.06	16.19	15.69	18.96	23.98		-0.10		26.99	Pass
HT20	MCS0	2	60	5300	0.06	0.06	15.67	15.47	18.59	23.98		-0.10		26.99	Pass
HT20	MCS0	2	64	5320	0.06	0.06	16.22	15.42	18.85	23.98		-0.10		26.99	Pass
HT40	MCS0	2	54	5270	0.16	0.16	13.75	13.37	16.58	23.98		-0.10		26.99	Pass
HT40	MCS0	2	62	5310	0.16	0.16	13.84	13.47	16.67	23.98		-0.10		26.99	Pass
VHT20	MCS0	2	52	5260	0.16	0.16	16.55	15.79	19.19	23.98		-0.10		26.99	Pass
VHT20	MCS0	2	60	5300	0.16	0.16	15.77	15.59	18.69	23.98		-0.10		26.99	Pass
VHT20	MCS0	2	64	5320	0.16	0.16	16.36	15.57	18.99	23.98		-0.10		26.99	Pass
VHT40	MCS0	2	54	5270	0.30	0.33	13.91	13.60	16.77	23.98		-0.10		26.99	Pass
VHT40	MCS0	2	62	5310	0.30	0.33	13.97	13.71	16.85	23.98		-0.10		26.99	Pass
VHT80	MCS0	2	58	5290	0.57	0.62	11.58	10.75	14.20	23.98		-0.10		26.99	Pass

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TEST RESULTS DATA
Power Spectral Density

Band II															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Power Density (dBm/MHz)			Average PSD Limit (dBm/MHz)		DG (dBi)			Pass /Fail
					Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	2	52	5260	0.09	0.09			10.50	11.00		2.24			Pass
11a	6Mbps	2	60	5300	0.09	0.09			10.40	11.00		2.24			Pass
11a	6Mbps	2	64	5320	0.09	0.09			10.52	11.00		2.24			Pass
VHT20	MCS0	2	52	5260	0.16	0.16			8.28	11.00		2.24			Pass
VHT20	MCS0	2	60	5300	0.16	0.16			8.06	11.00		2.24			Pass
VHT20	MCS0	2	64	5320	0.16	0.16			8.15	11.00		2.24			Pass
VHT40	MCS0	2	54	5270	0.30	0.33			3.30	11.00		2.24			Pass
VHT40	MCS0	2	62	5310	0.30	0.33			3.21	11.00		2.24			Pass
VHT80	MCS0	2	58	5290	0.57	0.62			-2.26	11.00		2.24			Pass

TEST RESULTS DATA
26dB and 99% OBW

Band III																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)		26 dB Bandwidth (MHz)		IC 99% Bandwidth Power Limit (dBm)		IC 99% Bandwidth EIRP Limit (dBm)		FCC 26dB Bandwidth Power Limit (dBm)		Note
					Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	
11a	6Mbps	2	100	5500	17.73	18.28	24.13	30.92	23.49		29.49		23.98		
11a	6Mbps	2	116	5580	17.58	18.28	23.43	27.57	23.45		29.45		23.98		
11a	6Mbps	2	140	5700	17.93	18.98	25.77	33.62	23.54		29.54		23.98		
VHT20	MCS0	2	100	5500	18.63	18.63	23.83	23.98	23.70		29.70		23.98		
VHT20	MCS0	2	116	5580	18.68	18.63	23.88	23.78	23.70		29.70		23.98		
VHT20	MCS0	2	140	5700	18.63	18.63	23.93	24.48	23.70		29.70		23.98		
VHT40	MCS0	2	102	5510	36.86	36.66	48.73	42.44	23.98		30.00		23.98		
VHT40	MCS0	2	110	5550	36.66	36.46	42.17	41.63	23.98		30.00		23.98		
VHT40	MCS0	2	134	5670	36.76	36.66	42.62	41.72	23.98		30.00		23.98		
VHT80	MCS0	2	106	5530	75.52	75.52	82.96	82.48	23.98		30.00		23.98		
VHT80	MCS0	2	122	5610	75.52	75.52	83.28	82.32	23.98		30.00		23.98		

TEST RESULTS DATA
Average Power Table

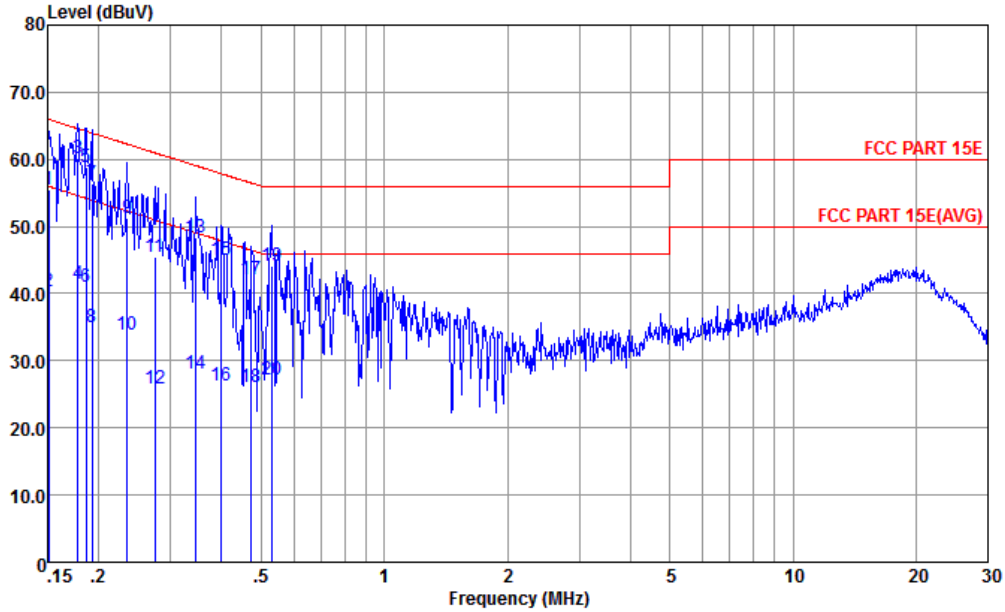
FCC Band III															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		EIRP Power Limit (dBm)	Pass/Fail
					Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	2	100	5500	0.09	0.09	16.90	16.80	19.86	23.98		-0.10		26.99	Pass
11a	6Mbps	2	116	5580	0.09	0.09	17.13	16.72	19.94	23.98		-0.10		26.99	Pass
11a	6Mbps	2	140	5700	0.09	0.09	16.60	16.43	19.53	23.98		-0.10		26.99	Pass
HT20	MCS0	2	100	5500	0.06	0.06	16.98	16.81	19.91	23.98		-0.10		26.99	Pass
HT20	MCS0	2	116	5580	0.06	0.06	17.31	17.53	20.44	23.98		-0.10		26.99	Pass
HT20	MCS0	2	140	5700	0.06	0.06	15.53	15.17	18.37	23.98		-0.10		26.99	Pass
HT40	MCS0	2	102	5510	0.16	0.16	13.81	13.49	16.67	23.98		-0.10		26.99	Pass
HT40	MCS0	2	110	5550	0.16	0.16	13.95	13.53	16.76	23.98		-0.10		26.99	Pass
HT40	MCS0	2	134	5670	0.16	0.16	14.17	13.58	16.90	23.98		-0.10		26.99	Pass
VHT20	MCS0	2	100	5500	0.16	0.16	17.09	16.94	20.02	23.98		-0.10		26.99	Pass
VHT20	MCS0	2	116	5580	0.16	0.16	17.51	17.48	20.50	23.98		-0.10		26.99	Pass
VHT20	MCS0	2	140	5700	0.16	0.16	15.67	15.35	18.52	23.98		-0.10		26.99	Pass
VHT40	MCS0	2	102	5510	0.30	0.33	14.01	13.69	16.86	23.98		-0.10		26.99	Pass
VHT40	MCS0	2	110	5550	0.30	0.33	14.13	13.74	16.95	23.98		-0.10		26.99	Pass
VHT40	MCS0	2	134	5670	0.30	0.33	14.36	13.79	17.10	23.98		-0.10		26.99	Pass
VHT80	MCS0	2	106	5530	0.57	0.62	12.42	12.60	15.52	23.98		-0.10		26.99	Pass
VHT80	MCS0	2	122	5610	0.57	0.62	12.29	12.30	15.31	23.98		-0.10		26.99	Pass

TEST RESULTS DATA
Power Spectral Density

Band III															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Power Density (dBm/MHz)			Average PSD Limit (dBm/MHz)		DG (dBi)			Pass /Fail
					Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	2	100	5500	0.09	0.09			10.66	11.00		2.71			Pass
11a	6Mbps	2	116	5580	0.09	0.09			10.19	11.00		2.71			Pass
11a	6Mbps	2	140	5700	0.09	0.09			10.04	11.00		2.71			Pass
VHT20	MCS0	2	100	5500	0.16	0.16			9.10	11.00		2.71			Pass
VHT20	MCS0	2	116	5580	0.16	0.16			9.36	11.00		2.71			Pass
VHT20	MCS0	2	140	5700	0.16	0.16			7.37	11.00		2.71			Pass
VHT40	MCS0	2	102	5510	0.30	0.33			3.51	11.00		2.71			Pass
VHT40	MCS0	2	110	5550	0.30	0.33			3.38	11.00		2.71			Pass
VHT40	MCS0	2	134	5670	0.30	0.33			3.13	11.00		2.71			Pass
VHT80	MCS0	2	106	5530	0.57	0.62			-0.93	11.00		2.71			Pass
VHT80	MCS0	2	122	5610	0.57	0.62			-1.11	11.00		2.71			Pass

Appendix B. AC Conducted Emission Test Results

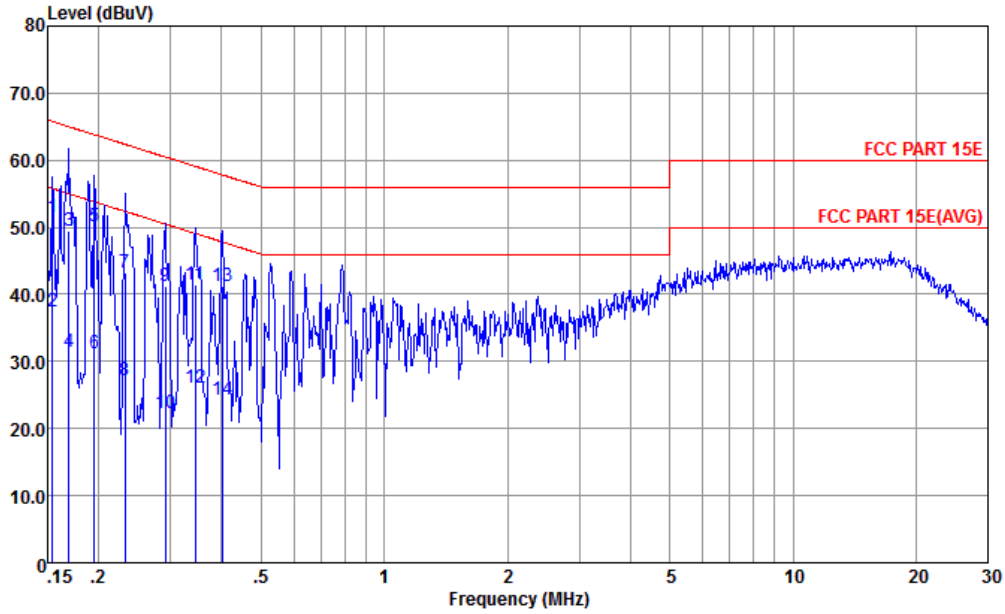
Test Engineer :	Morris Li	**Temperature :**	23.4~25.7℃
		Relative Humidity :	38~40%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line



Site : CO01-KS
Condition : FCC PART 15E LISN-L-181119-060105 LINE

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.151	55.47	-10.49	65.96	44.90	0.09	10.48	QP
2		0.151	40.37	-15.59	55.96	29.80	0.09	10.48	Average
3	*	0.178	60.22	-4.37	64.59	49.70	0.11	10.41	QP
4		0.178	41.42	-13.17	54.59	30.90	0.11	10.41	Average
5		0.186	58.80	-5.40	64.20	48.30	0.11	10.39	QP
6		0.186	41.10	-13.10	54.20	30.60	0.11	10.39	Average
7		0.192	56.39	-7.54	63.93	45.89	0.12	10.38	QP
8		0.192	35.09	-18.84	53.93	24.59	0.12	10.38	Average
9		0.235	51.27	-10.99	62.26	40.80	0.13	10.34	QP
10		0.235	33.87	-18.39	52.26	23.40	0.13	10.34	Average
11		0.274	45.36	-15.62	60.98	34.90	0.14	10.32	QP
12		0.274	25.76	-25.22	50.98	15.30	0.14	10.32	Average
13		0.345	48.34	-10.75	59.09	37.90	0.15	10.29	QP
14		0.345	28.04	-21.05	49.09	17.60	0.15	10.29	Average
15		0.400	45.02	-12.84	57.86	34.59	0.16	10.27	QP
16		0.400	26.32	-21.54	47.86	15.89	0.16	10.27	Average
17		0.474	42.21	-14.24	56.45	31.80	0.17	10.24	QP
18		0.474	26.11	-20.34	46.45	15.70	0.17	10.24	Average
19		0.529	44.21	-11.79	56.00	33.80	0.17	10.24	QP
20		0.529	27.11	-18.89	46.00	16.70	0.17	10.24	Average

Test Engineer :	Morris Li	**Temperature :**	23.4~25.7℃
		Relative Humidity :	38~40%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral



Site : CO01-KS
Condition : FCC PART 15E LISN-N-181119-060105 NEUTRAL

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.154	51.45	-14.33	65.78	40.80	0.18	10.47	QP
2		0.154	37.45	-18.33	55.78	26.80	0.18	10.47	Average
3		0.169	49.51	-15.48	64.99	38.90	0.18	10.43	QP
4		0.169	31.51	-23.48	54.99	20.90	0.18	10.43	Average
5	*	0.195	50.15	-13.65	63.80	39.61	0.17	10.37	QP
6		0.195	31.25	-22.55	53.80	20.71	0.17	10.37	Average
7		0.232	43.31	-19.08	62.39	32.80	0.17	10.34	QP
8		0.232	27.21	-25.18	52.39	16.70	0.17	10.34	Average
9		0.291	41.27	-19.23	60.50	30.80	0.16	10.31	QP
10		0.291	22.37	-28.13	50.50	11.90	0.16	10.31	Average
11		0.345	41.35	-17.74	59.09	30.90	0.16	10.29	QP
12		0.345	26.15	-22.94	49.09	15.70	0.16	10.29	Average
13		0.402	41.32	-16.49	57.81	30.90	0.15	10.27	QP
14		0.402	24.22	-23.59	47.81	13.80	0.15	10.27	Average

Appendix C. Radiated Spurious Emission

Band 1 - 5150~5250MHz

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+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 36 5180MHz		5137.44	63.73	-10.27	74	57.03	35.06	8.14	36.5	100	245	P	H
		5149.98	48.22	-5.78	54	41.52	35.06	8.14	36.5	100	245	A	H
	*	5182	107.7	-	-	100.94	35.08	8.17	36.49	100	245	P	H
		5182	101.06	-	-	94.3	35.08	8.17	36.49	100	245	A	H
		5147.36	59.83	-14.17	74	53.13	35.06	8.14	36.5	100	279	P	V
		5149.98	49.33	-4.67	54	42.63	35.06	8.14	36.5	100	279	A	V
	*	5182	107.97	-	-	101.21	35.08	8.17	36.49	100	279	P	V
		5182	103.15	-	-	96.39	35.08	8.17	36.49	100	279	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 36 5180MHz		10360	42.4	-25.9	68.3	56.12	37.47	11.87	63.06	100	360	P	H
		10360	43.29	-25.01	68.3	57.01	37.47	11.87	63.06	100	360	P	V
802.11a CH 44 5220MHz		10440	40.76	-27.54	68.3	54.37	37.5	11.93	63.04	100	360	P	H
		10440	44.1	-24.2	68.3	57.71	37.5	11.93	63.04	100	360	P	V
802.11a CH 48 5240MHz		10480	42.95	-25.35	68.3	56.48	37.53	11.97	63.03	100	360	P	H
		10480	43.85	-24.45	68.3	57.38	37.53	11.97	63.03	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11ac VHT20 (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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT20 CH 36 5180MHz		5149.6	59.38	-14.62	74	52.68	35.06	8.14	36.5	100	246	P	H
		5149.98	49.64	-4.36	54	42.94	35.06	8.14	36.5	100	246	A	H
	*	5178	106.34	-	-	99.58	35.08	8.17	36.49	100	246	P	H
		5178	99.24	-	-	92.48	35.08	8.17	36.49	100	246	A	H
		5149.44	59.65	-14.35	74	52.95	35.06	8.14	36.5	100	278	P	V
		5149.98	50.25	-3.75	54	43.55	35.06	8.14	36.5	100	278	A	V
	*	5182	107.57	-	-	100.81	35.08	8.17	36.49	100	278	P	V
		5182	100.25	-	-	93.49	35.08	8.17	36.49	100	278	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11ac VHT20 (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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT20 CH 36 5180MHz		10360	42.46	-25.84	68.3	56.18	37.47	11.87	63.06	100	360	P	H
		10360	43.32	-24.98	68.3	57.04	37.47	11.87	63.06	100	360	P	V
802.11ac VHT20 CH 44 5220MHz		10440	42.65	-25.65	68.3	56.26	37.5	11.93	63.04	100	360	P	H
		10440	43.83	-24.47	68.3	57.44	37.5	11.93	63.04	100	360	P	V
802.11ac VHT20 CH 48 5240MHz		10480	42.92	-25.38	68.3	56.45	37.53	11.97	63.03	100	360	P	H
		10480	44.65	-23.65	68.3	58.18	37.53	11.97	63.03	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11ac VHT40 (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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT40 CH 38 5190MHz		5147.84	60.75	-13.25	74	54.05	35.06	8.14	36.5	106	250	P	H
		5149.76	48.36	-5.64	54	41.66	35.06	8.14	36.5	106	250	A	H
	*	5186	100.55	-	-	93.79	35.08	8.17	36.49	106	250	P	H
		5186	92.96	-	-	86.2	35.08	8.17	36.49	106	250	A	H
		5388.3	49.2	-24.8	74	42.15	35.18	8.32	36.45	106	250	P	H
		5386.32	40.07	-13.93	54	33.04	35.18	8.3	36.45	106	250	A	H
		5147.52	62.06	-11.94	74	55.36	35.06	8.14	36.5	102	277	P	V
		5149.98	50.8	-3.2	54	44.1	35.06	8.14	36.5	102	277	A	V
	*	5192	102.64	-	-	95.87	35.09	8.17	36.49	102	277	P	V
		5192	95.34	-	-	88.57	35.09	8.17	36.49	102	277	A	V
		5382.72	49.23	-24.77	74	42.2	35.18	8.3	36.45	102	277	P	V
		5356.08	40.12	-13.88	54	33.11	35.16	8.3	36.45	102	277	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11ac VHT40 (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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT40 CH 38 5190MHz		10380	44.15	-24.15	68.3	57.82	37.48	11.9	63.05	100	0	P	H
		10380	42.61	-25.69	68.3	56.28	37.48	11.9	63.05	100	0	P	V
802.11ac VHT40 CH 46 5230MHz		10460	42.9	-25.4	68.3	56.46	37.51	11.97	63.04	100	360	P	H
		10460	42.8	-25.5	68.3	56.36	37.51	11.97	63.04	100	189	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT80 CH 42 5210MHz		5149.6	57.59	-16.41	74	50.89	35.06	8.14	36.5	115	268	P	H
		5145.92	48.58	-5.42	54	41.88	35.06	8.14	36.5	115	268	A	H
	*	5222	97.45	-	-	90.63	35.1	8.2	36.48	115	268	P	H
		5222	90.06	-	-	83.24	35.1	8.2	36.48	115	268	A	H
		5372.1	51.72	-22.28	74	44.7	35.17	8.3	36.45	115	268	P	H
		5350.14	41.15	-12.85	54	34.14	35.16	8.3	36.45	115	268	A	H
		5146.24	59.9	-14.1	74	53.2	35.06	8.14	36.5	101	248	P	V
		5146.08	50.34	-3.66	54	43.64	35.06	8.14	36.5	101	248	A	V
	*	5182	98.77	-	-	92.01	35.08	8.17	36.49	101	248	P	V
		5182	91.44	-	-	84.68	35.08	8.17	36.49	101	248	A	V
		5369.58	50.83	-23.17	74	43.81	35.17	8.3	36.45	101	248	P	V
		5353.56	41.48	-12.52	54	34.47	35.16	8.3	36.45	101	248	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11ac VHT80 (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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT80 CH 42 5210MHz		10420	43.45	-24.85	68.3	57.07	37.5	11.93	63.05	100	360	P	H
		10420	42.72	-25.58	68.3	56.34	37.5	11.93	63.05	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 2 - 5250~5350MHz

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+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 64 5320MHz	*	5322	108.58	-	-	101.62	35.15	8.27	36.46	100	252	P	H
		5322	101.85	-	-	94.89	35.15	8.27	36.46	100	252	A	H
		5351.1	59.35	-14.65	74	52.34	35.16	8.3	36.45	100	252	P	H
		5352	49.73	-4.27	54	42.72	35.16	8.3	36.45	100	252	A	H
	*	5318	109.98	-	-	103.02	35.15	8.27	36.46	100	276	P	V
		5318	103.34	-	-	96.38	35.15	8.27	36.46	100	276	A	V
		5352.6	60.87	-13.13	74	53.86	35.16	8.3	36.45	100	276	P	V
		5352.4	50.23	-3.77	54	43.22	35.16	8.3	36.45	100	276	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 2 5250~5350MHz

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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 52 5260MHz		10520	43.63	-24.67	68.3	57.12	37.54	12	63.03	100	360	P	H
		10520	44.9	-23.4	68.3	58.39	37.54	12	63.03	100	360	P	V
802.11a CH 60 5300MHz		10600	42.4	-31.6	74	55.77	37.58	12.06	63.01	100	360	P	H
		10600	43.23	-30.77	74	56.6	37.58	12.06	63.01	100	360	P	V
802.11a CH 64 5320MHz		10640	43.4	-30.6	74	56.71	37.6	12.09	63	100	360	P	H
		10640	44.06	-29.94	74	57.37	37.6	12.09	63	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 2 5250~5350MHz

WIFI 802.11ac VHT20 (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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT20 CH 64 5320MHz	*	5322	105.99	-	-	99.03	35.15	8.27	36.46	294	275	P	H
		5322	98.67	-	-	91.71	35.15	8.27	36.46	294	275	A	H
		5355	58.52	-15.48	74	51.51	35.16	8.3	36.45	294	275	P	H
		5350	49.27	-4.73	54	42.26	35.16	8.3	36.45	294	275	A	H
	*	5322	109.75	-	-	102.79	35.15	8.27	36.46	100	276	P	V
		5322	100.53	-	-	93.57	35.15	8.27	36.46	100	276	A	V
		5352.3	60.58	-13.42	74	53.57	35.16	8.3	36.45	100	276	P	V
		5350.1	49.56	-4.44	54	42.55	35.16	8.3	36.45	100	276	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 2 5250~5350MHz

WIFI 802.11ac VHT20 (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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT20 CH 52 5260MHz		10520	42.93	-25.37	68.3	56.42	37.54	12	63.03	100	360	P	H
		10520	43.16	-25.14	68.3	56.65	37.54	12	63.03	100	360	P	V
802.11ac VHT20 CH 60 5300MHz		10600	42.61	-31.39	74	55.98	37.58	12.06	63.01	100	360	P	H
		10600	44.9	-29.1	74	58.27	37.58	12.06	63.01	100	360	P	V
802.11ac VHT20 CH 64 5320MHz		10640	43.84	-30.16	74	57.15	37.6	12.09	63	100	360	P	H
		10640	44.78	-29.22	74	58.09	37.6	12.09	63	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 2 5250~5350MHz

WIFI 802.11ac VHT40 (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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT40 CH 62 5310MHz		5148.16	51.39	-22.61	74	44.69	35.06	8.14	36.5	131	335	P	H
		5126.4	41.56	-12.44	54	34.86	35.06	8.14	36.5	131	335	A	H
	*	5306	103.57	-	-	96.65	35.14	8.25	36.47	131	335	P	H
		5306	95.83	-	-	88.91	35.14	8.25	36.47	131	335	A	H
		5350.01	60.2	-13.8	74	53.19	35.16	8.3	36.45	131	335	P	H
		5350.2	50.52	-3.48	54	43.51	35.16	8.3	36.45	131	335	A	H
		5120	51.57	-22.43	74	44.89	35.05	8.14	36.51	100	270	P	V
		5113.44	41.45	-12.55	54	34.81	35.05	8.1	36.51	100	270	A	V
	*	5306	102.98	-	-	96.06	35.14	8.25	36.47	100	270	P	V
		5306	96.06	-	-	89.14	35.14	8.25	36.47	100	270	A	V
		5352.5	59.35	-14.65	74	52.34	35.16	8.3	36.45	100	270	P	V
		5352.6	49.94	-4.06	54	42.93	35.16	8.3	36.45	100	270	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 2 5250~5350MHz

WIFI 802.11ac VHT40 (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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT40 CH 54 5270MHz		10540	42.5	-25.8	68.3	55.94	37.55	12.03	63.02	100	0	P	H
		10540	44.43	-23.87	68.3	57.87	37.55	12.03	63.02	100	0	P	V
802.11ac VHT40 CH 62 5310MHz		10620	42.66	-31.34	74	55.99	37.59	12.09	63.01	100	0	P	H
		10620	43.15	-30.85	74	56.48	37.59	12.09	63.01	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 2 5250~5350MHz

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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT80 CH 58 5290MHz		5100.48	50.54	-23.46	74	43.91	35.04	8.1	36.51	124	283	P	H
		5119.52	41.67	-12.33	54	34.99	35.05	8.14	36.51	124	283	A	H
	*	5282	96.46	-	-	89.55	35.13	8.25	36.47	124	283	P	H
		5282	88.13	-	-	81.22	35.13	8.25	36.47	124	283	A	H
		5356.2	56.11	-17.89	74	49.1	35.16	8.3	36.45	124	283	P	H
		5350.5	47.19	-6.81	54	40.18	35.16	8.3	36.45	124	283	A	H
		5127.2	52.51	-21.49	74	45.81	35.06	8.14	36.5	100	286	P	V
		5145.28	42.29	-11.71	54	35.59	35.06	8.14	36.5	100	286	A	V
	*	5282	99.06	-	-	92.15	35.13	8.25	36.47	100	286	P	V
		5282	91.56	-	-	84.65	35.13	8.25	36.47	100	286	A	V
		5352.4	58.49	-15.51	74	51.48	35.16	8.3	36.45	100	286	P	V
		5350.3	50.08	-3.92	54	43.07	35.16	8.3	36.45	100	286	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 2 5250~5350MHz

WIFI 802.11ac VHT80 (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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT80 CH 58 5290MHz		10580	42.7	-25.6	68.3	56.07	37.58	12.06	63.01	100	360	P	H
		10580	42.24	-26.06	68.3	55.61	37.58	12.06	63.01	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 3 - 5470~5725MHz

WIFI 802.11a (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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 100 5500MHz		5459.98	54.78	-19.22	74	47.64	35.21	8.36	36.43	112	260	P	H
		5469.52	60.96	-7.34	68.3	53.77	35.22	8.4	36.43	112	260	P	H
		5459.98	45.49	-8.51	54	38.35	35.21	8.36	36.43	112	260	A	H
	*	5502	108.96	-	-	101.74	35.24	8.4	36.42	112	260	P	H
		5502	103.05	-	-	95.83	35.24	8.4	36.42	112	260	A	H
		5459.98	53.49	-20.51	74	46.35	35.21	8.36	36.43	100	264	P	V
		5466.8	59.35	-8.95	68.3	52.16	35.22	8.4	36.43	100	264	P	V
		5459.98	45.97	-8.03	54	38.83	35.21	8.36	36.43	100	264	A	V
	*	5496	111.03	-	-	103.82	35.23	8.4	36.42	100	264	P	V
		5496	104.5	-	-	97.29	35.23	8.4	36.42	100	264	A	V
802.11a CH 140 5700MHz	*	5702	110.41	-	-	102.98	35.24	8.61	36.42	100	110	P	H
		5702	103.3	-	-	95.87	35.24	8.61	36.42	100	110	A	H
		5726.36	64.46	-3.84	68.3	57.06	35.22	8.61	36.43	100	110	P	H
	*	5700	112.33	-	-	104.89	35.25	8.61	36.42	109	278	P	V
		5700	104.8	-	-	97.36	35.25	8.61	36.42	109	278	A	V
		5725	65.01	-3.29	68.3	57.61	35.22	8.61	36.43	109	278	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 3 - 5470~5725MHz

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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 100 5500MHz		11000	43.25	-30.75	74	56.05	37.76	12.37	62.93	100	360	P	H
		11000	43.26	-30.74	74	56.06	37.76	12.37	62.93	100	360	P	V
802.11a CH 116 5580MHz		11160	42.53	-31.47	74	55.08	37.84	12.51	62.9	100	360	P	H
		11160	43.33	-30.67	74	55.88	37.84	12.51	62.9	100	360	P	V
802.11a CH 140 5700MHz		11400	44.98	-29.02	74	57.2	37.95	12.68	62.85	100	360	P	H
		11400	43.48	-30.52	74	55.7	37.95	12.68	62.85	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 3 - 5470~5725MHz

WIFI 802.11ac VHT20 (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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT20 CH 100 5500MHz		5459.92	54.69	-19.31	74	47.55	35.21	8.36	36.43	100	240	P	H
		5469.36	60.75	-7.55	68.3	53.56	35.22	8.4	36.43	100	240	P	H
		5459.44	46.02	-7.98	54	38.88	35.21	8.36	36.43	100	240	A	H
	*	5498	108.9	-	-	101.68	35.24	8.4	36.42	100	240	P	H
		5498	101.06	-	-	93.84	35.24	8.4	36.42	100	240	A	H
		5459.98	55.09	-18.91	74	47.95	35.21	8.36	36.43	100	285	P	V
		5467.44	60.22	-8.08	68.3	53.03	35.22	8.4	36.43	100	285	P	V
		5459.92	46.91	-7.09	54	39.77	35.21	8.36	36.43	100	285	A	V
	*	5498	109.58	-	-	102.36	35.24	8.4	36.42	100	285	P	V
		5498	101.58	-	-	94.36	35.24	8.4	36.42	100	285	A	V
802.11ac VHT20 CH 140 5700MHz	*	5698	106.94	-	-	99.53	35.25	8.58	36.42	121	115	P	H
		5698	99.8	-	-	92.39	35.25	8.58	36.42	121	115	A	H
		5727	64.73	-3.57	68.3	57.33	35.22	8.61	36.43	121	115	P	H
	*	5702	109.84	-	-	102.41	35.24	8.61	36.42	103	285	P	V
		5702	101.99	-	-	94.56	35.24	8.61	36.42	103	285	A	V
		5726.92	64.23	-4.07	68.3	56.83	35.22	8.61	36.43	103	285	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 3 - 5470~5725MHz

WIFI 802.11ac VHT20 (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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT20 CH 100 5500MHz		11000	44.08	-29.92	74	56.88	37.76	12.37	62.93	100	360	P	H
		11000	43.99	-30.01	74	56.79	37.76	12.37	62.93	100	360	P	V
802.11ac VHT20 CH 116 5580MHz		11160	43.33	-30.67	74	55.88	37.84	12.51	62.9	100	360	P	H
		11160	44.07	-29.93	74	56.62	37.84	12.51	62.9	100	360	P	V
802.11ac VHT20 CH 140 5700MHz		11400	43.68	-30.32	74	55.9	37.95	12.68	62.85	100	0	P	H
		11400	44.75	-29.25	74	56.97	37.95	12.68	62.85	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 3 - 5470~5725MHz

WIFI 802.11ac VHT40 (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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT40 CH 102 5510MHz		5459.28	57.98	-16.02	74	50.84	35.21	8.36	36.43	117	336	P	H
		5469.04	61.93	-6.37	68.3	54.74	35.22	8.4	36.43	117	336	P	H
		5459.92	49.02	-4.98	54	41.88	35.21	8.36	36.43	117	336	A	H
	*	5508	103.72	-	-	96.46	35.24	8.44	36.42	117	336	P	H
		5508	95.93	-	-	88.67	35.24	8.44	36.42	117	336	A	H
		5732.2	53.86	-14.44	68.3	46.46	35.22	8.61	36.43	117	336	P	H
		5458.32	57.83	-16.17	74	50.69	35.21	8.36	36.43	100	272	P	V
		5468.88	61.32	-6.98	68.3	54.13	35.22	8.4	36.43	100	272	P	V
		5459.98	49.66	-4.34	54	42.52	35.21	8.36	36.43	100	272	A	V
	*	5508	104.01	-	-	96.75	35.24	8.44	36.42	100	272	P	V
		5508	97.29	-	-	90.03	35.24	8.44	36.42	100	272	A	V
		5733.56	56.26	-12.04	68.3	48.86	35.22	8.61	36.43	100	272	P	V
802.11ac VHT40 CH 134 5670MHz		5446.32	52.76	-21.24	74	45.62	35.21	8.36	36.43	100	118	P	H
		5462.16	48.74	-19.56	68.3	41.6	35.21	8.36	36.43	100	118	P	H
		5447.28	44.4	-9.6	54	37.26	35.21	8.36	36.43	100	118	A	H
	*	5672	100.28	-	-	92.84	35.27	8.58	36.41	100	118	P	H
		5672	92.45	-	-	85.01	35.27	8.58	36.41	100	118	A	H
		5732.12	53.48	-14.82	68.3	46.08	35.22	8.61	36.43	100	118	P	H
		5446.96	53.86	-20.14	74	46.72	35.21	8.36	36.43	100	293	P	V
		5463.12	49.09	-19.21	68.3	41.94	35.22	8.36	36.43	100	293	P	V
		5446.8	46.45	-7.55	54	39.31	35.21	8.36	36.43	100	293	A	V
	*	5674	101.62	-	-	94.18	35.27	8.58	36.41	100	293	P	V
		5674	94.79	-	-	87.35	35.27	8.58	36.41	100	293	A	V
		5727.16	57.96	-10.34	68.3	50.56	35.22	8.61	36.43	100	293	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 3 - 5470~5725MHz

WIFI 802.11ac VHT40 (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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT40 CH 102 5510MHz		11020	42.49	-31.51	74	55.25	37.77	12.4	62.93	100	183	P	H
		11020	43.79	-30.21	74	56.55	37.77	12.4	62.93	100	0	P	V
802.11ac VHT40 CH 110 5550MHz		11100	44.06	-29.94	74	56.71	37.81	12.45	62.91	100	0	P	H
		11100	44.38	-29.62	74	57.03	37.81	12.45	62.91	100	0	P	V
802.11ac VHT40 CH 134 5670MHz		11340	42.37	-31.63	74	54.69	37.92	12.62	62.86	100	0	P	H
		11340	43.39	-30.61	74	55.71	37.92	12.62	62.86	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 3 5470~5725MHz

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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT80 CH 106 5530MHz		5452.56	62.72	-11.28	74	55.58	35.21	8.36	36.43	117	239	P	H
		5461.04	63.54	-4.76	68.3	56.4	35.21	8.36	36.43	117	239	P	H
		5459.98	50.11	-3.89	54	42.97	35.21	8.36	36.43	117	239	A	H
	*	5526	99.89	-	-	92.63	35.24	8.44	36.42	117	239	P	H
		5526	92.73	-	-	85.47	35.24	8.44	36.42	117	239	A	H
		5754.84	51.04	-17.26	68.3	43.66	35.19	8.64	36.45	117	239	P	H
		5446.96	57.33	-16.67	74	50.19	35.21	8.36	36.43	100	297	P	V
		5463.12	59.38	-8.92	68.3	52.23	35.22	8.36	36.43	100	297	P	V
		5459.92	50.14	-3.86	54	43	35.21	8.36	36.43	100	297	A	V
	*	5526	101.61	-	-	94.35	35.24	8.44	36.42	100	297	P	V
		5526	93.49	-	-	86.23	35.24	8.44	36.42	100	297	A	V
		5744.76	50.97	-17.33	68.3	43.56	35.21	8.64	36.44	100	297	P	V
802.11ac VHT80 CH 122 5610MHz		5459.6	52.05	-21.95	74	44.91	35.21	8.36	36.43	100	244	P	H
		5462.8	53.75	-14.55	68.3	46.6	35.22	8.36	36.43	100	244	P	H
		5459.6	44.94	-9.06	54	37.8	35.21	8.36	36.43	100	244	A	H
	*	5616	104.05	-	-	96.63	35.29	8.52	36.39	100	244	P	H
		5616	97	-	-	89.58	35.29	8.52	36.39	100	244	A	H
		5735.72	57.74	-10.56	68.3	50.36	35.21	8.61	36.44	100	244	P	H
		5456.24	54.59	-19.41	74	47.45	35.21	8.36	36.43	100	279	P	V
		5467.92	56.71	-11.59	68.3	49.52	35.22	8.4	36.43	100	279	P	V
		5459.44	46.56	-7.44	54	39.42	35.21	8.36	36.43	100	279	A	V
	*	5606	105.53	-	-	98.13	35.28	8.52	36.4	100	279	P	V
		5606	97.83	-	-	90.43	35.28	8.52	36.4	100	279	A	V
		5737.16	61.25	-7.05	68.3	53.87	35.21	8.61	36.44	100	279	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 3 5470~5725MHz

WIFI 802.11ac VHT80 (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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT80 CH 106 5530MHz		11060	42.78	-31.22	74	55.48	37.8	12.42	62.92	100	360	P	H
		11060	44.01	-29.99	74	56.71	37.8	12.42	62.92	100	360	P	V
802.11ac VHT80 CH 122 5610MHz		11220	42.99	-31.01	74	55.47	37.87	12.54	62.89	100	360	P	H
		11220	42.89	-31.11	74	55.37	37.87	12.54	62.89	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

WIFI 802.11ac VHT40 (LF @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11ac VHT40 LF		170.65	33.8	-9.7	43.5	49.81	15.49	1.44	32.94	100	0	P	H
		200.72	30.97	-12.53	43.5	47.01	15.29	1.58	32.91	-	-	P	H
		789.51	24.22	-21.78	46	28.47	25.67	3.1	33.02	-	-	P	H
		815.7	25.08	-20.92	46	28.91	25.89	3.15	32.87	-	-	P	H
		906.88	25.37	-20.63	46	27.83	26.47	3.31	32.24	-	-	P	H
		949.56	24.83	-21.17	46	26.2	26.94	3.4	31.71	-	-	P	H
		42.61	23.5	-16.5	40	38.28	17.44	0.75	32.97	-	-	P	V
		66.86	25.96	-14.04	40	45.45	12.54	0.91	32.94	100	0	P	V
		172.59	26.75	-16.75	43.5	42.81	15.43	1.45	32.94	-	-	P	V
		653.71	23.64	-22.36	46	29.66	24.46	2.82	33.3	-	-	P	V
		877.78	26.19	-19.81	46	29.1	26.27	3.26	32.44	-	-	P	V
		907.85	25.91	-20.09	46	28.33	26.49	3.31	32.22	-	-	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

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)

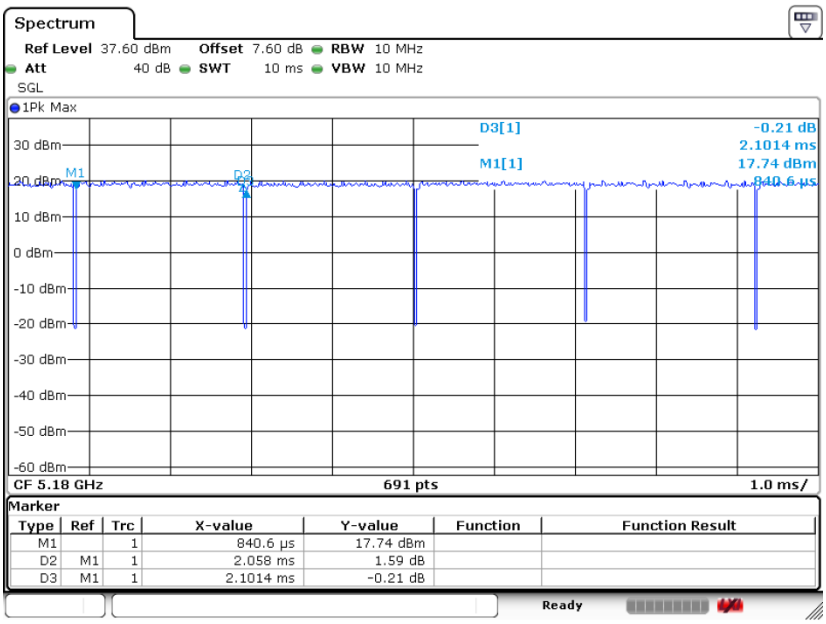
= -10.46(dB)

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

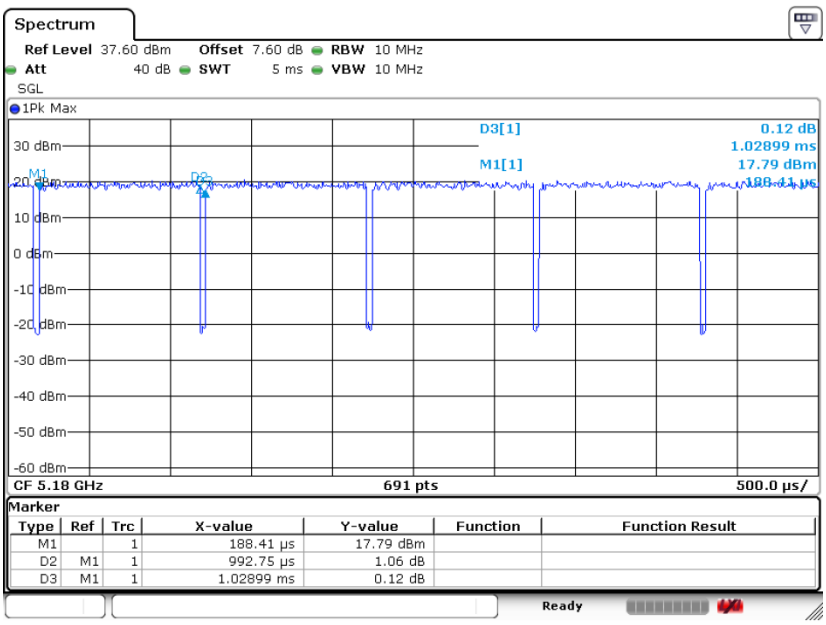
Appendix D. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
1+2	802.11a	97.93	2.058	0.486	0.51kHz
1+2	802.11ac VHT20	96.48	0.993	1.007	1.1kHz
1+2	802.11ac VHT40	92.70	0.497	2.012	2.2kHz
1+2	802.11ac VHT80	87.62	0.257	3.898	4.3kHz

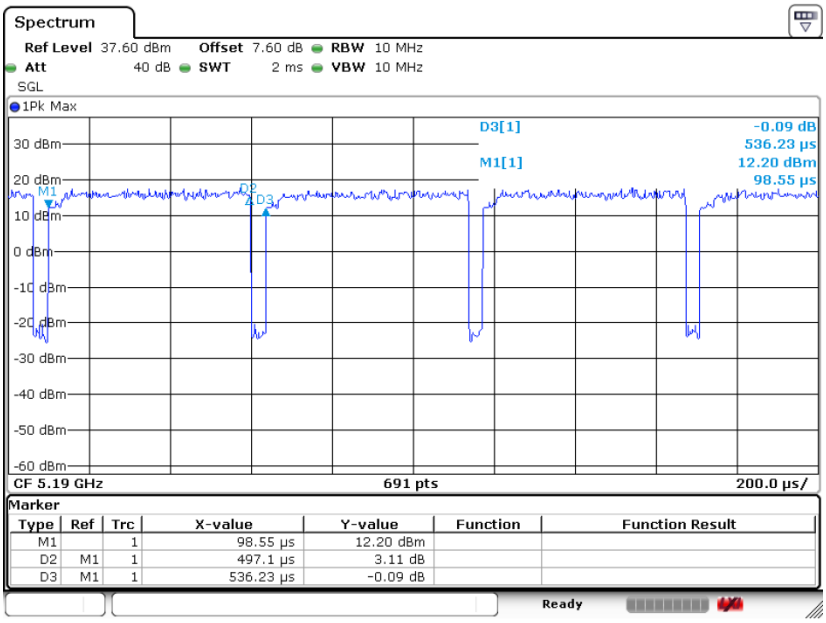
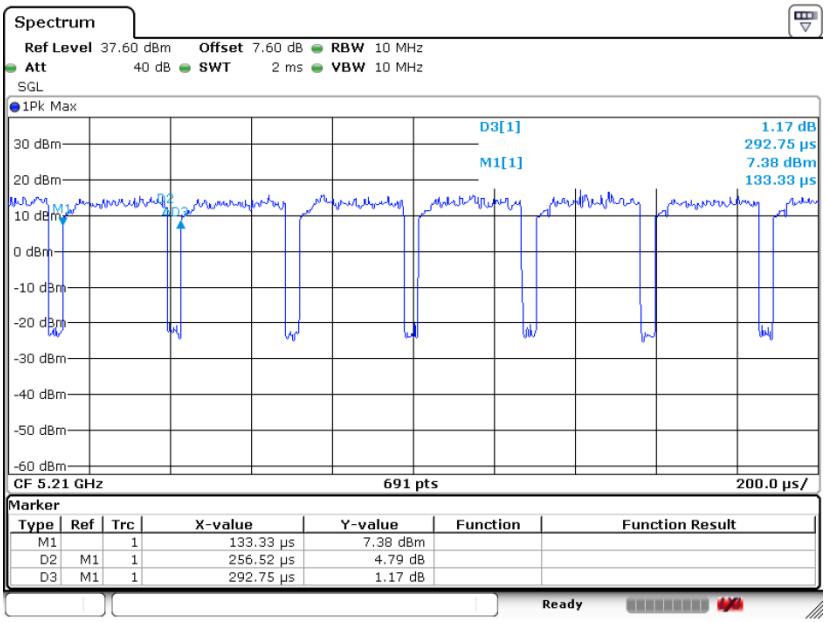
802.11a



802.11ac VHT20



802.11ac VHT40



802.11ac VHT80