FCC RF Test Report

APPLICANT	**:**	**iRobot Corporation**
EQUIPMENT	**:**	**Wichita**
BRAND NAME	**:**	**iRobot**
MODEL NAME	**:**	**AXD-Y1**
FCC ID	**:**	**UFEAXD-Y1**
STANDARD	**:**	**FCC Part 15 Subpart E §15.407**
CLASSIFICATION	**:**	**(NII) Unlicensed National Information Infrastructure**

The product was received on Mar. 07, 2019 and testing was completed on Apr. 21, 2019. We, Sporton International (Shenzhen) Inc., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

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

Eric Shih

Approved by: Eric Shih / Manager

NVLAP TESTING
NVLAP LAB CODE 600156-0

Sporton International (Shenzhen) Inc.
1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen City, Guangdong Province 518055, China

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR930701-01D	Rev. 01	Initial issue of report	Apr. 30, 2019

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 11.03 dB at 17235.000 MHz
3.5	15.407(c)	Automatically Discontinue Transmission	Discontinue Transmission	Pass	-
3.6	15.203 & 15.407(a)	Antenna Requirement	N/A	Pass	-

Note: The module is powered by the host. When the host will be charged, it will go through the host battery and enter the module power supply, so the conduction test item can be ignored.

1 General Description

1.1 Applicant

iRobot Corporation
8 Crosby Drive, Bedford, Massachusetts 01730, United States

1.2 Manufacturer

Huizhou BYD Electronic Co.,Ltd.
Xiangshui River,Economic Development Zone,Daya Bay,Huizhou,Guangdong Province,P.R.China

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Wichita
Brand Name	iRobot
Model Name	AXD-Y1
FCC ID	UFEAXD-Y1
EUT supports Radios application	WLAN 2.4GHz 11b/g/n HT20 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth LE/GNSS
HW Version	Wichita B2
SW Version	wichita+2.0.0_rc6+wichita+50
EUT Stage	Production Unit

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. The antenna provided to the EUT, please refer to the following table.

Antenna No.	Brand	Model	Gain(dBi)	Antenna Type	Frequency range (GHz to GHz)	Cable Length (mm)
1(External)	Laird	EMN2449A2S-16MHF1	3.15	PCB dipole antenna	2.4-2.4835	160
1(External)	Laird	EMN2449A2S-16MHF1	3.38	PCB dipole antenna	5.15-5.25	160
1(External)	Laird	EMN2449A2S-16MHF1	3.38	PCB dipole antenna	5.25-5.35	160
1(External)	Laird	EMN2449A2S-16MHF1	3.51	PCB dipole antenna	5.47-5.725	160
1(External)	Laird	EMN2449A2S-16MHF1	3.23	PCB dipole antenna	5.725-5.85	160
2(External)	Laird	EMN2449A2S-34MHF1	3.15	PCB dipole antenna	2.4-2.4835	340
2(External)	Laird	EMN2449A2S-34MHF1	3.38	PCB dipole antenna	5.15-5.25	340
2(External)	Laird	EMN2449A2S-34MHF1	3.38	PCB dipole antenna	5.25-5.35	340
2(External)	Laird	EMN2449A2S-34MHF1	3.51	PCB dipole antenna	5.47-5.725	340
2(External)	Laird	EMN2449A2S-34MHF1	3.23	PCB dipole antenna	5.725-5.85	340

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>
SISO<Ant. 1>
802.11a : 10.27 dBm / 0.0106 W
SISO<Ant. 2>
802.11a : 10.42 dBm / 0.0110 W
MIMO<Ant.1+2>
802.11n HT20 : 10.33 dBm / 0.0108 W
802.11n HT40 : 10.46 dBm / 0.0111 W
802.11ac VHT20: 10.24 dBm / 0.0106 W
802.11ac VHT40: 10.23 dBm / 0.0105 W
802.11ac VHT80: 10.21 dBm / 0.0105 W</td></tr>
<tr><td>99% Occupied Bandwidth</td><td>802.11a : 16.88 MHz
802.11n HT20 : 17.83 MHz
802.11n HT40 : 36.16 MHz
802.11ac VHT80 : 74.81 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 / Gain</td><td><Ant. 1> : PCB Dipole Antenna with gain 3.23 dBi
<Ant. 2> : PCB Dipole Antenna with gain 3.23 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 SISO</td><td>V</td><td>V</td></tr>
<tr><td>802.11 an/ac MIMO</td><td colspan="2">V</td></tr>
</table>
</td></tr>
</table>

Note:

1. For 802.11n HT20 / ac VHT20 and 802.11n HT40 / ac VHT40 mode, the whole testing have assessed only 802.11n HT20/ HT40 by referring to their maximum conducted power.
2. For 802.11a SISO mode, the whole testing has assessed Ant 2 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 (Shenzhen) Inc. is accredited to ISO 17025 by National Voluntary Laboratory Accreditation Program (NVLAP code: 600156-0).

Test Site	Sporton International (Shenzhen) Inc.		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen City, Guangdong Province 518055, China TEL: +86-755-8637-9589 FAX: +86-755-8637-9595		
Test Site No.	**Sporton Site No.**	**FCC designation No.**	**FCC Test Firm Registration No.**
	TH01-SZ	CN5018	337463

Test Site	Sporton International (Shenzhen) Inc.		
Test Site Location	No. 3 Bldg the third floor of south, Shahe River west, Fengzeyuan Warehouse, Nanshan District, Shenzhen City, Guangdong Province 518055, China TEL: +86-755- 3320-2398		
Test Site No.	**Sporton Site No.**	**FCC designation No.**	**FCC Test Firm Registration No.**
	03CH01-SZ	CN5019	577730

1.7 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: All test items were verified and recorded according to the standards and without any deviation during the test.

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: radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5745-5825 MHz Band 4 (U-NII-3)	149	5745	157	5785
	151*	5755	159*	5795
	153	5765	161	5805
	155#	5775	165	5825

Note:

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

2.2 Test Mode

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

SISO Mode

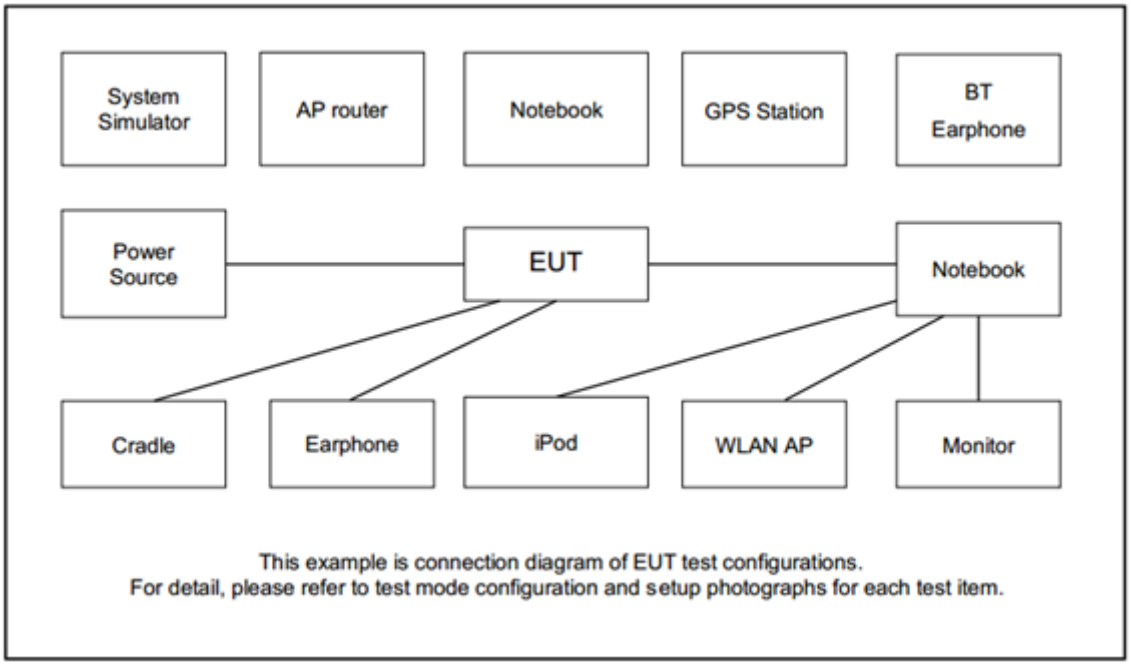
Modulation	Data Rate
802.11a	6 Mbps

MIMO Mode

Modulation	Data Rate
802.11n HT20	MCS0
802.11n HT40	MCS0
802.11ac VHT80	MCS0

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

2.3 Connection Diagram of Test System



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Battery	N/A	N/A	N/A	N/A	N/A

2.5 EUT Operation Test Setup

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

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 6.6 dB and 10dB attenuator.

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

= 6.6 + 10 = 16.6 (dB)

3 Test Result

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

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

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

26dB and 99% Occupied bandwidth are reporting only.

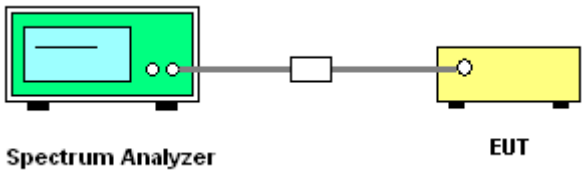
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

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

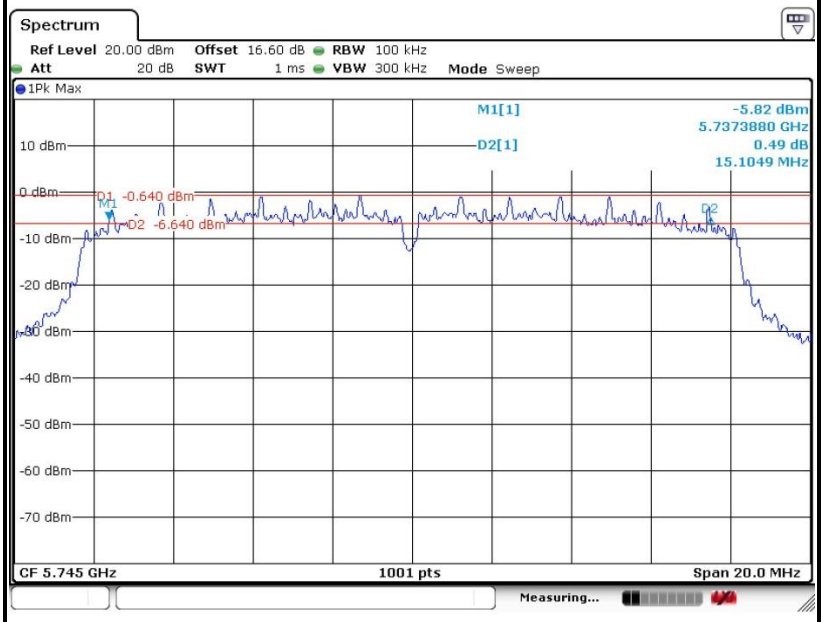
3.1.4 Test Setup



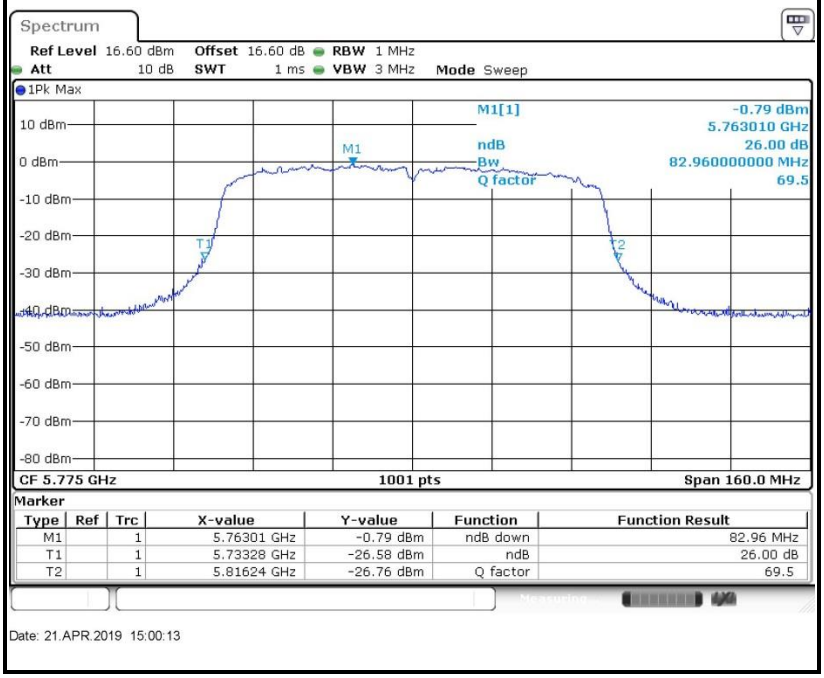
3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.

Minimum 6dB Bandwidth



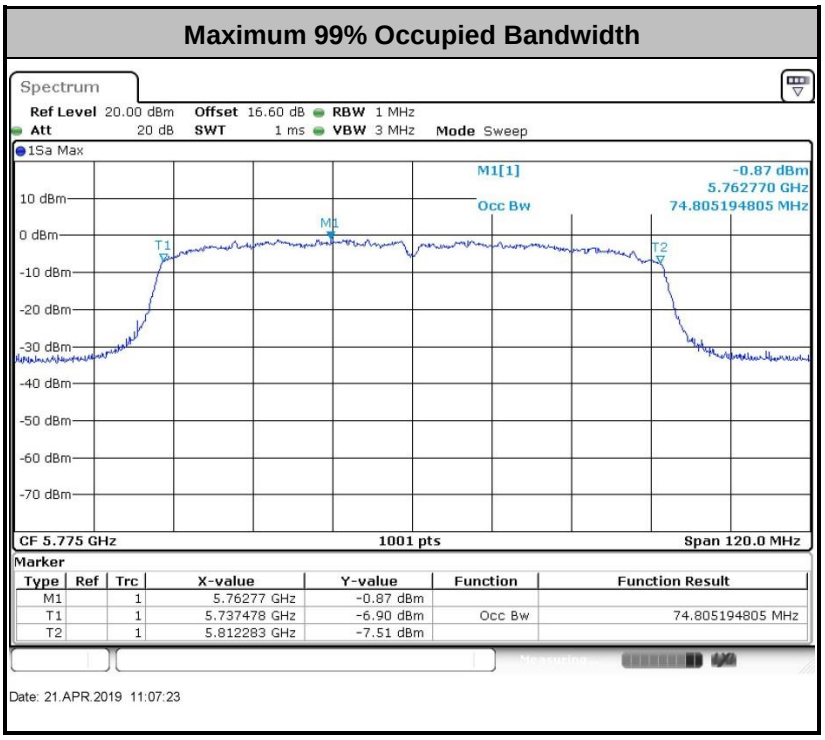
Maximum 26dB Bandwidth



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.76301 GHz	-0.79 dBm	ndB down	82.96 MHz
T1		1	5.73328 GHz	-26.58 dBm	ndB	26.00 dB
T2		1	5.81624 GHz	-26.76 dBm	Q factor	69.5

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.

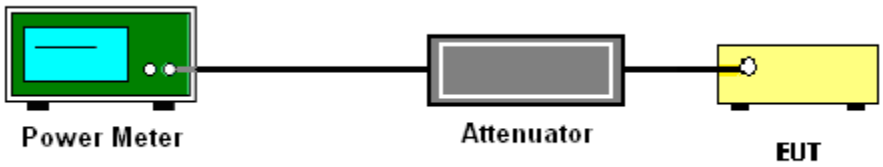
3.2.3 Test Procedures

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).

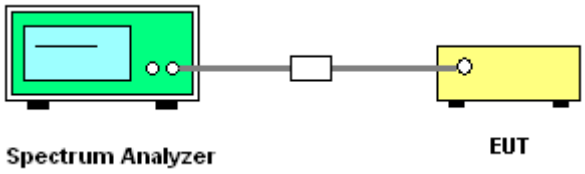
- Measure the duty cycle.
- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 300 kHz.
- Set VBW ≥ 1 MHz.
- Number of points in sweep ≥ 2 Span / RBW.
- Sweep time = auto.
- Detector = RMS
- Trace average at least 100 traces in power averaging mode.
- Add 10 log(500kHz/RBW) 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.

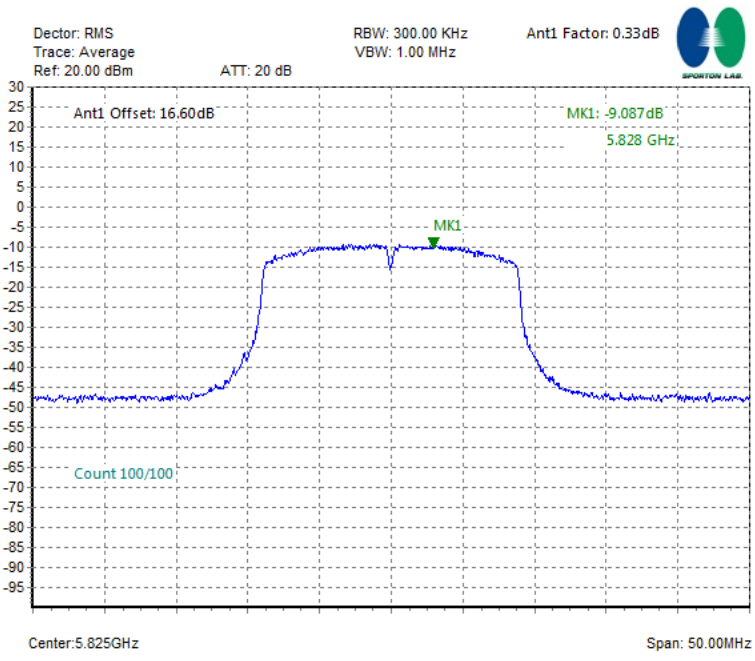
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

Worst Case Power Density (dBm/300kHz)



3.4 Unwanted Emissions Measurement

This section is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement.

3.4.1 Limit of Unwanted Emissions

(1) For transmitters operating in the 5.725-5.85 GHz band:

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

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

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

EIRP (dBm)	Field Strength at 3m (dBµV/m)
- 27	68.2

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

3.4.2 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.

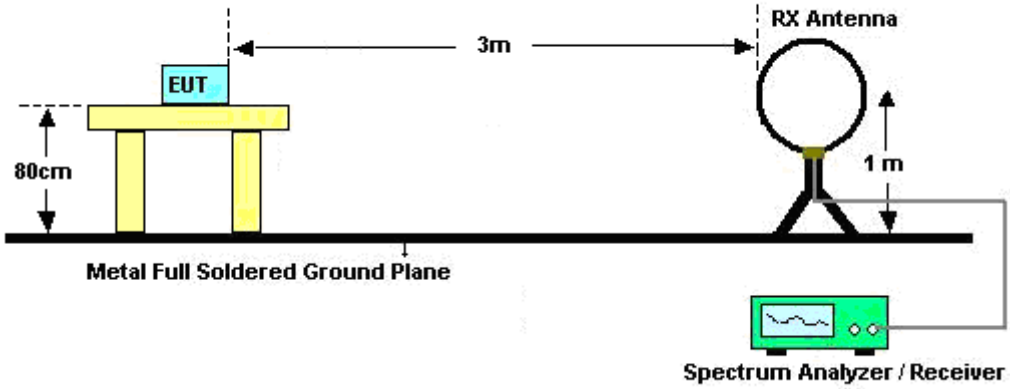
   (1) Procedure for Unwanted Emissions Measurements Below 1000MHz
   - RBW = 120 kHz
   - VBW = 300 kHz
   - Detector = Peak
   - Trace mode = max hold

   (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

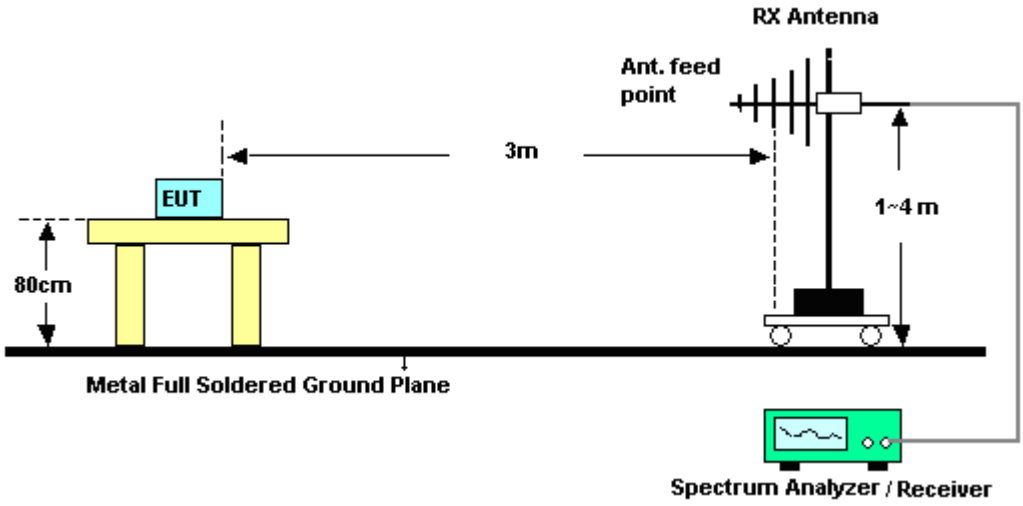
   (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz
   - RBW = 1 MHz
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting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

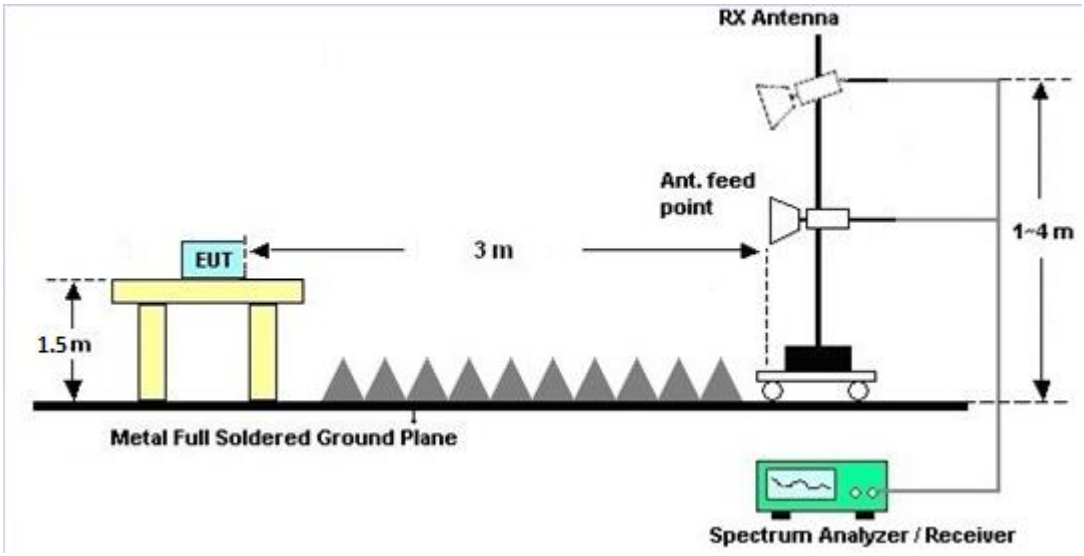
For radiated emissions below 30MHz



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 B.

3.4.7 Duty Cycle

Please refer to Appendix C.

3.4.8 Test Result of Unwanted Radiated Emission (30MHz ~ 10th Harmonic)

Please refer to Appendix B.

3.5 Automatically Discontinue Transmission

3.5.1 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.

3.5.2 Measuring Instruments

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

3.5.3 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.

3.6 Antenna Requirements

3.6.1 Standard Applicable

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

3.6.2 Antenna Anti-Replacement Construction

Non-standard antenna connector is used.

3.6.3 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.

<CDD Modes>

	Ant. 1 (dBi)	Ant. 2 (dBi)	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
Band IV	3.23	3.23	3.23	6.24	0.00	0.24

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101078	10Hz~40GHz	Apr. 18, 2019	Apr. 21, 2019	Apr. 17, 2020	Conducted (TH01-SZ)
Pulse Power Senor	Anritsu	MA2411B	1207253	30MHz~40GHz	Dec. 22, 2018	Apr. 21, 2019	Dec. 21, 2019	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1218010	50MHz Bandwidth	Dec. 22, 2018	Apr. 21, 2019	Dec. 21, 2019	Conducted (TH01-SZ)
EMI Test Receiver&SA	Agilent	N9038A	MY52260185	20Hz~26.5GHz	Aug. 30, 2018	Apr. 15, 2019	Aug. 29, 2019	Radiation (03CH01-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	May 29, 2018	Apr. 15, 2019	May 28, 2019	Radiation (03CH01-SZ)
Bilog Antenna	TeseQ	CBL6112D	35407	30MHz-2GHz	Jun. 05, 2018	Apr. 15, 2019	Jun. 04, 2019	Radiation (03CH01-SZ)
Double Ridge Horn Antenna	ETS Lindgren	3117	119436	1GHz~18GHz	Jun. 28, 2018	Apr. 15, 2019	Jun. 27, 2019	Radiation (03CH01-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18Ghz-40GHz	Mar. 30, 2019	Apr. 15, 2019	Mar. 29, 2020	Radiation (03CH01-SZ)
LF Amplifier	Burgeon	BPA-530	102209	0.01~3000Mhz	Apr. 20, 2018	Apr. 15, 2019	Apr. 19, 2019	Radiation (03CH01-SZ)
HF Amplifier	MITEQ	AMF-7D-00101800-30-10P-R	1707137	1GHz~18GHz	Oct. 19, 2018	Apr. 15, 2019	Oct. 18, 2019	Radiation (03CH01-SZ)
HF Amplifier	KEYSIGHT	83017A	MY53270104	0.5GHz~26.5Ghz	Dec. 22, 2018	Apr. 15, 2019	Dec. 21, 2019	Radiation (03CH01-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Jul. 17, 2018	Apr. 15, 2019	Jul. 16, 2019	Radiation (03CH01-SZ)
AC Power Source	Chroma	61601	616010001985	N/A	NCR	Apr. 15, 2019	NCR	Radiation (03CH01-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Apr. 15, 2019	NCR	Radiation (03CH01-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Apr. 15, 2019	NCR	Radiation (03CH01-SZ)

NCR: No Calibration Required

5 Uncertainty of Evaluation

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

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.8dB**

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

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

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

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

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Zhang Jiang	Temperature:	24~26	°C
Test Date:	2019/4/21	Relative Humidity:	50~53	%

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	1	149	5745	16.83	16.83	20.88	20.43	15.32	15.10	0.5	0.5	Pass
11a	6Mbps	1	157	5785	16.83	16.88	20.73	20.28	15.32	15.10	0.5	0.5	Pass
11a	6Mbps	1	165	5825	16.83	16.88	20.53	20.33	15.32	15.14	0.5	0.5	Pass
HT20	MCS0	2	149	5745	17.78	17.78	21.83	22.08	15.12	15.10	0.5		Pass
HT20	MCS0	2	157	5785	17.78	17.83	22.08	21.63	15.10	15.12	0.5		Pass
HT20	MCS0	2	165	5825	17.78	17.83	21.93	21.98	15.12	15.14	0.5		Pass
HT40	MCS0	2	151	5755	35.96	35.96	49.72	50.35	35.05	35.05	0.5		Pass
HT40	MCS0	2	159	5795	36.16	36.06	52.15	47.02	35.12	35.08	0.5		Pass
VHT80	MCS0	2	155	5775	74.81	74.81	82.96	82.80	75.05	75.05	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	0.22	0.20	10.20	10.33		30.00	30.00	3.23	3.23		Pass
11a	6Mbps	1	157	5785	0.22	0.20	10.10	10.42		30.00	30.00	3.23	3.23		Pass
11a	6Mbps	1	165	5825	0.22	0.20	10.27	10.42		30.00	30.00	3.23	3.23		Pass
HT20	MCS0	2	149	5745	0.33	0.27	6.88	7.37	10.14	30.00		3.23			Pass
HT20	MCS0	2	157	5785	0.33	0.27	6.92	7.45	10.21	30.00		3.23			Pass
HT20	MCS0	2	165	5825	0.33	0.27	7.14	7.49	10.33	30.00		3.23			Pass
HT40	MCS0	2	151	5755	0.64	0.58	7.19	7.48	10.35	30.00		3.23			Pass
HT40	MCS0	2	159	5795	0.64	0.58	7.30	7.60	10.46	30.00		3.23			Pass
VHT20	MCS0	2	149	5745	0.25	0.25	6.79	7.33	10.08	30.00		3.23			Pass
VHT20	MCS0	2	157	5785	0.25	0.25	6.91	7.40	10.17	30.00		3.23			Pass
VHT20	MCS0	2	165	5825	0.25	0.25	7.05	7.41	10.24	30.00		3.23			Pass
VHT40	MCS0	2	151	5755	0.42	0.47	7.08	7.37	10.23	30.00		3.23			Pass
VHT40	MCS0	2	159	5795	0.42	0.47	6.95	7.47	10.22	30.00		3.23			Pass
VHT80	MCS0	2	155	5775	0.83	0.89	7.05	7.34	10.21	30.00		3.23			Pass

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	1	149	5745	0.22	0.20	2.22	2.22	-3.67	-4.16		30.00	30.00	3.23	3.23	Pass
11a	6Mbps	1	157	5785	0.22	0.20	2.22	2.22	-4.12	-3.97		30.00	30.00	3.23	3.23	Pass
11a	6Mbps	1	165	5825	0.22	0.20	2.22	2.22	-3.59	-3.96		30.00	30.00	3.23	3.23	Pass
HT20	MCS0	2	149	5745	0.33	0.27	2.22				-4.10	29.76		6.24		Pass
HT20	MCS0	2	157	5785	0.33	0.27	2.22				-4.09	29.76		6.24		Pass
HT20	MCS0	2	165	5825	0.33	0.27	2.22				-3.53	29.76		6.24		Pass
HT40	MCS0	2	151	5755	0.64	0.58	2.22				-6.64	29.76		6.24		Pass
HT40	MCS0	2	159	5795	0.64	0.58	2.22				-6.45	29.76		6.24		Pass
VHT80	MCS0	2	155	5775	0.83	0.89	2.22				-9.27	29.76		6.24		Pass

Appendix B. Radiated Spurious Emission

Band 4 - 5725~5850MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
2		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 149 5745MHz		5616.8	54.26	-13.94	68.2	38.19	34.48	14.69	33.1	101	230	P	H
		5695.2	55.15	-46.51	101.66	38.9	34.48	14.87	33.1	101	230	P	H
		5719.4	56.23	-54.4	110.63	39.9	34.46	14.97	33.1	101	230	P	H
		5723.8	64.23	-55.23	119.46	47.9	34.46	14.97	33.1	101	230	P	H
	*	5745	107.44	-	-	91.03	34.45	15.06	33.1	101	230	P	H
		5745	100.64	-	-	84.23	34.45	15.06	33.1	101	230	A	H
		5641.8	53.9	-14.3	68.2	37.72	34.5	14.78	33.1	256	166	P	V
		5686	53.66	-41.21	94.87	37.41	34.48	14.87	33.1	256	166	P	V
		5716.6	55.44	-54.41	109.85	39.1	34.47	14.97	33.1	256	166	P	V
		5724.8	61.24	-60.5	121.74	44.91	34.46	14.97	33.1	256	166	P	V
	*	5745	104.31	-	-	87.9	34.45	15.06	33.1	256	166	P	V
		5745	96.53	-	-	80.12	34.45	15.06	33.1	256	166	A	V

WIFI Ant. 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 157 5785MHz		5607.2	54.21	-13.99	68.2	38.16	34.46	14.69	33.1	298	224	P	H
		5697.4	54.59	-48.69	103.28	38.34	34.48	14.87	33.1	298	224	P	H
		5707	53.75	-53.41	107.16	37.41	34.47	14.97	33.1	298	224	P	H
		5720.4	53.44	-58.27	111.71	37.11	34.46	14.97	33.1	298	224	P	H
	*	5785	105.88	-	-	89.39	34.44	15.15	33.1	298	224	P	H
		5785	98.64	-	-	82.15	34.44	15.15	33.1	298	224	A	H
		5851.6	53.76	-64.79	118.55	37.22	34.41	15.23	33.1	298	224	P	H
		5860.4	53.63	-55.66	109.29	37.01	34.4	15.32	33.1	298	224	P	H
		5888.8	53.7	-41.26	94.96	37.06	34.42	15.32	33.1	298	224	P	H
		5938.8	54.45	-13.75	68.2	37.6	34.46	15.49	33.1	298	224	P	H
		5614.4	53.65	-14.55	68.2	37.6	34.46	14.69	33.1	242	166	P	V
		5654.8	53.61	-18.16	71.77	37.44	34.49	14.78	33.1	242	166	P	V
		5716.4	54.57	-55.22	109.79	38.23	34.47	14.97	33.1	242	166	P	V
		5724	54.62	-65.3	119.92	38.29	34.46	14.97	33.1	242	166	P	V
	*	5785	103.17	-	-	86.68	34.44	15.15	33.1	242	166	P	V
		5785	97.01	-	-	80.52	34.44	15.15	33.1	242	166	A	V
		5852.2	52.55	-64.63	117.18	36.01	34.41	15.23	33.1	242	166	P	V
		5871.4	54.26	-51.95	106.21	37.63	34.41	15.32	33.1	242	166	P	V
		5904.6	53.61	-29.65	83.26	36.87	34.44	15.4	33.1	242	166	P	V
		5946.8	54.65	-13.55	68.2	37.8	34.46	15.49	33.1	242	166	P	V

WIFI Ant. 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 165 5825MHz	*	5825	105.12	-	-	88.57	34.42	15.23	33.1	133	229	P	H
	*	5825	97.67	-	-	81.12	34.42	15.23	33.1	133	229	A	H
		5851.4	54.6	-64.41	119.01	38.06	34.41	15.23	33.1	133	229	P	H
		5857.8	54.66	-55.35	110.01	38.04	34.4	15.32	33.1	133	229	P	H
		5875.6	54.13	-50.62	104.75	37.5	34.41	15.32	33.1	133	229	P	H
		5937.4	54.01	-14.19	68.2	37.17	34.45	15.49	33.1	133	229	P	H
	*	5825	102.21	-	-	85.66	34.42	15.23	33.1	317	199	P	V
	*	5825	94.78	-	-	78.23	34.42	15.23	33.1	317	199	A	V
		5851	53.38	-66.54	119.92	36.84	34.41	15.23	33.1	317	199	P	V
		5864.2	53.82	-54.4	108.22	37.2	34.4	15.32	33.1	317	199	P	V
		5902.2	54.18	-30.85	85.03	37.46	34.42	15.4	33.1	317	199	P	V
		5948.6	53.67	-14.53	68.2	36.82	34.46	15.49	33.1	317	199	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. 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 149 5745MHz		11490	49.08	-24.92	74	48.93	37.69	20.22	57.76	160	360	P	H
		17235	53.96	-14.24	68.2	44.62	43.89	23.42	57.97	170	360	P	H
		11490	47.38	-26.62	74	47.23	37.69	20.22	57.76	160	360	P	V
		17235	53.7	-14.5	68.2	44.36	43.89	23.42	57.97	170	360	P	V
802.11a CH 157 5785MHz		11570	49.66	-24.34	74	49.27	37.81	20.25	57.67	175	198	P	H
		17355	53.22	-14.98	68.2	44	43.53	23.49	57.8	189	185	P	H
		11570	47.76	-26.24	74	47.37	37.81	20.25	57.67	175	198	P	V
		17355	53.17	-15.03	68.2	43.95	43.53	23.49	57.8	189	185	P	V
802.11a CH 165 5825MHz		11650	48.7	-25.3	74	48.08	37.92	20.29	57.59	156	347	P	H
		17475	50.91	-17.29	68.2	41.81	43.18	23.56	57.64	150	360	P	H
		11650	48.59	-25.41	74	47.97	37.92	20.29	57.59	156	347	P	V
		17475	50.69	-17.51	68.2	41.59	43.18	23.56	57.64	150	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI Ant. 1+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)
		5615.4	54	-14.2	68.2	37.95	34.46	14.69	33.1	214	41	P	H
		5669.2	54.16	-28.29	82.45	37.91	34.48	14.87	33.1	214	41	P	H
		5719.8	55.71	-55.03	110.74	39.38	34.46	14.97	33.1	214	41	P	H
		5724.8	62.42	-59.32	121.74	46.09	34.46	14.97	33.1	214	41	P	H
802.11n	*	5745	107.85	-	-	91.44	34.45	15.06	33.1	214	41	P	H
HT20		5745	101.16	-	-	84.75	34.45	15.06	33.1	214	41	A	H
CH 149		5609.8	54.72	-13.48	68.2	38.67	34.46	14.69	33.1	379	129	P	V
5745MHz		5697	55.57	-47.42	102.99	39.32	34.48	14.87	33.1	379	129	P	V
		5718.2	54.46	-55.84	110.3	38.13	34.46	14.97	33.1	379	129	P	V
		5725	61.09	-61.11	122.2	44.76	34.46	14.97	33.1	379	129	P	V
	*	5745	106.54	-	-	90.13	34.45	15.06	33.1	379	129	P	V
		5745	100.04	-	-	83.63	34.45	15.06	33.1	379	129	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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		5612.4	53.92	-14.28	68.2	37.87	34.46	14.69	33.1	392	131	P	H
		5691.2	54.65	-44.06	98.71	38.4	34.48	14.87	33.1	392	131	P	H
		5713.6	53.12	-55.89	109.01	36.78	34.47	14.97	33.1	392	131	P	H
		5722.8	53.12	-64.06	117.18	36.79	34.46	14.97	33.1	392	131	P	H
	*	5785	107.52	-	-	91.03	34.44	15.15	33.1	392	131	P	H
		5785	100.51	-	-	84.02	34.44	15.15	33.1	392	131	A	H
		5853	54.07	-61.29	115.36	37.53	34.41	15.23	33.1	392	131	P	H
		5872.6	53.61	-52.26	105.87	36.98	34.41	15.32	33.1	392	131	P	H
802.11n		5923.6	54.4	-14.83	69.23	37.65	34.45	15.4	33.1	392	131	P	H
HT20		5930.4	55.24	-12.96	68.2	38.49	34.45	15.4	33.1	392	131	P	H
CH 157		5620.6	54.15	-14.05	68.2	38.08	34.48	14.69	33.1	395	131	P	V
5785MHz		5674.6	54.03	-32.41	86.44	37.78	34.48	14.87	33.1	395	131	P	V
		5715.6	53.49	-56.08	109.57	37.15	34.47	14.97	33.1	395	131	P	V
		5722.8	53.55	-63.63	117.18	37.22	34.46	14.97	33.1	395	131	P	V
	*	5785	108.01	-	-	91.52	34.44	15.15	33.1	395	131	P	V
		5785	101.05	-	-	84.56	34.44	15.15	33.1	395	131	A	V
		5850.8	53.45	-66.93	120.38	36.91	34.41	15.23	33.1	395	131	P	V
		5869.2	53.52	-53.3	106.82	36.9	34.4	15.32	33.1	395	131	P	V
		5888.2	54.02	-41.38	95.4	37.38	34.42	15.32	33.1	395	131	P	V
		5940.6	53.8	-14.4	68.2	36.95	34.46	15.49	33.1	395	131	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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
	*	5825	108.56	-	-	92.01	34.42	15.23	33.1	339	78	P	H
	*	5825	102.08	-	-	85.53	34.42	15.23	33.1	339	78	A	H
		5852.4	55.33	-61.4	116.73	38.79	34.41	15.23	33.1	339	78	P	H
		5859.6	54.93	-54.58	109.51	38.31	34.4	15.32	33.1	339	78	P	H
802.11n		5910	55.2	-24.07	79.27	38.46	34.44	15.4	33.1	339	78	P	H
HT20		5929.4	53.31	-14.89	68.2	36.56	34.45	15.4	33.1	339	78	P	H
CH 165	*	5825	106.39	-	-	89.84	34.42	15.23	33.1	385	147	P	V
5825MHz	*	5825	98.69	-	-	82.14	34.42	15.23	33.1	385	147	A	V
		5850.6	53.78	-67.05	120.83	37.24	34.41	15.23	33.1	385	147	P	V
		5869.6	54.51	-52.2	106.71	37.89	34.4	15.32	33.1	385	147	P	V
		5922.8	54.55	-15.27	69.82	37.8	34.45	15.4	33.1	385	147	P	V
		5947	54.05	-14.15	68.2	37.2	34.46	15.49	33.1	385	147	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI Ant. 1+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)
802.11n		11490	49.19	-24.81	74	49.04	37.69	20.22	57.76	160	360	P	H
HT20		17235	57.17	-11.03	68.2	47.83	43.89	23.42	57.97	170	360	P	H
CH 149		11490	49.02	-24.98	74	48.87	37.69	20.22	57.76	160	360	P	V
5745MHz		17235	56.46	-11.74	68.2	47.12	43.89	23.42	57.97	170	360	P	V
802.11n		11570	49.1	-24.9	74	48.71	37.81	20.25	57.67	175	198	P	H
HT20		17355	53.53	-14.67	68.2	44.31	43.53	23.49	57.8	189	185	P	H
CH 157		11570	48.83	-25.17	74	48.44	37.81	20.25	57.67	175	198	P	V
5785MHz		17355	53.67	-14.53	68.2	44.45	43.53	23.49	57.8	189	185	P	V
802.11n		11650	48.1	-25.9	74	47.48	37.92	20.29	57.59	156	347	P	H
HT20		17475	55.42	-12.78	68.2	46.32	43.18	23.56	57.64	150	360	P	H
CH 165		11650	48.75	-25.25	74	48.13	37.92	20.29	57.59	156	347	P	V
5825MHz		17475	53.41	-14.79	68.2	44.31	43.18	23.56	57.64	150	360	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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		5614.2	54.76	-13.44	68.2	38.71	34.46	14.69	33.1	266	47	P	H
		5686.2	56.97	-38.05	95.02	40.72	34.48	14.87	33.1	266	47	P	H
		5719.2	62.3	-48.28	110.58	45.97	34.46	14.97	33.1	266	47	P	H
		5724	65.18	-54.74	119.92	48.85	34.46	14.97	33.1	266	47	P	H
	*	5755	104.88	-	-	88.47	34.45	15.06	33.1	266	47	P	H
		5755	98.14	-	-	81.73	34.45	15.06	33.1	266	47	A	H
		5852	52.96	-64.68	117.64	36.42	34.41	15.23	33.1	266	47	P	H
		5867.2	53.56	-53.82	107.38	36.94	34.4	15.32	33.1	266	47	P	H
802.11n		5916.8	54.54	-19.71	74.25	37.8	34.44	15.4	33.1	266	47	P	H
HT40		5942.4	54.52	-13.68	68.2	37.67	34.46	15.49	33.1	266	47	P	H
CH 151		5612.6	55.61	-12.59	68.2	39.56	34.46	14.69	33.1	378	132	P	V
5755MHz		5679.4	57.81	-32.19	90	41.56	34.48	14.87	33.1	378	132	P	V
		5719.6	60.2	-50.49	110.69	43.87	34.46	14.97	33.1	378	132	P	V
		5724.8	65.96	-55.78	121.74	49.63	34.46	14.97	33.1	378	132	P	V
	*	5755	103.12	-	-	86.71	34.45	15.06	33.1	378	132	P	V
		5755	95.96	-	-	79.55	34.45	15.06	33.1	378	132	A	V
		5855	52.8	-58	110.8	36.27	34.4	15.23	33.1	378	132	P	V
		5859	54.33	-55.35	109.68	37.71	34.4	15.32	33.1	378	132	P	V
		5880.4	53.57	-47.62	101.19	36.94	34.41	15.32	33.1	378	132	P	V
		5936	54.18	-14.02	68.2	37.34	34.45	15.49	33.1	378	132	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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 159 5795MHz		5630.6	54.35	-13.85	68.2	38.19	34.48	14.78	33.1	218	49	P	H
		5693.6	56.6	-43.88	100.48	40.35	34.48	14.87	33.1	218	49	P	H
		5713.4	57.23	-51.72	108.95	40.89	34.47	14.97	33.1	218	49	P	H
		5724.6	55.61	-65.68	121.29	39.28	34.46	14.97	33.1	218	49	P	H
	*	5795	104.72	-	-	88.24	34.43	15.15	33.1	218	49	P	H
		5795	97.9	-	-	81.42	34.43	15.15	33.1	218	49	A	H
		5850.2	56.97	-64.77	121.74	40.43	34.41	15.23	33.1	218	49	P	H
		5863.6	54.66	-53.73	108.39	38.04	34.4	15.32	33.1	218	49	P	H
		5891.6	54.42	-38.46	92.88	37.78	34.42	15.32	33.1	218	49	P	H
		5944.2	54.4	-13.8	68.2	37.55	34.46	15.49	33.1	218	49	P	H
		5637.2	54.78	-13.42	68.2	38.6	34.5	14.78	33.1	258	177	P	V
		5697.6	56.29	-47.14	103.43	40.04	34.48	14.87	33.1	258	177	P	V
		5704.6	53.86	-52.63	106.49	37.52	34.47	14.97	33.1	258	177	P	V
		5722.4	54.98	-61.29	116.27	38.65	34.46	14.97	33.1	258	177	P	V
	*	5795	103.66	-	-	87.18	34.43	15.15	33.1	258	177	P	V
		5795	96.63	-	-	80.15	34.43	15.15	33.1	258	177	A	V
		5853.2	58.21	-56.69	114.9	41.67	34.41	15.23	33.1	258	177	P	V
		5856.2	59.84	-50.62	110.46	43.22	34.4	15.32	33.1	258	177	P	V
		5884.4	54.72	-43.5	98.22	38.09	34.41	15.32	33.1	258	177	P	V
		5927.4	53.49	-14.71	68.2	36.74	34.45	15.4	33.1	258	177	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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		5648.6	54.75	-13.45	68.2	38.57	34.5	14.78	33.1	166	50	P	H
		5691.6	58.05	-40.96	99.01	41.8	34.48	14.87	33.1	166	50	P	H
		5714	60.85	-48.27	109.12	44.51	34.47	14.97	33.1	166	50	P	H
		5723	64.2	-53.44	117.64	47.87	34.46	14.97	33.1	166	50	P	H
	*	5775	98.38	-	-	81.98	34.44	15.06	33.1	166	50	P	H
		5775	90.92	-	-	74.52	34.44	15.06	33.1	166	50	A	H
		5850.2	54.13	-67.61	121.74	37.59	34.41	15.23	33.1	166	50	P	H
		5856.8	54.84	-55.46	110.3	38.22	34.4	15.32	33.1	166	50	P	H
802.11ac		5884.8	53.53	-44.39	97.92	36.9	34.41	15.32	33.1	166	50	P	H
VHT80		5939	54.62	-13.58	68.2	37.77	34.46	15.49	33.1	166	50	P	H
CH 155		5645.4	55.77	-12.43	68.2	39.59	34.5	14.78	33.1	259	167	P	V
5775MHz		5696.4	58.21	-44.34	102.55	41.96	34.48	14.87	33.1	259	167	P	V
		5719.6	60.94	-49.75	110.69	44.61	34.46	14.97	33.1	259	167	P	V
		5722.2	62.5	-53.32	115.82	46.17	34.46	14.97	33.1	259	167	P	V
	*	5775	100.32	-	-	83.92	34.44	15.06	33.1	259	167	P	V
		5775	92.53	-	-	76.13	34.44	15.06	33.1	259	167	A	V
		5850.4	55.21	-66.08	121.29	38.67	34.41	15.23	33.1	259	167	P	V
		5857	54.62	-55.62	110.24	38	34.4	15.32	33.1	259	167	P	V
		5875.6	55.25	-49.5	104.75	38.62	34.41	15.32	33.1	259	167	P	V
		5936	53.84	-14.36	68.2	37	34.45	15.49	33.1	259	167	P	V

Remark

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

Band 4 5725~5850MHz

WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI Ant. 1+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)
802.11n		11510	48.07	-25.93	74	47.89	37.7	20.22	57.74	160	360	P	H
HT40		17265	55.68	-12.52	68.2	46.37	43.79	23.44	57.92	170	360	P	H
CH 151		11510	48.04	-25.96	74	47.86	37.7	20.22	57.74	160	360	P	V
5755MHz		17265	54.75	-13.45	68.2	45.44	43.79	23.44	57.92	170	360	P	V
802.11n		11590	47.8	-26.2	74	47.34	37.84	20.27	57.65	170	300	P	H
HT40		17385	54.24	-13.96	68.2	45.05	43.43	23.51	57.75	150	200	P	H
CH 159		11590	47.95	-26.05	74	47.49	37.84	20.27	57.65	170	300	P	V
5795MHz		17385	52.98	-15.22	68.2	43.79	43.43	23.51	57.75	150	200	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 4 5725~5850MHz

Emission below 1GHz

5GHz WIFI 802.11n HT20 (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)
5GHz 802.11n HT20 LF		30	24.44	-15.56	40	31.11	24.4	0.23	31.3	-	-	P	H
		116.33	21.85	-21.65	43.5	34.64	17.75	1	31.54	-	-	P	H
		329.73	26.31	-19.69	46	35.58	19.92	2.15	31.34	-	-	P	H
		581.93	29.27	-16.73	46	33.51	24.3	2.95	31.49	-	-	P	H
		711.91	30.89	-15.11	46	34.08	25.05	3.31	31.55	-	-	P	H
		928.22	33.2	-12.8	46	33.95	26.75	3.89	31.39	178	289	P	H
		30.97	26.37	-13.63	40	33.6	23.82	0.25	31.3	156	310	P	V
		151.25	22.84	-20.66	43.5	36.32	16.6	1.31	31.39	-	-	P	V
		379.2	26.72	-19.28	46	34.65	21.11	2.32	31.36	-	-	P	V
		624.61	29.71	-16.29	46	33.54	24.6	3.08	31.51	-	-	P	V
		765.26	30.73	-15.27	46	32.64	25.75	3.51	31.17	-	-	P	V
		940.83	30.52	-15.48	46	31.07	26.87	3.92	31.34	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

Note symbol

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

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

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

1. Level(dBμV/m) =

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

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

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

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

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

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

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

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

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

= -10.46(dB)

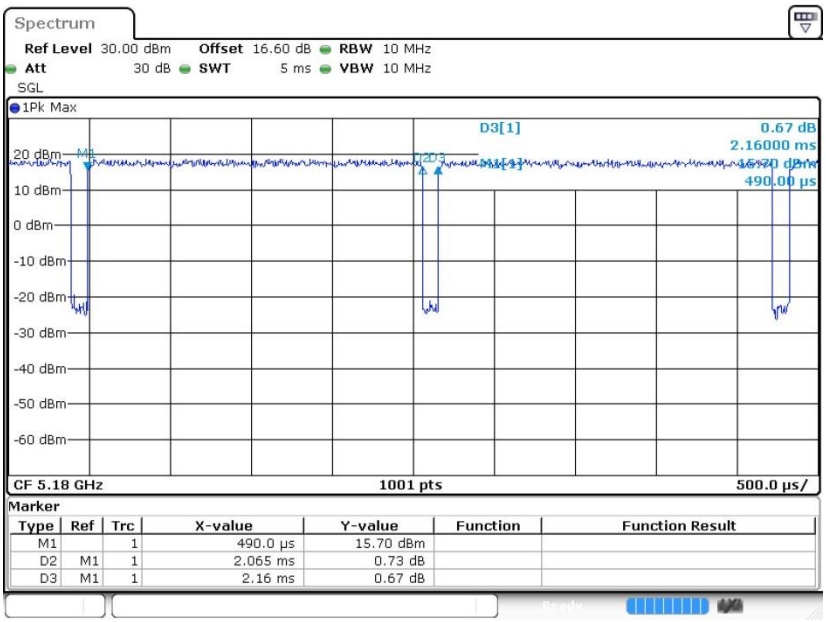
Both peak and average measured complies with the limit line, so test result is "PASS".

Appendix C. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
2	802.11a	95.60	2.065	0.484	1KHz
1+2(2)	802.11n HT20	93.90	1.925	0.519	1KHz
1+2(2)	802.11n HT40	87.51	0.946	1.057	3KHz
1+2(1)	802.11ac VHT80	82.58	0.465	2.152	3KHz

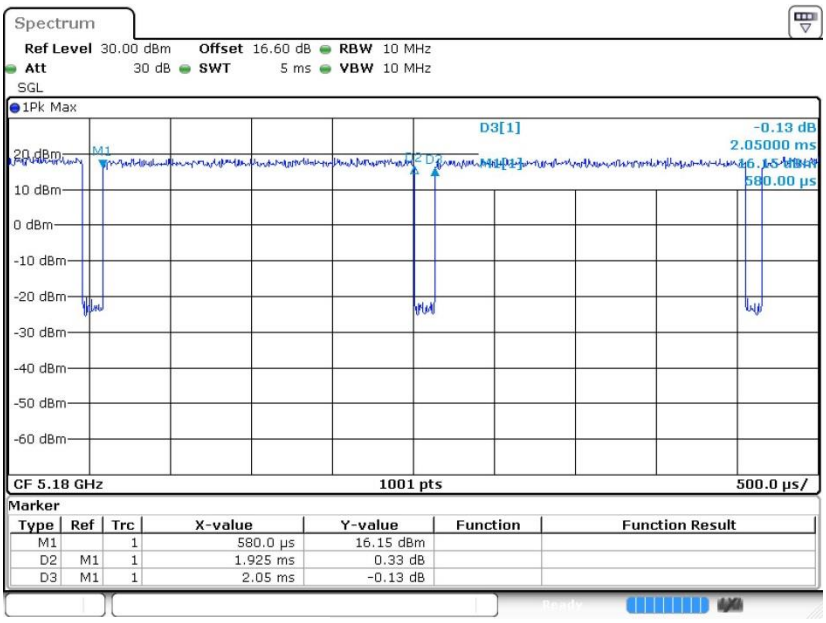
Ant. 2

802.11a



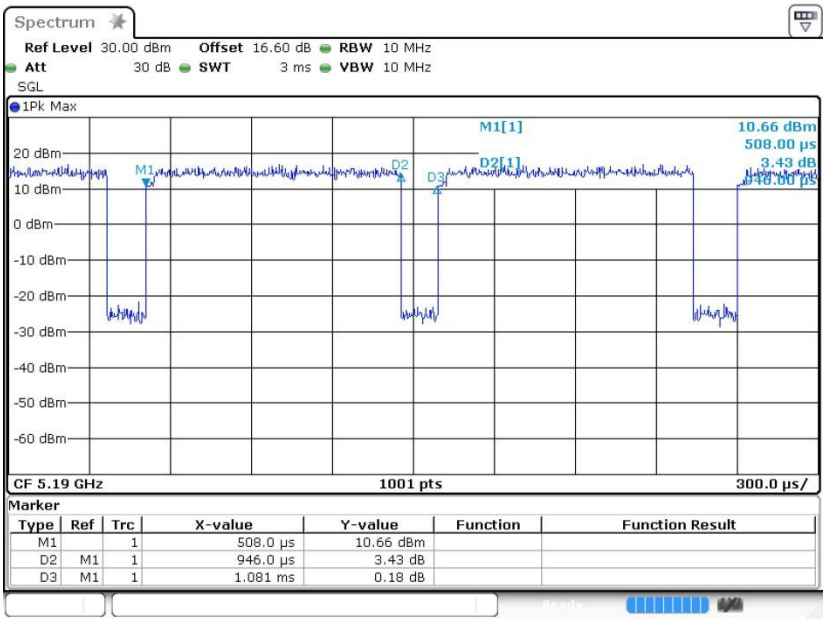
Ant.1+2

802.11n HT20



Ant.1+2

802.11n HT40



Ant.1+2

802.11ac VHT80