



FCC RF Test Report

APPLICANT : AzureWave Technologies, Inc.
EQUIPMENT : IEEE 802.11 2x2 MIMO a/b/g/n/ac Wireless LAN +
Bluetooth + NFC NGFF Module
BRAND NAME : AzureWave
MODEL NAME : AW-CM389NF
FCC ID : TLZ-CM389NF
STANDARD : FCC Part 15 Subpart E §15.407
CLASSIFICATION : (NII) Unlicensed National Information Infrastructure

The product was installed into ChromeBook (Brand Name: Hisense, CTL, POIN2, BITLAND, edugear; Model Name: C11, C12, J2, J4, LT0101-01, B800, K2, K4) during test.

The product was received on Mar. 03, 2015 and testing was completed on Mar. 31, 2015. We, SPORTON INTERNATIONAL (SHENZHEN) INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL (SHENZHEN) INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager



SPORTON INTERNATIONAL (SHENZHEN) INC.

1F & 2F, Building A, Morning Business Center, No. 4003 ShiGu Rd., Xili Town,
Nanshan District, Shenzhen, Guangdong, P. R. China



TABLE OF CONTENTS

REVISION HISTORY.....	3
SUMMARY OF TEST RESULT	4
1 GENERAL DESCRIPTION	5
1.1 Applicant.....	5
1.2 Manufacturer.....	5
1.3 Feature of Equipment Under Test.....	5
1.4 Product Specification of Equipment Under Test.....	6
1.5 Modification of EUT	7
1.6 Testing Location	7
1.7 Applicable Standards.....	8
2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST	9
2.1 Carrier Frequency and Channel	10
2.2 Pre-Scanned RF Power.....	11
2.3 Test Mode.....	14
2.4 Connection Diagram of Test System.....	15
2.5 Support Unit used in test configuration and system	16
2.6 EUT Operation Test Setup	16
2.7 Measurement Results Explanation Example.....	17
3 TEST RESULT.....	18
3.1 6dB Bandwidth Measurement	18
3.2 Maximum Conducted Output Power Measurement	20
3.3 Power Spectral Density Measurement	21
3.4 Unwanted Emissions Measurement.....	24
3.5 AC Conducted Emission Measurement.....	29
3.6 Frequency Stability Measurement.....	33
3.7 Automatically Discontinue Transmission	34
3.8 Antenna Requirements.....	35
4 LIST OF MEASURING EQUIPMENT	37
5 UNCERTAINTY OF EVALUATION	38
APPENDIX A. CONDUCTED TEST RESULTS	
APPENDIX B. RADIATED TEST RESULTS	
APPENDIX C. SETUP PHOTOGRAPHS	



REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR530302-01E	Rev. 01	This project is a C2PC application, the detail difference with original application FCC ID: TLZ-CM389NF which the grant issued on 04/09/2015 list as below: 1. Added three samples, the difference can refer section 1.3 2. Added adapter 3 and adapter 4 just different brand name. 3. Added two batteries. Since the test result is not affected, all the test cases were quoted from original report (Sporton Report Number FR530302E).	Jul. 10, 2015



SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.403(i)	6dB 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	$\leq -17, -27$ dBm/MHz & 15.209(a)	Pass	Under limit 6.61 dB at 103.720 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 12.46 dB at 0.250 MHz
3.6	15.407(g)	Frequency Stability	Within Operation Band	Pass	-
3.7	15.407(c)	Automatically Discontinue Transmission	Discontinue Transmission	Pass	-
3.8	15.203 & 15.407(a)	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

AzureWave Technologies, Inc.

8F., No.94, Baozhong Rd., Xindian, Taipei, Taiwan 231

1.2 Manufacturer

AzureWave Technologies, Inc..

8F., No.94, Baozhong Rd., Xindian, Taipei, Taiwan 231

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	IEEE 802.11 2x2 MIMO a/b/g/n/ac Wireless LAN + Bluetooth + NFC NGFF Module
Brand Name	AzureWave
Model Name	AW-CM389NF
FCC ID	TLZ-CM389NF
EUT supports Radios application	WLAN2.4GHz 802.11b/g/n HT20/HT40 WLAN5GHz 802.11a/n HT20/HT40 WLAN5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth v2.1+EDR Bluetooth v4.0 LE

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

Host Feature & Specification	
Host	ChromeBook
Brand Name	Hisense, CTL, POIN2, BITLAND, edugear
Model Name	C11, C12, J2, J4, LT0101-01, B800, K2, K4
HW Version	1.3
SW Version	google chrome
EUT Stage	Production Unit

Note: There are four types of EUT sample 1, sample 2, sample 3 and sample 4, the difference between sample 1 and sample 2 is only for touch panel, and sample 1/2 with sample 3, sample 4 are with different EMMC, LCD panel and RAM can refer the list below. According to the difference, we evaluate is not affect RF performance, so only choose sample 1 to perform RF test.

Component	Sample 1/Sample 2	Sample 3	Sample 4
LCD Panel	IVO_M116NWR1 LCD 11.6"	Reyken_RK116IWX2T30 LCD 11.6"	Reyken_RK116IWX2T30 LCD 11.6"
EMMC	Sandisk 16G	Toshiba 16G	Sandisk 32G
RAM	Samsung 2G	Hynix 4G	Hynix 4G

1.4 Product Specification of Equipment Under Test

Product Specification subjective to this standard												
Tx/Rx Channel Frequency Range		5725 MHz ~ 5850 MHz										
Maximum Output Power		<5725 MHz ~ 5850 MHz> <Ant. 0> 802.11a : 14.36 dBm / 0.0273 W 802.11n HT20 : 13.35 dBm / 0.0216 W 802.11n HT40 : 10.63 dBm / 0.0116 W 802.11ac VHT20: 7.21 dBm / 0.0053 W 802.11ac VHT40: 6.53 dBm / 0.0045 W 802.11ac VHT80: 7.04 dBm / 0.0051 W <Ant. 1> 802.11a : 13.91 dBm / 0.0246 W 802.11n HT20 : 13.16 dBm / 0.0207 W 802.11n HT40 : 10.66 dBm / 0.0116 W 802.11ac VHT20: 6.74 dBm / 0.0047 W 802.11ac VHT40: 6.04 dBm / 0.0040 W 802.11ac VHT80: 7.22 dBm / 0.0053 W MIMO <Ant. Port 0+1> 802.11a : 14.90 dBm / 0.0309 W 802.11n HT20 : 13.36 dBm / 0.0217 W 802.11n HT40 : 11.56 dBm / 0.0143 W 802.11ac VHT20: 7.25 dBm / 0.0053 W 802.11ac VHT40: 7.54 dBm / 0.0057 W 802.11ac VHT80: 8.55 dBm / 0.0072 W										
Minimum 6dB Bandwidth		802.11a : 16.32 MHz 802.11n HT20 : 17.56 MHz 802.11n HT40 : 35.68 MHz 802.11ac VHT20 : 17.52 MHz 802.11ac VHT40 : 35.60 MHz 802.11ac VHT80 : 76.32 MHz										
Type of Modulation		802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)										
Antenna Type/Gain		<5725 MHz ~ 5850 MHz> Chain Port 0: PIFA Antenna with gain 2.73 dBi Chain Port 1: PIFA Antenna with gain 1.92 dBi										
Antenna Function Description		<table><tr><td></td><td>Chain Port 0</td><td>Chain Port 1</td></tr><tr><td>802.11 a/n/ac SISO</td><td>V</td><td>V</td></tr><tr><td>802.11 a/n/ac MIMO</td><td>V</td><td>V</td></tr></table>			Chain Port 0	Chain Port 1	802.11 a/n/ac SISO	V	V	802.11 a/n/ac MIMO	V	V
	Chain Port 0	Chain Port 1										
802.11 a/n/ac SISO	V	V										
802.11 a/n/ac MIMO	V	V										



1.5 Modification of EUT

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

1.6 Testing Location

Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.	
Test Site Location	1F & 2F,Building A, Morning Business Center, No. 4003 ShiGu Rd., Xili Town, Nanshan District, Shenzhen, Guangdong, P. R. China TEL: +86-755-8637-9589 FAX: +86-755-8637-9595	
Test Site No.	Sporton Site No.	
	TH01-SZ	CO01-SZ

Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.	
Test Site Location	No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P. R. China TEL: +86-755- 3320-2398	
Test Site No.	Sporton Site No.	FCC Registration No.
	03CH02-SZ	831040

Note: The test site complies with ANSI C63.4 2009 requirement.



1.7 Applicable Standards

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

- ♦ FCC Part 15 Subpart E
- ♦ FCC KDB 789033 D02 General UNII Test Procedures New Rules v01
- ♦ 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. FCC permits the use of the 1.5 meter table as an alternative in C63.10-2013 through inquiry tracking number 961829.
3. 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

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: conducted emission (150 kHz to 30 MHz) and radiated emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

The final configuration from all the combinations and the worst-case data rates were investigated by measuring the maximum power across all the data rates and modulation modes under section 2.2.

Based on the worst configuration found above, the RF power setting is set individually to meet FCC compliance limit for the final conducted and radiated tests shown in section 2.3.



2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5725-5850 MHz Band 4 (U-NII-3)	149	5745	157	5785
	151	5755	159	5795
	153	5765	161	5805
	155	5775	165	5825

Note: The above Frequency and Channel in boldface were 802.11n HT40.



2.2 Pre-Scanned RF Power

Preliminary tests were performed in different data rate and data rate associated with the highest power were chosen for full test in the following tables. Final Output Power equals to Measured Output Power adds the duty factor.

WLAN 5GHz 802.11a Average Power (dBm)											
Power vs. Channel				Power vs. Data Rate							
Channel	Frequency (MHz)	Chain Port	Data Rate 6Mbps	Channel	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
CH 149	5745	0	13.75	CH 157	14.30	14.28	14.26	14.27	14.25	14.20	14.18
CH 157	5785	0	14.36								
CH 165	5825	0	13.53								
CH 149	5745	1	13.54	CH 157	13.86	13.85	13.74	13.88	13.87	13.80	13.81
CH 157	5785	1	13.91								
CH 165	5825	1	13.86								
CH 149	5745	0+1	14.46	CH 157	14.80	14.79	14.78	14.76	14.78	14.76	14.75
CH 157	5785	0+1	14.90								
CH 165	5825	0+1	14.64								

WLAN 5GHz 802.11n-HT20 Output Power (dBm)											
Power vs. Channel				Power vs. Data Rate							
Channel	Frequency (MHz)	Chain Port	MCS Index MCS0	Channel	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 149	5745	0	12.74	CH 157	13.26	13.33	13.31	13.30	13.23	13.27	13.28
CH 157	5785	0	13.35								
CH 165	5825	0	12.81								
CH 149	5745	1	12.55	CH 157	13.13	13.14	13.08	13.13	13.11	13.13	13.14
CH 157	5785	1	13.16								
CH 165	5825	1	13.13								
CH 149	5745	0+1	12.24	CH 157	12.70	12.65	12.61	12.65	12.64	12.61	12.64
CH 157	5785	0+1	13.36								
CH 165	5825	0+1	12.20								



WLAN 5GHz 802.11n-HT40 Output Power (dBm)											
Power vs. Channel				Power vs. Data Rate							
Channel	Frequency (MHz)	Chain Port	MCS Index MCS0	Channel	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 151	5755	0	9.92	CH 159	10.62	10.61	10.59	10.57	10.60	10.55	10.56
CH 159	5795	0	10.63								
CH 151	5755	1	10.11	CH 159	10.58	10.59	10.50	10.57	10.57	10.50	10.52
CH 159	5795	1	10.66								
CH 151	5755	0+1	11.15	CH 159	11.51	11.52	11.53	11.52	11.52	11.51	11.51
CH 159	5795	0+1	11.56								

WLAN 5GHz 802.11ac-VHT20 Output Power (dBm)												
Power vs. Channel				Power vs. Data Rate								
Channel	Frequency (MHz)	Chain Port	MCS Index MCS0	Channel	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8
CH 149	5745	0	6.91	CH 157	7.19	7.18	7.16	7.14	7.17	7.19	7.20	7.11
CH 157	5785	0	7.21									
CH 165	5825	0	6.78									
CH 149	5745	1	6.48	CH 157	6.63	6.61	6.59	6.56	6.57	6.60	6.54	6.52
CH 157	5785	1	6.74									
CH 165	5825	1	6.62									
CH 149	5745	0+1	6.85	CH 157	7.22	7.22	7.18	7.15	7.18	7.17	7.15	7.16
CH 157	5785	0+1	7.25									
CH 165	5825	0+1	7.05									



WLAN 5GHz 802.11ac-VHT40 Output Power (dBm)													
Power vs. Channel				Power vs. Data Rate									
Channel	Frequency (MHz)	Chain Port	MCS Index MCS0	Channel	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8	MCS9
CH 151	5755	0	5.96	CH 159	6.50	6.47	6.45	6.51	6.49	6.48	6.44	6.42	6.41
CH 159	5795	0	6.53										
CH 151	5755	1	5.81	CH 159	6.01	5.89	5.92	5.91	5.96	5.88	5.93	5.97	5.86
CH 159	5795	1	6.04										
CH 151	5755	0+1	7.08	CH 159	7.50	7.47	7.50	7.45	7.44	7.43	7.39	7.26	7.42
CH 159	5795	0+1	7.54										

WLAN 5GHz 802.11ac-VHT80 Output Power (dBm)													
Power vs. Channel				Power vs. Data Rate									
Channel	Frequency (MHz)	Chain Port	MCS Index MCS0	Channel	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8	MCS9
CH 155	5775	0	7.04	CH 155	7.00	6.89	6.92	6.91	6.95	6.87	6.88	6.96	6.87
CH 155	5775	1	7.22	CH 155	7.13	7.16	7.09	7.15	7.09	7.08	7.15	7.14	7.02
CH 155	5775	0+1	8.55	CH 155	8.51	8.45	8.41	8.44	8.43	8.45	8.44	8.42	8.43

2.3 Test Mode

Final test mode of conducted test items and radiated spurious emissions are considering the modulation and worse data rates from the power table described in section 2.2.

Modulation	Data Rate
802.11a	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0
802.11ac VHT20	MCS0
802.11ac VHT40	MCS0
802.11ac VHT80	MCS0

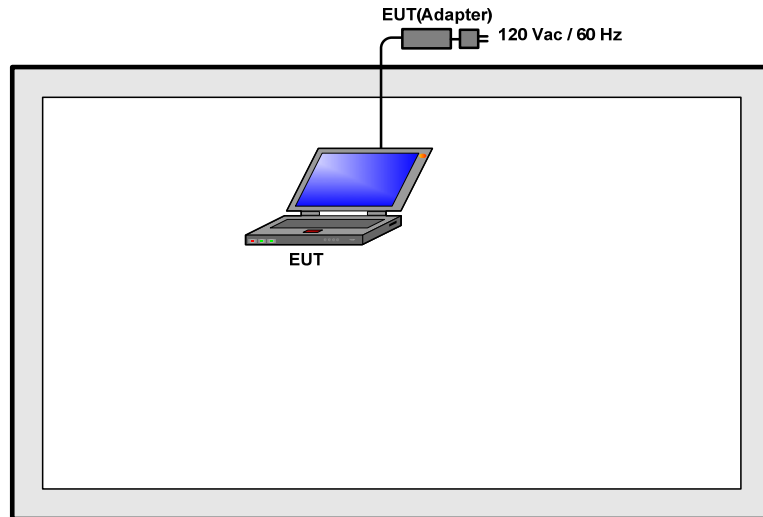
AC Conducted Emission	Mode 1 : Bluetooth Link + WLAN (5G) Link + Earphone + Battery + Adapter 2
-----------------------------	---

Ch. #		Band IV : 5725-5850 MHz		
		802.11a	802.11n HT20	802.11n HT40
L	Low	149	149	151
M	Middle	157	157	-
H	High	165	165	159

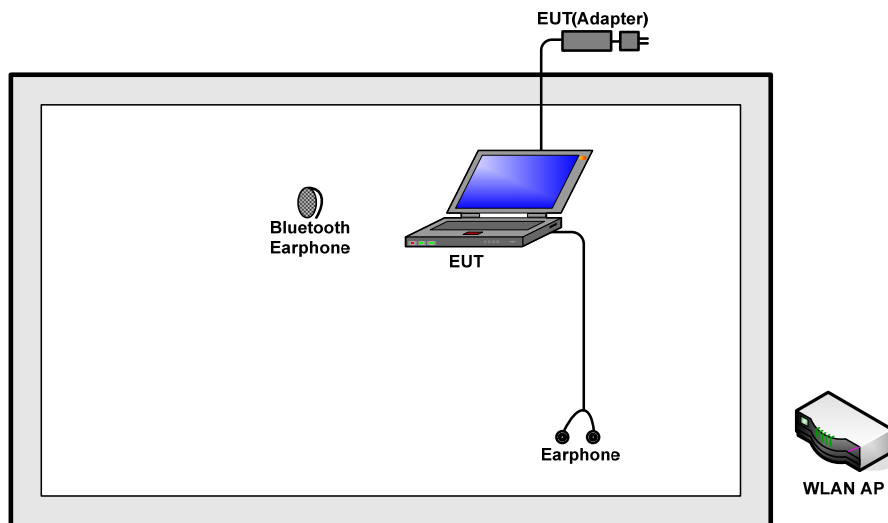
Ch. #		Band IV : 5725-5850 MHz		
		802.11ac VHT20	802.11ac VHT40	802.11ac VHT80
L	Low	149	151	-
M	Middle	157	-	155
H	High	165	159	-

2.4 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



2.5 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Bluetooth Earphone	Nokia	BH-108	PYAHS-107W	N/A	N/A
2.	WLAN AP	D-Link	DIR-815	KA2DIR815A1	N/A	Unshielded, 1.8 m
3.	Notebook	Lenovo	G480	FCC DoC	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
4.	Earphone	Apple	MC692ZFA	FCC DoC	Unshielded, 16 m	N/A

2.6 EUT Operation Test Setup

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

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



2.7 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 6.5 dB and 10dB attenuator.

$$\begin{aligned}\text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)} \\ &= 6.5 + 10 = 16.5 \text{ (dB)}\end{aligned}$$

3 Test Result

3.1 6dB Bandwidth Measurement

3.1.1 Description of 6dB Bandwidth

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

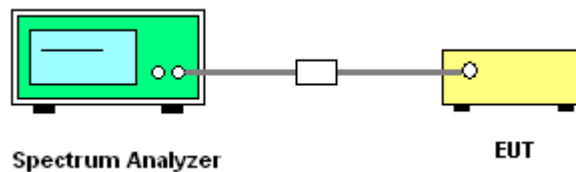
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

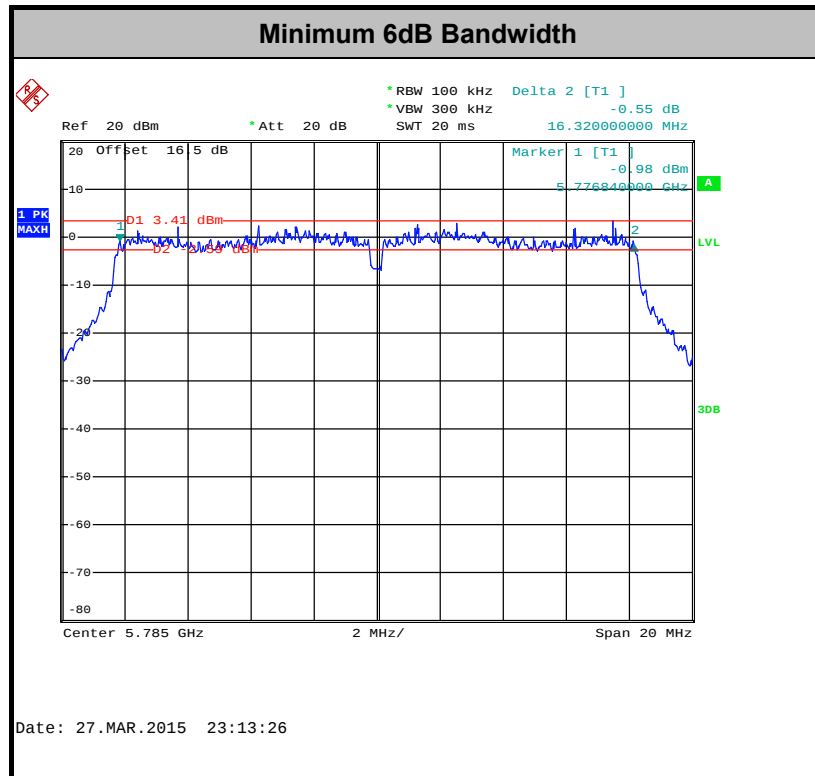
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01.
Section C) Emission bandwidth for the band 5.725-5.85GHz
2. Set RBW = 100kHz.
3. Set the VBW $\geq 3 \times$ RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 6 dB 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.



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 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.

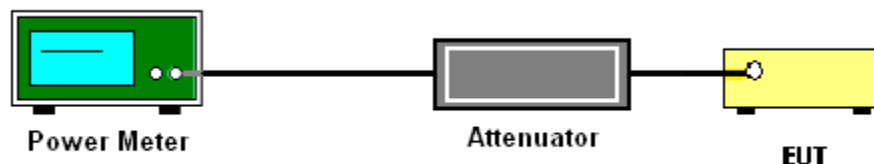
3.2.3 Test Procedures

The testing follows Method PM of FCC KDB 789033 D02 General UNII Test Procedures New Rules v01.

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 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 v01.
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).

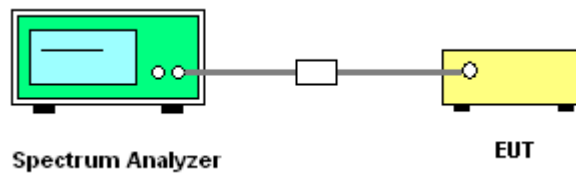
1. The testing follows Method SA-2 of FCC KDB 789033 D01 General UNII Test Procedures v01r03.
 - Measure the duty cycle.
 - Set span to encompass the entire emission bandwidth (EBW) of the signal.
 - Set RBW = 300 kHz.
 - Set VBW $\geq$ 1 MHz.
 - Number of points in sweep $\geq$ 2 Span / RBW.
 - Sweep time = auto.
 - Detector = RMS
 - Trace average at least 100 traces in power averaging mode.
 - Add $10 \log(500\text{kHz}/\text{RBW})$ 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.

2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Each plot has already offset with cable loss, and attenuator loss. Measure the PPSD and record it.
4. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

Method (1): 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.

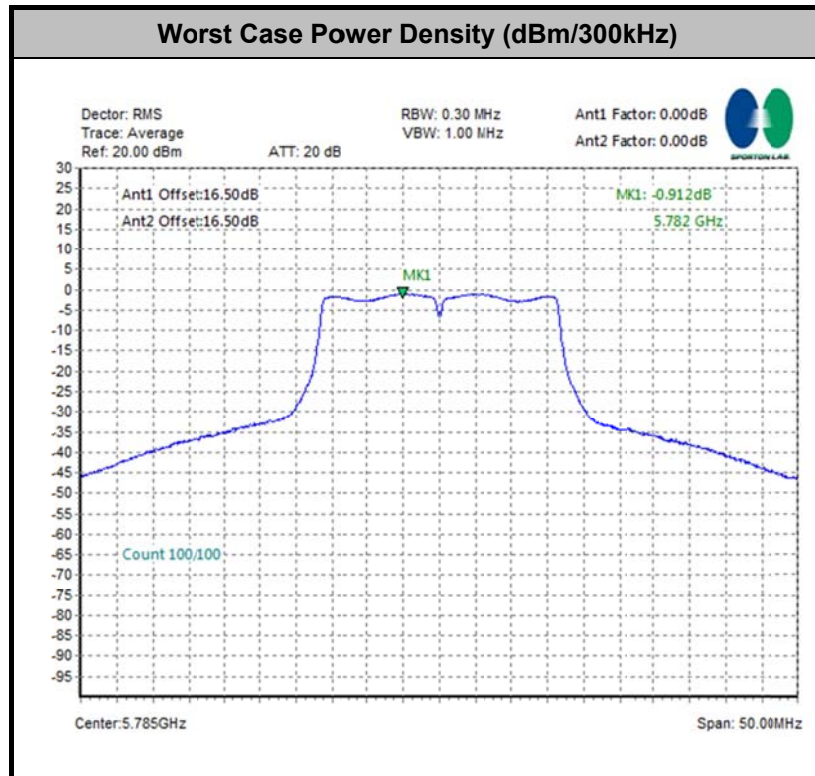
3.3.4 Test Setup





3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.



3.4 Unwanted Emissions Measurement

This section as specified in FCC Part 15.407(b) is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement. The unwanted emissions shall comply with 15.407(b)(1) to (6), and restricted bands per FCC Part 15.205.

3.4.1 Limit of Unwanted Emissions

- (1) For transmitters operating in the 5725-5850 MHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of -17 dBm/MHz (78.3dBμV/m); for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27 dBm/MHz (68.3dBμV/m).
- (2) Unwanted spurious emissions fallen in restricted bands per FCC Part 15.205 shall comply with the general field strength limits set forth in § 15.209 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

Note: The following formula is used to convert the EIRP to field strength.

$$E = \frac{1000000\sqrt{30P}}{3} \text{ } \mu\text{V/m, where P is the eirp (Watts)}$$

EIRP (dBm)	Field Strength at 3m (dBμV/m)
-17	78.3
-27	68.3

- (3) KDB789033 v01r03 H)2)c(i) As specified in 15.407(b), emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz (or -17 dBm/MHz as specified in 15.407(b)(4)). However, an out-of-band emission that complies with both the average and peak limits of 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz 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 v01.

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 $\geq$ 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 $\geq$ 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.

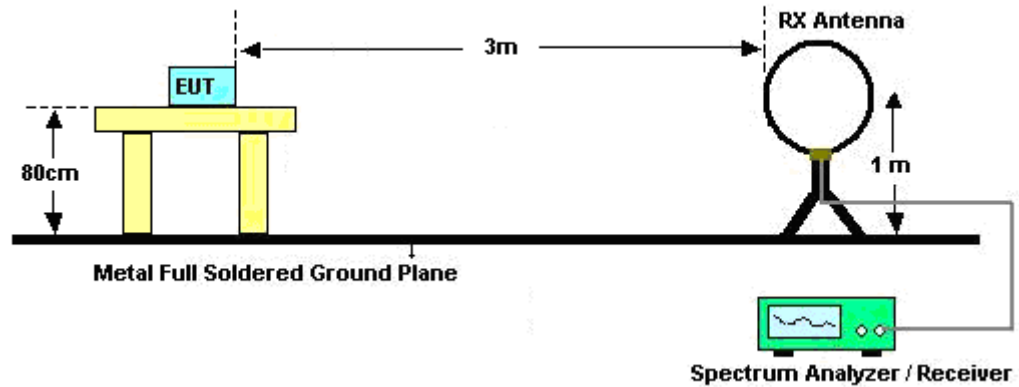
Antenna	Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
0+1	802.11a	100	-	-	10Hz
0+1	802.11n HT20	100	-	-	10Hz
0+1	802.11n HT40	100	-	-	10Hz
0+1	802.11ac VHT20	100	-	-	10Hz
0+1	802.11ac VHT40	100	-	-	10Hz
0+1	802.11ac VHT80	100	-	-	10Hz



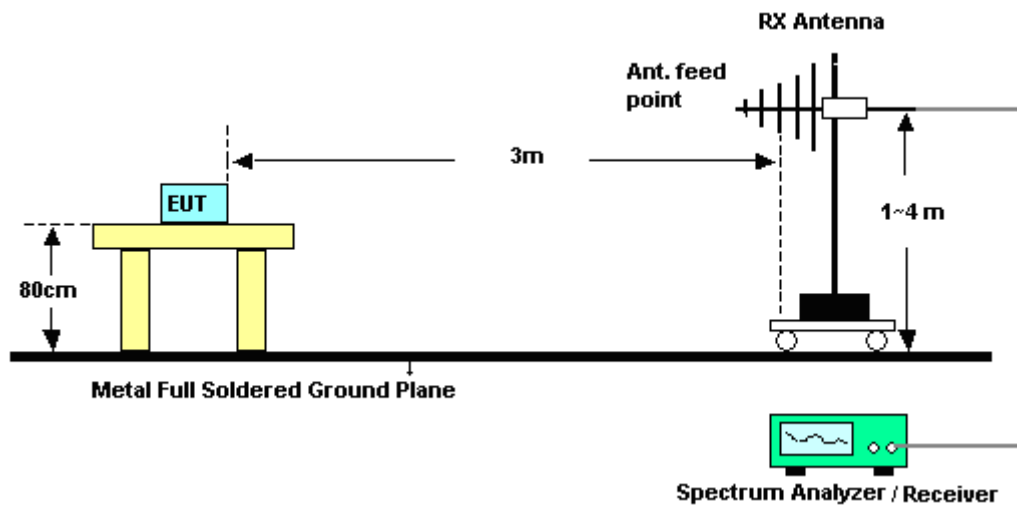
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband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

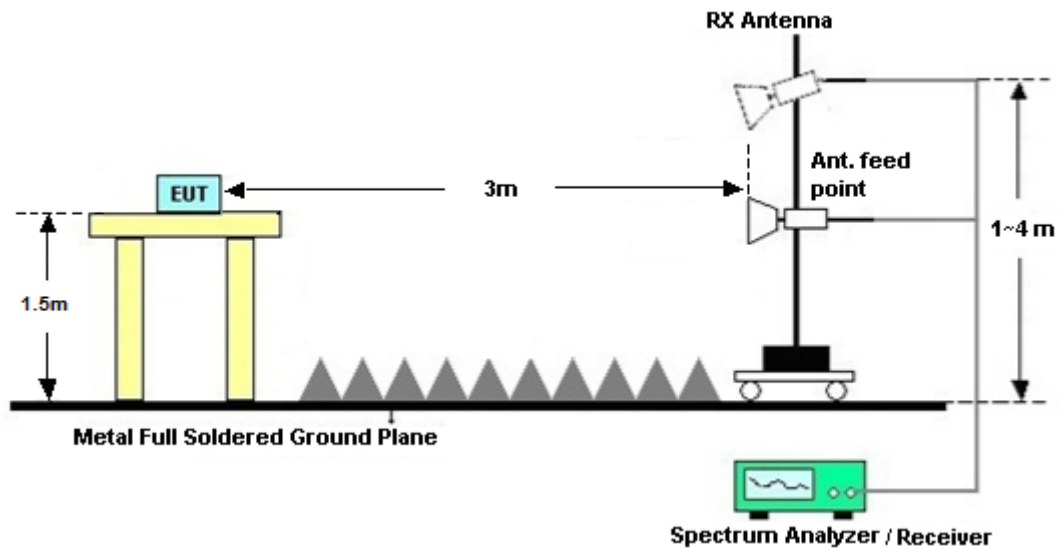
For radiated emissions below 30MHz



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 per 15.31(o) was not reported.

3.4.6 Test Result of Radiated Band Edges

Please refer to Appendix B.

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

Please refer to Appendix B.

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 (dB μ V)	
	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.

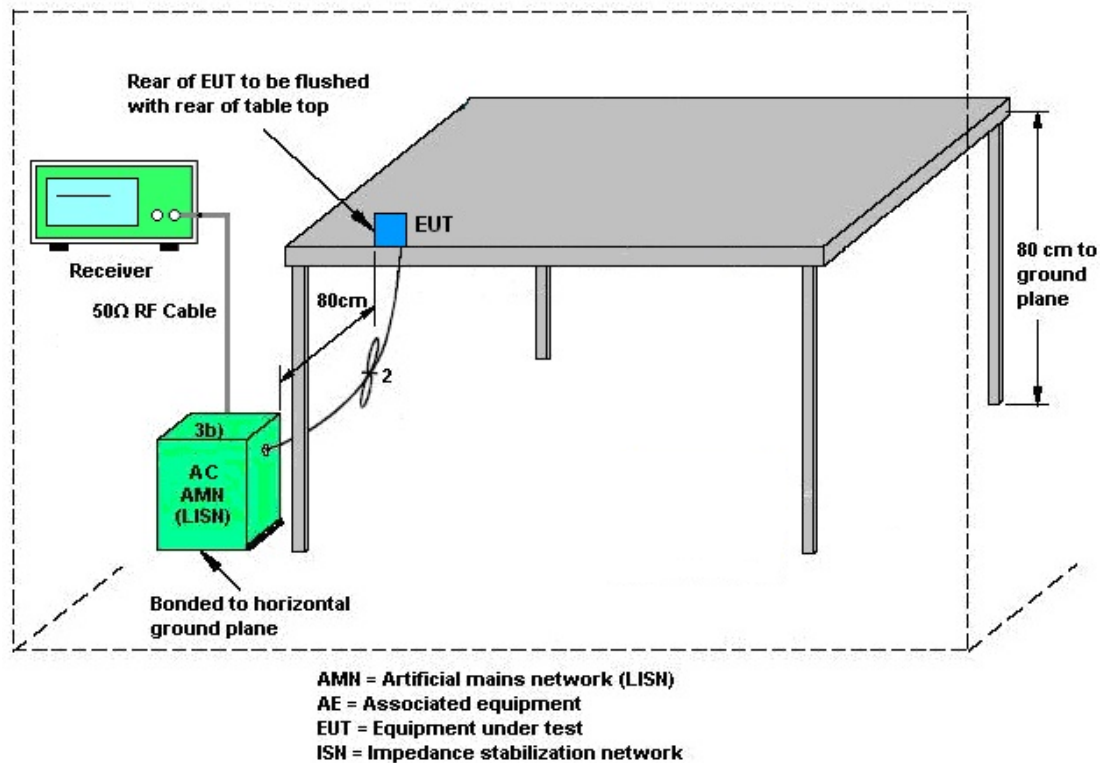
3.5.2 Measuring Instruments

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.

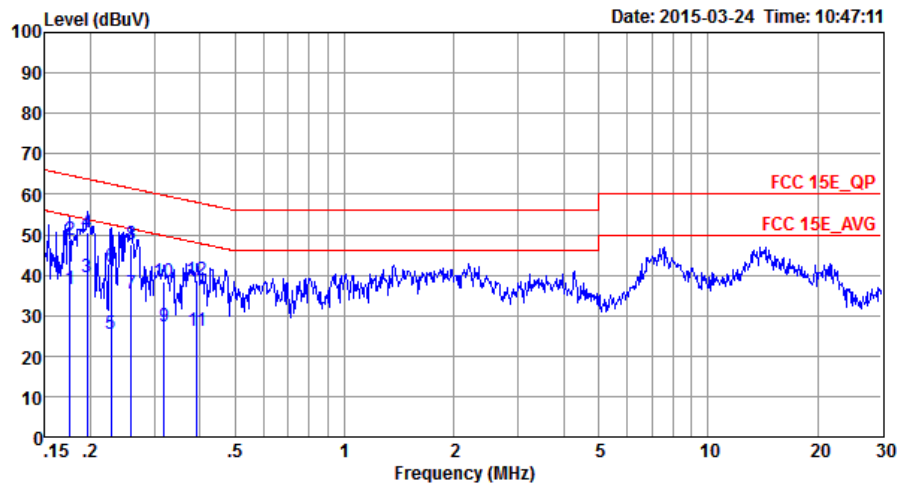
3.5.4 Test Setup





3.5.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	21~22℃
Test Engineer :	Jack Tian	Relative Humidity :	41~42%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	Bluetooth Link + WLAN (5G) Link + Earphone + Battery + Adapter 2		

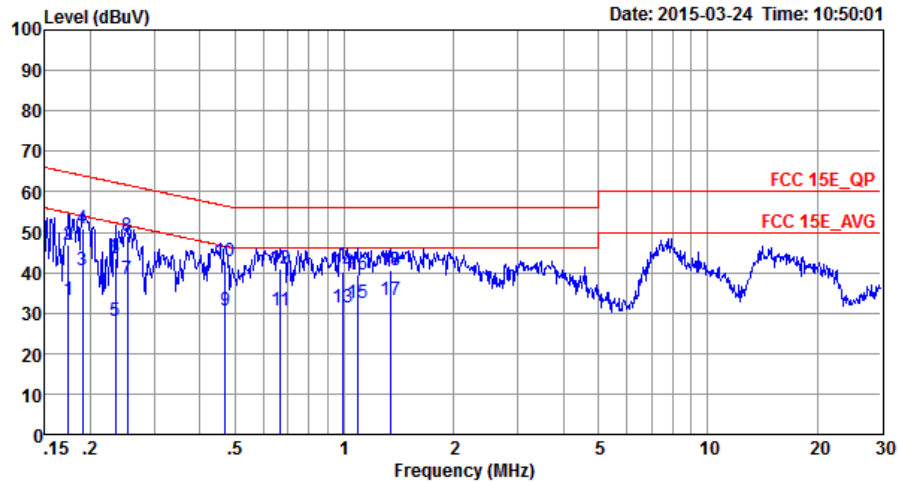


Site : C001-SZ
Condition: FCC 15E_QP LISN_L_20140304 LINE

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.18	36.54	-18.14	54.68	26.00	0.22	10.32	Average
2	0.18	48.74	-15.94	64.68	38.20	0.22	10.32	QP
3	0.20	39.42	-14.38	53.80	28.90	0.22	10.30	Average
4 *	0.20	50.62	-13.18	63.80	40.10	0.22	10.30	QP
5	0.23	25.49	-27.03	52.52	15.00	0.23	10.26	Average
6	0.23	42.09	-20.43	62.52	31.60	0.23	10.26	QP
7	0.26	35.58	-15.89	51.47	25.11	0.24	10.23	Average
8	0.26	47.78	-13.69	61.47	37.31	0.24	10.23	QP
9	0.32	27.46	-22.29	49.75	17.01	0.26	10.19	Average
10	0.32	38.36	-21.39	59.75	27.91	0.26	10.19	QP
11	0.39	26.35	-21.64	47.99	15.90	0.28	10.17	Average
12	0.39	38.75	-19.24	57.99	28.30	0.28	10.17	QP



Test Mode :	Mode 1	Temperature :	21~22℃
Test Engineer :	Jack Tian	Relative Humidity :	41~42%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	Bluetooth Link + WLAN (5G) Link + Earphone + Battery + Adapter 2		



Site : C001-SZ
Condition: FCC 15E_QP LISN_N_20140304 NEUTRAL

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.17	33.25	-21.52	54.77	22.60	0.32	10.33	Average
2	0.17	46.75	-18.02	64.77	36.10	0.32	10.33	QP
3	0.19	40.53	-13.49	54.02	29.90	0.32	10.31	Average
4	0.19	50.83	-13.19	64.02	40.20	0.32	10.31	QP
5	0.23	28.09	-24.21	52.30	17.49	0.34	10.26	Average
6	0.23	43.49	-18.81	62.30	32.89	0.34	10.26	QP
7	0.25	38.38	-13.26	51.64	27.80	0.34	10.24	Average
8 *	0.25	49.18	-12.46	61.64	38.60	0.34	10.24	QP
9	0.47	30.66	-15.83	46.49	20.10	0.40	10.16	Average
10	0.47	42.76	-13.73	56.49	32.20	0.40	10.16	QP
11	0.67	30.62	-15.38	46.00	20.20	0.27	10.15	Average
12	0.67	41.02	-14.98	56.00	30.60	0.27	10.15	QP
13	0.99	31.48	-14.52	46.00	21.00	0.33	10.15	Average
14	0.99	40.18	-15.82	56.00	29.70	0.33	10.15	QP
15	1.09	32.49	-13.51	46.00	22.01	0.33	10.15	Average
16	1.09	39.59	-16.41	56.00	29.11	0.33	10.15	QP
17	1.34	33.21	-12.79	46.00	22.69	0.35	10.17	Average
18	1.34	40.71	-15.29	56.00	30.19	0.35	10.17	QP

3.6 Frequency Stability Measurement

3.6.1 Limit of Frequency Stability

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

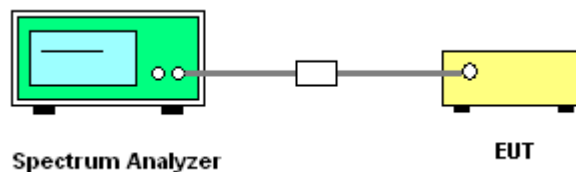
3.6.2 Measuring Instruments

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

3.6.3 Test Procedures

1. To ensure emission at the band edge is maintained within the authorized band, those values shall be measured by radiation emissions at upper and lower frequency points, and finally compensated by frequency deviation as procedures below.
2. The EUT was operated at the maximum output power, and connected to the spectrum analyzer, which is set to maximum hold function and peak detector. The peak value of the power envelope was measured and noted. The upper and lower frequency points were respectively measured relatively 10dB lower than the measured peak value.
3. The frequency deviation was calculated by adding the upper frequency point and the lower frequency point divided by two. Those detailed values of frequency deviation are provided in table below.

3.6.4 Test Setup



3.6.5 Test Result of Frequency Stability

Please refer to Appendix A.

3.7 Automatically Discontinue Transmission

3.7.1 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.

3.7.2 Measuring Instruments

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

3.7.3 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.

3.8 Antenna Requirements

3.8.1 Standard Applicable

According to FCC 47 CFR Section 15.407(a)(1)(2) ,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.

3.8.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.8.3 Antenna Gain

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

$$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

where

Each antenna is driven by no more than one spatial stream;

N_{SS} = the number of independent spatial streams of data;

N_{ANT} = the total number of antennas

$g_{j,k} = 10^{G_k / 20}$ if the k th antenna is being fed by spatial stream j , or zero if it is not;
 G_k is the gain in dBi of the k th antenna.

The EUT supports CDD mode.

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.



	Chain	Chain	DG	DG	Power	PSD
	Port 0	Port 1	for	for	Limit	Limit
	Ant 1	Ant 2	Power	PSD	Reduction	Reduction
	(dBi)	(dBi)	(dBi)	(dBi)	(dB)	(dB)
Band IV	2.73	1.92	5.34	5.34	0.00	0.00

Power Limit Reduction = DG(Power) – 6dBi, (min = 0)

PSD Limit Reduction = DG(PSD) – 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	FSP30	101400	9kHz~30GHz	Jan. 28, 2015	Mar. 27, 2015~ Mar. 31, 2015	Jan. 27, 2016	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1218010	10Hz~40GHz	Jan. 28, 2015	Mar. 27, 2015~ Mar. 31, 2015	Jan. 27, 2016	Conducted (TH01-SZ)
Power Sensor	Anritsu	MA2411B	1207253	0.3GHz~40GHz	Jan. 28, 2015	Mar. 27, 2015~ Mar. 31, 2015	Jan. 27, 2016	Conducted (TH01-SZ)
EMI TEST Receiver	R&S	ESC17	100768	9kHz~3GHz	May 04, 2014	Mar. 25, 2015	May 03, 2015	Radiation (03CH02-SZ)
Spectrum Analyzer	Agilent Technologies	N9038A	MY52260185	20Hz~26.5GHz	May 26, 2014	Mar. 25, 2015	May 25, 2015	Radiation (03CH02-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	May 09, 2014	Mar. 25, 2015	May 08, 2015	Radiation (03CH02-SZ)
Bilog Antenna	TESEQ	CBL 6112D	37877	30MHz~2GHz	Oct. 15, 2014	Mar. 25, 2015	Oct. 14, 2015	Radiation (03CH02-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1285	1GHz~18GHz	Jan. 20, 2015	Mar. 25, 2015	Jan. 19, 2016	Radiation (03CH02-SZ)
Double Ridged Horn Antenna	COM-POWER	AH-840	101071	18GHz~40GHz	Sep. 04, 2014	Mar. 25, 2015	Sep. 03, 2015	Radiation (03CH02-SZ)
Amplifier	com-power	PA-103A	161069	1~1000MHz	May 04, 2014	Mar. 25, 2015	May 03, 2015	Radiation (03CH02-SZ)
Amplifier	Agilent	8449B	3008A01023	1GHz~26.5GHz	Oct. 29, 2014	Mar. 25, 2015	Oct. 28, 2015	Radiation (03CH02-SZ)
AC Source(AVR)	CHROMA	61601ACSOU RCE	6160100024 70	100Vac~240Vac	NCR	Mar. 25, 2015	NCR	Radiation (03CH02-SZ)
Turn Table	Qiangdian	3000	N/A	0~360 degree	NCR	Mar. 25, 2015	NCR	Radiation (03CH02-SZ)
Antenna Mast	Qiangdian	3000	N/A	1 m~4 m	NCR	Mar. 25, 2015	NCR	Radiation (03CH02-SZ)
EMI TEST Receiver	R&S	ESC17	100768	9kHz~3GHz	May 04, 2014	Mar. 24, 2015	May 03, 2015	Conduction (CO01-SZ)
AC LISN	EMCO	3816/2SH	00103912	9kHz~30MHz	Feb. 02, 2015	Mar. 24, 2015	Feb. 01, 2016	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	EMCO	3816/2SH	00103892	9kHz~30MHz	Feb. 02, 2015	Mar. 24, 2015	Feb. 01, 2016	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	6160200008 91	100Vac~250Vac	Sep. 29, 2014	Mar. 24, 2015	Sep. 28, 2015	Conduction (CO01-SZ)



5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.3
---	-----

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	4.5
---	-----



Appendix A. Conducted Test Results

Test Engineer:	Tiny You	Temperature:	21~25	℃
Test Date:	2015/3/27~2015/3/31	Relative Humidity:	51~54	%

TEST RESULTS DATA
6dB and 99% OBW

FCC Band IV									
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	6 dB Bandwidth (MHz)		FCC 6 dB Bandwidth Min. Limit (MHz)		Pass/Fail
					Ant 0	Ant 1	Ant 0	Ant 1	
11a	6Mbps	1	149	5745	16.36	16.36	0.5	0.5	Pass
11a	6Mbps	1	157	5785	16.32	16.36	0.5	0.5	Pass
11a	6Mbps	1	165	5825	16.36	16.52	0.5	0.5	Pass
HT20	MCS0	1	149	5745	17.56	17.56	0.5	0.5	Pass
HT20	MCS0	1	157	5785	17.56	17.56	0.5	0.5	Pass
HT20	MCS0	1	165	5825	17.56	17.60	0.5	0.5	Pass
HT40	MCS0	1	151	5755	35.68	35.84	0.5	0.5	Pass
HT40	MCS0	1	159	5795	35.76	36.08	0.5	0.5	Pass
VHT20	MCS0	1	149	5745	17.52	17.52	0.5	0.5	Pass
VHT20	MCS0	1	157	5785	17.60	17.56	0.5	0.5	Pass
VHT20	MCS0	1	165	5825	17.56	17.56	0.5	0.5	Pass
VHT40	MCS0	1	151	5755	35.84	36.16	0.5	0.5	Pass
VHT40	MCS0	1	159	5795	35.76	35.68	0.5	0.5	Pass
VHT80	MCS0	1	155	5775	76.48	76.48	0.5	0.5	Pass
11a	6Mbps	2	149	5745	16.32	16.32	0.5		Pass
11a	6Mbps	2	157	5785	16.32	16.36	0.5		Pass
11a	6Mbps	2	165	5825	16.32	16.40	0.5		Pass
HT20	MCS0	2	149	5745	17.60	17.60	0.5		Pass
HT20	MCS0	2	157	5785	17.56	17.60	0.5		Pass
HT20	MCS0	2	165	5825	17.56	17.60	0.5		Pass
HT40	MCS0	2	151	5755	36.00	36.00	0.5		Pass
HT40	MCS0	2	159	5795	35.76	35.76	0.5		Pass
VHT20	MCS0	2	149	5745	17.52	17.56	0.5		Pass
VHT20	MCS0	2	157	5785	17.56	17.52	0.5		Pass
VHT20	MCS0	2	165	5825	17.56	17.60	0.5		Pass
VHT40	MCS0	2	151	5755	35.80	35.76	0.5		Pass
VHT40	MCS0	2	159	5795	35.60	35.84	0.5		Pass
VHT80	MCS0	2	155	5775	76.48	76.32	0.5		Pass

TEST RESULTS DATA
Average Power Table

FCC Band IV															
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)			Pass/Fail
					Ant 0	Ant 1	Ant 0	Ant 1	SUM	Ant 0	Ant 1	Ant 0	Ant 1		
11a	6Mbps	1	149	5745	0.00	0.00	13.75	13.54		30.00	30.00	2.73	1.92		Pass
11a	6Mbps	1	157	5785	0.00	0.00	14.36	13.91		30.00	30.00	2.73	1.92		Pass
11a	6Mbps	1	165	5825	0.00	0.00	13.53	13.86		30.00	30.00	2.73	1.92		Pass
HT20	MCS0	1	149	5745	0.00	0.00	12.74	12.55		30.00	30.00	2.73	1.92		Pass
HT20	MCS0	1	157	5785	0.00	0.00	13.35	13.16		30.00	30.00	2.73	1.92		Pass
HT20	MCS0	1	165	5825	0.00	0.00	12.81	13.13		30.00	30.00	2.73	1.92		Pass
HT40	MCS0	1	151	5755	0.00	0.00	9.92	10.11		30.00	30.00	2.73	1.92		Pass
HT40	MCS0	1	159	5795	0.00	0.00	10.63	10.66		30.00	30.00	2.73	1.92		Pass
VHT20	MCS0	1	149	5745	0.00	0.00	6.91	6.48		30.00	30.00	2.73	1.92		Pass
VHT20	MCS0	1	157	5785	0.00	0.00	7.21	6.74		30.00	30.00	2.73	1.92		Pass
VHT20	MCS0	1	165	5825	0.00	0.00	6.78	6.62		30.00	30.00	2.73	1.92		Pass
VHT40	MCS0	1	151	5755	0.00	0.00	5.96	5.81		30.00	30.00	2.73	1.92		Pass
VHT40	MCS0	1	159	5795	0.00	0.00	6.53	6.04		30.00	30.00	2.73	1.92		Pass
VHT80	MCS0	1	155	5775	0.00	0.00	7.04	7.22		30.00	30.00	2.73	1.92		Pass
11a	6Mbps	2	149	5745	0.00	0.00	11.63	11.26	14.46	30.00		5.34			Pass
11a	6Mbps	2	157	5785	0.00	0.00	12.10	11.67	14.90	30.00		5.34			Pass
11a	6Mbps	2	165	5825	0.00	0.00	11.62	11.63	14.64	30.00		5.34			Pass
HT20	MCS0	2	149	5745	0.00	0.00	9.61	8.81	12.24	30.00		5.34			Pass
HT20	MCS0	2	157	5785	0.00	0.00	10.72	9.95	13.36	30.00		5.34			Pass
HT20	MCS0	2	165	5825	0.00	0.00	9.56	8.78	12.20	30.00		5.34			Pass
HT40	MCS0	2	151	5755	0.00	0.00	8.07	8.21	11.15	30.00		5.34			Pass
HT40	MCS0	2	159	5795	0.00	0.00	8.65	8.45	11.56	30.00		5.34			Pass
VHT20	MCS0	2	149	5745	0.00	0.00	3.97	3.71	6.85	30.00		5.34			Pass
VHT20	MCS0	2	157	5785	0.00	0.00	4.32	4.16	7.25	30.00		5.34			Pass
VHT20	MCS0	2	165	5825	0.00	0.00	3.96	4.11	7.05	30.00		5.34			Pass
VHT40	MCS0	2	151	5755	0.00	0.00	4.08	4.06	7.08	30.00		5.34			Pass
VHT40	MCS0	2	159	5795	0.00	0.00	4.64	4.42	7.54	30.00		5.34			Pass
VHT80	MCS0	2	155	5775	0.00	0.00	5.31	5.76	8.55	30.00		5.34			Pass

TEST RESULTS DATA
Power Spectral Density

FCC Band IV																
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	Duty Factor (dB)		10log (500kHz /RBW) Factor (dB)		Average Power Density (dBm/500kHz)			Average PSD Limit (dBm/500kHz)		DG (dBi)		Pass /Fail
					Ant 0	Ant 1	Ant 0	Ant 1	Ant 0	Ant 1	SUM	Ant 0	Ant 1	Ant 0	Ant 1	
11a	6Mbps	1	149	5745	0.00	0.00	2.22	2.22	0.50	0.16		30.00	30.00	2.73	1.92	Pass
11a	6Mbps	1	157	5785	0.00	0.00	2.22	2.22	1.37	0.73		30.00	30.00	2.73	1.92	Pass
11a	6Mbps	1	165	5825	0.00	0.00	2.22	2.22	0.60	0.81		30.00	30.00	2.73	1.92	Pass
HT20	MCS0	1	149	5745	0.00	0.00	2.22	2.22	-0.47	-0.87		30.00	30.00	2.73	1.92	Pass
HT20	MCS0	1	157	5785	0.00	0.00	2.22	2.22	0.12	-0.39		30.00	30.00	2.73	1.92	Pass
HT20	MCS0	1	165	5825	0.00	0.00	2.22	2.22	-0.19	-0.55		30.00	30.00	2.73	1.92	Pass
HT40	MCS0	1	151	5755	0.00	0.00	2.22	2.22	-6.31	-6.26		30.00	30.00	2.73	1.92	Pass
HT40	MCS0	1	159	5795	0.00	0.00	2.22	2.22	-5.92	-5.86		30.00	30.00	2.73	1.92	Pass
VHT20	MCS0	1	149	5745	0.00	0.00	2.22	2.22	-6.74	-7.42		30.00	30.00	2.73	1.92	Pass
VHT20	MCS0	1	157	5785	0.00	0.00	2.22	2.22	-5.98	-6.66		30.00	30.00	2.73	1.92	Pass
VHT20	MCS0	1	165	5825	0.00	0.00	2.22	2.22	-6.43	-6.79		30.00	30.00	2.73	1.92	Pass
VHT40	MCS0	1	151	5755	0.00	0.00	2.22	2.22	-10.25	-10.84		30.00	30.00	2.73	1.92	Pass
VHT40	MCS0	1	159	5795	0.00	0.00	2.22	2.22	-9.62	-10.55		30.00	30.00	2.73	1.92	Pass
VHT80	MCS0	1	155	5775	0.00	0.00	2.22	2.22	-13.17	-12.98		30.00	30.00	2.73	1.92	Pass
11a	6Mbps	2	149	5745	0.00	0.00	2.22				0.90	30.00		5.34		Pass
11a	6Mbps	2	157	5785	0.00	0.00	2.22				1.31	30.00		5.34		Pass
11a	6Mbps	2	165	5825	0.00	0.00	2.22				1.07	30.00		5.34		Pass
HT20	MCS0	2	149	5745	0.00	0.00	2.22				-1.43	30.00		5.34		Pass
HT20	MCS0	2	157	5785	0.00	0.00	2.22				-0.71	30.00		5.34		Pass
HT20	MCS0	2	165	5825	0.00	0.00	2.22				-1.32	30.00		5.34		Pass
HT40	MCS0	2	151	5755	0.00	0.00	2.22				-5.96	30.00		5.34		Pass
HT40	MCS0	2	159	5795	0.00	0.00	2.22				-5.46	30.00		5.34		Pass
VHT20	MCS0	2	149	5745	0.00	0.00	2.22				-7.27	30.00		5.34		Pass
VHT20	MCS0	2	157	5785	0.00	0.00	2.22				-6.54	30.00		5.34		Pass
VHT20	MCS0	2	165	5825	0.00	0.00	2.22				-7.05	30.00		5.34		Pass
VHT40	MCS0	2	151	5755	0.00	0.00	2.22				-10.09	30.00		5.34		Pass
VHT40	MCS0	2	159	5795	0.00	0.00	2.22				-9.46	30.00		5.34		Pass
VHT80	MCS0	2	155	5775	0.00	0.00	2.22				-12.17	30.00		5.34		Pass

TEST RESULTS DATA
Frequency Stability

Band IV										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)	Temperature (°C)	Voltage (V)	Note
11a	6Mbps	1	149	5745	5745.000	0.000	0.00	20	6.3	
11a	6Mbps	1	149	5745	5745.000	0.000	0.00	20	8.4	
11a	6Mbps	1	149	5745	5745.000	0.000	0.00	20	7.4	
11a	6Mbps	1	149	5745	5745.000	0.000	0.00	-30	7.4	
11a	6Mbps	1	149	5745	5745.000	0.000	0.00	50	7.4	



Appendix B. Radiated Spurious Emission

Band 4 - 5725~5850MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 149 5745MHz		5711.96	57.71	-10.59	68.3	51.99	32.33	8.99	35.6	160	200	P	H
		5722.6	64.82	-13.48	78.3	59.07	32.36	8.99	35.6	160	200	P	H
	*	5745	106.18	-	-	100.37	32.39	9.01	35.59	160	200	P	H
	*	5745	96.03	-	-	90.22	32.39	9.01	35.59	160	200	A	H
		5713.72	52.16	-16.14	68.3	46.44	32.33	8.99	35.6	150	230	P	V
		5723.16	60.83	-17.47	78.3	55.08	32.36	8.99	35.6	150	230	P	V
	*	5745	99.38	-	-	93.57	32.39	9.01	35.59	150	230	P	V
	*	5745	89.2	-	-	83.39	32.39	9.01	35.59	150	230	A	V
802.11a CH 157 5785MHz		5713.24	50.43	-17.87	68.3	44.71	32.33	8.99	35.6	160	200	P	H
		5723.64	49.86	-28.44	78.3	44.11	32.33	8.99	35.6	160	200	P	H
	*	5785	105.96	-	-	100.07	32.44	9.03	35.58	160	200	P	H
	*	5785	95.88	-	-	89.99	32.44	9.03	35.58	160	200	A	H
		5859.2	51.23	-27.07	78.3	45.1	32.58	9.1	35.55	160	200	P	H
		5867.76	50.5	-17.8	68.3	44.37	32.58	9.08	35.55	160	200	P	H
		5713.08	49.99	-18.31	68.3	44.27	32.33	8.99	35.6	150	230	P	V
		5718.12	49.31	-28.99	78.3	43.56	32.33	8.99	35.6	150	230	P	V
	*	5785	100.1	-	-	94.21	32.44	9.03	35.58	150	230	P	V
	*	5785	89.32	-	-	83.43	32.44	9.03	35.58	150	230	A	V
		5855.92	49.97	-28.33	78.3	43.87	32.58	9.08	35.56	150	230	P	V
		5870.08	49.96	-18.34	68.3	43.83	32.58	9.08	35.55	150	230	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)
802.11a CH 165 5825MHz	*	5825	106.72	-	-	100.72	32.52	9.05	35.57	160	200	P	H
	*	5825	96.53	-	-	90.53	32.52	9.05	35.57	160	200	A	H
		5850.72	64.32	-13.98	78.3	58.25	32.55	9.08	35.56	160	200	P	H
		5861.36	56.91	-11.39	68.3	50.78	32.55	9.08	35.56	160	200	P	H
	*	5825	98.3	-	-	92.3	32.52	9.05	35.57	150	230	P	V
	*	5825	89.21	-	-	83.21	32.52	9.05	35.57	150	230	A	V
		5851.04	55.01	-23.29	78.3	48.94	32.55	9.08	35.56	150	230	P	V
		5861.12	50.89	-17.41	68.3	44.76	32.55	9.08	35.56	150	230	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 4 5725~5850MHz

WIFI 802.11a (Harmonic @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	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	47.98	-26.02	74	30.76	39.06	13.38	35.22	145	265	P	H
		17235	49.42	-24.58	74	26.38	41.39	16.36	34.71	174	321	P	H
		11490	47.82	-26.18	74	30.6	39.06	13.38	35.22	145	265	P	V
		17235	49.71	-24.29	74	26.67	41.39	16.36	34.71	174	321	P	V
802.11a CH 157 5785MHz		11570	48.45	-25.55	74	31.23	38.98	13.43	35.19	105	198	P	H
		17355	50.96	-23.04	74	26.9	42.18	16.59	34.71	189	185	P	H
		11570	48.74	-25.26	74	31.52	38.98	13.43	35.19	105	198	P	V
		17355	49.25	-24.75	74	25.19	42.18	16.59	34.71	189	185	P	V
802.11a CH 165 5825MHz		11650	47.95	-26.05	74	30.72	38.92	13.48	35.17	146	347	P	H
		17475	50.71	-23.29	74	25.63	42.98	16.81	34.71	123	53	P	H
		11650	48.56	-25.44	74	31.33	38.92	13.48	35.17	146	347	P	V
		17475	50.22	-23.78	74	25.14	42.98	16.81	34.71	123	53	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)
802.11n HT20 CH 149 5745MHz		5714.2	54.23	-14.07	68.3	48.51	32.36	8.99	35.6	150	178	P	H
		5724.36	66.42	-11.88	78.3	60.67	32.36	8.99	35.6	150	178	P	H
	*	5745	103.05	-	-	97.24	32.39	9.01	35.59	150	178	P	H
	*	5745	93.04	-	-	87.23	32.39	9.01	35.59	150	178	A	H
		5714.36	51.55	-16.75	68.3	45.83	32.33	8.99	35.6	150	205	P	V
		5723.72	61.08	-17.22	78.3	55.33	32.36	8.99	35.6	150	205	P	V
	*	5745	97.34	-	-	91.53	32.39	9.01	35.59	150	205	P	V
	*	5745	86.59	-	-	80.78	32.39	9.01	35.59	150	205	A	V
802.11n HT20 CH 157 5785MHz		5701.24	49.87	-18.43	68.3	44.18	32.33	8.97	35.61	150	178	P	H
		5719.8	49.18	-29.12	78.3	43.43	32.36	8.99	35.6	150	178	P	H
	*	5785	104.35	-	-	98.46	32.44	9.03	35.58	150	178	P	H
	*	5785	93.69	-	-	87.8	32.44	9.03	35.58	150	178	A	H
		5857.36	50.44	-27.86	78.3	44.34	32.58	9.08	35.56	150	178	P	H
		5878.96	50.16	-18.14	68.3	44	32.61	9.1	35.55	150	178	P	H
		5692.6	49.48	-18.82	68.3	43.82	32.3	8.97	35.61	150	205	P	V
		5720.12	48.56	-29.74	78.3	42.81	32.36	8.99	35.6	150	205	P	V
	*	5785	98.9	-	-	93.01	32.44	9.03	35.58	150	205	P	V
	*	5785	88.44	-	-	82.55	32.44	9.03	35.58	150	205	A	V
		5851.6	49.05	-29.25	78.3	42.98	32.55	9.08	35.56	150	205	P	V
		5884.72	50.16	-18.14	68.3	43.99	32.61	9.1	35.54	150	205	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 HT20 CH 165 5825MHz	*	5825	104.16	-	-	98.16	32.52	9.05	35.57	150	178	P	H
	*	5825	94.27	-	-	88.27	32.52	9.05	35.57	150	178	A	H
		5850	59.06	-9.24	68.3	52.99	32.55	9.08	35.56	150	178	P	H
		5860.24	51.87	-16.43	68.3	45.74	32.58	9.1	35.55	150	178	P	H
	*	5825	97.26	-	-	91.26	32.52	9.05	35.57	150	205	P	V
	*	5825	87.6	-	-	81.6	32.52	9.05	35.57	150	205	A	V
		5854.16	50.85	-27.45	78.3	44.75	32.58	9.08	35.56	150	205	P	V
		5862.16	50.47	-17.83	68.3	44.34	32.58	9.1	35.55	150	205	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 HT20 CH 149 5745MHz		11490	46.19	-27.81	74	28.97	39.06	13.38	35.22	145	265	P	H
		17235	47.36	-26.64	74	24.32	41.39	16.36	34.71	174	321	P	H
		11490	46.69	-27.31	74	29.47	39.06	13.38	35.22	145	265	P	V
		17235	46.33	-27.67	74	23.29	41.39	16.36	34.71	174	321	P	V
802.11n HT20 CH 157 5785MHz		11570	45.98	-28.02	74	28.76	38.98	13.43	35.19	105	198	P	H
		17355	47.32	-26.68	74	23.26	42.18	16.59	34.71	189	185	P	H
		11570	45.53	-28.47	74	28.31	38.98	13.43	35.19	105	198	P	V
		17355	46.34	-27.66	74	22.28	42.18	16.59	34.71	189	185	P	V
802.11n HT20 CH 165 5825MHz		11650	46.8	-27.2	74	29.57	38.92	13.48	35.17	146	347	P	H
		17475	47.46	-26.54	74	22.38	42.98	16.81	34.71	123	53	P	H
		11650	46.04	-27.96	74	28.81	38.92	13.48	35.17	146	347	P	V
		17475	45.49	-28.51	74	20.41	42.98	16.81	34.71	123	53	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)
802.11n HT40 CH 151 5755MHz		5714.68	59.32	-8.98	68.3	53.6	32.33	8.99	35.6	150	348	P	H
		5724.76	62.29	-16.01	78.3	56.54	32.36	8.99	35.6	150	348	P	H
	*	5755	96.57	-	-	90.74	32.41	9.01	35.59	150	348	P	H
	*	5755	86.72	-	-	80.89	32.41	9.01	35.59	150	348	A	H
		5851.36	50.01	-28.29	78.3	43.94	32.55	9.1	35.55	150	348	P	H
		5860.72	50.51	-17.79	68.3	44.38	32.58	9.1	35.55	150	348	P	H
		5712.92	54.34	-13.96	68.3	48.62	32.33	8.99	35.6	150	0	P	V
		5721.56	58.22	-20.08	78.3	52.47	32.36	8.99	35.6	150	0	P	V
	*	5755	92.21	-	-	86.38	32.41	9.01	35.59	150	0	P	V
	*	5755	83.35	-	-	77.52	32.41	9.01	35.59	150	0	A	V
		5857.44	49.44	-28.86	78.3	43.34	32.58	9.08	35.55	150	0	P	V
		5860.96	50.25	-18.05	68.3	44.12	32.58	9.1	35.55	150	0	P	V
802.11n HT40 CH 159 5795MHz		5702.52	49.64	-18.66	68.3	43.95	32.33	8.97	35.61	150	340	P	H
		5723.32	50.08	-28.22	78.3	44.33	32.36	8.99	35.6	150	340	P	H
	*	5795	94.04	-	-	88.12	32.47	9.03	35.58	150	340	P	H
	*	5795	84.16	-	-	78.24	32.47	9.03	35.58	150	340	A	H
		5851.6	51.36	-26.94	78.3	45.29	32.55	9.08	35.56	150	340	P	H
		5862.32	50.41	-17.89	68.3	44.28	32.58	9.1	35.55	150	340	P	H
		5703.8	49.38	-18.92	68.3	43.69	32.33	8.97	35.61	150	0	P	V
		5724.44	49.32	-28.98	78.3	43.57	32.36	8.99	35.6	150	0	P	V
	*	5795	92.47	-	-	86.55	32.47	9.03	35.58	150	0	P	V
	*	5795	82.46	-	-	76.54	32.47	9.03	35.58	150	0	A	V
		5850.8	50.21	-28.09	78.3	44.14	32.55	9.08	35.56	150	0	P	V
		5882.08	50.36	-17.94	68.3	44.2	32.61	9.1	35.55	150	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 4 5725~5850MHz
WIFI 802.11n HT40 (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 HT40 CH 151 5755MHz		11510	50.27	-23.73	74	33.04	39.04	13.4	35.21	145	265	P	H
		17265	44.25	-29.75	74	20.92	41.62	16.42	34.71	174	321	P	H
		11510	48.28	-25.72	74	31.05	39.04	13.4	35.21	145	265	P	V
		17265	43.48	-30.52	74	20.15	41.62	16.42	34.71	174	321	P	V
802.11n HT40 CH 159 5795MHz		11590	48.16	-25.84	74	30.93	38.97	13.45	35.19	105	198	P	H
		17385	45.11	-28.89	74	20.77	42.41	16.64	34.71	189	185	P	H
		11590	48.82	-25.18	74	31.59	38.97	13.45	35.19	105	198	P	V
		17385	45.55	-28.45	74	21.21	42.41	16.64	34.71	189	185	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 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 149 5745MHz		5714.84	51.3	-17	68.3	45.58	32.33	8.99	35.6	265	178	P	H
		5724.44	54.67	-23.63	78.3	48.92	32.36	8.99	35.6	265	178	P	H
	*	5745	99.36	-	-	93.55	32.39	9.01	35.59	265	178	P	H
	*	5745	89.05	-	-	83.24	32.39	9.01	35.59	265	178	A	H
		5706.04	49.82	-18.48	68.3	44.12	32.33	8.97	35.6	224	266	P	V
		5724.6	50.19	-28.11	78.3	44.44	32.36	8.99	35.6	224	266	P	V
	*	5745	95.36	-	-	89.55	32.39	9.01	35.59	224	266	P	V
	*	5745	84.65	-	-	78.84	32.39	9.01	35.59	224	266	A	V
802.11ac VHT20 CH 157 5785MHz		5709.56	49.72	-18.58	68.3	44	32.33	8.99	35.6	265	184	P	H
		5718.44	50.29	-28.01	78.3	44.54	32.36	8.99	35.6	265	184	P	H
	*	5785	100.75	-	-	94.86	32.44	9.03	35.58	265	184	P	H
	*	5785	90.06	-	-	84.17	32.44	9.03	35.58	265	184	A	H
		5850.08	50.08	-28.22	78.3	44.01	32.55	9.08	35.56	265	184	P	H
		5879.36	50.34	-17.96	68.3	44.18	32.61	9.1	35.55	265	184	P	H
		5686.12	49.16	-19.14	68.3	43.5	32.3	8.97	35.61	230	266	P	V
		5723.8	49.4	-28.9	78.3	43.65	32.36	8.99	35.6	230	266	P	V
	*	5785	94.78	-	-	88.89	32.44	9.03	35.58	230	266	P	V
	*	5785	84.18	-	-	78.29	32.44	9.03	35.58	230	266	A	V
		5855.44	49.63	-28.67	78.3	43.53	32.58	9.08	35.56	230	266	P	V
		5881.36	50.48	-17.82	68.3	44.32	32.61	9.1	35.55	230	266	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)
802.11ac VHT20 CH 165 5825MHz	*	5825	100.66	-	-	94.66	32.52	9.05	35.57	265	186	P	H
	*	5825	89.76	-	-	83.76	32.52	9.05	35.57	265	186	A	H
		5852.56	50.74	-27.56	78.3	44.67	32.55	9.08	35.56	265	186	P	H
		5874	50.08	-18.22	68.3	43.92	32.61	9.1	35.55	265	186	P	H
	*	5825	93.79	-	-	87.79	32.52	9.05	35.57	239	266	P	V
	*	5825	83.27	-	-	77.27	32.52	9.05	35.57	239	266	A	V
		5857.04	50.06	-28.24	78.3	43.96	32.58	9.08	35.56	239	266	P	V
		5889.36	50.35	-17.95	68.3	44.14	32.63	9.12	35.54	239	266	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 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		11490	47.58	-26.42	74	30.36	39.06	13.38	35.22	145	265	P	H
VHT20		17235	45.56	-28.44	74	22.52	41.39	16.36	34.71	174	321	P	H
CH 149		11490	47.57	-26.43	74	30.35	39.06	13.38	35.22	145	265	P	V
5745MHz		17235	46.78	-27.22	74	23.74	41.39	16.36	34.71	174	321	P	V
802.11ac		11570	47.32	-26.68	74	30.1	38.98	13.43	35.19	105	198	P	H
VHT20		17355	46.72	-27.28	74	22.66	42.18	16.59	34.71	189	185	P	H
CH 157		11570	46.89	-27.11	74	29.67	38.98	13.43	35.19	105	198	P	V
5785MHz		17355	47.6	-26.4	74	23.54	42.18	16.59	34.71	189	185	P	V
802.11ac		11650	47.59	-26.41	74	30.36	38.92	13.48	35.17	146	347	P	H
VHT20		17475	47.98	-26.02	74	22.9	42.98	16.81	34.71	123	53	P	H
CH 165		11650	46.89	-27.11	74	29.66	38.92	13.48	35.17	146	347	P	V
5825MHz		17475	47.02	-26.98	74	21.94	42.98	16.81	34.71	123	53	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 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 151 5755MHz		5714.04	50.18	-18.12	68.3	44.46	32.33	8.99	35.6	150	360	P	H
		5718.68	49.73	-28.57	78.3	43.98	32.36	8.99	35.6	150	360	P	H
	*	5755	93.04	-	-	87.21	32.41	9.01	35.59	150	360	P	H
	*	5755	83.04	-	-	77.21	32.41	9.01	35.59	150	360	A	H
		5854.16	49.72	-28.58	78.3	43.62	32.58	9.08	35.56	150	360	P	H
		5860.8	49.53	-18.77	68.3	43.4	32.58	9.1	35.55	150	360	P	H
		5715	50.77	-27.53	78.3	45.05	32.33	8.99	35.6	230	261	P	V
		5716.04	50.17	-28.13	78.3	44.45	32.33	8.99	35.6	230	261	P	V
	*	5755	91.53	-	-	85.7	32.41	9.01	35.59	230	261	P	V
	*	5755	82.06	-	-	76.23	32.41	9.01	35.59	230	261	A	V
		5854.32	50.23	-28.07	78.3	44.13	32.58	9.08	35.56	230	261	P	V
		5864.96	50.07	-18.23	68.3	43.94	32.58	9.1	35.55	230	261	P	V
802.11ac VHT40 CH 159 5795MHz		5699.88	49.77	-18.53	68.3	44.11	32.3	8.97	35.61	150	285	P	H
		5721.64	49.43	-28.87	78.3	43.68	32.36	8.99	35.6	150	285	P	H
	*	5795	91.49	-	-	85.57	32.47	9.03	35.58	150	285	P	H
	*	5795	82.18	-	-	76.26	32.47	9.03	35.58	150	285	A	H
		5859.44	50.79	-27.51	78.3	44.66	32.58	9.1	35.55	150	285	P	H
		5882.8	50.71	-17.59	68.3	44.55	32.61	9.1	35.55	150	285	P	H
		5711	49.33	-18.97	68.3	43.61	32.33	8.99	35.6	230	255	P	V
		5719.16	49.04	-29.26	78.3	43.29	32.36	8.99	35.6	230	255	P	V
	*	5795	89.9	-	-	83.98	32.47	9.03	35.58	230	255	P	V
	*	5795	80.49	-	-	74.57	32.47	9.03	35.58	230	255	A	V
		5858.88	49.64	-28.66	78.3	43.53	32.58	9.08	35.55	230	255	P	V
		5889.04	50.46	-17.84	68.3	44.27	32.63	9.1	35.54	230	255	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 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		11510	47.2	-26.8	74	29.97	39.04	13.4	35.21	145	265	P	H
VHT40		17265	46.23	-27.77	74	22.9	41.62	16.42	34.71	174	321	P	H
CH 151		11510	46.8	-27.2	74	29.57	39.04	13.4	35.21	145	265	P	V
5755MHz		17265	47.78	-26.22	74	24.45	41.62	16.42	34.71	174	321	P	V
802.11ac		11590	46.75	-27.25	74	29.52	38.97	13.45	35.19	105	198	P	H
VHT40		17385	45.7	-28.3	74	21.36	42.41	16.64	34.71	189	185	P	H
CH 159		11590	46.65	-27.35	74	29.42	38.97	13.45	35.19	105	198	P	V
5795MHz		17385	47.01	-26.99	74	22.67	42.41	16.64	34.71	189	185	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)
802.11ac VHT80 CH 155 5775MHz		5687.32	56.82	-11.48	68.3	51.16	32.3	8.97	35.61	150	186	P	H
		5722.44	53.78	-24.52	78.3	48.03	32.36	8.99	35.6	150	186	P	H
	*	5775	92.89	-	-	87.01	32.44	9.03	35.59	150	186	P	H
	*	5775	82.88	-	-	77	32.44	9.03	35.59	150	186	A	H
		5852.24	58.62	-19.68	78.3	52.55	32.55	9.08	35.56	150	186	P	H
		5862.48	55.43	-12.87	68.3	49.3	32.58	9.1	35.55	150	186	P	H
		5700.6	56.42	-11.88	68.3	50.73	32.33	8.97	35.61	225	253	P	V
		5721.4	51.31	-26.99	78.3	45.56	32.36	8.99	35.6	225	253	P	V
	*	5775	87.37	-	-	81.49	32.44	9.03	35.59	225	253	P	V
	*	5775	78.2	-	-	72.32	32.44	9.03	35.59	225	253	A	V
		5850.96	54.7	-23.6	78.3	48.63	32.55	9.08	35.56	225	253	P	V
		5863.04	51.5	-16.8	68.3	45.37	32.58	9.1	35.55	225	253	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

**Band 4 5725~5850MHz****WIFI 802.11ac VHT80 (Harmonic @ 3m)**

WIFI Ant. 1+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		11550	47.61	-26.39	74	30.4	39	13.41	35.2	147	285	P	H
VHT80		17325	46.82	-27.18	74	23.04	41.96	16.53	34.71	165	246	P	H
CH 155		11550	47.17	-26.83	74	29.96	39	13.41	35.2	147	285	P	V
5775MHz		17325	47.86	-26.14	74	24.08	41.96	16.53	34.71	165	246	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Emission below 1GHz

5GHz WIFI 802.11a (LF @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
5GHz 802.11a LF		34.85	27.94	-12.06	40	41.83	15.55	1.19	30.63	-	-	P	H
		99.84	33.73	-9.77	43.5	50.43	12.2	1.62	30.52	100	210	P	H
		281.23	31.82	-14.18	46	46	13.78	2.35	30.31	-	-	P	H
		373.38	26.19	-19.81	46	38.33	15.45	2.57	30.16	-	-	P	H
		509.18	23.39	-22.61	46	32.42	18.01	2.89	29.93	-	-	P	H
		971.87	23.77	-30.23	54	26.66	22.29	3.93	29.11	-	-	P	H
		54.25	32.93	-7.07	40	54.54	7.62	1.33	30.56	-	-	P	V
		103.72	36.89	-6.61	43.5	53.47	12.32	1.62	30.52	100	351	P	V
		191.02	32.36	-11.14	43.5	50.31	10.56	1.92	30.43	-	-	P	V
		385.02	23.64	-22.36	46	35.4	15.66	2.72	30.14	-	-	P	V
		688.63	23.46	-22.54	46	29.88	19.81	3.43	29.66	-	-	P	V
		938.89	25.82	-20.18	46	29.03	22.07	3.89	29.17	-	-	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	Peak or Average
H/V	Horizontal or Vertical



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+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 01													
2412MHz		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”.