FCC RF Test Report

APPLICANT	:	ZTE CORPORATION
EQUIPMENT	:	LTE uFi
BRAND NAME	:	ZTE
MODEL NAME	:	MF923
FCC ID	:	SRQ-MF923
STANDARD	:	FCC Part 15 Subpart E §15.407
CLASSIFICATION	:	(NII) Unlicensed National Information Infrastructure

The product was received on Jun. 05, 2014 and testing was completed on Aug. 20, 2014. We, SPORTON INTERNATIONAL (KUNSHAN) INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

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

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager

Testing Laboratory 2627

SPORTON INTERNATIONAL (KUNSHAN) INC.
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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 7

2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST **8**

2.1 Carrier Frequency and Channel 8
2.2 Pre-Scanned RF Power 9
2.3 Test Mode 11
2.4 Connection Diagram of Test System 12
2.5 Support Unit used in test configuration and system 13
2.6 EUT Operation Test Setup 13
2.7 Measurement Results Explanation Example 13

3 TEST RESULT **14**

3.1 6dB Bandwidth Measurement 14
3.2 Maximum Conducted Output Power Measurement 17
3.3 Power Spectral Density Measurement 19
3.4 Unwanted Emissions Measurement 23
3.5 AC Conducted Emission Measurement 44
3.6 Frequency Stability Measurement 48
3.7 Automatically Discontinue Transmission 50
3.8 Antenna Requirements 51

4 LIST OF MEASURING EQUIPMENT **52**

5 UNCERTAINTY OF EVALUATION **53**

APPENDIX A. SETUP PHOTOGRAPHS

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR460508C	Rev. 01	Initial issue of report	Aug. 25, 2014

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	≤ -17, -27 dBm/MHz &15.209(a)	Pass	Under limit 3.07 dB at 5724.920 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 7.88 dB at 0.430 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

ZTE CORPORATION

ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China

1.2 Manufacturer

ZTE CORPORATION

ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	LTE uFi
Brand Name	ZTE
Model Name	MF923
FCC ID	SRQ-MF923
EUT supports Radios application	WCDMA/HSPA/HSPA+(Downlink Only)/DC-HSDPA/LTE WLAN2.4GHz 802.11b/g/n HT20/HT40 WLAN5GHz 802.11a/n HT20/HT40
HW Version	xx4A
SW Version	MF923V0.6
EUT Stage	Identical Prototype

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

1.4 Product Specification of Equipment Under Test

<table>
<tr><th colspan="2">Product Specification subjective to this standard</th></tr>
<tr><td>Tx/Rx Channel Frequency Range</td><td>5725 MHz ~ 5850 MHz</td></tr>
<tr><td>Maximum Output Power</td><td>802.11a : 11.46 dBm / 0.0140 W
802.11n HT20 : 13.50 dBm / 0.0224 W
802.11n HT40 : 11.44 dBm / 0.0139 W</td></tr>
<tr><td>Type of Modulation</td><td>802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)</td></tr>
<tr><td>Antenna Type</td><td>Chain Port 0 : IFA Antenna with gain 2.00 dBi
Chain Port 1 : IFA Antenna with gain 2.00 dBi</td></tr>
<tr><td>Antenna Function Description</td><td>
<table>
<tr><th></th><th>Chain Port 0</th><th>Chain Port 1</th></tr>
<tr><td>802.11 a</td><td>V</td><td>V</td></tr>
<tr><td>802.11 n SISO</td><td>V</td><td>V</td></tr>
<tr><td>802.11 n MIMO</td><td>V</td><td>V</td></tr>
</table>
</td></tr>
</table>

1.5 Modification of EUT

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

1.6 Testing Location

Test Site	SPORTON INTERNATIONAL (KUNSHAN) INC.			
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C. TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958			
Test Site No.	**Sporton Site No.**			**FCC Registration No.**
	TH01-KS	03CH01-KS	CO01-KS	149928

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 C63.4-2003

Remark:

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

2 Test Configuration of Equipment Under Test

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). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (X plane) were recorded in this report.

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.

5GHz 802.11a Average Power (dBm)										
Data Rate (MHz)	CH	6Mbps	CH	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
Chain Port 0	149	9.39	165	9.56	9.57	9.54	9.54	9.47	9.60	9.49
	157	9.50								
	165	**9.64**								
Chain Port 1	149	11.06	165	11.36	11.38	11.43	11.44	11.43	11.40	11.42
	157	11.35								
	165	**11.46**								

5GHz 802.11n HT20 Average Power (dBm)										
Data Rate (MHz)	CH	MCS0	CH	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Chain Port 0	149	9.41	165	9.54	9.55	9.47	9.56	9.55	9.40	9.39
	157	9.56								
	165	**9.57**								
Chain Port 1	149	10.12	165	10.54	10.51	10.54	10.59	10.58	10.56	10.52
	157	10.36								
	165	**10.61**								
Data Rate (MHz)	CH	MCS8	CH	MCS 9	MCS 10	MCS 11	MCS 12	MCS 13	MCS 14	MCS 15
Chain Port 0+1(0)	149	10.17	165	10.41	10.40	10.35	10.44	10.43	10.33	10.30
	157	10.36								
	165	10.45								
Chain Port 0+1(1)	149	10.23	165	10.39	10.44	10.23	10.24	10.21	10.39	10.11
	157	9.92								
	165	10.52								
Chain Port 0+1	149	13.21	165	13.41	13.43	13.30	13.35	13.33	13.37	13.22
	157	13.16								
	165	**13.50**								

5GHz 802.11n HT40 Average Power (dBm)										
Data Rate (MHz)	**CH**	**MCS0**	**CH**	**MCS1**	**MCS2**	**MCS3**	**MCS4**	**MCS5**	**MCS6**	**MCS7**
Chain Port 0	151	**9.39**	151	8.89	9.06	9.17	9.31	9.25	9.18	9.31
	159	9.04								
Chain Port 1	151	11.34	159	11.23	11.17	10.99	11.15	11.37	11.26	11.19
	159	**11.39**								
Data Rate (MHz)	**CH**	**MCS8**	**CH**	**MCS 9**	**MCS 10**	**MCS 11**	**MCS 12**	**MCS 13**	**MCS 14**	**MCS 15**
Chain Port 0+1(0)	151	8.33	151	8.01	8.12	8.04	8.11	8.12	7.89	7.53
	159	8.15								
Chain Port 0+1(1)	151	8.53	151	7.95	8.04	7.95	8.04	7.93	7.80	7.39
	159	8.41								
Chain Port 0+1	151	**11.44**	151	10.99	11.09	11.00	11.09	11.03	10.86	10.47
	159	11.29								

Note: Chain Port 0+1 is a calculated result from sum of the power Chain Port 0+1(0) and Chain Port 0+1(1).

2.3 Test Mode

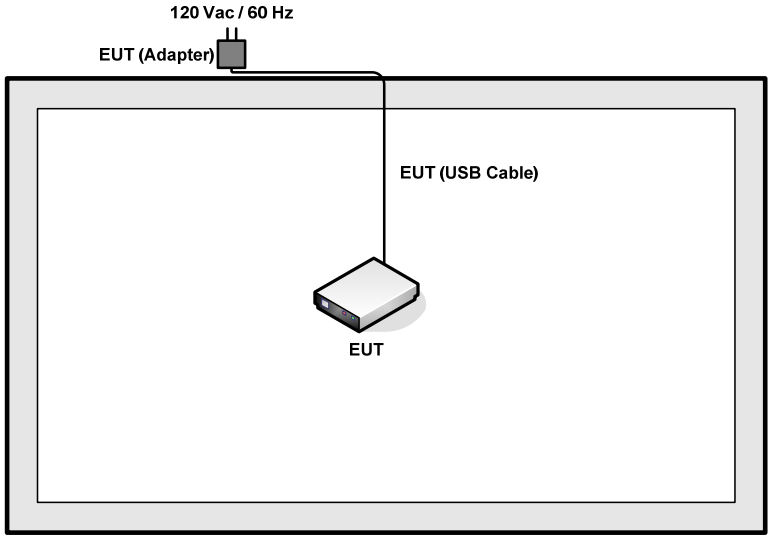
Final results of test modes, data rates and test channels are shown as following table.

Test Cases				
	Test Items	Mode	Data rate	Test Channel
Conducted TCs	6dB Bandwidth Power Spectral Density	802.11a	6 Mbps	L/M/H
		802.11n HT20	MCS0/ MCS8	L/M/H
		802.11n HT40	MCS0/ MCS8	L/M/H
	Output Power	802.11a	6 Mbps	L/M/H
		802.11n HT20	MCS0/ MCS8	L/M/H
		802.11n HT40	MCS0/ MCS8	L/M/H
	Frequency Stability	802.11a	6 Mbps	L
Radiated TCs	Radiated Band Edge	802.11a	6 Mbps	L/H
		802.11n HT20	MCS8	L/H
		802.11n HT40	MCS8	L/H
	Radiated Spurious Emission	802.11a	6 Mbps	L/M/H
		802.11n HT20	MCS8	L/M/H
		802.11n HT40	MCS8	L/M/H
AC Conducted Emission	Mode 1 ： WCDMA Band V Idle + WLAN(5G) Link + USB Cable (Charging from Adapter)			

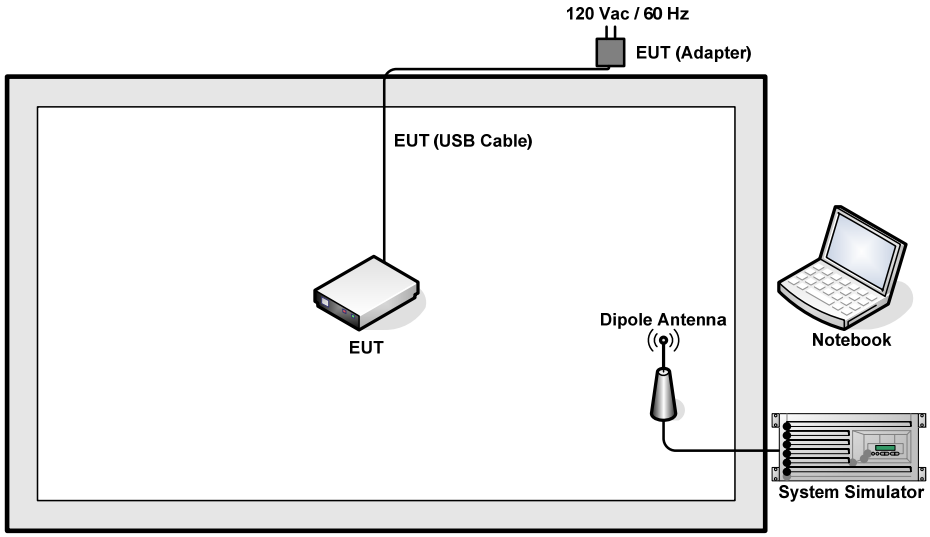
Ch. #		Band IV：5725-5850 MHz		
		802.11a	802.11n HT20	802.11n HT40
L	Low	149	149	151
M	Middle	157	157	-
H	High	165	165	159

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.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	DC Power Supply	GWINSTEK	GPS-3030D	N/A	N/A	Unshielded, 1.8 m
3.	Notebook	Acer	MS2204	QDS-BRCM1018	N/A	AC I/P: Unshielded, 0.9 m DC O/P: Shielded, 1.8 m

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 Notebook 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 6.3 dB and 10dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).
= 6.3 + 10 = 16.3 (dB)

3 Test Result

3.1 6dB Bandwidth Measurement

3.1.1 Description of 6dB Bandwidth

This section is for reporting purpose only.

There is no restriction limits for bandwidth.

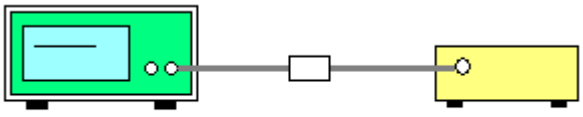
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01. 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.

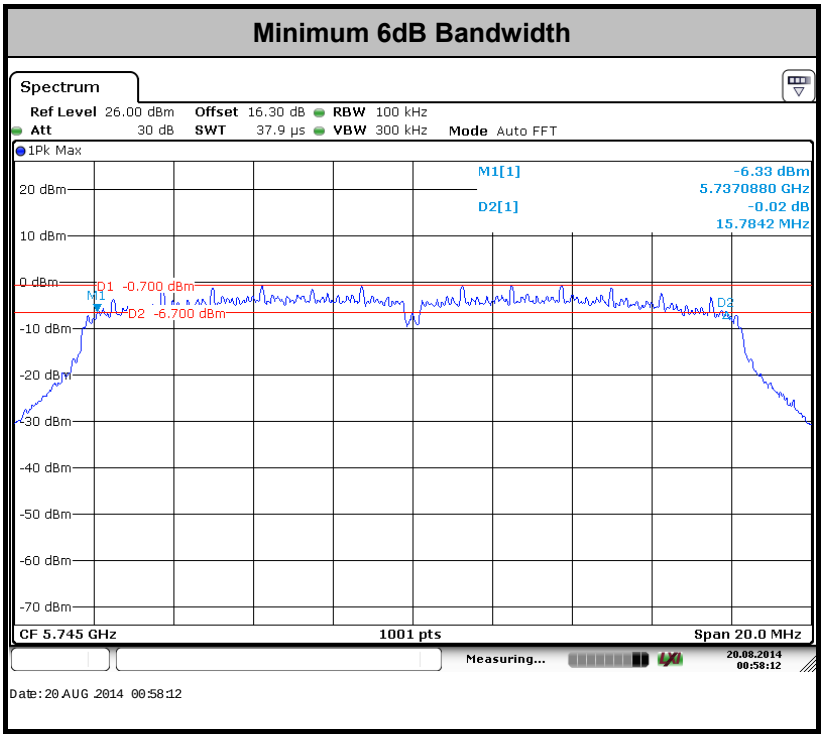
3.1.4 Test Setup



3.1.5 Test Result of 6dB Bandwidth

Test Band :	5GHz band 4	Temperature :	23~24℃
Test Engineer :	Adonis Li	Relative Humidity :	47~48%

Mod.	Data Rate	NTX	Channel	Freq. (MHz)	6 dB Bandwidth (MHz)		FCC 6 dB Bandwidth Min. Limit (MHz)		Pass/Fail
					Chain Port 0	Chain Port 1	Chain Port 0	Chain Port 1	
11a	6Mbps	1	149	5745	-	15.78	0.5	0.5	Pass
11a	6Mbps	1	157	5785	-	15.78	0.5	0.5	Pass
11a	6Mbps	1	165	5825	-	16.00	0.5	0.5	Pass
HT20	MCS0	1	149	5745	-	15.80	0.5	0.5	Pass
HT20	MCS0	1	157	5785	-	15.78	0.5	0.5	Pass
HT20	MCS0	1	165	5825	-	16.02	0.5	0.5	Pass
HT40	MCS0	1	151	5755	-	36.32	0.5	0.5	Pass
HT40	MCS0	1	159	5795	-	36.32	0.5	0.5	Pass
HT20	MCS8	2	149	5745	16.50	16.32	0.5		Pass
HT20	MCS8	2	157	5785	16.50	16.66	0.5		Pass
HT20	MCS8	2	165	5825	16.52	16.90	0.5		Pass
HT40	MCS8	2	151	5755	36.32	36.32	0.5		Pass
HT40	MCS8	2	159	5795	36.32	36.32	0.5		Pass



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.

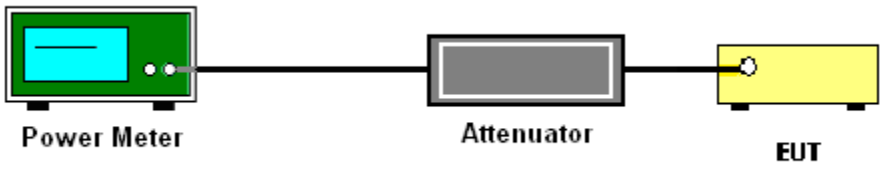
3.2.3 Test Procedures

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

Test Band :	5GHz band 4	Temperature :	23~24℃
Test Engineer :	Adonis Li	Relative Humidity :	47~48%

Mod.	Data Rate	NTX	Channel	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		Pass /Fail
					Chain Port 0	Chain Port 1	Chain Port 0	Chain Port 1	SUM	Chain Port 0	Chain Port 1	Chain Port 0	Chain Port 1	
11a	6Mbps	1	149	5745	0.21	0.22	9.39	11.06	-	30.00	30.00	2.00	2.00	Pass
11a	6Mbps	1	157	5785	0.21	0.22	9.50	11.35		30.00	30.00	2.00	2.00	Pass
11a	6Mbps	1	165	5825	0.21	0.22	9.64	11.46		30.00	30.00	2.00	2.00	Pass
HT20	MCS0	1	149	5745	0.22	0.23	9.41	10.12		30.00	30.00	2.00	2.00	Pass
HT20	MCS0	1	157	5785	0.22	0.23	9.56	10.36		30.00	30.00	2.00	2.00	Pass
HT20	MCS0	1	165	5825	0.22	0.23	9.57	10.61		30.00	30.00	2.00	2.00	Pass
HT40	MCS0	1	151	5755	0.43	0.44	9.39	11.34		30.00	30.00	2.00	2.00	Pass
HT40	MCS0	1	159	5795	0.43	0.44	9.04	11.39		30.00	30.00	2.00	2.00	Pass
HT20	MCS8	2	149	5745	0.43	0.42	10.17	10.23	13.21	30.00		2.00		Pass
HT20	MCS8	2	157	5785	0.43	0.42	10.36	9.92	13.16	30.00		2.00		Pass
HT20	MCS8	2	165	5825	0.43	0.42	10.45	10.52	13.50	30.00		2.00		Pass
HT40	MCS8	2	151	5755	0.78	0.79	8.33	8.53	11.44	30.00		2.00		Pass
HT40	MCS8	2	159	5795	0.78	0.79	8.15	8.41	11.29	30.00		2.00		Pass

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).

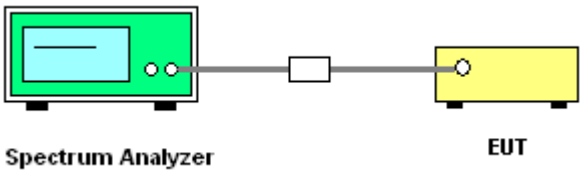
1. The testing follows Method SA-2 of FCC KDB 789033 D01 General UNII Test Procedures v01r03.
   - Measure the duty cycle.
   - Set span to encompass the entire emission bandwidth (EBW) of the signal.
   - Set RBW = 300 kHz.
   - Set VBW ≥ 1 MHz.
   - Number of points in sweep ≥ 2 Span / RBW.
   - Sweep 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.

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

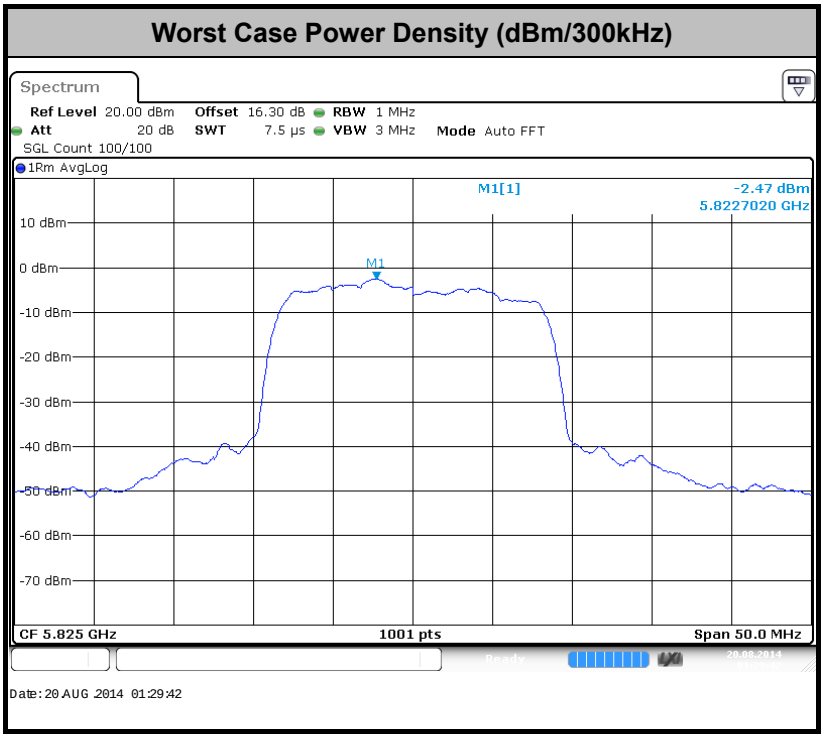


3.3.5 Test Result of Power Spectral Density

Test Band :	5GHz band 4	Temperature :	23~24℃
Test Engineer :	Adonis Li	Relative Humidity :	47~48%

Mod.	Data Rate	NTX	Channel	Freq. (MHz)	Duty Factor (dB)		10log (500kHz /RBW) Factor (dB)		Average Power Density (dBm/500kHz)			Average PSD Limit (dBm/500kHz)		DG (dBi)		Pass /Fail
					Chain Port 0	Chain Port 1	Chain Port 0	Chain Port 1	Chain Port 0	Chain Port 1	SUM	Chain Port 0	Chain Port 1	Chain Port 0	Chain Port 1	
11a	6Mbps	1	149	5745	0.21	0.22	2.22	2.22	-	-1.91	-	30.00	30.00	2.00	2.00	Pass
11a	6Mbps	1	157	5785	0.21	0.22	2.22	2.22	-	-0.95		30.00	30.00	2.00	2.00	Pass
11a	6Mbps	1	165	5825	0.21	0.22	2.22	2.22	-	-0.03		30.00	30.00	2.00	2.00	Pass
HT20	MCS0	1	149	5745	0.22	0.23	2.22	2.22	-	-2.67		30.00	30.00	2.00	2.00	Pass
HT20	MCS0	1	157	5785	0.22	0.23	2.22	2.22	-	-2.96		30.00	30.00	2.00	2.00	Pass
HT20	MCS0	1	165	5825	0.22	0.23	2.22	2.22	-	-3.23		30.00	30.00	2.00	2.00	Pass
HT40	MCS0	1	151	5755	0.43	0.44	2.22	2.22	-	-6.51		30.00	30.00	2.00	2.00	Pass
HT40	MCS0	1	159	5795	0.43	0.44	2.22	2.22	-	-5.83		30.00	30.00	2.00	2.00	Pass
HT20	MCS8	2	149	5745	0.43	0.42	2.22		-		-3.57	30.00		5.01		Pass
HT20	MCS8	2	157	5785	0.43	0.42	2.22				-0.39	30.00		5.01		Pass
HT20	MCS8	2	165	5825	0.43	0.42	2.22				-1.98	30.00		5.01		Pass
HT40	MCS8	2	151	5755	0.78	0.79	2.22				-10.26	30.00		5.01		Pass
HT40	MCS8	2	159	5795	0.78	0.79	2.22				-10.87	30.00		5.01		Pass

Worst Case Power Density (dBm/300kHz)



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 Part15.205.

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 Part15.205 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.

$$E=\frac{1000000\sqrt{30P}}{3}$$ μV/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 ≥ 3 MHz
   - Detector = Peak
   - Sweep time = auto
   - Trace mode = max hold

(3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

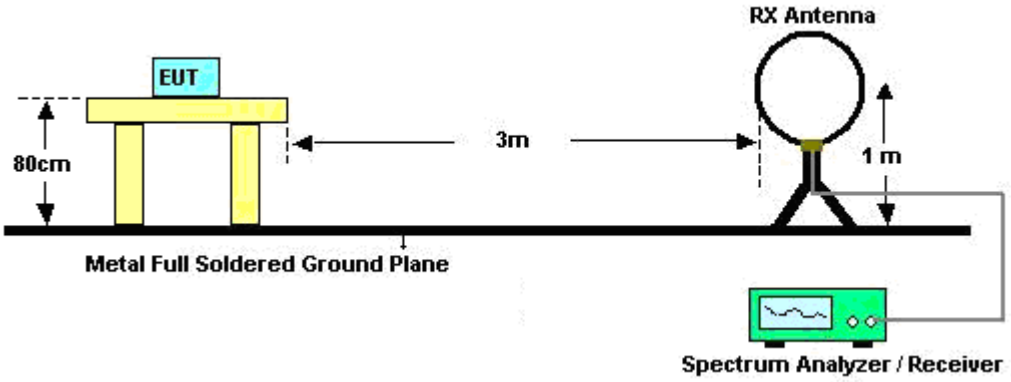
- RBW = 1 MHz
- VBW = 10 Hz, when duty cycle is no less than 98 percent.
- VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

Chain Port	Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
0	802.11a	95.32	2.07	0.48	1KHz
1	802.11a	95.12	2.06	0.49	1KHz
0+1	802.11n HT20	90.75	0.98	1.02	3KHz
0+1	802.11n HT40	83.50	0.50	2.01	3KHz

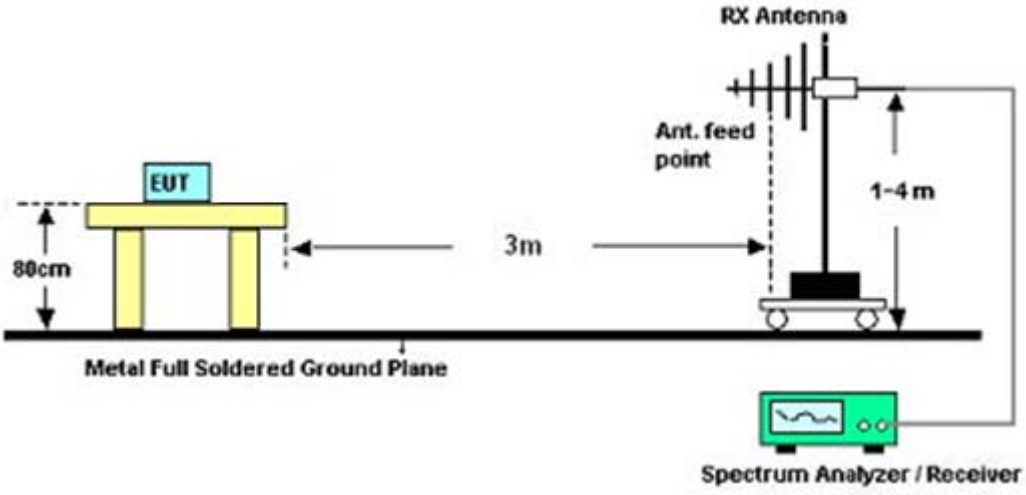
2. The EUT was placed on a rotatable table top 0.8 meter above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters 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

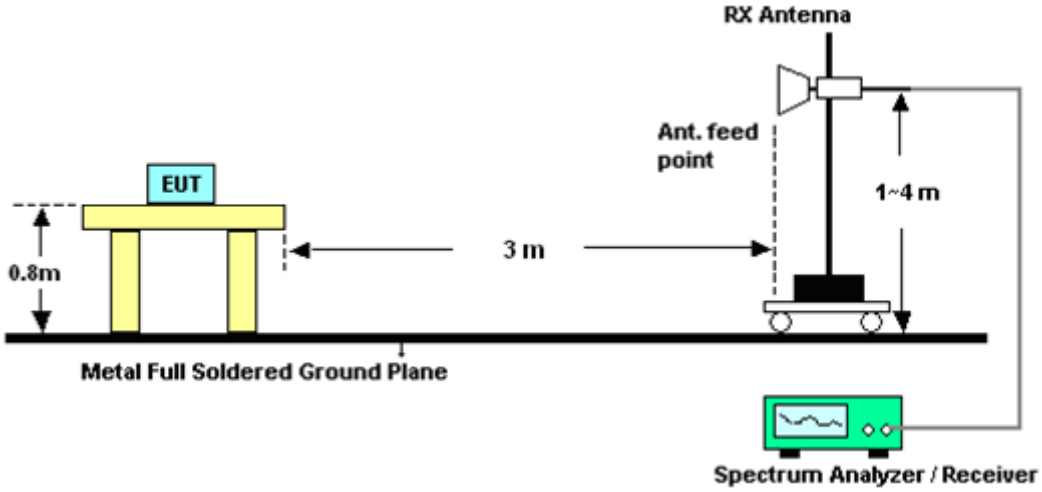
For radiated emissions below 30MHz



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

Chain Port 0

Test Mode :	802.11a	**Temperature :**	22~23°C
Test Channel :	149	**Relative Humidity :**	42~43%
Test Engineer :	Simon Lu		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5714.92	62.34	-5.96	68.3	62.09	34.72	4.13	38.6	103	7	Peak
5724.84	72.36	-5.94	78.3	72.12	34.73	4.15	38.64	103	7	Peak

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5701.64	55.26	-13.04	68.3	55.01	34.72	4.13	38.6	100	167	Peak
5724.36	64.08	-14.22	78.3	63.84	34.73	4.15	38.64	100	167	Peak

Remark:

1. 5714.92/5701.64 MHz is not within a restricted band, and satisfies 68.3 dBµV /m peak emission limit.

2. 5724.84/5724.36 MHz is not within a restricted band, and satisfies 78.3 dBµV /m peak emission limit.

Test Mode :	802.11a	**Temperature :**	22~23°C
Test Channel :	165	**Relative Humidity :**	42~43%
Test Engineer :	Simon Lu		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5850.32	67.77	-10.53	78.3	67.64	34.81	4.24	38.92	100	339	Peak
5861.44	63.62	-4.68	68.3	63.52	34.82	4.24	38.96	100	339	Peak

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5850.72	65.13	-13.17	78.3	65	34.81	4.24	38.92	151	117	Peak
5860.24	60.91	-7.39	68.3	60.81	34.82	4.24	38.96	151	117	Peak

Remark:

1. 5861.44/5860.24MHz is not within a restricted band, and satisfies 68.3 dBµV /m peak emission limit.

2. 5850.32/5850.72 MHz is not within a restricted band, and satisfies 78.3 dBµV /m peak emission limit.

Chain Port 1

Test Mode :	802.11a	**Temperature :**	22~23°C
Test Channel :	149	**Relative Humidity :**	42~43%
Test Engineer :	Simon Lu		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5709.72	62.9	-5.40	68.3	62.65	34.72	4.13	38.6	100	102	Peak
5724.92	75.23	-3.07	78.3	74.99	34.73	4.15	38.64	100	102	Peak

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5709.96	62.5	-5.80	68.3	62.25	34.72	4.13	38.6	194	316	Peak
5724.52	72.71	-5.59	78.3	72.47	34.73	4.15	38.64	194	316	Peak

Remark:

1. 5709.72/5709.96 MHz is not within a restricted band, and satisfies 68.3 dBµV /m peak emission limit.
2. 5724.92/5724.52 MHz is not within a restricted band, and satisfies 78.3 dBµV /m peak emission limit.

Test Mode :	802.11a	**Temperature :**	22~23°C
Test Channel :	165	**Relative Humidity :**	42~43%
Test Engineer :	Simon Lu		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5850.16	68.45	-9.85	78.3	68.32	34.81	4.24	38.92	100	103	Peak
5861.12	62.82	-5.48	68.3	62.72	34.82	4.24	38.96	100	103	Peak

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5850	65.25	-13.05	78.3	65.12	34.81	4.24	38.92	192	317	Peak
5860.16	59.88	-8.42	68.3	59.78	34.82	4.24	38.96	192	317	Peak

Remark:

1. 5861.12/5860.16 MHz is not within a restricted band, and satisfies 68.3 dBµV /m peak emission limit.
2. 5850.16/5850 MHz is not within a restricted band, and satisfies 78.3 dBµV /m peak emission limit.

Chain Port 0+1

Test Mode :	802.11n HT20	**Temperature :**	22~23°C
Test Channel :	149	**Relative Humidity :**	42~43%
Test Engineer :	Simon Lu		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5714.92	61	-7.30	68.3	60.75	34.72	4.13	38.6	100	159	Peak
5725	71.86	-6.44	78.3	71.62	34.73	4.15	38.64	100	159	Peak

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5714.92	58.43	-9.87	68.3	58.18	34.72	4.13	38.6	169	317	Peak
5725	68.48	-9.82	78.3	68.24	34.73	4.15	38.64	169	317	Peak

Remark:

1. 5714.92/5714.92 MHz is not within a restricted band, and satisfies 68.3 dBµV /m peak emission limit.
2. 5725 MHz is not within a restricted band, and satisfies 78.3 dBµV /m peak emission limit.

Test Mode :	802.11n HT20	**Temperature :**	22~23°C
Test Channel :	165	**Relative Humidity :**	42~43%
Test Engineer :	Simon Lu		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5850	70.64	-7.66	78.3	70.51	34.81	4.24	38.92	100	159	Peak
5864.16	65.06	-3.24	68.3	64.96	34.82	4.24	38.96	100	159	Peak

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5850.32	66.64	-11.66	78.3	66.51	34.81	4.24	38.92	165	290	Peak
5862	61.48	-6.82	68.3	61.38	34.82	4.24	38.96	165	290	Peak

Remark:

3. 5864.16/5862 MHz is not within a restricted band, and satisfies 68.3 dBµV /m peak emission limit.
4. 5850 /5850.32 MHz is not within a restricted band, and satisfies 78.3 dBµV /m peak emission limit.

Test Mode :	802.11n HT40	Temperature :	22~23°C
Test Channel :	151	Relative Humidity :	42~43%
Test Engineer :	Simon Lu		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5714.84	65.15	-3.15	68.3	64.90	34.72	4.13	38.6	101	147	Peak
5724.92	69.91	-8.39	78.3	69.67	34.73	4.15	38.64	101	147	Peak

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5714.68	59.78	-8.52	68.3	59.53	34.72	4.13	38.6	100	330	Peak
5722.28	63.4	-14.9	78.3	63.16	34.73	4.15	38.64	100	330	Peak

Remark:

1. 5714.84/5714.68 MHz is not within a restricted band, and satisfies 68.3 dBµV /m peak emission limit.
2. 5724.92/5722.28 MHz is not within a restricted band, and satisfies 78.3 dBµV /m peak emission limit.

Test Mode :	802.11n HT40	Temperature :	22~23°C
Test Channel :	159	Relative Humidity :	42~43%
Test Engineer :	Simon Lu		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5850.8	55.52	-22.78	78.3	55.39	34.81	4.24	38.92	100	157	Peak
5863.2	54.11	-14.19	68.3	54.01	34.82	4.24	38.96	100	157	Peak

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5853.68	53.53	-24.77	78.3	53.43	34.82	4.24	38.96	149	327	Peak
5868.40	53.31	-14.99	68.3	53.21	34.82	4.24	38.96	149	327	Peak

Remark:

1. 5863.2/5868.40 MHz is not within a restricted band, and satisfies 68.3 dBµV /m peak emission limit.
2. 5850.8/5853.68 MHz is not within a restricted band, and satisfies 78.3 dBµV /m peak emission limit.

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

Chain Port 0

Test Mode :	802.11a	**Temperature :**	22~23°C
Test Channel :	149	**Relative Humidity :**	42~43%
Test Engineer :	Simon Lu	**Polarization :**	Horizontal
Remark :	1. 5745 MHz is fundamental signal which can be ignored.. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5745	105.7	-	-	105.46	34.74	4.18	38.68	103	7	Peak
5745	93.9	-	-	93.66	34.74	4.18	38.68	103	7	Average
11490	24.81	-49.19	74	50.38	4.47	6.32	36.36	152	10	Peak

Test Mode :	802.11a	**Temperature :**	22~23°C
Test Channel :	149	**Relative Humidity :**	42~43%
Test Engineer :	Simon Lu	**Polarization :**	Vertical
Remark :	1. 5745 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5745	100.15	-	-	99.91	34.74	4.18	38.68	100	168	Peak
5745	88.06	-	-	87.82	34.74	4.18	38.68	100	168	Average
11490	26.43	-47.57	74	52	4.47	6.32	36.36	100	0	Peak

Test Mode :	802.11a	Temperature :	22~23°C
Test Channel :	157	Relative Humidity :	42~43%
Test Engineer :	Simon Lu	Polarization :	Horizontal
Remark :	1. 5785 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5785	104.56	-	-	104.32	34.77	4.24	38.77	100	341	Peak
5785	91.69	-	-	91.45	34.77	4.24	38.77	100	341	Average
11571	28.49	-45.51	74	53.86	4.38	6.35	36.1	200	110	Peak

Test Mode :	802.11a	Temperature :	22~23°C
Test Channel :	157	Relative Humidity :	42~43%
Test Engineer :	Simon Lu	Polarization :	Vertical
Remark :	1. 5785 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5785	99.75	-	-	99.51	34.77	4.24	38.77	100	158	Peak
5785	88.13	-	-	87.89	34.77	4.24	38.77	100	158	Average
11571	28.84	-45.16	74	54.21	4.38	6.35	36.1	141	12	Peak

Test Mode :	802.11a	Temperature :	22~23°C
Test Channel :	165	Relative Humidity :	42~43%
Test Engineer :	Simon Lu	Polarization :	Horizontal
Remark :	1. 5825 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5825	104.38	-	-	104.2	34.8	4.26	38.88	100	339	Peak
5825	92.43	-	-	92.25	34.8	4.26	38.88	100	339	Average
11649	30.28	-43.72	74	55.58	4.2	6.38	35.88	100	48	Peak

Test Mode :	802.11a	Temperature :	22~23°C
Test Channel :	165	Relative Humidity :	42~43%
Test Engineer :	Simon Lu	Polarization :	Vertical
Remark :	1. 5825 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5825	101.07	-	-	100.89	34.8	4.26	38.88	151	117	Peak
5825	89.2	-	-	89.02	34.8	4.26	38.88	151	117	Average
11649	30.94	-43.06	74	56.24	4.2	6.38	35.88	130	145	Peak

Chain Port 1

Test Mode :	802.11a	**Temperature :**	22~23°C
Test Channel :	149	**Relative Humidity :**	42~43%
Test Engineer :	Simon Lu	**Polarization :**	Horizontal
Remark :	1. 5745 MHz is fundamental signal which can be ignored.. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
97.87	34.48	-9.02	43.5	54.23	10.45	0.43	32.63	-	-	Peak
110.42	32.11	-11.39	43.5	50.35	11.82	0.58	32.64	-	-	Peak
239.42	37.32	-8.68	46	53.01	10.85	0.84	32.48	200	146	Peak
480.28	24.4	-21.6	46	41.05	17.3	1.22	32.17	-	-	Peak
721.14	25.5	-20.5	46	38.57	19.58	1.35	32	-	-	Peak
960.93	39.5	-14.5	54	47.73	20.76	1.72	31.71	-	-	Peak
5745	106.62	-	-	106.38	34.74	4.18	38.68	100	102	Peak
5745	95.24	-	-	95	34.74	4.18	38.68	100	102	Average
11490	25.02	-48.98	74	50.59	4.47	6.32	36.36	100	156	Peak

Test Mode :	802.11a	Temperature :	22~23°C
Test Channel :	149	Relative Humidity :	42~43%
Test Engineer :	Simon Lu	Polarization :	Vertical
Remark :	1. 5745 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
32.61	32.36	-7.64	40	46.54	16.27	0.19	32.64	100	0	Peak
47.16	31.32	-8.68	40	55.92	8.73	0.31	32.64	-	-	Peak
59.19	27.64	-12.36	40	55.21	5.53	0.47	32.6	-	-	Peak
95.35	27.33	-16.17	43.5	49.24	9.95	0.43	32.6	-	-	Peak
896.24	30.39	-15.61	46	39.83	20.39	1.8	31.72	-	-	Peak
960.12	31.34	-22.66	54	41.2	20.76	1.72	31.71	-	-	Peak
5745	104.33	-	-	104.09	34.74	4.18	38.68	194	316	Peak
5745	93.04	-	-	92.8	34.74	4.18	38.68	194	316	Average
11490	26.26	-47.74	74	51.83	4.47	6.32	36.36	100	36	Peak

Test Mode :	802.11a	Temperature :	22~23°C
Test Channel :	157	Relative Humidity :	42~43%
Test Engineer :	Simon Lu	Polarization :	Horizontal
Remark :	1. 5785 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5785	106.67	-	-	106.43	34.77	4.24	38.77	100	98	Peak
5785	94.83	-	-	94.59	34.77	4.24	38.77	100	98	Average
11571	27.32	-46.68	74	52.69	4.38	6.35	36.1	118	30	Peak

Test Mode :	802.11a	Temperature :	22~23°C
Test Channel :	157	Relative Humidity :	42~43%
Test Engineer :	Simon Lu	Polarization :	Vertical
Remark :	1. 5785 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5785	105.53	-	-	105.29	34.77	4.24	38.77	193	352	Peak
5785	93.97	-	-	93.73	34.77	4.24	38.77	193	352	Average
11571	26.56	-47.44	74	51.93	4.38	6.35	36.1	134	11	Peak

Test Mode :	802.11a	Temperature :	22~23°C
Test Channel :	165	Relative Humidity :	42~43%
Test Engineer :	Simon Lu	Polarization :	Horizontal
Remark :	1. 5825 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5825	106.62	-	-	106.44	34.8	4.26	38.88	100	103	Peak
5825	95.14	-	-	94.96	34.8	4.26	38.88	100	103	Average
11649	29.48	-44.52	74	54.78	4.2	6.38	35.88	100	90	Peak

Test Mode :	802.11a	Temperature :	22~23°C
Test Channel :	165	Relative Humidity :	42~43%
Test Engineer :	Simon Lu	Polarization :	Vertical
Remark :	1. 5825 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5825	103.99	-	-	103.81	34.8	4.26	38.88	192	317	Peak
5825	92.4	-	-	92.22	34.8	4.26	38.88	192	317	Average
11649	31.72	-42.28	74	57.02	4.2	6.38	35.88	100	300	Peak

Chain Port 0+1

Test Mode :	802.11n HT20	**Temperature :**	22~23°C
Test Channel :	149	**Relative Humidity :**	42~43%
Test Engineer :	Simon Lu	**Polarization :**	Horizontal
Remark :	1. 5745 MHz is fundamental signal which can be ignored.. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5745	103.89	-	-	103.65	34.74	4.18	38.68	100	159	Peak
5745	93.54	-	-	93.3	34.74	4.18	38.68	100	159	Average
11490	25.22	-48.78	74	50.79	4.47	6.32	36.36	112	22	Peak

Test Mode :	802.11n HT20	**Temperature :**	22~23°C
Test Channel :	149	**Relative Humidity :**	42~43%
Test Engineer :	Simon Lu	**Polarization :**	Vertical
Remark :	1. 5745 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5745	100.76	-	-	100.52	34.74	4.18	38.68	169	317	Peak
5745	89.74	-	-	89.5	34.74	4.18	38.68	169	317	Average
11490	25.15	-48.85	74	50.72	4.47	6.32	36.36	103	10	Peak

Test Mode :	802.11n HT20	Temperature :	22~23°C
Test Channel :	157	Relative Humidity :	42~43%
Test Engineer :	Simon Lu	Polarization :	Horizontal
Remark :	1. 5785 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5785	104.75	-	-	104.51	34.77	4.24	38.77	100	159	Peak
5785	94.05	-	-	93.81	34.77	4.24	38.77	100	159	Average
11571	29.53	-44.47	74	54.9	4.38	6.35	36.1	200	147	Peak

Test Mode :	802.11n HT20	Temperature :	22~23°C
Test Channel :	157	Relative Humidity :	42~43%
Test Engineer :	Simon Lu	Polarization :	Vertical
Remark :	1. 5785 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5785	101.5	-	-	101.26	34.77	4.24	38.77	200	299	Peak
5785	91.01	-	-	90.77	34.77	4.24	38.77	200	299	Average
11571	27.87	-46.13	74	53.24	4.38	6.35	36.1	100	47	Peak

Test Mode :	802.11n HT20	Temperature :	22~23°C
Test Channel :	165	Relative Humidity :	42~43%
Test Engineer :	Simon Lu	Polarization :	Horizontal
Remark :	1. 5825 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5825	105.17	-	-	104.99	34.8	4.26	38.88	100	159	Peak
5825	93.96	-	-	93.78	34.8	4.26	38.88	100	159	Average
11649	30.44	-43.56	74	55.74	4.2	6.38	35.88	106	45	Peak

Test Mode :	802.11n HT20	Temperature :	22~23°C
Test Channel :	165	Relative Humidity :	42~43%
Test Engineer :	Simon Lu	Polarization :	Vertical
Remark :	1. 5825 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5825	101.34	-	-	101.16	34.8	4.26	38.88	165	290	Peak
5825	90.01	-	-	89.83	34.8	4.26	38.88	165	290	Average
11649	29.87	-44.13	74	55.17	4.2	6.38	35.88	100	105	Peak

Test Mode :	802.11n HT40	Temperature :	22~23°C
Test Channel :	151	Relative Humidity :	42~43%
Test Engineer :	Simon Lu	Polarization :	Horizontal
Remark :	1. 5755 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5755	99.31	-	-	99.06	34.76	4.21	38.72	101	147	Peak
5755	87.87	-	-	87.62	34.76	4.21	38.72	101	147	Average
11511	26.44	-47.56	74	51.89	4.53	6.33	36.31	100	35	Peak

Test Mode :	802.11n HT40	Temperature :	22~23°C
Test Channel :	151	Relative Humidity :	42~43%
Test Engineer :	Simon Lu	Polarization :	Vertical
Remark :	1. 5755 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5755	94.12	-	-	93.87	34.76	4.21	38.72	100	330	Peak
5755	82.84	-	-	82.59	34.76	4.21	38.72	100	330	Average
11511	26.47	-47.53	74	51.92	4.53	6.33	36.31	113	21	Peak

Test Mode :	802.11n HT40	Temperature :	22~23°C
Test Channel :	159	Relative Humidity :	42~43%
Test Engineer :	Simon Lu	Polarization :	Horizontal
Remark :	1. 5795 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5795	98.98	-	-	98.74	34.78	4.27	38.81	100	157	Peak
5795	87.65	-	-	87.41	34.78	4.27	38.81	100	157	Average
11589	27.62	-46.38	74	52.98	4.34	6.35	36.05	100	17	Peak

Test Mode :	802.11n HT40	Temperature :	22~23°C
Test Channel :	159	Relative Humidity :	42~43%
Test Engineer :	Simon Lu	Polarization :	Vertical
Remark :	1. 5795 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5795	95.28	-	-	95.04	34.78	4.27	38.81	149	327	Peak
5795	83.54	-	-	83.3	34.78	4.27	38.81	149	327	Average
11589	29.46	-44.54	74	54.82	4.34	6.35	36.05	109	13	Peak

3.5 AC Conducted Emission Measurement

3.5.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

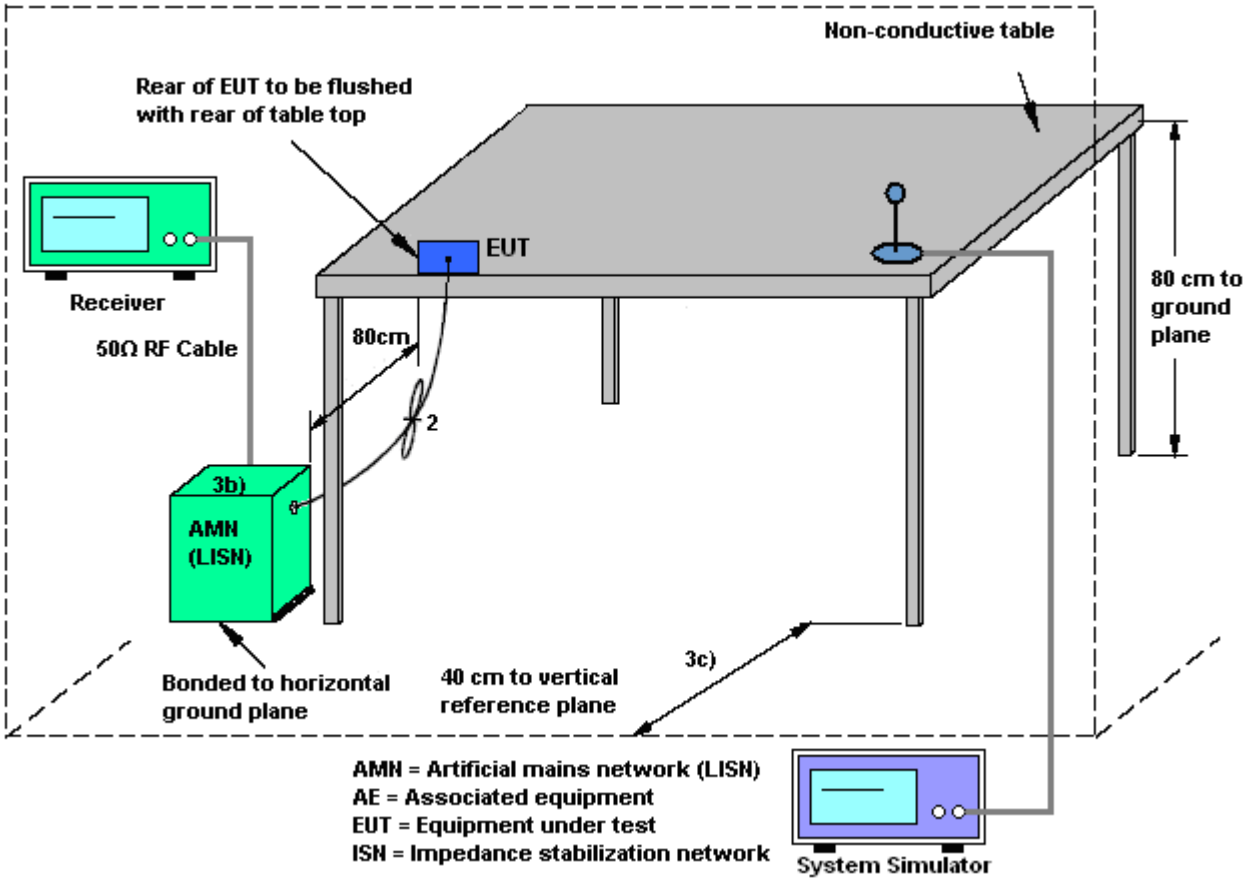
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

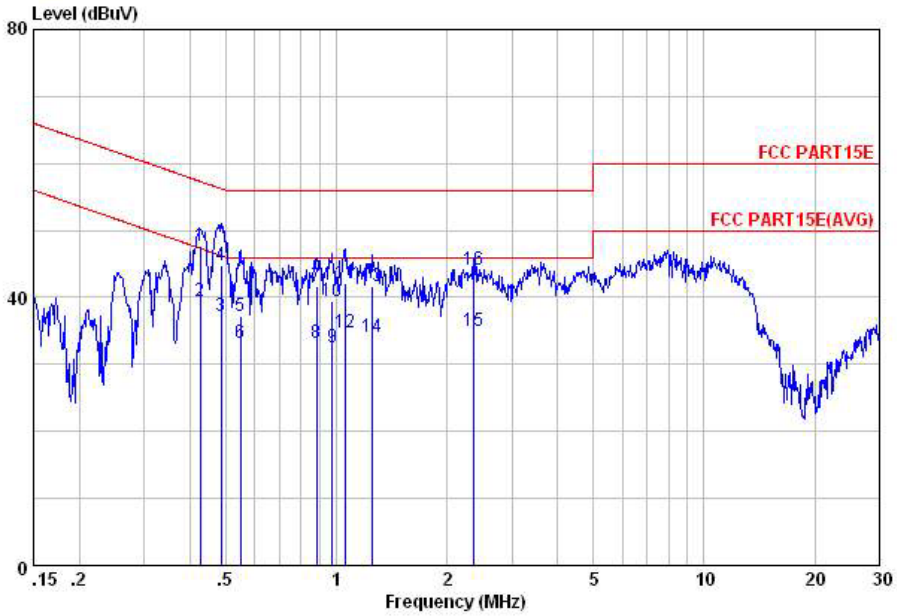
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

3.5.4 Test Setup



3.5.5 Test Result of AC Conducted Emission

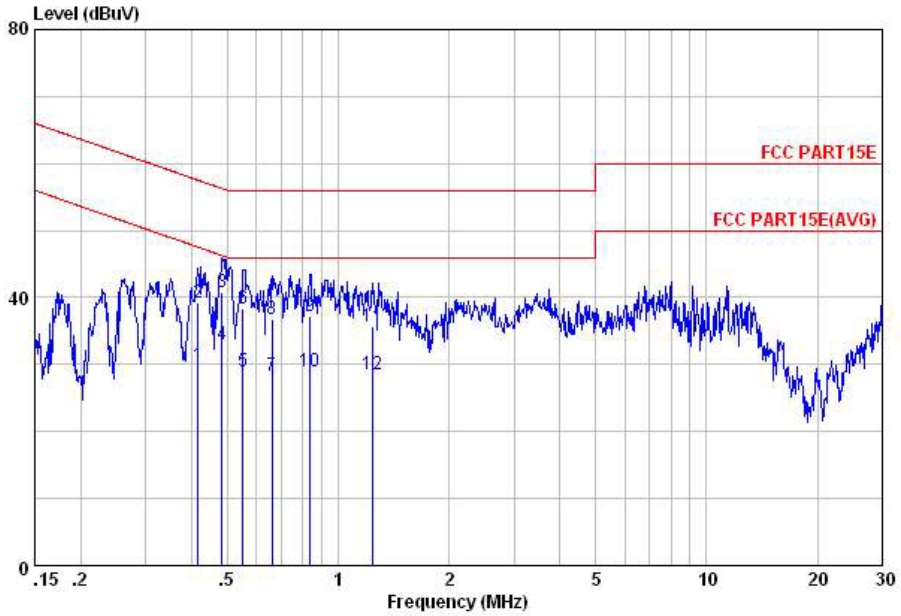
Test Mode :	Mode 1	Temperature :	22~24℃
Test Engineer :	Eligah Wang	Relative Humidity :	37~39%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WCDMA Band V Idle + WLAN(5G) Link + USB Cable (Charging from Adapter)		



Site : C001-KS
Condition: FCC PART15E LISN-L20130306 LINE

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.43	47.75	-9.58	57.33	37.19	0.28	10.28	QP
2	0.43	39.45	-7.88	47.33	28.89	0.28	10.28	Average
3	0.49	37.28	-8.95	46.23	26.80	0.21	10.27	Average
4	0.49	44.88	-11.35	56.23	34.40	0.21	10.27	QP
5	0.55	37.25	-18.75	56.00	26.80	0.20	10.25	QP
6	0.55	33.25	-12.75	46.00	22.80	0.20	10.25	Average
7	0.88	41.72	-14.28	56.00	31.40	0.13	10.19	QP
8	0.88	33.12	-12.88	46.00	22.80	0.13	10.19	Average
9	0.97	32.59	-13.41	46.00	22.31	0.10	10.18	Average
10	0.97	39.49	-16.51	56.00	29.21	0.10	10.18	QP
11	1.05	42.18	-13.82	56.00	31.90	0.10	10.18	QP
12	1.05	34.78	-11.22	46.00	24.50	0.10	10.18	Average
13	1.26	41.68	-14.32	56.00	31.40	0.10	10.18	QP
14	1.26	34.08	-11.92	46.00	23.80	0.10	10.18	Average
15	2.37	35.01	-10.99	46.00	24.70	0.11	10.20	Average
16	2.37	44.11	-11.89	56.00	33.80	0.11	10.20	QP

Test Mode :	Mode 1	Temperature :	22~24℃
Test Engineer :	Eligah Wang	Relative Humidity :	37~39%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WCDMA Band V Idle + WLAN(5G) Link + USB Cable (Charging from Adapter)		



Site : CO01-KS
Condition: FCC PART15E LISN-N20130306 NEUTRAL

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.42	29.86	-17.65	47.51	19.20	0.38	10.28	Average
2	0.42	39.26	-18.25	57.51	28.60	0.38	10.28	QP
3	0.48	40.78	-15.49	56.27	30.20	0.31	10.27	QP
4	0.48	32.98	-13.29	46.27	22.40	0.31	10.27	Average
5	0.55	29.03	-16.97	46.00	18.50	0.28	10.25	Average
6	0.55	38.33	-17.67	56.00	27.80	0.28	10.25	QP
7	0.66	28.33	-17.67	46.00	17.90	0.21	10.22	Average
8	0.66	36.83	-19.17	56.00	26.40	0.21	10.22	QP
9	0.84	37.14	-18.86	56.00	26.80	0.15	10.19	QP
10	0.84	28.94	-17.06	46.00	18.60	0.15	10.19	Average
11	1.24	35.68	-20.32	56.00	25.40	0.10	10.18	QP
12	1.24	28.48	-17.52	46.00	18.20	0.10	10.18	Average

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.

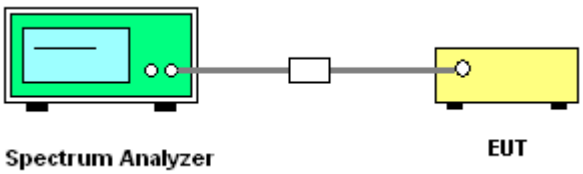
3.6.2 Measuring Instruments

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

Test Band :	5GHz band 4	Test Engineer :	Adonis Li

Mod.	Data Rate	N_{TX}	Channel	Freq. (MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)	Temperature (°C)	Voltage (V)
11a	6Mbps	1	149	5745	5744.975	-0.025	-4.35	20	3.7
11a	6Mbps	1	149	5745	5744.975	-0.025	-4.35	-10	3.5
11a	6Mbps	1	149	5745	5744.975	-0.025	-4.35	-10	4.2
11a	6Mbps	1	149	5745	5744.975	-0.025	-4.35	55	3.5
11a	6Mbps	1	149	5745	5744.975	-0.025	-4.35	55	4.2

Note: Center Frequency = (Low Frequency + High Frequency) / 2.

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

Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows.

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

Array Gain = 10 log(N_{ANT}/N_{SS}=1) dB.

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$.

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.

	Ant 1 (dBi)	Ant 2 (dBi)	for Power (dBi)	for PSD (dBi)	Limit Reduction (dB)	Limit Reduction (dB)
Band IV	2.00	2.00	2.00	5.01	0.00	0.00

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

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

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV30	101338	9kHz~30GHz	May 04, 2014	Aug. 20, 2014	May 03, 2015	Conducted (TH01-KS)
Pulse Power Senor	Anritsu	MA2411B	0917070	30MHz~40GHz	Feb. 27, 2014	Aug. 20, 2014	Feb. 26, 2015	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Feb. 27, 2014	Aug. 20, 2014	Feb. 26, 2015	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-960502	-40~+150°C	Dec. 10, 2013	Aug. 20, 2014	Dec. 09, 2014	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESCI	100534	9kHz~3GHz	Nov. 05, 2013	Aug. 06, 2014	Nov. 04, 2014	Radiation (03CH01-KS)
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Dec. 28, 2013	Aug. 06, 2014	Dec. 27, 2014	Radiation (03CH01-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 09, 2013	Aug. 06, 2014	Oct. 08, 2014	Radiation (03CH01-KS)
Bilog Antenna	SCHAFFNER	CBL6112D	23182	25MHz~2GHz	Jan. 08, 2014	Aug. 06, 2014	Jan. 07, 2015	Radiation (03CH01-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75959	1GHz~18GHz	Jan. 08, 2014	Aug. 06, 2014	Jan. 07, 2015	Radiation (03CH01-KS)
Active Horn Antenna	com-power	AHA-118	701030	1GHz~18GHz	Nov. 18, 2013	Aug. 06, 2014	Nov. 17, 2014	Radiation (03CH01-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Mar. 10, 2014	Aug. 06, 2014	Mar. 09, 2015	Radiation (03CH01-KS)
Amplifier	com-power	PA-103A	161073	1MHz~1GHz	May 04, 2014	Aug. 06, 2014	May 03, 2015	Radiation (03CH01-KS)
Amplifier	Agilent	8449B	3008A02371	1GHz~26.5GHz	Dec. 10, 2013	Aug. 06, 2014	Dec. 09, 2014	Radiation (03CH01-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Aug. 06, 2014	NCR	Radiation (03CH01-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Aug. 06, 2014	NCR	Radiation (03CH01-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Aug. 06, 2014	NCR	Radiation (03CH01-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	May 04, 2014	Jul. 30, 2014	May 03, 2015	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Dec. 10, 2013	Jul. 30, 2014	Dec. 09, 2014	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Dec. 10, 2013	Jul. 30, 2014	Dec. 09, 2014	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Nov. 12, 2013	Jul. 30, 2014	Nov. 11, 2014	Conduction (CO01-KS)

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.3**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.5**