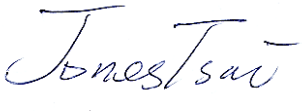
FCC RF Test Report

APPLICANT	:	TCT Mobile Limited
EQUIPMENT	:	LTE USB Modem/4G AP
BRAND NAME	:	ALCATEL onetouch
MODEL NAME	:	ONE TOUCH Y850O0
MARKETING NAME	:	ALCATEL ONETOUCH LINK Y850
FCC ID	:	RAD522
STANDARD	:	FCC Part 15 Subpart E §15.407
CLASSIFICATION	:	(NII) Unlicensed National Information Infrastructure

The product was received on Jul. 08, 2014 and testing was completed on Sep. 06, 2014. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

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

Reviewed by: Joseph Lin / Supervisor



Approved by: Jones Tsai / Manager

Testing Laboratory
1190

SPORTON INTERNATIONAL INC.
No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR493052B	Rev. 01	Initial issue of report	Oct. 14, 2014

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	2.1049 15.403(i)	RSS-210 A9.2	99% Bandwidth	-	Pass	-
3.2	15.407(a)	RSS-210 A9.2	Maximum Conducted Output Power	≤ 24 dBm	Pass	-
3.3	15.407(a)	RSS-210 A9.2	Power Spectral Density	≤ 11 dBm	Pass	-
3.4	15.407(b)	RSS-210 A9.3	Unwanted Emissions	≤ -27 dBm &15.209(a)	Pass	Under limit 16.37 dB at 5148.550 MHz
3.5	15.207	RSS-Gen 7.2.4	AC Conducted Emission	15.207(a)	Pass	Under limit 6.56 dB at 0.640 MHz
3.6	15.407(g)	-	Frequency Stability	Within Operation Band	Pass	-
3.7	15.407(c)	RSS-210 A9.4	Automatically Discontinue Transmission	Discontinue Transmission	Pass	-
3.8	15.203 & 15.407(a)	RSS-210 A9.2	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

TCT Mobile Limited

5F, C building, No. 232, Liang Jing Road, ZhangJiang High-Tech Park, Pudong Area, Shanghai, P.R. China. 201203

1.2 Manufacturer

TCL COMMUNICATION TECHNOLOGY HOLDINGS LIMITED

70 Huifeng 4rd, ZhongKai Hi-tech Development District, Huizhou, Guangdong 516006 P.R.China (TCL Mobile Communication Co.,LTD.Huizhou)

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	LTE USB Modem/4G AP
Brand Name	ALCATEL onetouch
Model Name	ONE TOUCH Y850O0
Marketing Name	ALCATEL ONETOUCH LINK Y850
FCC ID	RAD522
EUT supports Radios application	GSM/EGPRS/WCDMA/HSPA/LTE WLAN 11a/b/g/n HT20/HT40
HW Version	V4.0
SW Version	Y850V_00_01.13_15_20140626
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>5180 MHz ~ 5240 MHz</td></tr>
<tr><td>Maximum Output Power</td><td>SISO <Ant. 1>
802.11a : 6.03 dBm / 0.0040 W
802.11n HT20 : 4.64 dBm / 0.0029 W
802.11n HT40 : 5.13 dBm / 0.0033 W
SISO <Ant. 2>
802.11a : 7.90 dBm / 0.0062 W
802.11n HT20 : 6.08 dBm / 0.0041 W
802.11n HT40 : 6.70 dBm / 0.0047 W
MIMO <Ant. Port 1 + 2>
802.11a : 10.17 dBm / 0.0104 W
802.11n HT20 : 8.17 dBm / 0.0066 W
802.11n HT40 : 9.03 dBm / 0.0080 W</td></tr>
<tr><td>99% Occupied Bandwidth</td><td>802.11a : 18.10 MHz
802.11n HT20 : 18.80 MHz
802.11n HT40 : 37.40 MHz</td></tr>
<tr><td>Antenna Type</td><td>Antenna 1: PIFA Antenna with gain -4.00 dBi
Antenna 2: PIFA Antenna with gain -4.00 dBi</td></tr>
<tr><td>Type of Modulation</td><td>OFDM (BPSK / QPSK / 16QAM / 64QAM)</td></tr>
<tr><td>Antenna Function Description</td><td>
<table>
<tr><td></td><td>Ant.1</td><td>Ant. 2</td></tr>
<tr><td>802.11 a SISO</td><td>V</td><td>V</td></tr>
<tr><td>802.11 a MIMO</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

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. 831040 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

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.**	
	TH01-KS	03CH01-KS

Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.
Test Site Location	No. 101, Complex Building C, Guanlong Village, Xili Town, Nanshan District, Shenzhen, Guangdong, P.R.C. TEL: +86-755-8637-9589
Test Site No.	**Sporton Site No.**
	CO01-SZ

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 (Z 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)
5150-5250 MHz Band 1 (U-NII-1)	36	5180	44	5220
	38	**5190**	**46**	**5230**
	40	5200	48	5240

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.

SISO <Ant. 1>

5GHz 802.11a mode								
Data Rate (MHz)	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
Average Power (dBm)	6.03	5.73	5.75	5.79	5.70	5.87	5.92	5.99

5GHz 802.11n HT20 mode								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Average Power (dBm)	4.64	4.06	4.25	4.26	4.34	4.41	4.48	4.32

5GHz 802.11n HT40 mode								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Average Power (dBm)	5.05	4.68	4.81	4.87	4.98	5.03	4.99	4.97

SISO <Ant. 2>

5GHz 802.11a mode								
Data Rate (MHz)	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
Average Power (dBm)	7.90	7.70	7.69	7.82	7.68	7.77	7.75	7.74

5GHz 802.11n HT20 mode								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Average Power (dBm)	6.08	5.71	5.84	5.86	5.94	5.98	6.00	6.05

5GHz 802.11n HT40 mode								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Average Power (dBm)	6.70	6.36	6.42	5.66	6.41	6.10	5.29	6.47

MIMO <Ant. 1 + 2>

5GHz 802.11a mode								
Data Rate (MHz)	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
Average Power (dBm)	10.17	9.92	9.95	10.04	9.96	10.11	10.15	10.05

5GHz 802.11n HT20 mode								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Average Power (dBm)	8.17	7.73	7.87	7.93	7.78	7.90	7.91	7.89

5GHz 802.11n HT40 mode								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Average Power (dBm)	9.03	8.88	8.91	8.88	8.95	8.86	8.93	8.92

Note: MIMO Ant. 1+2 is a calculated result from sum of the power MIMO Ant. 1 and MIMO Ant. 2.

2.3 Test Mode

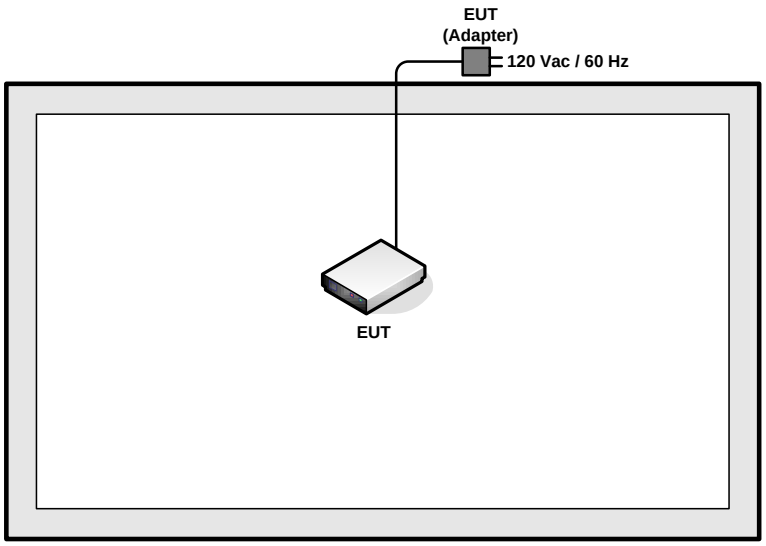
Final results of test modes, data rates and test channels are shown as following table.

Test Cases				
	Test Items	**Mode**	**Data Rate**	**Test Channel**
Conducted TCs	**99% BW Power Spectral Density**	**802.11a**	**6 Mbps**	**L/M/H**
		802.11n HT20	**MCS0**	**L/M/H**
		802.11n HT40	**MCS0**	**L/H**
	Output Power	**802.11a**	**6 Mbps**	**L/M/H**
		802.11n HT20	**MCS0**	**L/M/H**
		802.11n HT40	**MCS0**	**L/H**
	Frequency Stability	**802.11a**	**6 Mbps**	**L**
		802.11n HT20	**MCS0**	**-**
		802.11n HT40	**MCS0**	**-**
Radiated TCs	**Radiated Band Edge**	**802.11a**	**6 Mbps**	**L/H**
		802.11n HT20	**MCS0**	**L/H**
		802.11n HT40	**MCS0**	**L/H**
	Radiated Spurious Emission	**802.11a**	**6 Mbps**	**L/M/H**
		802.11n HT20	**MCS0**	**L/M/H**
		802.11n HT40	**MCS0**	**L/H**
AC Conducted Emission	Mode 1 : WCDMA Band V Idle + WLAN (5 GHz) Link + Adapter			

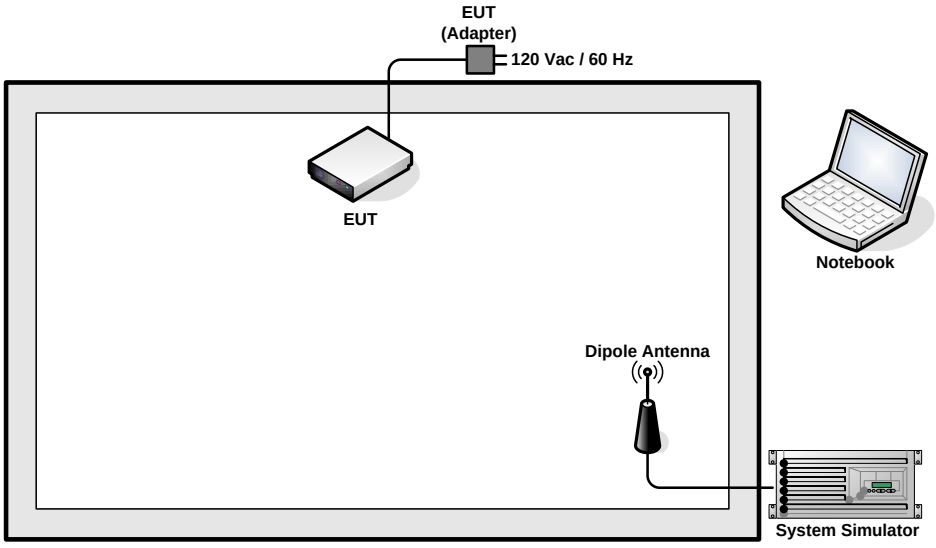
Ch. #		**Band I：5150-5250 MHz**		
		802.11a	**802.11n HT20**	**802.11n HT40**
L	**Low**	36	36	38
M	**Middle**	44	44	-
H	**High**	48	48	46

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	CMW 500	N/A	N/A	Unshielded, 1.8 m
2.	Notebook	Lenovo	G480	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m

2.6 EUT Operation Test Setup

For WLAN function, programmed RF utility, “adb” installed in the notebook make the EUT provide functions like channel selection and power level for continuous transmitting and receiving signals.

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 4.2 dB and 10dB attenuator.

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

= 4.2 + 10 = 14.2 (dB)

3 Test Result

3.1 99% Bandwidth Measurement

3.1.1 Description of 99% Occupied Bandwidth

This section is for reporting purpose only.

There is no restriction limits for bandwidth.

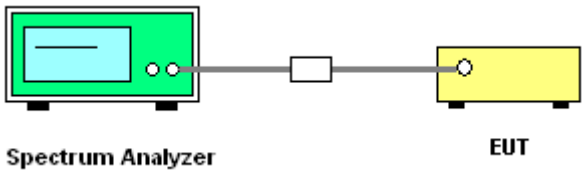
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01. Section C) Emission bandwidth
2. Set RBW = approximately 1% of the emission bandwidth.
3. Set the VBW > RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1MHz and set the Video bandwidth (VBW) ≥ 3 * RBW.
7. Measure and record the results in the test report.

3.1.4 Test Setup

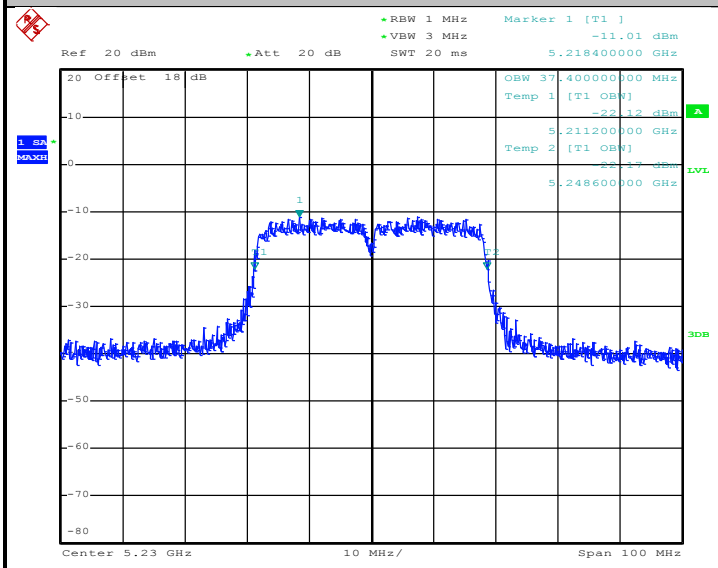


3.1.5 Test Result of 99% Occupied Bandwidth

Test Band :	5GHz band 1	Temperature :	24~26℃
Test Engineer :	Fly Liang	Relative Humidity :	50~53%

Mod.	Data Rate	N_{TX}	Channel	Freq. (MHz)	99% Bandwidth (MHz)		-		IC 99% Bandwidth EIRP Limit (dBm)		-	
					Ant 1	Ant 2	-	-	Ant 1	Ant 2	-	-
11a	6Mbps	1	36	5180	18.10	18.10	-	-	22.58	22.58	-	-
11a	6Mbps	1	44	5220	18.00	18.00	-	-	22.55	22.55	-	-
11a	6Mbps	1	48	5240	18.00	17.90	-	-	22.55	22.53	-	-
HT20	MCS0	1	36	5180	18.80	18.80	-	-	22.74	22.74	-	-
HT20	MCS0	1	44	5220	18.70	18.80	-	-	22.72	22.74	-	-
HT20	MCS0	1	48	5240	18.70	18.75	-	-	22.72	22.73	-	-
HT40	MCS0	1	38	5190	36.70	36.90	-	-	23.01	23.01	-	-
HT40	MCS0	1	46	5230	37.00	37.00	-	-	23.01	23.01	-	-
11a	6Mbps	2	36	5180	17.90	18.05	-	-	22.53		-	
11a	6Mbps	2	44	5220	18.05	18.10	-	-	22.56		-	
11a	6Mbps	2	48	5240	18.05	18.05	-	-	22.56		-	
HT20	MCS0	2	36	5180	18.65	18.75	-	-	22.71		-	
HT20	MCS0	2	44	5220	18.60	18.70	-	-	22.70		-	
HT20	MCS0	2	48	5240	18.65	18.75	-	-	22.71		-	
HT40	MCS0	2	38	5190	36.80	37.40	-	-	23.01		-	
HT40	MCS0	2	46	5230	36.80	37.40	-	-	23.01		-	

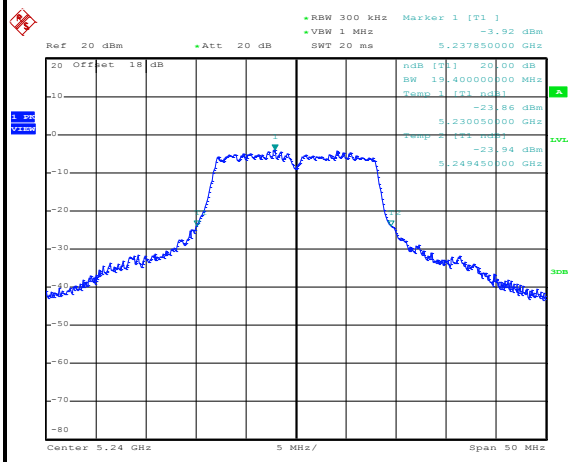
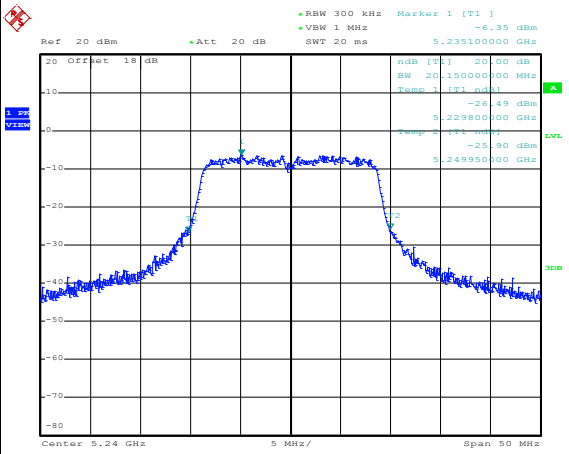
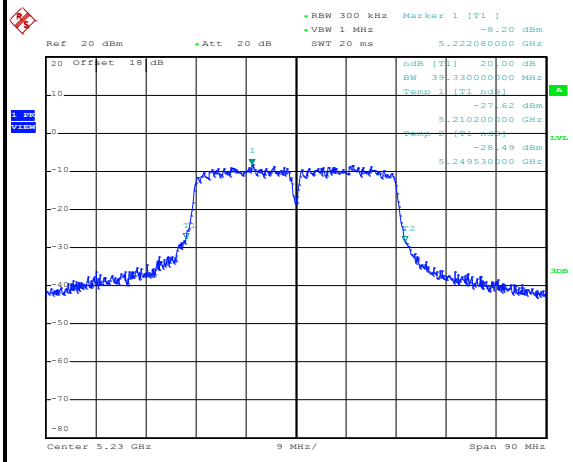
Maximum 99% Occupied Bandwidth



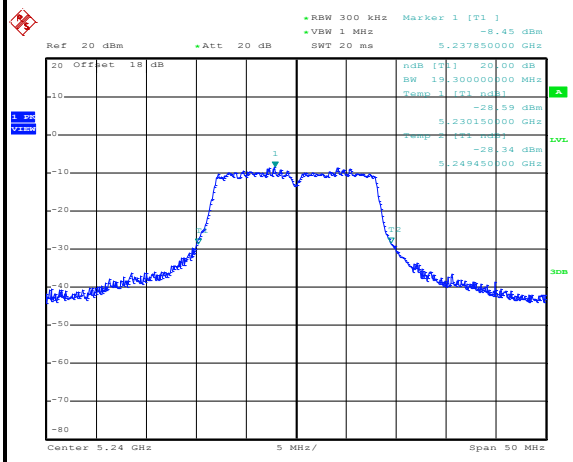
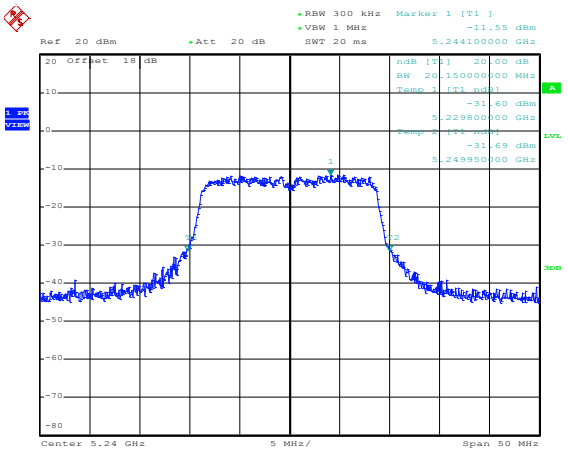
3.1.6 Test Result of 20dB Occupied Bandwidth

Mod.	Data Rate	NTX	Channel	Freq. (MHz)	20dB Bandwidth (MHz)		20dB Bandwidth Upper Frequency (FH) (MHz)		Upper Limit Line (MHz)	Pass/Fail
					Ant. 1	Ant. 2	Ant. 1	Ant. 2		
11a	6Mbps	1	48	5240	19.40	19.30	5249.45	5249.45	5250	Pass
HT20	MCS0	1	48	5240	20.15	20.15	5249.95	5249.95		Pass
HT40	MCS0	1	46	5230	39.33	39.69	5249.53	5249.80		Pass
11a	6Mbps	2	48	5240	19.35	-	5249.45	-		Pass
HT20	MCS0	2	48	5240	19.60		5249.75			Pass
HT40	MCS0	2	46	5230	39.15		5249.35			Pass

SISO <Ant. 1>

20dB Occupied Bandwidth	
802.11a CH48 5240MHz	**802.11n HT20 CH48 5240MHz**
 Date: 5.SEP.2014 17:57:59	 Date: 5.SEP.2014 17:54:33
802.11n HT40 CH46 5230MHz	
 Date: 5.SEP.2014 17:37:48	

SISO <Ant. 2>

20dB Occupied Bandwidth	
802.11a CH48 5240MHz	**802.11n HT20 CH48 5240MHz**
 Date: 5.SEP.2014 18:00:44	 Date: 5.SEP.2014 17:53:21
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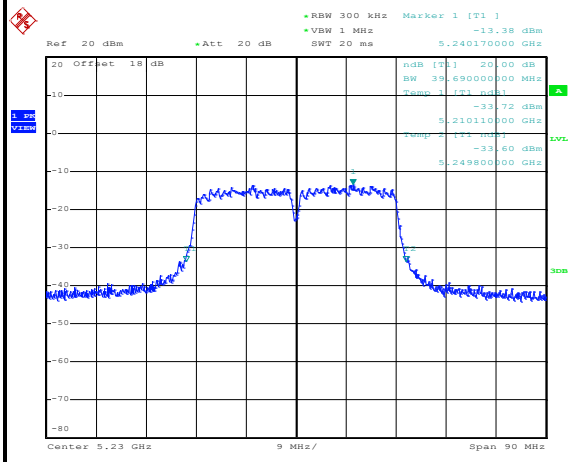
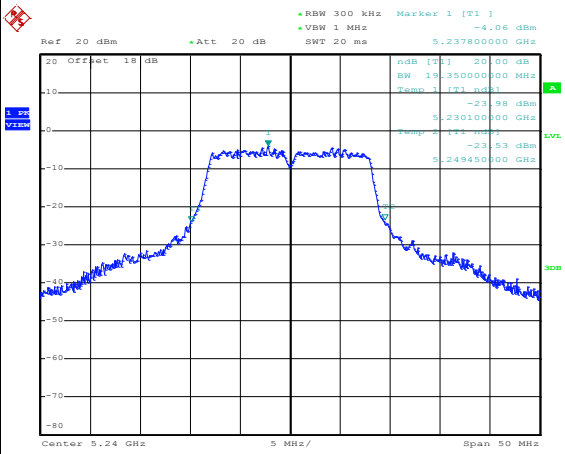
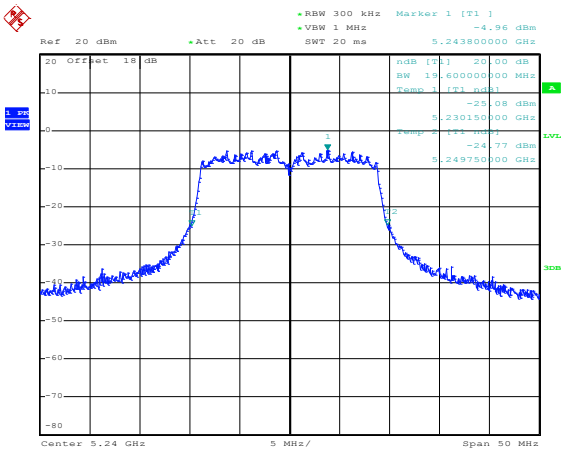
 Date: 5.SEP.2014 17:36:58	

MIMO <Ant. 1>

20dB Occupied Bandwidth	
802.11a CH48 5240MHz	**802.11n HT20 CH48 5240MHz**
 Date: 5.SEP.2014 17:59:28	 Date: 5.SEP.2014 17:42:27
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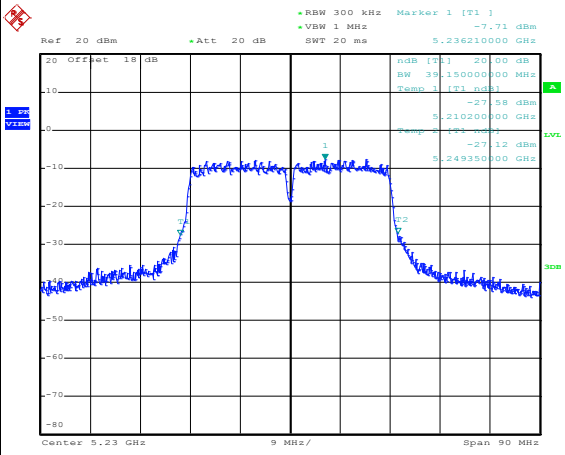
 Date: 5.SEP.2014 17:31:27	

3.2 Maximum Conducted Output Power Measurement

3.2.1 Limit of Maximum Conducted Output Power

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

3.2.2 Measuring Instruments

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

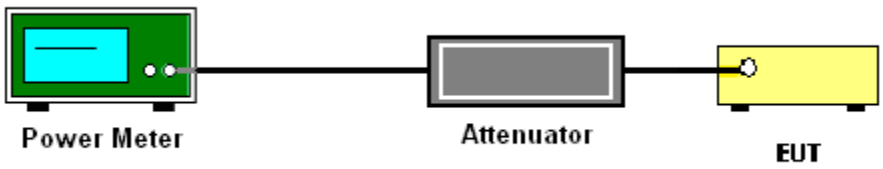
3.2.3 Test Procedures

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 1	Temperature :	24~26℃
Test Engineer :	Fly Liang	Relative Humidity :	50~53%

Mod.	Data Rate	N_{TX}	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)			FCC Power Limit (dBm)		DG (dBi)			Pass /Fail
					Ant. 1	Ant. 2	Ant. 1	Ant. 2	Sum Power	Ant. 1	Ant. 2	Ant. 1	Ant. 2		
11a	6Mbps	1	36	5180	0.10	0.08	6.03	7.14	-	24.00	24.00	-4.00	-4.00	-	Pass
11a	6Mbps	1	44	5220	0.10	0.08	5.88	7.90		24.00	24.00	-4.00	-4.00		Pass
11a	6Mbps	1	48	5240	0.10	0.08	4.99	7.70		24.00	24.00	-4.00	-4.00		Pass
HT20	MCS0	1	36	5180	0.08	0.08	3.98	5.03		24.00	24.00	-4.00	-4.00		Pass
HT20	MCS0	1	44	5220	0.08	0.08	4.64	6.08		24.00	24.00	-4.00	-4.00		Pass
HT20	MCS0	1	48	5240	0.08	0.08	3.13	5.62		24.00	24.00	-4.00	-4.00		Pass
HT40	MCS0	1	38	5190	0.16	0.16	5.05	5.87		24.00	24.00	-4.00	-4.00		Pass
HT40	MCS0	1	46	5230	0.16	0.16	3.72	6.70		24.00	24.00	-4.00	-4.00		Pass
11a	6Mbps	2	36	5180	0.05	0.09	5.50	7.64	9.71	24.00		-4.00		-	Pass
11a	6Mbps	2	44	5220	0.05	0.09	5.31	8.45	10.17	24.00		-4.00			Pass
11a	6Mbps	2	48	5240	0.05	0.09	4.17	8.11	9.58	24.00		-4.00			Pass
HT20	MCS0	2	36	5180	0.16	0.16	4.03	5.72	7.96	24.00		-4.00			Pass
HT20	MCS0	2	44	5220	0.16	0.16	3.72	6.24	8.17	24.00		-4.00			Pass
HT20	MCS0	2	48	5240	0.16	0.16	2.70	6.03	7.68	24.00		-4.00			Pass
HT40	MCS0	2	38	5190	0.27	0.32	4.78	6.43	8.69	24.00		-4.00			Pass
HT40	MCS0	2	46	5230	0.27	0.32	4.37	7.21	9.03	24.00		-4.00			Pass

Note:

1. Final Output Power equals to Measured Output Power adds the duty factor.
2. Sum Power is a calculated result from sum of the power Ant 1 and Ant 2.
3. For the band 5150-5250 MHz, the maximum average conducted output power shall not exceed lesser of 250 mW (24dBm).

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

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

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 D02 General UNII Test Procedures New Rules v01.
   - Measure the duty cycle.
   - Set span to encompass the entire emission bandwidth (EBW) of the signal.
   - Set RBW = 1 MHz.
   - Set VBW ≥ 3 MHz.
   - Number of points in sweep ≥ 2 Span / RBW.
   - Sweep time = auto.
   - Detector = RMS
   - Trace average at least 100 traces in power averaging mode.
   - Add 10 log(1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, add 10 log(1/0.25) = 6 dB if the duty cycle is 25 percent.
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

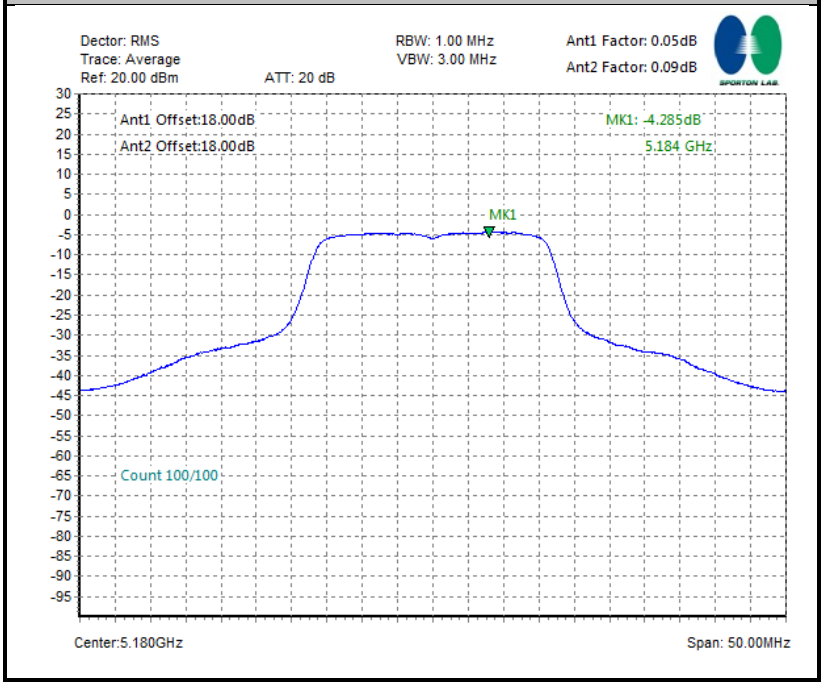
3.3.5 Test Result of Power Spectral Density

Test Band :	5GHz band 1	Temperature :	24~26℃
Test Engineer :	Fly Liang	Relative Humidity :	50~53%

Mod.	Data Rate	N_{TX}	CH.	Freq. (MHz)	Duty Factor (dB)		Average Power Density (dBm/MHz)			Average PSD Limit (dBm)		DG (dBi)		-		Pass /Fail
					Ant 1	Ant 2	Ant 1	Ant 2	Sum Power	Ant 1	Ant 2	Ant 1	Ant 2	-	-	
11a	6Mbps	1	36	5180	0.10	0.08	-6.69	-10.60		11.00	11.00	-4.00	-4.00	-	-	Pass
11a	6Mbps	1	44	5220	0.10	0.08	-6.87	-11.06		11.00	11.00	-4.00	-4.00	-	-	Pass
11a	6Mbps	1	48	5240	0.10	0.08	-7.87	-11.06		11.00	11.00	-4.00	-4.00	-	-	Pass
HT20	MCS0	1	36	5180	0.08	0.08	-8.41	-8.65		11.00	11.00	-4.00	-4.00	-	-	Pass
HT20	MCS0	1	44	5220	0.08	0.08	-8.64	-8.77	-	11.00	11.00	-4.00	-4.00	-	-	Pass
HT20	MCS0	1	48	5240	0.08	0.08	-9.47	-9.36		11.00	11.00	-4.00	-4.00	-	-	Pass
HT40	MCS0	1	38	5190	0.16	0.16	-11.50	-14.22		11.00	11.00	-4.00	-4.00	-	-	Pass
HT40	MCS0	1	46	5230	0.16	0.16	-11.87	-14.19		11.00	11.00	-4.00	-4.00	-	-	Pass
11a	6Mbps	2	36	5180	0.05	0.09			-4.29	11.00		-0.99		-		Pass
11a	6Mbps	2	44	5220	0.05	0.09			-5.47	11.00		-0.99		-		Pass
11a	6Mbps	2	48	5240	0.05	0.09			-5.94	11.00		-0.99		-		Pass
HT20	MCS0	2	36	5180	0.16	0.16			-7.05	11.00		-0.99		-		Pass
HT20	MCS0	2	44	5220	0.16	0.16		-	-7.42	11.00		-0.99		-		Pass
HT20	MCS0	2	48	5240	0.16	0.16			-7.96	11.00		-0.99		-		Pass
HT40	MCS0	2	38	5190	0.27	0.32			-12.22	11.00		-0.99		-		Pass
HT40	MCS0	2	46	5230	0.27	0.32			-12.69	11.00		-0.99		-		Pass

Note: Sum PSD is a bin-by-bin combined result of Ant 1 and Ant 2.

Worst Case Power Density (dBm/MHz)



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

(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 v01 G)2)c) 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.

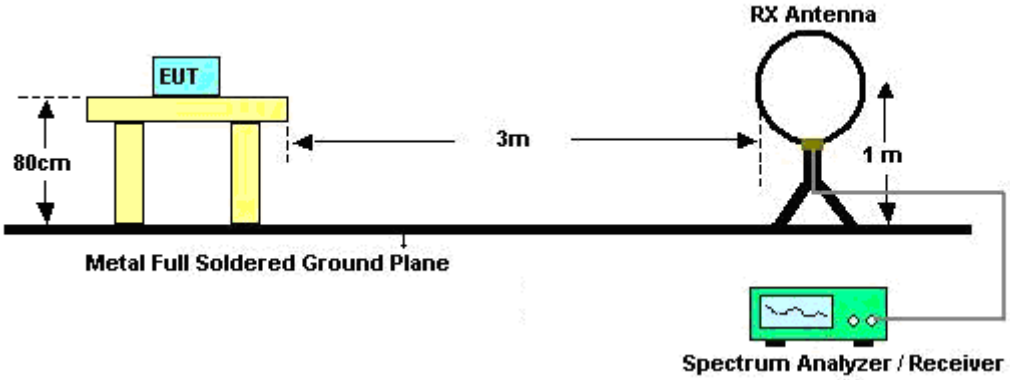
Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
1+2	802.11a	97.92	2.068	0.483559	1KHz
1+2	802.11n HT20	96.48	0.988	1.0121457	3KHz
1+2	802.11n HT40	92.94	0.5	2	3KHz

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.

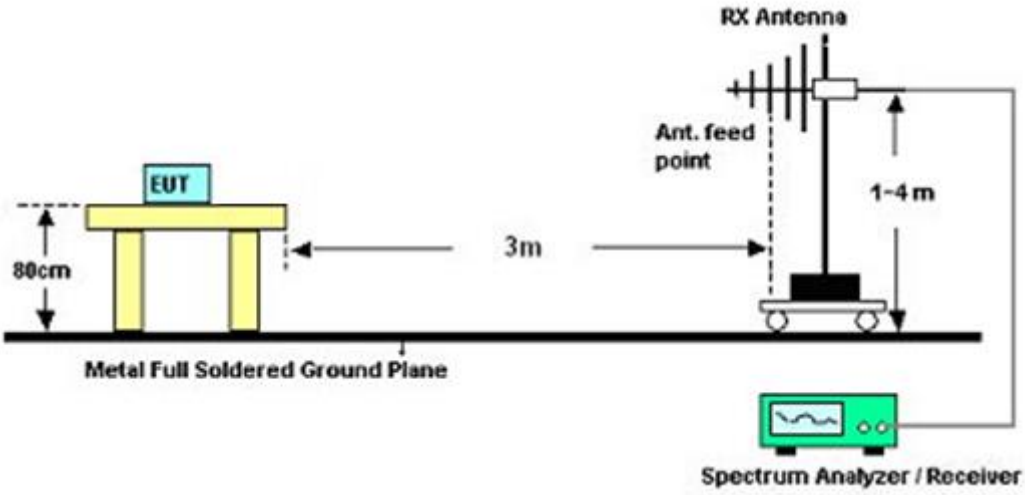
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level 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

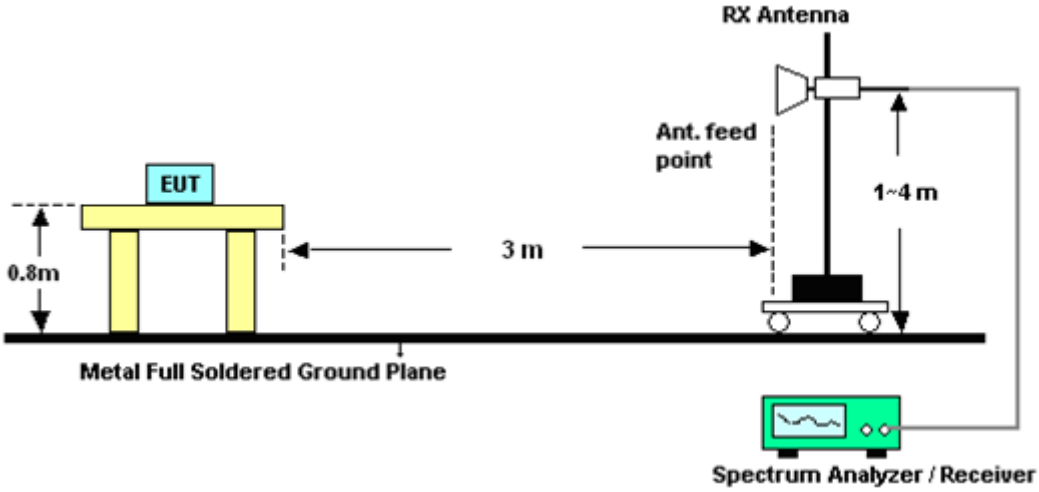
For radiated emissions below 30MHz



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

MIMO <Ant. 1+2>

Test Mode :	802.11a	**Temperature :**	22~23°C
Test Channel :	36	**Relative Humidity :**	41~42%
Test Engineer :	Jun Liu		

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
5149.9	56.7	-17.3	74	56.34	34.32	3.9	37.86	111	144	Peak
5149.9	35.68	-18.32	54	35.32	34.32	3.9	37.86	111	144	Average

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
5149.6	51.54	-22.46	74	51.18	34.32	3.9	37.86	114	277	Peak
5150	33.78	-20.22	54	33.42	34.32	3.9	37.86	114	277	Average

Test Mode :	802.11a	**Temperature :**	22~23°C
Test Channel :	48	**Relative Humidity :**	41~42%
Test Engineer :	Jun Liu		

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
5359.75	48.89	-25.11	74	49.56	34.4	4.01	39.08	122	141	Peak
5399.95	34.67	-19.33	54	35.66	34.4	4.03	39.42	122	141	Average

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
5361.5	47.74	-26.26	74	48.53	34.4	4.01	39.2	123	267	Peak
5386.3	33.09	-20.91	54	33.98	34.4	4.02	39.31	124	267	Average

Test Mode :	802.11n HT20	Temperature :	22~23°C
Test Channel :	36	Relative Humidity :	41~42%
Test Engineer :	Jun Liu		

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
5149.5	49.66	-24.34	74	49.3	34.32	3.9	37.86	100	144	Peak
5147	36.4	-17.6	54	36.04	34.32	3.9	37.86	100	144	Average

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
5135.05	48.15	-25.85	74	47.76	34.31	3.88	37.8	155	125	Peak
5132.25	34.81	-19.19	54	34.42	34.31	3.88	37.8	155	124	Average

Test Mode :	802.11n HT20	Temperature :	22~23°C
Test Channel :	48	Relative Humidity :	41~42%
Test Engineer :	Jun Liu		

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
5356.95	48.87	-25.13	74	49.55	34.4	4	39.08	110	150	Peak
5359.95	36.29	-17.71	54	36.96	34.4	4.01	39.08	110	150	Average

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
5352.5	48.02	-25.98	74	48.7	34.4	4	39.08	137	286	Peak
5399.95	34.91	-19.09	54	35.9	34.4	4.03	39.42	137	286	Average

Test Mode :	802.11n HT40	Temperature :	22~23°C
Test Channel :	38	Relative Humidity :	41~42%
Test Engineer :	Jun Liu		

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
5148.6	52.01	-21.99	74	51.65	34.32	3.9	37.86	125	209	Peak
5148.55	37.63	-16.37	54	37.27	34.32	3.9	37.86	125	209	Average

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
5149.2	47.58	-26.42	74	47.22	34.32	3.9	37.86	200	255	Peak
5149.6	35.42	-18.58	54	35.06	34.32	3.9	37.86	200	255	Average

Test Mode :	802.11n HT40	Temperature :	22~23°C
Test Channel :	46	Relative Humidity :	41~42%
Test Engineer :	Jun Liu		

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
5358.95	47.52	-26.48	74	48.19	34.4	4.01	39.08	112	204	Peak
5387.5	34.94	-19.06	54	35.83	34.4	4.02	39.31	112	204	Average

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
5366.3	48.04	-25.96	74	48.83	34.4	4.01	39.2	126	53	Peak
5383.6	34.43	-19.57	54	35.32	34.4	4.02	39.31	126	53	Average

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

MIMO <Ant. 1+2>

Test Mode :	802.11a	**Temperature :**	22~23°C
Test Channel :	36	**Relative Humidity :**	41~42%
Test Engineer :	Jun Liu	**Polarization :**	Horizontal
Remark :	1. 5180 MHz is fundamental signal which can be ignored. 2. 10360 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

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
5180	106.43	-	-	106.16	34.35	3.92	38	111	144	Peak
5180	94.02	-	-	93.75	34.35	3.92	38	111	144	Average
10360	32.93	-41.07	74	62.39	1.46	5.85	36.77	110	210	Peak

Test Mode :	802.11a	**Temperature :**	22~23°C
Test Channel :	36	**Relative Humidity :**	41~42%
Test Engineer :	Jun Liu	**Polarization :**	Vertical
Remark :	1. 5180 MHz is fundamental signal which can be ignored. 2. 10360 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

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
5180	100.76	-	-	100.49	34.35	3.92	38	114	277	Peak
5180	87.66	-	-	87.39	34.35	3.92	38	114	277	Average
10360	31.76	-42.24	74	61.22	1.46	5.85	36.77	156	217	Peak

Test Mode :	802.11a	Temperature :	22~23°C
Test Channel :	44	Relative Humidity :	41~42%
Test Engineer :	Jun Liu	Polarization :	Horizontal
Remark :	1. 5220 MHz is fundamental signal which can be ignored. 2. 10440 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

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
5220	105.74	-	-	105.6	34.37	3.95	38.18	100	195	Peak
5220	94.18	-	-	94.04	34.37	3.95	38.18	100	195	Average
10440	29.21	-44.79	74	58.61	1.53	5.89	36.82	129	317	Peak

Test Mode :	802.11a	Temperature :	22~23°C
Test Channel :	44	Relative Humidity :	41~42%
Test Engineer :	Jun Liu	Polarization :	Vertical
Remark :	1. 5220 MHz is fundamental signal which can be ignored. 2. 10440 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

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
5220	101.64	-	-	101.5	34.37	3.95	38.18	112	280	Peak
5220	87.83	-	-	87.69	34.37	3.95	38.18	112	280	Average
10440	29.71	-44.29	74	59.11	1.53	5.89	36.82	158	203	Peak

Test Mode :	802.11a	Temperature :	22~23°C
Test Channel :	48	Relative Humidity :	41~42%
Test Engineer :	Jun Liu	Polarization :	Horizontal
Remark :	1. 5240 MHz is fundamental signal which can be ignored. 2. 10480 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

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
5240	105.37	-	-	105.32	34.39	3.95	38.29	122	141	Peak
5240	92.92	-	-	92.87	34.39	3.95	38.29	122	141	Average
10480	31.45	-42.55	74	60.88	1.56	5.92	36.91	108	309	Peak

Test Mode :	802.11a	Temperature :	22~23°C
Test Channel :	48	Relative Humidity :	41~42%
Test Engineer :	Jun Liu	Polarization :	Vertical
Remark :	1. 5240 MHz is fundamental signal which can be ignored. 2. 10480 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

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
5240	101.32	-	-	101.27	34.39	3.95	38.29	124	267	Peak
5240	87.93	-	-	87.88	34.39	3.95	38.29	124	267	Average
10480	30.1	-43.9	74	59.53	1.56	5.92	36.91	195	164	Peak

Test Mode :	802.11n HT20	Temperature :	22~23°C
Test Channel :	36	Relative Humidity :	41~42%
Test Engineer :	Jun Liu	Polarization :	Horizontal
Remark :	1. 5180 MHz is fundamental signal which can be ignored. 2. 10360 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

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
5180	106.07	-	-	105.8	34.35	3.92	38	100	144	Peak
5180	95.49	-	-	95.22	34.35	3.92	38	100	144	Average
10360	28	-46	74	57.46	1.46	5.85	36.77	125	301	Peak

Test Mode :	802.11n HT20	Temperature :	22~23°C
Test Channel :	36	Relative Humidity :	41~42%
Test Engineer :	Jun Liu	Polarization :	Vertical
Remark :	1. 5180 MHz is fundamental signal which can be ignored. 2. 10360 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

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
5180	97.93	-	-	97.66	34.35	3.92	38	155	124	Peak
5180	87.07	-	-	86.8	34.35	3.92	38	155	124	Average
10360	28.61	-45.39	74	58.07	1.46	5.85	36.77	147	320	Peak

Test Mode :	802.11n HT20	Temperature :	22~23°C
Test Channel :	44	Relative Humidity :	41~42%
Test Engineer :	Jun Liu	Polarization :	Horizontal
Remark :	1. 5220 MHz is fundamental signal which can be ignored. 2. 10440 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

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
5220	105.07	-	-	104.93	34.37	3.95	38.18	100	154	Peak
5220	95.08	-	-	94.94	34.37	3.95	38.18	100	154	Average
10440	29.32	-44.68	74	58.72	1.53	5.89	36.82	128	301	Peak

Test Mode :	802.11n HT20	Temperature :	22~23°C
Test Channel :	44	Relative Humidity :	41~42%
Test Engineer :	Jun Liu	Polarization :	Vertical
Remark :	1. 5220 MHz is fundamental signal which can be ignored. 2. 10440 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

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
5220	98.18	-	-	98.04	34.37	3.95	38.18	200	280	Peak
5220	88.88	-	-	88.74	34.37	3.95	38.18	200	280	Average
10440	28.28	-45.72	74	57.68	1.53	5.89	36.82	105	0	Peak

Test Mode :	802.11n HT20	Temperature :	22~23°C
Test Channel :	48	Relative Humidity :	41~42%
Test Engineer :	Jun Liu	Polarization :	Horizontal
Remark :	1. 5240 MHz is fundamental signal which can be ignored. 2. 10480 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

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
5240	104.29	-	-	104.24	34.39	3.95	38.29	110	150	Peak
5240	94.3	-	-	94.25	34.39	3.95	38.29	110	150	Average
10480	29.36	-44.64	74	58.79	1.56	5.92	36.91	125	304	Peak

Test Mode :	802.11n HT20	Temperature :	22~23°C
Test Channel :	48	Relative Humidity :	41~42%
Test Engineer :	Jun Liu	Polarization :	Vertical
Remark :	1. 5240 MHz is fundamental signal which can be ignored. 2. 10480 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

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
5240	98.03	-	-	97.98	34.39	3.95	38.29	137	286	Peak
5240	87.56	-	-	87.51	34.39	3.95	38.29	137	286	Average
10480	29.73	-44.27	74	59.16	1.56	5.92	36.91	154	92	Peak

Test Mode :	802.11n HT40	Temperature :	22~23°C
Test Channel :	38	Relative Humidity :	41~42%
Test Engineer :	Jun Liu	Polarization :	Horizontal
Remark :	1. 5190 MHz is fundamental signal which can be ignored. 2. 10380 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

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
5190	104.62	-	-	104.35	34.35	3.92	38	125	209	Peak
5190	94.97	-	-	94.7	34.35	3.92	38	125	209	Average
10380	28.74	-45.26	74	58.17	1.48	5.86	36.77	100	203	Peak

Test Mode :	802.11n HT40	Temperature :	22~23°C
Test Channel :	38	Relative Humidity :	41~42%
Test Engineer :	Jun Liu	Polarization :	Vertical
Remark :	1. 5190 MHz is fundamental signal which can be ignored. 2. 10380 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

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
5190	98.33	-	-	98.06	34.35	3.92	38	200	255	Peak
5190	88.28	-	-	88.01	34.35	3.92	38	200	255	Average
10380	29.6	-44.4	74	59.03	1.48	5.86	36.77	157	210	Peak

Test Mode :	802.11n HT40	Temperature :	22~23°C
Test Channel :	46	Relative Humidity :	41~42%
Test Engineer :	Jun Liu	Polarization :	Horizontal
Remark :	1. 5230 MHz is fundamental signal which can be ignored. 2. 10460 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

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
5230	104.58	-	-	104.53	34.39	3.95	38.29	112	204	Peak
5230	94.76	-	-	94.71	34.39	3.95	38.29	112	204	Average
10460	27.92	-46.08	74	57.33	1.54	5.9	36.85	142	310	Peak

Test Mode :	802.11n HT40	Temperature :	22~23°C
Test Channel :	46	Relative Humidity :	41~42%
Test Engineer :	Jun Liu	Polarization :	Vertical
Remark :	1. 5230 MHz is fundamental signal which can be ignored. 2. 10460 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

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
5230	98.01	-	-	97.96	34.39	3.95	38.29	127	53	Peak
5230	88.17	-	-	88.12	34.39	3.95	38.29	127	53	Average
10460	27.87	-46.13	74	57.28	1.54	5.9	36.85	124	208	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.

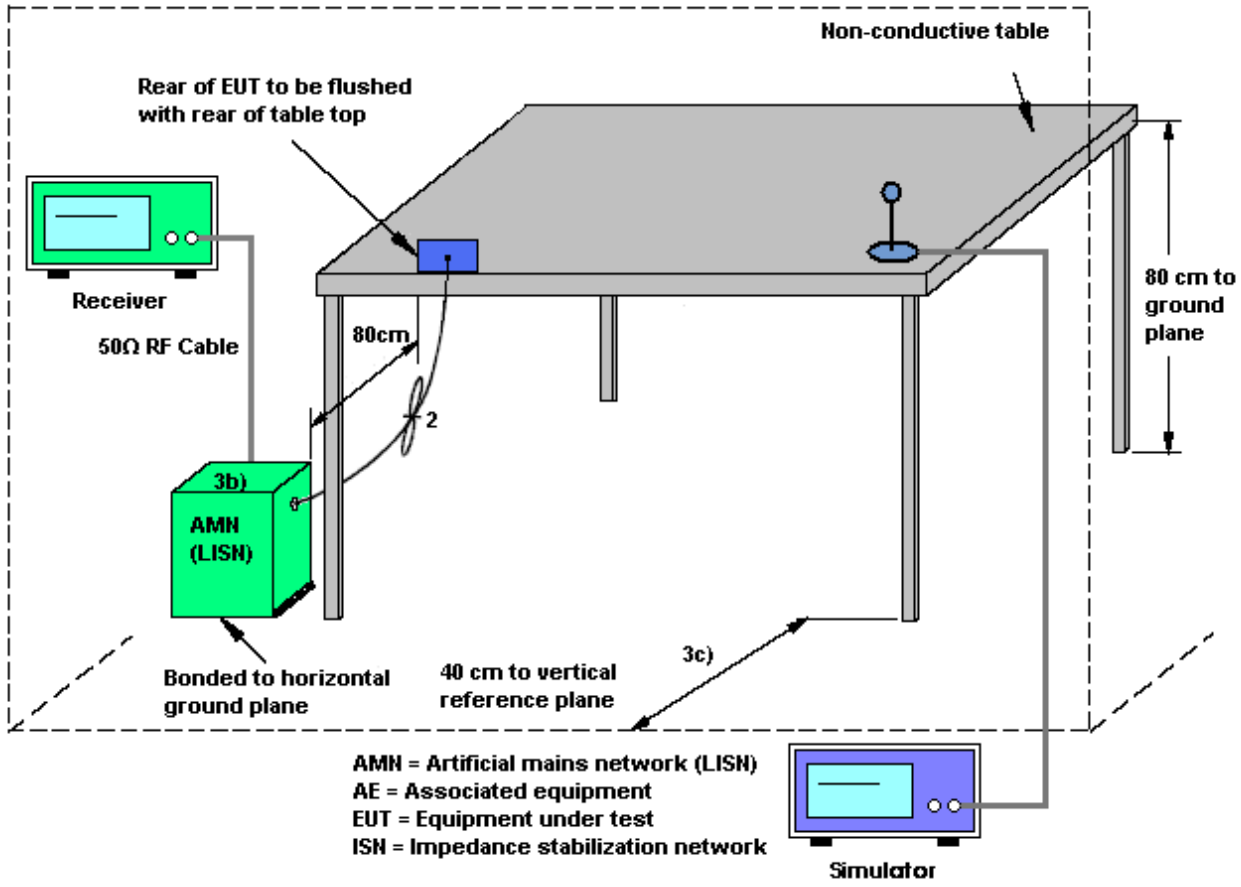
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

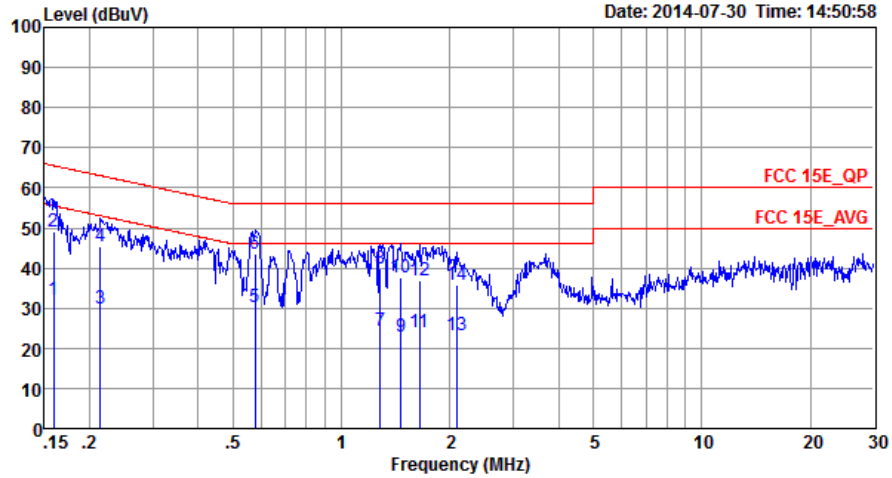
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
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

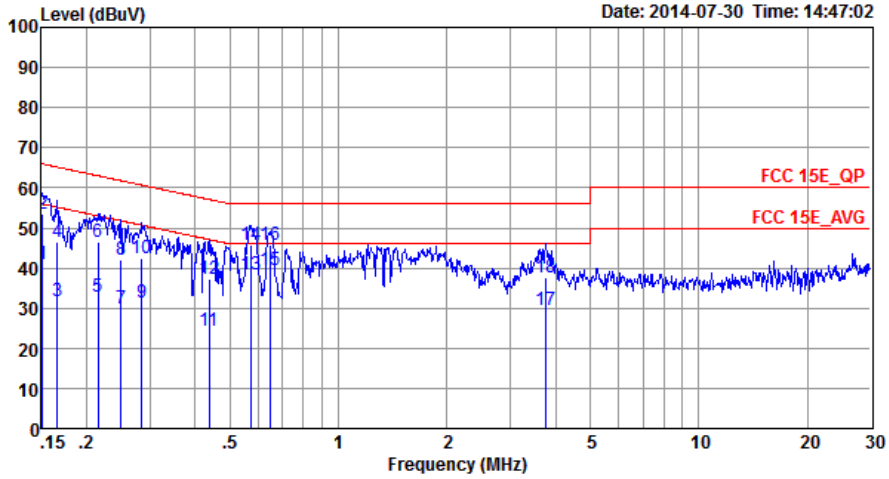
Test Mode :	Mode 1	**Temperature :**	21~22℃
Test Engineer :	Jack Ten	**Relative Humidity :**	41~42%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	WCDMA Band V Idle + WLAN (5 GHz) Link + Adapter		



Site : CO01-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		0.16	32.27	-23.25	55.52	21.70	0.22	10.35	Average
2		0.16	49.17	-16.35	65.52	38.60	0.22	10.35	QP
3		0.21	29.90	-23.15	53.05	19.39	0.23	10.28	Average
4		0.21	45.50	-17.55	63.05	34.99	0.23	10.28	QP
5		0.58	30.40	-15.60	46.00	20.00	0.25	10.15	Average
6	*	0.58	43.70	-12.30	56.00	33.30	0.25	10.15	QP
7		1.28	24.21	-21.79	46.00	13.80	0.25	10.16	Average
8		1.28	40.01	-15.99	56.00	29.60	0.25	10.16	QP
9		1.46	22.71	-23.29	46.00	12.30	0.24	10.17	Average
10		1.46	37.81	-18.19	56.00	27.40	0.24	10.17	QP
11		1.64	23.81	-22.19	46.00	13.40	0.23	10.18	Average
12		1.64	36.81	-19.19	56.00	26.40	0.23	10.18	QP
13		2.10	23.12	-22.88	46.00	12.70	0.23	10.19	Average
14		2.10	35.92	-20.08	56.00	25.50	0.23	10.19	QP

Test Mode :	Mode 1	Temperature :	21~22℃
Test Engineer :	Jack Ten	Relative Humidity :	41~42%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WCDMA Band V Idle + WLAN (5 GHz) Link + Adapter		



Site : CO01-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	0.15	40.89	-15.07	55.96	30.20	0.33	10.36	Average
2	0.15	53.69	-12.27	65.96	43.00	0.33	10.36	QP
3	0.17	31.86	-23.30	55.16	21.19	0.33	10.34	Average
4	0.17	46.46	-18.70	65.16	35.79	0.33	10.34	QP
5	0.22	33.00	-20.01	53.01	22.39	0.33	10.28	Average
6	0.22	46.60	-16.41	63.01	35.99	0.33	10.28	QP
7	0.25	29.79	-21.99	51.78	19.21	0.34	10.24	Average
8	0.25	42.09	-19.69	61.78	31.51	0.34	10.24	QP
9	0.28	31.37	-19.31	50.68	20.80	0.36	10.21	Average
10	0.28	42.27	-18.41	60.68	31.70	0.36	10.21	QP
11	0.44	24.46	-22.65	47.11	13.90	0.40	10.16	Average
12	0.44	37.26	-19.85	57.11	26.70	0.40	10.16	QP
13	0.57	38.30	-7.70	46.00	27.80	0.35	10.15	Average
14	0.57	45.60	-10.40	56.00	35.10	0.35	10.15	QP
15 *	0.64	39.44	-6.56	46.00	29.00	0.29	10.15	Average
16	0.64	45.84	-10.16	56.00	35.40	0.29	10.15	QP
17	3.76	29.68	-16.32	46.00	19.01	0.45	10.22	Average
18	3.76	37.78	-18.22	56.00	27.11	0.45	10.22	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.

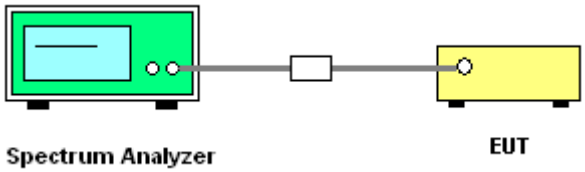
3.6.2 Measuring Instruments

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

Test Band :	5GHz band 1	Temperature :	24~26℃
Test Engineer :	Fly Liang	Relative Humidity :	50~53%

Mod.	Data Rate	NTX	Channel	Freq. (MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)	Temperature (°C)	Voltage (V)
11a	6Mbps	1	36	5180	5180.000	0.000	0.00	20	4.75
11a	6Mbps	1	36	5180	5180.000	0.000	0.00	20	5.25
11a	6Mbps	1	36	5180	5180.000	0.000	0.00	20	5
11a	6Mbps	1	36	5180	5180.025	0.025	4.83	-30	5
11a	6Mbps	1	36	5180	5179.950	-0.050	-9.65	50	5

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

Non-standard antenna connector 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)	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
Band I	-4.00	-4.00	-4.00	-0.99	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	FSP30	101400	9kHz~30GHz	Mar. 03, 2014	Aug. 12, 2014 ~ Sep. 06, 2014	Mar. 02, 2015	Conducted (TH01-SZ)
Spectrum Analyzer	R&S	FSV40	101078	10Hz~40GHz	May 08, 2014	Aug. 12, 2014 ~ Sep. 06, 2014	May 07, 2015	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1218010	13dBm ~-20dBm	Mar. 03, 2014	Aug. 12, 2014 ~ Sep. 06, 2014	Mar. 02, 2015	Conducted (TH01-SZ)
Power Sensor	Dare	RPR3006W	TH01SZ00019	0.3GHz~6GHz	Mar. 14, 2014	Aug. 12, 2014 ~ Sep. 06, 2014	Mar. 13, 2015	Conducted (TH01-SZ)
ESCIO TEST Receiver	R&S	ESCI	100724	9kHz~3GHz	Feb. 21, 2014	Jul. 30, 2014	Feb. 20, 2015	Conduction (CO01-SZ)
AC LISN	EMCO	3816/2SH	00103912	9kHz~30MHz	Mar. 04, 2014	Jul. 30, 2014	Mar. 03, 2015	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	EMCO	3816/2SH	00103892	9kHz~30MHz	Mar. 04, 2014	Jul. 30, 2014	Mar. 03, 2015	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000891	100Vac~250Vac	Dec. 17, 2013	Jul. 30, 2014	Dec. 16, 2014	Conduction (CO01-SZ)
EMI Test Receiver	R&S	ESCI	100534	9kHz~3GHz	Nov. 05, 2013	Aug. 29, 2014 ~ Sep. 04, 2014	Nov. 04, 2014	Radiation (03CH01-KS)
Spectrum Analyzer	R&S	FSP30	101399	9kHz~30GHz	May 04, 2014	Aug. 29, 2014 ~ Sep. 04, 2014	May 03, 2015	Radiation (03CH01-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 09, 2013	Aug. 29, 2014 ~ Sep. 04, 2014	Oct. 08, 2014	Radiation (03CH01-KS)
Bilog Antenna	SCHAFFNER	CBL6112D	23182	25MHz~2GHz	Jan. 08, 2014	Aug. 29, 2014 ~ Sep. 04, 2014	Jan. 07, 2015	Radiation (03CH01-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75959	1GHz~18GHz	Jan. 08, 2014	Aug. 29, 2014 ~ Sep. 04, 2014	Jan. 07, 2015	Radiation (03CH01-KS)
Active Horn Antenna	com-power	AHA-118	701030	1GHz~18GHz	Nov. 18, 2013	Aug. 29, 2014 ~ Sep. 04, 2014	Nov. 17, 2014	Radiation (03CH01-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Mar. 10, 2014	Aug. 29, 2014 ~ Sep. 04, 2014	Mar. 09, 2015	Radiation (03CH01-KS)
Amplifier	com-power	PA-103A	161073	1MHz~1GHz	May 04, 2014	Aug. 29, 2014 ~ Sep. 04, 2014	May 03, 2015	Radiation (03CH01-KS)
Amplifier	Agilent	8449B	3008A02371	1GHz~26.5GHz	Dec. 10, 2013	Aug. 29, 2014 ~ Sep. 04, 2014	Dec. 09, 2014	Radiation (03CH01-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Aug. 29, 2014 ~ Sep. 04, 2014	NCR	Radiation (03CH01-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Aug. 29, 2014 ~ Sep. 04, 2014	NCR	Radiation (03CH01-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Aug. 29, 2014 ~ Sep. 04, 2014	NCR	Radiation (03CH01-KS)

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.30**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.50**