FCC RF Test Report

APPLICANT	:	**ZTE CORPORATION**
EQUIPMENT	:	**LTE UFI MODEM**
BRAND NAME	:	**ZTE**
MODEL NAME	:	**MF90**
FCC ID	:	**SRQMF90**
STANDARD	:	**FCC Part 15 Subpart E §15.407**
CLASSIFICATION	:	**(NII) Unlicensed National Information Infrastructure**

The product was received on Apr. 09, 2014 and testing was completed on May 21, 2014. We, SPORTON INTERNATIONAL (KUNSHAN) INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and the testing has shown the tested sample to be 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.
No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C.

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR440903	Rev. 01	Initial issue of report	May 23, 2014

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.403(i)	26dB Bandwidth	-	Pass	-
3.2	15.407(a)	Maximum Conducted Output Power	≤ 17, 24, 30 dBm (depend on band)	Pass	-
3.3	15.407(a)	Power Spectral Density	≤ 4, 11, 17 dBm (depend on band)	Pass	-
3.4	15.407(a)(6)	Peak Excursion Ratio	≤ 13dB	Pass	-
3.5	15.407(b)	Unwanted Emissions	≤ -17, -27 dBm (depend on band)&15.209(a)	Pass	Under limit 6.86 dB at 5148.500 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 11.97 dB at 0.630 MHz
3.7	15.407(g)	Frequency Stability	Within Operation Band	Pass	-
3.8	15.407(c)	Automatically Discontinue Transmission	Discontinue Transmission	Pass	-
3.9	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 MODEM
Brand Name	ZTE
Model Name	MF90
FCC ID	SRQMF90
EUT supports Radios application	GPRS/EGPRS/WCDMA/HSPA/HSPA+/ DC-HSDPA/LTE WLAN 2.4GHz 802. 11b/g/n HT20/HT40/ WLAN 5GHz 802. 11a/n HT20/HT40
HW Version	xq5B
SW Version	EN_ZTE_MF90LATINV1.0.0B05
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>802.11a : 9.44 dBm / 0.0088 W
802.11n HT20 : 12.49 dBm / 0.0177 W
802.11n HT40 : 11.49 dBm / 0.0141 W</td></tr>
<tr><td>Antenna Type</td><td>Chain Port 0 : PIFA Antenna with gain 1.00 dBi
Chain Port 1 : PIFA Antenna with gain 1.00 dBi</td></tr>
<tr><td>Type of Modulation</td><td>802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)</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

Note: The test site complies with ANSI C63.4 2003 requirement.

1.7 Applicable Standards

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

- FCC Part 15 Subpart E
- FCC KDB 789033 D01 General UNII Test Procedures v01r03
- 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)
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.

5GHz 802.11a Average Power (dBm)									
Data Rate (MHz)	6Mbps	CH	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
Chain Port 0	9.43	36	9.25	8.84	9.35	9.37	9.17	9.25	8.78
	9.25								
	9.13								
Chain Port 1	9.44	36	9.13	9.06	9.11	9.15	9.28	9.15	8.97
	8.93								
	8.86								

5GHz 802.11n HT20 Average Power (dBm)									
Data Rate (MHz)	MCS0	CH	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Chain Port 0	9.65	36	9.58	9.48	9.44	9.49	9.61	9.59	9.32
	9.29								
	9.20								
Chain Port 1	9.66	36	9.59	9.45	9.47	9.59	9.65	9.59	9.14
	9.40								
	9.46								
Data Rate (MHz)	MCS8	CH	MCS 9	MCS 10	MCS 11	MCS 12	MCS 13	MCS 14	MCS 15
Chain Port 0+1(0)	8.15	36	8.10	8.11	8.04	8.00	8.13	8.09	7.94
	7.94								
	7.96								
Chain Port 0+1(1)	10.49	36	10.22	10.34	10.11	10.40	10.40	10.34	10.20
	10.30								
	10.33								
Chain Port 0+1	12.49	36	12.30	12.38	12.21	12.38	12.42	12.37	12.22
	12.29								
	12.32								

5GHz 802.11n HT40 Average Power (dBm)									
Data Rate (MHz)	MCS0	CH	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Chain Port 0	9.55	38	9.50	8.52	9.37	9.49	9.54	9.43	9.33
	9.30								
Chain Port 1	9.56	38	9.34	9.02	9.19	9.32	9.20	9.22	8.81
	9.37								
Data Rate (MHz)	MCS8	CH	MCS 9	MCS 10	MCS 11	MCS 12	MCS 13	MCS 14	MCS 15
Chain Port 0+1(0)	7.57	38	7.31	7.43	7.39	7.51	7.49	7.55	6.96
	7.36								
Chain Port 0+1(1)	9.23	38	9.11	9.18	8.74	8.98	9.19	9.20	9.03
	9.03								
Chain Port 0+1	11.49	38	11.32	11.40	11.13	11.31	11.43	11.47	11.13
	11.28								

Note:

1. 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. The data rates of WLAN 802.11a/n were set in 6Mbps for 802.11a (Chain Port 1), MCS0 for 802.11n HT20 (Chain Port 1), MCS8 for 802.11n HT20 (Chain Port 0+1), MCS0 for 802.11n HT40 (Chain Port 1), MCS8 for 802.11n HT40 (Chain Port 0+1) due to the highest RF output power.

2.3 Test Mode

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

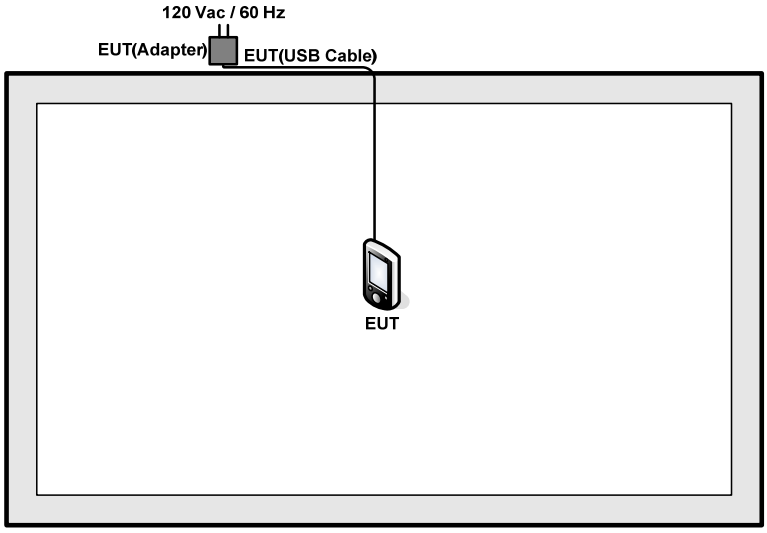
Test Cases					
	Test Items	Mode	Data rate	Test Channel	Remark
Conducted TCs	26dB BW Power Spectral Density	802.11a	6 Mbps	L/M/H	Chain Port 1
		802.11n HT20	MCS0	L/M/H	Chain Port 1
		802.11n HT40	MCS0	L/M/H	Chain Port 1
		802.11n HT20	MCS8	L/M/H	Chain Port 0+1
		802.11n HT40	MCS8	L/M/H	Chain Port 0+1
	Output Power	802.11a	6 Mbps	L/M/H	Chain Port 0
		802.11a	6 Mbps	L/M/H	Chain Port 1
		802.11n HT20	MCS0	L/M/H	Chain Port 0
		802.11n HT20	MCS0	L/M/H	Chain Port 1
		802.11n HT20	MCS8	L/M/H	Chain Port 0+1
		802.11n HT40	MCS0	L/M/H	Chain Port 0
		802.11n HT40	MCS0	L/M/H	Chain Port 1
		802.11n HT40	MCS8	L/M/H	Chain Port 0+1
	Peak Excursion	802.11a	6 Mbps	L	Chain Port 0
		802.11n HT20	MCS0	L	Chain Port 0
		802.11n HT40	MCS0	L	Chain Port 0
	Frequency Stability	802.11a	6 Mbps	L/M/H	Chain Port 0
		802.11n HT20	MCS0	L/M/H	Chain Port 0
		802.11n HT40	MCS0	L/M/H	Chain Port 0
Radiated TCs	Radiated Band Edge	802.11a	6 Mbps	L/H	Chain Port 1
		802.11n HT20	MCS0	L/H	Chain Port 1
		802.11n HT20	MCS8	L/H	Chain Port 0+1
		802.11n HT40	MCS0	L/H	Chain Port 1
		802.11n HT40	MCS8	L/H	Chain Port 0+1
	Radiated Spurious Emission	802.11a	6 Mbps	L/M/H	Chain Port 1
		802.11n HT20	MCS0	L/M/H	Chain Port 1
		802.11n HT20	MCS8	L/M/H	Chain Port 0+1
		802.11n HT40	MCS0	L/M/H	Chain Port 1
		802.11n HT40	MCS8	L/M/H	Chain Port 0+1

AC Conducted Emission	Mode 1 : GPRS850 Idle + WLAN 5GHz Link + USB Cable (Charging from 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>



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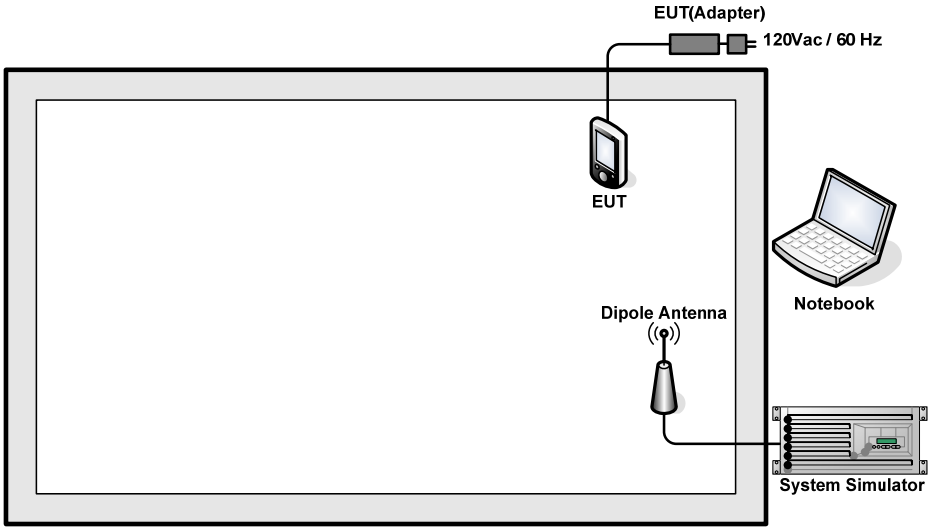


2.5 Support Unit used in test configuration and system

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.	Notebook	Acer	MS2204	QDS-BRCM1018	N/A	DC O/P: Shielded, 1.8 m AC I/P: Unshielded, 0.9 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.

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 7.3 dB and 10dB attenuator.

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

= 7.3 + 10 = 17.3 (dB)

3 Test Result

3.1 26dB Bandwidth Measurement

3.1.1 Description of 26dB Bandwidth

There is no restriction limits for bandwidth. The maximum conducted output power can be limited by measured emission bandwidth (B).

For the band 5150-5250 MHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW (17dBm) or 4 dBm + 10log B.

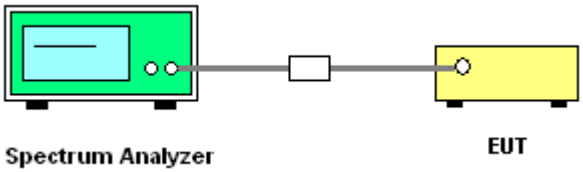
3.1.2 Measuring Instruments

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 D01 General UNII Test Procedures v01r03. Section C) Emission bandwidth
2. Set RBW = approximately 1% of the emission bandwidth.
3. Set the VBW > RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
7. Measure and record the results in the test report.

3.1.4 Test Setup

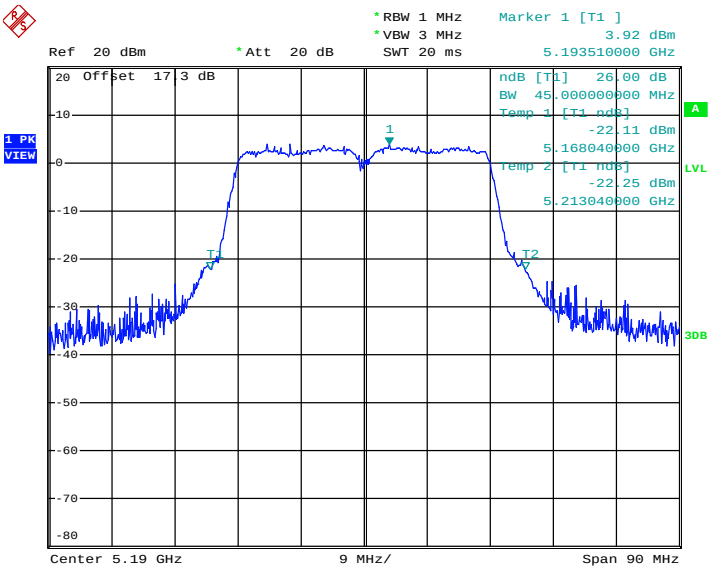


3.1.5 Test Result of 26dB Bandwidth

Test Band :	5GHz band 1	Temperature :	23~24℃
Test Engineer :	Adonis Li	Relative Humidity :	47~48%

Mod.	Data Rate	N_{TX}	Channel	Freq. (MHz)	26dB Bandwidth (MHz)		FCC 26dB Bandwidth Power Limit (dBm)	
					Chain Port 0	Chain Port 1	Chain Port 0	Chain Port 1
11a	6Mbps	1	36	5180	-	19.65	16.99	16.93
11a	6Mbps	1	44	5220	-	19.65	16.99	16.93
11a	6Mbps	1	48	5240	-	19.85	16.99	16.98
HT20	MCS0	1	36	5180	-	20.30	16.99	16.99
HT20	MCS0	1	44	5220	-	20.30	16.99	16.99
HT20	MCS0	1	48	5240	-	20.35	16.99	16.99
HT40	MCS0	1	38	5190	-	45.00	16.99	16.99
HT40	MCS0	1	46	5230	-	43.02	16.99	16.99
HT20	MCS0	2	36	5180	20.15	20.05	23.01	
HT20	MCS0	2	44	5220	20.40	19.90	22.99	
HT20	MCS0	2	48	5240	20.35	19.95	23.00	
HT40	MCS0	2	38	5190	42.03	42.57	23.01	
HT40	MCS0	2	46	5230	42.30	43.92	23.01	

Maximum 26dB Bandwidth



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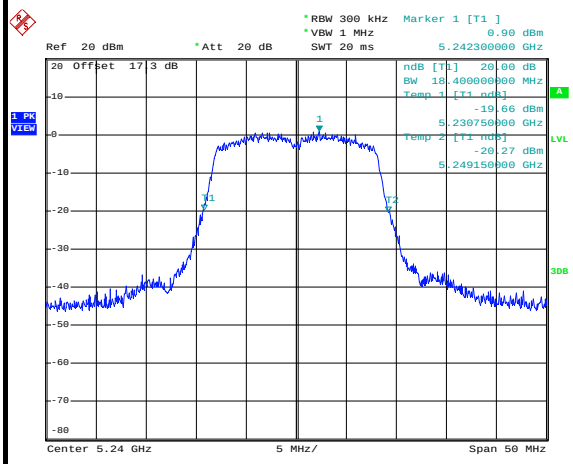
3.1.6 Test Result of 20dB Occupied Bandwidth

Mod.	Data Rate	NTX	Channel	Freq. (MHz)	20dB Bandwidth (MHz)		20dB Bandwidth Upper Frequency (FH) (MHz)		Upper Limit Line (MHz)	Pass/Fail
					Chain Port 0	Chain Port 1	Chain Port 0	Chain Port 1		
11a	6Mbps	1	48	5240	-	18.40	-	5249.15	5250	Pass
HT20	MCS0	1	48	5240	-	19.00	-	5249.45		Pass
HT40	MCS0	1	46	5230	-	38.34	-	5249.17		Pass
HT20	MCS0	2	48	5240	18.85	19.00	5249.40	5249.55		Pass
HT40	MCS0	2	46	5230	38.52	38.43	5249.26	5249.17		Pass

20dB Occupied Bandwidth

802.11a CH48 5240MHz for Chain 1



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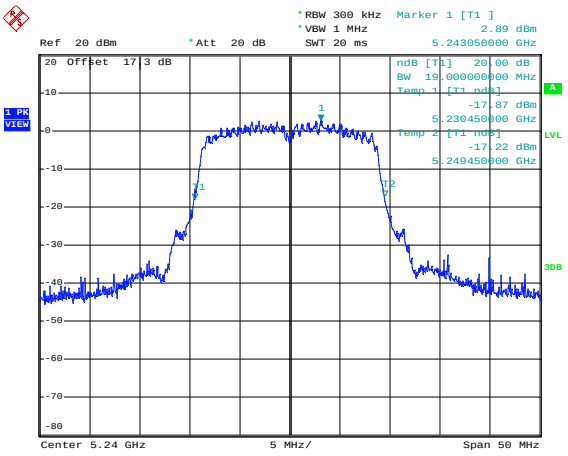
802.11n HT20 CH48 5240MHz for Chain 1



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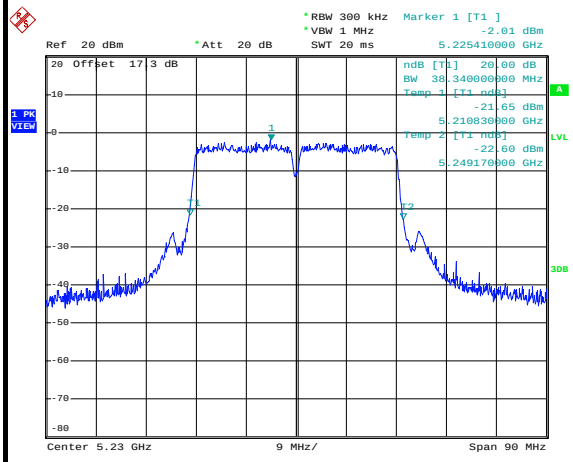
802.11n HT40 CH46 5230MHz for Chain 1



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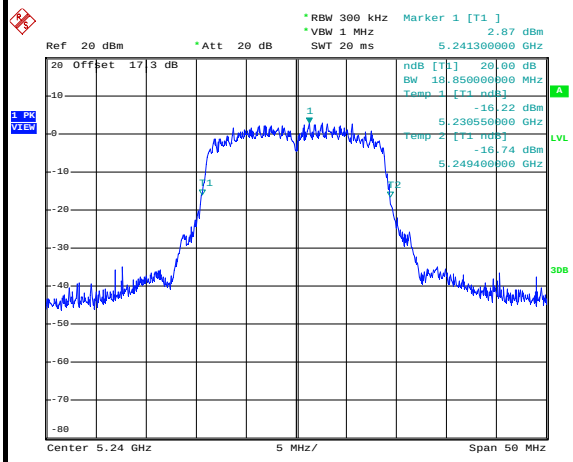
20dB Occupied Bandwidth

802.11n HT20 CH48 5240MHz for Chain 0



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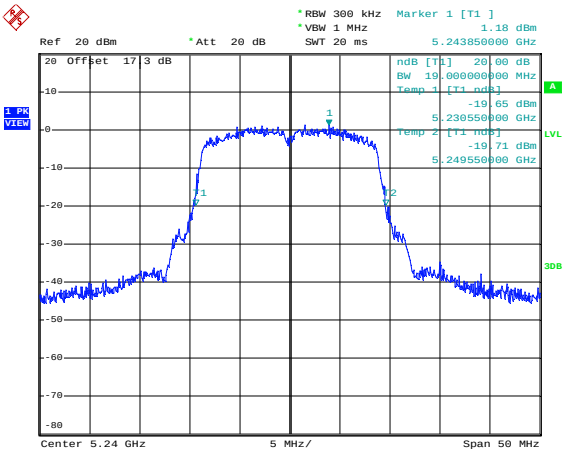
802.11n HT20 CH48 5240MHz for Chain 1



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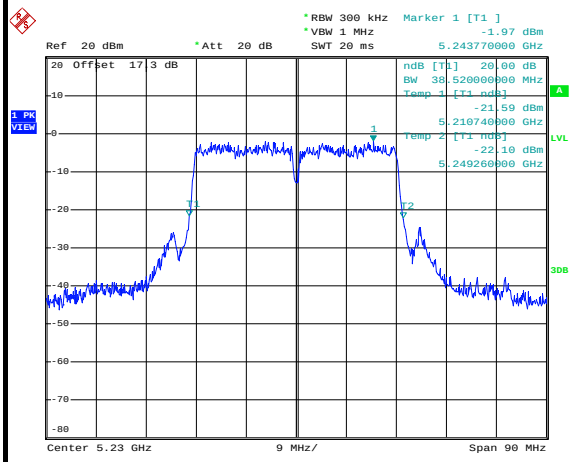
802.11n HT40 CH46 5230MHz for Chain 0



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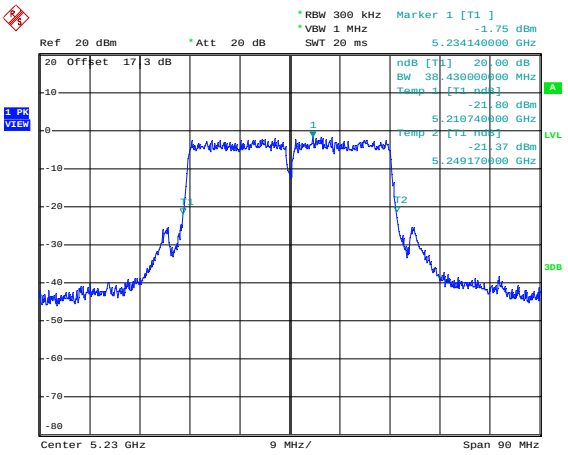
802.11n HT40 CH46 5230MHz for Chain 0



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3.2 Maximum Conducted Output Power Measurement

3.2.1 Limit of Maximum Conducted Output Power

For the band 5150-5250 MHz, the maximum conducted output power shall not exceed the lesser of 50 mW (17dBm) or 4 dBm + 10log B, where B is the 26 dB emissions bandwidth in 1-MHz. If transmitting antenna directional gain is greater than 6 dBi, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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.

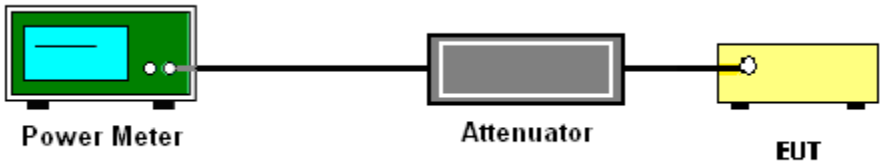
3.2.3 Test Procedures

The testing follows Method PM of FCC KDB 789033 D01 General UNII Test Procedures v01r03.

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 :	23~24℃
Test Engineer :	Adonis Li	Relative Humidity :	47~48%

Mod.	Data Rate	N_{TX}	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)			FCC Power Limit (dBm)		DG (dBi)		Pass /Fail
					Chain Port 0	Chain Port 1	Chain Port 0	Chain Port 1	Sum Power	Chain Port 0	Chain Port 1	Chain Port 0	Chain Port 1	
11a	6Mbps	1	36	5180	0.20	0.21	9.43	9.44	-	16.99	16.93	1.00	1.00	Pass
11a	6Mbps	1	44	5220	0.20	0.21	9.25	8.93		16.99	16.93	1.00	1.00	Pass
11a	6Mbps	1	48	5240	0.20	0.21	9.13	8.86		16.99	16.98	1.00	1.00	Pass
HT20	MCS0	1	36	5180	0.22	0.22	9.65	9.66		16.99	16.99	1.00	1.00	Pass
HT20	MCS0	1	44	5220	0.22	0.22	9.29	9.40		16.99	16.99	1.00	1.00	Pass
HT20	MCS0	1	48	5240	0.22	0.22	9.20	9.46		16.99	16.99	1.00	1.00	Pass
HT40	MCS0	1	38	5190	0.43	0.47	9.55	9.56		16.99	16.99	1.00	1.00	Pass
HT40	MCS0	1	46	5230	0.43	0.47	9.30	9.37		16.99	16.99	1.00	1.00	Pass
HT20	MCS0	2	36	5180	0.39	0.42	8.15	10.49	12.49	23.01		1.00		Pass
HT20	MCS0	2	44	5220	0.39	0.42	7.94	10.30	12.29	22.99		1.00		Pass
HT20	MCS0	2	48	5240	0.39	0.42	7.96	10.33	12.32	23.00		1.00		Pass
HT40	MCS0	2	38	5190	0.79	0.79	7.57	9.23	11.49	23.01		1.00		Pass
HT40	MCS0	2	46	5230	0.79	0.79	7.36	9.03	11.28	23.01		1.00		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 Chain Port 0 and Chain Port 1.
3. For the band 5150-5250 MHz, the maximum average conducted output power shall not exceed lesser of 50 mW (17dBm) or 4 dBm + 10log (B), where B is 26dB BW for FCC.

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

For the band 5150-5250 MHz, peak power spectral density shall not exceed 4 dBm in any 1-MHz.

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 D01 General UNII Test Procedures v01r03.

Section F) Peak power spectral density (PPSD).

Note: Though the rule refers to “peak power spectral density”, the intent is to measure the maximum value of the time average of the power spectral density measured during a period of continuous transmission.

 # Method SA-2 #

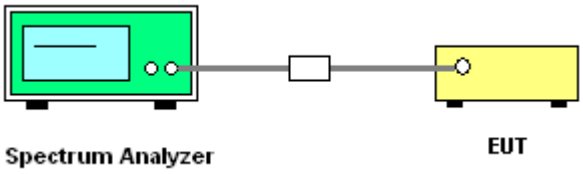
(trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction).

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 = 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

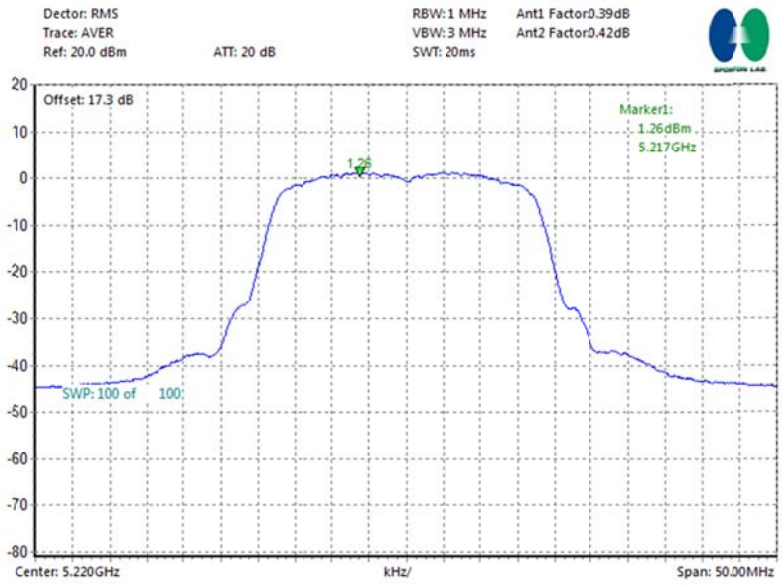


3.3.5 Test Result of Power Spectral Density

Test Band :	5GHz band 1	Temperature :	23~24℃
Test Engineer :	Adonis Li	Relative Humidity :	47~48%

Mod.	Data Rate	N_{TX}	CH.	Freq. (MHz)	Duty Factor (dB)		Average Power Density (dBm/MHz)			Average PSD Limit (dBm)		DG (dBi)		Pass /Fail
					Chain Port 0	Chain Port 1	Chain Port 0	Chain Port 1	Sum Power	Chain Port 0	Chain Port 1	Chain Port 0	Chain Port 1	
11a	6Mbps	1	36	5180	0.20	0.21	-	-2.37	-	4.00	4.00	1.00	1.00	Pass
11a	6Mbps	1	44	5220	0.20	0.21	-	-1.83		4.00	4.00	1.00	1.00	Pass
11a	6Mbps	1	48	5240	0.20	0.21	-	-2.10		4.00	4.00	1.00	1.00	Pass
HT20	MCS0	1	36	5180	0.22	0.22	-	-2.10		4.00	4.00	1.00	1.00	Pass
HT20	MCS0	1	44	5220	0.22	0.22	-	-1.81		4.00	4.00	1.00	1.00	Pass
HT20	MCS0	1	48	5240	0.22	0.22	-	-1.98		4.00	4.00	1.00	1.00	Pass
HT40	MCS0	1	38	5190	0.43	0.47	-	-5.01		4.00	4.00	1.00	1.00	Pass
HT40	MCS0	1	46	5230	0.43	0.47	-	-5.09		4.00	4.00	1.00	1.00	Pass
HT20	MCS0	2	36	5180	0.39	0.42	-		0.57	4.00		4.01		Pass
HT20	MCS0	2	44	5220	0.39	0.42			1.26	4.00		4.01		Pass
HT20	MCS0	2	48	5240	0.39	0.42			1.07	4.00		4.01		Pass
HT40	MCS0	2	38	5190	0.79	0.79			-1.71	4.00		4.01		Pass
HT40	MCS0	2	46	5230	0.79	0.79			-3.06	4.00		4.01		Pass

Note: Sum PSD is a bin-by-bin combined result of Chain Port 0 and Chain Port 1.

Worst Case Power Density (dBm/MHz)


3.4 Peak Excursion Ratio Measurement

3.4.1 Limit of Peak Excursion Ratio

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

3.4.2 Measuring Instruments

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

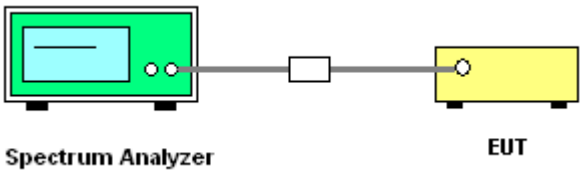
3.4.3 Test Procedures

The testing follows FCC KDB 789033 D01 General UNII Test Procedures v01r03.

Section G) Peak excursion measurement

1. The transmitter output is connected to the spectrum analyzer.
2. Set the spectrum analyzer span to view the entire emission bandwidth.
3. Find the maximum of the peak-max-hold spectrum.
   *Set RBW = 1MHz.
   *Set VBW ≥ 3MHz.
   *Detector = peak.
   *Trace mode = max-hold.
   *Allow the sweeps to continue until the trace stabilizes.
   *Use the peak search function to find the peak of the spectrum.
4. Use the procedure found under section 3.3 to measure the PPSD.
5. Compute the ratio of the maximum of the peak-max-hold spectrum to the PPSD.

3.4.4 Test Setup



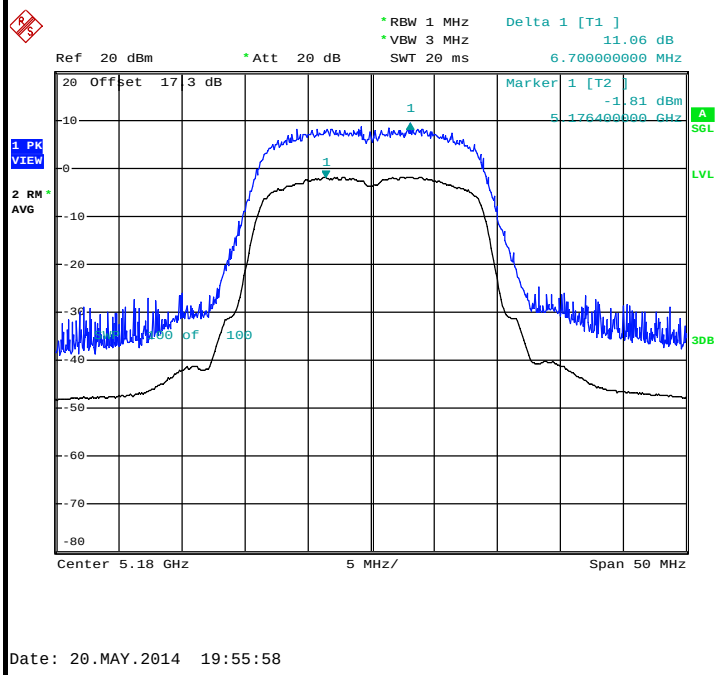
3.4.5 Test Result of Peak Excursion Ratio

Test Band :	5GHz band 1	Temperature :	23~24℃
Test Engineer :	Adonis Li	Relative Humidity :	47~48%

Mod.	N_{TX}	Channel	Freq. (MHz)	Peak Excursion Ratio (dB)					Max. Limits (dB)	Pass/Fail
				BPSK	QPSK	16QAM	64QAM	256QAM		
11a	1	36	5180	9.64	9.44	9.48	9.49	-	13	Pass
HT20	1	36	5180	9.74	10.19	10.30	9.18	-	13	Pass
HT40	1	38	5230	9.43	9.87	9.69	9.77	-	13	Pass

Note: All modulation measured based on the minimum data rate setting.

Worst Case Peak Excursion Ratio (dB)



Note: Peak Excursion Ratio (dB) = Peak – (Average + Duty Cycle Offset)

3.5 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.

3.5.1 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 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.

3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

1. The testing follows FCC KDB 789033 D01 General UNII Test Procedures v01r03. Section H) 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

   - The setting follows the H) 5) of FCC KDB 789033.
   - RBW = 1 MHz
   - VBW ≥ 3 MHz
   - Detector = Peak
   - Sweep time = auto
   - Trace mode = max hold

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

   - The setting follows H) 6) of FCC KDB 789033.
   - 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.

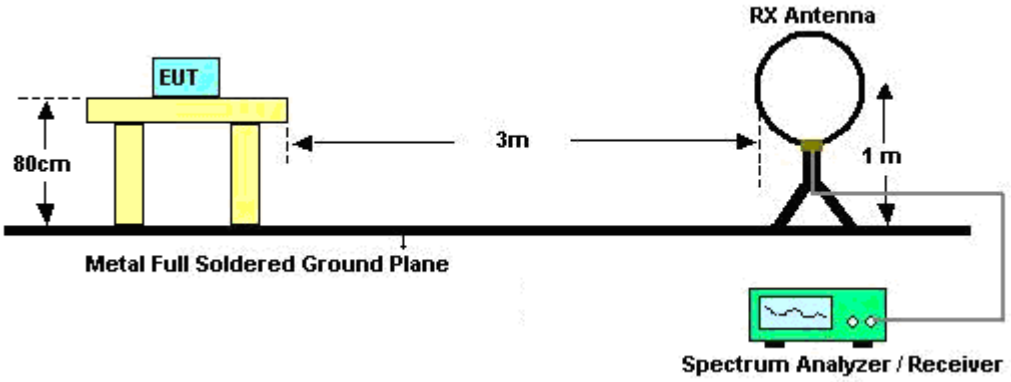
Antenna	Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
1	802.11a	95.38	2.066	0.484	1kHz
1	802.11n HT20	95.09	1.938	0.516	1kHz
1	802.11n HT40	89.75	0.946	1.057	3kHz
0+1	802.11n HT20	91.36	0.994	1.006	3kHz
0+1	802.11n HT40	83.44	0.504	1.984	3kHz

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.

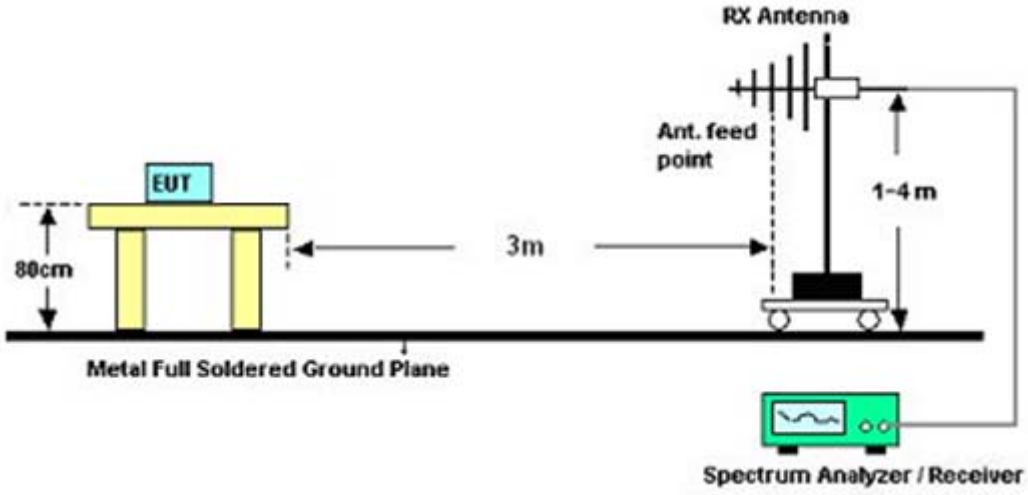
5. For each suspected emission, the EUT was arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, 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.

3.5.4 Test Setup

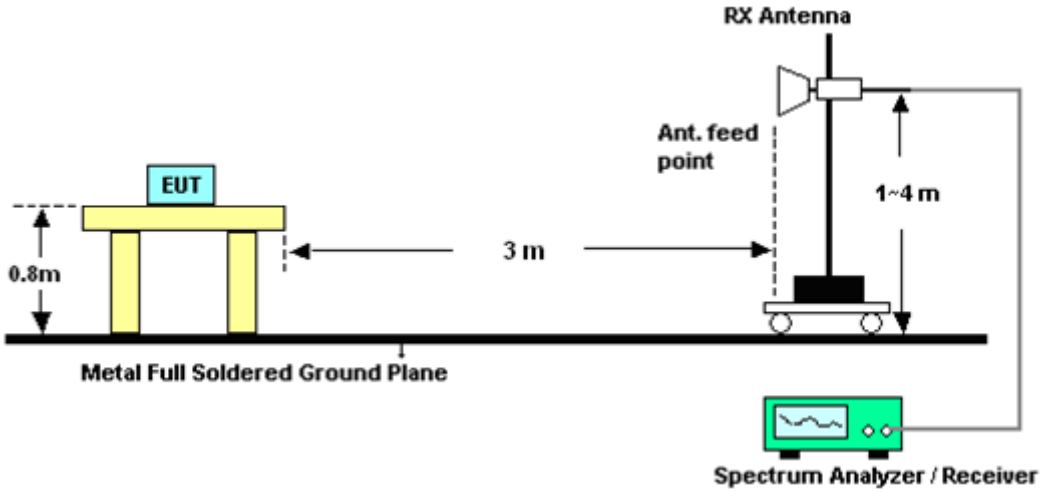
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.5.5 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.

3.5.6 Test Result of Radiated Band Edges

Test Mode :	802.11a – Chain Port 1	Temperature :	22~23°C
Test Channel :	36	Relative Humidity :	42~43%
Test Engineer :	Star Wei		

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
5149.3	56.34	-17.66	74	49.48	35.25	5.38	33.77	102	334	Peak
5149.6	42.7	-11.3	54	35.84	35.25	5.38	33.77	102	334	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
5148.95	53.55	-20.45	74	46.69	35.25	5.38	33.77	100	348	Peak
5142.75	39.85	-14.15	54	32.99	35.25	5.38	33.77	100	348	Average

Test Mode :	802.11a– Chain Port 1	Temperature :	22~23°C
Test Channel :	48	Relative Humidity :	42~43%
Test Engineer :	Star Wei		

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
5388.8	54.96	-19.04	74	47.89	35.34	5.45	33.72	100	327	Peak
5386.55	42	-12	54	34.93	35.34	5.45	33.72	100	327	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
5352.25	52.95	-21.05	74	45.91	35.32	5.45	33.73	160	302	Peak
5396.3	39.58	-14.42	54	32.49	35.35	5.46	33.72	160	302	Average

Test Mode :	802.11n HT20– Chain Port 1	Temperature :	22~23°C
Test Channel :	36	Relative Humidity :	42~43%
Test Engineer :	Star Wei		

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	58.12	-15.88	74	51.26	35.25	5.38	33.77	100	354	Peak
5141.8	42.26	-11.74	54	35.4	35.25	5.38	33.77	100	354	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
5135.2	53.13	-20.87	74	46.29	35.24	5.38	33.78	100	154	Peak
5137.05	40.1	-13.9	54	33.26	35.24	5.38	33.78	100	154	Average

Test Mode :	802.11n HT20– Chain Port 1	Temperature :	22~23°C
Test Channel :	48	Relative Humidity :	42~43%
Test Engineer :	Star Wei		

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
5388.7	56.32	-17.68	74	49.25	35.34	5.45	33.72	100	329	Peak
5386.8	44.27	-9.73	54	37.2	35.34	5.45	33.72	100	329	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
5391.3	55.1	-18.9	74	48.03	35.34	5.45	33.72	158	263	Peak
5393.45	43.2	-10.8	54	36.13	35.34	5.45	33.72	158	263	Average

Test Mode :	802.11n HT40– Chain Port 1	Temperature :	22~23°C
Test Channel :	38	Relative Humidity :	42~43%
Test Engineer :	Star Wei		

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
5149.95	67.13	-6.87	74	60.27	35.25	5.38	33.77	189	349	Peak
5149.75	44.81	-9.19	54	37.95	35.25	5.38	33.77	189	349	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
5148.4	59.02	-14.98	74	52.16	35.25	5.38	33.77	186	92	Peak
5149.05	40.59	-13.41	54	33.73	35.25	5.38	33.77	186	92	Average

Test Mode :	802.11n HT40– Chain Port 1	Temperature :	22~23°C
Test Channel :	46	Relative Humidity :	42~43%
Test Engineer :	Star Wei		

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
5366.35	56.38	-17.62	74	49.32	35.33	5.45	33.72	100	332	Peak
5367.7	43.24	-10.76	54	36.18	35.33	5.45	33.72	100	332	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
5351.45	53.83	-20.17	74	46.79	35.32	5.45	33.73	191	303	Peak
5363.35	40.89	-13.11	54	33.83	35.33	5.45	33.72	191	303	Average

Test Mode :	802.11n HT20– Chain Port 0+1	Temperature :	22~23°C
Test Channel :	36	Relative Humidity :	42~43%
Test Engineer :	Star Wei		

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
5149.95	59.05	-14.95	74	52.19	35.25	5.38	33.77	100	156	Peak
5147.95	44.17	-9.83	54	37.31	35.25	5.38	33.77	100	156	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
5149.4	57.08	-16.92	74	50.22	35.25	5.38	33.77	189	301	Peak
5146.85	42.96	-11.04	54	36.1	35.25	5.38	33.77	189	301	Average

Test Mode :	802.11n HT20– Chain Port 0+1	Temperature :	22~23°C
Test Channel :	48	Relative Humidity :	42~43%
Test Engineer :	Star Wei		

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
5388.5	55.73	-18.27	74	48.66	35.34	5.45	33.72	109	175	Peak
5393.6	43.43	-10.57	54	36.36	35.34	5.45	33.72	109	175	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
5385.3	54.46	-19.54	74	47.39	35.34	5.45	33.72	100	302	Peak
5386.55	42.51	-11.49	54	35.44	35.34	5.45	33.72	100	302	Average

Test Mode :	802.11n HT40– Chain Port 0+1	Temperature :	22~23°C
Test Channel :	38	Relative Humidity :	42~43%
Test Engineer :	Star Wei		

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
5149.25	66.77	-7.23	74	59.91	35.25	5.38	33.77	100	136	Peak
5148.5	47.14	-6.86	54	40.28	35.25	5.38	33.77	100	136	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
5149.1	61.49	-12.51	74	54.63	35.25	5.38	33.77	100	317	Peak
5149.05	43.44	-10.56	54	36.58	35.25	5.38	33.77	100	317	Average

Test Mode :	802.11n HT40– Chain Port 0+1	Temperature :	22~23°C
Test Channel :	46	Relative Humidity :	42~43%
Test Engineer :	Star Wei		

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
5366.65	54.89	-19.11	74	47.83	35.33	5.45	33.72	100	168	Peak
5365.75	41.86	-12.14	54	34.8	35.33	5.45	33.72	100	168	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
5364.9	56.54	-17.46	74	49.48	35.33	5.45	33.72	200	272	Peak
5366.1	43.49	-10.51	54	36.43	35.33	5.45	33.72	200	272	Average

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

Test Mode :	802.11a– Chain Port 1	**Temperature :**	22~23°C
Test Channel :	36	**Relative Humidity :**	42~43%
Test Engineer :	Star Wei	**Polarization :**	Horizontal
Remark :	1. 5180 MHz is fundamental signal which can be ignored. 2. 10359 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	104.77	-	-	97.89	35.26	5.39	33.77	102	334	Peak
5180	93.11	-	-	86.23	35.26	5.39	33.77	102	334	Average
10359	36.15	-37.85	74	25.42	37.5	7.72	34.49	100	54	Peak

Test Mode :	802.11a– Chain Port 1	Temperature :	22~23°C
Test Channel :	36	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Vertical
Remark :	1. 5180 MHz is fundamental signal which can be ignored. 2. 10353 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	96.79	-	-	89.91	35.26	5.39	33.77	100	348	Peak
5180	84.26	-	-	77.38	35.26	5.39	33.77	100	348	Average
10353	38.03	-35.97	74	63.38	1.45	7.71	34.51	100	61	Peak

Test Mode :	802.11a– Chain Port 1	Temperature :	22~23°C
Test Channel :	44	Relative Humidity :	42~43%
Test Engineer :	Star Wei	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	104	-	-	97.09	35.27	5.4	33.76	100	325	Peak
5220	92.13	-	-	85.22	35.27	5.4	33.76	100	325	Average
10440	35.3	-38.7	74	60.45	1.53	7.76	34.44	100	0	Peak

Test Mode :	802.11a– Chain Port 1	Temperature :	22~23°C
Test Channel :	44	Relative Humidity :	42~43%
Test Engineer :	Star Wei	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	98.19	-	-	91.28	35.27	5.4	33.76	100	33	Peak
5220	86.32	-	-	79.41	35.27	5.4	33.76	100	33	Average
10440	35.47	-38.53	74	60.62	1.53	7.76	34.44	120	144	Peak

Test Mode :	802.11a– Chain Port 1	Temperature :	22~23°C
Test Channel :	48	Relative Humidity :	42~43%
Test Engineer :	Star Wei	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	104.95	-	-	98.01	35.28	5.41	33.75	100	327	Peak
5240	92.72	-	-	85.78	35.28	5.41	33.75	100	327	Average
10480	34.06	-39.94	74	23.08	37.6	7.79	34.41	120	118	Peak

Test Mode :	802.11a– Chain Port 1	Temperature :	22~23°C
Test Channel :	48	Relative Humidity :	42~43%
Test Engineer :	Star Wei	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	98.41	-	-	91.47	35.28	5.41	33.75	160	302	Peak
5240	87.31	-	-	80.37	35.28	5.41	33.75	160	302	Average
10480	35.98	-38.02	74	25	37.6	7.79	34.41	154	110	Peak

Test Mode :	802.11n HT20– Chain Port 1	Temperature :	22~23°C
Test Channel :	36	Relative Humidity :	42~43%
Test Engineer :	Star Wei	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	105.43	-	-	98.55	35.26	5.39	33.77	128	341	Peak
5180	94.11	-	-	87.23	35.26	5.39	33.77	128	341	Average
10360	35.11	-38.89	74	60.42	1.46	7.72	34.49	100	152	Peak

Test Mode :	802.11n HT20– Chain Port 1	Temperature :	22~23°C
Test Channel :	36	Relative Humidity :	42~43%
Test Engineer :	Star Wei	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	98.81	-	-	91.93	35.26	5.39	33.77	109	6	Peak
5180	87.93	-	-	81.05	35.26	5.39	33.77	109	6	Average
10360	36.85	-37.15	74	62.16	1.46	7.72	34.49	100	230	Peak

Test Mode :	802.11n HT20– Chain Port 1	Temperature :	22~23°C
Test Channel :	44	Relative Humidity :	42~43%
Test Engineer :	Star Wei	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	-	-	98.09	35.27	5.4	33.76	100	331	Peak
5220	92.49	-	-	85.58	35.27	5.4	33.76	100	331	Average
10440	36.3	-37.7	74	25.43	37.55	7.76	34.44	162	147	Peak

Test Mode :	802.11n HT20– Chain Port 1	Temperature :	22~23°C
Test Channel :	44	Relative Humidity :	42~43%
Test Engineer :	Star Wei	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	95.92	-	-	89.01	35.27	5.4	33.76	100	55	Peak
5220	84.43	-	-	77.52	35.27	5.4	33.76	100	55	Average
10440	36.33	-37.67	74	25.46	37.55	7.76	34.44	152	221	Peak

Test Mode :	802.11n HT20– Chain Port 1	Temperature :	22~23°C
Test Channel :	48	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Horizontal
Remark :	1. 5240 MHz is fundamental signal which can be ignored. 2. 10482 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	110.33	-	-	103.39	35.28	5.41	33.75	100	329	Peak
5240	98.3	-	-	91.36	35.28	5.41	33.75	100	329	Average
10482	37.66	-36.34	74	62.72	1.56	7.79	34.41	101	41	Peak

Test Mode :	802.11n HT20– Chain Port 1	Temperature :	22~23°C
Test Channel :	48	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Vertical
Remark :	1. 5240 MHz is fundamental signal which can be ignored. 2. 10479 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	105.86	-	-	98.92	35.28	5.41	33.75	158	263	Peak
5240	93.74	-	-	86.8	35.28	5.41	33.75	158	263	Average
10479	34.83	-39.17	74	59.89	1.56	7.79	34.41	115	210	Peak

Test Mode :	802.11n HT40– Chain Port 1	Temperature :	22~23°C
Test Channel :	38	Relative Humidity :	42~43%
Test Engineer :	Star Wei	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
43.58	22.03	-17.97	40	45	10.03	0.62	33.62	115	201	Peak
110.51	22.19	-21.31	43.5	43.02	11.8	0.98	33.61	-	-	Peak
128.94	19.9	-23.6	43.5	40.74	11.71	1.04	33.59	-	-	Peak
234.67	15.27	-30.73	46	36.09	11.23	1.42	33.47	-	-	Peak
295.78	13.34	-32.66	46	32.18	12.95	1.59	33.38	-	-	Peak
551.86	20.34	-25.66	46	32.75	18.5	2.1	33.01	-	-	Peak
5190	101.62	-	-	94.74	35.26	5.39	33.77	116	337	Peak
5190	89.59	-	-	82.71	35.26	5.39	33.77	116	337	Average
10380	33.37	-40.63	74	58.64	1.48	7.73	34.48	100	111	Peak

Test Mode :	802.11n HT40– Chain Port 1	Temperature :	22~23°C
Test Channel :	38	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Vertical
Remark :	1. 5190 MHz is fundamental signal which can be ignored. 2. 10374 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
53.28	28.47	-11.53	40	54.57	6.8	0.68	33.58	154	119	Peak
100.81	23.63	-19.87	43.5	45.69	10.62	0.93	33.61	-	-	Peak
163.86	13.33	-30.17	43.5	36.3	9.44	1.17	33.58	-	-	Peak
233.7	16.27	-29.73	46	37.16	11.17	1.41	33.47	-	-	Peak
569.32	19.44	-26.56	46	31.71	18.53	2.19	32.99	-	-	Peak
739.07	21.29	-24.71	46	31.84	19.8	2.45	32.8	-	-	Peak
5190	94.79	-	-	87.91	35.26	5.39	33.77	170	91	Peak
5190	83.19	-	-	76.31	35.26	5.39	33.77	170	91	Average
10374	37.35	-36.65	74	62.66	1.46	7.72	34.49	100	184	Peak

Test Mode :	802.11n HT40– Chain Port 1	Temperature :	22~23°C
Test Channel :	46	Relative Humidity :	42~43%
Test Engineer :	Star Wei	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	107.17	-	-	100.23	35.28	5.41	33.75	100	332	Peak
5230	95.59	-	-	88.65	35.28	5.41	33.75	100	332	Average
10460	34.51	-39.49	74	59.63	1.54	7.77	34.43	145	122	Peak

Test Mode :	802.11n HT40– Chain Port 1	Temperature :	22~23°C
Test Channel :	46	Relative Humidity :	42~43%
Test Engineer :	Star Wei	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	100.76	-	-	93.82	35.28	5.41	33.75	191	303	Peak
5230	89.58	-	-	82.64	35.28	5.41	33.75	191	303	Average
10460	34.15	-39.85	74	59.27	1.54	7.77	34.43	115	120	Peak

Test Mode :	802.11n HT20– Chain Port 0+1	Temperature :	22~23°C
Test Channel :	36	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Horizontal
Remark :	1. 5180 MHz is fundamental signal which can be ignored. 2. 10359 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	105.55	-	-	98.67	35.26	5.39	33.77	100	180	Peak
5180	93.65	-	-	86.77	35.26	5.39	33.77	100	180	Average
10359	35.06	-38.94	74	60.37	1.46	7.72	34.49	119	52	Peak

Test Mode :	802.11n HT20– Chain Port 0+1	Temperature :	22~23°C
Test Channel :	36	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Vertical
Remark :	1. 5180 MHz is fundamental signal which can be ignored. 2. 10359 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	104.25	-	-	97.37	35.26	5.39	33.77	176	280	Peak
5180	93.12	-	-	86.24	35.26	5.39	33.77	176	280	Average
10359	37.21	-36.79	74	62.52	1.46	7.72	34.49	140	207	Peak

Test Mode :	802.11n HT20– Chain Port 0+1	Temperature :	22~23°C
Test Channel :	44	Relative Humidity :	42~43%
Test Engineer :	Star Wei	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	105.58	-	-	98.67	35.27	5.4	33.76	100	178	Peak
5220	93.59	-	-	86.68	35.27	5.4	33.76	100	178	Average
10440	37.3	-36.7	74	26.43	37.55	7.76	34.44	116	20	Peak

Test Mode :	802.11n HT20– Chain Port 0+1	Temperature :	22~23°C
Test Channel :	44	Relative Humidity :	42~43%
Test Engineer :	Star Wei	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	101.77	-	-	94.86	35.27	5.4	33.76	100	1	Peak
5220	90.12	-	-	83.21	35.27	5.4	33.76	100	1	Average
10440	37.33	-36.67	74	26.46	37.55	7.76	34.44	100	148	Peak

Test Mode :	802.11n HT20– Chain Port 0+1	Temperature :	22~23°C
Test Channel :	48	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Horizontal
Remark :	1. 5240 MHz is fundamental signal which can be ignored. 2. 10479 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	109.68	-	-	102.74	35.28	5.41	33.75	100	175	Peak
5240	98.05	-	-	91.11	35.28	5.41	33.75	100	175	Average
10479	35.36	-38.64	74	60.42	1.56	7.79	34.41	115	203	Peak

Test Mode :	802.11n HT20– Chain Port 0+1	Temperature :	22~23°C
Test Channel :	48	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Vertical
Remark :	1. 5240 MHz is fundamental signal which can be ignored. 2. 10479 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	109.24	-	-	102.3	35.28	5.41	33.75	100	302	Peak
5240	96.63	-	-	89.69	35.28	5.41	33.75	100	302	Average
10479	36.26	-37.74	74	61.32	1.56	7.79	34.41	100	148	Peak

Test Mode :	802.11n HT40– Chain Port 0+1	Temperature :	22~23°C
Test Channel :	38	Relative Humidity :	42~43%
Test Engineer :	Star Wei	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	103.02	-	-	96.14	35.26	5.39	33.77	100	343	Peak
5190	90.63	-	-	83.75	35.26	5.39	33.77	100	343	Average
10380	34.15	-39.85	74	59.42	1.48	7.73	34.48	100	106	Peak

Test Mode :	802.11n HT40– Chain Port 0+1	Temperature :	22~23°C
Test Channel :	38	Relative Humidity :	42~43%
Test Engineer :	Star Wei	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	99.72	-	-	92.84	35.26	5.39	33.77	179	304	Peak
5190	88.5	-	-	81.62	35.26	5.39	33.77	179	304	Average
10380	35.11	-38.89	74	60.38	1.48	7.73	34.48	200	100	Peak

Test Mode :	802.11n HT40– Chain Port 0+1	Temperature :	22~23°C
Test Channel :	46	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Horizontal
Remark :	1. 5230 MHz is fundamental signal which can be ignored. 2. 10458 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	106.34	-	-	99.4	35.28	5.41	33.75	100	168	Peak
5230	94.87	-	-	87.93	35.28	5.41	33.75	100	168	Average
10458	33.7	-40.3	74	58.82	1.54	7.77	34.43	100	184	Peak

Test Mode :	802.11n HT40– Chain Port 0+1	Temperature :	22~23°C
Test Channel :	46	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Vertical
Remark :	1. 5230 MHz is fundamental signal which can be ignored. 2. 10461 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	106.25	-	-	99.31	35.28	5.41	33.75	189	272	Peak
5230	94.04	-	-	87.1	35.28	5.41	33.75	189	272	Average
10461	31.71	-42.29	74	56.8	1.55	7.78	34.42	162	332	Peak

3.6 AC Conducted Emission Measurement

3.6.1 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.

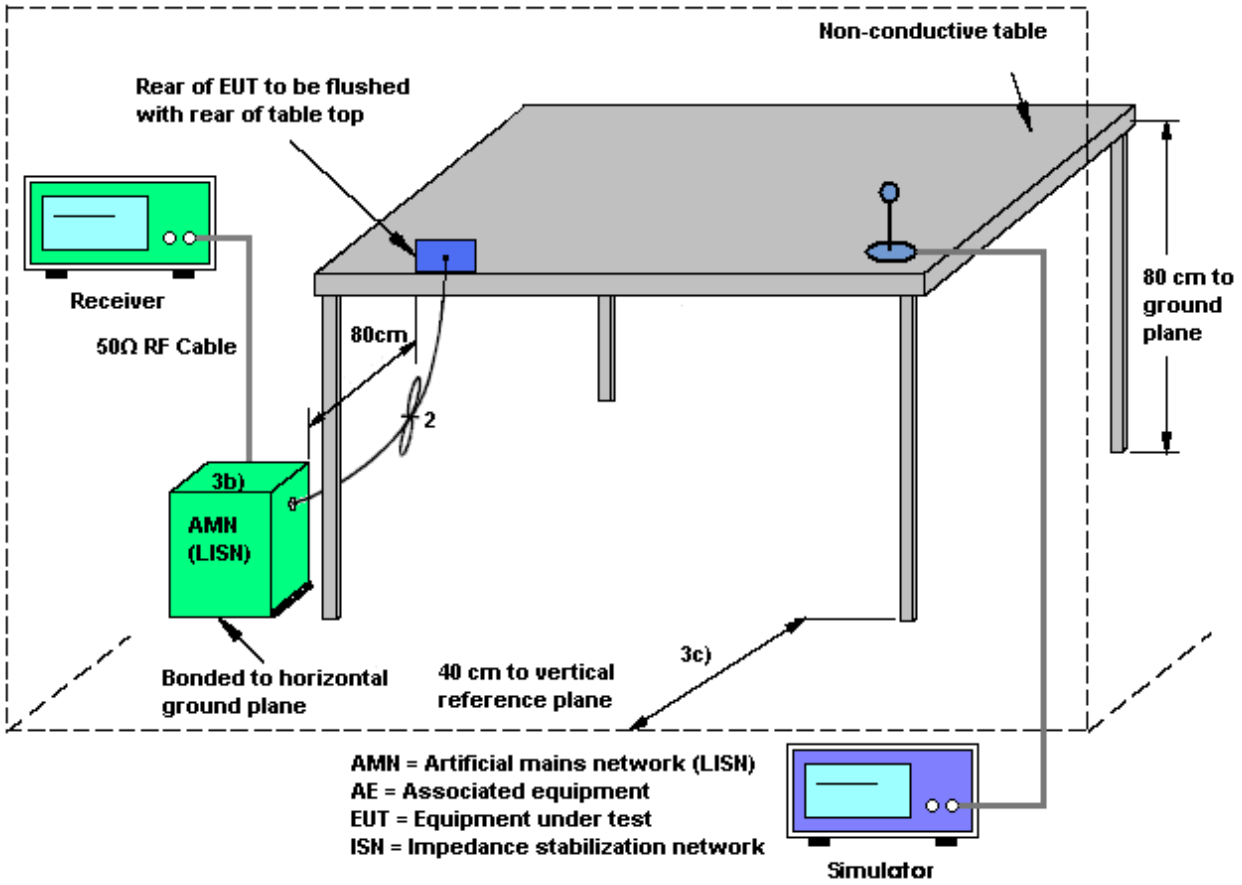
3.6.2 Measuring Instruments

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

3.6.3 Test Procedures

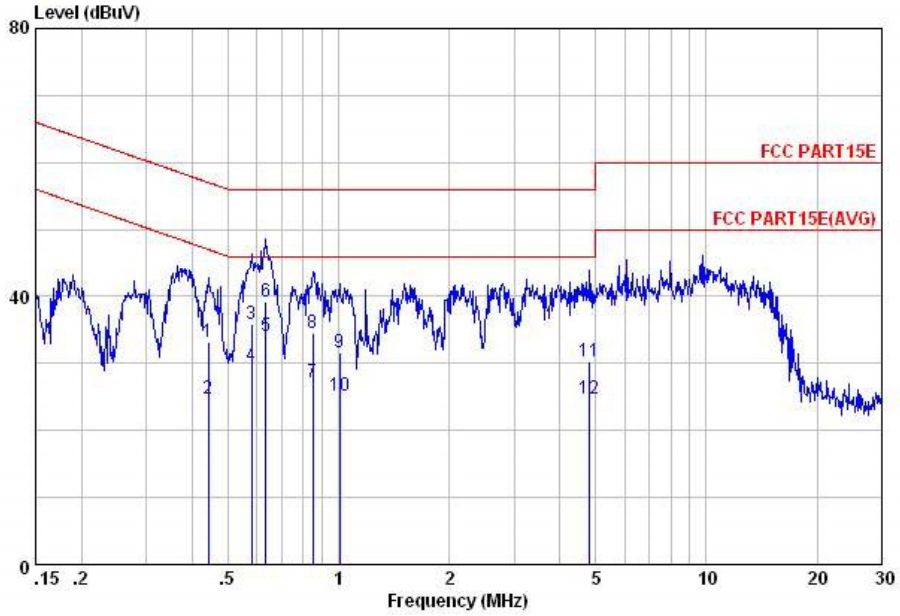
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.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

3.6.4 Test Setup



3.6.5 Test Result of AC Conducted Emission

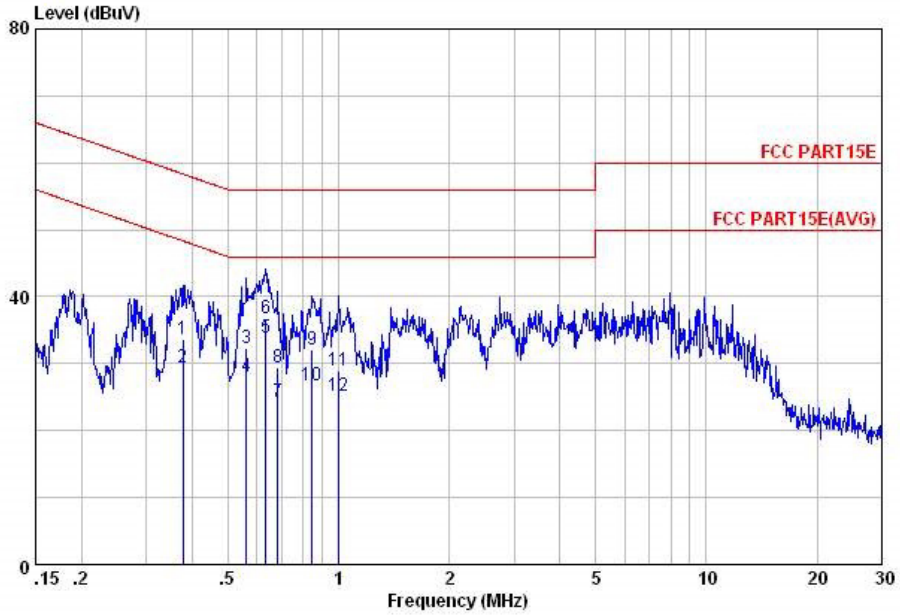
Test Mode :	Mode 1	Temperature :	21~23℃
Test Engineer :	Eligah Wang	Relative Humidity :	32~34%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GPRS850 Idle + WLAN 5GHz Link + USB Cable (Charging from Adapter)		



Site : C001-KS
Condition: FCC PART15E LISN-L20130306 LINE
Project : (FR) 440903
mode : Mode 1

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.44	33.13	-23.89	57.02	22.60	0.26	10.27	QP
2	0.44	24.83	-22.19	47.02	14.30	0.26	10.27	Average
3	0.58	35.95	-20.05	56.00	25.50	0.20	10.25	QP
4	0.58	29.75	-16.25	46.00	19.30	0.20	10.25	Average
5	0.63	34.03	-11.97	46.00	23.60	0.20	10.23	Average
6	0.63	39.33	-16.67	56.00	28.90	0.20	10.23	QP
7	0.85	27.13	-18.87	46.00	16.80	0.14	10.19	Average
8	0.85	34.63	-21.37	56.00	24.30	0.14	10.19	QP
9	1.00	31.58	-24.42	56.00	21.30	0.10	10.18	QP
10	1.00	25.08	-20.92	46.00	14.80	0.10	10.18	Average
11	4.82	30.25	-25.75	56.00	19.79	0.20	10.26	QP
12	4.82	24.75	-21.25	46.00	14.29	0.20	10.26	Average

Test Mode :	Mode 1	Temperature :	21~23℃
Test Engineer :	Eligah Wang	Relative Humidity :	32~34%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GPRS850 Idle + WLAN 5GHz Link + USB Cable (Charging from Adapter)		



Site : C001-KS
Condition: FCC PART15E LISN-N20130306 NEUTRAL
Project : (FR) 440903
mode : Mode 1

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.38	33.64	-24.70	58.34	22.90	0.44	10.30	QP
2	0.38	29.44	-18.90	48.34	18.70	0.44	10.30	Average
3	0.56	32.42	-23.58	56.00	21.90	0.27	10.25	QP
4	0.56	28.12	-17.88	46.00	17.60	0.27	10.25	Average
5	0.63	33.95	-12.05	46.00	23.50	0.22	10.23	Average
6	0.63	36.85	-19.15	56.00	26.40	0.22	10.23	QP
7	0.68	24.32	-21.68	46.00	13.90	0.21	10.21	Average
8	0.68	29.32	-26.68	56.00	18.90	0.21	10.21	QP
9	0.85	32.03	-23.97	56.00	21.70	0.14	10.19	QP
10	0.85	26.63	-19.37	46.00	16.30	0.14	10.19	Average
11	1.00	28.88	-27.12	56.00	18.60	0.10	10.18	QP
12	1.00	25.08	-20.92	46.00	14.80	0.10	10.18	Average

3.7 Frequency Stability Measurement

3.7.1 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.

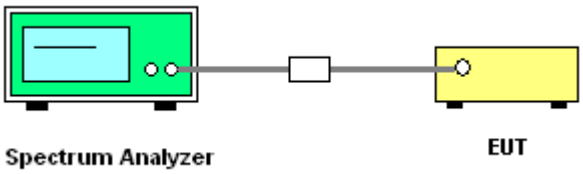
3.7.2 Measuring Instruments

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

3.7.3 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.

3.7.4 Test Setup



3.7.5 Test Result of Frequency Stability

Test Band :	5GHz band 1	Temperature :	23~24℃
Test Engineer :	Adonis Li	Relative Humidity :	47~48%

Mod.	Data Rate	N_{TX}	Channel	Frequency (MHz)	Center Frequency (Hz)	Frequency Deviation (Hz)	Frequency Stability (ppm)
11a	6Mbps	1	36	5180	5180000000.00	0.00	0.00
11a	6Mbps	1	48	5240	5240000000.00	0.00	0.00

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

3.8 Automatically Discontinue Transmission

3.8.1 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.

3.8.2 Measuring Instruments

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

3.8.3 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.

3.9 Antenna Requirements

3.9.1 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.

3.9.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.9.3 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.

	Chain Port 0 Ant 1 (dBi)	Chain Port 1 Ant 2 (dBi)	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
Band I	1.00	1.00	1.00	4.01	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	FSP40	100319	9kHz~40GHz	Dec. 28, 2013	May 15, 2014~ May 21, 2014	Dec. 27, 2014	Conducted (TH01-KS)
Pulse Power Sensor	Anritsu	MA2411B	0917070	30MHz~40GHz	Feb. 27, 2014	May 15, 2014~ May 21, 2014	Feb. 26, 2015	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Feb. 27, 2014	May 15, 2014~ May 21, 2014	Feb. 26, 2015	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESCI	100534	9kHz~3GHz	Nov. 05, 2013	May 07, 2014	Nov. 04, 2014	Radiation (03CH01-KS)
Spectrum Analyzer	R&S	FSP30	101399	9kHz~30GHz	May 23, 2013	May 07, 2014	May 22, 2014	Radiation (03CH01-KS)
Bilog Antenna	SCHAFFNER	CBL6112D	23182	25MHz~2GHz	Jan. 08, 2014	May 07, 2014	Jan. 07, 2015	Radiation (03CH01-KS)
Double Ridge Horn Antenna	EMCO	3117	00075959	1GHz~18GHz	Jan. 08, 2014	May 07, 2014	Jan. 07, 2015	Radiation (03CH01-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Nov. 22, 2013	May 07, 2014	Nov. 21, 2014	Radiation (03CH01-KS)
Active Horn Antenna	com-power	AHA-118	701030	1GHz~18GHz	Nov. 18, 2013	May 07, 2014	Nov. 17, 2014	Radiation (03CH01-KS)
Amplifier	com-power	PA-103A	161069	1MHz~1GHz	May 23, 2013	May 07, 2014	May 22, 2014	Radiation (03CH01-KS)
Amplifier	Agilent	8449B	3008A02371	1GHz~26.5GHz	Dec. 10, 2013	May 07, 2014	Dec. 09, 2014	Radiation (03CH01-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	May 07, 2014	NCR	Radiation (03CH01-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	May 07, 2014	NCR	Radiation (03CH01-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz	May 23, 2013	Apr. 26, 2014	May 22, 2014	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Dec. 10, 2013	Apr. 26, 2014	Dec. 09, 2014	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Dec. 10, 2013	Apr. 26, 2014	Dec. 09, 2014	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	May 25, 2013	Apr. 26, 2014	May 24, 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))	**2.26**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.54**