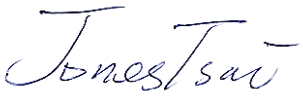
FCC RF Test Report

APPLICANT	**:**	**Ailen LLC**
EQUIPMENT	**:**	**Digital Media Receiver**
MODEL NAME	**:**	**CL1130**
FCC ID	**:**	**S59-4891**
STANDARD	**:**	**FCC Part 15 Subpart E §15.407**
CLASSIFICATION	**:**	**(NII) Unlicensed National Information Infrastructure**

The product was completely tested on Jul. 26, 2013. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and shown to be compliant 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

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
FR332717-02D	Rev. 01	Initial issue of report	Aug. 19, 2013

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 0.82 dB at 5150.000 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 8.30 dB at 0.526 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

Ailen LLC

P.O. Box 8125

Wilmington, DE 19803

1.2 Feature of Equipment Under Test

Product Feature	
Equipment	Digital Media Receiver
Model Name	CL1130
FCC ID	S59-4891
EUT supports Radios application	WLAN 11abgn / Bluetooth 2.1/3.0/4.0

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

1.3 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><Ant. 1>
802.11a : 14.86 dBm / 0.0306 W
802.11n HT20 : 14.83 dBm / 0.0304 W
802.11n HT40 : 14.97 dBm / 0.0314 W
MIMO <Ant. 1+2>
802.11n HT20 : 15.41 dBm / 0.0347 W
802.11n HT40 : 16.72 dBm / 0.0469 W</td></tr>
<tr><td>Antenna Type</td><td>Antenna 1 : Fixed Internal Antenna with gain 3.00 dBi
Antenna 2 : Fixed Internal Antenna with gain 1.90 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</td><td>V</td><td>-</td></tr>
<tr><td>802.11 n SISO</td><td>V</td><td>-</td></tr>
<tr><td>802.11 n MIMO</td><td>V</td><td>V</td></tr>
</table>
</td></tr>
</table>

1.4 Modification of EUT

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

1.5 Testing Site

Test Site	SPORTON INTERNATIONAL INC.			
Test Site Location	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-3273456 / FAX: +886-3-3284978			
Test Site No.	Sporton Site No.			FCC/IC Registration No.
	TH02-HY	CO05-HY	03CH08-HY	636805/4086B

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

1.6 Applied 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 v01r02.
- 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	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 antenna configurations as following table and the highest power data rates were chosen for full test in the following tables. Final Output Power equals to Measured Output Power adds the duty factor.

<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)	**14.86**	14.65	14.54	14.82	14.83	14.81	14.82	14.79

5GHz 802.11a/n HT20 mode								
Data Rate (MHz)	**MCS0**	**MCS1**	**MCS2**	**MCS3**	**MCS4**	**MCS5**	**MCS6**	**MCS7**
Average Power (dBm)	**14.83**	14.66	14.75	14.82	14.81	14.80	14.81	14.79

5GHz 802.11a/n HT40 mode								
Data Rate (MHz)	**MCS0**	**MCS1**	**MCS2**	**MCS3**	**MCS4**	**MCS5**	**MCS6**	**MCS7**
Average Power (dBm)	**14.97**	14.85	14.81	13.87	13.98	13.91	14.04	14.06

MIMO <Ant. 1+2>

5GHz 802.11a/n HT20 mode								
Data Rate (MHz)	**MCS0**	**MCS1**	**MCS2**	**MCS3**	**MCS4**	**MCS5**	**MCS6**	**MCS7**
Average Power (dBm)	15.28	15.25	15.37	15.37	15.39	15.40	15.39	15.38
Data Rate (MHz)	**MCS 8**	**MCS 9**	**MCS 10**	**MCS 11**	**MCS 12**	**MCS 13**	**MCS 14**	**MCS 15**
Average Power (dBm)	**15.41**	15.34	15.34	15.37	15.38	15.39	15.38	15.39

5GHz 802.11a/n HT40 mode								
Data Rate (MHz)	**MCS0**	**MCS1**	**MCS2**	**MCS3**	**MCS4**	**MCS5**	**MCS6**	**MCS7**
Average Power (dBm)	16.71	16.70	16.69	15.82	16.00	15.87	15.88	15.91
Data Rate (MHz)	**MCS 8**	**MCS 9**	**MCS 10**	**MCS 11**	**MCS 12**	**MCS 13**	**MCS 14**	**MCS 15**
Average Power (dBm)	**16.72**	16.71	16.70	15.92	15.79	15.83	15.95	15.87

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

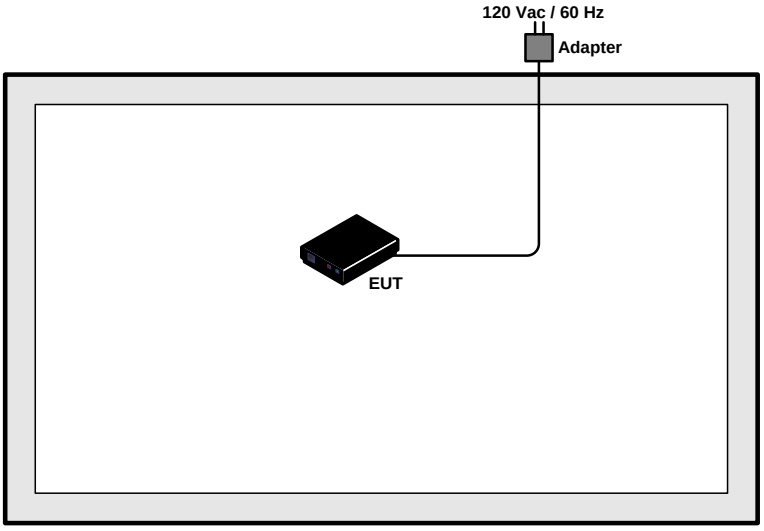
Final results of test modes, data rates and test channels are shown as following table.

Test Cases				
	Test Items	**Mode**	**Data rate**	**Test Channel**
Conducted TCs	**26dB BW Power Spectral Density**	**802.11a**	**6 Mbps**	**L/M/H**
		802.11n HT20	**MCS0/MCS8**	**L/M/H**
		802.11n HT40	**MCS0/MCS8**	**L/M/H**
	Output Power	**802.11a**	**6 Mbps**	**L/M/H**
		802.11n HT20	**MCS0/MCS8**	**L/M/H**
		802.11n HT40	**MCS0/MCS8**	**L/M/H**
	Peak Excursion	**802.11a**	**6 Mbps**	**L/M/H**
		802.11n HT20	**MCS0/MCS8**	**L/M/H**
		802.11n HT40	**MCS0/MCS8**	**L/M/H**
	Frequency Stability	**802.11a**	**6 Mbps**	**L/M/H**
		802.11n HT20	**MCS0/MCS8**	**L/M/H**
		802.11n HT40	**MCS0/MCS8**	**L/M/H**
Radiated TCs	**Radiated Band Edge**	**802.11a**	**6 Mbps**	**L/H**
		802.11n HT20	**MCS0/MCS8**	**L/H**
		802.11n HT40	**MCS0/MCS8**	**L/H**
	Radiated Spurious Emission	**802.11a**	**6 Mbps**	**L/M/H**
		802.11n HT20	**MCS0/MCS8**	**L/M/H**
		802.11n HT40	**MCS0/MCS8**	**L/M/H**
AC Conducted Emission	Mode 1 : WLAN (5G) Link + Bluetooth Link + HDMI Cable + RJ-45 Load + Audio Converter Load + Mouse + MPEG4 + Adapter			
Remark: HDMI Cable means media application transferred between EUT and external display.				

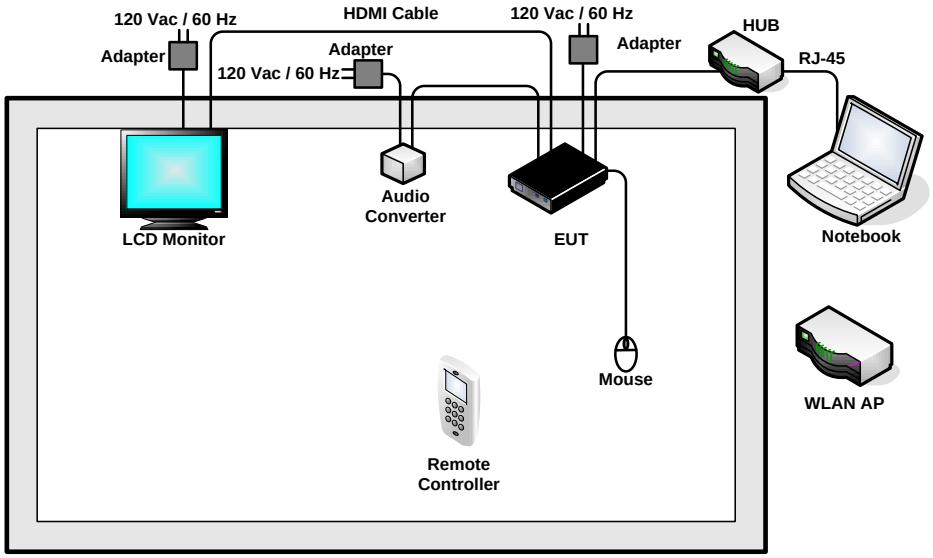
Ch. #		**Band I： 5150-5250 MHz**		
		802.11a	**802.11n HT20**	**802.11n HT40**
L	**Low**	36	36	38
M	**Middle**	44	44	-
H	**High**	48	48	46

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.	HUB	D-Link	DES-1005A	N/A	Unshielded, 3m	N/A
2.	Mouse	Lenovo	SM-1035	FCC DoC	Shielded, 1.4 m	N/A
3.	Audio Converter	UPMOST	1039-CA	N/A	N/A	N/A
4.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
5.	Notebook	DELL	Latitude E6320	FCC DoC	Unshielded, 3m	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
6.	LCD Monitor	DELL	U2410	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
7.	Adapter	Foxlink	RE54WE	Verification	N/A	Shielded, 1.5 m
8.	Remote controller	N/A	DU3560	Verification	N/A	N/A

2.6 Description of RF Function Operation Test Setup

The programmed RF utility “adb”, is installed in EUT to provide channel selection, power level, data rate and the application type. RF Utility can send transmitting signal for all testing. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

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 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.

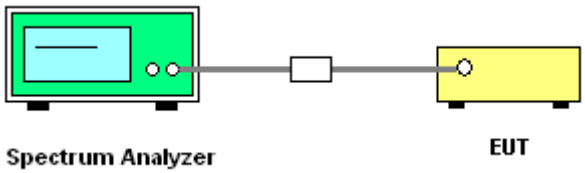
3.1.2 Measuring Instruments

See list of measuring instruments 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

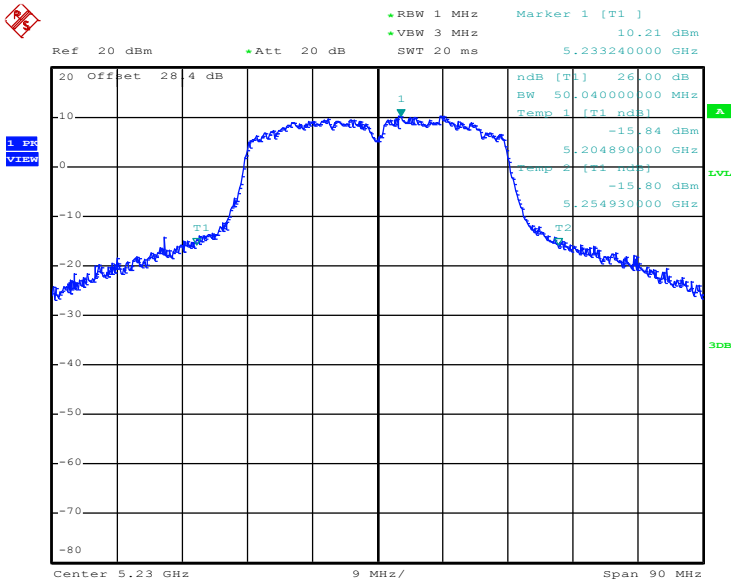


3.1.5 Test Result of 26dB Bandwidth

Test Band :	5GHz band 1	Temperature :	24~26℃
Test Engineer :	Reece Li and Kenny Chen	Relative Humidity :	45~49%

Mod.	Data Rate	N_{TX}	Channel	Freq. (MHz)	26dB Bandwidth (MHz)		FCC 26dB Bandwidth Power Limit (dBm)
					Chain Port 0 Ant. 1	Chain Port 1 Ant. 2	
11a	6Mbps	1	36	5180	21.80	-	17
11a	6Mbps	1	44	5220	25.55	-	17
11a	6Mbps	1	48	5240	25.00	-	17
HT20	MCS0	1	36	5180	22.30	-	17
HT20	MCS0	1	44	5220	26.20	-	17
HT20	MCS0	1	48	5240	25.75	-	17
HT40	MCS0	1	38	5190	43.38	-	17
HT40	MCS0	1	46	5230	50.04	-	17
HT20	MCS8	2	36	5180	21.05	21.55	17
HT20	MCS8	2	44	5220	21.05	21.75	17
HT20	MCS8	2	48	5240	21.20	21.85	17
HT40	MCS8	2	38	5190	42.21	42.93	17
HT40	MCS8	2	46	5230	45.99	48.51	17

Maximum 26dB Bandwidth



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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.

3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

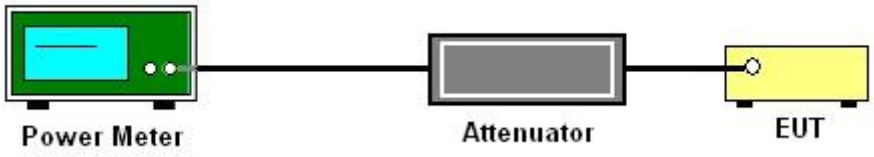
3.2.3 Test Procedures

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 :	24~26℃
Test Engineer :	Reece Li and Kenny Chen	Relative Humidity :	45~49%

Mod.	Data Rate	N_{TX}	Channel	Freq. (MHz)	Duty Factor (dB)		RF Output Power (dBm)			Power Limit (dBm)	DG (dBi)	Pass/Fail
					Chain Port 0 Ant. 1	Chain Port 1 Ant. 2	Chain Port 0 Ant. 1	Chain Port 1 Ant. 2	Sum Power			
11a	6Mbps	1	36	5180	0.06	-	14.63	-	-	17	3.00	Pass
11a	6Mbps	1	44	5220	0.06	-	14.86	-	-	17	3.00	Pass
11a	6Mbps	1	48	5240	0.06	-	14.64	-	-	17	3.00	Pass
HT20	MCS0	1	36	5180	0.09	-	13.80	-	-	17	3.00	Pass
HT20	MCS0	1	44	5220	0.09	-	14.83	-	-	17	3.00	Pass
HT20	MCS0	1	48	5240	0.09	-	14.74	-	-	17	3.00	Pass
HT40	MCS0	1	38	5190	0.16	-	9.64	-	-	17	3.00	Pass
HT40	MCS0	1	46	5230	0.16	-	14.97	-	-	17	3.00	Pass
HT20	MCS8	2	36	5180	0.17	0.17	12.60	11.99	15.32	17	2.48	Pass
HT20	MCS8	2	44	5220	0.17	0.17	12.61	11.91	15.29	17	2.48	Pass
HT20	MCS8	2	48	5240	0.17	0.17	12.78	11.98	15.41	17	2.48	Pass
HT40	MCS8	2	38	5190	0.30	0.30	10.20	9.24	12.76	17	2.48	Pass
HT40	MCS8	2	46	5230	0.30	0.30	14.25	13.09	16.72	17	2.48	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 Chain Port 0 and Chain Port 1.
3. For the band 5150-5250 MHz, the maximum conducted output power shall not exceed the lesser of 50 mW (17dBm) or 4 dBm + 10log (26dB BW).

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

For the band 5150-5250 MHz, the peak power spectral density shall not exceed 4 dBm in any 1-MHz band. If transmitting antenna directional gain is greater than 6 dBi, both the maximum conducted output 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.

3.3.2 Measuring Instruments

See list of measuring instruments 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 = sample
   - 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 v01r02.

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

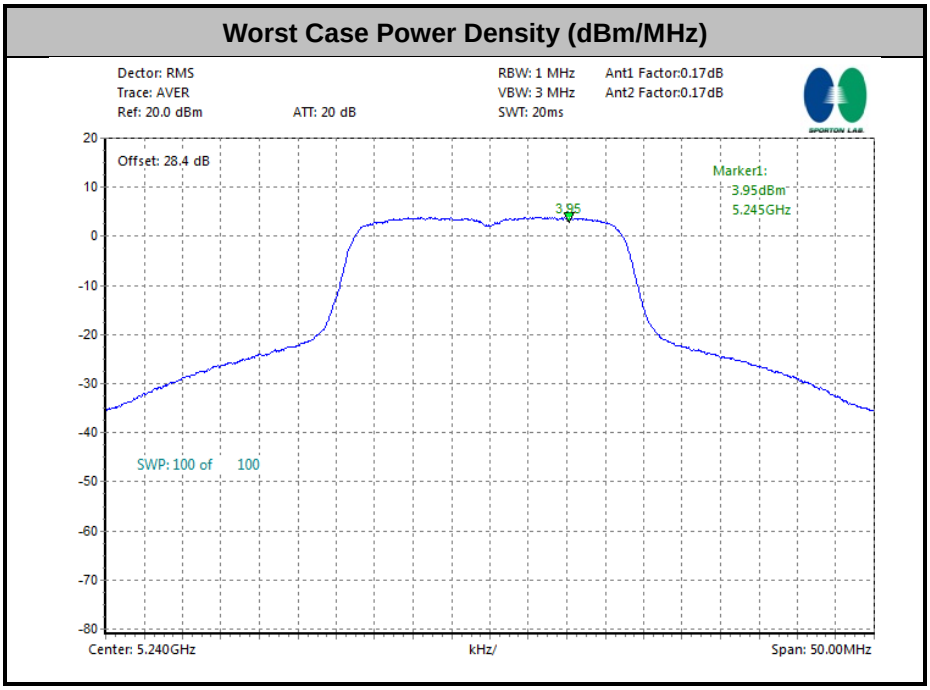
3.3.5 Test Result of Power Spectral Density

Test Band :	5GHz band 1	Temperature :	24~26℃
Test Engineer :	Reece Li and Kenny Chen	Relative Humidity :	45~49%

Mod.	Data Rate	N_{TX}	Channel	Freq. (MHz)	Duty Factor (dB)		Power Density (dBm/MHz)		Combined Power Density (dBm/MHz)	Max. Limits (dBm/MHz)	DG (dBi)	Pass/ Fail
					Chain Port 0 Ant. 1	Chain Port 1 Ant. 2	Chain Port 0 Ant. 1	Chain Port 1 Ant. 2				
11a	6Mbps	1	36	5180	0.06	-	3.16	-	-	4	3.00	Pass
11a	6Mbps	1	44	5220	0.06	-	3.56	-	-	4	3.00	Pass
11a	6Mbps	1	48	5240	0.06	-	3.35	-	-	4	3.00	Pass
HT20	MCS0	1	36	5180	0.09	-	2.21	-	-	4	3.00	Pass
HT20	MCS0	1	44	5220	0.09	-	3.48	-	-	4	3.00	Pass
HT20	MCS0	1	48	5240	0.09	-	3.30	-	-	4	3.00	Pass
HT40	MCS0	1	38	5190	0.16	-	-4.42	-	-	4	3.00	Pass
HT40	MCS0	1	46	5230	0.16	-	1.74	-	-	4	3.00	Pass
HT20	MCS8	2	36	5180	0.17	0.17	-	-	3.84	4	5.50	Pass
HT20	MCS8	2	44	5220	0.17	0.17	-	-	3.92	4	5.50	Pass
HT20	MCS8	2	48	5240	0.17	0.17	-	-	3.95	4	5.50	Pass
HT40	MCS8	2	38	5190	0.30	0.30	-	-	-3.26	4	5.50	Pass
HT40	MCS8	2	46	5230	0.30	0.30	-	-	0.47	4	5.50	Pass

Note: Combined Power Density is a bin-by-bin combined 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

See list of measuring instruments of this test report.

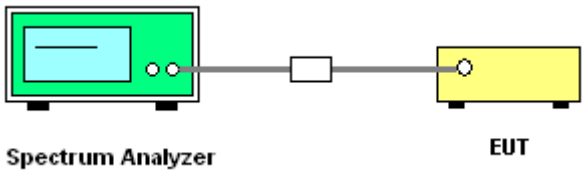
3.4.3 Test Procedures

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



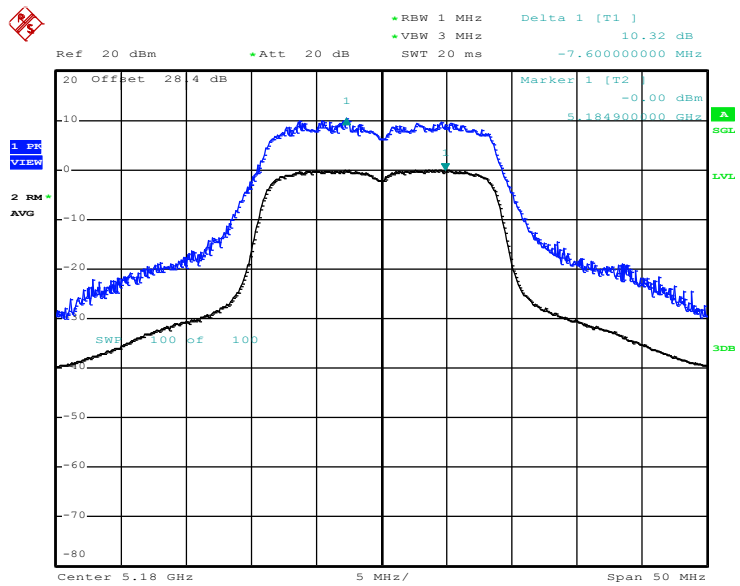
3.4.5 Test Result of Peak Excursion Ratio

Test Band :	5GHz band 1	Temperature :	24~26℃
Test Engineer :	Reece Li and Kenny Chen	Relative Humidity :	45~49%

Mod.	N_{TX}	Channel	Freq. (MHz)	Peak Excursion Ratio (dB)					Max. Limits (dB)	Pass/Fail
				BPSK	QPSK	16QAM	64QAM	256QAM		
11a	1	36	5180	8.83	9.42	9.52	9.24	-	13	Pass
HT20	1	36	5180	8.64	9.28	9.39	9.78	-	13	Pass
HT40	1	38	5230	9.28	9.19	9.36	9.47	-	13	Pass
HT20	2	36	5180	8.36	9.24	8.96	9.03	-	13	Pass
HT40	2	38	5230	9.15	8.75	8.30	9.31	-	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

See list of measuring instruments 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

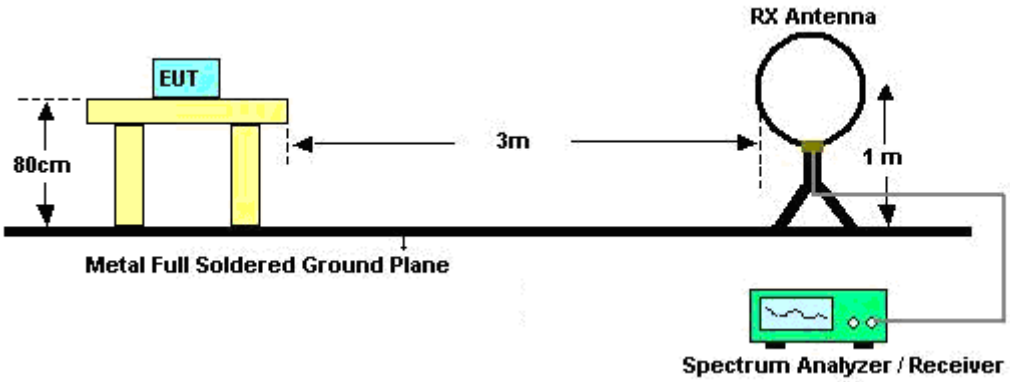
   - The setting follows H) 6) of FCC KDB 789033.
   - RBW = 1 MHz
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
1	802.11a	98.57	-	-	10Hz
1	802.11n HT20	97.96	1920.00	0.52	1kHz
1	802.11n HT40	96.34	948.00	1.05	3kHz
1+2	802.11n HT20 for Ant1	96.08	980.00	1.02	
1+2	802.11n HT20 for Ant2	96.08	980.00	1.02	
1+2	802.11n HT40 for Ant1	93.26	498.00	2.01	
1+2	802.11n HT40 for Ant2	93.26	498.00	2.01	

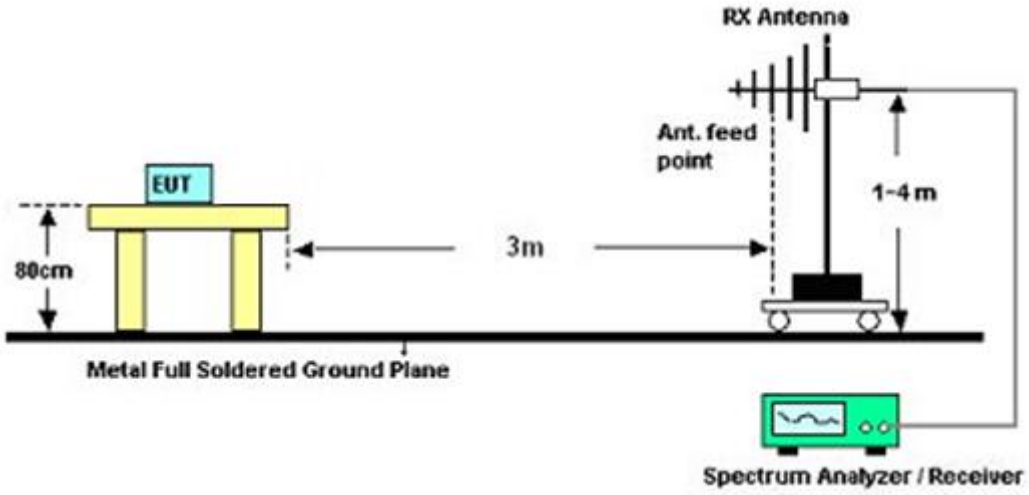
2. The EUT was placed on a rotatable table top 0.8 meter above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters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

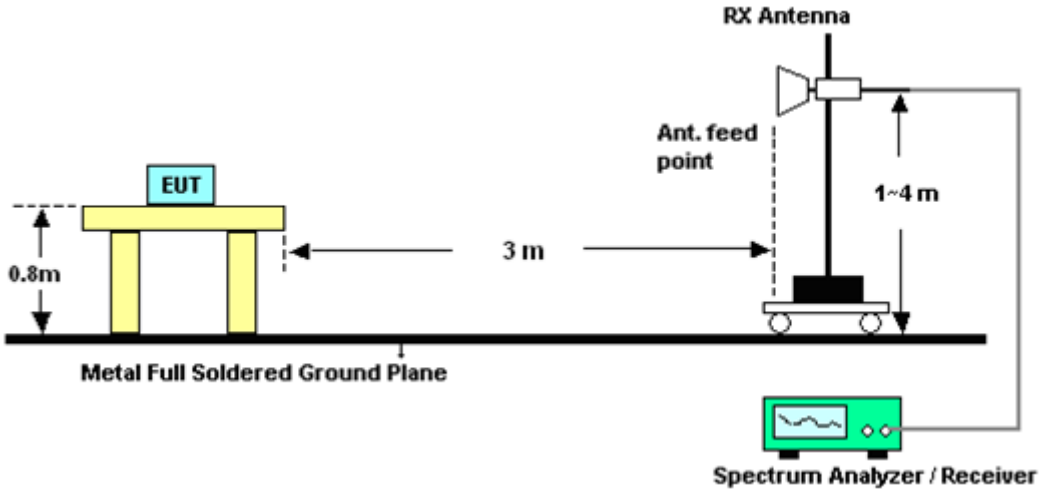
For radiated emissions below 30MHz



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

<Ant. 1>

Test Mode :	802.11a	**Temperature :**	23~24°C
Test Channel :	36	**Relative Humidity :**	51~52%
Test Engineer :	Jet Lu		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	**Level (dBµV/m)**	**Over Limit (dB)**	**Limit Line (dBµV/m)**	**Read Level (dBµV)**	**Antenna Factor (dB)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Ant Pos (cm)**	**Table Pos (deg)**	**Remark**
5149.7	68.82	-5.18	74	60.69	34.42	8.65	34.94	100	149	Peak
5150	52.57	-1.43	54	44.44	34.42	8.65	34.94	100	149	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**
5150	64.95	-9.05	74	57.06	34.18	8.65	34.94	100	72	Peak
5150	49.43	-4.57	54	41.54	34.18	8.65	34.94	100	72	Average

Test Mode :	802.11a	**Temperature :**	23~24°C
Test Channel :	48	**Relative Humidity :**	51~52%
Test Engineer :	Jet Lu		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	**Level (dBµV/m)**	**Over Limit (dB)**	**Limit Line (dBµV/m)**	**Read Level (dBµV)**	**Antenna Factor (dB)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Ant Pos (cm)**	**Table Pos (deg)**	**Remark**
5126.45	61.41	-12.59	74	53.35	34.41	8.6	34.95	100	149	Peak
5141.45	47.86	-6.14	54	39.74	34.42	8.65	34.95	100	149	Average
5378.82	61.32	-12.68	74	52.81	34.55	8.8	34.84	100	149	Peak
5357.37	48.08	-5.92	54	39.59	34.54	8.8	34.85	100	149	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**
5111.75	60.77	-13.23	74	52.97	34.21	8.55	34.96	100	242	Peak
5000.15	47.57	-6.43	54	39.94	34.3	8.33	35	100	242	Average
5353.41	61.84	-12.16	74	53.59	34.3	8.8	34.85	100	242	Peak
5370.79	47.82	-6.18	54	39.54	34.33	8.8	34.85	100	242	Average

Test Mode :	802.11n HT20	Temperature :	23~24°C
Test Channel :	36	Relative Humidity :	51~52%
Test Engineer :	Jet Lu		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5150	64.92	-9.08	74	56.79	34.42	8.65	34.94	100	148	Peak
5150	52.27	-1.73	54	44.14	34.42	8.65	34.94	100	148	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
5146.55	61.72	-12.28	74	53.83	34.18	8.65	34.94	100	98	Peak
5150	49.28	-4.72	54	41.39	34.18	8.65	34.94	100	98	Average

Test Mode :	802.11n HT20	Temperature :	23~24°C
Test Channel :	48	Relative Humidity :	51~52%
Test Engineer :	Jet Lu		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5147.15	61.48	-12.52	74	53.35	34.42	8.65	34.94	100	150	Peak
5130.35	48.57	-5.43	54	40.51	34.41	8.6	34.95	100	150	Average
5375.41	62.25	-11.75	74	53.74	34.55	8.8	34.84	100	150	Peak
5352.86	48.8	-5.2	54	40.31	34.54	8.8	34.85	100	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
5112.2	61.07	-12.93	74	53.27	34.21	8.55	34.96	100	244	Peak
5077.4	48.27	-5.73	54	40.52	34.23	8.49	34.97	100	244	Average
5408.19	61.63	-12.37	74	53.25	34.4	8.81	34.83	100	244	Peak
5414.02	48.48	-5.52	54	40.07	34.43	8.81	34.83	100	244	Average

Test Mode :	802.11n HT40	Temperature :	23~24°C
Test Channel :	38	Relative Humidity :	51~52%
Test Engineer :	Jet Lu		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5150	63.9	-10.1	74	55.77	34.42	8.65	34.94	100	150	Peak
5150	53.18	-0.82	54	45.05	34.42	8.65	34.94	100	150	Average
5357.37	62.18	-11.82	74	53.69	34.54	8.8	34.85	100	150	Peak
5353.3	49.36	-4.64	54	40.87	34.54	8.8	34.85	100	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
5150	63.01	-10.99	74	55.12	34.18	8.65	34.94	190	87	Peak
5150	49.9	-4.1	54	42.01	34.18	8.65	34.94	190	87	Average
5380.14	61.93	-12.07	74	53.59	34.37	8.81	34.84	190	87	Peak
5440.64	49.13	-4.87	54	40.67	34.47	8.81	34.82	190	87	Average

Test Mode :	802.11n HT40	Temperature :	23~24°C
Test Channel :	46	Relative Humidity :	51~52%
Test Engineer :	Jet Lu		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5139.35	62.06	-11.94	74	54	34.41	8.6	34.95	100	150	Peak
5111.6	49.01	-4.99	54	41.03	34.39	8.55	34.96	100	150	Average
5448.01	61.7	-12.3	74	53.13	34.58	8.81	34.82	100	150	Peak
5365.07	49.66	-4.34	54	41.16	34.55	8.8	34.85	100	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
5135.6	61.58	-12.42	74	53.74	34.19	8.6	34.95	100	75	Peak
5024.9	48.81	-5.19	54	41.15	34.27	8.38	34.99	100	75	Average
5372.33	61.89	-12.11	74	53.61	34.33	8.8	34.85	100	75	Peak
5402.47	49.22	-4.78	54	40.84	34.4	8.81	34.83	100	75	Average

<MIMO Ant. 1+2>

Test Mode :	802.11n HT20	**Temperature :**	23~24°C
Test Channel :	36	**Relative Humidity :**	51~52%
Test Engineer :	Jet Lu		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	**Level (dBµV/m)**	**Over Limit (dB)**	**Limit Line (dBµV/m)**	**Read Level (dBµV)**	**Antenna Factor (dB)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Ant Pos (cm)**	**Table Pos (deg)**	**Remark**
5150	64.67	-9.33	74	56.54	34.42	8.65	34.94	100	144	Peak
5150	52.54	-1.46	54	44.41	34.42	8.65	34.94	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**
5149.55	62.31	-11.69	74	54.42	34.18	8.65	34.94	190	292	Peak
5150	50.75	-3.25	54	42.86	34.18	8.65	34.94	190	292	Average

Test Mode :	802.11n HT20	**Temperature :**	23~24°C
Test Channel :	48	**Relative Humidity :**	51~52%
Test Engineer :	Jet Lu		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	**Level (dBµV/m)**	**Over Limit (dB)**	**Limit Line (dBµV/m)**	**Read Level (dBµV)**	**Antenna Factor (dB)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Ant Pos (cm)**	**Table Pos (deg)**	**Remark**
5118.35	61.56	-12.44	74	53.52	34.39	8.6	34.95	100	151	Peak
5148.95	49.27	-4.73	54	41.14	34.42	8.65	34.94	100	151	Average
5382.34	62.08	-11.92	74	53.56	34.55	8.81	34.84	100	151	Peak
5355.83	49.86	-4.14	54	41.37	34.54	8.8	34.85	100	151	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**
5004.5	61.47	-12.53	74	53.85	34.29	8.33	35	188	293	Peak
5068.7	48.87	-5.13	54	41.1	34.25	8.49	34.97	188	293	Average
5385.86	61.22	-12.78	74	52.88	34.37	8.81	34.84	188	293	Peak
5355.72	49.5	-4.5	54	41.25	34.3	8.8	34.85	188	293	Average

Test Mode :	802.11n HT40	Temperature :	23~24°C
Test Channel :	38	Relative Humidity :	51~52%
Test Engineer :	Jet Lu		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5149.55	64.2	-9.8	74	56.07	34.42	8.65	34.94	100	146	Peak
5150	52.85	-1.15	54	44.72	34.42	8.65	34.94	100	146	Average
5392.9	61.66	-12.34	74	53.14	34.55	8.81	34.84	100	146	Peak
5381.9	49.4	-4.6	54	40.88	34.55	8.81	34.84	100	146	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	63.55	-10.45	74	55.66	34.18	8.65	34.94	192	292	Peak
5150	51.21	-2.79	54	43.32	34.18	8.65	34.94	192	292	Average
5433.49	61.38	-12.62	74	52.92	34.47	8.81	34.82	192	292	Peak
5381.68	49.19	-4.81	54	40.85	34.37	8.81	34.84	192	292	Average

Test Mode :	802.11n HT40	Temperature :	23~24°C
Test Channel :	46	Relative Humidity :	51~52%
Test Engineer :	Jet Lu		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5009.75	61.08	-12.92	74	53.44	34.31	8.33	35	112	153	Peak
5139.8	49.01	-4.99	54	40.94	34.42	8.6	34.95	112	153	Average
5367.05	61.27	-12.73	74	52.77	34.55	8.8	34.85	112	153	Peak
5355.94	50.03	-3.97	54	41.54	34.54	8.8	34.85	112	153	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
5105	60.62	-13.38	74	52.81	34.22	8.55	34.96	100	72	Peak
5141.15	48.75	-5.25	54	40.87	34.18	8.65	34.95	100	72	Average
5386.08	61.57	-12.43	74	53.23	34.37	8.81	34.84	100	72	Peak
5390.15	49.11	-4.89	54	40.77	34.37	8.81	34.84	100	72	Average

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

<Ant. 1>

Test Mode :	802.11a	**Temperature :**	23~24°C
Test Channel :	36	**Relative Humidity :**	51~52%
Test Engineer :	Jet Lu	**Polarization :**	Horizontal
Remark :	1. 5178 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
1538	41.06	-12.94	54	44.47	28.52	4.84	36.77	100	120	Average
1538	56.97	-17.03	74	60.38	28.52	4.84	36.77	100	120	Peak
5178	100.92	-	-	92.69	34.45	8.71	34.93	100	149	Average
5178	112.65	-	-	104.42	34.45	8.71	34.93	100	149	Peak
10360	47.62	-6.38	54	53.29	37.69	12	55.36	101	323	Average
10360	59.28	-14.72	74	64.98	37.68	12	55.38	101	323	Peak

Test Mode :	802.11a	**Temperature :**	23~24°C
Test Channel :	36	**Relative Humidity :**	51~52%
Test Engineer :	Jet Lu	**Polarization :**	Vertical
Remark :	1. 5178 MHz is fundamental signal which can be ignored. 2. 10362 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
5178	90.2	-	-	82.27	34.15	8.71	34.93	100	72	Average
5178	106.5	-	-	98.57	34.15	8.71	34.93	100	72	Peak
10362	47.54	-6.46	54	53.75	37.15	12	55.36	164	24	Average
10362	58.34	-15.66	74	64.55	37.15	12	55.36	164	24	Peak

Test Mode :	802.11a	**Temperature :**	23~24°C
Test Channel :	44	**Relative Humidity :**	51~52%
Test Engineer :	Jet Lu	**Polarization :**	Horizontal
Remark :	1. 5222 MHz is fundamental signal which can be ignored. 2. 10443 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
5222	99.2	-	-	90.87	34.47	8.77	34.91	100	152	Average
5222	111.22	-	-	102.89	34.47	8.77	34.91	100	152	Peak
10443	45.79	-8.21	54	51.28	37.75	12.04	55.28	100	320	Average
10443	57.76	-16.24	74	63.25	37.75	12.04	55.28	100	320	Peak

Test Mode :	802.11a	**Temperature :**	23~24°C
Test Channel :	44	**Relative Humidity :**	51~52%
Test Engineer :	Jet Lu	**Polarization :**	Vertical
Remark :	1. 5222 MHz is fundamental signal which can be ignored. 2. 10443 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
5222	94.46	-	-	86.47	34.13	8.77	34.91	100	74	Average
5222	105.42	-	-	97.43	34.13	8.77	34.91	100	74	Peak
10443	47	-7	54	53.11	37.13	12.04	55.28	163	3	Average
10443	58.43	-15.57	74	64.54	37.13	12.04	55.28	163	3	Peak

Test Mode :	802.11a	**Temperature :**	23~24°C
Test Channel :	48	**Relative Humidity :**	51~52%
Test Engineer :	Jet Lu	**Polarization :**	Horizontal
Remark :	1. 5242 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
5242	99.79	-	-	91.43	34.5	8.77	34.91	100	149	Average
5242	111.79	-	-	103.43	34.5	8.77	34.91	100	149	Peak
10479	46.81	-7.19	54	52.17	37.79	12.07	55.22	100	325	Average
10479	57.87	-16.13	74	63.23	37.79	12.07	55.22	100	325	Peak

Test Mode :	802.11a	**Temperature :**	23~24°C
Test Channel :	48	**Relative Humidity :**	51~52%
Test Engineer :	Jet Lu	**Polarization :**	Vertical
Remark :	1. 5242 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
5242	94.97	-	-	87.01	34.1	8.77	34.91	100	242	Average
5242	106.21	-	-	98.25	34.1	8.77	34.91	100	242	Peak
10482	46.34	-7.66	54	52.38	37.11	12.07	55.22	135	51	Average
10482	57.09	-16.91	74	63.13	37.11	12.07	55.22	135	51	Peak

Test Mode :	802.11n HT20	**Temperature :**	23~24°C
Test Channel :	36	**Relative Humidity :**	51~52%
Test Engineer :	Jet Lu	**Polarization :**	Horizontal
Remark :	1. 5178 MHz is fundamental signal which can be ignored. 2. 10356 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
5178	101.89	-	-	93.66	34.45	8.71	34.93	100	148	Average
5178	112	-	-	103.77	34.45	8.71	34.93	100	148	Peak
10356	47.37	-6.63	54	53.07	37.68	12	55.38	100	330	Average
10356	57.87	-16.13	74	63.57	37.68	12	55.38	100	330	Peak

Test Mode :	802.11n HT20	**Temperature :**	23~24°C
Test Channel :	36	**Relative Humidity :**	51~52%
Test Engineer :	Jet Lu	**Polarization :**	Vertical
Remark :	1. 5182 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
5182	95.16	-	-	87.23	34.15	8.71	34.93	100	98	Average
5182	104.6	-	-	96.67	34.15	8.71	34.93	100	98	Peak
10360	49.26	-4.74	54	55.47	37.15	12	55.36	111	2	Average
10360	57.87	-16.13	74	64.08	37.15	12	55.36	111	2	Peak

Test Mode :	802.11n HT20	Temperature :	23~24°C
Test Channel :	44	Relative Humidity :	51~52%
Test Engineer :	Jet Lu	Polarization :	Horizontal
Remark :	1. 5222 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
1532	40.52	-13.48	54	44.1	28.35	4.84	36.77	100	274	Average
1532	56.38	-17.62	74	59.96	28.35	4.84	36.77	100	274	Peak
1600	42.25	-11.75	54	44.96	29.04	4.94	36.69	100	352	Average
1600	57.99	-16.01	74	60.7	29.04	4.94	36.69	100	352	Peak
5222	100.35	-	-	92.02	34.47	8.77	34.91	111	142	Average
5222	110.17	-	-	101.84	34.47	8.77	34.91	111	142	Peak
10440	45.51	-8.49	54	51	37.75	12.04	55.28	100	318	Average
10440	55.57	-18.43	74	61.06	37.75	12.04	55.28	100	318	Peak

Test Mode :	802.11n HT20	Temperature :	23~24°C
Test Channel :	44	Relative Humidity :	51~52%
Test Engineer :	Jet Lu	Polarization :	Vertical
Remark :	1. 5222 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
5222	95.91	-	-	87.92	34.13	8.77	34.91	100	75	Average
5222	105.71	-	-	97.73	34.13	8.77	34.92	100	75	Peak
10440	46.82	-7.18	54	52.93	37.13	12.04	55.28	102	0	Average
10440	58.95	-15.05	74	65.06	37.13	12.04	55.28	102	0	Peak

Test Mode :	802.11n HT20	**Temperature :**	23~24°C
Test Channel :	48	**Relative Humidity :**	51~52%
Test Engineer :	Jet Lu	**Polarization :**	Horizontal
Remark :	1. 5238 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
5238	100.79	-	-	92.44	34.49	8.77	34.91	100	150	Average
5238	110.87	-	-	102.52	34.49	8.77	34.91	100	150	Peak
10482	46.43	-7.57	54	51.79	37.79	12.07	55.22	100	328	Average
10482	58.2	-15.8	74	63.56	37.79	12.07	55.22	100	328	Peak

Test Mode :	802.11n HT20	**Temperature :**	23~24°C
Test Channel :	48	**Relative Humidity :**	51~52%
Test Engineer :	Jet Lu	**Polarization :**	Vertical
Remark :	1. 5242 MHz is fundamental signal which can be ignored. 2. 10478 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
5242	95.98	-	-	88.02	34.1	8.77	34.91	100	244	Average
5242	105.61	-	-	97.65	34.1	8.77	34.91	100	244	Peak
10478	46.07	-7.93	54	52.11	37.11	12.07	55.22	100	45	Average
10478	56.73	-17.27	74	62.77	37.11	12.07	55.22	100	45	Peak

Test Mode :	802.11n HT40	**Temperature :**	23~24°C
Test Channel :	38	**Relative Humidity :**	51~52%
Test Engineer :	Jet Lu	**Polarization :**	Horizontal
Remark :	1. 5192 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
151.5	27.25	-16.25	43.5	47.75	9.85	1.45	31.8	124	325	Peak
215.76	22.63	-20.87	43.5	44.4	8.24	1.71	31.72	-	-	Peak
271.11	21.45	-24.55	46	38.83	12.42	1.91	31.71	-	-	Peak
328	23.93	-22.07	46	39.82	13.74	2.09	31.72	-	-	Peak
391	21.5	-24.5	46	35.36	15.4	2.28	31.54	-	-	Peak
974.1	22.96	-31.04	54	28.62	21.23	3.62	30.51	-	-	Peak
5192	94.91	-	-	86.62	34.46	8.76	34.93	100	150	Average
5192	105.56	-	-	97.27	34.46	8.76	34.93	100	150	Peak
10380	40.01	-13.99	54	45.63	37.71	12.01	55.34	100	325	Average
10380	50.74	-23.26	74	56.36	37.71	12.01	55.34	100	325	Peak

Test Mode :	802.11n HT40	**Temperature :**	23~24°C
Test Channel :	38	**Relative Humidity :**	51~52%
Test Engineer :	Jet Lu	**Polarization :**	Vertical
Remark :	1. 5192 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
30	17.1	-22.9	40	26.86	21.66	0.64	32.06	117	224	Peak
37.56	15.44	-24.56	40	33.46	13.24	0.72	31.98	-	-	Peak
215.49	14.18	-29.32	43.5	35.12	9.07	1.71	31.72	-	-	Peak
881.7	22.48	-23.52	46	29.23	20.47	3.45	30.67	-	-	Peak
930.7	22.96	-23.04	46	29.3	20.67	3.54	30.55	-	-	Peak
981.8	23.15	-30.85	54	28.65	21.37	3.64	30.51	-	-	Peak
5192	89.97	-	-	82	34.14	8.76	34.93	190	87	Average
5192	100.56	-	-	92.59	34.14	8.76	34.93	190	87	Peak
10380	41.05	-12.95	54	47.23	37.15	12.01	55.34	103	2	Average
10380	51.22	-22.78	74	57.4	37.15	12.01	55.34	103	2	Peak

Test Mode :	802.11n HT40	**Temperature :**	23~24°C
Test Channel :	46	**Relative Humidity :**	51~52%
Test Engineer :	Jet Lu	**Polarization :**	Horizontal
Remark :	1. 5232 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
5232	99.38	-	-	91.03	34.49	8.77	34.91	100	150	Average
5232	109.68	-	-	101.33	34.49	8.77	34.91	100	150	Peak
10461	46.95	-7.05	54	52.36	37.77	12.06	55.24	100	44	Average
10461	56.56	-17.44	74	61.97	37.77	12.06	55.24	100	44	Peak

Test Mode :	802.11n HT40	**Temperature :**	23~24°C
Test Channel :	46	**Relative Humidity :**	51~52%
Test Engineer :	Jet Lu	**Polarization :**	Vertical
Remark :	1. 5232 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
5232	94.61	-	-	86.64	34.11	8.77	34.91	100	75	Average
5232	104.85	-	-	96.88	34.11	8.77	34.91	100	75	Peak
10461	45.8	-8.2	54	51.87	37.11	12.06	55.24	100	47	Average
10461	55.31	-18.69	74	61.38	37.11	12.06	55.24	100	47	Peak

<MIMO Ant. 1 + 2>

Test Mode :	802.11n HT20	**Temperature :**	23~24°C
Test Channel :	36	**Relative Humidity :**	51~52%
Test Engineer :	Jet Lu	**Polarization :**	Horizontal
Remark :	1. 5178 MHz is fundamental signal which can be ignored. 2. 10362 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
1542	38.65	-15.35	54	42.02	28.52	4.88	36.77	153	360	Average
1542	51.95	-22.05	74	55.32	28.52	4.88	36.77	153	360	Peak
1600	42.41	-11.59	54	45.12	29.04	4.94	36.69	160	354	Average
1600	55.57	-18.43	74	58.28	29.04	4.94	36.69	160	354	Peak
5178	102.49	-	-	94.26	34.45	8.71	34.93	100	144	Average
5178	113.43	-	-	105.2	34.45	8.71	34.93	100	144	Peak
10362	48.02	-5.98	54	53.69	37.69	12	55.36	100	255	Average
10362	56.61	-17.39	74	62.28	37.69	12	55.36	100	255	Peak

Test Mode :	802.11n HT20	**Temperature :**	23~24°C
Test Channel :	36	**Relative Humidity :**	51~52%
Test Engineer :	Jet Lu	**Polarization :**	Vertical
Remark :	1. 5178 MHz is fundamental signal which can be ignored. 2. 10358 MHz is not within a restricted band, and satisfies both the average and peak limits of 15.209.		

Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
1598	49.7	-24.3	74	52.9	28.58	4.94	36.72	-	-	Peak
5178	99.07	-	-	91.14	34.15	8.71	34.93	190	292	Average
5178	110.29	-	-	102.36	34.15	8.71	34.93	190	292	Peak
10358	48.54	-5.46	54	54.76	37.16	12	55.38	102	203	Average
10358	55.98	-18.02	74	62.2	37.16	12	55.38	102	203	Peak

Test Mode :	802.11n HT20	Temperature :	23~24°C
Test Channel :	44	Relative Humidity :	51~52%
Test Engineer :	Jet Lu	Polarization :	Horizontal
Remark :	1. 5222 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
1526	41.52	-12.48	54	45.1	28.35	4.84	36.77	100	208	Average
1526	58.6	-15.4	74	62.18	28.35	4.84	36.77	100	208	Peak
1540	42.81	-11.19	54	46.22	28.52	4.84	36.77	100	222	Average
1540	59.2	-14.8	74	62.61	28.52	4.84	36.77	100	222	Peak
5222	102.65	-	-	94.32	34.47	8.77	34.91	100	150	Average
5222	113.8	-	-	105.47	34.47	8.77	34.91	100	150	Peak
10440	46.34	-7.66	54	51.83	37.75	12.04	55.28	100	325	Average
10440	58.68	-15.32	74	64.17	37.75	12.04	55.28	100	325	Peak

Test Mode :	802.11n HT20	Temperature :	23~24°C
Test Channel :	44	Relative Humidity :	51~52%
Test Engineer :	Jet Lu	Polarization :	Vertical
Remark :	1. 5222 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
5222	99.91	-	-	91.92	34.13	8.77	34.91	190	289	Average
5222	111.1	-	-	103.11	34.13	8.77	34.91	190	289	Peak
10440	48.76	-5.24	54	54.87	37.13	12.04	55.28	101	38	Average
10440	59.42	-14.58	74	65.53	37.13	12.04	55.28	101	38	Peak

Test Mode :	802.11n HT20	Temperature :	23~24°C
Test Channel :	48	Relative Humidity :	51~52%
Test Engineer :	Jet Lu	Polarization :	Horizontal
Remark :	1. 5242 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
1530	41.94	-12.06	54	45.52	28.35	4.84	36.77	100	350	Average
1530	55.5	-18.5	74	59.08	28.35	4.84	36.77	100	350	Peak
1600	45.32	-8.68	54	48.03	29.04	4.94	36.69	100	341	Average
1600	57.98	-16.02	74	60.69	29.04	4.94	36.69	100	341	Peak
5242	102.56	-	-	94.2	34.5	8.77	34.91	100	151	Average
5242	113.48	-	-	105.12	34.5	8.77	34.91	100	151	Peak
10482	47.97	-6.03	54	53.33	37.79	12.07	55.22	103	221	Average
10482	58.8	-15.2	74	64.16	37.79	12.07	55.22	103	221	Peak

Test Mode :	802.11n HT20	Temperature :	23~24°C
Test Channel :	48	Relative Humidity :	51~52%
Test Engineer :	Jet Lu	Polarization :	Vertical
Remark :	1. 5242 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
5242	99.7	-	-	91.74	34.1	8.77	34.91	188	293	Average
5242	110.14	-	-	102.18	34.1	8.77	34.91	188	293	Peak
10482	46.91	-7.09	54	52.95	37.11	12.07	55.22	110	113	Average
10482	58.06	-15.94	74	64.1	37.11	12.07	55.22	110	113	Peak

Test Mode :	802.11n HT40	**Temperature :**	23~24°C
Test Channel :	38	**Relative Humidity :**	51~52%
Test Engineer :	Jet Lu	**Polarization :**	Horizontal
Remark :	1. 5188 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
145.02	14.7	-28.8	43.5	34.63	10.47	1.41	31.81	-	-	Peak
154.74	14.3	-29.2	43.5	34.9	9.74	1.46	31.8	-	-	Peak
270.84	16.65	-29.35	46	34.03	12.42	1.91	31.71	-	-	Peak
818.7	22.84	-23.16	46	30.2	20.23	3.3	30.89	-	-	Peak
944	23.69	-22.31	46	29.78	20.88	3.56	30.53	154	167	Peak
995.1	22.84	-31.16	54	28.18	21.49	3.67	30.5	-	-	Peak
1598	44.08	-9.92	54	46.82	29.04	4.94	36.72	100	7	Average
1598	57.64	-16.36	74	60.38	29.04	4.94	36.72	100	7	Peak
5188	94.99	-	-	86.76	34.45	8.71	34.93	100	146	Average
5188	105.45	-	-	97.22	34.45	8.71	34.93	100	146	Peak
10380	39.6	-14.4	54	45.22	37.71	12.01	55.34	100	320	Average
10380	51.56	-22.44	74	57.18	37.71	12.01	55.34	100	320	Peak

Test Mode :	802.11n HT40	**Temperature :**	23~24°C
Test Channel :	38	**Relative Humidity :**	51~52%
Test Engineer :	Jet Lu	**Polarization :**	Vertical
Remark :	1. 5192 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit. 3. 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
30	16.82	-23.18	40	26.58	21.66	0.64	32.06	-	-	Peak
37.56	15.41	-24.59	40	33.43	13.24	0.72	31.98	-	-	Peak
300	12.47	-33.53	46	28.89	13.23	2	31.65	-	-	Peak
921.6	23.24	-22.76	46	29.62	20.66	3.53	30.57	130	220	Peak
982.5	23.21	-30.79	54	28.7	21.38	3.64	30.51	-	-	Peak
986	23.56	-30.44	54	29.02	21.4	3.65	30.51	-	-	Peak
5192	92.13	-	-	84.16	34.14	8.76	34.93	192	292	Average
5192	102.1	-	-	94.13	34.14	8.76	34.93	192	292	Peak
10380	49.5	-24.5	74	55.68	37.15	12.01	55.34	100	0	Peak

Test Mode :	802.11n HT40	**Temperature :**	23~24°C
Test Channel :	46	**Relative Humidity :**	51~52%
Test Engineer :	Jet Lu	**Polarization :**	Horizontal
Remark :	1. 5232 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
5232	98.1	-	-	89.75	34.49	8.77	34.91	112	153	Average
5232	108.78	-	-	100.43	34.49	8.77	34.91	112	153	Peak
10461	44.53	-9.47	54	49.94	37.77	12.06	55.24	128	265	Average
10461	55.13	-18.87	74	60.54	37.77	12.06	55.24	128	265	Peak

Test Mode :	802.11n HT40	**Temperature :**	23~24°C
Test Channel :	46	**Relative Humidity :**	51~52%
Test Engineer :	Jet Lu	**Polarization :**	Vertical
Remark :	1. 5232 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
5232	93.98	-	-	86.01	34.11	8.77	34.91	100	72	Average
5232	104.62	-	-	96.65	34.11	8.77	34.91	100	72	Peak
10461	46.05	-7.95	54	52.12	37.11	12.06	55.24	106	179	Average
10461	56.72	-17.28	74	62.79	37.11	12.06	55.24	106	179	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.

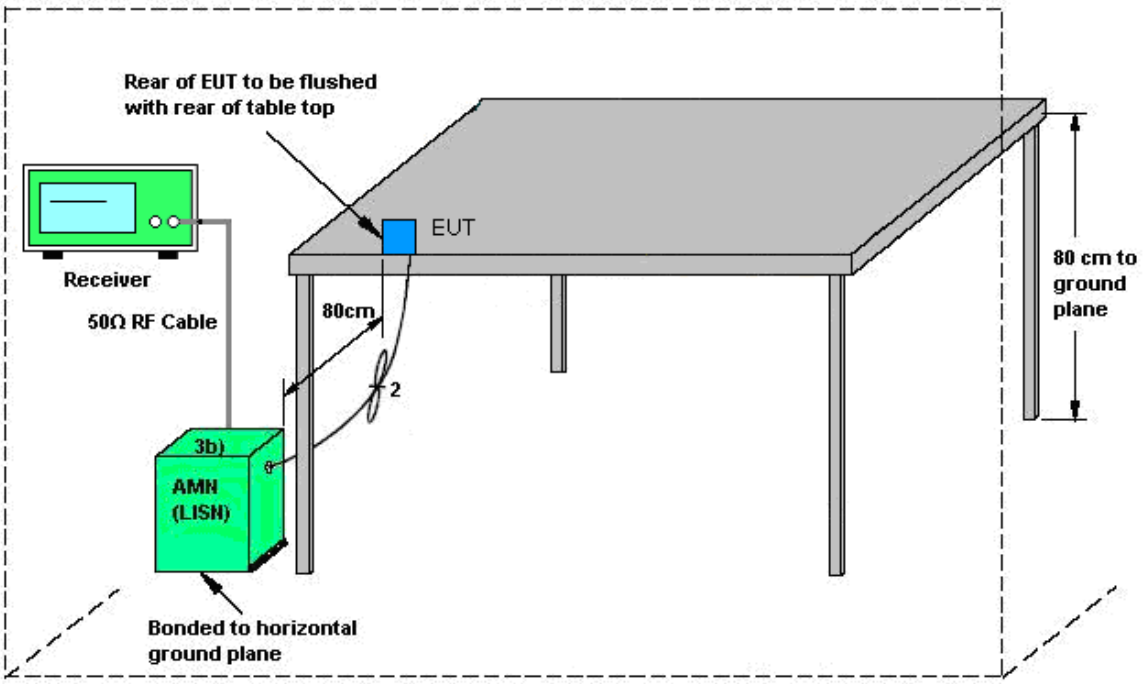
3.6.2 Measuring Instruments

See list of measuring instruments 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.

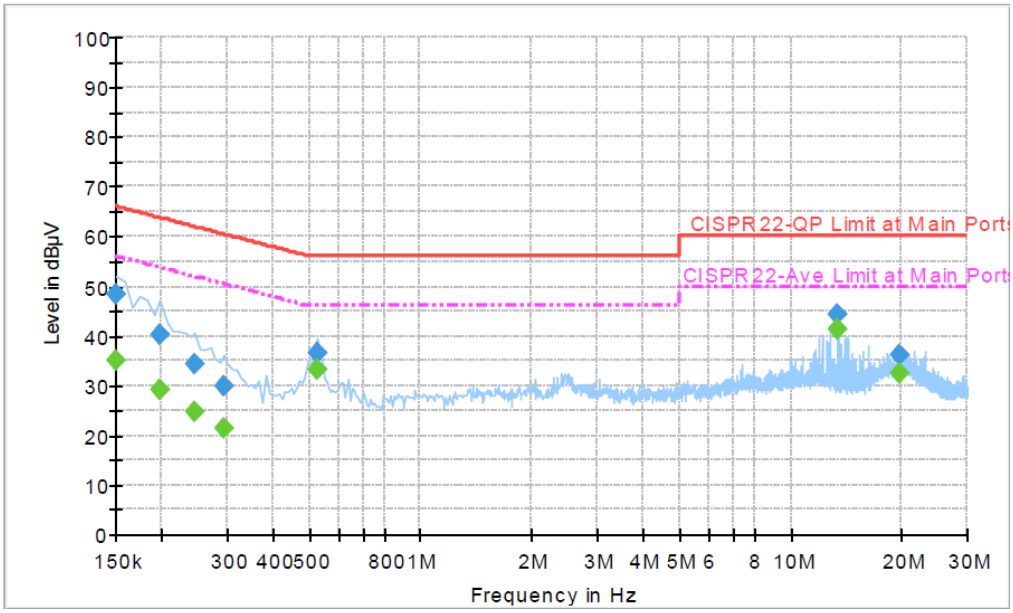
3.6.4 Test Setup



AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

3.6.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	**Temperature :**	20~22℃
Test Engineer :	Kai-Chun Chu	**Relative Humidity :**	45~47%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	WLAN (5G) Link + Bluetooth Link + HDMI Cable + RJ-45 Load + Audio Converter Load + Mouse + MPEG4 + Adapter		



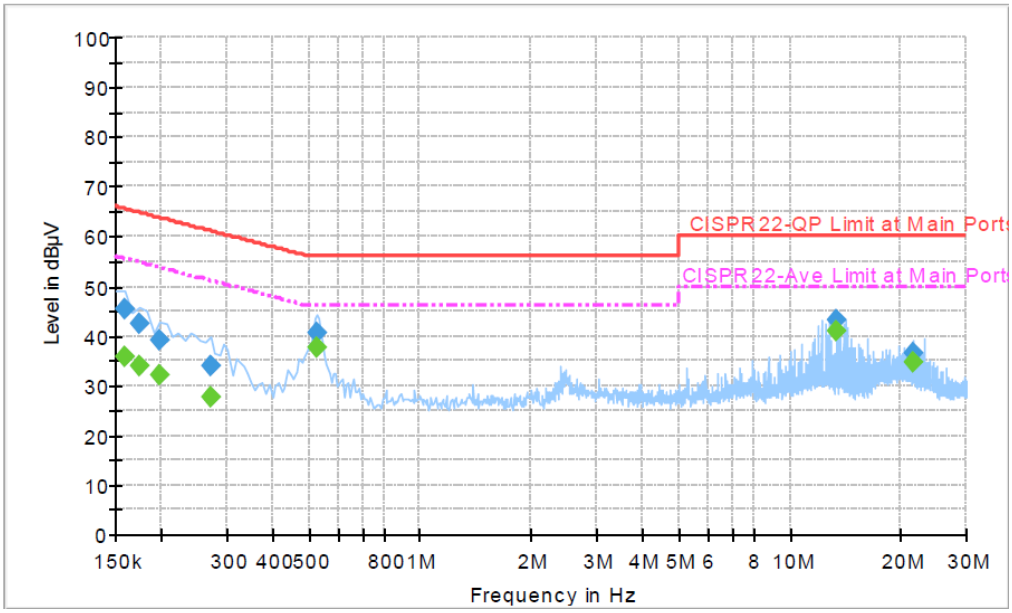
Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	48.4	Off	L1	19.4	17.6	66.0
0.198000	40.2	Off	L1	19.3	23.5	63.7
0.246000	34.5	Off	L1	19.4	27.4	61.9
0.294000	29.9	Off	L1	19.4	30.5	60.4
0.526000	36.4	Off	L1	19.4	19.6	56.0
13.358000	44.2	Off	L1	19.8	15.8	60.0
19.710000	36.2	Off	L1	19.9	23.8	60.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	34.9	Off	L1	19.4	21.1	56.0
0.198000	29.2	Off	L1	19.3	24.5	53.7
0.246000	24.7	Off	L1	19.4	27.2	51.9
0.294000	21.4	Off	L1	19.4	29.0	50.4
0.526000	33.3	Off	L1	19.4	12.7	46.0
13.358000	41.5	Off	L1	19.8	8.5	50.0
19.710000	32.5	Off	L1	19.9	17.5	50.0

Test Mode :	Mode 1	Temperature :	20~22℃
Test Engineer :	Kai-Chun Chu	Relative Humidity :	45~47%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WLAN (5G) Link + Bluetooth Link + HDMI Cable + RJ-45 Load + Audio Converter Load + Mouse + MPEG4 + Adapter		



Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	45.4	Off	N	19.3	20.2	65.6
0.174000	42.5	Off	N	19.4	22.3	64.8
0.198000	39.1	Off	N	19.3	24.6	63.7
0.270000	33.8	Off	N	19.4	27.3	61.1
0.526000	40.5	Off	N	19.4	15.5	56.0
13.358000	43.2	Off	N	19.9	16.8	60.0
21.662000	36.5	Off	N	20.0	23.5	60.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	36.0	Off	N	19.3	19.6	55.6
0.174000	34.0	Off	N	19.4	20.8	54.8
0.198000	32.1	Off	N	19.3	21.6	53.7
0.270000	27.6	Off	N	19.4	23.5	51.1
0.526000	37.7	Off	N	19.4	8.3	46.0
13.358000	40.8	Off	N	19.9	9.2	50.0
21.662000	34.6	Off	N	20.0	15.4	50.0

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.

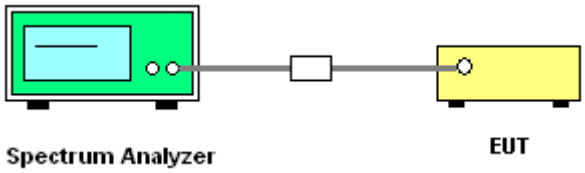
3.7.2 Measuring Instruments

See list of measuring instruments 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 :	24~26℃
Test Engineer :	Reece Li and Kenny Chen	Relative Humidity :	45~49%

Mod.	Data Rate	N_{TX}	Channel	Frequency (MHz)	Low Frequency (MHz)	High Frequency (MHz)	Mid Frequency (MHz)	Frequency Stability (ppm)
11a	6Mbps	1	36	5180	5171.75	5188.15	5179.95	-9.65
11a	6Mbps	1	44	5220	5211.70	5228.15	5219.93	-14.37
11a	6Mbps	1	48	5240	5231.75	5248.15	5239.95	-9.54
HT20	MCS0	1	36	5180	5171.10	5188.70	5179.90	-19.31
HT20	MCS0	1	44	5220	5211.10	5228.80	5219.95	-9.58
HT20	MCS0	1	48	5240	5231.10	5248.80	5239.95	-9.54
HT40	MCS0	1	38	5190	5172.09	5208.09	5190.09	17.34
HT40	MCS0	1	46	5230	5211.73	5248.09	5229.91	-17.21
HT20	MCS8	2	36	5180	5171.05	5188.85	5179.95	-9.65
HT20	MCS8	2	44	5220	5211.05	5228.75	5219.90	-19.16
HT20	MCS8	2	48	5240	5231.05	5248.85	5239.95	-9.54
HT40	MCS8	2	38	5190	5172.00	5208.18	5190.09	17.34
HT40	MCS8	2	46	5230	5211.91	5248.09	5230.00	0.00

Note: Mid 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

See list of measuring instruments 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 Connected Construction

Non-standard connector used.

3.9.3 Antenna Gain

FCC KDB 662911 D01 Multiple Transmitter Output v02

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)
5GHz	3.00	1.90	2.48	5.50	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 Equipments

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	Rohde & Schwarz	FSP40	100055	9kHz~40GHz	Jun. 07, 2013	Jun. 25, 2013 ~ Jul. 26, 2013	Jun. 06, 2014	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	1036004	300MHz~40GHz	Sep. 08, 2012	Jun. 25, 2013 ~ Jul. 26, 2013	Sep. 07, 2013	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	1027253	300MHz~40GHz	Sep. 08, 2012	Jun. 25, 2013 ~ Jul. 26, 2013	Sep. 07, 2013	Conducted (TH02-HY)
EMI Test Receiver	Rohde & Schwarz	ESCS 30	100356	9kHz ~ 2.75GHz	Nov. 13, 2012	Jul. 25, 2013	Nov. 12, 2013	Conduction (CO05-HY)
Two-LISN (for auxiliary equipment)	Rohde & Schwarz	ENV216	100081	9kHz ~ 30MHz	Dec. 12, 2012	Jul. 25, 2013	Dec. 11, 2013	Conduction (CO05-HY)
Two-LISN	Rohde & Schwarz	ENV216	100080	9kHz ~ 30MHz	Dec. 06, 2012	Jul. 25, 2013	Dec. 05, 2013	Conduction (CO05-HY)
AC Power Source	APC	APC-1000W	N/A	N/A	N/A	Jul. 25, 2013	N/A	Conduction (CO05-HY)
Spectrum Analyzer	R&S	ESU26	100390	20Hz~26.5GHz	Dec. 14, 2012	Jun. 28, 2013 ~ Jul. 19, 2013	Dec. 13, 2013	Radiation (03CH08-HY)
Bilog Antenna	Schaffner	CBL6111C	2725	30MHz~2GHz	Oct. 06, 2012	Jun. 28, 2013 ~ Jul. 19, 2013	Oct. 05, 2013	Radiation (03CH08-HY)
Horn Antenna	ESCO	3117	66584	1GHz~18GHz	Aug. 10, 2012	Jun. 28, 2013 ~ Jul. 19, 2013	Aug. 09, 2013	Radiation (03CH08-HY)
Preamplifier	COM-POWER	PA-103	161075	10Hz~1000MHz Gain:32dB	Feb. 26, 2013	Jun. 28, 2013 ~ Jul. 19, 2013	Feb. 25, 2014	Radiation (03CH08-HY)
Pre Amplifier	Agilent	8449B	3008A02665	1GHz~26.5GHz	Aug. 28, 2012	Jun. 28, 2013 ~ Jul. 19, 2013	Aug. 27, 2013	Radiation (03CH08-HY)
Turn Table	HD	Deis HD 2000	420/611	0 ~ 360 degree	N/A	Jun. 28, 2013 ~ Jul. 19, 2013	N/A	Radiation (03CH08-HY)
Antenna Mast	HD	MA 240	240/666	1 m ~ 4 m	N/A	Jun. 28, 2013 ~ Jul. 19, 2013	N/A	Radiation (03CH08-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	860004/0001	9 kHz~30 MHz	Jul. 03, 2012	Jun. 28, 2013 ~ Jul. 19, 2013	Jul. 03, 2014	Radiation (03CH08-HY)

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 (30MHz ~ 1000MHz)

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

Uncertainty of Radiated Emission Measurement (1GHz ~ 40GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.72**