FCC RF Test Report

APPLICANT	:	**Redpine Signals Inc.**
EQUIPMENT	:	**802.11 abgn MODULE**
BRAND NAME	:	**Redpine Signals**
MODEL NAME	:	**RS9110-N-11-03**
FCC ID	:	**XF6-RS9110N1103**
STANDARD	:	**FCC Part 15 Subpart E §15.407**
CLASSIFICATION	:	**(NII) Unlicensed National Information Infrastructure**

This is a partial report which is included the conducted power, Radiated Band Edges and Radiated Spurious Emission, and AC Conducted Emission test items. The product was received on Jul. 22, 2014 and testing was completed on Sep. 03, 2014. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

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

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager

Testing Laboratory 1190

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

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR472246B	Rev. 01	Initial issue of report	Sep. 05, 2014

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.407(b)	RSS-210 A9.3	Unwanted Emissions	≤ -17, -27 dBm (depend on band)&15.209(a)	Pass	Under limit 1.05 dB at 5150.000 MHz
3.2	15.207	RSS-Gen 7.2.4	AC Conducted Emission	15.207(a)	Pass	Under limit 9.50 dB at 1.366 MHz
3.3	15.407(c)	RSS-210 A9.4	Automatically Discontinue Transmission	Discontinue Transmission	Pass	-
3.4	15.203 & 15.407(a)	RSS-210 A9.2	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Redpine Signals Inc.
2107 N.First Street Suite 680 San Jose, CA 95131-2019 U.S.A

1.2 Manufacturer

Redpine Signals Inc.
2107 N.First Street Suite 680 San Jose, CA 95131-2019 U.S.A

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	802.11 abgn MODULE
Brand Name	Redpine Signals
Model Name	RS9110-N-11-03
FCC ID	XF6-RS9110N1103
Host (WLAN Access Point Card)	Brand Name : Option Model Name : CG2102
Host (CloudGate)	Brand Name : Option Model Name : CG0114
EUT supports Radios application	WLAN 11b/g/n HT20 WLAN 11a/n HT20
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 subjective to this standard

Product Specification subjective to this standard	
Tx/Rx Frequency Range	5180 MHz ~ 5240 MHz
Maximum Output Power to Antenna	802.11a : 12.35 dBm / 0.0172 W 802.11n HT20 : 13.19 dBm / 0.0208 W
Antenna Type	Dipole Antenna type with gain 3.00 dBi
Type of Modulation	OFDM (BPSK / QPSK / 16QAM / 64QAM)

1.5 Modification of EUT

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

1.6 Testing Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1022 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

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: +886-3-327-3456 FAX: +886-3-328-4978		
Test Site No.	**Sporton Site No.**		
	TH02-HY	CO05-HY	03CH05-HY

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 Old Rules v01r04
- 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 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

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 mode								
Data Rate (MHz)	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
Average Power (dBm)	12.35	12.31	12.29	12.32	12.28	12.27	12.33	12.30

5GHz 802.11n HT20 mode								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Average Power (dBm)	13.19	13.11	13.13	13.15	13.16	13.14	13.17	13.12

2.3 Test Mode

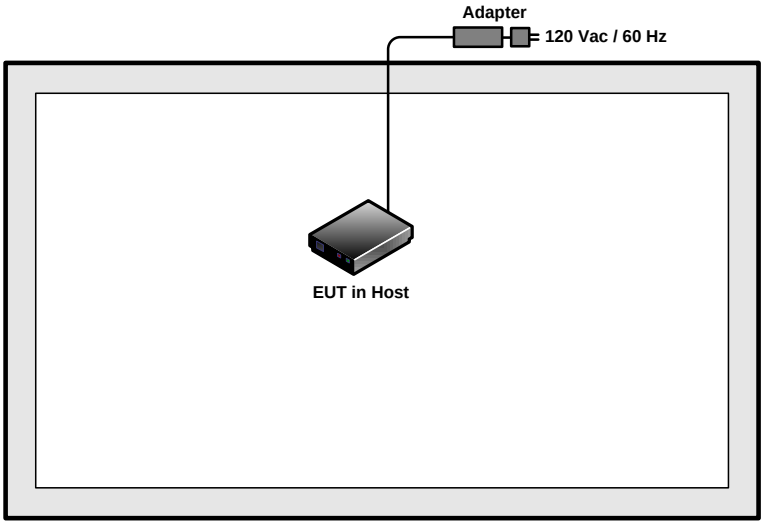
Final results of test modes, data rates and test channels are shown as following table.

Test Cases				
Radiated TCs	Test Items	Mode	Data rate	Test Channel
	Radiated Band Edge	802.11a	6 Mbps	L/H
		802.11n HT20	MSC0	L/H
	Radiated Spurious Emission	802.11a	6 Mbps	L/M/H
		802.11n HT20	MSC0	L/M/H
AC Conducted Emission	Mode 1 : WLAN (5GHz) Link + RJ-45 Link + Adapter			

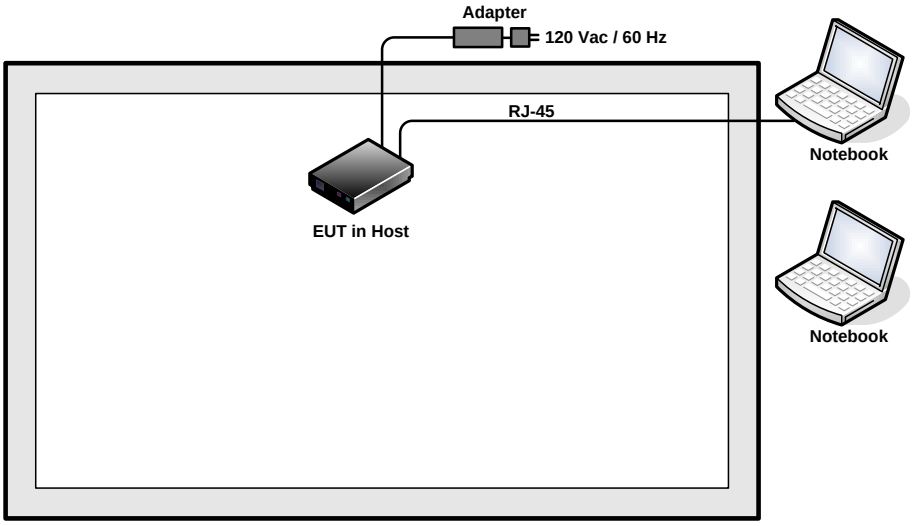
Ch. #		Band I：5150-5250 MHz	
		802.11a	802.11n HT20
L	Low	36	36
M	Middle	44	44
H	High	48	48

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.	Notebook	DELL	Latitude E6320	FCC DoC/ Contains FCC ID: QDS-BRCM1054	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
2.	Notebook	DELL	P20G	FCC DoC/ Contains FCC ID: QDS-BRCM1051	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m

2.6 EUT Operation Test Setup

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

3 Test Result

3.1 Unwanted Radiated Emission 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.

3.1.1 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 Old Rules v01r04 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.

3.1.2 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 Old Rules v01r04. 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

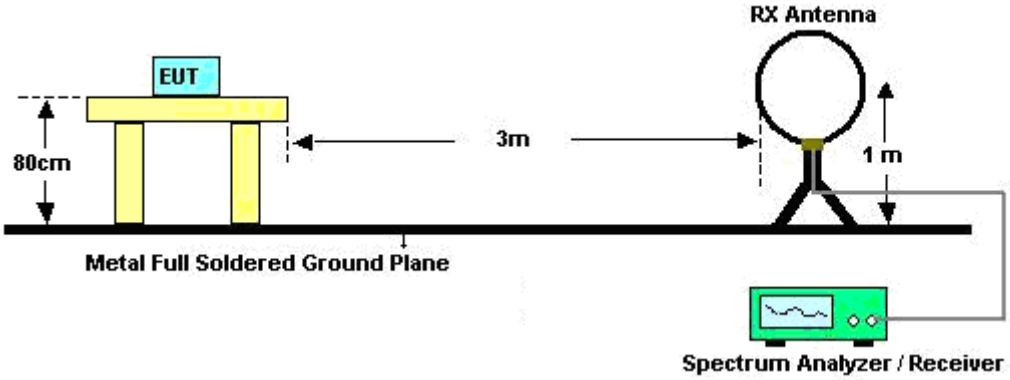
   - The setting follows H) 6) of FCC KDB 789033.
   - RBW = 1 MHz
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power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

Band	Duty Cycle(%)	T(μs)	1/T(kHz)	VBW Setting
802.11a	100	-	-	10Hz
802.11n HT20	100	-	-	10Hz

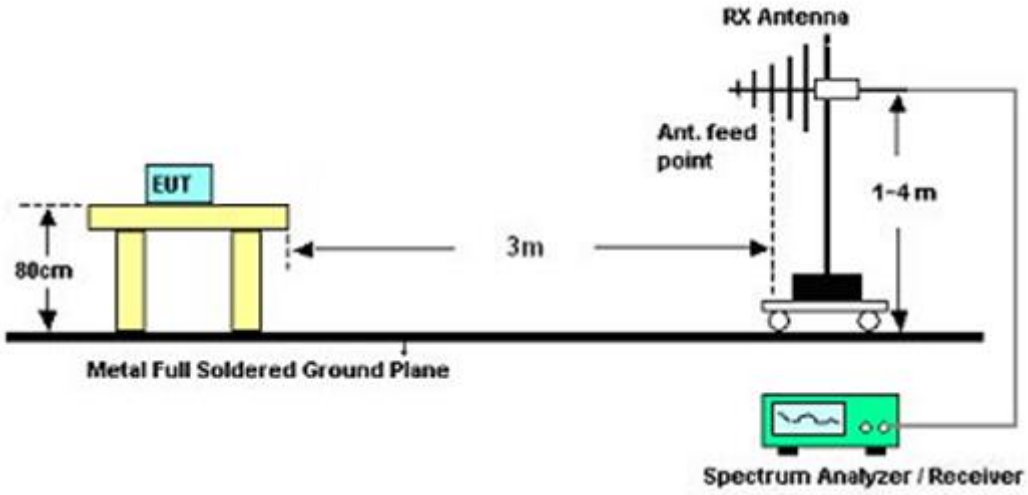
2. The EUT was placed on a rotatable table top 0.8 meter above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters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

3.1.4 Test Setup

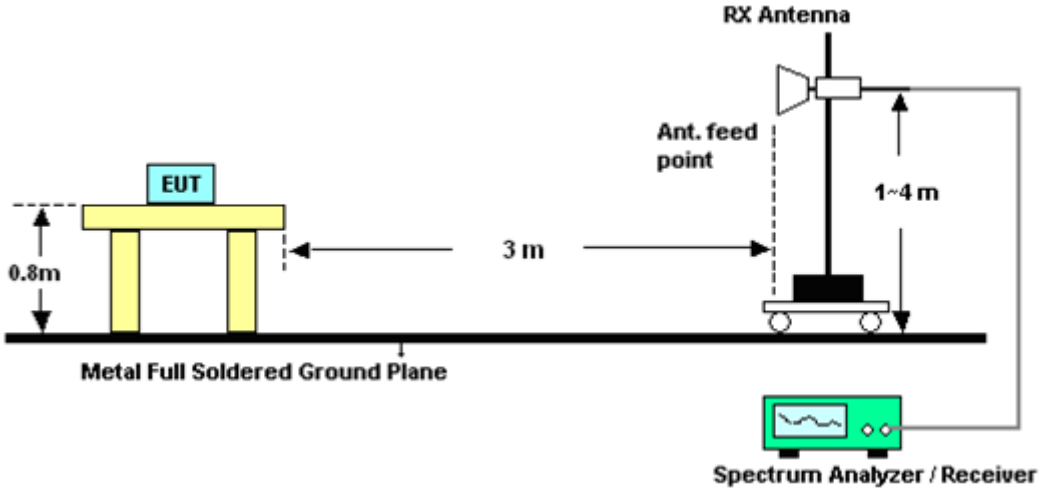
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.1.5 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.

3.1.6 Test Result

3.1.7 Test Result of Radiated Band Edges

Test Mode :	802.11a	Temperature :	25~26°C
Test Channel :	36	Relative Humidity :	50~51%
Test Engineer :	Kyle Jhuang, Luke Chang, and Karl Hou		

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	67.61	-6.39	74	58	35.18	6.72	32.29	100	50	Peak
5150	50.99	-3.01	54	41.38	35.18	6.72	32.29	100	50	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
5149.25	65.77	-8.23	74	56.16	35.18	6.72	32.29	127	6	Peak
5150	50.16	-3.84	54	40.55	35.18	6.72	32.29	127	6	Average

Test Mode :	802.11a	Temperature :	25~26°C
Test Channel :	48	Relative Humidity :	50~51%
Test Engineer :	Kyle Jhuang, Luke Chang, and Karl Hou		

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	60.11	-13.89	74	50.5	35.18	6.72	32.29	100	56	Peak
5119.85	47.98	-6.02	54	38.43	35.14	6.71	32.3	100	56	Average
5411.05	60.21	-13.79	74	50.05	35.48	6.9	32.22	100	56	Peak
5359.79	47.46	-6.54	54	37.42	35.42	6.85	32.23	100	56	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
5123.3	60.29	-13.71	74	50.71	35.16	6.71	32.29	124	5	Peak
5120.15	47.08	-6.92	54	37.53	35.14	6.71	32.3	124	5	Average
5458.79	60.49	-13.51	74	50.21	35.54	6.94	32.2	124	5	Peak
5359.79	47.72	-6.28	54	37.68	35.42	6.85	32.23	124	5	Average

Test Mode :	802.11n HT20	Temperature :	25~26°C
Test Channel :	36	Relative Humidity :	50~51%
Test Engineer :	Kyle Jhuang, Luke Chang, and Karl Hou		

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
5145.8	68.14	-5.86	74	58.53	35.18	6.72	32.29	100	50	Peak
5150	52.95	-1.05	54	43.34	35.18	6.72	32.29	100	50	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
5149.25	66.48	-7.52	74	56.87	35.18	6.72	32.29	124	359	Peak
5150	51.58	-2.42	54	41.97	35.18	6.72	32.29	124	359	Average

Test Mode :	802.11n HT20	Temperature :	25~26°C
Test Channel :	48	Relative Humidity :	50~51%
Test Engineer :	Kyle Jhuang, Luke Chang, and Karl Hou		

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
5090	59.93	-14.07	74	50.43	35.12	6.68	32.3	100	50	Peak
5120	48.09	-5.91	54	38.54	35.14	6.71	32.3	100	50	Average
5357.15	60.67	-13.33	74	50.63	35.42	6.85	32.23	100	50	Peak
5360.01	47.48	-6.52	54	37.44	35.42	6.85	32.23	100	50	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
5025.05	60.39	-13.61	74	51.02	35.04	6.65	32.32	125	5	Peak
5119.7	47.16	-6.84	54	37.61	35.14	6.71	32.3	125	5	Average
5418.42	61.7	-12.3	74	51.51	35.5	6.9	32.21	125	5	Peak
5359.79	47.76	-6.24	54	37.72	35.42	6.85	32.23	125	5	Average

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

Test Mode :	802.11a	**Temperature :**	25~26°C
Test Channel :	36	**Relative Humidity :**	50~51%
Test Engineer :	Kyle Jhuang, Luke Chang, and Karl Hou	**Polarization :**	Horizontal
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. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5178	96.39	-	-	86.72	35.22	6.73	32.28	100	50	Average
5178	107.27	-	-	97.6	35.22	6.73	32.28	100	50	Peak
10358	47.5	-26.5	74	56.69	38.2	9.8	57.19	100	0	Peak
15542	48.11	-25.89	74	53.93	40.64	11.81	58.27	100	0	Peak

Test Mode :	802.11a	**Temperature :**	25~26°C
Test Channel :	36	**Relative Humidity :**	50~51%
Test Engineer :	Kyle Jhuang, Luke Chang, and Karl Hou	**Polarization :**	Vertical
Remark :	1. 5178 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. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5178	94.25	-	-	84.58	35.22	6.73	32.28	127	6	Average
5178	105.1	-	-	95.43	35.22	6.73	32.28	127	6	Peak
10359	48.1	-25.9	74	57.28	38.2	9.8	57.18	100	0	Peak
15540	45.97	-28.03	74	51.79	40.64	11.81	58.27	100	0	Peak

Test Mode :	802.11a	Temperature :	25~26°C
Test Channel :	44	Relative Humidity :	50~51%
Test Engineer :	Kyle Jhuang, Luke Chang, and Karl Hou	Polarization :	Horizontal
Remark :	1. 5218 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. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5218	94.69	-	-	84.94	35.26	6.76	32.27	100	48	Average
5218	105.7	-	-	95.95	35.26	6.76	32.27	100	48	Peak
10440	45.52	-28.48	74	54.64	38.2	9.82	57.14	100	0	Peak
15658	46.16	-27.84	74	51.75	40.79	11.8	58.18	100	0	Peak

Test Mode :	802.11a	Temperature :	25~26°C
Test Channel :	44	Relative Humidity :	50~51%
Test Engineer :	Kyle Jhuang, Luke Chang, and Karl Hou	Polarization :	Vertical
Remark :	1. 5218 MHz is fundamental signal which can be ignored. 2. 10438 MHz is not within a restricted band and satisfies both the average and peak limits of 15.209. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5218	93.17	-	-	83.42	35.26	6.76	32.27	153	355	Average
5218	104.15	-	-	94.4	35.26	6.76	32.27	153	355	Peak
10438	46.57	-27.43	74	55.69	38.2	9.82	57.14	100	0	Peak
15660	46.31	-27.69	74	51.9	40.79	11.8	58.18	100	0	Peak

Test Mode :	802.11a	Temperature :	25~26°C
Test Channel :	48	Relative Humidity :	50~51%
Test Engineer :	Kyle Jhuang, Luke Chang, and Karl Hou	Polarization :	Horizontal
Remark :	1. 5238 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. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5238	94.59	-	-	84.8	35.28	6.77	32.26	100	56	Average
5238	105.58	-	-	95.79	35.28	6.77	32.26	100	56	Peak
10479	45.46	-28.54	74	54.53	38.2	9.84	57.11	100	0	Peak
15720	45.63	-28.37	74	51.08	40.87	11.8	58.12	100	0	Peak

Test Mode :	802.11a	Temperature :	25~26°C
Test Channel :	48	Relative Humidity :	50~51%
Test Engineer :	Kyle Jhuang, Luke Chang, and Karl Hou	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. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5240	93.82	-	-	84.03	35.28	6.77	32.26	124	5	Average
5240	104.83	-	-	95.04	35.28	6.77	32.26	124	5	Peak
10479	48.51	-25.49	74	57.58	38.2	9.84	57.11	100	0	Peak
15720	45.42	-28.58	74	50.87	40.87	11.8	58.12	100	0	Peak

Test Mode :	802.11n HT20	Temperature :	25~26°C
Test Channel :	36	Relative Humidity :	50~51%
Test Engineer :	Kyle Jhuang, Luke Chang, and Karl Hou	Polarization :	Horizontal
Remark :	1. 5178 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. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
63.48	18.29	-21.71	40	43.21	5.98	0.89	31.79	-	-	Peak
142.59	23.79	-19.71	43.5	42.81	11.5	1.26	31.78	-	-	Peak
250.05	33.07	-12.93	46	50.8	12.4	1.64	31.77	100	155	Peak
359.5	31.41	-14.59	46	46.67	14.6	1.92	31.78	-	-	Peak
479.9	26.04	-19.96	46	38.02	17.7	2.19	31.87	-	-	Peak
840.4	23.65	-22.35	46	29.27	23.2	2.9	31.72	-	-	Peak
5178	96.72	-	-	87.05	35.22	6.73	32.28	100	50	Average
5178	107.57	-	-	97.9	35.22	6.73	32.28	100	50	Peak
10359	47.6	-26.4	74	56.78	38.2	9.8	57.18	100	0	Peak
15540	47	-27	74	52.82	40.64	11.81	58.27	100	0	Peak

Test Mode :	802.11n HT20	Temperature :	25~26°C
Test Channel :	36	Relative Humidity :	50~51%
Test Engineer :	Kyle Jhuang, Luke Chang, and Karl Hou	Polarization :	Vertical
Remark :	1. 5178 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. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
60.24	30.98	-9.02	40	56.01	5.9	0.87	31.8	100	58	Peak
141.24	19.41	-24.09	43.5	38.43	11.5	1.26	31.78	-	-	Peak
250.05	27.06	-18.94	46	44.79	12.4	1.64	31.77	-	-	Peak
359.5	29.37	-16.63	46	44.63	14.6	1.92	31.78	-	-	Peak
479.9	26.88	-19.12	46	38.86	17.7	2.19	31.87	-	-	Peak
902	35.39	-10.61	46	40.37	23.42	3.01	31.41	-	-	Peak
5178	94.62	-	-	84.95	35.22	6.73	32.28	124	359	Average
5178	105.39	-	-	95.72	35.22	6.73	32.28	124	359	Peak
10359	48.92	-25.08	74	58.1	38.2	9.8	57.18	100	0	Peak
15542	47.88	-26.12	74	53.7	40.64	11.81	58.27	100	0	Peak

Test Mode :	802.11n HT20	Temperature :	25~26°C
Test Channel :	44	Relative Humidity :	50~51%
Test Engineer :	Kyle Jhuang, Luke Chang, and Karl Hou	Polarization :	Horizontal
Remark :	1. 5218 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. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5218	95.72	-	-	85.97	35.26	6.76	32.27	100	49	Average
5218	106.55	-	-	96.8	35.26	6.76	32.27	100	49	Peak
10440	45.27	-28.73	74	54.39	38.2	9.82	57.14	100	0	Peak
15660	46	-28	74	51.59	40.79	11.8	58.18	100	0	Peak

Test Mode :	802.11n HT20	Temperature :	25~26°C
Test Channel :	44	Relative Humidity :	50~51%
Test Engineer :	Kyle Jhuang, Luke Chang, and Karl Hou	Polarization :	Vertical
Remark :	1. 5218 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. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5218	94.06	-	-	84.31	35.26	6.76	32.27	151	357	Average
5218	104.65	-	-	94.9	35.26	6.76	32.27	151	357	Peak
10440	46.8	-27.2	74	55.92	38.2	9.82	57.14	100	0	Peak
15660	47.33	-26.67	74	52.92	40.79	11.8	58.18	100	0	Peak

Test Mode :	802.11n HT20	Temperature :	25~26°C
Test Channel :	48	Relative Humidity :	50~51%
Test Engineer :	Kyle Jhuang, Luke Chang, and Karl Hou	Polarization :	Horizontal
Remark :	1. 5238 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. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5238	95.18	-	-	85.39	35.28	6.77	32.26	100	50	Average
5238	105.69	-	-	95.9	35.28	6.77	32.26	100	50	Peak
10479	46.47	-27.53	74	55.54	38.2	9.84	57.11	100	0	Peak
15720	45.76	-28.24	74	51.21	40.87	11.8	58.12	100	0	Peak

Test Mode :	802.11n HT20	Temperature :	25~26°C
Test Channel :	48	Relative Humidity :	50~51%
Test Engineer :	Kyle Jhuang, Luke Chang, and Karl Hou	Polarization :	Vertical
Remark :	1. 5238 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. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5238	94.37	-	-	84.58	35.28	6.77	32.26	125	5	Average
5238	105.13	-	-	95.34	35.28	6.77	32.26	125	5	Peak
10479	46.96	-27.04	74	56.03	38.2	9.84	57.11	100	0	Peak
15720	48.67	-25.33	74	54.12	40.87	11.8	58.12	100	0	Peak

3.2 AC Conducted Emission Measurement

3.2.1 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.

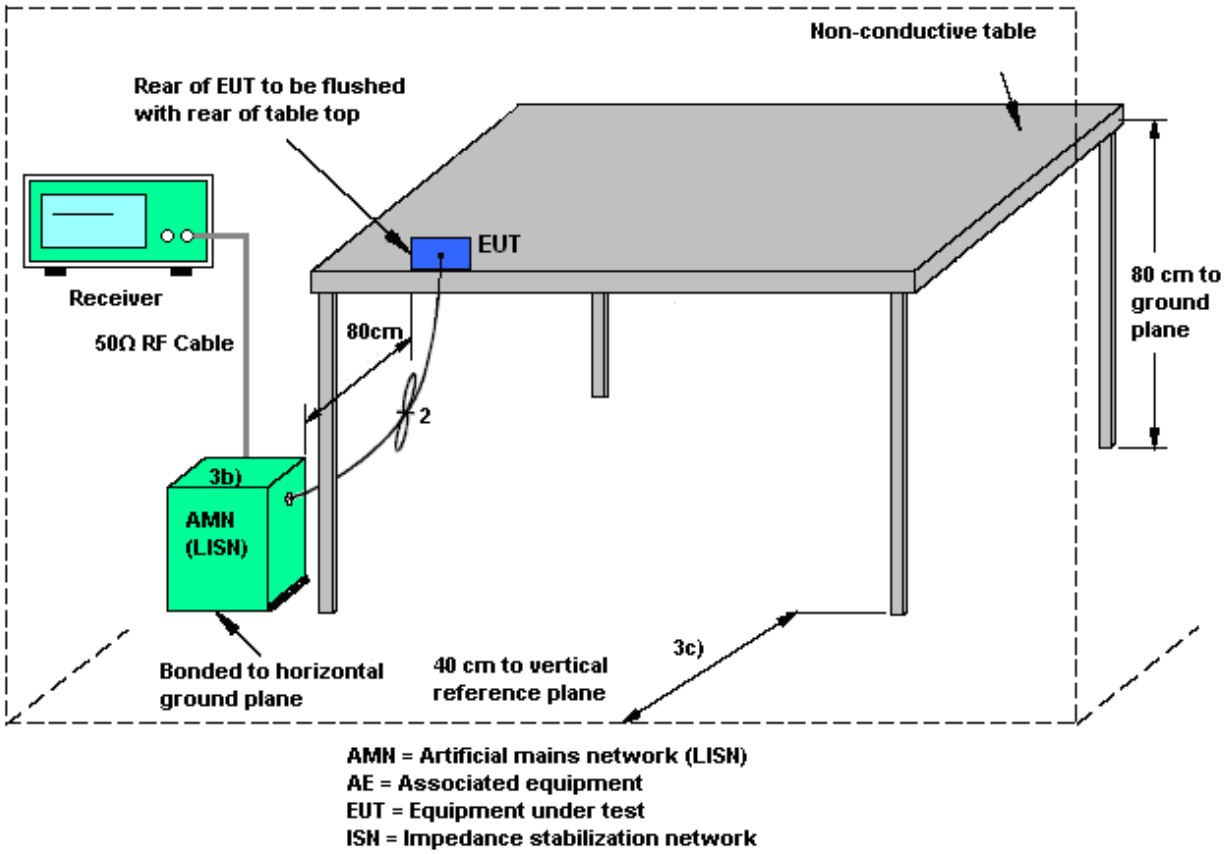
3.2.2 Measuring Instruments

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

3.2.3 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 (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

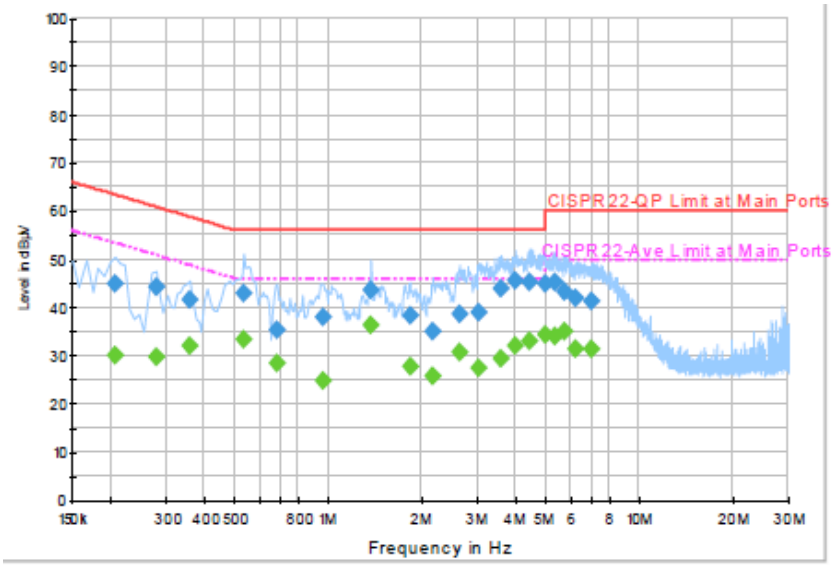
3.2.4 Test Setup



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

3.2.5 Test Result of AC Conducted Emission

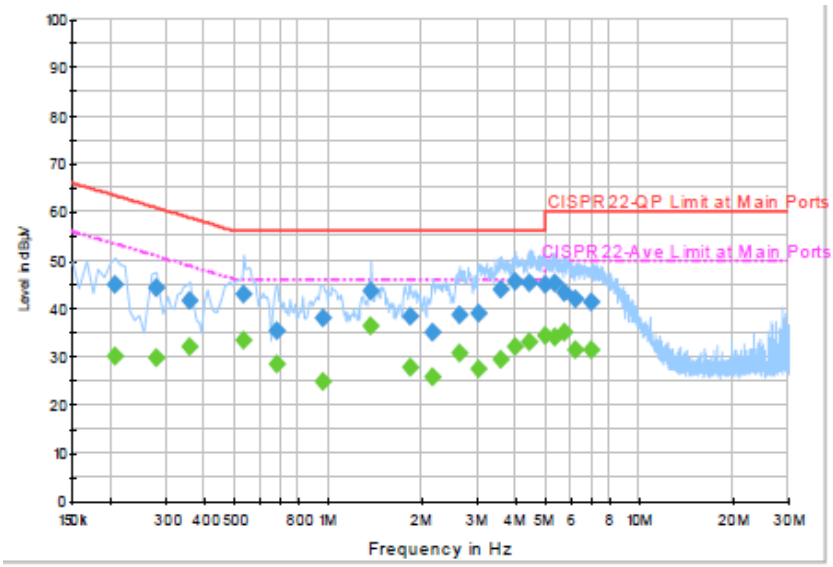
Test Mode :	Mode 1	Temperature :	20~22℃
Test Engineer :	Kai-Chun Chu	Relative Humidity :	46~48%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WLAN (5GHz) Link + RJ-45 Link + Adapter		



Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.206000	45.0	Off	L1	19.3	18.4	63.4
0.278000	44.4	Off	L1	19.4	16.5	60.9
0.358000	41.5	Off	L1	19.4	17.3	58.8
0.534000	43.0	Off	L1	19.4	13.0	56.0
0.686000	35.5	Off	L1	19.5	20.5	56.0
0.958000	37.9	Off	L1	19.5	18.1	56.0
1.366000	43.5	Off	L1	19.5	12.5	56.0
1.822000	38.4	Off	L1	19.6	17.6	56.0
2.166000	35.1	Off	L1	19.5	20.9	56.0
2.638000	38.6	Off	L1	19.5	17.4	56.0
3.046000	38.9	Off	L1	19.6	17.1	56.0
3.598000	44.0	Off	L1	19.5	12.0	56.0
3.990000	45.7	Off	L1	19.5	10.3	56.0
4.398000	45.3	Off	L1	19.5	10.7	56.0
4.958000	44.9	Off	L1	19.6	11.1	56.0
5.334000	45.1	Off	L1	19.6	14.9	60.0
5.750000	43.2	Off	L1	19.5	16.8	60.0
6.214000	42.0	Off	L1	19.6	18.0	60.0
6.966000	41.2	Off	L1	19.6	18.8	60.0

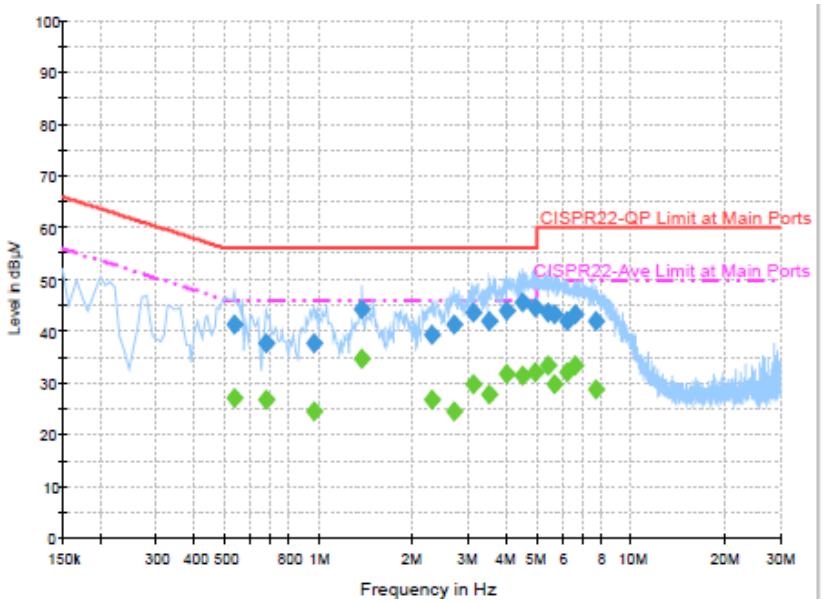
Test Mode :	Mode 1	Temperature :	20~22℃
Test Engineer :	Kai-Chun Chu	Relative Humidity :	46~48%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WLAN (5GHz) Link + RJ-45 Link + Adapter		



Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.206000	30.1	Off	L1	19.3	23.3	53.4
0.278000	29.7	Off	L1	19.4	21.2	50.9
0.358000	32.1	Off	L1	19.4	16.7	48.8
0.534000	33.4	Off	L1	19.4	12.6	46.0
0.686000	28.3	Off	L1	19.5	17.7	46.0
0.958000	24.8	Off	L1	19.5	21.2	46.0
1.366000	36.5	Off	L1	19.5	9.5	46.0
1.822000	27.8	Off	L1	19.6	18.2	46.0
2.166000	25.9	Off	L1	19.5	20.1	46.0
2.638000	30.8	Off	L1	19.5	15.2	46.0
3.046000	27.4	Off	L1	19.6	18.6	46.0
3.598000	29.5	Off	L1	19.5	16.5	46.0
3.990000	32.0	Off	L1	19.5	14.0	46.0
4.398000	33.1	Off	L1	19.5	12.9	46.0
4.958000	34.5	Off	L1	19.6	11.5	46.0
5.334000	34.0	Off	L1	19.6	16.0	50.0
5.750000	35.0	Off	L1	19.5	15.0	50.0
6.214000	31.5	Off	L1	19.6	18.5	50.0
6.966000	31.3	Off	L1	19.6	18.7	50.0

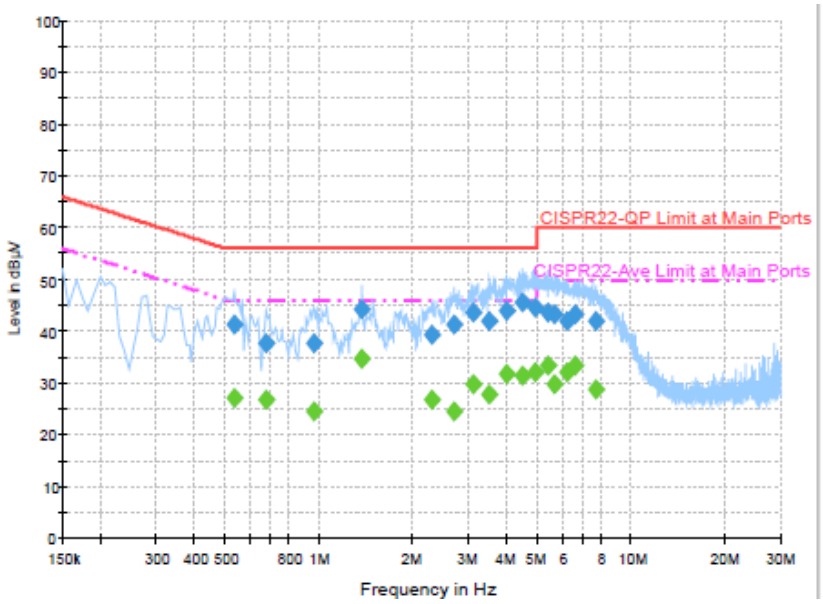
Test Mode :	Mode 1	Temperature :	20~22℃
Test Engineer :	Kai-Chun Chu	Relative Humidity :	46~48%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WLAN (5GHz) Link + RJ-45 Link + Adapter		



Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.534000	41.1	Off	N	19.4	14.9	56.0
0.678000	37.8	Off	N	19.5	18.2	56.0
0.958000	37.6	Off	N	19.5	18.4	56.0
1.366000	44.1	Off	N	19.5	11.9	56.0
2.294000	39.1	Off	N	19.5	16.9	56.0
2.702000	41.4	Off	N	19.6	14.6	56.0
3.110000	43.4	Off	N	19.6	12.6	56.0
3.510000	42.1	Off	N	19.6	13.9	56.0
3.998000	43.8	Off	N	19.6	12.2	56.0
4.462000	45.6	Off	N	19.6	10.4	56.0
4.926000	44.7	Off	N	19.6	11.3	56.0
5.406000	43.6	Off	N	19.6	16.4	60.0
5.670000	43.4	Off	N	19.6	16.6	60.0
6.230000	41.9	Off	N	19.6	18.1	60.0
6.622000	43.2	Off	N	19.6	16.8	60.0
7.646000	42.1	Off	N	19.6	17.9	60.0

Test Mode :	Mode 1	Temperature :	20~22℃
Test Engineer :	Kai-Chun Chu	Relative Humidity :	46~48%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WLAN (5GHz) Link + RJ-45 Link + Adapter		



Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.534000	26.9	Off	N	19.4	19.1	46.0
0.678000	26.8	Off	N	19.5	19.2	46.0
0.958000	24.4	Off	N	19.5	21.6	46.0
1.366000	34.8	Off	N	19.5	11.2	46.0
2.294000	26.8	Off	N	19.5	19.2	46.0
2.702000	24.5	Off	N	19.6	21.5	46.0
3.110000	29.6	Off	N	19.6	16.4	46.0
3.510000	27.8	Off	N	19.6	18.2	46.0
3.998000	31.6	Off	N	19.6	14.4	46.0
4.462000	31.4	Off	N	19.6	14.6	46.0
4.926000	32.1	Off	N	19.6	13.9	46.0
5.406000	33.3	Off	N	19.6	16.7	50.0
5.670000	29.7	Off	N	19.6	20.3	50.0
6.230000	32.1	Off	N	19.6	17.9	50.0
6.622000	33.3	Off	N	19.6	16.7	50.0
7.646000	28.6	Off	N	19.6	21.4	50.0

3.3 Automatically Discontinue Transmission

3.3.1 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.

3.3.2 Measuring Instruments

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

3.3.3 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.

3.4 Antenna Requirements

3.4.1 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.

3.4.2 Antenna Anti-Replacement Construction

Non-standard antenna connector is used.

3.4.3 Antenna Gain

The antenna gain is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

4 List of Measuring Equipments

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Power Meter	Anritsu	ML2495A	1036004	300MHz~40GHz	Aug. 09, 2014	Sep. 03, 2014	Aug. 08, 2015	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	1027253	300MHz~40GHz	Aug. 09, 2014	Sep. 03, 2014	Aug. 08, 2015	Conducted (TH02-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP40	100055	9kHz~40GHz	Jun. 09, 2014	Aug. 29, 2014~ Aug. 30, 2014	Jun. 08, 2015	Radiation (03CH05-HY)
Bilog Antenna	Schaffner	CBL6111C	2725	30MHz~1GHz	Oct. 10, 2013	Aug. 29, 2014~ Aug. 30, 2014	Oct. 09, 2014	Radiation (03CH05-HY)
Double Ridged Guide Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1241	1GHz~18GHz	Apr. 16, 2014	Aug. 29, 2014~ Aug. 30, 2014	Apr. 15, 2015	Radiation (03CH05-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	18GHz~40GHz	Oct. 03, 2013	Aug. 29, 2014~ Aug. 30, 2014	Oct. 02, 2014	Radiation (03CH05-HY)
Preamplifier	MITEQ	AMF-7D-0010 1800-30-10P	1590074	100kHz~18GHz	Jul. 07, 2014	Aug. 29, 2014~ Aug. 30, 2014	Jul. 06, 2015	Radiation (03CH05-HY)
Preamplifier	EMCI	EMC011830	980148	DC~18GHz	Jun. 23, 2014	Aug. 29, 2014~ Aug. 30, 2014	Jun. 22, 2015	Radiation (03CH05-HY)
Preamplifier	COM-POWER	PA-103	161075	9kHz~30MHz	Apr. 15, 2014	Aug. 29, 2014~ Aug. 30, 2014	Apr. 14, 2015	Radiation (03CH05-HY)
Preamplifier	Miteq	TTA0204	1872107	18GHz~40GHz	May 23, 2014	Aug. 29, 2014~ Aug. 30, 2014	May 22, 2015	Radiation (03CH05-HY)
Turn Table	HD	HD100	420/611	0 - 360 degree	N/A	Aug. 29, 2014~ Aug. 30, 2014	N/A	Radiation (03CH05-HY)
Antenna Mast	HD	HD100	240/666	1 m - 4 m	N/A	Aug. 29, 2014~ Aug. 30, 2014	N/A	Radiation (03CH05-HY)
EMI Test Receiver	Rohde & Schwarz	ESCS 30	100356	9kHz ~ 2.75GHz	Nov. 15, 2013	Jul. 31, 2014	Nov. 14, 2014	Conduction (CO05-HY)
LISN (for auxiliary equipment)	Rohde & Schwarz	ENV216	100081	9kHz ~ 30MHz	Dec. 12, 2013	Jul. 31, 2014	Dec. 11, 2014	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz ~ 30MHz	Dec. 04, 2013	Jul. 31, 2014	Dec. 03, 2014	Conduction (CO05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Jul. 31, 2014	N/A	Conduction (CO05-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 (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.10**