FCC PART 15 B

TEST REPORT

For

Iconnect

No.9, Aly. 58, Ln. 112, Ruiguang Rd., Neihu Dist.,Taipei City,Taiwan

FCC ID: 2AB87197D

Report Type:	**Product Type:**
Original Report	802.11ac AC1200 Wide-Range Wi Fi Router

Test Engineer: Allen Qiao

Report Number: RDG150401003-00C

Report Date: 2015-04-23

Reviewed By: Sula Huang
RF Leader

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *Iconnect*'s product, model number: *AC1200R (FCC ID: 2AB87197D) or* ("EUT") in this report is a *802.11ac AC1200 Wide-Range Wi Fi Router,* which was measured approximately: 17 cm (L) x 11.4 cm (W) x3.2 cm (H), rated input voltage: DC 12V from adapter.

Adapter Information: Sunny
Model: SYS1308-2412-W2
Input: AC 100-240V, 50/60Hz, MAX 1.0A
Output: DC 12V, 2.0A

Note: The series product, model AC1200R, AC1200RV2, AC1200RU, AC1200RU2, AC1200RI, AC1200RUI, C1200RIV2,AC1200RUIV2,AC1200RG,AC600R,AC600RV2,AC600RU,AC600RUV2,AC600RI,AC600RIV2 are electrically identical, the difference between them is just the model name, we selected AC1200R for fully testing, the details was explained in the attached

** All measurement and test data in this report was gathered from production sample serial number: 154AAC12R0004 (Assigned by applicant). The EUT was received on 2015-04-03.*

Objective

This test report is prepared on behalf of *Iconnect* in accordance with Part 2, Subpart J, and Part 15-Subparts A and B of the Federal Communications Commission's rules.

The objective of the manufacturer is to determine the compliance of EUT with FCC Part 15 B Class B.

Related Submittal(s)/Grant(s)

FCC Part 15C DTS submissions with FCC ID: 2AB87197D.
FCC Part 15E NII submissions with FCC ID: 2AB87197D.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Dongguan).

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Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China

Test site at Bay Area Compliance Laboratories Corp. (Dongguan) has been fully described in reports submitted to the Federal Communications Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 06, 2015. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

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SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a typical fashion (as normally used by a typical user).

EUT Exercise Software

N/A

Equipment Modifications

No modification was made to the EUT tested.

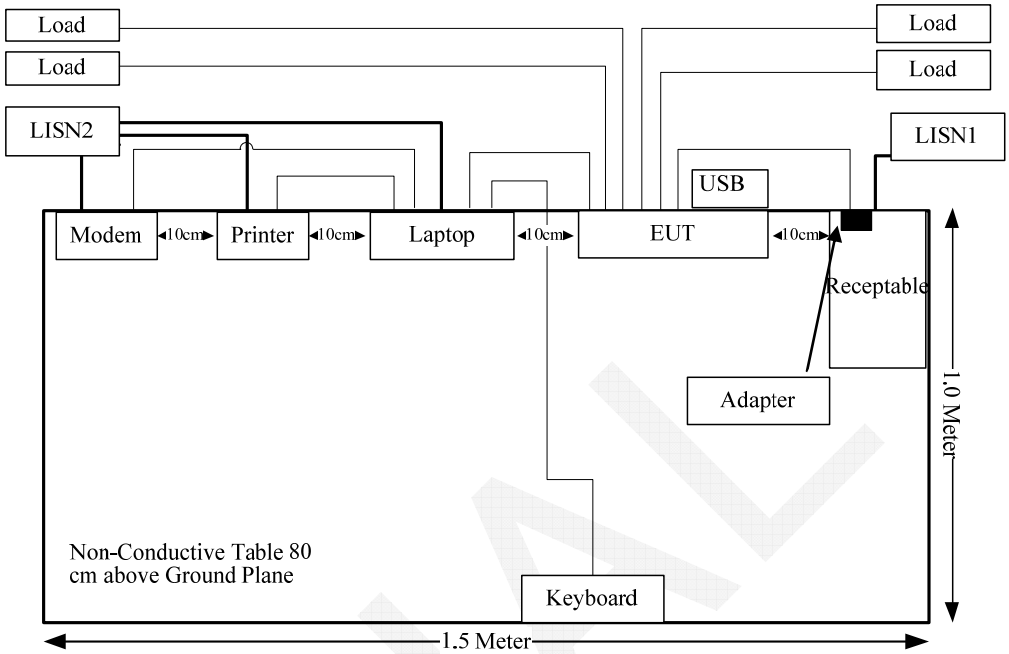
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DELL	Laptop	PP11L	QDS-BRCM1017
HP	Printer	C3941A	JPTVOB2337
DELL	Keyboard	L100	CNORH656658907BL05DC
SAST	Modem	AEM-2100	0293
DELL	Laptop	PP11L	1CVM0C1
Kingston	USB storage	/	/

Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From	To
Serial Cable	Yes	No	1.2	Serial Port of Laptop	Modem
Parallel Cable	Yes	No	1.2	Parallel Port of Laptop	Printer
Keyboard Cable	Yes	Yes	1.8	USB Port of Laptop	Keyboard
RJ45 Cable*1	No	No	1.0	EUT	Laptop
RJ45 Cable*4	No	No	10	EUT	Load

Configuration of Test Setup



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SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§15.107	Conducted Emissions	Compliance
§15.109	Radiated Emissions	Compliance

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FCC§15.107 - CONDUCTED EMISSIONS

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are Receiver, cable loss, and LISN.

Compliance or non- compliance with a disturbance limit shall be determined in the following manner:

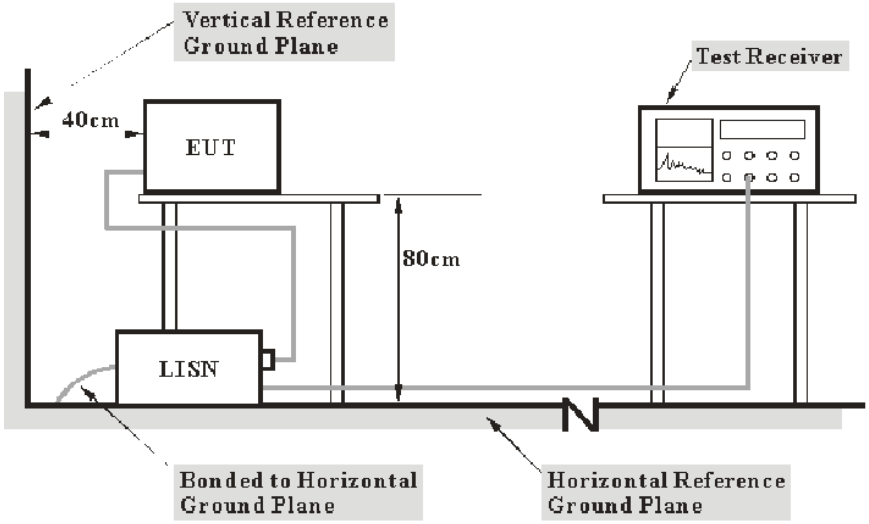
If U_{lab} is less than or equal to U_{cispr} of Table 1, then:
–compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
–non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.
If U_{lab} is greater than U_{cispr} of Table 1, then:
–compliance is deemed to occur if no measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit;
–non - compliance is deemed to occur if any measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit.

Based on CISPR 16-4-2: 2011, measurement uncertainty of conducted disturbance at mains port using AMN at Bay Area Compliance Laboratories Corp. (Dongguan) is 3.46 dB (150 kHz to 30 MHz).

Table 1 – Values of U_{cispr}

Measurement	U_{cispr}
Conducted disturbance at mains port using AMN (150 kHz to 30 MHz)	3.4 dB

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2009 measurement procedure. The specification used was with the FCC Part 15 B Class B limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The adapter was connected to a 120V/60Hz AC power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCS 30	830245/006	2014-10-20	2015-10-20
R&S	L.I.S.N	ESH2-Z5	892107/021	2014-06-09	2015-06-09
R&S	Two-line V-network	ENV 216	3560.6550.12	2014-12-11	2015-12-11
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the first LISN and the other support equipments were connected to the outlet of the second LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$V_C = V_R + A_C + VDF$

Herein,
V_C: corrected voltage amplitude

V_R: reading voltage amplitude

A_c: attenuation caused by cable loss

VDF: voltage division factor of AMN or ISN

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of 7dB means the emission is 7dB below the maximum limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15 B Class B, with the worst margin reading of:

2.6 dB at **0.412647 MHz** in the **Neutral** conducted mode

Test Data

Environmental Conditions

Temperature:	26.2 °C
Relative Humidity:	64 %
ATM Pressure:	100.1kPa

The testing was performed by Allen Qiao on 2015-04-03.

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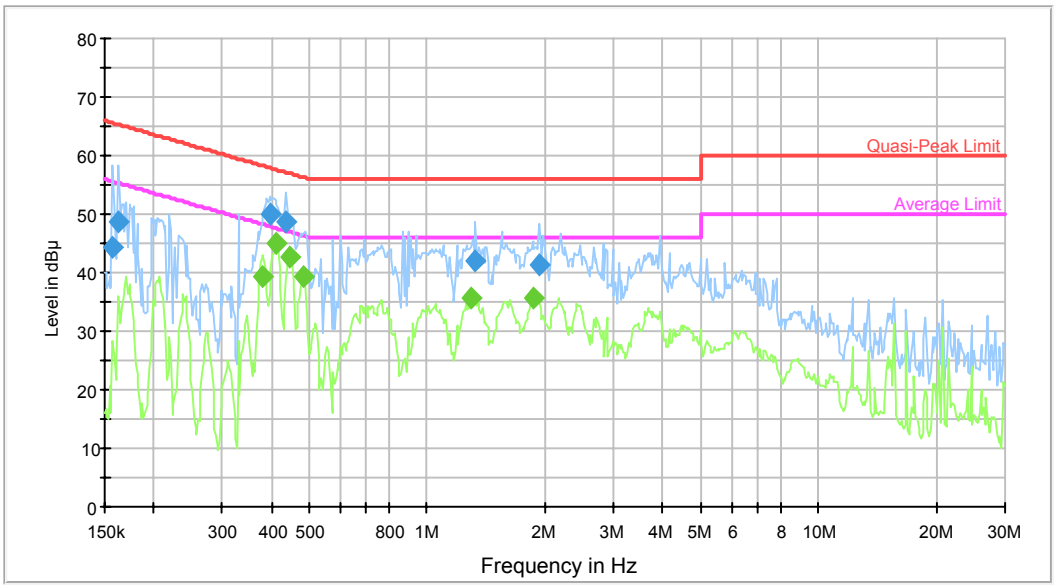
Test Mode: Operating

AC120V, 60Hz, Line:

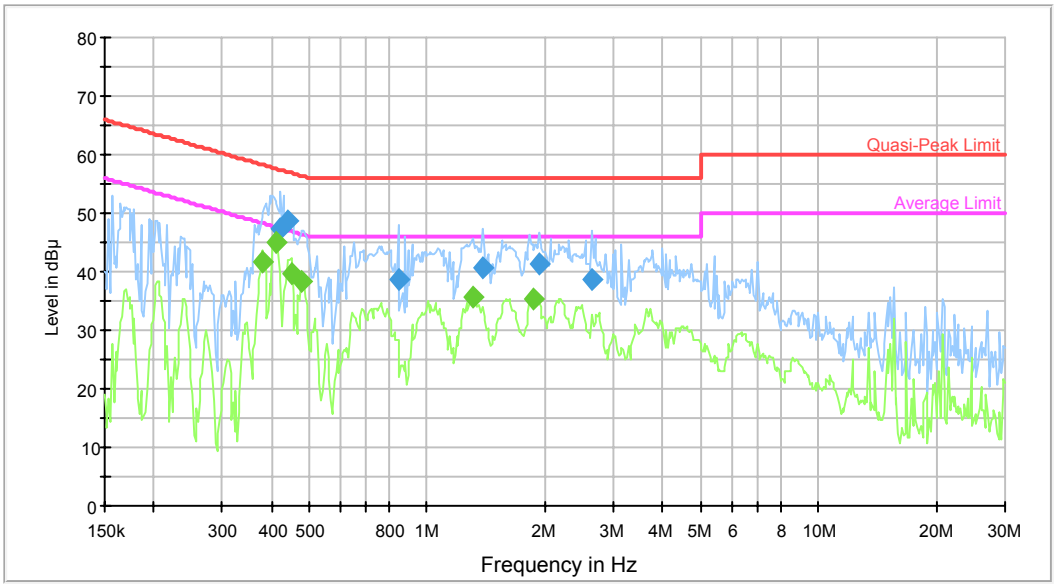


Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.157346	44.4	9.000	L1	10.2	21.2	65.6	Compliance
0.162441	48.5	9.000	L1	10.2	16.8	65.3	Compliance
0.396530	50.1	9.000	L1	10.2	7.8	57.9	Compliance
0.436318	48.6	9.000	L1	10.2	8.5	57.1	Compliance
1.331304	42.0	9.000	L1	10.4	14.0	56.0	Compliance
1.936076	41.3	9.000	L1	10.4	14.7	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.381043	39.5	9.000	L1	10.3	8.8	48.3	Compliance
0.412647	44.9	9.000	L1	10.2	2.7*	47.6	Compliance
0.446873	42.5	9.000	L1	10.2	4.4	46.9	Compliance
0.483938	39.4	9.000	L1	10.1	6.9	46.3	Compliance
1.289541	35.6	9.000	L1	10.4	10.4	46.0	Compliance
1.860457	35.5	9.000	L1	10.4	10.5	46.0	Compliance

**Within measurement uncertainty!*

AC120V, 60Hz, Neutral:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.422630	47.3	9.000	N	10.2	10.1	57.4	Compliance
0.439808	48.7	9.000	N	10.2	8.4	57.1	Compliance
0.845331	38.6	9.000	N	10.4	17.4	56.0	Compliance
1.385415	40.8	9.000	N	10.4	15.2	56.0	Compliance
1.936076	41.3	9.000	N	10.4	14.7	56.0	Compliance
0.422630	47.3	9.000	N	10.2	10.1	57.4	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.378019	41.7	9.000	N	10.3	6.6	48.3	Compliance
0.412647	45.0	9.000	N	10.2	2.6*	47.6	Compliance
0.450448	39.8	9.000	N	10.2	7.1	46.9	Compliance
0.480097	38.4	9.000	N	10.1	7.9	46.3	Compliance
1.310256	35.6	9.000	N	10.4	10.4	46.0	Compliance
1.875341	35.3	9.000	N	10.4	10.7	46.0	Compliance

**Within measurement uncertainty!*

FCC §15.109 - RADIATED SPURIOUS EMISSIONS

Measurement Uncertainty

Compliance or non- compliance with a disturbance limit shall be determined in the following manner：

If U_{lab} is less than or equal to U_{cispr} of Table 1, then:
–compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
–non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.
If U_{lab} is greater than U_{cispr} of Table 1, then:
–compliance is deemed to occur if no measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit;
–non - compliance is deemed to occur if any measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit.

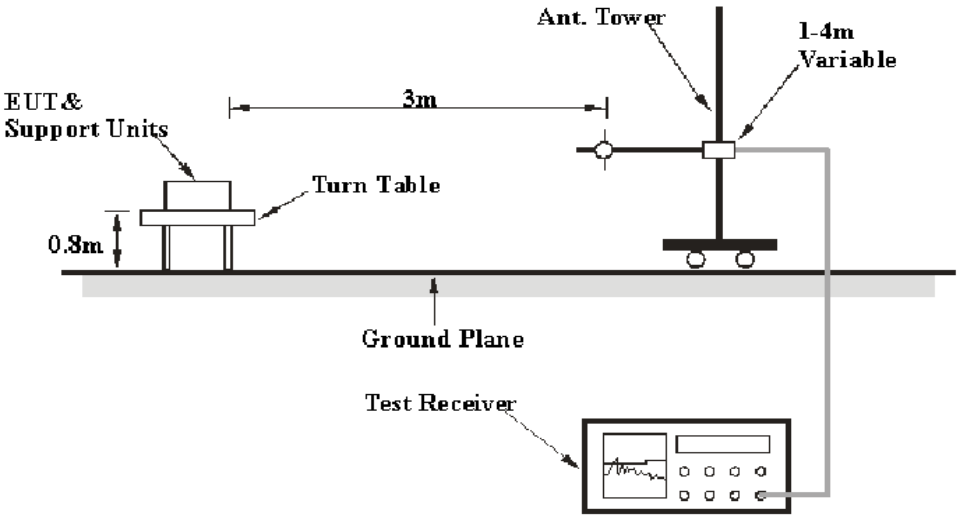
Based on CISPR 16-4-2: 2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is:30M~200MHz: 5.0 dB; 200M~1GHz: 6.2 dB; 1G~6GHz: 4.45 dB, 6G~18GHz: 5.23 dB

Table 1 – Values of U_{cispr}

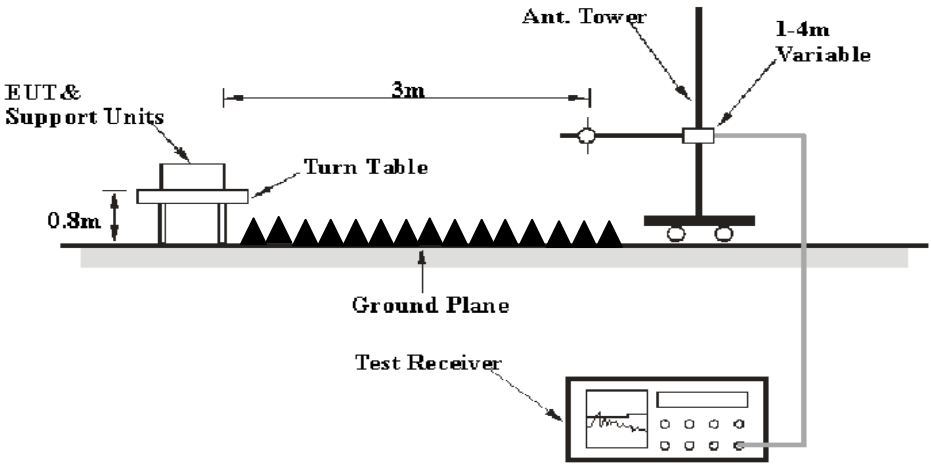
Measurement		U_{cispr}
Radiated disturbance (electric field strength at an OATS or in a SAC)	(30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR)	(1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR)	(6 GHz to 18 GHz)	5.5 dB

EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC Part 15.109 Class B limits.

EMI Test Receiver Setup

The system was investigated from 30 MHz to 6 GHz.

During the radiated emission test, the EMI test receiver was set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	Peak
	1 MHz	10 Hz	/	Ave.

Test Procedure

During the radiated emissions, the adapter was connected to the first AC floor outlet and the other support equipments were connected to the second AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The data was recorded in the Quasi-peak detection mode for below 1 GHz, peak and average detection mode above 1 GHz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2014-05-09	2015-05-09
Sunol Sciences	Antenna	JB3	A060611-3	2014-11-06	2017-11-05
HP	Amplifier	8447E	2434A02181	2014-09-01	2015-09-01
Agilent	Spectrum Analyzer	E4440A	SG43360054	2014-12-04	2015-12-04
ETS-Lindgren	Horn Antenna	3115	000 527 35	2012-09-06	2015-09-06
Mini-Circuit	Amplifier	ZVA-213-S+	054201245	2015-02-19	2016-02-19
R&S	Spectrum Analyzer	FSP 38	100478	2014-05-09	2015-05-09
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-01 1304	2014-06-16	2017-06-15
Quinstar	Amplifier	QLW-1840553 6-JO	15964001001	2014-09-06	2015-09-06

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Loss and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude = Meter Reading + Antenna Loss + Cable Loss - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Results Summary

According to the data in the following table, the EUT complied with the FCC Part 15 B Class B, with the worst margin reading of:

3.5 dB at **125.0600 MHz** in the **Vertical** polarization

Test Data

Environmental Conditions

Temperature:	23.6°C
Relative Humidity:	66 %
ATM Pressure:	101.3 kPa

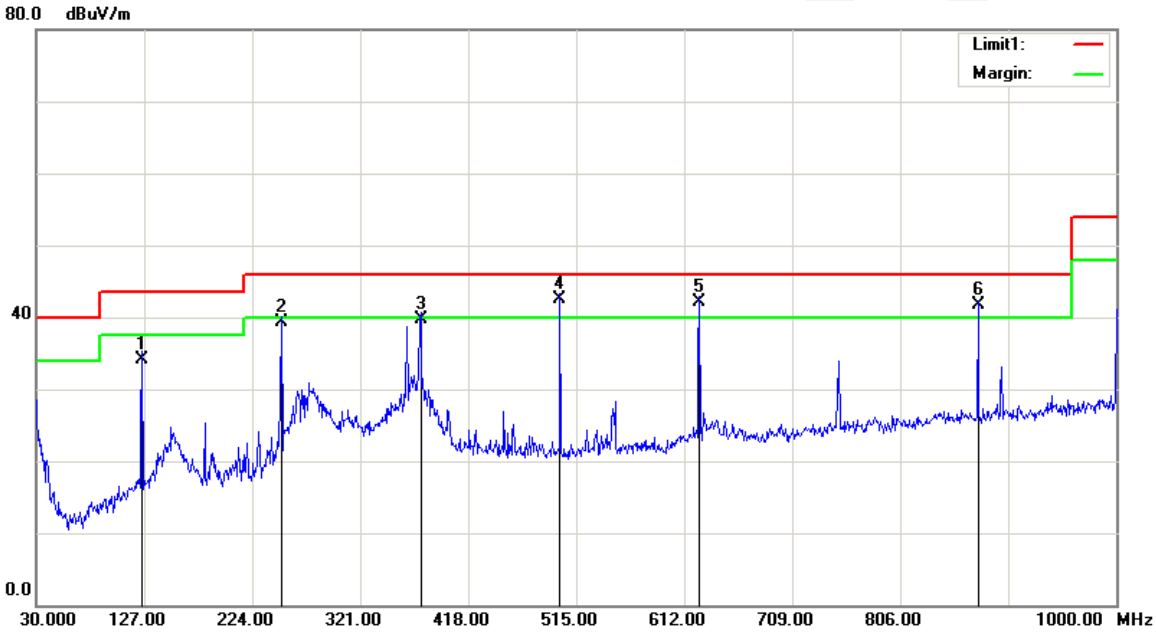
The testing was performed by Allen Qiao on 2015-04-11.

Test Result: Compliance

Test Mode: Operating

1) Below 1G:

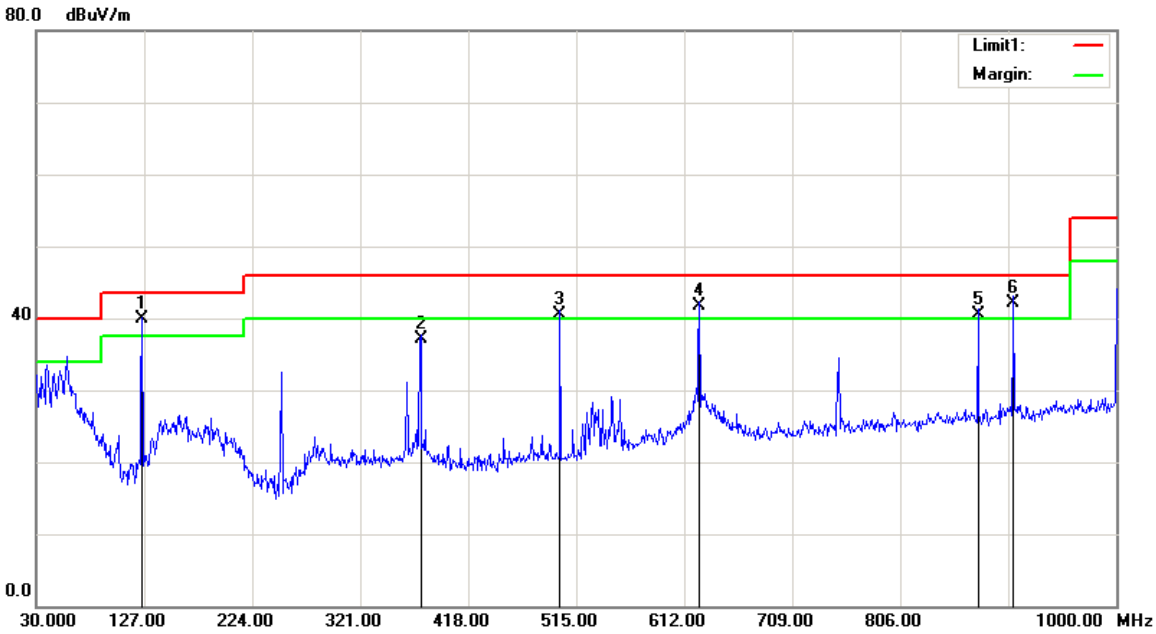
Horizontal



Frequency (MHz)	Receiver Reading (dBµV)	Detector (PK/QP/Ave)	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
125.0600	39.78	QP	-5.58	34.20	43.50	9.30
250.1900	47.26	QP	-7.96	39.30	46.00	6.70
375.3200	44.06	QP	-4.26	39.80	46.00	6.20
500.4500	44.09	QP	-1.60	42.50	46.00	3.51*
625.5800	41.97	QP	0.13	42.10	46.00	3.90*
875.8400	38.60	QP	3.10	41.70	46.00	4.30*

**Within measurement uncertainty!*

Vertical

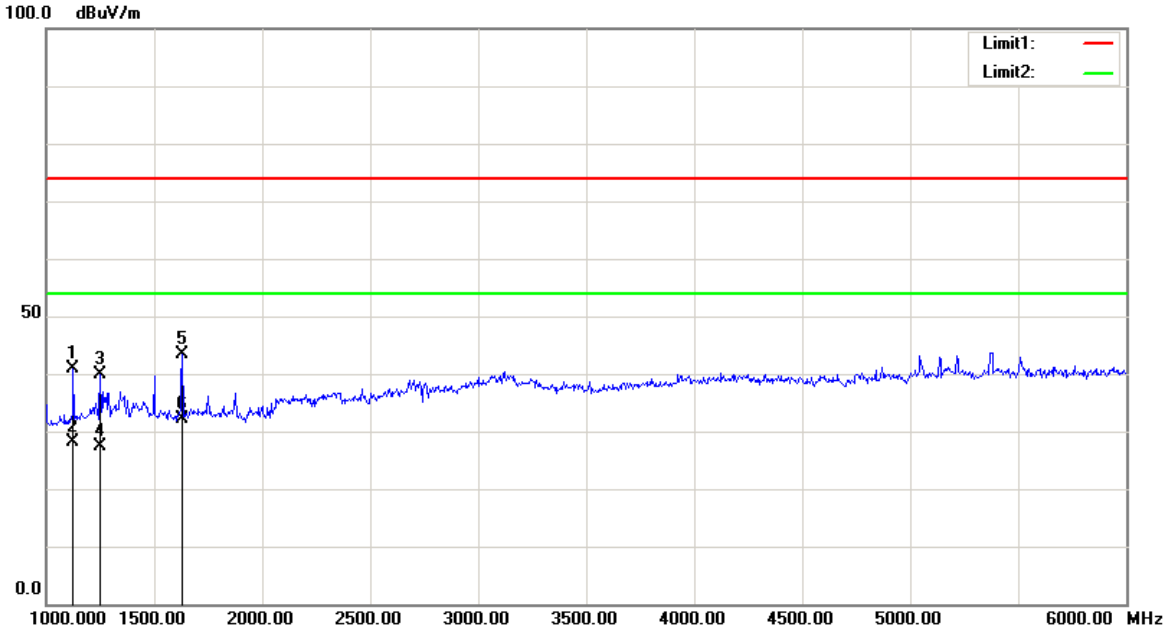


Frequency (MHz)	Receiver Reading (dBµV)	Detector (PK/QP/Ave)	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
125.0600	45.58	QP	-5.58	40.00	43.50	3.50*
375.3200	41.36	QP	-4.26	37.10	46.00	8.90
500.4500	42.20	QP	-1.60	40.60	46.00	5.40*
625.5800	41.67	QP	0.13	41.80	46.00	4.20*
875.8400	37.50	QP	3.10	40.60	46.00	5.40*
907.8500	38.34	QP	3.86	42.20	46.00	3.80*

**Within measurement uncertainty!*

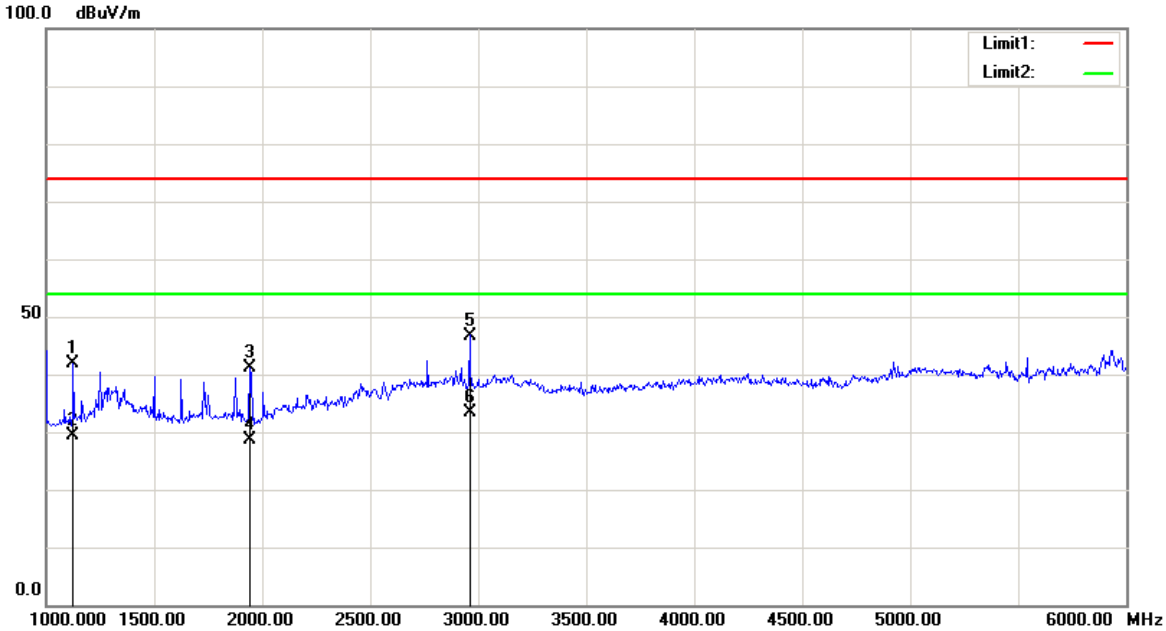
2) Above 1G:

Horizontal



Frequency (MHz)	Receiver Reading (dBµV)	Detector (PK/QP/Ave)	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1125.000	41.92	peak	-1.06	40.86	74.00	33.14
1125.000	29.30	AVG	-1.06	28.24	54.00	25.76
1250.000	40.83	peak	-1.03	39.80	74.00	34.20
1250.000	28.39	AVG	-1.03	27.36	54.00	26.64
1632.500	44.53	peak	-1.11	43.42	74.00	30.58
1632.500	33.28	AVG	-1.11	32.17	54.00	21.83

Vertical



Frequency (MHz)	Receiver Reading (dBµV)	Detector (PK/QP/Ave)	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1125.000	42.87	peak	-1.06	41.81	74.00	32.19
1125.000	30.37	AVG	-1.06	29.31	54.00	24.69
1947.500	41.22	peak	-0.02	41.20	74.00	32.80
1947.500	28.66	AVG	-0.02	28.64	54.00	25.36
2962.500	40.53	peak	6.22	46.75	74.00	27.25
2962.500	27.14	AVG	6.22	33.36	54.00	20.64

DECLARATION LETTER

Declaration of Alteration

To Whom It May Concern,

We, Iconnect, hereby declare that there are some differences between our Multiple Models and testing products. Details as below:

(This is for your reference only.)

Products Description	Name	802.11ac AC1200 Wide-Range Wi Fi Router
	Brand	ALFA
	Manufacturer	Iconnect
	Project No.	RDG150401003

Differences Description			
Testing Products	Multiple Models	Differences Items	Details
AC1200R	AC1200RV2,AC1200RU, AC1200RU2,AC1200RI, AC1200RUI,AC1200RIV2, AC1200RUIV2,AC1200RG, AC600R,AC600RV2,AC600RU, AC600RUV2,AC600RI, AC600RIV2	Model name	They are the same product, and just have the different model name.

Notes: Testing products-the products tested by BACL
Multiple Model- have the same or similar appearance, structure, PCB, Material and function to the testing products, and only are different for little parameters.

Besides the differences in the table above, we declare the products are identical
We guarantee all the information provided above is true, and notice that we'll bear all the consequences caused by any false information or concealing

Best Regards,

Signature:
Print Name: Johnson Wang
Title: Manager

*******END OF REPORT*******