FCC/IC TEST REPORT

according to

FCC Rules and Regulations Part 15 Subpart C /

RSS-210 Issue 8

Applicant	: Qualcomm Atheros, Inc.
Address	: 1700 Technology Drive, San Jose, CA95110
Equipment	: 1X1 802.11b/g/n-BT4.0 Combo PCIe minicard
Model No.	: QCWB335
FCC ID	: PPD-QCWB335

The test result refers exclusively to the test presented test model / sample.,

- Without written approval of ***Cerpass Technology (Suzhou) Co.,Ltd***. the test report shall not be reproduced except in full.
- The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Rules and Regulations Part 15/RSS-210. The test report has been issued separately.
- The test report must not be used by the clients to claim product certification approval by ***NVLAP*** or any agency of the Government.

Contents

History of this test report

■ ORIGINAL.

☐ Additional attachment as following record:

Attachment No.	Issue Date	Description

CERTIFICATE OF COMPLIANCE

according to

FCC Rules and Regulations Part 15 Subpart C /

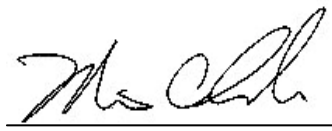
RSS-210 Issue 8

Applicant	: Qualcomm Atheros, Inc.
Address	: 1700 Technology Drive, San Jose, CA95110
Equipment	: 1X1 802.11b/g/n-BT4.0 Combo PCIe minicard
Model No.	: QCWB335
FCC ID	: PPD-QCWB335

I **HEREBY** CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in **ANSI C63.4** The equipment was ***passed*** the test performed according to **FCC Rules and Regulations Part 15 Subpart C (2010)/ RSS-210 Issue 8.**
The test was carried out on Nov 11,2013 at ***Cerpass Technology (Suzhou) Co.,Ltd***

Signature



Miro Chueh/ Technical director

1. Report of Measurements and Examinations

1.1 List of Measurements and Examinations

FCC Rule	. Description of Test	Result
§ 15.209(a)	. Radiated Emission	Pass
§ 15.247(b)	. Output Power	Pass

2. Test Configuration of Equipment under Test

2.1 Feature of Equipment under Test

WLAN	
Modulation	802.11b: CCK, DQPSK, DBPSK 802.11g: 64 QAM, 16 QAM, QPSK, BPSK 802.11n: BPSK, QPSK,16QAM, 64QAM
Frequency Range	802.11b/g/n(20MHz): 2412-2462MHz 802.11n(40MHz): 2422-2452MHz
Number of Channels	802.11b/g/n (20MHz):11 802.11n (40MHz): 7
Data Rate	802.11b: 1, 2, 5.5, 11Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps 802.11n: MCS0~MCS7
Duty Cycle	802.11b: 100% 802.11g: 97.21% 802.11n(20MHz):96.93% 802.11n(40MHz):96.10%
Bluetooth	
Frequency Range	2400MHz-2483.5MHz
Number of Channels	79 for Bluetooth,40 for Bluetooth 4.0
Modulation	Bluetooth 4.0:GFSK Bluetooth 3.0+EDR:GFSK, π/4-QPSK,8-DPSK

2.2 Antenna list

Antenna Type: PIFA

Antenna	Manufacture	Part Number	Antenna peak gain
Main antenna(Tx1)	Luxshare-ICT	LA22RF742-1H	2.75dBi for 2.4GHz
Aux antenna(Tx2)	Luxshare-ICT	LA22RF743-1H	2.28dBi for 2.4GHz

2.3 Carrier Frequency of Channels

For 2.4G 802.11b, 802.11g, 802.11n (20MHz)

Channel	Frequency(MHz)	Channel	Frequency(MHz)
01	2412	07	2442
02	2417	08	2447
03	2422	09	2452
04	2427	10	2457
05	2432	11	2462
06	2437	---	---

For 2.4G 802.11n (40MHz)

Channel	Frequency(MHz)	Channel	Frequency(MHz)
01	---	08	2447
02	---	09	2452
03	2422	---	---
04	2427	---	---
05	2432	---	---
06	2437	---	---
07	2442	---	---

For Bluetooth

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	20	2422	40	2442	60	2462
01	2403	21	2423	41	2443	61	2463
02	2404	22	2424	42	2444	62	2464
03	2405	23	2425	43	2445	63	2465
04	2406	24	2426	44	2446	64	2466
05	2407	25	2427	45	2447	65	2467
06	2408	26	2428	46	2448	66	2468
07	2409	27	2429	47	2449	67	2469
08	2410	28	2430	48	2450	68	2470
09	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461	---	---

2.4 Test Manner

Test Manner	
a	During testing, the interface cables and equipment positions were varied according to 47 CFR, Part 2, Part 15
b	Adjust the EUT at the test mode and the test channel. Then test.
The test modes:	
WIFI The worst-case data rates: IEEE802.11b mode: Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 1Mbps data rate were chosen for full testing. IEEE802.11g mode: Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 6Mbps data rate were chosen for full testing. IEEE 802.11gn Standard-20 MHz Channel mode: Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with MCS0 data rate were chosen for full testing. IEEE 802.11gn Wide-40 MHz Channel mode: Channel Low (2422MHz), Channel Mid (2437MHz) and Channel High (2452MHz) with MCS0 data rate were chosen for full testing. Then, the EUT configuration and cable configuration of the above highest emission mode was recorded for all final test items. Bluetooth: GFSK: CH 00: 2402MHz, CH 39: 2441MHz, CH 78: 2480MHz. 4DQPSK: CH 00: 2402MHz, CH 39: 2441MHz, CH 78: 2480MHz. 8DPSK: CH 00: 2402MHz, CH 39: 2441MHz, CH 78: 2480MHz	

2.5 General Information of Test

Test Site:	Cerpass Technology (Suzhou) Co.,Ltd
Test Site Location :	No.66,Tangzhuang Road, Suzhou Industrial Park, Jiangsu 215006, China
NVLAP LAB Code :	200814-0
FCC Registration Number :	916572, 331395
IC Registration Number :	7290A-1, 7290A-2
VCCI Registration Number :	T-1945 for Telecommunication Test C-2919 for Conducted emission test R-2670 for Radiated emission test below 1GHz G-227 for Radiated emission test above 1GHz
Frequency Range Investigated:	Conducted: from 150kHz to 30MHz Radiation: from 30MHz to 25000MHz
Test Distance:	The test distance of radiated emission from antenna to EUT is 3 M.

NVLAP LAB CODE 200814-0

2.6 Measurement Uncertainty

Measurement Item	Measurement Uncertainty
Conducted Emission	±2.71 dB
Radiation test (10m) below 1GHz	Vertical : ±3.89 dB
	Horizontal: ±4.11 dB
Radiation test (3m) below 1GHz	Vertical : ±4.11 dB
	Horizontal: ±4.10 dB
20 dB Bandwidth	7500 Hz
Maximum Peak Output Power	±1.4 dB
100kHz Bandwidth of Frequency Band Edges	±2.2 dB
Power Spectral Density	±1.3870 dB

3. Test of Radiated Band edge and Harmonic Emission

3.1 Test Limit

Radiated emissions from 30 MHz to 25 GHz were measured according to the methods defines in ANSI C63.4-2009. The EUT was placed, 0.8 meter above the ground plane, as shown in section 5.6.3. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions
For unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

FREQUENCIES(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

For unintentional device, according to CISPR PUB.22, for Class B digital devices, the general requirement of field strength of radiated emissions from intentional radiators at a distance of 10 meters shall not exceed the above table.

Frequency (MHz)	Distance Meters	Radiated (dB μ V/ M)
30-230	10	30
230-1000	10	37

3.2 Test Procedures

a. The EUT was placed on a rotatable table top 0.8 meter above ground.

b. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.

c. The table was rotated 360 degrees to determine the position of the highest radiation.

d. The antenna is a broadband antenna and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.

e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.

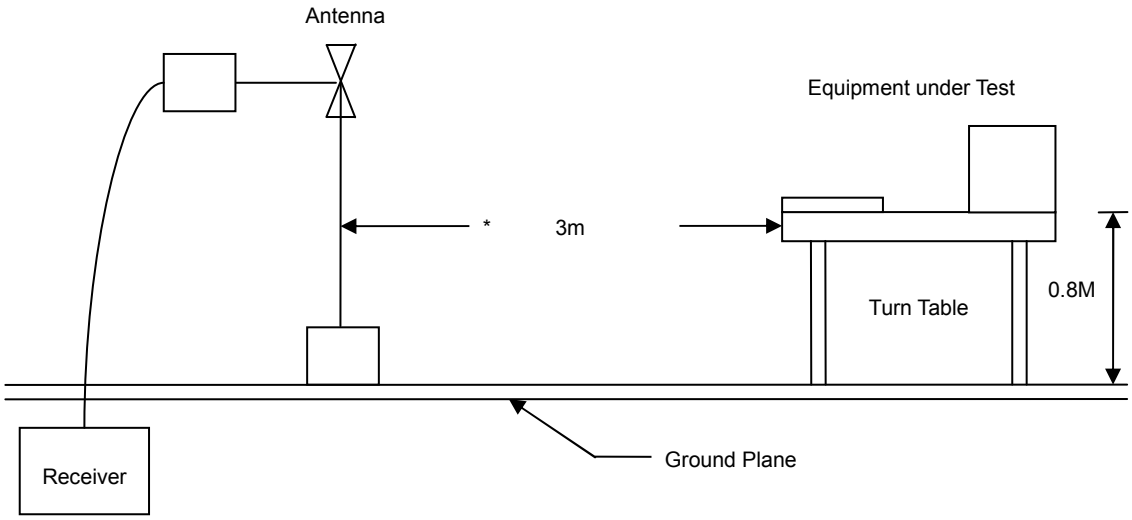
f. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.

g. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.

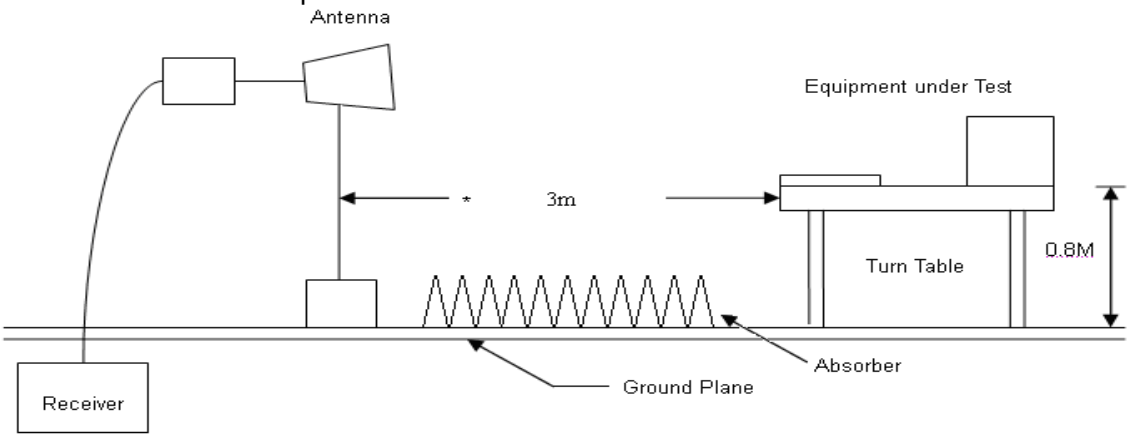
h. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

3.3 Typical Test Setup

Below 1GHz Test Setup



Above 1GHz Test Setup



3.4 Measurement equipment

Instrument	Model No.	Manufacturer	Serial No.	Calibration Date	Valid Date.
EMI Test Receiver	R&S	ESCI	100563	2013.03.10	2014.03.09
H64 Preamplifier	HP	8447F	3113A05582	2013.03.10	2014.03.09
Preamplifier	Agilent	8449B	3008A02342	2013.03.10	2014.03.09
Ultra Broadband Antenna	R&S	HL562	100362	2013.05.03	2014.05.02
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-619	2013.05.03	2014.05.02
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	9170-347	2013.05.03	2014.05.02
Spectrum Analyzer	Agilent	E4407B	MY44211883	2013.09.25	2014.09.25
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-002	2013.03.10	2014.03.09

3.5 Test Result and Data for WIFI

Engineer : Matt	
Site : EMC Lab AC 102	**Time : 2013-11-10**
Limit : FCC_15_03M_PK	**Margin : 6**
EUT : Notebook computer	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	**Note : Transmit by 802.11b (2412MHz)**

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Safe Margin (dB)	Detector Mode (PK/QP)
					Peak (dBuV/m)	AV (dBuV/m)				
2390.00	V	64.78	51.56	1.39	66.17	52.95	74.00	54.00	-1.05	average
4824.74	V	57.96	40.81	6.41	64.37	47.22	74.00	54.00	-6.78	average
2390.00	H	62.57	49.67	1.40	63.97	51.07	74.00	54.00	-2.93	average
4824.45	H	57.12	38.67	6.41	63.53	45.08	74.00	54.00	-8.92	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

Engineer : Matt	
Site : EMC Lab AC 102	**Time : 2013-11-10**
Limit : FCC_15_03M_PK	**Margin : 6**
EUT : Notebook computer	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	**Note : Transmit by 802.11b (2437MHz)**

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Safe Margin (dB)	Detector Mode (PK/QP)
					Peak (dBuV/m)	AV (dBuV/m)				
2389.88	V	61.88	49.45	1.39	63.27	50.84	74.00	54.00	-3.16	average
2483.50	V	62.34	50.72	1.45	63.79	52.17	74.00	54.00	-1.83	average
4874.13	V	63.12	40.23	6.54	69.66	46.77	74.00	54.00	-7.23	average
2390.00	H	59.75	49.11	1.39	61.14	50.50	74.00	54.00	-3.50	average
2483.50	H	60.84	49.04	1.45	62.29	50.49	74.00	54.00	-3.51	average
4875.52	H	61.23	40.12	6.53	67.76	46.65	74.00	54.00	-7.35	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

Engineer : Matt	
Site : EMC Lab AC 102	**Time : 2013-11-10**
Limit : FCC_15_03M_PK	**Margin : 6**
EUT : Notebook computer	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	**Note : Transmit by 802.11b (2462MHz)**

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Safe Margin (dB)	Detector Mode (PK/QP)
					Peak (dBuV/m)	AV (dBuV/m)				
2483.50	V	62.52	50.02	1.45	63.97	51.47	74.00	54.00	-2.53	average
4924.16	V	60.45	39.85	6.99	67.44	46.84	74.00	54.00	-7.16	average
2483.50	H	61.23	49.89	1.45	62.68	51.34	74.00	54.00	-2.66	average
2487.24	H	60.45	47.35	1.46	61.91	48.81	74.00	54.00	-5.19	average
4924.67	H	60.28	39.21	6.99	67.27	46.20	74.00	54.00	-7.80	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

Engineer : Matt	
Site : EMC Lab AC 102	**Time : 2013-11-10**
Limit : FCC_15_03M_PK	**Margin : 6**
EUT : Notebook computer	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	**Note : Transmit by 802.11g (2412MHz)**

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Safe Margin (dB)	Detector Mode (PK/QP)
					Peak (dBuV/m)	AV (dBuV/m)				
2387.20	V	71.55	51.45	1.39	72.94	52.84	74.00	54.00	-1.16	average
4824.12	V	62.24	40.56	6.53	68.77	47.09	74.00	54.00	-6.91	average
2378.31	H	69.34	50.24	1.39	70.73	51.63	74.00	54.00	-2.37	average
4824.21	H	60.23	39.68	6.53	66.76	46.21	74.00	54.00	-7.79	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

Engineer : Matt	
Site : EMC Lab AC 102	**Time : 2013-11-10**
Limit : FCC_15_03M_PK	**Margin : 6**
EUT : Notebook computer	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	**Note : Transmit by 802.11g (2437MHz)**

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Safe Margin (dB)	Detector Mode (PK/QP)
					Peak (dBuV/m)	AV (dBuV/m)				
2389.41	V	71.25	51.21	1.39	72.64	52.60	74.00	54.00	-1.40	average
2483.50	V	70.21	50.77	1.45	71.66	52.22	74.00	54.00	-1.78	average
4875.16	V	60.23	41.56	6.85	67.08	48.41	74.00	54.00	-5.59	average
2389.02	H	69.76	50.12	1.39	71.15	51.51	74.00	54.00	-2.49	average
2483.50	H	67.21	48.72	1.45	68.66	50.17	74.00	54.00	-3.83	average
4875.78	H	59.86	40.77	6.85	66.71	47.62	74.00	54.00	-6.38	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

Engineer : Matt	
Site : EMC Lab AC 102	**Time : 2013-11-10**
Limit : FCC_15_03M_PK	**Margin : 6**
EUT : Notebook computer	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	**Note : Transmit by 802.11g (2462MHz)**

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Safe Margin (dB)	Detector Mode (PK/QP)
					Peak (dBuV/m)	AV (dBuV/m)				
2483.50	V	71.03	51.23	1.45	72.48	52.68	74.00	54.00	-1.32	average
4924.11	V	61.35	41.65	6.99	68.34	48.64	74.00	54.00	-5.36	average
2483.50	H	67.56	49.01	1.45	69.01	50.46	74.00	54.00	-3.54	average
4925.84	H	60.28	40.77	6.99	67.27	47.76	74.00	54.00	-6.24	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

Engineer : Matt	
Site : EMC Lab AC 102	**Time : 2013-11-10**
Limit : FCC_15_03M_PK	**Margin : 6**
EUT : Notebook computer	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	**Note : Transmit by 802.11n (20MHz) (2412MHz)**

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Safe Margin (dB)	Detector Mode (PK/QP)
					Peak (dBuV/m)	AV (dBuV/m)				
2389.91	V	70.82	50.82	1.39	72.21	52.21	74.00	54.00	-1.79	average
4824.00	V	60.95	38.75	6.53	67.48	45.28	74.00	54.00	-8.72	average
2389.90	H	68.21	49.22	1.39	69.60	50.61	74.00	54.00	-3.39	average
4824.00	H	59.84	38.89	6.53	66.37	45.42	74.00	54.00	-8.58	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

Engineer : Matt	
Site : EMC Lab AC 102	**Time : 2013-11-10**
Limit : FCC_15_03M_PK	**Margin : 6**
EUT : Notebook computer	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	**Note : Transmit by 802.11n (20MHz) (2437MHz)**

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Safe Margin (dB)	Detector Mode (PK/QP)
					Peak (dBuV/m)	AV (dBuV/m)				
2390.00	V	70.11	49.87	1.39	71.50	51.26	74.00	54.00	-2.74	average
2483.50	V	68.98	49.56	1.45	70.43	51.01	74.00	54.00	-2.99	average
4874.71	V	59.12	40.75	6.85	65.97	47.60	74.00	54.00	-6.40	average
2390.00	H	59.12	49.44	1.39	60.51	50.83	74.00	54.00	-3.17	average
2483.50	H	65.11	47.91	1.45	66.56	49.36	74.00	54.00	-4.64	average
4874.21	H	59.12	39.44	6.85	65.97	46.29	74.00	54.00	-7.71	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

Engineer : Matt	
Site : EMC Lab AC 102	**Time : 2013-11-10**
Limit : FCC_15_03M_PK	**Margin : 6**
EUT : Notebook computer	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	**Note : Transmit by 802.11n (20MHz) (2462MHz)**

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Safe Margin (dB)	Detector Mode (PK/QP)
					Peak (dBuV/m)	AV (dBuV/m)				
2483.50	V	69.84	50.24	1.45	71.29	51.69	74.00	54.00	-2.31	average
2485.75	V	69.21	49.89	1.45	70.66	51.34	74.00	54.00	-2.66	average
4924.75	V	59.46	40.21	6.99	66.45	47.20	74.00	54.00	-6.80	average
2483.50	H	65.28	48.95	1.45	66.73	50.40	74.00	54.00	-3.60	average
4924.84	H	59.21	40.12	6.99	66.20	47.11	74.00	54.00	-6.89	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

Engineer : Matt	
Site : EMC Lab AC 102	**Time : 2013-11-10**
Limit : FCC_15_03M_PK	**Margin : 6**
EUT : Notebook computer	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	**Note : Transmit by 802.11n (40MHz) (2422MHz)**

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Safe Margin (dB)	Detector Mode (PK/QP)
					Peak (dBuV/m)	AV (dBuV/m)				
2385.11	V	69.89	52.00	1.38	71.27	53.38	74.00	54.00	-0.62	average
4844.33	V	60.21	40.89	6.61	66.82	47.50	74.00	54.00	-6.50	average
2385.55	H	67.28	51.09	1.38	68.66	52.47	74.00	54.00	-1.53	average
4844.57	H	58.86	39.22	6.61	65.47	45.83	74.00	54.00	-8.17	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

Engineer : Matt	
Site : EMC Lab AC 102	**Time : 2013-11-10**
Limit : FCC_15_03M_PK	**Margin : 6**
EUT : Notebook computer	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	**Note : Transmit by 802.11n (40MHz) (2437MHz)**

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Safe Margin (dB)	Detector Mode (PK/QP)
					Peak (dBuV/m)	AV (dBuV/m)				
2386.21	V	68.78	50.41	1.38	70.16	51.79	74.00	54.00	-2.21	average
2483.50	V	70.76	50.87	1.45	72.21	52.32	74.00	54.00	-1.68	average
4875.33	V	61.96	40.86	6.85	68.81	47.71	74.00	54.00	-6.29	average
2387.78	H	66.12	50.78	1.38	67.50	52.16	74.00	54.00	-1.84	average
2384.50	H	68.85	50.08	1.45	70.30	51.53	74.00	54.00	-2.47	average
4874.87	H	59.88	38.67	6.85	66.73	45.52	74.00	54.00	-8.48	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

Engineer : Matt	
Site : EMC Lab AC 102	**Time : 2013-11-10**
Limit : FCC_15_03M_PK	**Margin : 6**
EUT : Notebook computer	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	**Note : Transmit by 802.11n (40MHz) (2452MH)**

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Safe Margin (dB)	Detector Mode (PK/QP)
					Peak (dBuV/m)	AV (dBuV/m)				
2483.50	V	71.24	51.77	1.45	72.69	53.22	74.00	54.00	-0.78	average
2493.61	V	70.78	51.24	1.47	72.25	52.71	74.00	54.00	-1.29	average
4905.25	V	61.45	39.96	6.92	68.37	46.88	74.00	54.00	-7.12	average
2483.50	H	69.84	50.61	1.45	71.29	52.06	74.00	54.00	-1.94	average
4904.44	H	59.67	39.11	6.92	66.59	46.03	74.00	54.00	-7.97	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

3.6 Test Result and Data for Bluetooth

Site : EMC Lab AC 102	**Time : 2013-11-10**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Test mode: Transmit by GFSK 2402MHz	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
2320.41	V	57.86	33.96	1.15	59.01	35.11	74	54	-18.89	average
2495.86	V	52.56	31.56	1.56	54.12	33.12	74	54	-20.88	average
2320.00	H	55.21	35.21	1.15	56.36	36.36	74	54	-17.64	average
2485.91	H	50.28	32.56	1.46	51.74	34.02	74	54	-19.98	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

Site : EMC Lab AC 102	**Time : 2013-11-10**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Test mode: Transmit by GFSK 2441MHz	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
2362.85	V	42.46	34.56	1.23	43.69	35.79	74	54	-18.21	average
2490.24	V	46.59	33.12	1.52	48.11	34.64	74	54	-19.36	average
2362.00	H	45.96	36.57	1.23	47.19	37.8	74	54	-16.2	average
2490.45	H	48.62	35.56	1.52	50.14	37.08	74	54	-16.92	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

Site : EMC Lab AC 102	**Time : 2013-11-10**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Test mode: Transmit by GFSK 2480MHz	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
2350.52	V	48.56	35.68	1.21	49.77	36.89	74	54	-17.11	average
2483.50	V	64.28	49.21	1.45	65.73	50.66	74	54	-3.34	average
2355.84	H	49.68	33.56	1.24	50.92	34.8	74	54	-19.2	average
2483.50	H	65.24	48.56	1.45	66.69	50.01	74	54	-3.99	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

Site : EMC Lab AC 102	**Time : 2013-11-10**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Test mode: Transmit by π/4 DQPSK 2402MHz	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
2343.41	V	56.75	34.12	1.25	58.00	35.37	74	54	-18.63	average
2494.86	V	53.31	32.76	1.56	54.87	34.32	74	54	-19.68	average
2344.96	H	56.21	35.67	1.26	57.47	36.93	74	54	-17.07	average
2486.67	H	51.25	32.18	1.47	52.72	33.65	74	54	-20.35	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

Site : EMC Lab AC 102	**Time : 2013-11-10**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Test mode: Transmit by π/4 DQPSK 2441MHz	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
2360.75	V	41.85	34.86	1.23	43.08	36.09	74	54	-17.91	average
2489.56	V	46.97	33.51	1.52	48.49	35.03	74	54	-18.97	average
2360.86	H	46.82	35.24	1.23	48.05	36.47	74	54	-17.53	average
2490.74	H	49.58	34.86	1.52	51.1	36.38	74	54	-17.62	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

Site : EMC Lab AC 102	**Time : 2013-11-10**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Test mode: Transmit by π/4 DQPSK 2480MHz	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
2354.91	V	48.68	36.82	1.26	49.94	38.08	74	54	-15.92	average
2483.50	V	65.29	48.89	1.45	66.74	50.34	74	54	-3.66	average
2357.85	H	50.75	34.56	1.24	51.99	35.8	74	54	-18.2	average
2483.50	H	65.24	47.98	1.45	66.69	49.43	74	54	-4.57	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

Site : EMC Lab AC 102	**Time : 2013-11-10**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Test mode: Transmit by 8DPSK 2402MHz	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
2450.70	V	55.86	35.12	1.29	57.15	36.41	74	54	-17.59	average
2490.46	V	52.64	33.92	1.54	54.18	35.46	74	54	-18.54	average
2346.92	H	55.92	35.89	1.26	57.18	37.15	74	54	-16.85	average
2488.85	H	52.41	34.54	1.47	53.88	36.01	74	54	-17.99	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

Site : EMC Lab AC 102	**Time : 2013-11-10**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Test mode: Transmit by 8DPSK 2441MHz	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
2362.46	V	42.86	35.91	1.23	44.09	37.14	74	54	-16.86	average
2490.76	V	46.95	34.86	1.52	48.47	36.38	74	54	-17.62	average
2362.76	H	47.84	35.98	1.23	49.07	37.21	74	54	-16.79	average
2490.53	H	48.96	35.45	1.52	50.48	36.97	74	54	-17.03	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

Site : EMC Lab AC 102	**Time : 2013-11-10**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Test mode: Transmit by 8DPSK 2480MHz	**Probe : VERTICAL/ HORIZONTAL**
Power : AC 120V/60Hz	

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
2360.67	V	49.56	35.97	1.31	50.87	37.28	74	54	-16.72	average
2483.50	V	65.21	48.22	1.45	66.66	49.67	74	54	-4.33	average
2360.28	H	50.21	35.28	1.31	51.52	36.59	74	54	-17.41	average
2483.50	H	66.84	48.93	1.45	68.29	50.38	74	54	-3.62	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

4. Maximum Output Power

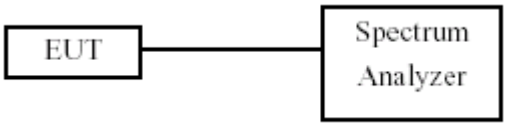
4.1 Test Limit

The Maximum Output Power Measurement is 30dBm.

4.2 Test Procedures

The antenna port(RF output)of the EUT was connected to the input(RF input)of a power meter. Power was read directly from the meter and cable loss connection was added to the reading to obtain power at the EUT antenna terminal. The EUT Output Power was set to maximum to produce the worse case test result.

4.3 Test Setup Layout



4.4 Measurement equipment

Instrument/Ancillary	Model No.	Manufacturer	Serial No.	Calibration Date	Valid Date
Spectrum Analyzer	FSP40	R&S	100324	2013.03.10	2014.03.09

4.5 Test Result and Data

For WIFI

Test Mode	Channel No.	Frequency (MHz)	Average Power (dBm)
802.11b	01	2412	17.44
	06	**2437**	**18.12**
	11	2462	17.83
802.11g	01	2412	14.92
	06	2437	18.09
	11	2462	15.15
802.11n (20MHz)	01	2412	13.66
	06	2437	16.55
	11	2462	14.03
802.11n (40MHz)	03	2422	11.16
	06	2437	14.67
	09	2452	11.51

For Bluetooth

Test Mode	Channel No.	Frequency (MHz)	Average Power (dBm)
Bluetooth LE GFSK	00	2402	8.35
	19	2441	8.47
	39	2480	8.62
Bluetooth EDR 8DPSK	00	2402	8.42
	39	2441	8.91
	78	2480	8.83