

APPLICATION FOR CERTIFICATION

On Behalf of

LG Electronics Inc.

Wireless Adapter Card

Model No. : R3

FCC ID : BEJ9QK-DMR3

IC: 2703H-DMR3

Brand : LG

Prepared for : LG Electronics Inc.
19-1, Cheongho-Ri, Jinwuy-Myeon,
Pyeongtaek-City, Gyeonggi-Do, 451-713,
Korea

Prepared by : AUDIX Technology Corporation
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Date of Test : Apr. 15 ~ 24, 2013
Date of Report : Apr. 25, 2013

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TEST REPORT CERTIFICATION

Applicant : LG Electronics Inc.
Manufacturer : LG Electronics Inc.
Factory : NAMUGA (SUZHOU) TECHNOLOGIES CO., LTD.
EUT Description : Wireless Adapter Card
FCC ID : **BEJ9QK-DMR3**
IC : **2703H-DMR3**
(A) Model No. : R3
(B) Serial No. : N/A
(C) Brand : LG
(D) Power Supply : DC 5V (Powered by Notebook PC)

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C, Oct. 2012
Industry Canada Rules and Regulations RSS-Gen (Issue 3), December 2010 and
RSS-210 (Issue 8), December 2010
(Canada RSS-210 §Annex 8)
And ANSI C63.4:2003

(FCC 47 CFR Part 15C, §15.205 and §15.207 and §15.209 and §15.247)

The device described above was tested by AUDIX Technology Corporation to determine the maximum emission levels emanating from the device. The maximum emission levels were compared to the FCC Part 15 subpart C and Canada RSS-Gen, RSS-210 limits.

The measurement results are contained in this test report and AUDIX Technology Corporation is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliant with the requirements of FCC and Industry Canada RSS-Gen, RSS-210 standards.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of AUDIX Technology Corporation.

Date of Test: Apr. 15 ~ 24, 2013

Date of Report: Apr. 25, 2013

Producer: Annie Yu
(Annie Yu/Administrator)

Signatory: Leon Liu
(Leon Liu/Deputy General Manager)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

Description	:	Wireless Adapter Card The frequency range of 2412MHz ~ 2464MHz, 5736MHz ~ 5814Hz was tested in this report. The frequency range 5180MHz ~ 5240MHz has been tested and the test data are reported in other report of EM-F1020318.
Model Number	:	R3
Serial Number	:	N/A
Brand	:	LG
FCC ID	:	BEJ9QK-DMR3
IC	:	2703H-DMR3
Applicant	:	LG Electronics Inc. 19-1, Cheongho-Ri, Jinwuy-Myeon, Pyeongtaek-City, Gyeonggi-Do, 451-713, Korea
Manufacturer	:	LG Electronics Inc. 19-1, Cheongho-Ri, Jinwuy-Myeon, Pyeongtaek-City, Gyeonggi-Do, 451-713, Korea
Factory	:	NAMUGA (SUZHOU) TECHNOLOGIES CO., LTD. 445, SUHONG MIDDLE ROAD, SUZHOU INDUSTRIAL PARK, SUZHOU, JIANGSU, CHINA.
Fundamental Range	:	2412MHz ~ 2464MHz and 5180MHz ~ 5240MHz and 5736MHz ~ 5814MHz
Channel Number	:	2.4GHz: 3 Channel 5.2GHz: 3 Channel 5.8GHz: 3 Channel
Radio Technology	:	QPSK Modulation

Data Transfer Rate : 22Mbps

Antenna Gain : 2.4GHz: 1.0dBi (Peak)
5.2GHz: 3.0dBi (Peak)
5.8GHz: 4.6dBi (Peak)

Antenna Transmit Type : 1T1R
(can not support transmit simultaneously)

Antenna Type : PCB ANT (PIFA)

Date of Receipt of Sample : Apr. 10, 2013

Date of Test : Apr. 15 ~ 24, 2013

1.2. Tested Supporting System Details

1.2.1. NOTEBOOK PC

Model Number : N20A Series

Serial Number : WB200903001

Manufacturer : ASUS

USB Cable : Non-Shielded, Detachable, 1.8m

AC Adapter : ASUS, M/N SADP-65NB BB
DC Cord: Non-Shielded, Undetachable, 1.8m
Bonded a ferrite core

AC Power Cord : Non-Shielded, Detachable, 1.8m

1.2.2. JIG BOARD

Model Number : N/A

Serial Number : N/A

Brand : LG

Bus Cable : Non-Shielded, Detachable, 0.25m

1.2.3. LCD MONITOR

Model Number : P190S

Serial Number : MX-004K3T-74262-1AJ-23RL

Brand : DELL

D-Sub Cable : Shielded, Detachable, 1.8m
Bonded two ferrite cores

AC Power Cord : Non-Shielded, Detachable, 1.8m

1.2.4. USB MOUSE

Model Number : AMU94APZ-CN
Serial Number : 1109001101
FCC ID : FCC by DoC
Brand : Targus
D-Sub Cable : Non-Shielded, Undetachable, 1.8m

1.2.5. LASER PRINTER

Model Number : ML-1630
Serial Number : 4561B1CP600023X
FCC ID : A3LML1630
BSMI ID : R33475
Brand : SAMSUNG
USB Cable : Shielded, Detachable, 1.8m
Power Cable : Non-Shielded, Detachable, 1.8m

1.3. Description of Test Facility

Name of Firm : **AUDIX Technology Corporation**
EMC Department
No. 53-11, Dingfu, Linkou Dist.,
New Taipei City 244, Taiwan, R.O.C.

Test Site : **No. 8 Shielded Room &**
(C8/Semi-AC) No. 53-11, Dingfu, Linkou Dist.,
New Taipei City 244, Taiwan, R.O.C.
Semi-Anechoic Chamber
No. 53-11, Dingfu, Linkou Dist.,
New Taipei City 244, Taiwan, R.O.C.
May 14, 2009 Renewal on
Federal Communication Commission
Registration Number: 90993

NVLAP Lab. Code : 200077-0

TAF Accreditation No : 1724

1.4. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty (dB)
Conduction Test	150kHz~30MHz	$\pm 1.73\text{dB}$
Radiation Test (Distance: 3m)	30MHz~300MHz	$\pm 2.91\text{dB}$
	300MHz~1000MHz	$\pm 2.74\text{dB}$
	Above 1GHz	$\pm 5.02\text{dB}$

Remark : Uncertainty = $k u_c(y)$

Test Item	Uncertainty
6dB Bandwidth	$\pm 0.05\text{kHz}$
Maximum peak output power	$\pm 0.33\text{dBm}$
Band edges	$\pm 0.13\text{dB}$
Power spectral density	$\pm 0.13\text{dB}$
Emission Limitations	$\pm 0.13\text{dB}$

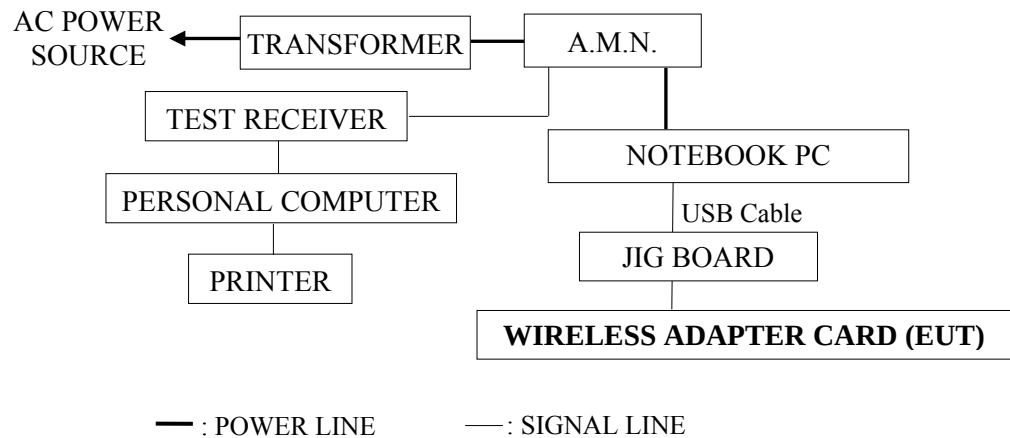
2. CONDUCTED EMISSION MEASUREMENT

2.1. Test Equipment

The following test equipment was used during the conducted emission measurement :
(No. 8 Shielded Room)

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Test Receiver	R&S	ESCS30	100265	Aug. 24, 12'	Aug. 23, 13'
2.	A.M.N.	R&S	ESH2-Z5	100366	Mar. 19, 13'	Mar. 18, 14'

2.2. Block Diagram of Test Setup



2.3. Powerline Conducted Emission Limit §15.207, Class B,

RSS-Gen §7.2.2/Table 2]

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level	Average Level
150kHz ~ 500kHz	66 ~ 56 dBμV	56 ~ 46 dBμV
500kHz ~ 5MHz	56 dBμV	46 dBμV
5MHz ~ 30MHz	60 dBμV	50 dBμV

Remark 1.: If the average limit is met when using a Quasi-Peak detector, the EUT shall be deemed to meet both limits and measurement with the average detector is unnecessary.

2.: The lower limit applies at the band edges.

2.4. Operating Condition of EUT

- 2.4.1. Setup the EUT and simulator as shown on 2.2.
- 2.4.2. Turn on the power of all equipment.
- 2.4.3. The Notebook PC was running test software “GUI_Demo_01.05.17_7828” to set EUT (Wireless Adapter Card) on transmitting and receiving during all testing.

2.5. Test Procedure

The EUT (link Notebook PC) was placed on the table which was above the ground by 80cm and Notebook PC's adapter's power cord connected to the AC mains through an Artificial Mains Network (A.M.N.). This provided a 50 ohm coupling impedance for the measuring equipment. (Please refer to the block diagram of the test setup and photographs.)

Both sides of A.C. line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions simulators of the interface cables should be manipulated according to ANSI C63.4-2003, RSS-Gen and RSS-210 regulation during conducted measurement.

The bandwidth of the R&S Test Receiver ESCS 30 was set at 9kHz.

The frequency range from 150kHz to 30MHz was checked.

All the final readings from Test Receiver were measured with the Quasi-Peak detector and Average detector. Remark: If the Average limit is met when using a Quasi-Peak detector, the Average detector is unnecessary)

2.6. Conducted Emission Measurement Results

PASSED.

(All the emissions not reported below are too low against the prescribed limits.)

EUT was performed during this section testing and all the test results are attached in next pages.

EUT : Wireless Adapter Card M/N : R3

Test Date : Apr. 15, 2013 Temperature : 23°C Humidity : 69%

Reference Test Data : Neutral # 2; Line # 1

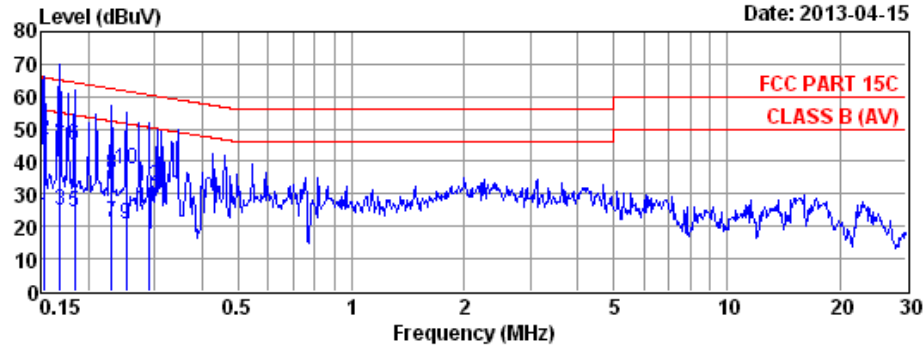


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Email: emc@audixtech.com

Data: 2

File: D:\test data\REPORT\2013\1M1304XXX\1M1304105-C-D.EM6 (2)

Date: 2013-04-15



Site no. : No.8 Shielded Room Data no. : 2
Dis. / Ant. : ESH2-Z5 366 Ant. pol. : NEUTRAL
Limit : FCC PART 15C
Env. / Ins. : 23°C / 69% ESCS (265) Engineer : Jack_Wu
EUT : R3
Power Rating : 120Vac/60Hz
Test Mode : Operating

	Freq. (MHz)	AMN. Factor (dB)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
1	0.152	0.10	0.04	22.53	22.67	55.87	33.20	Average
2	0.152	0.10	0.04	46.72	46.86	65.87	19.01	QP
3	0.168	0.10	0.04	24.66	24.80	55.08	30.28	Average
4	0.168	0.10	0.04	47.64	47.78	65.08	17.30	QP
5	0.183	0.10	0.04	24.46	24.60	54.33	29.73	Average
6	0.183	0.10	0.04	44.80	44.94	64.33	19.39	QP
7	0.230	0.10	0.04	20.97	21.11	52.44	31.33	Average
8	0.230	0.10	0.04	36.05	36.19	62.44	26.25	QP
9	0.252	0.10	0.04	20.29	20.43	51.69	31.26	Average
10	0.252	0.10	0.04	37.46	37.60	61.69	24.09	QP
11	0.291	0.10	0.04	25.53	25.67	50.50	24.83	Average
12	0.291	0.10	0.04	32.42	32.56	60.50	27.94	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Reading.

2. If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

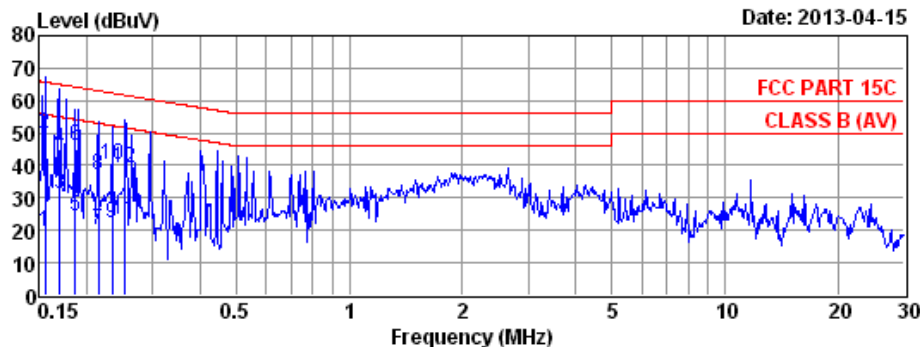


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Data: 1

File: D:\test data\REPORT\2013\C1M1304XXX\C1M1304105-C-D.EM6 (2)

Date: 2013-04-15



Site no. : No.8 Shielded Room Data no. : 1
Dis. / Ant. : ESH2-Z5 366 Ant. pol. : LINE
Limit : FCC PART 15C
Env. / Ins. : 23°C / 69% ESCS (265) Engineer : Jack_Wu
EUT : R3
Power Rating : 120Vac/60Hz
Test Mode : Operating

	Freq. (MHz)	AMN. Factor (dB)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
1	0.155	0.10	0.04	19.38	19.52	55.74	36.22	Average
2	0.155	0.10	0.04	49.89	50.03	65.74	15.71	QP
3	0.169	0.10	0.04	30.87	31.01	54.99	23.98	Average
4	0.169	0.10	0.04	44.89	45.03	64.99	19.96	QP
5	0.186	0.10	0.04	24.25	24.39	54.20	29.81	Average
6	0.186	0.10	0.04	45.72	45.86	64.20	18.34	QP
7	0.215	0.10	0.04	20.00	20.14	53.01	32.87	Average
8	0.215	0.10	0.04	37.11	37.25	63.01	25.76	QP
9	0.234	0.10	0.04	21.96	22.10	52.30	30.20	Average
10	0.234	0.10	0.04	40.07	40.21	62.30	22.09	QP
11	0.253	0.10	0.04	22.99	23.13	51.64	28.51	Average
12	0.253	0.10	0.04	39.18	39.32	61.64	22.32	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Reading.

2. If the average limit is met when using a quasi-peak detector,
the EUT shall be deemed to meet both limits and measurement
with average detector is unnecessary.

3. RADIATED EMISSION MEASUREMENT

3.1. Test Equipment

The following test equipment was used during the radiated emission measurement:

3.1.1. For Frequency Range 30MHz~1000MHz (at Semi-Anechoic Chamber)

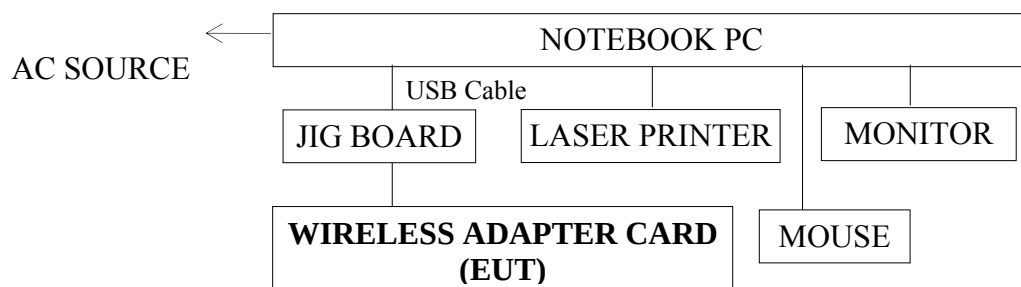
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E4446A	US44300366	Aug. 08, 12'	Aug. 06, 13'
2.	Test Receiver	R & S	ESCS30	100338	Jul. 04, 12'	Jul. 03, 13'
3.	Amplifier	HP	8447D	2944A06305	Feb. 19, 13'	Feb. 18, 14'
4.	Biconical Antenna	CHASE	VBA6106 A	1264	Mar. 02, 13'	Mar. 01, 14'
5.	Log Periodic Antenna	Schwarzbeck	UHALP91 08-A	0810	Mar. 02, 13'	Mar. 01, 14'

3.1.2. For Frequency Above 1GHz (at Semi-Anechoic Chamber)

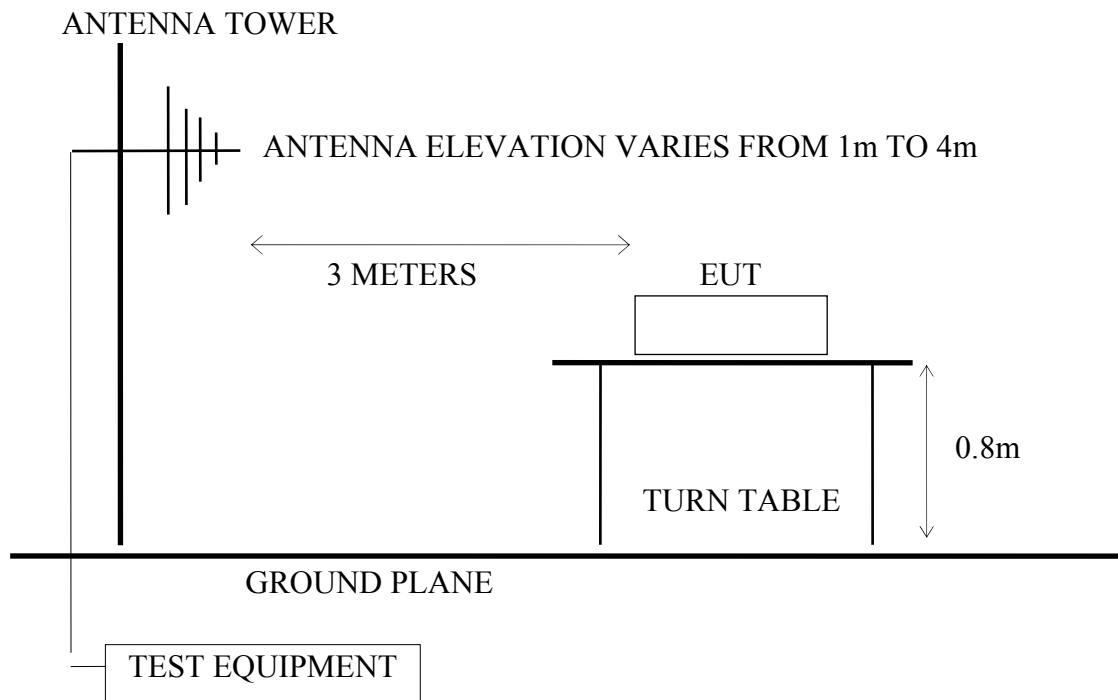
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E4446A	US44300366	Aug. 08, 12'	Aug. 06, 13'
2.	Amplifier	HP	8449B	3008A00529	Jan. 31, 13'	Jan. 30, 14'
3.	Horn Antenna	EMCO	3115	9112-3775	May 09, 12'	May 08, 13'
4.	Horn Antenna	EMCO	3116	2653	Oct. 15, 11'	Oct. 14, 13'
5.	2.4GHz Notch Filter	EWT	EWT-14-00 70-R1	G2	Feb. 14, 13'	Feb. 13, 14'
6.	3.5G High Pass Filter	HP	84300-8003 8	005	Dec. 15, 12'	Dec. 14, 13'
7.	5G High Pass Filter	Microwave Circuits	H1G013G1	459777	Dec. 13, 12'	Dec. 12, 13'
8.	5G Notch Filter	Microwave Circuits	N0555983	459481	Dec. 31, 12'	Dec. 30, 13'
9.	5G Notch Filter	Microwave Circuits	N0258771	459776	Jan. 03, 13'	Jan. 02, 14'
10.	Signal Generator	HP	83732B	US34490489	May 16, 12'	May 15, 13'

3.2. Test Setup

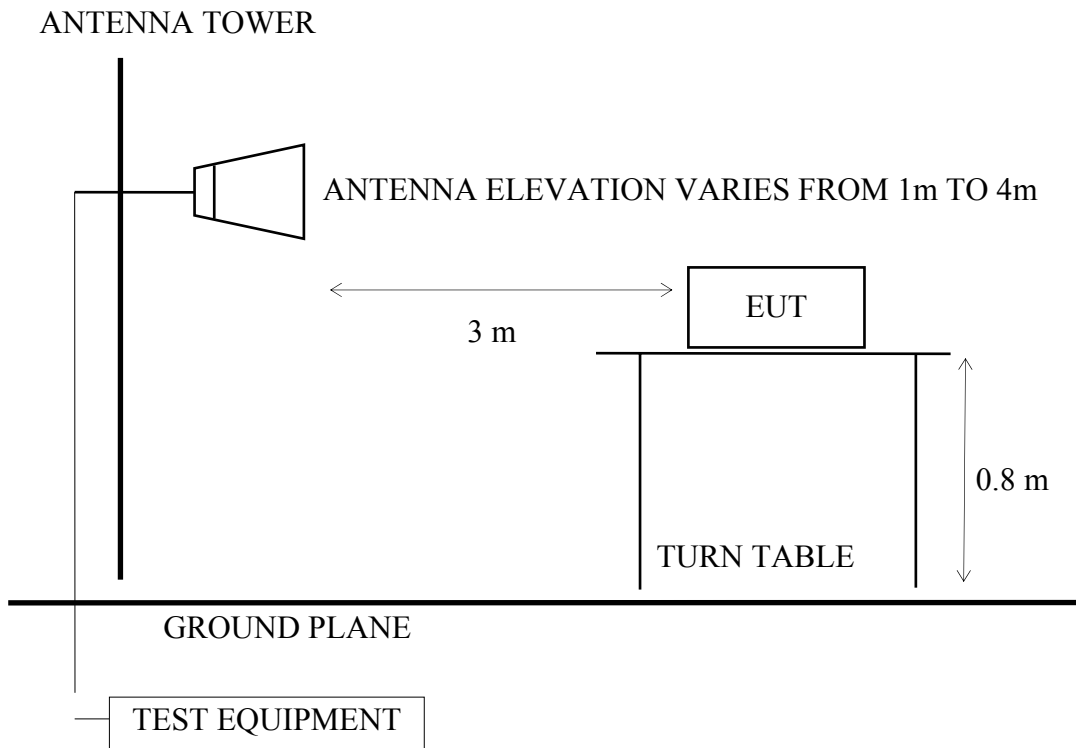
3.2.1. Block Diagram of connection between EUT and simulators



3.2.2. Semi-Anechoic Chamber (3m) Setup Diagram for 30-1000MHz



3.2.3. Semi-Anechoic Chamber (3m) Setup Diagram for above 1GHz



3.3. Radiated Emission Limits (§15.209, RSS-210 §2.7/Table 2)

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMITS	
		$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
Above 960	3	500	54.0
Above 1000	3	74.0 $\text{dB}\mu\text{V/m}$ (Peak) 54.0 $\text{dB}\mu\text{V/m}$ (Average)	

- Remark :
- (1) Emission level ($\text{dB}\mu\text{V/m}$) = 20 log Emission level ($\mu\text{V/m}$)
 - (2) The tighter limit applies at the edge between two frequency bands.
 - (3) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
 - (4) The limits in this table are based on CFR 47 Part 15.205(a)(b) and Part 15.209 (a).
 - (5) The over 1GHz limit, FCC limit is used based on CFR 47 Part 15.35(b) and Part 15.205(b) & Part 15.209(e) and Part 15.207(c).

3.4. Operating Condition of EUT

- 3.4.1. Set up the EUT (Wireless Adapter Card) via Notebook PC and simulator as shown on 3.2.
- 3.4.2. To turn on the power of all equipments.
- 3.4.3. The EUT was set the Notebook PC using test program "GUI_Demo_01.05.17_7828".
- 3.4.4. The EUT supports 2.4G/5.8G modes, we performed pre-scan high, middle, low channels for each mode for spurious emission and listed the worst channel of each mode in test report.

The worst channel of each mode as following:

Mode	Type of Network	Channel	Frequency
1.	2.4G	CH 1	2412MHz
2.	5.8G	CH 3	5814MHz

3.5. Test Procedure

The EUT and its simulators were placed on a turn table which was 0.8 meter above the ground. The turn table rotated 360 degrees to determine the position of the maximum emission level. EUT was set 3 meters away from the receiving antenna which was mounted on an antenna tower. The antenna moved up and down between 1 to 4 meters to find out the maximum emission level. Broadband antenna such as calibrated biconical and log-periodical antenna or horn antenna were used as a receiving antenna. Both horizontal and vertical polarization of the antenna were set on measurement. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4-2003, RSS-Gen and RSS-210 regulation.

The bandwidth of the R&S Test Receiver was set at 120kHz. (For 30MHz to 1000MHz)

The resolution bandwidth and video bandwidth of test spectrum analyzer is 1MHz for peak detection (PK) at frequency above 1GHz.

The resolution bandwidth of test spectrum analyzer is 1MHz and the video bandwidth is 10Hz for average detection (AV) at frequency above 1GHz.

The frequency range from 30MHz to 40GHz (Up to 10th harmonics from fundamental frequency) was checked. 30MHz to 1000MHz was measured with Quasi-Peak detector. Pursuant to ANSI 4.2.2, peak detector is an alternate option for frequency from 30MHz to 1000MHz.

For emissions above 1GHz were measured with peak and average detectors, and performed measurement in 1 m distance for frequency range from 5500MHz up to 40000MHz where there is no emission be found.

Pursuant to ANSI C63.4 8.3.1.2, when peak value complies with the average limit, we didn't perform measurement in average detector.

3.6. Test Results

PASSED.

(All emissions not reported for there is no emission be found.)

EUT : Wireless Adapter Card M/N : R3

Test Date : Apr. 24, 2013 Temperature : 26°C Humidity : 61%

For Frequency Range 30MHz~1000MHz:

The EUT with following test modes were performed during this section testing and all the test results are listed in section 3.6.1.

Mode	Type of Network	Channel	Frequency	Test Mode	Reference Test Data	
					Horizontal	Vertical
1.	2.4G	CH 1	2412MHz	Transmit	# 2	# 1
2.	5.8G	CH 3	5814MHz		# 2	# 1

* Above all final readings were measured with Quasi-Peak detector.

2.4GHz & 5.8GHzfor Frequency above 1GHz:

The emissions (up to 40GHz) not reported for there is no emission be found.

For Restricted Bands:

The EUT was tested in restricted bands and all the test results are listed in section 3.6.2. (The restricted bands defined in part 15.205(a))

Mode	Type of Network	Channel	Frequency	Test Mode	Reference Test Data	
					Horizontal	Vertical
1.	2.4G	CH 1	2412MHz	Transmit	# 3, # 4	# 1, # 2
2.		CH 3	2464MHz		# 5, # 6	# 7, # 8

3.6.1. For 30-1000MHz Frequency Range Measurement Results

Frequency: 2412MHz

Site no. : A/C Chamber Data no. : 2
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : HORIZONTAL
 Limit : FCC PART-15C
 Env. / Ins. : E4446A 26°C/61% □jianlun_hung
 EUT : R3
 Power Rating : DC5V (VIA USB)
 Test Mode : TX2412

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
37.290	21.58	1.20	12.58	35.37	40.00	4.63	Peak
62.400	12.28	1.60	22.23	36.11	40.00	3.89	Peak
160.140	20.80	2.70	12.75	36.25	43.50	7.25	Peak
209.280	21.81	3.16	8.74	33.70	43.50	9.80	Peak
264.090	24.60	3.67	8.54	36.81	46.00	9.19	Peak
337.800	15.09	4.25	12.80	32.14	46.00	13.86	Peak
399.400	17.69	4.80	7.15	29.63	46.00	16.37	Peak
703.900	23.56	6.60	1.68	31.84	46.00	14.16	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.

Site no. : A/C Chamber Data no. : 1
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : VERTICAL
 Limit : FCC PART-15C
 Env. / Ins. : E4446A 26°C/61% □jianlun_hung
 EUT : R3
 Power Rating : DC5V (VIA USB)
 Test Mode : TX2412

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
37.290	21.58	1.20	12.69	35.48	40.00	4.52	Peak
61.590	12.28	1.60	21.80	35.68	40.00	4.32	Peak
160.140	20.80	2.70	5.32	28.82	43.50	14.68	Peak
287.580	25.85	3.80	2.34	31.99	46.00	14.01	Peak
337.800	15.09	4.25	12.02	31.36	46.00	14.64	Peak
360.900	16.24	4.43	9.54	30.21	46.00	15.79	Peak
400.800	17.66	4.80	10.47	32.93	46.00	13.07	Peak
488.300	18.63	6.20	5.43	30.26	46.00	15.74	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.

Frequency: 5814MHz

Site no. : A/C Chamber Data no. : 2
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : HORIZONTAL
 Limit : FCC PART-15C
 Env. / Ins. : E4446A 26°C/61% □jianlun_hung
 EUT : R3
 Power Rating : DC5V (VIA USB)
 Test Mode : TX5814

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
37.290	21.58	1.20	11.98	34.77	40.00	5.23	Peak
61.860	12.28	1.60	21.97	35.86	40.00	4.14	Peak
86.430	14.98	1.90	15.43	32.31	40.00	7.69	Peak
264.090	24.60	3.67	13.63	41.90	46.00	4.10	Peak
309.800	14.93	4.00	10.20	29.12	46.00	16.88	Peak
353.900	15.64	4.30	9.68	29.62	46.00	16.38	Peak
791.400	23.94	6.90	1.63	32.47	46.00	13.53	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.

Site no. : A/C Chamber Data no. : 1
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : VERTICAL
 Limit : FCC PART-15C
 Env. / Ins. : E4446A 26°C/61% □jianlun_hung
 EUT : R3
 Power Rating : DC5V (VIA USB)
 Test Mode : TX5814

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
37.290	21.58	1.20	12.88	35.67	40.00	4.33	Peak
62.130	12.28	1.60	22.21	36.10	40.00	3.90	Peak
160.680	20.82	2.70	3.84	27.37	43.50	16.13	Peak
288.390	25.85	3.80	4.98	34.63	46.00	11.37	Peak
337.800	15.09	4.25	11.38	30.72	46.00	15.28	Peak
399.400	17.69	4.80	7.33	29.82	46.00	16.18	Peak

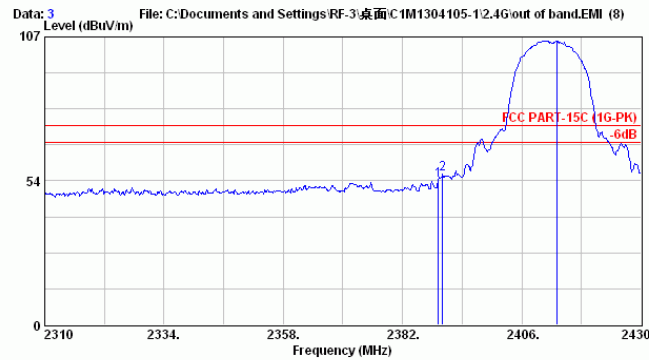
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.

3.6.2. Restricted Bands Measurement Results

Date of Test : Apr. 24, 2013 Temperature : 26°C

EUT : Wireless Adapter Card Humidity : 61%

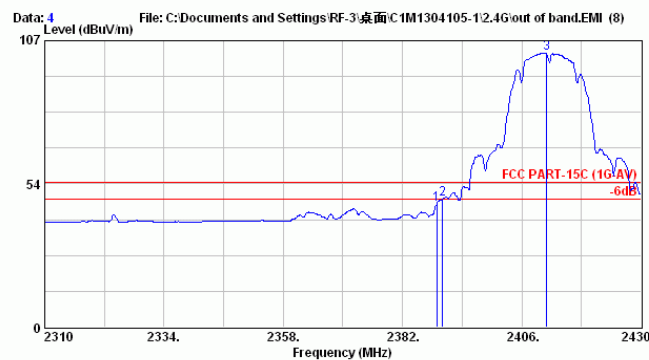
Test Mode : Transmit, Channel: 01, Frequency: 2412MHz



Site no. : A/C Chamber Data no. : 3
Dis. / Ant. : 3m 3115(4927) Ant. pol. : HORIZONTAL
Limit : FCC PART-15C (1G-PK)
Env. / Ins. : E4446A 26°C/61% Qjianlun_hung
EUT : R3
Power Rating : DC5V (VIA USB)
Test Mode : TX2412

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2389.200	28.47	6.34	18.98	53.80	74.00	20.21	Peak
2	2390.040	28.47	6.34	21.08	55.90	74.00	18.10	Peak
3	2413.080	28.51	6.36	70.68	105.55	74.00	-31.55	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

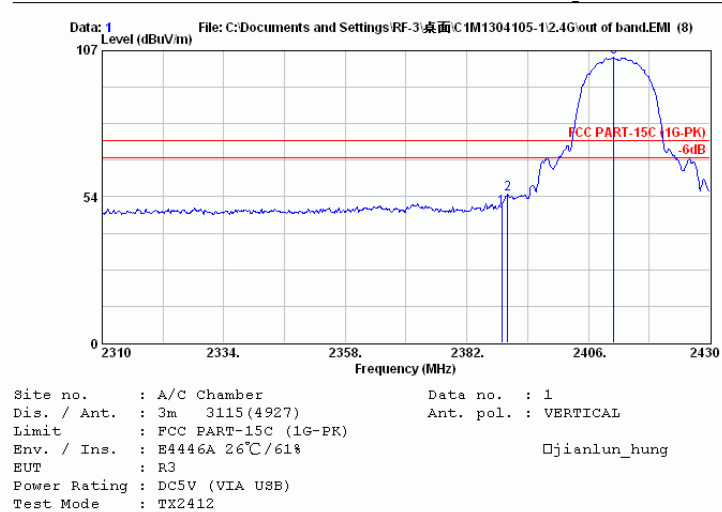


Site no. : A/C Chamber Data no. : 4
Dis. / Ant. : 3m 3115(4927) Ant. pol. : HORIZONTAL
Limit : FCC PART-15C (1G-AV)
Env. / Ins. : E4446A 26°C/61% Qjianlun_hung
EUT : R3
Power Rating : DC5V (VIA USB)
Test Mode : TX2412

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2388.840	28.47	6.34	11.12	45.93	54.00	8.07	Average
2	2390.040	28.47	6.34	13.09	47.91	54.00	6.09	Average
3	2411.040	28.51	6.36	67.50	102.37	54.00	-48.37	Average

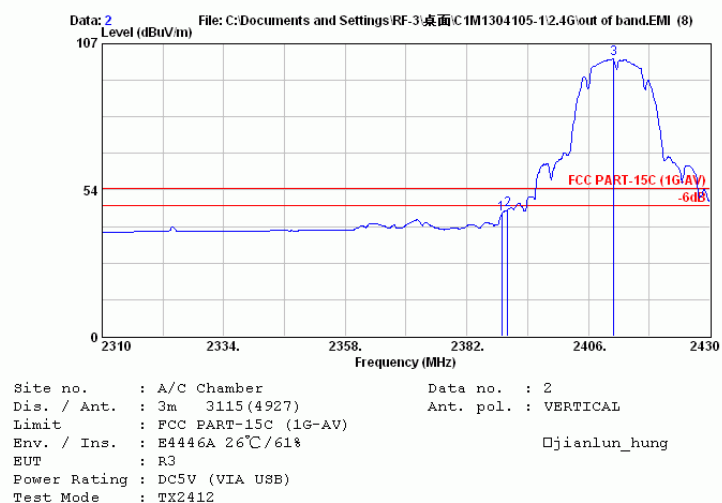
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Date of Test : Apr. 24, 2013 Temperature : 26°C
EUT : Wireless Adapter Card Humidity : 61%
Test Mode : Channel: 01, Frequency: 2412MHz



	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2388.840	28.47	6.34	14.52	49.33	74.00	24.67	Peak
2	2390.040	28.47	6.34	19.52	54.34	74.00	19.66	Peak
3	2411.040	28.51	6.36	69.91	104.78	74.00	-30.78	Peak

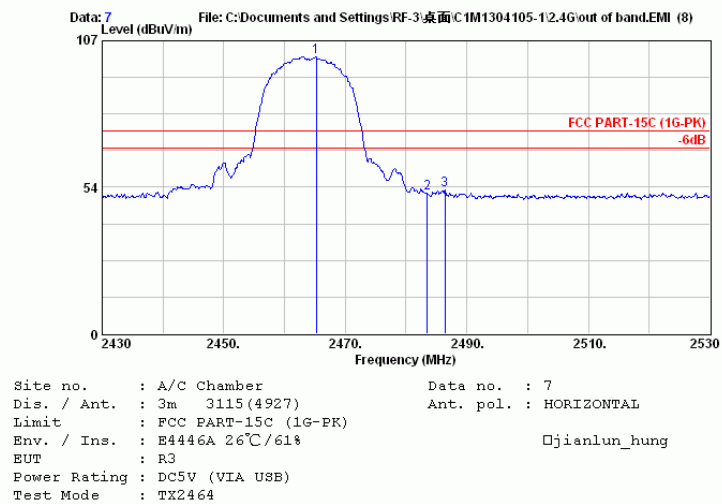
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2388.840	28.47	6.34	9.68	44.49	54.00	9.51	Average
2	2390.040	28.47	6.34	11.57	46.39	54.00	7.61	Average
3	2411.040	28.51	6.36	66.46	101.33	54.00	-47.33	Average

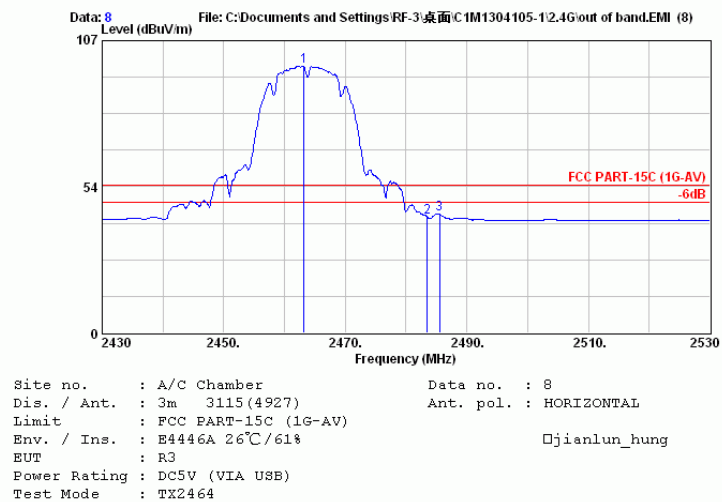
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Date of Test : Apr. 24, 2013 Temperature : 26°C
EUT : Wireless Adapter Card Humidity : 61%
Test Mode : Channel: 03, Frequency: 2464MHz



	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2465.200	28.62	6.42	66.05	101.10	74.00	-27.10	Peak
2	2483.500	28.66	6.45	16.05	51.17	74.00	22.83	Peak
3	2486.400	28.66	6.45	17.40	52.52	74.00	21.48	Peak

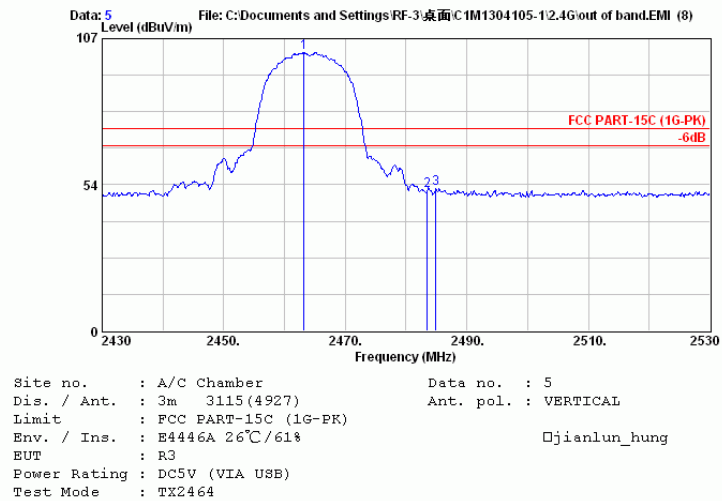
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2463.200	28.62	6.42	62.66	97.71	54.00	-43.71	Average
2	2483.500	28.66	6.45	7.38	42.49	54.00	11.51	Average
3	2485.500	28.66	6.45	8.24	43.35	54.00	10.65	Average

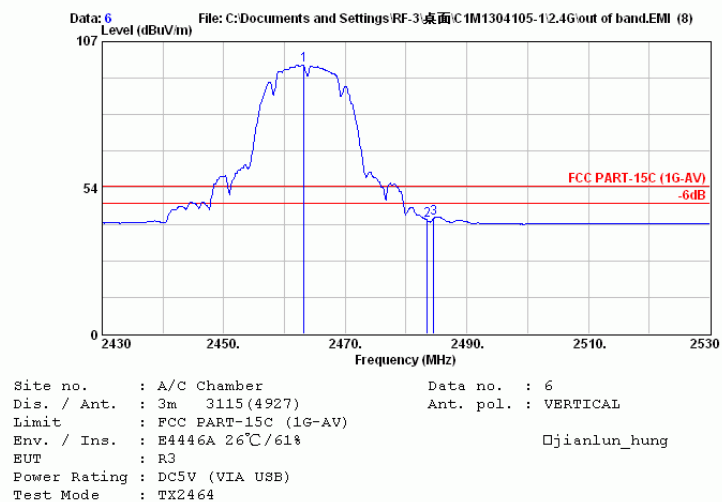
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Date of Test : Apr. 24, 2013 Temperature : 26°C
EUT : Wireless Adapter Card Humidity : 61%
Test Mode : Channel: 03, Frequency: 2464MHz



	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2463.200	28.62	6.42	66.92	101.97	74.00	-27.97	Peak
2	2483.500	28.66	6.45	16.16	51.28	74.00	22.72	Peak
3	2484.900	28.66	6.45	16.83	51.94	74.00	22.06	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2463.200	28.62	6.42	63.31	98.36	54.00	-44.36	Average
2	2483.500	28.66	6.45	6.43	41.55	54.00	12.45	Average
3	2484.500	28.66	6.45	7.05	42.16	54.00	11.84	Average

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

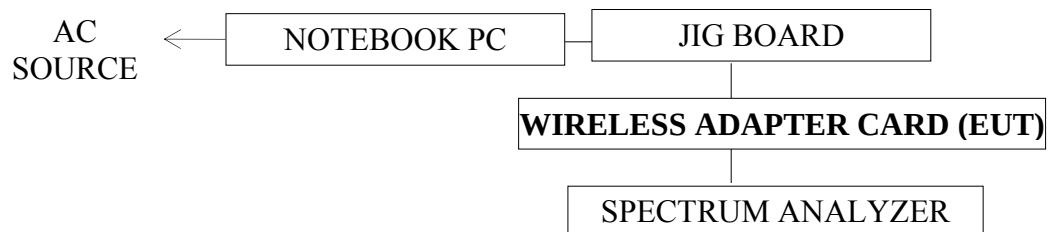
4. 6dB BANDWIDTH MEASUREMENT

4.1. Test Equipment

The following test equipment was used during the Emission Bandwidth measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9030A-544	US51350140	Oct. 17, 12'	Oct. 16, 13'

4.2. Block Diagram of Test Setup



4.3. Specification Limits [§15.247(a)(2), RSS-210 §A8.2 (a)]

The minimum 6dB bandwidth shall be at least 500kHz.

4.4. Operating Condition of EUT

Test program GUI_Demo_01.05.17_7828 is used for enabling the EUT transmitting continuing.

4.5. Test Procedure

The transmitter output was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measure by spectrum analyzer using 100kHz RBW and ≥ 300 kHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

The measurement guideline was according to KDB 558074 D01v03 8.1 option 13.

4.6. Test Results

PASSED. All the test results are attached in next pages.

(Test Date : Apr. 22, 2013 Temperature : 25°C Humidity : 60%)

Mode	Type of Network	Channel	Frequency	6dB Bandwidth
1.	2.4G	CH 1	2412MHz	10.25MHz
2.		CH 2	2438MHz	10.25MHz
3.		CH 3	2464MHz	10.25MHz
4.	5.8G	CH 1	5736MHz	10.15MHz
5.		CH 2	5762MHz	10.15MHz
6.		CH 3	5814MHz	10.15MHz

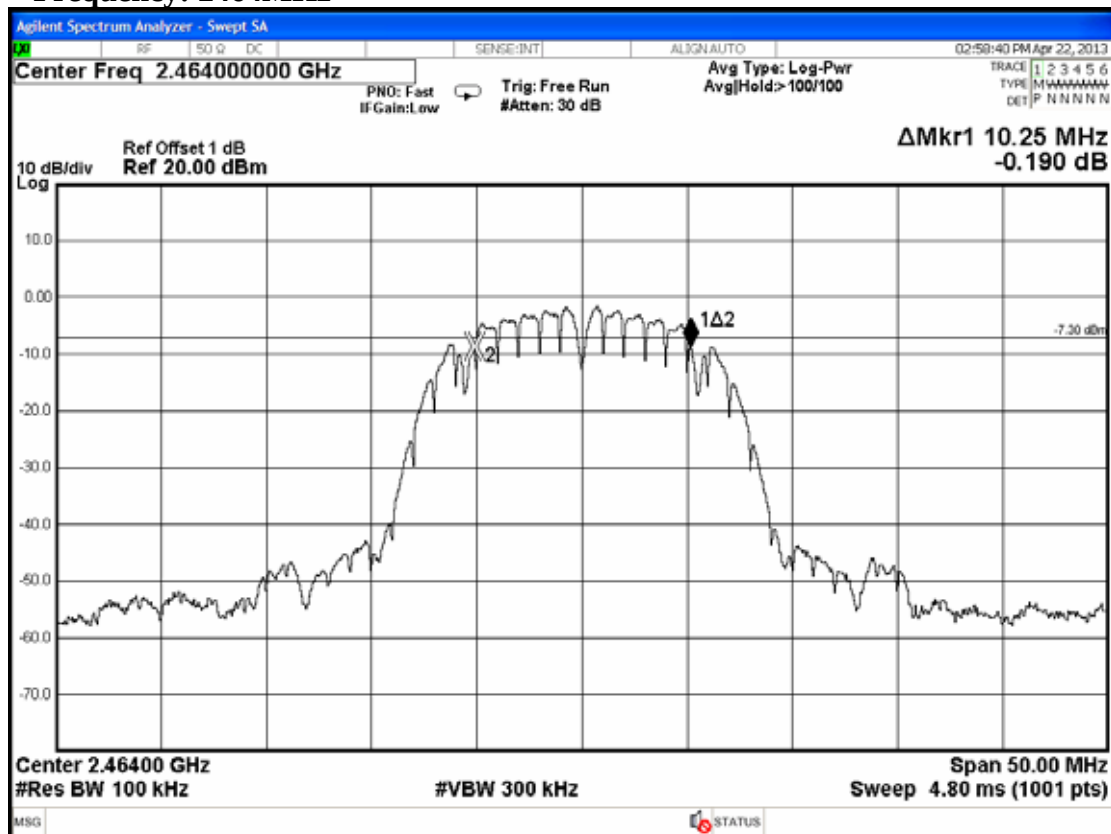
[Limit: least 500kHz]

Frequency: 2412MHz



Frequency: 2438MHz



Frequency: 2464MHz**Frequency: 5736MHz**

Frequency: 5762MHz**Frequency: 5814MHz**

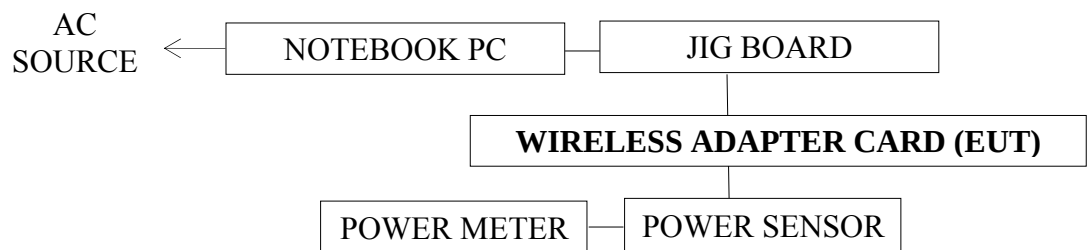
5. MAXIMUM PEAK OUTPUT POWER MEASUREMENT

5.1. Test Equipment

The following test equipment was used during the maximum peak output power measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Power Meter	Anritsu	ML2495A	1145008	Oct. 30, 12'	Oct. 29, 13'
2.	Power Sensor	Anritsu	MA2411B	1126096	Oct. 30, 12'	Oct. 29, 13'

5.2. Block Diagram of Test Setup



5.3. Specification Limits (§15.247(b)-(3))

The Limits of maximum Peak Output Power for digital modulation in 2400-2483.5MHz & 5725-5850MHz is : 1Watt. (30dBm)

5.4. Operating Condition of EUT

Test program GUI_Demo_01.05.17_7828 is used for enabling the EUT transmitting continuing.

5.5. Test Procedure

The transmitter output was connected to the power sensor and record the reading of power meter.

The measurement guideline was according to KDB 558074 D01v03 9.2.2.1 AVGPM is used.

5.6. Test Results

PASSED. All the test results are listed below.

(Test Date : Apr. 22, 2013 Temperature : 25°C Humidity : 60%)

Mode	Type of Network	Channel	Frequency	Peak Output Power (dBm)	Power Setting	
					Addar	Value
1.	2.4G	CH 1	2412MHz	17.54	171	15
2.		CH 2	2438MHz	17.50	171	15
3.		CH 3	2464MHz	17.46	171	15
4.	5.8G	CH 1	5736MHz	14.83	171	20
5.		CH 2	5762MHz	14.79	171	20
6.		CH 3	5814MHz	15.13	171	20

[Limit: 1Watt. (30dBm)]

6. EMISSION LIMITATIONS MEASUREMENT

Pursuant to KDB558074 D03 that emission levels below limits specified in 15.209 would not be required.

7. BAND EDGES MEASUREMENT

7.1. Test Equipment

The following test equipment was used during the band edges measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9030A-544	US51350140	Oct. 17, 12'	Oct. 16, 13'

7.2. Block Diagram of Test Setup

The same as section.4.2.

7.3. Specification Limits [§15.247(c), RSS-210 §A8.5]

7.3.1. The highest level should be at least 20 dB below that in the 100kHz bandwidth.

7.3.2. The reference level for determining limit of emission limitations is according to the value measured indicated in plots at section 8.6.

7.4. Operating Condition of EUT

Test program GUI_Demo_01.05.17_7828 is used for enabling the EUT transmitting continuing.

7.5. Test Procedure

The transmitter output was connected to the spectrum analyzer. Set both RBW=100 kHz and VBW to 300kHz with suitable frequency span including 100kHz bandwidth from band edge.

The measurement guideline was according to KDB 558074 D01 V03.

7.6. Test Results

PASSED. All the test results are attached in next pages.

(Test Date : Apr. 22, 2013 Temperature : 25°C Humidity : 60%)

2.4G

Below Band edge: The highest emission level is -47.735dBm on 2.39990GHz.

Upper Band edge : The highest emission level is -56.803dBm on 2.48360GHz.

5.8G

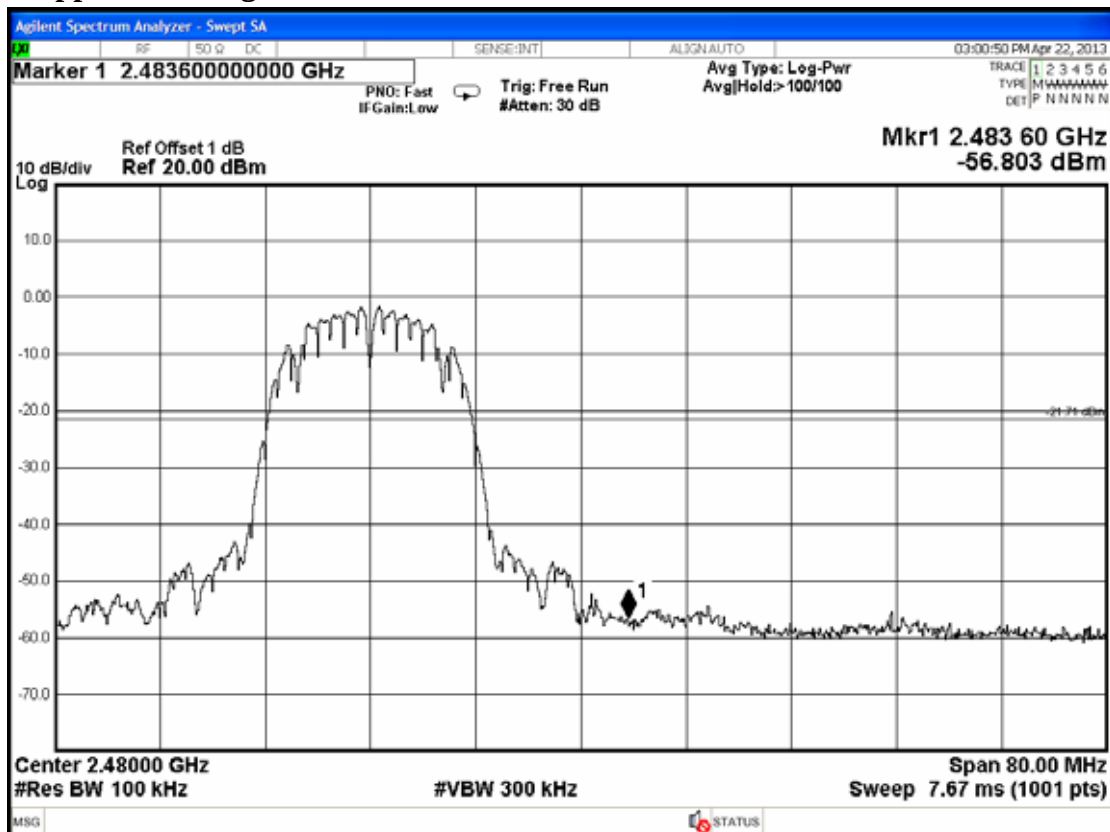
Below Band edge: The highest emission level is -43.941dBm on 5.72490GHz.

Upper Band edge : The highest emission level is -58.226dBm on 5.85010GHz.

2.4G Below Band edge



Upper Band edge



5.8G Below Band edge



Upper Band edge



8. POWER SPECTRAL DENSITY MEASUREMENT

8.1. Test Equipment

The following test equipment was used during the power spectral density measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9030A-544	US51350140	Oct. 17, 12'	Oct. 16, 13'

8.2. Block Diagram of Test Setup

The same as section.4.2.

8.3. Specification Limits [§15.247(d), RSS-210 §A8.2 (b)]

The peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band.

8.4. Operating Condition of EUT

Test program GUI_Demo_01.05.17_7828 is used for enabling the EUT transmitting continuing.

8.5. Test Procedure

The transmitter output was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measured with the spectrum analyzer using 100kHz RBW and ≥ 300 kHz VBW, set sweep time = Auto.

The measurement guideline was according to KDB 558074 D01v03 Peak PSD is used.

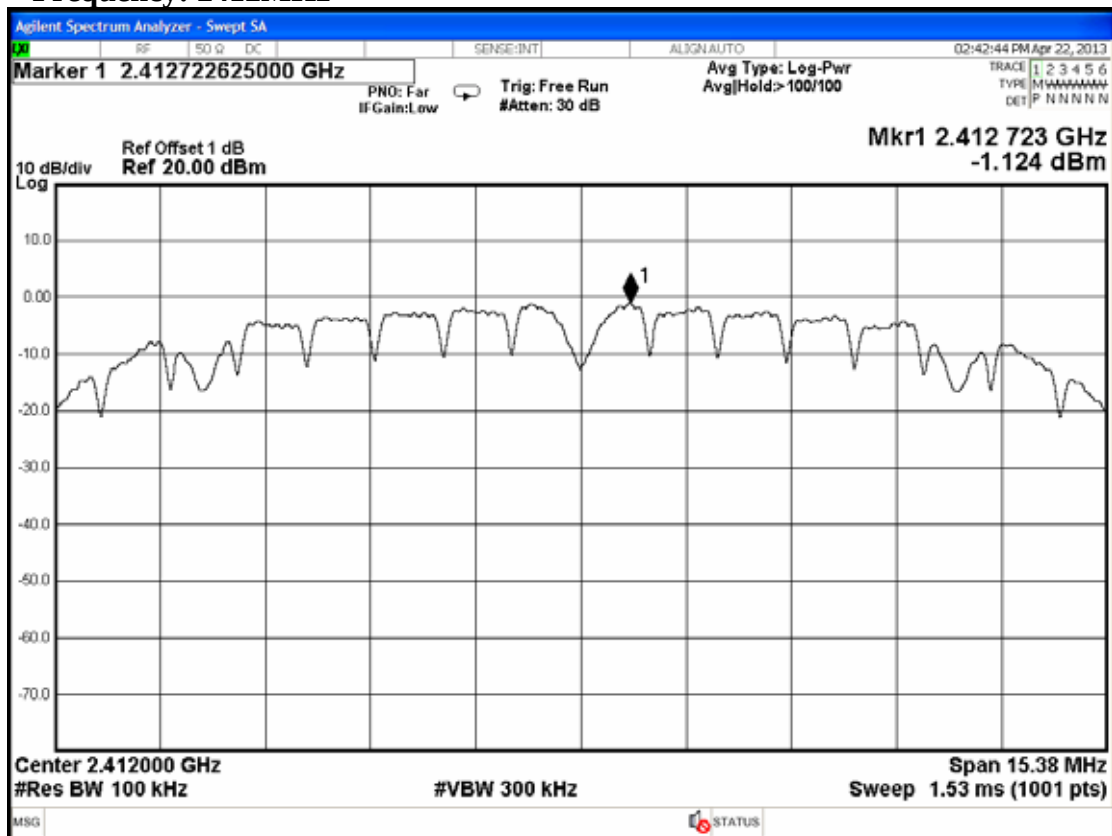
8.6. Test Results

PASSED. All the test results are attached in next pages.

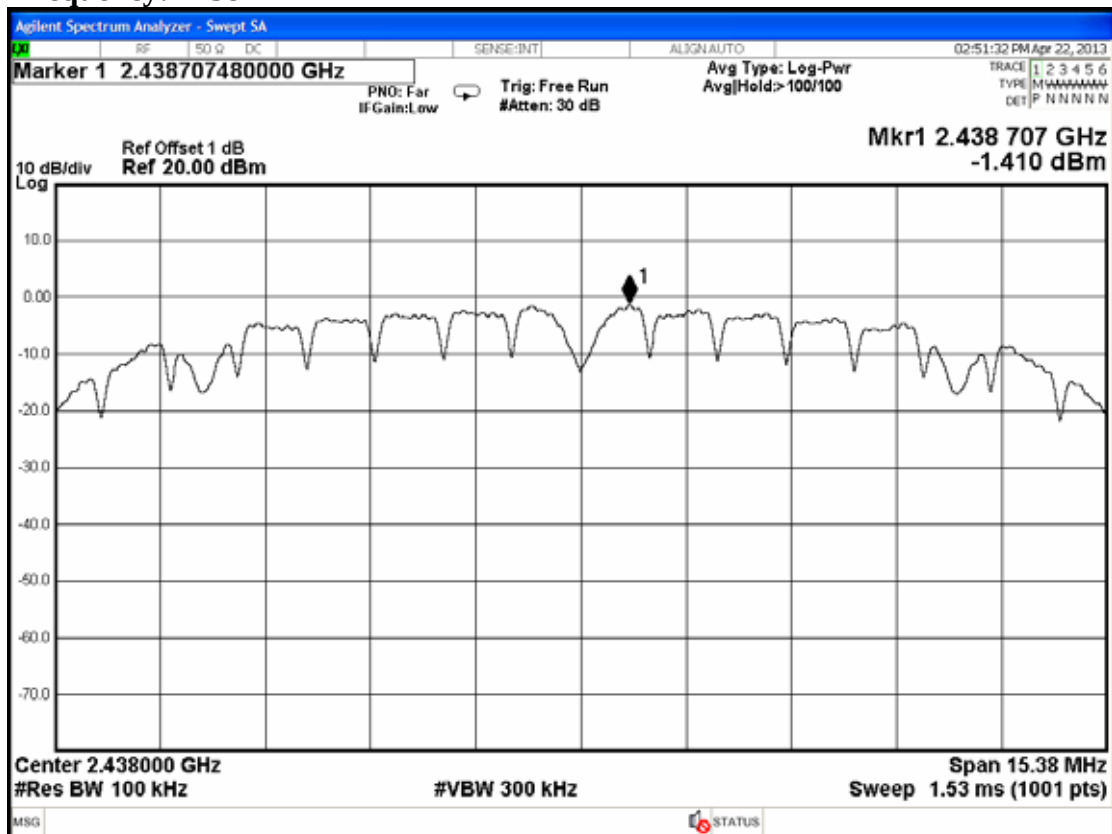
(Test Date : Apr. 22, 2013 Temperature : 25°C Humidity : 60%)

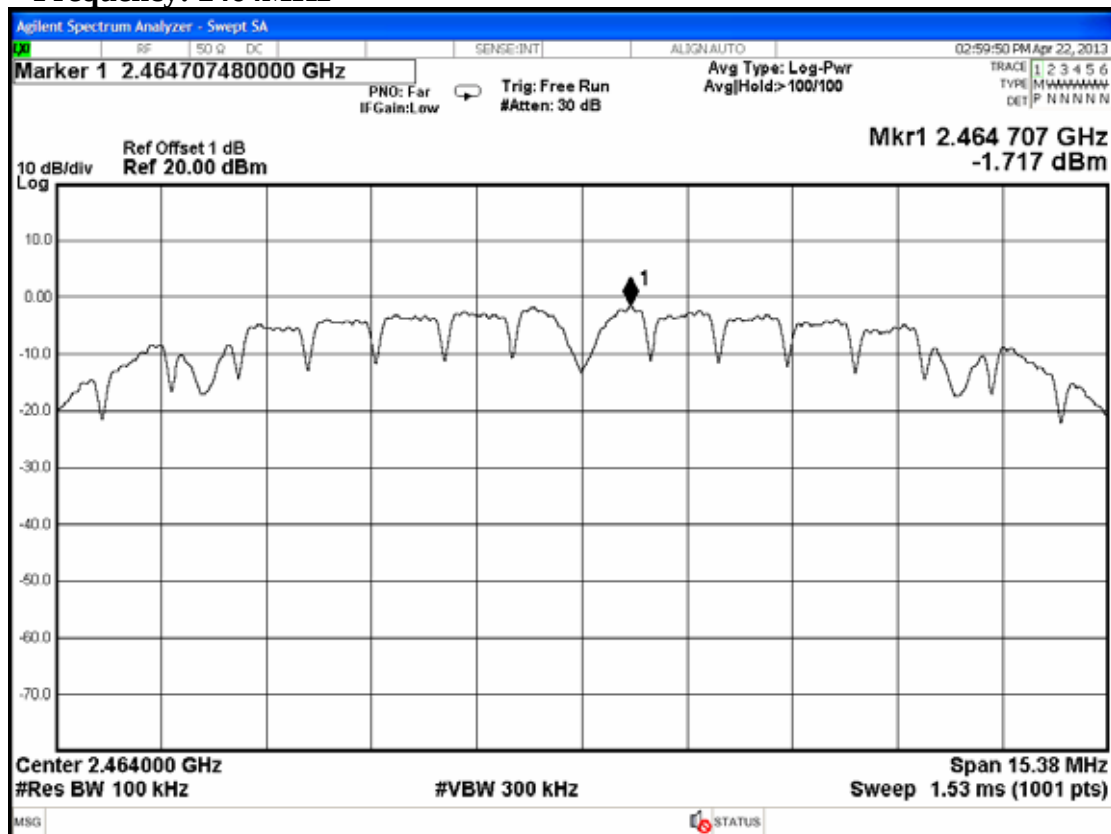
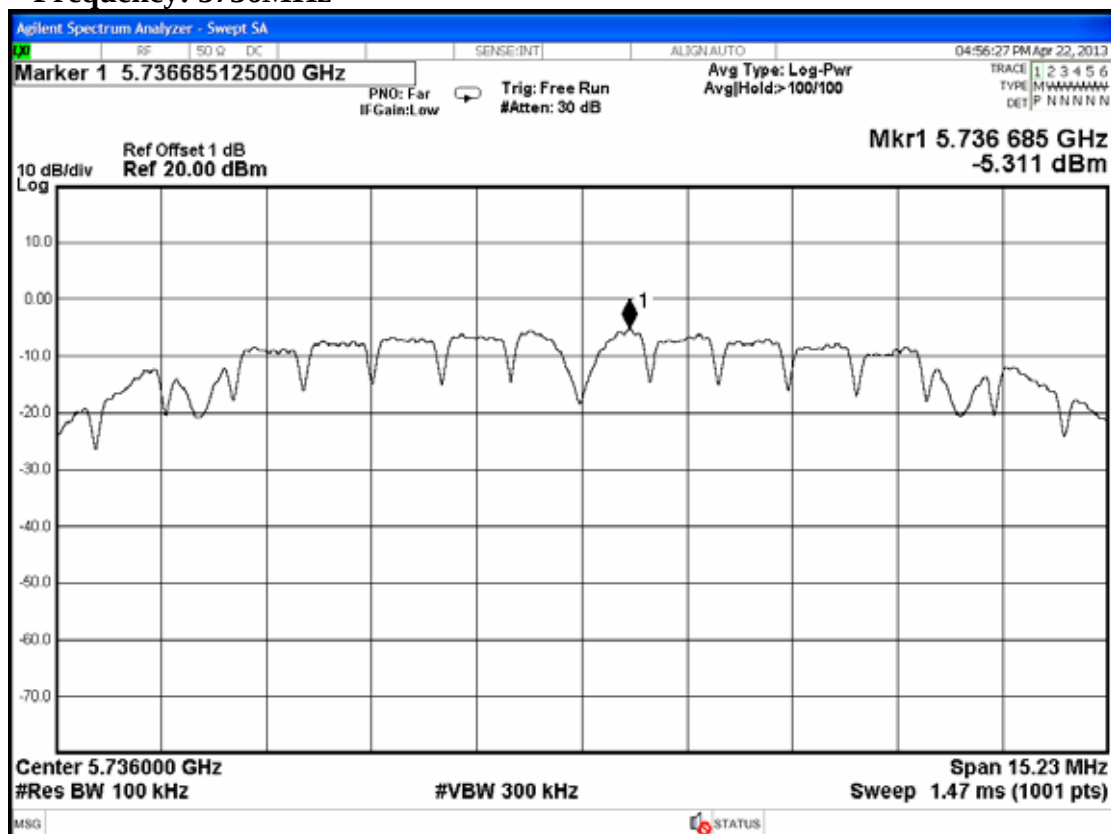
Mode	Type of Network	Channel	Frequency	Power Spectral Density (dBm)	Limit (dBm)
1.	2.4G	CH 1	2412MHz	-1.124	8
2.		CH 2	2438MHz	-1.410	8
3.		CH 3	2464MHz	-1.717	8
4.	5.8G	CH 1	5736MHz	-5.311	8
5.		CH 2	5762MHz	-5.952	8
6.		CH 3	5814MHz	-4.332	8

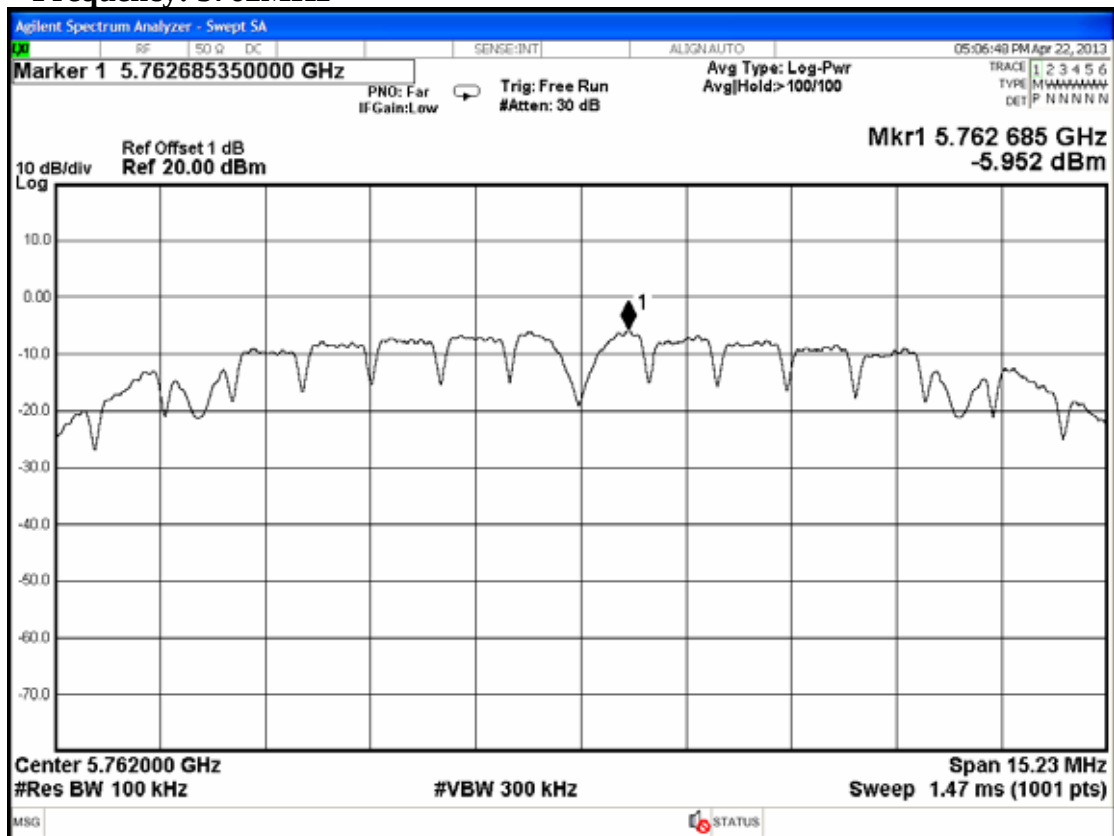
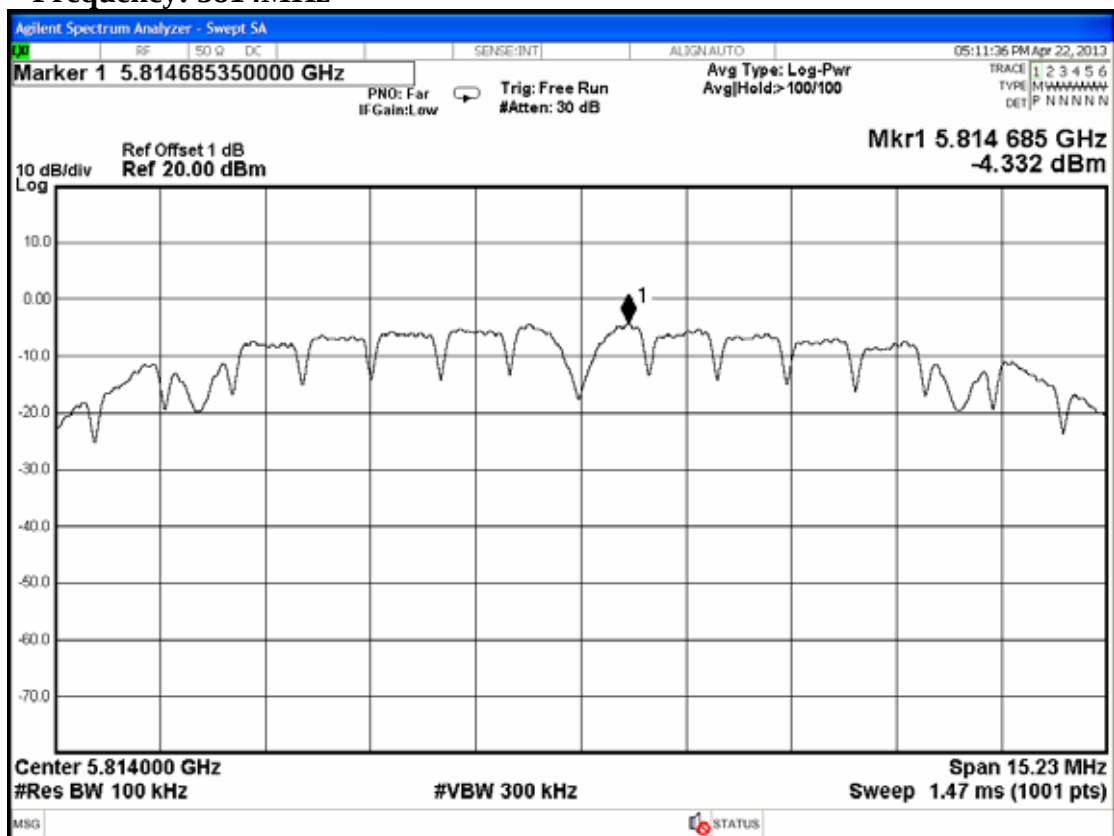
Frequency: 2412MHz



requeency: 2438MHz



Frequency: 2464MHz**Frequency: 5736MHz**

Frequency: 5762MHz**Frequency: 5814MHz**

9. DEVIATION TO TEST SPECIFICATIONS

【NONE】

10. PHOTOGRAPHS

10.1. Photos of Conducted Disturbance Measurement



FRONT VIEW OF CONDUCTED MEASUREMENT



BACK VIEW OF CONDUCTED MEASUREMENT

10.2.Photos of Radiated Measurement at Semi-Anechoic Chamber

10.2.1.Frequency Below 1GHz



FRONT VIEW OF RADIATED MEASUREMENT



BACK VIEW OF RADIATED MEASUREMENT

10.2.2. Frequency Above 1GHz



FRONT VIEW OF RADIATED MEASUREMENT



BACK VIEW OF RADIATED MEASUREMENT

10.3.Photo of Section RF Conducted Measurement

