

Class II Change
for
FCC Part 15 Subpart B & C

of

Product Name

802.11g WLAN USB Adapter with Flash Disk

Model

DMUZ

(Brand: Wistron Neweb)

Applied by:

Wistron Neweb Corporation
No. 10-1, Li-hsin Road 1,
Science-based Industrial Park, Hsinchu 300,
Taiwan, R. O. C.

Test Performed by:

International Standards Laboratory

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ISL-T10-R29-1

Contents of Report

1. General..... 1

1.1 Certification of Accuracy of Test Data..... 1

2. Test Results Summary 2

3. Description of Equipment Under Test (EUT)..... 3

4. TEST RESULTS (802.11b)..... 4

4.1 Powerline Conducted Emissions [Section 15.207] 4

4.1.1 EUT Configuration..... 4

4.1.2 Test Procedure 4

4.1.3 EMI Receiver/Spectrum Analyzer Configuration (for the frequencies tested) .4

4.1.4 Test Data: 5

4.2 Bandwidth for DSSS [Section 15.247 (a)(2)]..... 7

4.2.1 Test Procedure 7

4.2.2 Test Setup 7

4.2.3 Test Data: 7

4.3 DSSS Maximum Peak Output Power [Section 15.247 (b)(1)]..... 10

4.3.1 Test Procedure 10

4.3.2 Test Setup 10

4.3.3 Test Data 10

4.4 Radiated Emission Measurement [Section [15.247(c)(4)] 11

4.4.1 EUT Configuration..... 11

4.4.2 Test Procedure 11

4.4.3 EMI Receiver/Spectrum Analyzer Configuration (for the frequencies tested)11

4.4.4 Test Data (30MHz – 1GHz): 12

4.4.5 Test Data (1GHz – 25 GHz) 13

4.5 Band Edge Measurement..... 16

4.5.1 Test Procedure (Conducted) 16

4.5.2 Test Setup (Conducted) 16

4.5.3 Test Data: 16

4.5.4 Test Procedure (Radiated) 18

4.5.5 Test Setup (Radiated) 18

4.5.6 Test Data 19

4.6 RF Exposure Measurement [Section 15.247(b)(4) & 1.1307(b)]..... 22

4.7 DSSS Peak Power Spectral Density [Section 15.247(d)]..... 23

4.7.1 Test Procedure 23

4.7.2 Test Setup 23

4.7.3 Test Data 23

5. TEST RESULTS (802.11g)..... 26

5.1 Powerline Conducted Emissions [Section 15.207] 26

5.1.1 EUT Configuration..... 26

5.1.2 Test Procedure 26

5.1.3 EMI Receiver/Spectrum Analyzer Configuration (for the frequencies tested)26

5.1.4 Test Data:..... 27

5.2 Bandwidth for DSSS [Section 15.247 (a)(2)]..... 29

5.2.1 Test Procedure 29

5.2.2 Test Setup 29

5.2.3 Test Data:..... 29

5.3 DSSS Maximum Peak Output Power [Section 15.247 (b)(1)]..... 32

5.3.1 Test Procedure 32

5.3.2 Test Setup 32

5.3.3 Test Data 32

5.4 Radiated Emission Measurement [Section [15.247(c)(4)] 33

5.4.1 EUT Configuration..... 33

5.4.2 Test Procedure 33

5.4.3 EMI Receiver/Spectrum Analyzer Configuration (for the frequencies tested)33

5.4.4 Test Data (30MHz – 1GHz): 34

5.4.5 Test Data (1GHz – 25 GHz) 35

5.5 Band Edge Measurement..... 38

5.5.1 Test Procedure (Conducted) 38

5.5.2 Test Setup (Conducted) 38

5.5.3 Test Data:..... 38

5.5.4 Test Procedure (Radiated) 40

5.5.5 Test Setup (Radiated) 40

5.5.6 Test Data 41

5.6 RF Exposure Measurement [Section 15.247(b)(4) & 1.1307(b)]..... 44

5.7 DSSS Peak Power Spectral Density [Section 15.247(d)]..... 45

5.7.1 Test Procedure 45

5.7.2 Test Setup 45

5.7.3 Test Data 45

6. Appendix 48

6.1 Appendix A: Measurement Procedure for Power line Conducted Emissions..... 48

6.2 Appendix B: Test Procedure for Radiated Emissions 49

6.3 Appendix C: Test Equipment 50

6.3.1 Test Equipment List..... 50

6.3.2 Software for Controlling Spectrum/Receiver and Calculating Test Data..... 50

6.4 Appendix D: Layout of EUT and Support Equipment 51

6.4.1 General Conducted Test Configuration..... 51

6.4.2 General Radiation Test Configuration 52

6.5 Appendix E: Description of Support Equipment..... 53

6.5.1 Description of Support Equipment..... 53

6.5.2 Software for Controlling Support Unit..... 54

6.5.3 I/O Cable Condition of EUT and Support Units 55

6.6 Appendix F: Accuracy of Measurement..... 56

6.7 Appendix G: Photographs of EUT Configuration Test Set Up 58

6.8 Appendix H: Antenna Spec. 61

1. General

1.1 Certification of Accuracy of Test Data

Standards: CFR 47 Part 15 Subpart B Class B
CFR 47 Part 15 Subpart C (Section 15.247)

Test Procedure: ANSI C63.4:2003

Equipment Tested: 802.11g WLAN USB Adapter with Flash Disk

Model: DMUZ

Applied by: Wistron Neweb Corporation

Sample received Date: 2005/06/10

Final test Date : 2005/07/18-2005/07/21

Test Result PASS

Test Site: Chamber 02, Conduction 02

Temperature Refer to each site test data

Humidity: Refer to each site test data

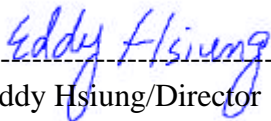


Test Engineer: Mailes Hsieh

All the tests in this report have been performed and recorded in accordance with the standards described above and performed by an independent electromagnetic compatibility consultant, International Standards Laboratory.

The test results contained in this report accurately represent the measurements of the characteristics and the energy generated by sample equipment under test at the time of the test. The sample equipment tested as described in this report is in compliance with the limits of above standards.

Approve & Signature



Eddy Hsiung/Director

Test results given in this report apply only to the specific sample(s) tested under stated test conditions. This report shall not be reproduced other than in full without the explicit written consent of ISL. This report totally contains 64 pages, including 1 cover page, 2 contents page, and 61 pages for the test description. This report must not be use to claim product endorsement by NVLAP or any agency of the U.S. Government.

This test data shown below is traceable to NIST or national or international standard. International Standards Laboratory certifies that no party to this application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 853(a).

2. Test Results Summary

The 802.11b functions of EUT has been tested according to the FCC regulations listed below:

Tested Standards: 47 CFR Part 15 Subpart C			
Standard Section	Test Type	Result	Remarks
15.207	AC Power Line Emissions	Pass	
15.247(a)(2)	Spectrum Bandwidth Of DSSS device	Pass	
15.247(b)	Max. Peak Output Power	Pass	
15.247(c)	Radiated Emissions 30MHz – 25 GHz	Pass	
15.247 (c)	Band Edge Measurement	Pass	
15.247(b)(4)	Radiation Exposure	Pass	SAR report attached
15.247 (d)	Power Spectral Density	Pass	

The 802.11g functions of EUT has been tested according to the FCC regulations listed below:

Tested Standards: 47 CFR Part 15 Subpart C			
Standard Section	Test Type	Result	Remarks
15.207	AC Power Line Emissions	Pass	
15.247(a)(2)	Spectrum Bandwidth Of DSSS device	Pass	
15.247(b)	Max. Peak Output Power	Pass	
15.247(c)	Radiated Emissions 30MHz – 25 GHz	Pass	
15.247 (c)	Band Edge Measurement	Pass	
15.247(b)(4)	Radiation Exposure	Pass	SAR report attached
15.247 (d)	Power Spectral Density	Pass	

3. Description of Equipment Under Test (EUT)

Description: 802.11g WLAN USB Adapter with Flash Disk
 FCC ID: NKRDMUZ
 Brand: Wistron NeWeb
 Condition: Pre-Production
 Model: DMUZ
 Frequency Range 802.11b/g: 2400 - 2483.5 MHz
 Support channel: 802.11b/g 11 Channels
 Modulation Skill: 802.11b DBPSK(1Mbps), DQPSK(2Mbps), CCK(5.5/11Mbps)
 802.11g OFDM (6M - 54Mbps)
 Antennas Type: Chip Ceramic Antenna made by Advanced Ceramic X Corp.
 Antenna peak Gain:
 Right Antenna: -0.25 dBi (Model: AT5020-2R8HAATLF)
 Left Antenna: -1.05 dBi (Model: AT5020-2R8HAATLF)
 Antenna Connected: The chip antenna is soldered on the PCB of the EUT. The user is not possible to change the antenna .
 Power Type: 5V DC from Notebook PC

The EUT is a USB 802.11g WLAN adapter, and has been granted on 06/28/2005 .

There are some differences from the original application:

1. Take out R6、 R7. (WLAN)
2. Add a capacitance(C3R) between C41 and C43 . (WLAN)
3. Add a choke(L3B) between U3 and U4. (Flash Memory)

We have tested again for radiation emission and bandedge, the others measurements were made in last application, only listed for your reference.

The channel and the operation frequency of 802.11b and 802.11g is listed below:

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		

4. TEST RESULTS (802.11b)

4.1 Powerline Conducted Emissions [Section 15.207]

4.1.1 EUT Configuration

The conducted emission test setups are in accordance with Figs 9, 10(a) and 10(b) of ANSI C63.4-2001, CFR 47 Part 15 Subpart B; or EN55022:1994/ A1:1995/A2:1997; CISPR 22:1993/A1:1995/A2:1996.

The EUT was set up on the non-conductive table that is 1.0 by 1.5 meter, 80cm above ground. The wall of the shielded room was located 40cm to the rear of the EUT.

Power to the EUT was provided through the LISN. The impedance vs. frequency characteristic of the LISN is complied with the limit shown on the figure 1 of ANSI C63.4-2001.

Both lines (neutral and hot) were connected to the LISN in series at testing. A coaxial-type connector which provides one 50 ohms terminating impedance was provided for connecting the test instrument. The excess length of the power cord was folded back and forth at the center of the lead so as to form a bundle not exceeding 40cm in length.

Any changes made to the configuration, or modifications made to the EUT, during testing are noted in the following test record.

If the EUT is a Personal Computer or a peripheral of personal computer, and the personal computer has an auxiliary AC outlet which can be used for providing power to an external monitor, then all measurements will be made with the monitor power from first the computer-mounted AC outlet and then a floor-mounted AC outlet.

4.1.2 Test Procedure

The system was set up as described above, with the EMI diagnostic software running. The main power line conducted EMI tests were run on the hot and neutral conductors of the power cord and the results were recorded. The effect of varying the position of the interface cables has been investigated to find the configuration that produces maximum emission.

At the frequencies where the peak values of the emissions were higher than 6dB below the applicable limits, the emissions were also measured with the quasi-peak detectors. At the frequencies where the quasi-peak values of the emissions were higher than 6dB below the applicable average limits, the emissions were also measured with the average detectors.

The highest emissions were analyzed in details by operating the spectrum analyzer in fixed tuned mode to determine the nature of the emissions and to provide information which could be useful in reducing their amplitude.

4.1.3 EMI Receiver/Spectrum Analyzer Configuration (for the frequencies tested)

Frequency Range	150 KHz--30MHz
Detector Function	Quasi-Peak/Average
Bandwidth (RBW)	9KHz

4.1.4 Test Data:

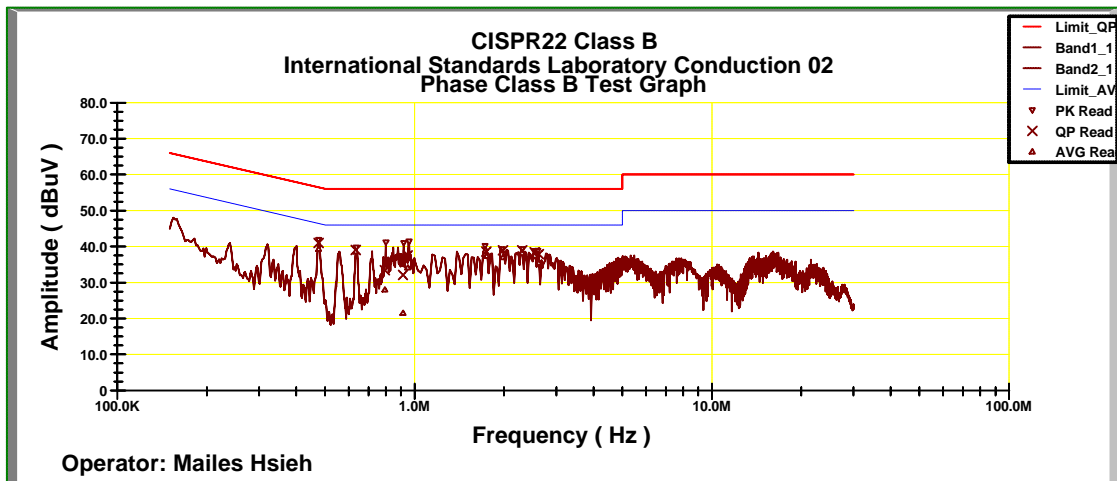
Power Line Conducted Emissions (Hot) Channel 1, 6, 11

Operator:MailesHsieh

Temperature(C):29

Humidity(%):54

Frequency MHz	LISNLoss (dB)	CableLoss (dB)	QPCorrt. Amp.(dBuV)	QPLimit (dBuV)	QPMargin (dB)	AVECorrt. Amp.(dBuV)	AVELimit (dBuV)	AVEMargin (dB)
0.47520	0.11	0.07	40.95	56.71	-15.76	39.22	46.71	-7.49
0.63386	0.14	0.07	39.03	56.00	-16.97	38.56	46.00	-7.44
0.79403	0.17	0.07	33.37	56.00	-22.63	27.95	46.00	-18.05
0.91341	0.19	0.07	32.04	56.00	-23.96	21.49	46.00	-24.51
0.94836	0.19	0.07	37.52	56.00	-18.48	34.13	46.00	-11.87
1.74331	0.23	0.08	38.54	56.00	-17.46	37.27	46.00	-8.73
1.98070	0.20	0.09	38.91	56.00	-17.09	36.97	46.00	-9.03
2.29841	0.20	0.10	38.90	56.00	-17.10	38.15	46.00	-7.85
2.53616	0.20	0.10	38.36	56.00	-17.64	37.43	46.00	-8.57
2.61646	0.20	0.11	37.88	56.00	-18.12	35.44	46.00	-10.56



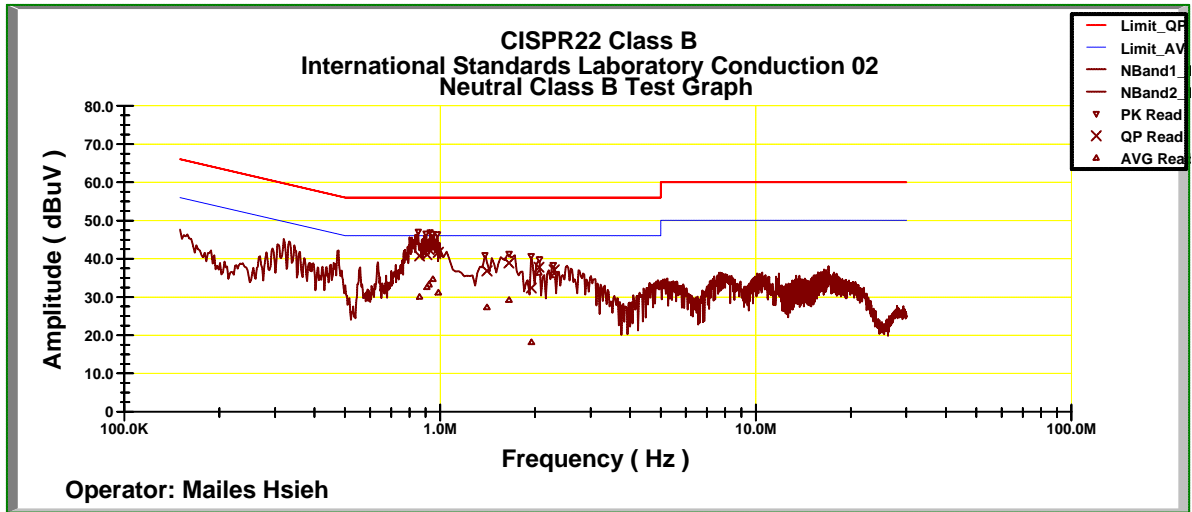
Power Line Conducted Emissions (Neutral) Channel 1, 6, 11

Operator:MailesHsieh

Temperature(C):29

Humidity(%):54

Frequency	LISNLoss	CableLoss	QPCorrt.	QPLimit	QPMargin	AVECorrt.	AVELimit	AVEMargin
MHz	(dB)	(dB)	Amp.(dBuV)	(dBuV)	(dB)	Amp.(dBuV)	(dBuV)	(dB)
0.86133	0.18	0.07	40.73	56.00	-15.27	30.04	46.00	-15.96
0.90885	0.18	0.07	41.07	56.00	-14.93	32.56	46.00	-13.44
0.92293	0.19	0.07	42.43	56.00	-13.57	33.27	46.00	-12.73
0.94945	0.19	0.07	43.14	56.00	-12.86	34.62	46.00	-11.38
0.98740	0.20	0.07	41.67	56.00	-14.33	31.15	46.00	-14.85
1.40812	0.20	0.08	36.83	56.00	-19.17	27.27	46.00	-18.73
1.65213	0.20	0.08	38.87	56.00	-17.13	29.23	46.00	-16.77
1.94476	0.20	0.09	32.34	56.00	-23.66	18.13	46.00	-27.87
2.05643	0.20	0.09	37.76	56.00	-18.24	36.32	46.00	-9.68
2.29644	0.20	0.10	37.07	56.00	-18.93	35.62	46.00	-10.38



* NOTE: During the test, the EMI receiver was set to Max. Hold then switch the EUT Channel between 1, 6, 11 to get the maximum reading of all these channels.
 Margin = Amplitude + Insertion Loss - Limit
 A margin of -8dB means that the emission is 8dB below the limit

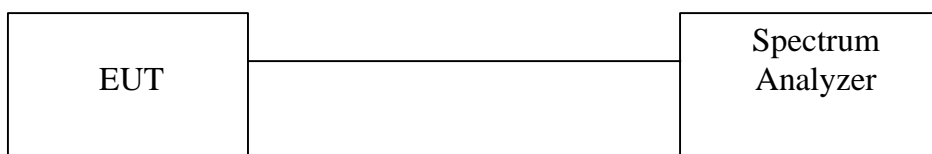
4.2 Bandwidth for DSSS [Section 15.247 (a)(2)]

4.2.1 Test Procedure

The Transmitter output of EUT was connected to the spectrum analyzer. The 6 dB bandwidth of the fundamental frequency was measured. The setting of spectrum analyzer is as follows

Equipment mode	Spectrum analyzer
Detector function	Peak mode
RBW	100KHz
VBW	100KHz

4.2.2 Test Setup



4.2.3 Test Data:

6dB Bandwidth

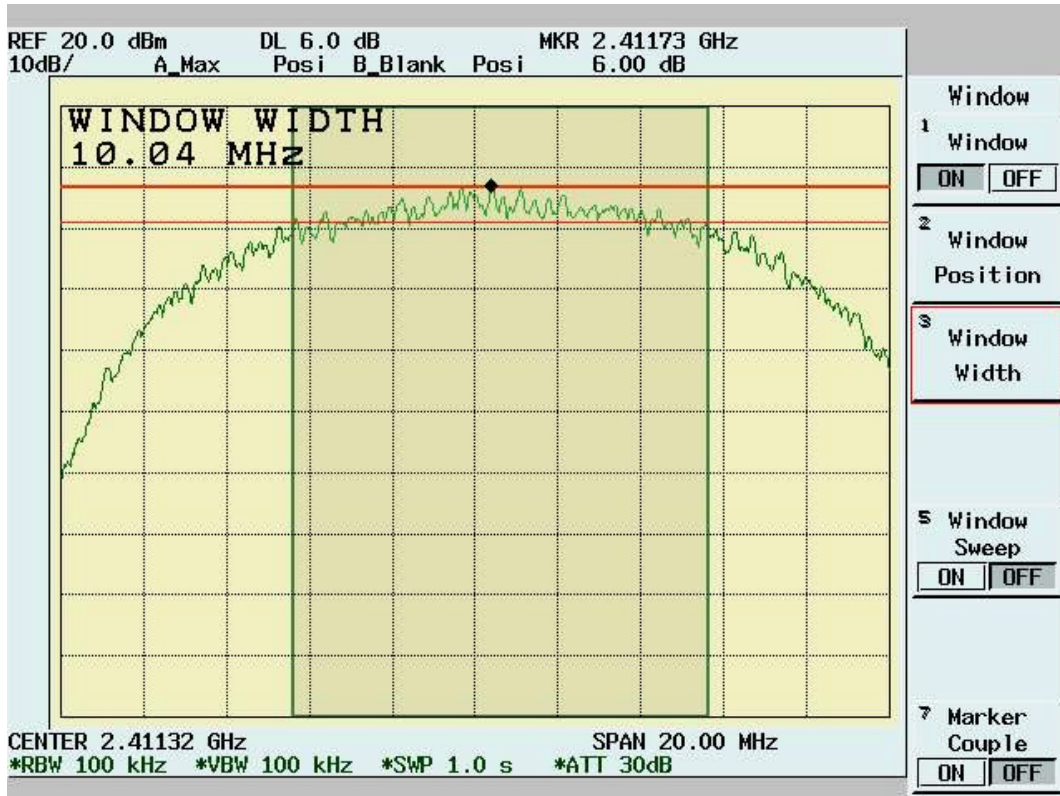
Test Engineer:Mailes Hsieh

Temperature ():27

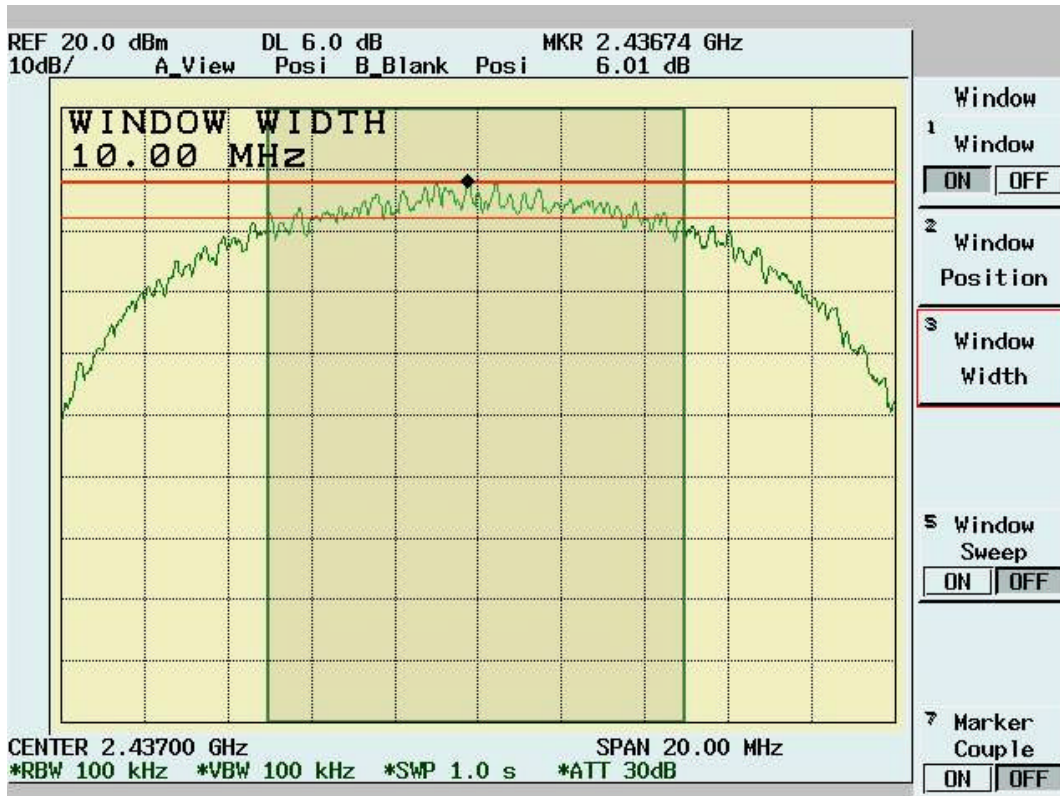
Humidity (%):55

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Pass/Fail
1	2412	10.04	0.5	Pass
6	2437	10.00	0.5	Pass
11	2462	10.04	0.5	Pass

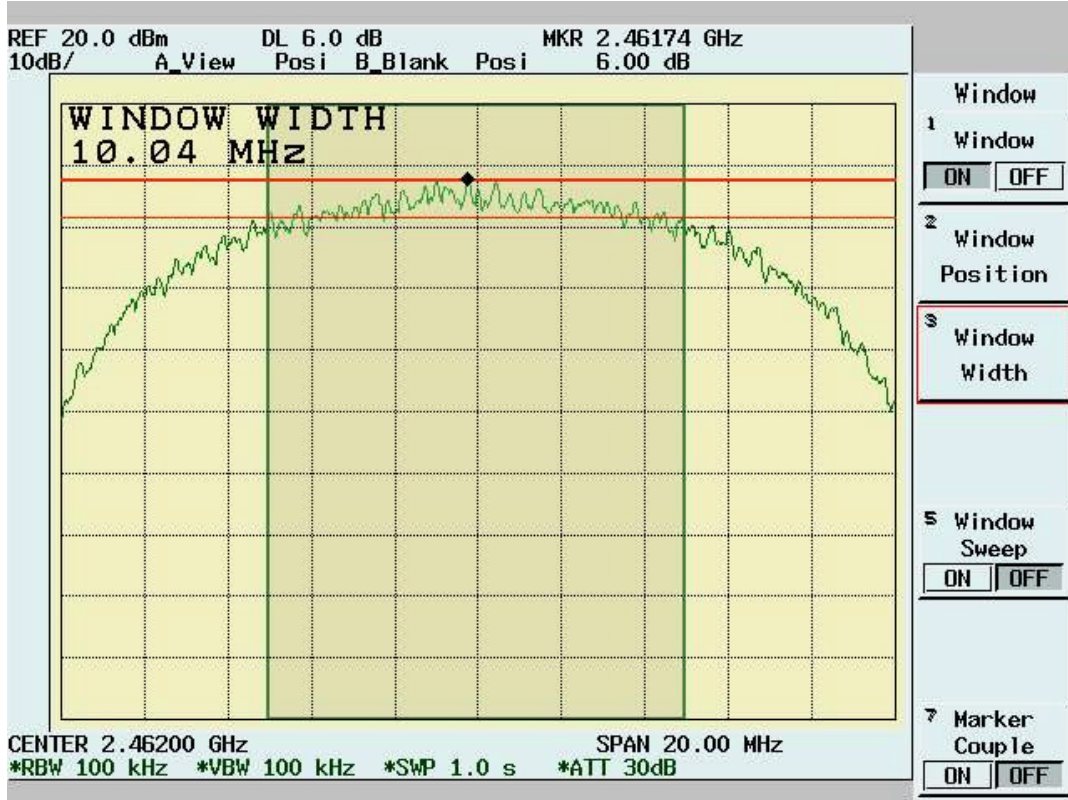
Channel 1:



Channel 6:



Channel 11:

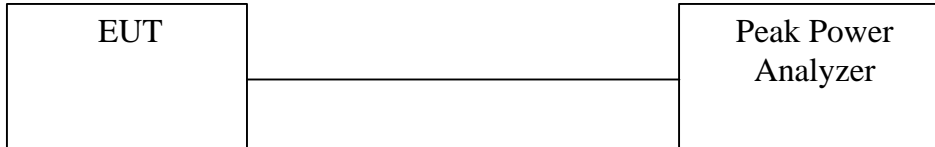


4.3 DSSS Maximum Peak Output Power [Section 15.247 (b)(1)]

4.3.1 Test Procedure

The Transmitter output of EUT was connected to the peak power analyzer.

4.3.2 Test Setup



4.3.3 Test Data

Maximum Peak Output Power

Test Engineer:Mailes Hsieh

Temperature ():27

Humidity (%):55

Channel	Frequency (Mhz)	Analyzer Reading (dBm)	Cable Loss (dB)	Peak Power Output (mW)	Peak Power Output (dBm)	Limit (dBm)	Pass/Fail
1	2412	16.00	1.30	53.70	17.30	30	Pass
6	2437	17.06	1.30	68.55	18.36	30	Pass
11	2462	16.73	1.30	63.53	18.03	30	Pass

Note: Two RF output(MAIN & AUX) have been test,the worse data shown above.

4.4 Radiated Emission Measurement [Section [15.247(c)(4)]

4.4.1 EUT Configuration

The equipment under test was set up on the 10 meter chamber with measurement distance of 3 meters. The EUT was placed on a non-conductive table 80cm above ground.

Any changes made to the configuration, or modifications made to the EUT, during testing are noted in the following test record.

4.4.2 Test Procedure

The system was set up as described above, with the EMI diagnostic software running. We found the maximum readings by varying the height of antenna and then rotating the turntable. Both polarization of antenna, horizontal and vertical, are measured.

30M to 1GHz: The highest emissions between 30 MHz to 1000 MHz were also analyzed in details by operating the spectrum analyzer and/or EMI receiver in quasi-peak mode to determine the precise amplitude of the emissions. While doing so, the interconnecting cables and major parts of the system were moved around, the antenna height was varied between one and four meters, its polarization was varied between vertical and horizontal, and the turntable was slowly rotated, to maximize the emission.

1GHz – 25GHz: The highest emissions were also analyzed in details by operating the spectrum analyzer and/or EMI receiver in peak mode to determine the precise amplitude of the emission. While doing so, the interconnecting cables and major parts of the system were moved around, the antenna height was varied between one and four meters, its polarization was varied between vertical and horizontal, and the turntable was slowly rotated, to maximize the emission. During test the EMI receiver and spectrum was setup according to *EMI Receiver/Spectrum Analyzer Configuration*.

For the test of 2nd to 10th harmonics frequencies , the equipment setup was also refer to *EMI Receiver/Spectrum Analyzer Configuration*. The frequencies were tested using Peak mode first, if the test data is higher than the emissions limit, an additional measurement using Average mode will be performed and the average reading will be compared to the limit and record in test report.

4.4.3 EMI Receiver/Spectrum Analyzer Configuration (for the frequencies tested)

Frequency Range Tested:	30MHz~1000MHz
Detector Function:	Quasi-Peak Mode
Resolution Bandwidth (RBW):	120KHz
Video Bandwidth (VBW)	1MHz

Frequency Range Tested:	1GHz – 25 GHz
Detector Function:	Peak Mode
Resolution Bandwidth (RBW):	1MHz
Video Bandwidth (VBW)	3MHz

Frequency Range Tested:	1GHz – 25 GHz
Detector Function:	Average Mode
Resolution Bandwidth (RBW):	1MHz
Video Bandwidth (VBW)	10 Hz

4.4.4 Test Data (30MHz – 1GHz):

30M – 1GHz Open Field Radiated Emissions (Horizontal) Channel 1, 6, 11

Operator:MailesHsieh
 Temperature(C):27
 Humidity(%):44

Frequency	RxAmp.	AntFact	CableLoss	PreAmpGain	Corrct.Emi.	Limit	Margin	Ant.Pos.	TablePos
MHz	(dBuV)	(dB/m)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg)
359.8	9.86	16.14	4.17	0	30.17	46	-15.83	100	285
395.69	7.7	15.93	4.41	0	28.04	46	-17.96	150	6
480.08	21.73	16.92	5.07	0	43.72	46	-2.28	100	267
496.57	14.83	17.32	5.25	0	37.4	46	-8.6	100	285
599.39	5.48	18.7	5.85	0	30.03	46	-15.97	100	65
838.01	3.09	20.48	7.72	0	31.29	46	-14.71	100	27
940.83	2.81	21.17	8.38	0	32.36	46	-13.64	150	156

30M – 1GHz Open Field Radiated Emissions (Vertical) Channel 1, 6, 11

Operator:MailesHsieh
 Temperature(C):27
 Humidity(%):44

Frequency	RxAmp.	AntFact	CableLoss	PreAmpGain	Corrct.Emi.	Limit	Margin	Ant.Pos.	TablePos
MHz	(dBuV)	(dB/m)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg)
62.98	18.23	5.4	1.38	0	25.02	40	-14.98	100	81
106.63	15.04	11.1	1.99	0	28.13	43.5	-15.37	150	169
136.7	15.83	10.63	2.2	0	28.66	43.5	-14.84	100	121
480.08	12.53	16.92	5.07	0	34.52	46	-11.48	100	267
533.43	6.47	18.2	5.4	0	30.08	46	-15.92	100	76
547.01	6.17	18.53	5.51	0	30.21	46	-15.79	100	9
594.54	5.6	18.69	5.82	0	30.11	46	-15.89	100	325

NOTE:

During the Pre-test, the EUT has been tested for Channel 1, 6, 11 transmit from Main and Aux antenna respectively to get all the critical emission frequencies. In the final test all the critical emission frequencies has been tested and the test data are listed above.

Margin = Corrected Amplitude – Limit

Corrected Amplitude = Radiated Amplitude + Antenna Correction Factor + Cable Loss - Pre-Amplifier Gain

A margin of -8dB means that the emission is 8dB below the limit

All frequencies from 30MHz to 1GHz have been tested

4.4.5 Test Data (1GHz – 25 GHz) .

1GHz~ 25 GHz (Horizontal), Channel 1: 2412 MHz

Operator:MailesHsieh

RBW:1MHz
Humidity(%):44
Temperature(C):27

Frequency	Rx_R.	Ant_F.	Cab_L.	PreAmpl	Emission	Average Limit	Average Margin	Peak Limit	Peak Margin	Ant. Tower	Turn Table
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	dBuV/m	dB	cm	deg
1359.64	50.08 pk	26.15	2.21	34.12	44.32 pk	54.00	-9.68	74.00	--	101	87
1806.69	45.56 pk	29.38	2.46	34.8	42.59 pk	54.00	-11.41	74.00	--	100	56
2368.63	44.33 pk	30.93	1.48	35.19	41.53 pk	54.00	-12.47	74.00	--	101	159
4824	66.98 pk	34.93	2.12	37.72	66.32 pk	54.00	--	74.00	-7.68	100	14
4824	50.81 av	34.93	2.12	37.72	50.14 av	54.00	-3.86	74.00	--	100	14
7236	47.84 pk	39.48	2.68	36.83	53.17 pk	54.00	-0.83	74.00	--	100	14
9648	40.38 pk	40.57	3.25	34.33	49.87 pk	54.00	-4.13	74.00	--	100	14

1GHz~ 25 GHz (Vertical), Channel 1: 2412 MHz

Operator:MailesHsieh

RBW:1MHz
Humidity(%):44
Temperature(C):27

Frequency	Rx_R.	Ant_F.	Cab_L.	PreAmpl	Emission	Average Limit	Average Margin	Peak Limit	Peak Margin	Ant. Tower	Turn Table
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	dBuV/m	dB	cm	deg
1204.8	44.95 pk	25.44	2.19	34.04	38.54 pk	54.00	-15.46	74.00	--	102	98
2333.67	46.97 pk	30.93	1.58	35.19	44.29 pk	54.00	-9.71	74.00	--	101	148
2575.92	39.52 pk	30.93	1.37	35.13	36.70 pk	54.00	-17.3	74.00	--	102	224
4824	63.89 pk	34.93	2.12	37.72	63.23 pk	54.00	--	74.00	-10.77	100	330
4824	50.01 av	34.93	2.12	37.72	49.34 av	54.00	-4.66	74.00	--	100	330
7236	45.25 pk	39.48	2.68	36.83	50.58 pk	54.00	-3.42	74.00	--	100	330
9648	44.75 pk	40.57	3.25	34.33	54.24 pk	54.00	--	74.00	-19.76	100	330
9648	38.05 av	40.57	3.25	34.33	47.54 av	54.00	-6.46	74.00	--	100	330

Note:

According to ANSI C63.4-2001 8.3.1.2 Notes(1):Where limits are specified by agencies for both average and peak (or quasi-peak) detection , if the peak (or quasi-peak) measured value complies with the average limit , it is unnecessary to perform an average measurement.

“ * ”: Fundamental Frequency

“***”: Not in the restricted band, Limit level=Fundamental Emission-20dB

“ pk ”: peak mode

“ av ”: average mode

“ --- ”: No meter reading data due to the emission level is smaller than spectrum noise level.

The Spectrum noise level+Correction Factor < Limit - 6 dB

Margin=Corrected Amplitude – Limit

Corrected Amplitude=Radiated Amplitude+Antenna Correction Factor+Cable Loss-Pre-Amplifier Gain

A margin of -8dB means that the emission is 8dB below the limit.

All frequencies from 1GHz to 25 GHz have been tested.

1GHz~ 25 GHz (Horizontal) , Channel 6 : 2437 MHz

Operator:MailesHsieh

RBW:1MHz
Humidity(%):44
Temperature(C):27

Frequency	Rx_R.	Ant_F.	Cab_L.	PreAmpl	Emission	Average Limit	Average Margin	Peak Limit	Peak Margin	Ant. Tower	Turn Table
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	dBuV/m	dB	cm	deg
1354.65	49.19 pk	26.13	2.21	34.12	43.41 pk	54.00	-10.59	74.00	--	101	88
1814.19	45.99 pk	29.44	2.46	34.82	43.08 pk	54.00	-10.92	74.00	--	100	56
2483.52	42.55 pk	30.9	1.45	35.2	39.70 pk	54.00	-14.3	74.00	--	101	195
4874	57.59 pk	35.12	2.14	37.77	57.08 pk	54.00	--	74.00	-16.92	100	324
4874	43.38 av	35.12	2.14	37.77	42.87 av	54.00	-11.13	74.00	--	100	324
7311	49.07 pk	39.6	2.55	36.7	54.52 pk	54.00	--	74.00	-19.48	100	324
7311	35.98 av	39.6	2.55	36.7	41.43 av	54.00	-12.57	74.00	--	100	324
9748	49.04 pk	40.35	3.3	34.37	58.32 pk	54.00	--	74.00	-15.68	100	324
9748	41.64 av	40.35	3.3	34.37	50.92 av	54.00	-3.08	74.00	--	100	324

1GHz~ 25 GHz (Vertical), Channel 6 : 2437 MHz

Operator:MailesHsieh

ORBW:1MHz
Humidity(%):44
Temperature(C):27

Frequency	Rx_R.	Ant_F.	Cab_L.	PreAmpl	Emission	Average Limit	Average Margin	Peak Limit	Peak Margin	Ant. Tower	Turn Table
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	dBuV/m	dB	cm	deg
1197.3	45.44 pk	25.41	2.19	34.04	39.00 pk	54.00	-15	74.00	--	102	98
1846.65	40.96 pk	29.71	2.49	34.88	38.28 pk	54.00	-15.72	74.00	--	100	54
2376.12	43.27 pk	30.92	1.45	35.2	40.46 pk	54.00	-13.54	74.00	--	101	161
4874	66.49 pk	35.12	2.14	37.77	65.98 pk	54.00	--	74.00	-8.02	100	17
4874	51.02 av	35.12	2.14	37.77	50.51 av	54.00	-3.49	74.00	--	100	17
7311	41.59 pk	39.6	2.55	36.7	47.04 pk	54.00	-6.96	74.00	--	100	17
9748	46.60 pk	40.35	3.3	34.37	55.88 pk	54.00	--	74.00	-18.12	100	17
9748	37.08 av	40.35	3.3	34.37	46.36 av	54.00	-7.64	74.00	--	100	17

Note:

- ⚡ According to ANSI C63.4-2001 8.3.1.2 Notes(1):Where limits are specified by agencies for both average and peak (or quasi-peak) detection , if the peak (or quasi-peak) measured value complies with the average limit , it is unnecessary to perform an average measurement.
- ⚡ “ * ”: Fundamental Frequency
- ⚡ “***”: Not in the restricted band, Limit level=Fundamental Emission-20dB
- ⚡ “ pk” : peak mode
- ⚡ “ av” : average mode
- ⚡ “---“: No meter reading data due to the emission level is smaller than spectrum noise level.
- ⚡ The Spectrum noise level+Correction Factor < Limit - 6 dB
- ⚡ Margin=Corrected Amplitude – Limit
- ⚡ Corrected Amplitude=Radiated Amplitude+Antenna Correction Factor+Cable Loss-Pre-Amplifier Gain
- ⚡ A margin of -8dB means that the emission is 8dB below the limit.

All frequencies from 1GHz to 25 GHz have been tested.

1GHz~ 25 GHz (Horizontal), Channel 11: 2462 MHz

Operator:MailesHsieh

RBW:1MHz
Humidity(%):44
Temperature(C):27

Frequency	Rx_R.	Ant_F.	Cab_L.	PreAmpl	Emission	Average Limit	Average Margin	Peak Limit	Peak Margin	Ant. Tower	Turn Table
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	dBuV/m	dB	cm	deg
1357.14	49.03 pk	26.14	2.21	34.12	43.26 pk	54.00	-10.74	74.00	--	101	87
1679.32	47.19 pk	28.31	2.36	34.55	43.31 pk	54.00	-10.69	74.00	--	101	65
4924	60.11 pk	35.31	2.15	37.83	59.75 pk	54.00	--	74.00	-14.25	100	0
4924	47.50 av	35.31	2.15	37.83	47.13 av	54.00	-6.87	74.00	--	100	0
7386	42.09 pk	39.72	2.42	36.56	47.67 pk	54.00	-6.33	74.00	--	100	0
9848	50.61 pk	40.13	3.35	34.41	59.69 pk	54.00	--	74.00	-14.31	100	0
9848	41.67 av	40.13	3.35	34.41	50.74 av	54.00	-3.26	74.00	--	100	0

1GHz~ 25 GHz (Vertical), Channel 11 : 2462 MHz

Operator:MailesHsieh

RBW:1MHz
Humidity(%):44
Temperature(C):27

Frequency	Rx_R.	Ant_F.	Cab_L.	PreAmpl	Emission	Average Limit	Average Margin	Peak Limit	Peak Margin	Ant. Tower	Turn Table
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	dBuV/m	dB	cm	deg
1199.8	45.92 pk	25.42	2.19	34.04	39.50 pk	54.00	-14.5	74.00	--	102	98
2361.14	41.88 pk	30.93	1.5	35.19	39.11 pk	54.00	-14.89	74.00	--	101	156
2530.97	41.56 pk	30.91	1.37	35.17	38.67 pk	54.00	-15.33	74.00	--	102	210
4924	64.41 pk	35.31	2.15	37.83	64.05 pk	54.00	--	74.00	-9.95	100	329
4924	48.49 av	35.31	2.15	37.83	48.12 av	54.00	-5.88	74.00	--	100	329
7386	43.48 pk	39.72	2.42	36.56	49.06 pk	54.00	-4.94	74.00	--	100	329
9848	48.17 pk	40.13	3.35	34.41	57.25 pk	54.00	--	74.00	-16.75	100	329
9848	41.27 av	40.13	3.35	34.41	50.34 av	54.00	-3.66	74.00	--	100	329

Note:

- ⚡ According to ANSI C63.4-2001 8.3.1.2 Notes(1):Where limits are specified by agencies for both average and peak (or quasi-peak) detection , if the peak (or quasi-peak) measured value complies with the average limit , it is unnecessary to perform an average measurement.
- ⚡ “ * ”: Fundamental Frequency
- ⚡ “**”: Not in the restricted band, Limit level=Fundamental Emission-20dB
- ⚡ “ pk”: peak mode
- ⚡ “av”: average mode
- ⚡ “---”: No meter reading data due to the emission level is smaller than spectrum noise level.
- ⚡ The Spectrum noise level+Correction Factor < Limit - 6 dB
- ⚡ Margin=Corrected Amplitude – Limit
- ⚡ Corrected Amplitude=Radiated Amplitude+Antenna Correction Factor+Cable Loss-Pre-Amplifier Gain
- ⚡ A margin of -8dB means that the emission is 8dB below the limit.

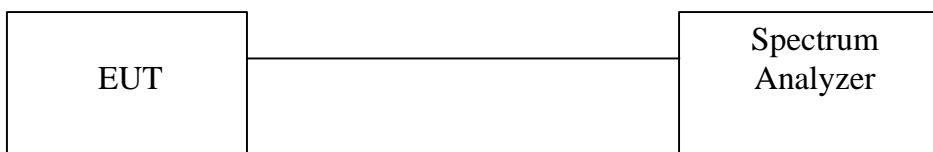
All frequencies from 1GHz to 25 GHz have been tested.

4.5 Band Edge Measurement

4.5.1 Test Procedure (Conducted)

1. The transmitter output of EUT was connected to the spectrum analyzer.
 Equipment mode: Spectrum analyzer
 Detector function: Peak mode
 SPAN: 100MHz
 RBW: 100KHz
 VBW: 100KHz
 Center frequency: 2.4GHz, 2.4835GHz.
2. Using Peak Search to read the peak power of Carrier frequencies after Maximum Hold function is completed
3. Find the next peak frequency outside the operation frequency band

4.5.2 Test Setup (Conducted)



4.5.3 Test Data:

Table: Band Edge measurement (Conducted)

Test Engineer:Mailes Hsieh

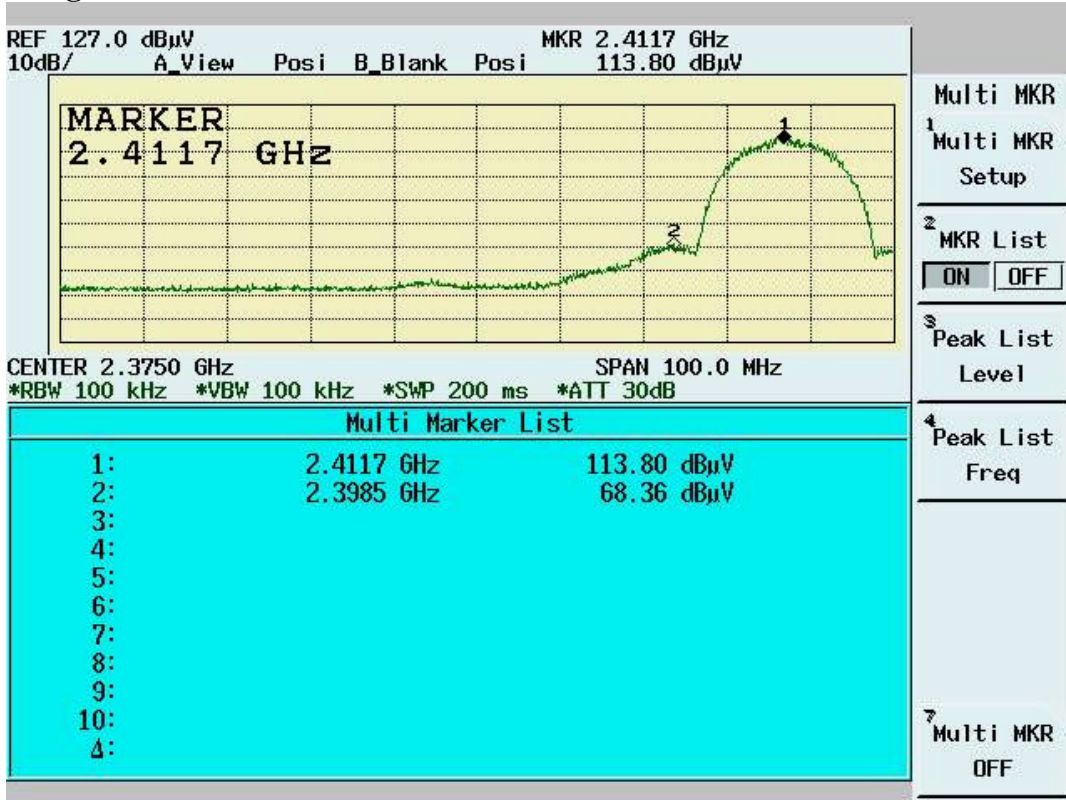
Temperature ():27

Humidity (%):55

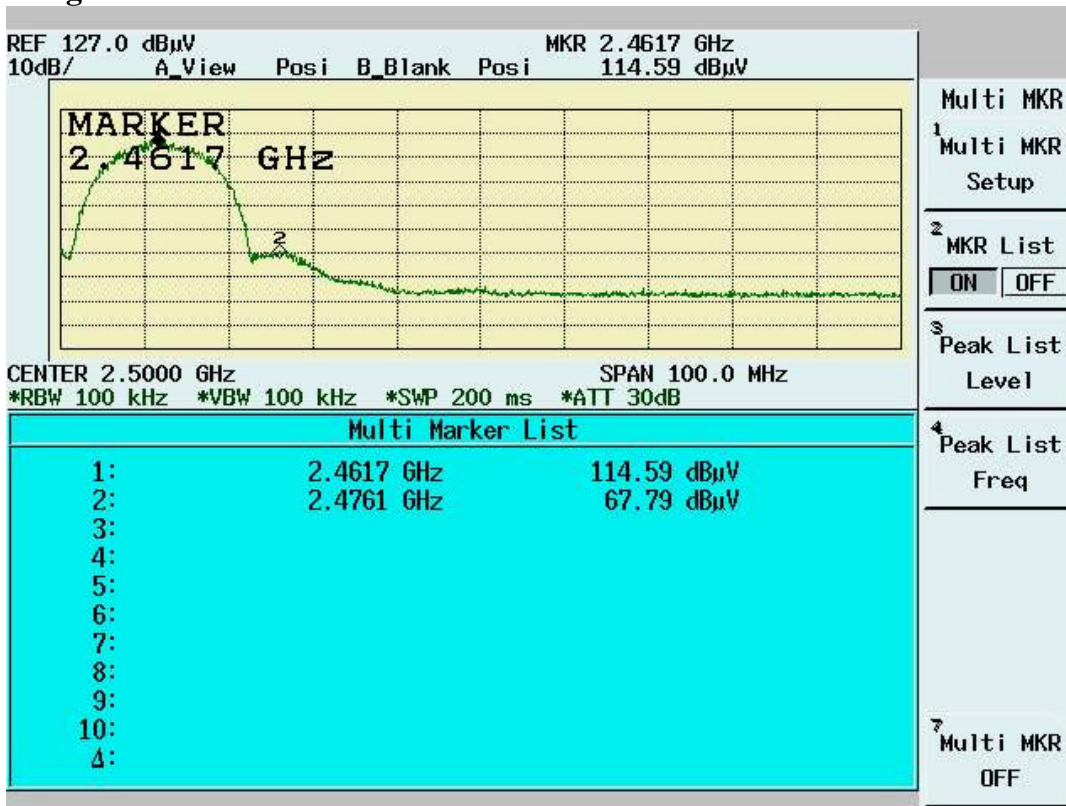
Channel	Frequency (MHz)	Spectrum Reading (dBuV)	Carrier - Outsideband Limit: >20dB (dB)	Pass/Fail
1	2411.7	113.80	---	---
Outside band	2398.5	68.36	45.44	Pass
11	2461.7	114.59	---	---
Outside band	2476.1	67.79	46.80	Pass

Note: Two RF output(MAIN & AUX) have been test,the worse data shown above.

Band Edge Conducted measurement



Band Edge Conducted Measurement



4.5.4 Test Procedure (Radiated)

1. Antenna and Turntable test procedure same as Radiated Emission Measurement.
Equipment mode: Spectrum analyzer
Detector function: Peak mode
SPAN: 100MHz
RBW: 1MHz
VBW: 3MHz
Center frequency: 2.395GHz, 2.48GHz.
2. Using Peak Search to read the peak power of Carrier frequencies after Maximum Hold function is completed.
3. Find the next peak frequency outside the operation frequency band
4. For peak frequency emission level measurement in Restricted Band
Change RBW: 1MHz
VBW: 10Hz
Span: 100MHz.
5. Get the spectrum reading after Maximum Hold function is completed.

4.5.5 Test Setup (Radiated)

Same as *Radiated Emission Measurement*

4.5.6 Test Data

Table Band Edge measurement (Radiated)

Test Engineer:Mailes Hsieh

Temperature ():26

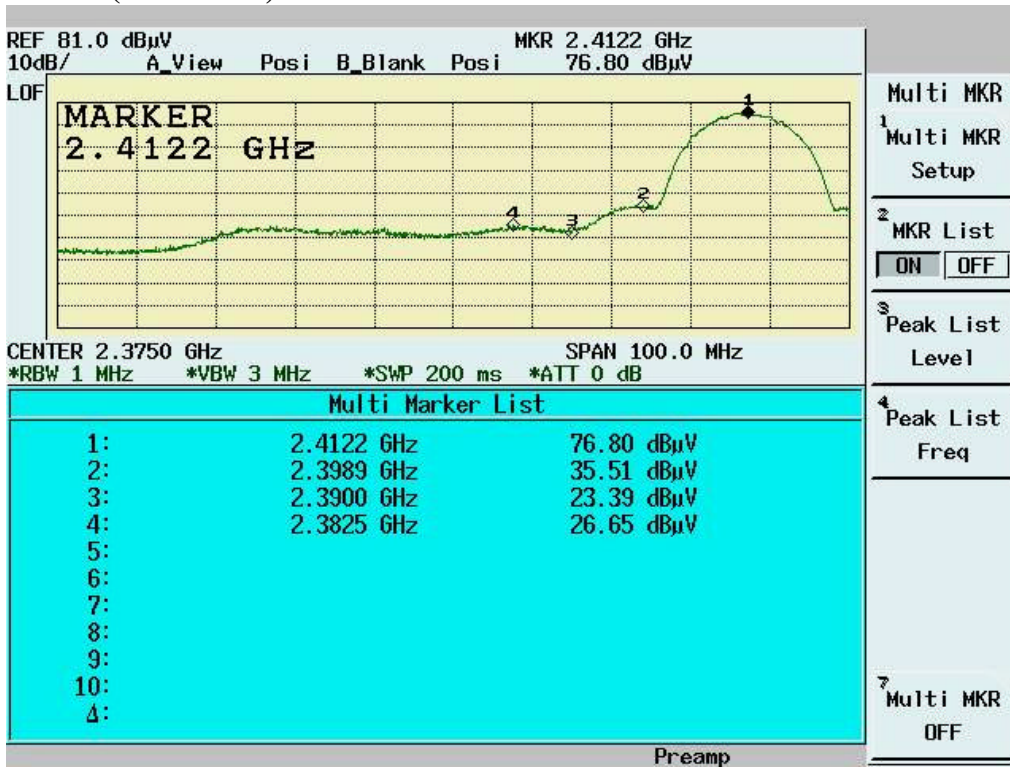
Humidity (%):43

Description	Frequency (MHz)	Spectrum Reading (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	dBc (Limit: > 20dBc)	Limit (dBuV/m)	Equip. Setup VBW	Pass or Fail
Channel_1 (average mode)	2411.9	69.05	35.48	104.53	---	---	10Hz	---
Channel_1 (peak mode)	2412.2	76.80	35.48	112.28	---	---	3MHz	---
Outside band (peak mode)	2398.9	35.51	35.48	70.99	41.29	---	3MHz	Pass
Channel_11 (average mode)	2463.3	68.24	35.50	103.74	---	---	10Hz	---
Channel_11 (peak mode)	2462.0	75.94	35.50	111.44	---	---	3MHz	---
Outside band (peak mode)	2475.6	33.66	35.51	69.17	42.27	---	3MHz	Pass
Channel_1 Restricted band (peak mode)	2382.5	26.65	35.47	62.12	---	74	3MHz	Pass
Restricted band (average mode)	2381.9	14.44	35.47	49.91	---	54	10Hz	Pass
Channel_11 Restricted band (peak mode)	2489.9	27.40	35.51	62.91	---	74	3MHz	Pass
Restricted band (average mode)	2493.0	13.84	35.51	49.35	---	54	10Hz	Pass

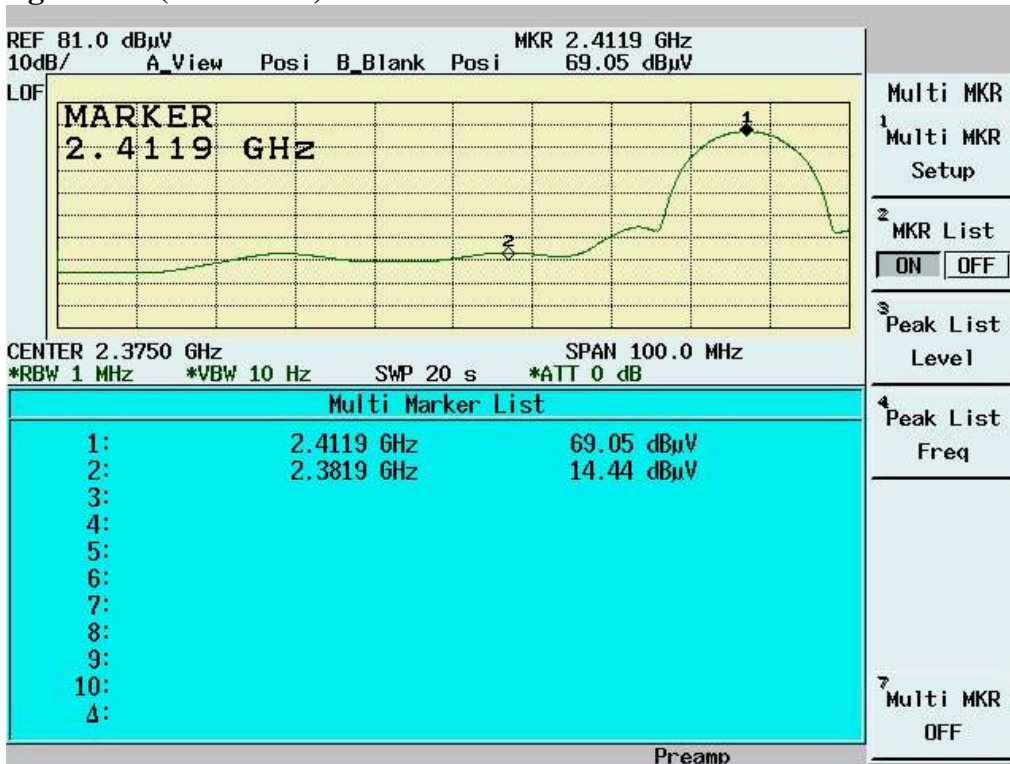
Note:

- ☞ The Spectrum plot of emission level measurement in Restricted band is attached.
- ☞ Emission Level=Spectrum Reading+Correction Factor
- ☞ Correction Factor=Antenna Factor+cable loss–amplifier gain
- ☞ Both Horizontal and Vertical polarization have been tested and the worst data is listed above.

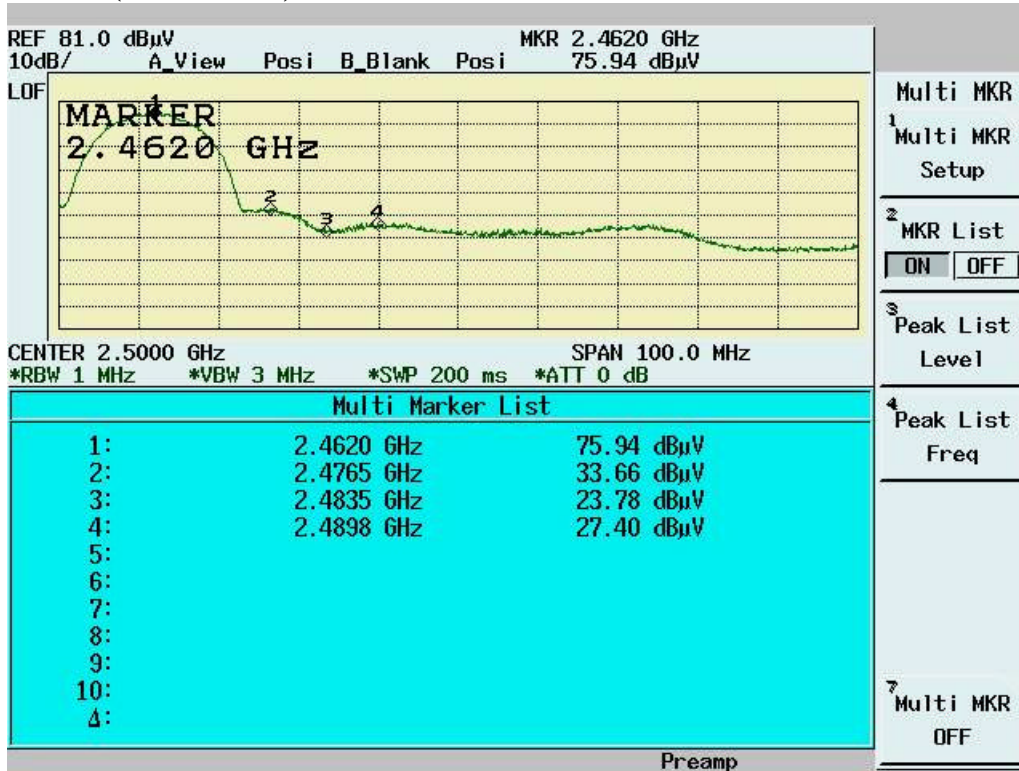
Band Edge measurement for radiated emission in Restricted Band(Radiated) Peak Mode (Channel 1)



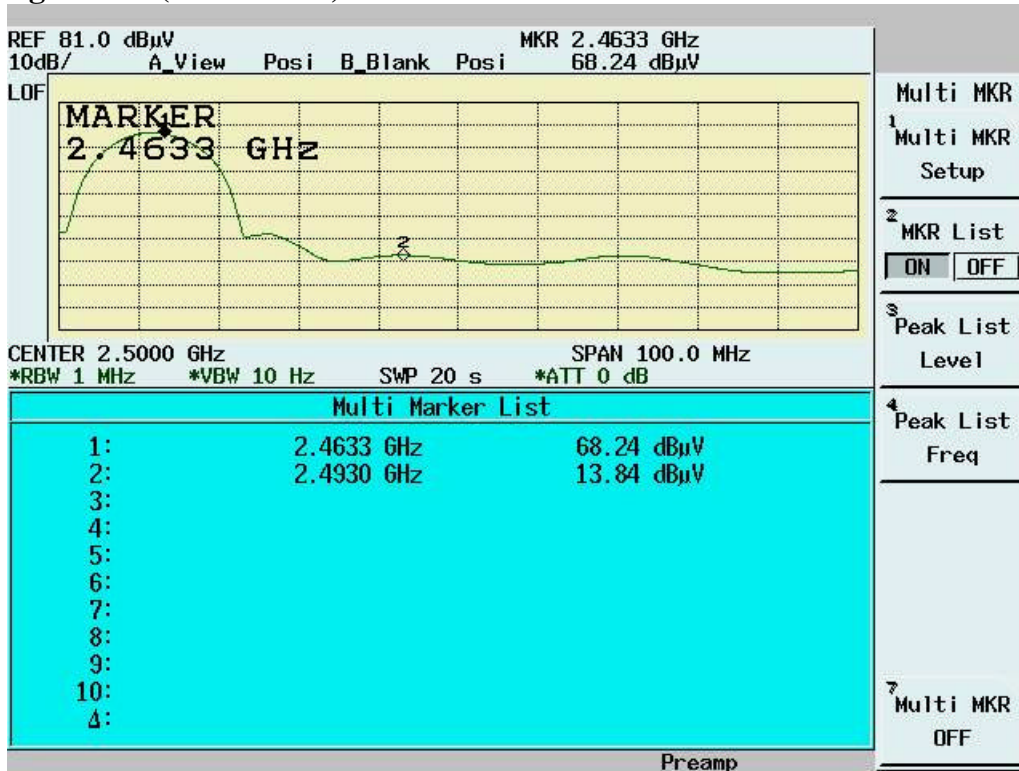
Band Edge measurement for radiated emission in Restricted Band(Radiated) Average Mode (Channel 1)



Band Edge measurement for radiated emission in Restricted Band(Radiated) Peak Mode (Channel 11)



Band Edge measurement for radiated emission in Restricted Band(Radiated) Average Mode (Channel 11)



4.6 RF Exposure Measurement [Section 15.247(b)(4) & 1.1307(b)]

See SAR report

4.7 DSSS Peak Power Spectral Density [Section 15.247(d)]

4.7.1 Test Procedure

1. The Transmitter output of EUT was connected to the spectrum analyzer.
 Equipment mode: Spectrum analyzer
 Detector function: Peak mode
 SPAN:1.5MHz
 RBW: 3KHz
 VBW: 30KHz
 Center frequency: fundamental frequency tested.
 Sweep time= 500 sec.
2. Using Peak Search to read the peak power after Maximum Hold function is completed.

4.7.2 Test Setup



4.7.3 Test Data

Maximum Peak Output Power Density

Test Engineer:Mailes Hsieh

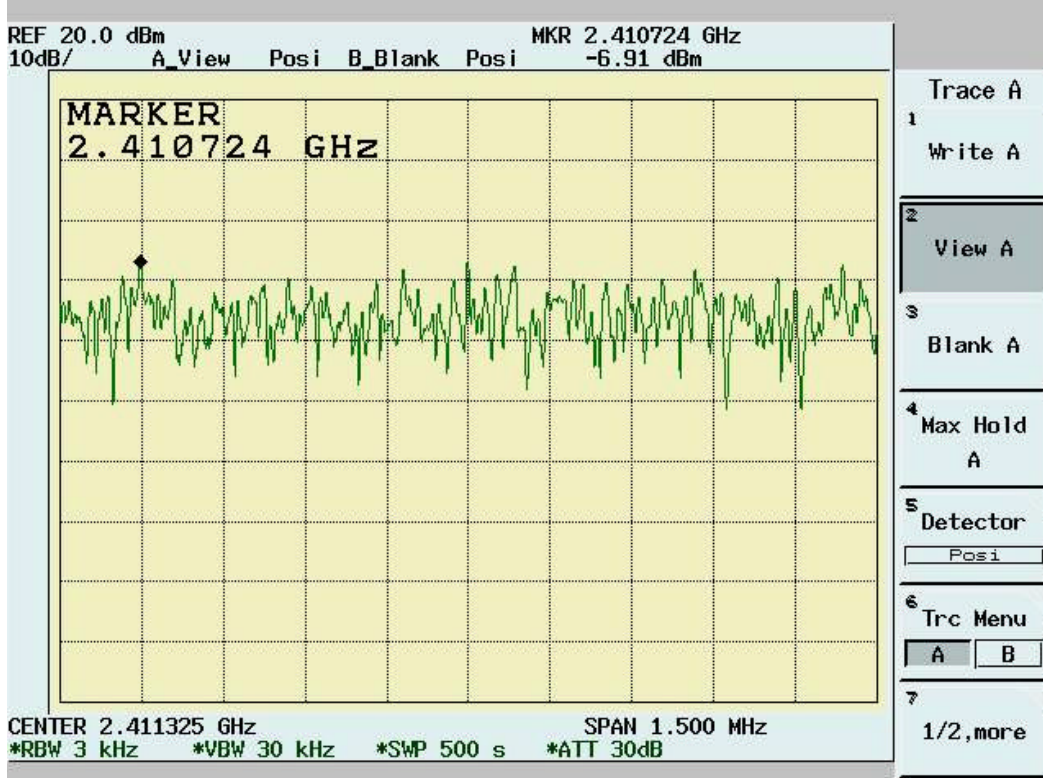
Temperature ():27

Humidity (%):55

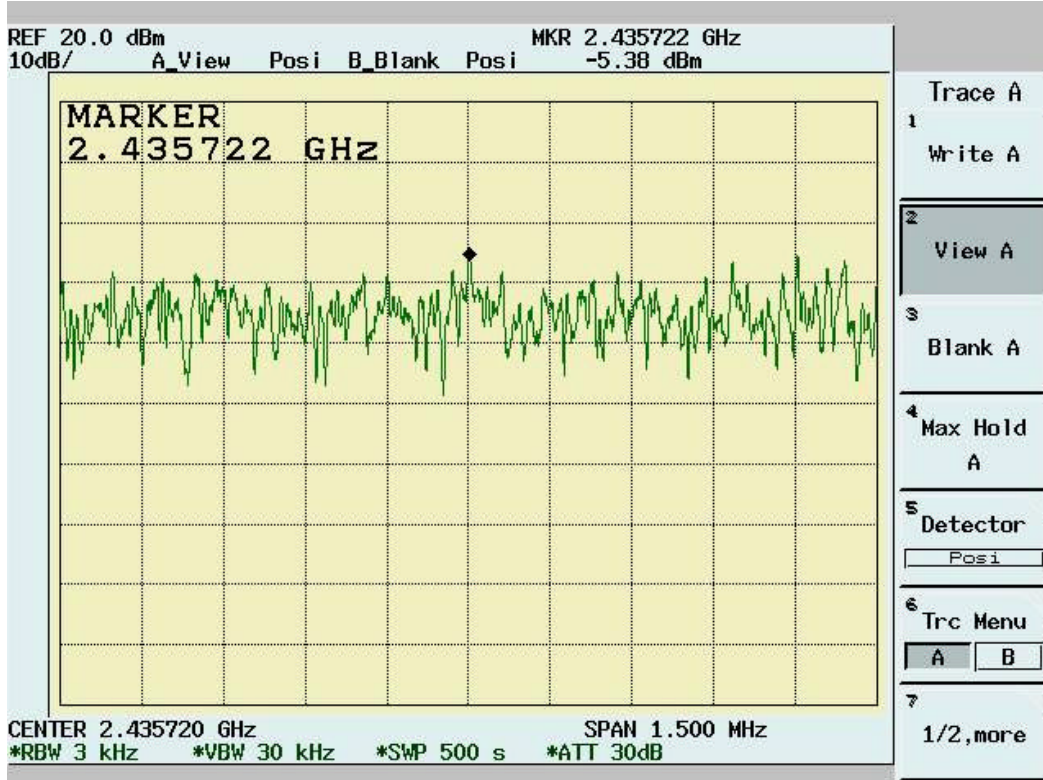
Channel	Frequency (MHz)	Spectrum Reading (dBm/3KHz)	Cable Loss (dB)	Peak Power Output (dBm/3KHz)	Limit (dBm/3KHz)	Pass/Fail
1	2412	-6.91	1.30	-5.61	8	Pass
6	2437	-5.38	1.30	-4.08	8	Pass
11	2462	-5.98	1.30	-4.68	8	Pass

Note: Two RF output(MAIN & AUX) have been test,the worse data shown above.

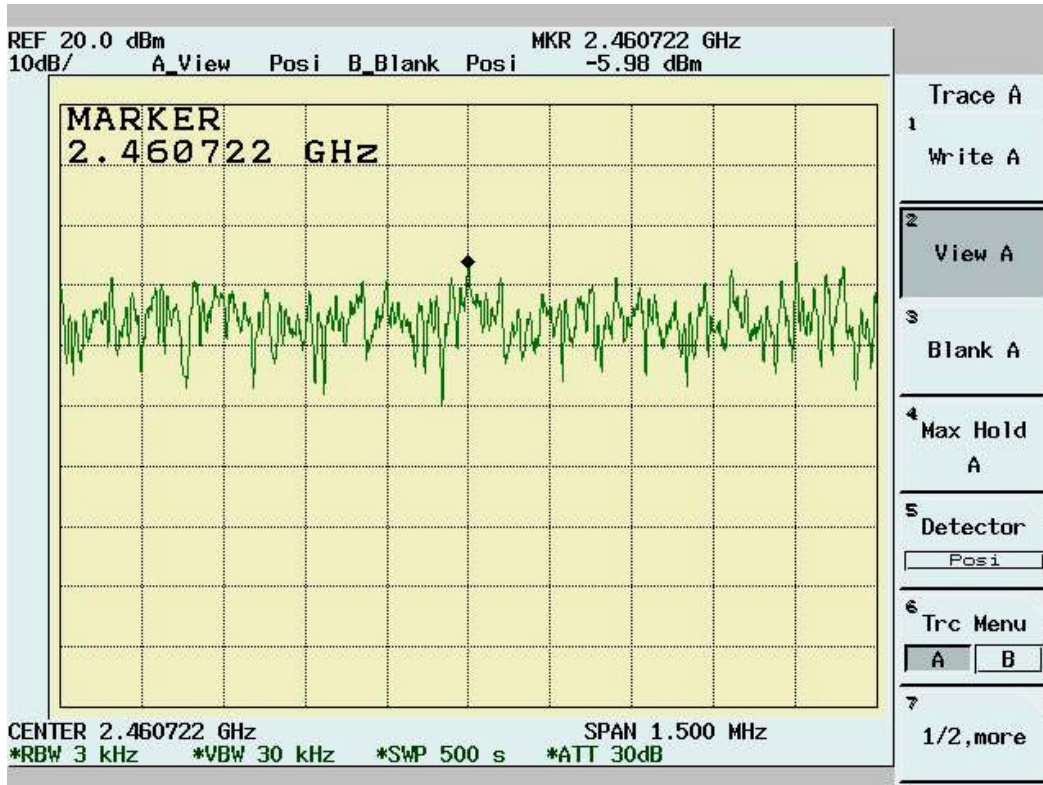
Channel 1



Channel 6



Channel 11



5. TEST RESULTS (802.11g)

5.1 Powerline Conducted Emissions [Section 15.207]

5.1.1 EUT Configuration

The conducted emission test setups are in accordance with Figs 9, 10(a) and 10(b) of ANSI C63.4-2001, CFR 47 Part 15 Subpart B; or EN55022:1994/ A1:1995/A2:1997; CISPR 22:1993/A1:1995/A2:1996.

The EUT was set up on the non-conductive table that is 1.0 by 1.5 meter, 80cm above ground. The wall of the shielded room was located 40cm to the rear of the EUT.

Power to the EUT was provided through the LISN. The impedance vs. frequency characteristic of the LISN is complied with the limit shown on the figure 1 of ANSI C63.4-2001.

Both lines (neutral and hot) were connected to the LISN in series at testing. A coaxial-type connector which provides one 50 ohms terminating impedance was provided for connecting the test instrument. The excess length of the power cord was folded back and forth at the center of the lead so as to form a bundle not exceeding 40cm in length.

Any changes made to the configuration, or modifications made to the EUT, during testing are noted in the following test record.

If the EUT is a Personal Computer or a peripheral of personal computer, and the personal computer has an auxiliary AC outlet which can be used for providing power to an external monitor, then all measurements will be made with the monitor power from first the computer-mounted AC outlet and then a floor-mounted AC outlet.

5.1.2 Test Procedure

The system was set up as described above, with the EMI diagnostic software running. The main power line conducted EMI tests were run on the hot and neutral conductors of the power cord and the results were recorded. The effect of varying the position of the interface cables has been investigated to find the configuration that produces maximum emission.

At the frequencies where the peak values of the emissions were higher than 6dB below the applicable limits, the emissions were also measured with the quasi-peak detectors. At the frequencies where the quasi-peak values of the emissions were higher than 6dB below the applicable average limits, the emissions were also measured with the average detectors.

The highest emissions were analyzed in details by operating the spectrum analyzer in fixed tuned mode to determine the nature of the emissions and to provide information which could be useful in reducing their amplitude.

5.1.3 EMI Receiver/Spectrum Analyzer Configuration (for the frequencies tested)

Frequency Range	150 KHz--30MHz
Detector Function	Quasi-Peak/Average
Bandwidth (RBW)	9KHz

5.1.4 Test Data:

Power Line Conducted Emissions (Hot) Channel 1, 6, 11

Operator:MailesHsieh
 Temperature(C):29
 Humidity(%):54

Frequency MHz	LISNLoss (dB)	CableLoss (dB)	QPCorrt. Amp.(dBuV)	QPLimit (dBuV)	QPMargin (dB)	AVECorrt. Amp.(dBuV)	AVELimit (dBuV)	AVEMargin (dB)
0.47478	0.11	0.07	40.78	56.72	-15.94	39.17	46.72	-7.55
0.55316	0.13	0.07	34.21	56.00	-21.79	30.60	46.00	-15.40
0.63448	0.14	0.07	39.16	56.00	-16.84	38.63	46.00	-7.37
0.87298	0.18	0.07	35.71	56.00	-20.29	31.76	46.00	-14.24
0.95203	0.19	0.07	38.08	56.00	-17.92	35.91	46.00	-10.09
1.66435	0.23	0.08	35.33	56.00	-20.67	31.02	46.00	-14.98
1.74347	0.23	0.08	37.88	56.00	-18.12	35.93	46.00	-10.07
1.98250	0.20	0.09	38.88	56.00	-17.12	36.67	46.00	-9.33
2.06302	0.20	0.09	38.93	56.00	-17.07	37.63	46.00	-8.37
2.30103	0.20	0.10	38.67	56.00	-17.33	38.02	46.00	-7.98

