TEST REPORT

of

FCC Part 15 Subpart B & C

<Tested with WLAN Module-802.11bg & 802.11a 5725MHz-5850MHz >

Product : **Notebook Personal Computer**

Model(s): **V100**
(with SIERRA HSDPA Module, Model:MC8775V)
(with WLAN a/b/g Module, INTEL, Model:WM3945ABG)
(with Bluetooth Module, BILLIONTON, Model:GUBTCR42M)

Brand: **GETAC**

Applicant: **MITAC Technology Corporation**

Address: **4F, No.1, R&D Road 2,**
Hsinchu Science-Based industrial Park,
Hsinchu 300
Taiwan

Test Performed by:

International Standards Laboratory
<Lung-Tan LAB>
*Site Registration No.
BSMI: SL2-IN-E-0013; TAF: 0997
IC: IC4164-1; VCCI: R-1435, C-1440, T-299; NEMKO: ELA 113B
*Address:
No. 120, Lane 180, San Ho Tsuen, Hsin Ho Rd.
Lung-Tan Hsiang, Tao Yuan County 325, Taiwan
*Tel : 886-3-407-1718; Fax: 886-3-407-1738

Report No.: **ISL-07LR034FCBG**
Issue Date : **2008/05/12**

Contents of Report

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:	Notebook Personal Computer
Model:	V100
Applied by:	MITAC Technology Corporation
Sample received Date:	2007/10/26
Release Date :	2008/05/12
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:	Jerry Chiou

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

Roy Hsieh / Manager

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 96 pages, including 1 cover page , 2 contents page, and 93 pages for the test description.

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).

1.2 Applicant & Manufacturer Information

Applicant: Mitac Technology Corp
No. 1, R&D 2nd RD., Hsin-Chu Science Based Industrial Park
Hsin-Chu Hsien,
Taiwan

Manufacturer 1: Mitac Technology Corp
No. 1, R&D 2nd RD., Hsin-Chu Science Based Industrial Park
Hsin-Chu Hsien,
Taiwan

Manufacturer 2: Getac Technology (Kunshan) Co., Ltd
No. 269, 2nd Road, Export Processing Zone,
Changjiang South, Road,
Kunshan, Jiangsu, P.R.C Zip code: 215300

1.3 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	

2. Description of Equipment Under Test (EUT)

Description:	Notebook Personal Computer
Condition:	Pre-Production
Model:	V100
Brand:	GETAC
Wireless LAN Module:	Intel, Model: WM3945ABG
Bluetooth Module:	BILLIONTON (Model:GUBTCR42M)
Frequency Range of 802.11a:	5150 - 5250 MHz 5250 - 5350 MHz 5725 - 5850 MHz
Frequency Range of 802.11b/g:	2400 - 2483.5 MHz
Frequency Range of Bluetooth:	2400 - 2483.5 MHz
Support channel:	
802.11a Normal mode	13 Channels
802.11b/g	11 Channels
Bluetooth	79 Channels
Modulation Skill:	
802.11a	OFDM (6 Mbps – 54 Mbps)
802.11b	DBPSK(1Mbps), DQPSK(2Mbps), CCK(5.5/11Mbps)
802.11g	OFDM (6M - 54Mbps)
Bluetooth	GFSK (1Mbps) DQPSK(2Mbps), 8DPSK(3Mbps)
Antennas Type:	
WLAN Right antenna:	PIFA (P/N: IA-060076) White made by JOINSOON ELECTRONICS MFG. CO., LTD
WLAN Left antenna:	PIFA (P/N: IA-060239) Black made by JOINSOON ELECTRONICS MFG. CO., LTD
Bluetooth antenna:	PIFA Antenna(P/N: IA060093), made by JOINSOON ELECTRONICS MFG. CO.,LTD.
Antenna Connected:	Connected to RF connector on the PCB of the Bluetooth or WLAN module .The user is not possible to change the antenna without disassembling the notebook computer.
Antenna peak Gain:	
WLAN Right antenna	1.61dBi(11b,11g), 2.45dBi(11a)
WLAN Left antenna	-0.55 dBi (11b,11g), 3.97 dBi (11a)
Bluetooth antenna	-0.8 dBi
Power Type of wireless module:	3.3V DC from Notebook PC
Power Type of Bluetooth module:	3.3V DC from Notebook PC

The channel and the operation frequency of 802.11a listed below:

Channel	Frequency(MHz)	Channel	Frequency(MHz)
01	5180	02	5200
03	5220	04	5240
05	5260	06	5280
07	5300	08	5320
09	5745	10	5765
11	5785	12	5805
13	5825		

The channel and the operation frequency of 802.11b and 802.11g 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		

The channels and the operation frequency of Bluetooth listed below:

Channel	Frequency(MHz)	Channel	Frequency(MHz)
00	2402	01	2403
02	2404	03	2405
04	2406	05	2407
……			
75	2477	76	2478
77	2479	78	2480

WWAN HW version	SIERRA, Model:MC8775V
WWAN TX Frequency	824MHz~849MHz 1850MHz ~ 1910MHz
WWAN RX Frequency	869MHz~894MHz 1930MHz ~ 1990MHz
WWAN Antenna Type	PIFA Antenna
WWAN Antenna Gain	0.52dBi (850MHz), 2.06dBi(1900MHz)
WWAN Type of Antenna Connector	I-PEX

CPU:	Genuine intel U2500 1.2GHz
Adapter Type:	Auto Switching AC Adapter 100-240V,1.2A 50-60Hz EPS (Model: F10903-A)
Hard Disk Driver:	Toshiba (Model:MK8032GSX) 80G or Toshiba (Model:MK1234GSX) 120G
Modem Card:	Conexant (Model: RD-02-D330)
Wireless LAN Card:	Intel(Model:WM3945ABG)
Bluetooth module:	BILLIONTON(Model:GUBTCR42M)
USB Connector:	two 4 pin
RJ11 Connector:	one 2 pin
Serial Port:	two 9 pin
RJ45 Connector:	one 8 pin
Line out Port:	one
Line-in Port:	one
SD Card Port:	one
PCMCIA Slot:	two
DC IN Port:	one
Battery:	MITAC(Model: BP-LC2600/33-0151), 11.1Vdc, 7800mAh
LCD:	Toshiba(Model: LTD104KA1S) or Toshiba(Model: LTD121EXEV)
DDR:	Infineon(Model:PC2-4200S-444-11-A0) 512M Hnnix(Model:PC2-5300S555-12) 1G
Power Cord:	Non-shielded, Detachable

Test configuration:

configuration	LCD	CPU	Adapter Type	Hard Disk	Modem Card	Wireless LAN Card	Battery	DDR
1	Toshiba(Model: LTD104KA1S)	Genuine intel U2500 1.2GHz	EPS (Model: F10903-A)	Toshiba (Model:MK1234GSX) 120G	Conexant (Model: RD-02-D330)	Intel(Model:WM3945ABG)	MITAC(Model:BP-LC2600/33-0151)	Hnnix(Model:PC2-5300S555-12)
2	Toshiba(Model: LTD121EXEV)	Genuine intel U2500 1.2GHz	EPS (Model: F10903-A)	Toshiba (Model:MK1234GSX) 120G	Conexant (Model: RD-02-D330)	Intel(Model:WM3945ABG)	MITAC(Model:BP-LC2600/33-0151)	Hnnix(Model:PC2-5300S555-12)

All types of LCD、CPU、Adapter Type、Hard Disk、Modem Card、Wireless LAN Card、Battery、DDR with related components have been tested, only shown the worst data using the following configuration in this report.

configuration	LCD	CPU	Adapter Type	Hard Disk	Modem Card	Wireless LAN Card	Battery	DDR
2	Toshiba(Model: LTD121EXEV)	Genuine intel U2500 1.2GHz	EPS (Model: F10903-A)	Toshiba (Model:MK1234GSX) 120G	Conexant (Model: RD-02-D330)	Intel(Model:WM3945ABG)	MITAC(Model:BP-LC2600/33-0151)	Hnnix(Model:PC2-5300S555-12)

EMI Noise Source:

GPS board Crystal: 12MHz(X1)
Touch Panel board Crystal:7.372MHz(X1)
SD card board Crystal:12MHz(X2)
Main board Crystal:25MHz(X3),10MHz(X2),14.318MHz(X501)
Clock Generator: U514

EMI Solution:

1. Adding shielded tape on LCD Signal cable
2. Adding Gasket on LCD Signal cable
3. Adding Gasket on LCD Panel around
4. Adding Gasket on Bluetooth Module
5. Adding aluminum foil on 3GCDMA antenna
6. Adding Copper on Main board
7. Adding Copper on Modem Card
8. Adding Gasket on Main board
9. Adding Gasket on Modem Card
10. Adding Core(A5 FS 16*5*12) on LAN Signal cable
11. Adding Core(A3 FS 15*3*11) on Modem Card Signal cable
12. Adding Core(K5B RH 6.35*15.8*3.3) on DC IN Jack
13. Adding aluminum foil on Case
14. Adding Core(FPC 40*2.7*12-K) on Keyboard Signal cable
15. Adding Core(RC 16*28*9 -M2) on Adapter Type Signal cable

Maximum Peak Output Power

802.11b (dBm)							
Freq.	Bit rate (mbps)						
(MHz)	1	2	5.5	11			
2412	13.91	12.8	13.5	12.9			
2437	14.7	13.3	14.67	13.51			
2462	**14.95**	13.39	14.21	13.45			

802.11g (dBm)							
Freq.	Bit rate (mbps)						
(MHz)	6	9	12	18	24	36	54
2412	18.42	18.41	18.26	17.95	18.43	17.93	16.98
2437	18.44	18.44	18.09	17.87	18.31	17.74	17.34
2462	**18.57**	18.48	17.83	17.58	18	17.5	17.1

802.11a (dBm)							
Freq.	Bit rate (mbps)						
(MHz)	6	9	12	18	24	36	54
5745	14.05	14.05	13.96	13.94	13.97	13.54	13.1
5785	14.36	14.35	14.17	13.97	13.83	13.27	13
5825	**14.45**	14.02	13.79	12.98	13.52	12.47	12.05

3. Description of Support Equipment

3.1 Description of Support Equipment

Unit	Model Serial No.	Brand	Power Cord	FCC ID
Aceex Modem	DM1414 S/N: 0301000557	Aceex	Nonshielded Detachable	FCC DOC
Aceex Modem	DM1414 S/N: 0301000557	Aceex	Nonshielded Detachable	FCC DOC
Bluetooth test set	Mt8852B S/N: 6K00004613	Anritsu	Shielded Detachable	NA
External Hard Disk Case	F12-UF S/N: NA	TeraSys	Nonshielded Detachable	FCC DOC
External Hard Disk Case	F12-UF S/N: NA	TeraSys	Nonshielded Detachable	FCC DOC
ATA Microphone and HeadSet	1221K S/N: NA	ATA	NA	FCC DOC

3.1.1 Software for Controlling Support Unit

Test programs exercising various part of EUT were used. The programs were executed as follows:

A. Read and write to the disk drives.
B. The RF software makes the transmitter continuously sending RF signals
C. Repeat the above steps.

	Filename	Issued Date
CRTU 3945ABG version 4.0.18.0000	CRTU.exe	2005/10/16

3.1.2 I/O Cable Condition of EUT and Support Units

Description	Path	Cable Length	Cable Type	Connector Type
AC Power Cord	110V (~240V) to EUT SPS	1.8M	Nonshielded, Detachable	Plastic Head
AC Power Cord	110V (~240V) to BT test set SPS	1.8M	Shielded, Detachable	Plastic Head
Modem Data Cable*2	Modem to PC COM 1 port	1.5M	Shielded, Detachable	Metal Head
USB Data Cable*2	USB external hard disk to EUT USB Port	1.8M	Shielded, Un-detachable	Metal Head
Audio Data Cable	Microphone and HeadSet to EUT Line In Port and Line Out Port	1.8M	Non-shielded, Un-Detachable	Plastic Head

4. TEST RESULTS (802.11b & g)

4.1 Powerline Conducted Emissions [Section 15.207]

4.1.1 EUT Configuration

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 used.

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 6dß 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 6dß below the applicable average limits, the emissions were also measured with the average detectors.

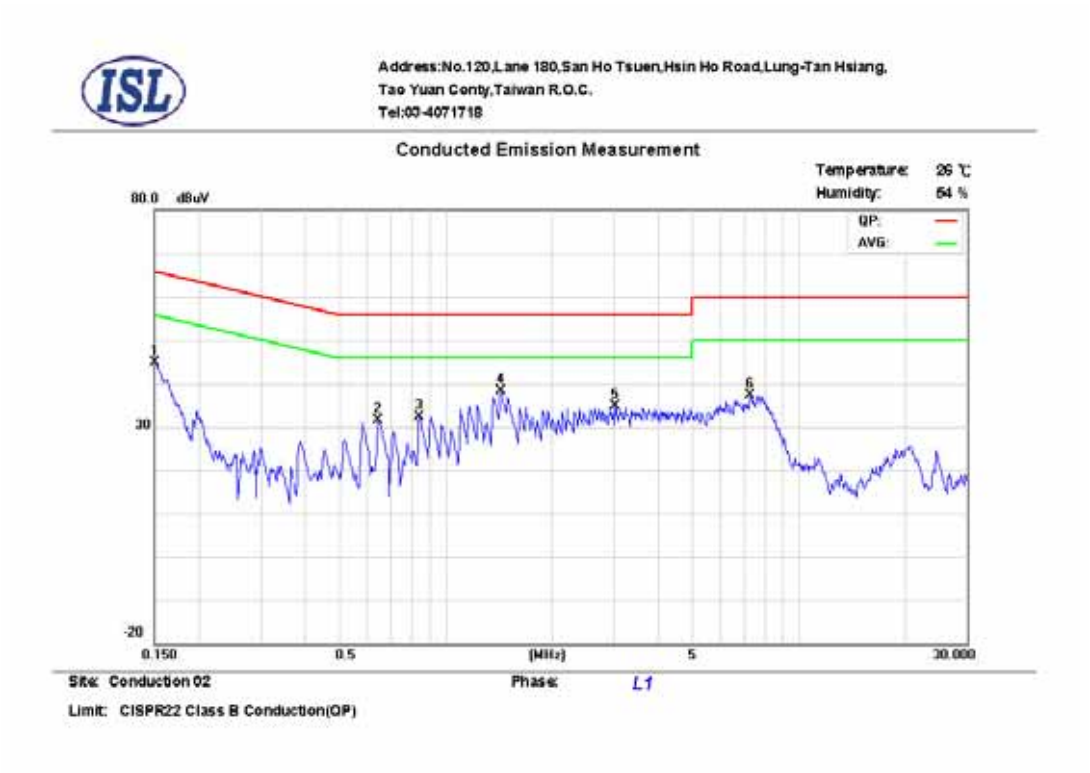
The highest emissions were analyzed in details by operating the spectrum analyzer in fixed tuned mode to determine the nature of the emissions and to provide information which could be useful in reducing their amplitude.

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

4.1.4 802.11b Test Data:

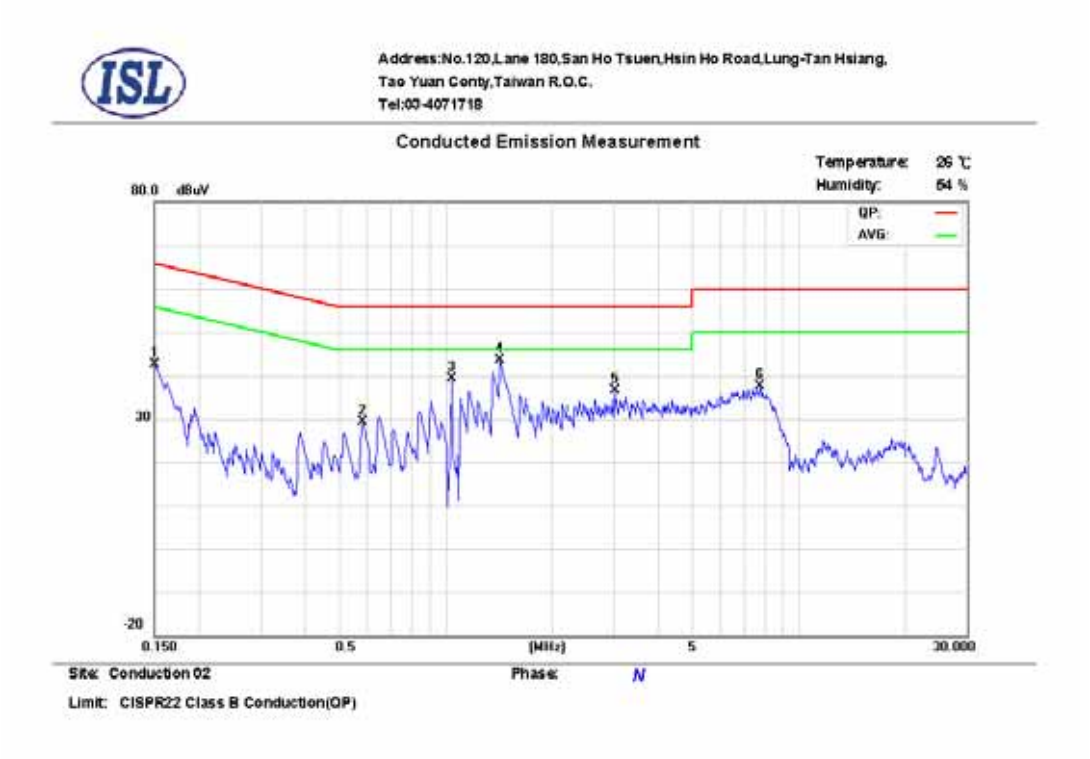
802.11b Power Line Conducted Emissions (Hot) Channel 1, 6, 11



Frequency MHz	LISN Loss dB	Cable Loss dB	QP Correct. dBuV	QP Limit dBuV	QP Margin dB	AVG Correct. dBuV	AVG Limit dBuV	AVG Margin dB	Note
0.1508	0.1	0.02	43.00	65.9	-22.9	39.90	55.9	-16.0	
0.6440	0.2	0.07	32.70	56.0	-23.3	29.60	46.0	-16.4	
0.8438	0.2	0.07	33.00	56.0	-23.0	32.60	46.0	-13.4	
* 1.4257	0.2	0.08	39.90	56.0	-16.1	36.90	46.0	-9.10	
3.0253	0.3	0.12	25.80	56.0	-30.2	22.40	46.0	-23.6	
7.2518	0.45	0.18	38.50	60.0	-21.5	34.90	50.0	-15.1	

*:Maximum data x:Over limit

802.11b Power Line Conducted Emissions (Neutral) Channel 1, 6, 11



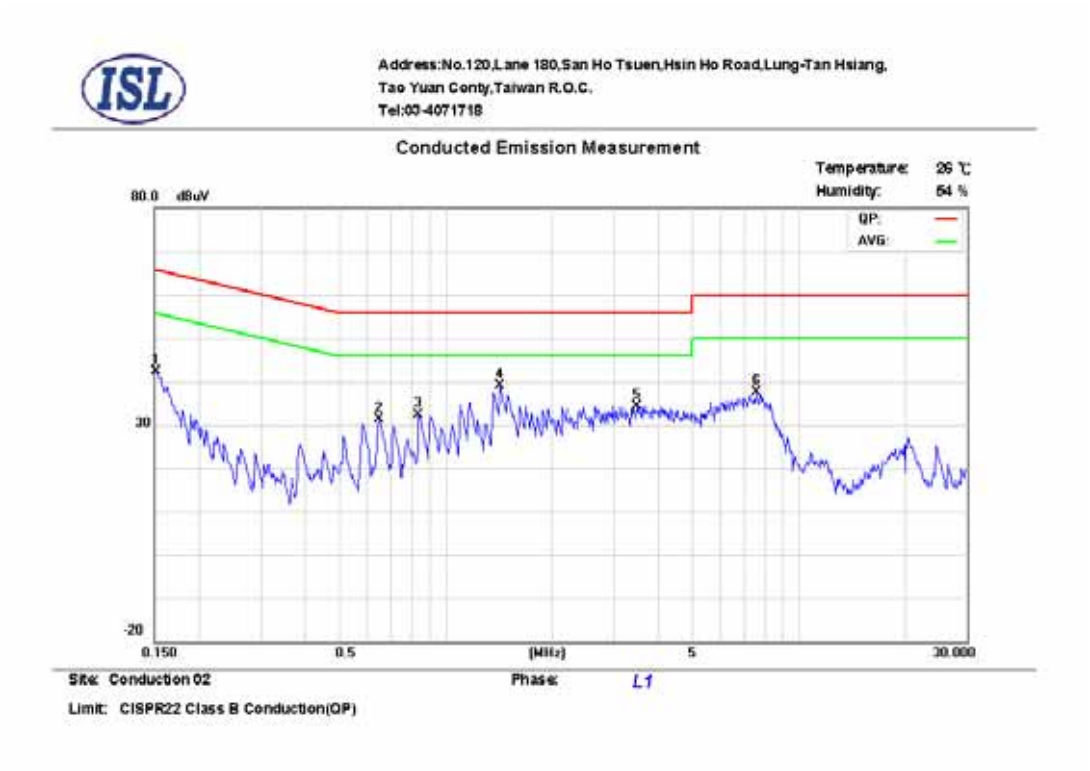
Frequency MHz	LISN Loss dB	Cable Loss dB	QP Correct. dBuV	QP Limit dBuV	QP Margin dB	AVG Correct. dBuV	AVG Limit dBuV	AVG Margin dB	Note
0.1508	0.1	0.02	42.30	65.9	-23.6	39.50	55.9	-16.4	
0.5854	0.2	0.07	31.10	56.0	-24.9	28.00	46.0	-18.0	
1.0430	0.2	0.07	23.40	56.0	-32.6	15.50	46.0	-30.5	
* 1.4220	0.2	0.08	43.70	56.0	-12.3	40.30	46.0	-5.70	
3.0253	0.2	0.12	26.90	56.0	-29.1	21.60	46.0	-24.4	
7.7689	0.33	0.18	36.80	60.0	-23.2	32.60	50.0	-17.4	

*:Maximum data x:Over limit

* 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

4.1.5 802.11g Test Data:

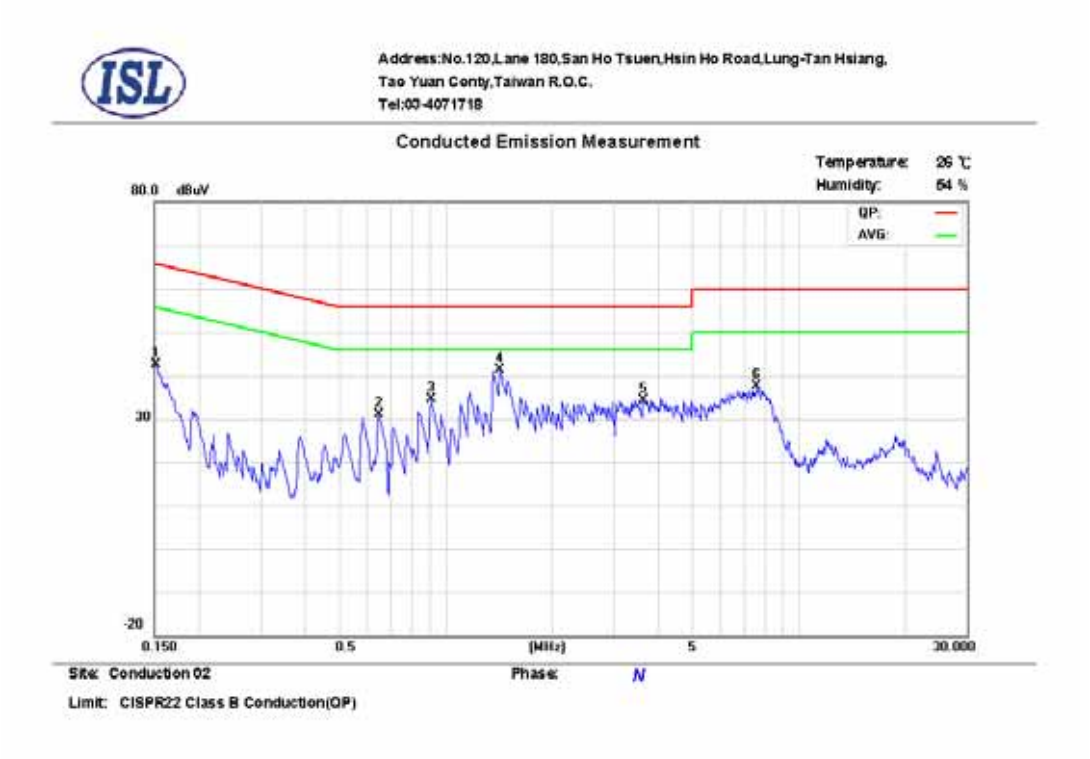
802.11g Power Line Conducted Emissions (Hot) Channel 1, 6, 11



Frequency MHz	LISN Loss dB	Cable Loss dB	QP Correct. dBuV	QP Limit dBuV	QP Margin dB	AVG Correct. dBuV	AVG Limit dBuV	AVG Margin dB	Note
0.1516	0.1	0.02	42.90	65.9	-23.0	39.70	55.9	-16.2	
0.6508	0.2	0.07	32.60	56.0	-23.4	29.10	46.0	-16.9	
0.8393	0.2	0.07	32.50	56.0	-23.5	31.90	46.0	-14.1	
* 1.4257	0.2	0.08	39.60	56.0	-16.4	36.40	46.0	-9.60	
3.4906	0.35	0.13	34.30	56.0	-21.7	33.60	46.0	-12.4	
7.5658	0.46	0.18	37.80	60.0	-22.2	37.90	50.0	-12.1	

*:Maximum data x:Over limit

802.11g Power Line Conducted Emissions (Neutral) Channel 1, 6, 11



Frequency MHz	LISN Loss dB	Cable Loss dB	QP Correct. dBuV	QP Limit dBuV	QP Margin dB	AVG Correct. dBuV	AVG Limit dBuV	AVG Margin dB	Note
0.1516	0.1	0.02	42.30	65.9	-23.6	39.20	55.9	-16.7	
0.6474	0.2	0.07	31.70	56.0	-24.3	30.90	46.0	-15.1	
0.9087	0.2	0.07	35.20	56.0	-20.8	32.00	46.0	-14.0	
* 1.4242	0.2	0.08	40.40	56.0	-15.6	40.30	46.0	-5.70	
3.6418	0.2	0.13	24.80	56.0	-31.2	19.60	46.0	-26.4	
7.5658	0.32	0.18	37.40	60.0	-22.6	36.00	50.0	-14.0	

*:Maximum data x:Over limit

* 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

4.2.3 802.11b Test Data:

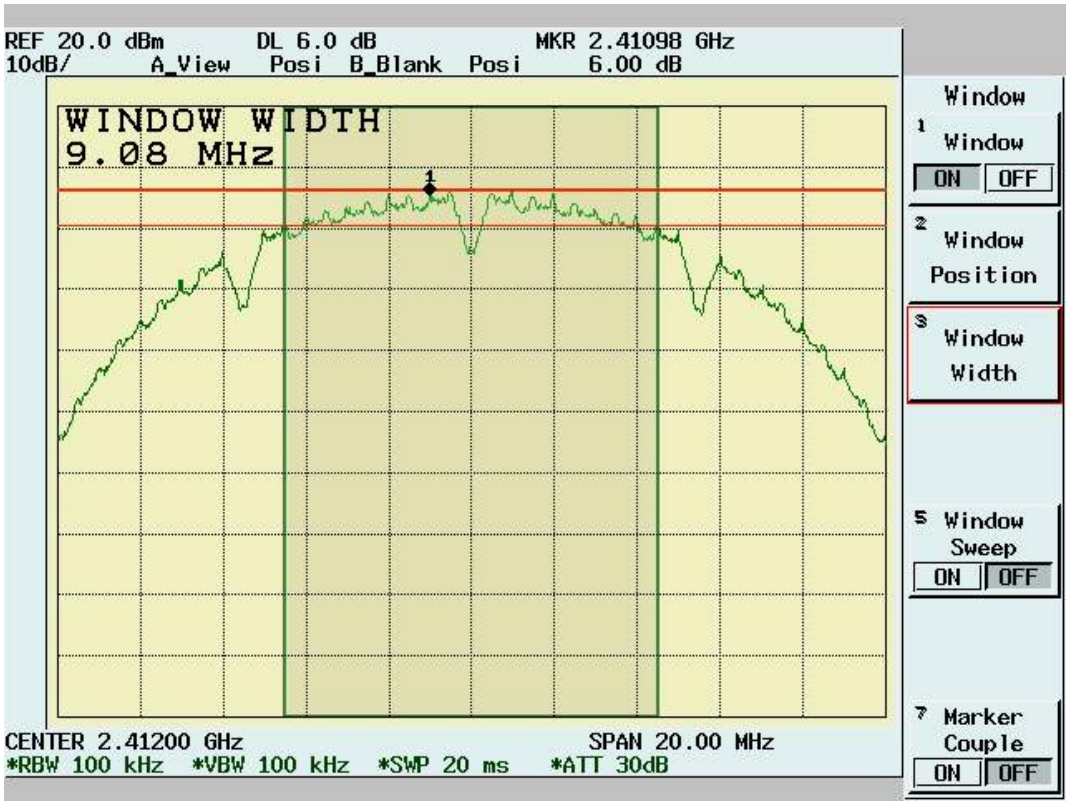
802.11b 6dB Bandwidth

Temp. (° C): 25

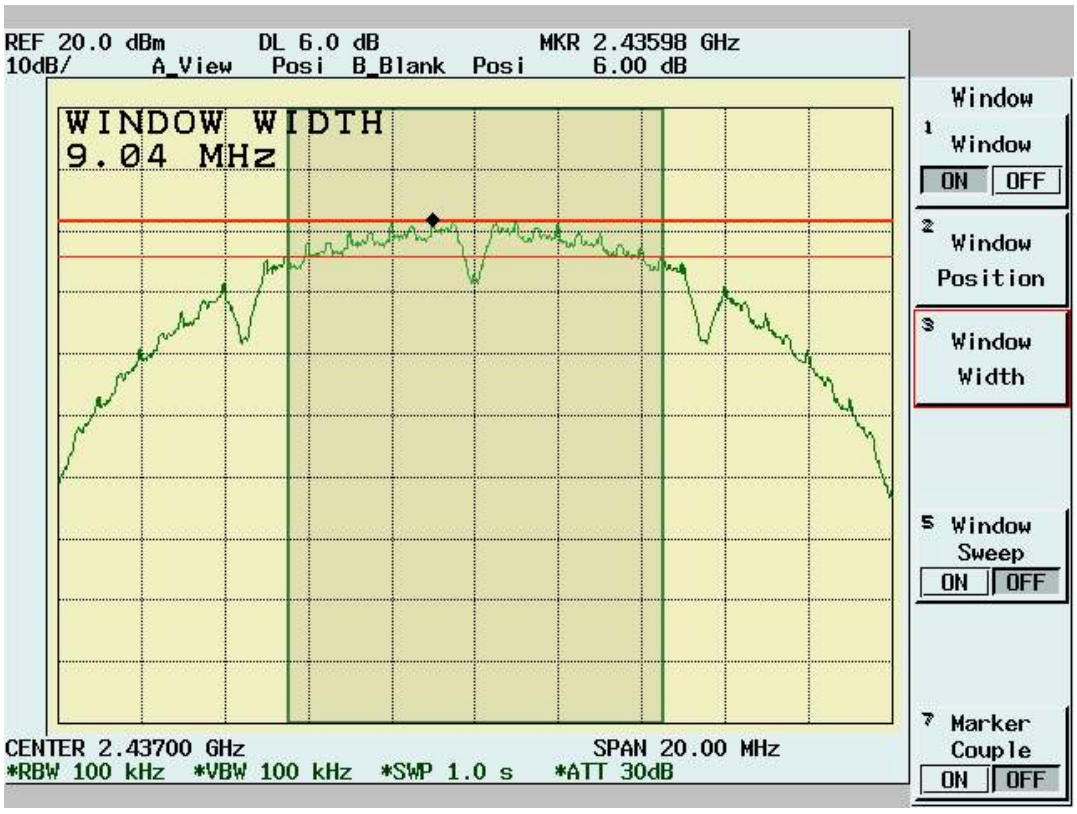
Test Engr: Jerry Humidity (%): 55

Chennel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Pass/Fail
1	2412	9.08	0.5	Pass
6	2437	9.04	0.5	Pass
11	2462	9.08	0.5	Pass

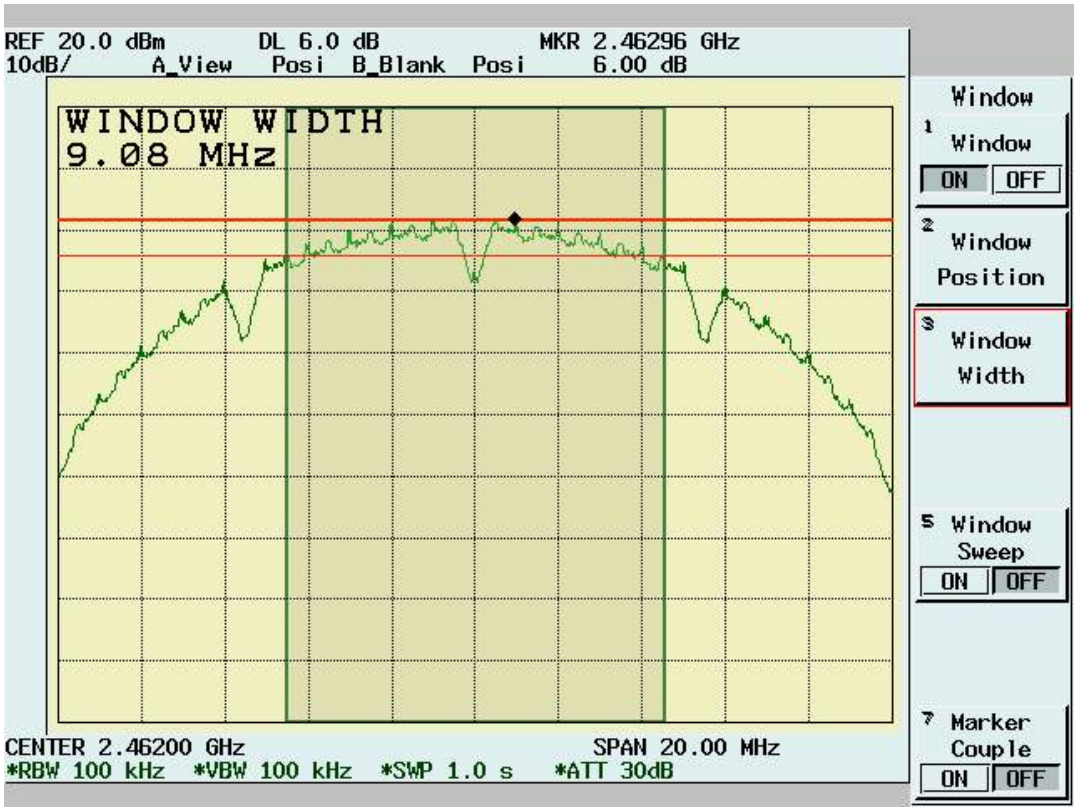
802.11bChannel 1:



802.11b Channel 6:



802.11b Channel 11:



4.2.4 802.11g Test Data:

802.11g 6dB Bandwidth

Temp. (° C): 25

Test Engr: Jerry Humidity (%): 55

Chennel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Pass/Fail
1	2412	9.12	0.5	Pass
6	2437	9.08	0.5	Pass
11	2462	9.08	0.5	Pass

802.11g Channel 1:

802.11g Channel 6:

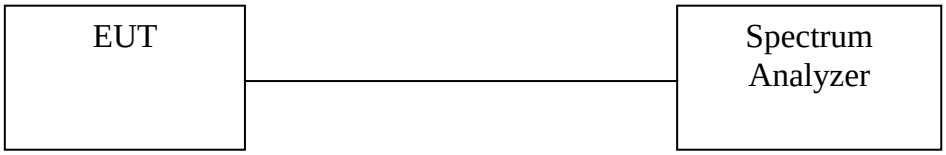
802.11g Channel 11:

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



4.3.3 802.11b Test Data

802.11b Maximum Peak Output Power

Temp. (° C): 25

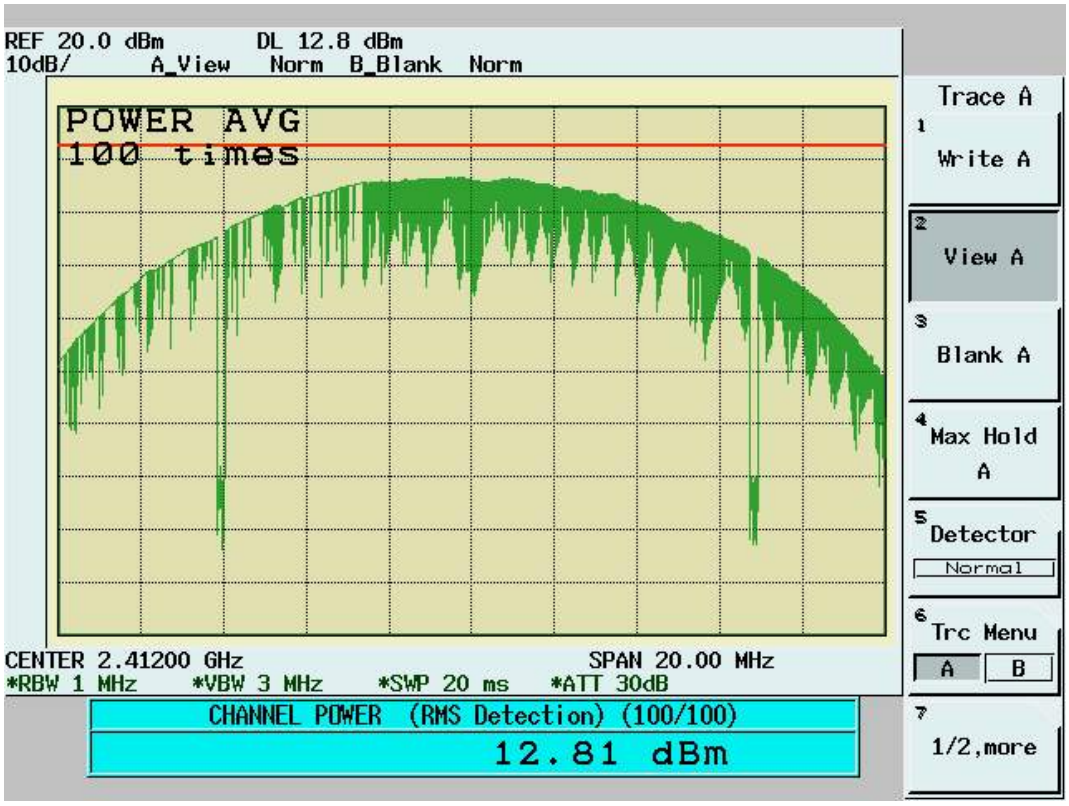
Test Engr: Jerry Humidity (%): 55

Channel	Frequency (MHz)	Analyzer Reading (dBm)	Cable Loss (dB)	Peak Power Output (mW)	Peak Power Output (dBm)	Limit (dBm)	Pass/Fail
1	2412	12.81	1.1	24.60	13.91	30	Pass
6	2437	13.6	1.1	29.51	14.7	30	Pass
11	2462	13.85	1.1	31.26	**14.95**	30	Pass

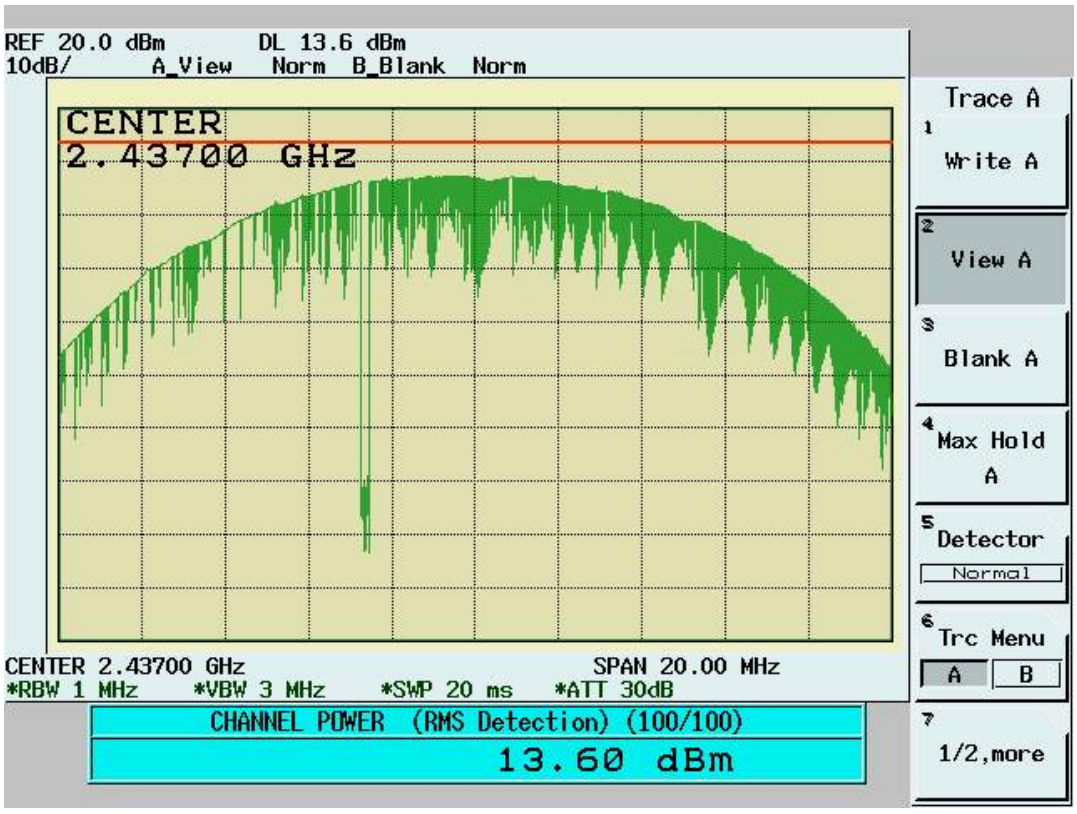
802.11b (dBm)							
Freq.	Bit rate (mbps)						
(MHz)	1	2	5.5	11			
2412	13.91	12.8	13.5	12.9			
2437	14.7	13.3	14.67	13.51			
2462	**14.95**	13.39	14.21	13.45			

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

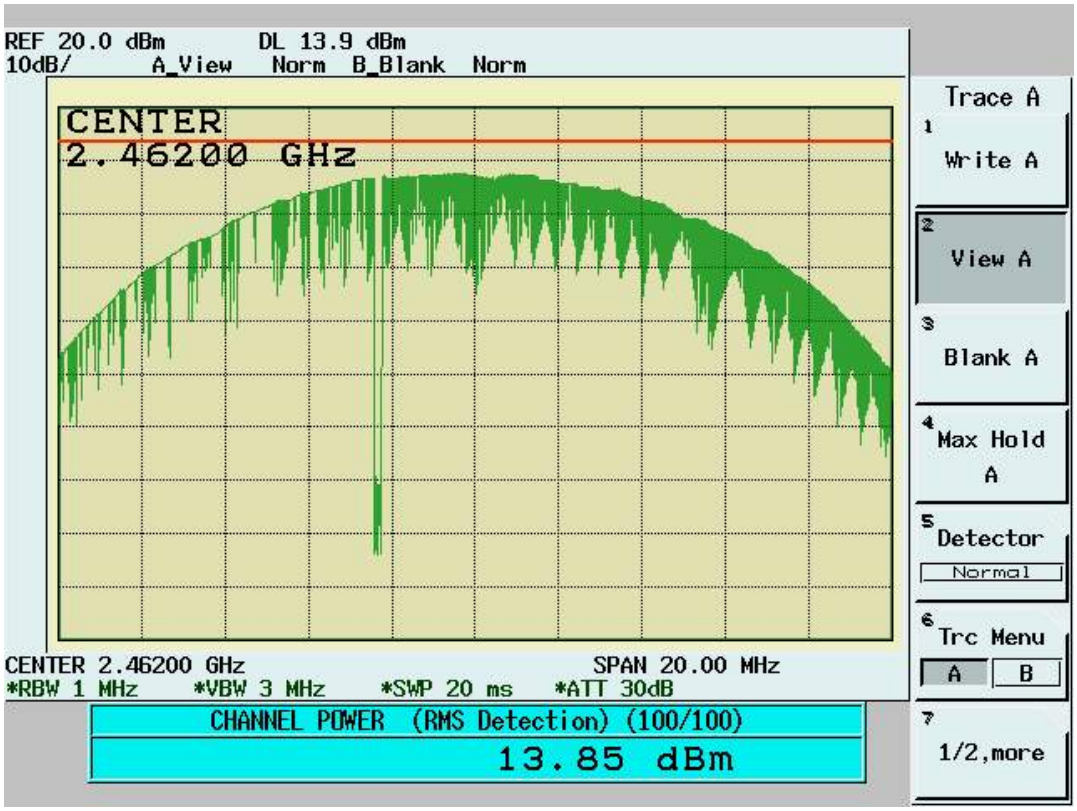
802.11b Channel 1:



802.11b Channel 6:



802.11b Channel 11:



4.3.4 802.11b Test Data

802.11b Maximum Peak Output Power

Temp. (° C): 25

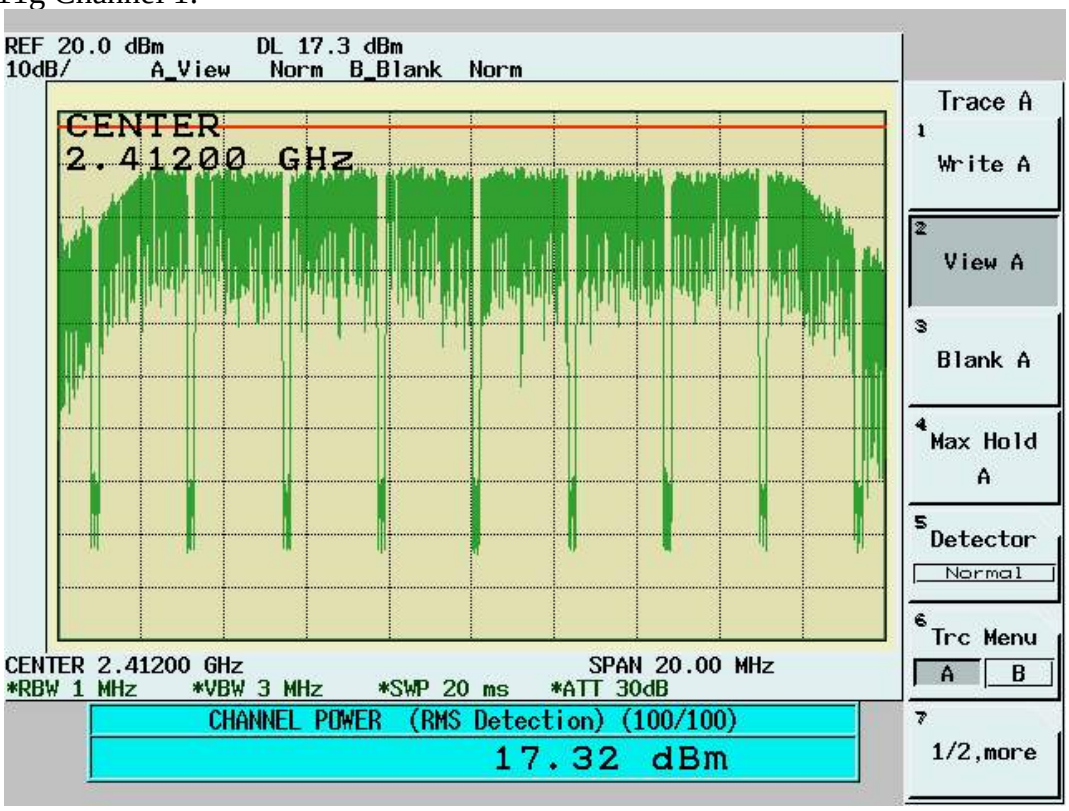
Test Engr: Jerry Humidity (%): 55

Channel	Frequency (MHz)	Analyzer Reading (dBm)	Cable Loss (dB)	Peak Power Output (mW)	Peak Power Output (dBm)	Limit (dBm)	Pass/Fail
1	2412	17.32	1.1	69.50	18.42	30	Pass
6	2437	17.34	1.1	69.82	18.44	30	Pass
11	2462	17.47	1.1	71.94	**18.57**	30	Pass

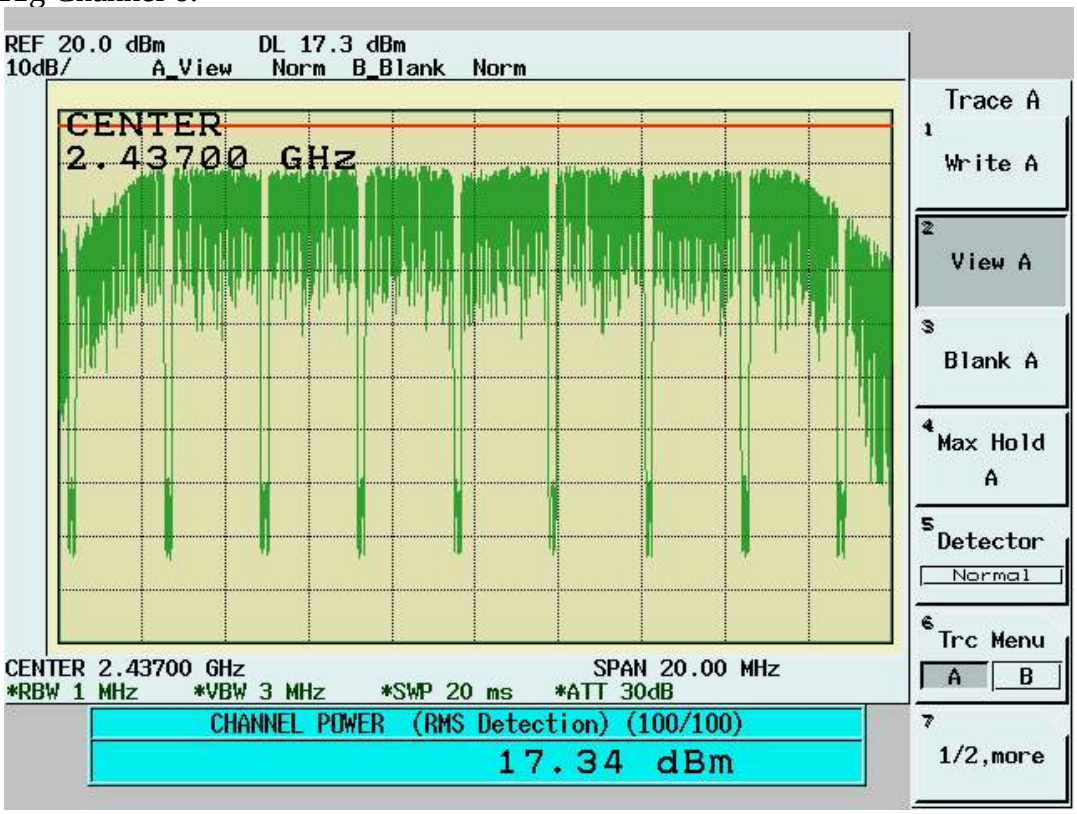
802.11g (dBm)							
Freq.	Bit rate (mbps)						
(MHz)	6	9	12	18	24	36	54
2412	18.42	18.41	18.26	17.95	18.43	17.93	16.98
2437	18.44	18.44	18.09	17.87	18.31	17.74	17.34
2462	18.57	18.48	17.83	17.58	18	17.5	17.1

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

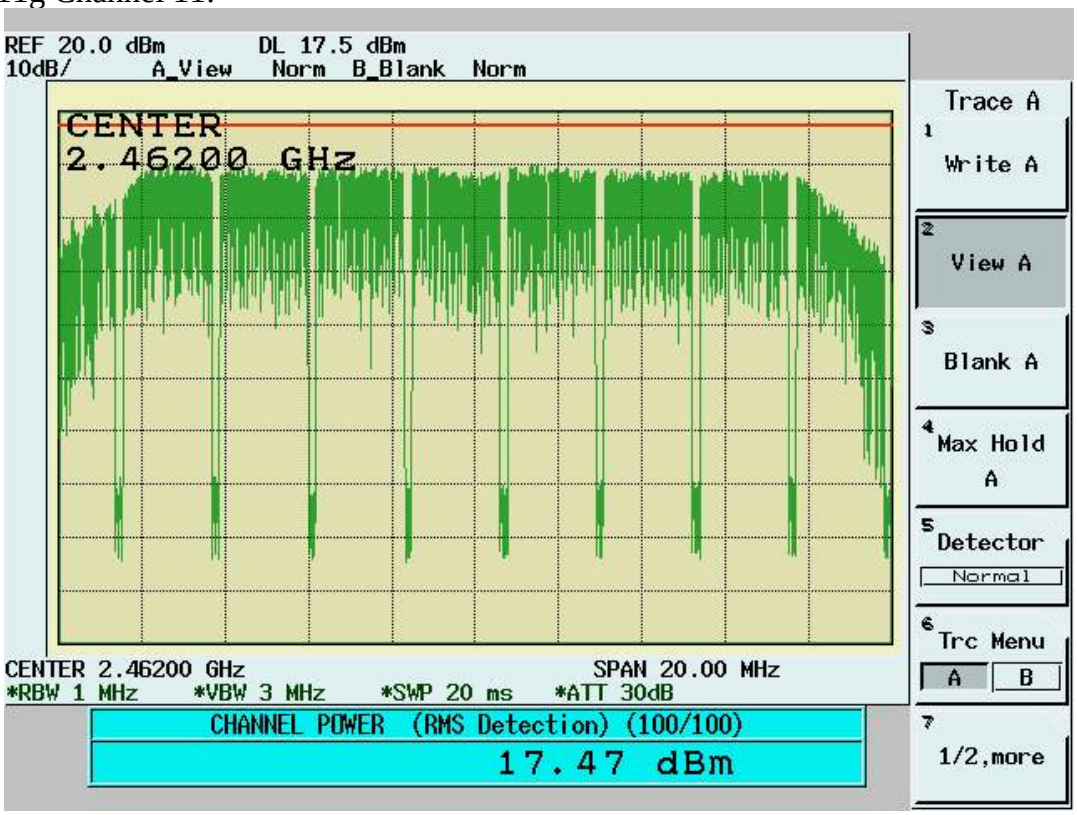
802.11g Channel 1:



802.11g Channel 6:



802.11g Channel 11:



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 2^{nd} to 10^{th} 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)	360KHz
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

4.4.4 802.11b Test Data (30MHz – 1GHz):

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

Operator: Jerry Chiou

Temperature (C): 25
Humidity (%): 63

Frequency MHz	Rx Amp. (dBuV)	Ant Fact (dB/m)	CableLoss (dB)	PreAmpGain (dB)	Corrct. Emi. (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pos. (cm)	Table Pos. (deg)
65.89	22.39	6.31	1.47	0.00	30.16	40.00	-9.84	96.00	218.00
87.23	22.49	8.35	1.67	0.00	32.51	40.00	-7.49	96.00	244.00
95.96	17.37	9.91	1.79	0.00	29.07	43.50	-14.43	96.00	34.00
105.66	15.52	11.62	1.93	0.00	29.07	43.50	-14.43	96.00	60.00
108.57	16.24	12.14	1.94	0.00	30.32	43.50	-13.18	96.00	34.00
111.48	19.59	12.43	1.90	0.00	33.92	43.50	-9.58	96.00	34.00
157.07	16.10	10.13	2.34	0.00	28.57	43.50	-14.93	96.00	218.00
163.86	16.33	9.87	2.39	0.00	28.58	43.50	-14.92	96.00	218.00
182.29	15.59	9.23	2.47	0.00	27.30	43.50	-16.20	96.00	271.00
197.81	15.91	9.16	2.60	0.00	27.67	43.50	-15.83	96.00	244.00
201.69	16.92	9.18	2.63	0.00	28.73	43.50	-14.77	96.00	244.00
919.49	4.29	20.66	5.32	0.00	30.26	46.00	-15.74	96.00	324.00

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

Operator: Jerry Chiou

Temperature (C): 25
Humidity (%): 63

Frequency	Rx Amp.	Ant Fact	CableLoss	PreAmpGain	Corrct. Emi.	Limit	Margin	Ant. Pos.	Table Pos.
MHz	(dBuV)	(dB/m)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg)
70.74	21.44	6.16	1.55	0.00	29.14	40.00	-10.86	96.00	244.00
89.17	21.96	8.73	1.66	0.00	32.36	43.50	-11.14	96.00	218.00
95.96	16.63	9.91	1.79	0.00	28.34	43.50	-15.16	96.00	34.00
102.75	13.90	11.10	1.93	0.00	26.92	43.50	-16.58	96.00	34.00
105.66	14.79	11.62	1.93	0.00	28.34	43.50	-15.16	96.00	60.00
111.48	19.16	12.43	1.90	0.00	33.50	43.50	-10.00	96.00	34.00
159.01	17.81	10.11	2.38	0.00	30.30	43.50	-13.20	96.00	218.00
163.86	15.97	9.87	2.39	0.00	28.22	43.50	-15.28	96.00	218.00
183.26	15.73	9.20	2.48	0.00	27.41	43.50	-16.09	96.00	191.00
202.66	16.46	9.17	2.63	0.00	28.26	43.50	-15.24	96.00	244.00
208.48	14.85	9.12	2.62	0.00	26.58	43.50	-16.92	96.00	244.00
584.84	5.77	18.79	4.42	0.00	28.98	46.00	-17.02	96.00	297.00

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

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

Operator: Jerry Chiou

RBW: 1MHz
Humidity (%): 57
Temperature (C): 22

Frequency	Rx_R.	Ant_F.	Cab_L.	PreAmpl	Emission	Limit	Margin	A.Tower	T.Table
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
1986.51	35.79 pk	30.89	2.59	23.75	45.52 pk	54.00 av	-8.48	100	44
4818.18	35.01 pk	34.11	5.14	27.49	46.76 pk	54.00 av	-7.24	100	18
7222.78	36.09 pk	38.09	3.85	26.60	51.43 pk	54.00 av	-2.57	101	142
9641.86	30.61 pk	38.84	3.94	24.84	48.55 pk	54.00 av	-5.45	102	7

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

Operator: Jerry Chiou

RBW: 1MHz
Humidity (%): 57
Temperature (C): 22

Frequency	Rx_R.	Ant_F.	Cab_L.	PreAmpl	Emission	Limit	Margin	A.Tower	T.Table
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
1861.64	37.81 pk	29.84	2.50	23.75	46.40 pk	54.00 av	-7.60	100	53
4818.18	35.76 pk	34.11	5.14	27.49	47.51 pk	54.00 av	-6.49	100	18
7222.78	38.45 pk	38.09	3.85	26.60	53.79 pk	54.00 av	-0.21	101	142
9641.86	33.26 pk	38.84	3.94	24.84	51.20 pk	54.00 av	-2.80	102	7

Note:

- According to the standards used, 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.
- " peak": peak mode; "avg": 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: Jerry Chiou

RBW: 1MHz
Humidity (%): 57
Temperature (C): 22

Frequency	Rx_R.	Ant_F.	Cab_L.	PreAmpl	Emission	Limit	Margin	A.Tower	T.Table
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
4861.64	42.02 pk	34.27	5.13	27.43	54.00 pk	74.00 pk	-20	100	14
4873.91	39.58 av	34.27	5.13	27.43	51.56 av	54.00 av	-2.44	100	14
7295.2	35.80 pk	38.38	3.88	26.57	51.49 pk	54.00 av	-2.51	101	152
9728.77	32.55 pk	38.69	4.00	24.78	50.46 pk	54.00 av	-3.54	102	5

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

Operator: Jerry Chiou

RBW: 1MHz
Humidity (%): 57
Temperature (C): 22

Frequency	Rx_R.	Ant_F.	Cab_L.	PreAmpl	Emission	Limit	Margin	A.Tower	T.Table
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
4861.64	43.80 pk	34.27	5.13	27.43	55.77 pk	74.00 pk	-18.23	100	14
4874.16	40.56 av	34.27	5.13	27.43	52.53 av	54.00 av	-1.47	100	14
7295.2	38.87 pk	38.38	3.88	26.57	54.56 pk	74.00 pk	-19.44	101	152
7308.2	33.82 av	38.38	3.88	26.57	49.51 av	54.00 av	-4.49	101	152
9728.77	39.96 pk	38.69	4.00	24.78	57.86 pk	74.00 pk	-16.14	102	5
9747.95	33.54 av	38.69	4.00	24.78	51.44 av	54.00 av	-2.56	102	5

Note:

- According to the standards used, 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.
- " peak": peak mode; "avg": 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: Jerry Chiou

RBW: 1MHz
Humidity (%): 57
Temperature (C): 22

Frequency	Rx_R.	Ant_F.	Cab_L.	PreAmpl	Emission	Limit	Margin	A.Tower	T.Table
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
4919.58	35.10 pk	34.49	5.13	27.35	47.37 pk	54.00 av	-6.63	100	8
7367.63	32.79 pk	38.67	3.92	26.54	48.84 pk	54.00 av	-5.16	101	163

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

Operator: Jerry Chiou

RBW: 1MHz
Humidity (%): 57
Temperature (C): 22

Frequency	Rx_R.	Ant_F.	Cab_L.	PreAmpl	Emission	Limit	Margin	A.Tower	T.Table
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
4919.58	39.78 pk	34.49	5.13	27.35	52.05 pk	54.00 av	-1.95	100	8
7382.12	35.71 pk	38.73	3.93	26.53	51.83 pk	54.00 av	-2.17	101	165
9830.17	31.63 pk	38.51	4.07	24.72	49.49 pk	54.00 av	-4.51	101	3

Note:

- According to the standards used, 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.
- " peak": peak mode; "avg": 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.

4.4.5 802.11g Test Data

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

Operator: Jerry Chiou

Temperature (C): 25
Humidity (%): 63

Frequency	Rx Amp.	Ant Fact	CableLoss	PreAmpGain	Corrct. Emi.	Limit	Margin	Ant. Pos.	Table Pos.
MHz	(dBuV)	(dB/m)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg)
59.1	20.05	6.72	1.33	0.00	28.10	40.00	-11.90	96.00	217.00
64.92	20.63	6.35	1.45	0.00	28.44	40.00	-11.56	96.00	243.00
89.17	19.52	8.73	1.66	0.00	29.92	43.50	-13.58	96.00	217.00
95.96	16.82	9.91	1.79	0.00	28.53	43.50	-14.97	96.00	59.00
102.75	14.56	11.10	1.93	0.00	27.58	43.50	-15.92	96.00	32.00
108.57	17.48	12.14	1.94	0.00	31.56	43.50	-11.94	96.00	32.00
111.48	16.43	12.43	1.90	0.00	30.76	43.50	-12.74	96.00	32.00
129.91	13.33	11.81	2.08	0.00	27.21	43.50	-16.29	96.00	138.00
157.07	19.58	10.13	2.34	0.00	32.05	43.50	-11.45	96.00	217.00
167.74	16.79	9.64	2.42	0.00	28.85	43.50	-14.65	96.00	217.00
334.58	12.97	14.03	3.30	0.00	30.30	46.00	-15.70	96.00	32.00
584.84	6.22	18.79	4.42	0.00	29.43	46.00	-16.57	96.00	296.00

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

Operator: Jerry Chiou

Temperature (C): 25
Humidity (%): 63

Frequency	Rx Amp.	Ant Fact	CableLoss	PreAmpGain	Corrct. Emi.	Limit	Margin	Ant. Pos.	Table Pos.
MHz	(dBuV)	(dB/m)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg)
59.1	19.20	6.72	1.33	0.00	27.26	40.00	-12.74	96.00	217.00
66.86	21.20	6.26	1.48	0.00	28.93	40.00	-11.07	96.00	243.00
90.14	19.67	8.92	1.66	0.00	30.26	43.50	-13.24	96.00	217.00
92.08	18.64	9.25	1.70	0.00	29.60	43.50	-13.90	96.00	217.00
95.96	16.94	9.91	1.79	0.00	28.64	43.50	-14.86	96.00	59.00
105.66	14.09	11.62	1.93	0.00	27.64	43.50	-15.86	96.00	32.00
108.57	16.52	12.14	1.94	0.00	30.59	43.50	-12.91	96.00	32.00
111.48	17.71	12.43	1.90	0.00	32.05	43.50	-11.45	96.00	32.00
140.58	13.71	11.14	2.17	0.00	27.02	43.50	-16.48	96.00	85.00
159.01	15.27	10.11	2.38	0.00	27.75	43.50	-15.75	96.00	217.00
169.68	15.19	9.52	2.45	0.00	27.16	43.50	-16.34	96.00	217.00
919.49	3.60	20.66	5.32	0.00	29.57	46.00	-16.43	96.00	322.00

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

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

Operator: Jerry Chiou

RBW: 1MHz
Humidity (%): 57
Temperature (C): 22

Frequency	Rx_R.	Ant_F.	Cab_L.	PreAmpl	Emission	Limit	Margin	A.Tower	T.Table
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
4803.7	39.79 pk	34.05	5.14	27.51	51.47 pk	54.00 av	-2.53	100	20
7222.78	39.29 pk	38.09	3.85	26.60	54.63 pk	74.00 pk	-19.36	101	142
7229.65	26.41 av	38.09	3.85	26.60	54.63 av	54.00 av	-12.25	101	142
9641.86	32.11 pk	38.84	3.94	24.84	50.05 pk	54.00 av	-3.95	102	7

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

Operator: Jerry Chiou

RBW: 1MHz
Humidity (%): 57
Temperature (C): 22

Frequency	Rx_R.	Ant_F.	Cab_L.	PreAmpl	Emission	Limit	Margin	A.Tower	T.Table
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
4818.18	40.86 pk	34.11	5.14	27.49	52.62 pk	54.00 av	-1.38	100	18
7222.78	41.46 pk	38.09	3.85	26.60	56.80 pk	74.00 pk	-17.2	101	142
7228.75	29.12 av	38.09	3.85	26.60	44.46 av	54.00 av	-9.54	101	142
9627.37	39.85 pk	38.87	3.93	24.85	57.80 pk	74.00 pk	-16.2	102	7
9631.19	28.11 av	38.87	3.93	24.85	46.06 av	54.00 av	-7.94	102	7

Note:

- According to the standards used, 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.
- " peak": peak mode; "avg": 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: Jerry Chiou

RBW: 1MHz
Humidity (%): 57
Temperature (C): 22

Frequency	Rx_R.	Ant_F.	Cab_L.	PreAmpl	Emission	Limit	Margin	A.Tower	T.Table
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
4861.64	44.74 pk	34.27	5.13	27.43	56.72 pk	74.00 pk	-17.28	100	14
4882.06	33.24 av	34.27	5.13	27.43	45.22 av	54.00 av	-8.78	100	14
7295.2	39.20 pk	38.38	3.88	26.57	54.89 pk	74.00 pk	-19.11	101	152
7298.1	27.76 av	38.38	3.88	26.57	43.45 av	54.00 av	-10.55	101	152
9714.29	35.00 pk	38.71	3.99	24.79	52.91 pk	54.00 av	-1.09	102	6

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

Operator: Jerry Chiou

RBW: 1MHz
Humidity (%): 57
Temperature (C): 22

Frequency	Rx_R.	Ant_F.	Cab_L.	PreAmpl	Emission	Limit	Margin	A.Tower	T.Table
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
4861.64	47.22 pk	34.27	5.13	27.43	59.20 pk	74.00 pk	-14.8	100	14
4872.30	33.56 av	34.27	5.13	27.43	45.64 av	54.00 av	-8.46	100	14
7295.2	43.39 pk	38.38	3.88	26.57	59.09 pk	74.00 pk	-14.91	101	152
7298.12	29.43 av	38.38	3.88	26.57	45.13 av	54.00 av	-8.87	101	152
9728.77	41.75 pk	38.69	4.00	24.78	59.65 pk	74.00 pk	-14.35	102	5
9728.77	27.71 av	38.69	4.00	24.78	45.61 av	54.00 av	-8.39	102	5

Note:

- According to the standards used, 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.
- " peak": peak mode; "avg": 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: Jerry Chiou

RBW: 1MHz
Humidity (%): 57
Temperature (C): 22

Frequency	Rx_R.	Ant_F.	Cab_L.	PreAmpl	Emission	Limit	Margin	A.Tower	T.Table
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
4919.58	38.41 pk	34.49	5.13	27.35	50.69 pk	54.00 av	-3.31	100	8
7367.63	34.44 pk	38.67	3.92	26.54	50.49 pk	54.00 av	-3.51	101	163

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

Operator: Jerry Chiou

RBW: 1MHz
Humidity (%): 57
Temperature (C): 22

Frequency	Rx_R.	Ant_F.	Cab_L.	PreAmpl	Emission	Limit	Margin	A.Tower	T.Table
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
4919.58	42.75 pk	34.49	5.13	27.35	55.02 pk	74.00 pk	-18.92	100	8
4924.00	27.62 av	34.49	5.13	27.35	39.89 av	54.00 av	-14.11	100	8
7367.63	39.91 pk	38.67	3.92	26.54	55.96 pk	74.00 pk	-18.04	101	163
7381.02	25.10 av	38.67	3.92	26.54	41.15 av	54.00 av	-12.85	101	163
9830.17	33.78 pk	38.51	4.07	24.72	51.64 pk	54.00 av	-2.36	101	3

Note:

- According to the standards used, 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.
- " peak": peak mode; "avg": 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

Radiated

1. Antenna and Turntable test procedure same as Radiated Emission Measurement.
   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

Radiated

Same as *Radiated Emission Measurement*

4.5.3 802.11b Test Data:

Table: Band Edge measurement

Conducted Test

Temp. (°C): 25

Test Engr: Jerry Humidity (%): 55

Channel	Frequency (MHz)	Spectrum Reading (dBuV)	Carrier - Outsideband Limit: >30dB (dB)	Pass/Fail
1	2410.9	107.86	---	---
Outside band	2400	65.33	42.53	Pass
11	2460.9	108.02	---	---
Outside band	2485.2	50.77	57.25	Pass

Radiated Test

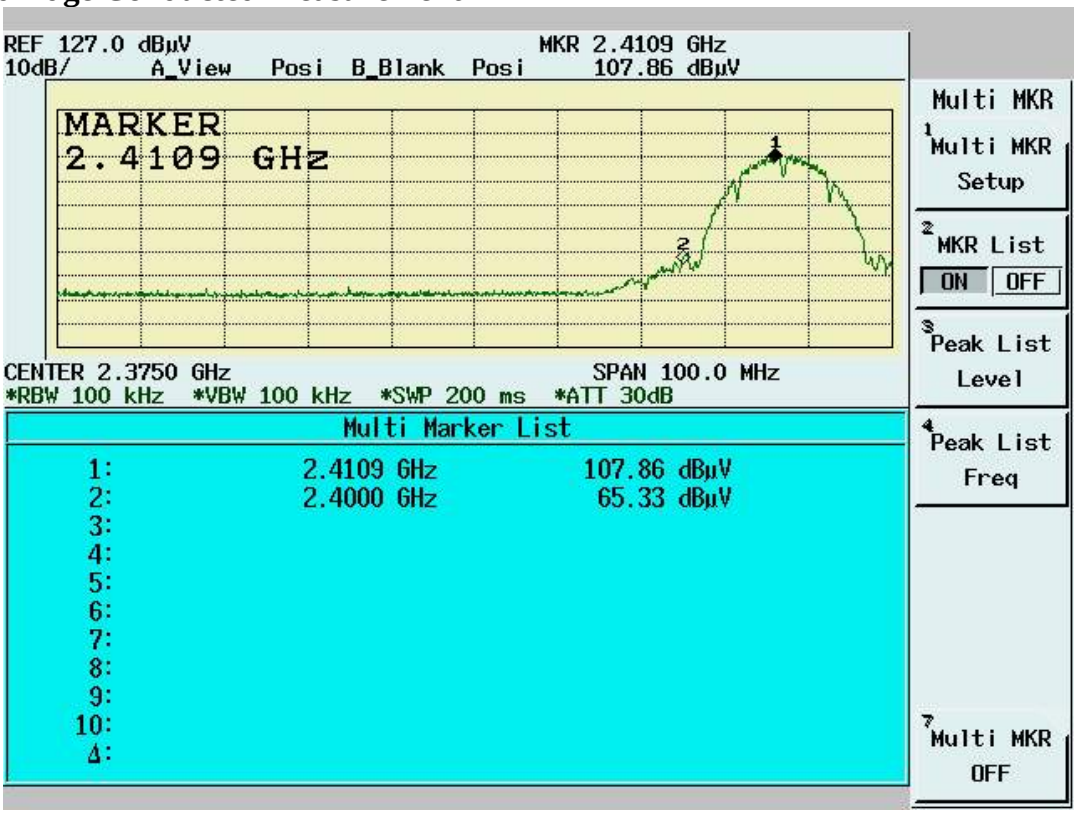
Temp. (°C): 25

Test Engr: Jerry Humidity (%): 55

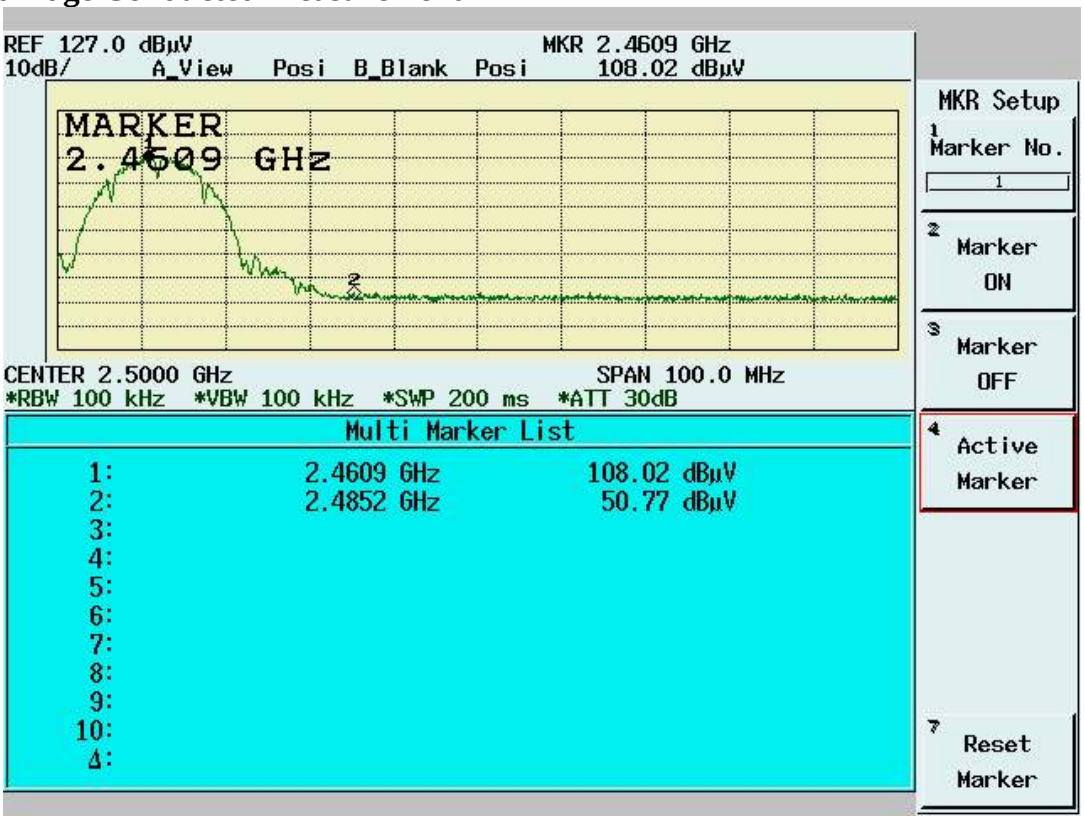
Channel	Frequency (MHz)	Spectrum Reading (dBuV)	Carrier - Outsideband Limit: >30dB (dB)	Pass/Fail
1	2411	64.38	---	---
Outside band	2399.5	19.22	45.16	Pass
11	2461.7	69.24	---	---
Outside band	2487.1	12.85	56.39	Pass

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

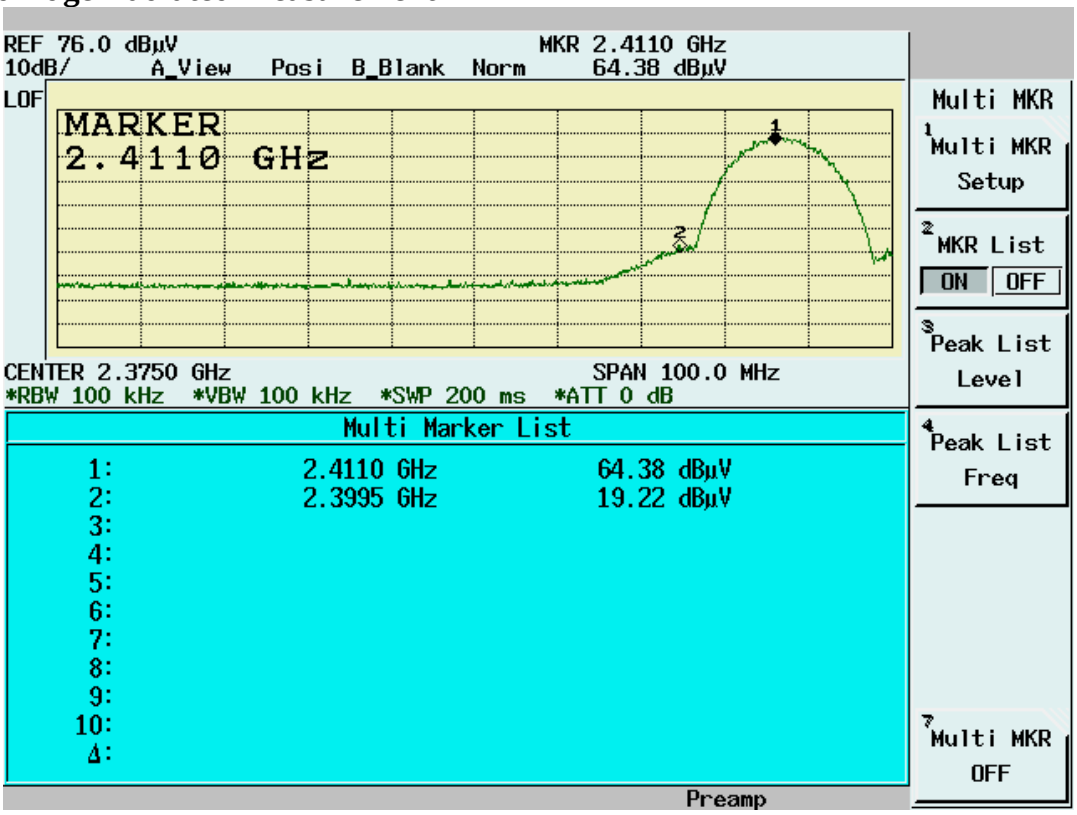
Band Edge Conducted Measurement



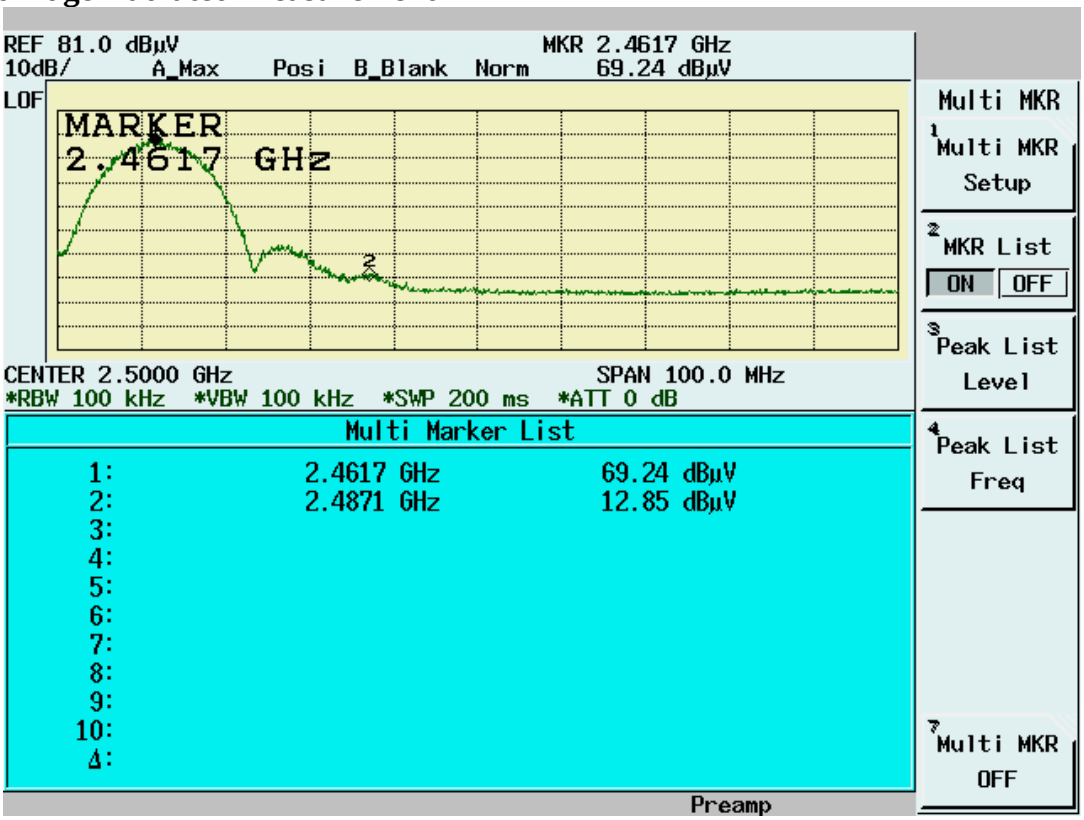
Band Edge Conducted Measurement



Band Edge Radiated Measurement



Band Edge Radiated Measurement



4.5.4 802.11g Test Data:

Table: Band Edge measurement

Conducted Test

Temp. (°C): 25

Test Engr: Jerry Humidity (%): 55

Channel	Frequency (MHz)	Spectrum Reading (dBuV)	Carrier - Outsideband Limit: >30dB (dB)	Pass/Fail
1	2414.5	108.5	---	---
Outside band	2400	76.92	31.58	Pass
11	2464.5	108.36	---	---
Outside band	2483.8	63.32	45.04	Pass

Radiated Test

Temp. (°C): 25

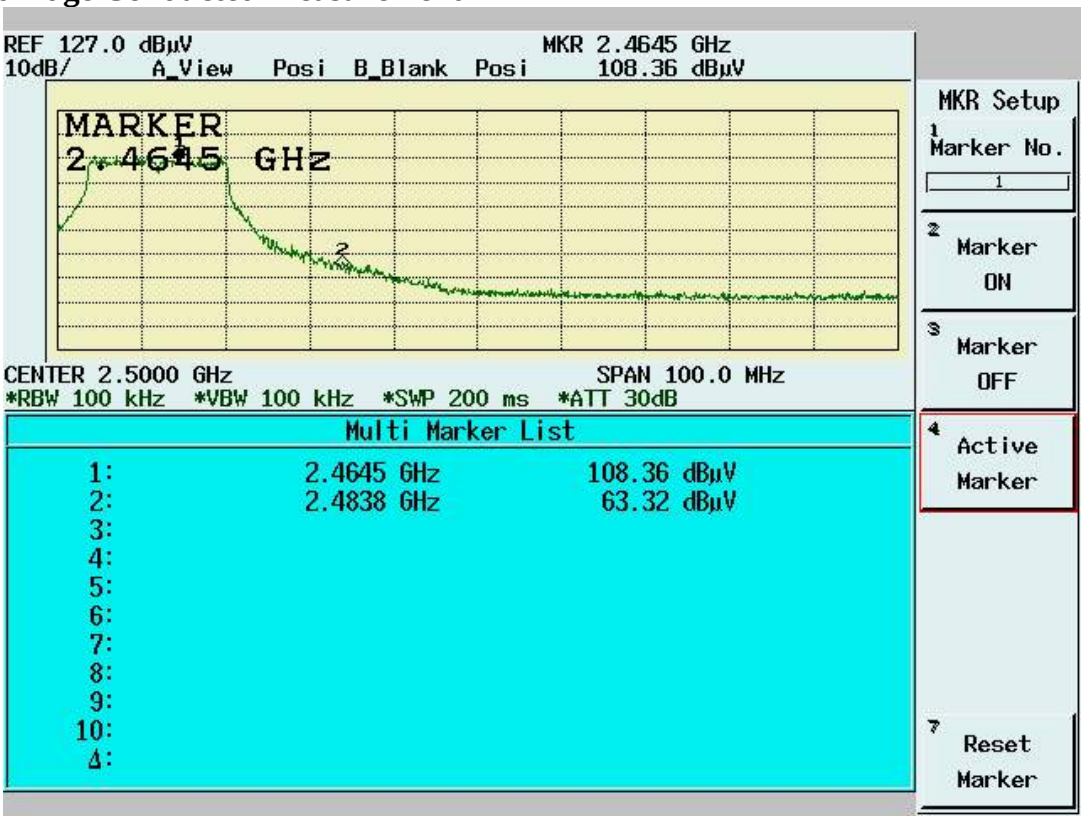
Test Engr: Jerry Humidity (%): 55

Channel	Frequency (MHz)	Spectrum Reading (dBuV)	Carrier - Outsideband Limit: >30dB (dB)	Pass/Fail
1	2404.5	66.35	---	---
Outside band	2400	33.84	32.51	Pass
11	2463.2	64.23	---	---
Outside band	2484.4	22.08	42.15	Pass

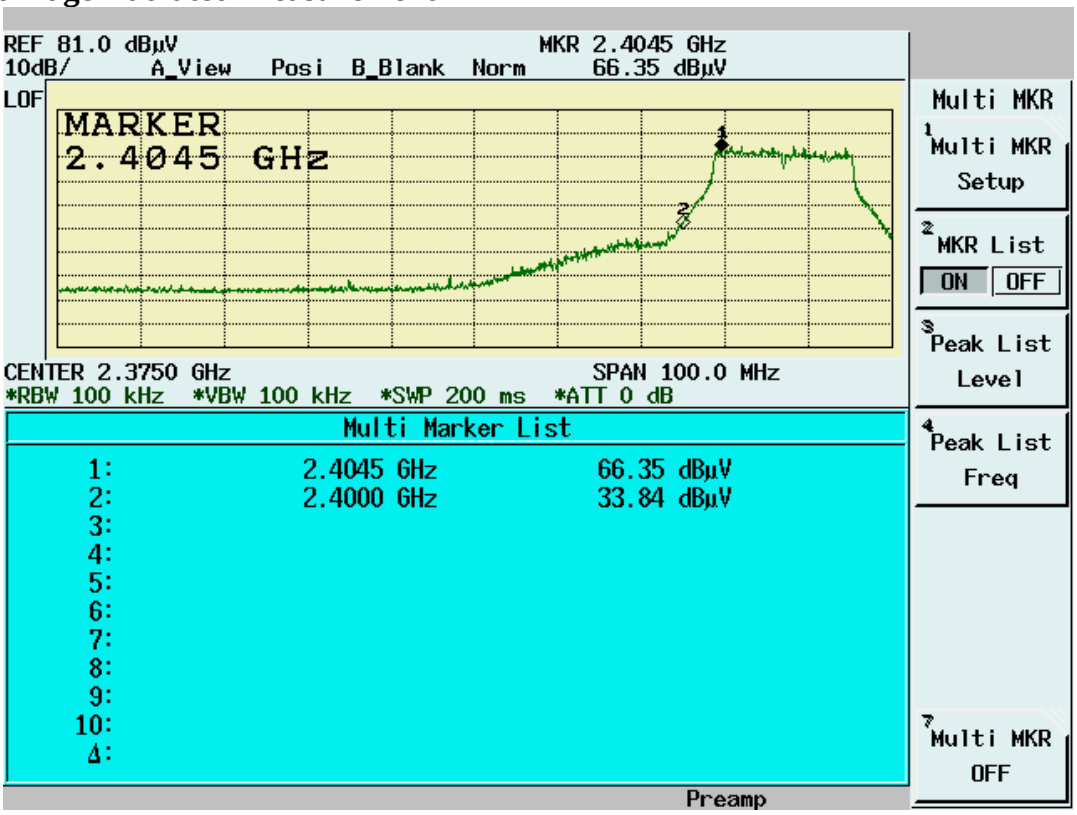
Note: Two RF output (MAIN & AUX) have been tested,the worse data shown above.

Band Edge Conducted Measurement

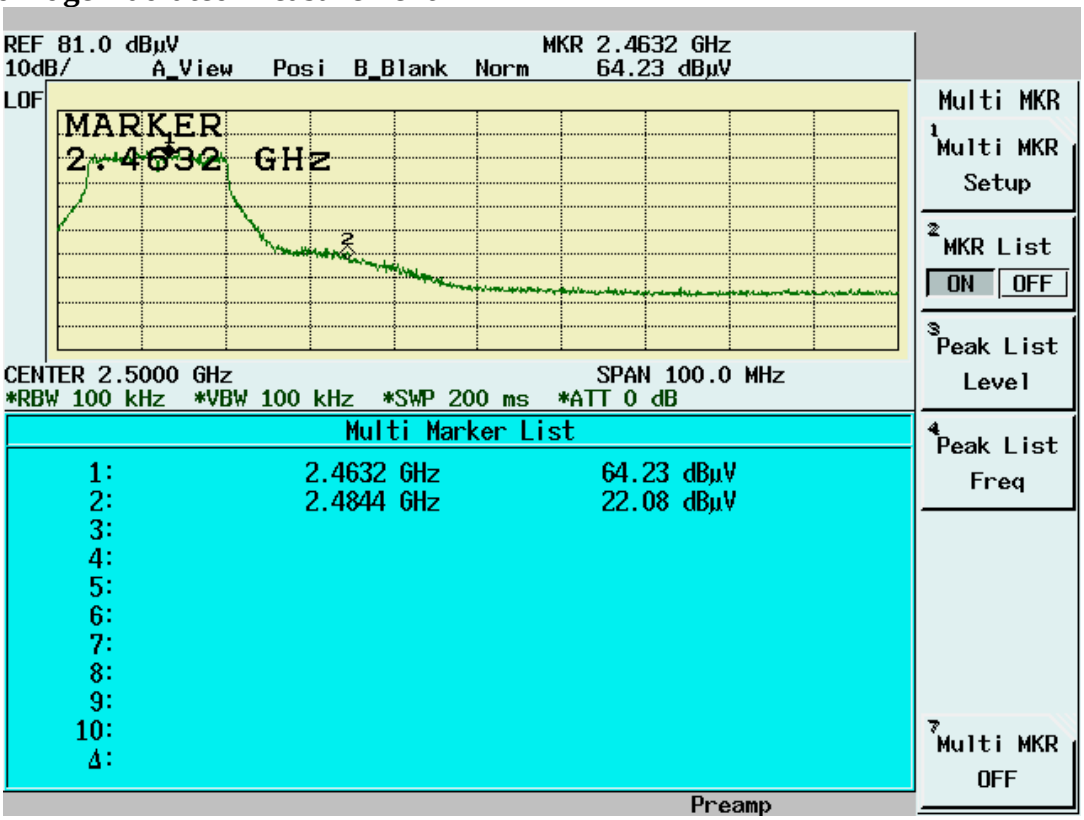
Band Edge Conducted Measurement



Band Edge Radiated Measurement



Band Edge Radiated Measurement



4.6 Restricted Bands Measurement

4.6.1 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: 2.4GHz, 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.

4.6.2 Test Setup (Radiated)

Same as *Radiated Emission Measurement*

4.6.3 802.11b Test Data

Table Band Edge Measurement (Radiated)

Temp. (° C): 25

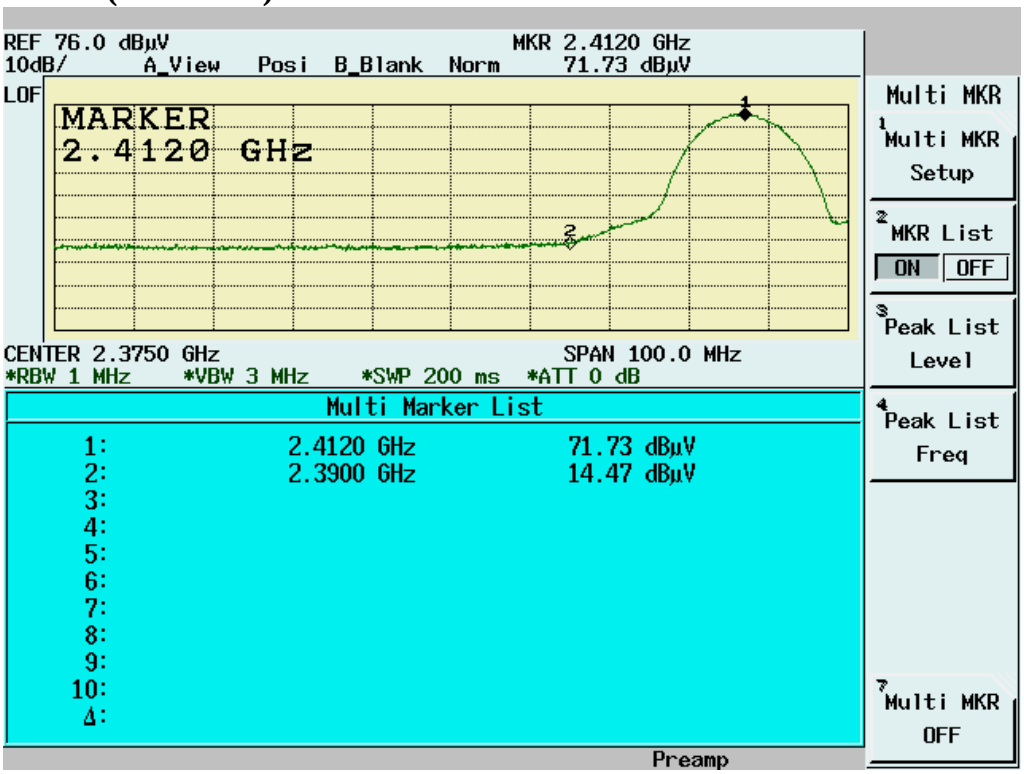
Test Engr: Jerry Humidity (%): 55

Description	Frequency (MHz)	Spectrum Reading (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Equip. Setup VBW	Pass or Fail
Channel_1 (peak mode)	2412	71.73	35.48	107.21	---	3MHz	---
Channel_1 (average mode)	2411.2	55.4	35.48	90.88	---	10Hz	---
Channel_11 (peak mode)	2463.3	76.35	35.5	111.85	---	3MHz	---
Channel_11 (average mode)	2461.3	60.3	35.5	95.8	---	10Hz	---
Channel_1 Restricted band (peak mode)	2390	14.47	35.47	49.94	74	3MHz	Pass
Restricted band (average mode)	2390	2.91	35.47	38.38	54	10Hz	Pass
Channel_11 Restricted band (peak mode)	2485.8	24.59	35.51	60.1	74	3MHz	Pass
Restricted band (average mode)	2486.4	12.71	35.51	48.22	54	10Hz	Pass

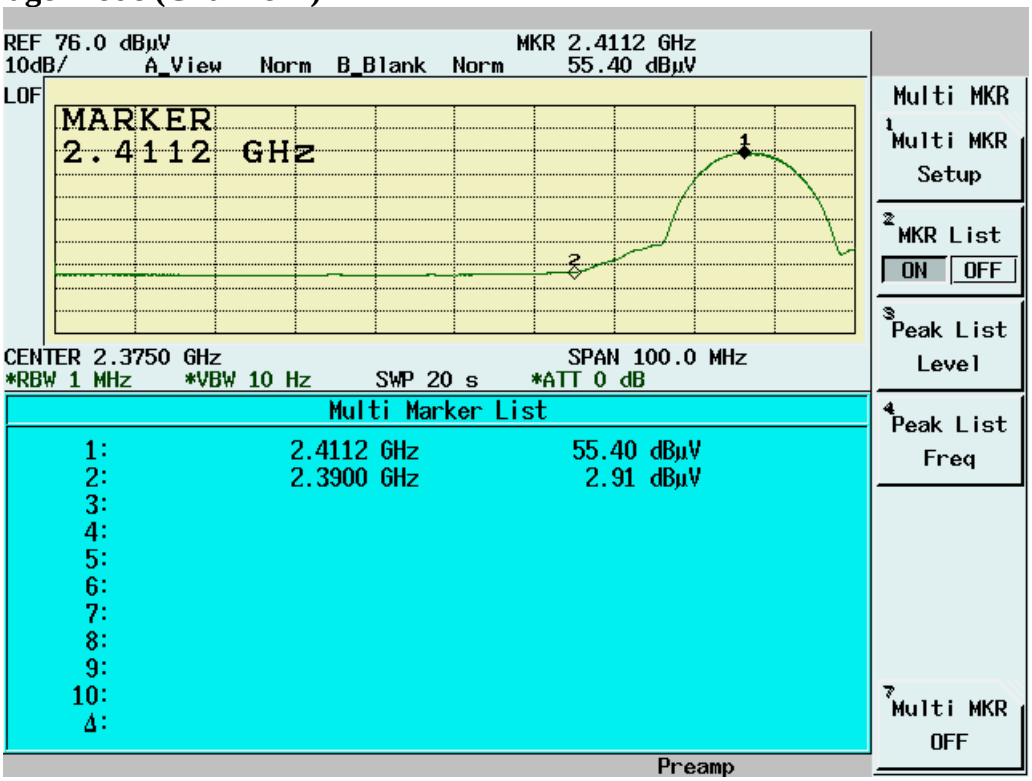
Note:

- 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 polarizaion have been tested and the worst data is listed above.

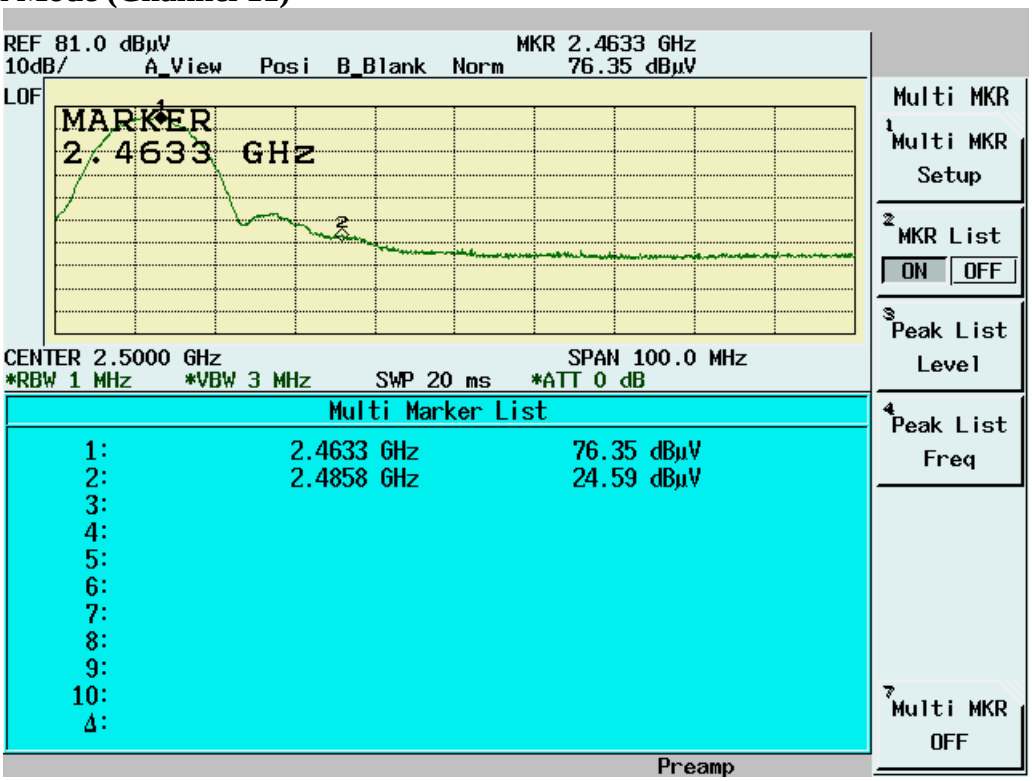
Band Edge measurement for radiated emission in Restricted Band (Radiated) Peak Mode (Channel 1)



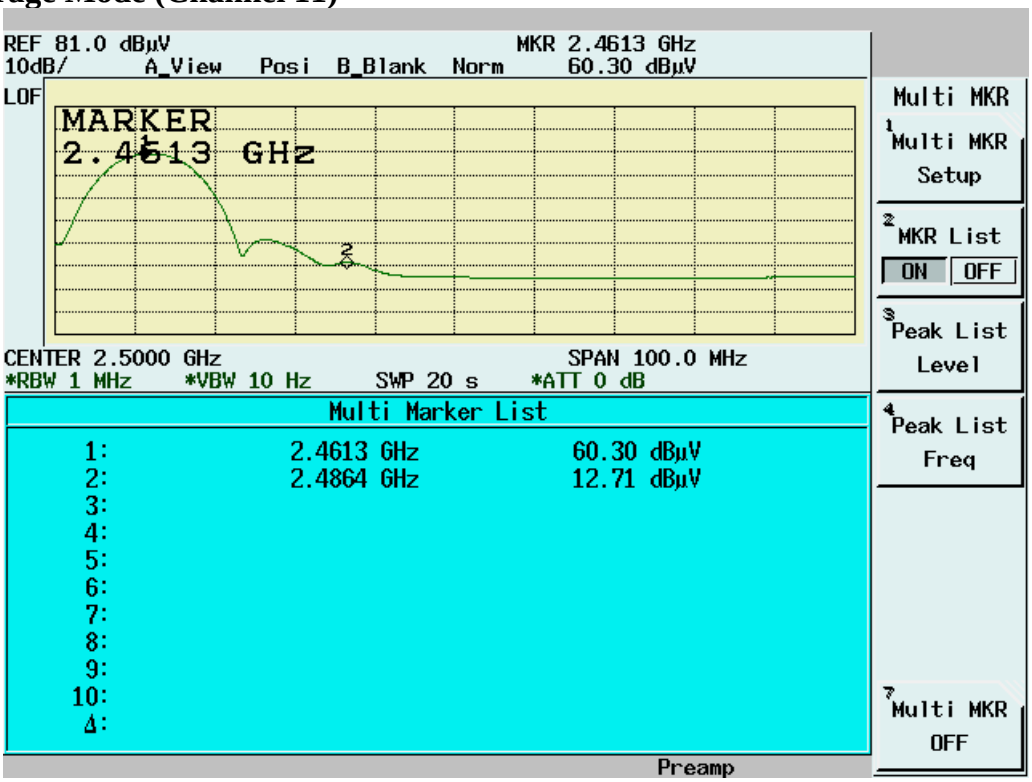
Band Edge measurement for radiated emission in Restricted Band (Radiated) Average Mode (Channel 1)



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)



4.6.4 802.11g Test Data

Table Band Edge Measurement (Radiated)

Temp. (° C): 25

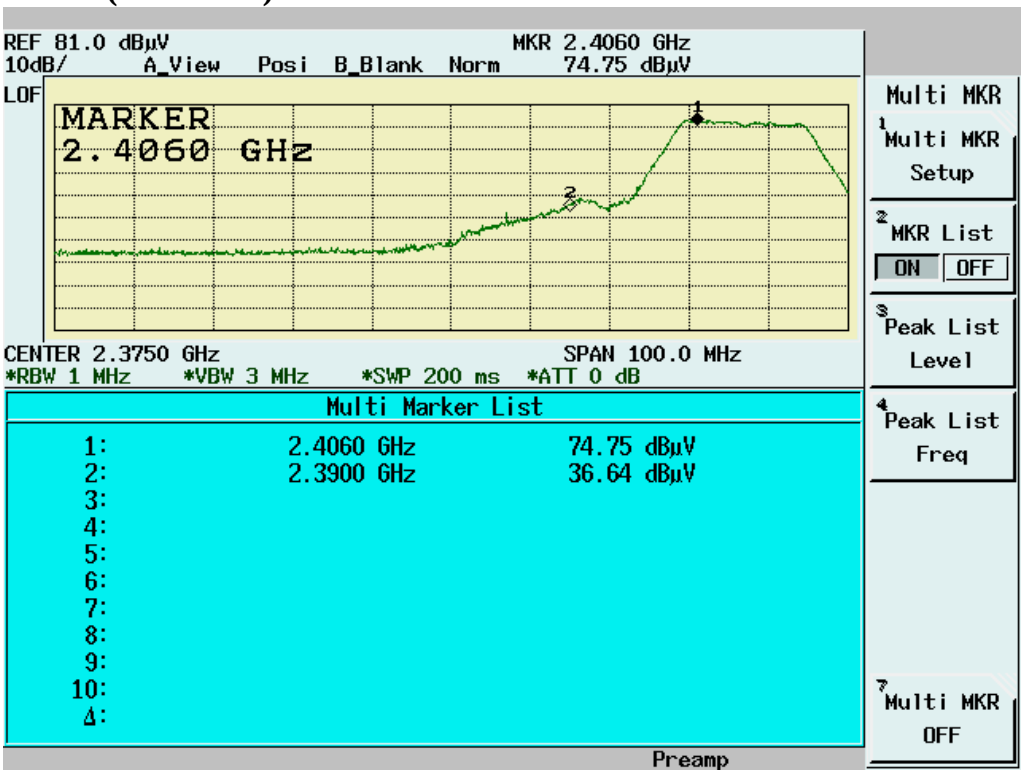
Test Engr: Jerry Humidity (%): 55

Description	Frequency (MHz)	Spectrum Reading (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Equip. Setup VBW	Pass or Fail
Channel_1 (peak mode)	2406	74.75	35.48	110.23	---	3MHz	---
Channel_1 (average mode)	2404.9	50.11	35.48	85.59	---	10Hz	---
Channel_11 (peak mode)	2456.3	73.15	35.5	108.65	---	3MHz	---
Channel_11 (average mode)	2456.3	54.62	35.5	90.12	---	10Hz	---
Channel_1 Restricted band (peak mode)	2390	36.64	35.47	72.11	74	3MHz	Pass
Restricted band (average mode)	2390	11.58	35.47	47.05	54	10Hz	Pass
Channel_11 Restricted band (peak mode)	2483.6	36.25	35.51	71.76	74	3MHz	Pass
Restricted band (average mode)	2483.6	16.02	35.51	51.53	54	10Hz	Pass

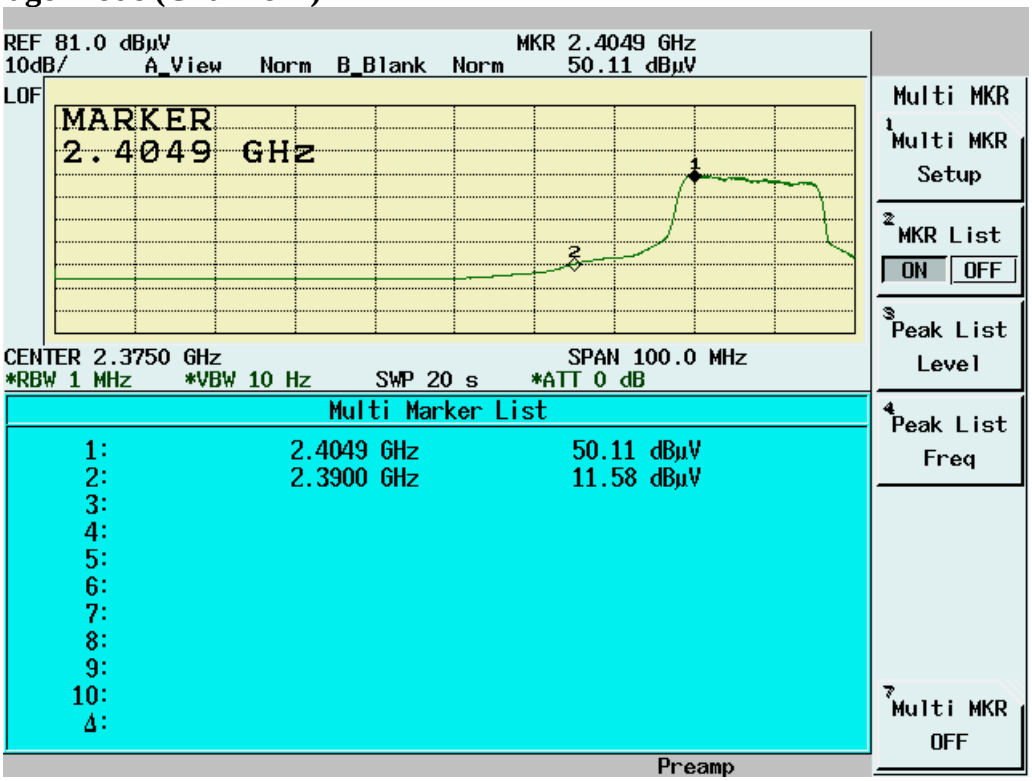
Note:

- 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 polarizaion have been tested and the worst data is listed above.

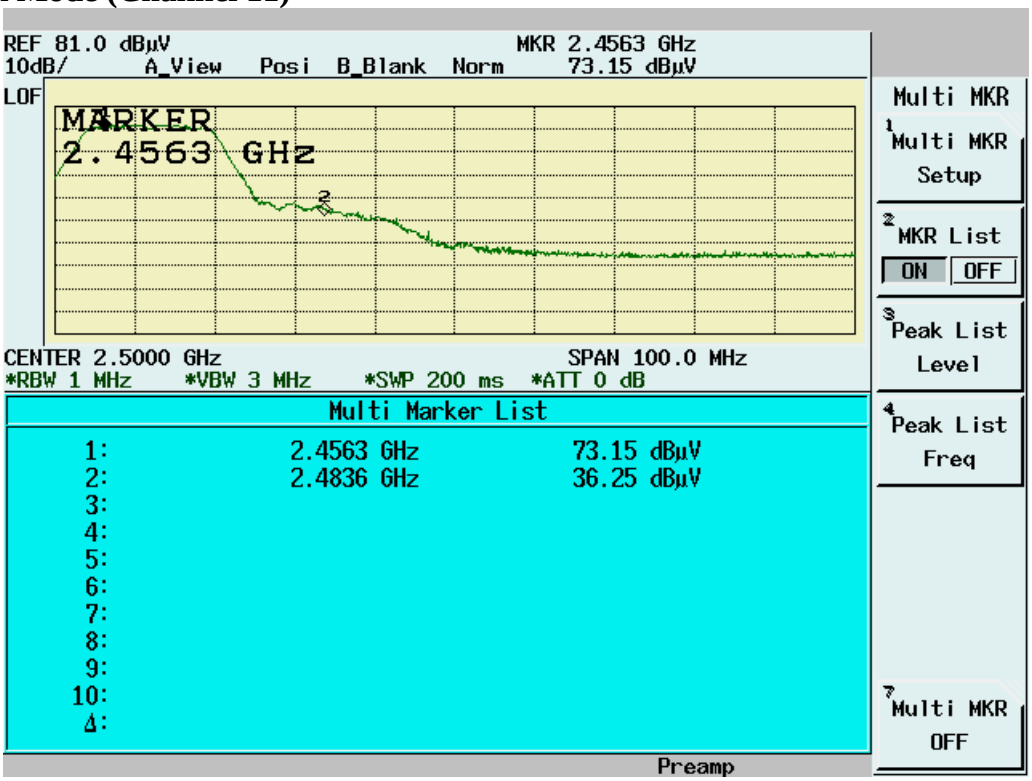
Band Edge measurement for radiated emission in Restricted Band (Radiated) Peak Mode (Channel 1)



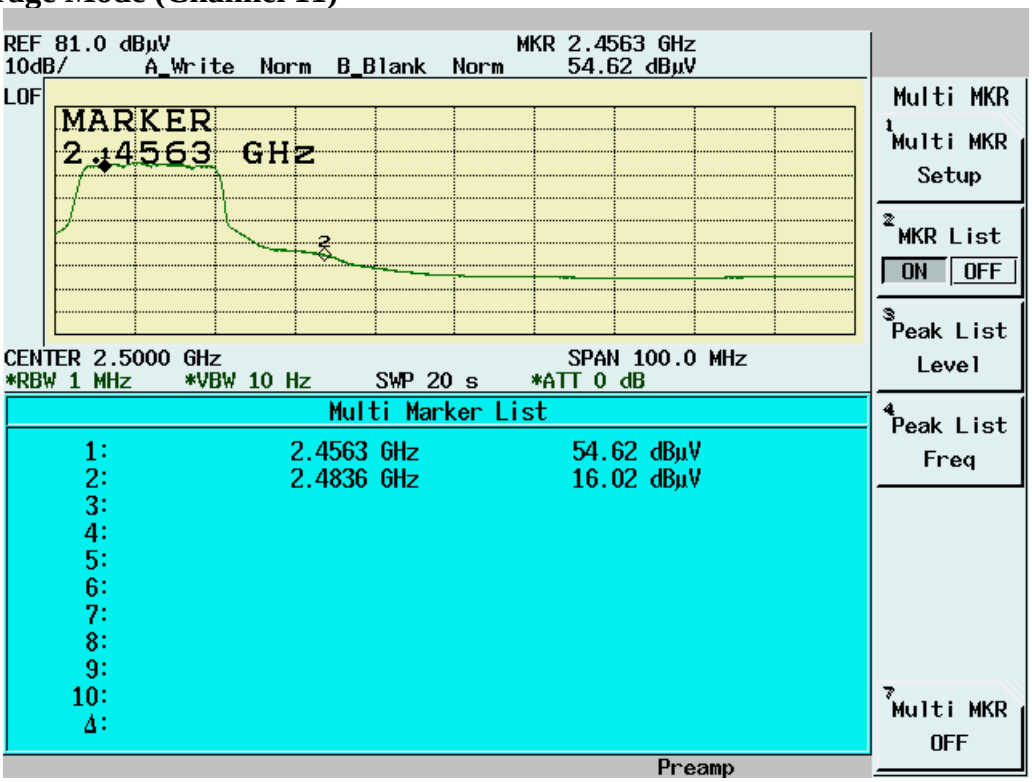
Band Edge measurement for radiated emission in Restricted Band (Radiated) Average Mode (Channel 1)



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)



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

See SAR report

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

4.8.1 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.

4.8.2 Test Setup

4.8.3 802.11b Test Data

802.11b Maximum Peak Output Power Density

Temp. (° C): 25

Test Engr: Jerry Humidity (%): 55

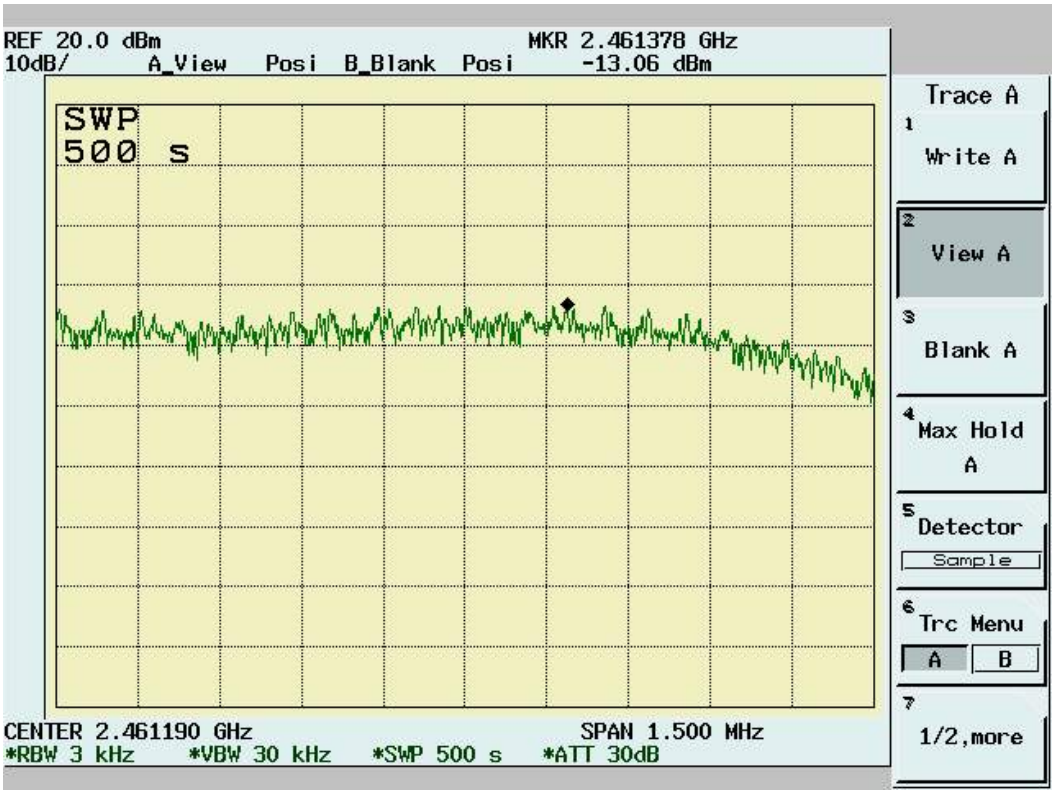
Chennel	Frequency (MHz)	Spectrum Reading (dBm/3KHz)	Cable Loss (dB)	Power Density (dBm/3KHz)	Limit (dBm/3KHz)	Pass/Fail
1	2412	-13.45	1.1	-12.35	8	Pass
6	2437	-13.07	1.1	-11.97	8	Pass
11	2462	-13.06	1.1	-11.96	8	Pass

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

802.11b Channel 1

802.11b Channel 6

802.11b Channel 11



4.8.4 802.11g Test Data

802.11g Maximum Peak Output Power Density

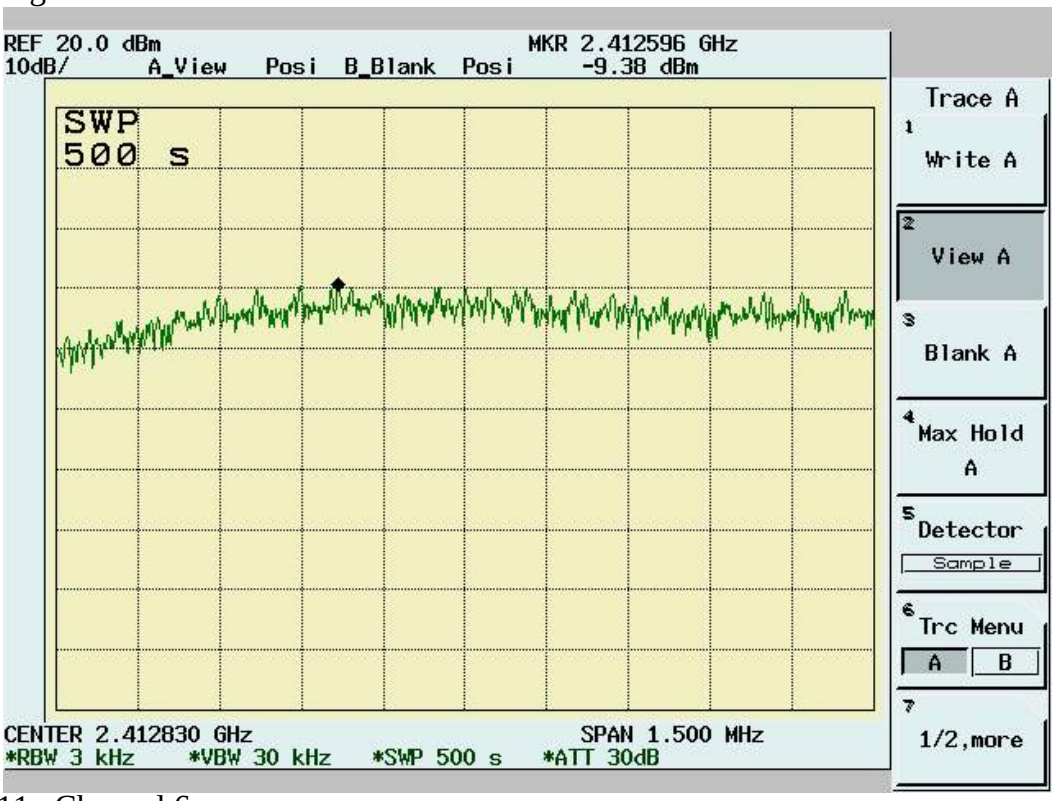
Temp. (° C): 25

Test Engr: Jerry Humidity (%): 55

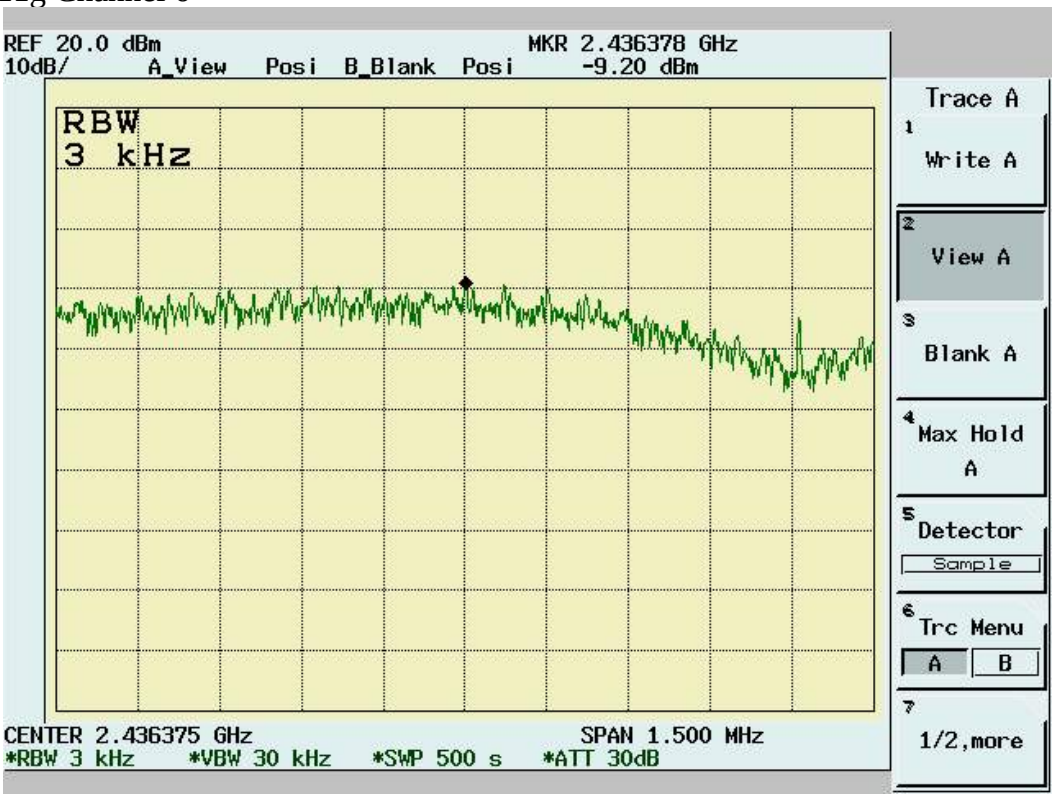
Chennel	Frequency (MHz)	Spectrum Reading (dBm/3KHz)	Cable Loss (dB)	Power Density (dBm/3KHz)	Limit (dBm/3KHz)	Pass/Fail
1	2412	-9.38	1.1	-8.28	8	Pass
6	2437	-9.2	1.1	-8.1	8	Pass
11	2462	-9.41	1.1	-8.31	8	Pass

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

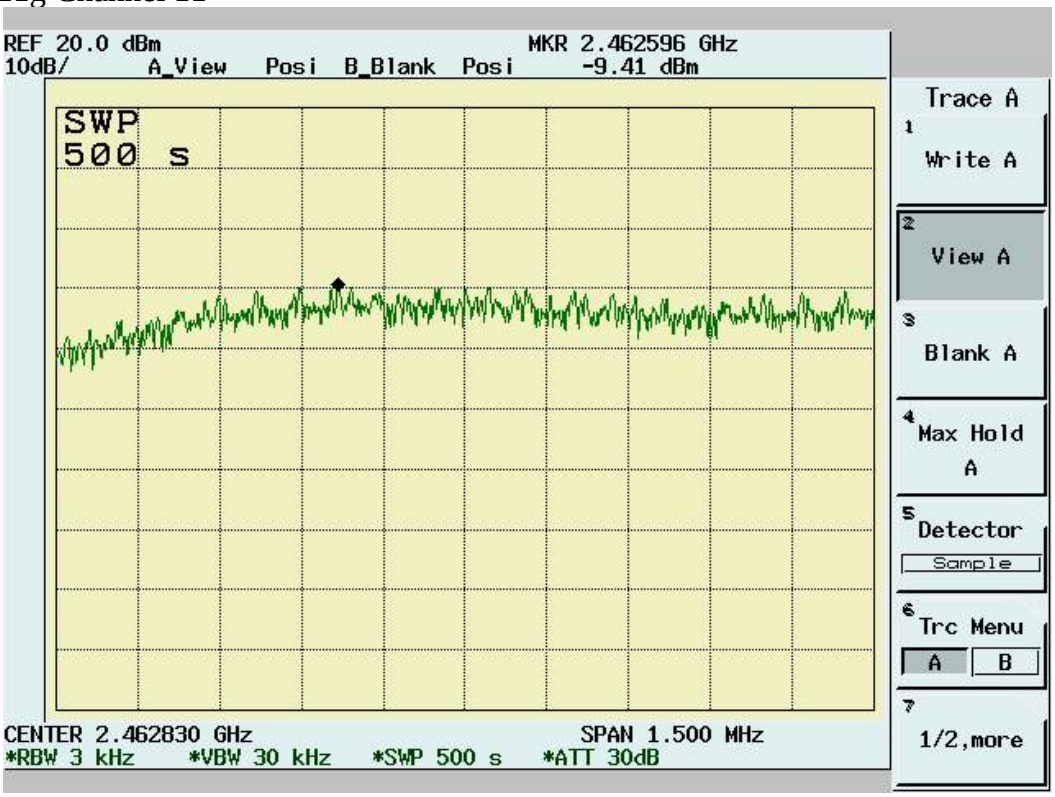
802.11g Channel 1



802.11g Channel 6



802.11g Channel 11



5. TEST RESULTS (802.11a 5725MHz-5850MHz)

5.1 Powerline Conducted Emissions [Section 15.207]

5.1.1 EUT Configuration

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 used.

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 6dß 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 6dß below the applicable average limits, the emissions were also measured with the average detectors.

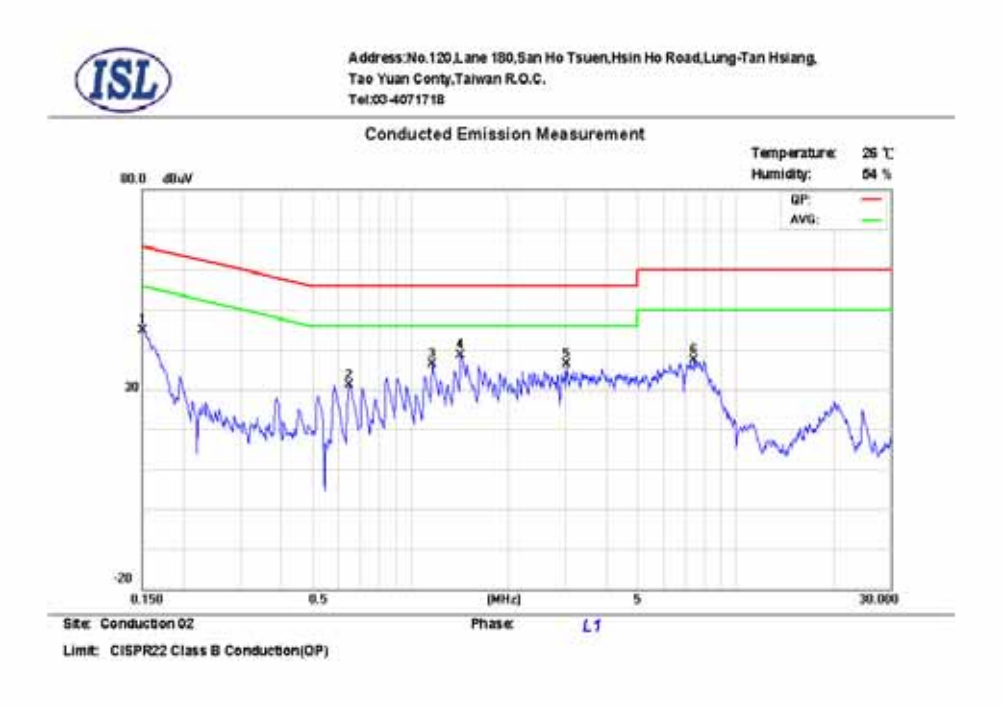
The highest emissions were analyzed in details by operating the spectrum analyzer in fixed tuned mode to determine the nature of the emissions and to provide information which could be useful in reducing their amplitude.

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:

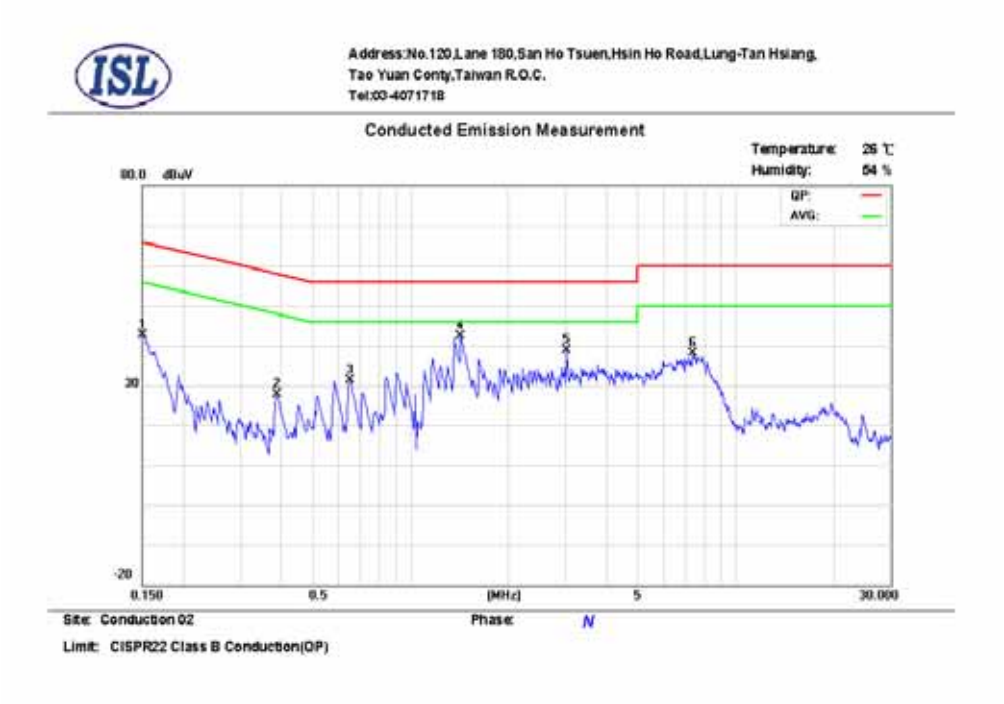
Power Line Conducted Emissions (Hot) 5745,5785,5825MHz



Frequency MHz	LISN Loss dB	Cable Loss dB	QP Correct. dBuV	QP Limit dBuV	QP Margin dB	AVG Correct. dBuV	AVG Limit dBuV	AVG Margin dB	Note
0.1500	0.1	0.02	43.20	66.0	-22.8	40.00	56.0	-16.0	
0.6474	0.2	0.07	34.30	56.0	-21.7	31.90	46.0	-14.1	
1.1657	0.2	0.07	38.00	56.0	-18.0	34.70	46.0	-11.3	
* 1.4257	0.2	0.08	42.00	56.0	-14.0	37.20	46.0	-8.80	
3.0253	0.3	0.12	26.20	56.0	-29.8	22.20	46.0	-23.8	
7.4465	0.46	0.18	37.80	60.0	-22.2	36.30	50.0	-13.7	

*:Maximum data x:Over limit

Power Line Conducted Emissions (Neutral) 5745,5785,5825MHz



Frequency MHz	LISN Loss dB	Cable Loss dB	QP Correct. dBuV	QP Limit dBuV	QP Margin dB	AVG Correct. dBuV	AVG Limit dBuV	AVG Margin dB	Note
0.1500	0.1	0.02	42.60	66.0	-23.4	39.60	56.0	-16.4	
0.3893	0.19	0.09	28.70	58.0	-29.3	26.90	48.0	-21.1	
0.6543	0.2	0.07	24.00	56.0	-32.0	19.90	46.0	-26.1	
* 1.4257	0.2	0.08	44.10	56.0	-11.9	40.40	46.0	-5.60	
3.0253	0.2	0.12	26.10	56.0	-29.9	22.40	46.0	-23.6	
7.3680	0.31	0.18	35.40	60.0	-24.6	30.60	50.0	-19.4	

*:Maximum data x:Over limit

* NOTE: During the test, the EMI receiver was set to Max. Hold then switch the EUT Channel between 5745,5785,5825MHz 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

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

5.2.1 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

5.2.2 Test Setup

5.2.3 Test Data:

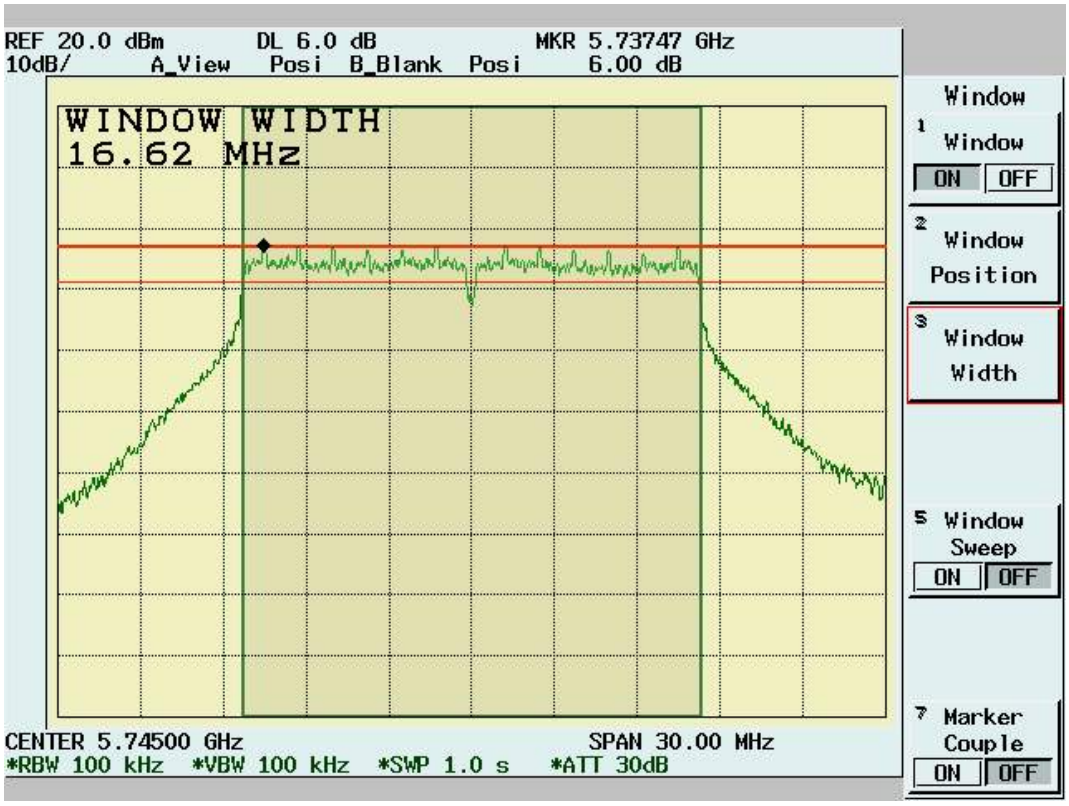
6dB Bandwidth

Temp. (°C): 25

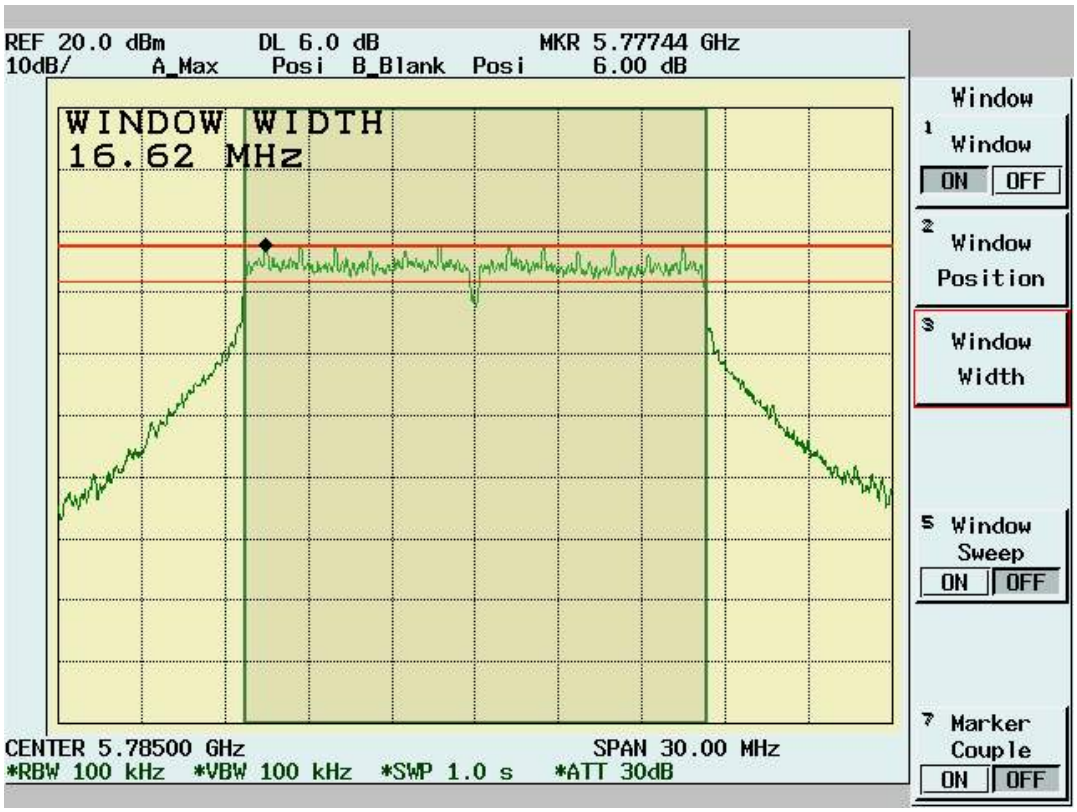
Test Engr: Jerry Chiou Humidity (%): 50

Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Pass/Fail
5745	16.62	0.5	Pass
5785	16.62	0.5	Pass
5825	16.62	0.5	Pass

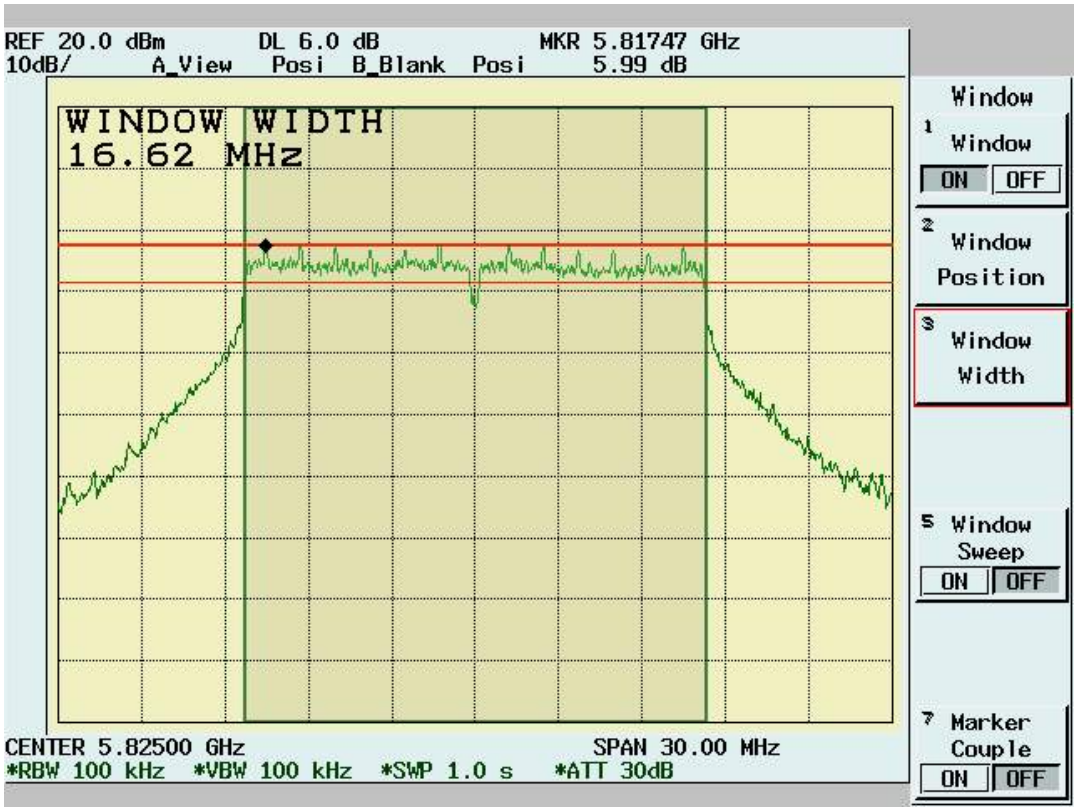
5745 MHz:



5785 MHz:



5825 MHz:


REF 20.0 dBm
DL 6.0 dB
MKR 5.81747 GHz
10dB/
A_View
Posi
B_Blank
Posi
5.99 dB
WINDOW WIDTH
16.62 MHz
CENTER 5.82500 GHz
SPAN 30.00 MHz
*RBW 100 kHz
*VBW 100 kHz
*SWP 1.0 s
*ATT 30dB
Window
1 Window
ON OFF
2 Window Position
3 Window Width
5 Window Sweep
ON OFF
7 Marker Couple
ON OFF

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

5.3.1 Test Procedure

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

5.3.2 Test Setup

5.3.3 Test Data

Maximum Peak Output Power

Temp. (° C): 25

Test Engr: Jerry Humidity (%): 55

Frequency (MHz)	Analyzer Reading (dBm)	Cable Loss (dB)	Power Output (mW)	Power Output (dBm)	Limit (dBm)	Pass/Fail
5745	12.75	1.3	25.41	14.05	30	Pass
5785	13.06	1.3	27.29	14.36	30	Pass
5825	13.15	1.3	27.86	14.45	30	Pass

802.11a							
Freq.	Bit rate (mbps)						
(MHz)	6	9	12	18	24	36	54
5745	14.05	14.05	13.96	13.94	13.97	13.54	13.1
5785	14.36	14.35	14.17	13.97	13.83	13.27	13
5825	14.45	14.02	13.79	12.98	13.52	12.47	12.05

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

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

5.4.1 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.

5.4.2 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 2^{nd} to 10^{th} 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.

5.4.3 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

5.4.4 Test Data (30MHz – 1GHz):

30M – 1GHz Open Field Radiated Emissions (Horizontal) 5745,5785,5825MHz

Operator: Jerry Chiou

Temperature (C): 25
Humidity (%): 63

Frequency	Rx Amp.	Ant Fact	CableLoss	PreAmp Gain	Corrct. Emi.	Limit	Margin	Ant. Pos.	Table Pos.
59.1	19.28	6.72	1.33	0.00	27.33	40.00	-12.67	96.00	245.00
68.8	22.93	6.16	1.51	0.00	30.60	40.00	-9.40	96.00	219.00
88.2	23.45	8.54	1.67	0.00	33.66	43.50	-9.84	96.00	219.00
95.96	18.16	9.91	1.79	0.00	29.87	43.50	-13.63	96.00	35.00
99.84	14.61	10.57	1.92	0.00	27.11	43.50	-16.39	96.00	35.00
102.75	14.55	11.10	1.93	0.00	27.57	43.50	-15.93	96.00	61.00
105.66	14.84	11.62	1.93	0.00	28.38	43.50	-15.12	96.00	35.00
111.48	18.73	12.43	1.90	0.00	33.06	43.50	-10.44	96.00	61.00
158.04	21.85	10.12	2.36	0.00	34.33	43.50	-9.17	96.00	219.00
177.44	16.34	9.35	2.49	0.00	28.17	43.50	-15.33	96.00	193.00
197.81	21.01	9.16	2.60	0.00	32.76	43.50	-10.74	96.00	245.00
202.66	22.27	9.17	2.63	0.00	34.07	43.50	-9.43	96.00	245.00

30M – 1GHz Open Field Radiated Emissions (Vertical) 5745,5785,5825MHz

Operator: Jerry Chiou

Temperature (C): 25
Humidity (%): 63

Frequency	Rx Amp.	Ant Fact	CableLoss	PreAmpGain	Corrct. Emi.	Limit	Margin	Ant. Pos.	Table Pos.
MHz	(dBuV)	(dB/m)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg)
70.74	22.55	6.16	1.55	0.00	30.25	40.00	-9.75	96.00	245.00
89.17	23.28	8.73	1.66	0.00	33.68	43.50	-9.82	96.00	219.00
95.96	18.13	9.91	1.79	0.00	29.84	43.50	-13.66	96.00	35.00
105.66	15.46	11.62	1.93	0.00	29.01	43.50	-14.49	96.00	35.00
108.57	14.66	12.14	1.94	0.00	28.74	43.50	-14.76	96.00	61.00
111.48	15.78	12.43	1.90	0.00	30.12	43.50	-13.38	96.00	61.00
155.13	17.70	10.15	2.31	0.00	30.16	43.50	-13.34	96.00	219.00
159.98	17.04	10.10	2.39	0.00	29.53	43.50	-13.97	96.00	219.00
162.89	17.05	9.93	2.39	0.00	29.37	43.50	-14.13	96.00	219.00
197.81	16.45	9.16	2.60	0.00	28.20	43.50	-15.30	96.00	245.00
202.66	16.30	9.17	2.63	0.00	28.10	43.50	-15.40	96.00	245.00
334.58	13.27	14.03	3.30	0.00	30.60	46.00	-15.40	96.00	140.00

NOTE:

- During the Pre-test, the EUT has been tested for 5745,5785,5825MHz 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

5.4.5 Test Data (1GHz – 40 GHz) .

1GHz~ 40 GHz (Horizontal), 5745 MHz

Operator: Jerry Chiou

RBW: 1MHz
Humidity (%): 57
Temperature (C): 22

Frequency	Rx_R.	Ant_F.	Cab_L.	PreAmpl	Emission	Limit	Margin	A.Tower	T.Table
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
4927.27	39.23pk	35.32	2.15	27.34	49.36pk	54.00av	-4.64	100	7

1GHz~ 40 GHz (Vertical), 5745 MHz

Operator: Jerry Chiou

RBW: 1MHz
Humidity (%): 57
Temperature (C): 22

Frequency	Rx_R.	Ant_F.	Cab_L.	PreAmpl	Emission	Limit	Margin	A.Tower	T.Table
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
5272.53	38.64pk	35.82	2.67	27.40	49.72pk	54.00av	-4.28	100	78

Note:

- According to the standards used, 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~ 40 GHz (Horizontal) , 5785 MHz

Operator: Jerry Chiou

RBW: 1MHz
Humidity (%): 57
Temperature (C): 22

Frequency	Rx_R.	Ant_F.	Cab_L.	PreAmpl	Emission	Limit	Margin	A.Tower	T.Table
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
5157.44	41.02pk	35.73	2.55	27.33	51.96pk	54.00av	-2.04	100	45

1GHz~ 40 GHz (Vertical), 5785 MHz

Operator: Jerry Chiou

RBW: 1MHz
Humidity (%): 57
Temperature (C): 22

Frequency	Rx_R.	Ant_F.	Cab_L.	PreAmpl	Emission	Limit	Margin	A.Tower	T.Table
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
5150.25	38.80pk	35.72	2.52	27.33	49.71pk	54.00av	-4.29	100	43

Note:

- According to the standards used, 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~ 40 GHz (Horizontal), 5825 MHz

Operator: Jerry Chiou

RBW: 1MHz
Humidity (%): 57
Temperature (C): 22

Frequency	Rx_R.	Ant_F.	Cab_L.	PreAmpl	Emission	Limit	Margin	A.Tower	T.Table
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
5200.6	41.04pk	35.76	2.66	27.36	52.10pk	54.00av	-1.90	100	58

1GHz~ 40 GHz (Vertical), 5825 MHz

Operator: Jerry Chiou

RBW: 1MHz
Humidity (%): 57
Temperature (C): 22

Frequency	Rx_R.	Ant_F.	Cab_L.	PreAmpl	Emission	Limit	Margin	A.Tower	T.Table
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
5207.79	41.87pk	35.77	2.66	27.36	52.92pk	54.00av	-1.08	100	60

Note:

- According to the standards used, 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.

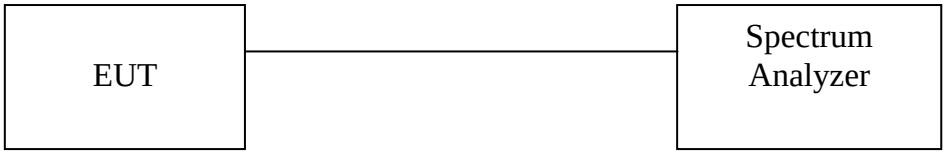
All frequencies from 1GHz to 25 GHz have been tested.

5.5 Band Edge Measurement

5.5.1 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: 5.725GHz, 5.850GHz.
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

5.5.2 Test Setup (Conducted)



5.5.3 Test Data:

Table: Band Edge measurement (Conducted)

Temp. (deg. C): 25

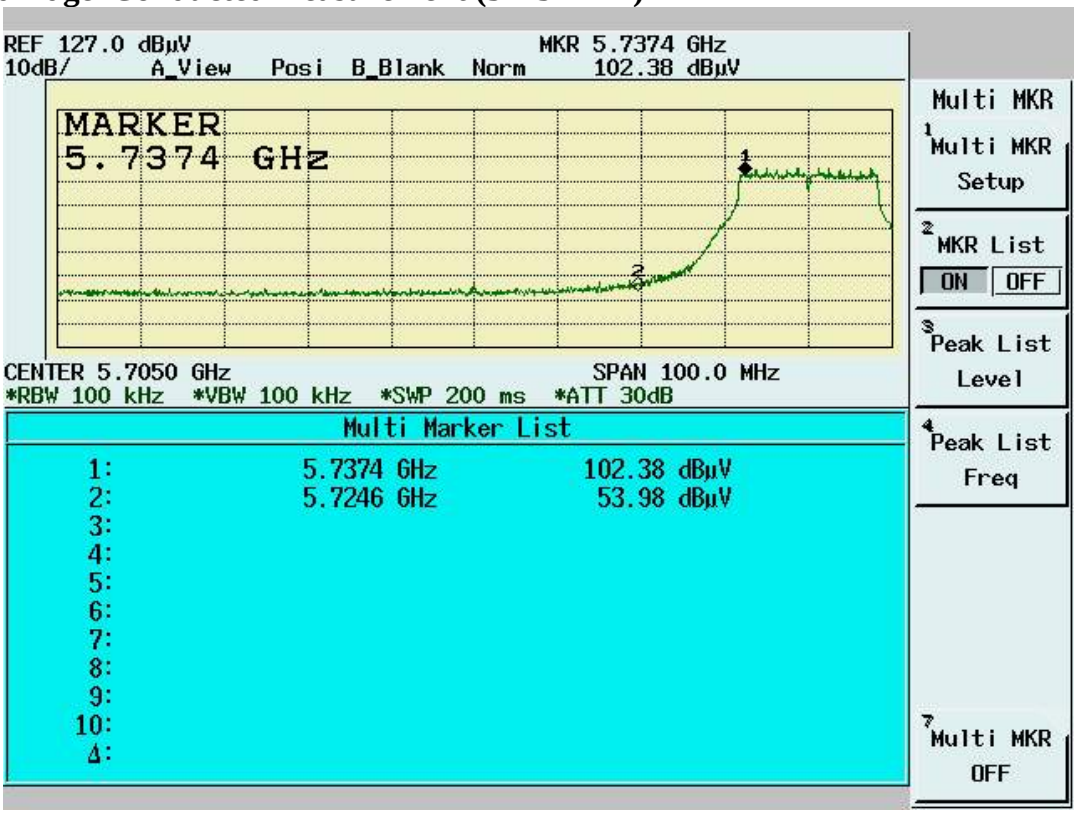
Test Engr: Jerry Chiou Humidity (%): 50

Conducted Mode

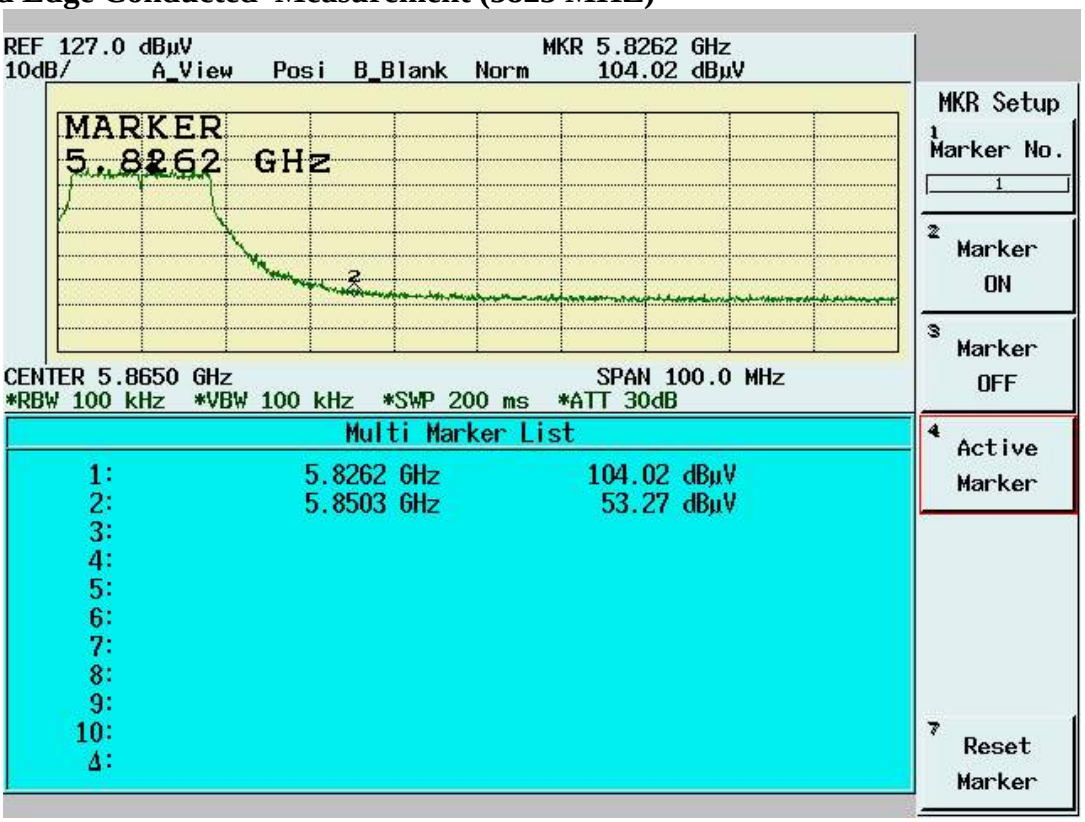
Channel	**Frequency (MHz)**	**Spectrum Reading (dBuV)**	**Carrier - Outsideband Limit: >30dB (dB)**	Pass/Fail
5745 MHz	5737.4	102.38	---	---
Outside band	5724.6	53.98	48.4	Pass
5825 MHz	5826.2	104.02	---	---
Outside band	5850.3	53.27	50.75	Pass
Radiated Mode				
Channel	**Frequency (MHz)**	**Spectrum Reading (dBuV)**	**Carrier - Outsideband Limit: >30dB (dB)**	**Pass/Fail**
5745 MHz	5737.3	48.85	---	---
Outside band	5725	11.48	37.37	Pass
5825 MHz	5823.7	53.57	---	---
Outside band	5850.4	12.22	41.35	Pass

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

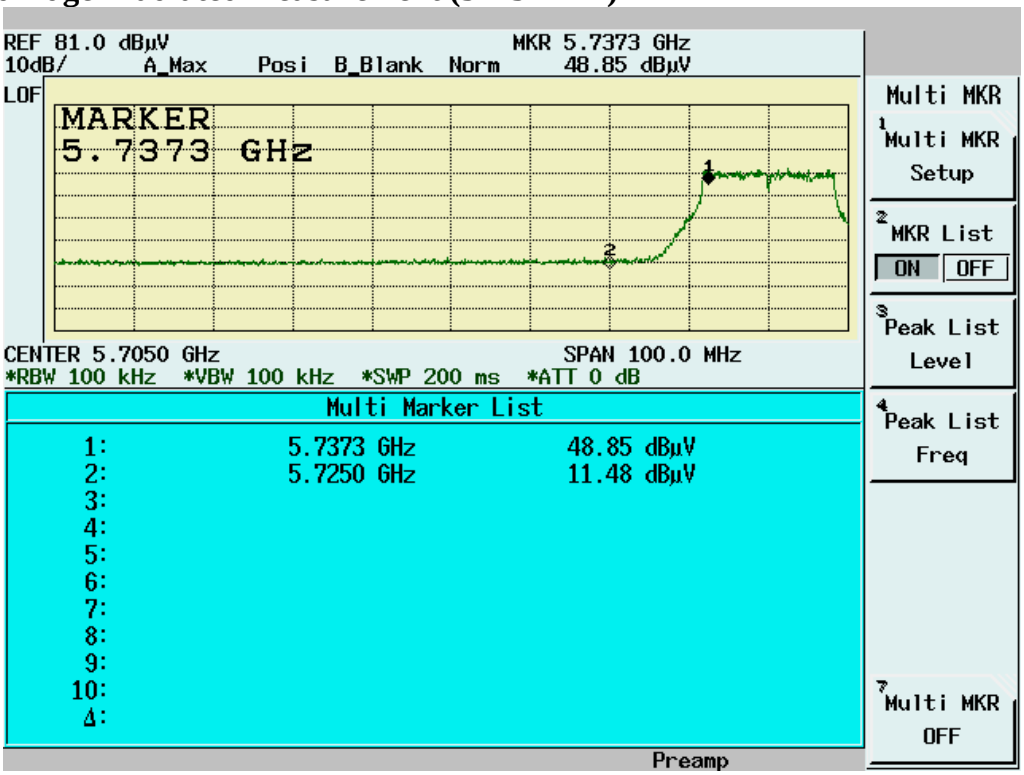
Band Edge Conducted measurement (5745 MHz)



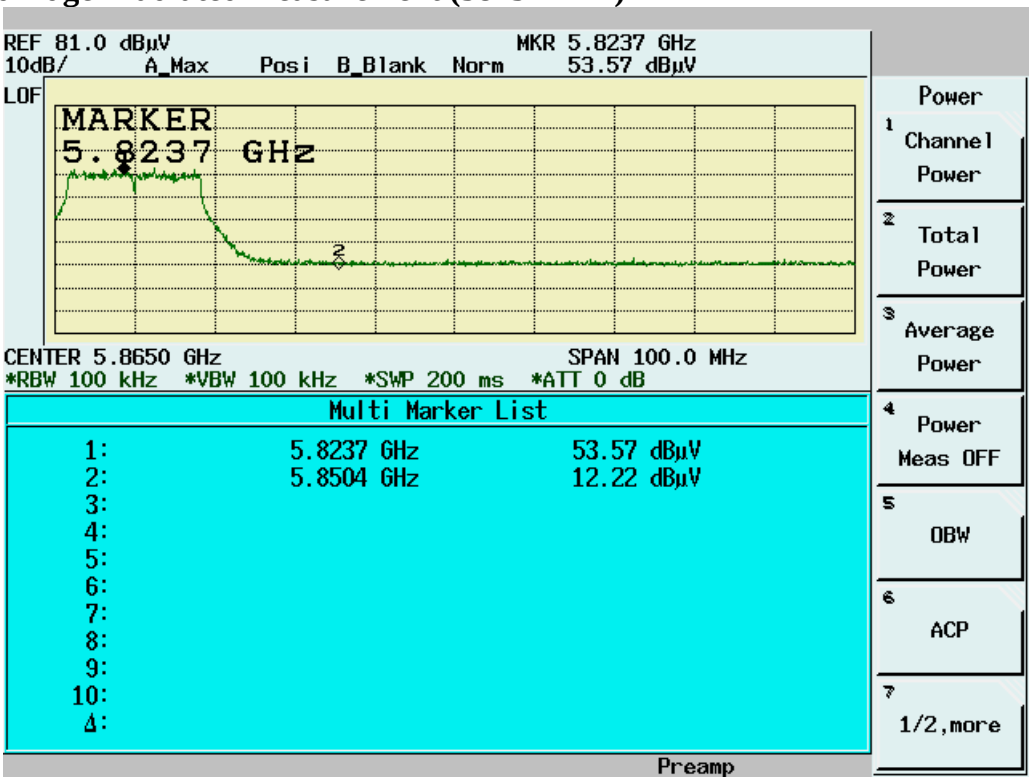
Band Edge Conducted Measurement (5825 MHZ)



Band Edge Radiated measurement (5745 MHz)



Band Edge Radiated measurement (5825 MHZ)



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

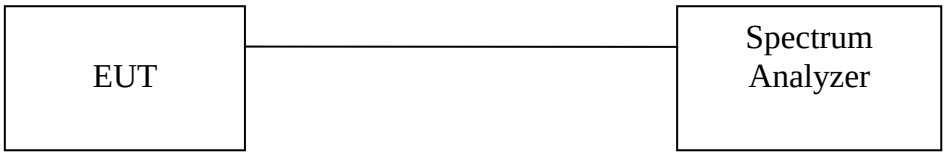
See SAR report

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

5.7.1 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.

5.7.2 Test Setup



5.7.3 Test Data

Maximum Peak Output Power Density

Temp. (° C): 25

Test Engr: Jerry Chiou Humidity (%): 50

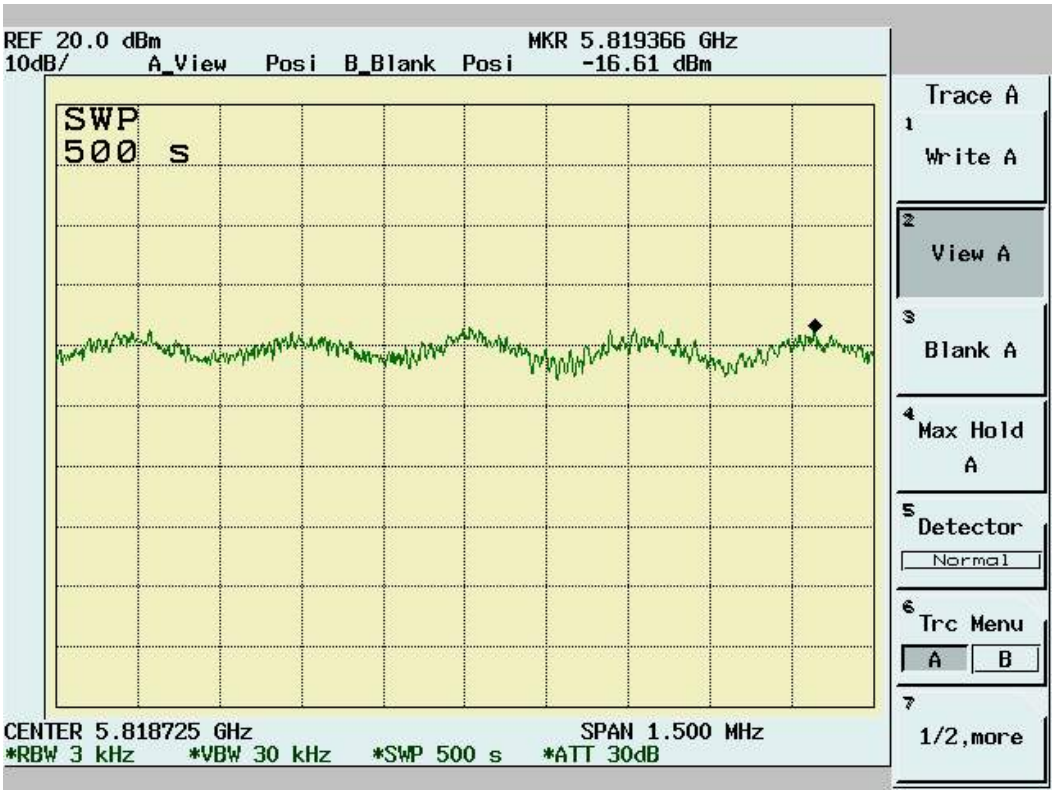
Frequency (MHz)	Spectrum Reading (dBm/3KHz)	Cable Loss (dB)	Peak Power Output (dBm/3KHz)	Limit (dBm/3KHz)	Pass/Fail
5745	-17.15	1.3	-15.85	8	Pass
5785	-16.73	1.3	-15.43	8	Pass
5825	-16.61	1.3	-15.31	8	Pass

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

5745 MHz

5785 MHz

5825 MHz


REF 20.0 dBm
MKR 5.819366 GHz
10dB/ A_View Posi B_Blank Posi -16.61 dBm
SWP
500 s
Trace A
1 Write A
2 View A
3 Blank A
4 Max Hold A
5 Detector
Normal
6 Trc Menu
A B
7 1/2,more
CENTER 5.818725 GHz
SPAN 1.500 MHz
*RBW 3 kHz *VBW 30 kHz *SWP 500 s *ATT 30dB

6. Appendix

6.1 Appendix A: Measurement Procedure for Power line Conducted Emissions

The measurements are performed in a 3.5m x 3.4m x 2.5m shielded room, which referred as Conduction 01 test site, or a 3m x 3m x 2.3m test site, which referred as Conduction 02 test site. The EUT was placed on non-conduction 1.0m x 1.5m table, which is 0.8 meters above an earth-grounded.

Power to the EUT was provided through the LISN which has the Impedance (50ohm/50uH) vs. Frequency Characteristic in accordance with the required standard. Power to the LISNs were filtered to eliminate ambient signal interference and these filters were bonded to the ground plane. Peripheral equipment required to provide a functional system (support equipment) for EUT testing was powered from the second LISN through a ganged, metal power outlet box which is bonded to the ground plane at the LISN.

If the EUT is supplied with a flexible power cord, the power cord length in excess of the distance separating the EUT from the LISN shall be folded back and forth at the center of the lead so as to form a bundle not exceeding 40cm in length. If the EUT is provided with a permanently coiled power cord, bundling of the cord is not required. If the EUT is supplied without a power cord, the EUT shall be connected to the LISN by a power cord of the type specified by the manufacturer which shall not be longer than 1 meter. The excess power cord shall be bundled as described above. If a non-flexible power cord is provided with the EUT, it shall be cut to the length necessary to attach the EUT to the LISN and shall not be bundled.

The interconnecting cables were arranged and moved to get the maximum emission. Both the line of power cord, hot and neutral, were measured.

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.

6.2 Appendix B: Test Procedure for Radiated Emissions

Preliminary Measurements in the Anechoic Chamber

The radiated emissions are initially measured in the anechoic chamber at a measurement distance of 3 meters. Desktop EUT are placed on a wooden stand 0.8 meter in height. The measurement antenna is 3 meters from the EUT. The test setup in anechoic chamber is the same as open site. The turntable rotated 360°C. The antenna height is varied from 1-2.5m. The primary objective of the radiated measurements in the anechoic chamber is to identify the frequency spectrum in the absence of the electromagnetic environment existing on the open test site. The frequencies can then be pre-selected on the open test site to obtain the corresponding amplitude. The initial scan is made with the spectrum analyzer in automatic sweep mode. The spectrum peaks are then measured manually to determine the exact frequencies.

Measurements on the Open Site or 10m EMC Chamber

The radiated emissions test will then be repeated on the open site or 10m EMC chamber to measure the amplitudes accurately and without the multiple reflections existing in the shielded room. The EUT and support equipment are set up on the turntable of one of the 3 or 10 meter open field sites. Desktop EUT are set up on a wooden stand 0.8 meter above the ground.

For the initial measurements, the receiving antenna is varied from 1-4 meter height and is changed in the vertical plane from vertical to horizontal polarization at each frequency. Both reading are recorded with the quasi-peak detector with 120KHz bandwidth. For frequency between 30 MHz and 1000MHz, the reading is recorded with peak detector or quasi-peak detector. For frequency above 1 GHz, the reading is recorded with peak detector or average detector with 1 MHz bandwidth.

At the highest amplitudes observed, the EUT is rotated in the horizontal plane while changing the antenna polarization in the vertical plane to maximize the reading. The interconnecting cables were arranged and moved to get the maximum emission. Once the maximum reading is obtained, the antenna elevation and polarization will be varied between specified limits to maximize the readings.

6.3 Appendix C: Test Equipment

6.3.1 Test Equipment List

Location	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Conduction	Coaxial Cable 1F-C2	Harbourindustries	RG400	1F-C2	02/13/2008	02/13/2009
Conduction	Digital Hygro-Thermometer Conduct	MicroLife	HT-2126G	ISL-Conduction02	12/26/2007	12/26/2008
Conduction	EMI Receiver 07	Schwarzbeck Mess-Elektronik	FCKL 1528	1528-201	08/31/2007	08/30/2008
Conduction	LISN 01	R&S	ESH2-Z5	890485/013	01/03/2008	01/03/2009
Conduction	LISN 06	R&S	ESH3-Z5	828874/009	12/14/2007	12/14/2008
Radiation	BILOG Antenna 08	Schaffner	CBL6112B	2756	06/13/2007	06/12/2008
Radiation	Coaxial Cable Chmb 02-10M	Belden	RG-8/U	Chmb 02-10M	02/13/2008	02/12/2009
Radiation	Digital Hygro-Thermometer Chmb 02	MicroLife	HT-2126G	Chmb 02	12/26/2006	12/26/2008
Radiation	EMI Receiver 02	HP	85460A	3448A00183	12/29/2007	12/28/2008
Radiation	Spectrum Analyzer 13	Advantest	R3132	121200411	03/16/2008	03/15/2009
Radiation	Horn Antenna 02	Com-Power	AH-118	10088	01/14/2008	01/14/2009
Radiation	Horn Antenna 04	Com-Power	AH-826	081-001	03/13/2008	03/13/2009
Radiation	Horn Antenna 05	Com-Power	AH-640	100A	11/16/2007	11/15/2008
Radiation	Microwave Cable RF SK-01	HUBER+SUHNERAG.	Sucoflex 102	22139 /2	06/01/2007	06/01/2008
Radiation	Preamplifier 09	MITEQ	AFS44-00102650-40-10P-44	858687	04/02/2008	04/02/2009
Radiation	Preamplifier 10	MITEQ	JS-26004000-27-5A	818471	12/28/2007	12/28/2008
Radiation	High Pass Filter 01	HEWLETT-PACKARD	84300-80038	001	N/A	N/A
Radiation	High Pass Filter 02	HEWLETT-PACKARD	84300-80039	005	N/A	N/A
Radiation	Spectrum Analyzer 14	Advantest	R3182	140600028	12/06/2007	12/06/2008

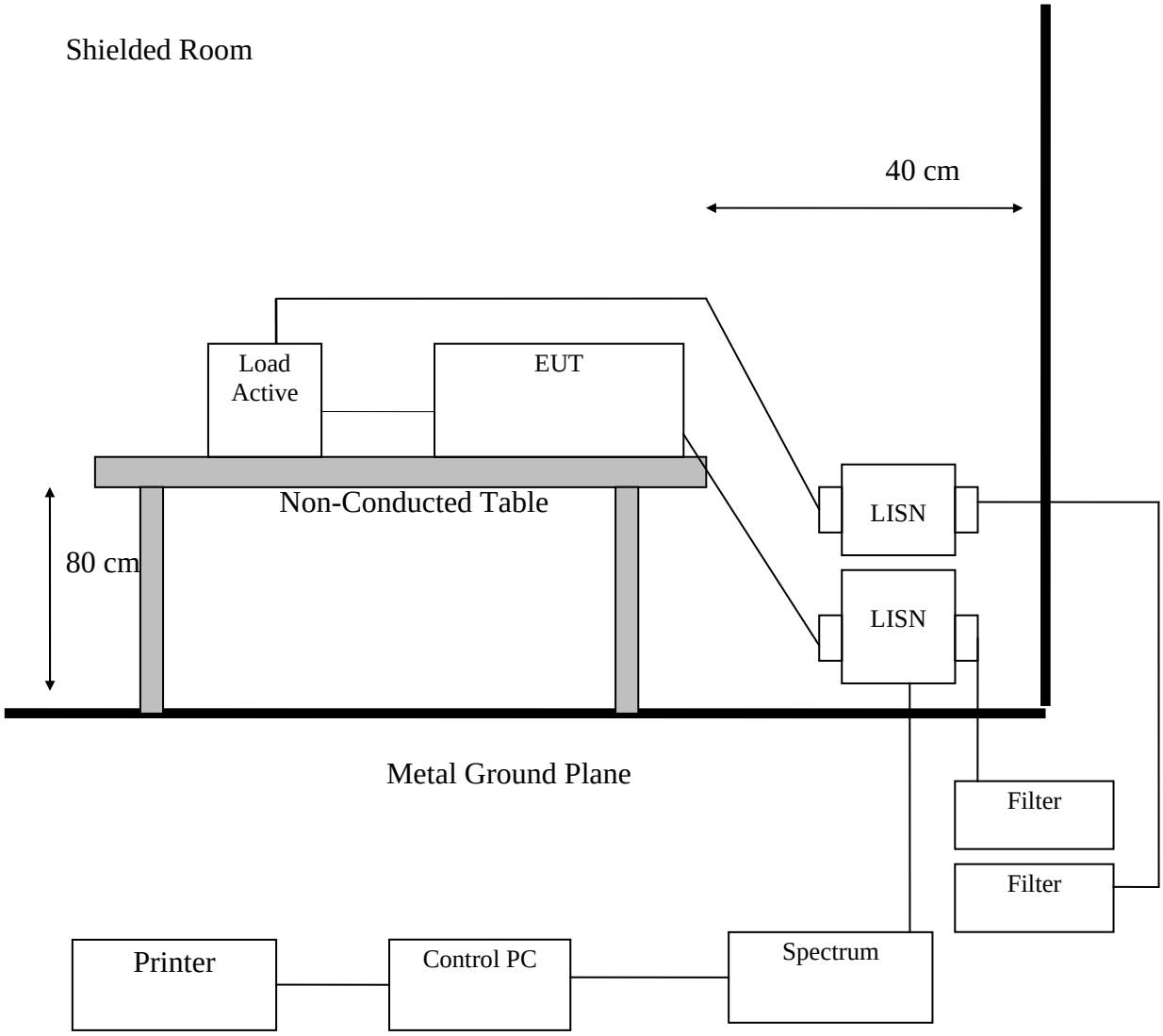
Note: Calibration is traceable to NIST or national or international standards.

6.3.2 Software for Controlling Spectrum/Receiver and Calculating Test Data

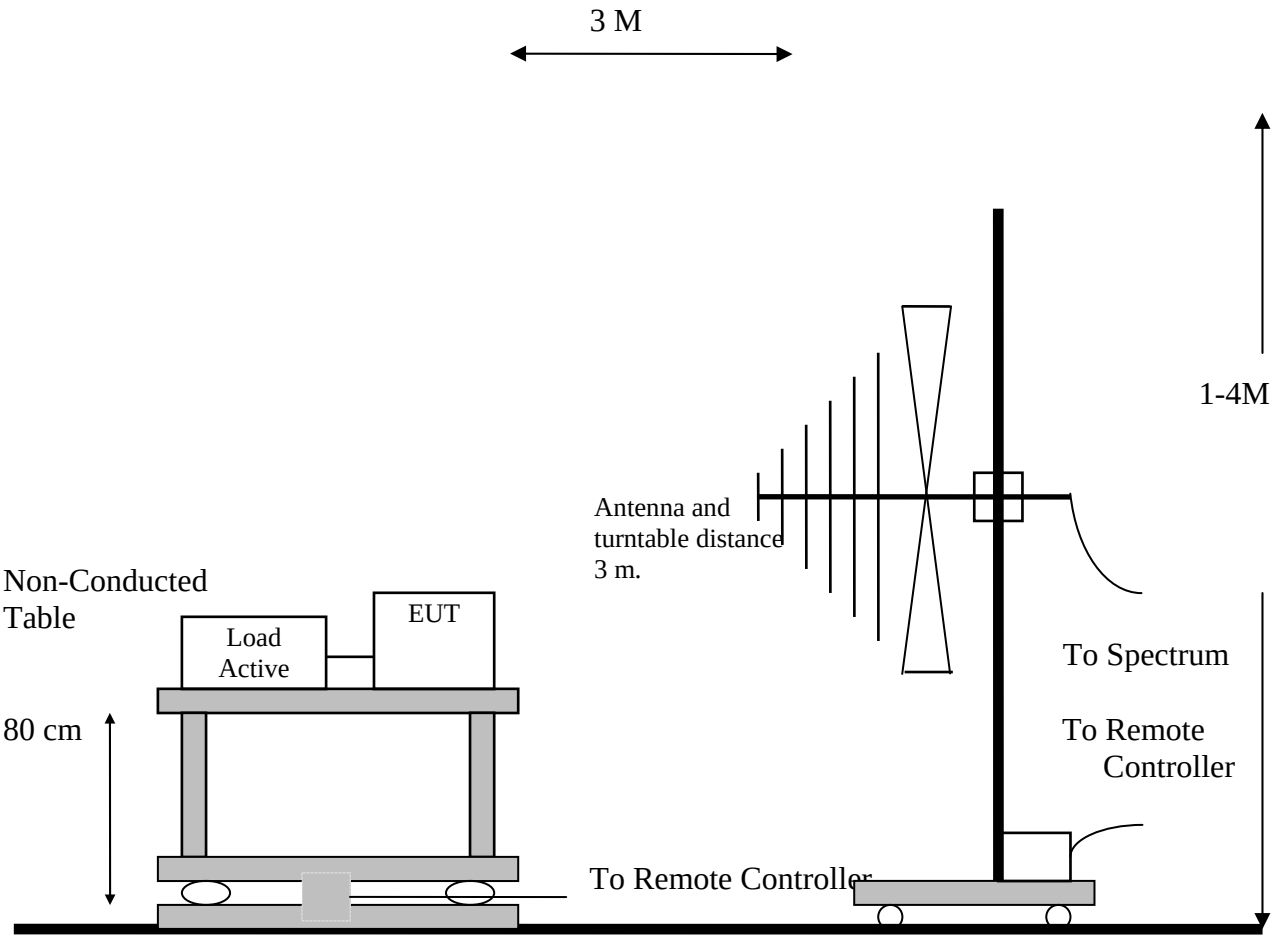
Radiation/Conduction	Filename	Version	Issued Date
Conduction	Tile.exe	1.12E	7/7/2000
Radiation	Tile.exe	1.12C	6/16/2000

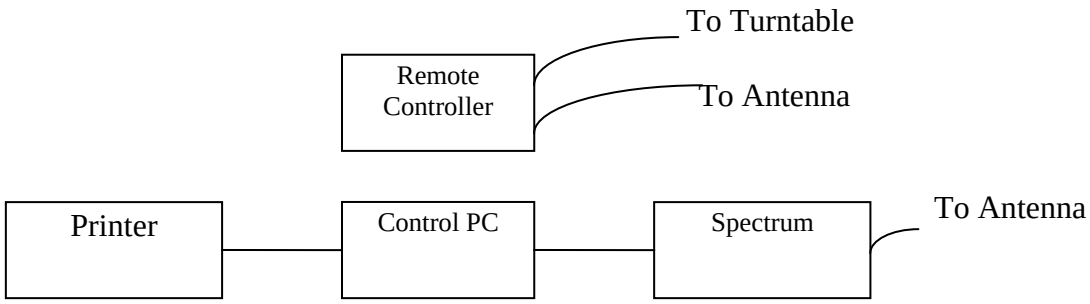
6.4 Appendix D: Layout of EUT and Support Equipment

6.4.1 General Conducted Test Configuration



6.4.2 General Radiation Test Configuration





6.5 Appendix E: Accuracy of Measurement

The measurement uncertainty refers to CISPR 16-4-2:2003. The coverage factor k = 2 yields approximately a 95 % level of confidence.

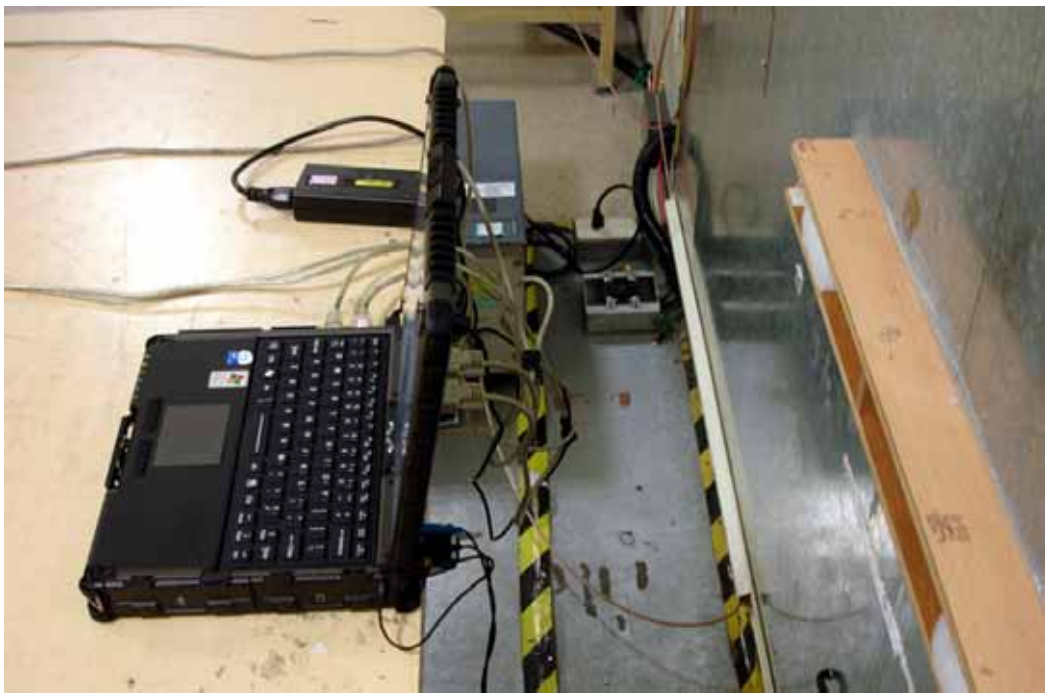
<Conduction 02>: ±1.77dB

<Chamber 02 (10M)>
30MHz~1GHz: ±2.56dB

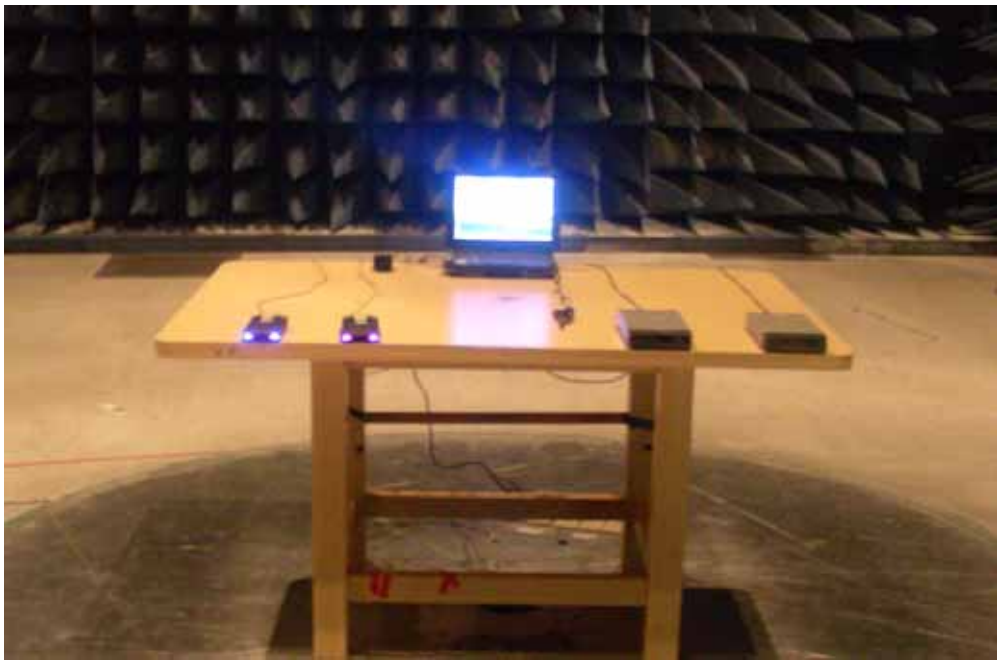
6.6 Appendix F: Photographs of EUT Configuration Test Set Up

The Front View of Highest Conducted Set-up For EUT

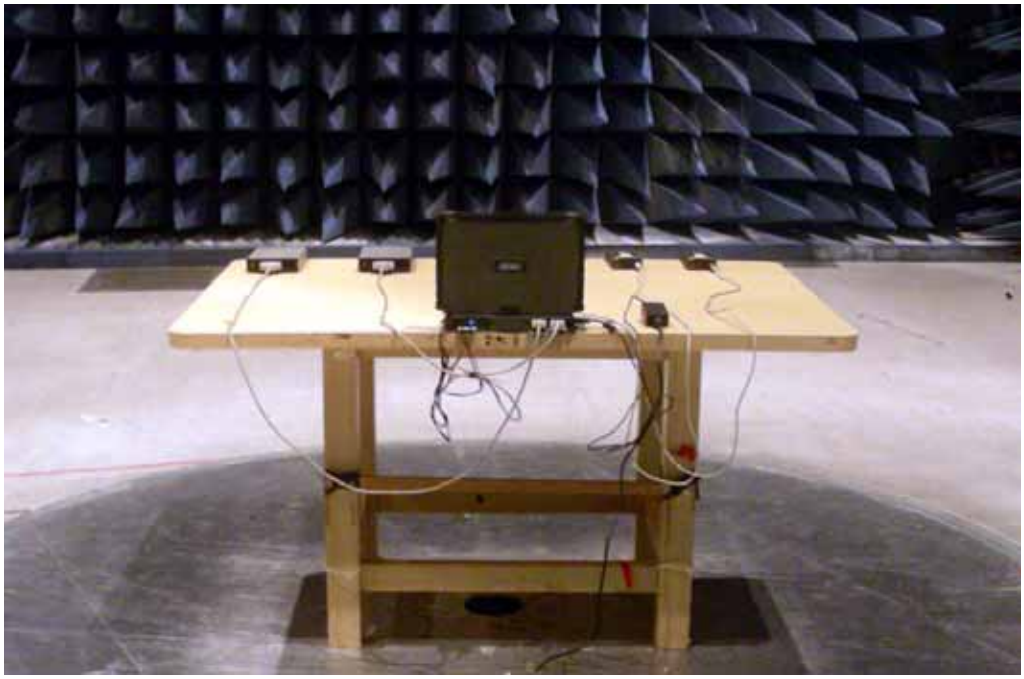
The Back View of Highest Conducted Set-up For EUT



The Front View of Highest Radiated Set-up For EUT



The Back View of Highest Radiated Set-up For EUT



6.7 Appendix G: Antenna Specification

Please refer to the attached file.