Test Report
for
FCC Part 15 Subpart B & C

of

Product Name

Notebook Personal Computer

(with Intel PRO/Wireless 2200BG Network Connection and Broadcom USB Bluetooth Module BCM92035NMD inside)

Model

TravelMate C310;MS2161

(Brand: acer)

Applied by:

Acer Inc.
8F, 88, Sec. 1, Hsin Tai Wu Rd.,
Hsichih, Taipei Hs
Taiwan, R. O. C.

Test Performed by:

International Standards Laboratory

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Report Number: ISL-05LR012FC **Issue Date: 2005/05/12**

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) 6
4.1 Powerline Conducted Emissions [Section 15.207] 6
4.1.1 EUT Configuration 6
4.1.2 Test Procedure 6
4.1.3 EMI Receiver/Spectrum Analyzer Configuration (for the frequencies tested) 6
4.1.4 Test Data: 7
4.2 Bandwidth for DSSS [Section 15.247 (a)(2)] 9
4.2.1 Test Procedure 9
4.2.2 Test Setup 9
4.2.3 Test Data: 9
4.3 DSSS Maximum Peak Output Power [Section 15.247 (b)(1)] 12
4.3.1 Test Procedure 12
4.3.2 Test Setup 12
4.3.3 Test Data 12
4.4 Radiated Emission Measurement [Section [15.247(c)(4)] 13
4.4.1 EUT Configuration 13
4.4.2 Test Procedure 13
4.4.3 EMI Receiver/Spectrum Analyzer Configuration (for the frequencies tested) 13
4.4.4 Test Data (30MHz – 1GHz): 14
4.4.5 Test Data (1GHz – 25 GHz) 15
4.5 Band Edge Measurement 18
4.5.1 Test Procedure (Conducted) 18
4.5.2 Test Setup (Conducted) 18
4.5.3 Test Data: 18
4.5.4 Test Procedure (Radiated) 20
4.5.5 Test Setup (Radiated) 20
4.5.6 Test Data 21
4.6 RF Exposure Measurement [Section 15.247(b)(4) & 1.1307(b)] 24
4.7 DSSS Peak Power Spectral Density [Section 15.247(d)] 25
4.7.1 Test Procedure 25
4.7.2 Test Setup 25
4.7.3 Test Data 25
5. TEST RESULTS (802.11g) 28
5.1 Powerline Conducted Emissions [Section 15.207] 28
5.1.1 EUT Configuration 28
5.1.2 Test Procedure 28
5.1.3 EMI Receiver/Spectrum Analyzer Configuration (for the frequencies tested) 28
5.1.4 Test Data: 29
5.2 Bandwidth for DSSS [Section 15.247 (a)(2)] 31
5.2.1 Test Procedure 31
5.2.2 Test Setup 31
5.2.3 Test Data: 31
5.3 DSSS Maximum Peak Output Power [Section 15.247 (b)(1)] 34
5.3.1 Test Procedure 34
5.3.2 Test Setup 34

5.3.3 Test Data 34
5.4 Radiated Emission Measurement [Section [15.247(c)(4)] 35
5.4.1 EUT Configuration 35
5.4.2 Test Procedure 35
5.4.3 EMI Receiver/Spectrum Analyzer Configuration (for the frequencies tested) 35
5.4.4 Test Data (30MHz – 1GHz): 36
5.4.5 Test Data (1GHz – 25 GHz) 37
5.5 Band Edge Measurement 40
5.5.1 Test Procedure (Conducted) 40
5.5.2 Test Setup (Conducted) 40
5.5.3 Test Data: 40
5.5.4 Test Procedure (Radiated) 42
5.5.5 Test Setup (Radiated) 42
5.5.6 Test Data 43
5.6 RF Exposure Measurement [Section 15.247(b)(4) & 1.1307(b)] 46
5.7 DSSS Peak Power Spectral Density [Section 15.247(d)] 47
5.7.1 Test Procedure 47
5.7.2 Test Setup 47
5.7.3 Test Data 47
6. TEST RESULTS (Bluetooth Device co-located with the WLAN Device) 50
6.1 Radiated Emission Measurement [Section [15.247(c)(4)] 50
6.1.1 EUT Configuration 50
6.1.2 Test Procedure 50
6.1.3 EMI Receiver/Spectrum Analyzer Configuration (for the frequencies tested) 50
6.1.4 Test Data (above 1GHz) : 51
6.2 Band Edge Measurement (when Bluetooth and WLAN are operating at the same time) 53
6.2.1 Band Edge measurement Test Procedure (Radiated) 53
6.2.2 Test Setup (Radiated) 53
6.2.3 Test Data (bluetooth & 802.11b): 54
6.2.4 Test Data (bluetooth & 802.11g): 57
7. TEST RESULTS (Bluetooth) 60
7.1 20 dB BANDWIDTH 60
7.2 HOPPING FREQUENCY SEPARATION 64
7.3 7.3 NUMBER OF HOPPING CHANNELS 66
7.4 AVERAGE TIME OF OCCUPANCY 70
7.5 PEAK OUTPUT POWER 75
7.6 AVERAGE POWER 77
7.7 PEAK POWER SPECTRAL DENSITY 78
7.8 CONDUCTED SPURIOUS EMISSIONS 82
7.9 RADIATED EMISSIONS 91
7.9.1 RADIATED EMISSIONS ABOVE 1 GHZ 94
7.9.2 RADIATED EMISSIONS BELOW 1 GHZ 104
7.10 CO-LOCATED RADIATED EMISSIONS 106
7.11 POWERLINE CONDUCTED EMISSIONS 116
8. Appendix 120
8.1 Appendix A: Measurement Procedure for Power line Conducted Emissions 120
8.2 Appendix B: Test Procedure for Radiated Emissions 121
8.3 Appendix C: Test Equipment 122
8.3.1 Test Equipment List 122
8.3.2 Software for Controlling Spectrum/Receiver and Calculating Test Data 122
8.4 Appendix D: Layout of EUT and Support Equipment 123
8.4.1 General Conducted Test Configuration 123

8.4.2 General Radiation Test Configuration 124
8.5 Appendix E: Description of Support Equipment 125
8.5.1 Software for Controlling Support Unit 126
8.5.2 I/O Cable Condition of EUT and Support Units 127
8.6 Appendix F: Accuracy of Measurement 128
8.7 Appendix G: Photographs of EUT Configuration Test Set Up 130
8.8 Appendix H: Antenna Spec. 133

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 (with Intel PRO/Wireless 2200BG Network Connection inside)
Model:	TravelMate C310;MS2161
Applied by:	Acer Inc.
Sample received Date:	2005/05/03
Final test Date :	2005/05/04-2005/05/11
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

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 117 pages, including 1 cover page , 3 contents page, and 113 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	MPE 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	MPE report attached
15.247 (d)	Power Spectral Density	Pass	

The Bluetooth of EUT has been tested to the FCC regulations listed below:

Tested Standards: 47 CFR Part 15 Subpart C
Please see the bluetooth test report

3. Description of Equipment Under Test (EUT)

Description:	Notebook Personal Computer (with PRO/Wireless 2200BG Network Connection & Broadcom USB Bluetooth Module BCM92035NMD inside)
Model No.:	TravelMate C310; MS2161
FCC ID:	HLZMS2161BG
Brand:	acer
Wireless LAN Module:	Intel, Model: WM3B2200BG
Bluetooth Wireless Card:	Broadcom, Model: BCM92035NMD
Frequency Range 802.11b/g:	2412 - 2462 MHz
Frequency Range of bluetooth:	2402 - 2480 MHz
Support channel:	
802.11b/g	11 Channels
bluetooth	79 Channels
Modulation Skill:	
802.11b	DBPSK(1Mbps), DQPSK(2Mbps), CCK(5.5/11Mbps)
802.11g	OFDM (6M - 54Mbps)
bluetooth	GFSK
Antennas Type:	
Main antenna:	PIFA (**P/N: 25.90146.001**) made by Hannatar
Aux antenna:	PIFA (**P/N: 25.90130.001**) made by Hannatar
Antenna Connected:	Connected to RF connector on the PCB of the 802.11b/g WLAN Adapter and bluetooth card. The user is not possible to change the antenna without disassembling the notebook computer.
Antenna peak Gain:	
Main antenna	2.42 dBi (11b,11g)
AUX antenna	0.91 dBi (11b,11g)
Bluetooth antenna	3 dBi
Power Type of wireless module:	3.3V DC from Notebook PC

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		

The channel and the operation frequency of bluetooth is listed below:

Channel	Frequency(MHz)	Channel	Frequency(MHz)
00	2402	01	2403
02	2404	03	2405
……..			
……			
77	2479	78	2480

In this report about bluetooth, we will show the Radiated Emission above1GHz and the Radiated Band-Edge when the bluetooth device is co-located with the WLAN device.

Adapter Type:	Liteon 70W(Model:PA-1700-02) 3pins
SDRAM:	Nanya 128MB (Model: NT128D64SH4BBGM-6K) or Infineon 256MB (Model: HYS64D32020GDL-6-B) or Nanya 256MB (Model: NT256D64SH8BAGM-6K) or Elpida 256MB (Model: W30256AAEP1652A) or Micron 256MB (Model: MT8VDDT3264HDG-335C3) or Infineon 512MB (Model: HYS64D64020GBDL-6-B) or Elpida 512MB (Model: EBD52UC8AARA6B) or Micron 512MB (Model: MT16VDDF6464HG-335C2)
Hard Disk Driver:	HGST 20G (Model: IC25N020ATMR04-0) or HGST 30G (Model: IC25N030ATMR04-0) or HGST 40G (Model: IC25N040ATMR04-0) or HGST 60G (Model: IC25N060ATMR04-0) or HGST 80G (Model: IC25N080ATMR04-0) or Toshiba 30GB (Model: MK3021GAS) or Toshiba 40GB (Model: MK4021GAS) or Toshiba 60GB (Model: MK6021GAS)
DVD-ROM:	MKE (Model: SR-8177-BAA3) or Liteon (Model: XJ-SD081D)
CD-ROM:	Mitsumi (Model: SR244W1 A6) or
Combo:	Sony (Model: CRX-830) or QSI (Model: SBW-242U) or Pioneer (Model: DVR-K12D)
FDD Driver:	Y-E Data(Model:YD-8U10) (Optional module)

Battery:	Sanyo 8 cell Li+ (Model:BTP-63D1)
Power In Port:	one
USB Port:	two 4-pin (USB 2.0)
VGA Port:	one
TV-Out Port	one
1394 Connecter:	one 4-pin
Line Out Port:	one
Line In Port:	one
LAN Connector:	one 8-pin (10Mbps/100Mbps)
Modem Connector:	one
PCMCIA:	one
Mini-PCI:	one
Port Replicator:	one 100-pin
Power Cord:	Shielded
LCD:	CMO 14.1" XGA (Model: CHIME/N141X9-L01) or AU 14.1" XGA (Model: B141XG08)

Speed & CPU	
Speed	CPU
100MHz	Intel Banias 1.7GHz

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 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)

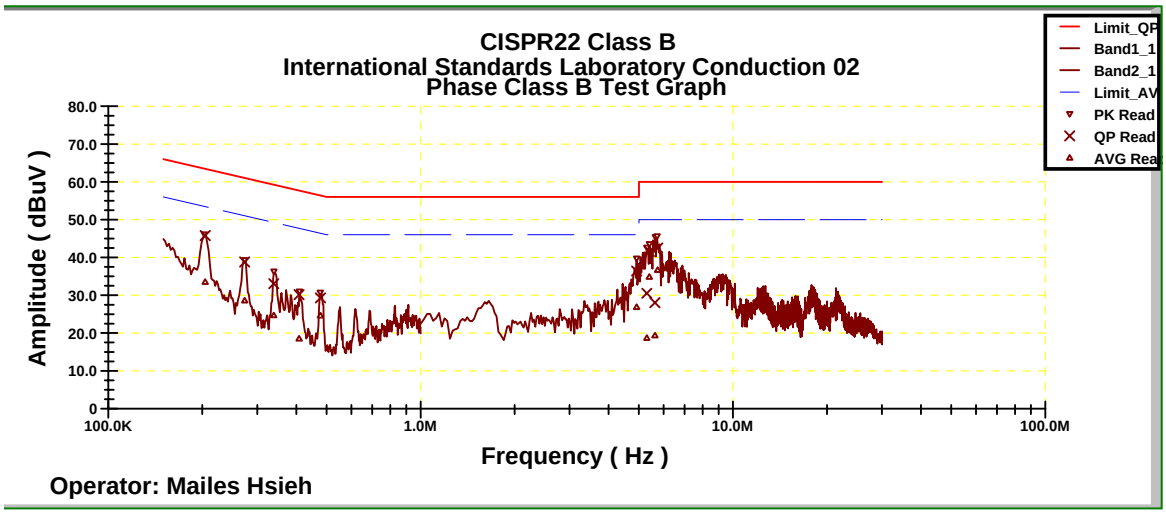
Frequency Range	150 KHz--30MHz
Detector Function	Quasi-Peak/Average
Bandwidth (RBW)	9KHz

4.1.4 Test Data:

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

Operator:MailesHsieh
Temperature(C):24
Humidity(%):63

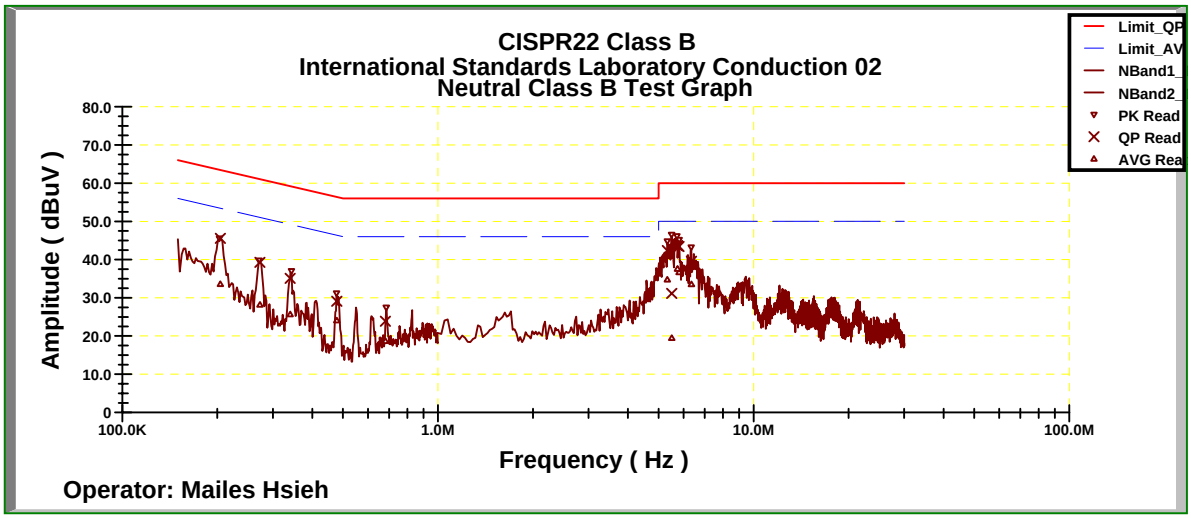
Frequency	LISN Loss	Cable Loss	QP Corrct.	QP Limit	QP Margin	AVE Corrct.	AVE Limit	AVE Margin
MHz	(dB)	(dB)	Amp.(dBuV)	(dBuV)	(dB)	Amp.(dBuV)	(dBuV)	(dB)
0.2042	0.10	0.05	45.79	64.45	-18.66	33.47	54.45	-20.98
0.2732	0.10	0.09	38.78	62.48	-23.70	28.60	52.48	-23.88
0.3386	0.10	0.09	33.04	60.61	-27.56	24.65	50.61	-25.96
0.4082	0.10	0.08	30.15	58.62	-28.48	18.49	48.62	-30.14
0.4777	0.11	0.07	29.28	56.64	-27.36	24.60	46.64	-22.04
4.9131	0.22	0.15	36.38	56.00	-19.62	26.83	46.00	-19.17
5.2970	0.22	0.16	30.50	60.00	-29.50	18.64	50.00	-31.36
5.3965	0.23	0.16	41.59	60.00	-18.41	34.84	50.00	-15.16
5.6235	0.23	0.16	28.03	60.00	-31.97	19.32	50.00	-30.68
5.7362	0.23	0.16	42.50	60.00	-17.50	36.68	50.00	-13.32



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

Operator:MailesHsieh
Temperature(C):24
Humidity(%):63

Frequency	LISN Loss	Cable Loss	QP Corrct.	QP Limit	QP Margin	AVE Corrct.	AVE Limit	AVE Margin
MHz	(dB)	(dB)	Amp.(dBuV)	(dBuV)	(dB)	Amp.(dBuV)	(dBuV)	(dB)
0.2044	0.10	0.05	45.54	64.44	-18.90	33.56	54.44	-20.88
0.2729	0.10	0.09	39.28	62.49	-23.21	28.15	52.49	-24.34
0.3402	0.10	0.09	35.08	60.56	-25.48	25.63	50.56	-24.93
0.4780	0.11	0.07	29.08	56.63	-27.55	24.07	46.63	-22.55
0.6815	0.15	0.07	23.85	56.00	-32.15	18.65	46.00	-27.35
5.3229	0.19	0.16	42.34	60.00	-17.66	34.75	50.00	-15.25
5.5001	0.19	0.16	31.11	60.00	-28.89	19.44	50.00	-30.56
5.7344	0.18	0.16	43.62	60.00	-16.38	37.55	50.00	-12.45
5.8029	0.18	0.16	43.41	60.00	-16.59	36.67	50.00	-13.33
6.3484	0.18	0.17	39.53	60.00	-20.47	33.50	50.00	-16.50



* 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:

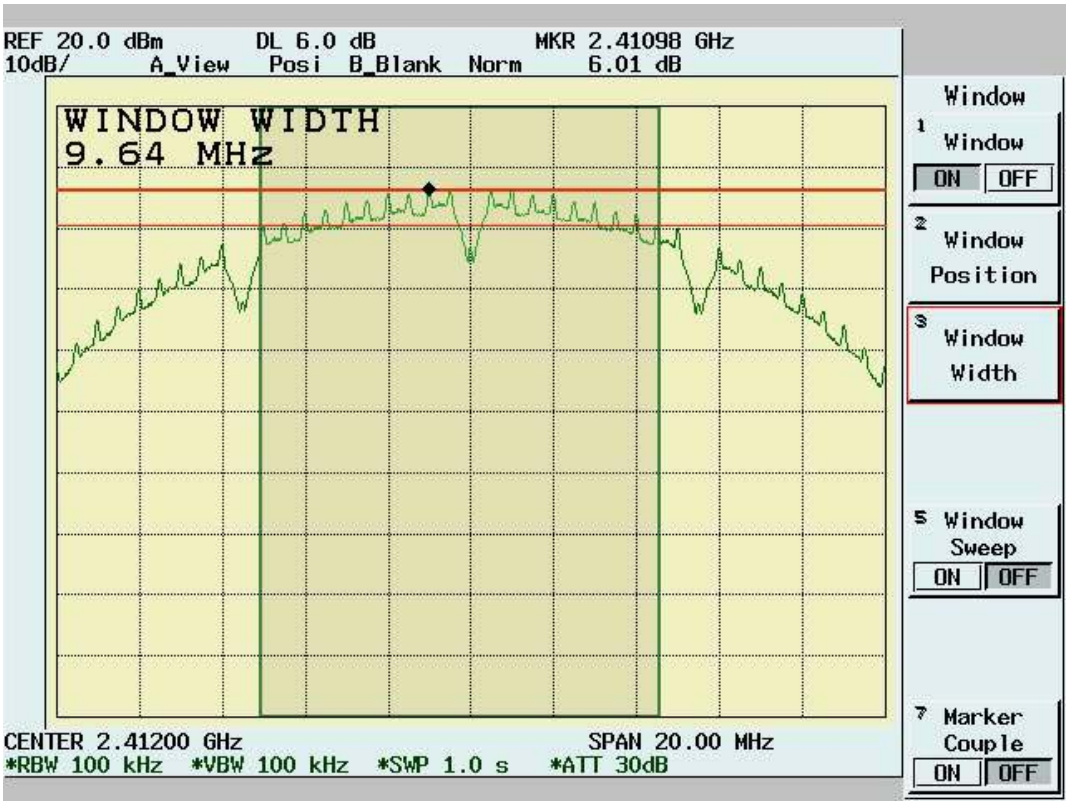
6dB Bandwidth

Temperature (℃):24

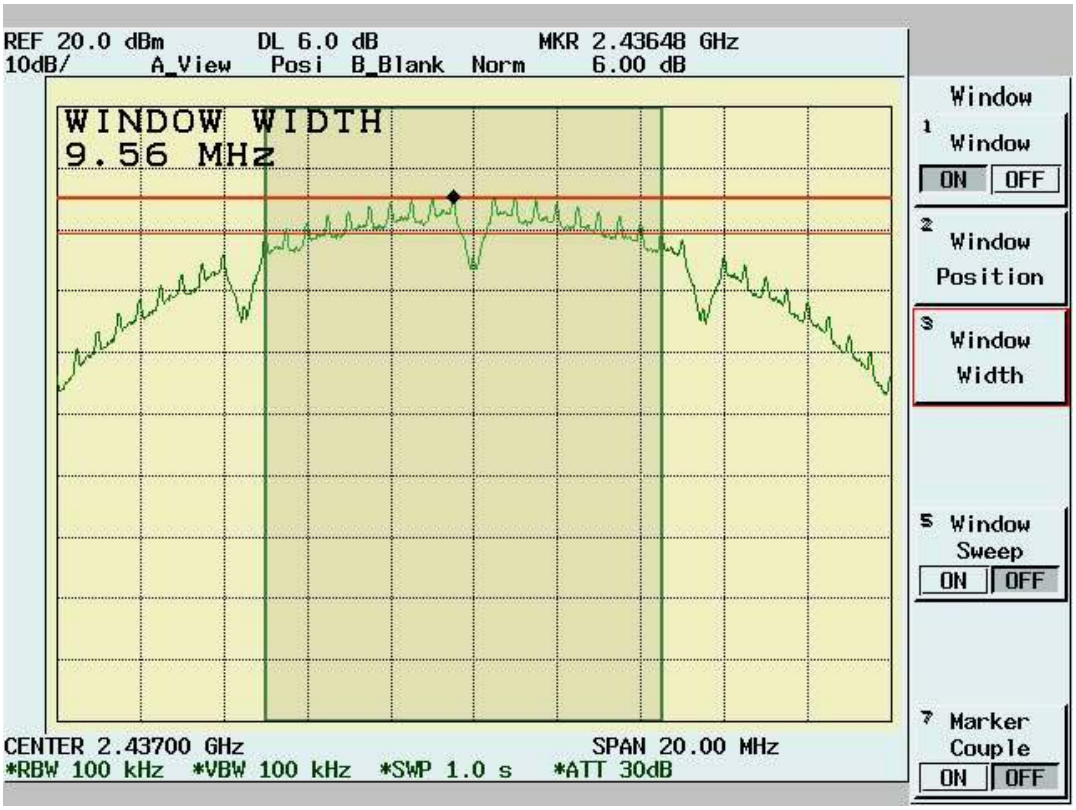
Test Engineer:Mailes Hsieh Humidity (%):58

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Pass/Fail
1	**2412**	9.64	0.5	Pass
6	**2437**	9.56	0.5	Pass
11	**2462**	9.56	0.5	Pass

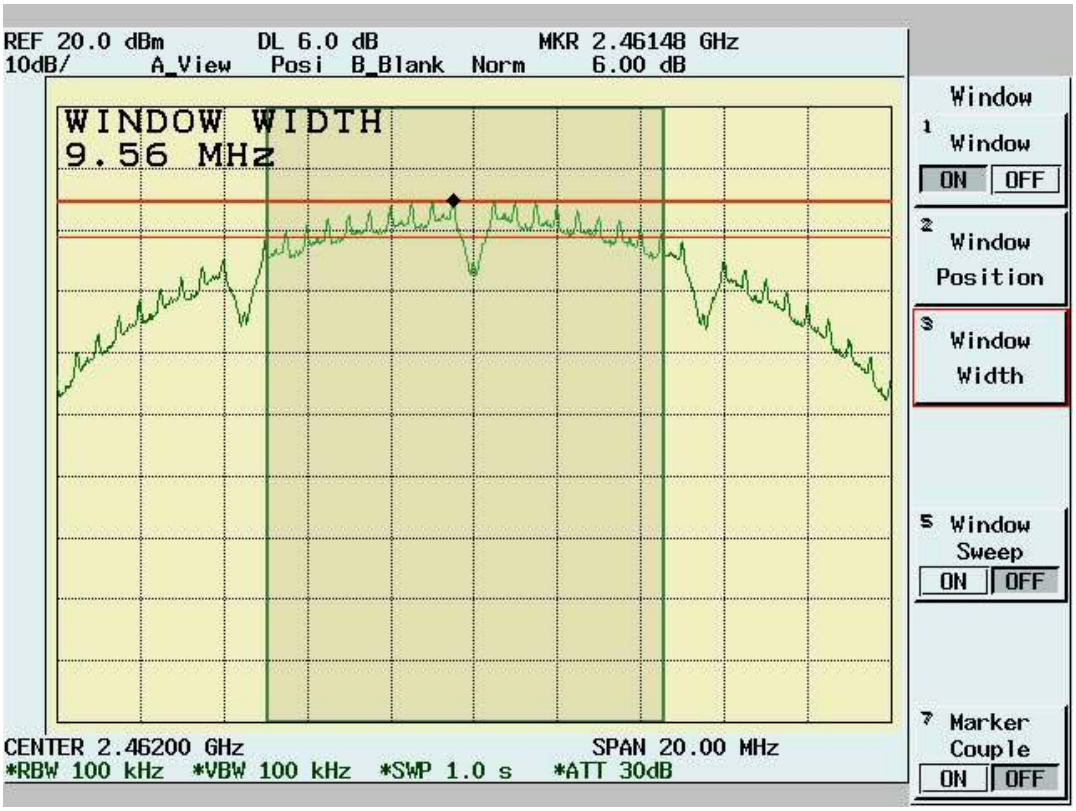
Channel 1:



Channel 6:



Channel 11:

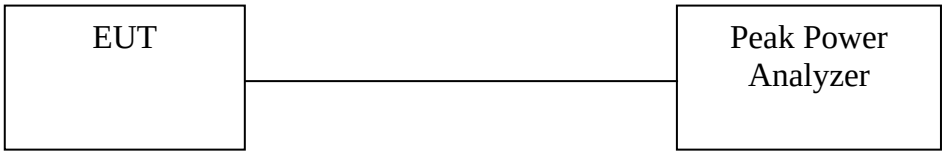

REF 20.0 dBm
10dB/
DL 6.0 dB
A_View
Posi
B_Blank
Norm
MKR 2.46148 GHz
6.00 dB
WINDOW WIDTH
9.56 MHz
CENTER 2.46200 GHz
SPAN 20.00 MHz
*RBW 100 kHz
*VBW 100 kHz
*SWP 1.0 s
*ATT 30dB
Window
1 Window
ON OFF
2 Window Position
3 Window Width
5 Window Sweep
ON OFF
7 Marker Couple
ON OFF

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

Temperature (℃):24

Test Engineer:Mailes Hsieh Humidity (%):58

Channel	Frequency (Mhz)	Analyzer Reading (dBm)	Cable Loss (dB)	Peak Power Output (mW)	Peak Power Output (dBm)	Limit (dBm)	Pass/Fail
1	**2412**	14.81	1.10	38.99	15.91	30	Pass
6	**2437**	14.44	1.10	35.81	15.54	30	Pass
11	**2462**	14.57	1.10	36.90	15.67	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 ac*cording 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)	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):22
Humidity(%):42

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
262.80	16.11	12.90	3.19	0.00	32.20	46.00	-13.80	103.00	199.00
298.69	20.98	13.57	3.59	0.00	38.15	46.00	-7.85	103.00	232.00
314.21	14.55	13.80	3.76	0.00	32.12	46.00	-13.88	103.00	297.00
328.76	14.57	14.00	3.91	0.00	32.49	46.00	-13.51	103.00	33.00
335.55	14.56	14.10	3.98	0.00	32.64	46.00	-13.36	103.00	33.00
354.95	15.38	14.46	4.14	0.00	33.98	46.00	-12.02	103.00	149.00
366.59	20.91	14.83	4.22	0.00	39.95	46.00	-6.05	103.00	215.00
431.58	16.04	16.15	4.68	0.00	36.87	46.00	-9.13	103.00	116.00
497.54	9.96	17.44	5.26	0.00	32.66	46.00	-13.34	103.00	83.00
871.96	4.73	20.51	8.05	0.00	33.30	46.00	-12.70	103.00	66.00

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

Operator:MailesHsieh
Temperature(C):22
Humidity(%):42

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
42.61	14.95	10.94	1.13	0.00	27.02	40.00	-12.98	103.00	105.00
99.84	25.80	10.27	1.89	0.00	37.96	43.50	-5.54	103.00	105.00
159.01	19.12	8.86	2.36	0.00	30.34	43.50	-13.16	103.00	171.00
165.80	23.58	8.63	2.42	0.00	34.63	43.50	-8.87	103.00	154.00
184.23	20.07	8.56	2.62	0.00	31.25	43.50	-12.25	103.00	228.00
364.65	14.77	14.77	4.20	0.00	33.74	46.00	-12.26	103.00	39.00
431.58	12.16	16.15	4.68	0.00	33.00	46.00	-13.00	103.00	22.00
847.71	4.44	20.58	7.74	0.00	32.76	46.00	-13.24	103.00	72.00
871.96	7.23	20.51	8.05	0.00	35.79	46.00	-10.21	103.00	55.00
897.18	4.59	20.41	8.08	0.00	33.08	46.00	-12.92	103.00	72.00

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

4.4.5 Test Data (1GHz – 25 GHz) .

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

Operator:MailesHsieh RBW:1MHz
Humidity(%):43
Temperature(C):25

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
1192.31	52.07pk	25.38	2.19	34.03	45.61pk	54.00av	-8.39	102	99
1332.17	51.30pk	26.03	2.21	34.11	45.43pk	54.00av	-8.57	101	89
1596.90	52.73pk	27.61	2.30	34.39	48.25pk	54.00av	-5.75	101	71
2311.19	52.32pk	30.94	1.65	35.19	49.72pk	54.00av	-4.28	101	141
2331.17	51.58pk	30.93	1.59	35.19	48.91pk	54.00av	-5.09	101	147
2510.99	48.20pk	30.90	1.36	35.19	45.27pk	54.00av	-8.73	102	203
9643.36	43.83av	40.58	3.24	34.33	53.33av	54.00av	-0.67	102	7

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

Operator:MailesHsieh RBW:1MHz
Humidity(%):43
Temperature(C):25

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
1327.17	57.08pk	26.00	2.21	34.11	51.19pk	54.00av	-2.81	101	89
1596.90	52.73pk	27.61	2.30	34.39	48.26pk	54.00av	-5.74	101	71
1796.70	52.78pk	29.29	2.45	34.78	49.74pk	54.00av	-4.26	100	57
2311.19	51.77pk	30.94	1.65	35.19	49.16pk	54.00av	-4.84	101	141
2328.67	52.43pk	30.93	1.60	35.19	49.77pk	54.00av	-4.23	101	146
2491.01	49.97pk	30.90	1.41	35.20	47.08pk	54.00av	-6.92	101	197
4989.51	46.15pk	35.56	2.17	37.90	45.98pk	54.00av	-8.02	100	1
6426.57	44.02pk	36.31	3.36	37.73	45.96pk	54.00av	-8.04	100	211
6821.68	42.92pk	38.14	3.21	37.40	46.87pk	54.00av	-7.13	101	141
9643.36	42.86av	40.58	3.24	34.33	52.36av	54.00av	-1.64	102	7

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(%):43
Temperature(C):25

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
1394.61	50.55pk	26.32	2.22	34.14	44.94pk	54.00av	-9.06	101	85
1594.41	53.32pk	27.59	2.30	34.39	48.83pk	54.00av	-5.17	101	71
2333.67	55.31pk	30.93	1.58	35.19	52.63pk	54.00av	-1.37	101	148
2353.65	51.10pk	30.93	1.52	35.19	48.36pk	54.00av	-5.64	101	154
2398.60	55.12pk	30.92	1.46	35.20	52.30pk	54.00av	-1.70	101	168
2535.96	48.93pk	30.91	1.37	35.17	46.04pk	54.00av	-7.96	102	211
9745.25	44.05av	40.36	3.30	34.37	53.34av	54.00av	-0.66	102	5

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

Operator:MailesHsieh

RBW:1MHz
Humidity(%):43
Temperature(C):25

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
1329.67	55.67pk	26.02	2.21	34.11	49.79pk	54.00av	-4.21	101	89
1596.90	51.52pk	27.61	2.30	34.39	47.05pk	54.00av	-6.95	101	71
2333.67	52.98pk	30.93	1.58	35.19	50.31pk	54.00av	-3.69	101	148
2356.14	49.12pk	30.93	1.51	35.19	46.37pk	54.00av	-7.63	101	155
2383.62	50.23pk	30.92	1.43	35.20	47.38pk	54.00av	-6.62	101	163
2535.96	48.84pk	30.91	1.37	35.17	45.95pk	54.00av	-8.05	102	211
4975.52	51.28pk	35.51	2.16	37.88	51.07pk	54.00av	-2.93	100	2
6493.01	43.68pk	36.39	3.40	37.68	45.79pk	54.00av	-8.21	100	199
6821.68	43.41pk	38.14	3.21	37.40	47.35pk	54.00av	-6.65	101	141
9745.25	43.69av	40.36	3.30	34.37	52.98av	54.00av	-1.02	102	5

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(%):43
Temperature(C):25

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
1596.90	52.46pk	27.61	2.30	34.39	47.99pk	54.00av	-6.01	101	71
2343.66	50.96pk	30.93	1.55	35.19	48.25pk	54.00av	-5.75	101	151
2358.64	54.27pk	30.93	1.51	35.19	51.51pk	54.00av	-2.49	101	156
2386.11	49.98pk	30.92	1.42	35.20	47.13pk	54.00av	-6.87	101	164
2396.10	49.30pk	30.92	1.45	35.20	46.48pk	54.00av	-7.52	101	167
2423.58	53.70pk	30.92	1.46	35.20	50.87pk	54.00av	-3.13	101	176
9841.16	44.12av	40.15	3.35	34.40	53.21av	54.00av	-0.79	101	3

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

Operator:MailesHsieh RBW:1MHz
Humidity(%):43
Temperature(C):25

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
1332.17	55.51pk	26.03	2.21	34.11	49.64pk	54.00av	-4.36	101	89
1594.41	50.95pk	27.59	2.30	34.39	46.46pk	54.00av	-7.54	101	71
1794.21	50.27pk	29.27	2.45	34.78	47.21pk	54.00av	-6.79	100	57
2286.21	48.45pk	30.94	1.73	35.19	45.93pk	54.00av	-8.07	101	133
2358.64	53.62pk	30.93	1.51	35.19	50.86pk	54.00av	-3.14	101	156
2421.08	53.10pk	30.92	1.48	35.20	50.30pk	54.00av	-3.70	101	175
4982.52	46.36pk	35.53	2.17	37.89	46.17pk	54.00av	-7.83	100	2
6821.68	42.16pk	38.14	3.21	37.40	46.11pk	54.00av	-7.89	101	141
6912.59	41.14pk	38.63	3.15	37.32	45.60pk	54.00av	-8.40	101	125
9841.16	44.37av	40.15	3.35	34.40	53.46av	54.00av	-0.54	101	3

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.

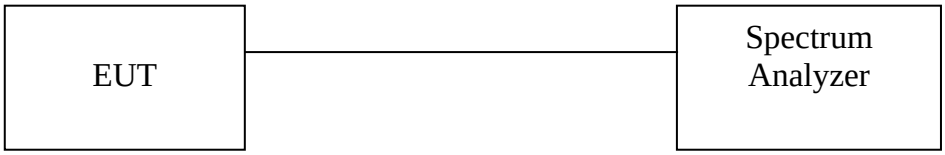
All frequencies from 1GHz to 25 GHz have been tested.

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)

Temperature (℃):24

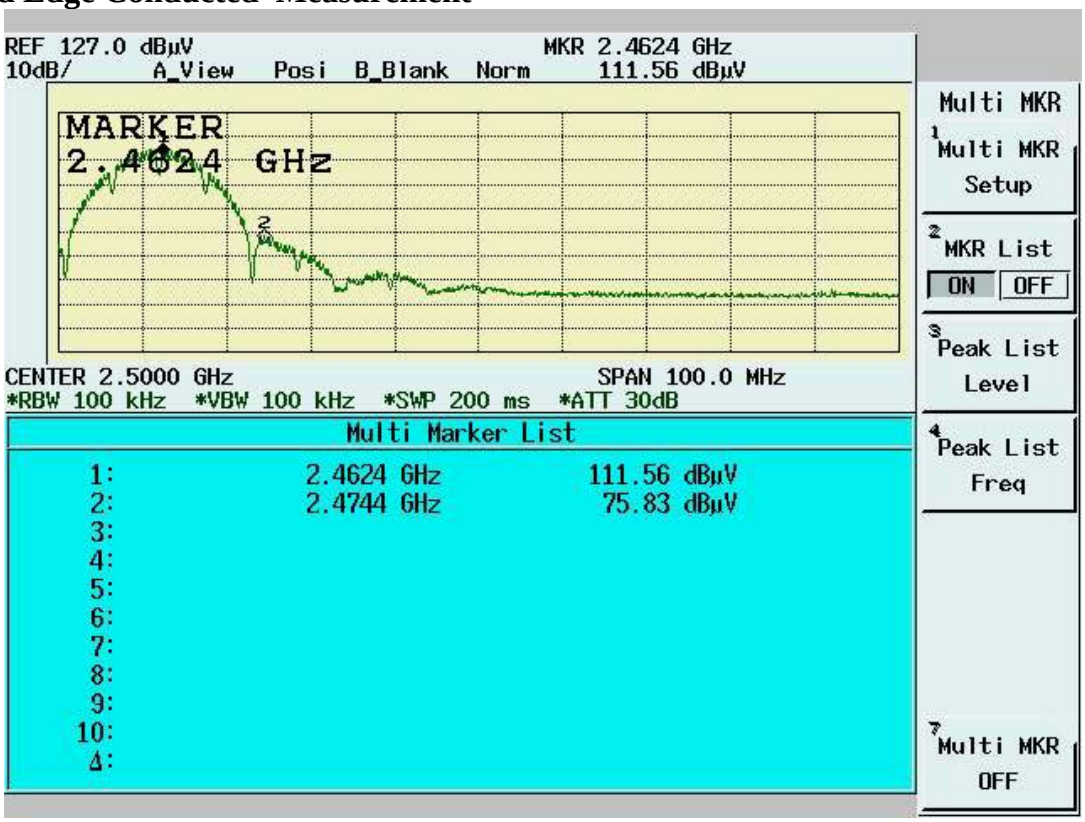
Test Engineer:Mailes Hsieh Humidity (%):58

Channel	Frequency (MHz)	Spectrum Reading (dBuV)	Carrier - Outsideband Limit: >20dB (dB)	Pass/Fail
1	2411.5	113.34	---	---
Outside band	2400.0	73.91	39.43	Pass
11	2462.4	111.56	---	---
Outside band	2474.4	75.83	35.73	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)

Temperature (℃):26

Test Engineer:Mailes Hsieh

Humidity (%):43

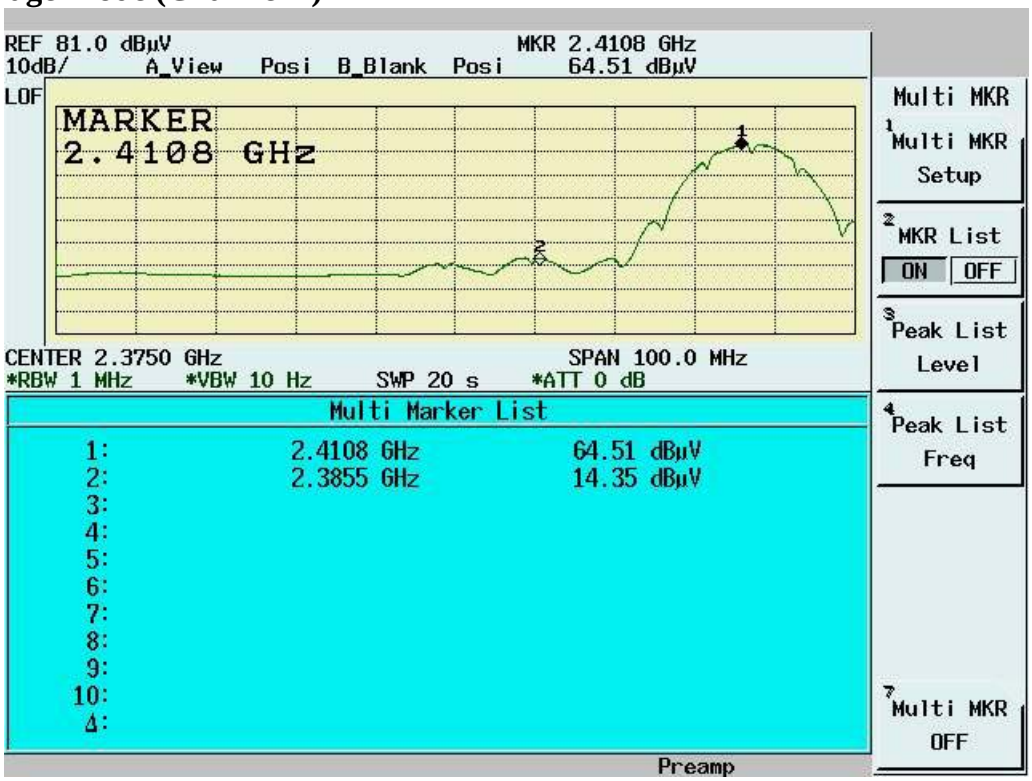
Description	Frequency (MHz)	Spectrum Reading (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	dBc (Limit: > 20dBc)	Limit (dBuV/m)	Equip. Setup VBW	Pass or Fail
Channel_1 (average mode)	2410.8	64.51	35.48	99.99	---	---	10Hz	---
Channel_1 (peak mode)	2411.7	71.20	35.48	106.68	---	---	3MHz	---
Outside band (peak mode)	2399.7	36.16	35.48	71.64	35.04	---	3MHz	Pass
Channel_11 (average mode)	2462.7	60.88	35.50	96.38	---	---	10Hz	---
Channel_11 (peak mode)	2462.9	67.70	35.50	103.20	---	---	3MHz	---
Outside band (peak mode)	2474.8	34.16	35.51	69.67	33.53	---	3MHz	Pass
Channel_1 Restricted band (peak mode)	2384.4	23.58	35.47	59.05	---	74	3MHz	Pass
Restricted band (average mode)	2385.5	14.35	35.47	49.82	---	54	10Hz	Pass
Channel_11 Restricted band (peak mode)	2490.3	21.52	35.51	57.03	---	74	3MHz	Pass
Restricted band (average mode)	2488.4	11.58	35.51	47.09	---	54	10Hz	Pass

Note:

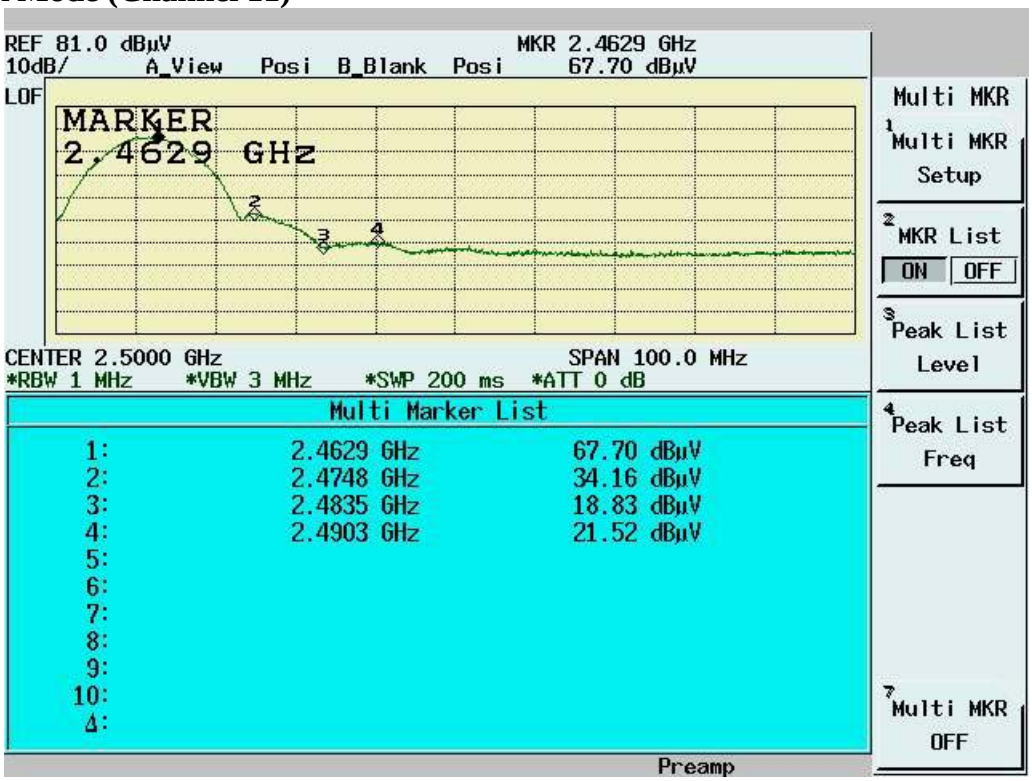
- The Spectrum plot of emission level measurement in Restricted band is attached.
- Emission Level=Spectrum Reading+Correction Factor
- Correction Factor=Antenna Factor+cable loss–amplifier gain
- Both Horizontal and Vertical polarizaion have been tested and the worst data is listed above.

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

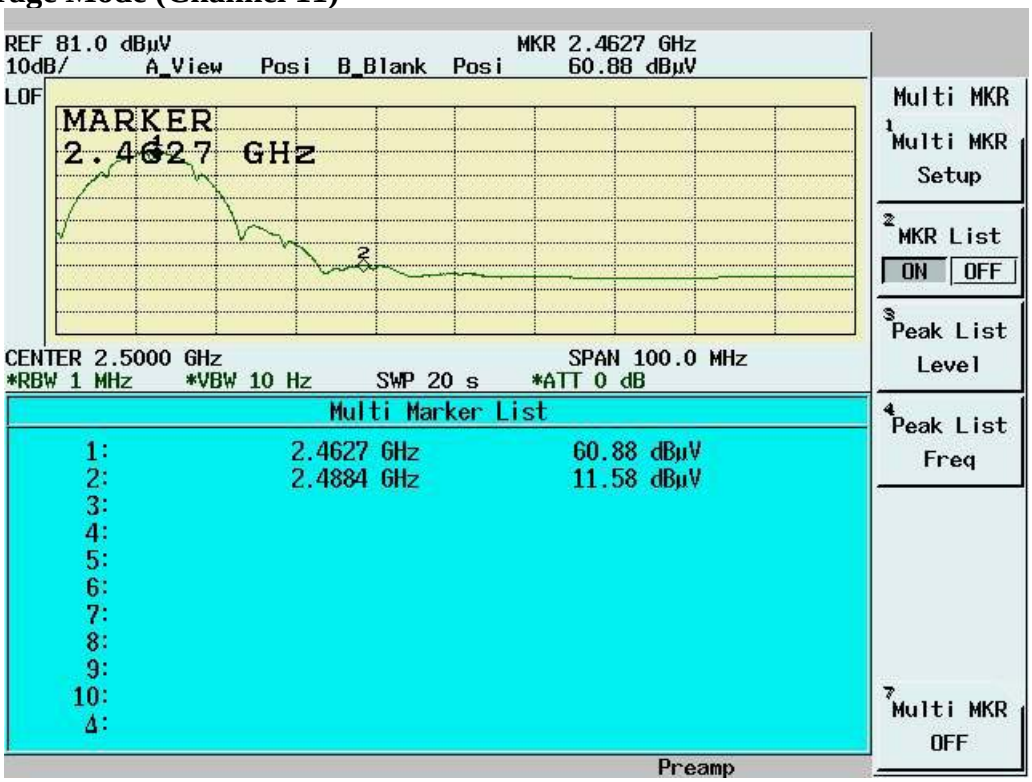
Band Edge measurement for radiated emission in Restricted Band(Radiated) Average Mode (Channel 1)



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

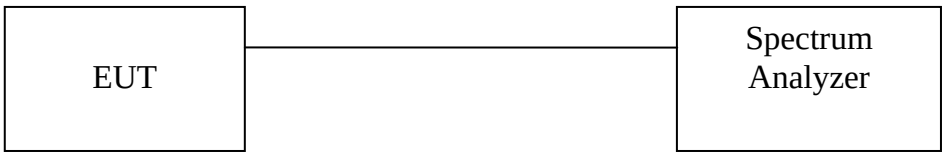
See MPE report

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

Temperature (℃):24

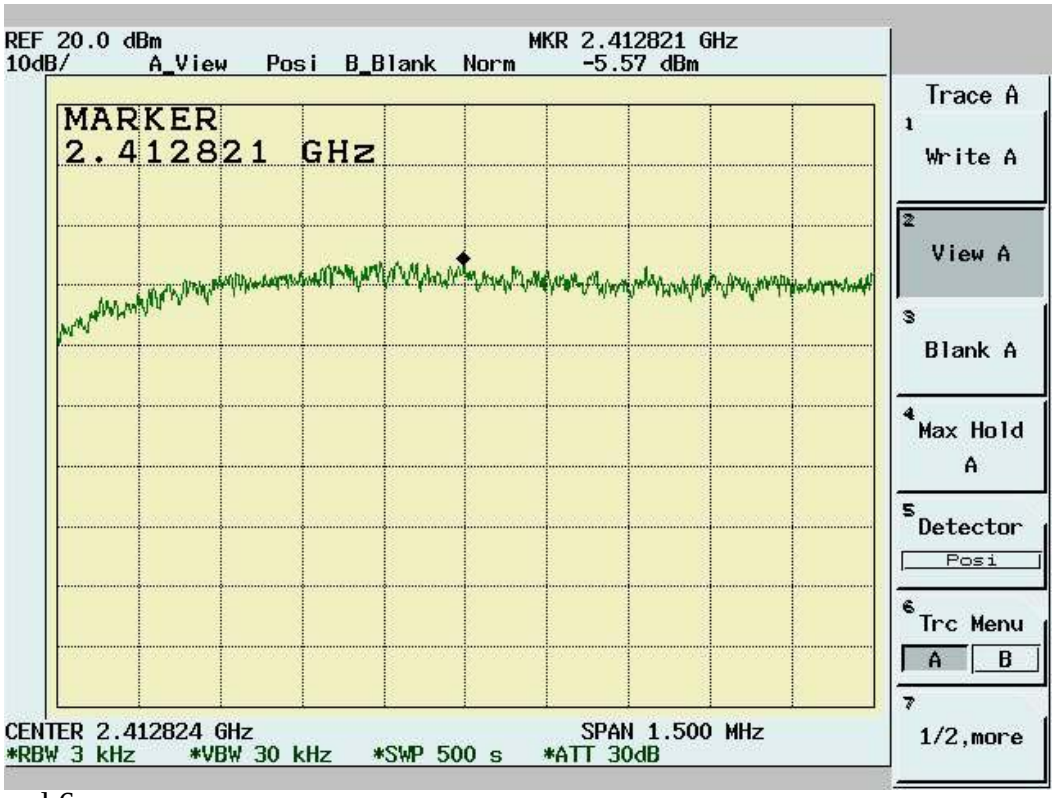
Test Engineer:Mailes Hsieh

Humidity (%):58

Channel	Frequency (MHz)	Spectrum Reading (dBm/3KHz)	Cable Loss (dB)	Peak Power Output (dBm/3KHz)	Limit (dBm/3KHz)	Pass/Fail
1	**2412**	-5.57	1.10	-4.47	8	Pass
6	**2437**	-5.87	1.10	-4.77	8	Pass
11	**2462**	-8.02	1.10	-6.92	8	Pass

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

Channel 1



Channel 6

Channel 11


REF 20.0 dBm
10dB/
A_View
Posi
B_Blank
Norm
MKR 2.462692 GHz
-8.02 dBm
SWP
500 s
Trace A
1 Write A
2 View A
3 Blank A
4 Max Hold A
5 Detector
Posi
6 Trc Menu
A
B
7 1/2,more
CENTER 2.462677 GHz
SPAN 1.500 MHz
*RBW 3 kHz
*VBW 30 kHz
*SWP 500 s
*ATT 30dB

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 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)

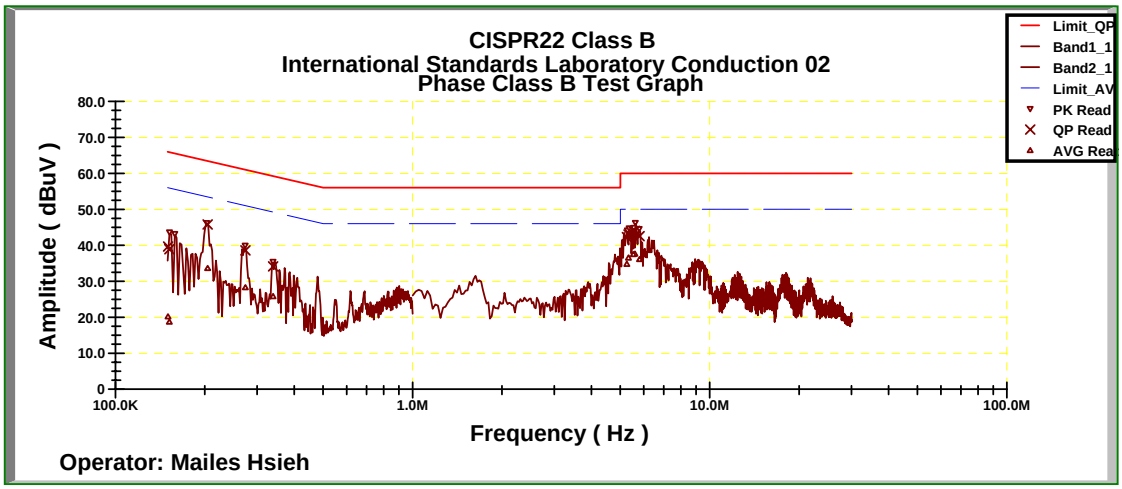
Frequency Range	150 KHz--30MHz
Detector Function	Quasi-Peak/Average
Bandwidth (RBW)	9KHz

5.1.4 Test Data:

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

Operator:MailesHsieh
Temperature(C):24
Humidity(%):63

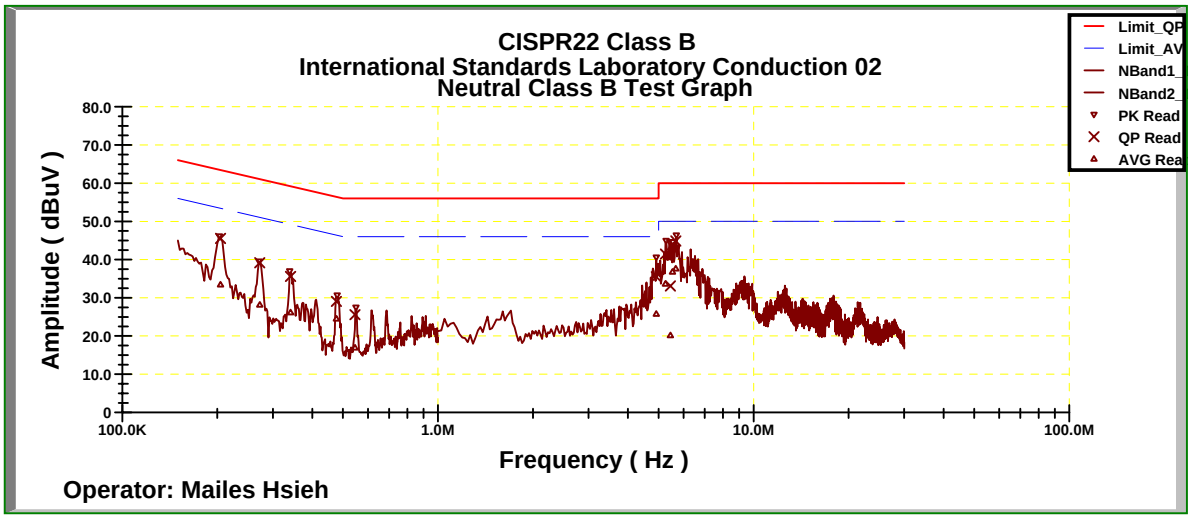
Frequency	LISN Loss	Cable Loss	QP Corrct.	QP Limit	QP Margin	AVE Corrct.	AVE Limit	AVE Margin
MHz	(dB)	(dB)	Amp.(dBuV)	(dBuV)	(dB)	Amp.(dBuV)	(dBuV)	(dB)
0.1504	0.10	0.02	39.62	65.99	-26.37	20.12	55.99	-35.87
0.1519	0.10	0.02	38.90	65.95	-27.04	18.66	55.95	-37.29
0.2044	0.10	0.05	45.78	64.45	-18.67	33.55	54.45	-20.90
0.2737	0.10	0.09	38.58	62.46	-23.89	28.23	52.46	-24.24
0.3393	0.10	0.09	34.12	60.59	-26.47	25.75	50.59	-24.84
5.2565	0.22	0.15	42.29	60.00	-17.71	34.75	50.00	-15.25
5.3256	0.22	0.16	43.00	60.00	-17.00	36.49	50.00	-13.51
5.5296	0.23	0.16	43.96	60.00	-16.04	37.44	50.00	-12.56
5.5979	0.23	0.16	44.03	60.00	-15.97	37.58	50.00	-12.42
5.8029	0.23	0.16	42.53	60.00	-17.47	36.04	50.00	-13.96



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

Operator:MailesHsieh
Temperature(C):24
Humidity(%):63

Frequency	LISN Loss	Cable Loss	QP Corrct.	QP Limit	QP Margin	AVE Corrct.	AVE Limit	AVE Margin
MHz	(dB)	(dB)	Amp.(dBuV)	(dBuV)	(dB)	Amp.(dBuV)	(dBuV)	(dB)
0.2046	0.10	0.05	45.52	64.44	-18.92	33.44	54.44	-21.00
0.2724	0.10	0.09	39.15	62.50	-23.36	28.18	52.50	-24.33
0.3412	0.10	0.09	35.57	60.54	-24.96	26.15	50.54	-24.39
0.4768	0.11	0.07	29.05	56.66	-27.62	24.50	46.66	-22.17
0.5460	0.12	0.07	25.57	56.00	-30.43	16.93	46.00	-29.07
4.9125	0.19	0.15	35.47	56.00	-20.53	25.78	46.00	-20.22
5.2553	0.19	0.15	41.41	60.00	-18.59	33.65	50.00	-16.35
5.4477	0.19	0.16	33.06	60.00	-26.94	20.15	50.00	-29.85
5.5317	0.19	0.16	43.87	60.00	-16.13	36.79	50.00	-13.21
5.6655	0.18	0.16	44.84	60.00	-15.16	37.62	50.00	-12.38



* 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

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

Temperature (℃):24

Test Engineer:Mailes Hsieh Humidity (%):58

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Pass/Fail
1	**2412**	16.44	0.5	Pass
6	**2437**	16.44	0.5	Pass
11	**2462**	16.48	0.5	Pass

Channel 1:

Channel 6:

Channel 11:

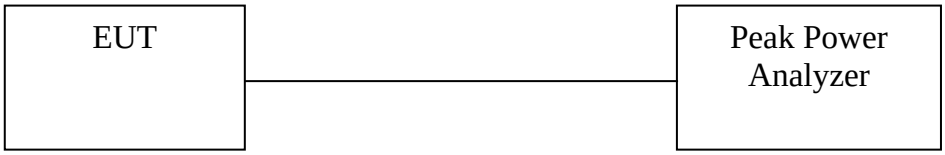

REF 20.0 dBm
10dB/
DL 6.0 dB
A_View
Posi
B_Blank
Norm
MKR 2.46324 GHz
6.00 dB
WINDOW WIDTH
16.48 MHz
Window
1 Window
ON
OFF
2 Window Position
3 Window Width
5 Window Sweep
ON
OFF
7 Marker Couple
ON
OFF
CENTER 2.46200 GHz
SPAN 20.00 MHz
*RBW 100 kHz
*VBW 100 kHz
*SWP 1.0 s
*ATT 30dB

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

Temperature (℃):24

Test Engineer:Mailes Hsieh Humidity (%):58

Channel	Frequency (Mhz)	Analyzer Reading (dBm)	Cable Loss (dB)	Peak Power Output (mW)	Peak Power Output (dBm)	Limit (dBm)	Pass/Fail
1	**2412**	15.87	1.10	49.77	16.97	30	Pass
6	**2437**	15.65	1.10	47.32	16.75	30	Pass
11	**2462**	15.48	1.10	45.50	16.58	30	Pass

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 ac*cording 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) Channel 1, 6, 11

Operator:MailesHsieh
Temperature(C):22
Humidity(%):42

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)
256.01	16.85	12.38	3.17	0.00	32.40	46.00	-13.60	103.00	56.00
299.66	22.62	13.59	3.60	0.00	39.81	46.00	-6.19	103.00	285.00
328.76	15.21	14.00	3.91	0.00	33.13	46.00	-12.87	103.00	153.00
335.55	15.41	14.10	3.98	0.00	33.48	46.00	-12.52	103.00	104.00
354.95	17.19	14.46	4.14	0.00	35.79	46.00	-10.21	103.00	203.00
364.65	20.32	14.77	4.20	0.00	39.29	46.00	-6.71	103.00	203.00
431.58	16.91	16.15	4.68	0.00	37.75	46.00	-8.25	103.00	170.00
497.54	10.48	17.44	5.26	0.00	33.19	46.00	-12.81	103.00	137.00
871.96	3.68	20.51	8.05	0.00	32.24	46.00	-13.76	103.00	121.00
915.61	3.57	20.62	8.18	0.00	32.37	46.00	-13.63	103.00	72.00

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

Operator:MailesHsieh
Temperature(C):22
Humidity(%):42

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)
42.61	15.53	10.94	1.13	0.00	27.60	40.00	-12.40	103.00	102.00
98.87	25.67	10.07	1.89	0.00	37.64	43.50	-5.86	103.00	20.00
159.01	18.88	8.86	2.36	0.00	30.10	43.50	-13.40	103.00	86.00
166.77	22.61	8.60	2.43	0.00	33.64	43.50	-9.86	103.00	102.00
184.23	19.57	8.56	2.62	0.00	30.75	43.50	-12.75	103.00	53.00
366.59	18.14	14.83	4.22	0.00	37.19	46.00	-8.81	103.00	315.00
431.58	12.01	16.15	4.68	0.00	32.84	46.00	-13.16	103.00	283.00
592.60	8.02	18.89	5.81	0.00	32.71	46.00	-13.29	103.00	315.00
871.96	6.00	20.51	8.05	0.00	34.56	46.00	-11.44	103.00	315.00
896.21	4.55	20.42	8.08	0.00	33.05	46.00	-12.95	103.00	20.00

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

5.4.5 Test Data (1GHz – 25 GHz) .

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

Operator:MailesHsieh RBW:1MHz
Humidity(%):43
Temperature(C):25

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
1599.40	52.77pk	27.63	2.30	34.39	48.32pk	54.00av	-5.68	101	71
2208.79	50.88pk	30.96	1.96	35.19	48.62pk	54.00av	-5.38	101	109
2283.72	50.76pk	30.94	1.73	35.19	48.24pk	54.00av	-5.76	101	132
2510.99	51.71pk	30.90	1.36	35.19	48.79pk	54.00av	-5.21	102	203
2518.48	49.95pk	30.91	1.36	35.18	47.03pk	54.00av	-6.97	102	206
2573.43	49.96pk	30.93	1.37	35.13	47.13pk	54.00av	-6.87	102	223

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

Operator:MailesHsieh RBW:1MHz
Humidity(%):43
Temperature(C):25

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
1327.17	55.40pk	26.00	2.21	34.11	49.51pk	54.00av	-4.49	101	89
1594.41	49.95pk	27.59	2.30	34.39	45.46pk	54.00av	-8.54	101	71
2208.79	49.52pk	30.96	1.96	35.19	47.25pk	54.00av	-6.75	101	109
2333.67	52.74pk	30.93	1.58	35.19	50.06pk	54.00av	-3.94	101	148
2498.50	49.16pk	30.90	1.37	35.20	46.23pk	54.00av	-7.77	101	200
2510.99	51.46pk	30.90	1.36	35.19	48.54pk	54.00av	-5.46	102	203
4979.02	46.33pk	35.52	2.16	37.89	46.13pk	54.00av	-7.87	100	2
6426.57	44.84pk	36.31	3.36	37.73	46.78pk	54.00av	-7.22	100	211
6825.17	45.77pk	38.16	3.20	37.40	49.73pk	54.00av	-4.27	101	140
9643.36	39.80pk	40.58	3.24	34.33	49.30pk	54.00av	-4.70	102	7

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(%):43
Temperature(C):25

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
1374.63	50.27pk	26.22	2.21	34.13	44.58pk	54.00av	-9.42	101	86
1594.41	51.59pk	27.59	2.30	34.39	47.09pk	54.00av	-6.91	101	71
2231.27	51.05pk	30.95	1.89	35.19	48.71pk	54.00av	-5.29	101	116
2518.48	49.28pk	30.91	1.36	35.18	46.37pk	54.00av	-7.63	102	206
2535.96	50.80pk	30.91	1.37	35.17	47.91pk	54.00av	-6.09	102	211
2598.40	48.77pk	30.94	1.38	35.11	45.98pk	54.00av	-8.02	102	231

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

Operator:MailesHsieh RBW:1MHz
Humidity(%):43
Temperature(C):25

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
1327.17	55.29pk	26.00	2.21	34.11	49.40pk	54.00av	-4.60	101	89
1596.90	50.88pk	27.61	2.30	34.39	46.41pk	54.00av	-7.59	101	71
1799.20	49.55pk	29.31	2.45	34.79	46.53pk	54.00av	-7.47	100	57
2231.27	51.41pk	30.95	1.89	35.19	49.07pk	54.00av	-4.93	101	116
2488.51	50.98pk	30.90	1.42	35.20	48.10pk	54.00av	-5.90	101	196
2535.96	51.67pk	30.91	1.37	35.17	48.79pk	54.00av	-5.21	102	211
4989.51	45.98pk	35.56	2.17	37.90	45.81pk	54.00av	-8.19	100	1
6493.01	43.73pk	36.39	3.40	37.68	45.84pk	54.00av	-8.16	100	199
6821.68	43.00pk	38.14	3.21	37.40	46.94pk	54.00av	-7.06	101	141
9745.25	44.28pk	40.36	3.30	34.37	53.57pk	54.00av	-0.43	102	5

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(%):43
Temperature(C):25

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
1599.40	51.66pk	27.63	2.30	34.39	47.21pk	54.00av	-6.79	101	71
2256.24	51.54pk	30.95	1.82	35.19	49.12pk	54.00av	-4.88	101	123
2386.11	53.52pk	30.92	1.42	35.20	50.66pk	54.00av	-3.34	101	164
2398.60	52.98pk	30.92	1.46	35.20	50.17pk	54.00av	-3.83	101	168
2421.08	53.34pk	30.92	1.48	35.20	50.54pk	54.00av	-3.46	101	175
2560.94	49.96pk	30.92	1.37	35.15	47.11pk	54.00av	-6.89	102	219

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

Operator:MailesHsieh RBW:1MHz
Humidity(%):43
Temperature(C):25

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
1332.17	55.98pk	26.03	2.21	34.11	50.11pk	54.00av	-3.89	101	89
2256.24	50.27pk	30.95	1.82	35.19	47.84pk	54.00av	-6.16	101	123
2286.21	53.40pk	30.94	1.73	35.19	50.88pk	54.00av	-3.12	101	133
2386.11	53.20pk	30.92	1.42	35.20	50.35pk	54.00av	-3.65	101	164
2398.60	52.52pk	30.92	1.46	35.20	49.71pk	54.00av	-4.29	101	168
2563.44	49.89pk	30.93	1.37	35.14	47.04pk	54.00av	-6.96	102	220
4979.02	46.36pk	35.52	2.16	37.89	46.16pk	54.00av	-7.84	100	2
6821.68	41.28pk	38.14	3.21	37.40	45.23pk	54.00av	-8.77	101	141
6898.60	41.46pk	38.55	3.16	37.34	45.84pk	54.00av	-8.16	101	127
9841.16	43.77pk	40.15	3.35	34.40	52.86pk	54.00av	-1.14	101	3

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.

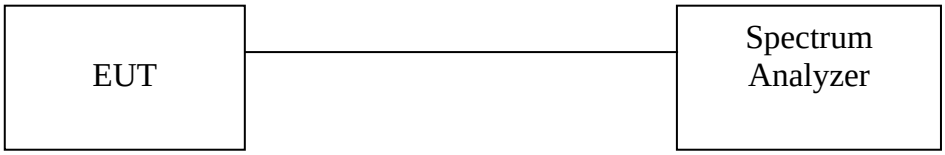
All frequencies from 1GHz to 25 GHz have been tested.

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: 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

5.5.2 Test Setup (Conducted)



5.5.3 Test Data:

Table: Band Edge measurement (Conducted)

Temperature (℃):24

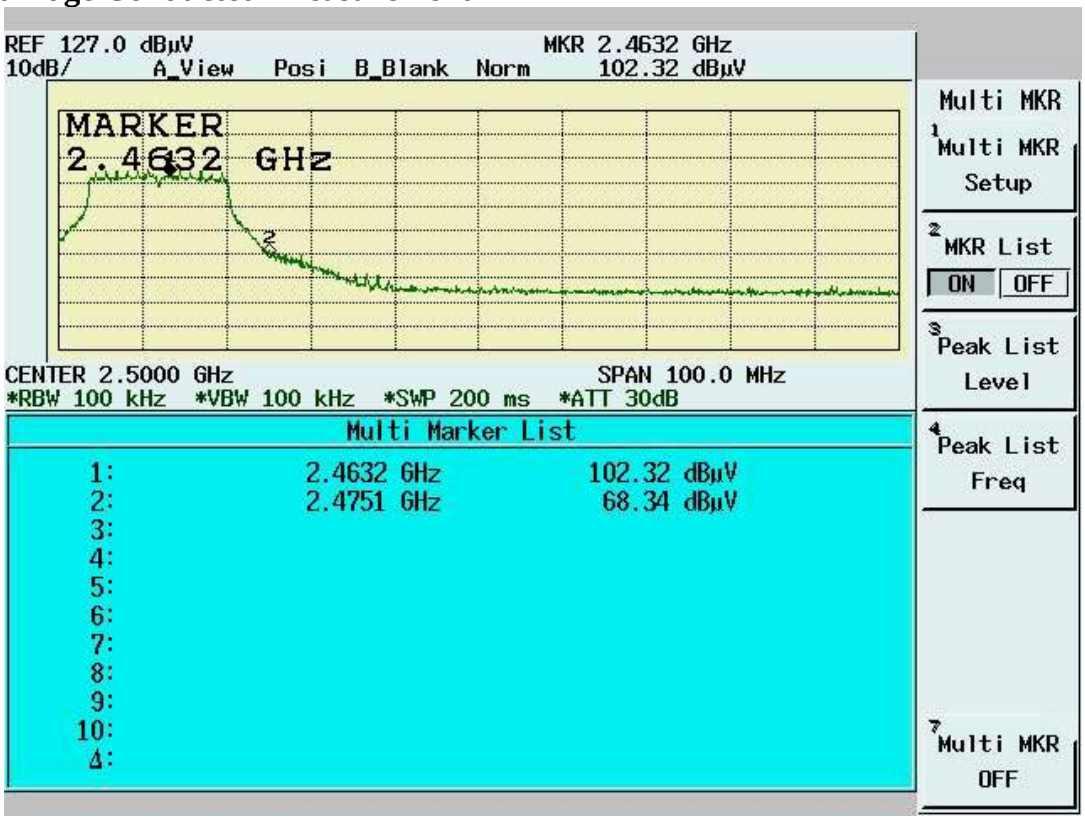
Test Engineer:Mailes Hsieh Humidity (%):58

Channel	Frequency (MHz)	Spectrum Reading (dBuV)	Carrier - Outsideband Limit: >20dB (dB)	Pass/Fail
1	2413.2	103.57	---	---
Outside band	2400.0	73.34	30.23	Pass
11	2463.2	102.32	---	---
Outside band	2475.1	68.34	33.98	Pass

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

Band Edge Conducted measurement

Band Edge Conducted Measurement



5.5.4 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.

5.5.5 Test Setup (Radiated)

Same as *Radiated Emission Measurement*

5.5.6 Test Data

Table Band Edge measurement (Radiated)

Temperature (℃):26

Test Engineer:Mailes Hsieh Humidity (%):43

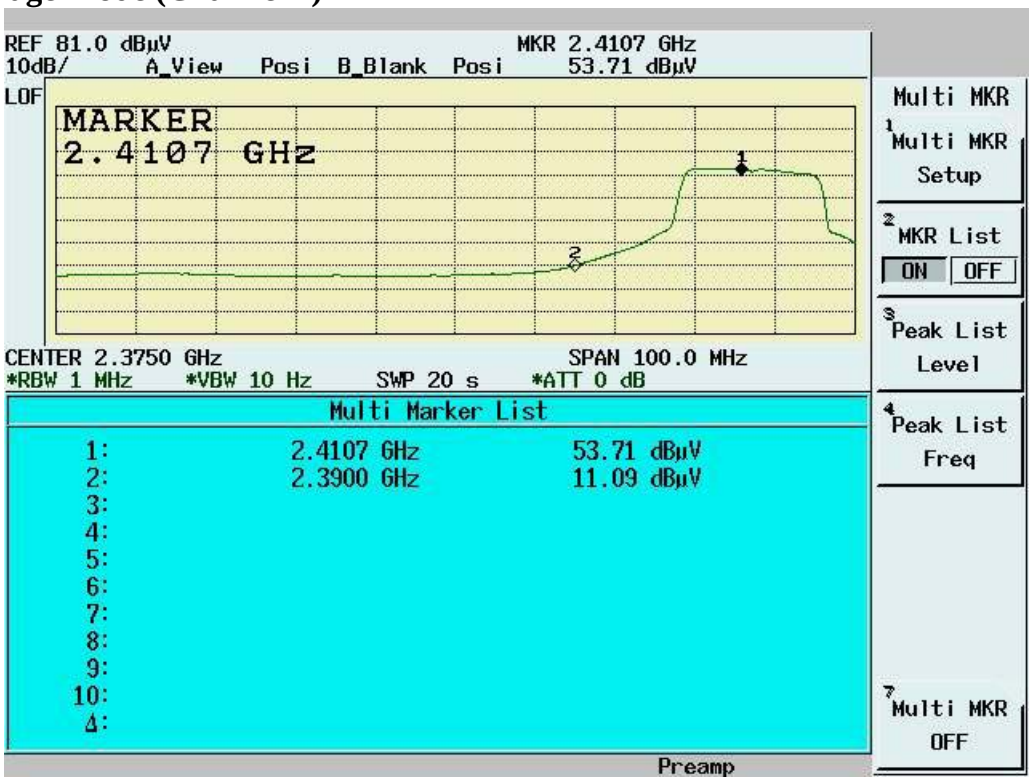
Description	Frequency (MHz)	Spectrum Reading (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	dBc (Limit: > 20dBc)	Limit (dBuV/m)	Equip. Setup VBW	Pass or Fail
Channel_1 (average mode)	2410.7	53.71	35.48	89.19	---	---	10Hz	---
Channel_1 (peak mode)	2408.8	67.63	35.48	103.11	---	---	3MHz	---
Outside band (peak mode)	2400.0	46.82	35.48	82.30	20.81	---	3MHz	Pass
Channel_11 (average mode)	2460.7	50.30	35.50	85.80	---	---	10Hz	---
Channel_11 (peak mode)	2459.4	64.51	35.50	100.01	---	---	3MHz	---
Outside band (peak mode)	2475.8	36.45	35.51	71.96	28.05	---	3MHz	Pass
Channel_1 Restricted band (peak mode)	2389.8	29.52	35.47	64.99	---	74	3MHz	Pass
Restricted band (average mode)	2390.0	11.09	35.47	46.56	---	54	10Hz	Pass
Channel_11 Restricted band (peak mode)	2483.9	28.92	35.51	64.43	---	74	3MHz	Pass
Restricted band (average mode)	2483.5	10.61	35.51	46.12	---	54	10Hz	Pass

Note:

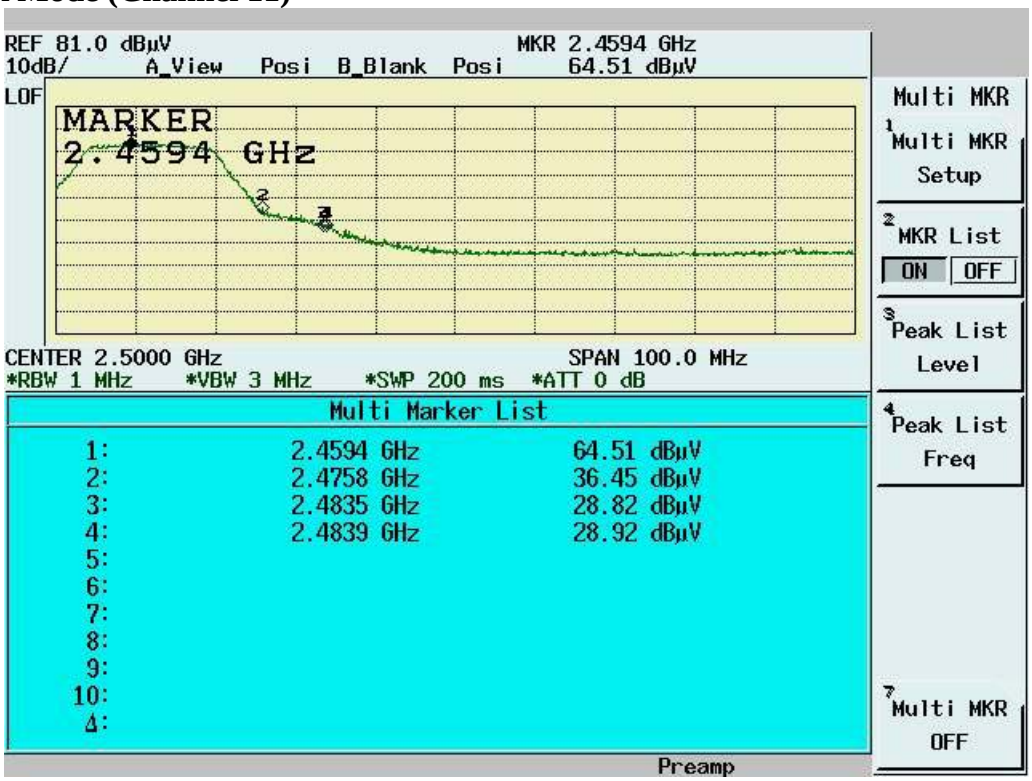
- The Spectrum plot of emission level measurement in Restricted band is attached.
- Emission Level=Spectrum Reading+Correction Factor
- Correction Factor=Antenna Factor+cable loss–amplifier gain
- Both Horizontal and Vertical polarizaion have been tested and the worst data is listed above.

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

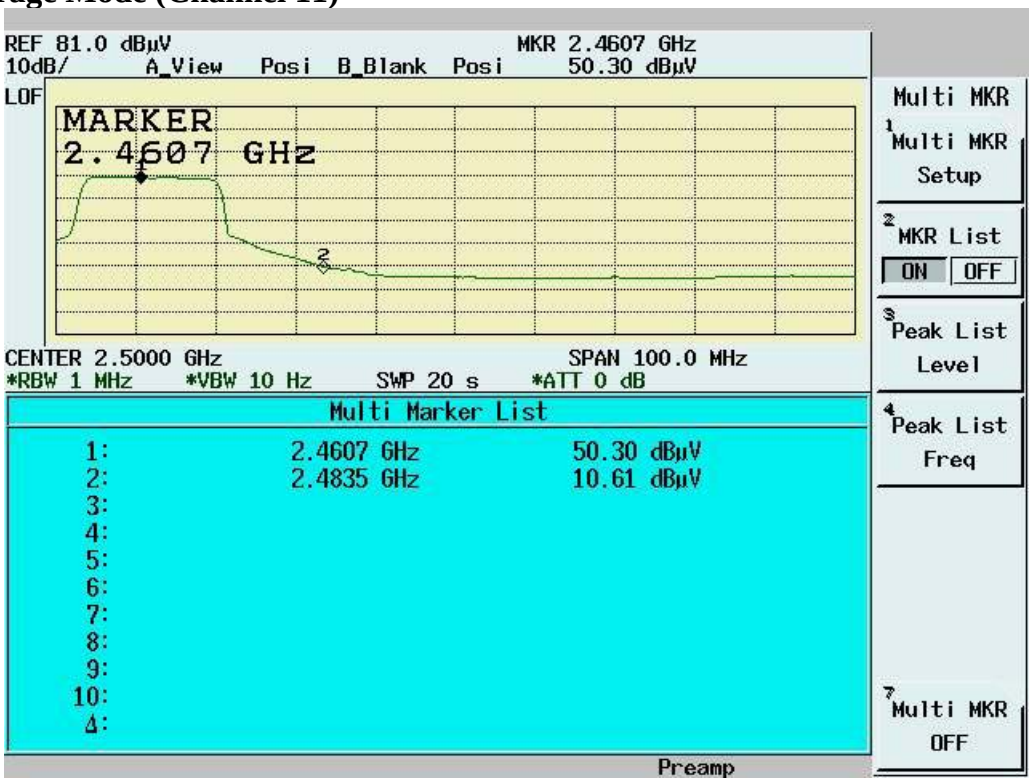
Band Edge measurement for radiated emission in Restricted Band(Radiated) Average Mode (Channel 1)



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)



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

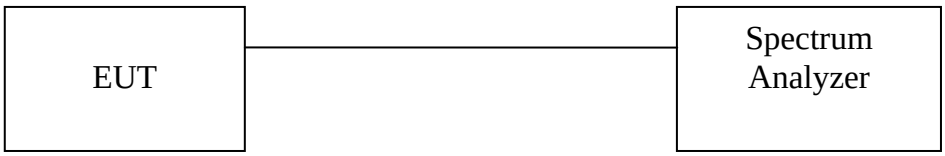
See MPE report

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

Temperature (℃):24

Test Engineer:Mailes Hsieh

Humidity (%):58

Channel	Frequency (MHz)	Spectrum Reading (dBm/3KHz)	Cable Loss (dB)	Peak Power Output (dBm/3KHz)	Limit (dBm/3KHz)	Pass/Fail
1	**2412**	-14.32	1.10	-13.22	8	Pass
6	**2437**	-13.86	1.10	-12.76	8	Pass
11	**2462**	-15.64	1.10	-14.54	8	Pass

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

Channel 1

Channel 6

Channel 11


REF 20.0 dBm
10dB/ A_View Posi B_Blank Norm
MKR 2.461742 GHz
-15.64 dBm
MARKER
2.461742 GHz
Trace A
1 Write A
2 View A
3 Blank A
4 Max Hold A
5 Detector
Posi
6 Trc Menu
A B
7 1/2,more
CENTER 2.461994 GHz
SPAN 1.500 MHz
*RBW 3 kHz
*VBW 30 kHz
*SWP 500 s
*ATT 30dB

6. TEST RESULTS (Bluetooth Device co-located with the WLAN Device)

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

6.1.1 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.

6.1.2 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.

6.1.3 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

6.1.4 Test Data (above 1GHz) :.

1GHz~ 25 GHz (Horizontal), The Emission Data While Bluetooth Channel 00 : 2402 MHz & 802.11b WLAN Channel 1 : 2412 MHz operating

Operator:MailesHsieh RBW:1MHz
Humidity(%):41
Temperature(C):26

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
1097.4	53.12 pk	24.95	2.18	33.98	46.26 pk	54.00 av	-7.74	102	105
1327.17	55.02 pk	26	2.21	34.11	49.13 pk	54.00 av	-4.87	101	89
1599.4	51.40 pk	27.63	2.3	34.39	46.94 pk	54.00 av	-7.06	101	71
2311.19	51.59 pk	30.94	1.65	35.19	48.99 pk	54.00 av	-5.01	101	141
2333.67	49.52 pk	30.93	1.58	35.19	46.84 pk	54.00 av	-7.16	101	148
4800.7	50.63 pk	34.84	2.12	37.69	49.90 pk	54.00 av	-4.1	100	20
6426.57	46.18 pk	36.31	3.36	37.73	48.12 pk	54.00 av	-5.88	100	211
9601.4	40.77 pk	40.68	3.22	34.32	50.35 pk	54.00 av	-3.65	102	8
9643.36	47.84 av	40.58	3.24	34.33	52.34 av	54.00 av	-1.66	102	7

1GHz~ 25 GHz (Vertical), , The Emission Data While Bluetooth Channel 00 : 2402 MHz & 802.11b WLAN Channel 1 : 2412 MHz operating

Operator:MailesHsieh RBW:1MHz
Humidity(%):41
Temperature(C):26

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
1327.17	58.73 pk	26	2.21	34.11	52.84 pk	54.00 av	-1.16	101	89
1596.9	52.08 pk	27.61	2.3	34.39	47.60 pk	54.00 av	-6.4	101	71
1791.71	50.70 pk	29.25	2.45	34.77	47.62 pk	54.00 av	-6.38	100	57
1861.64	49.63 pk	29.84	2.5	34.91	47.06 pk	54.00 av	-6.94	100	53
2308.69	51.06 pk	30.94	1.66	35.19	48.47 pk	54.00 av	-5.53	101	140
4800.7	53.77 pk	34.84	2.12	37.69	53.04 pk	54.00 av	-0.96	100	20
4993.01	46.68 pk	35.57	2.17	37.9	46.52 pk	54.00 av	-7.48	100	1
6426.57	46.53 pk	36.31	3.36	37.73	48.47 pk	54.00 av	-5.53	100	211
7203.8	46.92 pk	39.43	2.74	36.89	52.20 pk	54.00 av	-1.8	101	139
9601.4	41.52 av	40.68	3.22	34.32	51.10 av	54.00 av	-2.9	102	8
9643.36	43.34 av	40.58	3.24	34.33	52.84 av	54.00 av	-1.16	102	7

Note:

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.
The worst data of the Radiated Emission over 1GHz are listed above when the bluetooth device is co-located with the WLAN device.

1GHz~ 25 GHz (Horizontal), The Emission Data While Bluetooth Channel 00 : 2402 MHz & 802.11g WLAN Channel 1 : 2412 MHz operating

Operator:MailesHsieh RBW:1MHz
Humidity(%):41
Temperature(C):26

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
1332.17	55.48 pk	26.03	2.21	34.11	49.61 pk	54.00 av	-4.39	101	89
1599.4	51.06 pk	27.63	2.3	34.39	46.61 pk	54.00 av	-7.39	101	71
2208.79	50.54 pk	30.96	1.96	35.19	48.27 pk	54.00 av	-5.73	101	109
2323.68	54.14 pk	30.94	1.61	35.19	51.50 pk	54.00 av	-2.5	101	145
2510.99	50.70 pk	30.9	1.36	35.19	47.78 pk	54.00 av	-6.22	102	203
4800.7	51.58 pk	34.84	2.12	37.69	50.85 pk	54.00 av	-3.15	100	20
6426.57	46.76 pk	36.31	3.36	37.73	48.69 pk	54.00 av	-5.31	100	211
9607.39	40.77 pk	40.66	3.23	34.32	50.34 pk	54.00 av	-3.66	102	8

1GHz~ 25 GHz (Vertical), , The Emission Data While Bluetooth Channel 00 : 2402 MHz & 802.11g WLAN Channel 1 : 2412 MHz operating

Operator:MailesHsieh RBW:1MHz
Humidity(%):41
Temperature(C):26

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
1324.68	57.90 pk	25.99	2.21	34.11	52.00 pk	54.00 av	-2	101	90
2308.69	53.63 pk	30.94	1.66	35.19	51.03 pk	54.00 av	-2.97	101	140
2491.01	49.52 pk	30.9	1.41	35.2	46.63 pk	54.00 av	-7.37	101	197
2510.99	50.73 pk	30.9	1.36	35.19	47.80 pk	54.00 av	-6.2	102	203
2598.4	49.68 pk	30.94	1.38	35.11	46.89 pk	54.00 av	-7.11	102	231
4800.7	53.88 pk	34.84	2.12	37.69	53.15 pk	54.00 av	-0.85	100	20
4986.01	46.73 pk	35.55	2.17	37.89	46.55 pk	54.00 av	-7.45	100	1
6426.57	46.66 pk	36.31	3.36	37.73	48.59 pk	54.00 av	-5.41	100	211
7203.8	47.32 pk	39.43	2.74	36.89	52.60 pk	54.00 av	-1.4	101	139
9601.4	41.84 av	40.68	3.22	34.32	51.43 av	54.00 av	-2.57	102	8

Note:

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.

The worst data of the Radiated Emission over 1GHz are listed above when the bluetooth device is co-located with the WLAN device.

6.2 Band Edge Measurement (when Bluetooth and WLAN are operating at the same time)

!! Measuring the Peak / Average Mode when Bluetooth Channel 0 is co-located with the WLAN Channel 1 and Bluetooth Channel 78 is co-located with the WLAN Channel 11.

6.2.1 Band Edge measurement 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, 2.48 GHz.
2. Using Peak Search to read the peak power of Carrier frequencies after Maximun 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 Maximun Hold function is completed.

6.2.2 Test Setup (Radiated)

Same as *Radiated Emission Measurement*

6.2.3 Test Data (bluetooth & 802.11b):

Band Edge measurement (Radiated)

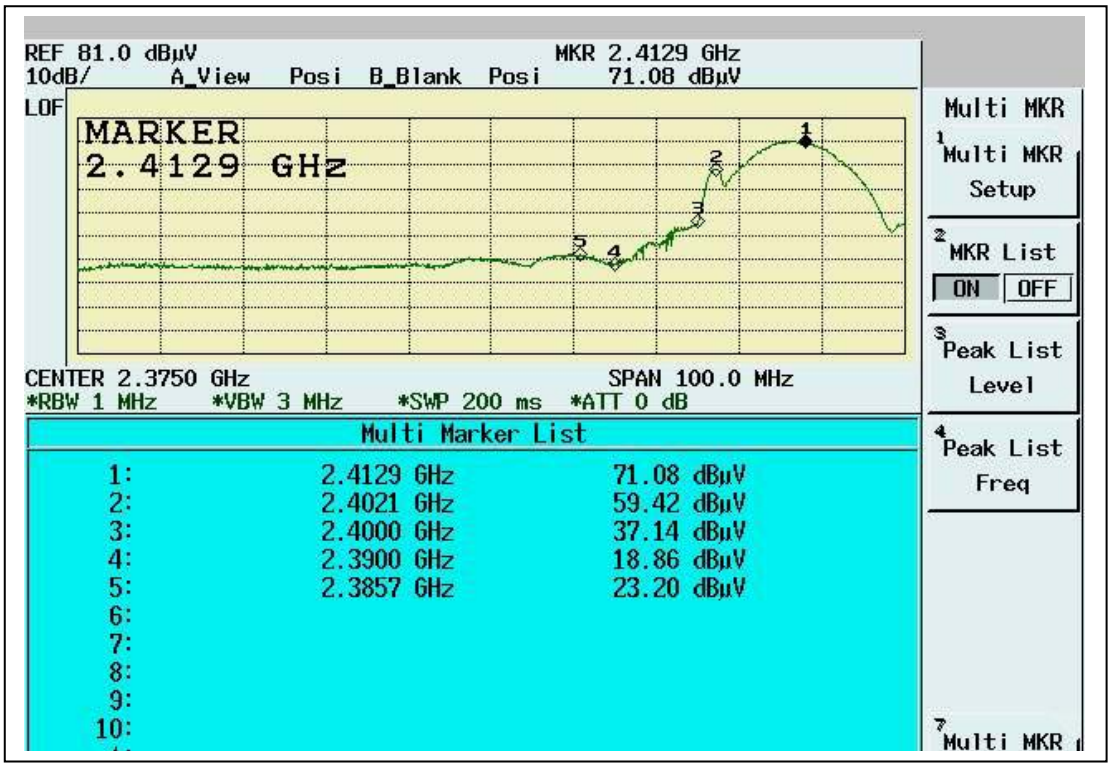
Temperature (℃):26

Test Engineer:Mailes Hsieh Humidity (%):43

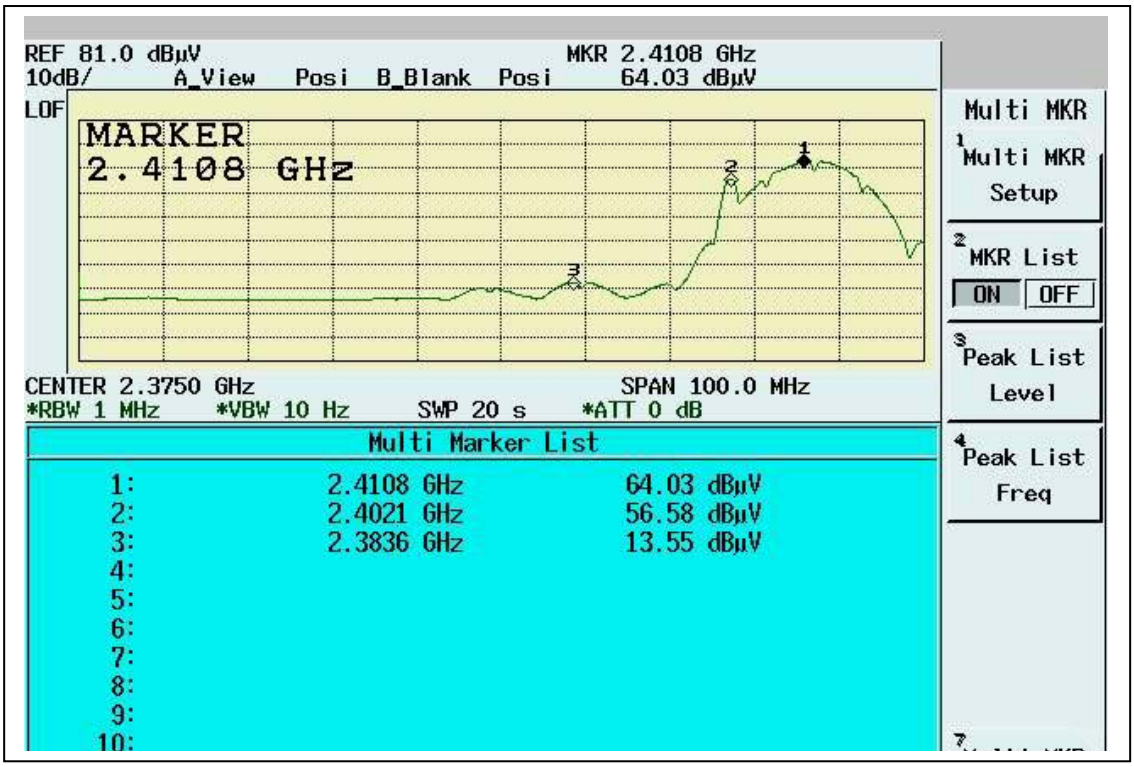
Description	Frequency (MHz)	Spectrum Reading (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	dBc (Limit: > 20dBc)	Limit (dBuV/m)	Equip. Setup VBW	Pass or Fail
Channel_1 (average mode)	2410.8	64.03	35.48	99.51	---	---	10Hz	---
BT_Channel_00 (average mode)	2402.1	56.58	35.48	92.06	---	---	10Hz	---
Channel_1 (peak mode)	2412.9	71.08	35.48	106.56	---	---	3MHz	---
BT_Channel_00 (peak mode)	2402.1	59.42	35.48	94.90	---	---	3MHz	---
Outside band (peak mode)	2400.0	37.14	35.48	72.62	33.94	---	3MHz	Pass
Channel_11 (average mode)	2460.7	60.53	35.50	96.03	---	---	10Hz	---
BT_Channel_78 (average mode)	2480.0	53.90	35.50	89.40	---	---	10Hz	---
Channel_11 (peak mode)	2462.9	67.64	35.50	103.14	---	---	3MHz	---
BT_Channel_78 (peak mode)	2480.0	54.78	35.50	90.28	---	---	3MHz	---
Outside band (peak mode)	2474.2	33.84	35.51	69.35	33.79	---	3MHz	Pass
Channel_1 Restricted band (peak mode)	2385.7	23.20	35.47	58.67	---	74	3MHz	Pass
Restricted band (average mode)	2383.6	13.55	35.47	49.02	---	54	10Hz	Pass
Channel_11 Restricted band (peak mode)	2487.1	21.34	35.51	56.85	---	74	3MHz	Pass
Restricted band (average mode)	3488.3	10.40	35.51	45.91	---	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

Band Edge measurement for radiated emission in Restricted Band(Radiated)
Peak Mode (Bluetooth Channel 0 is co-located with the WLAN Channel 1)

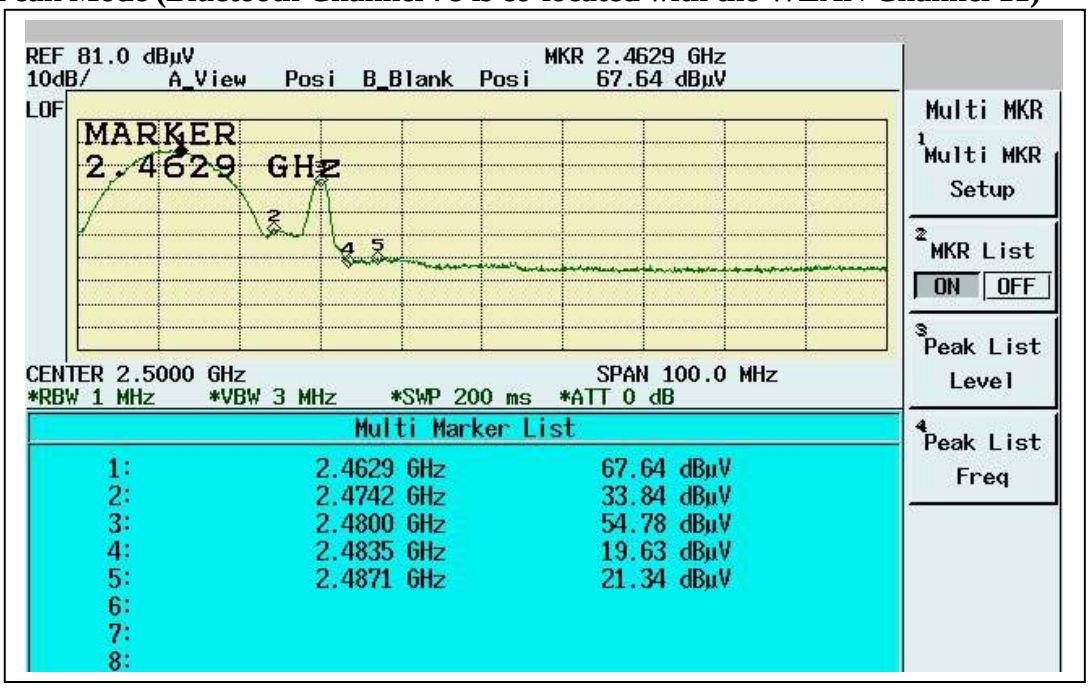


Band Edge measurement for radiated emission in Restricted Band(Radiated)
Average Mode (Bluetooth Channel 0 is co-located with the WLAN Channel 1)



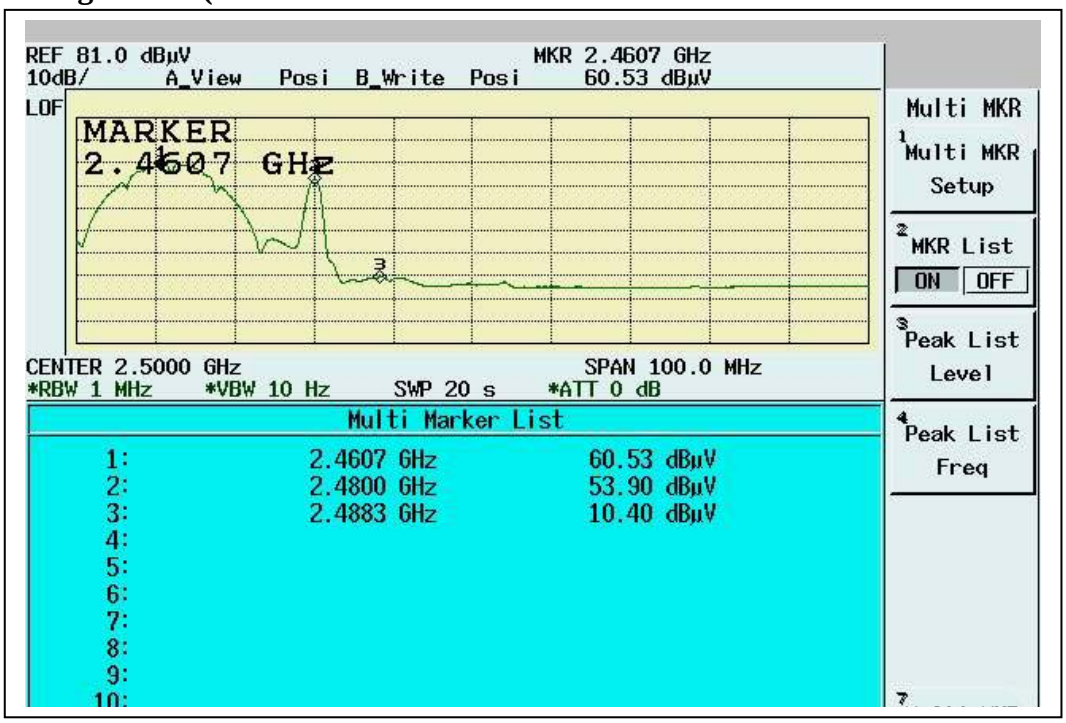
Band Edge measurement for radiated emission in Restricted Band(Radiated)

Peak Mode (Bluetooth Channel 78 is co-located with the WLAN Channel 11)



Band Edge measurement for radiated emission in Restricted Band(Radiated)

Average Mode (Bluetooth Channel 78 is co-located with the WLAN Channel 11)



6.2.4 Test Data (bluetooth & 802.11g):

Band Edge measurement (Radiated)

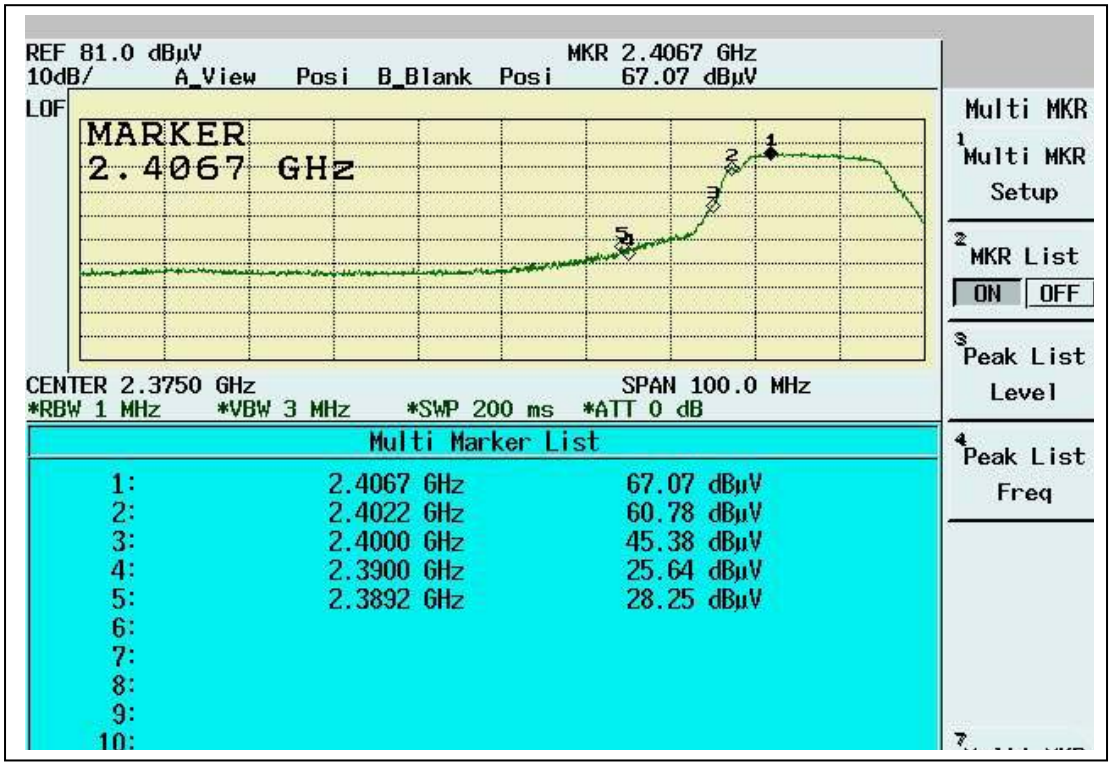
Temperature (℃):26

Test Engineer:Mailes Hsieh Humidity (%):43

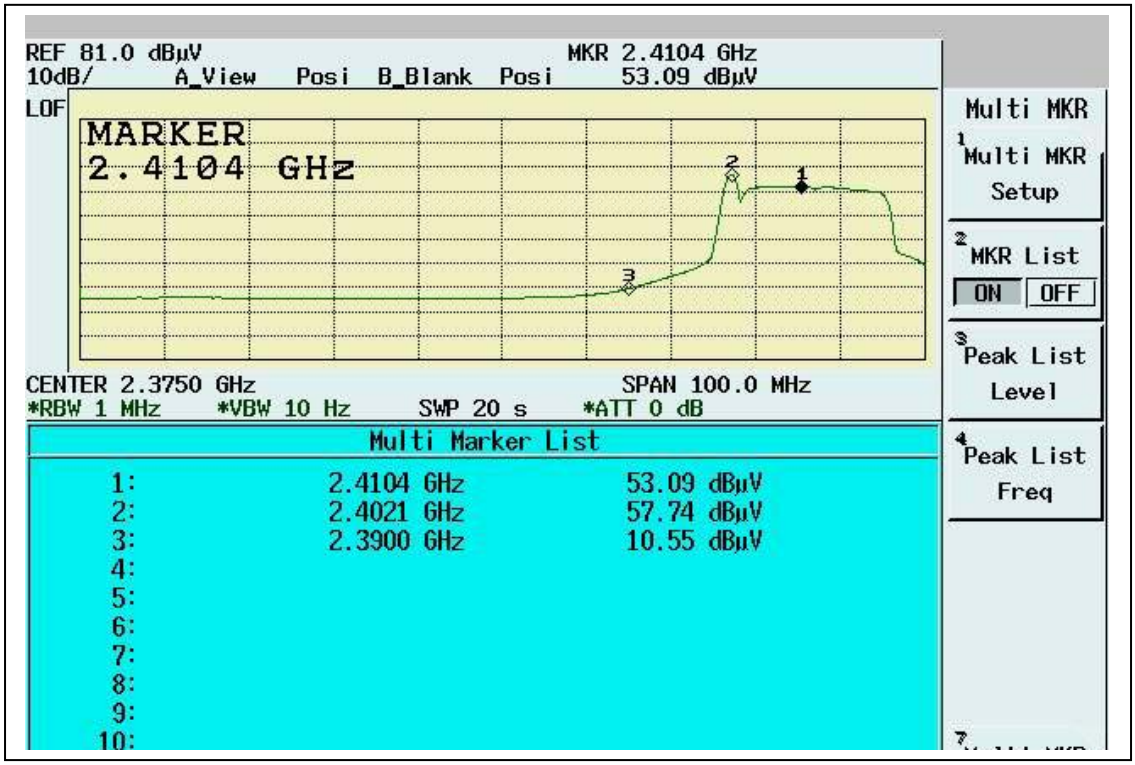
Description	Frequency (MHz)	Spectrum Reading (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	dBc (Limit: > 20dBc)	Limit (dBuV/m)	Equip. Setup VBW	Pass or Fail
Channel_1 (average mode)	2410.4	53.09	35.48	88.57	---	---	10Hz	---
BT_Channel_00 (average mode)	2402.1	57.74	35.48	93.22	---	---	10Hz	---
Channel_1 (peak mode)	2406.7	67.07	35.48	102.55	---	---	3MHz	---
BT_Channel_00 (peak mode)	2402.2	60.78	35.48	96.26	---	---	3MHz	---
Outside band (peak mode)	2400.0	45.38	35.48	80.86	21.69	---	3MHz	Pass
Channel_11 (average mode)	2460.3	50.17	35.50	85.67	---	---	10Hz	---
BT_Channel_78 (average mode)	2480.0	53.89	35.50	89.39	---	---	10Hz	---
Channel_11 (peak mode)	2459.5	63.57	35.50	99.07	---	---	3MHz	---
BT_Channel_78 (peak mode)	2480.1	54.73	35.50	90.23	---	---	3MHz	---
Outside band (peak mode)	2476.5	32.27	35.51	67.78	31.29	---	3MHz	Pass
Channel_1 Restricted band (peak mode)	2389.2	28.25	35.47	63.72	---	74	3MHz	Pass
Restricted band (average mode)	2390.0	10.55	35.47	46.02	---	54	10Hz	Pass
Channel_11 Restricted band (peak mode)	2483.7	27.67	35.51	63.18	---	74	3MHz	Pass
Restricted band (average mode)	2483.5	10.26	35.51	45.77	---	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

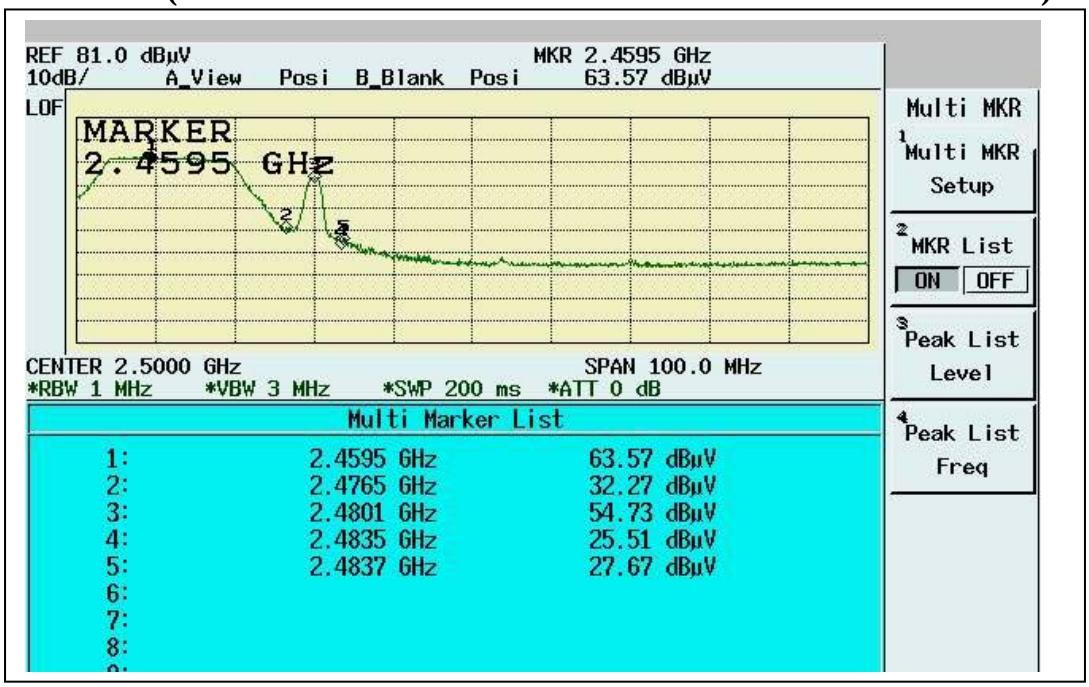
Band Edge measurement for radiated emission in Restricted Band(Radiated) Peak Mode (Bluetooth Channel 0 is co-located with the WLAN Channel 1)



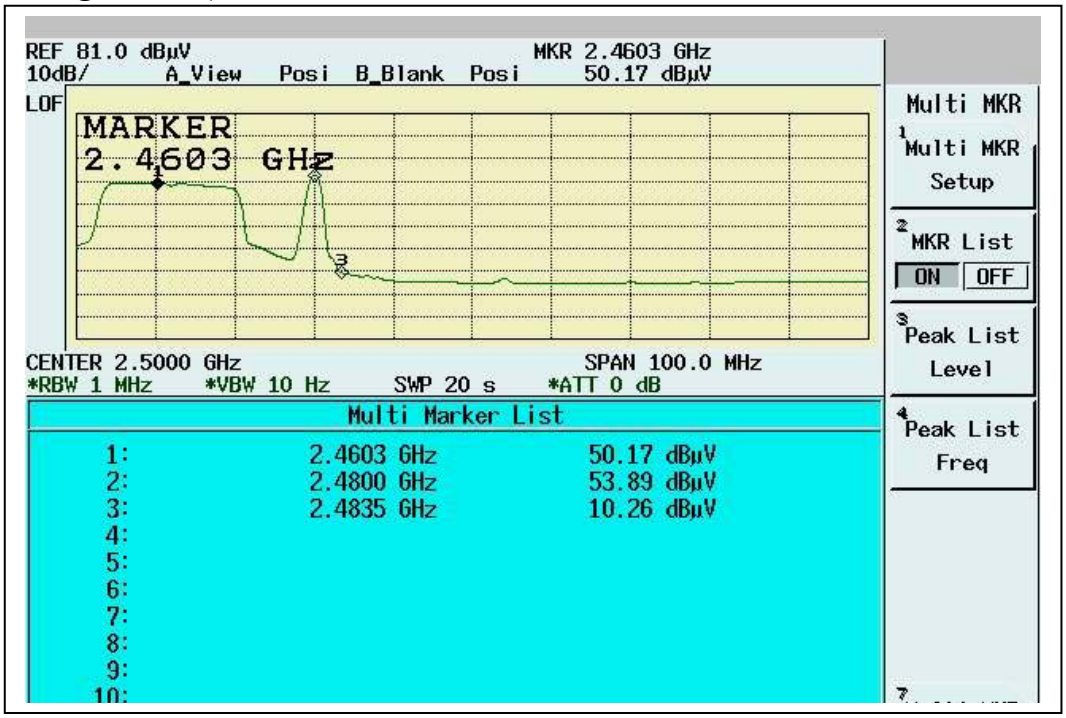
Band Edge measurement for radiated emission in Restricted Band(Radiated) Average Mode (Bluetooth Channel 0 is co-located with the WLAN Channel 1)



Band Edge measurement for radiated emission in Restricted Band(Radiated) Peak Mode (Bluetooth Channel 78 is co-located with the WLAN Channel 11)



Band Edge measurement for radiated emission in Restricted Band(Radiated) Average Mode (Bluetooth Channel 78 is co-located with the WLAN Channel 11)



7. TEST RESULTS (Bluetooth)

7.1. 20 dB BANDWIDTH

LIMIT

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 1% to 3% of the 20 dB bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled.

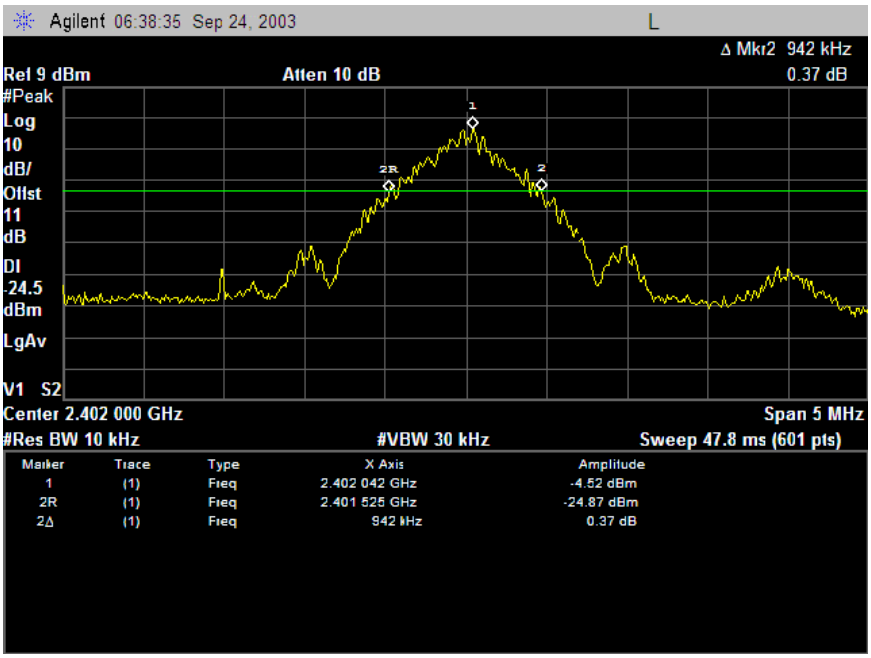
RESULTS

No non-compliance noted:

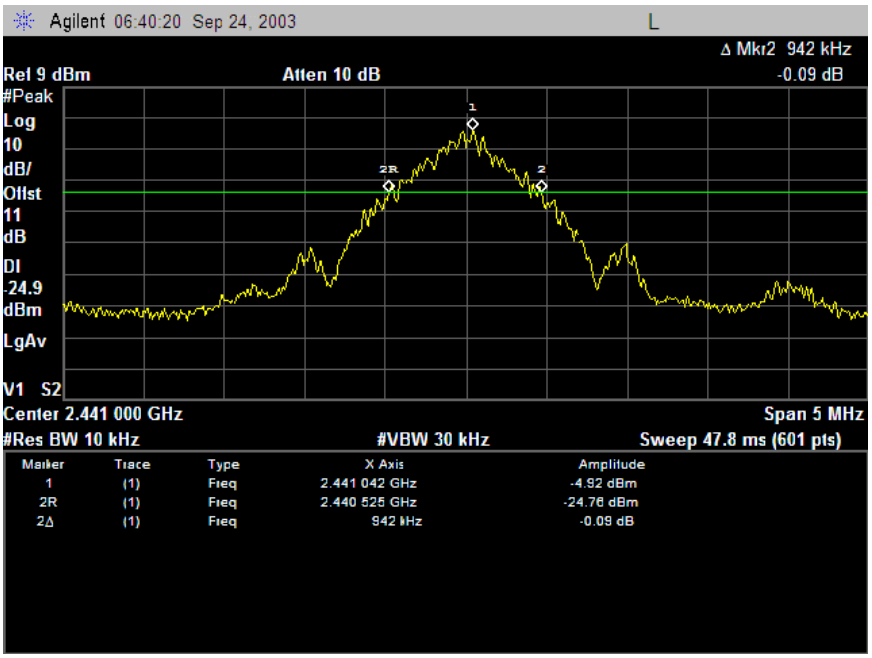
Channel	Frequency (MHz)	20 dB Bandwidth (kHz)
Low	2402	942
Middle	2441	942
High	2480	942

20 DB BANDWIDTH

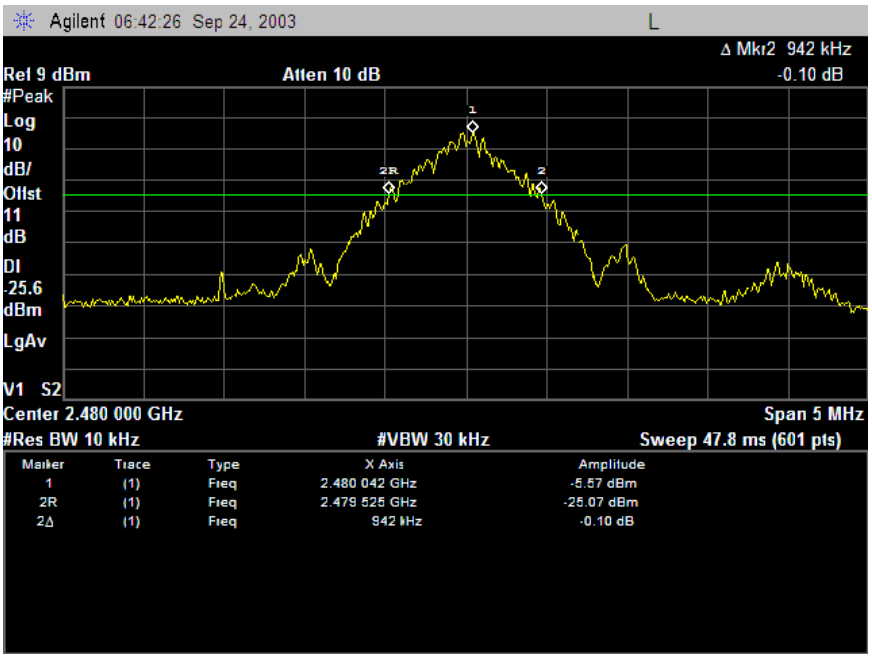
20 DB BANDWIDTH LOW CH



20 DB BANDWIDTH MID CH



20 DB BANDWIDTH HIGH CH



7.2. HOPPING FREQUENCY SEPARATION

LIMIT

§15.247 (a) (1) Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hoping channel, whichever is greater.

TEST PROCEDURE

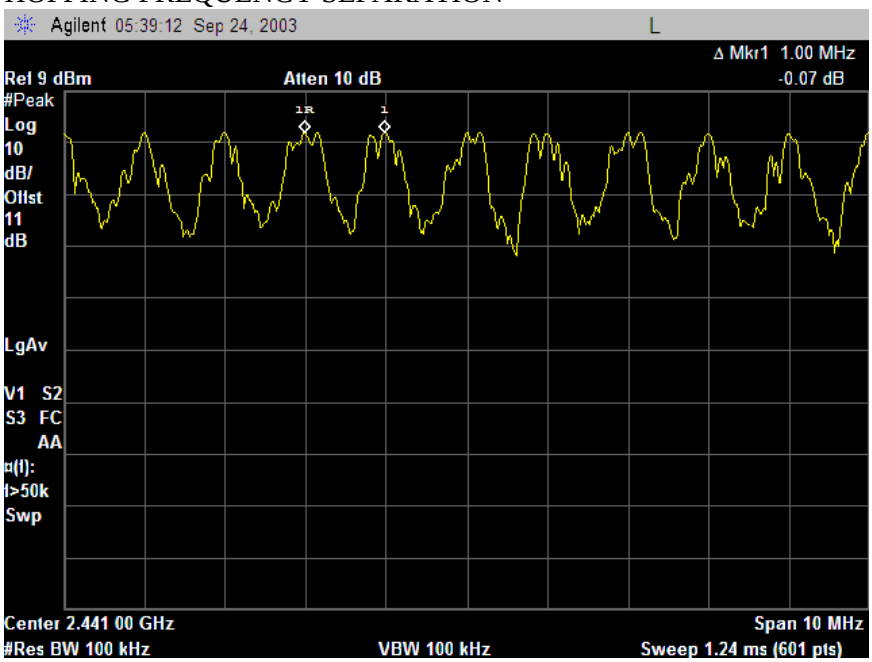
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 100 kHz. The sweep time is coupled.

RESULTS

No non-compliance noted:

HOPPING FREQUENCY SEPARATION

HOPPING FREQUENCY SEPARATION



7.3. NUMBER OF HOPPING CHANNELS

LIMIT

§15.247 (a) (1) (iii) Frequency hopping systems in the 2400 – 2483.5 MHz band shall use at least 15 non-overlapping channels.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. The RBW is set to 1 % of the span. The analyzer is set to Max Hold.

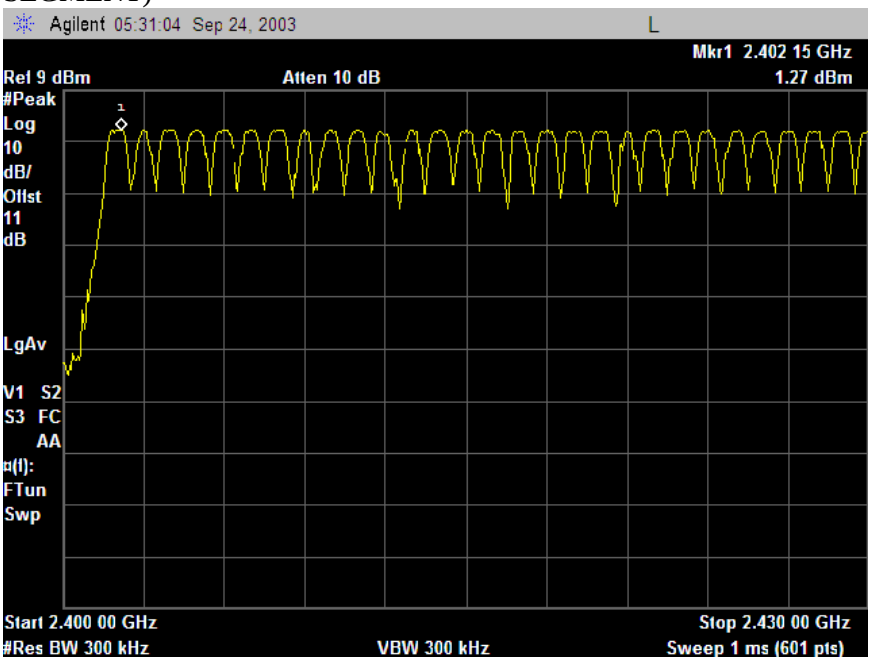
RESULTS

No non-compliance noted:

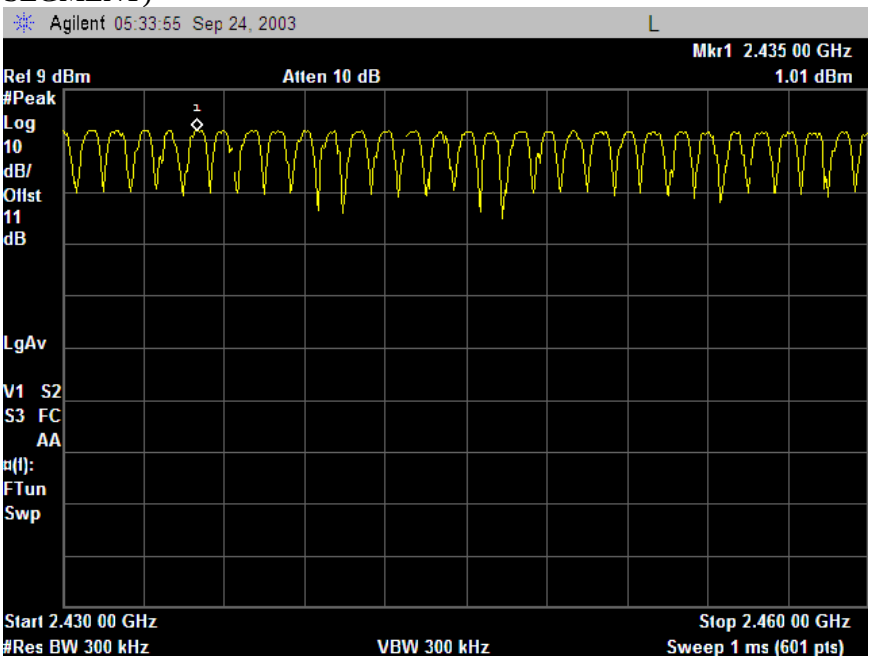
79 Channels observed.

NUMBER OF HOPPING CHANNELS

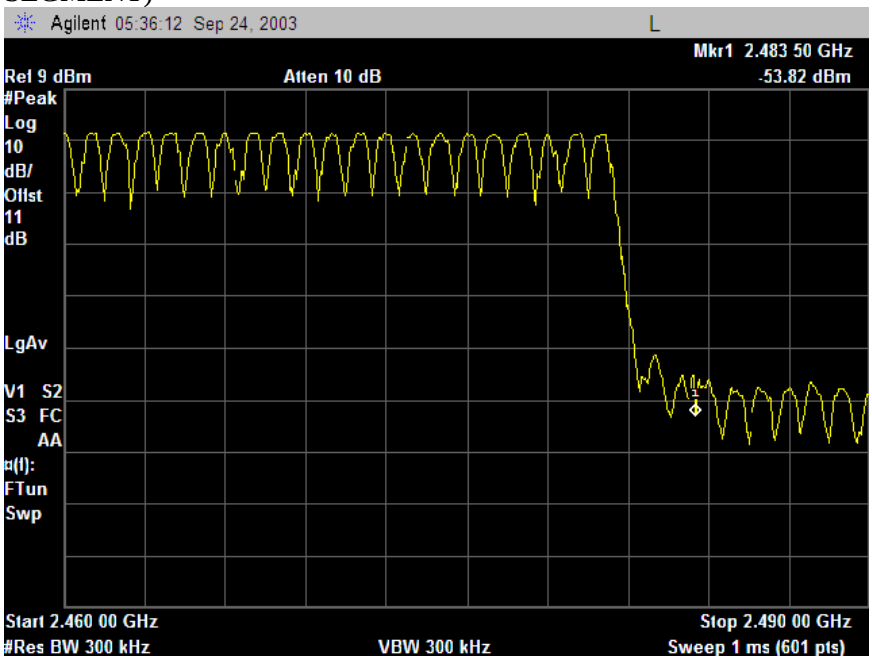
NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, FIRST SEGMENT)



NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, SECOND SEGMENT)



NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, THIRD SEGMENT)



7.4. AVERAGE TIME OF OCCUPANCY

LIMIT

§15.247 (a) (1) (iii) Frequency hopping systems in the 2400 – 2483.5 MHz band shall use at least 15 non-overlapping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The span is set to 0 Hz, centered on a single, selected hopping channel. The width of a single pulse is measured in a fast scan. The number of pulses is measured in a 3.16 second scan, to enable resolution of each occurrence.

The average time of occupancy in the specified 31.6 second period (79 channels * 0.4 s) is equal to 10 * (# of pulses in 3.16 s) * pulse width.

RESULTS

No non-compliance noted:

DH5 (5+1)

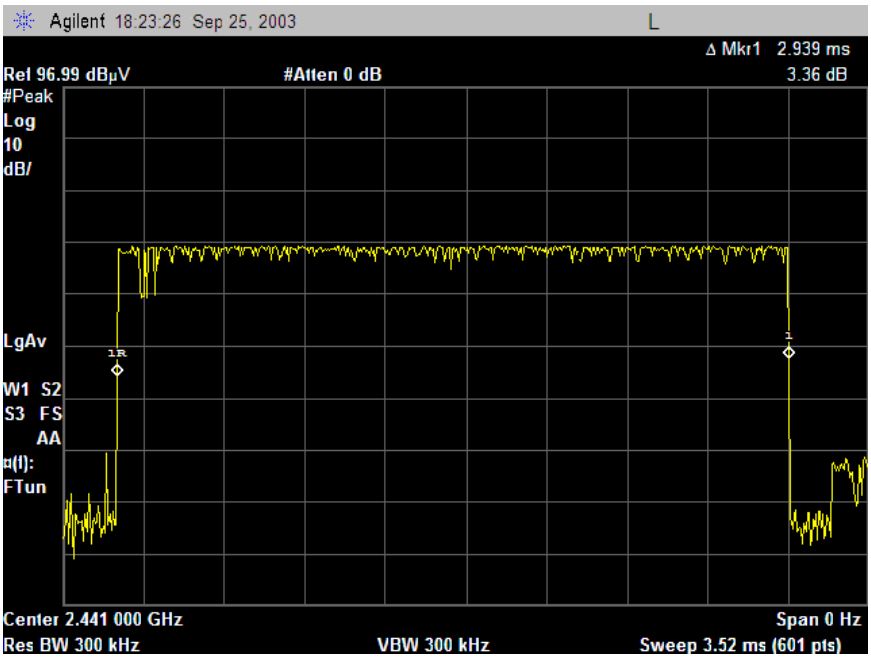
OCCURANCE 3.16 sec
8

OCCURANCE IN 31.6 SECONDS (79 CHANNELS x 0.4 SEC)
8 x 10 = 80 (PULSES IN 31.6 SECONDS)

PULSE WIDTH (mS)	PULSES IN 31.6 SECONDS	TIME OF OCCUPANCY (sec)	LIMIT (sec)	MARGIN (sec)
2.939	80	.235	0.400	0.165

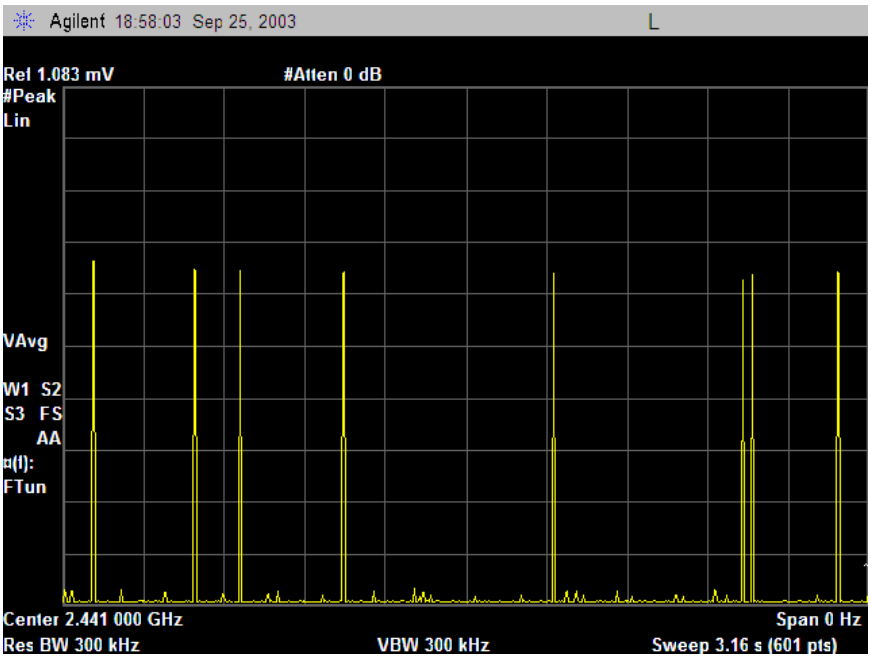
PULSE WIDTH

PULSE WIDTH



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD

NUMBER OF PULSES



7.5. PEAK OUTPUT POWER

PEAK POWER LIMIT

§15.247 (b) The maximum peak output power of the intentional radiator shall not exceed the following:

§15.247 (b) (1) For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 hopping channels: 1 watt.

§15.247 (b) (4) Except as shown in paragraphs (b)(3) (i), (ii) and (iii) of this section, if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum antenna gain is 3.0 dBi, therefore the limit is 30 dBm.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer and the analyzer bandwidth is set to a value greater than the 20 dB bandwidth of the EUT.

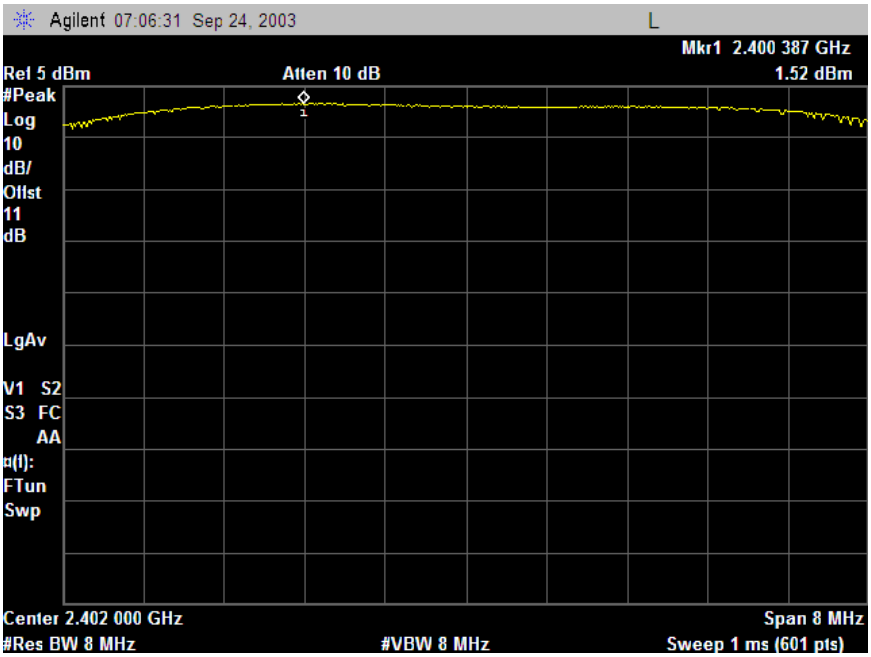
RESULTS

No non-compliance noted:

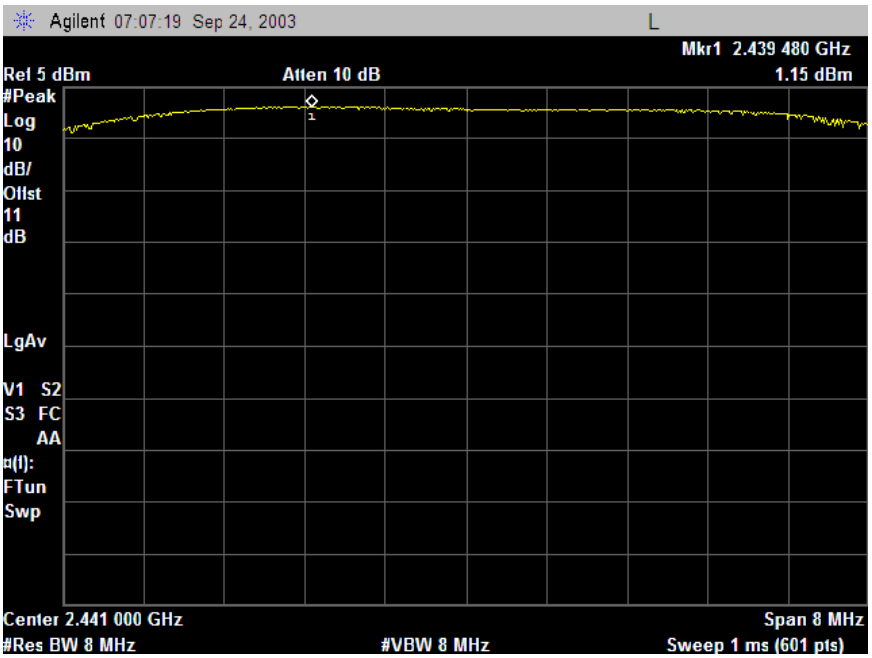
Channel	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	1.52	30	-28.48
Middle	2441	1.15	30	-28.85
High	2480	0.60	30	-29.40

OUTPUT POWER

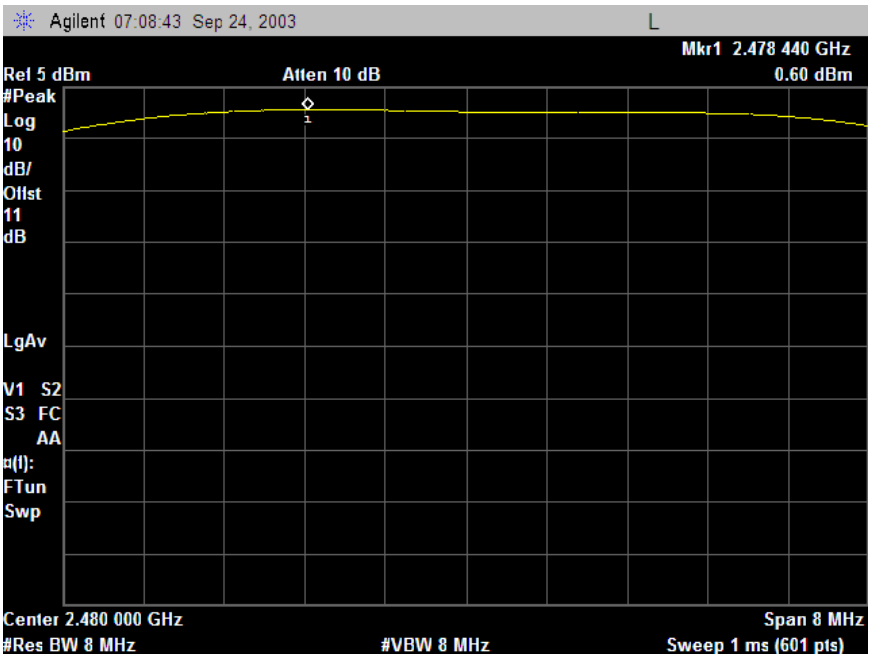
PEAK POWER LOW CH



PEAK POWER MID CH



PEAK POWER HIGH CH



7.6. AVERAGE POWER

AVERAGE POWER LIMIT

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

No non-compliance noted:

The cable assembly insertion loss of 11 dB (including 10 dB pad and 1.0 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	0.93
Middle	2441	0.51
High	2480	-0.07

7.7. PEAK POWER SPECTRAL DENSITY

LIMIT

§15.247 (d) For direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

§15.247 (f) The digital modulation operation of the hybrid system, with the frequency hopping turned off, shall comply with the power density requirements of paragraph (d) of this section.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer, the maximum level in a 3 kHz bandwidth is measured with the spectrum analyzer using RBW = 3 kHz and VBW > 3 kHz, sweep time = span / 3 kHz, and video averaging is turned off. The PPSD is the highest level found across the emission in any 3 kHz band.

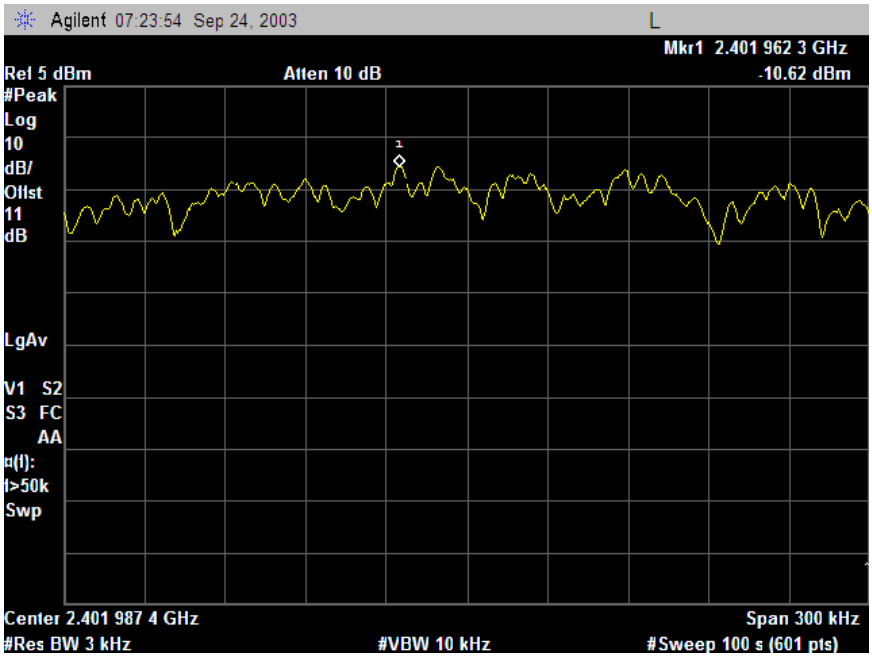
RESULTS

No non-compliance noted:

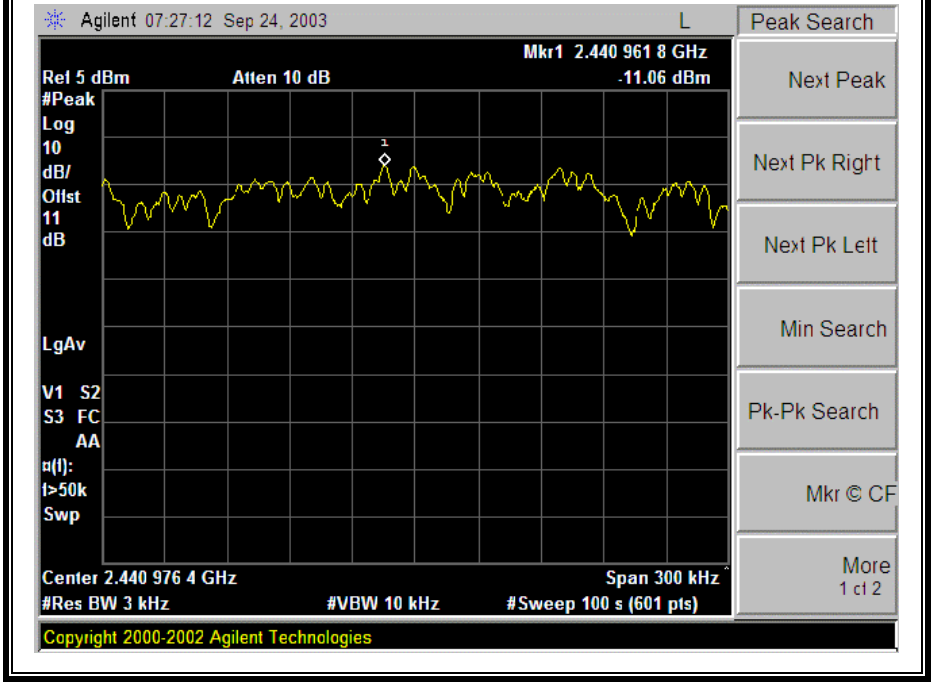
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2402	-10.62	8	-18.62
Middle	2441	-11.06	8	-19.06
High	2480	-11.56	8	-19.56

PEAK POWER SPECTRAL DENSITY

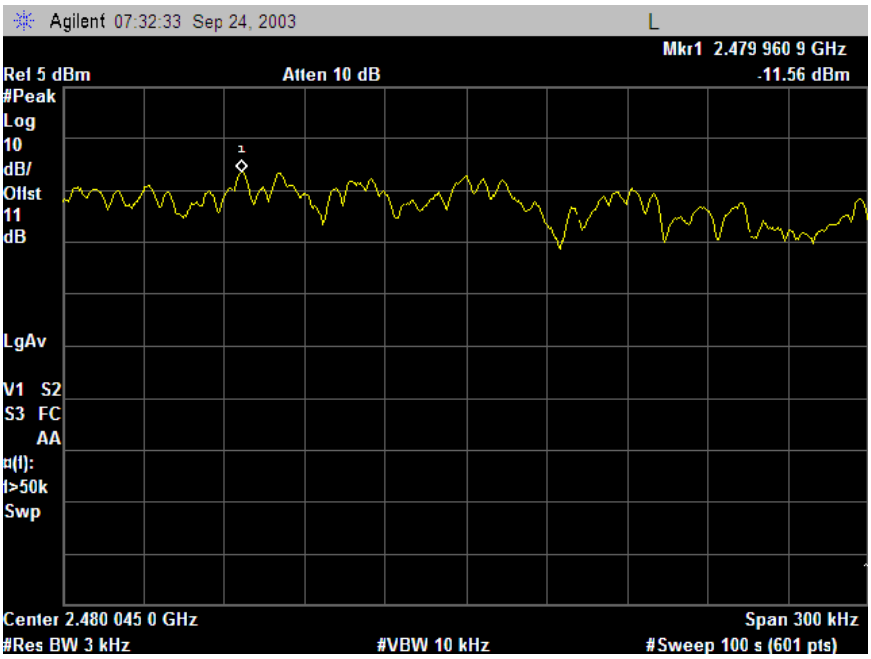
PPSD LOW CH



PPSD MID CH



PPSD HIGH CH



7.8. CONDUCTED SPURIOUS EMISSIONS

LIMITS

§15.247 (c) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in§15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 100 kHz.

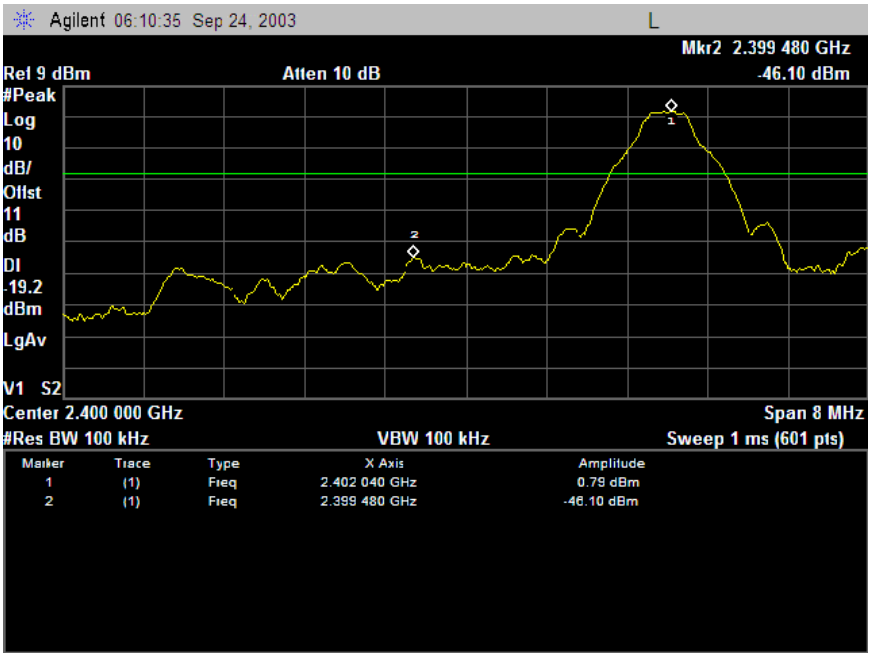
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

RESULTS

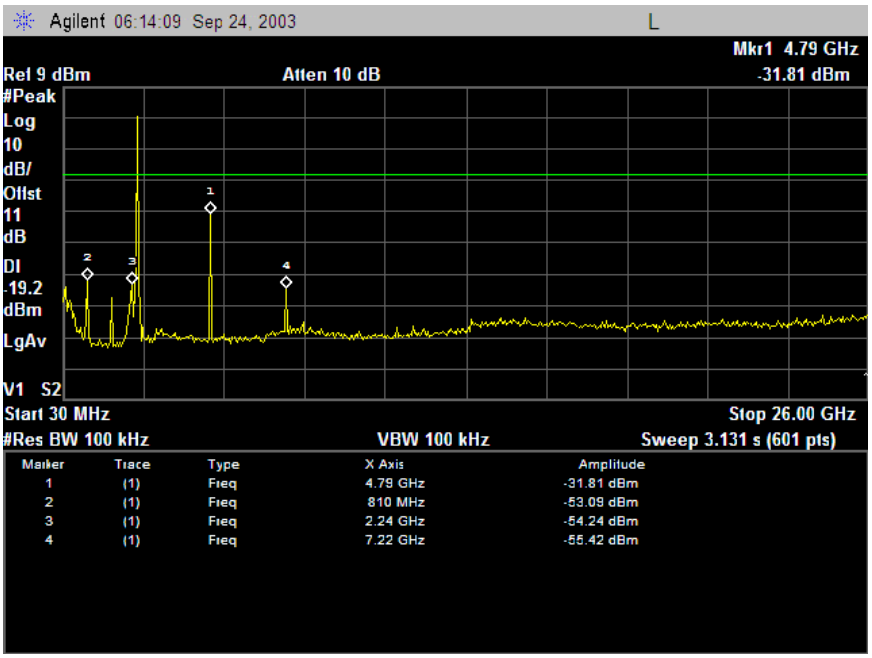
No non-compliance noted:

SPURIOUS EMISSIONS, LOW CHANNEL

LOW CHANNEL BANDEDGE

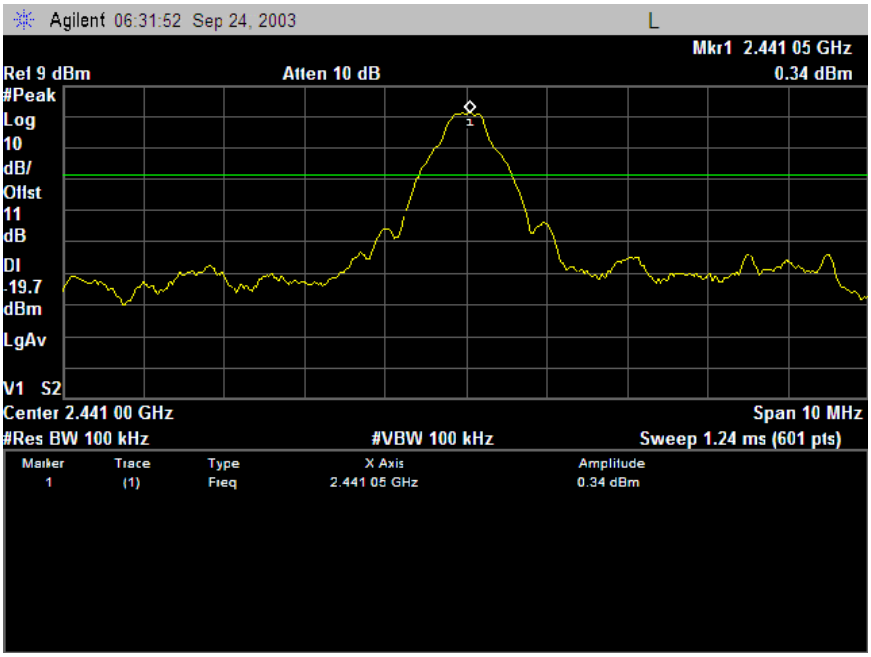


LOW CHANNEL SPURIOUS

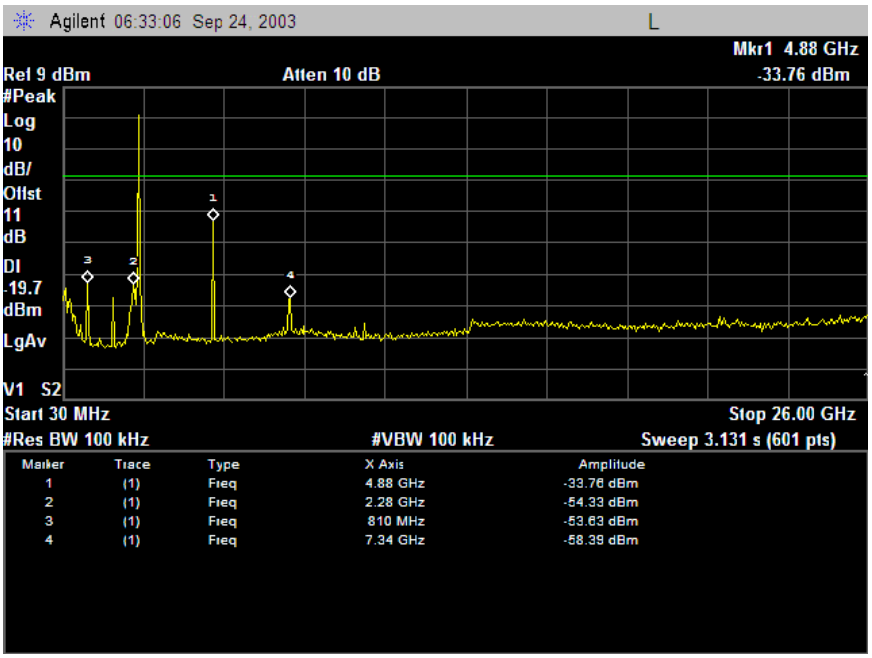


SPURIOUS EMISSIONS, MID CHANNEL

MID CHANNEL REFERENCE

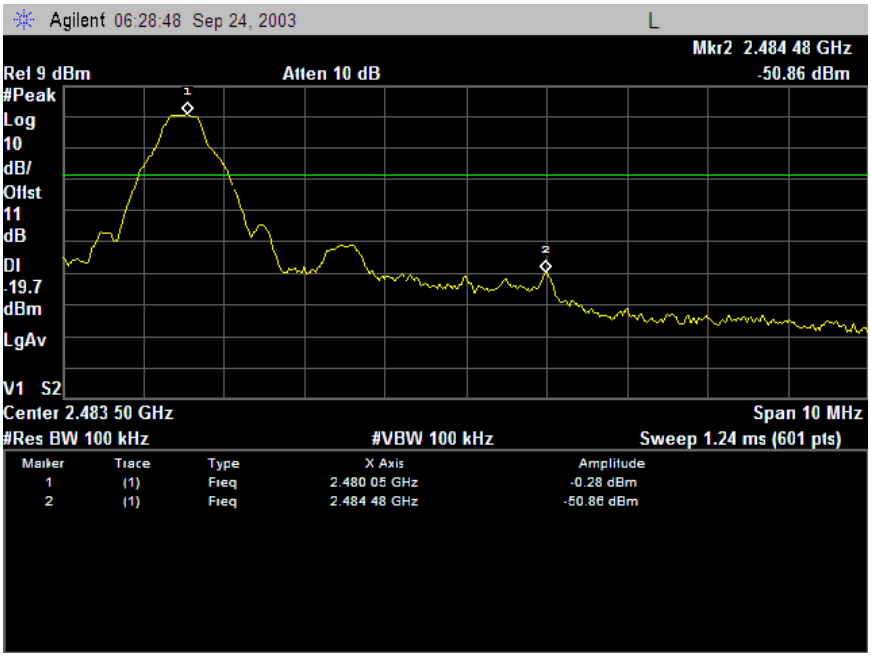


MID CHANNEL SPURIOUS

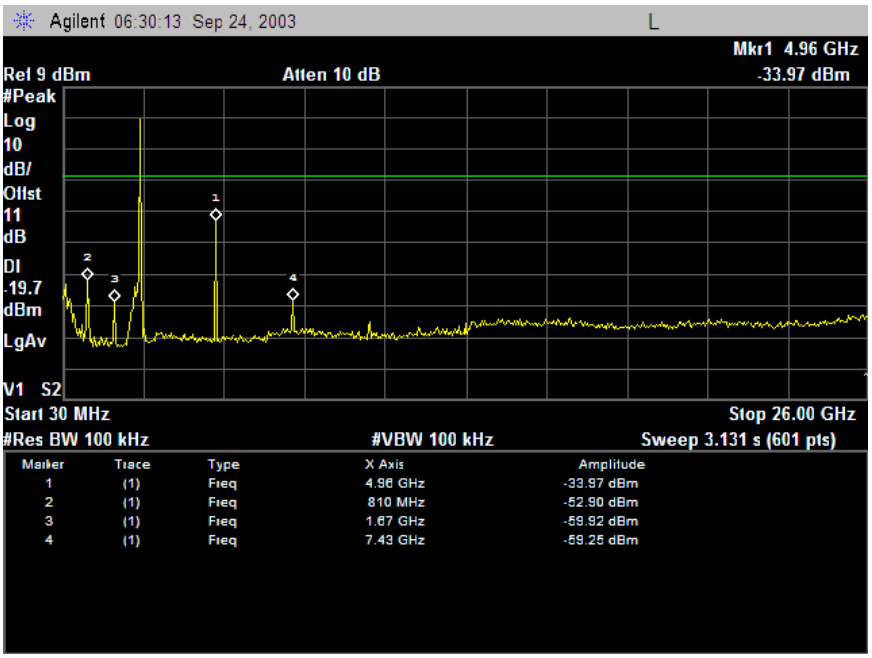


SPURIOUS EMISSIONS, HIGH CHANNEL

HIGH CHANNEL BANDEDGE

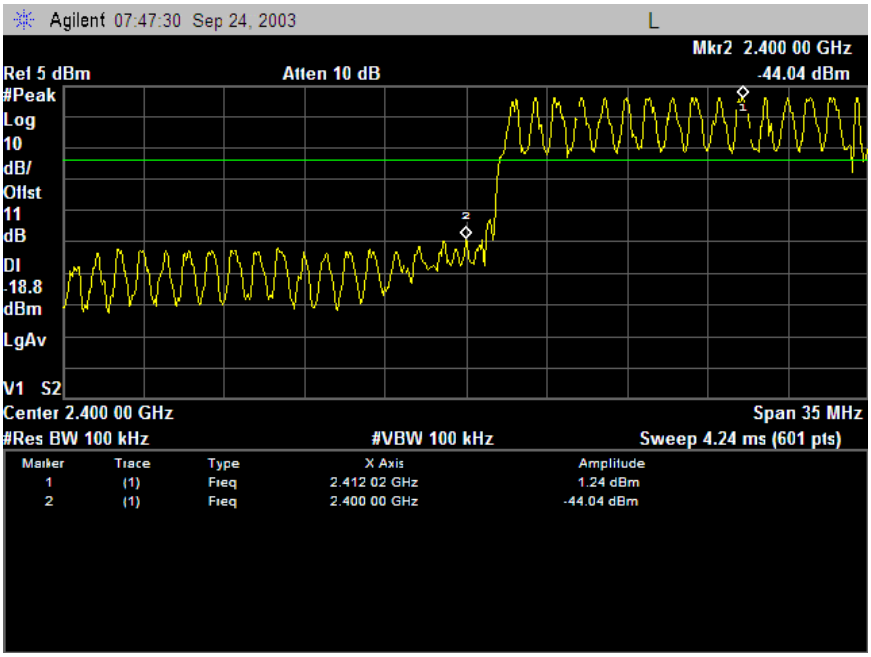


HIGH CHANNEL SPURIOUS

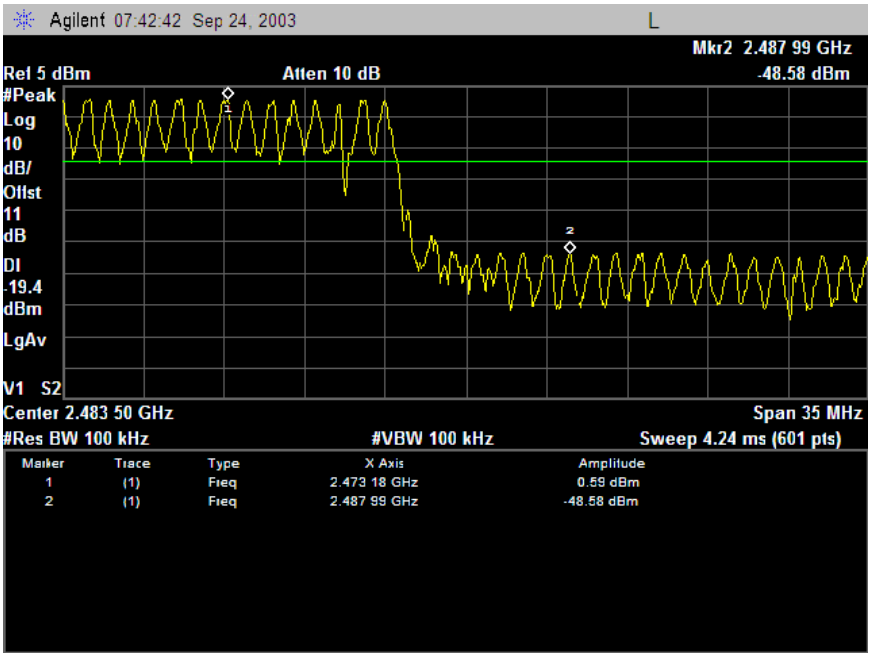


SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON

LOW BANDEDGE WITH HOPPING ON



HIGH BANDEDGE WITH HOPPING ON



7.9. RADIATED EMISSIONS

LIMITS

§15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])
13.36 - 13.41			

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
[2] Above 38.6

§15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

§15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

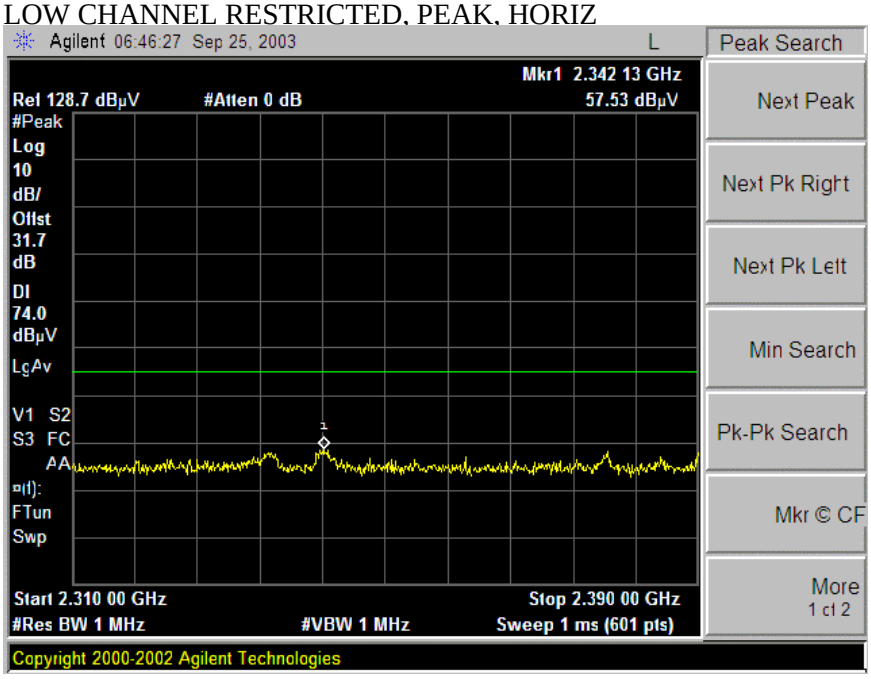
RESULTS

No non-compliance noted:

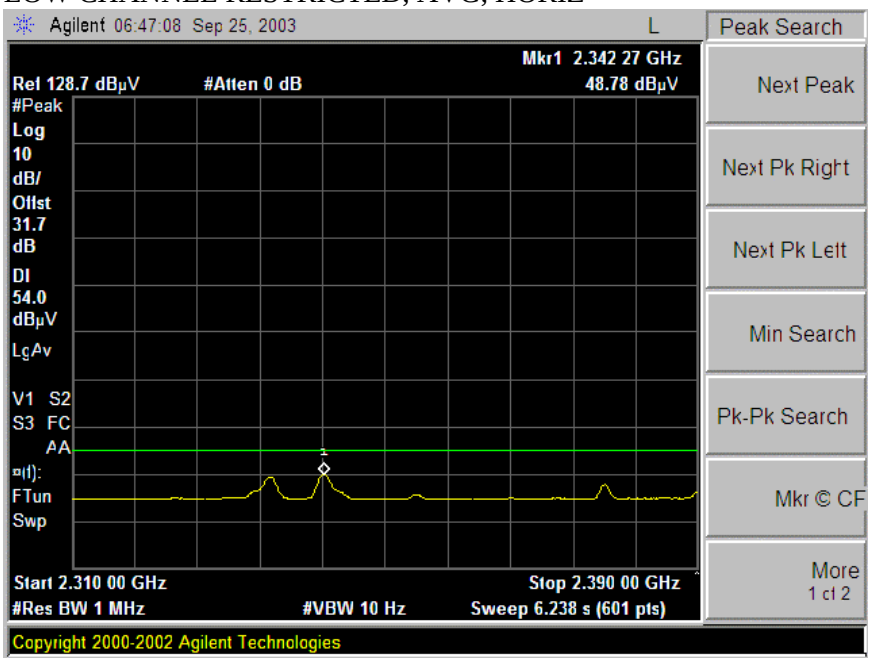
7.9.1. RADIATED EMISSIONS ABOVE 1 GHZ

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

LOW CHANNEL RESTRICTED, PEAK, HORIZ

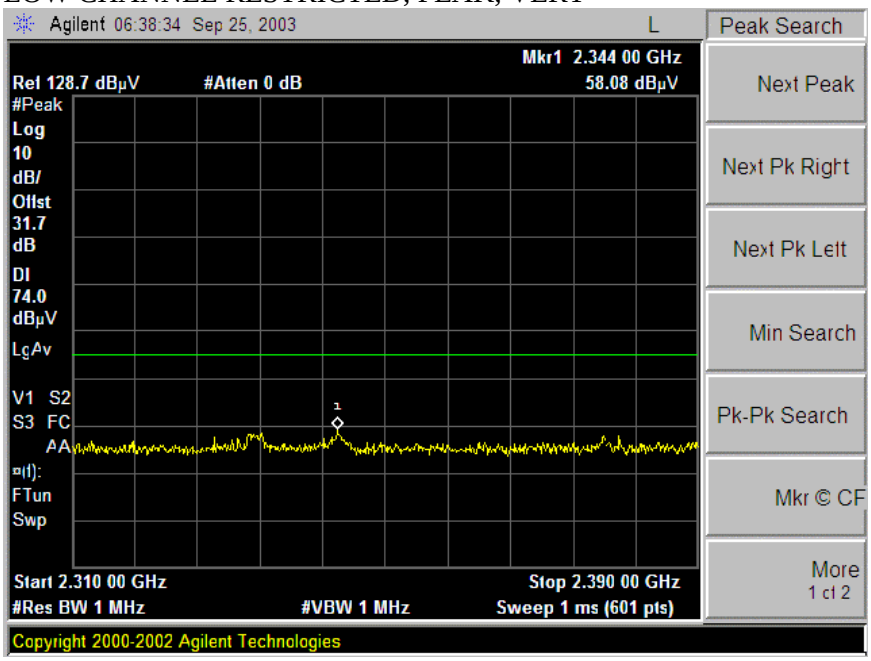


LOW CHANNEL RESTRICTED, AVG, HORIZ

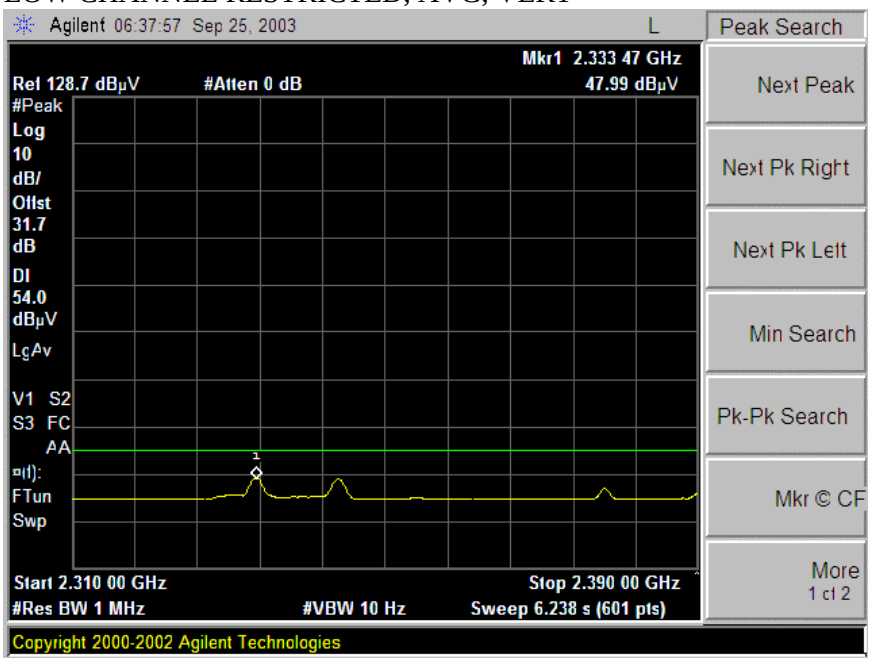


RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

LOW CHANNEL RESTRICTED, PEAK, VERT

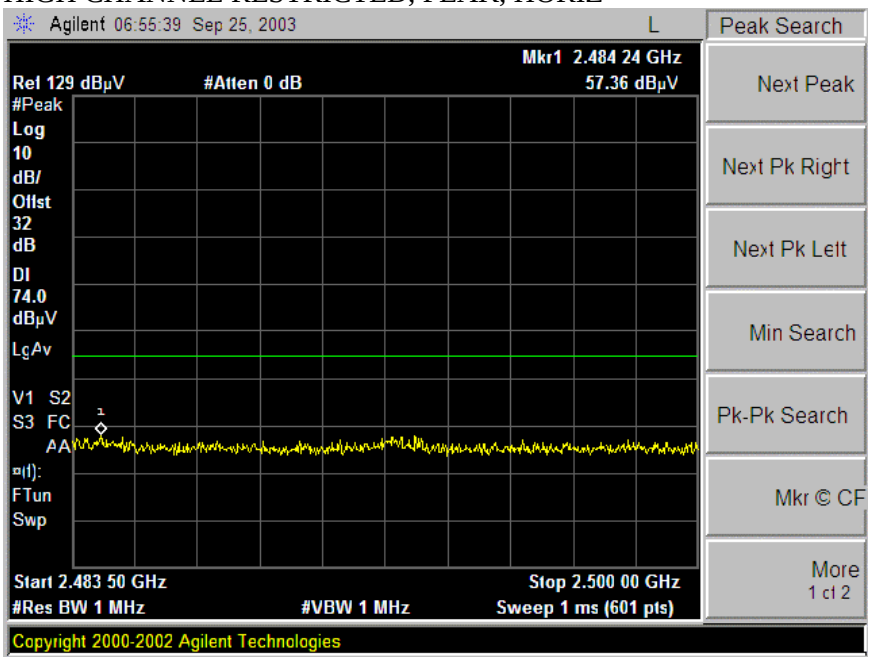


LOW CHANNEL RESTRICTED, AVG, VERT

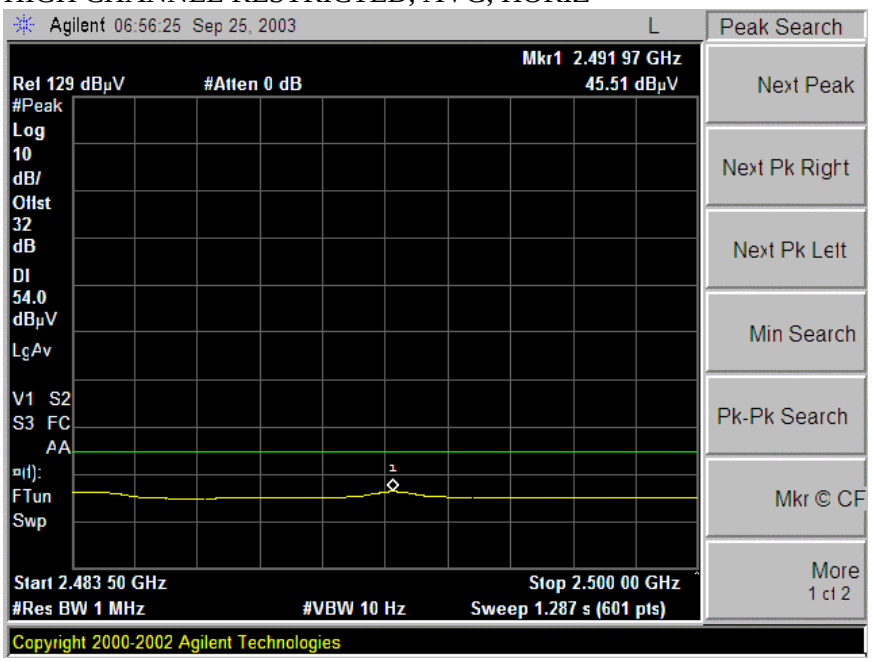


RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

HIGH CHANNEL RESTRICTED, PEAK, HORIZ

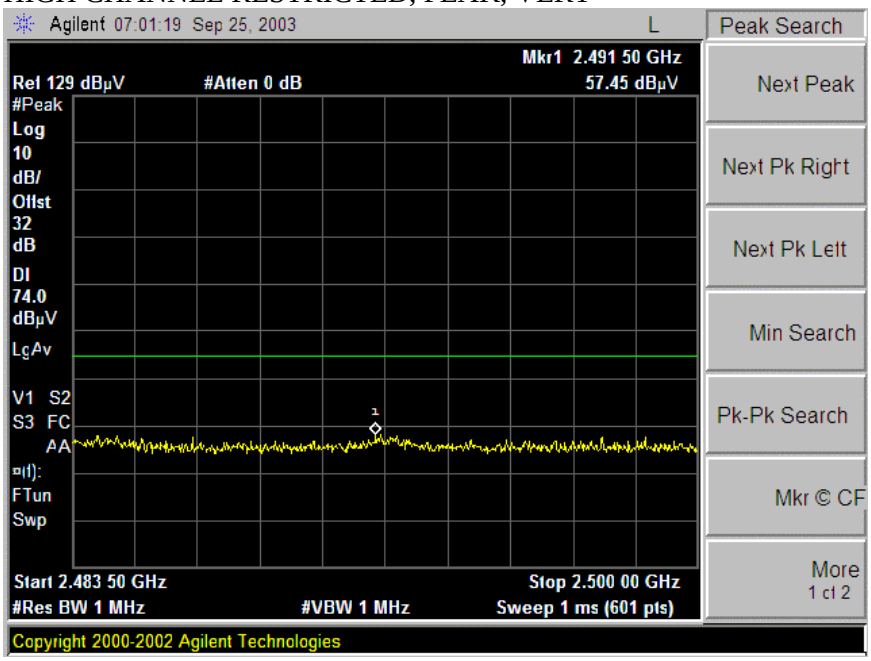


HIGH CHANNEL RESTRICTED, AVG, HORIZ

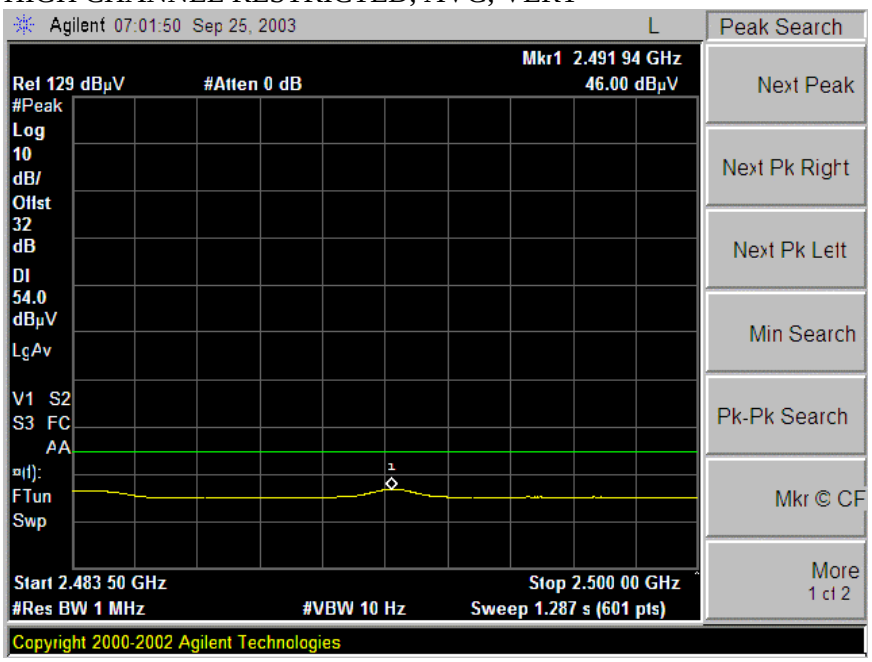


RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

HIGH CHANNEL RESTRICTED, PEAK, VERT

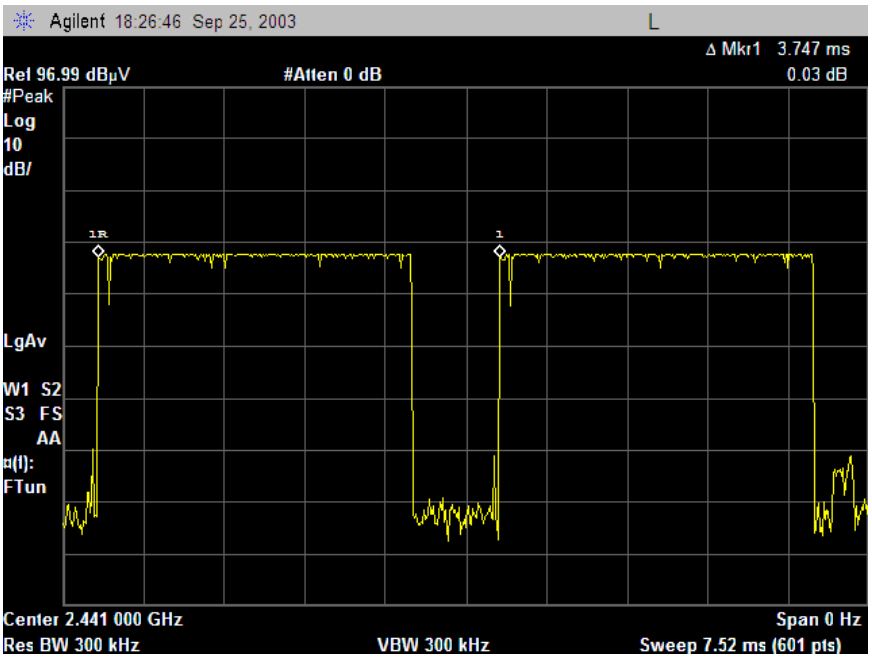


HIGH CHANNEL RESTRICTED, AVG, VERT



DUTY CYCLE CORRECTION FACTOR

DWELL TIME



*IN ACCORDANCE WITH FCC PUBLIC NOTICE DA-00-705, THE "DUTY CYCLE CORRECTION FACTOR" FOR SPURIOUS RADIATED EMISSIONS IS; 20 log * (3.747 ms / 100 ms) = -28.5 dB, WHICH WAS USED TO CORRECT THE AVERAGE SPURIOUS READING.

HARMONICS AND SPURIOUS EMISSIONS (LOW, MIDDLE, AND HIGH CHANNELS)

Test Equipment:

EMCO Horn 1-18GHz	Pre-amplifier 1-26GHz	Spectrum Analyzer	Horn > 18GHz	Limit
T75; S/N: 6717 @3m	T63 Miteq 646456	Agilent E4446A Analyzer		FCC 15.205

Hi Frequency Cables: ☐ (2 ft) ☑ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☑ (12 ft)

Peak Measurements: 1 MHz Resolution Bandwidth; 10Hz Video Bandwidth

Average Measurements: 1 MHz Resolution Bandwidth; 10Hz Video Bandwidth

f GHz	Dist feet	Raw Pk dBuV	Raw Avg dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
		LOW CHANNEL 2402MHz													
4.804	9.8	60.9	56.7	33.4	2.9	-35.3	0.0	1.0	62.8	30.1	74.0	54.0	-11.2	-23.9	V
4.804	9.8	53.3	50.2	33.4	2.9	-35.3	0.0	1.0	55.2	23.6	74.0	54.0	-18.8	-30.4	H
12.010	9.8	41.8	30.4	39.2	5.1	-34.9	0.0	1.0	52.2	12.3	74.0	54.0	-21.8	-41.7	V
12.010	9.8	40.3	30.3	39.2	5.1	-34.9	0.0	1.0	50.7	12.2	74.0	54.0	-23.3	-41.8	H
		MIDDLE CHANNEL 2441MHz													
4.882	9.8	53.2	50.8	33.4	3.0	-35.3	0.0	1.0	55.2	23.5	74.0	54.0	-18.8	-30.5	V
4.882	9.8	48.7	42.3	33.4	3.0	-35.3	0.0	1.0	50.7	15.8	74.0	54.0	-23.3	-38.2	H
7.323	9.8	47.8	40.7	35.9	3.8	-34.6	0.0	1.0	53.9	18.2	74.0	54.0	-20.1	-35.8	V
7.323	9.8	46.3	39.6	35.9	3.8	-34.6	0.0	1.0	52.3	17.1	74.0	54.0	-21.7	-36.9	H
12.205	9.8	42.1	30.9	39.2	5.2	-35.1	0.0	1.0	52.2	12.6	74.0	54.0	-21.8	-41.4	V
12.205	9.8	43.3	30.2	39.2	5.2	-35.1	0.0	1.0	53.5	11.9	74.0	54.0	-20.5	-42.1	H
		HIGH CHANEL 2480MHz													
4.960	9.8	49.5	43.8	33.5	3.0	-35.3	0.0	1.0	51.7	17.5	74.0	54.0	-22.3	-36.5	V
4.960	9.8	44.9	40.7	33.5	3.0	-35.3	0.0	1.0	47.1	14.4	74.0	54.0	-26.9	-39.6	H
7.440	9.8	48.0	39.2	36.1	3.8	-34.5	0.0	1.0	54.3	17.1	74.0	54.0	-19.7	-36.9	V
7.440	9.8	47.1	40.3	36.1	3.8	-34.5	0.0	1.0	53.5	18.2	74.0	54.0	-20.5	-35.8	H
12.400	9.8	41.9	30.8	39.2	5.2	-35.4	0.0	1.0	51.9	12.3	74.0	54.0	-22.1	-41.7	V
12.400	9.8	41.7	30.6	39.2	5.2	-35.4	0.0	1.0	51.7	12.1	74.0	54.0	-22.3	-41.9	H
		NO OTHER SPURIOUS EMISSIONS DETECTED WITHIN THE RESTRICTED BANDS ABOVE -20dB OF THE LIMIT													
		NOTE: AVERAGE FIELD STRENGTH INCLUDES DUTY CYCLE CORRECTION FACTOR OF -28.54dB													

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

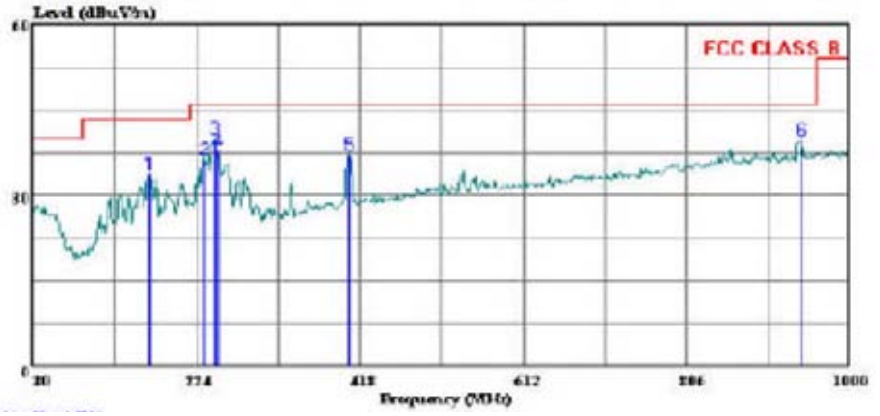
.

7.9.2. RADIATED EMISSIONS BELOW 1 GHZ

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

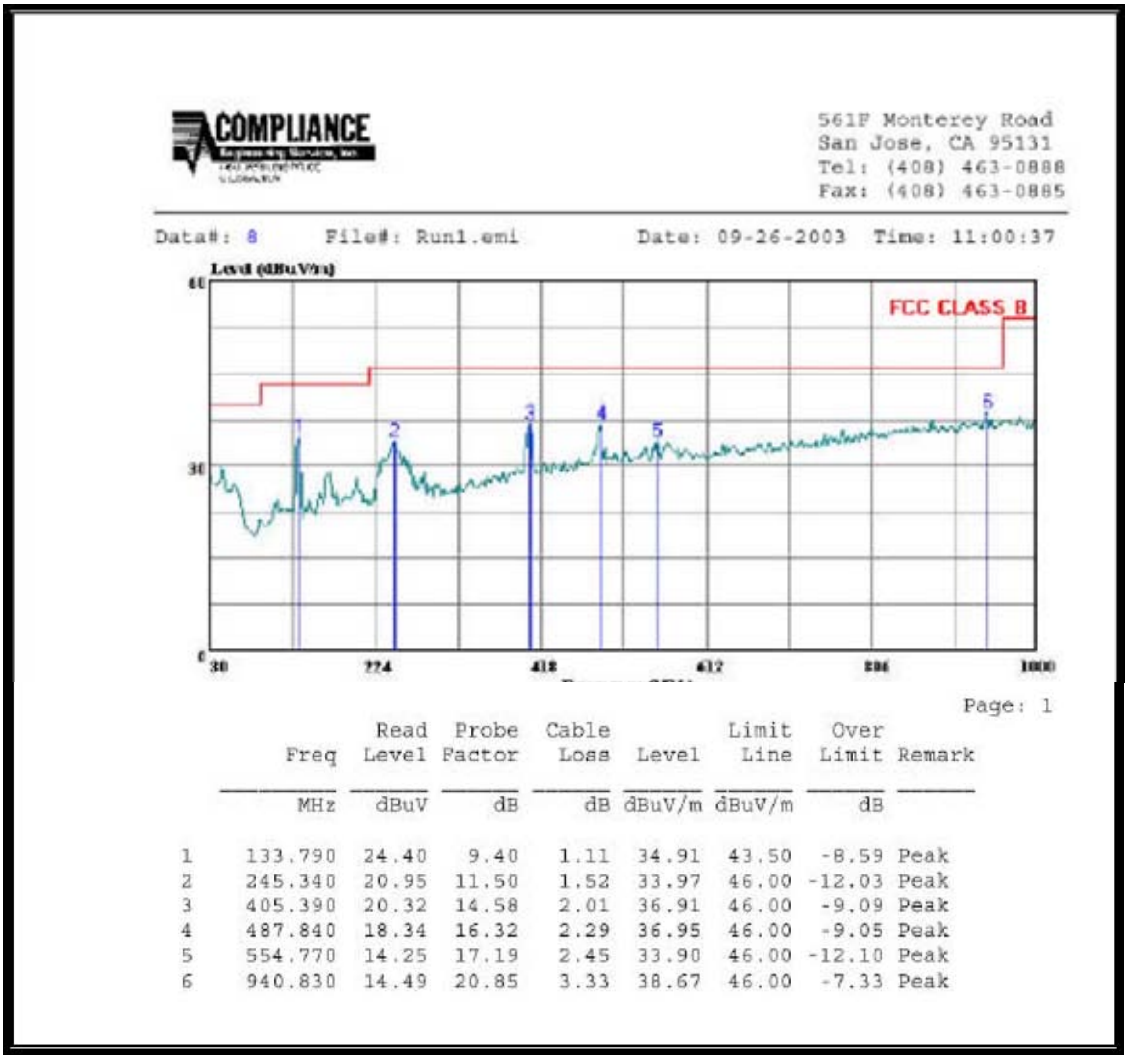
COMPLIANCE Engineering Services, Inc.
561F Monterey Road
San Jose, CA 95131
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 10 File#: Run1.emi Date: 09-26-2003 Time: 11:48:11



	Freq	Read Level	Probe Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV/m	dBuV/m	dB	
1	167.740	23.67	8.78	1.30	33.75	43.50	-9.75	Peak
2	233.700	23.97	10.89	1.49	36.35	46.00	-9.65	Peak
3	245.340	27.07	11.50	1.52	40.09	46.00	-5.91	Peak
4	250.190	24.66	11.76	1.55	37.97	46.00	-8.03	Peak
5	405.390	20.62	14.58	2.01	37.21	46.00	-8.79	Peak
6	940.830	15.60	20.85	3.33	39.78	46.00	-6.22	Peak

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)



561F Monterey Road
San Jose, CA 95131
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 8 File#: Run1.emi Date: 09-26-2003 Time: 11:00:37

Page: 1

	Freq	Read Level	Probe Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV/m	dBuV/m	dB	
1	133.790	24.40	9.40	1.11	34.91	43.50	-8.59	Peak
2	245.340	20.95	11.50	1.52	33.97	46.00	-12.03	Peak
3	405.390	20.32	14.58	2.01	36.91	46.00	-9.09	Peak
4	487.840	18.34	16.32	2.29	36.95	46.00	-9.05	Peak
5	554.770	14.25	17.19	2.45	33.90	46.00	-12.10	Peak
6	940.830	14.49	20.85	3.33	38.67	46.00	-7.33	Peak

7.10. CO-LOCATED RADIATED EMISSIONS

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

The dominant transmitter is set to the worst case channel. The spurious emissions performance of the dominant transmitter is investigated as the settings of the non-dominant transmitter are varied. Worst case results are reported.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

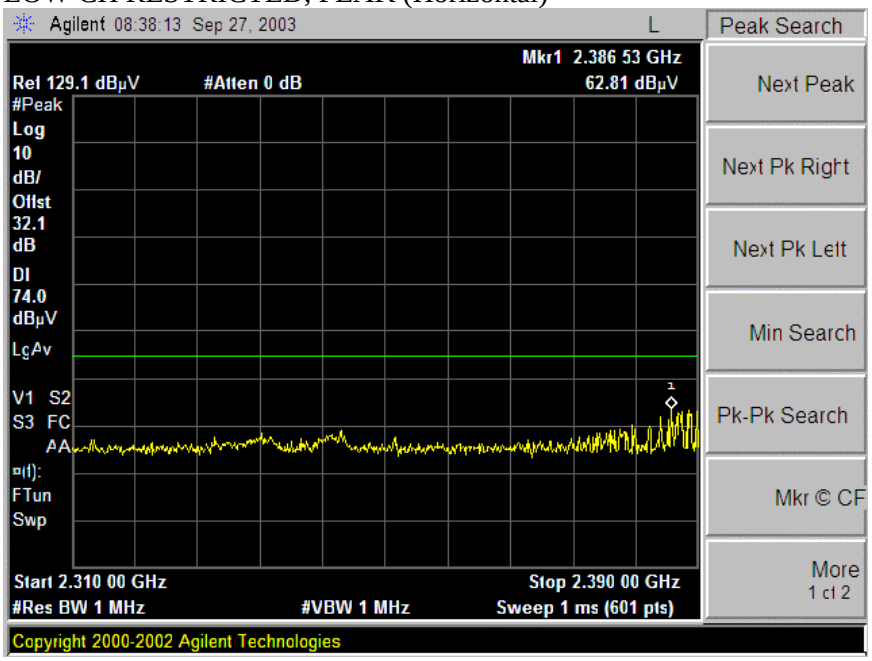
RESULTS

No non-compliance noted:

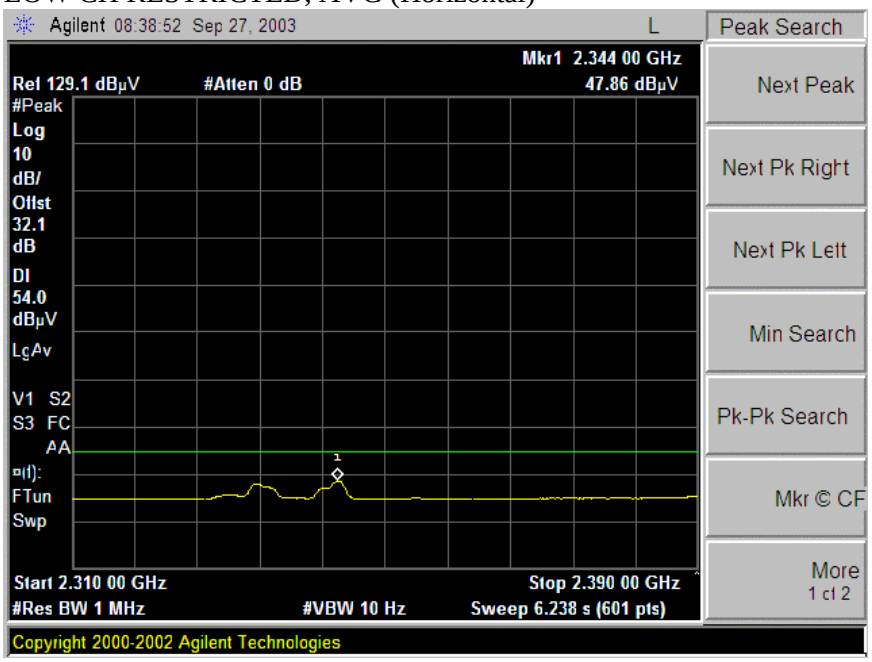
Dominant LAN is transmitted at low channel with non-dominant Bluetooth at low channel as investigated.

WORST-CASE RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

LOW CH RESTRICTED, PEAK (Horizontal)

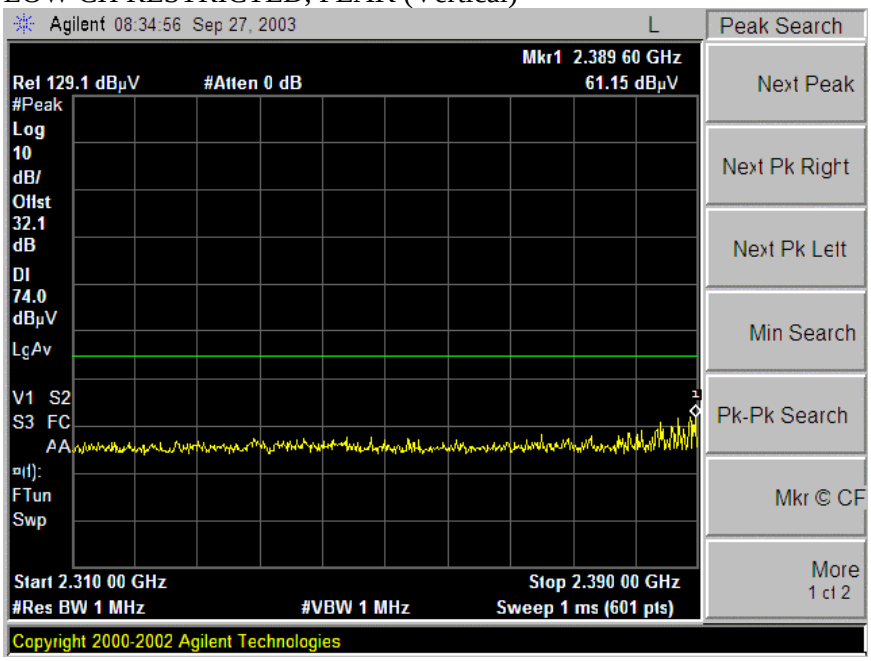


LOW CH RESTRICTED, AVG (Horizontal)

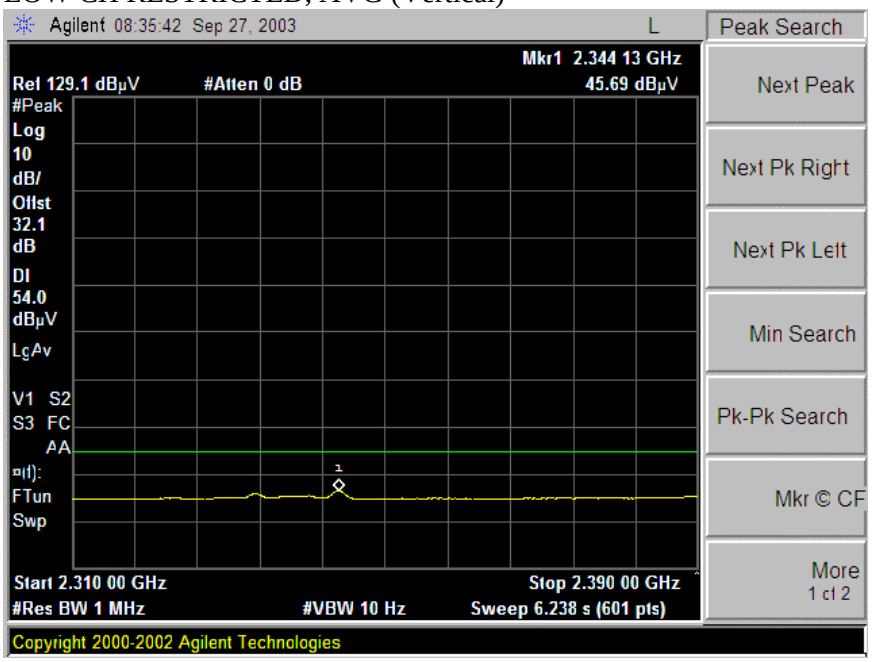


WORST-CASE RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

LOW CH RESTRICTED, PEAK (Vertical)

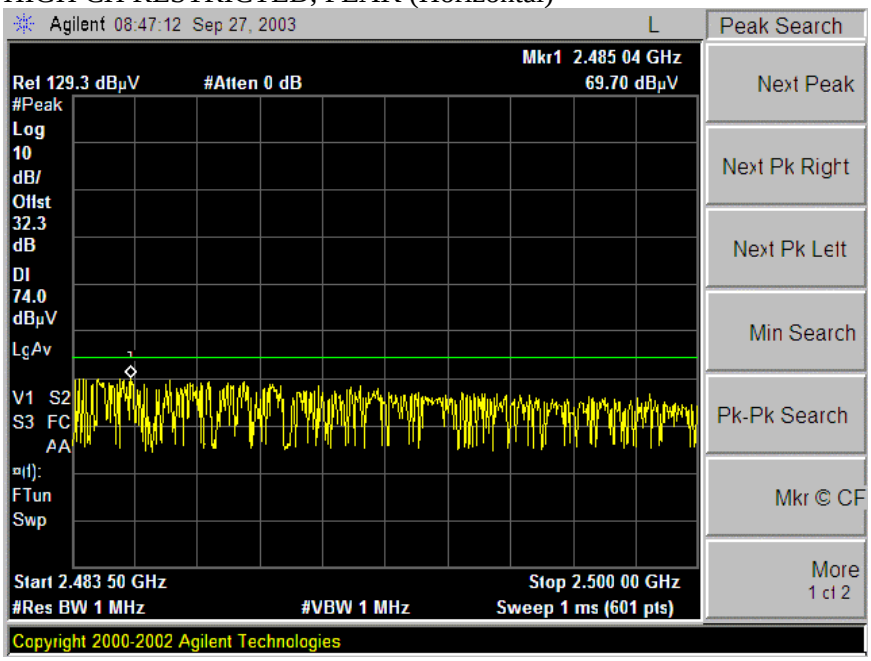


LOW CH RESTRICTED, AVG (Vertical)

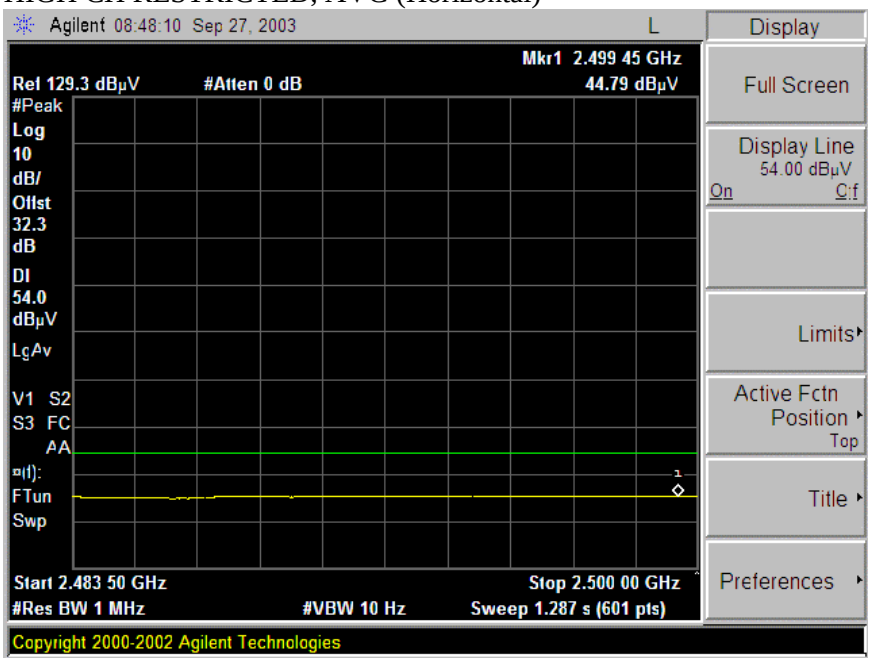


WORST-CASE RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

HIGH CH RESTRICTED, PEAK (Horizontal)

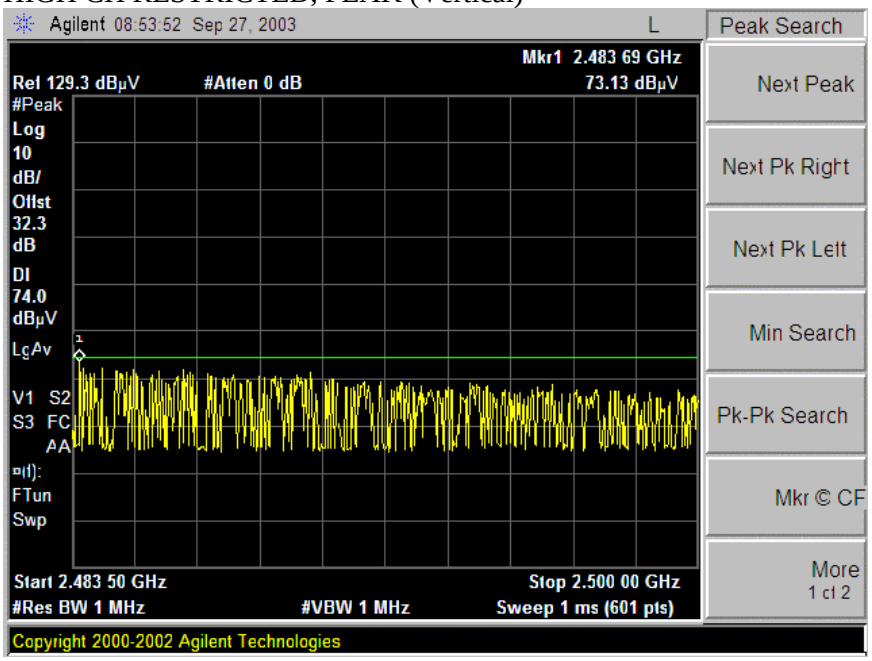


HIGH CH RESTRICTED, AVG (Horizontal)

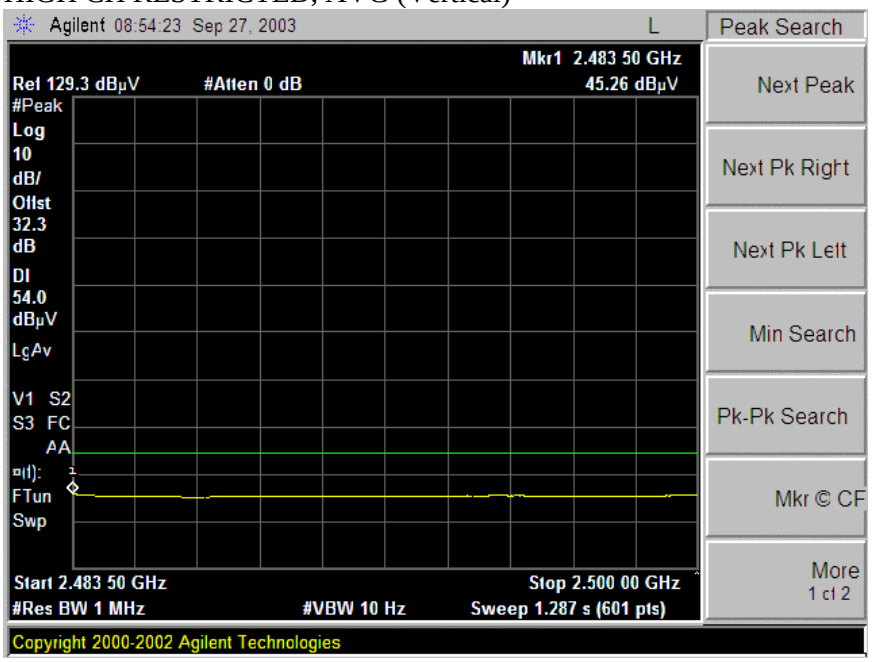


WORST-CASE RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

HIGH CH RESTRICTED, PEAK (Vertical)



HIGH CH RESTRICTED, AVG (Vertical)



WORST-CASE HARMONICS AND SPURIOUS EMISSIONS

Test Equipment:

EMCO Horn 1-18GHz	Pre-amplifer 1-26GHz	Spectrum Analyzer	Horn > 18GHz	Limit
T60; S/N: 2238 @3m	T86 Miteq 924341	Agilent E4446A Analyzer		FCC 15.205

Hi Frequency Cables

☐ (2 ft) ☑ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☑ (12 ft)

Peak Measurements:
1 MHz Resolution Bandwidth
1MHz Video Bandwidth

Average Measurements:
1 MHz Resolution Bandwidth
10Hz Video Bandwidth

f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
		LAN= LOW CHANNEL AND BLUETOOTH= LOW CHANNEL													
4.824	9.8	44.3	38.5	33.1	2.9	-45.6	0.0	1.0	35.8	29.9	74.0	54.0	-38.2	-24.1	V(FLOOR NOISE)
4.824	9.8	44.0	38.6	33.1	2.9	-45.6	0.0	1.0	35.4	30.0	74.0	54.0	-38.6	-24.0	H(FLOOR NOISE)

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

7.11. POWERLINE CONDUCTED EMISSIONS

LIMIT

§15.207 (a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

The lower limit applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The resolution bandwidth is set to 9 kHz for both peak detection and quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

Line conducted data is recorded for both NEUTRAL and HOT lines.

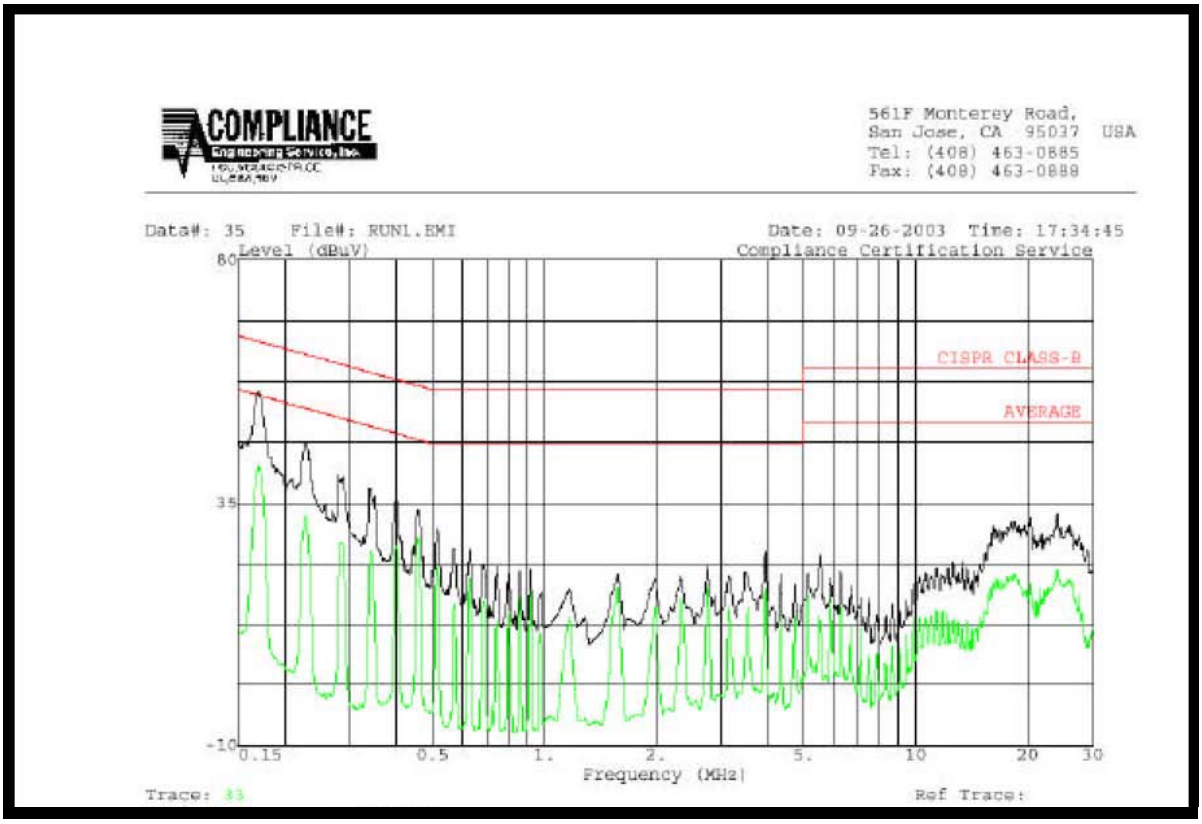
RESULTS

No non-compliance noted:

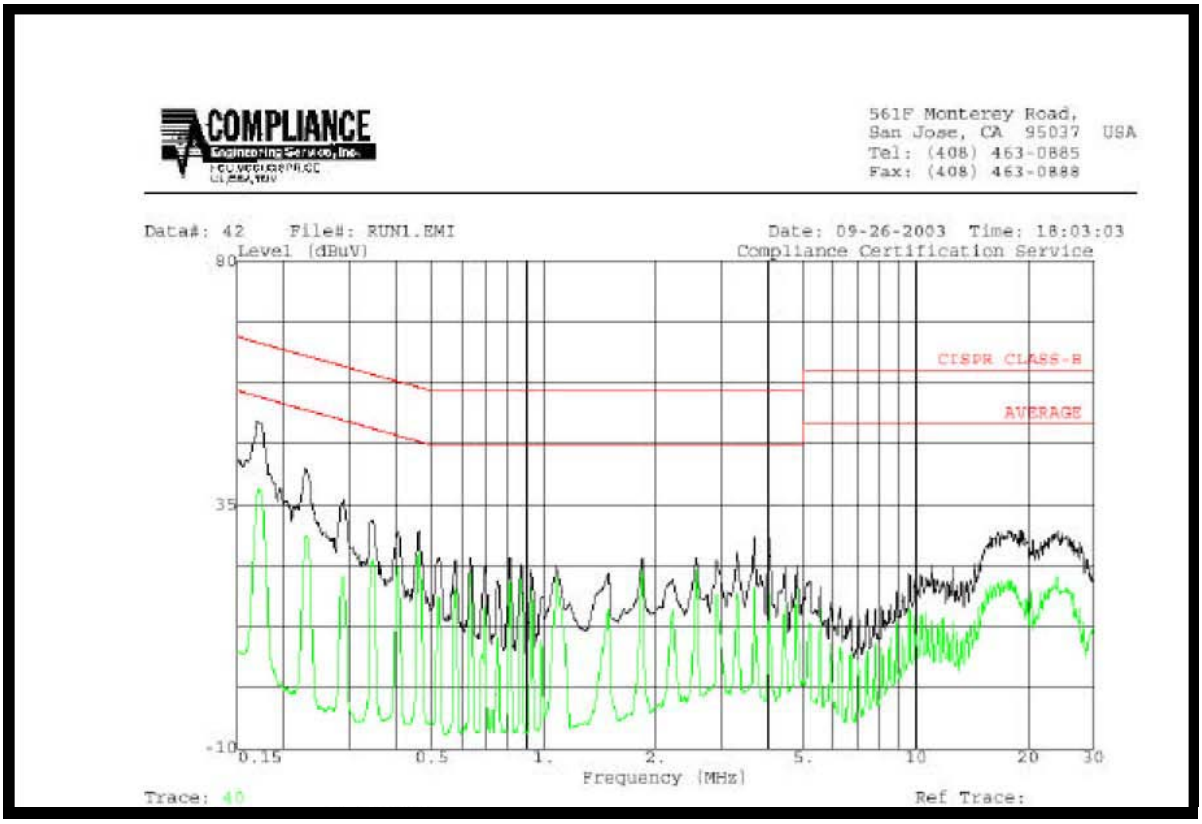
6 WORST EMISSIONS

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	EN_B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.17	55.54	--	41.95	0.00	65.46	55.46	-9.92	-13.51	L1
0.23	46.12	--	32.26	0.00	63.77	53.77	-17.65	-21.51	L1
0.28	40.18	--	20.41	0.00	62.31	52.31	-22.13	-31.90	L1
0.17	50.42	--	36.34	0.00	65.46	55.46	-15.04	-19.12	L2
0.23	41.59	--	28.59	0.00	63.77	53.77	-22.18	-25.18	L2
0.29	36.10	--	21.28	0.00	62.03	52.03	-25.93	-30.75	L2
6 Worst Data									

LINE 1 RESULTS



LINE 2 RESULTS



8. Appendix

8.1 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.

8.2 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.

8.3 Appendix C: Test Equipment

8.3.1 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	06/02/2004	06/02/2005
Conduction	Digital Hygro-Thermometer Conduct	MicroLife	HT-2126G	ISL-Conduction02	11/30/2004	11/30/2005
Conduction	EMI Receiver 02	HP	85460A	3448A00183	10/01/2004	10/01/2005
Conduction	LISN 01	R&S	ESH2-Z5	890485/013	04/29/2005	04/29/2006
Conduction	LISN 06	R&S	ESH3-Z5	828874/009	12/18/2004	12/18/2005
Radiation	BILOG Antenna 08	Schaffner	CBL6112B	2756	06/02/2004	06/02/2005
Radiation	Coaxial Cable Chmb 02-10M	Belden	RG-8/U	Chmb 02-10M	11/16/2004	11/16/2005
Radiation	Digital Hygro-Thermometer Chmb 02	MicroLife	HT-2126G	Chmb 02	11/30/2004	12/30/2005
Radiation	EMI Receiver 03	HP	85460A	3448A00209	01/08/2005	01/08/2006
Radiation	Spectrum Analyzer 13	Advantest	R3132	121200411	02/16/2005	02/16/2006
Radiation	Horn Antenna 02	Com-Power	AH-118	10088	02/17/2005	02/17/2006
Radiation	Horn Antenna 04	Com-Power	AH-826	081-001	01/13/2005	01/13/2006
Radiation	Horn Antenna 05	Com-Power	AH-640	100A	09/22/2004	09/22/2005
Radiation	Microwave Cable RF SK-01	HUBER+SUHNERAG.	Sucoflex 102	22139 /2	07/07/2004	07/07/2005
Chamber 05	Peak Power Analyzer	HP	8990A	3621A01269	02/15/2005	02/15/2006
Chamber 05	Power Sensor Radar	HP	84815A	3318A01828	02/15/2005	02/15/2006
Radiation	Preamplifier 02	MITEQ	AFS44-00102 650-40-10P-44	728229	01/28/2005	01/28/2006
Radiation	Preamplifier 10	MITEQ	JS-26004000-27-5A	818471	02/28/2005	02/28/2006
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	09/09/2004	09/09/2006

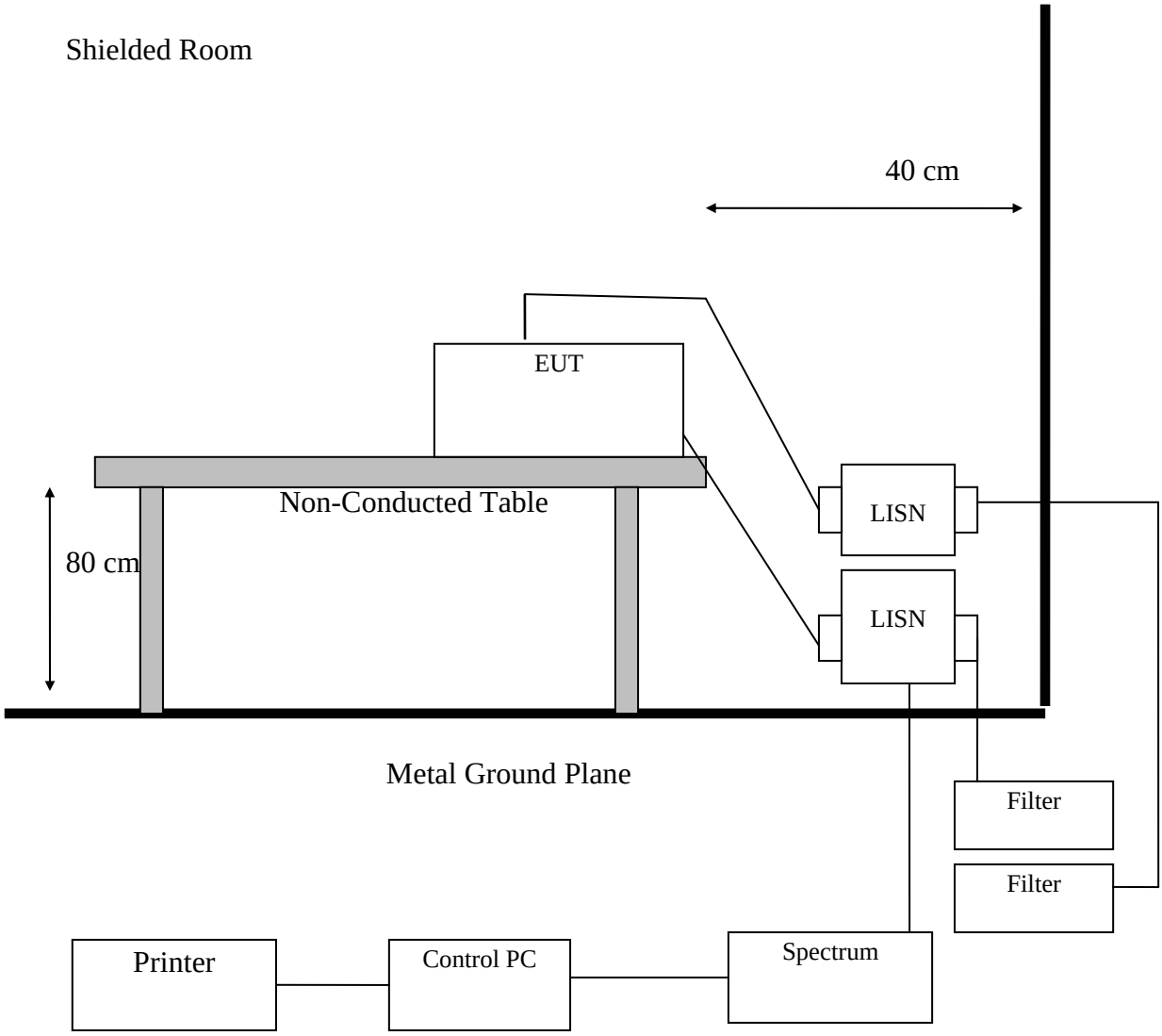
Note: Calibration is traceable to NIST or national or international standards.

8.3.2 Software for Controlling Spectrum/Receiver and Calculating Test Data

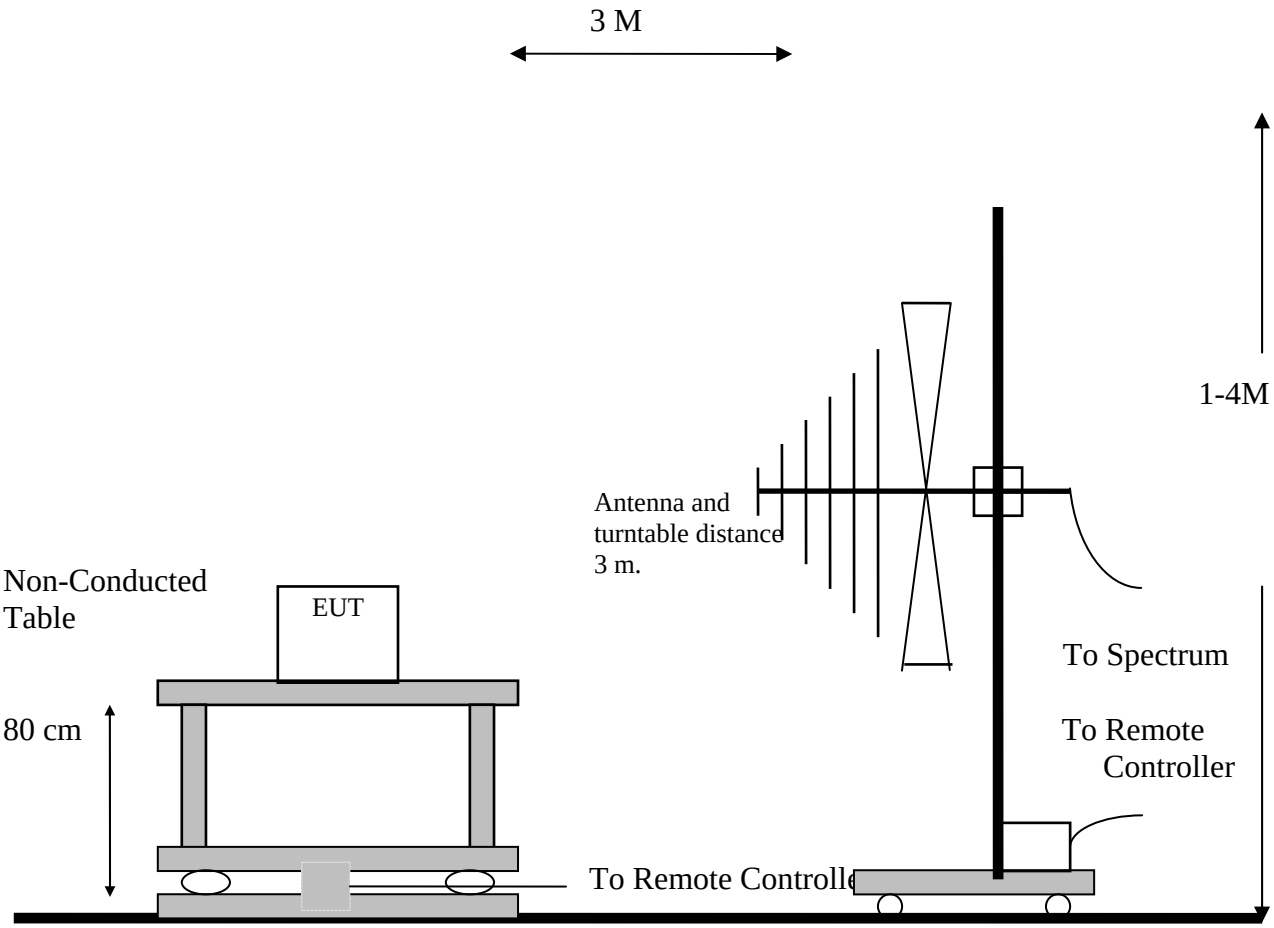
Radiation/Conduction	Filename	Version	Issued Date
Conduction	Tile.exe	1.12E	7/7/2000
Radiation	Tile.exe	1.12C	6/16/2000

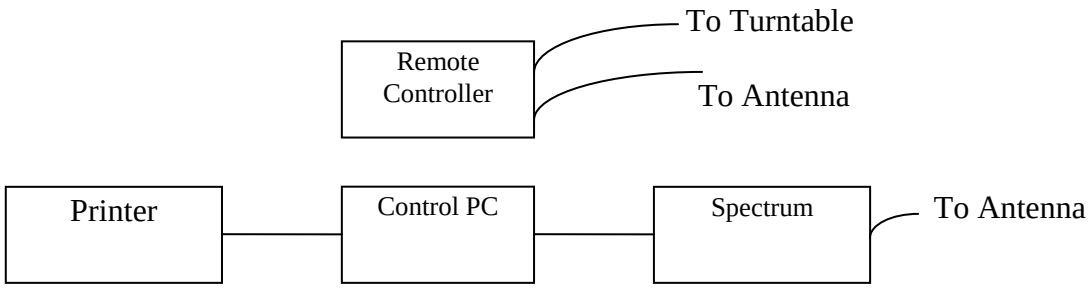
8.4 Appendix D: Layout of EUT and Support Equipment

8.4.1 General Conducted Test Configuration



8.4.2 General Radiation Test Configuration





8.5 Appendix E: Description of Support Equipment

Support Unit 1.

Description:	DELL 19” Monitor
Model:	P992
Serial Number:	JP-08D468-47743-2B2-203T
Power Cord:	Non-shielded, Detachable
FCC ID:	(Comply with FCC DOC)

Support Unit 2.

Description:	External Hard Disk Case
Manufacturer :	TeraSys
Model Number:	F12-UF
Serial Number	NA
Power Supply Type:	YHI(Model:YS-1015U12)
1394 Port:	one 6-Pins
USB:	one 4-Pins
Power In:	one
Power Cable:	Non-shielded, Detachable, (Can Dismantle)

Support Unit 3.

Description:	External Hard Disk Case
Manufacturer :	TeraSys
Model Number:	F12-UF
Serial Number	NA
Power Supply Type:	YHI(Model:YS-1015U12)
1394 Port:	one 6-Pins
USB:	one 4-Pins
Power In:	one
Power Cable:	Non-shielded, Detachable, (Can Dismantle)

Support Unit 4.

Description:	External Hard Disk Case
Manufacturer :	TeraSys
Model Number:	F12-UF
Serial Number	NA
Power Supply Type:	YHI(Model:YS-1015U12)
1394 Port:	one 6-Pins
USB:	one 4-Pins
Power In:	one
Power Cable:	Non-shielded, Detachable, (Can Dismantle)

Support Unit 5.

Description:	DELL USB Mouse
Model Number:	M-UR69
Serial Number:	LNA24412741
Power Supply Type:	N/A
Power Cord:	N/A
FCC ID:	N/A (Comply with FCC DOC)

Support Unit 6.

Description:	Firstline Headphone
Model Number:	H1160.0
Serial Number:	N/A
Power Supply Type:	N/A
Power Cord:	N/A
FCC ID:	N/A

Support Unit 7.

Description:	KOKA Microphone
Model Number:	DM-510
Serial Number:	N/A
Power Supply Type:	N/A
Power Cord:	N/A
FCC ID:	N/A

8.5.1 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. R/W memory card form EUT USB Port through External Hard Disk Case
C. Send audio signal to the headphone.
D. Receive audio signal from the microphone
E. The RF software makes the transmitter continuously sending RF signals
F. Repeat the above steps.

	Filename	Issued Date
External Hard Disk Case	Winthrax.exe	5/21/1996
CRTU2 Rev2.2.9.3000	CRTU-II.exe	2003/12/10
Broadcom Bluetooth	Bluetool.exe	2005/03/24

8.5.2 I/O Cable Condition of EUT and Support Units

Description	Path	Cable Length	Cable Type	Connector Type
Headphone Data Cable	Headphone to PC Line Out Port	1.2M	Non-shielded, Un-detachable	Plastic Head
Microphone Data Cable	Microphone to PC Line In Port	1.5M	Non-shielded, Un-detachable	Plastic Head
USB Mouse Data Cable	USB Mouse to PC USB Port	1.8M	Shielded, Un-detachable	Metal Head
USB Data Cable*3	EUT USB Port (4 Pin) to External Hard Disk Case USB Port(6 Pin)	2M	Non-shielded, Detachable	Metal Head
Monitor Data Cable	Monitor to PC VGA Port	1.6M	Shielded, Un-detachable	Metal Head
AC Power Cord	110V (~240V) to AC Power Cord Inlet (3-pin)	1.8M	Nonshielded, Detachable	Plastic Head

8.6 Appendix F: Accuracy of Measurement

Test Site: Conduction 02

Item	Source of Uncertainty	Probability Distribution	Total Uncertainties (dB)		Standard Uncertainty (dB)	
1	Systematic Effects: (Assessment from 20 repeat observation; 1 reading on EUT)	Normal	k=2	0.104	k=1	0.052
2	Random Effects: (Assessment from 20 random observations; 1 reading on EUT)	Normal	k=2	0.330	k=1	0.165
3	Receiver Calibration	Rectangular	k=1.73	1.000	k=1	0.577
4	LISN Factor Calibration	Normal	k=2	1.200	k=1	0.600
5	Cable Loss Calibration	Normal	k=2	1.000	k=1	0.500
6	Combined Standard Uncertainty Uc(y)	Normal			k=1	0.850
7	**Total Uncertainty @95% mim. Confidence Level**	**Normal**	**k=2**	**1.701**		

Measurement Uncertainty Calculations:

Uc (y) = square root ($u_1 (y)^2 + u_2 (y)^2 + ...+u_n (y)^2$)

U = 2 * Uc (y)

Note: The measurement Uncertainties mentioned above also refer to NIS 81-1994 of NAMAS : The treatment of Uncertainty in EMC Measurement.

Test Site: Chamber 02-3M

Item	Source of Uncertainty	Probability Distribution	Total Uncertainties (dB)		Standard Uncertainty (dB)	
1	Systematic Effects: (Assessment from 20 repeat observation; 1 reading on EUT)	Normal	k=2	0.067	k=1	0.034
2	Random Effects: (Assessment from 20 random observations; 1 reading on EUT)	Normal	k=2	0.103	k=1	0.052
3	Receiver Calibration	Rectangular	k=1.73	1.000	k=1	0.577
4	Antenna Factor Calibration	Normal	k=2	1.700	k=1	0.850
5	Cable Loss Calibration	Normal	k=2	1.000	k=1	0.500
6	Combined Standard Uncertainty Uc(y)	Normal			k=1	1.029
7	**Total Uncertainty @95% mim. Confidence Level**	**Normal**	**k=2**	**2.059**		

Measurement Uncertainty Calculations:

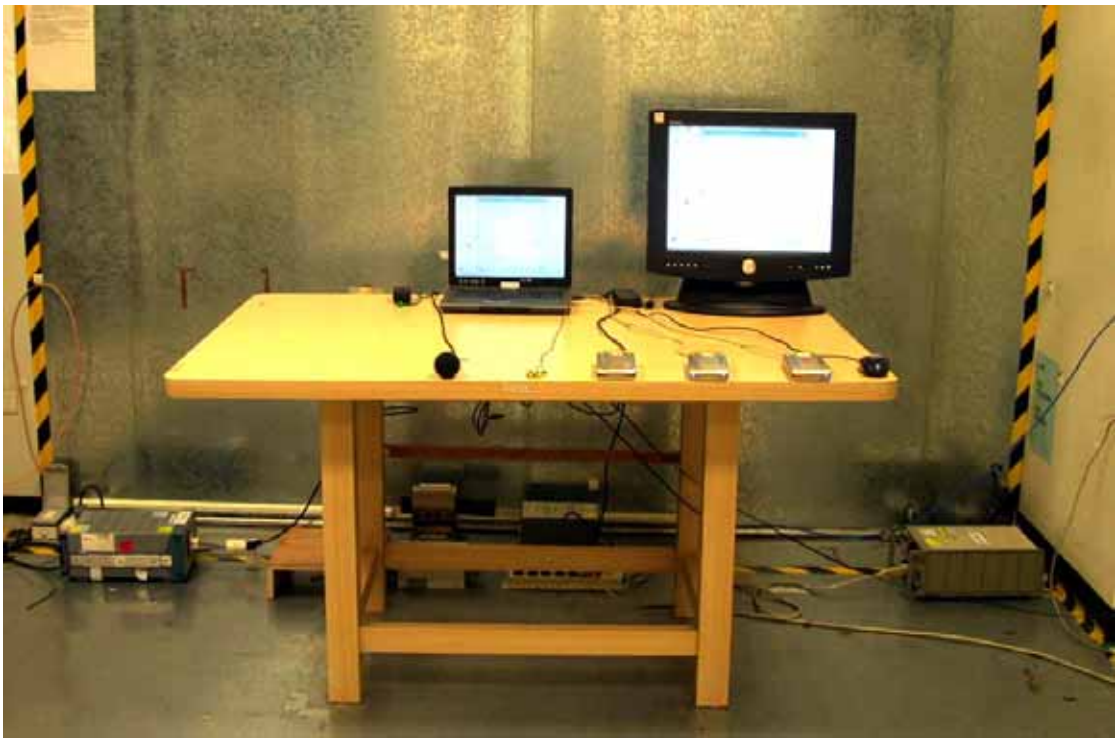
Uc (y) = square root ($u_1 (y)^2 + u_2 (y)^2 + ...+u_n (y)^2$)

U = 2 * Uc (y)

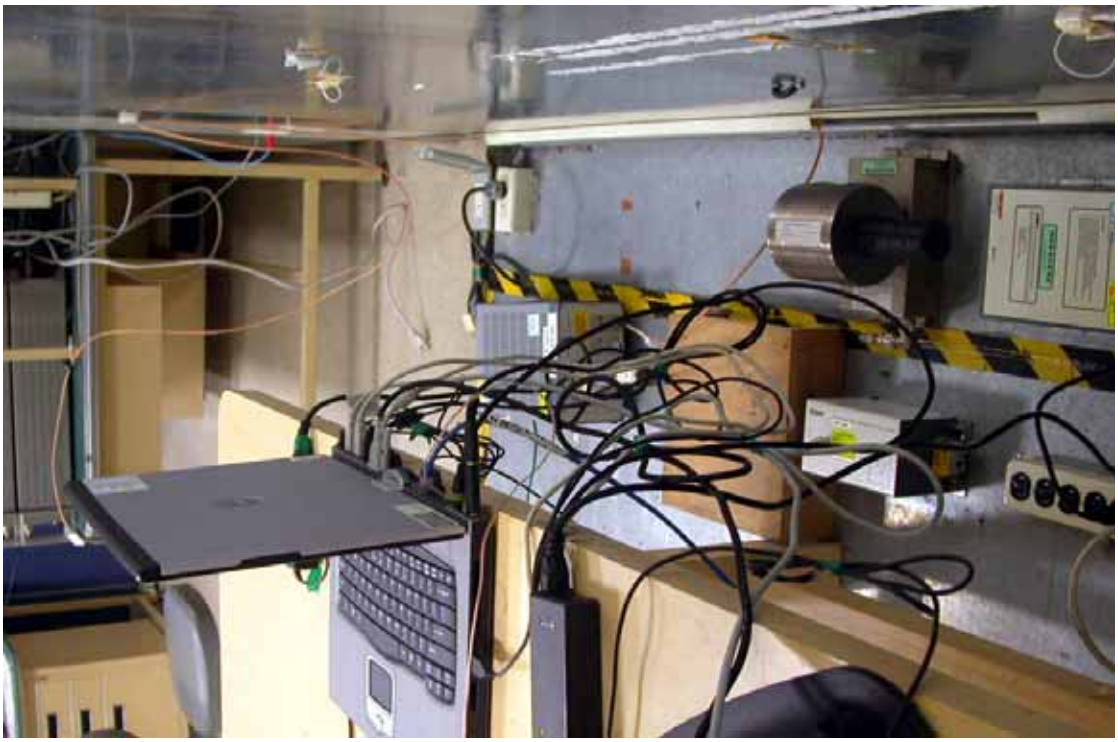
Note: The measurement Uncertainties mentioned above also refer to NIS 81-1994 of NAMAS : The treatment of Uncertainty in EMC Measurement.

8.7 Appendix G: Photographs of EUT Configuration Test Set Up

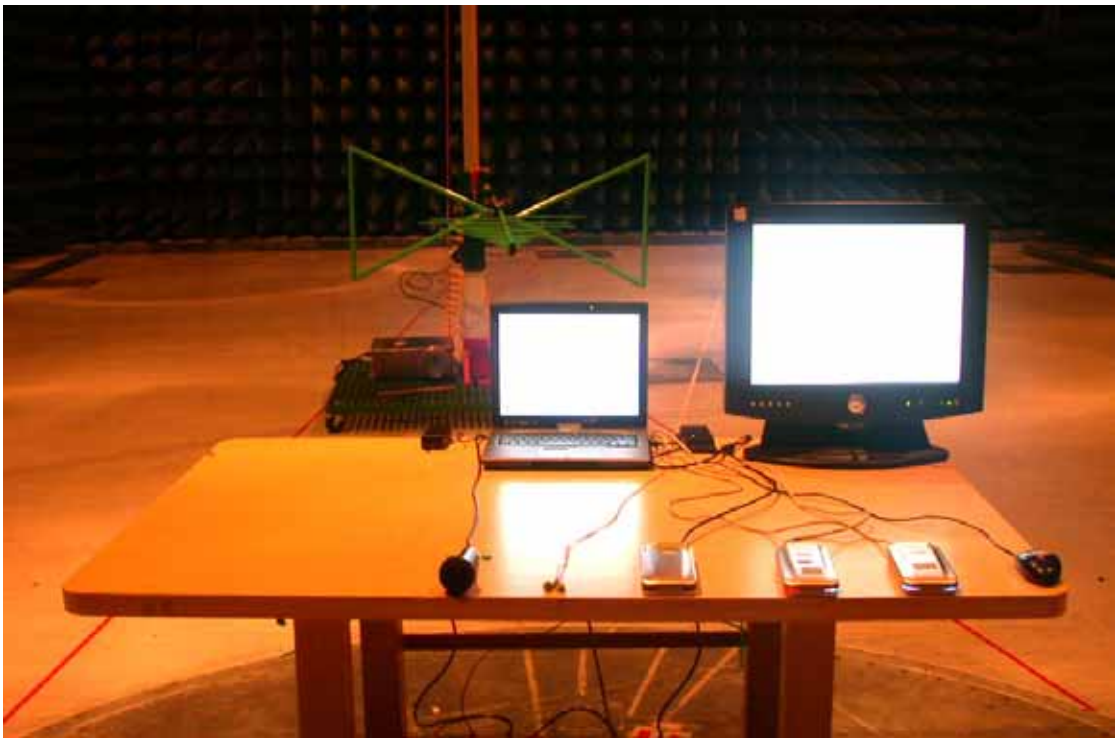
The Front View of Highest Conducted Set-up For EUT



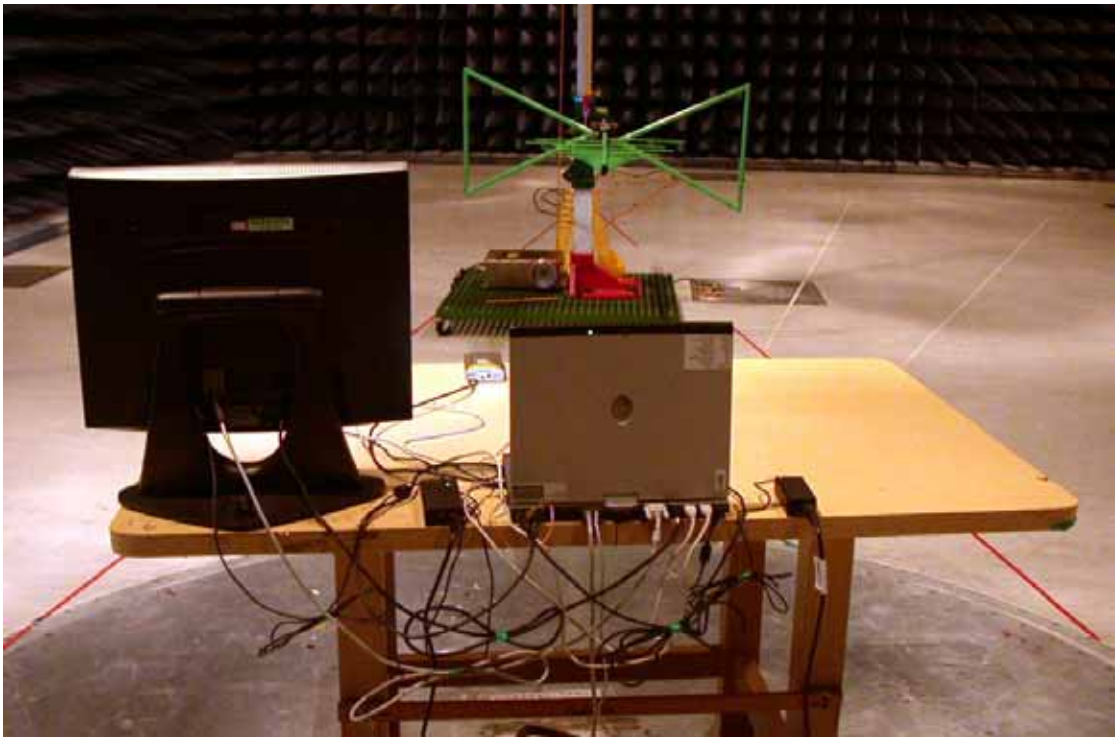
The Back View of Highest Conducted Set-up For EUT



The Front View of Highest Radiated Set-up For EUT



The Back View of Highest Radiated Set-up For EUT



8.8 Appendix H: Antenna Spec.

Please refer to the attached file.