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

Operator:MailesHsieh

RBW:1MHz
Humidity(%):37
Temperature(C):22

Frequency	Rx_R.	Ant_F.	Cab_L.	PreAmpl	Emission	Limit	Margin	A.Tower	T.Table
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
2106.39	44.41pk	30.98	2.28	35.35	42.31pk	54.00av	-11.69	100	76
2201.3	44.39pk	30.96	1.99	35.39	41.94pk	54.00av	-12.06	101	106
2356.14	44.53pk	30.93	1.51	35.46	41.51pk	54.00av	-12.49	101	155
2508.49	44.39pk	30.90	1.36	35.52	41.14pk	54.00av	-12.86	102	203
4797.2	30.02pk	34.83	2.12	39.11	27.86pk	54.00av	-26.14	100	20
9745.25	29.70pk	40.36	3.30	33.75	39.60pk	54.00av	-14.40	102	5

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

Operator:MailesHsieh

RBW:1MHz
Humidity(%):37
Temperature(C):22

Frequency	Rx_R.	Ant_F.	Cab_L.	PreAmpl	Emission	Limit	Margin	A.Tower	T.Table
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
2333.67	44.61pk	30.93	1.58	35.45	41.67pk	54.00av	-12.33	101	148
2638.36	44.20pk	30.96	1.38	35.48	41.07pk	54.00av	-12.93	102	243
3000.5	45.02pk	31.10	1.45	35.36	42.21pk	54.00av	-11.79	103	357
3032.97	44.92pk	31.13	1.47	35.42	42.10pk	54.00av	-11.90	103	349
4797.2	28.86pk	34.83	2.12	39.11	26.70pk	54.00av	-27.30	100	20
9745.25	30.46pk	40.36	3.30	33.75	40.37pk	54.00av	-13.63	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(%):37
Temperature(C):22

Frequency	Rx_R.	Ant_F.	Cab_L.	PreAmpl	Emission	Limit	Margin	A.Tower	T.Table
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
1032.47	51.42pk	24.65	2.17	34.86	43.38pk	54.00av	-10.62	102	110
2308.69	44.39pk	30.94	1.66	35.44	41.55pk	54.00av	-12.45	101	140
2688.31	44.16pk	30.98	1.39	35.46	41.07pk	54.00av	-12.93	102	259
3050.45	44.89pk	31.14	1.48	35.45	42.06pk	54.00av	-11.94	103	344
9841.16	29.73pk	40.15	3.35	33.40	39.82pk	54.00av	-14.18	101	3

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

Operator:MailesHsieh RBW:1MHz
Humidity(%):37
Temperature(C):22

Frequency	Rx_R.	Ant_F.	Cab_L.	PreAmpl	Emission	Limit	Margin	A.Tower	T.Table
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
2028.97	44.21pk	30.99	2.51	35.32	42.39pk	54.00av	-11.61	100	52
2391.11	44.73pk	30.92	1.42	35.47	41.59pk	54.00av	-12.41	101	166
2600.9	45.82pk	30.94	1.38	35.49	42.65pk	54.00av	-11.35	102	232
4863.64	28.95pk	35.08	2.13	39.16	27.01pk	54.00av	-26.99	100	14
9829.17	30.12pk	40.18	3.34	33.45	40.19pk	54.00av	-13.81	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.

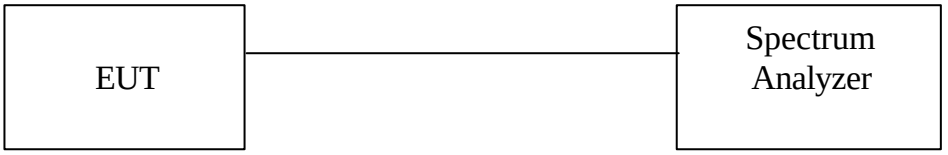
All frequencies from 1GHz to 25 GHz have been tested.

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)

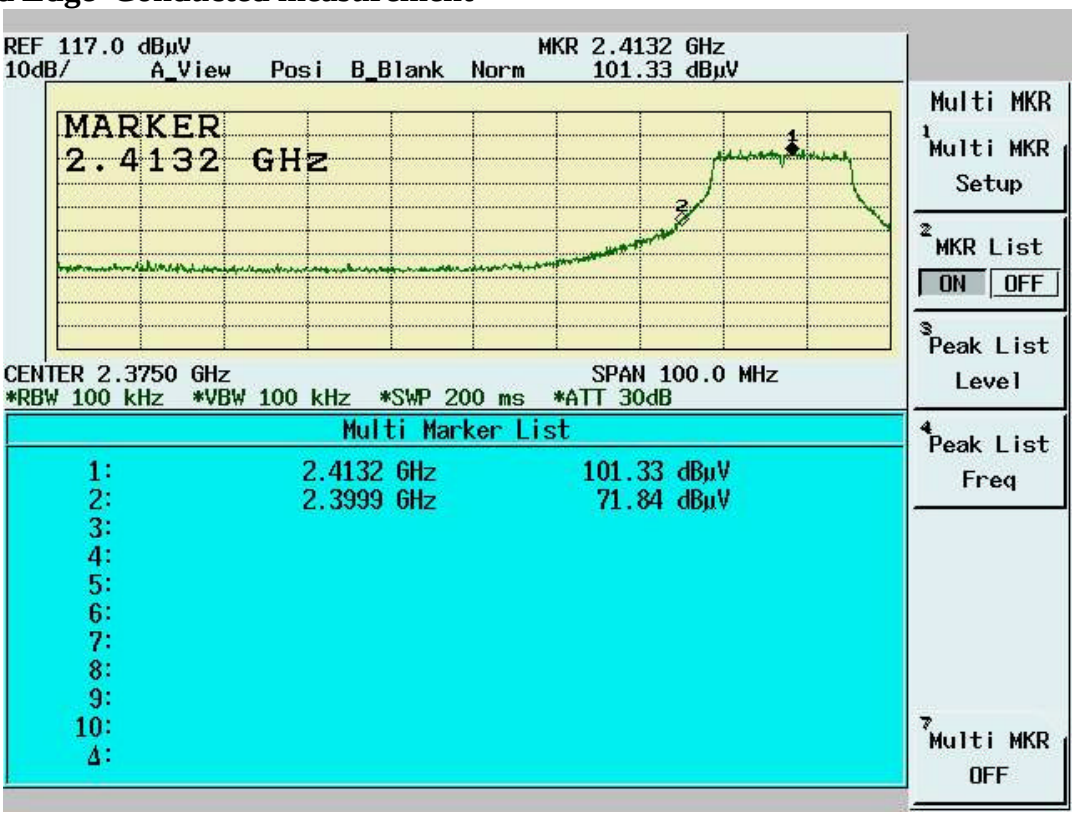
Temp. (deg. C): 25

Test Engr: Mailes Hsieh Humidity (%): 50

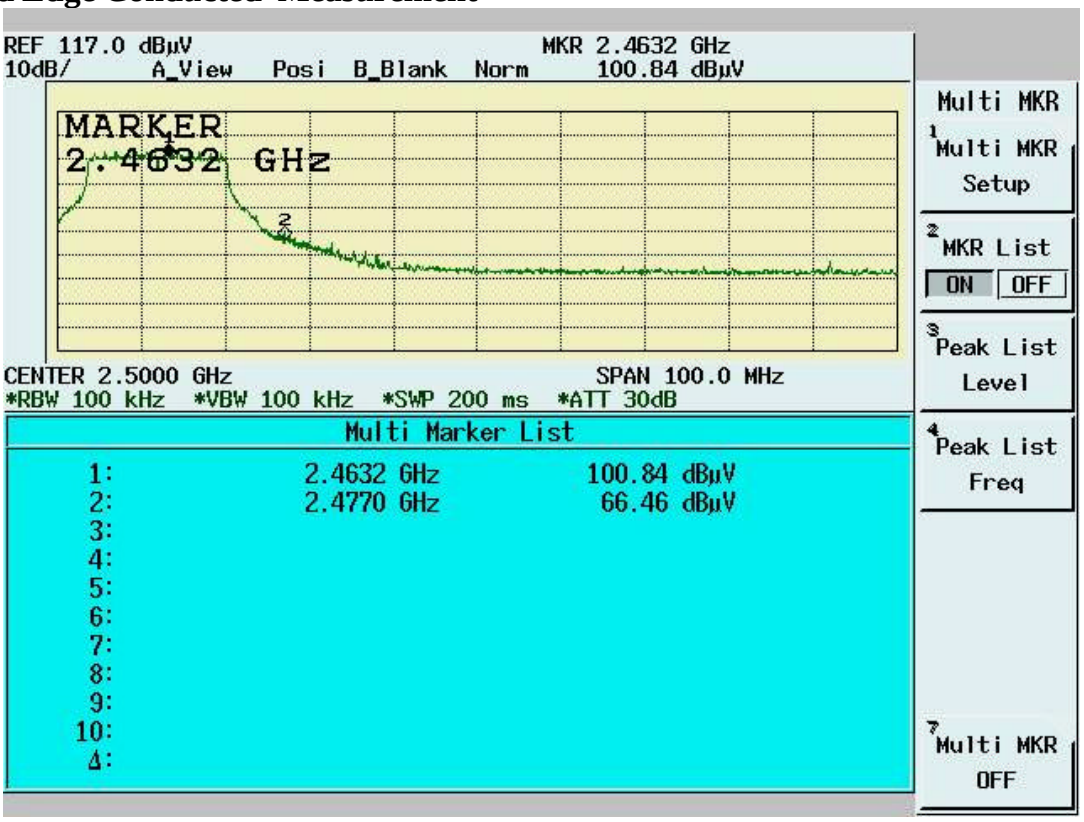
Channel	Frequency (MHz)	Spectrum Reading (dBuV)	Carrier - Outsideband Limit: >20dB (dB)	Pass/Fail
1	2413.2	101.33	---	---
Outside band	1399.9	71.84	29.49	Pass
11	2463.2	100.84	---	---
Outside band	2477	66.46	34.38	Pass

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)

Temp. (deg. C): 25

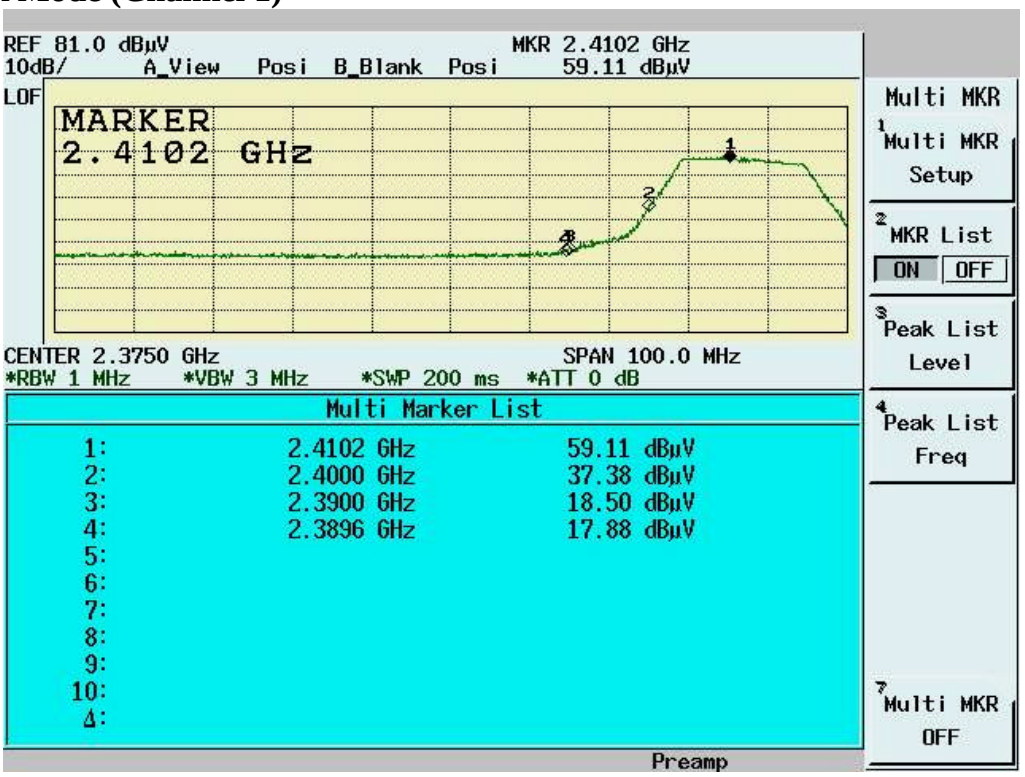
Test Engr: Mailes Hsieh Humidity (%): 50

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)	2409.6	46.18	35.48	81.66	---	---	10Hz	---
Channel_1 (peak mode)	2410.2	59.11	35.48	94.59	---	---	3MHz	---
Outside band (peak mode)	2400	37.38	35.48	72.86	21.73	---	3MHz	Pass
Channel_11 (average mode)	2463.5	44.16	35.5	79.66	---	---	10Hz	---
Channel_11 (peak mode)	2465.7	56.79	35.5	92.29	---	---	3MHz	---
Outside band (peak mode)	2477.1	26.32	35.51	61.83	30.46	---	3MHz	Pass
Channel_1 Restricted band (peak mode)	2389.6	17.88	35.47	53.35	---	74	3MHz	Pass
Restricted band (average mode)	2390	6.76	35.47	42.23	---	54	10Hz	Pass
Channel_11 Restricted band (peak mode)	2484.4	21.46	35.51	56.97	---	74	3MHz	Pass
Restricted band (average mode)	2483.5	7.95	35.51	43.46	---	54	10Hz	Pass

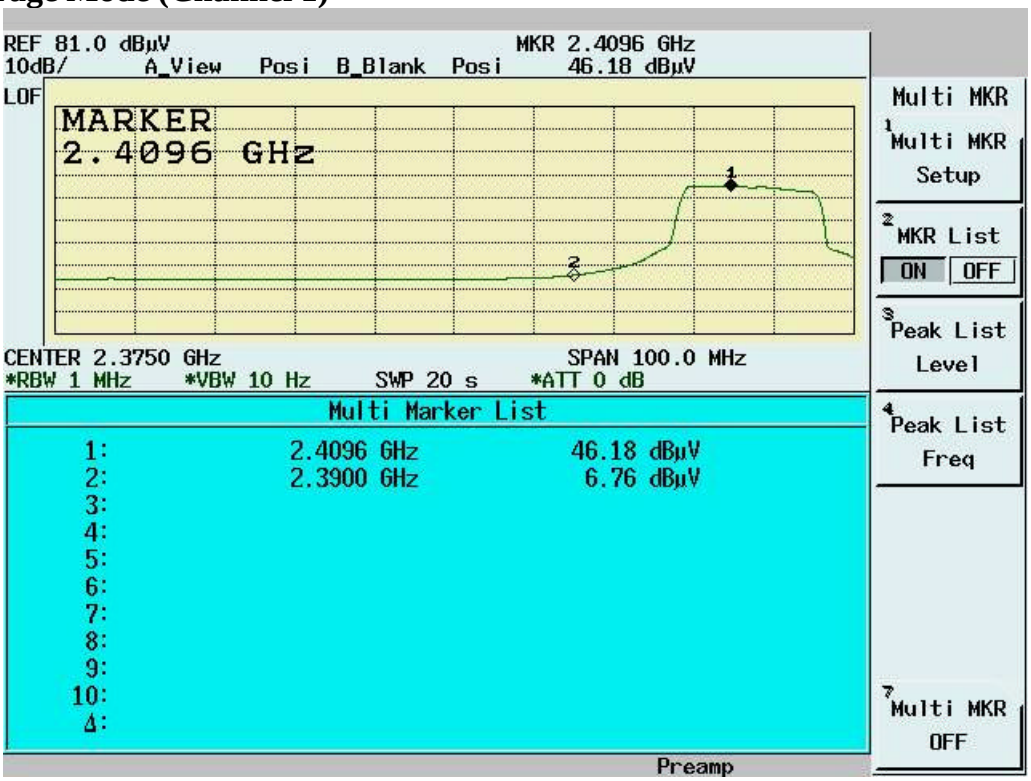
Note:

- ✍✍ 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.

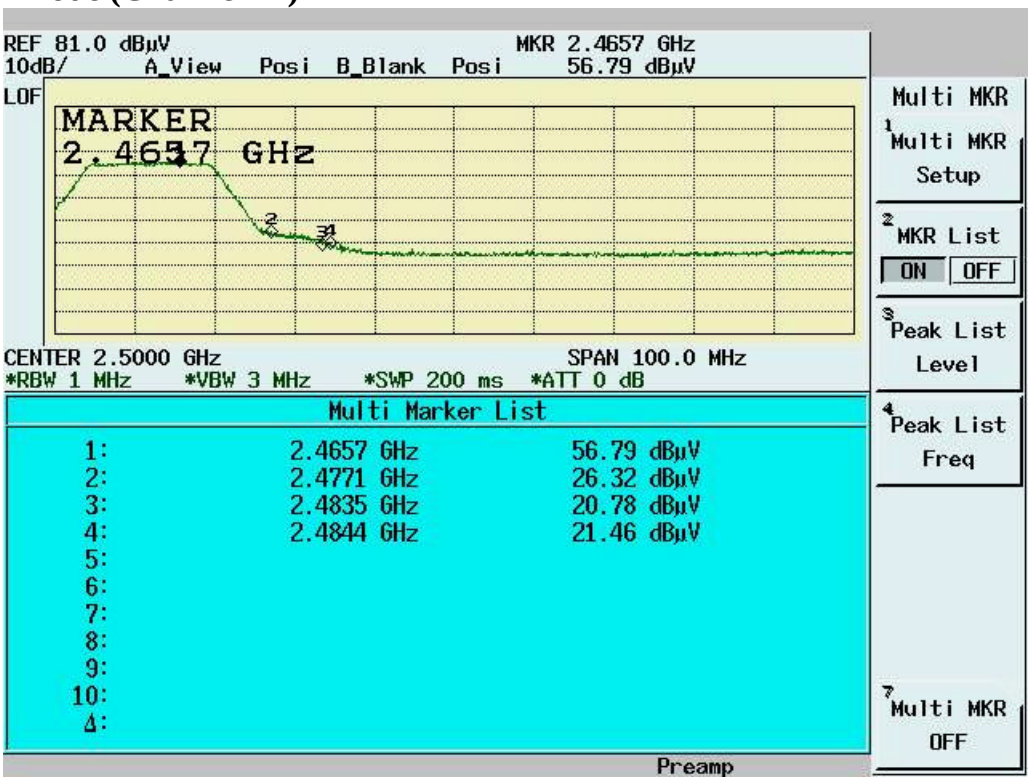
Band Edge measurement for radiated emission in Restricted Band(Radiated) Peak Mode (Channel 1)



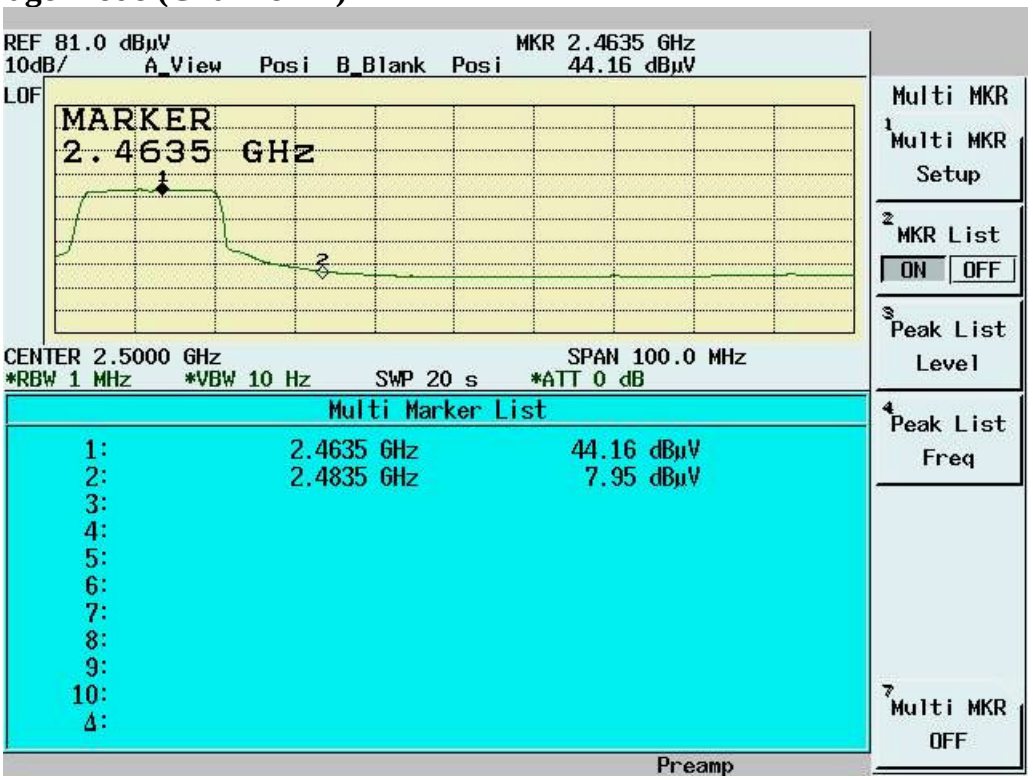
Band Edge measurement for radiated emission in Restricted Band(Radiated) Average Mode (Channel 1)



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



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



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

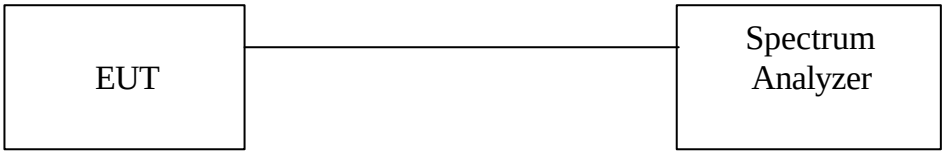
See MPE report

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

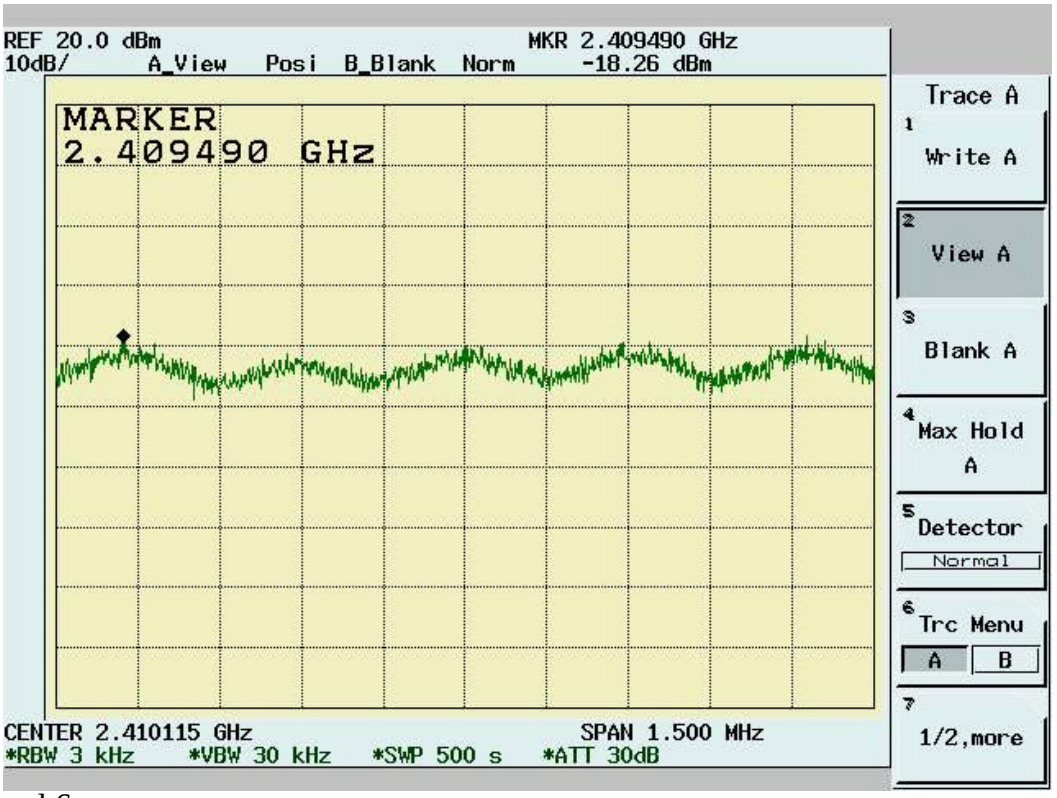
Temp. (deg. C): 25

Test Engr: Mailes Hsieh Humidity (%): 50

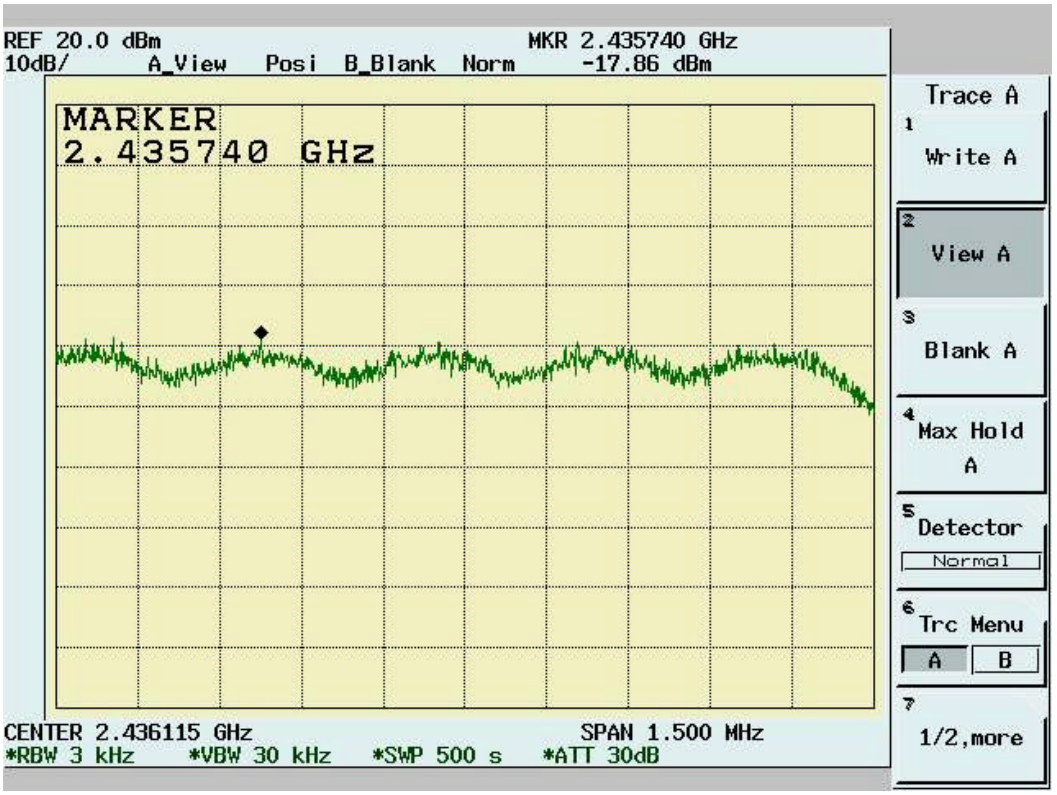
Chennel	Frequency (MHz)	Spectrum Reading (dBm/3KHz)	Cable Loss (dB)	Peak Power Output (dBm/3KHz)	Limit (dBm/3KHz)	Pass/Fail
1	2412	-18.26	1.1	-17.16	8	Pass
6	2437	-17.86	1.1	-16.76	8	Pass
11	2462	-19.12	1.1	-18.02	8	Pass

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 2.462930 GHz
-19.12 dBm
MARKER
2.462930 GHz
Trace A
1 Write A
2 View A
3 Blank A
4 Max Hold A
5 Detector
Normal
6 Trc Menu
A B
7 1/2,more
CENTER 2.462615 GHz
SPAN 1.500 MHz
*RBW 3 kHz *VBW 30 kHz *SWP 500 s *ATT 30dB

6. Appendix

6.1 Appendix A: Measurement Procedure for Power line Conducted Emissions

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

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

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

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

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

6.2 Appendix B: Test Procedure for Radiated Emissions

Preliminary Measurements in the Anechoic Chamber

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

Measurements on the Open Site or 10m EMC Chamber

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

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

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

6.3 Appendix C: Test Equipment

6.3.1 Test Equipment List

Location	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Conduction	Coaxial Cable 1F-C2	Harbourindustries	RG400	1F-C2	06/02/2004	06/02/2005
Conduction	Digital Hygro-Thermometer Conduct	MicroLife	HT-2126G	ISL-Conduction 02	12/04/2004	12/04/2005
Conduction	EMI Receiver 02	HP	85460A	3448A00183	10/01/2004	10/01/2005
Conduction	LISN 01	R&S	ESH2-Z5	890485/013	04/29/2004	04/29/2005
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	12/04/2004	12/04/2005
Radiation	EMI Receiver 03	HP	85460A	3448A00209	01/08/2005	01/08/2006
Radiation	Spectrum Analyzer 13	Advantest	R3132	121200411	02/12/2004	02/12/2005
Rad. Above 1Ghz	Horn Antenna 02	Com-Power	AH-118	10088	02/17/2004	02/17/2005
Rad. Above 1Ghz	Horn Antenna 04	Com-Power	AH-826	081-001	09/22/2004	09/22/2005
Rad. Above 1Ghz	Horn Antenna 05	Com-Power	AH-640	100A	01/07/2004	01/07/2005
Rad. Above 1Ghz	Microwave Cable RF SK-01	HUBER+SUHNER AG.	Sucoflex 102	22139 /2	02/17/2004	02/17/2005
Rad. Above 1Ghz	Peak Power Analyzer	HP	8990A	3621A01269	01/02/2005	01/02/2006
Rad. Above 1Ghz	Power Sensor Radar	HP	84815A	3318A01828	01/02/2004	01/02/2006
Rad. Above 1Ghz	Preamplifier 02	MITEQ	AFS44-00102650-40-10P-44	728229	05/12/2004	05/12/2005
Rad. Above 1Ghz	Preamplifier 09	MITEQ	AFS44-00102650-40-10P-44	858687	05/12/2004	05/12/2005
Rad. Above 1Ghz	Preamplifier 10	MITEQ	JS-26004000-27-5A	818471	02/28/2004	02/28/2005
Rad. Above 1Ghz	High Pass Filter 01	HEWLETT-PACKARD	84300-80038	001	N/A	N/A
Rad. Above 1Ghz	High Pass Filter 02	HEWLETT-PACKARD	84300-80039	005	N/A	N/A
Rad. Above 1Ghz	Spectrum Analyzer 07	Advantest	R3182	110600649	04/08/2004	04/08/2005

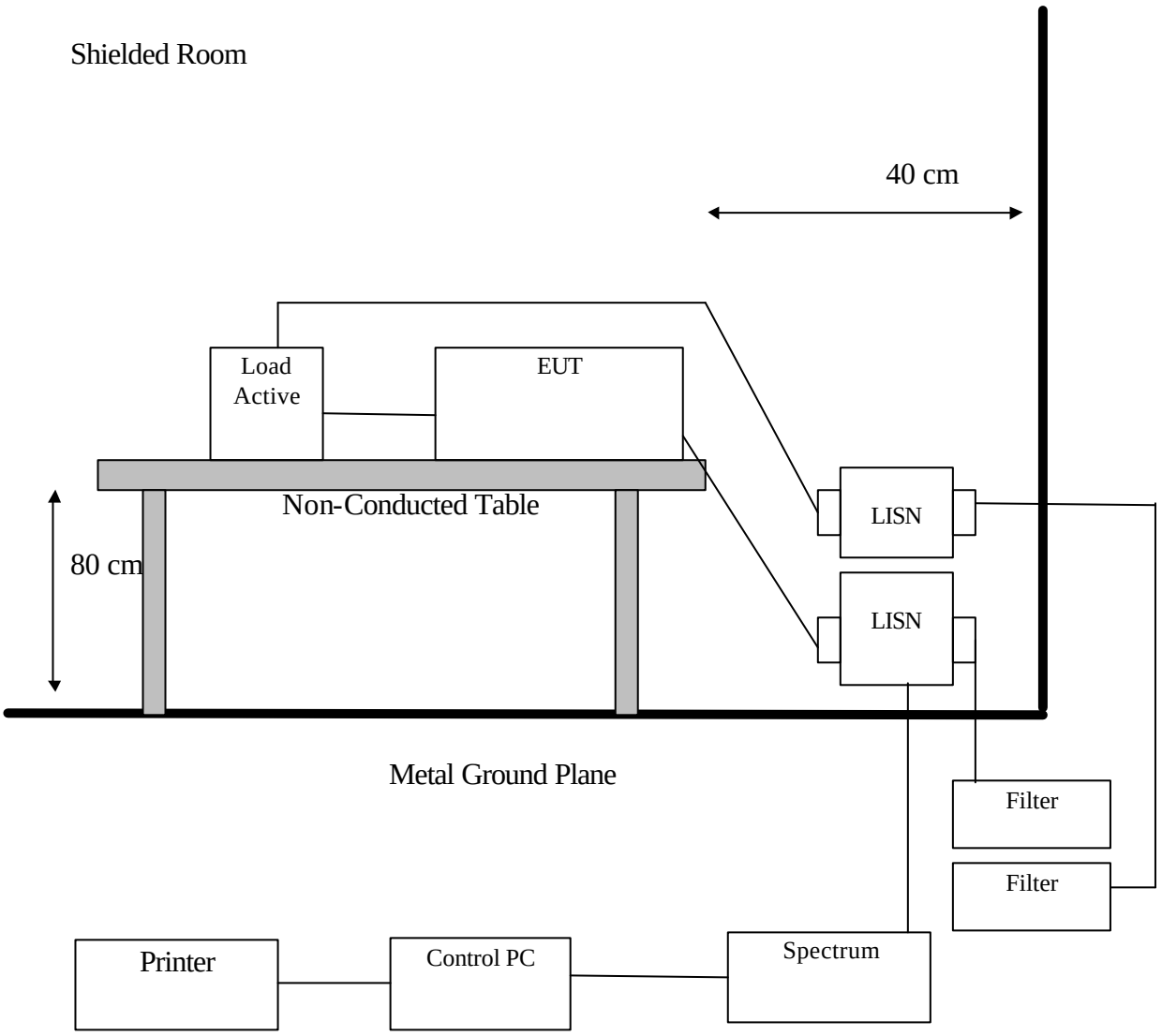
Note: Calibration is traceable to NIST or national or international standards.

6.3.2 Software for Controlling Spectrum/Receiver and Calculating Test Data

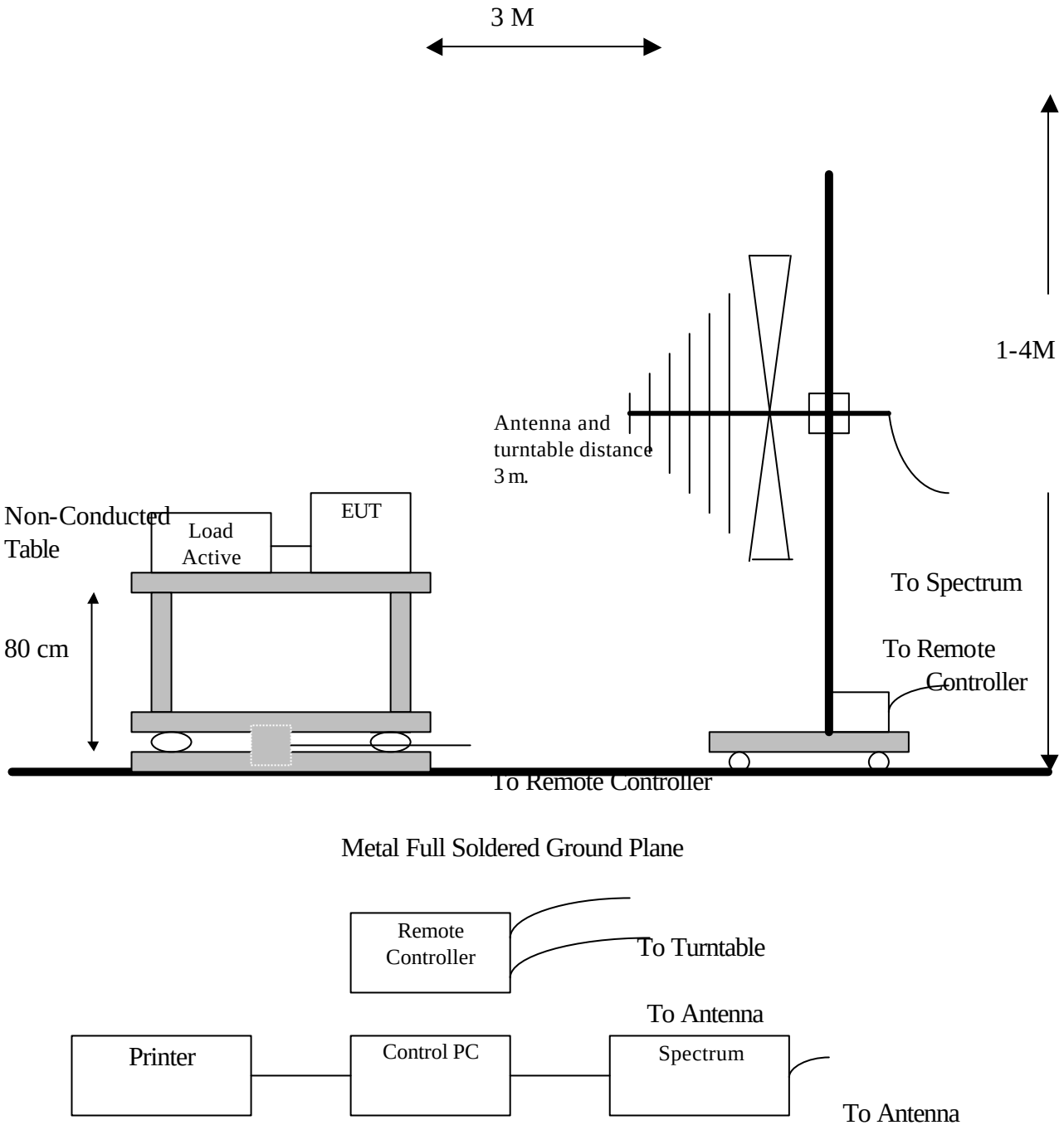
Radiation/Conduction	Filename	Version	Issued Date
Conduction	Tile.exe	1.12E	7/7/2000
Radiation	Tile.exe	1.12C	6/16/2000

6.4 Appendix D: Layout of EUT and Support Equipment

6.4.1 General Conducted Test Configuration



6.4.2 General Radiation Test Configuration



6.5 Appendix E: Description of Support Equipment

6.5.1 Description of Support Equipment

Support Unit 1.

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 2.

Description:	Philips Monitor
Model:	109P40
Serial Number:	BZ000421172019
Power Cord:	Non-shielded, Detachable
FCC ID:	A3KM092

6.5.2 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. Send H pattern to the video port device (Monitor).
C. The RF software makes the transmitter continuously sending RF signals
D. Repeat the above steps.

	Filename	Issued Date
CRTU2 Rev2.2.9.3000	CRTU-II.exe	2003/12/10
Monitor	HH.bat	8/20/1991

6.5.3 I/O Cable Condition of EUT and Support Units

Description	Path	Cable Length	Cable Type	Connector Type
AC Power Cord	110V (~240V) to AC Power Cord Inlet (3-pin)	1.8M	Nonshielded, Detachable	Plastic Head
Monitor Data Cable	Monitor to PC VGA Port	1.6M	Shielded, Detachable	Metal Head
Mouse Data Cable	Mouse to PC Mouse port	1.8M	Shielded, Un-detachable	Metal Head

6.6 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)

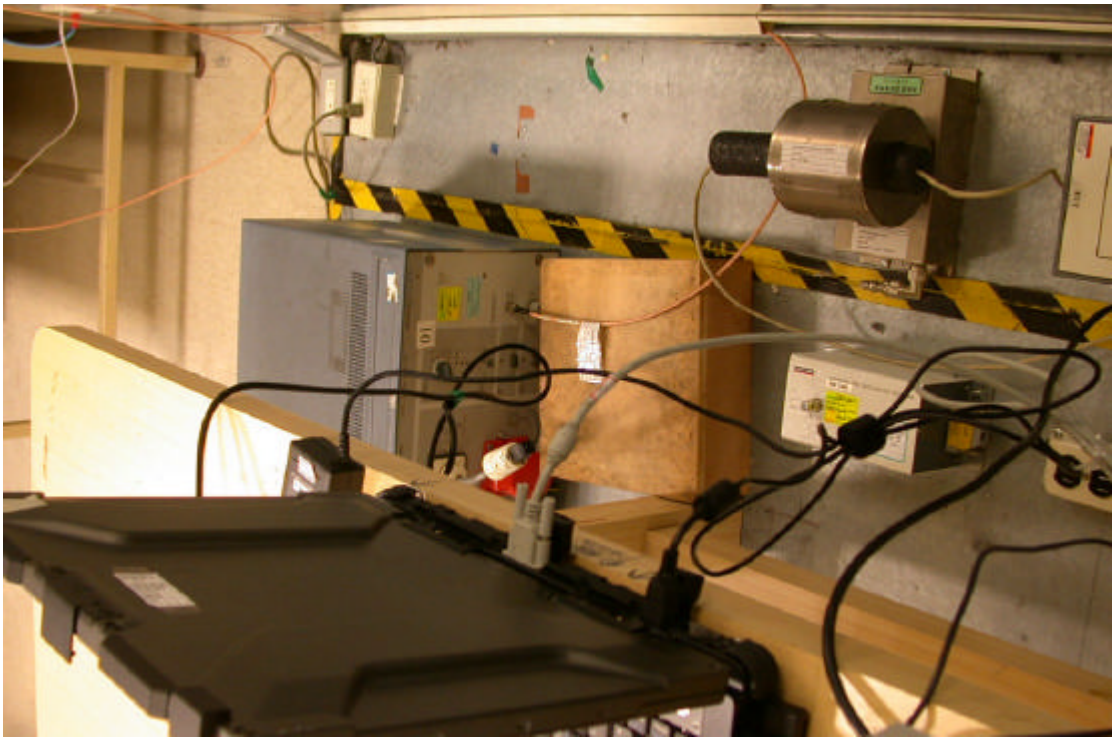
U = 2 * Uc (y)

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

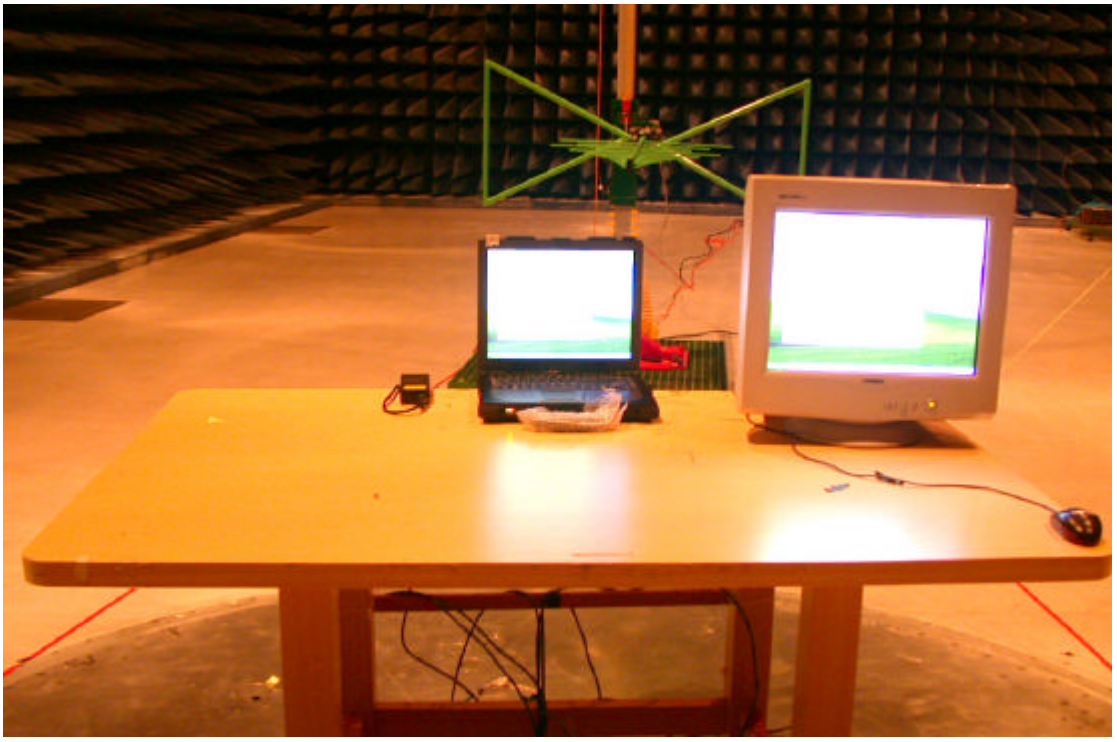
6.7 Appendix G: Photographs of EUT Configuration Test Set Up

The Front View of Highest Conducted Set-up For EUT

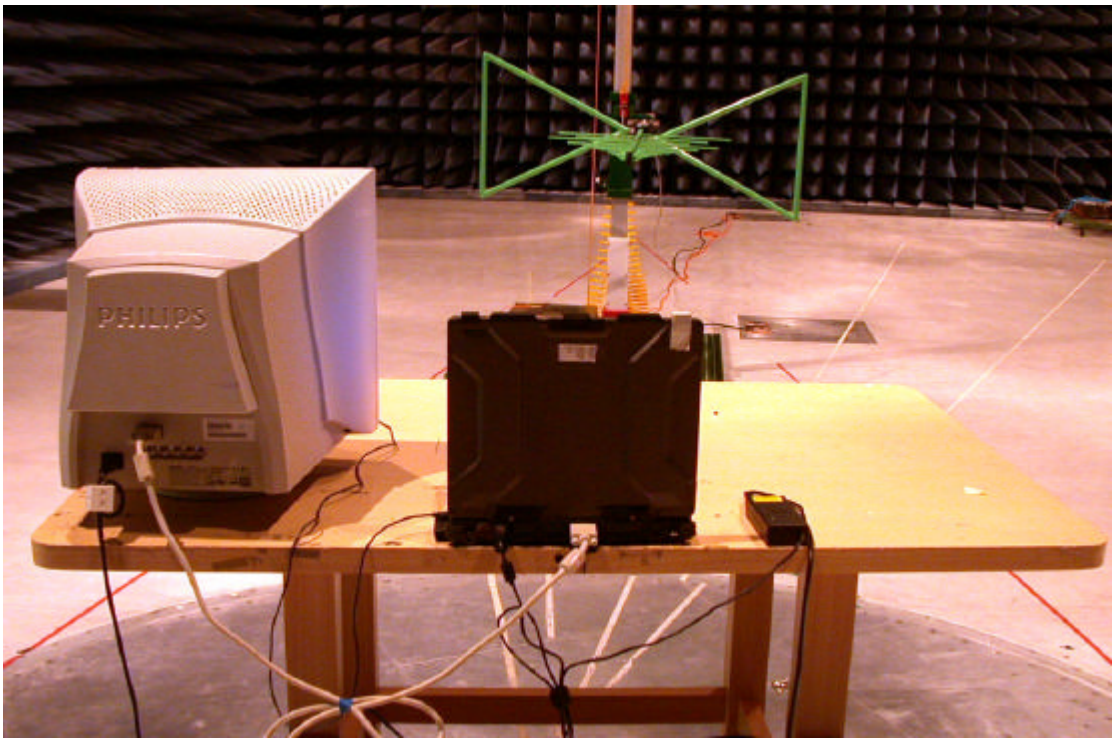
The Back View of Highest Conducted Set-up For EUT



The Front View of Highest Radiated Set-up For EUT



The Back View of Highest Radiated Set-up For EUT



6.8 Appendix H: Antenna Spec.

Please refer to the attached file.