

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:

Please refer to Elliott Laboratories, Inc. Report Number: R60260
FCC ID: PPD-AR5BXB6

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)

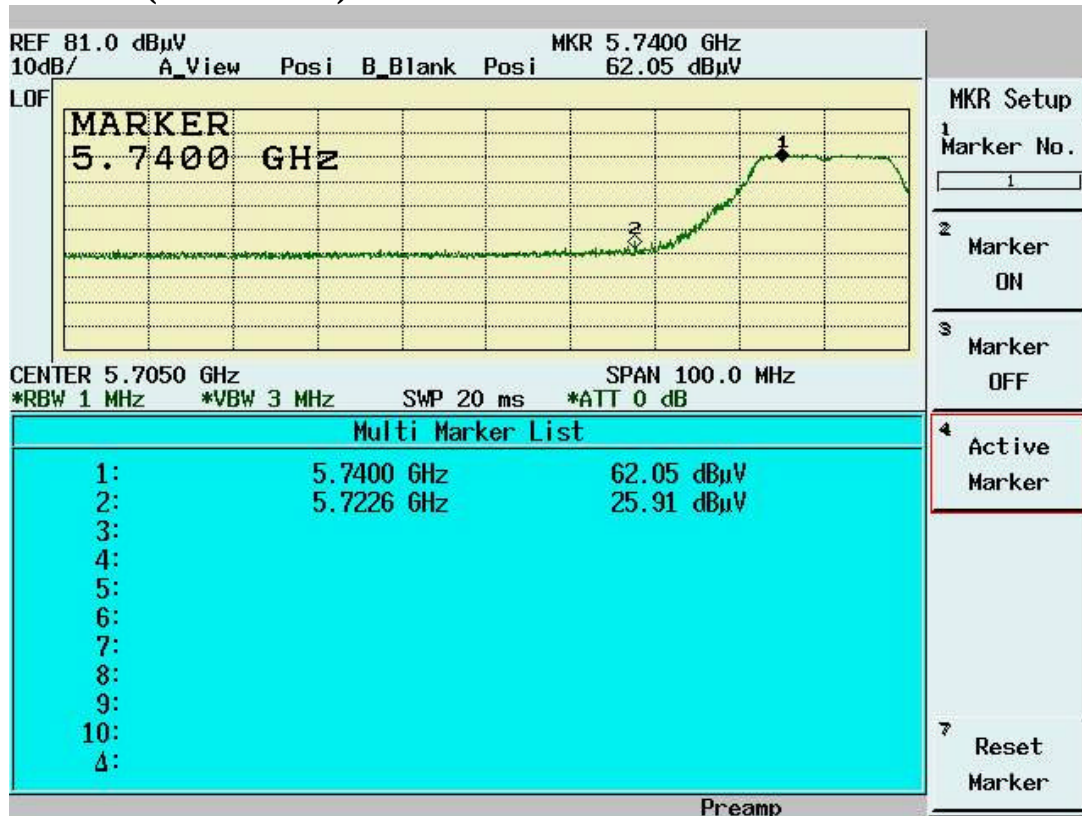
802.11a

Test Engr: Jerry Chiou

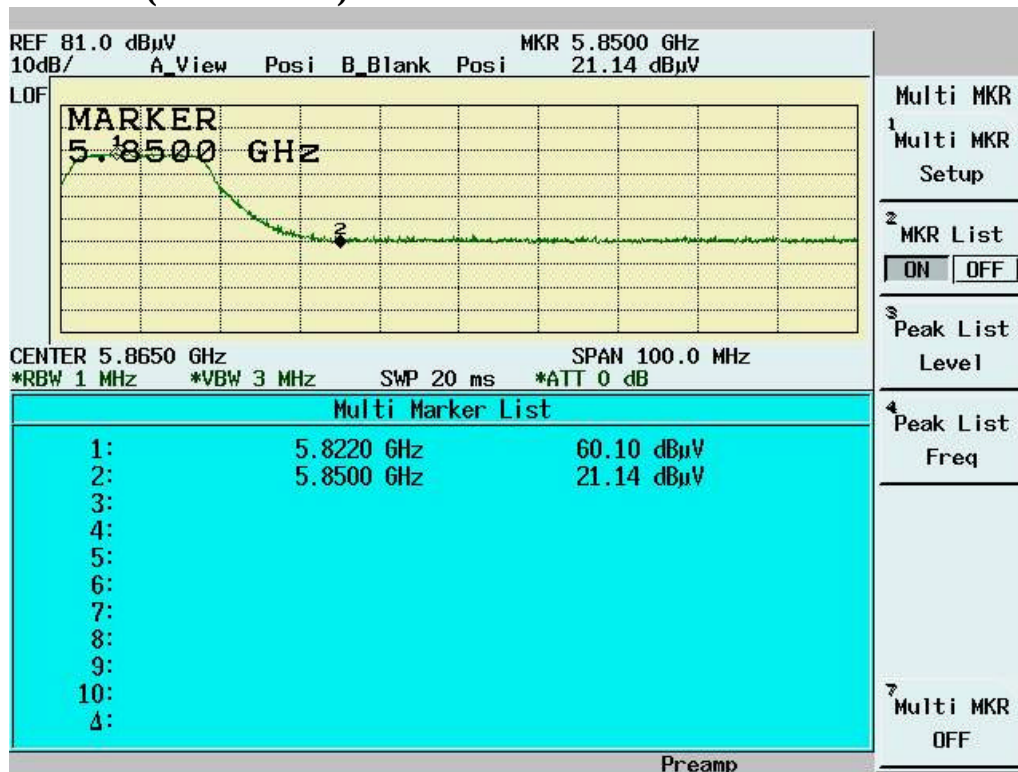
Temp. (deg. C): 25
Humidity (%): 50

Description	Frequency (MHz)	Spectrum Reading (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	dBc (Limit: > 30dBc)	Limit (dBuV/m)	Equip. Setup VBW	Pass or Fail
Channel_149 (peak mode)	5740	62.05	39.41	101.46	---	---	3MHz	---
Outside band (peak mode)	5722.6	25.91	39.41	65.32	36.14	---	3MHz	Pass
Channel_165 (peak mode)	5822	60.1	39.42	99.52	---	---	3MHz	---
Outside band (peak mode)	5850	21.14	39.45	60.59	38.93	---	3MHz	Pass
Turbo Channel_152 (peak mode)	5750.2	59.48	39.41	98.89	---	---	3MHz	---
Outside band (peak mode)	5725	26.69	39.41	66.1	32.79	---	3MHz	Pass
Turbo Channel_161 (peak mode)	5798.3	60.55	39.42	99.97	---	---	3MHz	---
Outside band (peak mode)	5850	22.4	39.45	61.85	38.12	---	3MHz	Pass

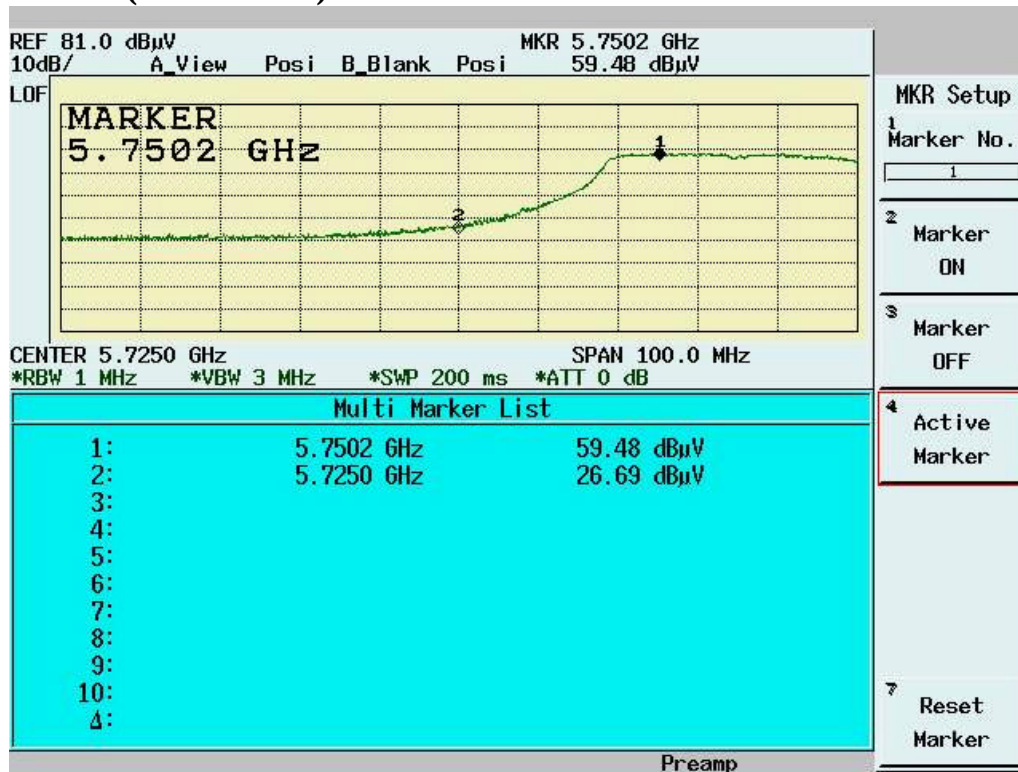
Normal Mode (Channel 149) Peak data



Normal Mode (Channel 165) Peak data



Turbo Mode (Channel 152) Peak data



Turbo Mode (Channel 161) Peak data

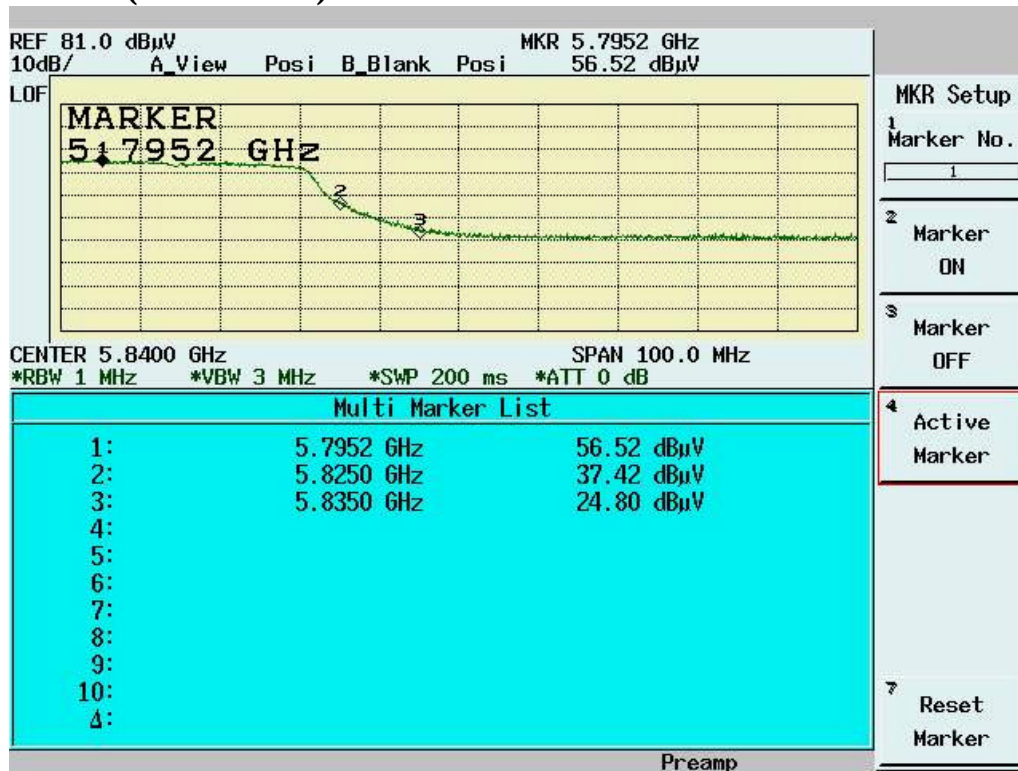


Table Band Edge measurement (Radiated)

Temp. (? C): 25

Test Engr: Jerry Chiou

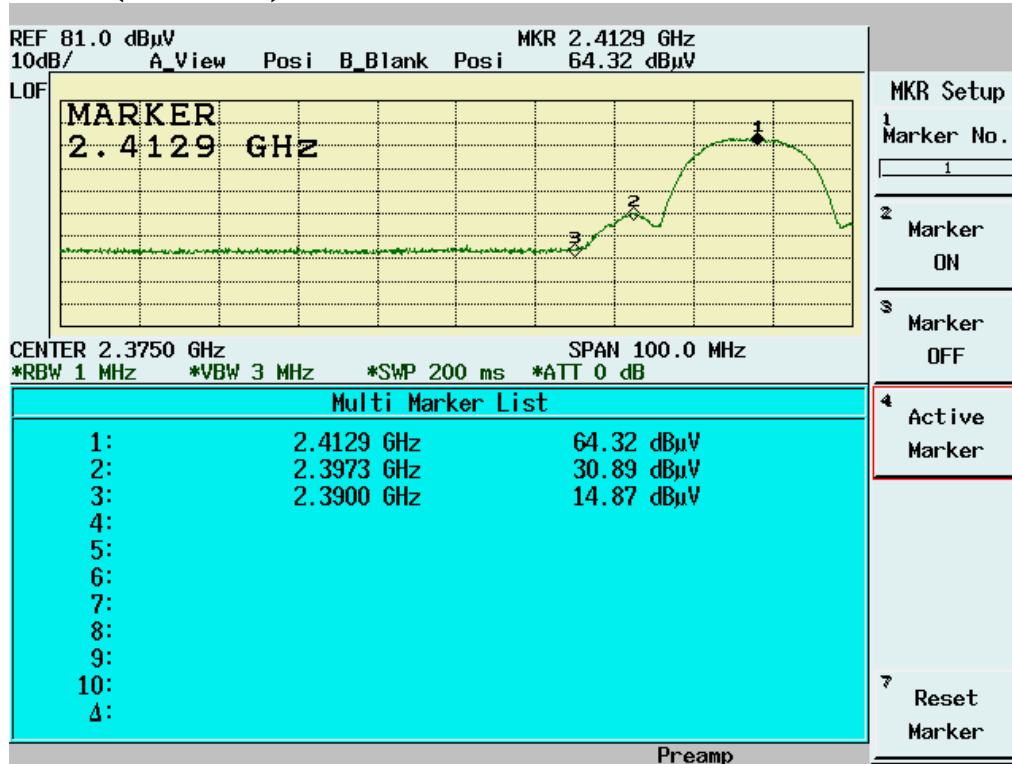
Humidity (%): 50

Description	Frequency (MHz)	Spectrum Reading (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	dBc (Limit: > 30dBc)	dBc (Limit: > 20dBc)	Limit (dBuV/m)	Equip. Setup VBW	Pass or Fail
Channel_1 (average mode)	2413.7	59.72	35.48	95.2	---	---	---	10Hz	---
Channel_1 (peak mode)	2412.9	64.32	35.48	99.8	---	---	---	3MHz	---
Outside band (average mode)	2397.1	26.5	35.48	61.98	33.22	---	---	10Hz	Pass
Outside band (peak mode)	2397.3	30.89	35.48	66.37	---	33.43	---	3MHz	Pass
Channel_11 (average mode)	2460.3	62.27	35.5	97.77	---	---	---	10Hz	---
Channel_11 (peak mode)	2459.8	67.34	35.5	102.84	---	---	---	3MHz	---
Outside band (peak mode)	2487.2	8.31	35.51	43.82	53.95	---	---	10Hz	Pass
Outside band (peak mode)	2487.3	20.02	35.51	55.53	---	47.31	---	3MHz	Pass
Channel_1 Restricted band (peak mode)	2390	14.87	35.47	50.34	---	---	74	3MHz	Pass
Restricted band (average mode)	2390	5.91	35.47	41.38	---	---	54	10Hz	Pass
Channel_11 Restricted band (peak mode)	2487.3	20.02	35.51	55.53	---	---	74	3MHz	Pass
Restricted band (average mode)	2487.2	8.31	35.51	43.82	---	---	54	10Hz	Pass

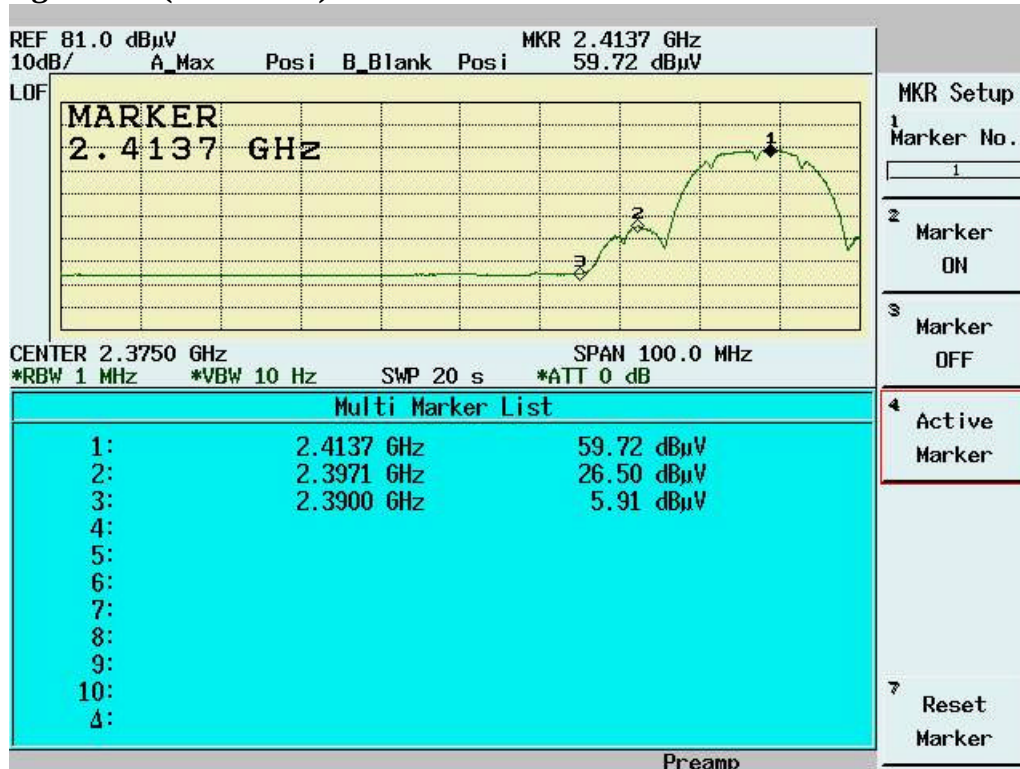
Note:

- 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.

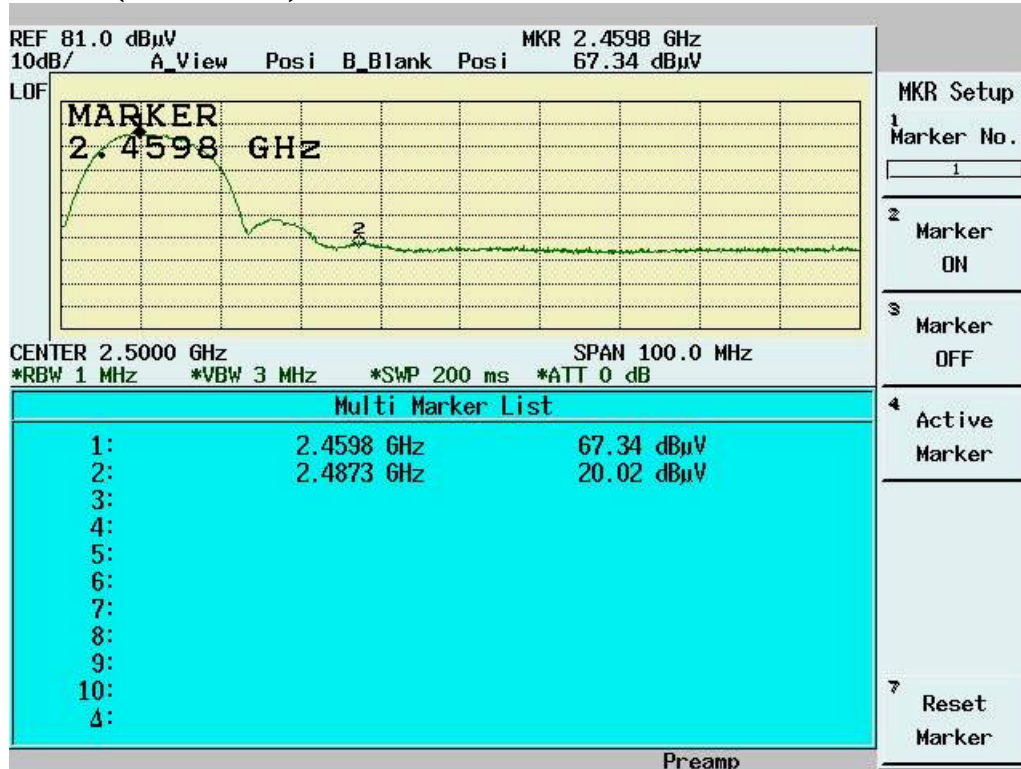
Band Edge measurement for radiated emission in Restricted Band(Radiated) Peak Mode (Channel 1)



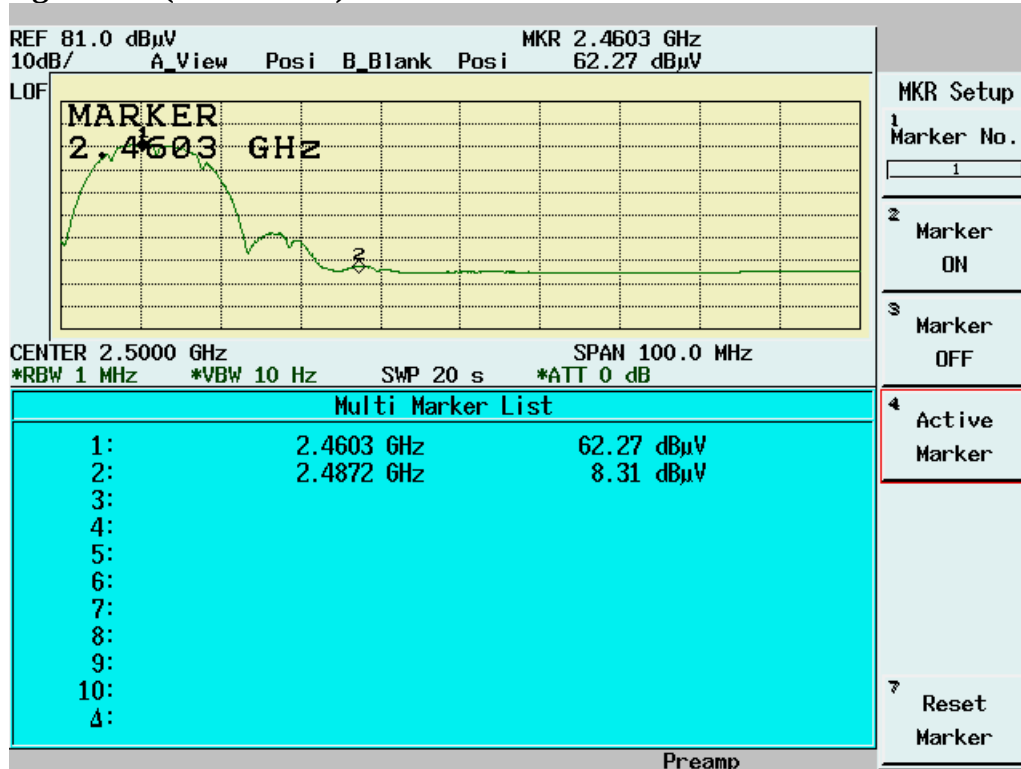
Band Edge measurement for radiated emission in Restricted Band(Radiated) Average Mode (Channel 1)



**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 SAR report

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

5.7.1 Test Procedure

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

5.7.2 Test Setup



5.7.3 Test Data

Please refer to Elliott Laboratories, Inc. Report Number: R60260

FCC ID: PPD-AR5BXB6

6. TEST RESULTS (802.11g)

6.1 Powerline Conducted Emissions [Section 15.207]

6.1.1 EUT Configuration

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

Power to the EUT was provided through the LISN. The impedance vs. frequency characteristic of the LISN is complied with the limit used.

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

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

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

6.1.2 Test Procedure

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

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

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

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

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

6.1.4 Test Data:

Please refer to Elliott Laboratories, Inc. Report Number: R60260
FCC ID: PPD-AR5BXB6

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

6.2.1 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

6.2.2 Test Setup



6.2.3 Test Data:

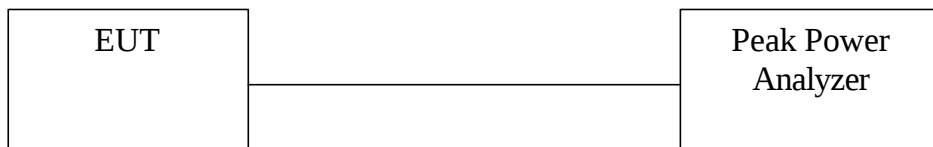
Please refer to Elliott Laboratories, Inc. Report Number: R60260
FCC ID: PPD-AR5BXB6

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

6.3.1 Test Procedure

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

6.3.2 Test Setup



6.3.3 Test Data

Maximum Peak Output Power

Temp. (deg. C): 25

Test Engr: Jerry Chiou Humidity (%): 50

Channel	Frequency (Mhz)	Analyzer Reading (dBm)	Cable Loss (dB)	Peak Power Output (mW)	Peak Power Output (dBm)	Limit (dBm)	Pass/Fail
1	2412	21.2	1.1	169.82	22.3	30	Pass
6	2437	21.1	1.1	165.96	22.2	30	Pass
11	2462	21.9	1.1	199.53	23	30	Pass
Turbo	2437	21.5	1.1	181.97	22.6	30	Pass

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

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

6.4.1 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.

6.4.2 Test Procedure

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

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

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

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

6.4.3 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

6.4.4 Test Data (30MHz – 1GHz):

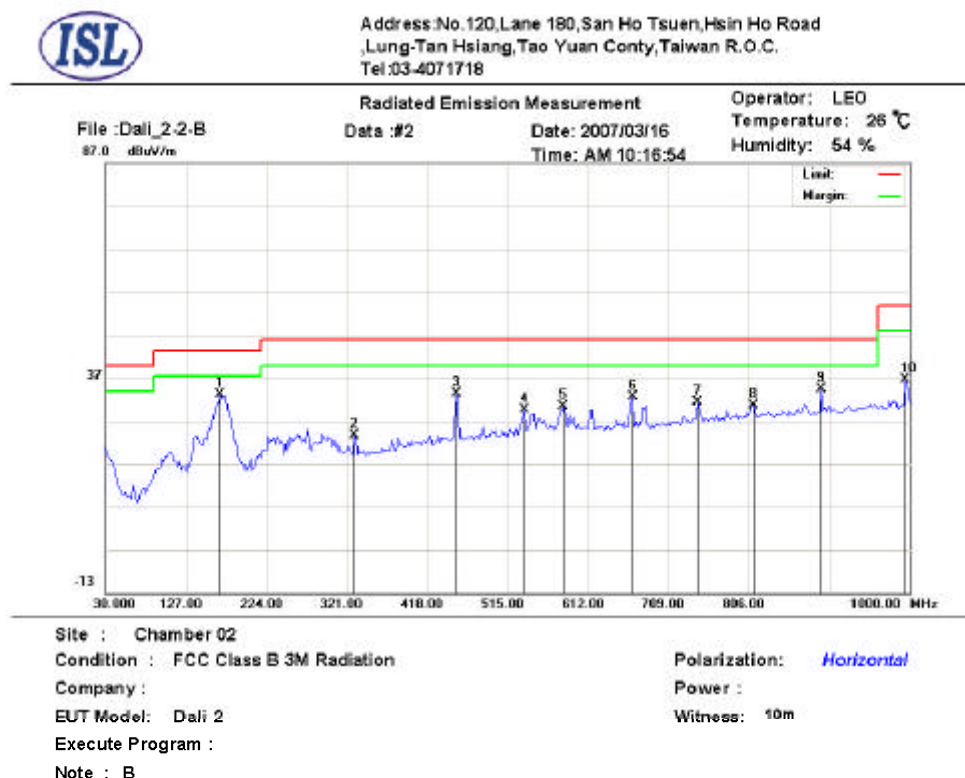
30M – 1GHz Open Field Radiated Emissions (Horizontal) Channel 1, 6, 11



Mk.	Frequency (MHz)	RX_R (dBuV/m)	Ant_F (dB)	Cab_L (dB)	PreAmp (dB)	Emission (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant.Pos (cm)	Tab.Pos (deg.)	Detector
	30.0000	1.83	18.8	0.84	0	21.47	40.00	-18.53			peak
*	167.7400	23.00	9.64	2.08	0	34.72	43.50	-8.78			peak
	452.9200	13.69	16.74	3.87	0	34.30	46.00	-11.70			peak
	582.9000	7.22	18.8	4.55	0	30.57	46.00	-15.43			peak
	615.8800	6.40	18.8	4.69	0	29.89	46.00	-16.11			peak
	664.3800	6.03	18.97	4.91	0	29.91	46.00	-16.09			peak
	681.8400	5.88	18.94	5	0	29.82	46.00	-16.18			peak
	743.9200	4.28	19.69	5.32	0	29.29	46.00	-16.71			peak
	871.9600	6.13	20.39	5.91	0	32.43	46.00	-13.57			peak
	994.1800	10.36	21.25	6.45	0	38.06	54.00	-15.94			peak

*:Maximum data x:Over limit !:over margin

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



Mk.	Frequency (MHz)	RX_R (dBuV/m)	Ant_F (dB)	Cab_L (dB)	PreAmp (dB)	Emission (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant.Pos (cm)	Tab.Pos (deg.)	Detector
*	167.7400	21.37	9.64	2.08	0	33.09	43.50	-10.41			peak
	330.7000	6.38	13.94	3.21	0	23.53	46.00	-22.47			peak
	452.9200	12.66	16.74	3.87	0	33.27	46.00	-12.73			peak
	534.4000	6.80	18.5	4.26	0	29.56	46.00	-16.44			peak
	580.9600	6.98	18.81	4.54	0	30.33	46.00	-15.67			peak
	666.3200	8.68	18.97	4.92	0	32.57	46.00	-13.43			peak
	743.9200	6.27	19.69	5.32	0	31.28	46.00	-14.72			peak
	811.8200	4.96	19.99	5.68	0	30.63	46.00	-15.37			peak
	893.3000	8.05	20.47	5.95	0	34.47	46.00	-11.53			peak
	994.1800	8.90	21.25	6.45	0	36.60	54.00	-17.40			peak

*:Maximum data x:Over limit !:over margin

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

International Standards Laboratory

Report Number: ISL-07LR013FC

HC LAB: NVLAP:200234-0; VCCI: R-341, C-354; NEMKO: ELA 113A; BSMI: SL2-IN-E-0037; SL2-R1-E-0037; CNLA: 1178; IC: IC4067

LT LAB: NVLAP:200234-0; VCCI: R-1435, C-1440; NEMKO: ELA 113B; CNLA: 0997; IC: IC4164-1

6.4.5 Test Data (1GHz – 25 GHz) .

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

Operator: Jerry Chiou

RBW: 1MHz
Humidity (%): 56
Temperature (C): 24

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
1596.9	55.91pk	27.61	2.3	23.75	62.07pk	74.00pk	-11.93	101	71
1597.11	27.69av	27.61	2.3	23.75	33.85av	54.00av	-20.15	101	71
1661.84	43.8	28.16	2.35	23.75	50.56	54	-3.44	101	66
2366.13	44.59	30.93	1.48	24.54	52.46	54	-1.54	101	158

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

Operator: Jerry Chiou

RBW: 1MHz
Humidity (%): 56
Temperature (C): 24

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
1591.91	55.48pk	27.57	2.3	23.75	61.60pk	74.00pk	-12.4	101	71
1597	31.52av	27.57	2.3	23.75	37.64av	54.00av	-16.36	101	71
1614.39	44.52pk	27.76	2.31	23.75	50.85pk	54.00av	-3.15	101	70
1664.34	49.70pk	28.18	2.35	23.75	56.49pk	74.00pk	-17.51	101	66
1664.34	30.63av	28.18	2.35	23.75	37.42av	54.00av	-16.58	101	66

Note:

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

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

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

Operator: Jerry Chiou

RBW: 1MHz
Humidity (%): 56
Temperature (C): 24

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
1596.9	53.05pk	27.61	2.3	23.75	59.22pk	74.00pk	-14.78	101	71
1596.54	31.47av	27.61	2.3	23.75	37.64av	54.00av	-16.36	101	71
1621.88	38.34pk	27.82	2.32	23.75	44.73pk	54.00av	-9.27	101	69
1661.84	43.55pk	28.16	2.35	23.75	50.31pk	54.00av	-3.69	101	66
2008.99	34.98pk	31	2.57	23.77	44.79pk	54.00av	-9.21	100	46

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

Operator: Jerry Chiou

RBW: 1MHz
Humidity (%): 56
Temperature (C): 24

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
1596.9	56.09pk	27.61	2.3	23.75	62.26pk	74.00pk	-11.74	101	71
1598.34	34.27av	27.61	2.3	23.75	40.44av	54.00av	-13.56	101	71
1636.86	41.73pk	27.95	2.33	23.75	48.27pk	54.00av	-5.73	101	68
1659.34	51.10pk	28.14	2.35	23.75	57.84pk	74.00pk	-16.16	101	67
1662.02	33.51av	28.14	2.35	23.75	40.25av	54.00av	-13.75	101	67

Note:

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

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

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

Operator: Jerry Chiou

RBW: 1MHz
Humidity (%): 56
Temperature (C): 24

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
1594.41	52.79pk	27.59	2.3	23.75	58.93pk	74.00pk	-15.07	101	71
1592.78	29.92av	27.59	2.3	23.75	31.13av	54.00av	-22.87	101	71
1661.84	46.18pk	28.16	2.35	23.75	52.94pk	54.00av	-1.06	101	66
2004	35.05pk	31	2.59	23.76	44.88pk	54.00av	-9.12	100	44

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

Operator: Jerry Chiou

RBW: 1MHz
Humidity (%): 56
Temperature (C): 24

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
1599.4	57.21pk	27.63	2.3	23.75	63.40pk	74.00pk	-10.6	101	71
1598.03	34.09av	27.63	2.3	23.75	40.28av	54.00av	-13.72	101	71
1626.87	44.80pk	27.87	2.32	23.75	51.24pk	54.00av	-2.76	101	69
1659.34	49.92pk	28.14	2.35	23.75	56.66pk	74.00pk	-17.34	101	67
1656.95	30.83av	28.14	2.35	23.75	37.57av	54.00av	-16.43	101	67

Note:

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

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

1GHz~ 40 GHz (Horizontal), Turbo Mode, 2437 MHZ

Operator: Jerry Chiou
Turbo

RBW: 1MHz
Humidity (%): 56
Temperature (C): 24

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
1596.9	51.21pk	27.61	2.3	23.75	57.38av	74.00pk	-16.62	101	71
1598.2	29.79av	27.61	2.3	23.75	35.96pk	54.00av	-18.04	101	71
1659.34	48.46pk	28.14	2.35	23.75	55.20pk	74.00pk	-18.8	101	67
1663.69	30.81av	28.14	2.35	23.75	38.75av	54.00av	-16.45	101	67
1939.06	35.99pk	30.49	2.55	23.75	45.29pk	54.00av	-8.71	100	47
2011.49	35.61pk	31	2.56	23.77	45.40pk	54.00av	-8.6	100	47

1GHz~ 40 GHz (Vertical), Turbo Mode, 2437 MHZ

Operator: Jerry Chiou
Turbo

RBW: 1MHz
Humidity (%): 56
Temperature (C): 24

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
1546.95	45.33pk	27.19	2.26	23.75	51.04pk	54.00av	-2.96	101	74
1596.9	56.70pk	27.61	2.3	23.75	62.86pk	74.00pk	-11.14	101	71
1593.58	33.43av	27.61	2.3	23.75	39.59av	54.00av	-14.41	101	71
1646.85	46.53pk	28.03	2.34	23.75	53.15pk	54.00av	-0.85	101	67
1664.34	54.34pk	28.18	2.35	23.75	61.12pk	74.00pk	-12.88	101	66
1664.21	35.21av	28.18	2.35	23.75	41.99av	54.00av	-12.01	101	66

Note: “ * ”: Fundamental Frequency

“ pk”: peak reading

“av”: average reading

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 40 GHz have been tested.

6.5 Band Edge Measurement

6.5.1 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

6.5.2 Test Setup (Conducted)



6.5.3 Test Data:

Please refer to Elliott Laboratories, Inc. Report Number: R60260
FCC ID: PPD-AR5BXB6

6.5.4 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.

6.5.5 Test Setup (Radiated)

Same as *Radiated Emission Measurement*

6.5.6 Test Data

Table Band Edge measurement (Radiated)

Temp. (? C): 25

Test Engr: Jerry Chiou

Humidity (%): 50

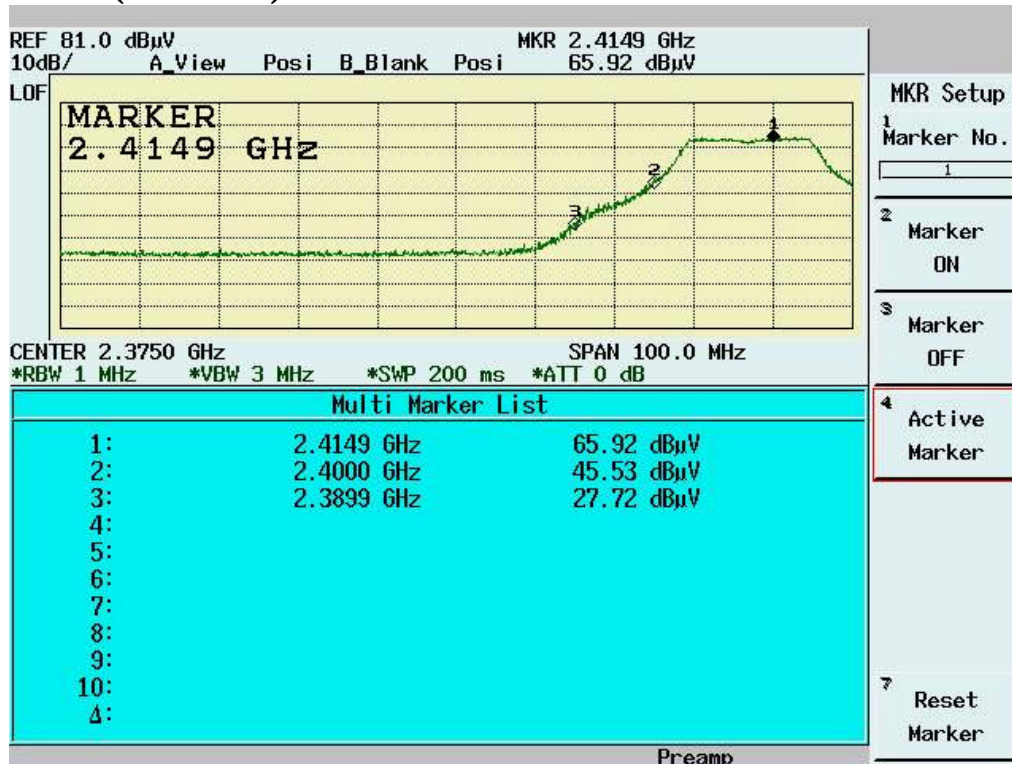
Description	Frequency (MHz)	Spectrum Reading (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	dBc (Limit: > 30dBc)	dBc (Limit: > 20dBc)	Limit (dBuV/m)	Equip. Setup VBW	Pass or Fail
Channel_1 (average mode)	2418.6	54.66	35.48	90.14	---	---	---	10Hz	---
Channel_1 (peak mode)	2414.9	65.92	35.48	101.4	---	---	---	3MHz	---
Outside band (average mode)	2400	24.2	35.48	59.68	30.46	---	---	10Hz	Pass
Outside band (peak mode)	2400	45.53	35.48	81.01	---	20.39	---	3MHz	Pass
Channel_11 (average mode)	2457.3	55.95	35.5	91.45	---	---	---	10Hz	---
Channel_11 (peak mode)	2455.7	67.15	35.5	102.65	---	---	---	3MHz	---
Outside band (average mode)	2483.5	10.33	35.51	45.84	45.61	---	---	10Hz	Pass
Outside band (peak mode)	2483.5	29.41	35.51	64.92	---	37.73	---	3MHz	Pass
Channel_1 Restricted band (peak mode)	2389.9	27.72	35.47	63.19	---	---	74	3MHz	Pass
Restricted band (average mode)	2390	9.27	35.47	44.74	---	---	54	10Hz	Pass
Channel_11 Restricted band (peak mode)	2483.5	29.41	35.51	64.92	---	---	74	3MHz	Pass
Restricted band (average mode)	2483.5	10.33	35.51	45.84	---	---	54	10Hz	Pass

Description	Frequency (MHz)	Spectrum Reading (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	dBc (Limit: > 30dBc)	dBc (Limit: > 20dBc)	Limit (dBuV/m)	Equip. Setup VBW	Pass or Fail
Turbo g (average mode)	2429.6	54.1	35.48	89.58	---	---	---	10Hz	---
Turbo g (peak mode)	2429.6	65.63	35.48	101.11	---	---	---	3MHz	---
Outside band (average mode)	2400	8.08	35.48	43.56	46.02	---	---	10Hz	Pass
Outside band (peak mode)	2400	22.59	35.48	58.07	---	43.04	---	3MHz	Pass
Turbo g (average mode)	2429.5	54.05	35.5	89.55	---	---	---	10Hz	---
Turbo g (peak mode)	2429.1	65.83	35.5	101.33	---	---	---	3MHz	---
Outside band (average mode)	2483.5	6.92	35.51	42.43	47.12	---	---	10Hz	Pass
Outside band (peak mode)	2483.5	19.61	35.51	55.12	---	46.21	---	3MHz	Pass
Turbo g Restricted band (peak mode)	2390	16.11	35.47	51.58	---	---	74	3MHz	Pass
Restricted band (average mode)	2390	5.8	35.47	41.27	---	---	54	10Hz	Pass
Turbo g Restricted band (peak mode)	2483.5	19.61	35.51	55.12	---	---	74	3MHz	Pass
Restricted band (average mode)	2483.5	6.92	35.51	42.43	---	---	54	10Hz	Pass

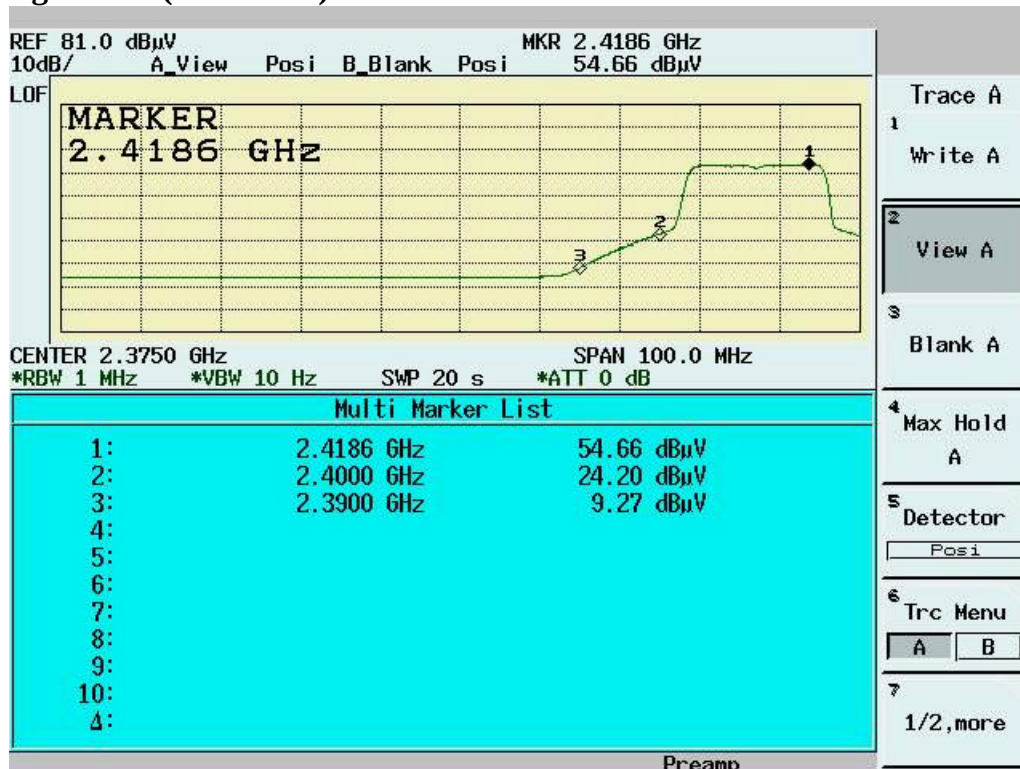
Note:

- 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.

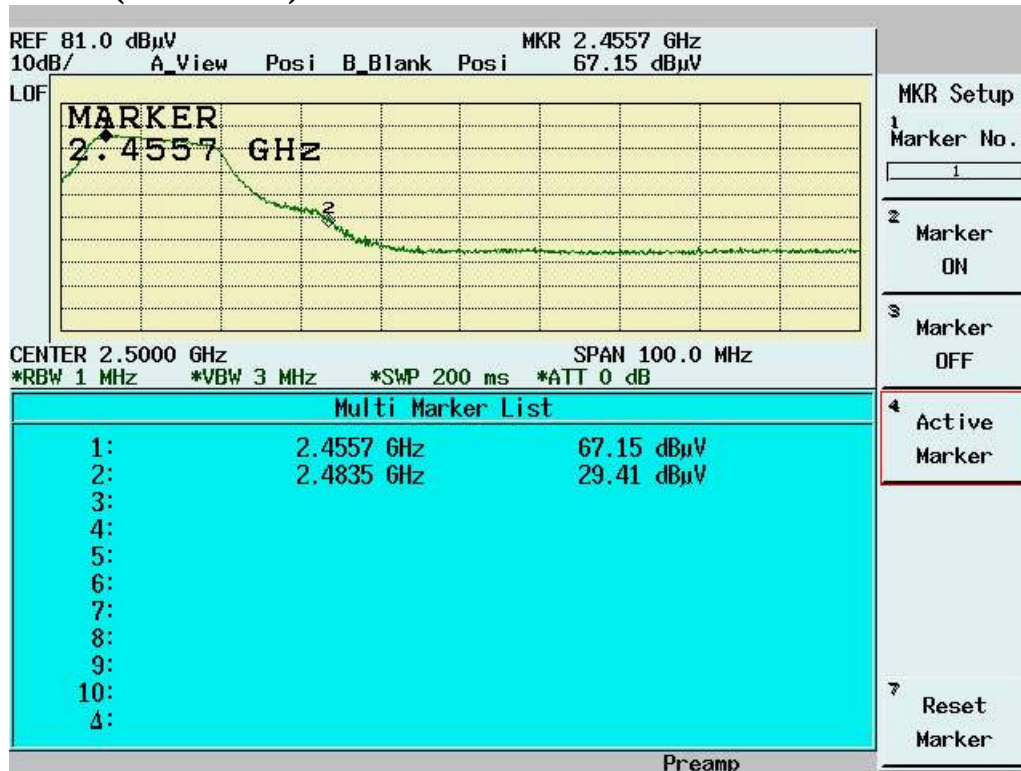
Band Edge measurement for radiated emission in Restricted Band(Radiated) Peak Mode (Channel 1)



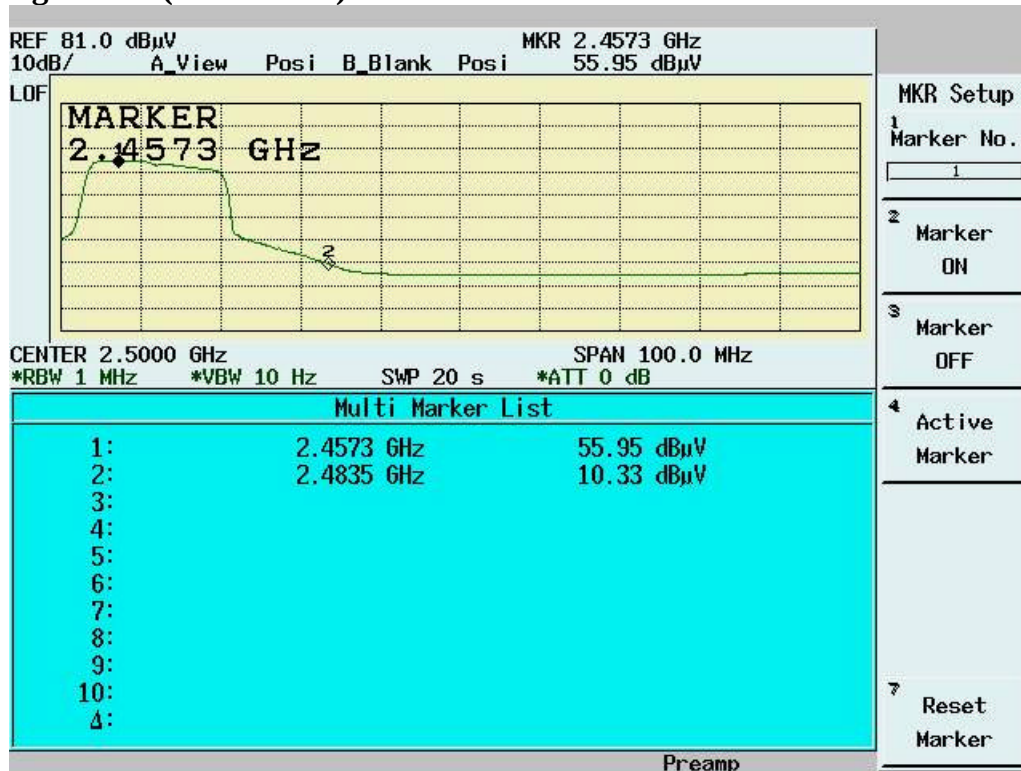
Band Edge measurement for radiated emission in Restricted Band(Radiated) Average Mode (Channel 1)



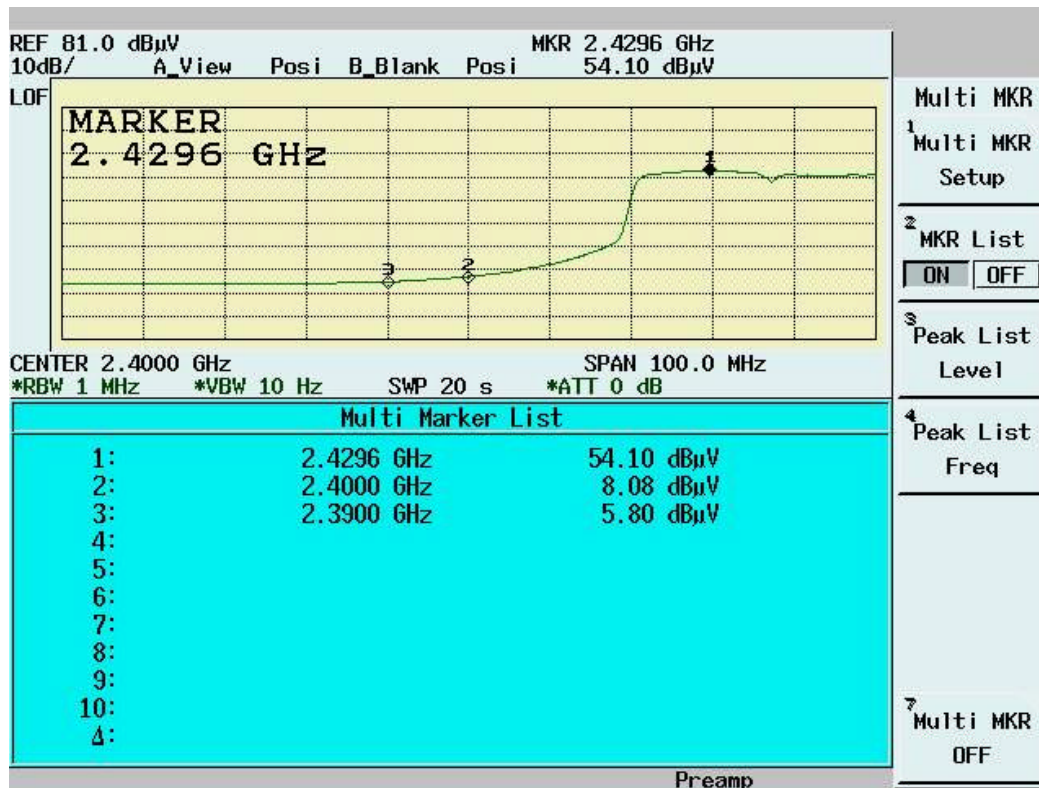
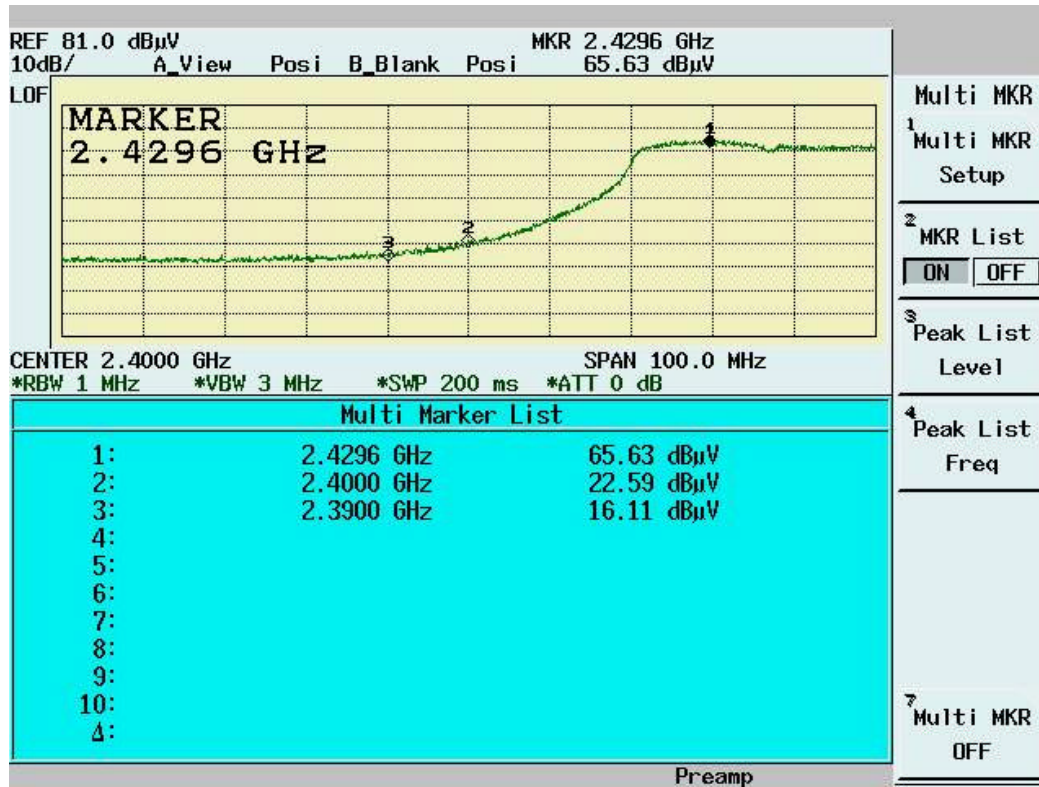
Band Edge measurement for radiated emission in Restricted Band(Radiated) Peak Mode (Channel 11)

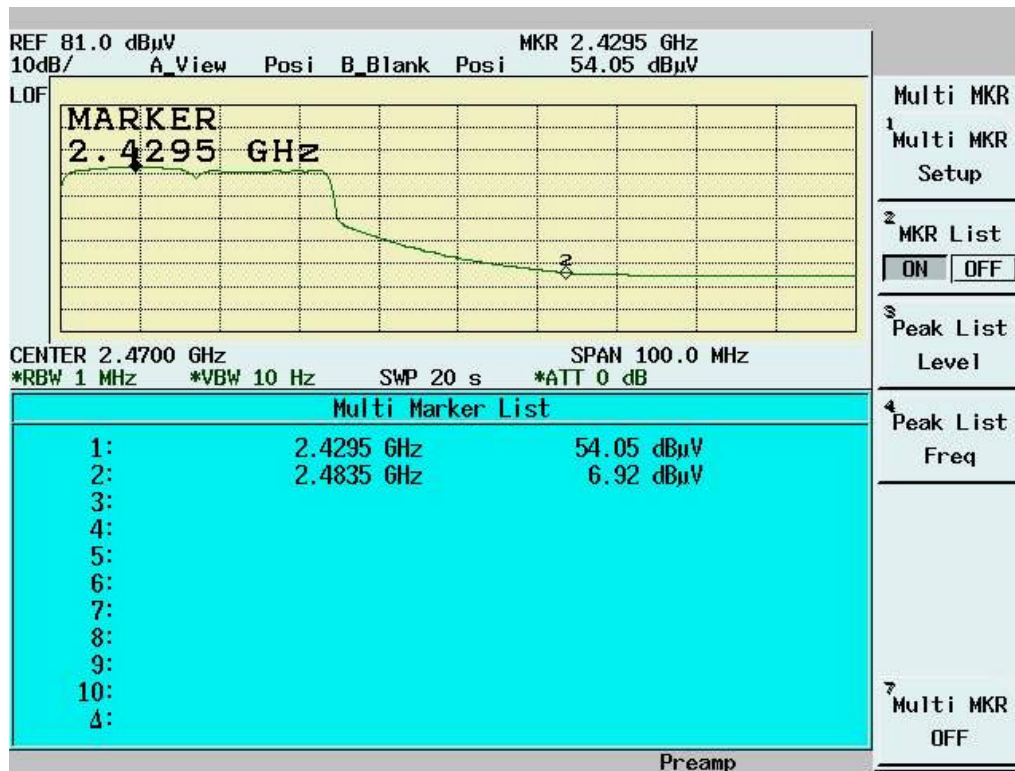
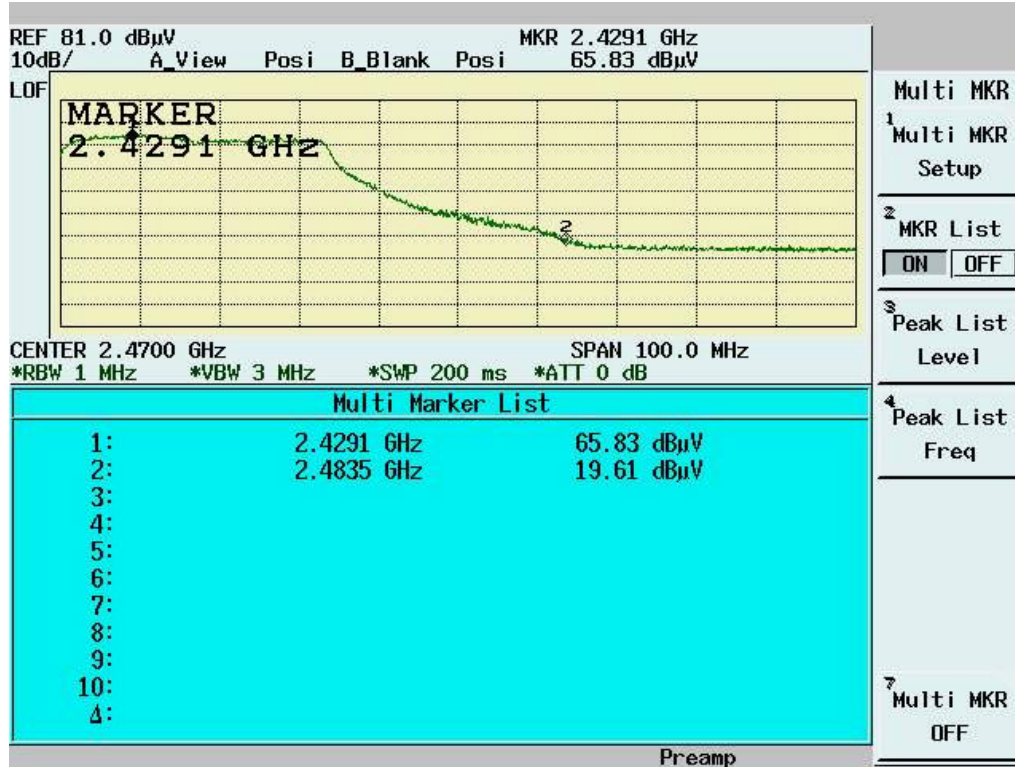


Band Edge measurement for radiated emission in Restricted Band(Radiated) Average Mode (Channel 11)



Turbo g





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

See SAR report

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

6.7.1 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.

6.7.2 Test Setup



6.7.3 Test Data

Please refer to Elliott Laboratories, Inc. Report Number: R60260

FCC ID: PPD-AR5BXB6

7. Appendix

7.1 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.

7.2 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.

7.3 Appendix C: Test Equipment

7.3.1 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	07/15/2006	07/15/2007
Conduction	Digital Hygro-Thermometer Conduct	MicroLife	HT-2126G	ISL-Conduction02	11/30/2006	11/30/2007
Conduction	EMI Receiver 07	Schwarzbeck Mess-Elektronik	FCKL 1528	1528-201	09/01/2007	09/01/2008
Conduction	LISN 04	EMCO	3810/2	9604-1429	12/30/2006	12/30/2007
Conduction	LISN 06	R&S	ESH3-Z5	828874/009	12/13/2006	12/13/2007
Radiation	BILOG Antenna 08	Schaffner	CBL6112B	2756	06/12/2006	06/12/2007
Radiation	Coaxial Cable Chmb 02-10M	Belden	RG-8/U	Chmb 02-10M	07/12/2006	07/12/2007
Radiation	Digital Hygro-Thermometer Chmb 02	MicroLife	HT-2126G	Chmb 02	11/30/2006	12/30/2007
Radiation	EMI Receiver 03	HP	85460A	3448A00183	04/10/2006	04/10/2007
Radiation	Spectrum Analyzer 13	Advantest	R3132	121200411	02/17/2007	02/17/2008
Radiation	Horn Antenna 02	Com-Power	AH-118	10088	12/28/2006	12/27/2007
Radiation	Horn Antenna 04	Com-Power	AH-826	081-001	03/24/2007	03/23/2008
Radiation	Horn Antenna 05	Com-Power	AH-640	100A	11/16/2006	11/15/2007
Radiation	Microwave Cable RF SK-01	HUBER+SUHNERAG.	Sucoflex 102	22139 /2	11/09/2006	11/09/2007
Radiation	Preamplifier 09	MITEQ	AFS44-00102 650-40-10P-44	858687	04/02/2006	04/02/2007
Radiation	Preamplifier 10	MITEQ	JS-26004000-27-5A	818471	12/28/2006	12/27/2007
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	11/21/2006	11/21/2007

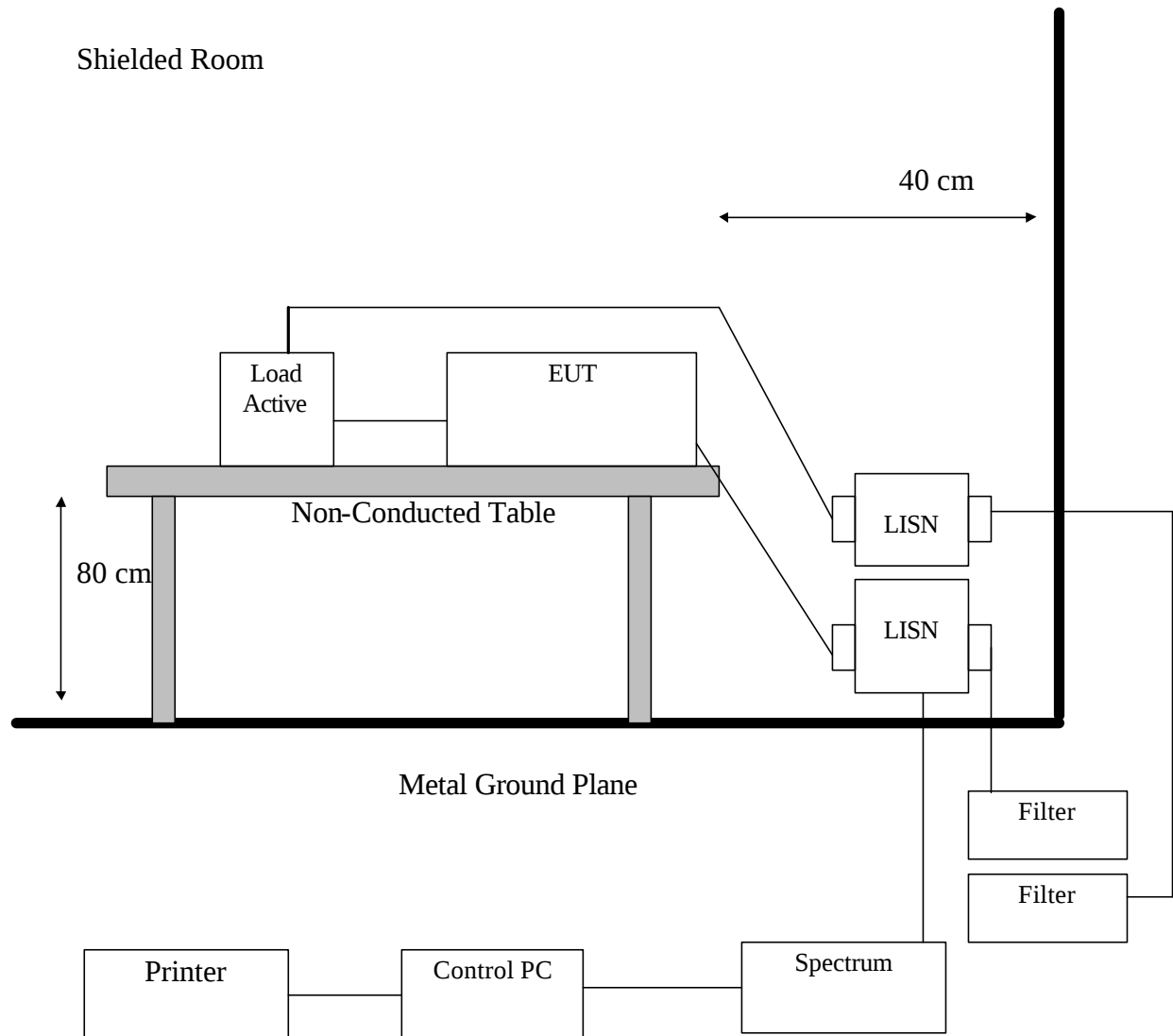
Note: Calibration is traceable to NIST or national or international standards.

7.3.2 Software for Controlling Spectrum/Receiver and Calculating Test Data

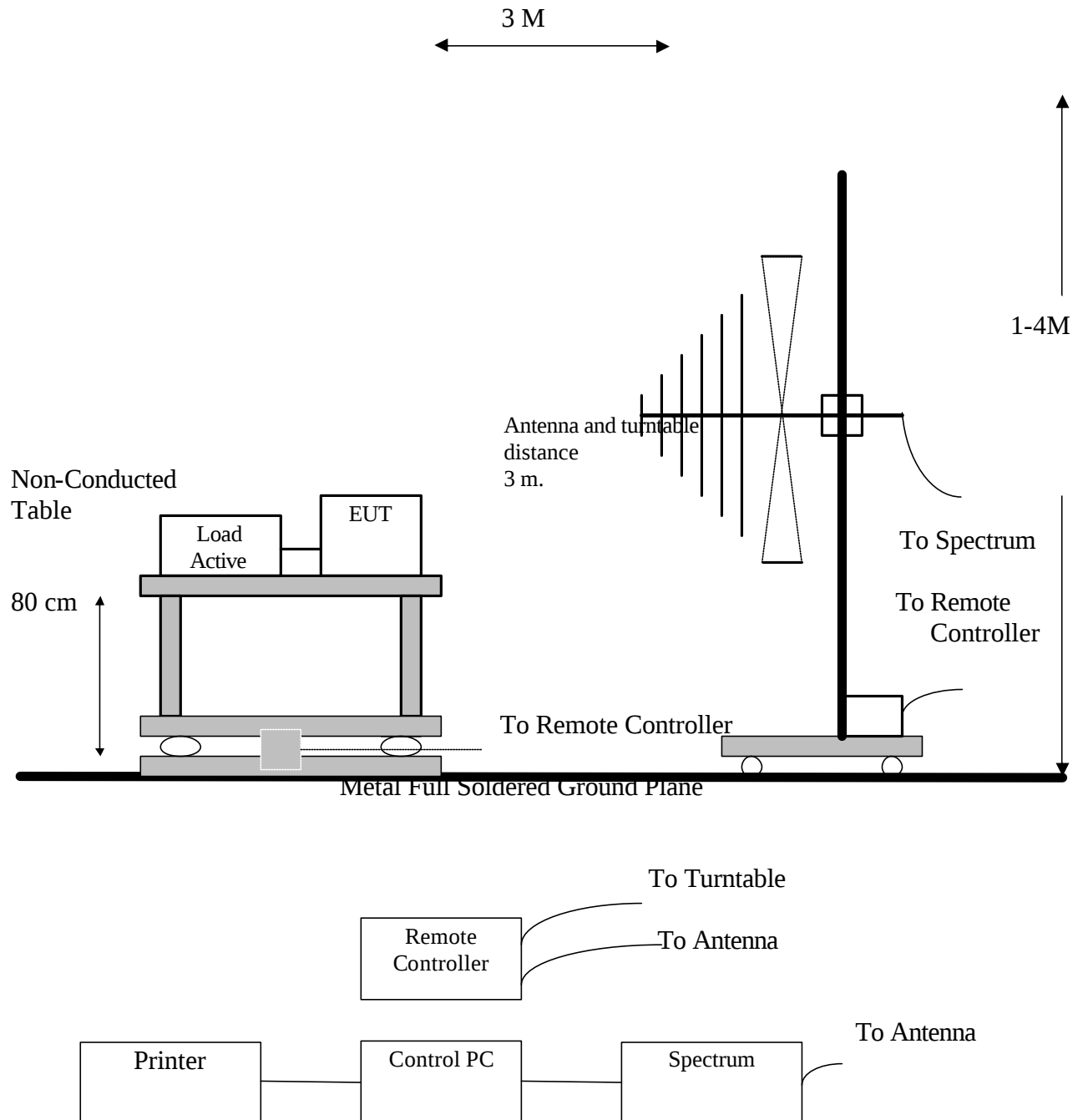
Radiation/Conduction	Filename	Version	Issued Date
Conduction	Tile.exe	1.12E	7/7/2000
Radiation	Tile.exe	1.12C	6/16/2000

7.4 Appendix D: Layout of EUT and Support Equipment

7.4.1 General Conducted Test Configuration



7.4.2 General Radiation Test Configuration



7.5 Appendix E: Description of Support Equipment

7.5.1 Description of Support Equipment

Description:	IBM Tablet Personal Computer
Brand Name:	Lenovo
Model Name:	7762/7763/7764/7767/7768/7769
Project Name:	ThinkPad X61 Tablet Series
Serial Number:	N/A
Power Supply Type:	Lenovo 65W 20V (MODEL: PA-1650-17)
Hard Disk Driver:	FUJITSU 60GB SATA (MODEL: MHT2060BH)
DDR:	HYNIX 512MB (MODEL: HYMP564S64BP6 -C4)
Battery	SANYO 8cells (MODEL: BTP-B6K8)
Power In Port:	one
USB Connector:	three
VGA Port:	one
Line Out Port:	one
MIC In Port:	one
Modem Card:	MDC 1.5 Foxconn
LAN Connector:	one
PCMCIA Slot:	one
Modem Connector:	one
SD Card reader:	one
BT:	USI (MODEL: BM-GP-CS-08)
Wireless LAN Card:	EUT
Bluetooth:	BDC 2.0 Foxconn
WWAN:	WWAN MC8755 Sierra

7.5.2 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. The RF software makes the transmitter continuously sending RF signals
- C. Repeat the above steps.

	Filename	Issued Date
ART V53 Build12	ART.exe	2005/10/13

7.5.3 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

7.6 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 $U_c(y)$	Normal			k=1	0.850
7	Total Uncertainty @95% mim. Confidence Level	Normal	k=2	1.701		

Measurement Uncertainty Calculations:

$$U_c(y) = \text{square root} (u_1(y)^2 + u_2(y)^2 + \dots + u_n(y)^2)$$

$$U = 2 * U_c(y)$$

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:

$$U_c(y) = \text{square root} (u_1(y)^2 + u_2(y)^2 + \dots + u_n(y)^2)$$

$$U = 2 * U_c(y)$$

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

7.7 Appendix G: Photographs of EUT Configuration Test Set Up

Please refer to the attached file

7.8 Appendix H: Antenna Spec.

Please refer to the attached file.