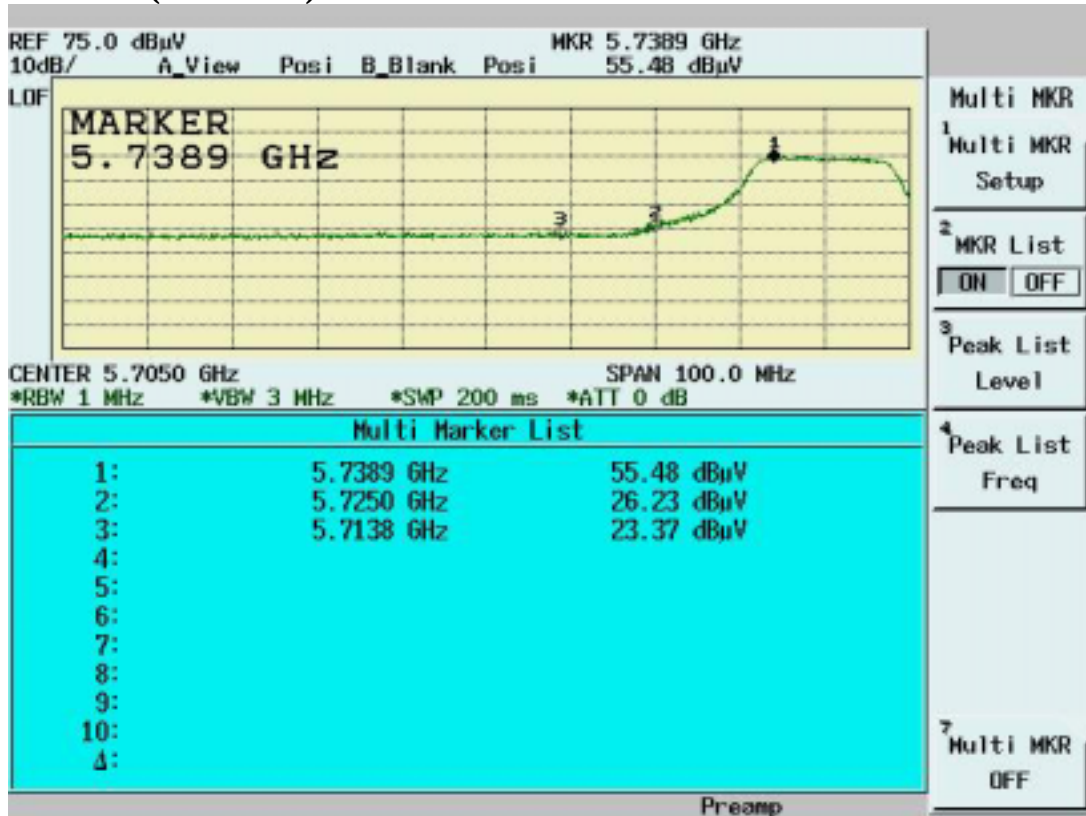
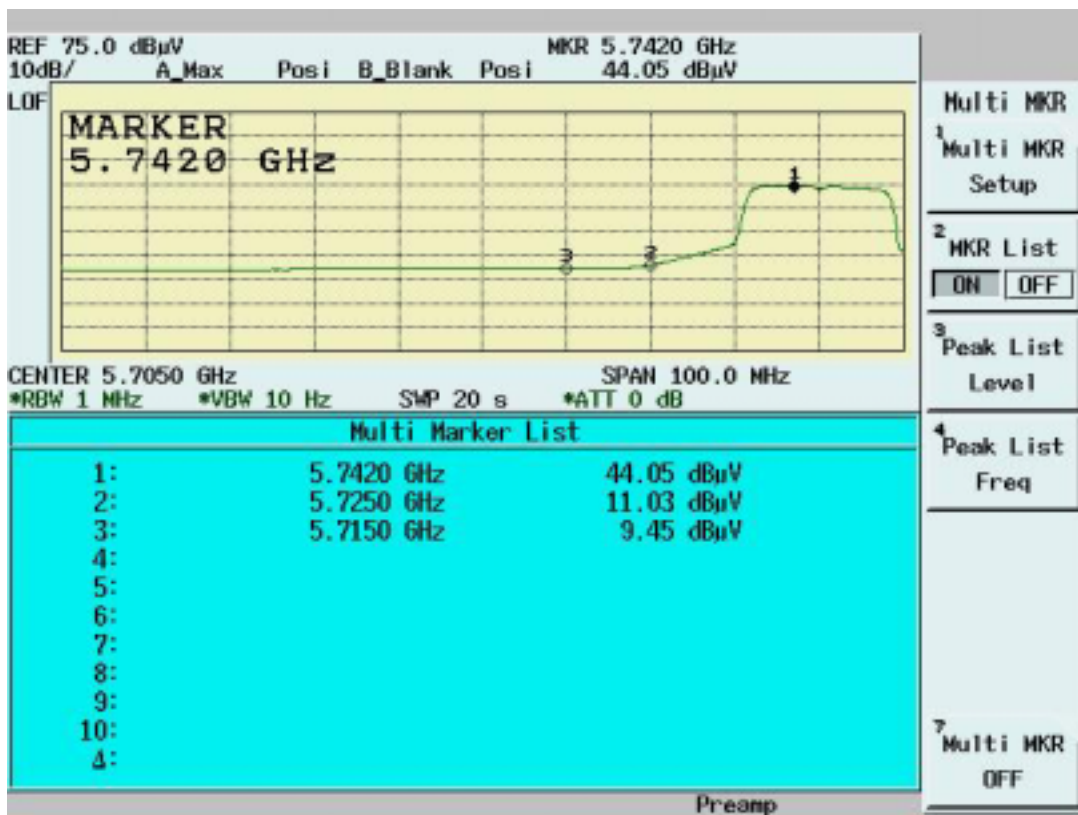


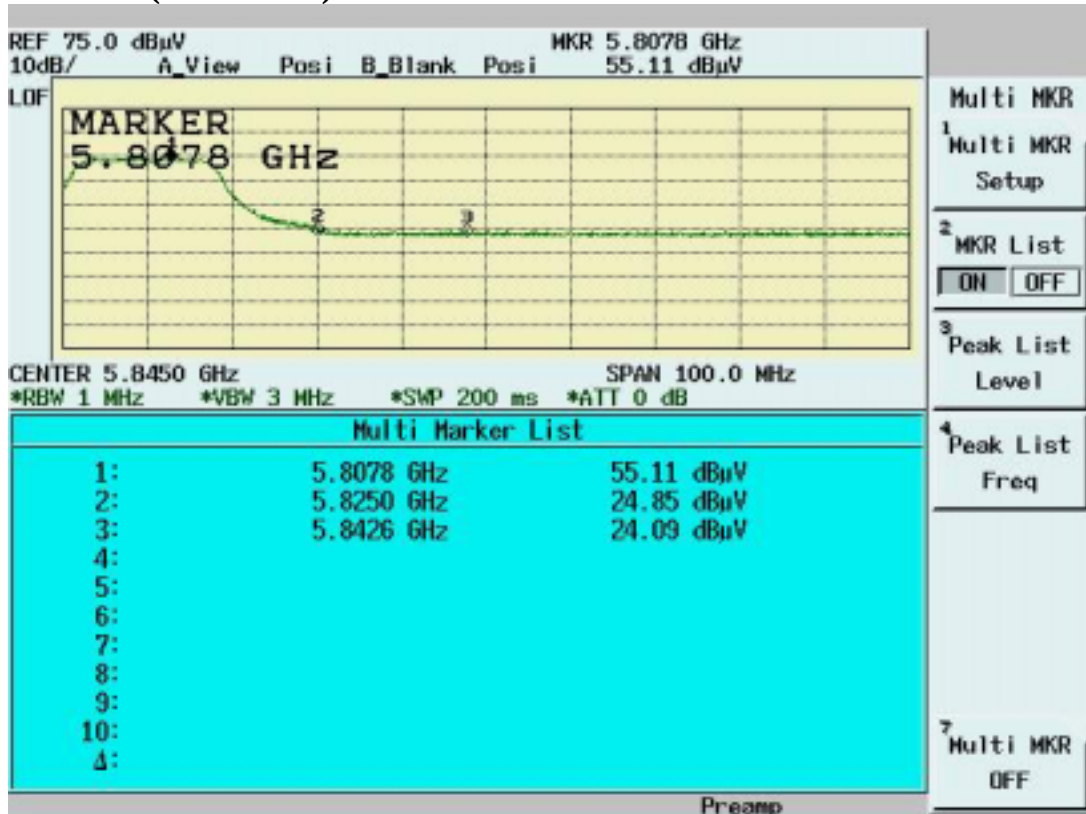
Normal Mode (Channel 9) Peak data



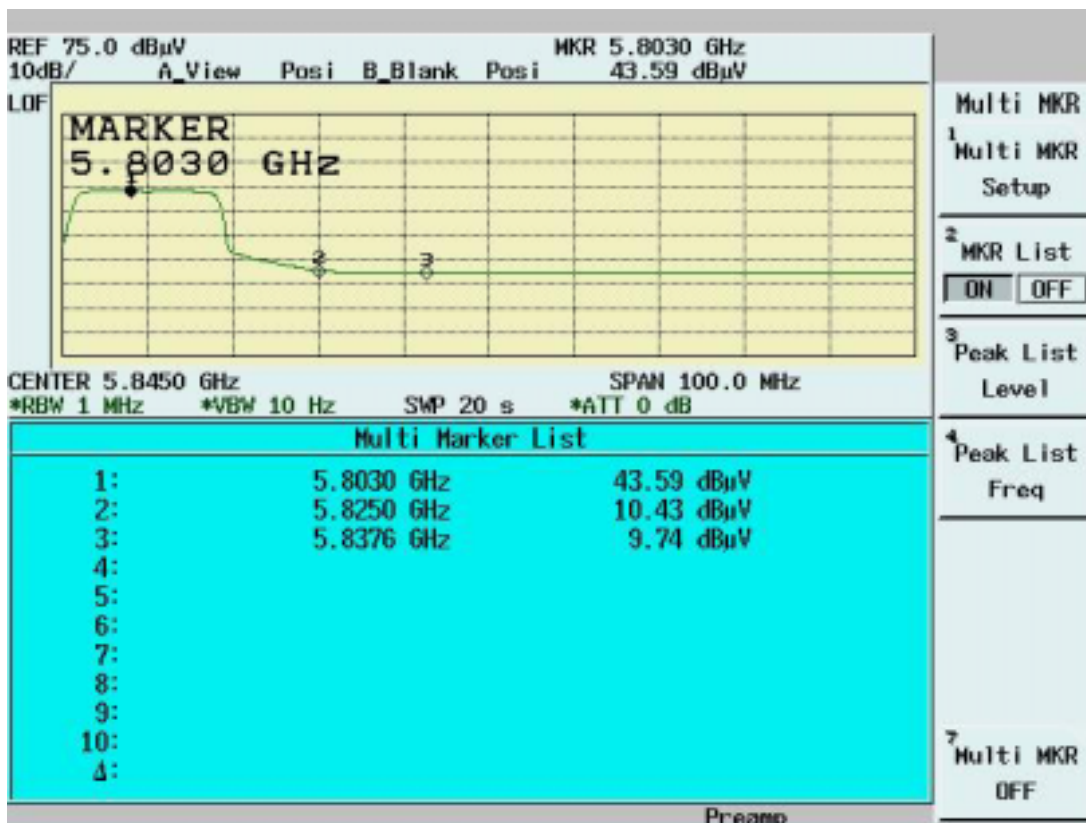
Normal Mode (Channel 9) Average Data



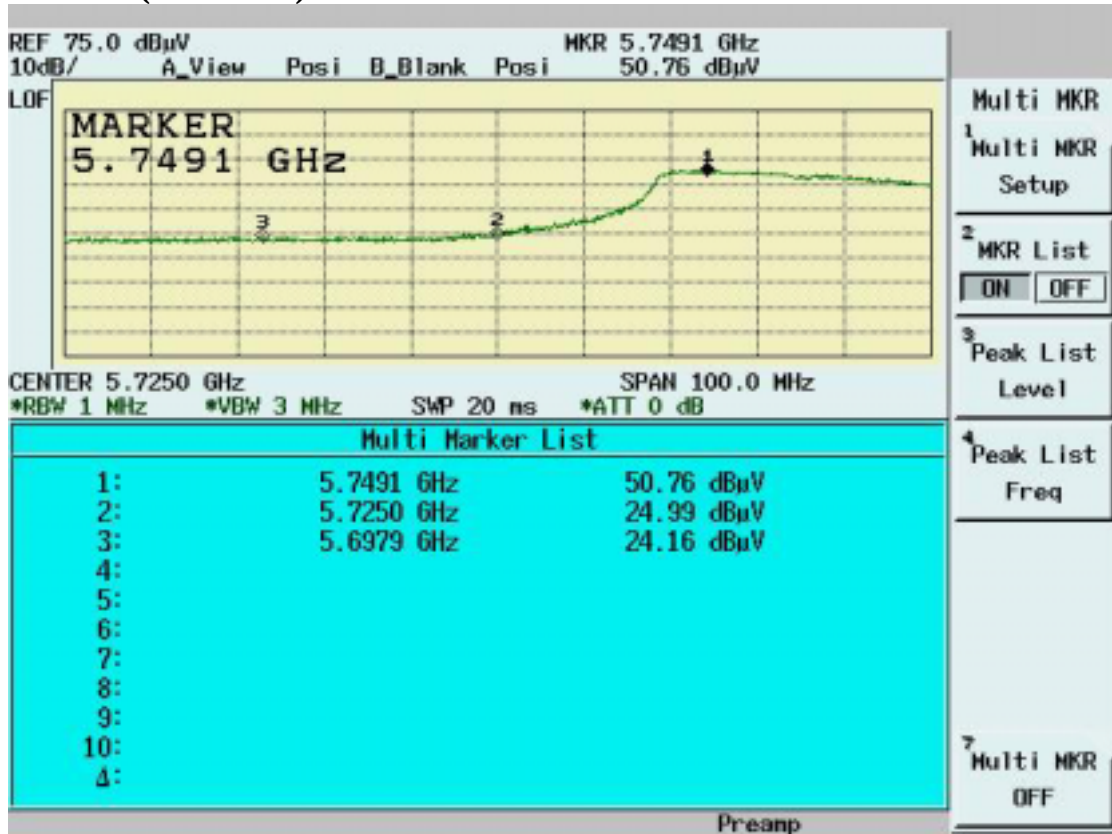
Normal Mode (Channel 12) Peak data



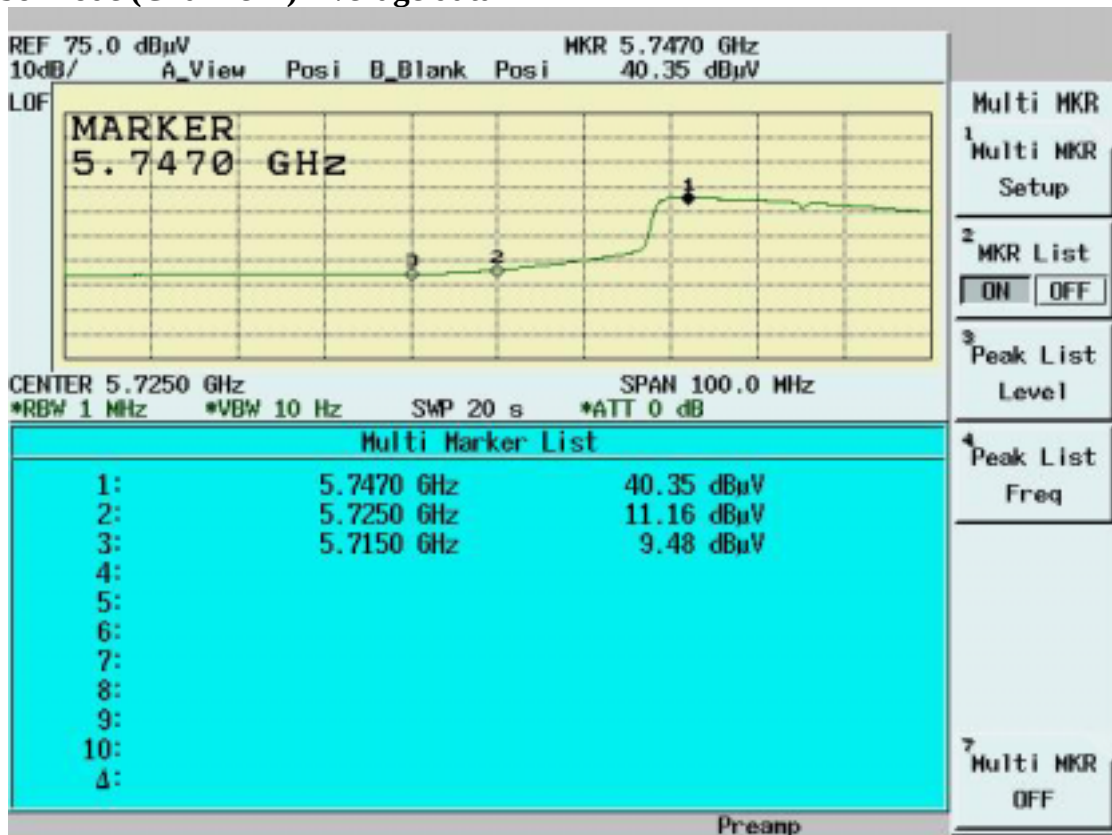
Normal Mode (Channel 12) Average Data



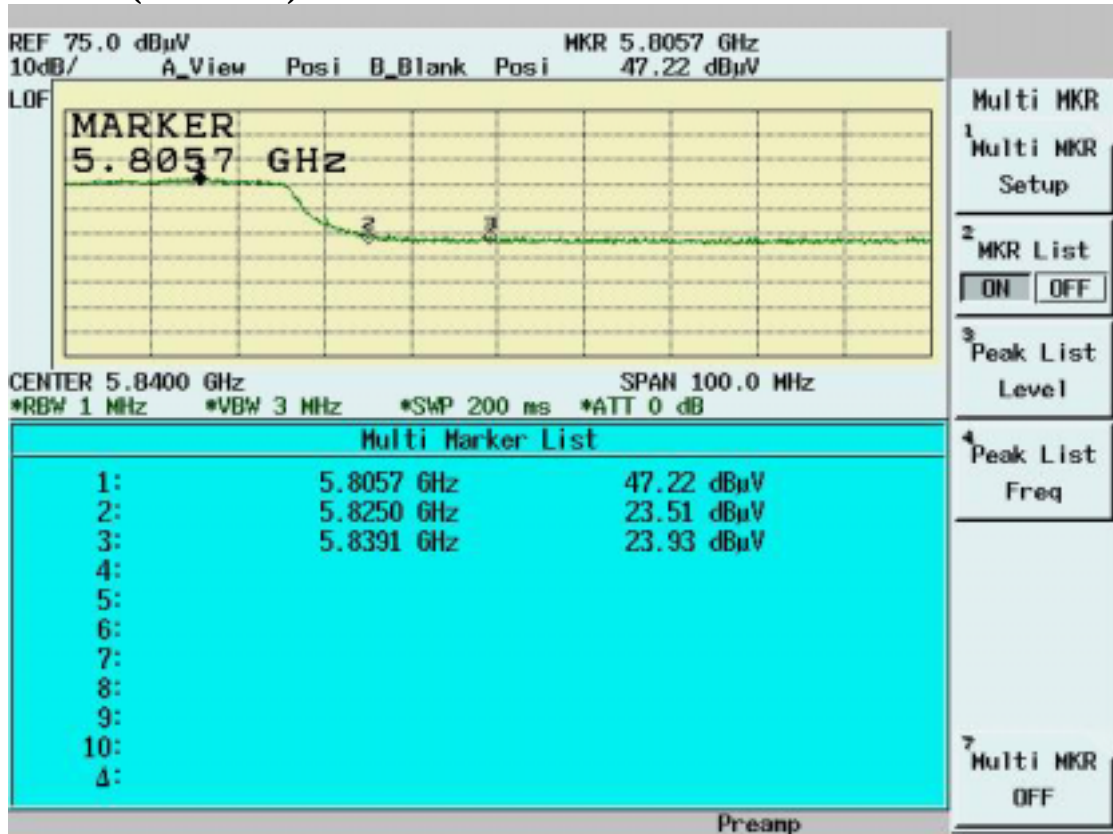
Turbo Mode (Channel 4) Peak data



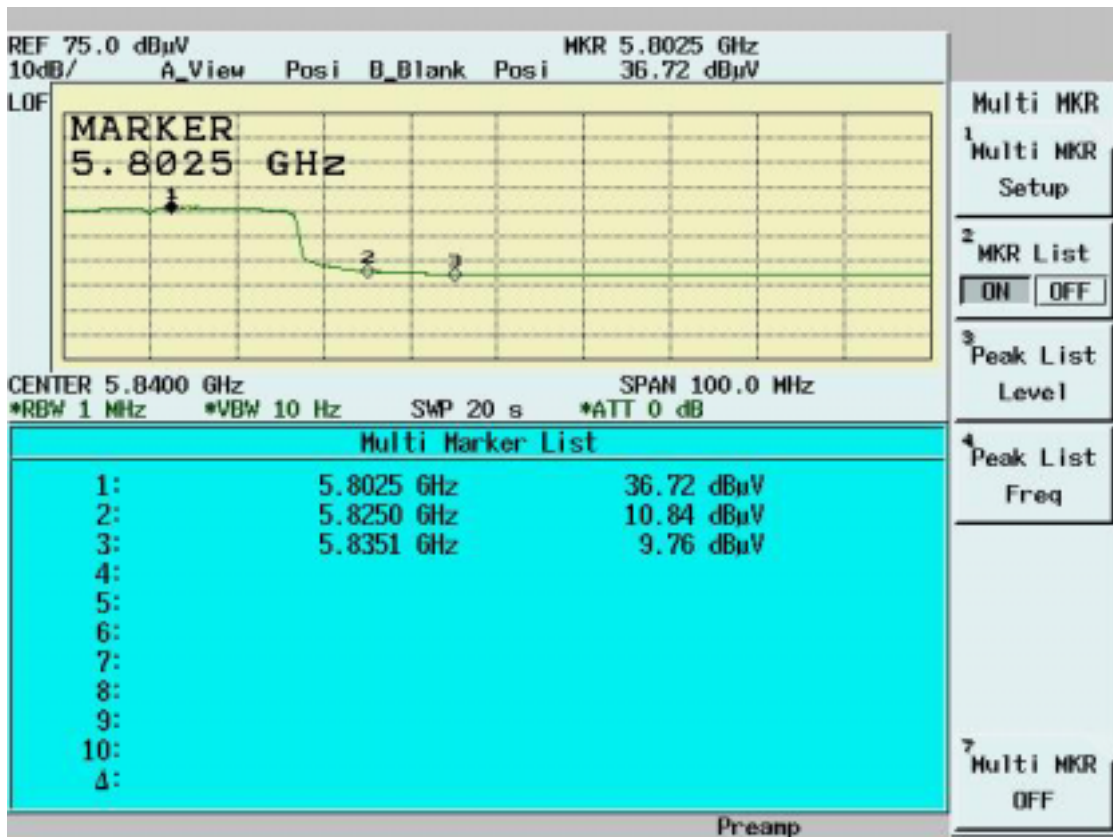
Turbo Mode (Channel 4) Average data



Turbo Mode (Channel 5) Peak data



Turbo Mode (Channel 5) Average Data



4.6 RF Exposure Measurement [Section 15.407(f)(4) & 1.1307(b)]

Refer to MPE Test Report

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

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 ():25

Test Engineer:Mailes Hsieh

Humidity (%):50

Channel	Frequency	Spectrum Reading	Cable Loss	Peak Power Output	Limit	Pass/Fail
Normal	(MHz)	(dBm/3KHz)	(dB)	(dBm/3KHz)	(dBm/3KHz)	
9	5745	-11.13	1.20	-9.93	8	Pass
10	5765	-10.37	1.20	-9.17	8	Pass
12	5805	-12.20	1.20	-11.00	8	Pass

Channel	Frequency	Spectrum Reading	Cable Loss	Peak Power Output	Limit	Pass/Fail
Turbo	(MHz)	(dBm/3KHz)	(dB)	(dBm/3KHz)	(dBm/3KHz)	
4	5760	-12.38	1.20	-11.18	8	Pass
5	5800	-17.61	1.20	-16.41	8	Pass

Note 1: According to Section 15.247 (c)(1)(ii) Systems operating in the 5725-5850 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted output power.

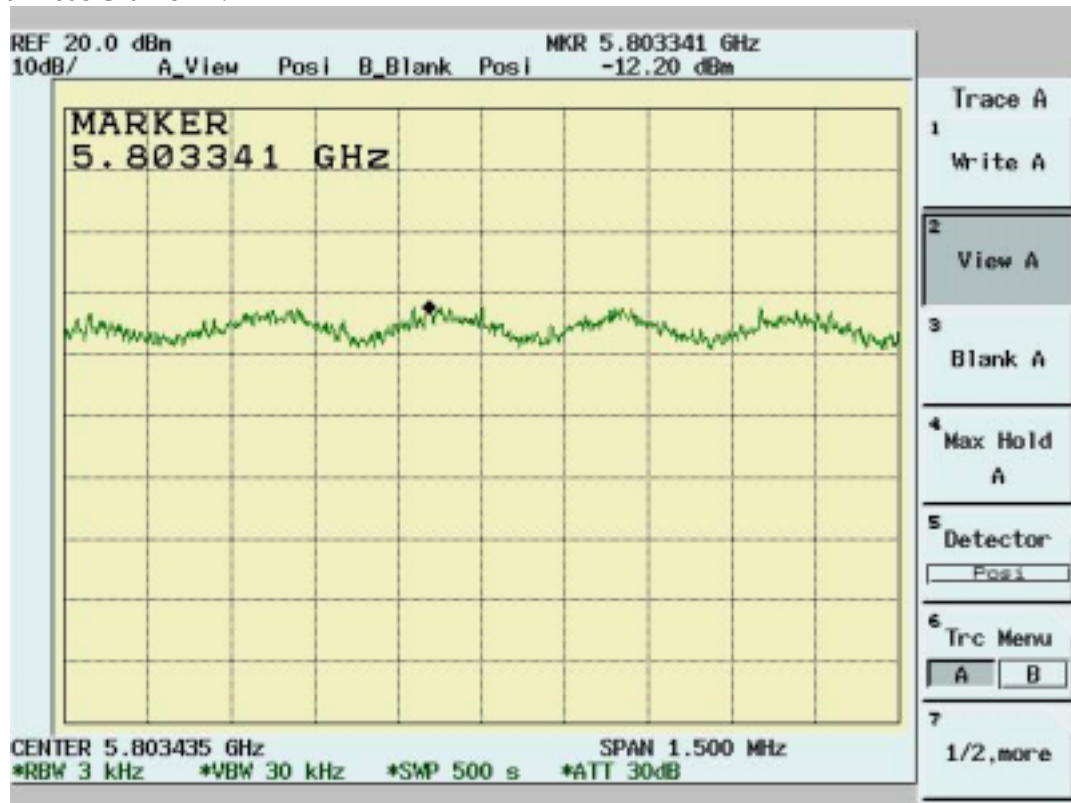
Normal mode Channel 9:



Normal mode Channel 10:



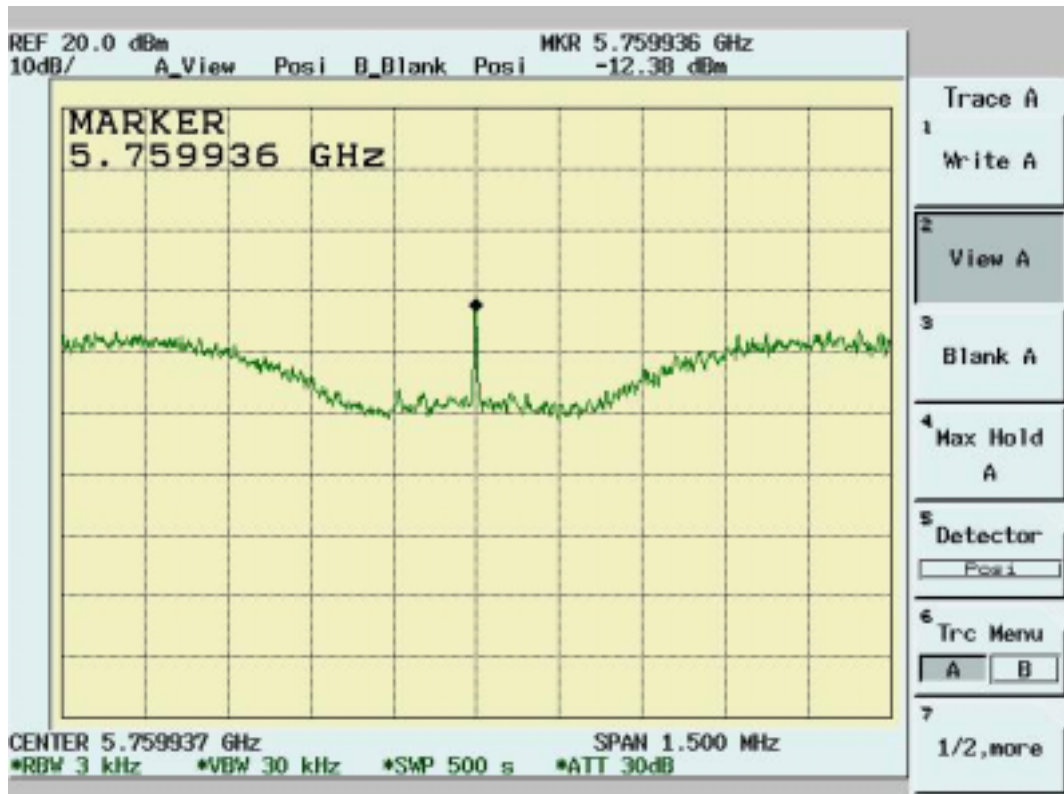
Normal mode Channel 12:



Turbo mode Channel 4:



Turbo mode Channel 5:



5. TEST RESULTS (802.11b)

5.1 Powerline Conducted Emissions [Section 15.207]

5.1.1 EUT Configuration

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

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

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

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

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

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

5.1.2 Test Procedure

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

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

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

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

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

5.1.4 Test Data:

5.1.5 Test Data:

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

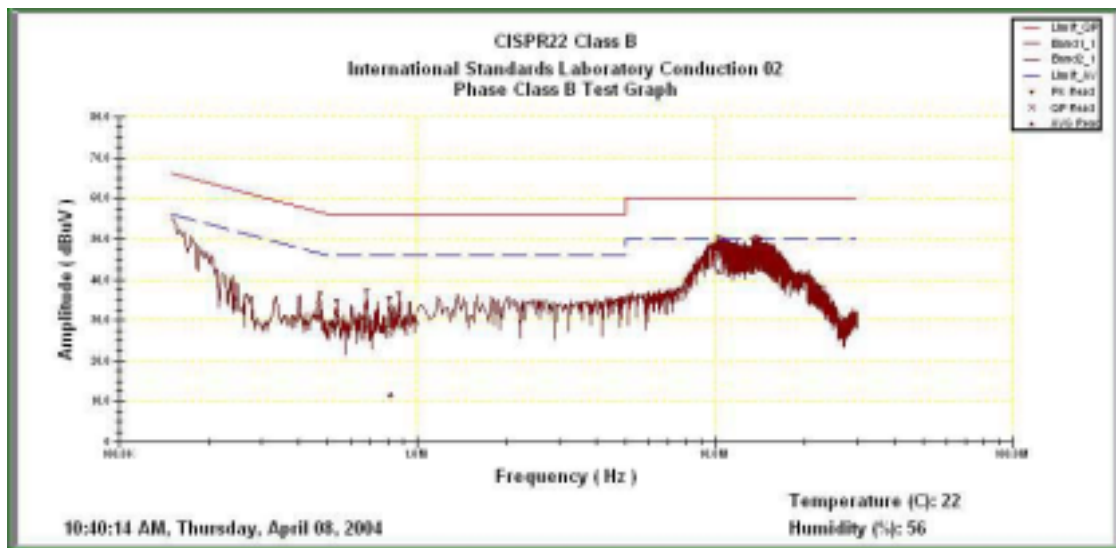
Operator: Mailes Hsieh

Temperature (C): 22

Humidity (%): 56

10:40:14 AM, Thursday, April 08, 2004

Frequency	LISN Loss	Cable Loss	QP Corrt.	QP Limit	QP Margin	AVE Corrt.	AVE Limit	AVE Margin
MHz	(dB)	(dB)	Amp.(dBuV)	(dBuV)	(dB)	Amp.(dBuV)	(dBuV)	(dB)
0.46803	0.11	0.03	33.53	56.91	-23.38	30.44	46.91	-16.47
0.53496	0.12	0.03	32.02	56.00	-23.98	29.38	46.00	-16.62
0.67085	0.15	0.04	30.23	56.00	-25.77	27.82	46.00	-18.18
0.81381	0.17	0.06	26.49	56.00	-29.51	11.53	46.00	-34.47
0.86686	0.18	0.06	32.79	56.00	-23.21	30.93	46.00	-15.07
10.2798	0.53	0.19	46.85	60.00	-13.15	42.04	50.00	-7.96
13.4186	0.64	0.26	47.16	60.00	-12.84	41.82	50.00	-8.18
13.688	0.65	0.27	48.22	60.00	-11.78	42.98	50.00	-7.02
13.8204	0.66	0.27	48.53	60.00	-11.47	43.21	50.00	-6.79
14.1525	0.67	0.28	47.82	60.00	-12.18	42.59	50.00	-7.41



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

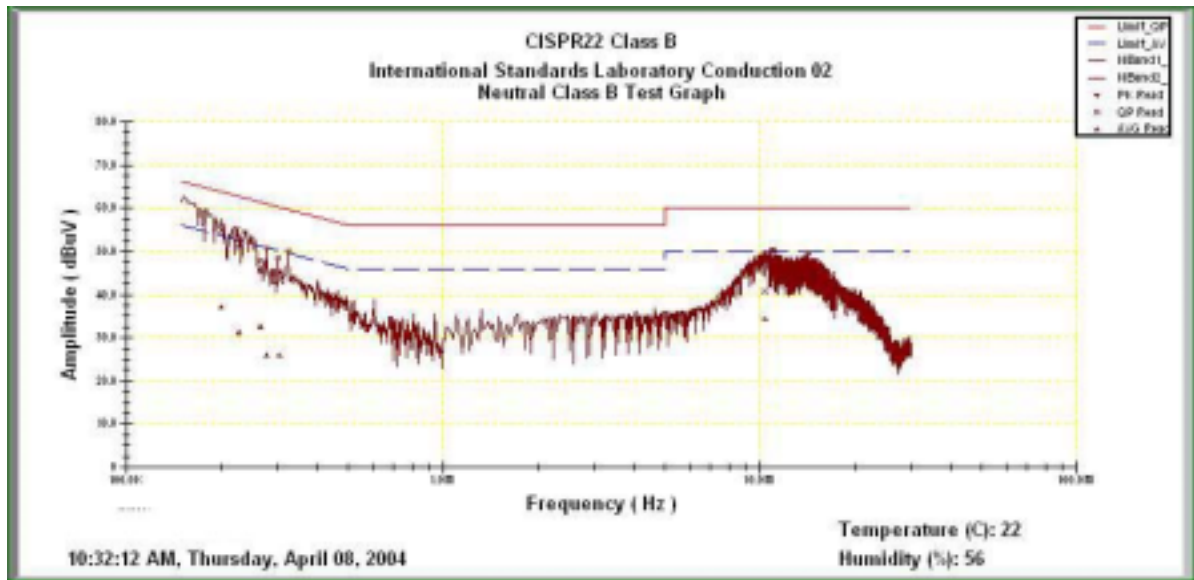
Operator: Mailles Hsieh

Temperature (C): 22

10:32:12 AM, Thursday, April 08, 2004

Humidity (%): 56

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)
0.19948	0.10	0.02	54.74	64.59	-9.85	37.06	54.59	-17.52
0.22723	0.10	0.02	50.88	63.79	-12.91	31.11	53.79	-22.69
0.26445	0.10	0.02	47.80	62.73	-14.93	32.43	52.73	-20.30
0.27763	0.10	0.02	44.83	62.35	-17.52	25.86	52.35	-26.50
0.30348	0.10	0.02	43.52	61.61	-18.09	25.97	51.61	-25.64
10.3427	0.32	0.19	40.70	60.00	-19.30	34.38	50.00	-15.62
10.9525	0.33	0.20	48.19	60.00	-11.81	43.58	50.00	-6.42
11.0864	0.33	0.21	48.16	60.00	-11.84	43.51	50.00	-6.49
14.1579	0.38	0.28	47.28	60.00	-12.72	42.09	50.00	-7.91
14.2235	0.39	0.28	46.94	60.00	-13.06	41.54	50.00	-8.46



* 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



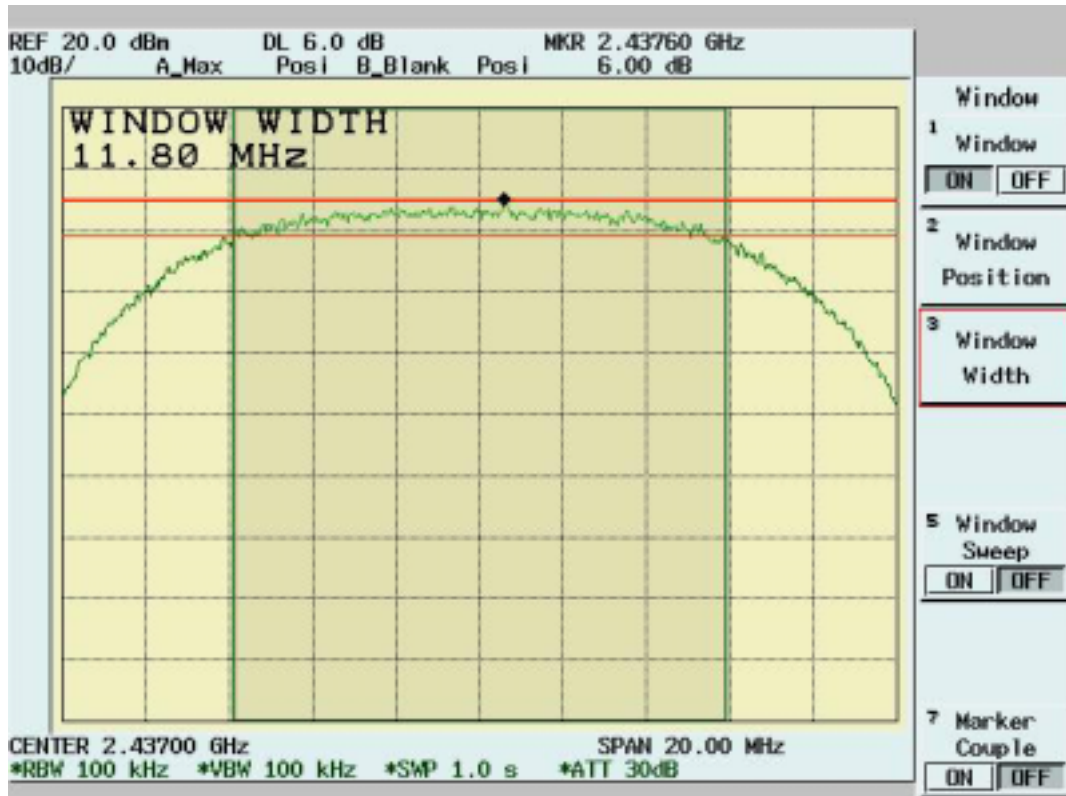
5.2.3 Test Data:

		6dB Bandwidth		
		Temp. (deg. C):	25	
Test Engr: Mailes Hsieh		Humidity (%):	50	
Chennel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Pass/Fail
1	2412	12.36	0.5	Pass
6	2437	11.8	0.5	Pass
11	2462	12.08	0.5	Pass

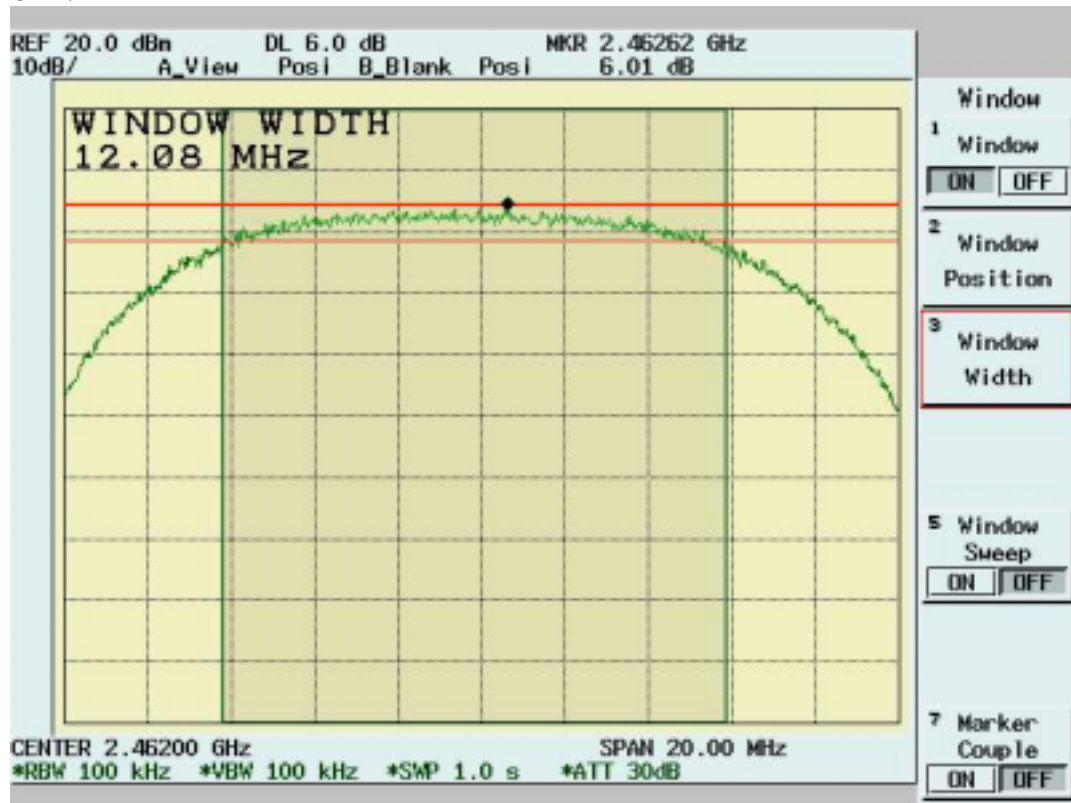
Channel 1:



Channel 6:



Channel 11:

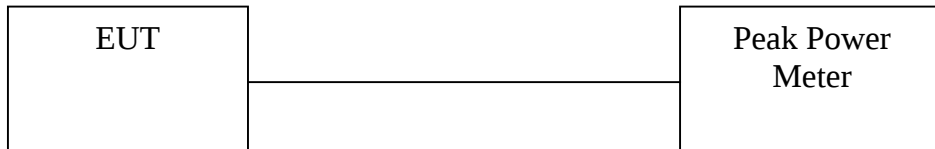


5.3 DSSS Maximum Peak Output Power [Section 15.247 (b)(1)]

5.3.1 Test Procedure

The Transmitter output of EUT was connected to the peak power meter(RBW=150MHz).

5.3.2 Test Setup



5.3.3 Test Data

Maximum Peak Output Power

Temp. (deg. C): 25

Test Engr: Mailes
Hsieh

Humidity (%): 50

Channel	Frequency (Mhz)	Analyzer Reading (dBm)	Cable Loss (dB)	Peak Power Output (mW)	Peak Power Output (dBm)	Limit (dBm) (see Note)	Pass/Fail
1	2412	21.499	1.1	181.93	22.599	24	Pass
6	2437	21.624	1.1	187.24	22.724	24	Pass
11	2462	21.624	1.1	187.24	22.724	24	Pass

Note: According to Section 15.247 (b)(4) if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced , by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

$$\text{Antenna Gain} = 12, \text{Limit} = 30 - (12 - 6) = 24$$

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

5.4.1 EUT Configuration

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

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

5.4.2 Test Procedure

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

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

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

For the test of 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.

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(%):49

Frequency	RxAmp.	AntFact	CableLoss	PreAmpGain	Corrct.Emi.	Limit	Margin	Ant.Pos.	TablePos
MHz	(dBuV)	(dB/m)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg)
99.84	22.45	10.27	3.02	0.00	35.73	43.50	-7.77	100.00	140.00
198.78	24.94	8.86	4.18	0.00	37.98	43.50	-5.52	100.00	346.00
231.76	27.17	9.21	4.48	0.00	40.87	46.00	-5.13	100.00	9.00
298.69	21.10	13.57	4.69	0.00	39.37	46.00	-6.63	100.00	173.00
365.62	23.66	14.83	5.08	0.00	43.57	46.00	-2.43	100.00	173.00
398.6	19.57	15.95	5.31	0.00	40.83	46.00	-5.17	100.00	239.00
431.58	18.91	16.25	5.61	0.00	40.77	46.00	-5.23	100.00	157.00
465.53	15.27	16.80	5.88	0.00	37.95	46.00	-8.05	100.00	9.00
564.47	13.97	19.04	6.57	0.00	39.58	46.00	-6.42	100.00	305.00
864.2	8.76	20.54	8.24	0.00	37.54	46.00	-8.46	100.00	124.00

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

Operator:MailesHsieh

Temperature(C):22

Humidity(%):49

Frequency	RxAmp.	AntFact	CableLoss	PreAmpGain	Corrct.Emi.	Limit	Margin	Ant.Pos.	TablePos
MHz	(dBuV)	(dB/m)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg)
136.7	17.95	10.73	3.54	0.00	32.22	43.50	-11.28	100.00	242.00
364.65	15.38	14.80	5.07	0.00	35.25	46.00	-10.75	100.00	176.00
431.58	12.89	16.25	5.61	0.00	34.75	46.00	-11.25	100.00	209.00
469.41	13.09	16.90	5.89	0.00	35.89	46.00	-10.11	100.00	192.00
497.54	12.74	17.64	6.04	0.00	36.41	46.00	-9.59	100.00	225.00
643.04	7.62	19.07	7.00	0.00	33.70	46.00	-12.30	100.00	242.00
652.74	14.39	19.09	7.05	0.00	40.53	46.00	-5.47	100.00	225.00
661.47	8.12	19.08	7.07	0.00	34.27	46.00	-11.73	100.00	242.00
764.29	5.61	20.07	7.64	0.00	33.32	46.00	-12.68	100.00	209.00
864.2	4.57	20.54	8.24	0.00	33.35	46.00	-12.65	100.00	143.00

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	Average Limit	Average Margin	Peak Limit	Peak Margin	Ant. Tower	Turn Table
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	dBuV/m	dB	cm	deg
1062.44	54.91pk	24.79	2.18	33.96	47.91pk	54.00	-6.09	74.00	--	102	108
1199.80	54.58pk	25.42	2.19	34.04	48.15pk	54.00	-5.85	74.00	--	102	98
1262.24	55.82pk	25.71	2.20	34.07	49.66pk	54.00	-4.34	74.00	--	101	94
1324.68	53.97pk	25.99	2.21	34.11	48.07pk	54.00	-5.93	74.00	--	101	90
3357.64	49.94pk	31.39	1.64	35.53	47.43pk	54.00	-6.57	74.00	--	100	265
4821.68	45.27pk	34.92	2.12	37.71	44.60pk	54.00	-9.40	74.00	--	100	25

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	Average Limit	Average Margin	Peak Limit	Peak Margin	Ant. Tower	Turn Table
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	dBuV/m	dB	cm	deg
1192.31	50.54pk	25.38	2.19	34.03	44.08pk	54.00	-9.92	74.00	--	102	99
1262.24	48.21pk	25.71	2.20	34.07	42.05pk	54.00	-11.95	74.00	--	101	94
2650.85	44.92pk	30.96	1.39	35.06	42.21pk	54.00	-11.79	74.00	--	102	247
2878.12	44.89pk	31.05	1.43	34.86	42.51pk	54.00	-11.49	74.00	--	103	319
3357.64	45.73pk	31.39	1.64	35.53	43.22pk	54.00	-10.78	74.00	--	103	265
4821.68	47.23pk	34.92	2.12	37.71	46.56pk	54.00	-7.44	74.00	--	100	25
7233.77	57.00av	39.47	2.69	36.83	62.63pk	54.00	--	74.00	-11.67	100	25
7233.77	42.13av	39.47	2.69	36.83	47.46av	54.00	-6.54	74.00	--	100	25
9643.36	42.16pk	40.58	3.24	34.33	51.65pk	54.00	-2.35	74.00	--	100	25

Note:

“pk”: peak reading

“av”: average reading

“---”: 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	Average Limit	Average Margin	Peak Limit	Peak Margin	Ant. Tower	Turn Table
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	dBuV/m	dB	cm	deg
1062.44	54.94pk	24.79	2.18	33.96	47.94pk	54.00	-6.06	74.00	--	102	108
1194.81	54.22pk	25.40	2.19	34.04	47.77pk	54.00	-6.23	74.00	--	102	99
1262.24	55.18pk	25.71	2.20	34.07	49.02pk	54.00	-4.98	74.00	--	101	94
1329.67	53.52pk	26.02	2.21	34.11	47.63pk	54.00	-6.37	74.00	--	101	89
3357.64	49.93pk	31.39	1.64	35.53	47.42pk	54.00	-6.58	74.00	--	103	265
4870.63	45.58pk	35.11	2.14	37.77	45.06pk	54.00	-8.94	74.00	--	100	13
7305.69	56.73pk	39.59	2.56	36.71	62.17pk	54.00	--	74.00	-11.83	101	154
7305.69	41.94av	39.59	2.56	36.71	47.38av	54.00	-6.62	74.00	--	101	154

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	Average Limit	Average Margin	Peak Limit	Peak Margin	Ant. Tower	Turn Table
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	dBuV/m	dB	cm	deg
1194.81	51.07pk	25.40	2.19	34.04	44.62pk	54.00	-9.38	74.00	--	102	99
1679.32	46.20pk	28.31	2.36	34.55	42.32pk	54.00	-11.68	74.00	--	101	65
2183.82	46.91pk	30.96	2.04	35.19	44.72pk	54.00	-9.28	74.00	--	101	101
2381.12	45.40pk	30.92	1.44	35.20	42.56pk	54.00	-11.44	74.00	--	101	163
3357.64	45.37pk	31.39	1.64	35.53	42.86pk	54.00	-11.14	74.00	--	103	265
4870.63	47.52pk	35.11	2.14	37.77	47.00pk	54.00	-7.00	74.00	--	100	25
7305.69	60.52pk	39.59	2.56	36.71	65.96pk	54.00	--	74.00	-8.04	101	25
7305.69	45.77av	39.59	2.56	36.71	51.21av	54.00	-2.79	74.00	--	101	25
9745.25	55.34pk	40.36	3.30	34.37	64.63pk	54.00	--	74.00	-9.37	102	25
9745.25	40.65av	40.36	3.30	34.37	49.94av	54.00	-4.06	74.00	--	102	25

Note:

“pk”: peak reading

“av”: average reading

“---”: 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.