Product Name:	Bluetooth Presenter, V2.1+EDR
Model No.:	VP-1000
Applicant:	Vencer Co., Ltd. 20F-1, No.77, Sec.1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, 221
Date of Receipt:	Feb. 21, 2008
Finished date of Test:	Mar. 07, 2008
Applicable Standards:	47 CFR Part 15, Subpart C, Class B ANSI C63.4:2003

We, **Spectrum Research & Testing Laboratory Inc.**, hereby certify that one sample of the above was tested in our laboratory with positive results according to the above-mentioned standards. The records in the report are an accurate account of the results. Details of the results are given in the subsequent pages of this report.

Tested By: Shunm Wang , Date: Mar. 10. 2008
(Shunm Wang)

Approved By: _____ Date: 3/10/2008
(Johnson Ho, Director)

NVLAP®
Lab Code: 200099-0
FMNG-059.10 REPORT

TABLE OF CONTENTS

1. DOCUMENT POLICY AND TEST STATEMENT

1.1 DOCUMENT POLICY

- The report shall not be reproduced except in full, without the written approval of SRT Lab, Inc.
- The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

1.2 TEST STATEMENT

- The test results in the report apply only to the unit tested by SRT Lab.
- There was no deviation from the requirements of test standards during the test.
- AC power source, 120 VAC/60 Hz, was used during the test.

1.3 EUT MODIFICATION

- No modification in SRT Lab.

2. DESCRIPTION OF EUT AND TEST MODE

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Bluetooth Presenter, V2.1+EDR
MODEL NO.	VP-1000
POWER REQUIREMENTS	DC 3.7V, 0.04A
FREQUENCY BAND	2400 ~ 2483.5MHz
CARRIER FREQUENCY	2402~2480MHz
CARRIER FREQUENCY	CH0: 2402 MHz CH39: 2441 MHz CH78: 2480 MHz
NUMBER OF CHANNEL	79
CHANNEL SPACING	1MHz
RF OUTPUT POWER	0dBm
MODULATION TYPE	GFSK, II/4DQPSK, 8DPSK
DUTY CYCLE	50%
MODE OF OPERATION	Duplex
BIT RATE OF TRANSMISSION	2.1Mbps
ANTENNA TYPE	PCB printed
ANTENNA GAIN	2dBi
CHANNEL BANDIWDTH	1MHz
OPERATING TEMPERATURE	-10℃ to 55℃
STORAGE HUMIDITY	10% to 90%

NOTE：

For more detailed information, please refer to the EUT's specification or user's manual provided by manufacturer.

2.2 DESCRIPTION OF SUPPORT UNIT

The transmitter part of EUT was tested with a PC system and configured by the requirement of ANSI C63.4. All interface ports were connected to the appropriate support units via specific cables. The support units and cables are listed below.

NO	DEVICE	BRAND / MAKER	MODEL #	CABLE
1	Notebook	Dell	PA-16	2.0m shielded power cable
2	Dongle	MSI	BToes	N/A

2.3 DESCRIPTION OF TEST MODE

79 channels are provided by EUT, 3 channels of them were chosen for test.

Channel	Frequency (MHz)	Final Test
0	2402	V
39	2441	V
78	2480	V

NOTE :

1. Below 1 GHz, the 3 channels were pre-tested in chamber. The channel 0, the worst-case one, was chosen for final test.
2. Above 1 GHz, the channel 0, 39 & 78 were tested individually.

3. DESCRIPTION OF APPLIED STANDARDS

The EUT is a kind of wireless product and to be connected with a PC system for normal use. According to the specifications provided by the applicant, it must comply with the requirements of the following standards:

47 CFR Part 15, Subpart C

ANSI C63.4:2003

All tests have been performed and recorded as the above standards.

4. TECHNICAL CHARACTERISTICS TEST

4.1 CHANNEL SEPARATION TEST

4.1.1 LIMIT

FCC Part15, Subpart C Section 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 hopping channel, whichever is greater.

Frequency Range (MHz)	Limit(kHz)
902-928	>25kHz
2400-2483.5	>25kHz
5725-5850	>25kHz

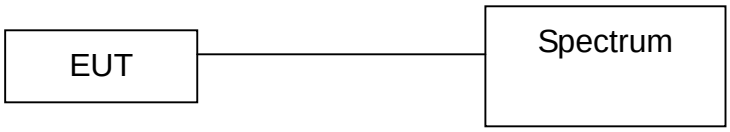
4.1.2 TEST EQUIPMENT

The following test equipment was used during the radiated emission test：

Equipment/ Facilities	Specifications	Manufacturer	Model#/ Serial#	Due Date of Cal. & Cal. Center
SPECTRUM	9kHz-7GHz	ROHDE & SCHWARZ	FSP7/ 839511/010	MAR. 2008 ETC

NOTE: The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

4.1.3 TEST SET-UP



The EUT was connected to a spectrum through a 50Ω RF cable.

4.1.4 TEST PROCEDURE

The EUT was operating in hopping mode or could be controlled its channel.
Printed out the test result from the spectrum by hard copy function.

4.1.5 EUT OPERATING CONDITION

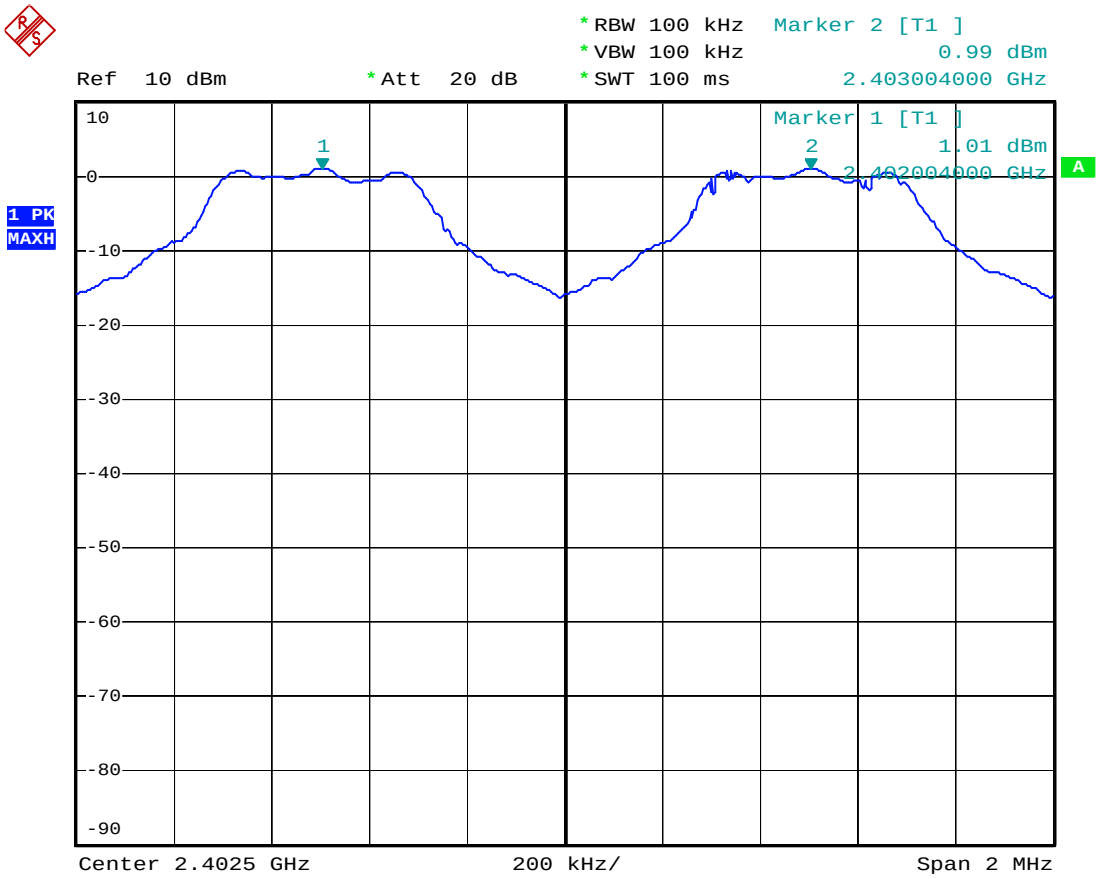
1. Set the EUT under transmission condition continuously at a specific channel frequency.
2. The EUT was set to the highest available power level.

4.1.6 TEST RESULT

Temperature:	24°C	Humidity:	62%RH
Spectrum Detector:	PK	Tested by:	Shunm Wang
Test Result:	PASS	Tested Date:	Feb. 26, 2008

Channel Number	Channel Frequency (MHz)	Separation Read Value (kHz)	Minimum Limit(20dB Bandwidth) (kHz)
0	2402	1000.000	25
39	2441	1004.000	25
78	2480	1000.000	25

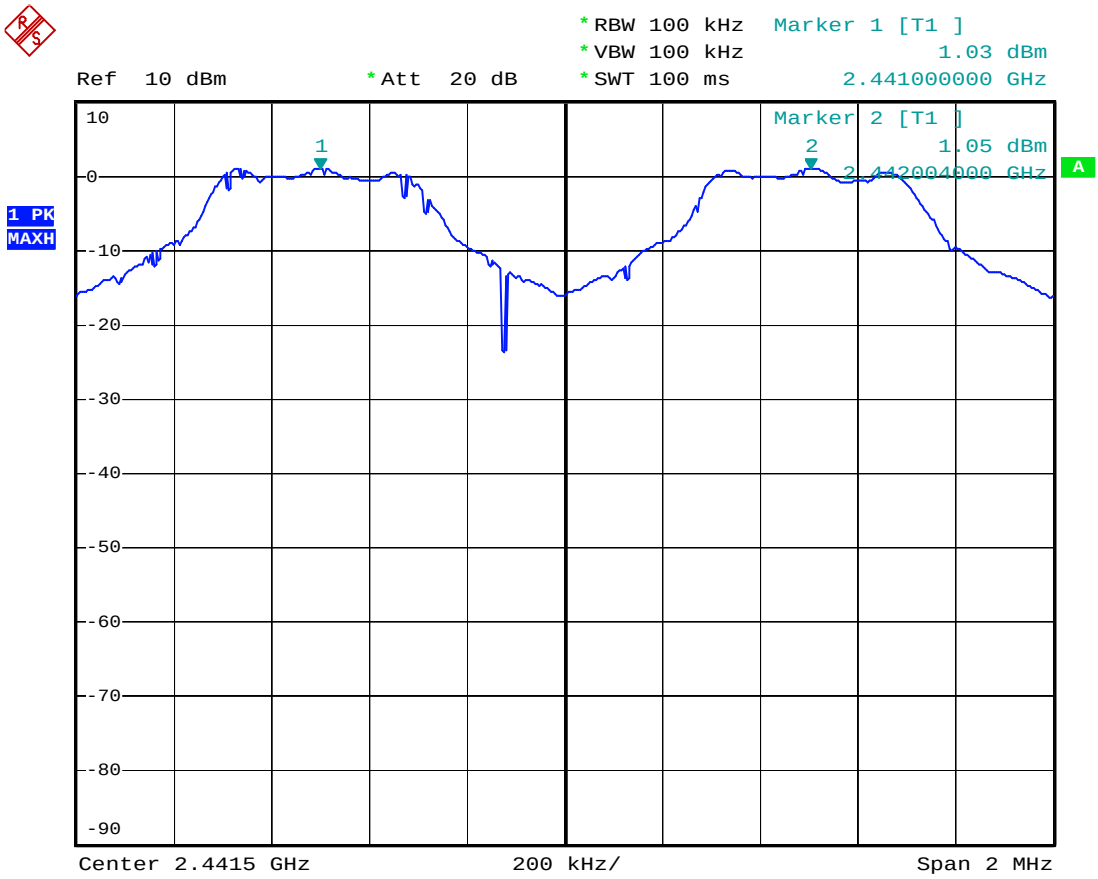
CH0:



-20dB bw

Date: 26.FEB.2008 15:26:02

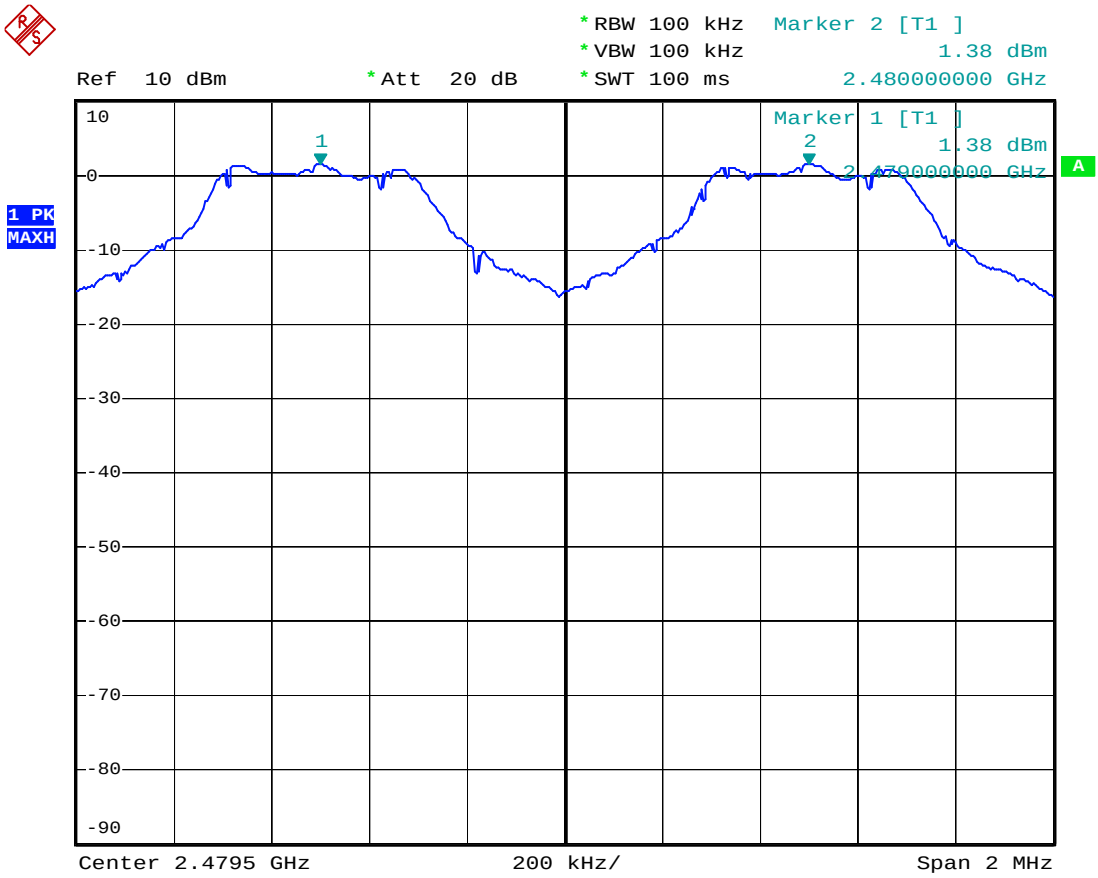
CH39:



-20dB bw

Date: 26.FEB.2008 15:30:24

CH78:



-20dB bw

Date: 26.FEB.2008 15:32:46

4.2 20dB Bandwidth

4.2.2 LIMIT

Frequency Range (MHz)	Limit(kHz)				
	Quantity of Hopping Channel	50	25	15	75
902-928		<250	>250	NA	NA
2400-2483.5		NA	NA	>1000	<1000

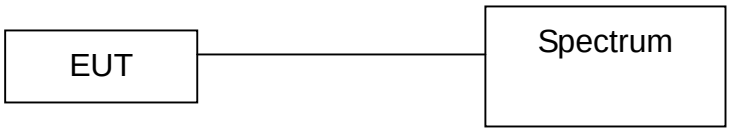
4.2.2 TEST EQUIPMENT

The following test equipment was used during the test:

Equipment/ Facilities	Specifications	Manufacturer	Model#/ Serial#	Due Date of Cal. & Cal. center
SPECTRUM	9kHz-7GHz	ROHDE & SCHWARZ	FSP7/ 839511/010	APR. 2008 R&S

NOTE: The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

4.2.3 TEST SET-UP



The EUT was connected to a spectrum through a 50Ω RF cable.

4.2.4 TEST PROCEDURE

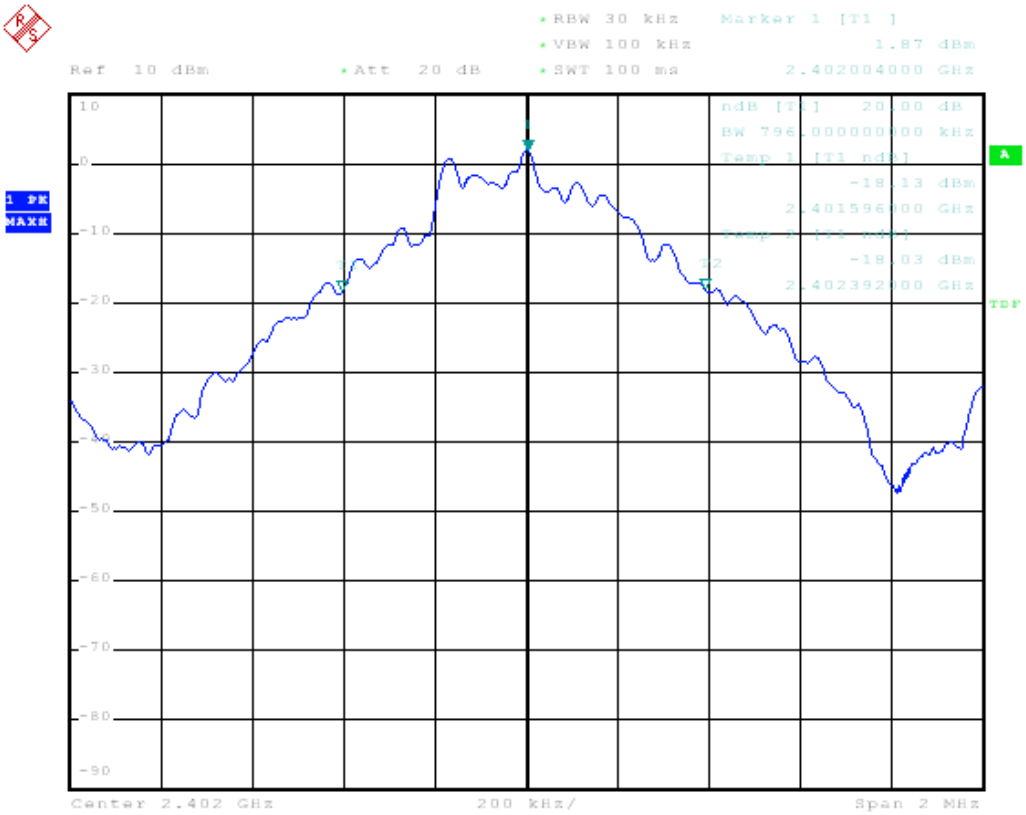
The EUT was operated in hopping mode or any specific channel.
Printed out the test result from the spectrum by hard copy function.

4.2.5 TEST RESULT

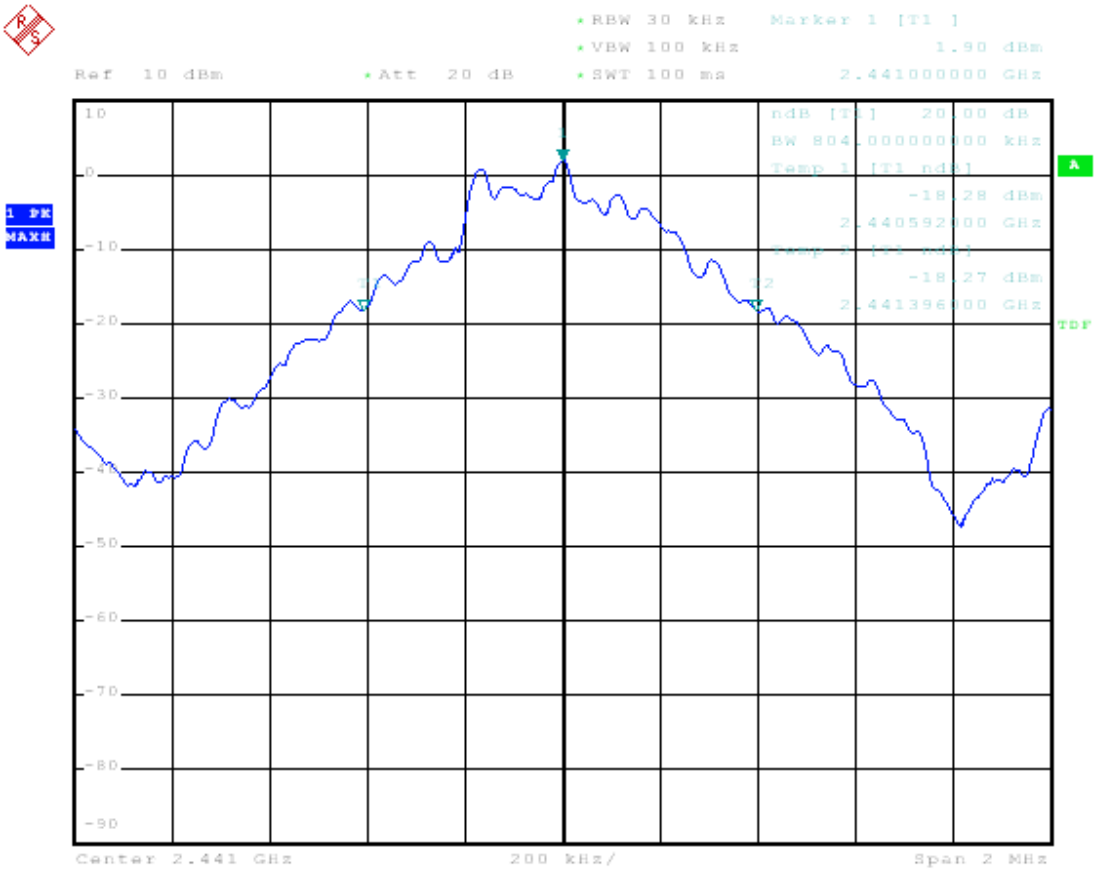
Temperature:	22°C	Humidity:	60%RH
Spectrum Detector:	PK	Tested by:	Shunm Wang
Test Result:	PASS	Tested Date:	Feb. 26, 2008

CHANNEL NUMBER	CHANNEL FREQUENCY (MHz)	20dB Down Bandwidth (kHz)
0	2402	796
39	2441	804
78	2480	796

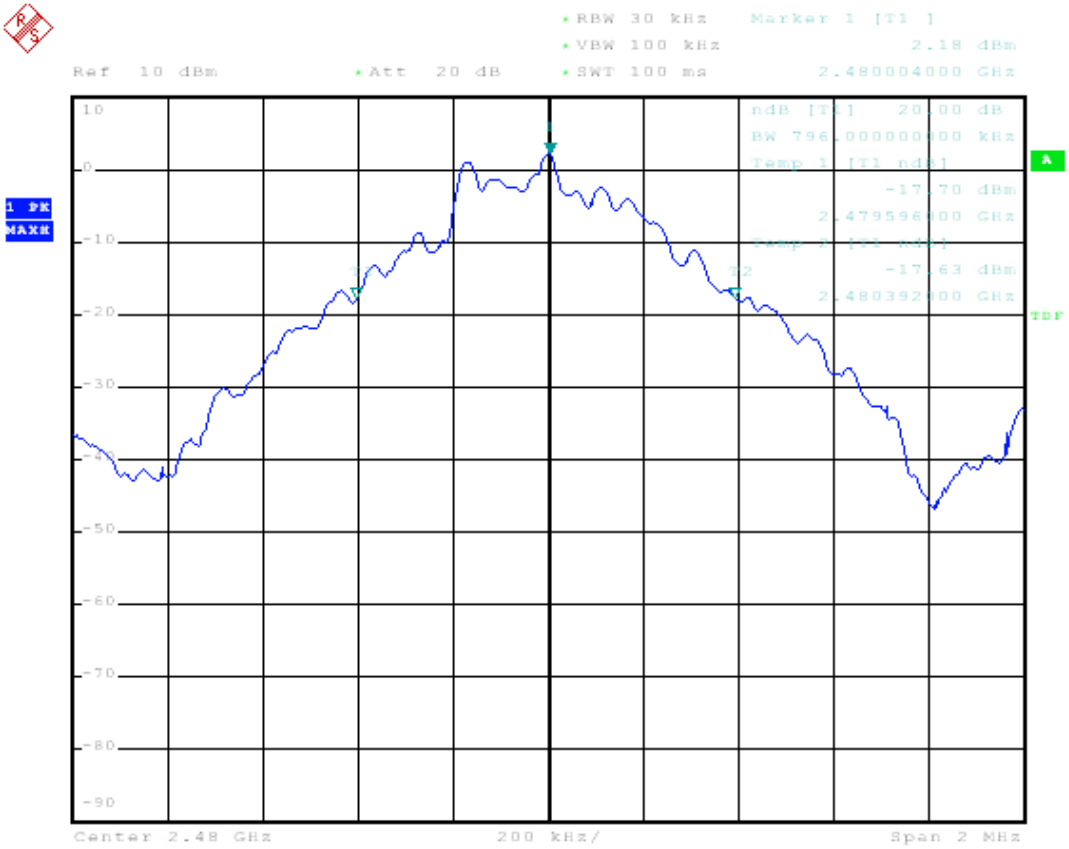
CH 0



Ch 39


RBW 30 kHz
VBW 100 kHz
SWT 100 ms
Marker 1 [T1]
1.90 dBm
2.441000000 GHz
Ref 10 dBm
Att 20 dB
ndB [T1] 20.00 dB
BW 804.000000000 kHz
-18.28 dBm
2.440592000 GHz
-18.27 dBm
2.441396000 GHz
1 PK
MAXH
A
TDF
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.441 GHz
200 kHz/
Span 2 MHz

Ch 78


RBW 30 kHz
VBW 100 kHz
SWT 100 ms
Marker 1 [T1]
2.18 dBm
2.480004000 GHz
Ref 10 dBm
Att 20 dB
ndB [T1] 20.00 dB
BW 796.000000000 kHz
Temp 1 [T1 ndB]
-17.70 dBm
2.479596000 GHz
Temp 2 [T2 ndB]
-17.63 dBm
2.480392000 GHz
1 PK
MAXH
A
TDF
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.48 GHz
200 kHz/
Span 2 MHz

4.3 QUANTITY OF HOPPING CHANNEL TEST

4.3.1 LIMIT

FCC Part15, Subpart C Section 15.247.

Frequency Range (MHz)	Limit (Quantity of Hopping Channel)			
	20dB Bandwidth <250kHZ	20dB Bandwidth >250kHZ	20dB Bandwidth <1MHz	20dB Bandwidth >1MHz
902-928	50	25	N/A	N/A
2400-2483.5	N/A	N/A	75	15
5725-5850	N/A	N/A	75	N/A

4.3.2 TEST EQUIPMENT

The following test equipment was used during the test:

Equipment/ Facilities	Specifications	Manufacturer	Model#/ Serial#	Due Date of Cal. & Cal. Center
SPECTRUM	9kHz-7GHz	ROHDE & SCHWARZ	FSP7/ 839511/010	MAR. 2008 ETC

NOTE: The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

4.3.3 TEST SET-UP

The EUT was connected to a spectrum through a 50Ω RF cable.

4.3.4 TEST PROCEDURE

The EUT was operating in hopping mode or could be controlled its channel.
Printed out the test result from the spectrum by hard copy function.

4.3.5 EUT OPERATING CONDITION

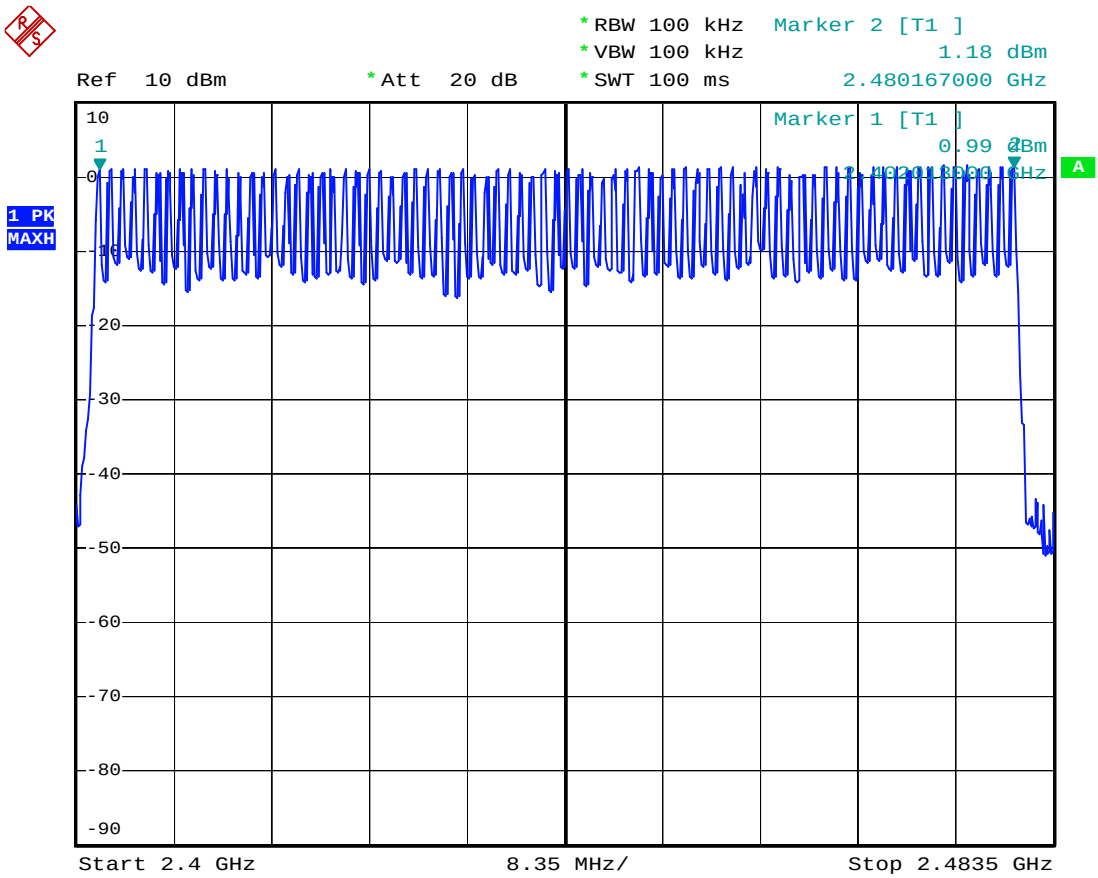
1. Set the EUT under frequency hopping transmission condition.
2. The EUT was set to the highest available power level.

4.3.6 TEST RESULT

Temperature:	24°C	Humidity:	62%RH
Spectrum Detector:	PK	Tested by:	Shunm Wang
Test Result:	PASS	Tested Date:	Feb.26,2008

Hopping Channel Frequency Range(MHz)	Quantity of Hopping Channel Read Value	Quantity of Hopping Channel Limit
2402~2480	79	75

CH0-CH78



-20dB bw

Date: 26.FEB.2008 15:35:47

4.4 TIME OF OCCUPANCY (Dwell Time)

4.4.1 LIMIT

FCC Part15, Subpart C Section 15.247.

Frequency Range (MHz)	Limit (ms)		
	20dB Bandwidth <250kHZ(50Channel)	20dB Bandwidth >250kHZ(25Channel)	20dB Bandwidth <1MHz(75Channel)
902-928	400(20s)	400(10s)	NA
2400-2483.5	NA	NA	400(30s)
5725-5850	NA	NA	400(30s)

NOTE: The "()" is all channel's average time of occupancy.

4.4.2 TEST EQUIPMENT

The following test equipment was used during the test:

Equipment/ Facilities	Specifications	Manufacturer	Model#/ Serial#	Due Date of Cal. & Cal. Center
SPECTRUM	9kHz-7GHz	ROHDE & SCHWARZ	FSP7/ 839511/010	MAR. 2008 ETC

NOTE: The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

4.4.3 TEST SET-UP

The EUT was connected to a spectrum through a 50Ω RF cable.

4.4.4 TEST PROCEDURE

The EUT was operating in hopping mode or could be controlled its channel.
Printed out the test result from the spectrum by hard copy function.

4.4.5 EUT OPERATING CONDITION

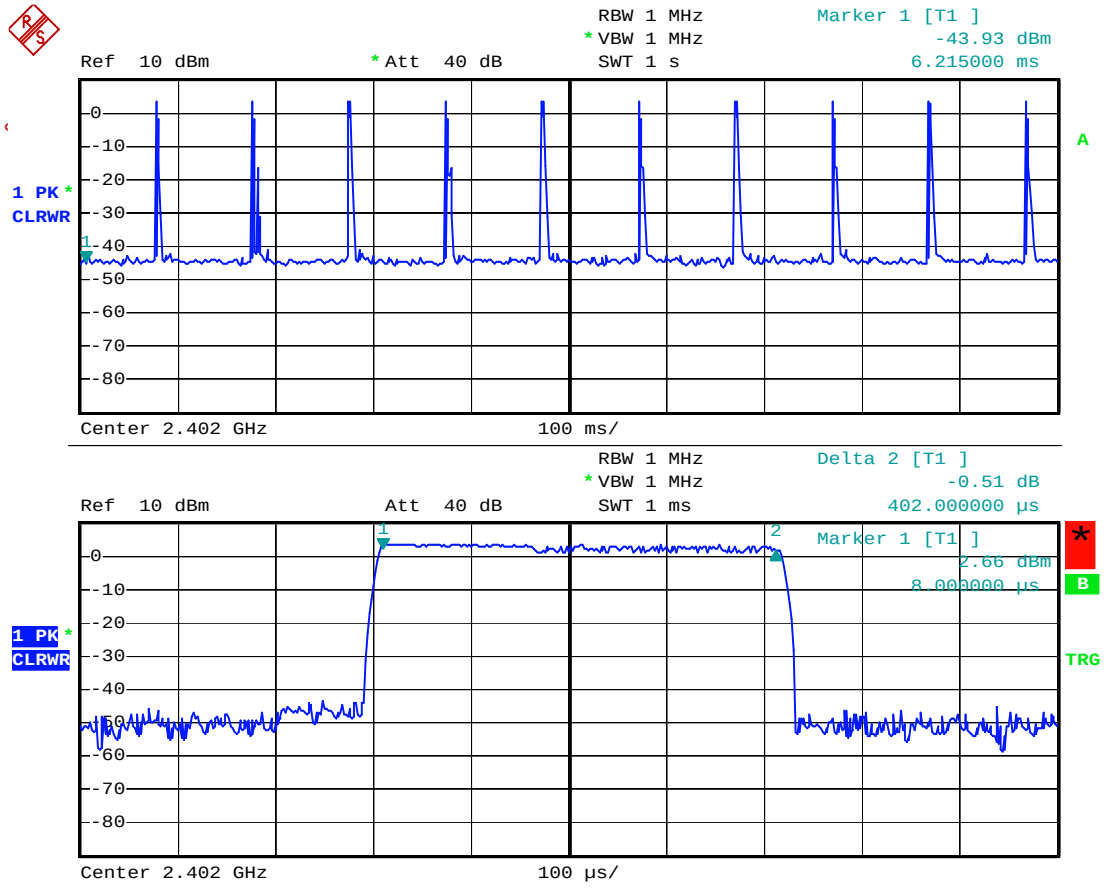
Same as section 4.1.5 of this report.

4.4.6 TEST RESULT

Temperature:	24°C	Humidity:	64%RH
Spectrum Detector:	PK	Tested by:	Shunm Wang
Test Result:	PASS	Tested Date:	Feb. 26,2008

Channel Number	Channel Frequency (MHz)	Pulse Time (μs)	Period Time (s)	Time of Occupancy (Dwell Time) (ms)	Average Time of Occupancy Limit (ms)
0	2402.00	402	31.6	127.032	400
39	2441.00	392	31.6	123.872	400
78	2480.00	394	31.6	124.504	400

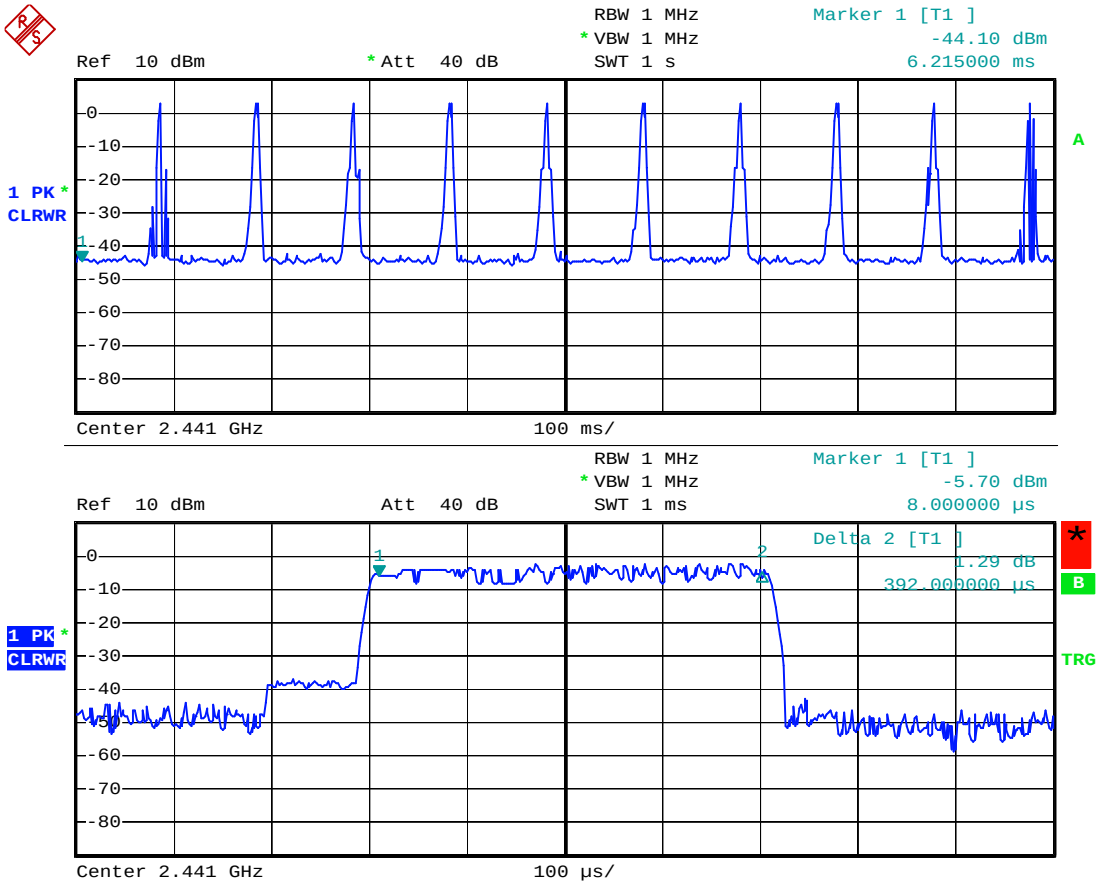
CH0:



-20dB bw

Date: 26.FEB.2008 14:49:07

Ch39:

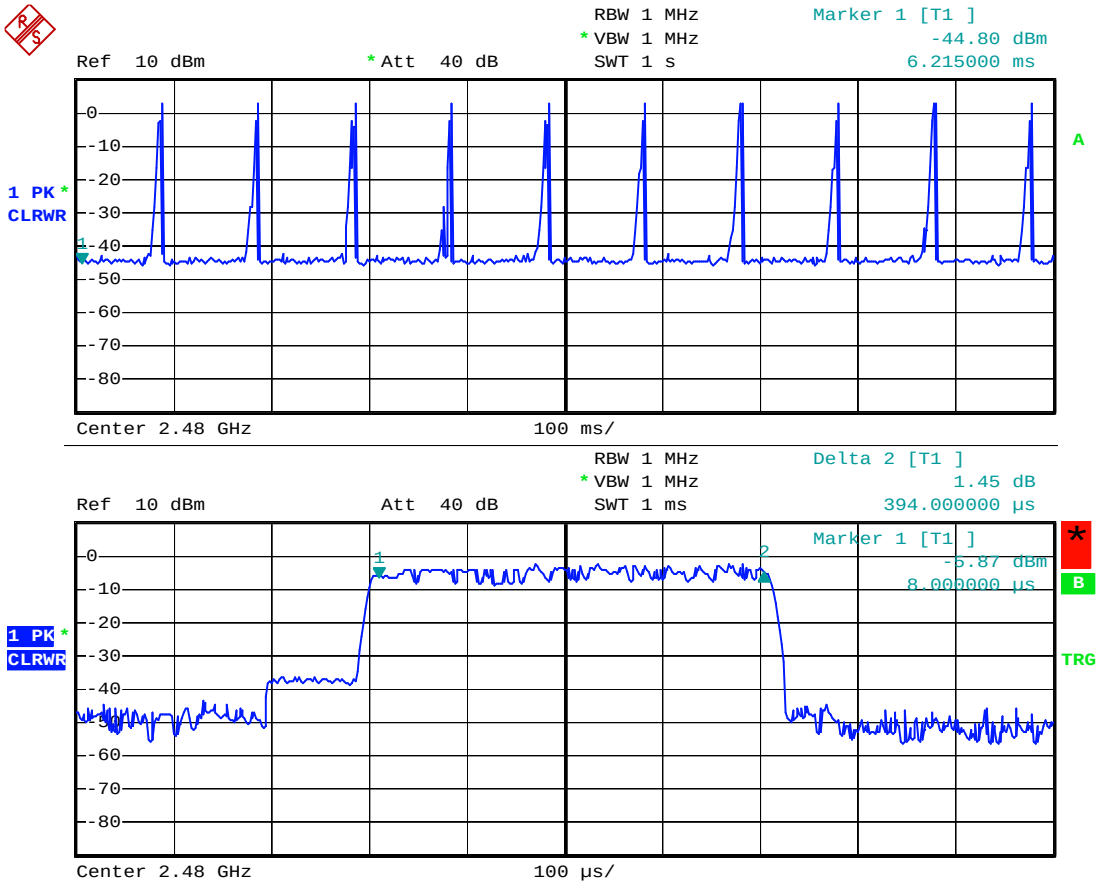


-20dB bw

Date: 26.FEB.2008 14:45:00

Date: 26.FEB.2008 14:45:00

CH78:



-20dB bw

Date: 26.FEB.2008 14:47:29

4.5 CONDUCTED EMISSION

4.5.1 LIMIT

FREQUENCY (MHz)	Class A (dBμV)		Class B (dBμV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.5 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

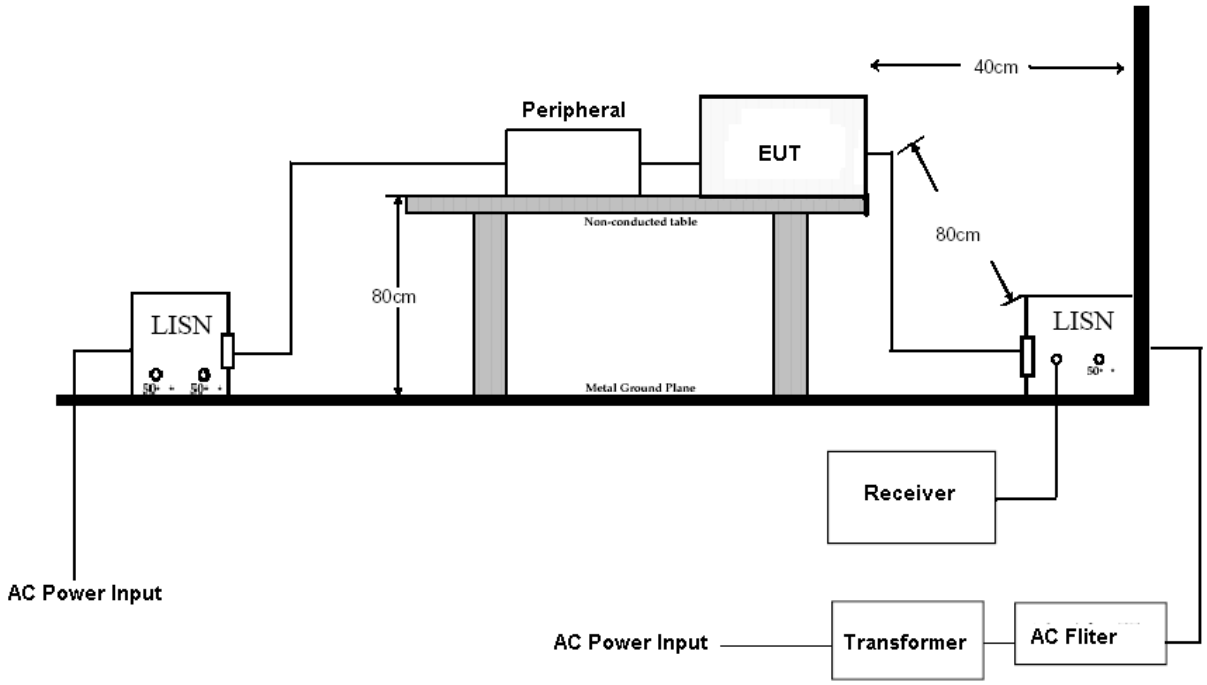
4.5.2 TEST EQUIPMENT

The following test equipment was used for the test:

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
EMI TEST RECEIVER	9 kHz TO 30 MHz	ROHDE & SCHWARZ	ESHS30 / 826003/008	SEP. 2008 ETC
LISN	50 μH, 50 ohm	FCC	FCC-LISN-50-25-2 / 01017	OCT. 2008 ETC
LISN	50μH, 50 ohm	FCC	9252-50-R24-BNC / 951315	JUN. 2008 ETC
50 OHM TERMINATOR	50 ohm	HP	11593A / #2	OCT. 2008 ETC
COAXIAL CABLE	5M	TIMES	EQM-0159 / #5-5m	AUG. 2008 SRT
FILTER	2 LINE, 30A	FIL.COIL	FC-943 / 771	NCR
GROUND PLANE	2.3M (H) x 2.4M (W)	SRT	N/A	NCR
GROUND PLANE	2.4M (H) x 2.4M (W)	SRT	N/A	NCR

NOTE: The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

4.5.3 TEST SETUP



NOTE:

1. The EUT was put on a wooden table with 0.8m height above ground plane, and 0.4m away from reference ground plane (> 2mx2m).
2. For the actual test configuration, please refer to the photos of testing.
3. The serial no. of the LISN connected to EUT is 951318.
4. The serial no. of the LISN connected to support units is 924839.

4.5.4 TEST PROCEDURE

The EUT was tested according to the requirement of ANSI C63.4: 2003 and CISRP22:2006. The frequency spectrum from 0.15 MHz to 30 MHz was investigated. The LISN used was 50 ohm/50µH as specified. All readings were quasi-peak and average values with 10 kHz resolution bandwidth of the test receiver. The EUT system was operated in all typical methods by users. Both lines of the power mains of EUT were measured and the cables connected to EUT and support units were moved to find the maximum emission levels for each frequency.

4.5.5 EUT OPERATING CONDITION

Set the EUT under transmission condition continuously at a specific channel frequency.

Under Windows XP ran “EMI TEST” program, PC sent “H” pattern or accessed the following peripherals:

- Notebook
- Dongle

4.5.6 TEST RESULT

Temperature:	18°C	Humidity:	55%RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	CH0
Receiver Detector:	Q.P. and AV.	Tested By:	Shunm Wang
		Tested Date:	Mar. 04, 2008

Power Line Measured : Line

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBμV)		Emission Level (dBμV)		Limit (dBμV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.168	0.30	51.76	40.01	52.06	40.31	65.04	55.04	-12.98	-14.73
0.174	0.30	52.42	42.93	52.72	43.23	64.75	54.75	-12.03	-11.52
0.812	0.19	39.54	35.17	39.73	35.36	56.00	46.00	-16.27	-10.64
1.220	0.14	32.56	28.25	32.70	28.39	56.00	46.00	-23.30	-17.61
1.329	0.15	36.12	33.45	36.27	33.60	56.00	46.00	-19.73	-12.40
14.592	0.25	27.80	18.47	28.05	18.72	60.00	50.00	-31.95	-31.28

Power Line Measured : Neutral

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBμV)		Emission Level (dBμV)		Limit (dBμV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.165	0.30	51.88	34.03	52.18	34.33	65.19	55.19	-13.01	-20.86
0.174	0.30	51.58	41.17	51.88	41.47	64.75	54.75	-12.87	-13.28
0.519	0.24	36.68	32.31	36.92	32.55	56.00	46.00	-19.08	-13.45
3.526	0.19	35.24	25.72	35.43	25.91	56.00	46.00	-20.57	-20.09
3.705	0.19	35.94	27.06	36.13	27.25	56.00	46.00	-19.87	-18.75
5.670	0.22	31.38	25.32	31.60	25.54	60.00	50.00	-28.40	-24.46

NOTE :

1. Measurement uncertainty is +/-2dB
2. Emission level = Reading value + Correction factor
3. Correction Factor = Cable loss + Insertion loss of LISN
4. Margin value = Emission level - Limit
5. The emission of other frequencies was very low against the limit.
6. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.

Temperature:	18°C	Humidity:	55%RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	CH39
Receiver Detector:	Q.P. and AV.	Tested By:	Shunm Wang
		Tested Date:	Mar. 04, 2008

Power Line Measured : Line

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBμV)		Emission Level (dBμV)		Limit (dBμV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.168	0.30	50.80	39.12	51.10	39.42	65.04	55.04	-13.94	-15.62
0.174	0.30	51.66	42.28	51.96	42.58	64.75	54.75	-12.79	-12.17
0.519	0.24	39.34	31.99	39.58	32.23	56.00	46.00	-16.42	-13.77
1.210	0.14	35.00	31.52	35.14	31.66	56.00	46.00	-20.86	-14.34
1.329	0.15	37.86	33.63	38.01	33.78	56.00	46.00	-17.99	-12.22
14.206	0.25	26.62	19.51	26.87	19.76	60.00	50.00	-33.13	-30.24

Power Line Measured : Neutral

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBμV)		Emission Level (dBμV)		Limit (dBμV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.165	0.30	52.00	35.26	52.30	35.56	65.19	55.19	-12.89	-19.63
0.168	0.30	50.58	37.28	50.88	37.58	65.04	55.04	-14.16	-17.46
0.519	0.24	37.02	31.45	37.26	31.69	56.00	46.00	-18.74	-14.31
3.734	0.19	30.10	13.79	30.29	13.98	56.00	46.00	-25.71	-32.02
3.873	0.20	36.04	27.42	36.24	27.62	56.00	46.00	-19.76	-18.38
5.842	0.22	30.98	24.35	31.20	24.57	60.00	50.00	-28.80	-25.43

NOTE :

1. Measurement uncertainty is +/-2dB
2. Emission level = Reading value + Correction factor
3. Correction Factor = Cable loss + Insertion loss of LISN
4. Margin value = Emission level - Limit
5. The emission of other frequencies was very low against the limit.
6. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.

Temperature:	18°C	Humidity:	55%RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	CH78
Receiver Detector:	Q.P. and AV.	Tested By:	Shunm Wang
		Tested Date:	Mar. 04, 2008

Power Line Measured : Line

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBμV)		Emission Level (dBμV)		Limit (dBμV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.150	0.30	35.44	19.02	35.74	19.32	65.98	55.98	-30.24	-36.66
0.498	0.25	33.44	31.54	33.69	31.79	56.02	46.02	-22.33	-14.23
3.061	0.18	27.34	16.22	27.52	16.40	56.00	46.00	-28.48	-29.60
3.635	0.19	28.14	16.73	28.33	16.92	56.00	46.00	-27.67	-29.08
5.721	0.22	24.26	16.91	24.48	17.13	60.00	50.00	-35.52	-32.87
5.893	0.22	23.28	15.66	23.50	15.88	60.00	50.00	-36.50	-34.12

Power Line Measured : Neutral

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBμV)		Emission Level (dBμV)		Limit (dBμV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.165	0.30	51.70	34.68	52.00	34.98	65.19	55.19	-13.19	-20.21
0.174	0.30	51.86	42.36	52.16	42.66	64.75	54.75	-12.59	-12.09
0.984	0.17	39.04	35.05	39.21	35.22	56.00	46.00	-16.79	-10.78
1.210	0.14	34.30	31.19	34.44	31.33	56.00	46.00	-21.56	-14.67
1.329	0.15	37.64	34.76	37.79	34.91	56.00	46.00	-18.21	-11.09
15.082	0.25	27.76	19.49	28.01	19.74	60.00	50.00	-31.99	-30.26

NOTE :

1. Measurement uncertainty is +/-2dB
2. Emission level = Reading value + Correction factor
3. Correction Factor = Cable loss + Insertion loss of LISN
4. Margin value = Emission level - Limit
5. The emission of other frequencies was very low against the limit.
6. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.

Temperature:	18°C	Humidity:	55%RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	Charge
Receiver Detector:	Q.P. and AV.	Tested By:	Shunm Wang
		Tested Date:	Mar. 04, 2008

Power Line Measured : Line

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBμV)		Emission Level (dBμV)		Limit (dBμV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.168	0.30	51.76	40.10	52.06	40.40	65.04	55.04	-12.98	-14.64
0.174	0.30	52.42	42.93	52.72	43.23	64.75	54.75	-12.03	-11.52
0.812	0.19	39.54	35.17	39.73	35.36	56.00	46.00	-16.27	-10.64
1.220	0.14	32.56	28.25	32.70	28.39	56.00	46.00	-23.30	-17.61
1.329	0.15	36.12	33.45	36.27	33.60	56.00	46.00	-19.73	-12.40
14.592	0.25	27.80	18.47	28.05	18.72	60.00	50.00	-31.95	-31.28

Power Line Measured : Neutral

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBμV)		Emission Level (dBμV)		Limit (dBμV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.171	0.30	49.68	40.76	49.98	41.06	64.89	54.89	-14.91	-13.83
0.174	0.30	50.78	41.86	51.08	42.16	64.75	54.75	-13.67	-12.59
0.519	0.24	37.60	35.05	37.84	35.29	56.00	46.00	-18.16	-10.71
3.754	0.19	36.46	29.86	36.65	30.05	56.00	46.00	-19.35	-15.95
3.863	0.20	33.14	25.76	33.34	25.96	56.00	46.00	-22.66	-20.04
5.832	0.22	31.24	26.71	31.46	26.93	60.00	50.00	-28.54	-23.07

NOTE :

1. Measurement uncertainty is +/-2dB
2. Emission level = Reading value + Correction factor
3. Correction Factor = Cable loss + Insertion loss of LISN
4. Margin value = Emission level - Limit
5. The emission of other frequencies was very low against the limit.
6. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.

Temperature:	18°C	Humidity:	55%RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	Link
Receiver Detector:	Q.P. and AV.	Tested By:	Shunm Wang
		Tested Date:	Mar. 04, 2008

Power Line Measured : Line

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBμV)		Emission Level (dBμV)		Limit (dBμV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.165	0.30	51.70	34.68	52.00	34.98	65.19	55.19	-13.19	-20.21
0.174	0.30	51.86	42.36	52.16	42.66	64.75	54.75	-12.59	-12.09
0.984	0.17	39.04	35.05	39.21	35.22	56.00	46.00	-16.79	-10.78
1.210	0.14	34.30	31.19	34.44	31.33	56.00	46.00	-21.56	-14.67
1.329	0.15	37.64	34.76	37.79	34.91	56.00	46.00	-18.21	-11.09
15.082	0.25	27.76	19.49	28.01	19.74	60.00	50.00	-31.99	-30.26

Power Line Measured : Neutral

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBμV)		Emission Level (dBμV)		Limit (dBμV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.165	0.30	51.40	34.09	51.70	34.39	65.19	55.19	-13.49	-20.80
0.168	0.30	50.12	37.33	50.42	37.63	65.04	55.04	-14.62	-17.41
0.519	0.24	37.06	31.06	37.30	31.30	56.00	46.00	-18.70	-14.70
2.774	0.17	35.70	28.66	35.87	28.83	56.00	46.00	-20.13	-17.17
4.160	0.20	34.06	27.51	34.26	27.71	56.00	46.00	-21.74	-18.29
5.721	0.22	31.82	24.36	32.04	24.58	60.00	50.00	-27.96	-25.42

NOTE :

1. Measurement uncertainty is +/-2dB
2. Emission level = Reading value + Correction factor
3. Correction Factor = Cable loss + Insertion loss of LISN
4. Margin value = Emission level - Limit
5. The emission of other frequencies was very low against the limit.
6. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.

Temperature:	18°C	Humidity:	55%RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	Standby
Receiver Detector:	Q.P. and AV.	Tested By:	Shunm Wang
		Tested Date:	Mar. 04, 2008

Power Line Measured : Line

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBμV)		Emission Level (dBμV)		Limit (dBμV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.168	0.30	50.80	39.12	51.10	39.42	65.04	55.04	-13.94	-15.62
0.174	0.30	51.66	42.28	51.96	42.58	64.75	54.75	-12.79	-12.17
0.519	0.24	39.34	31.99	39.58	32.23	56.00	46.00	-16.42	-13.77
1.210	0.14	35.00	31.52	35.14	31.66	56.00	46.00	-20.86	-14.34
1.329	0.15	37.86	33.63	38.01	33.78	56.00	46.00	-17.99	-12.22
14.206	0.25	26.62	19.51	26.87	19.76	60.00	50.00	-33.13	-30.24

Power Line Measured : Neutral

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBμV)		Emission Level (dBμV)		Limit (dBμV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.171	0.30	49.40	40.42	49.70	40.72	64.89	54.89	-15.19	-14.17
1.129	0.14	30.84	12.43	30.98	12.57	56.00	46.00	-25.02	-33.43
3.408	0.19	34.96	24.89	35.15	25.08	56.00	46.00	-20.85	-20.92
3.635	0.19	35.78	27.07	35.97	27.26	56.00	46.00	-20.03	-18.74
5.548	0.22	29.72	21.36	29.94	21.58	60.00	50.00	-30.06	-28.42
6.066	0.22	30.60	22.69	30.82	22.91	60.00	50.00	-29.18	-27.09

NOTE :

1. Measurement uncertainty is +/-2dB
2. Emission level = Reading value + Correction factor
3. Correction Factor = Cable loss + Insertion loss of LISN
4. Margin value = Emission level - Limit
5. The emission of other frequencies was very low against the limit.
6. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.

4.6 RADIATED EMISSION TEST

4.6.1 LIMIT

FCC Part15, Subpart C Section 15.209 limit of radiated emission measurement for frequency below 1000 MHz. The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

FREQUENCY (MHz)	DISTANCE(m)	FIELD STRENGTH (dBμV/m)
30 – 88	3	40.0
88 - 216	3	43.5
216 - 960	3	46.0
ABOVE 960	3	54.0

NOTE:

1. In the emission tables above, the tighter limit applies at the band edges.
2. Distance refers to the distance between measuring instrument, antenna, and the closest point of any part of the device or system.

FCC Part 15, Subpart 15.35(b) limit of radiated emission for frequency above 1000MHz

FREQUENCY (MHz)	Class A (dBμV/m) (at 3m)		Class B (dBμV/m) (at 3m)	
	PK.	AV.	PK.	AV.
Above 1000	80.0	60.0	74.0	54.0

FCC Part 15, Subpart C Section 15.249. The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

FUNDAMENTAL FREQUENCY (MHz)	FILED STRENGTH OF FUNDAMENTAL (dBμV/m) (at 3m)		FIELD STRENGTH OF HARMONICS (dBμV/m) (at 3m)	
	PK.	AV.	PK.	AV.
902-928	114	94	74.0	54.0
2400-2483.5	114	94	74.0	54.0
5725-5875	114	94	74.0	54.0
24000-24250	128	108	88	68

4.6.2TEST EQUIPMENT

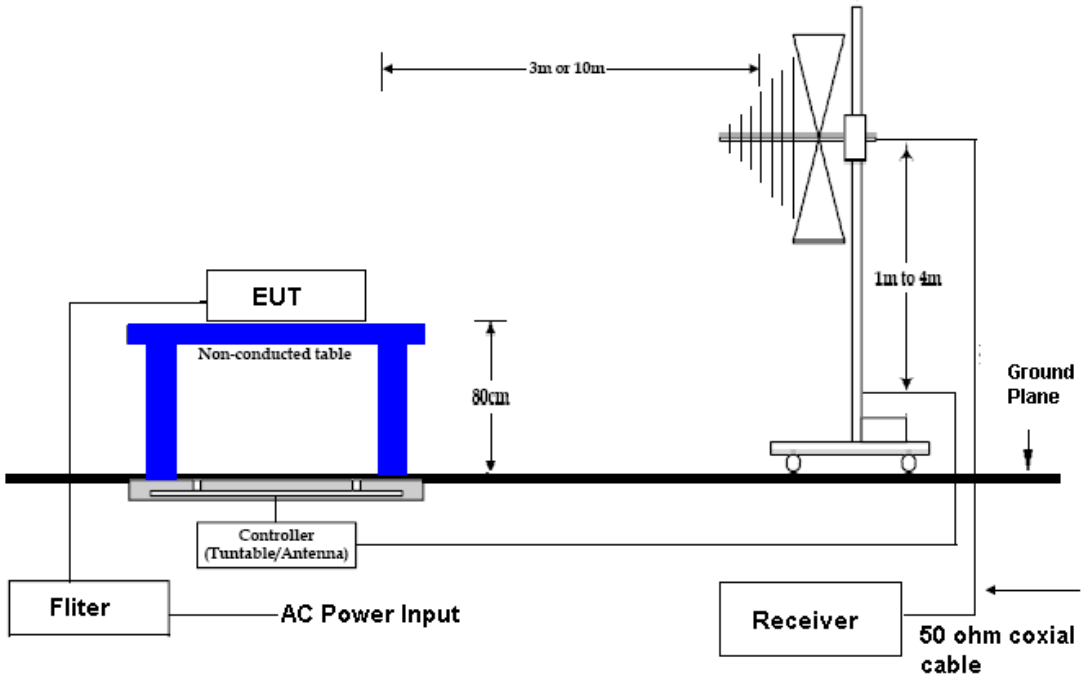
The following test equipment was used during the radiated emission test:

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
EMI TEST RECEIVER	9kHz TO 2.75 GHz	ROHDE & SCHWARZ	ESCS30/ 830245/012	OCT. 2008 ETC
SPECTRUM ANALYZER	PK-40GHz	ROHDE & SCHWARZ	FSP40/ 100093	SEP 2008 ETC
BI-LOG ANTENNA	25 MHz TO 2 GHz	EMCO	3142B/ 0005-1534	NOV. 2008 ETC
PRE-AMPLIFIER	1 GHz TO 26.5 GHz	HP	8449B/ 3008A01995	SEP. 2008 ETC
HORN ANTENNA	1 GHz TO 18 GHz	EMCO	3115/ 9602-4681	JAN. 2009 ETC
OATS	3 – 10 M MEASUREMENT	SRT	SRT-1	NOV. 2008 SRT
COAXIAL CABLE	25M	TIMES	J400/ #25M	AUG. 2008 ETC
FILTER	2 LINE, 30A	FIL.COIL	FC-943/ 869	NCR

NOTE:

1. The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.
2. The Open Area Test Site (SRT-1) is registered by FCC with No. 90957 and VCCI with No. R-1081.
3. The Open Area Test Site (SRT-2) is registered by FCC with No. 98458 and VCCI with No. R-1168.

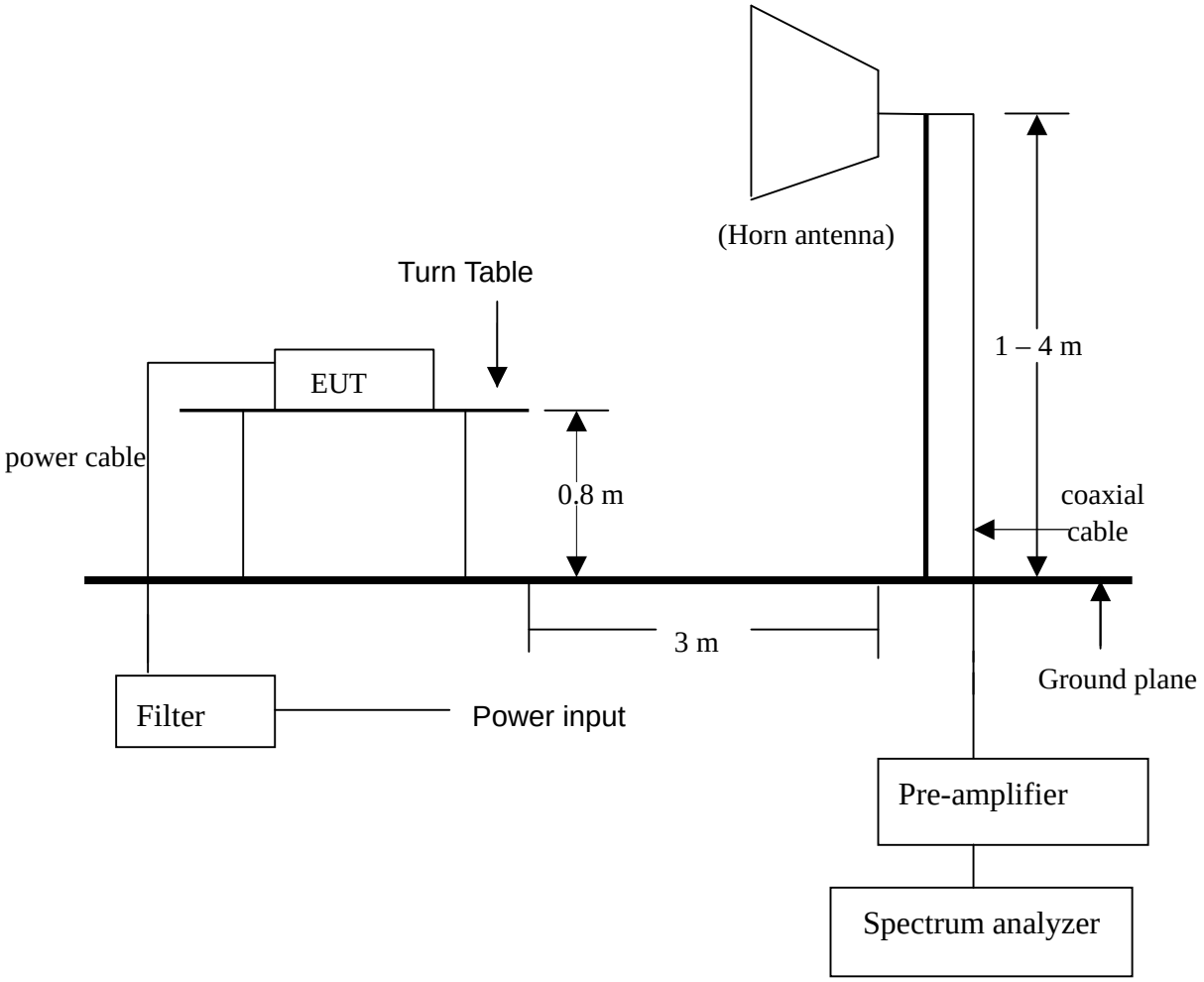
4.6.3 TEST SET-UP (30MHz – 1000MHz)



NOTE :

1. The EUT system was put on a wooden table with 0.8m heights above a ground plane.
2. For the actual test configuration, please refer to the photos of testing.

TEST SET- UP (1GHz - 25GHz)



NOTE :

1.The EUT system was put on a wooden table with 0.8m heights above a ground plane.

2.For the actual test configuration, please refer to the photos of testing.

4.6.4 TEST PROCEDURE

The EUT was tested according to the requirement of ANSI C63.4:2003 and CISPR 22:2006. The measurements were made at an open area test site with 10 meter measurement distance under 1 GHz and with 3m distance above 1GHz. The frequency spectrum measured started from 30 MHz. Under 1 GHz, all readings were quasi-peak values with 120 kHz resolution bandwidth of the test receiver. Above 1 GHz, the measurements were made at an open area test site with 3 meter measurement distance and all readings were peak or average values with 1 MHz resolution bandwidth of the test receiver. The EUT system was operated in all typical methods by users. The cables connected to EUT and support units were moved to find the maximum emission levels for each frequency.
First, Find the margin or higher points at least 6 points by software, then use manual to find the maximum data. The procedure is referred on the test procedure of SRT LAB.

4.6.5 EUT OPERATING CONDITION

Same as section 4.1.5 of this report.

4.6.6 RADIATED EMISSION TEST RESULT

Temperature:	20°C	Humidity:	59%RH
Ferquency Range:	30 – 1000 MHz	Test mode:	CH0
Receiver Detector:	Q.P.	Measured Distance:	3m
Tested by:	Shunm Wang	Tested Date:	Mar. 03, 2008

Antenna Polarization：Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dBμV/m)	AZ(°)	EL(m)
63.9930	1.06	4.53	20.3	25.9	40.0	-14.1	215	2.25
243.1969	2.24	11.21	14.1	27.5	46.0	-18.5	144	1.87
257.1353	2.52	11.86	15.5	29.9	46.0	-16.1	155	1.69
271.5572	2.20	12.59	16.4	31.2	46.0	-14.8	330	1.42
432.8169	3.01	16.62	12.6	32.2	46.0	-13.8	21	1.51
801.9750	5.22	21.43	15.9	42.5	46.0	-3.5	23	1.07

Antenna Polarization：Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dBμV/m)	AZ(°)	EL(m)
34.1146	0.57	11.96	16.1	28.6	40.0	-11.4	30	1
108.9919	1.59	7.44	22.3	31.3	43.5	-12.2	270	1
189.3336	1.96	9.34	16.5	27.8	43.5	-15.7	105	1.05
213.1681	2.00	9.95	18.6	30.5	43.5	-13.0	229	1
284.3156	2.64	13.27	13.5	29.4	46.0	-16.6	44	1.46
801.9748	5.22	21.43	12.6	39.2	46.0	-6.8	26	1.04

NOTE : 1. Measurement uncertainty is less than +/-2dB
2. "*": Measurement does not apply for this frequency.
3. Emissiom Level = Reading Value + Ant. Factor + Cable Loss
4. The field strength of other emission frequencies were very low against the limit.

Temperature:	20°C	Humidity:	59%RH
Ferquency Range:	30 – 1000 MHz	Test mode:	CH39
Receiver Detector:	Q.P.	Measured Distance:	3m
Tested by:	Shunm Wang	Tested Date:	Mar. 03, 2008

Antenna Polarization：Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dBμV/m)	AZ(°)	EL(m)
63.9930	1.06	4.53	19.9	25.5	40.0	-14.5	210	2.18
243.1969	2.24	11.21	13.8	27.2	46.0	-18.8	139	1.69
257.1353	2.52	11.86	15.1	29.5	46.0	-16.5	150	1.72
271.5572	2.20	12.59	16.2	31.0	46.0	-15.0	324	1.44
432.8169	3.01	16.62	12.7	32.3	46.0	-13.7	28	1.49
813.5932	5.05	21.76	15.8	42.6	46.0	-3.4	165	1.38

Antenna Polarization：Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dBμV/m)	AZ(°)	EL(m)
34.1146	0.57	11.96	15.8	28.3	40.0	-11.7	26	1.01
108.9919	1.59	7.44	21.9	30.9	43.5	-12.6	261	1.1
189.3336	1.96	9.34	16.3	27.6	43.5	-15.9	100	1.1
213.1681	2.00	9.95	18.3	30.2	43.5	-13.3	231	1
284.3156	2.64	13.27	13.2	29.1	46.0	-16.9	46	1.42
813.5931	5.05	21.76	13.9	40.7	46.0	-5.3	171	1.29

NOTE : 1. Measurement uncertainty is less than +/-2dB
2. "*": Measurement does not apply for this frequency.
3. Emissiom Level = Reading Value + Ant. Factor + Cable Loss
4. The field strength of other emission frequencies were very low against the limit.

Temperature:	20°C	Humidity:	59%RH
Ferquency Range:	30 – 1000 MHz	Test mode:	CH78
Receiver Detector:	Q.P.	Measured Distance:	3m
Tested by:	Shunm Wang	Tested Date:	Mar. 03, 2008

Antenna Polarization：Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dBμV/m)	AZ(°)	EL(m)
63.9930	1.06	4.53	20.2	25.8	40.0	-14.2	213	2.19
243.1969	2.24	11.21	14.2	27.6	46.0	-18.4	146	1.82
257.1353	2.52	11.86	15.4	29.8	46.0	-16.2	152	1.65
271.5572	2.20	12.59	16.2	31.0	46.0	-15.0	336	1.43
432.8169	3.01	16.62	12.4	32.0	46.0	-14.0	25	1.5
827.9850	4.86	22.16	15.8	42.8	46.0	-3.2	41	1.1

Antenna Polarization：Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dBμV/m)	AZ(°)	EL(m)
34.1146	0.57	11.96	16.2	28.7	40.0	-11.3	27	1
108.9919	1.59	7.44	22.0	31.0	43.5	-12.5	261	1
189.3336	1.96	9.34	16.2	27.5	43.5	-16.0	109	1
213.1681	2.00	9.95	18.7	30.6	43.5	-12.9	228	1
284.3156	2.64	13.27	13.6	29.5	46.0	-16.5	41	1.39
827.9852	4.86	22.16	15.6	42.6	46.0	-3.4	10	1

NOTE : 1. Measurement uncertainty is less than +/-2dB

2. "*": Measurement does not apply for this frequency.

3. Emissiom Level = Reading Value + Ant. Factor + Cable Loss

4. The field strength of other emission frequencies were very low against the limit.

Temperature:	20°C	Humidity:	59%RH
Ferquency Range:	30 – 1000 MHz	Test mode:	Charge
Receiver Detector:	Q.P.	Measured Distance:	3m
Tested by:	Shunm Wang	Tested Date:	Mar. 03, 2008

Antenna Polarization：Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dBμV/m)	AZ(°)	EL(m)
30.2835	0.31	13.60	20.5	34.4	40.0	-5.6	351	1.9
326.2160	2.83	14.65	13.5	31.0	46.0	-15.0	59	1.6
596.7100	3.72	19.13	12.5	35.3	46.0	-10.7	106	1.4
670.1300	4.47	20.60	10.0	35.1	46.0	-10.9	35	1
864.5200	4.59	23.19	11.9	39.7	46.0	-6.3	199	1
936.5127	4.86	23.23	9.8	37.9	46.0	-8.1	261	1.1

Antenna Polarization：Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dBμV/m)	AZ(°)	EL(m)
30.2841	0.31	13.60	21.3	35.2	40.0	-4.8	2	1
167.5610	1.95	8.59	17.9	28.4	43.5	-15.1	315	1.3
235.1560	2.09	10.87	15.1	28.1	46.0	-17.9	271	1.2
596.7600	3.72	19.13	13.6	36.4	46.0	-9.6	115	1
702.2256	4.01	21.20	15.9	41.1	46.0	-4.9	33	1
936.5130	4.86	23.23	9.7	37.8	46.0	-8.2	256	1.15

NOTE : 1. Measurement uncertainty is less than +/-2dB

2. "*": Measurement does not apply for this frequency.

3. Emissiom Level = Reading Value + Ant. Factor + Cable Loss

4. The field strength of other emission frequencies were very low against the limit.

Temperature:	20°C	Humidity:	59%RH
Ferquency Range:	30 – 1000 MHz	Test mode:	Link
Receiver Detector:	Q.P.	Measured Distance:	3m
Tested by:	Shunm Wang	Tested Date:	Mar. 03, 2008

Antenna Polarization：Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dBμV/m)	AZ(°)	EL(m)
63.9940	1.06	4.53	20.1	25.7	40.0	-14.3	218	2.3
243.1960	2.24	11.21	14.2	27.6	46.0	-18.4	141	1.9
257.1360	2.52	11.86	15.7	30.1	46.0	-15.9	151	1.67
271.5560	2.20	12.59	16.1	30.9	46.0	-15.1	333	1.4
432.8100	3.01	16.62	12.8	32.4	46.0	-13.6	18	1.5
570.9100	3.69	18.69	10.1	32.5	46.0	-13.5	207	1.2

Antenna Polarization：Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dBμV/m)	AZ(°)	EL(m)
34.1160	0.57	11.96	16.0	28.5	40.0	-11.5	36	1
108.9913	1.59	7.44	22.1	31.1	43.5	-12.4	268	1
189.3347	1.96	9.34	16.7	28.0	43.5	-15.5	101	1
213.1680	2.00	9.95	18.9	30.8	43.5	-12.7	223	1
284.3150	2.64	13.27	13.7	29.6	46.0	-16.4	49	1.5
849.9960	4.56	22.77	14.0	41.3	46.0	-4.7	355	1.2

NOTE : 1. Measurement uncertainty is less than +/-2dB
2. "*": Measurement does not apply for this frequency.
3. Emissiom Level = Reading Value + Ant. Factor + Cable Loss
4. The field strength of other emission frequencies were very low against the limit.

Temperature:	20°C	Humidity:	59%RH
Ferquency Range:	30 – 1000 MHz	Test mode:	Standby
Receiver Detector:	Q.P.	Measured Distance:	3m
Tested by:	Shunm Wang	Tested Date:	Mar. 03, 2008

Antenna Polarization：Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dBμV/m)	AZ(°)	EL(m)
30.3960	0.31	13.60	15.9	29.8	40.0	-10.2	7	1.71
46.2230	0.97	7.22	11.5	19.7	40.0	-20.3	233	1.62
80.3390	1.26	7.60	13.5	22.4	40.0	-17.6	174	1.69
153.0960	1.51	9.64	10.8	21.9	43.5	-21.6	159	2
259.8130	2.51	11.97	16.1	30.6	46.0	-15.4	328	1.58
374.1940	3.21	15.65	14.1	33.0	46.0	-13.0	13	1.91

Antenna Polarization：Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dBμV/m)	AZ(°)	EL(m)
30.3950	0.31	13.60	15.4	29.3	40.0	-10.7	358	1.2
35.1670	0.63	11.55	12.8	25.0	40.0	-15.0	51	1.34
46.2330	0.97	7.22	12.6	20.8	40.0	-19.2	225	1.51
65.1970	1.09	4.95	13.9	19.9	40.0	-20.1	23	1.1
79.3500	1.25	7.44	15.5	24.2	40.0	-15.8	149	1.2
512.4560	3.55	17.70	14.5	35.8	46.0	-10.2	315	1

NOTE : 1. Measurement uncertainty is less than +/-2dB

2. "*": Measurement does not apply for this frequency.

3. Emissiom Level = Reading Value + Ant. Factor + Cable Loss

4. The field strength of other emission frequencies were very low against the limit.

Temperature:	20°C	Humidity:	59%RH
Ferquency Range:	1 – 25 GHz	Test mode:	CH0
Receiver Detector:	PK. or AV.	Measured Distance:	3m
Tested by:	Shunm Wang	Tested Date:	Mar. 03, 2008

Antenna Polarization：Horizontal

Frequency (MHz)	Cable Loss (dB)	Ant. Fact. (dB)	Reading (dBuV)		Emission (dBuV/m)		Limit Line (dBuV/m)		Margin (dBuV/m)		AZ (°)	EL (m)
			PK	AV	PK	AV	PK	AV	PK	AV		
2402.01	-32.16	28.54	89.9	83.4	86.3	79.8	74.0	54.0	NA	NA	23.5	1.40
4805.51	-30.47	33.64	51.6	44.0	54.8	47.2	74.0	54.0	-19.2	-6.8	106	1.00
7210.03	-28.91	36.27	31.5	*	38.9	*	74.0	54.0	-35.1	*	33.7	1.30
1063.15	-34.57	24.34	46.1	*	35.9	*	74.0	54.0	-38.1	*	354	1.24
1606.00	-32.91	25.70	51.0	43.1	43.8	35.9	74.0	54.0	-30.2	-18.1	269	1.35
1850.53	-33.05	26.63	49.7	*	43.3	*	74.0	54.0	-30.7	*	301	1.20

Antenna Polarization：Vertical

Frequency (MHz)	Cable Loss (dB)	Ant. Fact. (dB)	Reading (dBuV)		Emission (dBuV/m)		Limit Line (dBuV/m)		Margin (dBuV/m)		AZ (o)	EL (m)
			PK	AV	PK	AV	PK	AV	PK	AV		
2402.01	-32.16	28.00	88.1	82.4	83.9	78.2	74.0	54.0	NA	NA	25.1	1.30
4805.51	-30.47	33.64	50.2	43.2	53.4	46.4	74.0	54.0	-20.6	-7.6	103	1.10
7210.03	-28.91	36.27	30.3	*	37.7	*	74.0	54.0	-36.3	*	39	1.29
1066.02	-34.59	24.35	50.0	*	39.8	*	74.0	54.0	-34.2	*	223	1.20
1471.03	-30.21	25.24	49.2	*	44.2	*	74.0	54.0	-29.8	*	350	1.00
1606.00	-32.91	25.70	50.6	42.2	43.4	35.0	74.0	54.0	-30.6	-19.0	186	1.00

NOTE : 1. Measurement uncertainty is less than +/-2dB

2. "*": Measurement does not apply for this frequency.

3. Emissiom Level = Reading Value + Ant. Factor + Cable Loss(included Pre-amplifier)

4. The field strength of other emission frequencies were very low against the limit.

5. The tested value of over 10GHz is too weak to record.

Temperature:	20°C	Humidity:	59%RH
Ferquency Range:	1 – 25 GHz	Test mode:	CH39
Receiver Detector:	PK. or AV.	Measured Distance:	3m
Tested by:	Shunm Wang	Tested Date:	Mar. 03, 2008

Antenna Polarization：Horizontal

Frequency (MHz)	Cable Loss (dB)	Ant. Fact. (dB)	Reading (dBuV)		Emission (dBuV/m)		Limit Line (dBuV/m)		Margin (dBuV/m)		AZ (°)	EL (m)
			PK	AV	PK	AV	PK	AV	PK	AV		
2441.00	-32.23	28.62	95.8	84.9	92.2	81.3	74.0	54.0	NA	NA	26.4	1.39
4882.01	-30.26	33.71	55.3	40.2	58.7	43.6	74.0	54.0	-15.3	-10.4	104	1.02
7322.99	-29.04	36.36	40.2	*	47.5	*	74.0	54.0	-26.5	*	34.5	1.29
1063.15	-34.57	24.34	39.6	*	29.4	*	74.0	54.0	-44.6	*	352	1.23
1606.00	-32.91	25.70	45.1	25.0	37.9	17.8	74.0	54.0	-36.1	-36.2	272	1.34
1850.53	-33.05	26.63	40.5	*	34.1	*	74.0	54.0	-39.9	*	303	1.21

Antenna Polarization：Vertical

Frequency (MHz)	Cable Loss (dB)	Ant. Fact. (dB)	Reading (dBuV)		Emission (dBuV/m)		Limit Line (dBuV/m)		Margin (dBuV/m)		AZ (o)	EL (m)
			PK	AV	PK	AV	PK	AV	PK	AV		
2441.00	-32.23	28.08	95.1	85.0	91.0	80.9	74.0	54.0	NA	NA	23.9	1.29
4882.01	-30.26	33.71	56.1	42.7	59.5	46.1	74.0	54.0	-14.5	-7.9	102	1.10
7322.99	-29.04	36.36	41.2	*	48.5	*	74.0	54.0	-25.5	*	38.4	1.30
1066.02	-34.59	24.35	49.8	*	39.6	*	74.0	54.0	-34.4	*	221	1.18
1471.03	-30.21	25.24	40.6	*	35.6	*	74.0	54.0	-38.4	*	346	1.10
1606.00	-32.91	25.70	38.8	*	31.6	*	74.0	54.0	-42.4	*	186	1.00

NOTE : 1. Measurement uncertainty is less than +/-2dB

2. "*": Measurement does not apply for this frequency.

3. Emissiom Level = Reading Value + Ant. Factor + Cable Loss(included Pre-amplifier)

4. The field strength of other emission frequencies were very low against the limit.

5. The tested value of over 10GHz is too weak to record.

Temperature:	20°C	Humidity:	59%RH
Ferquency Range:	1 – 25 GHz	Test mode:	CH78
Receiver Detector:	PK. or AV.	Measured Distance:	3m
Tested by:	Shunm Wang	Tested Date:	Mar. 03, 2008

Antenna Polarization：Horizontal

Frequency (MHz)	Cable Loss (dB)	Ant. Fact. (dB)	Reading (dBuV)		Emission (dBuV/m)		Limit Line (dBuV/m)		Margin (dBuV/m)		AZ (°)	EL (m)
			PK	AV	PK	AV	PK	AV	PK	AV		
2480.00	-32.19	28.73	87.3	80.5	83.8	77.0	74.0	54.0	NA	NA	30.6	1.35
4960.01	-30.26	33.77	49.1	*	52.6	*	74.0	54.0	-21.4	*	96.4	1.03
7440.00	-28.95	36.45	31.2	*	38.7	*	74.0	54.0	-35.3	*	40.5	1.27
1063.15	-34.57	24.34	45.9	*	35.7	*	74.0	54.0	-38.3	*	349	1.25
1606.00	-32.91	25.70	49.9	42.9	42.7	35.7	74.0	54.0	-31.3	-18.3	277	1.33
1850.53	-33.05	26.63	49.5	*	43.1	*	74.0	54.0	-30.9	*	298	1.22

Antenna Polarization：Vertical

Frequency (MHz)	Cable Loss (dB)	Ant. Fact. (dB)	Reading (dBuV)		Emission (dBuV/m)		Limit Line (dBuV/m)		Margin (dBuV/m)		AZ (o)	EL (m)
			PK	AV	PK	AV	PK	AV	PK	AV		
2480.00	-32.19	28.16	88.5	81.6	84.5	77.6	74.0	54.0	NA	NA	25.1	1.31
4960.01	-30.26	33.77	51.3	44.8	54.8	48.3	74.0	54.0	-19.2	-5.7	103	1.09
7440.00	-28.95	36.45	34.1	*	41.6	*	74.0	54.0	-32.4	*	39	1.28
1066.02	-34.59	24.35	50.3	*	40.1	*	74.0	54.0	-33.9	*	223	1.21
1471.03	-30.21	25.24	49.4	*	44.4	*	74.0	54.0	-29.6	*	350	1.03
1606.00	-32.91	25.70	50.1	41.5	42.9	34.3	74.0	54.0	-31.1	-19.7	186	1.01

NOTE : 1. Measurement uncertainty is less than +/-2dB

2. "*": Measurement does not apply for this frequency.

3. Emissiom Level = Reading Value + Ant. Factor + Cable Loss(included Pre-amplifier)

4. The field strength of other emission frequencies were very low against the limit.

5. The tested value of over 10GHz is too weak to record.

4.7 PEAK POWER TEST

4.7.1 LIMIT

FCC Part15, Subpart C Section 15.247.

Frequency Range (MHz)	Limit(w)				
	Quantity of Hopping Channel	50	25	15	75
902-928		1(30dBm)	0.125(21dBm)	NA	NA
2400-2483.5		NA	NA	0.125(21dBm)	1(30dBm)
5725-5850		NA	NA	NA	1(30dBm)

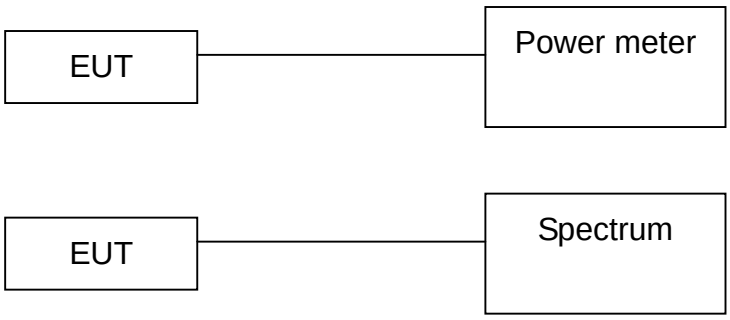
4.7.2 TEST EQUIPMENT

The following test equipment was used during the test：

Equipment/ Facilities	Specifications	Manufacturer	Model#/ Serial#	Due Date of Cal. & Cal. Center
SPECTRUM	9kHz-7GHz	ROHDE & SCHWARZ	FSP7/ 839511/010	MAR. 2008 ETC
POWER METER	N/A	BOONTON	4232A/ 29001	MAY 2008 ETC
POWER SENSOR	DC-18GHz 0.3μW-100mW 50Ω	BOONTON	51011-EMC/ 31184	JUN. 2008 ETC

NOTE: The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

4.7.3 TEST SET-UP



The EUT was connected to a spectrum through a 50Ω RF cable.

4.7.4 TEST PROCEDURE

The EUT was operating in hopping mode or could control its channel.
Printed out the test result from the spectrum by hard copy function.
Recorded the read value of the power meter.

4.7.5 EUT OPERATING CONDITION

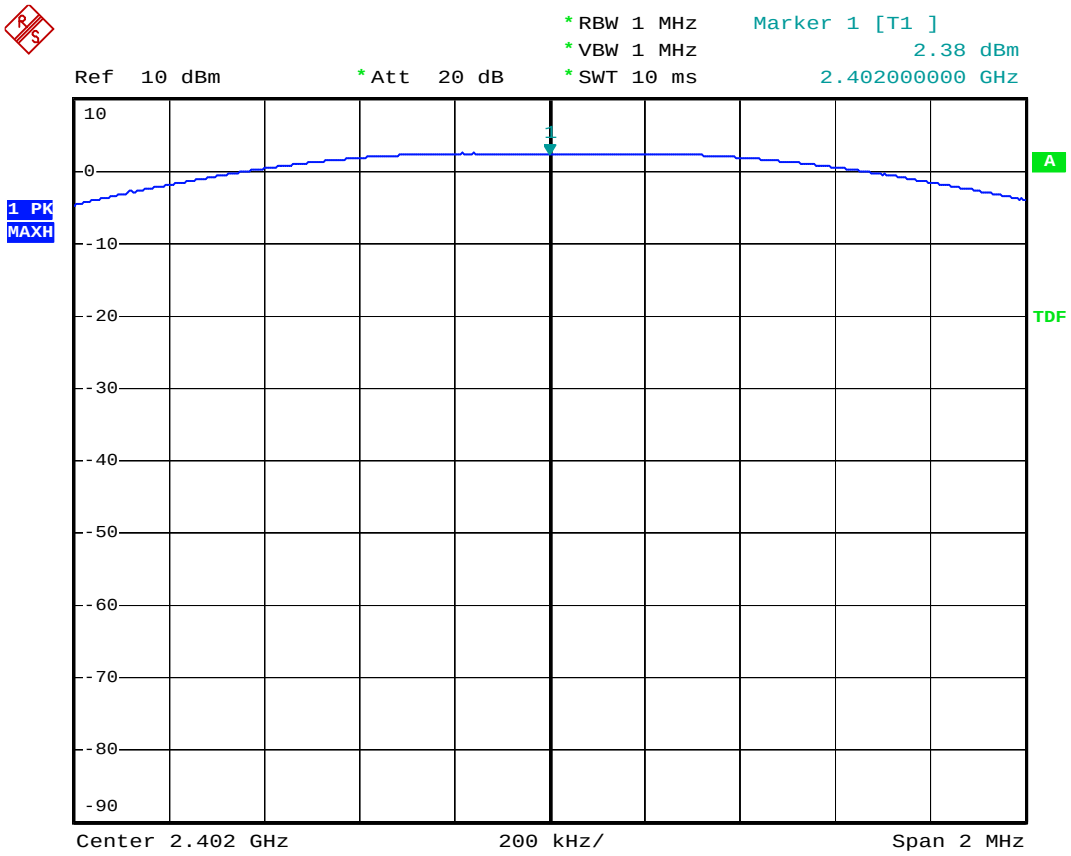
Same as section 4.1.5 of this report.

4.7.6 TEST RESULT

Temperature:	22°C	Humidity:	60%RH
Spectrum Detector:	PK	Tested by:	Shunm Wang
Test Result:	PASS	Tested Date:	Feb. 26, 2008

Channel Number	Channel Frequency (MHz)	Peak Output Power (dBm)	Peak Power Limit (dBm)
0	2402.0000	2.38	30
39	2441.0000	2.43	30
78	2480.0000	2.77	30

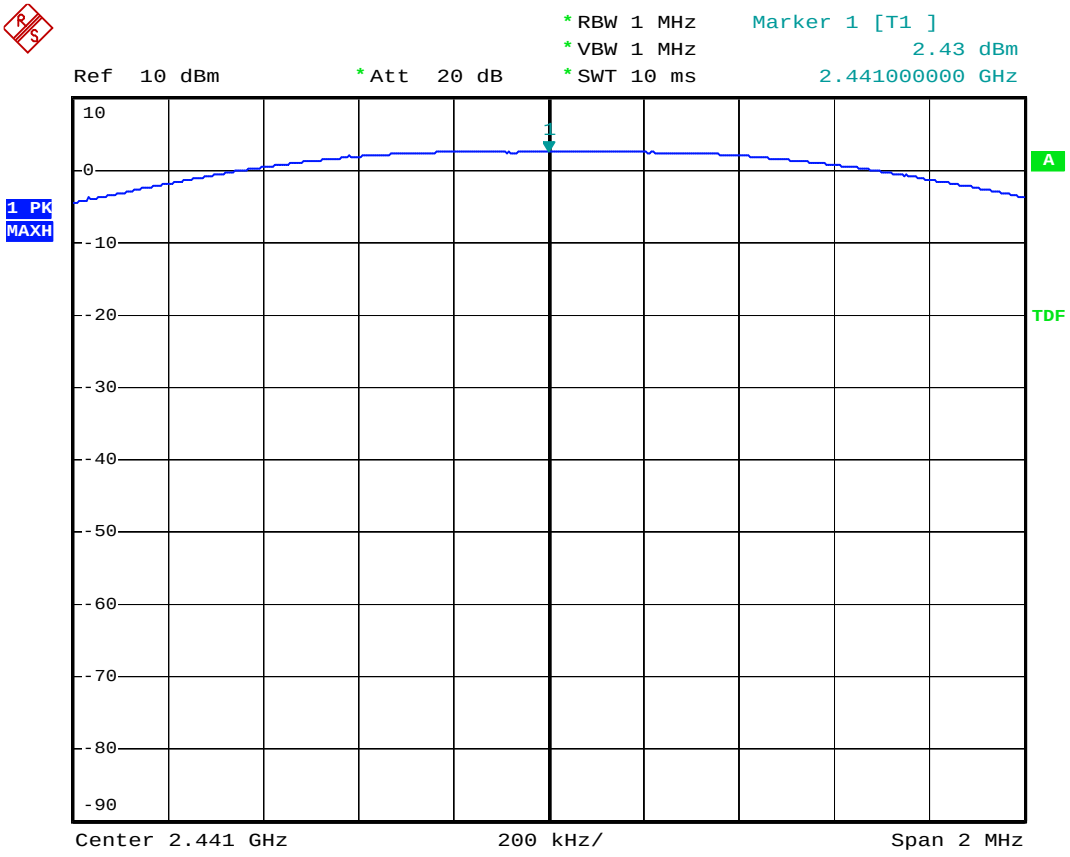
CH0



-20dB bw

Date: 26.FEB.2008 09:13:12

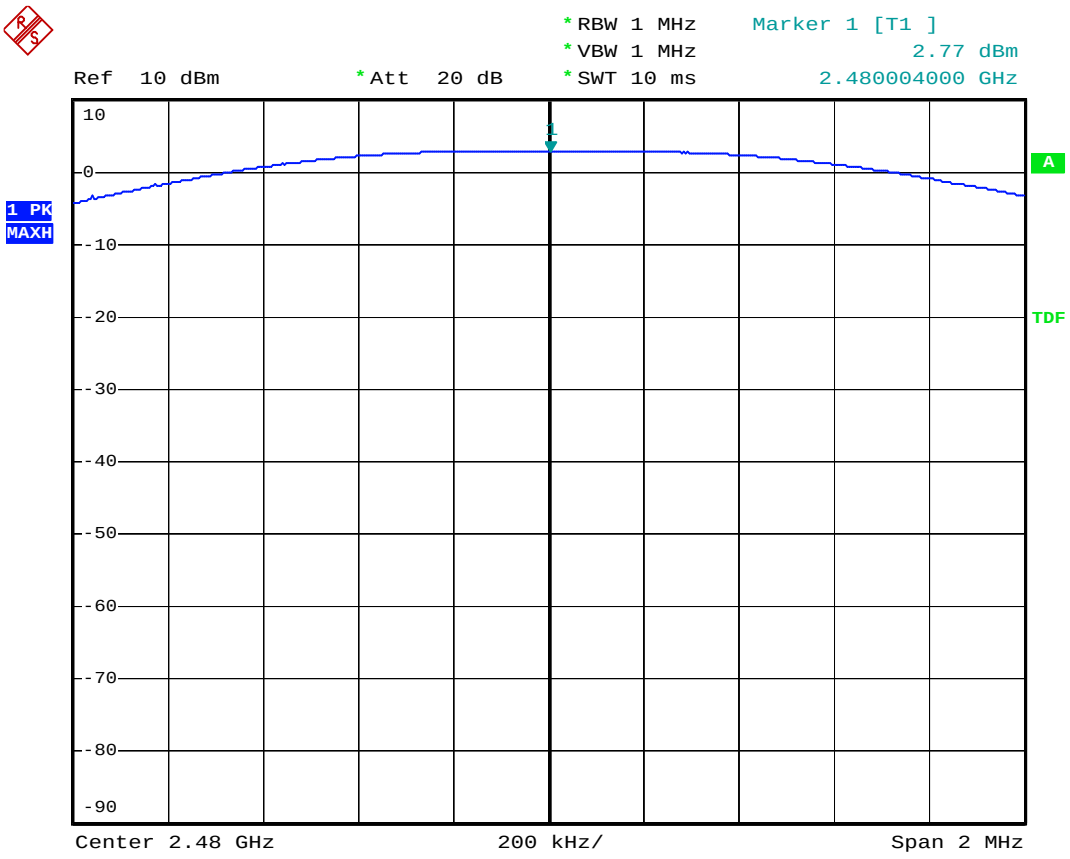
CH39



-20dB bw

Date: 26.FEB.2008 09:14:58

CH78



-20dB bw

Date: 26.FEB.2008 09:17:01

4.8 BAND EDGE TEST

4.8.1 LIMIT

FCC Part15, Subpart C Section 15.249 (c), Emission radiated outside of the specified frequency bands, except for harmonics, shall attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

Operating Frequency Range (MHz)	Limit (dBμV/m)	
	Peak	Average
902-928	74	54
2400-2483.5		
5725-5850		

4.8.2 TEST EQUIPMENT

The following test equipment was used during the test：

Equipment/ Facilities	Specification	Manufacturer	Model#/ Serial#	Due Date of Cal. & Cal. Center
SPECTRUM	9kHz-7GHz	ROHDE & SCHWARZ	FSP7/ 839511/010	APR. 2008 R&S
EMI TEST RECEIVER	9 kHz TO 2750 MHz	ROHDE & SCHWARZ	ESCS30/ 830245/012	OCT. 2008 ETC
SPECTRUM	9KHz-26.5GHz	HP	8953E/ 3710A03220	MAY 2008 ETC
PRE-AMPLIFIER	1GHz-26.5GHz Gain:30dB	HP	8449B/ 3008A01019	NOV. 2008 ETC
BI-LOG ANTENNA	25 MHz TO 2 GHz	EMCO	3142/ 9701-1124	FEB. 2009 SRT
HORN ANTENNA	1GHz to 18GHz	EMCO	3115/ 9602-4681	DEC. 2008 ETC
OATS	3 - 10 M measurement	SRT	SRT-1	APR. 2008 SRT

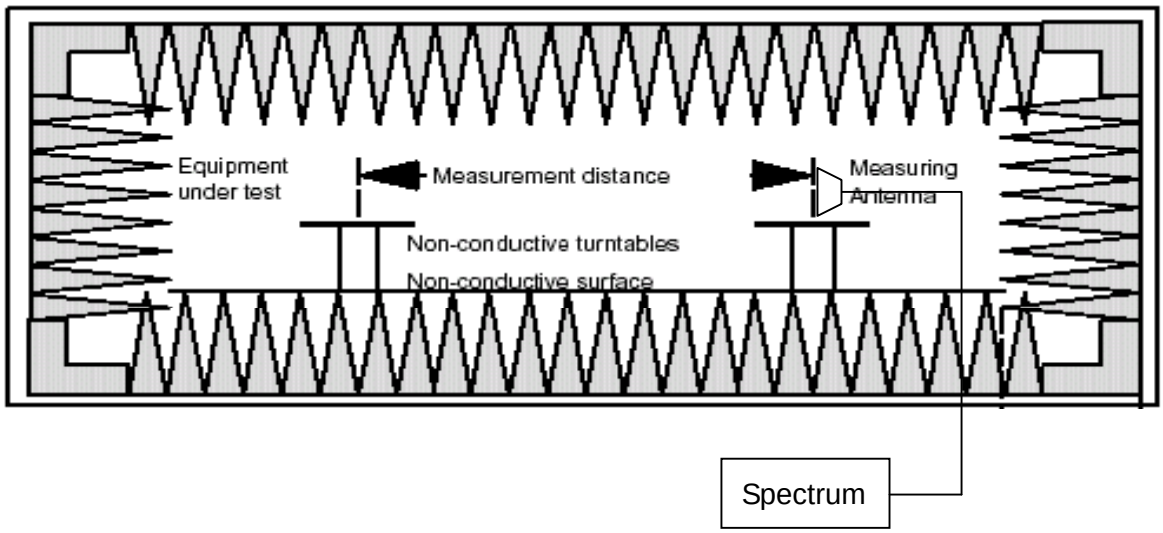
NOTE: The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

4.8.3 TEST SET-UP

FOR RF CONDUCTED TEST (dBc)

The EUT was connected to the spectrum through a 50Ω RF cable.

FOR RADIATED EMISSION TEST



NOTE :

1. The EUT system was put on a wooden table with 0.8m heights above a ground plane.
2. For the actual test configuration, please refer to the photos of testing.

4.8.4 TEST PROCEDURE

1. The EUT was operating in hopping mode or could be controlled its channel. Printed out the test result from the spectrum by hard copy function.
2. The EUT was tested according to the requirement of ANSI C63.4 and CISPR 22. The measurements were made at an open area test site with 10 meter measurement distance under 1 GHz and with 3m distance above 1GHz. The frequency spectrum measured started from 30 MHz. Under 1 GHz. All readings were quasi-peak values with 120 kHz resolution bandwidth of the test receiver. Above 1 GHz, the measurements were made at an open area test site with 3 meter measurement distance and all readings were peak and average values with 1 MHz resolution bandwidth of the test receiver. The EUT system was operated in all typical methods by users. The cables connected to EUT and support units were moved to find the maximum emission levels for each frequency.

4.8.5 EUT OPERATING CONDITION

Same as section 4.1.5 of this report.

4.8.6 TEST RESULT

Temperature:	21°C	Humidity:	62%RH
Spectrum Detector:	PK & AV	Tested by:	Shunm Wang
Test Result:	PASS	Tested Date:	Feb. 26, 2008

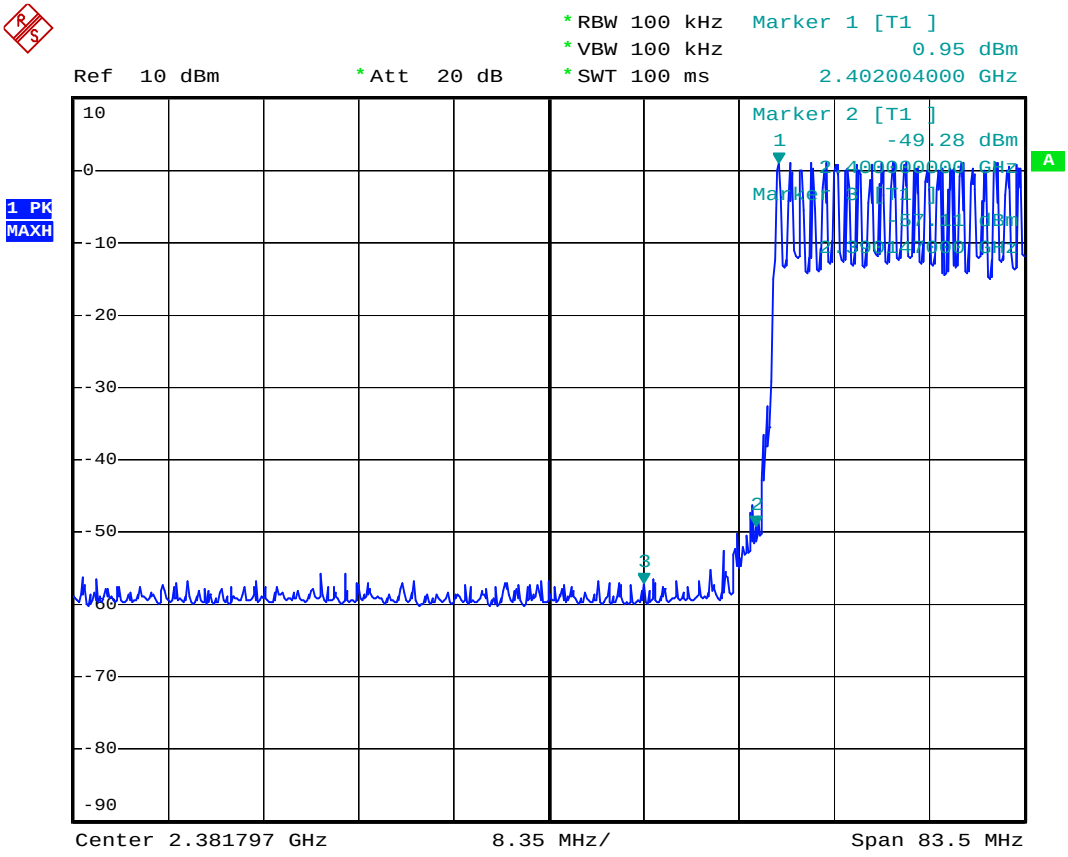
1.Conducted emission test

Frequency (MHz)	PEAK POWER OUTPUT (dBm)	Emission read Value (dBm)	Result of Band edge (dBc)	Band edge LIMIT (dBc)
<2400	0.95	-49.28	50.23	>20dBc
>2483.5	0.78	-45.79	46.57	>20dBc

2.Radiated emission test

Frequency (MHz)	Antenna polarization (H/V)	Reading (dBuV)	Emission (dBuV/m)	Band edge Limit (dBuV)
		Strength	Strength	Strength
<2400	H	45.9	41.7	54.0
>2483.5	V	39.1	35.1	54.0

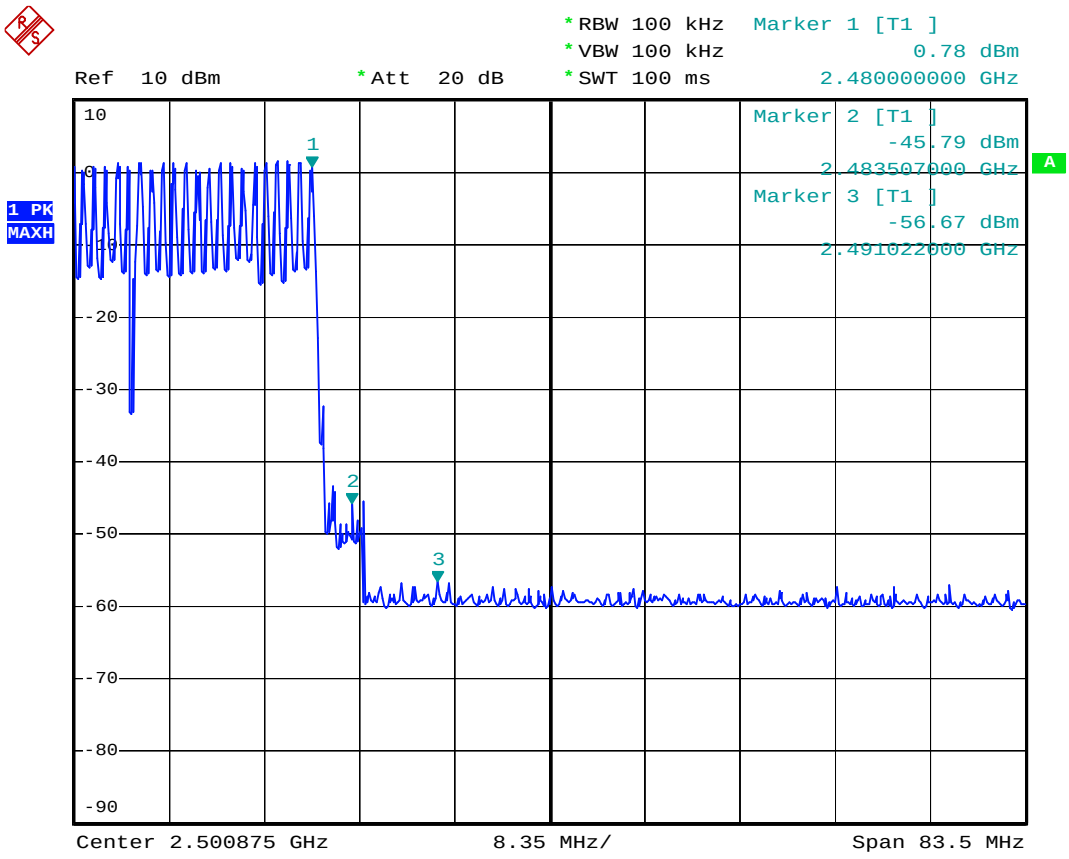
<2400 MHz(Conducted)



-20dB bw

Date: 26.FEB.2008 15:37:44

>2483.5 MHz(Conducted)



-20dB bw

Date: 26.FEB.2008 15:39:29

5 ANTENNA APPLICATION

5.1 Antenna requirement

The EUT's antenna is met the requirement of FCC part15C section15.203 and 15.204.

5.2 Result

The EUT's antenna used a PCB printed antenna. The antennas' gain is 2dBi and meet the requirement.

7. TERMS OF ABBREVIATION

AV.	Average detection
AZ(°)	Turn table azimuth
Correct.	Correction
EL(m)	Antenna height (meter)
EUT	Equipment Under Test
Horiz.	Horizontal direction
LISN	Line Impedance Stabilization Network
NSA	Normalized Site Attenuation
Q.P.	Quasi-peak detection
SRT Lab	Spectrum Research & Testing Laboratory, Inc.
Vert.	Vertical direction