FCC Test Report

for

WATCH-DOG

Trade Name	**:**	**WELL**
Model Number	**:**	**ED-50**
FCC ID	**:**	**U5AWE-ED-50**
Report Number	**:**	**RF-W150-0702-106**
Date of Receipt	**:**	**March 5, 2007**
Date of Report	**:**	**March 12, 2007**

Prepared for

WELL ELECTRONICS CO., LTD.

33F, NO.293, WEN HUA ROAD, SEC. 2, PANCHIAO CITY, TAIPEI HSIEN, TAIWAN, R.O.C.

Prepared by

Central Research Technology Co.

EMC Test Laboratory

11, Lane41, Fushuen St., Jungshan Chiu, Taipei, Taiwan, 104, R.O.C.

Certification of Compliance

Equipment under Test	:	**WATCH-DOG**
Model No.	:	**ED-50**
FCC ID	:	**U5AWE-ED-50**
Manufacturer	:	**WELL ELECTRONICS CO., LTD.**
Applicant	:	**WELL ELECTRONICS CO., LTD.**
Address	:	**33F, NO.293, WEN HUA ROAD, SEC. 2, PANCHIAO CITY, TAIPEI HSIEN, TAIWAN, R.O.C.**
Applicable Standards	:	**47 CFR part 15, Subpart C**
Date of Testing	:	**March 7, 2007**
Deviation	:	**N/A**
Condition of Test Sample	:	**Prototype**

We, **Central Research Technology Co**., hereby certify that one sample of the designated product was tested in our facility during the period mentioned above. The test records, data evaluation and Equipment Under Test (EUT) configurations shown in the present report are true and accurate representation of the measurements of the sample's RF characteristics under the conditions herein specified.

The test results show that the EUT as described in the present report is in compliance with the requirements set forth in the standards mentioned above and apply to the tested sample identified in the present report only. The test report shall not be reproduced, except in its entirety, without the written approval of Central Research Technology Co.

PREPARED BY : Cathy Chen , **DATE :** Mar. 12, 2007
(Cathy Chen/ Technical Manager)

APPROVED BY : J. Y. Shih , **DATE :** Mar. 12, 2007
(Tsun-Yu Shih/Laboratory Head)

Contents

1. General Description

1.1 General Description of EUT

Equipment under Test	:	WATCH-DOG
Model No.	:	ED-50
Power in	:	120Vac/60Hz
Test Voltage	:	120Vac/60Hz
Manufacturer	:	WELL ELECTRONICS CO., LTD.
Channel Numbers	:	1
Frequency Range	:	2451MHz
Fundamental Frequency	:	2451MHz
Function Modulation	:	FSK
Function Description	:	

The EUT is used to transmit and receive control command. Please refer to the user's manual for the details.

1.2 Test Methodology

For this E.U.T., the radiated emissions measurement performed according to the procedures illustrated in ANSI C63.4 and other required were illustrated in separate sections of this test report for detail.

1.3 Applied standards

(1) Field strength of Fundamental

According to 15.249(a), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency	Field Strength of Fundamental (mV/m)	Field Strength of Harmonics (uV/m)
902 – 928 MHz	50	500
2400 – 2483.5 MHz	50	500
5725 – 5875 MHz	50	500
24.0 – 24.25 GHz	250	2500

(2) Radiation emission

According to 15.249(d), Emissions radiated outside of the specified frequency bands, except for harmonics, shall be 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.

(3) Radiated emission limits, general requirements.

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

Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

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

(4) Conduction Emission Requirement

For intentional device, according to §15.207(a) line conduction emission limit is as below table.

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

* Decreases with the logarithm of the frequency.

(5) Restricted Band

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
[2]1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(2)
13.36 - 13.41			

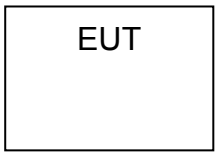
[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

[2] Above 38.6

1.4 The Support Units

No.	Unit	Model No./ Serial No.	Teade Name	PowerCode	Supported by lab.
NA	*	*	*	*	*

1.5 Layout of the Setup



Connecting Cables :

No.	Cable	Length	Shielded	Ferrite Core	Shielded Backshell	Supported by lab.	Note
N/A	*	*	*	*	*	*	*

Justification:

For both conducted and radiated emission below 1GHz, the system was configured for typical fashion as a customer could normal use it.

1.6 Test Capability

Test Facility

The test facility used for evaluating the conformance of the EUT with each standard in the present report meets what required in CISPR16-1-4, CISPR16-2-3 and ANSI C63.4.

Test Room	Type of Test Room	Descriptions
☐ TR1	10m semi-anechoic chamber (23m×14m×9m)	Complying with the NSA requirements in documents CISPR 22 and ANSI C63.4. For the radiated emission measurement.
☐ TR10	3m semi-anechoic chamber (9m × 6m × 6m)	
☑ TR11	3m semi-anechoic chamber (9m × 6m × 6m)	
☐ TR4	Shielding Room (5m×3m×3m)	For the RF conducted emission measurement.
☑ TR5	Shielding Room (8m×5m×4m)	For the conducted emission measurement.

Test Laboratory Competence Information

Central Research Technology Co. has been accredited/filed/authorized by the agencies listed in the following table.

Certificate	Nation	Agency	Code	Mark
Accreditation Certificate	USA	NVLAP	200575-0	ISO/IEC 17025
	R.O.C. (Taiwan)	TAF	0905	ISO/IEC 17025
	R.O.C. (Taiwan)	BSMI	SL2-IN-E-0033,SL2-IS-E-0033, SL2-A1-E-0033	ISO/IEC 17025
Site Filing Document	USA	FCC	474046, TW-1021	Test facility list & NSA Data
	Canada	IC	4699A	Test facility list & NSA Data
	Japan	VCCI	R-1527,C-1609,T-131	Test facility list & NSA Data
Authorization Certificate	Norway	Nemko	ELA 212	ISO/IEC 17025

The copy of each certificate can be downloaded from our web site: www.crc-lab.com

1.7 Measurement Uncertainly

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2. The values are less than U_{cispr} in table 1 of CISPR 16-4-2 and which are shown as below.

Test Item	Measurement Uncertainty
Radiated Emission: (30MHz~200MHz)	Horizontal: 3.3dB；Vertical: 3.4dB
Radiated Emission: (200MHz~1GHz)	Horizontal: 3.7dB；Vertical: 3.7dB
Radiated Emission: (above 1GHz)	Horizontal: 4.4 dB；Vertical: 4.4 dB

2. Field strength of Fundamental

Result: PASS

2.1 Limits for Field strength of Fundamental

Fundamental Frequency	Peak	Average
☐ 902 – 928 MHz	500mV/m (**114dBuV/m**)	50mV/m (**94dBuV/m**)
☑ 2400 – 2483.5 MHz	500 mV/m (**114dBuV/m**)	50 mV/m (**94dBuV/m**)
☐ 5725 – 5875 MHz	500 mV/m (**114dBuV/m**)	50 mV/m (**94dBuV/m**)
☐ 24.0 – 24.25 GHz	2500 mV/m (**128dBuV/m**)	250 mV/m (**108dBuV/m**)

2.2 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Semi-anechoic Chamber	ETS.LINDGREN	TR11/13455	June 13, 2006	June 13, 2007
Spectrum Analyzer	Agilent	E4407B/ MY45106797	March 7, 2007	March 7, 2008
Antenna	EMCO	3117/ 57408	Feb. 11, 2006	Feb. 11, 2008
Pre-amplifier	MITEQ	AMF-4D-005180-24-10P/1072961	June 7, 2006	June 7, 2007

Note：

1. The calibrations are traceable to NML/ROC.
2. NCR:No Calibration Required

Instrument Setting

RBW	VBW	Detector	Trace	Comment
1MHz	3MHz	Peak	Maxhold	

Climatic Condition

Ambient Temperature：27°C ; Relative Humidity ：68%

2.3 Test Procedures

a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.

b. If the EUT is desktop equipment, it was placed on a non-conducted table with a height of 0.8 meters above the reference ground plane in the semi-anechoic chamber. If the EUT is floor-standing equipment, it was placed on a non-conducted support with a height of 12 mm above the reference ground plane in the semi-anechoic chamber.

c. The EUT was set at 3m away from the interference receiving antenna.

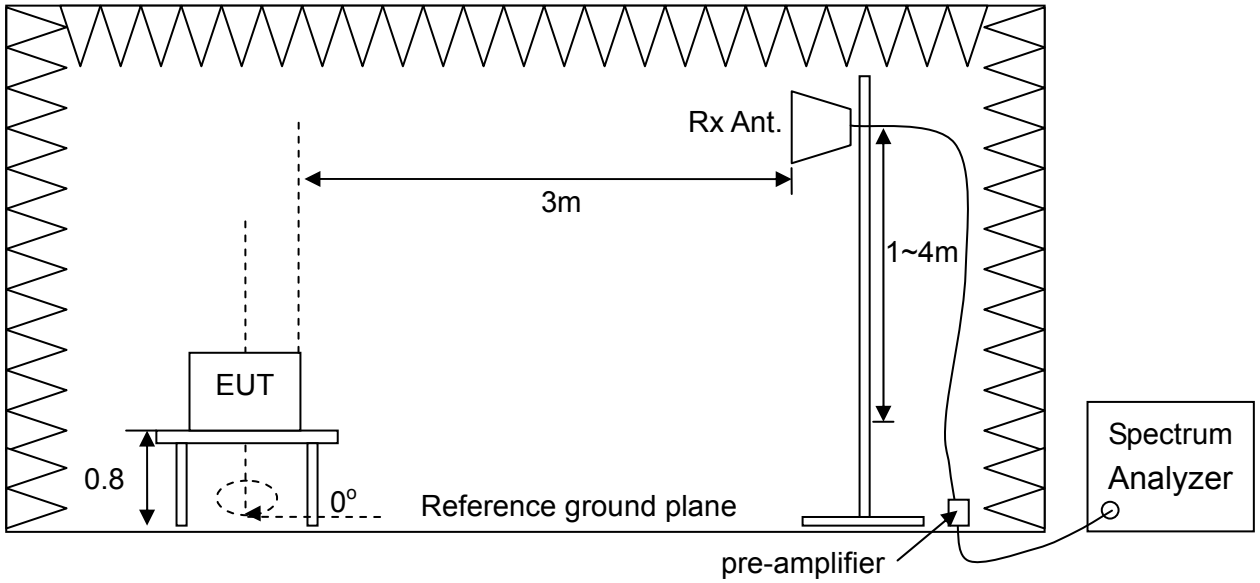
d. Rapidly sweep the signal in the test frequency range by using the spectrum through the Maximum-peak detector.

e. Rotate the EUT from 0° to 360° and position the receiving antenna at heights from 1 to 4 meters above the reference ground plane continuously to determine the fundamental frequency and frequencies associated with higher emission levels and record them.

f. Finely turn the turntable and the antenna is be positioned with its plane vertical at the specified distance from the EUT and rotated about its vertical axis for maximum response and recorded position of fundamental frequency found from step e.

g. Record and compare the maximum level with the required limit. Change the receiving antenna to another polarization to measure Field Strength of fundamental by following step e. to g. again.

2.4 Test Configurations



2.5 Test Results

Test Mode : Transmitter

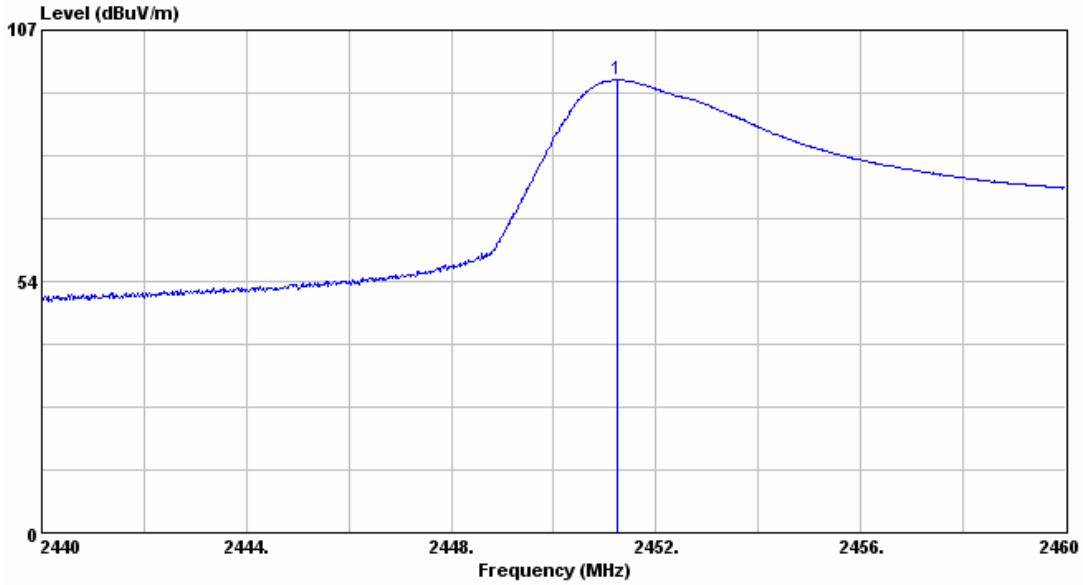
Test Distance : 3m **Tester :** Bill

Frequency (MHz)	Polarization	Reading Data (dBuV)		Correction Factor (dB/m)	Output Field Strength (dBμV/m)		Limit (dBμV/m)		Margin (dB)	
		PK	AV		PK	AV	PK	AV	PK	AV
2451.24	V	97.45	36.96	-1.09	96.36	35.87	113.98	93.98	17.62	58.11
2451.24	H	99.00	37.13	-1.09	97.91	36.04	113.98	93.98	16.07	57.94

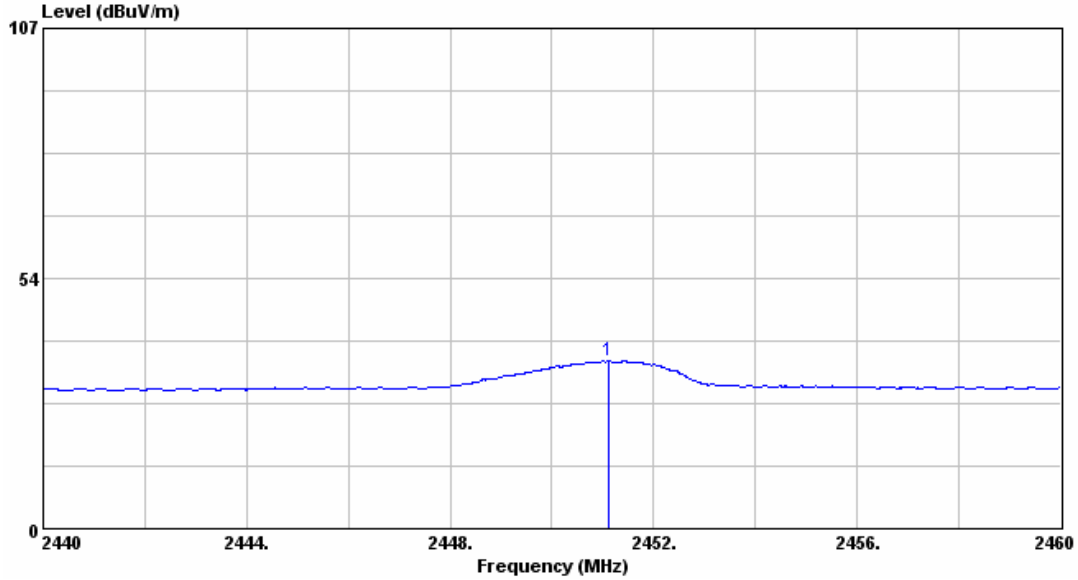
Note：

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier
2. Output Field Strength (dBuV/m) = Reading Data + Correction Factor
3. Margin (dB) = Limit – Output Field Strength

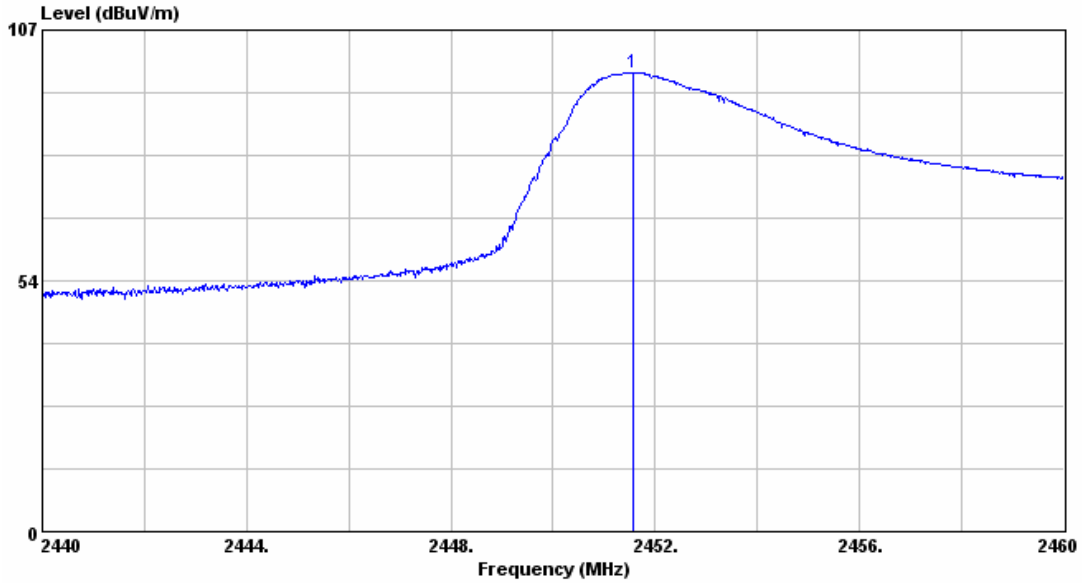
Vertical Polarization - Peak



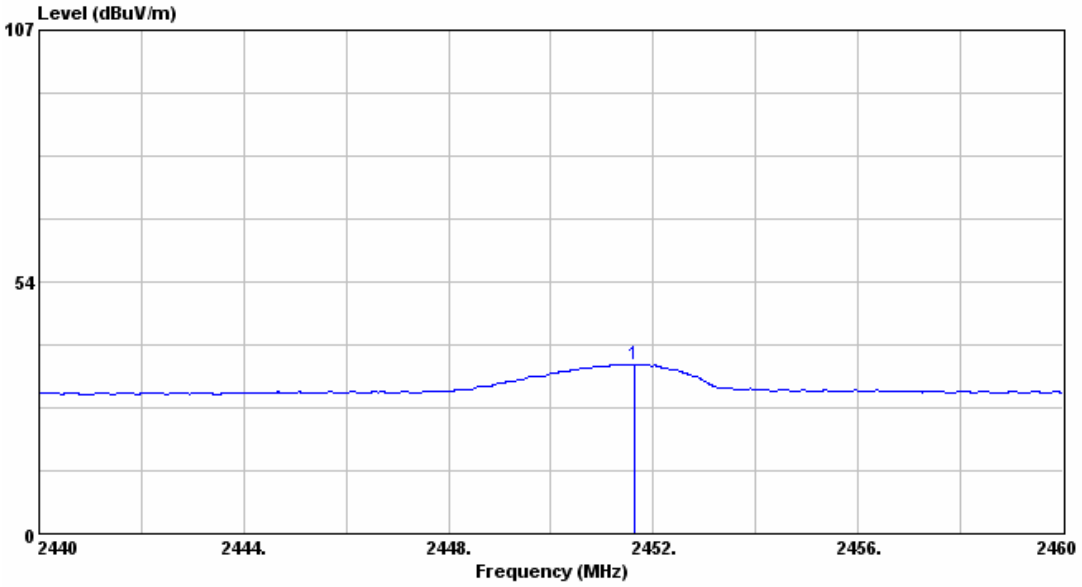
Vertical Polarization - Average



Horizontal Polarization - Peak



Horizontal Polarization - Average



3. Radiated Emission Measurement

Result: PASS

3.1 Limit for Radiated Emission Measurement

Limit for Harmonics Radiation Emission Measurement

Fundamental Frequency	Field Strength of Harmonics
☐ 902 – 928 MHz	500 uV/m (54dBuV/m)
☑ 2400 – 2483.5 MHz	500 uV/m (54dBuV/m)
☐ 5725 – 5875 MHz	500 uV/m (54dBuV/m)
☐ 24.0 – 24.25 GHz	2500 uV/m(68dBuV/m)

Limit for Other Emissions except Harmonics

Frequency (MHz)	Quasi-peak (dBμV/m)	
30 to 88	40	
88 to 216	43.5	
216 to 960	46	
960 to 1000	54	
Frequency (MHz)	**Peak (dBμV/m)**	**Average (dBμV/m)**
Above 1000	74	54

Note 1- The lower limit shall apply at the transition frequency.
Note 2- Additional provisions may be required for cases where interference occurs.

3.2 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Semi-anechoic Chamber	ETS.LINDGREN	TR11/13455	June 13, 2006	June 13, 2007
Test Receiver	R&S	ESCI/ 100019	Nov. 22, 2006	Nov. 22, 2007
Spectrum Analyzer	Agilent	E4407B/ MY45106797	March 7, 2007	March 7, 2008
Antenna	EMCO	3142C/ 35035	Aug. 14, 2006	Aug. 14, 2007
Antenna	EMCO	3117/ 57408	Feb. 11, 2007	Feb. 11, 2008
Antenna	EMCO	3116/ 20533	Dec. 13, 2006	Dec. 13, 2007
Pre-amplifier	MITEQ	AMF-4D-005180-24-10P/1072961	June 7, 2006	June 7, 2007
Pre-amplifier	MITEQ	JS4-18002600-30-5A/ 741923	Aug. 1, 2006	Aug. 1,2007
Pre-amplifier	Mini Circuit	ZKL-2/ 008	Aug. 31, 2006	Aug. 31,2007
High Pass Filter	MCI	H04G13G1/ 2467-01	March 31, 2007	March 31, 2008

Note：

1. The calibrations are traceable to NML/ROC.
2. NCR:No Calibration Required

Instrument Setting

RBW	VBW	Detector	Trace	Comment
120kHz	N/A	Quasi-Peak	Maxhold	Below 1GHz
1MHz	1MHz	Peak	Maxhold	Above 1GHz Peak
1MHz	10Hz	Peak	Maxhold	Above 1GHz Average

Climatic Condition

Ambient Temperature：27°C ; Relative Humidity ：68%

3.3 Test Procedures

a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.

b. If the EUT is desktop equipment, it was placed on a non-conducted table with a height of 0.8 meters above the reference ground plane in the semi-anechoic chamber. If the EUT is floor-standing equipment, it was placed on a non-conducted support with a height of 12 mm above the reference ground plane in the semi-anechoic chamber.

c. The EUT was set at 3m away from the interference receiving antenna.

d. Rapidly sweep the signal in the test frequency range by using the spectrum through the Maximum-peak detector.

e. Rotate the EUT from 0° to 360° and position the receiving antenna at heights from 1 to 4 meters above the reference ground plane continuously to determine the fundamental frequency and frequencies associated with higher emission levels and record them.

f. Then measure each frequency found from step e. by using the spectrum with rotating the EUT and positioning the receiving antenna height to determine the maximum level.

g. Finely tune the antenna and turntable around the recorded position of each frequency found from step f.

h. For measurement of frequency below 1000MHz, set the receiver detector to be Quasi-Peak per CISPR 16-1 to find out the maximum level occurred.

i. For measurement of frequency above 1000MHz, set the spectrum detector to be Peak or Average to find out the maximum level occurred, if any.

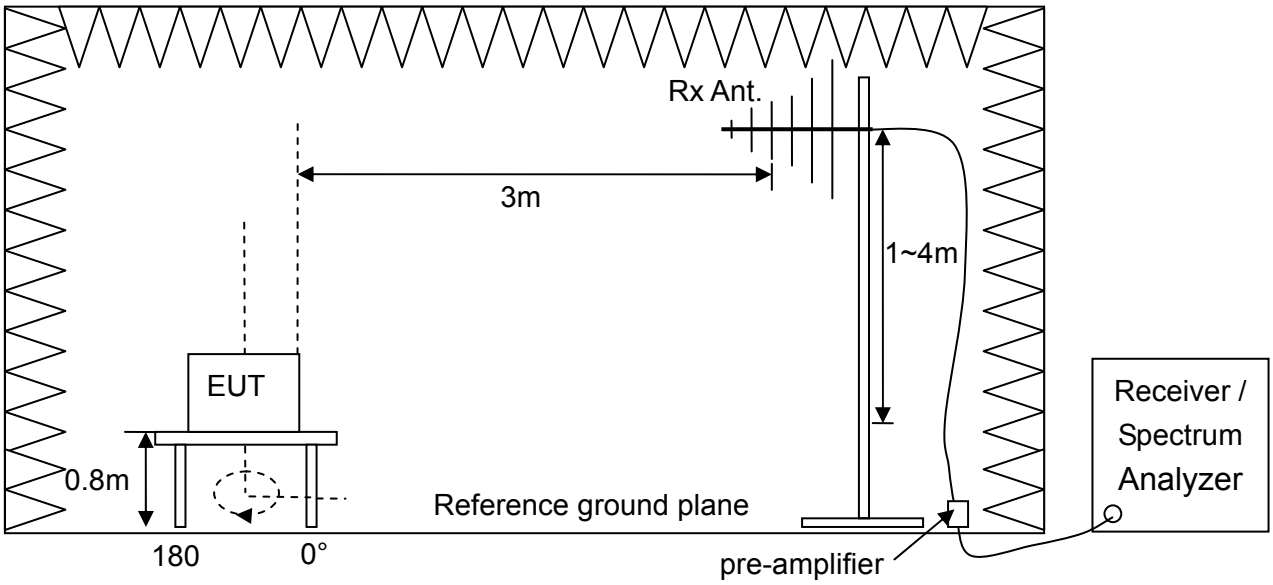
j. Record the frequency and polarization of the receiving antenna and compare the maximum level with the required limit.

k. Change the receiving antenna to another polarization to measure radiated emission by following step d. to j. again.

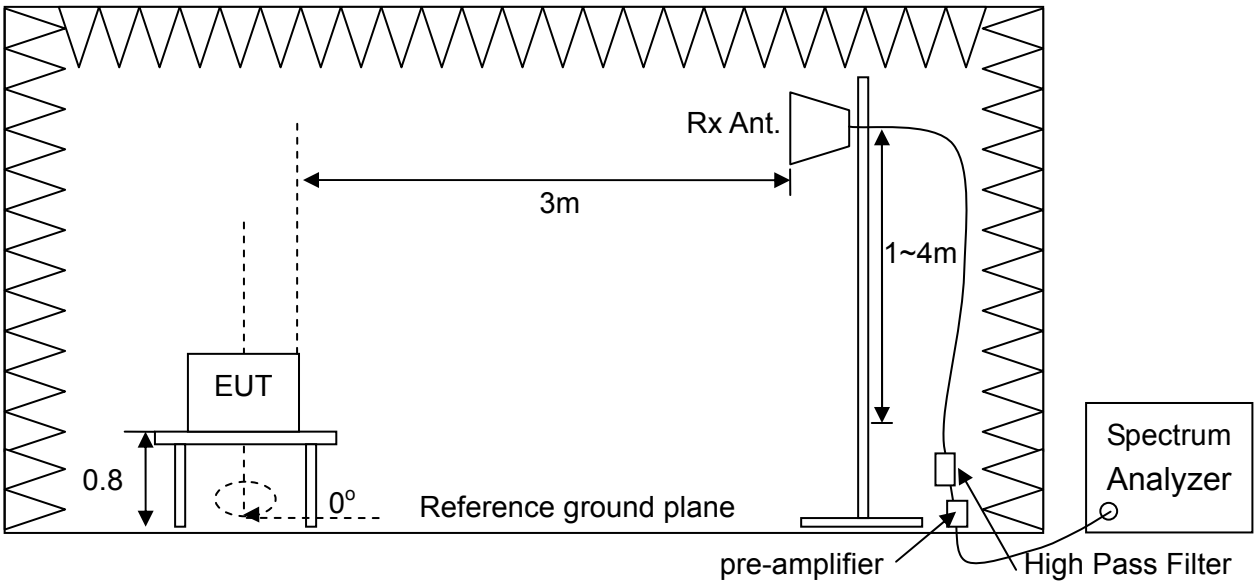
l. If the peak emission level measured from step e. is 10dB lower than the limit specified, then the emission values presented will be the peak value only. Otherwise, accurate Q.P. value will be measured and presented.

3.4 Test Configuration

Radiated Emission Measurement below 1000MHz



Radiated Emission Measurement above 1000MHz



3.5 Test Results

Band Edge

Test Mode **: Transmitter**

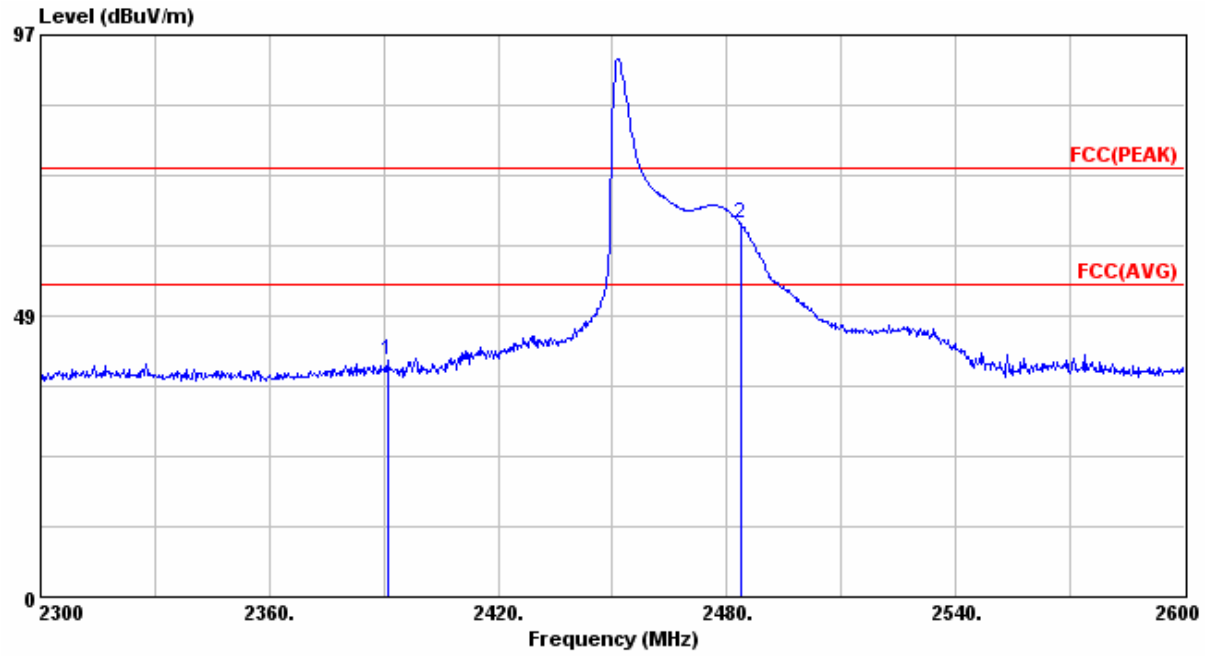
Test Distance **:** 3m **Tester** **:** Bill

Band	Polarization	Frequency (MHz)	Reading Data (dBuV)		Correction Factor (dB/m)	Emission (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
			PK.	AV.		PK.	AV.	PK.	AV.	PK.	AV.
Lowest	V	2390.9	42.05	27.57	-1.26	40.79	26.31	74	54	33.21	27.69
	H	2381.6	45.96	31.50	-1.29	44.67	30.21	74	54	29.33	23.79
Highest	V	2483.5	65.52	27.37	-1.15	64.37	26.22	74	54	9.63	27.78
	H	2483.5	67.68	31.00	-1.15	66.53	29.85	74	54	7.47	24.15

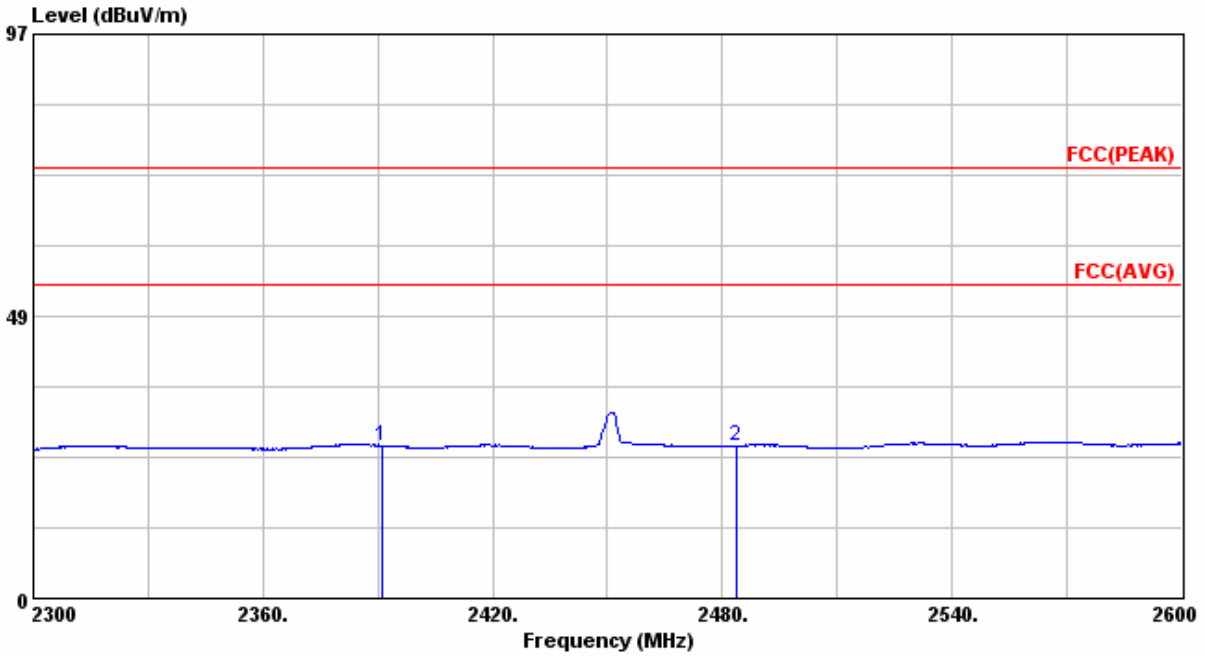
Note:

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier
2. Emission Level (dBuV/m) = Reading Data + Correction Factor
3. Margin (dB) = Limit – Emission Level
4. "*": The emission is too low to be measured.

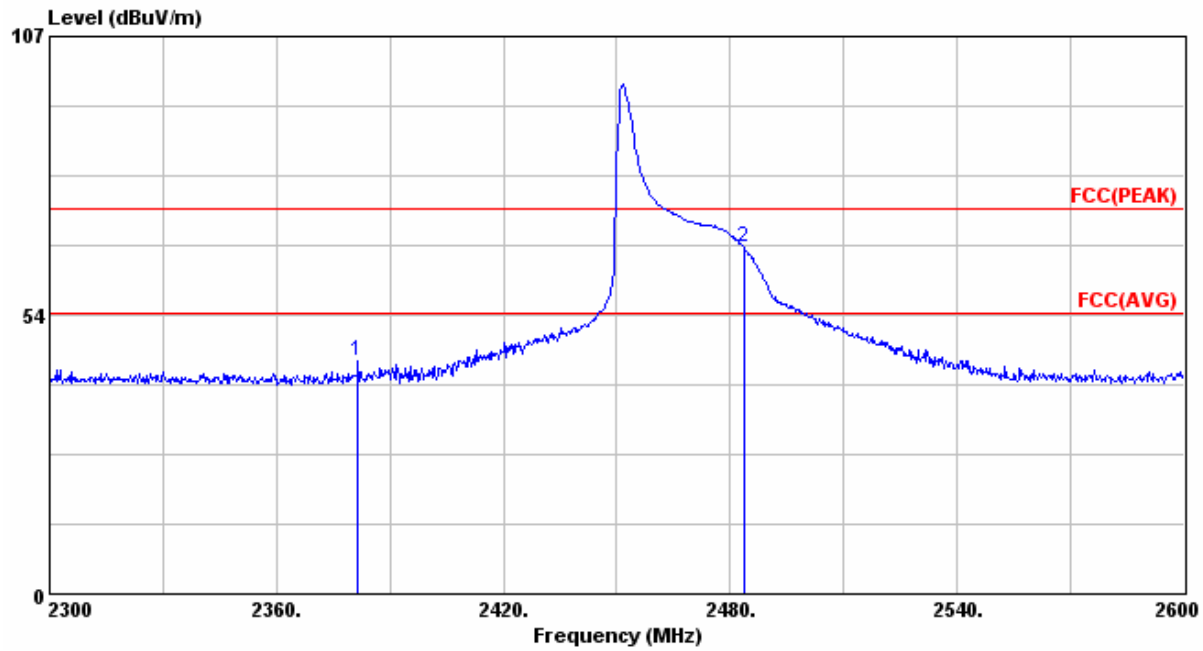
Vertical, Peak



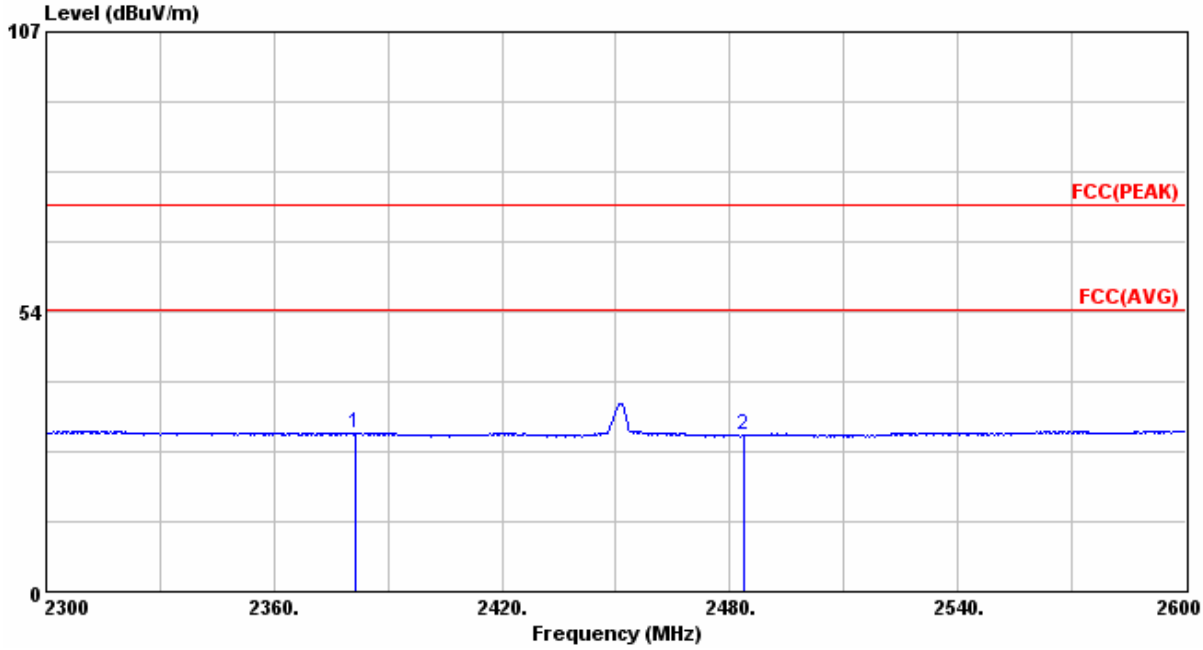
Vertical, Average



Horizontal, Peak



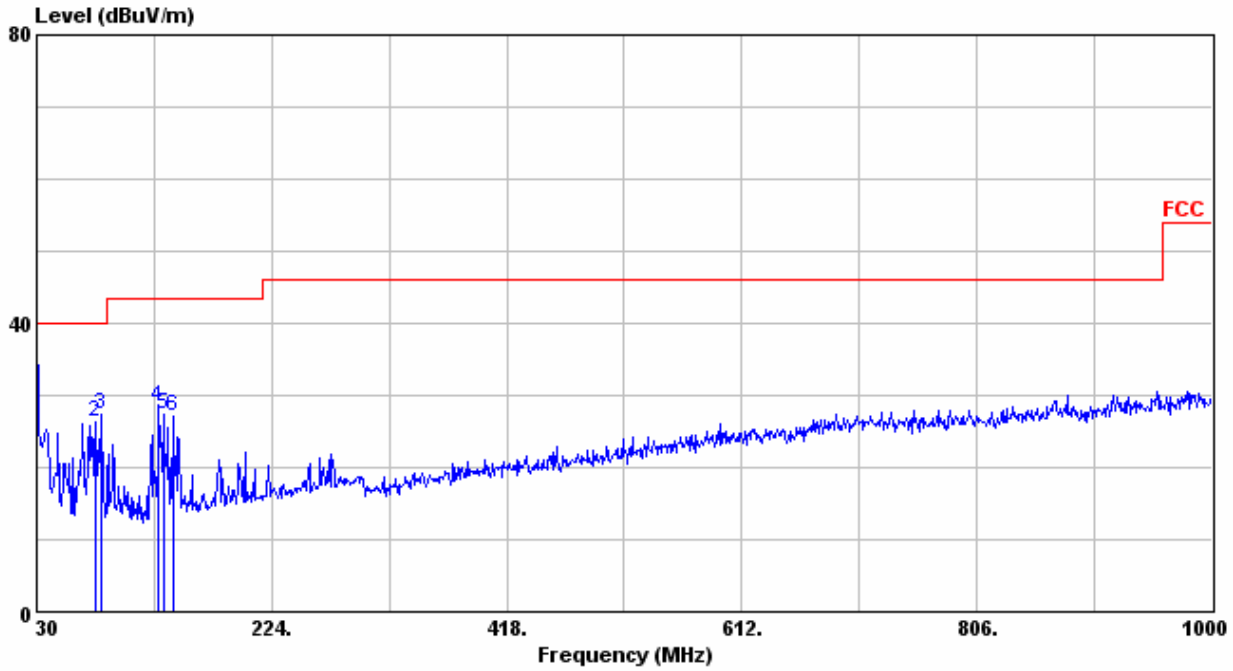
Horizontal, Average



Radiated Emission Measurement

Below 1GHz

Test Mode	:	**Transmitter/Receiver**			
Test Distance	:	3m	**Tester**	:	Bill
Polarization	:	Vertical	**Frequency Range**	:	30MHz~1GHz

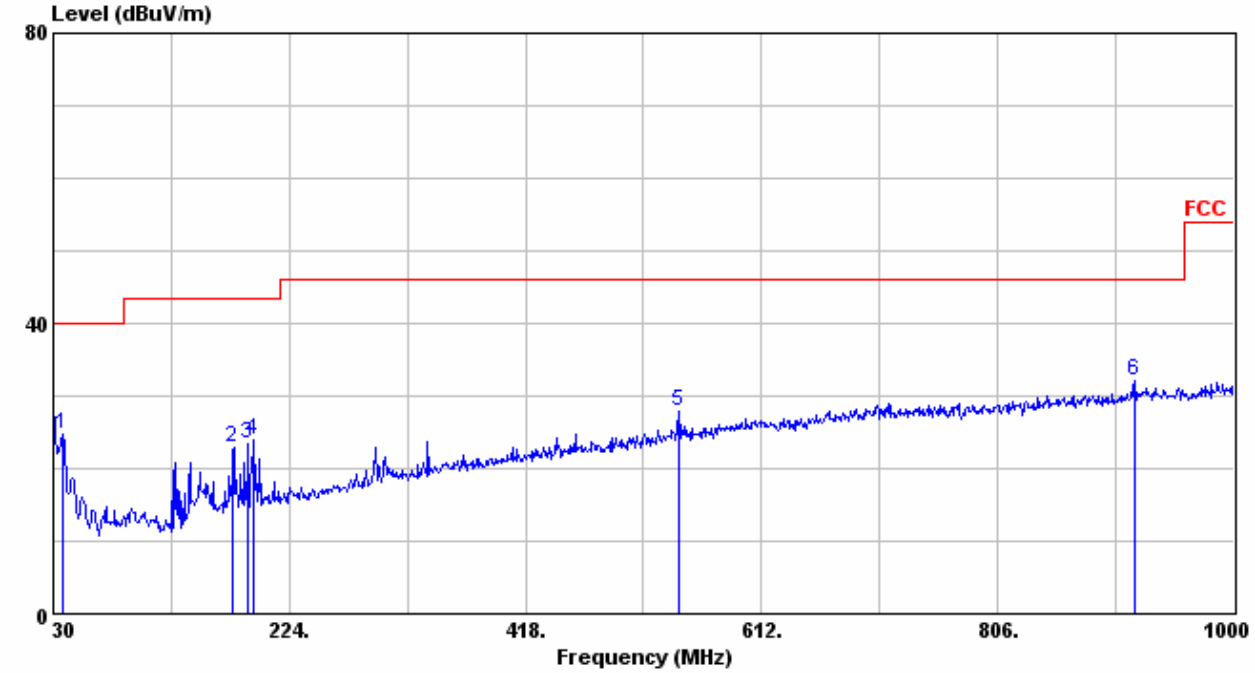


	Freq	Level	Factor	Read Level	Limit Line	Over Limit	Ant Pos	Table Pos	Pol/Phase	Remark
	MHz	dBuV/m	dB/m	dBuV	dBuV/m	dB	cm	deg		
1 !	30.000	35.75	-11.17	46.92	40.00	-4.25	---	---	VERTICAL	
2 !	78.500	26.30	-22.91	49.21	40.00	-13.70	---	---	VERTICAL	
3 !	83.350	27.49	-22.50	49.99	40.00	-12.51	---	---	VERTICAL	
4 !	130.880	28.30	-21.80	50.10	43.50	-15.20	---	---	VERTICAL	
5 !	134.760	27.34	-21.43	48.77	43.50	-16.16	---	---	VERTICAL	
6 !	142.520	27.00	-20.63	47.63	43.50	-16.50	---	---	VERTICAL	

Note:

1. Emission Level = reading value + correction factor.
2. Correction factor = cable loss + antenna factor – gain of pre-amplifier.
3. Q.P is abbreviation of quasi-peak.

Test Mode	**:**	**Transmitter/Receiver**			
Test Distance	**:**	3m	**Tester**	**:**	Bill
Polarization	**:**	Horizontal	**Frequency Range**	**:**	30MHz~1GHz



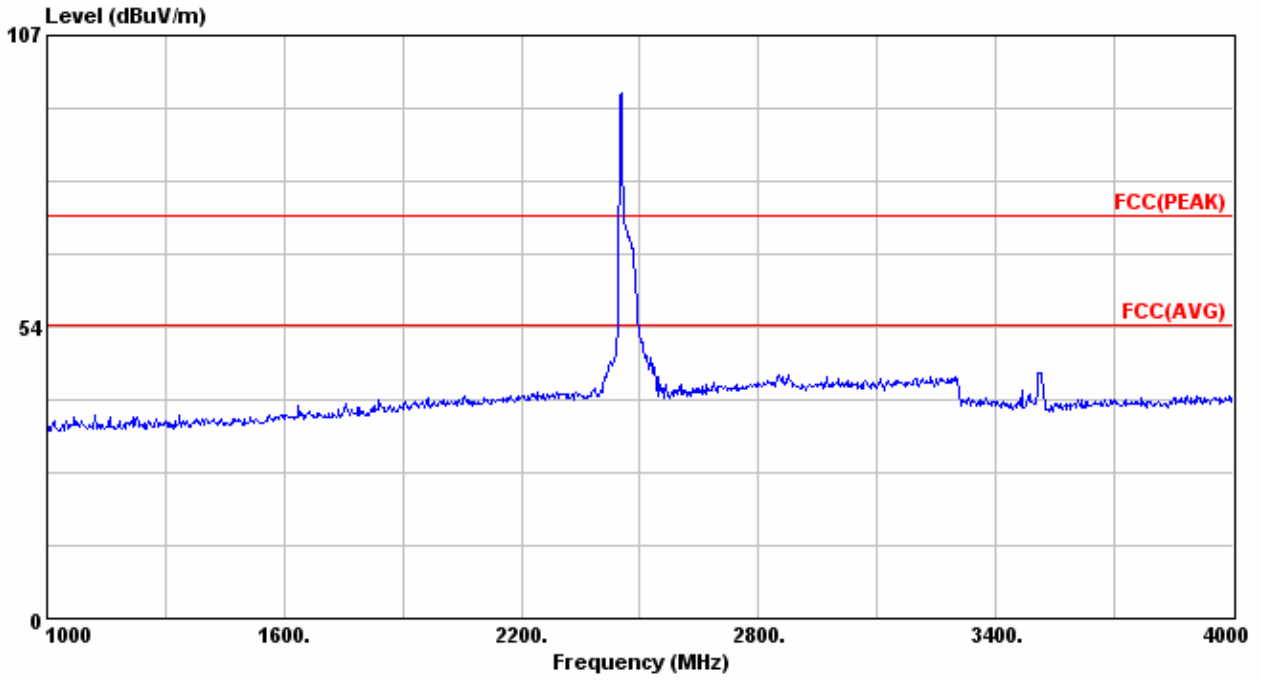
	Freq	Level	Factor	Read Level	Limit Line	Over Limit	Ant Pos	Table Pos	Pol/Phase	Remark
	MHz	dBuV/m	dB/m	dBuV	dBuV/m	dB	cm	deg		
1 !	37.760	24.71	-15.51	40.22	40.00	-15.29	---	---	HORIZONTAL	
2 !	177.960	22.80	-18.68	41.48	43.50	-20.70	---	---	HORIZONTAL	
3 !	189.570	23.39	-18.43	41.82	43.50	-20.11	---	---	HORIZONTAL	
4 !	194.160	23.89	-18.29	42.18	43.50	-19.61	---	---	HORIZONTAL	
5 !	544.100	28.00	-7.88	35.88	46.00	-18.00	---	---	HORIZONTAL	
6 !	918.520	32.13	-2.07	34.20	46.00	-13.87	---	---	HORIZONTAL	

Note:

1. Emission Level = reading value + correction factor.
2. Correction factor = cable loss + antenna factor – gain of pre-amplifier.
3. Q.P is abbreviation of quasi-peak.

Above 1GHz

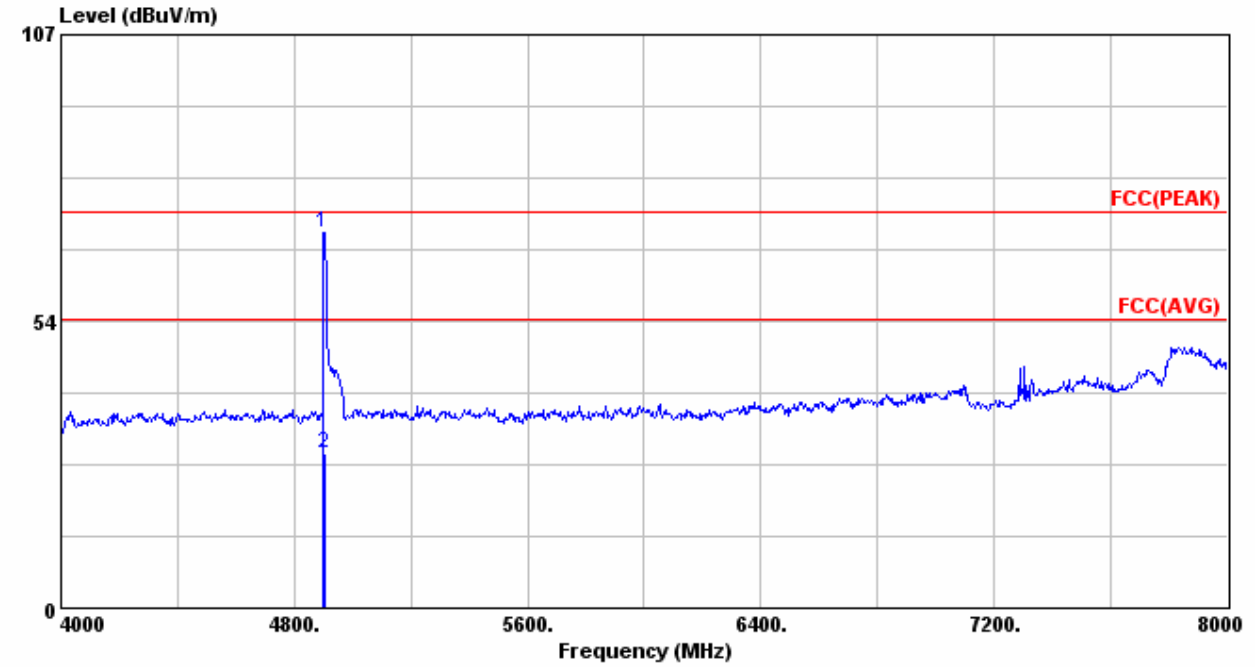
Test Mode	:	**Transmitter/Receiver**			
Test Distance	:	3m	**Tester**	:	Bill
Polarization	:	Vertical	**Frequency Range**	:	1GHz ~ 4GHz



Note:

1. Emission Level = reading value + correction factor.
2. Correction factor = cable loss + antenna factor – gain of pre-amplifier.

Test Mode	:	**Transmitter/Receiver**			
Test Distance	:	3m	**Tester**	:	Bill
Polarization	:	Vertical	**Frequency Range**	:	4GHz ~ 8GHz

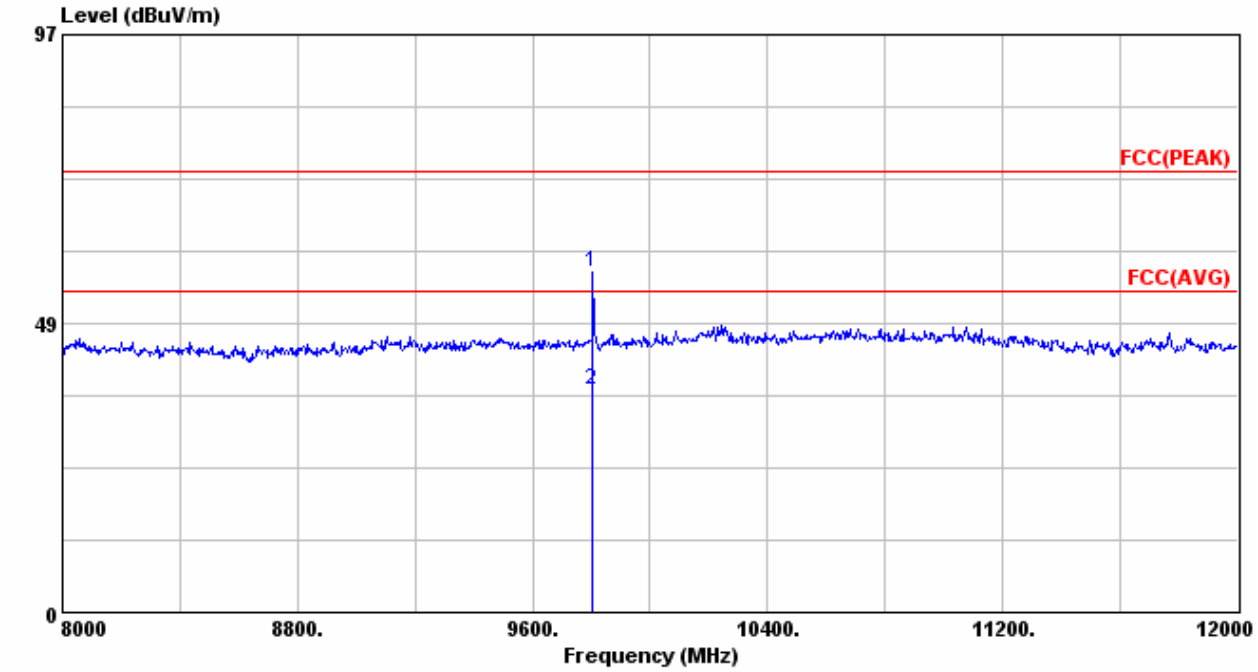


	Freq	Level	Factor	Read Level	Limit Line	Over Limit	Ant Pos	Table Pos	Pol/Phase	Remark
	MHz	dBuV/m	dB/m	dBuV	dBuV/m	dB	cm	deg		
1 !	4900.000	69.96	4.52	65.44	74.00	-4.04	---	---	VERTICAL	
2 !	4902.940	28.76	4.52	24.24	54.00	-25.24	---	---	VERTICAL	Average

Note:

1. Emission Level = reading value + correction factor.
2. Correction factor = cable loss + antenna factor – gain of pre-amplifier.

Test Mode	**:**	**Transmitter/Receiver**			
Test Distance	**:**	3m	**Tester**	**:**	Bill
Polarization	**:**	Vertical	**Frequency Range**	**:**	8GHz ~ 12GHz



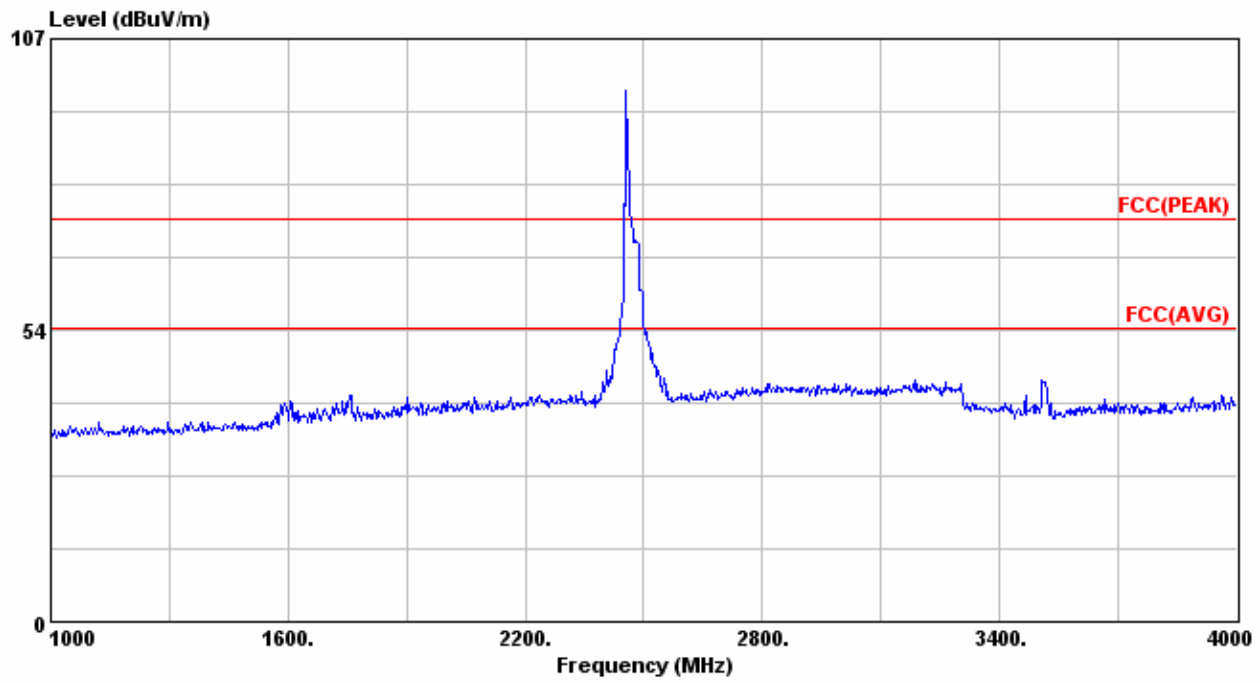
	Freq	Level	Factor	Read Level	Limit Line	Over Limit	Ant Pos	Table Pos	Pol/Phase	Remark
	MHz	dBuV/m	dB/m	dBuV	dBuV/m	dB	cm	deg		
1 !	9804.000	56.96	11.36	45.60	74.00	-17.04	---	---	VERTICAL	
2 !	9805.770	37.19	11.35	25.84	54.00	-16.81	---	---	VERTICAL	Average

Note:

1. Emission Level = reading value + correction factor.
2. Correction factor = cable loss + antenna factor – gain of pre-amplifier.

No signal can be detected from 12GHz to 25GHz, so the graphs are omitted above 12GHz.

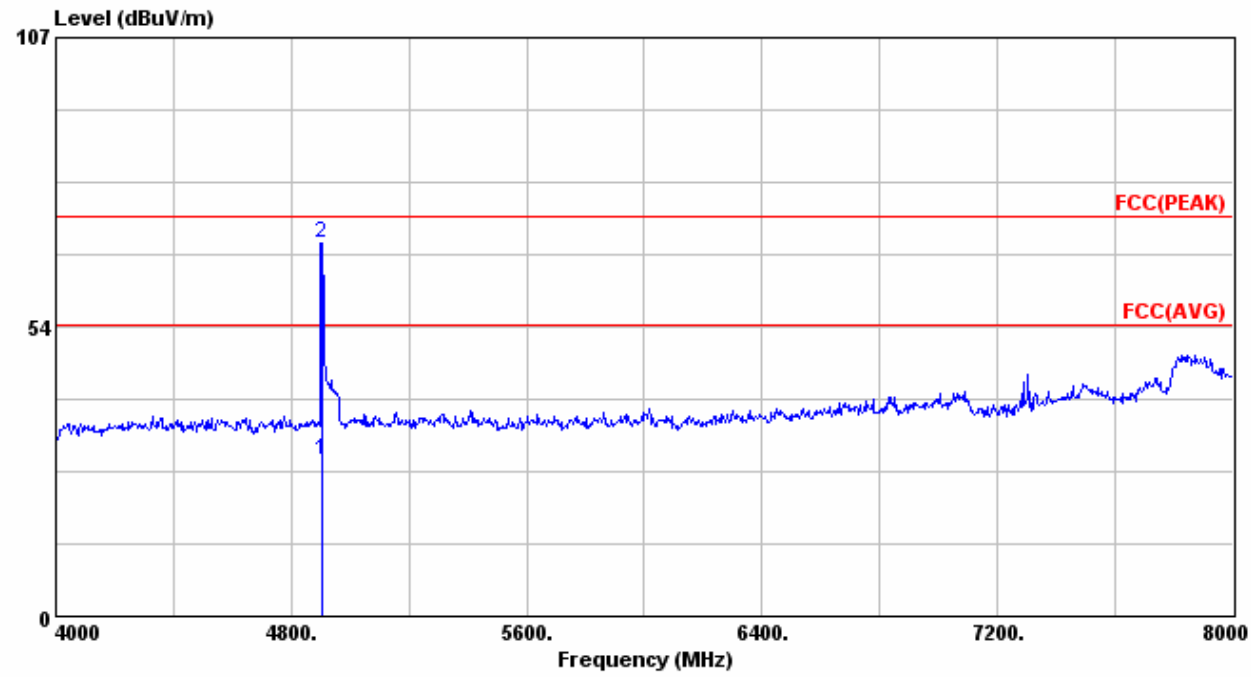
Test Mode	:	**Transmitter/Receiver**			
Test Distance	:	3m	**Tester**	:	Bill
Polarization	:	Horizontal	**Frequency Range**	:	1GHz ~ 4GHz



Note:

1. Emission Level = reading value + correction factor.
2. Correction factor = cable loss + antenna factor – gain of pre-amplifier.

Test Mode	:	**Transmitter/Receiver**			
Test Distance	:	3m	**Tester**	:	Bill
Polarization	:	Horizontal	**Frequency Range**	:	4GHz ~ 8GHz

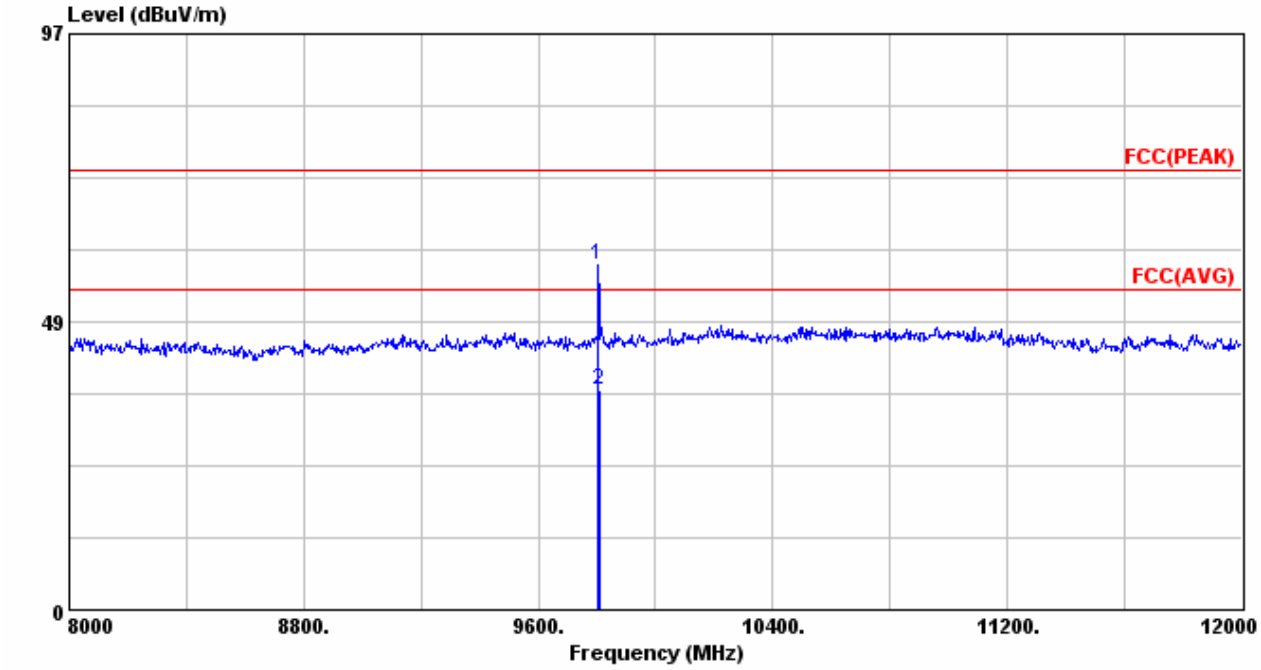


	Freq	Level	Factor	Read Level	Limit Line	Over Limit	Ant Pos	Table Pos	Pol/Phase	Remark
	MHz	dBuV/m	dB/m	dBuV	dBuV/m	dB	cm	deg		
1 !	4903.430	28.85	4.52	24.33	54.00	-25.15	---	---	HORIZONTAL	Average
2 !	4904.000	69.06	4.52	64.54	74.00	-4.94	---	---	HORIZONTAL	

Note:

1. Emission Level = reading value + correction factor.
2. Correction factor = cable loss + antenna factor – gain of pre-amplifier.

Test Mode	:	**Transmitter/Receiver**			
Test Distance	:	3m	**Tester**	:	Bill
Polarization	:	Horizontal	**Frequency Range**	:	8GHz ~ 12GHz



	Freq	Level	Factor	Read Level	Limit Line	Over Limit	Ant Pos	Table Pos	Pol/Phase	Remark
	MHz	dBuV/m	dB/m	dBuV	dBuV/m	dB	cm	deg		
1 !	9804.000	58.15	11.36	46.79	74.00	-15.85	---	---	HORIZONTAL	
2 !	9806.360	37.00	11.36	25.64	54.00	-17.00	---	---	HORIZONTAL	Average

Note:

1. Emission Level = reading value + correction factor.
2. Correction factor = cable loss + antenna factor – gain of pre-amplifier.

No signal can be detected from 12GHz to 25GHz, so the graphs are omitted above 12GHz.

4. Conducted Emission Measurement

Result: Pass

4.1 Applied standard

For intentional device, according to §15.207(a) line conduction emission limit is as below table.

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

* Decreases with the logarithm of the frequency.

4.2 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Test Receiver	R&S	ESCS 30/ **836858/021**	Jan. 6, 2007	Jan. 6, 2008
LISN	R&S	ESH2-Z5/ **836613/001**	Jan. 4, 2007	Jan. 4,2008
2nd LISN	R&S	ENV4200/ **833209/010**	Jan. 4, 2007	Jan. 4,2008
50Ω terminator	N/A	N/A/ **001**	Sep. 10, 2006	Sep. 10,2007
RF Switch	N/A	RSU28/ **338965/002**	March 10, 2006	March 10,2007
Shielded room	ETS.LINDGREN	TR5/ **15353-F**	NCR	NCR

Note:

1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.

Instrument Setting

IF BW	Measurement Time	Detector	Trace	Comment
9kHz	1 second	Quasi-Peak / Average	Maxhold	

Climatic Condition

Ambient Temperature：27°C ; Relative Humidity : 68%

4.3 Measurement Procedure

a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.

b. If the EUT is tabletop equipment, it was placed on a non-conducted table with a height of 0.8 meters above the reference ground plane and 0.4 meters from the conducting wall of the shielded room. Also if the EUT is floor-standing equipment, it was placed on a non-conducted support with a height of 12 millimeters above the reference ground plane.

c. Connect the EUT's power source to the appropriate power mains through the LISN.

d. All the other peripherals are connected to the 2nd LISN, if any.

e. The LISN was placed 0.8 meters from the EUT and at least 0.8 meters from other units and other metal planes.

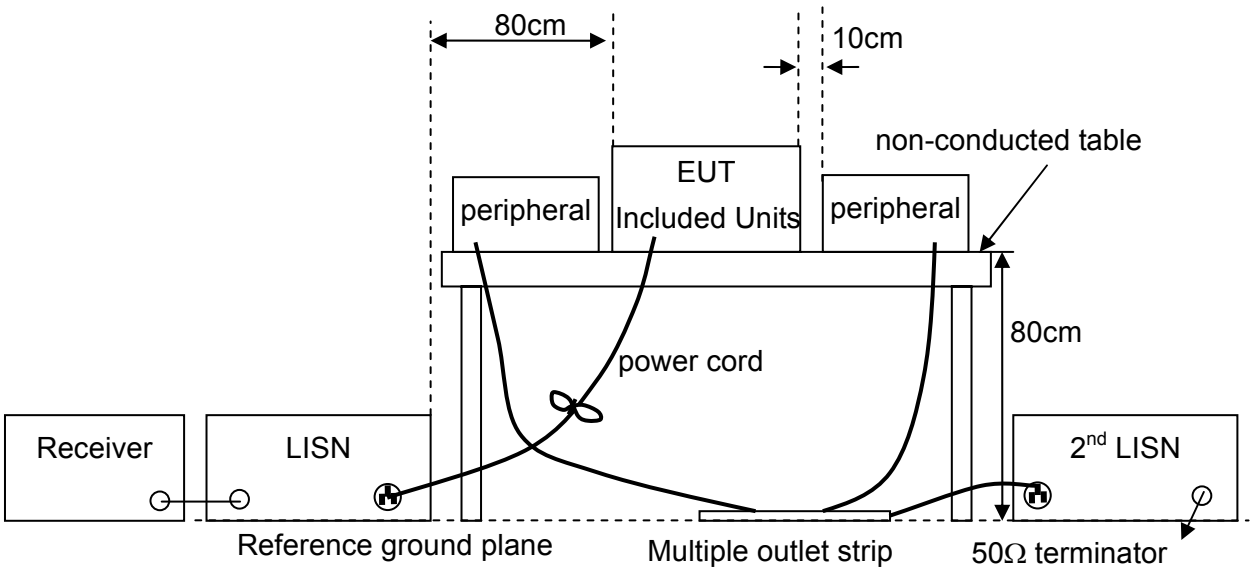
f. Measure the conducted emissions on each power line (Neutral Line and Line 1 – Hot side) of the EUT's power source by using the test receiver connected to the coupling RF output port of LISN.

g. Rapidly scan the signal from 150kHz to 30MHz by using the receiver through the Maximum-Peak detector to determine those frequencies associated with higher emission levels for each measured line.

h. Then measure the maximum level of conducted disturbance for each frequency found from step g. by using the receiver through the Quasi-Peak and Average detectors per CISPR 16-1.

i. Record the level for each frequency and compare with the required limit.

4.4 Test configuration

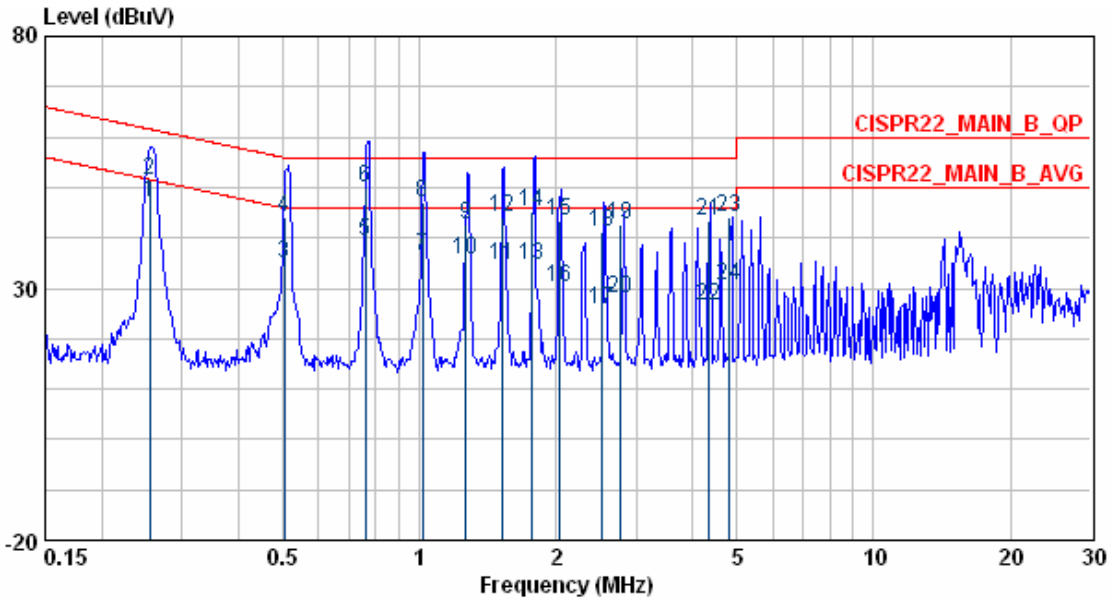


4.5 Test Data

Test Mode : **Transmitter/Receiver**

Frequency Range : 150kHz~30MHz **Phase** : Line

Tester : Bill



	Freq	Level	Factor	Read Level	Limit Line	Over Limit	Ant Pos	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	cm		
1 @	0.26	47.03	0.11	46.92	51.59	-4.56	---	LINE	AVERAGE
2	0.26	51.33	0.11	51.22	61.59	-10.26	---	LINE	QP
3	0.50	35.01	0.17	34.84	46.00	-10.99	---	LINE	AVERAGE
4	0.50	44.14	0.17	43.97	56.00	-11.86	---	LINE	QP
5	0.76	39.30	0.22	39.08	46.00	-6.70	---	LINE	AVERAGE
6	0.76	49.89	0.22	49.67	56.00	-6.11	---	LINE	QP
7	1.02	36.46	0.26	36.20	46.00	-9.54	---	LINE	AVERAGE
8	1.02	47.21	0.26	46.95	56.00	-8.79	---	LINE	QP
9	1.27	42.63	0.27	42.36	56.00	-13.37	---	LINE	QP
10	1.27	35.51	0.27	35.24	46.00	-10.49	---	LINE	AVERAGE
11	1.52	34.67	0.28	34.39	46.00	-11.33	---	LINE	AVERAGE
12	1.52	44.04	0.28	43.76	56.00	-11.96	---	LINE	QP
13	1.77	34.68	0.29	34.39	46.00	-11.32	---	LINE	AVERAGE
14	1.77	45.27	0.29	44.98	56.00	-10.73	---	LINE	QP
15	2.03	43.20	0.30	42.90	56.00	-12.80	---	LINE	QP
16	2.03	30.22	0.30	29.92	46.00	-15.78	---	LINE	AVERAGE
17	2.53	25.77	0.36	25.41	46.00	-20.23	---	LINE	AVERAGE
18	2.53	41.08	0.36	40.72	56.00	-14.92	---	LINE	QP
19	2.78	42.66	0.38	42.28	56.00	-13.34	---	LINE	QP
20	2.78	27.88	0.38	27.50	46.00	-18.12	---	LINE	AVERAGE
21	4.32	43.52	0.50	43.02	56.00	-12.48	---	LINE	QP
22	4.32	26.34	0.50	25.84	46.00	-19.66	---	LINE	AVERAGE
23	4.79	44.23	0.53	43.70	56.00	-11.77	---	LINE	QP
24	4.79	30.68	0.53	30.15	46.00	-15.32	---	LINE	AVERAGE

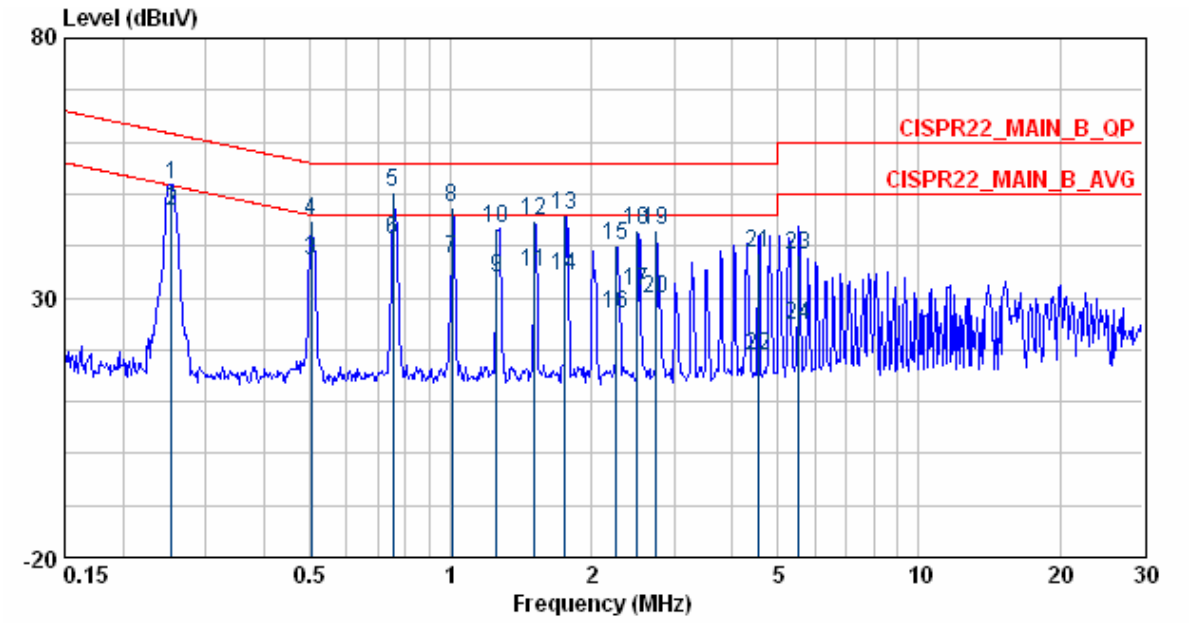
Note:

1. Emission Level = Reading Data + correction factor.
2. Correction factor = cable loss + insertion loss of LISN.
3. Over Limit = Limit–Emission level.
4. P.K., Q.P. and AV. are abbreviation of peak, quasi-peak and average respectively.
5. If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the EUT shall be deemed to meet both limits.

Test Mode : **Transmitter/Receiver**

Frequency Range : 150kHz~30MHz **Phase** : Neutral

Tester : Bill



	Freq	Level	Factor	Read Level	Limit Line	Over Limit	Ant Pos	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	cm		
1	0.25	51.66	0.11	51.55	61.64	-9.99	---	NEUTRAL	QP
2	0.25	46.78	0.11	46.67	51.64	-4.87	---	NEUTRAL	AVERAGE
3	0.50	37.32	0.17	37.15	46.00	-8.68	---	NEUTRAL	AVERAGE
4	0.50	44.89	0.17	44.72	56.00	-11.11	---	NEUTRAL	QP
5	0.75	50.48	0.22	50.26	56.00	-5.52	---	NEUTRAL	QP
6 @	0.75	41.15	0.22	40.93	46.00	-4.85	---	NEUTRAL	AVERAGE
7	1.01	37.33	0.26	37.07	46.00	-8.67	---	NEUTRAL	AVERAGE
8	1.01	47.54	0.26	47.28	56.00	-8.46	---	NEUTRAL	QP
9	1.25	33.77	0.27	33.50	46.00	-12.23	---	NEUTRAL	AVERAGE
10	1.25	43.48	0.27	43.21	56.00	-12.52	---	NEUTRAL	QP
11	1.50	34.87	0.28	34.59	46.00	-11.13	---	NEUTRAL	AVERAGE
12	1.50	44.73	0.28	44.45	56.00	-11.27	---	NEUTRAL	QP
13	1.76	45.98	0.29	45.69	56.00	-10.02	---	NEUTRAL	QP
14	1.76	34.31	0.29	34.02	46.00	-11.69	---	NEUTRAL	AVERAGE
15	2.25	40.18	0.31	39.87	56.00	-15.82	---	NEUTRAL	QP
16	2.25	26.94	0.31	26.63	46.00	-19.06	---	NEUTRAL	AVERAGE
17	2.51	31.11	0.32	30.79	46.00	-14.89	---	NEUTRAL	AVERAGE
18	2.51	43.02	0.32	42.70	56.00	-12.98	---	NEUTRAL	QP
19	2.75	42.83	0.33	42.50	56.00	-13.17	---	NEUTRAL	QP
20	2.75	29.64	0.33	29.31	46.00	-16.36	---	NEUTRAL	AVERAGE
21	4.55	38.67	0.43	38.24	56.00	-17.33	---	NEUTRAL	QP
22	4.55	18.84	0.43	18.41	46.00	-27.16	---	NEUTRAL	AVERAGE
23	5.53	38.36	0.50	37.86	60.00	-21.64	---	NEUTRAL	QP
24	5.53	24.81	0.50	24.31	50.00	-25.19	---	NEUTRAL	AVERAGE

Note:

1. Emission Level = Reading Data + correction factor.
2. Correction factor = cable loss + insertion loss of LISN.
3. Over Limit = Limit–Emission level.
4. P.K., Q.P. and AV. are abbreviation of peak, quasi-peak and average respectively.
5. If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the EUT shall be deemed to meet both limits.