

FCC Test Report

E.U.T. : Bluetooth Speaker
Trade Name : JS
Model : JS2302WA
FCC ID : JQYBSJS2303WA00
IC ID : 6208A-B2302WA0
Report No. : RC-A25-0508-321
Date of Report : October 18,2005

Prepared for

JAZZ HIPSTER CORPORATION

2Fd, No.512, Yuan-San Rd., Chung-Ho City, Taipei Hsien, Taiwan, R.O.C.

Prepared by



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NVLAP LAB CODE 200575-0

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Total : 94 Pages

Certification of Compliance

E.U.T. : Bluetooth Speaker
Trade Name : JS
Model : JS2302WA
FCC ID : JQYBSJS2303WA00
IC ID : 6208A-B2302WA0□□
Manufacturer : Chiyu Electronics (SZ) Co.,Ltd
Applicant : JAZZ HIPSTER CORPORATION
Address : 2Fd, No.512, Yuan-San Rd., Chung-Ho City, Taipei Hsien, Taiwan,
R.O.C.
Date of Receipt : October 12, 2005
Date of Test : October 13~17, 2005
Applicable Standards : 47 CFR part 15, Subpart C
RSS-210 Issue 6
Deviation : None
Condition of 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,

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Attachment 1 – Photographs of the Test Configurations

Attachment 2 –External Photographs of EUT

Attachment 3 –Internal Photographs of EUT

1 General Description

1.1 General Description of E.U.T.

E.U.T. : Bluetooth Speaker
Model No. : JS2302WA
FCC ID : JQYBSJS2303WA00
IC ID : 6208A-B2302WA0□□
Brand : JS
Power in : AC 120v/60Hz
Test Voltage : AC 120V/60Hz
Applicant : JAZZ HIPSTER CORPORATION
Manufacturer : Chiyu Electronics (SZ) Co.,Ltd

1.2 Characteristic of E.U.T.

Frequency Range : 2400~2483.5MHz
Function Description : GFSK

The EUT contains a bluetooth function is used to transmit both control command and data. Please refer to the user's manual for the details.

Perform the function of EUT continuously by executing the test program supplied by manufacturer.

1.3 Test Methodology

For Bluetooth Speaker, both conducted and radiated emissions were performed according to the procrdures illustrated in ANSI C63.4 and other required measurements were illustrated in separate sections of this test report for detail.

1.4 Requirement for Compliance

(1) 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.

(2) Radiated Emission Requirement

For intentional device, according to §15.209, the general requirement of field strength of radiated emissions from intentional radiator at a distance of 3 meters shall not exceed the below table.

Frequency (MHz)	Measurement Distance (m)	Field Strength (uV/m)	Field Strength (dBuV/m)
30 – 88	3	100	40.0
88 – 216	3	150	43.5
216 – 960	3	200	46.0
960 – 1610	3	500	54.0
above 1610	3	500	54.0

Note 1- The lower limit shall apply at the transition frequency.

(3) Hopping Channel Carrier Frequencies Separation and 20dB Bandwidth

According to 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.

(4) Dwell Time on Each Channel

According to 15.247(a)(1)(iii), frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 non-overlapping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

(5) Maximun Peak Output Power

According to 15.247(b)(1), for frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

(6) 100kHz Bandedge

According to 15.247(c), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

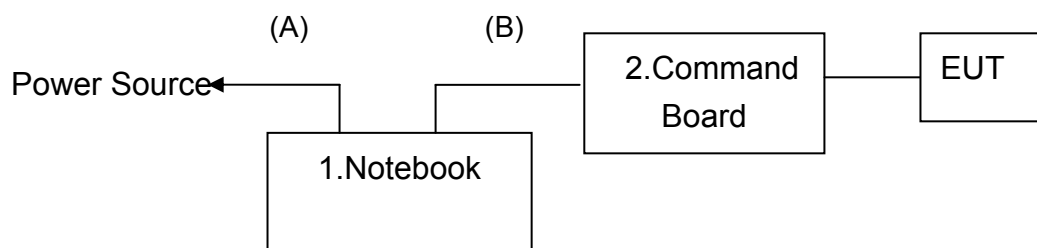
(7) Restricted Band

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (MHz)
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

1.5 Layout of Setup



The Support Units :

No.	Unit	Model No./ Serial No.	FCC ID	Trade Name	Power Cord	Supported by lab.
1	Notebook	LATITUDE D400/ 34590451312	NA	0.8m	✓	✓
2.	Command Board	VIC-1A 94V-0/ 0320	NA			

Connecting Cables :

No.	Cable	Length	Shielded	Core	Shielded Backshell	Supported by lab.	Note
A	Power cord	1.8m		✓		✓	
B	RS232	1.0m	✓				

Justification :

For both conducted and radiated emission below 1GHz, the system was configured for typical fasion as a customer could normal use it. The peripherals other than EUT was connected in normally standing by situation. Measurement was performed under the conduction that a computer program was excited to simulate data communication of EUT, and the transmission rate was setup maximum allowed by EUT.

For line conducted emission, only measurement of TX/RX and Charge mode operated, for the digital circuits portion also function normally whenever TX or RX is operated. For radiated emission, measurement of radiated emission from digital circuit is performed with channel 0, Channel 39 and channel 78 by transmitting mode.

1.6 Test Facility

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.
☒ TR4	Shielding Room (5m×3m×3m)	For the RF conducted emission measurement.
☒ TR5	Shielding Room (8m×5m×4m)	For the Line conducted emission measurement.

1.7 Measurement Uncertainty

All the measurement uncertainty evaluation procedures in this report are base on ETSI TR 100 028-1, 100 028-2,and ETSI TR 102 273-3. The assessed measurement uncertainties are:

Test Item	Measurement Uncertainty
Peak Output Power	4.56dB
100kHz Bandedge	Horizontal 4.56dB ; Vertical 4.62dB
Carrier Frequencies Separation	2.21 Hz
Unwanted Emission (below 1GHz)	Horizontal 4.05dB ; Vertical 4.08dB
Unwanted Emission (above 1GHz)	Horizontal 4.56dB ; Vertical 4.62dB
Dwell time	2%
Line Conducted Emission	2.26dB

2 Maximum Peak Output Power

Result: Pass

2.1 Applied standard

According to 15.247(b)(1), for frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

2.2 Measurement Procedure

1. 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.
2. A software provided by client enabled the EUT to transmit data at single channel.
The Transmitter output of EUT was connected to the spectrum analyzer through a probe and perform the maximum peak output power measurement.
3. Record the level and compare with the required limit.

2.3 Test configuration



2.4 Test Instruments

Test Site and Equipment	Manufacturer	Model No./Serial No.	Calibration Due Data
TR4 Shielded Room	ETS.LINDGREN	TR4/ 15353-E	NCR
Spectrum Analyzer	Advantest	R3132/ 103082587	September 7,2006

Note:

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

Instrument Setting

RBW	VBW	Detector	Trace	Comment
10KHz	100KHz	Peak	Maxhold	

Climatic Condition

Ambient Temperature : 28°C ;

Relative Humidity : 64%

2.5 Test Data

Test Mode : Continuous Transmitting

Test Site : TR4

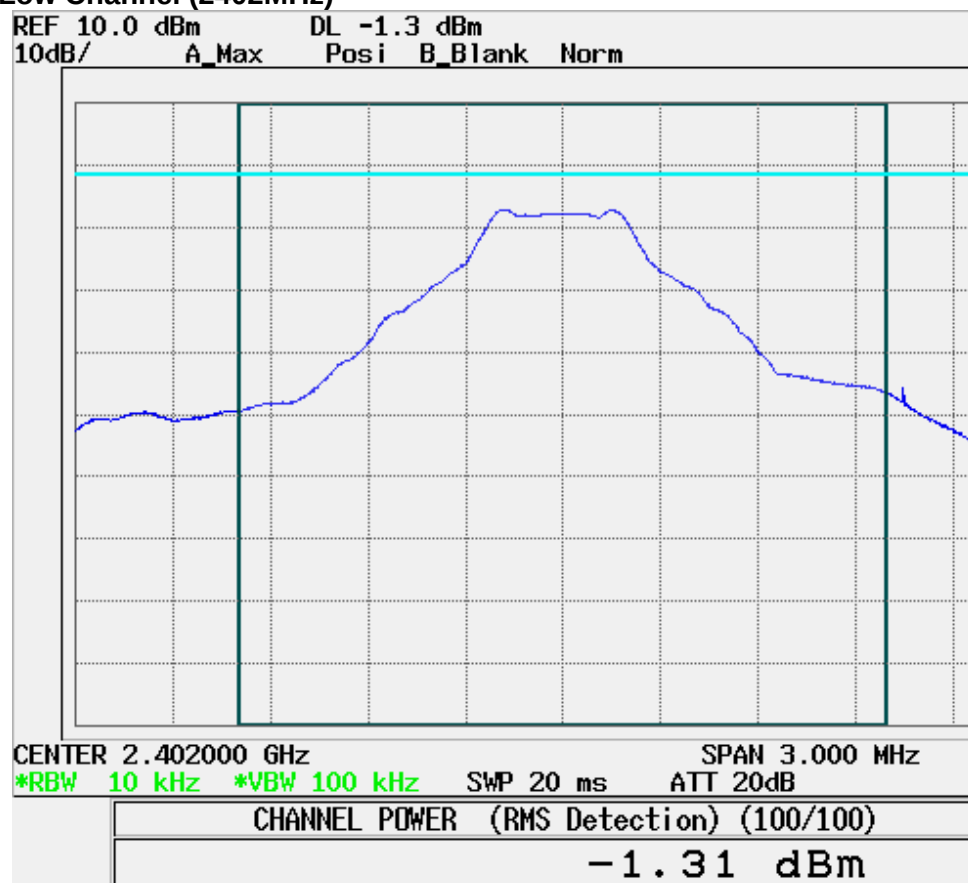
Tester : Bill

Operating Frequency (MHz)	Reading Data (dBm)	Correction Factor (dB)	Emission (dBm)	Limit (dBm)	Margin (dB)
2402	-1.31	0.97	-0.34	30	30.34
2441	-2.09	0.98	-1.11	30	31.11
2480	-3.23	0.99	-2.24	30	32.24

Note:

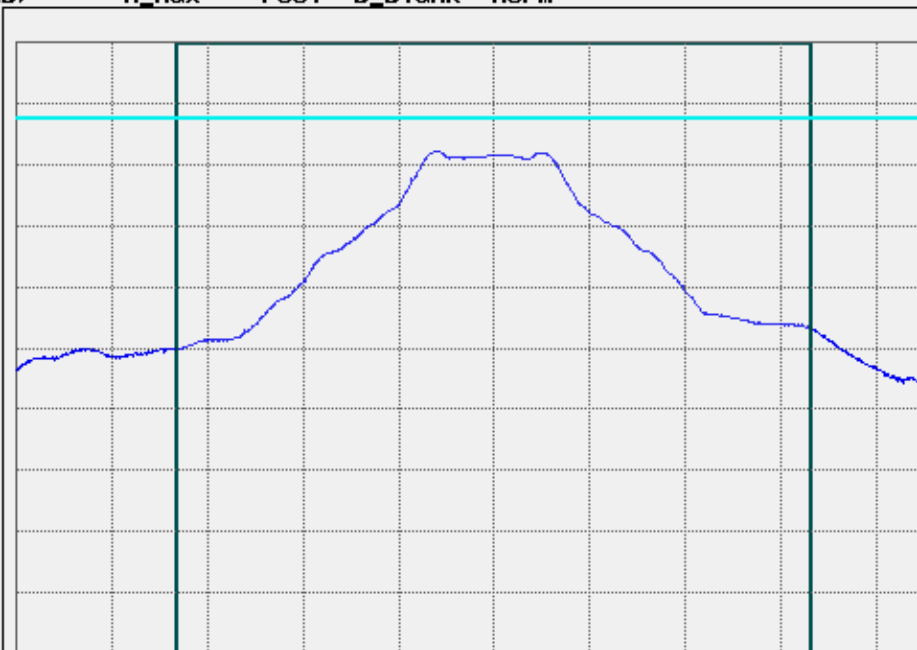
1. Correction Factor (dB) = Cable Loss + Attenuator
2. Emission (dBm) = Reading Data + Correction Factor
3. Margin (dB) = Limit – Emission

Low Channel (2402MHz)



MiddleChannel (2441MHz)

REF 10.0 dBm DL -2.1 dBm
10dB/ A_Max Posi B_Blank Norm



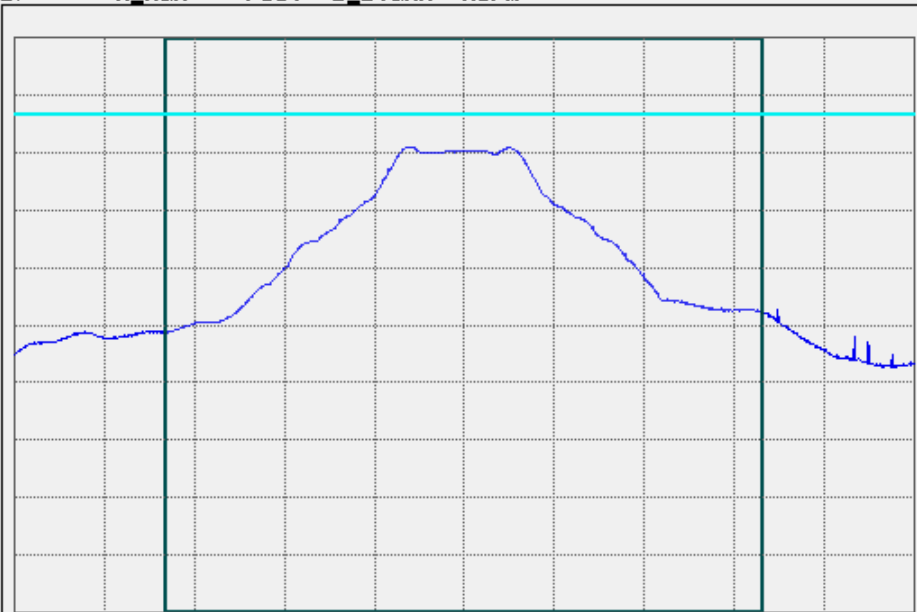
CENTER 2.441000 GHz SPAN 3.000 MHz
*RBW 10 kHz *VBW 100 kHz SWP 20 ms ATT 20dB

CHANNEL POWER (RMS Detection) (100/100)

-2.09 dBm

High Channel (2480MHz)

REF 10.0 dBm DL -3.2 dBm
10dB/ A_Max Posi B_Blank Norm



CENTER 2.480000 GHz SPAN 3.000 MHz
*RBW 10 kHz *VBW 100 kHz SWP 20 ms ATT 20dB

CHANNEL POWER (RMS Detection) (100/100)

-3.23 dBm

3 Band Edge

Result: Pass

3.1 Applied standard

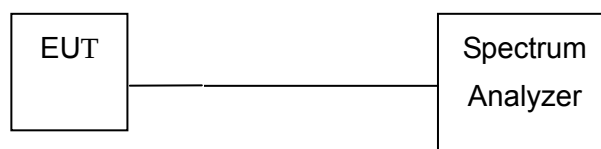
According to 15.247(c), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

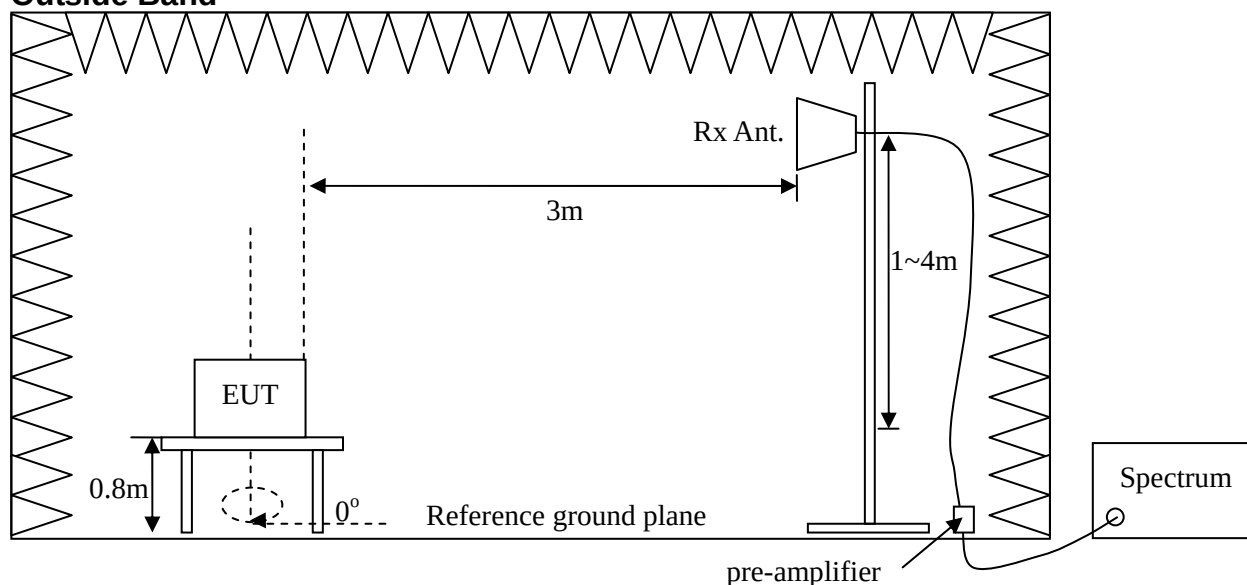
3.2 Measurement Procedure

1. 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.
2. A software provided by client enabled the EUT to transmit data at single channel.
The Transmitter output of EUT was connected to the spectrum analyzer through a probe and perform the band edge measurement.
3. Record the band edge and compare with the required limit.

3.3 Test configuration

Within Band



Outside Band**3.4 Test Instruments**

Test Site and Equipment	Manufacturer	Model No./Serial No.	Calibration Due Data
Semi-anechoic Chamber	ETS.LINDGREN	TR1/ 17627-B	April 12,2006
TR4 Shielded Room	ETS.LINDGREN	TR4/ 15353-E	NCR
Spectrum Analyzer	R&S	FSP40/ 100031	June 6,2006
Spectrum Analyzer	Advantest	R3132/ 103082587	September 7,2006
Antenna	R&S	HF906/ 359287/001	August 11,2006
Pre-amplifier	MITEQ	AMP-4D-005180-24-10P/ 1072962	May 19,2006

Note:

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

Instrument Setting

RBW	VBW	Detector	Trace	Comment
100kHz	100kHz	Peak	Maxhold	Within Band
1MHz	1MHz	Peak	Maxhold	Outside Band Peak
1MHz	10Hz	Peak	Maxhold	Outside Band Average

Climatic Condition

Ambient Temperature : 28°C ; Relative Humidity : 64%

3.5 Test Data

Test Mode : Continuous Transmitting

Tester : Bill

Operation Frequency (MHz)	Maximum Emission Level (dBm)	Emission Frequency (MHz)	Emission Outside of the band (dBm)	Attenuation (dB)	Limit (dBm)	Margin (dB)
2402	-6.95	2399.72	-44.67	37.72	20	17.72
2480	-9.10	2483.65	-47.15	38.05	20	18.05

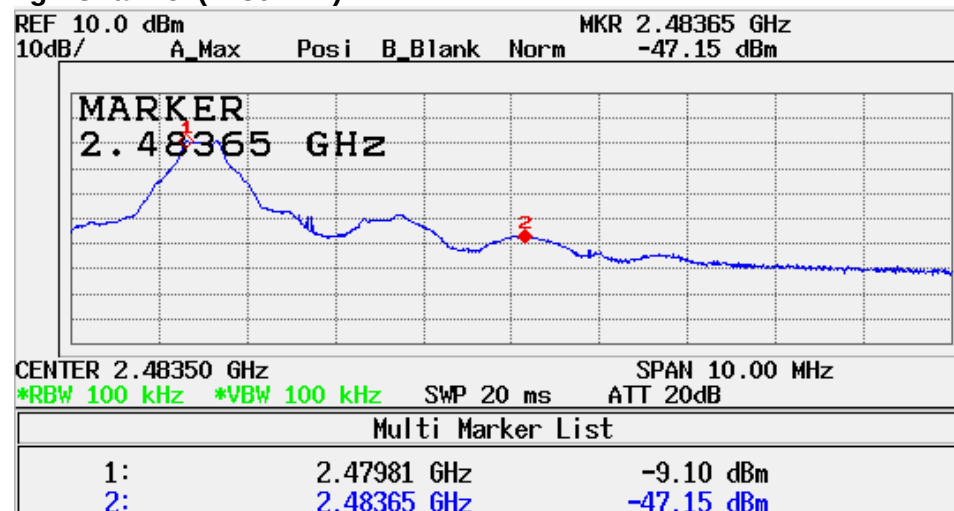
Note:

1. Attenuation (dB) = Maximum Emission Level - Emission Outside of the band
2. Margin (dB) = Attenuation – Limit

Low Channel (2402MHz)



High Channel (2480MHz)



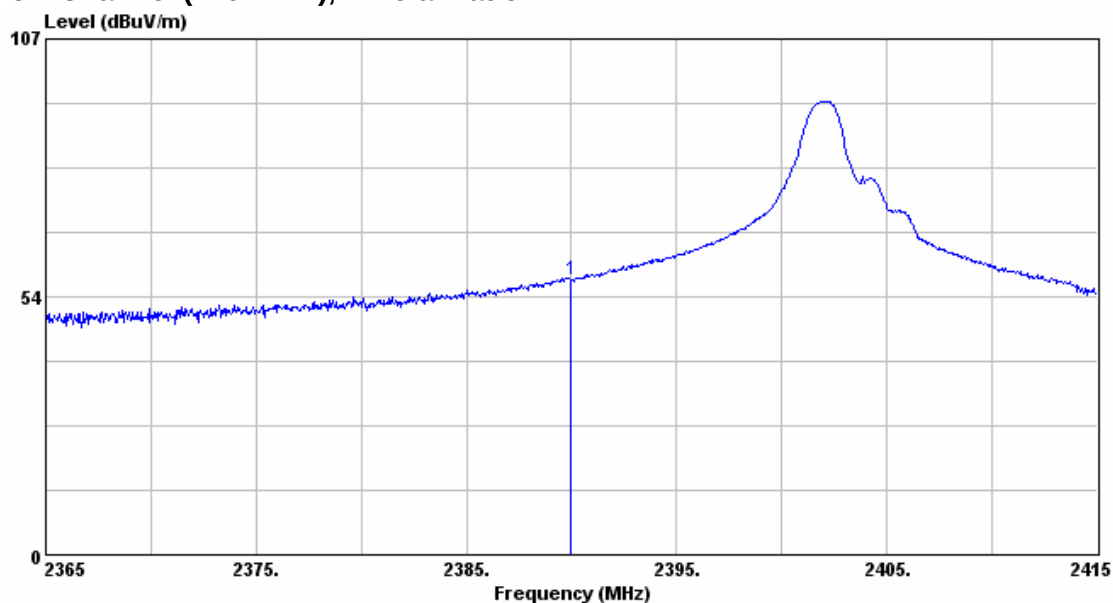
Test Mode : Continuous Transmitting
 Tester : Bill

Operation Channel	Antenna 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.
CH0	V	2390.0	56.43	33.60	0.50	56.93	34.10	74.00	54.00	17.07	19.90
CH0	H	2390.0	55.36	33.00	0.50	55.86	33.50	74.00	54.00	18.14	20.50
CH78	V	2483.5	67.23	36.01	0.42	67.65	36.43	74.00	54.00	6.35	17.57
CH78	H	2483.5	62.17	33.30	0.42	62.59	33.72	74.00	54.00	11.41	20.28

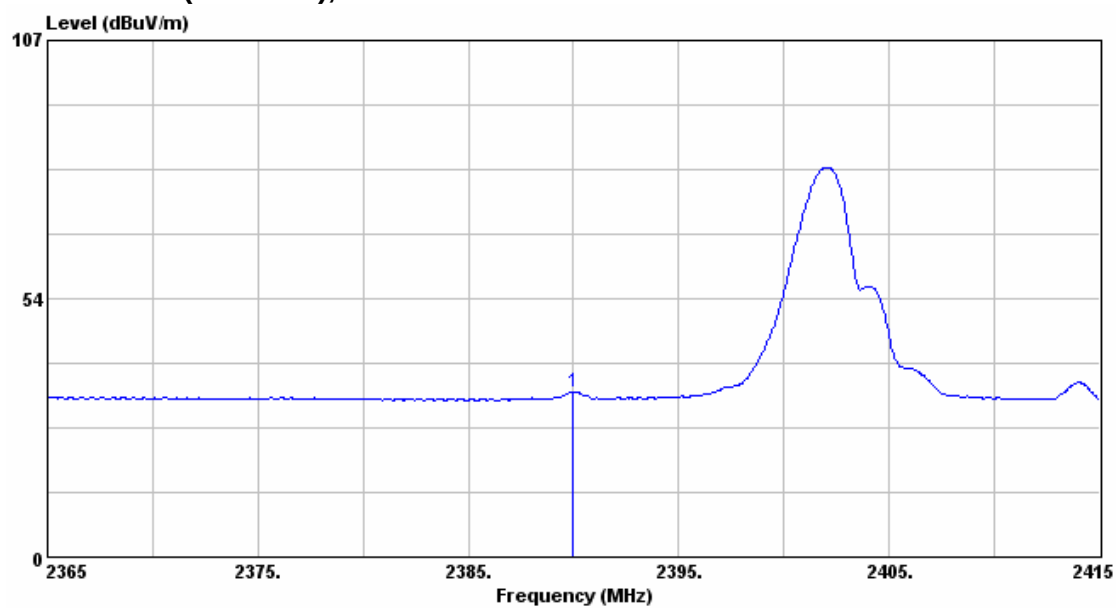
Note:

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

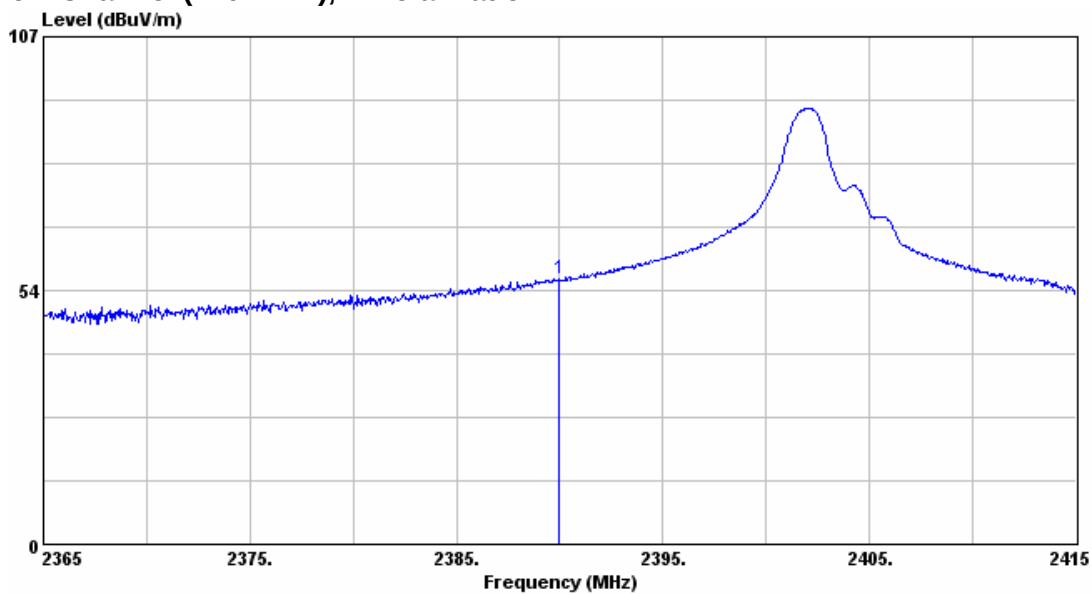
Low Channel (2402MHz), V Polarization – PK.



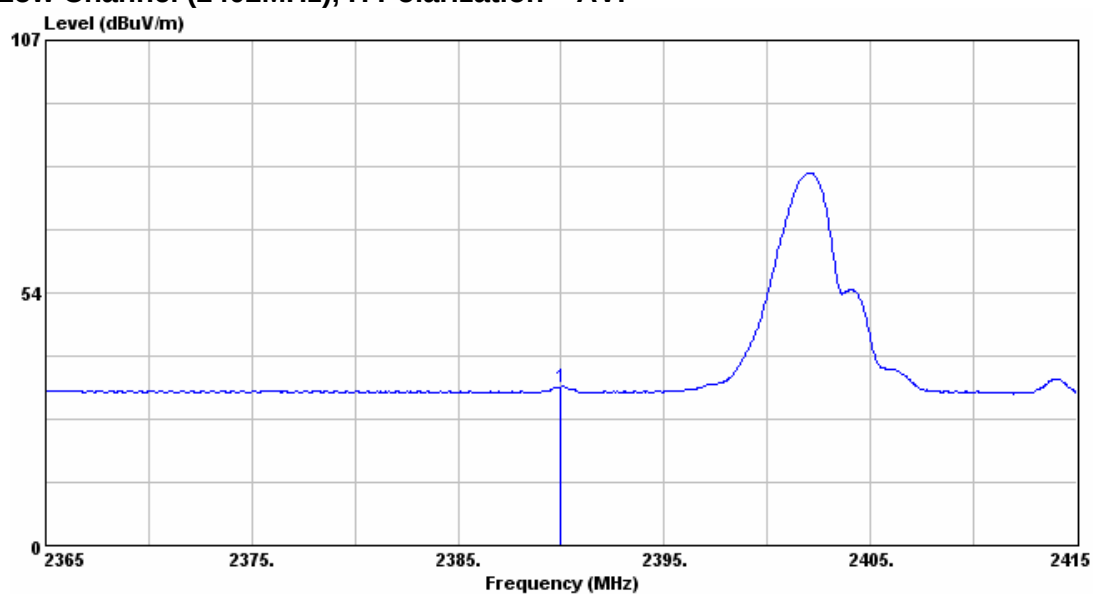
Low Channel (2402MHz), V Polarization – AV.



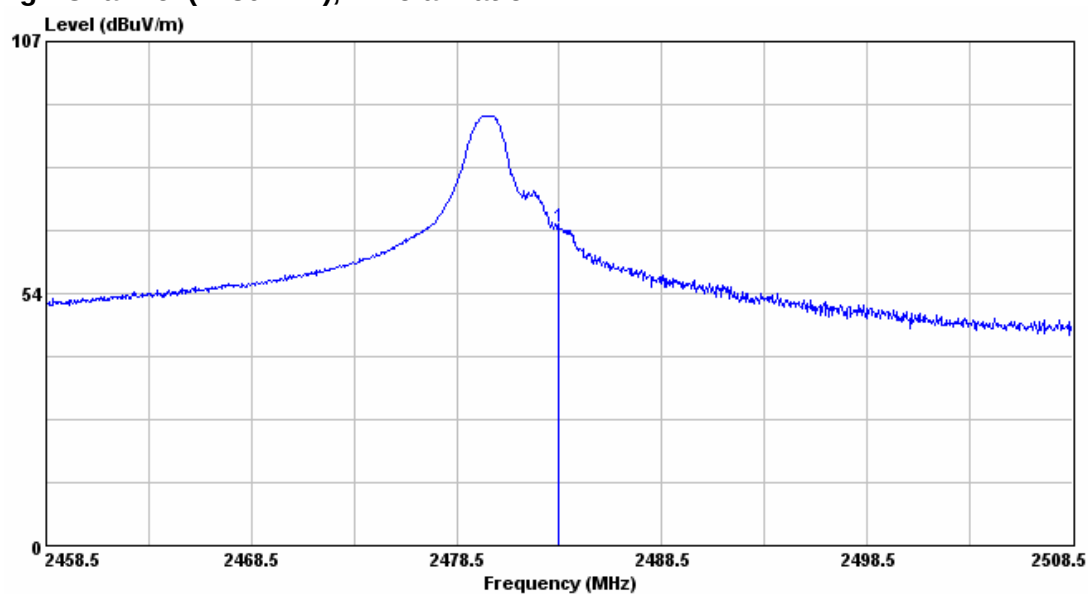
Low Channel (2402MHz), H Polarization – PK.



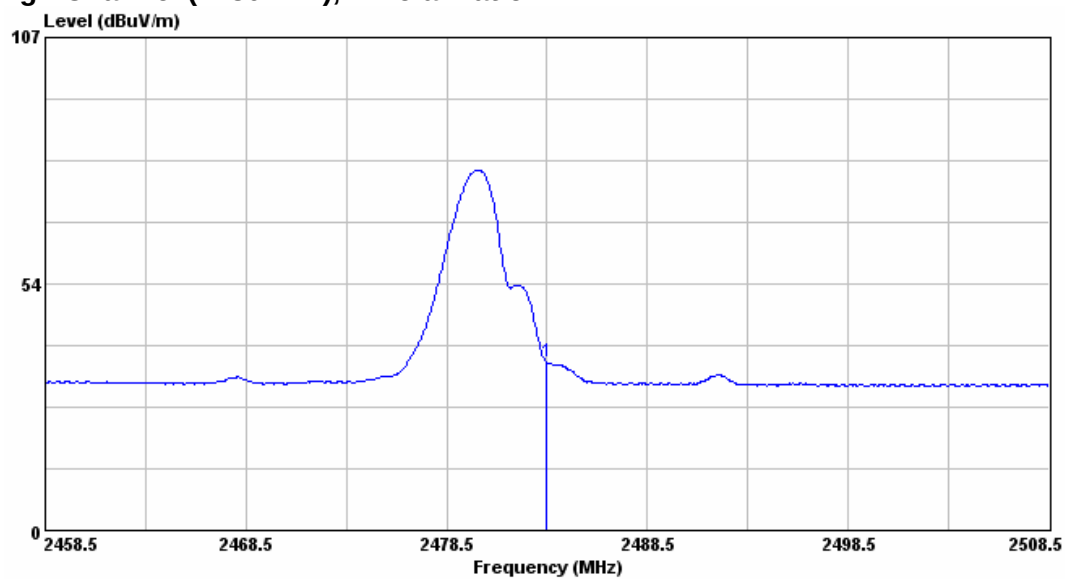
Low Channel (2402MHz), H Polarization – AV.



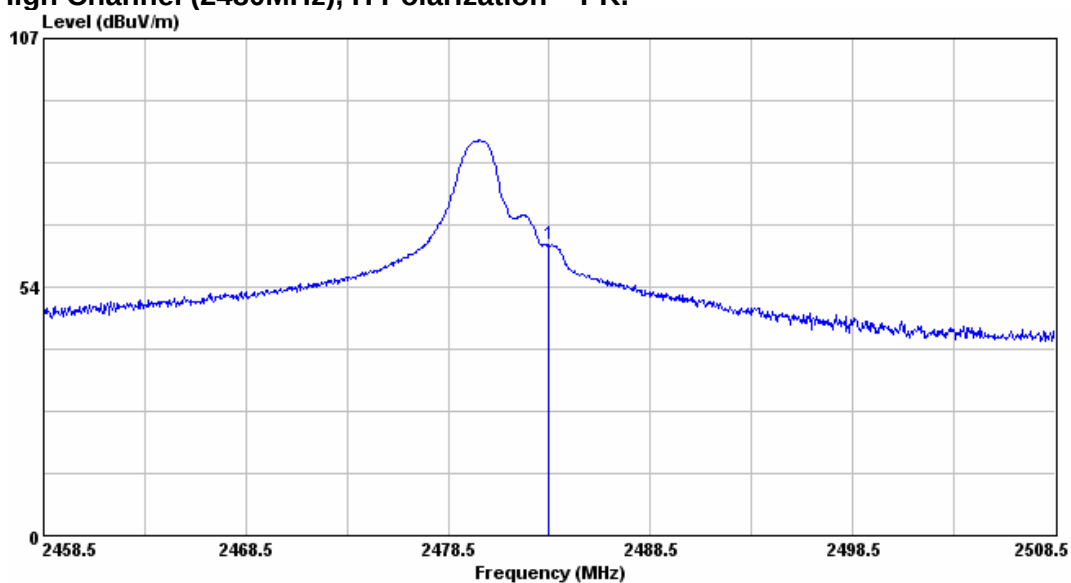
High Channel (2480MHz), V Polarization – PK.



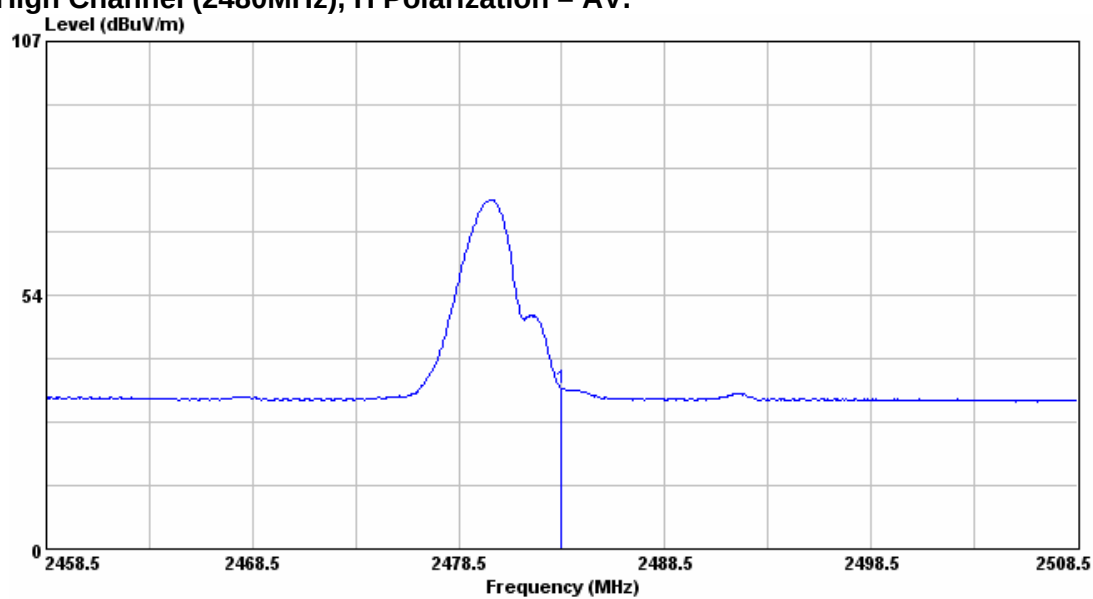
High Channel (2480MHz), V Polarization – AV.



High Channel (2480MHz), H Polarization – PK.



High Channel (2480MHz), H Polarization – AV.



4 Hopping Channel Carrier Frequencies Spacing

Result: Pass

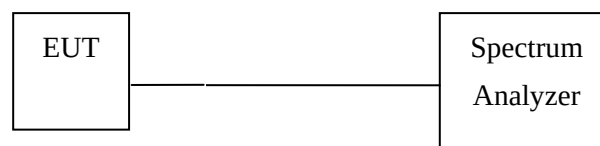
4.1 Applied standard

According to 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.

4.2 Measurement Procedure

1. 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.
2. A software provided by client enabled the EUT to transmit data at single channel.
The Transmitter output of EUT was connected to the spectrum analyzer through a probe and perform the 20dB bandwidth measurement.
3. A software provided by client enabled the EUT to transmit data at low, middle and high channel frequencies individually.
4. Record the 20dB bandwidth and compare with 25kHz to determine the required carrier frequency spacing.
5. The Transmitter output of EUT was connected to the spectrum analyzer through a probe and perform the carrier frequency spacing measurement.
6. Record the frequency spacing and compare with the required limit.

4.3 Test configuration



4.4 Test Instruments

Test Site and Equipment	Manufacturer	Model No./Serial No.	Calibration Due Data
Shielded Room	ETS.LINDGREN	TR4/15353-F	NCR
Spectrum Analyzer	Advantest	R3132/ 103082587	September 7,2006

Note:

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

Instrument Setting

RBW	VBW	Detector	Trace	Comment
10kHz	100kHz	Peak	Maxhold	20dB Bandwidth
30kHz	100kHz	Peak	Maxhold	Carrier Spacing

Climatic Condition

Ambient Temperature : 28°C ; Relative Humidity : 64%

4.5 Test Data

20dB bandwidth

Test Site : TR4

Tester : Bill

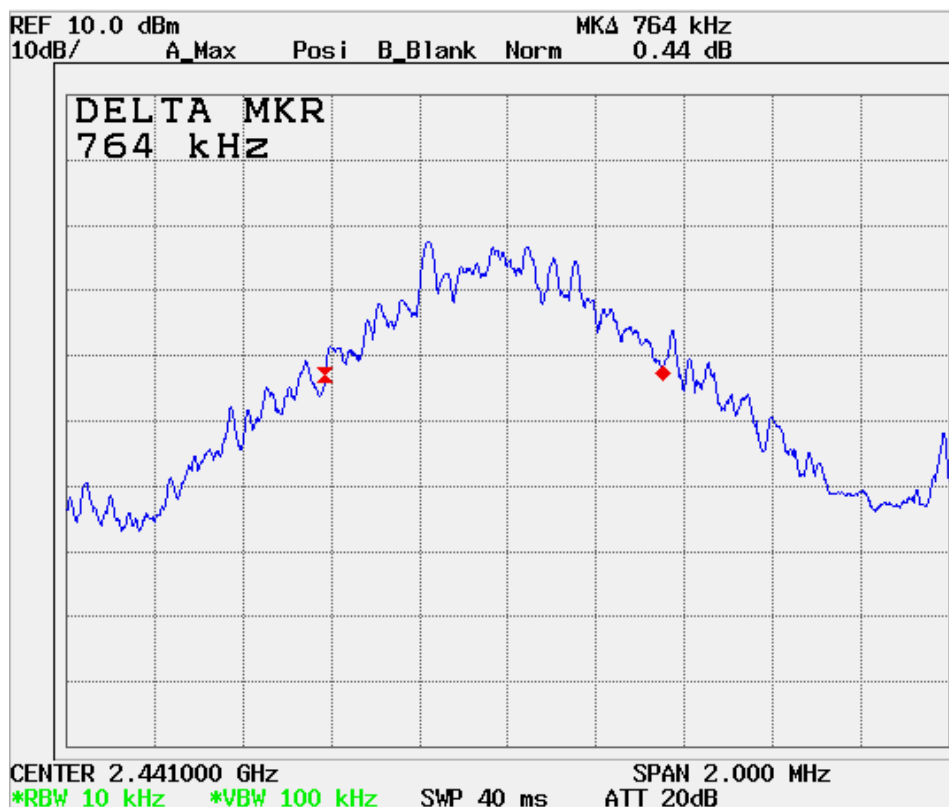
Operation Channel (MHz)	20dBandwidth (KHz)
Low 2402 MHz	764
Middle 2441MHz	764
High 2480MHz	762

Measured 20dB bandwidth is 764 KHz. According to 15.247(a)(1), hopping channel carrier frequencies spacing should be greater than 764kHz.

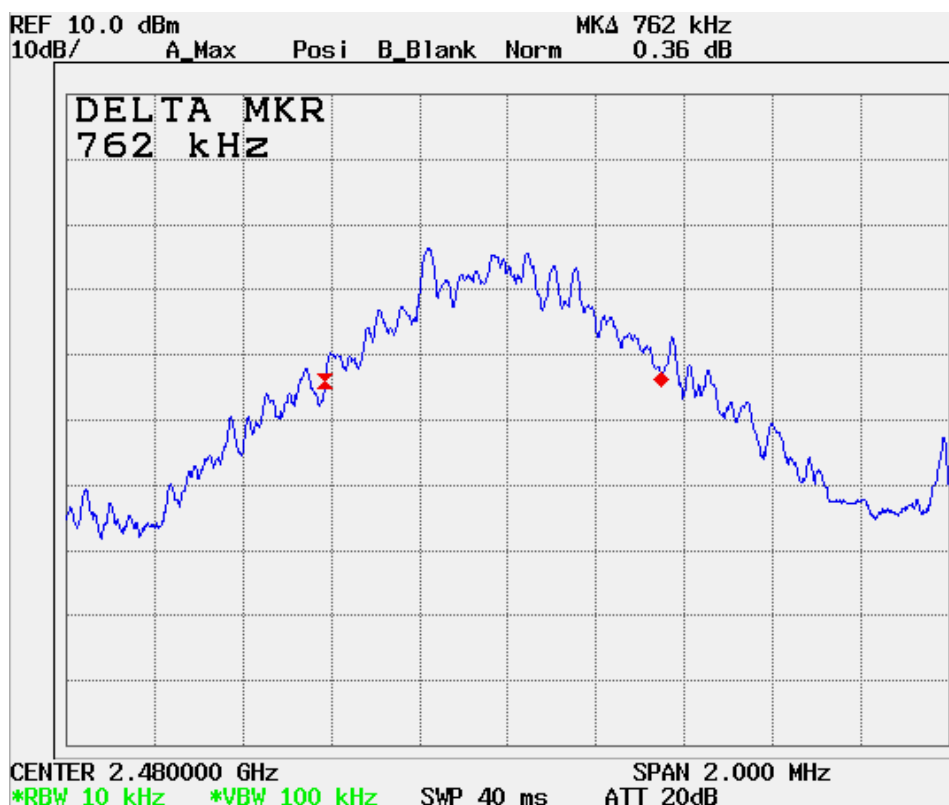
Low Channel (2402MHz)



Middle Channel (2441MHz)



High Channel (2480MHz)



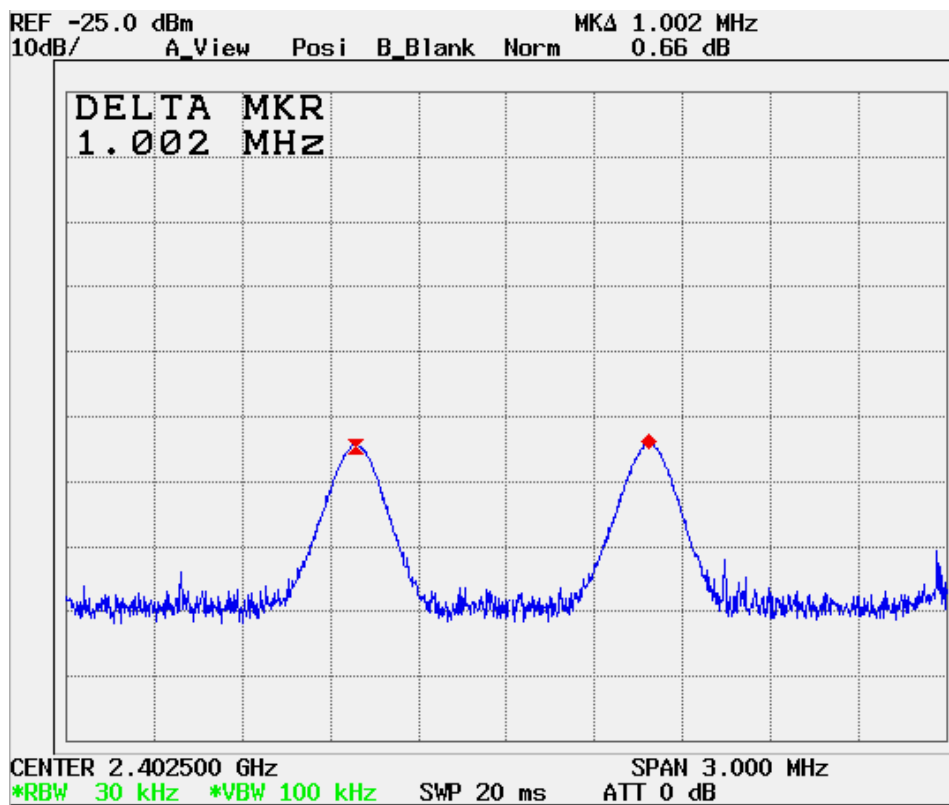
Hopping Channel Carrier Frequencies spacing

Test Site : TR4

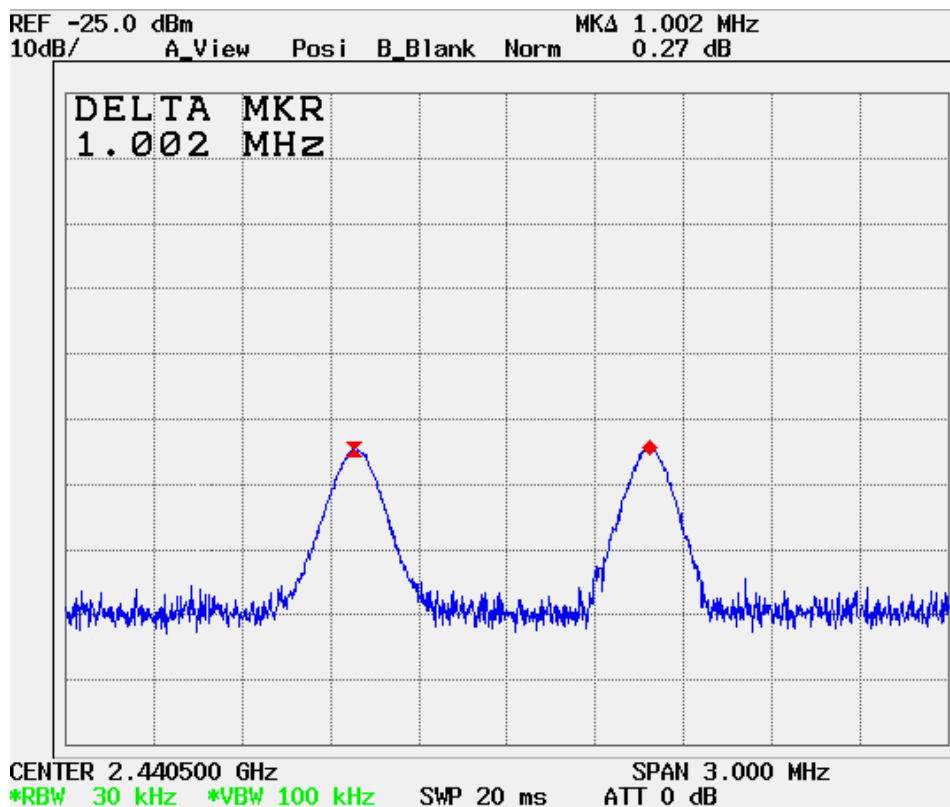
Tester : Bill

Test Channel	Carrier Spacing (KHz)	Limit (KHz)	Margin (KHz)
Low	1002	764	238
Middle	1002	764	238
High	1002	764	238

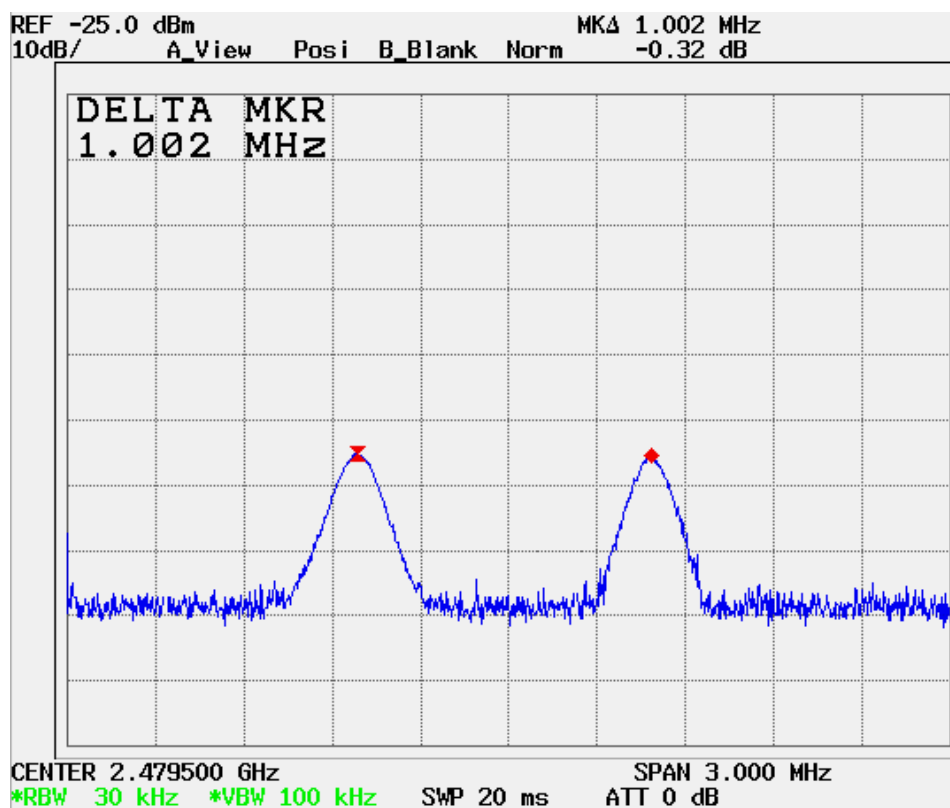
Low Channel (2402MHz)



Middle Channel (2441MHz)



High Channel (2480MHz)



5 Number of Hopping Channels

Result: 79 Hopping Channels

5.1 Applied standard

According to 15.247(b)(1), for frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

5.2 Measurement Procedure

1. 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.
2. A software provided by client enabled the EUT to transmit data at all channels.
3. The Transmitter output of EUT was connected to the spectrum analyzer through a probe and perform the number of hopping channels measurement.
4. Record number of hopping channels and compare with the required limit.

5.3 Test configuration

See section 4.3.

5.4 Test Instruments

See section 4.4.

Instrument Setting

RBW	VBW	Detector	Trace	Comment
1MHz	3MHz	Peak	Maxhold	

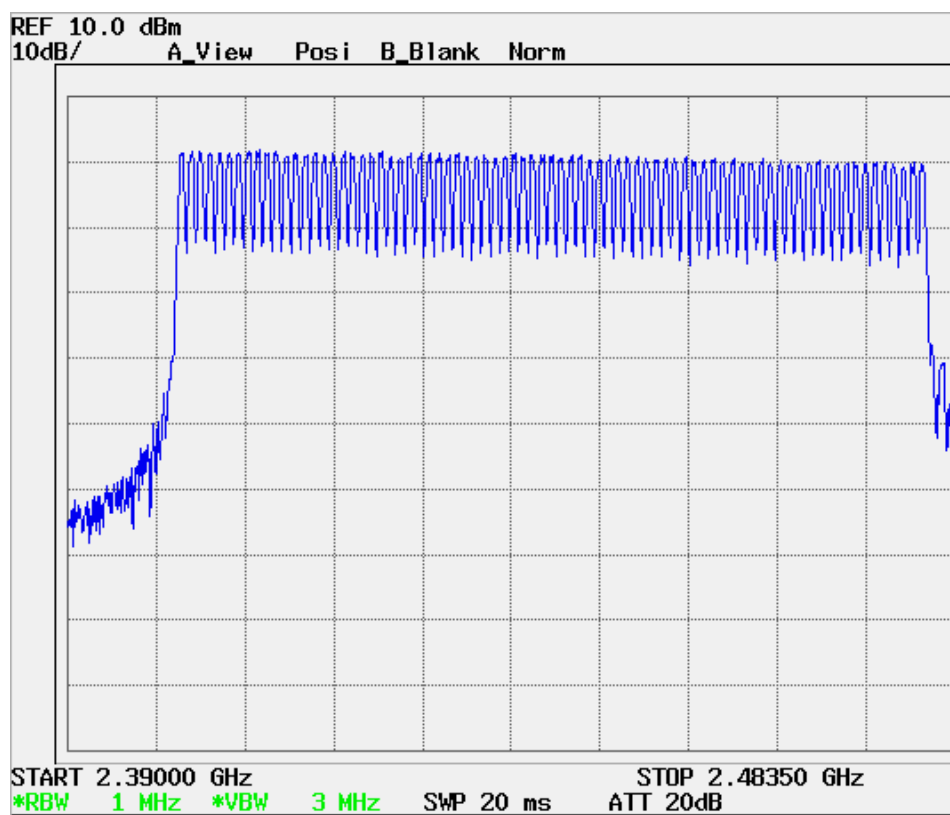
Climatic Condition

Ambient Temperature : 28°C ; Relative Humidity : 64%

5.5 Test Data

Test Site : TR4

Tester : Bill



6 Radiated Emission

Result: Pass

6.1 Applied standard

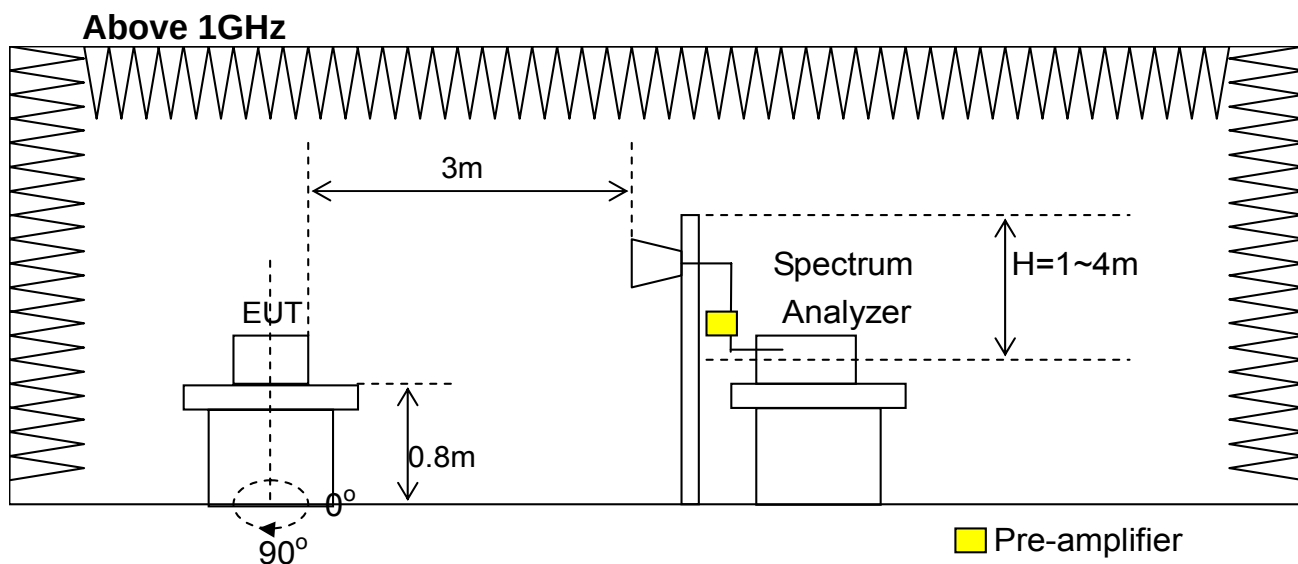
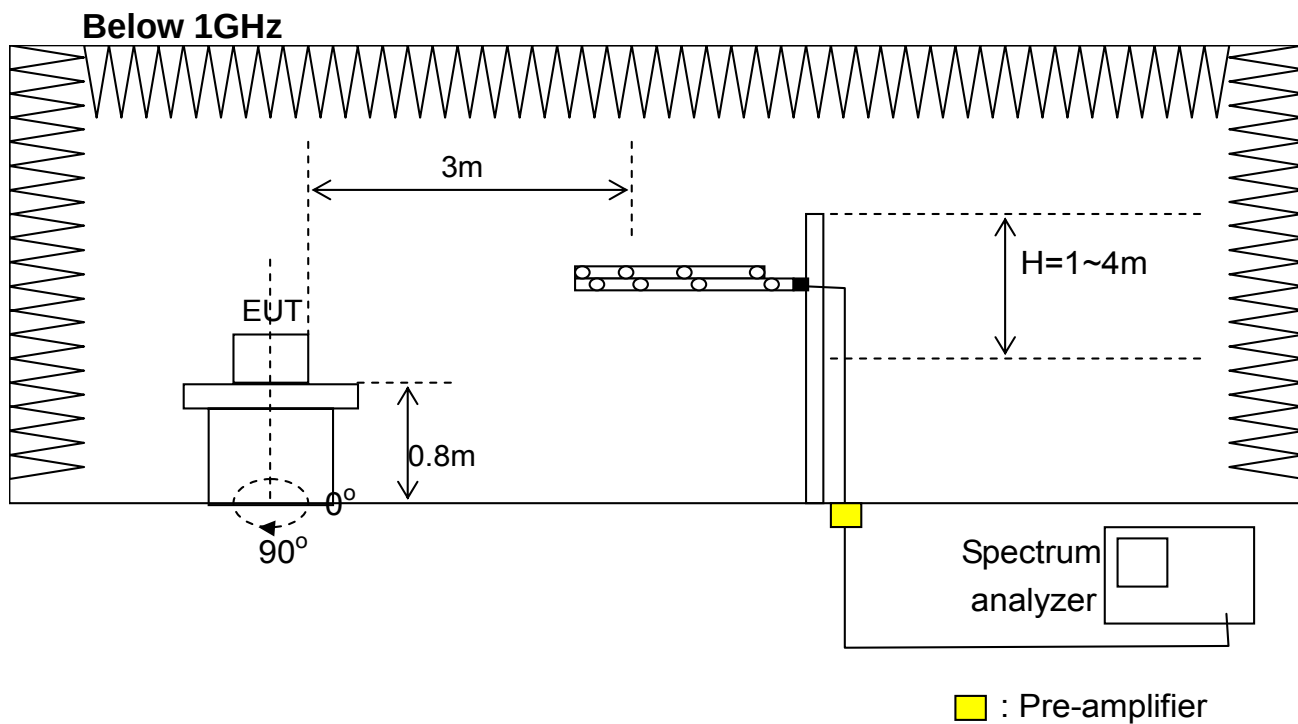
According to 15.247(c), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

6.2 Measurement Procedure

1. 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.
2. A software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.
3. If the EUT is tabletop equipment, it was placed on a wooden 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 millimeters above the reference ground plane in the semi-anechoic chamber.
4. The EUT was set 3m away from the interference receiving antenna.
5. Rapidly sweep the signal in the test frequency range by using the spectrum through the Maximum-peak detector.
6. 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 at least six frequencies associated with higher emission levels and record them.
7. Then measure each frequency found from step 6. by using the spectrum with rotating the EUT and positioning the receiving antenna height to determine the maximum level.

8. 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.
9. For measurement of frequency above 1000MHz, set the spectrum detector to be Peak or Average to find out the maximum level occurred, if any.
10. Record frequency, azimuth angle of the turntable, height, and polarization of the receiving antenna and compare the maximum level with the required limit.
11. Change the receiving antenna to another polarization to measure radiated emission by following step 5. to 10. again.
12. If the peak emission level below 1000MHz measured from step 6. is 4dB 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.
13. If the peak emission level above 1000MHz measured from step 6. is 20dB lower than the limit specified, then the emission values presented will be the peak value only. Otherwise, accurate A.V. value will be measured and presented.

6.3 Test configuration



6.4 Test Instruments

Test Site and Equipment	Manufacturer	Model No./Serial No.	Calibration Due Data
Semi-anechoic Chamber	ETS.LINDGREN	TR1/ 17627-B	April 12,2006
Test Receiver	R&S	ESCS30/ 836858/020	July 30,2006
Spectrum Analyzer*	R&S	FSP40/ 100031	June 6,2006
Antenna	R&S	HL562/ 360543/010	July 7,2006
Antenna*	R&S	HF906/ 359287/001	August 11,2006
Antenna*	EMCO	3116/ 20552	December 10,2005
Pre-amplifier*	MITEQ	AMF-4D-005180-24-10P/ 1072962	May 19,2006
Pre-amplifier*	MITEQ	JS4-18002600-30-5A/ 741923	June 27,2006
Pre-amplifier*	MITEQ	AMF-6F-260400-33-8P/ 928336	June 27,2006
Pre-amplifier	Mini Circuit	ZKL-2/ 002	April 11,2006
High-Pass Filter*	MCI	H04G13G1/ 2467-01	March 1,2006

Note:

1. “*” : These instruments are used only for the measurement of emission frequency above 1000MHz.
2. The calibrations are traceable to NML/ROC.
3. NCR : No Calibration Required.
4. The calibration date of the semi-anechoic chamber listed above is the date of NSA measurement.

Instrument Setting

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

Climatic Condition

Ambient Temperature : 28°C ;

Relative Humidity : 64%

6.5 Test Data

Radiated Emission Measurement below 1000MHz

Test Mode : Channel 0(2402MHz), Continuous Transmitting

Test Distance : 3m

Tester : Bill

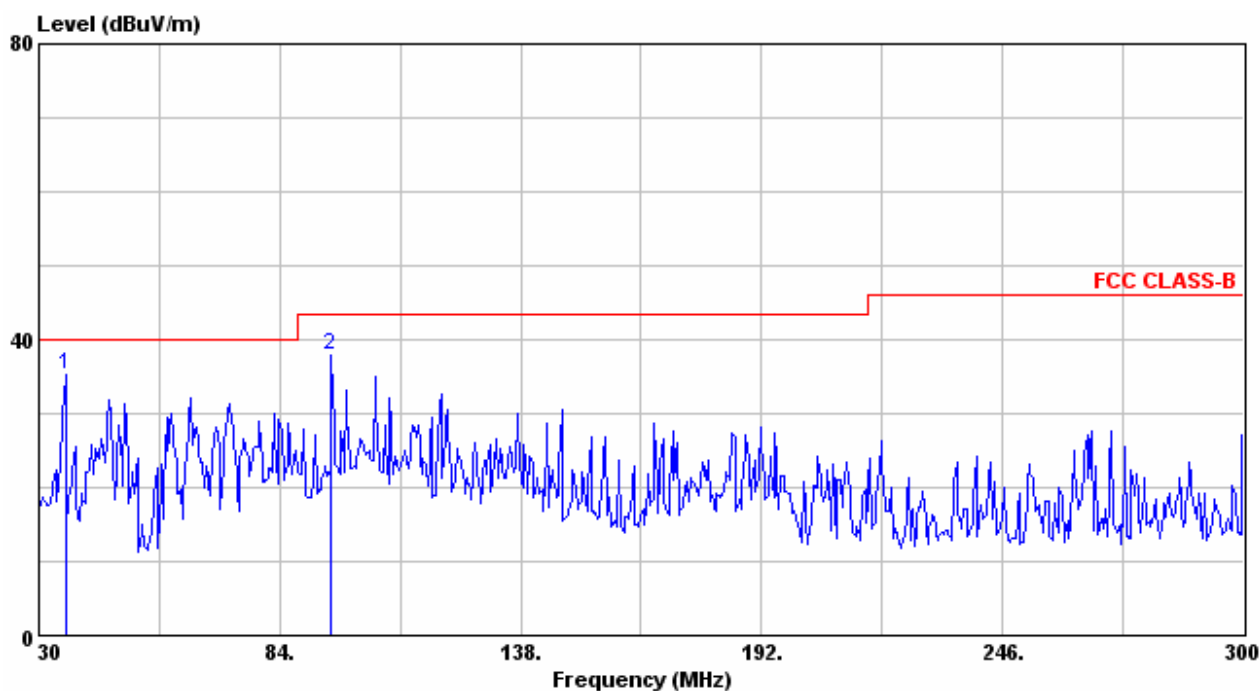
Polarization : Vertical

Frequency Range : 30MHz~300MHz

	Freq. (MHz)	Reading Data (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	35.94	50.88	-15.57	35.31	40.00	4.69
2	95.61	59.02	-21.06	37.96	43.50	5.54

Note:

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier
2. Emission Level (dBuV/m) = Reading Data + Correction Factor
3. Margin (dB) = Limit – Emission Level



Test Mode : Channel 0(2402MHz), Continuous Transmitting

Test Distance : 3m

Tester : Bill

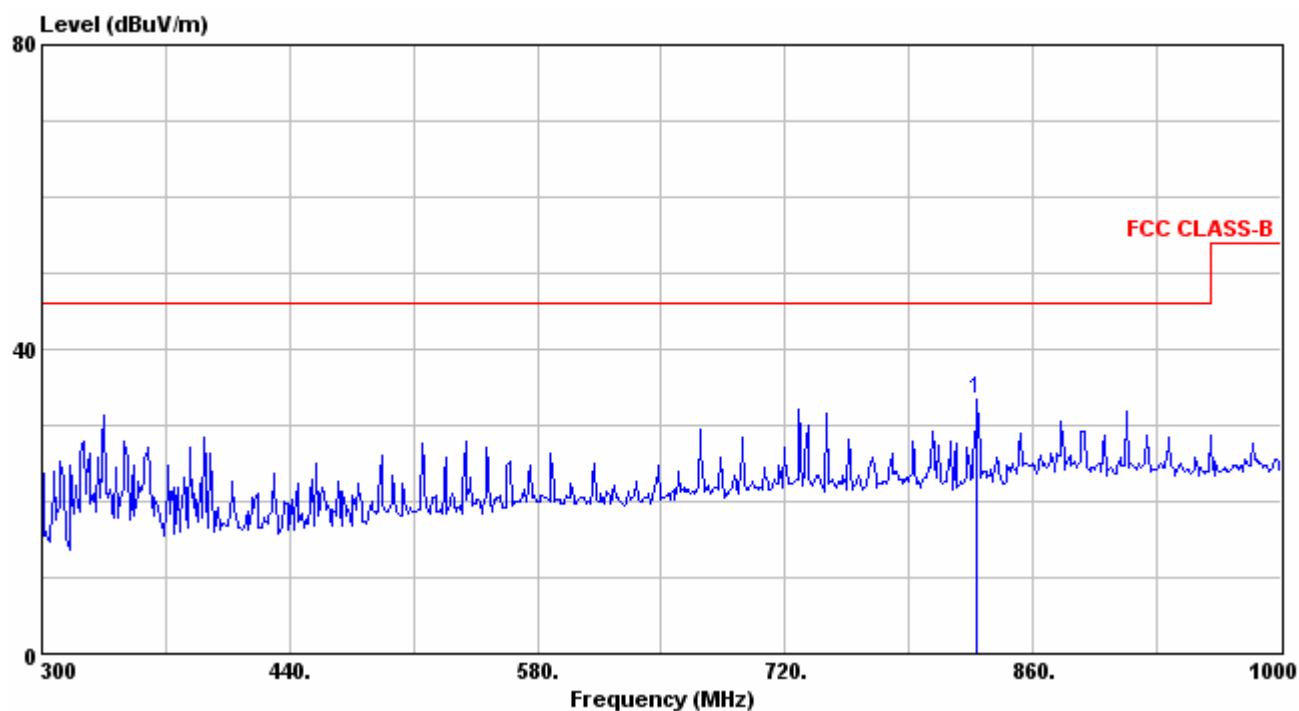
Polarization : Vertical

Frequency Range : 300MHz~1GHz

	Freq. (MHz)	Reading Data (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	828.50	37.20	-3.68	33.52	46.00	12.48

Note:

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier
2. Emission Level (dBuV/m) = Reading Data + Correction Factor
3. Margin (dB) = Limit – Emission Level



Test Mode : Channel 0(2402MHz), Continuous Transmitting

Test Distance : 3m

Tester : Bill

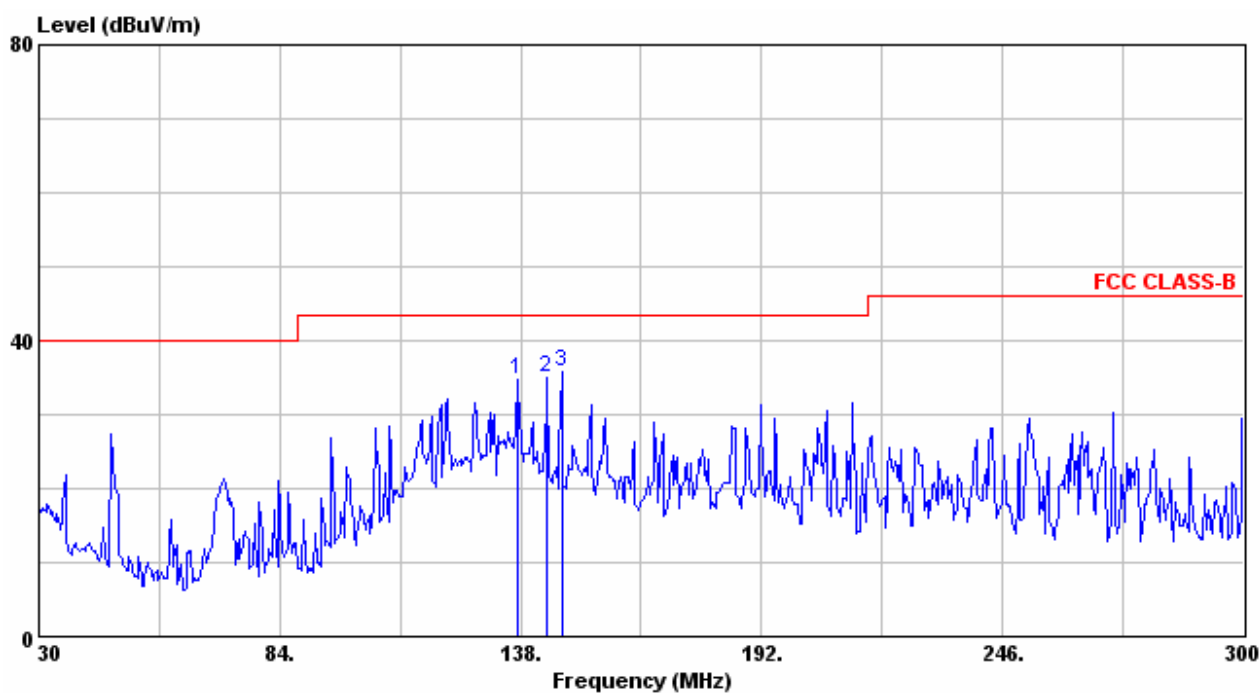
Polarization : Horizontal

Frequency Range : 30MHz~300MHz

	Freq. (MHz)	Reading Data (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	137.46	56.28	-21.42	34.86	43.50	8.64
2	143.94	55.71	-20.80	34.91	43.50	8.59
3	147.18	56.19	-20.43	35.76	43.50	7.74

Note:

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier
2. Emission Level (dBuV/m) = Reading Data + Correction Factor
3. Margin (dB) = Limit – Emission Level



Test Mode : Channel 0(2402MHz), Continuous Transmitting

Test Distance : 3m

Tester : Bill

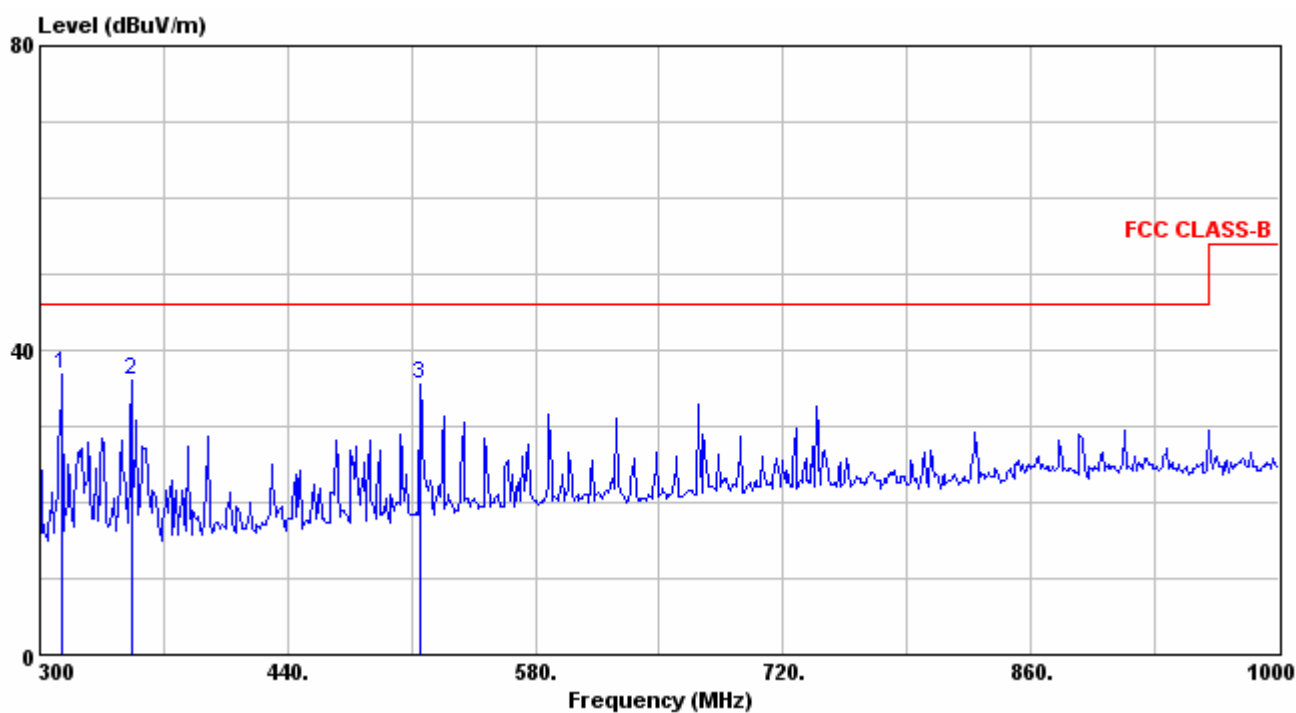
Polarization : Horizontal

Frequency Range : 300MHz~1GHz

	Freq. (MHz)	Reading Data (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	312.60	51.14	-14.25	36.89	46.00	9.11
2	351.80	48.54	-12.41	36.13	46.00	9.87
3	514.90	44.42	-8.90	35.52	46.00	10.48

Note:

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier
2. Emission Level (dBuV/m) = Reading Data + Correction Factor
3. Margin (dB) = Limit – Emission Level



Test Mode : Channel 39(2441MHz), Continuous Transmitting

Test Distance : 3m

Tester : Bill

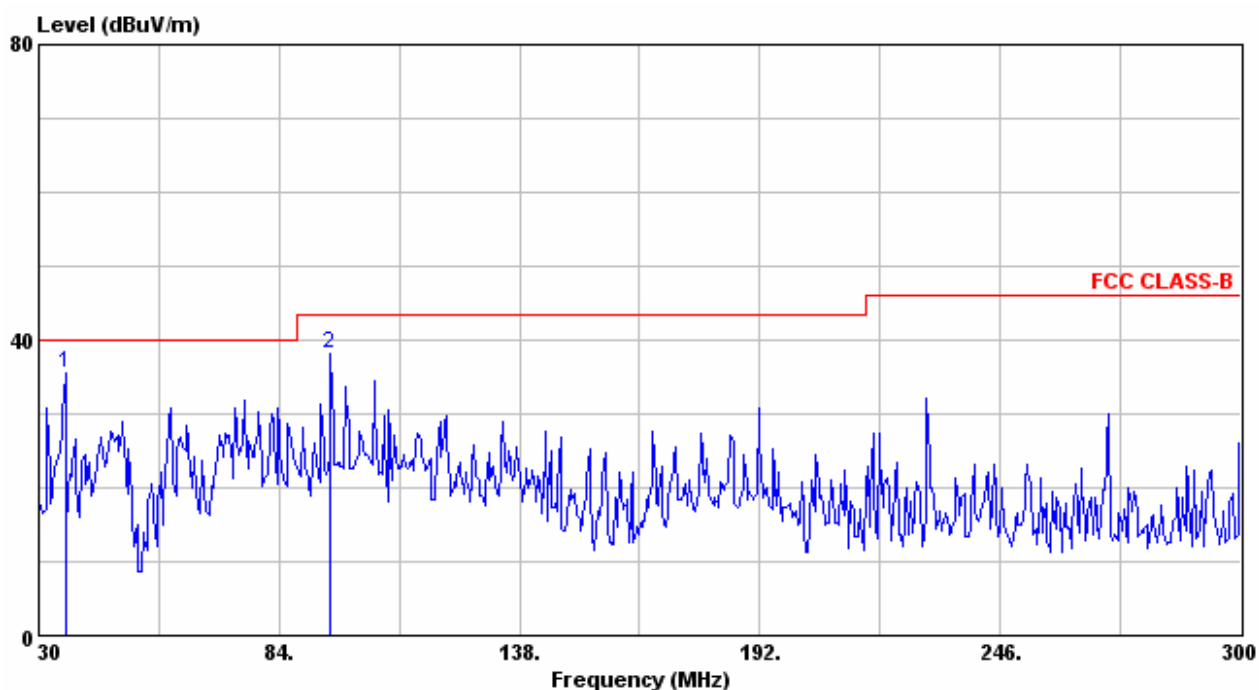
Polarization : Vertical

Frequency Range : 30MHz~300MHz

	Freq. (MHz)	Reading Data (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	35.94	51.09	-15.57	35.52	40.00	4.48
2	95.61	59.23	-21.06	38.17	43.50	5.33

Note:

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier
2. Emission Level (dBuV/m) = Reading Data + Correction Factor
3. Margin (dB) = Limit – Emission Level



Test Mode : Channel 39(2441MHz), Continuous Transmitting

Test Distance : 3m

Tester : Bill

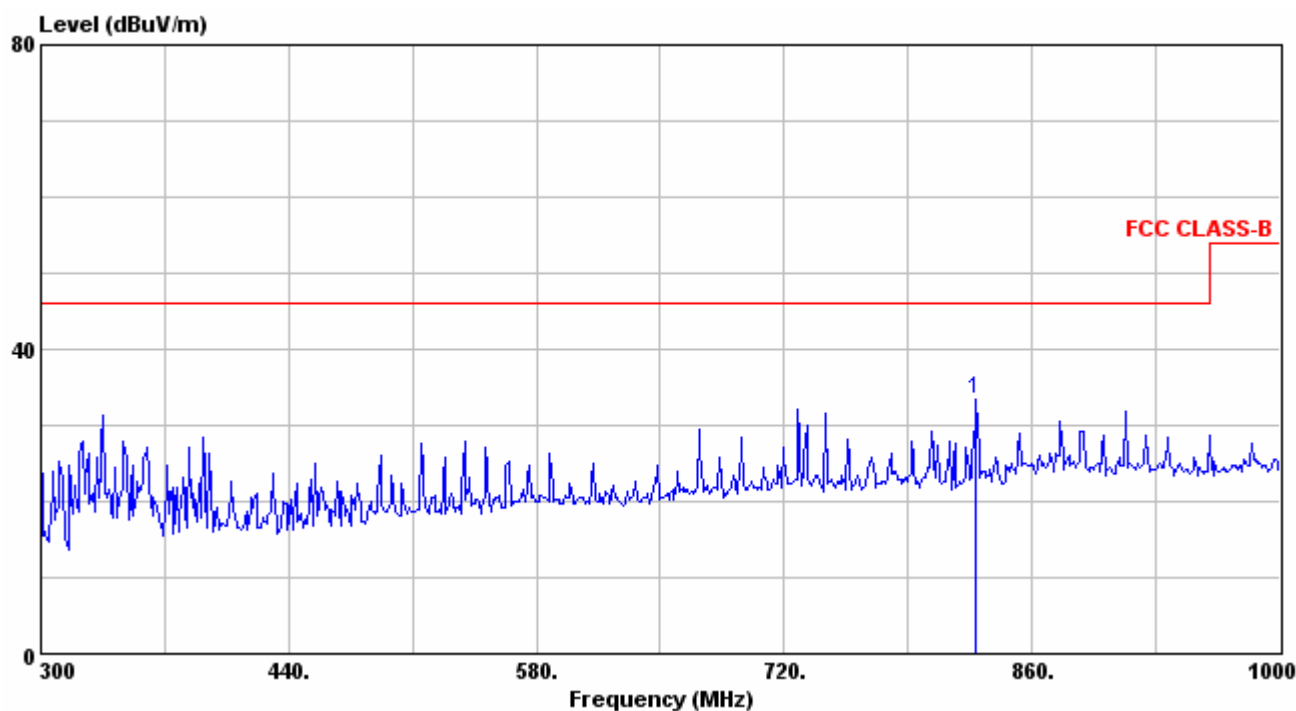
Polarization : Vertical

Frequency Range : 300MHz~1GHz

	Freq. (MHz)	Reading Data (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	828.50	37.20	-3.68	33.52	46.00	12.48

Note:

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier
2. Emission Level (dBuV/m) = Reading Data + Correction Factor
3. Margin (dB) = Limit – Emission Level



Test Mode : Channel 39(2441MHz), Continuous Transmitting

Test Distance : 3m

Tester : Bill

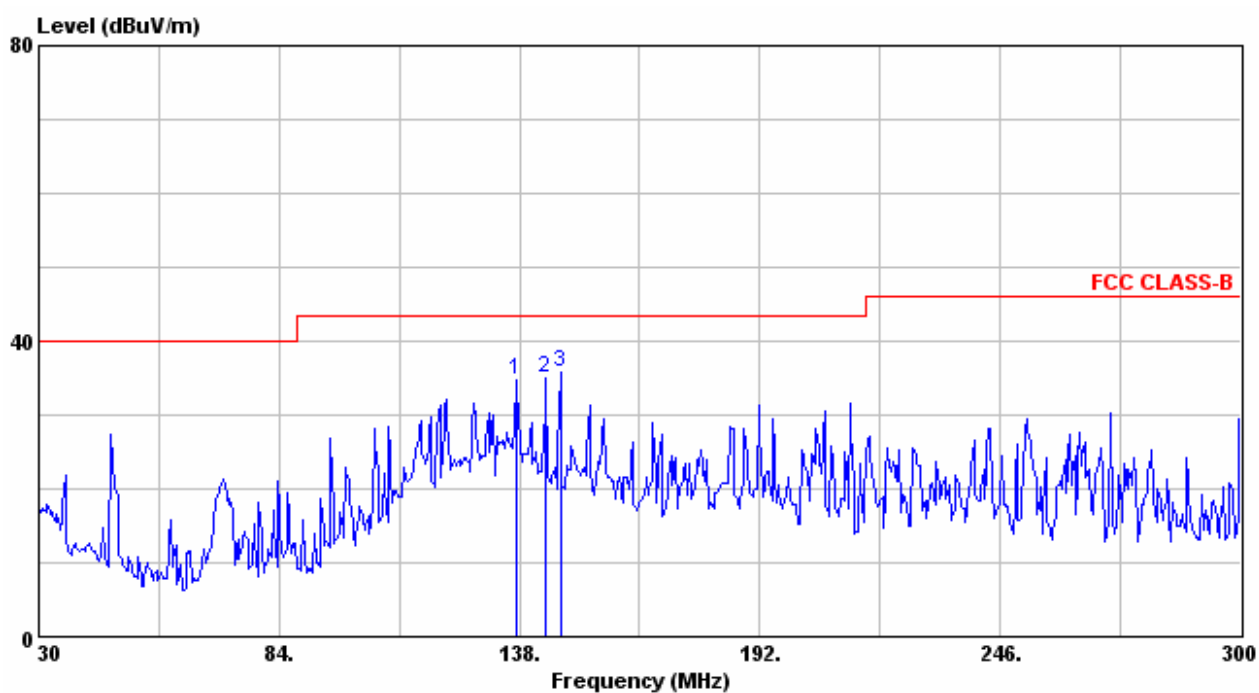
Polarization : Horizontal

Frequency Range : 30MHz~300MHz

	Freq. (MHz)	Reading Data (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	137.46	56.28	-21.42	34.86	43.50	8.64
2	143.94	55.71	-20.80	34.91	43.50	8.59
3	147.18	56.19	-20.43	35.76	43.50	7.74

Note:

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier
2. Emission Level (dBuV/m) = Reading Data + Correction Factor
3. Margin (dB) = Limit – Emission Level



Test Mode : Channel 39(2441MHz), Continuous Transmitting

Test Distance : 3m

Tester : Bill

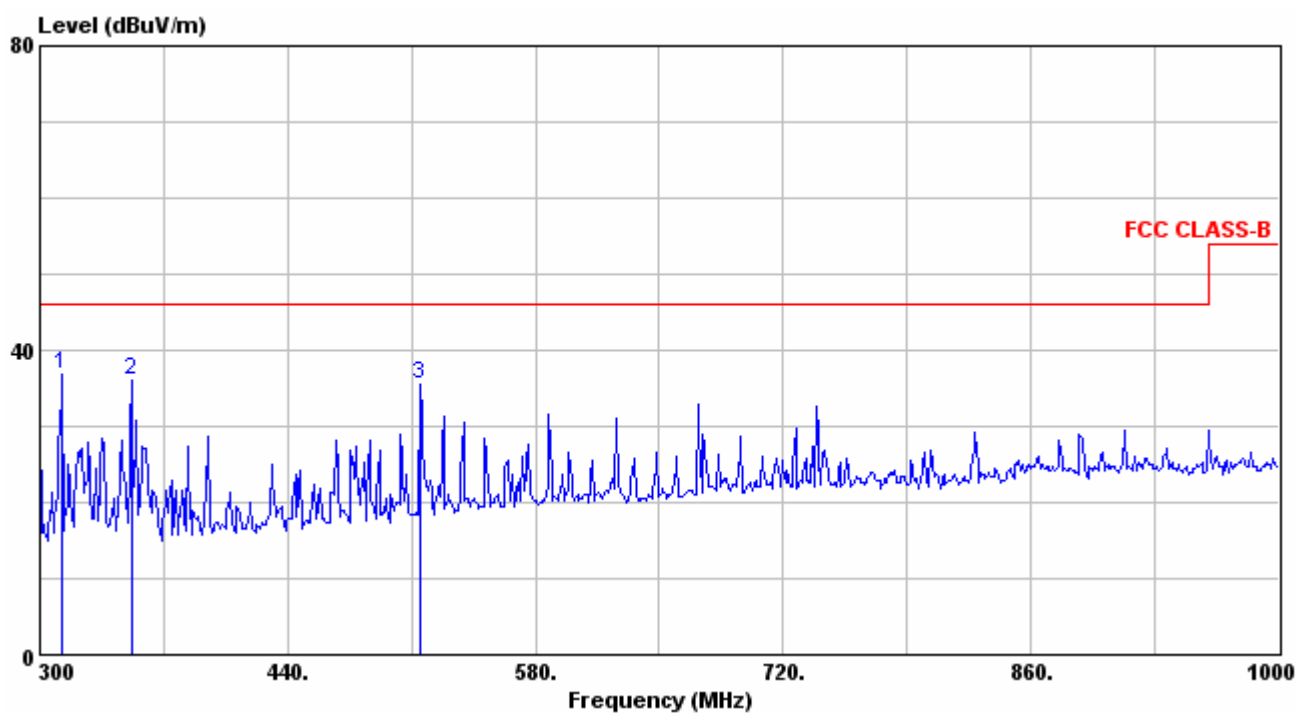
Polarization : Horizontal

Frequency Range : 300MHz~1GHz

	Freq. (MHz)	Reading Data (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	312.60	51.14	-14.25	36.89	46.00	9.11
2	351.80	48.54	-12.41	36.13	46.00	9.87
3	514.90	44.42	-8.90	35.52	46.00	10.48

Note:

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier
2. Emission Level (dBuV/m) = Reading Data + Correction Factor
3. Margin (dB) = Limit – Emission Level



Test Model : Channel 78(2480MHz), Continuous Transmitting

Test Distance : 3m

Tester : Bill

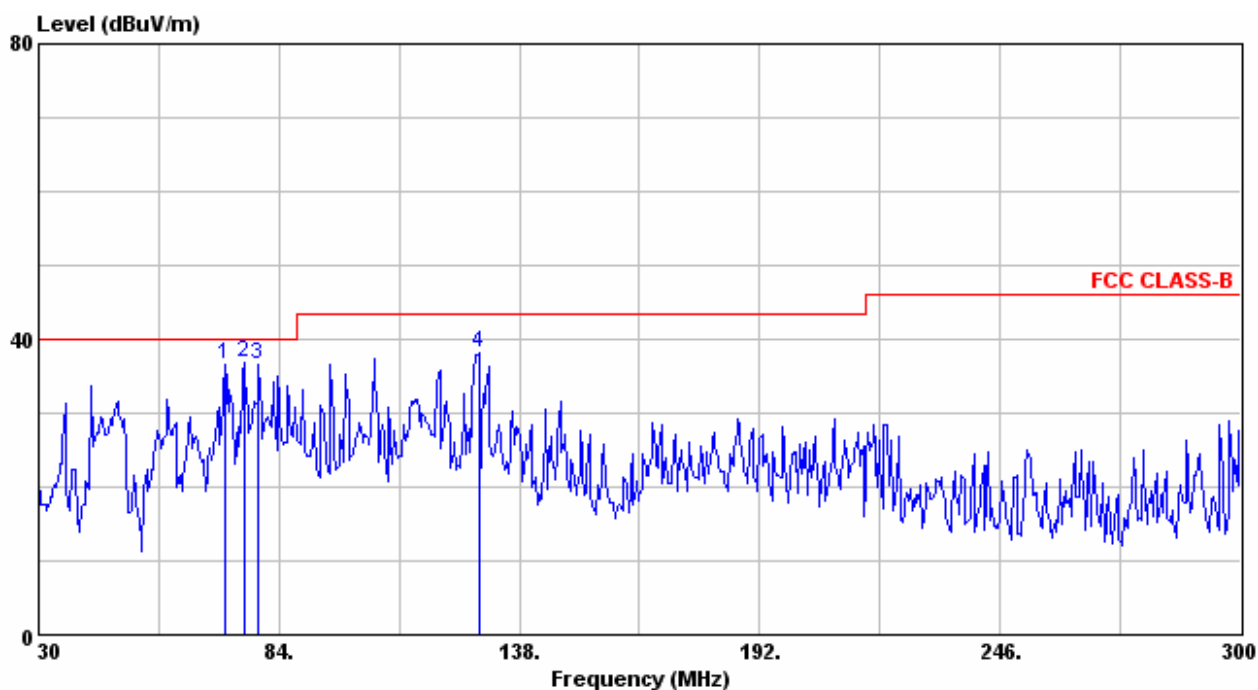
Polarization : Vertical

Frequency Range : 30MHz~300MHz

	Freq. (MHz)	Reading Data (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	71.85	59.26	-22.77	36.49	40.00	3.51
2	76.17	59.63	-22.79	36.84	40.00	3.16
3	79.41	59.39	-22.77	36.62	40.00	3.38
4	128.82	60.28	-22.04	38.24	43.50	5.26

Note:

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier
2. Emission Level (dBuV/m) = Reading Data + Correction Factor
3. Margin (dB) = Limit – Emission Level



Test Model : Channel 78(2480MHz), Continuous Transmitting

Test Distance : 3m

Tester : Bill

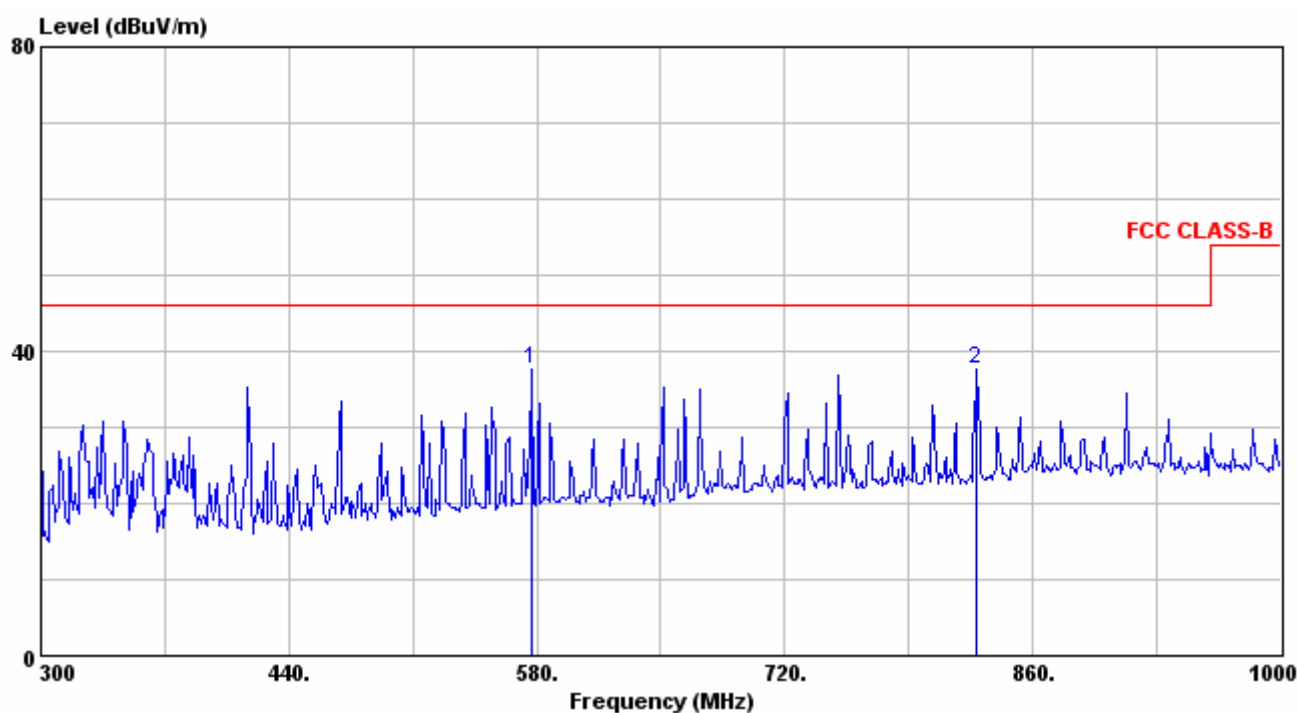
Polarization : Vertical

Frequency Range : 300MHz~1GHz

	Freq. (MHz)	Reading Data (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	576.50	44.81	-7.16	37.65	46.00	8.35
2	828.50	41.44	-3.68	37.76	46.00	8.24

Note:

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier
2. Emission Level (dBuV/m) = Reading Data + Correction Factor
3. Margin (dB) = Limit – Emission Level



est Model : Channel 78(2480MHz), Continuous Transmitting

Test Distance : 3m

Tester : Bill

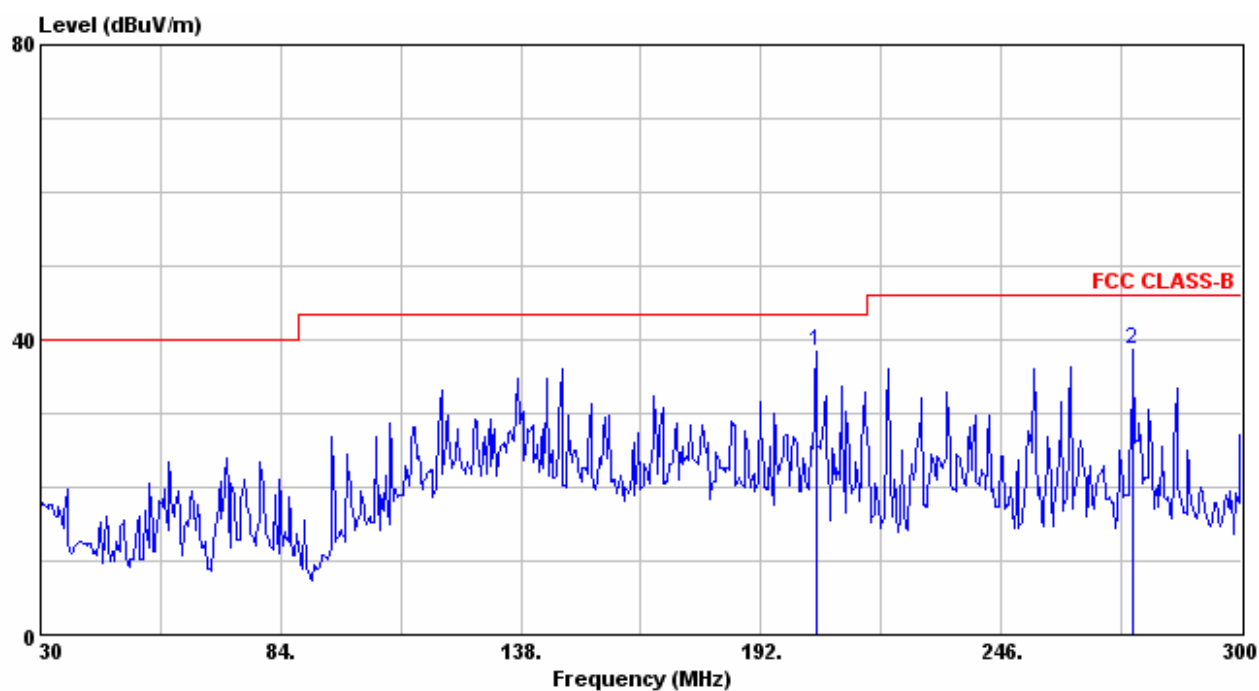
Polarization : Horizontal

Frequency Range : 30MHz~300MHz

	Freq. (MHz)	Reading Data (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	204.42	56.42	-17.96	38.46	43.50	5.04
2	275.70	54.08	-15.42	38.66	46.00	7.34

Note:

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier
2. Emission Level (dBuV/m) = Reading Data + Correction Factor
3. Margin (dB) = Limit – Emission Level

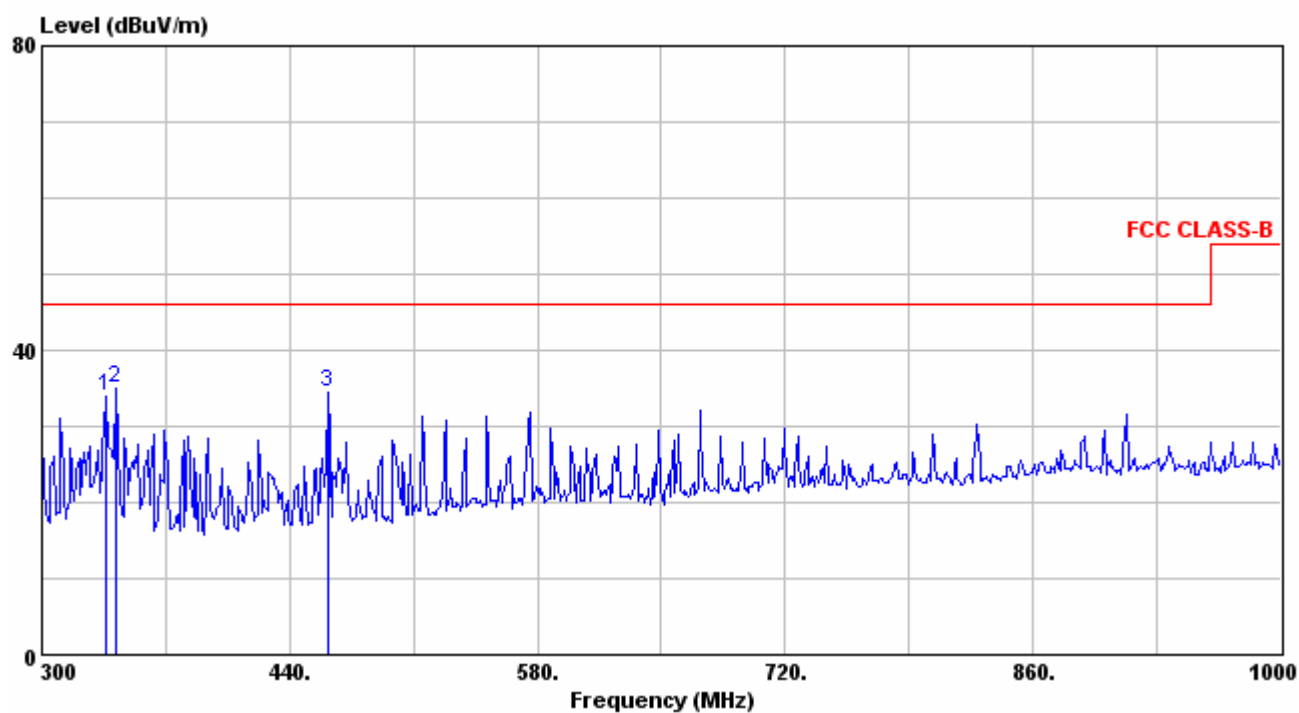


Test Model : Channel 78(2480MHz), Continuous Transmitting
Test Distance : 3m **Tester** : Bill
Polarization : Horizontal **Frequency Range**: 300MHz~1GHz

	Freq. (MHz)	Reading Data (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	335.70	47.07	-13.15	33.92	46.00	12.08
2	341.30	47.97	-12.90	35.07	46.00	10.93
3	461.70	44.70	-10.13	34.57	46.00	11.43

Note:

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier
2. Emission Level (dBuV/m) = Reading Data + Correction Factor
3. Margin (dB) = Limit – Emission Level



Test Model : Channel 0(2402MHz), Receiving

Test Distance : 3m

Tester : Bill

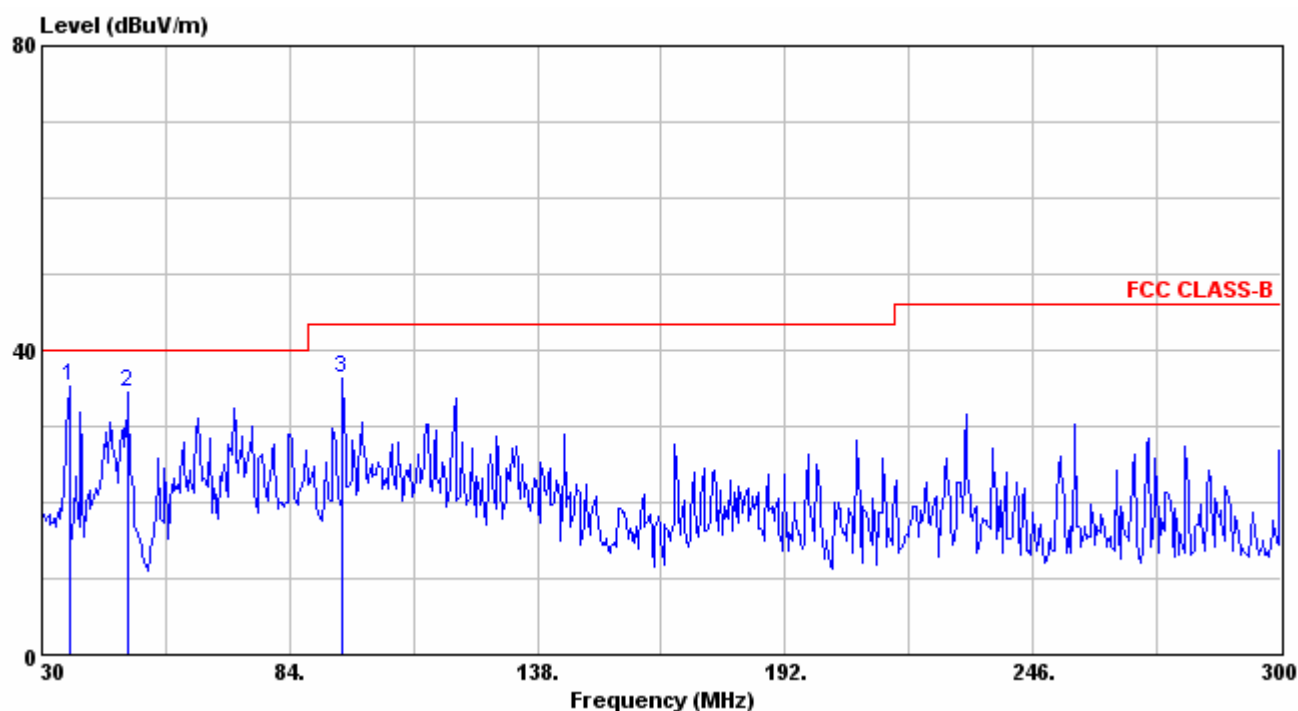
Antenna Polarization: Vertical

Frequency Range : 30MHz~300MHz

	Freq. (MHz)	Reading Data (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	35.94	50.74	-15.57	35.17	40.00	4.83
2	48.90	55.00	-20.60	34.40	40.00	5.60
3	95.61	57.50	-21.06	36.44	43.50	7.06

Note:

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



Test Model : Channel 0(2402MHz), Receiving

Test Distance : 3m

Tester : Bill

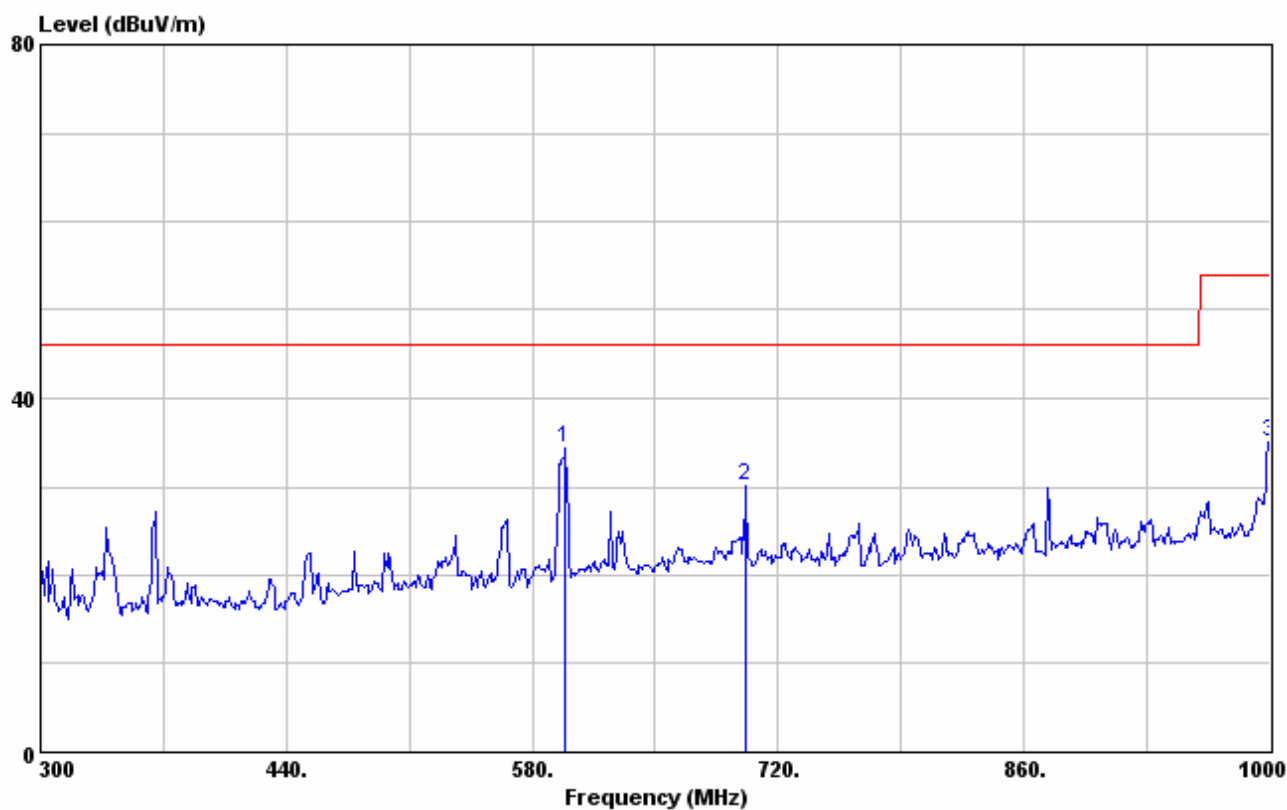
Antenna Polarization: Vertical

Frequency Range : 300MHz~1GHz

	Freq. (MHz)	Reading Data (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	828.50	40.61	-3.68	36.93	46.00	9.07

Note:

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



Test Mode : Channel 0(2402MHz), Receiving

Test Distance : 3m

Tester : Bill

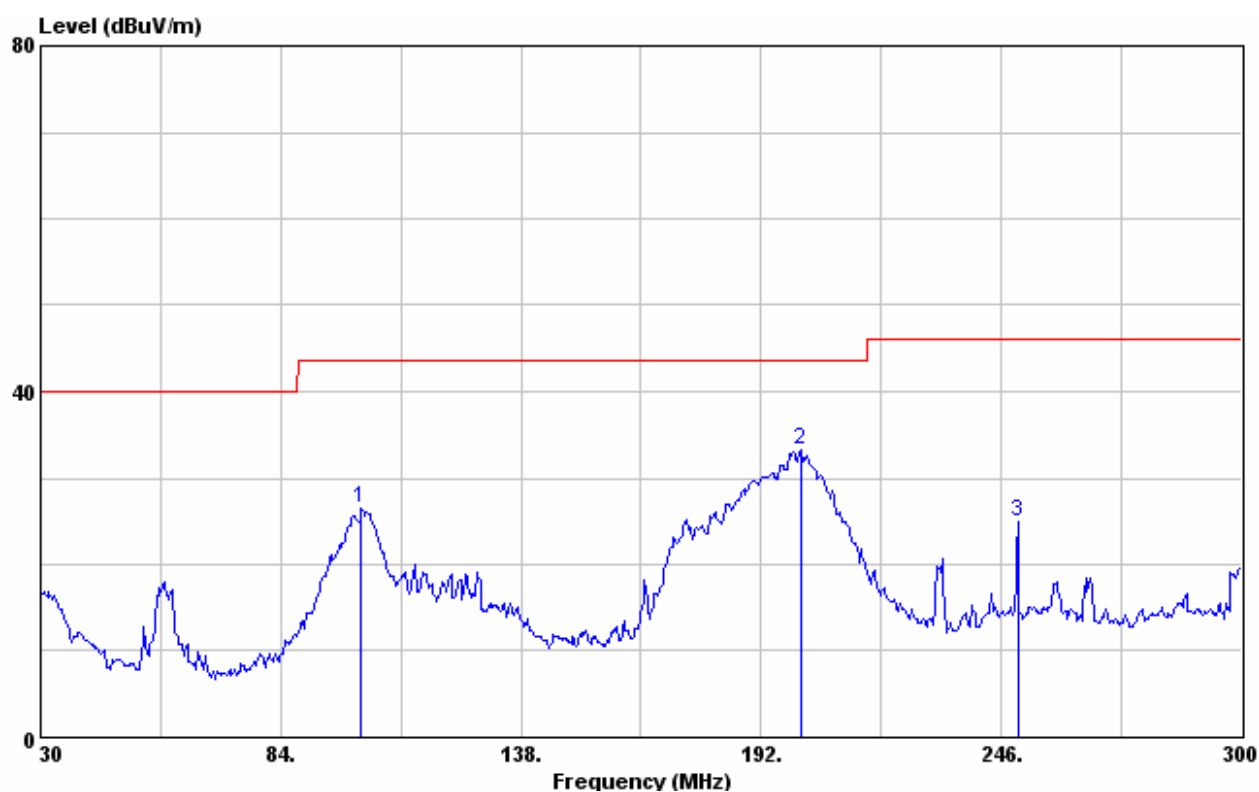
Polarization : Horizontal

Frequency Range : 30MHz~300MHz

	Freq. (MHz)	Reading Data (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	143.94	55.69	-20.80	34.89	43.50	8.61
2	261.66	51.04	-16.02	35.02	46.00	10.98

Note:

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier
2. Emission Level (dBuV/m) = Reading Data + Correction Factor
3. Margin (dB) = Limit – Emission Level



Test Mode : Channel 0(2402MHz), Receiving

Test Distance : 3m

Tester : Bill

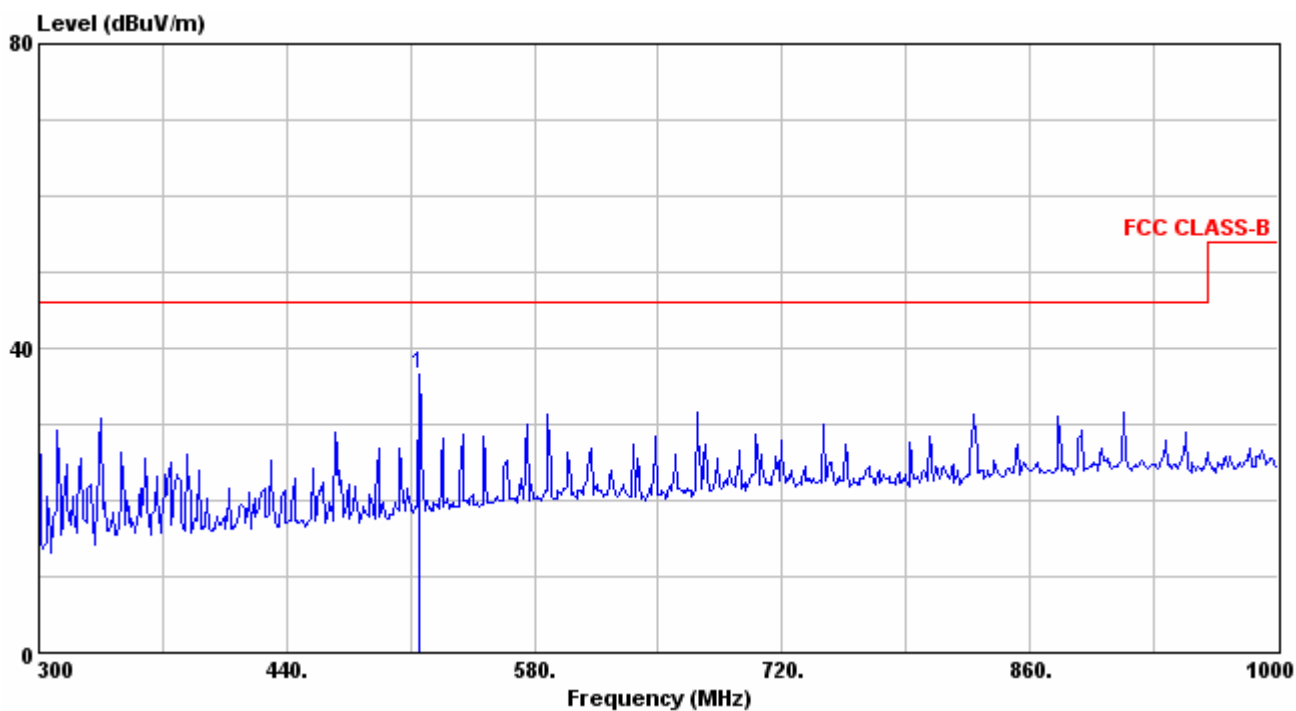
Polarization : Horizontal

Frequency Range : 300MHz~1GHz

	Freq. (MHz)	Reading Data (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	514.90	45.57	-8.90	36.67	46.00	9.33

Note:

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier
2. Emission Level (dBuV/m) = Reading Data + Correction Factor
3. Margin (dB) = Limit – Emission Level



Test Model : Channel 39(2441MHz), Receiving

Test Distance : 3m

Tester : Bill

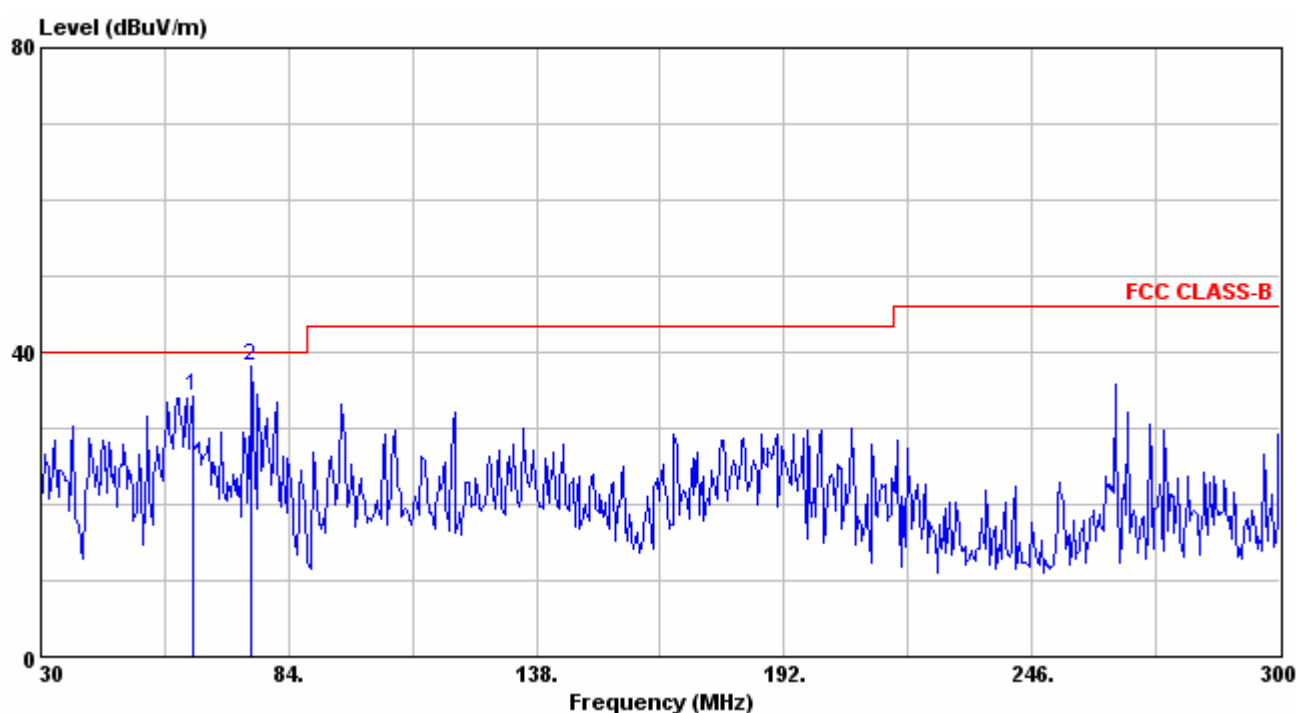
Antenna Polarization: Vertical

Frequency Range : 30MHz~300MHz

	Freq. (MHz)	Reading Data (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	62.94	56.49	-22.28	34.21	40.00	5.79
2	75.90	60.86	-22.80	38.06	40.00	1.94

Note:

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier
2. Emission Level (dBuV/m) = Reading Data + Correction Factor
3. Margin (dB) = Limit – Emission Level



Test Model : Channel 39(2441MHz), Receiving

Test Distance : 3m

Tester : Bill

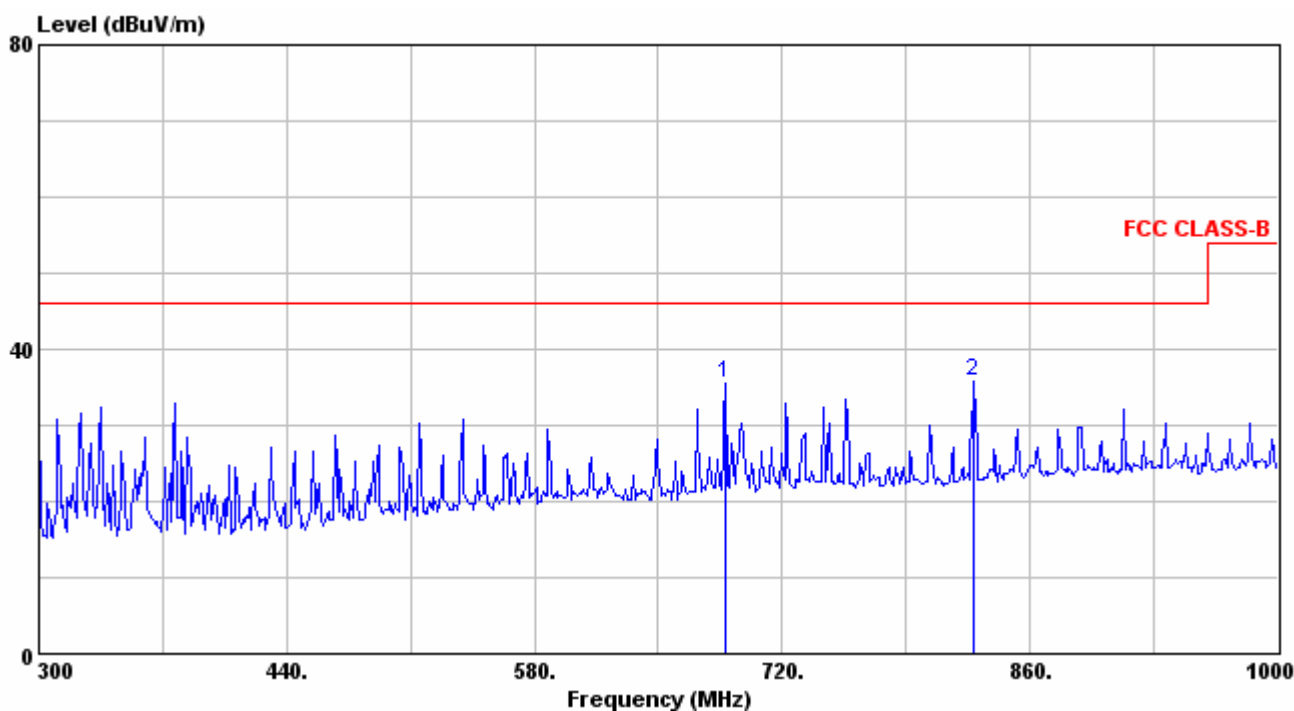
Antenna Polarization: Vertical

Frequency Range : 300MHz~1GHz

	Freq. (MHz)	Reading Data (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	687.80	40.57	-5.15	35.42	46.00	10.58
2	828.50	39.38	-3.68	35.70	46.00	10.30

Note:

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier
2. Emission Level (dBuV/m) = Reading Data + Correction Factor
3. Margin (dB) = Limit – Emission Level

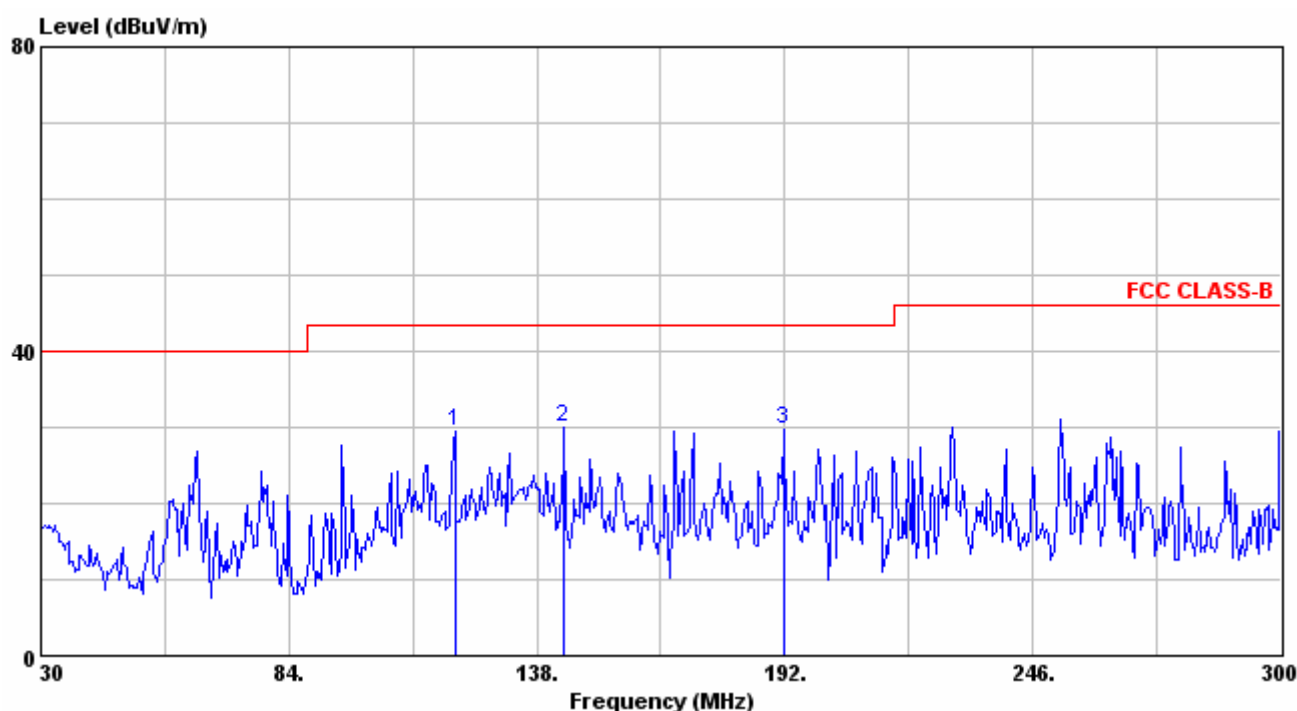


Test Model : Channel 39(2441MHz), Receiving
Test Distance : 3m
Tester : Bill
Antenna Polarization: Horizontal
Frequency Range : 30MHz~300MHz

	Freq. (MHz)	Reading Data (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	120.18	52.01	-22.43	29.58	43.50	13.92
2	143.94	50.68	-20.80	29.88	43.50	13.62
3	191.73	48.00	-18.31	29.69	43.50	13.81

Note:

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier
2. Emission Level (dBuV/m) = Reading Data + Correction Factor
3. Margin (dB) = Limit – Emission Level



Test Model : Channel 39(2441MHz), Receiving

Test Distance : 3m

Tester : Bill

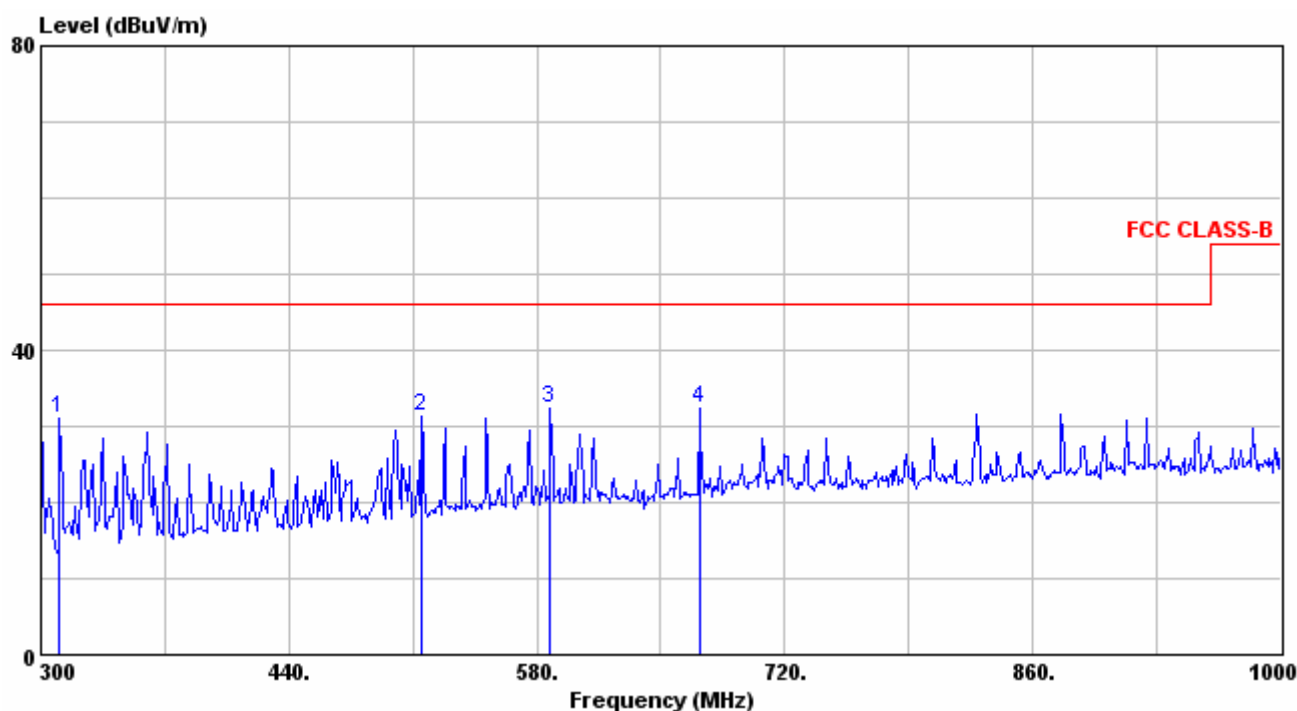
Antenna Polarization: Horizontal

Frequency Range : 300MHz~1GHz

	Freq. (MHz)	Reading Data (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	310.50	45.48	-14.35	31.13	46.00	14.87
2	514.90	40.23	-8.90	31.33	46.00	14.67
3	587.70	39.30	-6.93	32.37	46.00	13.63
4	671.70	38.00	-5.54	32.46	47.00	14.54

Note:

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier
2. Emission Level (dBuV/m) = Reading Data + Correction Factor
3. Margin (dB) = Limit – Emission Level



Test Model : Channel 78(2480MHz), Receiving

Test Distance : 3m

Tester : Bill

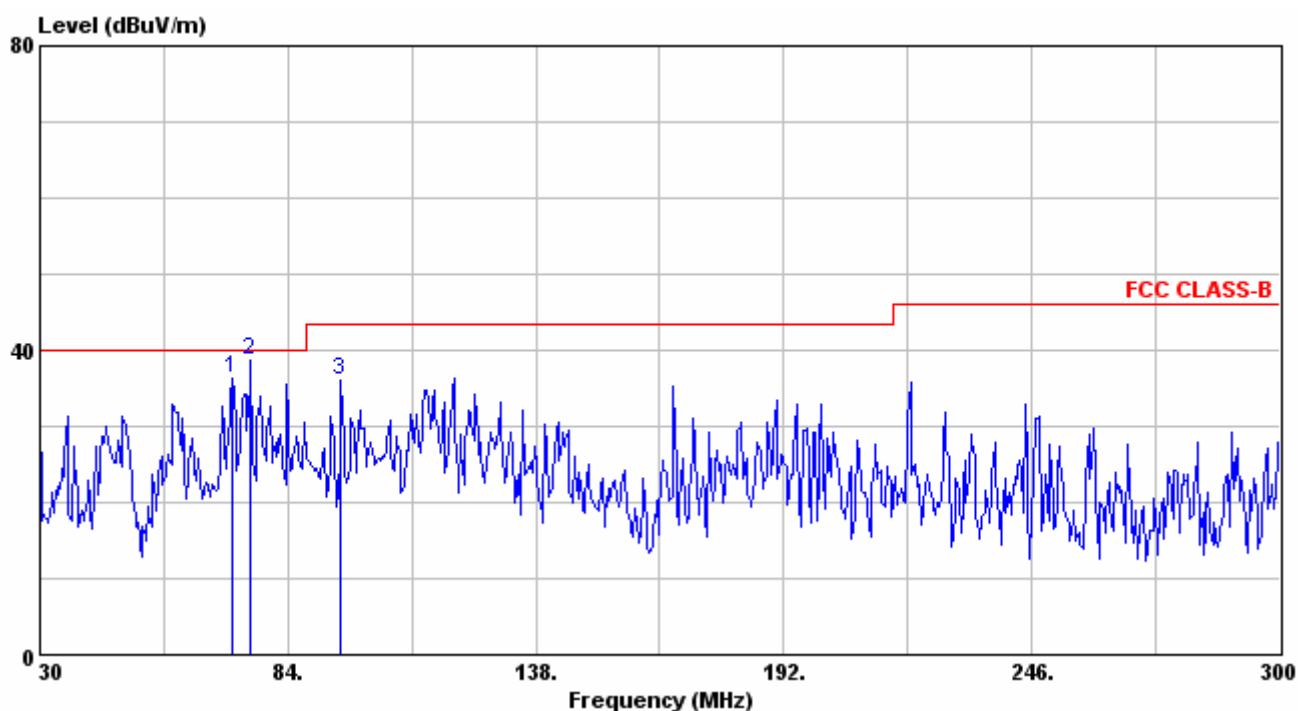
Antenna Polarization: Vertical

Frequency Range : 30MHz~300MHz

	Freq. (MHz)	Reading Data (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	71.85	59.05	-22.77	36.28	40.00	3.72
2	75.90	61.42	-22.80	38.62	40.00	1.38
3	95.61	57.21	-21.06	36.15	43.50	7.35

Note:

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier
2. Emission Level (dBuV/m) = Reading Data + Correction Factor
3. Margin (dB) = Limit – Emission Level



Test Model : Channel 78(2480MHz), Receiving

Test Distance : 3m

Tester : Bill

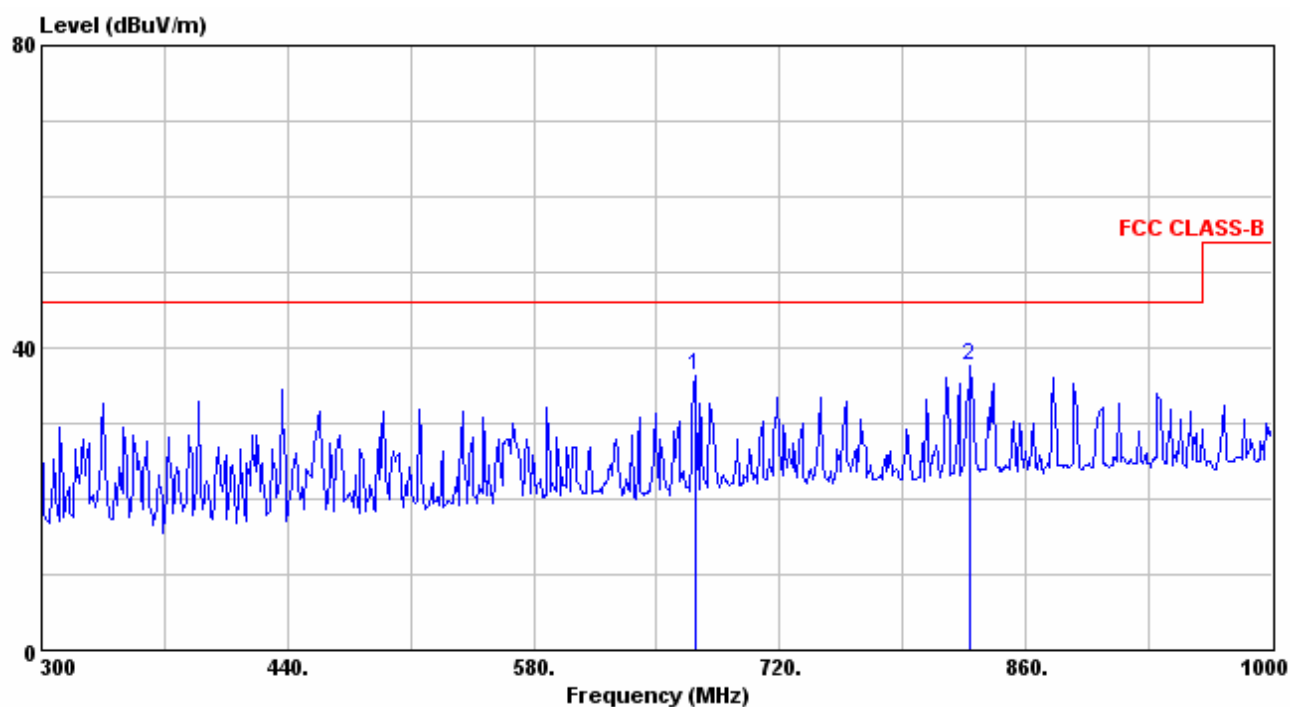
Antenna Polarization: Vertical

Frequency Range : 300MHz~1GHz

	Freq. (MHz)	Reading Data (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	671.70	41.78	-5.54	36.24	46.00	9.76
2	828.50	41.27	-3.68	37.59	46.00	8.41

Note:

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier
2. Emission Level (dBuV/m) = Reading Data + Correction Factor
3. Margin (dB) = Limit – Emission Level



Test Model : Channel 78(2480MHz), Receiving

Test Distance : 3m

Tester : Bill

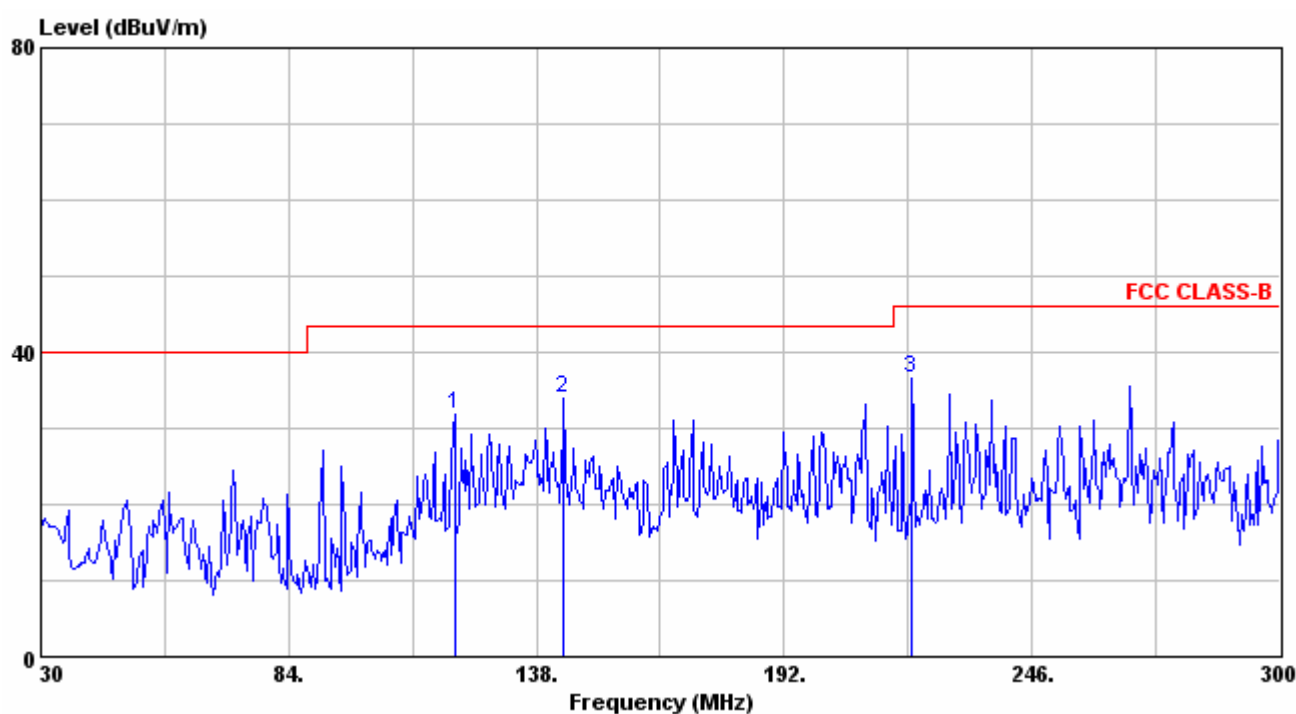
Antenna Polarization: Horizontal

Frequency Range : 30MHz~300MHz

	Freq. (MHz)	Reading Data (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	120.18	54.22	-22.43	31.79	43.50	11.71
2	143.94	54.79	-20.80	33.99	43.50	9.51
3	219.81	54.10	-17.43	36.67	46.00	9.33

Note:

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier
2. Emission Level (dBuV/m) = Reading Data + Correction Factor
3. Margin (dB) = Limit – Emission Level



Test Model : Channel 78(2480MHz), Receiving

Test Distance : 3m

Tester : Bill

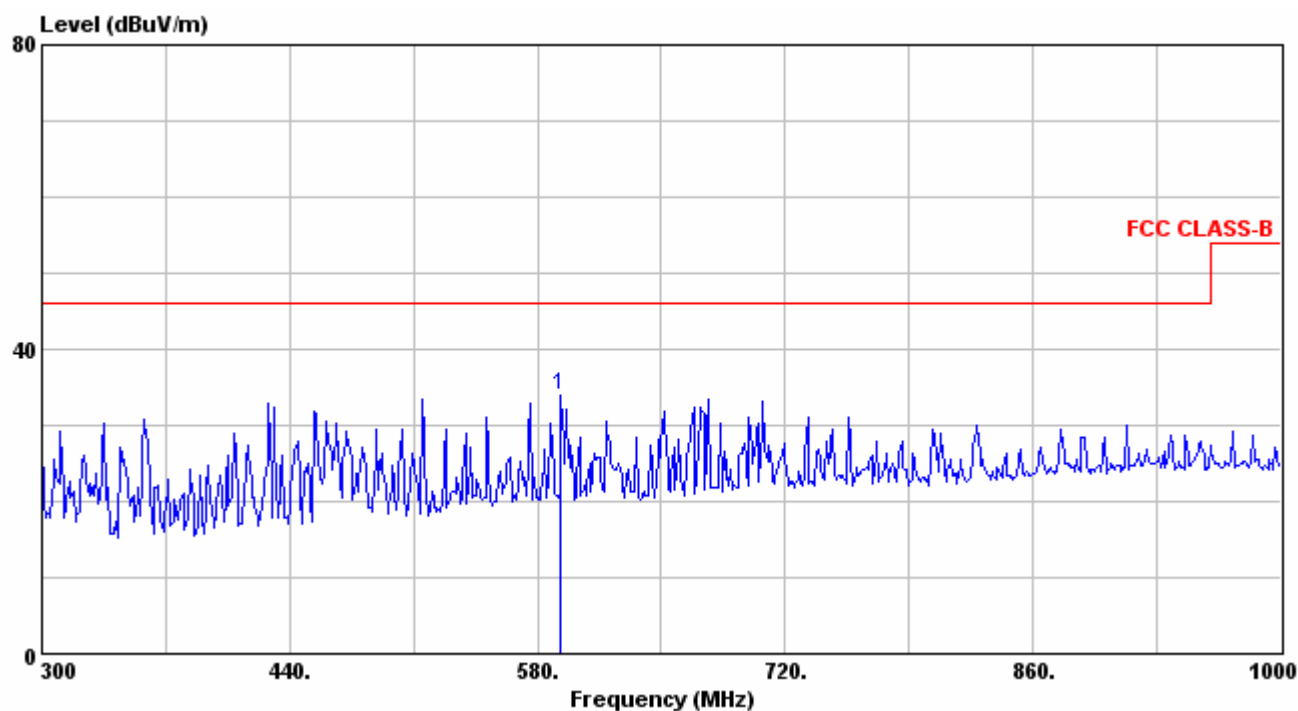
Antenna Polarization: Horizontal

Frequency Range : 300MHz~1GHz

	Freq. (MHz)	Reading Data (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	593.30	40.67	-6.85	33.82	46.00	12.18

Note:

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier
2. Emission Level (dBuV/m) = Reading Data + Correction Factor
3. Margin (dB) = Limit – Emission Level



Radiated Emission Measurement above 1000MHz

Test Model : Channel 0(2402MHz), Continuous Transmitting

Test Distance : 3m

Tester : Bill

Antenna Polarization : Vertical

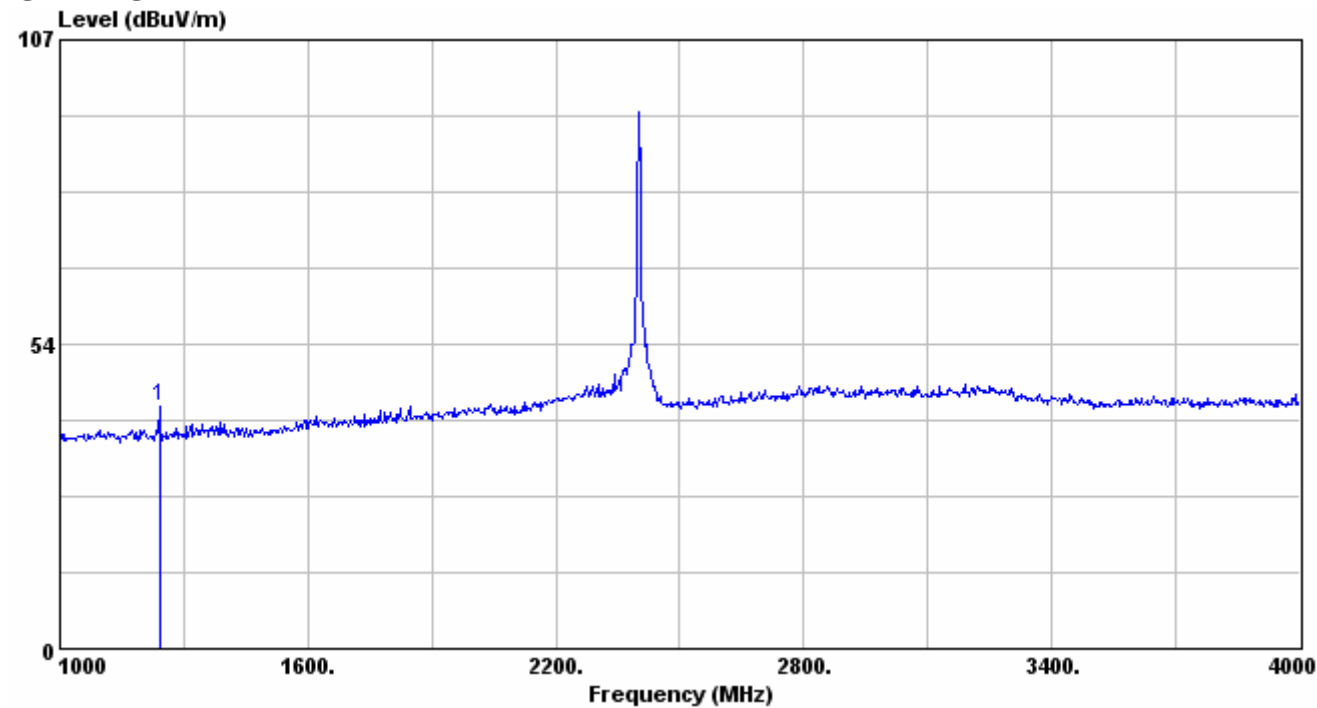
Frequency Range :1GHz~25GHz

	Frequency (MHz)	Reading Data (dBuV)		Correction Factor (dB/m)	Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		PK.	AV.		PK.	AV.	PK.	AV.	PK.	AV.
1	1240	48.00	*	-5.48	42.52	*	74.00	54.00	31.48	*
2	4804	*	*	*	*	*	74.00	54.00	*	*
3	7206	*	*	*	*	*	74.00	54.00	*	*
4	9608	*	*	*	*	*	74.00	54.00	*	*
5	12010	*	*	*	*	*	74.00	54.00	*	*
6	14412	*	*	*	*	*	74.00	54.00	*	*
7	16814	*	*	*	*	*	74.00	54.00	*	*
8	19216	*	*	*	*	*	74.00	54.00	*	*
9	21618	*	*	*	*	*	74.00	54.00	*	*
10	24020	*	*	*	*	*	74.00	54.00	*	*
11	25000	*	*	*	*	*	74.00	54.00	*	*

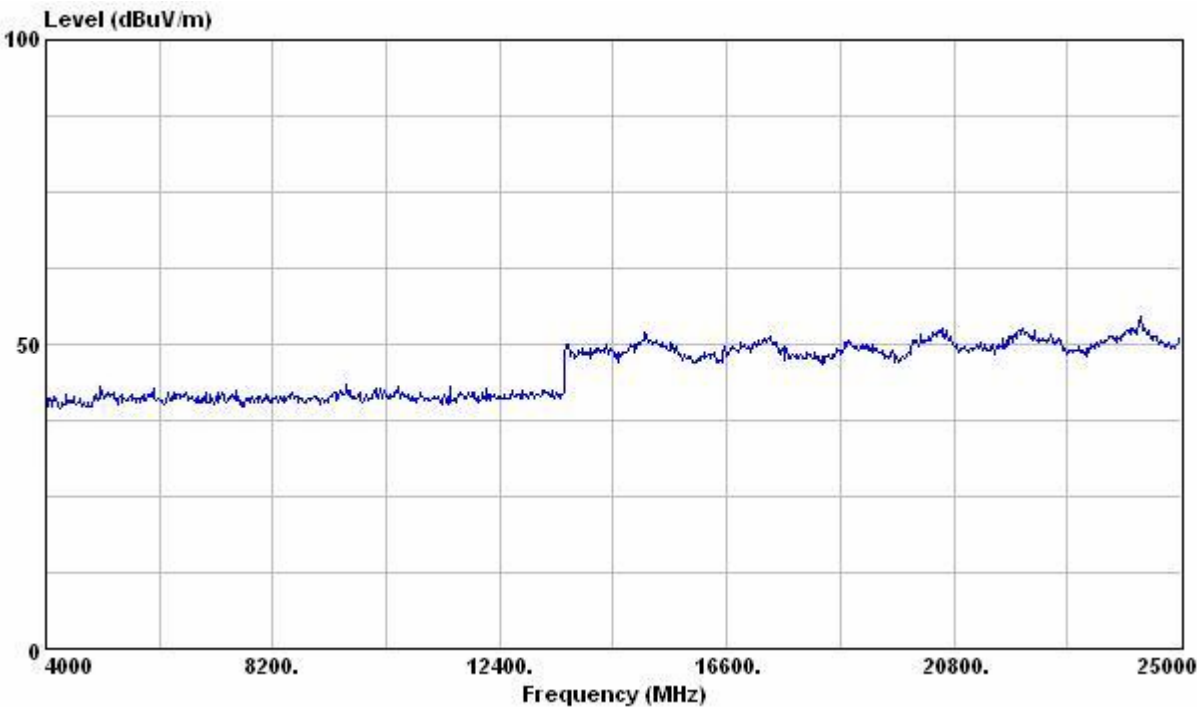
Note:

1. Emission Level (dBuV/m) = Reading Value + Correction Factor.
2. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier.
3. Margin (dB) = Limit–Emission Level.
4. PK. and AV. are abbreviation of peak and average respectively.
5. “*”: The emission is too low to be measured.

1GHz~4GHz



4GHz~25GHz



Test Model : Channel 0(2402MHz), Continuous Transmitting

Test Distance : 3m

Tester : Bill

Antenna Polarization : Horizontal

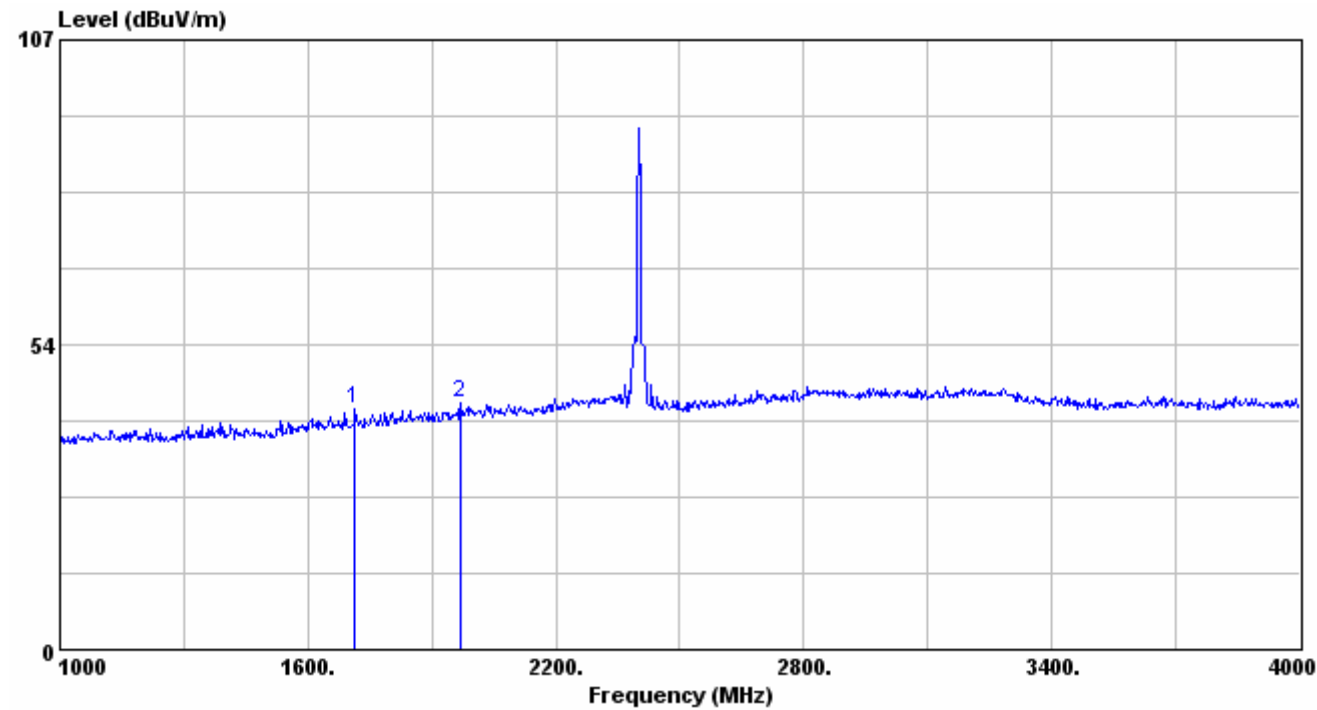
Frequency Range :1GHz~25GHz

	Frequency (MHz)	Reading Data (dBuV)		Correction Factor (dB/m)	Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		PK.	AV.		PK.	AV.	PK.	AV.	PK.	AV.
1	1714	44.69	*	-2.60	42.09	*	74.00	54.00	31.91	*
2	1969	44.07	*	-0.70	43.37	*	74.00	54.00	30.63	*
3	4804	*	*	*	*	*	74.00	54.00	*	*
4	7206	*	*	*	*	*	74.00	54.00	*	*
5	9608	*	*	*	*	*	74.00	54.00	*	*
6	12010	*	*	*	*	*	74.00	54.00	*	*
7	14412	*	*	*	*	*	74.00	54.00	*	*
8	16814	*	*	*	*	*	74.00	54.00	*	*
9	19216	*	*	*	*	*	74.00	54.00	*	*
10	21618	*	*	*	*	*	74.00	54.00	*	*
11	24020	*	*	*	*	*	74.00	54.00	*	*
12	25000	*	*	*	*	*	74.00	54.00	*	*

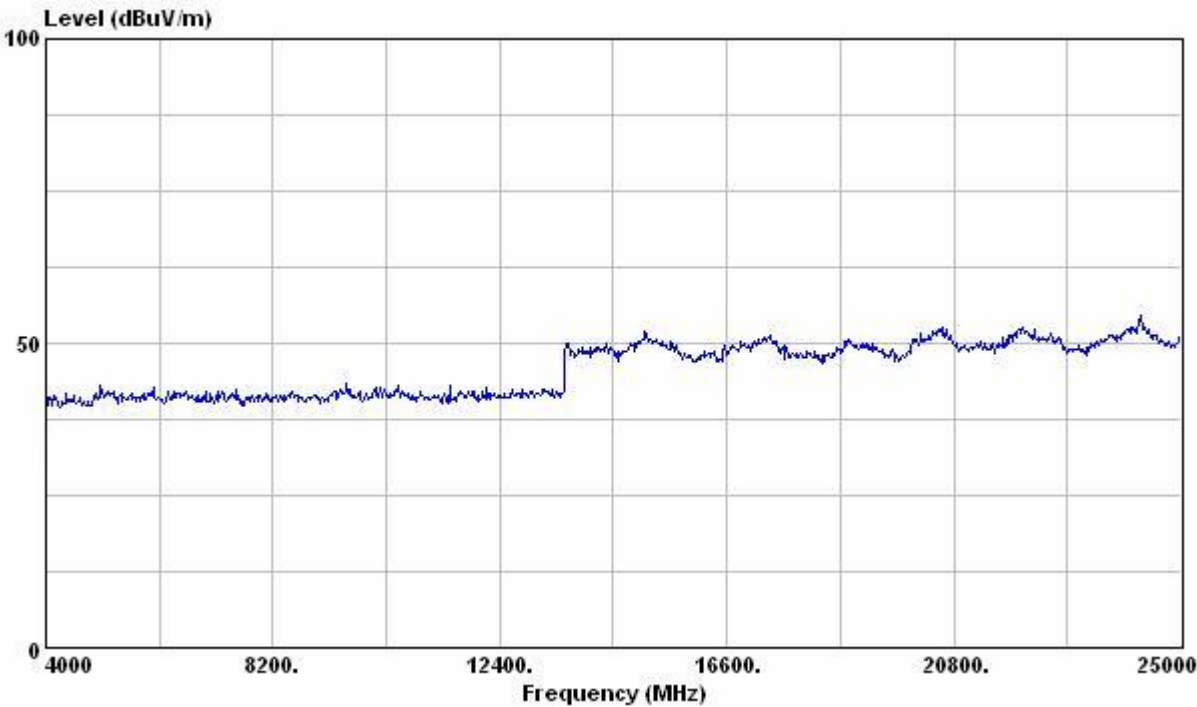
Note:

1. Emission Level (dBuV/m) = Reading Value + Correction Factor.
2. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier.
3. Margin (dB) = Limit–Emission Level.
4. PK. and AV. are abbreviation of peak and average respectively.
5. “*”: The emission is too low to be measured.

1GHz~4GHz



4GHz~25GHz



Test Model : Channel 39(2441MHz), Continuous Transmitting

Test Distance : 3m

Tester : Bill

Antenna Polarization : Vertical

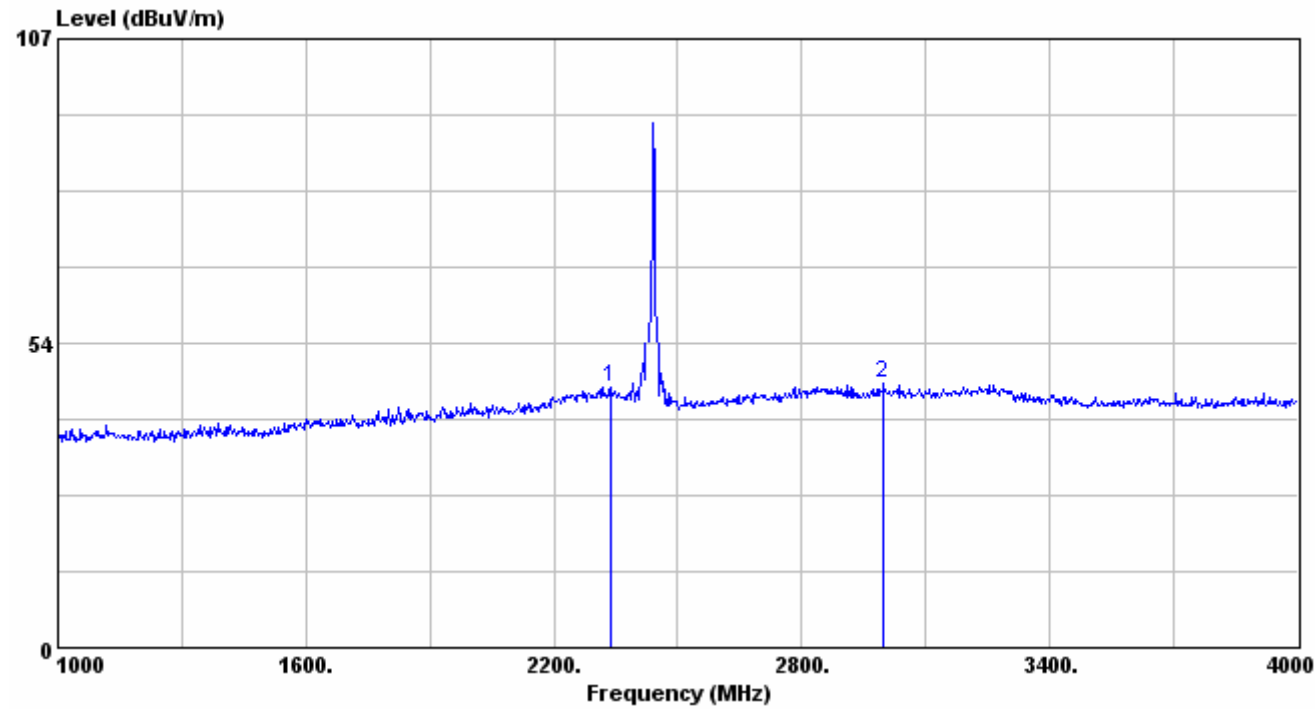
Frequency Range :1GHz~25GHz

	Frequency (MHz)	Reading Data (dBuV)		Correction Factor (dB/m)	Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		PK.	AV.		PK.	AV.	PK.	AV.	PK.	AV.
1	2338	45.31	*	0.41	45.72	*	74.00	54.00	28.28	*
2	2998	44.37	*	2.26	46.63	*	74.00	54.00	27.37	*
3	4882	*	*	*	*	*	74.00	54.00	*	*
4	7323	*	*	*	*	*	74.00	54.00	*	*
5	9764	*	*	*	*	*	74.00	54.00	*	*
6	12205	*	*	*	*	*	74.00	54.00	*	*
7	14646	*	*	*	*	*	74.00	54.00	*	*
8	17087	*	*	*	*	*	74.00	54.00	*	*
9	19528	*	*	*	*	*	74.00	54.00	*	*
10	21969	*	*	*	*	*	74.00	54.00	*	*
11	24410	*	*	*	*	*	74.00	54.00	*	*
12	25000	*	*	*	*	*	74.00	54.00	*	*

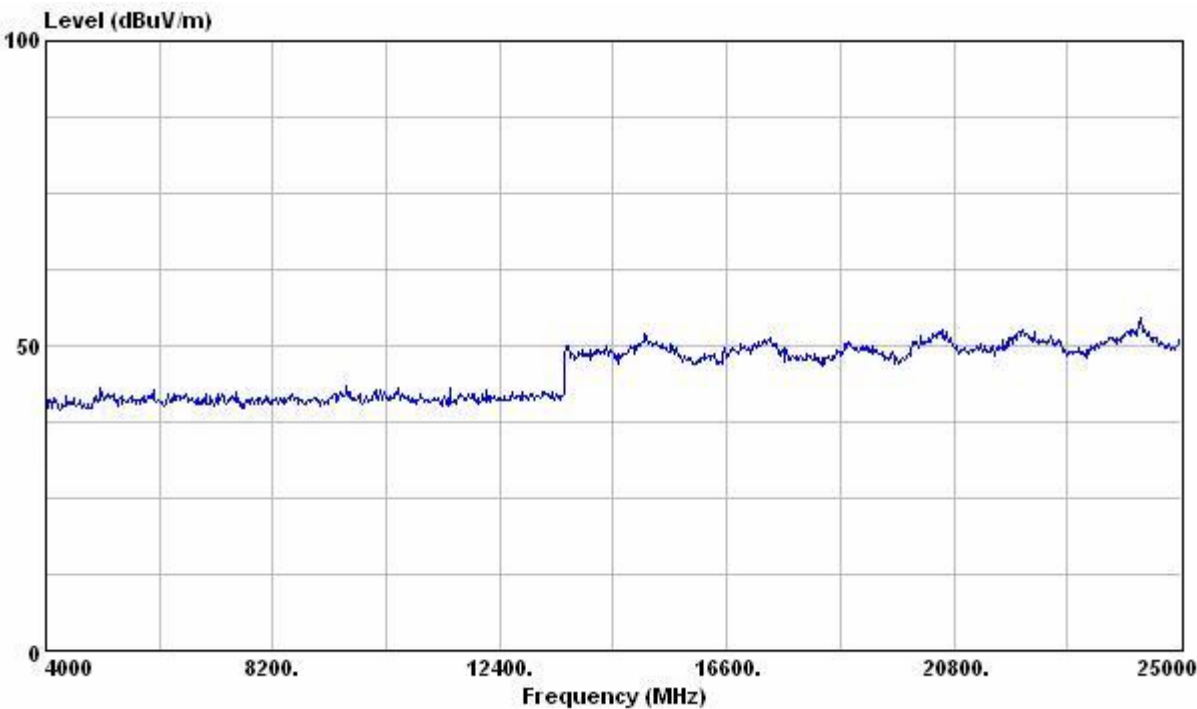
Note:

1. Emission Level (dBuV/m) = Reading Value + Correction Factor.
2. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier.
3. Margin (dB) = Limit–Emission Level.
4. PK. and AV. are abbreviation of peak and average respectively.
5. “*”: The emission is too low to be measured.

1GHz~4GHz



4GHz~25GHz



Test Model : Channel 39(2441MHz), Continuous Transmitting

Test Distance : 3m

Tester : Bill

Antenna Polarization : Horizontal

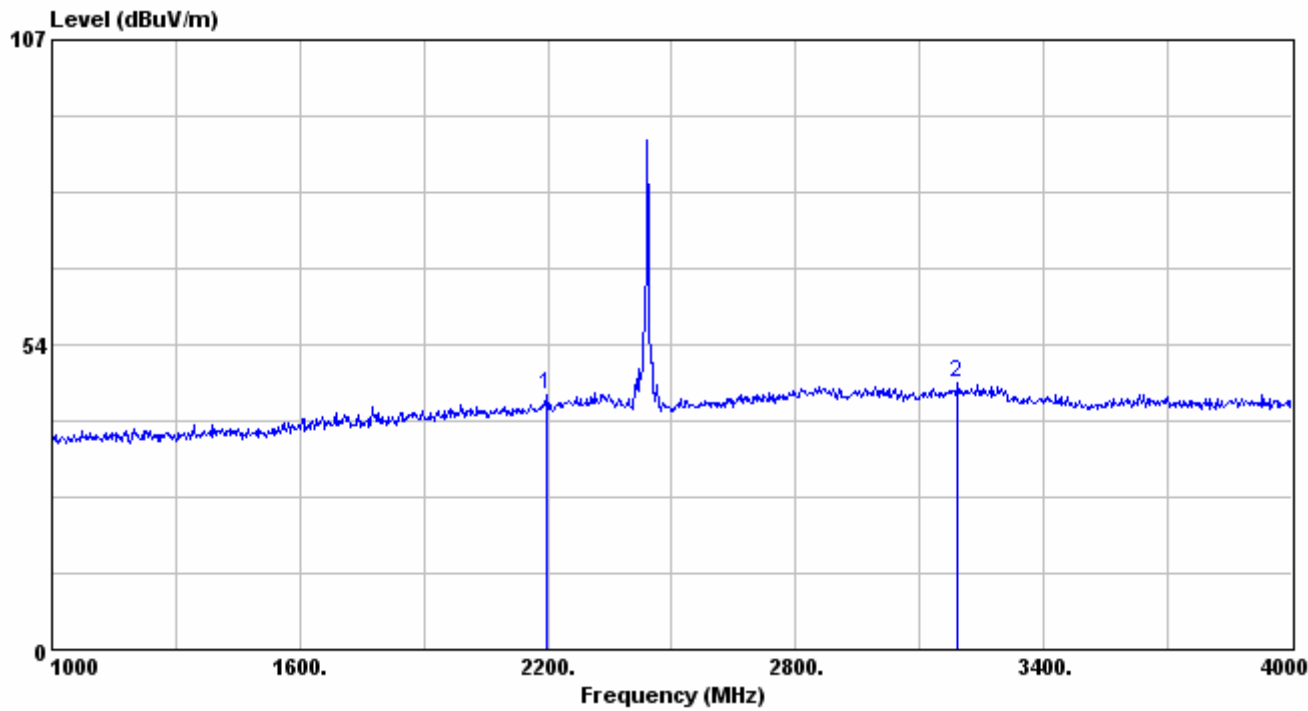
Frequency Range :1GHz~25GHz

	Frequency (MHz)	Reading Data (dBuV)		Correction Factor (dB/m)	Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		PK.	AV.		PK.	AV.	PK.	AV.	PK.	AV.
1	2197	44.85	*	-0.05	44.80	*	74.00	54.00	29.20	*
2	3193	44.68	*	2.24	46.92	*	74.00	54.00	27.08	*
3	4882	*	*	*	*	*	74.00	54.00	*	*
4	7323	*	*	*	*	*	74.00	54.00	*	*
5	9764	*	*	*	*	*	74.00	54.00	*	*
6	12205	*	*	*	*	*	74.00	54.00	*	*
7	14646	*	*	*	*	*	74.00	54.00	*	*
8	17087	*	*	*	*	*	74.00	54.00	*	*
9	19528	*	*	*	*	*	74.00	54.00	*	*
10	21969	*	*	*	*	*	74.00	54.00	*	*
11	24410	*	*	*	*	*	74.00	54.00	*	*
12	25000	*	*	*	*	*	74.00	54.00	*	*

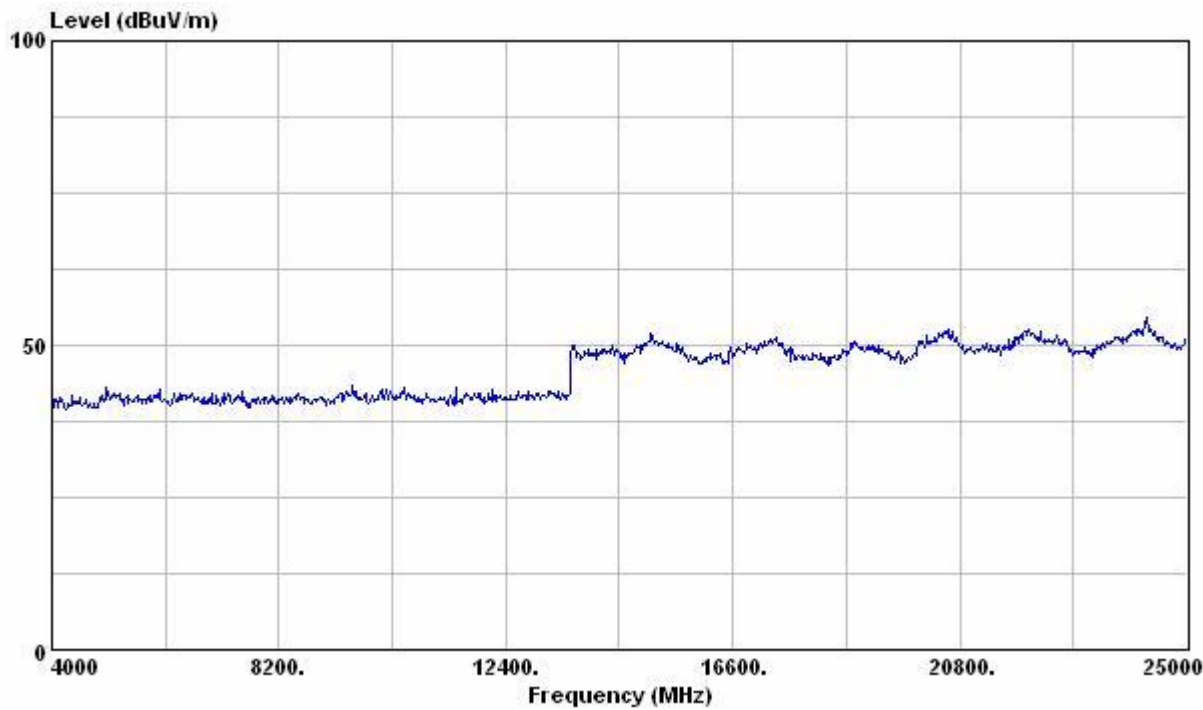
Note:

1. Emission Level (dBuV/m) = Reading Value + Correction Factor.
2. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier.
3. Margin (dB) = Limit–Emission Level.
4. PK. and AV. are abbreviation of peak and average respectively.
5. “*”: The emission is too low to be measured.

1GHz~4GHz



4GHz~25GHz



Test Model : Channel 78(2480MHz), Continuous Transmitting

Test Distance : 3m

Tester : Bill

Antenna Polarization : Vertical

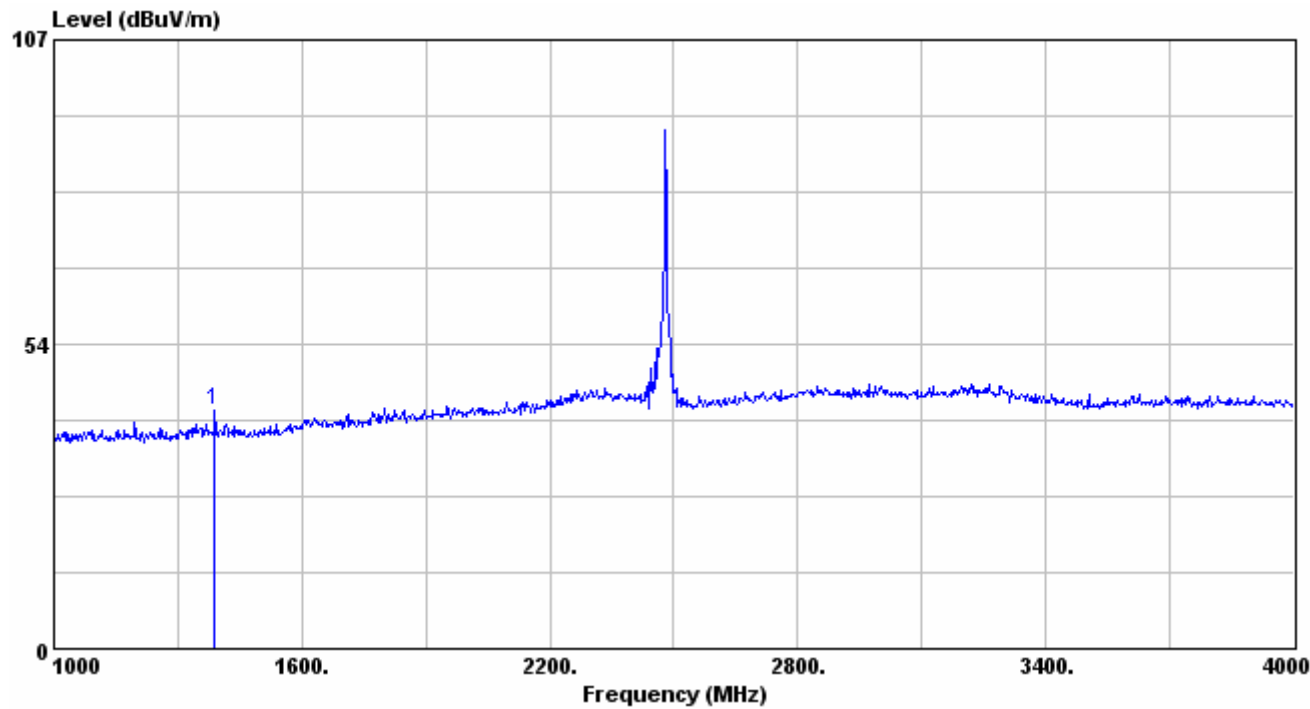
Frequency Range :1GHz~25GHz

	Frequency (MHz)	Reading Data (dBuV)		Correction Factor (dB/m)	Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		PK.	AV.		PK.	AV.	PK.	AV.	PK.	AV.
1	1390	46.60	*	-4.77	41.83	*	74.00	54.00	32.17	*
2	4960	*	*	*	*	*	74.00	54.00	*	*
3	7440	*	*	*	*	*	74.00	54.00	*	*
4	9920	*	*	*	*	*	74.00	54.00	*	*
5	12400	*	*	*	*	*	74.00	54.00	*	*
6	14880	*	*	*	*	*	74.00	54.00	*	*
7	17360	*	*	*	*	*	74.00	54.00	*	*
8	19840	*	*	*	*	*	74.00	54.00	*	*
9	22320	*	*	*	*	*	74.00	54.00	*	*
10	24800	*	*	*	*	*	74.00	54.00	*	*
11	25000	*	*	*	*	*	74.00	54.00	*	*

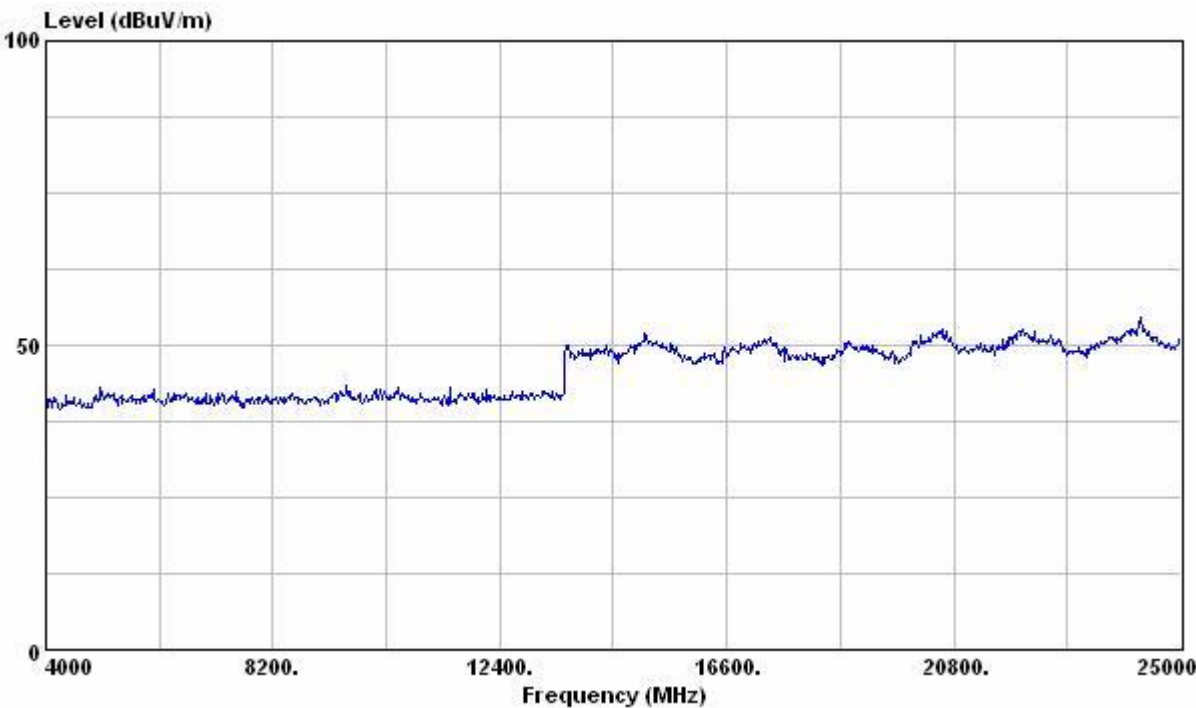
Note:

1. Emission Level (dBuV/m) = Reading Value + Correction Factor.
2. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier.
3. Margin (dB) = Limit–Emission Level.
4. PK. and AV. are abbreviation of peak and average respectively.
5. “*”: The emission is too low to be measured.

1GHz~4GHz



4GHz~25GHz



0937090

Test Model : Channel 78(2480MHz), Continuous Transmitting

Test Distance : 3m

Tester : Bill

Antenna Polarization : Horizontal

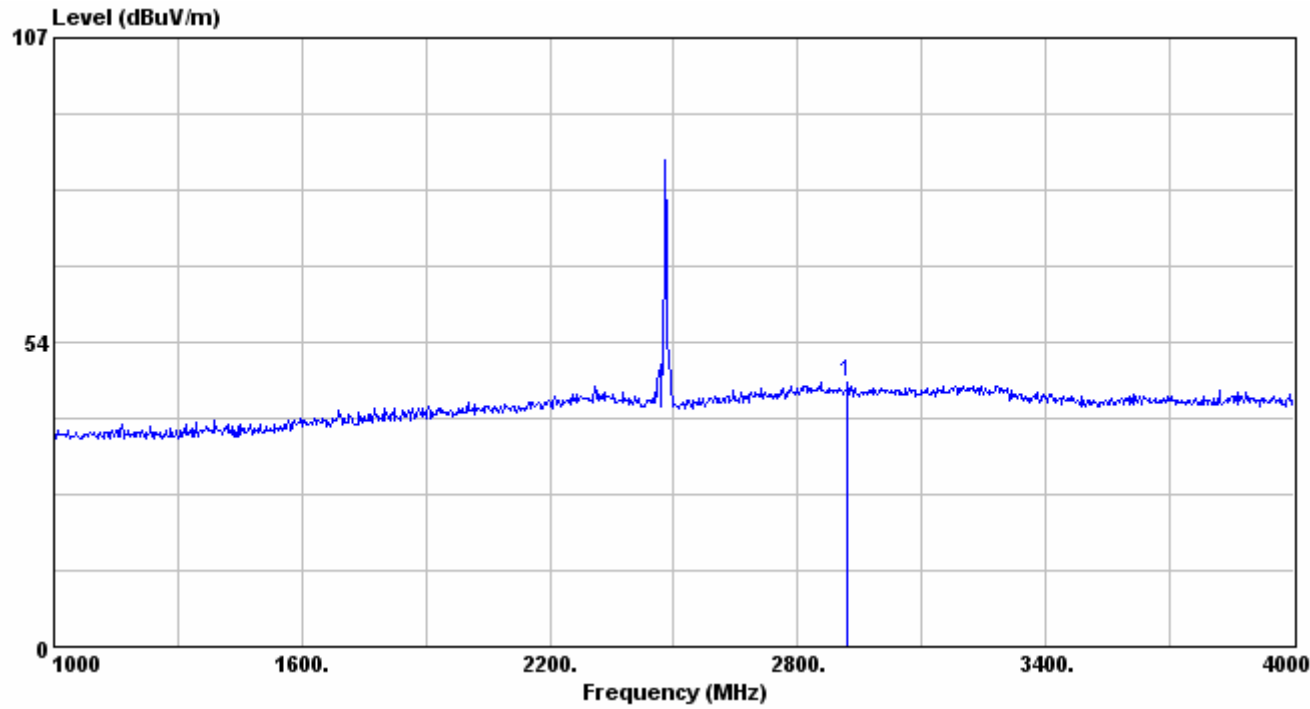
Frequency Range :1GHz~25GHz

	Frequency (MHz)	Reading Data (dBuV)		Correction Factor (dB/m)	Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		PK.	AV.		PK.	AV.	PK.	AV.	PK.	AV.
1	2920	44.66	*	1.96	46.62	*	74.00	54.00	27.38	*
2	4960	*	*	*	*	*	74.00	54.00	*	*
3	7440	*	*	*	*	*	74.00	54.00	*	*
4	9920	*	*	*	*	*	74.00	54.00	*	*
5	12400	*	*	*	*	*	74.00	54.00	*	*
6	14880	*	*	*	*	*	74.00	54.00	*	*
7	17360	*	*	*	*	*	74.00	54.00	*	*
8	19840	*	*	*	*	*	74.00	54.00	*	*
9	22320	*	*	*	*	*	74.00	54.00	*	*
10	24800	*	*	*	*	*	74.00	54.00	*	*
11	25000	*	*	*	*	*	74.00	54.00	*	*

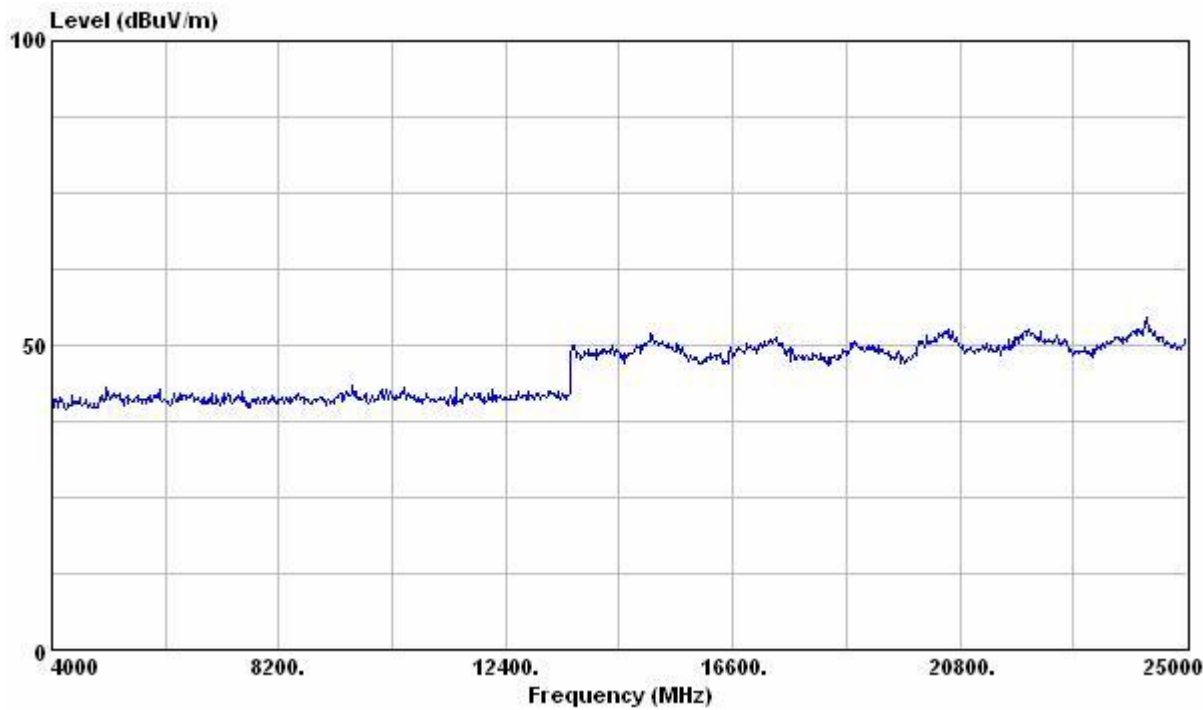
Note:

1. Emission Level (dBuV/m) = Reading Value + Correction Factor.
2. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier.
3. Margin (dB) = Limit–Emission Level.
4. PK. and AV. are abbreviation of peak and average respectively.
5. “*”: The emission is too low to be measured.

1GHz~4GHz



4G~25G



Test Model : Channel 0(2402MHz), Receiving

Test Distance : 3m

Tester : Bill

Antenna Polarization : Vertical

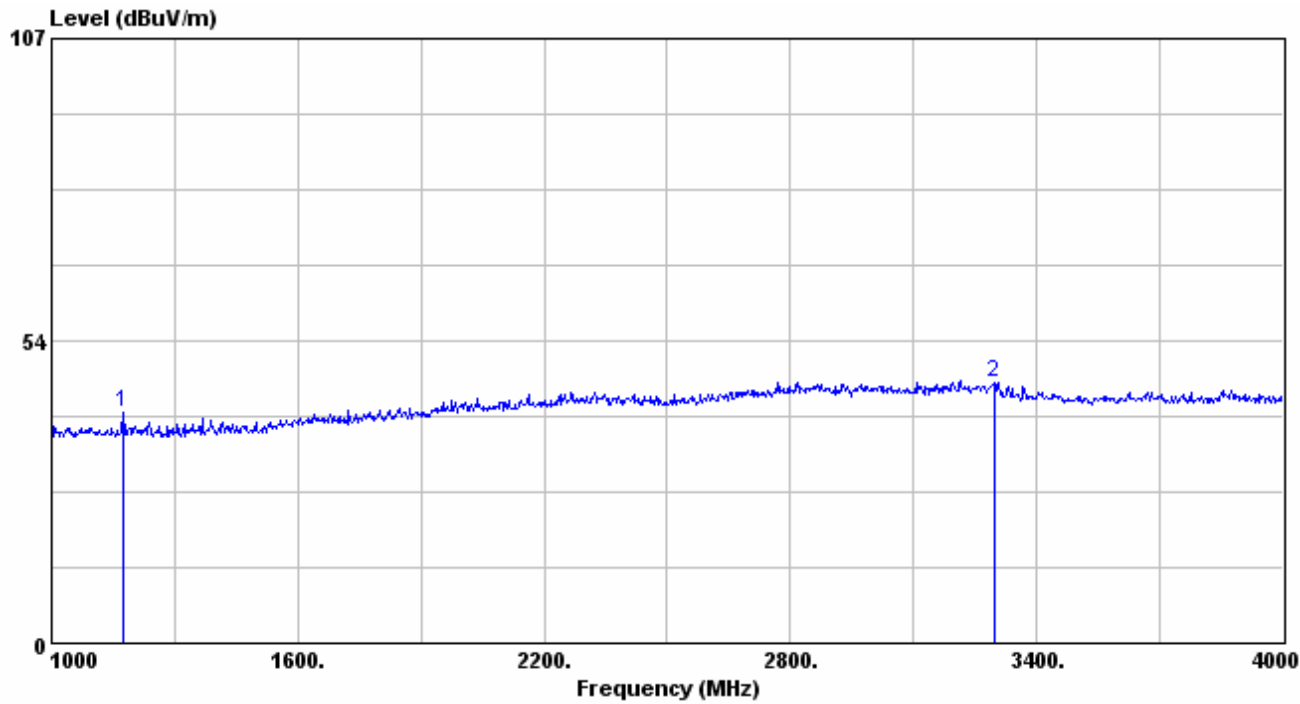
Frequency Range :1GHz~25GHz

	Frequency (MHz)	Reading Data (dBuV)		Correction Factor (dB/m)	Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		PK.	AV.		PK.	AV.	PK.	AV.	PK.	AV.
1	1174	46.13	*	-5.42	40.71	*	74	54	33.29	*
2	3295	44.39	*	1.69	46.08	*	74	54	27.92	*
3	4804	*	*	*	*	*	74	54	*	*
4	7206	*	*	*	*	*	74	54	*	*
5	9608	*	*	*	*	*	74	54	*	*
6	12010	*	*	*	*	*	74	54	*	*
7	14412	*	*	*	*	*	74	54	*	*
8	16814	*	*	*	*	*	74	54	*	*
9	19216	*	*	*	*	*	74	54	*	*
10	21618	*	*	*	*	*	74	54	*	*
11	24020	*	*	*	*	*	74	54	*	*
12	25000	*	*	*	*	*	74	54	*	*

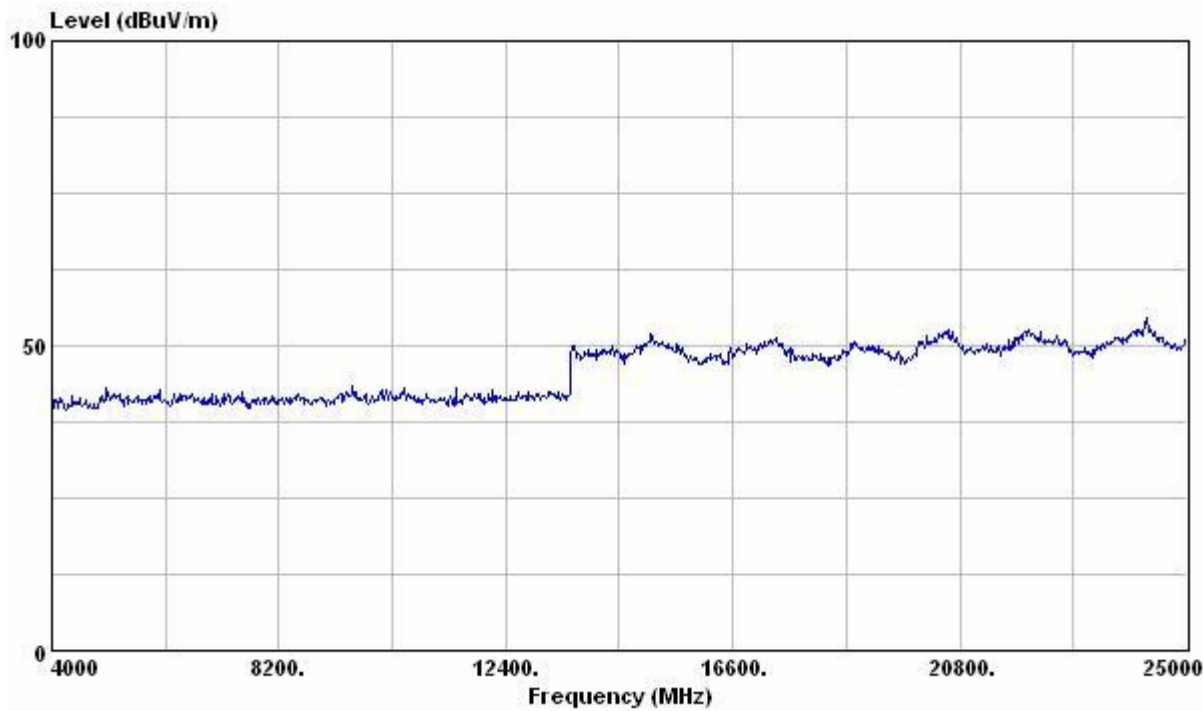
Note:

1. Emission Level (dBuV/m) = Reading Value + Correction Factor.
2. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier.
3. Margin (dB) = Limit–Emission Level.
4. PK. and AV. are abbreviation of peak and average respectively.
5. “*”: The emission is too low to be measured.

1GHz~4GHz



4GHz~25GHz



Test Model : Channel 0(2402MHz), Receiving

Test Distance : 3m

Tester : Bill

Antenna Polarization : Horizontal

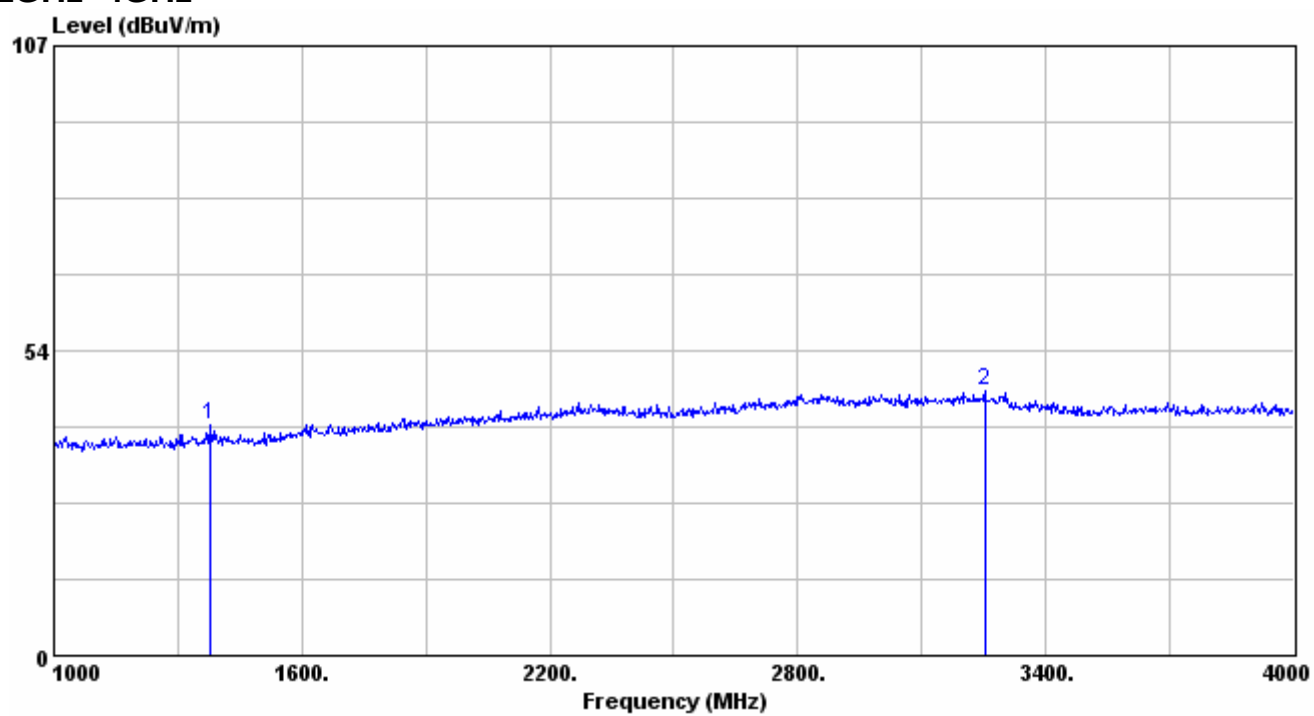
Frequency Range :1GHz~25GHz

	Frequency (MHz)	Reading Data (dBuV)		Correction Factor (dB/m)	Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		PK.	AV.		PK.	AV.	PK.	AV.	PK.	AV.
1	1378	45.19	*	-4.78	40.41	*	74.00	54.00	33.59	*
2	3253	44.13	*	2.19	46.32	*	74.00	54.00	27.68	*
3	4804	*	*	*	*	*	74	54	*	*
4	7206	*	*	*	*	*	74	54	*	*
5	9608	*	*	*	*	*	74	54	*	*
6	12010	*	*	*	*	*	74	54	*	*
7	14412	*	*	*	*	*	74	54	*	*
8	16814	*	*	*	*	*	74	54	*	*
9	19216	*	*	*	*	*	74	54	*	*
10	21618	*	*	*	*	*	74	54	*	*
11	24020	*	*	*	*	*	74	54	*	*
12	25000	*	*	*	*	*	74	54	*	*

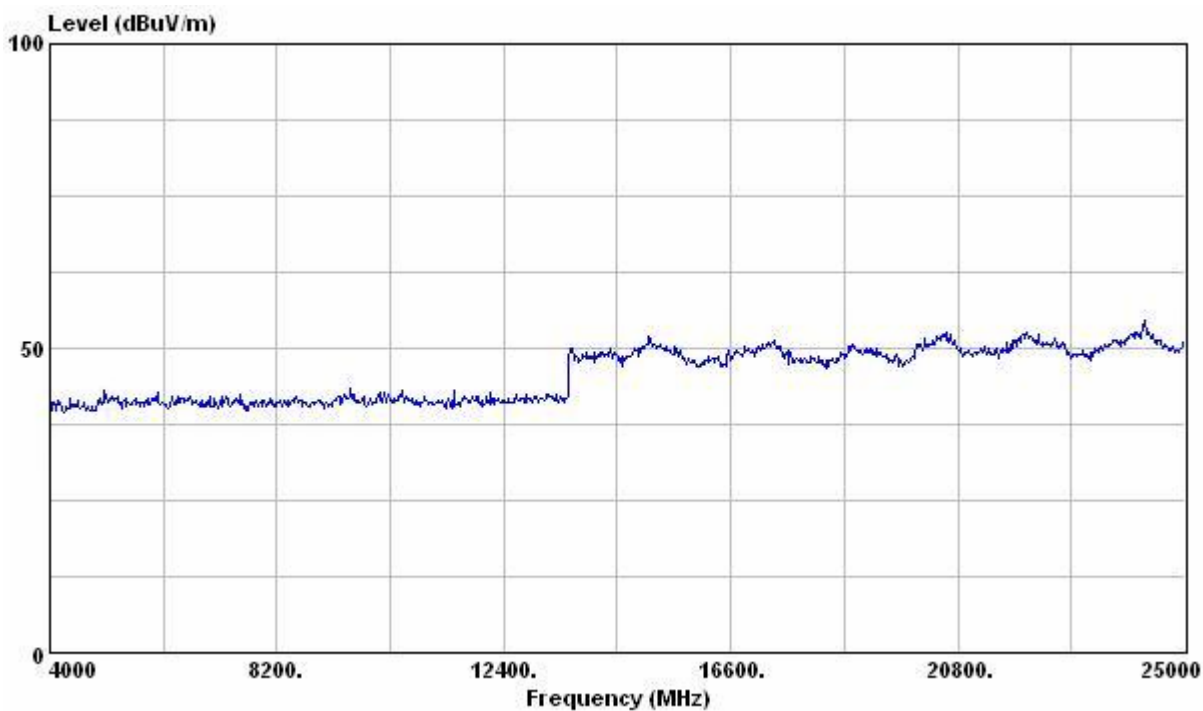
Note:

1. Emission Level (dBuV/m) = Reading Value + Correction Factor.
2. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier.
3. Margin (dB) = Limit–Emission Level.
4. PK. and AV. are abbreviation of peak and average respectively.
5. “*”: The emission is too low to be measured.

1GHz~4GHz



4GHz~25GHz



Test Model : Channel 39(2441MHz), Receiving

Test Distance : 3m

Tester : Bill

Antenna Polarization : Vertical

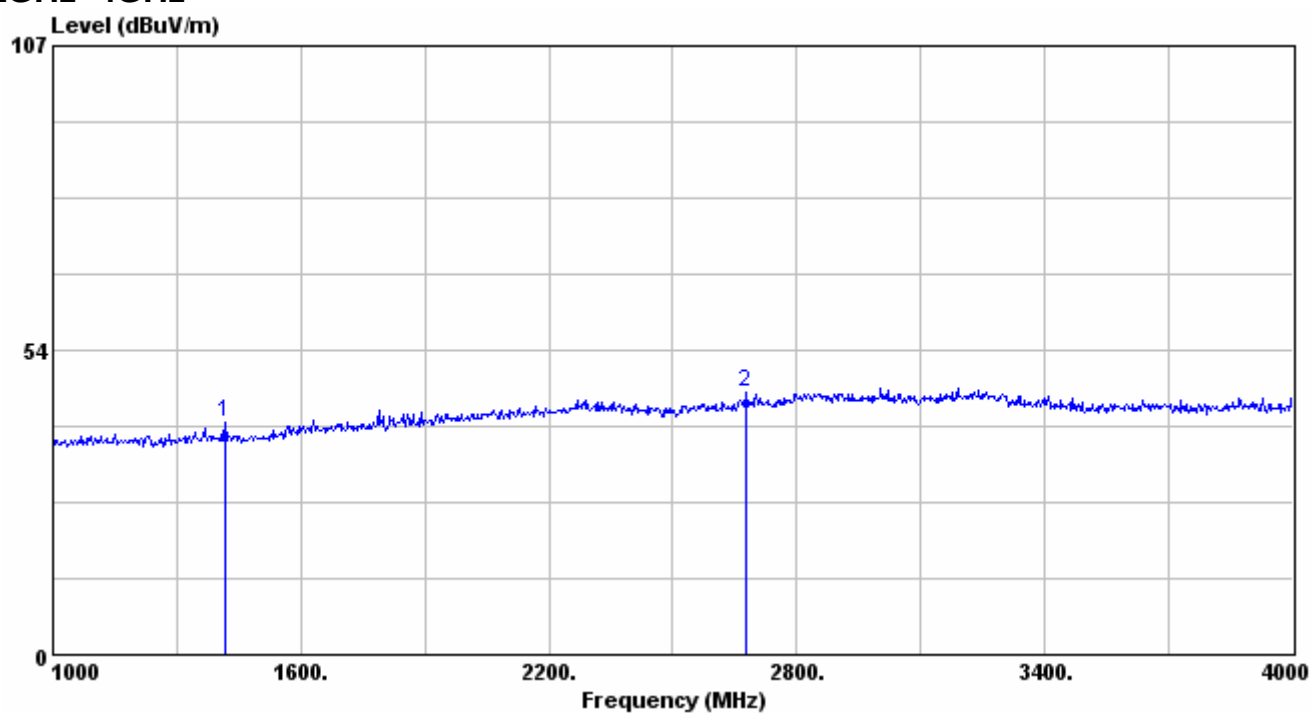
Frequency Range :1GHz~25GHz

	Frequency (MHz)	Reading Data (dBuV)		Correction Factor (dB/m)	Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		PK.	AV.		PK.	AV.	PK.	AV.	PK.	AV.
1	1417	45.43	*	-4.72	40.71	*	74.00	54.00	33.29	*
2	2677	44.93	*	1.04	45.97	*	74.00	54.00	28.03	*
3	4882	*	*	*	*	*	74	54	*	*
4	7323	*	*	*	*	*	74	54	*	*
5	9764	*	*	*	*	*	74	54	*	*
6	12205	*	*	*	*	*	74	54	*	*
7	14646	*	*	*	*	*	74	54	*	*
8	17087	*	*	*	*	*	74	54	*	*
9	19528	*	*	*	*	*	74	54	*	*
10	21969	*	*	*	*	*	74	54	*	*
11	24410	*	*	*	*	*	74	54	*	*
12	25000	*	*	*	*	*	74	54	*	*

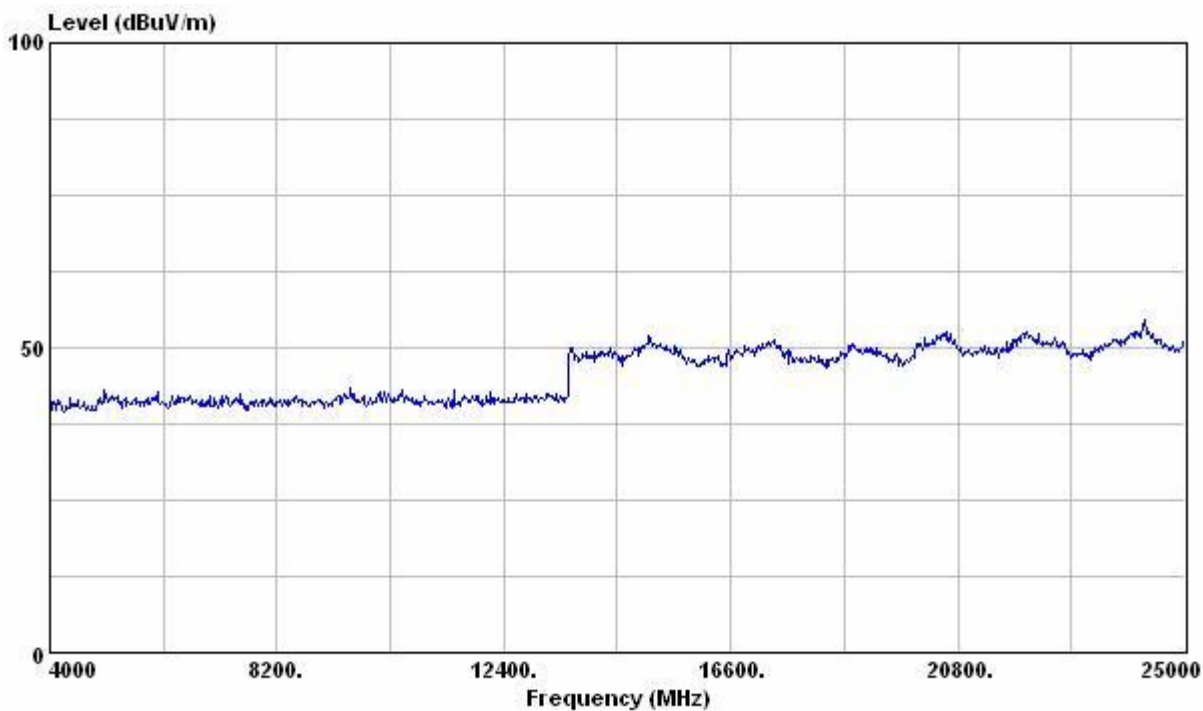
Note:

1. Emission Level (dBuV/m) = Reading Value + Correction Factor.
2. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier.
3. Margin (dB) = Limit–Emission Level.
4. PK. and AV. are abbreviation of peak and average respectively.
5. “*”: The emission is too low to be measured.

1GHz~4GHz



4GHz~25GHz



Test Model : Channel 39(2441MHz), Receiving

Test Distance : 3m

Tester : Bill

Antenna Polarization : Horizontal

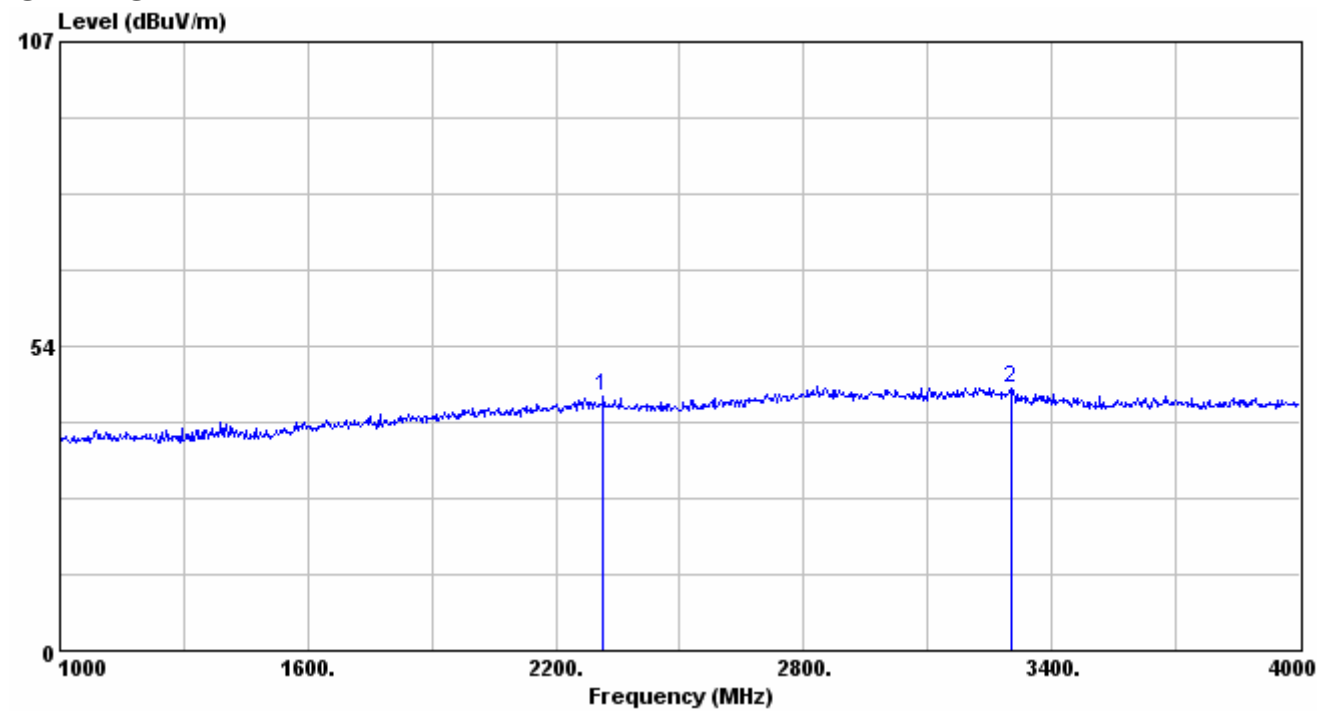
Frequency Range :1GHz~25GHz

	Frequency (MHz)	Reading Data (dBuV)		Correction Factor (dB/m)	Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		PK.	AV.		PK.	AV.	PK.	AV.	PK.	AV.
1	2314	44.38	*	0.29	44.67	*	74.00	54.00	29.33	*
2	3304	44.33	*	1.63	45.96	*	74.00	54.00	28.04	*
3	4882	*	*	*	*	*	74	54	*	*
4	7323	*	*	*	*	*	74	54	*	*
5	9764	*	*	*	*	*	74	54	*	*
6	12205	*	*	*	*	*	74	54	*	*
7	14646	*	*	*	*	*	74	54	*	*
8	17087	*	*	*	*	*	74	54	*	*
9	19528	*	*	*	*	*	74	54	*	*
10	21969	*	*	*	*	*	74	54	*	*
11	24410	*	*	*	*	*	74	54	*	*
12	25000	*	*	*	*	*	74	54	*	*

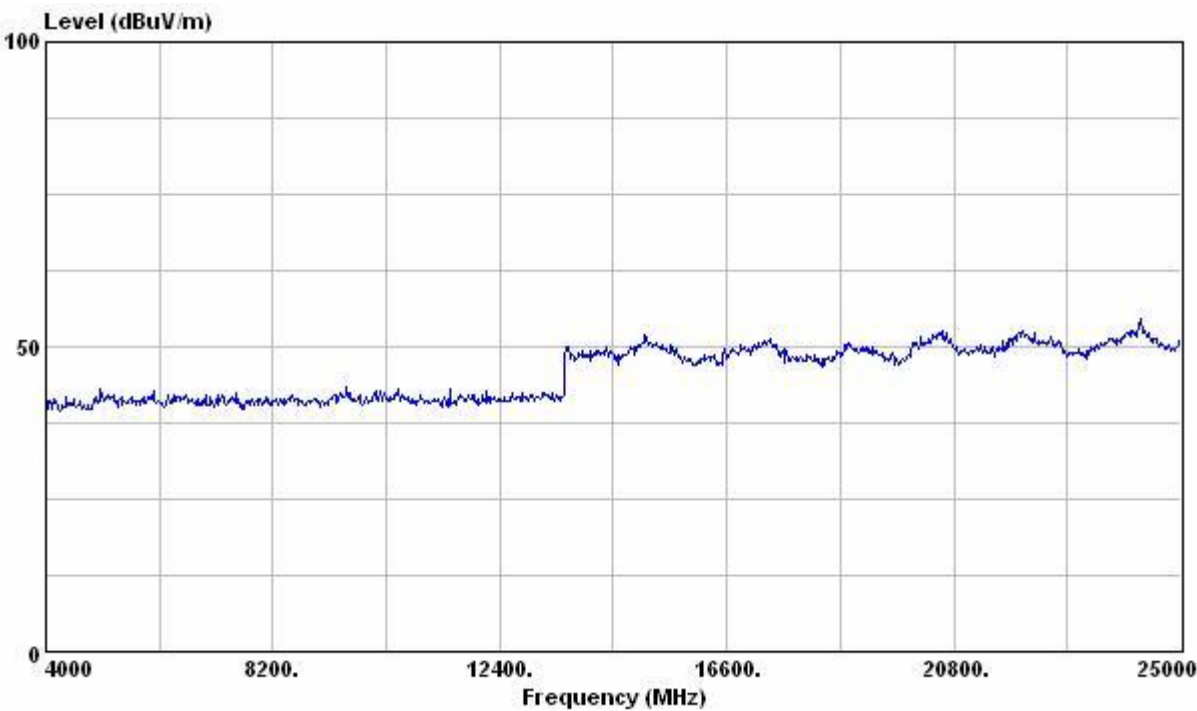
Note:

1. Emission Level (dBuV/m) = Reading Value + Correction Factor.
2. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier.
3. Margin (dB) = Limit–Emission Level.
4. PK. and AV. are abbreviation of peak and average respectively.
5. “*”: The emission is too low to be measured.

1GHz~4GHz



4GHz~25GHz



Test Model : Channel 78(2480MHz), Receiving

Test Distance : 3m

Tester : Bill

Antenna Polarization : Vertical

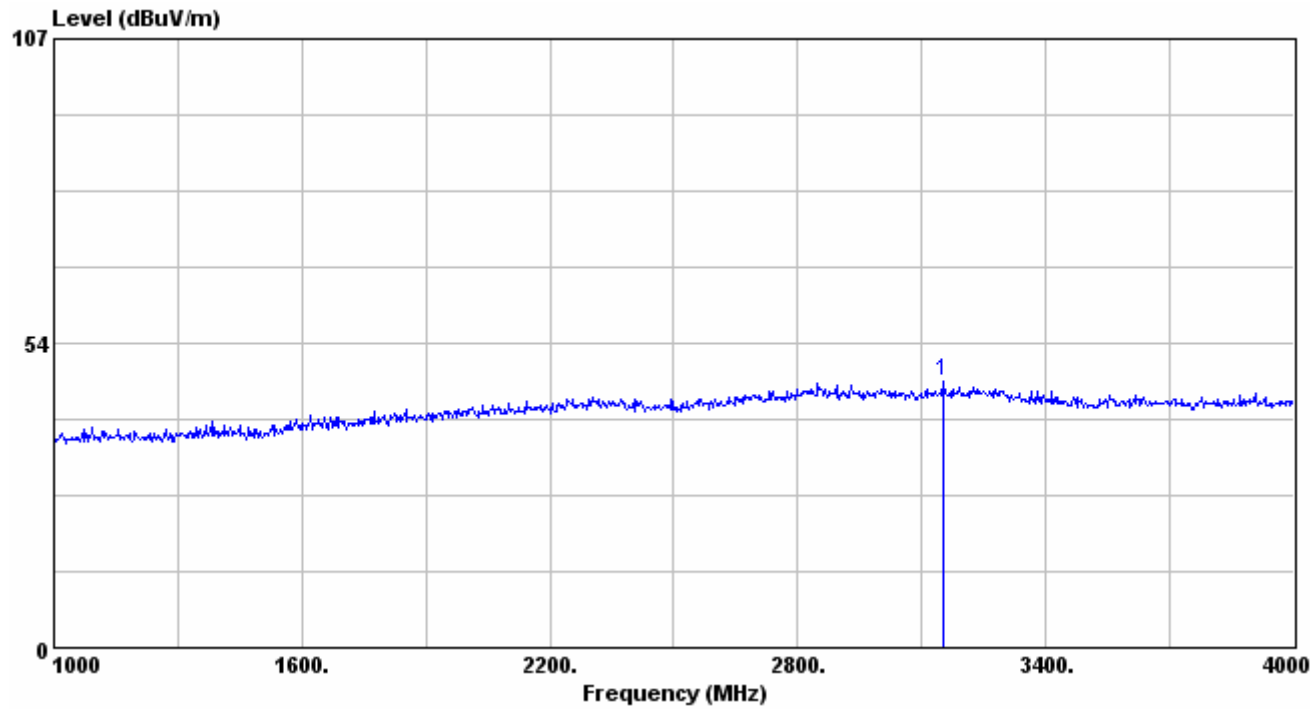
Frequency Range :1GHz~25GHz

	Frequency (MHz)	Reading Data (dBuV)		Correction Factor (dB/m)	Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		PK.	AV.		PK.	AV.	PK.	AV.	PK.	AV.
1	3154	44.79	*	2.14	46.93	*	74.00	54.00	27.07	*
2	4960	*	*	*	*	*	74	54	*	*
3	7440	*	*	*	*	*	74	54	*	*
4	9920	*	*	*	*	*	74	54	*	*
5	12400	*	*	*	*	*	74	54	*	*
6	14880	*	*	*	*	*	74	54	*	*
7	17360	*	*	*	*	*	74	54	*	*
8	19840	*	*	*	*	*	74	54	*	*
9	22320	*	*	*	*	*	74	54	*	*
10	24800	*	*	*	*	*	74	54	*	*
11	25000	*	*	*	*	*	74	54	*	*

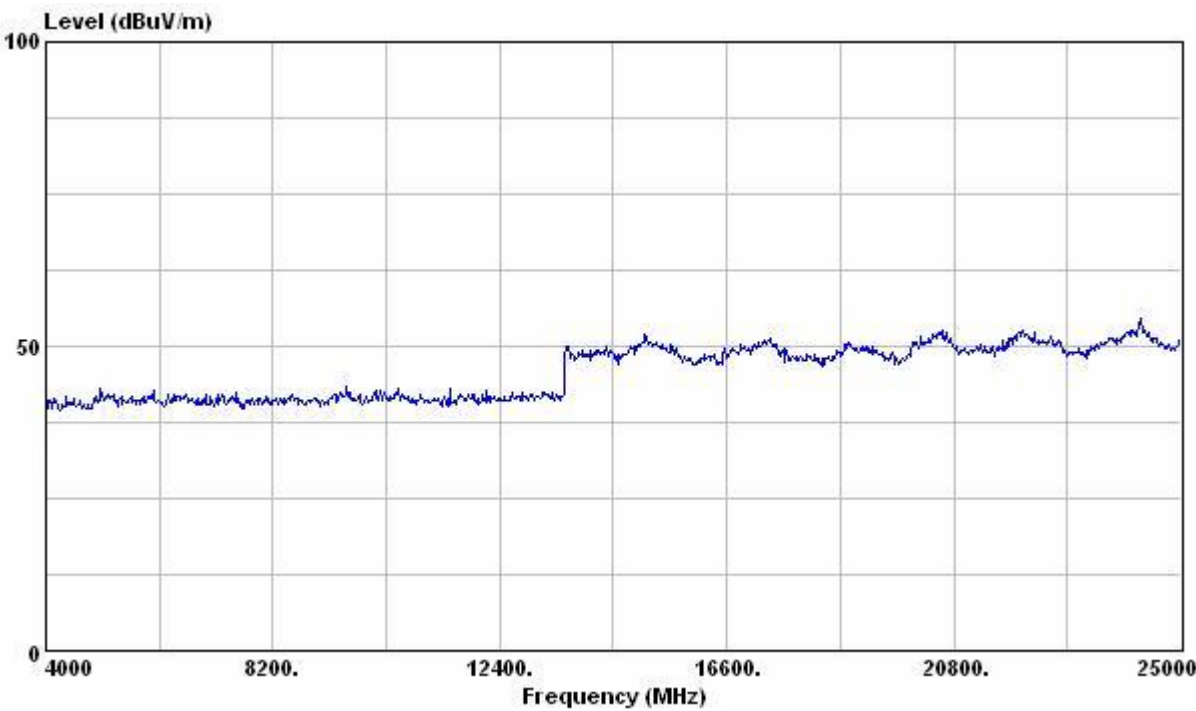
Note:

1. Emission Level (dBuV/m) = Reading Value + Correction Factor.
2. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier.
3. Margin (dB) = Limit–Emission Level.
4. PK. and AV. are abbreviation of peak and average respectively.
5. “*”: The emission is too low to be measured.

1GHz~4GHz



4GHz~25GHz



Test Model : Channel 78(2480MHz), Receiving

Test Distance : 3m

Tester : Bill

Antenna Polarization : Horizontal

Frequency Range :1GHz~25GHz

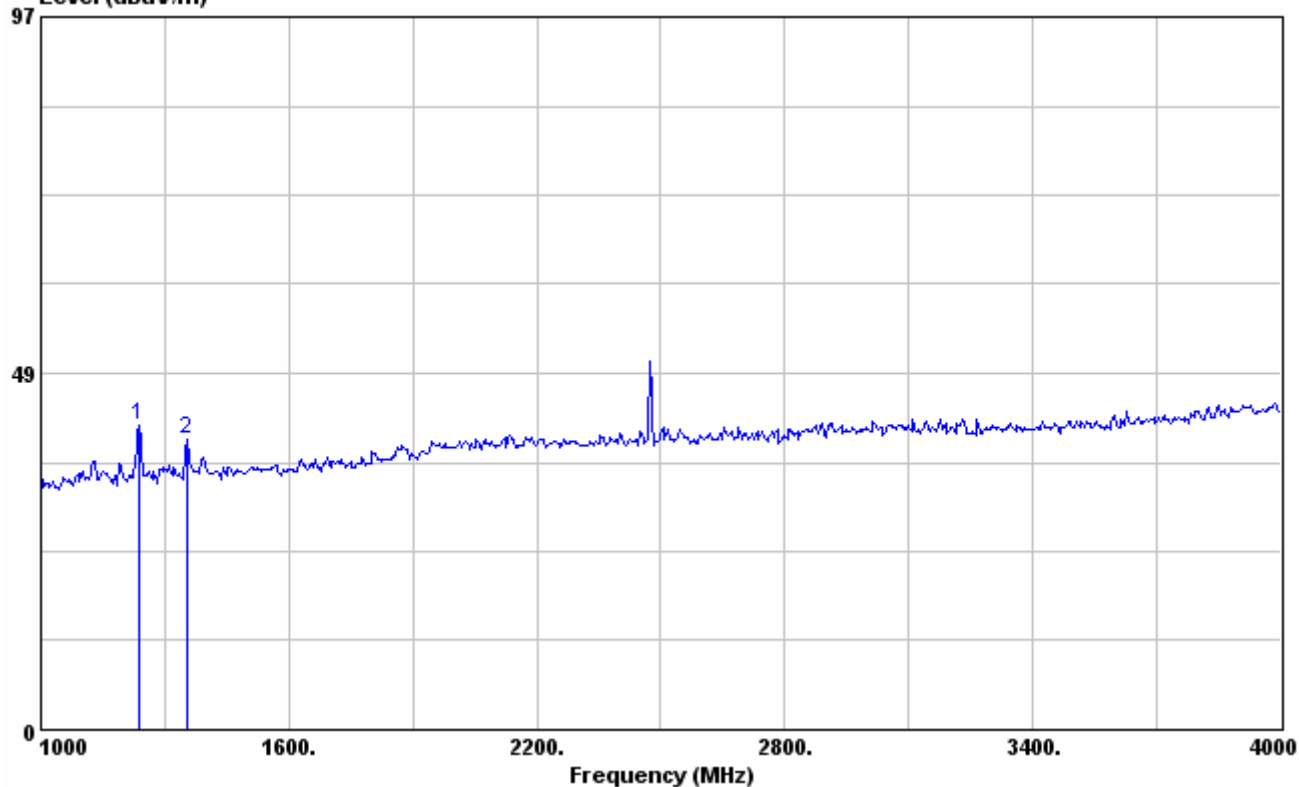
	Frequency (MHz)	Reading Data (dBuV)		Correction Factor (dB/m)	Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		PK.	AV.		PK.	AV.	PK.	AV.	PK.	AV.
1	1693	44.64	*	-2.71	41.93	*	74.00	54.00	32.07	
2	3289	44.38	*	1.76	46.14	*	74.00	54.00	27.86	
3	4960	*	*	*	*	*	74	54	*	*
4	7440	*	*	*	*	*	74	54	*	*
5	9920	*	*	*	*	*	74	54	*	*
6	12400	*	*	*	*	*	74	54	*	*
7	14880	*	*	*	*	*	74	54	*	*
8	17360	*	*	*	*	*	74	54	*	*
9	19840	*	*	*	*	*	74	54	*	*
10	22320	*	*	*	*	*	74	54	*	*
11	24800	*	*	*	*	*	74	54	*	*
12	25000	*	*	*	*	*	74	54	*	*

Note:

1. Emission Level (dBuV/m) = Reading Value + Correction Factor.
2. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier.
3. Margin (dB) = Limit–Emission Level.
4. PK. and AV. are abbreviation of peak and average respectively.
5. “*”: The emission is too low to be measured.

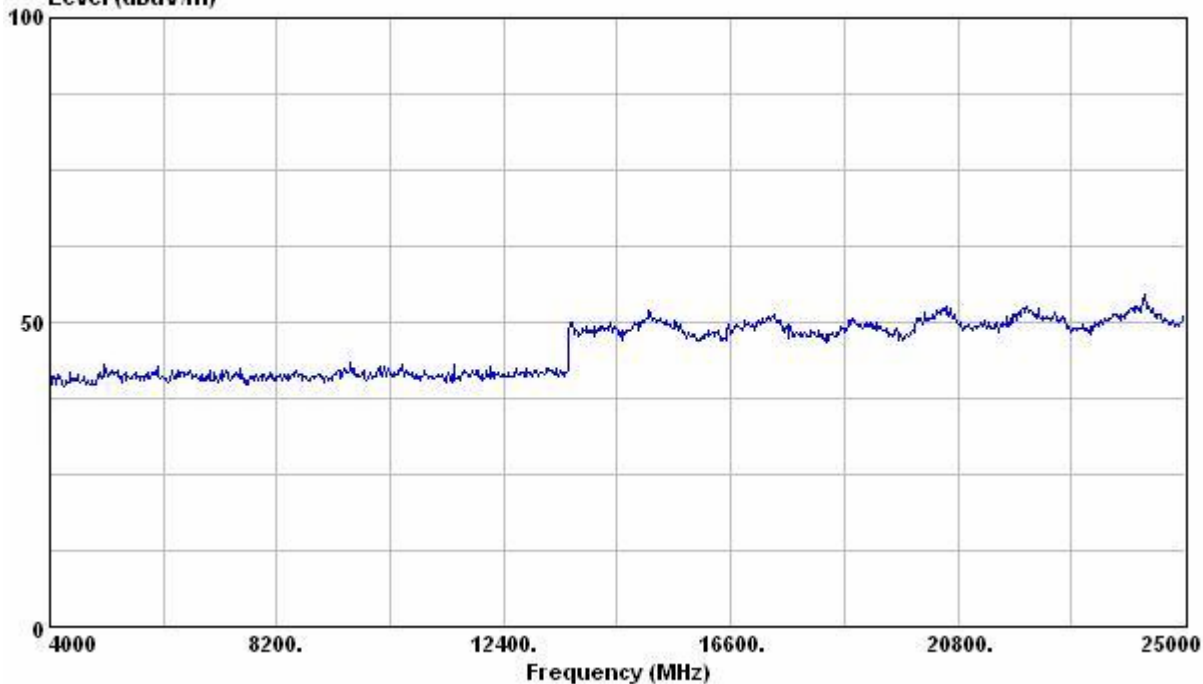
1GHz~4GHz

Level (dBuV/m)



4GHz~25GHz

Level (dBuV/m)



7 Dwell Time

Result: Pass

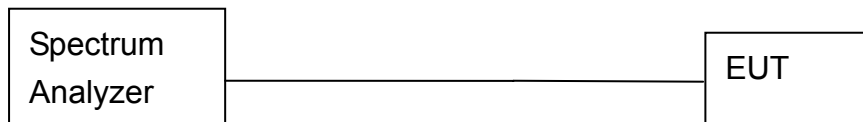
7.1 Applied standard

According to 15.247(a)(1)(iii), frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 non-overlapping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

7.2 Measurement Procedure

1. 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.
2. A software provided by client enabled the EUT to transmit data with the same packet type.
3. The transmitter output of EUT was connected to the spectrum analyzer through a probe and measure the single packet duration time.
4. Measure the hopping repetition rate by observe 10 seconds.
5. Change the transmitting packet type and repeat the step 3 ~ 4.
6. Calculate the dwell time and compare with the required limit.

7.3 Test configuration



7.4 Test Instruments

Test Site and Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Shielded Room	ETS.LINDGREN	TR4/ 15353-F	NCR
Spectrum Analyzer	Advantest	R3132/ 103082587	September 7,2006

Note:

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

Instrument Setting

RBW	VBW	Span	Detector	Comment
1MHz	1MHz	0Hz	Peak	

Climatic Condition

Ambient Temperature : 28°C ;

Relative Humidity : 64%

7.5 Test Data

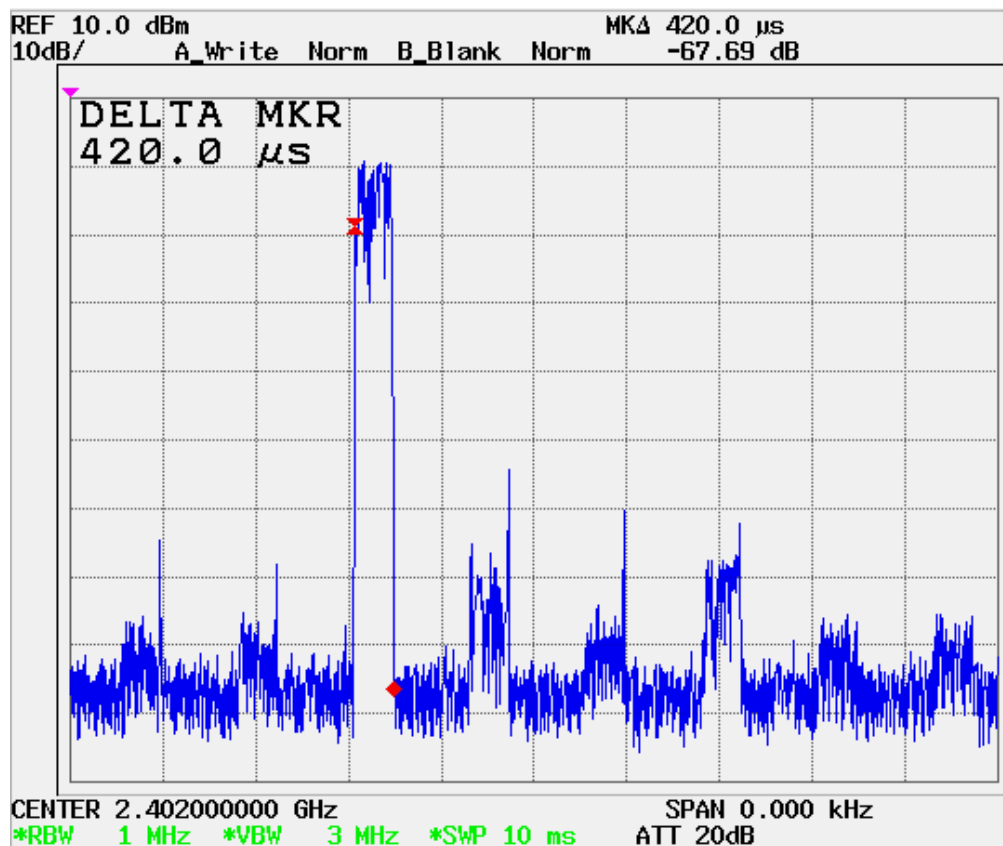
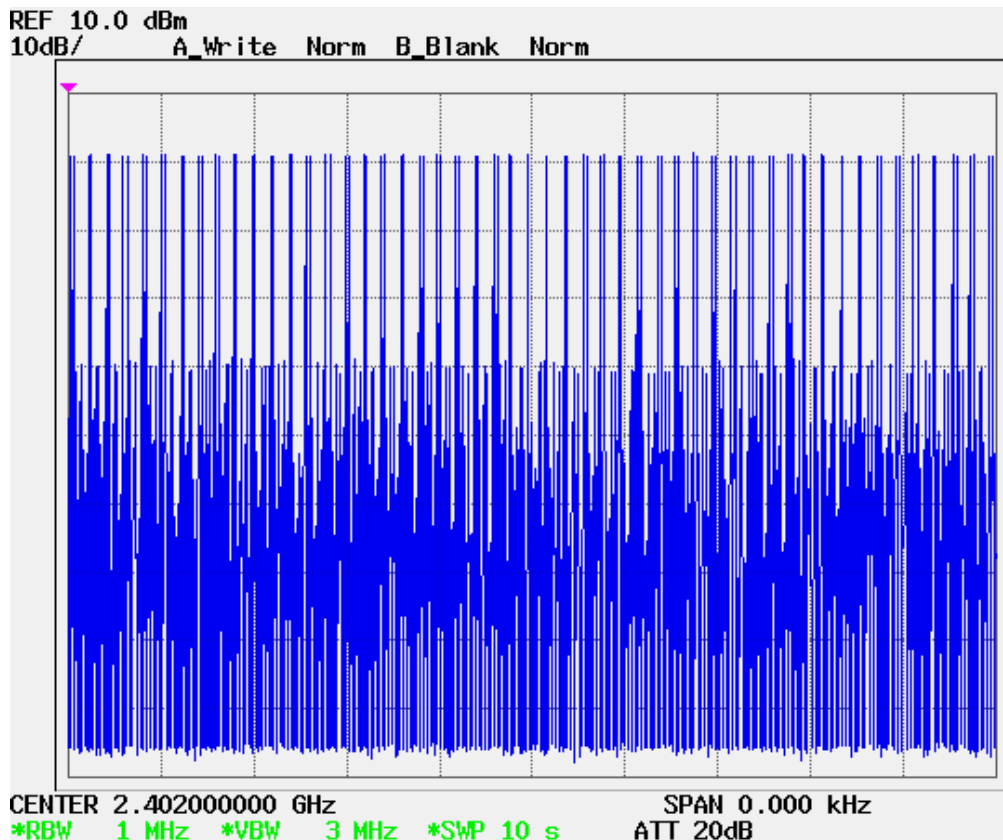
Tester : Bill

Operating Frequency (MHz)	Data Type	Single Packet Duration Time (ms)	Hopping Repetition Rate (1/s)	Dwell Time (ms)	Limit (ms)	Margin (ms)
2402	DH1	0.42	8.2	108.83	400	291.17
2402	DH3	1.67	4.7	248.02	400	151.98
2402	DH5	2.92	3.3	304.49	400	95.51

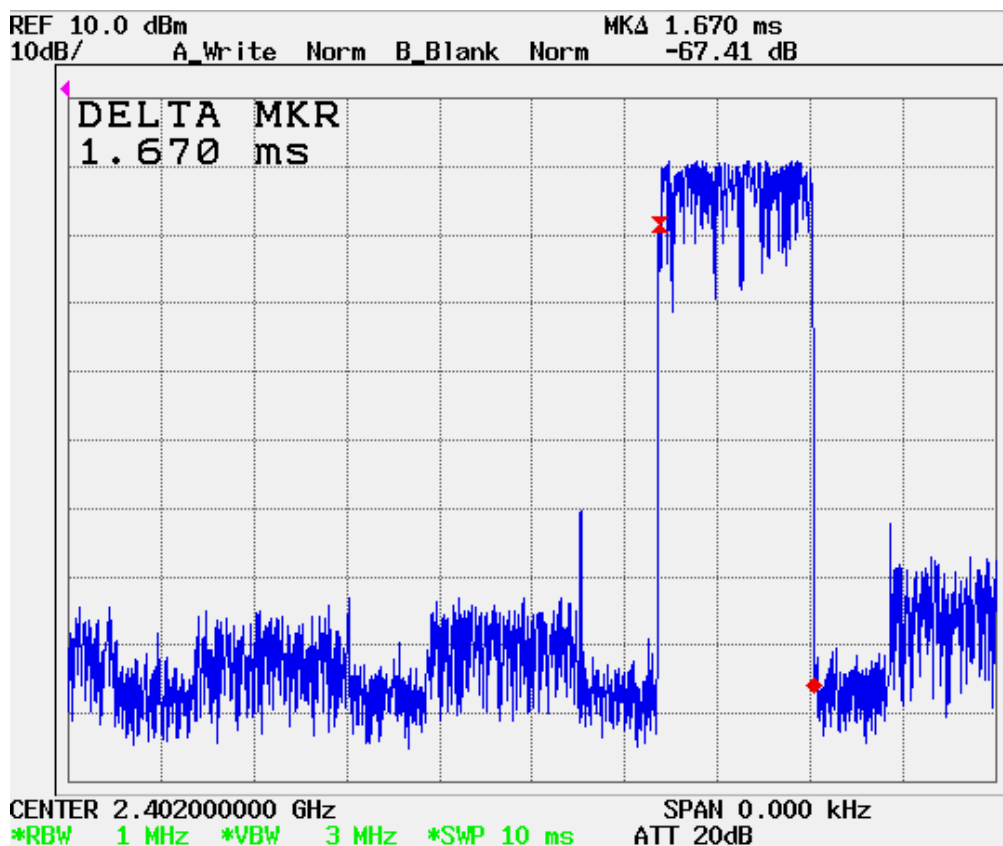
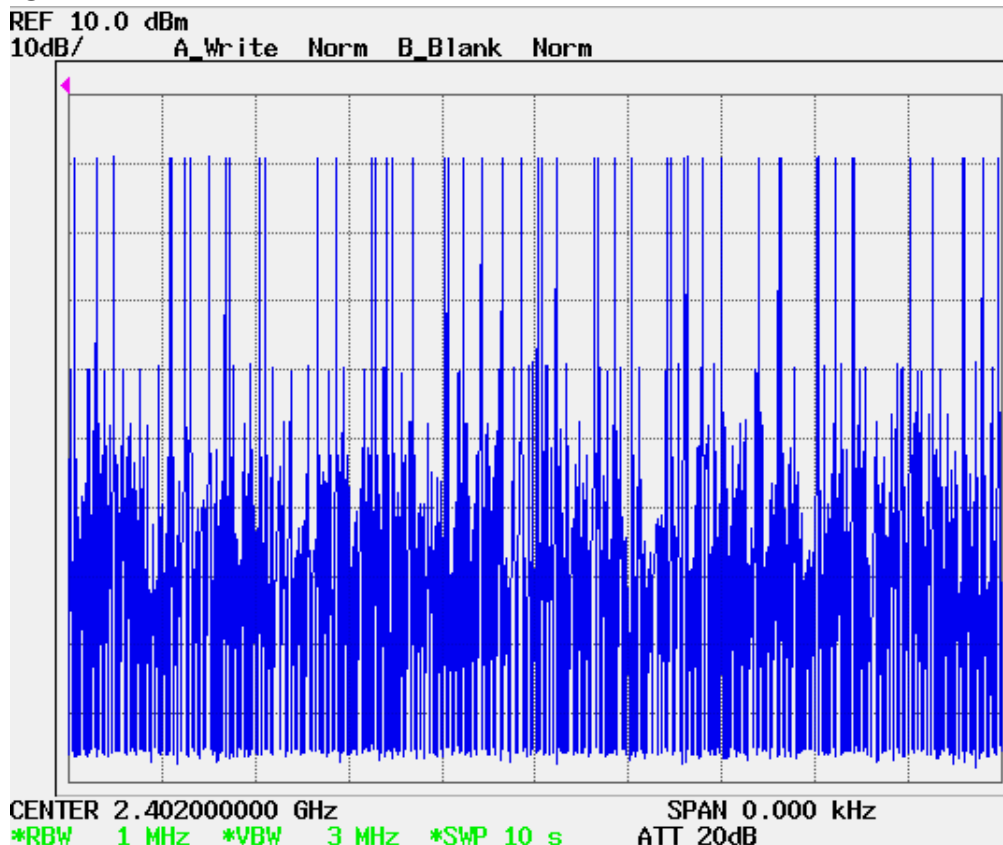
Note:

1. Hopping Cycle(second) = $79 \times 0.4 = 31.6$
2. Dwell Time (ms) = Single Packet Duration Time X Hopping repetition Rate X Hopping Cycle
3. Margin (ms) = Limit – Dwell Time

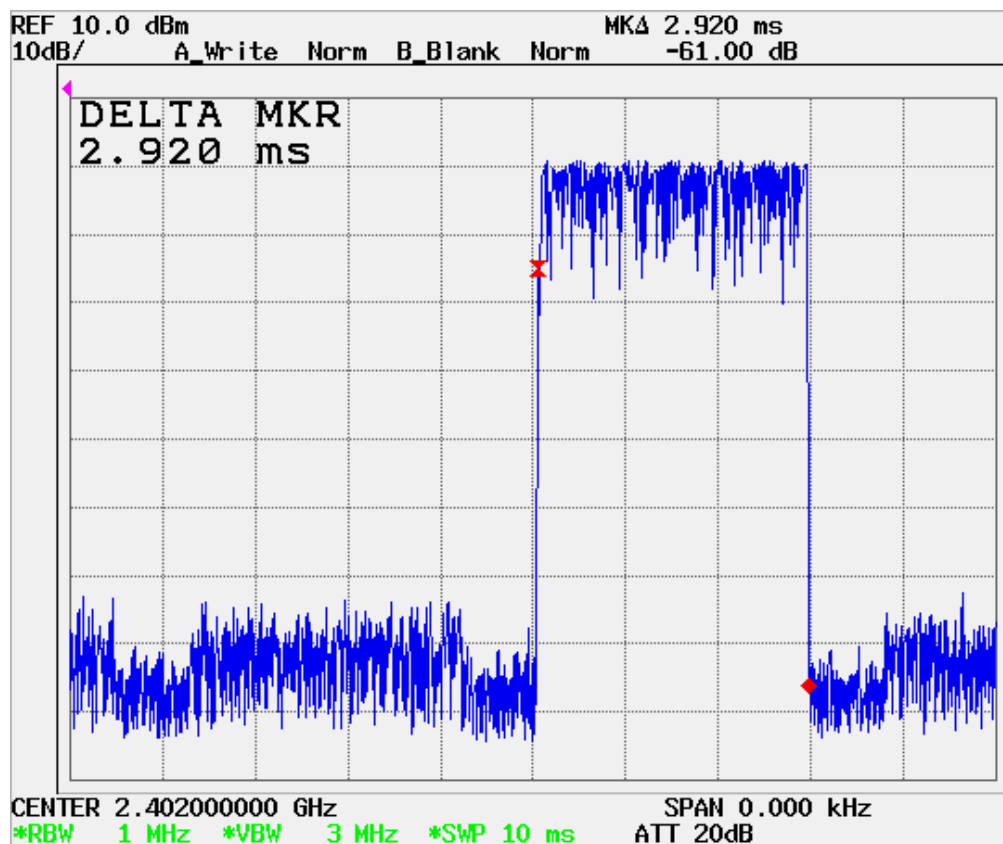
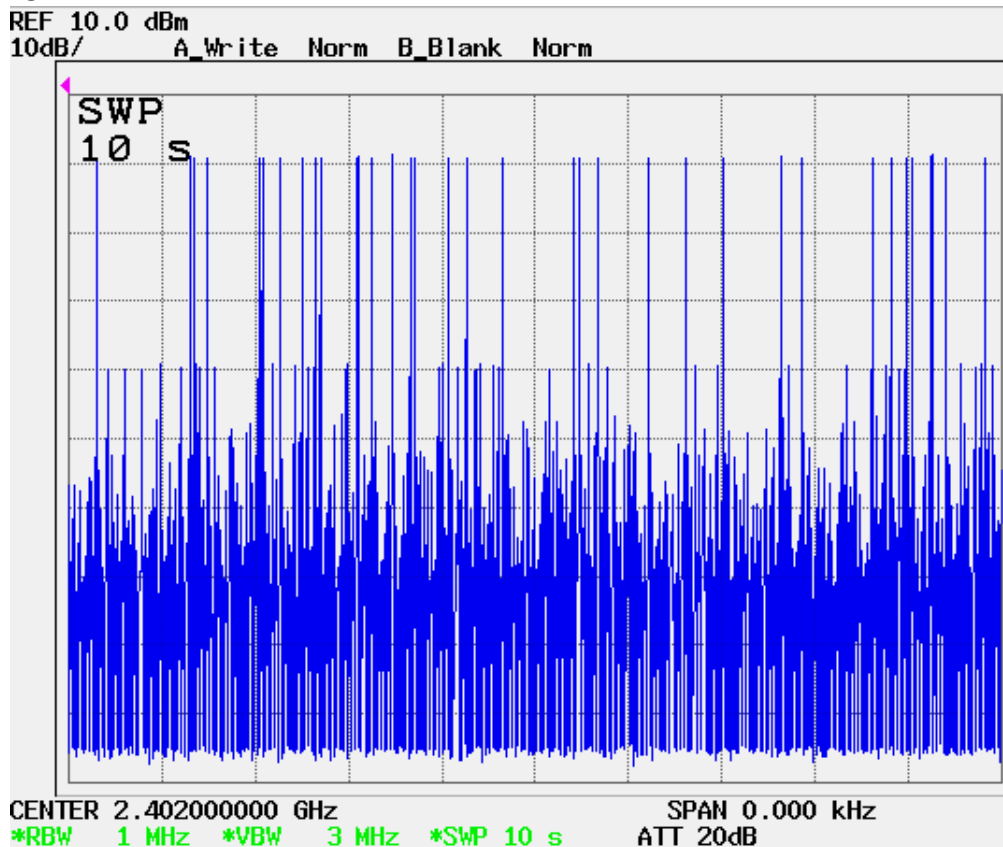
DH1



DH3



DH5



8 Conducted Emission Measurement

Result: Pass

8.1 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

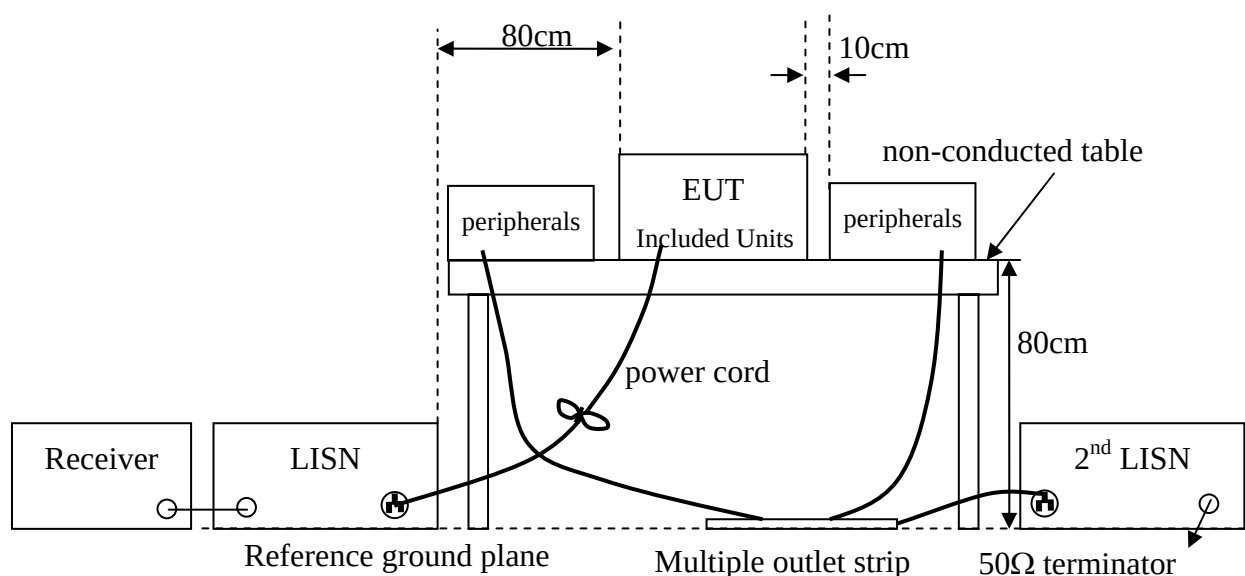
* Decreases with the logarithm of the frequency.

8.2 Measurement Procedure

1. 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.
2. If the EUT is tabletop equipment, it was placed on a wooden 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.
3. Connect the EUT's power source to the appropriate power mains through the LISN.
4. All the other peripherals are connected to the 2nd LISN, if any.
5. The LISN was placed 0.8 meters from the EUT and at least 0.8 meters from other units and other metal planes.
6. 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.
7. 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.

8. Then measure the maximum level of conducted disturbance for each frequency found from step 7. by using the receiver through the Quasi-Peak and Average detectors per CISPR 16-1.
9. Record the level for each frequency and compare with the required limit.

8.3 Test configuration



8.4 Test Instruments

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

Note:

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

Instrument Setting

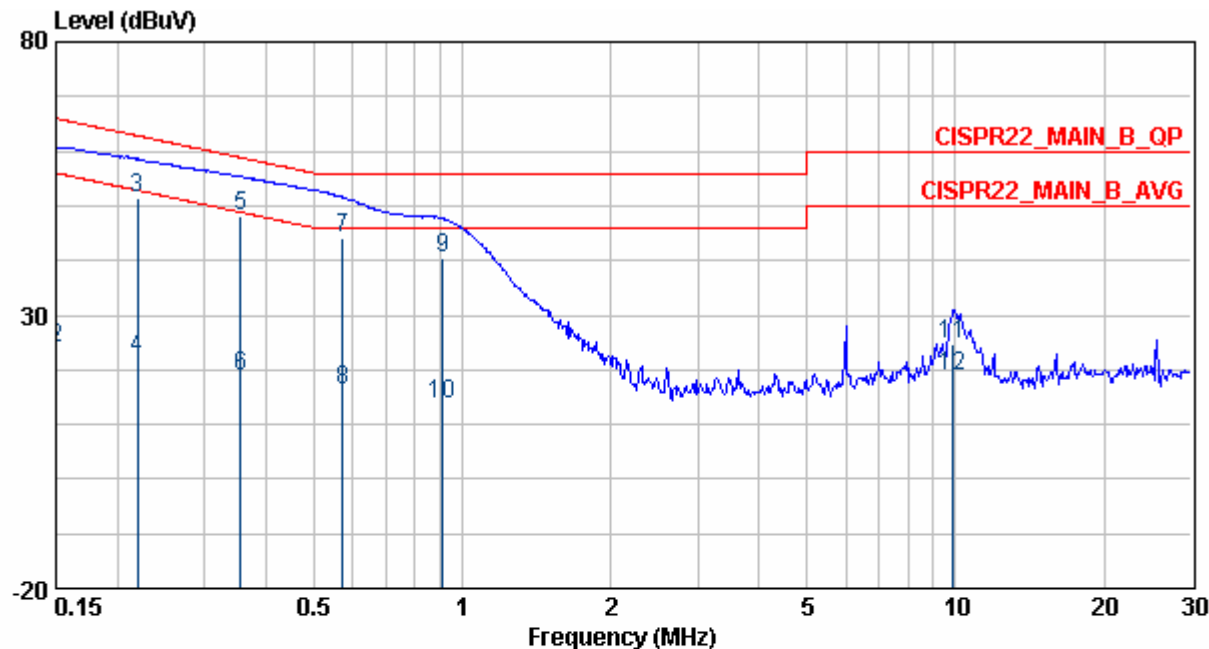
IF BW	Measurement Time	Detector	Trace	Comment
9kHz	1 second	Quasi-Peak / Average	Maxhold	

Climatic Condition

Ambient Temperature : 28°C ; Relative Humidity : 64%

8.5 Test Data

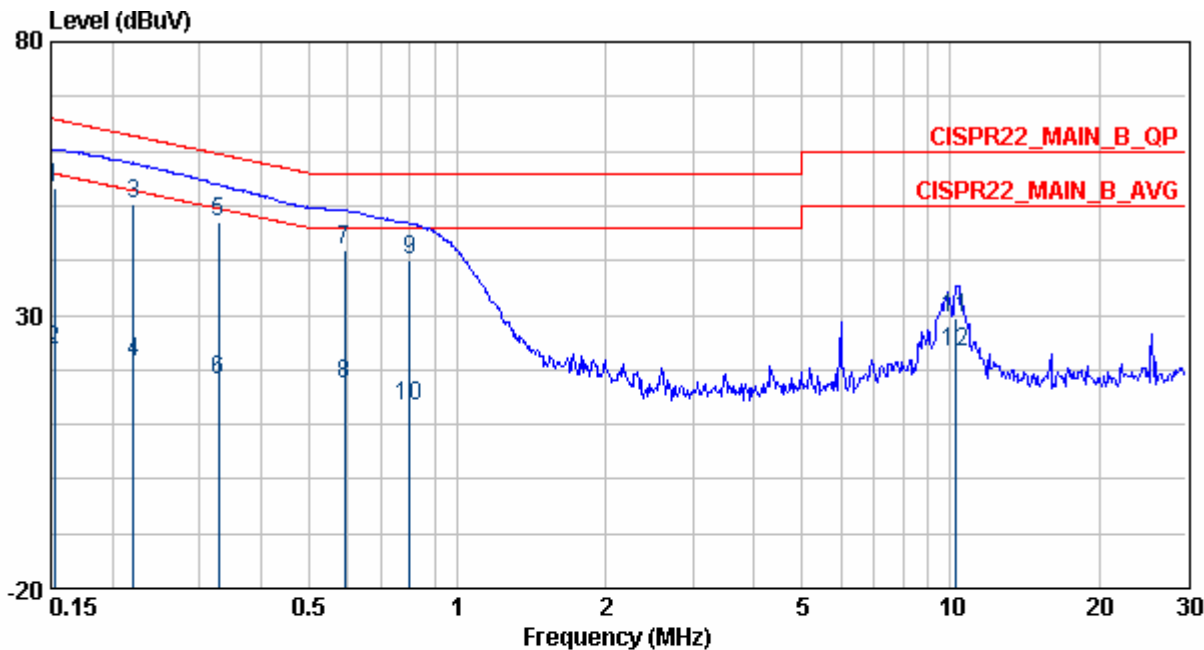
Test Mode : Continuous Transmitting, 2402MHz
Frequency Range : 150kHz~30MHz Phase : Line
Tester : 錯誤! 找不到參照來源。



	Freq	Level	Factor	Read Level	Limit Line	Over Limit	Ant Pos	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	cm		
1 @	0.15	53.51	0.16	53.35	66.00	-12.49	---	LINE	QP
2	0.15	23.97	0.16	23.81	56.00	-32.03	---	LINE	AVERAGE
3 @	0.22	51.49	0.21	51.28	62.83	-11.34	---	LINE	QP
4	0.22	22.05	0.21	21.84	52.83	-30.78	---	LINE	AVERAGE
5 @	0.36	48.29	0.16	48.13	58.83	-10.54	---	LINE	QP
6	0.36	18.91	0.16	18.75	48.83	-29.92	---	LINE	AVERAGE
7 @	0.57	44.02	0.18	43.84	56.00	-11.98	---	LINE	QP
8	0.57	16.31	0.18	16.13	46.00	-29.69	---	LINE	AVERAGE
9	0.91	40.51	0.25	40.26	56.00	-15.49	---	LINE	QP
10	0.91	13.61	0.25	13.36	46.00	-32.39	---	LINE	AVERAGE
11	9.91	24.69	0.54	24.15	60.00	-35.31	---	LINE	QP
12	9.91	18.72	0.54	18.18	50.00	-31.28	---	LINE	AVERAGE

- Note:
1. Emission Level = reading value + 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 : Continuous Transmitting, 2402MHz
Frequency Range : 150kHz~30MHz Phase : Neutral
Tester : 錯誤! 找不到參照來源。



	Freq	Level	Factor	Read Level	Limit Line	Over Limit	Ant Pos	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	cm		
1 @	0.15	53.11	0.11	53.00	65.87	-12.75	---	NEUTRAL	QP
2	0.15	23.51	0.11	23.40	55.87	-32.35	---	NEUTRAL	AVERAGE
3 @	0.22	50.48	0.12	50.36	62.79	-12.30	---	NEUTRAL	QP
4	0.22	21.29	0.12	21.17	52.79	-31.49	---	NEUTRAL	AVERAGE
5 @	0.33	46.85	0.13	46.72	59.49	-12.63	---	NEUTRAL	QP
6	0.33	18.19	0.13	18.06	49.49	-31.29	---	NEUTRAL	AVERAGE
7	0.59	42.05	0.18	41.87	56.00	-13.95	---	NEUTRAL	QP
8	0.59	17.54	0.18	17.36	46.00	-28.46	---	NEUTRAL	AVERAGE
9	0.80	40.05	0.23	39.82	56.00	-15.95	---	NEUTRAL	QP
10	0.80	13.35	0.23	13.12	46.00	-32.65	---	NEUTRAL	AVERAGE
11	10.29	29.30	0.66	28.64	60.00	-30.70	---	NEUTRAL	QP
12	10.29	23.21	0.66	22.55	50.00	-26.79	---	NEUTRAL	AVERAGE

- Note:
1. Emission Level = reading value + 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.

9 Antenna Requirement

9.1 Applied standard

According to 15.247(4), The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi

9.2 Antenna Information

This antenna's relative information as follow:

Brand	Model	Frequency Range (MHz)	Gain (dBi)	Comment
M.gear	C815-510005-A	2400 ~ 2483.5	1.8	

Antenna Position:





9.3 Result

Gain of the antenn is less than 6dBi.