

FCC Test Report

E.U.T. : Child Locator
Trade Name : Mommy I'm Here
Model : CL-103
FCC ID : SQR-CL103
Report No. : RF-A42-0411-254
Date of Report : December 6, 2004

Prepared for

Mommy I'm Here Inc.

4428 Technology Drive, Fremont, CA, 94538, USA

Prepared by



Central Research Technology Co.
EMC Test Laboratory

No.11, Lane41, Fushuen St., Jungshan Chiu, Taipei, Taiwan, 104, R.O.C.



NVLAP LAB CODE 200575-0



0905
ILAC MRA

This report shall not be reproduced, except in full, without the written approval of Central Research Technology Co.. It may be duplicated completely in its entirety for legal use with the permission of the applicant. It should not be used to claim product endorsement by CNLA, NVLAP or any U.S. government agency. The test result in the report applies only to the sample tested.

Total : 27 Pages

Certification of Compliance

E.U.T. : Child Locator
Trade Name : Mommy I'm Here
Model : CL-103
FCC ID : SQR-CL103
Manufacturer : Wellmike Enterprise Co., Ltd.
Applicant : Mommy I'm Here Inc.
Address : 4428 Technology Drive, Fremont, CA, 94538, USA
Arrival of Sample(s) : December 1, 2004
Date of Test : December 3, 2004
Applicable Standards : 47 CFR part 15, Subpart C
Deviation : None
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	:	<u>Cathy Chen</u> (Cathy Chen/RF Engineer)	DATE :	<u>Dec. 6, 2004</u>
CHECKED BY	:	<u>Sam Chien</u> (Sam Chien/Technical Manager)	DATE :	<u>Dec. 6, 2004</u>
APPROVED BY	:	<u>T. Y. Shih</u> (Tsun-Yu Shih/Laboratory Head)	DATE :	<u>Dec. 6, 2004</u>

Contents

1	General Description.....	4
1.1	GENERAL DESCRIPTION OF EUT.....	4
1.2	CHARACTERISTIC OF E.U.T.....	4
1.3	TEST METHODOLOGY	4
1.4	REQUIREMENT FOR COMPLIANCE.....	5
1.5	LAYOUT OF SETUP	7
1.6	TEST FACILITY	8
1.7	MEASUREMENT UNCERTAINTY	8
2	Dwell Time	9
2.1	APPLIED STANDARD	9
2.2	MEASUREMENT PROCEDURE	9
2.3	TEST CONFIGURATION	10
2.4	TEST INSTRUMENTS.....	10
2.5	TEST DATA	11
3	Radiated Emission.....	12
3.1	APPLIED STANDARD	12
3.2	MEASUREMENT PROCEDURE	13
3.3	TEST CONFIGURATION	14
3.4	TEST INSTRUMENTS.....	15
3.5	TEST DATA	16
4	Bandwidth	26
4.1	APPLIED STANDARD	26
4.2	MEASUREMENT PROCEDURE	26
4.3	TEST CONFIGURATION	26
4.4	TEST INSTRUMENTS.....	26
4.5	TEST DATA	27

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 EUT

E.U.T.	: Child Locator
Model No.	: CL-103
FCC ID	: SQR-CL103
Brand	: Mommy I'm Here
Power in	: DC 1.5V (Battery)
Test Voltage	: DC 1.5V (Battery)
Applicant	: Mommy I'm Here Inc.
Manufacturer	: Wellmike Enterprise Co., Ltd.

1.2 Characteristic of E.U.T.

Frequency Range : 433.87MHz

Function Modulation: ASK

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

1.3 Test Methodology

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

Since the EUT is considered a potable unit, it was pre-tested on the positioned of each 3 axis. There for only the test data of the worse case was used for Radiated test.

1.4 Requirement for Compliance

(1) Radiated Emission Requirement

For intentional device, according to §15.209, the general requirement of the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table.

Table 3 Limit			
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.

(2) Dwell Time

According to 15.231(a)(1), A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

(3) Field Strength of Emissions

According to 15.231(b), In addition to the provisions of Section 15.205, the field strength of emissions from intentional radiators operated under this Section shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundament (uV/m)	Field Strength of Spurious Emission (uV/m)
40.66 - 40.70	2250	225
70 – 130	1250	125
130 – 174	1250 to 3750**	125 to 375**
174 – 260	3750	375
260 – 470	3750 to 12500**	375 to 1250**
Above 470	12500	1250

** linear interpolations

(4) Emission Bandwidth

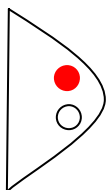
According to 15.231(c), The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

(5) Restricted Band

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (MHz)
0.090 - 0.110	37.475 - 38.275	1435.0 - 1626.5	8025.0 - 8500.0
¹ 0.490 - 0.510	73.500 - 75.400	1660.0 - 1755.0	9000.0 - 9200.0
2.172 - 2.198	108.00 - 138.00	1805.0 - 1850.0	9300.0 - 9500.0
3.013 - 3.033	149.90 - 150.05	2200.0 - 2300.0	10600 - 12700
4.115 - 4.198	156.70 - 156.90	2310.0 - 2390.0	13250 - 13400
5.670 - 5.690	162.01 - 167.17	2483.5 - 2500.0	14470 - 14500
6.200 - 6.300	167.72 - 173.20	2655.0 - 2900.0	15350 - 16200
8.230 - 8.400	240.00 - 285.00	3260.0 - 3267.0	17700 - 21400
12.265 - 12.600	322.00 - 335.40	3332.0 - 3339.0	22010 - 23120
13.340 - 13.430	399.90 - 410.00	3345.8 - 3358.0	23600 - 24000
14.965 - 15.020	608.00 - 614.00	3500.0 - 4400.0	31200 - 31800
16.700 - 16.755	825.00 - 915.00	4500.0 - 5250.0	36430 - 36500
19.965 - 20.020	935.00 - 1240.0	5350.0 - 5460.0	38600 以上
25.500 - 25.700	1300.0 - 1427.0	7250.0 - 7750.0	

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

1.5 Layout of Setup



(Transmitter)

Connecting Cables :

No.	Cable	Length	Shielded	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.

For radiated emission, measurement of radiated emission from digital circuit is performed with normal transmitting.

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.

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
Dwell Time	2%
Radiated Emission: (below 1GHz)	Horizontal 4.56dB ; Vertical 4.56dB
Radiated Emission: (above 1GHz)	Horizontal 4.05 dB ; Vertical 4.08 dB
Bandwidth	4.56 Hz

2 Dwell Time

Result: Pass

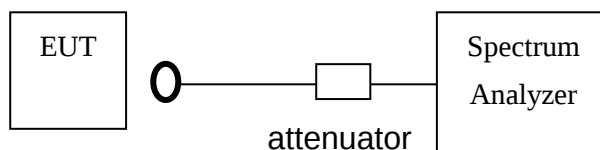
2.1 Applied standard

According to 15.231(a), A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

2.2 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. The Transmitter output of EUT was connected to the spectrum analyzer through an attenuator.
- c. Set the the spectrum analyzer into zero span and performs the dwell time bandwidth measurement.
- d. Record the dwell time and compare with the required limit.

2.3 Test configuration



2.4 Test Instruments

Test Site and Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Shielded Room	ETS.LINDGREN	TR4/15353-F	NCR
Spectrum Analyzer	R&S	FSP40/100031	2004/6/8
Attenuator	HP	8495B/ 2814A13358	2003/12/29

Note:

1. The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC.
2. NCR:No Calibration Required.

Instrument Setting

RBW	VBW	Detector	Trace	Comment
100KHz	300KHz	Peak	Maxhold	

Climatic Condition

Ambient Temperature : 24°C;

Relative Humidity : 55%

Test Site : TR4

Tester : Bill



3 Radiated Emission

Result: Pass

3.1 Applied standard

According to 15.231(b), In addition to the provisions of Section 15.205, the field strength of emissions from intentional radiators operated under this Section shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundament (uV/m)	Field Strength of Spurious Emission (uV/m)
40.66 - 40.70	2250	225
70 – 130	1250	125
130 – 174	1250 to 3750**	125 to 375**
174 – 260	3750	375
260 – 470	3750 to 12500**	375 to 1250**
Above 470	12500	1250

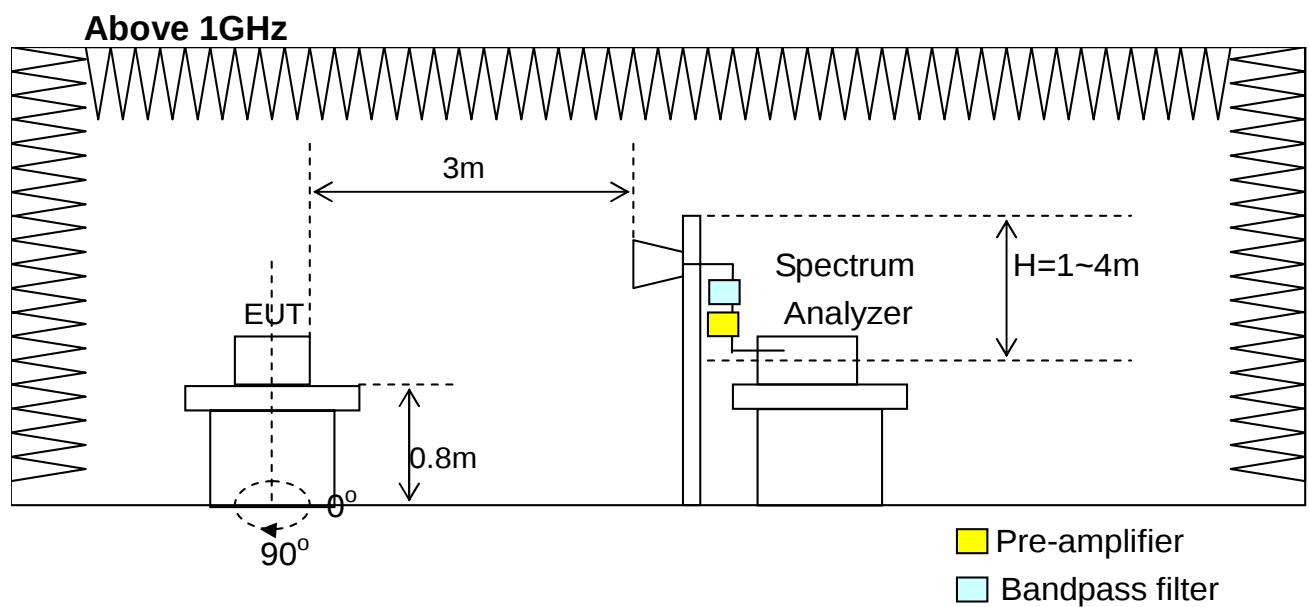
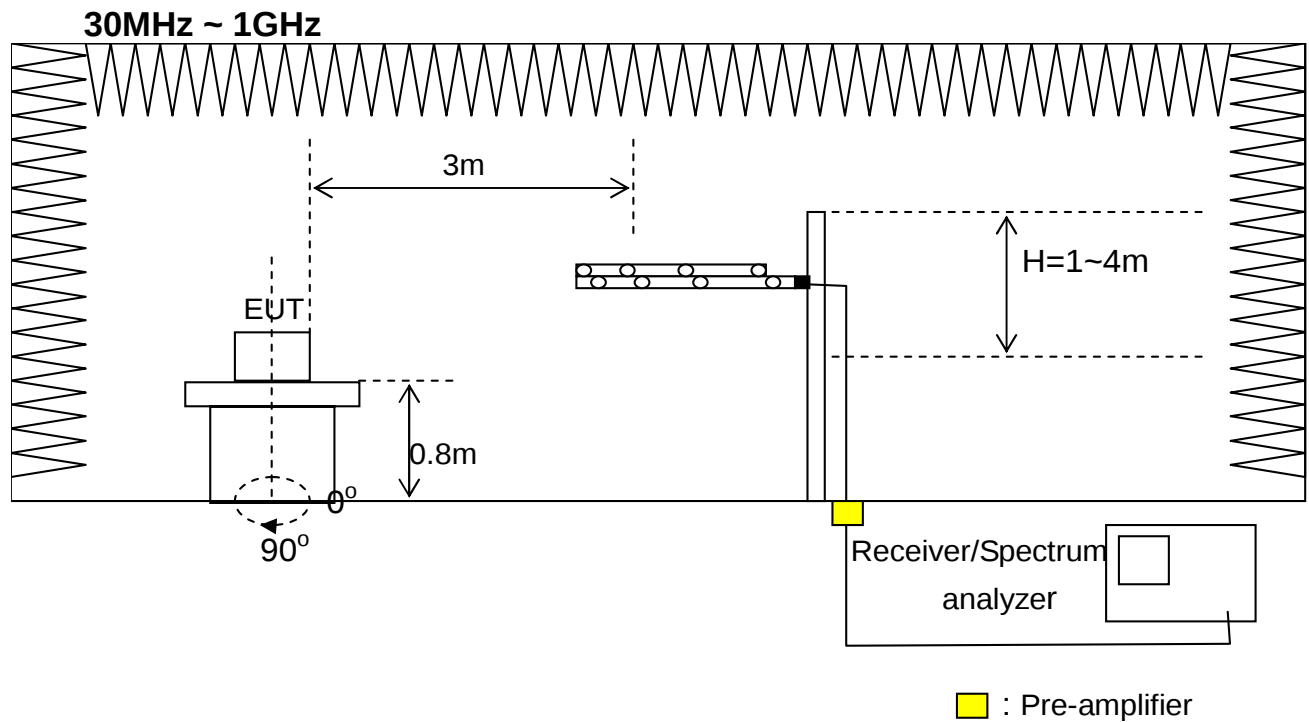
** linear interpolations

Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in Section 15.209, whichever limit permits a higher field strength.

3.2 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 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 0.1 meters above the reference ground plane in the semi-anechoic chamber.
- c. The EUT was set 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.

3.3 Test configuration



3.4 Test Instruments

Test Site and Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Semi-anechoic Chamber	ETS.LINDGREN	TR1/17627-B	2004//11
Test Receiver	R&S	ESCS30/ 836858/020	2004/7/21
Spectrum Analyzer	R&S	FSP40/100031	2004/6/8
Antenna	R&S	HL562/ 360543/006	2003/12/8
Antenna	R&S	HF906/ 359287/001	2004/4/26
Pre-amplifier	MITEQ	JS4-00101800-28-5A/ 742229	2004/3/14
Pre-amplifier	Mini Circuit	ZKL-2/ 001	2004/4/17
Bandpass Filter	MCI	H04G13G1/2467-01	2004/3/1

Note :

1. The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC.
2. NCR:No Calibration Required

Instrument Setting

RBW	VBW	Detector	Trace	Comment
100KHz	N/A	Peak/Average	Maxhold	Field Strength of Fundament
120kHz	N/A	Quasi-Peak	Maxhold	Below 1GHz
1MHz	1MHz	Peak	Maxhold	Above 1GHz Peak

Climatic Condition

Ambient Temperature : 24°C;

Relative Humidity : 55%

3.5 Test Data

Field Strength of Fundament

Test Distance : 3m
Worse Case Mode : Z-axis

Tester : Hata

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
433.87	V	72.35	68.34	-12.13	60.22	56.21	100.79	80.79	40.57	24.58
433.87	H	63.61	59.60	-12.13	51.48	47.47	100.79	80.79	49.31	33.32

Note :

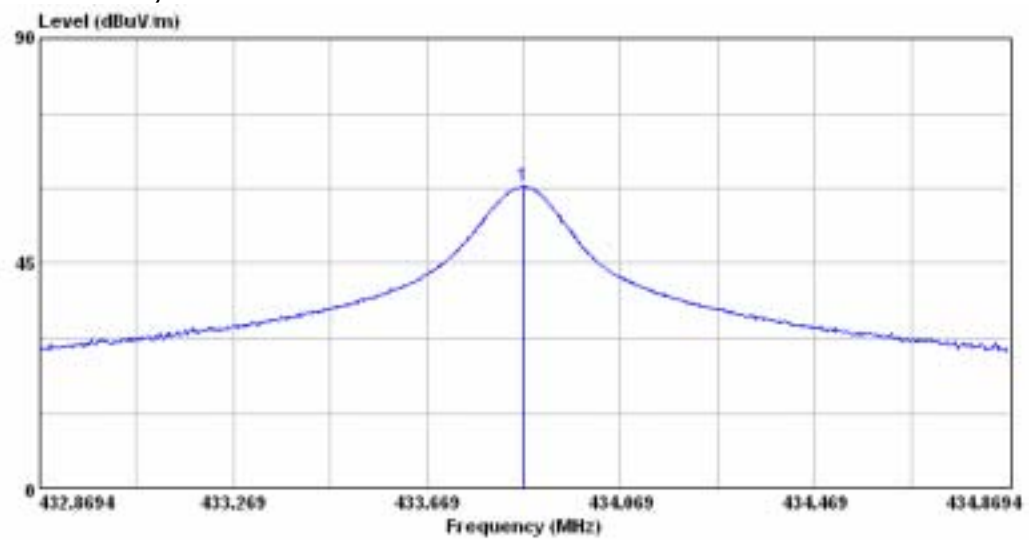
1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier
2. Output Field Strength (dBuV/m) = Reading Data + Correction Factor
3. Margin (dB) = Limit – Output Field Strength
4. The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle)

Where the duty factor is calculated from following formula:

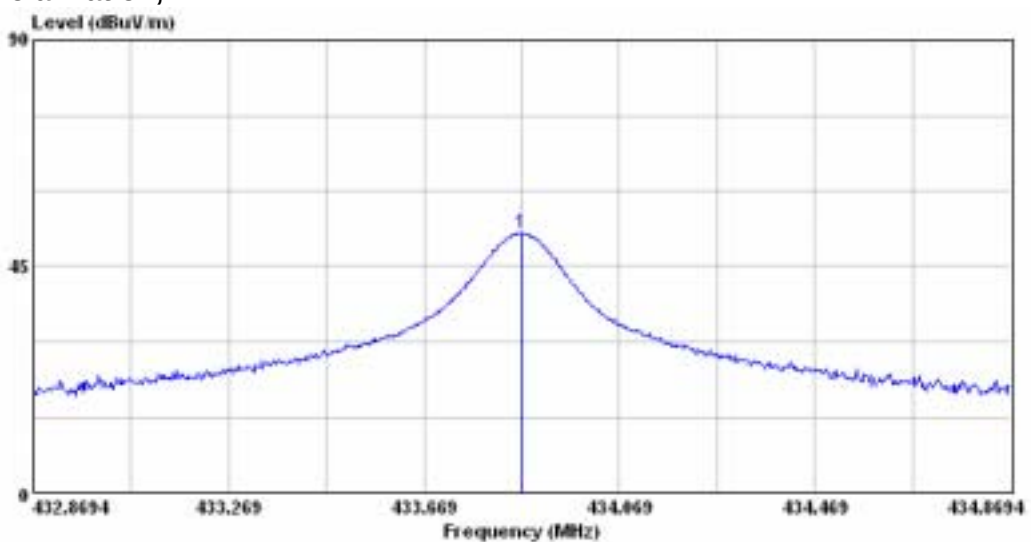
$$20\log(\text{Duty cycle}) = 20\log \frac{2.4 \times 1 + 1.6 \times 5 + 0.8 \times 7}{25.4} = -4.01\text{dB}$$

please see page 18 for plotted duty cycle.

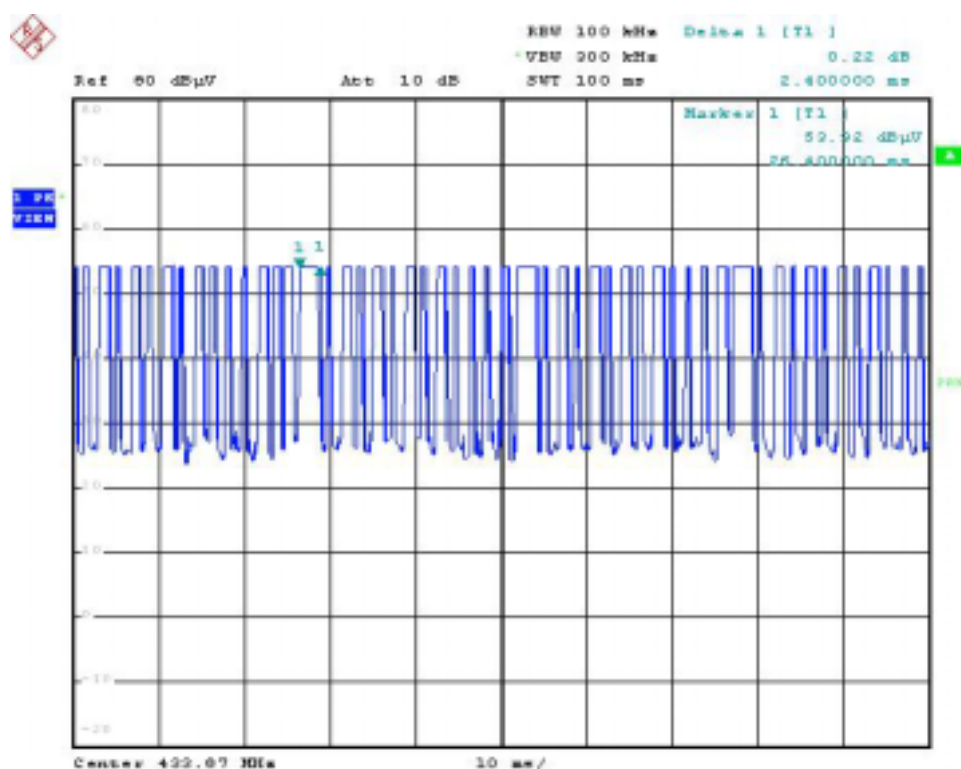
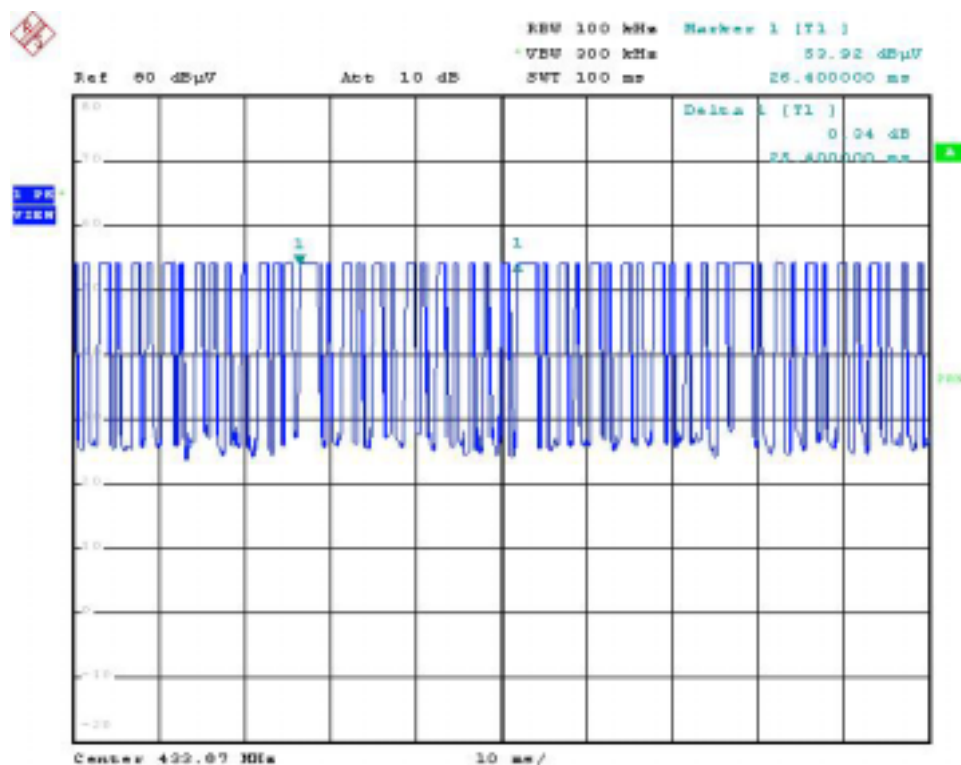
V Polarization, PK

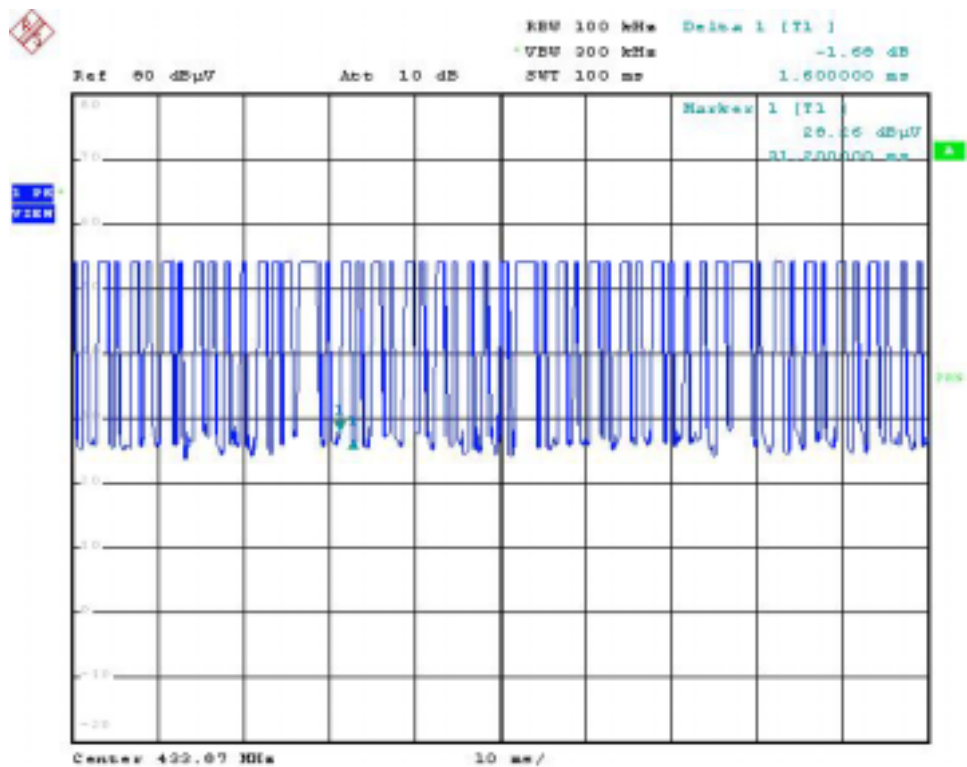
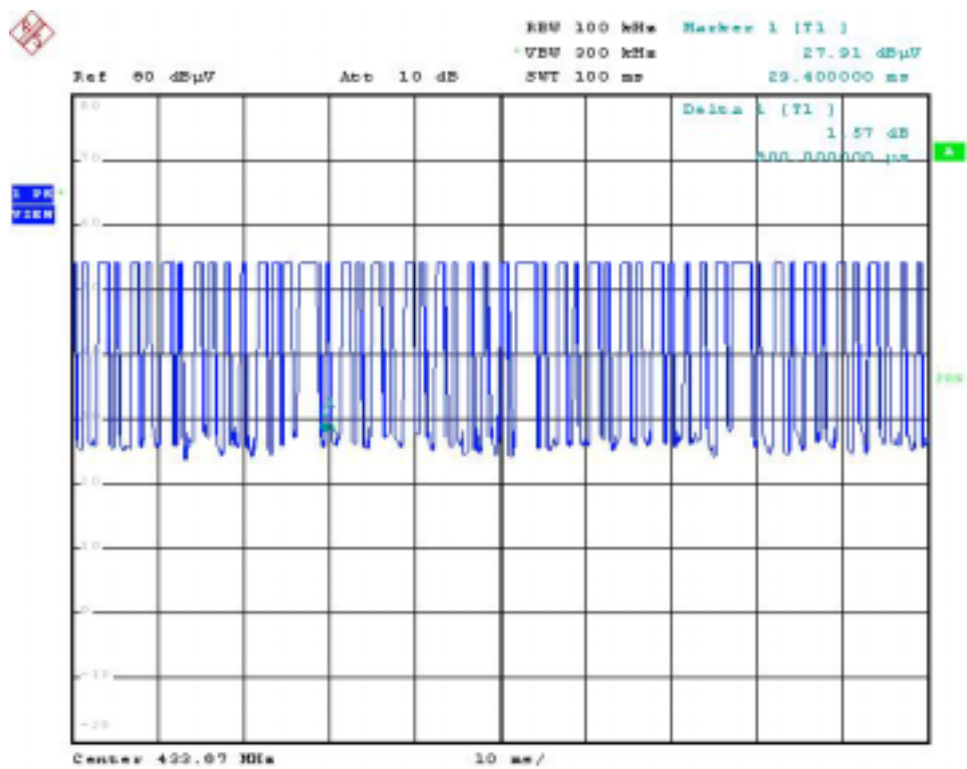


H Polarization, PK



Duty cycle





Field Strength of Spurious Emission

Below 1GHz

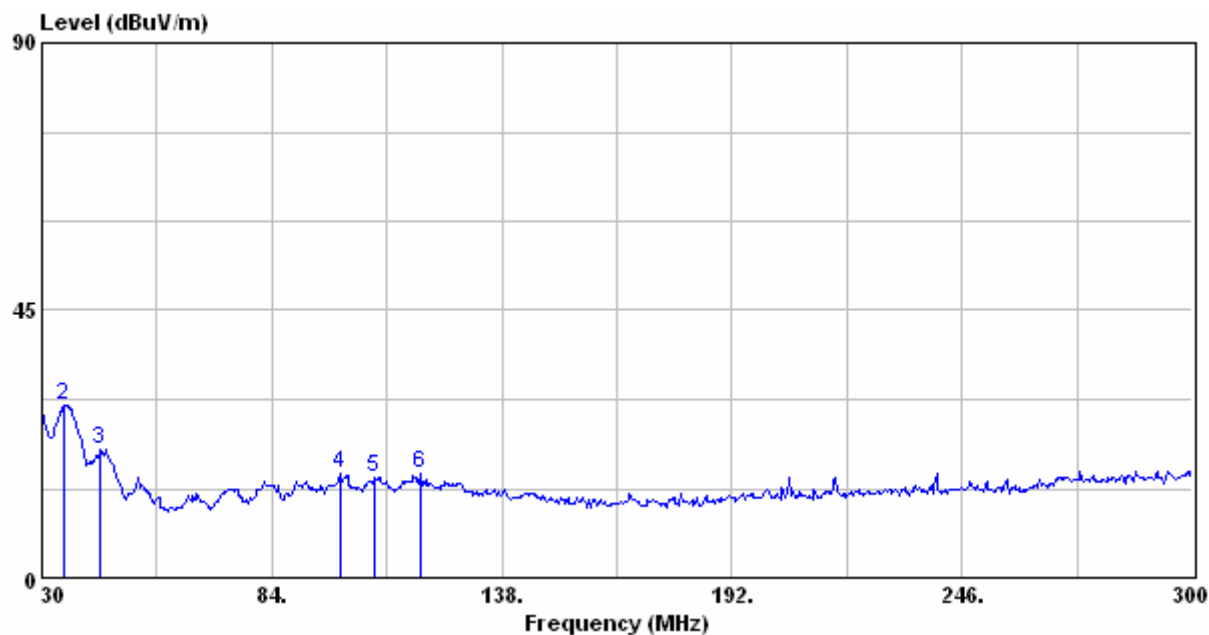
Test Distance : 3m
Polarization : Vertical
Worse Case Mode : Z- axis

Tester : Hata
Frequency Range : 30MHz~300MHz

	Freq. (MHz)	Reading Data (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	30.00	38.79	-10.65	28.14	40.00	11.86
2	35.13	39.81	-10.67	29.14	40.00	10.86
3	43.77	38.32	-16.76	21.56	40.00	18.44
4	99.93	36.39	-18.81	17.58	43.50	25.92
5	108.30	35.41	-18.41	17.00	43.50	26.5
6	119.10	35.37	-18.01	17.36	43.50	26.14

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.



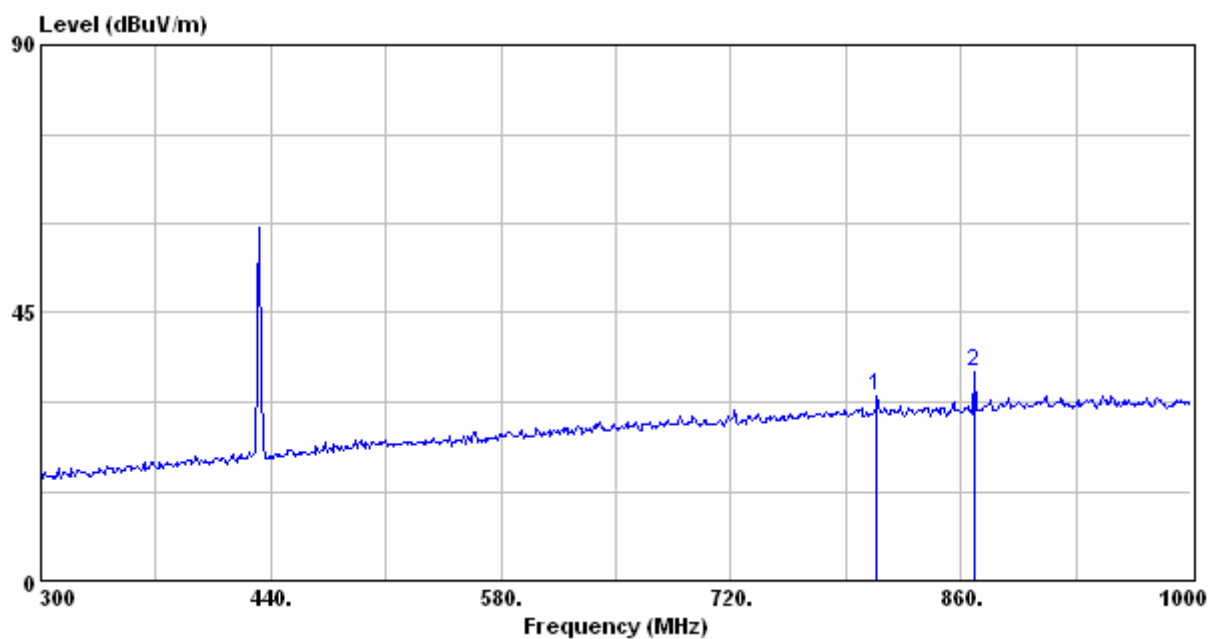
Test Distance : 3m
Polarization : Vertical
Worse Case Mode : Z- axis

Tester : Hata
Frequency Range : 300MHz~1GHz

	Freq. (MHz)	Reading Data (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	808.9	35.68	-4.79	30.89	46.00	15.11
2	867.7	39.08	-4.10	34.98	46.00	11.02

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



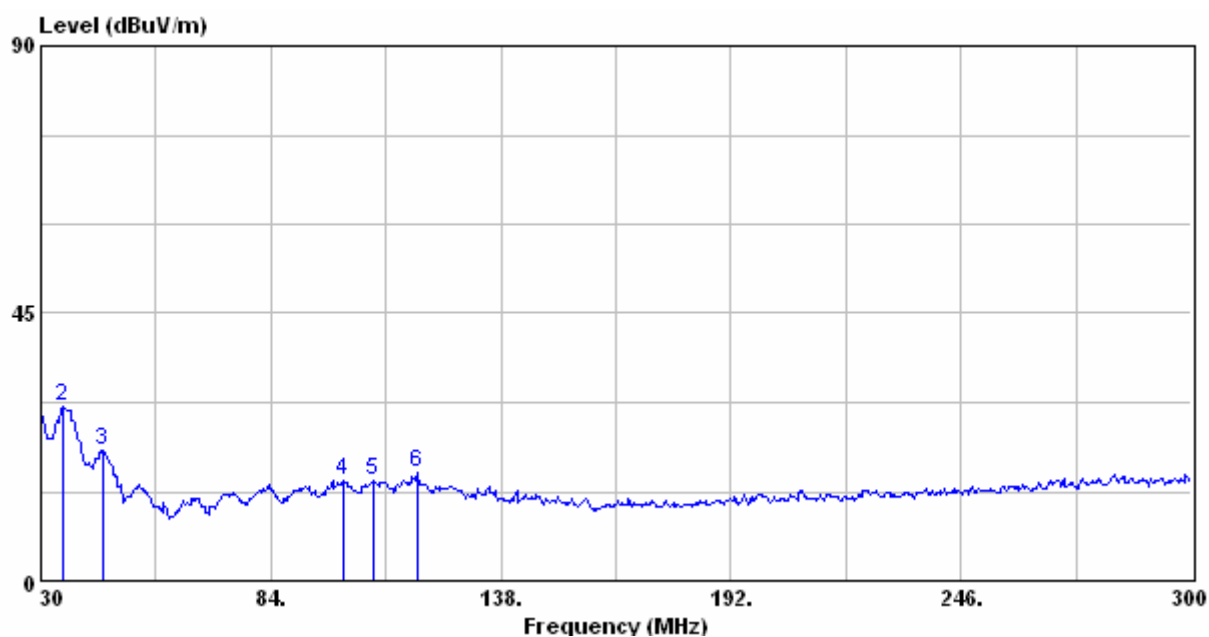
Test Distance : 3m
Polarization : Horizontal
Worse Case Mode : Z- axis

Tester : Hata
Frequency Range : 30MHz~300MHz

	Freq. (MHz)	Reading Data (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	30.00	39.08	-10.65	28.43	40.00	11.57
2	35.13	39.89	-10.67	29.22	40.00	10.78
3	44.58	39.16	-17.28	21.88	40.00	18.12
4	101.01	35.50	-18.76	16.74	43.50	26.76
5	108.30	35.38	-18.41	16.97	43.50	26.53
6	118.29	36.20	-18.04	18.16	43.50	25.34

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



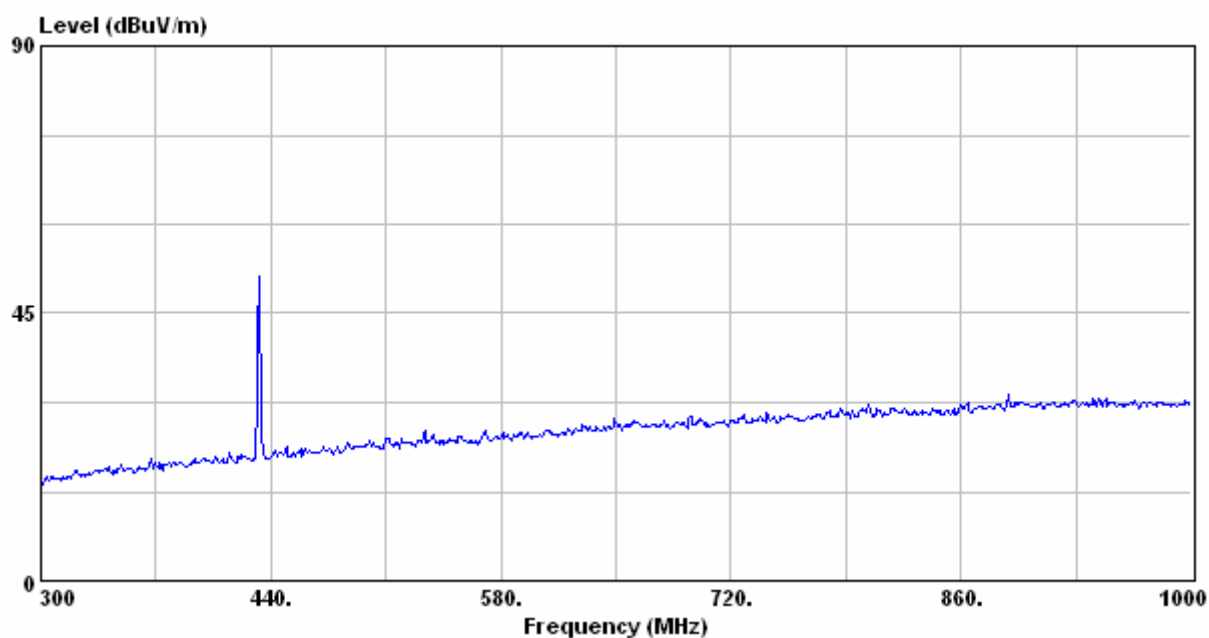
Test Distance : 3m
Polarization : Horizontal
Worse Case Mode : Z-axis

Tester : Hata
Frequency Range : 300MHz~1GHz

	Freq. (MHz)	Reading Data (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	*	*	*	*	*	*

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



Above 1GHz

Test Distance : 3m
Polarization : Vertical
Worse Case Mode : Z-axis

Tester : Hata
Frequency Range : 1GHz ~ 4.5GHz

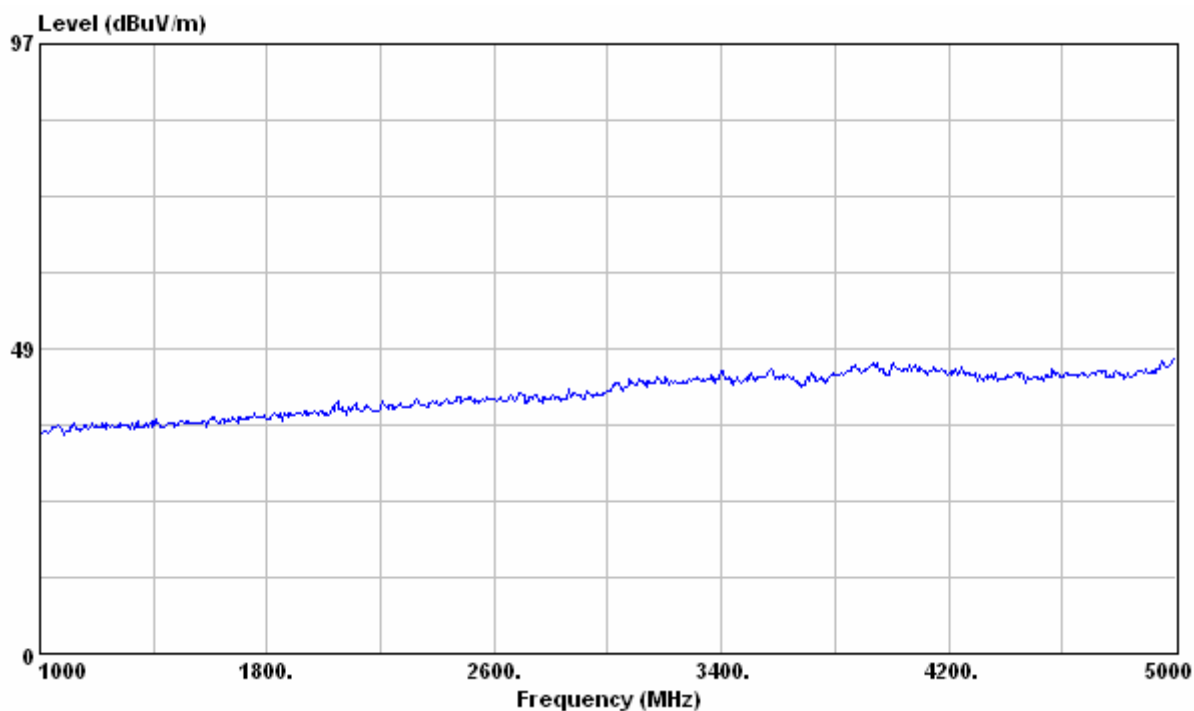
Frequency (MHz)	Reading Data (dBuV)		Correction Factor (dB/m)	Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
*	*	*	*	*	*	74.00	54.00	*	*

Note:

1. Emission Level (dBuV/m) = Reading Data + Correction Factor.
2. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier.
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.
6. The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle)
Where the duty factor is calculated from following formula:

$$20\log(\text{Duty cycle}) = 20\log \frac{2.4 \times 1 + 1.6 \times 5 + 0.8 \times 7}{25.4} = -4.01\text{dB}$$

please see page 18 for plotted duty cycle.



Test Distance : 3m
Polarization : Horizontal
Worse Case Mode : Z-axis

Tester : Hata
Frequency Range : 1GHz ~ 4.5GHz

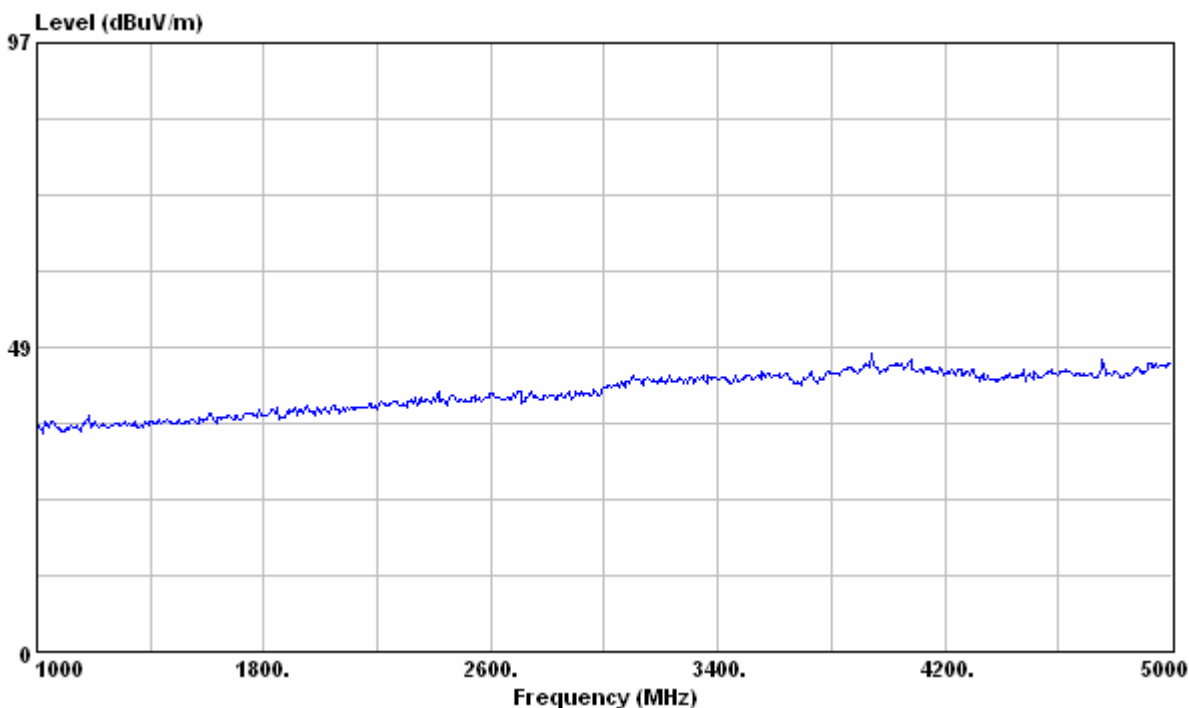
Frequency (MHz)	Reading Data (dBuV)		Correction Factor (dB/m)	Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
*	*	*	*	*	*	74.00	54.00	*	*

Note:

1. Emission Level (dBuV/m) = Reading Data + Correction Factor.
2. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier.
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.
6. The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle)
Where the duty factor is calculated from following formula:

$$20\log(\text{Duty cycle}) = 20\log \frac{2.4 \times 1 + 1.6 \times 5 + 0.8 \times 7}{25.4} = -4.01\text{dB}$$

please see page 18 for plotted duty cycle.



4 Bandwidth

Result: Pass

4.1 Applied standard

According to 15.231(c), The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

4.2 Measurement Procedure

- 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.
- The Transmitter output of EUT was connected to the spectrum analyzer through an attenuator.
- Measure the 20dB bandwidth and compare with the required limit.

4.3 Test configuration

As stated in the section 2.3

4.4 Test Instruments

As stated in the section 2.4

Instrument Setting

RBW	VBW	Detector	Trace	Comment
30Hz	100Hz	Peak	Maxhold	

Climatic Condition

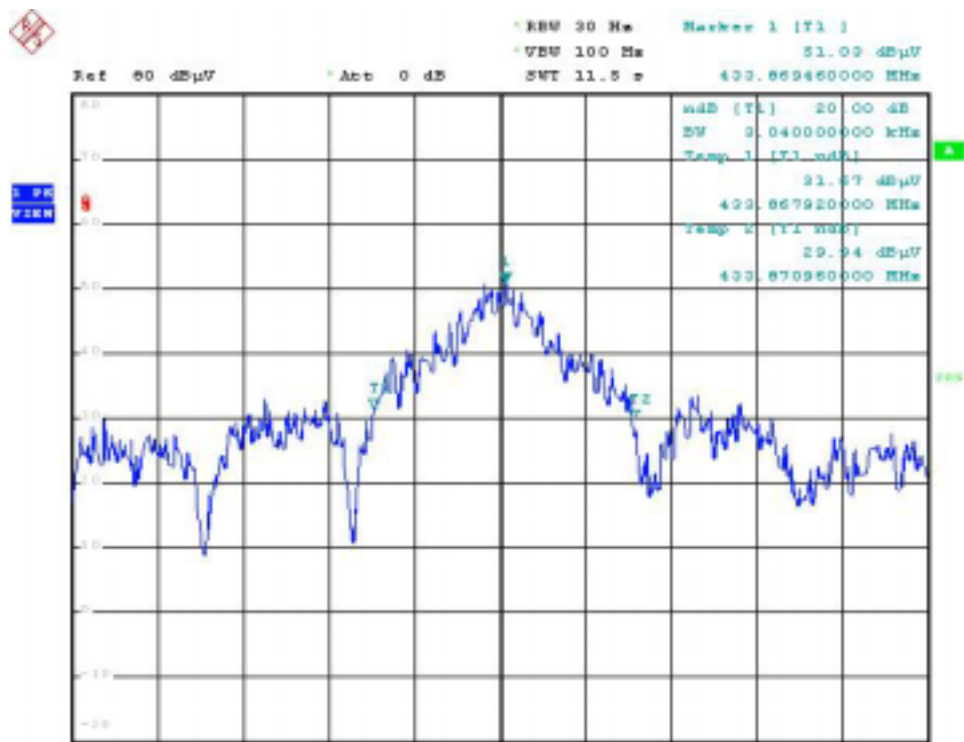
Ambient Temperature : 24°C; Relative Humidity : 55%

4.5 Test Data

20dB Bandwidth

Emission Freq. : 433.86MHz

Tester : Bill



Measured 20dB bandwidth is 3.04 kHz < 433.86MHzX0.25% = 1.0846MHz.