

EMC TEST REPORT

Report No. : EME-070002

Model No. : 99152, MB9152

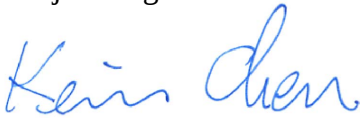
Issued Date : Jan. 22, 2007

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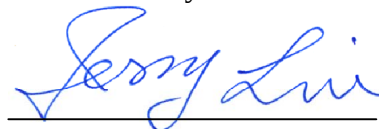
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Project Engineer



Marx Yan

Reviewed By



Jerry Liu

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Summary of Tests**Family Radio Service-Model: 99152**
FCC ID: PEG99152

Applied Standard: 47 CFR Part 95 and Part 2			
Paragraph	Test Item	Reference Rule	Result
3	Modulation Characteristics	2.1047(a)(b)	Pass
4	Frequency Stability	2.1055 / 95.627 / 95.621	Pass
5	RF Power Output	2.1046 / 95.639	Pass
6	Occupied Bandwidth	2.1049 / 95.635	Pass
7	Radiated Spurious Emission	2.1053 / 95.635	Pass
8	Conducted Spurious Emission	2.1053 / 95.635	Pass

1. General information

1.1 Identification of the EUT

Applicant: Senton Enterprises Limited
Manufacturer: Same as Applicant
Product: Family Radio Service
Model No.: 99152
Sample Received: Jan. 2, 2007
Test Date(s): Jan. 17, 2007 ~ Jan. 18, 2007

1.2 Basic description of the Equipment under test

This product is a Walkie-Talkie which can be worn on the wrist. 22FRS/GMRS channels are available. The used modulation technique is FM. For more detail features, please refer to Section 1.3

The models listed below are identical to model 99152 (EUT).
Different brand serves as marking strategy.

Trade Name	Model Number
SENTON, Bell Phone, VEXTRA	99152
Mountain Bell	MB9152

1.3 Features of Equipment under test

FRS

Items	Description
Type of Modulation	FM (F3E)
Number of Channels	14
Frequency Band	462.5625 ~ 467.7125 MHz
Carrier Frequencies	Please reference section 1.4
Authorized Bandwidth	12.5kHz
Output Power	23.1 dBm conducted 20.58 dBm ERP
Antenna Type / Gain	Dipole / 0 dBi
Function Type	Transceiver
Type of Emission	Please reference section 1.5
Power Rating (DC/AC, Voltage)	6VDC
Consumption (Current)	0.5A
Duty Cycle	> 50% (Max)
Temperature Range (operating)	-30 ~50

GMRS

Items	Description
Type of Modulation	FM (F3E)
Number of Channels	8
Frequency Band	462.5500 ~ 462.7250 MHz
Carrier Frequencies	Please reference section 1.4
Authorized Bandwidth	20kHz
Output Power	23.1 dBm conducted 20.36 dBm ERP
Antenna Type / Gain	Dipole / 0 dBi
Function Type	Transceiver
Type of Emission	Please reference section 1.5
Power Ration (DC/AC, Voltage)	6VDC
Consumption (Current)	0.5A
Duty Cycle	> 50% (Max)
Temperature Range (operating)	-30 ~50

1.4 Table for Carrier frequencies

FRS				GMRS	
CH	Frequency(MHz)	CH	Frequency(MHz)	CH	Frequency(MHz)
1	462.5625	8	467.5625	15	462.5500
2	462.5875	9	467.5875	16	462.5750
3	462.6125	10	467.6125	17	462.6000
4	462.6375	11	467.6375	18	462.6250
5	462.6625	12	467.6625	19	462.6500
6	462.6875	13	467.6875	20	462.6750
7	462.7125	14	467.7125	21	462.7000
				22	462.7250

1.5 Type of Emission

FRS and GMRS

$$B_n = 2M + 2DK$$

$$M = 3000$$

$$D = 1550$$

$$B_n = 2(3000) + 2(1550) = 9100$$

Type of Emission: 9K10F3E

2. Test specifications

2.1 Test standard

Here is the list of standards followed in this test report.

47 CFR Part 95

TIA/EIA-603A

ANSI C63.4/2003

2.2 Operation mode

- a. During testing, the EUT was placed on a non-conducting support.
- b. The following test modes were performed:
 - Mode 1: CH 01 (462.5625MHz) for FRS
 - Mode 2: CH 15 (462.5500MHz) for GMRS
- c. The EUT was operated in the status of continuously transmitting during the test. The used peripherals as well as the configuration fulfill the requirements of ANSI C63.4.
- d. The configuration is operated in a manner which tends to maximize its emission characteristics in a typical application.
- e. 3 meters measurement distance of semi-anechoic chamber or fully chamber was used in this test.

2.3 Test Software

No test software is required.

2.4 Modifications required for compliance

No modification were installed during test performance to bring the product into compliance. (Not include changes made specifically by Senton Enterprises Limited. Prior to compliance testing.)

2.5 Test equipment

Equipment	Brand	Frequency range	Model No.	Intertek ID No.	Next Cal. Date
EMI Test Receiver	Rohde & Schwarz	9kHz~2.75GHz	ESCS 30	EC303	04/27/2007
Spectrum Analyzer	Rohde & Schwarz	9kHz~30GHz	FSP 30	EC353	08/16/2007
Spectrum Analyzer	Rohde & Schwarz	20Hz~40GHz	FSEK 30	EC365	11/12/2007
AUDIO ANALYZER	Rohde & Schwarz	DC~110KHz	UPL16	EC400	11/26/2008
Function Generator	HP	N/A	33120A	EC334	11/12/2007
Telephone Analyzer System	Sunlight	100Hz~10kHz	TYPE1700	EC126	01/01/2008
Horn Antenna	SCHWARZBECK	1GHz~18GHz	BBHA 9120 D	EC371	02/19/2007
Bilog Antenna	SCHWARZBECK	25MHz~2GHz	VULB 9168	EC347	03/20/2007
Wideband Peak Power Meter/ Sensor	Anritsu	100MHz~18GHz	ML2497A/MA2491A	EC396	11/12/2007
Controller	HDGmbH	N/A	CM 100	EP346	N/A
Antenna Tower	HDGmbH	N/A	MA 240	EP347	N/A

Note: The above equipments are within the valid calibration period.

3. Modulation Characteristics

3.1 Operating environment

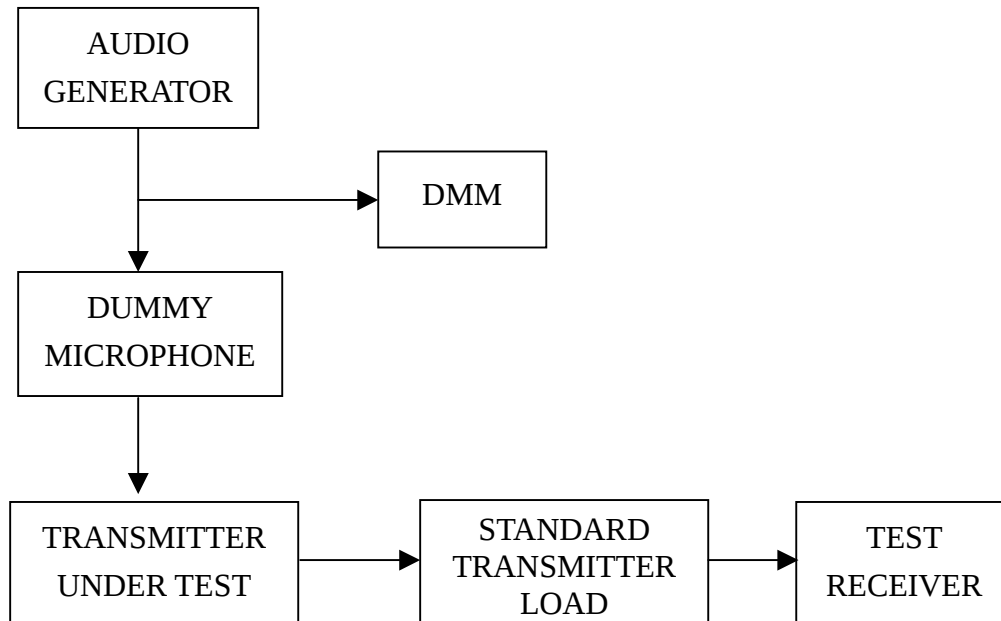
Temperature: 20
Relative Humidity: 55 %
Atmospheric Pressure: 1023 hPa

3.2 Test procedure

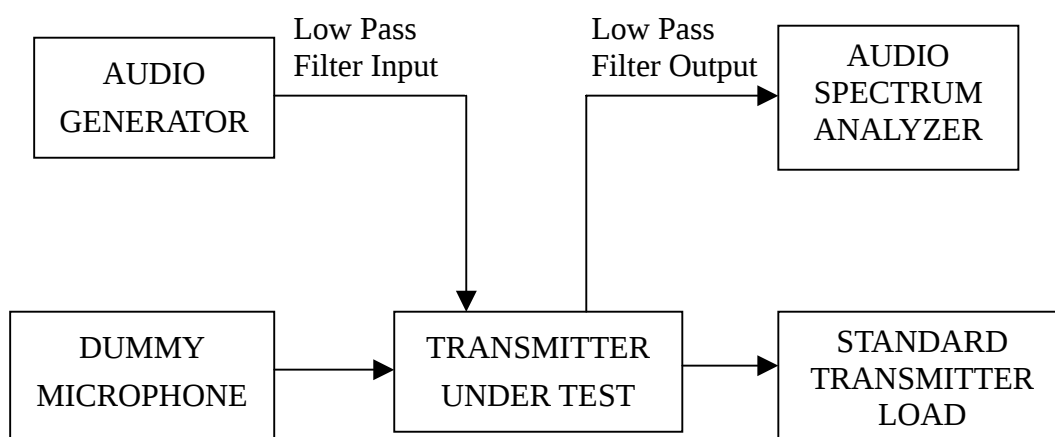
1. The transmitter output was connected to the spectrum analyzer, which has FM demodulation and deviation measurement function, through an attenuator.
2. According to the TIA-603, 95.637(a) and 95.637(b) requirement and test procedure measure the audio frequency response, modulating limiting and audio frequency low pass filtering.
3. The audio frequency response was measured in accordance with TIA/EIA Specification 603.
4. The audio input level needed for a particular percentage of modulation was measured in accordance with TIA/EIA Specification 603. The audio input curves versus modulation are curves are provided for audio input frequencies of 300, 500, 1000, 1500, 2000, 2500 and 3000 Hz.
5. The Audio Frequency Response testing is the output audio strength of frequency range 0.1 ~ 5 kHz relative to that of 1 kHz tone.
6. The Modulating Limiting is the deviation of demodulated audio signal v.s. the strength of input audio.
7. The Audio Frequency Low Pass Filtering is the strength of demodulated audio signal v.s. the input audio frequency.

3.3 Test setup

Audio Frequency Response Test Setup



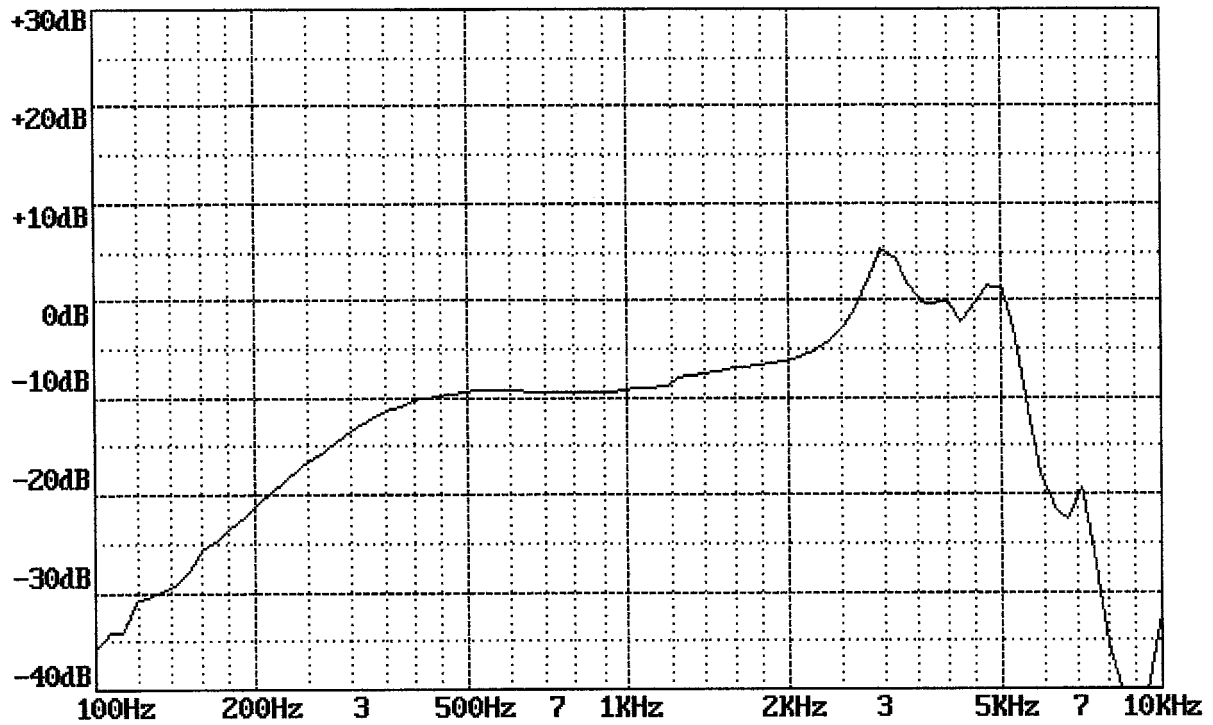
Audio Low Pass Filter Response Test Setup



3.4 Test Result for Audio Frequency Response

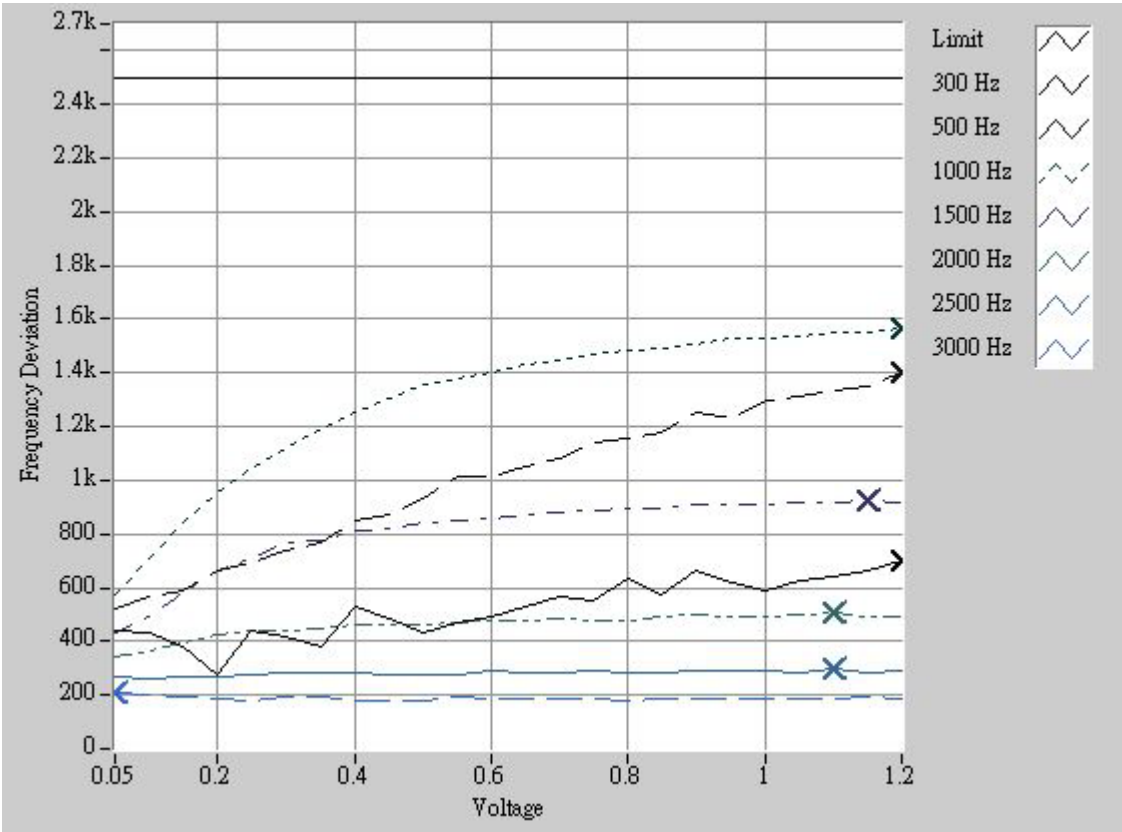
Modulation Type: FM

Duty cycle of the equipment during the test: 100%



3.5 Test Result for Modulating Limiting

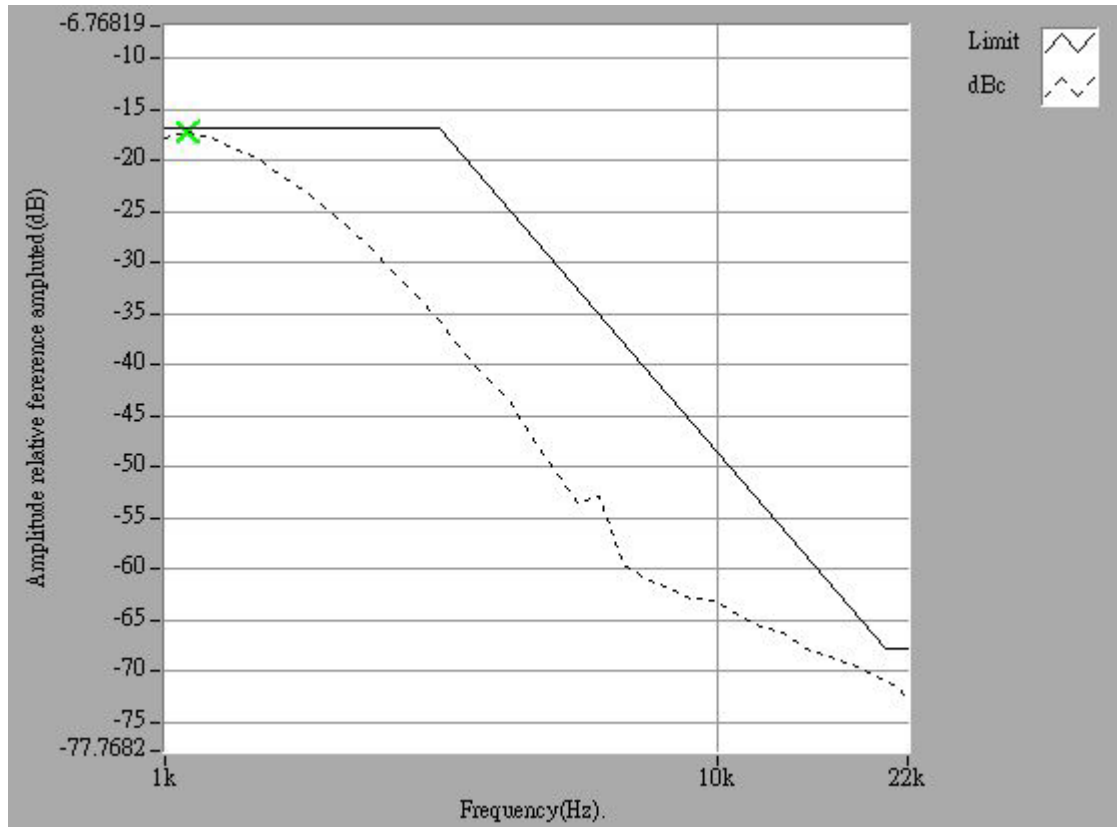
Modulation Type: FM
Duty cycle of the equipment during the test: 100%



3.6 Audio Frequency Low Pass Filtering

Modulation Type: FM

Duty cycle of the equipment during the test: 100%



/

4. Frequency Stability

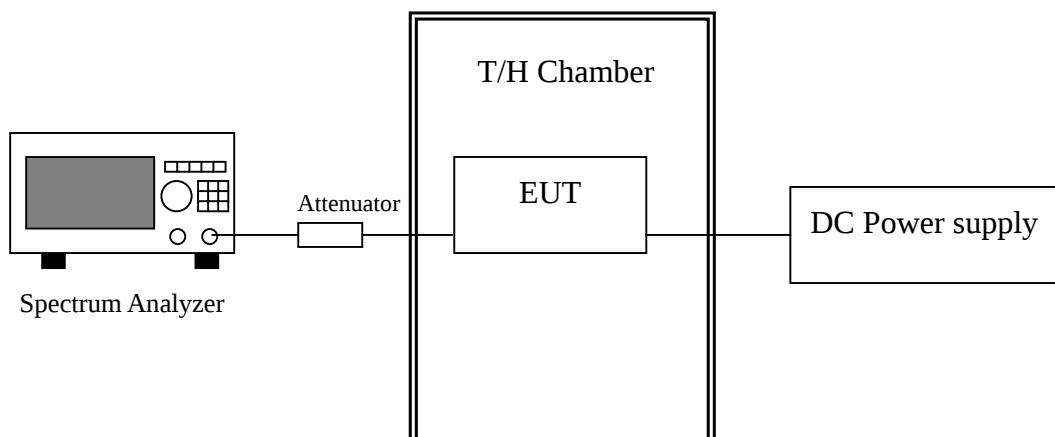
4.1 Operating environment

Temperature: 20
Relative Humidity: 55 %
Atmospheric Pressure: 1023 hPa

4.2 Test procedure

1. The transmitter output is connected to the spectrum analyzer through an attenuator.
2. Set RBW of spectrum analyzer to 1kHz and VBW to 1kHz.
3. Use peak detector mode, Max-hold and search the peak of trace 1.
4. According to the part 2.1055(d)(1), the supply voltage has to be changed from 85 to 115 percent of the nominal value.
5. According to the part 2.1055(a)(1), extreme temperature has to be changed from -30 to 50 .
6. Read the frequency of the carrier and calculate the deviation.

4.3 Test setup



4.4 Test Result

Test Model: FRS CH01

Modulation Type: Un-Modulated Carrier (CW)

Duty cycle of the equipment during the test: 100%

Carrier Frequency (MHz)	Measurement Frequency (MHz)	Frequency Error ppm	Limit ppm	Temperature
462.5625	462.5619	-1.2647	2.5	-30
462.5625	462.5620	-1.0550	2.5	-20
462.5625	462.5621	-0.8604	2.5	-10
462.5625	462.5631	1.3014	2.5	0
462.5625	462.5631	1.3014	2.5	10
462.5625	462.5623	-0.4281	2.5	30
462.5625	462.5619	-1.2928	2.5	40
462.5625	462.5626	0.2205	2.5	50

Carrier Frequency (MHz)	Measurement Frequency (MHz)	Frequency Error (ppm)	Limit (ppm)	Voltage V
462.5625	462.5625	-0.1081	2.5	6.9
462.5625	462.5625	0.0043	2.5	6.0
462.5625	462.5625	0.0151	2.5	5.1

Test Mode: GMRS CH15

Modulation Type: Un-Modulated Carrier (CW)

Duty cycle of the equipment during the test: 100%

Carrier Frequency (MHz)	Measurement Frequency (MHz)	Frequency Error (ppm)	Limit (ppm)	Temperature
462.5500	462.5492	-1.7295	5.0	-30
462.5500	462.5496	-0.8648	5.0	-20
462.5500	462.5501	0.2162	5.0	-10
462.5500	462.5503	0.6486	5.0	0
462.5500	462.5504	0.8648	5.0	10
462.5500	462.5496	-0.8648	5.0	30
462.5500	462.5492	-1.7295	5.0	40
462.5500	462.5488	-2.5943	5.0	50

Carrier Frequency (MHz)	Measurement Frequency (MHz)	Frequency Error (ppm)	Limit (ppm)	Voltage V
462.5500	462.5500	-0.0649	5.0	6.9
462.5500	462.5501	0.1513	5.0	6.0
462.5500	462.5500	-0.0649	5.0	5.1

5. RF Power Output

5.1 Operating environment

Temperature: 20
Relative Humidity: 55 %
Atmospheric Pressure: 1023 hPa

5.2 Test procedure

Conducted Test

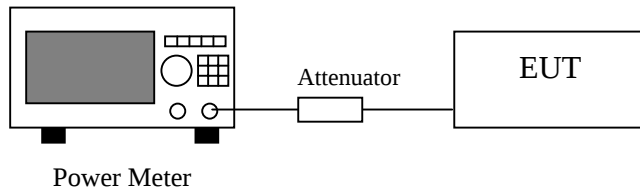
1. The transmitter output is connected to a peak power meter through an attenuator.
2. The output power was read directly from the meter.

Radiated Test

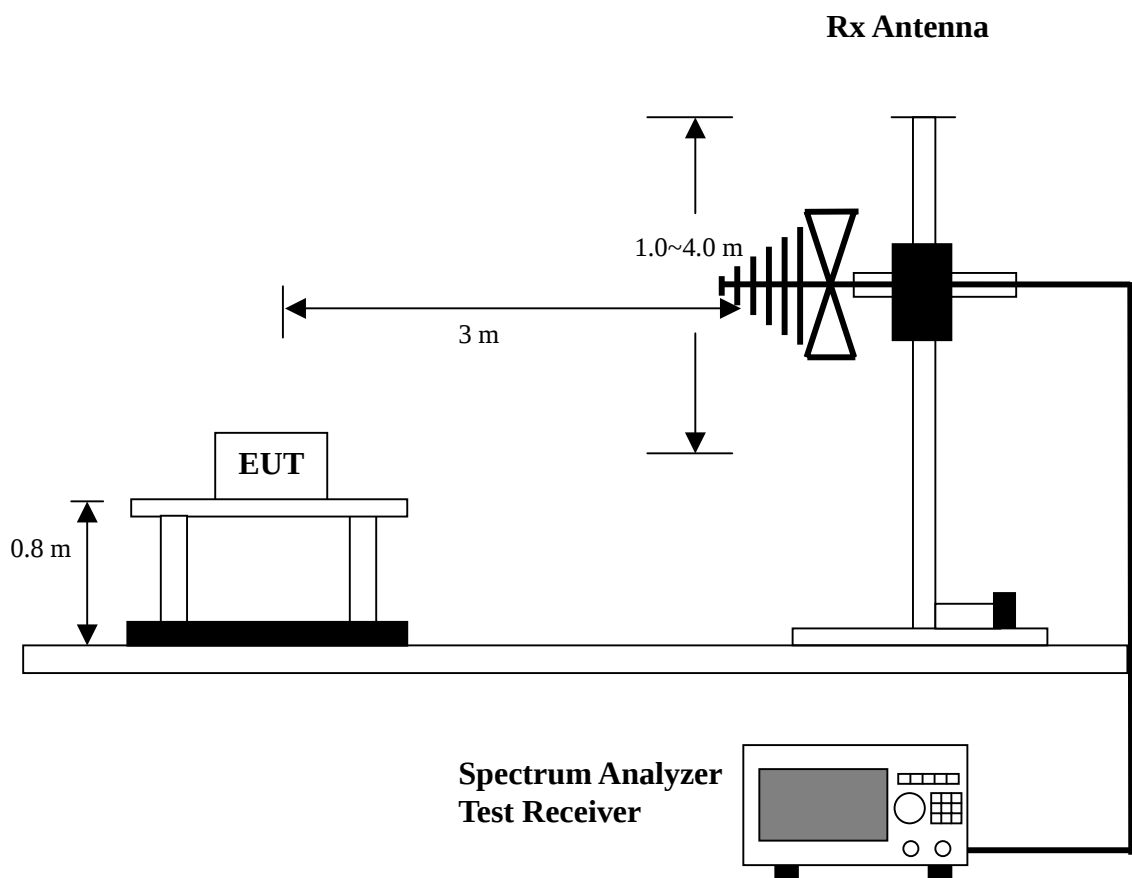
1. ERP was measured based on substitution method using with a broadband antenna.

5.3 Test setup

Conducted test



Radiated test



5.4 Test Result

Modulation Type: FM

Duty cycle of the equipment during the test: 100%

Channel	Frequency (MHz)	Conducted Output Power (dBm)	ERP Output Power (dBm)	Limit (dBm)
01	462.6525	23.1	20.58	27
15	462.5500	23.1	20.36	47

6. Occupied Bandwidth

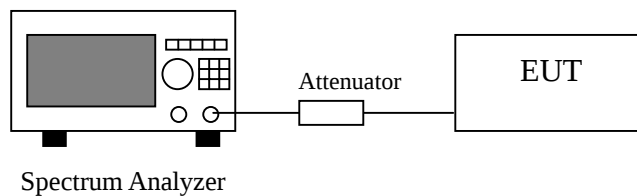
6.1 Operating environment

Temperature: 20
Relative Humidity: 55 %
Atmospheric Pressure: 1023 hPa

6.2 Test procedure

1. The transmitter output is connected to the spectrum analyzer through an attenuator.
2. Set RBW of spectrum analyzer to 300Hz and VBW to 100kHz.
3. Mark the frequency with maximum peak power as the center of the display of the spectrum.
4. Set the span to 80kHz and the sweep time to Auto.
5. Record the power spectral and compare to the Mask.

6.3 Test setup



6.4 Test Result

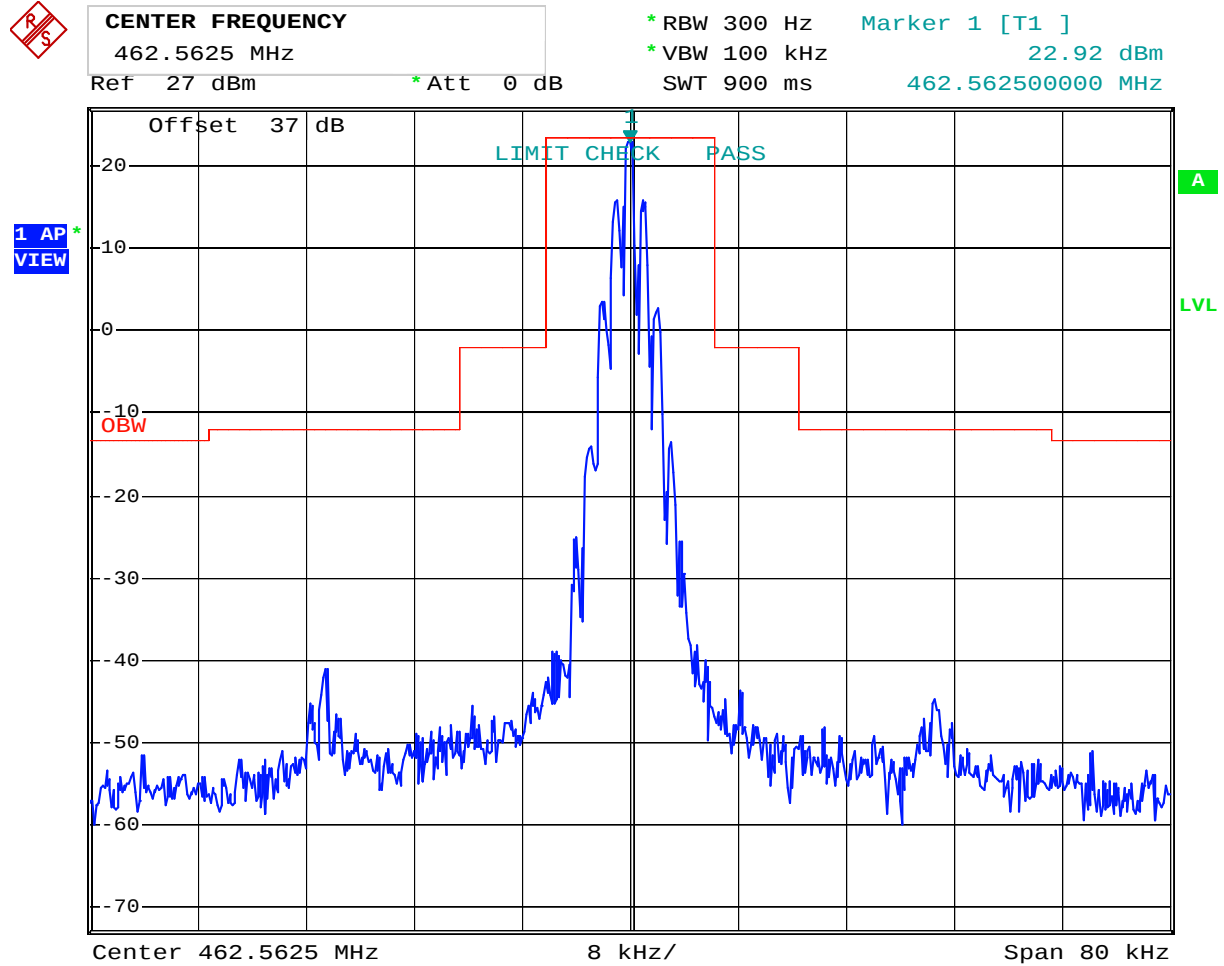
Modulation Type: FM

Duty cycle of the equipment during the test: 100%

Channel	Frequency (MHz)	Result
01	462.6525	Pass
15	462.5500	Pass

Please see the plot below.

Test Model: FRS CH 01



Comment: Occupied BW

Date: 19.JAN.2007 12:59:22

Test Mode2: GMRS CH 15



CENTER FREQUENCY

462.55 MHz

Ref 28 dBm

*Att 0 dB

*RBW 300 Hz

*VBW 100 kHz

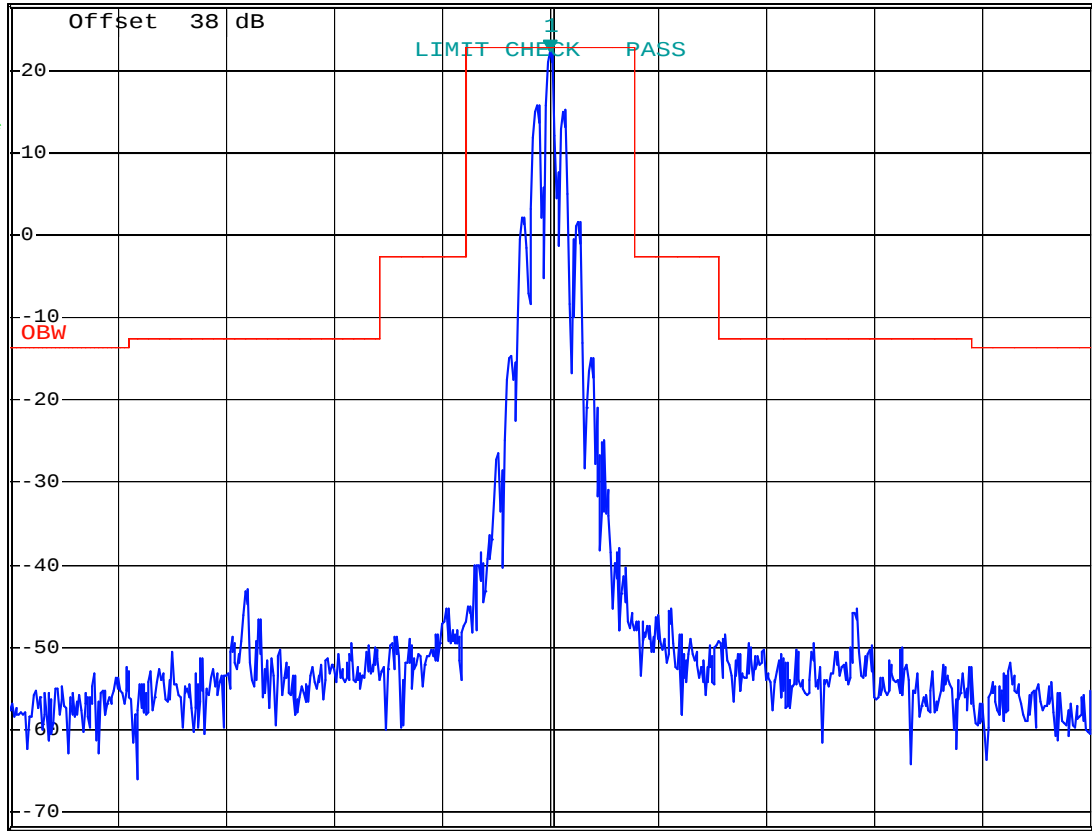
SWT 900 ms

Marker 1 [T1]

22.43 dBm

462.550000000 MHz

1 AP
VIEW



Comment: Occupied BW

Date: 19.JAN.2007 13:03:13

7. Radiated Spurious Emission

7.1 Operating environment

Temperature: 20
Relative Humidity: 55 %
Atmospheric Pressure: 1023 hPa

7.2 Test procedure

The radiated spurious emission was measured based on substitution method.
The frequency range from 30MHz to 1000MHz using Bilog Antenna.
The frequency range over 1GHz using Horn Antenna.

This test was verified at three orthogonal axes, and the test configuration was listed below:



Setup 1



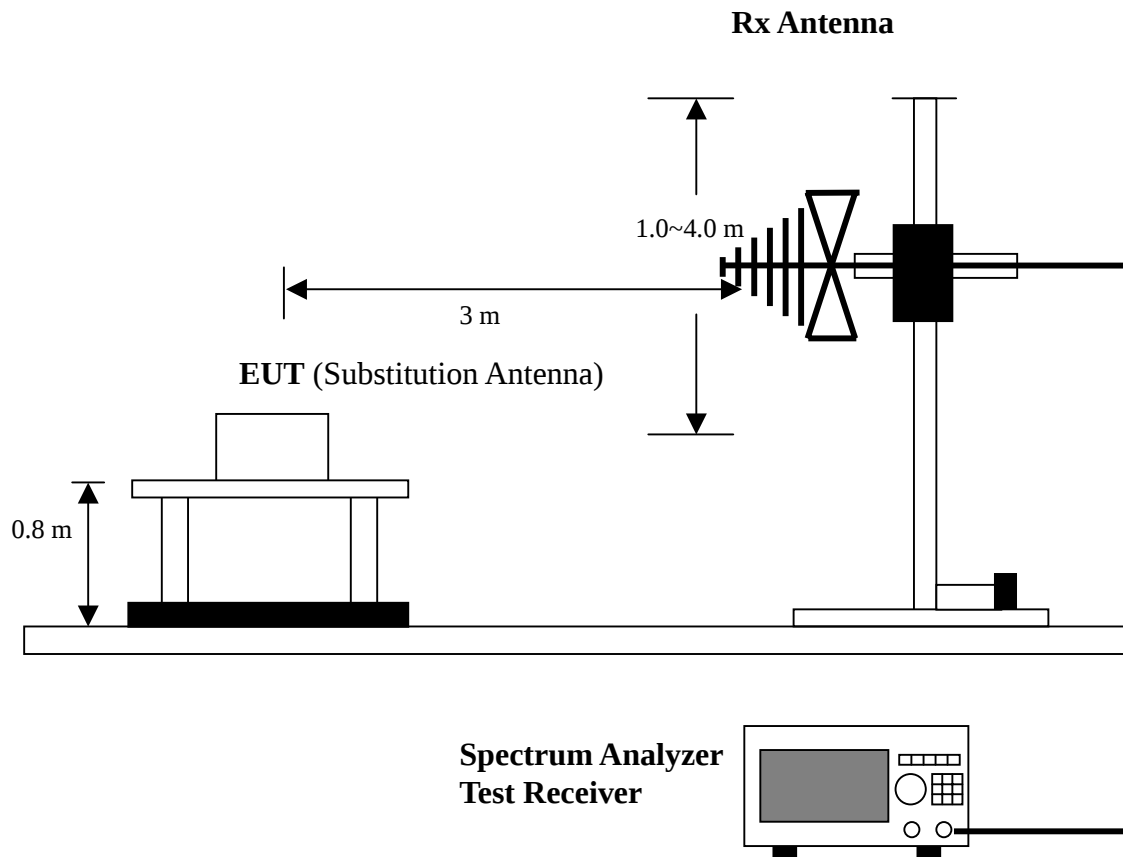
Setup 2



Setup 3

Test frequency range has been measured up to 10th harmonics frequency.

7.3 Test setup



7.4 Test Results

EUT : 99152
Test Condition : FRS CH01 at Setup 1

Frequency (MHz)	Antenna Polarization	Net (dBm)	Limit (dBm)	Margin (dB)
925.12	V	-21.03	-13	-8.03
925.12	H	-33.32	-13	-20.32

EUT : 99152
Test Condition : FRS CH01 at Setup 2

Frequency (MHz)	Antenna Polarization	Net (dBm)	Limit (dBm)	Margin (dB)
925.12	V	-33.08	-13	-20.08
925.12	H	-27.67	-13	-14.67

EUT : 99152
Test Condition : FRS CH01 at Setup 3

Frequency (MHz)	Antenna Polarization	Net (dBm)	Limit (dBm)	Margin (dB)
925.12	V	-31.79	-13	-18.79
925.12	H	-29.50	-13	-16.50

Remark:

Margin Value = Net - Limit Value

EUT : 99152
 Test Condition : GMRS CH15 at Setup 1

Frequency (MHz)	Antenna Polarization	Net (dBm)	Limit (dBm)	Margin (dB)
925.10	V	-21.01	-13	-8.01
925.10	H	-33.04	-13	-20.04

EUT : 99152
 Test Condition : GMRS CH15 at Setup 2

Frequency (MHz)	Antenna Polarization	Net (dBm)	Limit (dBm)	Margin (dB)
925.10	V	-32.92	-13	-19.92
925.10	H	-27.59	-13	-14.59

EUT : 99152
 Test Condition : GMRS CH15 at Setup 3

Frequency (MHz)	Antenna Polarization	Net (dBm)	Limit (dBm)	Margin (dB)
925.10	V	-31.48	-13	-18.48
925.10	H	-29.95	-13	-16.95

Remark:
 Margin Value = Net - Limit Value

7.5 Measurement results: frequency above 1GHz

EUT : 99152
 Test Condition : FRS CH01 at Setup 1

Frequency (MHz)	Antenna Polarization	Net (dBm)	Limit (dBm)	Margin (dB)
1387.69	V	-27.48	-13	-14.48
1850.25	V	-19.91	-13	-6.91
2312.81	V	-13.85	-13	-0.85
2775.38	V	-21.50	-13	-8.50
3237.94	V	-19.42	-13	-6.42
3700.50	V	-23.36	-13	-10.36
4163.06	V	-17.23	-13	-4.23
4625.63	V	-22.73	-13	-9.73
1387.69	H	-33.69	-13	-20.69
1850.25	H	-21.70	-13	-8.70
2312.81	H	-14.89	-13	-1.89
2775.38	H	-18.55	-13	-5.55
3237.94	H	-23.43	-13	-10.43
3700.50	H	-23.78	-13	-10.78
4163.06	H	-18.00	-13	-5.00
4625.63	H	-21.30	-13	-8.30

Remark:

Margin Value = Net - Limit Value

EUT : 99152
 Test Condition : FRS CH01 at Setup 2

Frequency (MHz)	Antenna Polarization	Net (dBm)	Limit (dBm)	Margin (dB)
1387.69	V	-31.86	-13	-18.86
1850.25	V	-20.23	-13	-7.23
2312.81	V	-13.26	-13	-0.26
2775.38	V	-17.01	-13	-4.01
3237.94	V	-22.55	-13	-9.55
3700.50	V	-24.59	-13	-11.59
4163.06	V	-18.61	-13	-5.61
4625.63	V	-22.40	-13	-9.40
1387.69	H	-27.46	-13	-14.46
1850.25	H	-18.51	-13	-5.51
2312.81	H	-14.85	-13	-1.85
2775.38	H	-21.63	-13	-8.63
3237.94	H	-19.09	-13	-6.09
3700.50	H	-19.46	-13	-6.46
4163.06	H	-15.09	-13	-2.09
4625.63	H	-20.75	-13	-7.75

Remark:

Margin Value = Net - Limit Value

EUT : 99152
 Test Condition : FRS CH01 at Setup 3

Frequency (MHz)	Antenna Polarization	Net (dBm)	Limit (dBm)	Margin (dB)
1387.69	V	-31.86	-13	-18.86
1850.25	V	-20.23	-13	-7.23
2312.81	V	-13.26	-13	-0.26
2775.38	V	-17.01	-13	-4.01
3237.94	V	-22.55	-13	-9.55
3700.50	V	-24.59	-13	-11.59
4163.06	V	-18.61	-13	-5.61
4625.63	V	-22.40	-13	-9.40
1387.69	H	-27.46	-13	-14.46
1850.25	H	-18.51	-13	-5.51
2312.81	H	-14.85	-13	-1.85
2775.38	H	-21.63	-13	-8.63
3237.94	H	-19.09	-13	-6.09
3700.50	H	-19.46	-13	-6.46
4163.06	H	-15.09	-13	-2.09
4625.63	H	-20.75	-13	-7.75

Remark:

Margin Value = Net - Limit Value

EUT : 99152
Test Condition : GMRS CH15 at Setup 1

Frequency (MHz)	Antenna Polarization	Net (dBm)	Limit (dBm)	Margin (dB)
1387.6500	V	-27.31	-13	-14.31
1850.2000	V	-19.70	-13	-6.70
2312.7500	V	-13.70	-13	-0.70
2775.3000	V	-21.17	-13	-8.17
3237.8500	V	-19.04	-13	-6.04
3700.4000	V	-23.36	-13	-10.36
4162.9500	V	-17.20	-13	-4.20
4625.5000	V	-21.36	-13	-8.36
1387.6500	H	-33.96	-13	-20.96
1850.2000	H	-21.04	-13	-8.04
2312.7500	H	-15.39	-13	-2.39
2775.3000	H	-18.97	-13	-5.97
3237.8500	H	-23.11	-13	-10.11
3700.4000	H	-23.68	-13	-10.68
4162.9500	H	-18.22	-13	-5.22
4625.5000	H	-21.16	-13	-8.16

Remark:

Margin Value = Net - Limit Value

EUT : 99152
Test Condition : GMRS CH15 at Setup 2

Frequency (MHz)	Antenna Polarization	Net (dBm)	Limit (dBm)	Margin (dB)
1387.6500	V	-32.09	-13	-19.09
1850.2000	V	-19.94	-13	-6.94
2312.7500	V	-13.46	-13	-0.46
2775.3000	V	-16.70	-13	-3.70
3237.8500	V	-22.30	-13	-9.30
3700.4000	V	-24.10	-13	-11.10
4162.9500	V	-18.90	-13	-5.90
4625.5000	V	-21.99	-13	-8.99
1387.6500	H	-27.27	-13	-14.27
1850.2000	H	-18.67	-13	-5.67
2312.7500	H	-14.15	-13	-1.15
2775.3000	H	-21.05	-13	-8.05
3237.8500	H	-18.71	-13	-5.71
3700.4000	H	-20.47	-13	-7.47
4162.9500	H	-14.96	-13	-1.96
4625.5000	H	-21.70	-13	-8.70

Remark:

Margin Value = Net - Limit Value

EUT : 99152
Test Condition : GMRS CH15 at Setup 3

Frequency (MHz)	Antenna Polarization	Net (dBm)	Limit (dBm)	Margin (dB)
1387.6500	V	-36.72	-13	-23.72
1850.2000	V	-25.14	-13	-12.14
2312.7500	V	-14.87	-13	-1.87
2775.3000	V	-22.35	-13	-9.35
3237.8500	V	-22.86	-13	-9.86
3700.4000	V	-20.10	-13	-7.10
4162.9500	V	-16.13	-13	-3.13
4625.5000	V	-19.90	-13	-6.90
1387.6500	H	-28.30	-13	-15.30
1850.2000	H	-19.76	-13	-6.76
2312.7500	H	-15.75	-13	-2.75
2775.3000	H	-20.99	-13	-7.99
3237.8500	H	-21.50	-13	-8.50
3700.4000	H	-22.91	-13	-9.91
4162.9500	H	-17.67	-13	-4.67
4625.5000	H	-20.96	-13	-7.96

Remark:

Margin Value = Net - Limit Value

8. Conducted Spurious Emission

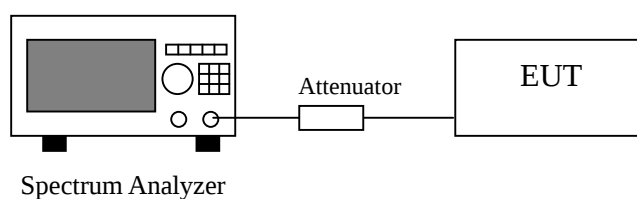
8.1 Operating environment

Temperature: 20
Relative Humidity: 55 %
Atmospheric Pressure: 1023 hPa

8.2 Test procedure

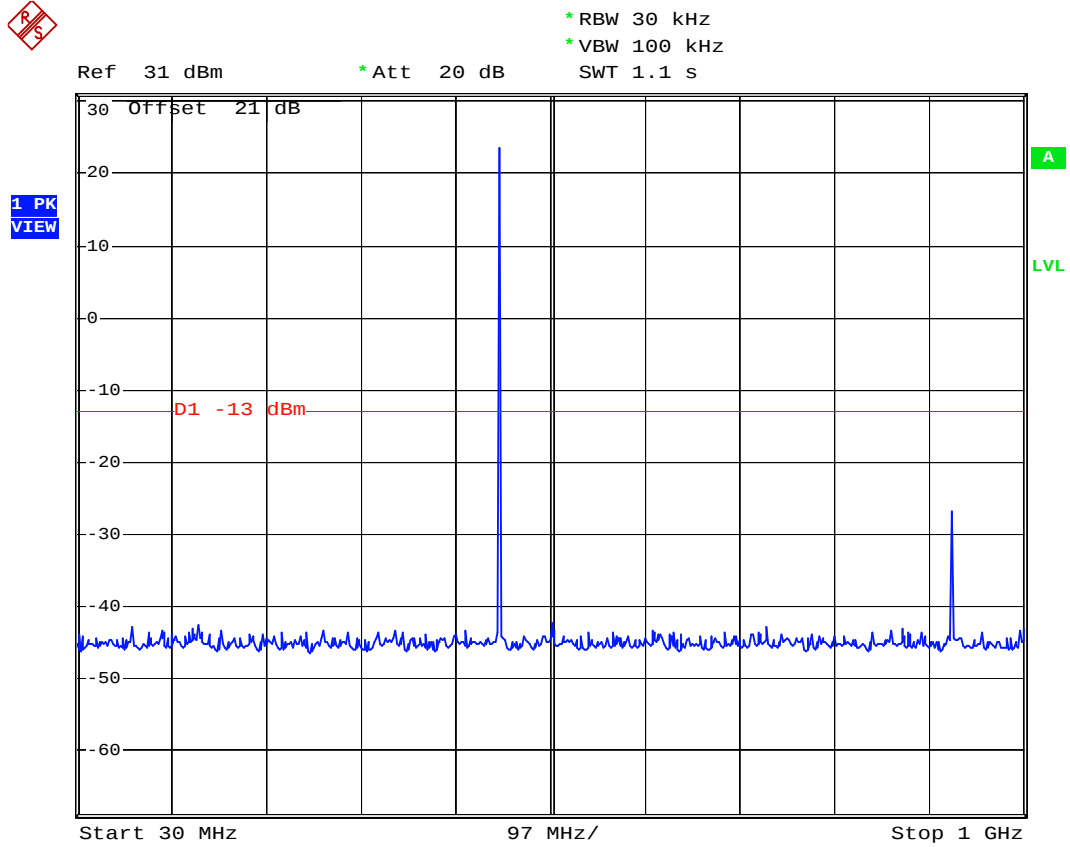
1. The transmitter output is connected to the spectrum analyzer through an attenuator
2. Adjust the spectrum analyzer for the following settings:
 - 1) Resolution Bandwidth = 30 kHz for spurious emissions below 1 GHz, and 1 MHz for spurious emissions above 1GHz.
 - 2) Video Bandwidth = 100 kHz for spurious emissions below 1 GHz, and 3 MHz for spurious emissions above 1 GHz.
 - 3) Sweep Speed slow enough to maintain measurement calibration.
 - 4) Detector Mode = Positive Peak.
3. Limits = -13dBm
4. Test frequency range has been measured up to 10th harmonics frequency.

8.3 Test Setup Configuration



8.4 Test Results

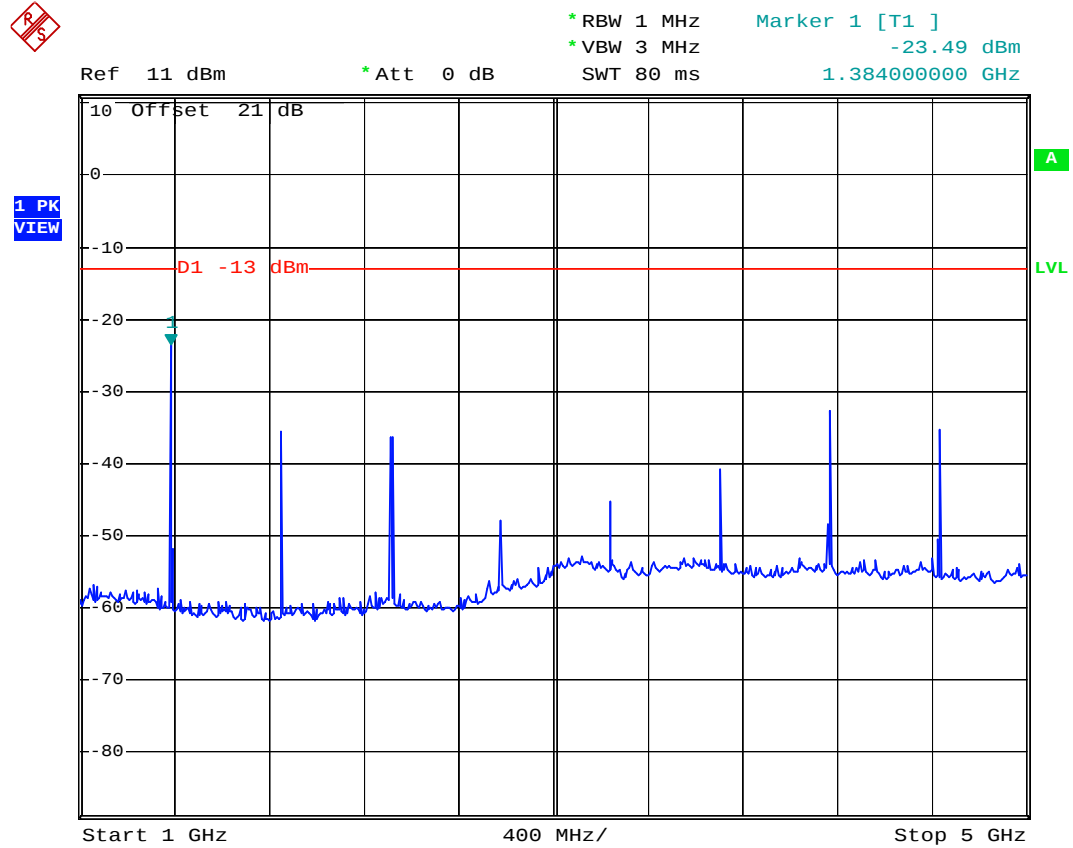
Test Model1: FRS CH01 (Below 1GHz)



462.562500 at mode 30MHz~1GHz

Date: 19.JAN.2007 10:26:08

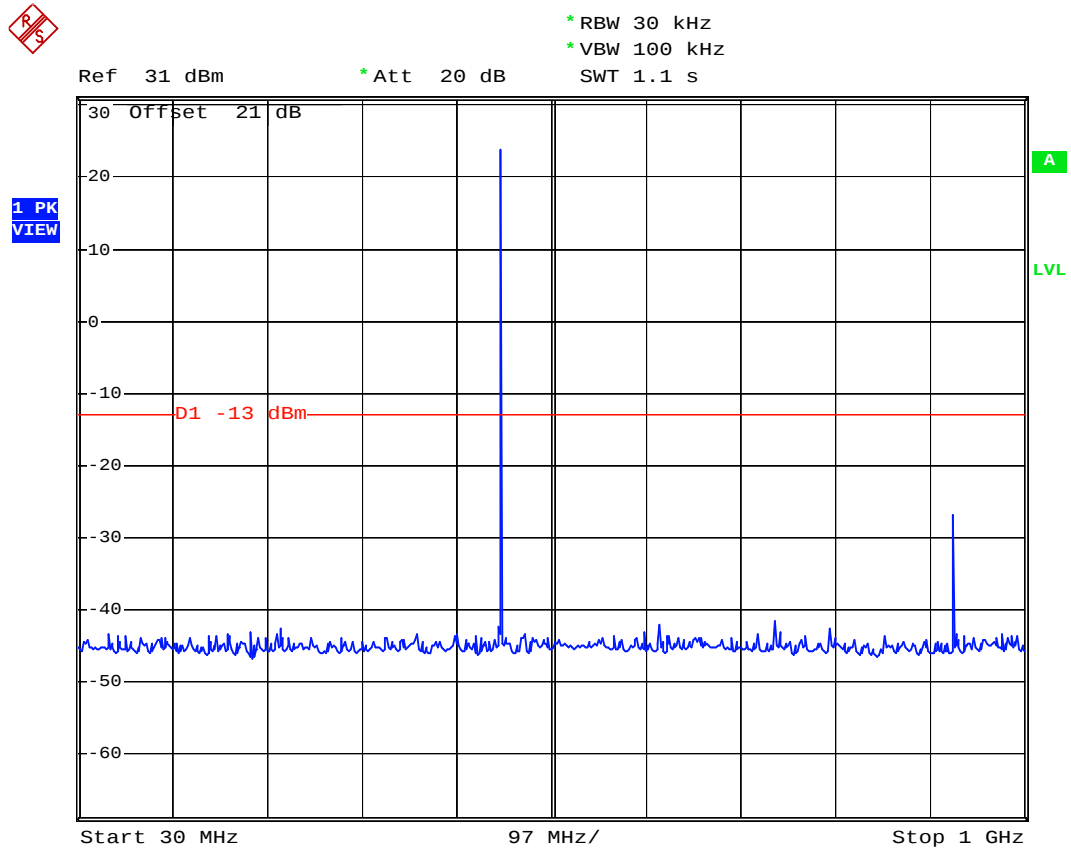
Test Mode1: FRS CH01 (Above 1GHz)



462.562500 at mode 1GHz~5GHz

Date: 19.JAN.2007 10:26:39

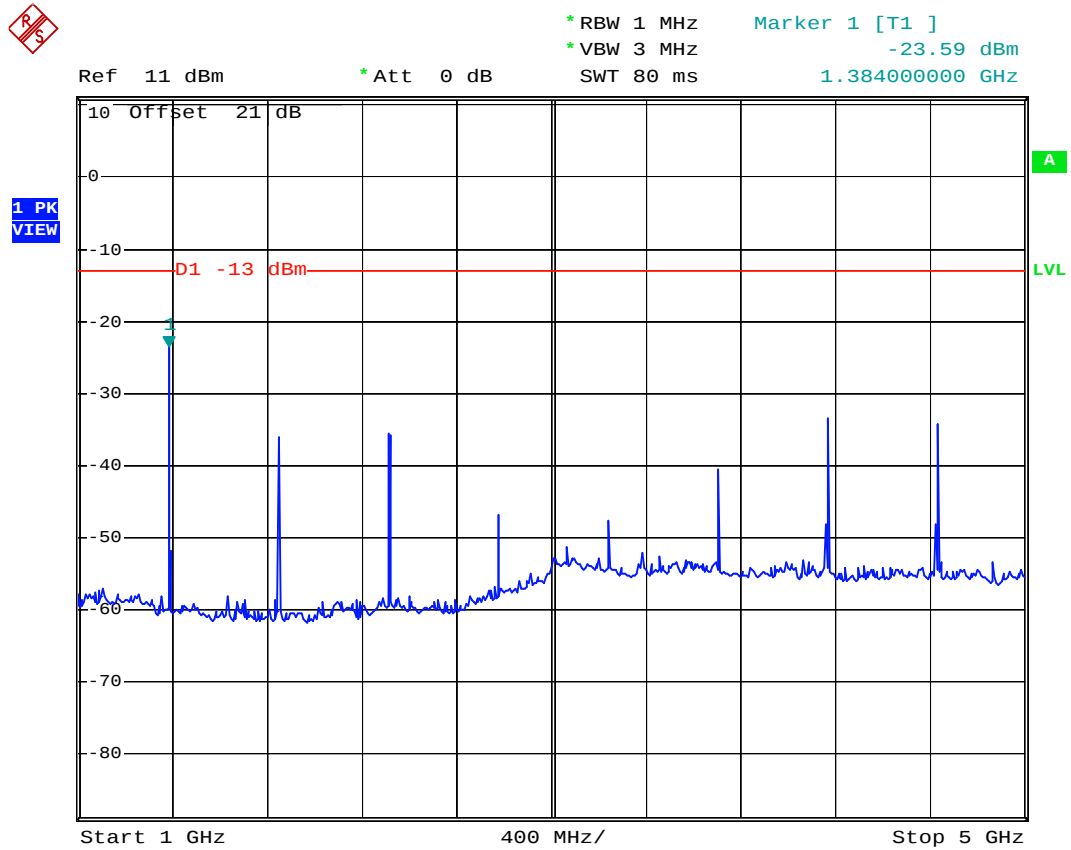
Test Mode2: GMRS CH15 (Below 1GHz)



462.550000 at mode 30MHz~1GHz

Date: 19.JAN.2007 10:28:18

Test Mode2: GMRS CH15 (Above 1GHz)



462.550000 at mode 1GHz~5GHz

Date: 19.JAN.2007 10:28:46