

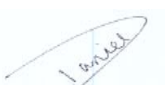
FCC PART 95
MEASUREMENT AND TEST REPORT

For

Vigor Sports, Inc. dba ChatterBox

16918 Edwards Rd.
Cerritos, CA90703, USA

FCC ID: KA9HJC-X1B
Model: GMRS X1 Bluetooth

This Report Concerns: ☒ Original Report		Product Type: 22 channel GMRS/FRS Transceiver with Bluetooth
Test Engineer:	Dan Corona 	
Report Number:	R0703304-95	
Report Date:	2007-04-30	
Reviewed By:	Daniel Deng 	
Prepared By:	Bay Area Compliance Laboratories Corp. (BACL) 1274 Anvilwood Ave. Sunnyvale, CA 94089 Tel: (408) 732-9162 Fax: (408) 732 9164	

Note: This test report is for the customer shown above and their specific product only. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. This report **must not** be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

This Bay Area Compliance Laboratories Corp. test report has been prepared on behalf of *Vigor Sport, Inc. Chatter Box* and their product, GMRS X1 Bluetooth FM Handheld transceiver / two way radio (FCCID:KA9HJC-X1B) or the EUT (Equipment Under Test) as referred to in the rest of this report.

The EUT is a 22 channel GMRS/FRS Transceiver with Bluetooth radio self-contained transceiver unit with integral antenna intended for use as a general communication tool. It is designed to operate on all 22 channels allocated by the FCC. The useable range, while dependent upon terrain and other radio propagation principles, is typically two miles. The X1 Bluetooth uses the maximum transmit power allowed to help ensure the maximum communication range.

Features include: 22 channel GMRS/FRS Transceiver with Bluetooth, Page and LCD Display. The unit is equipped with an external Headset option connector. DC 4.8V, Ni-MH Rechargeable Pack batteries, that are readily available in retail outlets, supply operating power. An automatic power savings feature allows the typical standby battery life to extend to more than 4days.

Item	Content
Modulation	FM
Frequency Band	FRS: 467.5625 ~ 467.7125MHz GMRS: 462.5625 ~ 462.7125 MHz 462.5500 ~ 462.7250 MHz
Dimensions (L*W*H)	65 mm(L)× 132 mm(W)×39 mm(H)
Weight	172 g
Power Source	DC 4.8V, Ni-MH Rechargeable battery pack
Normal Operation	Face-held and Body-worn (Belt Clip)

Mechanical Description

The Vigor Sport, Inc. Chatter Box product, FCCID: KA9GMRS-X1, measures approximately 65 mm (L) x132 mm (W) x 39 mm (H).

* The test data gathered are from typical production sample, serial number: CBXBT00001 assigned by Manufacturer.

EUT Photo

Additional photos in Exhibit C

Objective

This type approval report is prepared on behalf of *Vigor Sport, Inc Chatter Box* in accordance with Part 2, Subpart J and Part 95 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC rules for RF output power, modulation characteristic, occupied bandwidth, spurious emission at antenna terminal, field strength of spurious radiation, frequency stability, band edge, and conducted and radiated margin.

This report is provided on behalf of *Vigor Sport, Inc Chatter Box* for confirmation of regulatory compliance. The manufacturer declares that the model: GMRS X1 Bluetooth serial number: CBXBT00001 provided for testing is identical in construction and electrical operation with the post production product. Retesting is recommended for any changes to the model that might affect compliance including those with respect to software, circuitries, PCB layout, RF module, features and functionality.

Related Submittal(s)/Grant(s)

No Related Submittals

Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-part J as well as the following parts:

Part 95A: General Mobile Radio Service (GMRS)

Part 95B: Family Radio Service (FRS)

Applicable Standards: TIA 603-C, ANSI C63.4-2003.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratories, Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the values range from ± 2.0 for Conducted Emissions tests and ± 4.0 dB for Radiated Emissions tests are the most accurate estimates pertaining to uncertainty of EMC measurements at BACL.

Detailed instrumentation measurement uncertainties can be found in BACL report QAP-018.

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. to collect radiated and conducted emission measurement data is located at their facility in Sunnyvale, California 94089, USA.

The test site at Bay Area Compliance Laboratories Corp. has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules and Article 8 of the VCCI regulations. The facility also complies with the test methods and procedures set forth in ANSI C63.4-2003.

The Federal Communications Commission, Industry Canada, and Voluntary Control Council for Interference have the reports on file and are listed under FCC file 31040/SIT 1300F2, IC registration number: 3062A, and VCCI Registration No.: C-1298 and R-1234. The test site has been approved by the FCC, IC, and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL is a National Institute of Standards and Technology (NIST) accredited laboratory under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The current scope of accreditations can be found at <http://ts.nist.gov/ts/htdocs/210/214/scopes/2001670.htm>

SYSTEM TEST CONFIGURATION

Justification

The EUT was configured for testing according to TIA-603-C.

The final qualification test was performed with test software provided by the manufacturer.

Block Diagram

Please refer to Exhibit D.

Equipment Modifications

No modifications were made to the EUT.

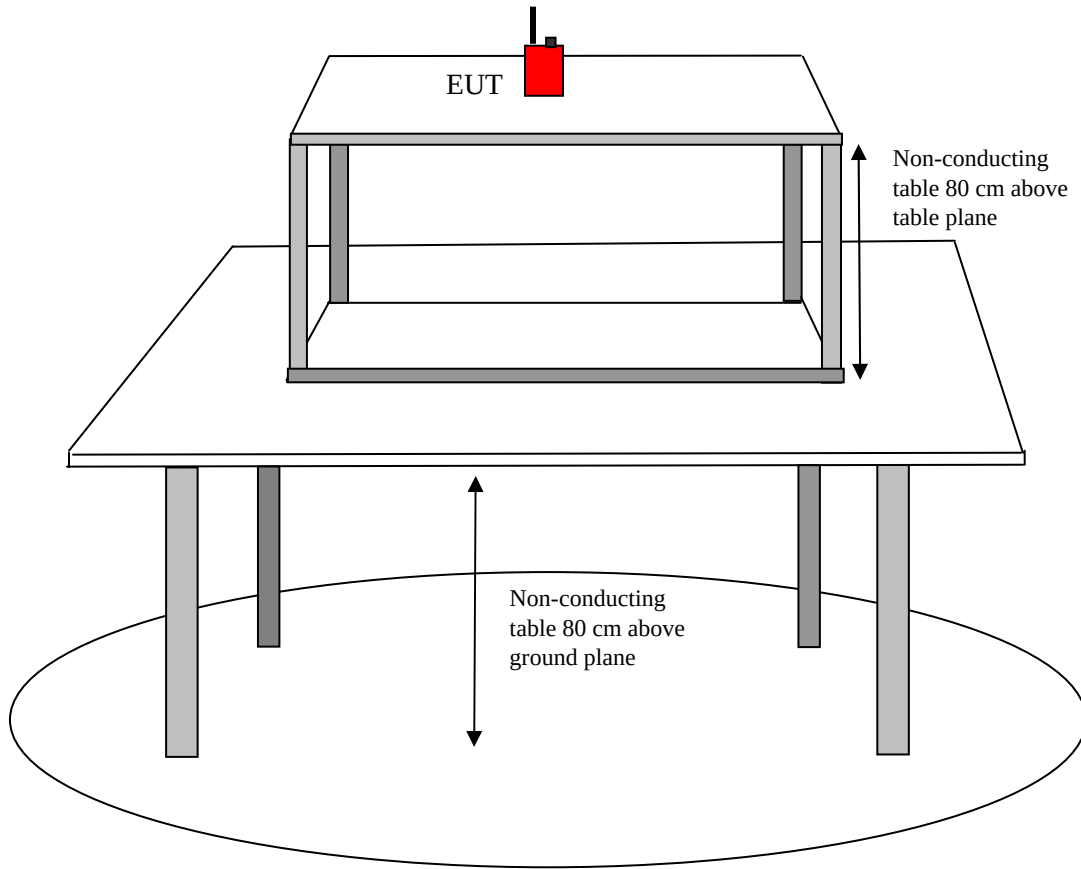
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
HP	DC Power Supply	6236B	2003A05705

Interface Ports and Cabling

Cable Description	Length (m)	From	To
Audio cable	0.5	Microphone	EUT

Test Setup Block Diagram



SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§ 2.1047, §95.637	Modulation Characteristics	Compliant
§ 2.1053, § 95.635	Field Strength of Spurious Radiation	Compliant
§ 2.1046 ; § 95.639	RF Output Power	Compliant
§ 2.1049; § 95.633; § 95.635	Occupied Bandwidth; Emission Mask	Compliant
§ 2.1051, § 95.635	Spurious Emissions at Antenna Terminals	Compliant
§ 2.1055 (a); § 2.1055 (d) § 95.621; § 95.627	Frequency stability vs. temperature Frequency stability vs. voltage	Compliant
§ 2.1093	RF Exposure	Compliant (Please refer to SAR report)

§2.1046, §95.639 – RF OUTPUT POWER

Applicable Standard

(a) No GMRS transmitter, under any condition of modulation, shall exceed:

(1) 50 W Carrier power (average TP during one unmodulated RF cycle) when transmitting emission type A1D, F1D, G1D, A3E, F3E or G3E.

(2) 50 W peak envelope TP when transmitting emission type H1D, J1D, R1D, H3E, J3E or R3E.

(d) No FRS unit, under any condition of modulation, shall exceed 0.500 W effective radiated power (ERP).

Test Procedure

TIA-603-C clause 2.2.17.2

Test Equipment List and Details

Equipment Description	Model Number	Manufacturer	Serial Numbers	Last Calibration
Spectrum Analyzer	E4440A	Agilent	MY44303352	2007-02-23
Spectrum Analyzer	8565E	Agilent	3964A00131	2007-01-24
Antenna	JB1	Sunol	A013105-3	2006-04-26
Pre-amplifier	317	Sonoma Instrument	260407	2006-03-20
Antenna, Dipole	AD-100	Com-Power	2219	2006-04-26

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Environmental Conditions

Temperature:	20 °C
Relative Humidity:	59 %
ATM Pressure:	102.0 kPa

** The testing was performed by Dan Corona on 2007-04-20th to 24th*

Test Result

Compliant

FRS (Low Power):

Channel	Frequency (MHz)	Conducted Output Power (dBm)	Conducted Output Power (Watt)	ERP (Watt)	Limit (Watt)
CH16	467.5625	26.16	0.413	0.322	0.5
CH19	467.6375	26.28	0.425	0.311	0.5
CH22	467.7125	28.31	0.428	0.326	0.5

GMRS (High Power):

Channel	Frequency (MHz)	Conducted Output Power (dBm)	Conducted Output Power (Watt)	ERP (Watt)	Limit (Watt)
CH1	462.5625	31.75	1.496	1.049	50
CH8	462.5750	31.72	1.496	1.049	50
CH15	462.7250	31.66	1.466	1.019	50

§2.1047 & §95.637 - MODULATION CHARACTERISTICS

Applicable Standard

CFR47 § 2.1047(d) and §95.637.

(a) A GMRS transmitter that transmits emission types F1D, G1D, or G3E must not exceed a peak frequency deviation of plus or minus 5 kHz. A GMRS transmitter that transmits emission type F3E must not exceed a peak frequency deviation of plus or minus 5 kHz. A FRS unit that transmits emission type F3E must not exceed a peak frequency deviation of plus or minus 2.5 kHz, and the audio frequency response must not exceed 3.125 kHz.

(b) Each GMRS transmitter, except a mobile station transmitter with a power output of 2.5 W or less, must automatically prevent a greater than normal audio level from causing overmodulation. The transmitter also must include audio frequency low pass filtering, unless it complies with the applicable paragraphs of §95.631 (without filtering.) The filter must be between the modulation limiter and the modulated stage of the transmitter. At any frequency (f in kHz) between 3 and 20 kHz, the filter must have an attenuation of at least $60 \log_{10}(f/3)$ dB greater than the attenuation at 1 kHz. Above 20 kHz, it must have an attenuation of at least 50 dB greater than the attenuation at 1 kHz.

Test Procedure

At different modulating frequencies, the output level of the audio generator was varied and the AM deviation level was recorded.

TIA-603-C section 2.2.3, 2.2.6

Test Equipment List and Details

Equipment Description	Model Number	Manufacturer	Serial Numbers	Last Calibration
Spectrum Analyzer	E4440A	Agilent	MY44303352	2007-02-23
Spectrum Analyzer	8565E	Agilent	3964A00131	2007-01-24
Modulation Analyzer	8901A	HP	2026A00847	2006-01-17*
Generator	33220A	Agilent	MY43004878	2006-05-18

*Two year calibration cycle

Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Environmental Conditions

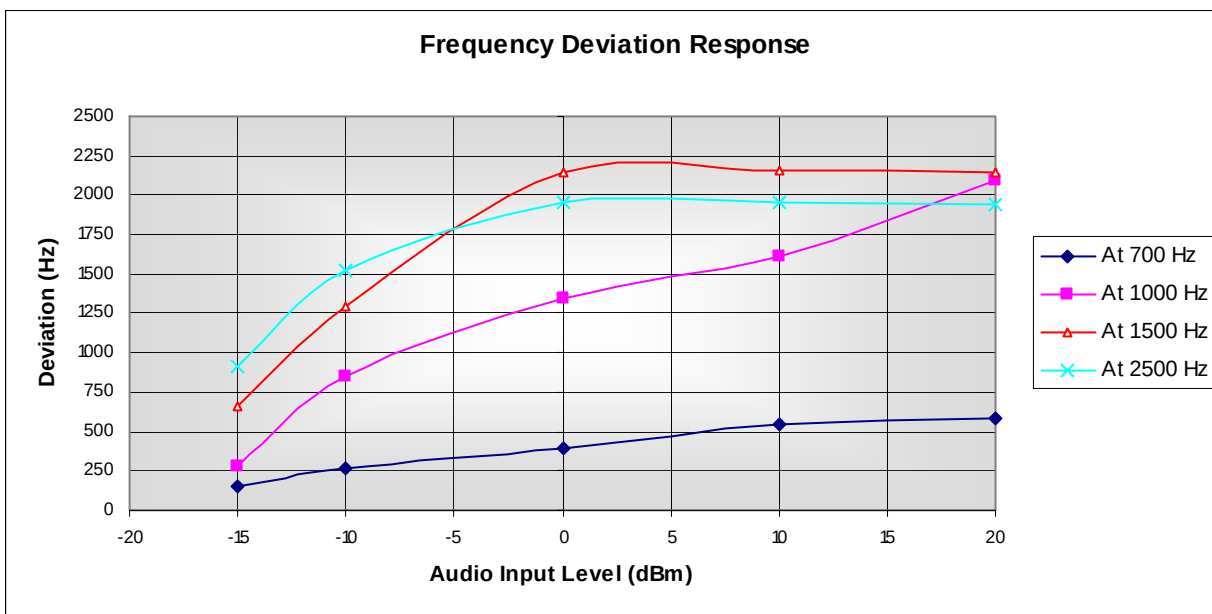
Temperature:	20 °C
Relative Humidity:	59 %
ATM Pressure:	102.0 kPa

* The testing was performed by Dan Coronio on 2007-04-20th to 24th

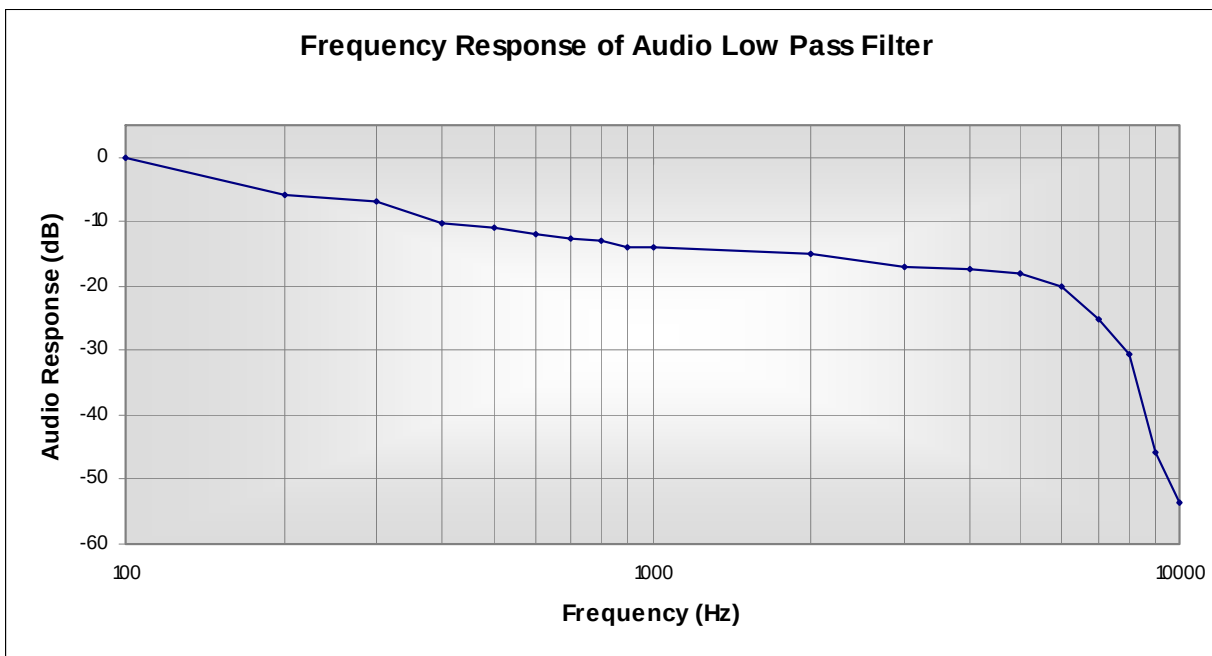
Test Results

No non-compliance noted, please refer to the plots.

Modulation Limiting



Frequency Response of Audio Low Pass Filter



§2.1049, §95.633 and §95.335 - OCCUPIED BANDWIDTH AND EMISSION MASK

Applicable Standards

CFR 47 § 2.1049 and § 95.633 (a) (c).

(a) The authorized bandwidth (maximum permissible bandwidth of a transmission) for emission type H1D, J1D, R1D, H3E, J3E or R3E is 4 kHz. The authorized bandwidth for emission type A1D or A3E is 8 kHz. The authorized bandwidth for emission type F1D, G1D, F3E or G3E is 20 kHz.

(c) The authorized bandwidth for emission type F3E or F2D transmitted by a FRS unit is 12.5 kHz.

Test Procedure

The RF output of the transmitter was connected to the simulator and the spectrum analyzer through sufficient attenuation.

Test Equipment List and Details

Equipment Description	Model Number	Manufacturer	Serial Numbers	Last Calibration
Spectrum Analyzer	E4440A	Agilent	MY44303352	2007-02-23
Modulation Analyzer	8901A	HP	2026A00847	2007-04-26
Generator	33220A	Agilent	MY43004878	2006-05-18

**Two year calibration cycle*

Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Environmental Conditions

Temperature:	20 °C
Relative Humidity:	59 %
ATM Pressure:	102.0 kPa

** The testing was performed by Dan Corona on 2007-04-27*

Test Results

No non-compliance noted, please refer to the plots.

According to CFR47 § 2.201 & § 2.202

$$B_n = 2M + 2DK$$

$$M = 3000$$

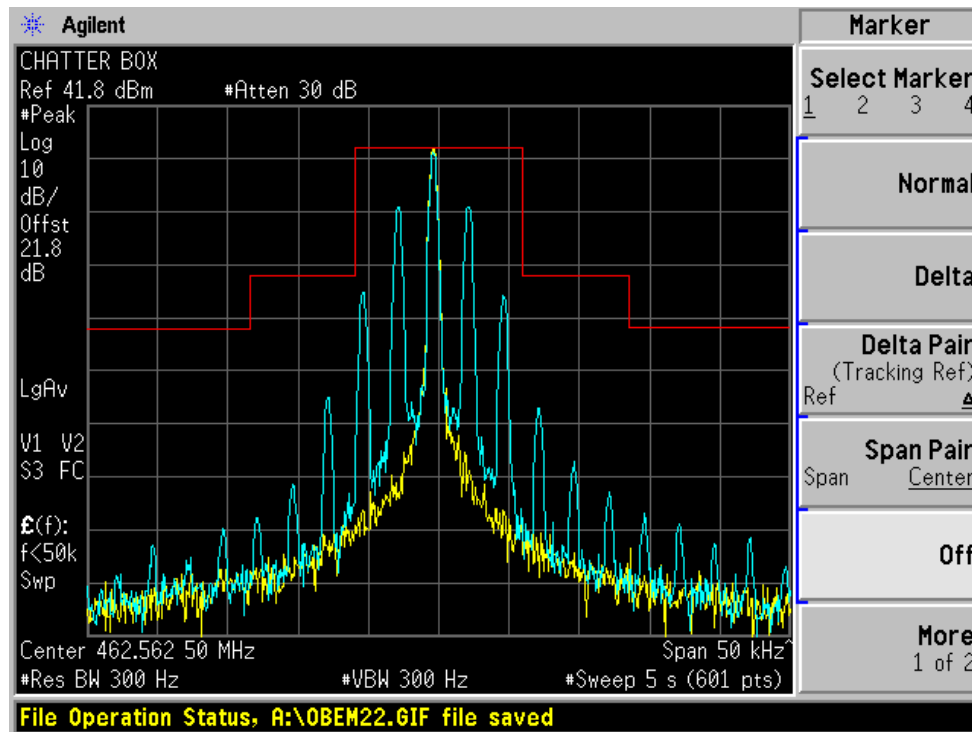
$$D = 2.5 \text{ k}$$

$$K = 1$$

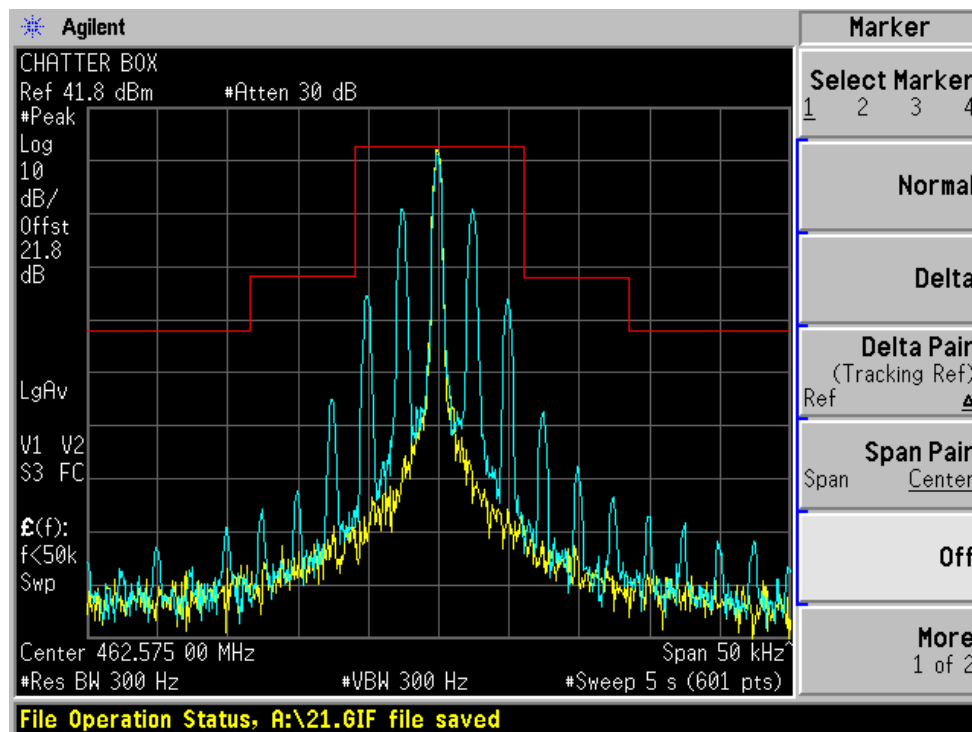
$$B_n = 2(3000) + 2(2500) = 11 \text{ k} \quad \text{Type of Emission: 11k0F3E}$$

GMRS:

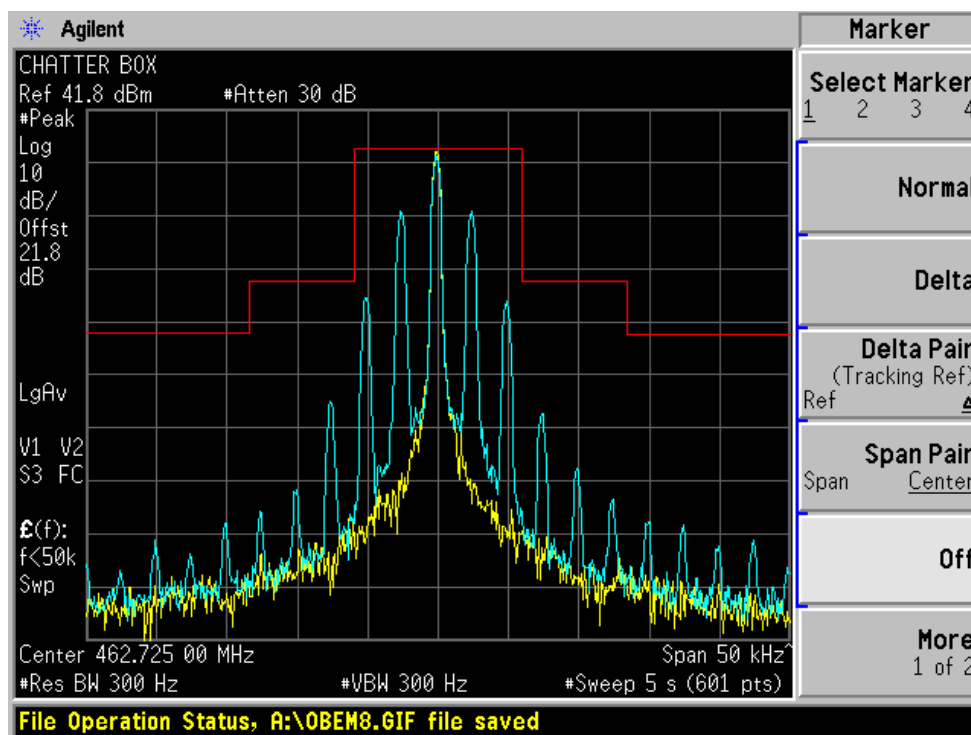
CH 1



CH 8

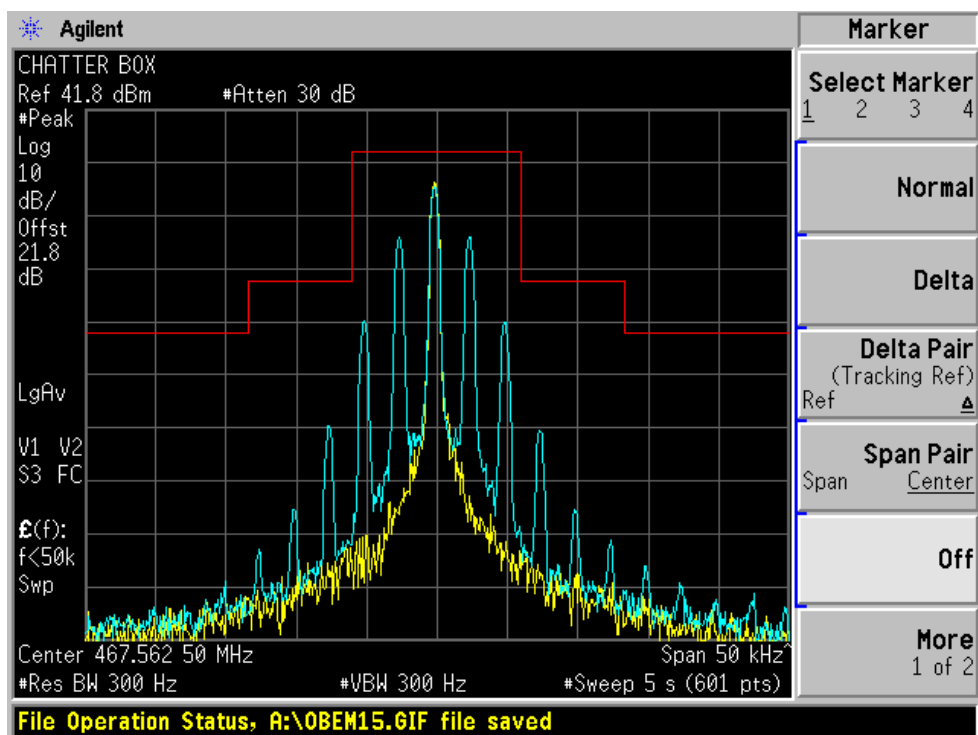


CH 15

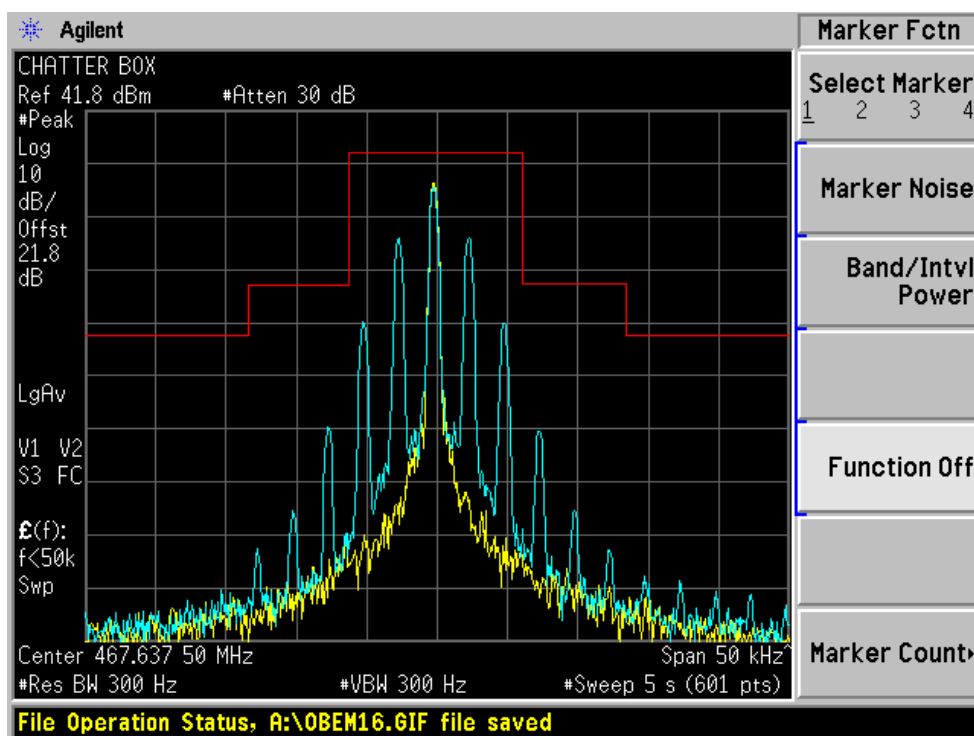


FRS:

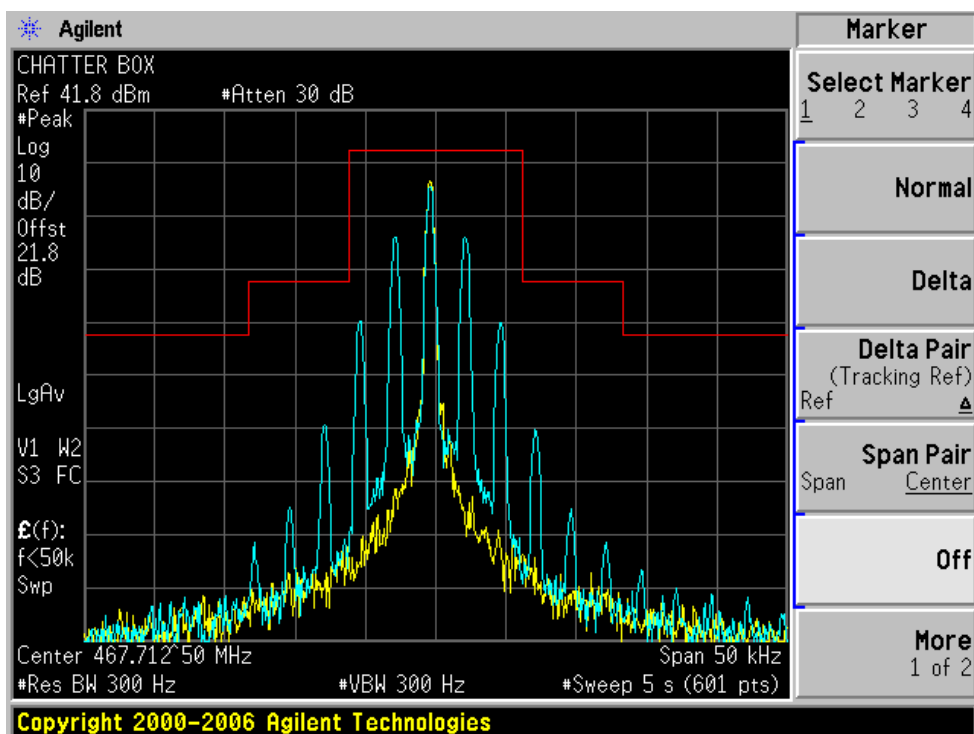
CH 16



CH 19



CH 22



§2.1051, §95.635 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Applicable Standards

CFR47 §2.1051 and §95.635.

Transmitter	Emission type	Applicable paragraphs (b)
GMRS	A1D, A3E, F1D, G1D, F3E, G3E with filtering	(1), (3), (7).
	A1D, A3E, F1D, G1D, F3E, G3E without filtering	(5), (6), (7).
	H1D, J1D, R1D, H3E, J3E, R3E	(2), (4), (7).
FRS	F3E with filtering	(1), (3), (7).

(1) At least 25 dB (decibels) on any frequency removed from the center of the authorized bandwidth by more than 50% up to and including 100% of the authorized bandwidth.

(3) At least 35 dB on any frequency removed from the center of the authorized bandwidth by more than 100% up to and including 250% of the authorized bandwidth.

(7) At least $43 + 10 \log_{10}(T)$ dB on any frequency removed from the center of the authorized bandwidth by more than 250%.

Test Procedure

Conducted:

TIA 603-C Clause 2.2.13

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation.

Test Equipment List and Details

Equipment Description	Model Number	Manufacturer	Serial Numbers	Last Calibration
Spectrum Analyzer	E4440A	Agilent	MY44303352	2007-02-23
Modulation Analyzer	8901A	HP	2026A00847	2006-01-17*
Generator	33220A	Agilent	MY43004878	2006-05-18
Spectrum Analyzer	8565E	Agilent	3964A00131	2007-01-24

*Two year calibration cycle

Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Environmental Conditions

Temperature:	20 °C
Relative Humidity:	59 %
ATM Pressure:	102.0 kPa

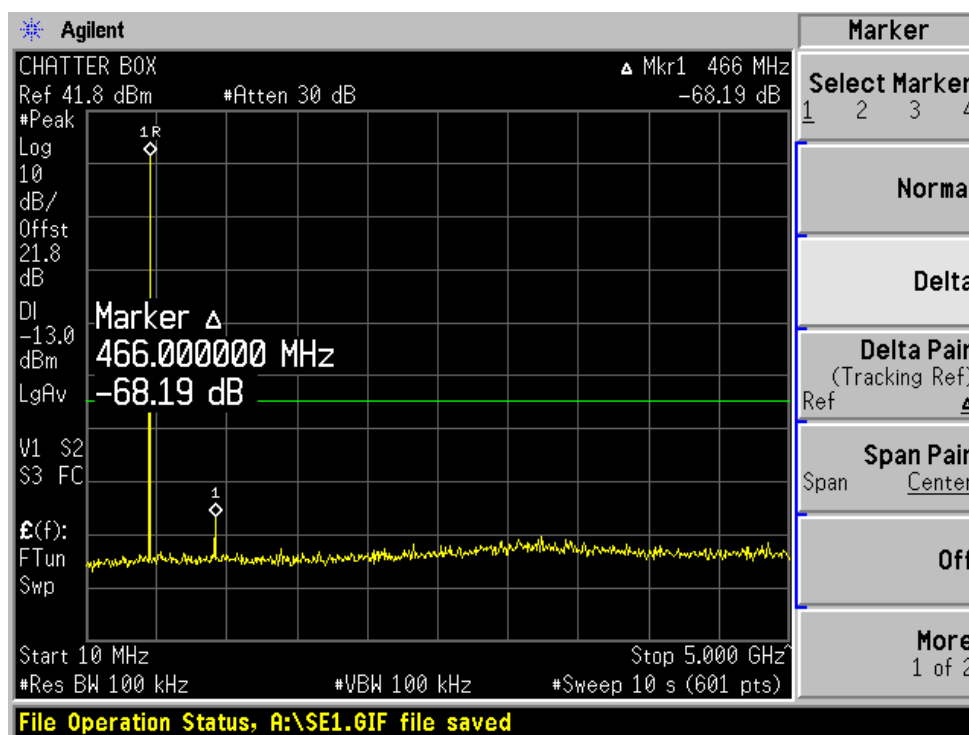
* The testing was performed by Dan Corona on 2007-04-20th to 24th

Test Results

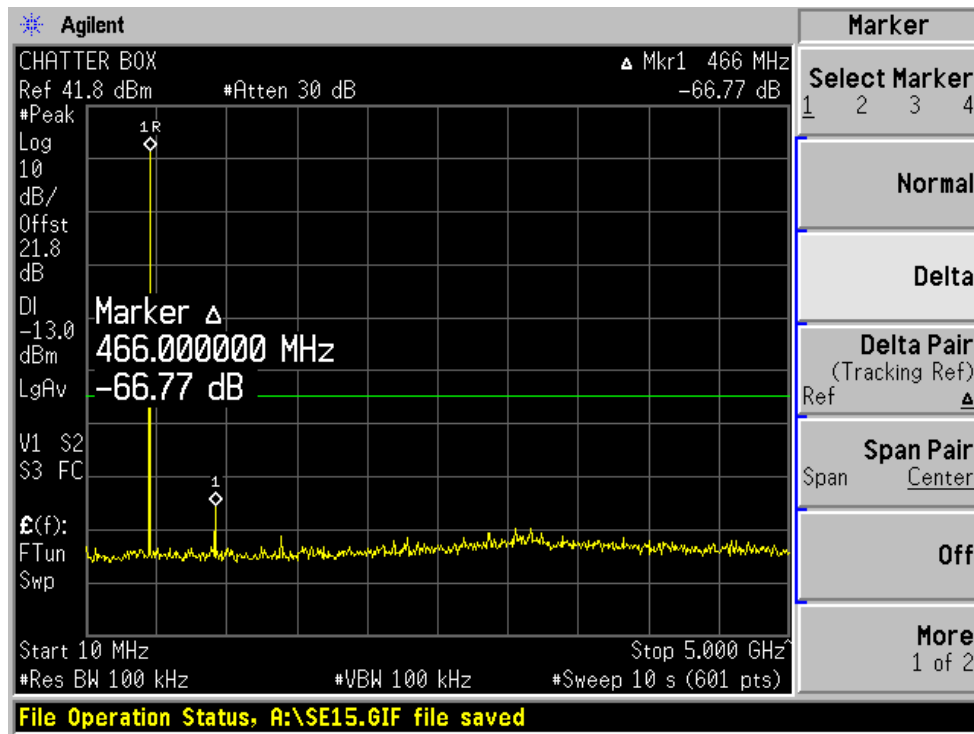
Compliant, please refer to the plots.

GMRS:

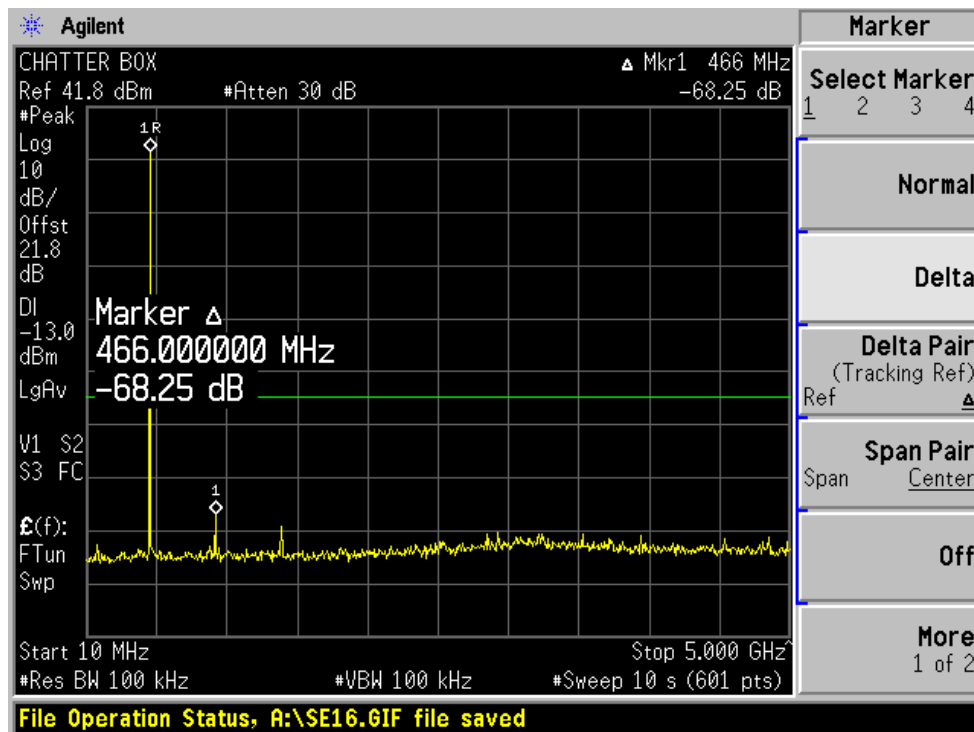
CH 1



CH 8

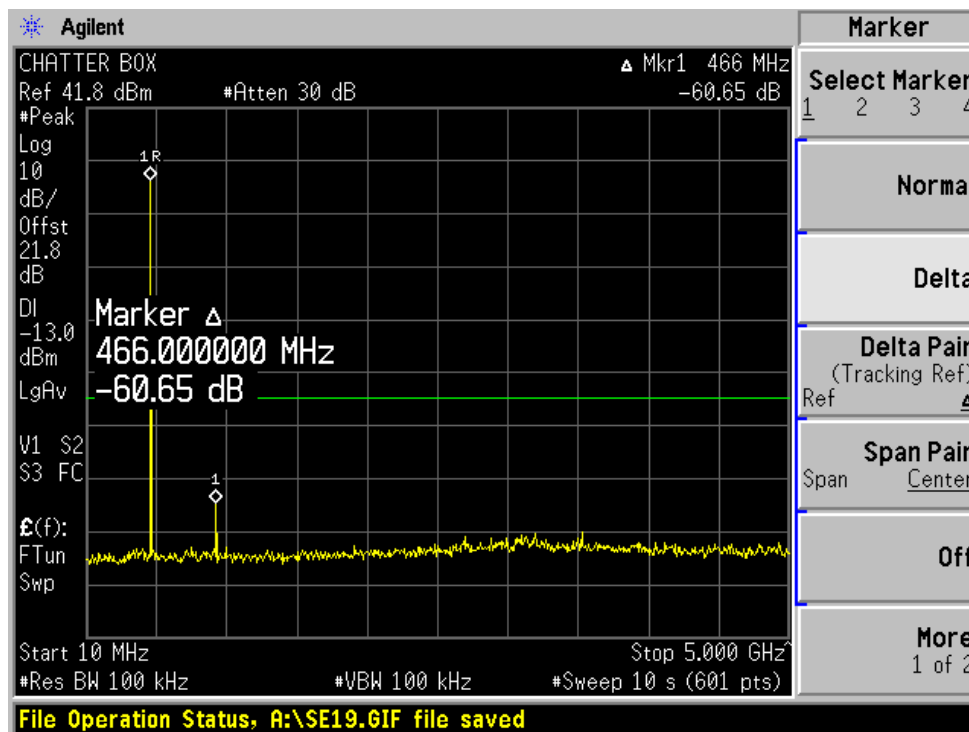


CH 15

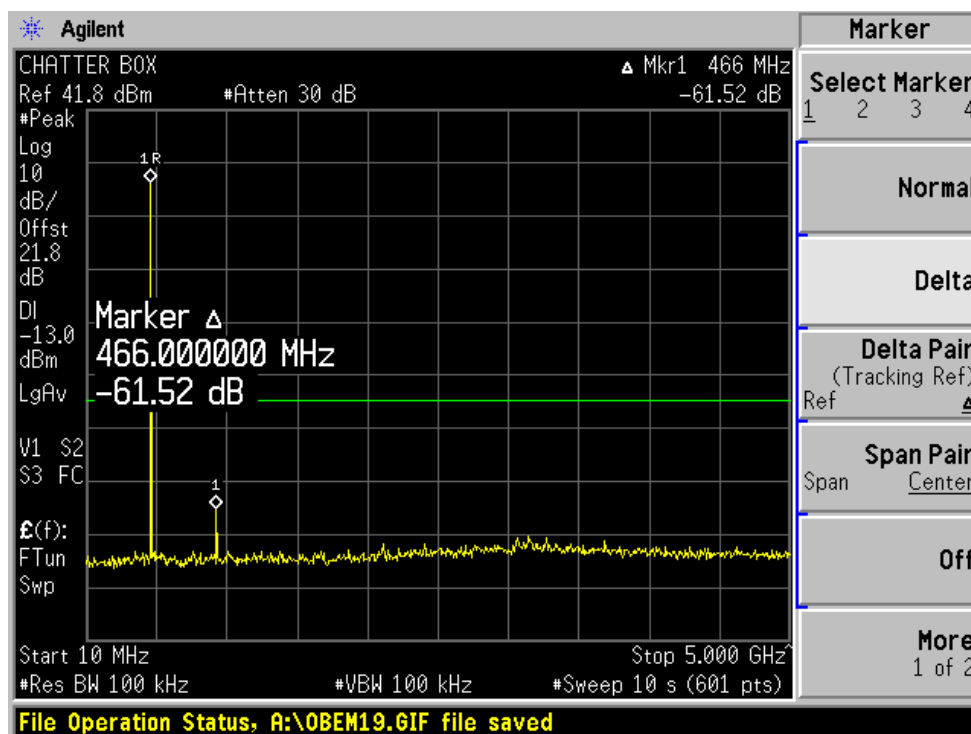


FRS:

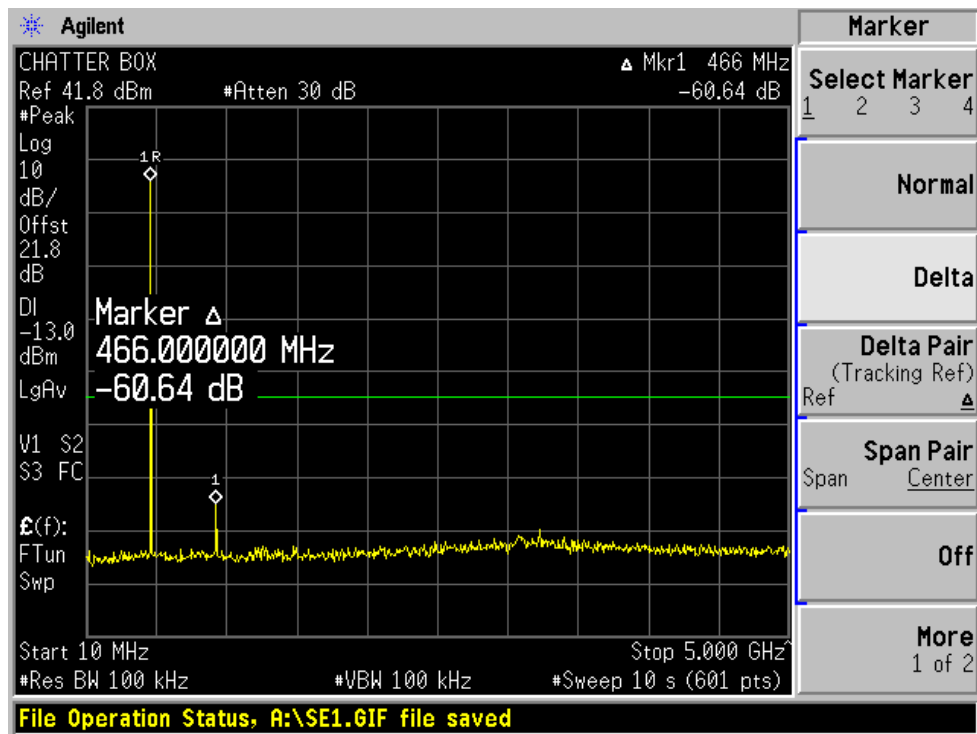
CH 16



CH 19



CH 22



§2.1053 - SPURIOUS RADIATED EMISSIONS

Applicable Standards

CFR47 §2.1051 and §95.635.

Transmitter	Emission type	Applicable paragraphs (b)
GMRS	A1D, A3E, F1D, G1D, F3E, G3E with filtering	(1), (3), (7).
	A1D, A3E, F1D, G1D, F3E, G3E without filtering	(5), (6), (7).
	H1D, J1D, R1D, H3E, J3E, R3E	(2), (4), (7).
FRS	F3E with filtering	(1), (3), (7).

- (1) At least 25 dB (decibels) on any frequency removed from the center of the authorized bandwidth by more than 50% up to and including 100% of the authorized bandwidth.
- (3) At least 35 dB on any frequency removed from the center of the authorized bandwidth by more than 100% up to and including 250% of the authorized bandwidth.
- (7) At least $43 + 10 \log_{10}(T)$ dB on any frequency removed from the center of the authorized bandwidth by more than 250%.

Test Procedure

TIA/EIA 603-C Clause 2.2.12

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

The EUT Removed and replaced with a substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = $10 \log(\text{TXpwr in Watts}/0.001)$ – the absolute level

Spurious attenuation limit in dB = $43 + 10 \log_{10}(\text{power out in Watts})$

Test Equipment List and Details

Equipment Description	Model Number	Manufacturer	Serial Numbers	Last Calibration
Spectrum Analyzer	E4440A	Agilent	MY44303352	2007-02-23
Modulation Analyzer	8901A	HP	2026A00847	2006-01-17*
Generator	33220A	Agilent	MY43004878	2006-05-18
Antenna, Bi-log	JB1	Sunol	A013105-3	2006-04-26
Pre-amplifier	317	Sonoma Instrument	260407	2006-04-26
Antenna, Dipole	AD-100	Com-Power	2219	2006-04-26

*Two year calibration cycle

Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Environmental Conditions

Temperature:	20 °C
Relative Humidity:	59 %
ATM Pressure:	102.0 kPa

* The testing was performed by Dan Coronio on 2007-04-20th to 24th

Test Results

Compliant

GMRS: Channel 1

Indicated		Azimuth Degrees	Antenna Height (m)	Polar. H/V	Substitution					Limit (dBm)	Margin (dB)
Frequency (MHz)	Amp. (dBm)				Frequency MHz	Level (dBm)	Antenna Gain Correction	Cable Loss (dB)	Absolute Level (dBm)		
1387.6875	-37.33	342	2.0	H	1387.6875	-30.20	7.84	0.39	-22.8	-13	-9.8
1387.6875	-39.33	227	1.3	V	1387.6875	-34.00	7.84	0.39	-26.6	-13	-13.6
2312.8125	-44.50	256	1.5	V	2312.8125	-40.11	9.94	0.56	-30.7	-13	-17.7
2312.8125	-41.67	175	1.9	H	2312.8125	-39.87	9.16	0.44	-31.2	-13	-18.2
1850.2500	-43.67	23	2.1	H	1850.2500	-40.64	9.16	0.44	-31.9	-13	-18.9
1850.2500	-40.67	347	2.1	H	1850.2500	-43.64	9.94	0.56	-34.3	-13	-21.3
925.1250	-42.67	296	1.7	V	925.1250	-35.44	0.00	0.36	-35.8	-13	-22.8
925.1250	-40.67	257	2.4	V	925.1250	-37.77	0.00	0.36	-38.1	-13	-25.1

GMRS: Channel 8

Indicated		Azimuth Degrees	Antenna Height (m)	Polar. H/V	Substitution					Limit (dBm)	Margin (dB)
Frequency (MHz)	Amp. (dBm)				Frequency MHz	Level (dBm)	Antenna Gain Correction	Cable Loss (dB)	Absolute Level (dBm)		
1387.7250	-37.20	300	2.3	H	1387.7250	-30.07	7.84	0.53	-22.8	-13	-9.8
1387.7250	-38.98	220	1.4	V	1387.7250	-33.65	7.84	0.53	-26.3	-13	-13.3
1850.3000	-42.78	240	1.6	V	1850.3000	-39.95	9.16	0.56	-31.4	-13	-18.4
1850.3000	-40.58	180	2.0	H	1850.3000	-40.09	9.16	0.56	-31.5	-13	-18.5
2312.8750	-42.98	210	1.8	V	2312.8750	-40.92	9.94	0.56	-31.5	-13	-18.5
2312.8750	-41.89	165	2.1	H	2312.8750	-41.03	9.94	0.56	-31.7	-13	-18.7
925.1500	-41.48	300	2.0	H	925.1500	-35.55	0.00	0.49	-36.0	-13	-23.0
925.1500	-43.96	250	1.7	V	925.1500	-37.68	0.00	0.49	-38.2	-13	-25.2

GMRS: Channel 15

Indicated		Azimuth Degrees	Antenna Height (m)	Polar. H/V	Substitution					Limit (dBm)	Margin (dB)
Frequency (MHz)	Amp. (dBm)				Frequency MHz	Level (dBm)	Antenna Gain Correction	Cable Loss (dB)	Absolute Level (dBm)		
1388.1750	-38.16	245	1.6	H	1388.1750	-30.03	7.84	0.69	-22.9	-13	-9.9
1388.1750	-39.68	160	1.6	V	1388.1750	-34.35	7.84	0.69	-27.2	-13	-14.2
2313.6250	-42.56	278	1.0	V	2313.6250	-39.56	9.94	0.74	-30.4	-13	-17.4
1850.9000	-41.89	120	2.0	H	1850.9000	-39.95	9.16	0.72	-31.5	-13	-18.5
1850.9000	-40.12	300	2.7	H	1850.9000	-40.51	9.16	0.72	-32.1	-13	-19.1
2313.6250	-41.75	280	2.4	H	2313.6250	-44.78	9.94	0.74	-35.6	-13	-22.6
925.4500	-43.54	230	2.0	V	925.4500	-35.33	0.00	0.68	-36.0	-13	-23.0
925.4500	-45.64	185	1.0	V	925.4500	-38.99	0.00	0.68	-39.7	-13	-26.7

FRS: Channel 16

Indicated		Azimuth Degrees	Antenna Height (m)	Polar. H/V	Substitution					Limit (dBm)	Margin (dB)
Frequency (MHz)	Amp. (dBm)				Frequency MHz	Level (dBm)	Antenna Gain Correction	Cable Loss (dB)	Absolute Level (dBm)		
935.1250	-31.11	293	2.0	V	935.1250	-23.88	0.00	0.36	-24.2	-13	-11.2
1402.6875	-32.23	221	1.6	H	1402.6875	-35.05	8.33	0.39	-27.1	-13	-14.1
1402.6875	-40.38	294	1.5	V	1402.6875	-37.52	8.33	0.39	-29.6	-13	-16.6
935.1250	-47.65	161	2.0	H	935.1250	-29.33	0.00	0.36	-29.7	-13	-16.7
2337.8125	-40.32	152	2.0	H	2337.8125	-39.76	9.94	0.74	-30.56	-13	-17.6
2337.8125	-42.52	166	1.4	V	2337.8125	-41.66	9.94	0.74	-32.46	-13	-19.5
1870.2500	-46.23	188	1.5	V	1870.2500	-43.2	9.16	0.44	-34.5	-13	-21.5
1870.2500	-48.32	280	1.3	H	1870.2500	-46.52	9.16	0.44	-37.8	-13	-24.8

FRS: Channel 19

Indicated		Azimuth Degrees	Antenna Height (m)	Polar. H/V	Substitution					Limit (dBm)	Margin (dB)
Frequency (MHz)	Amp. (dBm)				Frequency MHz	Level (dBm)	Antenna Gain Correction	Cable Loss (dB)	Absolute Level (dBm)		
1402.9125	-32.31	195	2.2	V	1402.9125	-33.52	8.33	0.53	-25.7	-13	-12.7
1402.9125	-31.56	185	1.4	H	1402.9125	-35.01	8.33	0.53	-27.2	-13	-14.2
2338.1875	-43.65	254	1.5	H	2338.1875	-40.64	9.94	0.56	-31.3	-13	-18.3
2338.1875	-40.34	195	1.1	V	2338.1875	-42.55	9.94	0.65	-33.3	-13	-20.3
1870.5500	-41.20	185	1.3	H	1870.5500	-44.45	9.16	0.56	-35.9	-13	-22.9
1870.5500	-43.41	180	2.3	V	1870.5500	-47.56	9.16	0.56	-39.0	-13	-26.0
935.2750	-47.48	245	1.2	V	935.2750	-42.15	0.00	0.49	-42.6	-13	-29.6
925.4250	-49.36	156	1.0	H	925.4250	-43.12	0.00	0.49	-43.6	-13	-30.6

FRS: Channel 22

Indicated		Azimuth Degrees	Antenna Height (m)	Polar. H/V	Substitution					Limit (dBm)	Margin (dB)
Frequency (MHz)	Amp. (dBm)				Frequency MHz	Level (dBm)	Antenna Gain Correction	Amp. (dBm)	Absolute Level (dBm)		
1403.1375	-31.13	195	1.2	V	1403.1375	-31.43	8.33	0.69	-23.8	-13	-10.8
2338.5625	-33.15	185	2.1	H	2338.5625	-39.69	9.94	0.74	-30.5	-13	-17.5
1403.1375	-41.56	254	1.3	H	1403.1375	-38.23	8.33	0.69	-30.6	-13	-17.6
2338.5625	-43.56	195	1.4	V	2338.5625	-41.45	9.94	0.74	-32.3	-13	-19.3
1870.8500	-40.25	185	2.6	H	1870.8500	-44.32	9.16	0.72	-35.9	-13	-22.9
1870.8500	-41.45	180	1.0	V	1870.8500	-44.43	9.16	0.72	-36.0	-13	-23.0
935.4250	-46.12	245	2.3	V	935.4250	-43.16	0.00	0.68	-43.8	-13	-30.8
935.4250	-46.23	156	1.3	H	935.4250	-44.15	0.00	0.68	-44.8	-13	-31.8

§2.1055, §95.621, §95.627 - FREQUENCY STABILITY

Applicable Standard

CFR47 §2.1055, §95.621 (b), §95.627 (b)

§95.621 (b) Each GMRS transmitter for mobile station, small base station and control station operation must be maintained within a frequency tolerance of 0.0005%. Each GMRS transmitter for base station (except small base), mobile relay station or fixed station operation must be maintained within a frequency tolerance of 0.00025%.

§95.627 (b) Each FRS unit must be maintained within a frequency tolerance of 0.00025%.

Test Procedure

Frequency Stability vs. Temperature:

The equipment under test was connected to an external DC power supply and the RF output was connected to a frequency counter via feed through attenuators. EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the frequency counter.

Frequency Stability vs. Voltage:

An external variable DC power supply was connected to the EUT, The voltage was set to 115%, 100%, and 85% of the nominal operating input voltage, and the frequency output was recorded from the frequency counter.

Test Equipment List and Details

Equipment Description	Model Number	Manufacturer	Serial Number	Calibration Date
Frequency Counter	5342 A	HP	2232A06380	2006-12-12*
Spectrum Analyzer	E4440A	Agilent	MY44303352	2007-02-23
Temperature Oven	VersaTenn	Tenney	12.222-193	2006-06-27

*Two year calibration cycle

Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Environmental Conditions

Temperature:	20 °C
Relative Humidity:	59 %
ATM Pressure:	102.0 kPa

* The testing was performed by Dan Corona on 2007-04-20th to 24th

Test Results

Compliant

FRS**Frequency stability versus temperature:**

Reference Frequency 467.5625 MHz, Limit : 0.00025% or 2.5 PPM			
Environment Conditions		Frequency Measure with Time Elapsed	
Temperature (^o C)	Power supplied (V DC)	Measured Frequency (MHz)	Error (%)
50	4.8	467.562412	0.0000188
40	4.8	467.562423	0.0000165
30	4.8	467.562409	0.0000195
20	4.8	467.562440	0.0000128
10	4.8	467.562440	0.0000128
0	4.8	467.562410	0.0000192
-10	4.8	467.562419	0.0000173
-20	4.8	467.562456	0.0000094
-30	4.8	467.562401	0.0000212

Frequency Stability versus Voltage:

Reference Frequency 462.7125 MHz, Limit : 0.00025% or 2.5 PPM			
Environment Conditions		Frequency Measure with Time Elapsed	
Temperature (^o C)	Power supplied (V DC)	Measured Frequency (MHz)	Error (%)
20	5.1	467.562452	0.0000103
20	5.52	467.562448	0.0000111

GMRS**Frequency stability versus temperature:**

Reference Frequency 462.5750 MHz, Limit : 0.0005% or 5 PPM			
Environment Conditions		Frequency Measure with Time Elapsed	
Temperature (°C)	Power supplied (V DC)	Measured Frequency (MHz)	Error (%)
50	4.8	462.574933	0.0000145
40	4.8	462.574932	0.0000147
30	4.8	462.574927	0.0000158
20	4.8	462.574951	0.0000106
10	4.8	462.574945	0.0000119
0	4.8	462.574936	0.0000138
-10	4.8	462.574949	0.0000110
-20	4.8	462.574950	0.0000102
-30	4.8	462.574952	0.0000104

Frequency Stability versus Voltage:

Reference Frequency 462.7125 MHz, Limit : 0.0005% or 5 PPM			
Environment Conditions		Frequency Measure with Time Elapsed	
Temperature (°C)	Power supplied (V DC)	Measured Frequency (MHz)	Error (%)
20	5.1	462.574939	0.0000132
20	5.52	462.574940	0.0000130