THRU Lab & Engineering.

477-6, Hager-Ri, Yoju-Up, Yoju-Gun
Kyunggi-Do,469-803, Korea
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THRU

Test Report

Product Name: GMRS/FRS Combination

MODEL NO:FR-1000

FCC ID:VGJFR-1000

Applicant:

ETON Corporation
1015 Corporation Way, Palo Alto,
CA 94303, USA

Date Receipt:06/15/2007

Date Tested: 06/25/2007

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APPLICANT: ETON Corporation
FCC ID : VGJFR-1000

TEST REPORT

EXHIBITS CONTAINING:

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GENERAL INFORMATION REQUIRED
FOR CERTIFICATION

2.1033 (c) (1) (2) ETON Corporation will manufacture

the FCCID: VGJFR-1000 GMRS/FRS COMBINATION TRANSCEIVER in quantity, for use under FCC RULES PART 95A&B.
ETON Corporation
1015 Corporation Way, Palo Alti,
CA 94303, USA

2.1033 (c) TECHNICAL DESCRIPTION

2.1033 (c) (3) Instruction book. A draft copy of the instruction manual is included as EXHIBIT 7.

2.1033 (c) (4) Type of Emission : 9K8F3E
95.631

Bn = 2M + 2DK
M = 3000
D = 1.889k
Bn =2(3000) + 2(1889) = 9.8k

GMRS Authorized Bandwidth :20.0kHz

2.1033 (c) (5) GMRS Frequency Range:
95.621

1. 462.5500 13. 462.7000
2. 462.5625 14. 462.7125
3. 462.5750 15. 462.7250
4. 462.5875 16. 467.5500
5. 462.6000 17. 467.5750
6. 462.6125 18. 467.6000
7. 462.6250 19. 467.6250
8. 462.6375 20. 467.6500
9. 462.6500 21. 467.6750
10. 462.6625 22.467.7000
11. 462.6750 23. 467.7250
12. 462.6875

FRS Authorized Bandwidth:11.25kHz

2.1033(c)(5) FRS Frequency Range:
95.627

1. 462.5625 8. 467.5625
2. 462.5875 9. 467.5875
3. 462.6125 10. 467.6125
4. 462.6375 11. 467.6375
5. 462.6625 12. 467.6625
6. 462.6875 13. 467.6875
7. 462.7125 14. 467.7125 MHz

2.10311c)(6)(7) RF power is measured by the substitution method as
2.1046(a) outlined in TIA/EIA - 603. With a Alkaline battery voltage of 6 V, and the transmitter properly adjusted the RF output measures:

power supply : Alkaline battery 1.5V * 4(6VDC)

GMRS (HIGH) – 0.5574 Watts
GMRS (LOW) - 0.1014 Watts
FRS - 0.1040 Watts

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2.1033(c)(6)(7) FRS Power Output shall not exceed 0.50 Watts effective

95.639 radiated power. There can be no provisions for

95.649 Increasing the power or varying the power.

2.1033(c)(8) DC Voltages and Current into Final Amplifier:
FINAL AMPLIFIER ONLY

FOR GMRS HIGH POWER SETTING INPUT POWER: (6V)(0.92A)=5.52 Watts
FOR GMRS LOW POWER SETTING INPUT POWER: (6V)(0.47A)=2.82 Watts
FOR FRS POWER SETTING INPUT POWER: (6V)(0.48A)=2.88 Watts

2.1033(c)(9) Tune-up procedure. The tune-up procedure is included as EXHIBIT # 9.

2.1033(c)(10) Complete Circuit Diagrams: The circuit diagram is included as EXHIBIT 6 of this report. The block diagrams are included as EXHIBIT 5 of this report.

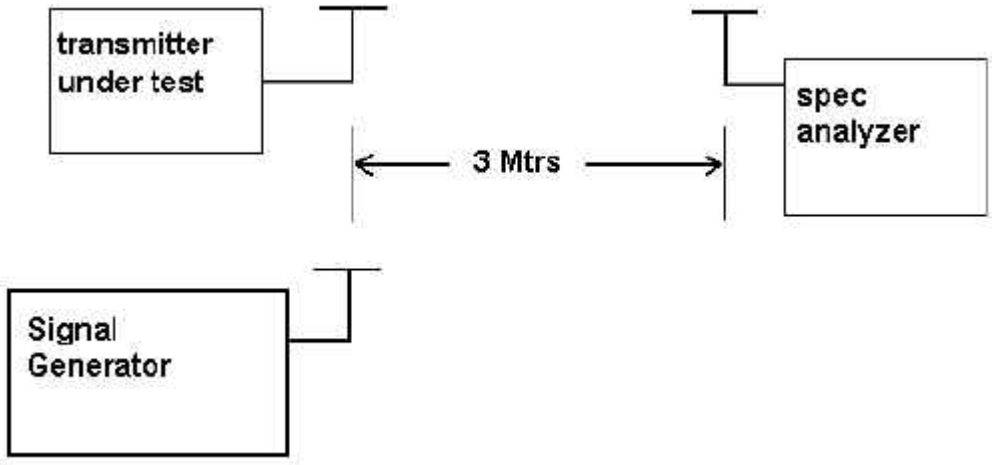
2.1033(c)(11) A photograph or a drawing of the equipment identification label is included as exhibit No. 1.

2.1033(c)(12) Photographs(8"X10") of the equipment of sufficient clarity to reveal equipment construction and layout, including meters, labels for controls, including any view under shields. See exhibits 3-4.

2.1033(c)(13) Digital modulation is not allowed.

2.1033(c)(14) The data required by 2.1046 through 2.1057 is submitted below.

2.1046(a) RF power output. The test procedure used was TIA/EIA-603.



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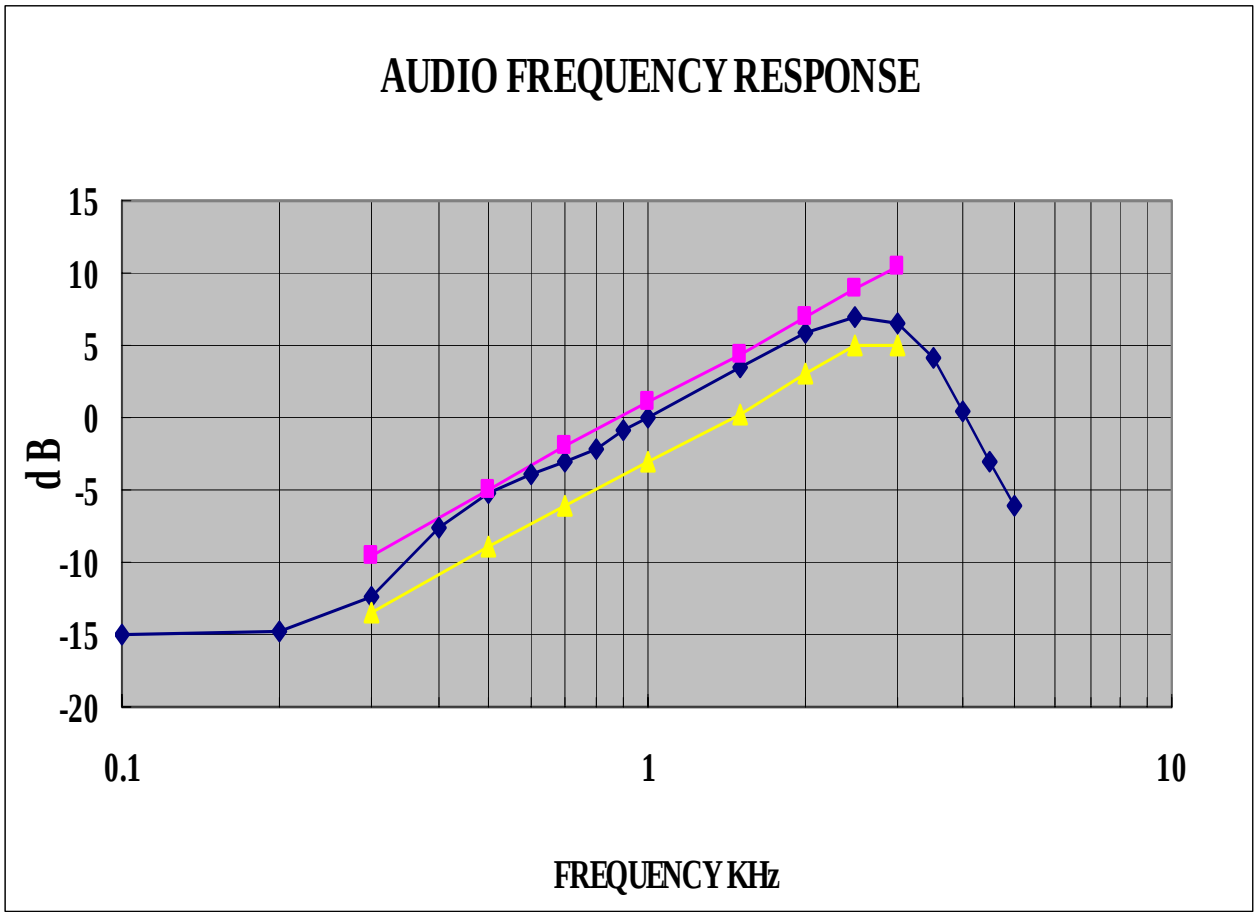
2.1047 (a) (b) Modulation characteristics :

AUDIO FREQUENCY RESPONSE

The audio frequency response was measured in accordance with TIA/EIA Specification 603. The audio frequency response curve is shown on the next page. The audio signal was fed into a dummy microphone Circuit and into the microphone connector. The Input required to produce 30 percent modulation Level was measured. See plot below.

AUDIO FRQUENCY RESPONSE PLOT GOES HERE



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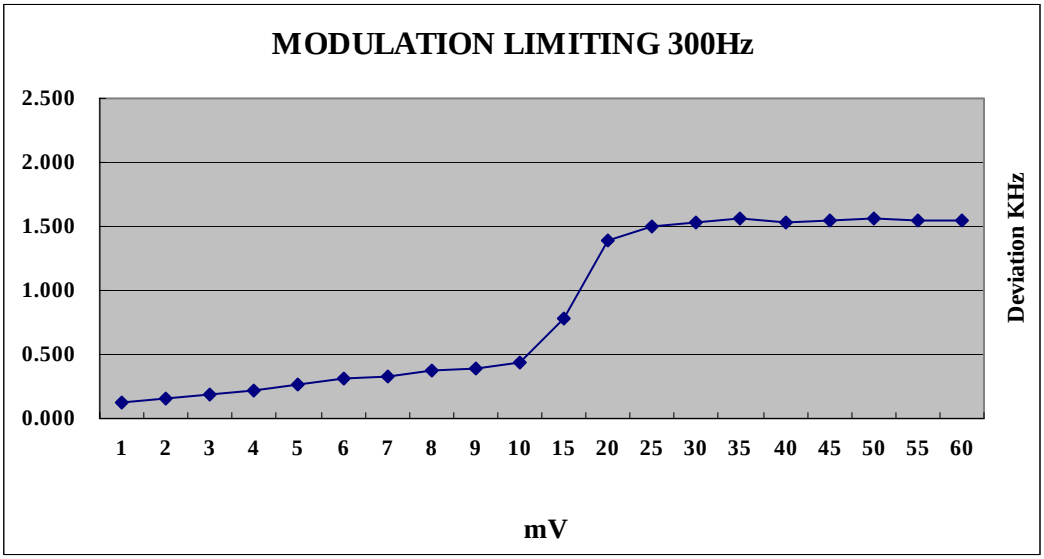
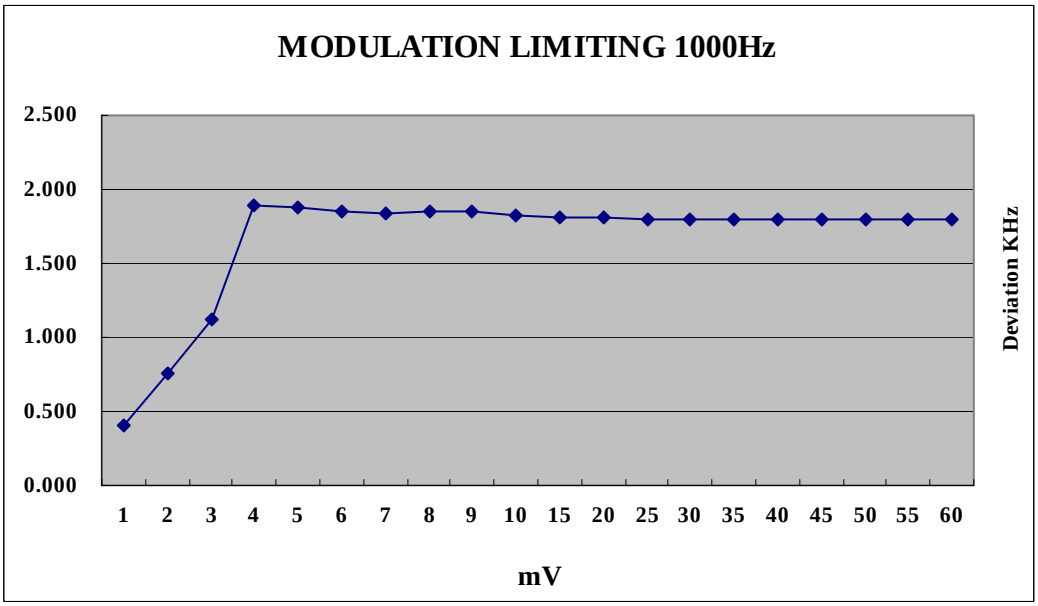
2.1047 (b) Audio input versus modulation

The audio input level needed for a particular per-percentage of modulation was measured in accor – dance with TIA/EIA Specification 603. The audio input curves versus modulation are on the following pages. Curves are provided for audio input frequent-cies of 300, 1000, and 2500 Hz. See Pages 4 and 5 of report.





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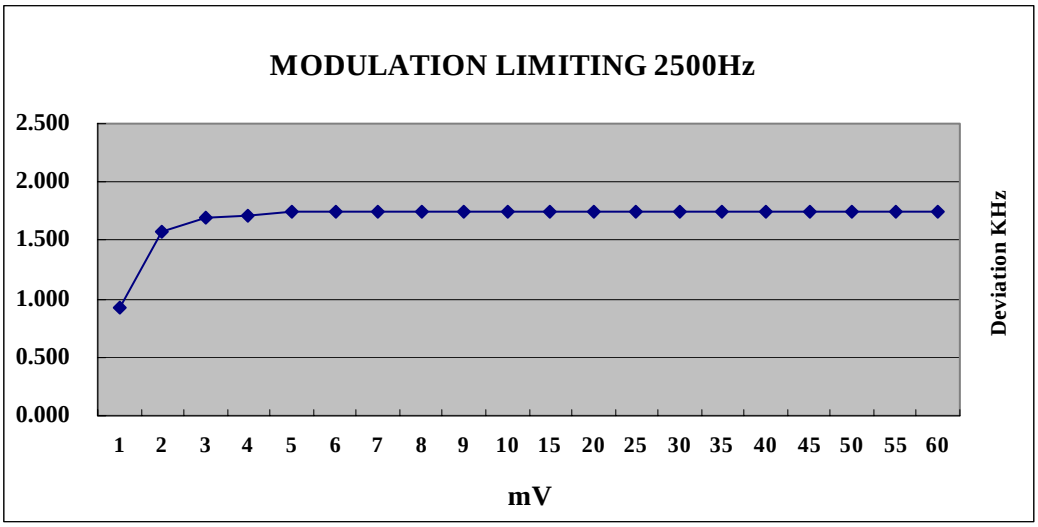

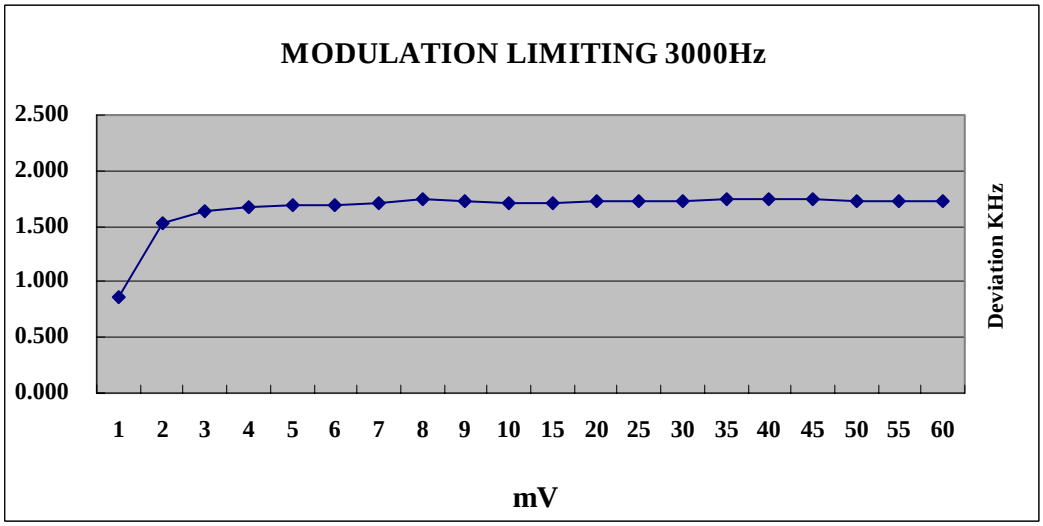

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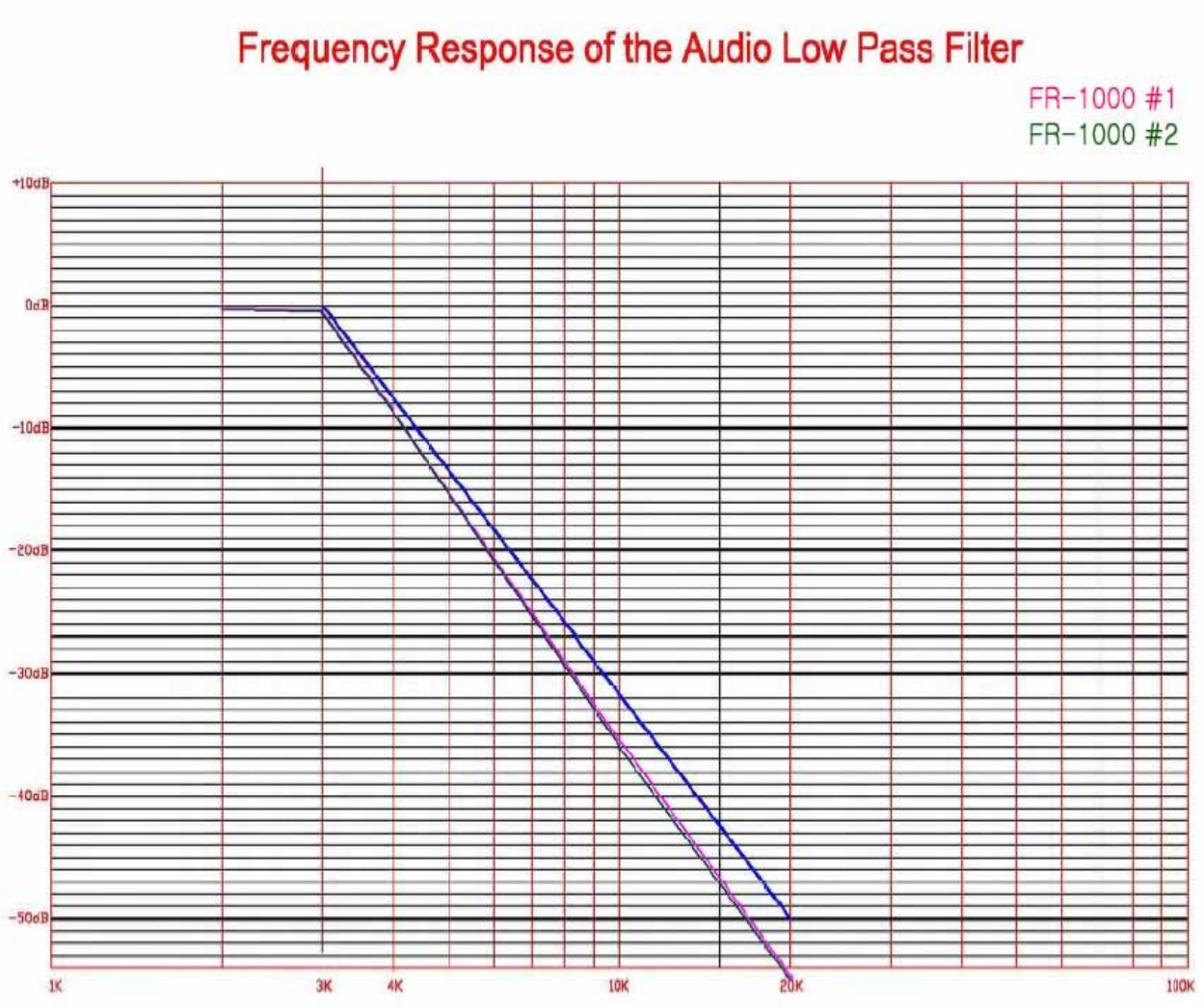
AUDIO LOW PASS FILTER GRAPH

95.637 Post Limiter Filter Each GMRS transmitter, except a Mobile station transmitter with a power of 2.5Watts or less, must be equipped with an audio low pass filter. At any frequency between 3 & 20 kHz the filter must have an attenuation of 60log (f/3) greater than the attenuation at 1KHz. See below.



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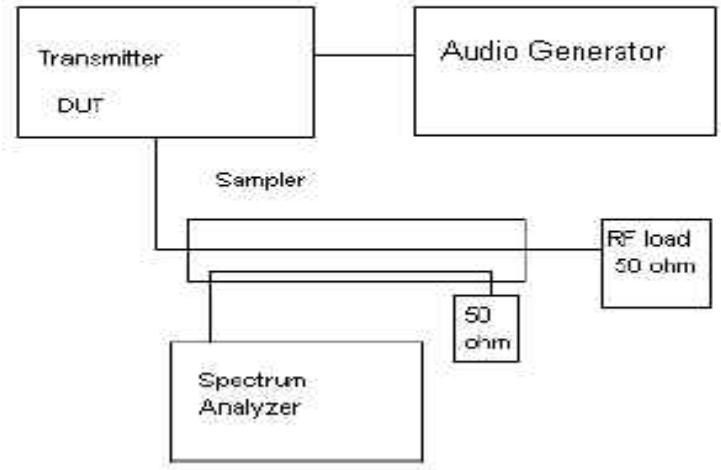
2.1049 Occupied bandwidth :
95.635 (b) (1) (3) (7)

At least 25dB on any frequency removed from the center of the authorized bandwidth by more than 50%up to and including 100% of the authorized bandwidth. At least 35dBon any frequency removed from the center of the authorized BW by more than 100% up to and including 250% of the authorized BW. At lease 43+log10(TP) dB on any frequency removed from the center of the authorized bandwidth by more than 250%. See plots on the next 1 pages.

Occupied BW Test Equipment Setup



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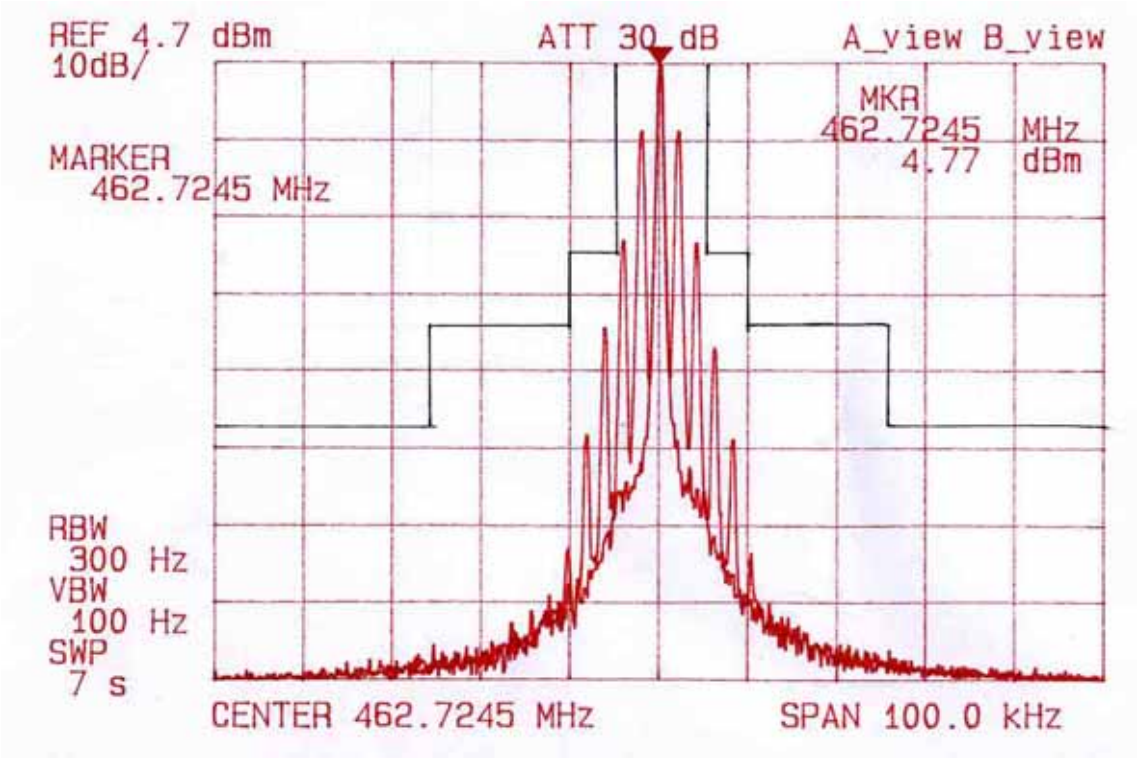
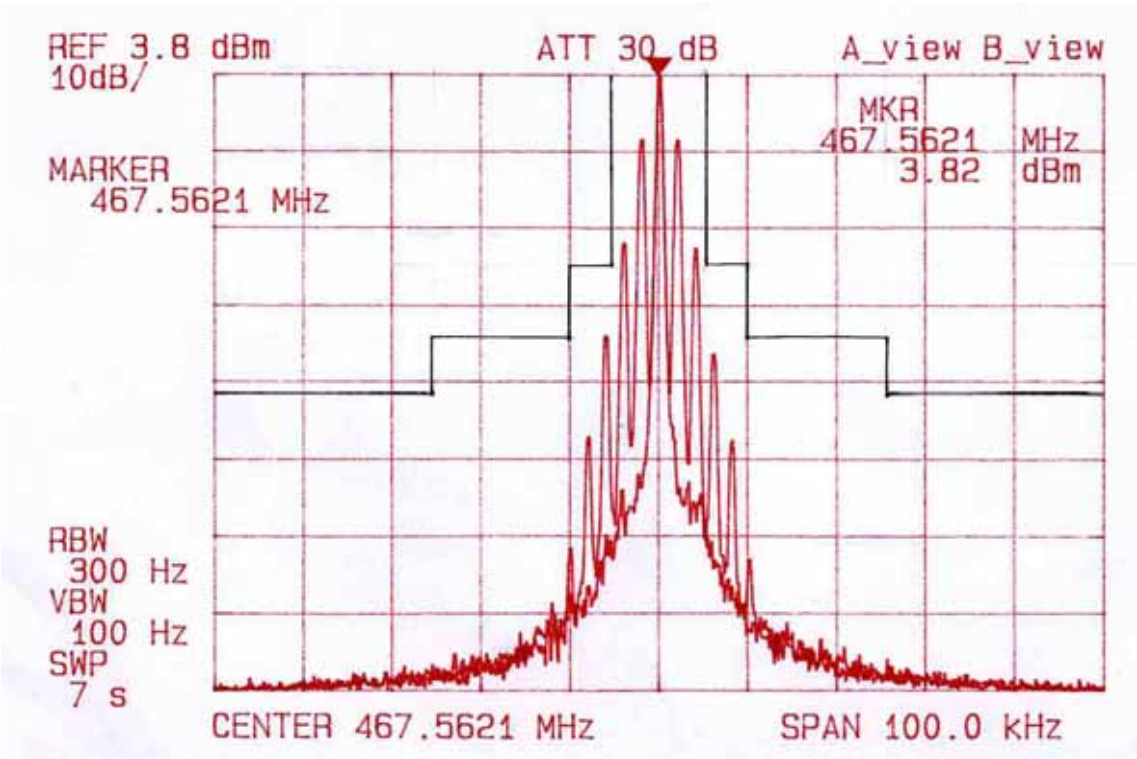
22ch



8ch



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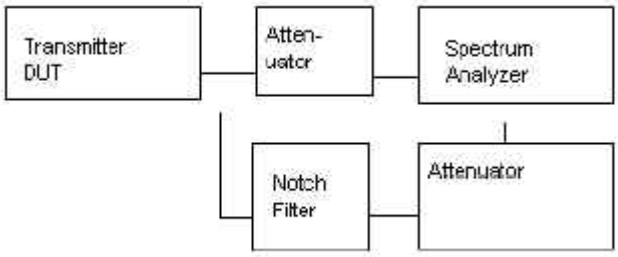
2.1051 Spurious emissions at antenna terminals (conducted) :

The following data shows the level of conducted spurious responses at the antenna terminal. The test procedure used was TIA/EIA 603 S2.2.13 with the exception that the emissions were recorded in dBc. The spectrum was the fundamental.

spurious Emission at
antenna Terminals



Method of Measuring Conducted Spurious Emissions

2.1051 Spurious emissions at the Antenna Terminals

NAME OF TEST: SPURIOUS EMISSIONS AT ANTENNA TERMINALS

2.1051 Not Applicable, no antenna terminal allowed.

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2.1053 UNWANTED RADIATION
95.635 (b) (7)

The tabulated Data shows the results of the radiated Field strength emissions test. The spectrum was Scanned from 30 MHz to at least the 10^{th} harmonic of The fundamental. This test was conducted per ANSI C63.4 – 2003.

REQUIREMENTS: GMRS (HIGH): 43 + 10log(0.5574) = 40.46dB
(LOW) : 43 + 10log(0.1014) = 33.06dB

GMRS-High				GMRS-Low			
frequency	**dBc**	**Margin**	**dBm**	**frequency**	**dBc**	**Margin**	**dBm**
462.7250				462.7250			
925.4500	61.24	20.78	-33.78	925.4500	52.04	18.98	-31.98
1388.1750	67.55	27.09	-40.09	1388.1750	61.05	27.99	-40.99
1850.9000	75.49	35.03	-48.03	1850.9000	65.39	32.33	-45.33
2313.6250	68.07	27.61	-40.61	2313.6250	62.67	29.61	-42.61
2776.3500	68.31	27.85	-40.85	2776.3500	59.81	26.75	-39.75
3239.0750	66.49	26.03	-39.03	3239.0750	58.89	25.83	-38.83
3701.8000	66.95	26.49	-39.49	3701.8000	50.05	16.99	-29.99
4164.5250	62.75	22.29	-35.29	4164.5250	60.25	27.19	-40.19
4627.2500	61.65	21.19	-34.19	4627.2500	58.05	24.99	-37.99

METHOD OF MEASUREMENT : The tabulated data shows the results of the radiated field strength emissions test. The spectrum was scanned from 30 MHz to at least the tenth harmonic of the fundamental. This test was conducted per TIA/EIA STANDARD 603 using the substitution method. Measurements were made at the open field test site of ThruLab & ENGINEERING. located at 477-6, Hager-Ri, Yoju-Up, Yoju-Gun, Kyunggi-Do,469-803, Korea

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2.1053 UNWANTED RADIATION:
95.635 (b) (7)

The tabulated Data shows the results of the radiated Field strength emissions test. The spectrum was Scanned from 30 MHz to at least the 10^{th} harmonic of The fundamental. This test was conducted per ANSI C63.4 – 2003.

REQUIREMENTS: FRS: 43 + 10log(0.1040) = 33.17dB

FRS			
frequency	dBc	Margin	dBm
467.5625			
935.1250	51.45	18.28	-31.28
1402.6875	59.79	26.62	-39.62
1870.2500	66.73	33.56	-46.56
2337.8125	63.41	30.24	-43.24
2805.3750	58.86	25.69	-38.69
3272.9375	59.62	26.45	-39.45
3740.5000	62.09	28.92	-41.92
4208.0625	61.72	28.55	-41.55
4675.6250	58.47	25.30	-38.30

METHOD OF MEASUREMENT : The tabulated data shows the results of the radiated field strength emissions test. The spectrum was scanned from 30 MHz to at least the tenth harmonic of the fundamental. This test was conducted per TIA/EIA STANDARD 603 using the substitution method. Measurements were made at the open field test site of ThruLab & ENGINEERING. located at 477-6, Hager-Ri, Yoju-Up, Yoju-Gun, Kyunggi-Do,469-803, Korea

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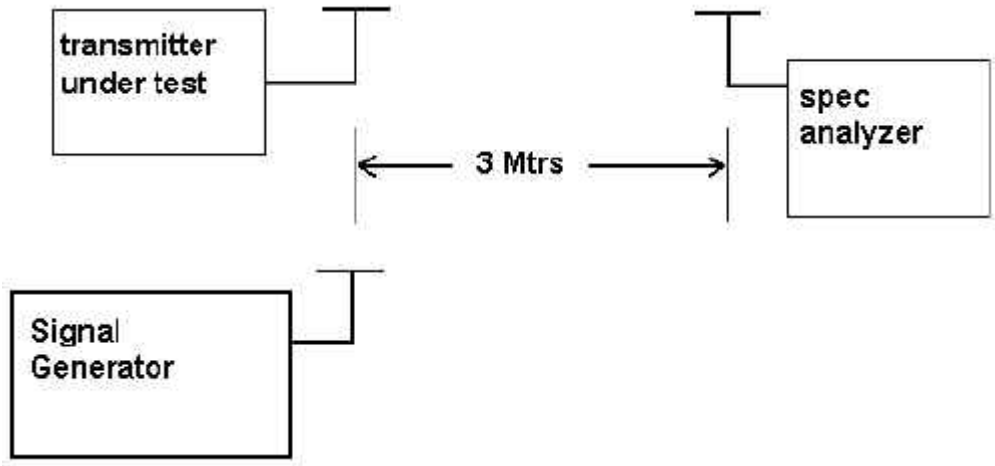
Method of Measuring Radiated Spurious Emissions



Equipment placed 80 cm above ground

on a rotatable platform.

* Appropriate antenna raised from 1 to 4 M.

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2.1055 Frequency stability
95.621 (b)

Temperature and voltage tests were performed to verify that The frequency remains within the 0.0005%, 5 ppm specification limit. The test was conducted as follows : The transmitter was placed in the temperature chamber at 25 degrees C and allowed to stabilize for one hour. The transmitter was keyed ON for one minute during which four frequency readings were recorded at 15 second intervals. The worse case number was taken for temperature plotting. The acssigned channel frequency was considered to be the reference frequency. The temperature was then reduced to – 30 degress C after which the transmitter was again allowed to stabi-lize for one hour. The transmitter was keyed ON for one minute, and again frequency readings were noted at 15 second intervals. The worst case number was recorded for temperature plotting. This procedure was repeated in 10 degree increments up to + 50 degrees C.

Reading were also taken at the end point of the battery voltage of 6 V/dc

MEASUREMENT DATA:

REFERENCE VOTAGE (V DC)	6.0	REFERENCE FREQUENCY (MHz)	462.57500
TEMPERATURE	FREQUENCY(MHz)	PPM	LIMIT(ppm)
-30	462.57612	2.42	5.0
-20	462.57573	1.57	2.5
-10	462.57579	1.71	2.5
0	462.57586	1.87	2.5
10	462.57598	2.12	2.5
20	462.57510	0.22	2.5
30	462.57532	0.68	2.5
40	462.57461	-0.84	2.5
50	462.57578	1.68	2.5
+15% Battery : 6.9V	462.57550	1.08	2.5
-15% Battery : 5.1V	462.57567	1.44	2.5

Note: This EUT meets the frequency stability requirement for a FRS: +/-2.5ppm over temp range of -20 degress C to + 50 degrees C. It also meets the GMRS frequency stability requirements : +/- 5ppm over the temp range -30 degrees C to +50 degrees C.

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TEST Equipment List

No	Description	Manufacturer	Model No.	Serial No.	Due Cal.
1	Test Receiver	Rohde & Schwarz	ESHS 10	825832/014	2007.08.25
2	Test Receiver	Rohde & Schwarz	ESVS 10	826008/014	2008.06.12
3	Spectrum Analyzer	Hewlett Packard	8566B	2311A02394	2008.06.13
4	Spectrum Display	Hewlett Packard	85662A	2542A12429	2008.06.13
5	Quasi-peak Adapter	Hewlett Packard	85650A	2521A00887	2008.06.13
6	RF Preselector	Hewlett Packard	85685A	2648A00504	2008.06.13
7	Preamplifer	Hewlett Packard	8449B	3008A00375	2007.04.23
8	Preamplifer	Hewlett Packard	8447F	3113A05367	2007.05.09
9	Preamplifer	Hewlett Packard	8447F	2805A02570	2008.05.28
10	Preamplifer	A.H. Systems	PAM-0118	164	2008.05.08
11	Biconical Antenna	Eaton Corp.	94455-1	0977	2008.04.01
12	Biconical Antenna	EMCO	3104C	9111-2468	2008.06.07
13	Log Periodic Antenna	EMCO	3146	2051	2008.05.11
14	Horn Antenna	A.H. Systems	SAS-571	414	2008.03.17
15	Loop Antenna	Rohde & Schwarz	HFH2-Z2.335.4711.52	826532/006	2009.01.31
16	Dipole Antenna	Rohde & Schwarz	VHAP	574	2007.12.12
17	Dipole Antenna	Rohde & Schwarz	VHAP	575	2007.12.12
18	Dipole Antenna	Rohde & Schwarz	UHAP	546	2007.12.12
19	Dipole Antenna	Rohde & Schwarz	UHAP	547	2007.12.12
20	Signal Generator	Rohde & Schwarz	SMX	825459/030	2007.06.15
21	Spectrum Monitor	Rohde & Schwarz	EZM	862304/007	None
22	Panorama Monitor	Rohde & Schwarz	EPN	883707/207	None

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23	Spectrum Analyzer	Advantest Corp.	R3261C	61720208	2008.06.12
24	LISN	EMCO	3825/2	9111-1912	2007.12.12
25	LISN	Kyoritsu	KNW-242	8-923-2	2008.05.23
26	Plotter	Hewlett Packard	7475A	2210A02802	None
27	Modulation Analyzer	Hewlett Packard	8901B	3438A05094	2008.05.25
28	Waveform Generator	Hewlett Packard	33120A	US34001190	2008.05.21
29	Audio analyzer	Hewlett Packard	8903B	3011A12915	2008.05.21
30	Temperature & Humidity Chamber	TABAI EZPEC CORP.	MC711P	112000492	2006.08.27
31	Antenna Mast	EMCO	1070-3	9109-1617	None
32	Turn Table	EMCO	1080-1,2	9203-1762	None
33	Positioning Controller	EMCO	1090	9111-1054	
34	Antenna Power Supply	Rohde & Schwarz	HZ-9	920127	None
35	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	881052	None
36	Coaxial Take-up Reel	EMCO	100817	9109-1684	None