FCC PART 95

MEASUREMENT AND TEST REPORT

FOR

XINLEI (H.K) ELECTRONICS CO.

Yijian Industry Zone, Linyuan East Rd, Shangmeilin, Shenzhen, P.R.China

FCC ID: UV4F-700

Report Concerns: Original Report	**Equipment Type:** Watch Walkie Talkie

Model: F-700

Report No.: STR06128052I

Test/Witness Engineer: Innaz Lee

Test Date: 2006-12-29

Prepared By:

Shenzhen SEM.Test Compliance Service Co., Ltd
Room 609-610, Baotong Building, Baomin 1st Road, Baoan District, Shenzhen, Guangdong, P.R.C. (518133)

Approved & Authorized By:

Jandy So / PSQ Manager

Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by SEM.Test Compliance Service Co., Ltd.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant:	XINLEI (H.K) ELECTRONICS CO.
Address of applicant:	Yijian Industry Zone, Linyuan East Rd, Shangmeilin, Shenzhen, P.R.China
Manufacturer:	XINLEI (H.K) ELECTRONICS CO.
Address of manufacturer:	Yijian Industry Zone, Linyuan East Rd, Shangmeilin, Shenzhen, P.R.China

General Description of E.U.T

Items	Description
EUT Description:	Watch Walkie Talkie
Trade Name:	FREETALKER
Model No.:	F-700
Rated Voltage:	DC 3.6V Battery
Output Power:	< 0.5W
Frequency Range:	462.5500-462.7250 MHz 462.5625-467.7125 MHz
Mode:	FRS/GMRS
Channel Spacing:	25kHz
Size:	7.0X5.0X2.0 cm
Antenna Length:	4.5 cm
For more information refer to the circuit diagram form and the user's manual.	

The test data gathered are from a production sample, provided by the manufacturer.

1.2 Test Standards

The following report of is prepared on behalf of XINLEI (H.K) ELECTRONICS CO. in accordance with Part 2, Subpart J, and Part 95 of the Federal Communication Commissions rules.

The objective is to determine compliance with the Part 2, Subpart J, and Part 95 of the Federal Communication Commissions rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Related Submittal(s)/Grant(s)

No Related Submittal(s).

1.4 Test Methodology

Measurements contained in this report were also conducted with Part 95 Subpart B and Subpart E of the Federal Communication Commissions rules and ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted with FRS and GMRS mode. For more detail refere to the Operating Instructions.

1.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:
United States of American Federal Communications Commission (**FCC**), and the registration number is **274801**.
Industry Canada (**IC**), and the registration number is **IC4174**.
All measurement required was performed at laboratory of Shenzhen Academy of Metrology and Quality Inspection, Bldg. of Metrology & Quality Inspection, Longzhu Road, Nanshan District, Shenzhen, Guangdong, China.

1.6 EUT Exercise Software

The EUT exercise program used during the testing was designed to exercise the system components.

1.7 Accessories Equipment List and Details

Manufacturer	Description	Model	Serial Number
MEILI	Audio Generator	MFG-3005	200612187

1.8 EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Cord/Without Cord
DC Power Cable	1.5	Unshielded	Without Cord
Earphone Cable	1.2	Unshielded	Without Cord

2. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§2.1046 §95.135 §95.639(d)	RF Output Power	Compliant
§2.1047 §95.637(a)	Modulation Characteristic	Compliant
§2.1049 §95.633(a)(c)	Occupied Bandwidth	Compliant
§2.1053 §95.635(b) (7)	Spurious Radiated Emissions	Compliant
§2.1055 §95.627(b) §95.621	Frequency stability	Compliant
§1.1307(b) (1)	RF Exposure Evaluation	Compliant

3. §2.1046, §95.135 and §95.639(d) - RF OUTPUT POWER

3.1 Standard Applicable

According to FCC §2.1046, and §95.639(d), No FRS Unit, under any condition of modulation, shall exceed a 0.500 w effective radiated power (ERP).

According to FCC §95.135, A small base station must transmit with no more than 5 watts effective radiated power (ERP).

3.2 Test Equipment List and Detail

Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Rohde & Schwarz	EMI Test Receiver	ESI26	830245/009	2006-1-26	2007-1-25
ETS	Multi_Device Controller	2090	57230	2006-1-26	2007-1-25
Antenna	Schwarzbeck	VUBA9117	115	2006-1-24	2009-1-25
3m chamber	Albatross Projects	9X6X6	----	2006-1-24	2008-1-25
Rohde & Schwarz	Horn Antenna	HF906	100014	2006-1-26	2007-1-25
Signal Generator	Rohde & Schwarz	SMR20	100047	2006-1-24	2007-1-25
Dipole Antenna	Schwarzbeck	H00009170	9136	2006-1-24	2007-1-25

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

3.3 Test Procedure

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

2. 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 test was performed by placing the EUT on 3-orthogonal axis.

3. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the ERP were measured by the substitution.

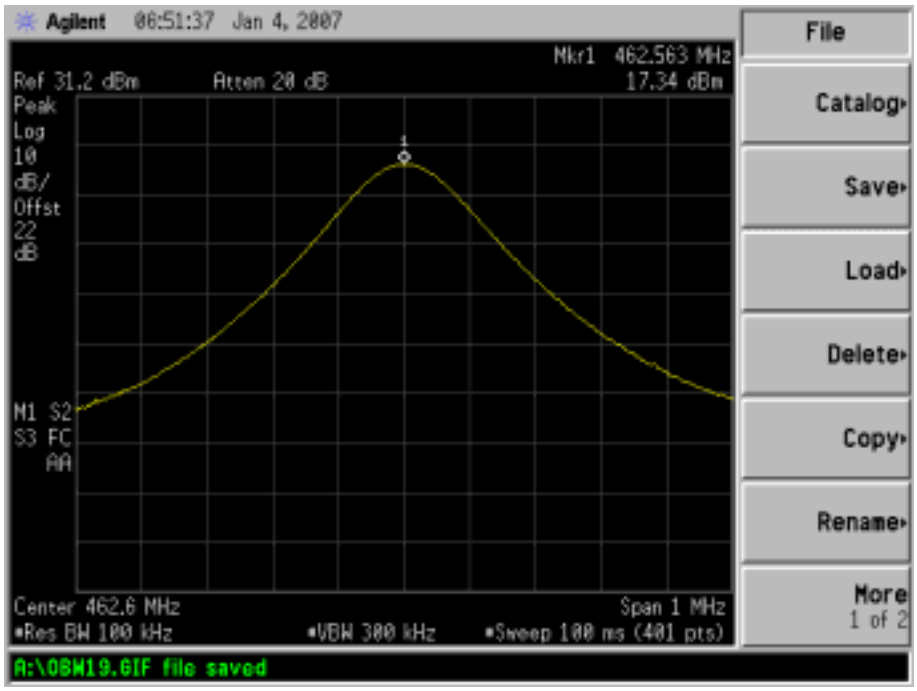
4. Absolute level = substituted level + Antenna gain – Cable Loss

3.4 Test Result/Plots

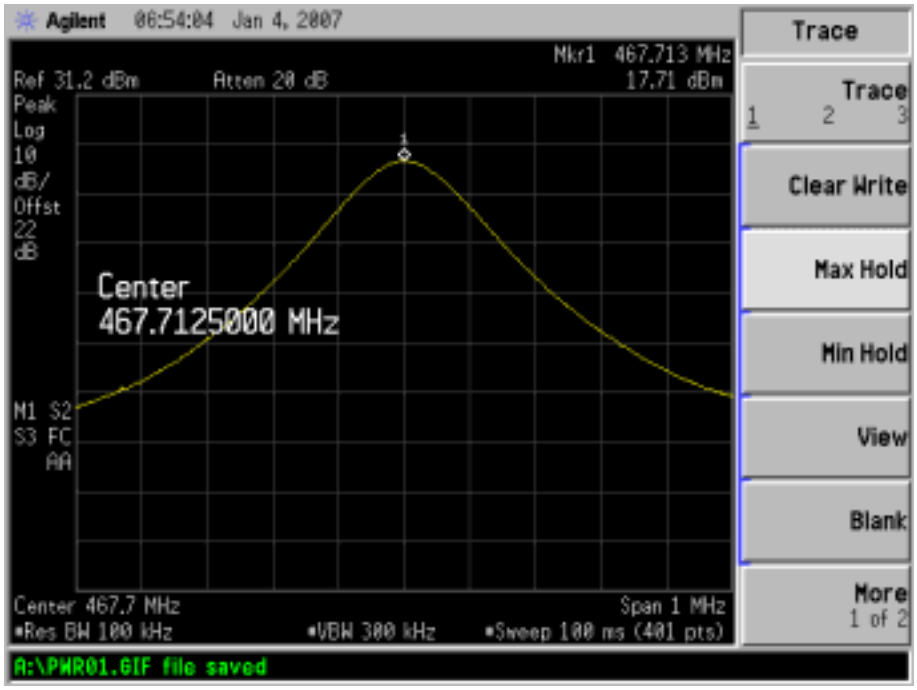
Frequency	SG Reading	Height	Table	Polar	Cable loss	Antenna Gain	Corrected Ampl.	FCC Part 95
MHz	dBm	Meter	Degree	H / V	dB	dB	dBm	mW
Low Channel (FRS CH01)								
462.5625	18.42	1.2	112	H	2.3	0	16.12	40.92
462.5625	21.59	1.5	115	V	2.3	0	19.29	84.92
Middle Channel (FRS CH14)								
467.7125	17.90	1.3	145	H	2.3	0	15.60	36.31
467.7125	21.28	1.2	146	V	2.3	0	18.98	40.74
High Channel (GMRS CH19)								
462.6500	18.40	1.0	145	H	2.3	0	16.10	40.74
462.6500	23.05	1.2	145	V	2.3	0	19.75	94.41

Conducted Output Power hereby is for reference

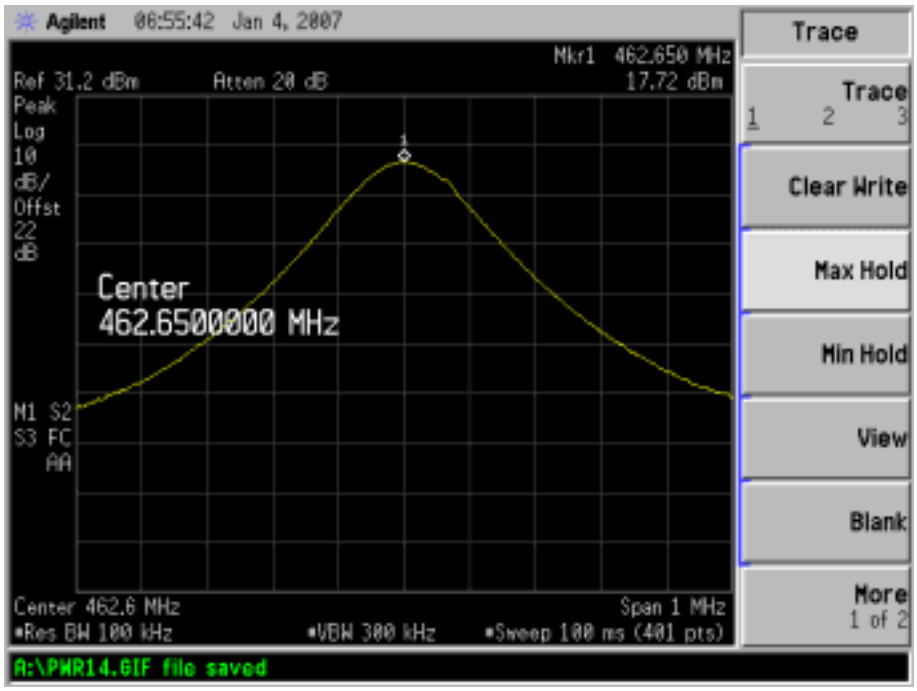
Low Channel (FRS CH01):



Middle Channel (FRS CH14):



High Channel (GMRS CH19):



4. §2.1047, and §95.637(a)-MODULATION CHARACTERISTICS

4.1 Standard Applicable

According to FCC §2.1047 & §95.637

(a) Equipment which utilizes voice modulated communication shall show the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz. for equipment which is required to have a low pass filter, the frequency response of the filter, or all of the circuitry installed between the modulation limited and the modulated stage shall be supplied.

(b) Equipment which employs modulation limiting, a curve showing the percentage of modulation versus the modulation input voltage shall be supplied.

(c) A FRS Unit that transmits emission type F3E must not exceed peak frequency deviation of plus or minus 2.5 kHz.

(d) A GMRS transmitter that transmits emission type F3E must not exceed a peak frequency deviation of plus or minus 5 kHz.

4.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Modulation Analyzer	Rohde & Schwarz	FAM 54	334.2015.54	2006-06-30	2007-06-29
Attenuator	Atten	DC-4GHz	ATS100-4-20	2006-06-30	2007-06-29
Audio Generator	MEILI	MFG-3005	200612187	2006-06-30	2007-06-29

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

4.3 Test Procedure

Test is carried out under the procedure of TIA/EIA-603-C

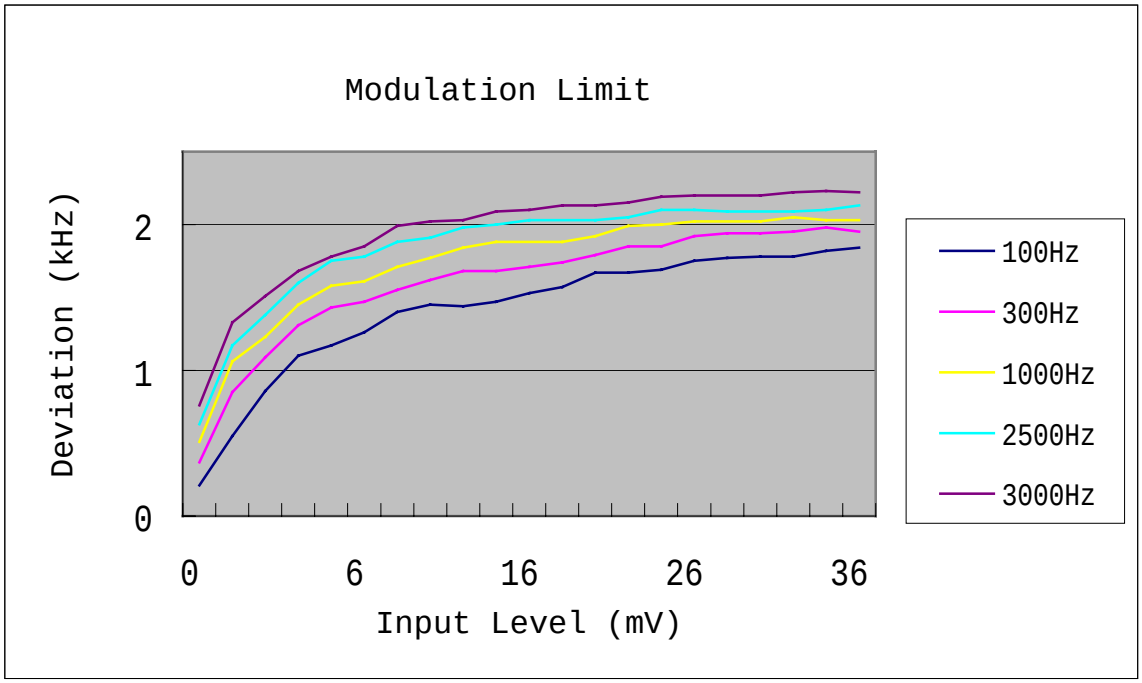
4.4 Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	50%
ATM Pressure:	1005mbar

4.5 Test Results/Plots

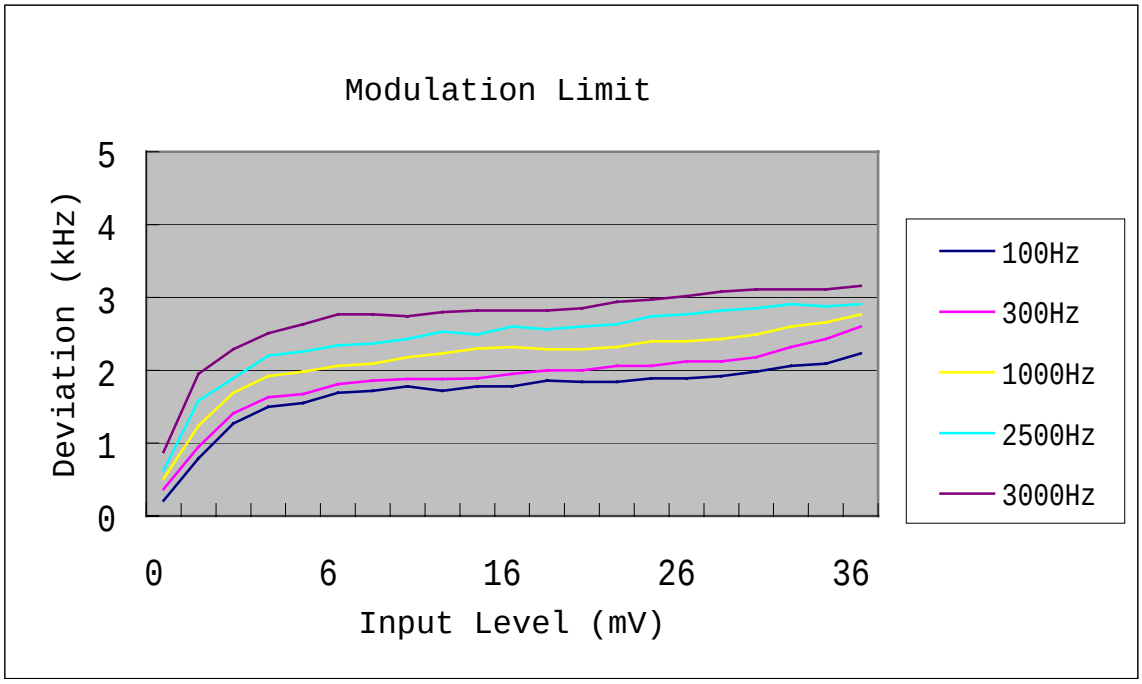
For FRS Mode

Audio Input(mV)	100Hz Deviation(kHz)	300Hz Deviation(kHz)	1kHz Deviation(kHz)	3kHz Deviation(kHz)	5kHz Deviation(kHz)
0	0.21	0.37	0.51	0.63	0.76
1	0.55	0.85	1.06	1.17	1.33
2	0.86	1.09	1.23	1.38	1.51
3	1.10	1.31	1.45	1.6	1.68
4	1.17	1.43	1.58	1.75	1.78
6	1.26	1.47	1.61	1.78	1.85
8	1.40	1.55	1.71	1.88	1.99
10	1.45	1.62	1.77	1.91	2.02
12	1.44	1.68	1.84	1.98	2.03
14	1.47	1.68	1.88	2.00	2.09
16	1.53	1.71	1.88	2.03	2.10
18	1.57	1.74	1.88	2.03	2.13
20	1.67	1.79	1.92	2.03	2.13
22	1.67	1.85	1.99	2.05	2.15
24	1.69	1.85	2.00	2.10	2.19
26	1.75	1.92	2.02	2.10	2.20
28	1.77	1.94	2.02	2.09	2.20
30	1.78	1.94	2.02	2.09	2.20
32	1.78	1.95	2.05	2.09	2.22
34	1.82	1.98	2.03	2.10	2.23
36	1.84	1.95	2.03	2.13	2.22



For GMRS Mode

Audio Input(mV)	100Hz Deviation(kHz)	300Hz Deviation(kHz)	1kHz Deviation(kHz)	3kHz Deviation(kHz)	5kHz Deviation(kHz)
0	0.20	0.38	0.53	0.66	0.89
1	0.79	0.95	1.24	1.58	1.95
2	1.27	1.41	1.69	1.89	2.29
3	1.50	1.63	1.92	2.20	2.51
4	1.55	1.676	1.98	2.26	2.63
6	1.69	1.81	2.06	2.34	2.77
8	1.72	1.86	2.09	2.37	2.77
10	1.78	1.88	2.18	2.43	2.74
12	1.72	1.88	2.23	2.53	2.8
14	1.78	1.89	2.30	2.49	2.82
16	1.78	1.95	2.32	2.60	2.82
18	1.86	2.00	2.29	2.56	2.82
20	1.84	2.00	2.29	2.60	2.85
22	1.84	2.06	2.32	2.63	2.94
24	1.89	2.06	2.40	2.74	2.97
26	1.89	2.12	2.40	2.77	3.02
28	1.92	2.12	2.43	2.82	3.08
30	1.98	2.18	2.49	2.85	3.11
32	2.06	2.32	2.60	2.91	3.11
34	2.09	2.43	2.66	2.88	3.11
36	2.23	2.60	2.77	2.91	3.16



5. §2.1049 and § 95.633(a)(c) - OCCUPIED BANDWIDTH OF EMISSION

5.1 Standard Applicable

According to FCC §2.1049 and FCC §95.633(a) (c), the authorized bandwidth for emission type F3E or F2D transmitted by an FRS Unit is 12.5 kHz and the authorized bandwidth for emission type F1D, G1D, F3E or G3E transmitted by an GMRS Unit is 20 kHz.

5.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Agilent	Spectrum Analyzer	E4402B	US41192821	2006-06-30	2007-06-29
Atten	Attenuator	DC-4GHz	ATS100-4-20	2006-06-30	2007-06-29
Audio Generator	MEILI	MFG-3005	200612187	2006-06-30	2007-06-29

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

5.3 Test Procedure

1. The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

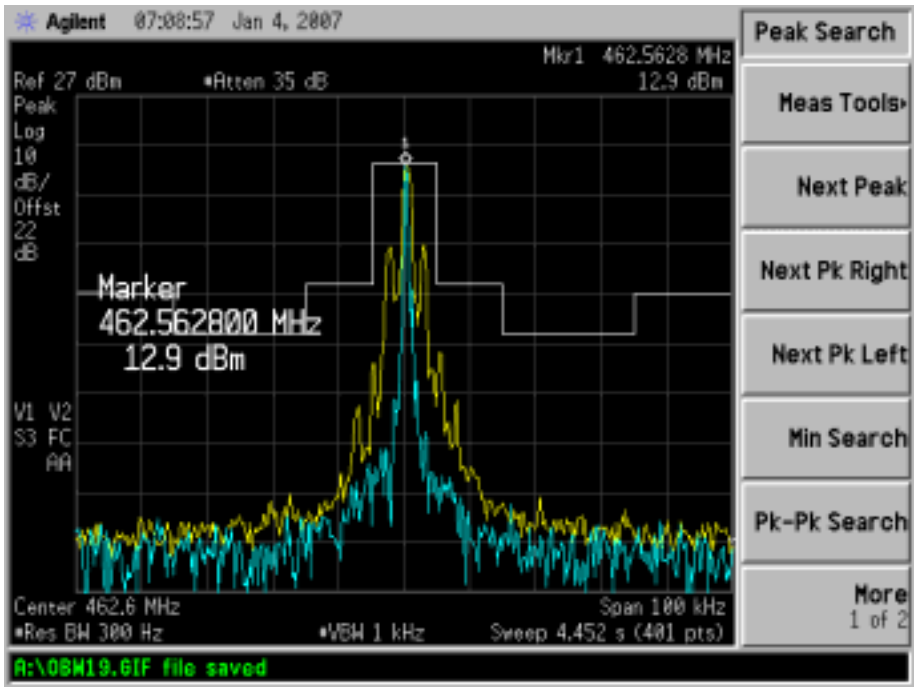
2. The signal is modulated with 2.5kHz audio signal as necessary levels.

3. The resolution bandwidth of the spectrum analyzer was set at 300 Hz and video bandwidth was set to 1kHz. Then the mask plots was reported.

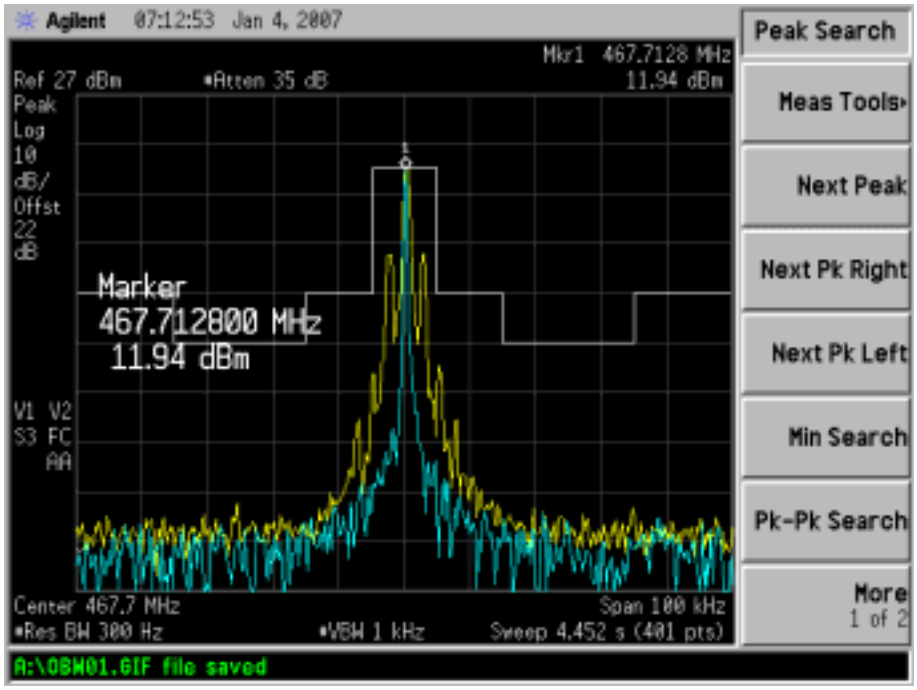
5.4 Test Results/Masks

The occupied Bandwidth Emission of all fall in the Mask, full fit the requirements of the standards.

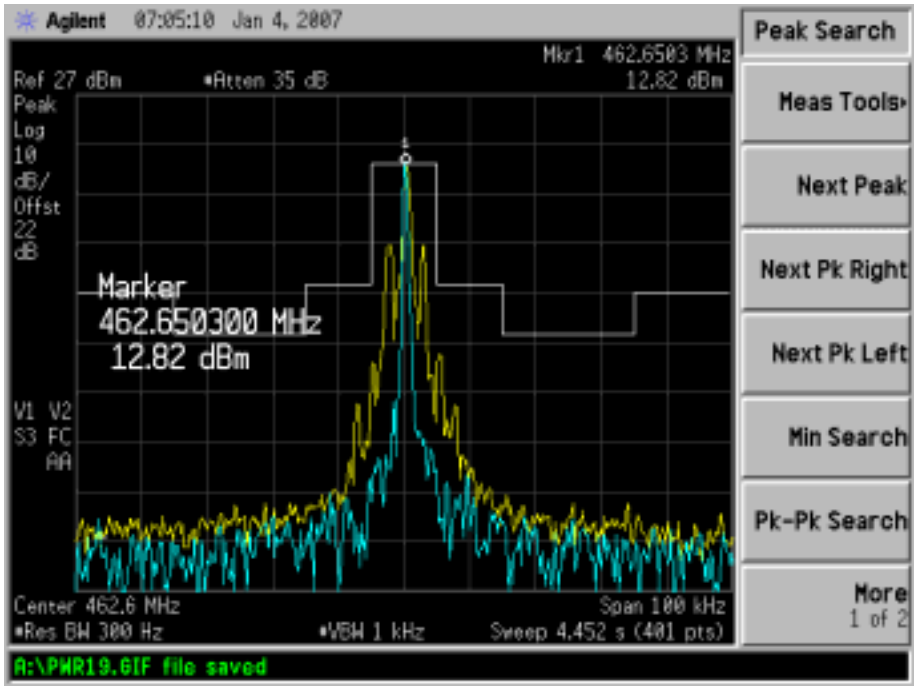
Low Channel (FRS CH01):



Middle Channel (FRS CH14):



High Channel (GMRS CH19):



6. 2.1053 and §95.635- RADIATED SPURIOUS EMISSION

6.1 Measurement Uncertainty

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is ±0.5 dB.

6.2 Standard Applicable

According to FCC §2.1053, measurements shall be made to detect spurious emission that may be radiated directly from the cabinet, control circuits, power leads, or intermediated circuit elements under normal condition of installation and operation. Information submitted shall include the relative radiated power of spurious emission with reference to the rated power output of the transmitter, assuming all emissions are radiated from a halfwave dipole antenna.
According to FCC §95.635, the necessary attenuation requirements need to meet as the following:

Spurious attenuation limit in dB = 43+10 Log_{10} (power out in Watts)

6.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Rohde & Schwarz	EMI Test Receiver	ESI26	830245/009	2006-1-26	2007-1-25
ETS	Multi_Device Controller	2090	57230	2006-1-26	2007-1-25
Antenna	Schwarzbeck	VUBA9117	115	2006-1-24	2009-1-25
3m chamber	Albatross Projects	9X6X6	----	2006-1-24	2008-1-25
Rohde & Schwarz	Horn Antenna	HF906	100014	2006-1-26	2007-1-25
Signal Generator	Rohde & Schwarz	SMR20	100047	2006-1-24	2007-1-25
Dipole Antenna	Schwarzbeck	H00009170	9136	2006-1-24	2007-1-25

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

6.4 Test Procedure

The setup of EUT is according with per TIA/EIA Standard 603 and ANSI C63.4-2003 measurement procedure.

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 test was performed by placing the EUT on 3-orthogonal axis.

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

Remove the EUT and replace it with 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 attenuation limit in dB =43+10 Log_{10} (power out in Watts)

6.5 Environmental Conditions

Temperature:	20° C
Relative Humidity:	53%
ATM Pressure:	1019 mbar

6.6 Summary of Test Results/Plots

According to the data below, the FCC Part 95 standards, and had the worst margin of:

-24.10 dB at **925.28 MHz** in the **Vertical of Low channel (FRS)** polarization, **30 MHz to 5 GHz, 3Meters.**

Frequency	SG Reading	Height	Polar	Cable loss	Antenna Gain	Corrected Ampl.	FCC Part 95 Limit	FCC Part 95 Margin
MHz	dBm	Meter	H / V	dB	dB	dBm	dBm	dB
Low Channel (FRS CH01)								
925.13	-33.9	1.6	V	3.2	0	-37.1	-13	-24.1
925.13	-34.2	1.6	H	3.2	0	-37.4	-13	-24.4
1387.69	-43.4	1.6	V	3.6	7.6	-39.4	-13	-26.4
1387.69	-45.4	1.6	H	3.6	7.6	-41.4	-13	-28.4
1850.25	-46.7	1.4	V	3.6	8.8	-41.5	-13	-28.5
1850.25	-47.4	1.4	H	3.6	8.8	-42.2	-13	-29.2
Middle Channel (FRS CH14)								
935.43	-36.3	1.4	V	3.2	0	-39.5	-13	-26.5
1403.14	-44.3	1.6	V	3.6	7.6	-40.3	-13	-27.3
1870.85	-46.8	1.5	V	3.6	8.8	-41.6	-13	-28.6
1403.14	-45.7	1.4	H	3.6	7.6	-41.7	-13	-28.7
1870.85	-47.5	1.5	H	3.6	8.8	-42.3	-13	-29.3
935.43	-41.5	1.6	H	3.2	0	-44.7	-13	-31.7
High Channel (GMRS CH19)								
925.30	-35.4	1.5	V	3.2	0	-38.6	-13	-25.6
1387.95	-46.1	1.5	V	3.6	7.6	-42.1	-13	-29.1
1850.60	-48.0	1.4	V	3.6	8.8	-42.8	-13	-29.8
925.30	-39.6	1.6	H	3.2	0	-42.8	-13	-29.8
1387.95	-48.0	1.6	H	3.6	7.6	-44.0	-13	-31.0
1850.60	-49.3	1.4	H	3.6	8.8	-44.1	-13	-31.1

Note: Testing is carried out with frequency rang 30MHz to the tenth harmonics. Emissions undetected below the base noise are not reported.

7. §2.1055, §95.621 and §95.627(b)- FREQUENCY STABILITY

7.1 Standard Applicable

According to FCC §2.1055(a)(1), the frequency stability shall be measure with variation of ambient temperature from –30ºC to +50ºC, and according to FCC 2.1055(d)(2), the frequency stability shall be measured with reducing primary supply voltage to the battery operating end point which is specified by the manufacturer.

According to FCC §95.627(b), Each FRS Unit must be maintained within a frequency tolerance of 0.00025%.

According to FCC §95.621, Each GMRS transmitter for mobile station, small base station and control station operation must be maintained within a frequency tolerance of 0.0005%.

7.2 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Agilent	Spectrum Analyzer	E4402B	US41192821	2006-06-30	2007-06-29
Atten	Attenuator	DC-4GHz	ATS100-4-20	2006-06-30	2007-06-29
GONGWEN	Moisture Test Chamber	GDS-150	SEMT-0013	2006-06-30	2007-06-29

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

7.3 Test Procedure

1. Setup the configuration of the ambient temperature form -30ºC to 50ºC with sufficient time. And measure the different power of the EUT with an artificial power from highest to end point voltage.
2. Active the Analyzer frequency counter option, center frequency to the right frequency needs to be measured.

7.4 Test Results/Plots

For FRS and GMRS Mode

Test Conditions		PPM Error		
		Low CH01 FRS (462.5625MHz)	**Middle CH14 FRS (467.7125MHz)**	**High CH19 GMRS (462.6500MHz)**
T_{nom}(22°C)	V_{nom}(3.60V)	1.31	1.32	1.42
T_{min}(-30°C)	V_{min}(3.06V)	1.33	1.33	1.44
	V_{max}(4.14V)	1.42	1.39	1.52
T_{max}(+50°)	V_{min}(3.06V)	1.44	1.42	1.53
	V_{max}(4.14V)	1.45	1.44	1.56
Max. frequency error (ppm)		1.45	1.44	1.56
Limit		2.5ppm		5.0ppm
End Point		DC 2.96V		

8. §1.1307(b) (1) RF EXPOSURE EVALUATION

8.1 Standard Applicable

According to § 1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline. Routine SAR evaluation refers to that specifically required by § 2.1093, using measurements or computer simulation.

According to FCC Exclusion list, In the following table, fGHz is mid-band frequency in GHz, and d is the distance to a person'sbody, excluding hands, wrists, feet, and ankles.

Exposure category	low threshold	high threshold
general population	$(60/f_{GHz})$ mW, $d < 2.5$ cm $(120/f_{GHz})$ mW, $d \geq 2.5$ cm	$(900/f_{GHz})$ mW, $d < 20$ cm
occupational	$(375/f_{GHz})$ mW, $d < 2.5$ cm $(900/f_{GHz})$ mW, $d \geq 2.5$ cm	$(2250/f_{GHz})$ mW, $d < 20$ cm

8.2 Measurement Result:

This is a portable device and the Max output power is 94.41mW<259.39mW=(60/0.46265GHz)mW*2

The SAR measurement is not necessary.

EXHIBIT 1- PRODUCT LABELING

Proposed FCC ID Label Format

FCC ID: UV4F-700

Specifications: Labels are printed in indelible ink on permanent adhesive silk-screened onto the EUT or shall be affixed at a conspicuous location on the EUT.

Proposed Label Location on EUT

FCC ID Label Location

EXHIBIT 2 - EUT EXTERNAL PHOTOGRAPHS

EUT View 1

EUT View 2

EUT View 3

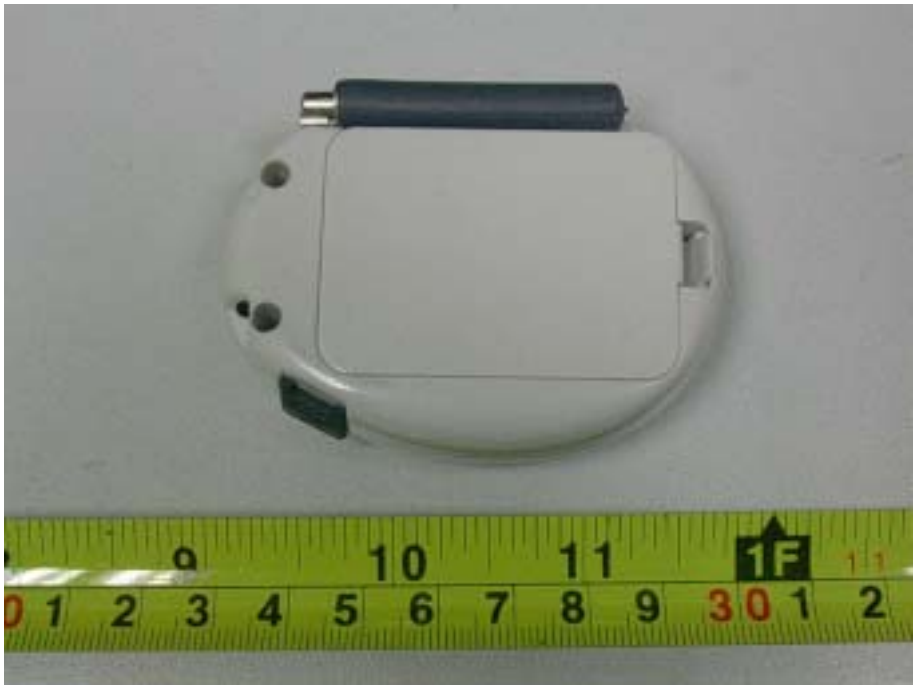
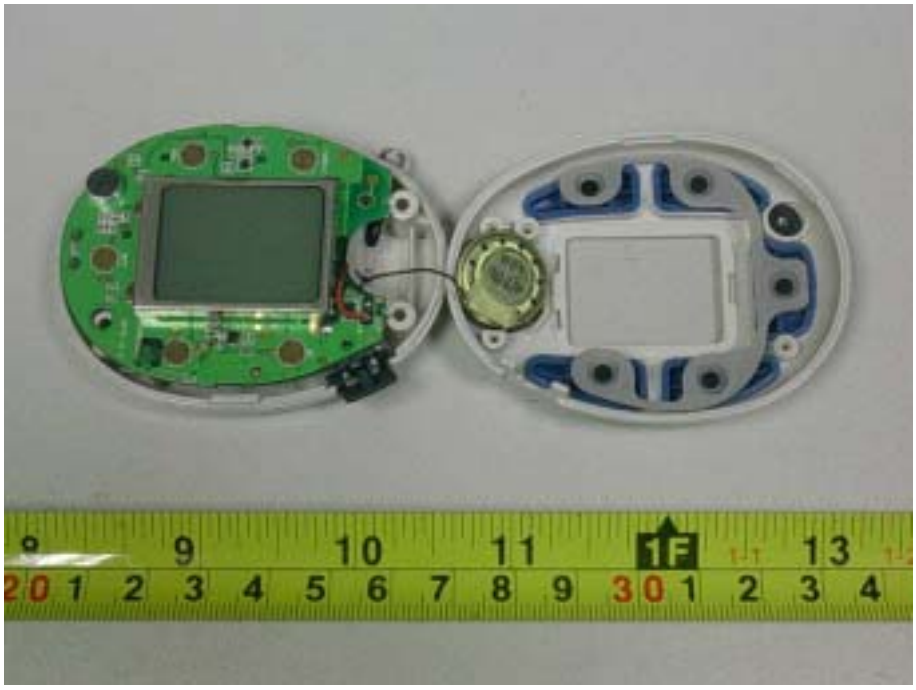
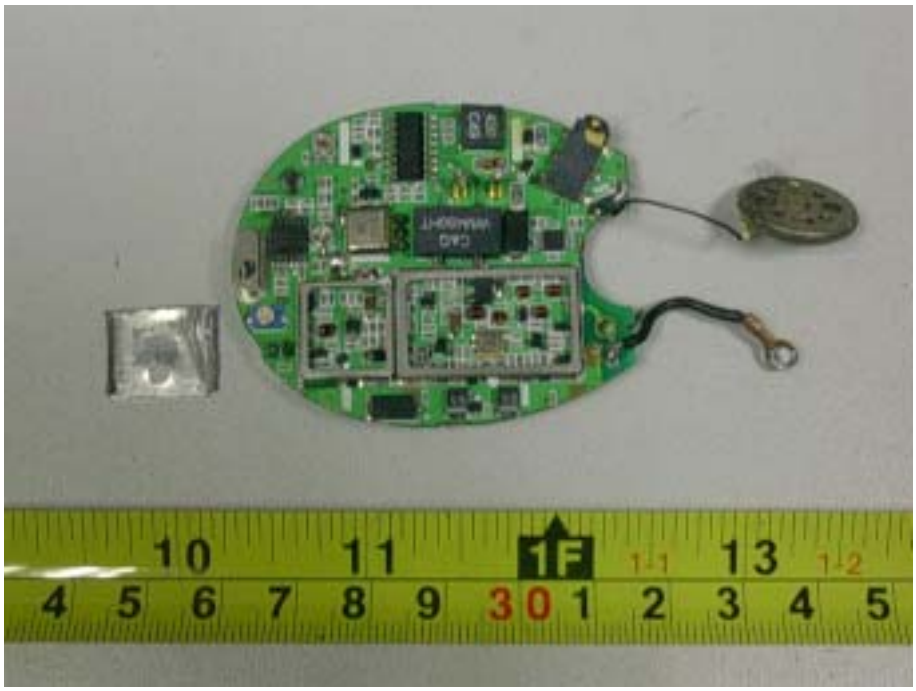


EXHIBIT 3 - EUT INTERNAL PHOTOGRAPHS

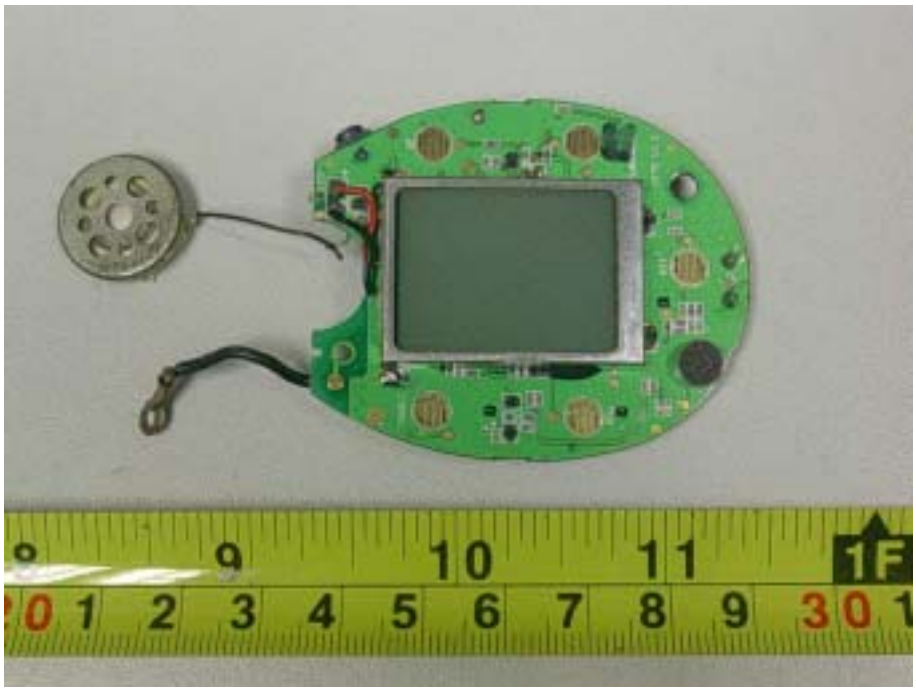
EUT Housing and Board View 1



EUT Housing and Board View 2



Solder Board-Component View 1



Solder Board-Component View 2

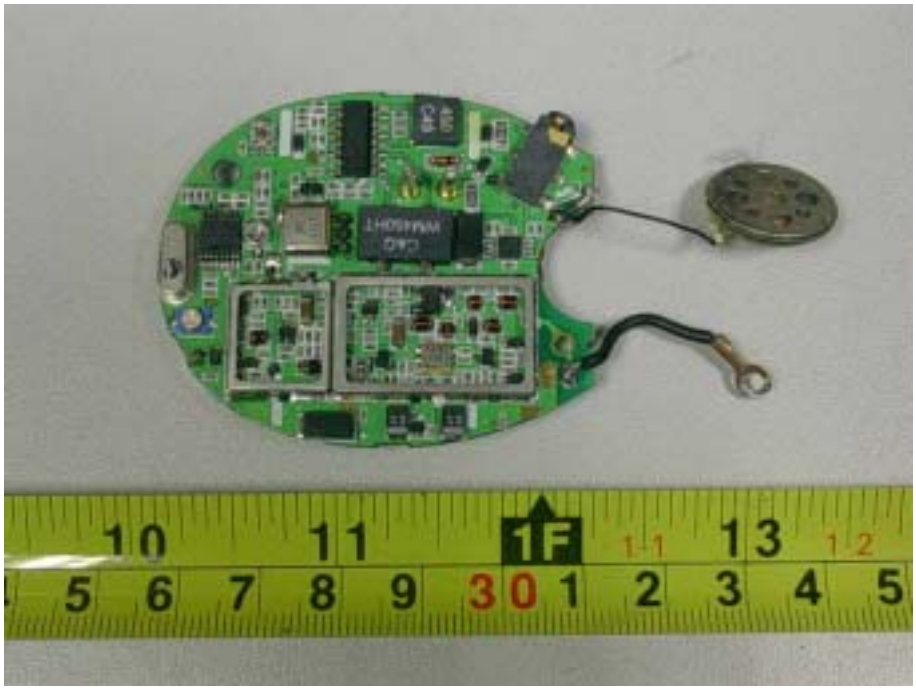
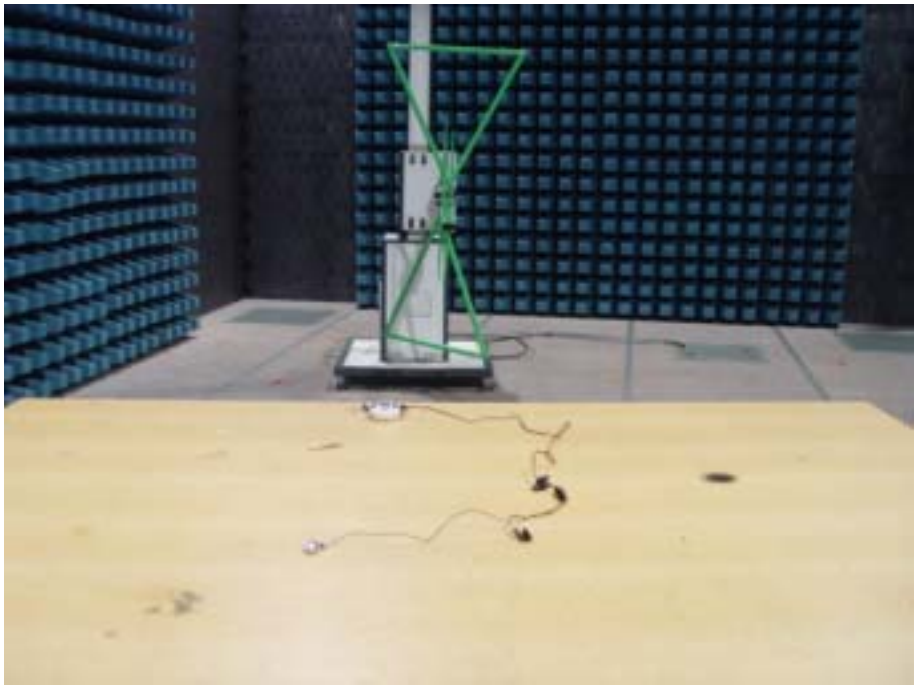
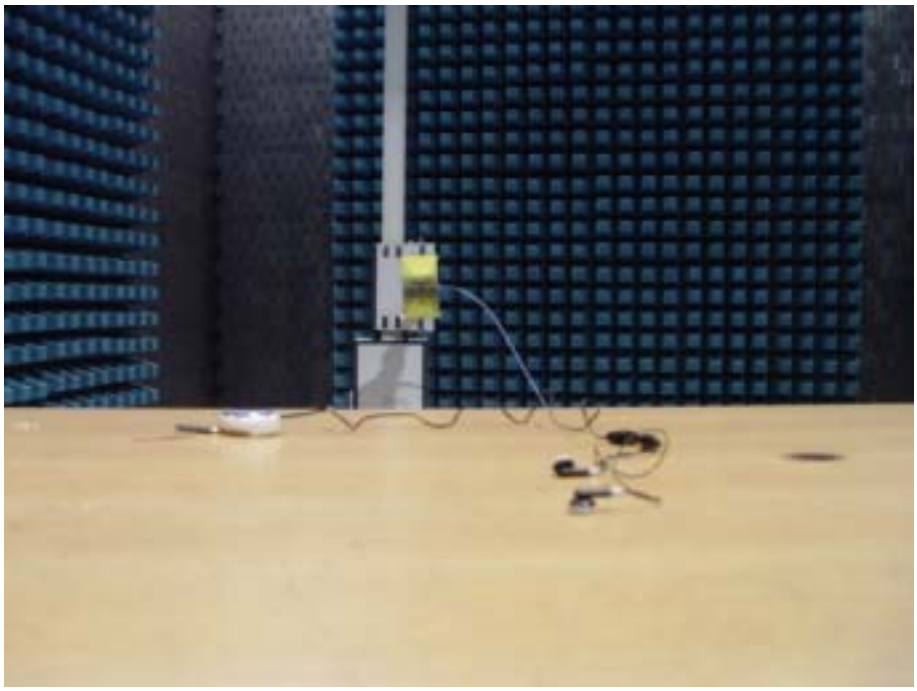


EXHIBIT 4 - TEST SETUP PHOTOGRAPHS

Radiated Spurious Emission Setup (Below 1GHz)



Radiated Spurious Emission Setup (Above 1GHz)



Frequency Stability Test Setup