Giant Electronics Limited

Application
For
Class II Permissive Change

Two Way Radio with GMRS, FRS,
Weather Band Receiver and Repeater

(FCC ID: K7GMSFGJ)

HK10120229-1
KS/ ss
March 07, 2011

- The test report only allows to be revised the retention period issued date unless further standard or the requirement was noticed.
- This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.

Intertek Testing Services Hong Kong Ltd.
2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
Tel: (852) 2173 8888 Fax: (852) 2785 5487 Website: www.hk.intertek-etlsemko.com

MEASUREMENT/TECHNICAL REPORT

Applicant : Giant Electronics Limited
Trade Name/Model No : Motorola / MS350R
MS350A, MS350TRP, MS351R, MS352R,
MS353R, MS355R, MS356R, MS358R
Date : March 07, 2011

This report concerns (check one:)Original Grant_____ Class II Change__X__

Equipment Type: FRF – Part 95 Family Radio Face Held Transmitter
CXX - Communications Rcvr for use w/ licensed Tx and CBs

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? Yes_____ No__X__
If yes, defer until: _____
date

Company Name agrees to notify the Commission by: _____
date

of the intended date of announcement of the product so that the grant can be issued on that date.

Report prepared by:

Sit Kim Wai, Ken
Intertek Testing Services Hong Kong Ltd.
2/F., Garment Centre,
576 Castle Peak Road,
Kowloon, Hong Kong.
Phone: 852-2173-8538
Fax: 852-2741-1693

Table of Contents

EXHIBIT 1

GENERAL DESCRIPTION

1.0 General Description

1.1 Product Description

The Equipment Under Test (EUT) is a Two Way Radio with GMRS, FRS, repeater channel and Weather Band operating between 462.5500MHz and 467.7250MHz while weather band receiver operating between 161.650MHz and 162.550MHz. The EUT is powered by 3.6V (1 x 3.6V "Ni-MH" type rechargeable battery) or 4.5V (3 x "AA" size 1.5V alkaline batteries). The EUT is turned off when the EUT is plugged into AC adaptor.

Transmitter Portion

(i)	Type of Emission	: GMRS: 5K40F3E ; FRS: 5K56F3E
(ii)	Frequency Range	: GMRS 23 Channels from 462.5500MHz to 467.7250MHz FRS 7 Channels from 467.5625MHz to 467.7125MHz
(iii)	Maximum Power Rating	: GMRS: 1.92W ERP; FRS: 0.25W ERP
(iv)	Antenna Type	: Integral, 0dBi, vertically polarized
(v)	DC Voltage of Radio Frequency Amplifying Device	: 4.5V
(vi)	DC Current of Radio Frequency Amplifying Device	: 1A

The Model: MS350A, MS350TRP, MS351R, MS352R, MS353R, MS355R, MS356R and MS358R are the same as the Model: MS350R in electrical mechanical and same PCB layout. The only differences between these models are color to be sold for marketing purpose.

The brief circuit description is saved with filename: descri.pdf

1.2 Related Submittal(s) Grants / Purpose of Application

This is an Application for Certification of the transmitter portion of a GMRS + FRS Transceiver. The receiver section of this Transceiver and digital device portion is subject to verification process.

The purpose of application is saved with filename: product change.pdf.

As the RF module remained unchanged, only results of modulation characteristic, occupied bandwidth, spurious emission, and frequency stability were included in this report.

1.3 Test Methodology

Radiated emission measurements was performed according to the procedures in ANSI C63.4 (2003) and ANSI/TIA-603-C-2004. All radiated measurement were performed in Open Area Test Sites. Preliminary scans were performed in the Open Area Test Sites only to determine worst case modes. All Radiated tests were performed at an antenna the EUT distance of 3 meters, unless stated otherwise in the **"Justification Section"** of this Application.

1.4 Test Facility

The open area test site test site used to collect the emission data is located at Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong. The test facility and site measurement data have been fully placed on file with the FCC.

EXHIBIT 2

SYSTEM TEST CONFIGURATION

2.0 **System Test Configuration**

2.1 Justification

The device was configured for testing in a typical fashion (as a customer would normally use it). The device was placed on a turntable, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes. The device has been tested with headset and without headset when the radiated emissions are measured.

The device was powered by 3 x new "AA" size 1.5V alkaline batteries.

The frequency range of transmitter from 30MHz to 10^{th} harmonics was searched for spurious emissions from the device. Only those emissions reported were detected. All other emissions were at least 20 dB below the applicable limits.

For transmitter radiated spurious measurement, the spectrum analyzer resolution bandwidth was 10kHz for emissions below 1GHz, and 1MHz for emissions above 1GHz. Video bandwidth was 300kHz for emissions below 1GHz, and 3MHz for emissions above 1GHz.

The following are all the test modes (only the worst-case was reported):
GMRS, Tx without headset
GMRS, Tx with headset

2.2 EUT Exercising Software

There was no special software to exercise the device. Once the PTT button was pushed, a signal was transmitted.

2.3 Special Accessories

No special accessory is needed for compliance of this device.

2.4 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty of test has been considered.

Uncertainty and Compliance - Unless the standard specifically states that measured values are to be extended by the measurement uncertainty in determining compliance, all compliance determinations are based on the actual measured value.

2.5 Support Equipment

Headset with 1.2m unshielded cable (Supplied by Client)
AC adaptor: 120VAC to 9VAC 200mA, Model: DV-0920ACS (Supplied by Client)
Operated Battery: 3 x “AA” size 1.5V battery
A “Ni-MH” type rechargeable battery 3.5V, 600mAh (Supplied by Client)

Confirmed by:

Sit Kim Wai, Ken
Manager
Intertek Testing Services Hong Kong Ltd.
Agent for Giant Electronics Limited

Signature

March 07, 2011 Date

EXHIBIT 3

RF POWER OUTPUT

3.0 **RF Power Output (Section 2.1046(a), 95.639(d))**

Testing Procedure

1. On a test site, the EUT shall be placed at 0.8m height on a wooden turntable, and in the position closest to normal use as declared by the applicant.

2. The test antenna shall be oriented initially for vertical polarisation located 3m from EUT to correspond to the frequency of the transmitter.

3. The output of the test antenna shall be connected to the measuring receiver and the peak detector is used for the measurement.

4. The transmitter shall be switched on, if possible, without modulation and the measuring receiver shall be tuned to the frequency of the transmitter under test.

5. The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.

6. The transmitter shall then the rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.

7. The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.

8. The maximum signal level detected by the measuring receiver shall be noted.

9. The transmitter shall be replaced by a tuned dipole (substitution antenna).

10. The substitution antenna shall be orientated for vertical polarisation and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.

11. The substitution antenna shall be connected to a calibrated signal generator.

12. If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.

13. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.

14. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring received, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.

15. The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.

16. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarisation.

17. The measure of the effective radiated power is the larger of the two levels recorded, at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.

Table 1

Giant Electronics Limited
MS350R

Transmission Power

Channel	Frequency	Effective Radiated Power		FCC 95.639 Limit	Margin
	(MHz)	(dBm)	(W)	(W)	(W)
26	467.625	32.7	1.87	5.00	-3.13

Notes: Negative sign in the margin column shows the value below limits.

Verdict: Passed

Test Engineer: Koo Wai Ip Date of Test: February 23, 2011

EXHIBIT 4

MODULATION CHARACTERISTICS

4.0 **Modulation Characteristics (Section 2.1047(a)(b), 95.637(a))**

In order to satisfy the 95.637(a) and 2.1047(b) requirements, Modulation Frequency Response and Modulation Limiting Characteristics are attached in Exhibit 4.1 & 4.2.

In order to satisfy the 2.1047(a) requirement, Audio Low Pass Filter Response is attached in Exhibit 4.3.

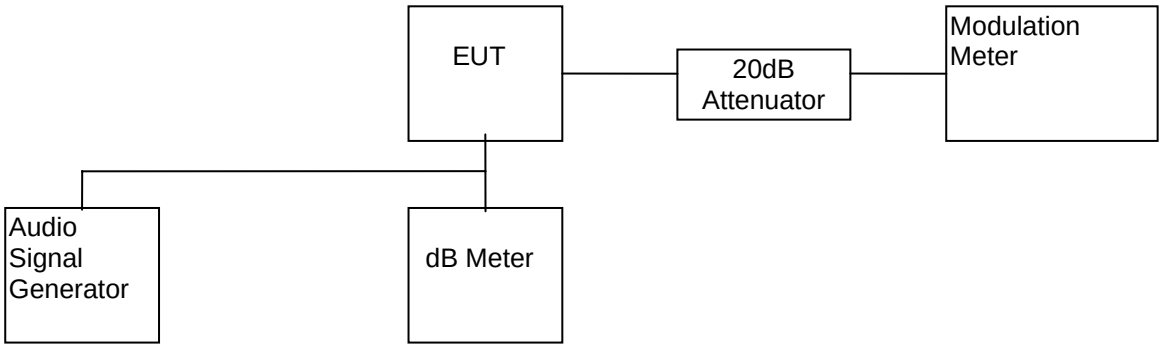
For electronic filing, the modulation frequency response curve and modulation limiting characteristic curve are saved with filename: mfr.pdf and mlc.pdf respectively.

For electronic filing, the audio low pass frequency response curve is saved with filename: lpf.pdf.

4.1 Modulation Frequency Response (Section 2.1047(a), 95.637(a))

A. Testing Procedure

1) Set-up the test equipment in the following configuration:



2) Set the audio signal generator frequency to the sound pressure level 137dBSPL at the microphone of the EUT.
3) The frequency of the audio signal generator is changed from 100Hz to 5kHz.
4) Record the frequency deviation.
5) The peak frequency deviation must not exceed:

   GMRS + FRS : ±2.5kHz

6) Calculate the audio frequency response at each frequency as:

   response = $20 \log_{10}(DEV_{FREQ} / DEV_{REF})$;

   DEV_{REF} = Frequency deviation at 1000Hz ;
   DEV_{FREQ} = Frequency deviation at 100 - 5000Hz ;

7) From the plot, audio frequency response rolls off before 3.125kHz.

B. Test Result

Table 2

Giant Electronics Limited
MS350R

Modulation Frequency Response

Test Channel : 26
Input level = 137dBSPL

Modulation Frequency(Hz)	Frequency Deviation(kHz)	Audio Frequency Response
100	0.768	-8.59
200	1.625	-2.08
300	1.698	-1.70
400	2.462	1.53
500	2.189	0.51
600	2.329	1.04
700	2.075	0.04
800	2.169	0.43
900	2.019	-0.20
1000	2.065	0.00
1250	2.095	0.13
1500	2.135	0.29
1750	2.285	0.88
2000	1.959	-0.46
2250	2.475	1.57
2500	1.522	-2.65
2750	1.955	-0.48
3000	2.091	0.11
3125	1.730	-1.54
3250	1.908	-0.69
3500	1.628	-2.07
4000	1.235	-4.47
5000	0.748	-8.82

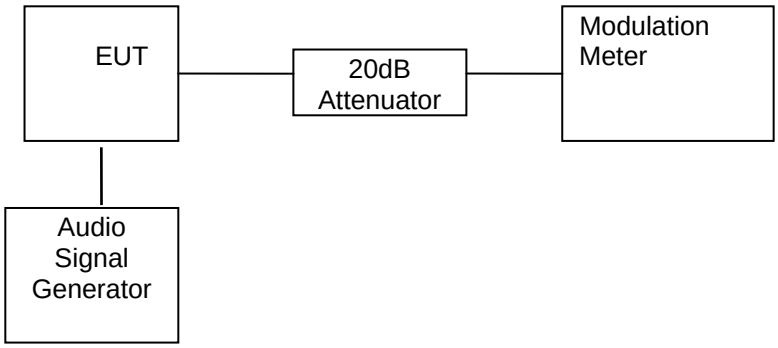
Verdict: Passed

Test Engineer: Koo Wai Ip Date of Test: February 23, 2011

4.2 Modulation Limiting Characteristics (Section 2.1047(b), 95.637(a))

A. Testing Procedure

1) Set-up the test equipment in the following configuration:



2) Set the frequency of the audio signal generator to 500Hz and adjust the level from 47dBSPL to 137dBSPL.
3) Record the maximum value of plus or minus peak frequency deviation.
4) Repeat the above procedure with frequency 1000Hz, 2500Hz & 3125Hz.
5) The peak frequency deviation must not exceed:

GMRS + FRS : ±2.5kHz

B. Test Result

Table 3

Giant Electronics Limited
MS350R

Modulation Limiting Characteristics

Test Channel : 26

Modulation Input (dBSPL)	Peak Frequency Deviation (kHz) at 500Hz	Peak Frequency Deviation (kHz) at 1000Hz	Peak Frequency Deviation (kHz) at 2500Hz	Peak Frequency Deviation (kHz) at 3125Hz
47	0.047	0.047	0.038	0.048
57	0.047	0.048	0.038	0.048
67	0.048	0.049	0.038	0.049
77	0.049	0.050	0.038	0.050
87	0.054	0.071	0.040	0.055
97	0.096	0.166	0.042	0.090
107	0.536	0.870	0.068	0.512
117	1.434	1.882	0.174	1.347
127	2.188	2.015	0.637	1.735
137	2.189	2.065	1.522	1.730

Verdict: Passed

Test Engineer: Koo Wai Ip Date of Test: February 23, 2011

4.3 Audio Low Pass Filter Response (Section 2.1047(a), 95.637(b))

A. Testing Procedure

1) Connect the audio signal generator to the input of the post limiter low pass filter and the dB meter to the output of the post limiter low pass filter.
2) Apply a 1000 Hz tone from the audio signal generator and adjust the level per manufacturer's specifications. Record the dB level of the 1000 Hz tone as LEV_{REF}.
3) Set the audio signal generator to the desired test frequency between 3000 Hz and the upper low pass filter limit. Record the dB level at the test frequency as LEV_{FREQ}.
4) Calculate the audio frequency response at the test frequency as:

   low pass filter response **=** LEV_{FREQ} **-** LEV_{REF}

5) Repeat the above procedure for all the desired test frequencies.

B. Test Result

Table 4

Giant Electronics Limited
MS350R

Low-Pass Filter Response

Test Channel : 26

Audio Input Strength = 10mVrms

Frequency (kHz)	dB relative to 1 kHz	TIA/EIA-603C
1	0.0	0.0
3	-8.5	0.0
4	-14.8	-7.5
5	-20.0	-13.3
6	-24.8	-18.1
8	-33.0	-25.6
10	-41.2	-31.4
15	-51.5	-41.9
20	-51.5	-50.0
30	-53.5	-50.0
40	-56.3	-50.0
50	-58.0	-50.0
60	-58.8	-50.0
70	-59.5	-50.0
80	-59.5	-50.0
90	-60.0	-50.0
100	-60.0	-50.0

Audio Output at 1kHz: -20.0dBV

Verdict: Passed

Test Engineer: Koo Wai Ip Date of Test: February 23, 2011

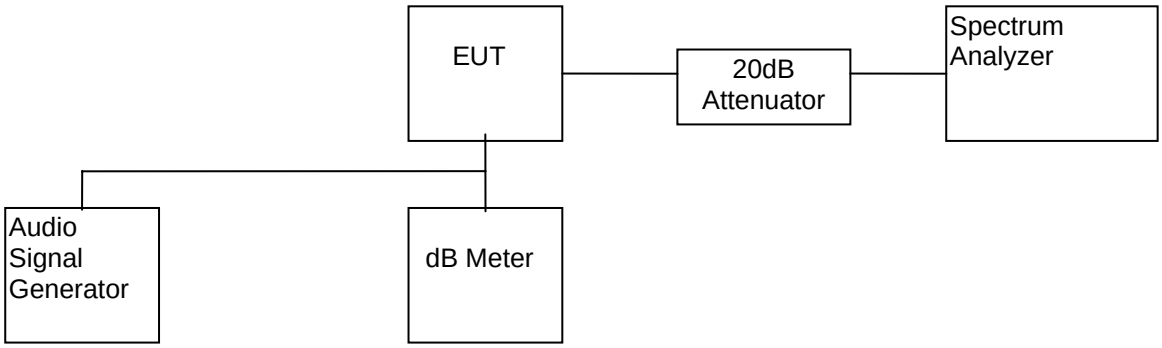
EXHIBIT 5

OCCUPIED BANDWIDTH

5.0 Occupied Bandwidth (Section 2.1049, 95.633(c))

A. Testing Procedure

1) Set-up the test equipment in the following configuration:



2) Set the level of audio signal generator to obtain 16 dB greater than required for 50% modulation.
3) The occupied bandwidth is measured with the spectrum analyzer set at 2kHz/div scan and 10dB/div.

B. Test Result

Table 5

Giant Electronics Limited
MS350R

System	Channel	Measured Bandwidth (kHz)	Limit (kHz)
GMRS	26	5.40	≤20

Verdict: Passed

For the electronic filing, the bandwidth plot is saved with filename: bw.pdf

Test Engineer: Koo Wai Ip Date of Test: February 23, 2011

EXHIBIT 6

SPURIOUS EMISSION

6.0 **Spurious Emission**

In order to satisfy the 95.635(b) requirement, the spurious emission from the EUT are measured and shown in the Exhibit 6.1.

6.1 Power of Spurious Radiation (Section 2.1053, 95.635(b))

A. Testing Procedure

Radiated emission measurements were performed according to the procedures in ANSI/TIA-603-C-2004. All measurements were performed in Open Area Test Sites located at Roof Top of Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.

B. Radiated Emission Configuration Photograph

Worst Case Radiated Emission

For electronic filing, the radiated emission configurations photograph is saved with filename: config photos.pdf

C. Test Result

Giant Electronics Limited
MS350R

Table 6(a)

1) Unwanted emission from CARRIER ±6.25kHz to CARRIER ±31.25kHz

(Refer to the plots which is saved with filename: spurious.pdf)

Region	Unwanted emission	
	Channel 4	Channel 11
CARRIER ±6.25kHz to ±12.5kHz	<25dB	<25dB
CARRIER ±12.5kHz to ±31.25kHz	<35dB	<35dB

Table 6(b): Channel 26

Frequency (MHz)	Effective Radiated Power (dBm)	Transmission Power (dBm)	Attenuation (dBc)	Limit (dBc)	Margin (dB)
233.813	-31.0	32.7	63.7	45.7	-18.0
701.439	-46.6	32.7	79.3	45.7	-33.6
935.252	-13.4	32.7	46.1	45.7	-0.4
1169.065	-27.0	32.7	59.7	45.7	-14.0
1402.878	-20.3	32.7	53.0	45.7	-7.3
1636.691	-24.2	32.7	56.9	45.7	-11.2
1870.504	-27.2	32.7	59.9	45.7	-14.2
2104.317	-25.3	32.7	58.0	45.7	-12.3
2338.130	-32.9	32.7	65.6	45.7	-19.9
2571.943	-35.0	32.7	67.7	45.7	-22.0
2805.756	-35.9	32.7	68.6	45.7	-22.9
3039.569	-37.8	32.7	70.5	45.7	-24.8
3273.382	-39.0	32.7	71.7	45.7	-26.0
3507.195	-38.8	32.7	71.5	45.7	-25.8
3741.008	-36.6	32.7	69.3	45.7	-23.6
3974.821	-36.2	32.7	68.9	45.7	-23.2
4208.634	-36.6	32.7	69.3	45.7	-23.6
4442.447	-36.5	32.7	69.2	45.7	-23.5

Remark: 1. Transmission power is 32.7 dBm or 2.7 dB(W).

2. According to Section 95.635(b7), the unwanted emission should be attenuated below TP by at least 43 + 10 $\log_{10}$ (TP) dB or 45.7 dB.

3. The test is performed according to ANSI/TIA-603-C-2004.

Verdict: Passed

Test Engineer: Koo Wai Ip Date of Test: February 23, 2011

EXHIBIT 7

FREQUENCY STABILITY

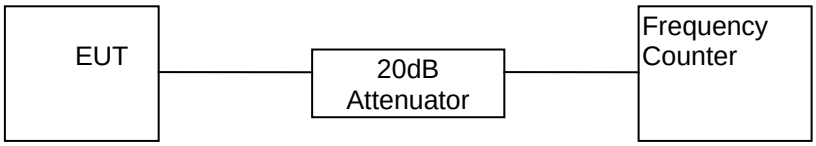
7.0 **Frequency Stability (Section 2.1055(a)(b)(d), 95.621(b) for GMRS)**

The frequency tolerance was tested in normal condition & over extreme ambient conditions with respect to voltage and temperature variation.

7.1 Frequency Tolerance (Section 95.627(b) for GMRS)

A. Testing Procedure

1) Set-up the test equipment in the following configuration:



2) Measure the channel frequency of channel 26 in MHz.

B. Test Result

Table 7

Giant Electronics Limited
MS350R

Frequency Tolerance

Channel	Frequency (MHz)	Measured Frequency (MHz)	Tolerance (%)
26	467.62500	467.62499	-0.00001

FCC Limit for GMRS & FRS (95.627(b)): ≤±0.00025%

Verdict: Passed

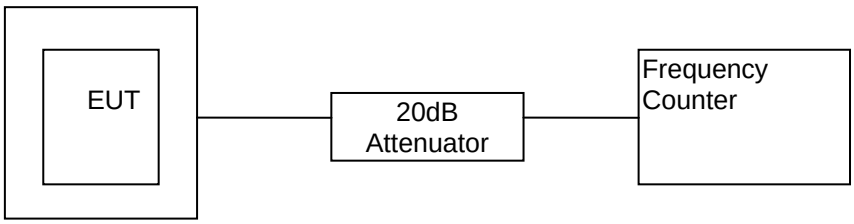
Test Engineer: Koo Wai Ip Date of Test: February 23, 2011

7.2 Frequency Stability - Temperature (Section 2.1055(a)(b), 95.621(b) for GMRS)

A. Testing Procedure

1) Set-up the test equipment in the following configuration:

Temperature Chamber



2) Set the Temperature Chamber to 20°C and stabilize the EUT temperature for one hour. Set transmitter ON for two minutes.
3) Measure the channel frequency of channel 26 in MHz.
4) Turn the EUT OFF.
5) Repeat the above procedure from -30°C to 50°C with 10°C increment for GMRS.

B. Test Result

Table 8(a)

Giant Electronics Limited
MS350R

Frequency Tolerance with Temperature Variation

Channel : 26

Temperature (°C)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Tolerance (%)	*Frequency Tolerance with reference to its value at +20°C (ppm)
-30	467.62500	467.62407	-0.000199	-2.0
-20	467.62500	467.62505	0.000011	0.1
-10	467.62500	467.62523	0.000049	0.5
0	467.62500	467.62603	0.000220	2.2
10	467.62500	467.62533	0.000071	0.7
20	467.62500	467.62499	-0.000001	0.0
30	467.62500	467.62478	-0.000047	-0.5
40	467.62500	467.62471	-0.000062	-0.6
50	467.62500	467.62491	-0.000019	-0.2

Remark: 1) For GMRS, frequency tolerance must be maintained within a frequency tolerance of 0.0005%.
2) For FRS mobile station, frequency tolerance must be maintained within a frequency tolerance of 0.00025%

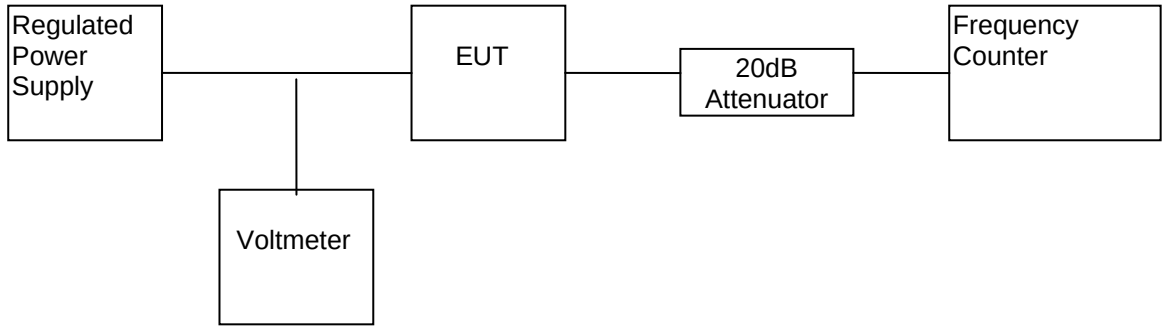
Verdict: Passed

Test Engineer: Koo Wai Ip Date of Test: February 23, 2011

7.3 Frequency Stability - Voltage (Section 2.1055(d), 95.621(b) for GMRS)

A. Testing Procedure

1) Set-up the test equipment in the following configuration:



2) Vary the level of regulated power supply to the manufacturer specified battery end point of the EUT.
3) Measure the channel frequency of channel 26 in MHz.

B. Test Result

Table 9

Giant Electronics Limited
MS350R

Frequency Tolerance with Voltage Variation

The manufacturer specified battery end point 2.8V

Channel	Frequency (MHz)	Measured Frequency (MHz)	Tolerance (%)
26	467.62500	467.62499	-0.000001

Remark: 1) For FRS, frequency tolerance must be maintained within a frequency tolerance of 0.00025%.
2) For GMRS, frequency tolerance must be maintained within a frequency tolerance of 0.0005%.
3) The test voltage is from primary supply voltage to 2.8V

Test Engineer: Koo Wai Ip Date of Test: February 23, 2011

8.0 **Equipment List**

1) Radiated Emissions Test

Equipment	Communication Service Monitor	Log Periodic Antenna	AC Millivoltmeter
Registration No.	EW-1775	EW-0446	EW-0054
Manufacturer	R&S	EMCO	LEADER
Model No.	CMS54	3146	LMV-182A
Calibration Date	Jan. 14, 2011	Apr. 26, 2010	Oct. 20, 2010
Calibration Due Date	Nov. 15, 2011	Oct. 26, 2011	Oct. 26, 2011

Equipment	Spectrum Analyzer	Biconical Antenna	EMI Test Receiver
Registration No.	EW-2253	EW-0954	EW-2251
Manufacturer	R&S	EMCO	R&S
Model No.	FSP40	3104C	ESCI
Calibration Date	Nov. 23, 2010	Apr. 14, 2010	Oct. 22, 2009
Calibration Due Date	Nov. 23, 2011	Oct. 14, 2011	Apr. 22, 2011

Equipment	Temperature & Humidity Chamber	Signal Generator	Frequency Counter
Registration No.	EW-2134	EW-1983	EW-1069
Manufacturer	GIANT FORCE	AGILENTTECH	OPTOELECTRON
Model No.	GTH-750-40-CP-SD	E8247C	3000A/TCXO
Calibration Date	Aug. 17, 2010	Jan. 16, 2009	Apr. 15, 2010
Calibration Due Date	Aug. 29, 2011	Apr. 16,2011	Apr. 15, 2011

Equipment	Sine Generator	Roberts Antennas	Digital Multimeter
Registration No.	EW-0211	EW-0160	EW-1237
Manufacturer	BK	CDI	FLUKE
Model No.	1051A	A100	179
Calibration Date	Jul. 19, 2010	Dec. 28, 2010	Sep. 01, 2009
Calibration Due Date	Jul. 17, 2011	Jun. 28, 2012	Oct. 01, 2011