Giant Electronics Ltd

Application
For
Class II Permissive Change of FCC Part 95 Certification

Two Way Radio with GMRS, FRS and Weather Band Receiver

(FCC ID: K7GMRCEJ)

HK11030473-1
KS/ cl
May 26, 2011

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EXHIBIT 1

GENERAL DESCRIPTION

1.0 General Description

1.1 Product Description

The model: MR350 is a Two Way Radio with GMRS, FRS, and Weather Band Receiver. GMRS and FRS radio operates between 462.5500MHz and 467.7125MHz. Weather band receiver operates 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). Power adaptor, USB port from computer and charging cradle can be alternative power sources.

Transmitter Portion

(i) Type of Emission : GMRS: 5K72F3E ; FRS: 5K64F3E
(ii) Frequency Range : GMRS 15 Channels from 462.5500MHz to 462.7250MHz
FRS 7 Channels from 467.5625MHz to 467.7125MHz
(iii) Maximum Power Rating : GMRS: 1.56W ERP; FRS: 0.33W 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: 1000mA

The Model: MR350R and MR351R are the same as the Model: MR350 in electrical, mechanical and same PCB layout. The only differences between these models are color to be sold for marketing purpose.

1.2 Purpose of Application

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

1.3 Test Methodology

Radiated emission measurements were performed according to the procedures in ANSI C63.4 (2003) and ANSI/TIA-603-C-2004. Conducted emission measurement were performed according to the procedures in ANSI C63..4 (2003). 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 and conducted emission 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 new "AA" size 1.5V alkaline batteries or a fully charged battery pack.

The frequency range of transmitter from 30MHz to 10th 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 100kHz for emissions below 1GHz, and 1MHz for emissions above 1GHz. Video bandwidth was 300kHz for emissions below 1GHz, and 3MHz for emissions above 1GHz. For receiver radiated spurious measurement, the spectrum analyzer resolution bandwidth was 100kHz for emission below 1GHz, and 1MHz for emissions above 1GHz. Video bandwidth was 3 times greater than resolution bandwidth.

For AC line conducted emission test, the EUT along with its peripherals were placed on a 1.0m(W)x1.5m(L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane. The EUT power cord connected to one LISN (Line impedance stabilization network), which provided 50ohm coupling impedance for measuring instrument. Meanwhile, the peripheral or support equipment power cords connected to a separate LISN. The ac power for all LISNs were obtained from the same power source. The LISN housing, measuring instrument case, reference ground plane, and vertical ground plane were bounded together. The excess power cable between the EUT and the LISN was bundled. Power cords of non-EUT equipment (peripherals) were not bundled. AC power cords of peripheral equipments draped over the rear edge of the table, and routed them down onto the floor of the ac powerline conducted emission test site to the second LISN.

All connecting cables of EUT and peripherals were manipulated to find the maximum emission.

This device supported several power-up methods (powered by rechargeable battery pack, alkaline batteries, charging cradle, adaptor and DC source from computer's USB port). All power-up methods were tested and the worst-case data were reported.

2.1 Justification (Cont'd)

The following are all the test modes (only the worst-case was reported):
GMRS, Tx without headset
GMRS, Tx with headset
GMRS, Tx with USB adaptor (with / without headset)
GMRS, Tx with USB cable via computer (with / without headset)
GMRS, Tx with Extra charger (with / without headset)
FRS (same as the all above cases)
Weather band receiver, with USB adaptor (with / without headset)

The RF module except a power transistor is the same as the original granted model: MR350. Therefore, RF power output measurement, power of spurious radiation, and AC line conducted emission measurement were included in the report.

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

1. AC adaptor for charging tray: 120VAC to 9VAC 200mA, Model: DV-0920ACS (Supplied by Client)
2. Operated battery: 3 x “AA” size 1.5V battery
3. A “Ni-MH” type rechargeable battery pack: 3.6V, 650mAh (Supplied by Client)
4. AC adaptor with USB jack: 100-240VAC to 5VDC 200mA, Model: DSA-6G-05 FUS 050020 (Supplied by Client)
5. Headset with 1.2m unshielded cable (Supplied by Client)
6 Notebook, Brand: Lenovo, Model: T61, S/N: L3-CF468 (Supplied by Intertek)
7. External 1394 HDD, Brand: Smart-drive, Model: HD3-SU2FW, S/N: 0800261 (HDD: Seagate 120GB, Model: ST912017AS, S/N: 5RE031DT) (Supplied by Intertek)
8. 1 x USB cable with 1.2 meter long (Supplied by Client)
9. 1 x USB cable with 0.7 meter long (Supplied by Intertek)
10. 1 x 1394 cable with 0.8 meter long (Supplied by Intertek)

Confirmed by:

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

Signature

May 26, 2011 Date

EXHIBIT 3

RF POWER OUTPUT

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

A. 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 Ltd
MR350

Transmission Power

Channel	Frequency	Effective Radiated Power		FCC 95.639 Limit	Margin	RSS-210 Limit	Margin
	(MHz)	(dBm)	(W)	(W)	(W)	(W)	(W)
1	462.5625	31.9	1.56	5.00	-3.44	2.0	-0.44
2	462.5875	31.9	1.56	5.00	-3.44	2.0	-0.44
3	462.6125	31.9	1.56	5.00	-3.44	2.0	-0.44
4	462.6375	31.9	1.56	5.00	-3.44	2.0	-0.44
5	462.6625	31.9	1.56	5.00	-3.44	2.0	-0.44
6	462.6875	31.9	1.56	5.00	-3.44	2.0	-0.44
7	462.7125	31.9	1.56	5.00	-3.44	2.0	-0.44
8	467.5625	25.1	0.33	0.50	-0.17	0.5	-0.17
9	467.5875	25.1	0.33	0.50	-0.17	0.5	-0.17
10	467.6125	25.1	0.33	0.50	-0.17	0.5	-0.17
11	467.6375	25.1	0.33	0.50	-0.17	0.5	-0.17
12	467.6625	25.1	0.33	0.50	-0.17	0.5	-0.17
13	467.6875	25.1	0.33	0.50	-0.17	0.5	-0.17
14	467.7125	25.1	0.33	0.50	-0.17	0.5	-0.17
15	462.5500	31.9	1.56	5.00	-3.44	2.0	-0.44
16	462.5750	31.9	1.56	5.00	-3.44	2.0	-0.44
17	462.6000	31.9	1.56	5.00	-3.44	2.0	-0.44
18	462.6250	31.9	1.56	5.00	-3.44	2.0	-0.44
19	462.6500	31.9	1.56	5.00	-3.44	2.0	-0.44
20	462.6750	31.9	1.56	5.00	-3.44	2.0	-0.44
21	462.7000	31.9	1.56	5.00	-3.44	2.0	-0.44
22	462.7250	31.9	1.56	5.00	-3.44	2.0	-0.44

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

Verdict: Passed

Test Engineer: Koo Wai Ip Date of Test: March 09 to May 24, 2011

EXHIBIT 4

SPURIOUS EMISSION

4.0 **Spurious Emission**

In order to satisfy the 95.635(b) requirement, the spurious emission from the EUT are measured and shown in the Exhibit 4.1.

4.1 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 Ltd
MR350

Table 2(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

Mode: Transmitter With Extra Charger

Table 2(a): Channel 4

Frequency (MHz)	Effective Radiated Power (dBm)	Transmission Power (dBm)	Attenuation (dBc)	Limit (dBc)	Margin (dB)
231.319	-37.0	31.9	68.9	44.9	-24.0
693.956	-32.0	31.9	63.9	44.9	-19.0
925.274	-15.0	31.9	46.9	44.9	-2.0
1156.593	-26.8	31.9	58.7	44.9	-13.8
1387.911	-30.0	31.9	61.9	44.9	-17.0
1619.230	-37.8	31.9	69.7	44.9	-24.8
1850.548	-21.0	31.9	52.9	44.9	-8.0
2081.867	-37.8	31.9	69.7	44.9	-24.8
2313.185	-25.0	31.9	56.9	44.9	-12.0
2544.504	-38.0	31.9	69.9	44.9	-25.0
2775.822	-38.2	31.9	70.1	44.9	-25.2
3007.141	-28.0	31.9	59.9	44.9	-15.0
3238.459	-37.8	31.9	69.7	44.9	-24.8
3469.778	-21.0	31.9	52.9	44.9	-8.0
3701.096	-37.0	31.9	68.9	44.9	-24.0
3932.415	-37.2	31.9	69.1	44.9	-24.2
4163.733	-38.2	31.9	70.1	44.9	-25.2
4395.652	-38.0	31.9	69.9	44.9	-25.0
4626.370	-38.8	31.9	70.7	44.9	-25.8

Remark: 1. Transmission power is 31.9 dBm or 1.9 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 44.9 dB.

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

Verdict: Passed

Test Engineer: Koo Wai Ip Date of Test: March 09 to May 24, 2011

Mode: Transmitter Without Headset

Table 2(b): Channel 11

Frequency (MHz)	Effective Radiated Power (dBm)	Transmission Power (dBm)	Attenuation (dBc)	Limit (dBc)	Margin (dB)
233.819	-37.2	25.1	62.3	38.1	-24.2
701.456	-36.5	25.1	61.6	38.1	-23.5
935.274	-17.8	25.1	42.9	38.1	-4.8
1169.093	-30.9	25.1	56.0	38.1	-17.9
1402.911	-38.0	25.1	63.1	38.1	-25.0
1636.730	-38.8	25.1	63.9	38.1	-25.8
1870.548	-33.1	25.1	58.2	38.1	-20.1
2104.367	-37.8	25.1	62.9	38.1	-24.8
2338.185	-32.9	25.1	58.0	38.1	-19.9
2572.004	-38.5	25.1	63.6	38.1	-25.5
2805.822	-37.0	25.1	62.1	38.1	-24.0
3039.641	-28.9	25.1	54.0	38.1	-15.9
3273.459	-37.0	25.1	62.1	38.1	-24.0
3507.278	-37.9	25.1	63.0	38.1	-24.9
3741.096	-37.8	25.1	62.9	38.1	-24.8
3974.915	-38.2	25.1	63.3	38.1	-25.2
4208.733	-39.0	25.1	64.1	38.1	-26.0
4442.512	-38.8	25.1	63.9	38.1	-25.8
4676.370	-39.2	25.1	64.3	38.1	-26.2

Remark: 1. Transmission power is 25.1 dBm or -4.9 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 38.1 dB.

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

Verdict: Passed

Test Engineer: Koo Wai Ip Date of Test: March 09 to May 24, 2011

4.2 **Field Strength of Radiation Emission and AC line Conducted Emission (Section 15.109 & 15.107)**

Data is included worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

A. Field Strength Calculation

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

FS = RA + AF + CF - AG + PD + AV

where FS = Field Strength in dBµV/m
RA = Receiver Amplitude (including preamplifier) in dBµV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB
PD = Pulse Desensitization in dB
AV = Average Factor in -dB

In the radiated emission table which follows, the reading shown on the data table may reflect the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

FS = RA + AF + CF - AG + PD + AV

Example
Assume a receiver reading of 62.0 dBµV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted. The pulse desensitization factor of the spectrum analyzer was 0 dB, and the resultant average factor was -10 dB. The net field strength for comparison to the appropriate emission limit is 32 dBµV/m. This value in dBµV/m was converted to its corresponding level in µV/m.

RA = 62.0 dBµV
AF = 7.4 dB
CF = 1.6 dB
AG = 29.0 dB
PD = 0 dB

AV = -10 dB

FS = 62 + 7.4 + 1.6 - 29 + 0 + (-10) = 32 dBµV/m

Level in µV/m = Common Antilogarithm [(32 dBµV/m)/20] = 39.8 µV/m

B. Radiated Emission Configuration Photograph – Weather Band Receiver

Worst Case Radiated Emission
at
140.600 MHz

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

C. Radiated Emission Data - Weather Band Receiver

The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Judgement: Passed by 8.4 dB margin

TEST PERSONNEL:

Signature

Koo Wai Ip, Lead Engineer
Typed/Printed Name

May 26, 2011
Date

Company: Giant Electronics Ltd. Date of Test: March 09 to May 24, 2011
Model: MR350
Mode: Weather Band Receiver with USB Adaptor

Table 2(c)

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
V	140.600	37.1	16	14.0	35.1	43.5	-8.4
V	281.200	29.0	16	22.0	35.0	46.0	-11.0
V	421.800	25.9	16	25.0	34.9	46.0	-11.1
V	562.400	22.6	16	28.0	34.6	46.0	-11.4
V	703.000	20.3	16	30.0	34.3	46.0	-11.7
V	843.600	19.2	16	31.0	34.2	46.0	-11.8

NOTES: 1. Peak detector is used for the emission measurement.

2. All measurements were made at 3 meters.

3. Negative value in the margin column shows emission below limit.

Test Engineer: Koo Wai Ip

D. Conducted Emission Configuration Photograph

Worst Case Conducted Emission

GMRS/ FRS / Tx at 0.4245 MHz

Weather Band Receiver at 0.4335 MHz

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

E. AC Line Conducted Emission Data

Judgement:

GMRS/ FRS/ Tx: Passed by 13.60 dB margin compare with average limit

Weather Band Receiver: Passed by 12.74 dB margin with average limit

For electronic filing, the conducted emission test result is saved with filename: conduct.pdf

TEST PERSONNEL:

Tester Signature

Koo Wai Ip, Lead Engineer
Typed/Printed Name

May 26, 2011
Date

5.0 **Equipment List**

1) Radiated Emissions Test

Equipment	Biconical Antenna	EMI Test Receiver		Spectrum Analyzer
Registration No.	EW-0954	EW-2500	EW-2251	EW-2188
Manufacturer	EMCO	R&S	R&S	AGILENTTECH
Model No.	3104C	ESCI	ESCI	E4407B
Calibration Date	Apr. 14, 2010	Jan. 25, 2011	Oct. 22, 2009	Dec. 27, 2010
Calibration Due Date	Oct. 14, 2011	Jan. 25, 2012	Apr. 22, 2011	Dec. 31, 2011

Equipment	Log Periodic Antenna	Double Ridged Guide Antenna (1GHz - 18GHz)	Spectrum Analyzer 40GHz
Registration No.	EW-0446	EW-1015	EW-2253
Manufacturer	EMCO	EMCO	R&S
Model No.	3146	3115	FSP40
Calibration Date	Apr. 26, 2010	Feb. 09, 2010	Nov. 23, 2010
Calibration Due Date	Oct. 26, 2011	Aug. 09, 2011	Nov. 23, 2011

2) Conducted Emissions Test

Equipment	EMI Test Receiver		Artificial Mains
Registration No.	EW-2666	EW-2500	EW-0090
Manufacturer	R&S	R&S	R&S
Model No.	ESCI7	ESCI	ESH3-Z5
Calibration Date	Oct. 12, 2010	Jan. 25, 2011	Feb. 05, 2010
Calibration Due Date	Oct. 12, 2011	Jan. 25, 2012	May 05, 2011

Equipment	Artificial Mains Network	Pulse Limiter
Registration No.	EW-2501	EW-0699
Manufacturer	R&S	R&S
Model No.	ENV-216	ESH3-Z2
Calibration Date	Mar. 30, 2011	Dec. 24, 2009
Calibration Due Date	Mar. 30, 2012	Jun. 24, 2011