

#### Giant Electronics Ltd.

Application For Permissive Change Class II

Two Way Radio with GMRS and FRS

(FCC ID: K7GSX900)

HK08030398-1 TL/ ac March 11, 2008

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#### MEASUREMENT/TECHNICAL REPORT

Application : Giant Electronics Ltd.

Trade Name/Model No: Motorola SX600

Motorola SX620, Motorola SX630

Date : March 11, 2008

This report concerns (check one:)O	riginal Grant <u>X</u> Class II Change					
Equipment Type: FRF – Part 95 Fa	Equipment Type: FRF – Part 95 Family Radio Face Held Transmitter					
Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? Yes NoX						
Company Name agrees to notify the	e 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:	Leung Wai Leung, Tommy 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					

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### List of attached file

Exhibit type	File Description Filename		
Operational Description	Technical Description	descri.pdf	
Operational Description	Purpose of Application	product change.pdf	
Test Report	Spurious Emission	spurious.pdf	
Block Diagram	Block Diagram	block.pdf	
Schematics	Circuit Diagram	circuit.pdf	
ID Label/Location	Label Artwork and Location	label.pdf	
User Manual	User Manual	manual.pdf	
Test Report	Test Report	report.pdf	
Test Setup Photo	Radiated Emission	config photos.doc	
Internal Photo	Internal Photo	internal photos.doc	
External Photo	External Photo	external photos.doc	
Part List/Tune Up Info	Part List	partlist.pdf	
RF Exposure Info	SAR Test Report	SAR report 1 of 2.pdf	
		SAR report 2 of 2.pdf	
Cover Letter	Letter of Agency	letter of agency.pdf	
Cover Letter	Confidentiality Request	request.pdf	

### **EXHIBIT 1**

### **GENERAL DESCRIPTION**

#### 1.0 **General Description**

#### 1.1 Product Description

The Equipment Under Test (EUT) is a Two Way Radio with GMRS and FRS operating between 462.5500MHz and 467.7125MHz. The EUT is powered by 3.6V (1 x 3.6V "Ni-MH" type rechargeable battery) or 4.5V (3 x "AAA" size 1.5V alkaline batteries). According to the user manual instructions, the EUT is turned off while in charging tray.

Transmitter Portion

(i) Type of Emission : GMRS: 5K60F3E; FRS: 5K60F3E

(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: 0.63W ERP; FRS: 0.30W ERP

(iv) Antenna Type : Integral

The Model: Motorola SX620, Motorola SX630 are the same as the Model: Motorola SX600 in hardware except cosmetic change aspect. The difference in model number serves as marketing strategy.

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

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#### 1.2 Purpose of Application

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 were performed according to the procedures in ANSI C63.4 (2003) and ANSI/TIA-603-B-2002. All measurement were performed in Open Area Test Sites. Preliminary scans were performed in the Open Area Test Sites only to determine worst case modes. For each scan, the procedure of maximizing emissions in Appendices D and E were followed. 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 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.

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# **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 "AAA" size 1.5V alkaline batteries.

The frequency range from 30 MHz to 4.69 GHz 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.

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#### 2.2 EUT Exercising Software

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

#### 2.5 Equipment Modification

Any modification installed previous to testing by Giant Electronics Ltd. will be incorporated in each production model sold/leased in the United States.

No modification were installed by Intertek Testing Services Hong Kong Ltd.

#### 2.6 Support Equipment

A headset with 1.2m unshielded cable.

Confirmed by:

Leung Wai Leung, Tommy Senior Manager Intertek Testing Services Hong Kong Ltd. Agent for Giant Electronics Ltd.

March 11, 2008 Date

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### **EXHIBIT 3**

# **RF POWER OUTPUT**

#### 3.0 RF Power Output (Section 2.1046(a))

#### A. Equipment Used

Equipment	Brand Name	Model No.
Log Periodic Antenna	EMCO	3148
Test receiver	Rohde & Schwarz	ESVS30
Tuned Dipole Antenna	CDI	A100
Signal Generator	IFR	2023B

#### B. Testing Procedure

- 1. On a test site, the EUT shall be placed at 1.5m 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 quasi-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.

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- 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.

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Table 1

Giant Electronics Ltd.

Motorola SX600

#### **Transmission Power**

Channel	Frequency	Effective Radiated Power		Limit	Margin
	(MHz)	(dBm)	(W)	(W)	(W)
1	462.5625	28.0	0.63	2.0	-1.37
2	462.5875	28.0	0.63	2.0	-1.37
3	462.6125	28.0	0.63	2.0	-1.37
4	462.6375	28.0	0.63	2.0	-1.37
5	462.6625	28.0	0.63	2.0	-1.37
6	462.6875	28.0	0.63	2.0	-1.37
7	462.7125	28.0	0.63	2.0	-1.37
8	467.5625	24.7	0.30	0.5	-0.20
9	467.5875	24.7	0.30	0.5	-0.20
10	467.6125	24.7	0.30	0.5	-0.20
11	467.6375	24.7	0.30	0.5	-0.20
12	467.6625	24.7	0.30	0.5	-0.20
13	467.6875	24.7	0.30	0.5	-0.20
14	467.7125	24.7	0.30	0.5	-0.20
15	462.5500	28.0	0.63	2.0	-1.37
16	462.5750	28.0	0.63	2.0	-1.37
17	462.6000	28.0	0.63	2.0	-1.37
18	462.6250	28.0	0.63	2.0	-1.37
19	462.6500	28.0	0.63	2.0	-1.37
20	462.6750	28.0	0.63	2.0	-1.37
21	462.7000	28.0	0.63	2.0	-1.37
22	462.7250	28.0	0.63	2.0	-1.37

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

Test Engineer: Ken Sit Date of Test: February 21-March 10, 2008

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### **EXHIBIT 4**

# **SPURIOUS EMISSION**

### 4.0 Spurious Emission (Section 95.635)

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

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### 4.1 Field Strength of Spurious Radiation (Section 95.635)

### A. Test Equipment

Equipment	Brand Name	Model No.
Antenna	EMCO	A100, 3148, 3104C, 3115
Spectrum Analyzer	ADVANTEST	U3661
Test receiver	Rohde & Schwarz	ESVS30
RF Filter	Trilithic	3VF500/1000-5-50-CC
Signal Generator	IFR	2023B

#### **B. Testing Procedure**

Radiated emission measurements were performed according to the procedures in ANSI C63.4(2003). All measurements were performed in Open Area Test Sites located at Roof Top of Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.

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# C. Radiated Emission Configuration Photograph

Worst Case Radiated Emission

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

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#### C. Test Result

# Giant Electronics Ltd. Motorola SX600

# Table 2(a)

1) Unwanted emission from CARRIER  $\pm 6.25 \text{kHz}$  to CARRIER  $\pm 31.25 \text{kHz}$ 

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

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

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Table 2(b): Channel 4

Frequency (MHz)	Effective Radiated Power (dBm)	Transmission Power (dBm)	Attenuation (dBc)	Limit (dB)	Margin (dB)
231.319	-50.2	28.0	78.2	41.0	-37.2
693.956	-46.5	28.0	74.5	41.0	-33.5
925.274	-42.6	28.0	70.6	41.0	-29.6
1156.593	-38.4	28.0	66.4	41.0	-25.4
1387.911	-35.4	28.0	63.4	41.0	-22.4
1619.230	-42.0	28.0	70.0	41.0	-29.0
1850.548	-29.0	28.0	57.0	41.0	-16.0
2081.867	-40.0	28.0	68.0	41.0	-27.0
2313.185	-35.4	28.0	63.4	41.0	-22.4
2544.504	-39.2	28.0	67.2	41.0	-26.2
2775.822	-37.0	28.0	65.0	41.0	-24.0
3007.141	-37.4	28.0	65.4	41.0	-24.4
3238.459	-33.8	28.0	61.8	41.0	-20.8
3469.778	-37.2	28.0	65.2	41.0	-24.2
3701.096	-37.4	28.0	65.4	41.0	-24.4
3932.415	-40.4	28.0	68.4	41.0	-27.4
4163.733	-39.2	28.0	67.2	41.0	-26.2
4395.052	-41.6	28.0	69.6	41.0	-28.6
4626.370	-42.0	28.0	70.0	41.0	-29.0

Remark: 1. Transmission power is 28 dBm or -2 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 41 dB.
- 3. The test is performed according to ANSI/TIA-603-B-2002.

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Table 2(b): Channel 11

Frequency (MHz)	Effective Radiated Power (dBm)	Transmission Power (dBm)	Attenuation (dBc)	Limit (dB)	Margin (dB)
233.819	-46.8	24.7	71.5	37.7	-33.8
701.456	-48.0	24.7	72.7	37.7	-35.0
935.274	-42.1	24.7	66.8	37.7	-29.1
1169.093	-42.8	24.7	67.5	37.7	-29.8
1402.911	-37.4	24.7	62.1	37.7	-24.4
1636.730	-44.4	24.7	69.1	37.7	-31.4
1870.548	-29.2	24.7	53.9	37.7	-16.2
2104.367	-43.0	24.7	67.7	37.7	-30.0
2338.185	-42.1	24.7	66.8	37.7	-29.1
2572.004	-41.4	24.7	66.1	37.7	-28.4
2805.822	-38.0	24.7	62.7	37.7	-25.0
3039.641	-40.0	24.7	64.7	37.7	-27.0
3273.459	-37.1	24.7	61.8	37.7	-24.1
3507.278	-38.2	24.7	62.9	37.7	-25.2
3741.096	-37.4	24.7	62.1	37.7	-24.4
3974.915	-39.0	24.7	63.7	37.7	-26.0
4208.733	-41.8	24.7	66.5	37.7	-28.8
4442.552	-41.2	24.7	65.9	37.7	-28.2
4676.370	-44.4	24.7	69.1	37.7	-31.4

Remark: 1. Transmission power is 24.7 dBm or -5.3 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 37.7 dB.
- 3. The test is performed according to ANSI/TIA-603-B-2002.

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# **EXHIBIT 5**

# **TECHNICAL SPECIFICATIONS**

# 5.0 **Technical Specifications**

# 5.1 Block Diagram

For electronic filing, the block diagram of the transceiver is saved with filename: block.pdf

Figure 5.1 Block Diagram

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# 5.2 Schematic Diagram

For electronic filing, the schematic diagram of the transceiver is saved with filename: circuit.pdf

Figure 5.2 Schematic Diagram

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# **EXHIBIT 6**

# **PRODUCT LABELLING**

# 6.0 **Product Labelling**

#### 6.1 Label Artwork & Location

Figure 6.1 Label Artwork & Location

An engineering drawing of the label which will be permanently affixed to the unit. For electronic filing, the label artwork & location are saved with filename: label.pdf

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### **EXHIBIT 7**

# **PHOTOGRAPHS**

# 7.0 **Equipment Photographs**

For electronic filing, photographs of the tested EUT are saved with filename: external photos.doc and internal photos.doc

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### **EXHIBIT 8**

# **INSTRUCTION MANUAL**

### 8.0 **Instruction Manual**

This manual will be provided to the end-user with each unit sold/leased in the United States.

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual.pdf

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### **EXHIBIT 9**

# **PART LIST**

# 9.0 Part List

For electronic filing, a preliminary copy of the Part List is saved with filename: partlist.pdf

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### **EXHIBIT 10**

### **RF EXPOSURE INFO**

# 10.0 RF Exposure Info

The RF Safety Information is shown on P.1 of User Manual.

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# **EXHIBIT 11**

### **LETTER OF AGENCY**

# 11.0 Letter of Agency

For electronic filing, a letter of agency is saved with filename: letter of agency.pdf

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# **EXHIBIT 12**

# **CONFIDENTIALITY REQUEST**

# 12.0 Confidentiality Request

For electronic filing, a confidentiality request is saved with filename: request.pdf

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