



CCT R & D Limited

Application
For
Class II Permissive Change
(FCC ID: NC8T5600)

September 2, 2003

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September 2, 2003

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MEASUREMENT/TECHNICAL REPORT

Application : CCT R & D Limited
Trade Name/Model No : MOTOROLA T5620
MOTOROLA T5600
Date : September 2, 2003

This report concerns (check one:) Original Grant _____ Class II Change X

Equipment Type: GMRS + FRS

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:

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List of attached file

Exhibit type	File Description	Filename
Operation Description	Technical Description	descri.pdf
Operation Description	Technical Change	change.pdf
Test Report	Bandwidth Plot	bw.pdf
Test Report	Modulation Frequency Response	mfr.pdf
Test Report	Modulation Limit Characteristic	mlc.pdf
Block Diagram	Block Diagram	block.pdf
Schematics	Circuit Diagram	circuit.pdf
Test Report	Test Report	report.pdf
Internal Photo	Internal Photo	internal photos.doc
External Photo	External Photo	external photos.doc
Test Report	Part List	partlist.pdf
Test Report	Audio Low Pass Filter Response	lpf.pdf
Cover Letter	Confidentiality Request	request.pdf

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EXHIBIT 1

GENERAL DESCRIPTION

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1.0 **General Description**

1.1 Product Description

The Equipment Under Test (EUT) is a Family Radio Service Plus General Mobile Radio Service operating at 462.5500 and 467.7125MHz. The EUT is powered by 4.5V d.c. (3 x 1.5V "AAA" size alkaline batteries).

Transmitter Portion

- i) Type of Emission : 10K5F3E
- ii) Frequency Range : FRS 7 Channels from 467.5625 to 467.7125MHz
GMRS 15 Channels from 462.5500 to 462.7250MHz
- iii) Maximum Power Rating : FRS - 0.20W ERP, GMRS - 0.21W ERP
- iv) Antenna Type : Integral

The Model: Motorola T5600 is the same as the Model: Motorola T5620 is the same as hardware aspect except that the no scan function is implemented in T5620 and in different in industrial drawing.

For electronic filing, the brief circuit description and technical change are saved with filename: descri.pdf and change.pdf respectively.

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1.2 Related Submittal(s) Grants

This is an Application for Class II permissive change of the transmitter portion of a GMRS + FRS Transceiver. The receiver section of this Transceiver is subject to verification process.

1.3 Test Methodology

Radiated emission measurements were performed according to the procedures in ANSI C63.4 (1992) and ANSI/TIA/EIA-603-1992. 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 and conducted measurement facility 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

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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. When the radiated emissions are measured.

The device was powered by 3 x new 1.5V "AAA" 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 unit is powered on, a signal is transmitted.

2.3 Special Accessories

No special accessory is needed for compliance of this device.

A supplied headset is provided for the testing.

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 CCT R & D Limited will be incorporated in each production model sold/leased in the United States.

No modification were installed by Intertek Testing Services.

Confirmed by:

*Derek Leung
Supervisor
Intertek Testing Services
Agent for CCT R & D Limited*



Signature

September 2, 2003 Date

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EXHIBIT 3

MODULATION CHARACTERISTICS

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3.0 **Modulation Characteristics**

In order to satisfy the 95.637(a) requirement, Modulation Frequency Response and Modulation Limit Characteristics are attached in Exhibit 4.1 & 4.2.

Plots for each tests are saved with filename: mfr.pdf and mlc.pdf

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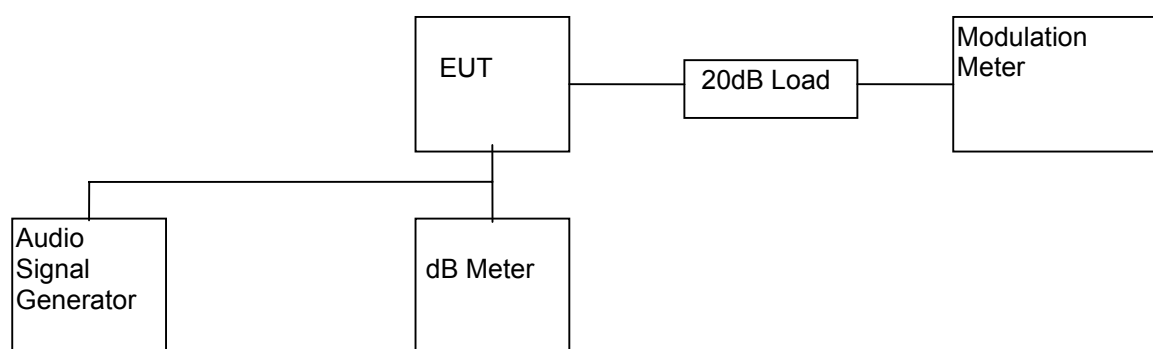
3.1 Modulation Frequency Response

A. Test Equipment

Equipment	Brand Name	Model No.
Audio Signal Generator	Leader	LFG-1300S
dB meter	Leader	LMV-182A
20 dB RF Load	Bird	8304-200-N
Modulation Meter	Marconi Instrument	2945

B. Testing Procedure

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



- 2) Set the audio signal generator frequency to the sound pressure level 83dBSPL at the microphone of the EUT.
- 3) The frequency of the audio signal generator is changed from 300Hz to 5kHz.
- 4) Record the frequency deviation.

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C. Test Result

Table 1

CCT R & D Limited
MOTOROLA T5620

Modulation Frequency Response

Test Channel : 4

Input level = 83dB SPL

Modulation Frequency (Hz)	Modulation index (%)
300	0.50
400	0.50
500	0.50
600	0.50
700	0.49
800	0.51
900	0.52
1000	0.51
1250	0.51
1500	0.45
1750	0.39
2000	0.40
2250	0.47
2500	0.52
2750	0.44
3000	0.33
3125	0.27
3250	0.22
3500	0.16
4000	0.09
5000	0.02

Test Engineer: Ben W. K. Ho

Date of Test: August 15, 2003

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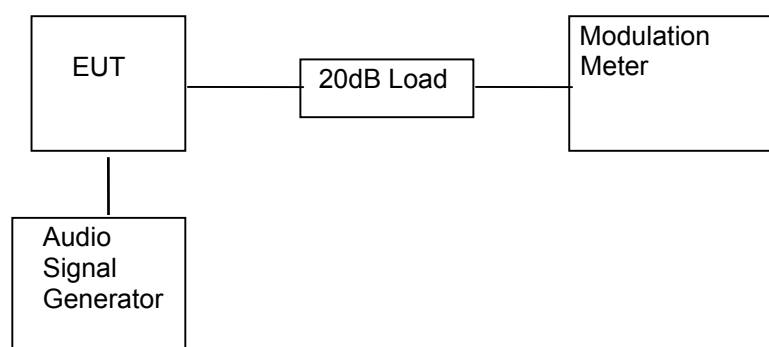
3.2 Modulation Limiting Characteristics (Section 2.1047(b))

A. Test Equipment

Equipment	Brand Name	Model No.
Audio Signal Generator	Leader	LFG-1300S
20 dB RF Load	Bird	8304-200-N
Modulation Meter	Marconi	2950

B. 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.

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C. Test Result

Table 2

CCT R & D Limited
MOTOROLA T5620

Modulation Limiting Characteristics

Test Channel : 4

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	0.10	0.10	0.15	0.16
57	0.11	0.12	0.22	0.21
67	0.12	0.20	0.43	0.33
77	0.17	0.37	0.84	0.58
87	0.28	0.68	1.59	1.10
97	0.51	1.23	1.91	1.54
107	0.91	2.16	1.90	1.62
117	1.72	2.38	1.91	1.64
127	2.09	2.49	1.91	1.63
137	2.15	2.39	1.92	1.64

Test Engineer: Ben W. K. Ho

Date of Test: August 15, 2003

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3.3 Audio Low Pass Filter Response (Section 95.637(b))

A. Test Equipment

Equipment	Brand Name	Model No.
Audio Signal Generator	Leader	LFG-1300S
dB meter	Leader	LMV-182A

B. 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:

$$\text{low pass filter response} = LEV_{FREQ} - LEV_{REF}$$

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

C. Test Result

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

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EXHIBIT 4

OCCUPIED BANDWIDTH

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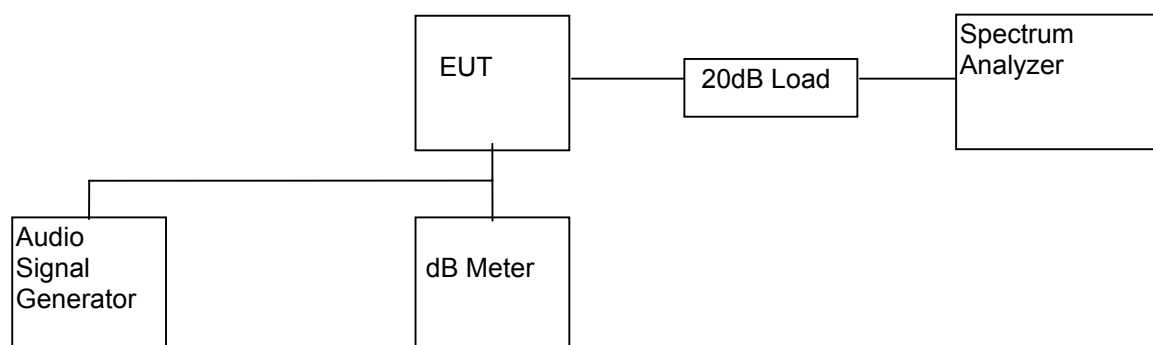
4.0 Occupied Bandwidth (Section 95.633(c))

A. Test Equipment

Equipment	Brand Name	Model No.
Audio Signal Generator	Leader	LFG-1300S
dB meter	Leader	LMV-182A
20 dB RF Load	Bird	8304-200-N
Spectrum Analyzer	Hewlett Packard	8951EM

B. 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 5kHz/div scan and 10dB/div.

C. Test Result

The occupied Bandwidth is measured to be 10.5 kHz.

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

Test Engineer: Ben W. K. Ho

Date of Test: August 15, 2003

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EXHIBIT 5

TECHNICAL SPECIFICATIONS

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5.0 Technical Specifications

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5.1 Block Diagram

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

Figure 8.1 Block Diagram

5.2 Schematic Diagram

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

Figure 8.2 Schematic Diagram

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EXHIBIT 6

EQUIPMENT PHOTOGRAPHS

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6.0 **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 7

PART LIST

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7.0 **Part List**

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

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EXHIBIT 8

CONFIDENTIALITY REQUEST

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8.0 **Confidentiality Request**

The applicant would like to have confidential protection of the following documents:

- Schematic
- Block Diagram
- Operation Description

For electronic filing, the request letter is saved with filename: request.pdf.