



Tandy Electronics (China) Ltd.

Application
For
Certification

Handheld CB Radio with Weather Alert

(FCC ID: AAO2101679A)

0724017
TL/ ac
27 November, 2007

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INTERTEK TESTING SERVICES

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MEASUREMENT/TECHNICAL REPORT

Application : Tandy Electronics (China) Ltd.
Trade Name/Model No : 21-1679 [A]
Date : 27 November, 2007

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

Equipment Type: TNF – Licensed Non-Broadcast Transmitter Held to Face Transmitter

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? Yes No

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
Test Report	Modulation Limit Characteristic	mlc.pdf
Test Report	Spurious Emission	spurious.pdf
Test Report	Conducted Emission Test Result	conduct.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_1.pdf
Test Report	Test Report	report_2.pdf
Test Setup Photo	Radiated Emission	config photos.doc
	Conducted Emission	
Internal Photo	Internal Photo	internal photos.doc
External Photo	External Photo	external photos.doc
Serial Number Engraving	Serial Number Engraving	serial.pdf
CB Transmitter Power	CB Transmitter Power	power.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 40 Channel mobile Citizen Band (CB) transceiver with 7 channels weather receiver. The CB Radio receives and transmits between 26.965 MHz and 27.405 MHz, while, it, additionally, can receive weather service between 162.400 MHz and 162.550 MHz. The EUT is powered by 12 Vdc.

Transmitter Portion

- (i) Type of Emission : 5K43A3E
- (ii) Frequency Range : 26.965 MHz to 27.405 MHz
- (iii) Maximum Power Rating : 4 Watt

Receiver Portion

- (i) Type of Receiver : Superheterodyne receiver
- (ii) Tuning Frequency : 26.965 MHz to 27.405 MHz
- (iii) Local Oscillator : 10.25 MHz
- (iv) IF : (1st)10.7 MHz and (2nd) 450kHz

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

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1.2 Related Submittal(s) Grants

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

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 cases 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

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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. The device had been tested with headset and without headset when the radiated emissions are measured.

The device was powered by a DC Power supply adjusted to give 13.8Vdc or a Ni-MH Battery Pack.

For measuring spurious and harmonics emissions of the transmitter, a 50 ohm load was connected to the antenna terminal.

The frequency range from 25 MHz to 1 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

A headset is provided for compliance of this product.

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 Tandy Electronics (China) 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.

Confirmed by:

*Leung Wai Leung, Tommy
Senior Manager
Intertek Testing Services Hong Kong Ltd.
Agent for Tandy Electronics (China) Ltd.*



_____ Signature

_____ 27 November, 2007 _____ Date

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EXHIBIT 3

MODULATION CHARACTERISTICS

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3.0 Modulation Characteristics

In order to satisfy the 95.637 requirements, Modulation Limit Characteristics is attached in Exhibit 3.1.

Plots for the test is saved with filename: mlc.pdf.

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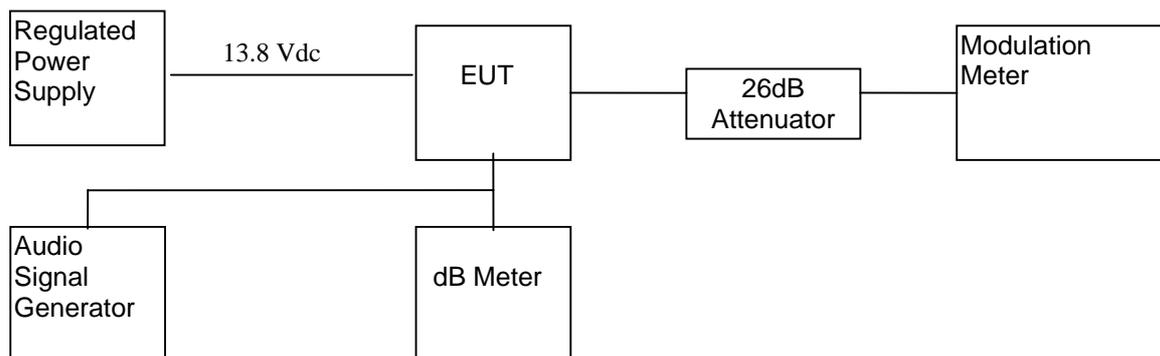
3.1 Modulation Limiting Characteristics (Section 2.1047(b))

A. Test Equipment

Equipment	Brand Name	Model No.
Regulated Power Supply	GWINSTEK	GPS-3030DD
20 dB RF Attenuator	Bird	8304-200-N
6dB RF Attenuator	AEROFLEXINME	1N100W-6dB
AC Millivoltmeter	Leader	LMV-182A
Audio Signal Generator	HP	HP8904A
Radiocommunication Service Monitor	R&S	CMS54

B. Testing Procedure

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



- 2) Set the frequency of the audio signal generator to 100Hz and adjust the level from -70dBm to 0dBm. Record the output modulation index.
- 3) Repeat the above procedure with frequency 300Hz, 1000Hz, 2500Hz & 3000Hz and 5000Hz.
- 4) Repeat the above procedure with Ni-MH Battery Pack power up.

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C. Test Result

Table 3

**Tandy Electronics (China) Ltd.
21-1679 [A]**

Modulation Limiting Characteristics

Test Channel : 20, Powered by AC adaptor

Frequency (Hz)	Audio Amplitude (dBm)							
	-70	-60	-50	-40	-30	-20	-10	0
100	0.11	0.16	0.38	2.09	6.48	20.44	72.64	93.04
300	0.34	1.85	5.48	17.96	45.05	71.19	71.79	77.16
1000	0.69	3.35	9.88	32.98	64.15	65.53	70.56	75.75
2500	0.47	2.38	6.71	21.43	62.47	65.00	69.72	74.96
3000	0.40	1.99	5.70	17.90	61.32	64.48	68.98	74.02
5000	0.23	0.64	3.10	9.19	29.93	62.59	66.26	70.45

Test Channel : 20, Powered by Ni-MH Battery Pack

Frequency (Hz)	Audio Amplitude (dBm)							
	-70	-60	-50	-40	-30	-20	-10	0
100	0.11	0.13	0.26	0.81	3.80	14.21	53.00	82.09
300	0.27	0.87	4.23	13.22	36.27	54.39	81.56	83.03
1000	0.51	2.60	7.40	23.91	69.48	70.45	72.13	74.54
2500	0.36	1.92	5.29	16.57	56.41	69.82	71.92	75.17
3000	0.31	0.95	4.53	14.06	47.18	69.41	71.50	74.65
5000	0.19	0.50	2.50	7.33	23.07	67.73	69.62	72.24

Test Engineer: Ken Sit

Date of Test: 19 November, 2007

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EXHIBIT 4

SPURIOUS EMISSION

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4.0 **Spurious Emission (Section 95.635)**

In order to satisfy the 95.635 requirements, the spurious emission from the EUT are measured and shown in the Exhibit 4.1 and 4.2.

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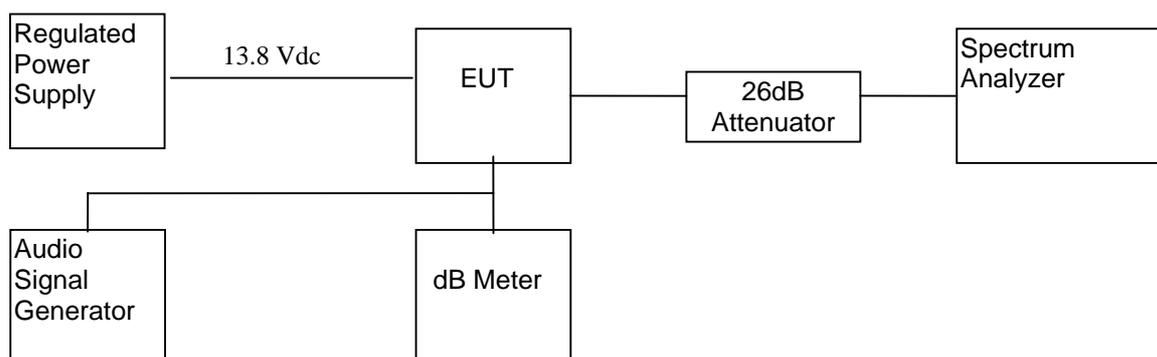
4.1 Spurious emission at the antenna terminal (Section 95.635)

A. Test Equipment

Equipment	Brand Name	Model No.
Audio Signal Generator	HP	HP8904A
Regulated Power Supply	GWINSTEK	GPS-3030DD
6dB RF Attenuator	AEROFLEXINME	1N100W-6dB
AC Millivoltmeter	Leader	LMV-182A
20 dB RF Attenuator	Bird	8304-200-N
Spectrum Analyzer	R&S	FSP40

B. Testing Procedure

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



- 2) Power the EUT with 13.8Vdc and set it in High Power mode.
- 3) Set the level of audio signal generator to obtain 16dB greater than required for 50% modulation.
- 4) Plot the graph of emissions relative to TP from 0.15 MHz to 1000 MHz, except the region CARRIER -20 kHz to CARRIER +20 kHz
- 5) Repeat the measurement, 3) and 4), with Low Power Setting.
- 6) Repeat the measurement, 2) to 5), with Battery Operated.

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C. Test Result

The power of each unwanted emission shall be less than TP, at least 60 dB on any frequency twice or greater than twice the fundamental frequency.

Refer to the following plots for spurious emissions at the antenna terminal:

Plot 4A1 - 4A5:

Modulated High Power Emissions in CH20 & Powered by AC Adaptor

Plot 4B1 - 4B5:

Modulated Low Power Emissions in CH20 & Powered by AC Adaptor

Plot 4C1 - 4C5:

Modulated High Power Emissions in CH20 & Powered by a Ni-MH Battery Pack

Plot 4D1 - 4D5:

Modulated Low Power Emissions in CH20 & Powered by a Ni-MH Battery Pack

The plots showed all spurious emission from 0.15 MHz to 1000 MHz were measured and they were found to be at least 60 dB on any frequency, twice or greater than twice the fundamental frequency, less than the TP.

Plots for the test is saved with filename: spurious.pdf.

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4.2 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

**Tandy Electronics (China) Ltd.
21-1679 [A]**

**Table 4(a) Channel 20
Test mode: High Power Transmission with Headset**

Frequency (MHz)	Effective Radiated Power (dBm)	Transmission Power (dBm)	Attenuation (dBc)	Limit (dB)	Margin (dB)
54.410	-33.6	35.3	68.9	60.0	-8.9
81.615	-38.7	35.3	74.0	60.0	-14.0
108.820	-54.6	35.3	89.9	60.0	-29.9
136.025	-51.2	35.3	86.5	60.0	-26.5
163.230	-39.0	35.3	74.3	60.0	-14.3
190.435	-54.4	35.3	89.7	60.0	-29.7
217.640	-57.5	35.3	92.8	60.0	-32.8
244.845	-58.7	35.3	94.0	60.0	-34.0
272.050	-62.0	35.3	97.3	60.0	-37.3

- Remark: 1. Transmission power is 35.3 dBm.
2. According to Section 95.635(9), the unwanted emission should be attenuated below TP by at least 60 dB.
3. The test is performed according to ANSI/TIA-603-B-2002.
4. Negative Sign (-) in the margin column signify levels below the limit.
5. “*” shows the data exceed the limit.

Test Engineer: Ken Sit

Date of Test: 19 November, 2007

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Table 4(b) Channel 20
Test mode: High Power Transmission without Headset

Frequency (MHz)	Effective Radiated Power (dBm)	Transmission Power (dBm)	Attenuation (dBc)	Limit (dB)	Margin (dB)
54.410	-32.0	35.3	67.3	60.0	-7.3
81.615	-43.2	35.3	78.5	60.0	-18.5
108.820	-55.1	35.3	90.4	60.0	-30.4
136.025	-54.0	35.3	89.3	60.0	-29.3
163.230	-48.0	35.3	83.3	60.0	-23.3
190.435	-54.6	35.3	89.9	60.0	-29.9
217.640	-56.0	35.3	91.3	60.0	-31.3
244.845	-58.0	35.3	93.3	60.0	-33.3
272.050	-60.6	35.3	95.9	60.0	-35.9

- Remark: 1. Transmission power is 35.3 dBm.
2. According to Section 95.635(9), the unwanted emission should be attenuated below TP by at least 60 dB.
3. The test is performed according to ANSI/TIA-603-B-2002.
4. Negative Sign (-) in the margin column signify levels below the limit.
5. “*” shows the data exceed the limit.

Test Engineer: Ken Sit

Date of Test: 19 November, 2007

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Table 4(c) Channel 20
Test mode: Low Power Transmission with Headset

Frequency (MHz)	Effective Radiated Power (dBm)	Transmission Power (dBm)	Attenuation (dBc)	Limit (dB)	Margin (dB)
54.410	-34.0	27.3	61.3	60.0	-1.3
81.615	-39.0	27.3	66.3	60.0	-6.3
108.820	-55.1	27.3	82.4	60.0	-22.4
136.025	-51.4	27.3	78.7	60.0	-18.7
163.230	-39.4	27.3	66.7	60.0	-6.7
190.435	-54.6	27.3	81.9	60.0	-21.9
217.640	-58.0	27.3	85.3	60.0	-25.3
244.845	-58.4	27.3	85.7	60.0	-25.7
272.050	-59.0	27.3	86.3	60.0	-26.3

- Remark: 1. Transmission power is 27.3 dBm.
2. According to Section 95.635(9), the unwanted emission should be attenuated below TP by at least 60 dB.
3. The test is performed according to ANSI/TIA-603-B-2002.
4. Negative Sign (-) in the margin column signify levels below the limit.
5. “*” shows the data exceed the limit.

Test Engineer: Ken Sit

Date of Test: 19 November, 2007

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Table 4(d) Channel 20
Test mode: Low Power Transmission without Headset

Frequency (MHz)	Effective Radiated Power (dBm)	Transmission Power (dBm)	Attenuation (dBc)	Limit (dB)	Margin (dB)
54.410	-34.0	27.3	61.3	60.0	-1.3
81.615	-47.2	27.3	74.5	60.0	-14.5
108.820	-55.6	27.3	82.9	60.0	-22.9
136.025	-54.4	27.3	81.7	60.0	-21.7
163.230	-49.0	27.3	76.3	60.0	-16.3
190.435	-56.4	27.3	83.7	60.0	-23.7
217.640	-58.0	27.3	85.3	60.0	-25.3
244.845	-58.4	27.3	85.7	60.0	-25.7
272.050	-61.2	27.3	88.5	60.0	-28.5

- Remark: 1. Transmission power is 27.3 dBm.
2. According to Section 95.635(9), the unwanted emission should be attenuated below TP by at least 60 dB.
3. The test is performed according to ANSI/TIA-603-B-2002.
4. Negative Sign (-) in the margin column signify levels below the limit.
5. "*" shows the data exceed the limit.

Test Engineer: Ken Sit

Date of Test: 19 November, 2007

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D. Conducted Emission Configuration Photograph

Worst Case Conducted Emission

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

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D. Test Result

**Tandy Electronics (China) Ltd.
21-1679 [A]**

Conducted Emission

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

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EXHIBIT 5

FREQUENCY STABILITY

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5.0 **Frequency Stability**

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

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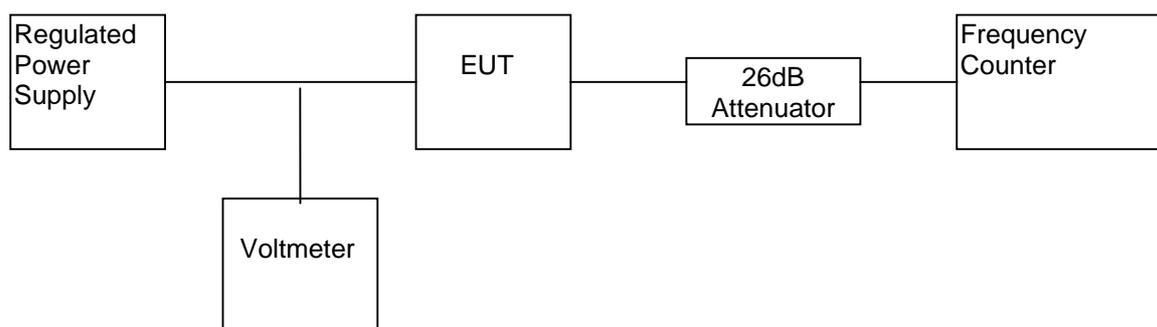
5.1 Frequency Stability - Voltage (Section 95.625)

A. Test Equipment

Equipment	Brand Name	Model No.
Regulated Power Supply	PAD	30-35L
20 dB RF Attenuator	Bird	8304-200-N
6dB RF Attenuator	AEROFLEXINME	1N100W-6dB
Regulated Power Supply	GWINSTEK	GPS-3030DD
Voltage meter	Fluke	87
Frequency Counter	OPTOELECTRONICS	3000A

B. Testing Procedure

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



- 2) Vary the level of regulated power supply from 85% to 115% of the rated voltage.
- 3) Measure the channel frequency of channel 20 in MHz at each input power level.

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C. Test Result

Table 5

**Tandy Electronics (China) Ltd.
21-1679 [A]**

Frequency Deviation with Voltage Variation

Nominal Voltage: 12 Vdc

Input Voltage: $12\text{Vdc} \times 0.85 = 10.2\text{ Vdc}$

Channel	Frequency (MHz)	Measured Frequency (MHz)	Tolerance (%)
20	27.20500	27.20502	0.000074

Input Voltage: $12\text{Vdc} \times 1.15 = 13.8\text{ Vdc}$

Channel	Frequency (MHz)	Measured Frequency (MHz)	Tolerance (%)
20	27.20500	27.20502	0.000074

Remark: For CB Radio, Frequency Tolerance must be maintained within a frequency tolerance of 0.005%

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EXHIBIT 6

TECHNICAL SPECIFICATIONS

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6.0 Technical Specifications

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6.1 Block Diagram

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

Figure 6.1 Block Diagram

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6.2 Schematic Diagram

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

Figure 6.2 Schematic Diagram

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EXHIBIT 7

PRODUCT LABELLING

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7.0 Product Labelling

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7.1 Label Artwork & Location

Figure 7.1 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 8
PHOTOGRAPHS

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8.0 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 9

INSTRUCTION MANUAL

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9.0 **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 10

Serial Number Engraving

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10.0 Serial Number Engraving

Figure 7.1 Serial Number Artwork & Location

An engineering drawing of the Serial Number which will be permanently engraved to the unit. For electronic filing, the Artwork & Location are saved with filename: serial.pdf

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EXHIBIT 11

CB Transmitter Power

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11.0 CB Transmitter Power

The dissipation rating of all the semiconductors or electron tubes which supply RF power to the antenna terminals of each CB Transmitter does not exceed 10W. The specification is saved with filename: power.pdf.

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EXHIBIT 12

CONFIDENTIALITY REQUEST

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12.0 Confidentiality Request

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