

August 12, 2009

In-Tech Electronics Ltd
Unit A, 13/F, Wing Tai Centre 12 Hing Yip Street, Kwun Tong
Kowloon, Hong Kong

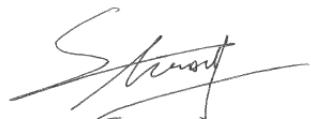
Dear Jacky Tsang :

Enclosed you will find your file copy of a Part 15 Certification (FCC ID: NV6-CS8140).

For your reference, TCB will normally take another 15-20 days for reviewing the report.
Approval will then be granted when no query is sorted.

Please contact me if you have any questions regarding the enclosed material.

Sincerely,



Shawn Xing
Assistant Manager

Enclosure

In-Tech Electronics Ltd

Application
For
Certification
(FCC ID: NV6-CS8140)

Bluetooth Neckloop Pendant

MODEL: CS8140

2.4GHz Transceiver

Billy Li

SZ09070265-3

Billy Li

August 12, 2009

- The test results reported in this test report shall refer only to the sample actually tested and shall not refer or be deemed to refer to bulk from which such a sample may be said to have been obtained.
- 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 copy or distribute this report. 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 referenced from 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.
- For Terms And Conditions of the services, it can be provided upon request.
- The evaluation data of the report will be kept for 3 years from the date of issuance.

TRF no.: FCC 15C_TXa
FCC ID: NV6-CS8140

Intertek Testing Services Shenzhen Ltd. Kejiyuan Branch
6F, D Block, Huahan Building, Langshan Road, Nanshan District, Shenzhen, P. R. China

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INTERTEK TESTING SERVICES

LIST OF EXHIBITS

INTRODUCTION

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INTERTEK TESTING SERVICES

MEASUREMENT/TECHNICAL REPORT

In-Tech Electronics Ltd - MODEL: CS8140

FCC ID: NV6-CS8140

August 12, 2009

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

Equipment Type: DXX - Part 15 Low Power Communication Device 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.

Transition Rules Request per 15.37? Yes No

If no, assumed Part 15, Subpart C for intentional radiator – the new 47 CFR [10-1-08 Edition] provision.

Report prepared by:



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List of attached file

Exhibit type	File Description	Filename
Test Report	Test Report	report.pdf
Test Setup Photo	Radiated Emission	radiated photos.pdf
Test Report	Bandedge Plot	bendedge.pdf
Test Report	20dB BW Plot	bw.pdf
External Photo	External Photo	external photos.pdf
Internal Photo	Internal Photo	internal photos.pdf
Block Diagram	Block Diagram	block.pdf
Schematics	Circuit Diagram	circuit.pdf
Operation Description	Technical Description	descri.pdf
ID Label/Location	Label Artwork and Location	label.pdf
User Manual	User Manual	manual.pdf
Cover Letter	Letter of Agency	agency.pdf
Equipment List	Test Equipment List	equipment list.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 Bluetooth Pendant model: CS8140. It is powered by an internal 3.7V rechargeable battery, and charging by an external adapter (Input: 100-240VAC, 50/60Hz, output: DC 5.0V, 500mA). The main function of EUT is to prove Bluetooth function for people who are using hearing aid device with T-coil mode. The EUT can not transmit when charging.

Antenna Type: PCB antenna

For electronic filing, the brief circuit description is saved with filename: descri.pdf.

1.2 Related Submittal(s) Grants

This is an application for certification of a transceiver.

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1.3 Test Methodology

Radiated emission measurements were performed according to the procedures in ANSI C63.4 (2003). Radiated Emission measurement was performed in a Semi-anechoic chamber. Preliminary scans were performed in the Semi-anechoic chamber only to determine worst case modes. For each scan, the procedure for maximizing emissions in Appendices D and E were followed. All Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application.

1.4 Test Facility

The Semi-anechoic chamber facility used to collect the radiated data is **Intertek Testing Services Shenzhen Ltd. Kejiyuan Branch** and located at 6F, D Block, Huahan Building, Langshan Road, Nanshan District, Shenzhen, P. R. China. This test facility and site measurement data have been fully placed on file with the FCC.

EXHIBIT 2

SYSTEM TEST CONFIGURATION

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2.0 **System Test Configuration**

2.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it), and in the confines as outlined in ANSI C63.4 (2003).

The EUT was powered fully charged 3.7V internal rechargeable battery in the testing.

For maximizing emissions, the EUT was rotated through 360°, the antenna height was varied from 1 meter to 4 meters above the ground plane, and the antenna polarization was changed. This step by step procedure for maximizing emissions led to the data reported in Exhibit 3.0.

The unit was operated standalone and placed in the center of the turntable.

The equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). The EUT was placed on a turn table, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

2.2 EUT Exercising Software

The EUT exercise program (BlueSuite2.0, provided by client) used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use.

The parameters of test software setting:

During the test, Channel and power controlling software provided by the applicant was used to control the operating channel as well as the output power level.

2.3 Special Accessories

No special accessories used.

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2.4 Equipment Modification

Any modifications installed previous to testing by In-Tech Electronics Ltd will be incorporated in each production model sold / leased in the United States.

No modifications were installed by Intertek Testing Services Shenzhen Ltd. Kejiyuan Branch.

2.5 Measurement Uncertainty

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

2.6 Support Equipment List and Description

This product was tested in the following configuration:

Refer List:

Description	Manufacturer	Model No.
Mobile phone	NOKIA	N73

All the items listed under section 2.0 of this report are

Confirmed by:

Shawn Xing
Assistant Manager
Intertek Testing Services Shenzhen Ltd. Kejiyuan Branch
Agent for In-Tech Electronics Ltd



Signature

August 12, 2009

Date

INTERTEK TESTING SERVICES

EXHIBIT 3

EMISSION RESULTS

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3.0 Emission Results

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.

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3.1 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 dB μ V/m

RA = Receiver Amplitude (including preamplifier) in dB μ V

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:

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

Assume a receiver reading of 62.0 dB μ V 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 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

$$RA = 62.0 \text{ dB}\mu\text{V}$$

$$AF = 7.4 \text{ dB}$$

$$CF = 1.6 \text{ dB}$$

$$AG = 29.0 \text{ dB}$$

$$PD = 0 \text{ dB}$$

$$AV = -10 \text{ dB}$$

$$FS = 62 + 7.4 + 1.6 - 29 + 0 + (-10) = 32 \text{ dB}\mu\text{V/m}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm} [(32 \text{ dB}\mu\text{V/m})/20] = 39.8 \mu\text{V/m}$$

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3.2 Radiated Emission Configuration Photograph

Worst Case Radiated Emission
at
4960.000 MHz

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

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3.3 Radiated Emission Data

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 8.7 dB

TEST PERSONNEL:



Signature

Billy Li, Compliance Engineer

Typed/Printed Name

August 12, 2009

Date

INTERTEK TESTING SERVICES

Applicant: In-Tech Electronics Ltd

Date of Test: August 12, 2009

Model: CS8140

Sample:1/2

Worst Case Operating Mode: Link with Mobile Phone

Table 1

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
Horizontal	34.880	25.2	20.0	18.4	23.6	40.0	-16.4
Horizontal	75.590	24.1	20.0	15.4	19.5	40.0	-20.5
Horizontal	100.810	26.1	20.0	12.2	18.3	43.5	-25.2
Horizontal	170.650	30.7	20.0	10.7	21.4	43.5	-22.1
Horizontal	186.170	34.8	20.0	8.3	23.1	43.5	-20.4
Horizontal	254.070	21.1	20.0	17.1	18.2	46.0	-27.8

NOTES: 1. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distances were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.

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

3. All emissions are below the QP limit.

Test Engineer: Billy Li

TRF no.: FCC 15C_TXa
FCC ID: NV6-CS8140

INTERTEK TESTING SERVICES

Applicant: In-Tech Electronics Ltd

Date of Test: August 12, 2009

Model: CS8140

Sample:2/2

Worst Case Operating Mode: Transmit

Table 2

Radiated Emissions

(2402MHz)

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Peak Limit at 3m (dB μ V/m)	Margin (dB)
Vertical	2402.000	98.2	36.7	28.5	90.0	114.0	-24.0
Horizontal	2402.000	88.9	36.7	28.5	80.7	114.0	-33.3
Vertical	4804.000	67.7	36.1	33.1	64.7	74.0	-9.3
Vertical	7206.000	54.0	36.2	37.8	55.6	74.0	-18.4
Vertical	9608.000	46.4	36.3	38.6	48.7	74.0	-25.3

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Average Factor (-dB)	Net at 3m (dB μ V/m)	Average Limit at 3m (dB μ V/m)	Margin (dB)
Vertical	2402.000	98.2	36.7	28.5	43.9	46.1	94.0	-47.9
Horizontal	2402.000	88.9	36.7	28.5	43.9	36.8	94.0	-57.2
Vertical	4804.000	67.7	36.1	33.1	43.9	20.8	54.0	-33.2
Vertical	7206.000	54.0	36.2	37.8	43.9	11.7	54.0	-42.3

Notes: 1. Peak Detector Data unless otherwise stated.

2. All measurements were made at 3 meter. Harmonic emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.

Test Engineer: Billy Li

TRF no.: FCC 15C_TXa
FCC ID: NV6-CS8140

INTERTEK TESTING SERVICES

Applicant: In-Tech Electronics Ltd

Date of Test: August 12, 2009

Model: CS8140

Sample:2/2

Worst Case Operating Mode: Transmit

Table 3

Radiated Emissions

(2441MHz)

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
Vertical	2441.000	100.8	36.7	28.5	92.6	114.0	-21.4
Horizontal	2441.000	90.9	36.7	28.5	82.7	114.0	-31.3
Vertical	4882.000	67.7	36.1	33.3	64.9	74.0	-9.1
Vertical	7323.000	53.1	36.3	37.9	54.7	74.0	-19.3
Vertical	9764.000	47.4	36.3	38.7	49.8	74.0	-24.2

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Average Factor (-dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
Vertical	2441.000	100.8	36.7	28.5	43.9	48.7	94.0	-45.3
Horizontal	2441.000	90.9	36.7	28.5	43.9	38.8	94.0	-55.2
Vertical	4882.000	67.7	36.1	33.3	43.9	21.0	54.0	-33.0
Vertical	7323.000	53.1	36.3	37.9	43.9	10.8	54.0	-43.2

Notes: 1. Peak Detector Data unless otherwise stated.

2. All measurements were made at 3 meter. Harmonic emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.

Test Engineer: Billy Li

TRF no.: FCC 15C_Txa
FCC ID: NV6-CS8140

INTERTEK TESTING SERVICES

Applicant: In-Tech Electronics Ltd

Date of Test: August 12, 2009

Model: CS8140

Sample:2/2

Worst Case Operating Mode: Transmit

Table 4

Radiated Emissions

(2480MHz)

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
Vertical	2480.000	100.8	36.7	28.6	92.7	114.0	-21.3
Horizontal	2480.000	90.9	36.7	28.6	82.8	114.0	-31.2
Vertical	4960.000	68.0	36.1	33.4	65.3	74.0	-8.7
Vertical	7440.000	52.0	36.3	38.2	53.9	74.0	-20.1
Vertical	9920.000	47.0	36.3	38.8	49.5	74.0	-24.5

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Average Factor (-dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
Vertical	2480.000	100.8	36.7	28.6	43.9	48.8	94.0	-45.2
Horizontal	2480.000	90.9	36.7	28.6	43.9	38.9	94.0	-55.1
Vertical	4960.000	68.0	36.1	33.4	43.9	21.4	54.0	-32.6

Notes: 1. Peak Detector Data unless otherwise stated.

2. All measurements were made at 3 meter. Harmonic emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.

Test Engineer: Billy Li

TRF no.: FCC 15C_Txa
FCC ID: NV6-CS8140

INTERTEK TESTING SERVICES

EXHIBIT 4

EQUIPMENT PHOTOGRAPHS

INTERTEK TESTING SERVICES

4.0 Equipment Photographs

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

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EXHIBIT 5

PRODUCT LABELLING

TRF no.: FCC 15C_TXa
FCC ID: NV6-CS8140

INTERTEK TESTING SERVICES

5.0 Product Labelling

For electronic filing, the FCC ID label artwork and the label location are saved with filename: label.pdf.

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EXHIBIT 6

TECHNICAL SPECIFICATIONS

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6.0 Technical Specifications

For electronic filing, the block diagram and schematics of the tested EUT are saved with filename: block.pdf and circuit.pdf respectively.

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EXHIBIT 7

INSTRUCTION MANUAL

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7.0 Instruction Manual

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

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

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EXHIBIT 8

MISCELLANEOUS INFORMATION

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8.0 Miscellaneous Information

This miscellaneous information includes details of the measured bandedge, the test procedure and calculation of factor such as pulse desensitization.

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8.1 Bandedge Plot

For electronic filing, the plot shows the fundamental emission when modulated is saved with filename: be.pdf. From the plot, the field strength of any emissions outside of the specified frequency band are attenuated to the general radiated emission limits in section 15.209. It fulfil the requirement of 15.249(d).

Peak Measurement

Bandedge compliance is determined by applying marker-delta method, i.e (Bandedge Plot).

(i) Lower channel 2402MHz:

Peak Resultant field strength = Fundamental emissions (peak value) – delta from the bandedge plot

$$\begin{aligned} &= 90.0 \text{ dB}\mu\text{v/m} - 35.5 \text{ dB} \\ &= 54.5 \text{ dB}\mu\text{v/m} \end{aligned}$$

Average Resultant field strength at 2402MHz = 46.1 dB μ v/m, below Average Limit 54dB μ v/m.

(ii) Upper channel 2480MHz:

Peak Resultant field strength = Fundamental emissions (peak value) – delta from the bandedge plot

$$\begin{aligned} &= 92.7 \text{ dB}\mu\text{v/m} - 53.1 \text{ dB} \\ &= 39.6 \text{ dB}\mu\text{v/m} \end{aligned}$$

Peak Resultant field strength below Average Limit 54dB μ v/m.

The resultant field strength meets the general radiated emission limit in section 15.209, which does not exceed 74 dB μ v/m (Peak Limit) and 54dB μ v/m (Average Limit).

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8.1 Bandedge Plot (cont'd)

Pursuant to FCC part 15 Section 15.215(c), the 20dB bandwidth of the emission was contained within the frequency band designated (mentioned as above) which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over excepted variations in temperature and supply voltage were considered.

Figure 8.1 Bandwidth

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8.2 Discussion of Pulse Desensitization

Pulse desensitivity is not applicable for this device. The effective period (T_{eff}) is approximately 625 μ s for Bluetooth. With a resolution bandwidth (3dB) of 1MHz, so the pulse desensitivity factor is 0dB.

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8.3 Transmitter Duty Cycle Calculation, FCC Rule 15.35(b, c)

Based on the Bluetooth Specification Version 2.1+ EDR, transmitter ON time is independent of packet type (DH1, DH3 and DH5) and packet length (single-slot and multi-slot). The maximum transmitter ON time for the Bluetooth is 625 μ s.

Each TX and RX time slot is 625 μ s in length. A TDD scheme is used where master and slave alternately transmit. For one period for a pseudo-random hopping through all 79 RF channels, it takes: $79 \times (0.625 \times 2) \text{ ms} = 98.75\text{ms}$.

Therefore,

$$\begin{aligned}\text{Average Factor (AF) of Bluetooth in dB} &= 20 \log_{10} (0.625/98.75) \text{ dB} \\ &= 20 \log_{10} (0.00633) \text{ dB} \\ &= -43.9 \text{ dB}\end{aligned}$$

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8.4 Emissions Test Procedures

The following is a description of the test procedure used by Intertek Testing Services in the measurements of transmitters operating under Part 15, Subpart C rules.

The test set-up and procedures described below are designed to meet the requirements of ANSI C63.4 - 2003.

The transmitting equipment under test (EUT) is placed on a wooden turntable which is four feet in diameter and approximately one meter in height above the ground plane. During the radiated emissions test, the turntable is rotated and any cables leaving the EUT are manipulated to find the configuration resulting in maximum emissions. The EUT is adjust through all three orthogonal axes to obtain maximum emission levels. The antenna height and polarization are varied during the testing to search for maximum signal levels.

Detector function for radiated emissions is in peak mode. Average readings, when required, are taken by measuring the duty cycle of the equipment under test and subtracting the corresponding amount in dB from the measured peak readings.

The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower. For line conducted emissions, the range scanned is 150 kHz to 30 MHz.

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8.4 Emissions Test Procedures (cont'd)

The EUT is warmed up for 15 minutes prior to the test.

AC power to the unit is varied from 85% to 115% nominal and variation in the fundamental emission field strength is recorded. If battery powered, a new, fully charged battery is used.

Conducted measurements are made as described in ANSI C63.4 - 2003.

The IF bandwidth used for measurement of radiated signal strength was 10 kHz for emission below 30 MHz and 120 kHz for emission from 30 MHz to 1000 MHz. Where pulsed transmissions of short enough pulse duration warrant, a greater bandwidth is selected according to the recommendations of Hewlett Packard Application Note 150-2. Above 1000 MHz, a resolution bandwidth of 1 MHz is used.

Transmitter measurements are normally conducted at a measurement distance of three meters. However, to assure low enough noise floor in the restricted bands and above 1 GHz, signals are acquired at a distance of one meter or less. All measurements are extrapolated to three meters using inverse scaling, but those measurements taken at a closer distance are so marked.

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EXHIBIT 9

TEST EQUIPMENT LIST

INTERTEK TESTING SERVICES

9.0 Test Equipment List

For electronic filing, the test equipment list of the tested EUT is saved with filename: equipment list.pdf.