

May 22, 2009

Uncle Milton Industries, Inc.
31186 La Baya Dr. Westlake Village California,
91362, United States

Dear Michael O'Connor :

Enclosed you will find your file copy of a Part 15 Certification (FCC ID: XCY150512UMI2009).

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,

A handwritten signature in black ink, appearing to read "Tommy".

Leung Wai Leung, Tommy
Senior Manager

Enclosure

Intertek Testing Services Hong Kong Ltd.

2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
Tel: (852) 2173 8888 Fax: (852) 2785 5487 Website: www.hk.intertek-etlsemko.com

Uncle Milton Industries, Inc.

Application
For
Certification
(FCC ID: XCY150512UMI2009)

Force Trainer

MODEL: 15051-2

2.4GHz Transceiver

We hereby certify that the sample of the above item is considered to comply with the requirements of FCC Part 15, Subpart C for Intentional Radiator, mention 47 CFR [09-20-07]

HK09041576-2

TL /at

May 22, 2009

- The test results reported in this 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 shall not be reproduced except in full without prior authorization from Intertek Testing Services Hong Kong Limited.
- The evaluation data of the report will be kept for 3 years from the date of issuance.

FCC ID: XCY150512UMI2009

Intertek Testing Services Hong Kong Ltd.

2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
Tel: (852) 2173 8888 Fax: (852) 2785 5487 Website: www.hk.intertek-etlsemko.com

INTERTEK TESTING SERVICES

LIST OF EXHIBITS

INTRODUCTION

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INTERTEK TESTING SERVICES

MEASUREMENT/TECHNICAL REPORT

Uncle Milton Industries, Inc. - MODEL: 15051-2

FCC ID: XCY150512UMI2009

May 22, 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 [09-20-07 Edition] provision.

Report prepared by:

Leung Wai Leung, Tommy
Intertek Testing Services
2/F., Garment Center,
576, Castle Peak Road,
HONG KONG
Phone: 852-2173-8888
Fax: 852-2742-9149

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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 Setup Photo	Conducted Emission	conducted photos.pdf
Test Report	Bandedge Plot	bandedge.pdf
Test Report	20dB BW Plot	bw.pdf
Test Report	Conducted Emission Test Result	conduct.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	Confidentiality Letter	request.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 Base unit for Force Trainer model: 15051-2 operating at 2.4GHz. It is powered by 6AA batteries or an output DC 9V, 1500mA adapter.

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 for the Base unit, and the corresponding Headset unit (2.4GHz transceiver) is subject to FCC certification with FCC ID: XCY150511UMI2009.

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1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurement was performed according to the procedures in ANSI C63.4 (2003). Radiated emission measurement was performed in semi-anechoic chamber and conducted emission measurement was performed in shield room. For radiated emission measurement, preliminary scans were performed in the semi-anechoic chamber only to determine the worst case modes. 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 and conducted measurement facility used to collect the radiated data and conducted data is **Interterk Testing Services Shenzhen Ltd. Kejiyuan Branch** and located at 6F, Block D, 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.

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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 6 new AA batteries and an input AC 120V, 60Hz output 9V, 1500mA adapter 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 rear of unit shall be flushed with the rear of the table for adaptor powered mode, and the unit was placed in the center of the turntable for battery operation mode. The worst case data was reported in this report.

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

There was no special software to exercise the device.

2.3 Special Accessories

No special accessories used.

2.4 Equipment Modification

Any modifications installed previous to testing by Uncle Milton Industries, Inc. will be incorporated in each production model sold / leased in the United States.

No modifications were installed by Intertek Testing Services.

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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.
Adapter (input AC 120V, 60Hz output 9V, 1500mA)	Ketiaowang	CD432K

All the items listed under section 2.0 of this report are

Confirmed by:

Leung Wai Leung, Tommy
Senior Manager
Intertek Testing Services
Agent for Uncle Milton Industries, Inc.



Signature

May 22, 2009

Date

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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 dB μ V
AF = 7.4 dB
CF = 1.6 dB
AG = 29.0 dB
PD = 0 dB

AV = -10 dB

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

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

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3.2 Radiated Emission Configuration Photograph

Worst Case Radiated Emission
at
4885.850 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 8.3 dB

TEST PERSONNEL:



Signature

Terry Chan, Compliance Engineer
Typed/Printed Name

May 22, 2009
Date

INTERTEK TESTING SERVICES

Applicant: Uncle Milton Industries, Inc.

Date of Test: May 22, 2009

Model: 15051-2

Sample: 1/1

Worst Case Operating Mode: Transmit, adapter powered

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)
Vertical	94.505	33.0	20.0	9.9	22.9	43.5	-20.6
Vertical	138.155	35.3	20.0	9.1	24.4	43.5	-19.1
Vertical	143.975	31.0	20.0	9.5	20.5	43.5	-23.0
Vertical	216.725	24.5	20.0	12.2	16.7	46.0	-29.3
Vertical	317.120	24.7	20.0	16.4	21.1	46.0	-24.9
Vertical	689.600	13.5	20.0	24.2	17.7	46.0	-28.3

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.

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Applicant: Uncle Milton Industries, Inc.

Date of Test: May 22, 2009

Model: 15051-2

Sample: 1/1

Worst Case Operating Mode: Transmit, battery operated

Table 2

Radiated Emissions

(2408MHz)

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	2407.900	92.5	36.7	28.5	84.3	114.0	-29.7
Horizontal	2407.900	86.4	36.7	28.5	78.2	114.0	-35.8
Vertical	4815.300	66.6	36.1	33.1	63.6	74.0	-10.4
Vertical	7223.400	42.8	36.2	37.8	44.4	74.0	-29.6
Vertical	9632.400	39.4	36.3	38.6	41.7	74.0	-32.3

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	2407.900	92.5	36.7	28.5	48.9	35.4	94.0	-58.6
Horizontal	2407.900	86.4	36.7	28.5	48.9	29.3	94.0	-64.7
Vertical	4815.300	66.6	36.1	33.1	48.9	14.7	54.0	-39.3

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: Terry Chan

INTERTEK TESTING SERVICES

Applicant: Uncle Milton Industries, Inc.

Date of Test: May 22, 2009

Model: 15051-2

Sample: 1/1

Worst Case Operating Mode: Transmit, battery operated

Table 3

Radiated Emissions

(2443MHz)

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	2442.700	92.8	36.7	28.5	84.6	114.0	-29.4
Horizontal	2442.700	87.1	36.7	28.5	78.9	114.0	-35.1
Vertical	4885.850	68.5	36.1	33.3	65.7	74.0	-8.3
Vertical	7328.240	44.4	36.3	37.9	46.0	74.0	-28.0
Vertical	9772.540	39.7	36.3	38.7	42.1	74.0	-31.9

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	2442.700	92.8	36.7	28.5	48.9	35.7	94.0	-58.3
Horizontal	2442.700	87.1	36.7	28.5	48.9	30.0	94.0	-64.0
Vertical	4885.850	68.5	36.1	33.3	48.9	16.8	54.0	-37.2

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: Terry Chan

INTERTEK TESTING SERVICES

Applicant: Uncle Milton Industries, Inc.

Date of Test: May 22, 2009

Model: 15051-2

Sample: 1/1

Worst Case Operating Mode: Transmit, battery operated

Table 4

Radiated Emissions

(2478MHz)

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	2478.280	91.8	36.7	28.6	83.7	114.0	-30.3
Horizontal	2478.280	85.5	36.7	28.6	77.4	114.0	-36.6
Vertical	4955.900	67.0	36.1	33.4	64.3	74.0	-9.7
Vertical	7432.840	42.7	36.3	38.2	44.6	74.0	-29.4
Vertical	9912.750	37.9	36.3	38.8	40.4	74.0	-33.6

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	2478.280	91.8	36.7	28.6	48.9	34.8	94.0	-59.2
Horizontal	2478.280	85.5	36.7	28.6	48.9	28.5	94.0	-65.5
Vertical	4955.900	67.0	36.1	33.4	48.9	15.4	54.0	-38.6

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: Terry Chan

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3.4 Conducted Emission Configuration Photograph

Worst Case Line-Conducted Configuration
at
28.284 MHz

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

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3.5 Conducted Emission Data

Judgement: Passed by 34.5 dB margin

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

TEST PERSONNEL:



Signature

Terry Chan, Compliance Engineer
Typed/Printed Name

May 22, 2009
Date

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

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 2408MHz:

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

$$\begin{aligned} &= 84.3\text{dB}\mu\text{v/m} - 30.1\text{dB} \\ &= 54.2\text{dB}\mu\text{v/m} \end{aligned}$$

$$\begin{aligned} \text{Average field strength} &= 54.2\text{ dB}\mu\text{v/m} - 48.9\text{ dB}\mu\text{v/m} \\ &= 5.3\text{dB}\mu\text{v/m} \end{aligned}$$

(ii) Upper channel 2478MHz:

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

$$\begin{aligned} &= 83.7\text{dB}\mu\text{v/m} - 27.4\text{dB} \\ &= 56.3\text{dB}\mu\text{v/m} \end{aligned}$$

$$\begin{aligned} \text{Average field strength} &= 56.3\text{ dB}\mu\text{v/m} - 48.9\text{ dB}\mu\text{v/m} \\ &= 7.4\text{dB}\mu\text{v/m} \end{aligned}$$

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

The determination of pulse desensitivity was made in accordance with Hewlett Packard Application Note 150-2, *Spectrum Analysis ... Pulsed RF*.

The effective period (T_{eff}) was approximately 200 μs for a digital "1" bit, as shown in the plots of Exhibit 8.3. With a resolution bandwidth (3 dB) of 100 kHz, the pulse desensitivity factor was 0 dB.

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8.3 Calculation of Average Factor

Averaging factor in dB = $20 \log (\text{duty cycle})$

The specification for output field strengths in accordance with the FCC rules specify measurements with an average detector. During testing, a spectrum analyzer incorporating a peak detector was used. Therefore, a reduction factor can be applied to the resultant peak signal level and compared to the limit for measurement instrumentation incorporating an average detector.

The time period over which the duty cycle is measured is 100 milliseconds, or the repetition cycle, whichever is a shorter time frame. The worst case (highest percentage on) duty cycle is used for the calculation. The duty cycle is measured by placing the spectrum analyzer in zero scan (receiver mode) and linear mode at maximum bandwidth (3 MHz at 3 dB down) and viewing the resulting time domain signal output from the analyzer on a Tektronix oscilloscope. The oscilloscope is used because of its superior time base and triggering facilities.

A plot of the worst-case duty cycle as detected in this manner are saved with filename: af.pdf

The duty cycle is simply the on-time divided by the period:

The duration of one cycle = 56.0ms
Effective period of the cycle = 200μs

$DC = 200\mu s / 56.0ms = 0.0036$ or 0.36%

Therefore, the averaging factor is found by $20 \log_{10} 0.0036 = -48.9 \text{ dB}$

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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 adjusted 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.