

**VTech Telecommunications Ltd.**

Application  
For  
Permissive Change Class II

1.9GHz Digital Modulation Cordless Phone with Bluetooth -  
Base Unit Bluetooth Portion

**(FCC ID: EW780-6684-00)**

**Superseded report no. HK08100367-1 dated November 13, 2008**

HK08100367-1(R1)  
KS/ ac  
December 24, 2008

- The test report only allows to be revised within the retention period date unless further standard or the requirement was noticed.
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**Intertek Testing Services Hong Kong Ltd.**

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# INTERTEK TESTING SERVICES

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**INTERTEK TESTING SERVICES**

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**MEASUREMENT/TECHNICAL REPORT**

**VTech Telecommunications Ltd. - Model: TL91XY8  
FCC ID: EW780-6684-00**

This report concerns (check one:)		Original Grant <input type="checkbox"/>	Class II Change <input checked="" type="checkbox"/>
Equipment Type : <u>DXX – Pt 15 Low Pwr Com. Device Tx</u>			
Deferred grant requested per 47 CFR 0.457(d)(1)(ii)?		Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
		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 <input type="checkbox"/>	No <input checked="" type="checkbox"/>
If no, assumed Part 15, Subpart C for intentional radiator - the new 47 CFR [10-01-07 Edition] Provision.			
Report prepared by:	Sit Kim Wai, Ken 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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# INTERTEK TESTING SERVICES

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## INTERTEK TESTING SERVICES

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### List of attached file

Exhibit type	File Description	filename
Test Report	Test Report	report.pdf
Operational Description	Technical Description	descri.pdf
Cover Letter	Purpose of Application	product change.pdf
Test Setup Photos	Radiated & Conducted Emission	config photos.pdf
Test Report	Emission Plot	emission.pdf
Test Report	Conducted Emission Test Result	conduct.pdf
External Photos	External Photo	external photos.pdf
Internal Photos	Internal Photo	internal photos.pdf
Block Diagram	Block Diagram	block.pdf
Schematics	Circuit Diagram	circuit.pdf
ID Label/Location Info	Label Artwork and Location	label.pdf
Users Manual	User Manual	manual 1 of 3.pdf manual 2 of 3.pdf manual 3 of 3.pdf
Cover Letter	Letter of Agency	letter of agency.pdf
Cover Letter	Confidentiality Request	request.pdf

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# INTERTEK TESTING SERVICES

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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 1.9GHz Digital Modulation Cordless Phone with Bluetooth. Only base unit offers Bluetooth as a feature, and it operates at frequency range of 2402MHz-2480MHz with 79 channels. It is powered by 100-240VAC to 6VDC 400mA adaptor, and it also has a "Bluetooth" button that manages Bluetooth connections to a Bluetooth-equipped mobile device. With Bluetooth and 1.9GHz wireless communications enable, the base unit allows a user uses a cordless handset to dial out or receive cellular phone calls via the cellular network.

Antenna Type : Integral, Internal

The Model: TL91278 is one of the Model: TL91XY8. The letters "X" and "Y" represent the number of handsets and different packing respectively. The difference in model number serves as marketing strategy.

The circuit description is saved with filename: descri.pdf

#### 1.2 Purpose of Application

The purpose of change is saved with filename: product change.pdf

## INTERTEK TESTING SERVICES

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### 1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (2003). All measurements were performed in Open Area Test Sites. Preliminary scans were performed in the Open Area Test Sites only to determine 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 open area test site and conducted measurement facility used to collect the radiated data and conducted data are located at Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong. 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

For emissions testing, the equipment under test (EUT) was setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, all cables were manipulated to produce worst case emissions. The EUT was powered by an AC adaptor 100-240VAC to 6VDC 400mA.

For the measurements, the EUT was attached to a plastic stand if necessary and placed on the wooden turntable. The signal was maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization were varied during the search for maximum signal level. The antenna height was varied from 1 to 4 meters. Radiated emissions were taken at three meters unless the signal level was too low for measurement at that distance. If necessary, a pre-amplifier was used and/or the test was conducted at a closer distance.

Measurements of the radiated signal level of the fundamental frequency component of the emission was performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage.

Analyzer resolution was 100 kHz or greater for frequencies below 1000 MHz. The resolution was 1 MHz or greater for frequencies above 1000 MHz. The spurious emissions more than 20 dB below the permissible value were not reported.

Radiated emission measurement were performed the lowest radio frequency signal generated in the device which was greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever was lower.

Determination of pulse desensitization was made according to *Hewlett Packard Application Note 150-2, Spectrum Analysis... Pulsed RF*. The effective period ( $\tau_{\text{eff}}$ ) was 625  $\mu\text{s}$  for Bluetooth. With the resolution bandwidth 1MHz and spectrum analyzer IF bandwidth 3 dB, the pulse desensitization factor was 0 dB.

#### 2.2 EUT Exercising Software

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use.

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### 2.3 Details of EUT and Description of Peripherals

#### Details of EUT:

AC adaptor (provided with the unit) were used to power the device. Its description is listed below.

- (1) Base Unit: A switching AC adaptor (100-240VAC to 6VDC 400mA, Model: SSA-5AP-09 060040) (Supplied by Client)

#### Description of Peripherals:

- (1) Handset, Model: TL91278, FCC ID: EW780-6684-00 (Supplied by Client)
- (2) Handset: A "Ni-MH" Type Rechargeable Battery Pack (2.4V 550mAh) (Supplied by Client)
- (3) Motorola Mobile Phone, Model: V3, IMEI: 358255007754177, FCC ID: IHDT56EU1 (Supplied by Client)
- (4) Telecommunication cable with RJ11C connectors (1m, unshielded), terminated (Supplied by Intertek)

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### 2.4 Measurement Uncertainty

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

### 2.5 Equipment Modification

Any modifications installed previous to testing by VTech Telecommunications Ltd. will be incorporated in each production model sold/leased in the United States.

No modifications were installed by Commercial & Electrical Division, Intertek Testing Services Hong Kong Ltd.

All the items listed under section 2.0 of this report are confirmed by:

*Confirmed by:*

*Sit Kim Wai, Ken  
Assistant Manager  
Intertek Testing Services  
Agent for VTech Telecommunications Ltd.*



\_\_\_\_\_ Signature

December 24, 2008 \_\_\_\_\_ Date

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**EXHIBIT 3  
EMISSION RESULTS**

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### 3.0 Emission Results

Data is included of the 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 Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

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

where            FS = Field Strength in dB $\mu$ V/m  
                    RA = Receiver Amplitude (including preamplifier) in dB $\mu$ V  
                    CF = Cable Attenuation Factor in dB  
                    AF = Antenna Factor in dB  
                    AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows:-

$$FS = RR + LF$$

where            FS = Field Strength in dB $\mu$ V/m  
                    RR = RA - AG in dB $\mu$ V  
                    LF = CF + AF in dB

Assume a receiver reading of 52.0 dB $\mu$ 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, giving a field strength of 32 dB $\mu$ V/m. This value in dB $\mu$ V/m was converted to its corresponding level in  $\mu$ V/m.

RA = 52.0 dB $\mu$ V  
AF = 7.4 dB  
CF = 1.6 dB  
AG = 29.0 dB  
FS = RR + LF  
FS = 23 + 9 = 32 dB $\mu$ V/m

RR = 23.0 dB $\mu$ V  
LF = 9.0 dB

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

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### 3.2 Radiated Emission Configuration Photograph - Base Unit

Worst Case Radiated Emission

at 4804.000 MHz

For electronic filing, the worst case radiated emission configuration photographs are saved with filename: config photos.pdf



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### 3.3 Radiated Emission Data - Base Unit

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

Judgement : Passed by 17.4 dB margin compared with peak limit

\*\*\*\*\*

#### **TEST PERSONNEL:**



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*Tester Signature*

Jess Tang, Lead Engineer  
*Typed/Printed Name*

December 24, 2008  
*Date*

## INTERTEK TESTING SERVICES

Company: VTech Telecommunications Ltd.    Date of Test: October 13-November 8, 2008  
 Model: TL91278  
 Mode : TX-Channel 0

Table 1, Base Unit

### Radiated Emissions Pursuant to FCC Part 15 Section 15.249(a) Requirements

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Average Factor (dB)	Calculated at 3m (dB $\mu$ V/m)	Average Limit at 3m (dB $\mu$ V/m)	Margin (dB)
H	2402.000	94.6	33	29.4	43.9	47.1	94.0	-46.9
V	*4804.000	54.7	33	34.9	43.9	12.7	54.0	-41.3
V	7206.000	48.9	33	37.9	43.9	9.9	54.0	-44.1
V	9608.000	48.2	33	40.4	43.9	11.7	54.0	-42.3
V	*12010.000	47.5	33	40.5	43.9	11.1	54.0	-42.9

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dB $\mu$ V/m)	Peak Limit at 3m (dB $\mu$ V/m)	Margin (dB)
H	2402.000	94.6	33	29.4	91.0	114.0	-23.0
V	*4804.000	54.7	33	34.9	56.6	74.0	-17.4
V	7206.000	48.9	33	37.9	53.8	74.0	-20.2
V	9608.000	48.2	33	40.4	55.6	74.0	-18.4
V	*12010.000	47.5	33	40.5	55.0	74.0	-19.0

- NOTES: 1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated 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 radiated 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.
5. Emissions radiated outside of the specified frequency bands, except harmonics, are attenuated by 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation, which meet the requirement of part 15.249(d).
- \* Emission within the restricted band meets the requirement of part 15.205.

Test Engineer: Jess Tang

## INTERTEK TESTING SERVICES

Company: VTech Telecommunications Ltd.    Date of Test: October 13-November 8, 2008  
 Model: TL91278  
 Mode : TX-Channel 39

Table 2, Base Unit

### Radiated Emissions Pursuant to FCC Part 15 Section 15.249(a) Requirements

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Average Factor (dB)	Calculated at 3m (dB $\mu$ V/m)	Average Limit at 3m (dB $\mu$ V/m)	Margin (dB)
H	2441.000	95.6	33	29.4	43.9	48.1	94.0	-45.9
V	*4882.000	54.4	33	34.9	43.9	12.4	54.0	-41.6
V	*7323.000	49.2	33	37.9	43.9	10.2	54.0	-43.8
V	9764.000	47.9	33	40.4	43.9	11.4	54.0	-42.6
V	*12205.000	47.3	33	40.5	43.9	10.9	54.0	-43.1

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dB $\mu$ V/m)	Peak Limit at 3m (dB $\mu$ V/m)	Margin (dB)
H	2441.000	95.6	33	29.4	92.0	114.0	-22.0
V	*4882.000	54.4	33	34.9	56.3	74.0	-17.7
V	*7323.000	49.2	33	37.9	54.1	74.0	-19.9
V	9764.000	47.9	33	40.4	55.3	74.0	-18.7
V	*12205.000	47.3	33	40.5	54.8	74.0	-19.2

- NOTES: 1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated 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 radiated 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.
5. Emissions radiated outside of the specified frequency bands, except harmonics, are attenuated by 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation, which meet the requirement of part 15.249(d).
- \* Emission within the restricted band meets the requirement of part 15.205.

Test Engineer: Jess Tang

## INTERTEK TESTING SERVICES

Company: VTech Telecommunications Ltd.    Date of Test: October 13-November 8, 2008  
 Model: TL91278  
 Mode : TX-Channel 78

Table 3, Base Unit

### Radiated Emissions Pursuant to FCC Part 15 Section 15.249(a) Requirements

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Average Factor (dB)	Calculated at 3m (dB $\mu$ V/m)	Average Limit at 3m (dB $\mu$ V/m)	Margin (dB)
H	2480.000	94.0	33	29.4	43.9	46.5	94.0	-47.5
V	*4960.000	54.3	33	34.9	43.9	12.3	54.0	-41.7
V	*7440.000	49.7	33	37.9	43.9	10.7	54.0	-43.3
V	9920.000	48.4	33	40.4	43.9	11.9	54.0	-42.1
V	*12400.000	47.4	33	40.5	43.9	11.0	54.0	-43.0

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dB $\mu$ V/m)	Peak Limit at 3m (dB $\mu$ V/m)	Margin (dB)
H	2480.000	94.0	33	29.4	90.4	114.0	-23.6
V	*4960.000	54.3	33	34.9	56.2	74.0	-17.8
V	*7440.000	49.7	33	37.9	54.6	74.0	-19.4
V	9920.000	48.4	33	40.4	55.8	74.0	-18.2
V	*12400.000	47.4	33	40.5	54.9	74.0	-19.1

- NOTES: 1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated 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 radiated 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.
5. Emissions radiated outside of the specified frequency bands, except harmonics, are attenuated by 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation, which meet the requirement of part 15.249(d).
- \* Emission within the restricted band meets the requirement of part 15.205.

Test Engineer: Jess Tang

## INTERTEK TESTING SERVICES

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### 3.4 Radiated Emission on the Bandedge

From the following plots, they show that the fundamental emissions are confined in the specified band (2400MHz and 2483.5MHz). In case of the fundamental emissions are within two standard bandwidths from the bandedge, the delta measurement technique is used for determining bandedge compliance. Standard bandwidth is the bandwidth specified by ANSI C63.4 (2003) for frequency being measured.

Emissions radiated outside of the specified frequency bands, except harmonics, are attenuated by 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation, which meet the requirement of part 15.249(d).

Please refer to the following plots for radiated emission on the bandedge:

Plot B1A\*: Base Unit - Low Channel Emissions

Plot B1B\*\*: Base Unit - High Channel Emissions

For electronic filing, the above plots are saved with filename: emission.pdf

\* Bandedge compliance is determined by applying marker-delta method, i.e.

Peak Resultant: Resultant field strength = Fundamental emissions - delta from the plot  
= 91.0dB $\mu$ V/m - 38.17dB  
= 52.83dB $\mu$ V/m

\*\* Bandedge compliance is determined by applying marker-delta method, i.e.

Peak Resultant: Resultant field strength = Fundamental emissions - delta from the plot  
= 90.4dB $\mu$ V/m - 43.59dB  
= 46.81dB $\mu$ V/m

The resultant field strength meets the general radiated emission limit in section 15.209, which does not exceed 74dB $\mu$ V/m for peak limit and also 54dB $\mu$ V/m for average limit.

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 expected variations in temperature and supply voltage were considered.

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### 3.5 Line Conducted Configuration Photograph - Base Unit

#### Worst Case Line-Conducted Configuration

For electronic filing, the worst case line conducted configuration photographs are saved with filename: config photos.pdf

## INTERTEK TESTING SERVICES

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### 3.6 Line Conducted Emission Data - Base Unit

The data on the following pages list the significant emission frequencies, the limit, and the margin of compliance.

Judgement : Passed by more than 20 dB margin

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

#### **TEST PERSONNEL:**



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*Tester Signature*

Jess Tang, Lead Engineer  
*Typed/Printed Name*

December 24, 2008  
*Date*

## INTERTEK TESTING SERVICES

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Company: VTech Telecommunications Ltd.    Date of Test: October 13-November 8, 2008  
Model: TL91278

### 3.7 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 the packet type (DH1, DH3 and DH5) and packet length (single-slot and multi-slot). The maximum transmitter ON time for the Bluetooth is 625 $\mu$ s.

Each TX and RX time slot is 625 $\mu$ 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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**EXHIBIT 4  
EQUIPMENT PHOTOGRAPHS**

## INTERTEK TESTING SERVICES

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### 4.0 Equipment Photographs

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

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**EXHIBIT 5  
PRODUCT LABELLING**

## INTERTEK TESTING SERVICES

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### 5.0 Product Labelling

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

**INTERTEK TESTING SERVICES**

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**EXHIBIT 6  
TECHNICAL SPECIFICATIONS**

## INTERTEK TESTING SERVICES

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### 6.0 Technical Specifications

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

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**INTERTEK TESTING SERVICES**

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**EXHIBIT 7  
INSTRUCTION MANUAL**

## INTERTEK TESTING SERVICES

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### 7.0 Instruction Manual

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual 1 of 3.pdf, manual 2 of 3.pdf & manual 3 of 3.pdf

The required FCC Information to the User is stated on the Instruction Manual.

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



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**EXHIBIT 8  
LETTER OF AGENCY**

## INTERTEK TESTING SERVICES

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### 8.0 Letter of Agency

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

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**EXHIBIT 9  
CONFIDENTIALITY REQUEST**

## INTERTEK TESTING SERVICES

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### 9.0 Confidentiality Request

For electronic filing, a preliminary copy of the Confidentiality Request is saved with filename: request.pdf