



## Test Report

Prepared for: SMK USA

Model: ECTR0008

Description: Levolor

Serial Number: N/A

FCC ID: UXULEV  
IC: 7316A-LEV

To

FCC Part 15.247

And

IC RSS-247

Date of Issue: May 17, 2017

On the behalf of the applicant:

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By the request of:

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**Project Test Engineer**

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### Test Report Revision History

Revision	Date	Revised By	Reason for Revision
1.0	April 13, 2017	Kenneth Lee	Original Document
2.0	May 16, 2017	Kenneth Lee	Updated the ANSI C63 References on page 6 and 7



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The tests results contained within this test report all fall within our scope of accreditation, unless noted below.

Please refer to <http://www.compliancetesting.com/labscope.html> for current scope of accreditation.

Testing Certificate Number: **2152.01**



**FCC Site Reg. #349717**

**IC Site Reg. #2044A-2**

**Non-accredited tests contained in this report:**

**N/A**

**The applicant has been cautioned as to the following**

15.21 - Information to User

The user's manual or instruction manual for an intentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

15.27(a) - Special Accessories

Equipment marked to a consumer must be capable of complying with the necessary regulations in the configuration in which the equipment is marketed. Where special accessories, such as shielded cables and/or special connectors are required to enable an unintentional or intentional radiator to comply with the emission limits in this part, the equipment must be marketed with, i.e. shipped and sold with, those special accessories. However, in lieu of shipping or packaging the special accessories with the unintentional or intentional radiator, the responsible party may employ other methods of ensuring that the special accessories are provided to the consumer without an additional charge.

Information detailing any alternative method used to supply the special accessories for a grant of equipment authorization or retained in the verification records, as appropriate. The party responsible for the equipment, as detailed in § 2.909 of this chapter, shall ensure that these special accessories are provided with the equipment. The instruction manual for such devices shall include appropriate instructions on the first page of text concerned with the installation of the device that these special accessories must be used with the device. It is the responsibility of the user to use the needed special accessories supplied with the equipment.



**Standard Test Conditions Engineering Practices**

Except as noted herein, the following conditions and procedures were observed during the testing:

In accordance with ANSI C63.10-2013 and unless otherwise indicated in the specific measurement results, the ambient temperature of the actual EUT was maintained within the range of 10° to 40°C (50° to 104°F) unless the particular equipment requirements specified testing over a different temperature range. Also, unless otherwise indicated, the humidity levels were in the range of 10% to 90% relative humidity.

Measurement results, unless otherwise noted, are worst-case measurements.

Environmental Conditions		
Temperature (°C)	Humidity (%)	Pressure (mbar)
26.3	29.5	968.6

**EUT Description**

**Model:** ECTR0008

**Description:** Levolor

**Firmware:** N/A

**Software:** N/A

**Serial Number:** N/A

**Additional Information:** The device implements GFSK modulation.

**EUT Operation during Tests**

The EUT was put into a test mode which allowed the device to transmit on the lowest, a middle and the highest channel of operation at the maximum available output power.

**Accessories:** None

**Cables:** None

**Modifications:** None

**15.203: Antenna Requirement:**

- The antenna is permanently attached to the EUT
- The antenna uses a unique coupling
- The EUT must be professionally installed
- The antenna requirement does not apply



**Test Summary**

FCC 15.247 Specification	RSS-247 Specification	Test Name	Pass, Fail, N/A	Comments
15.247(b)	Section 5.4(d)	Peak Output Power	Pass	
15.247(b)	Section 5.5	Conducted Spurious Emissions	N/A	EUT has no Antenna Connector
15.247(d), 15.209(a), 15.205	Section 5.5	Radiated Spurious Emissions	Pass	
15.247(d), 15.209(a), 15.205	Section 5.5	Emissions At Band Edges	Pass	
15.247(a)(2)	Section 5.2(a)	Occupied Bandwidth	Pass	
15.247(e)	Section 5.2(b)	Transmitter Power Spectral Density	Pass	
15.207	RSS-GEN Section 8.8	A/C Powerline Conducted Emissions	N/A	EUT is Battery Powered

References	Description
CFR47, Part 15, Subpart B	Unintentional Radiators
CFR47, Part 15, Subpart C	Intentional Radiators
ANSI C63.10-2013	American National standard for testing Unlicensed Wireless Devices
ANSI C63.4-2014	Method and Measurements of Radio-Noise Emissions from low-Voltage Electrical and Electronic Equipment in the range 9kHz to 40GHz.
ISO/IEC 17025:2005	General requirements for the Competence of Testing and Calibrations Laboratories
KDB 558074 D01 v03r03	Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating under §15.247

## Output Power

**Engineer:** Kenneth Lee

**Test Date:** 4/5/2017

### Test Procedure

The EUT was tested in a semi-anechoic chamber 3 meters from the receive antenna. Emissions were maximized by rotating the EUT 360° and raising and lowering the receive antenna from 1 to 4 meters while in both vertical and horizontal polarizations. A spectrum analyzer was used to ensure the EUT met the requirements for Output Power. The Spectrum Analyzer was set to the following:

RBW = RBW  $\geq$  DTS bandwidth

VBW  $\geq$  3 x RBW

Span =  $\geq$  3 x RBW

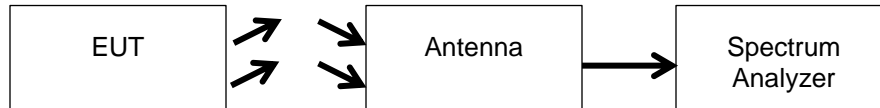
Detector = Peak

Sweep = auto

Trace Mode = Max Hold

The EUT was set to transmit on the lowest, middle and highest frequencies at the maximum power level. The RF output power was measured using the spectrum analyzer's peak marker function.

### Test Setup



### Transmitter Output Power

Tuned Frequency (MHz)	Measured Value (dBm)	Specification Limit	Result
2402	5.77	1 W (30 dBm)	Pass
2453	5.75	1 W (30 dBm)	Pass
2480	4.67	1 W (30 dBm)	Pass





## Radiated Spurious Emissions

**Engineer:** Kenneth Lee

**Test Dates:** 4/13/2017

### Test Procedure Radiated Spurious Emissions: 30 – 1000 MHz

The EUT was setup in a semi-anechoic test chamber set 3m from the receiving antenna. The EUT was set to transmit on the lowest, middle and highest frequencies at the maximum power level. A spectrum analyzer was used to verify that the EUT met the requirements for Radiated Emissions. The EUT was tested by rotating it 360° with the antennas in both the vertical and horizontal orientation and was raised from 1 to 4 meters to ensure the TX signal levels were maximized.

All emissions from 30 MHz to 1 GHz were examined.

Measured Level includes antenna and receiver cable correction factors.

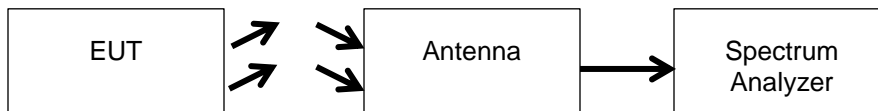
Correction factors were input into the spectrum analyzer before recording “Measured Level”.

RBW = 100 KHz

VBW = 300 KHz

Detector – Quasi Peak

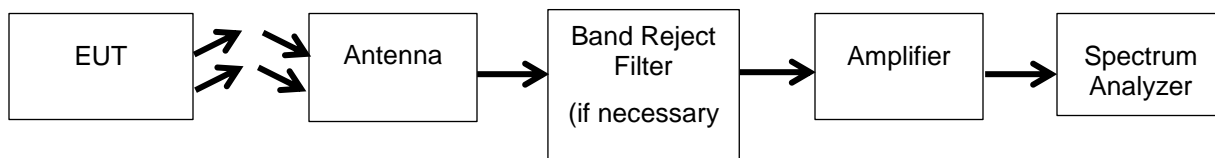
#### Test Setup



### Test Procedure for Radiated Spurious Emissions above 1 GHz

The EUT was setup in a semi-anechoic test chamber set 3m from the receiving antenna. The EUT was set to transmit on the lowest, middle and highest frequencies at the maximum power level. A spectrum analyzer was used to verify that the EUT met the requirements for Radiated Emissions. The EUT was tested by rotating it 360° with the antennas in both the vertical and horizontal orientation and was raised from 1 to 4 meters to ensure the TX signal levels were maximized.

#### Test Setup



**See Annex A for test data**



**DTS Bandwidth**

**Engineer:** Kenneth Lee

**Test Date:** 4/11/2017

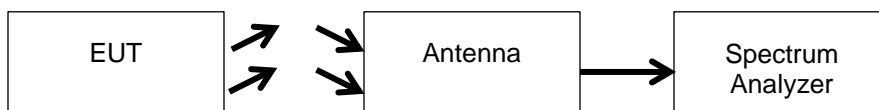
**Test Procedure**

The EUT was setup in a semi-anechoic test chamber set 3m from the receiving antenna. The EUT was set to transmit on the lowest, middle and highest frequencies at the maximum power level. A spectrum analyzer was used to verify that the EUT met the bandwidth requirements. The EUT was tested by rotating it 360° with the antennas in both the vertical and horizontal orientation and was raised from 1 to 4 meters to ensure the TX signal levels were maximized.

RBW = 100 kHz  
VBW ≥ 3 x RBW  
Peak Detector  
Trace mode = max hold  
Sweep = auto couple

The EUT was set to transmit at the lowest, middle and highest channels of the band at the maximum power levels. The maximum width of the emission that was determined by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that were attenuated by 6db and this value was used to determine the width of the carrier. Alternatively the spectrum analyzer’s automatic bandwidth capability was used.

**Test Setup**



**6 dB Occupied Bandwidth Summary**

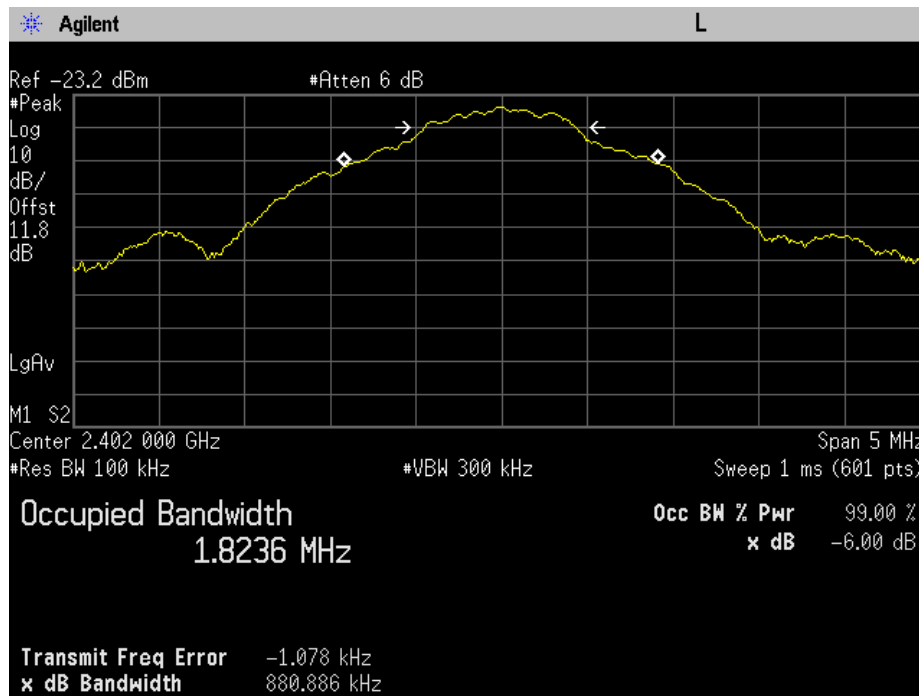
Frequency (MHz)	Measured Bandwidth (kHz)	Specification Limit (kHz)	Result
2402	880.886	≥ 500	Pass
2453	870.841	≥ 500	Pass
2480	784.773	≥ 500	Pass

**99% Bandwidth Summary**

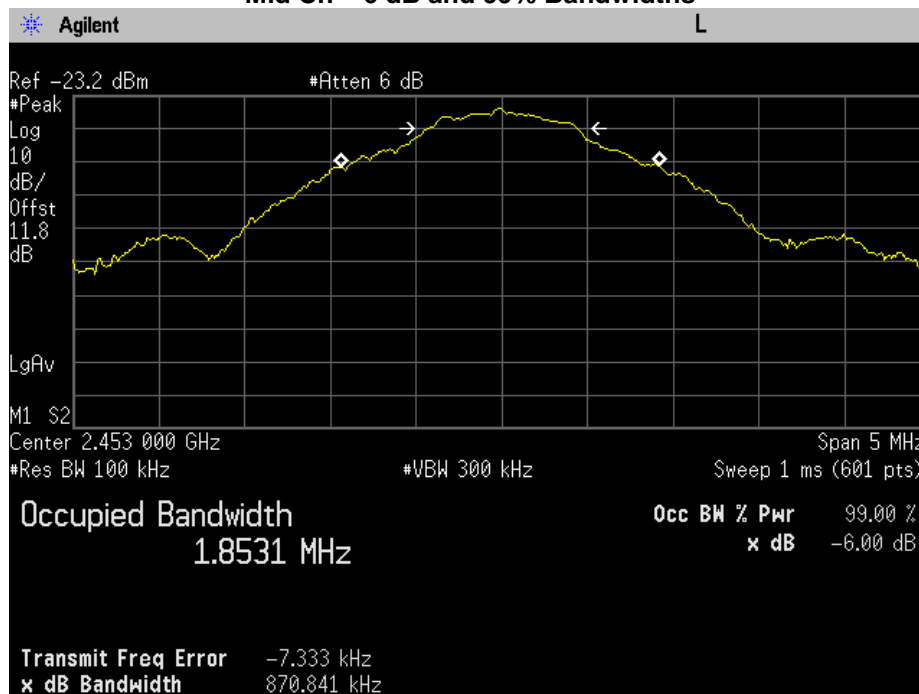
Frequency (MHz)	Measured Bandwidth (MHz)	Result
2402	1.8236	Pass
2453	1.8531	Pass
2480	1.8593	Pass



### Low Ch – 6 dB and 99% Bandwidths

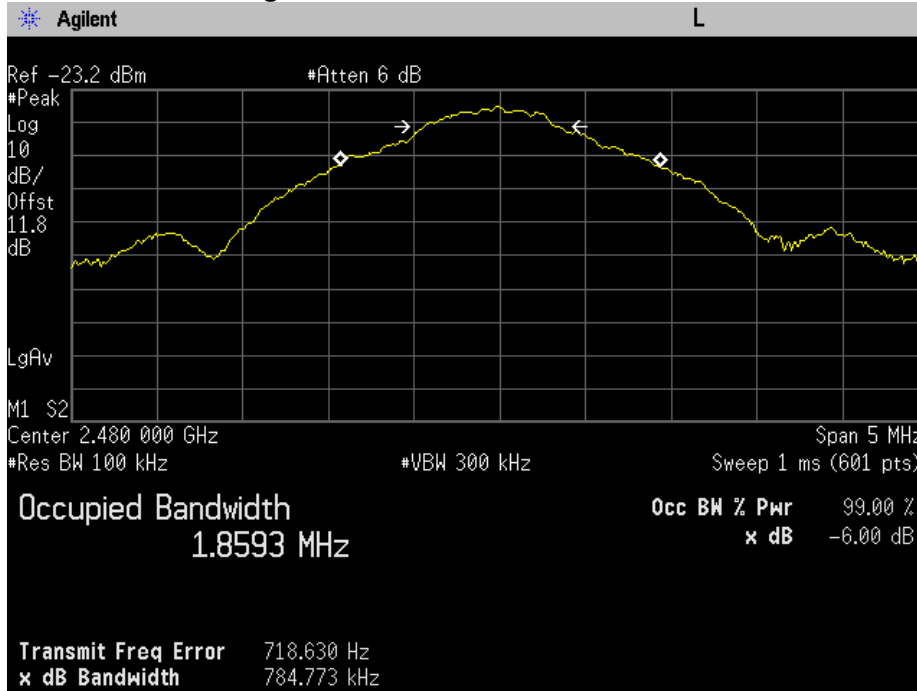


### Mid Ch – 6 dB and 99% Bandwidths





### High Ch - 6 dB and 99% Bandwidths





**Transmitter Power Spectral Density (PSD)**

**Engineer:** Kenneth Lee

**Test Date:** 4/11/2017

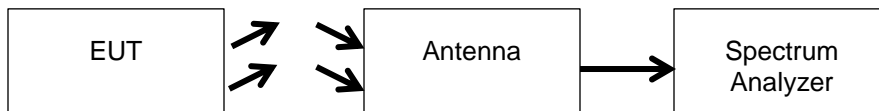
**Test Procedure**

The EUT was setup in a semi-anechoic test chamber set 3m from the receiving antenna. The EUT was set to transmit on the lowest, middle and highest frequencies at the maximum power level. A spectrum analyzer was used to verify that the EUT met the PSD requirements. The EUT was tested by rotating it 360° with the antennas in both the vertical and horizontal orientation and was raised from 1 to 4 meters to ensure the TX signal levels were maximized. The Spectrum Analyzer was set to the following:

- DTS channel center frequency
- Span 1.5 x DTS bandwidth
- RBW = 3 kHz ≤ RBW ≤ 100 kHz
- VBW ≥ 3 x RBW
- Peak Detector
- Sweep time = auto couple
- Trace mode = max hold

The EUT was set to transmit at the lowest, middle and highest channels of the band at the maximum power levels. Once the trace has stabilize the peak marker function was used to determine the peak power spectral density.

**Test Setup**

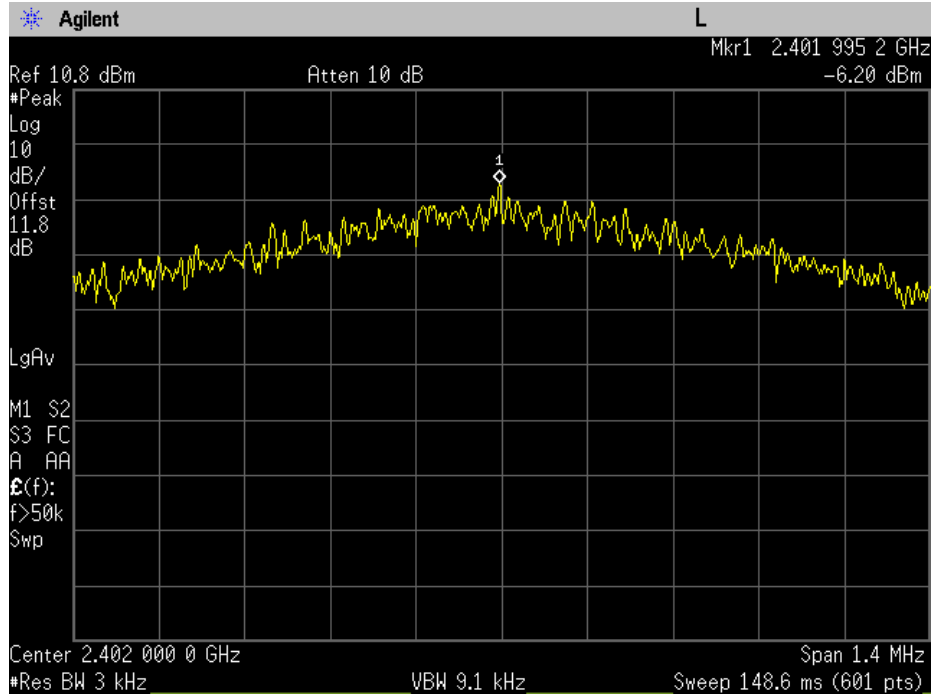


**PSD Summary**

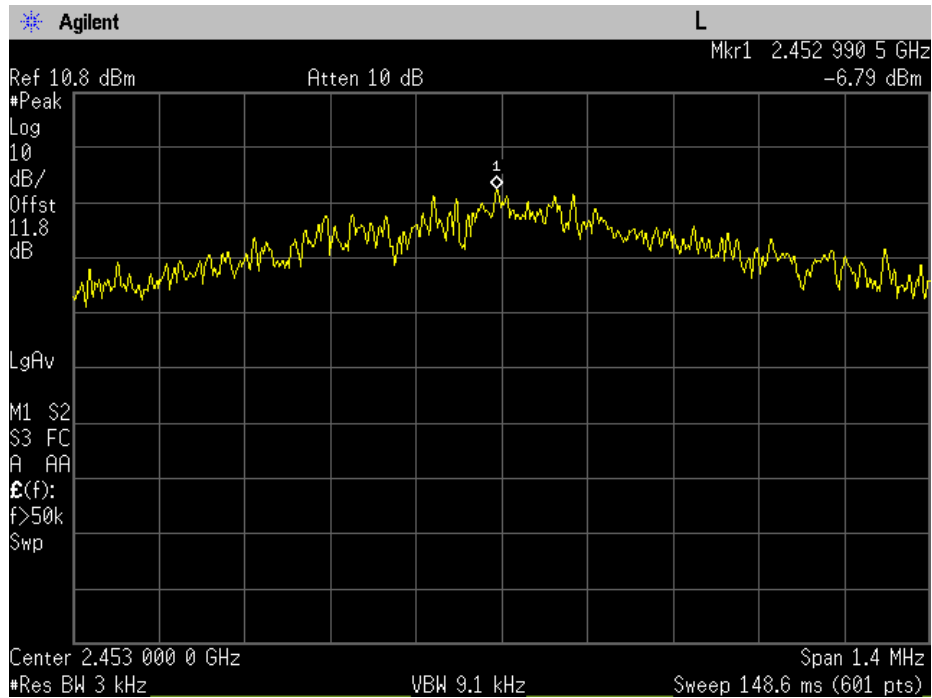
Frequency (MHz)	Measured Data (dBm)	Specification Limit (dBm)	Result
2402	-6.2	8	Pass
2453	-6.79	8	Pass
2480	-8.64	8	Pass



### Low Ch – PSD

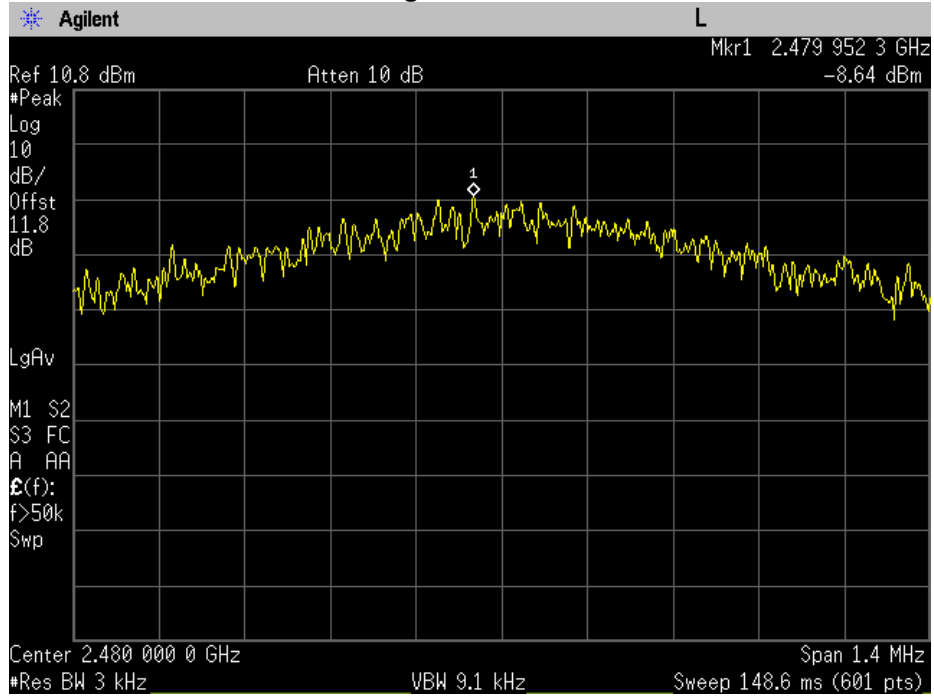


### Mid Ch – PSD





### High Ch - PSD





## Test Equipment Utilized

Description	Manufacturer	Model #	CT Asset #	Last Cal Date	Cal Due Date
Horn Antenna	ARA	DRG-118/A	i00271	6/16/16	6/16/18
Humidity / Temp Meter	Newport	IBTHX-W-5	i00282	5/26/16	5/26/17
Bi-Log Antenna	Schaffner	CBL 6111D	i00349	8/3/16	8/3/18
EMI Analyzer	Agilent	E7405A	i00379	2/22/17	2/22/18
3 Meter Semi-Anechoic Chamber	Panashield	3 Meter Semi-Anechoic Chamber	i00428	8/15/16	8/15/19
PSA Spectrum Analyzer	Agilent	E4445A	i00471	8/30/16	8/30/17
Preamplifier for 1-18GHz horn antenna	Miteq	AFS44 00101 400 23-10P-44	i00509	N/A	N/A

In addition to the above listed equipment standard RF connectors and cables were utilized in the testing of the described equipment. Prior to testing these components were tested to verify proper operation.

END OF TEST REPORT