



# Compliance Testing, LLC

Previously Flom Test Lab

EMI, EMC, RF Testing Experts Since 1963

toll-free: (866) 311-3268

fax: (480) 926-3598

<http://www.ComplianceTesting.com>

[info@ComplianceTesting.com](mailto:info@ComplianceTesting.com)

## Test Report

Prepared for: Safariland, LLC

Model: CAS30001

Description: Camera Auto-Activation System

Serial Number: N/A

FCC ID: 2ANW7-CAS30001

IC: 23268-7280CAS

To

FCC Part 15.247  
RSS-247

Date of Issue: October 16, 2017

On the behalf of the applicant:

Safariland, LLC  
3120 East Mission Blvd.  
Ontario, CA 91761

Attention of:

Terry O'Shea, Chief Technical Officer  
Phone: 909-923-7300 x103041  
Email: [terry.oshea@safariland.com](mailto:terry.oshea@safariland.com)

By the request of:

DataSoft Corporation  
1275 W Washington  
Suite 106  
Tempe, AZ 85281

Prepared By  
Compliance Testing, LLC  
1724 S. Nevada Way  
Mesa, AZ 85204  
(480) 926-3100 phone / (480) 926-3598 fax  
[www.compliancetesting.com](http://www.compliancetesting.com)  
Project No: p1790017

Kenneth Lee  
Project Test Engineer

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All results contained herein relate only to the sample tested.



### Test Report Revision History

Revision	Date	Revised By	Reason for Revision
1.0	September 23, 2017	Kenneth Lee	Original Document
2.0	October 16, 2017	Kenneth Lee	Updated Revision of KDB used, added Band Edge plots to Annex A



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**ILAC / A2LA**

Compliance Testing, LLC, has been accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to the joint ISO-ILAC-IAF Communiqué dated January 2009).

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)
18-21	31-42	962-972

### EUT Description

**Model:** CAS30001

**Description:** Camera Auto-Activation System

**Firmware:** N/A

**Software:** N/A

**Serial Number:** N/A

**Additional Information:** The EUT implements BLE modulation.

### EUT Operation during Tests

The EUT was set to transmit at the lowest, middle and highest channels of operation at the maximum available output power. The EUT was controlled via TeraTerm software on a laptop computer.

**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 Results Summary

FCC 15.247 Specification	RSS-247 Specification	Test Name	Pass, Fail, N/A	Comments
15.247(b)	Section 5.4(d)	Output Power	Pass	
15.247(d)	Section 5.5	Conducted Spurious Emissions	N/A	EUT has No Antenna Port
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 v04	Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating under §15.247



## Output Power

**Engineer:** Kenneth Lee

**Test Date:** 9/23/2017

### 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 frequency of operation at the maximum power level. The EUT was tested, in 3 orthogonal axis, by rotating it 360° with the receive antenna in both the vertical and horizontal orientation while raised from 1 to 4 meters to ensure the TX signal levels were maximized. A spectrum analyzer was used to verify that the EUT met the requirements for Output Power.

The Spectrum Analyzer was set to the following:

RBW  $\geq$  DTS Bandwidth

VBW  $\geq 3 \times$  RBW

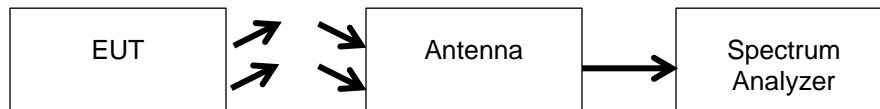
Span  $\geq 3 \times$  RBW

Sweep time = auto couple

Detector = peak

Trace Mode = max hold

### Test Setup



**Transmitter Output Power Summary Table**

Tuned Frequency (MHz)	Measured Value (dBm)	Specification Limit	Result
2401	-0.669	1 W (30 dBm)	Pass
2440	0.037	1 W (30 dBm)	Pass
2480	-1.29	1 W (30 dBm)	Pass





## Radiated Spurious Emissions

**Engineer:** Kenneth Lee

**Test Date:** 9/23/2017

### 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 frequency of operation at the maximum power level. The EUT was tested, in 3 orthogonal axis, by rotating it 360° with the receive antenna in both the vertical and horizontal orientation while raised from 1 to 4 meters to ensure the TX signal levels were maximized. A spectrum analyzer was used to verify that the EUT met the requirements for Radiated Spurious Emissions.

All emissions from 30 MHz to 1 GHz were examined.

Measured Level includes antenna and receiver cable correction factors.

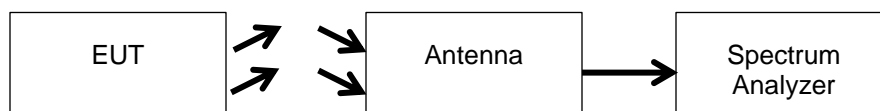
Correction factors were input into the spectrum analyzer before recording “Measured Level”.

RBW = 100 KHz

VBW = 300 KHz

Detector – Quasi Peak

#### Test Setup



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

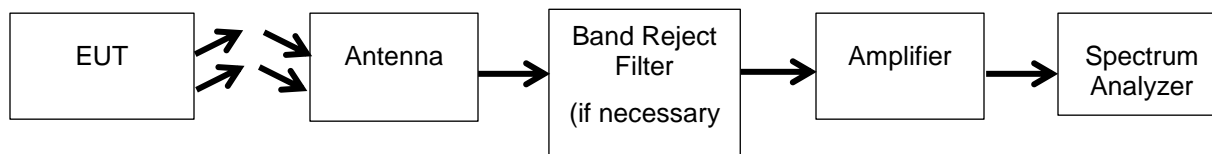
The EUT was setup in a semi-anechoic test chamber set 3m from the receiving antenna. The EUT was set to transmit on the lowest, middle and highest frequency of operation at the maximum power level. The EUT was tested, in 3 orthogonal axis, by rotating it 360° with the receive antenna in both the vertical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

RBW = 100 KHz and 1 MHz

VBW = 300 KHz and 3 MHz

Detector – Peak

#### Test Setup



**See Annex A for test data**



## Emissions at Band Edges

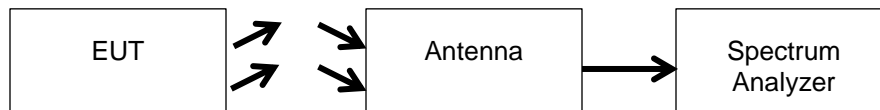
**Engineer:** Kenneth Lee

**Test Date:** 9/23/2017

### 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 and highest frequency of operation at the maximum power level. The EUT was tested, in 3 orthogonal axis, by rotating it 360° with the receive antenna in both the vertical and horizontal orientation while raised from 1 to 4 meters to ensure the TX signal levels were maximized. A spectrum analyzer was used to verify that the EUT met the requirements for band edges.

### Test Setup



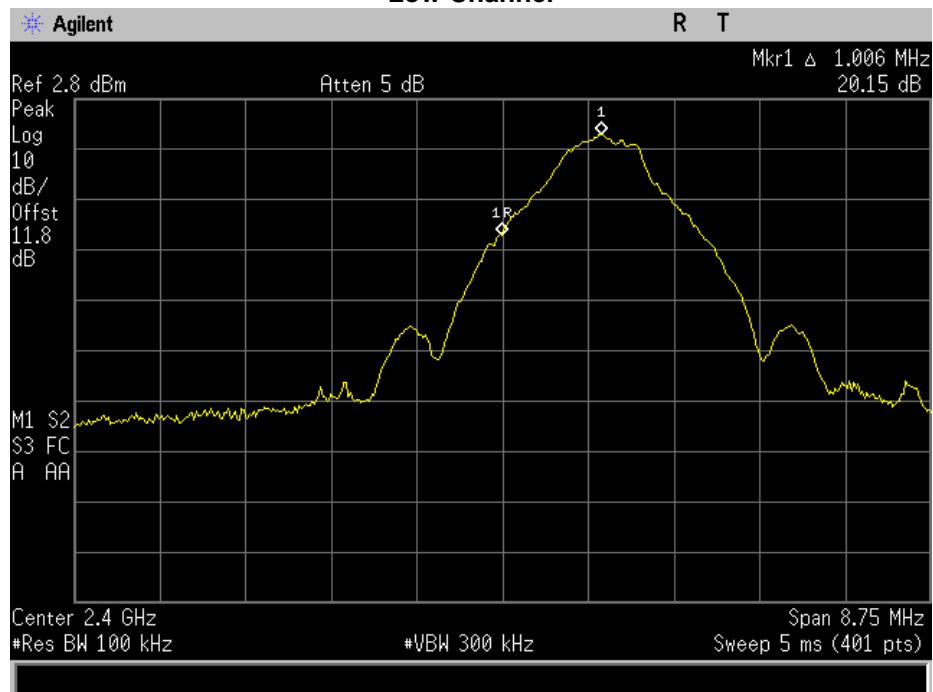
### Band Edge Emissions Summary

Tuned Frequency (MHz)	Emission Frequency (MHz)	Monitored Level	Detector	Limit	Result
2401	2400	-20.15	Peak	-20 dBc	Pass
2480	2483.5	-53.43	Peak	-20 dBc	Pass

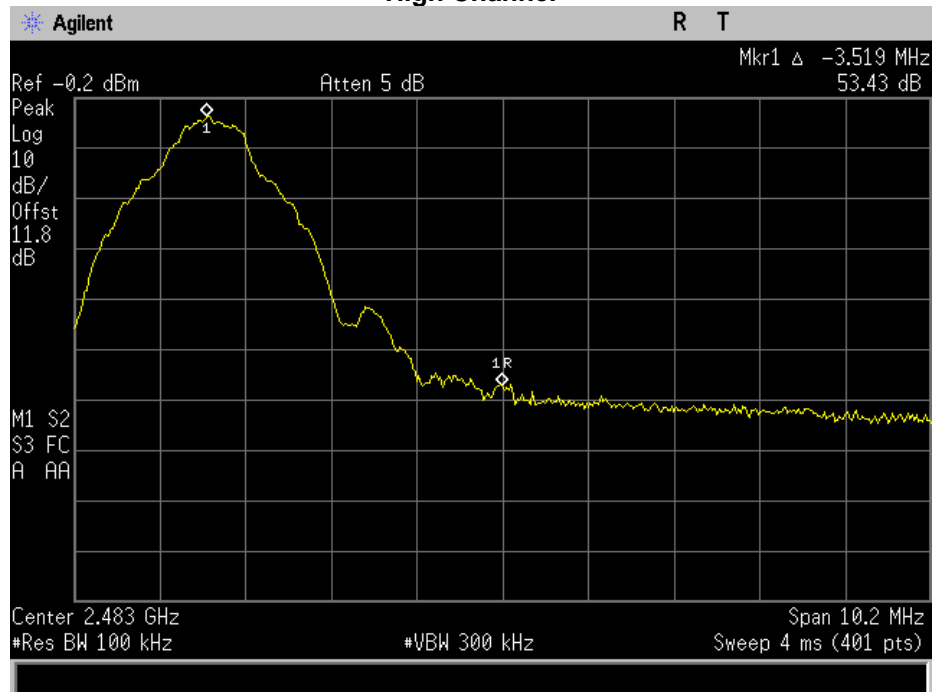


## Band Edge Plots

Low Channel



High Channel





## DTS Bandwidth

**Engineer:** Kenneth Lee

**Test Date:** 9/23/2017

### 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 frequency of operation at the maximum power level. The EUT was tested, in 3 orthogonal axis, by rotating it 360° with the receive antenna in both the vertical and horizontal orientation while raised from 1 to 4 meters to ensure the TX signal levels were maximized. A spectrum analyzer was used to verify that the EUT met the Bandwidth requirements.

The Spectrum Analyzer was set to the following:

RBW = 100 kHz

VBW  $\geq 3 \times$  RBW

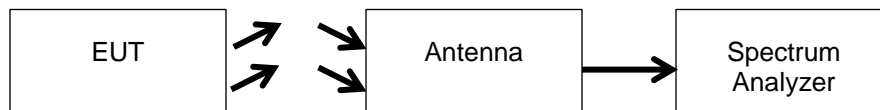
Peak Detector

Trace mode = max hold

Sweep = auto couple

Span = 1.5 x EBW

### Test Setup



### 6 dB Occupied Bandwidth Summary

Frequency (MHz)	Measured Bandwidth (kHz)	Specification Limit (kHz)	Result
2401	840.754	$\geq 500$	Pass
2440	896.093	$\geq 500$	Pass
2480	851.695	$\geq 500$	Pass

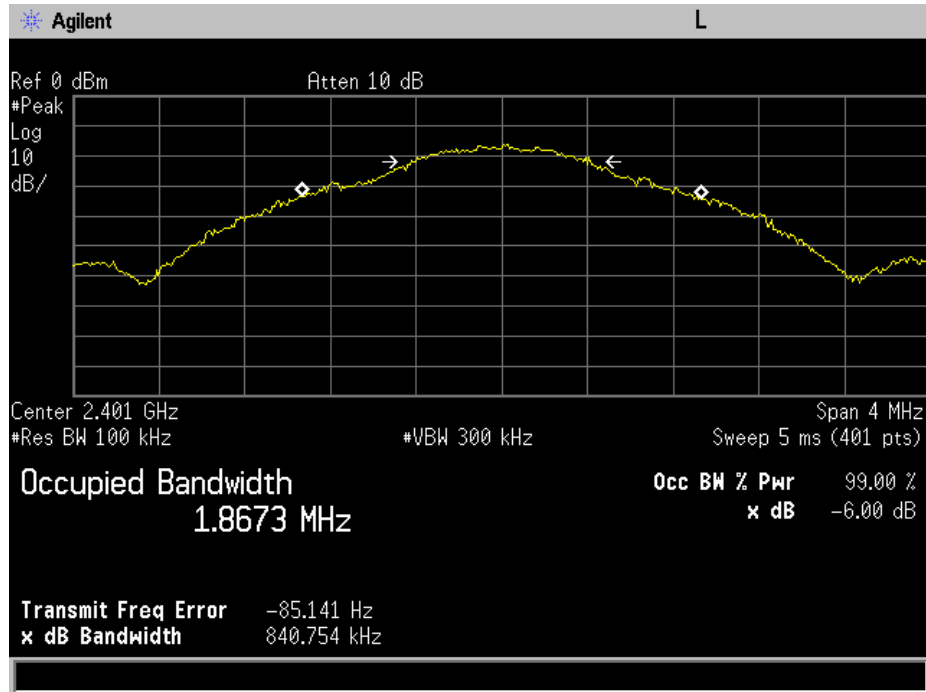
### 99% Bandwidth Summary

Frequency (MHz)	Measured Bandwidth (MHz)	Result
2401	1.8673	Pass
2440	1.8905	Pass
2480	1.8630	Pass

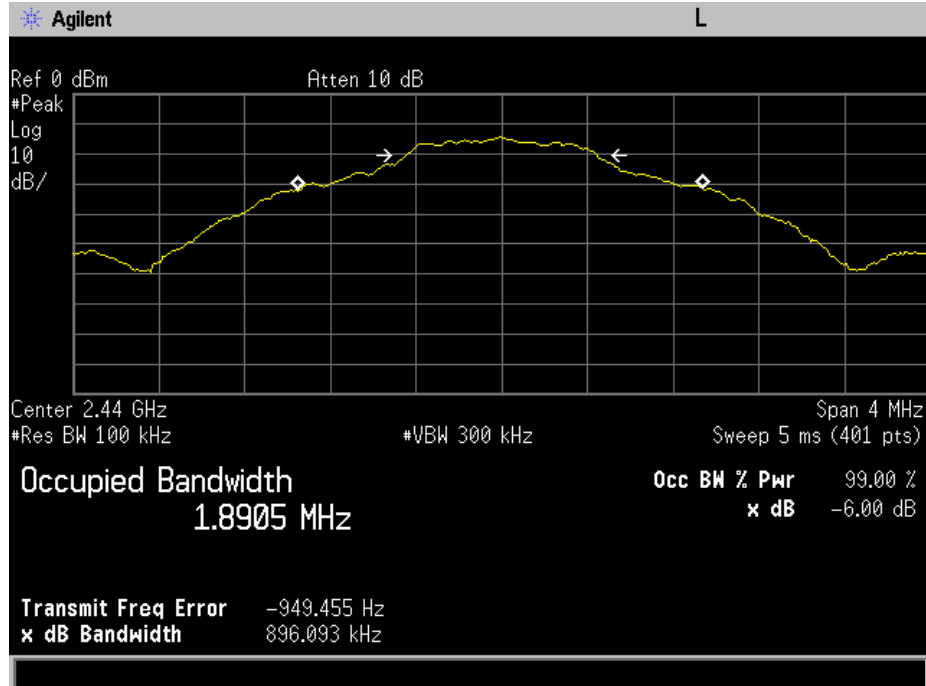


## 6 dB and 99% Bandwidth Plots

### Low Channel

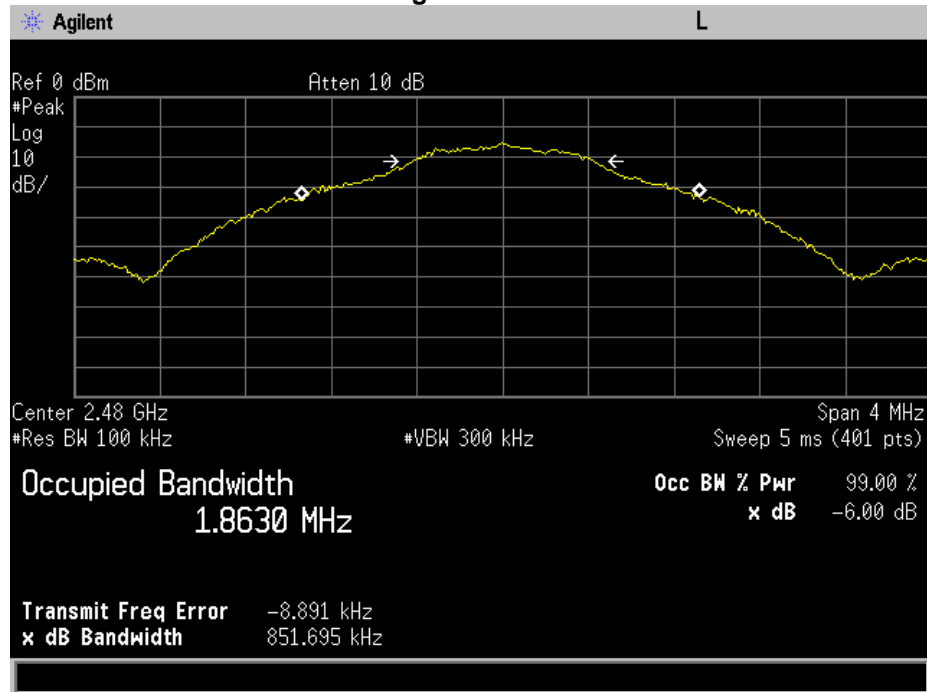


### Mid Channel





## High Channel





## Transmitter Power Spectral Density (PSD)

**Engineer:** Kenneth Lee

**Test Date:** 9/23/2017

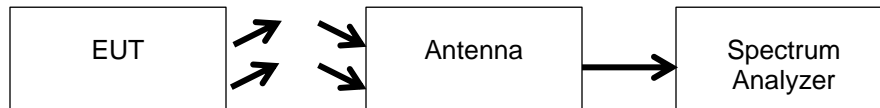
### Test Procedure

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 frequency of operation at the maximum power level. The EUT was tested, in 3 orthogonal axis, by rotating it 360° with the receive antenna in both the vertical and horizontal orientation while raised from 1 to 4 meters to ensure the TX signal levels were maximized. A spectrum analyzer was used to verify that the EUT met the requirements. The Spectrum Analyzer was set to the following:

DTS channel center frequency  
Span 1.5 x DTS bandwidth  
 $RBW = 3 \text{ kHz} \leq RBW \leq 100 \text{ kHz}$   
 $VBW \geq 3 \times RBW$   
Peak Detector  
Sweep time = auto couple  
Trace mode = max hold

Once the trace has stabilized the peak marker was used to determine the power spectral density.

### Test Setup



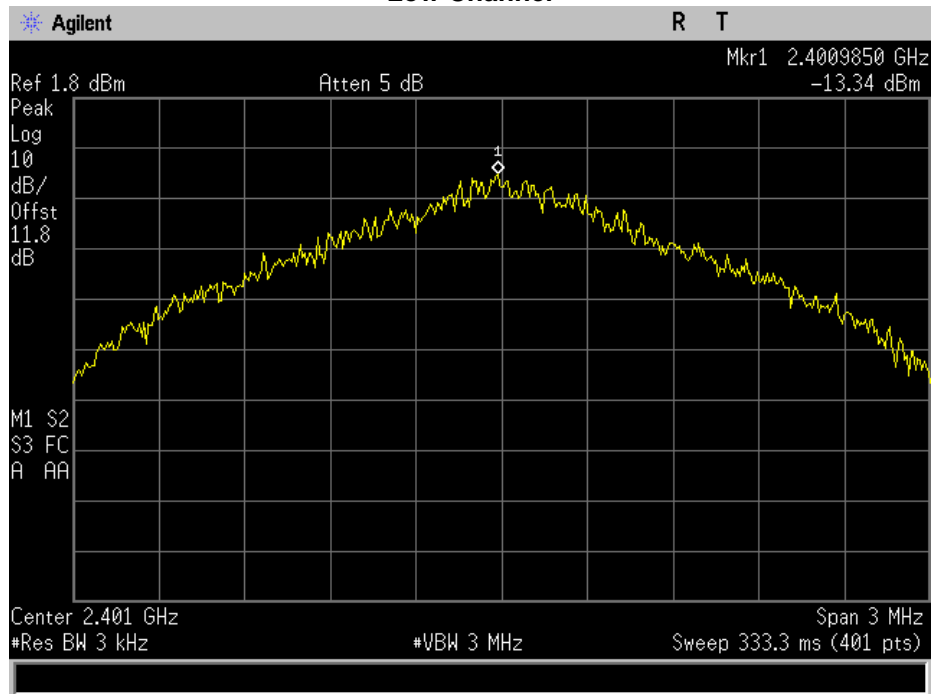
### PSD Summary

Frequency (MHz)	Measured Data (dBm)	Specification Limit (dBm)	Result
2401	-13.34	8	Pass
2440	-12.32	8	Pass
2480	-14.86	8	Pass

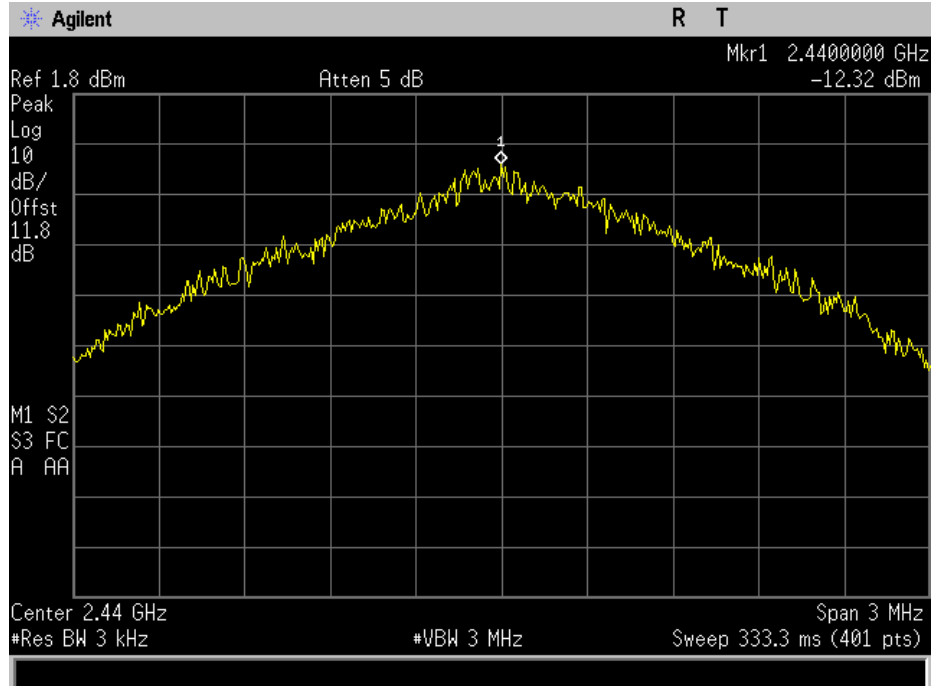


## PSD Plots

### Low Channel



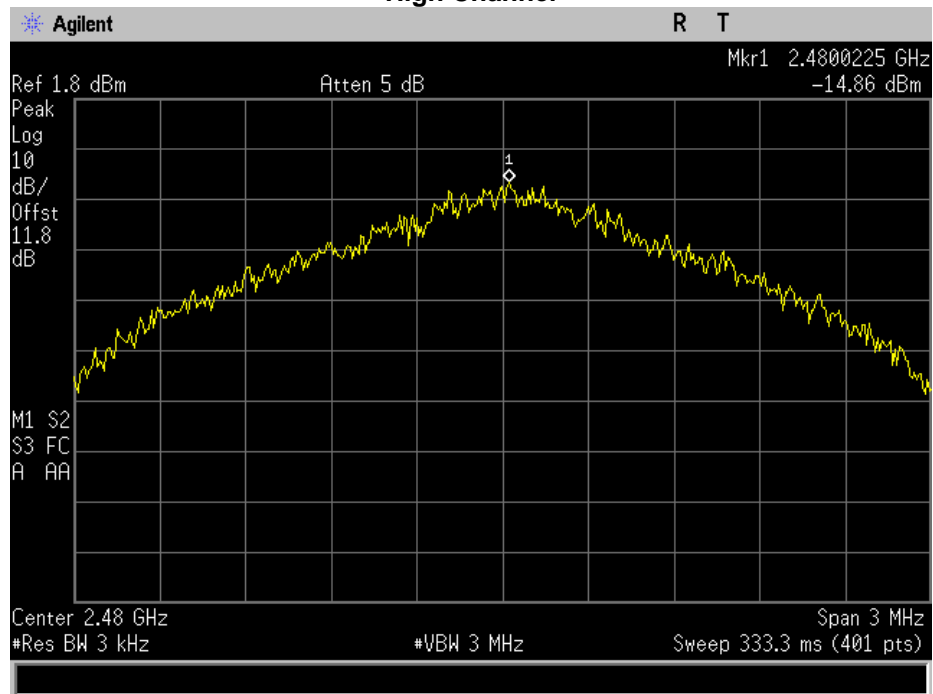
### Mid Channel







### High Channel





## 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	6/9/17	6/9/18
EMI Analyzer	Agilent	E7405A	i00379	2/22/17	2/22/18
Bi-Log Antenna	Schaffner	CBL 6111D	i00349	8/3/16	8/3/18
3 Meter Semi-Anechoic Chamber	Panashield	3 Meter Semi-Anechoic Chamber	i00428	8/15/16	8/15/19
Spectrum Analyzer	Agilent	E4407B	i00331	10/19/16	10/19/17
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