Compliance Testing, LLC
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Test Report

Prepared for: Rift Labs

Model: Viola

Description: LED Lamp

Serial Number: 0000001

FCC ID: 2ACZK-VIO05

To

FCC Part 15.247 DTS

Date of Issue: December 19, 2016

On the behalf of the applicant:

Rift Labs
Loeshagaveien 49
N-1450
Nesoddtangen 1450
Norway

Attention of:

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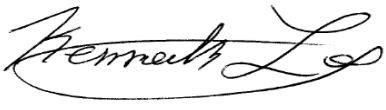

Kenneth Lee
Project Test Engineer

Test Report Revision History

Revision	Date	Revised By	Reason for Revision
1.0	September 2, 2016	Kenneth Lee	Original Document
2.0	December 19, 2016	Kenneth Lee	Updated Peak Power Output Test Procedure, Updated to ANSI C63.10-2013 and Updated additional information

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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**

ACCREDITED
TESTING CERT
#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 (ºC)	**Humidity (%)**	**Pressure (mbar)**
26.4	30.7	948.6

EUT Description
Model: Viola
Description: LED Lamp
Firmware: N/A
Software: N/A
Serial Number: 0000001
Additional Information: The EUT is capable of implementing a single modulation, BLE.

EUT Operation during Tests
The EUT was put into a test mode which allowed the selection of the lowest, middle and the highest channel of operation

Accessories: None

Cables: None

Modifications: None

15.203: Antenna Requirement:

X	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

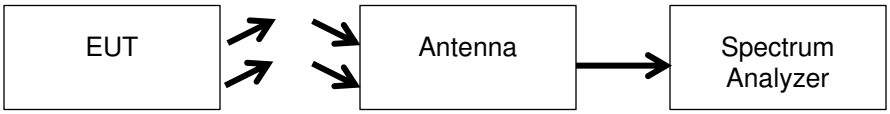
Specification	Test Name	Pass, Fail, N/A	Comments
15.247(b)	Peak Output Power	Pass	
15.247(b)	Conducted Spurious Emissions	N/A	EUT has no RF Ports
15.247(d), 15.209(a), 15.205	Radiated Spurious Emissions	Pass	
15.247(d), 15.209(a), 15.205	Emissions At Band Edges	Pass	
15.247(a)(2)	Occupied Bandwidth	Pass	
15.247(e)	Transmitter Power Spectral Density	Pass	
15.207	A/C Powerline Conducted Emissions	N/A	EUT is Battery Powered

Peak Output Power
Engineer: Kenneth Lee
Test Date: 09/02/2016

Test Procedure

The EUT was tested in a semi-anechoic test chamber set 1m from the receiving antenna. 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. FCC KDB 558074 section 9.1.1 test method was used.

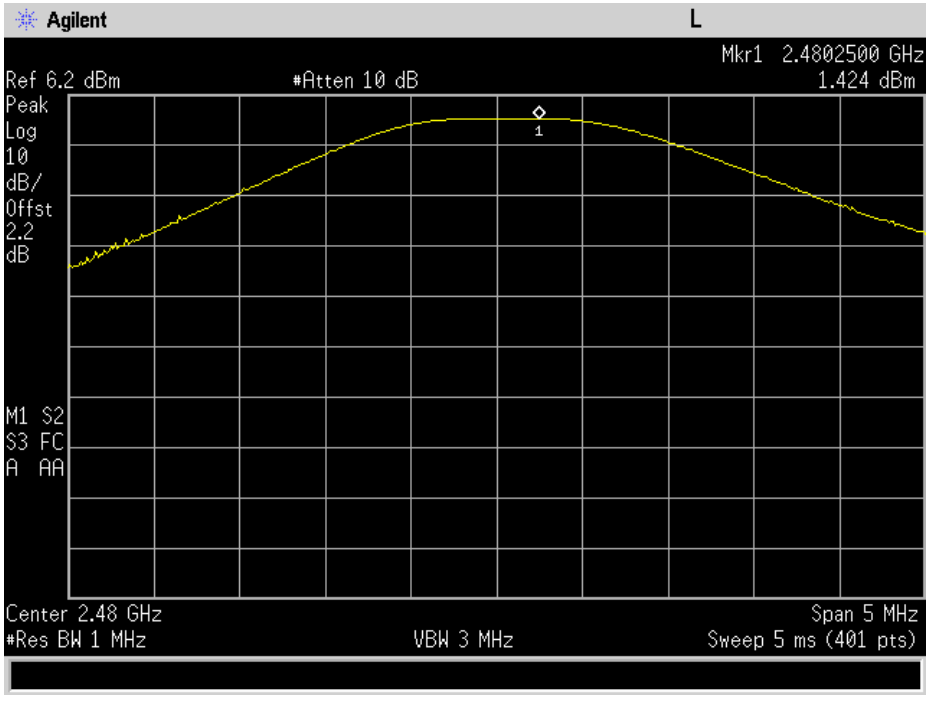
Test Setup



Transmitter Peak Output Power

Tuned Frequency (MHz)	Measured Value (dBm)	Specification Limit	Result
2402	0.665	1 W (30 dBm)	Pass
2441	1.606	1 W (30 dBm)	Pass
2480	1.424	1 W (30 dBm)	Pass

Sample Plot – High Channel



Radiated Spurious Emissions
Engineer: Kenneth Lee
Test Date: 09/02/2016

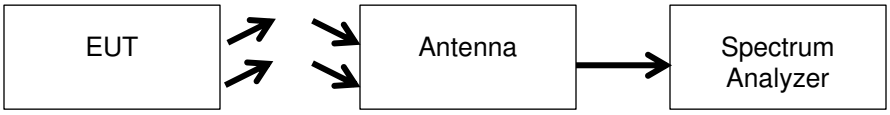
Test Procedure
Radiated Spurious Emissions: 30 – 1000 MHz

The EUT was tested in a semi-anechoic test chamber set 3m from the receiving antenna. 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

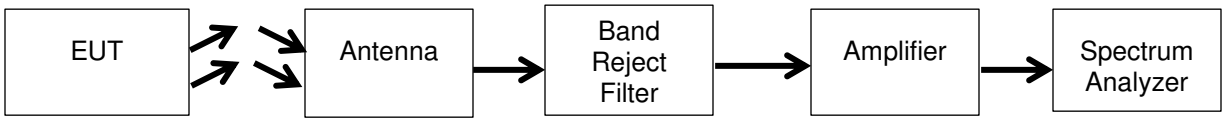
Test Setup



Test Procedure for
Radiated Spurious Emissions above 1 GHz

The EUT was tested in a semi anechoic chamber set 3m from the receiving antenna. A spectrum analyzer was used to verify that the EUT met the requirements for Radiated Spurious Emissions. The antenna, band reject filter, amplifier and cable correction factors were input into the spectrum analyzer before recording the Measured Level to ensure accurate readings. The spectrum for each tuned frequency was examined to the 10th harmonic.

Test Setup



Detector Settings	RBW (MHz)	VBW (MHz)	Span
Peak	1	3	As Necessary
Average	1	3	As Necessary

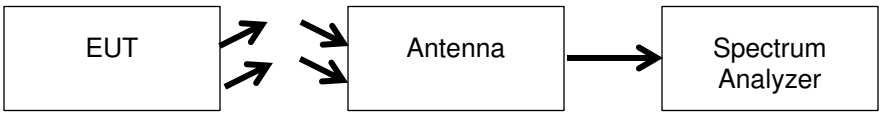
See Annex A for Test Data

Emissions at Band Edges
Engineer: Kenneth Lee
Test Date: 09/02/2016

Test Procedure

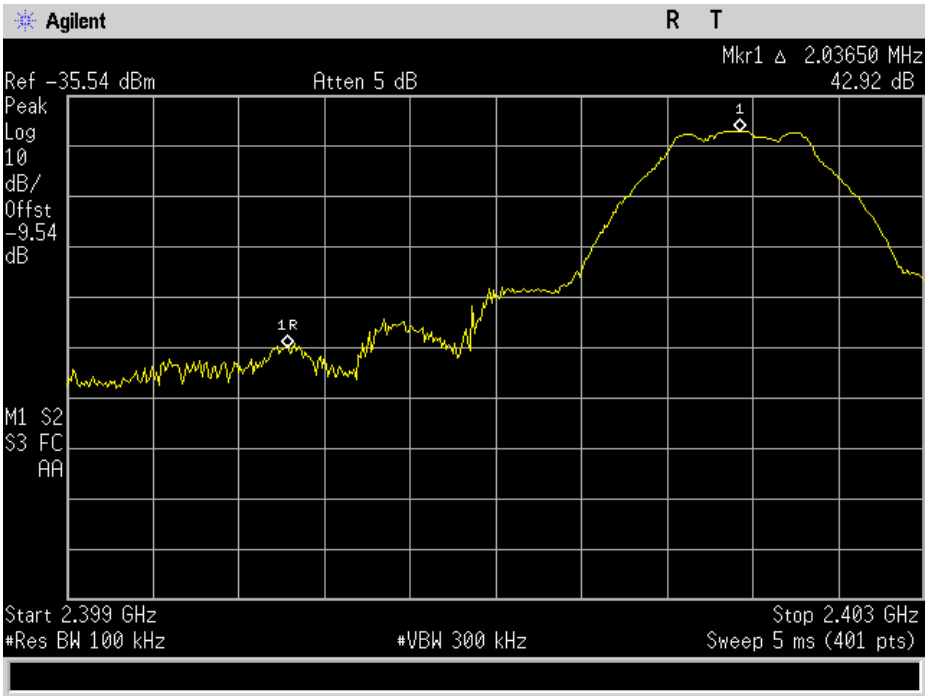
The EUT was tested in a semi-anechoic chamber set 3m from the receiving antenna. A spectrum analyzer was used to verify that the EUT met the requirements for band edge and restricted band for both peak and average measurements. The cable and antenna correction factors were input into the analyzer as a reference level offset to ensure accurate readings. For the restricted band the amplifier and band reject filter correction factors were also input to the spectrum analyzer.

Band Edge Test Setup

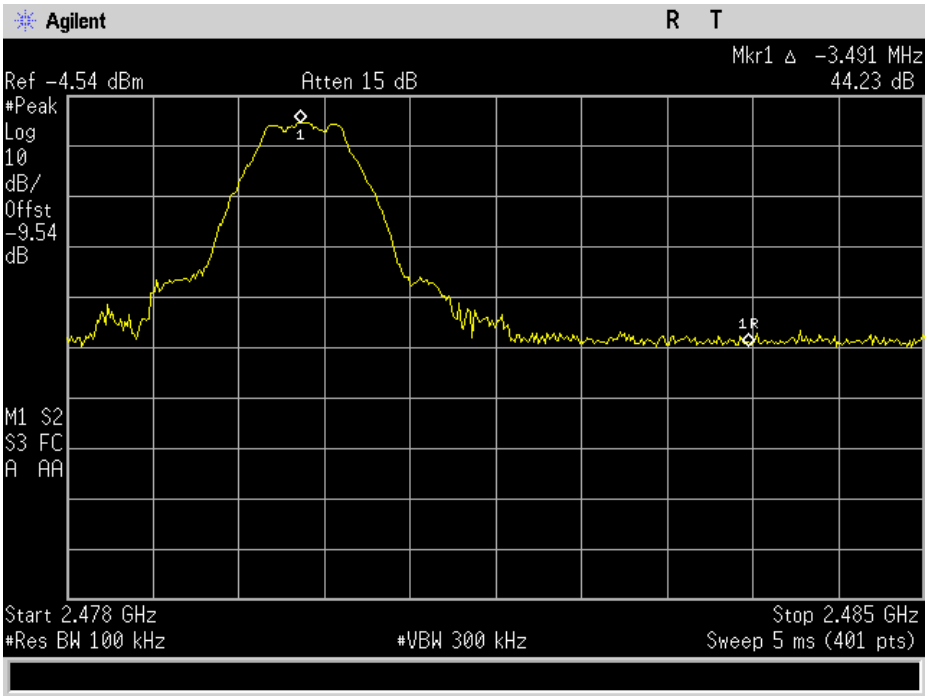


Restricted Band Test Setup

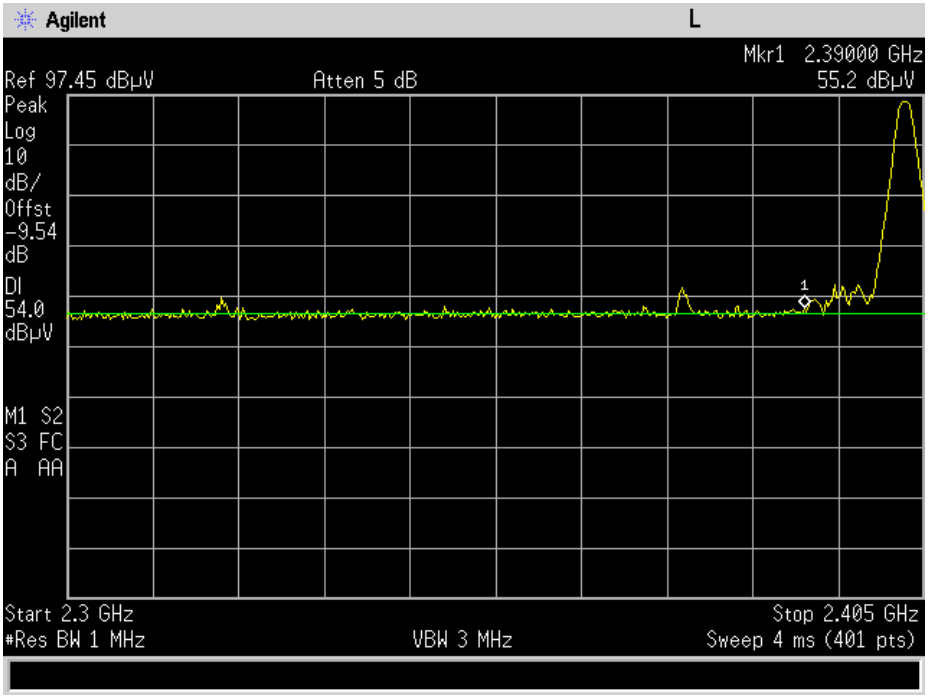
Band Edge 2400 MHz
Tuned Freq = 2402 MHz



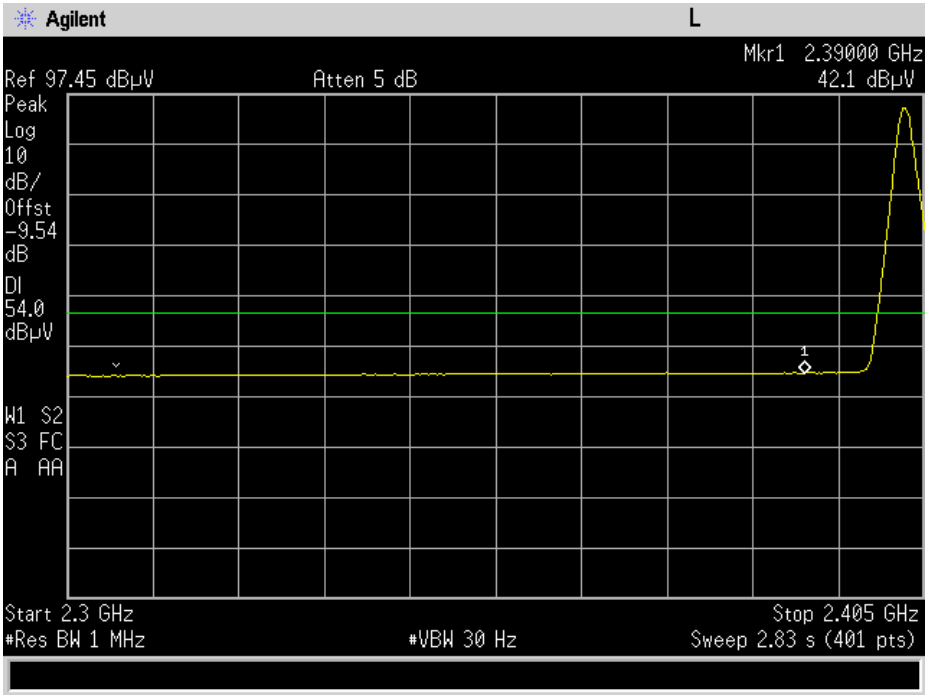
Band Edge 2483.5 MHz
Tuned Freq = 2480 MHz



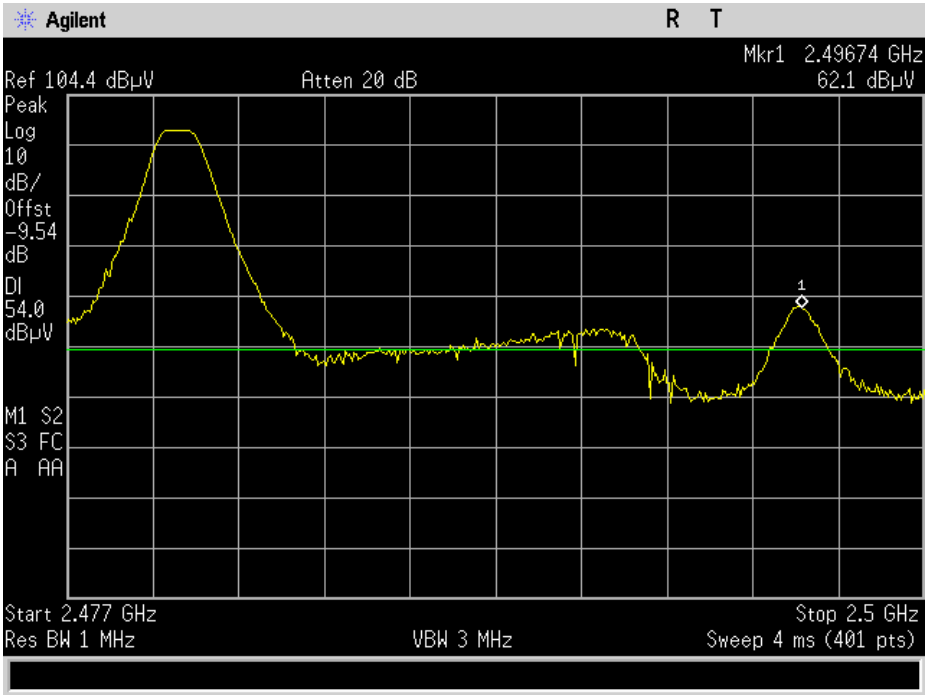
Restricted Band 2300 – 2390 MHz – Peak
Tuned Freq = 2402 MHz



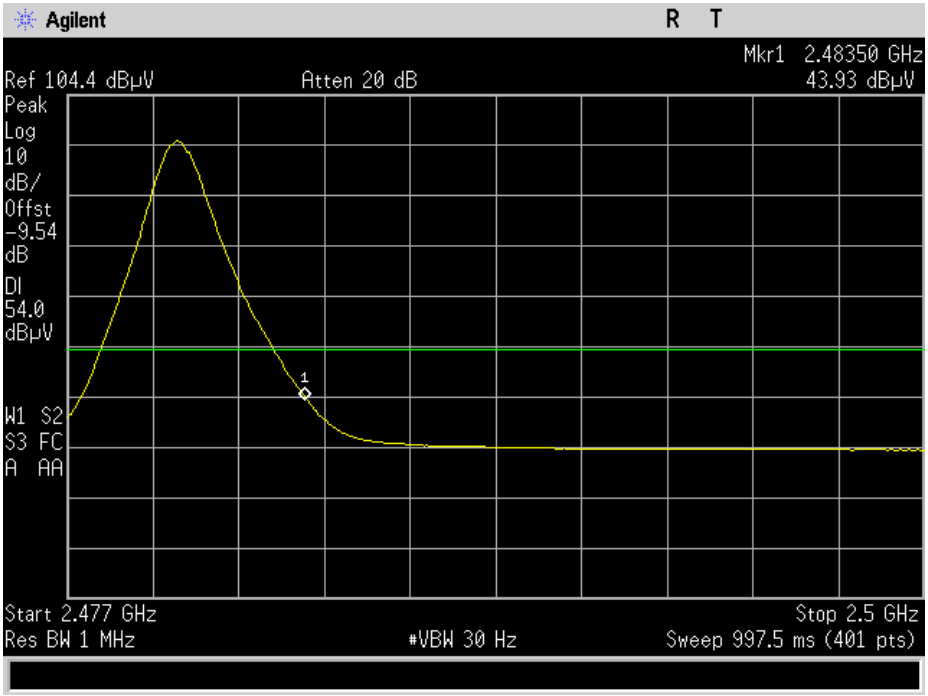
Restricted Band 2300 – 2390 MHz – Avg
Tuned Freq = 2402 MHz



Restricted Band 2483.5 – 2500 MHz – Peak
Tuned Freq = 2480 MHz



Restricted Band 2483.5 – 2500 MHz – Avg
Tuned Freq = 2480 MHz

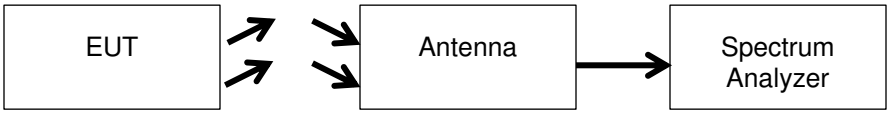


Occupied Bandwidth
Engineer: Kenneth Lee
Test Date: 09/02/2016

Test Procedure

The EUT was tested in a semi-anechoic test chamber set 3m from the receiving antenna. 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. The Span was set wide enough to capture the entire transmit spectrum and the resolution bandwidth was set to at least 1% of the span. The analyzer was set to max hold and when the entire spectrum was captured the 6dB and 99% bandwidths were measured to verify the bandwidth met the specification.

Test Setup



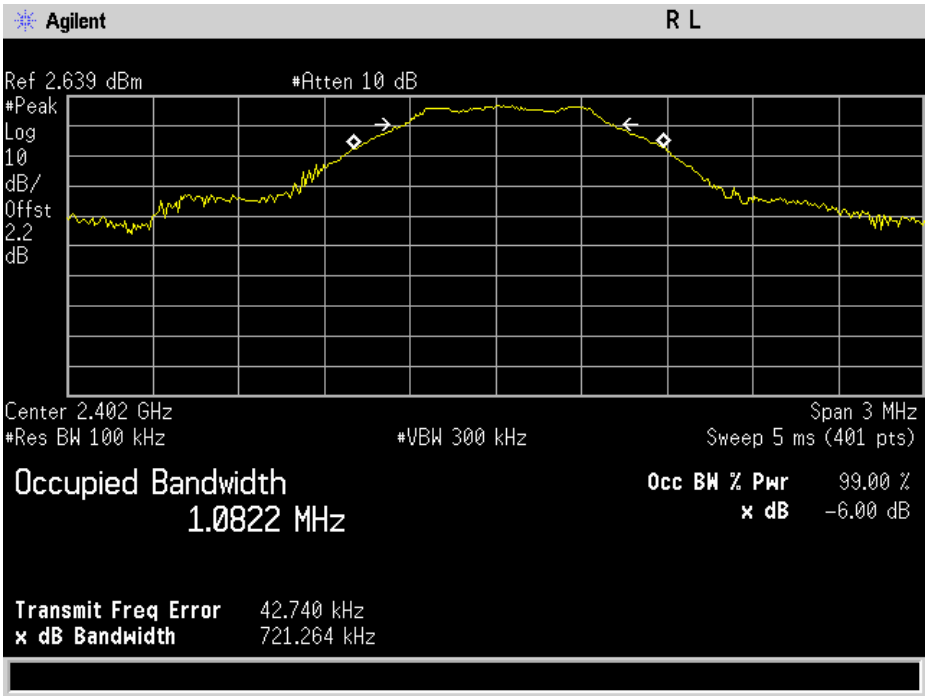
6 dB Occupied Bandwidth Summary

Frequency (MHz)	Measured Bandwidth (kHz)	Specification Limit (kHz)	Result
2402	721.264	≥ 500	Pass
2441	723.417	≥ 500	Pass
2480	711.607	≥ 500	Pass

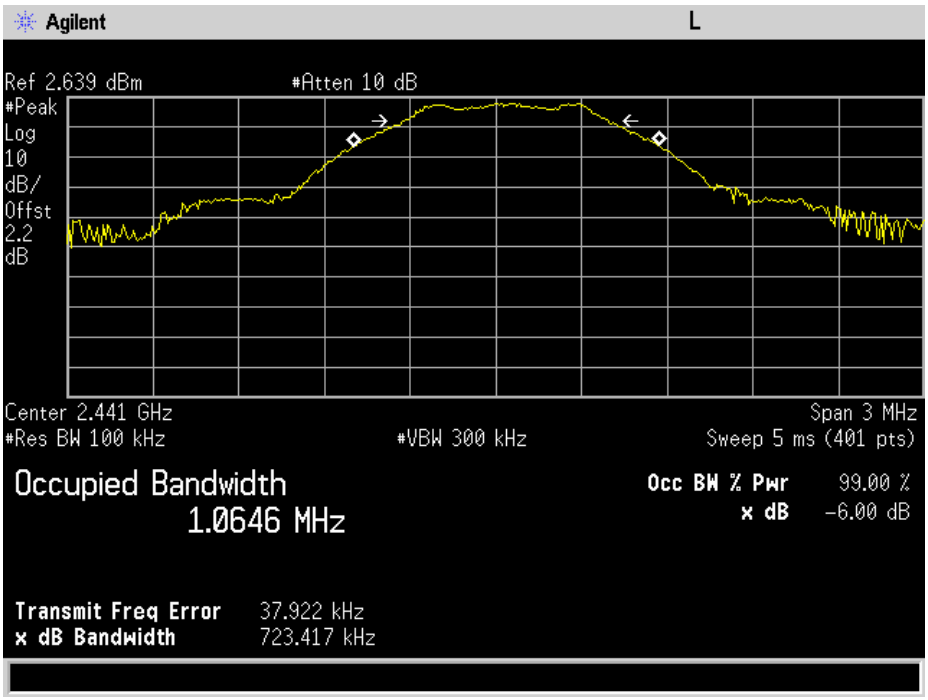
99% Bandwidth Summary

Frequency (MHz)	Measured Bandwidth (MHz)	Result
2402	1.0822	Pass
2441	1.0646	Pass
2480	1.0627	Pass

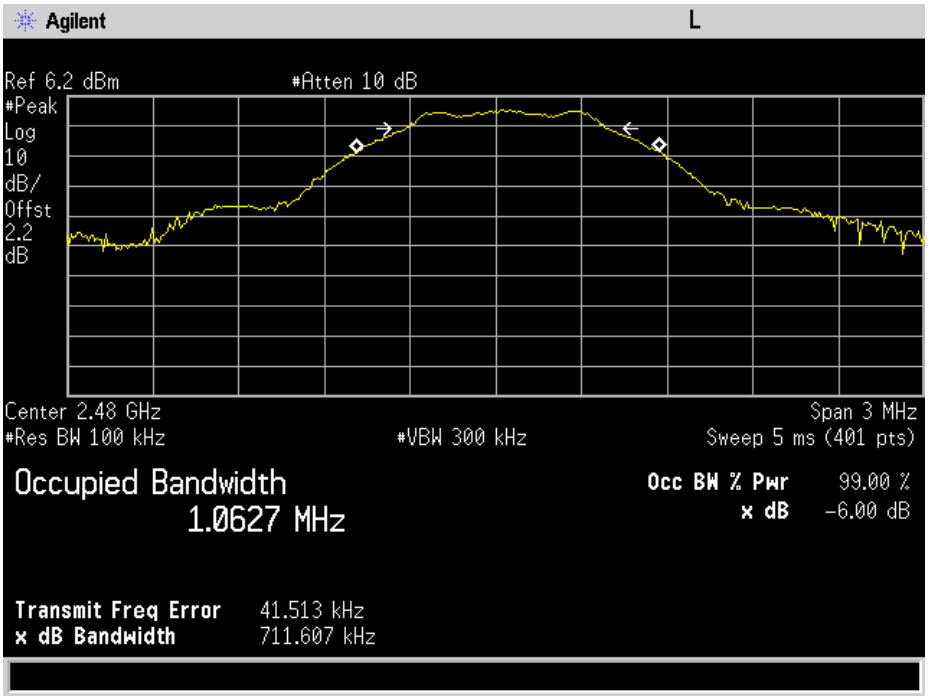
6dB and 99% Bandwidth 2402 MHz



6dB and 99% Bandwidth 2441 MHz



6dB and 99% Bandwidth 2480 MHz

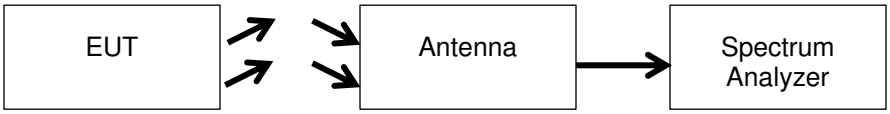


Transmitter Power Spectral Density (PSD)
Engineer: Kenneth Lee
Test Date: 09/02/2016

Test Procedure

The EUT was tested in a semi-anechoic test chamber set 3m from the receiving antenna. 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.

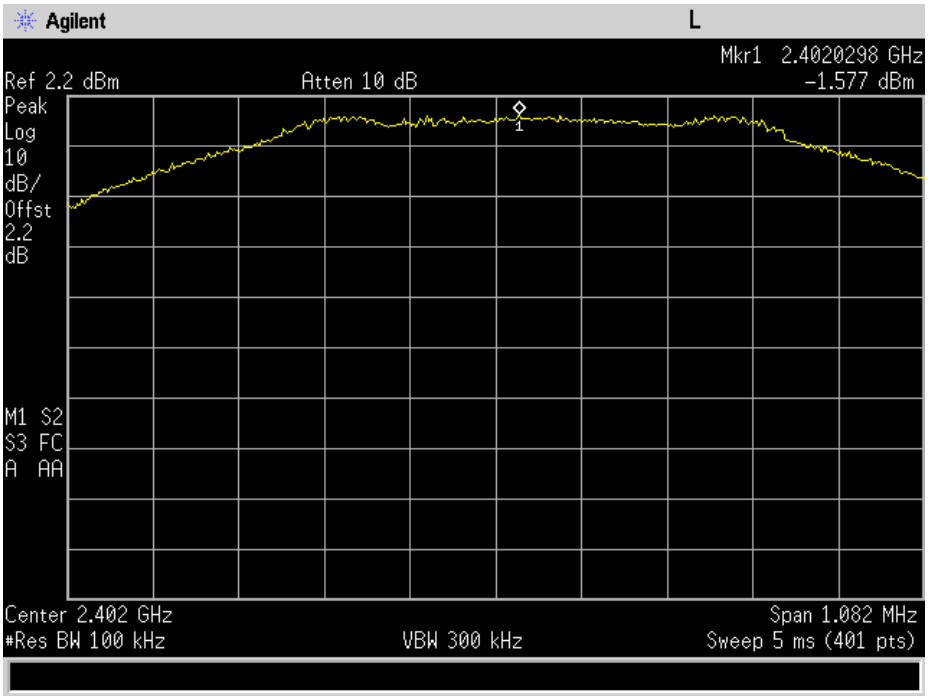
Test Setup



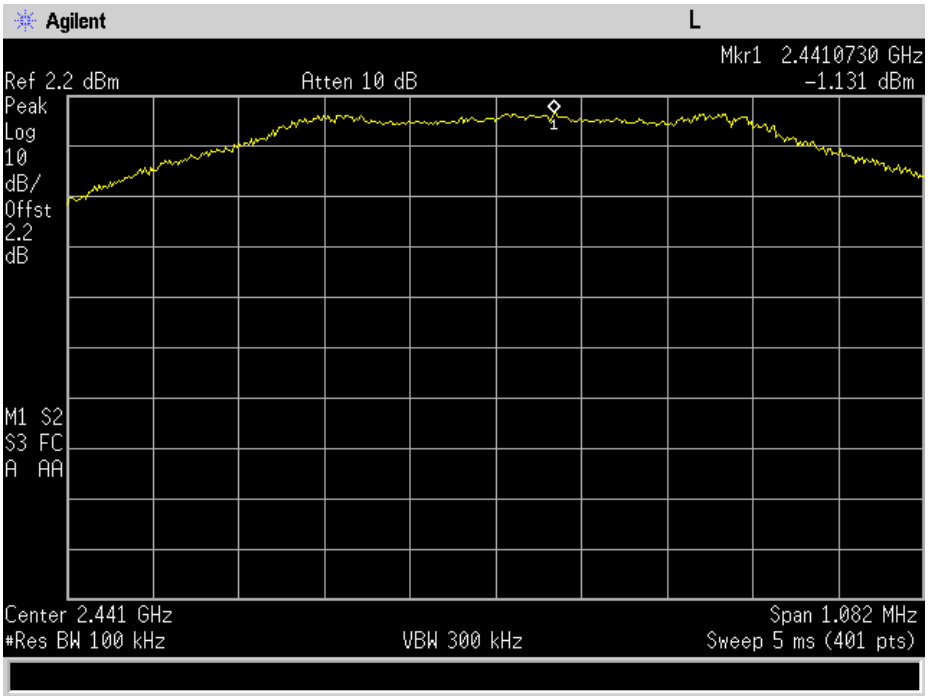
PSD Summary

Frequency (MHz)	Measured Data (dBm)	Specification Limit (dBm)	Result
2402	-1.577	8	Pass
2441	-1.131	8	Pass
2480	-1.255	8	Pass

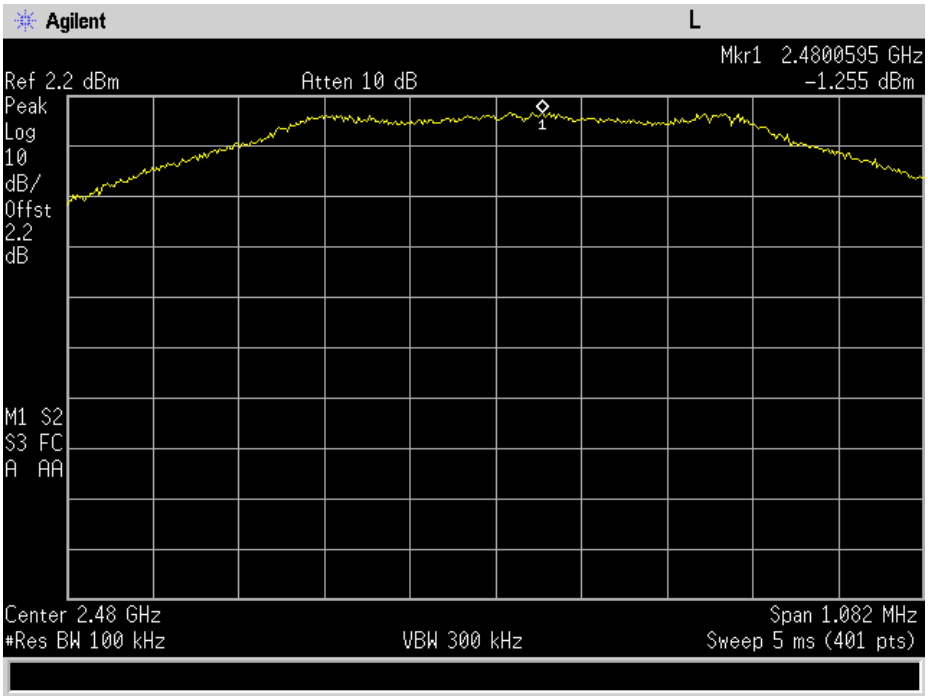
PSD 2402 MHz



PSD 2441 MHz



PSD 2480 MHz



Test Equipment Utilized

Description	Manufacturer	Model #	CT Asset #	Last Cal Date	Cal Due Date
Bilog Antenna	Schaffner	CBL6111C	i00267	3/1/16	3/1/18
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
EMI Analyzer	Agilent	E7405A	i00379	2/11/16	2/11/17
3 Meter Semi-Anechoic Chamber	Panashield	3 Meter Semi-Anechoic Chamber	i00428	8/15/16	8/15/17
Spectrum Analyzer	Agilent	E4407B	i00331	9/18/15	9/18/16
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