



Compliance Testing, LLC

Previously Flom Test Lab

EMI, EMC, RF Testing Experts Since 1963

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Test Report

Prepared for: Hunter Douglas Window Fashion

Model: 1002774

Description: Remote Control

Serial Number: N/A

FCC ID: UXULEV6

IC: 7316A-LEV6

To

FCC Part 15.247 DTS

And

RSS 247 Issue 2

Date of Issue: April 12, 2019

On the behalf of the applicant:

Hunter Douglas Window Fashion
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Broomfield, CO 80020

By the request of:

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Attention of:

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Project No: p1910003

Poona Saber
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	March 21, 2019	Poona Saber	Original Document
2.0	March 26, 2019	Amanda Reed	Updated contact information on cover page
3.0	April 8, 2019	Poona Saber	<ul style="list-style-type: none">- Page revised the wording of 4 dBm to max setting at 4 dBm- Revised mid channel on page 12 and 13- Changed PSD table on page 15- Changed PSD plots on page 16 & 17- Annex B revised and added Marker delta method. A note was added on page 11
4.0	April 10, 2019	Poona Saber	<ul style="list-style-type: none">- Revised table on page 9 to reflect conducted power in addition to EIRP- Made changes to table on page 15
5.0	April 11, 2019	Poona Saber	<ul style="list-style-type: none">- Annex B revised



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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)
23.3	28.9	967

EUT Description

Model: 1002774

Description: Remote Control

Additional Information:

Device is a battery powered remote control used to control window covers and it transmits at frequency range of 2402-2480 MHz and It's put on continuous modulated transmit mode at low, mid and high channels at max power level on the remote control which is the 4 dBm level.



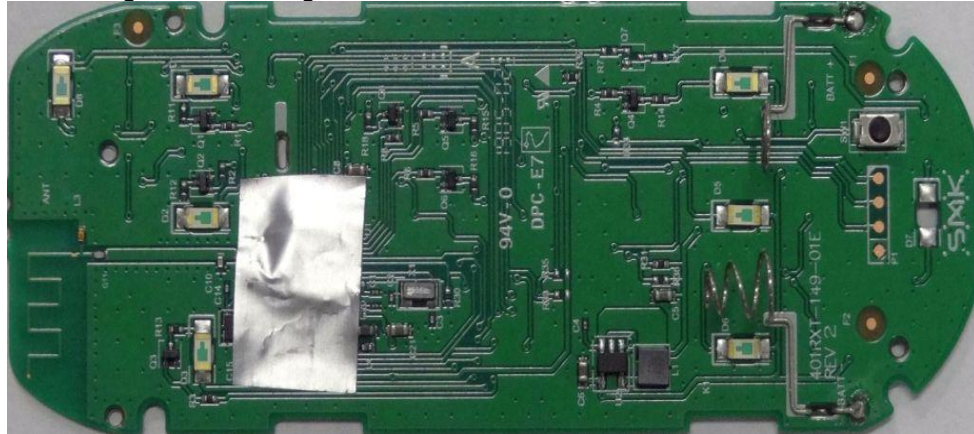
Accessories: None

Cables: None

Modifications:

In order to pass testing EMI absorbing sheet was added on the transmitter on the board as below.

1



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)	Peak Output Power	Pass	
15.247(d)	Section 5.5	Radiated Spurious Emissions at non-restricted frequency band	Pass	
15.247(d), 15.209(a), 15.205	Section 5.5	Radiated Spurious Emissions at restricted frequency band	Pass	
15.247(a)(2)	Sections 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	Unit is battery operated

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 v05	Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating under §15.247



Peak Radiated Output Power

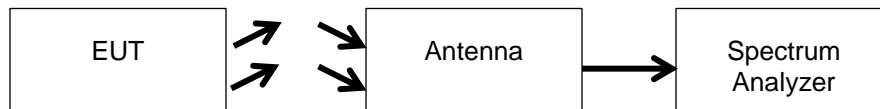
Engineer: Poona Saber

Test Date: 3/7/19

Test Procedure

The EUT was setup in a semi-anechoic test chamber set 3m from the receiving antenna. The EUT was maximized for highest emission per X,Y,Z axes and set to transmit on the lowest, middle and highest frequencies at the maximum power level. The peak readings were taken and the result was then compared to the limit.

Test Setup



Transmitter Peak Output Power

Tuned Frequency (MHz)	Measured Value EIRP (dBm)	Antenna Gain (dBi)	Peak Conducted power (dBm)	Specification Limit EIRP	Result
2402	-2.47	-1.75	-0.72	36 dBm	Pass
2453	-3.88	-1.75	-2.13	36 dBm	Pass
2480	-4.14	-1.75	-2.39	36 dBm	Pass



Radiated Spurious Emission in Non-Restricted Frequency Bands

Engineer: Poona Saber

Test Date: 3/7/18

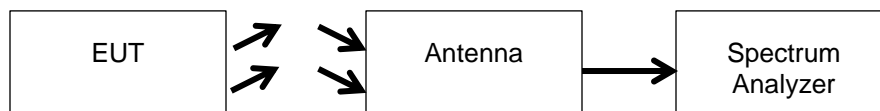
Test Procedure

The EUT was setup in a semi-anechoic test chamber set 3m from the receiving antenna. The EUT was maximized for highest emission per X, Y, Z axes and set to transmit on the lowest, middle and highest frequencies at the maximum power level.

The EUT was verified for spurious emissions of part 15.247 (d) and the frequency range from 30 MHz to the 10th harmonic of the fundamental transmitter was observed.

If the maximum peak conducted output power procedure was used to determine compliance, then the peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 20 dBc) which is done by reference level measurements per 11.11.2 of C63.10-2013 and emission level measurement of 11.11.3.

Test Setup



Note: For measurements in restricted bands per KDB 558074 a maximum ground reflection factor of 4.7 dB shall be added to EIRP level for frequencies between 30 MHz and 1000 MHz.

See Annex A for test results



Radiated Spurious Emissions in Restricted Frequency Bands

Engineer: Poona Saber

Test Date: 3/7/18

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 general Radiated Emissions limits of 15.209 if emissions fall in 15.205 restricted band. 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.

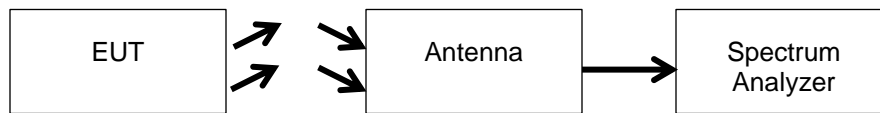
Correction factors were input into the spectrum analyzer before recording “Measured Level”.

RBW = 100 KHz

VBW = 300 KHz

Detector – Quasi Peak

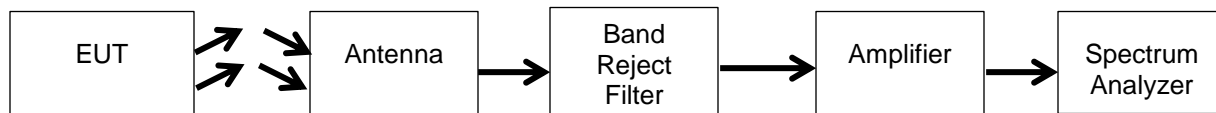
Test Setup



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

Note : per ANSI C63.10 marker delta method of 6.10.6 has been used for one of the band edge measurements.

See Annex B for test results



DTS Bandwidth

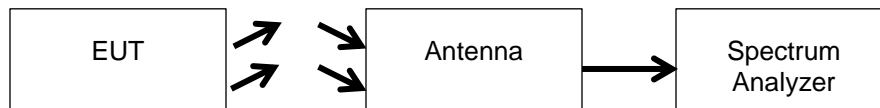
Engineer: Poona Saber

Test Date: 2/28/2019

Test Procedure

The EUT was setup in a semi-anechoic test chamber set 3m from the receiving antenna. Procedures on ANSI C63.10 subclause 11.8 were followed. 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

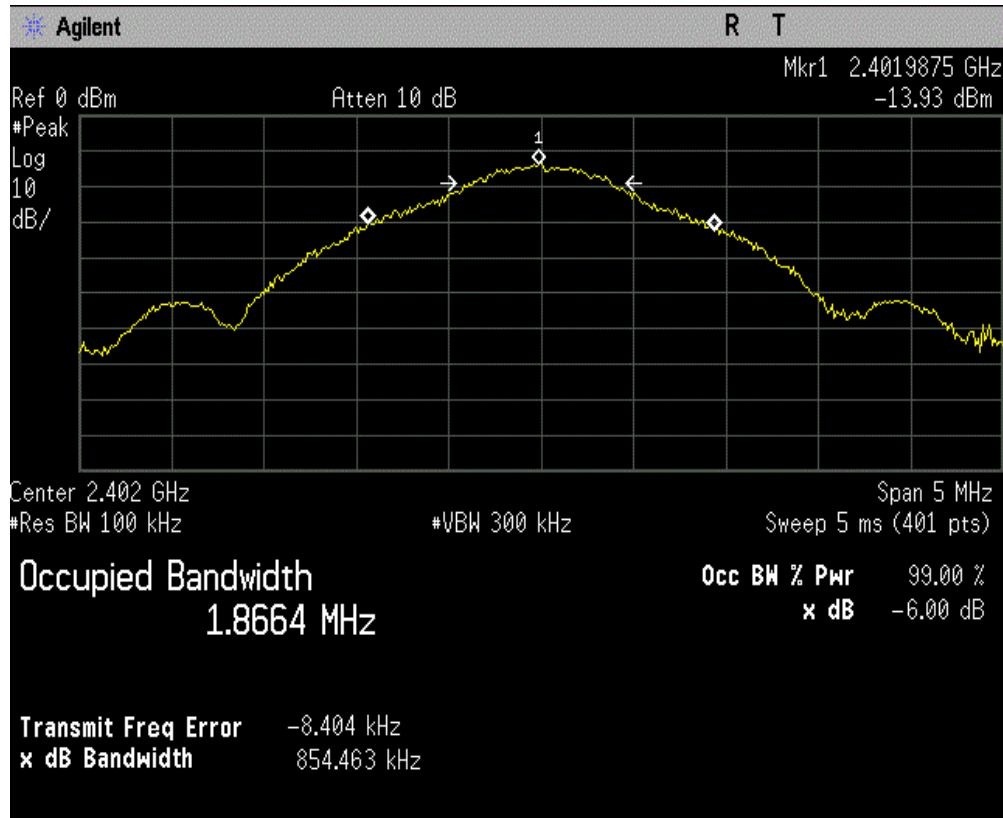
Frequency (MHz)	Measured Bandwidth (kHz)	Specification Limit (kHz)	Result
2402	854.46	≥ 500	Pass
2453	852.64	≥ 500	Pass
2480	859.73	≥ 500	Pass

99% Bandwidth Summary

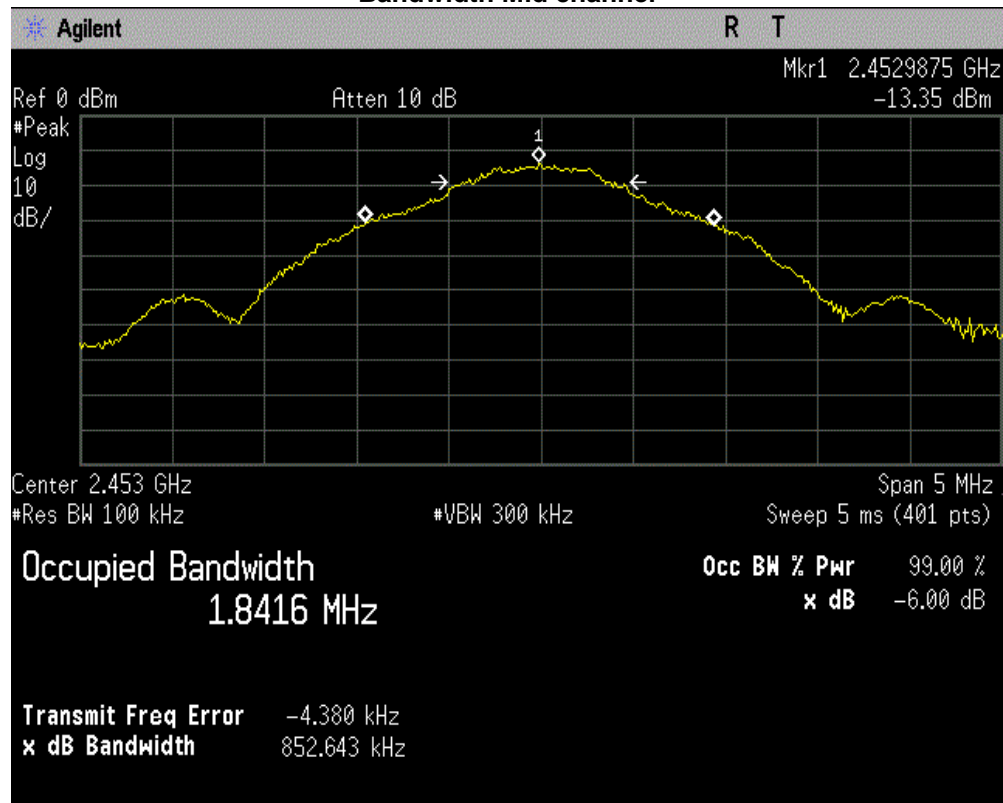
Frequency (MHz)	Measured Bandwidth (MHz)	Re46sult
2402	1.86	Pass
2453	1.84	Pass
2480	1.87	Pass

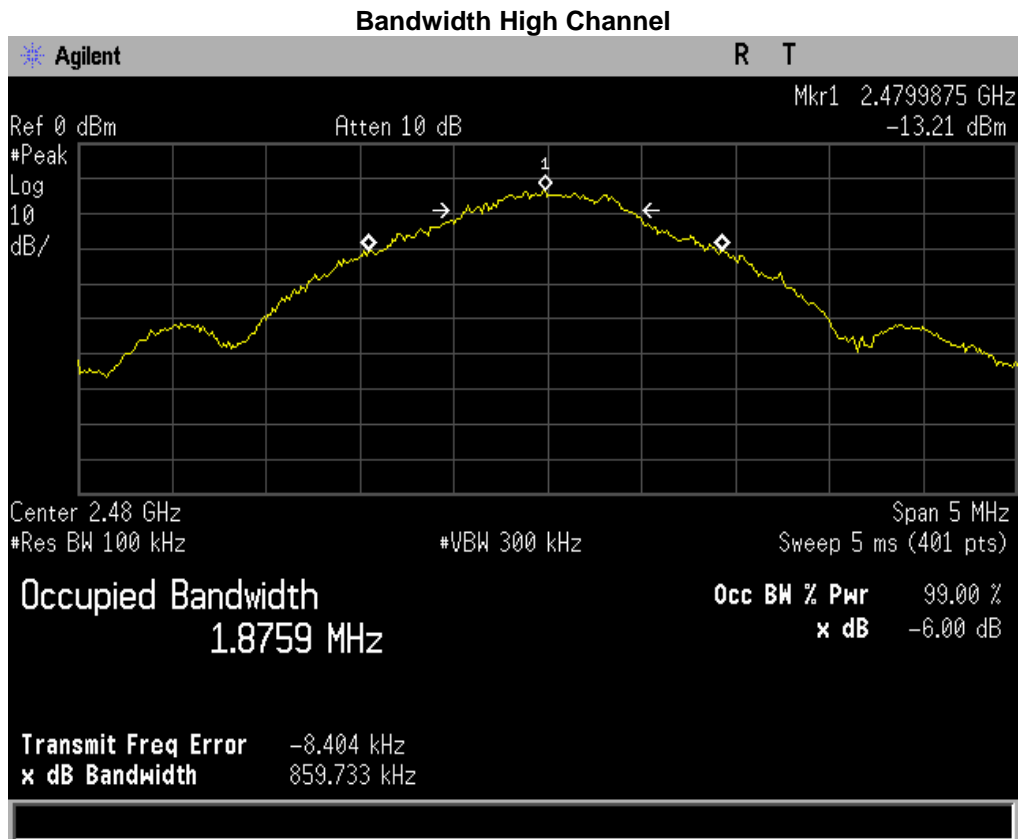


Bandwidth Low Channel



Bandwidth Mid channel







Transmitter Power Spectral Density (PSD)

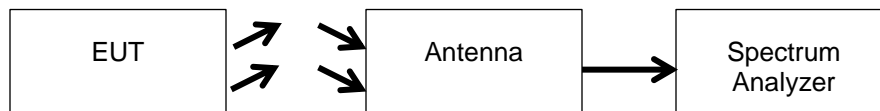
Engineer: Poona Saber

Test Date: 3/7/19

Test Procedure

The EUT was setup in a semi-anechoic test chamber set 3m from the receiving antenna. The test was performed per section 11.10 of C63.10:2013 "Procedure for determining PSD for DTS devices"

Test Setup

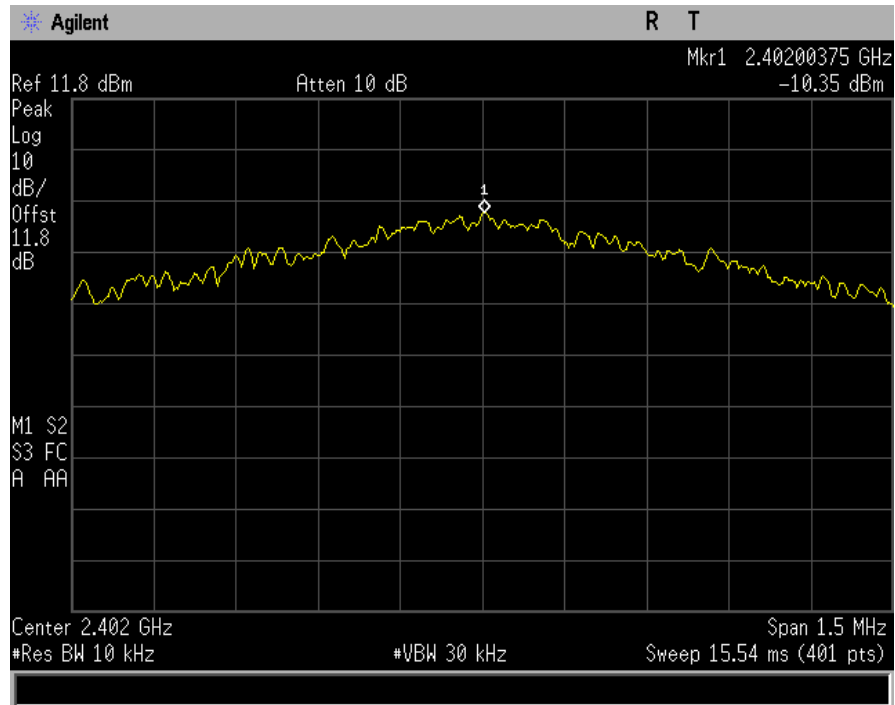


PSD Summary

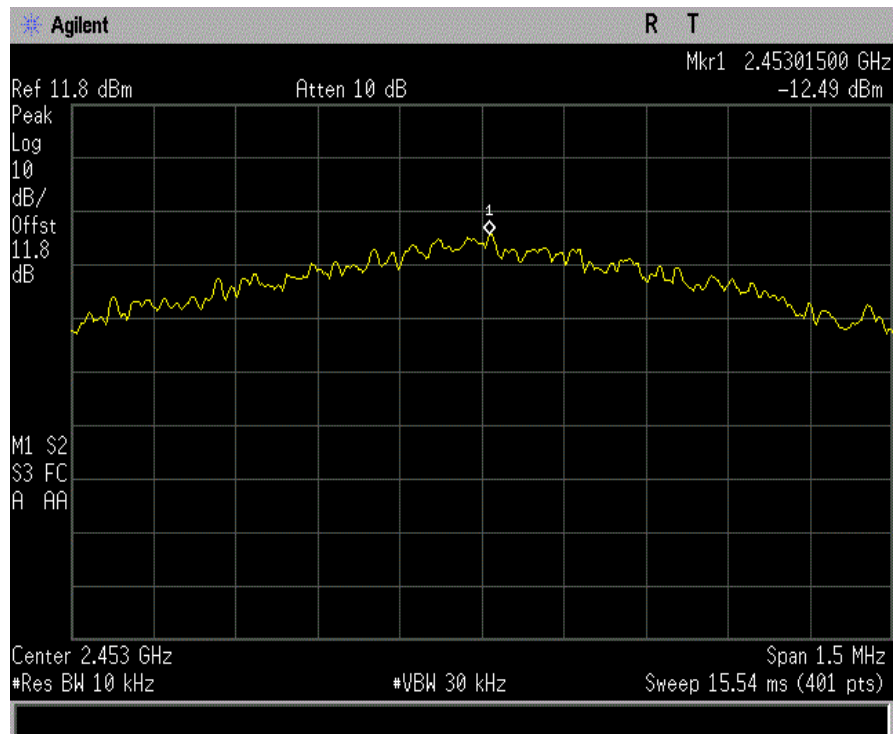
Frequency (MHz)	Measured Data EIRP (dBm)	Antenna Gain (dBi)	Conducted PSD (dBm)	Specification Limit (dBm)	Result
2402	-10.35	-1.75 dBi	-8.6	8	Pass
2453	-12.49	-1.75 dBi	-10.74	8	Pass
2480	-12.11	-1.75 dBi	-10.36	8	Pass



PSD Low Channel

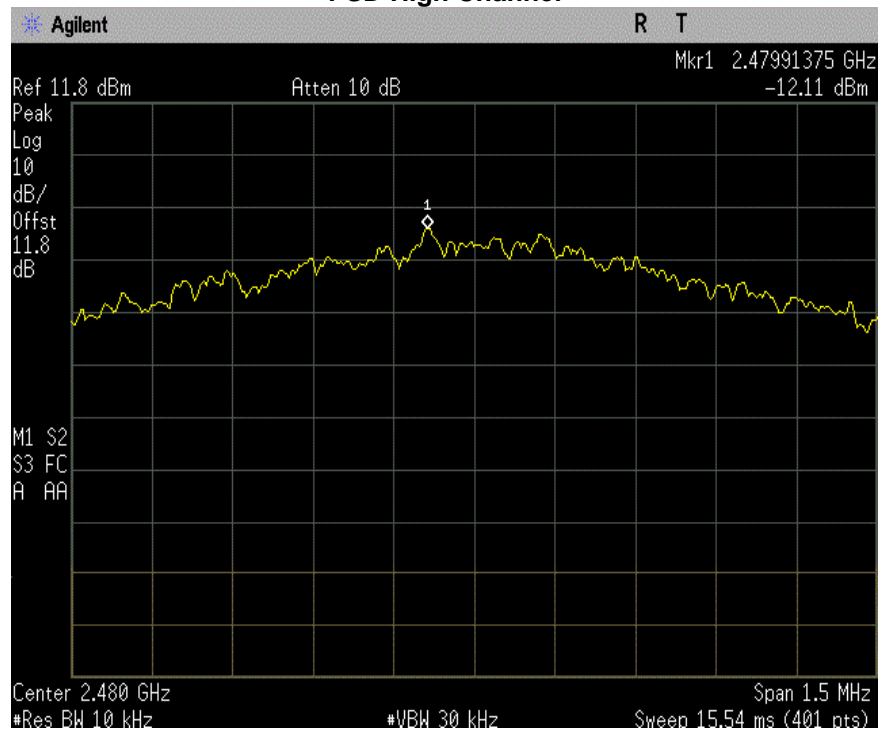


PSD Mid Channel





PSD High Channel



Measurement Uncertainty

Measurement Uncertainty (U_{lab}) for Compliance Testing is listed in the table below.
 The reported expanded uncertainty U_{lab} (dB) has been estimated at a 95% confidence level ($k=2$)

Measurement	U_{lab}
Radio Frequency	$\pm 1.0 \times 10^{-12}$
RF Power, conducted	± 0.43 dB
RF Power Density, conducted	$\pm .98$ dB
Spurious Emissions, Conducted	± 2.49 dB
All Emissions, radiated	± 5.7 dB
Temperature	± 1.0 deg C
Humidity	± 4.3 %
Dc voltage	$\pm .12$ %
Low Frequency voltages	± 2.3 %

The reported expanded uncertainty $\pm U_{lab}$ (dB) has been estimated at a 95% confidence level ($k=2$)

U_{lab} is less than or equal to U_{CISPR} therefore

- Compliance is deemed to occur if no measured disturbance exceeds the disturbance limit
- Non-Compliance is deemed to occur if any measured disturbance exceeds the disturbance limit



Test Equipment Utilized

Description	Manufacturer	Model #	CT Asset #	Last Cal Date	Cal Due Date
Horn Antenna	ARA	DRG-118/A	i00271	6/16/18	6/16/20
Horn Antenna, Amplified	ARA	MWH-1826/B	i00273	5/22/18	5/22/21
Humidity / Temp Meter	Newport	IBTHX-W-5	i00282	6/29/18	6/29/19
Spectrum Analyzer	Agilent	E4407B	i00331	12/4/19	12/4/20
Bi-Log antenna	Chase	CBL6111C	i00267	3/8/18	3/8/20
EMI Analyzer	Agilent	E7405A	i00379	2/13/18	2/13/19
3 Meter Semi-Anechoic Chamber	Panashield	3 Meter Semi-Anechoic Chamber	i00428	8/15/16	8/15/19
Preamplifier	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