

Test Report

Prepared for: Aerosens Inc.

Model: AX0WXT

Description: Wireless Tag

Serial Number: N/A

FCC ID: 2AYXGWTINP

To

FCC Part 15.247 DTS

Date of Issue: September 27, 2023

On the behalf of the applicant:

Aerosens Inc.
7120 SW 47th st
Miami, FL 33155

Attention of:

Maria Esther Martinez, CEO
Ph: 305 987 0102
E-mail: maria@aerosens.com

Prepared By
Compliance Testing, LLC
1724 S. Nevada Way
Mesa, AZ 85204
(480) 926-3100 phone / (480) 926-3598 fax
www.compliancetesting.com
Project No: p2390009

Test Result : PASS



John Michalowicz
Project Test Engineer

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All results contained herein relate only to the sample tested.

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	The EUT does not have a conducted port
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	The EUT does not connect to the AC mains
RSS-Gen §7	Receiver Spurious Emission Limits	Pass	

Statements of conformity are reported as:

- Pass - the measured value is below the acceptance limit, *acceptance limit = test limit*.
- Fail - the measured value is above the acceptance limit, *acceptance limit = test limit*.

Test Report Revision History

Revision	Date	Revised By	Reason for Revision
1.0	9/27/2023	John Michalowicz	Original Document

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ANAB

Compliance Testing, LLC, has been accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. 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.



FCC Site Reg. #349717

IC Site Reg. #2044A-2

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)
25.5 – 26.4	32.7 – 29.2	968 - 971

EUT Description

Model: AX0WXT

Description: BLE Wireless Tag

Firmware: V1.0

Software: N/A

Serial Number: N/A

Additional Information: The EUT is a BLE wireless tag used in aircraft and powered by a coin cell battery.

EUT Operation during Tests

Using InPLAY test software, the EUT was placed into a constant transmit mode at it's highest allowed output power.

Accessories:

Qty	Description	Manufacturer	Model	S/N
1	Programming board	InPlay	IN100	N/A

Cables:

Qty	Description	Length (M)	Shielding Y/N	Shielded Hood Y/N	Ferrite Y/N
1	USB	<3m	N	N	N

Modifications: N/A

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

Peak Output Power

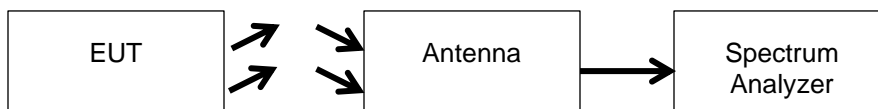
Engineer: John Michalowicz

Test Date: 9/26/23

Test Procedure

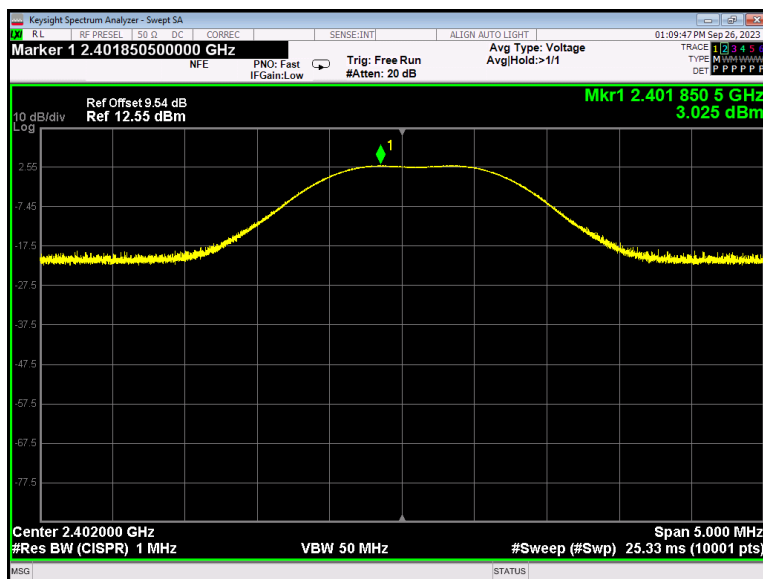
The EUT was tested in a semi-anechoic test chamber set 3m from the receiving antenna. A spectrum analyzer was used to verify that the EUT met the requirements for Radiated Emissions. The EUT was tested by rotating it 360° with the antennas in both the vertical and horizontal orientation and was raised from 1 to 4 meters to ensure the TX signal levels were maximized. The peak readings were taken and the result was then compared to the limit. All 3 axis were investigated and the highest emissions are reported below.

Test Setup

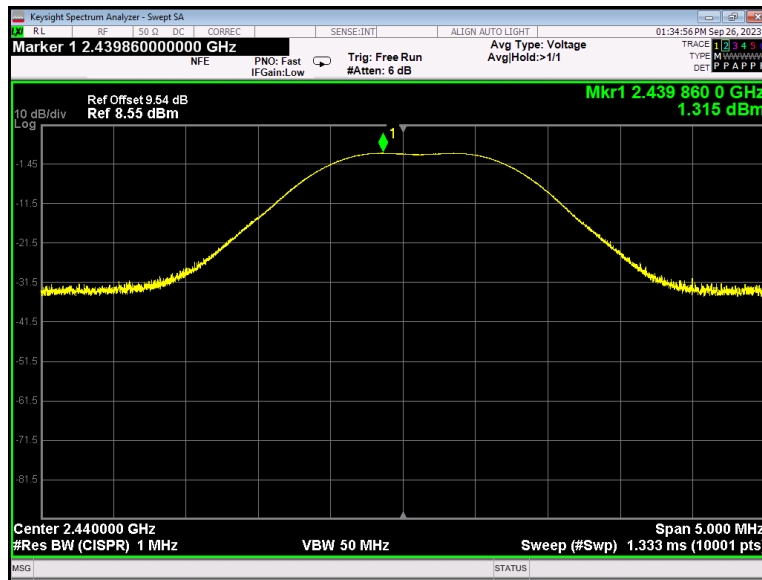


Transmitter Peak Output Power

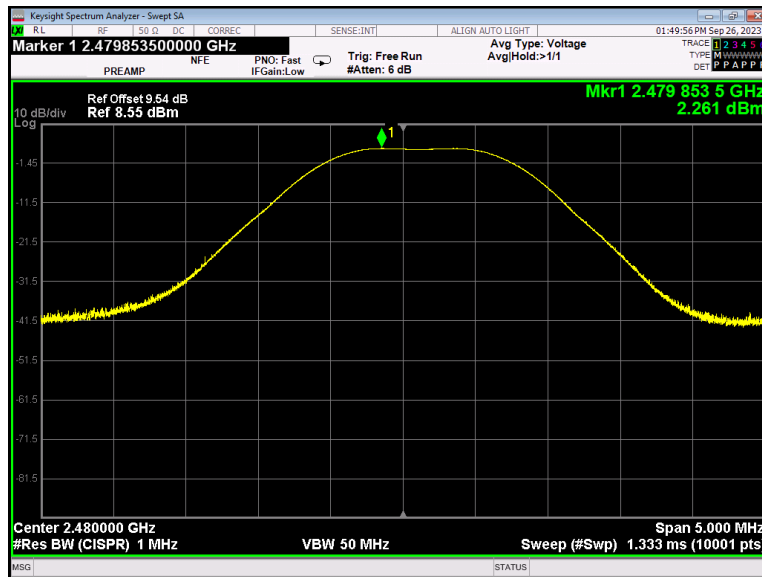
Tuned Frequency (MHz)	Measured Value (dBm)	Specification Limit	Result
2402	3.025	1 W (30 dBm)	Pass
2440	1.315	1 W (30 dBm)	Pass
2480	2.261	1 W (30 dBm)	Pass



Low channel Peak output power



Mid channel Peak output power



High channel Peak output power

Radiated Spurious Emissions

Engineer: John Michalowicz

Test Date: 9/27/23

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.

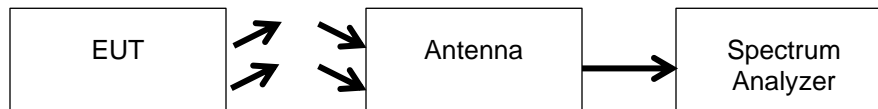
Correction factors were input into the spectrum analyzer before recording "Measured Level".

RBW = 100 KHz

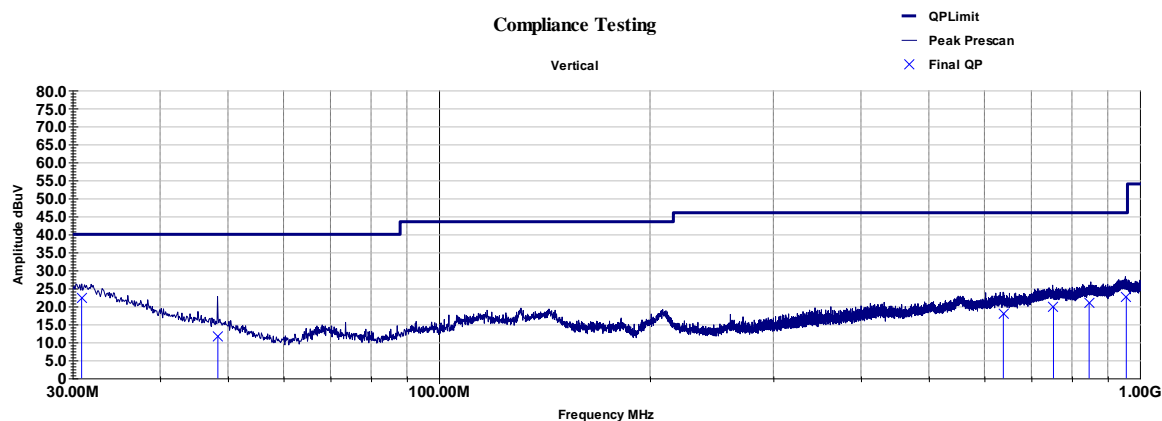
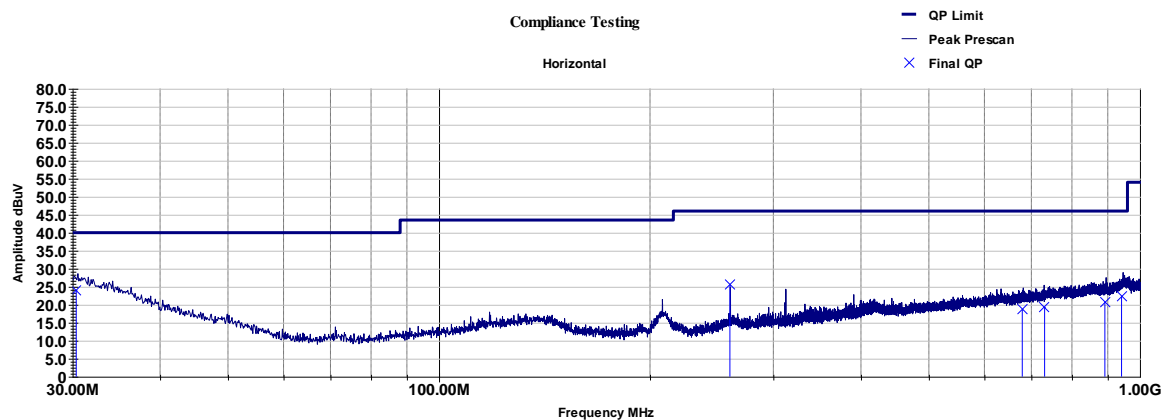
VBW = 300 KHz

Detector – Quasi Peak

Test Setup



Radiated Spurious Emissions Test Data: 30 MHz – 1000 MHz



There are no detectable emissions below 1 GHz

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. Only noise floor was measured above 5 GHz.

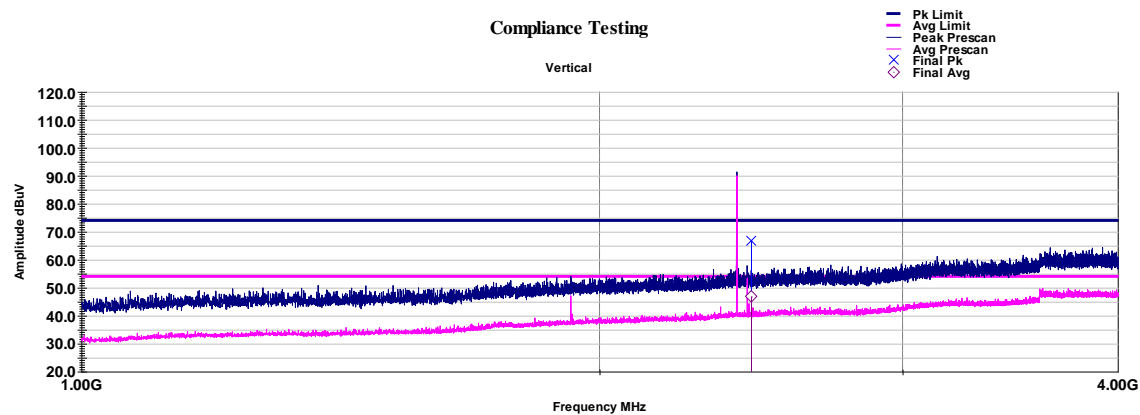
Test Setup



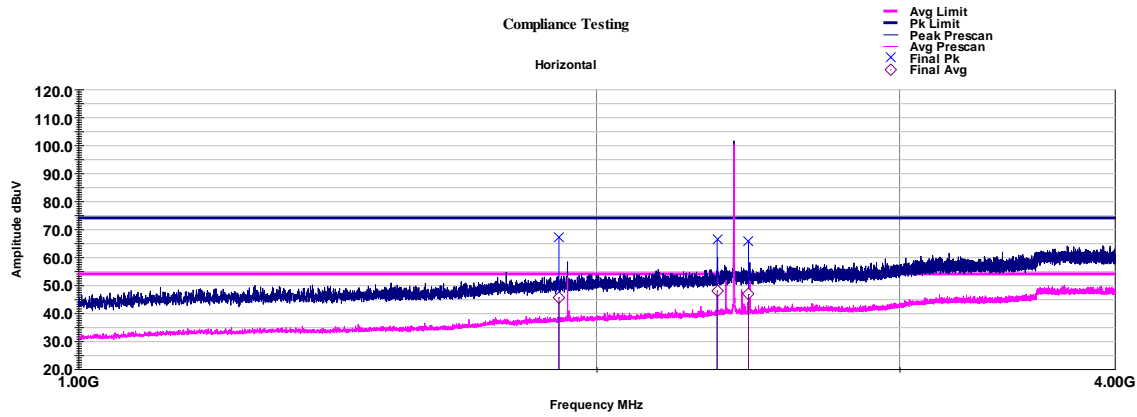
Detector Settings	RBW (MHz)	VBW (MHz)	Span
Peak	1	3	As Necessary
Average	1	3	As Necessary

Radiated Spurious Emissions

No other emissions were detectable. All emissions were more than -20 dBc.

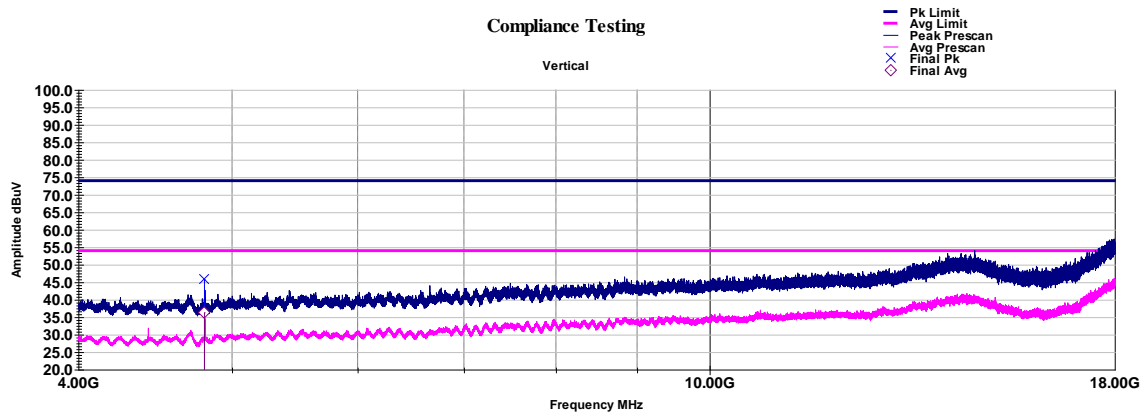


Frequency	Azimuth	Height	Raw Pk	Raw Avg	Correction	Final Pk	Pk Limit	Pk Margin	Final Avg	Avg Limit	Avg Margin
MHz	deg	cm	dBuV	dBuV	dB	dBuV/m	dBuV/m	dB	dBuV/m	dBuV/m	dB
2450.85	70.00	389.00	32.30	12.34	34.45	66.75	74.00	-7.25	46.79	53.98	-7.19
Final = Raw + Path Loss											
Margin = Final - Limit											

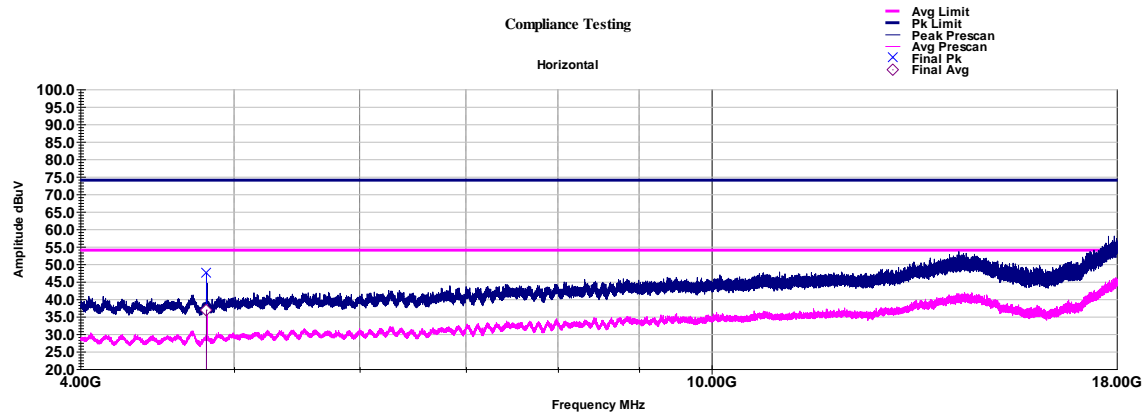


Frequency	Azimuth	Height	Raw Pk	Raw Avg	Correction	Final Pk	Pk Limit	Pk Margin	Final Avg	Avg Limit	Avg Margin
MHz	deg	cm	dBuV	dBuV	dB	dBuV/m	dBuV/m	dB	dBuV/m	dBuV/m	dB
1901.895	141.00	347.00	34.58	13.05	32.63	67.21	74.00	-6.79	45.68	53.98	-8.30
2350.292	133.00	105.00	32.35	14.21	33.88	66.23	74.00	-7.77	48.09	53.98	-5.90
2451.02	325.00	159.00	31.40	12.35	34.45	65.85	74.00	-8.15	46.80	53.98	-7.18
Final = Raw + Path Loss											
Margin = Final - Limit											

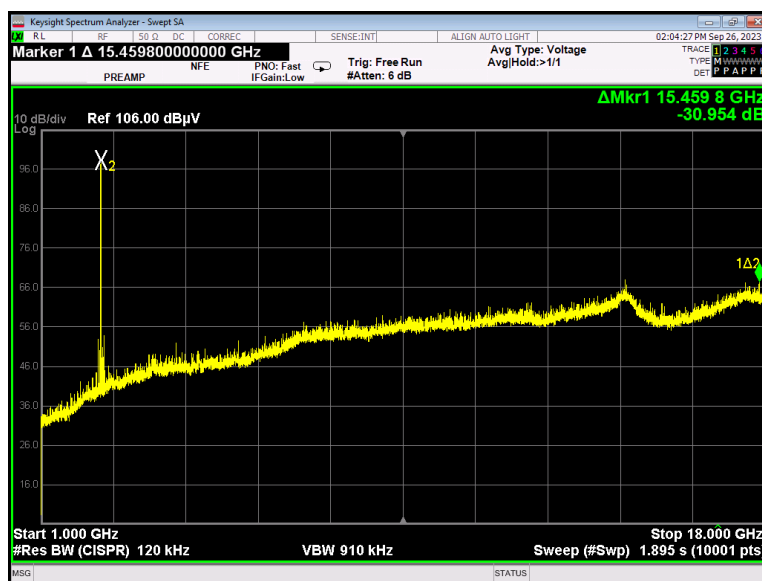
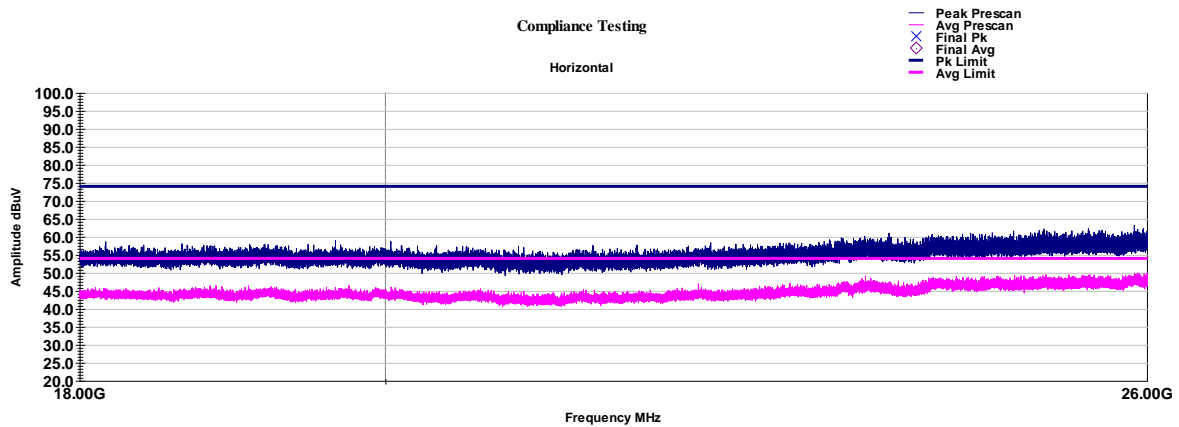
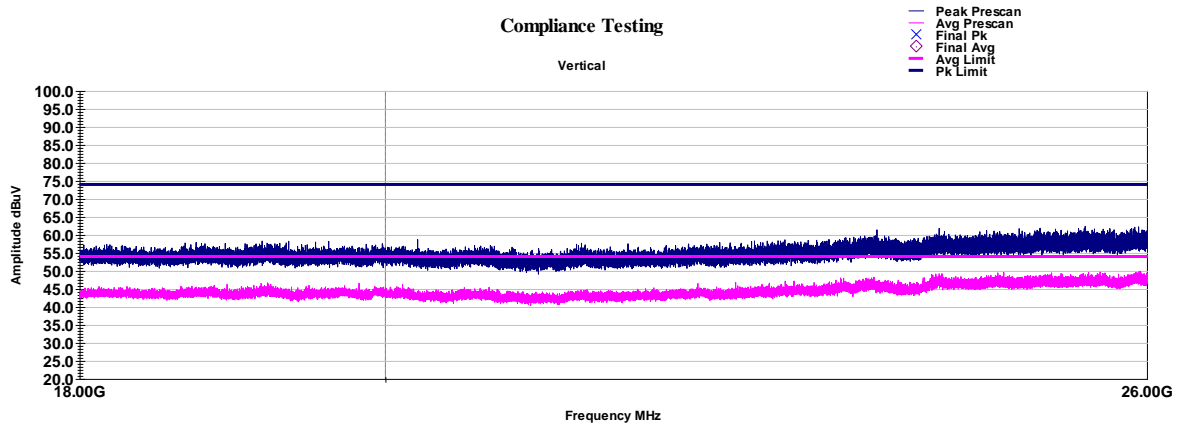
Low Ch_4 - 18 GHz



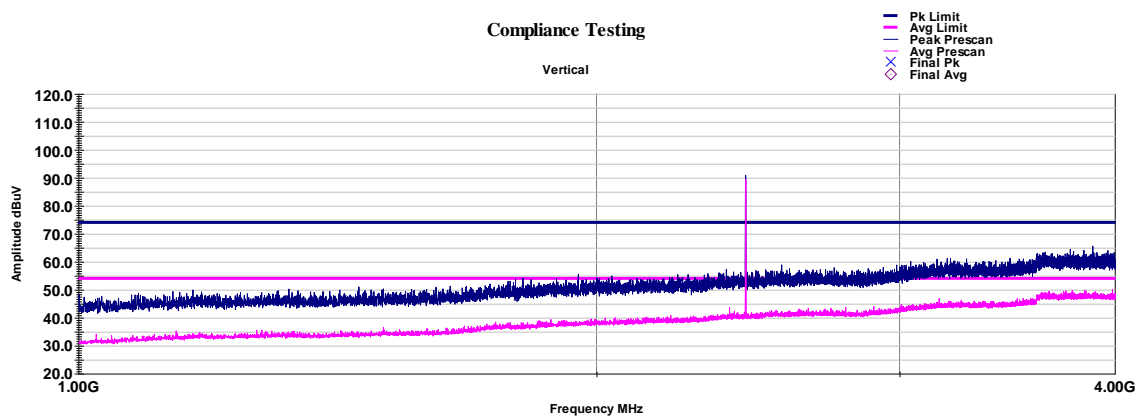
Frequency	Azimuth	Height	Raw Pk	Raw Avg	Correction	Final Pk	Pk Limit	Pk Margin	Final Avg	Avg Limit	Avg Margin
MHz	deg	cm	dBuV	dBuV	dB	dBuV/m	dBuV/m	dB	dBuV/m	dBuV/m	dB
4803.636	189.00	311.00	51.93	42.45	-5.61	45.81	74.00	-28.19	36.33	53.98	-17.65
Final = Raw + Path Loss											
Margin = Final - Limit											

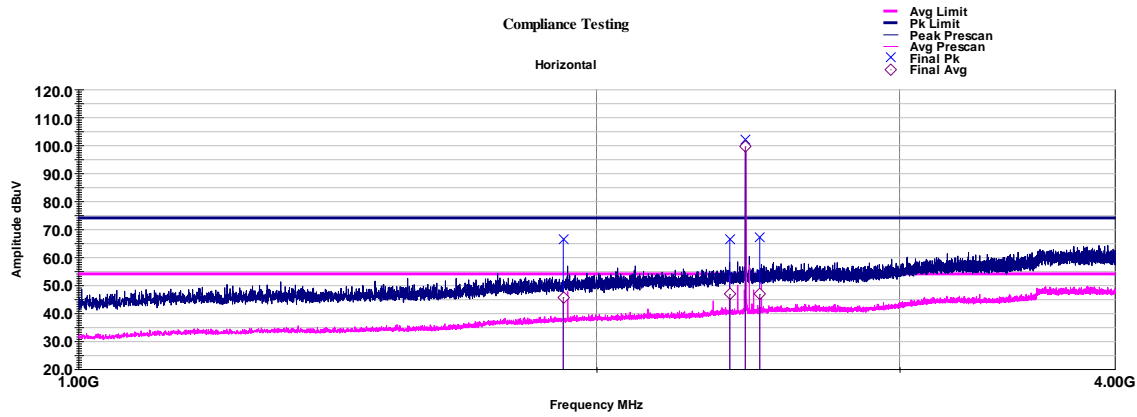


Frequency	Azimuth	Height	Raw Pk	Raw Avg	Correction	Final Pk	Pk Limit	Pk Margin	Final Avg	Avg Limit	Avg Margin
MHz	deg	cm	dBuV	dBuV	dB	dBuV/m	dBuV/m	dB	dBuV/m	dBuV/m	dB
4803.659	339.00	229.00	53.63	43.08	-5.61	47.51	74.00	-26.49	36.96	53.98	-17.02
Final = Raw + Path Loss											
Margin = Final - Limit											



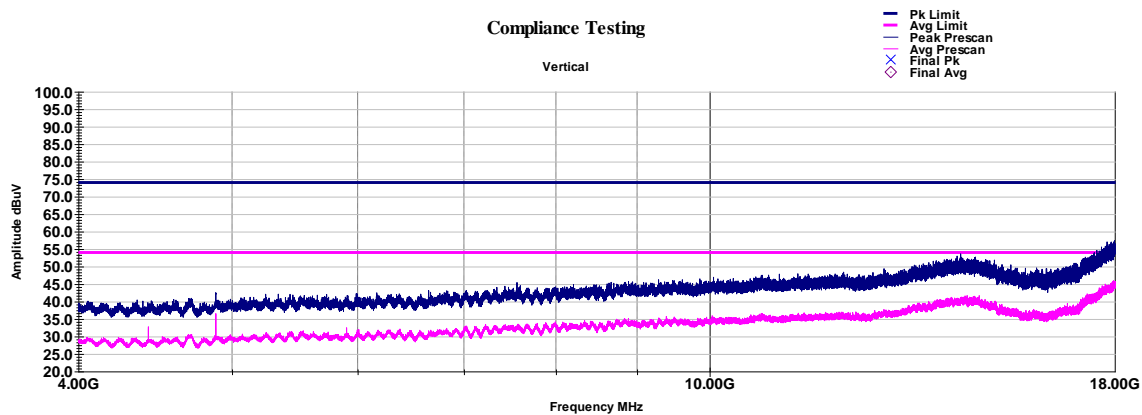
15.247(d)

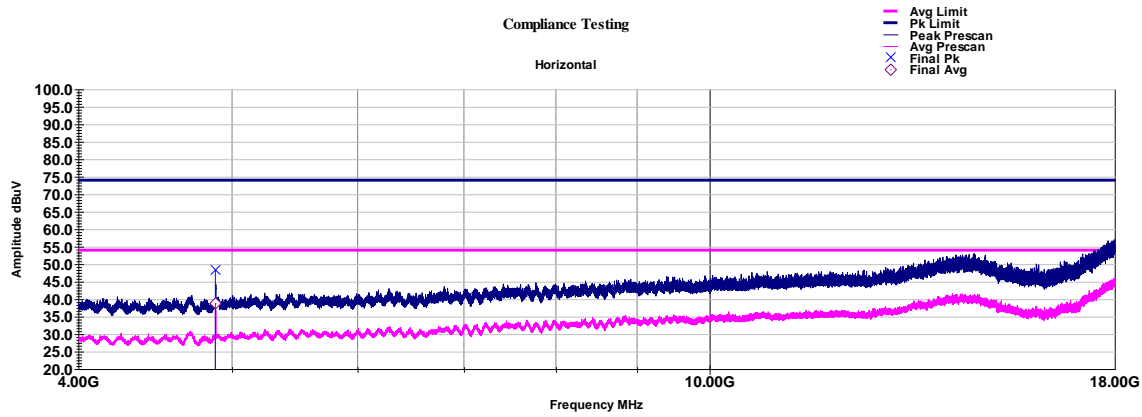




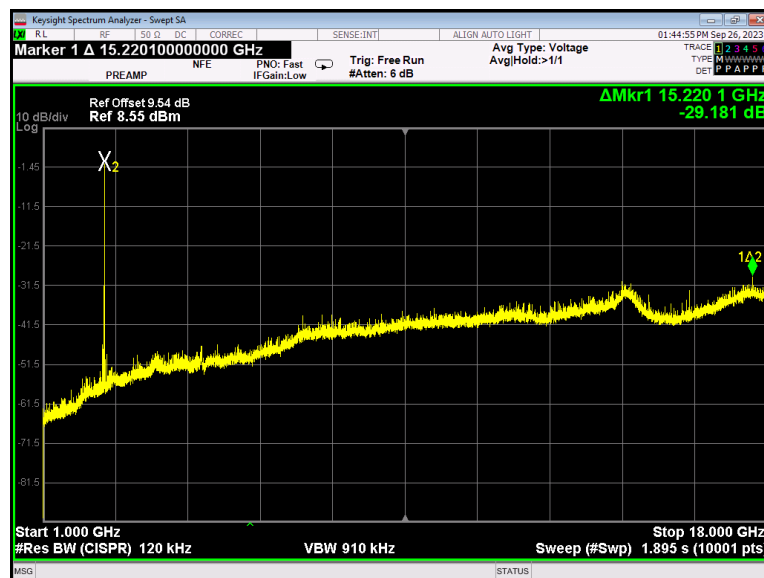
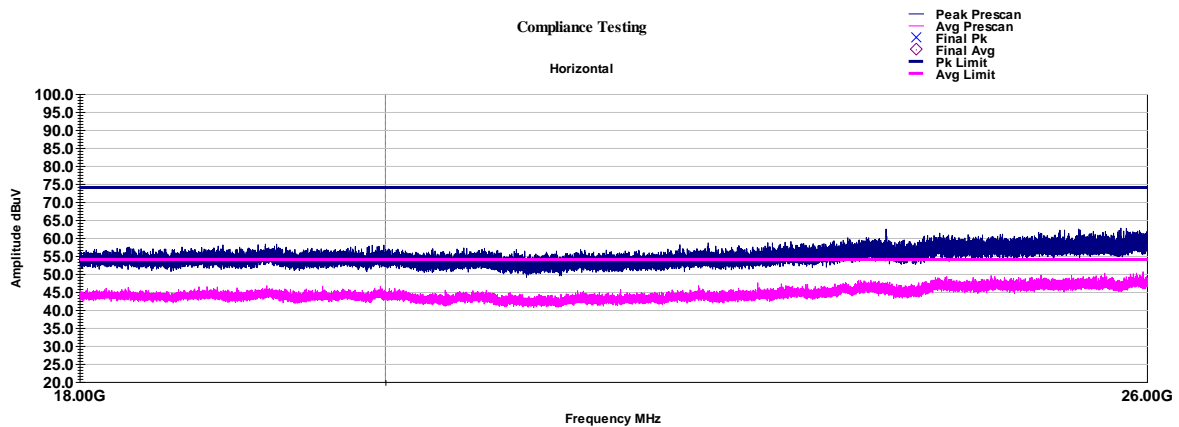
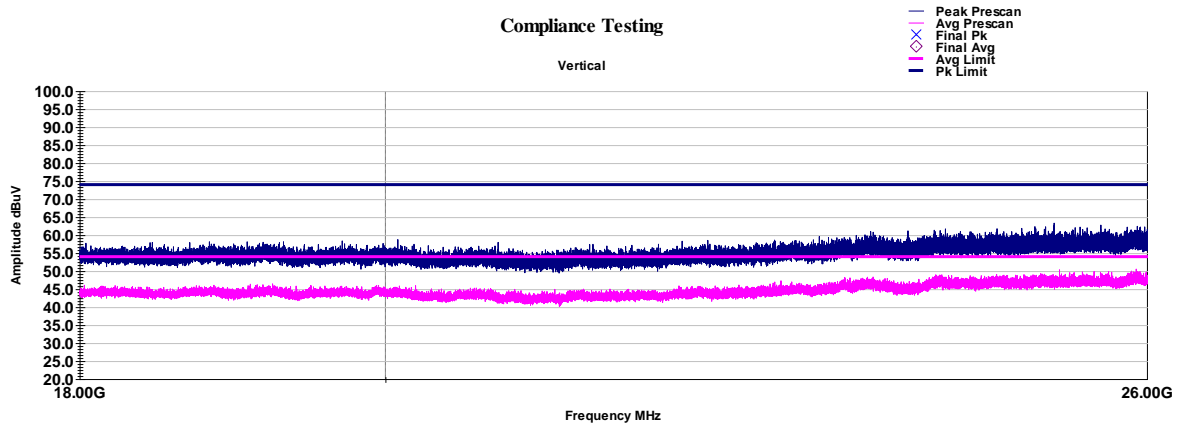
Frequency	Azimuth	Height	Raw Pk	Raw Avg	Correction	Final Pk	Pk Limit	Pk Margin	Final Avg	Avg Limit	Avg Margin
MHz	deg	cm	dBuV	dBuV	dB	dBuV/m	dBuV/m	dB	dBuV/m	dBuV/m	dB
1912.925	197.00	360.00	33.71	13.09	32.57	66.28	74.00	-7.72	45.66	53.98	-8.32
2390.415	351.00	356.00	32.05	12.42	34.30	66.34	74.00	-7.66	46.72	53.98	-7.26
2440.363	121.00	105.00	NA	NA	NA	NA	NA	NA	NA	NA	NA
2487.992	349.00	100.00	32.63	12.32	34.45	67.08	74.00	-6.92	46.77	53.98	-7.21
Final = Raw + Path Loss											
Margin = Final - Limit											

Mid CH_4-18 GHz



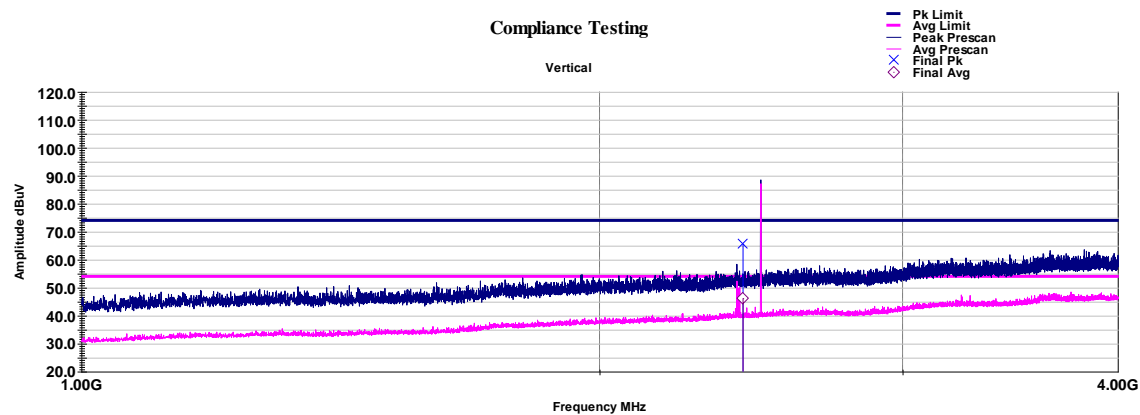


Frequency	Azimuth	Height	Raw Pk	Raw Avg	Correction	Final Pk	Pk Limit	Pk Margin	Final Avg	Avg Limit	Avg Margin
MHz	deg	cm	dBuV	dBuV	dB	dBuV/m	dBuV/m	dB	dBuV/m	dBuV/m	dB
4880.712	134.00	214.00	54.05	44.62	-5.27	48.28	74.00	-25.72	38.85	53.98	-15.13
Final = Raw + Path Loss											
Margin = Final - Limit											

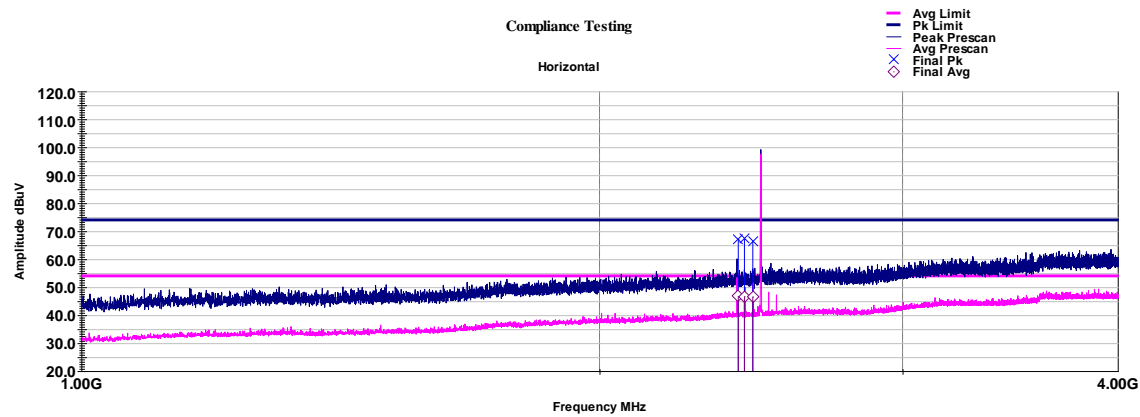


15.247(d)

High CH_1 - 4 GHz

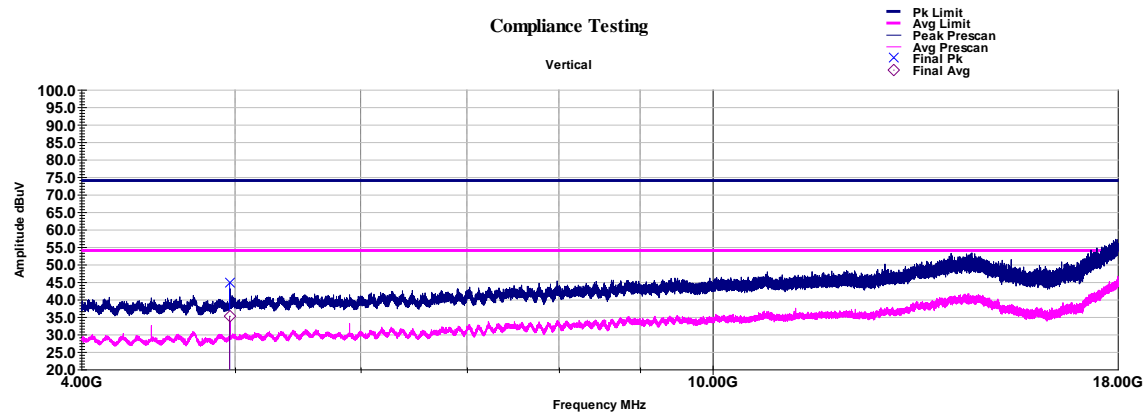


Frequency	Azimuth	Height	Raw Pk	Raw Avg	Correction	Final Pk	Pk Limit	Pk Margin	Final Avg	Avg Limit	Avg Margin
MHz	deg	cm	dBuV	dBuV	dB	dBuV/m	dBuV/m	dB	dBuV/m	dBuV/m	dB
2423.387	139.00	325.00	31.19	11.79	34.41	65.60	74.00	-8.40	46.21	53.98	-7.78
Final = Raw + Path Loss											
Margin = Final - Limit											

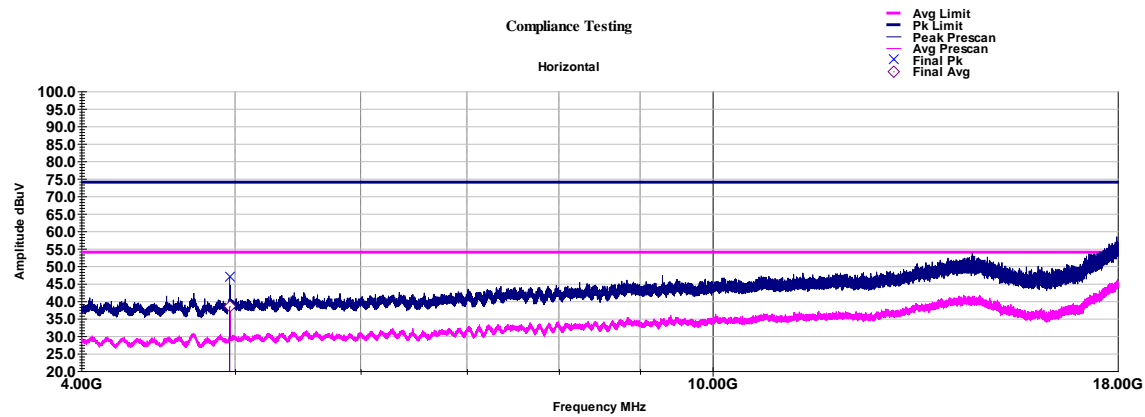


Frequency	Azimuth	Height	Raw Pk	Raw Avg	Correction	Final Pk	Pk Limit	Pk Margin	Final Avg	Avg Limit	Avg Margin
MHz	deg	cm	dBuV	dBuV	dB	dBuV/m	dBuV/m	dB	dBuV/m	dBuV/m	dB
2407.785	197.00	400.00	32.75	12.33	34.43	67.18	74.00	-6.82	46.75	53.98	-7.23
2428.062	139.00	140.00	32.84	12.28	34.39	67.23	74.00	-6.77	46.67	53.98	-7.31
2455.245	139.00	144.00	31.88	12.13	34.46	66.34	74.00	-7.66	46.59	53.98	-7.39
Final = Raw + Path Loss											
Margin = Final - Limit											

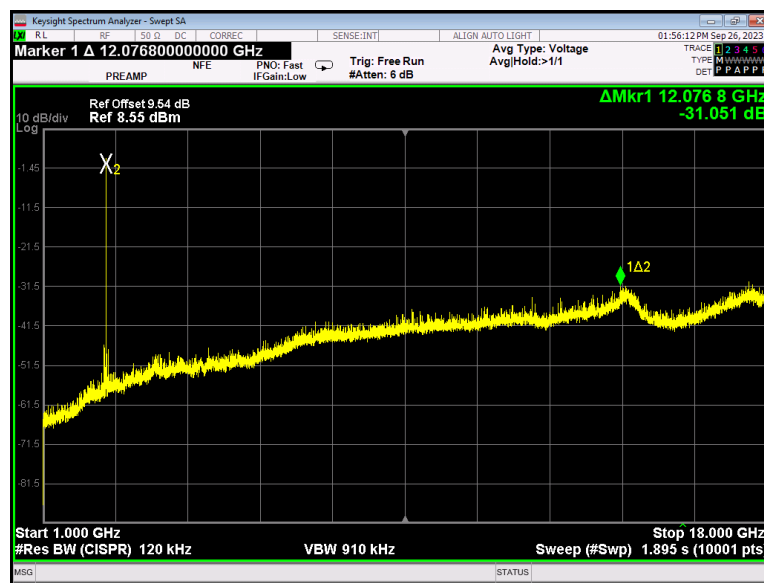
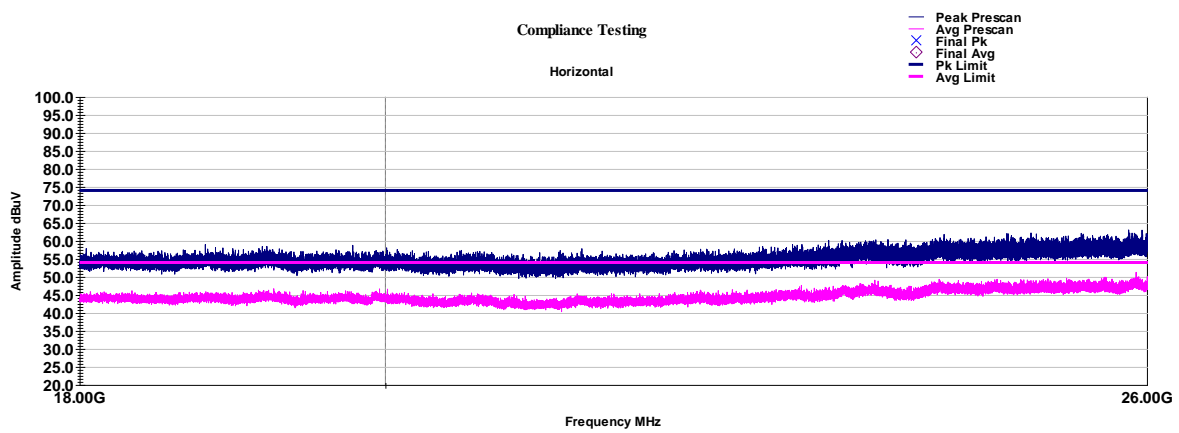
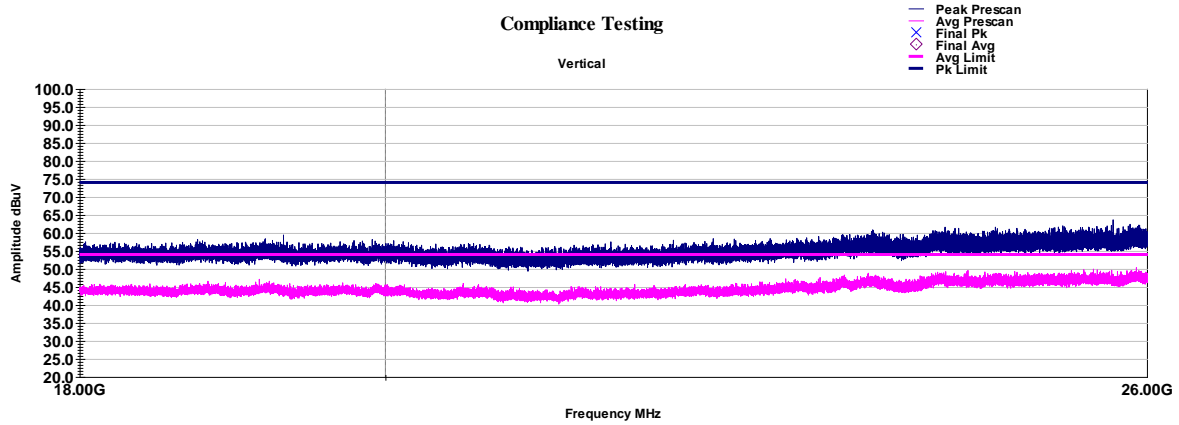
High CH_4 - 18 GHz



Frequency	Azimuth	Height	Raw Pk	Raw Avg	Correction	Final Pk	Pk Limit	Pk Margin	Final Avg	Avg Limit	Avg Margin
MHz	deg	cm	dBuV	dBuV	dB	dBuV/m	dBuV/m	dB	dBuV/m	dBuV/m	dB
4960.809	356.00	100.00	50.41	40.86	-5.05	44.83	74.00	-29.17	35.28	53.98	-18.70
Final = Raw + Path Loss											
Margin = Final - Limit											



Frequency	Azimuth	Height	Raw Pk	Raw Avg	Correction	Final Pk	Pk Limit	Pk Margin	Final Avg	Avg Limit	Avg Margin
MHz	deg	cm	dBuV	dBuV	dB	dBuV/m	dBuV/m	dB	dBuV/m	dBuV/m	dB
4960.666	165.00	124.00	52.50	44.05	-5.05	46.92	74.00	-27.08	38.47	53.98	-15.51
Final = Raw + Path Loss											
Margin = Final - Limit											



15.247(d)

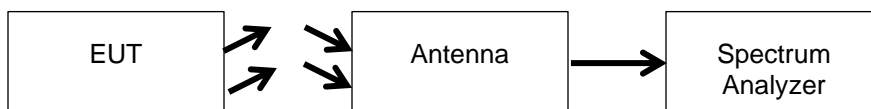
Emissions at Band Edges

Engineer: John Michalowicz

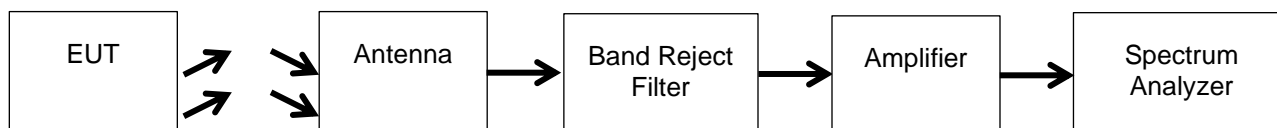
Test Date: 9/26/23

Test Procedure

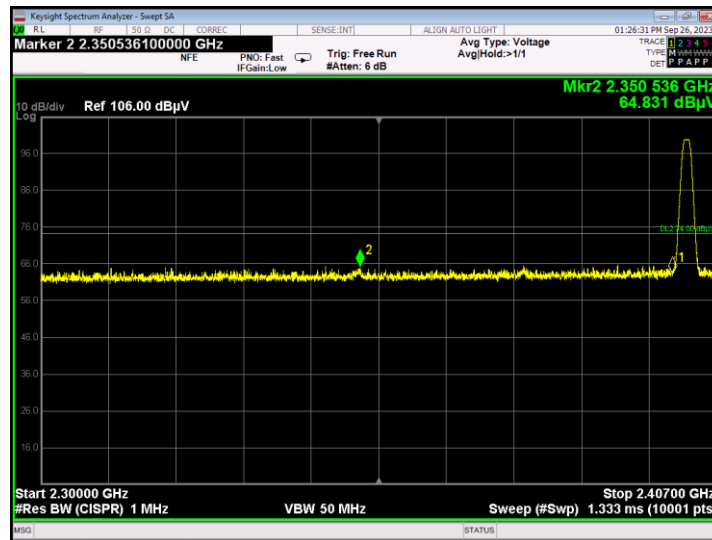
The EUT was tested in a semi-anechoic chamber set 3m from the receiving antenna. A spectrum analyzer was used to verify that the EUT met the requirements for band edge and restricted band for both peak and average measurements. The cable and antenna correction factors were input into the analyzer as 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**Band Edge Emissions Summary**

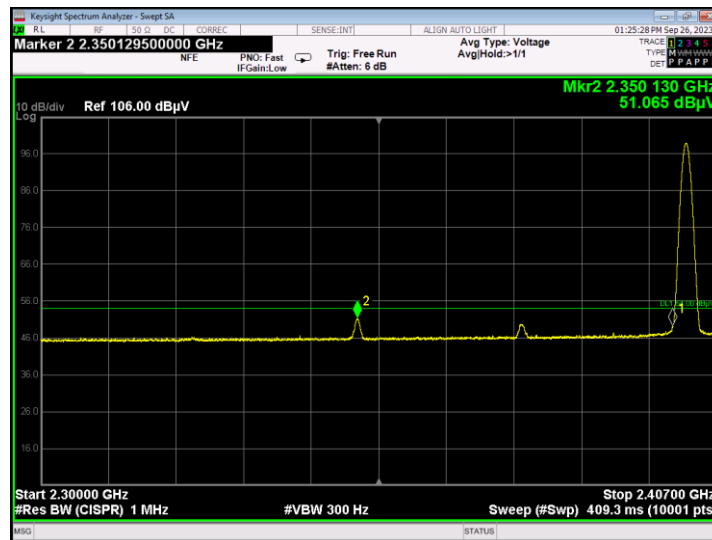
Tuned Frequency (MHz)	Emission Frequency (MHz)	Measured Value (dBc)	Detector	Limit (dBc)	Result
2402	2400	44.26	Peak	-20 dBc	Pass
2480	2483.5	54.97	Peak	-20dBc	Pass

Restricted Band Test Setup**Restricted Band Emissions Summary**

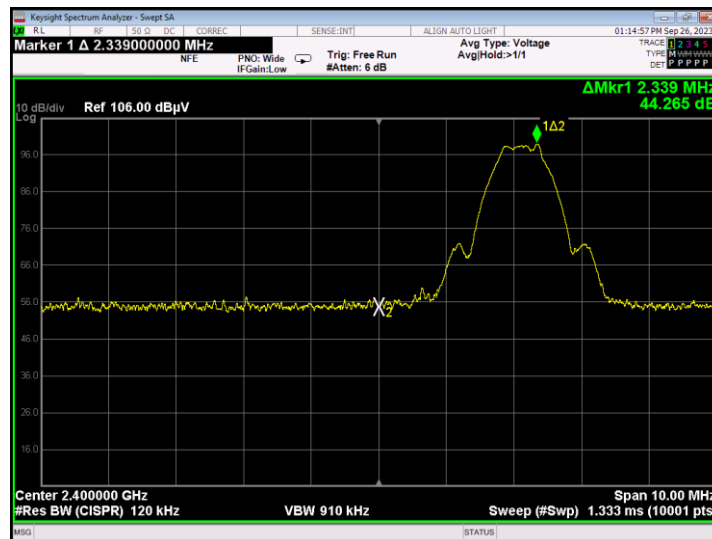
Restricted Band (MHz)	Tuned Frequency (MHz)	Emission Frequency (MHz)	Measured Value (dBuV/m)	Detector	Limit (dBuV/m)	Result
2300 – 2390	2402	2350	64.83	Peak	74	Pass
2300 – 2390	2402	2350	51.06	Average	54	Pass
2483.5 - 2500	2480	2506	56.23	Peak	74	Pass
2483.5 - 2500	2480	2506	49.96	Average	54	Pass



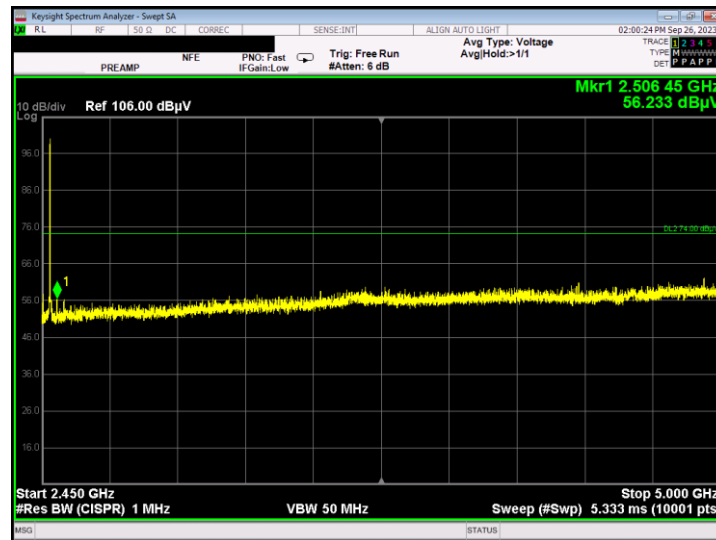
Low Channel Restricted Band Edge - Peak



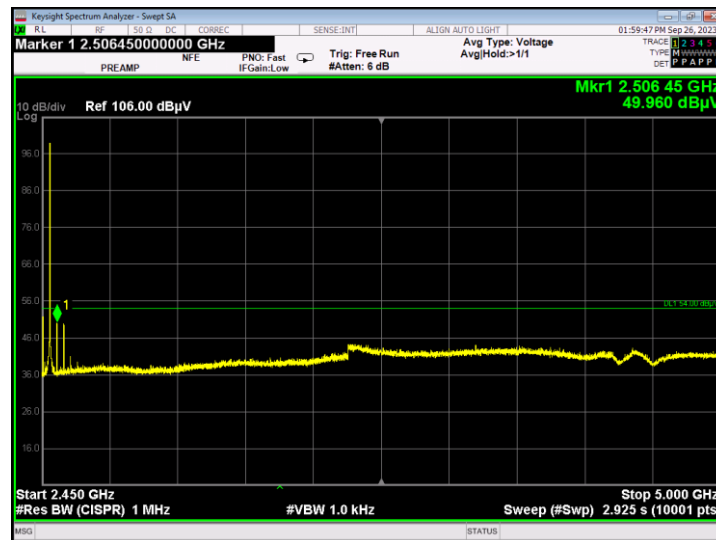
Low Channel Restricted Band Edge - AVG



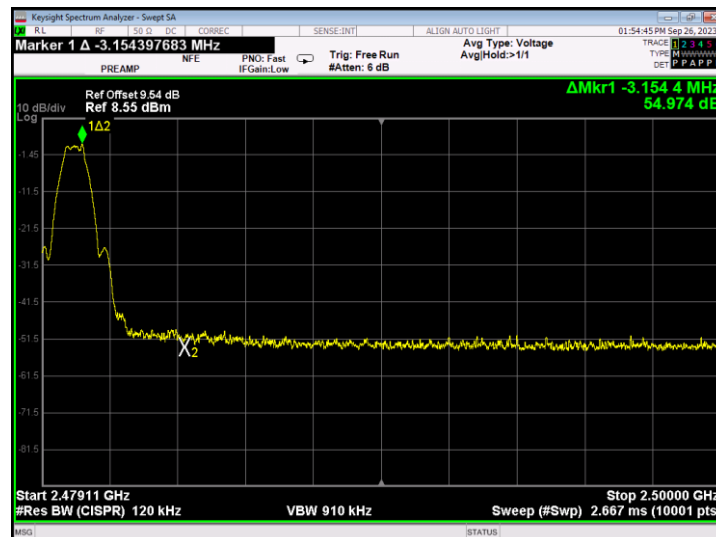
Low Channel 15.247(d) Band Edge



High Channel Restricted Band Edge - Peak



High Channel Restricted Band Edge - AVG



High Channel 15.247(d) Band Edge

Occupied Bandwidth

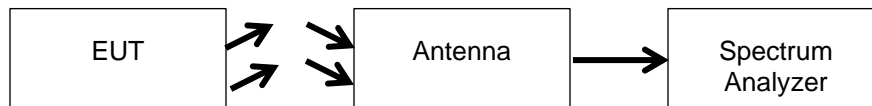
Engineer: John Michalowicz

Test Date: 9/26/23

Test Procedure

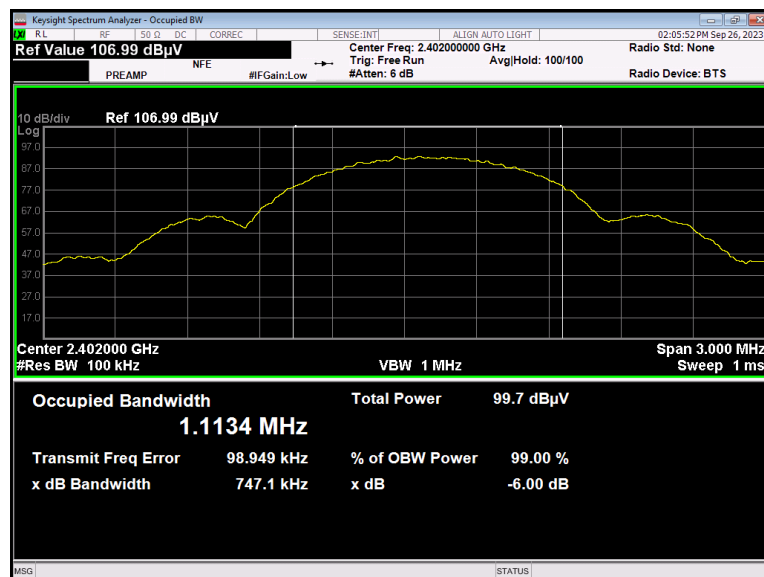
The EUT was connected directly to a spectrum analyzer. The Span was set wide enough to capture the entire transmit spectrum and the resolution bandwidth was set to at least 1% of the span. The analyzer was set to max hold and when the entire spectrum was captured the 6dB and 99% bandwidths were measured to verify the bandwidth met the specification.

Test Setup

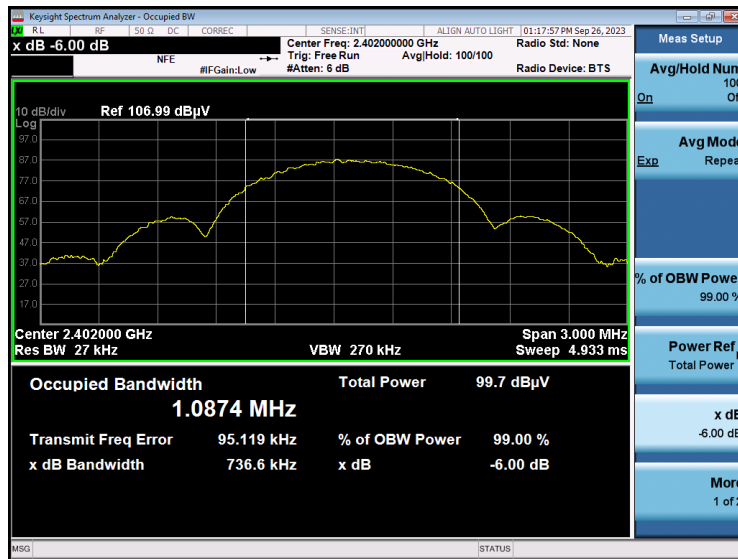


6 dB Occupied Bandwidth Summary

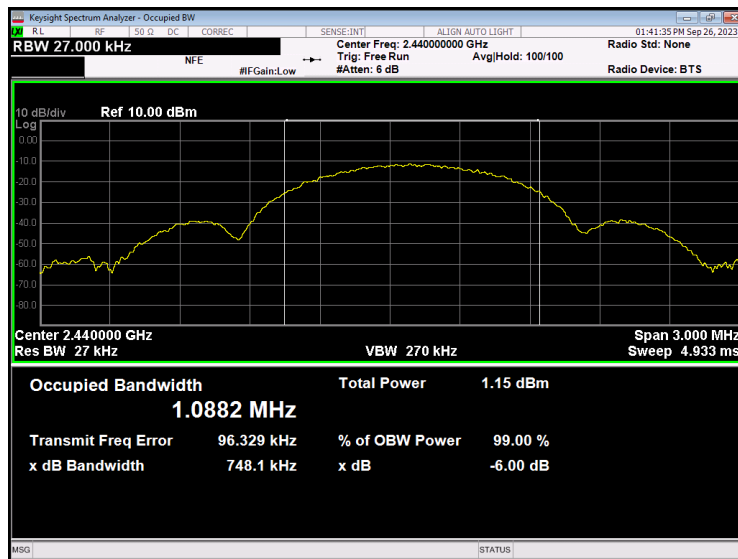
Frequency (MHz)	99% Bandwidth (MHz)	DTS Bandwidth (MHz)	Specification Limit (kHz)	Result
2402	1.087	0.747	≥ 500	Pass
2440	1.088	0.759	≥ 500	Pass
2480	1.078	0.717	≥ 500	Pass



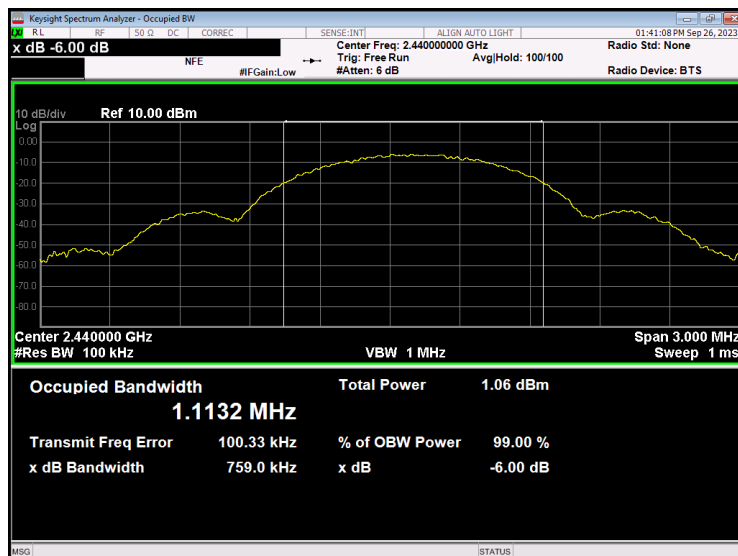
Low Channel DTS Bandwidth



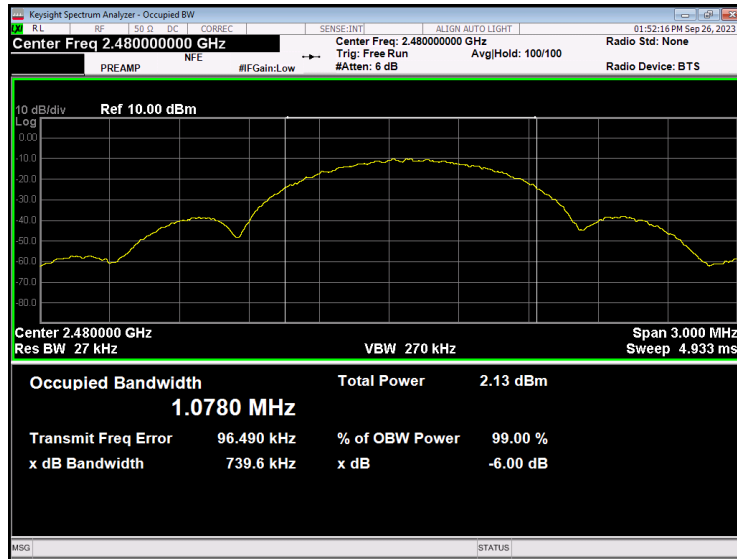
Low Channel 99% Bandwidth



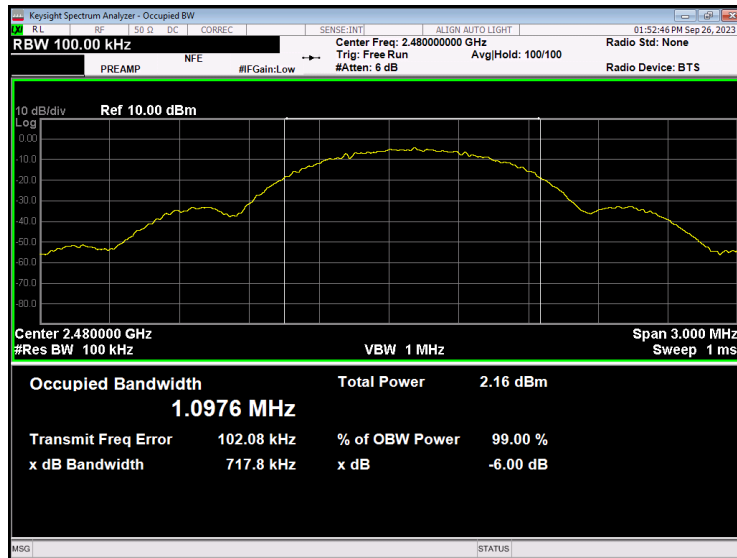
Mid Channel 99% Bandwidth



Mid Channel DTS Bandwidth



High Channel 99% Bandwidth



High Channel DTS Bandwidth

Transmitter Power Spectral Density (PSD)

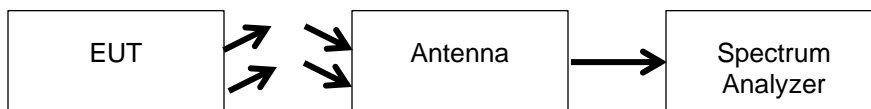
Engineer: John Michalowicz

Test Date: 9/25/23

Test Procedure

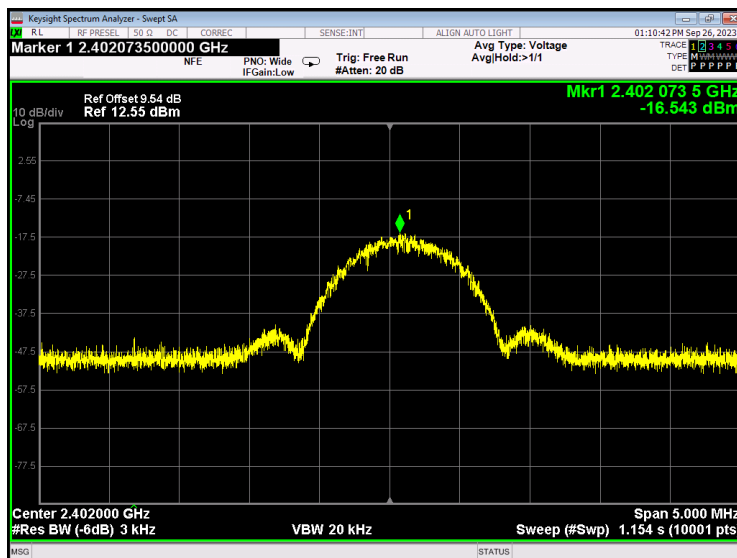
The EUT was connected directly to a spectrum analyzer. The test was performed per section 11.10 of C63.10:2013 "Procedure for determining PSD for DTS devices".

Test Setup

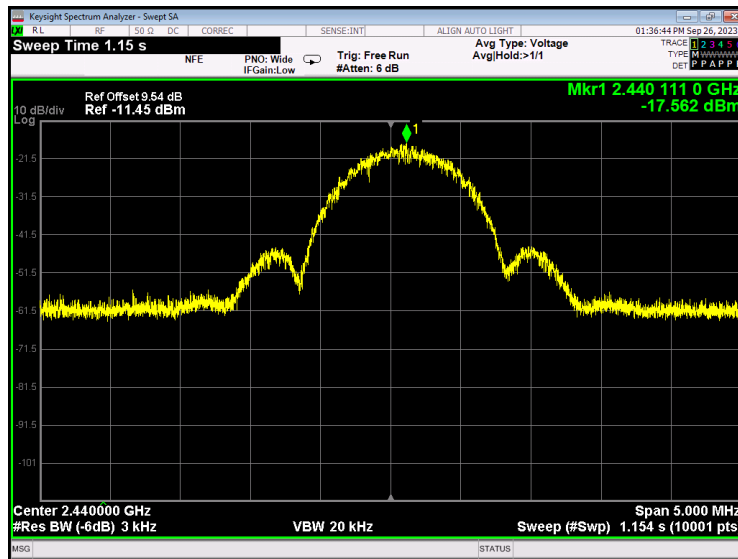


PSD Summary

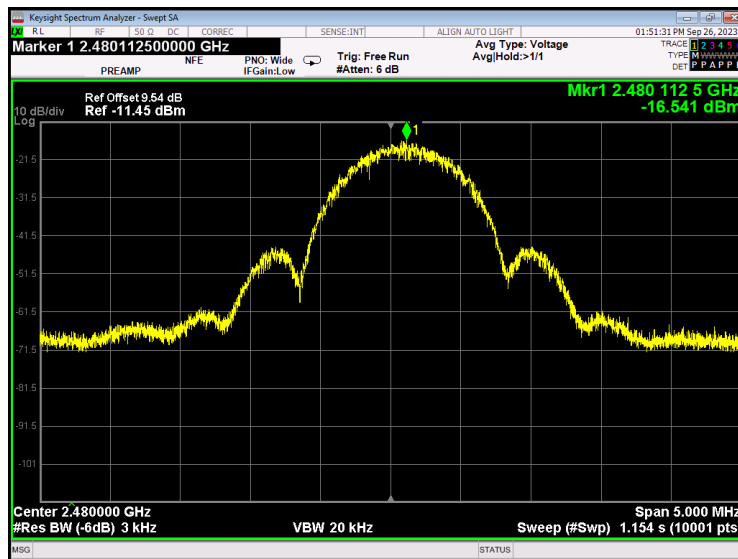
Frequency (MHz)	Measured Data (dBm)	Specification Limit (dBm)	Result
2402	-16.54	8	Pass
2440	-17.56	8	Pass
2480	-16.54	8	Pass



Low Channel PSD



Mid Channel PSD



High Channel PSD

Receiver Spurious Emissions

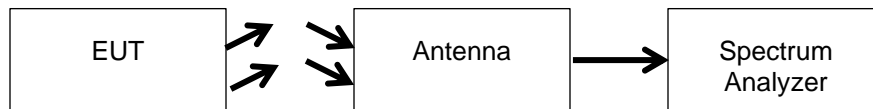
Engineer: John Michalowicz

Test Date: 9/27/23

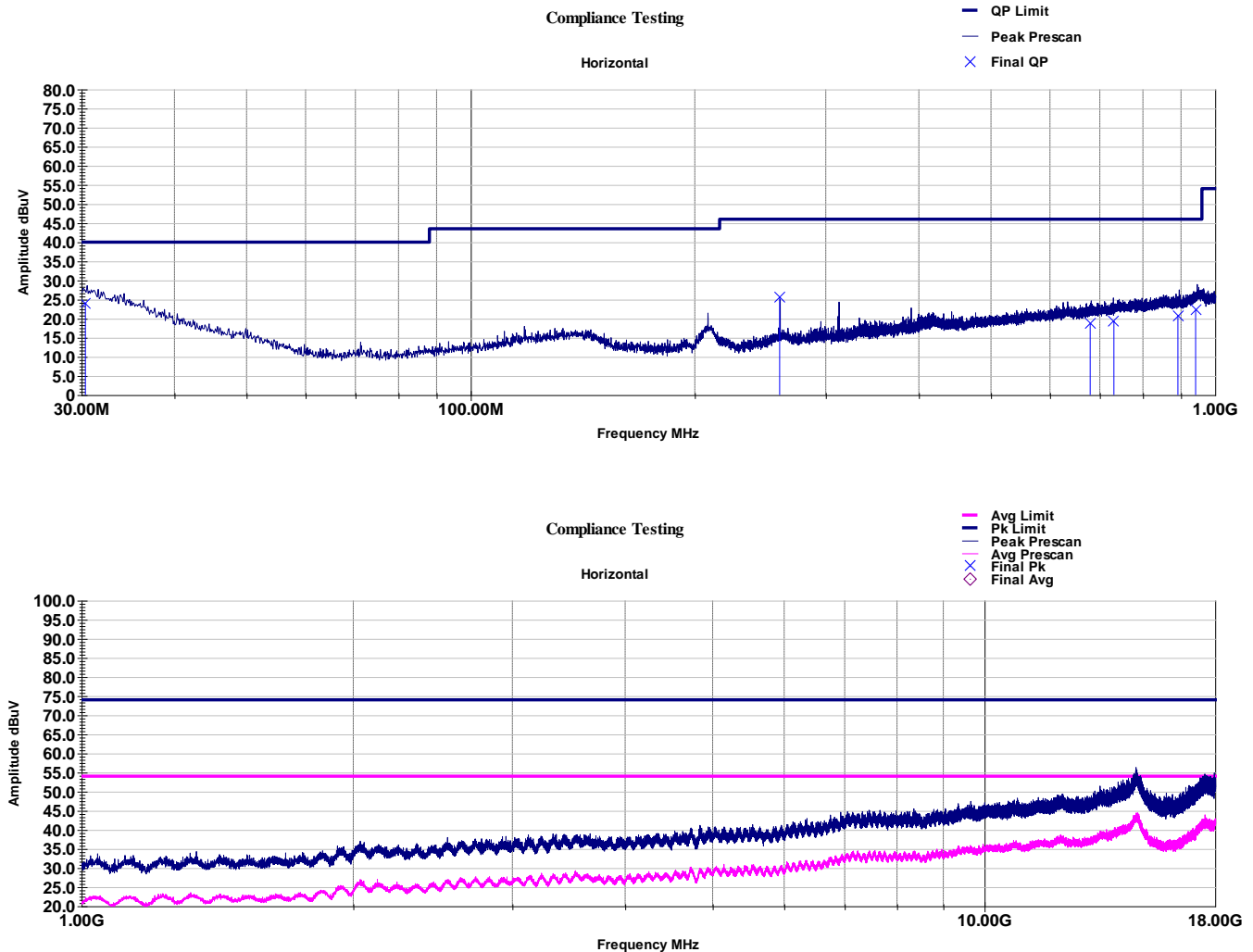
Test Procedure

The EUT was connected directly to a spectrum analyzer. The receiver spurious emissions were measured from 30 MHz to greater than 3 times the highest tunable frequency. There were no detectable emissions over the noise floor

Test Setup



Receiver Spurious Emissions Summary



Test Equipment Utilized

Description	Manufacturer	Model #	CT Asset #	Last Cal Date	Cal Due Date
Horn Antenna	EMCO	3116	i00085	3/14/23	3/13/25
Horn Antenna	ARA	DRG-118/A	i00271	08/11/22	08/10/24
Bilog antenna	Teseq	CBL 6111C	i00349	2/07/23	2/06/25
EMI Receiver	Keysight	N9038A	i00552	02/23/23	02/23/24
Preamplifier (0.01-50GHz)	Eravant	SBB-0115034018-2F2F-E3	i00650	N/A	N/A
Temp./humidity/pressure monitor (CI station)	Omega Engineering	iBTHX-W-5	i00686	1/5/23	1/5/24
Tile7	ETS-Lindgren	7.7.1.5	i00548	n/a	

Measurement Uncertainty

Measurement Uncertainty (U_{lab}) for Compliance Testing is listed in the table below.

Measurement	U_{lab}
Radio Frequency	$\pm 3.3 \times 10^{-8}$
RF Power, conducted	± 1.5 dB
RF Power Density, conducted	± 1.0 dB
Conducted Emissions	± 1.8 dB
Radiated Emissions 30Mhz-1000MHz	± 4.25 dB
Radiated Emissions – 1GHz-18GHz	± 4.5 dB
Temperature	± 1.5 deg C
Humidity	± 4.3 %
DC voltage	± 0.20 VDC
AC Voltage	± 1.2 VAC

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_{ETSI} 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

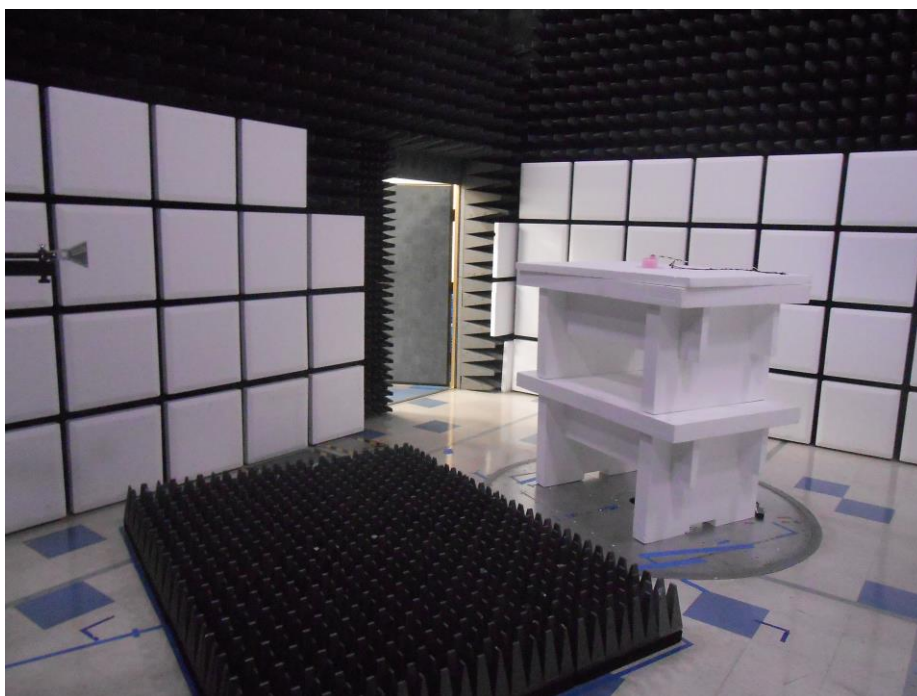
In addition to the above listed equipment standard RF connectors and cables were utilized in the testing of the described equipment. Prior to testing these components were tested to verify proper operation.



Radiated Emissions 30 – 1000 MHz



Radiated Emissions 1 – 18 GHz



Radiated Emissions 18 – 26 GHz

END OF TEST REPORT