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04/02/2026

SEWIO Networks s.r.o (part of HID Global Corporation)
Purkynova 7/99
Brno 612 00

Dear Petr Batchuluun Prachar,

Enclosed is the EMC Wireless test report for compliance testing of the SEWIO Networks s.r.o (part of HID Global Corporation) Zevon Omni, Zevon Direct as tested to the requirements of FCC Part 15.517 and RSS-220 Issue 1 + A1 for Intentional Radiators. This test report pertains specifically to the Ultra-Wideband radio onboard.

Thank you for using the services of Eurofins MET Labs. If you have any questions regarding these results or if MET can be of further service to you, please feel free to contact me.

Sincerely yours,
EUROFINS MET LABS

Nancy LaBrecque
Documentation Department

Reference: WIRA-139650-FCC-ISED-UWB-Rev 1

A2LA ACCREDITED TESTING CERT #0591.06

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Eurofins MET Laboratories Inc. (Eurofins E&E North America) is part of the Eurofins Electrical & Electronics (E&E) global compliance network.

Ultra-Wideband
Test Report

for the

SEWIO Networks s.r.o (part of HID Global Corporation)
Zevon Omni, Zevon Direct

Tested under
FCC Part 15.517 and RSS-220 Issue 1 + A1
For Indoor Ultra-Wideband Devices

Bryan Taylor, Wireless Team Lead
Electromagnetic Compatibility Lab

Nancy LaBrecque
Documentation Department

Engineering Statement: The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC Rules Part 15.517 under normal use and maintenance.

Matthew Hinojosa
EMC Manager, Austin Electromagnetic Compatibility Lab

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Report Status Sheet

Revision	Report Date	Reason for Revision
∅	03/04/2026	Initial Issue.
1	04/02/2026	TCB Reviewer Comments

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List of Terms and Abbreviations

AC	**A**lternating **C**urrent
ACF	**A**ntenna **C**orrection **F**actor
Cal	**Cal**ibration
d	**M**easurement **D**istance
dB	**D**eci**b**els
dBµA	**D**eci**b**els above one **micro**amp
dBµV	**D**eci**b**els above one **micro**volt
dBµA/m	**D**eci**b**els above one **micro**amp **per m**eter
dBµV/m	**D**eci**b**els above one **micro**volt **per m**eter
DC	**D**irect **C**urrent
E	**E**lectric Field
DSL	**D**igital **S**ubscriber **L**ine
ESD	**E**lectro**s**tatic **D**ischarge
EUT	**E**quipment **U**nder **T**est
f	**F**requency
FCC	**F**ederal **C**ommunications **C**ommission
GRP	**G**round **R**eference **P**lane
H	Magnetic Field
HCP	**H**orizontal **C**oupling **P**lane
Hz	**H**ertz
IEC	**I**nternational **E**lectrotechnical **C**ommission
kHz	**k**ilo**h**ertz
kPa	**k**ilo**pa**scal
kV	**k**ilovolt
LISN	**L**ine **I**mpedance **S**tabilization **N**etwork
MHz	**M**ega**h**ertz
µH	**micro**henry
µ	**micro**farad
µs	**micros**econds
NEBS	**N**etwork **E**quipment-**B**uilding **S**ystem
PRF	**P**ulse **R**epetition **F**requency
RF	**R**adio **F**requency
RMS	**R**oot-**M**ean-**S**quare
TWT	**T**raveling **W**ave **T**ube
V/m	**V**olts **per m**eter
VCP	**V**ertical **C**oupling **P**lane

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I. Executive Summary

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A. Purpose of Test

An EMC evaluation was performed to determine compliance of the Zevon Omni, Zevon Direct, with the requirements of FCC Part 15.517 and RSS-220 Issue 1 + A1. SEWIO Networks s.r.o (part of HID Global Corporation) should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the Zevon Omni, Zevon Direct, has been **permanently** discontinued.

B. Executive Summary

The following tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 15.517 and RSS-220 Issue 1 + A1, in accordance with SEWIO Networks s.r.o (part of HID Global Corporation) purchase order number PO01126. All tests were conducted using measurement procedures ANSI C63.4-2014 and ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024.

FCC Reference	ISED Reference	Description	Compliance
Title 47 of the CFR, Part 15 §15.203	RSS-220 (5.1.b)	Antenna Requirements	Compliant
Title 47 of the CFR, Part 15 §15.517(b)	RSS-220 (5.1.a)	UWB Bandwidth for Indoor Device	Compliant
Title 47 of the CFR, Part 15 §15.517(c)	RSS-220 (5.2 d)	Power Spectral Density	Compliant
Title 47 of the CFR, Part 15 §15.517(c)	RSS-220 (5.2.c and d)	Radiated Emissions	Compliant
Title 47 of the CFR, Part 15 §15.517(d)	RSS-220 (5.2.e)	Radiated Emissions in1164-1240MHz and 1559-1610 Bands	Compliant
Title 47 of the CFR, Part 15 §15.517(e)	RSS-220 (5.2.g)	Radiated Emissions (Peak Level) Centered on the Frequency With Highest Emissions	Compliant

Table 1. Executive Summary

II. Equipment Configuration

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A. Overview

Eurofins MET Labs was contracted by SEWIO Networks s.r.o (part of HID Global Corporation) to perform testing on the Zevon Omni, Zevon Direct, under SEWIO Networks s.r.o (part of HID Global Corporation) purchase order number PO01126.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the Zevon Omni, Zevon Direct.

The results obtained relate only to the item(s) tested.

Product Name:	RTLS Anchor	
Model(s) Tested:	Zevon Omni, Zevon Direct	
FCCID:	JQ6-SWAZ0	
ICID:	2236B-SWAZ0	
Equipment Specifications:	Primary Power:	48 – 57VDC (Power Over Ethernet)
	Transmitters Onboard:	Ultra-Wideband BLE (via preapproved module with FCCID: XPYBMD360)
	Equipment Code:	UWB
	Peak RF Output Power (EIRP):	-3.69dBm
	EUT Frequency Ranges:	7.9872GHz
	Antenna Gain[1]:	Zevon Direct: 9.06dBi Zevon Omni: 2.85dBi
	EUT Software Version:	FW version 4.1.0-cert
Analysis:	The results obtained relate only to the item(s) tested.	
Environmental Test Conditions:	Temperature: 15-35° C	
	Relative Humidity: 30-60%	
	Barometric Pressure: 860-1060 mbar	
Evaluated by:	Bryan Taylor	
Report Date(s):	04/02/2026	

Table 2. EUT Summary Table

[1] The antenna gain information was provided by SEWIO Networks s.r.o (part of HID Global Corporation) at the time of testing. The RTLS Anchor is produced in two variants, which only differ in the UWB antenna and enclosure. The rest of the HW is the same. Zevon Omni - it is equipped with an omnidirectional UWB antenna. Zevon Direct - it is equipped with a directional UWB antenna. Results for both variants are presented in this report.

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B. References

CFR 47, Part 15.517	Federal Communication Commission, Code of Federal Regulations, Title 47, Part 15.517: Subpart F – Ultra-Wideband Operation for Indoor Operation
RSS-220 Issue 1, Amendment 1: 2018	Devices Using Ultra-Wideband (UWB) Technology
ANSI C63.4:2014	Methods and Measurements of Radio-Noise Emissions from Low-Voltage Electrical And Electronic Equipment in the Range of 9 kHz to 40 GHz
ISO/IEC 17025:2017	General Requirements for the Competence of Testing and Calibration Laboratories
ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024	American National Standard for Testing Unlicensed Wireless Devices

Table 3. References

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C. Test Site

All testing was performed at Eurofins MET Labs, 13501 McCallen Pass, Austin, TX 78753. All equipment used in making physical determinations is accurate and bears recent traceability to the National Institute of Standards and Technology.

Radiated Emissions measurements were performed in a 10 meter semi-anechoic chamber (equivalent to an Open Area Test Site). In accordance with §2.948(a)(3), a complete site description is contained at MET Laboratories.

ISED Lab Info:
CAB Identifier: US0004
Company Number: 2043D

FCC Lab Info:
Designation Number: US1127

D. Measurement Uncertainty

Test Method	Typical Expanded Uncertainty	K	Confidence Level
Occupied Bandwidth Measurements	±4.52 Hz	2	95%
Conducted Power Measurements	±2.74 dB	2	95%
Power Spectral Density Measurements	±2.74 dB	2	95%
Conducted Spurious Emissions	±2.80 dB	2	95%
Conducted Emissions (Mains)	±2.97 dB	2	95%
Radiated Spurious Emissions (9kHz – 1GHz)	±2.95 dB	2	95%
Radiated Spurious Emissions (1GHz - 40GHz)	±3.54 dB	2	95%

Table 4. Uncertainty Calculations Summary

E. Description of Test Sample

The RTLS Anchor Anchor (Zevon Omni or Zevon Direct) is a UWB transceiver with a known position in the RTLS System. A set of Anchors creates location infrastructure where Tags are being located with sub-meter accuracy. The primary goal of the device is to gather radio signals from mobile locators, called Tags, and forward them to Sewio RTLS Studio software (via Ethernet), where the position is estimated. Anchors can also receive data from sensors equipped within the Tag, such as acceleration, orientation, button event, or custom data payload. Data are further exposed to the user via open API. Anchors can also communicate with the Tags via 2.4 GHz, BLE channels. UWB and 2.4GHz transmitters on the Anchor never transmit simultaneously. Anchors can also send UWB signals to each other to ensure precise synchronization. An anchor is an IP network device equipped with an Ethernet interface for both data backhaul and power supply. Anchors are configured and managed via RTLS Studio software. They support a variety of holders to simplify the installation in any premises. They are mounted above Tags, which ensures maximum coverage and minimizes obstacles blocking their communication line.

Zevon Anchors are produced in two variants, which only differ in the UWB antenna and enclosure. The rest of the HW is the same. Zevon Omni - it is equipped with an omnidirectional UWB antenna. Zevon Direct - it is equipped with a directional UWB antenna.

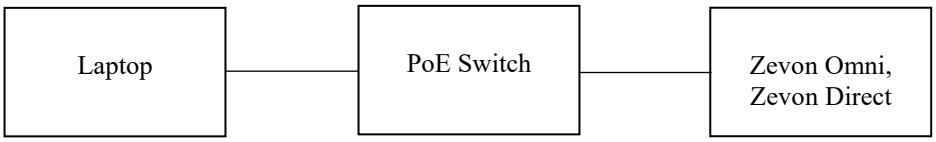

Figure 1. Block Diagram of Test Configuration

F. Equipment Configuration

The RTLS Anchor was set up as outlined in Figure 1 above. The test mode was configured via a tool loaded on the laptop as follows:

EUT operating mode no.	Description of operating modes	Additional information
Test mode 1 (UWB)	TX transmission period 1.01ms, UWB Channel 9, fc = 7.9872 GHz BLE disabled.	Continuous TX-Mode, set-up by Python script and with help of PC. The TX power is set to the nominal value by default, but it can be changed, if needed. BLE disabled.
Test Mode 2 (UWB)	TX transmission period 1 s, UWB Channel 9, fc = 7.9872 GHz BLE disabled.	Normal TCP TX-Mode for Transmission time measurement test, set-up by Python script and with help of PC. In this mode the EUT only transmit UWB frames, when it is connected to PC with RTLS Studio software. BLE disabled.

G. Support Equipment

Support equipment necessary for the operation and testing of the EUT is included in the following list.

Ref. ID	Name/Description	Manufacturer	Model Number	Customer Supplied Calibration Data
None	Laptop Computer	Dell	Lattitude	None
None	PoE Switch	Mikrotik	CRS320-8P-8B-4S+RM	None
None	Aux Zevon Omni	Sewio Networks	Zevon Omni 1.7 Rev 1	None

Table 5. Support Equipment

H. Ports and Cabling Information

Ref. Id	Port Name on EUT	Cable Description or reason for no cable	Qty	Length as tested (m)	Max Length (m)	Shielded? (Y/N)	Termination Box ID & Port Name
None	PoE IN	Shieldedd Ethernet Cable CAT5e or Higher	1	10m	100m	Yes	PoE Switch

Table 6. Ports and Cabling Information

I. Mode of Operation

Configuration 1 from the Sewio configuration document was used for this testing. The laptop provided a GUI for configuration of the sample being tested (UWB Radio Test GU – Certification Lab). This GUI allowed the user to run the python script (Zevon_Anchor_Configurator_UWB) in order to set the transmit channel, mode, and output power. The test samples had Firmware version 4.1.0-cert loaded onto them

Transmit Band	Modulation	Channel Frequencies Tested	Test Tool Power Setting
3.1GHz – 10.6GHz	BPSK	UWB Channel 9 (7.9872GHz)	-41.3

Table 7. Test Channels Utilized

J. Method of Monitoring EUT Operation

A spectrum analyzer was used to confirm proper transmitter operation.

K. Modifications

a) Modifications to EUT

No modifications were made to the EUT.

b) Modifications to Test Standard

No modifications were made to the test standard.

L. Disposition of EUT

The test sample including all support equipment submitted to the Electro-Magnetic Compatibility Lab for testing was returned to SEWIO Networks s.r.o (part of HID Global Corporation) upon completion of testing.

III. Electromagnetic Compatibility Criteria for Intentional Radiators

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Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.203 Antenna Requirement

Test Requirement: **§ 15.203:** An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

The structure and application of the EUT were analyzed to determine compliance with Section 15.203 of the Rules. Section 15.203 states that the subject device must meet at least one of the following criteria:

a.) Antenna must be permanently attached to the unit.

b.) Antenna must use a unique type of connector to attach to the EUT.

b.) Unit must be professionally installed. Installer shall be responsible for verifying that the correct antenna is employed with the unit.

Results: The EUT as tested is compliant with the criteria of §15.203. The TX antenna utilizes a non-standard connector.

Test Engineer(s): Bryan Taylor

Test Date(s): 1/5/2026

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Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.517(a)(5) UWB Transmitter Cutoff Timing

Test Requirement: **§ 15.517(a)(5):** A communications system shall transmit only when the intentional radiator is sending information to an associated receiver.

Test Procedure: The test sample was associated with a device configured to receive the UWB transmission (Test Mode 2). A spectrum analyzer was setup to monitor and display the UWB transmission from the test sample and a plot was captured showing the intended signal. The receiver device was then disabled and the UWB signal from the transmitter was observed to see if it stopped transmission. A plot displaying the transmission cessation was captured as well.

Results: The EUT as tested is compliant with the criteria of §15.517(a)(5). When the receiver device was disabled the transmitted UWB signal was observed to cease transmission.

Test Engineer(s): Sergio Gutierrez

Test Date(s): 2/24/2026

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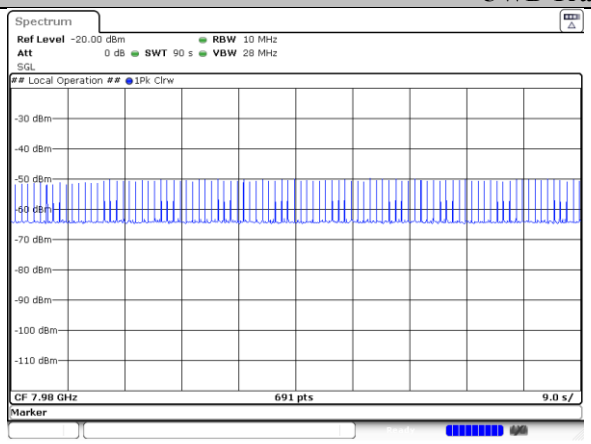
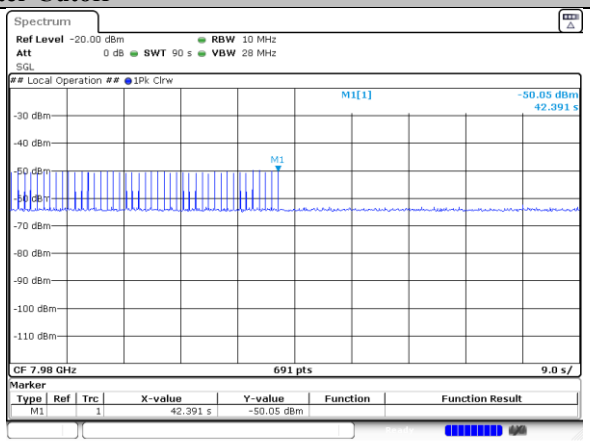
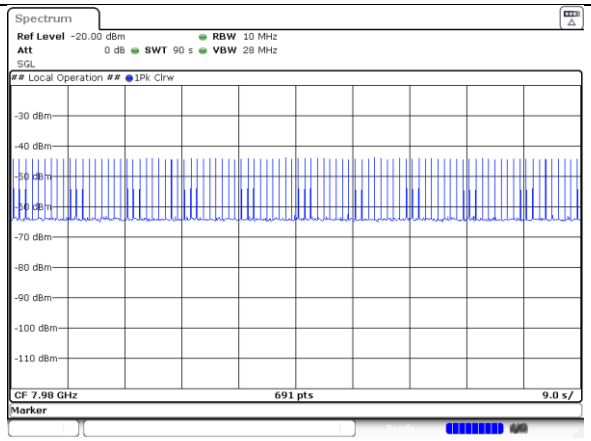
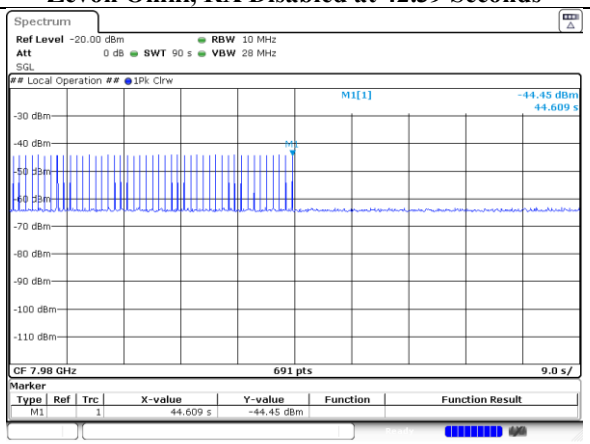
UWB Transmitter Cutoff	
	
Zevon Omni UWB Transmission	Zevon Omni, RX Disabled at 42.39 Seconds
	
Zevon Direct UWB Transmission	Zevon Direct, RX Disabled at 44.6 Seconds

Figure 2. UWB Transmitter Cutoff Plots

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.517(b) UWB Bandwidth

Test Requirements: The UWB bandwidth of a device operating under the provisions of this section must be contained between 3100 MHz and 10,600 MHz

Test Procedure: The UWB signal was maximized by rotating the device on a turntable and raising / lowering an antenna and adjusting the antennas polarity for maximum received signal. A marker was placed at the peak of the UWB signal. Markers were then placed at the lower edge and upper edge of the UWB signal 10dB lower than the peak marker (searching from the outside of the signal toward the center of the signal). The delta between these markers at the 10dB down points was recorded as the UWB Bandwidth. Delta markers were used on the plots so that the UWB Bandwidth could be read directly.

Test Results The EUT was compliant with § 15.517(b). The UWB bandwidth was entirely within the range of 3100 MHz and 10,600 MHz for low, mid, and high channels. Additionally, the UWB Bandwidth for each measured channel was greater than 500MHz.

Test Engineer(s): Bryan Taylor

Test Date(s): 1/6/2026

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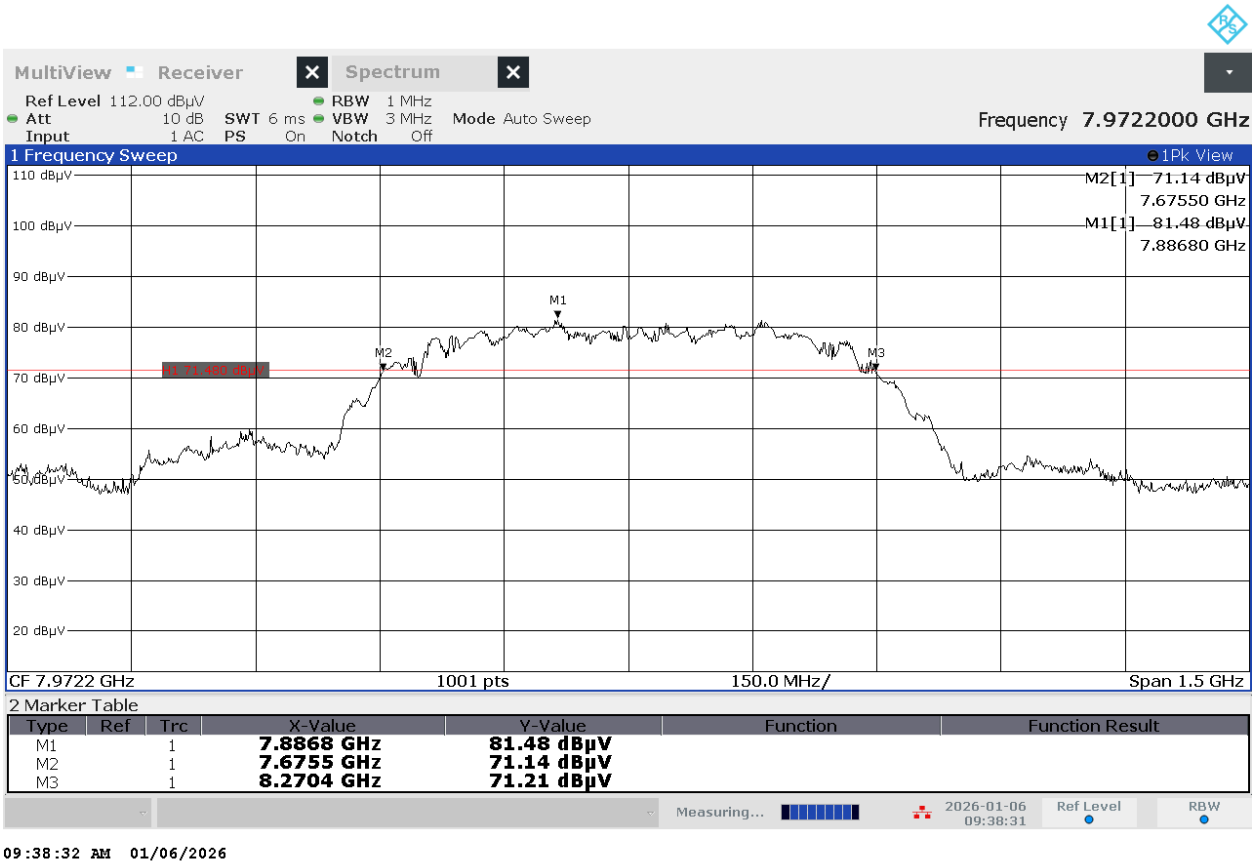
UWB Bandwidth Test Results

UWB Bandwidth = 8259.9MHz – 7724.9MHz = 535MHz

Figure 3. UWB Bandwidth (Zevon Direct)



UWB Bandwidth = 8270.4MHz – 7675.5MHz = 594.9MHz

Figure 4. UWB Bandwidth (Zevon Omni)

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.517(c) Power Spectral Density

Test Requirements: The power spectral density limitation is defined by the emission limitations from part 15.517(c) using a resolution bandwidth of 1 MHz:

Frequency (MHz)	§ 15.517(c),Radiated Emission Limits (dBm)	§ 15.517(c),Radiated Emission Limits (dBuV/m @ 3m)	§ 15.517(c),Radiated Emission Limits (dBuV/m @ 1m)
960 – 1610	-75.3	20.0	29.54
1610 – 1990	-53.3	42.0	51.54
1990 – 3100	-51.3	44.0	53.54
3100 – 10,600	-41.3	54.0	63.54
Above 10,600	-51.3	44.0	53.54

Figure 5. Radiated Field Strength Emissions Limits from FCC Part 15.517 (c)

Test Procedures: Measurements from 3100MHz – 10,600MHz were performed with a horn antenna positioned 3m away from the test sample. This antenna was moved from 1 to 4m in height and in vertical and horizontal polarities. Emissions were measured in terms of dBm using a 1MHz RBW (dBm/MHz) and then compared to the power density limit from 15.517(c).

Test Software: TILE Version 7.4.2.5 (Manufactured by ETS Lindgren) and ELEKTRA Version 4.61 (Manufactured by Rohde&Schwarz) was utilized to perform these measurements.

Test Results: The EUT was compliant with the power spectral density limit from **15.517(c)**.

Test Engineer(s): Bryan Taylor

Test Date(s): 3/2/2026

Device Measured	Measured Frequency (GHz)	Power Spectral Density Amplitude (dBm/MHz)	Power Spectral Density Limit (dBm)	Margin (dB)	Result
Zevon Direct	7.8867	-48.39	-41.3	7.09	Pass
Zevon Omni	7.8867	-48.48	-41.3	7.18	Pass

Figure 6. Power Spectral Density Measurements

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Power Spectral Density Test Results

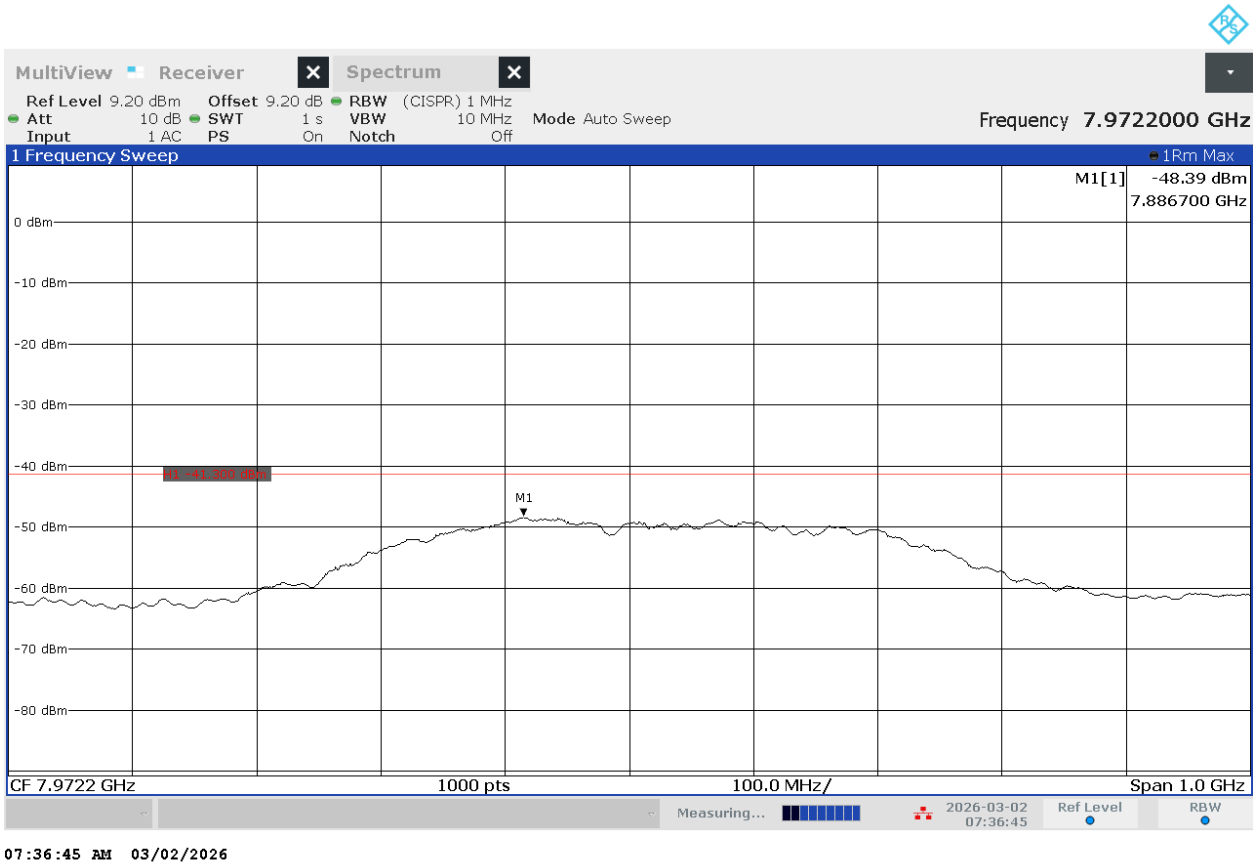

Figure 7. Power Spectral Density (Zevon Direct)

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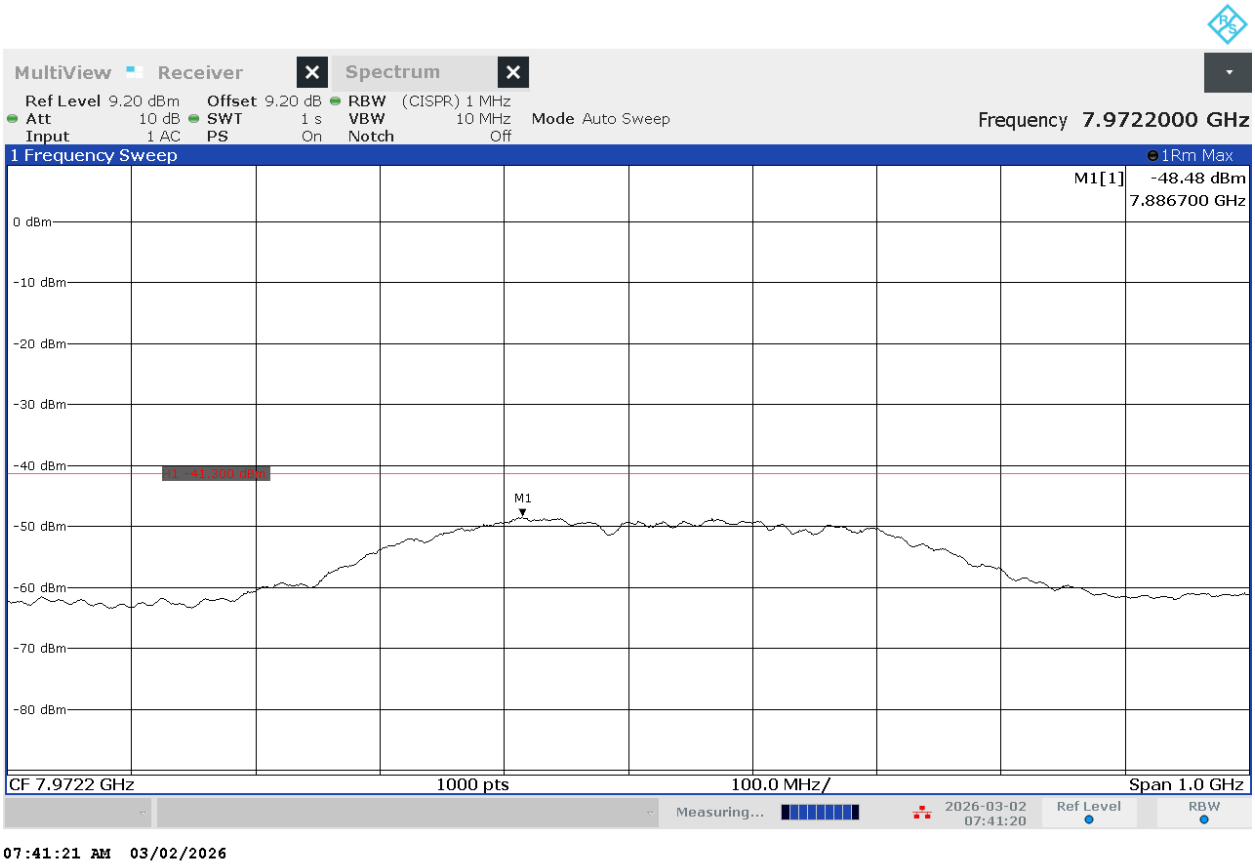


Figure 8. Power Spectral Density (Zevon Omni)

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.517(c) Radiated Emissions

Test Requirements: **R**adiated emissions at or below 960 MHz from a device operating under the provisions of this section shall not exceed the emission levels in § 15.209. The radiated emissions above 960 MHz from a device operating under the provisions of this section shall not exceed the following average limits when measured using a resolution bandwidth of 1 MHz:

Frequency (MHz)	§ 15.209(a),Radiated Emission Limits (dBµV) @ 3m
30 - 88	40.0
88 - 216	43.5
216 - 960	46.0
Above 960	54.0

Figure 9. Radiated Field Strength Emissions Limits from FCC Part 15.209 (a)

Frequency (MHz)	§ 15.517(c),Radiated Emission Limits (dBm)	§ 15.517(c),Radiated Emission Limits (dBuV/m @ 3m)	§ 15.517(c),Radiated Emission Limits (dBuV/m @ 1m)
960 – 1610	-75.3	20.0	29.54
1610 – 1990	-53.3	42.0	51.54
1990 – 3100	-51.3	44.0	53.54
3100 – 10,600	-41.3	54.0	63.54
Above 10,600	-51.3	44.0	53.54

Figure 10. Radiated Field Strength Emissions Limits from FCC Part 15.517 (c)

Test Procedures: The radiated emission methodology referenced in ANSI C63.10 was utilized in order to assess the unwanted emissions. The test sample was placed on an 80cm high table (for emissions below 1GHz) and on a 150cm high table (for emissions above 1GHz). The test sample was rotated 360 degrees and examined in three orthogonal axis during the test. The formulas from ANSI C63.10 Section 10.3.9 (formula 33 and 34) were used to convert from power terms to field strength terms:

$$E\left(\mathrm{dB\mu V/m}\right) = \mathrm{EIRP}\left(\mathrm{dBm}\right) + 95.3 \quad \text{[Formula 33]}$$

$$\mathrm{EIRP}\left(\mathrm{dBm}\right) = E\left(\mathrm{dB\mu V/m}\right) - 95.3 \quad \text{[Formula 34]}$$

For measurements below 30MHz a magnetic field loop was utilized at a distance of 3m away. The magnetic loop remained fixed at 1m height and the test was performed with the loop positioned in a co-axial (0 degrees) and co-planar (90 degrees) position. Radiated measurements below 30MHz were performed in a semi-anechoic chamber that has been correlated to an open area site. Emissions were compared to the limits from 15.209.

Measurements from 30MHz – 960MHz were performed with a Hybrid BiLog type antenna positioned 10m from the test sample. This antenna was moved from 1 to 4m in height and in vertical and horizontal polarities. Emissions were compared to the limits from 15.209.

Measurements from 960MHz – 1.6GHz were performed with a horn antenna positioned 1m away from the test sample. This antenna was moved from 1 to 4m in height and in vertical and horizontal polarities. Emissions were measured in terms of field strength (dBuV/m) and then extrapolated to a distance of 3m using an inverse distance correction factor of 20 dB / decade. The emission levels were then converted to power terms and compared to the limit from 15.517(c).

Measurements from 1.6GHz – 18GHz were performed with a horn antenna positioned 3m away from the test sample. This antenna was moved from 1 to 4m in height and in vertical and horizontal polarities. Emissions were measured in terms of field strength (dBuV/m). The emission levels were then compared to the limit (converted to field strength) from 15.517(c).

Measurements from 18GHz to 40GHz were performed with a horn antenna positioned 1m away from the test sample. This antenna was moved from 1 to 4m in height and in vertical and horizontal polarities. Emissions were measured in terms of field strength (dBuV/m) and then extrapolated to a distance of 3m using an inverse distance correction factor of 20 dB / decade. The emission levels were then compared to the limit (converted to field strength) from 15.517(c).

Test Software: TILE Version 7.4.2.5 (Manufactured by ETS Lindgren) and ELEKTRA Version 4.61 (Manufactured by Rohde&Schwarz) was utilized to perform these measurements.

Test Results: The EUT was compliant with the radiated emission limits from rule part **15.209** (below 960MHz) and **15.517(c)** (above 960MHz).

Test Engineer(s): Bryan Taylor

Test Date(s): 1/5/2026 – 1/9/2026

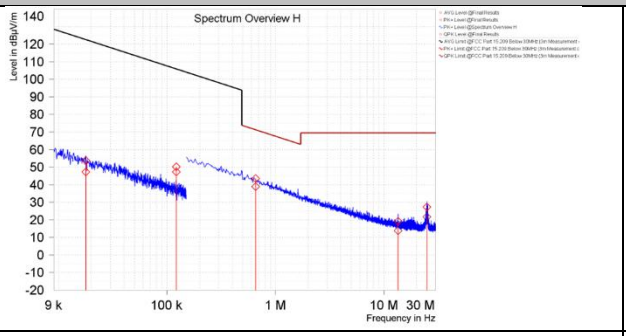
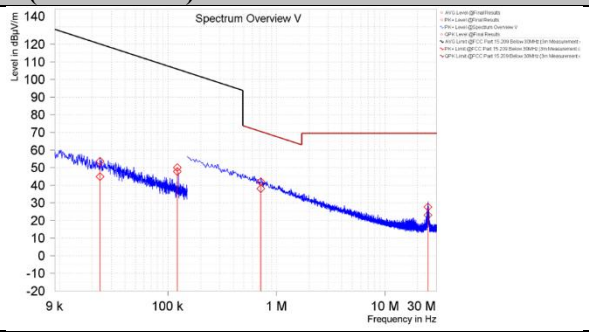
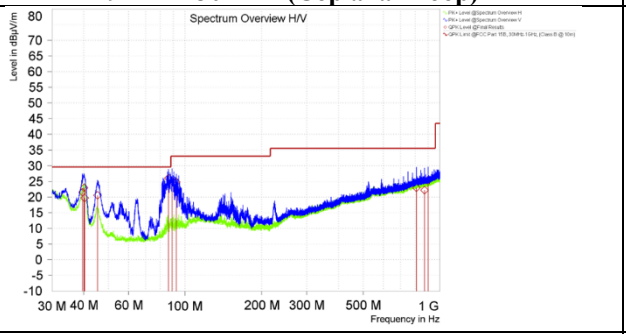
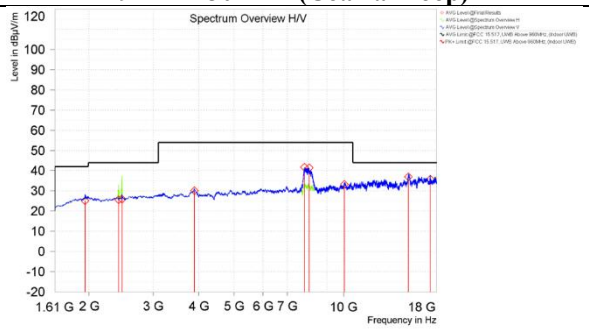
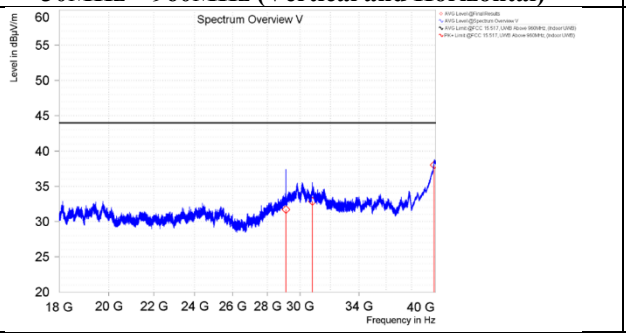
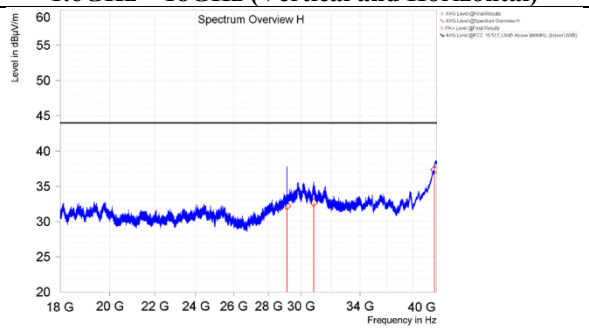
Radiated Emissions Plots (Zevon Direct)	
	
9kHz – 30MHz (Coplanar Loop)	9kHz – 30MHz (Coaxial Loop)
	
30MHz – 960MHz (Vertical and Horizontal)	1.6GHz – 18GHz (Vertical and Horizontal)
	
18GHz – 40GHz (Vertical)	18GHz – 40GHz (Horizontal)

Figure 11. Radiated Emission Plots (Zevon Direct)

Frequency [MHz]	Peak Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]	Result
0.018	53.79	122.58	68.79	15.20	H	15	1.00	0.200	Pass
0.024	53.52	120.13	66.61	14.19	V	93.6	1.00	0.200	Pass
0.121	50.26	105.91	55.65	11.30	H	275.9	1.00	0.200	Pass
0.121	49.94	105.91	55.97	11.30	V	278.3	1.00	0.200	Pass
0.654	43.56	71.29	27.73	11.39	H	172.8	1.00	9.000	Pass
0.717	42.04	70.49	28.45	11.50	V	316.2	1.00	9.000	Pass
13.475	19.13	69.50	50.37	10.61	H	20.9	1.00	9.000	Pass
24.896	27.66	69.50	41.84	9.70	V	197.1	1.00	9.000	Pass
24.990	27.38	69.50	42.12	9.72	H	135.1	1.00	9.000	Pass

Figure 12. Worst Case Field Strength Below 30MHz (Zevon Direct)

Frequency [MHz]	QPK Level [dBµV/m]	QPK Limit [dBµV/m]	Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]	Result
39.540	21.53	29.55	8.02	-7.47	V	57.4	4.00	120.000	Pass
40.080	22.94	29.55	6.61	-7.77	V	125.4	1.21	120.000	Pass
40.290	19.65	29.55	9.90	-7.98	H	216.3	1.33	120.000	Pass
45.330	20.53	29.55	9.02	-10.87	V	275.2	0.99	120.000	Pass
86.040	26.04	29.55	3.51	-11.48	V	254.2	1.50	120.000	Pass
88.860	25.06	33.07	8.01	-11.01	V	206.4	1.64	120.000	Pass
92.400	24.73	33.07	8.34	-10.35	V	180	1.07	120.000	Pass
810.030	22.96	35.57	12.61	4.52	V	141.8	2.00	120.000	Pass
869.970	22.14	35.57	13.43	5.49	V	195.9	1.95	120.000	Pass
899.970	25.31	35.57	10.26	5.84	V	129.2	1.68	120.000	Pass

Figure 13. Worst Case Field Strength 30MHz – 960MHz (Zevon Direct)

Frequency [MHz]	AVGLevel [dBµV/m]	AVGLimit [dBµV/m]	Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]	Result
1,951.500	25.13	42.00	16.87	-0.92	V	151.2	1.55	1,000.000	Pass
2,414.000	25.56	44.00	18.44	-2.45	H	347.6	1.24	1,000.000	Pass
2,463.000	25.81	44.00	18.19	-2.41	H	110.2	1.50	1,000.000	Pass
3,891.000	30.04	54.00	23.96	-1.62	V	162.9	3.94	1,000.000	Pass
7,798.000	41.74	54.00	12.26	-2.02	V	309.3	1.75	1,000.000	Pass
8,047.500	41.39	54.00	12.61	-3.51	V	304.9	2.01	1,000.000	Pass
10,044.500	33.24	54.00	20.76	1.05	V	252.7	1.12	1,000.000	Pass
15,045.500	36.95	44.00	7.05	1.40	H	202.7	2.26	1,000.000	Pass
17,288.000	35.77	44.00	8.23	-0.71	V	76.4	2.60	1,000.000	Pass
29,125.000	32.23	44.00	11.77	7.96	H	110.5	2.00	1,000.000	Pass
29,125.500	31.71	44.00	12.29	7.96	V	360	2.00	1,000.000	Pass
30,794.500	32.87	44.00	11.13	8.32	V	4.6	1.00	1,000.000	Pass
30,826.500	32.66	44.00	11.34	8.26	H	360.1	2.00	1,000.000	Pass
39,823.500	37.32	44.00	6.68	9.55	H	310.1	2.00	1,000.000	Pass
39,883.500	37.99	44.00	6.01	9.32	V	171.3	1.00	1,000.000	Pass

Figure 14. Worst Case Spurious Emissions 1.6GHz – 40GHz (Zevon Direct)

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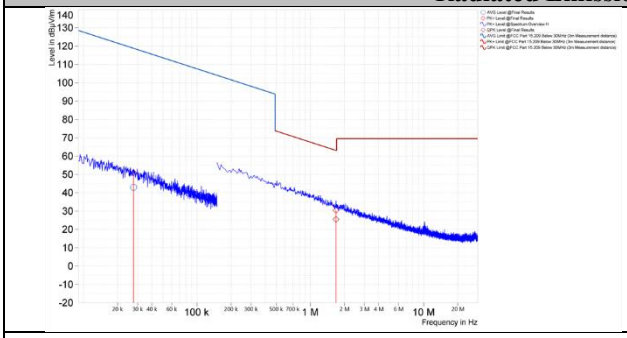
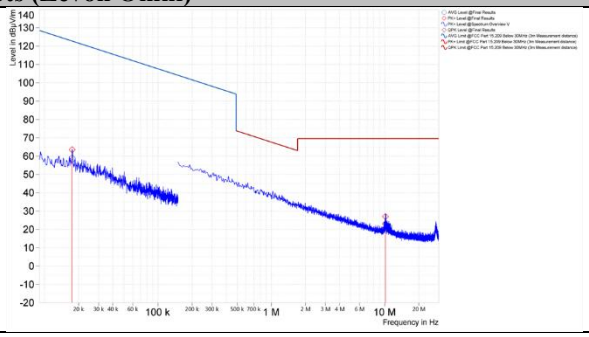
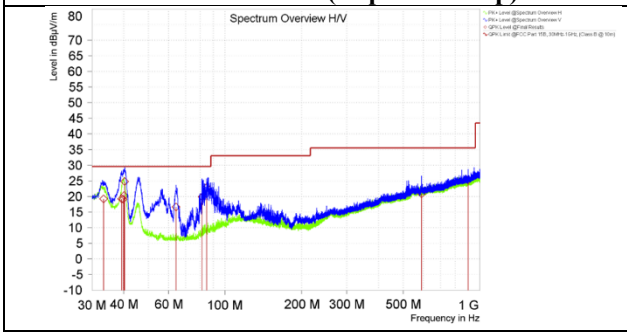
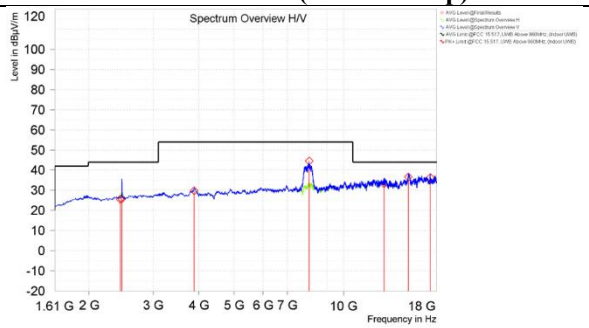
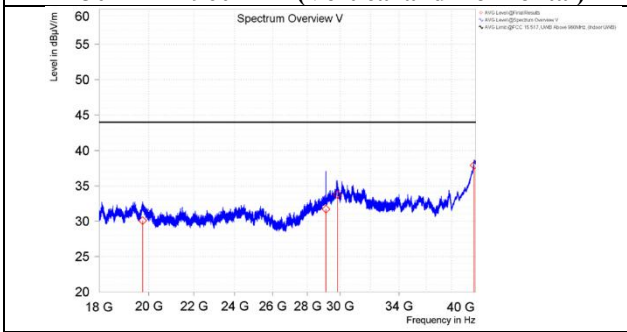
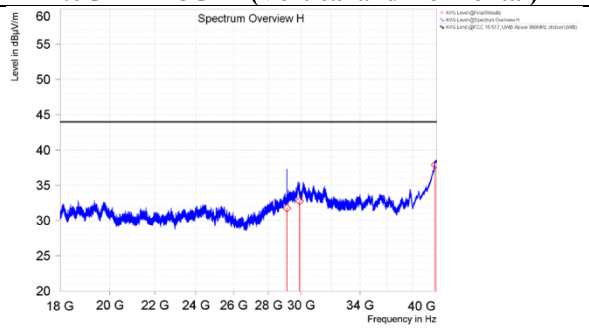
Radiated Emissions Plots (Zevon Omni)	
	
9kHz – 30MHz (Coplanar Loop)	9kHz – 30MHz (Coaxial Loop)
	
30MHz – 960MHz (Vertical and Horizontal)	1.6GHz – 18GHz (Vertical and Horizontal)
	
18GHz – 40GHz (Vertical)	18GHz – 40GHz (Horizontal)

Figure 15. Radiated Emission Plots (Zevon Omni)

Frequency [MHz]	Peak Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]	Result
0.018	63.46	122.73	59.26	15.31	V	14.7	1	0.200	Pass
0.028	50.92	118.77	67.85	13.98	H	99	1	0.200	Pass
1.685	30.53	63.07	32.53	11.69	H	201.9	1	9.000	Pass
10.149	26.99	69.50	42.51	10.82	V	190.7	1	9.000	Pass

Figure 16. Worst Case Field Strength Below 30MHz (Zevon Omni)

Frequency [MHz]	QPK Level [dBµV/m]	QPK Limit [dBµV/m]	Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]	Result
33.390	19.20	29.55	10.35	-4.25	V	135	4.00	120.000	Pass
39.240	19.22	29.55	10.33	-7.31	V	56.1	2.05	120.000	Pass
39.840	19.15	29.55	10.40	-7.71	H	142.3	3.84	120.000	Pass
40.140	20.29	29.55	9.26	-7.89	H	95.8	4.00	120.000	Pass
40.380	24.79	29.55	4.76	-7.97	V	351.9	1.02	120.000	Pass
64.170	16.57	29.55	12.98	-13.94	V	225	2.33	120.000	Pass
81.180	19.84	29.55	9.71	-12.49	V	16.5	1.49	120.000	Pass
84.660	22.82	29.55	6.73	-11.70	V	225	1.59	120.000	Pass
590.310	20.79	35.57	14.78	1.53	V	214	1.03	120.000	Pass
899.940	25.21	35.57	10.36	5.84	V	225	1.73	120.000	Pass

Figure 17. Worst Case Field Strength 30MHz – 960MHz (Zevon Omni)

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Frequency [MHz]	AVGLevel [dBµV/m]	AVGLimit [dBµV/m]	Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]	Result
2,434.500	25.61	44.00	18.39	-2.43	H	304.6	2.83	1,000.000	Pass
2,458.500	25.74	44.00	18.26	-2.46	V	206.3	3.55	1,000.000	Pass
3,886.000	29.83	54.00	24.17	-1.65	V	151.8	2.18	1,000.000	Pass
8,043.500	44.52	54.00	9.48	-3.45	V	114.4	1.23	1,000.000	Pass
12,902.000	33.21	44.00	10.79	-3.17	V	318.8	1.48	1,000.000	Pass
15,045.000	36.62	44.00	7.38	1.40	V	73.7	2.85	1,000.000	Pass
17,288.000	36.36	44.00	7.64	-0.71	V	340.4	3.66	1,000.000	Pass
19,748.000	30.09	44.00	13.91	2.88	V	360	2.00	1,000.000	Pass
29,125.000	31.73	44.00	12.27	7.96	H	0	2.00	1,000.000	Pass
29,126.000	31.70	44.00	12.30	7.96	H	47.5	2.00	1,000.000	Pass
29,845.500	33.76	44.00	10.24	8.88	V	-0.1	2.00	1,000.000	Pass
29,904.000	32.75	44.00	11.25	9.02	H	360.2	1.00	1,000.000	Pass
39,863.000	37.87	44.00	6.13	9.40	V	295	1.00	1,000.000	Pass
39,864.500	37.89	44.00	6.11	9.39	H	248.5	2.00	1,000.000	Pass

Figure 18. Worst Case Spurious Emissions 1.6GHz – 40GHz (Zevon Omni)

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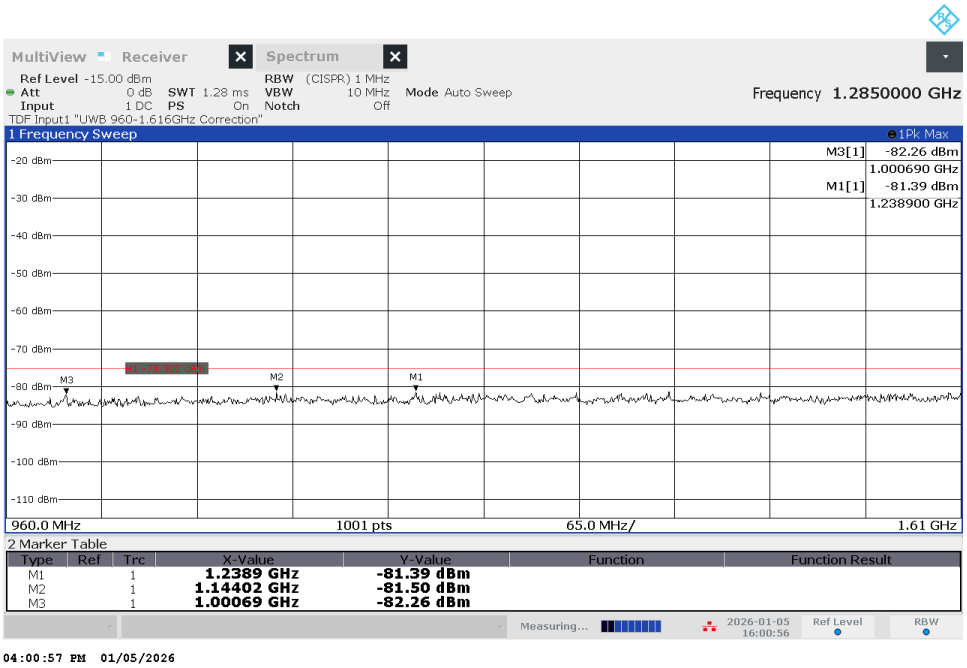

Figure 19. Radiated Emissions 960MHz – 1.6GHz (Vertical, Zevon Direct)

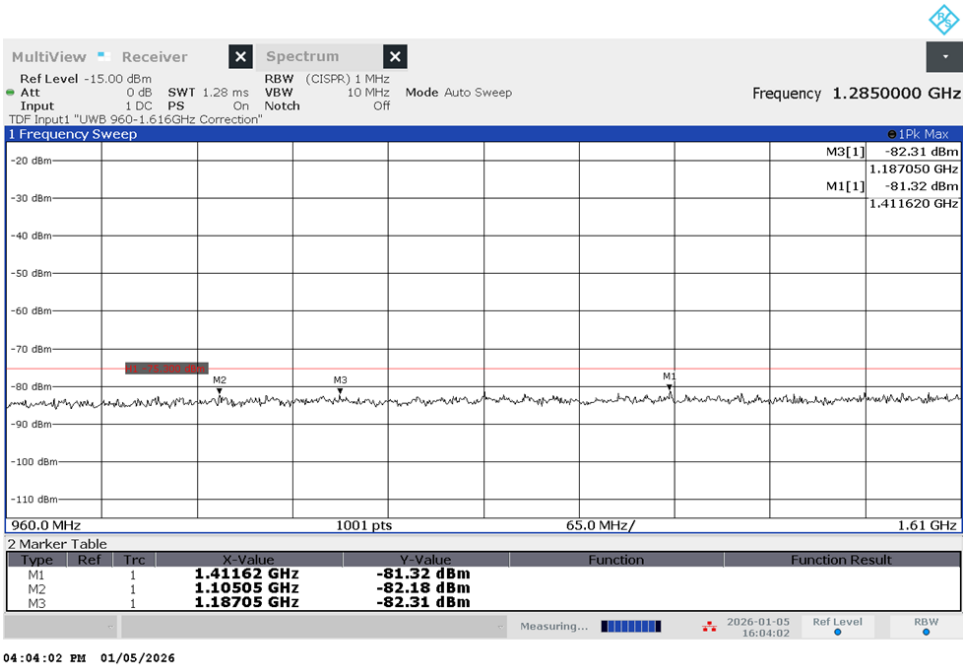

Figure 20. Radiated Emissions 960MHz – 1.6GHz (Horizontal, Zevon Direct)

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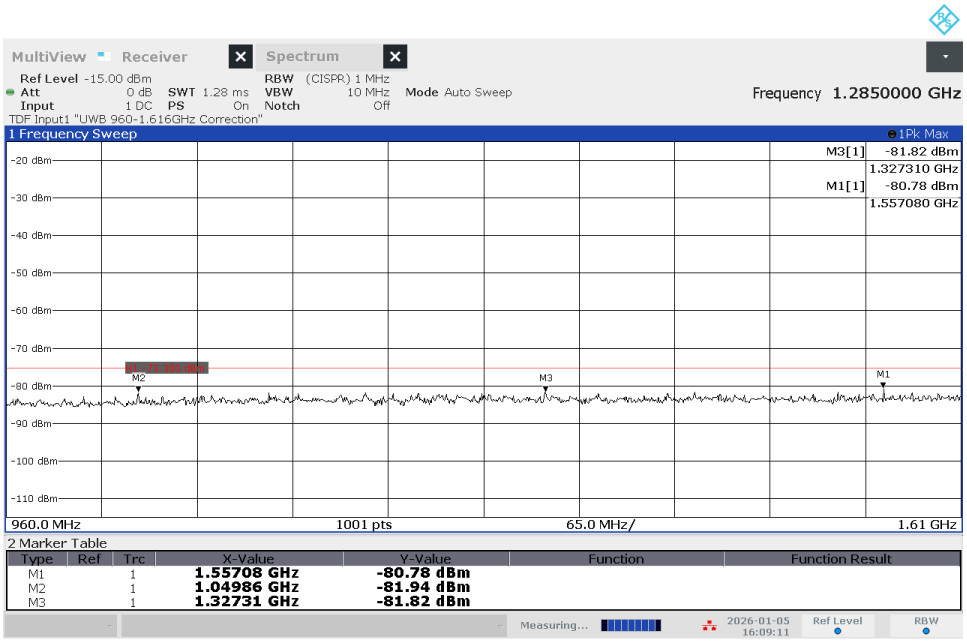


Figure 21. Radiated Emissions 960MHz – 1.6GHz (Vertical, Zevon Omni)

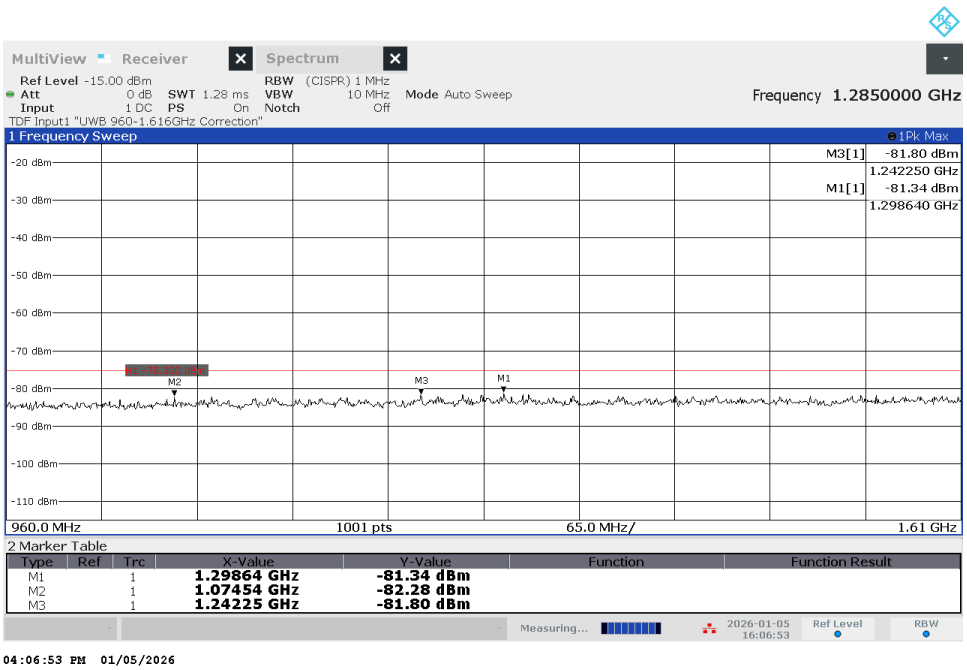


Figure 22. Radiated Emissions 960MHz – 1.6GHz (Horizontal, Zevon Omni)

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.517(d) Emissions in the 1164-1240MHz and 1559-1610MHz Bands

Test Requirements: In addition to the radiated emission limits specified in the table in paragraph (c) of this section, UWB transmitters operating under the provisions of this section shall not exceed the following average limits when measured using a resolution bandwidth of no less than 1 kHz

Frequency (MHz)	EIRP in dBm
1160 - 1240	-85.3
1559 - 1610	-85.3

Figure 23. Radiated Field Strength Emissions Limits in the GPS Bands

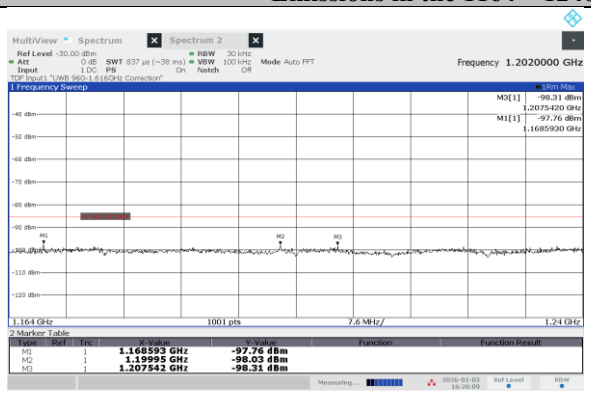
Test Procedure: Measurements in the 1164-1240MHz and 1559-1610MHz bands were performed using the same methodology as was used for the 15.517(c) spurious emission measurements. Per ANSI C63.10 section 10.3.10 a resolution bandwidth of 30kHz was used on the measurement instrument with RMS detection.

Test Results: The EUT was compliant with the limits from **§15.517 (d)**.

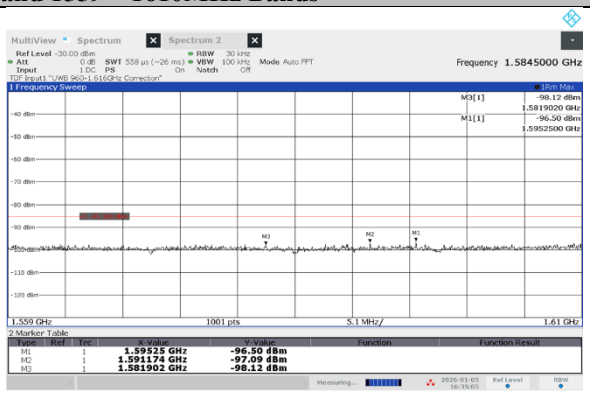
Test Engineer: Bryan Taylor

Test Date: 1/5/2026

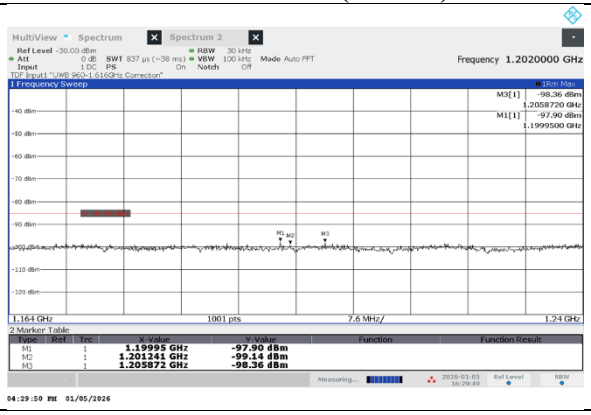
Emissions in the 1164 – 1240MHz and 1559 – 1610MHz Bands



1164 – 1240MHz (Vertical)



1559 – 1610MHz (Vertical)



1164 – 1240MHz (Horizontal)

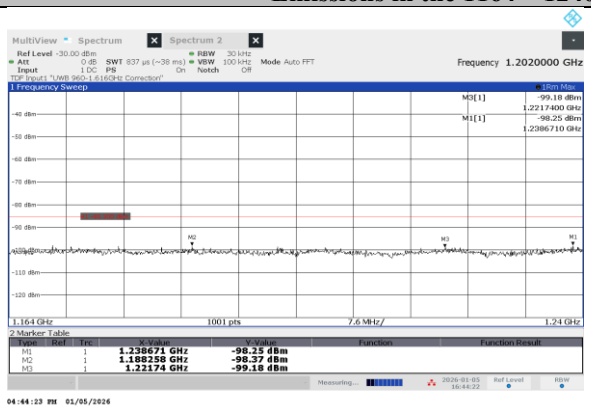
1559 – 1610MHz (Horizontal)

Figure 24. Emissions in the 1164 – 1240MHz and 1559 – 1610MHz Bands (Zevon Direct)

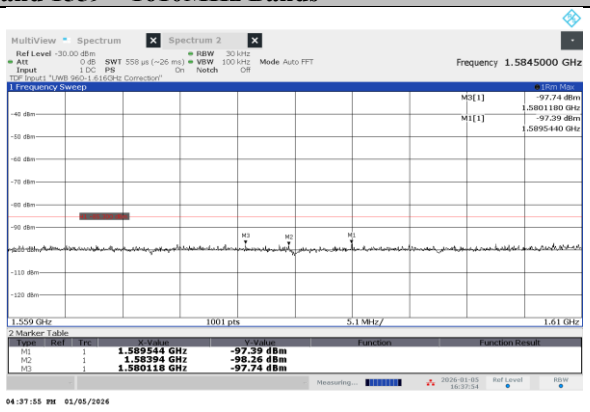
Tested Band	Frequency (GHz)	Amplitude (dBm)	Limit (dBm)	Margin (dB)	Polarity (V/H)	RBW	Result
1164MHz – 1240MHz	1.16859	-97.76	-85.3	12.46	V	30kHz	Pass
	1.19995	-98.03	-85.3	12.73	V	30kHz	Pass
	1.20754	-98.31	-85.3	13.01	V	30kHz	Pass
	1.19995	-97.90	-85.3	12.6	H	30kHz	Pass
	1.20124	-99.14	-85.3	13.84	H	30kHz	Pass
	1.20587	-98.36	-85.3	13.06	H	30kHz	Pass
1559MHz – 1610MHz	1.59525	-96.50	-85.3	11.2	V	30kHz	Pass
	1.59117	-97.09	-85.3	11.79	V	30kHz	Pass
	1.58190	-98.12	-85.3	12.82	V	30kHz	Pass
	1.59958	-97.42	-85.3	12.12	H	30kHz	Pass
	1.58317	-97.86	-85.3	12.56	H	30kHz	Pass
	1.58404	-97.68	-85.3	12.38	H	30kHz	Pass

Figure 25. Emissions in the 1164 – 1240MHz and 1559 – 1610MHz Bands (Zevon Direct)

Emissions in the 1164 – 1240MHz and 1559 – 1610MHz Bands



1164 – 1240MHz (Vertical)



1559 – 1610MHz (Vertical)

1164 – 1240MHz (Horizontal)

1559 – 1610MHz (Horizontal)

Figure 26. Emissions in the 1164 – 1240MHz and 1559 – 1610MHz Bands (Zevon Omni)

Tested Band	Frequency (MHz)	Amplitude (dBm)	Limit (dBm)	Margin (dB)	Polarity (V/H)	RBW	Result
1164MHz – 1240MHz	1.23867	-98.25	-85.3	12.95	V	30kHz	Pass
	1.18825	-98.37	-85.3	13.07	V	30kHz	Pass
	1.22174	-99.18	-85.3	13.88	V	30kHz	Pass
	1.20868	-97.17	-85.3	11.87	H	30kHz	Pass
	1.19592	-98.79	-85.3	13.49	H	30kHz	Pass
	1.22045	-99.42	-85.3	14.12	H	30kHz	Pass
1559MHz – 1610MHz	1.58954	-97.39	-85.3	12.09	V	30kHz	Pass
	1.58394	-98.26	-85.3	12.96	V	30kHz	Pass
	1.58011	-97.74	-85.3	12.44	V	30kHz	Pass
	1.59025	-96.91	-85.3	11.61	H	30kHz	Pass
	1.58730	-98.50	-85.3	13.2	H	30kHz	Pass
	1.57059	-97.75	-85.3	12.45	H	30kHz	Pass

Figure 27. Emissions in the 1164 – 1240MHz and 1559 – 1610MHz Bands (Zevon Omni)

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.517(e) Peak EIRP Within a 50MHz

Test Requirement: **15.517(e)** There is a limit on the peak level of the emissions contained within a 50 MHz bandwidth centered on the frequency at which the highest radiated emission occurs, fM. That limit is 0 dBm EIRP. It is acceptable to employ a different resolution bandwidth, and a correspondingly different peak emission limit, following the procedures described in § 15.521.

Test Procedure: The radiated emission methodology referenced in ANSI C63.10 was utilized in order to assess peak EIRP of the UWB device. The test sample was placed on an 150cm high table. A horn antenna was positioned 3m away and was scanned from 1-4 meters in height in vertical and horizontal polarities. The measurement instrument used was configured for peak detection using a 50MHz resolution bandwidth. The worst-case field strength contained within a 50MHz bandwidth centered on the frequency at which the highest emission occurred was recorded (in dBuV/m). The field strength measurement was then converted to power terms (in dBm) for comparison to the 0dBm limit in part 15.517(e). The formula from ANSI C63.10 Section 10.3.9 (formula 34) was used to convert from field strength to power terms:

$$\mathrm{EIRP}\left(\mathrm{dBm}\right) = E\left(\mathrm{dB\mu V/m}\right) - 95.3$$

Test Results: The EUT was compliant with the peak EIRP limit from **§15.517(e)**.

Test Engineer: Bryan Taylor

Test Date: 1/6/2025

Device Measured	Measured Frequency (GHz)	Polarity (V/H)	Amplitude (dBuV/m)	Amplitude (dBm)	RBW Used	Limit (dBm)	Margin (dB)	Result
Zevon Direct	7.9892	V	90.15	-5.15	50MHz	0	5.15	Pass
	7.8773	H	76.56	-18.74	50MHz	0	18.74	Pass
Zevon Omni	7.9922	V	91.61	-3.69	50MHz	0	3.69	Pass
	7.9952	H	75.19	-20.11	50MHz	0	20.11	Pass

Figure 28. Peak EIRP Measurements

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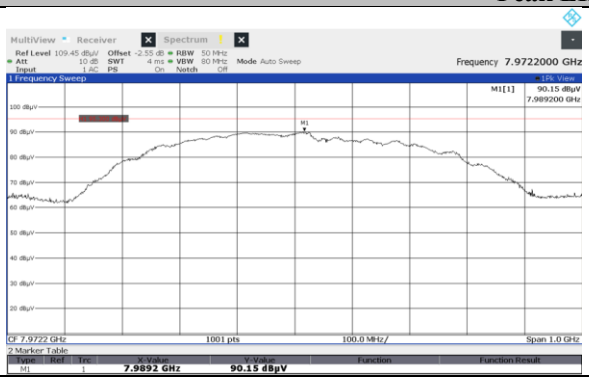
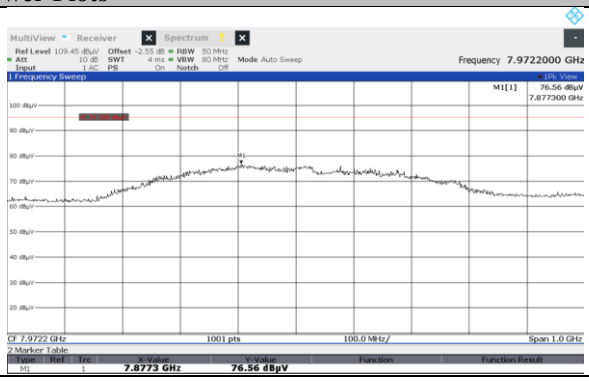
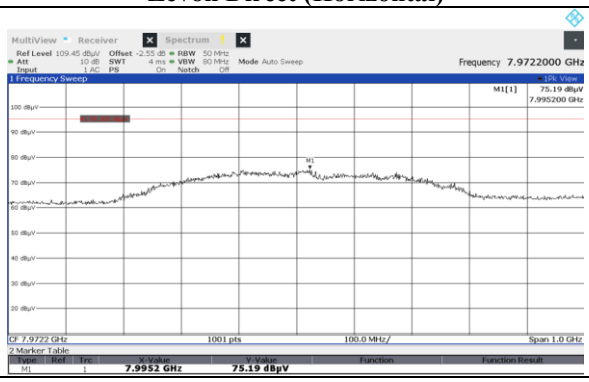
Peak EIRP Power Plots	
	
Zevon Direct (Vertical)	Zevon Direct (Horizontal)
	
Zevon Omni (Vertical)	Zevon Omni (Horizontal)

Figure 29. Peak EIRP Power Plots

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IV. Test Equipment

Test Equipment

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ISO/IEC 17025:2017.

Asset #	Description	Manufacturer	Model	Last Cal Date	Cal Due Date
1A1250	Receiver	Rohde & Schwarz	ESW44	03/28/2025	03/28/2026
1A1234	FSV Signal Analyzer	Rohde & Schwarz	FSV 40	03/13/2025	03/13/2027
1A1176	Active Loop Antenna (9KHz-30MHz)	ETS-Lindgren	6502	8/22/2024	08/22/2026
1A1050	Bi-Log Antenna	Schaffner	CBL-6112D	03/05/2024	03/05/2026
1A1047	Double Ridged Waveguide Antenna	ETS Lindgren	3117	06/26/2024	06/26/2026
1A1161	Horn Antenna (18GHz – 40GHz)	ETS Lindgren	3116C	08/01/2024	08/01/2026
1A1088	Preamplifier	Rohde & Schwarz	TS-PR1	See Note	
1A1044	Generator	Com-Power	CG-520	See Note	
1A1073	Multi Device Controller	ETS	2090	See Note	
1A1074	System Controller	Panasonic	WV-CU101	See Note	
1A1080	Multi-Device	ETS	2090	See Note	
1A1180	Preamplifier	Miteq	AMF-7D-01001800-22-10P	See Note	

Table 8. Test Equipment List

Note: Functionally tested equipment is verified using calibrated instrumentation at the time of testing.

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End of Report

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