HEADQUARTERS: 914 WEST PATAPSCO AVENUE • BALTIMORE, MARYLAND 21230 • PHONE (410) 354-3300 • FAX (410) 354-3313

11/25/2025

OnAsset Intelligence, Inc.
8407 Sterling St.
Irving, TX 75063
USA

Dear Shawn Key,

Enclosed is the EMC Wireless test report for compliance testing of the OnAsset Intelligence, Inc. Sentinel Flex as tested to the requirements of FCC 15.247 and RSS-247 Issue 3 for Intentional Radiators. This test report pertains specifically to the 915MHz ISM transmitter onboard which operates in the 902MHz – 928MHz band.

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 134911_FCC_IC_LoRa_R2

915MHz ISM Test Report

for the

OnAsset Intelligence, Inc.
Sentinel Flex

Tested under
FCC 15.247 and RSS-247 Issue 3
For Intentional Radiators

Veer Patel, EMC/Wireless Engineer
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 15.247 under normal use and maintenance.

Matthew Hinojosa
EMC Manager, Austin Electromagnetic Compatibility Lab

Report Status Sheet

Revision	Report Date	Reason for Revision
∅	6/25/2025	Initial Issue.
1	7/9/2025	TCB Reviewer Comments
2	11/25/2025	TCB Reviewer Comments

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**er**z**
IEC	**I**nternational **E**lectrotechnical **C**ommission
kHz	**k**ilo**h**er**z**
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

I. Executive Summary

A. Purpose of Test

An EMC evaluation was performed to determine compliance of the Sentinel Flex, with the requirements of FCC 15.247 and RSS-247 Issue 3. OnAsset Intelligence, Inc. should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the Sentinel Flex, 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 15.247 and RSS-247 Issue 3, in accordance with OnAsset Intelligence, Inc. purchase order number 8587. All tests were conducted using measurement procedures ANSI C63.4-2014 and ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024.

FCC Reference 47 CFR Part 15.247	IC Reference RSS-247 Issue 4 RSS-GEN Issue 5	Description	Compliance
Title 47 of the CFR, Part 15 §15.203	---	Antenna Requirement	**Compliant**
Title 47 of the CFR, Part 15 §15.207(a)	RSS-GEN(8.8)	Conducted Emission Limits	**Compliant**
Title 47 of the CFR, Part 15 §15.247(a)(1)	RSS-247 (5.1)	20dB Occupied Bandwidth	**Compliant**
---	RSS-GEN(6.7)	99% Occupied Bandwidth	**Compliant**
Title 47 of the CFR, Part 15 §15.247 (a, 1, i)	RSS-247(5.1)	Number of Hopping Channels	**Compliant**
Title 47 of the CFR, Part 15 §15.247 (a, 1, i)	RSS-247(5.1)	Channel Separation	**Compliant**
Title 47 of the CFR, Part 15 §15.247 (a, 1, i)	RSS-247(5.1)	Hopping Channel Dwell Time	**Compliant**
Title 47 of the CFR, Part 15 §15.247(b)	RSS-247(5.4)	Peak Power Output	**Compliant**
Title 47 of the CFR, Part 15 §15.247(d); §15.209; §15.205	RSS-GEN (6.13), (8.9), & (8.10)	Radiated Spurious Emissions Requirements	**Compliant**
Title 47 of the CFR, Part 15 §15.247(d)	RSS-247(5.5)	RF Conducted Spurious Emissions Requirements	**Compliant**

Table 1. Executive Summary

II. Equipment Configuration

A. Overview

Eurofins MET Labs was contracted by OnAsset Intelligence, Inc. to perform testing on the Sentinel Flex, under OnAsset Intelligence, Inc.'s purchase order number 8587.

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

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

Product Name:	Sentinel Flex Tag	
Model(s) Tested:	Sentinel Flex	
Test Sample Number:	25181-5	
EUT Specifications:	Primary Power: 3VDC Battery Powered	
	Type of Modulations:	Chirp Spread Spectrum
	Equipment Code:	DSS
	Peak RF Output Power (conducted):	20.21dBm (162.1mW)
	EUT Frequency Ranges:	902.3MHz – 914.9MHz
	Antenna Gain[1]:	-1.73dBi
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:	Veer Patel	
Report Date(s):	11/25/2025	

Table 2. EUT Summary Table

[1] The antenna gain information was provided by OnAsset Intelligence, Inc. and may affect compliance.

B. References

CFR 47, Part 15, Subpart C	Federal Communication Commission, Code of Federal Regulations, Title 47, Part 15: General Rules and Regulations, Allocation, Assignment, and Use of Radio Frequencies
RSS-247, Issue 4	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and License-Exempt Local Area Network (LE-LAN) Devices
RSS-GEN, Issue 5	General Requirements and Information for the Certification of Radio Apparatus
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

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 OnAsset Intelligence, Inc. Sentinel Flex Tag is an internal battery powered LoRaWAN transmitter, BLE beacon and Wi-Fi receiver with sensors intended for asset tracking and monitoring. EUT can be used to identify location area and save sensor information for later download.

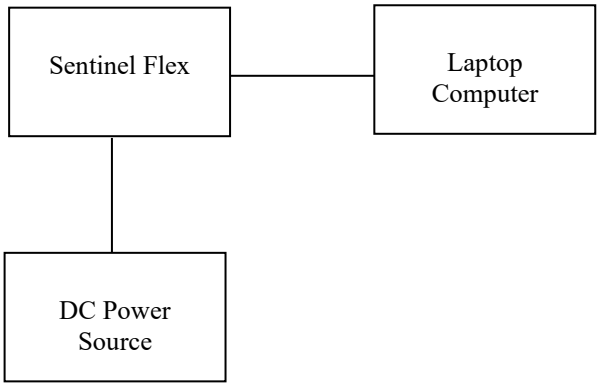


Figure 1. Block Diagram of Test Configuration

F. Equipment Configuration

The EUT was set up as outlined in Figure 1 above. The laptop computer was used to send test commands to force the transmitters to operate in the appropriate test mode.

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	Lenovo	ThinkPad	None

Table 5. Support Equipment

H. Ports and Cabling Information

Port Name on EUT	Qty	Length as tested (m)	Shielded? (Y/N)	Termination Box ID & Port Name
None. The Sentinel Flex Tag is a battery powered device with no cable connections				

Table 6. Ports and Cabling Information

I. Mode of Operation

User controlled software was provided (Sentinel Flex Certification Tests Version 0.1.0) to enable the EUT to achieve 100% duty cycle during EMC testing on low, mid, and high channels as well as to enable the hopping function. The support laptop provided a direct means of controlling transmitter parameters. Unless otherwise stated or shown, all tests were performed at worst-case modulation and data rates on the following channels.

Transmit Band	Modulation	Channel Frequencies Tested	Test Tool Power Setting[2]
902 – 928MHz	Chirp Spread Spectrum	902.3MHz / 908.5MHz / 914.9MHz	Product Default (20dBm)

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 OnAsset Intelligence, Inc. upon completion of testing.

[2] Note, the test tool power setting does not necessarily correspond to a power in dBm or Watts.

III. Electromagnetic Compatibility Criteria for Intentional Radiators

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.

c.) 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 the criteria of §15.203. The TX antenna is not accessible by the end user and it uses a unique coupling.

Test Engineer(s): Bryan Taylor

Test Date(s): 2/5/2025

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(a)(1) 20 dB Bandwidth

Test Requirements: **§ 15.247(a)(1):** Operation under the provisions of this section is limited to frequency hopping and digitally modulated intentional radiators that comply with the following provisions:

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.
(i) For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz

Test Procedure: The transmitter was on and transmitting at the highest output power. The bandwidth of the fundamental frequency was measured with the spectrum analyzer using a RBW approximately 1% of the total emission bandwidth, and the VBW > RBW. The 20 dB Bandwidth was measured and recorded. The measurements were performed on the low, mid and high channels.

Test Results The EUT was compliant with § 15.247 (a)(1).

The 20 dB Bandwidth was determined from the plots on the following pages.

Test Engineer(s): Veer Patel

Test Date(s): 2/3/2024

Electromagnetic Compatibility Criteria for Intentional Radiators

RSS-GEN (6.7) 99% Bandwidth

Test Requirements: The occupied bandwidth or the "99% emission bandwidth" is defined as the frequency rang between two points, one above and the other blow the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

Test Procedure: The transmitter was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured with the spectrum analyzer using a RBW approximately equal to 1% of the total emission bandwidth, and the VBW > RBW. The 99% Bandwidth was measured and recorded.

Test Results The 99% Bandwidth determined from the plots on the following pages.

Test Engineer(s): Veer Patel

Test Date(s): 2/3/2025

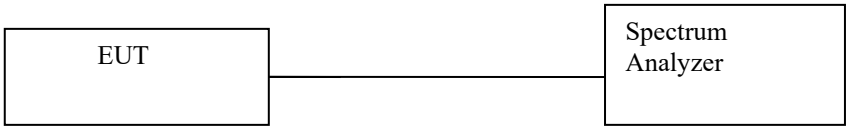
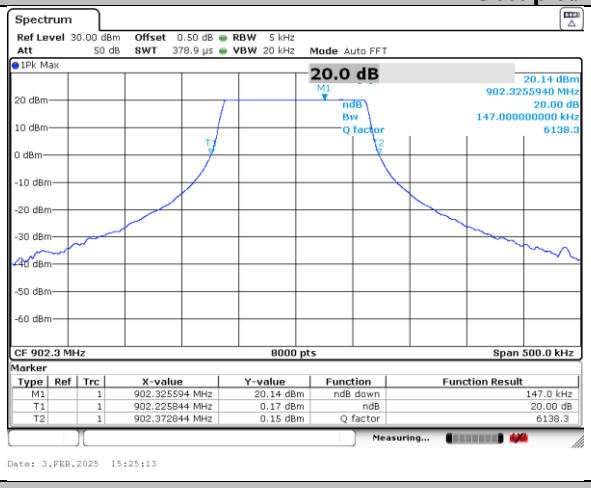


Figure 2. Block Diagram, Occupied Bandwidth Test Setup

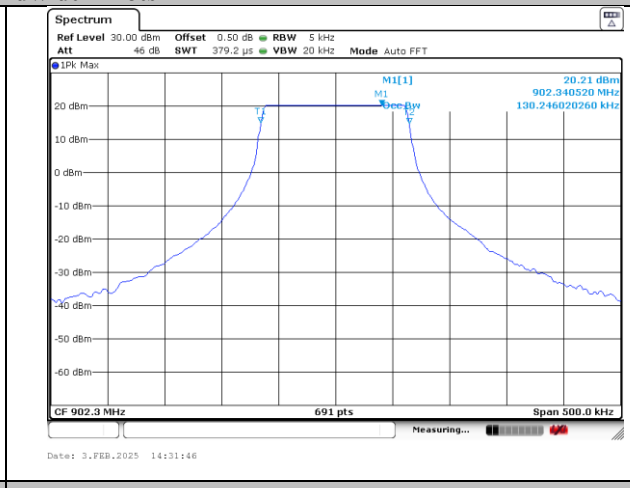
Channel	Frequency (MHz)	20dB Bandwidth (MHz)	20dB Bandwidth Limit (Maximum)	99% Bandwidth (MHz)	Result
Low	902.3MHz	0.147 MHz	0.25 MHz	0.130 MHz	Pass
Middle	908.5MHz	0.147 MHz	0.25 MHz	0.130 MHz	Pass
High	914.9MHz	0.147 MHz	0.25 MHz	0.130 MHz	Pass

Table 8. 99% and 20 dB Occupied Bandwidth, Test Results

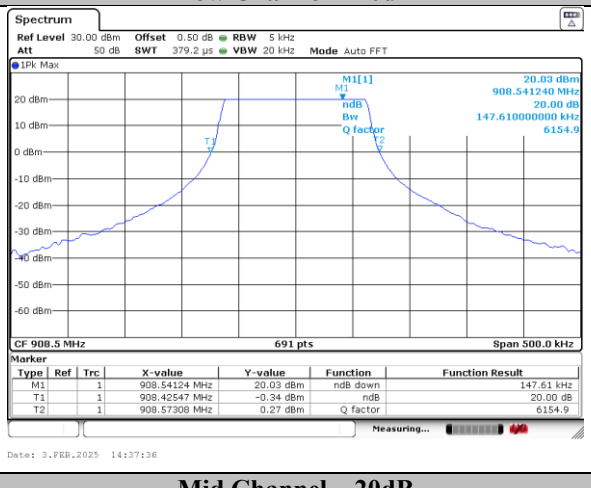
Occupied Bandwidth Plots



Low Channel – 20dB

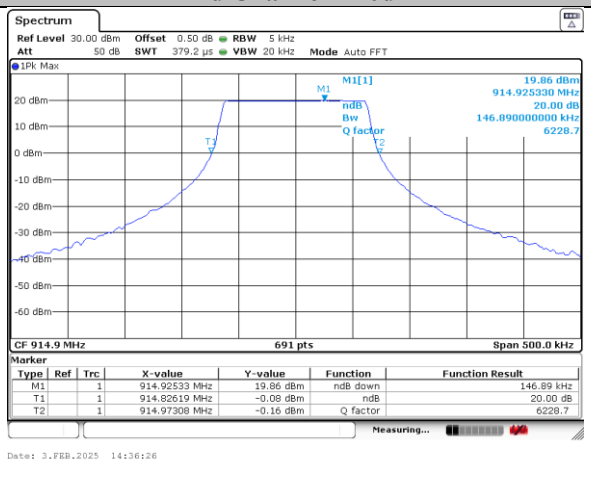


Low Channel – 99%

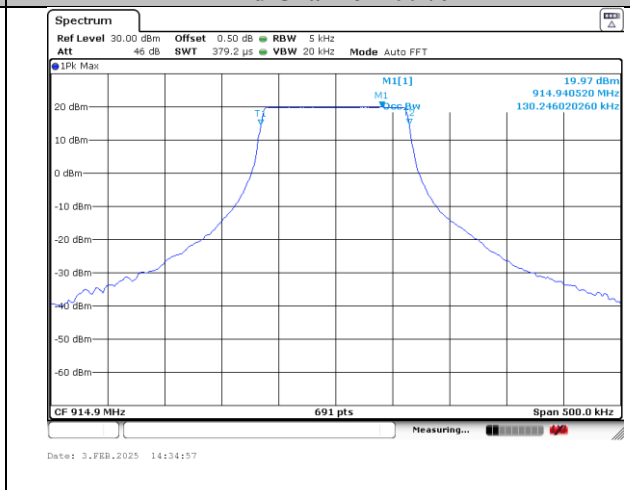


Mid Channel – 20dB

Mid Channel – 99%



High Channel – 20dB



High Channel – 99%

Figure 3. 20dB and 99% Bandwidth Plots

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(b) Number of Hopping Channels, Channel Dwell Time and Hopping Frequency Separation

Test Requirements: § 15.247(a, 1): Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

(i) For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

Test Requirements: **§RSS-247 (5.1):**

a. The bandwidth of a frequency hopping channel is the 20 dB emission bandwidth, measured with the hopping stopped. The system's radio frequency (RF) bandwidth is equal to the channel bandwidth multiplied by the number of channels in the hopset. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

b. FHSs shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, FHSs operating in the band 2400-2483.5 MHz may have hopping channel carrier frequencies that are separated by 25 kHz or two thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided that the systems operate with an output power no greater than 0.125 W.

c. For FHSs in the band 902-928 MHz: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping channels and the average time of occupancy on any channel shall not be greater than 0.4 seconds within a 20-second period. If the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping channels and the average time of occupancy on any channel shall not be greater than 0.4 seconds within a 10-second period. The maximum 20 dB bandwidth of the hopping channel shall be 500 kHz

Test Procedure: The transmitter was connected to a calibrated spectrum analyzer. The test sample was configured for its normal hopping sequence. A plot was captured showing the total number of hopping channels. Another plot was captured showing the channel separation. And finally, plots were captured showing the "on time" of a single hop as well as the number of hops in 20 seconds.

The total channel dwell time in a 20-second period was calculated by multiplying the number of hops in 20 seconds by the "on time" of a single hop.

Test Results: The EUT was compliant with hopping channel criteria from FCC part 15.247 and RSS-247 for a 20dB bandwidth of 147kHz.

Parameter	Measured Value	Limit	Result
Number Of Hopping Channels	64 Channels	At Least 50 Channels	Pass
Hopping Channel Separation	200kHz	At Least 147kHz	Pass
Hopping Channel Dwell Time	399mS	400mS	Pass

Figure 4. Hopping Channel Results

Test Engineer(s): Veet Patel

Test Date(s): 2/3/2025 – 3/25/2025

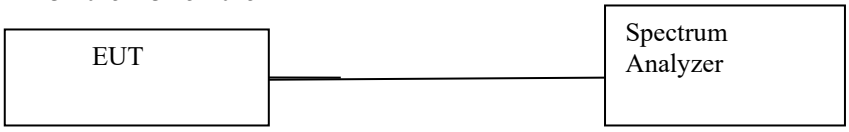
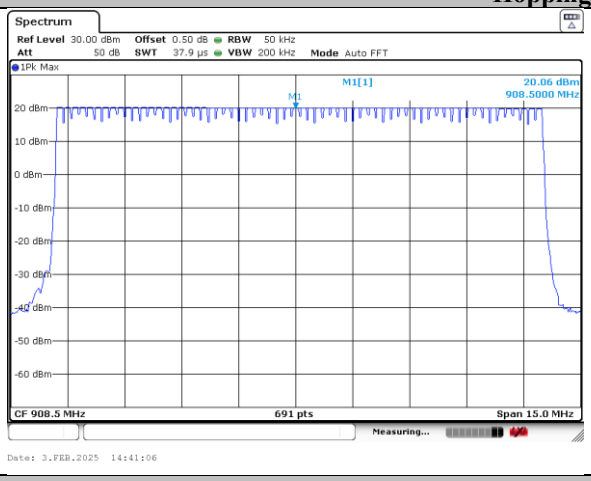
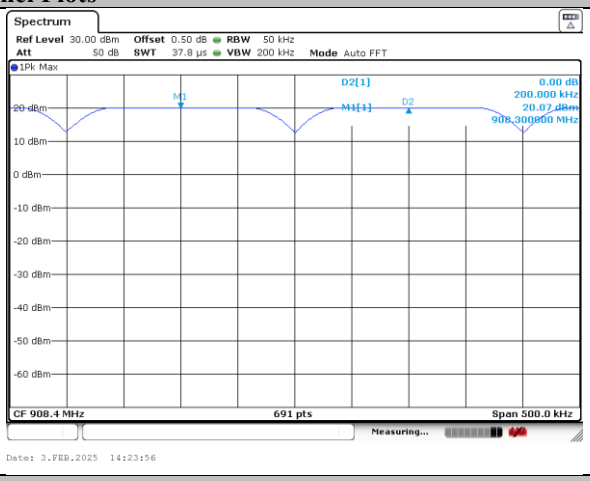


Figure 5. Hopping Channel Test Setup

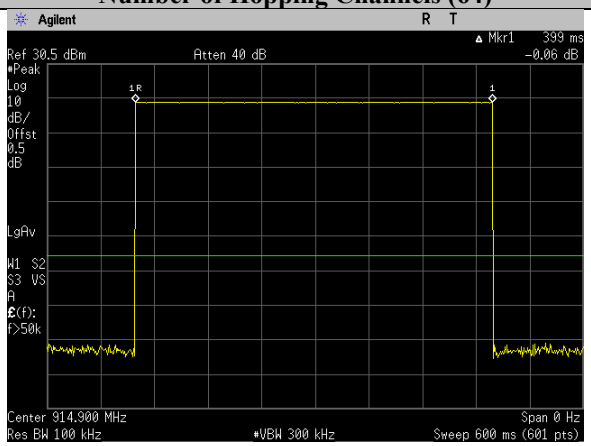
Hopping Channel Plots



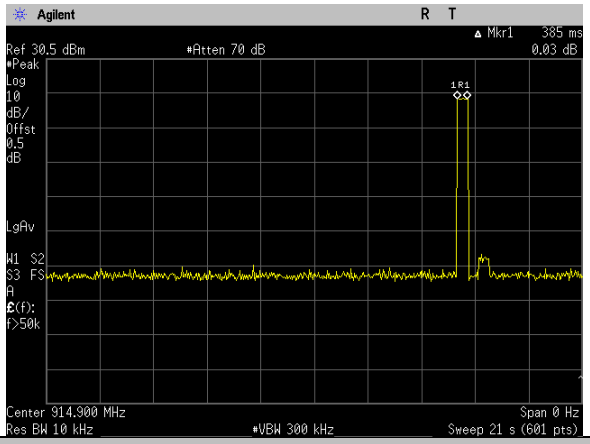
Number of Hopping Channels (64)



Channel Separation (200kHz)



On Time of a Single Hop (399mS)



Number of Hops in a 20 Second Period (One)

Figure 6. Hopping Channel Plots

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(b) Peak Power Output

Test Requirements: For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section

§15.247(c): if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in the **Error! Reference source not found.**, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

§ RSS-247 Peak Power Output and EIRP

Test Requirements: **§RSS-247 (5.4.a):** For FHSs operating in the band 902-928 MHz, the maximum peak conducted output power shall not exceed 1.0 W, and the e.i.r.p. shall not exceed 4 W if the hopset uses 50 or more hopping channels; the maximum peak conducted output power shall not exceed 0.25 W and the e.i.r.p. shall not exceed 1 W if the hopset uses less than 50 hopping channels.

Test Procedure: The transmitter was connected to a calibrated spectrum analyzer. The analyzer reference level was offset by cable loss connecting to the test sample. The peak power was measured at the low, mid and high channels of each band at the maximum power level.

Test Results: The EUT was compliant with the Peak Power Output limits of §15.247(b) and RSS-247 (5.4).

Test Engineer(s): Veet Patel

Test Date(s): 2/3/2025

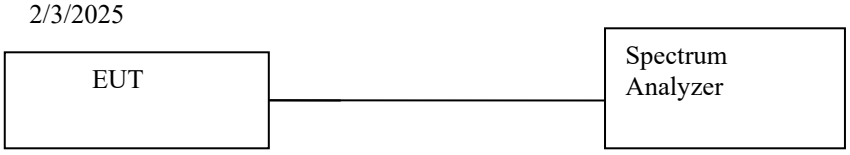


Figure 7. Peak Power Output Test Setup

Peak Power Output Test Results

Channel	Frequency (MHz)	Peak Conducted Power (dBm)	Peak Power Limit (dBm)	Result
Low	902.3MHz	20.21dBm	30	Pass
Middle	908.5MHz	20.08dBm	30	Pass
High	914.9MHz	19.99dBm	30	Pass

Table 9. Peak Power Output, Test Results

Channel	Frequency (MHz)	Peak Conducted Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Peak Power Limit (dBm)	Result
Low	902.3MHz	20.21dBm	-1.73	18.48dBm	36	Pass
Middle	908.5MHz	20.08dBm	-1.73	18.35dBm	36	Pass
High	914.9MHz	19.99dBm	-1.73	18.26dBm	36	Pass

Table 10. RSS-247 EIRP, Test Results

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(d) RF Conducted Spurious Emissions Requirements

Test Requirement:

15.247(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

RSS-247 (5.5) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

Test Procedure:

For intentional radiators with a digital device portion which operates below 10 GHz, the spectrum was investigated as per §15.33(a)(1) and §15.33(a)(4); i.e., the lowest RF signal generated or used in the device up to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

The transmitter was connected directly to a Spectrum Analyzer through an attenuator. The power level was set to the maximum level. The RBW was set to 100 kHz. The VBW was set to 3x the RBW. The spectrum analyzer was set to an auto sweep time and a peak detector was used. Measurements were carried out at the low, mid and high channels.

See following pages for detailed test results with RF Conducted Spurious Emissions.

Test Results:

The EUT was compliant with the Conducted Spurious Emission limits of §15.247(d) and RSS-247 (5.5).

Test Engineer(s):

Veer Patel

Test Date(s):

2/3/2025 – 2/10/2025

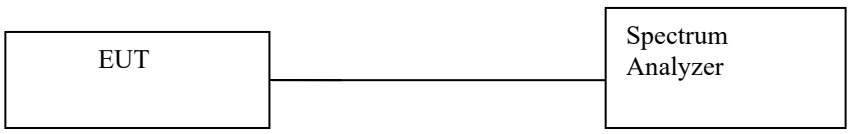


Figure 8. Block Diagram, Conducted Spurious Emissions Test Setup

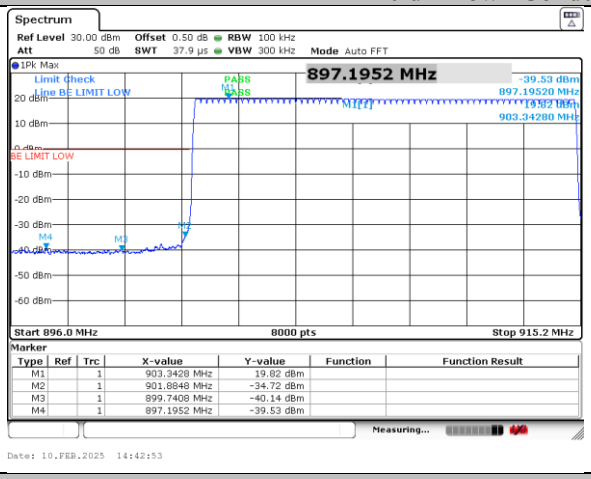
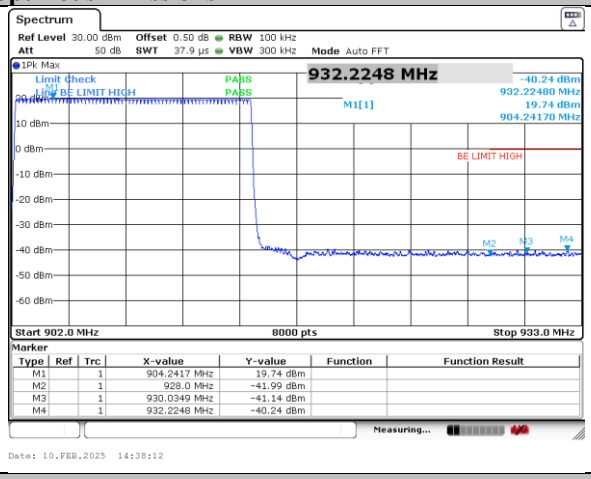
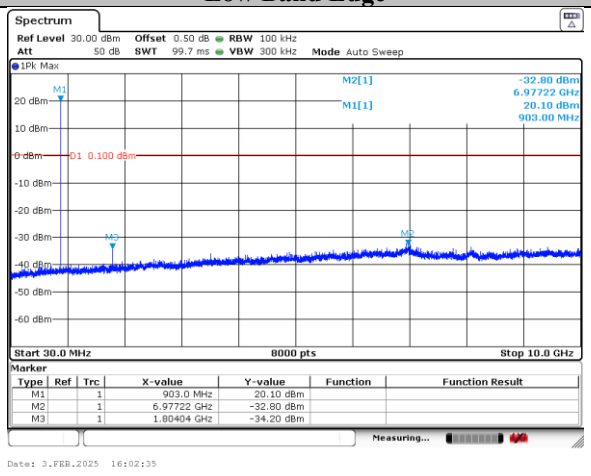
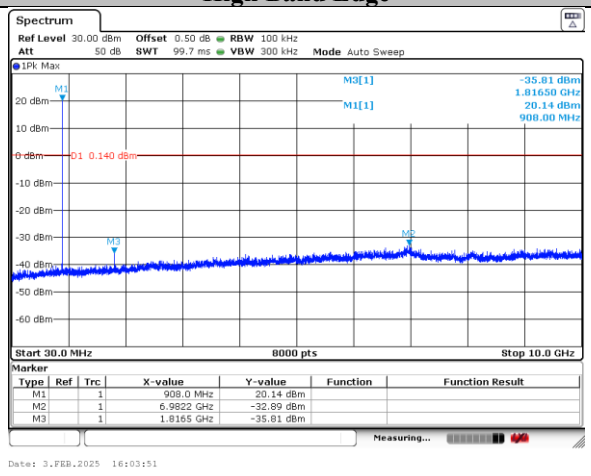
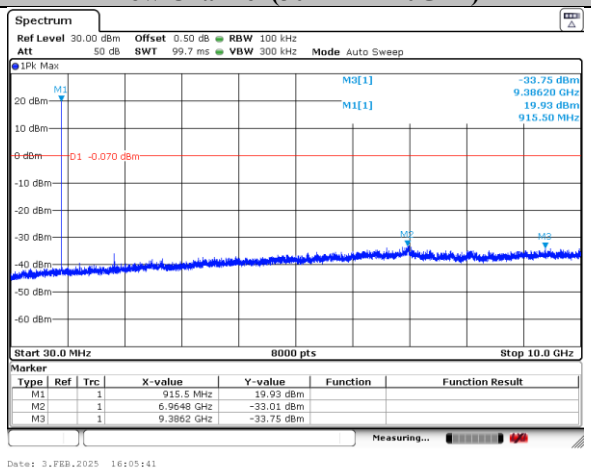
20 dB Down Conducted Spurious Emissions	
	
Low Band Edge	**High Band Edge**
	
Low Channel (30MHz – 40GHz)	**Mid Channel (30MHz – 40GHz)**
	
High Channel (30MHz – 40GHz)	**Intentionally Blank**

Figure 9. 20dB Down Conducted Spurious Emissions

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(d) Radiated Spurious Emissions Requirements and Band Edge

Test Requirements: **§15.247(d); §15.205:** Emissions outside the frequency band.

§15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a).

§15.205(a): Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090–0.110----------	16.42–16.423	399.9–410	4.5–5.15
[1] 0.495–0.505----------	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905----------	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128----------	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775----------	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775----------	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218----------	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825----------	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225----------	123–138	2200–2300	14.47–14.5
8.291–8.294----------	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366----------	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675----------	156.7–156.9	2655–2900	22.01–23.12
8.41425–8.41475----------	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293----------	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025----------	240–285	3345.8–3358 36.	43–36.5
12.57675–12.57725----------	322–335.4	3600–4400	([2])

Table 11. Restricted Bands of Operation

[1] Until February 1, 1999, this restricted band shall be 0.490 – 0.510 MHz.

[2] Above 38.6

Test Requirement(s): **§ 15.209 (a):** Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in Table 12.

Frequency (MHz)	§ 15.209(a),Radiated Emission Limits (dBµV) @ 3m
30 - 88	40.00
88 - 216	43.50
216 - 960	46.00
Above 960	54.00

Table 12. Radiated Emissions Limits Calculated from FCC Part 15, § 15.209 (a)

§ RSS-GEN Restricted Band Spurious Emissions

Test Requirements:

§RSS-GEN (8.10a): The transmit frequency, including fundamental components of modulation, of licence-exempt radio apparatus shall not fall within the restricted frequency bands listed in table 7 except for apparatus compliant with RSS-287, Emergency Position Indicating Radio Beacons (EPIRB), Emergency Locator Transmitters (ELT), Personal Locator Beacons (PLB), and Maritime Survivor Locator Devices (MSLD).

§RSS-GEN (8.10b): Unwanted emissions that fall into restricted frequency bands listed in table 7 shall comply with the limits specified in table 5 and table 6.

§RSS-GEN (8.10c): Unwanted emissions that do not fall within the restricted frequency bands listed in table 7 shall comply either with the limits specified in the applicable RSS or with those specified in table 5 and table 6.

Table 7 – Restricted frequency bands[Note 1]		
MHz	**MHz**	**GHz**
0.090 - 0.110	149.9 - 150.05	9.0 - 9.2
0.495 - 0.505	156.52475 - 156.52525	9.3 - 9.5
2.1735 - 2.1905	156.7 - 156.9	10.6 - 12.7
3.020 - 3.026	162.0125 - 167.17	13.25 - 13.4
4.125 - 4.128	167.72 - 173.2	14.47 - 14.5
4.17725 - 4.17775	240 – 285	15.35 - 16.2
4.20725 - 4.20775	322 - 335.4	17.7 - 21.4
5.677 - 5.683	399.9 - 410	22.01 - 23.12
6.215 - 6.218	608 - 614	23.6 - 24.0
6.26775 - 6.26825	960 - 1427	31.2 - 31.8
6.31175 - 6.31225	1435 - 1626.5	36.43 - 36.5
8.291 - 8.294	1645.5 - 1646.5	Above 38.6
8.362 - 8.366	1660 - 1710	
8.37625 - 8.38675	1718.8 - 1722.2	
8.41425 - 8.41475	2200 - 2300	
12.29 - 12.293	2310 - 2390	
12.51975 - 12.52025	2483.5 - 2500	
12.57675 - 12.57725	2655 - 2900	

Table 13. Restricted Bands of Operation

13.36 - 13.41	3260 – 3267	
16.42 - 16.423	3332 - 3339	
16.69475 - 16.69525	3345.8 - 3358	
16.80425 - 16.80475	3500 - 4400	
25.5 - 25.67	4500 - 5150	
37.5 - 38.25	5350 - 5460	
73 - 74.6	7250 - 7750	
74.8 - 75.2	8025 – 8500	
108 – 138		

Note 1: Certain frequency bands listed in table 7 and in bands above 38.6 GHz are designated for licence-exempt applications. These frequency bands and the requirements that apply to related devices are set out in the 200 and 300 series of RSSs.

Table 14. Restricted Bands of Operation (continued)

Table 5 – General field strength limits at frequencies above 30 MHz	
Frequency (MHz)	**Field strength (µV/m at 3 m)**
30 – 88	100
88 – 216	150
216 – 960	200
Above 960	500

Table 6 – General field strength limits at frequencies below 30 MHz		
Frequency	**Magnetic field strength (H-Field) (µA/m)**	**Measurement distance (m)**
9 - 490 kHz[Note 1]	6.37/F (F in kHz)	300
490 - 1705 kHz	63.7/F (F in kHz)	30
1.705 - 30 MHz	0.08	30

Note 1: The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.

Table 15. General Limits

Test Procedures: The conducted methodology referenced in ANSI C63.10: 2013 Section 11.12.1 was utilized in order to assess the unwanted emissions in the restricted bands.

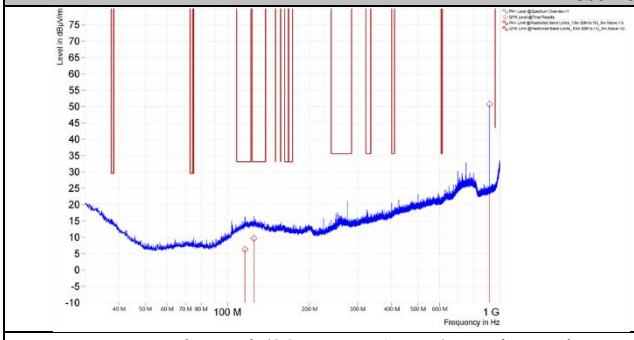
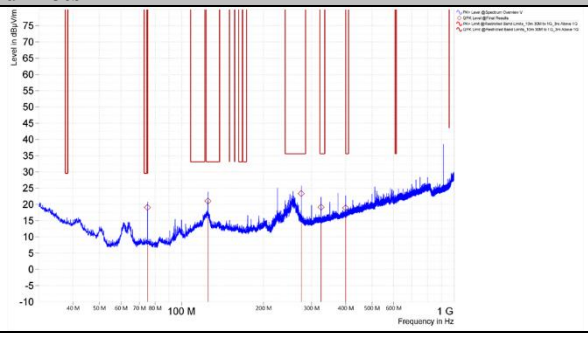
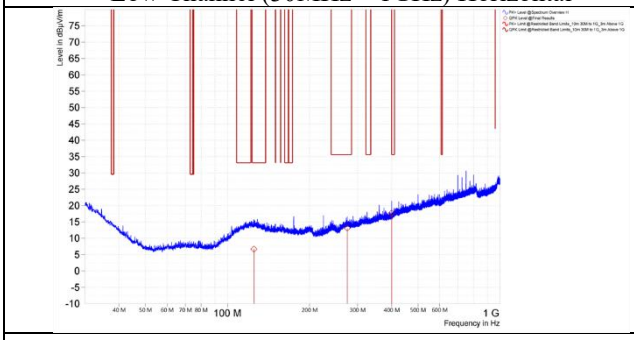
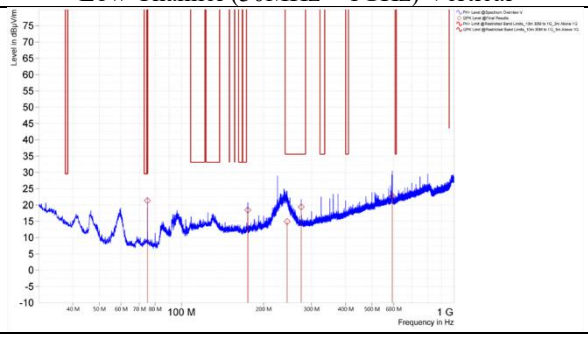
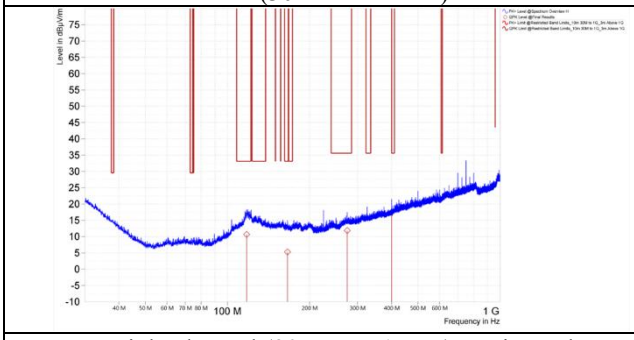
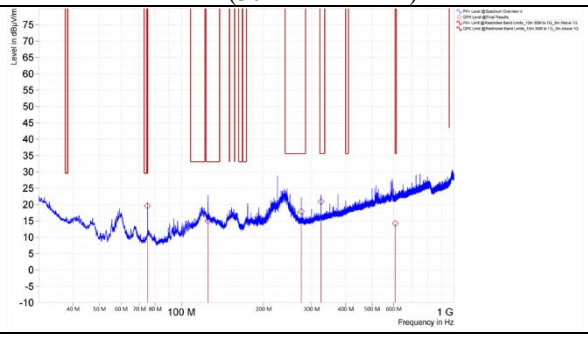
Additionally, in order to assess the emissions emanating from the cabinet, a radiated scan was performed with the antenna of proper impedance installed per ANSI C63.10 Section 11.12.2.7. The transmitter was turned on. Measurements were performed of the low, mid and high Channels. The EUT was rotated orthogonally through all three axes if multiple mounting orientations are supported. Plots shown are corrected for both antenna correction factor and distance and compared to a 3 m limit line.

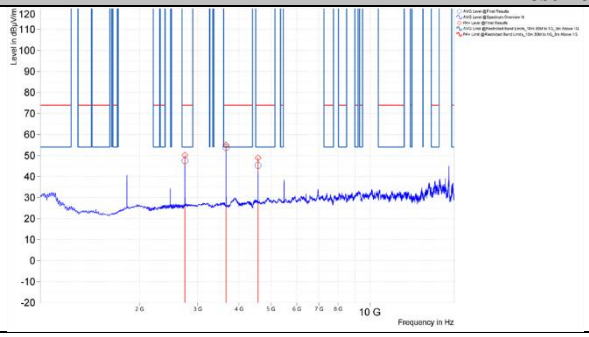
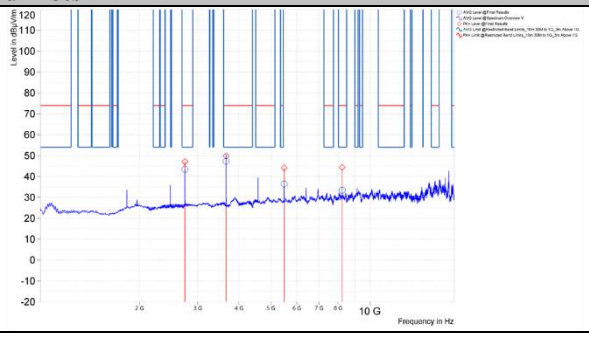
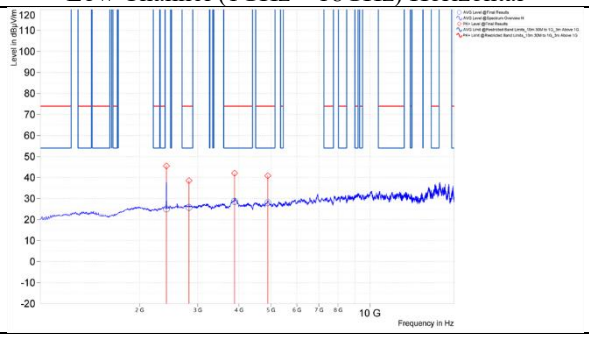
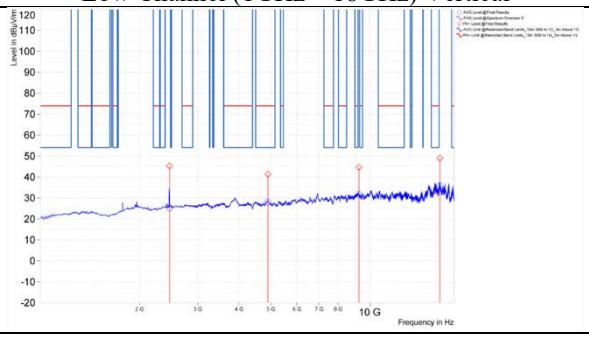
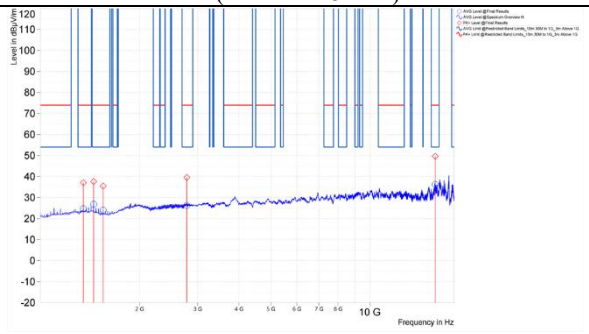
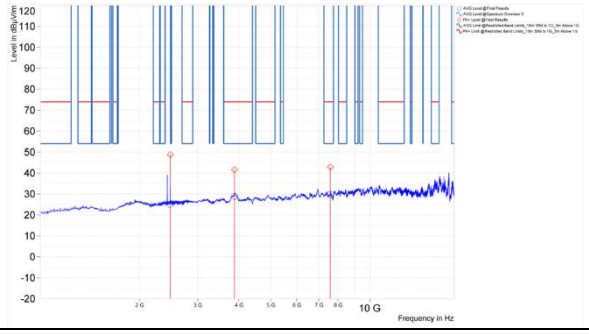
Radiated measurements below 30MHz were performed in a semi-anechoic chamber that has been correlated to an open area site.

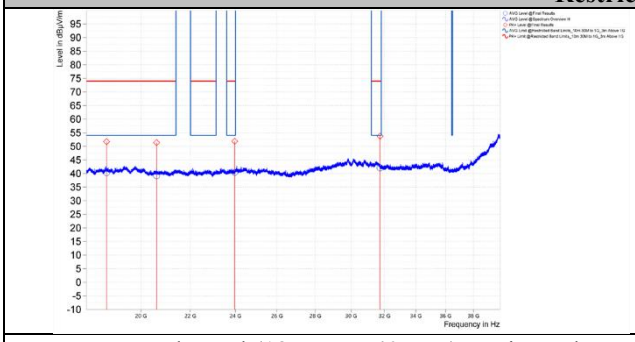
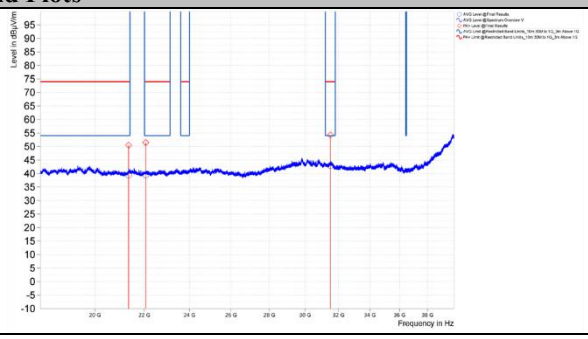
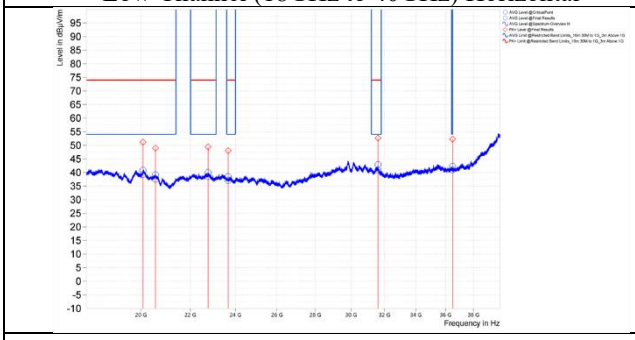
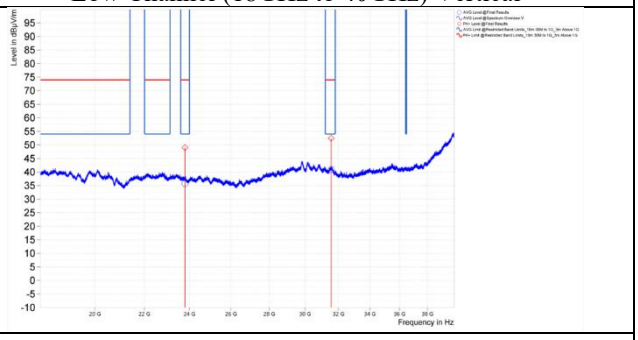
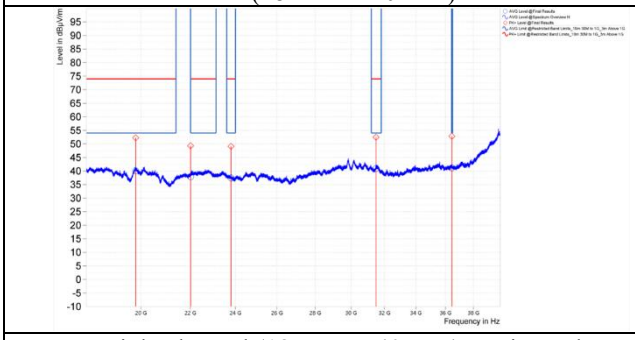
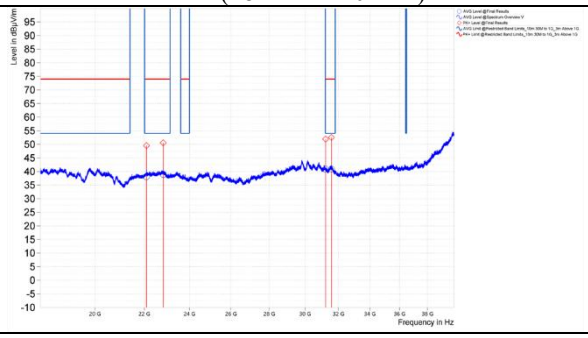
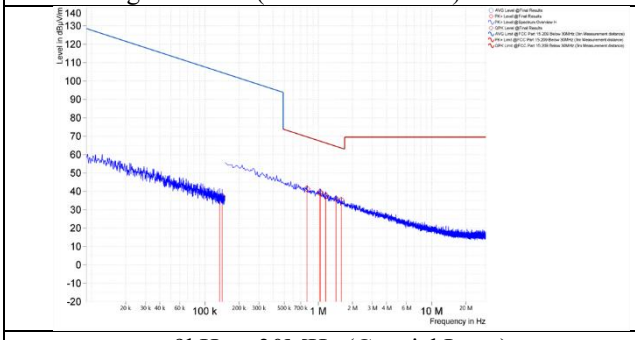
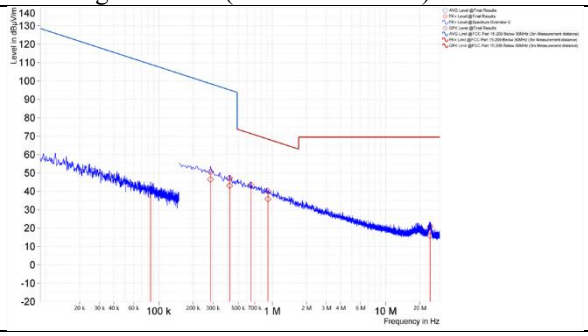
Test Results: The EUT was compliant with the Radiated Spurious Emission limits of § 15.247(d) and the RSS-GEN restricted band limits.

Test Engineer(s): Veer Patel, Frank Hernandez, A Dang

Test Date(s): 1/16/2025 – 1/21/2025

Restricted Band Plots	
	
Low Channel (30MHz – 1GHz) Horizontal	Low Channel (30MHz – 1GHz) Vertical
	
Mid Channel (30MHz – 1GHz) Horizontal	Mid Channel (30MHz – 1GHz) Vertical
	
High Channel (30MHz – 1GHz) Horizontal	High Channel (30MHz – 1GHz) Vertical

Restricted Band Plots	
	
Low Channel (1GHz – 18GHz) Horizontal	Low Channel (1GHz – 18GHz) Vertical
	
Mid Channel (1GHz – 18GHz) Horizontal	Mid Channel (1GHz – 18GHz) Vertical
	
High Channel (1GHz – 18GHz) Horizontal	High Channel (1GHz – 18GHz) Vertical

Restricted Band Plots	
	
Low Channel (18GHz to 40GHz) Horizontal	Low Channel (18GHz to 40GHz) Vertical
	
Mid Channel (18GHz to 40GHz) Horizontal	Mid Channel (18GHz to 40GHz) Vertical
	
High Channel (18GHz to 40GHz) Horizontal	High Channel (18GHz to 40GHz) Vertical
	
9kHz – 30MHz (Coaxial Loop)	9kHz – 30MHz (Coplanar Loop)

Worst Case Cabinet Spurious Emissions

Frequency [MHz]	PK+ Level [dBµV/m]	PK+ Limit [dBµV/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]	Result
0.084	41.18	109.07	67.89	11.65	V	124	1	0.200	Pass
0.135	36.76	105.02	68.26	11.37	H	268.7	1	0.200	Pass
0.142	37.26	104.56	67.31	11.40	H	312.3	1	0.200	Pass
0.285	50.57	98.50	47.93	11.29	V	321.2	1	9.000	Pass
0.420	47.22	95.14	47.92	11.28	V	67.6	1	9.000	Pass
0.645	43.52	71.41	27.89	11.37	V	157.8	1	9.000	Pass
0.794	41.48	69.61	28.13	11.50	H	326.4	1	9.000	Pass
0.915	40.08	68.37	28.29	11.55	V	167.8	1	9.000	Pass
1.037	39.58	67.29	27.70	11.77	H	16.7	1	9.000	Pass
1.041	38.90	67.25	28.35	11.77	H	95.1	1	9.000	Pass
1.163	37.65	66.29	28.64	11.73	H	0	1	9.000	Pass
1.167	37.49	66.26	28.77	11.73	H	238.5	1	9.000	Pass
1.433	35.92	64.47	28.55	11.70	H	162.3	1	9.000	Pass
1.595	35.22	63.54	28.33	11.67	H	8.9	1	9.000	Pass
24.707	20.91	69.50	48.59	9.67	V	0	1	9.000	Pass

Figure 10. Worst Case Cabinet Radiation, 9kHz - 30MHz

Frequency [MHz]	QPK Level [dBµV/m]	QPK Limit [dBµV/m]	QPK Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]	Result
75.000	19.08	29.55	10.47	-12.22	V	175.6	1.56	120.000	Pass
115.950	6.27	33.07	26.80	-6.71	H	43.1	3.98	120.000	Pass
125.010	21.02	33.07	12.05	-6.16	V	77.2	0.99	120.000	Pass
125.040	9.66	33.07	23.41	-6.25	H	140.1	3.98	120.000	Pass
275.010	23.31	35.57	12.26	-5.90	V	179.5	0.99	120.000	Pass
324.990	19.15	35.57	16.42	-4.66	V	47.6	3.99	120.000	Pass
400.020	18.93	35.57	16.64	-2.91	V	78.9	1.03	120.000	Pass

Figure 11. Radiated Spurious, 30MHz - 1GHz, Low

Frequency [MHz]	QPK Level [dBµV/m]	QPK Limit [dBµV/m]	QPK Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]	Result
75.000	21.33	29.55	8.22	-12.22	V	74.8	1.63	120.000	Pass
125.010	6.68	33.07	26.39	-6.25	H	282.3	3.34	120.000	Pass
244.080	14.89	35.57	20.68	-7.37	V	335.9	1.02	120.000	Pass
275.010	13.13	35.57	22.44	-5.90	H	179.1	3.91	120.000	Pass
275.010	19.40	35.57	16.17	-5.90	V	50.9	1.07	120.000	Pass
399.990	17.71	35.57	17.86	-3.01	H	282.5	1.74	120.000	Pass

Figure 12. Radiated Spurious, 30MHz - 1GHz, Mid

Frequency [MHz]	QPK Level [dBµV/m]	QPK Limit [dBµV/m]	QPK Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]	Result
75.000	19.57	29.55	9.98	-12.22	V	344.5	1.5	120.000	Pass
117.600	10.63	33.07	22.44	-6.59	H	187.1	3.89	120.000	Pass
124.950	15.05	33.07	18.02	-6.15	V	304.4	0.99	120.000	Pass
165.990	5.30	33.07	27.77	-7.96	H	89.8	3.78	120.000	Pass
274.980	11.84	35.57	23.73	-5.90	H	155.3	3.97	120.000	Pass
274.980	17.90	35.57	17.67	-5.90	V	305.8	1.04	120.000	Pass
324.990	20.89	35.57	14.68	-4.66	V	278.6	1.02	120.000	Pass
399.990	17.39	35.57	18.18	-3.01	H	299.9	1.43	120.000	Pass
609.240	14.25	35.57	21.32	1.35	V	347.1	1.49	120.000	Pass

Figure 13. Radiated Spurious, 30MHz - 1GHz, High

Frequency [MHz]	PK+ Level [dBµV/m]	PK+ Limit [dBµV/m]	PK+ Margin [dB]	AVG Level [dBµV/m]	AVG Limit [dBµV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Result
2,744.500	50.15	74.00	23.85	47.56	54.00	6.44	-2.74	H	223.4	1.03	Pass
2,744.500	47.07	74.00	26.93	43.39	54.00	10.61	-2.74	V	177.8	4	Pass
3,659.500	54.99	74.00	19.01	53.82	54.00	0.18	-3.66	H	217.8	1.35	Pass
3,660.000	49.79	74.00	24.21	47.27	54.00	6.73	-3.66	V	11	3.19	Pass
4,574.500	48.88	74.00	25.12	45.32	54.00	8.68	-3.78	H	18.3	1.06	Pass
8,234.000	44.33	74.00	29.67	33.42	54.00	20.58	-3.15	V	355.2	1.04	Pass

Figure 14. Radiated Spurious, 1GHz to 18GHz, Low

Frequency [MHz]	PK+ Level [dBµV/m]	PK+ Limit [dBµV/m]	PK+ Margin [dB]	AVG Level [dBµV/m]	AVG Limit [dBµV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Result
2,822.500	38.50	74.00	35.50	25.79	54.00	28.21	-3.03	H	34.6	3.49	Pass
3,881.500	42.07	74.00	31.93	28.64	54.00	25.36	-1.70	H	124.1	2.86	Pass
4,900.500	40.85	74.00	33.15	27.99	54.00	26.01	-3.02	H	113.8	3.09	Pass
4,900.500	41.35	74.00	32.65	28.01	54.00	25.99	-3.02	V	201.8	3.25	Pass

Figure 15. Radiated Spurious, 1GHz to 18GHz, Mid

Frequency [MHz]	PK+ Level [dBµV/m]	PK+ Limit [dBµV/m]	PK+ Margin [dB]	AVG Level [dBµV/m]	AVG Limit [dBµV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Result
1,350.000	37.10	74.00	36.90	24.71	54.00	29.29	0.65	H	356.4	1.01	Pass
1,450.000	37.61	74.00	36.39	26.84	54.00	27.16	-0.53	H	350.3	2.97	Pass
1,550.000	35.51	74.00	38.49	23.95	54.00	30.05	-2.20	H	360.3	1.28	Pass
2,781.500	39.52	74.00	34.48	26.23	54.00	27.77	-2.83	H	24.6	2.89	Pass
3,881.500	41.55	74.00	32.45	28.83	54.00	25.17	-1.70	V	61.9	3.52	Pass
7,580.000	42.86	74.00	31.14	29.83	54.00	24.17	-2.57	V	98.9	3.87	Pass
15,772.000	49.64	74.00	24.36	36.20	54.00	17.80	0.69	H	265	1.49	Pass

Figure 16. Radiated Spurious, 1GHz to 18GHz, High

Frequency [MHz]	PK+ Level [dBµV/m]	PK+ Limit [dBµV/m]	PK+ Margin [dB]	AVG Level [dBµV/m]	AVG Limit [dBµV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Result
18,715.688	51.73	74.00	22.27	40.33	54.00	13.67	13.08	H	298.2	1.59	Pass
20,609.750	51.38	74.00	22.62	39.22	54.00	14.78	12.42	H	108.5	2.49	Pass
21,340.563	50.51	74.00	23.49	39.45	54.00	14.55	12.70	V	232.3	1.47	Pass
22,060.375	51.45	74.00	22.55	39.56	54.00	14.44	13.17	V	80.1	3.1	Pass
23,968.188	51.88	74.00	22.12	40.43	54.00	13.57	14.48	H	203.5	4	Pass
31,506.625	54.26	74.00	19.74	42.93	54.00	11.07	16.77	V	109.6	1.69	Pass
31,725.938	53.76	74.00	20.24	42.07	54.00	11.93	16.18	H	198.4	4	Pass

Figure 17. Radiated Spurious, 18GHz to 40GHz, Low

Frequency [MHz]	PK+ Level [dBµV/m]	PK+ Limit [dBµV/m]	PK+ Margin [dB]	AVG Level [dBµV/m]	AVG Limit [dBµV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Result
20,077.625	51.15	74.00	22.85	39.26	54.00	14.74	12.22	H	101.4	2	Pass
20,565.750	48.95	74.00	25.05	37.57	54.00	16.43	12.31	H	323.2	2.49	Pass
22,767.813	49.44	74.00	24.56	38.45	54.00	15.55	14.02	H	103	1.37	Pass
23,666.375	48.01	74.00	25.99	37.03	54.00	16.97	14.49	H	82	1	Pass
23,797.000	48.99	74.00	25.01	35.75	54.00	18.25	14.54	V	160.3	2.06	Pass
31,550.625	52.48	74.00	21.52	40.98	54.00	13.02	16.82	V	234.4	2.81	Pass
31,606.313	52.63	74.00	21.37	40.97	54.00	13.03	16.84	H	108.3	3.22	Pass
36,492.375	52.31	74.00	21.69	40.99	54.00	13.01	15.78	H	81.9	3.91	Pass

Figure 18. Radiated Spurious, 18GHz to 40GHz, Mid

Frequency [MHz]	PK+ Level [dBµV/m]	PK+ Limit [dBV/m]	PK+ Margin [dB]	AVG Level [dBµV/m]	AVG Limit [dBµV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Result
19,794.375	52.27	74.00	21.73	40.03	54.00	13.97	12.39	H	101.6	1.01	Pass
22,010.188	49.31	74.00	24.69	37.87	54.00	16.13	13.00	H	174.1	2.19	Pass
22,087.875	49.53	74.00	24.47	38.08	54.00	15.92	13.26	V	348.4	2.5	Pass
22,811.813	50.52	74.00	23.48	38.93	54.00	15.07	14.02	V	108.3	1.98	Pass
23,798.375	49.06	74.00	24.94	37.42	54.00	16.58	14.54	H	39.3	1.49	Pass
31,210.313	51.90	74.00	22.10	40.84	54.00	13.16	16.59	V	233.4	1.5	Pass
31,477.750	52.48	74.00	21.52	40.91	54.00	13.09	16.72	H	101.6	1.49	Pass
31,570.563	52.54	74.00	21.46	40.89	54.00	13.11	16.84	V	11.4	3.91	Pass
36,447.000	52.81	74.00	21.19	41.13	54.00	12.87	15.88	H	239	1.49	Pass

Figure 19. Radiated Spurious, 18GHz to 40GHz, High

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.

MET Asset #	Description	Manufacturer	Model	Last Cal Date	Cal Due Date
MY46180897	Spectrum Analyzer	Keysight	E4448A	8/28/2024	8/28/2025
1A1250	EMI Receiver	Rohde & Schwarz	ESW44	04/08/2024	04/08/2025
1A1176	Active Loop Antenna (9KHz-30MHz)	ETS-Lindgren	6502	8/22/2024	8/22/2026
1A1147	Bi-Log Antenna	Suno Sciences Corp	JB3	04/06/2023	4/06/2025
1A1183	Horn Antenna	ETS - Lindgren	3117	02/20/2024	02/20/2026
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 16. Test Equipment List

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

End of Report