



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

May 8, 2025

HP Inc.
Tony Griffiths
1501 Old Page Mill Rd.
Palo Alto, CA 94304-1126
USA

Dear Tony Griffiths,

Enclosed is the EMC Wireless test report for compliance testing of the HP, Inc. model P033 as tested to the requirements of FCC 15.247 and RSS-247 Issue 3 for Intentional Radiators.

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

A handwritten signature in blue ink that reads "Nancy LaBrecque".

Nancy LaBrecque
Documentation Department

Reference: WIRA135001 – FCC247 RSS247-BT_FHSS

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Bluetooth FHSS Test Report

for the

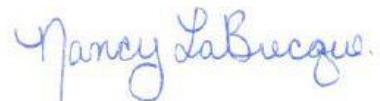
HP Inc.
P033

Tested under

FCC 15.247 and RSS-247 Issue 3
For Intentional Radiators



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 15.247 under normal use and maintenance.



Matthew Hinojosa
EMC Manager, Austin Electromagnetic Compatibility Lab

Report Status Sheet

Revision	Report Date	Reason for Revision
Ø	May 8, 2025	Initial Issue.

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List of Terms and Abbreviations

AC	Alternating Current
ACF	Antenna Correction Factor
Cal	Calibration
<i>d</i>	Measurement Distance
dB	Decibels
dB_μA	Decibels above one microamp
dB_μV	Decibels above one microvolt
dB_μA/m	Decibels above one microamp per meter
dB_μV/m	Decibels above one microvolt per meter
DC	Direct Current
E	Electric Field
DSL	Digital Subscriber Line
ESD	Electrostatic Discharge
EUT	Equipment Under Test
<i>f</i>	Frequency
FCC	Federal Communications Commission
GRP	Ground Reference Plane
H	Magnetic Field
HCP	Horizontal Coupling Plane
Hz	Hertz
IEC	International Electrotechnical Commission
kHz	kilohertz
kPa	kilopascal
kV	kilovolt
LISN	Line Impedance Stabilization Network
MHz	Megahertz
μH	microhenry
μ	microfarad
μs	microseconds
NEBS	Network Equipment-Building System
PRF	Pulse Repetition Frequency
RF	Radio Frequency
RMS	Root-Mean-Square
TWT	Traveling Wave Tube
V/m	Volts per meter
VCP	Vertical Coupling Plane

I. Executive Summary

A. Purpose of Test

An EMC evaluation was performed to determine compliance of the HP, Inc. model P033, with the requirements of FCC 15.247 and RSS-247 Issue 3. HP, Inc. should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the model P033, 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 HP, Inc. purchase order number 9100415812. All tests were conducted using measurement procedures ANSI C63.4-2014 and ANSI C63.10-2013.

FCC Reference 47 CFR Part 15.247:2005	IC Reference RSS-247 Issue 3 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	Note ¹
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)	RSS-247 (5.1)	Average Time of Occupancy (Dwell Time)	Compliant
Title 47 of the CFR, Part 15 §15.247(a)(1)	RSS-247 (5.1)	Number of RF Channels	Compliant
Title 47 of the CFR, Part 15 §15.247(a)(1)	RSS-247 (5.1)	RF Channel Separation	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	Note ¹

Figure 1. Executive Summary

¹ This test was not performed as part of the permissive change application.

II. Equipment Configuration

A. Overview

Eurofins MET Labs was contracted by HP, Inc. to perform testing on the model P033, under HP, Inc.'s purchase order number 9100415812.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the HP, Inc. model P033.

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

Product Marketing Name Tested:	Poly Studio X52	
Model Number Tested:	P033	
FCCID:	M72-P033	
ICID:	1849C-P033	
EUT Specifications:	Primary Power: 100 – 230VAC	
	Frequency Range: 50Hz / 60Hz	
	Type of Modulations:	GFSK, Pi/4 DQPSK, 8DPSK
	Equipment Code:	DSS
	Peak RF Output Power:	6.78dBm
	EUT Frequency Ranges:	2402-2480 MHz
	Antenna Gain (declared by HP, Inc.)	4.07dBi
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):	May 8, 2025	

Description	Model Number	Part Number	Serial Number	Rev #
Power Supply	065-1A120500B3	SM00754DG	1GBBL003T	N.A.
Poly Studio X52	OBAN50	2201-8749-001	822238671543FM	N.A.

Figure 2. EUT List

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 3, August 2023	Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSS) and Licence-Exempt Local Area Network (LE-LAN) Devices
RSS-GEN, Issue 5, March 2019	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 C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

Figure 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%

Figure 4. Uncertainty Calculations Summary

E. Description of Test Sample

The HP Inc. model P033 (marketed as Poly Studio X52), is a video conferencing bar designed to act as a Video endpoint over LAN network. The device is powered an AC/DC mains adapter and contains 2.4GHz / 5GHz WiFi and Bluetooth radio interfaces.

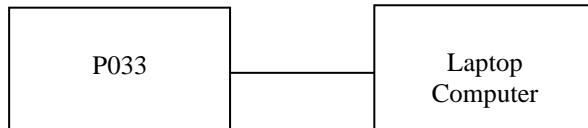


Figure 5. Block Diagram of Test Configuration

F. Equipment Configuration

The EUT was set up as outlined in Figure 5, Block Diagram of Test Setup. 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.

Name/Description	Manufacturer	Model Number	Customer Supplied Calibration Data
4k Monitors	hp	1B9T0AA	N/A
4k Monitors	hp	1B9T0AA	N/A
BT Remote	Poly/ Remotec	BW7640UN	N/A
USB keyboard	hp	KU-0316	N/A
USB mouse	hp	672652-001	N/A
Laptop for content and pings	Dell	XPS 14	N/A
Router Cisco gigabit router	Cisco	RN042G	N/A
WIFI access point Cisco AIR Lap	Cisco	1142N-A-K9	N/A

Figure 6. Support Equipment

H. Ports and Cabling Information

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
DC Power	DC Power Cable	1	2m	2m	No	AC/DC Power Adapter
USB-C	USB-C	1	10m	10m	Yes	Laptop Computer

Figure 7. Ports and Cabling Information

I. Mode of Operation

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	Operating Mode	Channel Frequencies Tested	Test Tool Power Setting	Test Tool Name
2400 – 2483.5MHz	GFSK	2402MHz / 2441MHz / 2480MHz	9.0dBm	WiFi_BT_DEBUG TOOL_v0.0.1.6
	Pi/4 DQPSK	2402MHz / 2441MHz / 2480MHz	9.0dBm	
	8DPSK	2402MHz / 2441MHz / 2480MHz	9.0dBm	

Figure 8. Test Channels Utilized

Additionally, some tests required the test sample to operate in its normal frequency hopping mode.

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 HP, Inc. upon completion of testing.

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.

Test Engineer(s): Bryan Taylor

Test Date(s): 2/14/2025

Electromagnetic Compatibility Criteria for Intentional Radiators**§ 15.247(a)(1) 20 dB Bandwidth**

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

For systems using digital modulation techniques, the EUT may operate in the 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz bands. For DTS, the minimum 6 dB bandwidth shall be at least 500 kHz. For frequency hopping systems, the EUT 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.

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): Bryan Taylor

Test Date(s): 3/26/2025

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 range between two points, one above and the other below 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): Bryan Taylor

Test Date(s): 3/26/2025

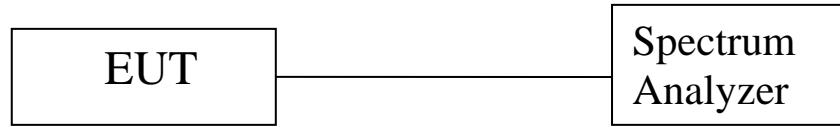
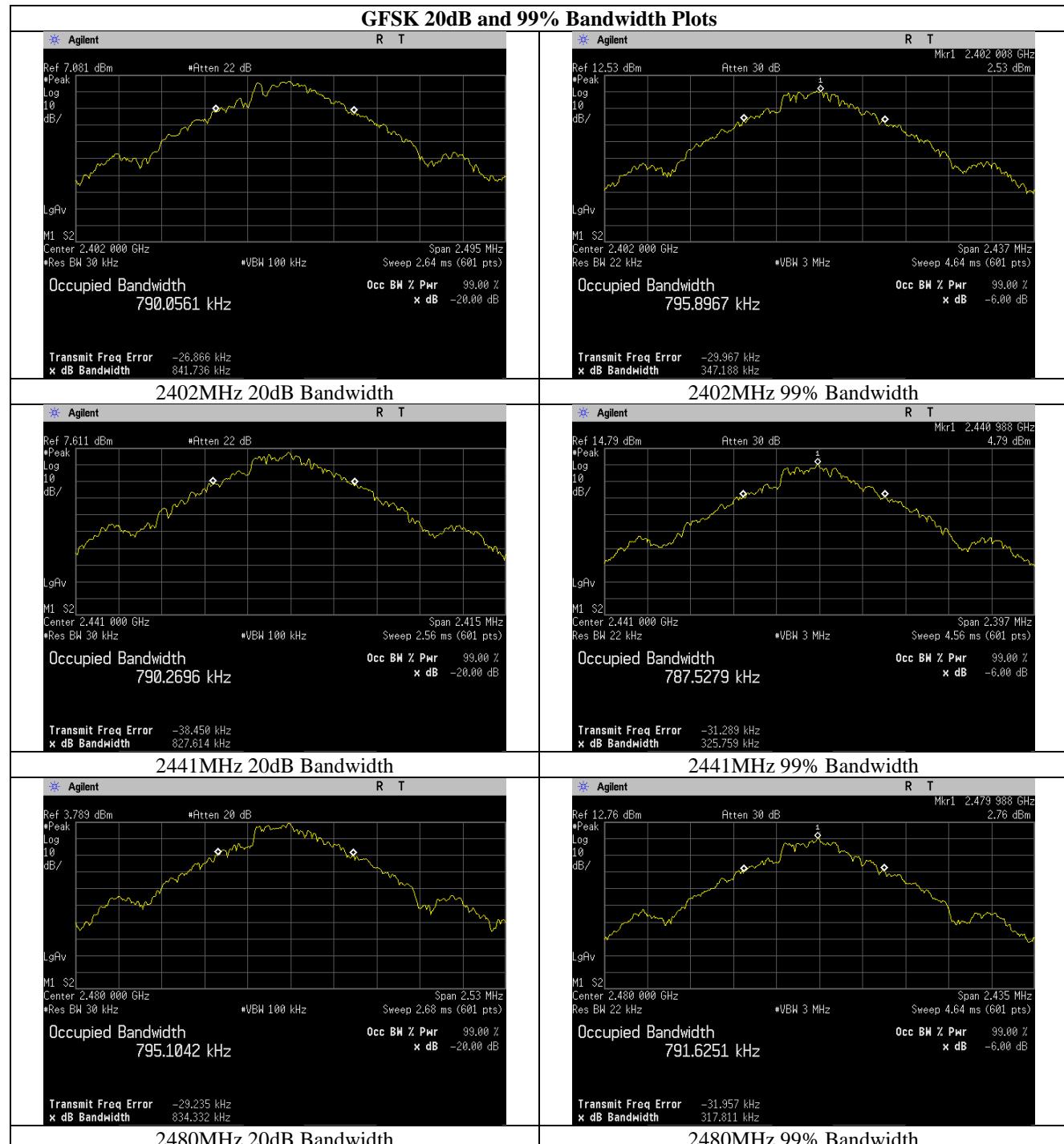


Figure 9. Block Diagram, Occupied Bandwidth Test Setup

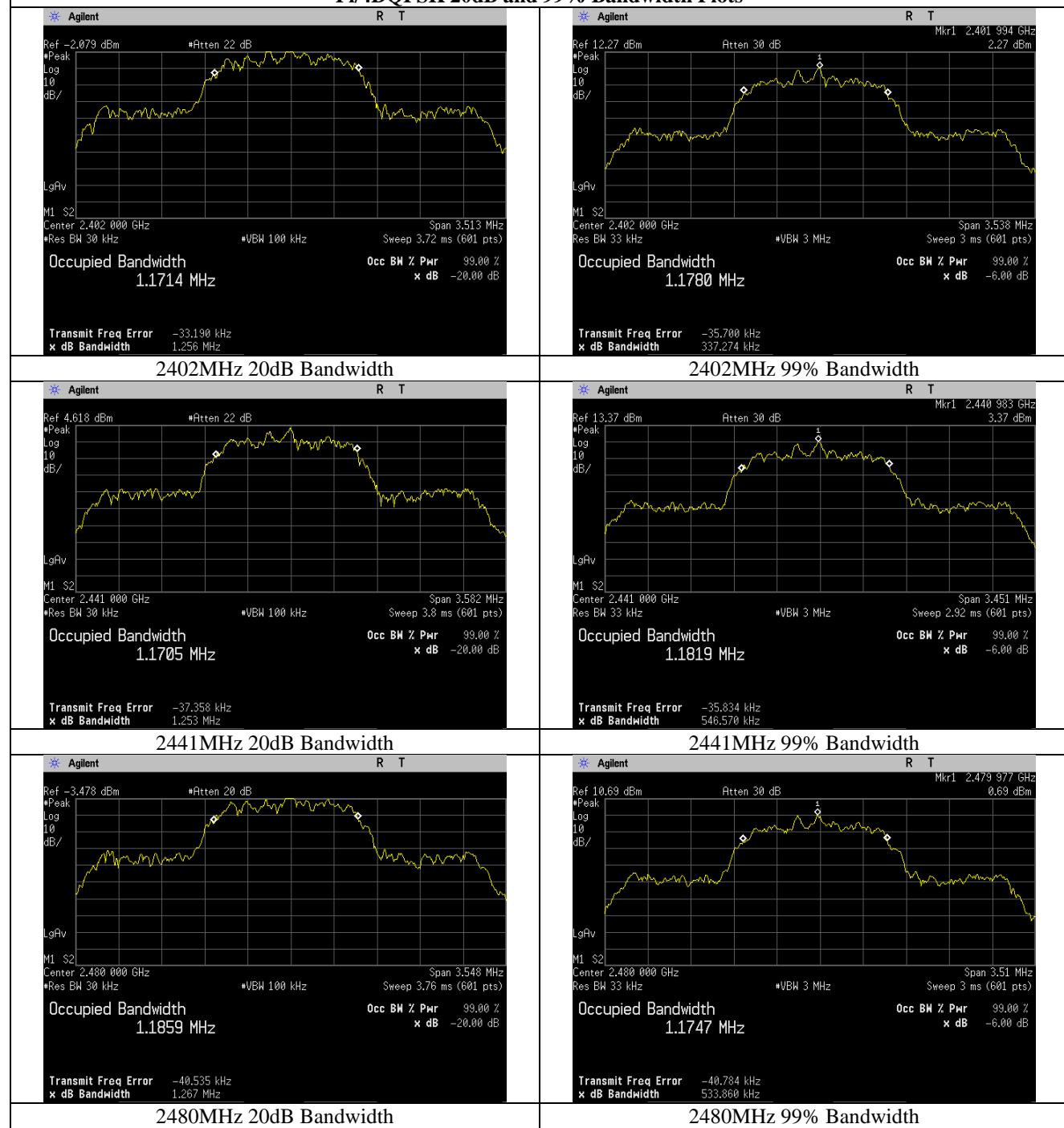
2.4GHz FHSS FCC OBW	-20dB BW (MHz)	99% BW (MHz)
Low Ch_2402MHz_GFSK	0.842	0.796
Mid Ch_2441MHz_GFSK	0.828	0.788
High Ch_2480MHz_GFSK	0.834	0.792
Low Ch_2402MHz_Pi_4DQPSK	1.256	1.178
Mid Ch_2441MHz_Pi_4DQPSK	1.253	1.182
High Ch_2480MHz_Pi_4DQPSK	1.267	1.175
Low Ch_2402MHz_8DPSK	1.261	1.170
Mid Ch_2441MHz_8DPSK	1.219	1.164
High Ch_2480MHz_8DPSK	1.229	1.162

Figure 10. 99% and 20 dB Occupied Bandwidth, Test Results

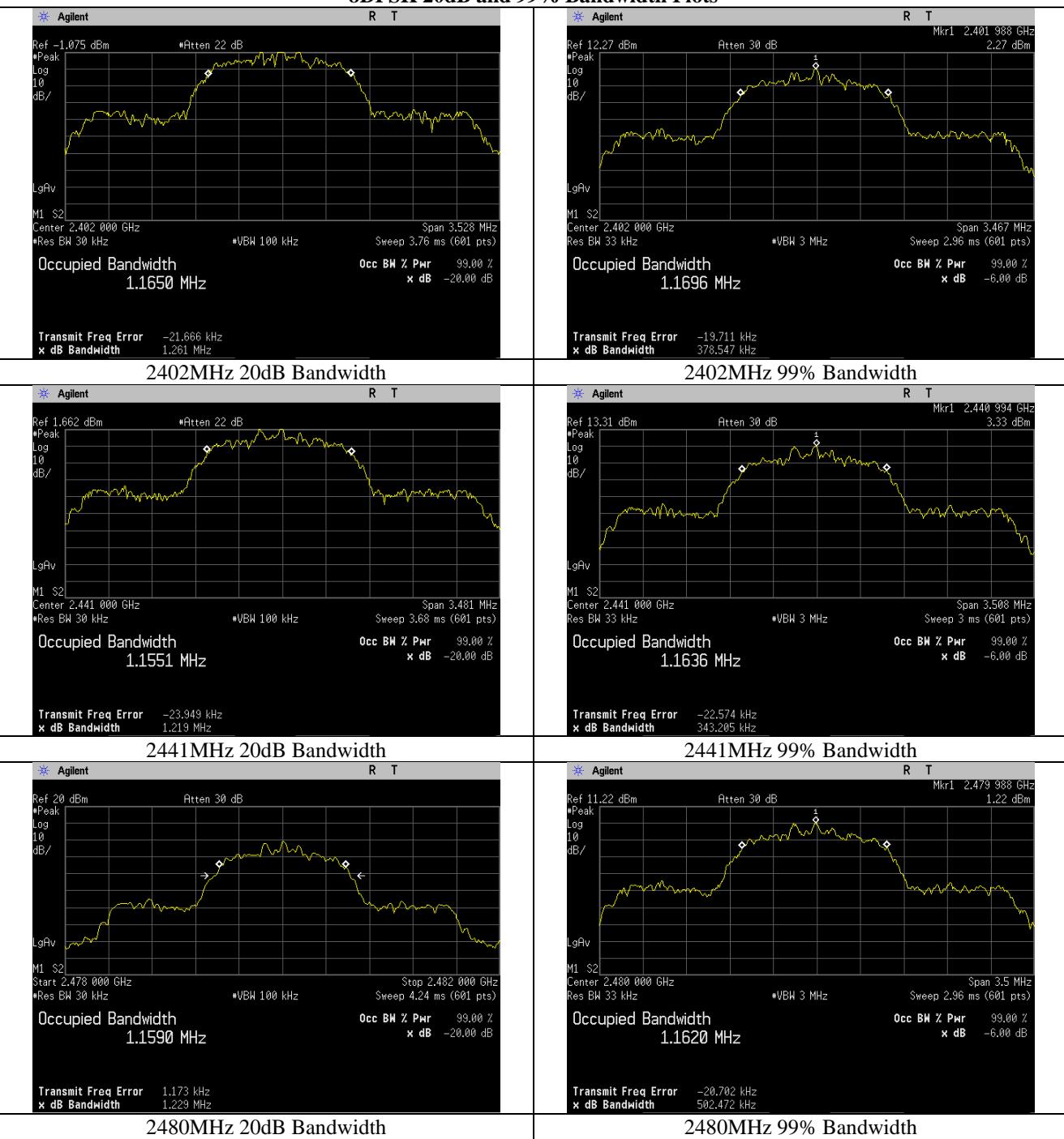
Occupied Bandwidth Test Results



Pi/4DQPSK 20dB and 99% Bandwidth Plots



8DPSK 20dB and 99% Bandwidth Plots



Electromagnetic Compatibility Criteria for Intentional Radiators**§ 15.247(a)(1) Average Time of Occupancy (Dwell Time)**

Test Requirements: Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

Test Results: The average time of occupancy is less than the 0.4 seconds for each transmit mode. Testing was performed with DH5 Packets since that was the worst case from the original testing.

Test Engineer(s): Bryan Taylor

Test Date(s): 3/26/2025

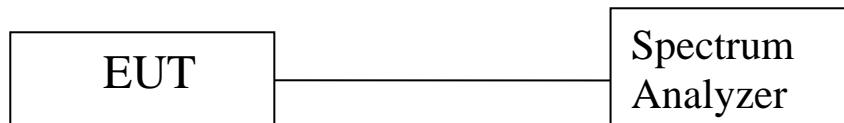
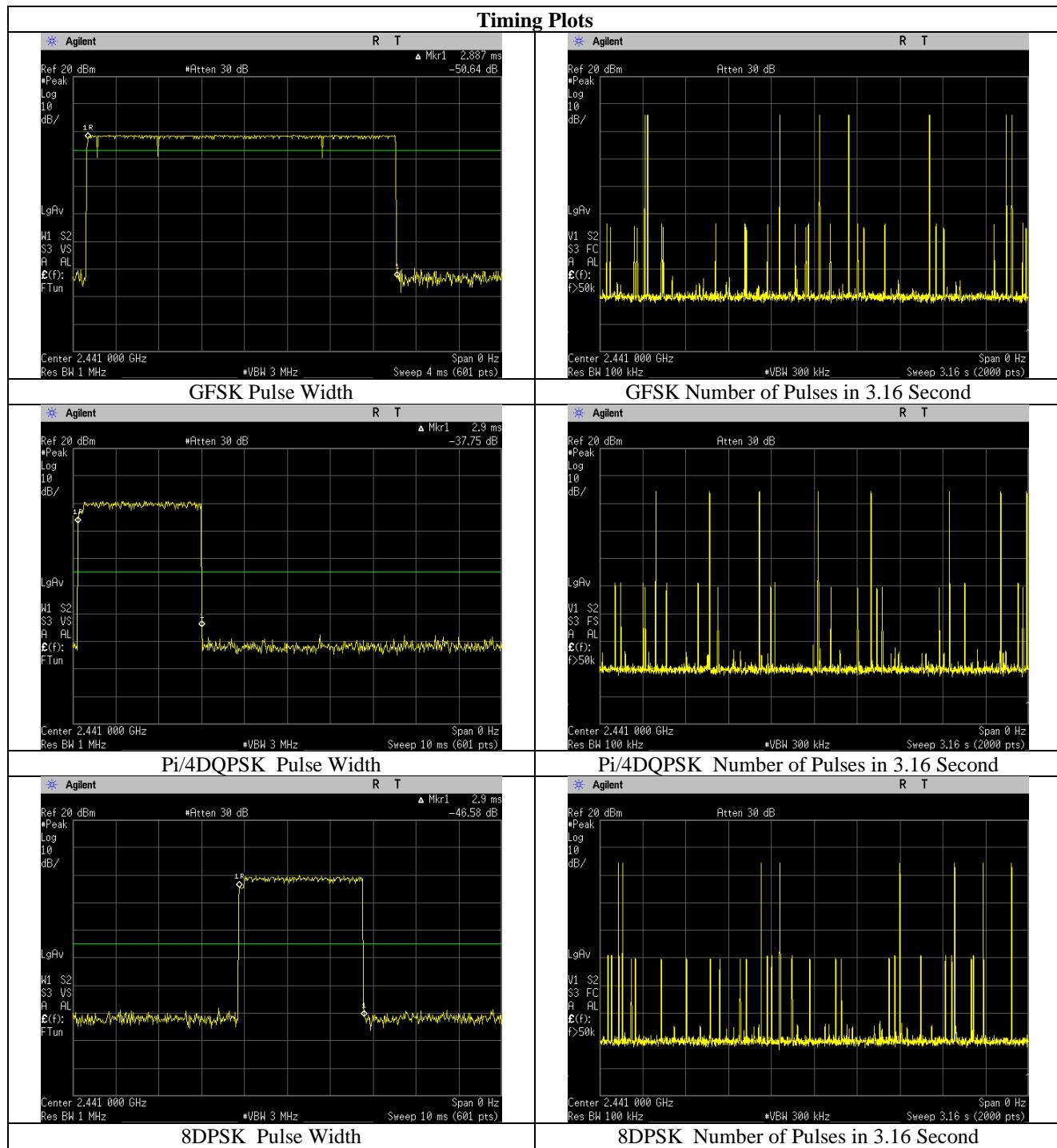


Figure 11. Block Diagram, Average Time of Occupancy Test Setup

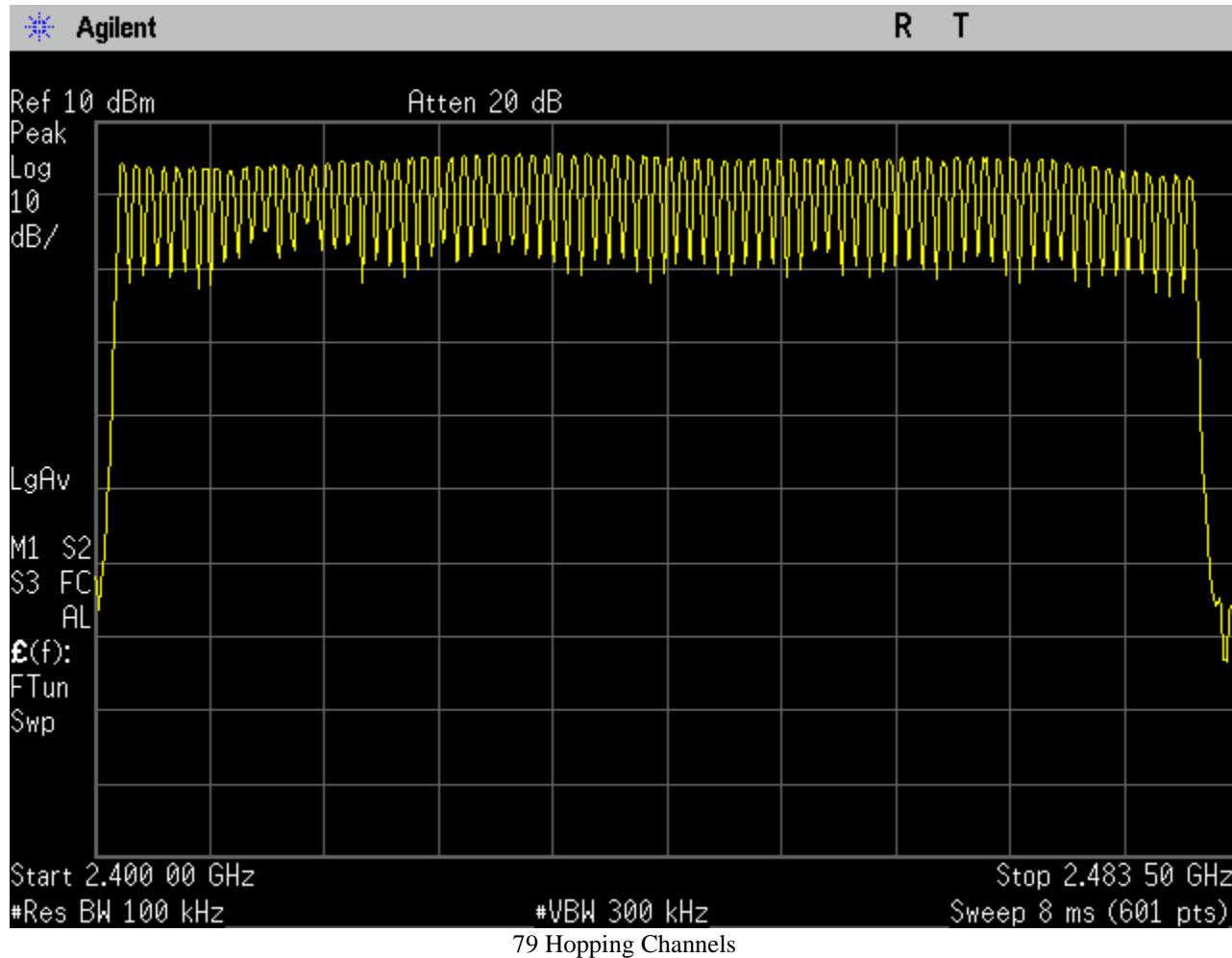
2.4GHz FHSS Dwell Time	Pulse Width (msec)	Number of Pulse in 3.16 (sec)	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
GFSK_DH5	2.887	8.0	0.231	0.4	0.169
Pi/4DQPSK_2DH5	2.900	8.0	0.232	0.4	0.168
8DPSK_3DH5	2.900	8.0	0.232	0.4	0.168

Figure 12. Dwell Time Test Results



Electromagnetic Compatibility Criteria for Intentional Radiators**§ 15.247(a)(1) Number of RF Channels**

Total hopping channels is 79. The EUT meets the specifications of Section 15.247(a) (1) (iii) for Number of Hopping Channels.



Electromagnetic Compatibility Criteria for Intentional Radiators

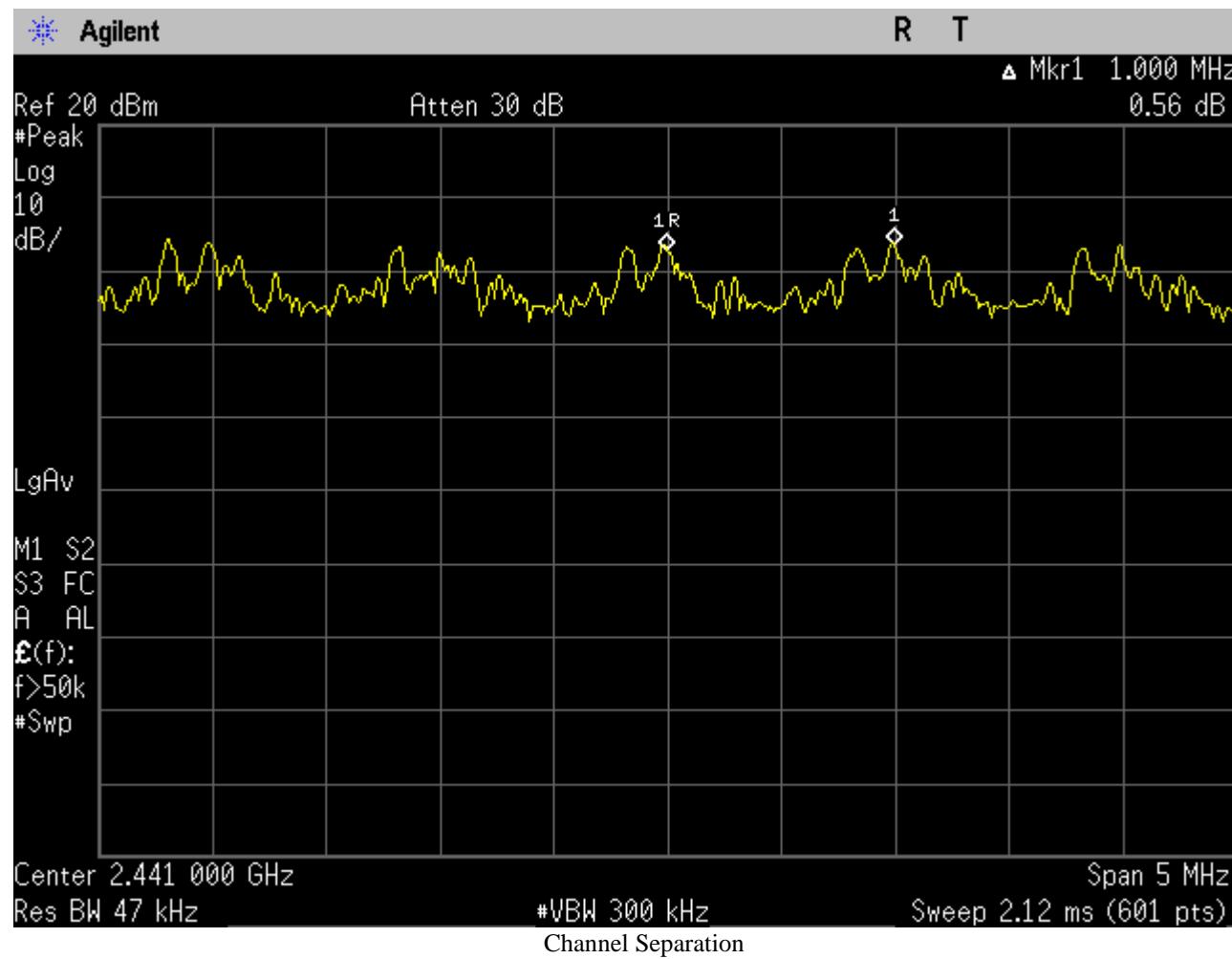
§ 15.247(a)(1) RF Channel Separation

Requirement: 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.

Remarks: EUT operates below 125mW (20dBm). Channels are separated by more than two thirds of the -20dB Bandwidth. Testing was performed only on the worst case mode with the widest 20dB bandwidth.

2.4GHz FHSS Dwell Time	Channel Separation (MHz)	Channel Separation Limit for Output Powers Less Than 125mW: Greater of 25kHz or two-thirds of the 20dB Bandwidth	Result
Pi/4DQPSK_2DH5	1.000	0.844	Pass

Figure 13. Channel Separation Results



Electromagnetic Compatibility Criteria for Intentional Radiators**§ 15.247(b) Peak Power Output**

Test Requirements: **§15.247(b):** The maximum peak output power of the intentional radiator shall not exceed the following:

Digital Transmission Systems (MHz)	Output Limit (Watts)
902-928	1.000
2400–2483.5	1.000
5725 – 5850	1.000

Figure 14. Output Power Requirements from §15.247(b)

§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 table above as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Systems operating in the 2400 – 2483.5 MHz band and using a point to point application may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

Systems operating in the 5725 – 5850 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter peak output power.

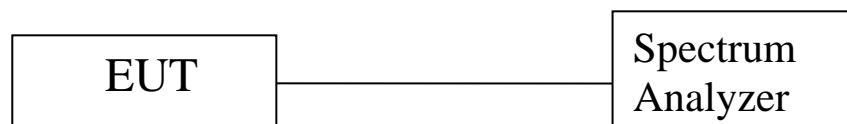
Fixed, point-to-point operation excludes the use of point-to-multipoint systems, Omni-directional applications, and multiple co-located intentional radiators transmitting the same information. The operator of the spread spectrum intentional radiator or, if the equipment is professionally installed, the installer is responsible for ensuring that the system is used exclusively for fixed, point-to-point operations. The instruction manual furnished with the intentional radiator shall contain language in the installation instructions informing the operator and the installer of this responsibility.

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)**. It was also compliant with the EIRP requirements from RSS-247 Section 5.4.

Test Engineer(s): Bryan Taylor

Test Date(s): 10/07/2024

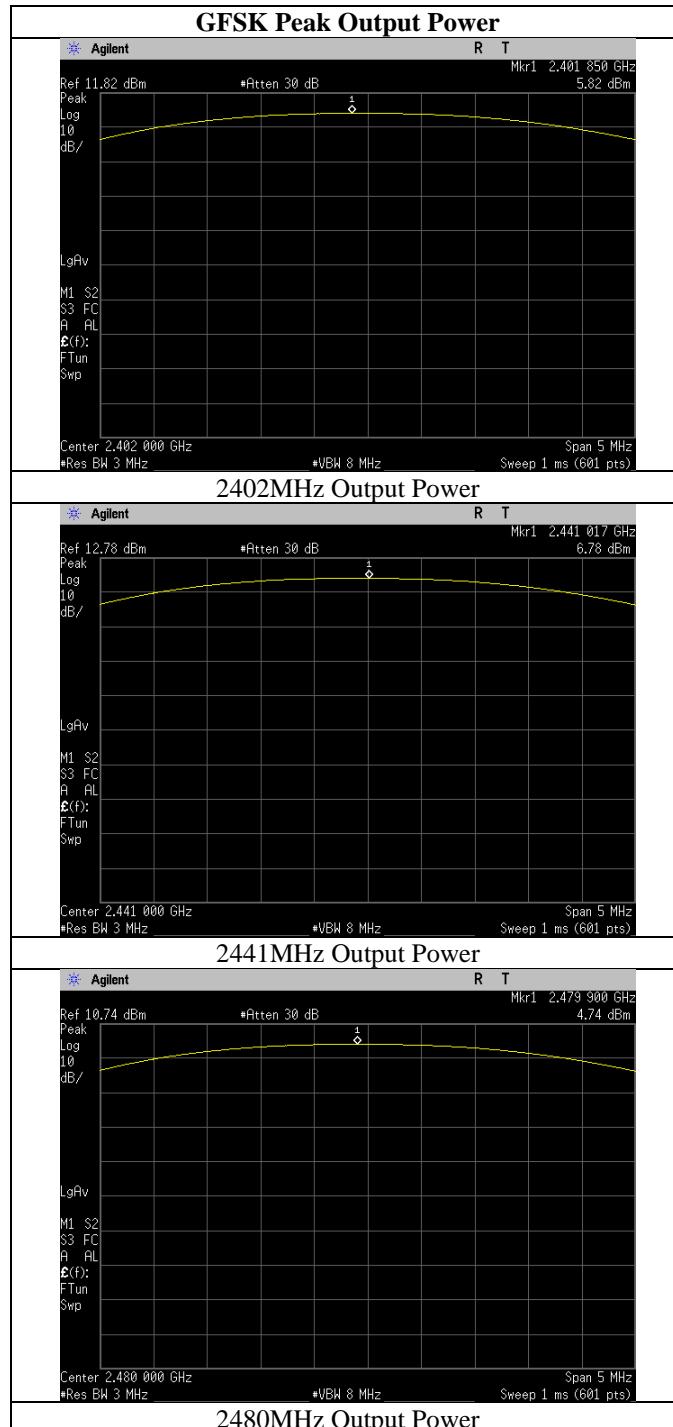
**Figure 15. Peak Power Output Test Setup**

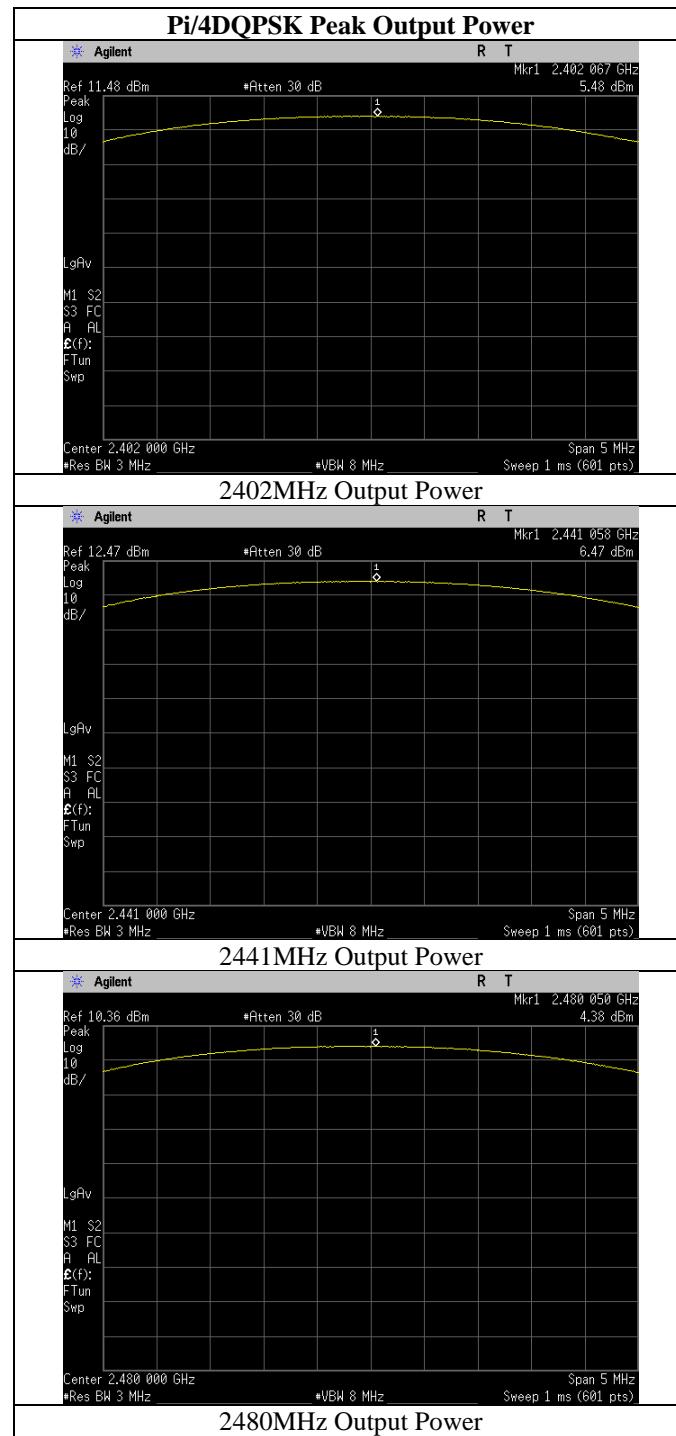
Peak Power Output Test Results

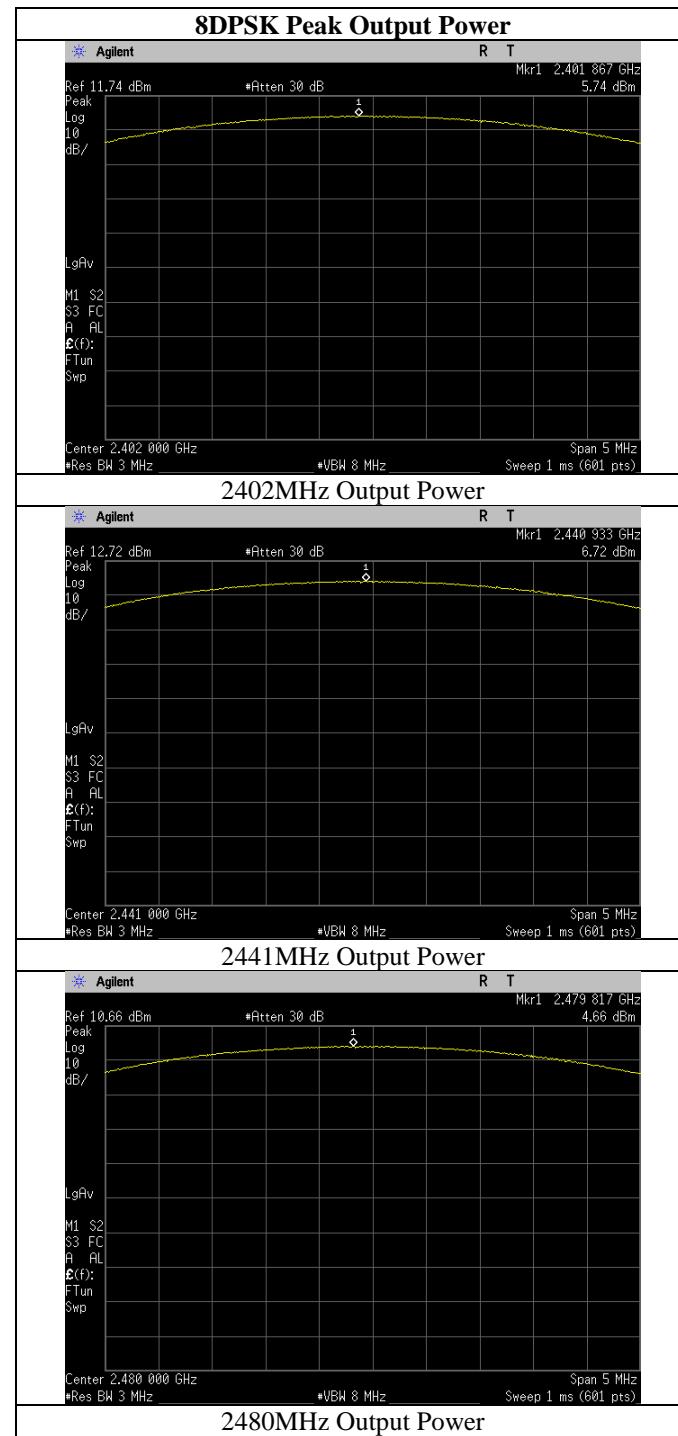
2.4GHz FHSS FCC PWR	Conducted Pk. Power (dBm)	Conducted Power Limit (dBm)	Conducted Power Margin (dB)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
Low Ch_2441MHz_GFSK	5.82	30	24.18	4.07	9.89	36	26.11
Mid Ch_2441MHz_GFSK	6.78	30	23.22	4.07	10.85	36	25.15
High Ch_2480MHz_GFSK	4.74	30	25.26	4.07	8.81	36	27.19
Low Ch_2402MHz_Pi_4DQPSK	5.48	30	24.52	4.07	9.55	36	26.45
Mid Ch_2441MHz_Pi_4DQPSK	6.47	30	23.53	4.07	10.54	36	25.46
High Ch_2480MHz_Pi_4DQPSK	4.36	30	25.64	4.07	8.43	36	27.57
Low Ch_2402MHz_8DPSK	5.74	30	24.26	4.07	9.81	36	26.19
Mid Ch_2441MHz_8DPSK	6.72	30	23.28	4.07	10.79	36	25.21
High Ch_2480MHz_8DPSK	4.66	30	25.34	4.07	8.73	36	27.27

Figure 16. Peak Power Output, Test Results

Peak Power Output Test Results







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)

Figure 17. Restricted Bands of Operation¹ 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 the table below:

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

Figure 18. Radiated Emissions Limits Calculated from FCC Part 15, § 15.209 (a)

Test Procedures: The antenna-port methodology from ANSI C63.10: 2013 Section 11.12.2 was utilized as an alternative to radiated emissions in the restricted bands.

The transmitter was connected directly to a Spectrum Analyzer through an attenuator. The power level was set to the maximum level. For frequencies below 1GHz, the RBW was set to 100 kHz and the VBW was set to 3x the RBW. For frequencies above 1GHz the RBW was set to 1MHz and the VBW was set to 3x the RBW. The spectrum analyzer was set to an auto sweep time and a peak detector was used. The maximum antenna gain was added to the measurement trace as was the appropriate maximum ground reflection factor as outlined in section 11.12.2 of ANSI C63.10. The resultant EIRP was then converted to an equivalent electric field strength which is shown on the graphical plots which follow. Measurements were carried out at the low, mid and high channels.

In order to assess the cabinet radiated spurious emissions, a radiated scan was performed with the antenna of proper impedance installed. 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).

Test Engineer(s): An Dang

Test Date(s): 2/14/2025

Radiated Spurious Emissions Test Results

Worst Case Cabinet Spurious Emissions

Frequency [MHz]	PK+ Level [dB μ V/m]	PK+ Limit [dB μ V/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]	Result
0.092	42.12	108.36	66.24	11.67	H	321.7	1	0.200	Pass
0.094	41.94	108.11	66.17	11.53	V	202	1	0.200	Pass
0.100	41.50	107.64	66.14	11.28	H	273.3	1	0.200	Pass
0.105	39.76	107.18	67.42	11.32	V	172.5	1	0.200	Pass
0.501	45.38	73.69	28.31	11.27	H	265.7	1	9.000	Pass
0.510	47.32	73.54	26.22	11.35	V	205.6	1	9.000	Pass

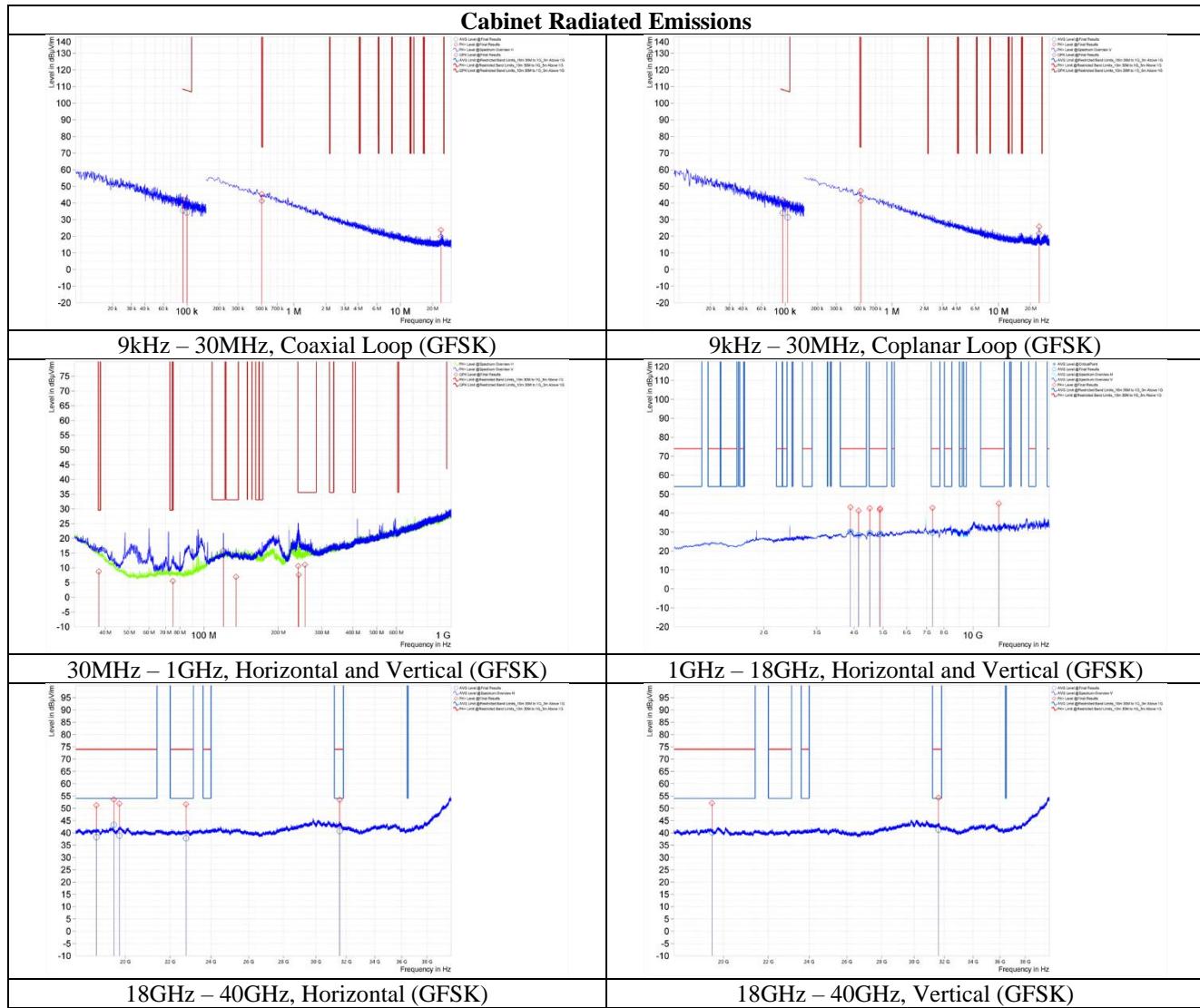
Figure 19. Worst Case Cabinet Radiation, Below 30MHz (GFSK)

Frequency [MHz]	QPK Level [dB μ V/m]	QPK Limit [dB μ V/m]	QPK Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]	Result
37.650	8.79	29.55	20.76	-6.12	V	173	2.98	120.000	Pass
75.000	5.50	29.55	24.05	-12.22	V	174.4	2.4	120.000	Pass
120.030	15.93	33.07	17.14	-6.77	V	24.3	1.41	120.000	Pass
135.030	6.93	33.07	26.14	-6.81	H	10.6	3.91	120.000	Pass
240.780	10.59	35.57	24.98	-7.36	V	173.5	1.04	120.000	Pass
241.860	7.58	35.57	27.99	-7.56	H	65.6	4	120.000	Pass

Figure 20. Worst Case Cabinet Radiation, 30MHz – 1GHz (GFSK)

Frequency [MHz]	PK+ Level [dB μ V/m]	PK+ Limit [dB μ V/m]	PK+ Margin [dB]	Avg Level [dB μ V/m]	Avg Limit [dB μ V/m]	Avg Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Result
3,892.500	43.09	74.00	30.91	30.14	54.00	23.86	-1.63	V	115.8	1.41	Pass
4,143.500	41.24	74.00	32.76	28.30	54.00	25.70	-3.83	H	117.1	2.5	Pass
4,520.000	42.49	74.00	31.51	29.44	54.00	24.56	-3.21	V	330.9	1.29	Pass
4,880.000	41.70	74.00	32.30	28.86	54.00	25.14	-3.35	V	215.7	2.4	Pass
4,890.000	42.37	74.00	31.63	29.01	54.00	24.99	-3.18	V	159.7	1.31	Pass
7,320.500	42.81	74.00	31.19	29.69	54.00	24.31	-2.79	V	150.3	2.21	Pass
12,200.000	45.03	74.00	28.97	31.42	54.00	22.58	-1.91	V	181.4	2.77	Pass
18,809.188	51.24	74.00	22.76	38.26	54.00	15.74	12.78	H	232.5	2.49	Pass
19,520.000	53.58	74.00	20.42	43.31	54.00	10.69	12.35	H	67.7	3.22	Pass
19,520.000	52.11	74.00	21.89	40.19	54.00	13.81	12.35	V	93.5	3.8	Pass
19,750.375	51.89	74.00	22.11	38.88	54.00	15.12	12.42	H	288	3.29	Pass
22,759.563	51.65	74.00	22.35	37.81	54.00	16.19	14.02	H	97.9	4	Pass
31,551.313	53.44	74.00	20.56	40.81	54.00	13.19	16.82	H	286.4	3.5	Pass
31,592.563	54.30	74.00	19.70	41.32	54.00	12.68	16.87	V	136.4	3.89	Pass

Figure 21. Worst Case Cabinet Radiation, Above 1GHz (GFSK)



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	08/28/2024	08/28/2025
1A1250	Receiver	Rohde & Schwarz	ESW44	04/08/2024	04/08/2025
1A1176	Active Loop Antenna (9KHz-30MHz)	ETS-Lindgren	6502	08/22/2024	08/22/2026
1A1147	Bi-Log Antenna	Suno Sciences Corp	JB3	04/06/2023	04/06/2025
1A1047	Horn Antenna	ETS - Lindgren	3117	06/26/2024	06/26/2025
1A1161	Horn Antenna (18GHz – 40GHz)	ETS Lindgren	3116C	08/01/2024	08/01/2026
1A1099	Generator	Com-Power	CGO-51000	See Note	
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	

Figure 22. Test Equipment List

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

End of Report