

TEST REPORT

Report Number: 16025792-E1V2

Applicant : Garmin International Inc.
1200 East 151st Street
Olathe, KS 66062-3426, USA

Model : A05116

Brand : Garmin

FCC ID : IPH-05116

IC : 1792A-05116

EUT Description : Portable Digital Transceiver

Test Standard(s) : FCC 47 CFR PART 15 SUBPART C
ISED RSS-247 ISSUE 4
ISED RSS-GEN ISSUE 5 + A1 + A2

Date Of Issue:
2026-01-09

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REPORT REVISION HISTORY

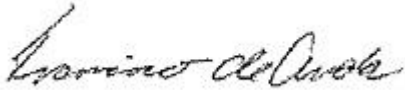
Rev.	Issue Date	Revisions	Revised By
V1	2026-01-07	Initial Issue	---
V2	2026-01-09	Updated Section 6.1	Tina Chu

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1. ATTESTATION OF TEST RESULTS

Applicant Name and Address	Garmin International Inc. 1200 East 151 st Street Olathe, KS 66062-3426, USA		
Model	A05116		
Brand	Garmin		
FCC ID	IPH-05116		
IC	1792A-05116		
EUT Description	Portable Digital Transceiver		
Serial Number	3522388213 (Radiated); 3522388124 (Conducted)		
Sample Receipt Date	2025-10-17		
Date Tested	2025-10-20 to 2025-10-31		
Applicable Standards	FCC 47 CRF Part 15 Subpart C ISED RSS-247 Issue 4 ISED RSS-GEN Issue 5 + A1 + A2		
Test Results	COMPLIES		
UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report. The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to ensure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise. This document may not be altered or revised in any way unless done so by UL Verification Services Inc., and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document.			
Approved & Released By:		Prepared & Reviewed By:	
			
Francisco deAnda Staff Engineer UL Verification Services Inc.		Glenn Escano Senior Test Engineer UL Verification Services Inc.	

2. TEST RESULTS SUMMARY

This report contains data provided by the customer, which can impact the validity of the results. UL Verification Services Inc. is only responsible for correctly integrating customer-provided data with measurements performed by UL Verification Services Inc.

Below is a list of the data provided by the customer:

1. Antenna gain and type (see section 6.3)
2. Cable loss (see section 6.3)

Requirement Description	Requirement Clause Number (FCC)	Requirement Clause Number (ISED)	Result
Duty Cycle	-	-	Reporting purposes only
20dB BW / 99% OBW	-	RSS-GEN 6.7	Complies
Hopping Frequency Separation	15.247 (a)(1)	RSS-247 (6.2.1) (b)	Complies
Number of Hopping Channels	15.247 (a)(1)(iii)	RSS-247 (6.2.3.1) (b)	Complies
Average Time of Occupancy	15.247 (a)(1)(iii)	RSS-247 (6.2.3.1) (b)	Complies
Output Power	15.247 (b) (1)	RSS-247 (6.2.3.2)	Complies
Average Power	-	-	Reporting purposes only
Conducted Spurious Emissions	15.247 (d)	RSS-247 (6.6)	Complies
Radiated Emissions	15.209, 15.205	RSS-GEN 8.9, 8.10	Complies
AC Mains Conducted Emissions	15.207	RSS-Gen 8.8	Not applicable. EUT is powered by battery/DC power supply

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with:

- ANSI C63.10-2020 (FCC)
- ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024+ Errata to C63.10a-2024 (ISED)
- FCC 47 CFR Part 2
- FCC 47 CFR Part 15C
- KDB 558074 D01 15.247 Meas Guidance
- KDB 414788 D01 Radiated Test Site
- RSS-GEN Issue 5 + A1 + A2
- RSS-247 Issue 4

4. FACILITIES AND ACCREDITATION

UL Verification Services Inc. is accredited by A2LA, certification #0751.05, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

	Address	ISED CABID	ISED Company Number	FCC Registration
☒	Building 1: 47173 Benicia Street, Fremont, CA 94538, USA	US0104	2324A	550739
☐	Building 2: 47266 Benicia Street, Fremont, CA 94538, USA			
☐	Building 3: 843 Auburn Court, Fremont, CA 94538, USA			
☒	Building 4: 47658 Kato Rd, Fremont, CA 94538, USA			
☐	Building 5: 47670 Kato Rd, Fremont, CA 94538, USA			

5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated regularly, with a maximum time between calibrations of one year or the manufacturer's recommendation, whichever is less, and, where applicable, is traceable to recognized national standards.

5.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

5.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	U _{LAB}
Conducted Antenna Port Emission Measurement	1.94 dB
Time Domain Measurements Using SA	3.39 %
RF Power Measurement Direct Method Using Power Meter	0.450 dB (Ave), 1.30 dB (PK)
Radio Frequency (Spectrum Analyzer)	141.16 Hz
Occupied Bandwidth	1.22 %
Carrier Frequency Separation	19.70 Hz
Number of Hopping Frequencies	0.000 dB
Worst Case Conducted Disturbance, 9kHz to 0.15 MHz	3.78 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.40 dB
Worst Case Radiated Disturbance, 9kHz to 30 MHz	2.87 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	6.01 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.73 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.51 dB

Uncertainty figures are valid to a confidence level of 95%.

5.4. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
 $36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} = 28.9 \text{ dBuV/m}$

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:

Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss.
 $36.5 \text{ dBuV} + 0 \text{ dB} + 10.1 \text{ dB} + 0 \text{ dB} = 46.6 \text{ dBuV}$

6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

The EUT is a Portable Digital Transceiver.

6.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

BT Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402 - 2480	Basic GFSK	8.03	6.35
2402 - 2480	DQPSK	6.20	4.17
2402 - 2480	Enhanced 8PSK	6.59	4.56

Note: GFSK, DQPSK, and 8PSK average powers are all investigated. The GFSK and 8PSK powers are the worst case. Testing is based on these modes to show compliance. For average power data, please refer to section 9.6.

6.3. DESCRIPTION OF AVAILABLE ANTENNAS AND CABLE LOSS

The antenna(s) gain and type, as provided by the manufacturer, are as follows:

The radio utilizes a PIFA antenna with a maximum gain of 1.40 dBi and 0.71 dB cable loss.

The cables were used for RF antenna port tests that had been offset to the test equipment during testing.

6.4. SOFTWARE AND FIRMWARE

The EUT firmware and software installed during testing were versions 0.74.

6.5. WORST-CASE CONFIGURATION AND MODE

Radiated emissions below 1GHz and above 18GHz were performed with the EUT set to transmit at the channel with the highest output power as a worst-case scenario.

Band edge and radiated emissions between 1GHz and 18GHz were performed with the EUT set to transmit at the highest power on low, middle, and high channels.

EUT was investigated in three orthogonal orientations: X (Flatbed), Y (Landscape), and Z (Portrait). The Z (Portrait) is the worst-case orientation. Full tests on the EUT were made on Z (Portrait) orientation. After investigation, the worst configuration set for all radiated tests is with EUT powered by an internal battery and the USB-C port is terminated by a laptop via USB cable.

Worst-case data rates as provided by the client were:

GFSK mode : DH5

8PSK mode : 3-DH5

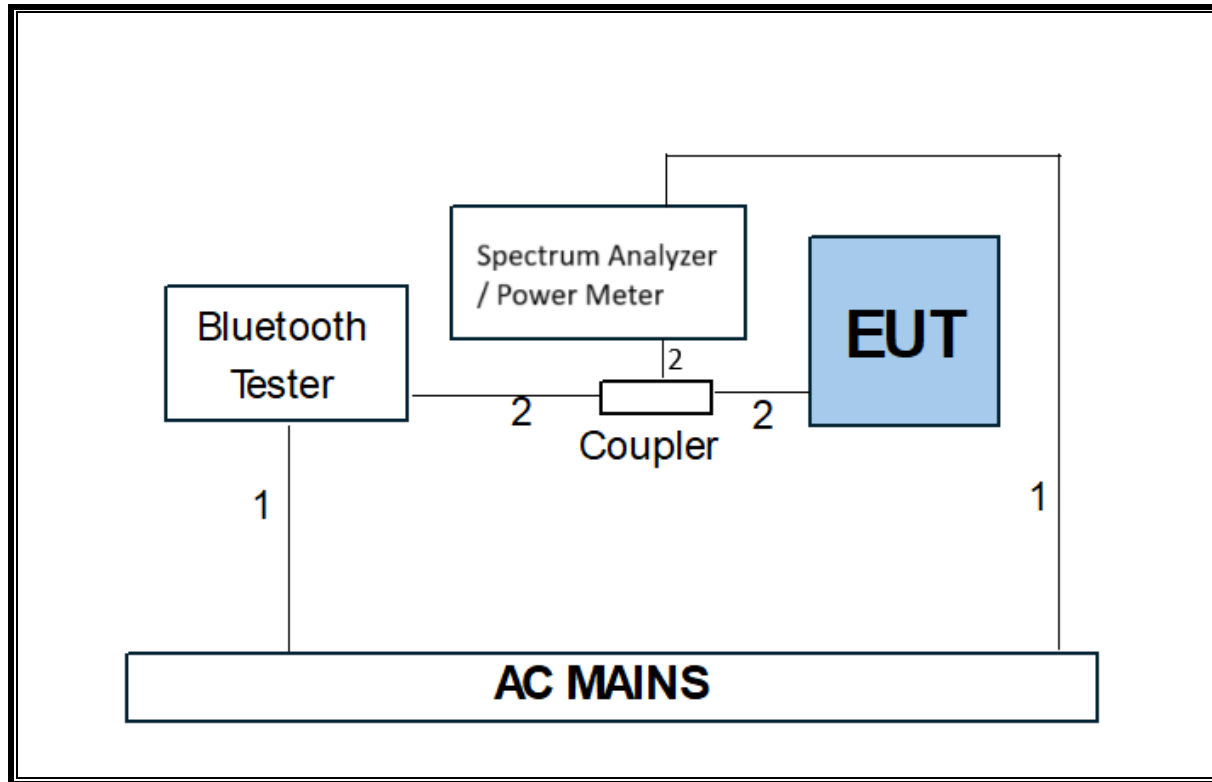
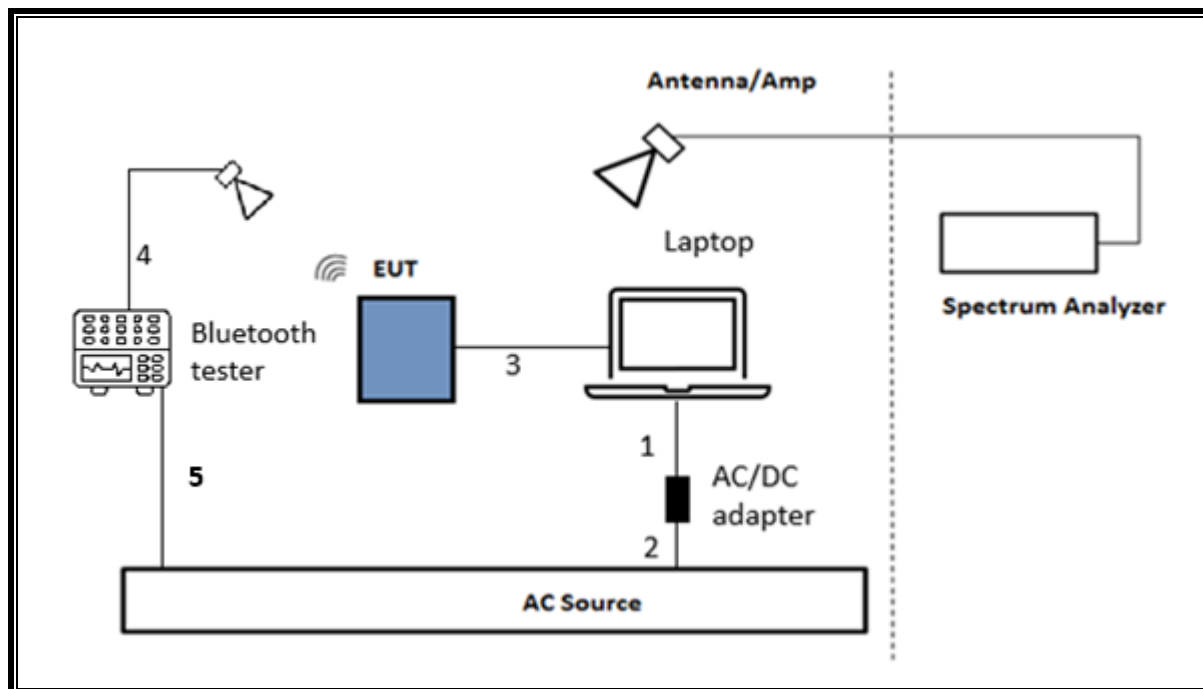
Plots included in the report are representative of the method and settings parameters used for the test.

6.6. DESCRIPTION OF TEST SETUP

SUPPORT TEST EQUIPMENT						
Description		Manufacturer	Model	Serial Number		FCC ID/ DoC
Laptop		Lenovo	T14	PF4BYGWJ		DOC
Laptop AC/DC adapter		Lenovo	ADLX65YLC2A	8SSA10M13948L1CZ8CJ0EA6		DOC
Bluetooth Tester		Rohde & Schwarz	CBT	81929		DoC
I/O CABLES (RF CONDUCTED TEST)						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	2	3-prongs	Un-Shielded	1.8	AC Mains to BT Tester/Analyzer/Power Meter
2	Antenna	3	SMA	Shielded	0.1	BT Tester to coupler to Analyzer/Power Meter to EUT
I/O CABLES (RF RADIATED AND AC LINE CONDUCTED TEST)						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC	1	DC	Shielded	1.8	AC/DC Adapter to Laptop
2	AC	1	2-prongs	Unshielded	1.8	AC Mains to AC/DC Adapter
3	USB	1	USB-C	Shielded	1	Laptop to EUT
4	SMA Cable	1	N	Shielded	3.5	Bluetooth tester to horn antenna
5	AC	1	3-prongs	Unshielded	1.8	AC Mains to to BT tester

TEST SETUP

The EUT setup is shown below. Test software exercised the radio card.

SETUP DIAGRAM FOR CONDUCTED TESTS**SETUP DIAGRAM FOR RADIATED TESTS**

7. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	ID Num	Cal Due
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	206808	2027-04-30
RF Filter Box, 1-18GHz	UL-FR1	RATS 1.0, 2 Amp, 8 Port	197920	2026-03-31
Antenna, Horn 18 to 26.5GHz	A.R.A.	MWH-1826/B	81140	2027-05-31
Link File, RF Amplifier Assembly, 18-26.5GHz, 60dB Gainr	UL-FR1	AMP18G26.5-60	215705	2026-10-31
EMI Test Receiver	Rohde & Schwarz	ESW44	225688	2026-02-28
Antenna, Passive Loop 100kHz to 30MHz	ELECTRO-METRICS	EM-6872	219910	2026-08-31
Antenna, Passive Loop 30Hz - 1MHz	ELECTRO-METRICS	EM-6871	219908	2026-08-31
Antenna, Broadband Hybrid, 30MHz to 3GHz	Sunol Sciences Corp.	JB3	202329	2027-04-30
Link File, 9KHz-1GHz Port 0 Factors	UL-FR1	Port 0 Factors	213877	2026-03-31
EMI TEST RECEIVER, with B8 option	Rohde & Schwarz	ESW44	245268	2026-02-28
10dB Fixed Attenuator	Pasternack Enterprises	PE7087-10	252765	Verified
P-Series Power Meter	Keysight Technologies Inc	N1912A-CFG003	259286	2026-03-31
Power Sensor, P - series, 50MHz to 18GHz, Wideband	Keysight Technologies Inc	N1921A	257703	2026-03-31
Spectrum Analyzer, PXA, 3Hz to 44GHz	N9030A	Keysight Technologies Inc	85214	2026-01-31

UL AUTOMATION SOFTWARE			
Radiated Software	UL	UL EMC	Ver 9.5, 25 Aug 2025
Conducted Software	UL	UL EMC	2024-02-23

8. MEASUREMENT METHOD

TEST ITEM	TEST METHOD
On Time and Duty Cycle	ANSI C63.10 Section 11.6
Occupied BW (20dB)	ANSI C63.10 Section 6.9.2
Occupied BW (99%)	ANSI C63.10 Section 6.9.3
Carrier Frequency Separation	ANSI C63.10 Section 7.8.2
Number of Hopping Frequencies	ANSI C63.10 Section 7.8.3
Time of Occupancy (Dwell Time)	ANSI C63.10 Section 7.8.4
Peak Output Power	ANSI C63.10 Section 7.8.5
Conducted Spurious Emissions	ANSI C63.10 Section 7.8.7
Conducted Band-Edge	ANSI C63.10 Section 6.10.4
Radiated Spurious Emissions Below 30MHz	ANSI C63.10 Section 6.4
Radiated Spurious Emissions 30-1000MHz	ANSI C63.10 Section 6.3, 6.5
Radiated Spurious Emissions above 1GHz	ANSI C63.10 Section 6.3, 6.6
Radiated Band-edge	ANSI C63.10 Section 6.10.5

9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

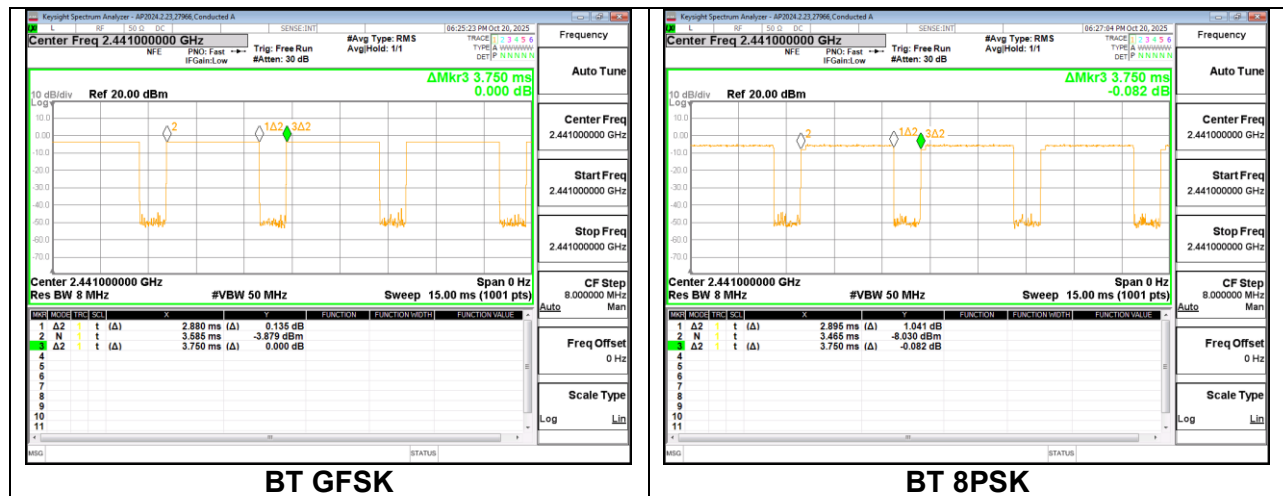
None; for reporting purposes only.

PROCEDURE

ANSI C63.10, Section 11.6: Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time T (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/T Minimum VBW (kHz)
GFSK	2.880	3.750	0.768	76.8	1.15	0.347
8PSK	2.895	3.750	0.772	77.2	1.12	0.345



9.2. 20dB AND 99% BANDWIDTH LIMITS

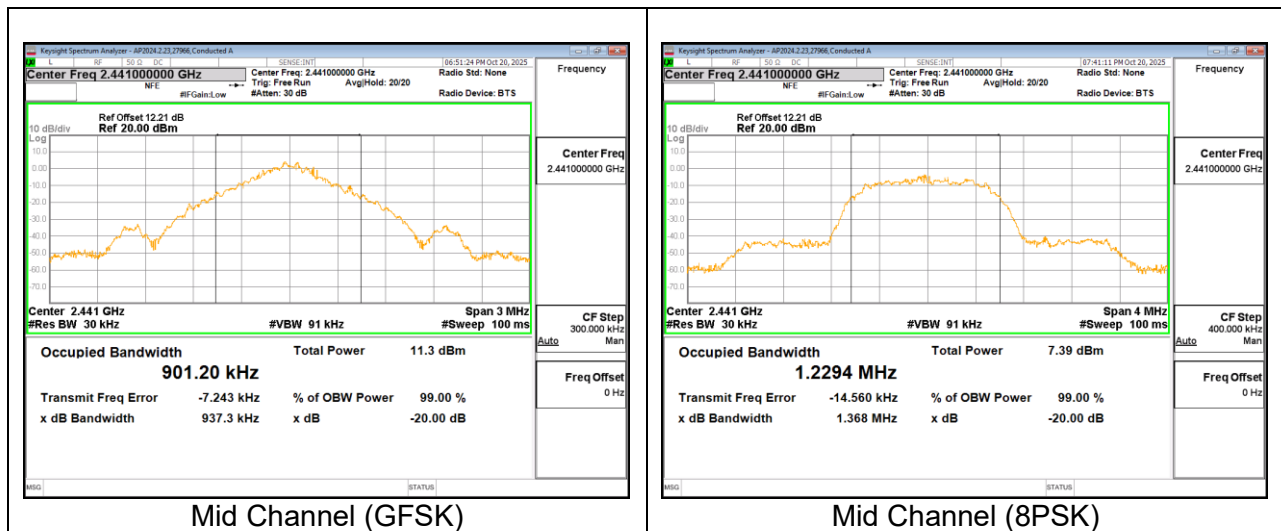
None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to $\geq 1\%$ of the 20 dB bandwidth. The VBW is set to $\geq 3 \times \text{RBW}$. The sweep time is coupled.

RESULTS

Worst-Case Mode (SISO)	Frequency (MHz)	Channel Number	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
GFSK	2402	Low	0.9322	0.89989
	2441	Mid	0.9373	0.9012
	2480	High	0.9361	0.89524
8PSK	2402	Low	1.374	1.2310
	2441	Mid	1.368	1.2294
	2480	High	1.364	1.2304



9.3. HOPPING FREQUENCY SEPARATION

LIMITS

FCC §15.247 (a) (1)

RSS-247 (6.2.1) (b)

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.

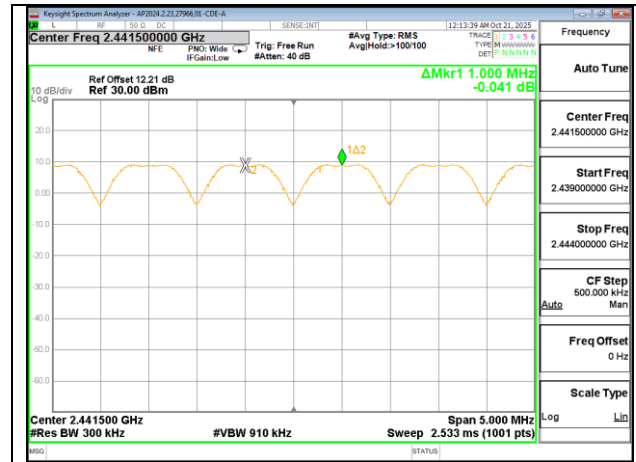
TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 300 kHz and the VBW is set to $\text{VBW} \geq 3 \times \text{RBW}$. The sweep time is coupled.

RESULTS

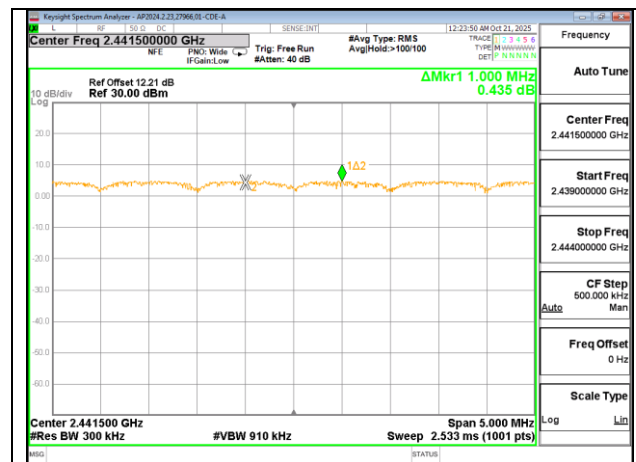
9.3.1. BASIC DATA RATE GFSK MODULATION

HOPPING FREQUENCY SEPARATION



9.3.2. ENHANCED DATA RATE 8PSK MODULATION

HOPPING FREQUENCY SEPARATION



9.4. NUMBER OF HOPPING CHANNELS

LIMITS

FCC §15.247 (a) (1) (iii)

RSS-247 (6.2.3.1) (b)

Frequency hopping systems in the 2400 – 2483.5 MHz band shall use at least 15 non-overlapping channels.

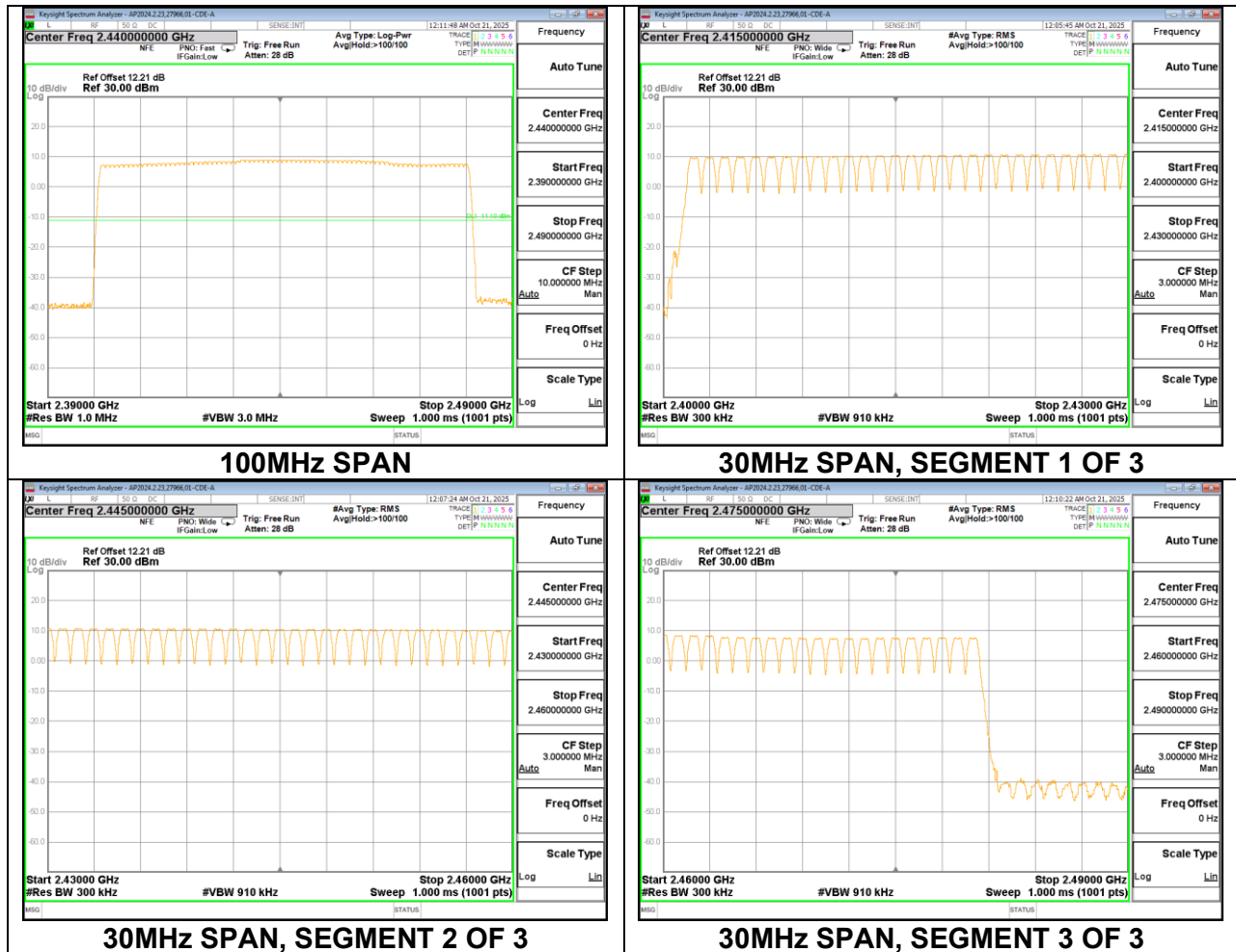
TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. RBW is set to a maximum of 1 % of the span. The analyzer is set to Max Hold.

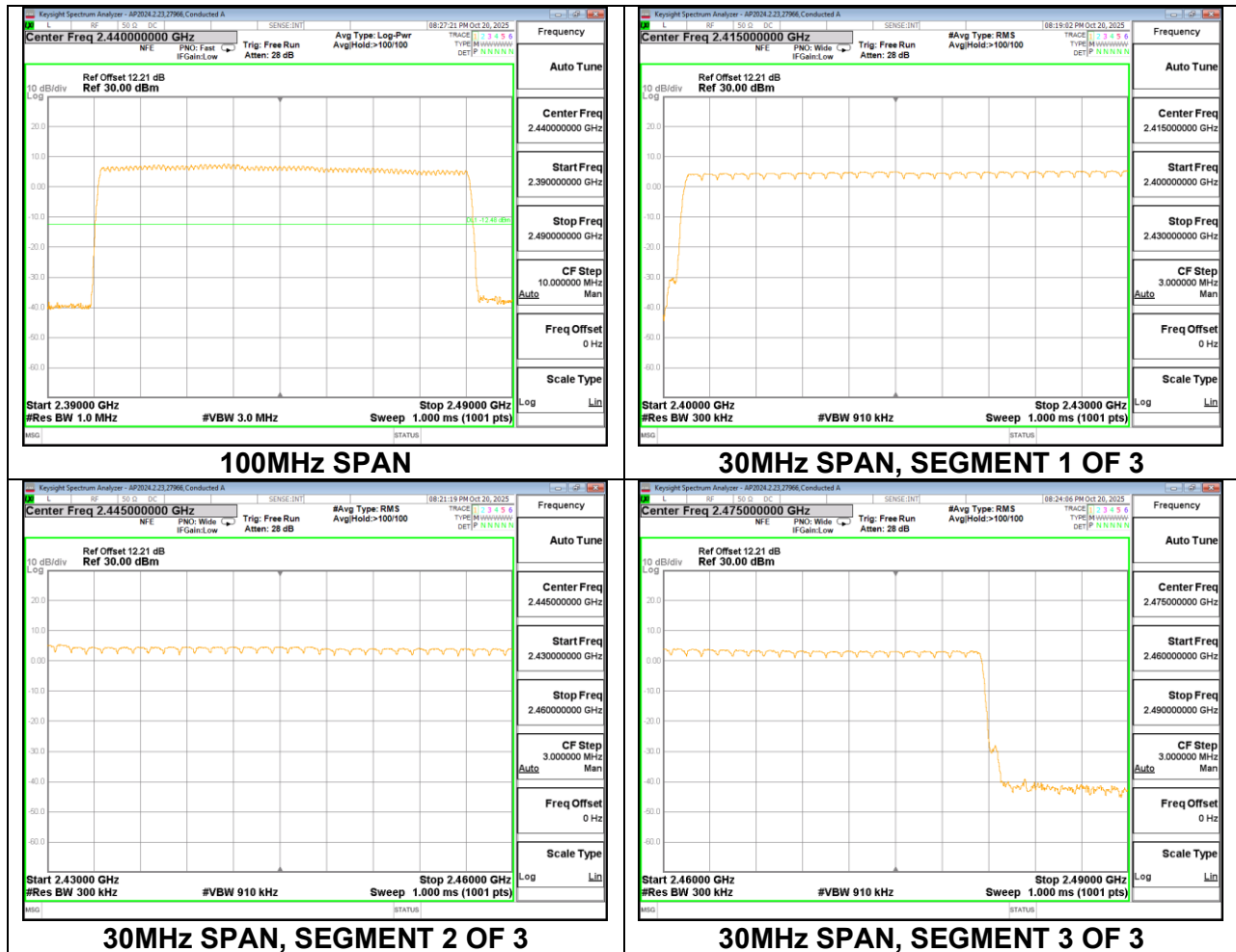
RESULTS

Normal Mode: 79 Channels Observed.

9.4.1. BASIC DATA RATE GFSK MODULATION



9.4.2. ENHANCED DATA RATE 8PSK MODULATION



9.5. AVERAGE TIME OF OCCUPANCY

LIMITS

FCC §15.247 (a) (1) (iii)

RSS-247 (6.2.3.1) (b)

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.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The span is set to 0 Hz, centered on a single, selected hopping channel. The width of a single pulse is measured in a fast scan. The number of pulses is measured in a 3.16-second scan to enable resolution of each occurrence.

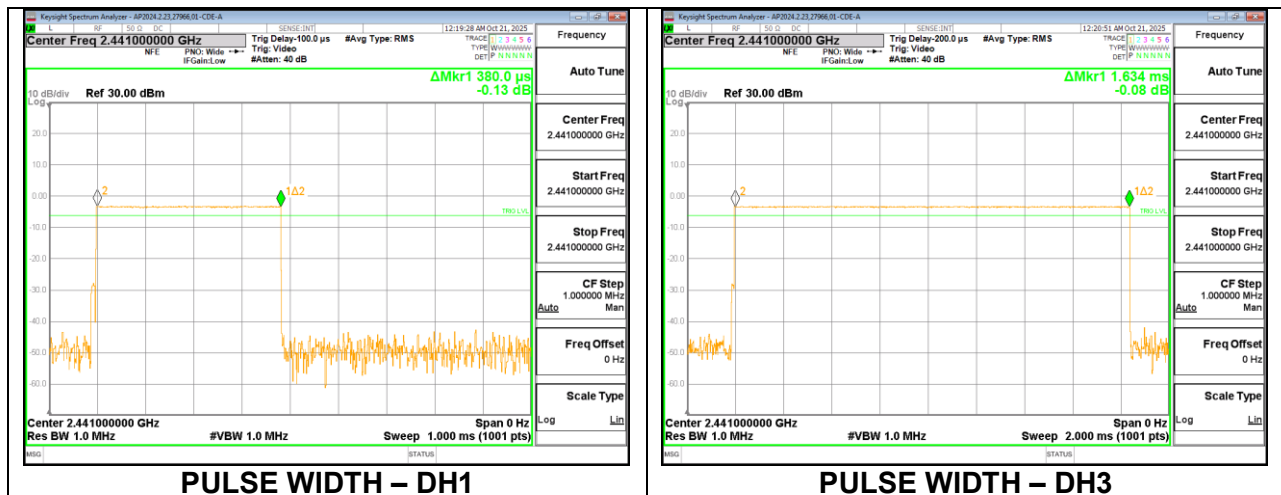
The average time of occupancy in the specified 3.16-second period (79 channels * 0.4 s) is equal to 10 * (# of pulses in 3.16 s) * pulse width.

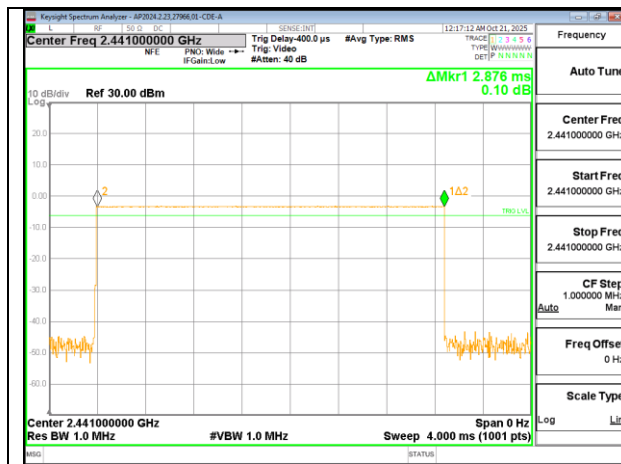
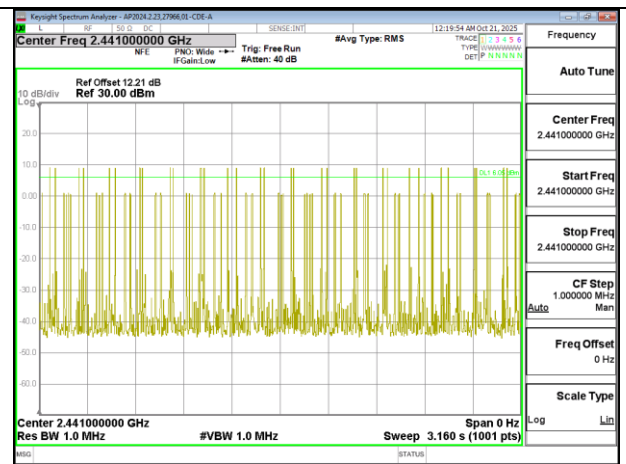
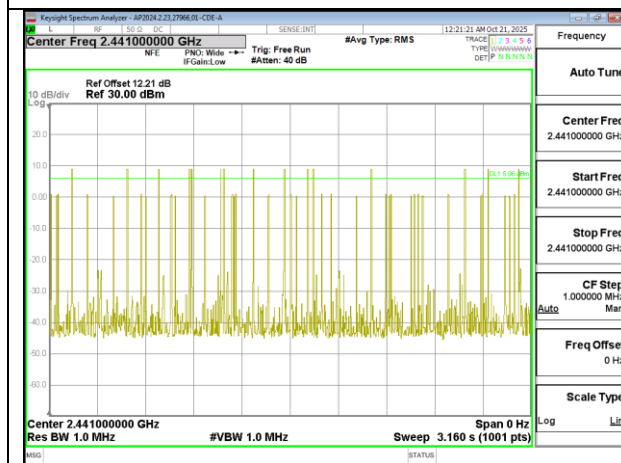
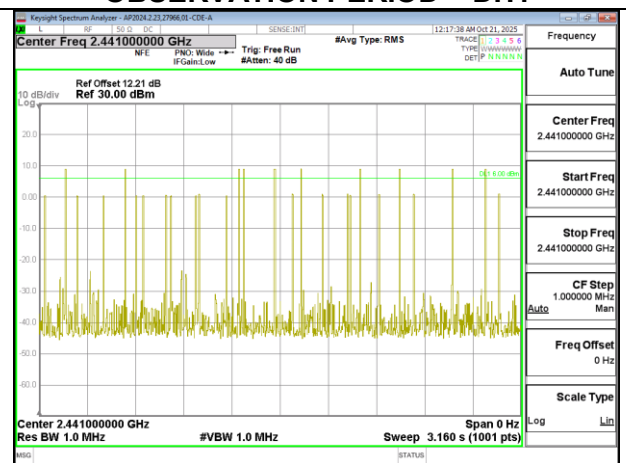
For AFH mode, the average time of occupancy in the specified 8-second period (20 channels * 0.4 seconds) is equal to 10 * (# of pulses in 0.8 s) * pulse width.

RESULTS

9.5.1. BASIC DATA RATE GFSK MODULATION

DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
GFSK Normal Mode					
DH1	0.380	32.0	0.122	0.4	-0.278
DH3	1.634	15.0	0.245	0.4	-0.155
DH5	2.876	10.0	0.288	0.4	-0.112
GFSK AFH Mode					
DH1	0.38	8.00	0.030	0.4	-0.370
DH3	1.634	3.75	0.061	0.4	-0.339
DH5	2.876	2.50	0.072	0.4	-0.328

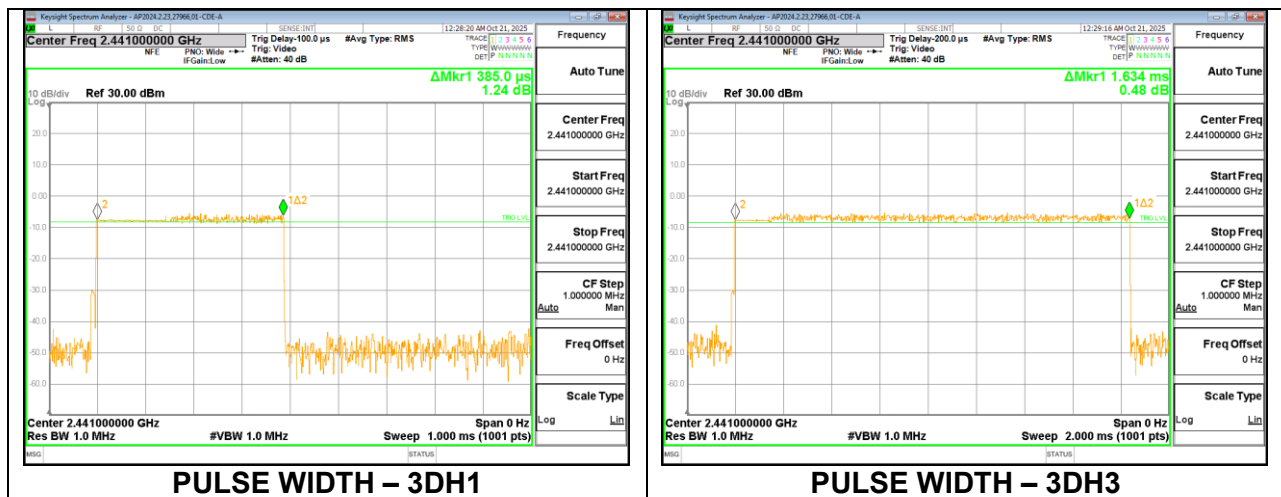


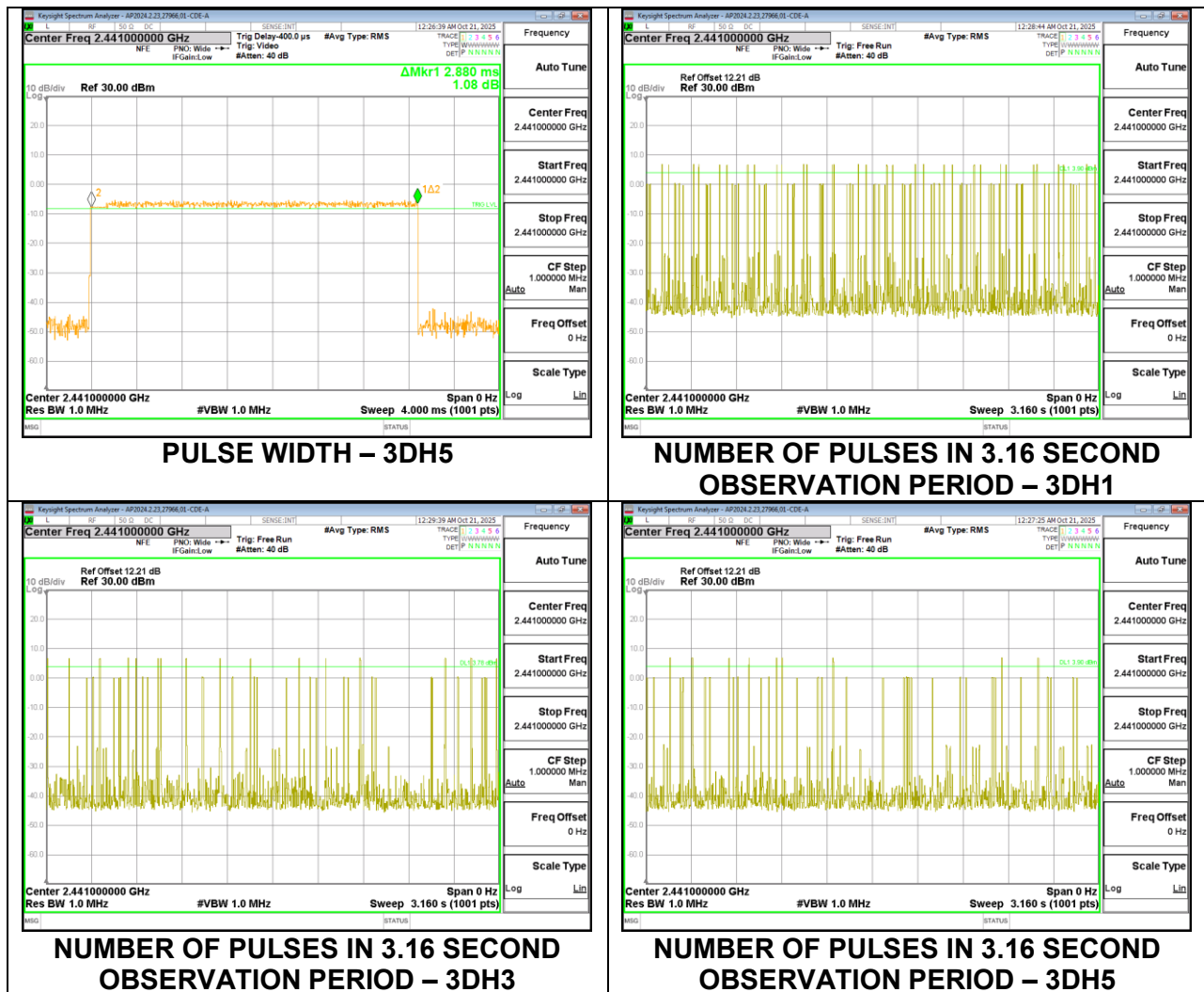
**PULSE WIDTH – DH5****NUMBER OF PULSES IN 3.16 SECOND
OBSERVATION PERIOD – DH1****NUMBER OF PULSES IN 3.16 SECOND
OBSERVATION PERIOD – DH3****NUMBER OF PULSES IN 3.16 SECOND
OBSERVATION PERIOD – DH5**

9.5.2. ENHANCED DATA RATE 8PSK MODULATION

DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
8PSK Normal Mode					
3DH1	0.385	32	0.1232	0.4	-0.2768
3DH3	1.634	16	0.2614	0.4	-0.1386
3DH5	2.880	9	0.2592	0.4	-0.1408

Note: for AFH(8PSK) mode, please refer to the results of AFH(GFSK) mode; the channel selection and hopping rate are the same for both EDR and Basic Rate operation, data for Basic Rate demonstrates compliance with channel occupancy when AFH is employed.





9.6. OUTPUT POWER

LIMITS

§15.247

- (a) (1) The maximum antenna gain is less than 6 dBi, therefore the limit is 30 dBm. 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.
- (b) (1) For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts

RSS-247

(6.2.3.1)

a. FHS 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.

(6.2.3.2)

The following transmitter output power and e.i.r.p. requirements shall apply:

- a. If the hopset uses 75 or more hopping channels, the maximum peak conducted output power shall not exceed 1.0 W.
- b. If the hopset uses less than 75 hopping channels, the maximum peak conducted output power shall not exceed 0.125 W.
- c. the e.i.r.p. shall not exceed 4 W, except as provided in sections 6.5 a) and b).

TEST PROCEDURE

Measurements are performed using a wideband RF power meter.

The power output was measured on the EUT antenna port using an SMA cable with a 10dB attenuator connected to a power meter via a wideband power sensor. The Peak and Gated Average output power was read directly from the power meter.

DIRECTIONAL ANTENNA GAIN

For 1 TX:

There is only one transmitter output; therefore, the directional gain is equal to the antenna gain.

RESULTS

Only the mid-channel plot is reported to show setting parameters comply with the testing method/procedure.

Tested By:	27966 PV
Date:	2025-10-21

2.4G (SISO)						
Chain 0 (dBi)		1.4				
2.4G (SISO)	Freq (MHz)	Ch. #	Power Limit (dBm)	Average Power (Gated) (dBm)	Total Corrected Average Power (dBm)	Peak Power (dBm)
GFSK	2402	Low	21	6.12	6.12	6.37
	2441	Mid		7.84	7.84	8.03
	2480	High		6.47	6.47	6.70
DQPSK	2402	Low		3.29	3.29	6.06
	2441	Mid		3.65	3.65	6.20
	2480	High		2.20	2.20	4.81
8PSK	2402	Low		3.31	3.31	6.32
	2441	Mid		3.66	3.66	6.59
	2480	High		2.21	2.21	5.12

9.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

RSS-247 6.6

Limit = -20 dBc

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

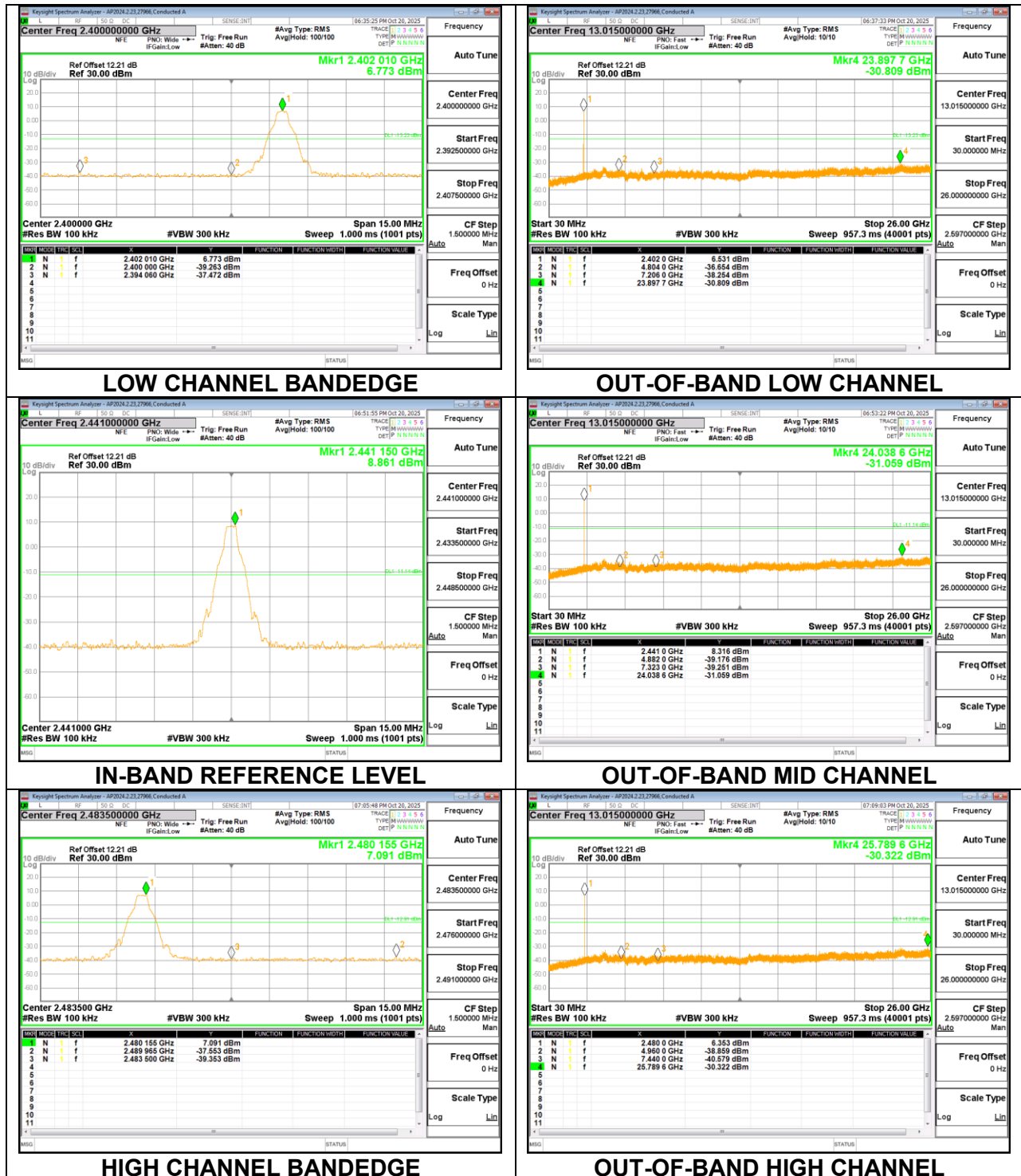
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

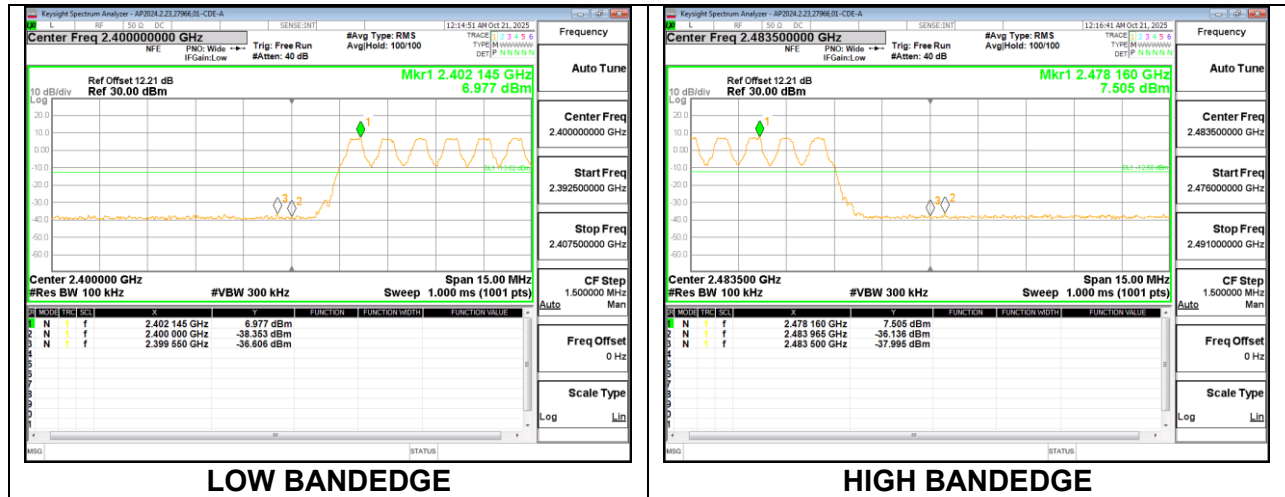
The band edges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal hopping mode.

RESULTS

9.7.1. BASIC DATA RATE GFSK MODULATION

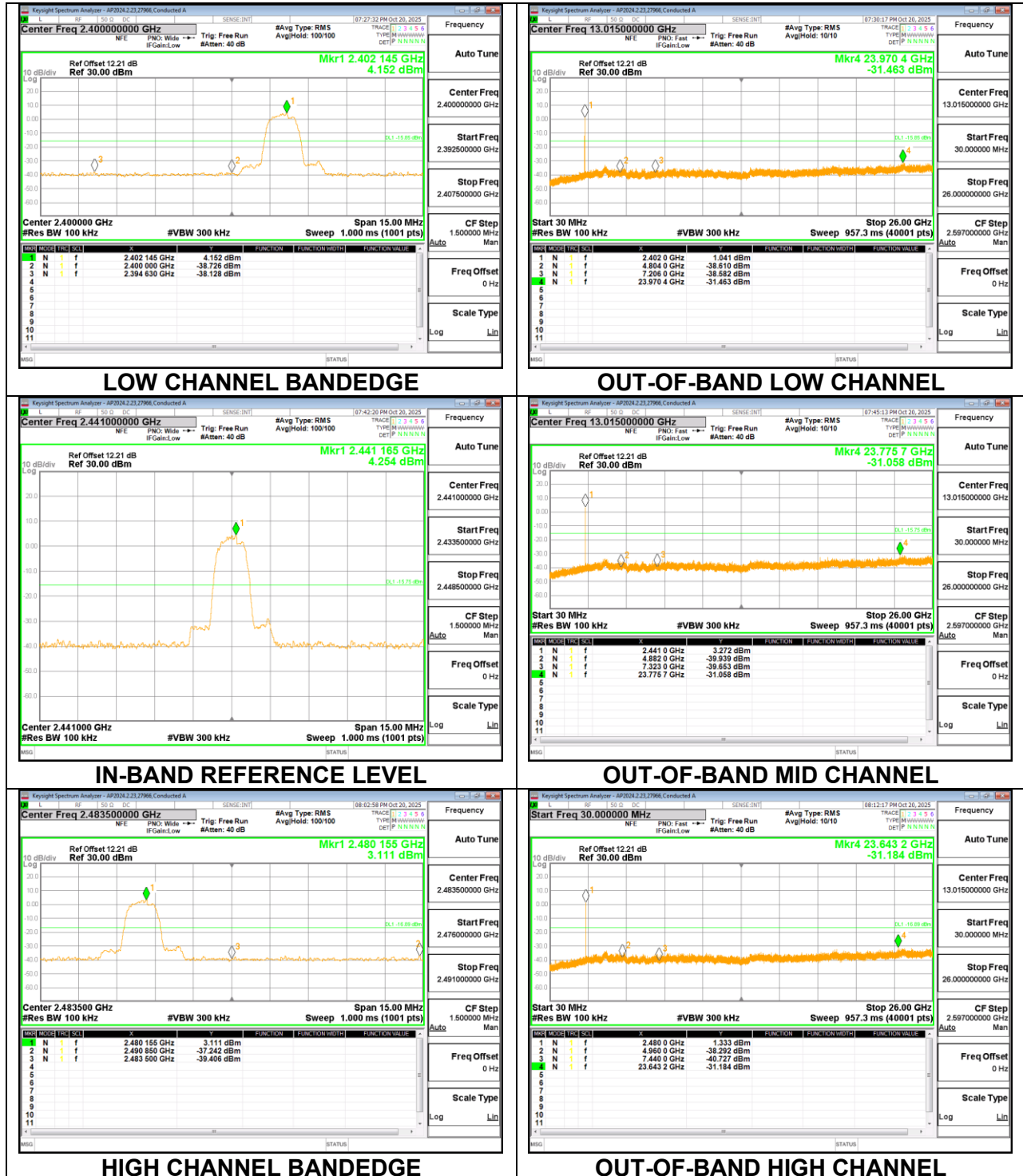
SPURIOUS EMISSIONS, NON-HOPPING

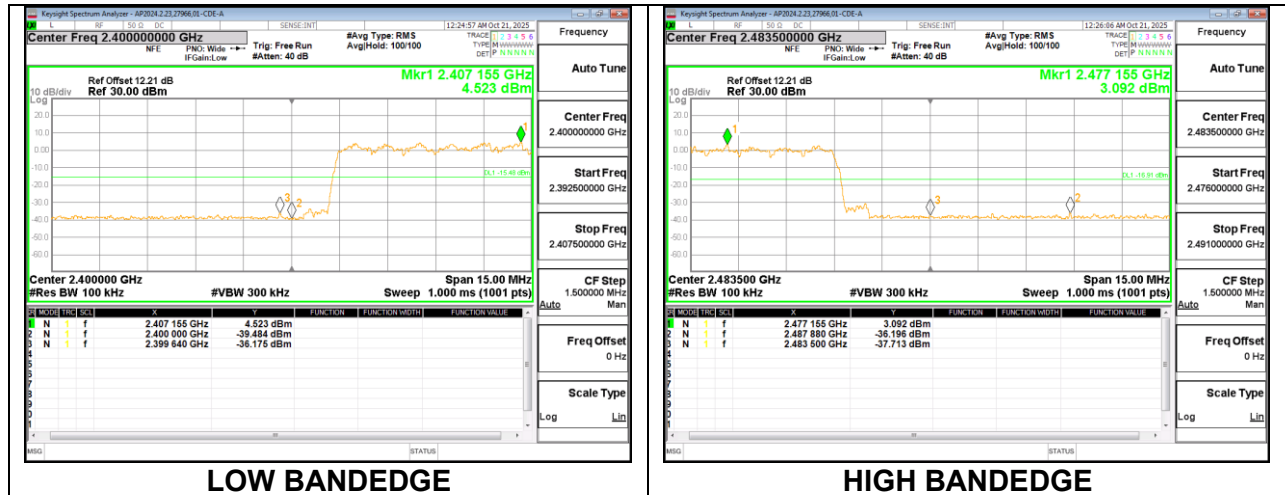


SPURIOUS BANEDGE EMISSIONS WITH HOPPING ON

9.7.2. 8PSK ENHANCED DATA RATE 8PSK MODULATION

SPURIOUS EMISSIONS, NON-HOPPING



SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON

10. RADIATED TEST RESULTS

LIMITS

FCC §15.205 and §15.209
RSS-GEN, Section 8.9 and 8.10

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
0.009-0.490	2400/F(kHz) @ 300 m	-
0.490-1.705	24000/F(kHz) @ 30 m	-
1.705 - 30	30 @ 30m	-
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for measurement below 1GHz; 1.5 m above the ground plane for measurement above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz, the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as a quasi-peak.

For pre-scans above 1 GHz, the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 kHz for peak measurements.

For final measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T video bandwidth with peak detector for average measurements.

The spectrum from 1 GHz to 18 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band. Below 1GHz and above 18GHz emissions, the channel with the highest output power was tested.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

For below 30MHz testing, an investigation was done on three antenna orientations (parallel, perpendicular, and ground-parallel). Parallel and perpendicular are the worst orientations, therefore, testing was performed on these two orientations only. Blue color trace on plots: Parallel orientation. Green color trace on plots: Perpendicular orientation.

Note: The limits in CFR 47, Part 15, Subpart C, paragraph 15.209(a), are identical to those in RSS-Gen section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using free space impedance of 377 Ohms. For example, the measurement at frequency X kHz resulted in a level of Y dBuV/m, which is equivalent to $Y-51.5 = Z$ dBuA/m, which has the same margin, W dB, to the corresponding RSS-Gen Table 6 limit as it must 15.209(a) limit.

KDB 414788 Open Field Site (OFS) and Chamber Correlation Justification

Based on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

OFS and chamber correlation testing had been performed, and the chamber-measured test result is the worst-case test result.

RESULTS

The plots in these sections are for reference settings only for different modes.

10.1. TRANSMITTER ABOVE 1 GHz

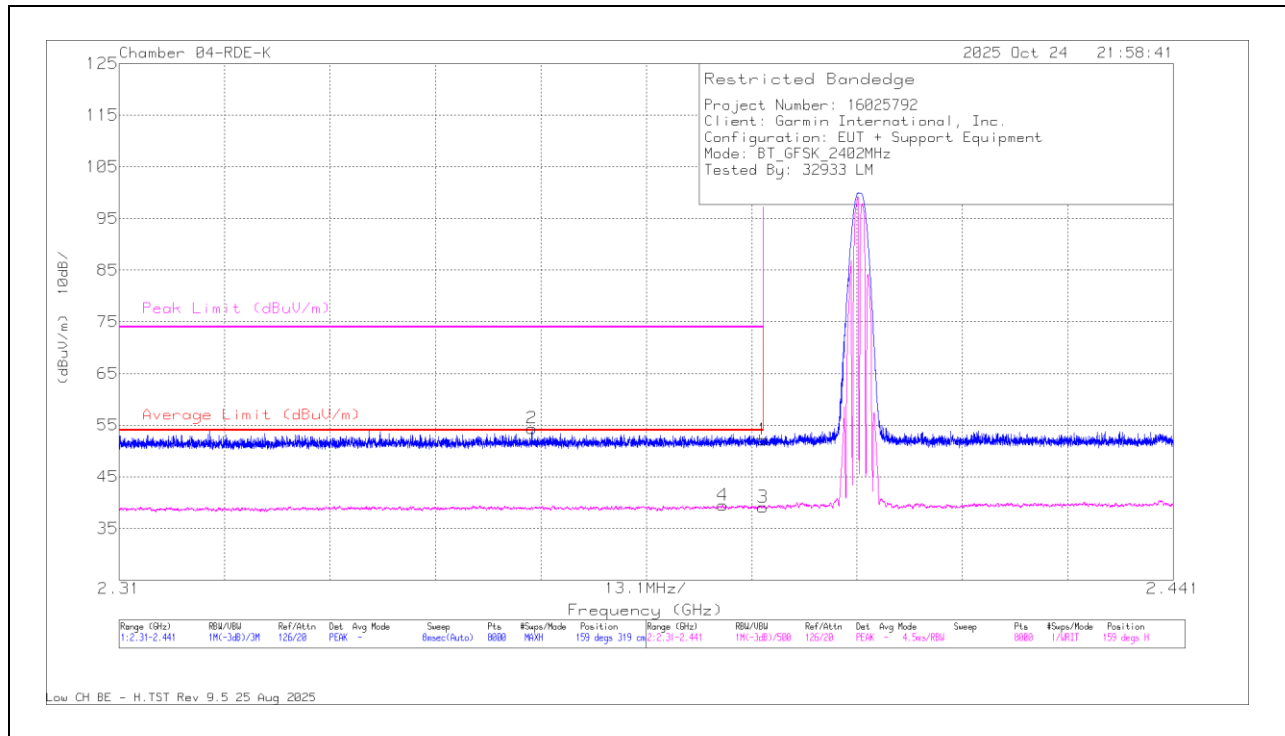
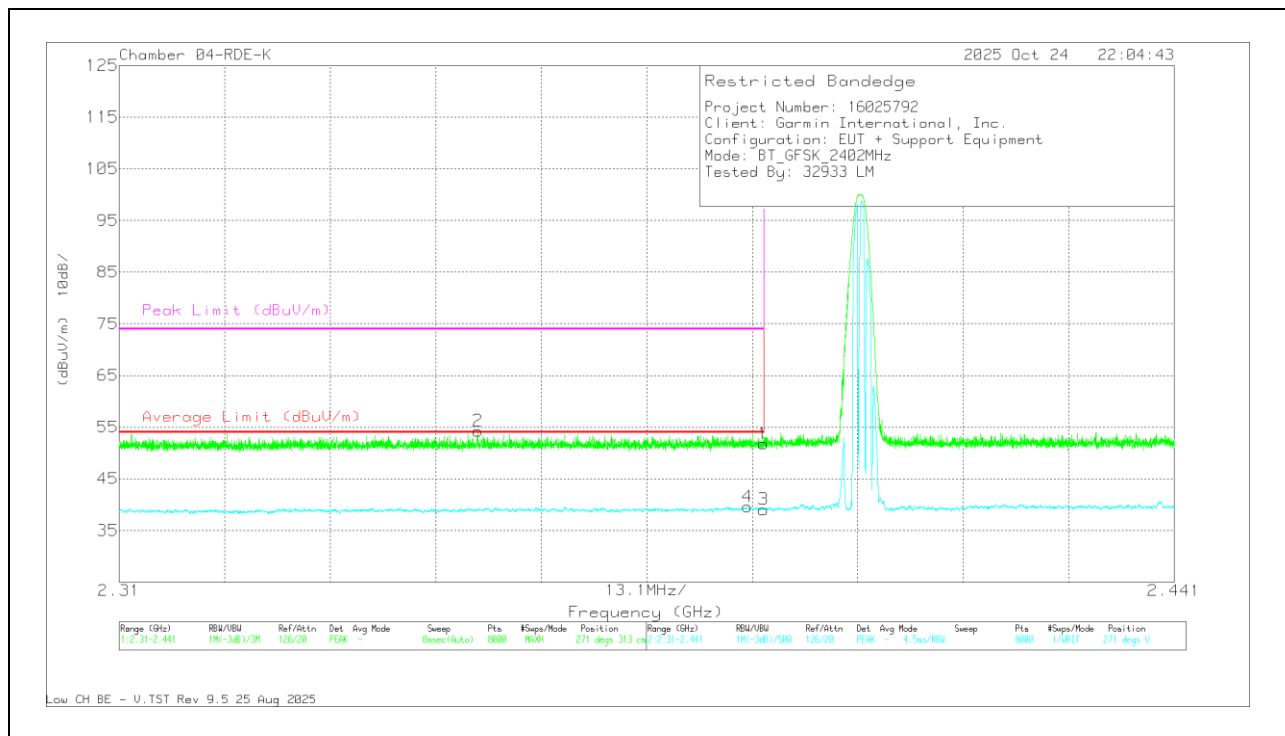
10.1.1. LOW BANDEDGE

2.4GHz (SISO)	Channel Frequency (MHz)	Frequency (GHz)	Meter Reading (dBuV)	Det	ACF (dB/m)	Amp/Cbl/ Fitr/Pad (dB)	Correct Reading (dBuV/m)	Avg Limit (dBuV/m)	Avg Margin (dB)	Pk Limit (dBuV/m)	Pk Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
GFSK	2402	* 2.39	54.5	Pk	32.3	-34.6	52.2	-	-	74	-21.8	159	319	H
		* 2.361293	56.9	Pk	32.2	-34.7	54.4	-	-	74	-19.6	159	319	H
		* 2.39	41.43	VA1T	32.3	-34.6	39.13	54	-14.87	-	-	159	319	H
		* 2.385007	41.81	VA1T	32.3	-34.6	39.51	54	-14.49	-	-	159	319	H
		* 2.39	54.08	Pk	32.3	-34.6	51.78	-	-	74	-22.22	271	313	V
		* 2.354529	56.75	Pk	32.2	-34.7	54.25	-	-	74	-19.75	271	313	V
		* 2.39	41.35	VA1T	32.3	-34.6	39.05	54	-14.95	-	-	271	312	V
8PSK	2402	* 2.388036	41.9	VA1T	32.3	-34.6	39.6	54	-14.4	-	-	271	312	V
		* 2.39	54.2	Pk	32.3	-34.6	51.9	-	-	74	-22.1	156	285	H
		* 2.316518	57.39	Pk	32	-34.9	54.49	-	-	74	-19.51	156	285	H
		* 2.39	41.36	VA1T	32.3	-34.6	39.06	54	-14.94	-	-	156	285	H
		* 2.356724	42.06	VA1T	32.2	-34.7	39.56	54	-14.44	-	-	156	285	H
		* 2.39	54.23	Pk	32.3	-34.6	51.93	-	-	74	-22.07	274	311	V
		* 2.389363	56.85	Pk	32.3	-34.6	54.55	-	-	74	-19.45	274	311	V
		* 2.39	41.5	VA1T	32.3	-34.6	39.2	54	-14.8	-	-	274	310	V
		* 2.389641	41.75	VA1T	32.3	-34.6	39.45	54	-14.55	-	-	274	310	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

VA1T - FHSS: Linear Voltage Average $VB=1/Ton$ where: Ton is transmit duration

BANDEDGE (LOW CHANNEL), GFSK**HORIZONTAL RESULT****VERTICAL RESULT**

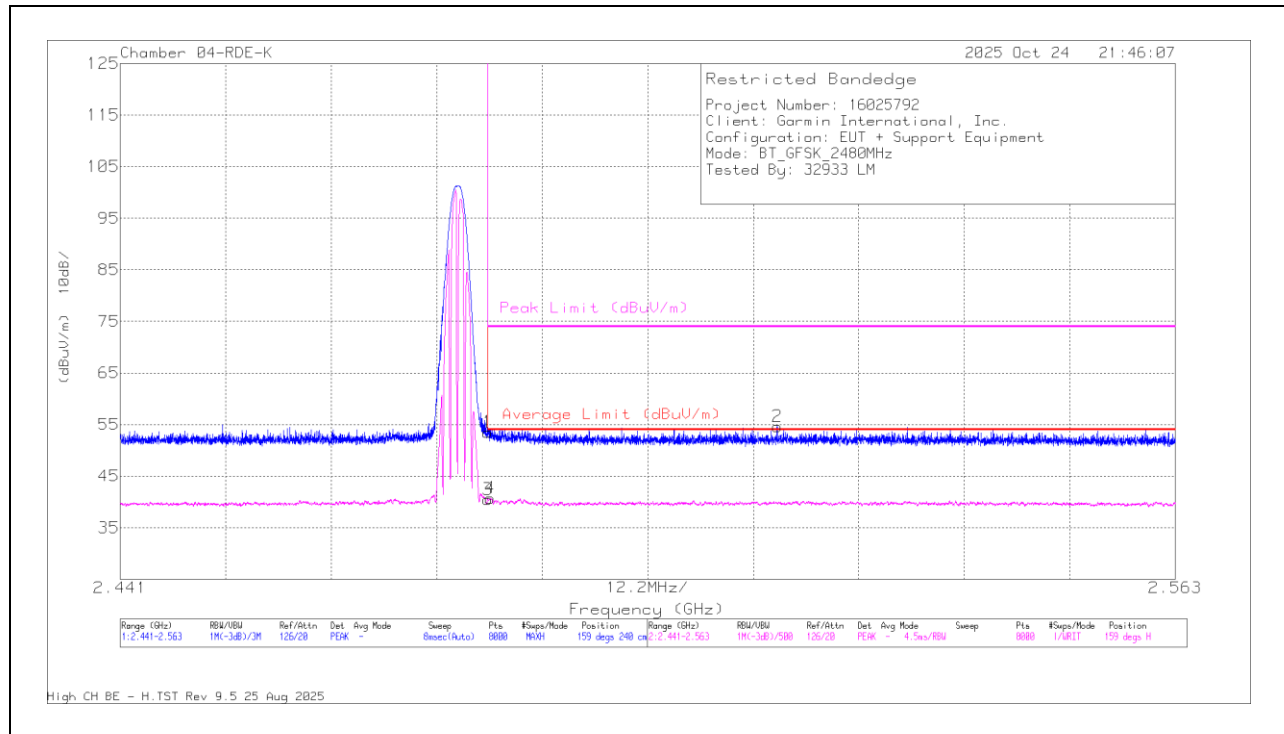
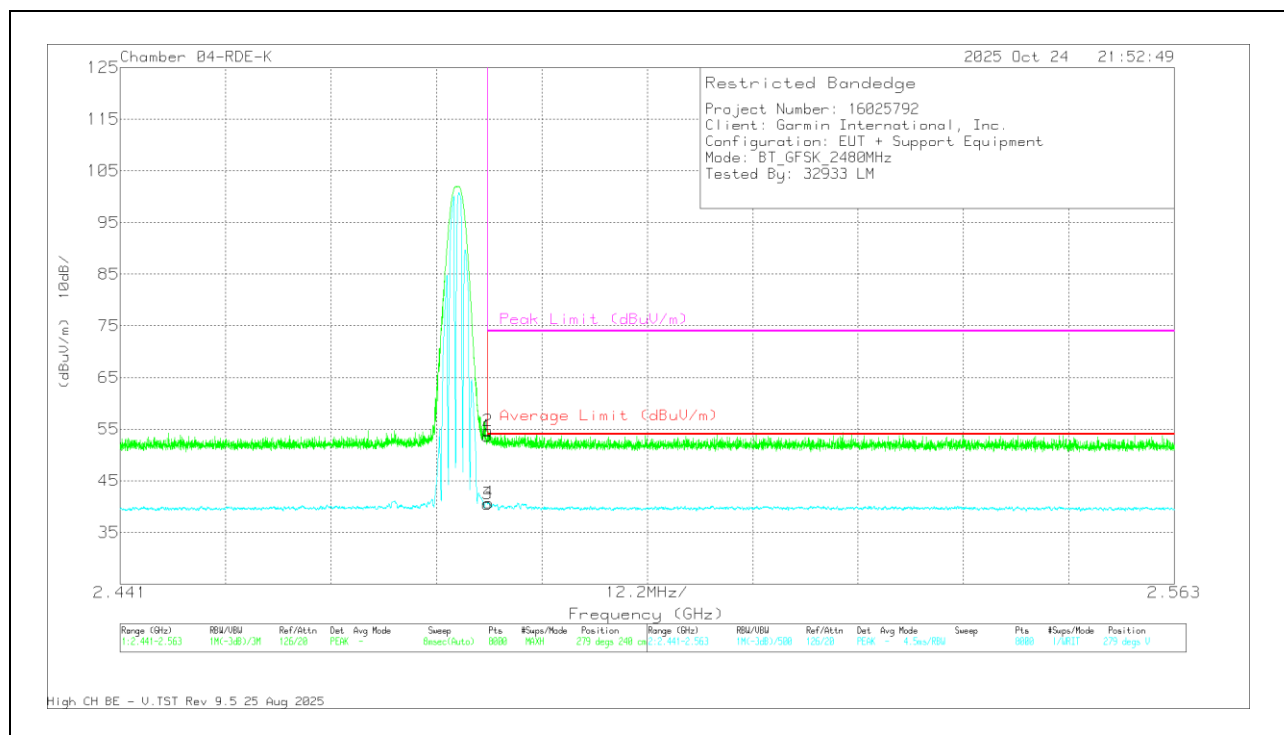
10.1.2. HIGH BANDEDGE

2.4GHz (SISO)	Channel Frequency (MHz)	Frequency (GHz)	Meter Reading (dBuV)	Det	ACF (dB/m)	Amp/Cbl/ Fitr/Pad (dB)	Correct Reading (dBuV/m)	Avg Limit (dBuV/m)	Avg Margin (dB)	Pk Limit (dBuV/m)	Pk Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
GFSK	2480	* 2.4835	55.11	Pk	32.6	-34.2	53.51	-	-	74	-20.49	159	240	H
		2.51697	56.11	Pk	32.6	-34.1	54.61	-	-	74	-19.39	159	240	H
		* 2.4835	42.09	VA1T	32.6	-34.2	40.49	54	-13.51	-	-	159	240	H
		* 2.483782	42.36	VA1T	32.6	-34.2	40.76	54	-13.24	-	-	159	240	H
		* 2.4835	55.24	Pk	32.6	-34.2	53.64	-	-	74	-20.36	279	240	V
		* 2.483553	56.27	Pk	32.6	-34.2	54.67	-	-	74	-19.33	279	240	V
		* 2.4835	42.13	VA1T	32.6	-34.2	40.53	54	-13.47	-	-	279	240	V
8PSK	2480	* 2.483629	42.34	VA1T	32.6	-34.2	40.74	54	-13.26	-	-	279	240	V
		* 2.4835	55.16	Pk	32.6	-34.2	53.56	-	-	74	-20.44	72	260	H
		2.516055	55.78	Pk	32.6	-34.1	54.28	-	-	74	-19.72	72	260	H
		* 2.4835	42.15	VA1T	32.6	-34.2	40.55	54	-13.45	-	-	72	260	H
		* 2.483507	42.14	VA1T	32.6	-34.2	40.54	54	-13.46	-	-	72	260	H
		* 2.4835	54.65	Pk	32.6	-34.2	53.05	-	-	74	-20.95	272	262	V
		* 2.483858	57.19	Pk	32.6	-34.2	55.59	-	-	74	-18.41	272	262	V
		* 2.4835	42.16	VA1T	32.6	-34.2	40.56	54	-13.44	-	-	272	262	V
		* 2.483751	42.15	VA1T	32.6	-34.2	40.55	54	-13.45	-	-	272	262	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

VA1T - FHSS: Linear Voltage Average $V_B=1/T_{on}$ where: T_{on} is transmit duration

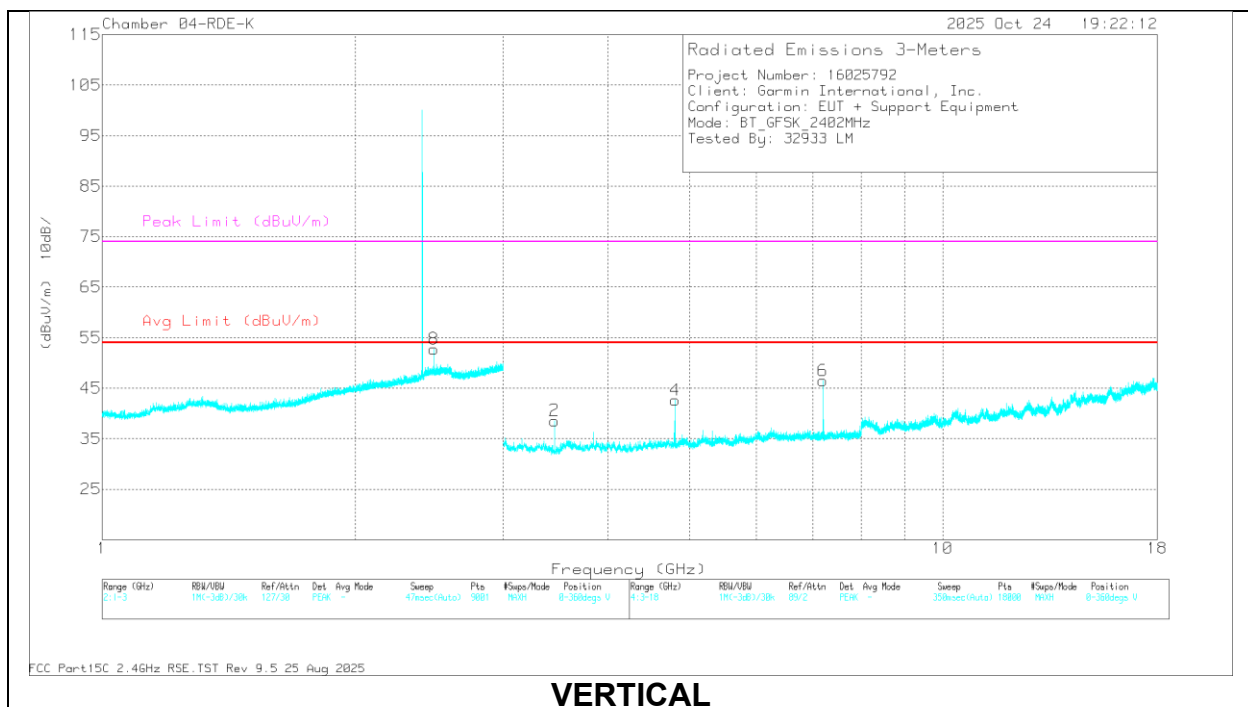
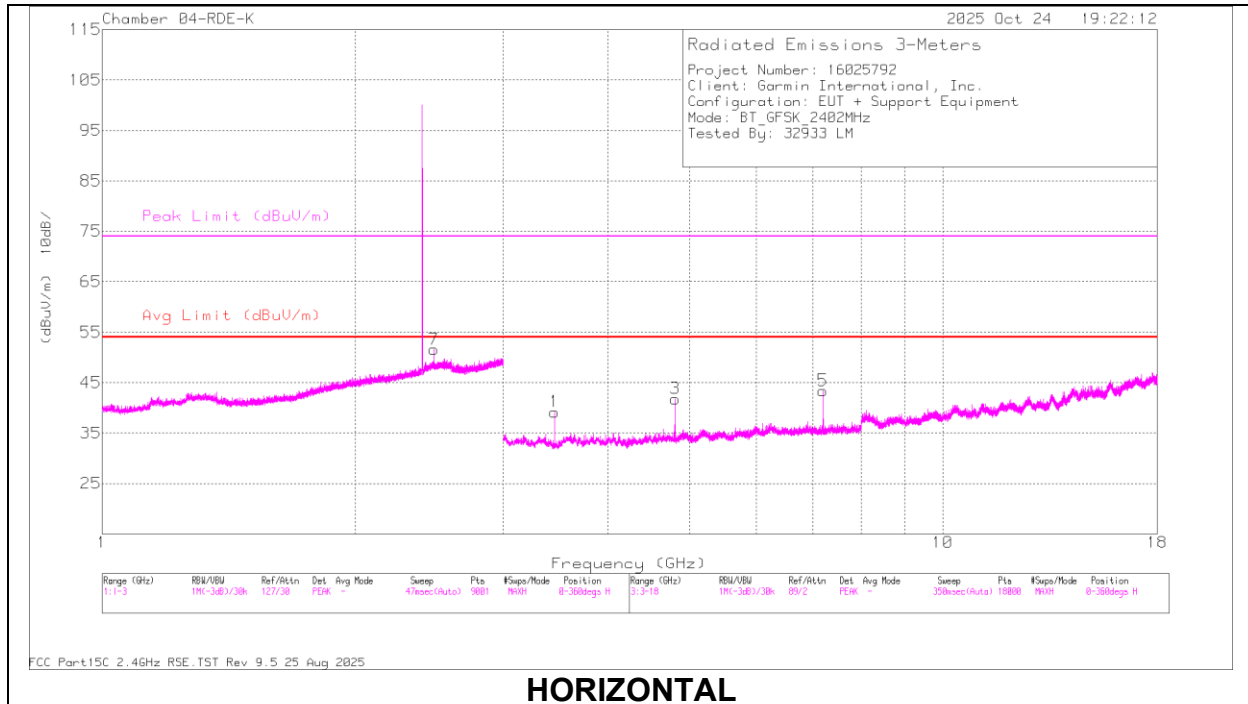
BANDEDGE (HIGH CHANNEL), GFSK**HORIZONTAL RESULT****VERTICAL RESULT**

10.1.3. HARMONICS AND SPURIOUS EMISSIONS

2.4 GHz (SISO)	Channel Frequency (MHz)	Frequency (GHz)	Meter Reading (dBuV)	Det	ACF (dB/m)	Amp/Cbl/ Filt/Pad (dB)	Correct Reading (dBuV/m)	Avg Limit (dBuV/m)	Avg Margin (dB)	Pk Limit (dBuV/m)	Pk Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
GFSK	2402	3.453224	53.1	PKFH	32.7	-41.6	44.2	-	-	-	-	358	205	H
		3.45334	54	PKFH	32.7	-41.6	45.1	-	-	-	-	216	392	V
		* 4.803797	52.97	PKFH	34.1	-40.3	46.77	-	-	74	-27.23	269	108	H
		* 4.804082	46.35	VA1T	34.1	-40.3	40.15	54	-13.85	-	-	269	108	H
		* 4.803927	52.69	PKFH	34.1	-40.3	46.49	-	-	74	-27.51	287	229	V
		* 4.804021	46.5	VA1T	34.1	-40.3	40.3	54	-13.7	-	-	287	229	V
		7.206502	51.42	PKFH	35.6	-38.2	48.82	-	-	-	-	175	214	H
		7.204661	47.65	PKFH	35.6	-38.2	45.05	-	-	-	-	225	106	V
	2441	2.481959	59.94	PKFH	32.6	-34.2	58.34	-	-	-	-	46	174	H
		2.481921	59.96	PKFH	32.6	-34.2	58.36	-	-	-	-	289	242	V
		3.453311	54.12	PKFH	32.7	-41.6	45.22	-	-	-	-	243	226	H
		3.453076	53.34	PKFH	32.7	-41.6	44.44	-	-	-	-	224	178	V
		* 4.882329	56.04	PKFH	34.1	-40.2	49.94	-	-	74	-24.06	85	211	H
		* 4.882049	50.5	VA1T	34.1	-40.2	44.4	54	-9.6	-	-	85	211	H
		* 4.882095	55.65	PKFH	34.1	-40.2	49.55	-	-	74	-24.45	313	258	V
		* 4.882001	51.17	VA1T	34.1	-40.2	45.07	54	-8.93	-	-	313	258	V
	2480	* 7.322799	52.3	PKFH	35.6	-37.8	50.1	-	-	74	-23.9	208	174	H
		* 7.322817	46.12	VA1T	35.6	-37.8	43.92	54	-10.08	-	-	208	174	H
		* 7.323291	54.69	PKFH	35.6	-37.8	52.49	-	-	74	-21.51	240	217	V
		* 7.322957	50.05	VA1T	35.6	-37.8	47.85	54	-6.15	-	-	240	217	V
		3.453066	54.47	PKFH	32.7	-41.6	45.57	-	-	-	-	40	359	H
		3.453362	54.36	PKFH	32.7	-41.6	45.46	-	-	-	-	358	280	V
		* 4.959774	55.61	PKFH	34.1	-40.2	49.51	-	-	74	-24.49	236	225	H
		* 4.960063	50.51	VA1T	34.1	-40.2	44.41	54	-9.59	-	-	236	225	H
8PSK	2402	* 4.960364	53.28	PKFH	34.1	-40.2	47.18	-	-	74	-26.82	336	257	V
		* 4.959808	46.64	VA1T	34.1	-40.2	40.54	54	-13.46	-	-	336	257	V
		* 7.440027	52.68	PKFH	35.6	-37.6	50.68	-	-	74	-23.32	212	184	H
		* 7.440107	47.14	VA1T	35.6	-37.6	45.14	54	-8.86	-	-	212	184	H
		* 7.439632	55.67	PKFH	35.6	-37.6	53.67	-	-	74	-20.33	251	249	V
		* 7.44017	50.48	VA1T	35.6	-37.6	48.48	54	-5.52	-	-	251	249	V
	2441	3.453339	54.61	PKFH	32.7	-41.6	45.71	-	-	-	-	19	149	H
		3.453739	53.86	PKFH	32.7	-41.6	44.96	-	-	-	-	344	118	V
		* 4.804055	53.08	PKFH	34.1	-40.3	46.88	-	-	74	-27.12	55	215	H
		* 4.803735	44.13	VA1T	34.1	-40.3	37.93	54	-16.07	-	-	55	215	H
		* 4.803459	54.15	PKFH	34.1	-40.3	47.95	-	-	74	-26.05	288	232	V
		* 4.803846	45.51	VA1T	34.1	-40.3	39.31	54	-14.69	-	-	288	232	V
		7.205576	49.55	PKFH	35.6	-38.2	46.95	-	-	-	-	173	356	H
		7.20533	50.94	PKFH	35.6	-38.2	48.34	-	-	-	-	252	102	V
	2480	3.453184	53.72	PKFH	32.7	-41.6	44.82	-	-	-	-	15	112	H
		3.453063	53.81	PKFH	32.7	-41.6	44.91	-	-	-	-	343	135	V
		* 4.87186	51.37	PKFH	34.1	-40.2	45.27	-	-	74	-28.73	164	211	H
		* 4.882034	41.81	VA1T	34.1	-40.2	35.71	54	-18.29	-	-	164	211	H
		* 4.881263	51.88	PKFH	34.1	-40.3	45.68	-	-	74	-28.32	246	103	V
		* 4.88189	41.13	VA1T	34.1	-40.3	34.93	54	-19.07	-	-	246	103	V
		* 7.322869	49.26	PKFH	35.6	-37.8	47.06	-	-	74	-26.94	199	184	H
		* 7.322976	38.72	VA1T	35.6	-37.8	36.52	54	-17.48	-	-	199	184	H
	2441	* 7.322411	51.6	PKFH	35.6	-37.8	49.4	-	-	74	-24.6	237	156	V
		* 7.322824	41.47	VA1T	35.6	-37.8	39.27	54	-14.73	-	-	237	156	V
	2480	3.453373	53.43	PKFH	32.7	-41.6	44.53	-	-	-	-	29	160	H
		3.453262	53.95	PKFH	32.7	-41.6	45.05	-	-	-	-	351	116	V
		* 4.959875	52.98	PKFH	34.1	-40.2	46.88	-	-	74	-27.12	242	204	H
		* 4.959915	44.1	VA1T	34.1	-40.2	38	54	-16	-	-	242	204	H
		* 4.960381	51.8	PKFH	34.1	-40.2	45.7	-	-	74	-28.3	339	232	V
		* 4.960012	42.77	VA1T	34.1	-40.2	36.67	54	-17.33	-	-	339	232	V
		* 7.440235	49.14	PKFH	35.6	-37.6	47.14	-	-	74	-26.86	213	186	H
		* 7.439862	39.11	VA1T	35.6	-37.6	37.11	54	-16.89	-	-	213	186	H
	2480	* 7.440374	52.49	PKFH	35.6	-37.6	50.49	-	-	74	-23.51	250	241	V
		* 7.440214	42.16	VA1T	35.6	-37.6	40.16	54	-13.84	-	-	250	241	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

HARMONICS AND SPURIOUS EMISSIONS (GFSK LOW CHANNEL)

10.2. TRANSMITTER WORST CASE BELOW 30MHz

SPURIOUS EMISSIONS BELOW 30MHz (WORST-CASE CONFIGURATION)



Below 30MHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna E (dB/m)	CBL/AMP (dB)	Dist Corr 300m (dB)	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Polarity (Degs)
1	.0122	20.28	Pk	60.1	-30.4	-80	-30.02	65.86	-95.88	45.86	-75.88	0-360	0
2	.0248	9.49	Pk	58.6	-31.6	-80	-43.51	59.69	-103.2	39.69	-83.2	0-360	0
3	.054	6.33	Pk	56.8	-31.9	-80	-48.77	52.93	-101.7	32.93	-81.7	0-360	0
6	.0123	16.6	Pk	60.1	-30.5	-80	-33.8	65.77	-99.57	45.77	-79.57	0-360	90
7	.024	6.72	Pk	58.7	-31.6	-80	-46.18	59.98	-106.16	39.98	-86.16	0-360	90
8	.0481	6.2	Pk	57.2	-31.9	-80	-48.5	53.95	-102.45	33.95	-82.45	0-360	90

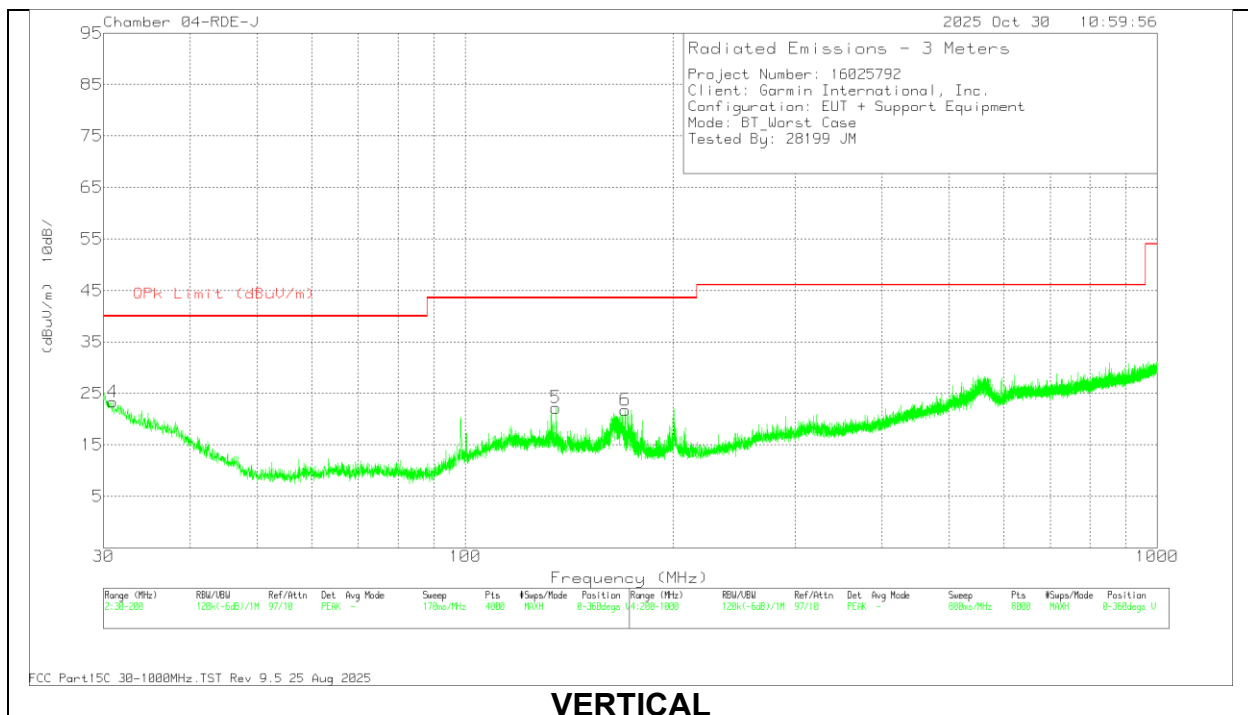
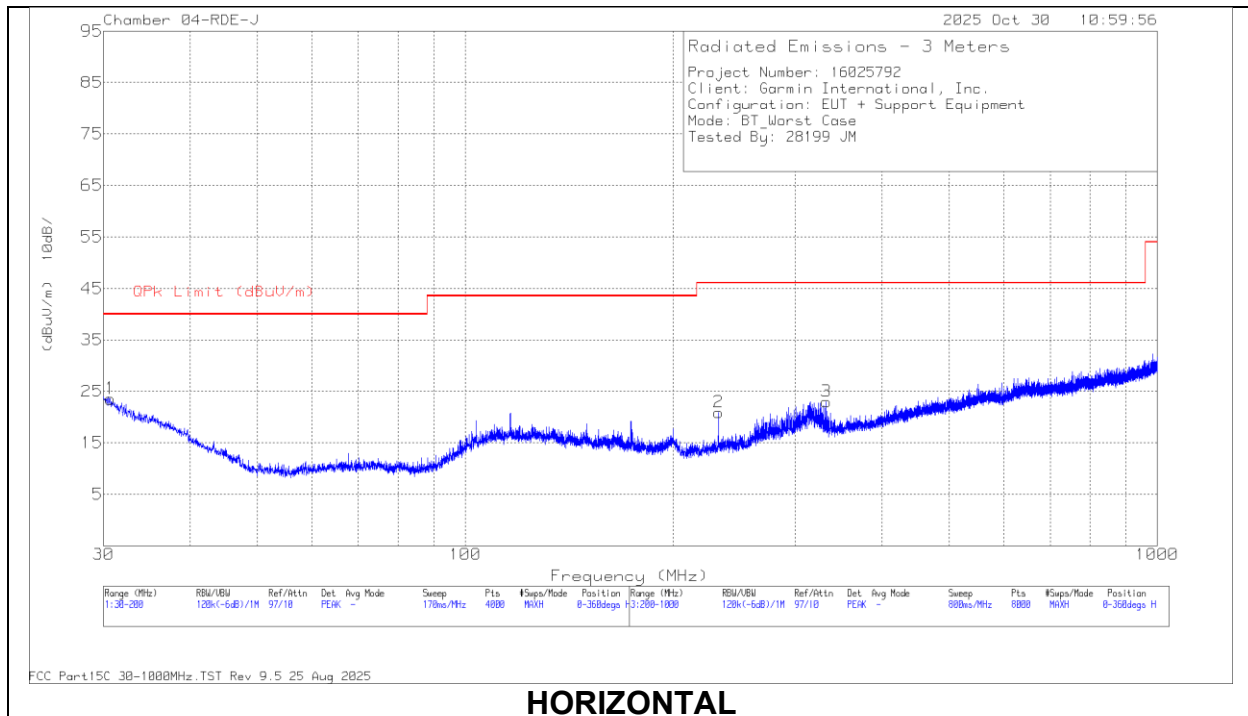
Pk - Peak detector

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna E (dB/m)	CBL/AMP (dB)	Dist Corr 30m (dB) 40Log	Corrected Reading (dBuV/m)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Polarity (Degs)
4	1.1746	18.75	Pk	45.9	-32.1	-40	-7.45	26.23	-33.68	0-360	0
5	8.4395	17.92	Pk	34.5	-31.7	-40	-19.28	29.5	-48.78	0-360	0
9	1.0391	19.13	Pk	46.6	-32.3	-40	-6.57	27.29	-33.86	0-360	90
10	6.9796	20.22	Pk	34.7	-31.9	-40	-16.98	29.5	-46.48	0-360	90

Pk - Peak detector

10.3. TRANSMITTER WORST CASE BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION)



Below 1GHz Data

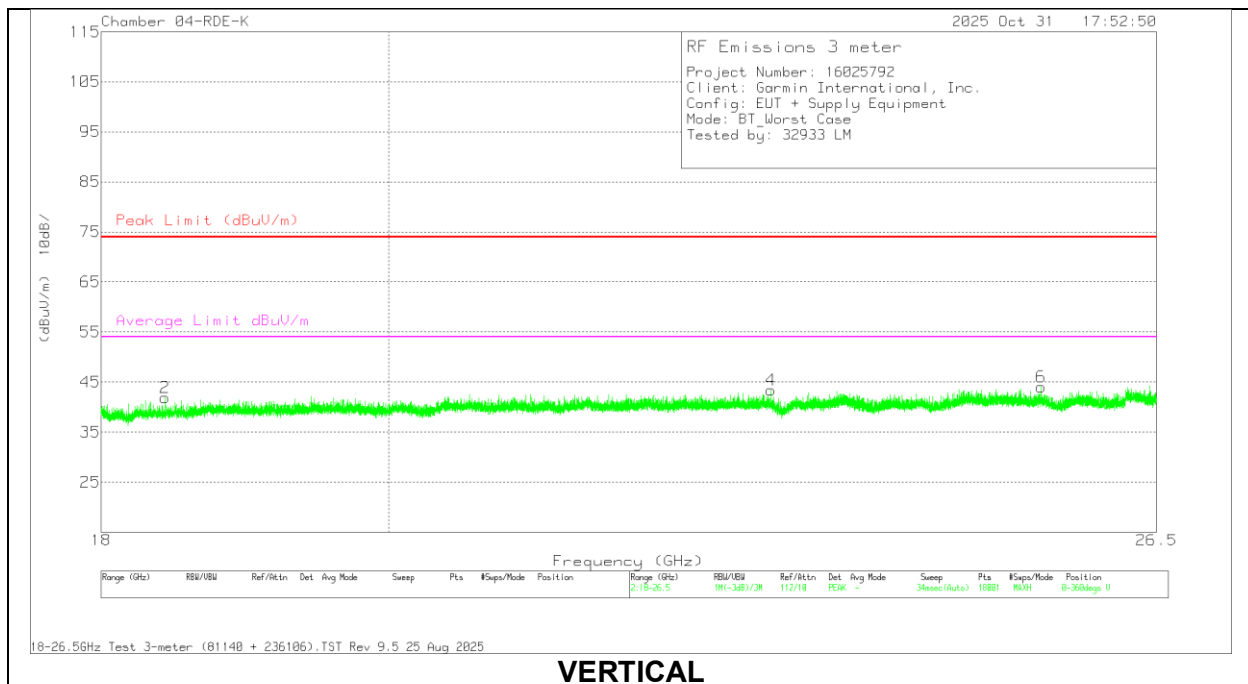
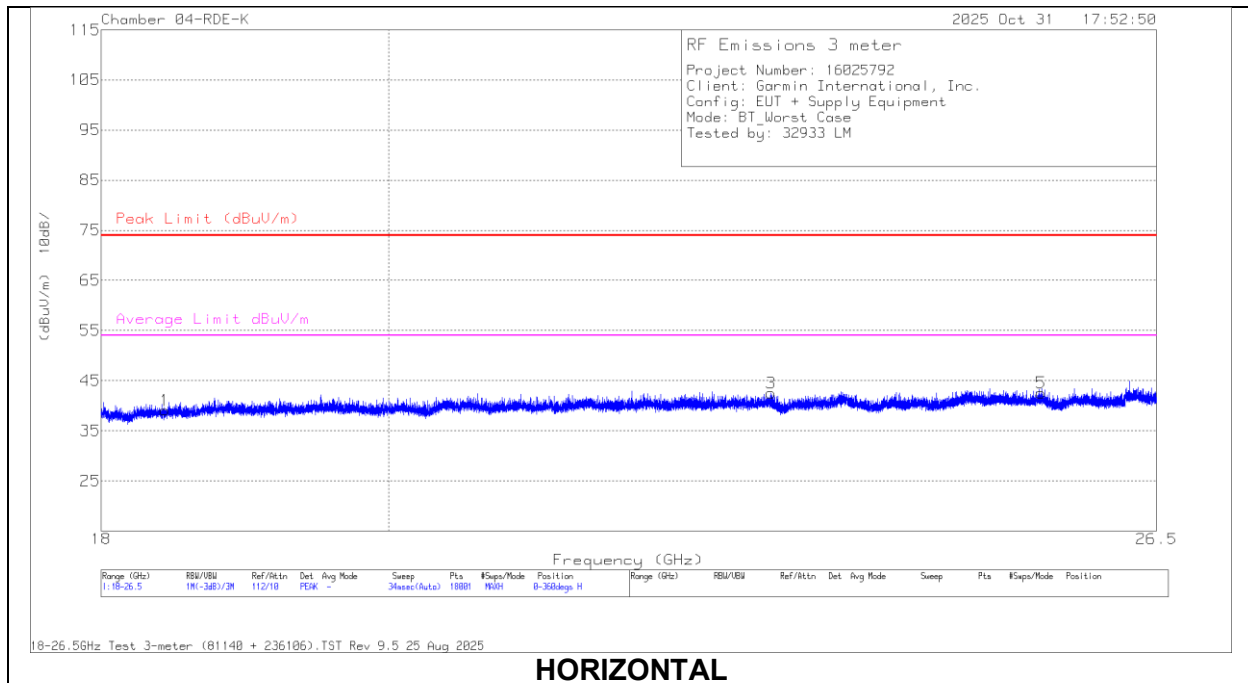
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	202329 ACF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	31.6608	30.92	Pk	25.4	-31.7	24.62	40	-15.38	43	281	H
	31.6608	21.96	Qp	25.4	-31.7	15.66	40	-24.34	43	281	H
2	232.204	34.52	Pk	17	-30.6	20.92	46.02	-25.1	0-360	99	H
3	332.417	33.42	Pk	19.8	-30.2	23.02	46.02	-23	0-360	99	H
4	30.9352	29.12	Pk	26	-31.8	23.32	40	-16.68	0-360	100	V
5	135.087	33.9	Pk	19.3	-31	22.2	43.52	-21.32	0-360	100	V
6	170.244	34.94	Pk	17.6	-30.8	21.74	43.52	-21.78	0-360	100	V

Pk - Peak detector

Qp - Quasi-Peak detector

10.4. TRANSMITTER WORST CASE 18-26 GHz

SPURIOUS EMISSIONS 18-26 GHz (WORST-CASE CONFIGURATION)



18 – 26GHz Data

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	81140 ACF (dB/m)	CBL/AMP (dB)	CBL (dB)	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	PK Margin (dB)	Average Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 18.425472	50.78	Pk	32.1	-63.2	19.4	39.08	74	-34.92	-	-	0-360	101	H
2	* 18.424528	53.82	Pk	32	-63.3	19.4	41.92	74	-32.08	-	-	0-360	200	V
3	* 23.010748	49.98	Pk	33.2	-62.2	21.5	42.48	74	-31.52	-	-	0-360	200	H
4	* 23.008859	50.94	Pk	33.2	-62.2	21.5	43.44	74	-30.56	-	-	0-360	200	V
5	25.401608	48.95	Pk	33.9	-62.8	22.5	42.55	74	-31.45	-	-	0-360	200	H
6	25.401608	50.4	Pk	33.9	-62.8	22.5	44	74	-30	-	-	0-360	200	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

11. SETUP PHOTOS

Please refer to 16025792-EP1 for setup photos.

END OF REPORT