

TEST REPORT

Report Number: R15699305-E1

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

Model : A04702

FCC ID : IPH-04702

IC : 1792A-04702

EUT Description : Portable Digital Transceiver

Test Standard(s) : FCC 47 CFR PART 15 SUBPART C
ISED RSS-247 ISSUE 3
ISED RSS-GEN ISSUE 5 + A1 + A2

Date Of Issue:
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REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	2025-04-14	Initial Issue	Manish Baral

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1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: Portable Digital Transceiver

MODEL: A04702

SERIAL NUMBER: 497855098, 497854737

SAMPLE RECEIPT DATE: 2025-03-04

DATE TESTED: 2025-03-04 to 2025-04-08

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	
ISED RSS-247 Issue 3	Refer to Section 2
ISED RSS-GEN Issue 5 + A1 + A2	

UL LLC 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 assure 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 LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document.

Approved & Released
For UL LLC By:

Prepared By:



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2. TEST RESULTS SUMMARY

This report contains info provided by the customer which can impact the validity of results. UL LLC is only responsible for the validity of results after the integration of the data provided by the customer.

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

- 1) Antenna gain and type (see section 6.3)

FCC Clause	ISED Clause	Requirement	Result	Comment
See Comment		Duty Cycle	Reporting purposes only	Per ANSI C63.10, Section 11.6.
See Comment	RSS-GEN 6.7	20dB BW/99% OBW	Reporting purposes only	ANSI C63.10 Sections 6.9.2 and 6.9.3
15.247 (a)(1)	RSS-247 (5.1) (b)	Hopping Frequency Separation	Compliant	None
15.247 (a)(1)(iii)	RSS-247 (5.1) (d)	Number of Hopping Channels		
15.247 (a)(1)(iii)	RSS-247 (5.1) (d)	Average Time of Occupancy		
15.247 (b)(1)	RSS-247 (5.4) (b)	Output Power		
See Comment		Average Power	Reporting purposes only	Per ANSI C63.10, Section 11.9.2.3.2.
15.247 (d)	RSS-247 (5.5)	Conducted Spurious Emissions	Compliant	None
15.209, 15.205	RSS-GEN 8.9, 8.10	Radiated Emissions		
15.207	RSS-Gen 8.8	AC Mains Conducted Emissions		

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC 47 CFR Part 2, FCC 47 CFR Part 15, ANSI C63.10-2020, KDB 558074 D01 15.247 Meas Guidance v05r02, KDB 414788 D01 Radiated Test Site v01r01, RSS-GEN Issue 5 + A1 + A2, and RSS-247 Issue 3.

4. FACILITIES AND ACCREDITATION

UL LLC is accredited by A2LA, certification # 0751.06, 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
<input type="checkbox"/>	Building: 12 Laboratory Dr RTP, NC 27709, U.S.A	US0067	2180C	825374
<input checked="" type="checkbox"/>	Building: 2800 Perimeter Park Dr. Suite B Morrisville, NC 27560, U.S.A		27265	

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 on a regular basis, with a maximum time between calibrations of one year or the manufacturers' 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	UNCERTAINTY
Radio Frequency (Spectrum Analyzer)	141.2 Hz
Occupied Channel Bandwidth	1.22%
RF output power, conducted	1.3 dB (PK) 0.45 dB (AV)
Power Spectral Density, conducted	2.47 dB
Unwanted Emissions, conducted	1.94 dB
All emissions, radiated	6.01 dB
Conducted Emissions (0.150-30MHz) - LISN	3.40 dB
Temperature	0.57°C
Humidity	3.39%
DC Supply voltages	1.70%
Time	3.39%

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. This report covers testing on the BT radio.

6.2. MAXIMUM OUTPUT POWER

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

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402 - 2480	Basic GFSK	13.34	21.58
2402 - 2480	Enhanced DQPSK	12.81	19.10
2402 - 2480	Enhanced 8PSK	12.06	16.07

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The antenna(s) gain and type, as provided by the manufacturer' are as follows:
The radio utilizes an antenna with the following type and maximum gain:

Type	Frequency Range (MHz)	Maximum Gain (dBi)
Inverted F	2402-2480	-4.47

6.4. SOFTWARE AND FIRMWARE

The software version installed during testing was 8.09.

6.5. WORST-CASE CONFIGURATION AND MODE

Radiated emissions below 1GHz, above 18GHz, and power line conducted emission were performed with the EUT set to transmit at the channel and mode with the highest average output power as 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.

The fundamental of the EUT was investigated in three orthogonal orientations X, Y, and Z. The worst-case orientation was determined to be the Y-orientation; therefore, all testing was performed with the EUT in the Y-orientation.

Worst-case packet sizes:

GFSK mode: DH5

DQPSK mode: 2-DH5

8PSK mode: 3-DH5

Note: To reduce size of report only representative plots are included for some conducted testing.

6.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adaptor	Sony	XQZ-UC11-010-236-21	32223W09205418	N/A
AC Adaptor	PHIHONG/Garmin	AQ27A-59CFA	N/A	N/A
Tag Reader	Synnix Technology Co	CL-2100R	N/A	N/A
Laptop	Lenovo	T14	PF4FKVWW	N/A
Laptop Charger	Lenovo	ADLX65YDC2D	8SSA10R16970D1SG35A139F	N/A

I/O CABLES

I/O Cable List						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	USB	1	USB-C	Shielded	<3m	Program/Charge EUT

TEST SETUP

EUT was configured using its own built-in push buttons prior to testing. For final emissions testing, the EUT was connected to AC mains.

SETUP DIAGRAMS

Please refer to R15699305-EP1 for setup diagrams

7. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville – Chamber 1)

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
18-40 GHz					
204704	Horn Antenna, 18-26.5GHz	Com-Power	AH-826	2023-07-20	2025-07-20
Gain-Loss Chains					
204704	Horn Antenna, 18-26.5GHz	Com-Power	AH-826	2023-07-20	2025-07-20
Receiver & Software					
206496	Spectrum Analyzer	Rohde & Schwarz	ESW44	2024-08-29	2025-08-29
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
Additional Equipment used					
241205	Environmental Meter	Fisher Scientific	15-077-963	2023-09-05	2025-09-05

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville – Chamber 4)

Equip. ID	Description	Manufacturer/Brand	Model Number	Last Cal.	Next Cal.
1-18 GHz					
89509	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2023-05-23	2025-05-23
Gain-Loss Chains					
207640	Gain-loss string: 1-18GHz	Various	Various	2024-05-22	2025-05-22
Receiver & Software					
197955	Spectrum Analyzer	Rohde & Schwarz	ESW44	2024-04-16	2025-04-16
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
Additional Equipment used					
241204	Environmental Meter	Fisher Scientific	15-077-963	2023-09-05	2025-09-05

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville – Chamber 2)

Equip. ID	Description	Manufacturer/Brand	Model Number	Last Cal.	Next Cal.
0.009-30MHz					
135144	Active Loop Antenna	ETS-Lindgren	6502	2024-10-02	2025-10-02
30-1000 MHz					
159203	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2024-03-05	2026-03-05
Gain-Loss Chains					
91975	Gain-loss string: 0.009-30MHz	Various	Various	2024-05-10	2025-05-10
91978	Gain-loss string: 25-1000MHz	Various	Various	2024-05-10	2025-05-10
Receiver & Software					
197954	Spectrum Analyzer	Rohde & Schwarz	ESW44	2024-03-05	2025-03-05
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
Additional Equipment used					
200540	Environmental Meter	Fisher Scientific	15-077-963	2023-07-19	2025-07-19

Note – Equipment was within calibration at time of use.

Test Equipment Used – Conducted Emissions Test Equipment – Morrisville (COND2)

Equip. ID	Description	Manufacturer/Brand	Model Number	Last Cal.	Next Cal.
90410	Spectrum Analyzer	Keysight Technologies	N9030A	2024-06-14	2025-06-14
Power Software	Boonton Power Analyzer	Boonton	Version 3.0.13.0	NA	NA
SOFTEMI	Antenna Port Software	UL	Version 2022.8.16	NA	NA
211057	Real-Time Peak Power Sensor 50MHz to 8GHz	Boonton	RTP5000	2024-08-01	2025-08-01
CBL091	Micro-Coax UTiFLEX Cable Assembly, Low Loss,40Ghz	Carlisle Interconnect Technologies	UFA147A-2-0360-200200	2024-03-01	2025-03-31
211056	Real-Time Peak Power Sensor 50MHz to 8GHz	Boonton	RTP5000	2024-08-01	2025-08-01
226562	SMA Coaxial 10dB Attenuator 25MHz-18GHz	CentricRF	C18S2-10	2024-04-11	2025-04-11
248881	Environmental Meter	Control Company	06-662-4	2024-04-10	2026-04-10

Test Equipment Used - Line-Conducted Emissions – Voltage (Morrisville – Conducted 1)

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
70374	EMI Test Receiver	ROHDE & SCHWARZ	ESCI7	2024-07-30	2025-07-30
CBL087	Coax cable, RG223, N-male to BNC-male, 20-ft.	Pasternack	PE3W06143-240	2024-04-04	2025-04-04
179892	Environmental Meter	Fisher Scientific	15-077-963	2024-08-12	2025-08-12
80391	LISN, 50-ohm/50-uH, 250uH 2-conductor, 25A	Fischer Custom Com.	FCC-LISN-50/250-25-2-01	2024-08-01	2025-08-01
52859	Transient Limiter, 0.009-100MHz	Electro-Metrics	EM-7600	2024-04-04	2025-04-04
236852	CW-AC Power Source	Ametek	CW2501	NA	NA
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		

Note – Equipment was within calibration at time of use.

8. MEASUREMENT METHODS

On Time and Duty Cycle: ANSI C63.10-2020 Section 11.6

Occupied BW (20dB): ANSI C63.10-2020 Section 6.9.2

Occupied BW (99%): ANSI C63.10-2020 Section 6.9.3

Carrier Frequency Separation: ANSI C63.10-2020 Section 7.8.2

Number of Hopping Frequencies: ANSI C63.10-2020 Section 7.8.3

Time of Occupancy (Dwell Time): ANSI C63.10-2020 Section 7.8.4

Output Power: ANSI C63.10-2020 Section 7.8.5

Conducted Spurious Emissions: ANSI C63.10-2020 Section 7.8.7

Conducted Band-Edge: ANSI C63.10-2020 Section 7.8.7.2 and 6.10.4

Radiated Band-edge: ANSI C63.10-2020 Section 6.10.5

Radiated Spurious Emissions: ANSI C63.10-2020 Sections 6.3 to 6.6 and 7.8.8

AC Power Line Conducted Emissions: ANSI C63.10-2020, Section 6.2.

9. ANTENNA PORT TEST RESULTS

9.1. 20 dB AND 99% BANDWIDTH

LIMITS

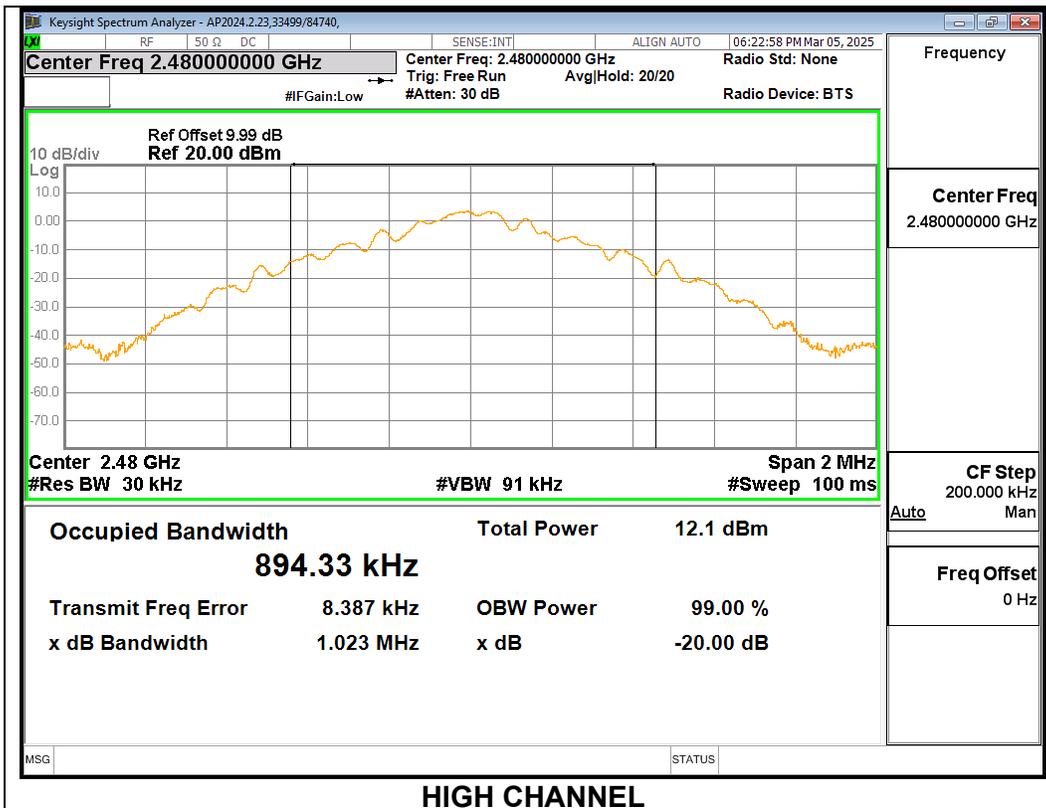
None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 1-5% of the 20 dB bandwidth. The VBW is set to \geq RBW. The sweep time is coupled.

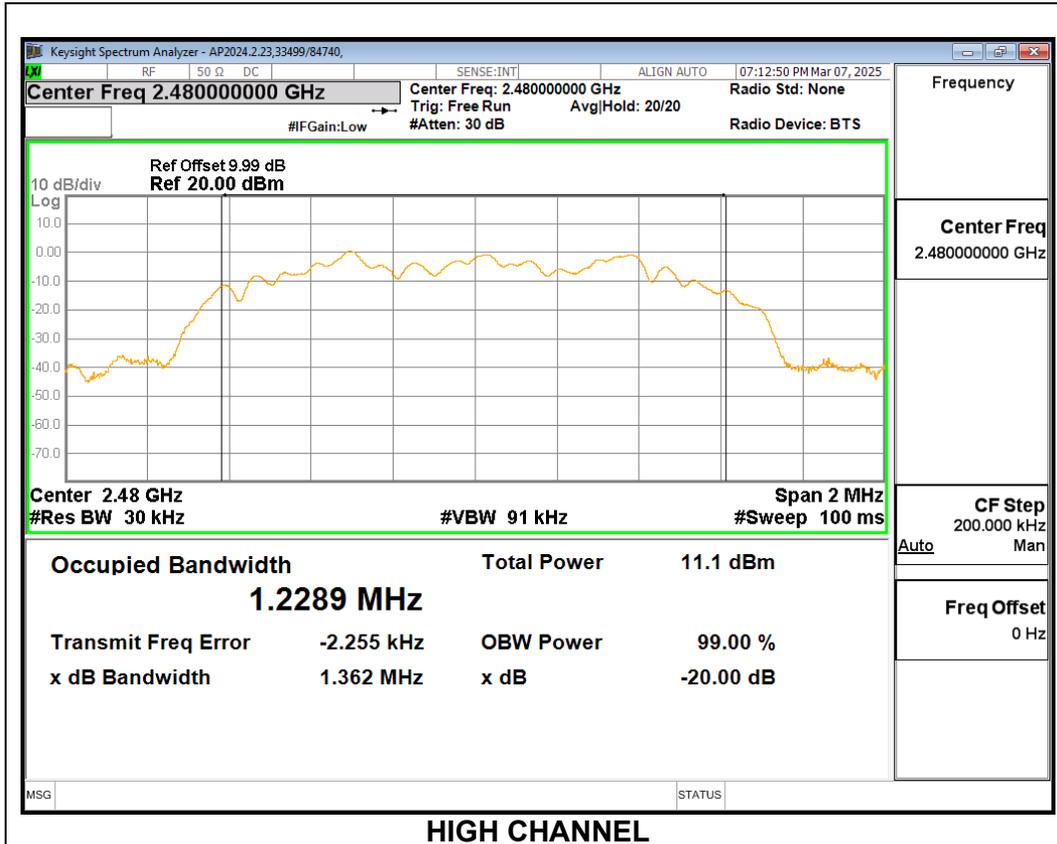
9.1.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	1.025	0.895
Mid	2441	1.024	0.894
High	2480	1.023	0.894



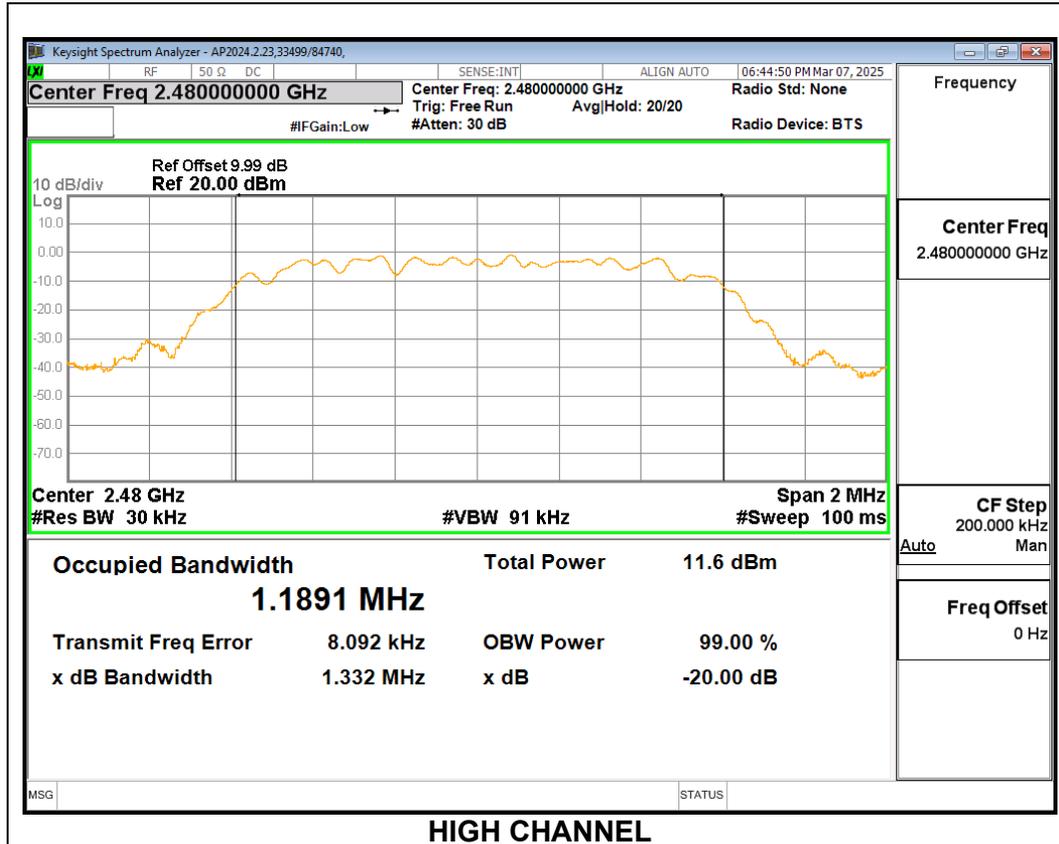
9.1.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	1.361	1.2286
Mid	2441	1.361	1.2286
High	2480	1.362	1.2289



9.1.1. BLUETOOTH ENHANCED DATA RATE QPSK MODULATION

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	1.332	1.1888
Mid	2441	1.331	1.1888
High	2480	1.332	1.1891



9.2. ON TIME AND DUTY CYCLE

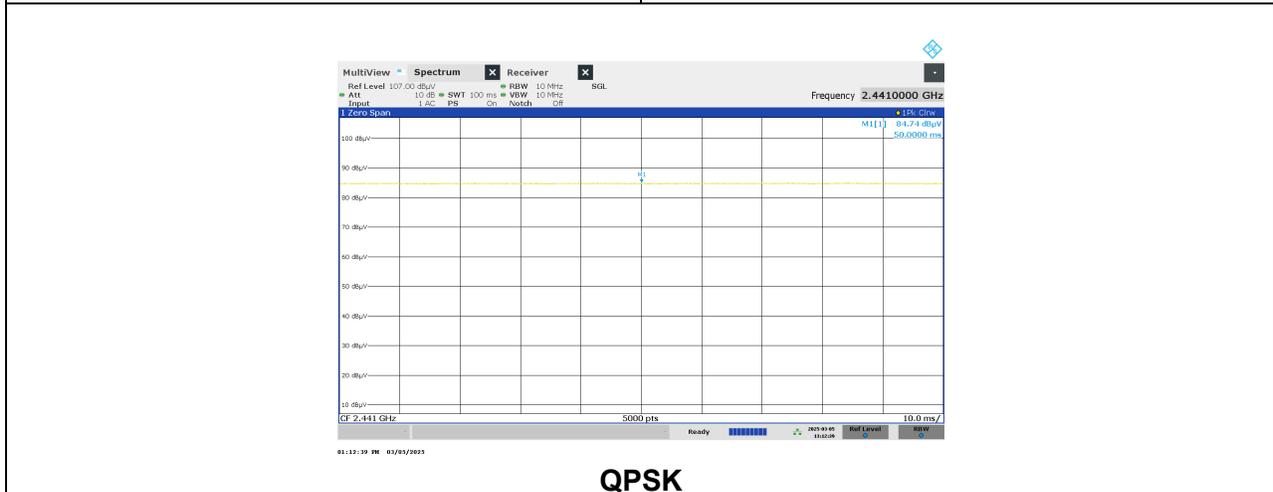
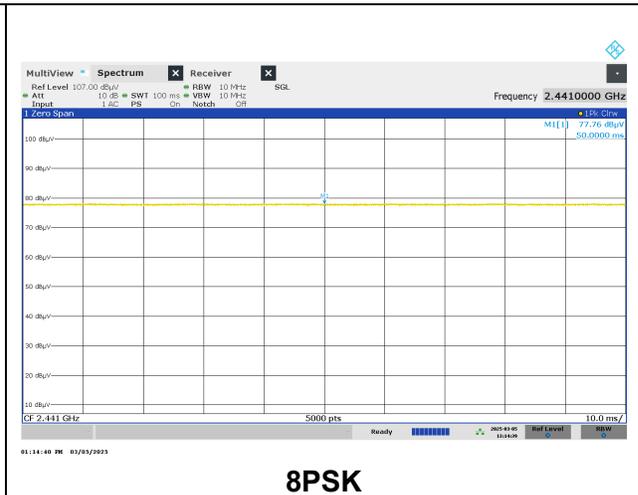
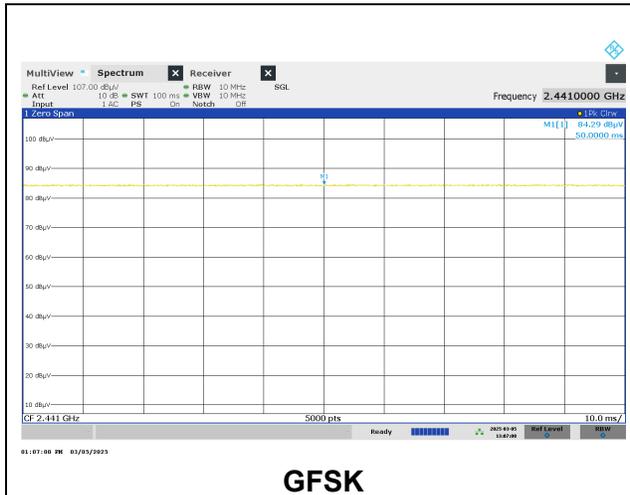
LIMITS

None; for reporting purposes only.

PROCEDURE

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

Mode	ON Time B (ms)	Period (ms)	Duty Cycle x (lineari)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/T Minimum VBW (kHz)
GFSK	100.00	100.00	1.000	100.00	0.00	0.010
8PSK	100.00	100.00	1.000	100.00	0.00	0.010
QPSK	100.00	100.00	1.000	100.00	0.00	0.010



9.3. HOPPING FREQUENCY SEPARATION

LIMITS

FCC §15.247 (a) (1)
RSS-247 (5.1) (b)

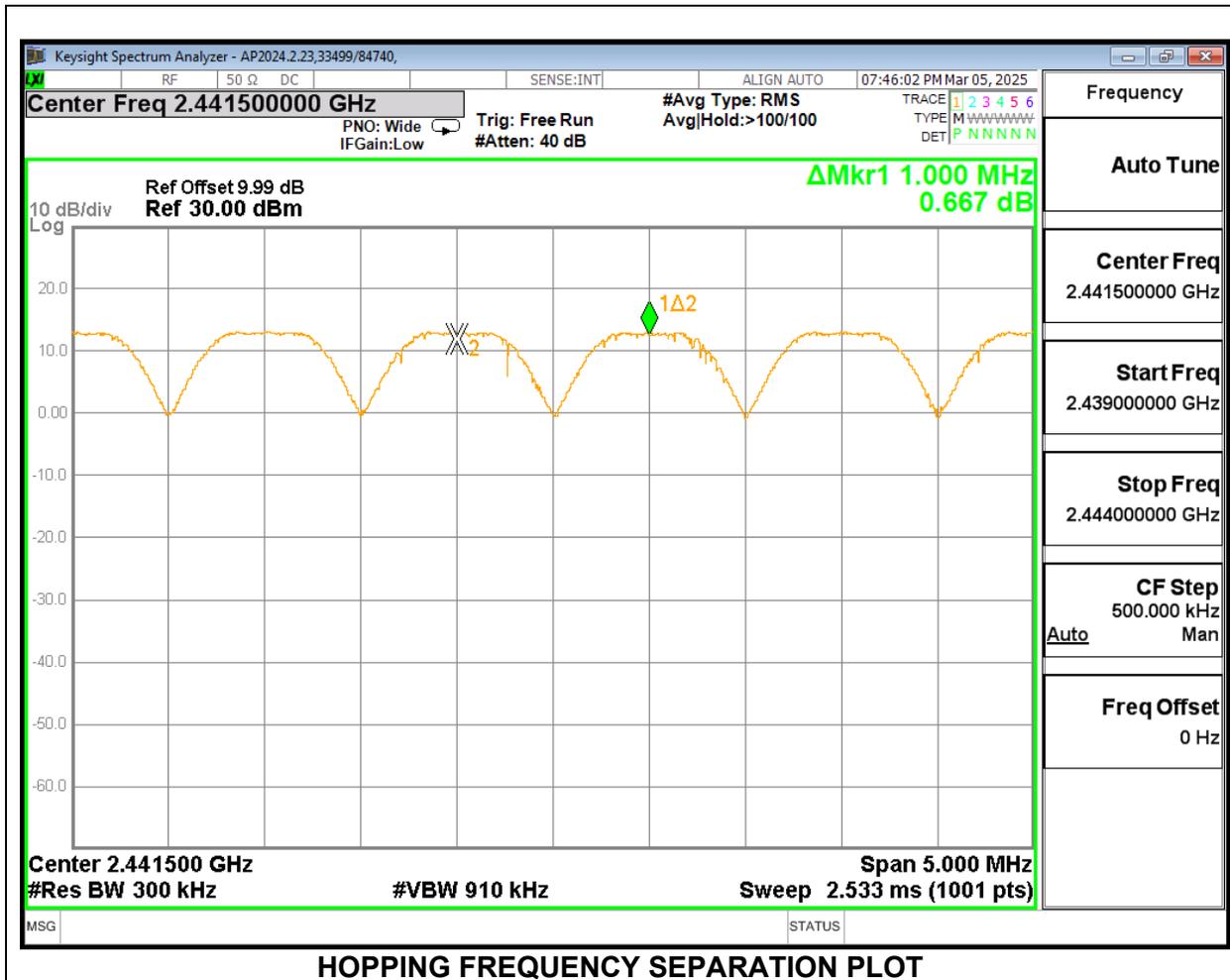
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

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

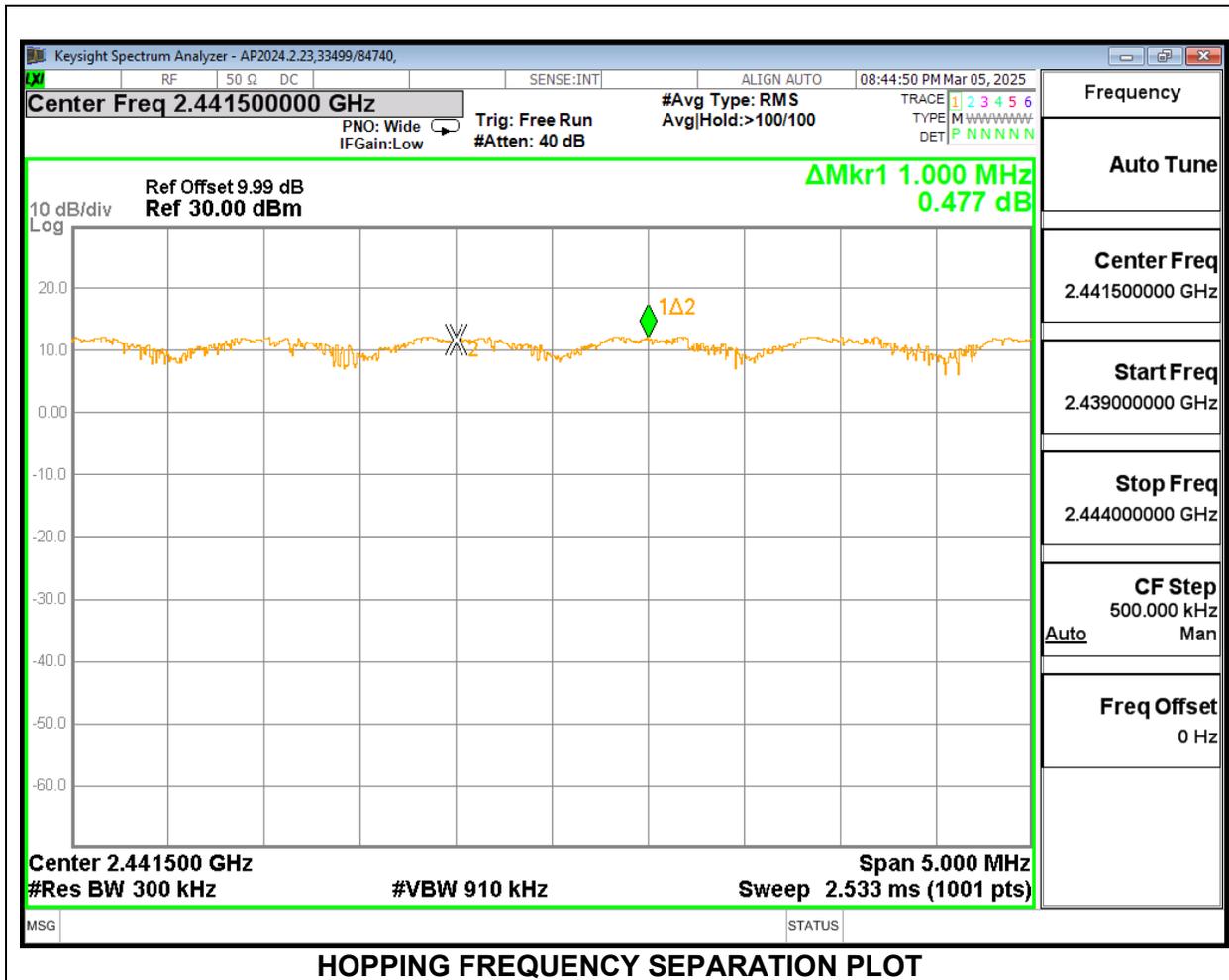
The transmitter output is connected to a spectrum analyzer. The RBW is set to 300 kHz and the VBW is set to $VBW \geq RBW$. The sweep time is coupled.

9.3.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION



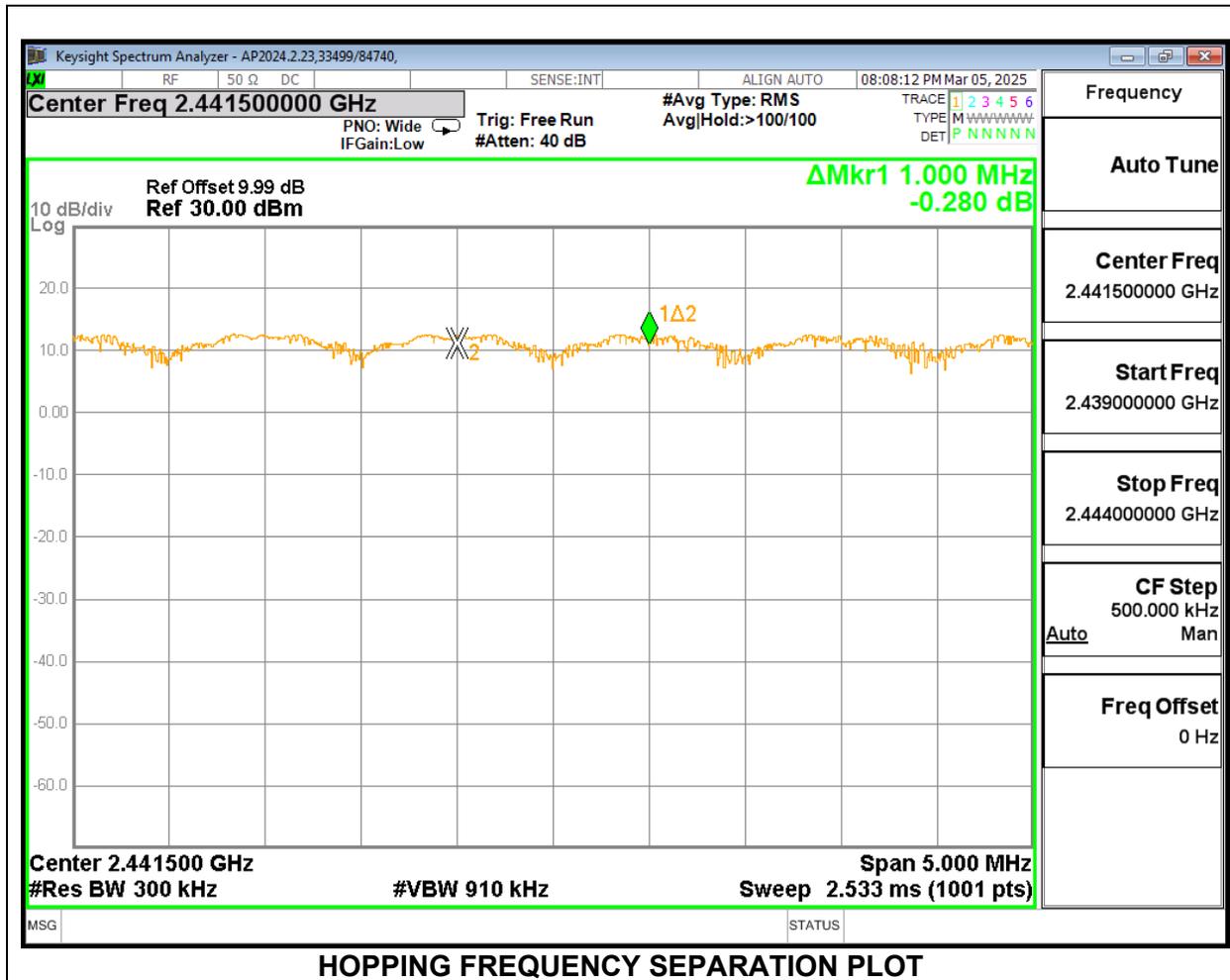
$$(20\text{dB BW}) \times (2/3) = (1.024 \text{ MHz}) \times (2/3) = 0.685 \text{ MHz}$$
$$0.685 \text{ MHz} < 1 \text{ MHz}$$

9.3.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION



$(20\text{dB BW}) \times (2/3) = (1.361 \text{ MHz}) \times (2/3) = 0.91 \text{ MHz}$
 $0.91 \text{ MHz} < 1 \text{ MHz}$

9.3.1. BLUETOOTH ENHANCED DATA RATE QPSK MODULATION



$$(20\text{dB BW}) \times (2/3) = (1.331 \text{ MHz}) \times (2/3) = 0.887 \text{ MHz}$$
$$0.887 \text{ MHz} < 1 \text{ MHz}$$

9.4. NUMBER OF HOPPING CHANNELS

LIMITS

FCC §15.247 (a) (1) (iii)
RSS-247 (5.1) (d)

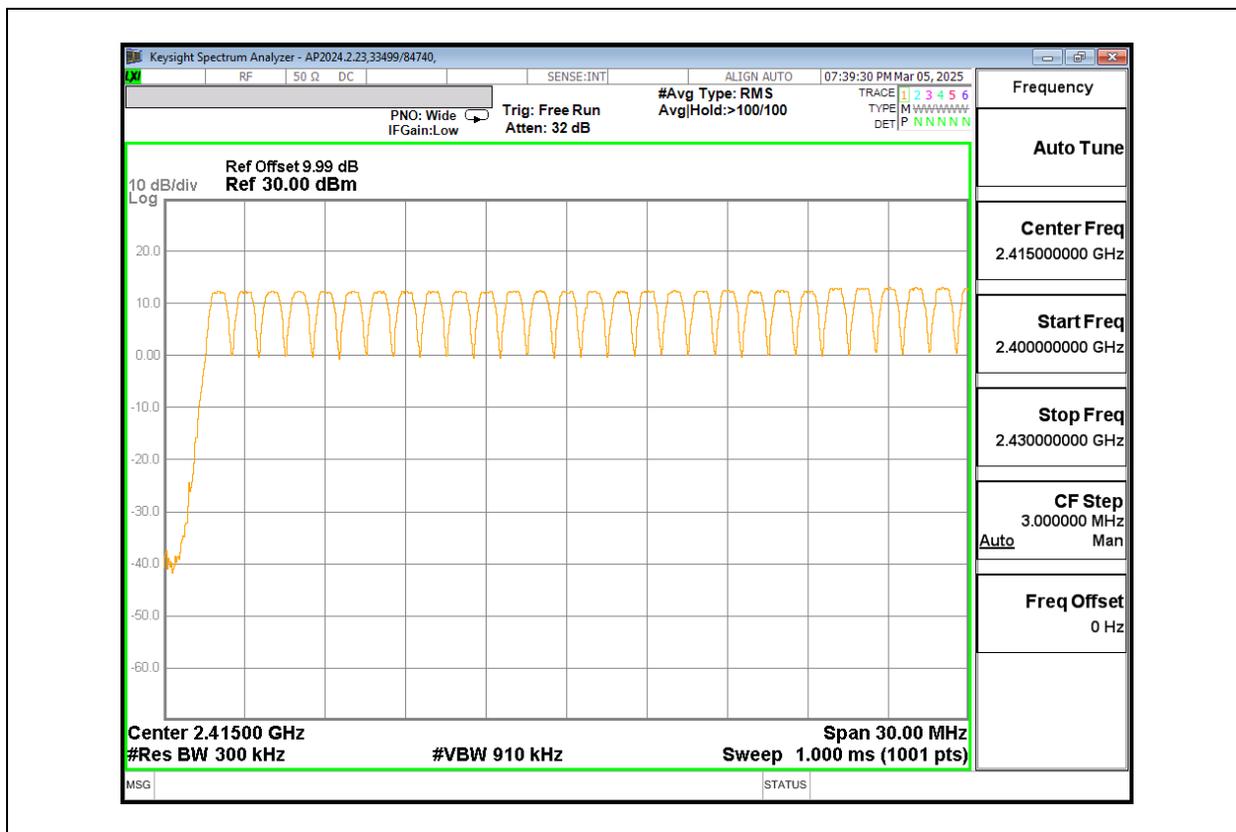
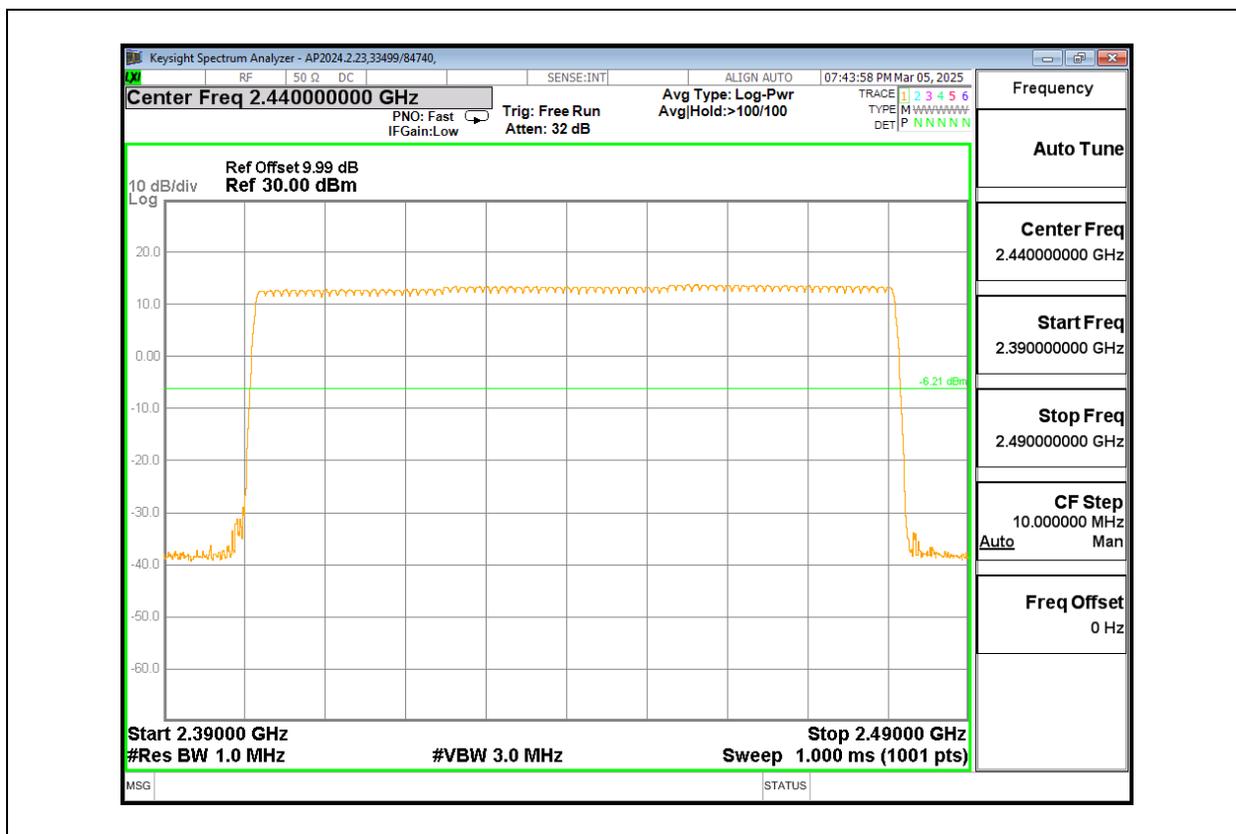
Frequency hopping systems in the 2400 – 2483.5 MHz band shall use at least 15 non-overlapping channels.

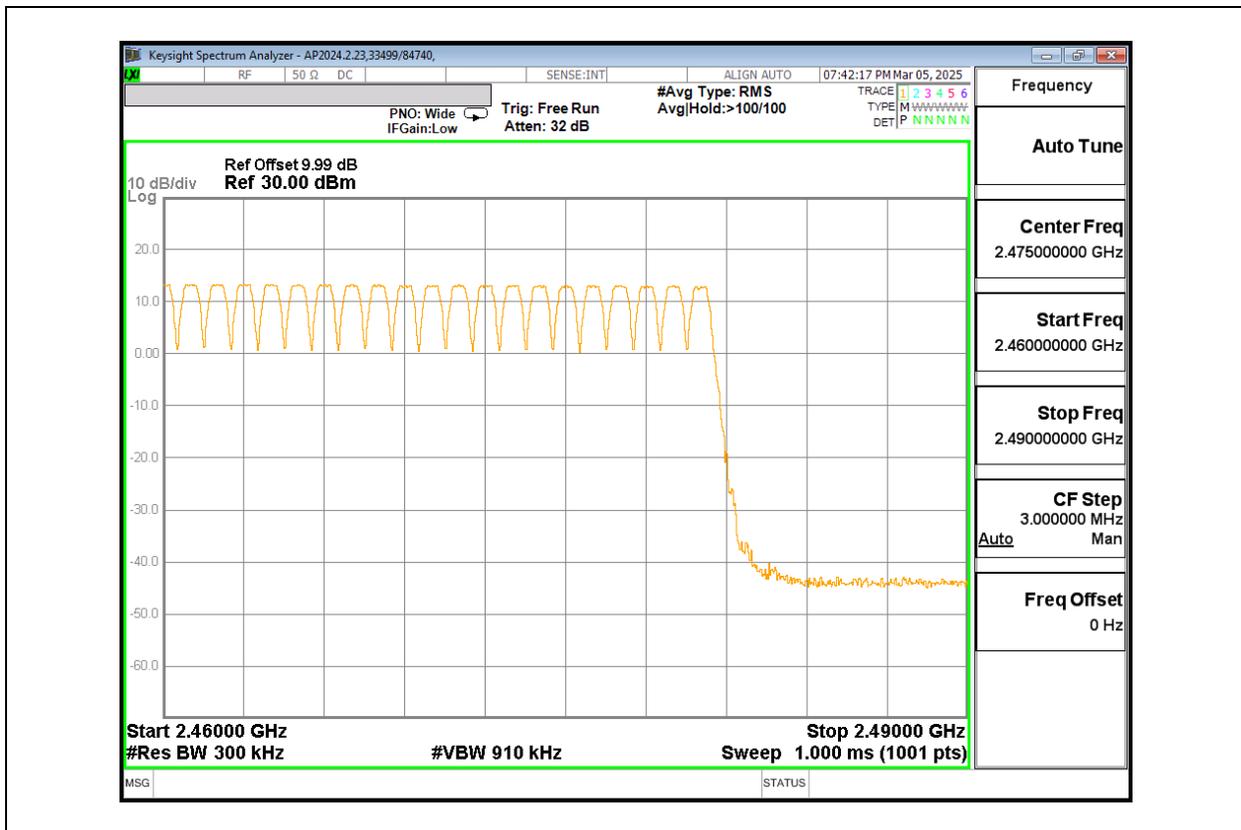
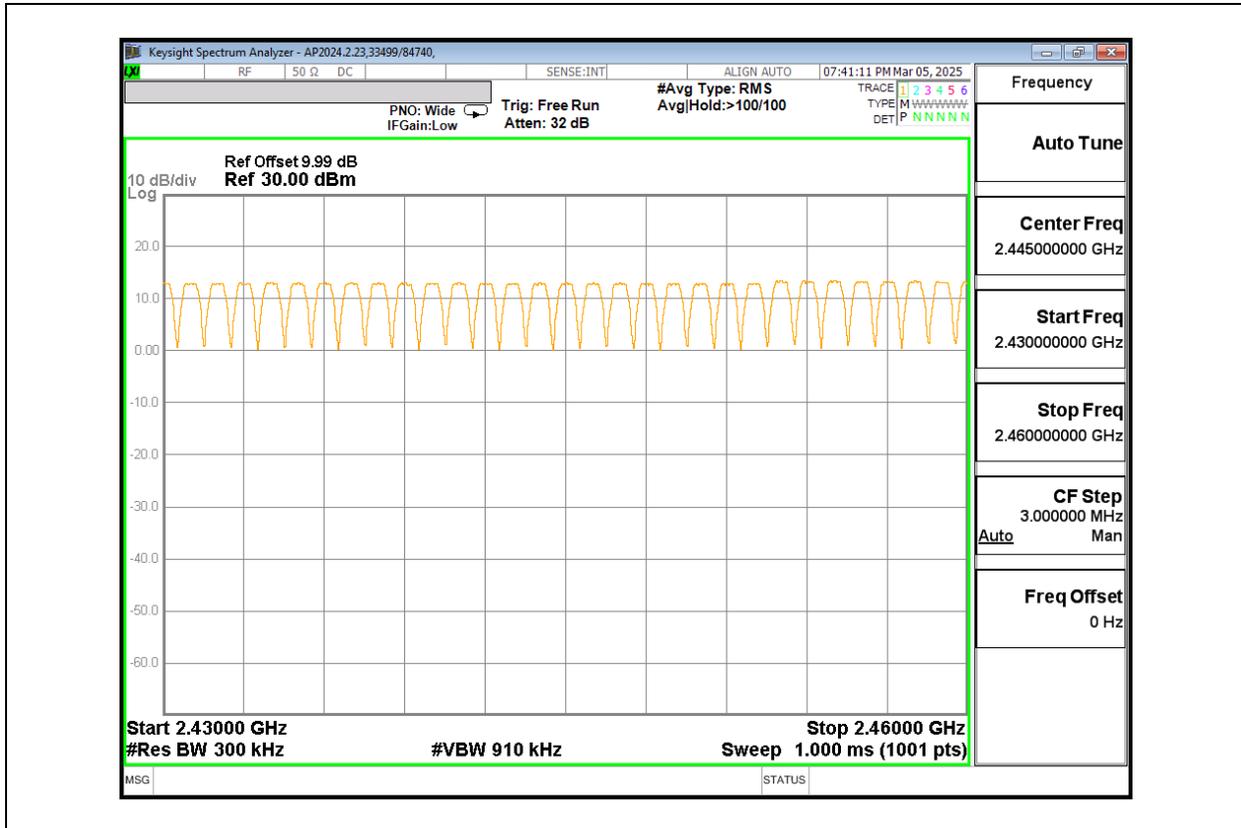
TEST PROCEDURE

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. The RBW is set to a maximum of 1 % of the span. The analyzer is set to Max Hold.

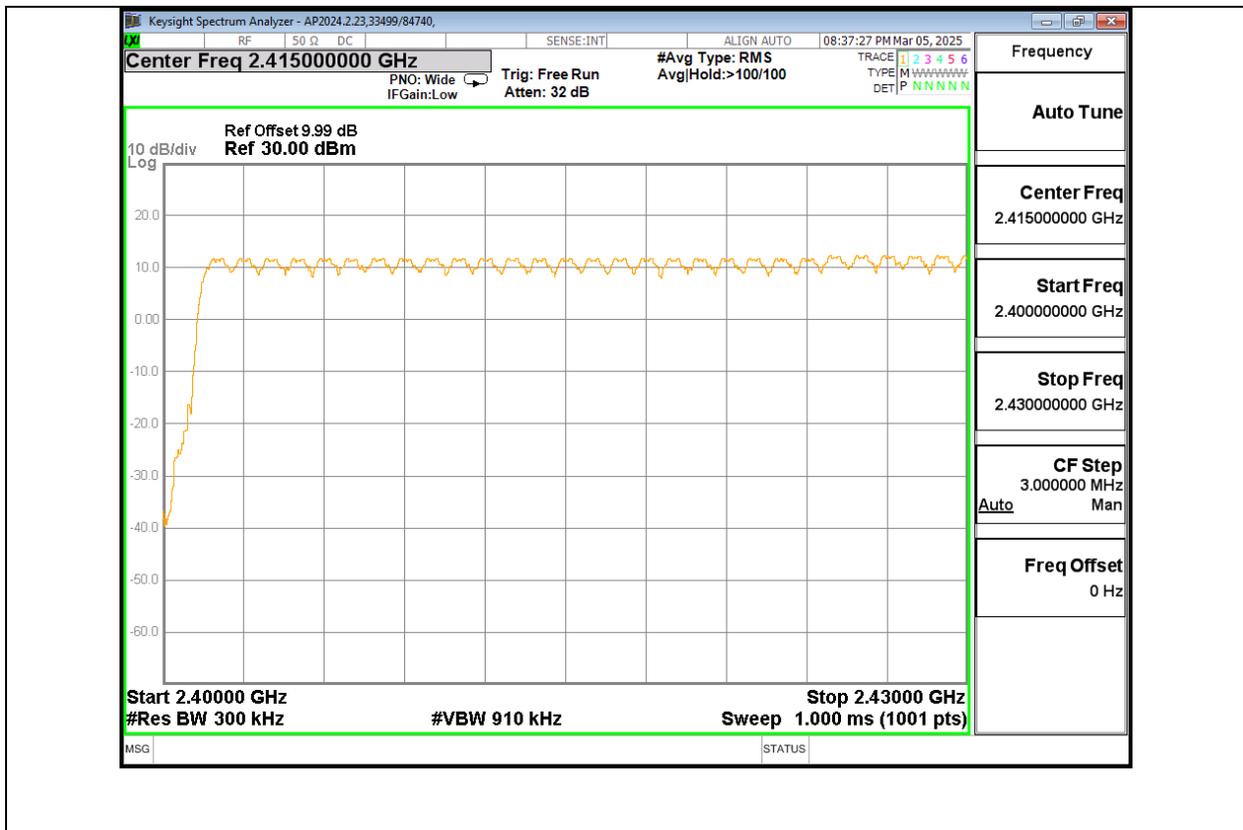
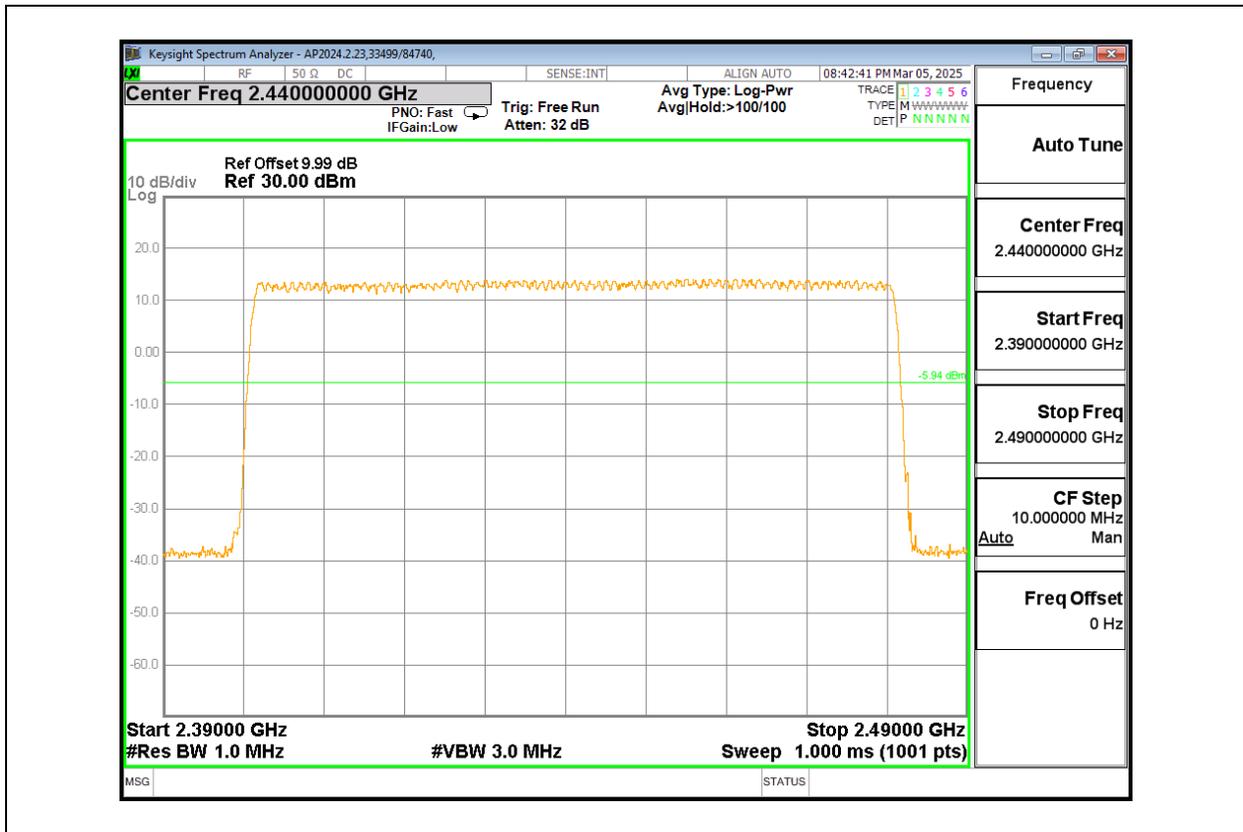
Normal Mode: 79 Channels Observed

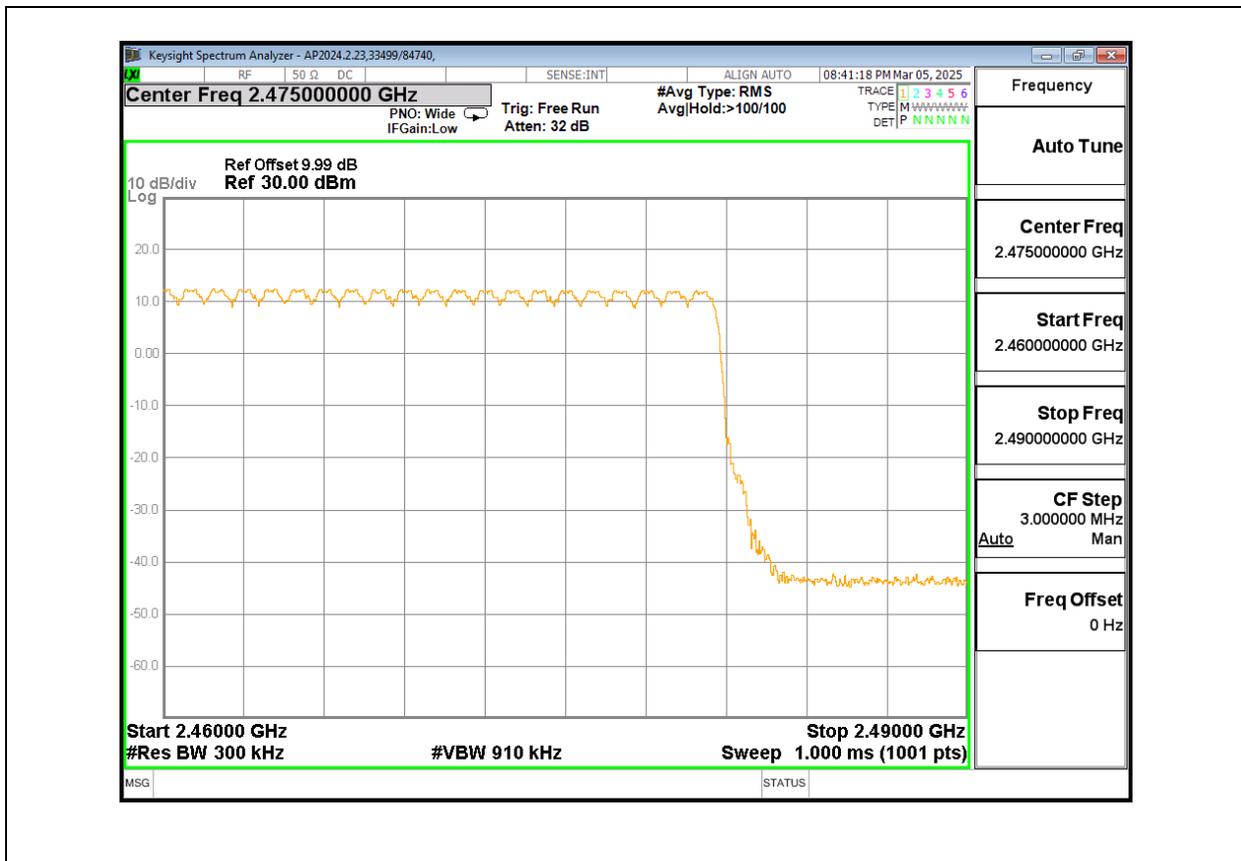
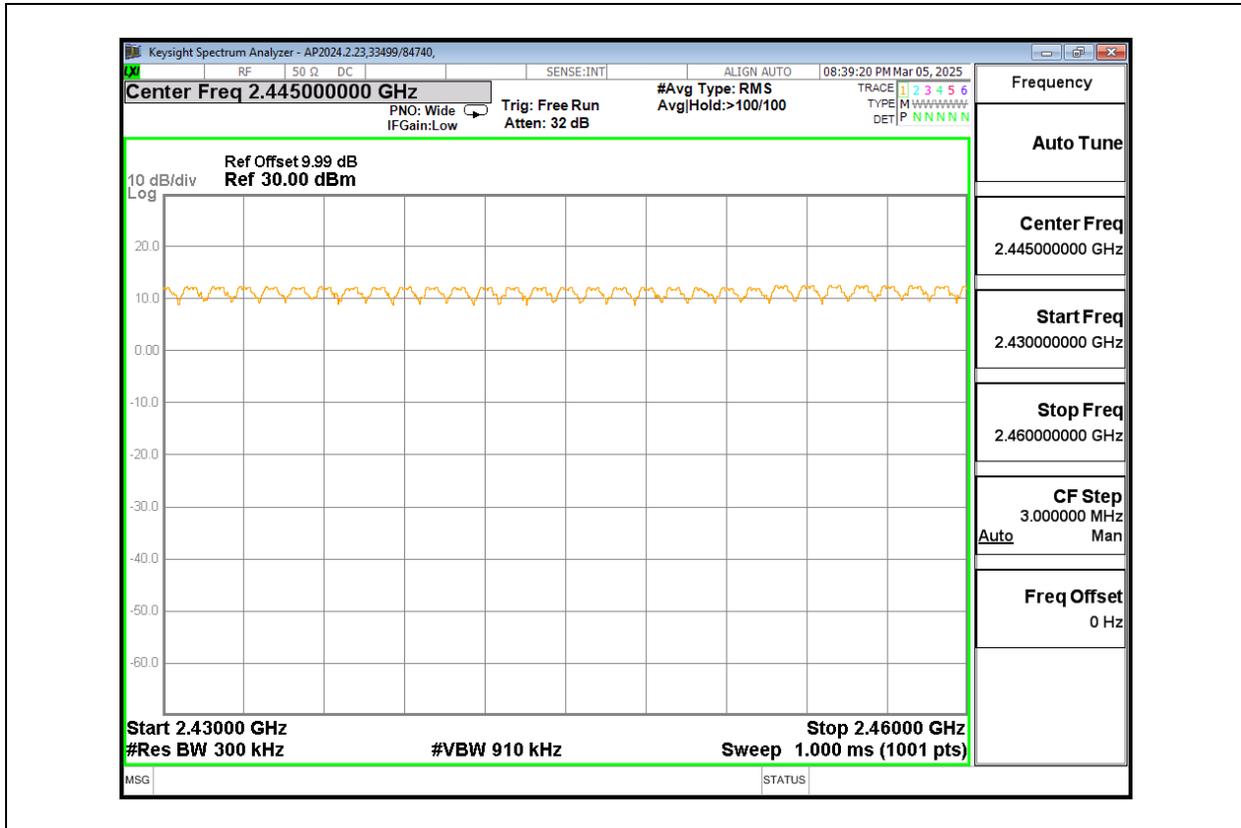
9.4.1. BLUETOOTH ENHANCED DATA RATE GFSK MODULATION



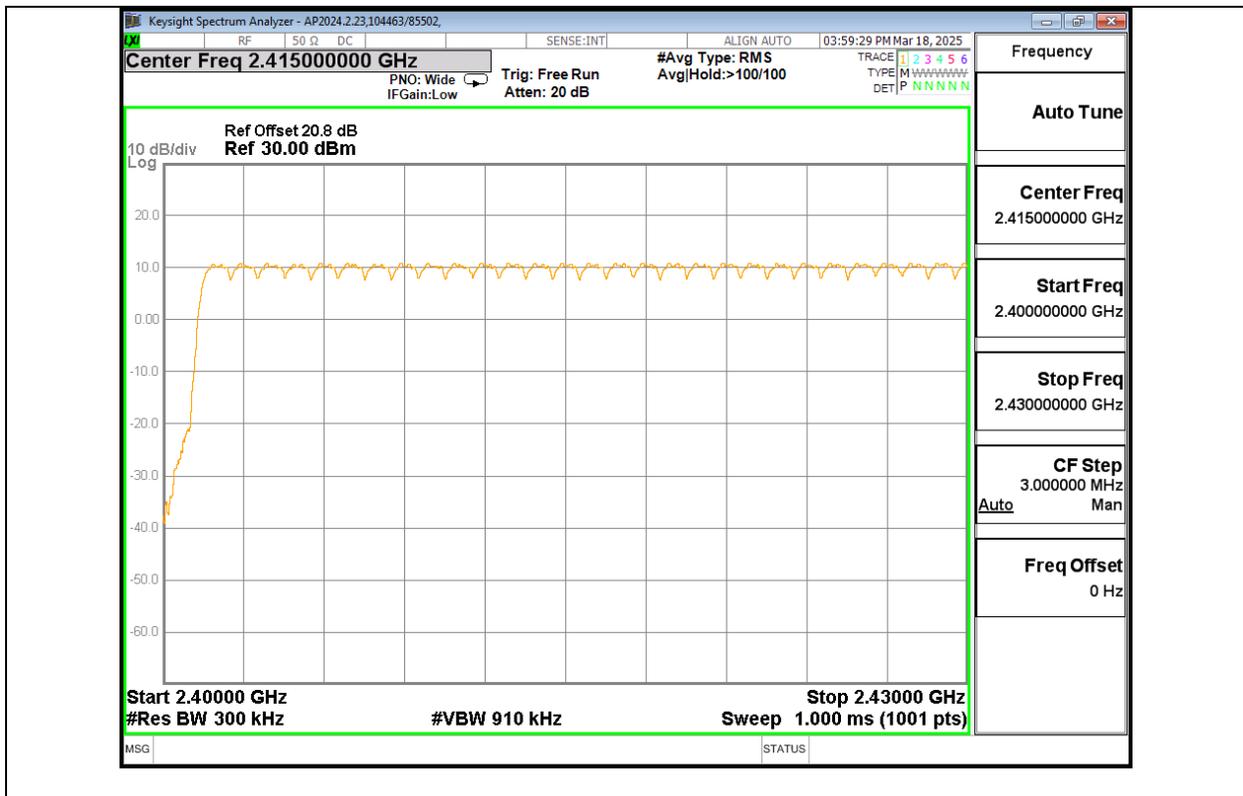
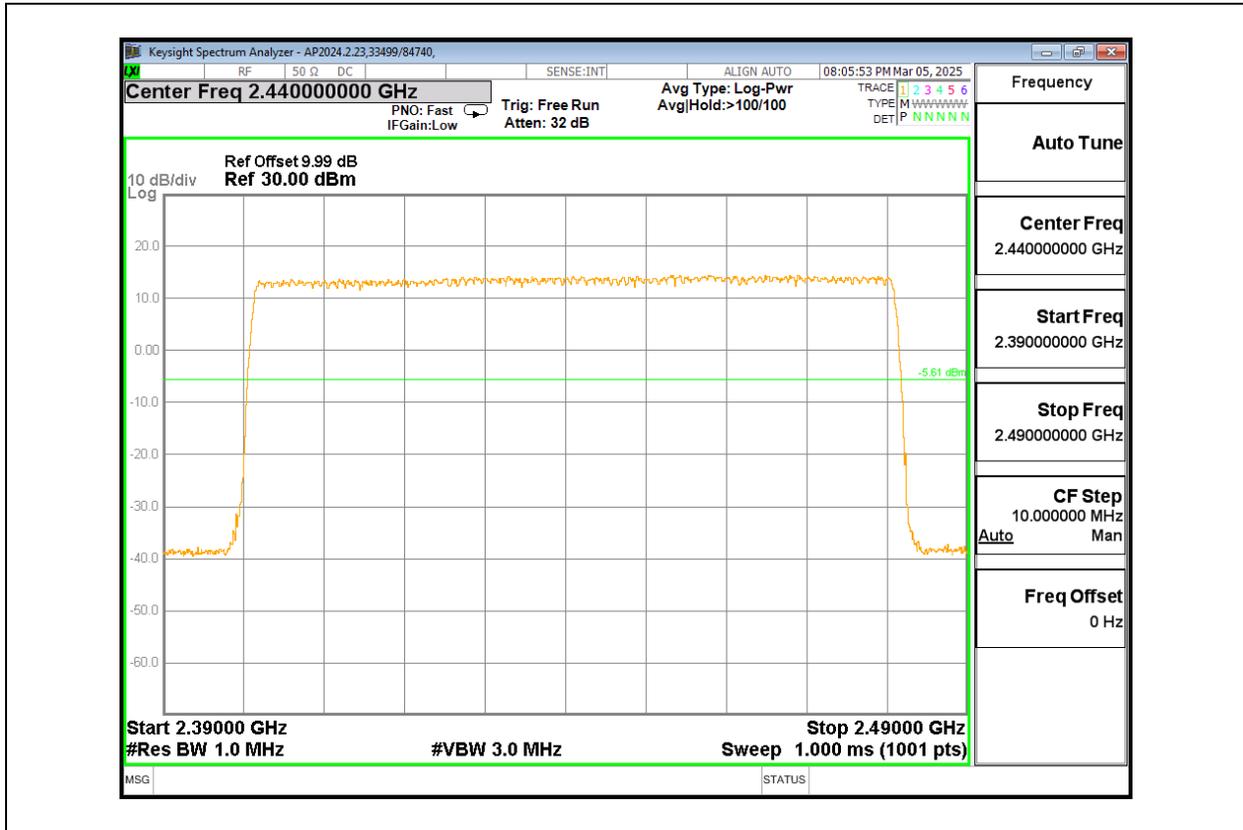


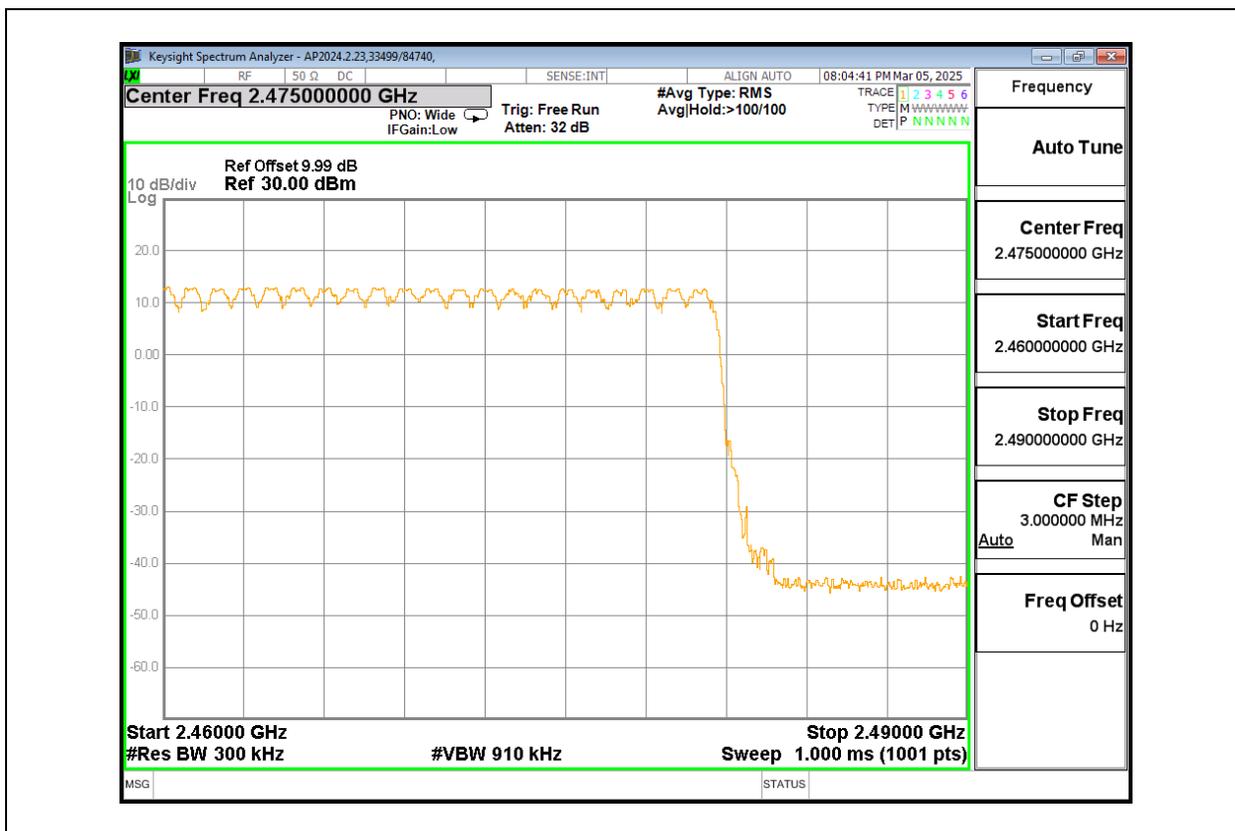
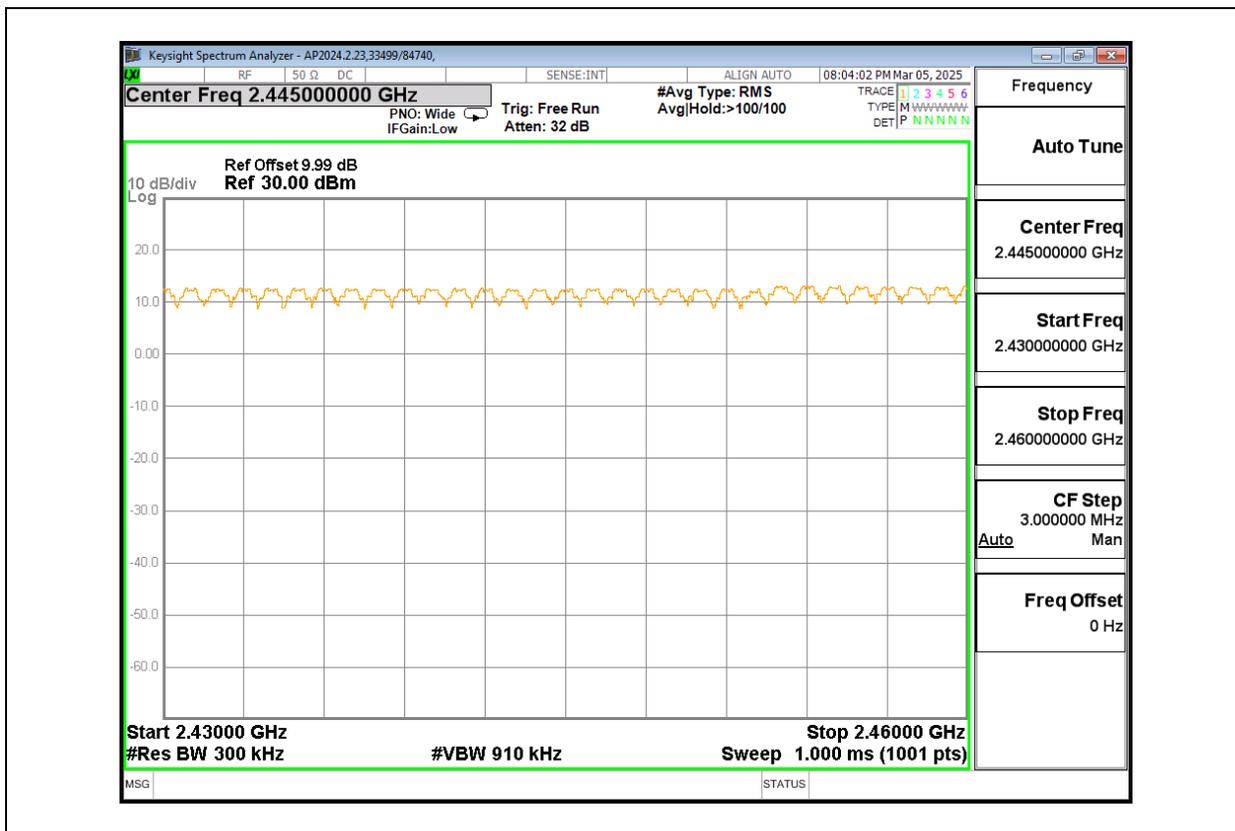
9.4.2. BLUETOOTH BASIC DATA RATE 8PSK MODULATION





9.4.3. BLUETOOTH ENHANCED DATA RATE QPSK MODULATION





9.5. AVERAGE TIME OF OCCUPANCY

LIMITS

FCC §15.247 (a) (1) (iii)
 RSS-247 (5.1) (d)

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

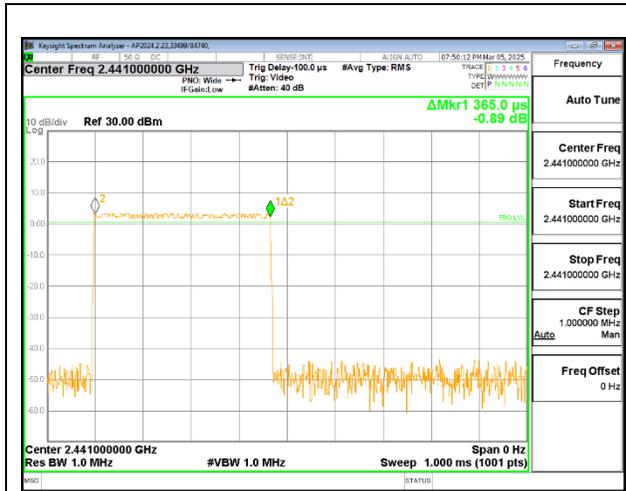
The transmitter output is connected to a spectrum analyzer. The span is set to 0 Hz, centered on a single, selected hopping channel. The width of a single pulse is measured in a fast scan. The number of pulses is measured in a 3.16 second scan, to enable resolution of each occurrence.

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

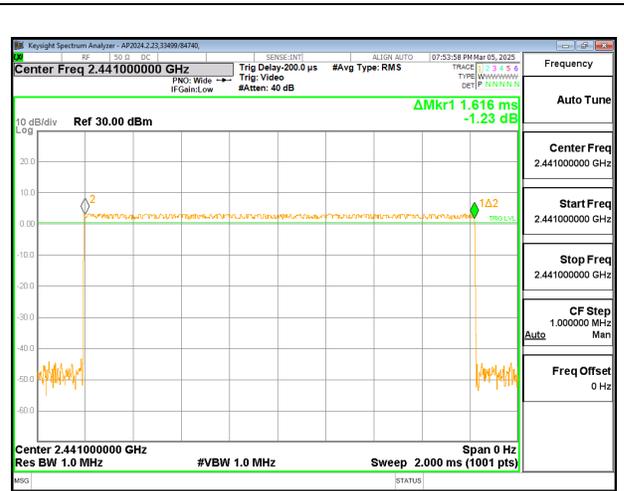
For AFH mode, the average time of occupancy in the specified 8 second period (20 channels * 0.4 seconds) is equal to $10 * (\# \text{ of pulses in } 0.8 \text{ s}) * \text{ pulse width}$.

9.5.1. BLUETOOTH 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	0.365	32	0.1168	0.4	-0.2832
DH3	1.616	18	0.2909	0.4	-0.1091
DH5	2.86	10	0.2860	0.4	-0.1140
GFSK AFH Mode					
DH Packet	Pulse Width (sec)	Number of Pulses in 0.8 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
DH1	0.365	8	0.02920	0.4	-0.3708
DH3	1.616	5	0.08080	0.4	-0.3192
DH5	2.86	3	0.08580	0.4	-0.3142



PULSE WIDTH – DH1



PULSE WIDTH – DH3



PULSE WIDTH – DH5



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH1



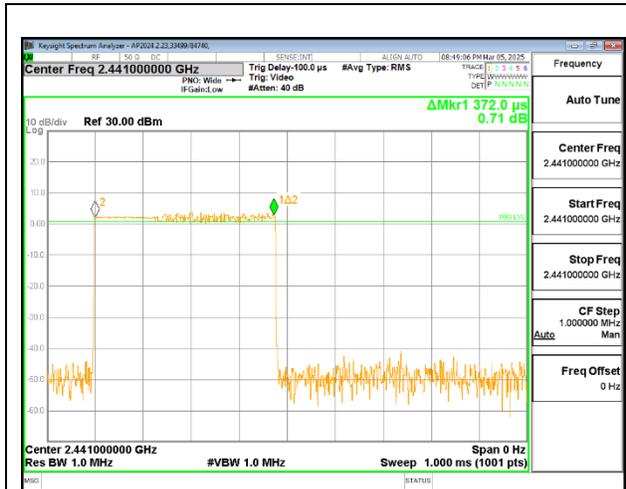
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH3



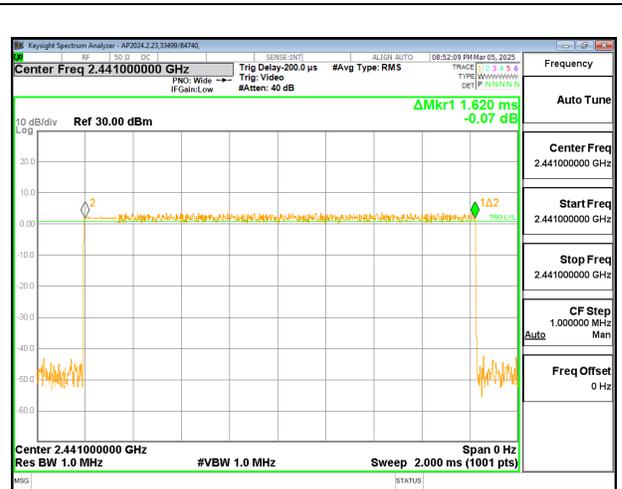
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH5

9.5.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

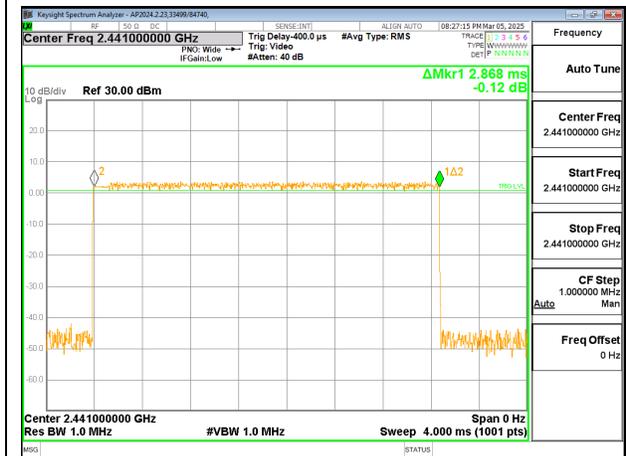
DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
8PSK Normal Mode					
DH1	0.372	32	0.1190	0.4	-0.2810
DH3	1.62	15	0.2430	0.4	-0.1570
DH5	2.868	12	0.3442	0.4	-0.0558
8PSK AFH Mode					
DH Packet	Pulse Width (sec)	Number of Pulses in 0.8 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
DH1	0.372	8	0.02976	0.4	-0.3702
DH3	1.62	4	0.06480	0.4	-0.3352
DH5	2.868	3	0.08604	0.4	-0.3140



PULSE WIDTH – DH1



PULSE WIDTH – DH3



PULSE WIDTH – DH5



**NUMBER OF PULSES IN 3.16 SECOND
 OBSERVATION PERIOD – DH1**



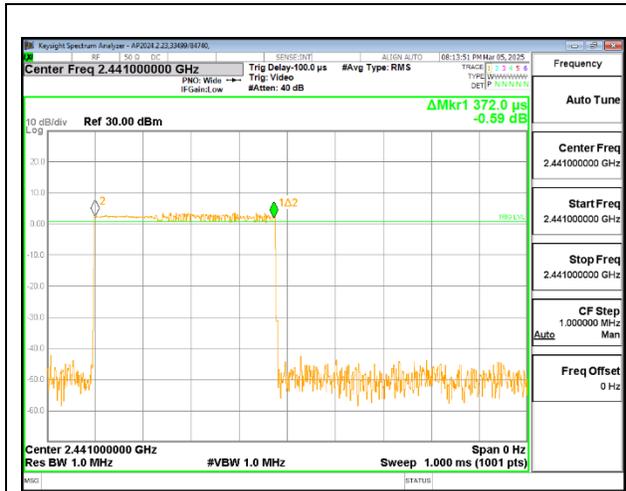
**NUMBER OF PULSES IN 3.16 SECOND
 OBSERVATION PERIOD – DH3**



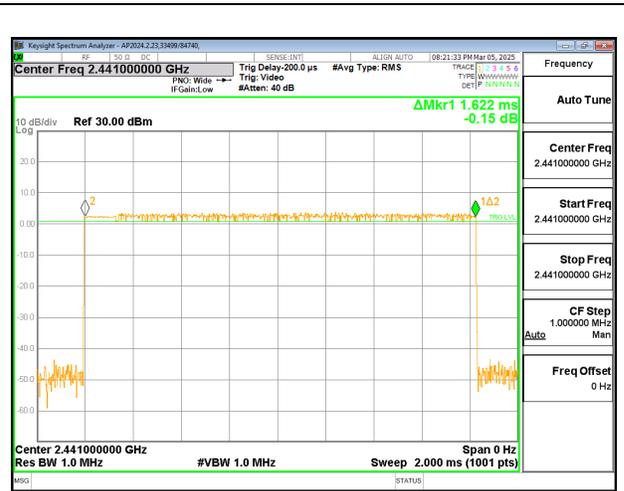
**NUMBER OF PULSES IN 3.16 SECOND
 OBSERVATION PERIOD – DH5**

9.5.1. BLUETOOTH ENHANCED DATA RATE DQPSK MODULATION

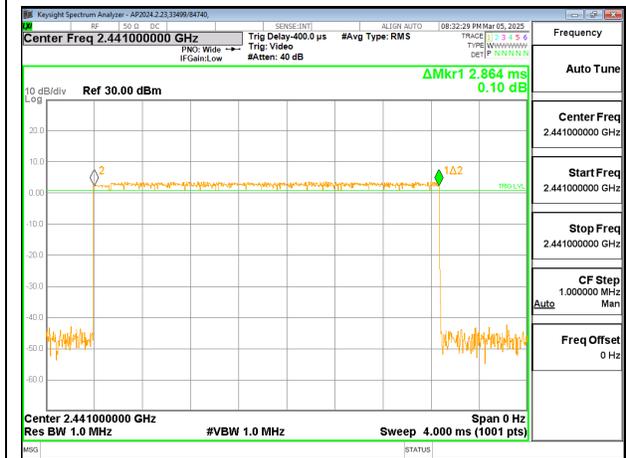
DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
8PSK Normal Mode					
DH1	0.372	32	0.1190	0.4	-0.2810
DH3	1.62	8	0.1296	0.4	-0.2704
DH5	2.864	5	0.1432	0.4	-0.2568
8PSK AFH Mode					
DH Packet	Pulse Width (sec)	Number of Pulses in 0.8 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
DH1	0.372	8	0.02976	0.4	-0.3702
DH3	1.62	2	0.03240	0.4	-0.3676
DH5	2.864	2	0.05728	0.4	-0.3427



PULSE WIDTH – DH1



PULSE WIDTH – DH3



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**

9.6. OUTPUT POWER

LIMITS

§15.247 (b) (1)
 RSS-247 (5.4) (b)

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.

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

TEST PROCEDURE

Measurements performed using a wideband RF power meter.

The cable assembly insertion loss of 0.68 dB (including 0.68 dB cable) was entered as an offset in the power meter.

The power output was measured on the EUT antenna port using SMA cable connected to a power meter via wideband power sensor. Peak output power was read directly from power meter.

9.6.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

Tested By:	33499
Date:	2025-03-04, 2025-03-05, 2025-03-07, 2025-04-08

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	13.24	21	-7.76
Middle	2441	13.74	21	-7.26
High	2480	13.84	21	-7.16

9.6.2. BLUETOOTH ENHANCED DATA RATE QPSK MODULATION

Tested By:	84740
Date:	2025-03-04, 2025-03-05, 2025-03-07

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	11.93	21	-9.07
Middle	2441	12.62	21	-8.38
High	2480	12.81	21	-8.19

9.6.3. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

Tested By:	84740
Date:	2025-03-04, 2025-03-05, 2025-03-07

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	11.65	21	-9.35
Middle	2441	12.06	21	-8.94
High	2480	12.04	21	-8.96

9.7. AVERAGE POWER

LIMITS

None; for reporting purposes only

TEST PROCEDURE

Measurements performed using a wideband gated RF power meter.

The cable assembly insertion loss of 0.68 dB (including 0.68 dB cable) was entered as an offset in the power meter.

The power output was measured on the EUT antenna port using SMA cable connected to a power meter via wideband power sensor. Gated average output power was read directly from power meter.

9.7.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

Tested By:	33499
Date:	2025-03-04, 2025-03-05, 2025-03-07, 2025-04-08

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	12.13
Middle	2441	12.71
High	2480	12.85

9.7.2. BLUETOOTH ENHANCED DATA RATE QPSK MODULATION

Tested By:	33499
Date:	2025-03-04, 2025-03-05, 2025-03-07

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	11.259
Middle	2441	11.979
High	2480	12.148

9.7.3. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

Tested By:	84740
Date:	2025-03-04, 2025-03-05, 2025-03-07

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	11.17
Middle	2441	11.56
High	2480	11.60

9.8. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)
RSS-247 5.5

Limit = -20 dBc

TEST PROCEDURE

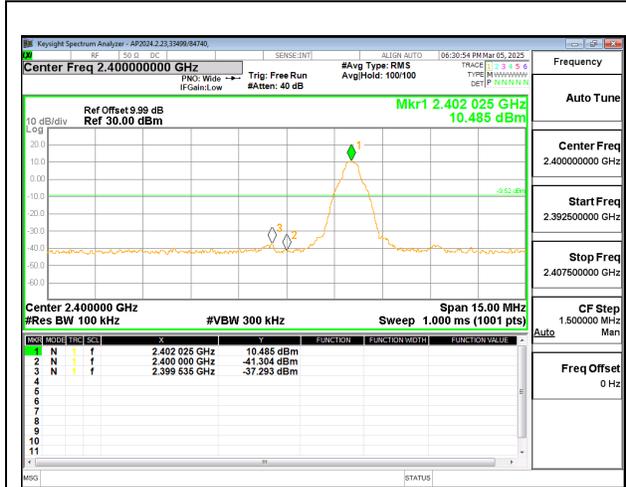
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

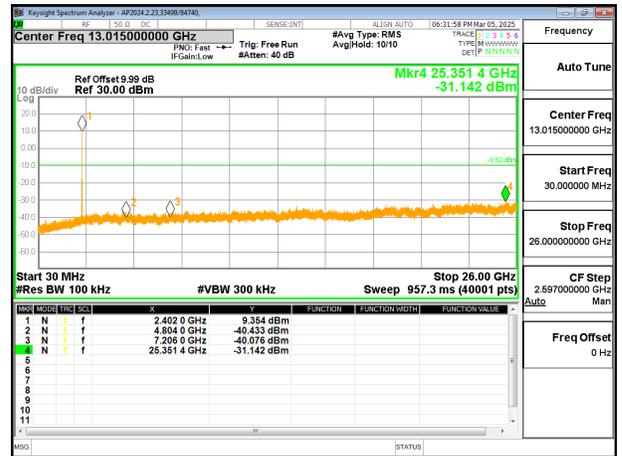
The bandedges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal hopping and hopping modes.

9.8.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

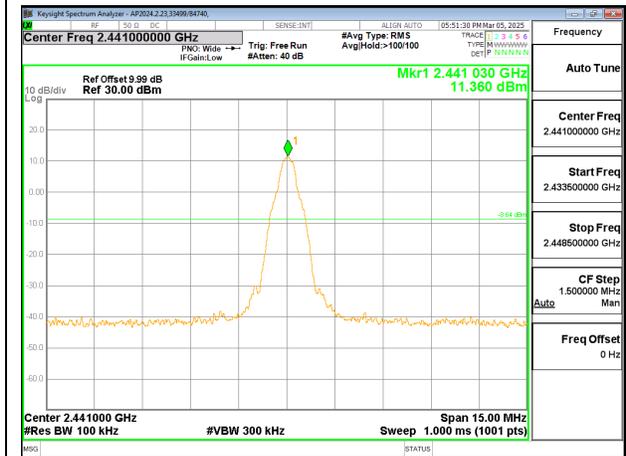
SPURIOUS EMISSIONS, NON-HOPPING



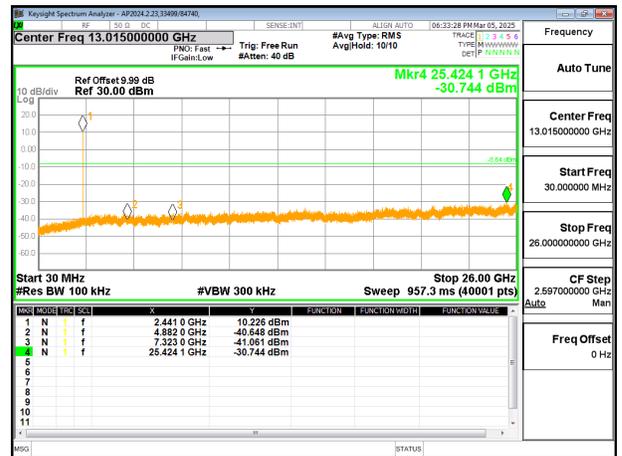
LOW CHANNEL BANDEDGE



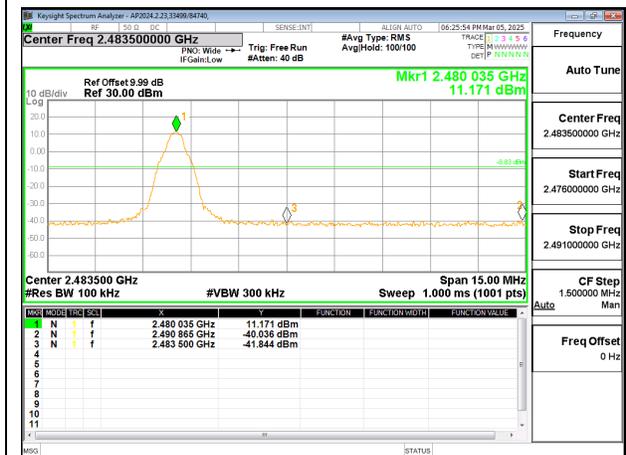
OUT-OF-BAND LOW CHANNEL



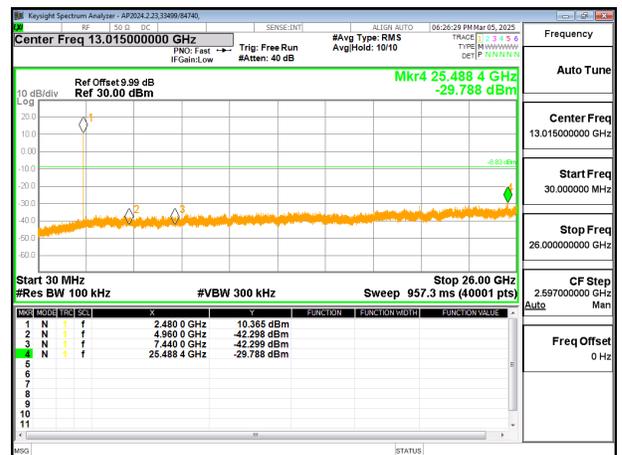
IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL



HIGH CHANNEL BANDEDGE



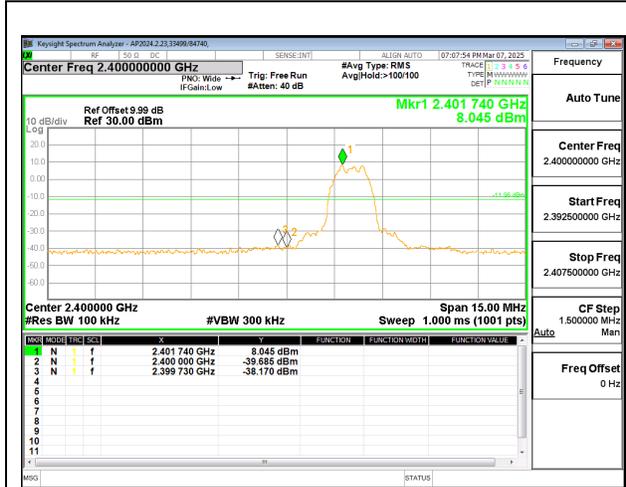
OUT-OF-BAND HIGH CHANNEL

SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON

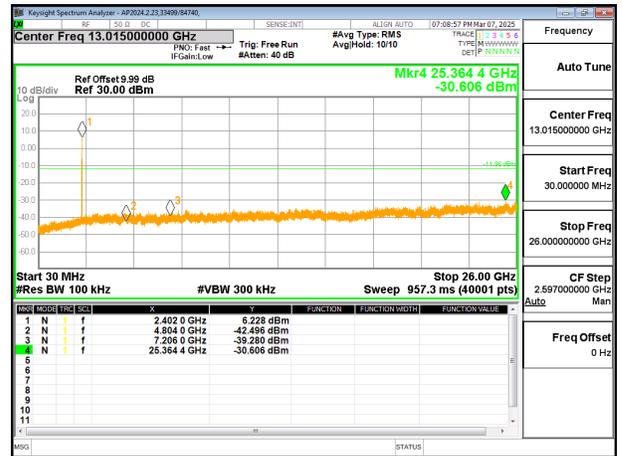


9.8.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

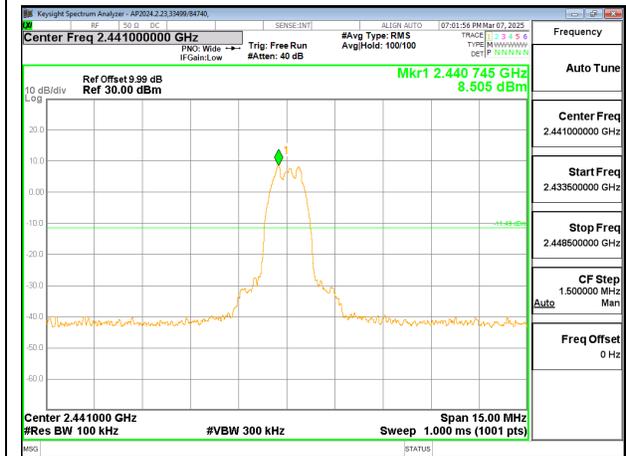
SPURIOUS EMISSIONS, NON-HOPPING



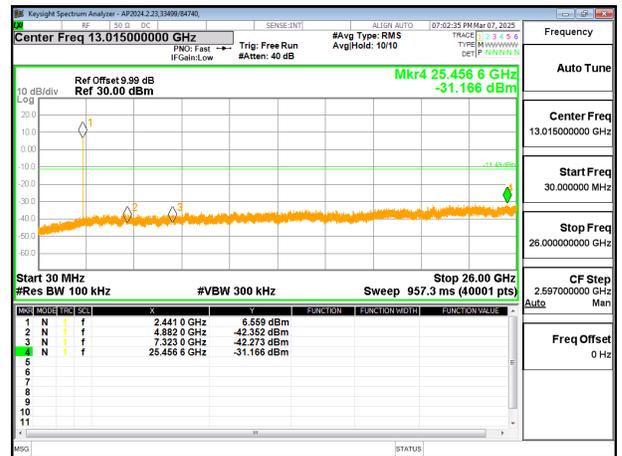
LOW CHANNEL BANDEDGE



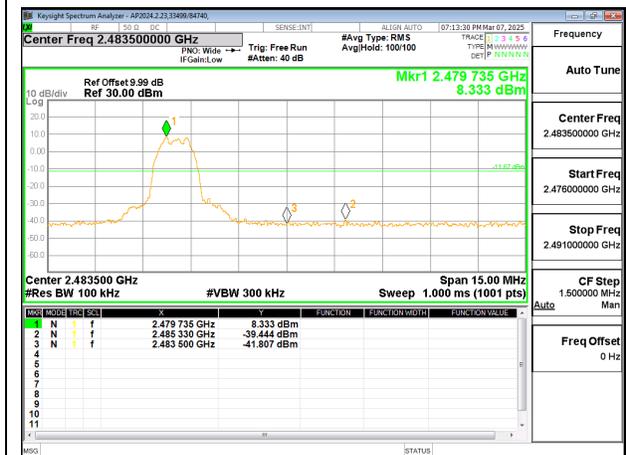
OUT-OF-BAND LOW CHANNEL



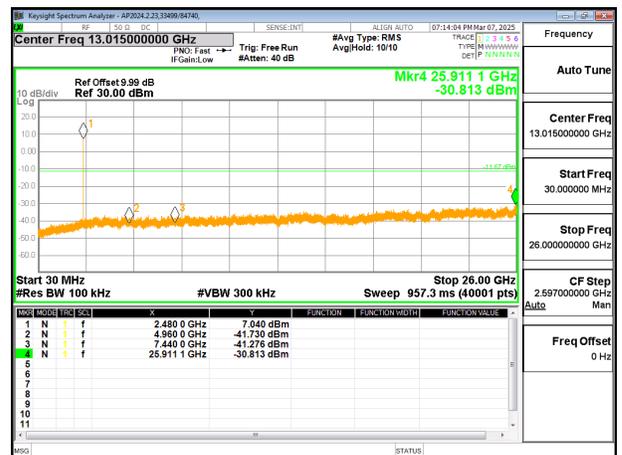
IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL



HIGH CHANNEL BANDEDGE



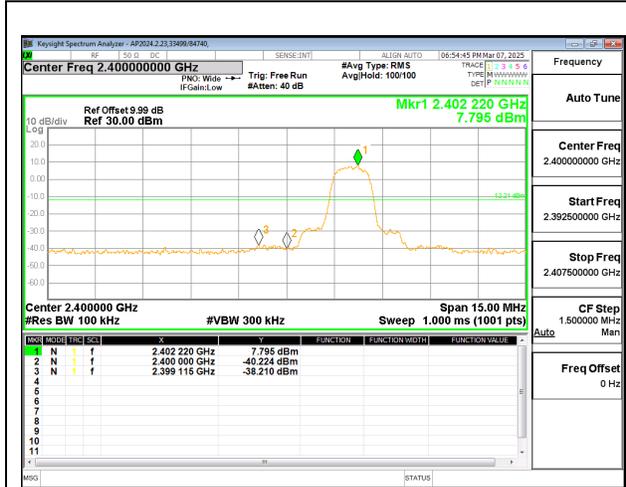
OUT-OF-BAND HIGH CHANNEL

SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON

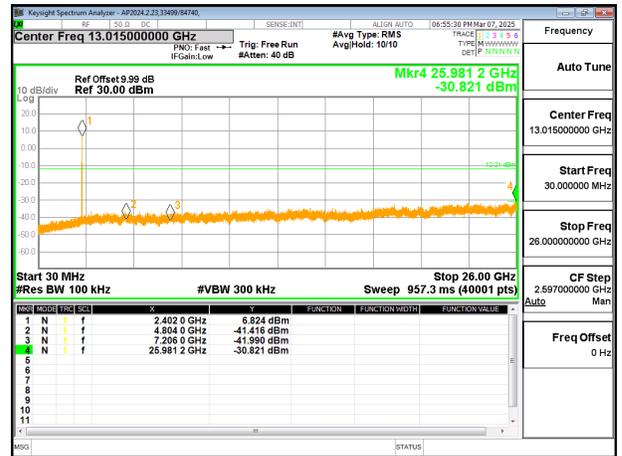


9.8.1. BLUETOOTH ENHANCED DATA RATE DQPSK MODULATION

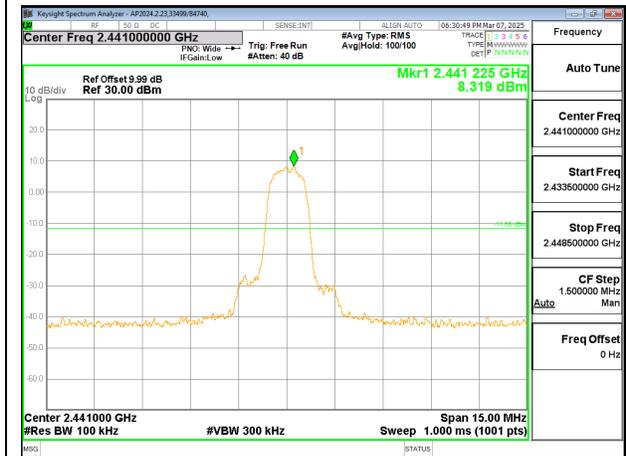
SPURIOUS EMISSIONS, NON-HOPPING



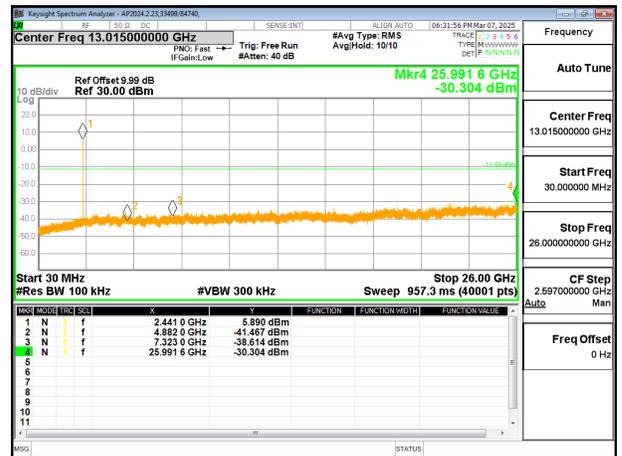
LOW CHANNEL BANDEDGE



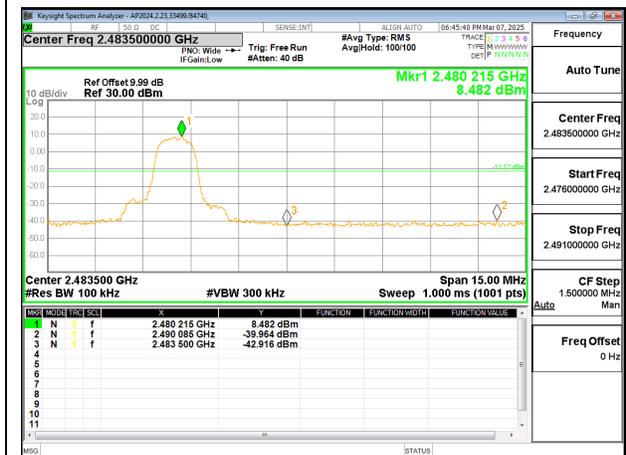
OUT-OF-BAND LOW CHANNEL



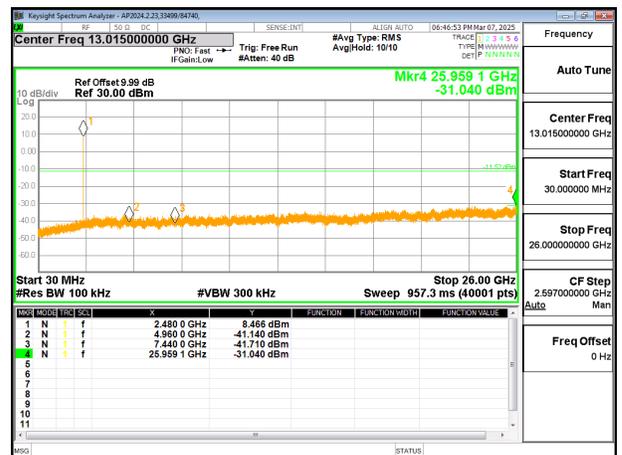
IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL



HIGH CHANNEL BANDEDGE



OUT-OF-BAND HIGH CHANNEL

SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



10. RADIATED TEST RESULTS

LIMITS

FCC §15.205 and §15.209

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

IC RSS-GEN Clause 8.9 and 8.10

Frequency Range (kHz)	Field Strength Limit (uA/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
0.009-0.490	6.37/F(kHz) @ 300 m	-
0.490-1.705	63.7/F(kHz) @ 30 m	-
1.705 - 30	0.08 @ 30m	-
Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
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 in the 30-1000MHz range, 9kHz for peak and/or quasi-peak detection measurements in the 0.15-30MHz range and 200Hz for peak and/or quasi-peak detection measurements in the 9 to 150kHz range. Peak detection is used unless otherwise noted as quasi-peak or average (9-90kHz and 110-490kHz).

For pre-scans above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3MHz 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. Reduced VBW method of averaging was used of 1/Ton where Ton = on time of the signal. For this testing, the on time was approximately 2.9 ms which yields a minimum VBW of 345 Hz.

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.

3D antenna use - For below 30MHz testing, investigation was done on three antenna orientations (parallel, perpendicular, and ground-parallel).

Base 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.

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

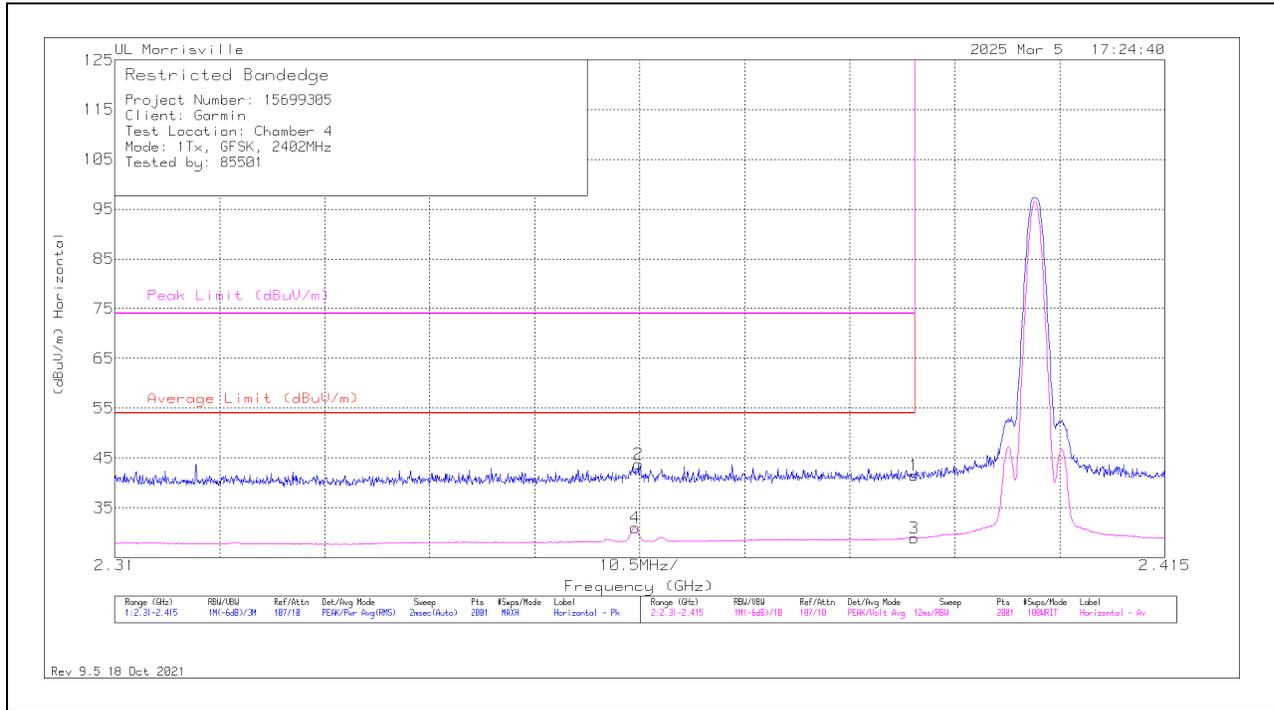
OFS and chamber correlation testing had been performed and chamber measured test result is the worst-case test result.

10.1. TRANSMITTER ABOVE 1 GHz

10.1.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	89509 ACF (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	*** 2.38996	32.72	Pk	32	-23.2	41.52	-	-	74	-32.48	58	126	H
2	*** 2.36234	34.85	Pk	31.9	-23	43.75	-	-	74	-30.25	58	126	H
3	*** 2.38996	20.08	VA1T	32	-23.2	28.88	54	-25.12	-	-	58	126	H
4	*** 2.36203	22.14	VA1T	31.9	-23	31.04	54	-22.96	-	-	58	126	H

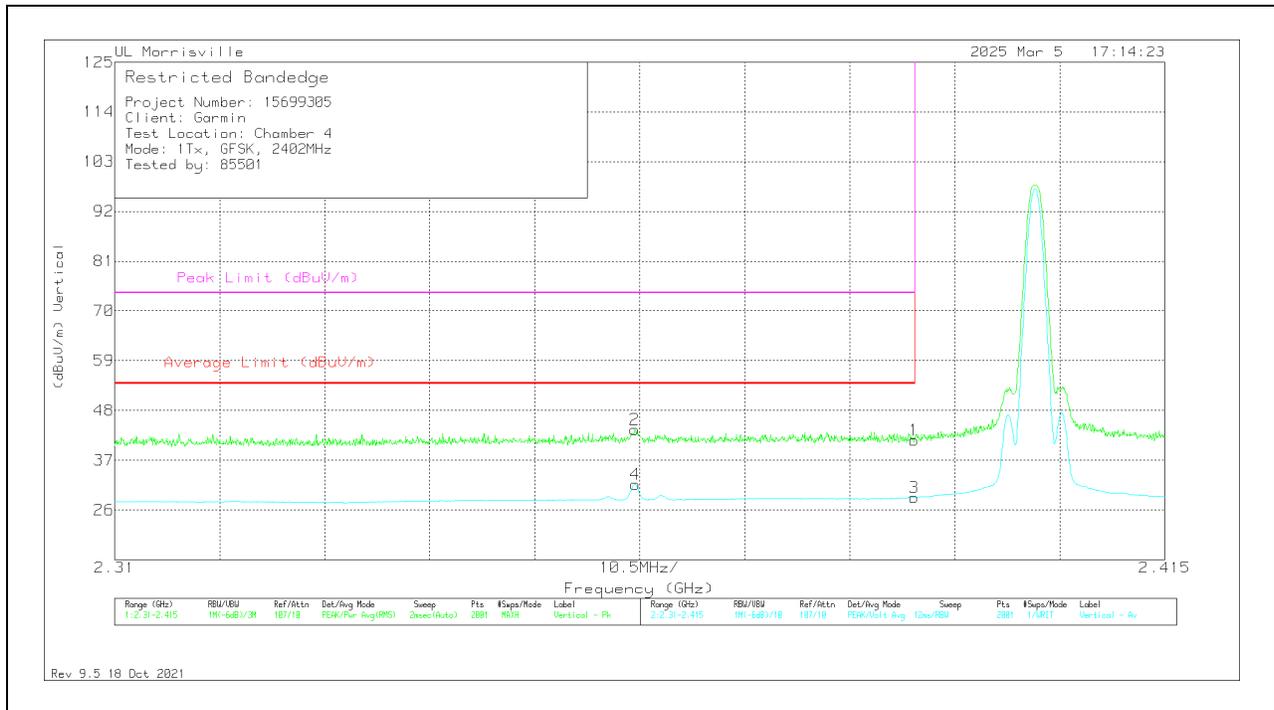
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

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

VERTICAL RESULT

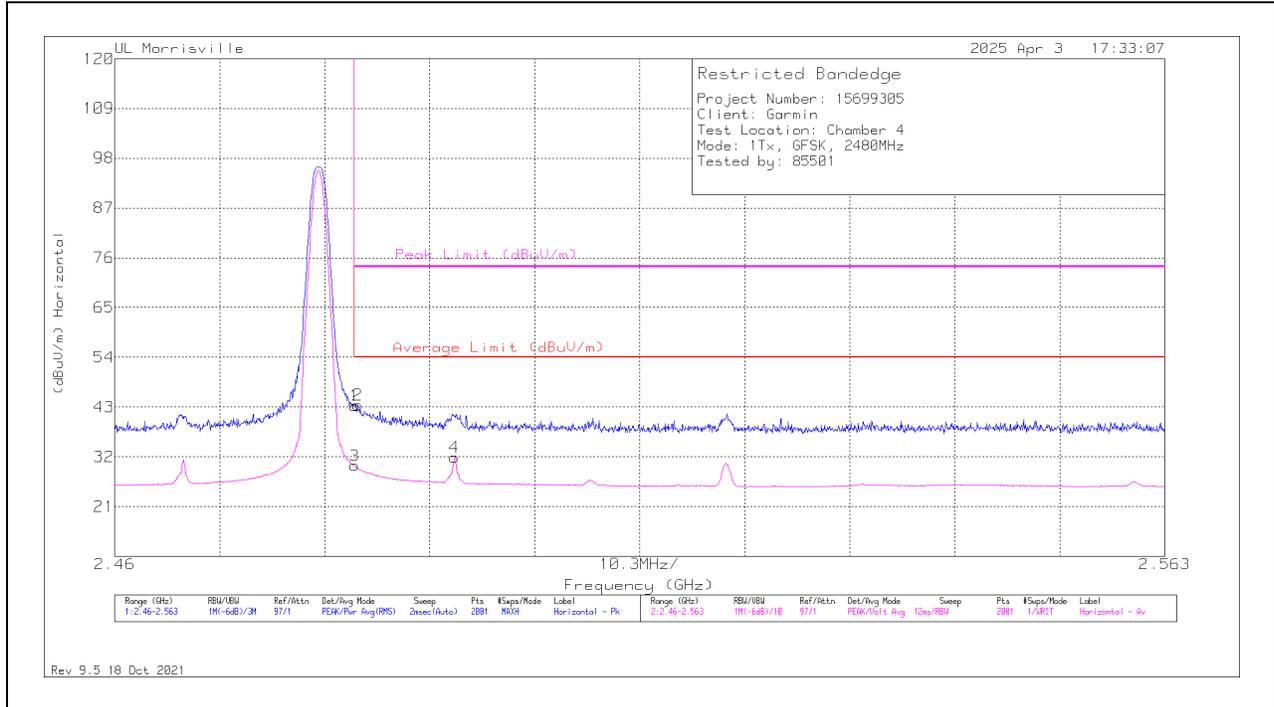


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	89509 ACF (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	*** 2.38996	32.59	Pk	32	-23.2	41.39	-	-	74	-32.61	19	152	V
2	*** 2.36198	34.83	Pk	31.9	-23	43.73	-	-	74	-30.27	19	152	V
3	*** 2.38996	19.91	VA1T	32	-23.2	28.71	54	-25.29	-	-	19	152	V
4	*** 2.36203	22.78	VA1T	31.9	-23	31.68	54	-22.32	-	-	19	152	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 ** - indicates frequency in Taiwan NCC LP0002 Restricted Band
 Pk - Peak detector
 VA1T - Linear Voltage Average VB=1/Ton where: Ton is transmit duration

BANDEDGE (HIGH CHANNEL)

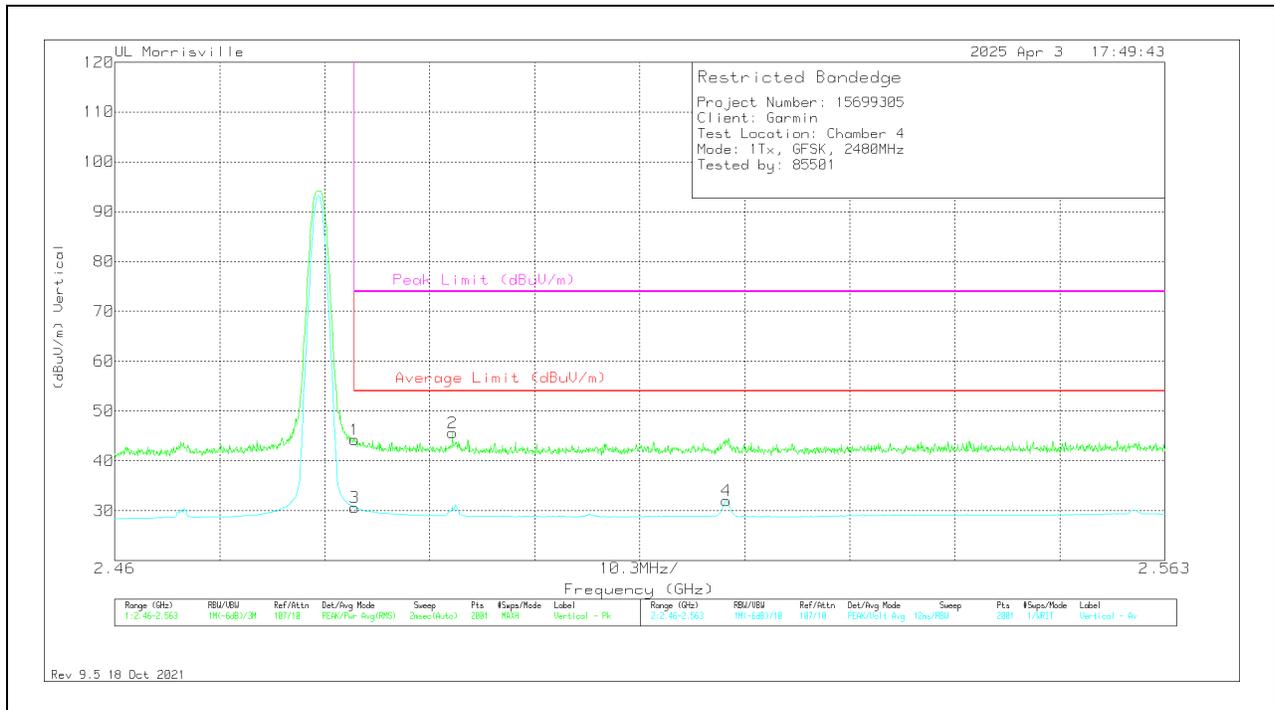
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	89509 ACF (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.48354	33.82	Pk	32.3	-22.8	43.32	-	-	74	-30.68	62	116	H
2	* ** 2.48384	33.97	Pk	32.3	-22.8	43.47	-	-	74	-30.53	62	116	H
3	* ** 2.48354	20.53	VA1T	32.3	-22.8	30.03	54	-23.97	-	-	62	116	H
4	* ** 2.49332	22.43	VA1T	32.3	-22.8	31.93	54	-22.07	-	-	62	116	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 ** - indicates frequency in Taiwan NCC LP0002 Restricted Band
 Pk - Peak detector
 VA1T - Linear Voltage Average VB=1/Ton where: Ton is transmit duration

VERTICAL RESULT

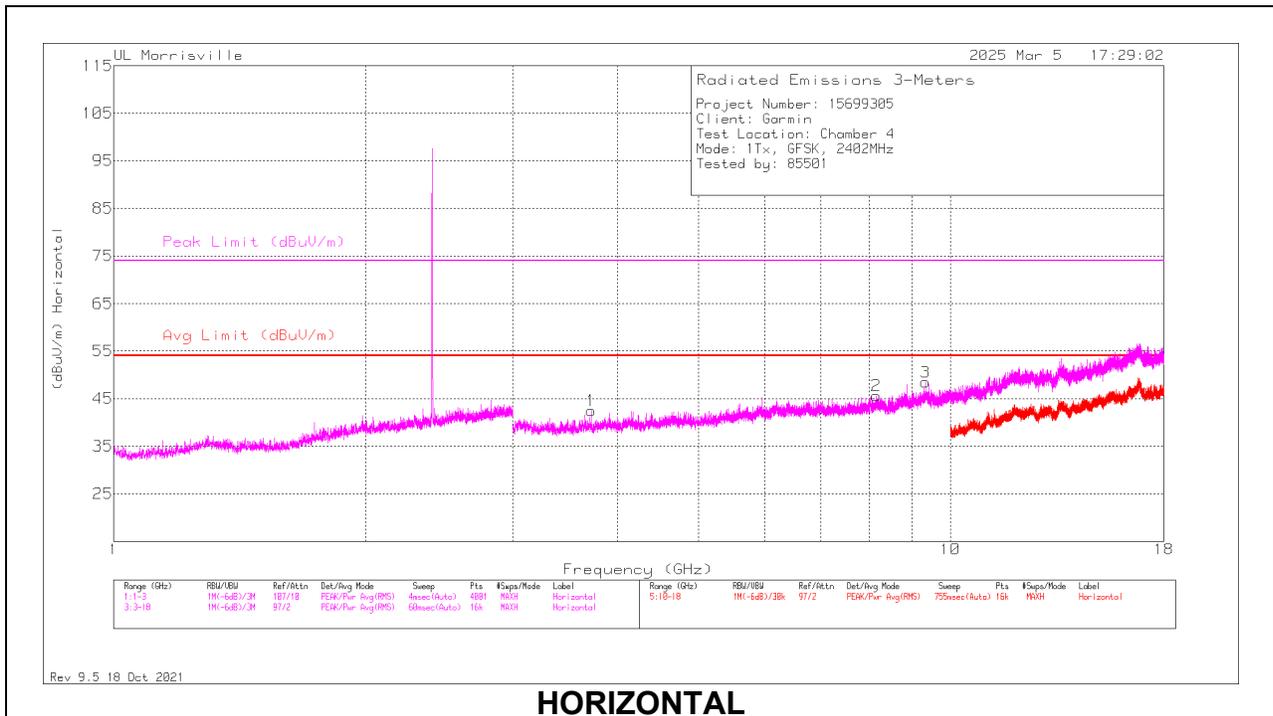


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	89509 ACF (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.48354	34.72	Pk	32.3	-22.8	44.22	-	-	74	-29.78	31	114	V
2	* ** 2.49311	36.1	Pk	32.3	-22.8	45.6	-	-	74	-28.4	31	114	V
3	* ** 2.48354	21.16	VA1T	32.3	-22.8	30.66	54	-23.34	-	-	31	114	V
4	** 2.52	22.44	VA1T	32.4	-22.8	32.04	54	-21.96	-	-	31	114	V

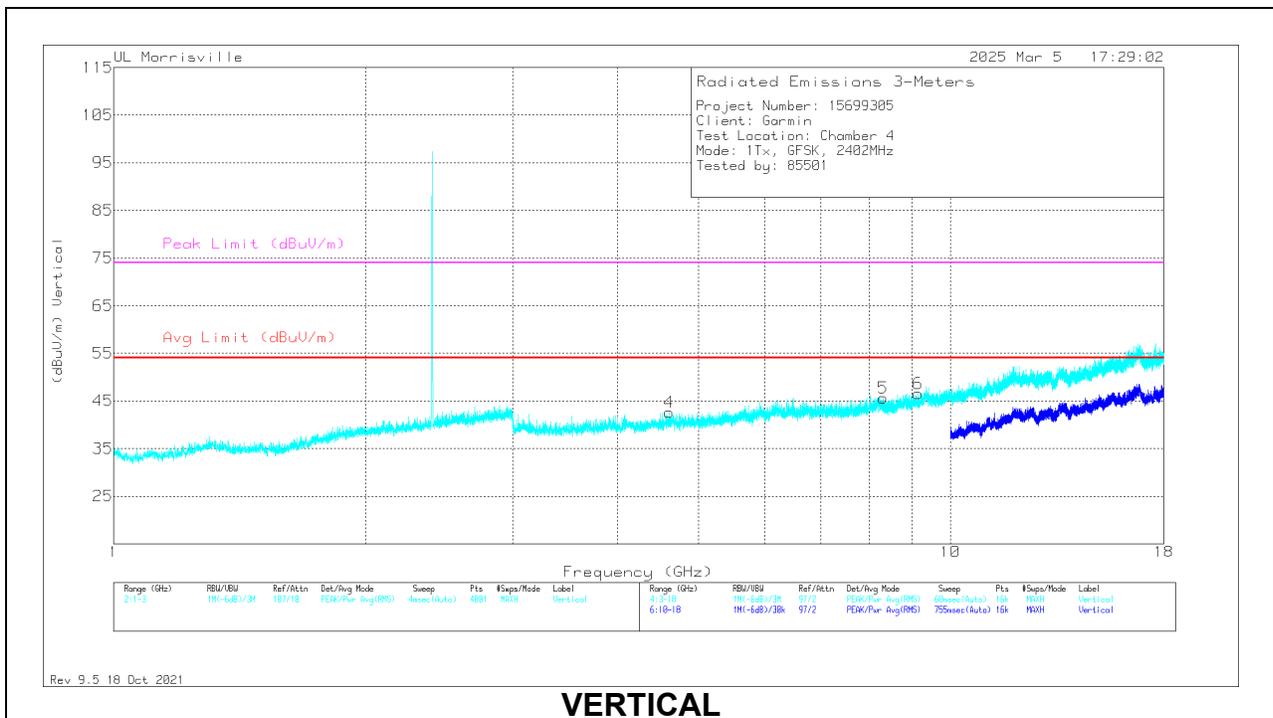
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 ** - indicates frequency in Taiwan NCC LP0002 Restricted Band
 Pk - Peak detector
 VA1T - Linear Voltage Average VB=1/Ton where: Ton is transmit duration

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZONTAL



VERTICAL

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	89509 ACF (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 3.72469	41.64	Pk	33.1	-32.3	42.44	54	-11.56	74	-31.56	0-360	100	H
2	* ** 8.15531	36.59	Pk	35.8	-26.8	45.59	54	-8.41	74	-28.41	0-360	100	H
3	* ** 9.33496	36.23	PK2	36.5	-24.2	48.53	-	-	74	-25.47	350	264	H
	* ** 9.33855	21.74	V1TV	36.5	-24.2	34.04	54	-19.96	-	-	350	264	H
4	* ** 4.61625	39.99	Pk	34.1	-31.5	42.59	54	-11.41	74	-31.41	0-360	200	V
5	* ** 8.31938	35.93	Pk	35.8	-26.1	45.63	54	-8.37	74	-28.37	0-360	200	V
6	* ** 9.14531	35.1	Pk	36.3	-24.9	46.5	54	-7.5	74	-27.5	0-360	200	V

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

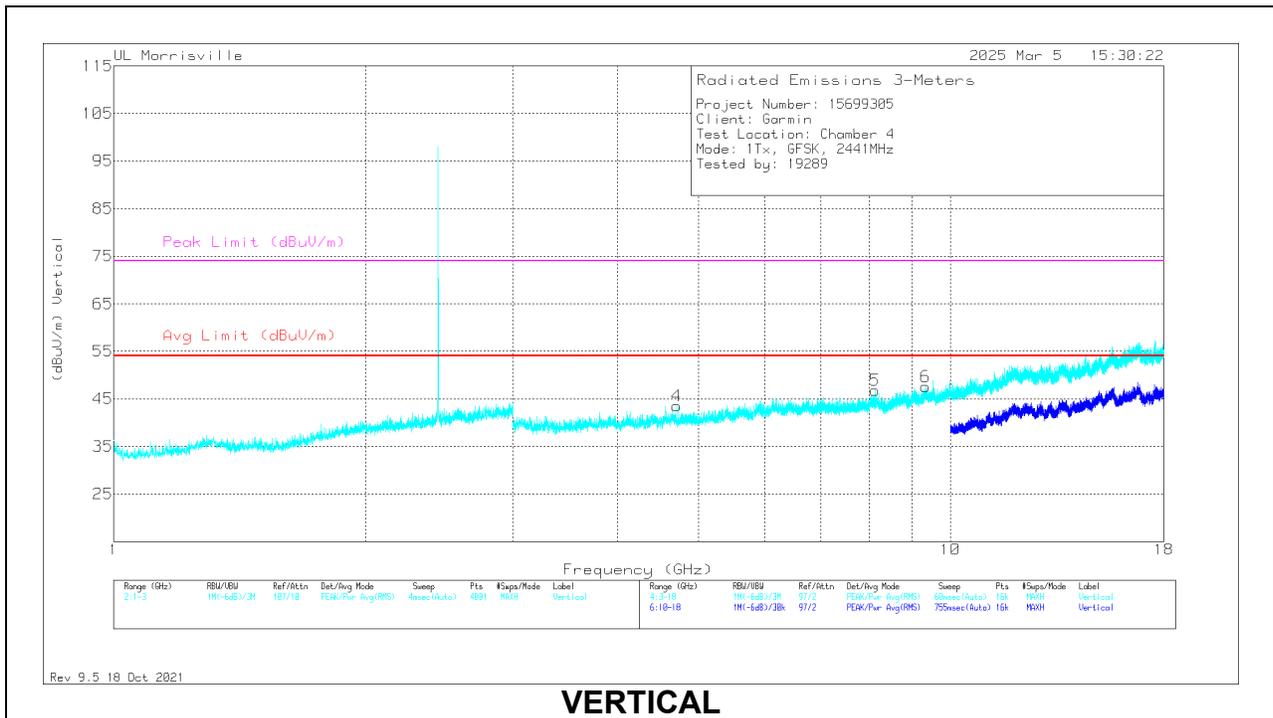
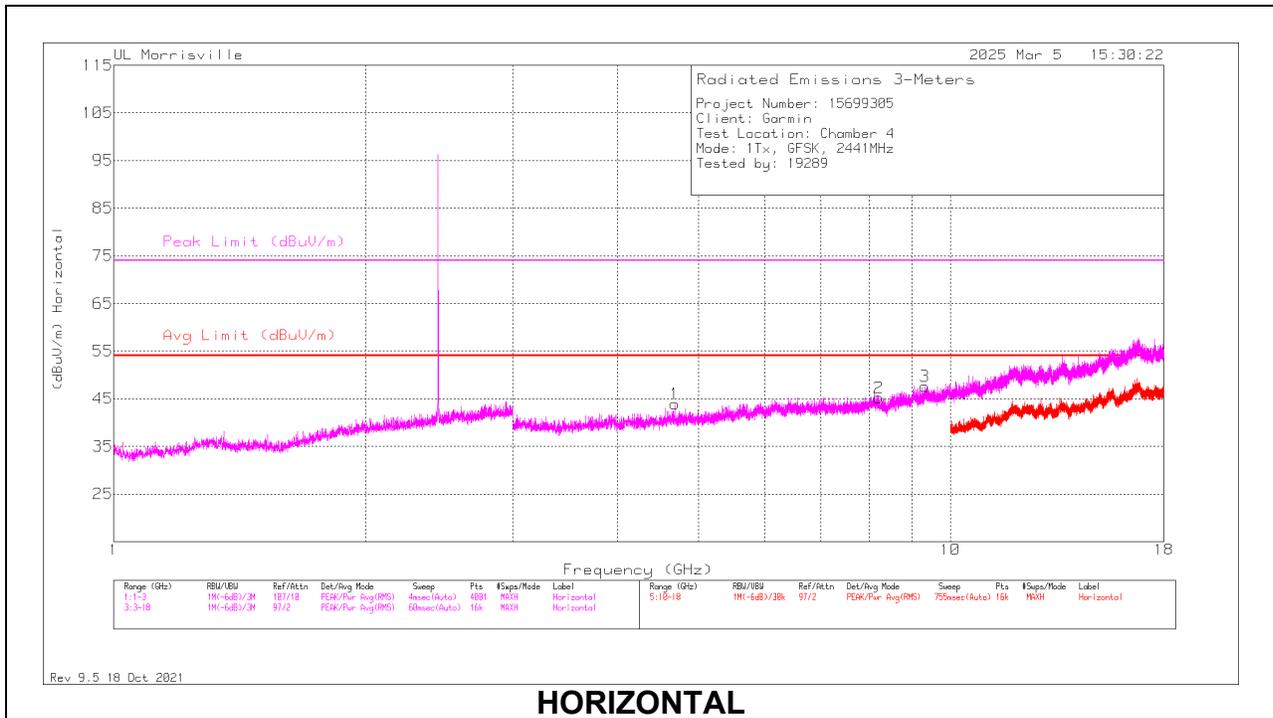
** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

PK2 - KDB558074 Method: Maximum Peak

V1TV - VB=1/Ton, Linear Voltage Average where: Ton is packet duration

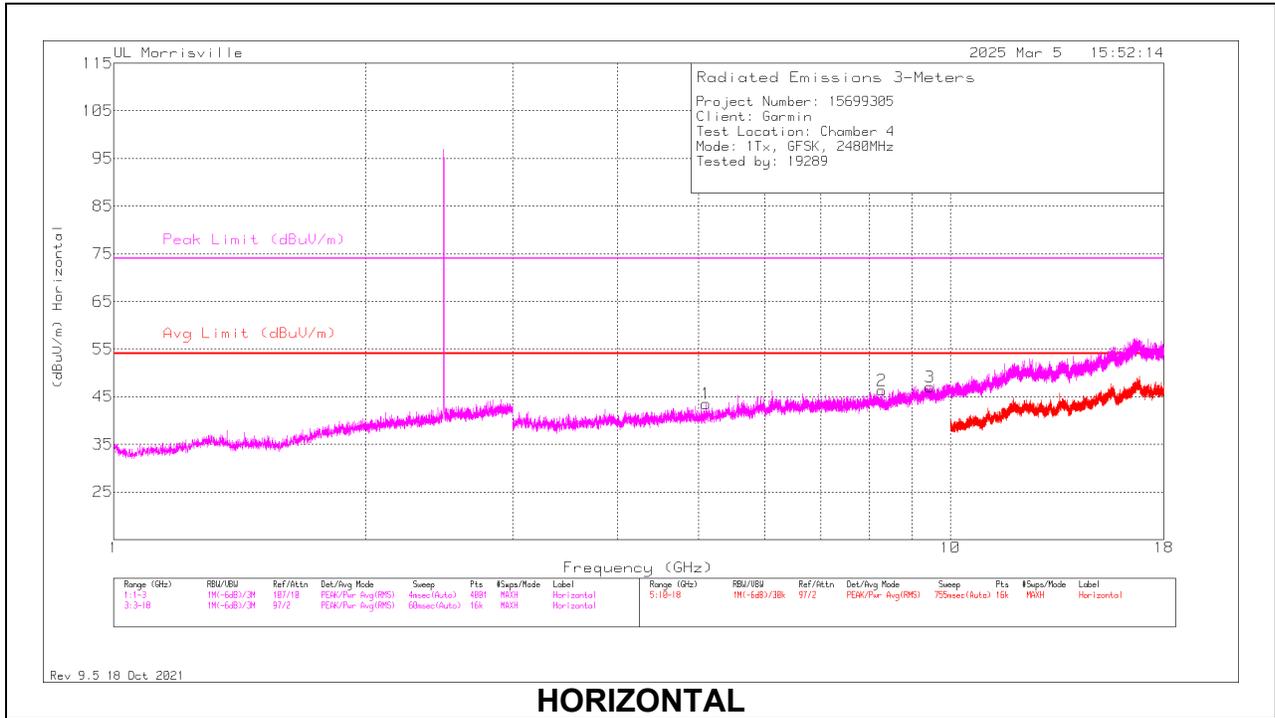
MID CHANNEL RESULTS



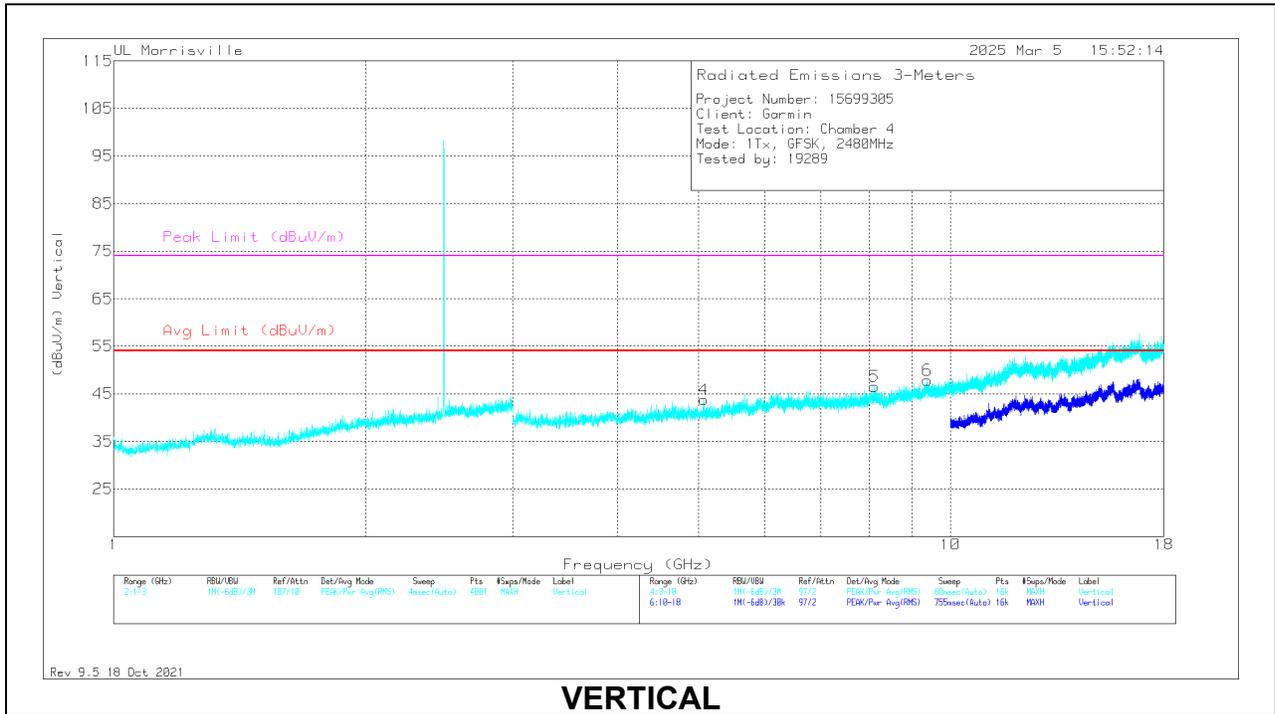
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	89509 ACF (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	*** 4.68844	40.74	Pk	34.1	-30.9	43.94	54	-10.06	74	-30.06	0-360	100	H
2	*** 8.21438	35.58	Pk	35.8	-26.2	45.18	54	-8.82	74	-28.82	0-360	100	H
3	*** 9.32344	35.57	Pk	36.4	-24.4	47.57	54	-6.43	74	-26.43	0-360	100	H
4	*** 4.70813	40.84	Pk	34.1	-31.4	43.54	54	-10.46	74	-30.46	0-360	200	V
5	*** 8.13375	37.95	Pk	35.8	-26.9	46.85	54	-7.15	74	-27.15	0-360	200	V
6	*** 9.34219	35.34	Pk	36.5	-24.2	47.64	54	-6.36	74	-26.36	0-360	200	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 ** - indicates frequency in Taiwan NCC LP0002 Restricted Band
 Pk - Peak detector

HIGH CHANNEL RESULTS



HORIZONTAL



VERTICAL

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	89509 ACF (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	*** 5.10656	40.48	Pk	34.1	-31.1	43.48	54	-10.52	74	-30.52	0-360	100	H
2	*** 8.2875	36.84	Pk	35.8	-26.3	46.34	54	-7.66	74	-27.66	0-360	100	H
3	** 9.45	35.41	Pk	36.7	-25.1	47.01	54	-6.99	74	-26.99	0-360	100	H
4	*** 5.07469	41.14	Pk	34.1	-31.5	43.74	54	-10.26	74	-30.26	0-360	200	V
5	*** 8.12063	37.45	Pk	35.8	-26.7	46.55	54	-7.45	74	-27.45	0-360	200	V
6	*** 9.38813	36.13	Pk	36.6	-24.9	47.83	54	-6.17	74	-26.17	0-360	200	V

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

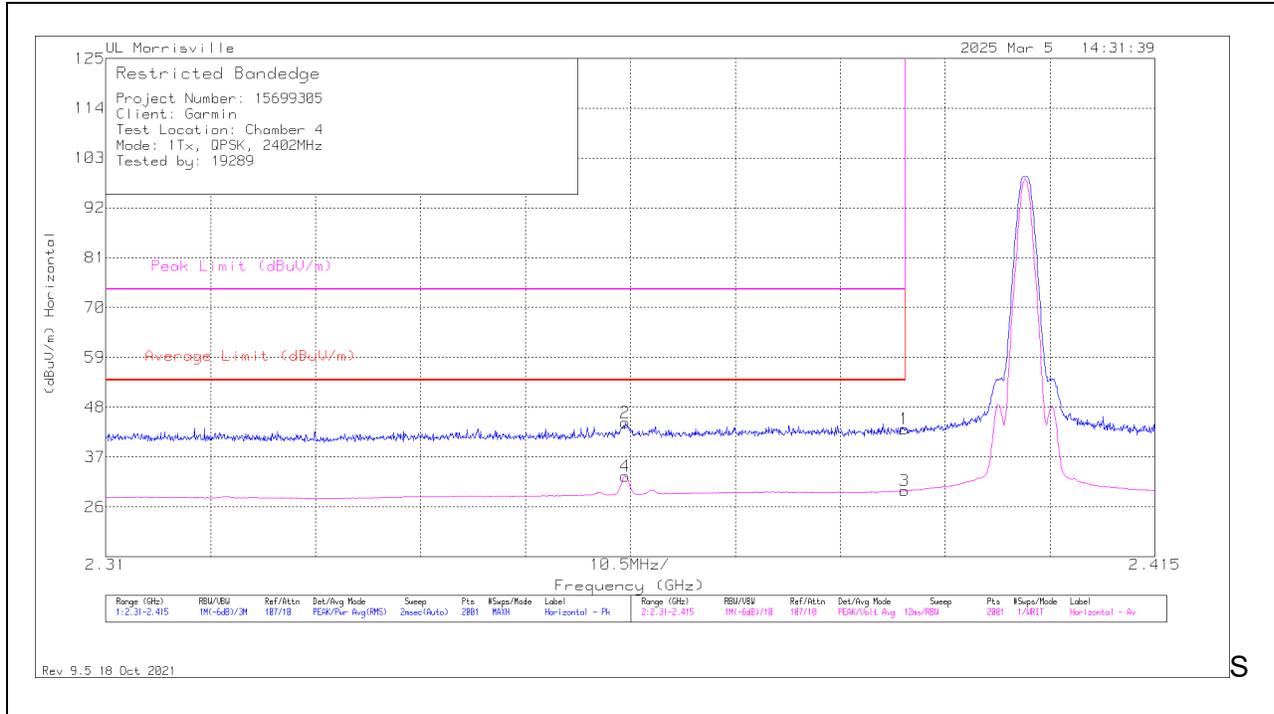
** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

10.1.1. BLUETOOTH ENHANCED DATA RATE DQPSK MODULATION

BANDEDGE (LOW CHANNEL)

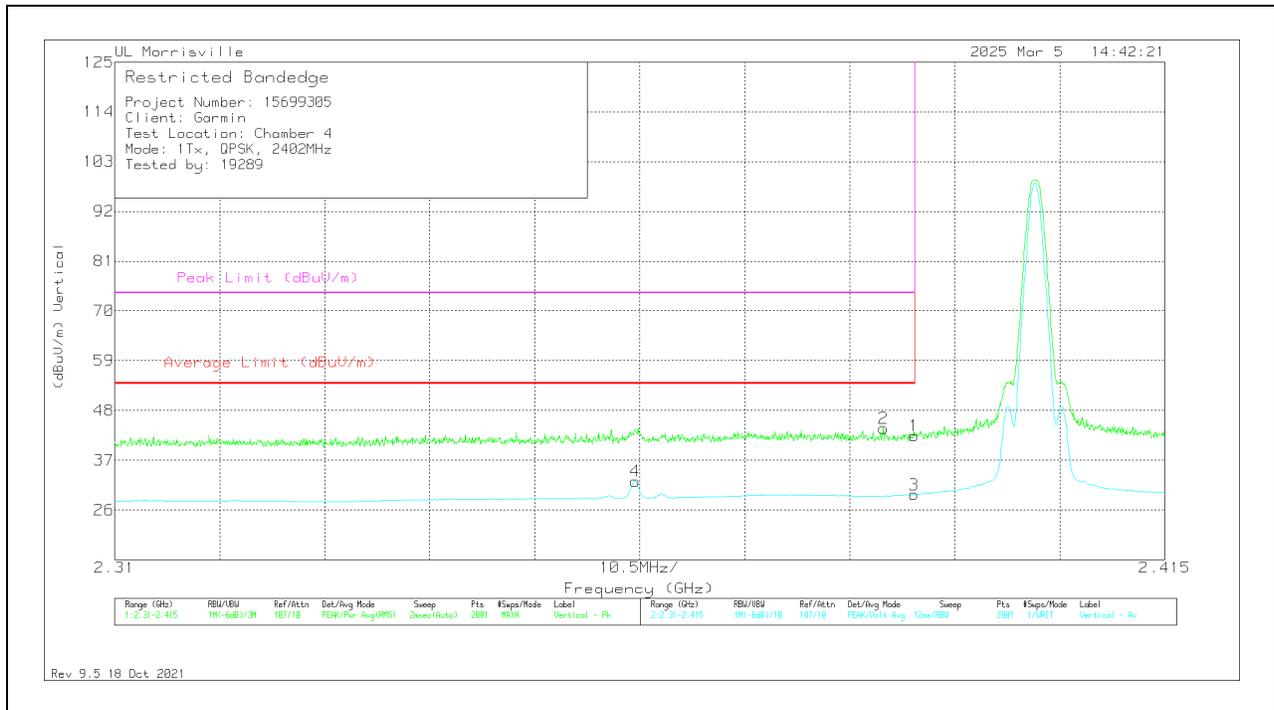
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	89509 ACF (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	** 2.38996	34.44	Pk	32	-23.2	43.24	-	-	74	-30.76	171	115	H
2	** 2.36198	35.67	Pk	31.9	-23	44.57	-	-	74	-29.43	171	115	H
3	** 2.38996	20.77	VA1T	32	-23.2	29.57	54	-24.43	-	-	171	115	H
4	** 2.36198	23.83	VA1T	31.9	-23	32.73	54	-21.27	-	-	171	115	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 ** - indicates frequency in Taiwan NCC LP0002 Restricted Band
 Pk - Peak detector
 VA1T - Linear Voltage Average VB=1/Ton where: Ton is transmit duration

VERTICAL RESULT

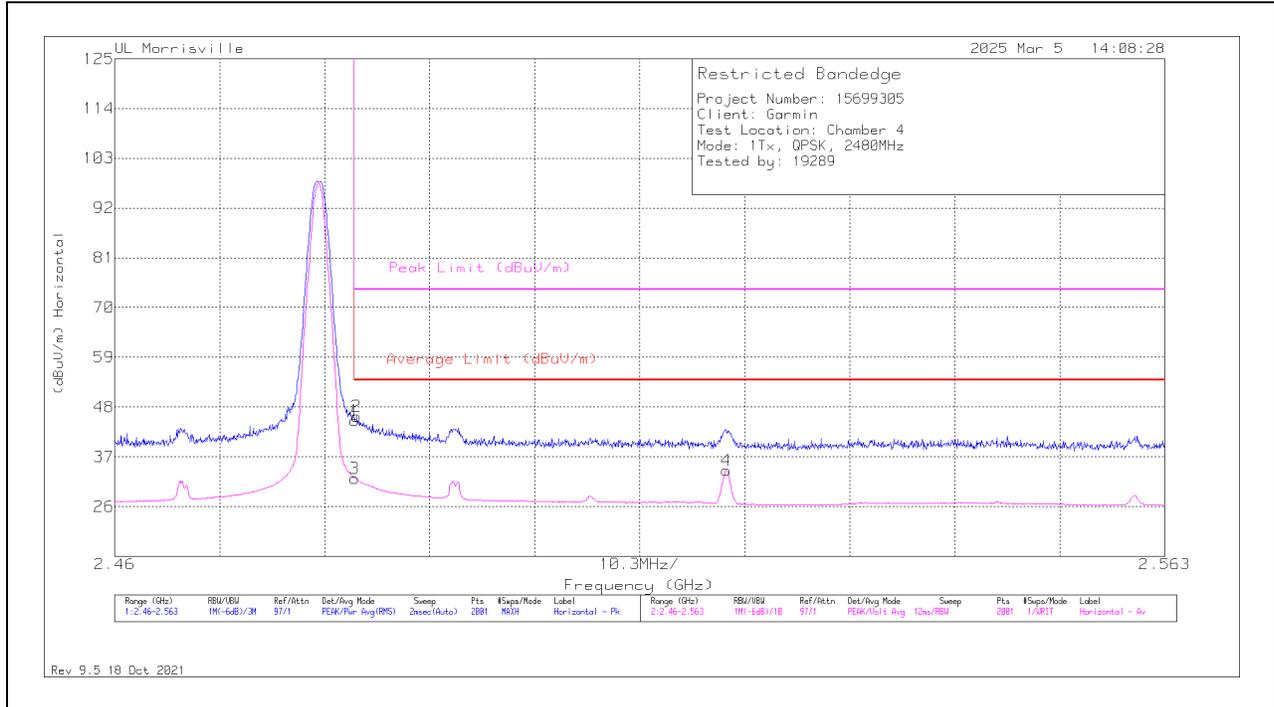


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	89509 ACF (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	*** 2.38996	33.59	Pk	32	-23.2	42.39	-	-	74	-31.61	58	105	V
2	*** 2.38686	35.38	Pk	32	-23.3	44.08	-	-	74	-29.92	58	105	V
3	*** 2.38996	20.58	VA1T	32	-23.2	29.38	54	-24.62	-	-	58	105	V
4	*** 2.36203	23.47	VA1T	31.9	-23	32.37	54	-21.63	-	-	58	105	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 ** - indicates frequency in Taiwan NCC LP0002 Restricted Band
 Pk - Peak detector
 VA1T - Linear Voltage Average VB=1/Ton where: Ton is transmit duration

BANDEDGE (HIGH CHANNEL)

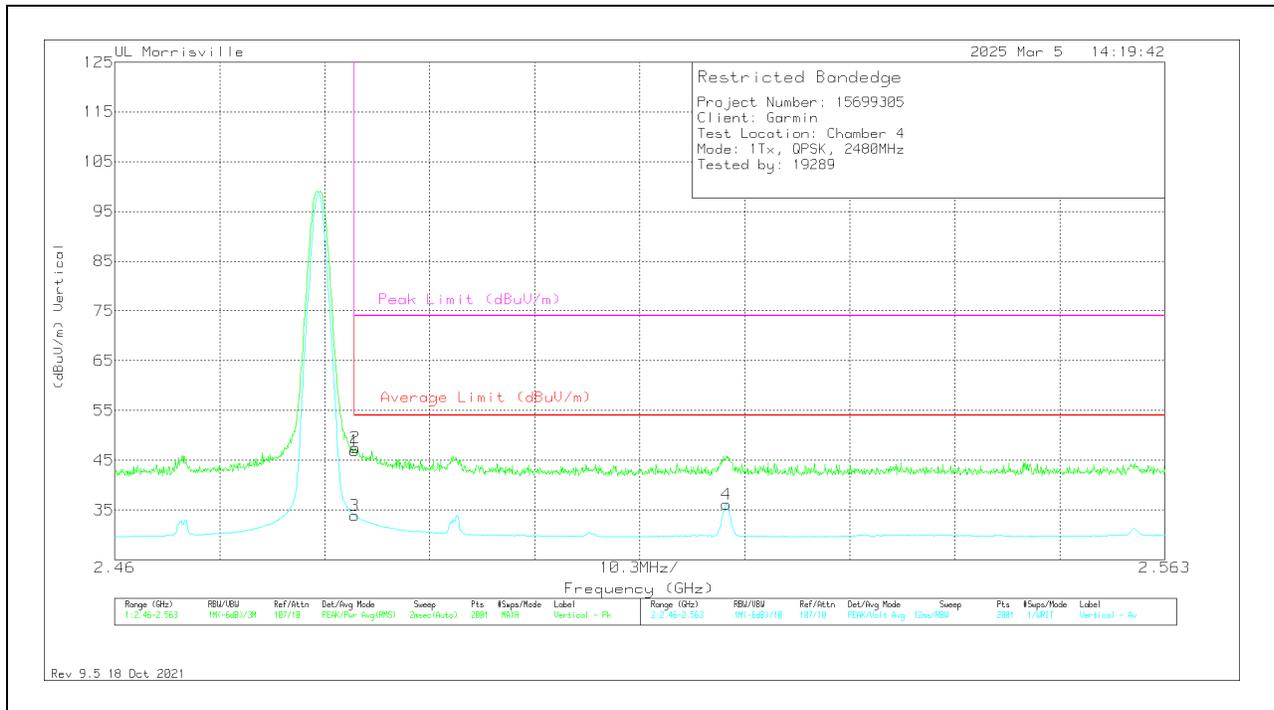
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	89509 ACF (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	*** 2.48354	35.5	Pk	32.3	-22.8	45	-	-	74	-29	27	120	H
2	*** 2.48374	36.43	Pk	32.3	-22.8	45.93	-	-	74	-28.07	27	120	H
3	*** 2.48354	22.75	VA1T	32.3	-22.8	32.25	54	-21.75	-	-	27	120	H
4	** 2.52	24.38	VA1T	32.4	-22.8	33.98	54	-20.02	-	-	27	120	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 ** - indicates frequency in Taiwan NCC LP0002 Restricted Band
 Pk - Peak detector
 VA1T - Linear Voltage Average VB=1/Ton where: Ton is transmit duration

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	89509 ACF (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	*** 2.48354	37.36	Pk	32.3	-22.8	46.86	-	-	74	-27.14	62	111	V
2	*** 2.48359	37.98	Pk	32.3	-22.8	47.48	-	-	74	-26.52	62	111	V
3	** 2.48354	24.35	VA1T	32.3	-22.8	33.85	54	-20.15	-	-	62	111	V
4	** 2.52	26.55	VA1T	32.4	-22.8	36.15	54	-17.85	-	-	62	111	V

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

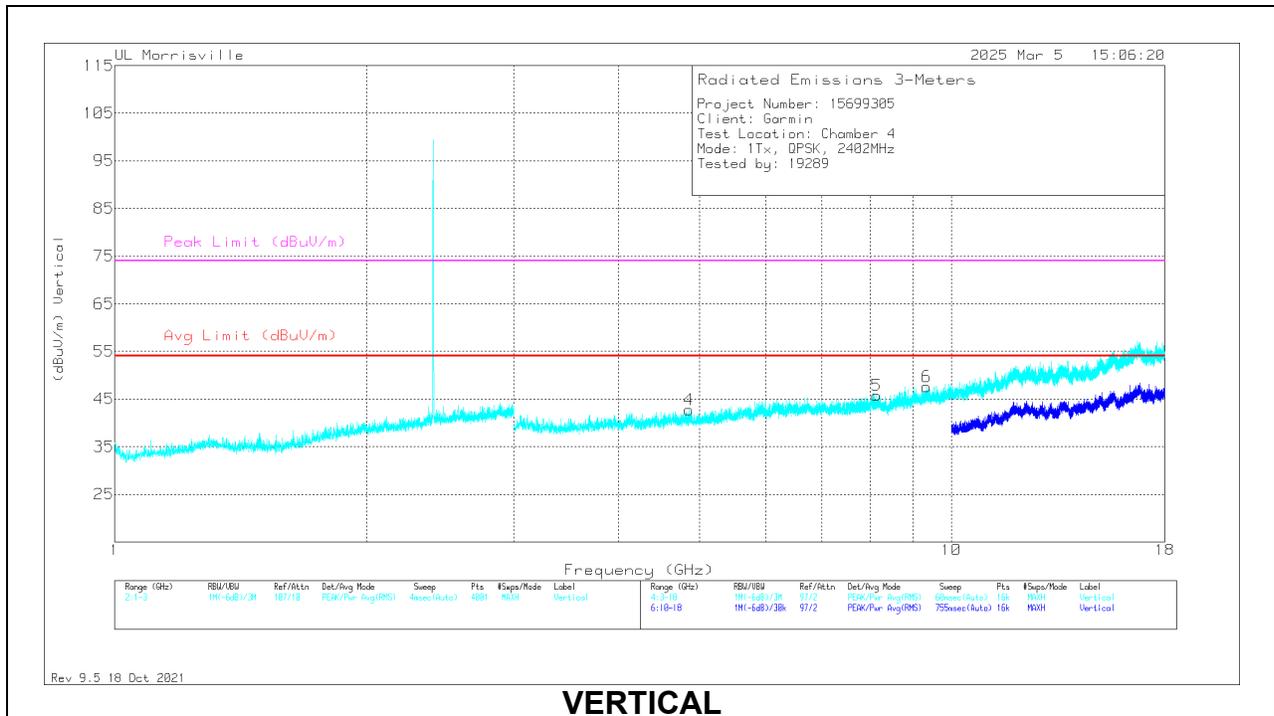
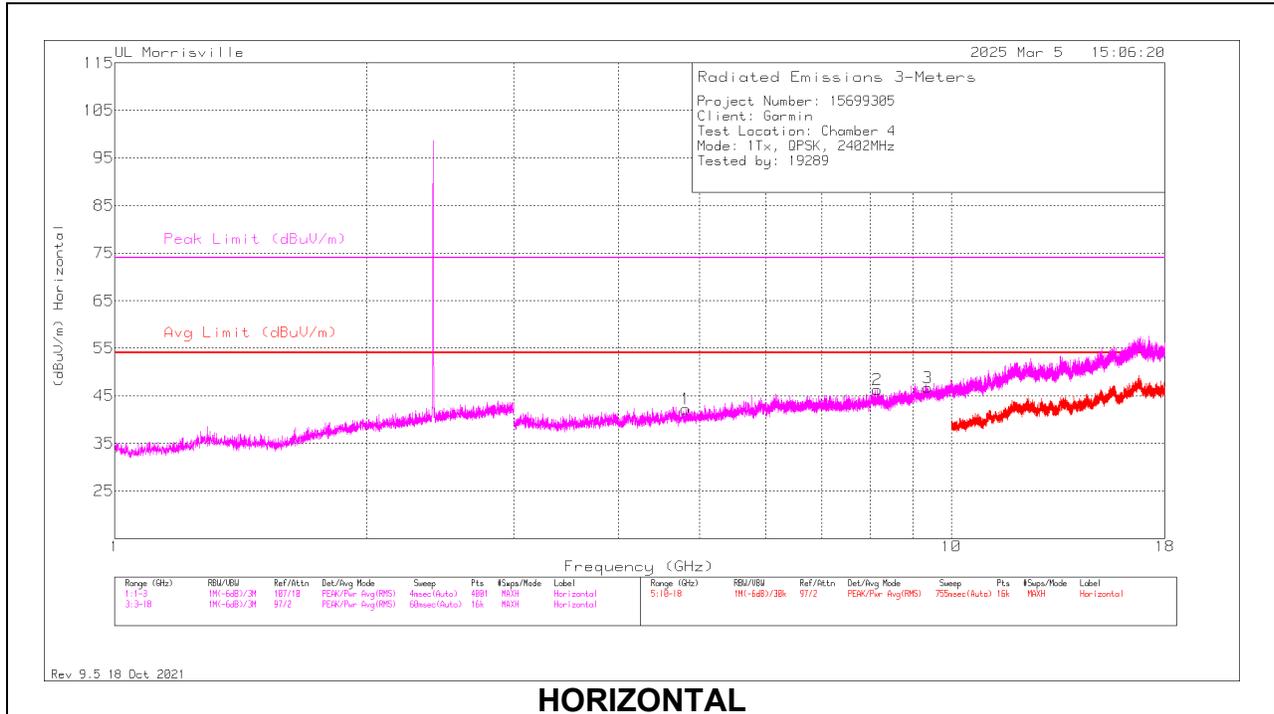
** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

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

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



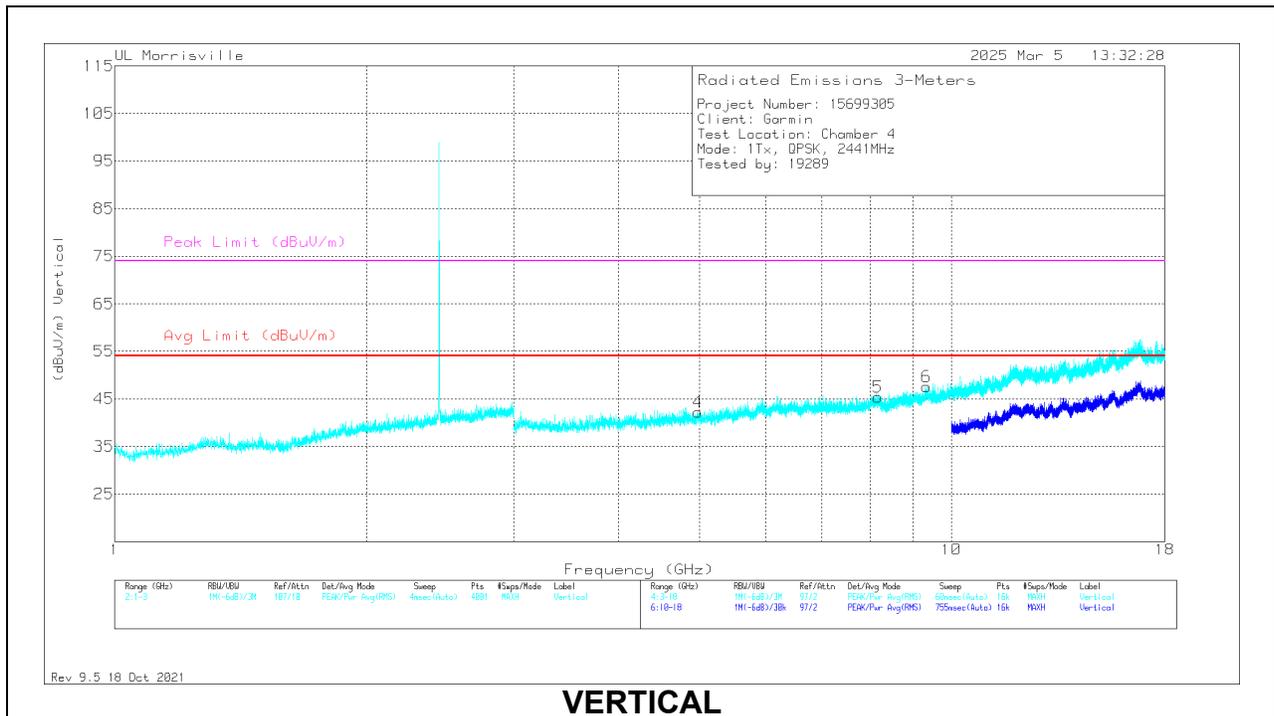
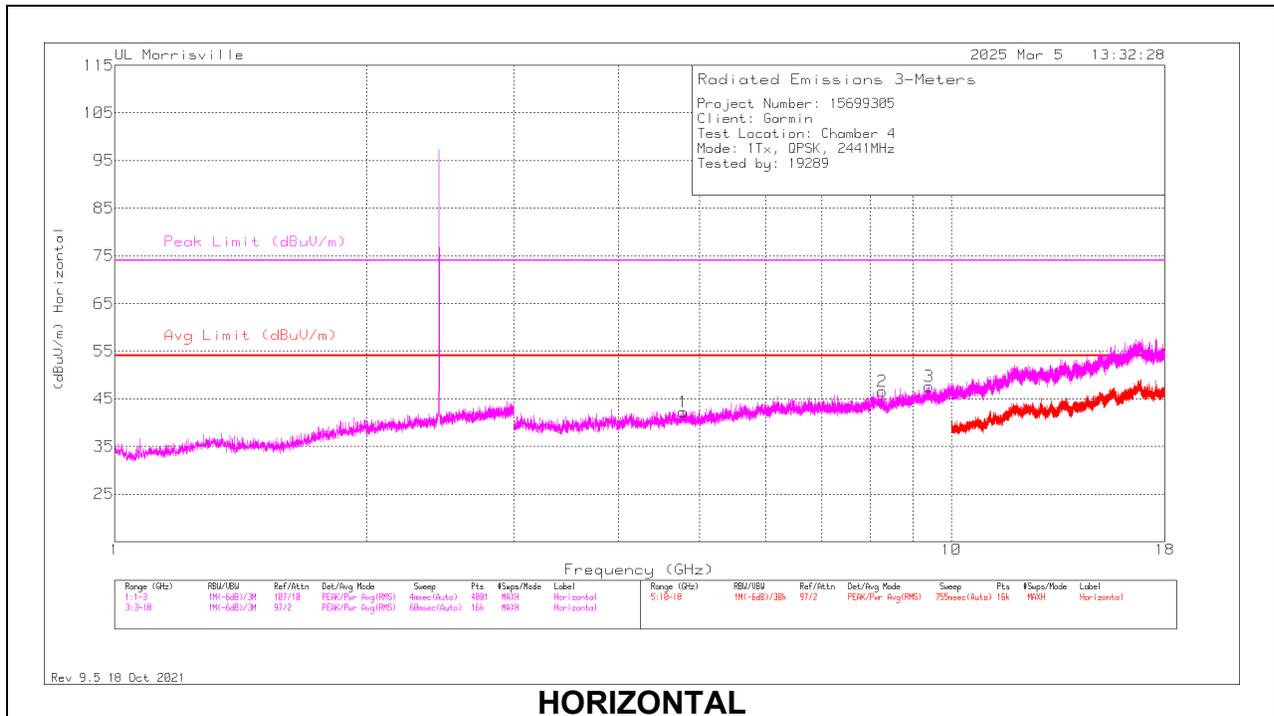
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	89509 ACF (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	*** 4.81781	39.29	Pk	34.1	-31.2	42.19	54	-11.81	74	-31.81	0-360	100	H
2	*** 8.15906	37.06	Pk	35.8	-26.6	46.26	54	-7.74	74	-27.74	0-360	100	H
3	*** 9.3675	34.83	Pk	36.5	-24.6	46.73	54	-7.27	74	-27.27	0-360	100	H
4	*** 4.86	39.55	Pk	34.1	-30.9	42.75	54	-11.25	74	-31.25	0-360	200	V
5	*** 8.14406	36.95	Pk	35.8	-27	45.75	54	-8.25	74	-28.25	0-360	200	V
6	*** 9.34969	35.39	Pk	36.5	-24.3	47.59	54	-6.41	74	-26.41	0-360	200	V

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

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

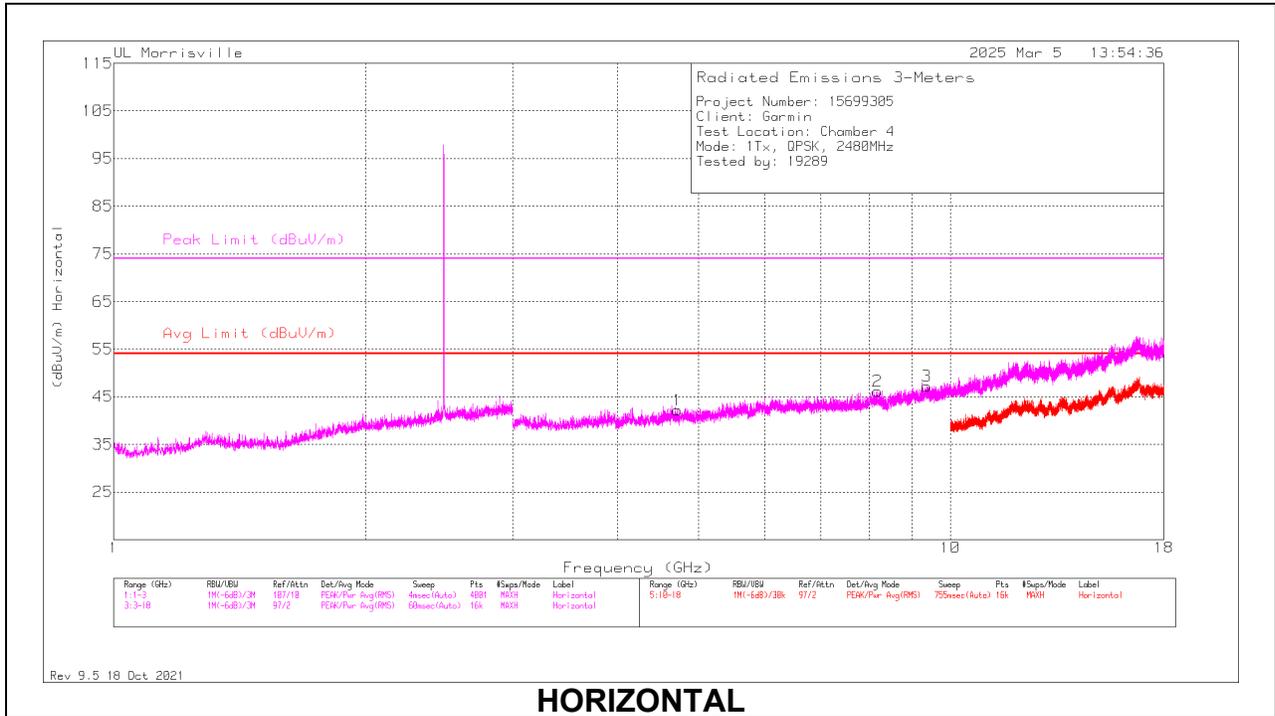
MID CHANNEL RESULTS



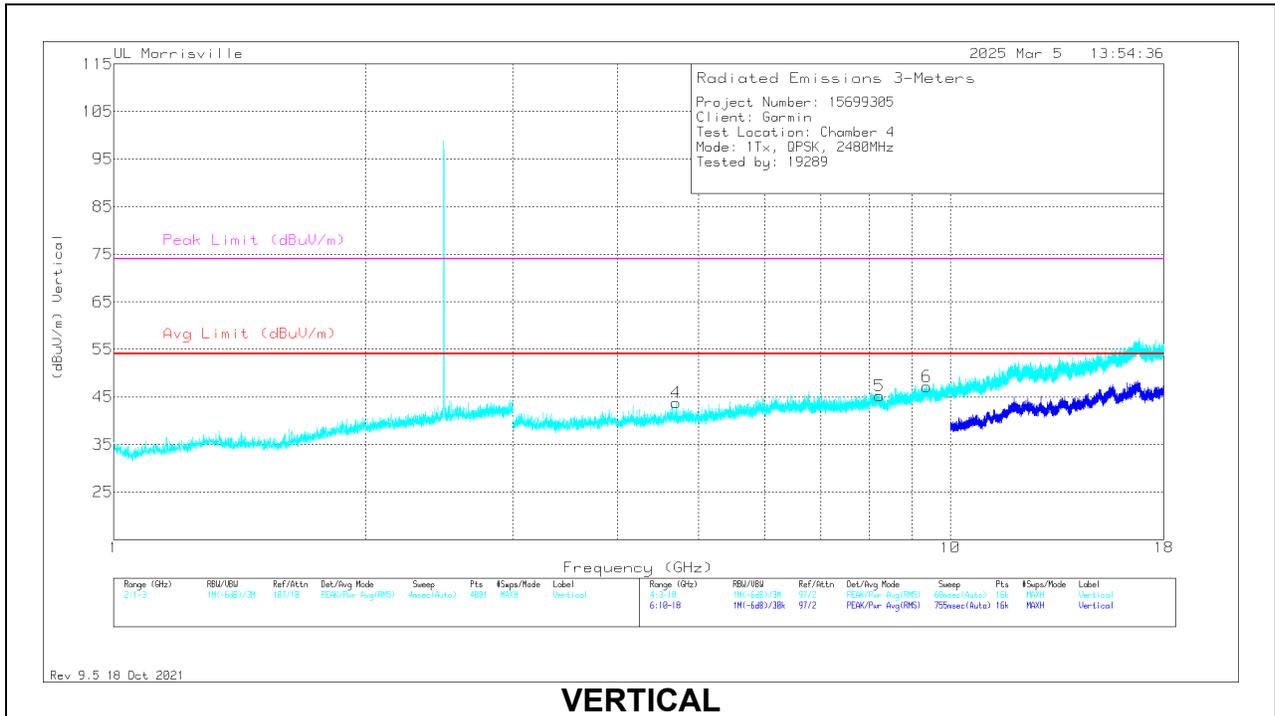
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	89509 ACF (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	*** 4.785	39.43	Pk	34.1	-31.3	42.23	54	-11.77	74	-31.77	0-360	100	H
2	*** 8.265	37.05	Pk	35.8	-26.3	46.55	54	-7.45	74	-27.45	0-360	100	H
3	*** 9.40125	36.12	Pk	36.6	-25.1	47.62	54	-6.38	74	-26.38	0-360	100	H
4	*** 4.98	39.49	Pk	34	-31.3	42.19	54	-11.81	74	-31.81	0-360	200	V
5	*** 8.17219	36.19	Pk	35.8	-26.6	45.39	54	-8.61	74	-28.61	0-360	200	V
6	*** 9.33469	35.29	Pk	36.5	-24.2	47.59	54	-6.41	74	-26.41	0-360	200	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 ** - indicates frequency in Taiwan NCC LP0002 Restricted Band
 Pk - Peak detector

HIGH CHANNEL RESULTS



HORIZONTAL



VERTICAL

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	89509 ACF (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	*** 4.71563	39.47	Pk	34.1	-31.4	42.17	54	-11.83	74	-31.83	0-360	100	H
2	*** 8.18344	36.58	Pk	35.8	-26.2	46.18	54	-7.82	74	-27.82	0-360	100	H
3	*** 9.36938	35.41	Pk	36.5	-24.7	47.21	54	-6.79	74	-26.79	0-360	100	H
4	*** 4.70344	40.92	Pk	34.1	-31.2	43.82	54	-10.18	74	-30.18	0-360	200	V
5	*** 8.23406	35.94	Pk	35.8	-26.5	45.24	54	-8.76	74	-28.76	0-360	200	V
6	*** 9.37313	35.45	Pk	36.5	-24.7	47.25	54	-6.75	74	-26.75	0-360	200	V

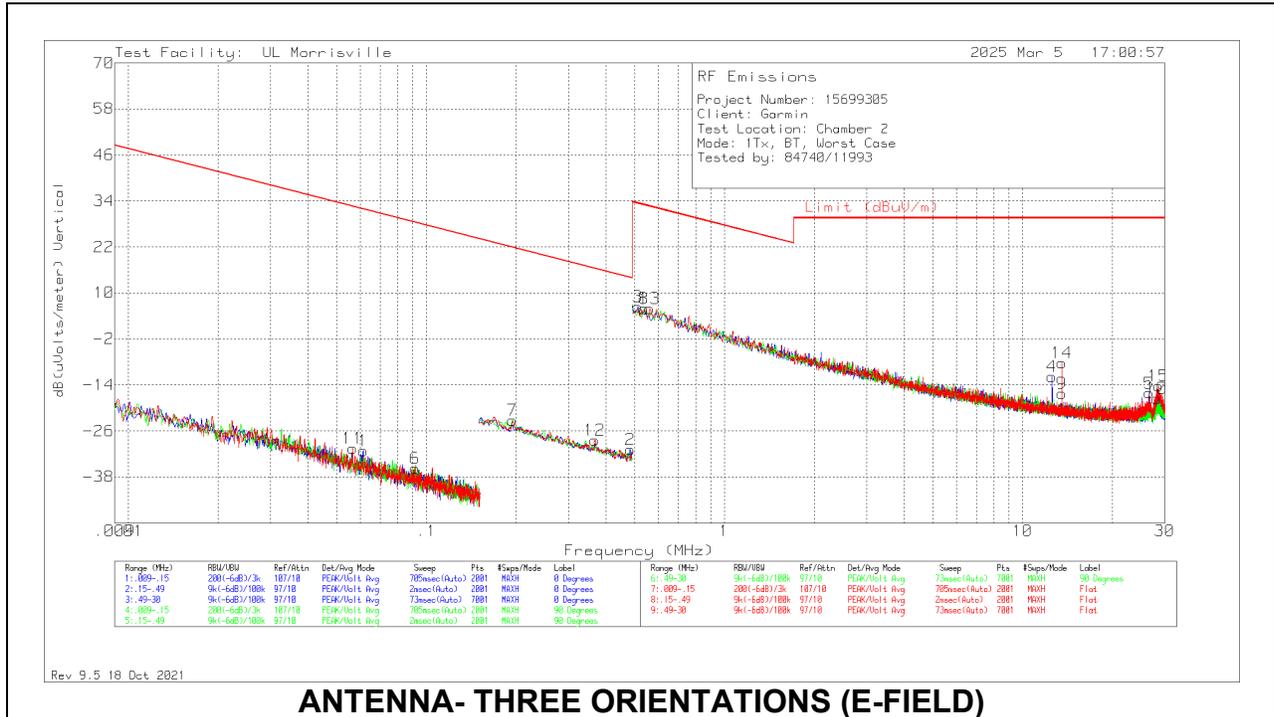
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

10.2. WORST CASE SPURIOUS BELOW 30MHZ

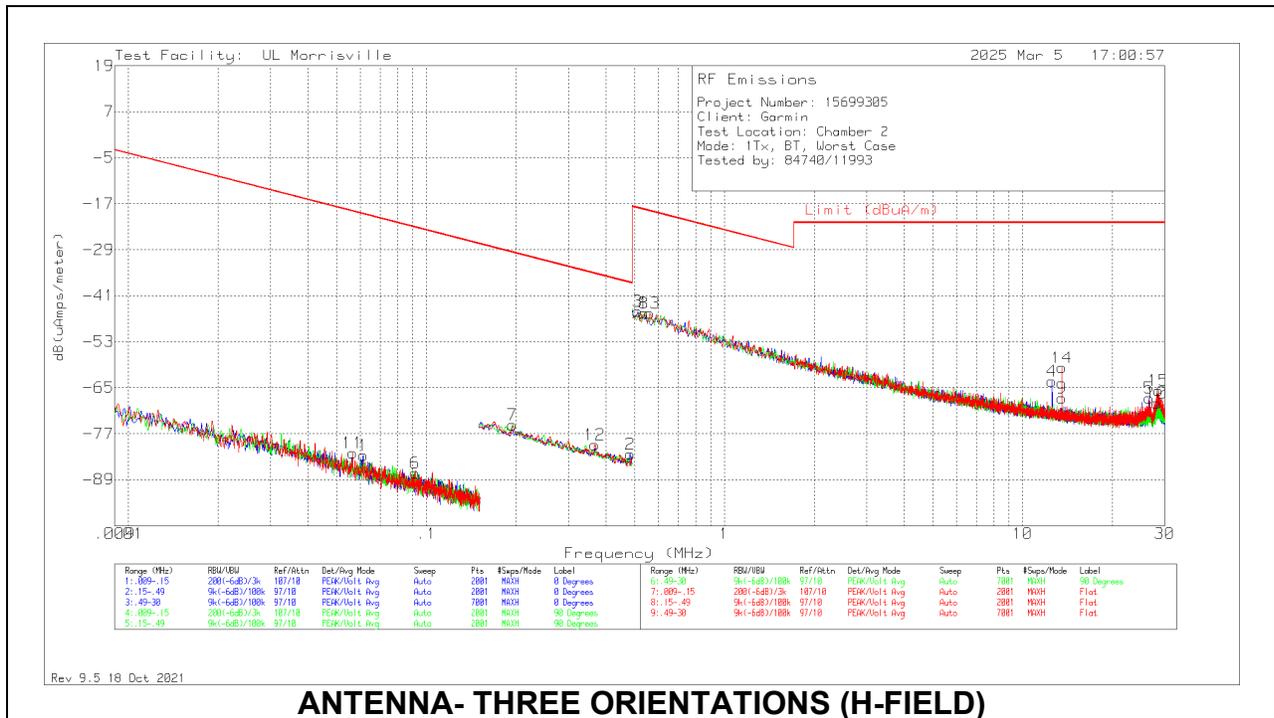
Note: All measurements were made at a test distance of 3 m. The measured data was extrapolated from the test distance (3m) to the specification distance (300 m from 9-490 kHz and 30 m from 490 kHz – 30 MHz) to clearly show the relative levels of fundamental and spurious emissions and demonstrate compliance with the requirement that the level of any spurious emissions be below the level of the intentionally transmitted signal. The extrapolation factor for the limits were 40*Log (test distance / specification distance).



ANTENNA- THREE ORIENTATIONS (E-FIELD)

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	135144 (dB/m)	Gain/Loss (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uVolts/meter)	QP/AV Limit (dBuV/m)	PK Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Loop Angle
11	.05657	37.95	Pk	11.4	.1	-80	-30.55	32.55	52.55	-63.1	0-360	Flat
1	.06133	37.37	Pk	11.4	.1	-80	-31.13	31.85	51.85	-62.98	0-360	0 degs
6	.09157	33.03	Pk	11.1	.1	-80	-35.77	28.37	-	-64.14	0-360	90 degs
7	.19463	45.67	Pk	11	.1	-80	-23.23	21.82	41.82	-45.05	0-360	90 degs
12	.3676	40.59	Pk	10.9	.1	-80	-28.41	16.3	36.3	-44.71	0-360	Flat
2	.4821	38.06	Pk	11	.1	-80	-30.84	13.94	33.94	-44.78	0-360	0 degs
3	.51108	35.28	Pk	11	.1	-40	6.38	33.43	-	-27.05	0-360	0 degs
8	.53638	34.86	Pk	11	.1	-40	5.96	33.01	-	-27.05	0-360	90 degs
13	.56167	34.83	Pk	11	.1	-40	5.93	32.61	-	-26.68	0-360	Flat
4	12.56041	17.65	Pk	9.9	.6	-40	-11.85	29.54	-	-41.39	0-360	0 degs
9	13.5596	13.45	Pk	9.8	.6	-40	-16.15	29.54	-	-45.69	0-360	90 degs
14	13.5596	21.3	Pk	9.8	.6	-40	-8.3	29.54	-	-37.84	0-360	Flat
5	26.53223	15.17	Pk	7.9	.8	-40	-16.13	29.54	-	-45.67	0-360	0 degs
10	28.16382	14.21	Pk	7.5	.8	-40	-17.49	29.54	-	-47.03	0-360	90 degs
15	28.56013	17.56	Pk	7.4	.8	-40	-14.24	29.54	-	-43.78	0-360	Flat

Pk - Peak detector

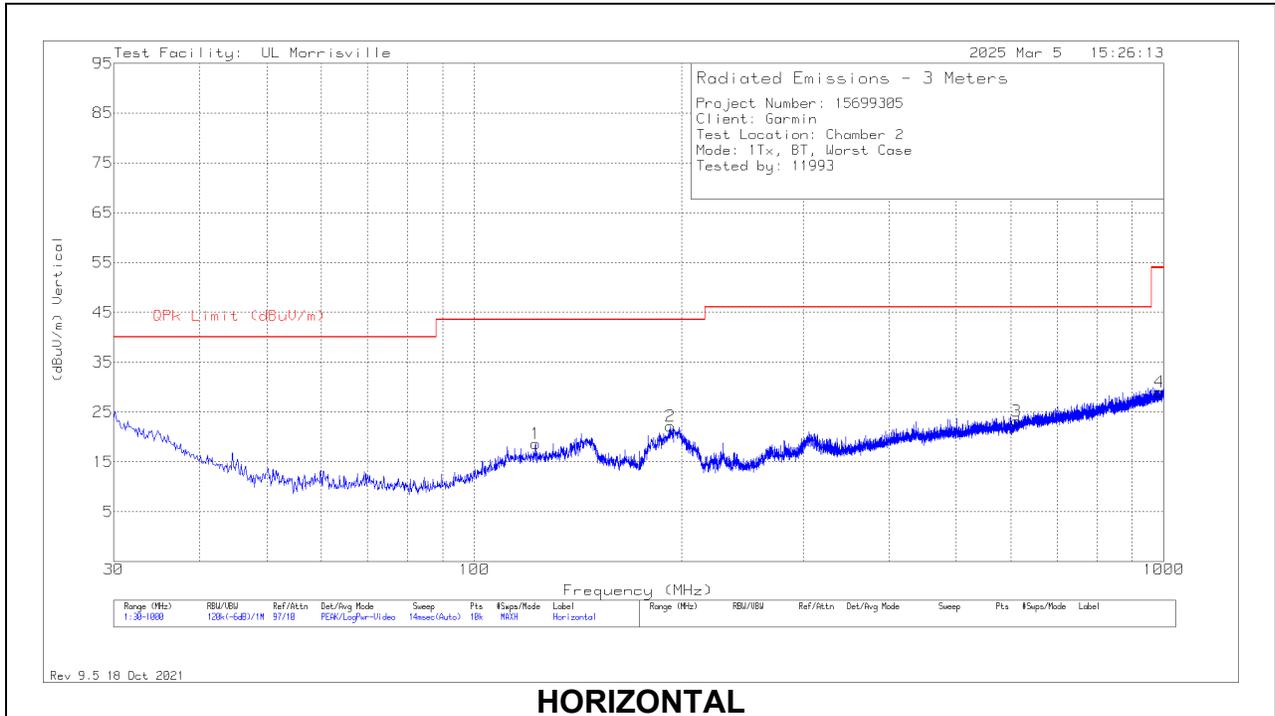


ANTENNA- THREE ORIENTATIONS (H-FIELD)

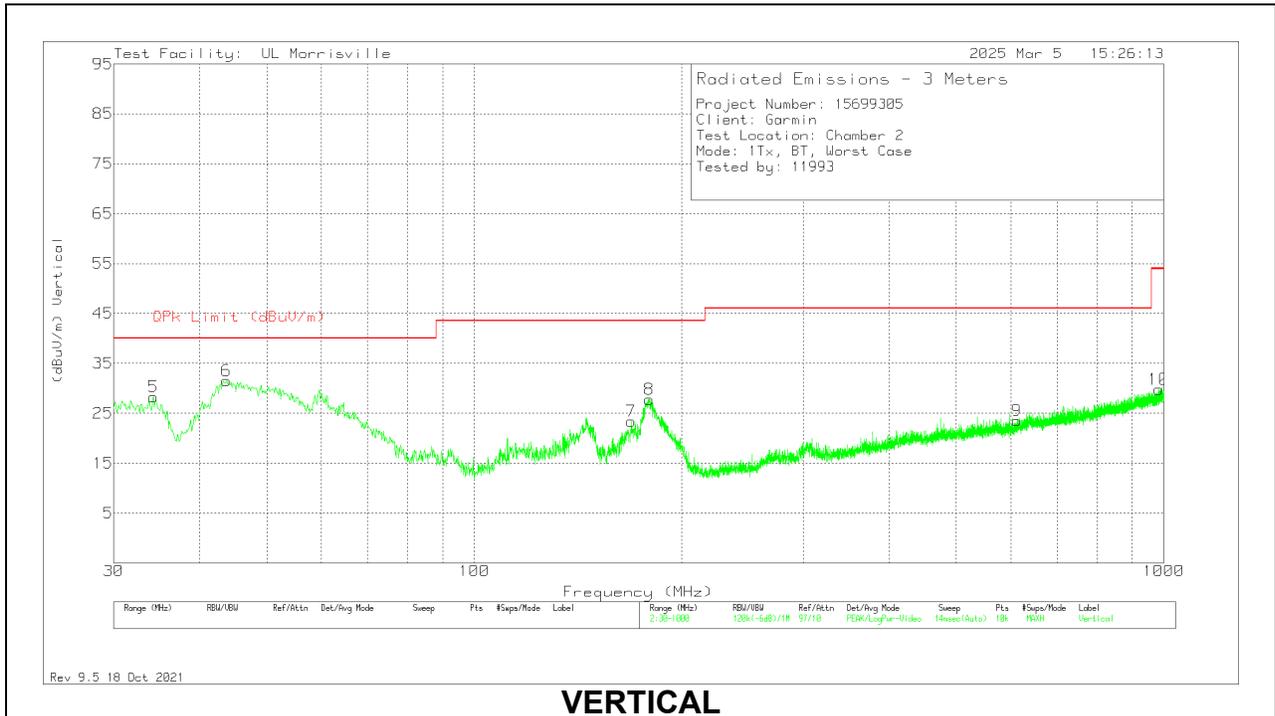
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	135144 (dB/m)	Gain/Loss (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uAmps/meter)	QP/AV Limit (dBuV/m)	PK Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Loop Angle
11	.05657	37.95	Pk	-40.1	.1	-80	-82.05	-18.95	1.05	-63.1	0-360	Flat
1	.06133	37.37	Pk	-40.1	.1	-80	-82.63	-19.65	0.35	-62.98	0-360	0 degs
6	.09157	33.03	Pk	-40.4	.1	-80	-87.27	-23.13	-	-64.14	0-360	90 degs
7	.19463	45.67	Pk	-40.5	.1	-80	-74.73	-29.68	-9.68	-45.05	0-360	90 degs
12	.3676	40.59	Pk	-40.6	.1	-80	-79.91	-35.2	-15.2	-44.71	0-360	Flat
2	.4821	38.06	Pk	-40.5	.1	-80	-82.34	-37.56	-17.56	-44.78	0-360	0 degs
3	.51108	35.28	Pk	-40.5	.1	-40	-45.12	-18.07	-	-27.05	0-360	0 degs
8	.53638	34.86	Pk	-40.5	.1	-40	-45.54	-18.49	-	-27.05	0-360	90 degs
13	.56167	34.83	Pk	-40.5	.1	-40	-45.57	-18.89	-	-26.68	0-360	Flat
4	12.56041	17.65	Pk	-41.6	.6	-40	-63.35	-21.96	-	-41.39	0-360	0 degs
9	13.5596	13.45	Pk	-41.7	.6	-40	-67.65	-21.96	-	-45.69	0-360	90 degs
14	13.5596	21.3	Pk	-41.7	.6	-40	-59.8	-21.96	-	-37.84	0-360	Flat
5	26.53223	15.17	Pk	-43.6	.8	-40	-67.63	-21.96	-	-45.67	0-360	0 degs
10	28.16382	14.21	Pk	-44	.8	-40	-68.99	-21.96	-	-47.03	0-360	90 degs
15	28.56013	17.56	Pk	-44.1	.8	-40	-65.74	-21.96	-	-43.78	0-360	Flat

Pk - Peak detector

10.3. WORST CASE SPURIOUS 30-1000MHZ



HORIZONTAL

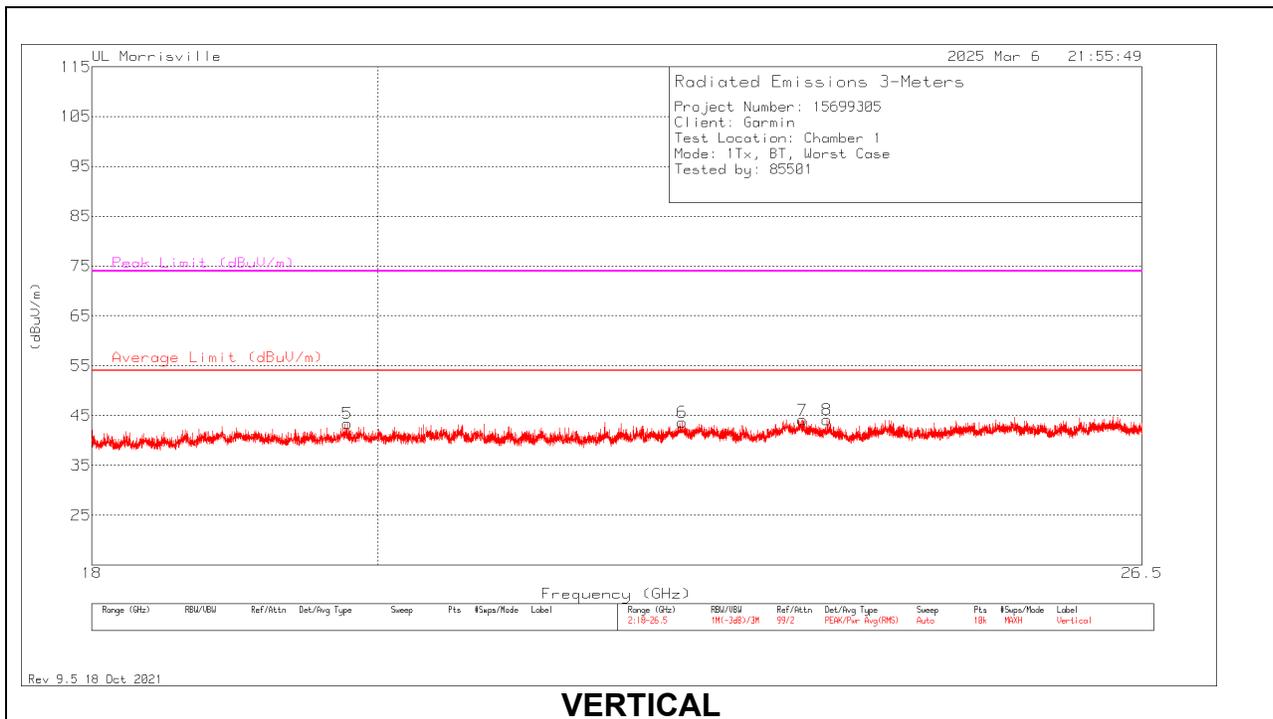
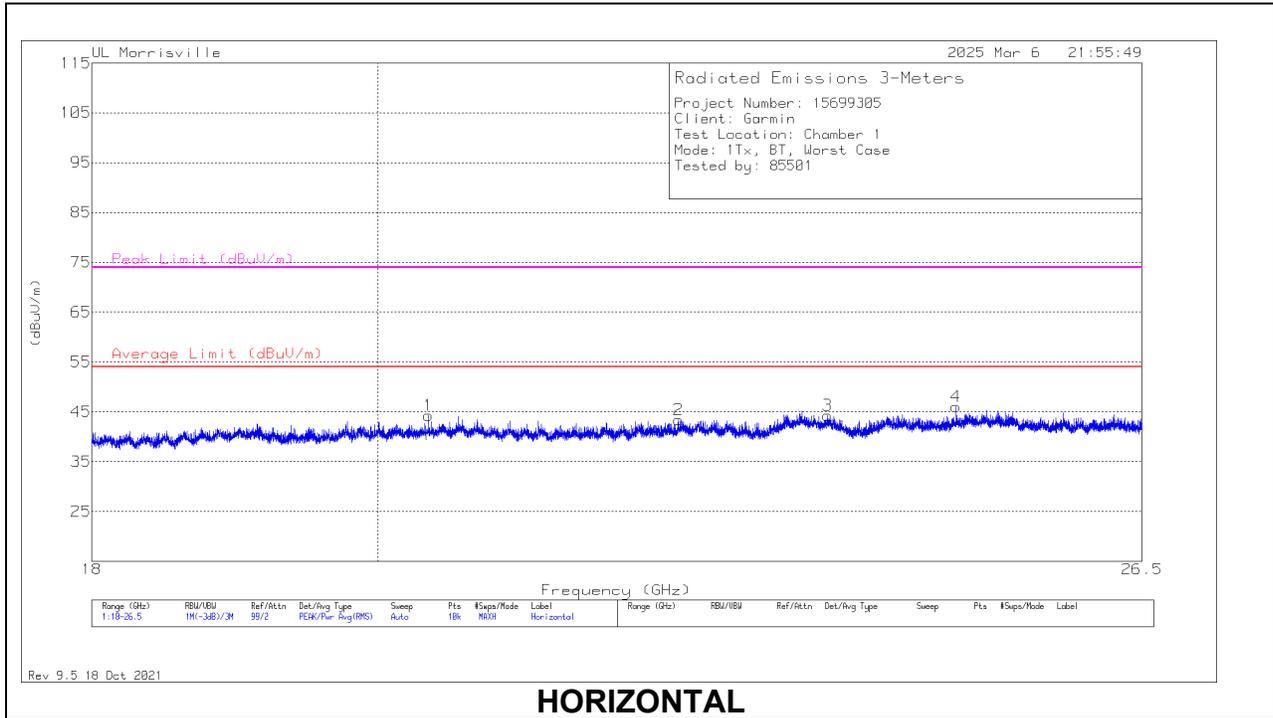


VERTICAL

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	159203 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 122.732	29.02	Pk	20.3	-30.7	18.62	43.52	-24.9	0-360	299	H
3	* ** 611.321	25.72	Pk	25.5	-28.1	23.12	46.02	-22.9	0-360	101	H
4	* ** 984.674	24.36	Pk	29.8	-25.1	29.06	53.97	-24.91	0-360	199	H
7	* ** 169.001	35.44	Pk	18.3	-30.3	23.44	43.52	-20.08	0-360	101	V
9	* ** 612.291	26.12	Pk	25.5	-28.1	23.52	46.02	-22.5	0-360	299	V
10	* ** 983.025	25.06	Pk	29.8	-25.1	29.76	53.97	-24.21	0-360	299	V
5	34.268	35.3	Pk	24.6	-31.6	28.3	-	-	0-360	101	V
6	43.677	45.44	Pk	17.6	-31.5	31.54	-	-	0-360	101	V
8	179.283	40.21	Pk	17.8	-30.2	27.81	-	-	0-360	101	V
2	192.572	34.14	Pk	18	-30	22.14	-	-	0-360	101	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 ** - indicates frequency in Taiwan NCC LP0002 Restricted Band
 Pk - Peak detector

10.4. WORST CASE SPURIOUS 18-26GHz



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	204704 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	*** 20.37551	50.8	Pk	33.6	-40.1	44.3	54	-9.7	74	-29.7	0-360	249	H
2	*** 22.33967	49.41	Pk	34.2	-40.2	43.41	54	-10.59	74	-30.59	0-360	249	H
3	*** 23.60349	49.73	Pk	34.6	-40	44.33	54	-9.67	74	-29.67	0-360	149	H
5	*** 19.77717	50.44	Pk	33.2	-40.2	43.44	54	-10.56	74	-30.56	0-360	300	V
6	*** 22.37281	49.75	Pk	34.1	-40.2	43.65	54	-10.35	74	-30.35	0-360	250	V
7	23.38591	49.5	Pk	34.6	-40	44.1	54	-9.9	74	-29.9	0-360	300	V
8	23.59669	49.56	Pk	34.6	-40	44.16	54	-9.84	74	-29.84	0-360	300	V
4	24.74833	50.35	Pk	35.1	-39.4	46.05	54	-7.95	74	-27.95	0-360	101	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 ** - indicates frequency in Taiwan NCC LP0002 Restricted Band
 Pk - Peak detector

11. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)
RSS-Gen 8.8

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

TEST PROCEDURE

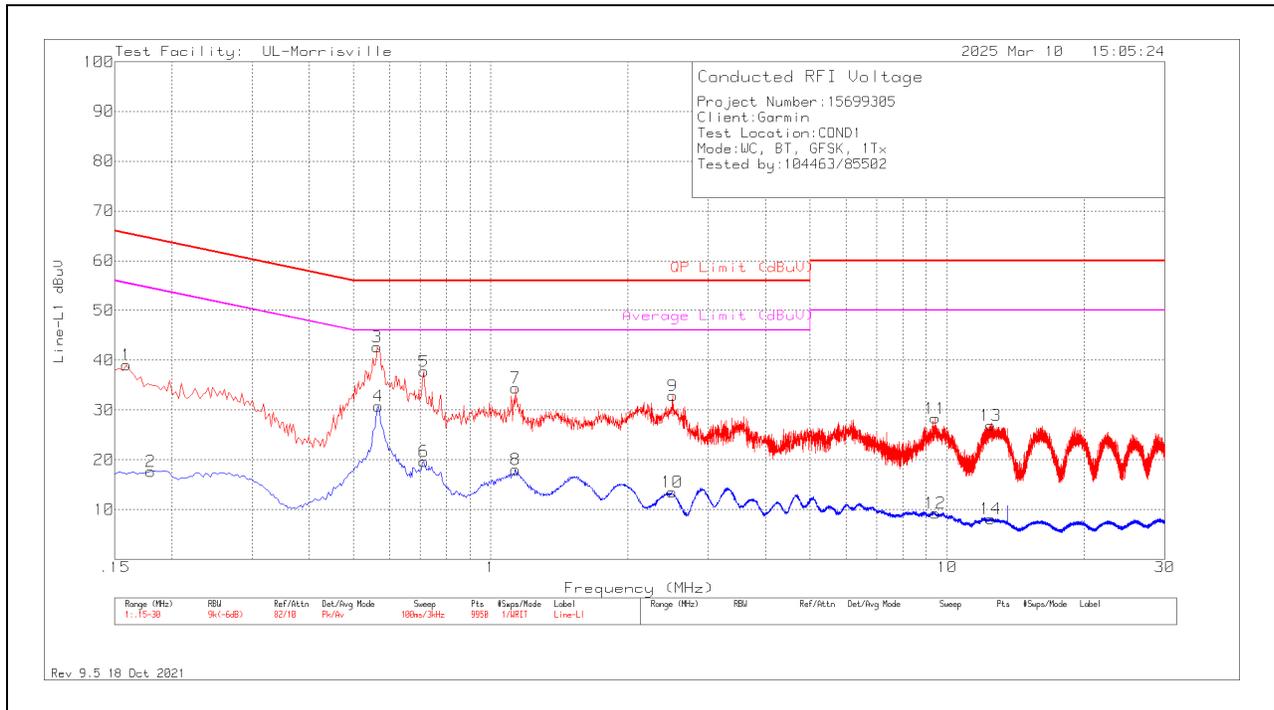
The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10.

The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both lines.

11.1. AC POWER LINE

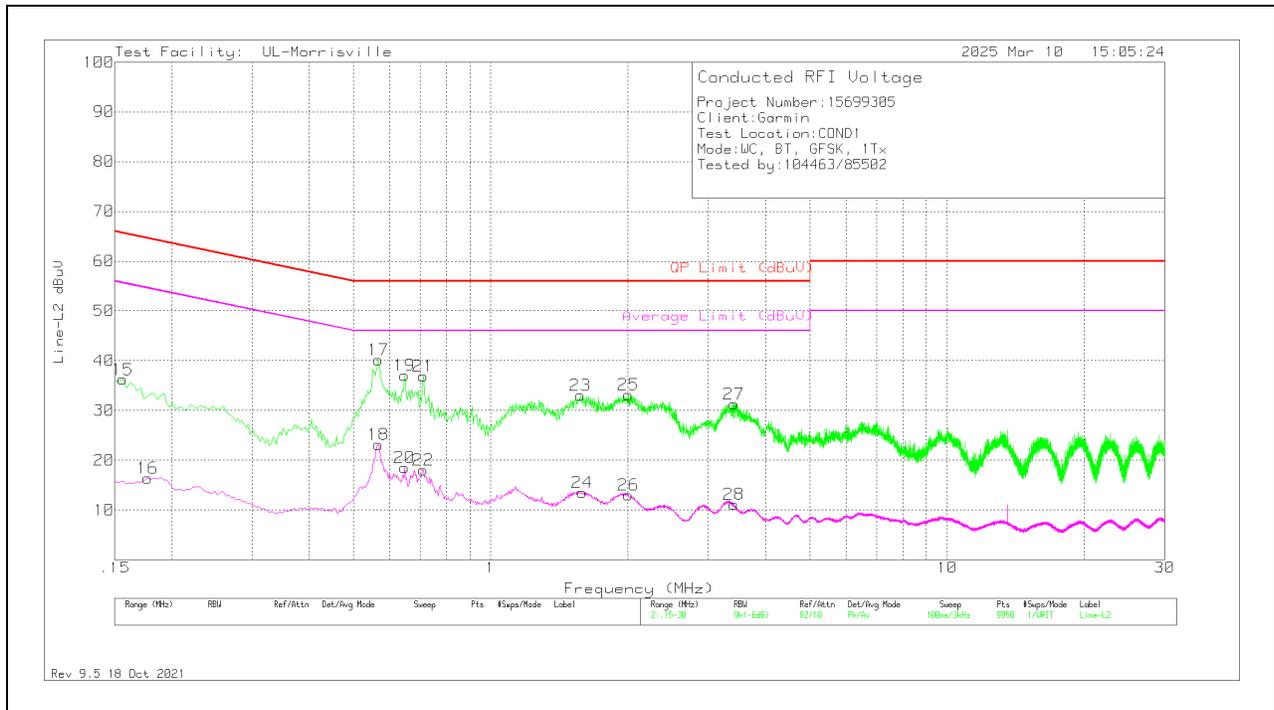
LINE 1 RESULTS



Range 1: Line-L1 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN VDF (dB)	Cbl/Limiter (dB)	Corrected Reading dBuV	QP Limit (dBuV)	Margin (dB)	Average Limit (dBuV)	Margin (dB)
1	.159	29.03	Pk	.2	9.8	39.03	65.52	-26.49	-	-
2	.18	7.61	Av	.2	9.8	17.61	-	-	54.49	-36.88
3	.564	32.85	Pk	0	9.8	42.65	56	-13.35	-	-
4	.567	20.97	Av	0	9.8	30.77	-	-	46	-15.23
5	.714	27.94	Pk	0	9.8	37.74	56	-18.26	-	-
6	.714	9.87	Av	0	9.8	19.67	-	-	46	-26.33
7	1.134	24.59	Pk	0	9.8	34.39	56	-21.61	-	-
8	1.134	8.24	Av	0	9.8	18.04	-	-	46	-27.96
10	2.499	3.76	Av	0	9.8	13.56	-	-	46	-32.44
9	2.502	23.06	Pk	0	9.8	32.86	56	-23.14	-	-
12	9.411	-.81	Av	.1	10	9.29	-	-	50	-40.71
11	9.435	18.24	Pk	.1	10	28.34	60	-31.66	-	-
14	12.453	-1.94	Av	.1	10	8.16	-	-	50	-41.84
13	12.456	16.86	Pk	.1	10	26.96	60	-33.04	-	-

Pk - Peak detector
 Av - Average detection

LINE 2 RESULTS



Range 2: Line-L2 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN VDF (dB)	Cbl/Limiter (dB)	Corrected Reading dBuV	QP Limit (dBuV)	Margin (dB)	Average Limit (dBuV)	Margin (dB)
15	.156	26.23	Pk	.2	9.8	36.23	65.67	-29.44	-	-
16	.177	6.42	Av	.2	9.8	16.42	-	-	54.63	-38.21
17	.567	30.4	Pk	0	9.8	40.2	56	-15.8	-	-
18	.567	13.33	Av	0	9.8	23.13	-	-	46	-22.87
19	.648	27.26	Pk	0	9.8	37.06	56	-18.94	-	-
20	.648	8.73	Av	0	9.8	18.53	-	-	46	-27.47
21	.711	27.1	Pk	0	9.8	36.9	56	-19.1	-	-
22	.711	8.24	Av	0	9.8	18.04	-	-	46	-27.96
23	1.572	23.19	Pk	0	9.8	32.99	56	-23.01	-	-
24	1.587	3.7	Av	0	9.8	13.5	-	-	46	-32.5
25	2.001	23.39	Pk	0	9.8	33.19	56	-22.81	-	-
26	2.001	3.18	Av	0	9.8	12.98	-	-	46	-33.02
28	3.411	1.3	Av	0	9.8	11.1	-	-	46	-34.9
27	3.414	21.49	Pk	0	9.8	31.29	56	-24.71	-	-

Pk - Peak detector
 Av - Average detection

12. SETUP PHOTOS

Please refer to R15699305-EP1 for setup photos.

END OF TEST REPORT