TEST REPORT

Report Number: R15191165-E10

Applicant	:	Garmin International Inc. 1200 East 151St Street Olathe, KS 66062-3426, USA
Model	:	A04413
FCC ID	:	IPH-04413
IC	:	1792A-04413
EUT Description	:	Wearable Smart Watch
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:
2024-07-03

Prepared by:
UL LLC
12 Laboratory Dr.
Research Triangle Park, NC 27709 U.S.A.
TEL: (919) 549-1400

ACCREDITED
CERT #0751.06

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	2024-05-01	Initial Issue	B. Kiewra
V2	2024-05-06	Revised antenna gain	B. Kiewra
V3	2024-05-13	Updated Section 9.4 and 9.5 Output Power	Charles Moody
V4	2024-07-03	Revised firmware revision	Charles Moody

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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: Wearable Smart Watch

MODEL: A04413

SERIAL NUMBER: 3467745434, 3467745272

SAMPLE RECEIPT DATE: 2024-03-13

DATE TESTED: 2024-03-19 to 2024-04-03

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

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:

Michael Antola
Staff Engineer
Consumer, Medical and IT Segment
UL LLC

Prepared By:

Brian Kiewra
Project Engineer
Consumer, Medical and IT Segment
UL LLC

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)
2) Worst-case data rates (see section 6.5)

FCC Clause	ISED Clause	Requirement	Result	Comment
See Comment		Duty Cycle	Reporting purposes only	ANSI C63.10 Section 11.6.
-	RSS-GEN 6.7	99% OBW	Reporting purposes only	ANSI C63.10 Section 6.9.3.
15.247 (a) (2)	RSS-247 5.2 (a)	6dB BW	Compliant	None
15.247 (b) (3)	RSS-247 5.4 (d)	Output Power		
See Comment		Average power	Reporting purposes only	Per ANSI C63.10, Section 11.9.2.3.2.
15.247 (e)	RSS-247 5.2 (b)	PSD	Compliant	None
15.247 (d)	RSS-247 5.5	Conducted Spurious Emissions		
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
☐	Building: 12 Laboratory Dr RTP, NC 27709, U.S.A	US0067	2180C	825374
☒	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 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 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 dBuV + 0 dB +10.1 dB+ 0 dB = 46.6 dBuV

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6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

The EUT is a smartwatch with BT, BLE, ANT+, 802.11b/g/n 2.4GHz WLAN, NFC, and Global Navigation Satellite System (GNSS) receiver. This report covers testing on BLE radio.

6.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402-2480	BLE 1Mbps	4.64	2.91
2402-2480	BLE 2Mbps	4.50	2.82

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	2350-2530	-2.63

6.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was revision 8.00.

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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 with highest 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. Radiated emissions performed on the mode with the highest power.

The fundamental of the EUT was investigated in three orthogonal axes, X, Y, and Z. Worst-case orientation was determined to be the Y-axis. Therefore all testing was performed with the EUT in the Y-axis.

Data rates supported by the EUT are 1 (2402-2480MHz) and 2Mbps (2404-2478MHz).

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**
USB-A power supply	Bose	S008AHU0500160	072381Z60770055AE	NA

I/O CABLES

I/O Cable List						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	Proprietary	1	4 pin Proprietary	Non-Shielded	<3m	Used for charging only

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 R15191165-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 - Wireless Conducted Measurement Equipment

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
90410	Spectrum Analyzer	Keysight Technologies	N9030A	2023-06-14	2024-06-14
90778	RF Power Meter	Keysight Technologies	N1911A	2023-10-06	2024-10-31
135125	Peak and Avg Power Sensor, 50MHz to 18GHz	Keysight Technologies	N1921A	2023-08-21	2024-08-21
238710	Environmental Meter	Fisher Scientific	15-077-963	2023-06-27	2024-06-27
SOFTEMI	Antenna Port Software	UL	Version 2022.8.16		
Power Software	Boonton Power Analyzer	Boonton	Version 3.0.13.0		
ETSI Power Software	EMPower ETSI Burst Measurement System	ETS-Lindgren	Version 1.0.3.18		
211055	Real-Time Peak Power Sensor 50MHz to 8GHz	Boonton	RTP5000	2023-08-01	2024-08-01

Test Equipment Used - Wireless Conducted Attenuators, Cables, and Couplers

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
Attenuators					
226563	SMA Coaxial 10dB Attenuator 25MHz-18GHz	CentricRF	C18S2-10	2024-02-29	2025-02-29
Cables					
CBL093	Micro-Coax UTiFLEX Cable Assembly, Low Loss,40Ghz	Carlisle Interconnect Technologies	UFA147A-2-0360-200200	2024-03-01	2025-03-01

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

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
CBL087	Coax cable, RG223, N-male to BNC-male, 20-ft.	Pasternack	PE3W06143-240	2023-04-04	2024-04-04
179892	Environmental Meter	Fisher Scientific	15-077-963	2023-07-26	2024-06-31
80391	LISN, 50-ohm/50-uH, 250uH 2-conductor, 25A	Fischer Custom Com.	FCC-LISN-50/250-25-2-01	2023-07-31	2024-07-31
75141	EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESCI 7	2023-08-01	2024-08-01
52859	Transient Limiter, 0.009-100MHz	Electro-Metrics	EM-7600	2023-04-04	2024-04-04
PS214	AC Power Source	Elgar	CW2501M	NA	NA
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		

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

Equipment 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					
135999	Gain-loss string: 18-40GHz	Various	Various	2023-05-16	2024-05-16
Receiver & Software					
81018	Spectrum Analyzer	Agilent	E4446A	2023-08-01	2024-08-01
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 2)

Equipment ID	Description	Manufacturer/Brand	Model Number	Last Cal.	Next Cal.
0.009-30MHz					
135144	Active Loop Antenna	ETS-Lindgren	6502	2024-01-24	2025-01-24
30-1000 MHz					
159203	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2024-03-05	2026-03-05
1-18 GHz					
86408	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2023-06-19	2025-06-19
Gain-Loss Chains					
91975	Gain-loss string: 0.009-30MHz	Various	Various	2023-06-06	2024-06-06
91978	Gain-loss string: 25-1000MHz	Various	Various	2023-06-06	2024-06-06
91977	Gain-loss string: 1-18GHz	Various	Various	2023-06-06	2024-06-06
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

8. MEASUREMENT METHOD

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

6 dB BW: ANSI C63.10-2020 Subclause -11.8.2

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

Output Power: ANSI C63.10-2020 Subclause -11.9.1.2 Method PKPM1 Peak-reading power meter
ANSI C63.10-2020 Subclause -11.9.2.3.2 Method AVGPM-G (Measurement using a gated RF average-reading power meter)

PSD: ANSI C63.10-2020 Subclause -11.10.2 Method PKPSD (peak PSD)

Conducted emissions non-restricted frequency bands: ANSI C63.10-2020 Subclause -11.11 and 6.10.4

Radiated emissions restricted frequency bands: ANSI C63.10-2020 Subclause -11.12.1 and 6.10.5, 6.3 to 6.6.

AC Power-line conducted emissions: ANSI C63.10-2020, Section 6.2.

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9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

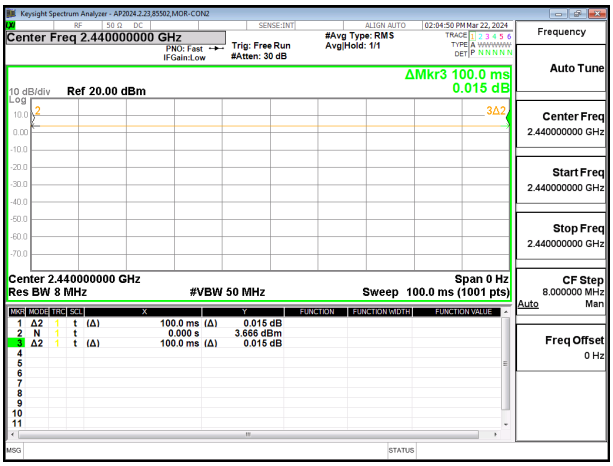
LIMITS

None; for reporting purposes only.

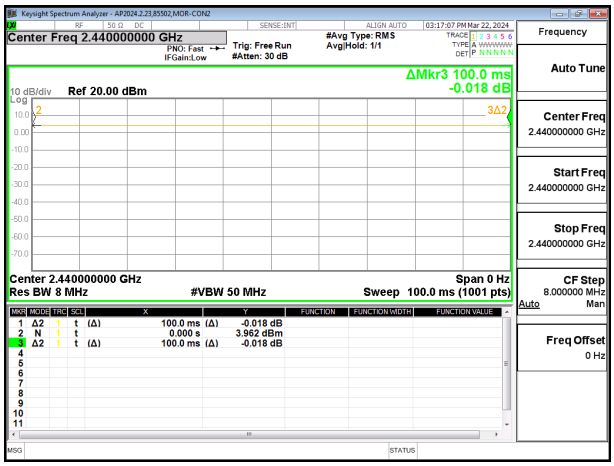
PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

Mode	ON Time B (ms)	Period (ms)	Duty Cycle x (linear)	Duty Cycle (%)	Voltage Duty Cycle Correction Factor (dB)	RMS Duty Cycle Correction Factor (dB)
BLE 1Mbps	100.00	100.00	1.000	100.00	0.00	0.00
BLE 2Mbps	100.00	100.00	1.000	100.00	0.00	0.00



DUTY CYCLE BLE 1Mbps MODE



DUTY CYCLE BLE 1Mbps MODE

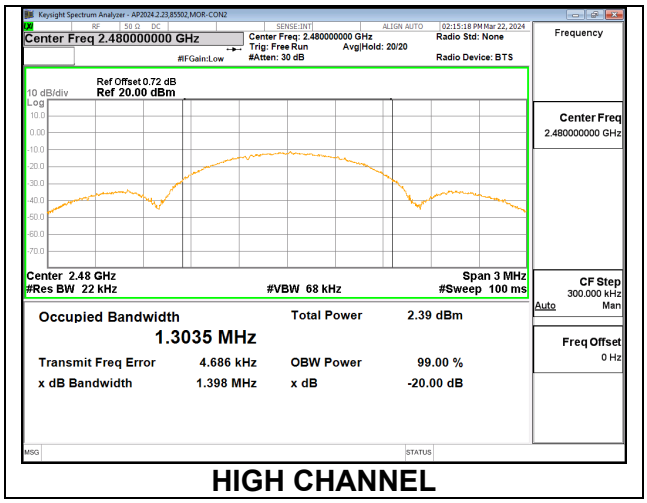
9.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

9.2.1. BLE 1Mbps MODE

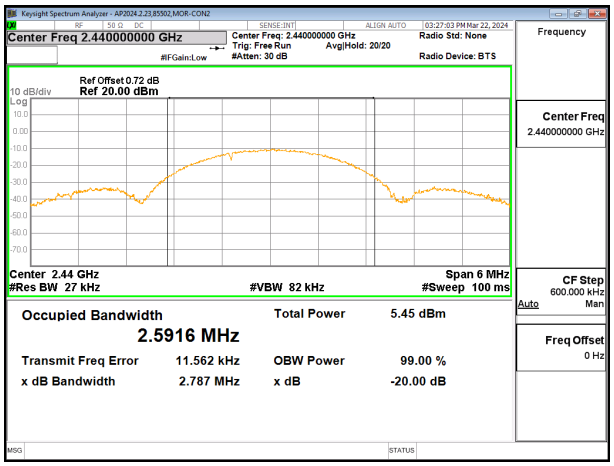
Channel	Frequency (MHz)	99% OBW (MHz)
Low	2402	1.2757
Low	2404	1.2656
Mid	2440	1.2807
High	2478	1.3032
High	2480	1.3035



HIGH CHANNEL

9.2.2. BLE 2Mbps MODE

Channel	Frequency (MHz)	99% OBW (MHz)
Low	2404	2.4423
Mid	2440	2.5916
High	2478	2.5306



MID CHANNEL

9.3. 6 dB BANDWIDTH

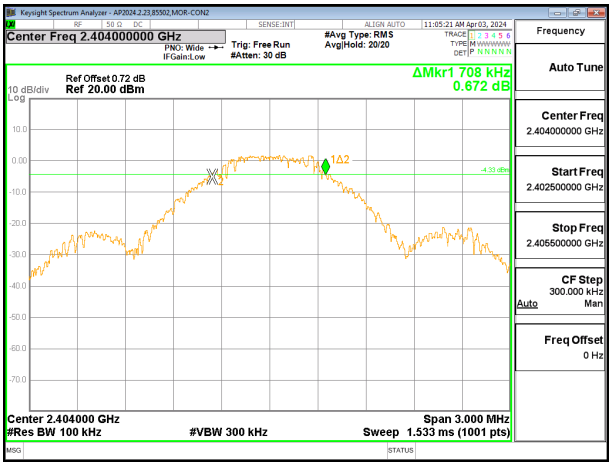
LIMITS

FCC §15.247 (a) (2)
RSS-247 5.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

9.3.1. BLE 1Mbps MODE

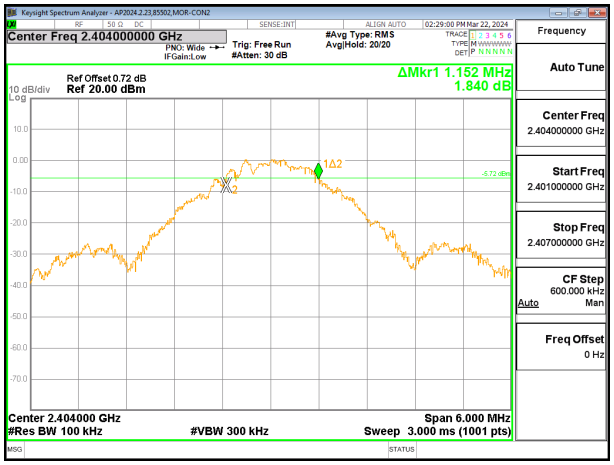
Channel	Frequency (MHz)	6 dB BW (MHz)	Minimum Limit (MHz)
Low	2402	0.744	0.5
Low	2404	0.708	0.5
Mid	2440	0.780	0.5
High	2478	0.798	0.5
High	2480	0.807	0.5



LOW CHANNEL

9.3.2. BLE 2Mbps MODE

Channel	Frequency (MHz)	6 dB BW (MHz)	Minimum Limit (MHz)
Low	2404	1.152	0.5
Mid	2440	1.602	0.5
High	2478	1.440	0.5



LOW CHANNEL

9.4. OUTPUT POWER

LIMITS

FCC §15.247 (b) (3)
RSS-247 5.4 (d)

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 0.72dB (including 0.72 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.

DIRECTIONAL ANTENNA GAIN

For 1Tx, directional gain equals antenna gain.

RESULTS

9.4.1. BLE 1Mbps MODE

Test Engineer:	85502
Test Date:	2024-03-20

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	Max Power (dBm)
Low	2402	-3.08	30.00	30.00
Low	2404	-3.08	30.00	30.00
Mid	2440	-3.08	30.00	30.00
High	2476	-3.08	30.00	30.00
High	2478	-3.08	30.00	30.00
High	2480	-3.08	30.00	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2402	0.35	30.00	-29.65
Low	2404	3.71	30.00	-26.29
Mid	2440	4.55	30.00	-25.45
High	2476	4.64	30.00	-25.36
High	2478	1.34	30.00	-28.66
High	2480	1.33	30.00	-28.67

9.4.2. BLE 2Mbps MODE

Test Engineer:	85502
Test Date:	2024-03-20

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	Max Power (dBm)
Low	2404	-3.08	30.00	30.00
Mid	2440	-3.08	30.00	30.00
High	2476	-3.08	30.00	30.00
High	2478	-3.08	30.00	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2404	3.93	30.00	-26.07
Mid	2440	4.26	30.00	-25.74
High	2476	4.50	30.00	-25.50
High	2478	1.42	30.00	-28.58

9.5. AVERAGE POWER

LIMITS

None; for reporting purposes only

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 0.72dB (including 0.72 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.

9.5.1. BLE 1Mbps MODE

Test Engineer:	85502
Test Date:	2024-03-20

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)
Low	2402	0.09
Low	2404	3.52
Mid	2440	4.12
High	2476	4.41
High	2478	1.13
High	2480	1.10

9.5.2. BLE 2Mbps MODE

Test Engineer:	85502
Test Date:	2024-03-20

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)
Low	2404	3.70
Mid	2440	4.01
High	2476	4.27
High	2478	1.22

9.6. POWER SPECTRAL DENSITY

LIMITS

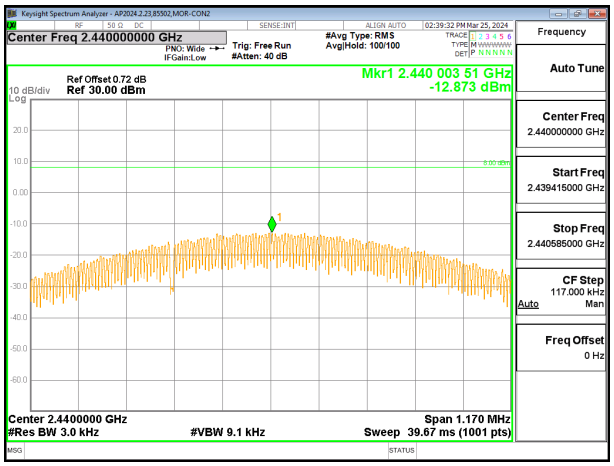
FCC §15.247 (e)
RSS-247 (5.2) (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

9.6.1. BLE 1Mbps MODE

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low	2402	-16.91	8.0	-24.9
Low	2404	-13.25	8.0	-21.2
Mid	2440	-12.87	8.0	-20.9
High	2478	-17.49	8.0	-25.5
High	2480	-16.11	8.0	-24.1

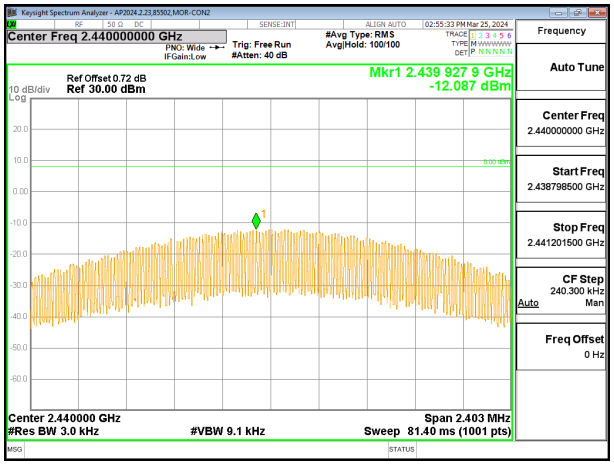


MID CHANNEL

9.6.2. BLE 2Mbps MODE

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low	2404	-12.65	8.0	-20.7
Mid	2440	-12.09	8.0	-20.1
High	2478	-17.21	8.0	-25.2



MID CHANNEL

9.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)
RSS-247 5.5

Output power was measured based on the use of peak measurement, therefore the required attenuation is -20 dBc.

RESULTS

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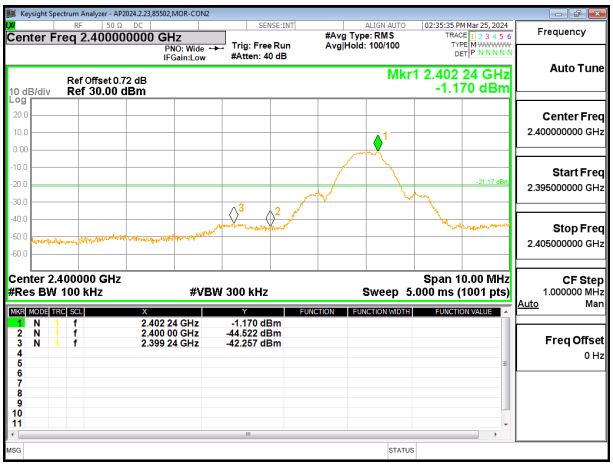
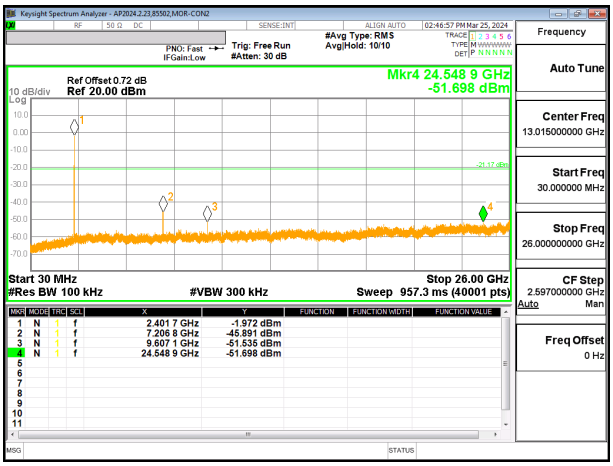
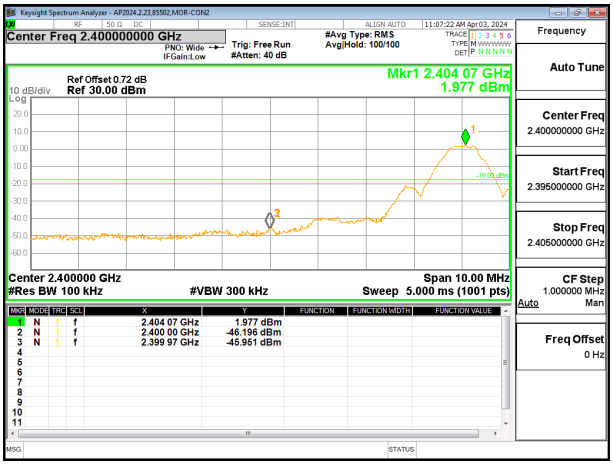
9.7.1. BLE 1Mbps MODE



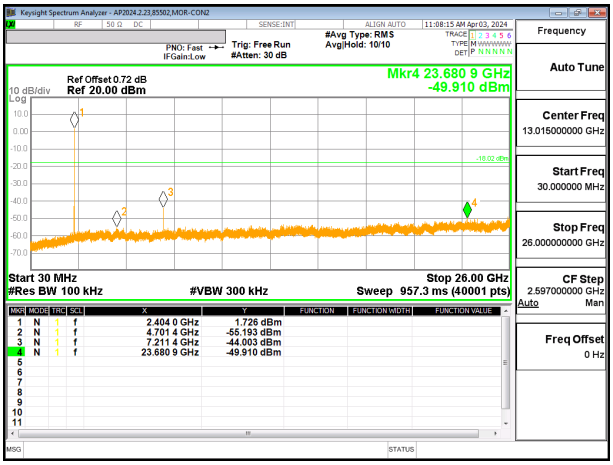
LOW CHANNEL



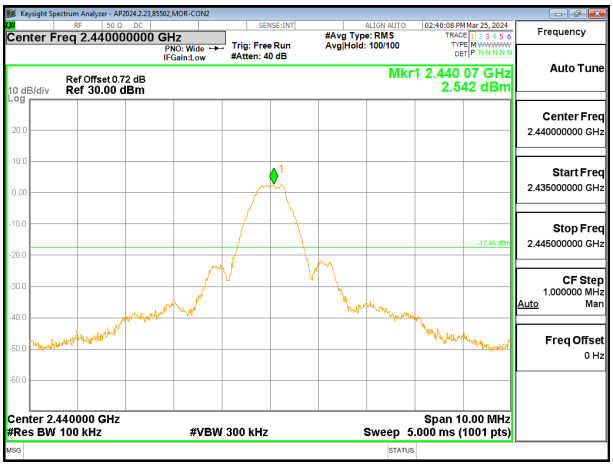
LOW CHANNEL



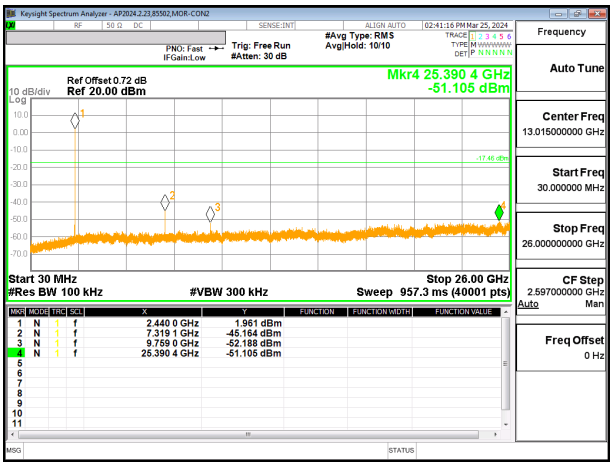
LOW CHANNEL



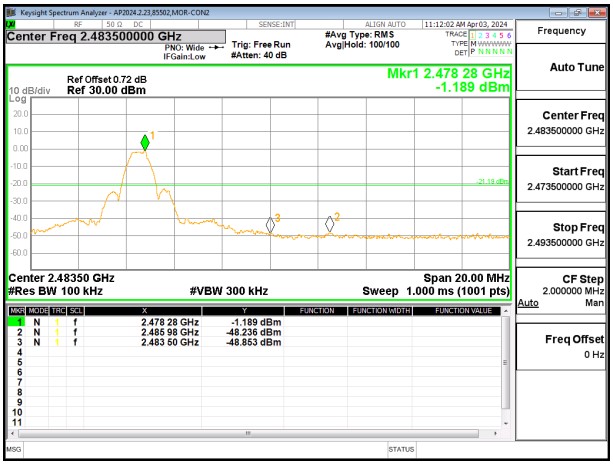
LOW CHANNEL



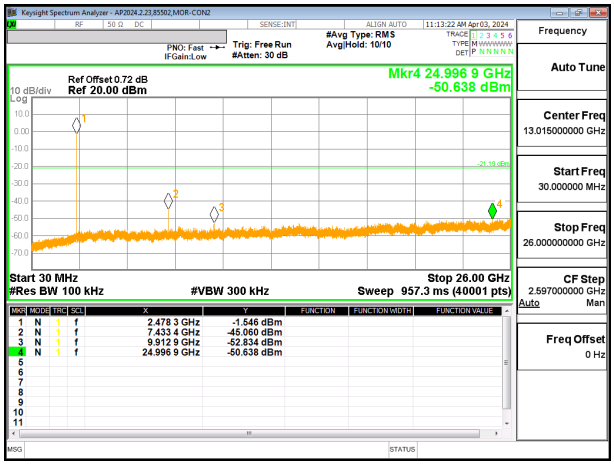
MID CHANNEL



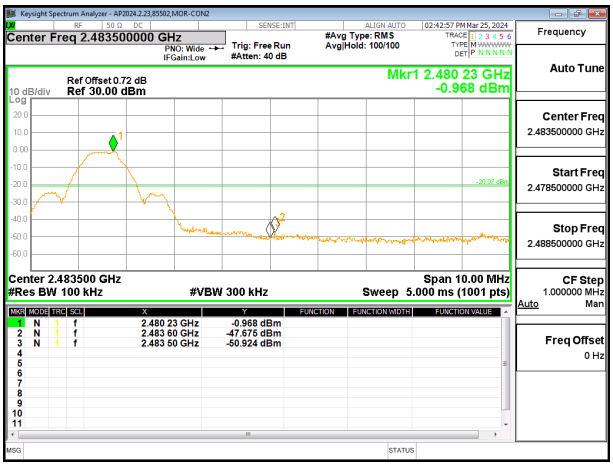
MID CHANNEL



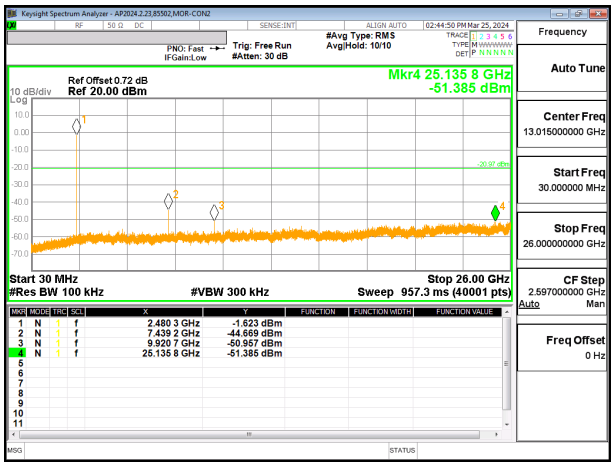
HIGH CHANNEL



HIGH CHANNEL

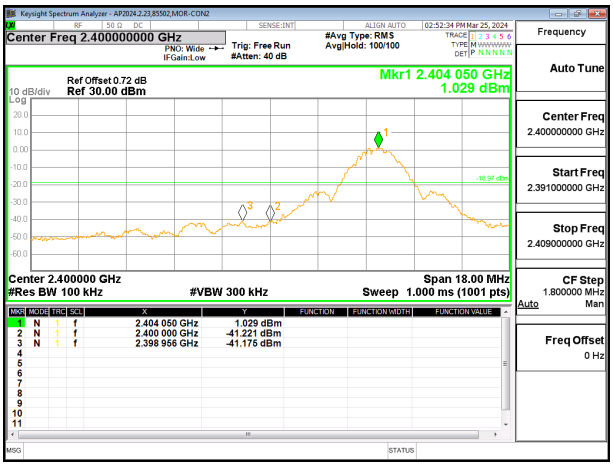


HIGH CHANNEL

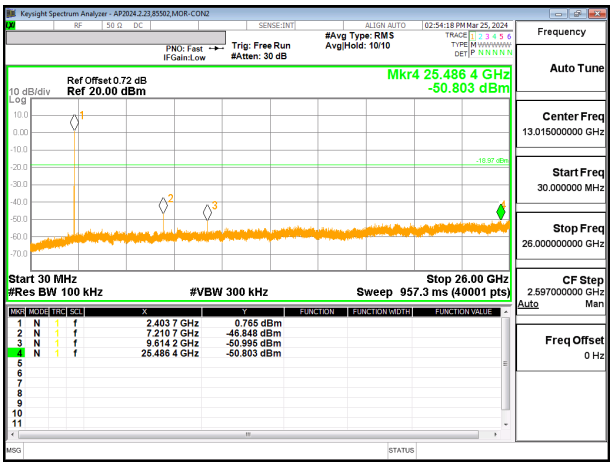


HIGH CHANNEL

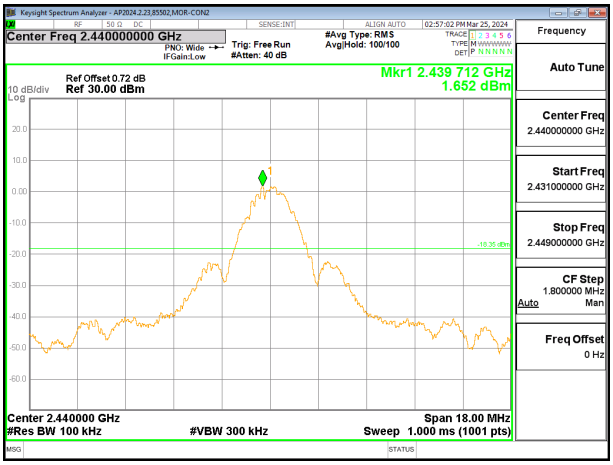
9.7.2. BLE 2Mbps MODE



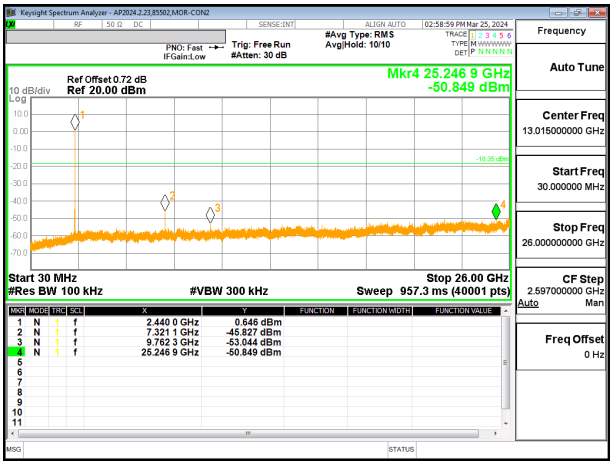
LOW CHANNEL



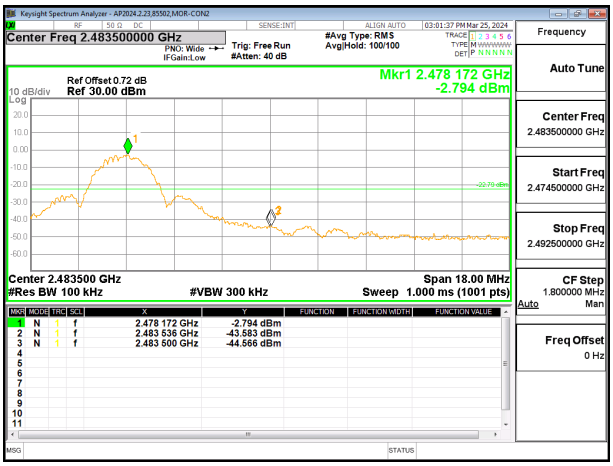
LOW CHANNEL



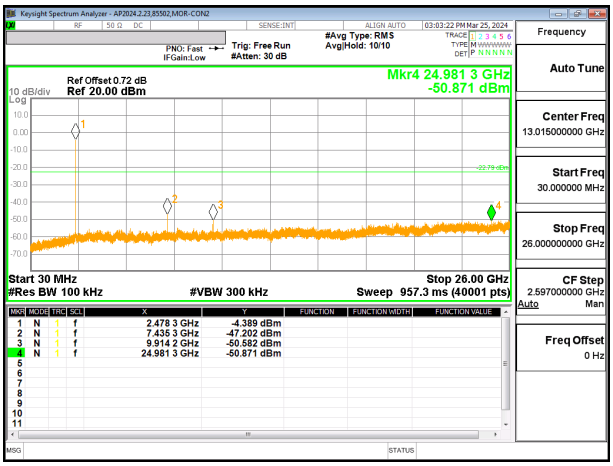
MID CHANNEL



MID CHANNEL



HIGH CHANNEL



HIGH CHANNEL

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 and as applicable for voltage 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.

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

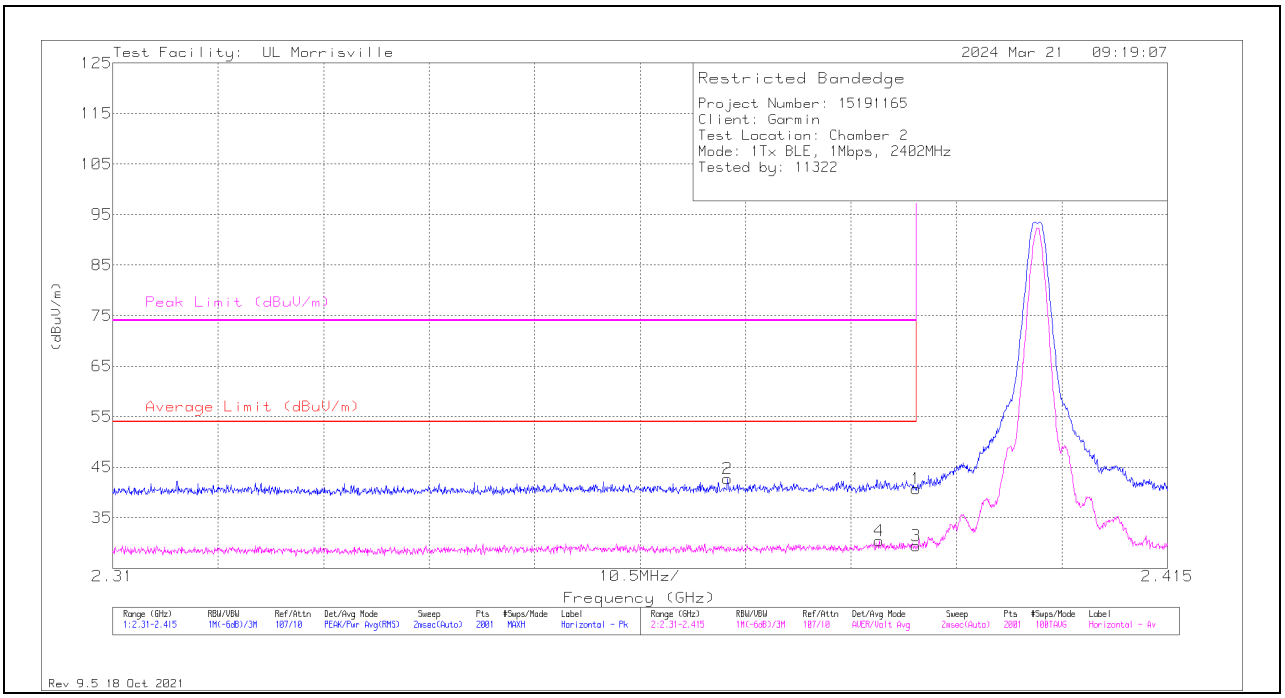
OFS and chamber correlation testing had been performed and chamber measured test result is the worst-case test result.

10.1. TRANSMITTER ABOVE 1 GHz

10.1.1. TX ABOVE 1 GHz BLE 1Mbps MODE IN THE 2.4 GHz BAND

BANDEDGE (LOW CHANNEL, 2402MHz)

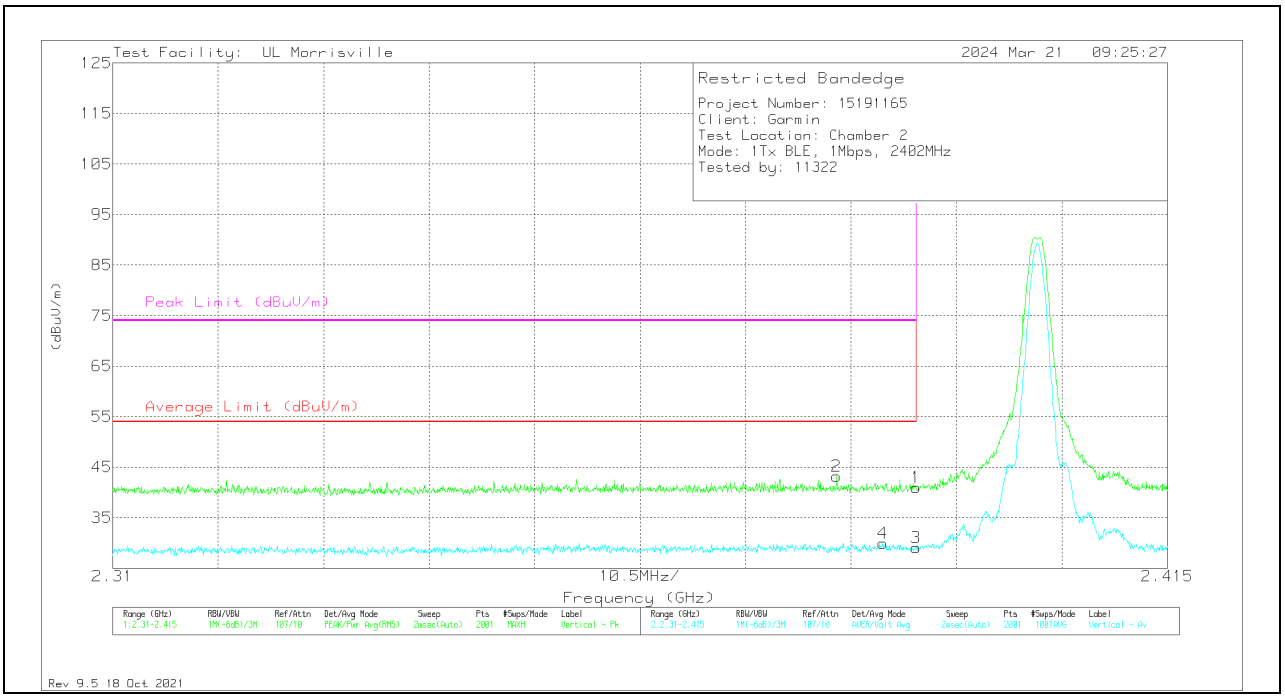
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	86408 (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	32.66	Pk	32.3	-24.2	40.76	-	-	74	-33.24	213	234	H
2	* ** 2.37122	34.59	Pk	32.2	-24.1	42.69	-	-	74	-31.31	213	234	H
3	* ** 2.38996	21.3	ADV	32.3	-24.2	29.4	54	-24.6	-	-	213	234	H
4	* ** 2.38628	22.42	ADV	32.2	-24.2	30.42	54	-23.58	-	-	213	234	H

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

VERTICAL RESULT

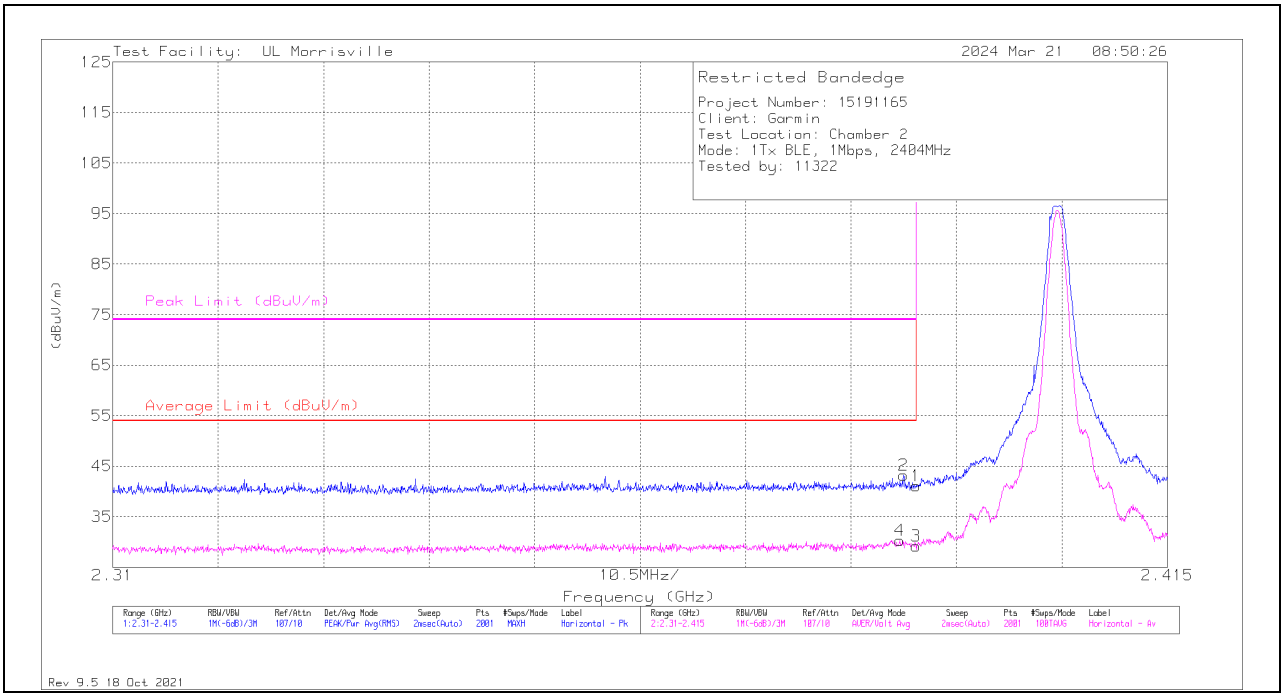


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	86408 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.38996	32.83	Pk	32.3	-24.2	40.93	-	-	74	-33.07	160	274	V
2	* ** 2.38208	35.18	Pk	32.2	-24.2	43.18	-	-	74	-30.82	160	274	V
3	* ** 2.38996	20.98	ADV	32.3	-24.2	29.08	54	-24.92	-	-	160	274	V
4	* ** 2.38665	21.98	ADV	32.2	-24.2	29.98	54	-24.02	-	-	160	274	V

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

BANDEDGE (LOW CHANNEL, 2404MHz)

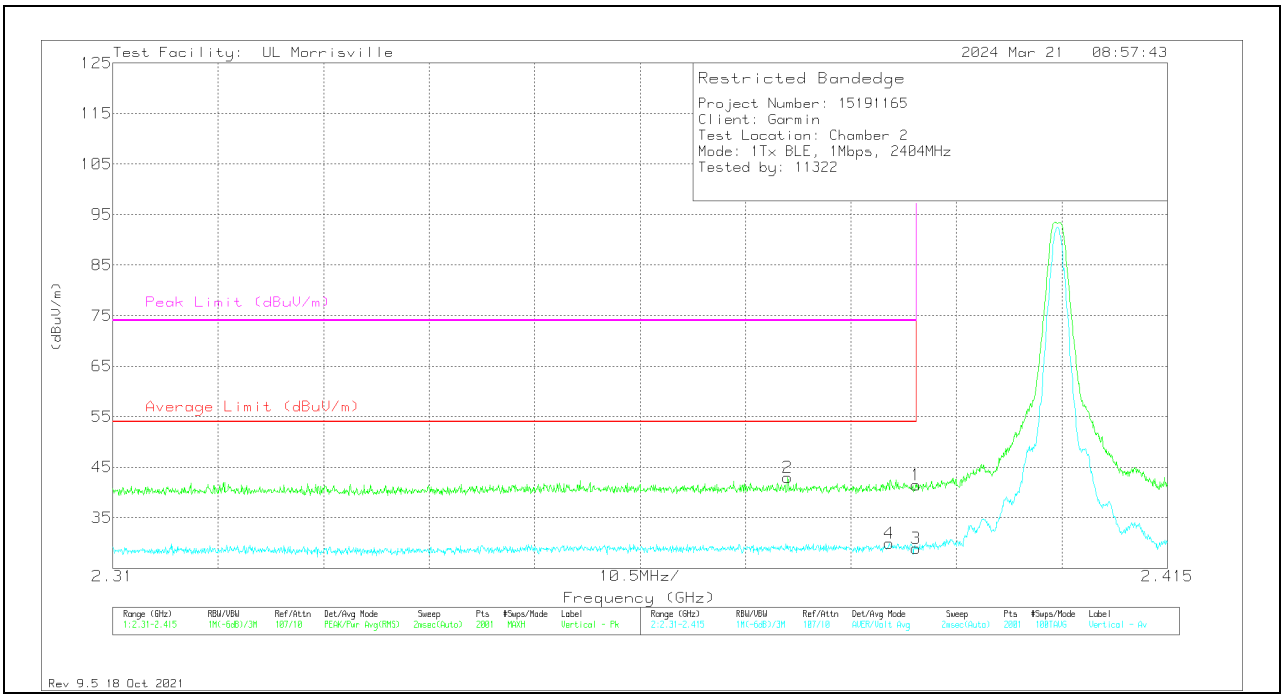
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	86408 (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	33.04	Pk	32.3	-24.2	41.14	-	-	74	-32.86	214	237	H
2	* ** 2.38875	35.07	Pk	32.3	-24.2	43.17	-	-	74	-30.83	214	237	H
3	* ** 2.38996	21.06	ADV	32.3	-24.2	29.16	54	-24.84	-	-	214	237	H
4	* ** 2.38838	22.2	ADV	32.3	-24.2	30.3	54	-23.7	-	-	214	237	H

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

VERTICAL RESULT

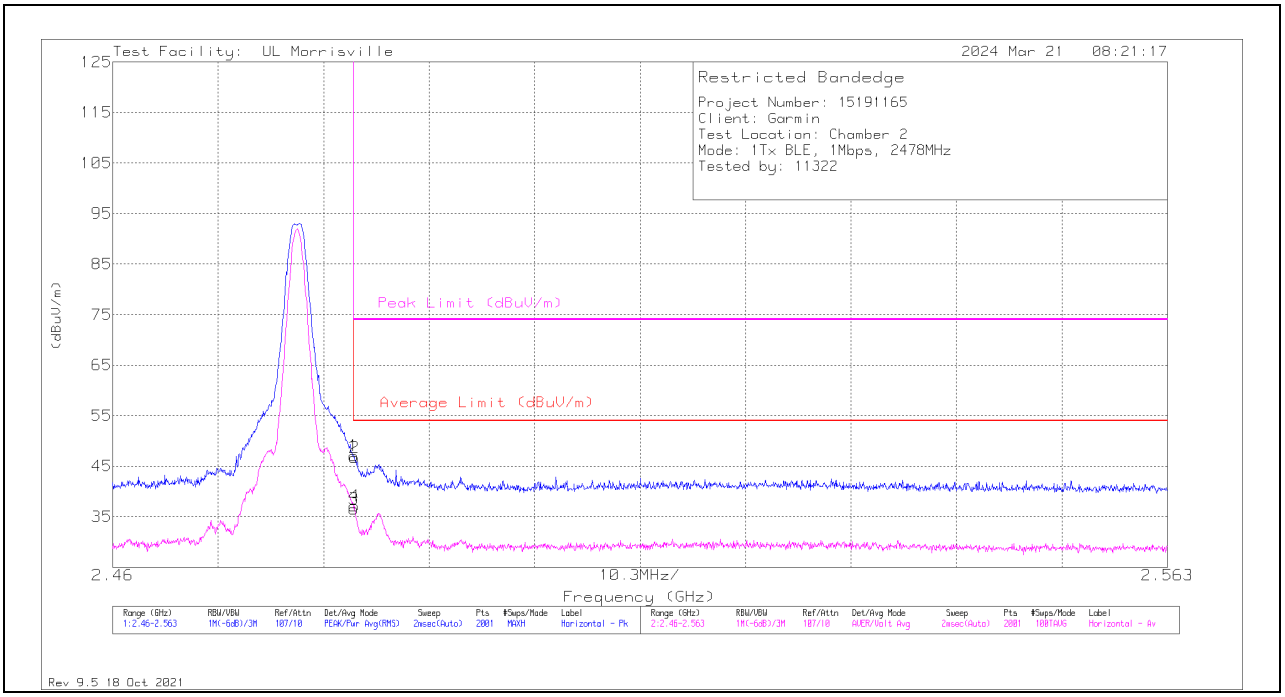


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	86408 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.38996	33.38	Pk	32.3	-24.2	41.48	-	-	74	-32.52	163	224	V
2	* ** 2.3772	34.9	Pk	32.2	-24.1	43	-	-	74	-31	163	224	V
3	* ** 2.38996	20.8	ADV	32.3	-24.2	28.9	54	-25.1	-	-	163	224	V
4	* ** 2.38728	21.96	ADV	32.2	-24.2	29.96	54	-24.04	-	-	163	224	V

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

BANDEDGE (HIGH CHANNEL, 2478MHz)

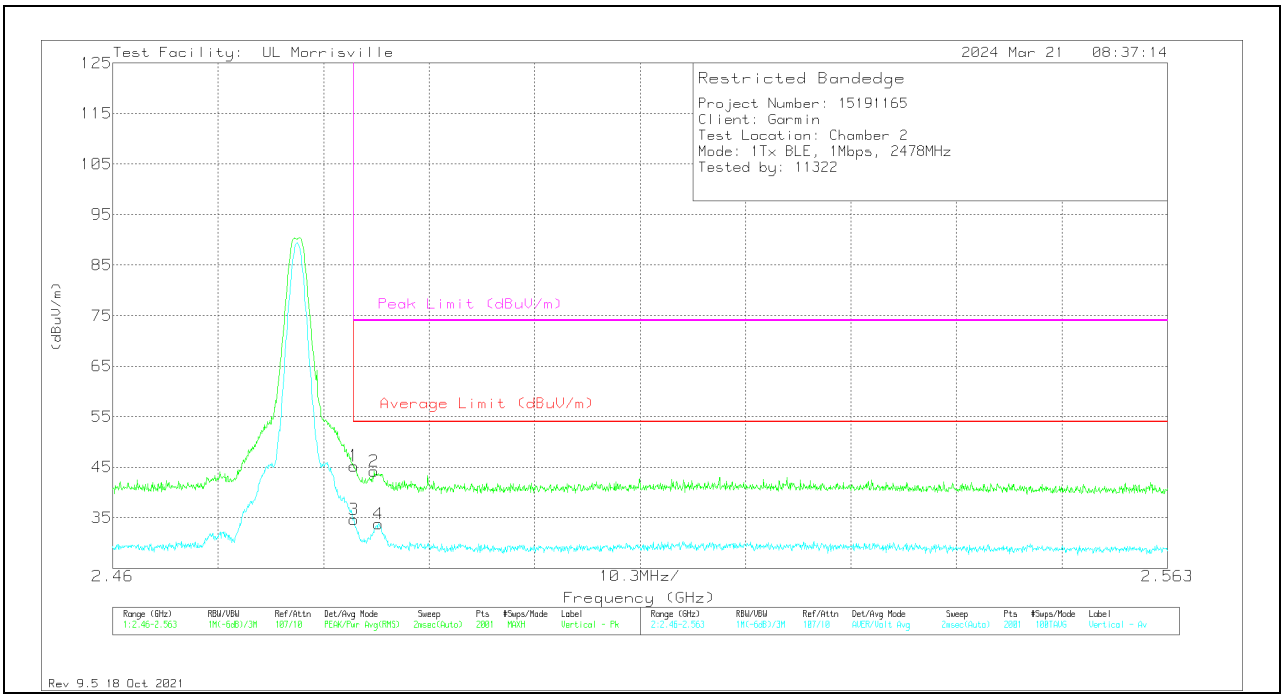
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	86408 (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	39.09	Pk	32.5	-24.5	47.09	-	-	74	-26.91	215	131	H
2	* ** 2.48364	38.69	Pk	32.5	-24.5	46.69	-	-	74	-27.31	215	131	H
3	* ** 2.48354	28.55	ADV	32.5	-24.5	36.55	54	-17.45	-	-	215	131	H
4	* ** 2.48359	29.18	ADV	32.5	-24.5	37.18	54	-16.82	-	-	215	131	H

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

VERTICAL RESULT

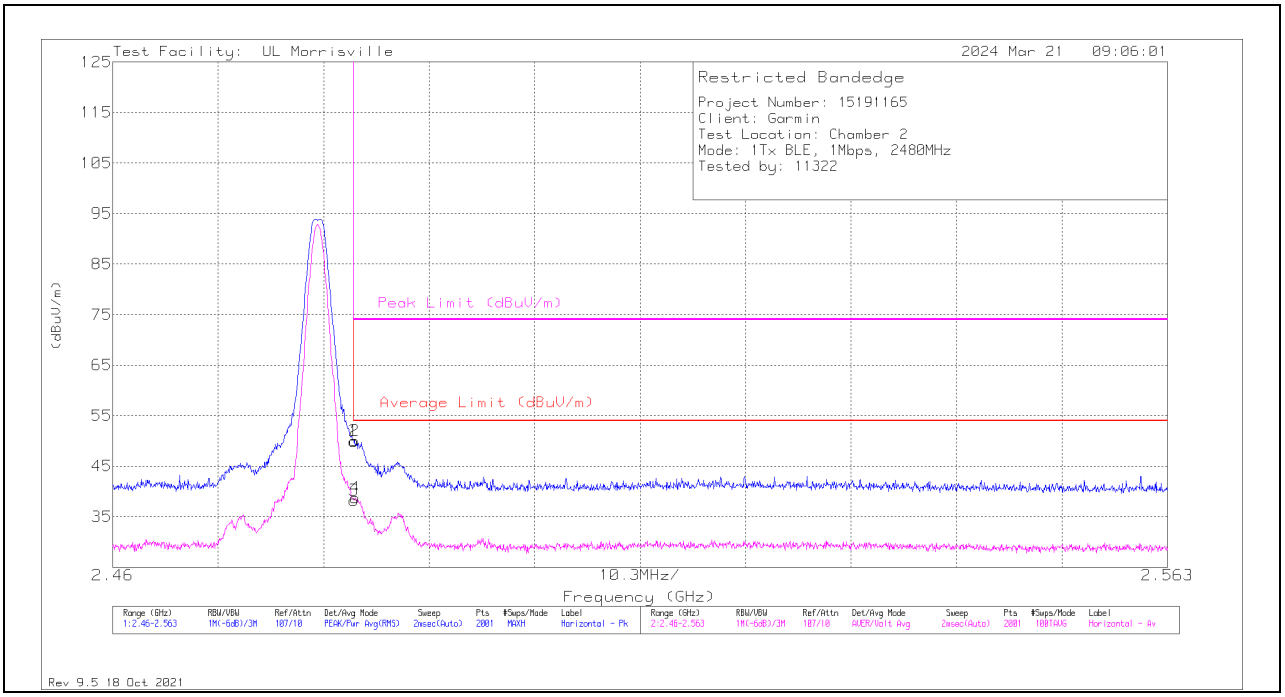


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	86408 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.48354	37.26	Pk	32.5	-24.5	45.26	-	-	74	-28.74	149	106	V
2	* ** 2.48554	36.17	Pk	32.5	-24.5	44.17	-	-	74	-29.83	149	106	V
3	* ** 2.48354	26.62	ADV	32.5	-24.5	34.62	54	-19.38	-	-	149	106	V
4	* ** 2.48596	25.93	ADV	32.5	-24.6	33.83	54	-20.17	-	-	149	106	V

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

BANDEDGE (HIGH CHANNEL, 2480MHz)

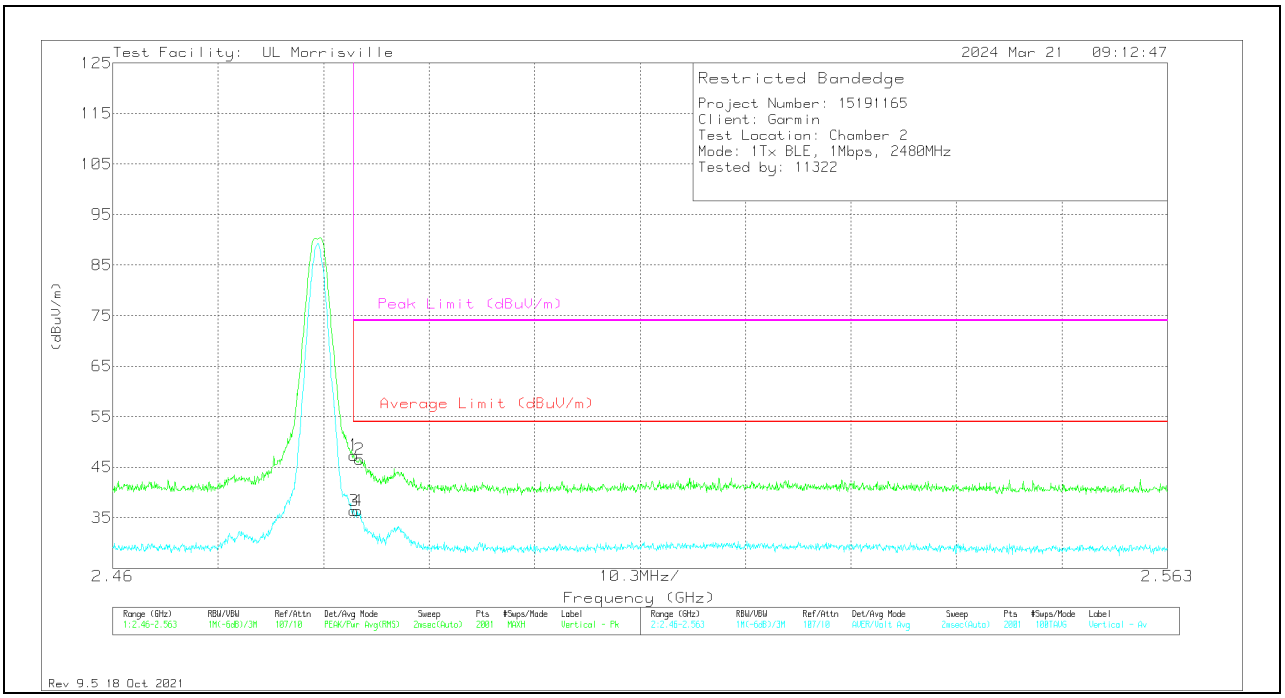
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	86408 (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	41.88	Pk	32.5	-24.5	49.88	-	-	74	-24.12	212	167	H
2	* ** 2.48364	41.99	Pk	32.5	-24.5	49.99	-	-	74	-24.01	212	167	H
3	* ** 2.48354	30.27	ADV	32.5	-24.5	38.27	54	-15.73	-	-	212	167	H
4	* ** 2.48369	30.73	ADV	32.5	-24.5	38.73	54	-15.27	-	-	212	167	H

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

VERTICAL RESULT

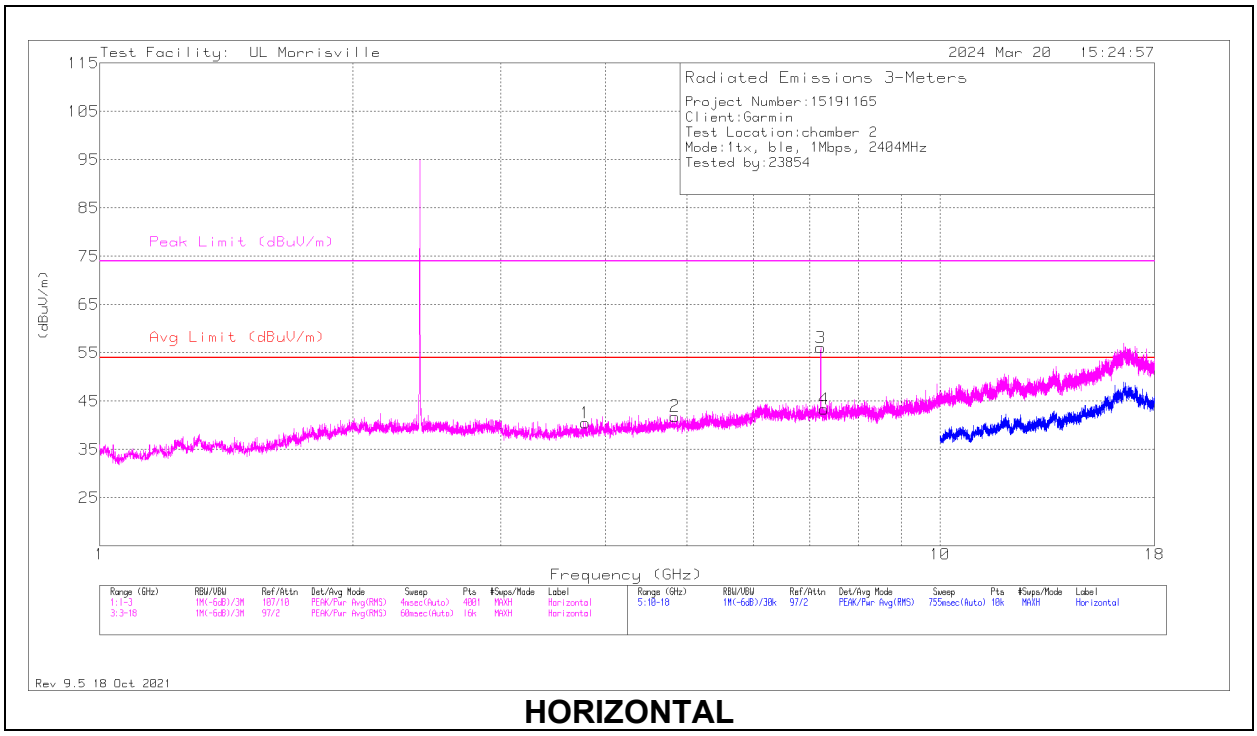


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	86408 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.48354	39.37	Pk	32.5	-24.5	47.37	-	-	74	-26.63	174	136	V
2	* ** 2.4841	38.54	Pk	32.5	-24.5	46.54	-	-	74	-27.46	174	136	V
3	* ** 2.48354	28.42	ADV	32.5	-24.5	36.42	54	-17.58	-	-	174	135	V
4	* ** 2.4839	28.44	ADV	32.5	-24.5	36.44	54	-17.56	-	-	174	135	V

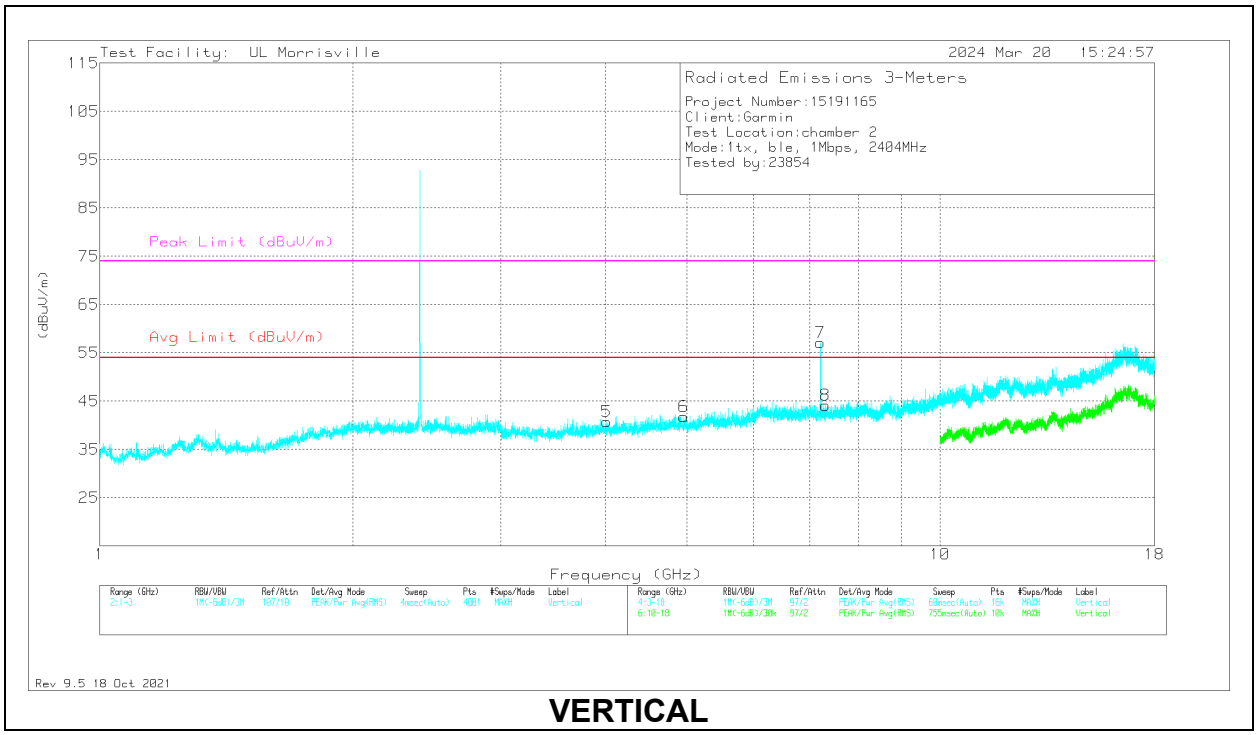
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
Pk - Peak detector
ADV - Linear Voltage Average

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL



HORIZONTAL

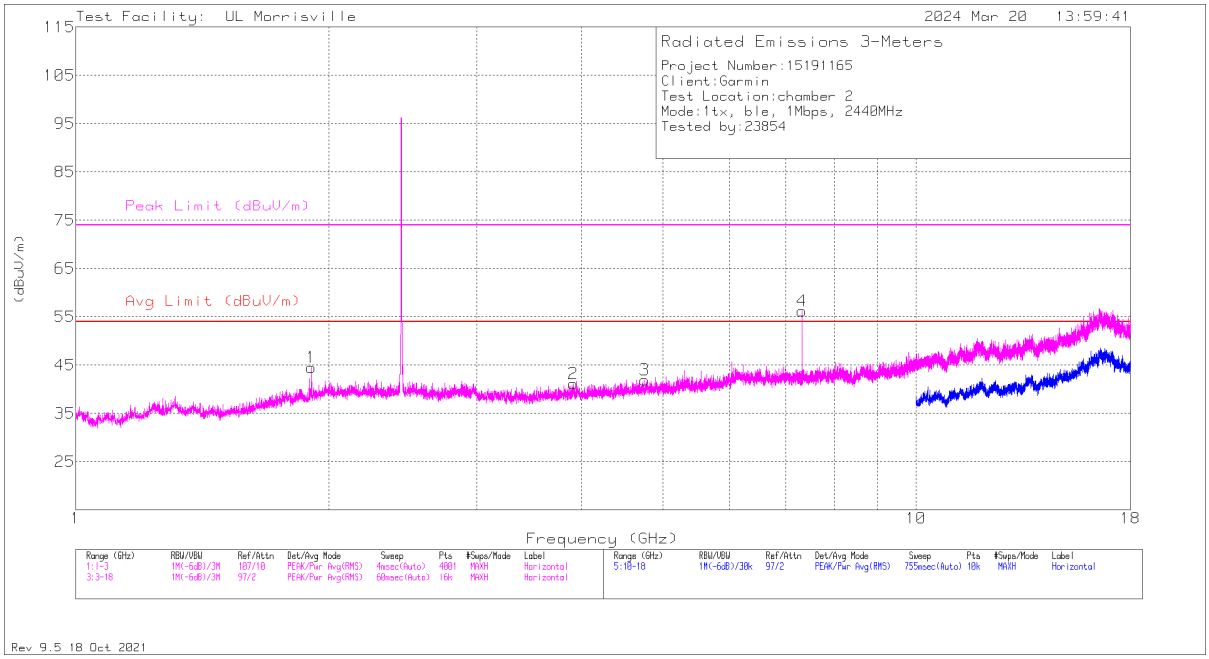


VERTICAL

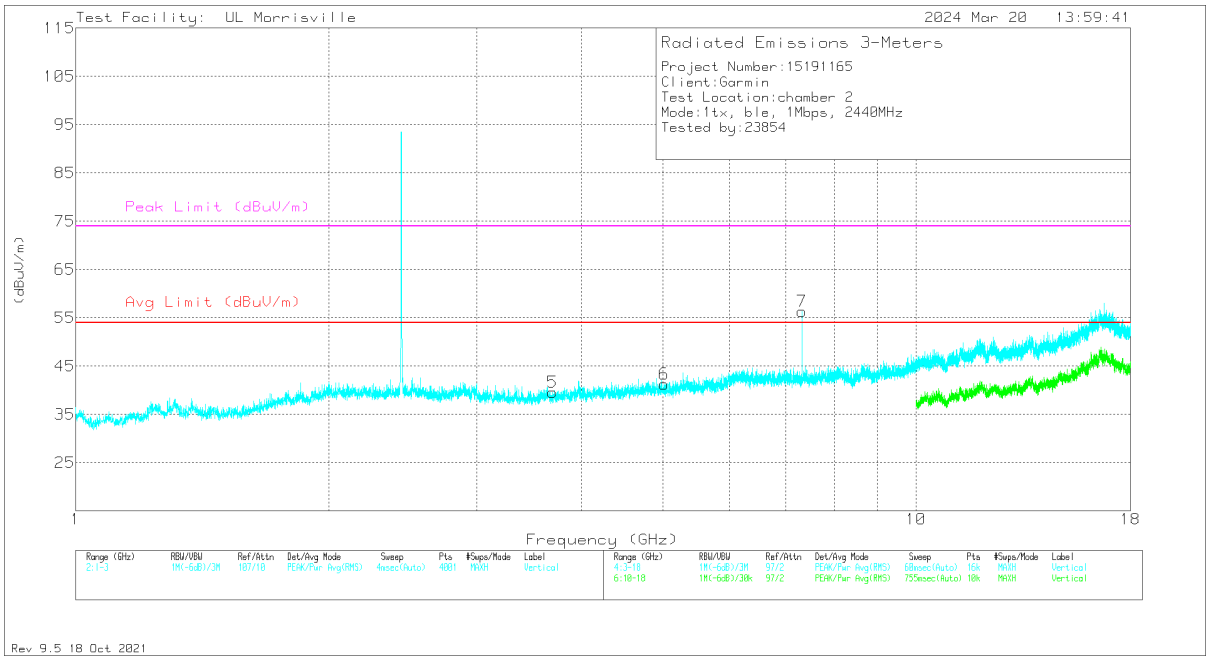
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	86408 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 3.78469	39.39	Pk	33.3	-32.2	40.49	54	-13.51	74	-33.51	0-360	199	H
2	* ** 4.8375	38.27	Pk	34.1	-30.5	41.87	54	-12.13	74	-32.13	0-360	101	H
4	* ** 7.28063	34.76	Pk	35.6	-27	43.36	54	-10.64	74	-30.64	0-360	101	H
5	* ** 4.0125	38.8	Pk	33.4	-31.4	40.8	54	-13.2	74	-33.2	0-360	200	V
6	* ** 4.95281	37.88	Pk	34	-30.1	41.78	54	-12.22	74	-32.22	0-360	200	V
8	* ** 7.30219	35.45	Pk	35.6	-26.9	44.15	54	-9.85	74	-29.85	0-360	101	V
7	7.21125	48.62	Pk	35.6	-27.1	57.12	-	-	-	-	0-360	101	V
3	7.21219	47.55	Pk	35.6	-27.1	56.05	-	-	-	-	0-360	199	H

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

MID CHANNEL



HORIZONTAL



VERTICAL

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	86408 (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	** 1.9085	36.1	Pk	31	-22.6	44.5	54	-9.5	74	-29.5	0-360	101	H
2	* ** 3.90844	39.1	Pk	33.4	-31.3	41.2	54	-12.8	74	-32.8	0-360	200	H
3	* ** 4.75406	38.36	Pk	34.2	-30.6	41.96	54	-12.04	74	-32.04	0-360	101	H
4	* ** 7.3208	49.14	PK2	35.6	-26.7	58.04	-	-	74	-15.96	215	148	H
	* ** 7.32059	43.93	ADV	35.6	-26.7	52.83	54	-1.17	-	-	215	148	H
5	* ** 3.69656	38.54	Pk	33.1	-32.1	39.54	54	-14.46	74	-34.46	0-360	101	V
6	* ** 5.01188	37.86	Pk	34	-30.6	41.26	54	-12.74	74	-32.74	0-360	101	V
7	* ** 7.32076	49.23	PK2	35.6	-26.7	58.13	-	-	74	-15.87	323	114	V
	* ** 7.32059	44.11	ADV	35.6	-26.7	53.01	54	-.99	-	-	323	114	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
Pk - Peak detector
PK2 - Maximum Peak
ADV - Linear Voltage Average

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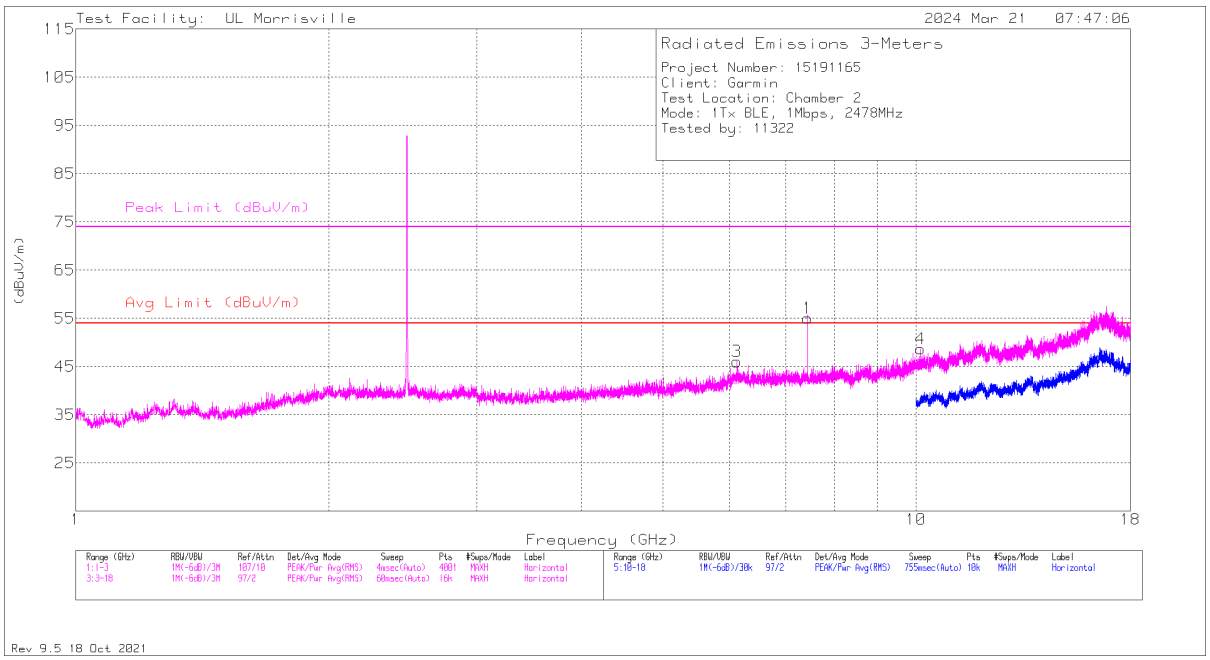
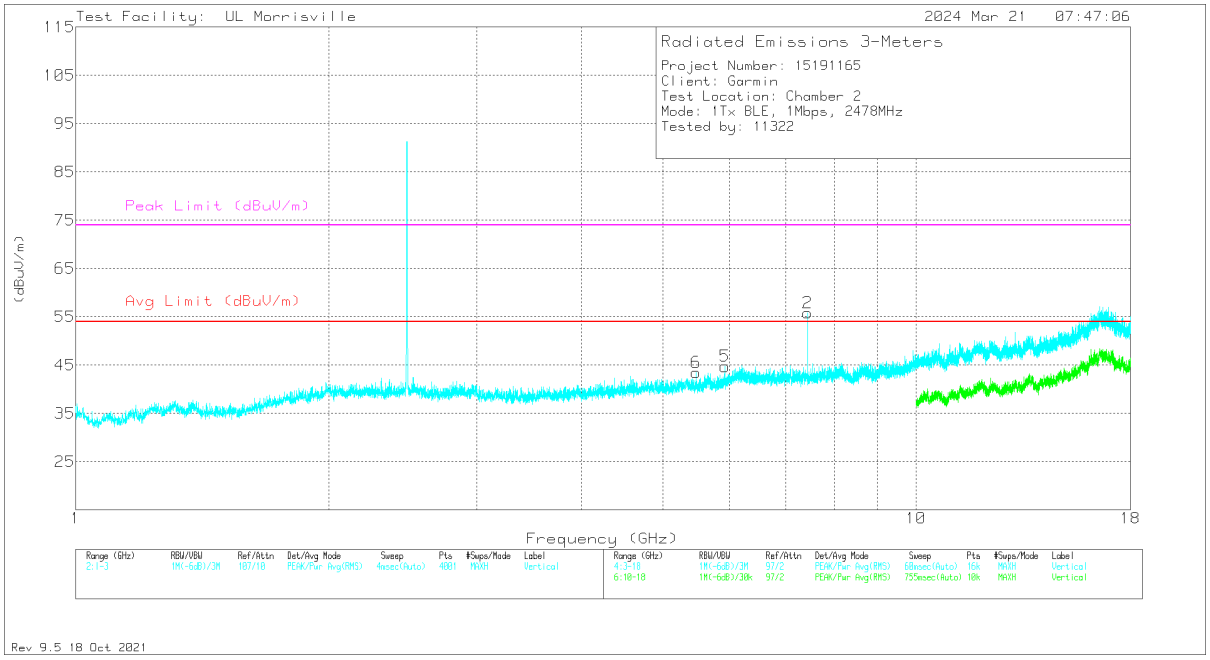
HIGH CHANNEL



HORIZONTAL



VERTICAL

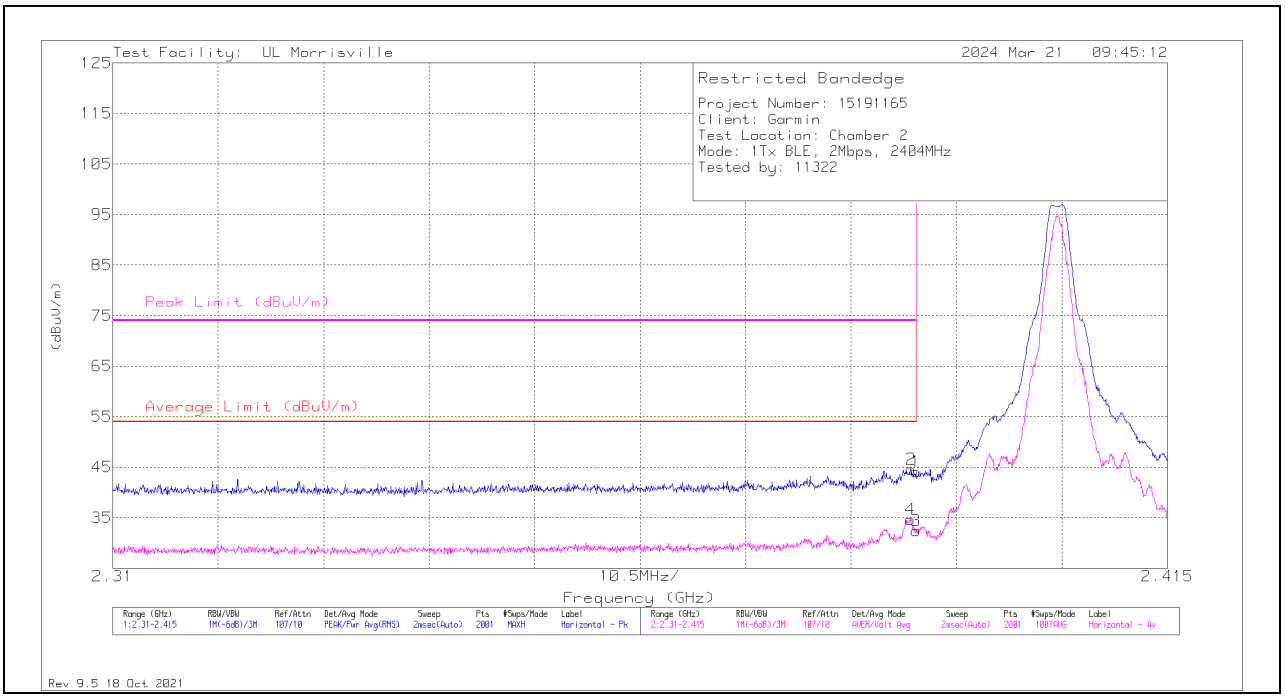
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	86408 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 7.43465	48.27	PK2	35.6	-26.8	57.07	-	-	74	-16.93	226	101	H
	* ** 7.43345	42.14	ADV	35.6	-26.8	50.94	54	-3.06	-	-	226	101	H
2	* ** 7.43328	48.72	PK2	35.6	-26.8	57.52	-	-	74	-16.48	321	109	V
	* ** 7.43346	42.65	ADV	35.6	-26.8	51.45	54	-2.55	-	-	321	109	V
6	5.47125	39.29	Pk	34.5	-30.3	43.49	54	-10.51	74	-30.51	0-360	200	V
5	5.92781	38.13	Pk	35.1	-28.5	44.73	54	-9.27	74	-29.27	0-360	200	V
3	6.12563	39.33	Pk	35.5	-28.8	46.03	54	-7.97	74	-27.97	0-360	101	H
4	10.125	35.79	Pk	37.4	-24.5	48.69	54	-5.31	74	-25.31	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
PK2 - Maximum Peak
ADV - Linear Voltage Average

10.1.1. TX ABOVE 1 GHz BLE 2Mbps MODE IN THE 2.4 GHz BAND

BANDEDGE (LOW CHANNEL, 2404MHz)

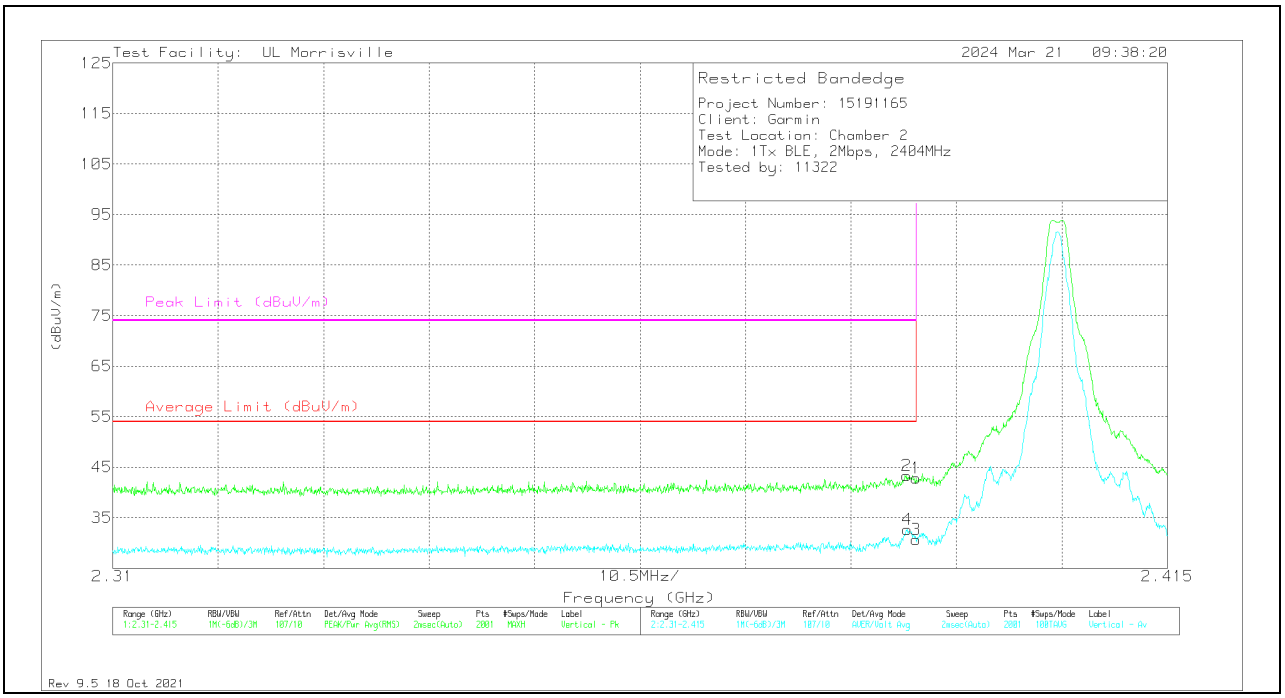
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	86408 (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	36.04	Pk	32.3	-24.2	44.14	-	-	74	-29.86	212	204	H
2	* ** 2.38949	36.45	Pk	32.3	-24.2	44.55	-	-	74	-29.45	212	204	H
3	* ** 2.38996	24.32	ADV	32.3	-24.2	32.42	54	-21.58	-	-	212	204	H
4	* ** 2.38943	26.55	ADV	32.3	-24.2	34.65	54	-19.35	-	-	212	204	H

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

VERTICAL RESULT

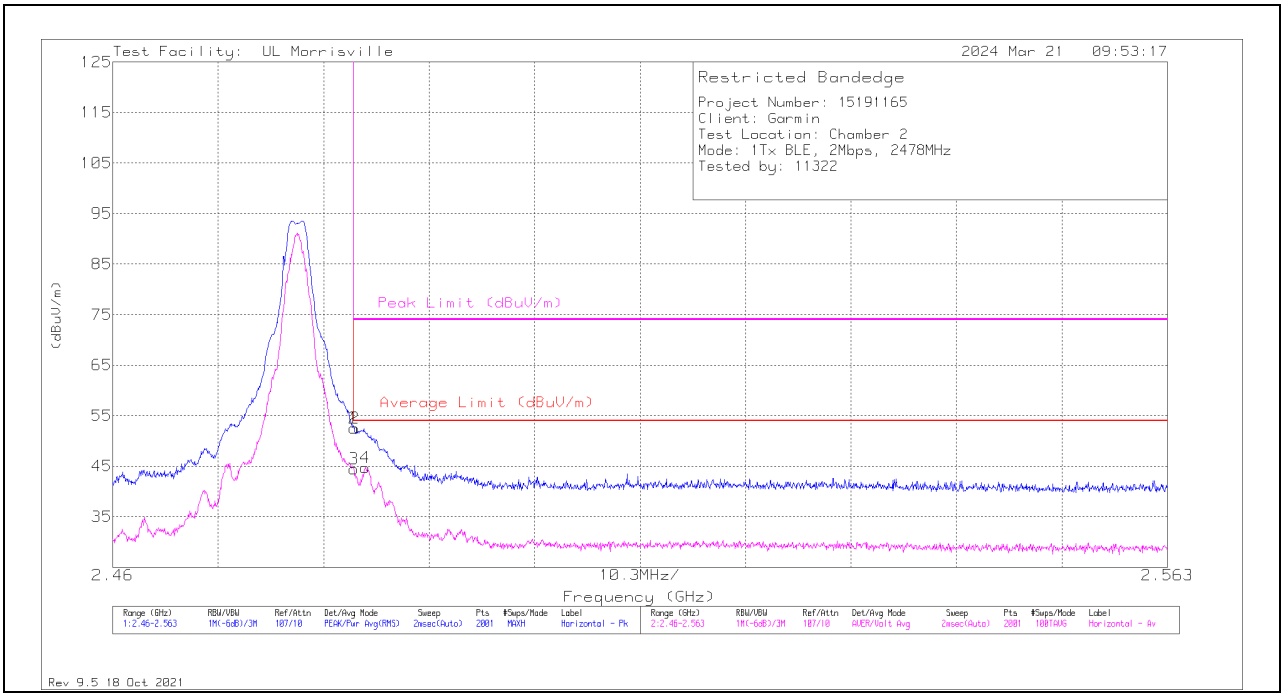


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	86408 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.38996	34.72	Pk	32.3	-24.2	42.82	-	-	74	-31.18	157	317	V
2	* ** 2.38907	35.25	Pk	32.3	-24.2	43.35	-	-	74	-30.65	157	317	V
3	* ** 2.38996	22.61	ADV	32.3	-24.2	30.71	54	-23.29	-	-	157	316	V
4	* ** 2.38912	24.59	ADV	32.3	-24.2	32.69	54	-21.31	-	-	157	316	V

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

BANDEDGE (HIGH CHANNEL, 2478MHz)

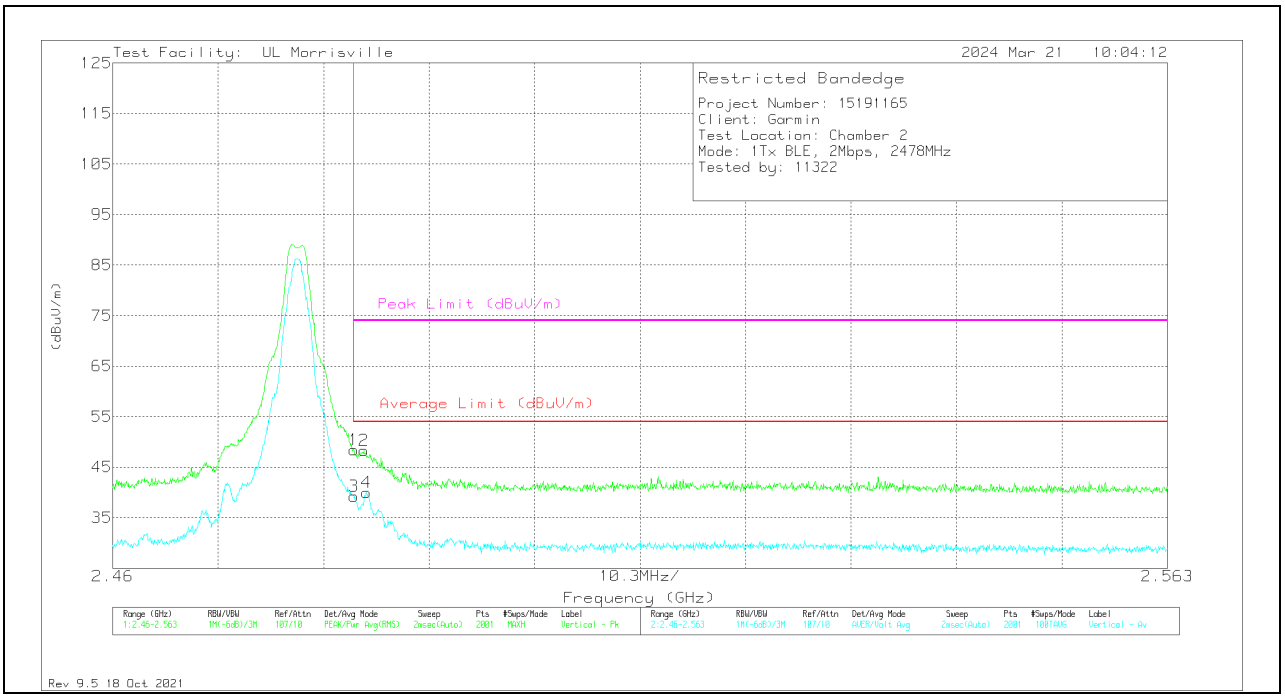
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	86408 (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	44.5	Pk	32.5	-24.5	52.5	-	-	74	-21.5	218	177	H
2	* ** 2.48359	44.55	Pk	32.5	-24.5	52.55	-	-	74	-21.45	218	177	H
3	* ** 2.48354	36.44	ADV	32.5	-24.5	44.44	54	-9.56	-	-	218	177	H
4	* ** 2.48467	36.72	ADV	32.5	-24.5	44.72	54	-9.28	-	-	218	177	H

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

VERTICAL RESULT

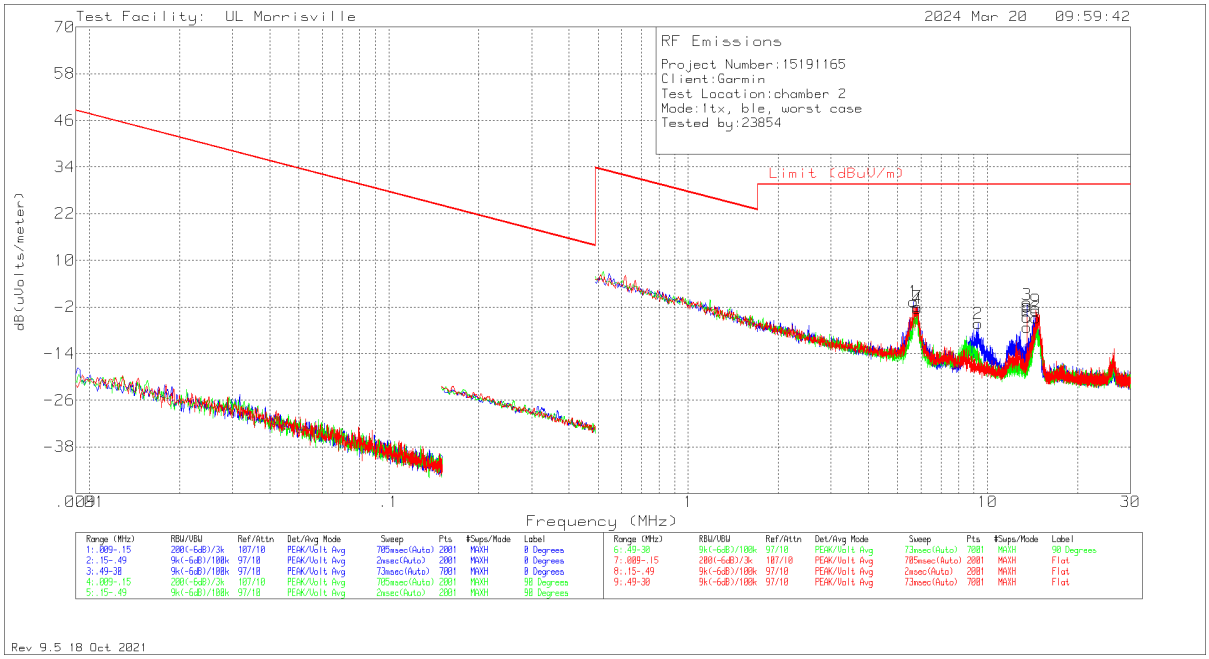


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	86408 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.48354	40.46	Pk	32.5	-24.5	48.46	-	-	74	-25.54	149	244	V
2	* ** 2.48451	40.31	Pk	32.5	-24.5	48.31	-	-	74	-25.69	149	244	V
3	* ** 2.48354	31.2	ADV	32.5	-24.5	39.2	54	-14.8	-	-	149	244	V
4	* ** 2.48477	32.01	ADV	32.5	-24.5	40.01	54	-13.99	-	-	149	244	V

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

10.2. WORST CASE SPURIOUS BELOW 30MHZ

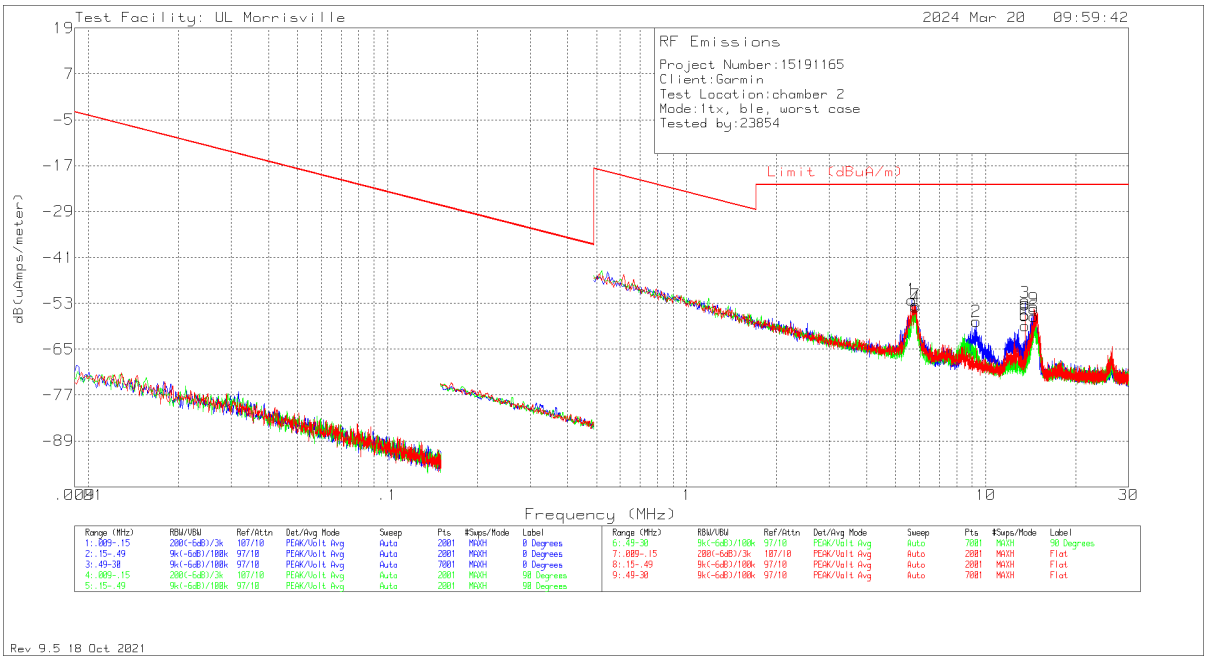
Note: All measurements were made at a test distance of 3 m. The measured data was extrapolated from the test distance (3m) to the specification distance (300 m from 9-490 kHz and 30 m from 490 kHz – 30 MHz) to clearly show the relative levels of fundamental and spurious emissions and demonstrate compliance 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 (dBuV/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
1	5.66725	27.83	Pk	11.2	.4	-40	-.57	29.54	-	-30.11	0-360	0 degs
7	5.81902	26.49	Pk	11.2	.4	-40	-1.91	29.54	-	-31.45	0-360	Flat
4	5.83167	25.99	Pk	11.2	.4	-40	-2.41	29.54	-	-31.95	0-360	90 degs
2	9.29301	22.34	Pk	10.9	.5	-40	-6.26	29.54	-	-35.8	0-360	0 degs
3	13.5596	27.34	Pk	10.7	.6	-40	-1.36	29.54	-	-30.9	0-360	0 degs
5	13.5596	21.4	Pk	10.7	.6	-40	-7.3	29.54	-	-36.84	0-360	90 degs
8	13.5596	24.06	Pk	10.7	.6	-40	-4.64	29.54	-	-34.18	0-360	Flat
6	14.47447	23.74	Pk	10.7	.7	-40	-4.86	29.54	-	-34.4	0-360	90 degs
9	14.47447	25.65	Pk	10.7	.7	-40	-2.95	29.54	-	-32.49	0-360	Flat

Pk - Peak detector

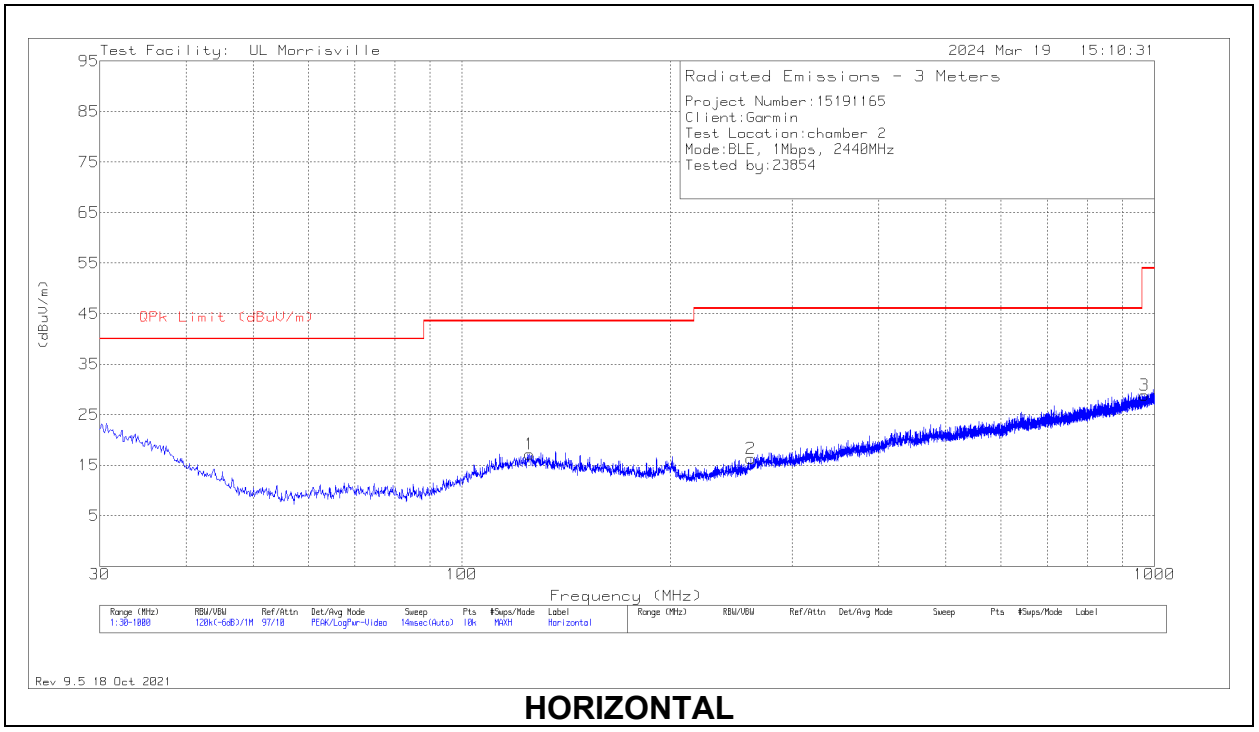


ANTENNA- THREE ORIENTATIONS (H-FIELD)

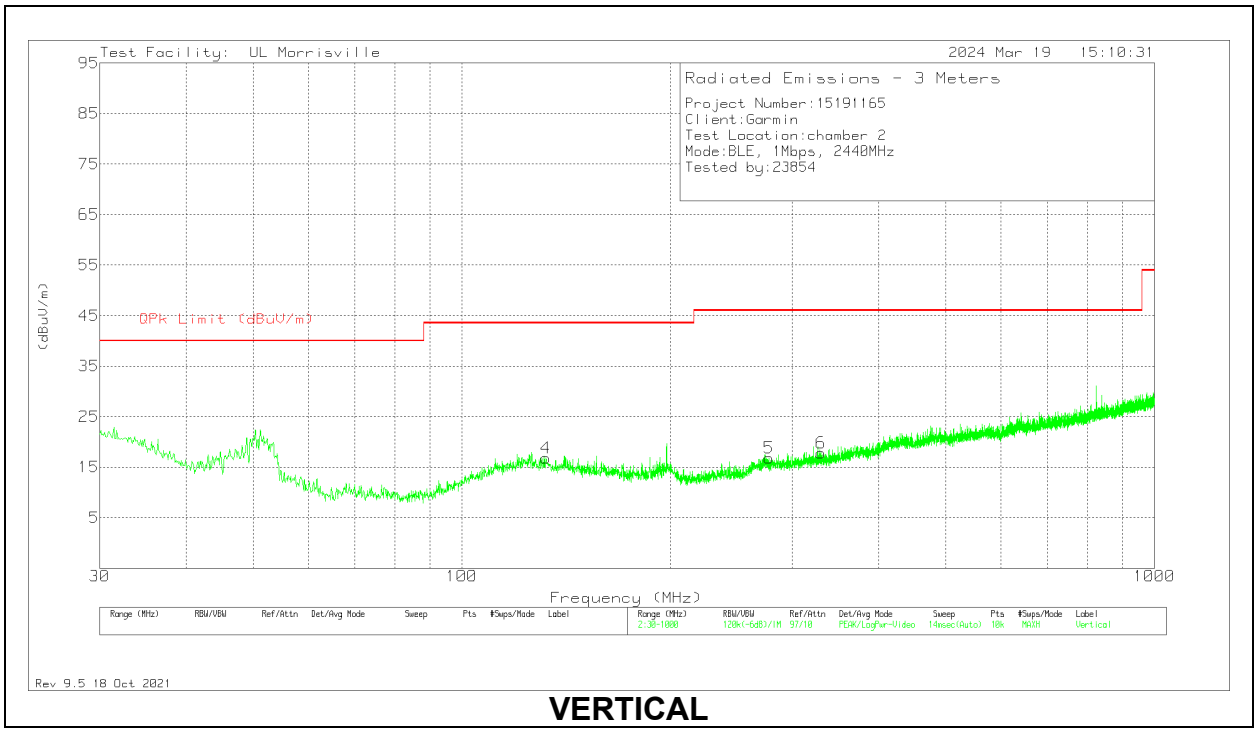
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	135144 (dBuV/m)	Gain/Loss (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uAmps/meter)	QP/AV Limit (dBuA/m)	PK Limit (dBuA/m)	Margin (dB)	Azimuth (Degs)	Loop Angle
1	5.66725	27.83	Pk	-40.3	.4	-40	-52.07	-21.96	-	-30.11	0-360	0 degs
7	5.81902	26.49	Pk	-40.3	.4	-40	-53.41	-21.96	-	-31.45	0-360	Flat
4	5.83167	25.99	Pk	-40.3	.4	-40	-53.91	-21.96	-	-31.95	0-360	90 degs
2	9.29301	22.34	Pk	-40.6	.5	-40	-57.76	-21.96	-	-35.8	0-360	0 degs
3	13.5596	27.34	Pk	-40.8	.6	-40	-52.86	-21.96	-	-30.9	0-360	0 degs
5	13.5596	21.4	Pk	-40.8	.6	-40	-58.8	-21.96	-	-36.84	0-360	90 degs
8	13.5596	24.06	Pk	-40.8	.6	-40	-56.14	-21.96	-	-34.18	0-360	Flat
6	14.47447	23.74	Pk	-40.8	.7	-40	-56.36	-21.96	-	-34.4	0-360	90 degs
9	14.47447	25.65	Pk	-40.8	.7	-40	-54.45	-21.96	-	-32.49	0-360	Flat

Pk - Peak detector

10.3. WORST CASE SPURIOUS BELOW 1 GHZ



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	* ** 125.254	27.35	Pk	20.4	-30.6	17.15	43.52	-26.37	0-360	199	H
2	* ** 261.151	27.27	Pk	18.8	-29.7	16.37	46.02	-29.65	0-360	199	H
3	* ** 967.408	24.71	Pk	29.7	-25.6	28.81	53.97	-25.16	0-360	399	H
4	* ** 132.238	27.44	Pk	20.1	-30.7	16.84	43.52	-26.68	0-360	100	V
5	* ** 277.447	26.53	Pk	19.8	-29.5	16.83	46.02	-29.19	0-360	199	V
6	* ** 330.312	26.35	Pk	20.5	-29	17.85	46.02	-28.17	0-360	199	V

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

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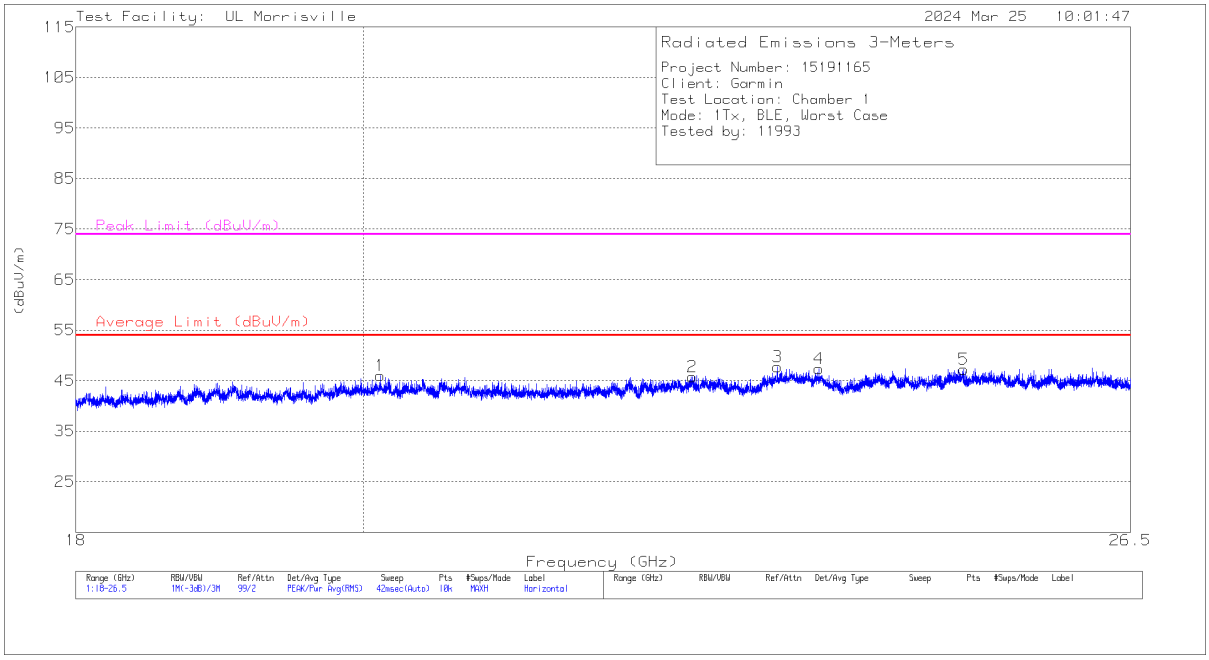
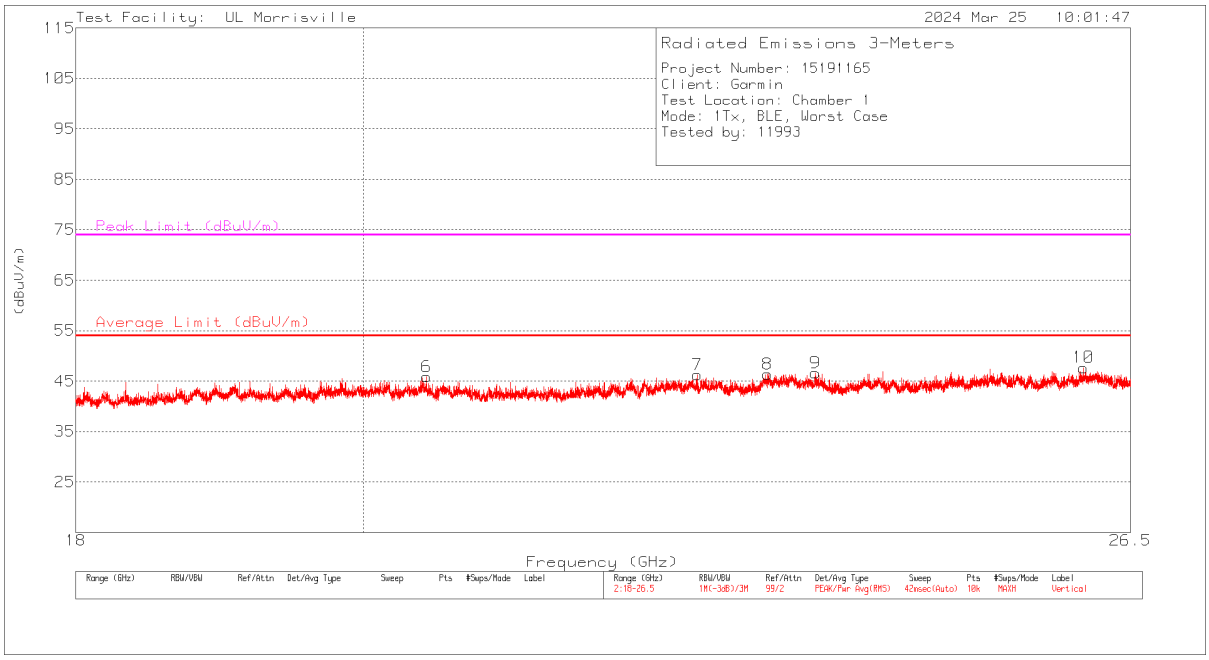
10.4. WORST CASE SPURIOUS 18-26 GHZ



HORIZONTAL



VERTICAL

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	* ** 20.12734	49.75	Pk	33.5	-37.3	45.95	54	-8.05	74	-28.05	0-360	101	H
2	* ** 22.56914	49.13	Pk	34.3	-37.7	45.73	54	-8.27	74	-28.27	0-360	300	H
4	* ** 23.64004	50.25	Pk	34.6	-37.5	47.35	54	-6.65	74	-26.65	0-360	101	H
6	* ** 20.47155	50.05	Pk	33.7	-37.9	45.85	54	-8.15	74	-28.15	0-360	250	V
7	* ** 22.61079	49.83	Pk	34.3	-37.9	46.23	54	-7.77	74	-27.77	0-360	101	V
9	* ** 23.60944	49.06	Pk	34.6	-37	46.66	54	-7.34	74	-27.34	0-360	200	V
8	23.19638	49.81	Pk	34.3	-37.7	46.41	-	-	-	-	0-360	300	V
3	23.28137	50.89	Pk	34.4	-37.6	47.69	-	-	-	-	0-360	199	H
5	24.92596	48.91	Pk	35.2	-36.9	47.21	-	-	-	-	0-360	101	H
10	26.04785	48.38	Pk	35.3	-36	47.68	-	-	-	-	0-360	151	V

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

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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

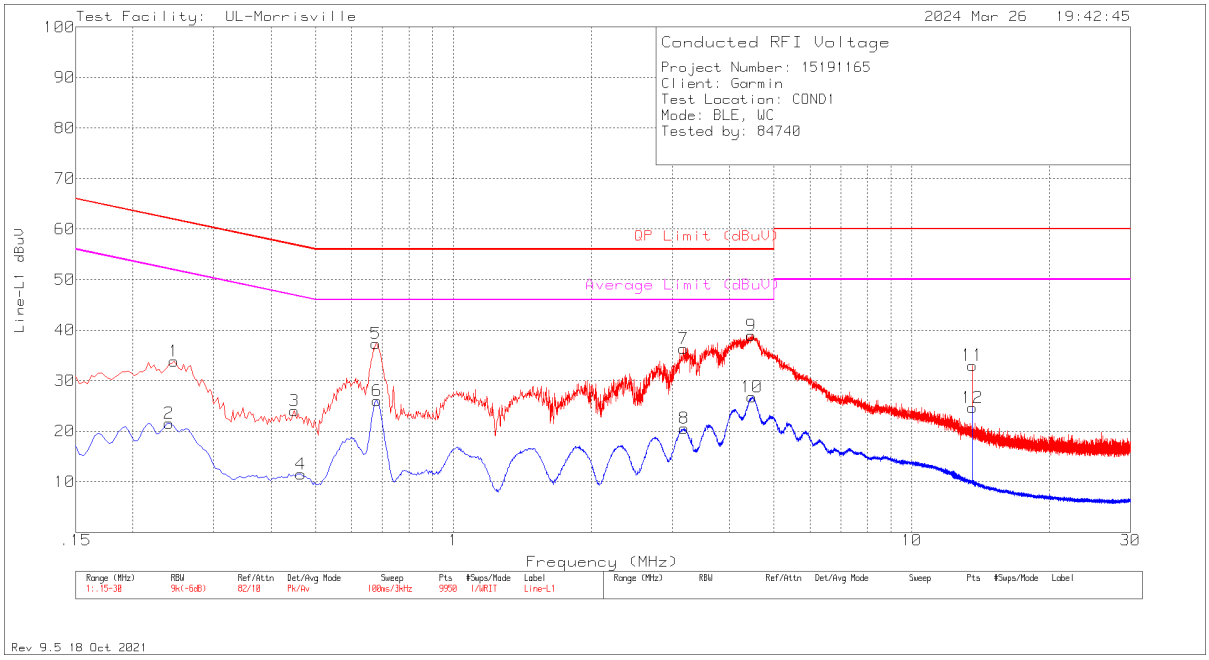
The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10.

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

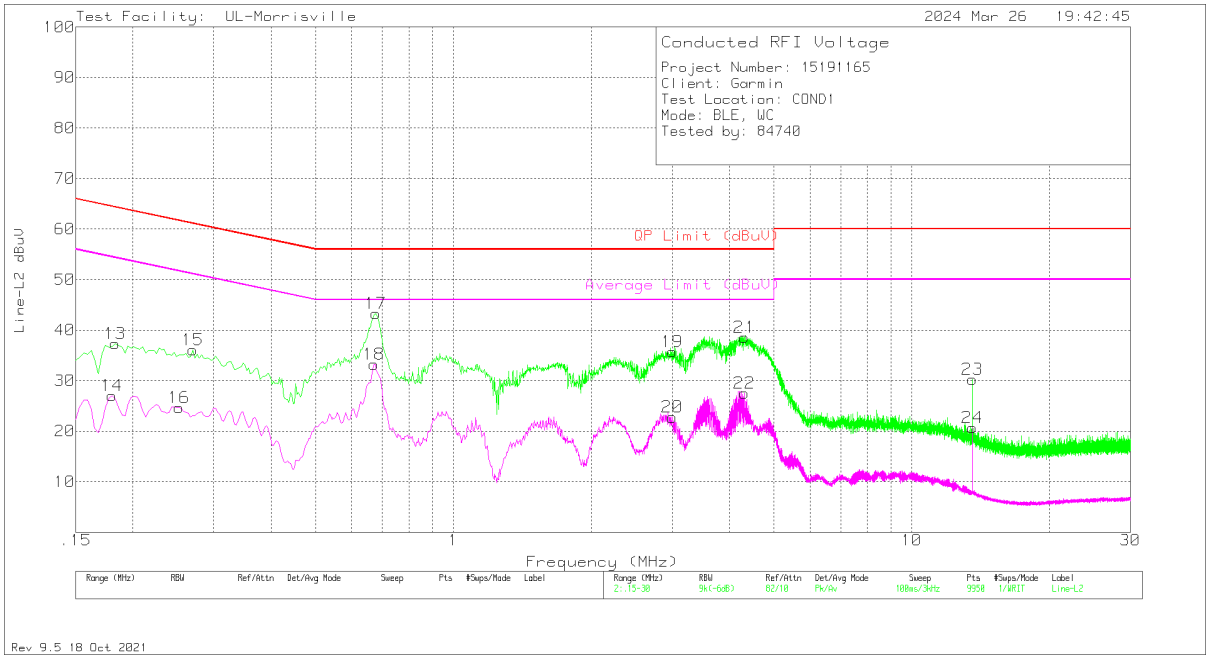
LINE 1 RESULTS



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	.246	23.88	Pk	.2	9.8	33.88	61.89	-28.01	-	-
2	.24	11.56	Av	.2	9.8	21.56	-	-	52.1	-30.54
3	.45	14.1	Pk	.1	9.8	24	56.88	-32.88	-	-
4	.465	1.63	Av	.1	9.8	11.53	-	-	46.6	-35.07
5	.678	27.48	Pk	.1	9.8	37.38	56	-18.62	-	-
6	.681	16.16	Av	.1	9.8	26.06	-	-	46	-19.94
7	3.174	26.49	Pk	.1	9.8	36.39	56	-19.61	-	-
8	3.189	10.66	Av	.1	9.8	20.56	-	-	46	-25.44
9	4.464	28.93	Pk	.1	9.9	38.93	56	-17.07	-	-
10	4.479	16.76	Av	.1	9.9	26.76	-	-	46	-19.24
11	13.56	22.85	Pk	.2	10	33.05	60	-26.95	-	-
12	13.56	14.48	Av	.2	10	24.68	-	-	50	-25.32

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)
13	.183	27.27	Pk	.3	9.8	37.37	64.35	-26.98	-	-
14	.18	16.95	Av	.3	9.8	27.05	-	-	54.49	-27.44
15	.27	26.05	Pk	.2	9.8	36.05	61.12	-25.07	-	-
16	.252	14.62	Av	.2	9.8	24.62	-	-	51.69	-27.07
17	.678	33.41	Pk	.1	9.8	43.31	56	-12.69	-	-
18	.672	23.39	Av	.1	9.8	33.29	-	-	46	-12.71
19	3	25.86	Pk	.1	9.8	35.76	56	-20.24	-	-
20	3.003	12.85	Av	.1	9.8	22.75	-	-	46	-23.25
21	4.32	28.62	Pk	.1	9.9	38.62	56	-17.38	-	-
22	4.317	17.51	Av	.1	9.9	27.51	-	-	46	-18.49
23	13.56	20.11	Pk	.2	10	30.31	60	-29.69	-	-
24	13.56	10.49	Av	.2	10	20.69	-	-	50	-29.31

Pk - Peak detector
Av - Average detection

12. SETUP PHOTOS

Please refer to R15191165-EP1 for setup photos

END OF TEST REPORT

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