TEST REPORT

Report Number: R15444895-E1

Applicant	:	Garmin International Inc 1200 E 151st St Olathe, Kansas 66062-3426, United States
Model	:	A04883
FCC ID	:	IPH-04883
IC	:	1792A-04883
EUT Description	:	Device
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART C: 2024 ISED RSS-247 ISSUE 3: 2023 ISED RSS-GEN ISSUE 5 + A1 + A2: 2021 ISED RSS-210 ISSUE 11:2024

Date Of Issue:
2024-08-30

Prepared by:
UL LLC
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CERT #0751.06

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	2024-08-30	Initial Issue	Chandler Stanley

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Garmin International Inc
1200 E 151st St
Olathe, Kansas 66062-3426, United States

EUT DESCRIPTION: Device

MODEL: A04883

SERIAL NUMBER: 477207590

SAMPLE RECEIPT DATE: 2024-08-13

DATE TESTED: 2024-08-13 to 2024-08-16

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C: 2024	Refer to Section 2
ISED RSS-247 Issue 3: 2023	Refer to Section 2
ISED RSS-GEN Issue 5 + A1 + A2: 2021	Refer to Section 2
ISED RSS-210 Issue 11:2024	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:

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

Prepared By:

Chandler Stanley
Engineer
Consumer, Medical and IT Segment
UL LLC

2. TEST RESULTS SUMMARY

This report contains data 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 provided by the customer:

1. Antenna gain and type (see section 6.3)

BLE				
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	Not Performed	ANSI C63.10 Section 6.9.3.
15.247 (a) (2)	RSS-247 5.2 (a)	6dB BW		None.
15.247 (b) (3)	RSS-247 5.4 (d)	Output Power		
See Comment		Average power		Per ANSI C63.10, Section 11.9.2.3.2.
15.247 (e)	RSS-247 5.2 (b)	PSD		None.
15.247 (d)	RSS-247 5.5	Conducted Spurious Emissions		
15.209, 15.205	RSS-GEN 8.9, 8.10	Radiated Emissions	Complies	
15.207	RSS-Gen 8.8	AC Mains Conducted Emissions	Not Performed	
ANT/ANT+				
FCC Clause	**ISED Clause**	**Requirement**	**Result**	**Comment**
15.249 (a)	RSS-210 B.10 (a)	Fundamental/harmonic measurements	Not Performed	None.
15.249 (d)	RSS-210 B.10 (b)	Radiated Emissions	See Comment	Band Edge is Compliant.

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 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, RSS-210 Issue 11, 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	U_{Lab}
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%

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

6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

The EUT is a device that contains a BLE and ANT/ANT+ radio and a GNSS receiver. This report covers the full radiated emissions testing of the BLE and ANT/ANT+ radios with the exception for ranges above 1GHz for ANT/ANT+.

6.2. MAXIMUM OUTPUT POWER

Not Performed.

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

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

The radio utilizes a Stamped metal antenna, with a maximum gain of -2.3 dBi.

6.4. SOFTWARE AND FIRMWARE

Software Version: 408

6.5. WORST-CASE CONFIGURATION AND MODE

Radiated emissions below 1GHz and above 18GHz were performed with the EUT set to transmit at the channel and mode that had the highest recorded power and PSD as the worst-case scenario.

Band edge and radiated emissions between 1GHz and 18GHz were performed with the EUT set to transmit on low and high channels, as well as middle channel for radiated spurious emissions. Band edge and radiated spurious emissions were performed on the worst-case power and PSD mode. For BLE, band edge was also tested at 2Mbps since this has the widest bandwidth.

ANT/ANT+ was tested at its only data-rate. ANT/ANT+ was only tested below 1GHz for spurious emissions, while full radiated testing was performed for BLE.

The fundamental of the EUT was investigated in three orthogonal orientations X,Y,Z, it was determined that Z orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Z orientation.

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	NA

I/O CABLES

I/O Cable List						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	Propriety	1	Propriety	Shielded	<3m	Charges to USB C

TEST SETUP

For testing, the EUT was programmed to transmit at the desired frequencies and power settings. The EUT was connected to AC Line via a charging cable as worst-case.

SETUP DIAGRAMS

Please refer to 15444895-EP1 for setup diagrams

7. MEASUREMENT METHOD

On Time and Duty Cycle: ANSI C63.10, Section 11.6 : Zero-Span Spectrum Analyzer Method.

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

General radiated emissions: ANSI C63.10 Subclause - 6.3-6.6

8. 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.
0.009-30MHz					
135144	Active Loop Antenna	ETS-Lindgren	6502	2024-01-24	2025-01-24
30-1000 MHz					
90629	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2024-01-30	2026-01-30
1-18 GHz					
135143	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2024-02-07	2026-02-07
18-40 GHz					
204704	Horn Antenna, 18-26.5GHz	Com-Power	AH-826	2023-07-20	2025-07-20
Gain-Loss Chains					
91974	Gain-loss string: 0.009-30MHz	Various	Various	2024-05-08	2025-05-08
91976	Gain-loss string: 25-1000MHz	Various	Various	2024-05-08	2025-05-08
91979	Gain-loss string: 1-18GHz	Various	Various	2024-05-08	2025-05-08
135999	Gain-loss string: 18-40GHz	Various	Various	2024-05-08	2025-05-08
Receiver & Software					
197954	Spectrum Analyzer	Rohde & Schwarz	ESW44	2024-03-05	2025-03-05
81018	Spectrum Analyzer	Agilent	E4446A	2024-07-31	2025-07-31
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

9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

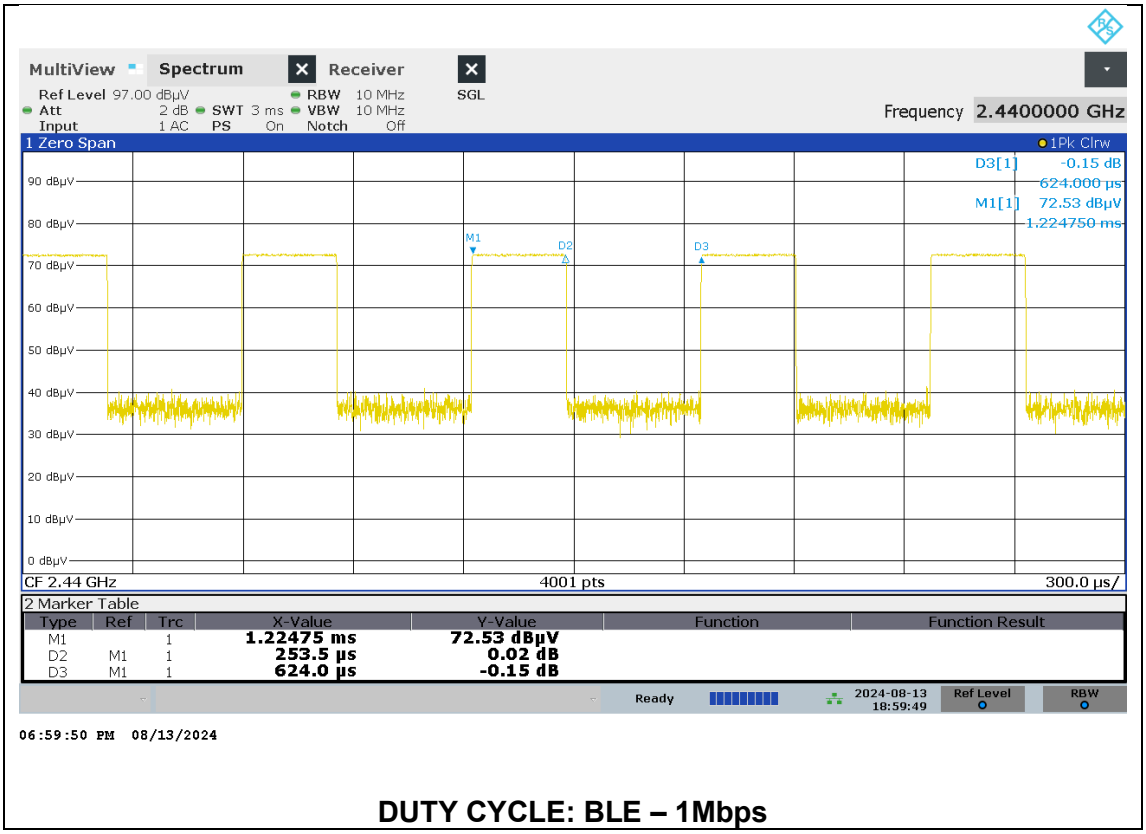
PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

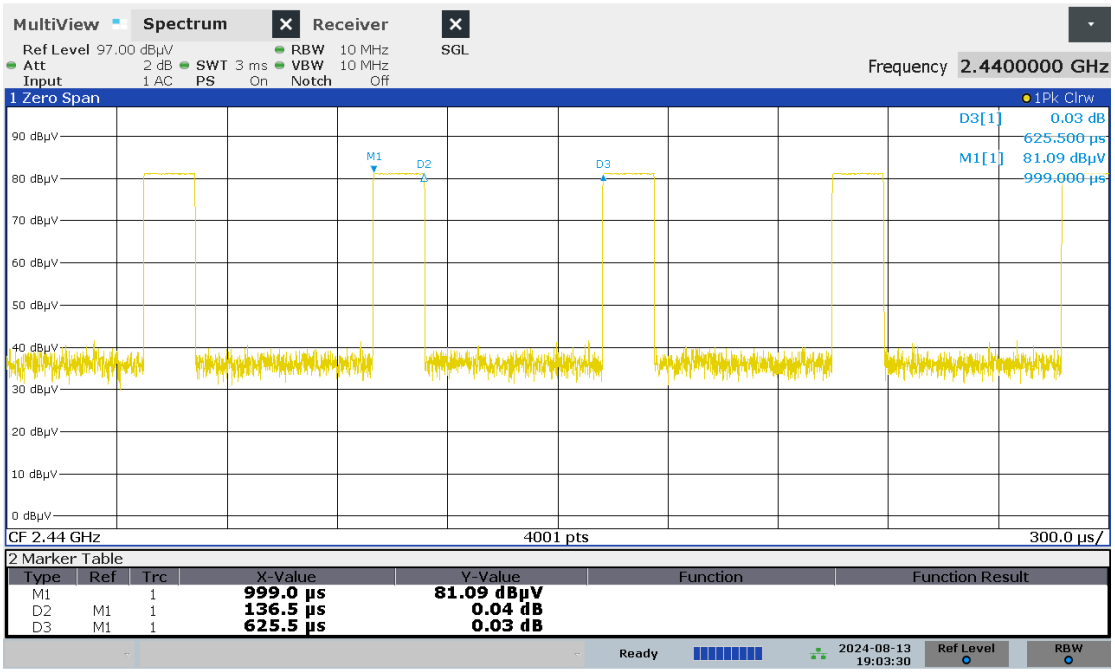
ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
2.4GHz Band						
BLE - 1 Mbps	0.254	0.624	0.406	40.63	7.82	3.945
BLE - 2 Mbps	0.137	0.626	0.218	21.82	13.22	7.326
ANT/ANT+	2.100	2.226	0.943	94.34	0.51	0.476

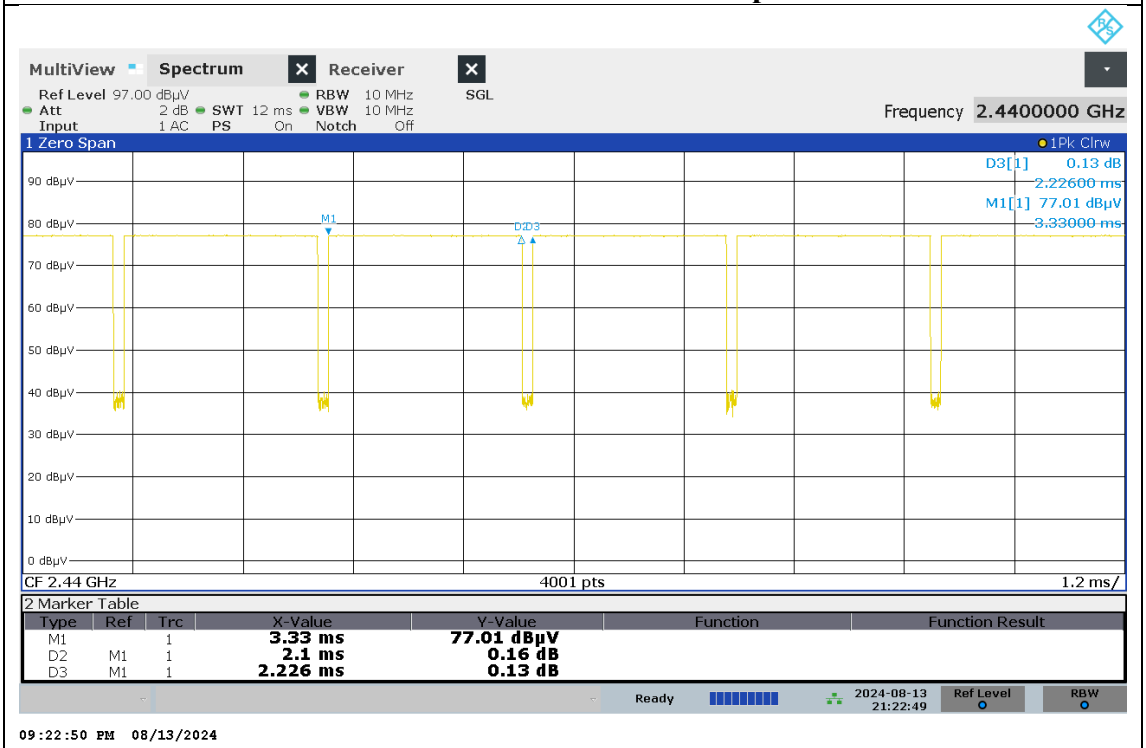
DUTY CYCLE PLOTS
Tested By: 11993 and 85501



DUTY CYCLE: BLE – 1Mbps



DUTY CYCLE: BLE – 2Mbps



DUTY CYCLE: ANT/ANT+

10. RADIATED TEST RESULTS

10.1. LIMITS AND PROCEDURE

LIMITS

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

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

RSS-GEN, Section 8.9 and 8.10.

Frequency Range (MHz)	Field Strength Limit (uA/m) at 3 m	Field Strength Limit (dBuA/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	-

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 3 MHz 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 average measurements. Linear Voltage Averaging was used.

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 power spectral density 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.

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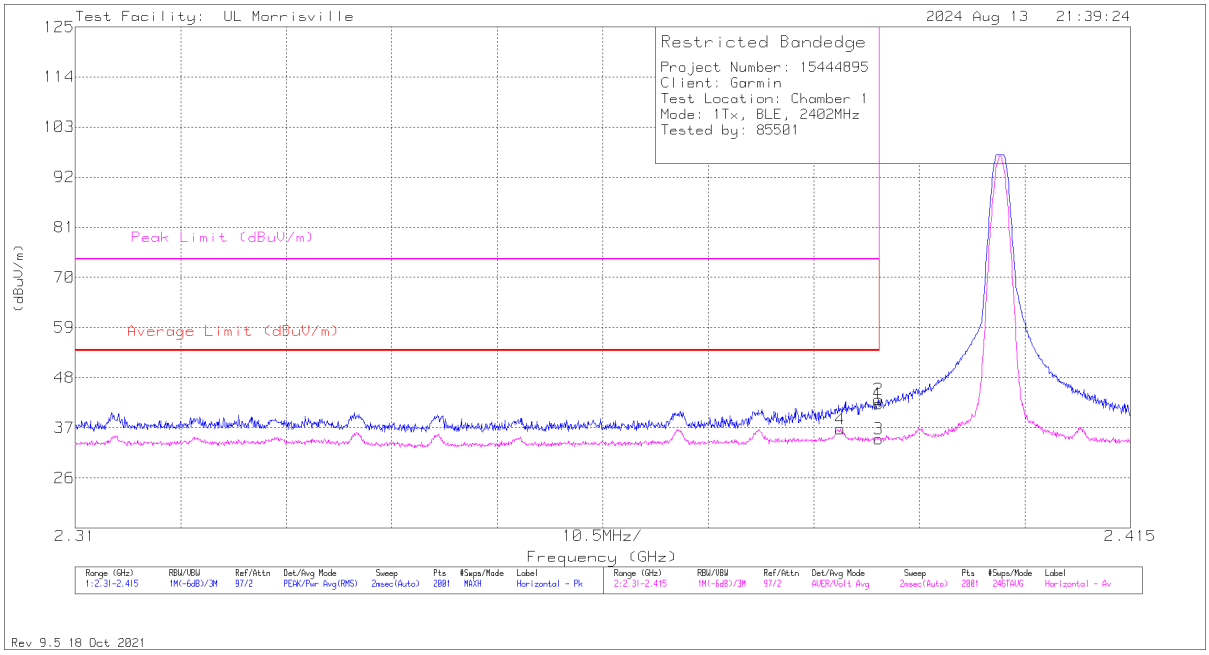
10.2. TRANSMITTER ABOVE 1 GHz

10.2.1. BLE (1Mbps)

BANDEDGE (LOW CHANNEL)

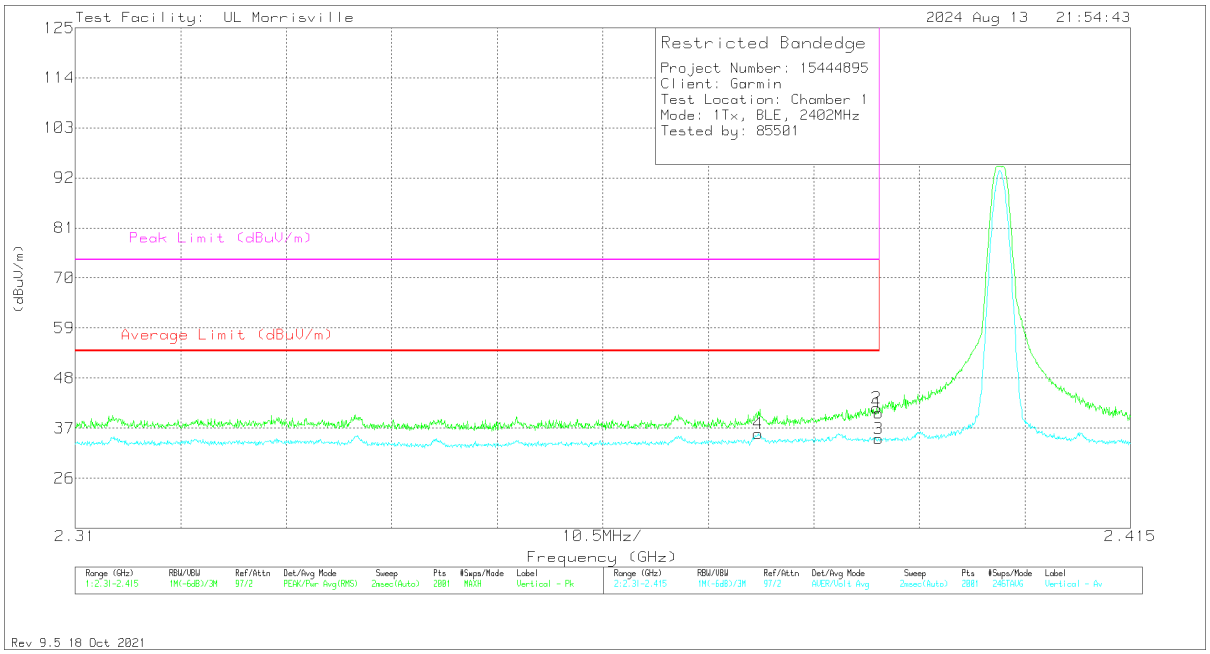
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	135143 (dB/m)	Gain/Loss (dB)	DC Corr (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	34.3	Pk	31.9	-24	0	42.2	-	-	74	-31.8	135	170	H
2	* ** 2.38991	35.31	Pk	31.9	-24	0	43.21	-	-	74	-30.79	135	170	H
3	* ** 2.38996	18.87	ADV	31.9	-24	7.82	34.59	54	-19.41	-	-	135	170	H
4	* ** 2.38613	20.86	ADV	31.9	-23.9	7.82	36.68	54	-17.32	-	-	135	170	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	135143 (dB/m)	Gain/Loss (dB)	DC Corr (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	32.47	Pk	31.9	-24	0	40.37	-	-	74	-33.63	270	171	V
2	* ** 2.38975	33.48	Pk	31.9	-24	0	41.38	-	-	74	-32.62	270	171	V
3	* ** 2.38996	18.94	ADV	31.9	-24	7.82	34.66	54	-19.34	-	-	270	171	V
4	* ** 2.37794	20.28	ADV	31.9	-24.2	7.82	35.8	54	-18.2	-	-	270	171	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
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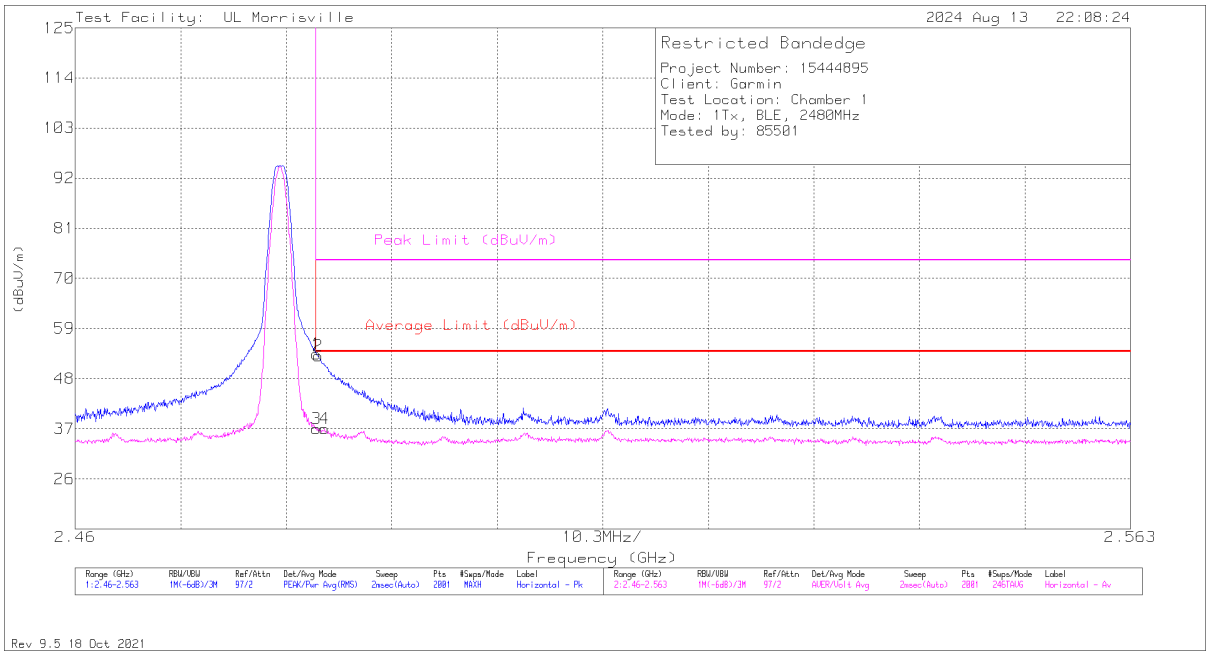
BANDEDGE (HIGH CHANNEL)

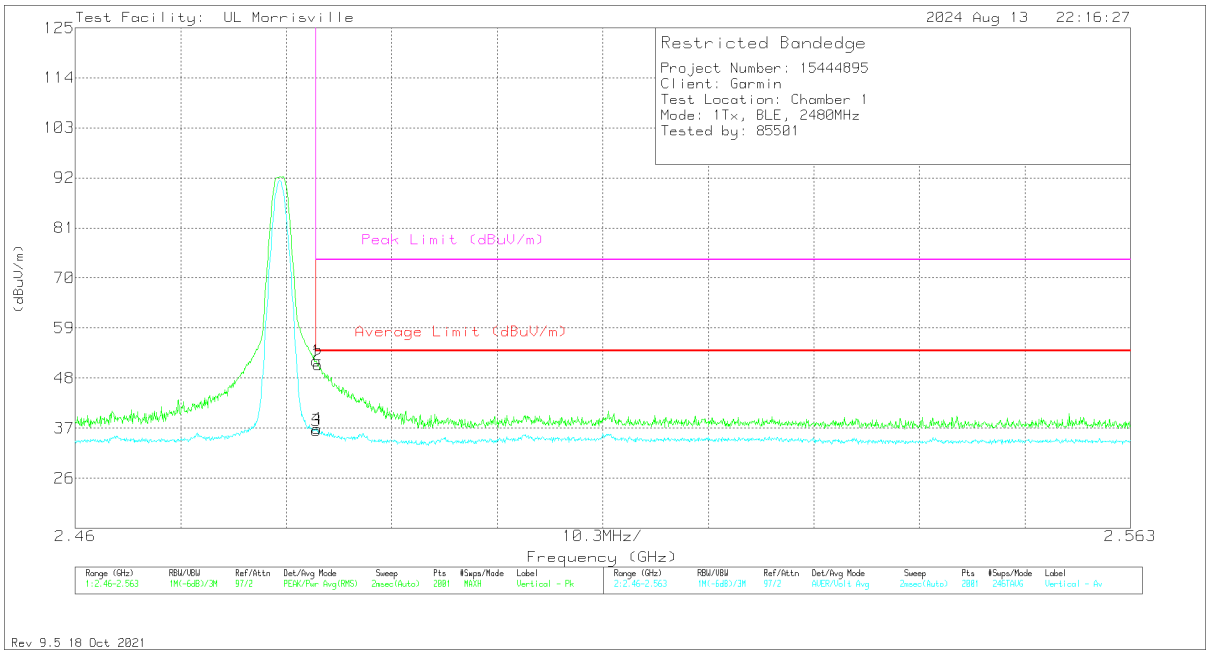
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	135143 (dB/m)	Gain/Loss (dB)	DC Corr (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	44.92	Pk	32.2	-23.7	0	53.42	-	-	74	-20.58	130	155	H
2	* ** 2.48374	44.53	Pk	32.2	-23.7	0	53.03	-	-	74	-20.97	130	155	H
3	* ** 2.48354	20.75	ADV	32.2	-23.7	7.82	37.07	54	-16.93	-	-	130	155	H
4	* ** 2.48436	20.82	ADV	32.2	-23.8	7.82	37.04	54	-16.96	-	-	130	155	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

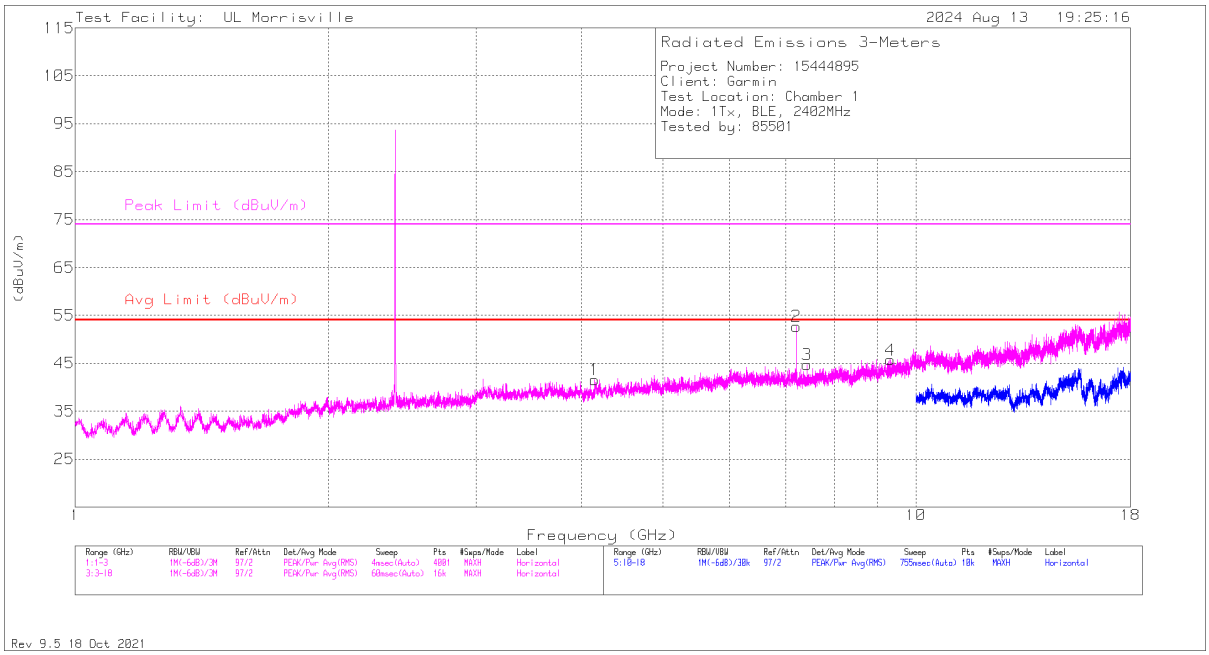


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	135143 (dB/m)	Gain/Loss (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.48354	43.24	Pk	32.2	-23.7	0	51.74	-	-	74	-22.26	270	164	V
2	* ** 2.48369	42.46	Pk	32.2	-23.7	0	50.96	-	-	74	-23.04	270	164	V
3	* ** 2.48354	20.13	ADV	32.2	-23.7	7.82	36.45	54	-17.55	-	-	270	164	V
4	* ** 2.48359	20.52	ADV	32.2	-23.7	7.82	36.84	54	-17.16	-	-	270	164	V

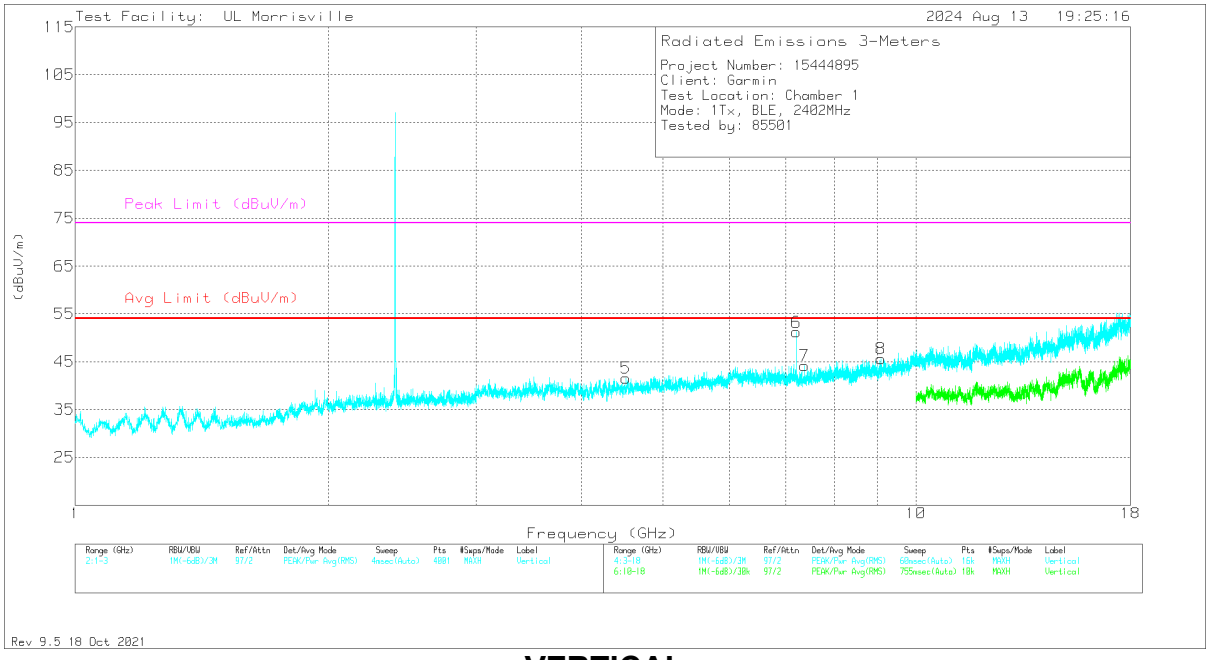
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
Pk - Peak detector
ADV - Linear Voltage Average

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZONTAL



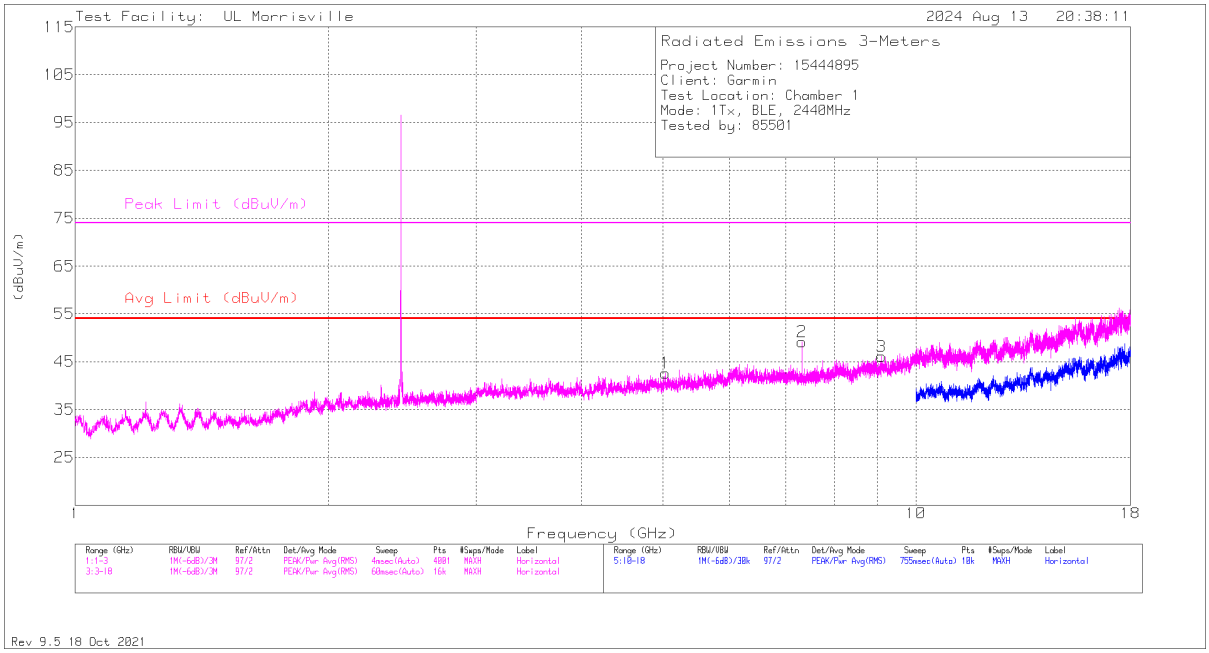
VERTICAL

RADIATED EMISSIONS

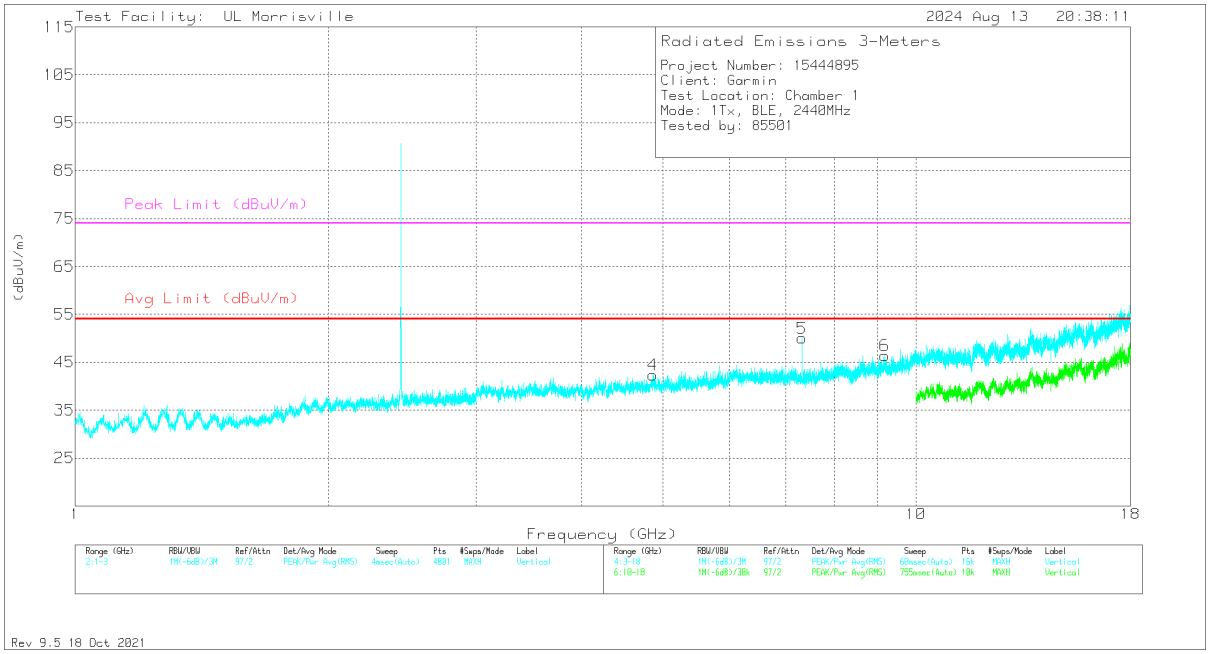
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	135143 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 4.15125	53.57	Pk	33.4	-45.4	41.57	54	-12.43	74	-32.43	0-360	200	H
3	* ** 7.425	50.54	Pk	35.4	-41.2	44.74	54	-9.26	74	-29.26	0-360	101	H
4	* ** 9.33188	49.89	Pk	36.2	-40.4	45.69	54	-8.31	74	-28.31	0-360	101	H
5	* ** 4.5225	53.6	Pk	33.9	-45.9	41.6	54	-12.4	74	-32.4	0-360	200	V
7	* ** 7.3725	50.24	Pk	35.4	-41.4	44.24	54	-9.76	74	-29.76	0-360	200	V
8	* ** 9.09563	49.9	Pk	35.9	-40.2	45.6	54	-8.4	74	-28.4	0-360	101	V
2	7.20563	59.55	Pk	35.4	-42.2	52.75	-	-	-	-	0-360	101	H
6	7.20656	57.99	Pk	35.4	-42.2	51.19	-	-	-	-	0-360	101	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



HORIZONTAL



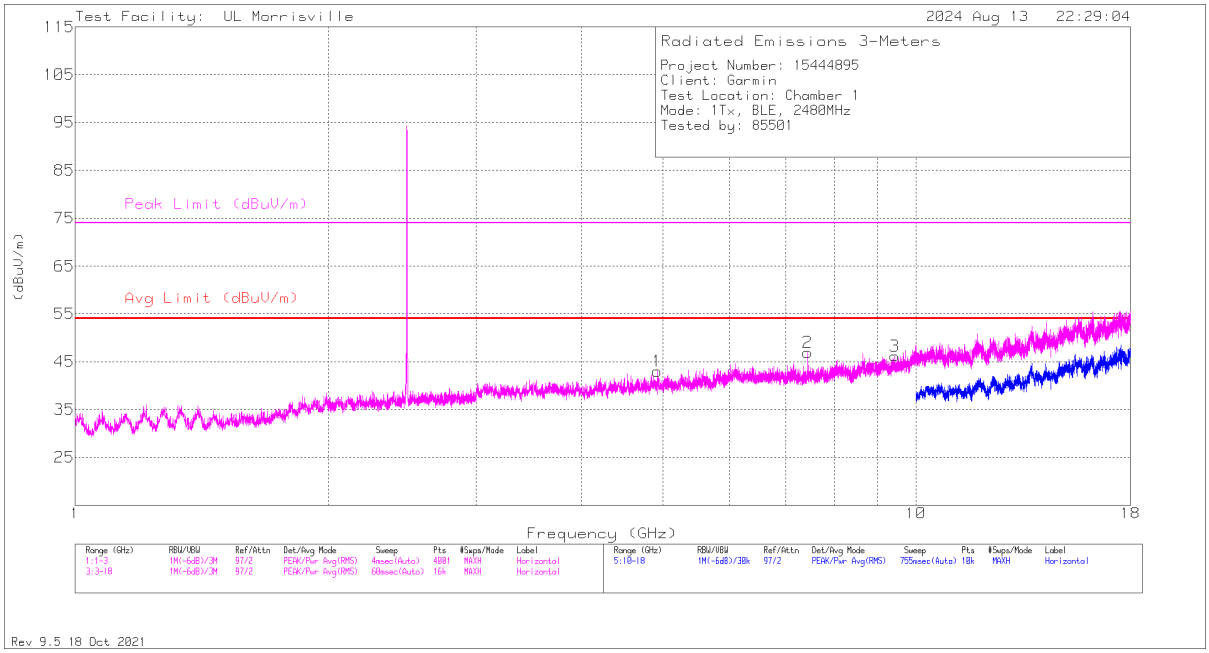
VERTICAL

RADIATED EMISSIONS

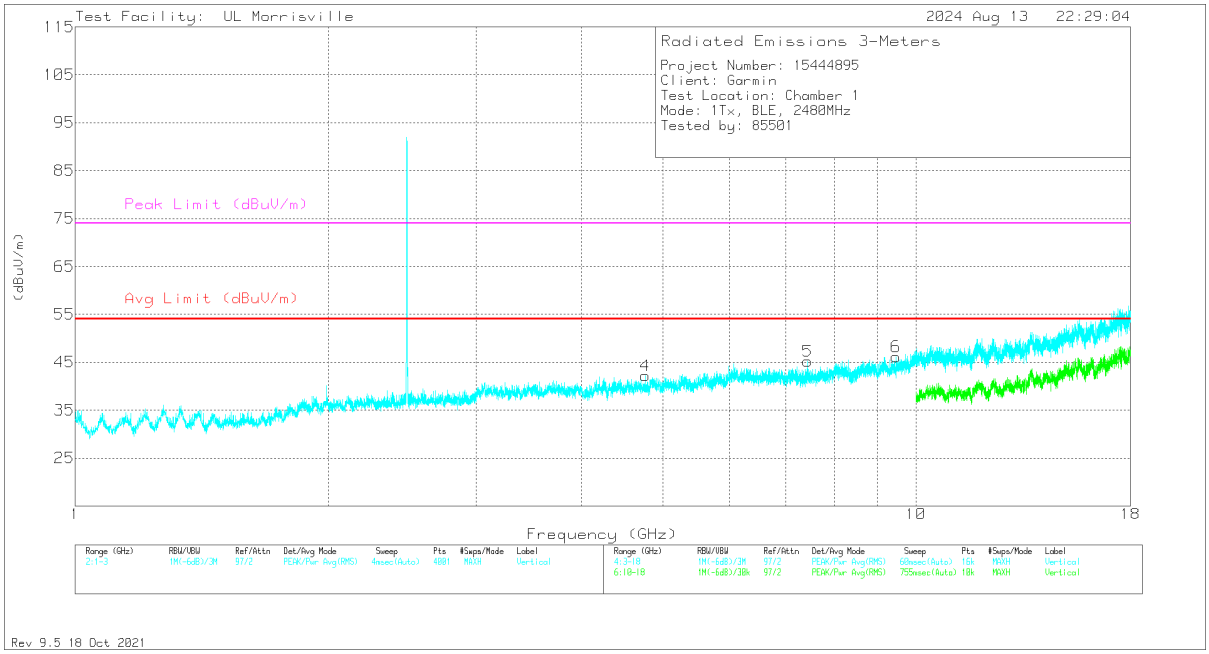
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	135143 (dB/m)	Gain/Loss (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 5.03344	52.68	Pk	34.3	-44.4	0	42.58	54	-11.42	74	-31.42	0-360	199	H
2	* ** 7.31923	58.35	PK2	35.4	-41.6	0	52.15	-	-	74	-21.85	44	101	H
	* ** 7.31927	45.36	ADV	35.4	-41.6	7.82	46.98	54	-7.02	-	-	44	101	H
3	* ** 9.10969	50.39	Pk	35.9	-40.2	0	46.09	54	-7.91	74	-27.91	0-360	199	H
4	* ** 4.86375	53.7	Pk	33.9	-45.2	0	42.4	54	-11.6	74	-31.6	0-360	101	V
5	* ** 7.31925	58.64	PK2	35.4	-41.6	0	52.44	-	-	74	-21.56	244	102	V
	* ** 7.31959	45.7	ADV	35.4	-41.7	7.82	47.22	54	-6.78	-	-	244	102	V
6	* ** 9.17813	50.27	Pk	36	-39.9	0	46.37	54	-7.63	74	-27.63	0-360	101	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

HIGH CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	135143 (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	* ** 4.92469	53.92	Pk	34.1	-45	43.02	54	-10.98	74	-30.98	0-360	101	H
2	* ** 7.44094	52.62	Pk	35.4	-41.1	46.92	54	-7.08	74	-27.08	0-360	200	H
3	* ** 9.43594	50.11	Pk	36.3	-40.2	46.21	54	-7.79	74	-27.79	0-360	200	H
4	* ** 4.76719	53.47	Pk	33.8	-45.1	42.17	54	-11.83	74	-31.83	0-360	200	V
5	* ** 7.44	50.88	Pk	35.4	-41.1	45.18	54	-8.82	74	-28.82	0-360	101	V
6	* ** 9.47813	50.33	Pk	36.4	-40.6	46.13	54	-7.87	74	-27.87	0-360	101	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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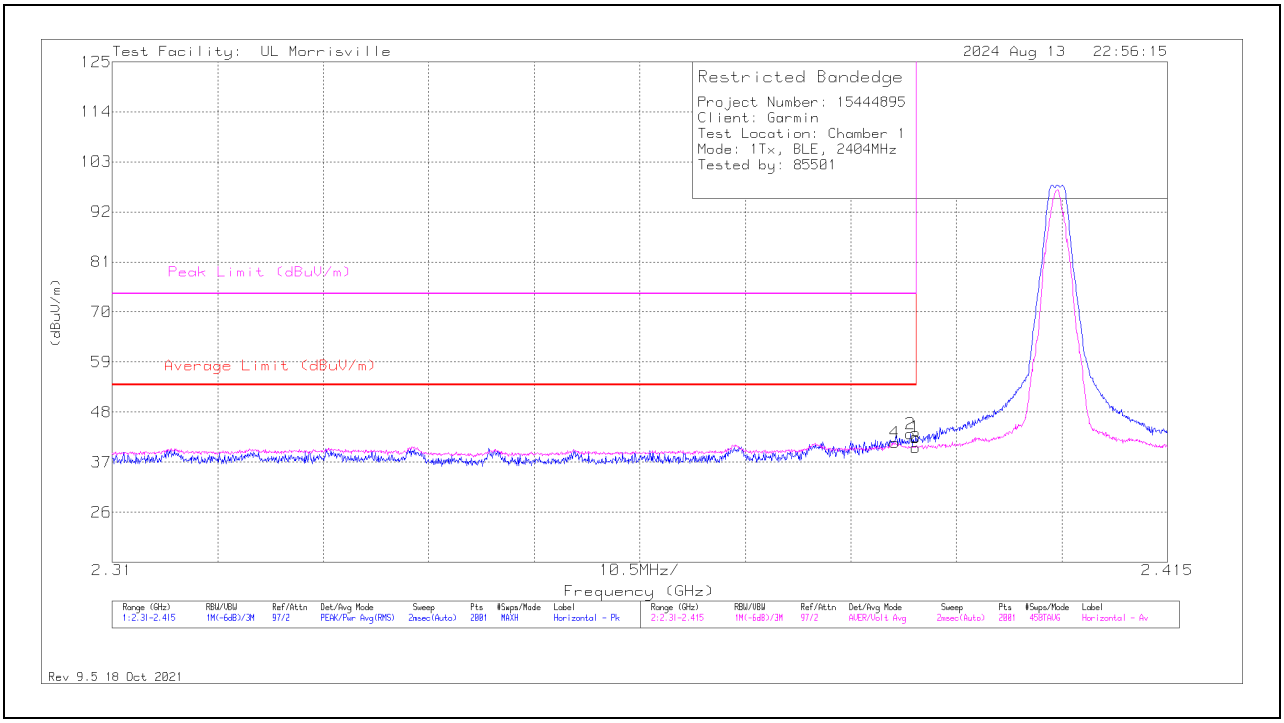
12 Laboratory Dr., RTP, NC 27709, U.S.A. TEL:(919) 549-1400

10.2.2. BLE (2Mbps)

BANDEDGE (LOW CHANNEL)

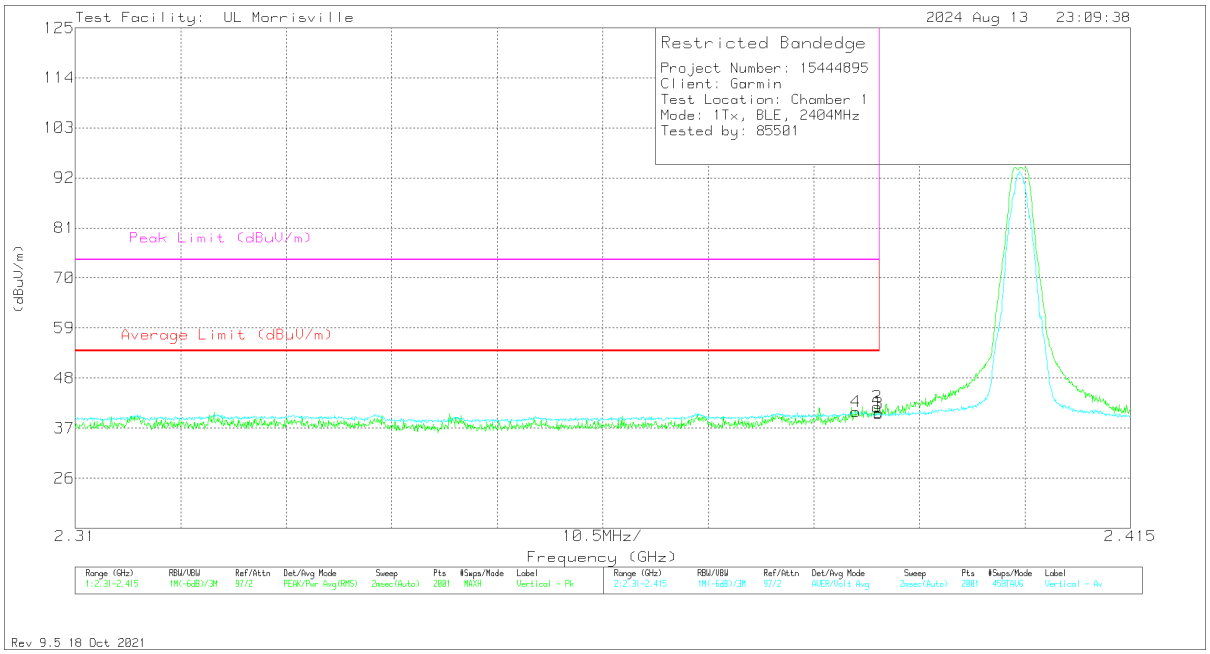
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	135143 (dB/m)	Gain/Loss (dB)	DC Corr (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	34.68	Pk	31.9	-24	0	42.58	-	-	74	-31.42	134	118	H
2	* ** 2.38943	35.32	Pk	31.9	-24	0	43.22	-	-	74	-30.78	134	118	H
3	* ** 2.38996	19.1	ADV	31.9	-24	13.22	40.22	54	-13.78	-	-	134	118	H
4	* ** 2.38786	20.05	ADV	31.9	-23.9	13.22	41.27	54	-12.73	-	-	134	118	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

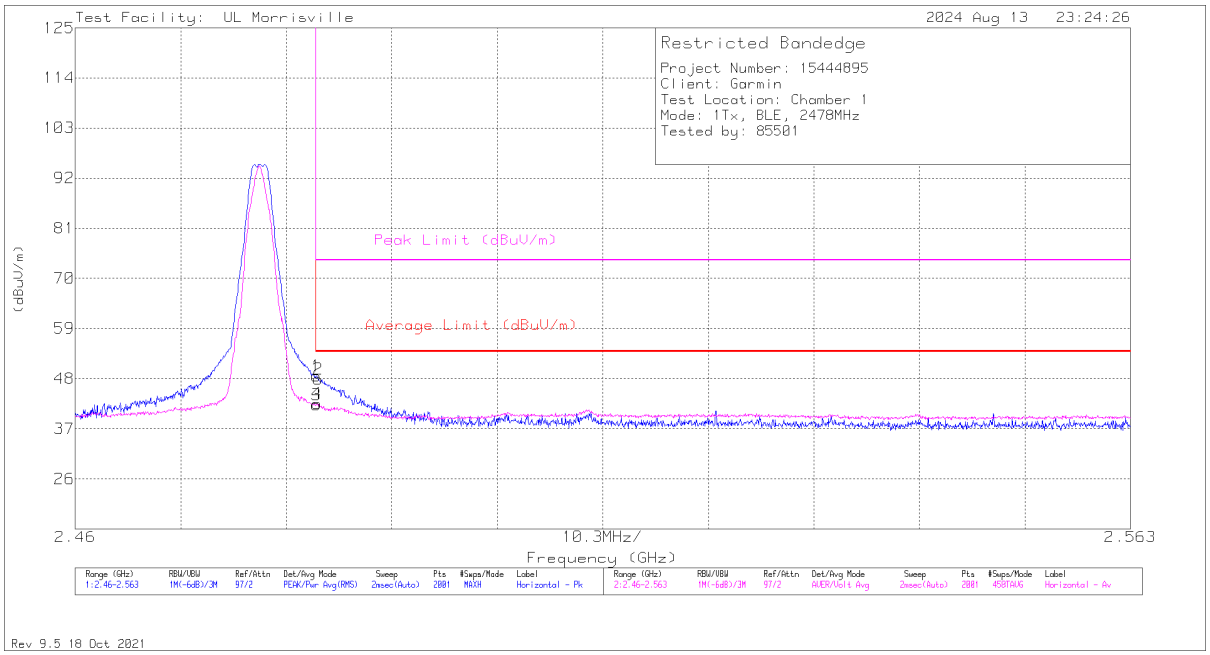


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	135143 (dB/m)	Gain/Loss (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.38996	32.6	Pk	31.9	-24	0	40.5	-	-	74	-33.5	262	110	V
2	* ** 2.3898	33.86	Pk	31.9	-24	0	41.76	-	-	74	-32.24	262	110	V
3	* ** 2.38996	19.12	ADV	31.9	-24	13.22	40.24	54	-13.76	-	-	262	110	V
4	* ** 2.3877	19.41	ADV	31.9	-23.9	13.22	40.63	54	-13.37	-	-	262	110	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)

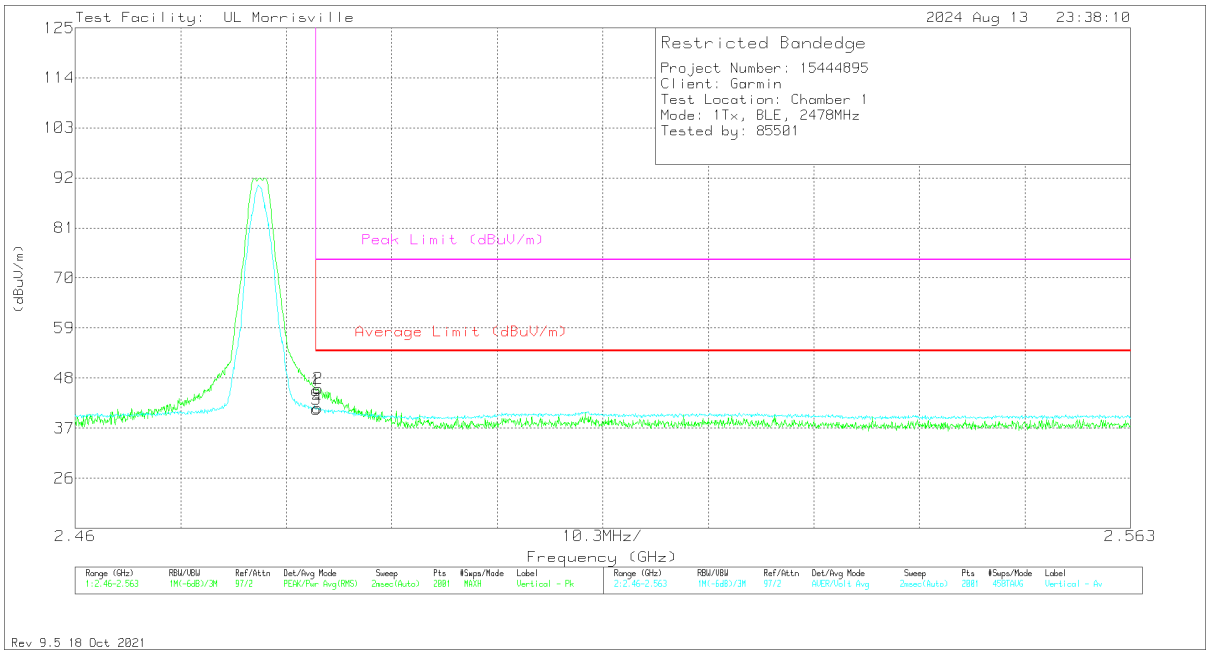
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	135143 (dB/m)	Gain/Loss (dB)	DC Corr (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	40.08	Pk	32.2	-23.7	0	48.58	-	-	74	-25.42	137	155	H
2	* ** 2.48374	39.36	Pk	32.2	-23.7	0	47.86	-	-	74	-26.14	137	155	H
3	* ** 2.48354	20.54	ADV	32.2	-23.7	13.22	42.26	54	-11.74	-	-	137	155	H
4	* ** 2.48359	20.78	ADV	32.2	-23.7	13.22	42.5	54	-11.5	-	-	137	155	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



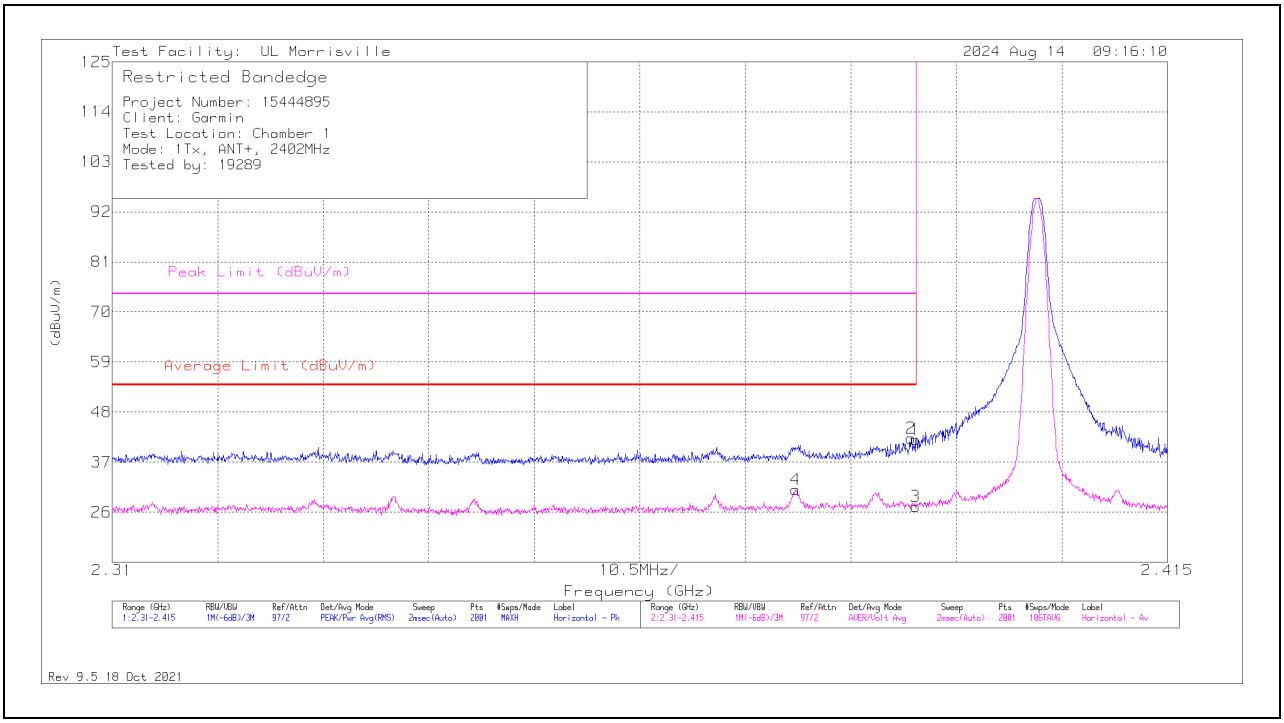
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	135143 (dB/m)	Gain/Loss (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.48354	36.77	Pk	32.2	-23.7	0	45.27	-	-	74	-28.73	267	158	V
2	* ** 2.48374	37.15	Pk	32.2	-23.7	0	45.65	-	-	74	-28.35	267	158	V
3	* ** 2.48354	19.45	ADV	32.2	-23.7	13.22	41.17	54	-12.83	-	-	267	158	V
4	* ** 2.48364	19.76	ADV	32.2	-23.7	13.22	41.48	54	-12.52	-	-	267	158	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

10.2.3. ANT/ANT+

BANDEDGE (LOW CHANNEL)

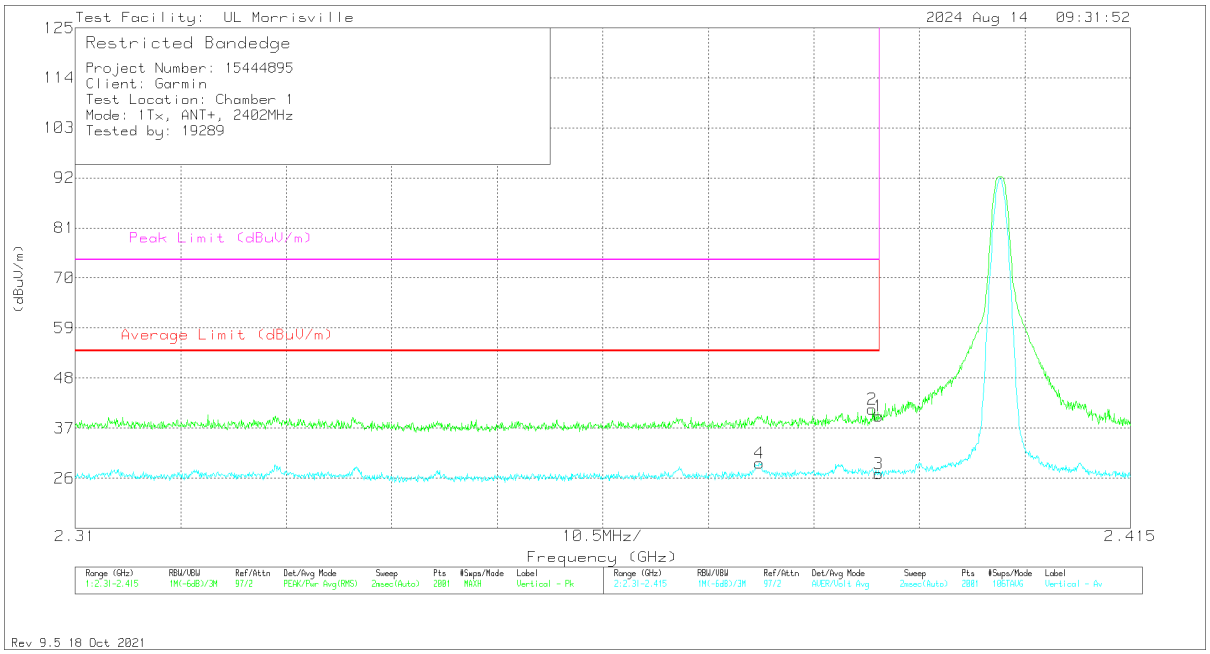
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	135143 (dB/m)	Gain/Loss (dB)	DC Corr (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	34.13	Pk	31.9	-24	0	42.03	-	-	74	-31.97	287	116	H
2	* ** 2.38949	34.41	Pk	31.9	-24	0	42.31	-	-	74	-31.69	287	116	H
3	* ** 2.38996	18.86	ADV	31.9	-24	.51	27.27	54	-26.73	-	-	287	116	H
4	* ** 2.37799	22.79	ADV	31.9	-24.2	.51	31	54	-23	-	-	287	116	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

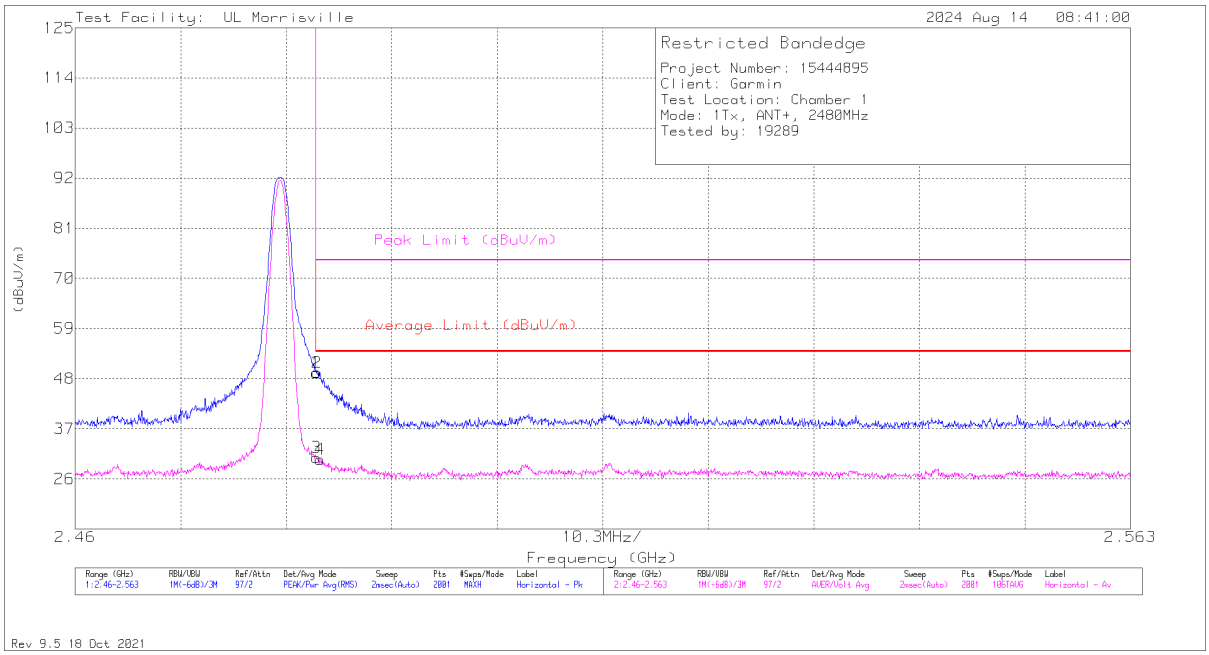


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	135143 (dB/m)	Gain/Loss (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.38996	31.78	Pk	31.9	-24	0	39.68	-	-	74	-34.32	343	103	V
2	* ** 2.38933	33.24	Pk	31.9	-24	0	41.14	-	-	74	-32.86	343	103	V
3	* ** 2.38996	18.59	ADV	31.9	-24	.51	27	54	-27	-	-	343	103	V
4	* ** 2.37809	21.05	ADV	31.9	-24.2	.51	29.26	54	-24.74	-	-	343	103	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)

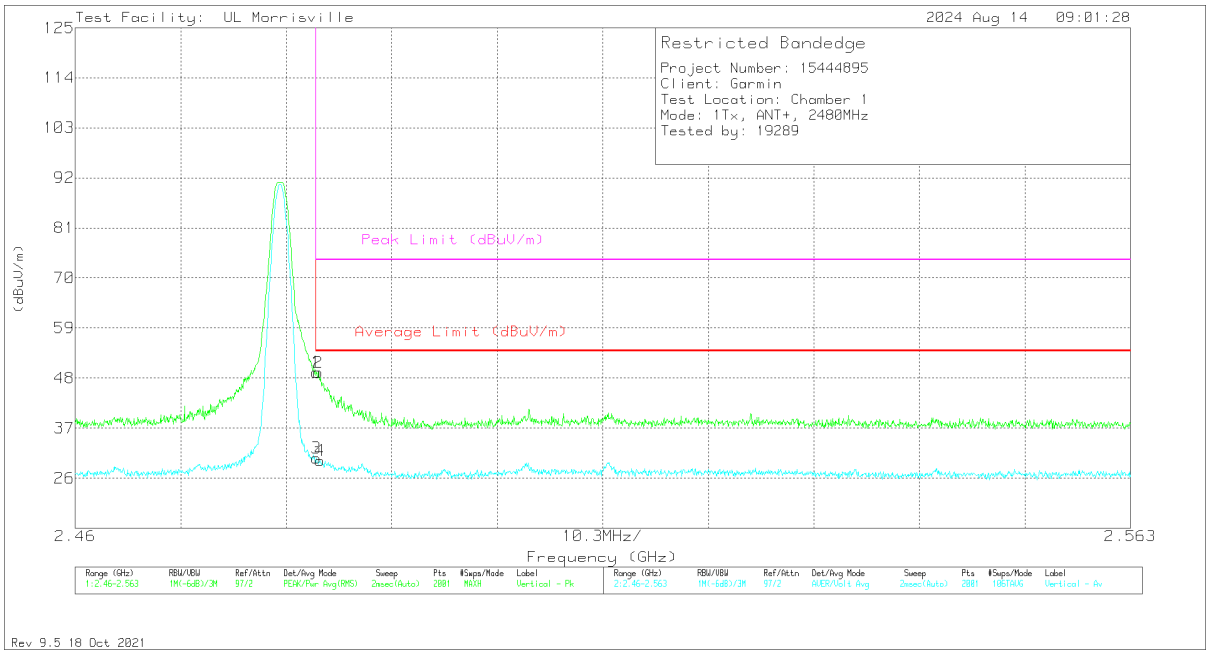
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	135143 (dB/m)	Gain/Loss (dB)	DC Corr (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	40.76	Pk	32.2	-23.7	0	49.26	-	-	74	-24.74	284	133	H
2	* ** 2.48359	40.85	Pk	32.2	-23.7	0	49.35	-	-	74	-24.65	284	133	H
3	* ** 2.48354	21.66	ADV	32.2	-23.7	.51	30.67	54	-23.33	-	-	284	133	H
4	* ** 2.4839	21.25	ADV	32.2	-23.7	.51	30.26	54	-23.74	-	-	284	133	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



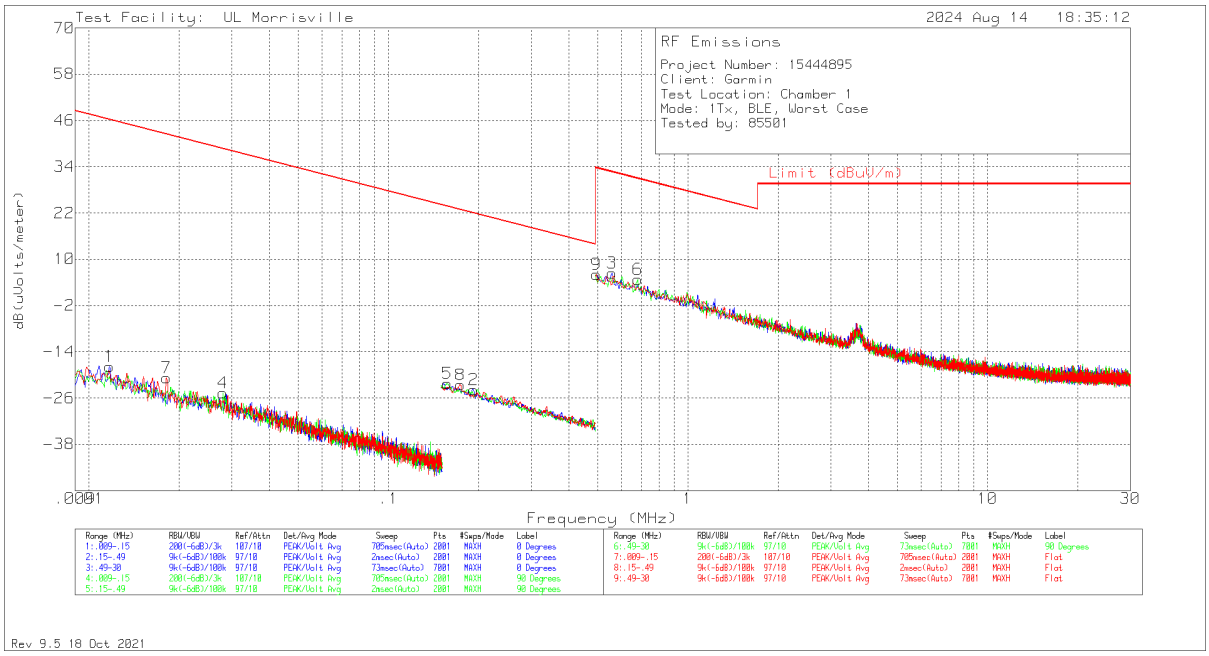
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	135143 (dB/m)	Gain/Loss (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.48354	40.76	Pk	32.2	-23.7	0	49.26	-	-	74	-24.74	97	122	V
2	* ** 2.48374	40.72	Pk	32.2	-23.7	0	49.22	-	-	74	-24.78	97	122	V
3	* ** 2.48354	21.37	ADV	32.2	-23.7	.51	30.38	54	-23.62	-	-	97	122	V
4	* ** 2.4839	20.82	ADV	32.2	-23.7	.51	29.83	54	-24.17	-	-	97	122	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

10.3. WORST CASE BELOW 30MHZ (BLE)

SPURIOUS EMISSIONS BELOW 30 MHz (WORST-CASE CONFIGURATION)

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).

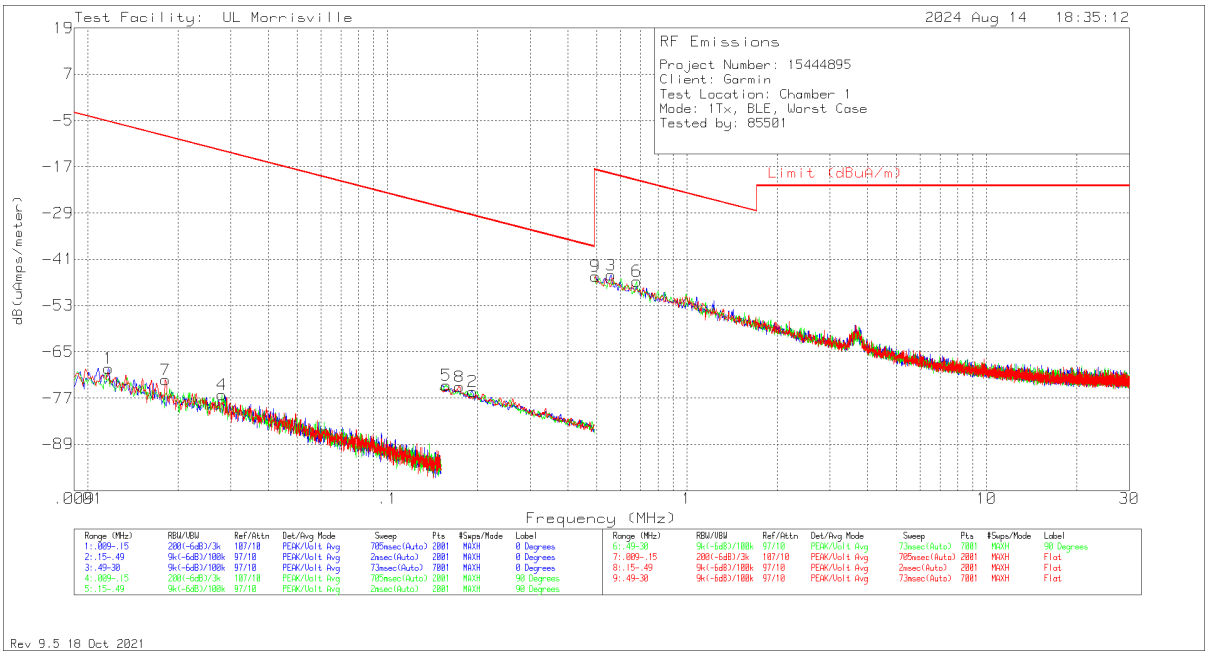


ANTENNA - THREE ORIENTATIONS – E FIELD

Below 30MHz Data

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	.0117	44.32	Pk	17.7	.1	-80	-17.88	46.24	66.24	-64.12	0-360	0 degs
7	.01816	44.28	Pk	14.8	.1	-80	-20.82	42.42	62.42	-63.24	0-360	Flat
4	.02803	41.68	Pk	13.6	.1	-80	-24.62	38.65	58.65	-63.27	0-360	90 degs
5	.15689	46.53	Pk	11.1	.1	-80	-22.27	23.69	43.69	-45.96	0-360	90 degs
8	.17414	46.18	Pk	11.1	.1	-80	-22.62	22.79	42.79	-45.41	0-360	Flat
2	.19216	45	Pk	11.1	.1	-80	-23.8	21.93	41.93	-45.73	0-360	0 degs
9	.49422	34.84	Pk	11.1	.1	-40	6.04	33.73	-	-27.69	0-360	Flat
3	.55746	35.14	Pk	11.1	.1	-40	6.34	32.68	-	-26.34	0-360	0 degs
6	.67972	33.43	Pk	11.2	.1	-40	4.73	30.96	-	-26.23	0-360	90 degs

Pk - Peak detector



ANTENNA - THREE ORIENTATIONS – H FIELD

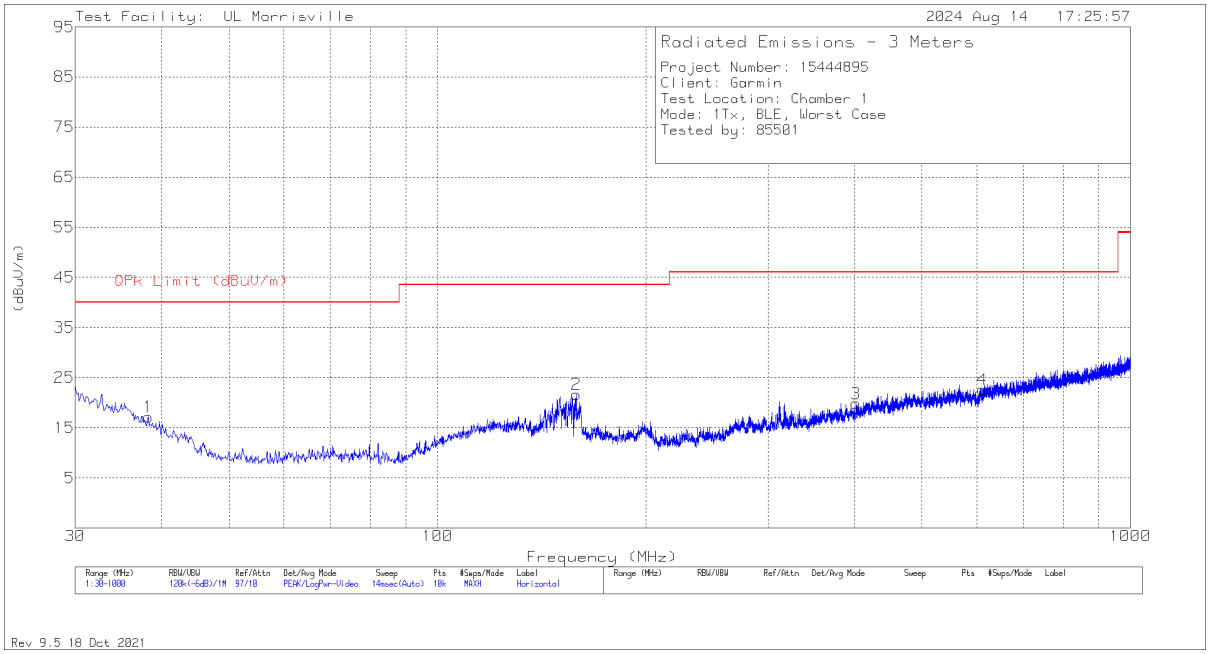
Below 30MHz Data

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	.0117	44.32	Pk	-33.8	.1	-80	-69.38	-5.26	14.74	-64.12	0-360	0 degs
7	.01816	44.28	Pk	-36.7	.1	-80	-72.32	-9.08	10.92	-63.24	0-360	Flat
4	.02803	41.68	Pk	-37.9	.1	-80	-76.12	-12.85	7.15	-63.27	0-360	90 degs
5	.15689	46.53	Pk	-40.4	.1	-80	-73.77	-27.81	-7.81	-45.96	0-360	90 degs
8	.17414	46.18	Pk	-40.4	.1	-80	-74.12	-28.71	-8.71	-45.41	0-360	Flat
2	.19216	45	Pk	-40.4	.1	-80	-75.3	-29.57	-9.57	-45.73	0-360	0 degs
9	.49422	34.84	Pk	-40.4	.1	-40	-45.46	-17.77	-	-27.69	0-360	Flat
3	.55746	35.14	Pk	-40.4	.1	-40	-45.16	-18.82	-	-26.34	0-360	0 degs
6	.67972	33.43	Pk	-40.3	.1	-40	-46.77	-20.54	-	-26.23	0-360	90 degs

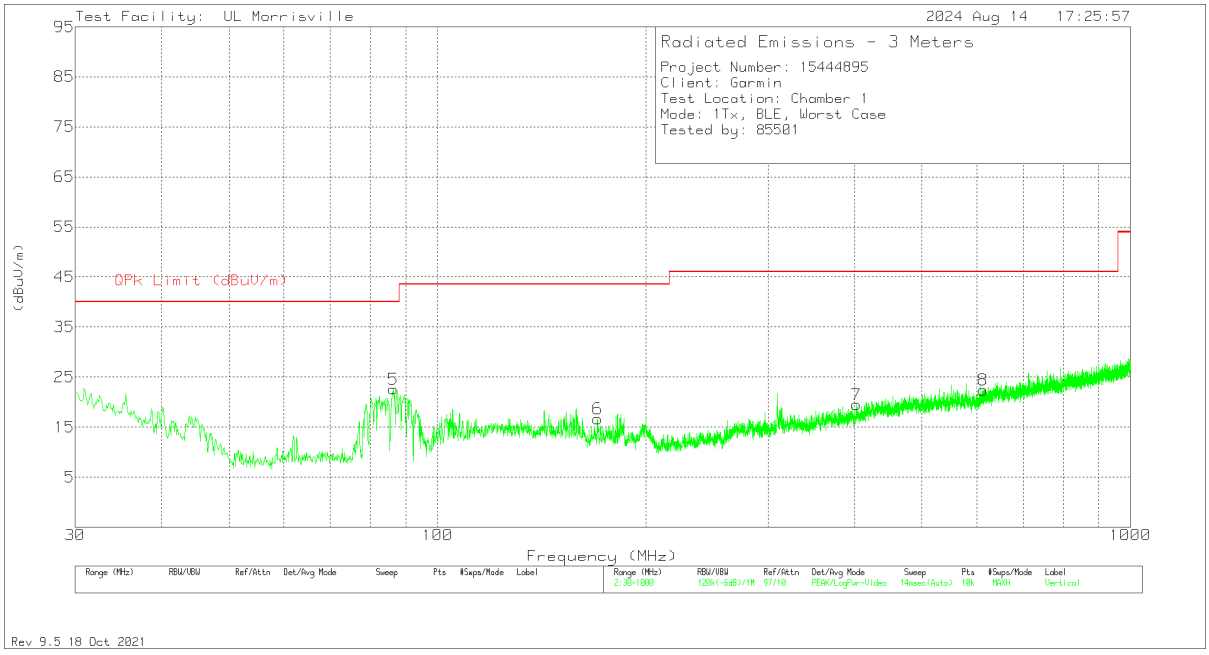
Pk - Peak detector

10.4. WORST CASE BELOW 1 GHZ (BLE)

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



HORIZONTAL



VERTICAL

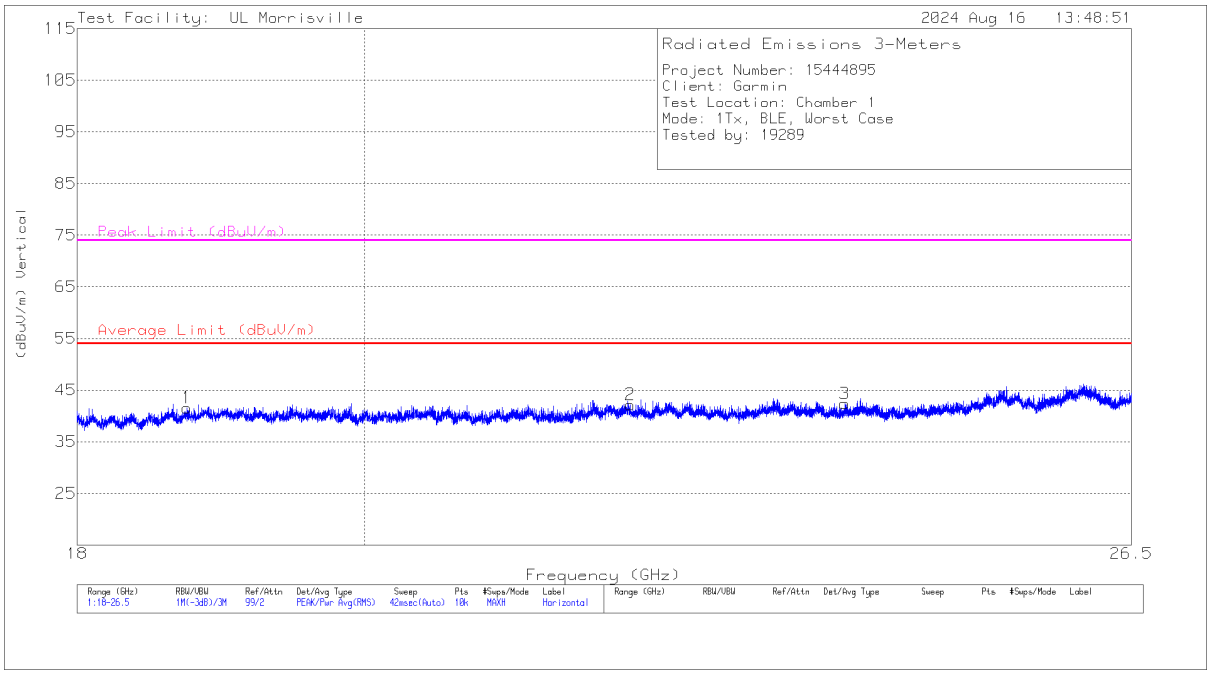
Below 1GHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	90629 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 38.245	27.85	Pk	21	-31.7	17.15	40	-22.85	0-360	200	H
3	* ** 401.995	27.24	Pk	21.5	-28.9	19.84	46.02	-26.18	0-360	399	H
4	* ** 612	25.9	Pk	25.1	-28.4	22.6	46.02	-23.42	0-360	200	H
6	* ** 170.165	28.82	Pk	18.1	-30.3	16.62	43.52	-26.9	0-360	100	V
7	* ** 402.674	26.77	Pk	21.6	-28.9	19.47	46.02	-26.55	0-360	100	V
8	* ** 612.873	25.47	Pk	25.1	-28.2	22.37	46.02	-23.65	0-360	100	V
5	86.357	40.29	Pk	13.6	-31.3	22.59	40	-17.41	0-360	100	V
2	158.525	33.72	Pk	18.4	-30.5	21.62	43.52	-21.9	0-360	200	H

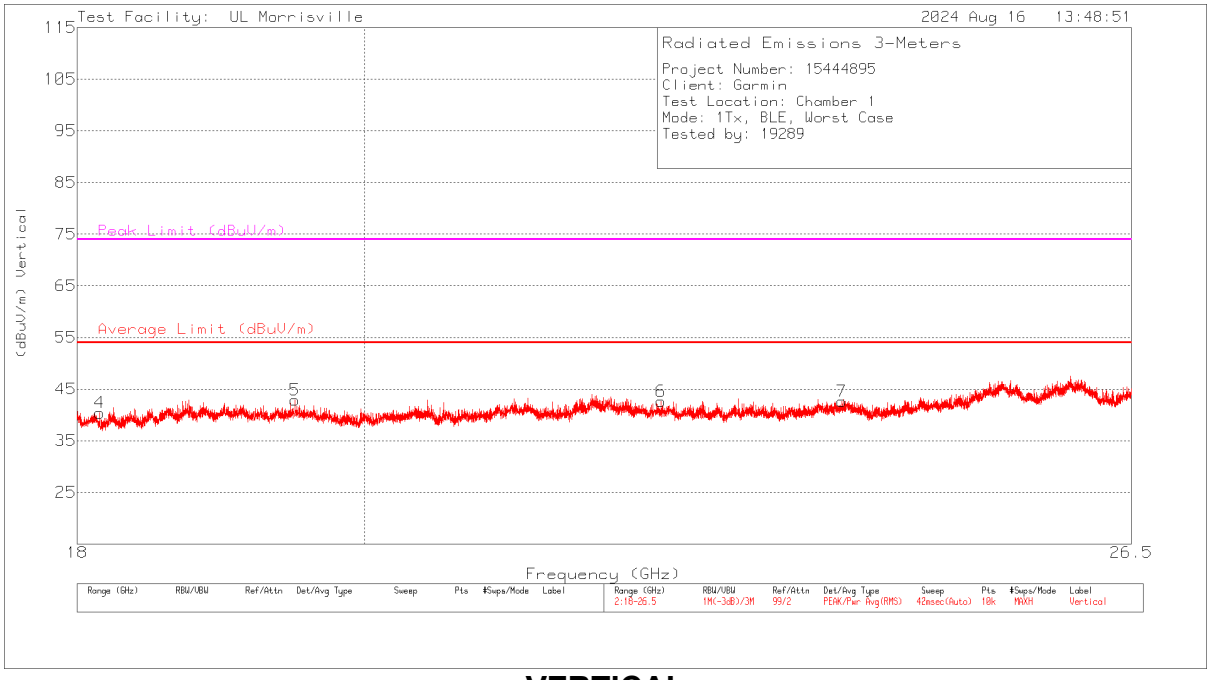
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
Pk - Peak detector

10.5. WORST CASE 18-26 GHZ (BLE)

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



HORIZONTAL



VERTICAL

18 – 26GHz Data

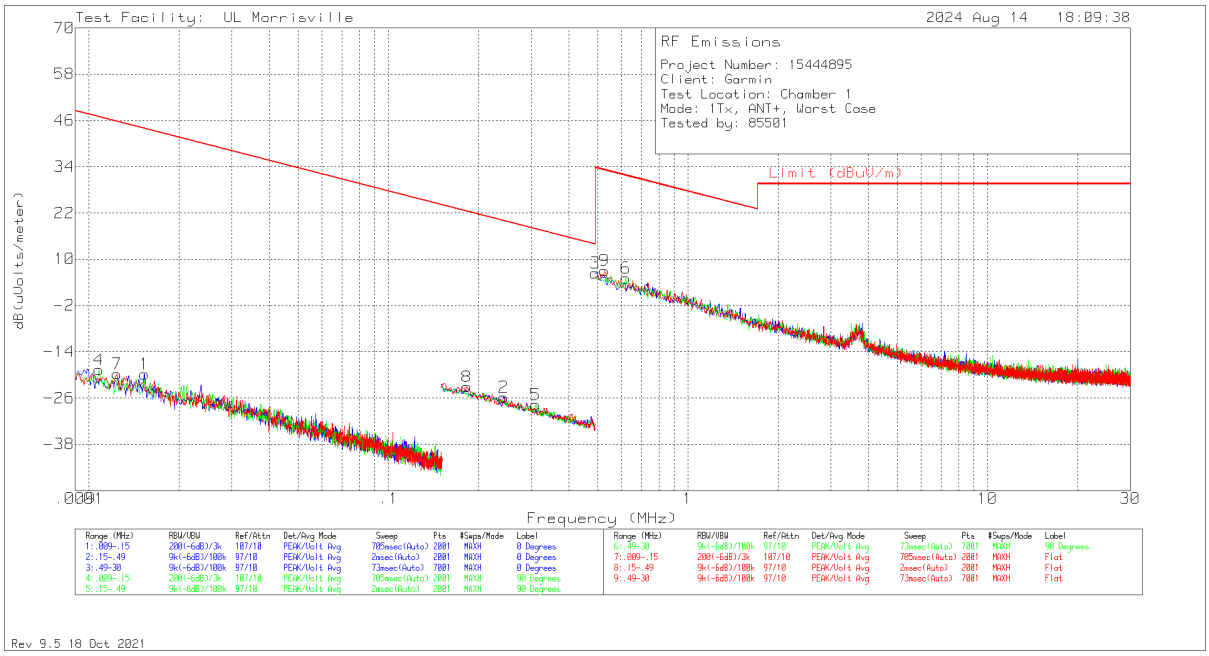
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	204704 (dB/m)	Gain/Loss (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 18.73943	48.47	Pk	33.2	-40.1	0	41.57	54	-12.43	74	-32.43	0-360	250	H
2	* ** 22.04985	48.17	Pk	34.2	-40.2	0	42.17	54	-11.83	74	-31.83	0-360	250	H
3	* ** 23.85421	47.88	Pk	34.4	-39.9	0	42.38	54	-11.62	74	-31.62	0-360	299	H
4	* ** 18.14789	47.6	Pk	32.9	-40.1	0	40.4	54	-13.6	74	-33.6	0-360	250	V
5	* ** 19.49585	49.65	Pk	33.3	-40.1	0	42.85	54	-11.15	74	-31.15	0-360	101	V
6	* ** 22.29887	48.62	Pk	34.2	-40.2	0	42.62	54	-11.38	74	-31.38	0-360	150	V
7	* ** 23.82787	48.13	Pk	34.4	-39.9	0	42.63	54	-11.37	74	-31.37	0-360	101	V

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

10.6. WORST CASE BELOW 30MHZ (ANT/ANT+)

SPURIOUS EMISSIONS BELOW 30 MHz (WORST-CASE CONFIGURATION)

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).

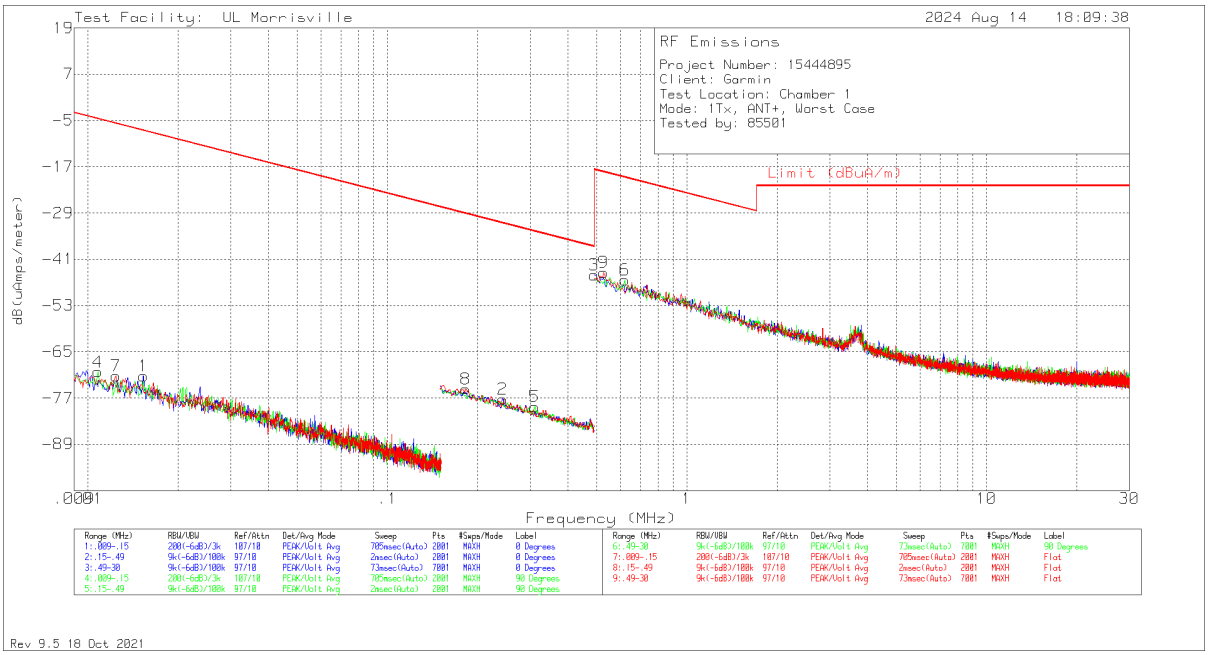


ANTENNA - THREE ORIENTATIONS – E FIELD

Below 30MHz Data

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
4	.01078	43.08	Pk	18.1	.1	-80	-18.72	46.96	66.96	-65.68	0-360	90 degs
7	.01241	42.78	Pk	17.4	.1	-80	-19.72	45.73	65.73	-65.45	0-360	Flat
1	.01532	44.05	Pk	16.1	.1	-80	-19.75	43.9	63.9	-63.65	0-360	0 degs
8	.18264	45.68	Pk	11.1	.1	-80	-23.12	22.37	42.37	-45.49	0-360	Flat
2	.24299	42.99	Pk	11.1	.1	-80	-25.81	19.89	39.89	-45.7	0-360	0 degs
5	.31057	41.11	Pk	11.1	.1	-80	-27.69	17.76	37.76	-45.45	0-360	90 degs
3	.49	35.16	Pk	11.1	.1	-40	6.36	13.8	33.8	-7.44	0-360	0 degs
9	.52794	35.9	Pk	11.1	.1	-40	7.1	33.15	-	-26.05	0-360	Flat
6	.6207	33.86	Pk	11.2	.1	-40	5.16	31.75	-	-26.59	0-360	90 degs

Pk - Peak detector



ANTENNA - THREE ORIENTATIONS – H FIELD

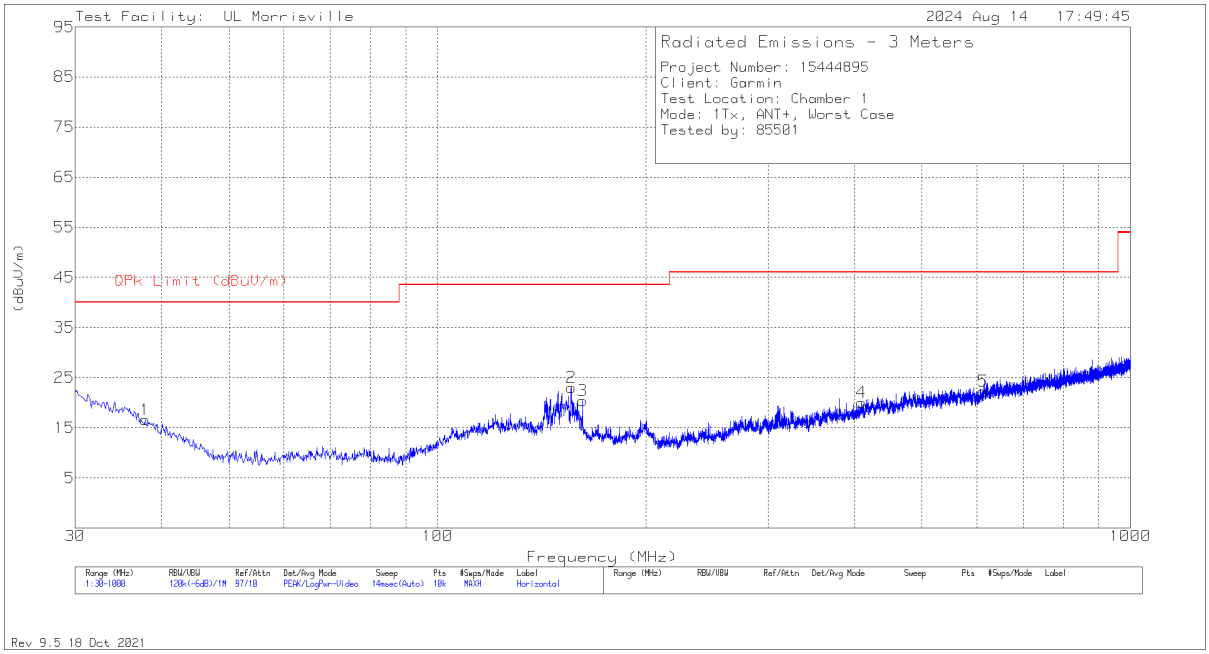
Below 30MHz Data

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
4	.01078	43.08	Pk	-33.4	.1	-80	-70.22	-4.54	15.46	-65.68	0-360	90 degs
7	.01241	42.78	Pk	-34.1	.1	-80	-71.22	-5.77	14.23	-65.45	0-360	Flat
1	.01532	44.05	Pk	-35.4	.1	-80	-71.25	-7.6	12.4	-63.65	0-360	0 degs
8	.18264	45.68	Pk	-40.4	.1	-80	-74.62	-29.13	-9.13	-45.49	0-360	Flat
2	.24299	42.99	Pk	-40.4	.1	-80	-77.31	-31.61	-11.61	-45.7	0-360	0 degs
5	.31057	41.11	Pk	-40.4	.1	-80	-79.19	-33.74	-13.74	-45.45	0-360	90 degs
3	.49	35.16	Pk	-40.4	.1	-40	-45.14	-37.7	-17.7	-7.44	0-360	0 degs
9	.52794	35.9	Pk	-40.4	.1	-40	-44.4	-18.35	-	-26.05	0-360	Flat
6	.6207	33.86	Pk	-40.3	.1	-40	-46.34	-19.75	-	-26.59	0-360	90 degs

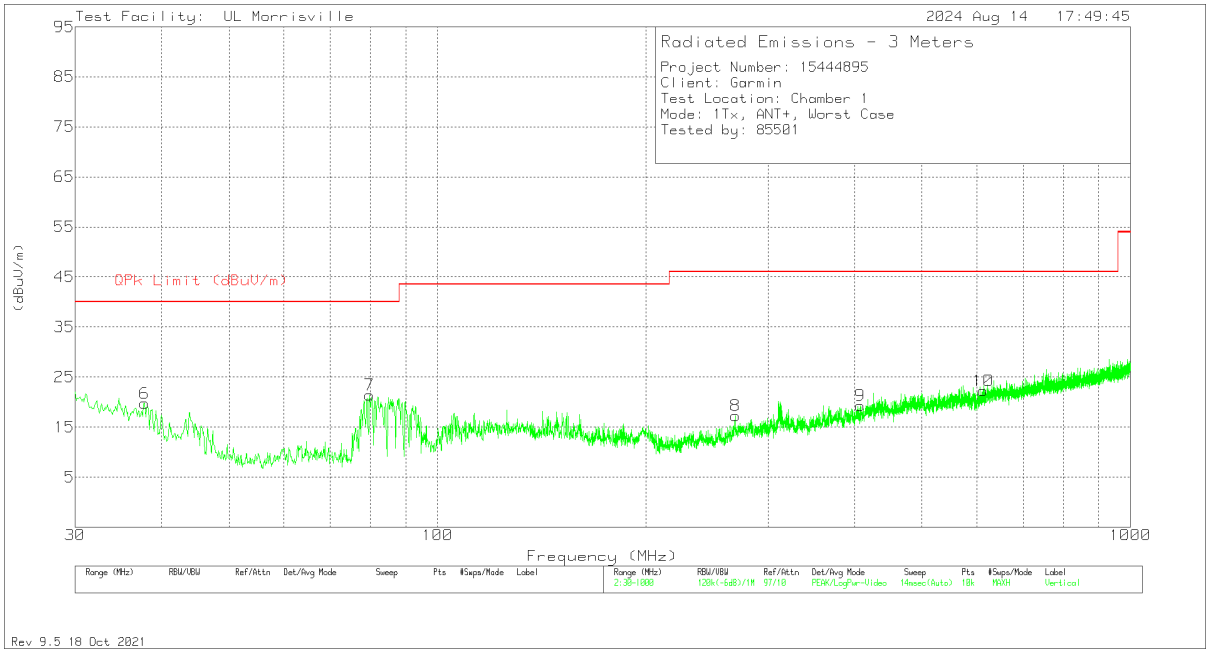
Pk - Peak detector

10.7. WORST CASE BELOW 1 GHZ (ANT/ANT+)

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



HORIZONTAL



VERTICAL

Below 1GHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	90629 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 37.857	27.09	Pk	21.3	-31.8	16.59	40	-23.41	0-360	200	H
3	* ** 162.017	32	Pk	18.5	-30.1	20.4	43.52	-23.12	0-360	200	H
4	* ** 408.979	27.01	Pk	21.7	-28.7	20.01	46.02	-26.01	0-360	399	H
5	* ** 612.776	25.53	Pk	25.1	-28.3	22.33	46.02	-23.69	0-360	299	H
6	* ** 37.76	30.12	Pk	21.4	-31.8	19.72	40	-20.28	0-360	100	V
8	* ** 269.202	27.41	Pk	19.2	-29.3	17.31	46.02	-28.71	0-360	100	V
9	* ** 407.524	26.53	Pk	21.7	-29	19.23	46.02	-26.79	0-360	100	V
10	* ** 612.679	25.43	Pk	25.1	-28.3	22.23	46.02	-23.79	0-360	100	V
7	79.761	38.27	Pk	14	-30.9	21.37	40	-18.63	0-360	100	V
2	155.906	34.96	Pk	18.5	-30.4	23.06	43.52	-20.46	0-360	200	H

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

11. SETUP PHOTOS

Please refer to R15444895-EP1 for setup photos

END OF TEST REPORT