TEST REPORT

Report Number: R15444890-E1

Applicant	:	Garmin International Inc 1200 E 151st St Olathe, Kansas 66062-3426, United States
Model	:	A04882
FCC ID	:	IPH-04882
IC	:	1792A-04882
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
12 Laboratory Dr.
Research Triangle Park, NC 27709 U.S.A.
TEL: (919) 549-1400

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: A04882

SERIAL NUMBER: 3475112672

SAMPLE RECEIPT DATE: 2024-08-13

DATE TESTED: 2024-08-14 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 -5.3 dBi.

6.4. SOFTWARE AND FIRMWARE

Software Version: 211

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 X orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in X 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	N/A

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 15444890-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
18-26.5 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.

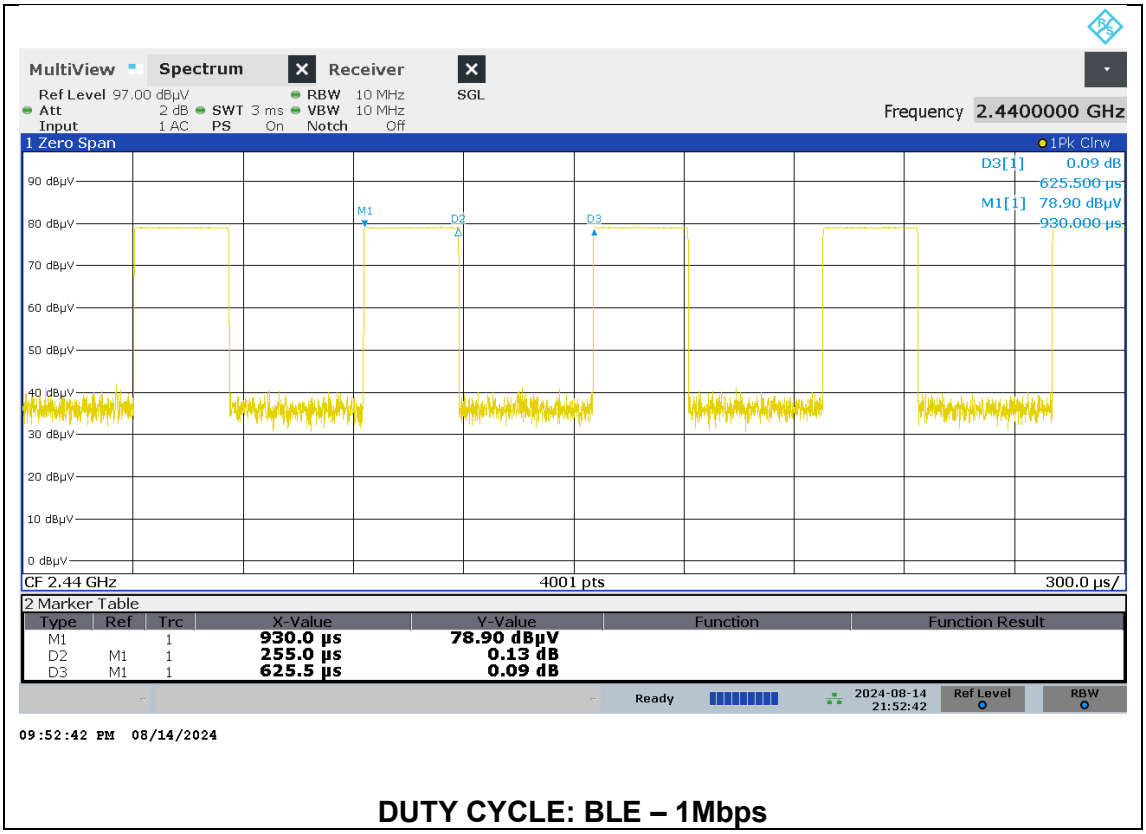
PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

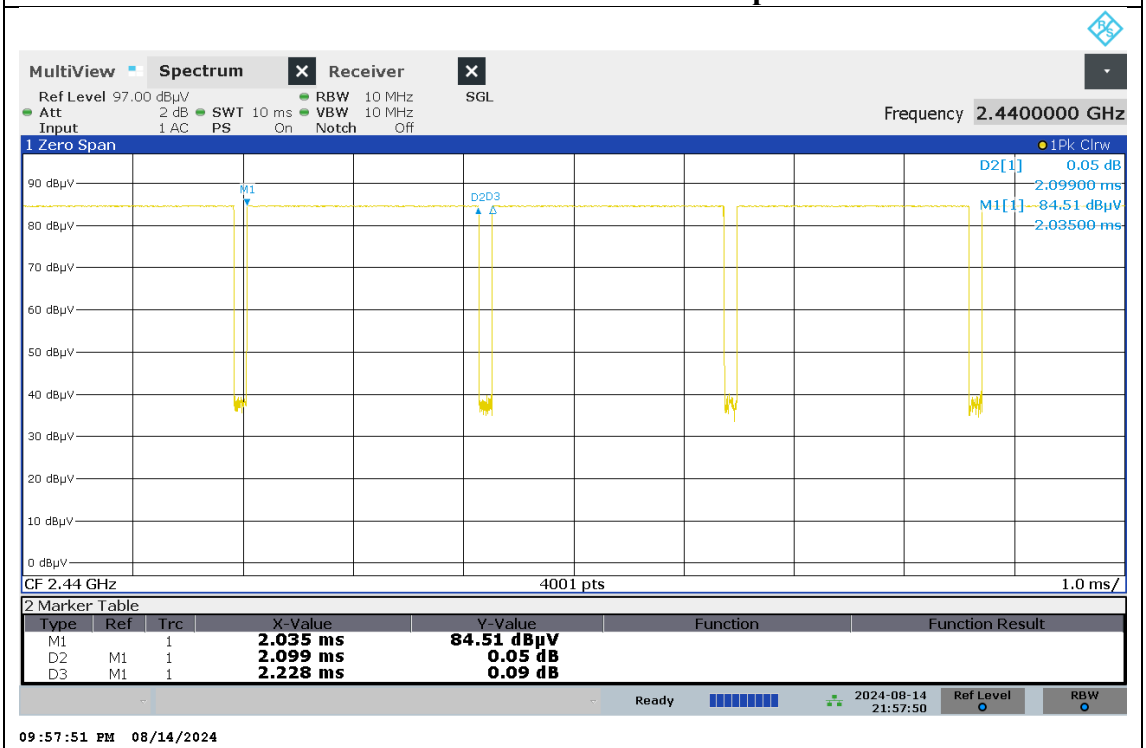
Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
2.4GHz Band						
BLE - 1 Mbps	0.255	0.626	0.408	40.77	7.79	3.922
BLE - 2 Mbps	0.137	0.626	0.218	21.82	13.22	7.326
ANT/ANT+	2.099	2.228	0.942	94.21	0.52	0.476

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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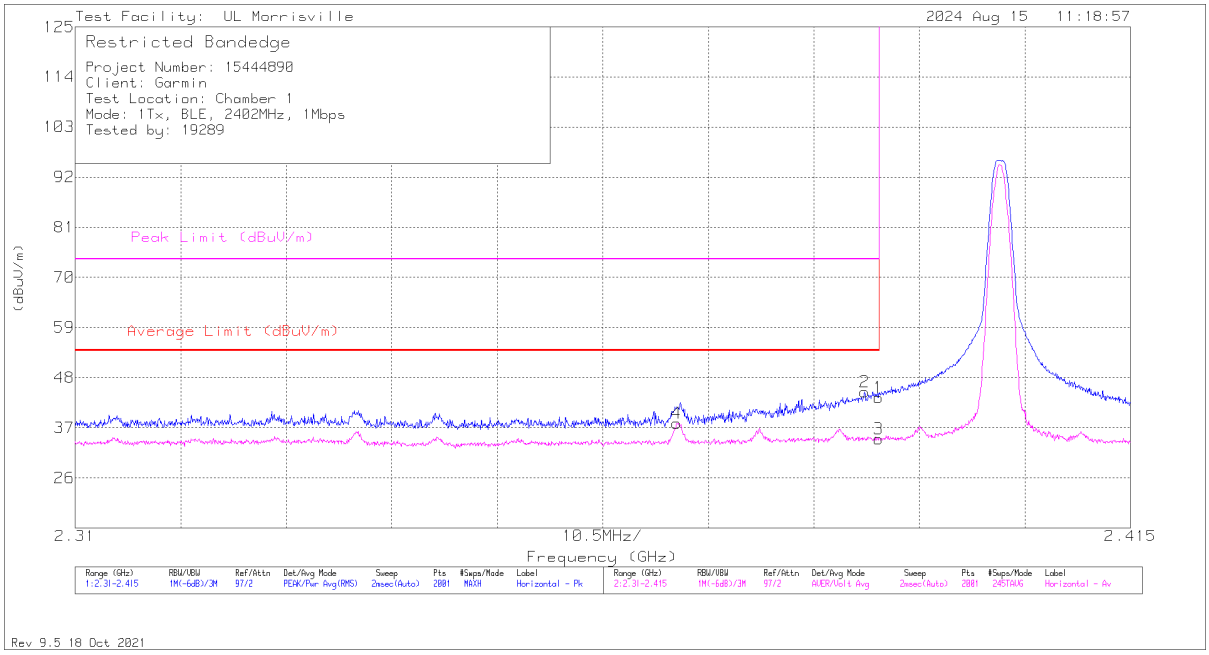
10.2. TRANSMITTER ABOVE 1 GHz

10.2.1. BLE (1Mbps)

BANDEDGE (LOW CHANNEL)

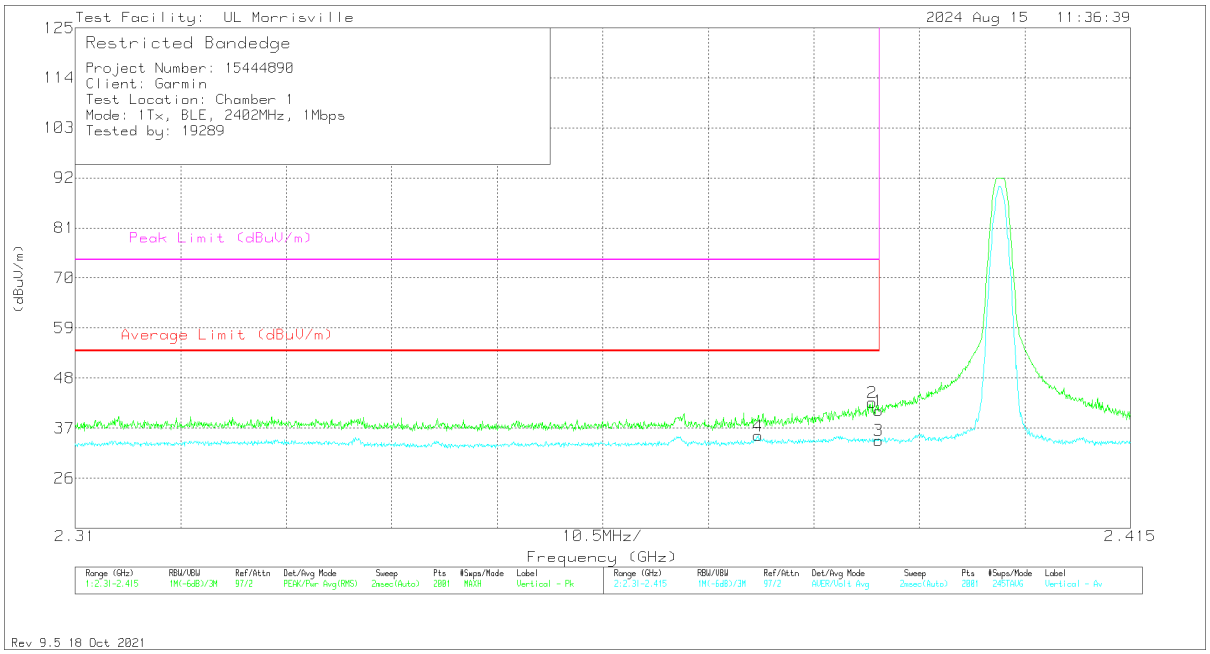
HORIZONTAL RESULT



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	35.77	Pk	31.9	-24	0	43.67	-	-	74	-30.33	187	169	H
2	* ** 2.38854	36.99	Pk	31.9	-24	0	44.89	-	-	74	-29.11	187	169	H
3	* ** 2.38996	18.86	ADV	31.9	-24	7.79	34.55	54	-19.45	-	-	187	169	H
4	* ** 2.36985	22.61	ADV	31.9	-24.3	7.79	38	54	-16	-	-	187	169	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	32.9	Pk	31.9	-24	0	40.8	-	-	74	-33.2	159	325	V
2	* ** 2.38933	34.7	Pk	31.9	-24	0	42.6	-	-	74	-31.4	159	325	V
3	* ** 2.38996	18.61	ADV	31.9	-24	7.79	34.3	54	-19.7	-	-	159	325	V
4	* ** 2.37794	19.81	ADV	31.9	-24.2	7.79	35.3	54	-18.7	-	-	159	325	V

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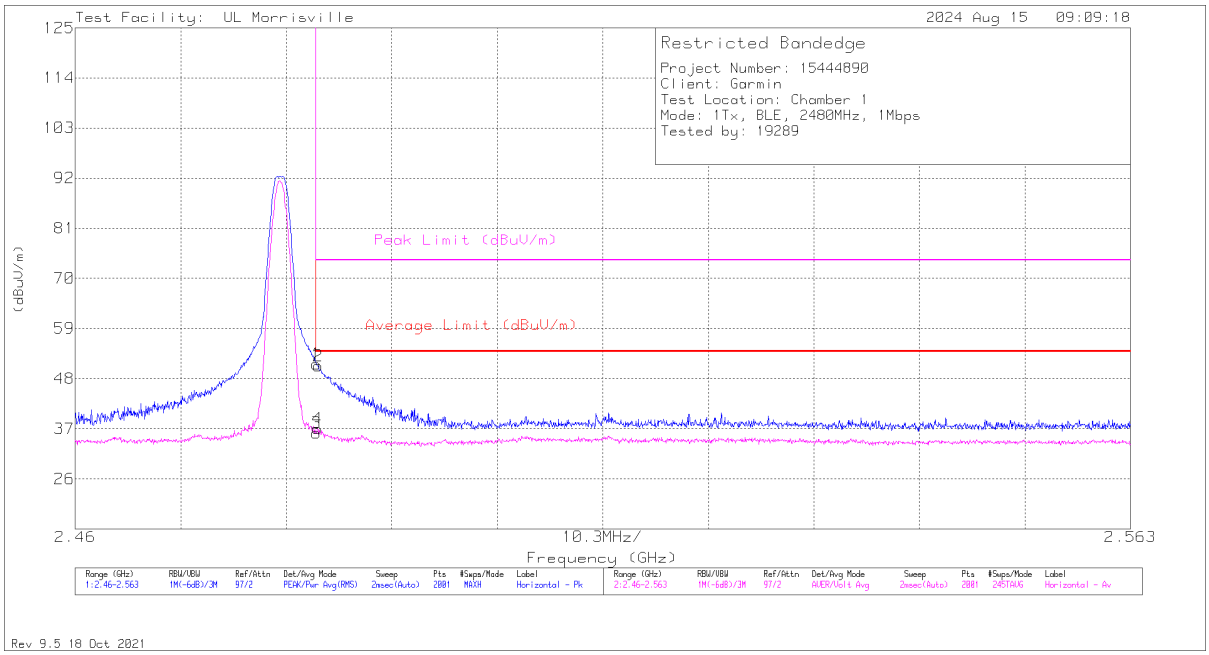
BANDEDGE (HIGH CHANNEL)

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	42.75	Pk	32.2	-23.7	0	51.25	-	-	74	-22.75	147	297	H
2	* ** 2.48374	42.34	Pk	32.2	-23.7	0	50.84	-	-	74	-23.16	147	297	H
3	* ** 2.48354	19.8	ADV	32.2	-23.7	7.79	36.09	54	-17.91	-	-	147	297	H
4	* ** 2.48364	20.73	ADV	32.2	-23.7	7.79	37.02	54	-16.98	-	-	147	297	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
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Pk - Peak detector
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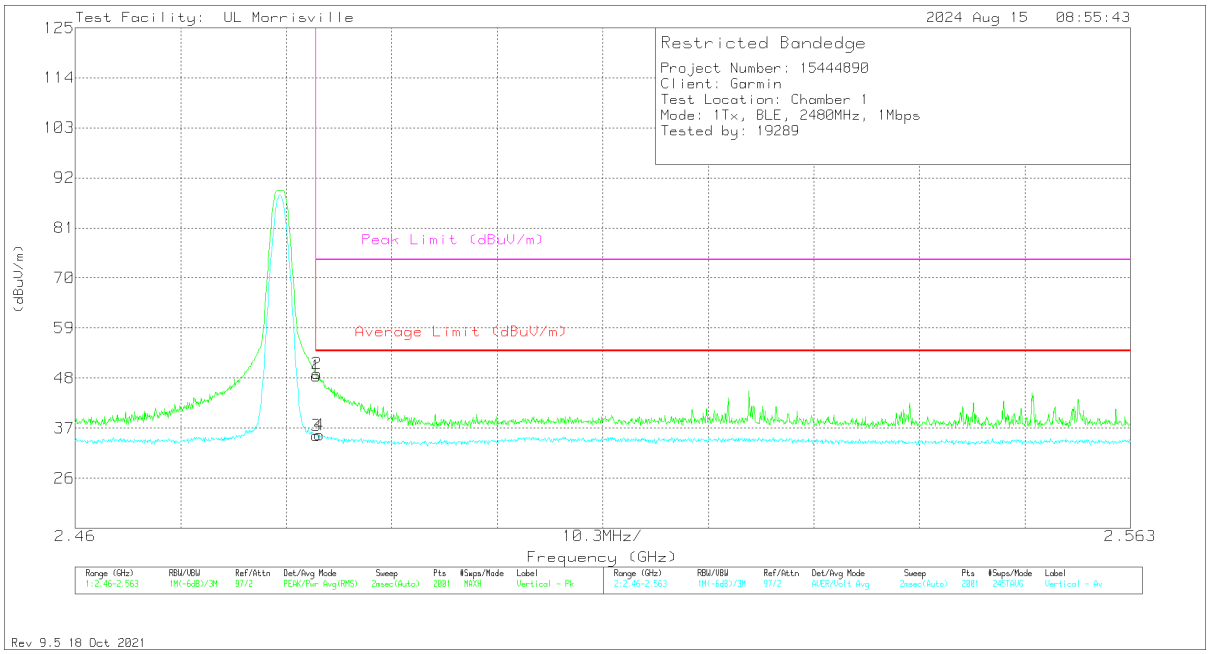
VERTICAL RESULT



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	39.9	Pk	32.2	-23.7	0	48.4	-	-	74	-25.6	116	379	V
2	* ** 2.48359	40.52	Pk	32.2	-23.7	0	49.02	-	-	74	-24.98	116	379	V
3	* ** 2.48354	19.12	ADV	32.2	-23.7	7.79	35.41	54	-18.59	-	-	116	379	V
4	* ** 2.48384	19.27	ADV	32.2	-23.7	7.79	35.56	54	-18.44	-	-	116	379	V

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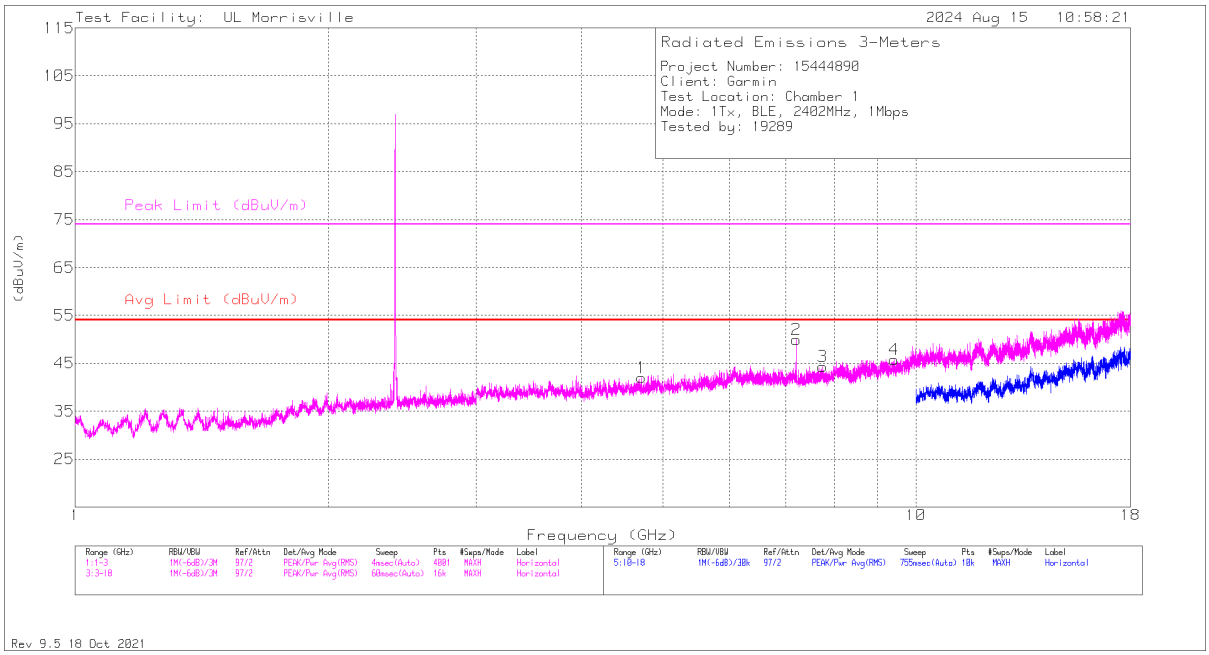
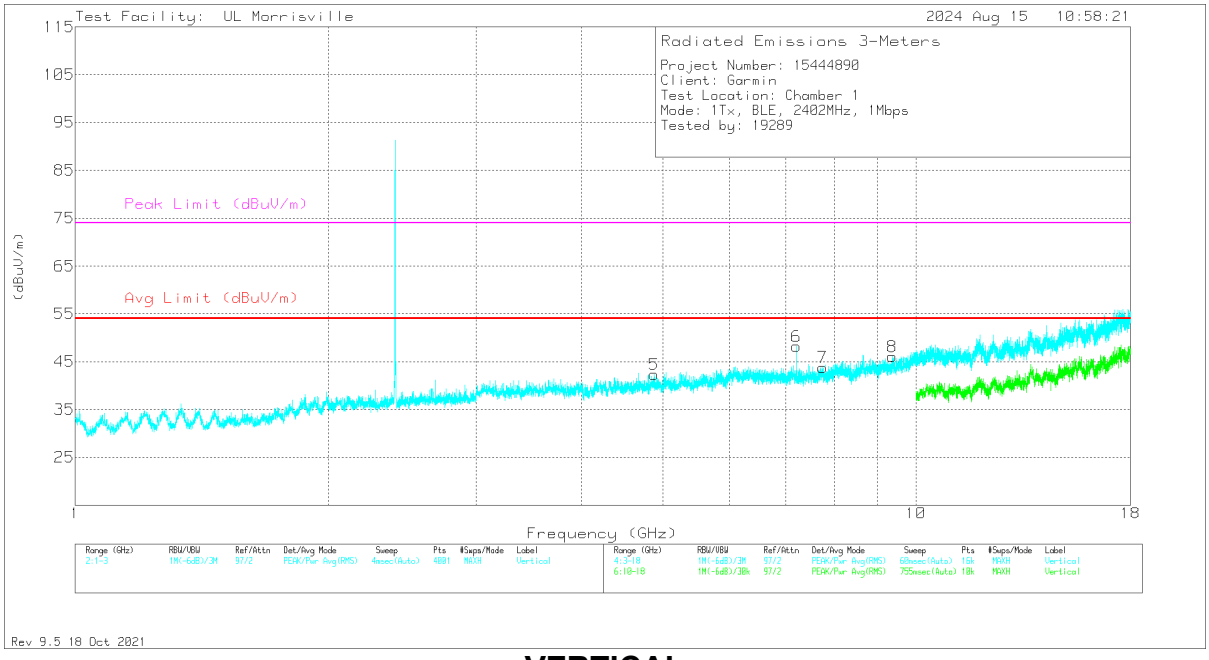
ADV - Linear Voltage Average

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZONTAL



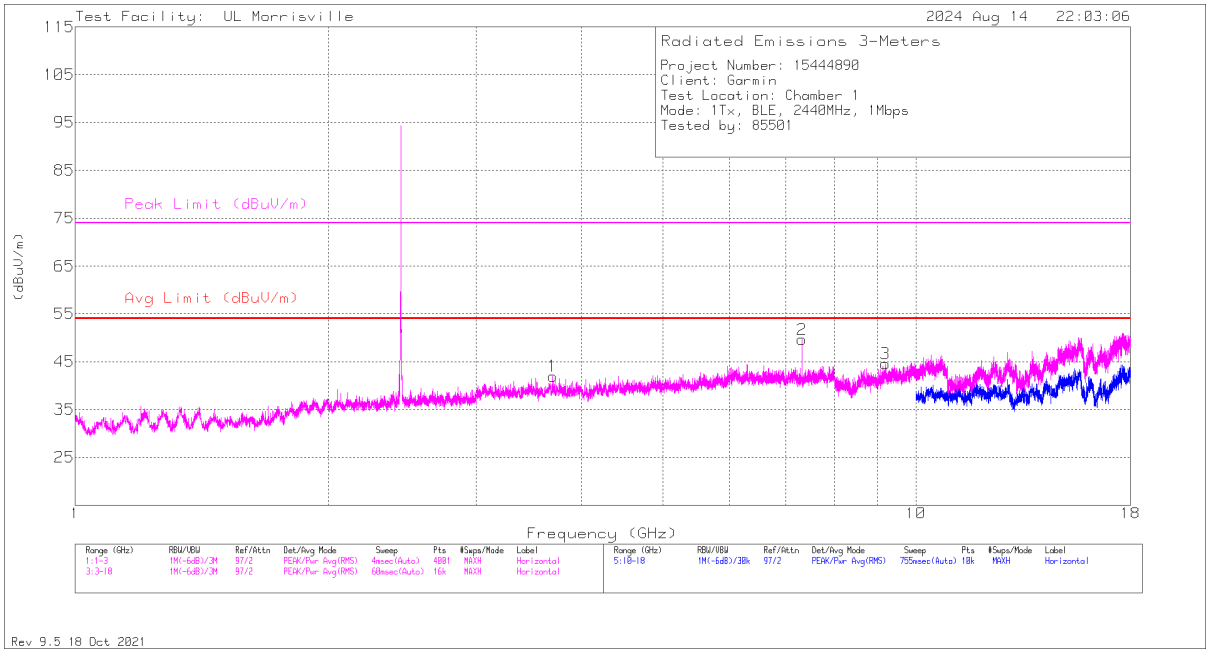
VERTICAL

RADIATED EMISSIONS

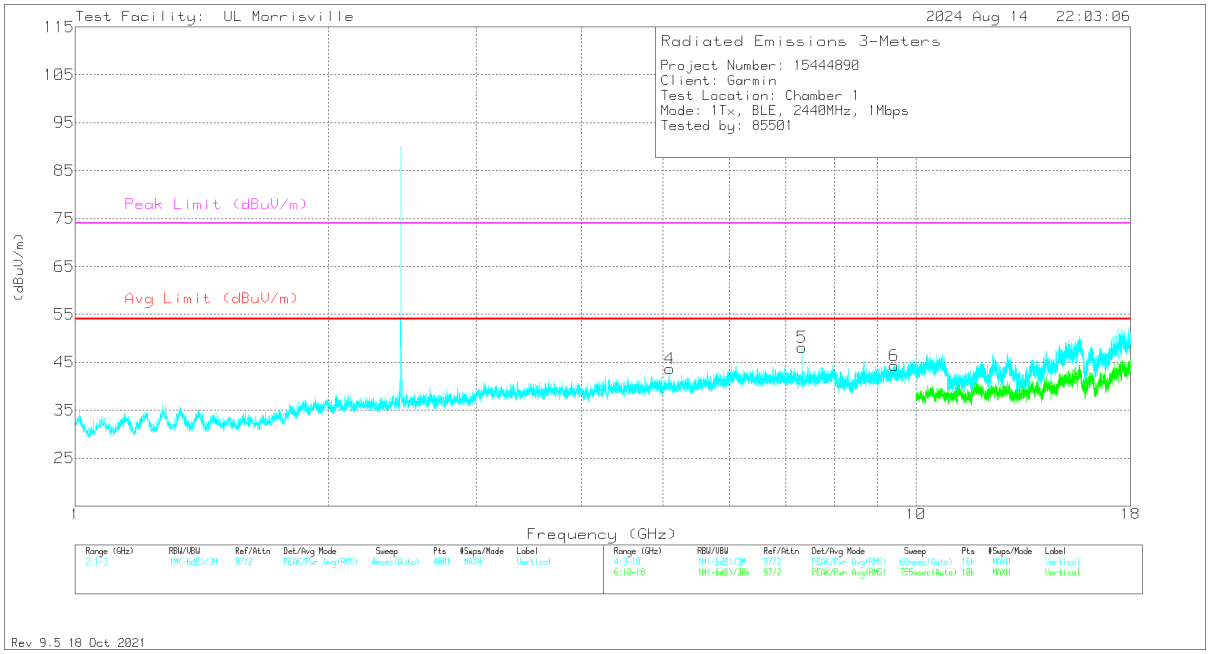
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	135143 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 4.71469	53.22	Pk	33.8	-45	42.02	54	-11.98	74	-31.98	0-360	199	H
3	* ** 7.74844	49.66	Pk	35.7	-41	44.36	54	-9.64	74	-29.64	0-360	199	H
4	* ** 9.42938	49.83	Pk	36.3	-40.4	45.73	54	-8.27	74	-28.27	0-360	199	H
5	* ** 4.87875	53	Pk	34	-44.7	42.3	54	-11.7	74	-31.7	0-360	101	V
7	* ** 7.74188	49.14	Pk	35.7	-41	43.84	54	-10.16	74	-30.16	0-360	200	V
8	* ** 9.37781	50.18	Pk	36.2	-40.3	46.08	54	-7.92	74	-27.92	0-360	101	V
6	7.20563	54.98	Pk	35.4	-42.2	48.18	-	-	-	-	0-360	200	V
2	7.20656	56.72	Pk	35.4	-42.2	49.92	-	-	-	-	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

MID CHANNEL RESULTS



HORIZONTAL



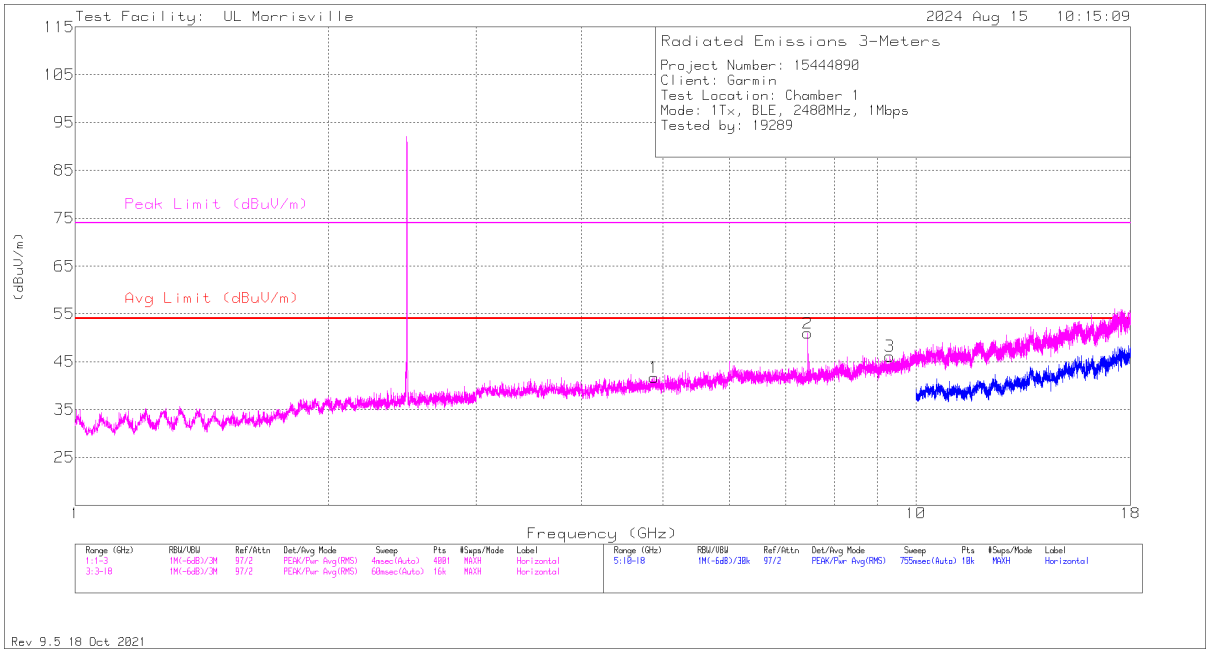
VERTICAL

RADIATED EMISSIONS

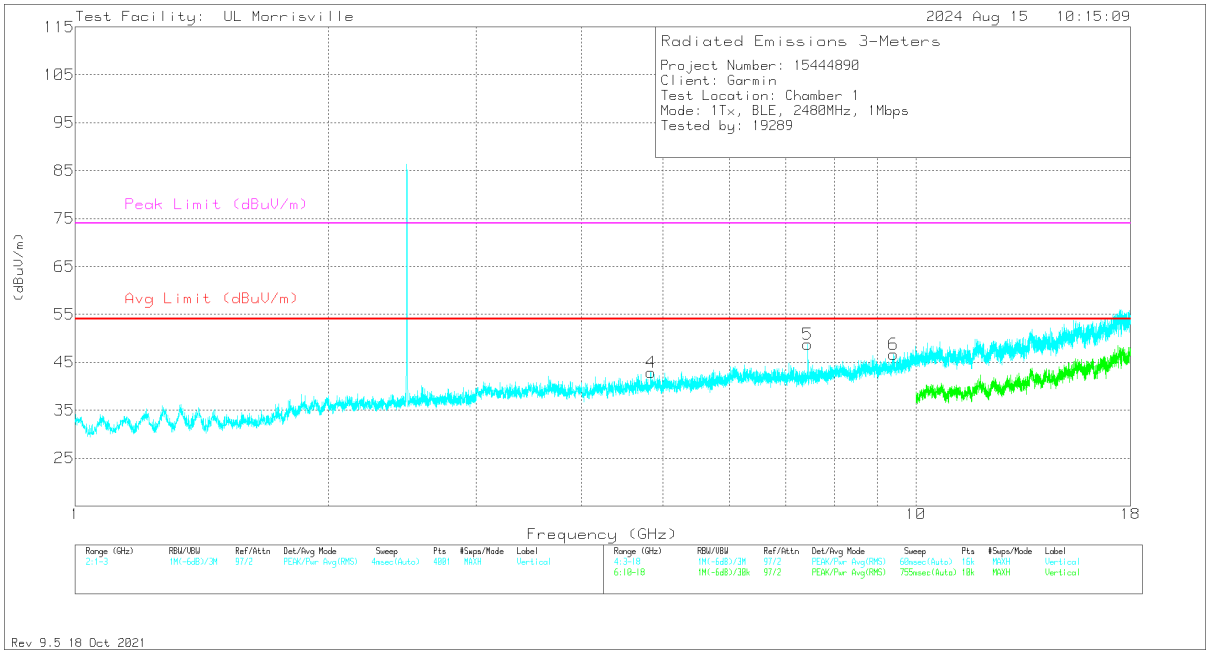
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	135143 (dB/m)	Gain/Loss (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 3.70031	53.01	Pk	33.2	-44.3	0	41.91	54	-12.09	74	-32.09	0-360	200	H
2	* ** 7.31918	58.38	PK2	35.4	-41.6	0	52.18	-	-	74	-21.82	1	109	H
	* ** 7.31948	46.29	ADV	35.4	-41.7	7.79	47.78	54	-6.22	-	-	1	109	H
3	* ** 9.19219	48.08	Pk	36	-39.5	0	44.58	54	-9.42	74	-29.42	0-360	101	H
4	* ** 5.09719	53.81	Pk	34.3	-44.4	0	43.71	54	-10.29	74	-30.29	0-360	101	V
5	* ** 7.32088	56.21	PK2	35.4	-41.8	0	49.81	-	-	74	-24.19	271	106	V
	* ** 7.3207	42.95	ADV	35.4	-41.7	7.79	44.44	54	-9.56	-	-	271	106	V
6	* ** 9.42188	48.12	Pk	36.3	-40.1	0	44.32	54	-9.68	74	-29.68	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 - Maximum Peak
ADV - Linear Voltage Average

HIGH CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

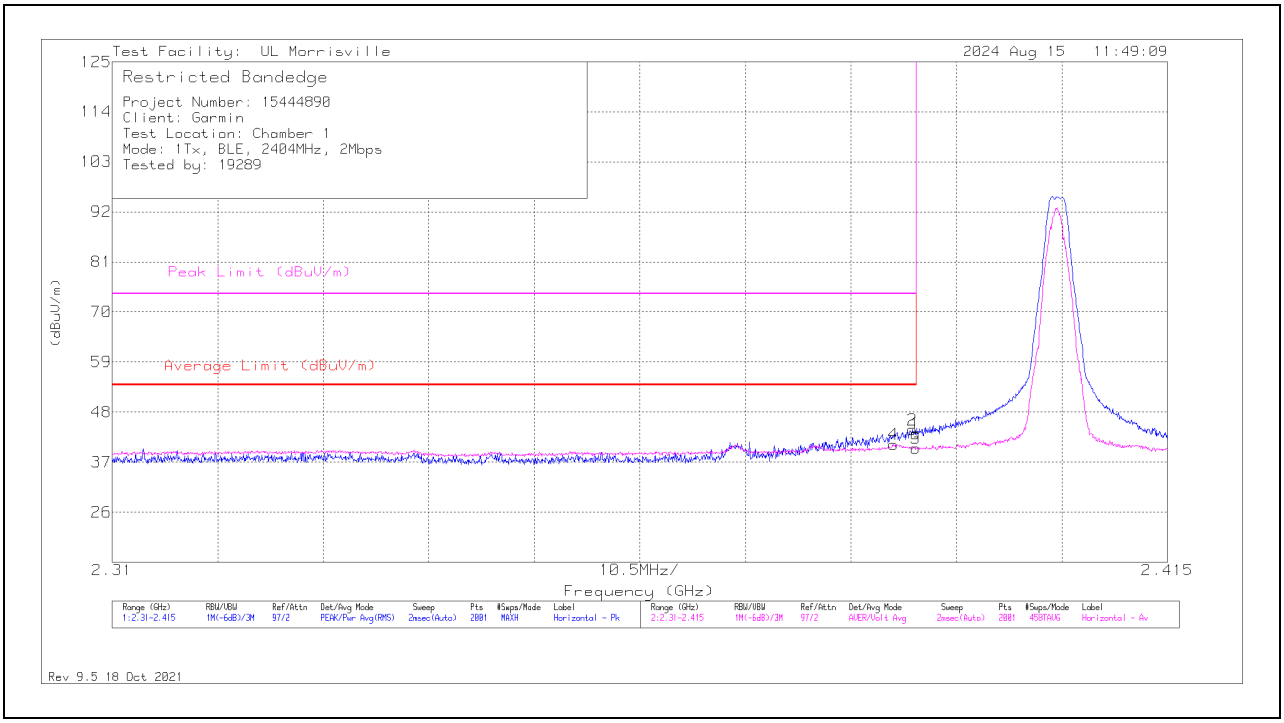
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	135143 (dB/m)	Gain/Loss (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 4.87969	52.39	Pk	34	-44.7	0	41.69	54	-12.31	74	-32.31	0-360	101	H
2	* ** 7.44081	58.58	PK2	35.4	-41.1	0	52.88	-	-	74	-21.12	322	102	H
	* ** 7.44047	45.71	ADV	35.4	-41.1	7.79	47.8	54	-6.2	-	-	322	102	H
3	* ** 9.31125	50.03	Pk	36.1	-40	0	46.13	54	-7.87	74	-27.87	0-360	199	H
4	* ** 4.8375	54.1	Pk	33.9	-45.1	0	42.9	54	-11.1	74	-31.1	0-360	200	V
5	* ** 7.43923	56.61	PK2	35.4	-41	0	51.01	-	-	74	-22.99	15	110	V
	* ** 7.43932	43.49	ADV	35.4	-41	7.79	45.68	54	-8.32	-	-	15	110	V
6	* ** 9.40313	51.22	Pk	36.3	-40.8	0	46.72	54	-7.28	74	-27.28	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 - Maximum Peak
ADV - Linear Voltage Average

10.2.2. BLE (2Mbps)

BANDEDGE (LOW CHANNEL)

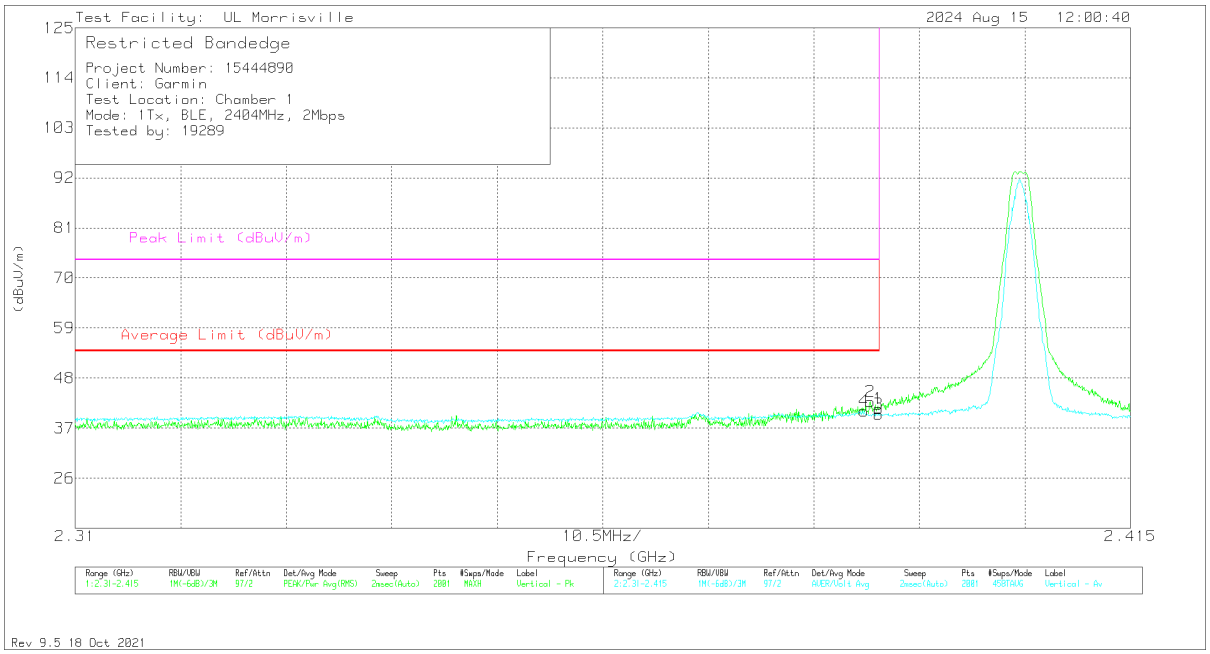
HORIZONTAL RESULT



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	35.33	Pk	31.9	-24	0	43.23	-	-	74	-30.77	60	358	H
2	* ** 2.38959	36.21	Pk	31.9	-24	0	44.11	-	-	74	-29.89	60	358	H
3	* ** 2.38996	18.98	ADV	31.9	-24	13.22	40.1	54	-13.9	-	-	60	358	H
4	* ** 2.38775	19.66	ADV	31.9	-23.9	13.22	40.88	54	-13.12	-	-	60	358	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

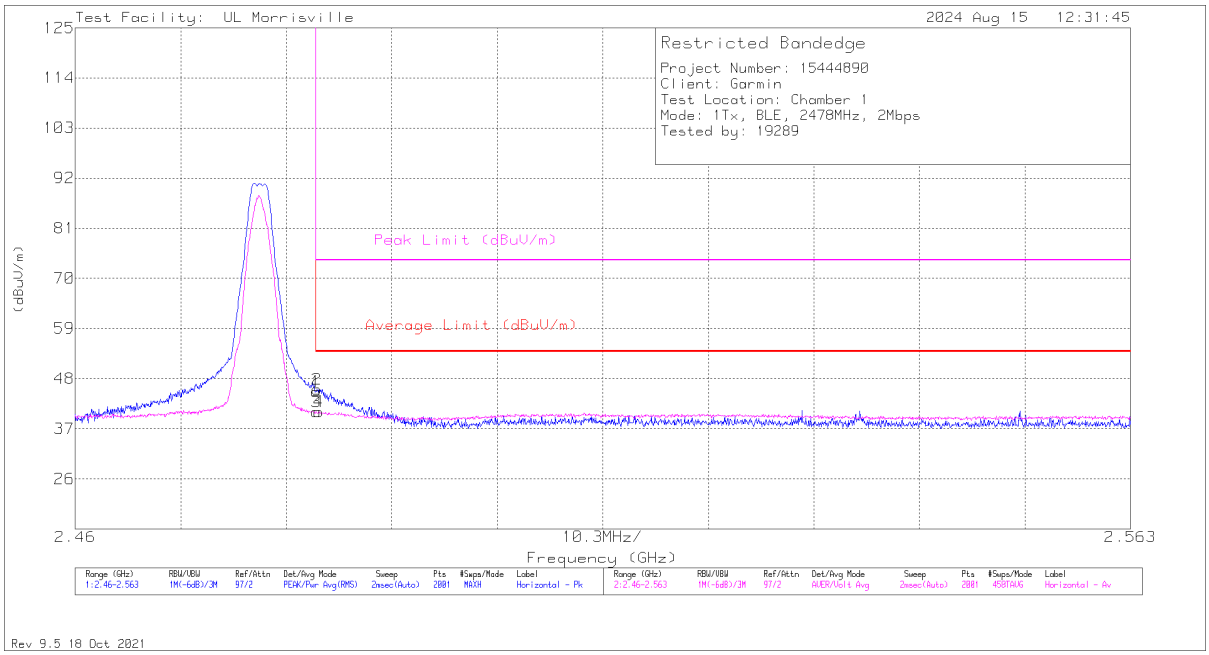


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	135143 (dB/m)	Gain/Loss (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.38996	33.35	Pk	31.9	-24	0	41.25	-	-	74	-32.75	351	362	V
2	* ** 2.38912	34.96	Pk	31.9	-24	0	42.86	-	-	74	-31.14	351	362	V
3	* ** 2.38996	18.95	ADV	31.9	-24	13.22	40.07	54	-13.93	-	-	351	362	V
4	* ** 2.38849	19.57	ADV	31.9	-24	13.22	40.69	54	-13.31	-	-	351	362	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)

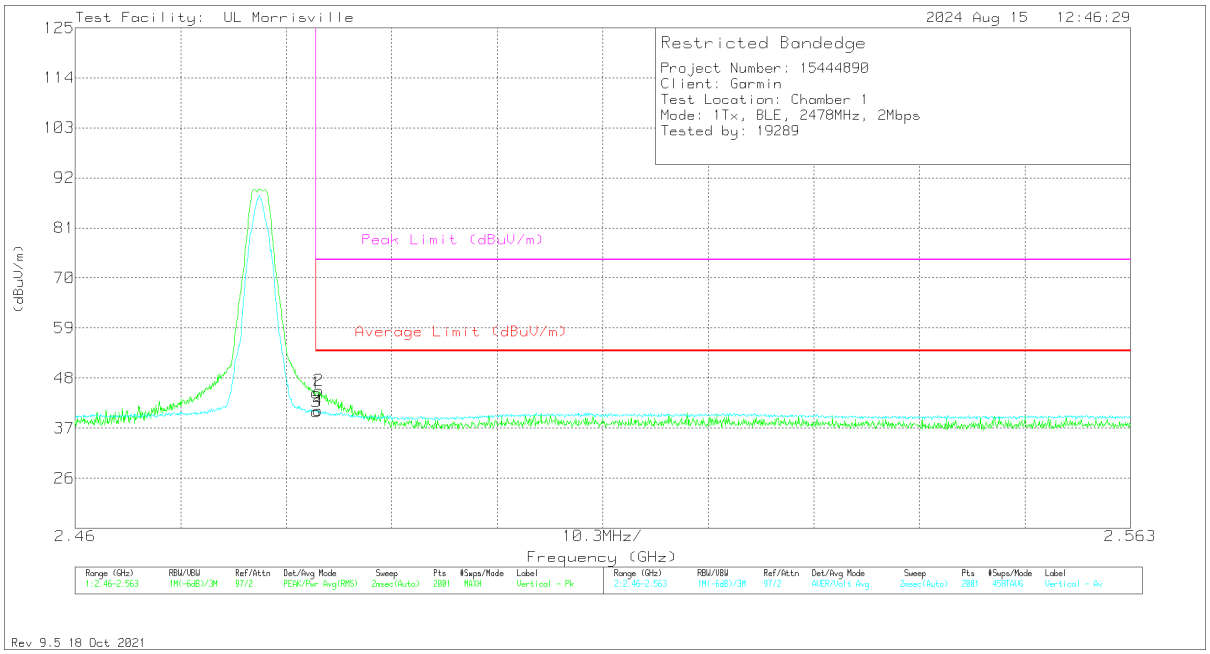
HORIZONTAL RESULT



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	36.7	Pk	32.2	-23.7	0	45.2	-	-	74	-28.8	34	371	H
2	* ** 2.48359	37.14	Pk	32.2	-23.7	0	45.64	-	-	74	-28.36	34	371	H
3	* ** 2.48354	19.01	ADV	32.2	-23.7	13.22	40.73	54	-13.27	-	-	34	371	H
4	* ** 2.48379	19.02	ADV	32.2	-23.7	13.22	40.74	54	-13.26	-	-	34	371	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



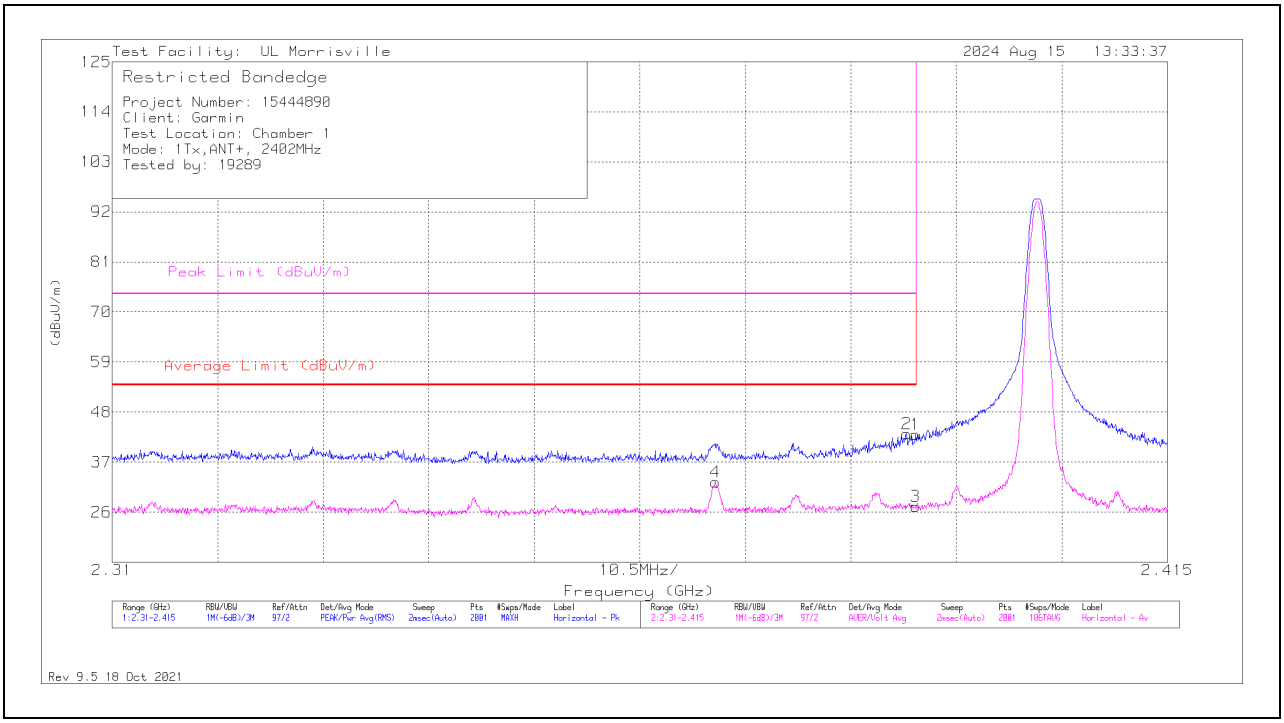
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	135143 (dB/m)	Gain/Loss (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.48354	36.24	Pk	32.2	-23.7	0	44.74	-	-	74	-29.26	348	378	V
2	* ** 2.48379	36.75	Pk	32.2	-23.7	0	45.25	-	-	74	-28.75	348	378	V
3	* ** 2.48354	18.93	ADV	32.2	-23.7	13.22	40.65	54	-13.35	-	-	348	378	V
4	* ** 2.48369	19.1	ADV	32.2	-23.7	13.22	40.82	54	-13.18	-	-	348	378	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)

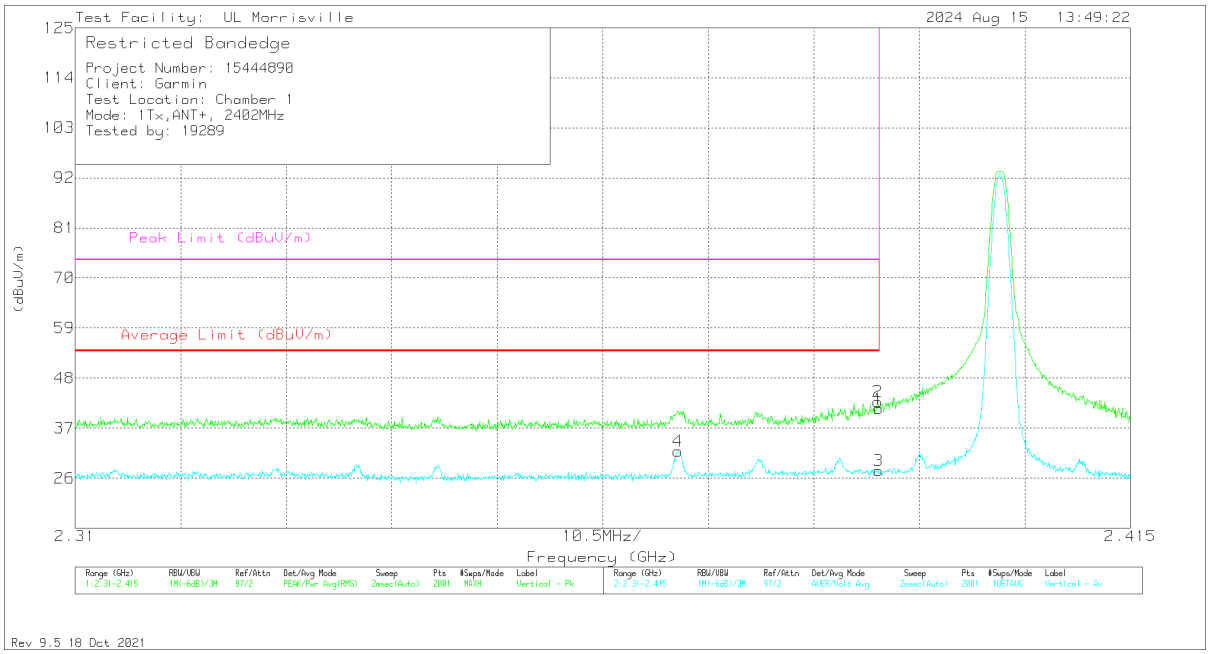
HORIZONTAL RESULT



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	35.18	Pk	31.9	-24	0	43.08	-	-	74	-30.92	127	351	H
2	* ** 2.38907	35.36	Pk	31.9	-24	0	43.26	-	-	74	-30.74	127	351	H
3	* ** 2.38996	18.83	ADV	31.9	-24	.52	27.25	54	-26.75	-	-	127	351	H
4	* ** 2.37006	24.5	ADV	31.9	-24.3	.52	32.62	54	-21.38	-	-	127	351	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

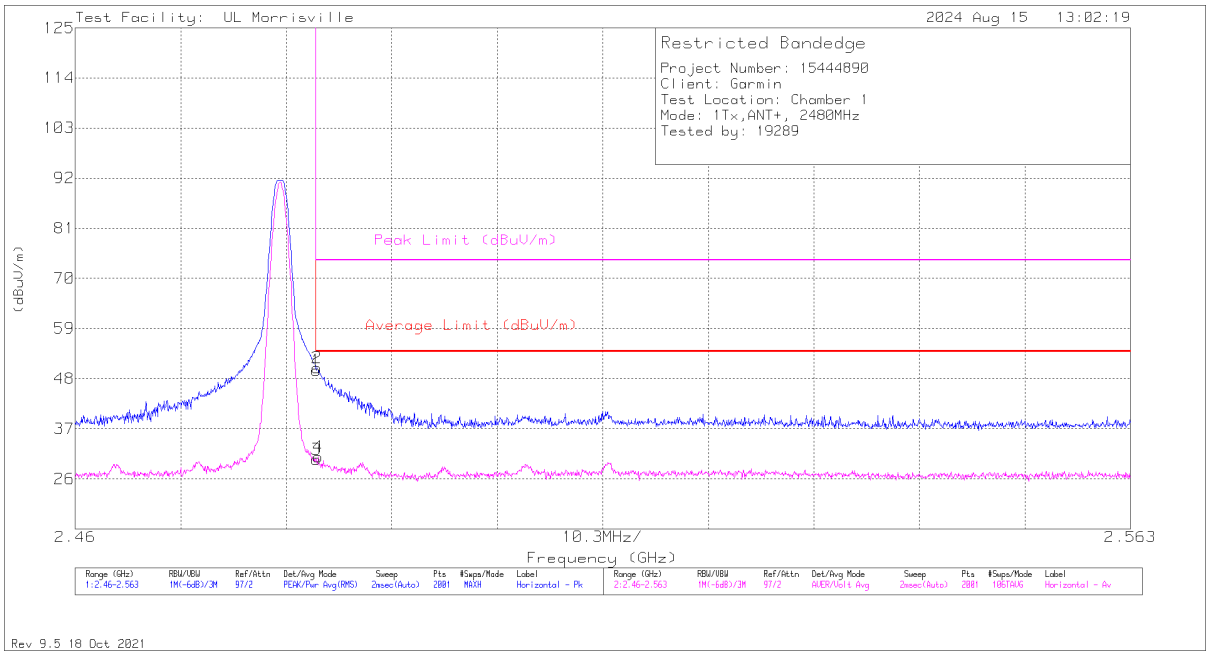


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	135143 (dB/m)	Gain/Loss (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.38996	33.32	Pk	31.9	-24	0	41.22	-	-	74	-32.78	104	362	V
2	* ** 2.38985	34.86	Pk	31.9	-24	0	42.76	-	-	74	-31.24	104	362	V
3	* ** 2.38996	19.19	ADV	31.9	-24	.52	27.61	54	-26.39	-	-	104	362	V
4	* ** 2.36996	23.77	ADV	31.9	-24.3	.52	31.89	54	-22.11	-	-	104	362	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)

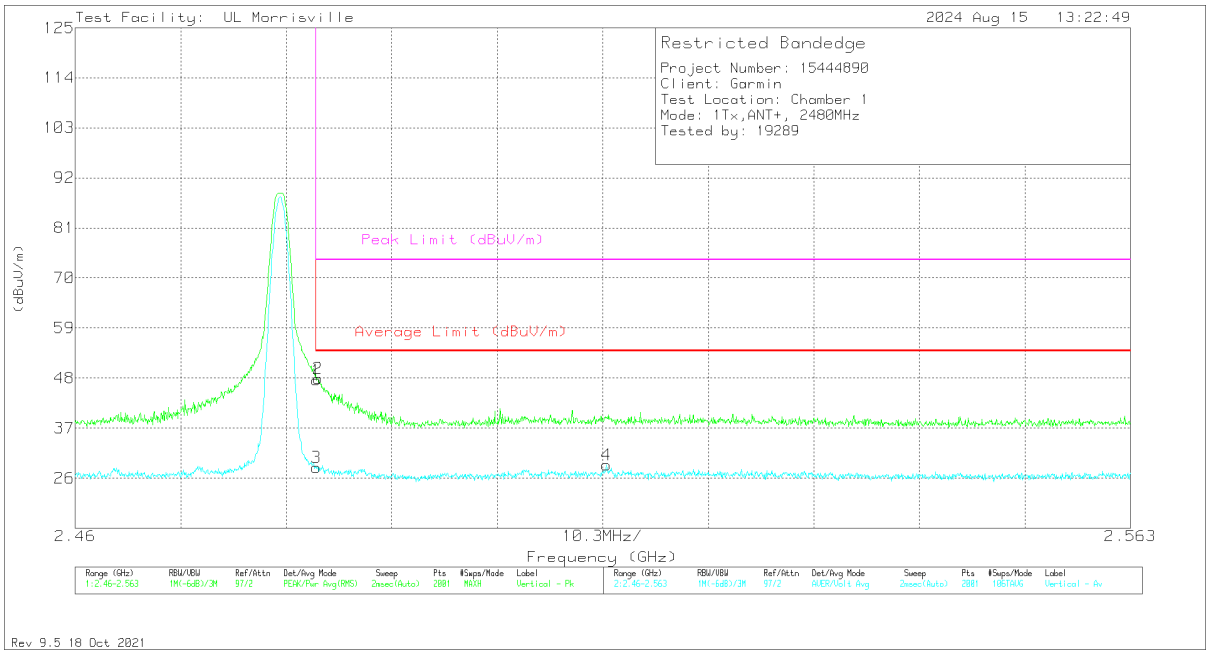
HORIZONTAL RESULT



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	41.31	Pk	32.2	-23.7	0	49.81	-	-	74	-24.19	50	372	H
2	* ** 2.48359	41.91	Pk	32.2	-23.7	0	50.41	-	-	74	-23.59	50	372	H
3	* ** 2.48354	21.3	ADV	32.2	-23.7	.52	30.32	54	-23.68	-	-	50	372	H
4	* ** 2.48374	21.82	ADV	32.2	-23.7	.52	30.84	54	-23.16	-	-	50	372	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



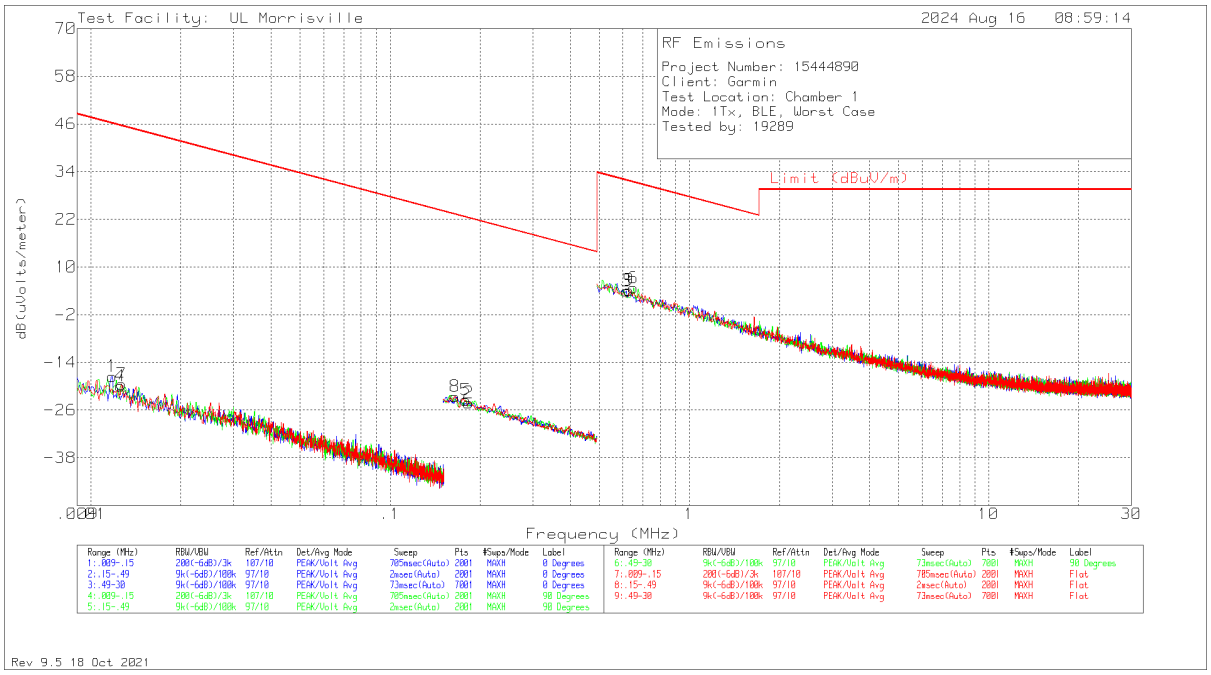
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	135143 (dB/m)	Gain/Loss (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.48354	39.05	Pk	32.2	-23.7	0	47.55	-	-	74	-26.45	348	378	V
2	* ** 2.48369	39.43	Pk	32.2	-23.7	0	47.93	-	-	74	-26.07	348	378	V
3	* ** 2.48354	19.28	ADV	32.2	-23.7	.52	28.3	54	-25.7	-	-	348	378	V
4	** 2.51186	20.16	ADV	32.3	-24.1	.52	28.88	54	-25.12	-	-	348	378	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).

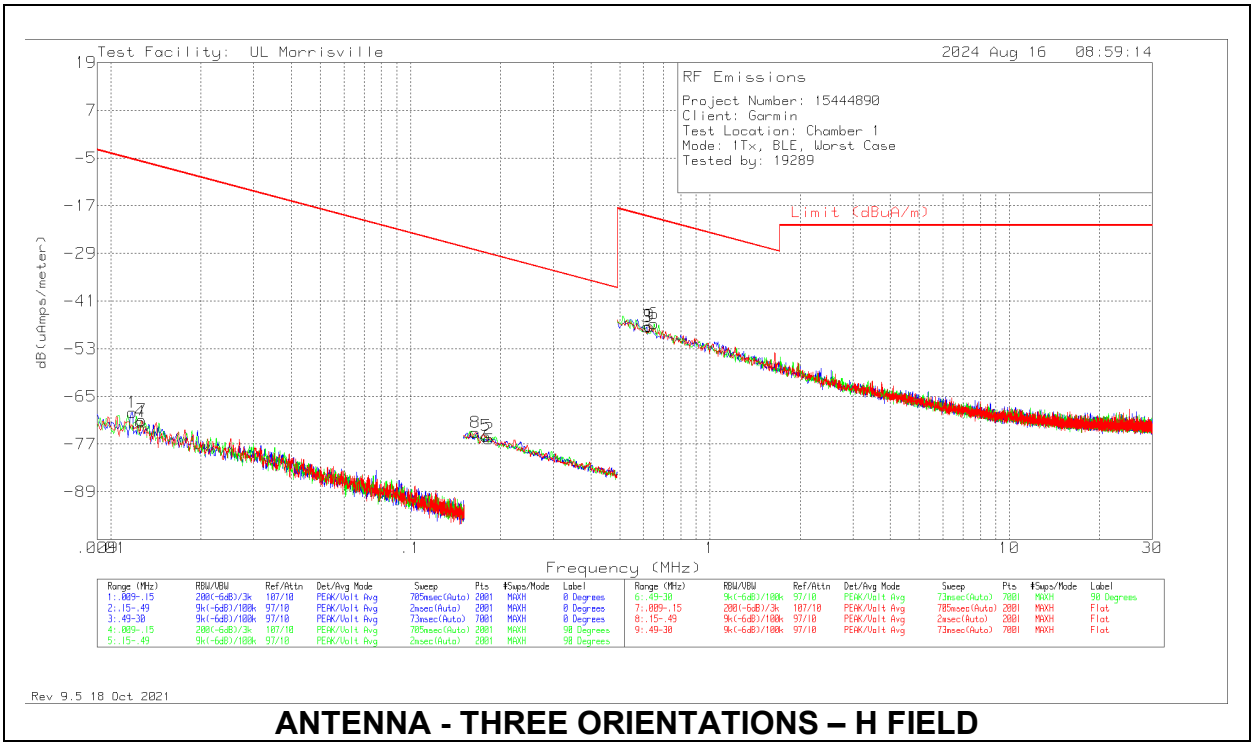


ANTENNA - THREE ORIENTATIONS – E FIELD

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	.01177	44.68	Pk	17.7	.1	-80	-17.52	46.19	66.19	-63.71	0-360	0 degs
4	.01255	42.67	Pk	17.3	.1	-80	-19.93	45.63	65.63	-65.56	0-360	90 degs
7	.01269	43.11	Pk	17.3	.1	-80	-19.49	45.53	65.53	-65.02	0-360	Flat
8	.16488	46.2	Pk	11.1	.1	-80	-22.6	23.26	43.26	-45.86	0-360	Flat
5	.17865	45.33	Pk	11.1	.1	-80	-23.47	22.56	42.56	-46.03	0-360	90 degs
2	.1829	44.61	Pk	11.1	.1	-80	-24.19	22.36	42.36	-46.55	0-360	0 degs
3	.61648	32.72	Pk	11.2	.1	-40	4.02	31.81	-	-27.79	0-360	0 degs
9	.62913	32.88	Pk	11.2	.1	-40	4.18	31.63	-	-27.45	0-360	Flat
6	.65021	33.47	Pk	11.2	.1	-40	4.77	31.34	-	-26.57	0-360	90 degs

Pk - Peak detector



ANTENNA - THREE ORIENTATIONS – H FIELD

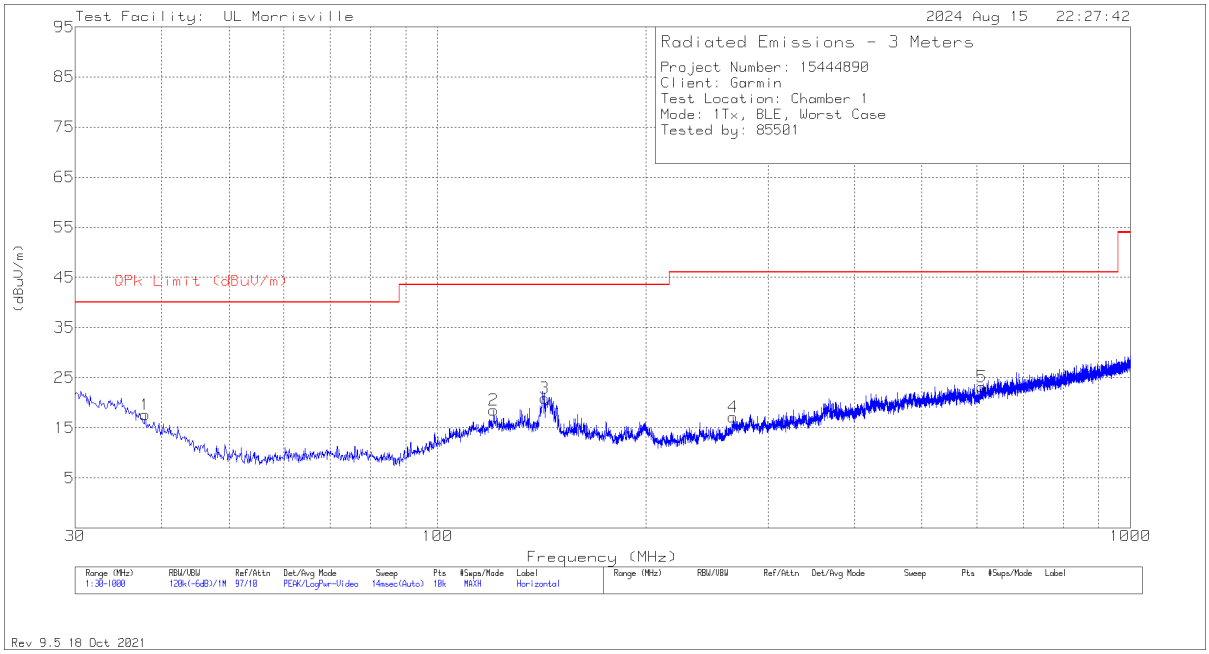
Below 30MHz Data

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	.01177	44.68	Pk	-33.8	.1	-80	-69.02	-5.31	14.69	-63.71	0-360	0 degs
4	.01255	42.67	Pk	-34.2	.1	-80	-71.43	-5.87	14.13	-65.56	0-360	90 degs
7	.01269	43.11	Pk	-34.2	.1	-80	-70.99	-5.97	14.03	-65.02	0-360	Flat
8	.16488	46.2	Pk	-40.4	.1	-80	-74.1	-28.24	-8.24	-45.86	0-360	Flat
5	.17865	45.33	Pk	-40.4	.1	-80	-74.97	-28.94	-8.94	-46.03	0-360	90 degs
2	.1829	44.61	Pk	-40.4	.1	-80	-75.69	-29.14	-9.14	-46.55	0-360	0 degs
3	.61648	32.72	Pk	-40.3	.1	-40	-47.48	-19.69	-	-27.79	0-360	0 degs
9	.62913	32.88	Pk	-40.3	.1	-40	-47.32	-19.87	-	-27.45	0-360	Flat
6	.65021	33.47	Pk	-40.3	.1	-40	-46.73	-20.16	-	-26.57	0-360	90 degs

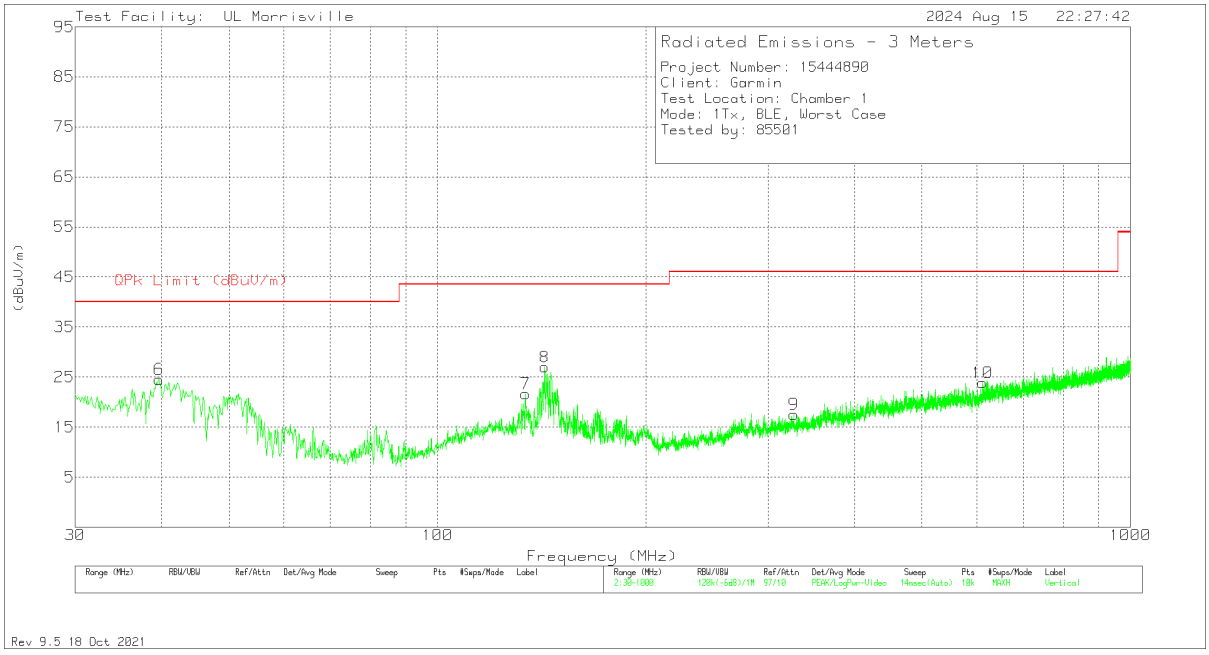
Pk - Peak detector

10.4. WORST CASE BELOW 1 GHZ (BLE)

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



HORIZONTAL



VERTICAL

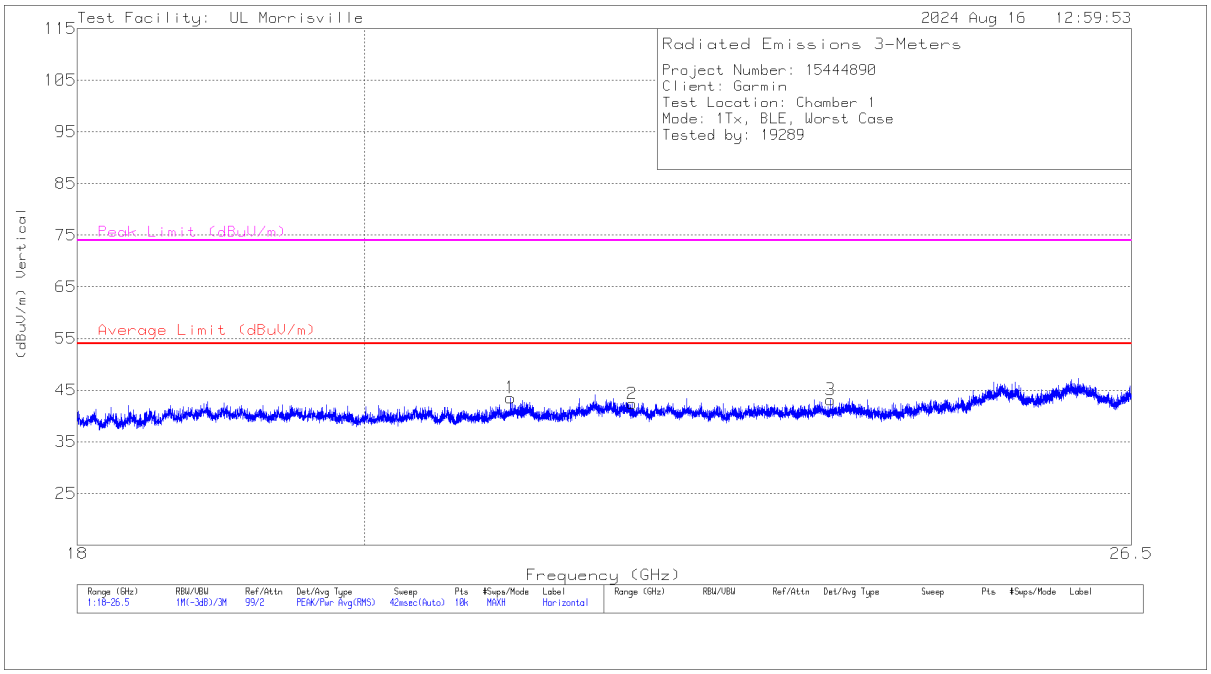
Below 1GHz Data

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	* ** 37.857	28.09	Pk	21.3	-31.8	17.59	40	-22.41	0-360	399	H
2	* ** 120.598	28.94	Pk	20	-30.4	18.54	43.52	-24.98	0-360	399	H
4	* ** 267.262	27.68	Pk	19	-29.5	17.18	46.02	-28.84	0-360	299	H
5	* ** 610.448	27.01	Pk	25	-28.8	23.21	46.02	-22.81	0-360	399	H
7	* ** 133.984	32.19	Pk	19.8	-30.3	21.69	43.52	-21.83	0-360	100	V
9	* ** 326.917	26.9	Pk	20	-29.4	17.5	46.02	-28.52	0-360	100	V
10	* ** 612.194	27.15	Pk	25.1	-28.4	23.85	46.02	-22.17	0-360	100	V
6	39.603	36	Pk	20.1	-31.6	24.5	40	-15.5	0-360	100	V
3	142.811	32.26	Pk	19.2	-30.6	20.86	43.52	-22.66	0-360	200	H
8	142.811	38.38	Pk	19.2	-30.6	26.98	43.52	-16.54	0-360	100	V

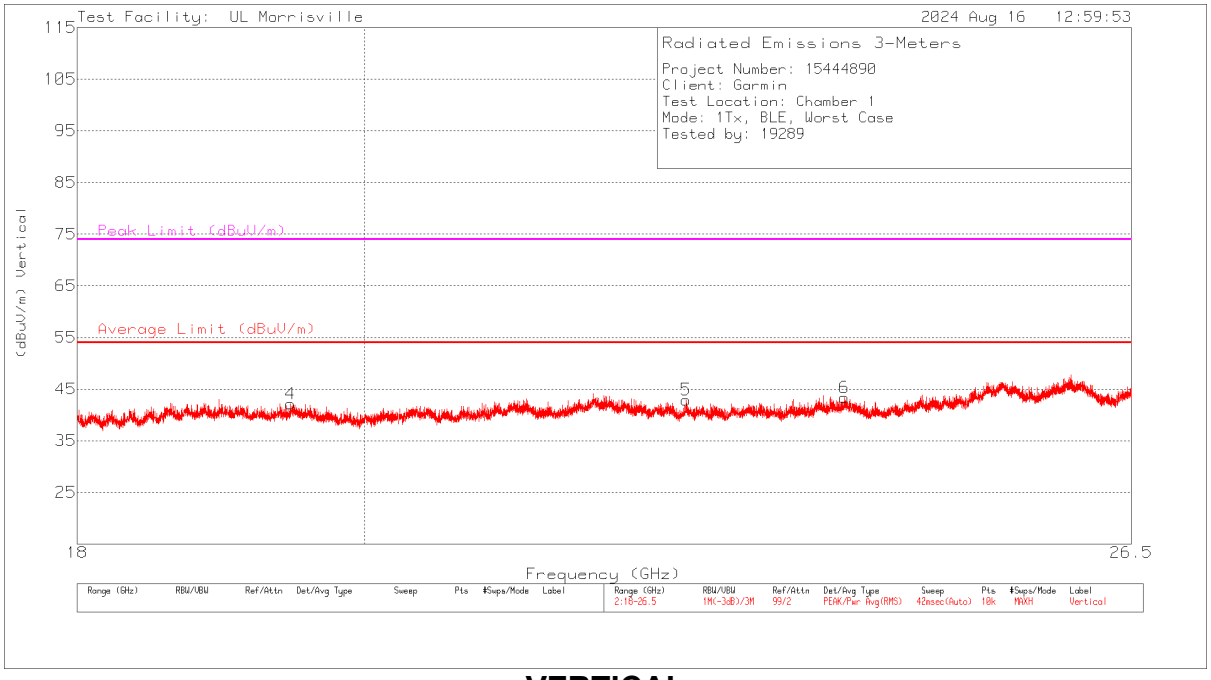
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
Pk - Peak detector

10.5. WORST CASE 18-26 GHZ (BLE)

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



HORIZONTAL



VERTICAL

18 – 26GHz Data

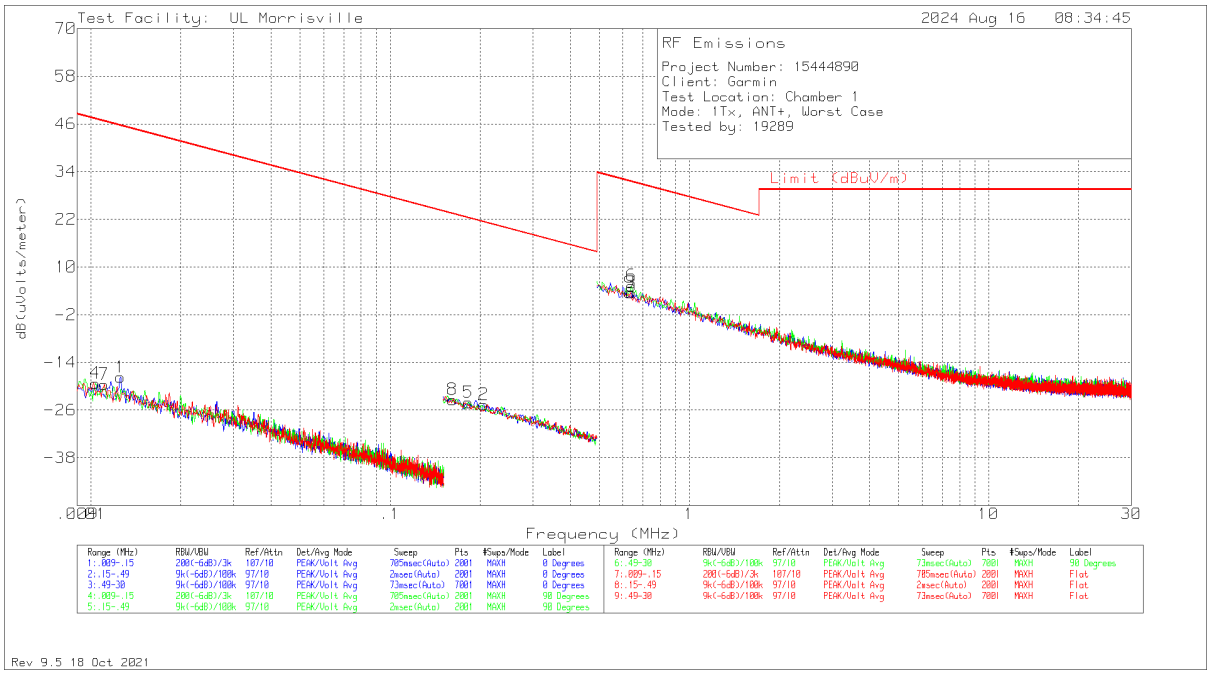
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	204704 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 21.10219	49.82	Pk	33.7	-40	43.52	54	-10.48	74	-30.48	0-360	300	H
2	* ** 22.06599	48.27	Pk	34.3	-40.2	42.37	54	-11.63	74	-31.63	0-360	300	H
3	* ** 23.73013	48.54	Pk	34.5	-39.9	43.14	54	-10.86	74	-30.86	0-360	101	H
4	* ** 19.46695	48.93	Pk	33.3	-40.1	42.13	54	-11.87	74	-31.87	0-360	101	V
5	* ** 22.50795	48.91	Pk	34.2	-40.2	42.91	54	-11.09	74	-31.09	0-360	150	V
6	* ** 23.85251	48.86	Pk	34.4	-39.9	43.36	54	-10.64	74	-30.64	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).

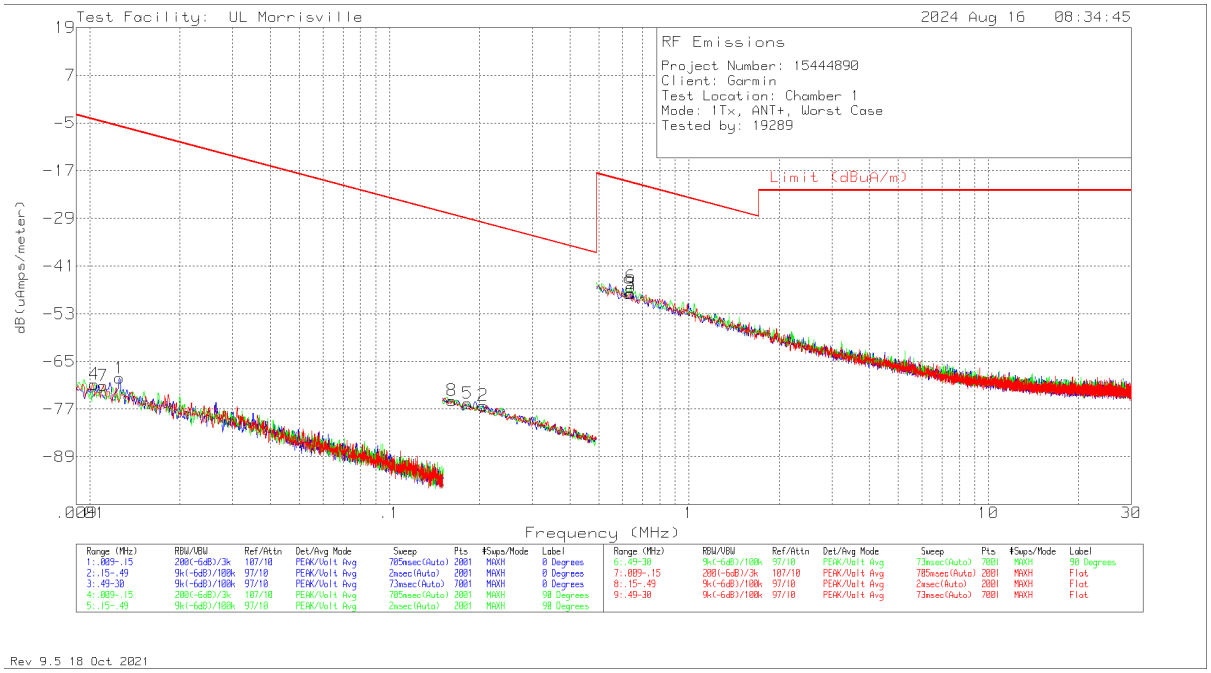


ANTENNA - THREE ORIENTATIONS – E FIELD

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	.01035	42.36	Pk	18.3	.1	-80	-19.24	47.31	67.31	-66.55	0-360	90 degs
7	.01106	42.31	Pk	18	.1	-80	-19.59	46.73	66.73	-66.32	0-360	Flat
1	.01255	44.88	Pk	17.3	.1	-80	-17.72	45.63	65.63	-63.35	0-360	0 degs
8	.1619	45.45	Pk	11.1	.1	-80	-23.35	23.42	43.42	-46.77	0-360	Flat
5	.18256	44.72	Pk	11.1	.1	-80	-24.08	22.38	42.38	-46.46	0-360	90 degs
2	.20534	44.18	Pk	11.1	.1	-80	-24.62	21.35	41.35	-45.97	0-360	0 degs
9	.63334	32.29	Pk	11.2	.1	-40	3.59	31.57	-	-27.98	0-360	Flat
3	.64178	32.22	Pk	11.2	.1	-40	3.52	31.46	-	-27.94	0-360	0 degs
6	.64178	34.01	Pk	11.2	.1	-40	5.31	31.46	-	-26.15	0-360	90 degs

Pk - Peak detector



ANTENNA - THREE ORIENTATIONS – H FIELD

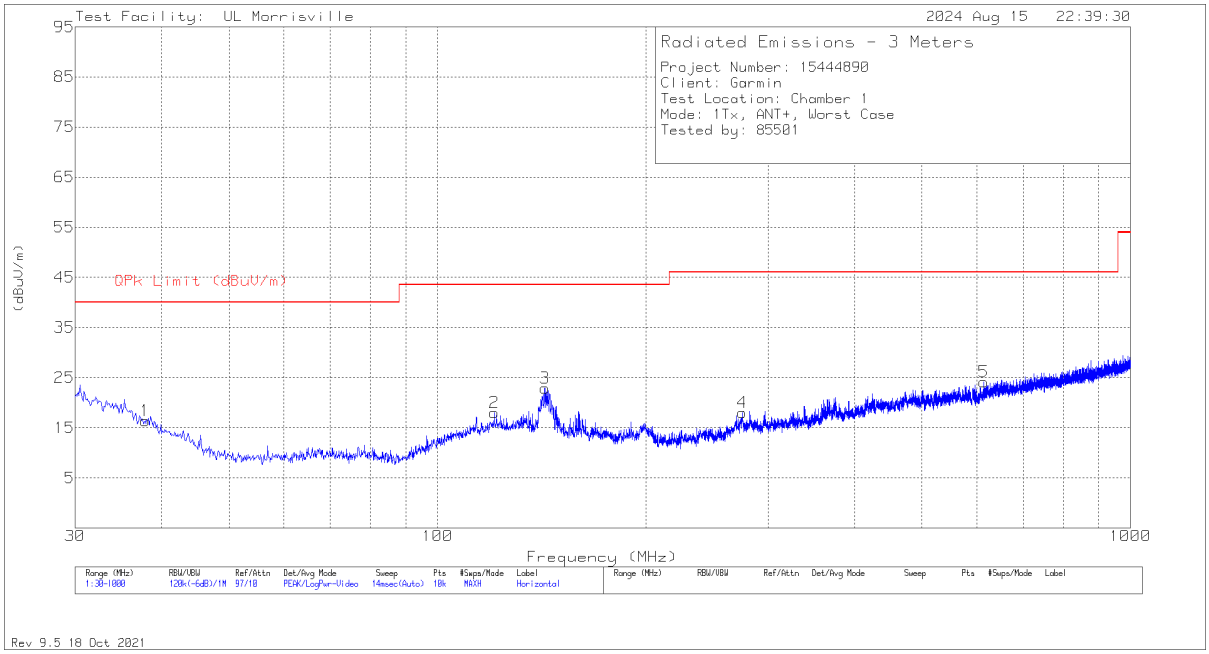
Below 30MHz Data

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	.01035	42.36	Pk	-33.2	.1	-80	-70.74	-4.19	15.81	-66.55	0-360	90 degs
7	.01106	42.31	Pk	-33.5	.1	-80	-71.09	-4.77	15.23	-66.32	0-360	Flat
1	.01255	44.88	Pk	-34.2	.1	-80	-69.22	-5.87	14.13	-63.35	0-360	0 degs
8	.1619	45.45	Pk	-40.4	.1	-80	-74.85	-28.08	-8.08	-46.77	0-360	Flat
5	.18256	44.72	Pk	-40.4	.1	-80	-75.58	-29.12	-9.12	-46.46	0-360	90 degs
2	.20534	44.18	Pk	-40.4	.1	-80	-76.12	-30.15	-10.15	-45.97	0-360	0 degs
9	.63334	32.29	Pk	-40.3	.1	-40	-47.91	-19.93	-	-27.98	0-360	Flat
3	.64178	32.22	Pk	-40.3	.1	-40	-47.98	-20.04	-	-27.94	0-360	0 degs
6	.64178	34.01	Pk	-40.3	.1	-40	-46.19	-20.04	-	-26.15	0-360	90 degs

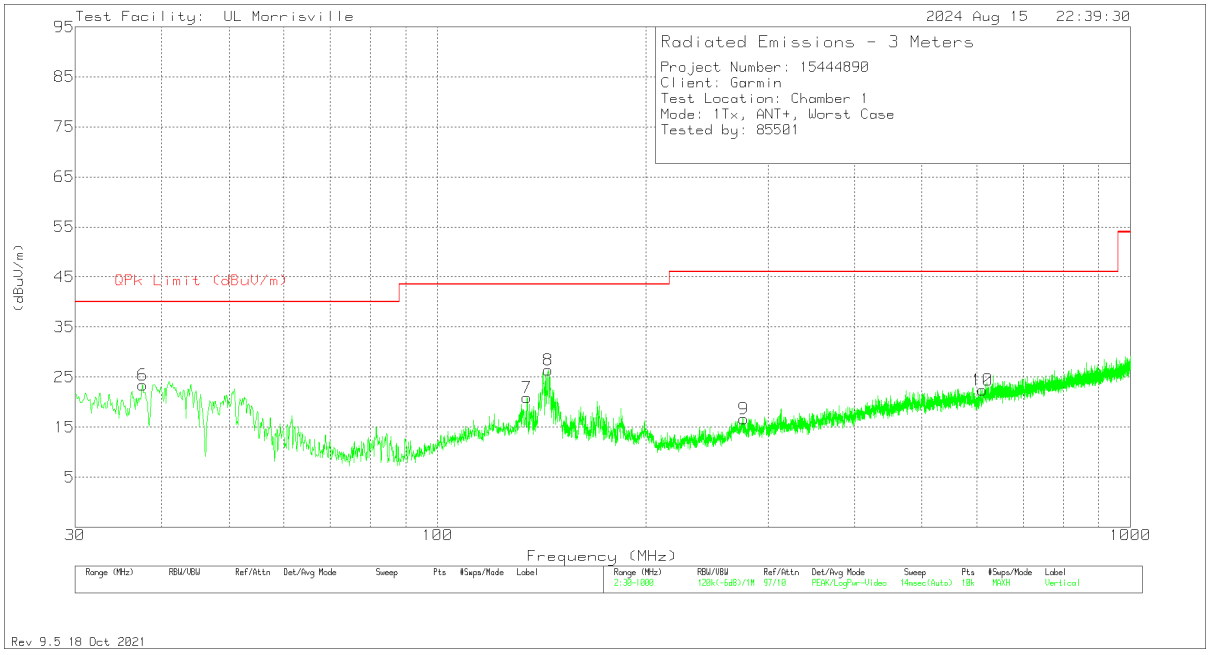
Pk - Peak detector

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	26.94	Pk	21.3	-31.8	16.44	40	-23.56	0-360	199	H
2	* ** 120.792	28.41	Pk	20	-30.4	18.01	43.52	-25.51	0-360	199	H
4	* ** 275.216	27.91	Pk	19.5	-29.4	18.01	46.02	-28.01	0-360	299	H
6	* ** 37.566	33.67	Pk	21.6	-31.9	23.37	40	-16.63	0-360	100	V
7	* ** 134.663	31.43	Pk	19.8	-30.3	20.93	43.52	-22.59	0-360	100	V
9	* ** 276.865	27.1	Pk	19.5	-29.9	16.7	46.02	-29.32	0-360	100	V
10	* ** 611.321	25.71	Pk	25	-28.3	22.41	46.02	-23.61	0-360	100	V
3	143.005	34.2	Pk	19.2	-30.5	22.9	43.52	-20.62	0-360	100	H
8	144.46	38.11	Pk	19.1	-30.8	26.41	43.52	-17.11	0-360	100	V
5	614.037	27.13	Pk	25.2	-28.2	24.13	46.02	-21.89	0-360	100	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 R15444890-EP1 for setup photos

END OF TEST REPORT