

TEST REPORT

Report Number: R15952388-E4

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

Model : A04986

FCC ID : IPH-04986

IC : 1792A-04986

EUT Description : Portable Transceiver

Test Standard(s) : FCC 47 CFR PART 15 SUBPART C: 2025
ISED RSS-210 ISSUE 11: 2024
ISED RSS-GEN ISSUE 5 + A1 + A2: 2021

Date Of Issue:

2025-10-03

Prepared by:

UL LLC

12 Laboratory Dr.

Durham, NC 27713 U.S.A.

TEL: (919) 549-1400



REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	2025-10-03	Initial Issue	Chandler Stanley

TABLE OF CONTENTS

REPORT REVISION HISTORY	2
TABLE OF CONTENTS	3
1. ATTESTATION OF TEST RESULTS	5
2. TEST RESULTS SUMMARY	6
3. TEST METHODOLOGY	6
4. FACILITIES AND ACCREDITATION	6
5. DECISION RULES AND MEASUREMENT UNCERTAINTY	7
5.1. METROLOGICAL TRACEABILITY	7
5.2. DECISION RULES.....	7
5.3. MEASUREMENT UNCERTAINTY.....	7
5.4. SAMPLE CALCULATION	7
6. EQUIPMENT UNDER TEST	8
6.1. EUT DESCRIPTION	8
6.2. DESCRIPTION OF AVAILABLE ANTENNAS	8
6.3. SOFTWARE AND FIRMWARE.....	8
6.4. WORST-CASE CONFIGURATION AND MODE.....	8
6.5. DESCRIPTION OF TEST SETUP.....	9
7. MEASUREMENT METHOD.....	10
8. TEST AND MEASUREMENT EQUIPMENT	11
9. ANTENNA PORT TEST RESULTS	13
9.1. ON TIME AND DUTY CYCLE.....	13
9.2. 99% AND 20dB BANDWIDTH	14
9.2.1. ANT/ANT+	14
10. RADIATED TEST RESULTS.....	16
10.1. FUNDAMENTAL AND SPURIOUS EMISSIONS (LOW CHANNEL)	18
10.1.1. FUNDAMENTAL (2402 MHz)	18
10.1.2. HARMONICS AND SPURIOUS EMISSIONS BELOW 1 GHz.....	19
10.1.3. HARMONICS AND SPURIOUS EMISSIONS ABOVE 1 GHz	21
10.2. FUNDAMENTAL AND SPURIOUS EMISSIONS (MID CHANNEL)	23
10.2.1. FUNDAMENTAL (2440 MHz)	23
10.2.2. HARMONICS AND SPURIOUS EMISSIONS BELOW 1 GHz.....	24
10.2.3. HARMONICS AND SPURIOUS EMISSIONS ABOVE 1 GHz	26

10.3.	<i>FUNDAMENTAL AND SPURIOUS EMISSIONS (HIGH CHANNEL)</i>	28
10.3.1.	FUNDAMENTAL (2480 MHz)	28
10.3.2.	HARMONICS AND SPURIOUS EMISSIONS BELOW 1 GHz	29
10.3.3.	HARMONICS AND SPURIOUS EMISSIONS ABOVE 1 GHz	31
10.4.	<i>SPURIOUS EMISSIONS BELOW 30 MHz</i>	33
10.5.	<i>WORST CASE 18-26 GHZ</i>	35
11.	AC POWER LINE CONDUCTED EMISSIONS	37
11.1.	<i>AC Power Line</i>	38
12.	SETUP PHOTOS	40
	END OF TEST REPORT	40

1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: Portable Transceiver

MODEL: A04986

SERIAL NUMBER: 3611415493 / 3611415476

SAMPLE RECEIPT DATE: 2025-08-13 And 2025-08-14

DATE TESTED: 2025-08-20 to 2025-09-05

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C: 2025	Complies
ISED RSS-210 Issue 11: 2024	Complies
ISED RSS-GEN Issue 5 + A1 + A2: 2021	Complies

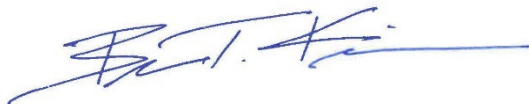
UL LLC tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the sample tested, 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. This report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the U.S. government.

Approved & Released
For UL LLC By:

Prepared By:



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



Chandler Stanley
Engineer
Consumer, Medical and IT Segment
UL LLC

2. TEST RESULTS SUMMARY

FCC Clause	ISED Clause	Requirement	Result	Comment
See Comment		Duty Cycle	Reporting purposes only	ANSI C63.10 Section 11.6.
15.215 (c)	-	20dB	Complies	None
-	RSS-GEN 6.7	99% OBW	Reporting purposes only	ANSI C63.10 Section 6.9.3.
15.249 (a)	RSS-210-B.10(a)	Fundamental Field Strength	Complies	None
15.205, 15.209, 15.249(a)	RSS-GEN 8.9, 8.10	Radiated Emissions	Complies	None.
15.207	RSS-GEN 8.8	AC Mains Conducted Emissions	Complies	None.

This report contains data provided by the applicant 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.

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC 47 CFR Part 2, FCC 47 CFR Part 15: 2024, ANSI C63.10-2020 + Cor.1-2023 + C63.10a-2024, KDB 414788 D01 Radiated Test Site v01r01, ISED RSS-GEN Issue 5 + A1 + A2: 2021, and RSS-210 Issue 11: 2024.

4. FACILITIES AND ACCREDITATION

UL LLC is accredited by A2LA, Certificate Number 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 Durham, NC 27713, U.S.A	US0067	2180C	703469
☒	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%
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	0.57%
Time	3.39%

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

5.4. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:

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

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:

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

6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

The EUT is a portable transceiver that utilizes BLE and ANT radios as well as a 57 GHz radar. This report covers full testing of the ANT radio.

6.2. DESCRIPTION OF AVAILABLE ANTENNAS

The antenna(s) 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)
PCB Inverted L	2402-2480	1.90

6.3. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was v4.06.

The test utility software used during testing was RF State Setter v1.100.

6.4. WORST-CASE CONFIGURATION AND MODE

Radiated Emissions below 30 MHz, above 18GHz, and power line conducted emissions were performed with the EUT set to transmit at the channel with the worst-case margin for 1-18 GHz radiated scans.

Radiated emissions and Equivalent Radiated Power below and above 1GHz were performed with the EUT set to transmit at 2402MHz, 2440MHz, and 2480MHz.

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

The client has declared an operational duty cycle of 13% resulting in a DCCF of -17.72dB. This correction factor is applied to peak measurements when the margin is within 6dB to use as AV calculation.

Sample calculations:

$$\text{DCCF} = 20\log(0.13) = -17.72\text{dB}$$

$$\text{AV} = \text{PK} + \text{DCCF}.$$

6.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Power Supply	Garmin	AQ27A-59CFA	NA	NA
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	USB C	1	USB-C	Shielded	<3m	Charge EUT

TEST SETUP

A laptop is used to program the device to transmit at the desired channels/modes. The laptop is removed from the chamber for radiated scans.

SETUP DIAGRAM

Please refer to R15952388-EP1 for setup diagrams

7. MEASUREMENT METHOD

Duty Cycle: ANSI C63.10-2020, Section 11.6

20dB Bandwidth: ANSI C63.10-2020, Section 6.9.2

Occupied Bandwidth: ANSI C63.10-2020, Subclause 6.9.3

Emissions non-restricted frequency bands: ANSI C63.10-2020, Subclause -11.11

General Radiated Spurious Emissions: ANSI C63.10-2020, Section 6.3, 6.5, 6.6

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

Fundamental emission output power: ANSI C63.10-2020, Section 11.9

8. 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.
Conducted Room 1					
90416	Spectrum Analyzer MY54490254	Keysight Technologies	N9030A	2025-07-31	2026-07-31
179892	Environmental Meter 161024885	Fisher Scientific	15-077-963	2025-08-05	2026-08-05
SOFTEMI	Antenna Port Software	UL	Version 2024.2.23	-	-
Pad III	SMA Coaxial 10dB Attenuator	CENTRICRF	C18S2-10	2025-08-18	2026-08-18

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

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
0.009-30MHz					
65682	Active Loop Antenna	ETS-Lindgren	6502	2023-10-03	2025-10-03
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
Gain-Loss Chains					
91974	Gain-loss string: 0.009-30MHz	Various	Various	2025-05-31	2026-05-31
91976	Gain-loss string: 25-1000MHz	Various	Various	2025-05-31	2026-05-31
91979	Gain-loss string: 1-18GHz	Various	Various	2025-05-31	2026-05-31
Receiver & Software					
197955	Spectrum Analyzer	Rohde & Schwarz	ESW44	2025-05-12	2026-05-12
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
Additional Equipment used					
241205	Environmental Meter	Fisher Scientific	15-077-963	2025-08-05	2027-08-05

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

Equip. ID	Description	Manufacturer/Brand	Model Number	Last Cal.	Next Cal.
18-26.5 GHz					
91186	Horn Antenna, 18-26.5GHz	ARA	MWH-1826/B	2024-05-16	2026-05-16
Gain-Loss Chains					
225795	Gain-loss string: 18-40GHz	Various	Various	2025-06-13	2026-06-13
Receiver & Software					
90411	Spectrum Analyzer	Keysight	N9030A	2025-07-30	2026-07-30
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
Additional Equipment used					
241204	Environmental Meter	Fisher Scientific	15-077-963	2025-08-05	2027-08-05

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	2025-04-17	2026-04-17
179892	Environmental Meter	Fisher Scientific	15-077-963	2025-08-05	2026-08-05
80389	LISN, 50-ohm/50-uH, 2-conductor, 25A	Fischer Custom Com.	FCC-LISN-50—50-2-02-550V	2025-07-30	2026-07-30
75141	EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESCI 7	2025-07-30	2026-07-30
52859	Transient Limiter, 0.009-100MHz	Electro-Metrics	EM-7600	2025-07-30	2026-07-30
236852	AC Power Source	California Instruments	AST3001	NA	NA
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
Miscellaneous (if needed)					
84681	ANSI C63.4 1m extension cable.	UL	Per Annex B of ANSI C63.4	2025-04-17	2026-04-17

9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

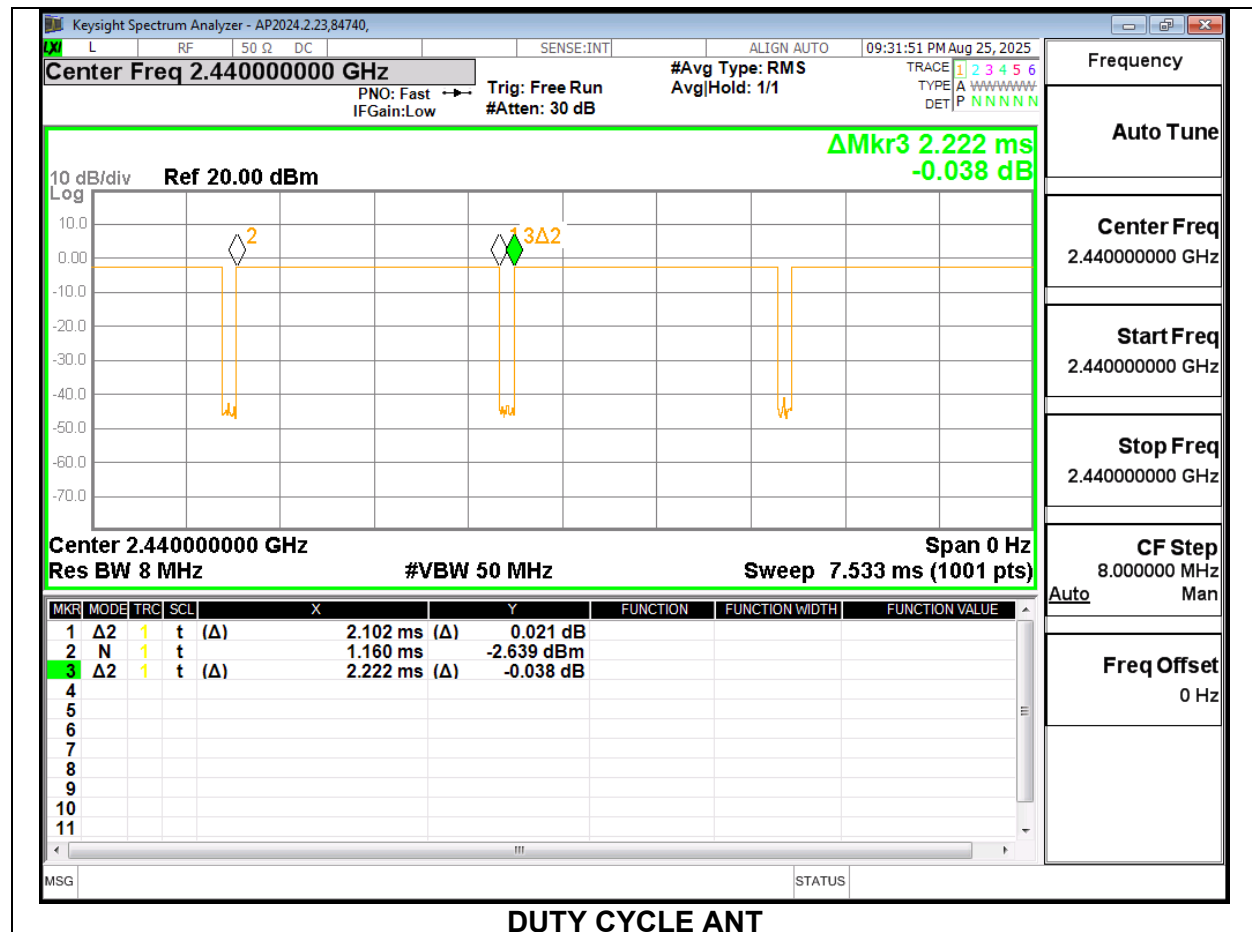
ANSI C63.10 Section 11.6
KDB 558074 Zero-Span Spectrum Analyzer Method.

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)
ANT/ANT+	2.102	2.222	0.946	94.60%	0.48	0.476

The client has declared an operational duty cycle of 13% corresponding to a DCCF of -17.72dB.
Sample Calculation: $DCCF = 20\log(0.13) = -17.72\text{dB}$

DUTY CYCLE PLOT



9.2. 99% AND 20dB BANDWIDTH

LIMITS

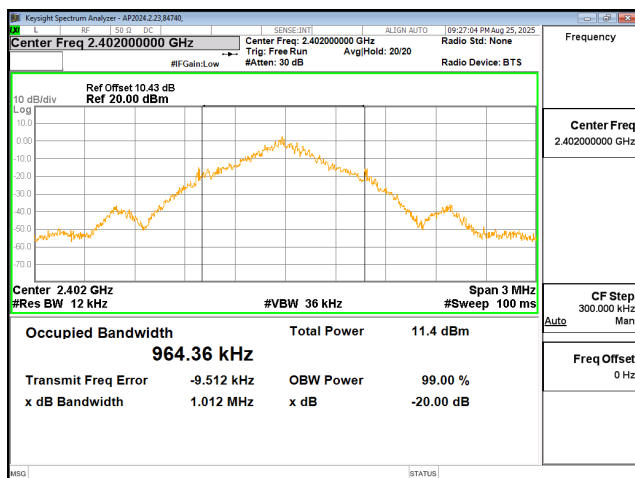
None; for reporting purposes only.

§15.215 (c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

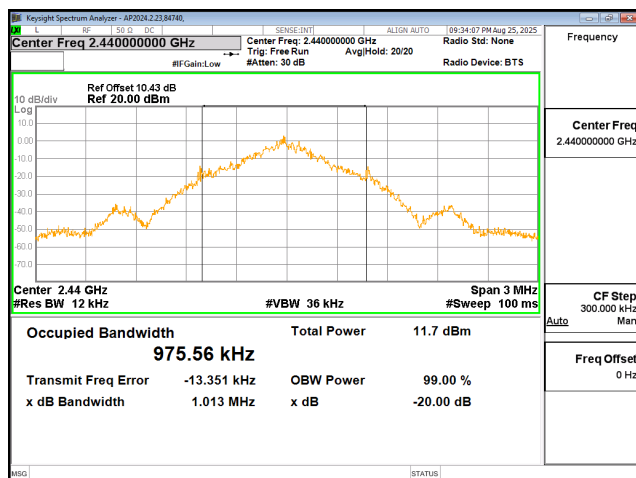
RESULTS

9.2.1. ANT/ANT+

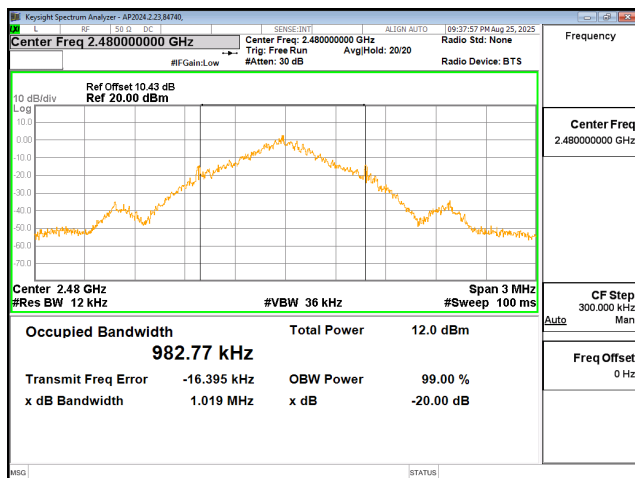
Channel	Frequency (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (kHz)
Low	2402	1.012	964.36
Mid	2440	1.013	975.56
High	2480	1.019	982.77



Low Channel 2402MHz



Mid Channel 2440MHz



High Channel 2480MHz



Intentionally Left Blank

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

FCC 15.249(a), RSS-210 B.10(a)

Frequency Range (MHz)	Field Strength Limit of Fundamental (mV/m) at 3 m	Field Strength Limit of Harmonics (mV/m) at 3 m
2402-2480	50	.5

(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation.

(e) As shown in § 15.35(b), for frequencies above 1000 MHz, the field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For point-to-point operation under paragraph (b) of this section, the peak field strength shall not exceed 2500 millivolts/meter at 3 meters along the antenna azimuth.

RSS-GEN, Section 8.9 and 8.10

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

TEST PROCEDURE

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

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements 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.

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. AV is determined by a calculation: $AV = PK + DCCF$.

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).

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

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

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

10.1. FUNDAMENTAL AND SPURIOUS EMISSIONS (LOW CHANNEL)

10.1.1. FUNDAMENTAL (2402 MHz)

Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (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
2402													
2.40184	98.32	Pk	32	-23.5	0	106.82	-	-	114	-7.18	27	101	H
2.40184	98.32	AV	32	-23.5	-17.72	89.1	94	-4.9	-	-	27	101	H
2.40184	91.5	Pk	32	-23.5	0	100	-	-	114	-14	343	128	V
2.40184	91.5	AV	32	-23.5	-17.72	82.28	94	-11.72	-	-	343	128	V

Pk - Peak detector

AV - Average

The client has declared an operational duty cycle of 13% corresponding to a DCCF of -17.72dB.

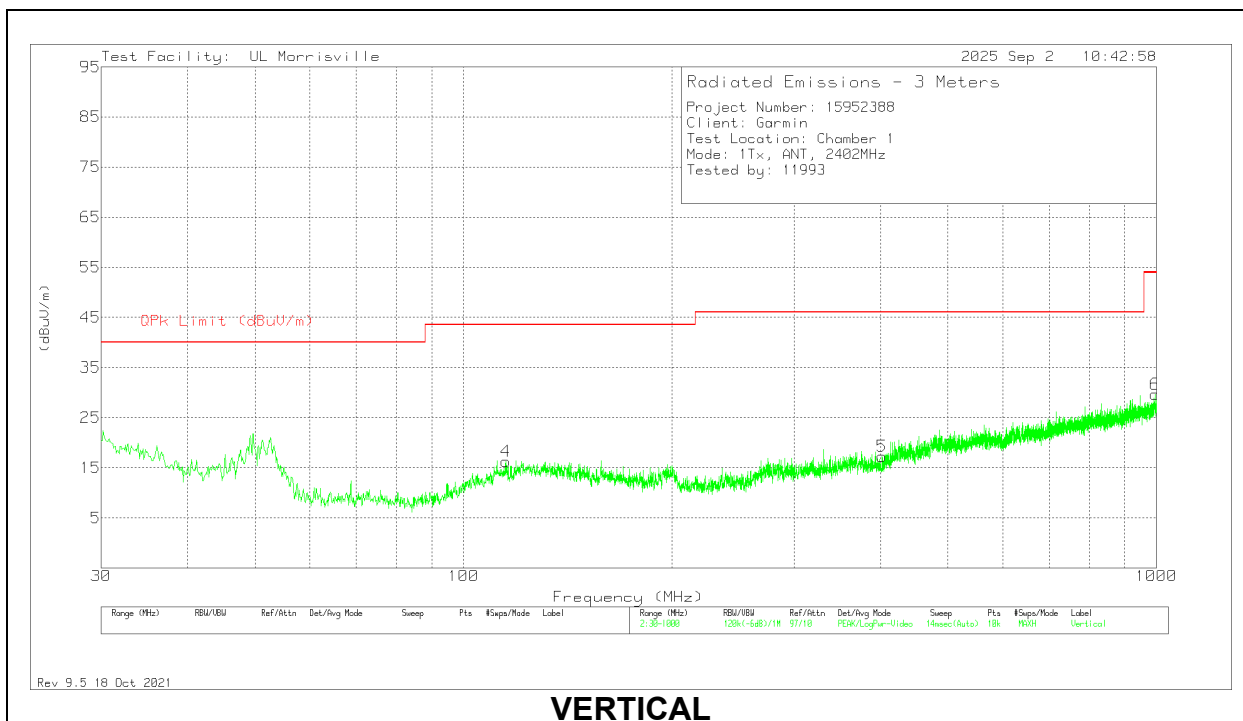
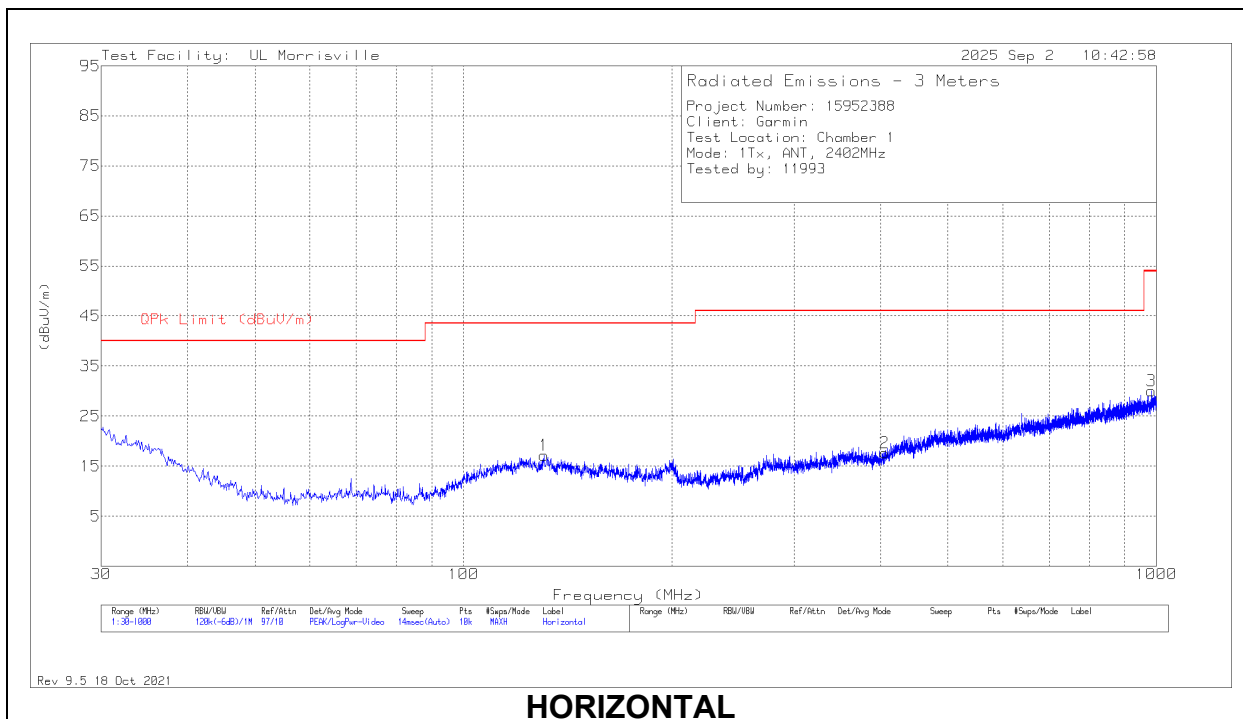
Sample Calculation: $DCCF = 20\log(0.13) = -17.72\text{dB}$

AV calculation:

$AV = PK + DCCF$.

10.1.2. HARMONICS AND SPURIOUS EMISSIONS BELOW 1 GHz

LOW CHANNEL, 2402 MHz RESULTS



RADIATED EMISSIONS

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	* ** 130.589	27.45	Pk	20	-30.3	17.15	43.52	-26.37	0-360	399	H
2	* ** 405.39	25.1	Pk	21.6	-29.1	17.6	46.02	-28.42	0-360	399	H
3	* ** 983.316	26.1	Pk	29.3	-25.4	30	53.97	-23.97	0-360	98	H
4	* ** 115.069	26.89	Pk	19.5	-30.1	16.29	43.52	-27.23	0-360	100	V
5	* ** 401.316	24.96	Pk	21.5	-29.2	17.26	46.02	-28.76	0-360	100	V
6	* ** 994.956	25.32	Pk	29.6	-25.3	29.62	53.97	-24.35	0-360	100	V

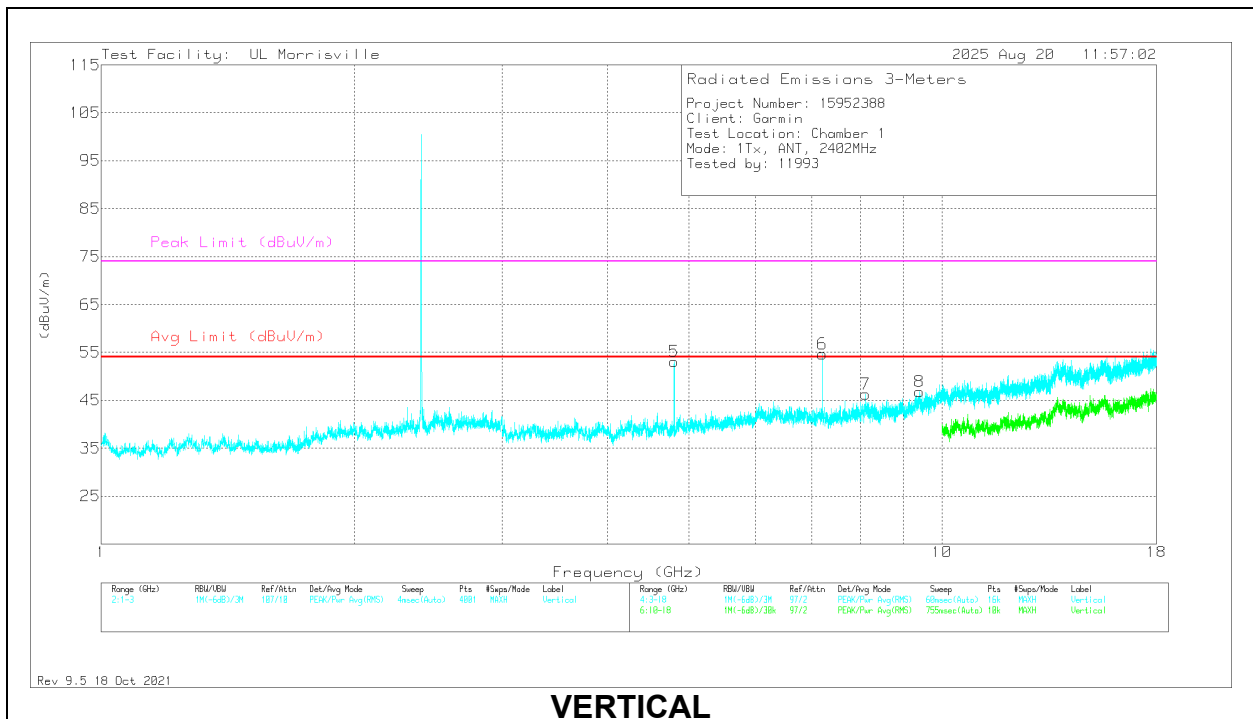
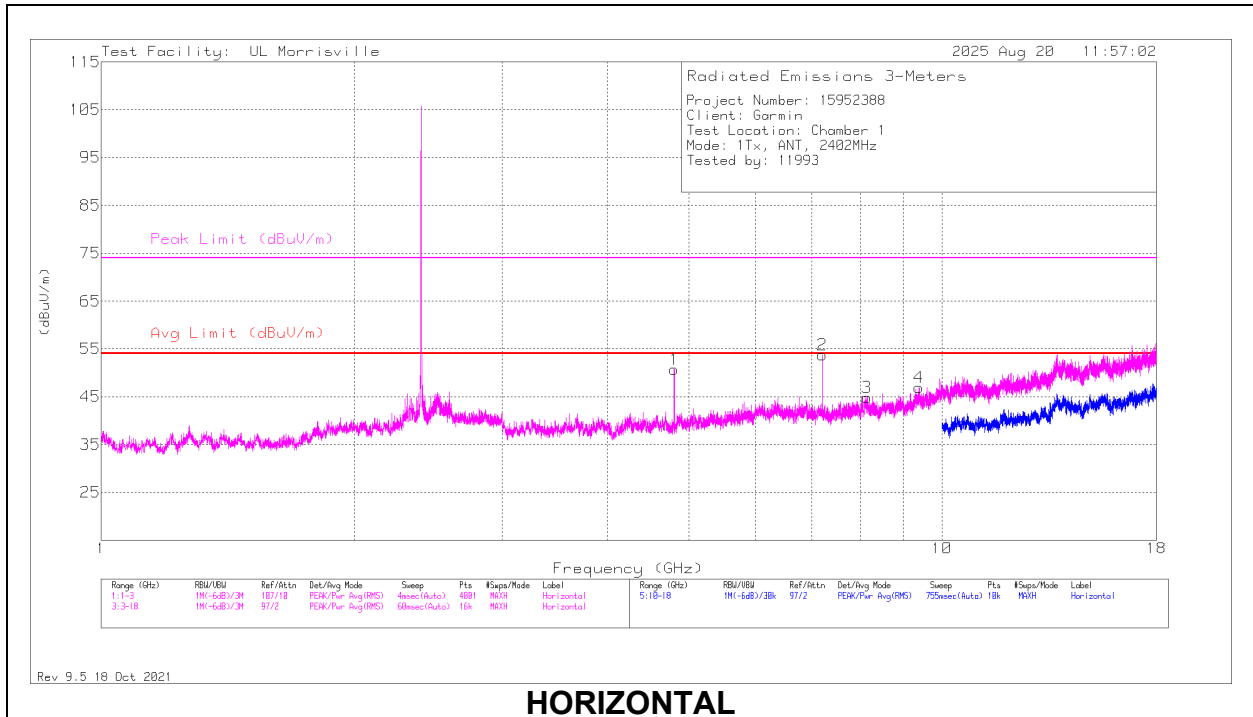
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

10.1.3. HARMONICS AND SPURIOUS EMISSIONS ABOVE 1 GHz

LOW CHANNEL, 2402 MHz RESULTS



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	* ** 4.80423	65.54	PK2	33.9	-47	0	52.44	-	-	74	-21.56	15	102	H
	* ** 4.80423	65.54	AV	33.9	-47	-17.72	34.72	54	-19.28	-	-	15	102	H
3	* ** 8.14219	50.41	Pk	35.9	-41.5	0	44.81	54	-9.19	74	-29.19	0-360	101	H
4	* ** 9.39375	51.69	Pk	36.3	-41	0	46.99	54	-7.01	74	-27.01	0-360	101	H
5	* ** 4.80429	67.18	PK2	33.9	-47	0	54.08	-	-	74	-19.92	86	103	V
	* ** 4.80429	67.18	AV	33.9	-47	-17.72	36.36	54	-17.64	-	-	86	103	V
7	* ** 8.11219	51.9	Pk	35.9	-41.5	0	46.3	54	-7.7	74	-27.7	0-360	101	V
8	* ** 9.40875	50.78	Pk	36.3	-40.3	0	46.78	54	-7.22	74	-27.22	0-360	101	V
2	7.20563	60.78	Pk	35.4	-42.4	0	53.78	-	-	-	-	0-360	199	H
6	7.20563	61.71	Pk	35.4	-42.4	0	54.71	-	-	-	-	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

AV - Average

The client has declared an operational duty cycle of 13% corresponding to a DCCF of -17.72dB.

Sample Calculation: $DCCF = 20\log(0.13) = -17.72\text{dB}$

AV calculation:

$AV = PK + DCCF$.

10.2. FUNDAMENTAL AND SPURIOUS EMISSIONS (MID CHANNEL)

10.2.1. FUNDAMENTAL (2440 MHz)

Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (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
2440													
2.43983	94.64	Pk	32.2	-23.2	0	103.64	-	-	114	-10.36	24	110	H
2.43983	94.64	AV	32.2	-23.2	-17.72	85.92	94	-8.08	-	-	24	110	H
2.43983	89.68	Pk	32.2	-23.2	0	98.68	-	-	114	-15.32	75	136	V
2.43983	89.68	AV	32.2	-23.2	-17.72	80.96	94	-13.04	-	-	75	136	V

Pk - Peak detector

AV - Average

The client has declared an operational duty cycle of 13% corresponding to a DCCF of -17.72dB.

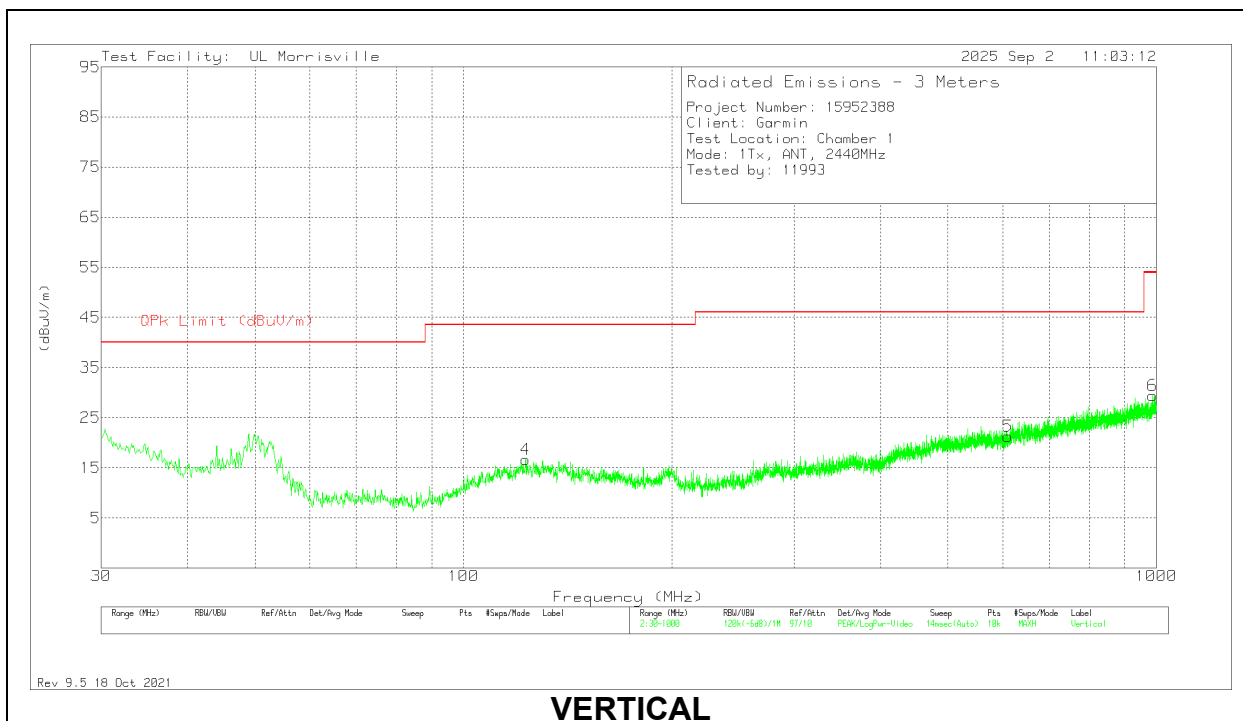
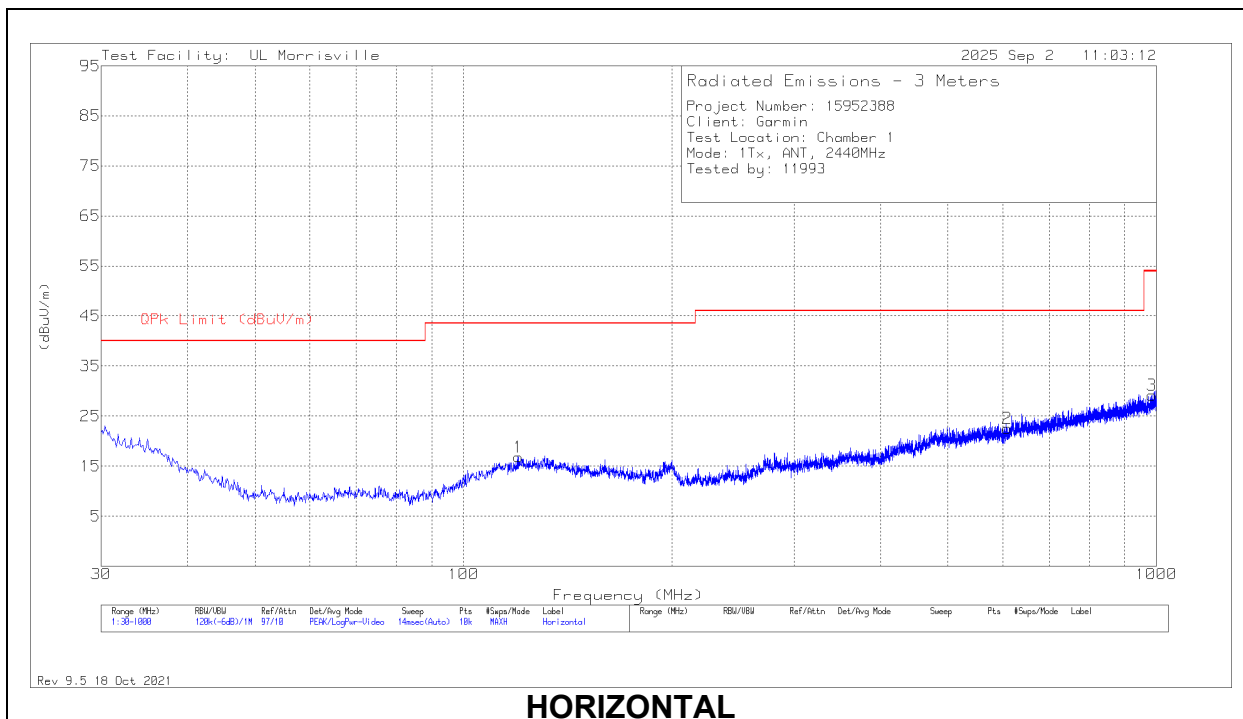
Sample Calculation: $DCCF = 20\log(0.13) = -17.72\text{dB}$

AV calculation:

AV= PK + DCCF.

10.2.2. HARMONICS AND SPURIOUS EMISSIONS BELOW 1 GHz

MID CHANNEL, 2440 MHz RESULTS



RADIATED EMISSIONS

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	* ** 120.113	27.73	Pk	19.9	-30.8	16.83	43.52	-26.69	0-360	300	H
2	* ** 608.702	26.29	Pk	24.9	-28.7	22.49	46.02	-23.53	0-360	199	H
3	* ** 984.48	25.64	Pk	29.3	-25.8	29.14	53.97	-24.83	0-360	399	H
4	* ** 122.926	27.68	Pk	20	-31	16.68	43.52	-26.84	0-360	100	V
5	* ** 610.739	24.53	Pk	25	-28.3	21.23	46.02	-24.79	0-360	100	V
6	* ** 986.614	25.39	Pk	29.4	-25.4	29.39	53.97	-24.58	0-360	100	V

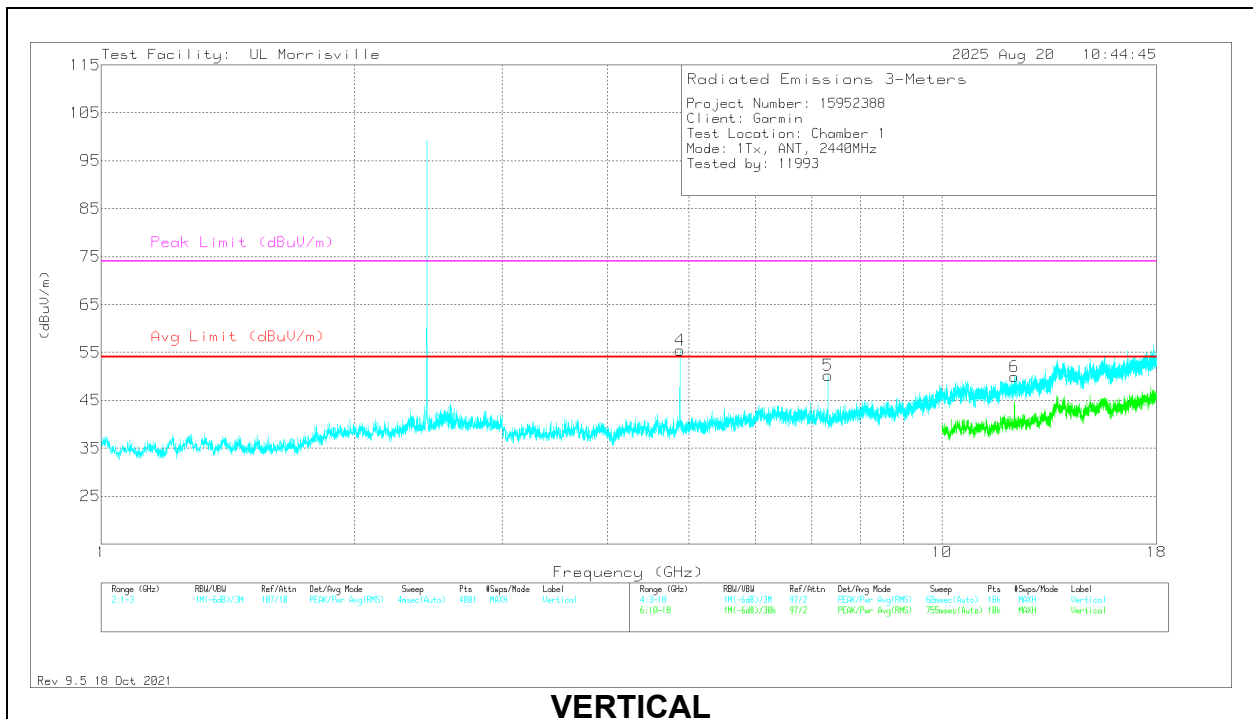
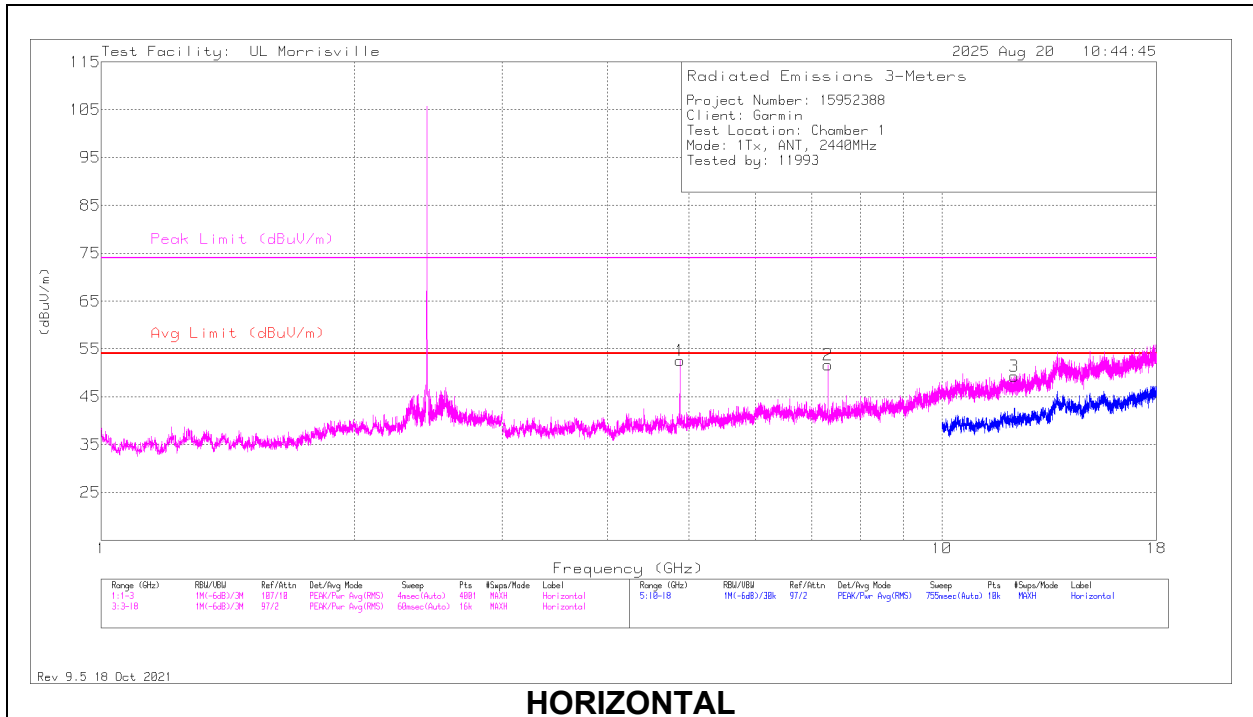
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

10.2.3. HARMONICS AND SPURIOUS EMISSIONS ABOVE 1 GHz

MID CHANNEL, 2440 MHz RESULTS



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	*** 4.88027	67.05	PK2	34	-45.4	0	55.65	-	-	74	-18.35	283	117	H
	*** 4.88027	67.05	AV	34	-45.4	-17.72	37.93	54	-16.07	-	-	283	117	H
2	*** 7.31945	62.21	PK2	35.4	-43.2	0	54.41	-	-	74	-19.59	131	174	H
	*** 7.31945	62.21	AV	35.4	-43.2	-17.72	36.69	54	-17.31	-	-	131	174	H
3	*** 12.20024	51.63	PK2	38.8	-38.5	0	51.93	-	-	74	-22.07	47	175	H
	*** 12.20024	51.63	AV	38.8	-38.5	-17.72	34.21	54	-19.79	-	-	47	175	H
4	*** 4.88035	68.1	PK2	34	-45.4	0	56.7	-	-	74	-17.3	13	110	V
	*** 4.88035	68.1	AV	34	-45.4	-17.72	38.98	54	-15.02	-	-	13	110	V
5	*** 7.32048	60.87	PK2	35.4	-43.2	0	53.07	-	-	74	-20.93	306	203	V
	*** 7.32048	60.87	AV	35.4	-43.2	-17.72	35.35	54	-18.65	-	-	306	203	V
6	*** 12.20077	52.65	PK2	38.8	-38.4	0	53.05	-	-	74	-20.95	334	155	V
	*** 12.20077	52.65	AV	38.8	-38.4	-17.72	35.33	54	-18.67	-	-	334	155	V

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

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

PK2 - Maximum Peak

AV - Average

The client has declared an operational duty cycle of 13% corresponding to a DCCF of -17.72dB.

Sample Calculation: $DCCF = 20\log(0.13) = -17.72\text{dB}$

AV calculation:

$AV = PK + DCCF$.

10.3. FUNDAMENTAL AND SPURIOUS EMISSIONS (HIGH CHANNEL)

10.3.1. FUNDAMENTAL (2480 MHz)

Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (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
2480													
2.48014	90.84	Pk	32.3	-23.1	0	100.04	-	-	114	-13.96	71	143	V
2.48014	90.84	AV	32.3	-23.1	-17.72	82.32	94	-11.68	-	-	71	143	V
2.48016	95.24	Pk	32.3	-23.1	0	104.44	-	-	114	-9.56	25	110	H
2.48016	95.24	AV	32.3	-23.1	-17.72	86.72	94	-7.28	-	-	25	110	H

Pk - Peak detector

AV - Average

The client has declared an operational duty cycle of 13% corresponding to a DCCF of -17.72dB.

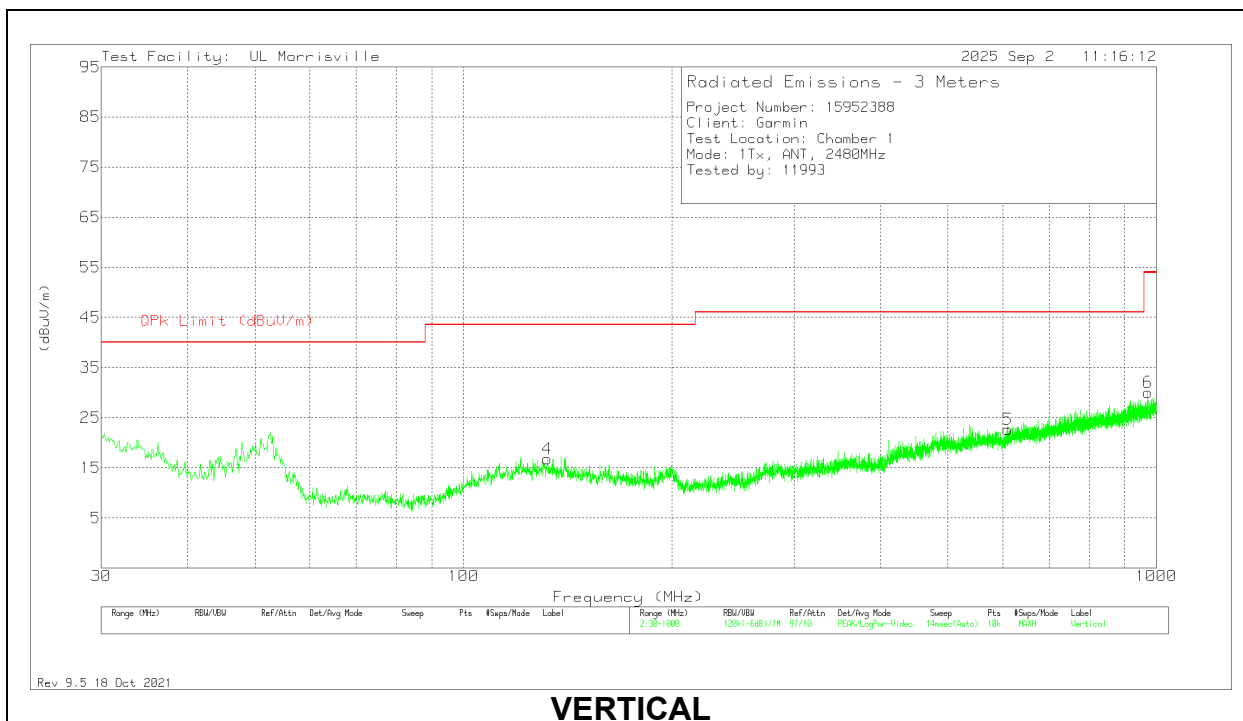
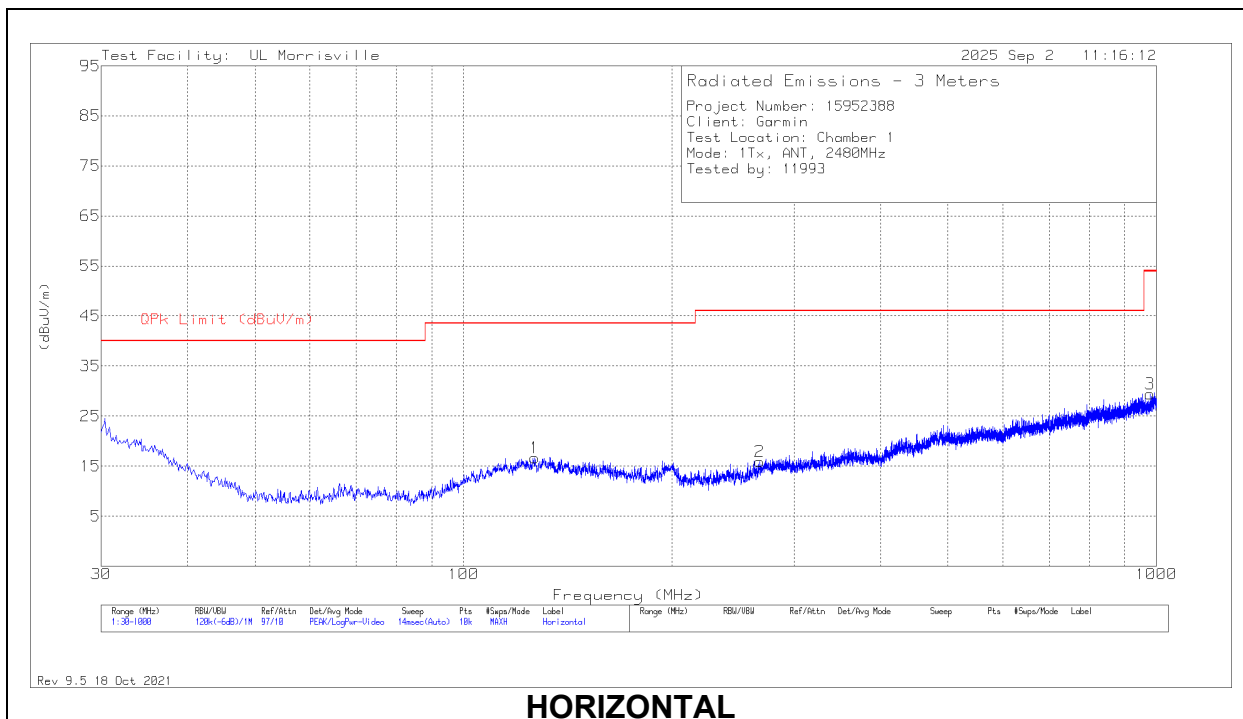
Sample Calculation: $DCCF = 20\log(0.13) = -17.72\text{dB}$

AV calculation:

$AV = PK + DCCF$.

10.3.2. HARMONICS AND SPURIOUS EMISSIONS BELOW 1 GHz

HIGH CHANNEL, 2480 MHz RESULTS



RADIATED EMISSIONS

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	* ** 126.709	26.97	Pk	20.1	-30.4	16.67	43.52	-26.85	0-360	99	H
2	* ** 267.359	26.54	Pk	19.1	-29.7	15.94	46.02	-30.08	0-360	200	H
3	* ** 979.727	26.06	Pk	29.1	-25.7	29.46	53.97	-24.51	0-360	99	H
4	* ** 132.141	27.43	Pk	19.9	-30.6	16.73	43.52	-26.79	0-360	100	V
5	* ** 610.933	26.02	Pk	25	-28.4	22.62	46.02	-23.4	0-360	100	V
6	* ** 972.161	26.78	Pk	29	-25.7	30.08	53.97	-23.89	0-360	100	V

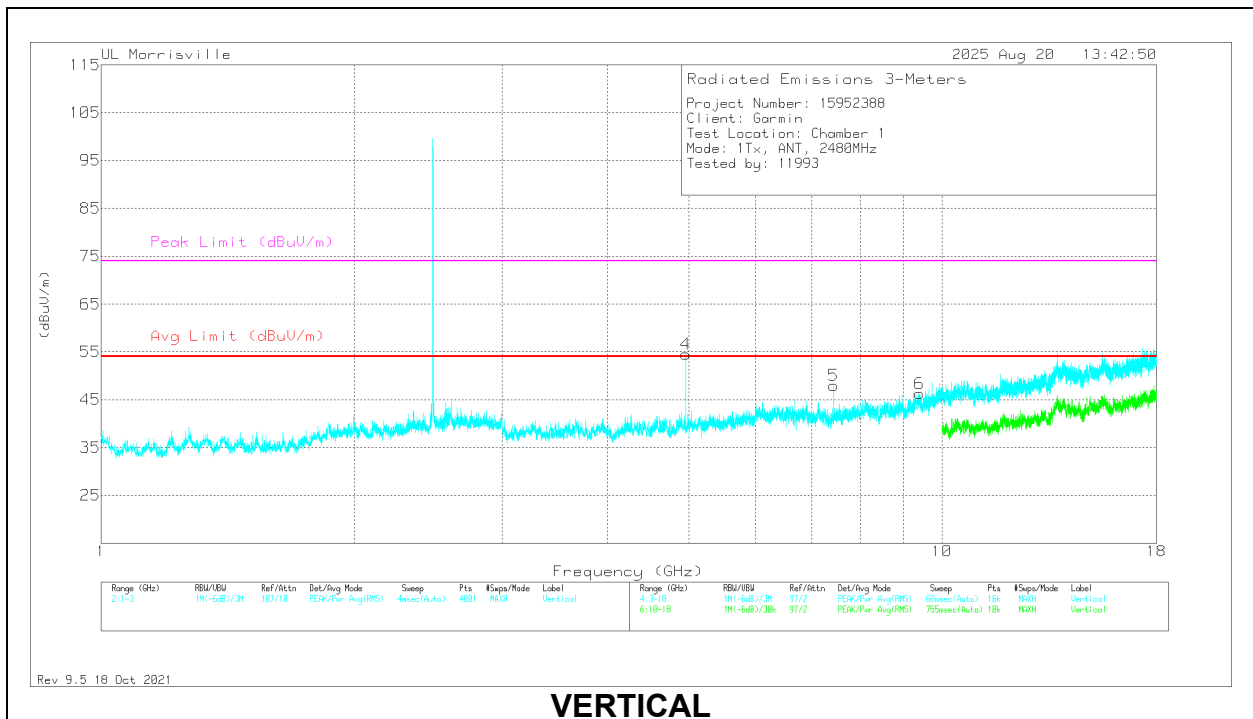
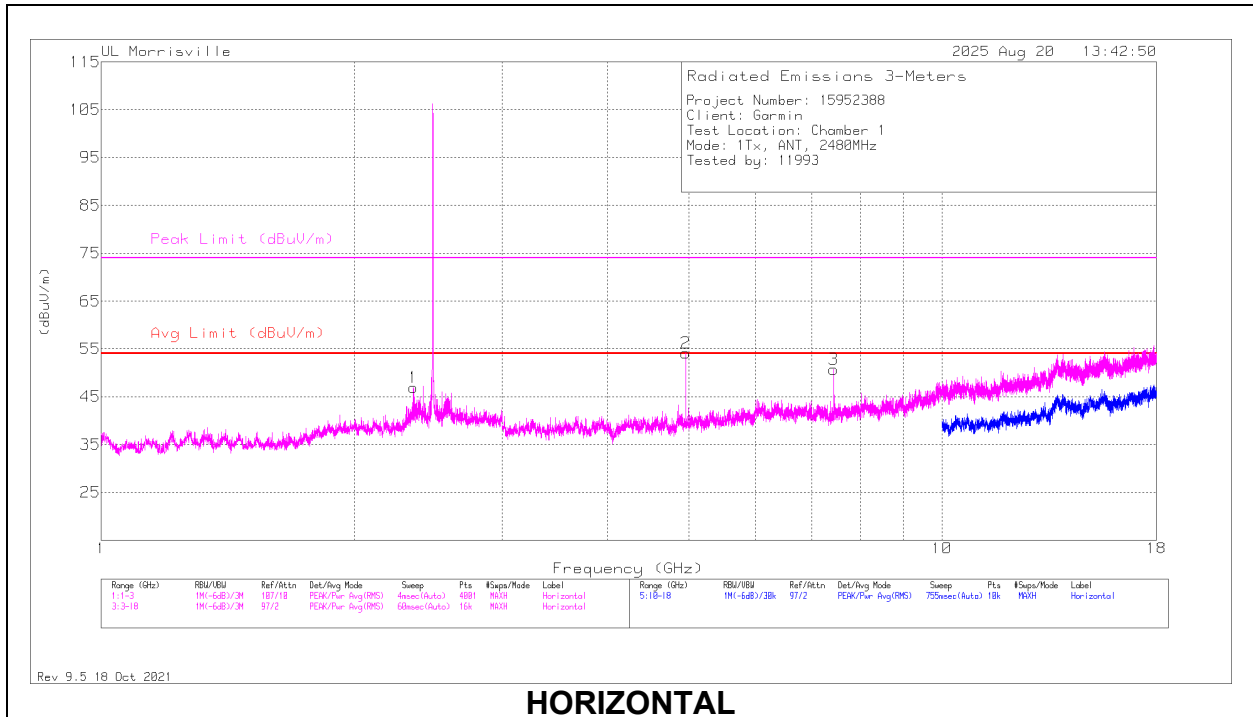
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

10.3.3. HARMONICS AND SPURIOUS EMISSIONS ABOVE 1 GHz

HIGH CHANNEL, 2480 MHz RESULTS



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	* ** 2.352	39.82	Pk	31.8	-24.7	0	46.92	54	-7.08	74	-27.08	0-360	101	H
2	* ** 4.96037	67.64	PK2	34.2	-45.7	0	56.14	-		74	-17.86	275	118	H
	* ** 4.96037	67.64	AV	34.2	-45.7	-17.72	38.42	54	-15.58	-	-	275	118	H
3	* ** 7.44041	59.86	PK2	35.4	-42.6	0	52.66	-		74	-21.34	42	205	H
	* ** 7.44041	59.86	AV	35.4	-42.6	-17.72	34.94	54	-19.06	-	-	42	205	H
4	* ** 4.96035	67.67	PK2	34.2	-45.7	0	56.17	-	-	74	-17.83	17	109	V
	* ** 4.96035	67.67	AV	34.2	-45.7	-17.72	38.45	54	-15.55	-	-	17	109	V
5	* ** 7.44	55.17	Pk	35.4	-42.6	0	47.97	54	-6.03	74	-26.03	0-360	200	V
6	* ** 9.41063	50.61	Pk	36.3	-40.6	0	46.31	54	-7.69	74	-27.69	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

AV - Average

The client has declared an operational duty cycle of 13% corresponding to a DCCF of -17.72dB.

Sample Calculation: $DCCF = 20\log(0.13) = -17.72\text{dB}$

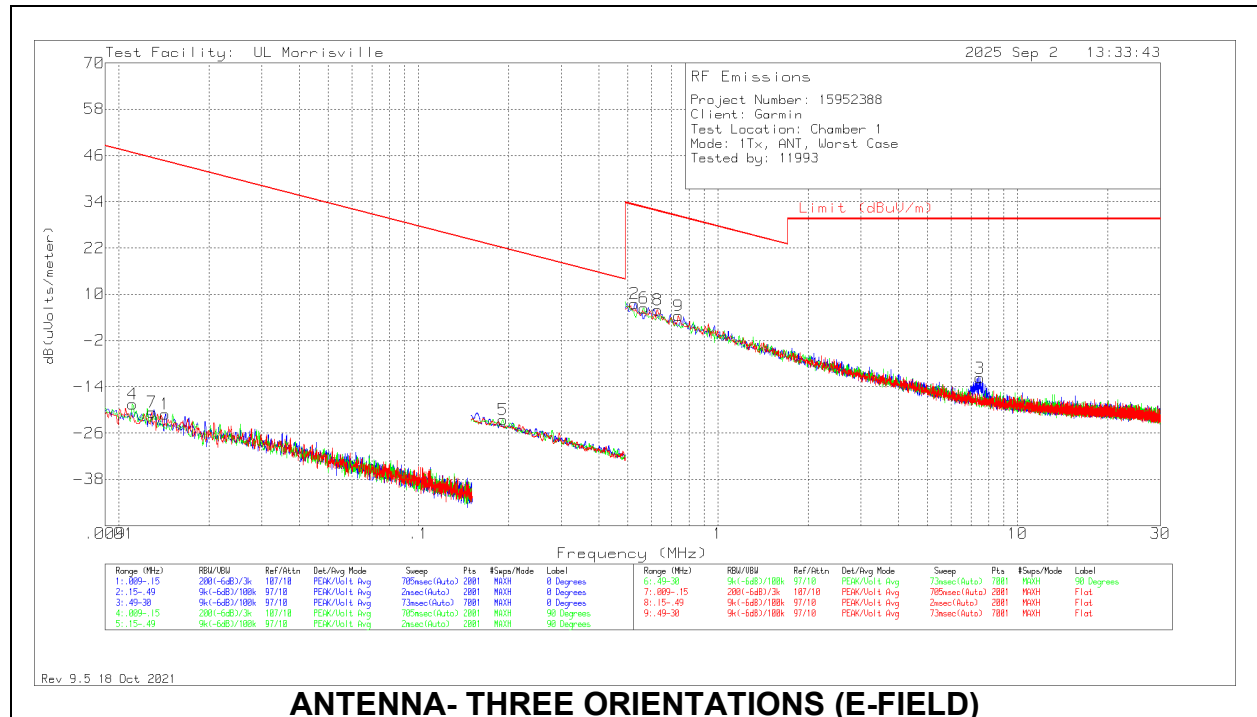
AV calculation:

$AV = PK + DCCF$.

10.4. SPURIOUS EMISSIONS BELOW 30 MHz

WORST-CASE CONFIGURATION

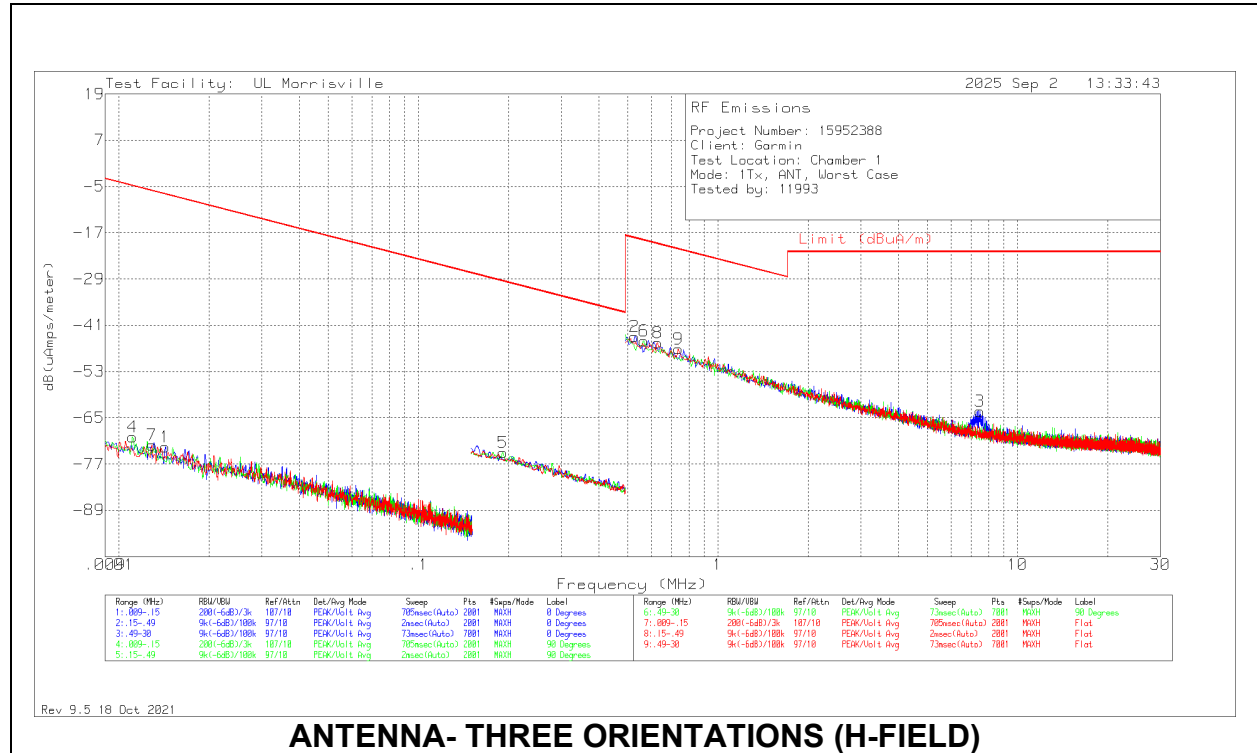
Note for below 30 MHz scans: All measurements were made at a test distance of 3 m. The measured data was extrapolated from the test distance (3m) to the specification distance (300 m from 9-490 kHz and 30 m from 490 kHz – 30 MHz) to clearly show the relative levels of fundamental and spurious emissions 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 $40 \cdot \log(\text{test distance} / \text{specification distance})$. Emissions were applied to the QP/AV limits as the worst case.



ANTENNA- THREE ORIENTATIONS (E-FIELD)

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	ANT (dB/m)	Gain/Loss (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uVolts/meter)	QP/AV Limit (dBuV/m)	PK Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Loop Angle
4	.01113	43.06	Pk	18.4	.1	-80	-18.44	46.67	66.67	-65.11	0-360	90 degs
7	.01291	41.76	Pk	17.5	.1	-80	-20.64	45.39	65.39	-66.03	0-360	Flat
1	.01425	42.05	Pk	16.8	.1	-80	-21.05	44.53	64.53	-65.58	0-360	0 degs
5	.19114	46.34	Pk	11	.1	-80	-22.56	21.98	41.98	-44.54	0-360	90 degs
2	.52794	36.49	Pk	11	.1	-40	7.59	33.15	-	-25.56	0-360	0 degs
6	.56589	35.34	Pk	11	.1	-40	6.44	32.55	-	-26.11	0-360	90 degs
8	.62913	34.81	Pk	11	.1	-40	5.91	31.63	-	-25.72	0-360	Flat
9	.73874	33.27	Pk	11	.1	-40	4.37	30.23	-	-25.86	0-360	Flat
3	7.48856	17.16	Pk	10.7	.4	-40	-11.74	29.54	-	-41.28	0-360	0 degs

Pk - Peak detector



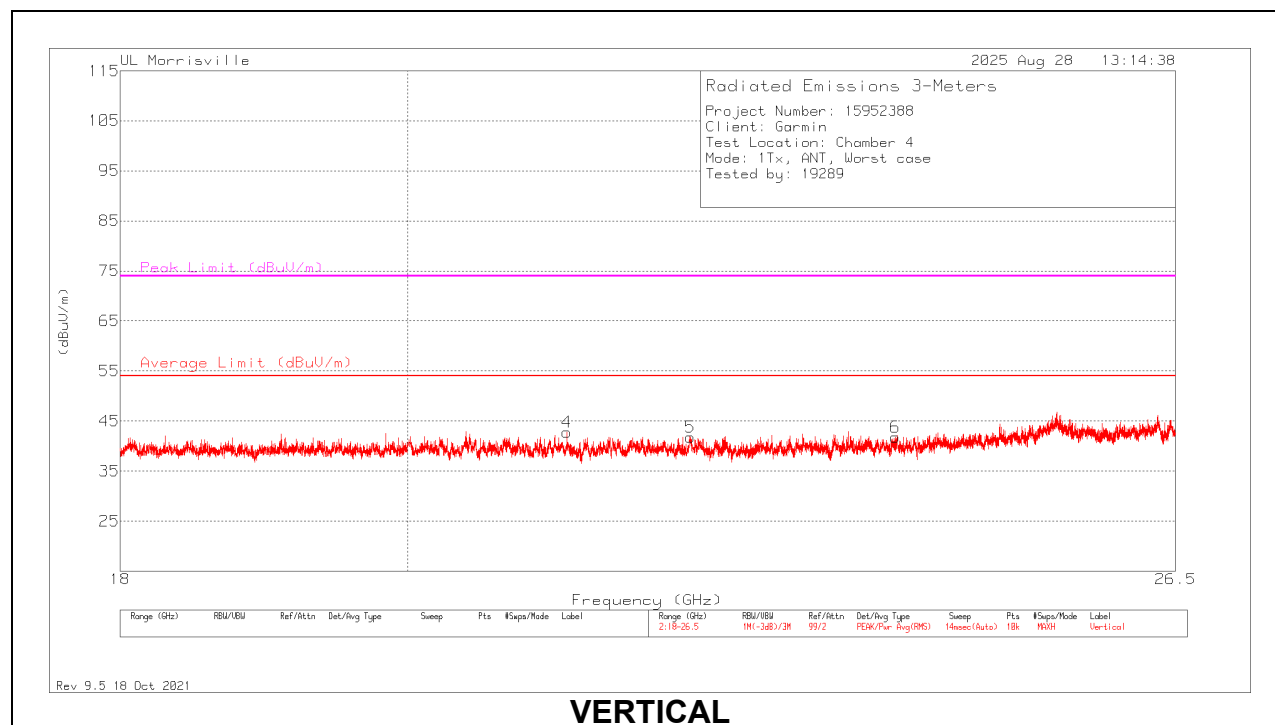
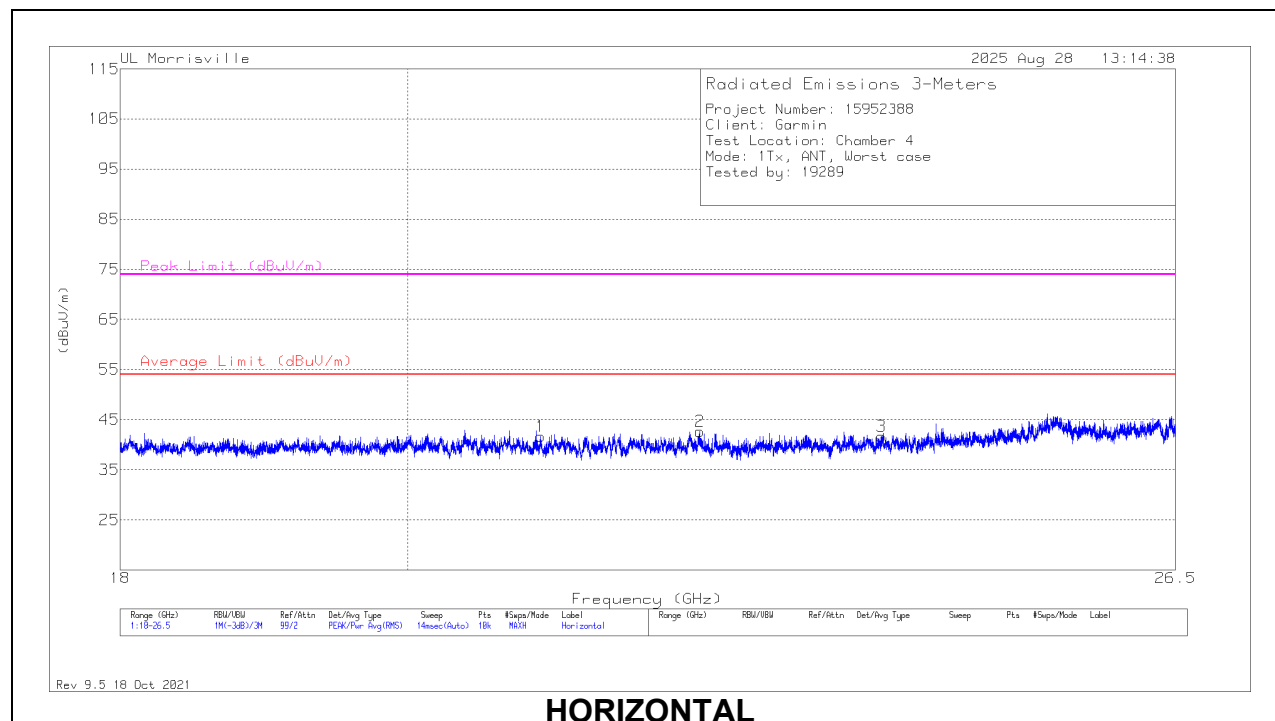
ANTENNA- THREE ORIENTATIONS (H-FIELD)

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	ANT (dB/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	.01113	43.06	Pk	-33.1	.1	-80	-69.94	-4.83	15.17	-65.11	0-360	90 degs
7	.01291	41.76	Pk	-34	.1	-80	-72.14	-6.11	13.89	-66.03	0-360	Flat
1	.01425	42.05	Pk	-34.7	.1	-80	-72.55	-6.97	13.03	-65.58	0-360	0 degs
5	.19114	46.34	Pk	-40.5	.1	-80	-74.06	-29.52	-9.52	-44.54	0-360	90 degs
2	.52794	36.49	Pk	-40.5	.1	-40	-43.91	-18.35	-	-25.56	0-360	0 degs
6	.56589	35.34	Pk	-40.5	.1	-40	-45.06	-18.95	-	-26.11	0-360	90 degs
8	.62913	34.81	Pk	-40.5	.1	-40	-45.59	-19.87	-	-25.72	0-360	Flat
9	.73874	33.27	Pk	-40.5	.1	-40	-47.13	-21.27	-	-25.86	0-360	Flat
3	7.48856	17.16	Pk	-40.8	.4	-40	-63.24	-21.96	-	-41.28	0-360	0 degs

Pk - Peak detector

10.5. WORST CASE 18-26 GHZ

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



Marker	Frequency (GHz)	MeterReading (dBuV)	Det	91186 (dB/m)	Gain/Loss (dB)	CorrectedReading(dBuV/m)	Average Limit (dBuV/m)	Margin(dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 20.99655	47.26	Pk	32.9	-38.5	41.66	54	-12.34	74	-32.34	0-360	200	H
2	* ** 22.26233	48.07	Pk	33.4	-38.8	42.67	54	-11.33	74	-31.33	0-360	150	H
3	* ** 23.79078	45.97	Pk	34	-38.3	41.67	54	-12.33	74	-32.33	0-360	250	H
4	* ** 21.20057	48.86	Pk	32.7	-38.8	42.76	54	-11.24	74	-31.24	0-360	300	V
5	* ** 22.18327	46.25	Pk	33.4	-37.9	41.75	54	-12.25	74	-32.25	0-360	250	V
6	* ** 23.91149	46.33	Pk	33.7	-38.2	41.83	54	-12.17	74	-32.17	0-360	300	V

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

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

11. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)
RSS-Gen 8.8

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

^{*} Decreases with the logarithm of the frequency.

TEST PROCEDURE

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

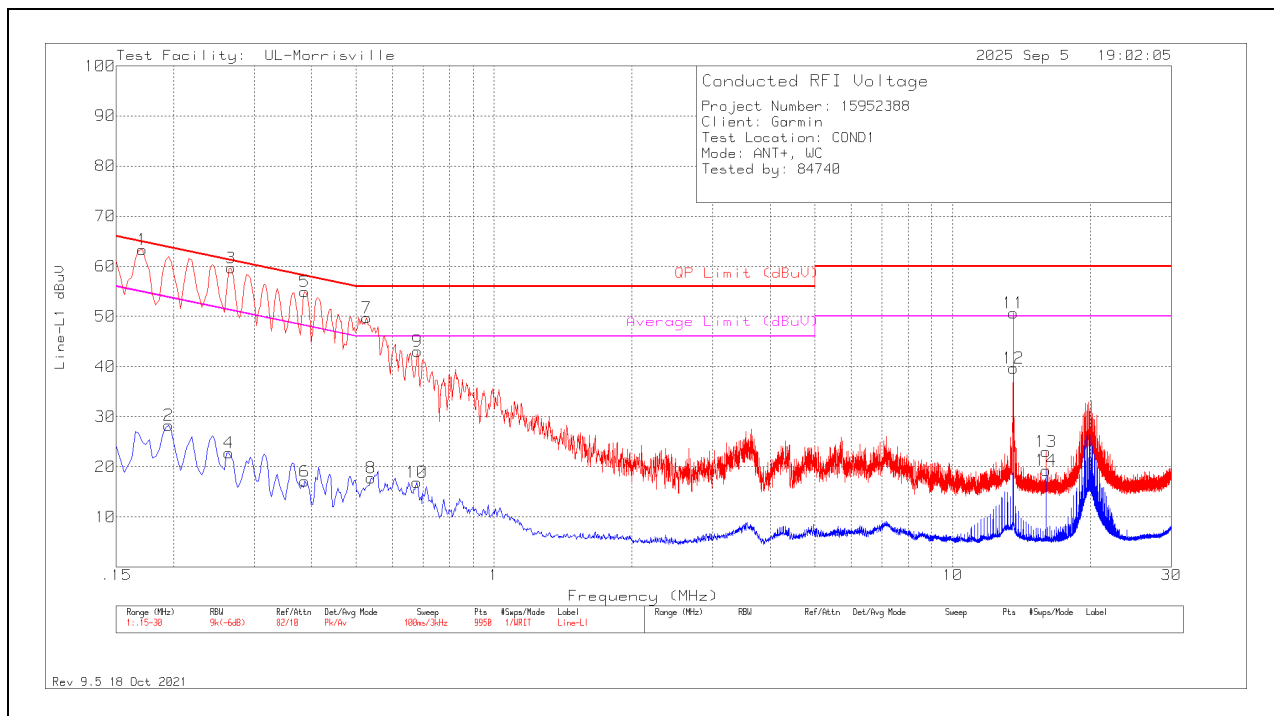
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

11.1. AC Power Line

LINE 1 RESULTS



Range 1: Line-L1 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80389 (dB)	Cbl/Limiter (dB)	Corrected Reading dBuV	QP Limit (dBuV)	Margin (dB)	Average Limit (dBuV)	Margin (dB)
1	.16898	48.33	Qp	.2	9.7	58.23	65.01	-6.78	-	-
2	.195	18.45	Av	.1	9.7	28.25	-	-	53.82	-25.57
3	.26621	44.71	Qp	.1	9.7	54.51	61.24	-6.73	-	-
4	.264	13.01	Av	.1	9.7	22.81	-	-	51.3	-28.49
5	.38815	39.55	Qp	0	9.7	49.25	58.1	-8.85	-	-
6	.387	7.38	Av	0	9.7	17.08	-	-	48.13	-31.05
7	.528	40.04	Pk	0	9.7	49.74	56	-6.26	-	-
8	.54	8.07	Av	0	9.7	17.77	-	-	46	-28.23
9	.681	33.34	Pk	0	9.7	43.04	56	-12.96	-	-
10	.678	7.24	Av	0	9.7	16.94	-	-	46	-29.06
11	13.56	40.84	Pk	.1	9.8	50.74	60	-9.26	-	-
12	13.56	29.82	Av	.1	9.8	39.72	-	-	50	-10.28
13	15.996	13.08	Pk	.1	9.8	22.98	60	-37.02	-	-
14	15.996	9.33	Av	.1	9.8	19.23	-	-	50	-30.77

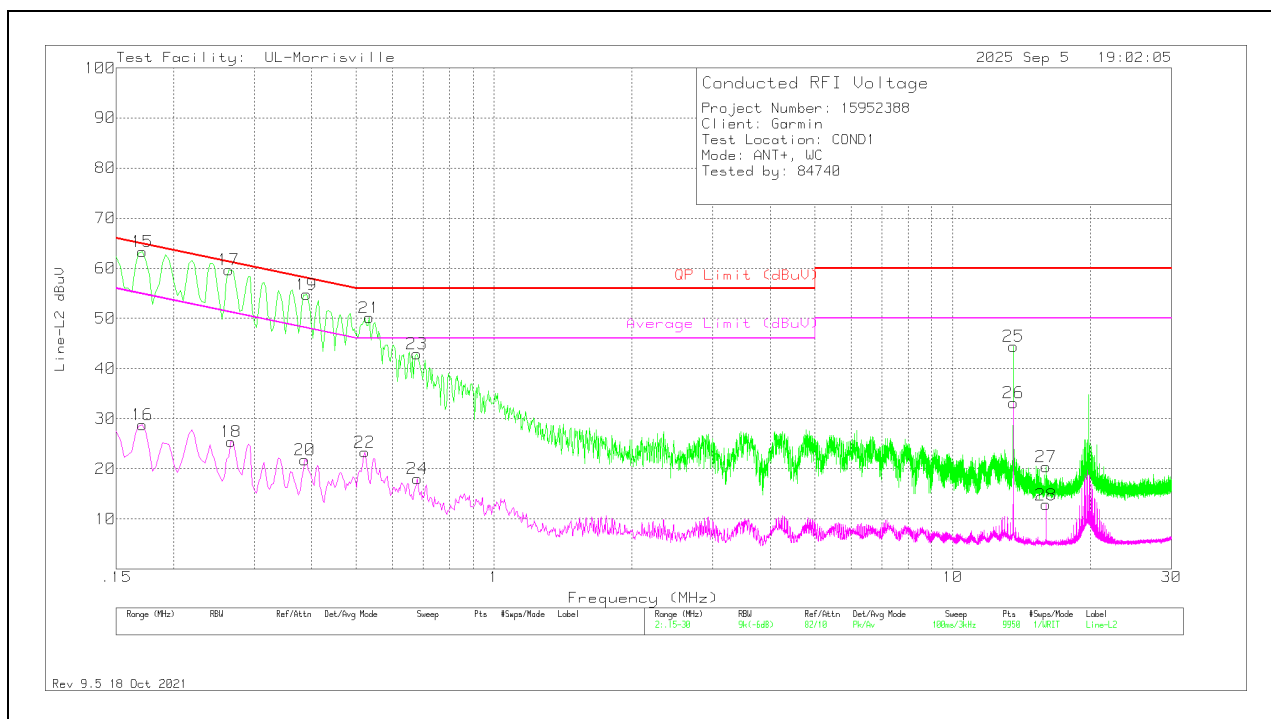
Pk - Peak detector

Av - Average detection

Qp - Quasi-Peak detector

Note* - Markers 11 and 12 are from RFID signals in the lab and is not related to the EUT.

LINE 2 RESULTS



Range 2: Line-L2 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80389 (dB)	Cbl/Limiter (dB)	Corrected Reading dBuV	QP Limit (dBuV)	Margin (dB)	Average Limit (dBuV)	Margin (dB)
15	.1688	48.37	Qp	.2	9.7	58.27	65.02	-6.75	-	-
16	.171	18.86	Av	.2	9.7	28.76	-	-	54.91	-26.15
17	.26479	44.18	Qp	.1	9.7	53.98	61.28	-7.3	-	-
18	.267	15.61	Av	.1	9.7	25.41	-	-	51.21	-25.8
19	.38622	38.99	Qp	0	9.7	48.69	58.14	-9.45	-	-
20	.387	12.07	Av	0	9.7	21.77	-	-	48.13	-26.36
21	.53148	32.19	Qp	0	9.7	41.89	56	-14.11	-	-
22	.522	13.63	Av	0	9.7	23.33	-	-	46	-22.67
23	.678	33.27	Pk	0	9.7	42.97	56	-13.03	-	-
24	.681	8.3	Av	0	9.7	18	-	-	46	-28
25	13.56	34.58	Pk	.1	9.8	44.48	60	-15.52	-	-
26	13.563	23.23	Av	.1	9.8	33.13	-	-	50	-16.87
27	15.996	10.46	Pk	.1	9.8	20.36	60	-39.64	-	-
28	15.996	2.92	Av	.1	9.8	12.82	-	-	50	-37.18

Pk - Peak detector

Av - Average detection

Qp - Quasi-Peak detector

Markers 25 and 26 are from RFID signals in the lab and are not related to the EUT.

12. SETUP PHOTOS

See R15952388-EP1 for Setup Photos.

END OF TEST REPORT