

TEST REPORT

Report Number: R15699305-E3

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

Model : A04702

FCC ID : IPH-04702

IC : 1792A-04702

EUT Description : Portable Digital Transceiver

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

Date Of Issue:
2025-04-14

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



Revision History

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

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1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: Portable Digital Transceiver

MODEL: A04702

SERIAL NUMBER: 497855098, 497854737

SAMPLE RECEIPT DATE: 2025-03-04

DATE TESTED: 2025-03-05 to 2025-04-10

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC 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 tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document.

Approved & Released
For UL LLC By:

Prepared By:



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



Manish Baral
Engineer
Consumer, Medical and IT Segment
UL LLC

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with:

- ANSI C63.10-2020
- FCC 47 CFR Part 2
- FCC 47 CFR Part 15C
- RSS-GEN Issue 5 + A1 + A2: 2021
- RSS-210 Issue 11: 2024
- KDB 174176

3. SUMMARY OF TEST RESULTS

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. RFID radio operational specifications (see section 6.4)

Requirement Description	Requirement Clause Number	Result	Remarks
Occupied Bandwidth	For Reporting Purposes Only	Passed	None.
Fundamental Measurements.	FCC §15.225 (a-d) FCC §15.209 (d)		
Tx Spurious Emissions	IC RSS-210, Annex B.6 IC RSS-GEN, Section 8.9 (Transmitter)		
Frequency Stability	FCC FCC §15.225 (e) RSS-210, Annex B.6		
AC Mains Line Conducted Emissions	FCC §15.207 IC RSS-GEN, Section 8.8		

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 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)	419.38 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

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:

Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss.

36.5 dBuV + 0 dB + 10.1 dB + 0 dB = 46.6 dBuV

6. EQUIPMENT UNDER TEST

6.1. DESCRIPTION OF EUT

The EUT is an Portable Digital Transceiver with BT, BLE, ANT/ANT+, 802.11b/g/n 2.4GHz WLAN, and NFC. This report covers testing on the NFC radio.

6.2. MAXIMUM ELECTRIC FIELD STRENGTH

The transmitter has a maximum peak radiated electric field strength as follows:

Fundamental Frequency (MHz)	E-Field at 30-Meters (dBuV/m)
13.56	29.09

6.3. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was:

The software version installed during testing was 8.09.

6.4. WORST-CASE CONFIGURATION AND MODE

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

In addition, Type A and F with and without a tag were investigated to determine the worst case based on the highest power and spurious emissions. Type F has 2 data rates. Data rate 212kb/s for type F was used for investigation as it was worst-case data rate declared by Garmin. Type A with a tag was determined to be the worst case and therefore selected for all final tests.

The distance between the EUT and NFC reader was also investigated, and the worst-case condition occurs when the NFC reader and EUT are separated by 3cm; therefore, all final radiated testing was performed with the EUT and NFC reader separated by 3cm.

Type A and Type F have the following data rates below:

Type	Data-Rate
A	106 kb/s
F	212/424 kb/s

6.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

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

I/O CABLES

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

SETUP DIAGRAM

Please refer to R15699305-EP2 for setup diagrams

7. TEST AND MEASUREMENT EQUIPMENT

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

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

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

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

Equip. ID	Description	Manufacturer/Brand	Model Number	Last Cal.	Next Cal.
90410	Spectrum Analyzer	Keysight Technologies	N9030A	2024-06-14	2025-06-14
SOFTEMI	Antenna Port Software	UL	Version 2022.8.16	NA	NA
226562	SMA Coaxial 10dB Attenuator 25MHz-18GHz	CentricRF	C18S2-10	2024-04-11	2025-04-11
226552	SMA Coaxial 20dB Attenuator 25MHz-18GHz	CentricRF	C18S2-20	2024-04-04	2025-04-04
CBL105	Micro-Coax UTiFLEX Cable Assembly, Low Loss	Carlisle Interconnect Technologies	UFB-197C-0-0160-300300	2024-03-01	2025-03-31
236852	California Instruments AC Power Source	Ametek	AST3001A1B	-	-
91219	True RMS Multimeter	Agilent	U1232A	2024-08-01	2025-08-01

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
Conducted Room 1					
207726	Temp/Humid Chamber	Thermotron	SM-32-8200	2025-01-15	2026-01-15

Note – All equipment used was in calibration during time of testing.

8. 20dB AND OCCUPIED BANDWIDTH

LIMITS

§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.

TEST PROCEDURE

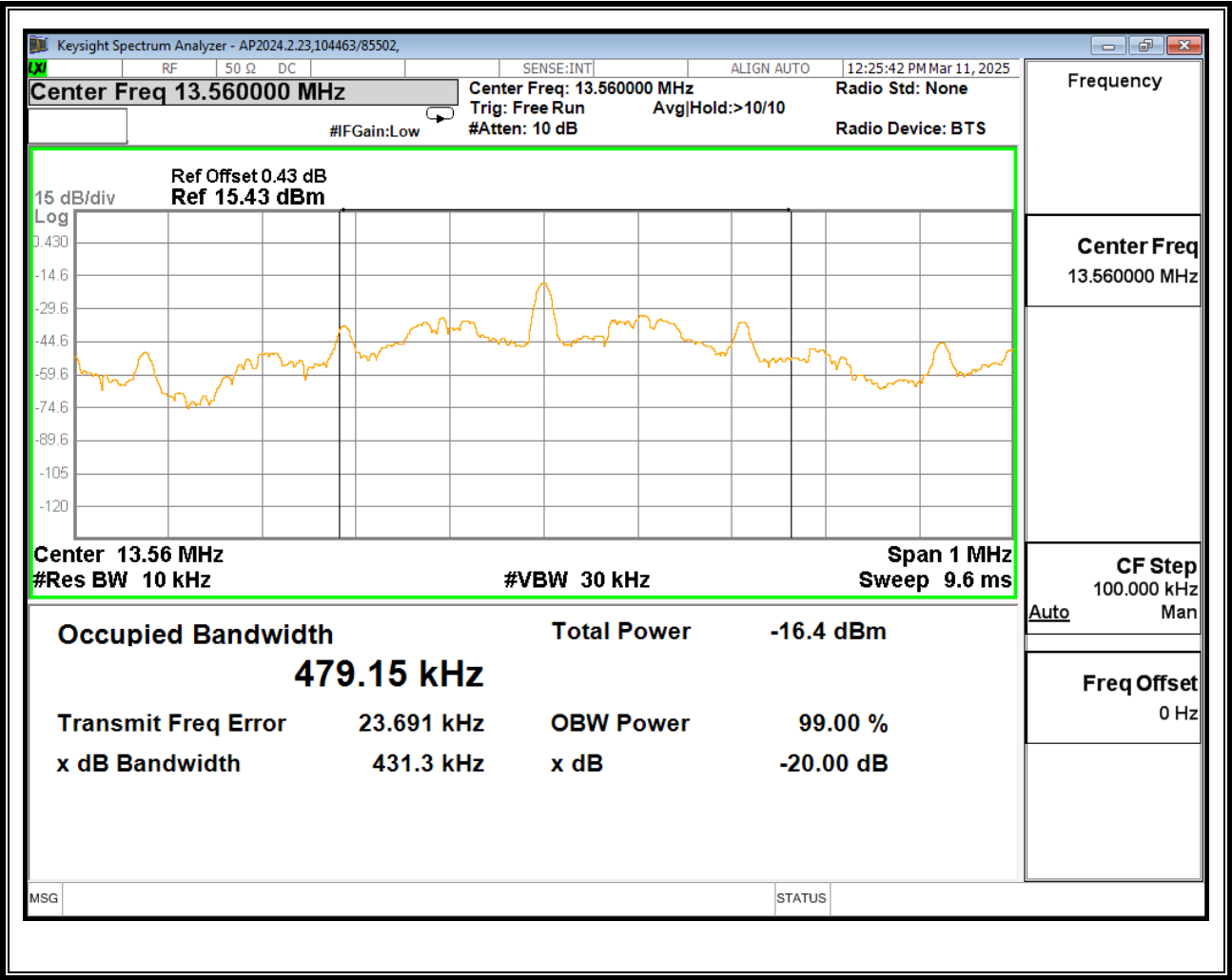
C63.10 6.9.2 and 6.9.3

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1-5% of the 20dB bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

Mode	Frequency (MHz)	20dB Bandwidth (kHz)
Type A	13.56	433.8

8.1. Type A (CE Mode)



9. RADIATED EMISSION TEST RESULTS

9.1. LIMITS AND PROCEDURE

LIMIT

FCC §15.225

IC RSS-210, Annex B.6

IC RSS-GEN, Section 8.9 (Transmitter)

(a) The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/ meter at 30 meters.

(b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

(c) Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

(d) The field strength of any emissions appearing outside of the 13.110– 14.010 MHz and shall not exceed the general radiated emission limits in § 15.209 as follows:

§15.209 (a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Limits for radiated disturbance of an intentional radiator		
Frequency range (MHz)	Limits (µV/m)	Measurement Distance (m)
0.009 – 0.490	2400 / F (kHz)	300
0.490 – 1.705	24000 / F (kHz)	30
1.705 – 30.0	30	30
30 – 88	100**	3
88 - 216	150**	3
216 – 960	200**	3
Above 960	500	3

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	-
Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g. §§ 15.231 and 15.241.

§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

Formula for converting the filed strength from uV/m to dBuV/m is:

Limit (dBuV/m) = 20 log limit (uV/m)

In addition:

§15.209 (d) The emission limits shown the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emissions limits in these three bands are based on measurements employing an average detector.

§15.209 (d) The provisions in §§ 15.225, measuring emissions at distances other than the distances specified in the above table, determining the frequency range over which radiated emissions are to be measured, and limiting peak emissions apply to all devices operated under this part.

TEST PROCEDURE

ANSI C63.10, 2020

The EUT is an intentional radiator that incorporates a digital device, the highest fundamental frequency generated or used in the device is 13.56 MHz; therefore, the frequency range was investigated from 9kHz to the 10th harmonic of the highest fundamental frequency, or 1000 MHz, whichever is greater.

Note: For all Below 30MHz test data, 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 $40 \cdot \log(\text{test distance} / \text{specification distance})$

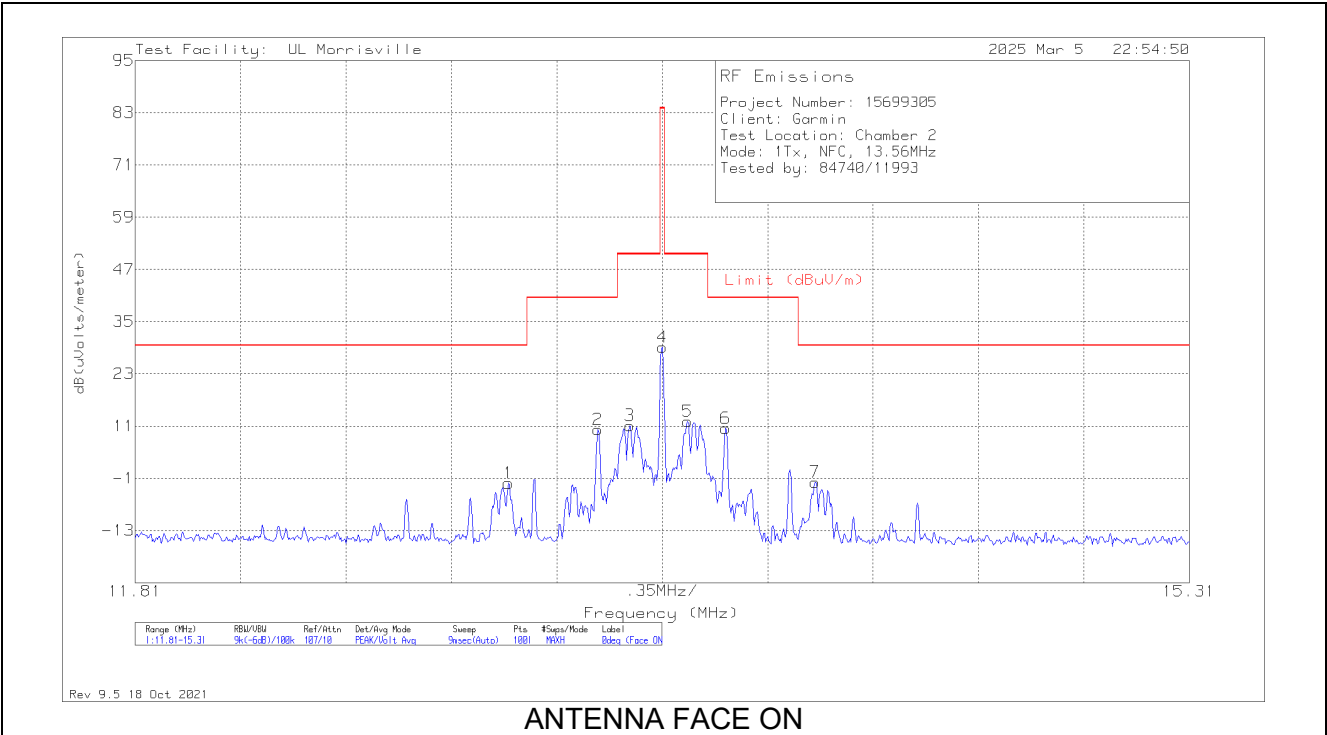
RESULTS

9.2. FUNDAMENTAL AND SPURIOUS EMISSIONS (Below 30MHz)

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

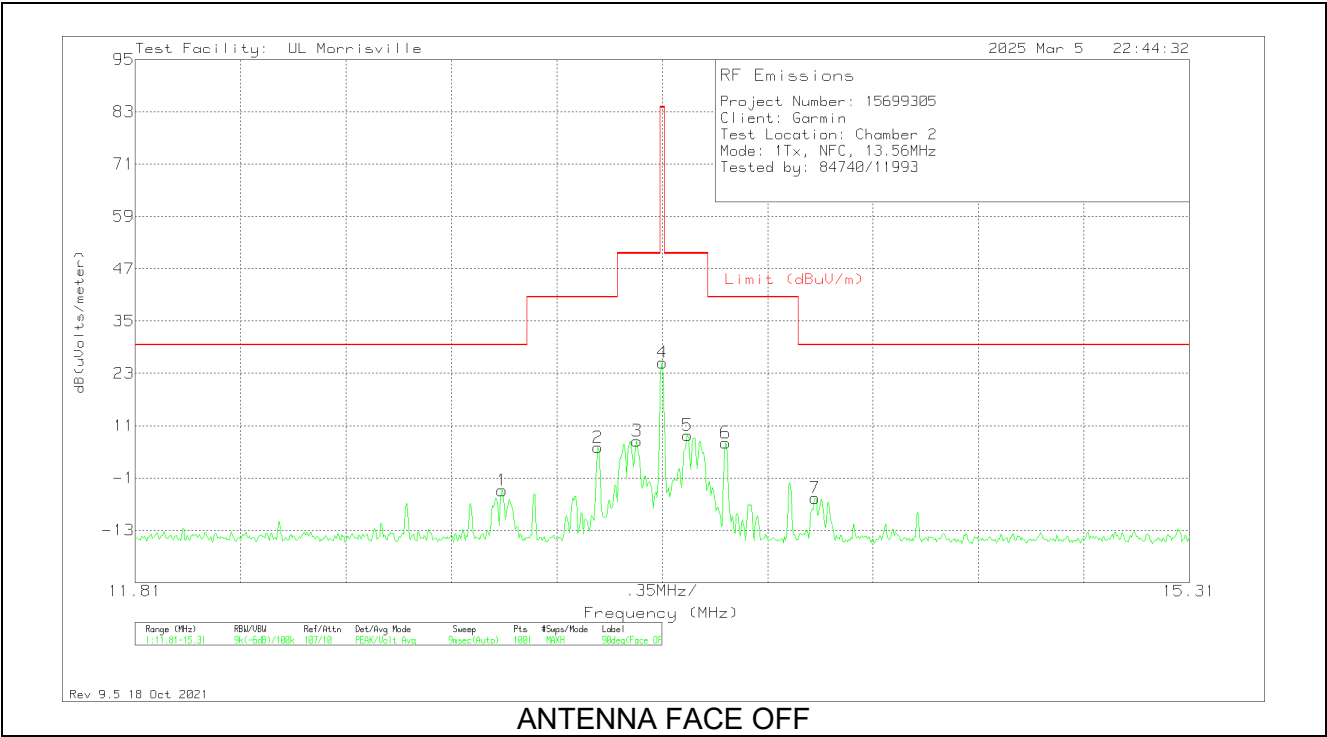
9.2.1. TYPE A WITH TAG

FUNDAMENTAL



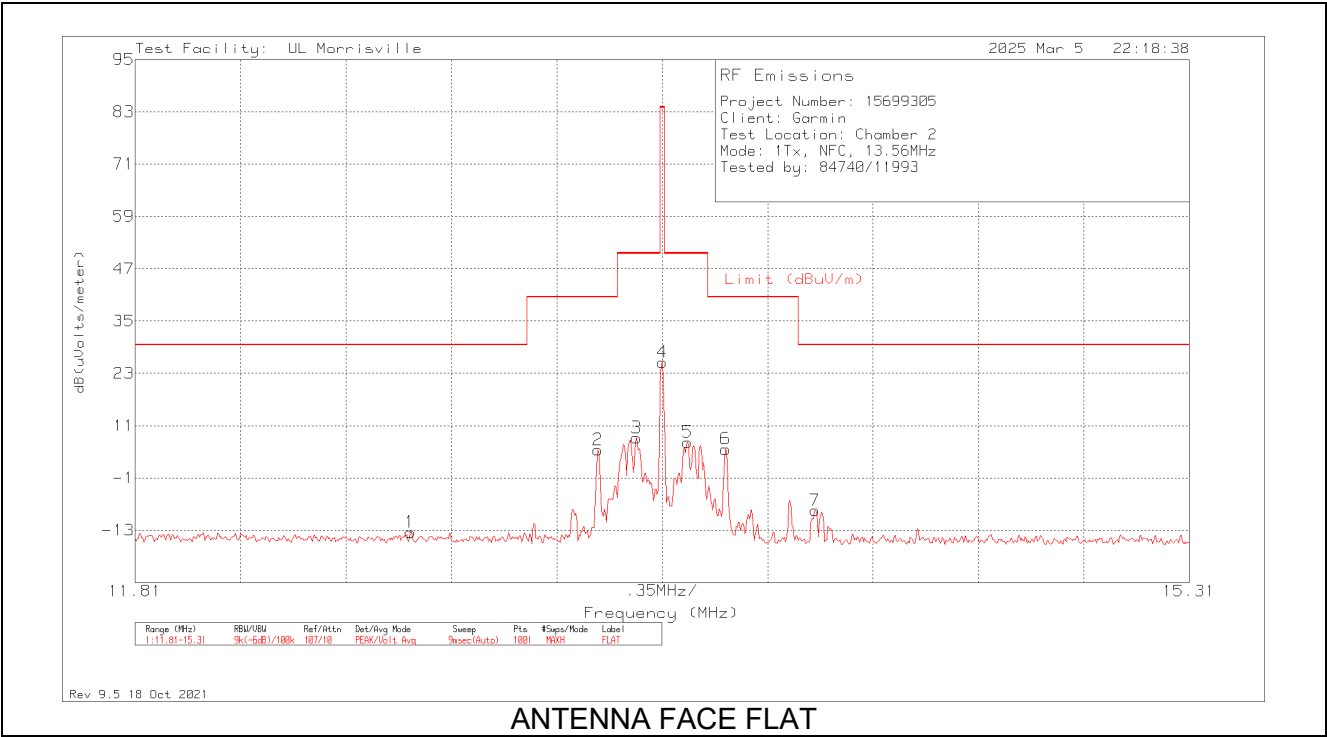
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	135144 (dB/m)	Gain/Loss (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uVolts/meter)	Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Loop Angle
1	13.049	27.48	Pk	9.8	.6	-40	-2.12	29.5	-31.62	181	100	0 degs
2	13.3465	39.79	Pk	9.8	.6	-40	10.19	40.5	-30.31	181	100	0 degs
3	13.4515	40.69	Pk	9.8	.6	-40	11.09	50.5	-39.41	181	100	0 degs
4	13.56	58.69	Pk	9.8	.6	-40	29.09	84	-54.91	181	100	0 degs
5	13.644	41.66	Pk	9.8	.6	-40	12.06	50.5	-38.44	181	100	0 degs
6	13.77	40.17	Pk	9.7	.6	-40	10.47	40.5	-30.03	181	100	0 degs
7	14.0675	27.78	Pk	9.7	.6	-40	-1.92	29.5	-31.42	181	100	0 degs

Pk - Peak detector



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	135144 (dB/m)	Gain/Loss (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uVolts/meter)	Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Loop Angle
1	13.028	25.74	Pk	9.8	.6	-40	-3.86	29.5	-33.36	268	100	90 degs
2	13.3465	35.61	Pk	9.8	.6	-40	6.01	40.5	-34.49	268	100	90 degs
3	13.476	37.08	Pk	9.8	.6	-40	7.48	50.5	-43.02	268	100	90 degs
4	13.56	55.05	Pk	9.8	.6	-40	25.45	84	-58.55	268	100	90 degs
5	13.644	38.36	Pk	9.8	.6	-40	8.76	50.5	-41.74	268	100	90 degs
6	13.77	36.73	Pk	9.7	.6	-40	7.03	40.5	-33.47	268	100	90 degs
7	14.0675	24.09	Pk	9.7	.6	-40	-5.61	29.5	-35.11	268	100	90 degs

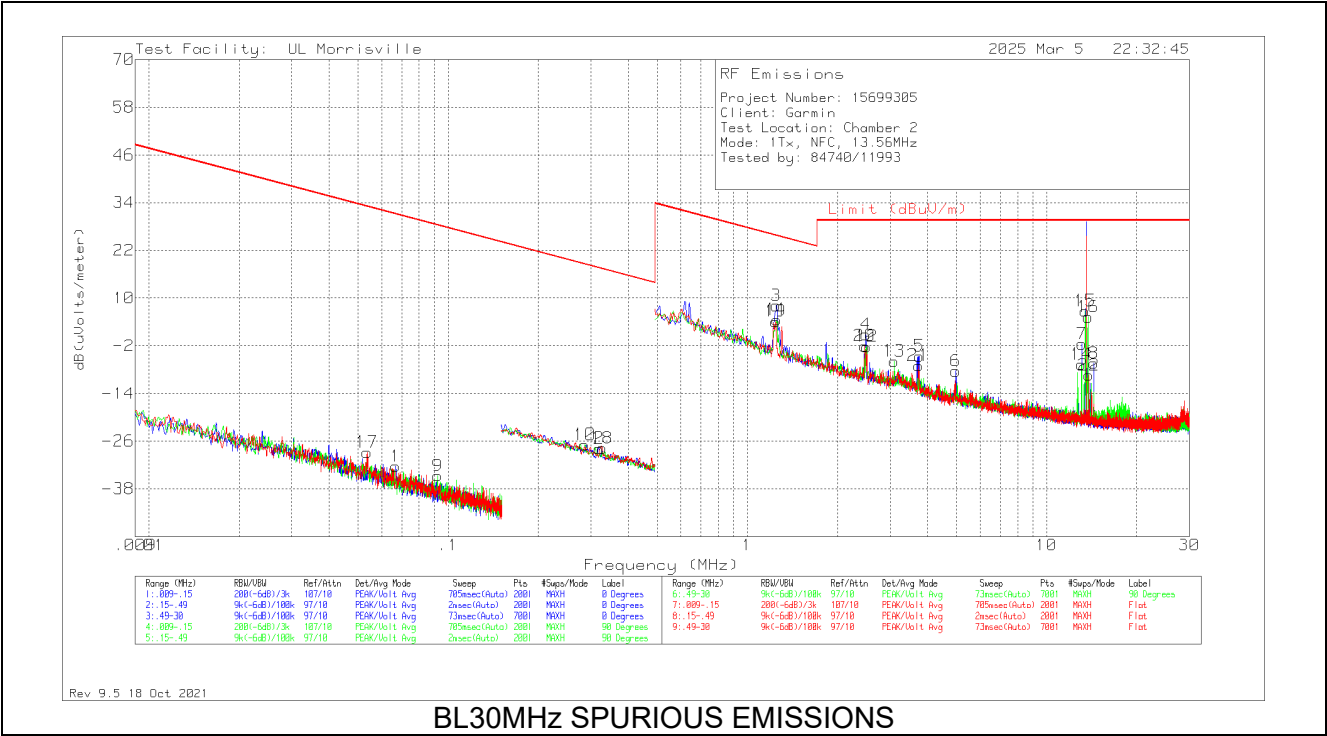
Pk - Peak detector



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	135144 (dB/m)	Gain/Loss (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uVolts/meter)	Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Loop Angle
1	12.7235	16.05	Pk	9.9	.6	-40	-13.45	29.5	-42.95	230	100	Flat
2	13.3465	35.04	Pk	9.8	.6	-40	5.44	40.5	-35.06	230	100	Flat
3	13.47425	37.79	Pk	9.8	.6	-40	8.19	50.5	-42.31	230	100	Flat
4	13.56	55.13	Pk	9.8	.6	-40	25.53	84	-58.47	230	100	Flat
5	13.644	36.8	Pk	9.8	.6	-40	7.2	50.5	-43.3	230	100	Flat
6	13.77	35.35	Pk	9.7	.6	-40	5.65	40.5	-34.85	230	100	Flat
7	14.0675	21.26	Pk	9.7	.6	-40	-8.44	29.5	-37.94	230	100	Flat

Pk - Peak detector

SPURIOUS EMISSION – E FIELD

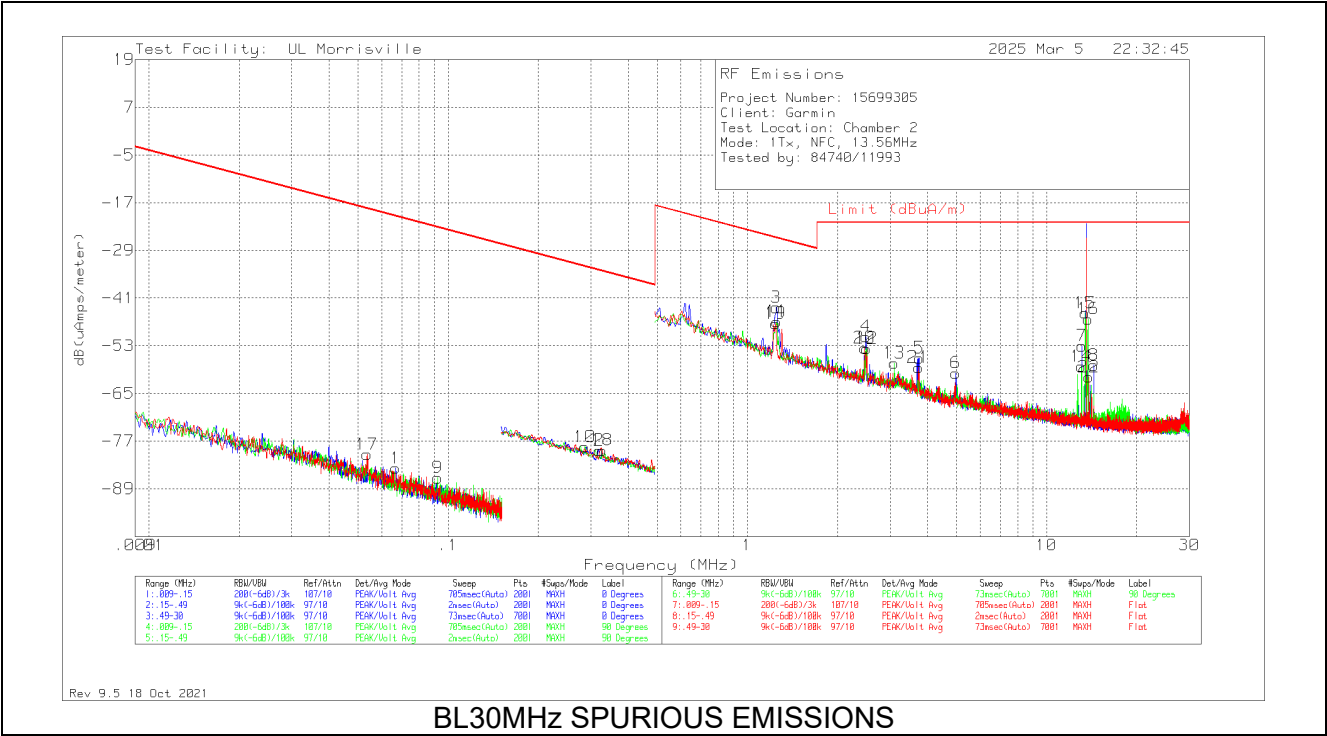


BL30MHz SPURIOUS EMISSIONS

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	135144 (dB/m)	Gain/Loss (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uVolts/meter)	QP/AV Limit (dBuV/m)	PK Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Loop Angle
17	.05359	39.58	Pk	11.5	.1	-80	-28.82	33.02	53.02	-61.84	0-360	Flat
1	.06679	36.27	Pk	11.3	.1	-80	-32.33	31.11	51.11	-63.44	0-360	0 degs
9	.09235	34.07	Pk	11.1	.1	-80	-34.73	28.3	-	-63.03	0-360	90 degs
10	.28617	42.06	Pk	10.9	.1	-80	-26.94	18.47	38.47	-45.41	0-360	90 degs
2	.31898	41.17	Pk	10.9	.1	-80	-27.83	17.53	37.53	-45.36	0-360	0 degs
18	.3268	41.21	Pk	10.9	.1	-80	-27.79	17.32	37.32	-45.11	0-360	Flat
19	1.24045	32.93	Pk	11	.2	-40	4.13	25.73	-	-21.6	0-360	Flat
3	1.24888	36.92	Pk	11	.2	-40	8.12	25.67	-	-17.55	0-360	0 degs
11	1.2531	33.37	Pk	11	.2	-40	4.57	25.64	-	-21.07	0-360	90 degs
20	2.4673	26.65	Pk	11.1	.2	-40	-2.05	29.54	-	-31.59	0-360	Flat
4	2.4926	29.52	Pk	11.1	.2	-40	.82	29.54	-	-28.72	0-360	0 degs
12	2.50525	26.49	Pk	11.1	.2	-40	-2.21	29.54	-	-31.75	0-360	90 degs
13	3.09549	22.73	Pk	11.1	.3	-40	-5.87	29.54	-	-35.41	0-360	90 degs
21	3.7321	21.72	Pk	11	.3	-40	-6.98	29.54	-	-36.52	0-360	Flat
5	3.74897	24.11	Pk	11	.3	-40	-4.59	29.54	-	-34.13	0-360	0 degs
6	4.97161	20.56	Pk	10.8	.3	-40	-8.34	29.54	-	-37.88	0-360	0 degs
14	13.06211	22.91	Pk	9.8	.6	-40	-6.69	29.54	-	-36.23	0-360	90 degs
7	13.13378	28.07	Pk	9.8	.6	-40	-1.53	29.54	-	-31.07	0-360	0 degs
15	13.4542	36.34	Pk	9.8	.6	-40	6.74	29.54	-	-22.8	0-360	90 degs
16	13.7704	34.96	Pk	9.7	.6	-40	5.26	29.54	-	-24.28	0-360	90 degs
22	13.84629	20.31	Pk	9.7	.6	-40	-9.39	29.54	-	-38.93	0-360	Flat
8	14.40702	23.29	Pk	9.7	.6	-40	-6.41	29.54	-	-35.95	0-360	0 degs

Pk - Peak detector

SPURIOUS EMISSION – H FIELD



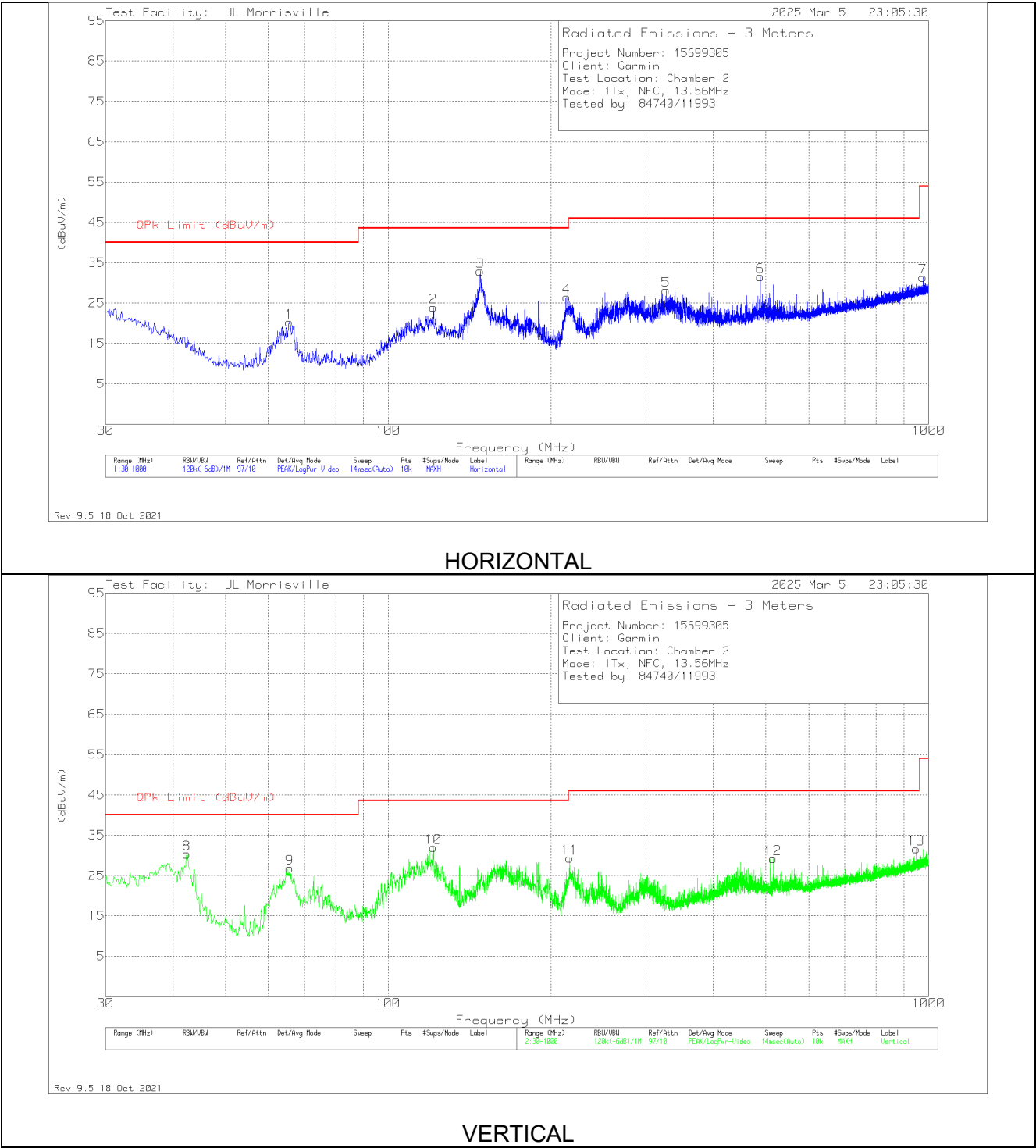
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	135144 (dB/m)	Gain/Loss (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uAmps/meter)	QP/AV Limit (dBuV/m)	PK Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Loop Angle
17	.05359	39.58	Pk	-40	.1	-80	-80.32	33.02	1.52	-61.84	0-360	Flat
1	.06679	36.27	Pk	-40.2	.1	-80	-83.83	31.11	-0.39	-63.44	0-360	0 degs
9	.09235	34.07	Pk	-40.4	.1	-80	-86.23	28.3	-	-63.03	0-360	90 degs
10	.28617	42.06	Pk	-40.6	.1	-80	-78.44	18.47	-13.03	-45.41	0-360	90 degs
2	.31898	41.17	Pk	-40.6	.1	-80	-79.33	17.53	-13.97	-45.36	0-360	0 degs
18	.3268	41.21	Pk	-40.6	.1	-80	-79.29	17.32	-14.18	-45.11	0-360	Flat
19	1.24045	32.93	Pk	-40.5	.2	-40	-47.37	25.73	-	-21.6	0-360	Flat
3	1.24888	36.92	Pk	-40.5	.2	-40	-43.38	25.67	-	-17.55	0-360	0 degs
11	1.2531	33.37	Pk	-40.5	.2	-40	-46.93	25.64	-	-21.07	0-360	90 degs
20	2.4673	26.65	Pk	-40.4	.2	-40	-53.55	29.54	-	-31.59	0-360	Flat
4	2.4926	29.52	Pk	-40.4	.2	-40	-50.68	29.54	-	-28.72	0-360	0 degs
12	2.50525	26.49	Pk	-40.4	.2	-40	-53.71	29.54	-	-31.75	0-360	90 degs
13	3.09549	22.73	Pk	-40.4	.3	-40	-57.37	29.54	-	-35.41	0-360	90 degs
21	3.7321	21.72	Pk	-40.5	.3	-40	-58.48	29.54	-	-36.52	0-360	Flat
5	3.74897	24.11	Pk	-40.5	.3	-40	-56.09	29.54	-	-34.13	0-360	0 degs
6	4.97161	20.56	Pk	-40.7	.3	-40	-59.84	29.54	-	-37.88	0-360	0 degs
14	13.06211	22.91	Pk	-41.7	.6	-40	-58.19	29.54	-	-36.23	0-360	90 degs
7	13.13378	28.07	Pk	-41.7	.6	-40	-53.03	29.54	-	-31.07	0-360	0 degs
15	13.4542	36.34	Pk	-41.7	.6	-40	-44.76	29.54	-	-22.8	0-360	90 degs
16	13.7704	34.96	Pk	-41.8	.6	-40	-46.24	29.54	-	-24.28	0-360	90 degs
22	13.84629	20.31	Pk	-41.8	.6	-40	-60.89	29.54	-	-38.93	0-360	Flat
8	14.40702	23.29	Pk	-41.8	.6	-40	-57.91	29.54	-	-35.95	0-360	0 degs

Pk - Peak detector

9.3. TX SPURIOUS EMISSION 30 TO 1000 MHz

9.3.1. TYPE A WITH TAG

SPURIOUS EMISSION



DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	159203 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
8	42.416	43.22	Pk	18.5	-31.4	30.32	40	-9.68	0-360	100	V
1	65.599	37.06	Pk	14.5	-31.3	20.26	40	-19.74	0-360	199	H
9	65.793	43.62	Pk	14.5	-31.3	26.82	40	-13.18	0-360	100	V
2	121.277	34.49	Pk	20.2	-30.7	23.99	43.52	-19.53	0-360	199	H
10	121.277	42.45	Pk	20.2	-30.7	31.95	43.52	-11.57	0-360	100	V
3	148.049	44.2	Pk	19.1	-30.4	32.9	43.52	-10.62	0-360	199	H
4	214.009	39.47	Pk	17	-30	26.47	43.52	-17.05	0-360	101	H
11	216.628	42.1	Pk	17.1	-29.9	29.3	46.02	-16.72	0-360	100	V
5	326.723	36.88	Pk	20.5	-29.2	28.18	46.02	-17.84	0-360	101	H
6	488.131	35.74	Pk	24.3	-28.5	31.54	46.02	-14.48	0-360	199	H
12	515.291	33.27	Pk	24.3	-28.4	29.17	46.02	-16.85	0-360	100	V
13	949.269	27.6	Pk	29.6	-25.6	31.6	46.02	-14.42	0-360	100	V
7	976.332	27.01	Pk	29.7	-25.3	31.41	53.97	-22.56	0-360	199	H

Pk - Peak detector

10. FREQUENCY STABILITY

LIMIT

§15.225 (e) The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency, over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

IC RSS-210, Annex B.6

Carrier frequency stability shall be maintained to $\pm 0.01\%$ (± 100 ppm).

TEST PROCEDURE

ANSI C63.10-2020 Clause 6.8

RESULTS

No non-compliance noted.

Nominal/High Voltage: 3.91V.

Low Voltage: 3.2V.

10.1. TYPE A WITH TAG

Reference Frequency: EUT Channel 13.56 MHz @ 20°C Limit: ± 100 ppm = 1.356 kHz										
Power Supply	Envir. Temp	Frequency Deviation Measured with Time Elapse								
(Vdc)	(°C)	Startup (MHz)	Delta (ppm)	@ 2 mins (MHz)	Delta (ppm)	@ 5 mins (MHz)	Delta (ppm)	@ 10 mins (MHz)	Delta (ppm)	Limit (ppm)
3.91	50	13.5595065	1.395	13.5595056	1.461	13.5595048	1.520	13.5595045	1.546	± 100
3.91	40	13.5595142	0.829	13.5595121	0.980	13.5595099	1.144	13.5595074	1.327	± 100
3.91	30	13.5595237	0.128	13.5595222	0.237	13.5595200	0.399	13.5595170	0.625	± 100
3.91	20	13.5595254	0.000	13.5595254	0.003	13.5595251	0.022	13.5595245	0.071	± 100
3.91	10	13.5595046	1.538	13.5595054	1.477	13.5595085	1.246	13.5595106	1.091	± 100
3.91	0	13.5595133	0.898	13.5595163	0.675	13.5595204	0.372	13.5595256	-0.014	± 100
3.91	-10	13.5595292	-0.280	13.5595328	-0.540	13.5595394	-1.031	13.5595436	-1.337	± 100
3.91	-20	13.5595477	-1.642	13.5595511	-1.892	13.5595550	-2.184	13.5595598	-2.536	± 100
3.20	20	13.5595185	0.508	13.5595150	0.768	13.5595147	0.794	13.5595198	0.413	± 100

Tested by: 105900/84740, 85502

Test date: 2025/03/10, 2025/04/10

11. AC MAINS LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207

IC RSS-GEN, Section 8.8

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

Frequency range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
Notes: 1. The lower limit shall apply at the transition frequencies 2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

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.

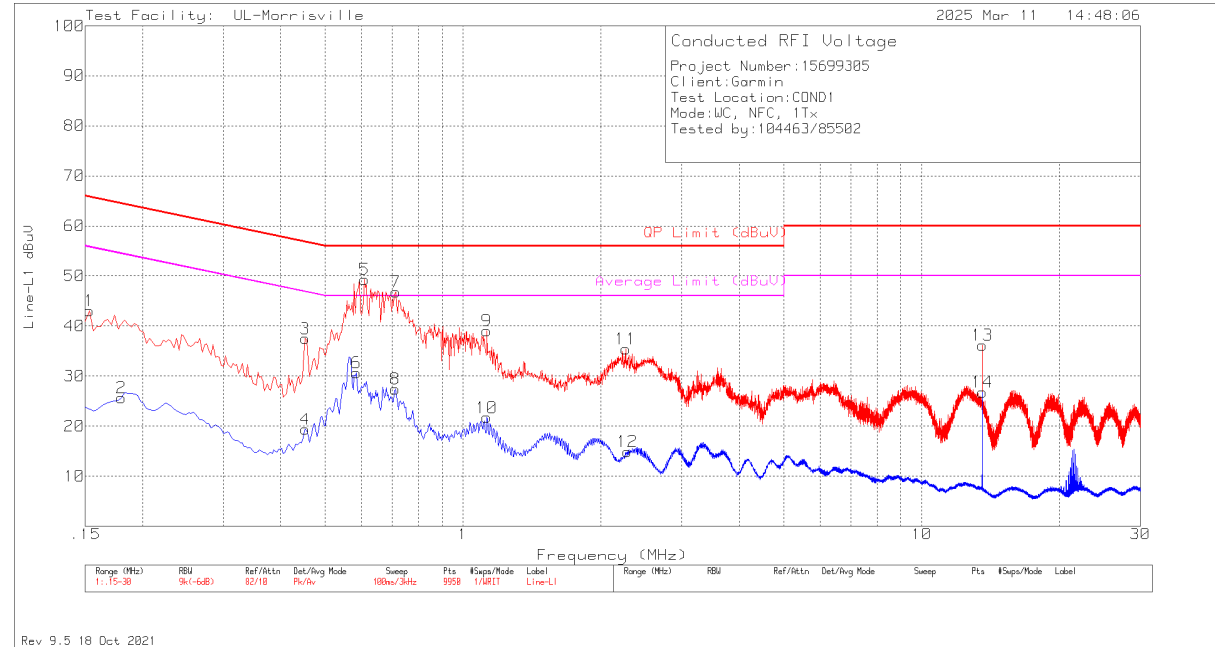
Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

No non-compliance noted:

11.1.1. TYPE A

LINE 1 RESULTS

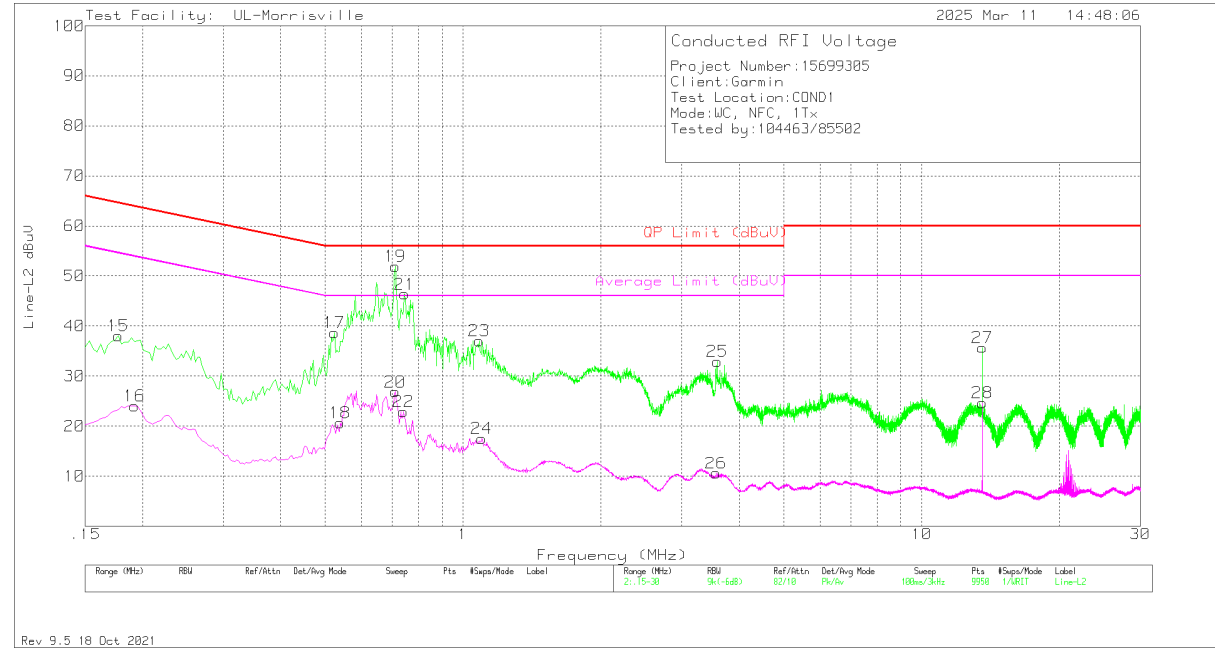


Emissions

Range 1: Line-L1 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN VDF (dB)	Cbl/Limiter (dB)	Corrected Reading dBuV	QP Limit (dBuV)	Margin (dB)	Average Limit (dBuV)	Margin (dB)
1	.153	33.07	Pk	.2	9.8	43.07	65.84	-22.77	-	-
2	.18	15.66	Av	.2	9.8	25.66	-	-	54.49	-28.83
3	.453	27.58	Pk	.1	9.8	37.48	56.82	-19.34	-	-
4	.453	9.44	Av	.1	9.8	19.34	-	-	46.82	-27.48
5	.609	39.48	Pk	0	9.8	49.28	56	-6.72	-	-
6	.585	20.88	Av	0	9.8	30.68	-	-	46	-15.32
7	.714	37.01	Pk	0	9.8	46.81	56	-9.19	-	-
8	.711	17.59	Av	0	9.8	27.39	-	-	46	-18.61
9	1.128	29.24	Pk	0	9.8	39.04	56	-16.96	-	-
10	1.128	11.91	Av	0	9.8	21.71	-	-	46	-24.29
11	2.262	25.57	Pk	0	9.8	35.37	56	-20.63	-	-
12	2.283	5.05	Av	0	9.8	14.85	-	-	46	-31.15
13	13.563	26.09	Pk	.1	10	36.19	60	-23.81	-	-
14	13.563	16.64	Av	.1	10	26.74	-	-	50	-23.26

Pk - Peak detector
Av - Average detection

LINE 2 RESULTS



Emissions

Range 2: Line-L2 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN VDF (dB)	Cbl/Limiter (dB)	Corrected Reading dBuV	QP Limit (dBuV)	Margin (dB)	Average Limit (dBuV)	Margin (dB)
15	.177	28.05	Pk	.2	9.8	38.05	64.63	-26.58	-	-
16	.192	14.07	Av	.2	9.8	24.07	-	-	53.95	-29.88
17	.525	28.89	Pk	0	9.8	38.69	56	-17.31	-	-
18	.54	10.82	Av	0	9.8	20.62	-	-	46	-25.38
19	.71129	31.98	Qp	0	9.8	41.78	56	-14.22	-	-
20	.711	17.04	Av	0	9.8	26.84	-	-	46	-19.16
21	.747	36.57	Pk	0	9.8	46.37	56	-9.63	-	-
22	.741	13.13	Av	0	9.8	22.93	-	-	46	-23.07
23	1.086	27.21	Pk	0	9.8	37.01	56	-18.99	-	-
24	1.098	7.67	Av	0	9.8	17.47	-	-	46	-28.53
25	3.585	23.03	Pk	0	9.9	32.93	56	-23.07	-	-
26	3.561	.68	Av	0	9.9	10.58	-	-	46	-35.42
27	13.56	25.62	Pk	.1	10	35.72	60	-24.28	-	-
28	13.56	14.55	Av	.1	10	24.65	-	-	50	-25.35

Pk - Peak detector
Av - Average detection

12. SETUP PHOTOS

Please refer to R15699305-EP2 for setup photos

END OF TEST REPORT