FCC 47 CFR PART 15 SUBPART C
ISED RSS-210 ISSUE 11

TEST REPORT

FOR

PORTABLE TRANSCEIVER

MODEL NUMBER: A04986

FCC ID: IPH-04986
IC: 1792A-04986

REPORT NUMBER: R15952388-E1

ISSUE DATE: 2025-11-11

Prepared for
GARMIN
1200 E 151st STREET
OLATHE, KS 66062 USA

Prepared by
UL LLC
12 LABORATORY DR.
DURHAM, NC 27713 USA
TEL: (919) 549-1400

CERT #0751.06

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2025-10-14	Initial Issue	Mike Antola
V2	2025-11-11	Misc. editorial update	Mike Antola
V3	2025-11-13	Misc. editorial update	Mike Antola

UL LLC
12 Laboratory Dr., Durham, NC 27713 TEL: (919) 549-1400

TABLE OF CONTENTS

UL LLC
12 Laboratory Dr., Durham, NC 27713 TEL: (919) 549-1400

1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	Garmin 1200 E 151st Street Olathe, KS 66062, USA
EUT DESCRIPTION:	Portable Transceiver
MODEL:	A04986
SERIAL NUMBER:	Non-serialized production unit
SAMPLE RECEIPT DATE:	2025-08-13, 2025-08-14
DATES TESTED:	2025-08-18 to 2025-10-10

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

Gia-piao Chin
Operations Manager
CONSUMER TECHNOLOGY DIVISION
UL LLC

Prepared By:

Mike Antola
Sr. Staff Engineer
CONSUMER TECHNOLOGY DIVISION
UL LLC

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2020, ANSI C63.10-Cor1-2023, FCC CFR 47 Part 2, FCC CFR 47 Part 15, FCC KDB 364244 D01, RSS-GEN Issue 5 + A1 + A2, and RSS-210 Issue 11.

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. FACILITIES AND ACCREDITATION

UL LLC is accredited by A2LA, Cert. No. 751.06, 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
☐	12 Laboratory Drive Durham, NC 27713, U.S.A.	US0067	2180C	825374
☒	2800 Perimeter Dr., Suite B, Morrisville, NC 27560, U.S.A.		27265	

4. DECISION RULES AND MEASUREMENT UNCERTAINTY

4.1. 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.

4.2. 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.)

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus.

PARAMETER	U_{LAB}
Conducted Disturbance, 0.15 to 30 MHz	3.4 dB
Radiated Emissions, 9 kHz to 30 MHz	2.9 dB
Radiated Emissions, 30 to 1000 MHz	6.0 dB
Radiated Emissions, 1 to 18 GHz	4.7 dB
Radiated Emissions, 18 to 26 GHz	4.5 dB
Radiated Emissions, 26 to 40 GHz	5.3 dB
Radiated Emissions, 40 to 200 GHz	2.9 dB

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

UL LLC
12 Laboratory Dr., Durham, NC 27713 TEL: (919) 549-1400

4.4. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:

EIRP (dBm) = Corrected Received Power (dBm) + Free-Space Propagation Path Loss (dB)

Where,

Corrected Received Power (dBm) = Measured Power (dBm) – Rx Antenna Gain (dBi) + Cable/Attenuator Loss (dB) – Preamp Gain (dB)

Free-Space Propagation Path Loss (dB) = 20log[F(MHz)] + 20log[d(m)] – 27.5

EIRP* (dBm) = 8 dBm - 20 dBi + 5 dB – 20 dB + 77 dB = 50 dBm

*-Assumes measurement of 56 GHz at a 3-meter measurement distance

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a presence sensor that contains an FMCW radar. The chipset utilized in this device has an operating range of 57.0 – 59.4 GHz. The EUT is intended for outdoor use.

5.2. OUTPUT POWER

The antenna is integral thus radiated measurements are made. The EIRP was measured at the worst-case condition, thus the EIRP measurement conditions correspond to the maximum EUT antenna gain.

The highest measured peak output power is 26.94 dBm EIRP.

5.3. MANUFACTURER'S DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes two (2) integrated TX patch antenna arrays and a single RX 3-chain array.

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was version 2.3.1.0.

The test utility used to control the radio was Zebroid 57GHz Compliance App v1.09.

5.5. WORST-CASE CONFIGURATION AND MODE

During normal operation, the radar will transmit in Long Range Frame (TX1 in phase with TX2 for every sweep in the Frame) mode and Short Range Frame (TX2 either in phase or 180 degrees out of phase with TX1, alternating every sweep in the Frame) Mode. These two modes were tested individually as part of this investigation for all in-band tests. Only the worst-case channel per mode was fully tested for spurious emissions.

6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop	Dell	Inspiron	12136464183	--

I/O CABLES

I/O Cable List					
Cable No.	**Port**	**# of Identical Ports**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	USB	1	USB-C	<3m	Connects to support laptop

TEST SETUP

Refer to photos exhibit R15952388-EP1.

7. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment Used – Frequency Stability Measurement Equipment

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	Conducted Room 2				
214284	Spectrum Analyzer	Rohde & Schwarz	FSW50	2025-03-14	2026-03-14
206203	Standard Gain Horn, 50-75GHz	Custom Microwave Inc.	HO15R	2025-02-28	2026-02-28
206607	WR15 Downconverter	VDI	WR15.0SAX-F	2025-04-24	2026-04-24
76023	Temp/Humid Chamber	Cincinnati Sub-Zero	ZPH-8-3.5-SCT/AC	2025-04-09	2026-04-09
248881	Environmental Meter	Control Company	06-662-4	2024-04-10	2026-04-10

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	2025-08-06	2026-08-06
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

Test Equipment Used - mmWave Test Equipment (Morrisville – Chamber 3)

Equip. ID	Description	Manufacturer/Brand	Model Number	Last Cal.	Next Cal.
	40-50 GHz				
206209	Standard Gain Horn, 40-50GHz	Custom Microwave Inc.	HO22R	2025-02-28	2026-02-28
205910	Low Noise Amplifier	Eravant	SBL-3335033040-2222-E1	2025-04-25	2026-04-25
222197	Band Pass Filter	Eravant	SWF-46308340-22-B1	2025-04-25	2026-04-25
	50-75 GHz				
206203	Standard Gain Horn, 50-75GHz	Custom Microwave Inc.	HO15R	2025-02-28	2026-02-28
206607	WR15 Downconverter	VDI	WR15.0SAX-F	2025-04-24	2026-04-24
205911	Low Noise Amplifier	Eravant	SBL-5037531850-1515-E1	2025-04-28	2026-04-28
	75-110 GHz				
206222	Standard Gain Horn, 75-110GHz	Custom Microwave Inc.	HO10R	2025-02-28	2026-02-28
207249	WR10 Downconverter	VDI	WR10.0SAX-F	2025-04-24	2026-04-24
205913	Low Noise Amplifier	Eravant	SBL-7531142050-1010-E1	2025-04-28	2026-04-28
	110-170 GHz				
206242	Standard Gain Horn, 110-170GHz	Custom Microwave Inc.	HO6R	2025-02-28	2026-02-28
206555	WR6.5 Downconverter	VDI	WR6.5SAX-F	2025-04-24	2026-04-24
205912	Low Noise Amplifier	Eravant	SBL-1141741860-0606-E1	2025-05-01	2026-05-01
	170-260 GHz				
206244	Standard Gain Horn, 170-260GHz	Custom Microwave Inc.	HO4R	2025-02-28	2026-02-28
206556	WR4.3 Downconverter	VDI	WR4.3SAX-F	2025-04-24	2026-04-24
	Receiver & Software				
214284	Spectrum Analyzer	Rohde & Schwarz	FSW50	2025-03-14	2026-03-14
mmWave	mmWave Software	UL	V2022.7.29		
SOFTEMI	EMI Software	UL	Version 9.5 (04 Mar 2021)		
	Additional Equipment used				
207161	Signal Generator	Rohde and Schwarz	SMA100B	2025-07-31	2026-07-31
206568	Isolator, 50-75GHz	Mi-Wave	115V/385	NA	NA
206569	Diode Detector, 50-75GHz	Mi-Wave	950V/385	NA	NA
239539	Environmental Meter	Fisher Scientific	15-077-963	2025-08-05	2027-08-05
208201	350 MHz High-Definition Oscilloscope	Teledyne Lecroy	HDO6034A	2025-01-13	2026-01-13
211004	200 MHz Low-Noise Voltage Amplifier	Femto	HVA-200M-40-B	NA	NA

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

Equip. ID	Description	Manufacturer/Brand	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				
90628	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2024-01-02	2026-01-02
	1-18 GHz				
206211	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2024-04-09	2026-04-09
	18-40 GHz				
91186	Horn Antenna, 18-26.5GHz	ARA	MWH-1826/B	2024-05-16	2026-05-16
91187	Horn Antenna, 26-40GHz	ARA	MWH-2640/B	2024-05-17	2026-05-17
	Gain-Loss Chains				
207638	Gain-loss string: 0.009-30MHz	Various	Various	2025-06-13	2026-06-13
207639	Gain-loss string: 25-1000MHz	Various	Various	2025-06-13	2026-06-13
207640	Gain-loss string: 1-18GHz	Various	Various	2025-06-13	2026-06-13
225795	Gain-loss string: 18-40GHz	Various	Various	2025-06-13	2026-06-13
	Receiver & Software				
197954	Spectrum Analyzer	Rohde & Schwarz	ESW44	2025-04-21	2026-04-21
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

Note: All equipment was in calibration at the time of test

8. SUMMARY TABLE

FCC Section	RSS Section	Test Description	Test Limit	Test Result
15.255 (c) (2) (i)	RSS-210 J.3.2 b) (i)	Peak EIRP FDS/Radar (57-59.4GHz)	30 dBm (Outdoor Operation)	Complies
15.255 (d)	RSS-210 J.4, J.5	Spurious Emissions < 40GHz	FCC 15.209 RSS-Gen	Complies
15.255 (d)	RSS-210 J.4, J.5	Spurious Emissions 40 – 200GHz	90 pW/cm^2	Complies
15.255 (f)	RSS-210 J.6	Frequency Stability	Within Band	Complies
15.255 (h)	RSS-210 J.7	Group installation	No Beam Forming / Phase Locking	Complies

9. APPLICABLE LIMITS AND TEST RESULTS

9.1. FAR-FIELD DISTANCE AND MEASUREMENT DISTANCE

The measurement distance is in the far field per formula $2D^2/\lambda$ where D is the largest dimension of the antenna.

For fundamental / band edge emissions, the largest far-field distance of either the EUT antenna or measurement antenna shall be used. In this case, the measurement antenna has the largest far-field distance. For above 18 GHz spurious emissions, the far-field distance shall be based on the measurement antenna. The EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest EIRP reading on the receive spectrum analyzer.

Frequency Range (GHz)	Wavelength (m)	Rx Antenna max dim. (m)	Far Field Distance (m)	Measurement Distance Used (m)
18-26.5	0.0113	0.104	1.91	3.00
26.5-40	0.0075	0.074	1.48	3.00
40-50	0.0060	0.055	1.01	3.00
50-75	0.0040	0.037	0.66	3.00
75-110	0.0027	0.025	0.45	3.00
110-170	0.0018	0.016	0.29	3.00
170-200	0.0012	0.011	0.19	3.00

Radiated spurious emissions limits above 40 GHz are based on a 3-meter measurement distance. As such, testing from 40-200 GHz was performed at 3-meters.

In-band testing was performed at a 3-meter distance, which was still in the far-field based on the maximum EUT / measurement antenna dimension.

Radiated power levels are investigated while the receive antenna was rotated through all angles to determine the worst-case polarization/positioning. The worse-case orientation of the EUT was with the front ~~fact~~ facing the RX antenna, which was polarized vertically. Refer to test setup photos exhibit for details.

9.2. DUTY CYCLE

REQUIREMENT

For reporting purposes only.

TEST PROCEDURE

The fundamental is measured using a Standard Gain Horn Antenna, Low Noise Amplifier and a Diode Detector connected to an Oscilloscope. Pulse widths, burst lengths, and periods are measured, then the duty cycle is calculated.

RESULTS

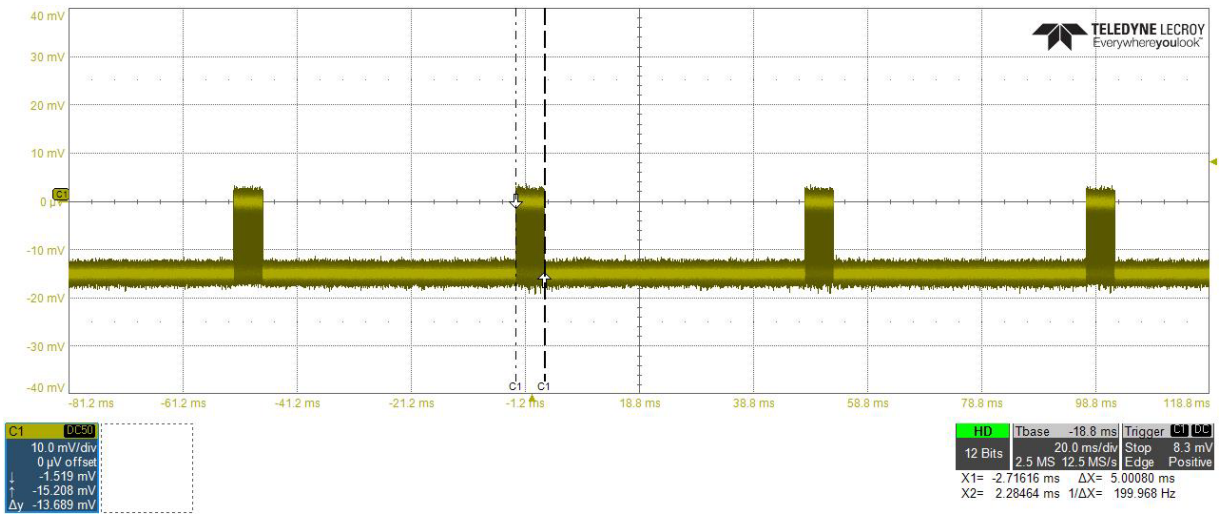
Duty cycle linear = (Burst On Time / Burst Period) * (Chirp On Time / Chirp Period)
Duty cycle % = Duty cycle linear * 100

Short Range Mode						
Burst ON Time (ms)	Burst Period (ms)	TX1+TX2 Chirp ON Time (us)	TX1-TX2 Chirp ON Time (us)	Total Chirp Period (us)	Total DC (Linear)	Total DC (%)
5.01	50.64	22.1	22.1	52.3	0.0836	8.36

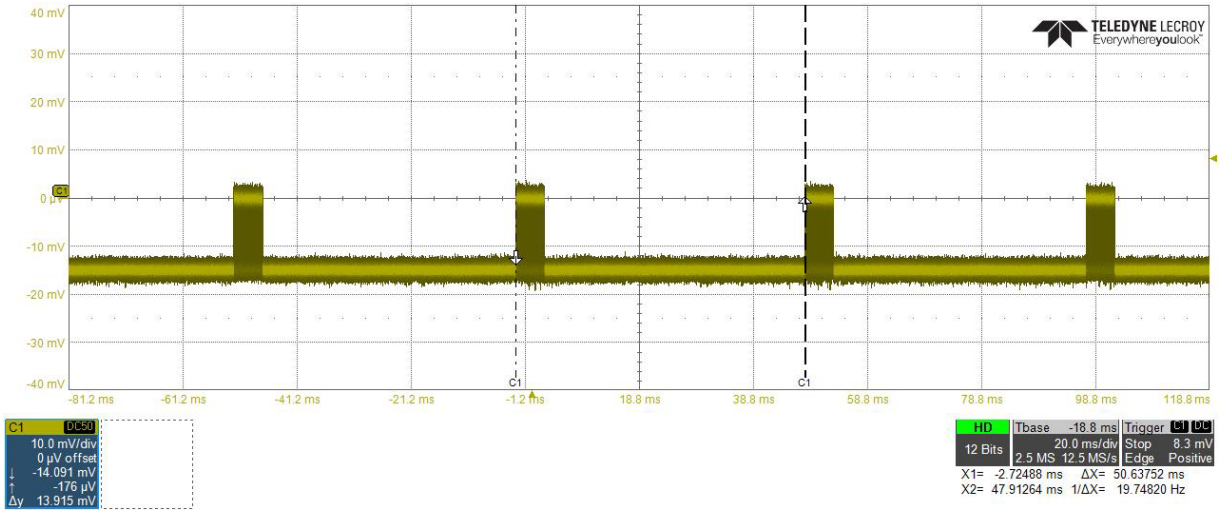
Short Range Mode						
Burst ON Time (ms)	Burst Period (ms)	TX1+TX2 Chirp ON Time (us)	TX1+TX2 Chirp ON Time (us)	Total Chirp Period (us)	Total DC (Linear)	Total DC (%)
5.01	50.64	22.1	22.1	52.3	0.0836	8.36

TESTED BY

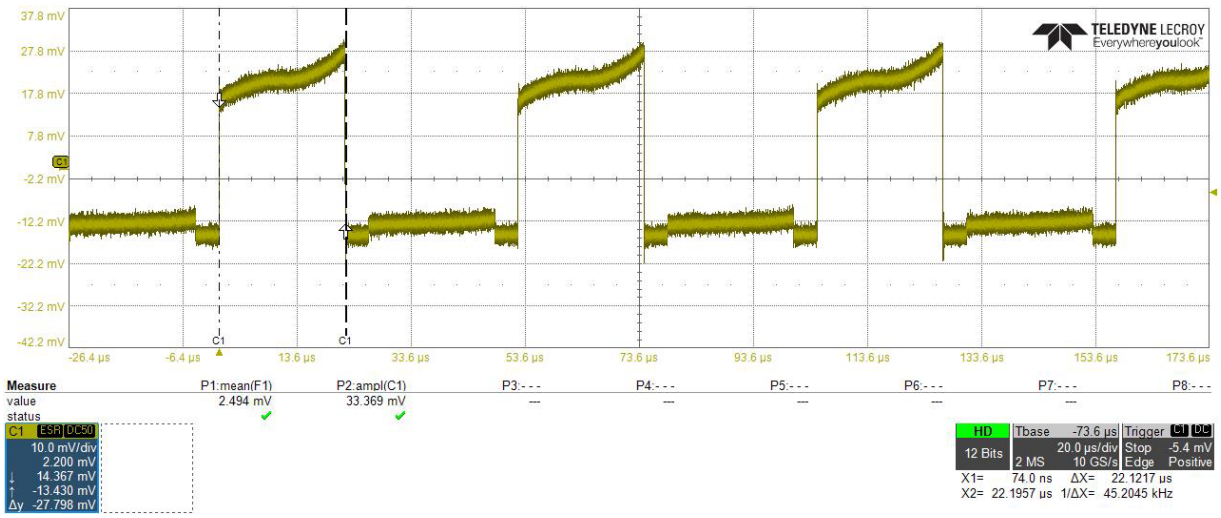
Employee ID: 11322
Test Dates: 2025-08-20, 2025-10-10
Test Location: Chamber 3



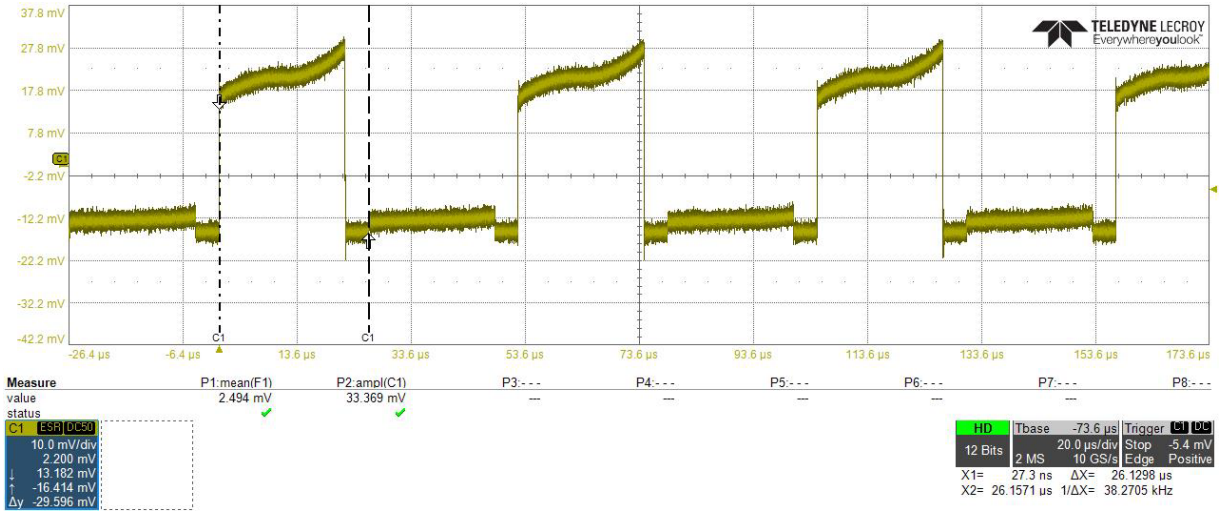
Burst ON Time



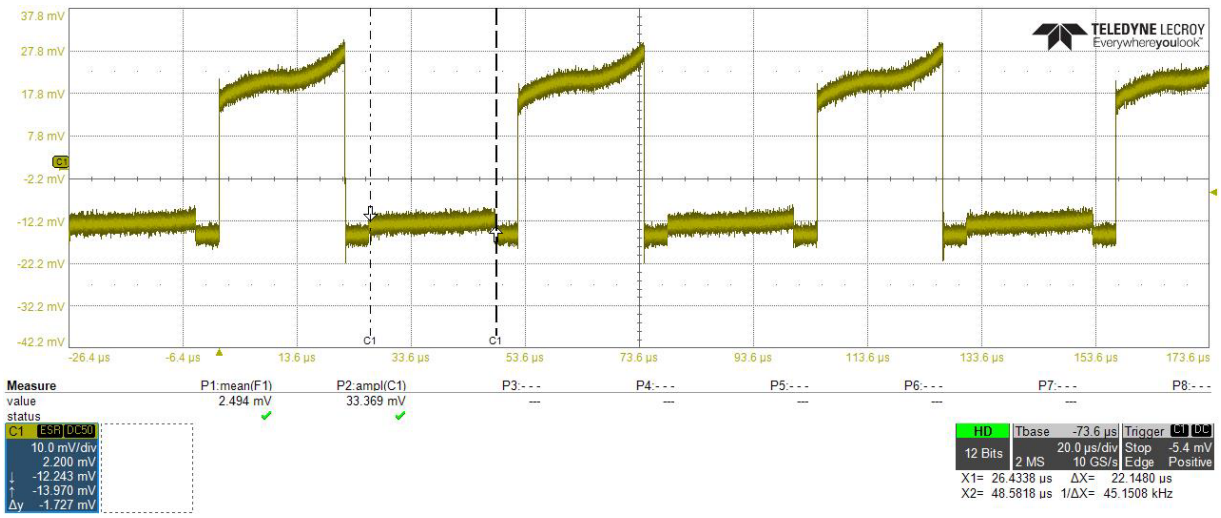
Burst Period



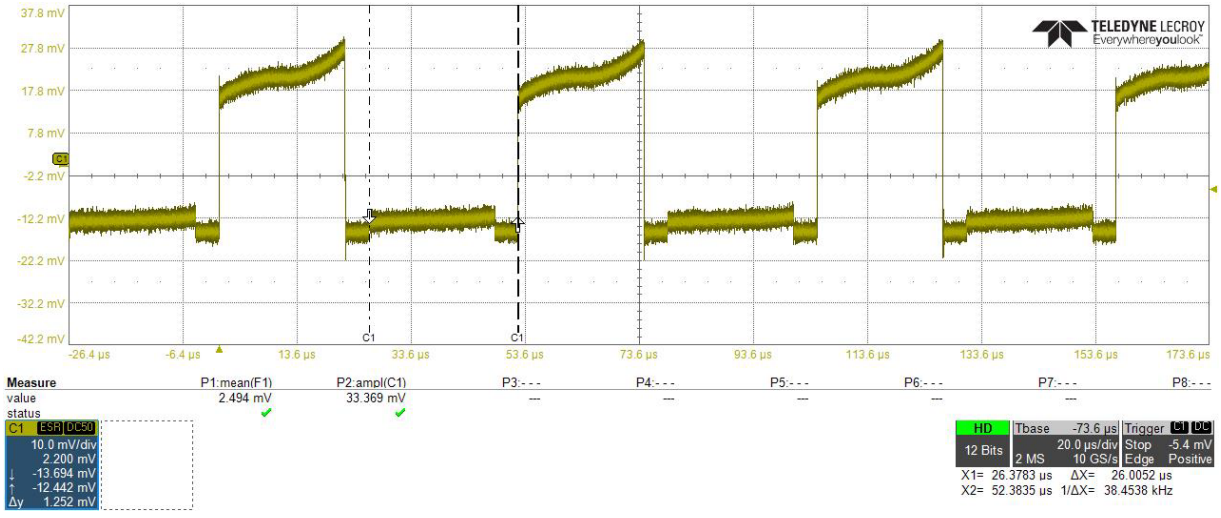
Chirp ON Time (TX1)



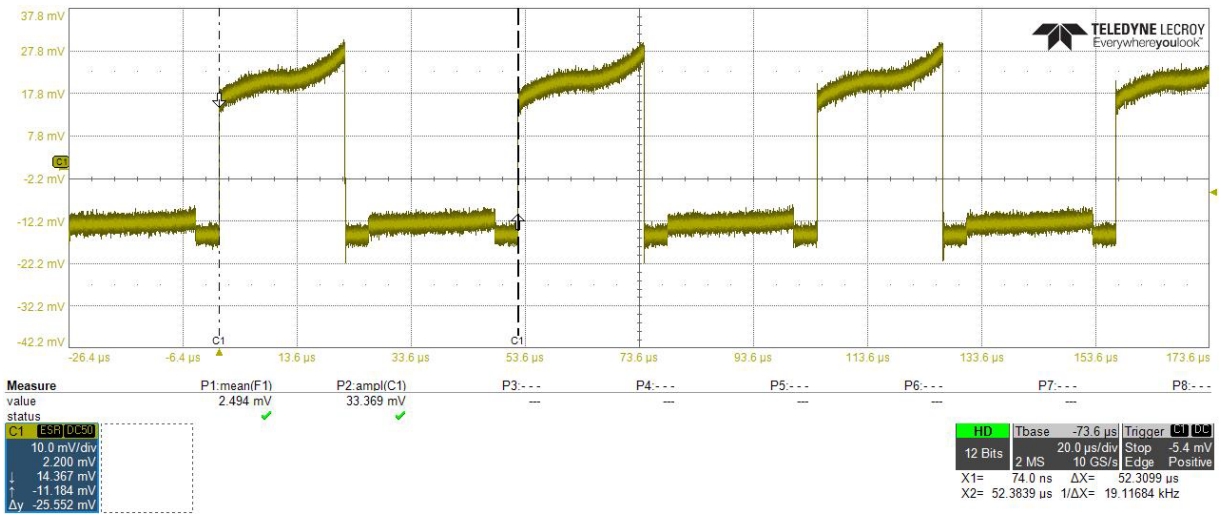
Chirp Period (TX1)



Chirp ON Time (TX2)



Chirp Period (TX2)



Total Chirp Period

9.3. 99% / 20dB BANDWIDTH

REQUIREMENT

§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.

§RSS-GEN 6.7

The occupied bandwidth or the “99% emission bandwidth” is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

TEST PROCEDURE

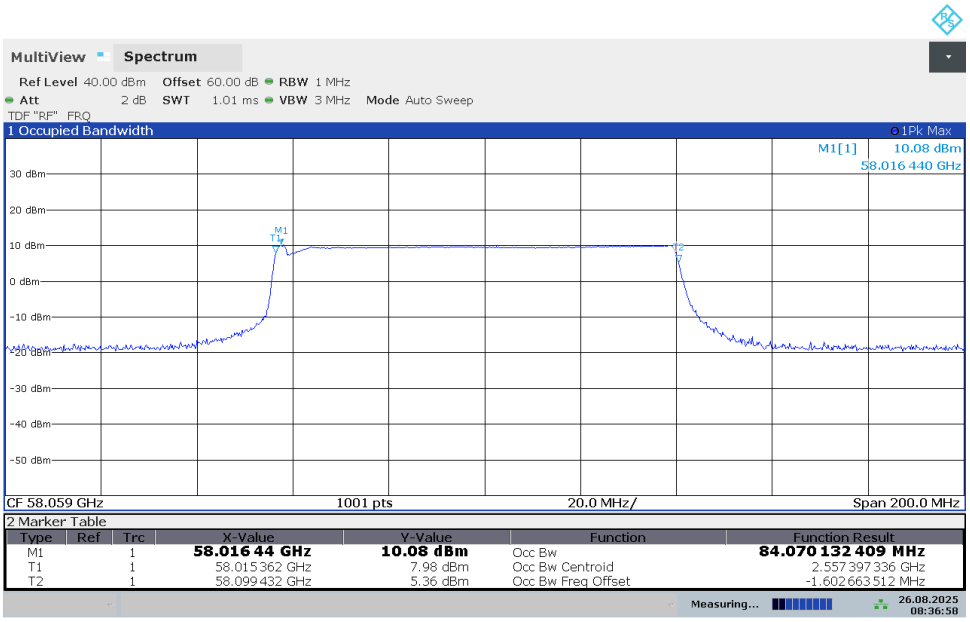
The spectrum analyzer and external mixer are set up to measure the radiated output of the transmitter. Refer to C63.10, Clause 9 for details.

RESULTS

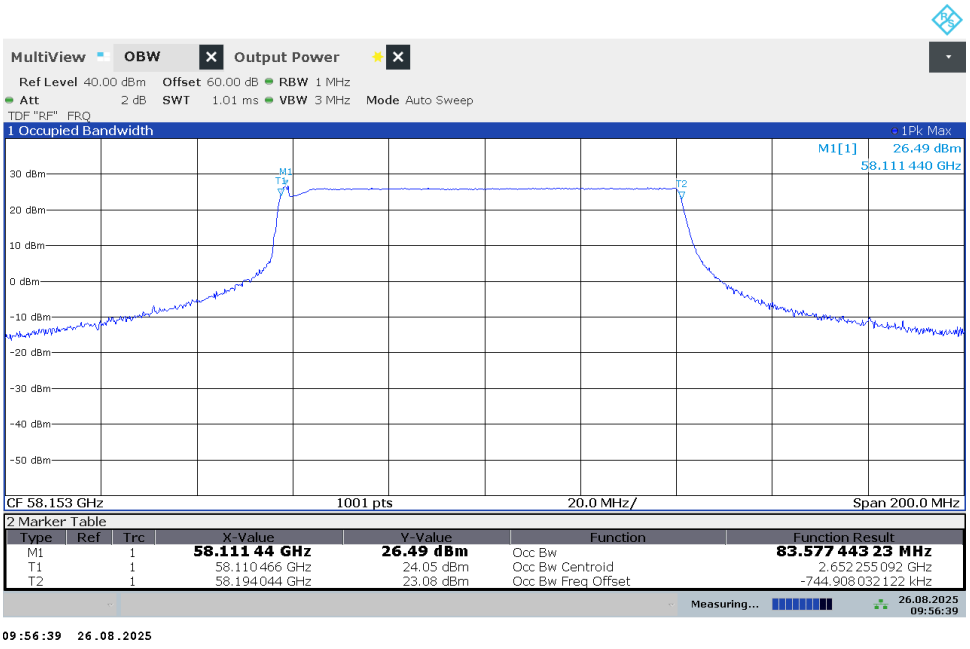
Mode	Channel / Frequency (GHz)	99% Bandwidth (MHz)	20 dB Bandwidth (MHz)
Long Frame	1 / 58.059	84.070	89.31
	2 / 58.153	83.577	89.71
	3 / 58.247	83.607	89.11
	4 / 58.341	83.679	89.11
Short Frame	1 / 57.546	309.535	339.16
	2 / 57.857	312.035	341.96
	3 / 58.543	310.919	337.76
	4 / 58.854	309.478	335.66

TESTED BY

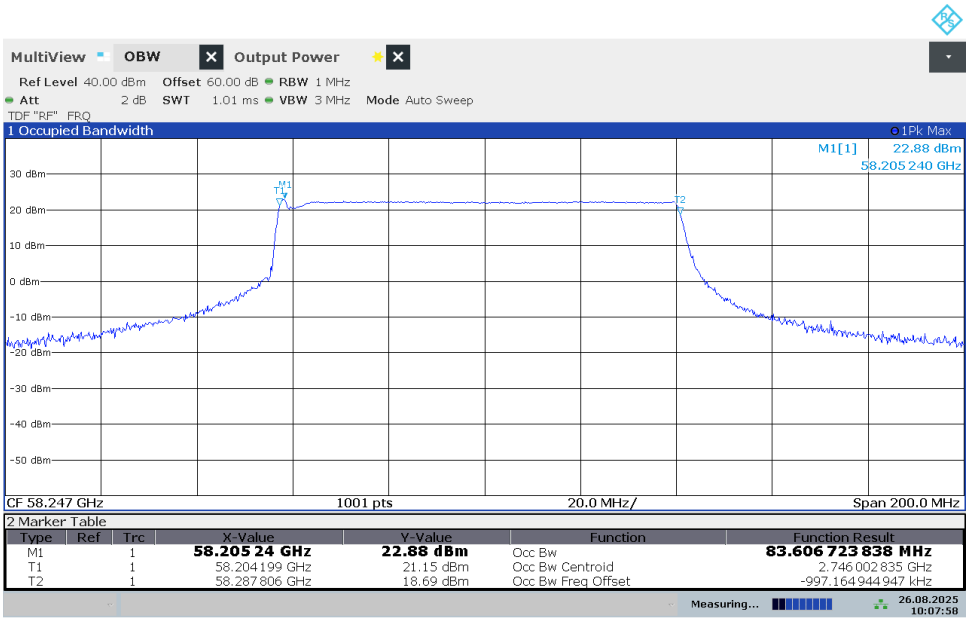
Employee ID: 11322
Test Dates: 2025-08-22, 2025-08-26
Test Location: Chamber 3



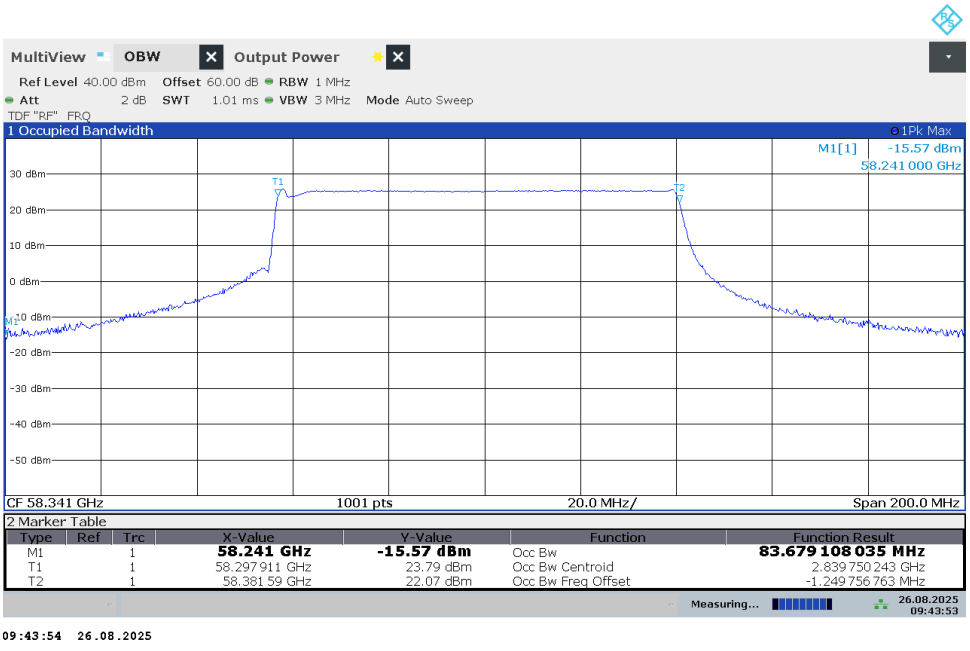
99% Bandwidth: Long Frame, Channel 1



99% Bandwidth: Long Frame, Channel 2



99% Bandwidth: Long Frame, Channel 3

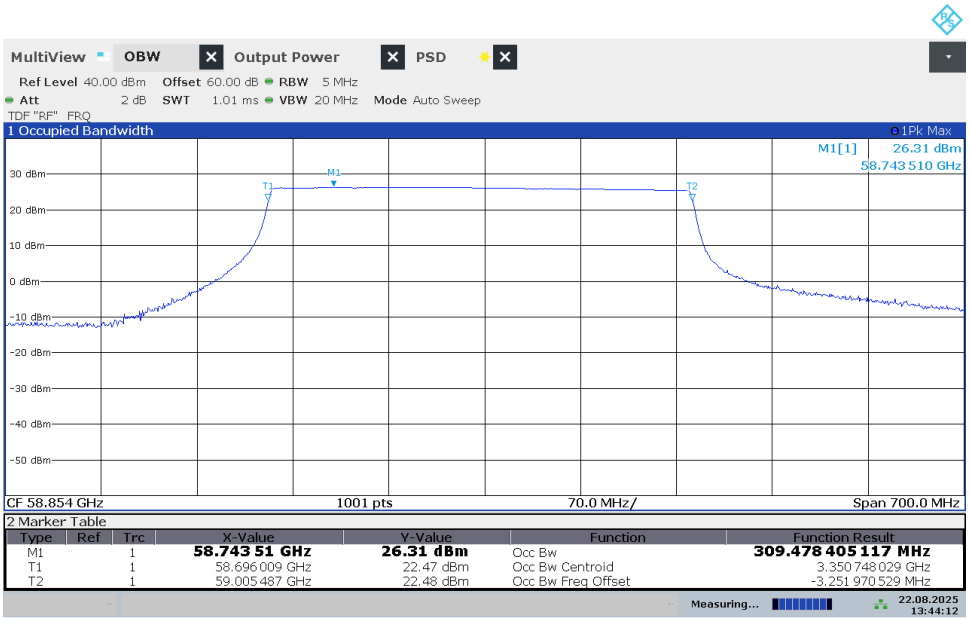


99% Bandwidth: Long Frame, Channel 4

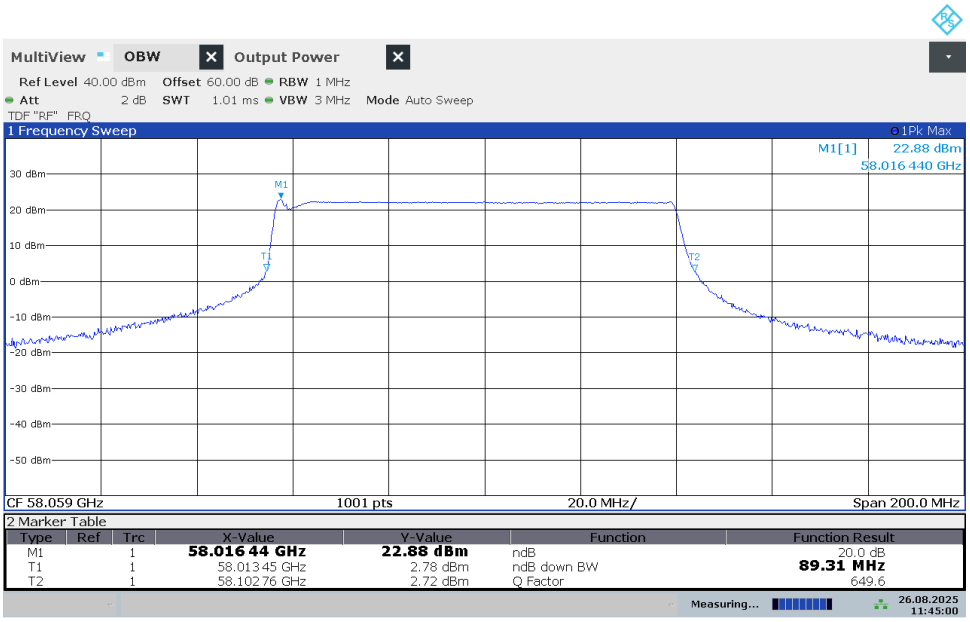
99% Bandwidth: Short Frame, Channel 1

99% Bandwidth: Short Frame, Channel 2

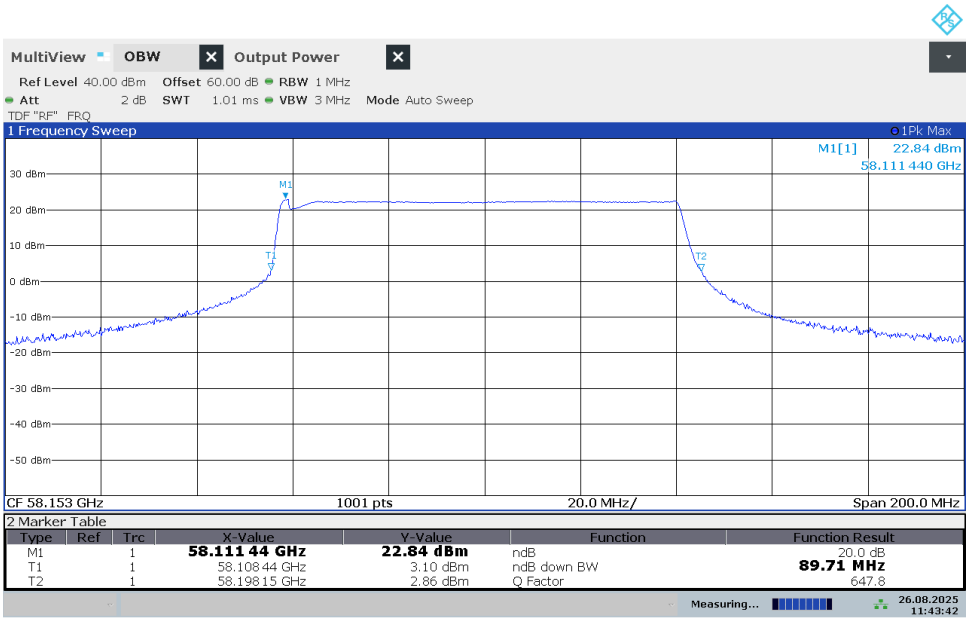
99% Bandwidth: Short Frame, Channel 3



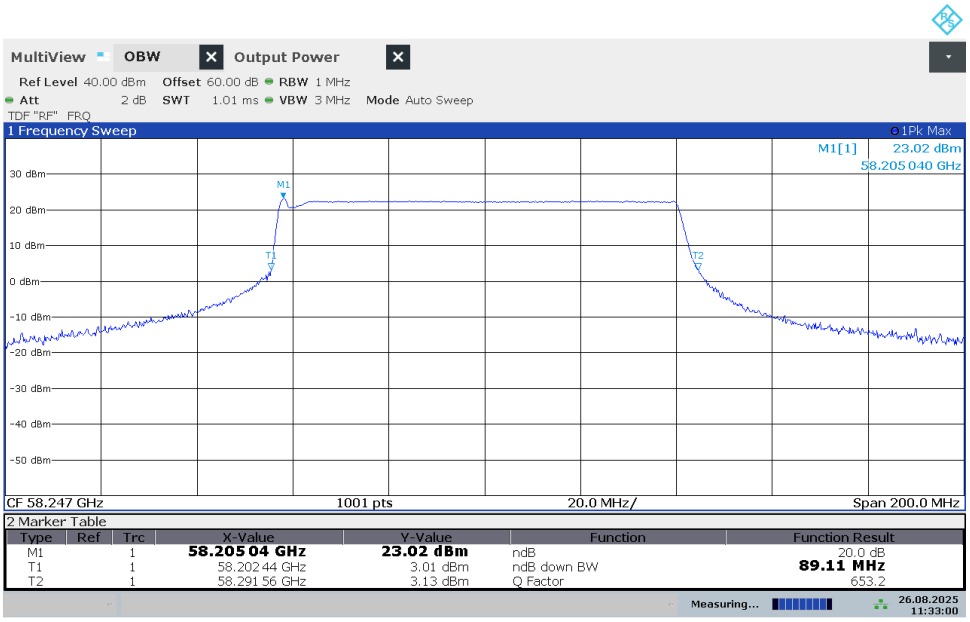
99% Bandwidth: Short Frame, Channel 4



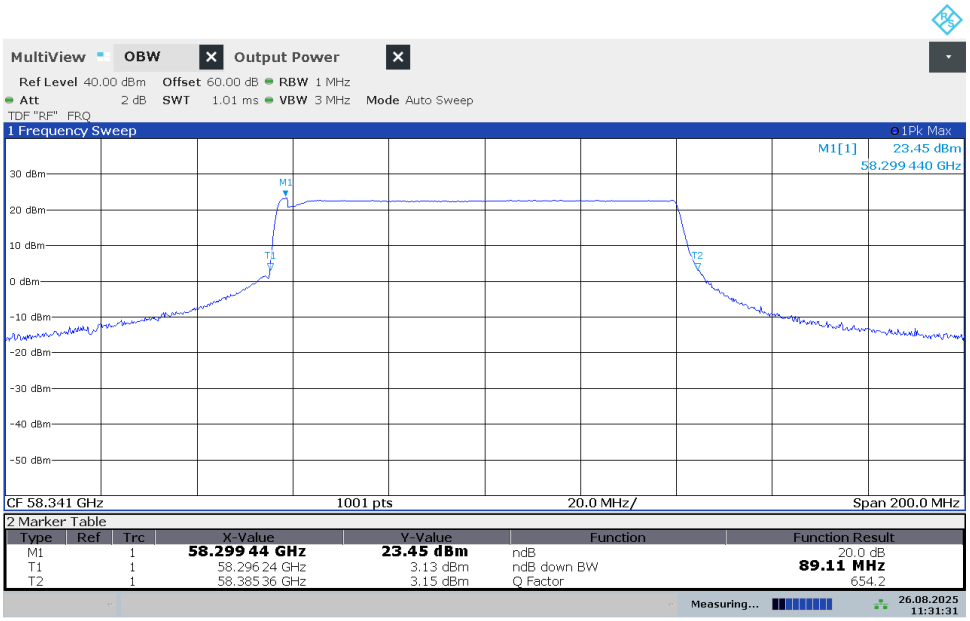
20 dB Bandwidth: Long Frame, Channel 1



20 dB Bandwidth: Long Frame, Channel 2



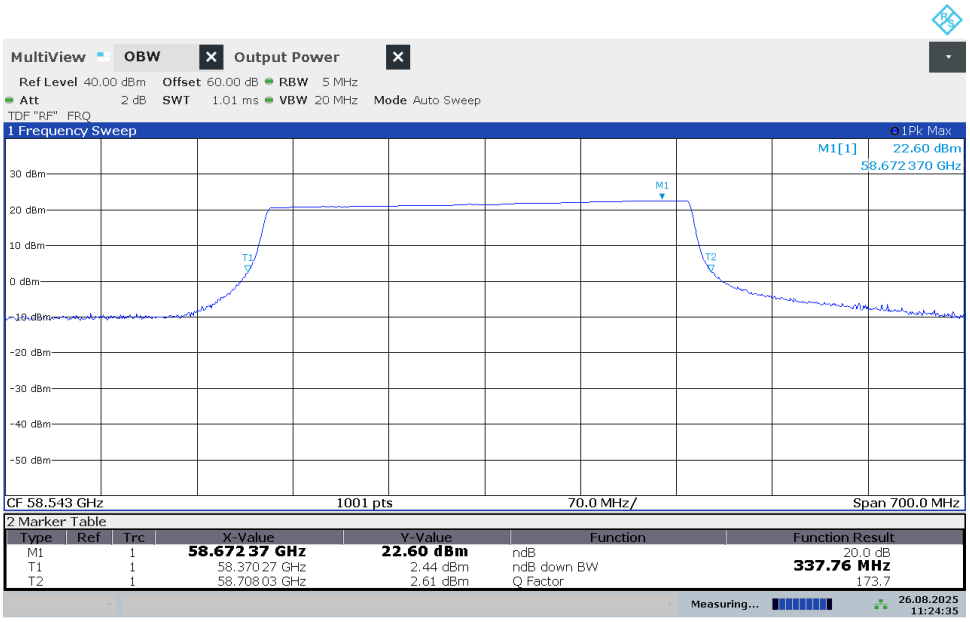
20 dB Bandwidth: Long Frame, Channel 3



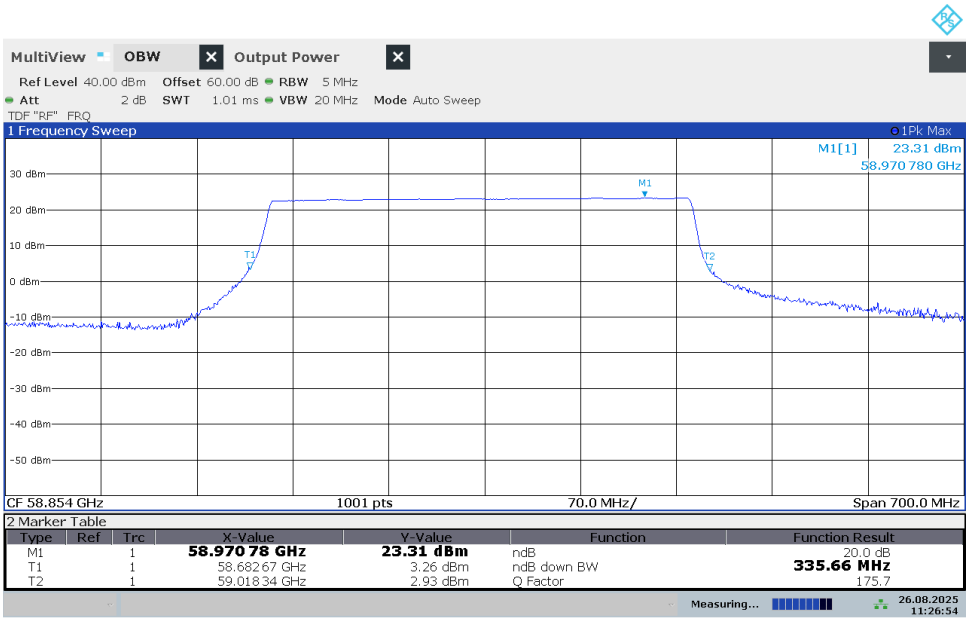
20 dB Bandwidth: Long Frame, Channel 4

20 dB Bandwidth: Short Frame, Channel 1

20 dB Bandwidth: Short Frame, Channel 2



20 dB Bandwidth: Short Frame, Channel 3



20 dB Bandwidth: Short Frame, Channel 4

9.4. RADIATED POWER

REQUIREMENT

FCC

§15.255 (c)

Within the 57-71 GHz band, emission levels shall not exceed the following equivalent isotropically radiated power (EIRP):

(2) Field disturbance sensors/radars shall not exceed −10 dBm peak conducted output power and 10 dBm peak EIRP except that field disturbance sensors/radars that limit their operation to all or part of the specified frequency band may operate without being subject to a transmitter conducted output power limit if they operate in compliance with paragraph (b)(3) of this section or with one or more of the provisions below:

(i) ***57.0-59.4 GHz:***
The peak EIRP level shall not exceed 20 dBm for indoor operation or 30 dBm for outdoor operation

ISED

RSS-210 Clause J.3.2

FDS devices operating in the 57-71 GHz band shall not exceed –10 dBm peak transmitter conducted output power and 10 dBm peak e.i.r.p. The following exceptions apply:

(b) FDS devices may operate in any mode as indicated in J.3.2(b)(i) and J.3.2(b)(ii), as long as they operate in only one of these modes for at least 33 ms before switching to another mode.

(i) FDS operating in the 57.0-59.4 GHz band shall comply with one of the following limits, depending on the operating condition of the device:

(1) the peak e.i.r.p. for outdoor usage (devices operating, situated in, designed to be used in, or carried in open air) shall not exceed 30 dBm

TEST PROCEDURE

ANSI C63.10-2020 Clause 9.8 and Annex L

RESULTS

Peak EIRP

Mode: Long Frame									
Channel	RBW (MHz)	VBW (MHz)	Span (MHz)	Sweep Time (s)	Measured PK Power (dBm)	FMCW Correction Factor (dB)	Corrected Peak Power (dBm)	Peak Radiated Limit (dBm)	Margin (dB)
1	1	3	200	60	23.11	1.16	24.27	30	-5.73
2	1	3	200	60	22.77	1.15	23.92	30	-6.08
3	1	3	200	60	25.79	1.15	26.94	30	-3.06
4	1	3	200	60	19.24	1.15	20.39	31	-10.61
Mode: Short Frame									
Channel	RBW (MHz)	VBW (MHz)	Span (MHz)	Sweep Time (s)	Measured PK Power (dBm)	FMCW Correction Factor (dB)	Corrected Peak Power (dBm)	Peak Radiated Limit (dBm)	Margin (dB)
1	1	3	600	150	17.66	5.12	22.78	30	-7.22
2	1	3	600	150	20.04	5.15	25.19	30	-4.81
3	1	3	600	150	17.24	5.13	22.37	30	-7.63
4	1	3	600	150	20.90	5.12	26.02	30	-3.98

FMCW correction factor (equation L.1) and sweep time are calculated using guidance from C63.10 2020 Annex L.

FMCW correction factor (Equation L.1) is calculated as follows:

$$\alpha = \frac{1}{\sqrt{1+\left(\frac{2\ln(2)}{\pi}\right)^2\left(\frac{BW_{Chirp}}{T_{Chirp}B^2}\right)^2}}$$

where

α	is the reduction in amplitude
BW_{Chirp}	is the FMCW Chirp Bandwidth
T_{Chirp}	is the FMCW Chirp Time
B	is the 3 dB IF Bandwidth = RBW

Where T_{Chrip} is the worst-case total On Time of TX1 and TX2.

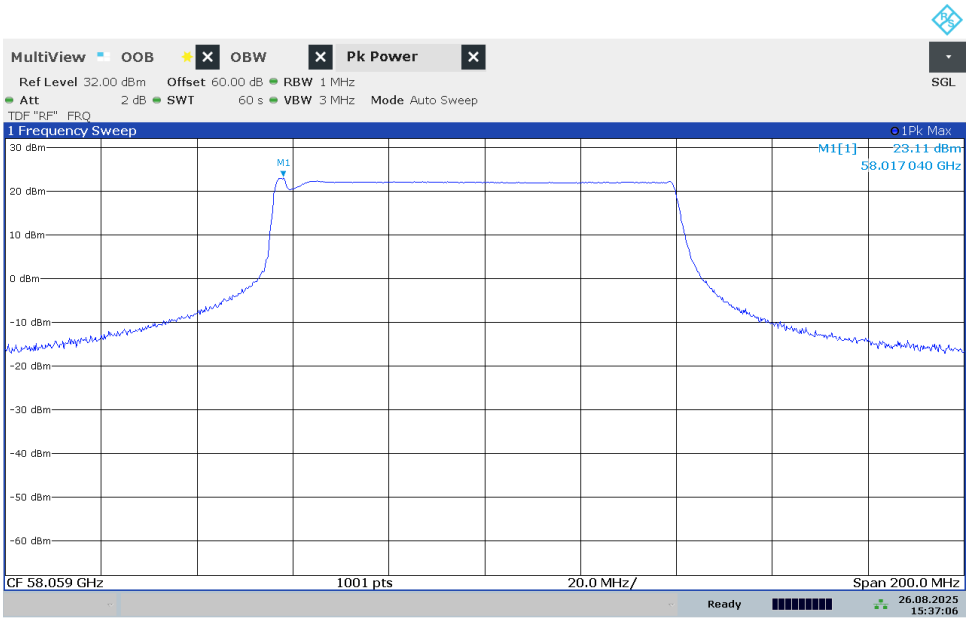
Example Calculation:

Sweep time is calculated as follows:

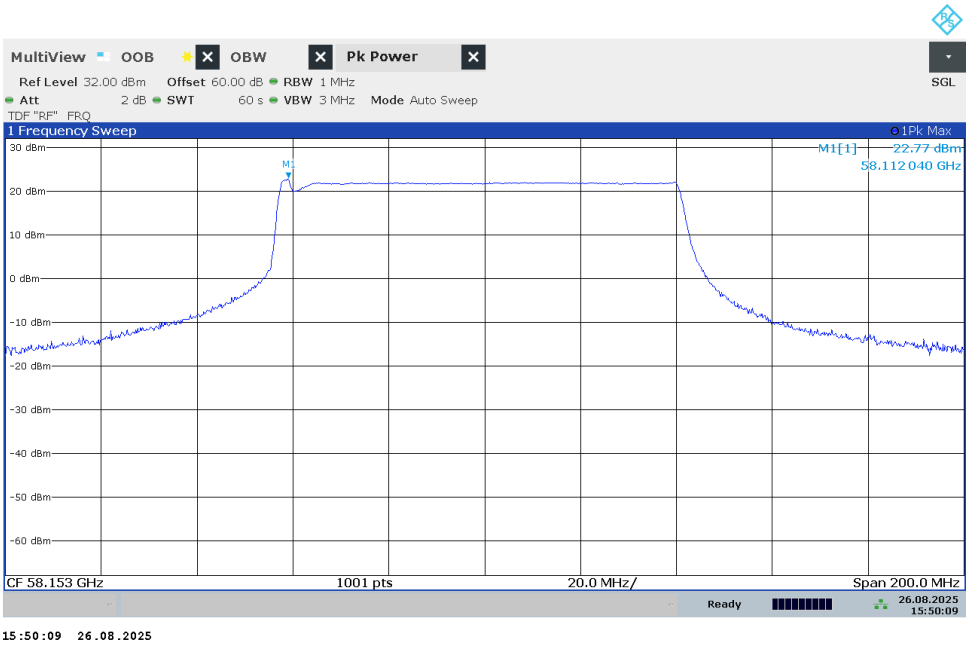
Sweep time ≥ N * (signal period) * (span / RBW), where N is a positive integer

TESTED BY

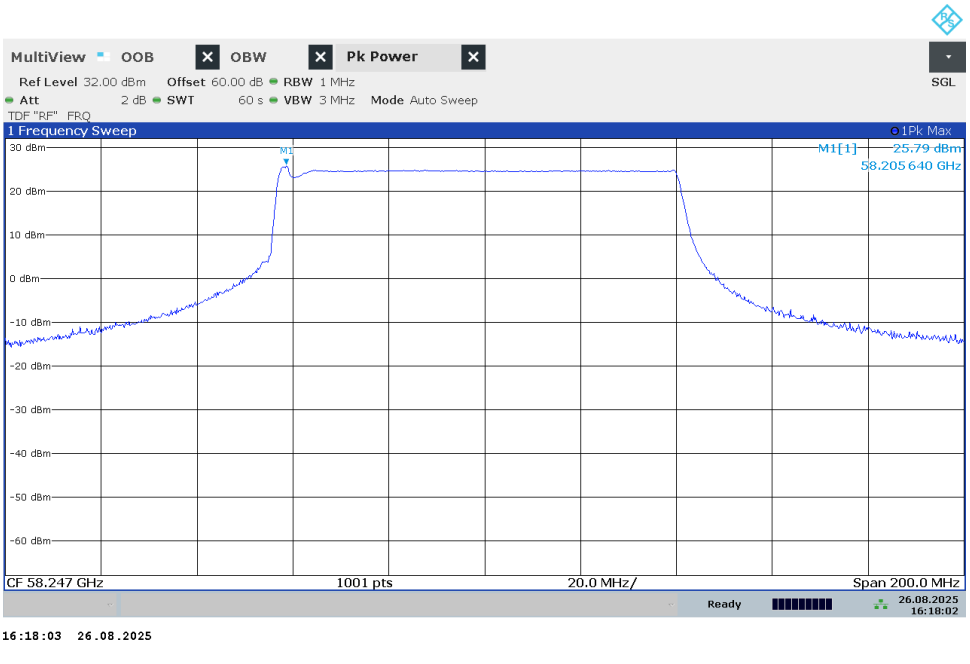
Employee ID: 11322
Test Dates: 2025-08-26
Test Location: Chamber 3



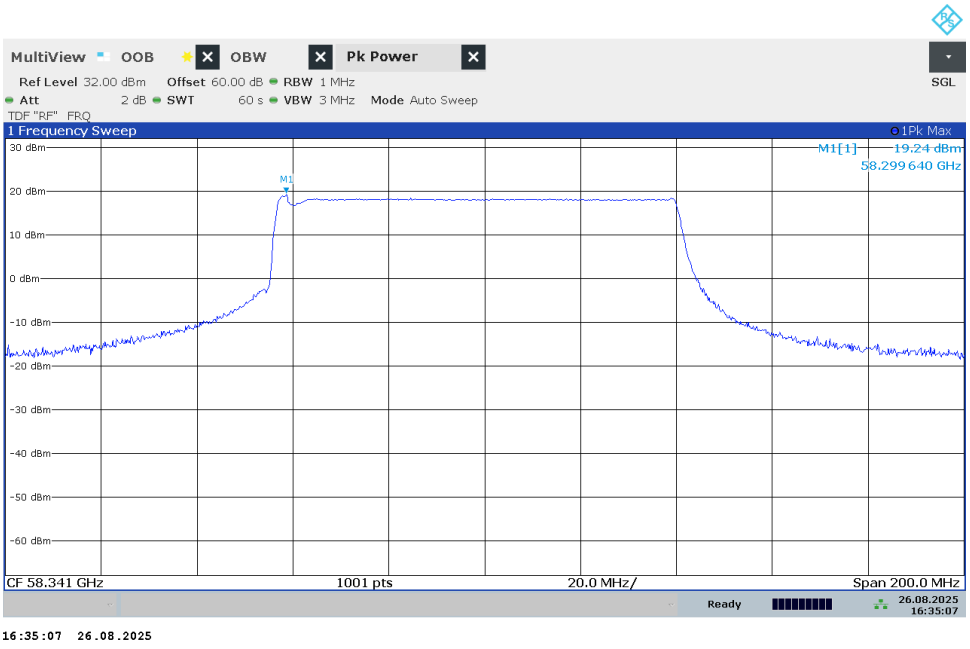
EIRP: Long Frame, Channel 1



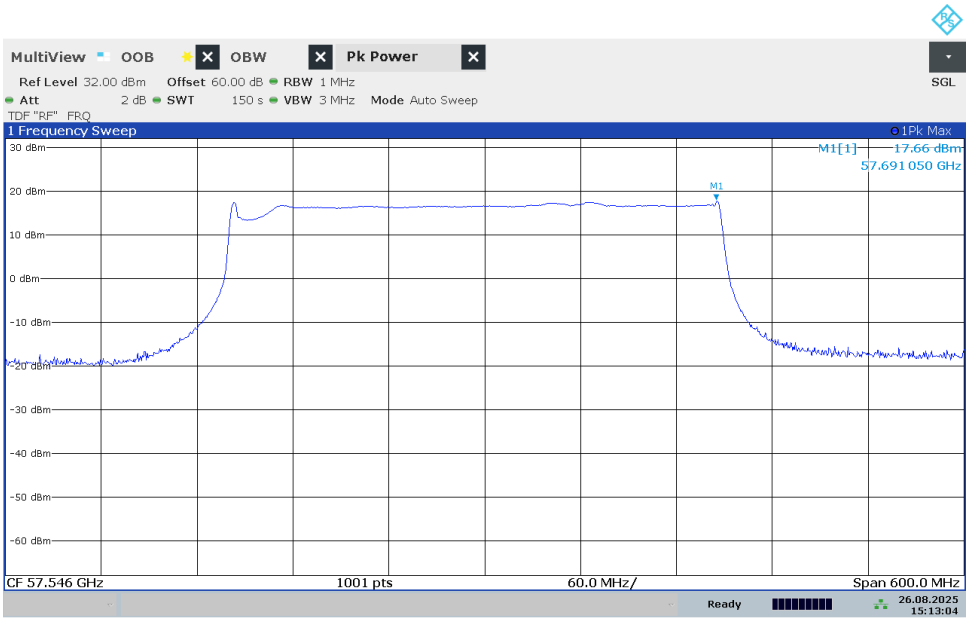
EIRP: Long Frame, Channel 2



EIRP: Long Frame, Channel 3



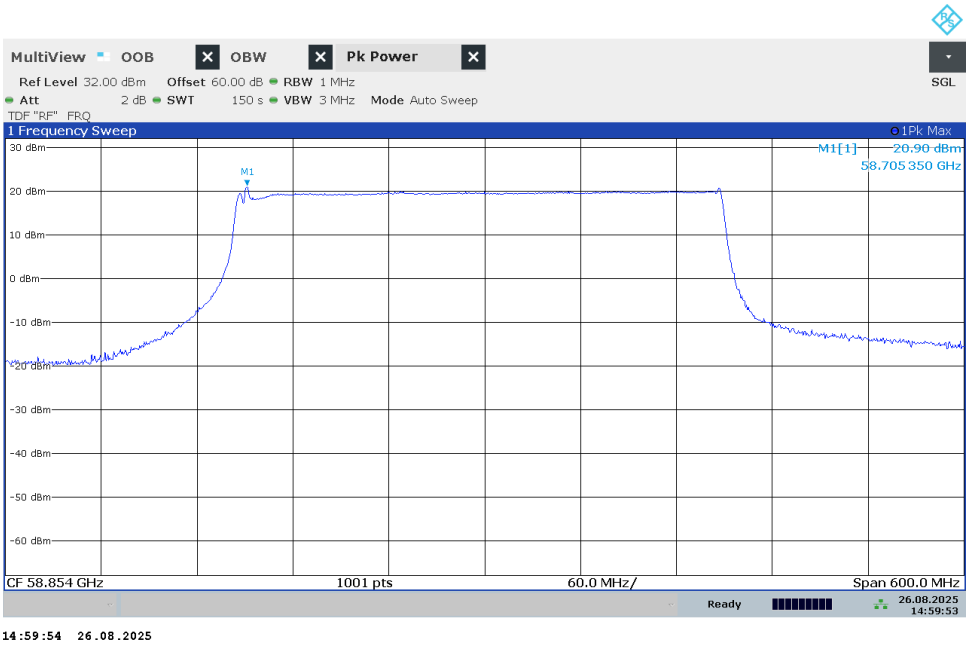
EIRP: Long Frame, Channel 4



EIRP: Short Frame, Channel 1

EIRP: Short Frame, Channel 2

EIRP: Short Frame, Channel 3



EIRP: Short Frame, Channel 4

9.5. SPURIOUS EMISSIONS

REQUIREMENT

FCC

§15.255 (d)

(1) The power density of any emissions outside the 57-71 GHz band shall consist solely of spurious emissions.

(2) Radiated emissions below 40 GHz shall not exceed the general limits in § 15.209.

(3) Between 40 GHz and 200 GHz, the level of these emissions shall not exceed 90 pW/cm^2 at a distance of 3 meters.

(4) The levels of the spurious emissions shall not exceed the level of the fundamental emission.

ISED

RSS-210 Clause J.4

Any emissions outside the band 57-71 GHz shall consist solely of spurious emissions and shall not exceed:

(a) the fundamental emission levels

(b) the general field strength limits specified in RSS-Gen, *General Requirements for Compliance of Radio Apparatus*, for emissions below 40 GHz

(c) 90 pW/cm2 at a distance of 3 m for emissions between 40 GHz and 200 GHz

TEST PROCEDURE - BELOW 50 GHz

The EUT is placed on a non-conducting table 80 cm above the ground plane for measurement below 1 GHz; 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 and 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. Peak detection is used unless otherwise noted as quasi-peak or average.

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; as applicable for linear voltage averaging measurements.

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.

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.

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

TEST PROCEDURE – ABOVE 50 GHz

ANSI C63.10-2020 Clause 9.10

External harmonic mixers are utilized.

The measurement distance is in the far field per formula $2D^2/\lambda$ where D is the larger dimension of the antenna.

Frequency Range (GHz)	Wavelength (m)	Rx Antenna max dim. (m)	Far Field Distance (m)	Measurement Distance Used (m)
18-26.5	0.0113	0.104	1.91	3.00
26.5-40	0.0075	0.074	1.48	3.00
40-50	0.0060	0.055	1.01	3.00
50-75	0.0040	0.037	0.66	3.00
75-110	0.0027	0.025	0.45	3.00
110-170	0.0018	0.016	0.29	3.00
170-200	0.0012	0.011	0.19	3.00

Radiated spurious emissions limits above 40 GHz are based on a 3-meter measurement distance. As such, testing from 40-200GHz was performed at 3-meter.

The antenna is scanned around the entire perimeter surface of the EUT, in both horizontal and vertical polarizations.

A final test is made at any frequency at which emissions are found. During this final scan, the antenna is kept no further from the EUT than the maximum distance calculated for each mixer band that yields a minimum system noise floor at least 6 dB below the spurious emissions limit.

The power is measured, the EIRP is calculated, then the extrapolated power density at a 3-meter distance is calculated.

The 90 pW/cm^2 limit for 40-200GHz was converted to dBm by the following equation:

10 * log(90 [pW/cm^2] * 100^2 * 10^{-12} * 4pi* (3m)^2 *1000) = -9.92 dBm

The 500 uV/m @ 3m limit for 18-40GHz was converted to dBm by the following equation:

20 * log(500 uV/m) + 20 * log(3m) – 104.8 = -41.25 dBm

RESULTS

Both modes were tested only at the channel that yielded the highest EIRP as described below:

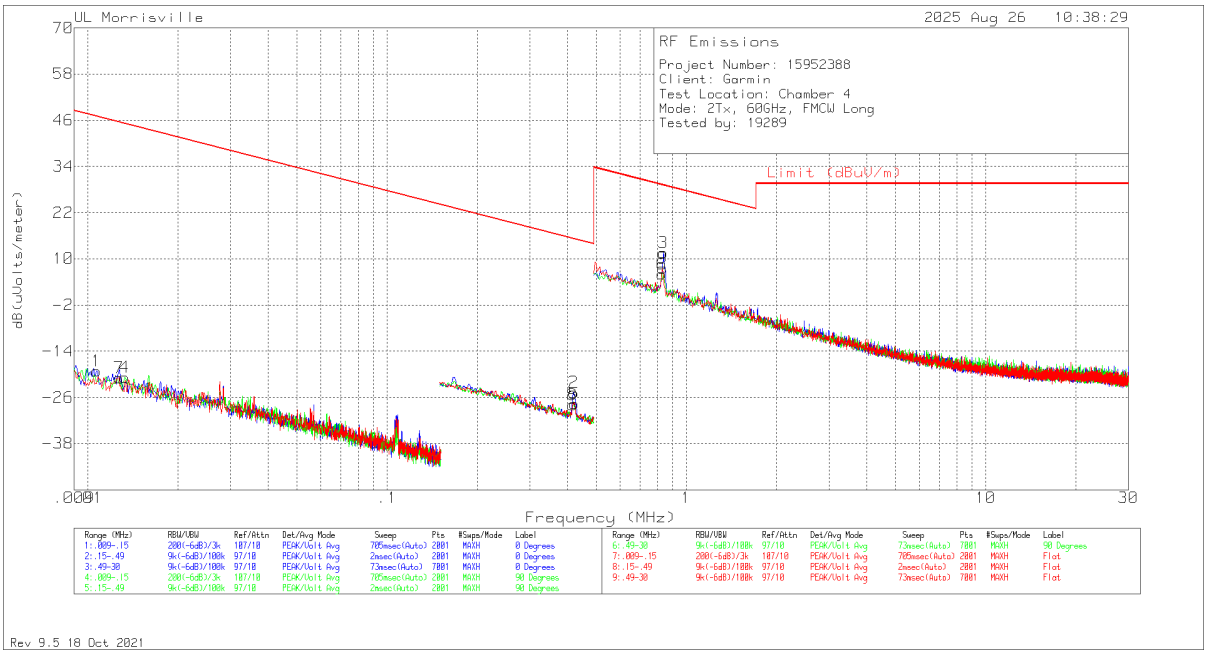
- Long Range Mode: Channel 2
- Short Range Mode: Channel 4

TESTED BY

Employee IDs: 11322, 19289
Test Dates: 2025-08-26 to 2025-08-28
Test Location: Chamber 3, Chamber 4

SPURIOUS EMISSIONS 9 kHz TO 30 MHz

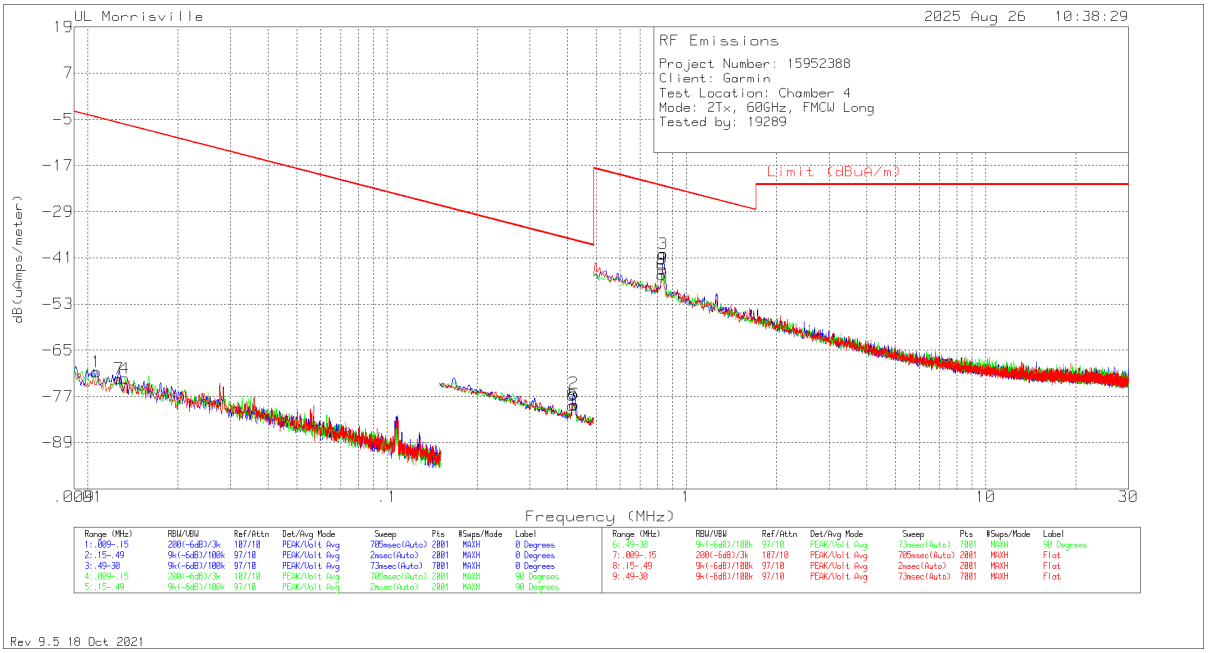
Long Range Mode (E-Field)



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	ANT (dB/m)	Gain/Loss (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uVolts/meter)	Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Loop Angle
1	.0107	42.3	Pk	18.6	0	-80	-19.1	47.01	-66.11	0-360	0 degs
7	.01269	41.51	Pk	17.6	0	-80	-20.89	45.53	-66.42	0-360	Flat
4	.01326	41.88	Pk	17.3	0	-80	-20.82	45.15	-65.97	0-360	90 degs
8	.4169	40.96	Pk	11	.1	-80	-27.94	15.2	-43.14	0-360	Flat
2	.41945	44.22	Pk	11	.1	-80	-24.68	15.15	-39.83	0-360	0 degs
5	.42132	41.37	Pk	11	.1	-80	-27.53	15.11	-42.64	0-360	90 degs
6	.82728	34.97	Pk	11	.1	-40	6.07	29.25	-23.18	0-360	90 degs
9	.8315	36.49	Pk	11	.1	-40	7.59	29.21	-21.62	0-360	Flat
3	.83571	40.45	Pk	11	.1	-40	11.55	29.16	-17.61	0-360	0 degs

Pk - Peak detector

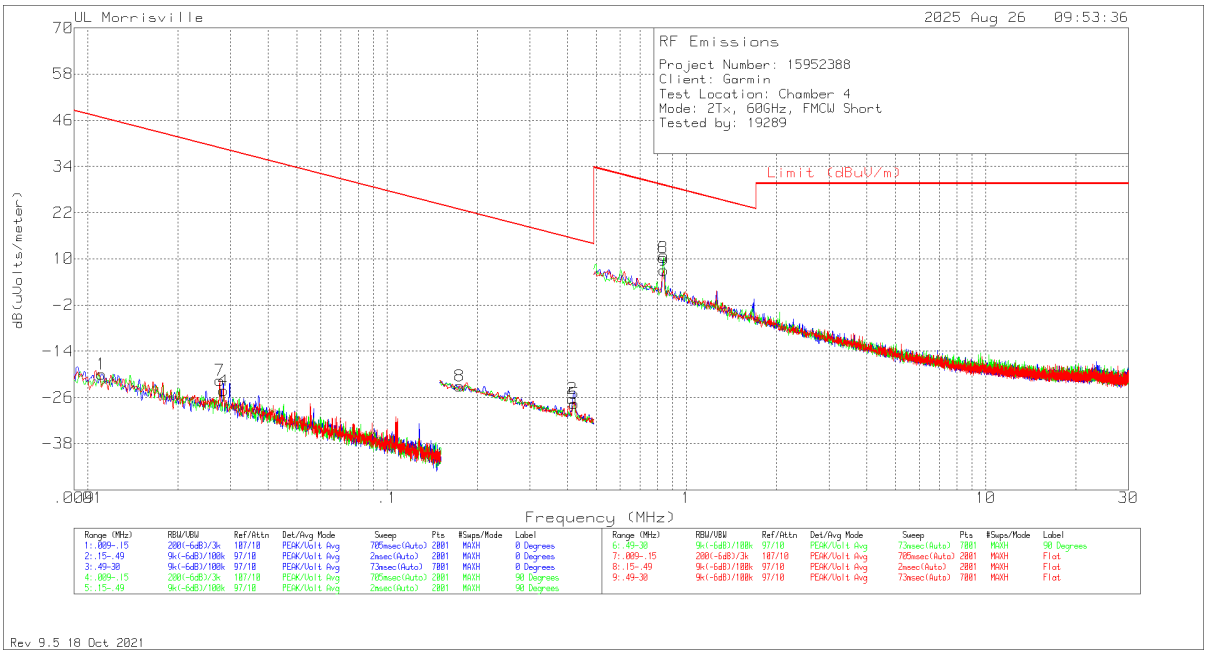
Long Range Mode (H-Field)



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	ANT (dB/m)	Gain/Loss (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uAmps/meter)	Limit (dBuA/m)	Margin (dB)	Azimuth (Degs)	Loop Angle
1	.0107	42.3	Pk	-32.9	0	-80	-70.6	-4.49	-66.11	0-360	0 degs
7	.01269	41.51	Pk	-33.9	0	-80	-72.39	-5.97	-66.42	0-360	Flat
4	.01326	41.88	Pk	-34.2	0	-80	-72.32	-6.35	-65.97	0-360	90 degs
8	.4169	40.96	Pk	-40.5	.1	-80	-79.44	-36.3	-43.14	0-360	Flat
2	.41945	44.22	Pk	-40.5	.1	-80	-76.18	-36.35	-39.83	0-360	0 degs
5	.42132	41.37	Pk	-40.5	.1	-80	-79.03	-36.39	-42.64	0-360	90 degs
6	.82728	34.97	Pk	-40.5	.1	-40	-45.43	-22.25	-23.18	0-360	90 degs
9	.8315	36.49	Pk	-40.5	.1	-40	-43.91	-22.29	-21.62	0-360	Flat
3	.83571	40.45	Pk	-40.5	.1	-40	-39.95	-22.34	-17.61	0-360	0 degs

Pk - Peak detector

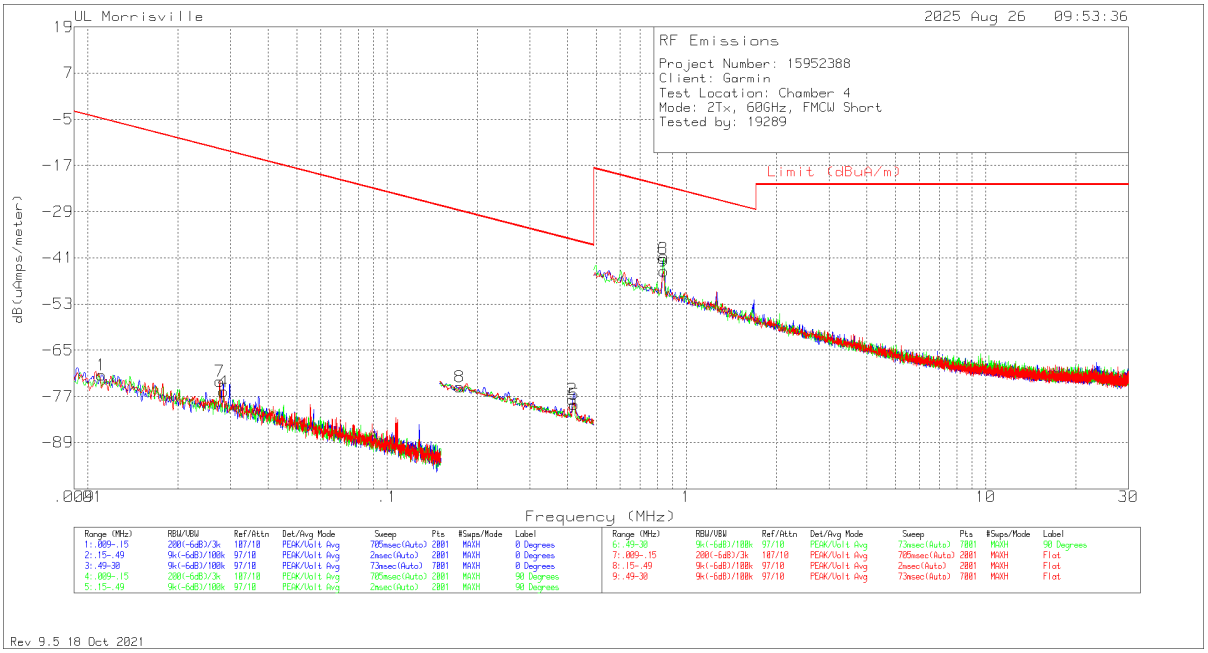
Short Range Mode (E-Field)



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	ANT (dB/m)	Gain/Loss (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uVolts/meter)	Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Loop Angle
1	.01113	41.61	Pk	18.4	0	-80	-19.99	46.67	-66.66	0-360	0 degs
7	.0276	45.09	Pk	13.3	0	-80	-21.61	38.79	-60.4	0-360	Flat
4	.02838	42.45	Pk	13.3	0	-80	-24.25	38.54	-62.79	0-360	90 degs
8	.17482	45.92	Pk	11	0	-80	-23.08	22.75	-45.83	0-360	Flat
2	.4169	42.57	Pk	11	.1	-80	-26.33	15.2	-41.53	0-360	0 degs
5	.42132	41.28	Pk	11	.1	-80	-27.62	15.11	-42.73	0-360	90 degs
3	.83571	39.23	Pk	11	.1	-40	10.33	29.16	-18.83	0-360	0 degs
6	.83571	39.19	Pk	11	.1	-40	10.29	29.16	-18.87	0-360	90 degs
9	.83993	35.91	Pk	11	.1	-40	7.01	29.12	-22.11	0-360	Flat

Pk - Peak detector

Short Range Mode (H-Field)

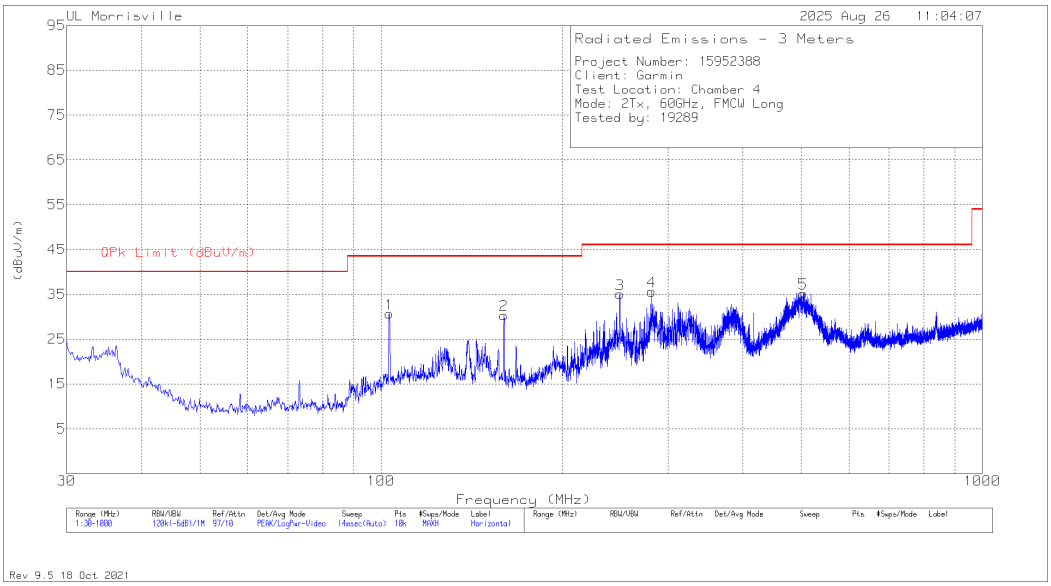


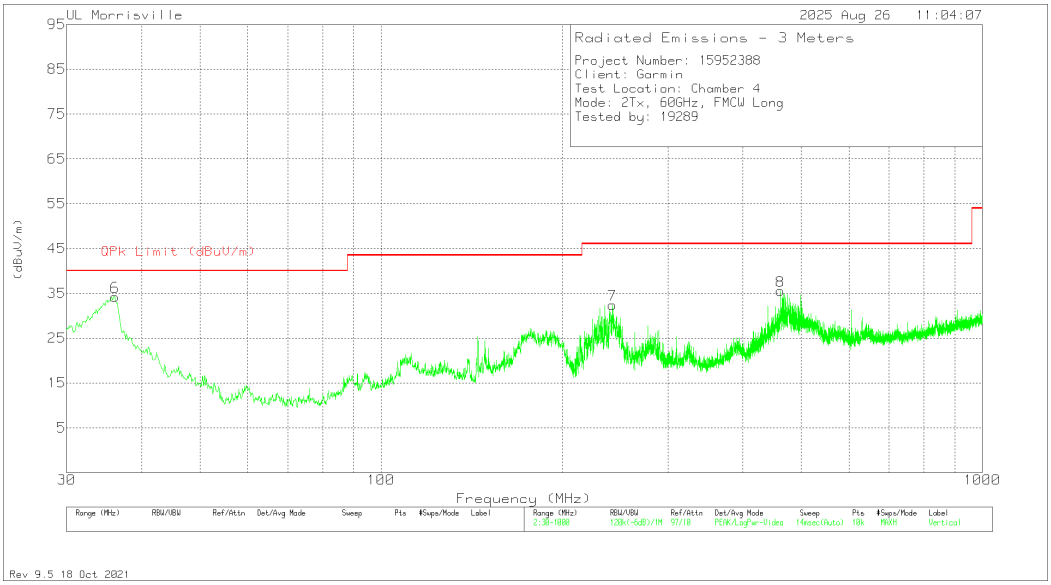
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	ANT (dB/m)	Gain/Loss (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uAmps/meter)	Limit (dBuA/m)	Margin (dB)	Azimuth (Degs)	Loop Angle
1	.01113	41.61	Pk	-33.1	0	-80	-71.49	-4.83	-66.66	0-360	0 degs
7	.0276	45.09	Pk	-38.2	0	-80	-73.11	-12.71	-60.4	0-360	Flat
4	.02838	42.45	Pk	-38.2	0	-80	-75.75	-12.96	-62.79	0-360	90 degs
8	.17482	45.92	Pk	-40.5	0	-80	-74.58	-28.75	-45.83	0-360	Flat
2	.4169	42.57	Pk	-40.5	.1	-80	-77.83	-36.3	-41.53	0-360	0 degs
5	.42132	41.28	Pk	-40.5	.1	-80	-79.12	-36.39	-42.73	0-360	90 degs
3	.83571	39.23	Pk	-40.5	.1	-40	-41.17	-22.34	-18.83	0-360	0 degs
6	.83571	39.19	Pk	-40.5	.1	-40	-41.21	-22.34	-18.87	0-360	90 degs
9	.83993	35.91	Pk	-40.5	.1	-40	-44.49	-22.38	-22.11	0-360	Flat

Pk - Peak detector

SPURIOUS EMISSIONS 30 TO 1000 MHz

Long Range Mode

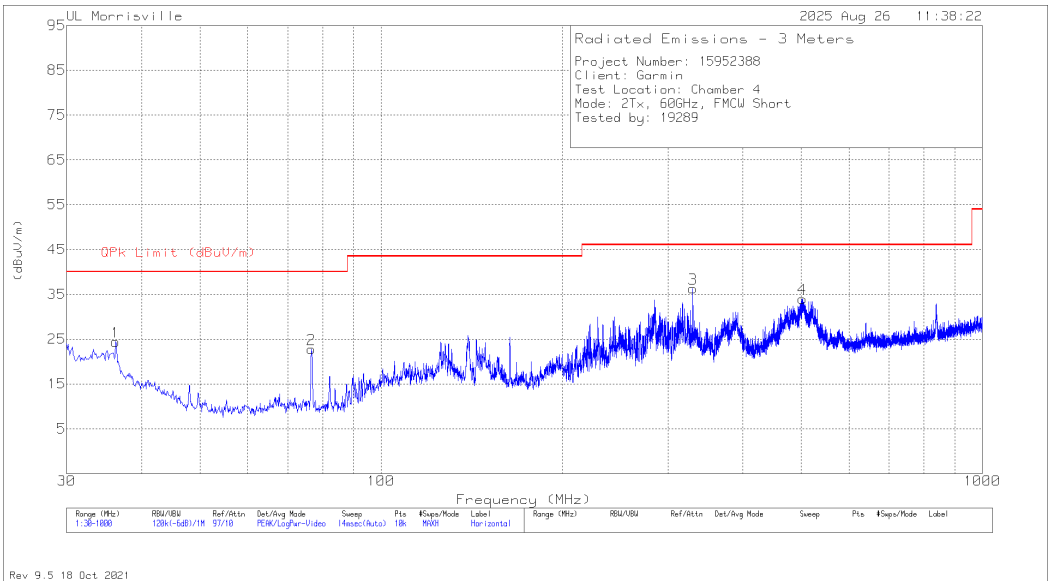


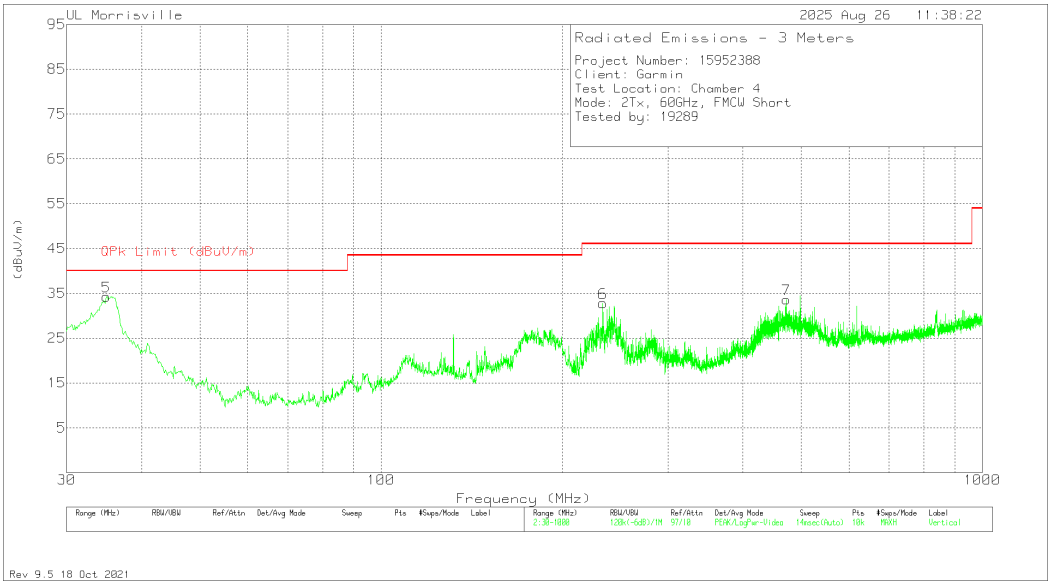


Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	90628 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
6	35.9112	38.63	Qp	22.9	-31.4	30.13	40	-9.87	336	104	V
1	103.235	44.25	Pk	17.4	-31	30.65	43.52	-12.87	0-360	200	H
2	160.077	42.16	Pk	18.4	-30.2	30.36	43.52	-13.16	0-360	100	H
7	242.527	44.14	Pk	17.7	-29.4	32.44	46.02	-13.58	0-360	100	V
3	249.608	47.15	Pk	17.5	-29.6	35.05	46.02	-10.97	0-360	100	H
4	281.909	45.52	Pk	19.5	-29.4	35.62	46.02	-10.4	0-360	100	H
8	461.65	40.72	Pk	23.2	-28.4	35.52	46.02	-10.5	0-360	100	V
5	503.554	39.32	Pk	23.8	-27.9	35.22	46.02	-10.8	0-360	100	H

Pk - Peak detector
Qp - Quasi-Peak detector

Short Range Mode



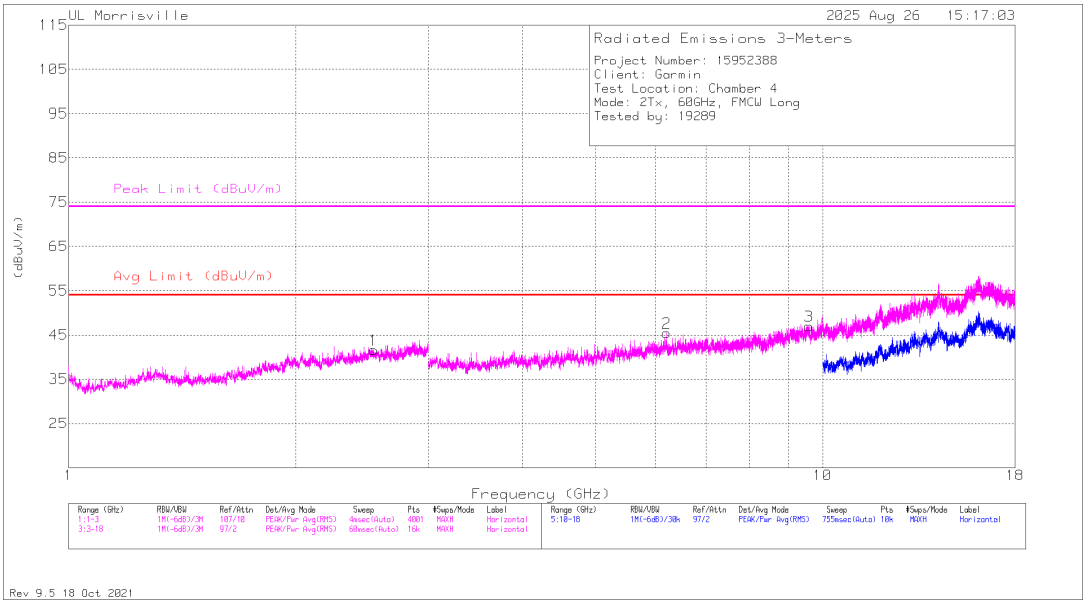


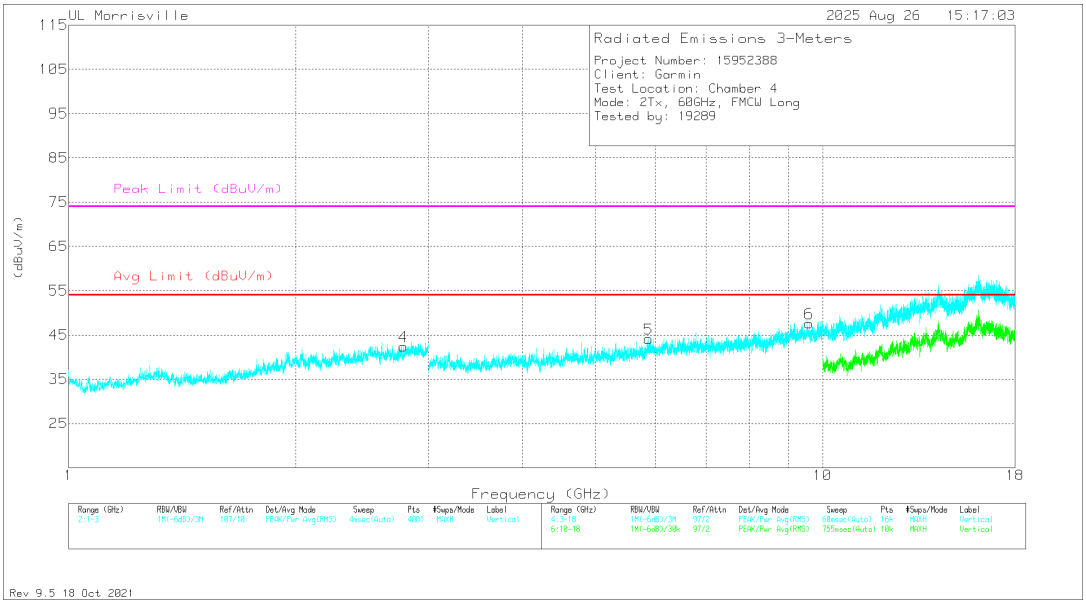
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	90628 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	35.8761	37.36	Qp	23	-31.5	28.86	40	-11.14	208	104	V
1	36.208	33.21	Pk	22.7	-31.5	24.41	40	-15.59	0-360	100	H
2	76.657	39.58	Pk	14.1	-30.9	22.78	40	-17.22	0-360	200	H
6	233.894	45.21	Pk	17.3	-29.7	32.81	46.02	-13.21	0-360	100	V
3	330.118	45.68	Pk	20.1	-29.5	36.28	46.02	-9.74	0-360	100	H
7	472.029	38.35	Pk	23.6	-28.3	33.65	46.02	-12.37	0-360	200	V
4	502.293	38.61	Pk	23.8	-28.4	34.01	46.02	-12.01	0-360	100	H

Pk - Peak detector
Qp - Quasi-Peak detector

SPURIOUS EMISSIONS 1 GHz TO 18 GHz

Long Range Mode

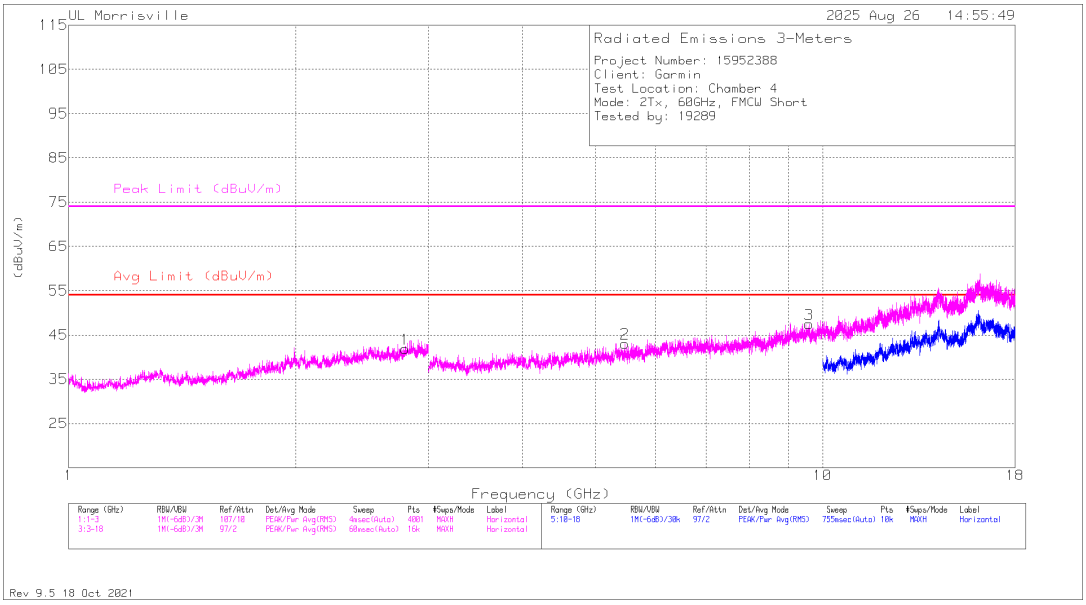


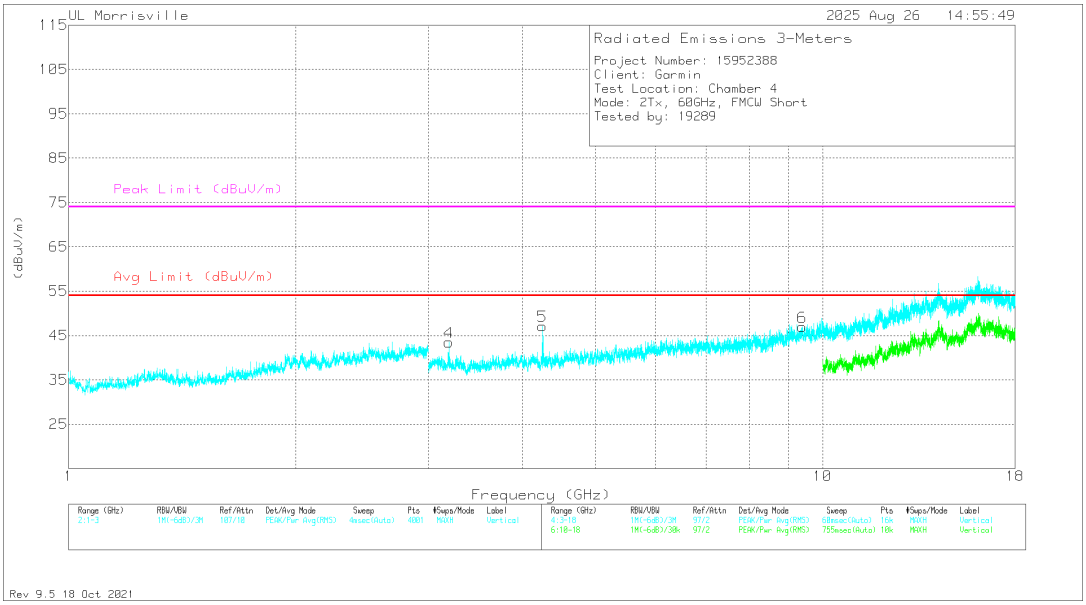


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.539	32.46	Pk	32.5	-23.3	41.66	54	-12.34	74	-32.34	0-360	100	H
4	2.779	33.19	Pk	32.3	-23.1	42.39	54	-11.61	74	-31.61	0-360	200	V
5	5.88094	38.11	Pk	34.9	-28.9	44.11	54	-9.89	74	-29.89	0-360	200	V
2	6.20906	37.96	Pk	35.3	-27.8	45.46	54	-8.54	74	-28.54	0-360	100	H
3	9.59063	34.72	Pk	36.6	-24.3	47.02	54	-6.98	74	-26.98	0-360	100	H
6	9.59438	35.35	Pk	36.6	-24.3	47.65	54	-6.35	74	-26.35	0-360	200	V

Pk - Peak detector

Long Range Mode



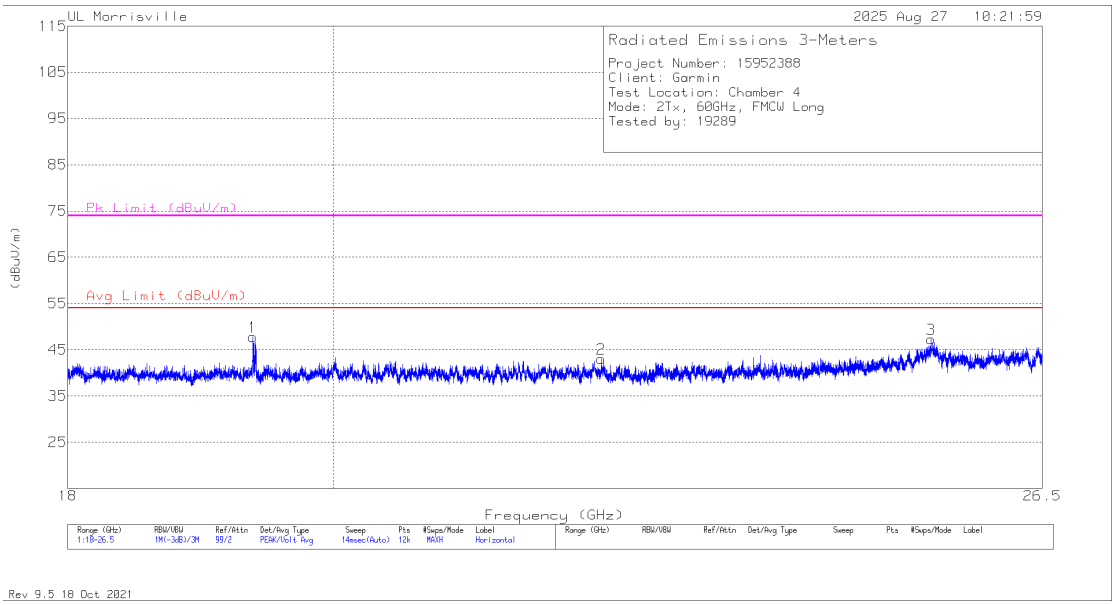


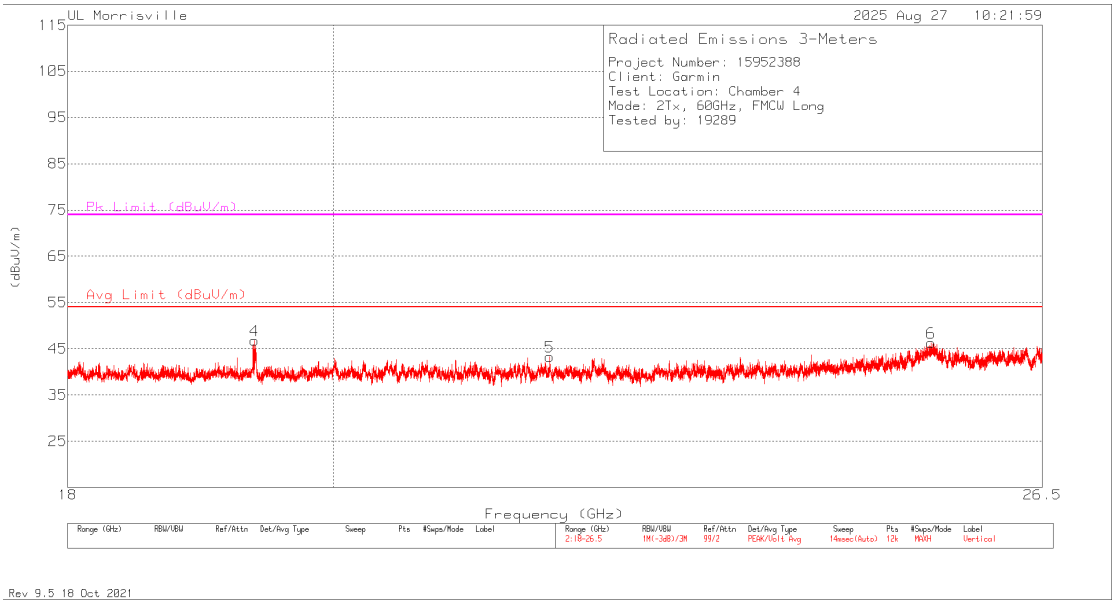
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.793	32.15	Pk	32.3	-22.6	41.85	54	-12.15	74	-32.15	0-360	100	H
4	3.19313	45.79	Pk	32.8	-35.1	43.49	54	-10.51	74	-30.51	0-360	200	V
5	4.24875	46.02	Pk	33.2	-32.1	47.12	54	-6.88	74	-26.88	0-360	200	V
2	5.4675	38.84	Pk	34.4	-30.2	43.04	54	-10.96	74	-30.96	0-360	100	H
6	9.39656	34.44	Pk	36.5	-24	46.94	54	-7.06	74	-27.06	0-360	200	V
3	9.59344	35.17	Pk	36.6	-24.3	47.47	54	-6.53	74	-26.53	0-360	100	H

Pk - Peak detector

SPURIOUS EMISSIONS 18 GHz TO 26.5 GHz

Long Range Mode

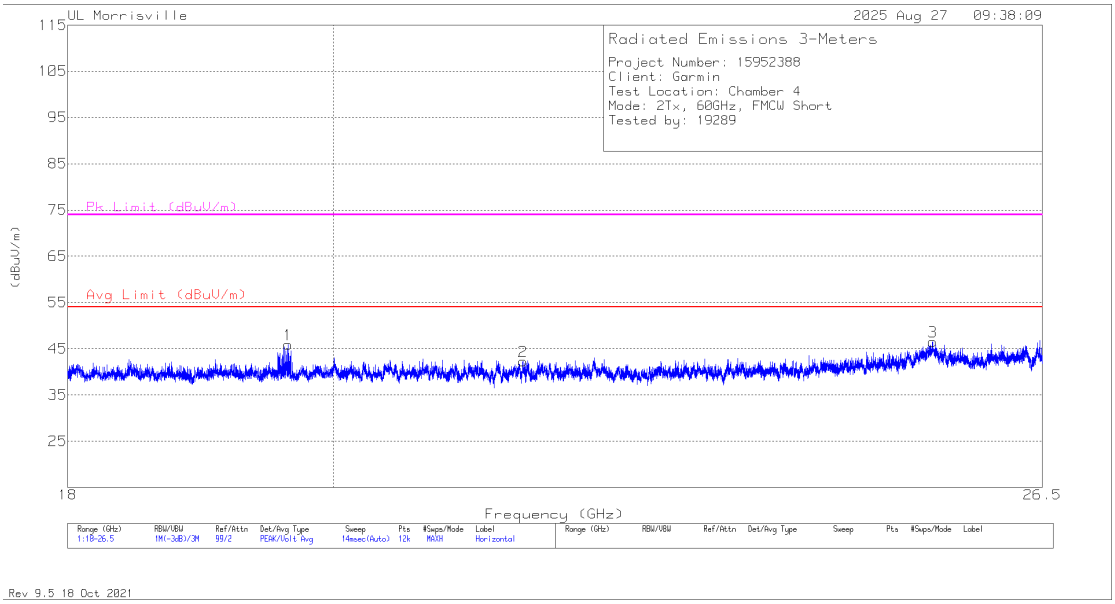


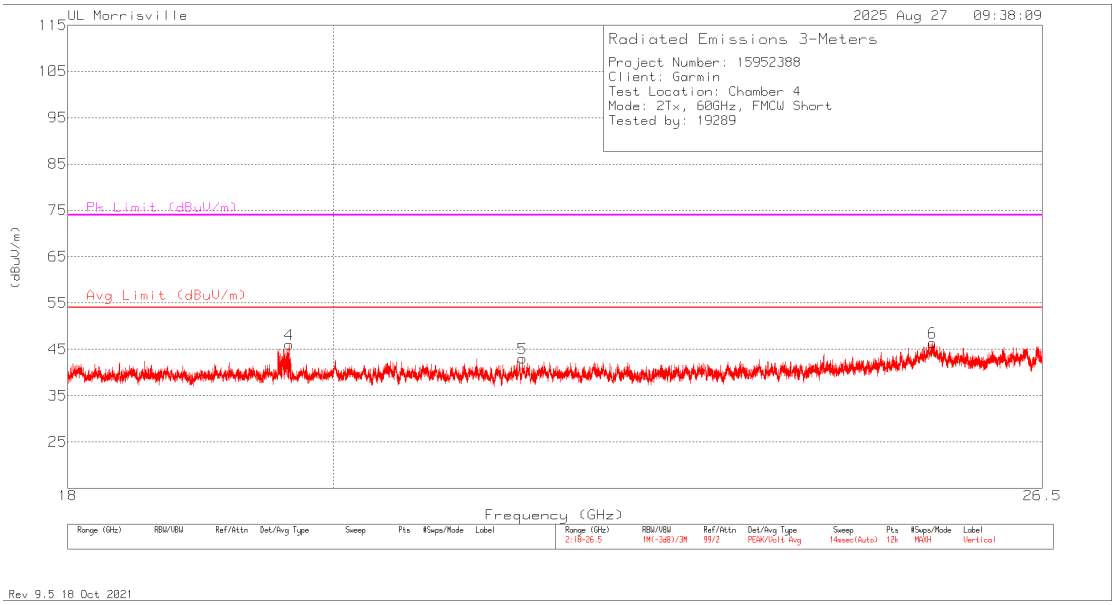


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	91186 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	19.37286	54.82	Pk	32.6	-39.6	47.82	54	-6.18	74	-26.18	0-360	200	H
4	19.38491	53.8	Pk	32.6	-39.6	46.8	54	-7.2	74	-27.2	0-360	100	V
5	21.79627	48.24	Pk	33.4	-38.4	43.24	54	-10.76	74	-30.76	0-360	200	V
2	22.24539	48.83	Pk	33.4	-39.2	43.03	54	-10.97	74	-30.97	0-360	200	H
6	25.35382	44.36	Pk	34.1	-32.2	46.26	54	-7.74	74	-27.74	0-360	200	V
3	25.35665	45.28	Pk	34.1	-32.1	47.28	54	-6.72	74	-26.72	0-360	100	H

Pk - Peak detector

Short Range Mode



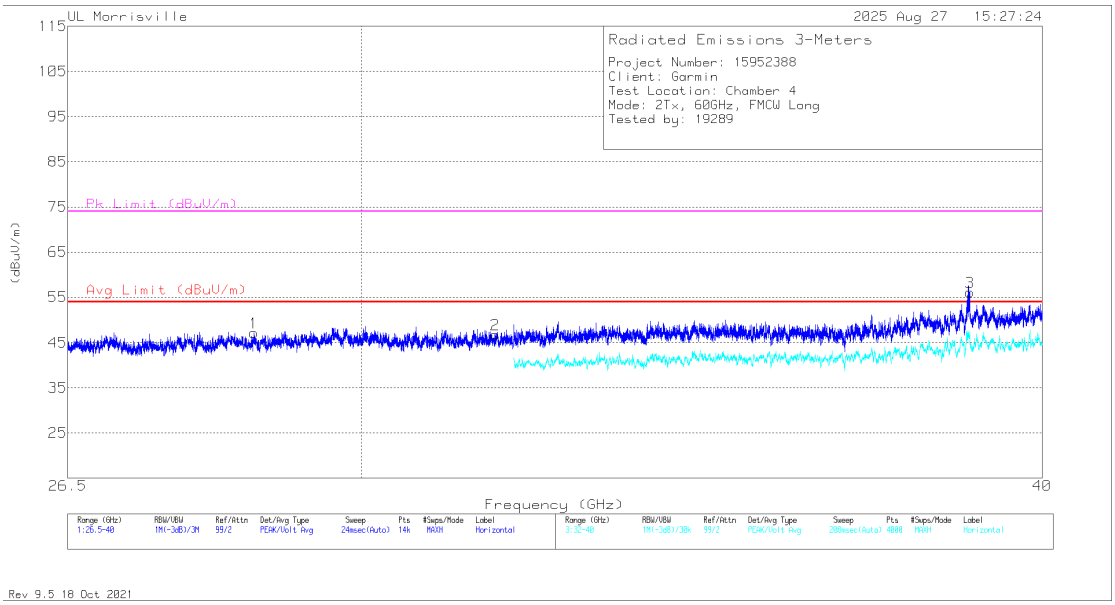


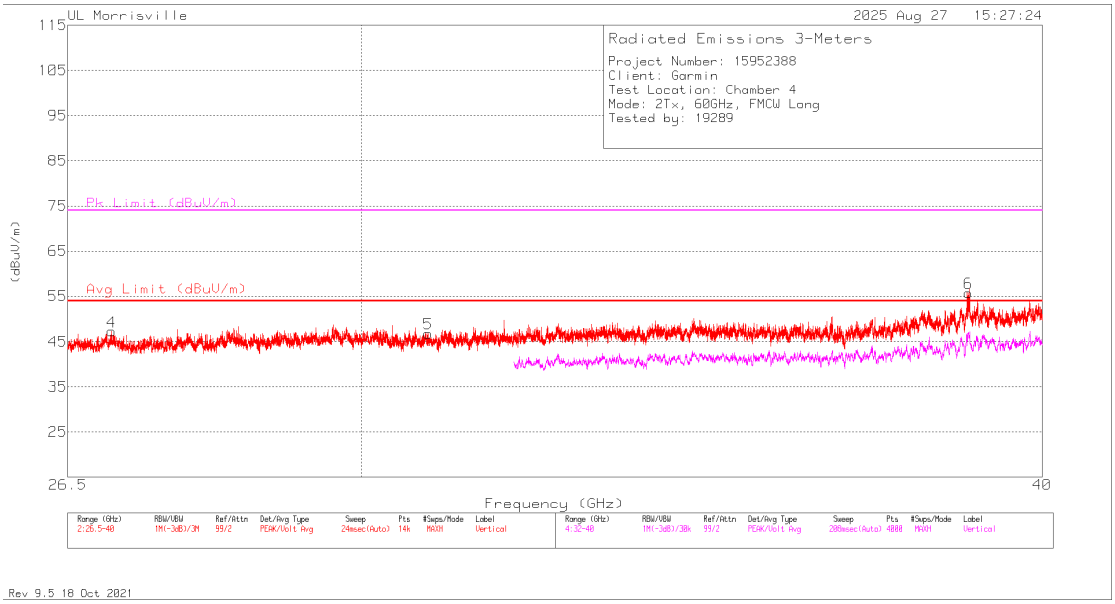
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	91186 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	19.64559	52.72	Pk	32.5	-39.3	45.92	54	-8.08	74	-28.08	0-360	100	H
4	19.65551	53	Pk	32.6	-39.6	46	54	-8	74	-28	0-360	150	V
5	21.56109	48.39	Pk	33	-38.4	42.99	54	-11.01	74	-31.01	0-360	300	V
2	21.56605	47.81	Pk	33	-38.5	42.31	54	-11.69	74	-31.69	0-360	150	H
6	25.37082	43.88	Pk	34.1	-31.6	46.38	54	-7.62	74	-27.62	0-360	250	V
3	25.37365	44.14	Pk	34.1	-31.7	46.54	54	-7.46	74	-27.46	0-360	100	H

Pk - Peak detector

SPURIOUS EMISSIONS 26.5 GHz TO 40 GHz

Long Range Mode

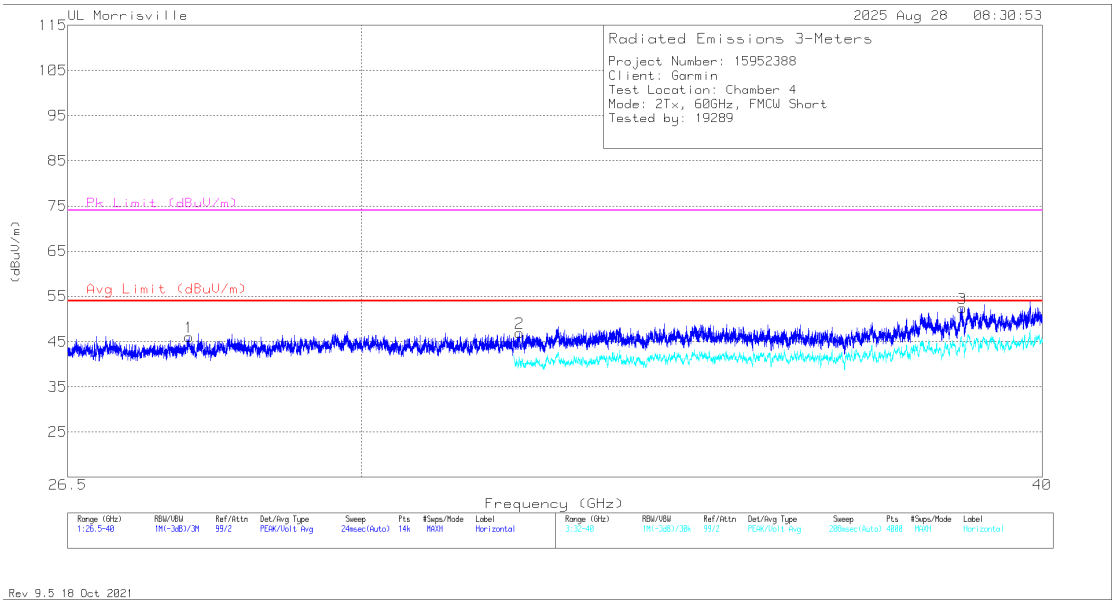


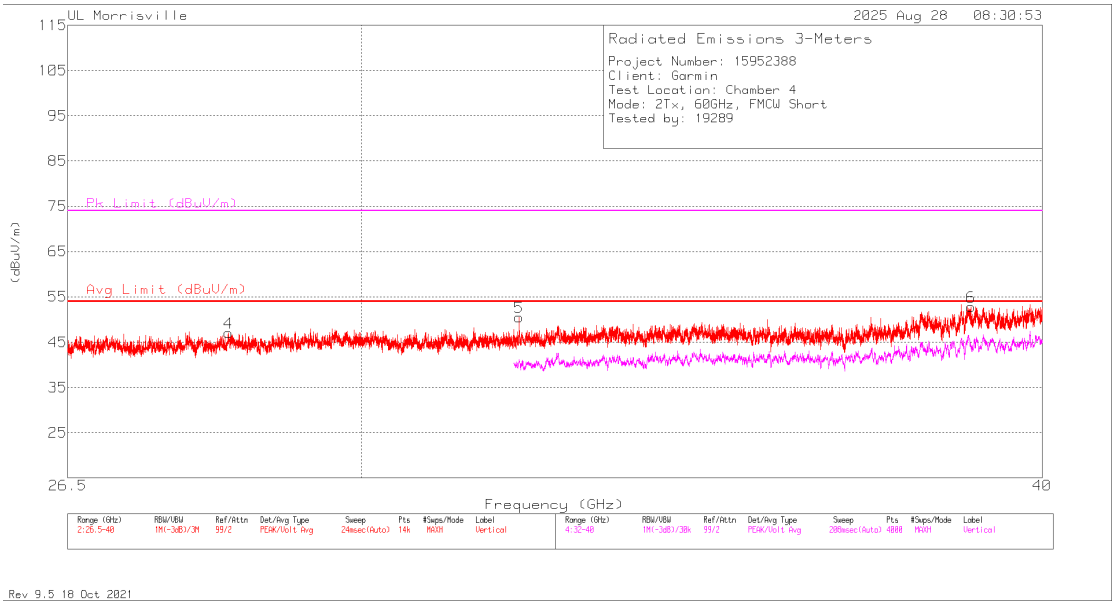


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	91187 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	26.99279	44.24	Pk	36	-33	47.24	54	-6.76	74	-26.76	0-360	200	V
1	28.67076	42.17	Pk	36.2	-31.2	47.17	54	-6.83	74	-26.83	0-360	200	H
5	30.85985	41.4	Pk	36.3	-30.9	46.8	54	-7.2	74	-27.2	0-360	200	V
2	31.7432	41.95	Pk	36.4	-31.5	46.85	54	-7.15	74	-27.15	0-360	200	H
6	38.7702	51.65	Pk	38.2	-29.5	60.35	-	-	74	-13.65	68	190	V
	38.741	36.73	Av	38.3	-30.5	44.53	54	-9.47	-	-	68	190	V
3	38.74055	53.83	Pk	38.3	-30.5	61.63	-	-	74	-12.37	323	174	H
	38.74089	33.23	Av	38.3	-30.5	41.03	54	-12.97	-	-	323	174	H

Pk - Peak detector
Av - Average detection

Short Range Mode



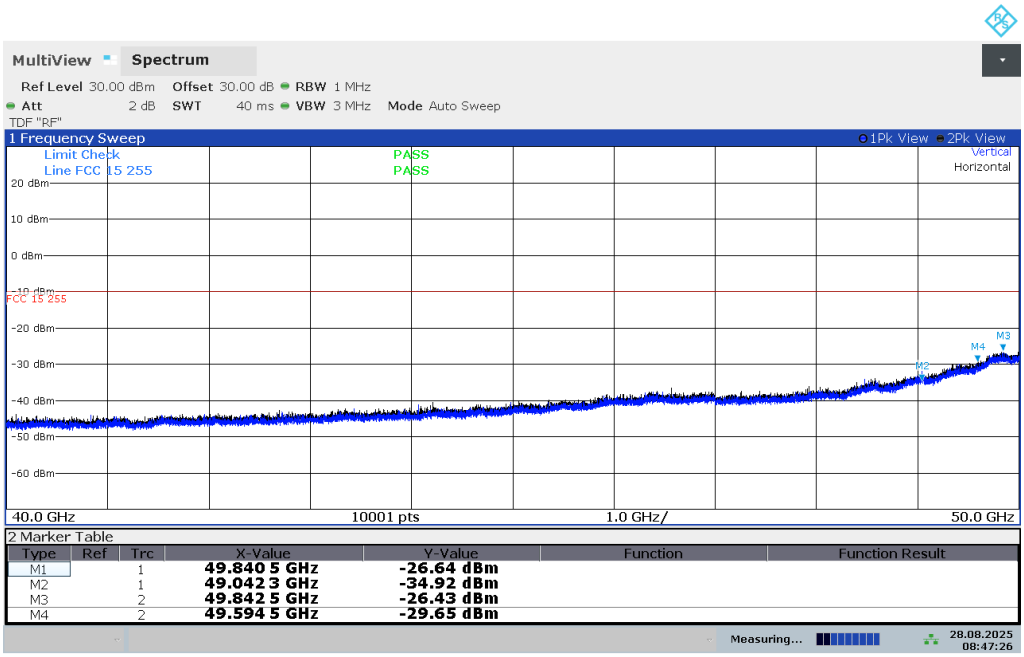


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	91187 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	27.89446	42.08	Pk	35.9	-32	45.98	54	-8.02	74	-28.02	0-360	250	H
4	28.35928	41.74	Pk	36.4	-31.1	47.04	54	-6.96	74	-26.96	0-360	150	V
5	32.06502	28.29	Av	36.3	-29.7	34.89	54	-19.11	-	-	82	143	V
	32.06507	43.2	Pk	36.3	-29.7	49.8	-	-	74	-24.2	82	143	V
2	32.07108	40.63	Pk	36.3	-30	46.93	54	-7.07	74	-27.07	0-360	250	H
3	38.66935	30	Av	38.4	-30.3	38.1	54	-15.9	-	-	56	295	H
	38.66968	44.92	Pk	38.4	-30.3	53.02	-	-	74	-20.98	56	295	H
6	38.72668	30.19	Av	38.4	-31.1	37.49	54	-16.51	-	-	358	183	V
	38.7275	46.1	Pk	38.4	-31	53.5	-	-	74	-20.5	358	183	V

Pk - Peak detector
Av - Average detection

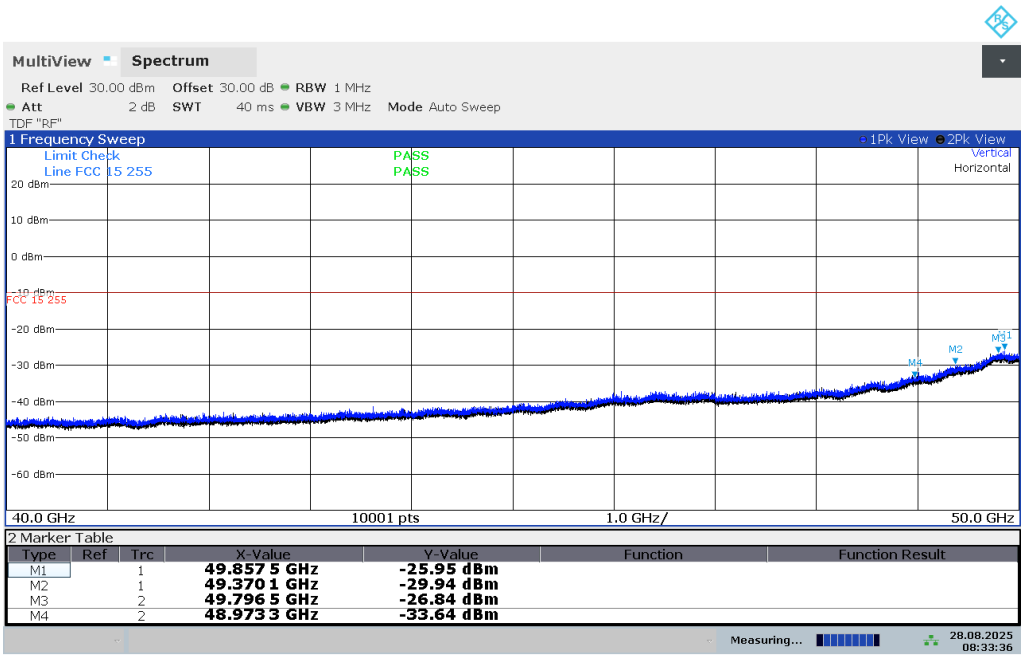
SPURIOUS EMISSIONS 40 GHz TO 50 GHz

Long Range Mode



08:47:27 28.08.2025

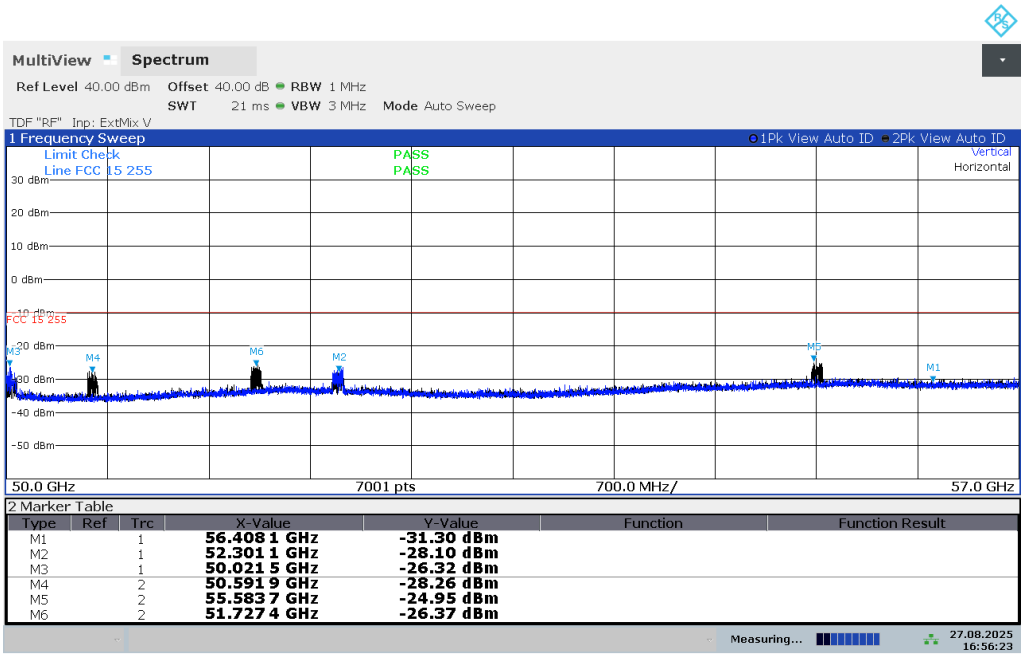
Short Range Mode



08:33:36 28.08.2025

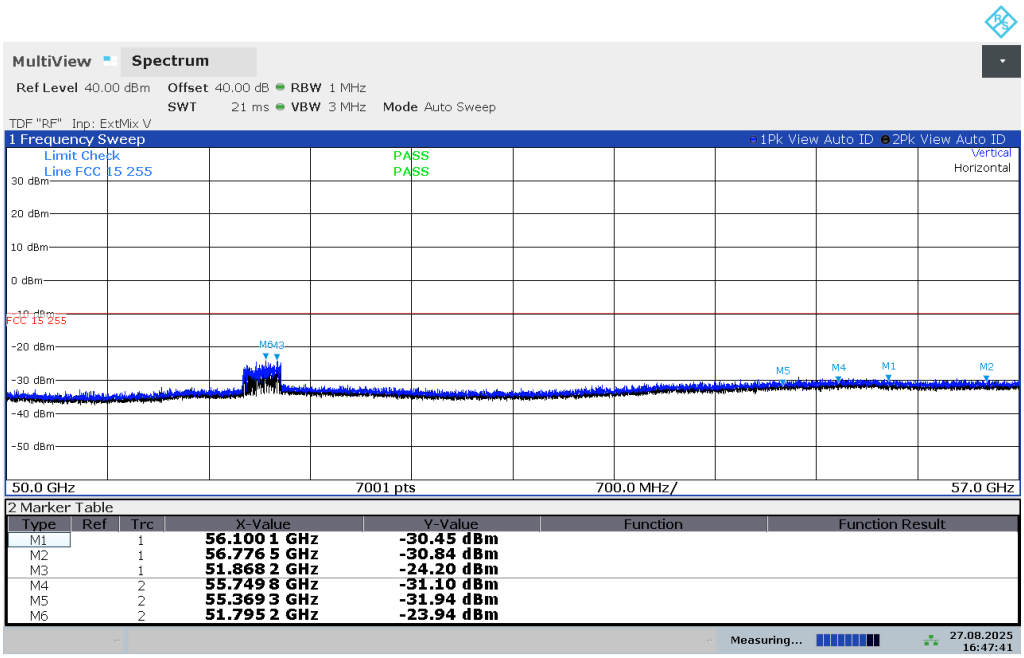
SPURIOUS EMISSIONS 50 GHz TO 57 GHz

Long Range Mode



16:56:24 27.08.2025

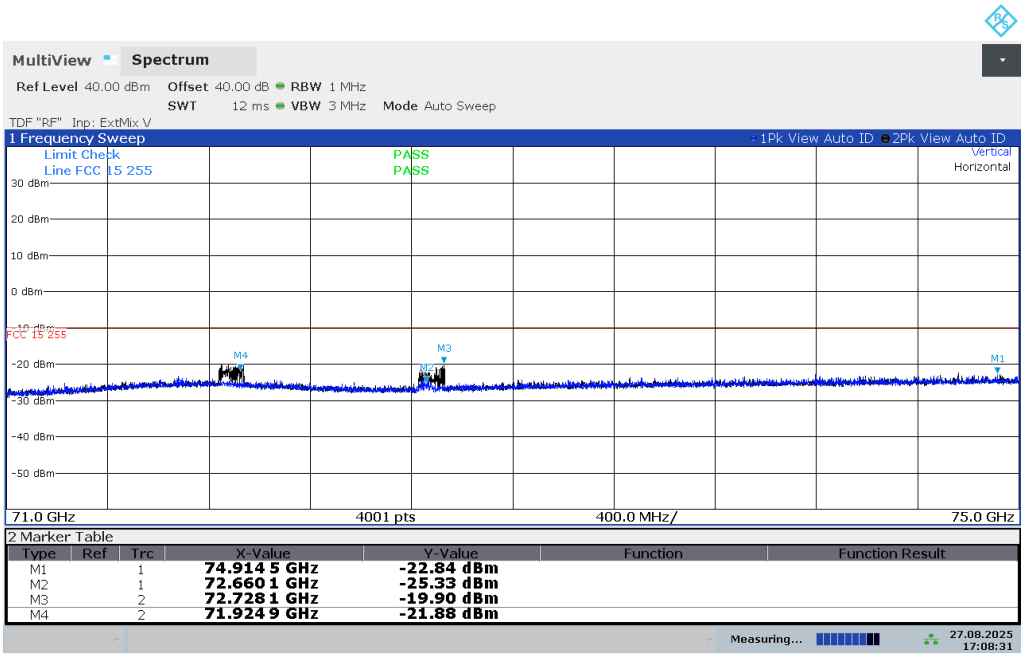
Short Range Mode



16:47:42 27.08.2025

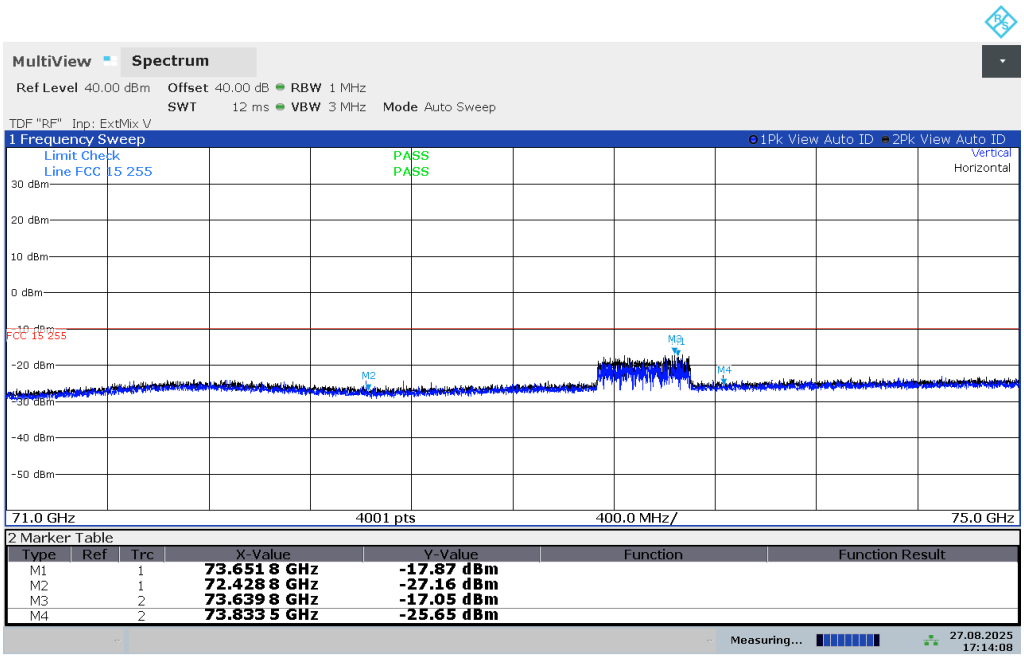
SPURIOUS EMISSIONS 71 GHz TO 75 GHz

Long Range Mode



17:08:32 27.08.2025

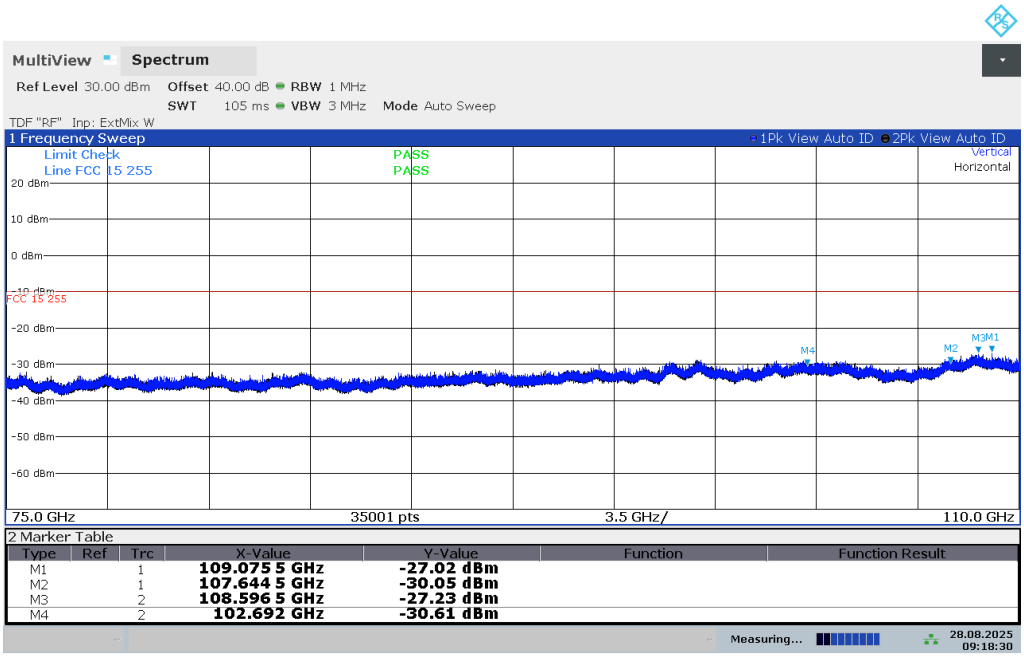
Short Range Mode



17:14:09 27.08.2025

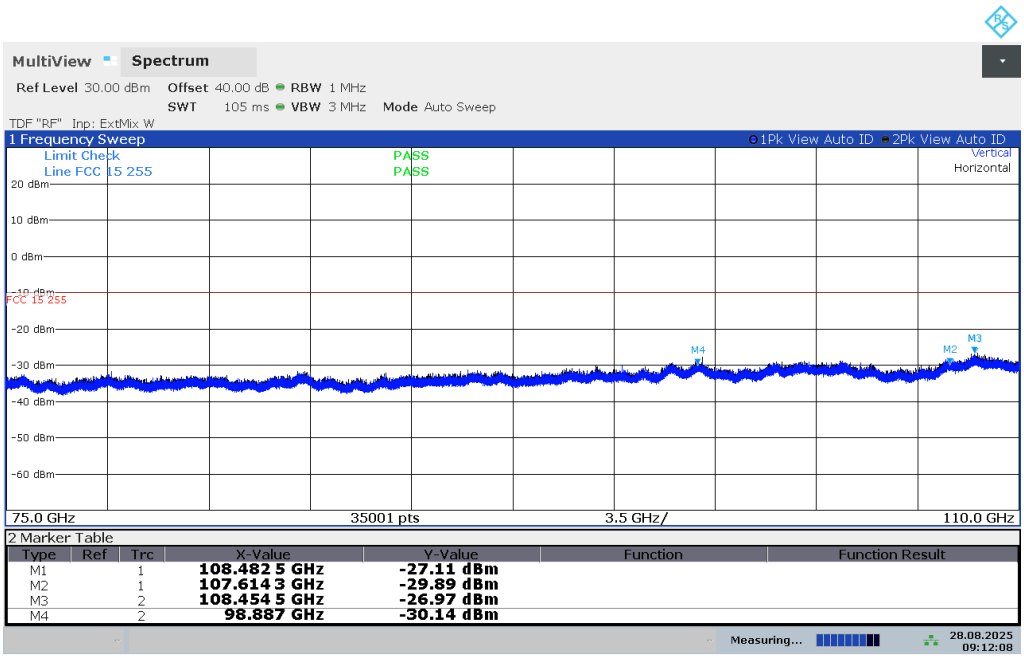
SPURIOUS EMISSIONS 75 GHz TO 110 GHz

Long Range Mode



09:18:30 28.08.2025

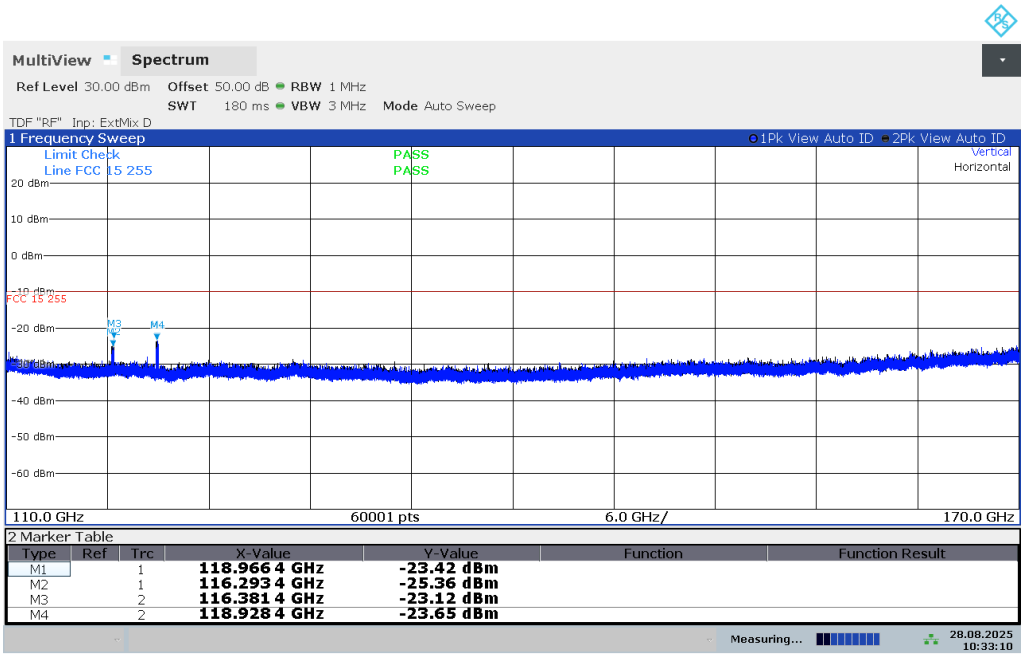
Short Range Mode



09:12:08 28.08.2025

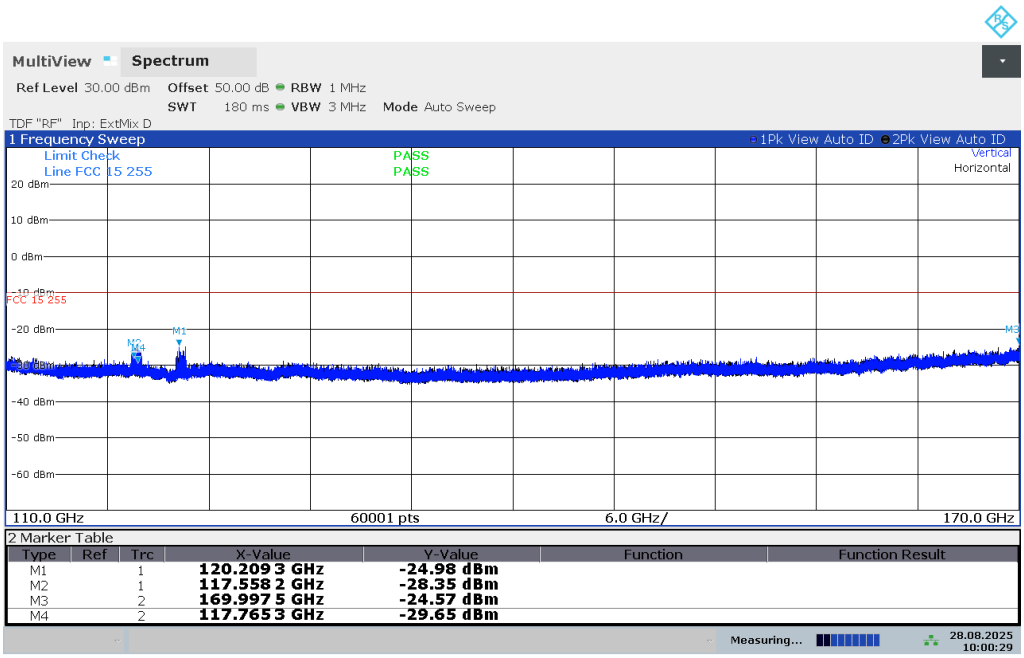
SPURIOUS EMISSIONS 110 GHz TO 170 GHz

Long Range Mode



10:33:11 28.08.2025

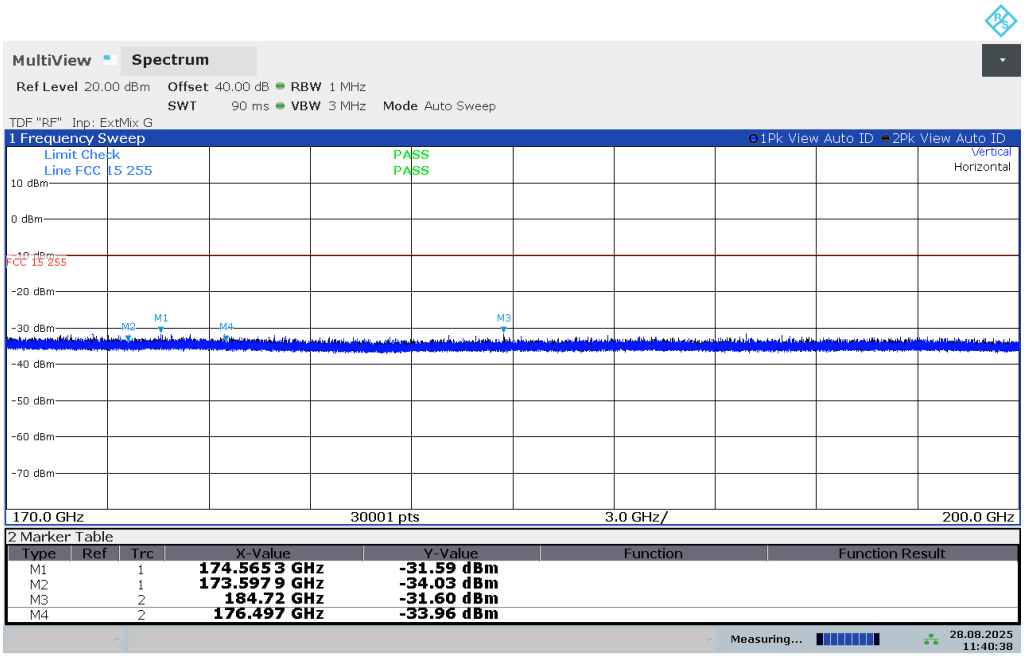
Short Range Mode



10:00:30 28.08.2025

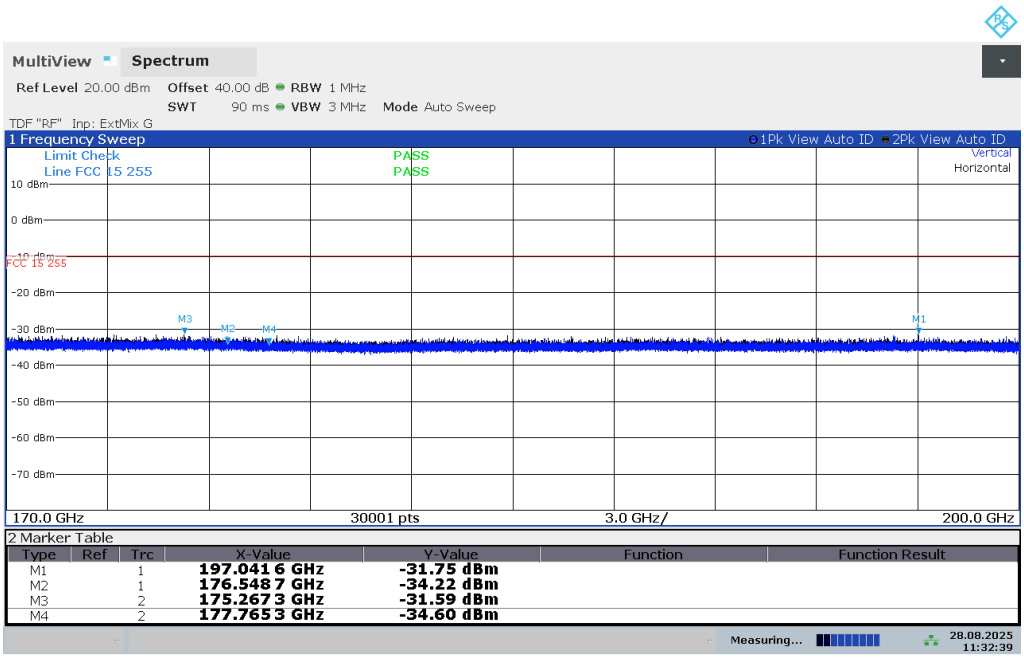
SPURIOUS EMISSIONS 170 GHz TO 200 GHz

Long Range Mode



11:40:39 28.08.2025

Short Range Mode



11:32:40 28.08.2025

9.6. RECEIVER SPURIOUS EMISSIONS

REQUIREMENT

The Rx spurious emission limits are the same as the Tx spurious emission limits. All emissions were measured with the transmitters and receivers operating simultaneously. The receiver spurious performance is documented by the transmit spurious results above.

9.7. AC MAINS LINE CONDUCTED EMISSIONS

REQUIREMENT

§15.207
RSS-GEN, Section 7.2.2

Frequency range (MHz)	Limits (dBµV)	
	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.		

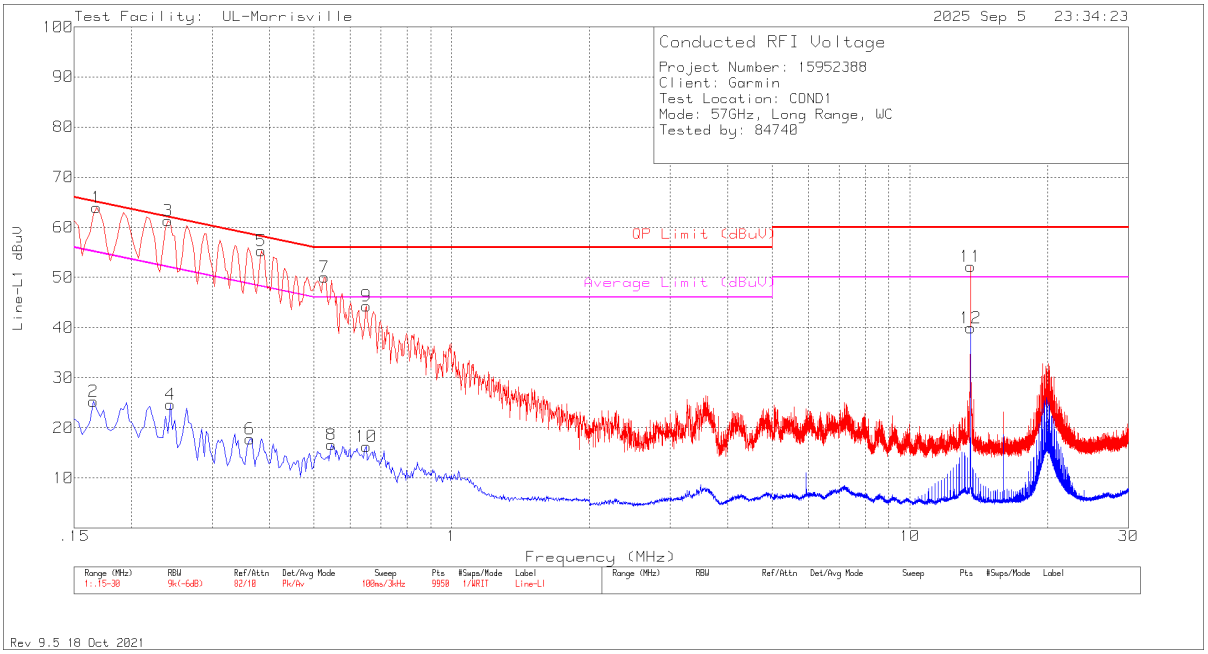
TEST PROCEDURE

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 lines.

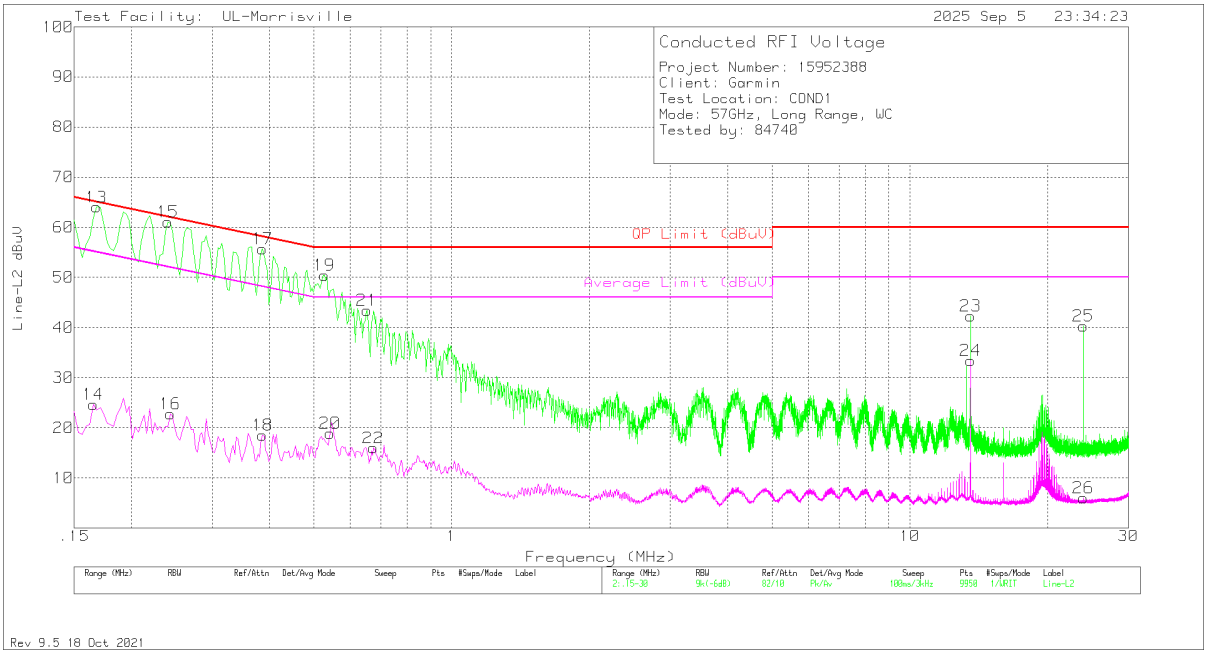
LINE 1 RESULTS – Long Frame Mode



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	.16822	47.31	Qp	.2	9.7	57.21	65.05	-7.84	-	-
2	.165	15.41	Av	.2	9.7	25.31	-	-	55.21	-29.9
3	.23996	44.17	Qp	.1	9.7	53.97	62.1	-8.13	-	-
4	.243	14.84	Av	.1	9.7	24.64	-	-	51.99	-27.35
5	.38586	38.55	Qp	0	9.7	48.25	58.15	-9.9	-	-
6	.363	8.08	Av	0	9.7	17.78	-	-	48.66	-30.88
7	.52872	33.12	Qp	0	9.7	42.82	56	-13.18	-	-
8	.546	6.89	Av	0	9.7	16.59	-	-	46	-29.41
9	.651	34.57	Pk	0	9.7	44.27	56	-11.73	-	-
10	.651	6.55	Av	0	9.7	16.25	-	-	46	-29.75
11	13.56	42.26	Pk	.1	9.8	52.16	60	-7.84	-	-
12	13.56	29.98	Av	.1	9.8	39.88	-	-	50	-10.12

Pk - Peak detector
Av - Average detection
Qp - Quasi-Peak detector

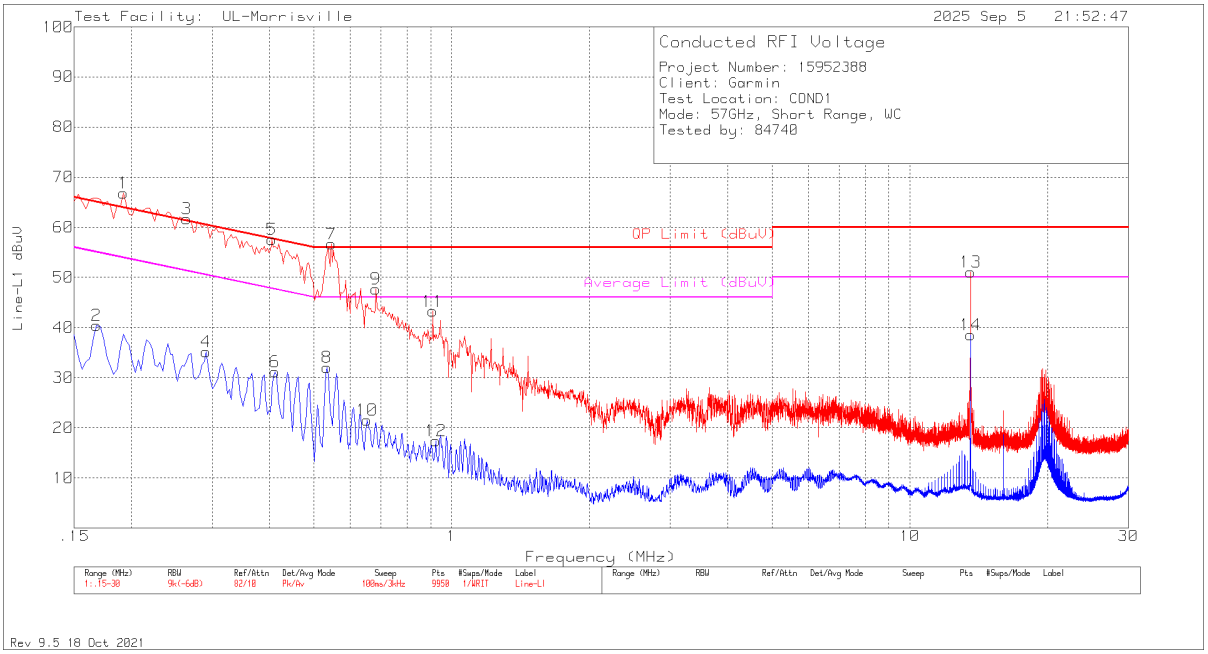
LINE 2 RESULTS – Long Frame Mode



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)
13	.16804	46.96	Qp	.2	9.7	56.86	65.06	-8.2	-	-
14	.165	14.8	Av	.2	9.7	24.7	-	-	55.21	-30.51
15	.24158	44.12	Qp	.1	9.7	53.92	62.04	-8.12	-	-
16	.243	13.02	Av	.1	9.7	22.82	-	-	51.99	-29.17
17	.38538	38.87	Qp	0	9.7	48.57	58.16	-9.59	-	-
18	.387	8.83	Av	0	9.7	18.53	-	-	48.13	-29.6
19	.53232	32.23	Qp	0	9.7	41.93	56	-14.07	-	-
20	.543	9.24	Av	0	9.7	18.94	-	-	46	-27.06
21	.654	33.72	Pk	0	9.7	43.42	56	-12.58	-	-
22	.675	6.26	Av	0	9.7	15.96	-	-	46	-30.04
23	13.563	32.38	Pk	.1	9.8	42.28	60	-17.72	-	-
24	13.563	23.5	Av	.1	9.8	33.4	-	-	50	-16.6
25	23.898	30.27	Pk	.2	9.8	40.27	60	-19.73	-	-
26	23.898	-3.95	Av	.2	9.8	6.05	-	-	50	-43.95

Pk - Peak detector
Av - Average detection
Qp - Quasi-Peak detector

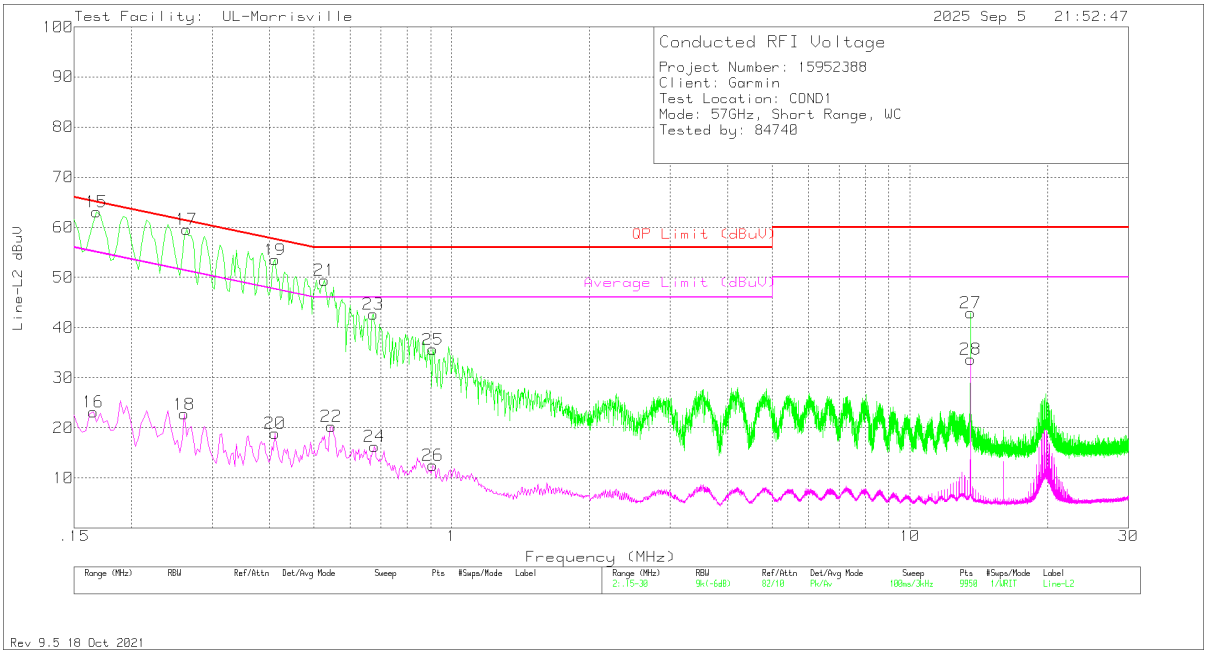
LINE 1 RESULTS – Short Frame Mode



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	.19204	46.17	Qp	.1	9.7	55.97	63.95	-7.98	-	-
2	.168	30.57	Av	.2	9.7	40.47	-	-	55.06	-14.59
3	.26512	43.38	Qp	.1	9.7	53.18	61.27	-8.09	-	-
4	.291	25.33	Av	.1	9.7	35.13	-	-	50.5	-15.37
5	.3875	38.49	Qp	0	9.7	48.19	58.12	-9.93	-	-
6	.411	21.48	Av	0	9.7	31.18	-	-	47.63	-16.45
7	.53171	32.38	Qp	0	9.7	42.08	56	-13.92	-	-
8	.534	22.36	Av	0	9.7	32.06	-	-	46	-13.94
9	.684	37.98	Pk	0	9.7	47.68	56	-8.32	-	-
10	.654	11.84	Av	0	9.7	21.54	-	-	46	-24.46
11	.909	33.54	Pk	0	9.7	43.24	56	-12.76	-	-
12	.924	7.73	Av	0	9.7	17.43	-	-	46	-28.57
13	13.56	41.12	Pk	.1	9.8	51.02	60	-8.98	-	-
14	13.563	28.66	Av	.1	9.8	38.56	-	-	50	-11.44

Pk - Peak detector
Av - Average detection
Qp - Quasi-Peak detector

LINE 2 RESULTS – Short Frame Mode



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	.1685	47.07	Qp	.2	9.7	56.97	65.03	-8.06	-	-
16	.165	13.23	Av	.2	9.7	23.13	-	-	55.21	-32.08
17	.26375	43.15	Qp	.1	9.7	52.95	61.31	-8.36	-	-
18	.261	12.91	Av	.1	9.7	22.71	-	-	51.4	-28.69
19	.40855	37.12	Qp	0	9.7	46.82	57.68	-10.86	-	-
20	.411	9.17	Av	0	9.7	18.87	-	-	47.63	-28.76
21	.528	39.77	Pk	0	9.7	49.47	56	-6.53	-	-
22	.546	10.57	Av	0	9.7	20.27	-	-	46	-25.73
23	.675	32.98	Pk	0	9.7	42.68	56	-13.32	-	-
24	.678	6.54	Av	0	9.7	16.24	-	-	46	-29.76
25	.909	25.91	Pk	0	9.7	35.61	56	-20.39	-	-
26	.909	2.8	Av	0	9.7	12.5	-	-	46	-33.5
27	13.563	33.05	Pk	.1	9.8	42.95	60	-17.05	-	-
28	13.56	23.72	Av	.1	9.8	33.62	-	-	50	-16.38

Pk - Peak detector
Av - Average detection
Qp - Quasi-Peak detector

9.8. FREQUENCY STABILITY

REQUIREMENT

FCC

§15.255 (f)

Fundamental emissions must be contained within the frequency bands specified in this section during all conditions of operation. Equipment is presumed to operate over the temperature range −20 to + 50 degrees Celsius with an input voltage variation of 85% to 115% of rated input voltage, unless justification is presented to demonstrate otherwise.

ISED

RSS-210 Clause J.6

Fundamental emissions shall be contained within the frequency bands specified in this annex during all conditions of operation when tested at the temperature and voltage variations specified for the frequency stability measurement in RSS-Gen.

TEST PROCEDURE

ANSI C63.10-2020 Clause 9.5

The radio module is placed in an environmental chamber, with power furnished by an adjustable source. The carrier frequency is counted at each condition and compared with the reference condition.

TESTED BY

Employee ID: 105900 / 11322
Test Dates: 2025-09-02
Test Location: Cond 1

RESULTS

Low Channel

Nominal Frequency:	57.546	GHz
Nominal Voltage:	5	Vdc

Temp (°C)	Voltage (V)	Lower Freq (MHz) @ 0 mins	Upper Freq (MHz) @ 0 mins	Lower Freq (MHz) @ 2 mins	Upper Freq (MHz) @ 2 mins	Lower Freq (MHz) @ 5 mins	Upper Freq (MHz) @ 5 mins	Lower Freq (MHz) @ 10 mins	Upper Freq (MHz) @ 10 mins	F_{low} Limit (GHz)	F_{high} Limit (GHz)
-20	5	57.389	57.697	57.390	57.697	57.389	57.697	57.389	57.697	57	59.4
-10	5	57.389	57.697	57.389	57.697	57.389	57.697	57.389	57.697	57	59.4
0	5	57.388	57.697	57.389	57.697	57.389	57.697	57.389	57.697	57	59.4
10	5	57.389	57.697	57.388	57.697	57.388	57.697	57.389	57.697	57	59.4
20	5	57.387	57.696	57.387	57.696	57.387	57.697	57.387	57.696	57	59.4
20	Battery Endpoint	57.387	57.697	NA	NA	NA	NA	NA	NA	57	59.4
20	Full Battery	57.389	57.695	NA	NA	NA	NA	NA	NA	57	59.4
30	5	57.386	57.697	57.386	57.697	57.386	57.697	57.386	57.697	57	59.4
40	5	57.386	57.697	57.386	57.697	57.386	57.697	57.386	57.697	57	59.4
50	5	57.385	57.696	57.385	57.696	57.385	57.696	57.386	57.696	57	59.4

High Channel

Nominal Frequency:	58.854	GHz
Nominal Voltage:	5	Vdc

Temp (°C)	Voltage (V)	Lower Freq (MHz) @ 0 mins	Upper Freq (MHz) @ 0 mins	Lower Freq (MHz) @ 2 mins	Upper Freq (MHz) @ 2 mins	Lower Freq (MHz) @ 5 mins	Upper Freq (MHz) @ 5 mins	Lower Freq (MHz) @ 10 mins	Upper Freq (MHz) @ 10 mins	F_{low} Limit (GHz)	F_{high} Limit (GHz)
-20	5	58.695	59.006	58.695	59.006	58.695	59.006	58.695	59.006	57	59.4
-10	5	58.696	59.005	58.696	59.006	58.696	59.006	58.696	59.006	57	59.4
0	5	58.696	59.006	58.696	59.005	58.696	59.005	58.696	59.005	57	59.4
10	5	58.697	59.005	58.697	59.005	58.697	59.005	58.697	59.005	57	59.4
20	5	58.697	59.005	58.697	59.005	58.697	59.005	58.697	59.005	57	59.4
20	Battery Endpoint	58.697	59.005	NA	NA	NA	NA	NA	NA	57	59.4
20	Full Battery	58.699	59.003	NA	NA	NA	NA	NA	NA	57	59.4
30	5	58.697	59.005	58.697	59.005	58.697	59.005	58.697	59.005	57	59.4
40	5	58.697	59.005	58.697	59.005	58.697	59.005	58.697	59.005	57	59.4
50	5	58.697	59.005	58.697	59.004	58.697	59.005	58.697	59.005	57	59.4

9.9. GROUP INSTALLATION

REQUIREMENT

FCC

§15.255 (h)

Any transmitter that has received the necessary FCC equipment authorization under the rules of this chapter may be mounted in a group installation for simultaneous operation with one or more other transmitter(s) that have received the necessary FCC equipment authorization, without any additional equipment authorization. However, no transmitter operating under the provisions of this section may be equipped with external phase-locking inputs that permit beam-forming arrays to be realized.

ISED

RSS-210 Clause J.7

Any transmitter that is certified under this annex may be mounted in a group installation for simultaneous operation with one or more certified transmitters, without any additional equipment authorization. However, no transmitter operating under the provisions of this annex shall be equipped with external phase-locking inputs that permit beam-forming arrays to be realized.

RESULTS

The EUT does not have any external phase locking inputs for beam forming.

10. SETUP PHOTOS

Please refer to report R15952388-EP1 for setup photos.

END OF TEST REPORT