GARMIN
Garmin International, Inc.
1200 East 151st Street
Olathe, Kansas 66062
P: 913-397-8200 F: 913-397-8282

16-Feb-26

Manufacturer: Garmin International, Inc.
Address: 1200 E. 151st St.
Olathe, KS 66062-3426
U.S.A.
Chile Representative: Matías Rodríguez Correa
Rosario Norte 660 piso 24, Las Condes Santiago
Province CP 7550083, Chile
Contact Email: matias.rodriguez@garmin.com

Subject: SUBTEL, Chile (Resolution 737) Certification Compliance 2026

Commercial Name: Xero C2

	Información (Information)
Tipo de equipo (Equipment type)	Portable Digital Transceiver
Marca (Brand)	Garmin GARMIN.
Modelo (Model)	A05125
Tecnología o modulación (Technology or modulation)	BLE (GMSK), Radar
Frecuencias (Frequencies)	BLE (2402MHz- 2480MHz), Radar (24078MHz – 24172MHz)
Ganancia de antena (dBi) (Antenna gain (dBi)	BLE PIFA (3.33 dBi), Radar Patch Array (N/A)
P.i.r.e. (E.I R P.)	BLE (6.45dBm, 4.41mW), Radar (6.71dBm, 4.68mW)
Módulos (Modules)	BLE, Radar 24GHz

Declaration of Conformity Statement: the equipment previously identified complies with the provisions established in the Technical Standard for Small Range Equipment, approved by Exempt Resolution No.1,985 of 2017, of the Undersecretary of Telecommunications.

Declaración de conformidad: El equipo anteriormente identificado cumple con las disposiciones establecidas en la Norma Técnica para Equipos de Corto Alcance, aprobada mediante la Resolución Exenta N° 1.985 de 2017, de la Subsecretaría de Telecomunicaciones.

TEST REPORT

APPLICANT
Garmin International, Inc.

MODEL NAME
A05125

FCC ID
IPH-05125

ISED ID
1792A-05125

REPORT NUMBER
HA2511-0267-R01-01

TEST REPORT

Date of Issue
December 08, 2025

Test Site
HCT America, Inc.
840 Yosemite Way, Milpitas, CA 95035, USA

Applicant	Garmin International, Inc.
Applicant Address	1200 East 151st Street, Olathe, KS 66062, USA
FCC ID	IPH-05125
ISED ID	1792A-05125
Model Name	A05125
EUT Type	Low-Power transmitter
Modulation Type	GFSK
FCC Classification	Digital Transmission System (DTS)
FCC Rule Part(s)	47 CFR FCC PART C § 15.247/15.205/15.207/15.209
ISED Rule Part(s)	RSS-247 ISSUE 4 RSS-GEN ISSUE 5 Amd 2
Test Procedure	ANSI C63.10-2020, KDB 558074 D01 v05r02

The device bearing the trade name and model specified above, has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures required. The results of testing in this report apply only to the product which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

HCT America, Inc. certifies that no party to application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C 862

Tested By

Kevin Kim

Test Engineer

Reviewed By

Dan Coronia

Technical Manager

REVISION HISTORY

The revision history for this document is shown in table.

TEST REPORT NO.	REVISION	DATE	DESCRIPTION
HA2511-0267-R01	0	December 04, 2025	Initial Issue
HA2511-0267-R01-01	1	December 08, 2025	Updated Section 4: Facilities and Accreditations

TABLE OF CONTENTS

1. GENERAL INFORMATION

EUT DESCRIPTION

Model	A05125
Product Name	A05125
Serial Number	Conducted: 18130908 Radiated: 18089177
Power Supply	USB 5 VDC or Internal battery 3.4-4.2 VDC
RF Specification	Bluetooth 5.4 LE (1M/2M), 24 GHz Radar
Transmitter Chain	1

RF SPECIFICATION SUBJECT TO THE REPORT

RF Specification	Bluetooth v5.2 LE (1/2 Mbps)
Transmitter Chain	1
Frequency Range	2 402 MHz – 2 480 MHz
Max. RF Conducted Power	Peak : 3.126 dBm (2.053 mW)
Modulation Type	GFSK
Number of Channels	40 Channels
Antenna Specification [1)]	Antenna Type: Inverted-F Peak Gain: 3.33 dBi
Firmware Version [2)]	2.09
Hardware Version [2)]	A05125
Sample Receipt Date	November 10 & 13, 2025
Date(s) of Tests	November 12, 2025, ~ November 18, 2025

Note(s):
1. Antenna information is based on the document provided.
2. Firmware and Hardware Versions are provided by the client.

OPERATING FREQUENCY CHANNELS

Bluetooth LE (1M)					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2 402	14	2 430	28	2 458
1	2 404	15	2 432	29	2 460
2	2 406	16	2 434	30	2 462
3	2 408	17	2 436	31	2 464
4	2 410	18	2 438	32	2 466
5	2 412	19	2 440	33	2 468
6	2 414	20	2 442	34	2 470
7	2 416	21	2 444	35	2 472
8	2 418	22	2 446	36	2 474
9	2 420	23	2 448	37	2 476
10	2 422	24	2 450	38	2 478
11	2 424	25	2 452	39	2 480
12	2 426	26	2 454	-	-
13	2 428	27	2 456	-	-

Bluetooth LE (2M)					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2 404	15	2 432	29	2 460
2	2 406	16	2 434	30	2 462
3	2 408	17	2 436	31	2 464
4	2 410	18	2 438	32	2 466
5	2 412	19	2 440	33	2 468
6	2 414	20	2 442	34	2 470
7	2 416	21	2 444	35	2 472
8	2 418	22	2 446	36	2 474
9	2 420	23	2 448	37	2 476
10	2 422	24	2 450	38	2 478
11	2 424	25	2 452	-	-
12	2 426	26	2 454	-	-
13	2 428	27	2 456	-	-
14	2 430	28	2 458	-	-

2. METHODOLOGY

FCC KDB 558074 D01 DTS Measurement Guidance v05r02 dated April 2nd, 2019 entitled "Guidance for Performing Compliance Measurements on Digital Transmission Systems, Frequency Hopping Spread Spectrum System, and Hybrid System Devices Operating Under Section 15.247 of the FCC Rules" and the measurement procedures described in ANSI C63.10(Version : 2020) 'the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices'.

EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rule Part 15 Subpart C and the Section 2.1091 under the FCC Rule Part 2 / the RSS-GEN issue 5 amd 2, RSS-247 issue 4.

GENERAL TEST PROCEDURES

Conducted Emissions
The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2 of ANSI C63.10. (Version :2020) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions
The EUT is placed on a turn table, which is 0.8 m above ground plane below 1GHz. Above 1GHz with 1.5m using absorbers between the EUT and receive antenna. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. Also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emission, the relative positions of this hand-held transmitter (EUT) were rotated through three orthogonal axes according to the requirements in Section 8 of ANSI C63.10. (Version: 2020)

Conducted Antenna Terminal
KDB 558074 D01 v05r02

DESCRIPTION OF TEST MODES

The EUT has been tested at BLE test mode. The EUT's test mode was used to control the channels, power setting, continuous TX and normal RX mode. The EUT is equipped with Bluetooth LE with the data rate 1 Mbps/2 Mbps.

3. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment's, which is traceable to recognized national standards. Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version: 2017).

HCT America, Inc. holds A2LA accreditation (certificate no. 4201.01) covering all testing included in the scope of this report. All tests were conducted at the facilities listed below.

4. FACILITIES AND ACCREDITATIONS

FACILITIES

HCT America, Inc. holds A2LA accreditation (certificate no. 4201.01) covering all testing included in the scope of this report. All tests were conducted at the facilities listed below.

	Address	ISED CABID	ISED Company Number	FCC Registration
☒	840 Yosemite Way, Milpitas, CA 95035 USA	US0189	11081A	898494
☐	1177 Comstock Road, Hollister, CA 95023 USA	US0189	11081A	898494

Accredited Laboratory

A2LA has accredited

HCT AMERICA, INC.

Milpitas, CA

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This laboratory also meets the A2LA – R256 – Specific Requirements. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system *(refer to joint ISO-ILAC-IAF Communiqué dated April 2017)*.

Presented this 22nd day of September 2025.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 4201.01
Valid to July 31, 2027

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

5. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203:
"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section."

(1) The antenna of this E.U.T is permanently attached and there is no provision for connection to an external antenna.
(2) The E.U.T Complies with the requirement of §15.203

According to RSS-Gen Issue 5 Amd 2 (Section 6.8) :
The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below).

When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer.

The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.

6. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2020.

All measurement uncertainty values are shown with a coverage factor of $k = 2$ to indicate a 95 % level of confidence. The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty
Output Power, Conducted	± 0.54 dB
Occupied Bandwidth	± 120.66 kHz
Unwanted Emissions, Conducted	± 0.54 dB
Radiated Emissions (below 1 GHz)	± 5.29 dB
Radiated Emissions (Above 1 GHz)	± 4.29 dB

7. DESCRIPTION OF TESTS

7.1. DUTY CYCLE

TEST SETUP

TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer.
Zero-span measurement method was used, 6 (b) in KDB 558074 D01 v05r02.

The largest available value of RBW is 8 MHz and VBW is 50 MHz.
The zero-span method of measuring duty cycle shall not be used if T ≤ 6.25 microseconds. (50/6.25 = 8)
The zero-span method was used because all measured T data are > 6.25 microseconds and both RBW and VBW are > 50/*T*.

- RBW = 8 MHz (the largest available value)
- VBW = 8 MHz (≥ RBW)
- SPAN = 0 Hz
- Detector = Peak
- Number of points in sweep > 100
- Trace mode = Clear write
- Measure T_{total} and T_{on}
- Calculate Duty Cycle = T_{on}/ T_{total} and Duty Cycle Factor = 10*log(1/Duty Cycle)

7.2. 6 dB BANDWIDTH / 99 % OCCUPIED BANDWIDTH

LIMIT

§15.247(a)(2) / RSS-247(Issue 4) Section 6.3.1(a)
The bandwidth at 6 dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the receive antenna while the EUT is operating in transmission mode at the appropriate frequencies.

The minimum permissible 6 dB bandwidth is 500 kHz.

TEST SETUP

TEST PROCEDURE (6 dB BANDWIDTH)

Section 8.2 in KDB 558074 D01 v05r02, Subclause 11.8 in ANSI 63.10-2020

The transmitter output is connected to the Spectrum Analyzer.
The Spectrum Analyzer setting :

- RBW = 100 kHz
- VBW ≥ 3 x RBW
- Detector = Peak
- Trace mode = max hold
- Sweep = auto couple
- Allow the trace to stabilize
- Use X dB bandwidth measurement function from the spectrum analyzer by setting X dB to 6 dB

TEST PROCEDURE (99% Bandwidth) for ISED

The transmitter output is connected to the spectrum analyzer.

- RBW = 1% ~ 5% of the occupied bandwidth
- VBW ≒ 3 x RBW
- Detector = Peak
- Trace mode = max hold
- Sweep = auto couple
- Allow the trace to stabilize

Note(s) :
We tested OBW using the automatic bandwidth measurement capability of a spectrum analyzer.

7.3. OUTPUT POWER

LIMIT

§15.247(b)(3)
The maximum permissible conducted output power is 1 Watt.

RSS-247(Issue 4) Section 6.3.2
For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1 W. The e.i.r.p. shall not exceed 4 W.

TEST SETUP

TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer.
TX condition of the EUT is the actual operating mode by RF test program.
The Spectrum Analyzer setting :

Peak Power (Section 8.3.1.1 in KDB 558074 D01 v05r02, Subclause 11.9.1.1 in ANSI 63.10-2020)
- RBW ≥ DTS Bandwidth
- VBW ≥ 3 x RBW
- SPAN ≥ 3 x RBW
- Detector Mode = Peak
- Sweep = auto couple
- Trace Mode = max hold
- Allow trace to fully stabilize.
- Use peak marker function to determine the peak amplitude level

Average Power (Section 8.3.2.2 in KDB 558074 D01 v05r02, Subclause 11.9.2.2 in ANSI 63.10-2020)
We use the spectrum analyzer's integrated band power measurement function.
- Measure the duty cycle.
- Set span to at least 1.5 times the OBW.
- RBW = 1-5 % of the OBW, not to exceed 1 MHz
- VBW ≥ 3 x RBW
- Number of points in sweep ≥ 2 x span / RBW. (This gives bin-to-bin spacing ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)
- Sweep time = auto.
- Detector = RMS (i.e., power averaging)
- Do not use sweep triggering. Allow the sweep to "free run".
- Trace average at least 100 traces in power averaging (RMS) mode.
- Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function with band limits set equal to the OBW band edges.
- Add 10 log (1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times.

Sample Calculation
- Conducted Output Power (Peak) = Reading Value + ATT loss + Cable loss
- Conducted Output Power (Average) = Reading Value + ATT loss + Cable loss + Duty Cycle Factor

7.4. POWER SPECTRAL DENSITY

LIMIT

§15.247(e) / RSS-247(Issue 4) Section 6.3.1(b)
The transmitter power density average over 1-second interval shall not be greater than 8dBm in any 3kHz BW.

TEST SETUP

TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer.
We tested according to Procedure 8.4 in KDB 558074 D01 v05r02, Procedure 11.10 in ANSI 63.10-2020.

The spectrum analyzer is set to:

- Set analyzer center frequency to DTS channel center frequency.
- Set span to at least 1.5 times the OBW.
- RBW = 3 kHz ≤ RBW ≤ 100 kHz.
- VBW ≥ 3 x RBW.
- Sweep = auto couple
- Detector = power averaging (rms) or sample detector (when rms not available).
- Ensure that the number of measurement points in the sweep ≥ [2 ×span / RBW].
- Employ trace averaging (rms) mode over a minimum of 100 traces
- Use the peak marker function to determine the maximum amplitude level.
- Use the peak marker function to determine the maximum amplitude level within the RBW. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.
- if then duty factor shall be added to adjust the result if the duty cycle is less than 98%

7.5. CONDUCTED BAND EDGE (OUT OF BAND EMISSIONS) / CONDUCTED SPURIOUS EMISSIONS

LIMIT

§15.247(d) / RSS-247(Issue 4) Section 6.6

The maximum conducted (peak) output power was used to demonstrate compliance, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz.
[Conducted > 20 dBc]

TEST SETUP

TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer.
(Procedure 8.5 in KDB 558074 D01 v05r02, Procedure 11.11 in ANSI 63.10-2020)

- RBW = 100 kHz
- VBW ≥ 3 x RBW
- Set span to encompass the spectrum to be examined.
- Detector = Peak
- Trace Mode = max hold
- Sweep time = auto couple
- Ensure that the number of measurement points ≥ 2*Span/RBW
- Allow trace to fully stabilize.
- Use peak marker function to determine the maximum amplitude level.

Measurements are made over the 30 MHz to 25 GHz range with the transmitter set to the lowest, middle, and highest channels.

7.6. RADIATED EMISSIONS

RADIATION EMISSION LIMIT

FCC: 47 CFR § 15.209		
Frequency (MHz)	**Field Strength (uV/m)**	**Measurement Distance (m)**
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

ISED : RSS-GEN Section 8.9		
Frequency (MHz)	**Field Strength (uV/m)**	**Measurement Distance (m)**
0.009 – 0.490	6.37/F(kHz)	300
0.490 – 1.705	63.7/F(kHz)	30
1.705 – 30	0.08	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

RECEIVER RADIATED EMISSION LIMIT

ISED : RSS-GEN Section 7.3		
Frequency (MHz)	**Field Strength (uV/m)**	**Measurement Distance (m)**
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

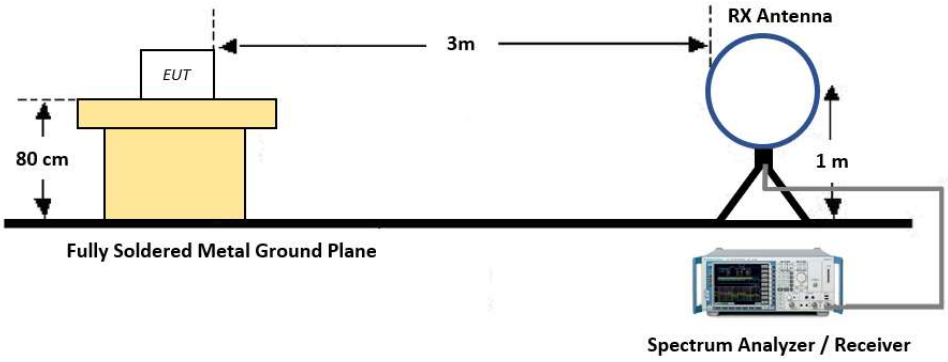
RESTRICTED BANDS OF OPERATION

FCC: 47 CFR § 15.205(a)				
Frequency (MHz)	**Frequency (MHz)**	**Frequency (MHz)**	**Frequency (MHz)**	**Frequency (MHz)**
0.090 – 0.110	12.29 - 12.293	149.9 - 150.05	1660.0 - 1710.0	8025 - 8500
0.495 - 0.505	12.51975 - 12.52025	156.52475 - 156.52525	1718.8 - 1722.2	9000 - 9200
2.1735 - 2.1905	12.57675 - 12.57725	156.7 - 156.9	2200.0 - 2300.0	9300 - 9500
4.125 - 4.128	13.36 - 13.41	162.0125 - 167.17	2310.0 - 2390.0	10600 - 12700
4.17725 - 4.17775	16.42 - 16.423	167.72 - 173.2	2483.5 - 2500.0	13250 - 13400
4.20725 - 4.20775	16.69475 - 16.69525	240.0 - 285.0	2690.0 - 2900.0	14470 - 14500
6.215 - 6.218	16.80425 - 16.80475	322.0 - 335.4	3260.0 - 3267.0	15350 - 16200
6.26775 - 6.26825	25.5 - 25.67	399.9 - 410.0	3332.0 - 3339.0	17700 - 21400
6.31175 - 6.31225	37.5 - 38.25	608.0 - 614.0	3345.8 - 3358.0	22010 - 23120
8.291 - 8.294	73 - 74.6	960.0 - 1240.0	3600.0 - 4400.0	23600 - 24000
8.362 - 8.366	74.8 - 75.2	1300.0 - 1427.0	4500.0 - 5150.0	31200 - 31800
8.37625 - 8.38675	108 - 121.94	1435.0 - 1626.5	5350.0 - 5460.0	36430 - 36500
8.41425 - 8.41475	123 - 138	1645.5 - 1646.5	7250.0 - 7750.0	Above 38600

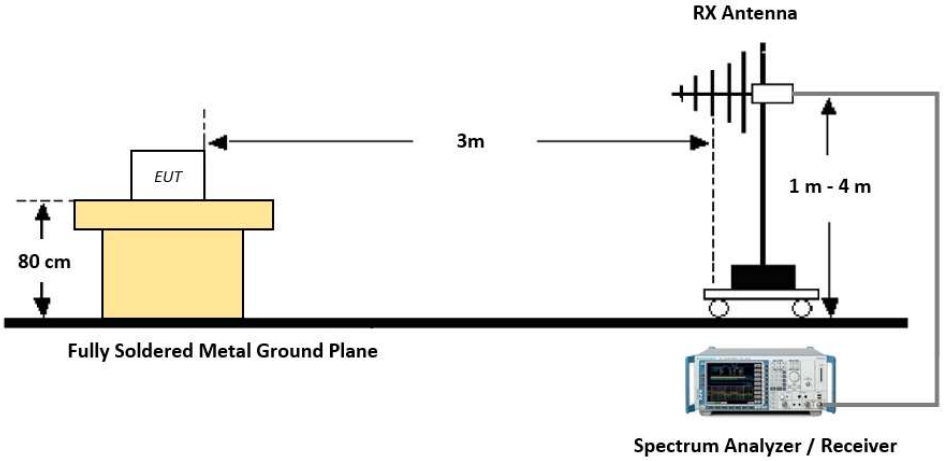
ISED: RSS-GEN Section 8.10				
Frequency (MHz)	**Frequency (MHz)**	**Frequency (MHz)**	**Frequency (MHz)**	**Frequency (MHz)**
0.090 - 0.110	8.37625 - 8.38675	108 – 138	1660 - 1710	8025 - 8500
0.495 - 0.505	8.41425 - 8.41475	149.9 - 150.05	1718.8 - 1722.2	9000 - 9200
2.1735 - 2.1905	12.29 - 12.293	156.52475 - 156.52525	2200 - 2300	9300 - 9500
3.020 - 3.026	12.51975 - 12.52025	156.7 - 156.9	2310 - 2390	10600 - 12700
4.125 - 4.128	12.57675 - 12.57725	162.0125 - 167.17	2483.5 - 2500	13250 - 13400
4.17725 - 4.17775	13.36 - 13.41	167.72 - 173.2	2655 - 2900	14470 - 14500
4.20725 - 4.20775	16.42 - 16.423	240 - 285	3260 - 3267	15350 - 16200
5.677 - 5.683	16.69475 - 16.69525	322 - 335.4	3332 - 3339	17700 - 21400
6.215 - 6.218	16.80425 - 16.80475	399.9 - 410	3345.8 - 3358	22010 - 23120
6.26775 - 6.26825	25.5 - 25.67	608 - 614	3500 - 4400	23600 - 24000
6.31175 - 6.31225	37.5 - 38.25	960 - 1427	4500 - 5150	31200 - 31800
8.291 - 8.294	73 - 74.6	1435 - 1626.5	5350 - 5460	36430 - 36500
8.362 - 8.366	74.8 - 75.2	1645.5 - 1646.5	7250 - 7750	Above 38600

TEST SETUP

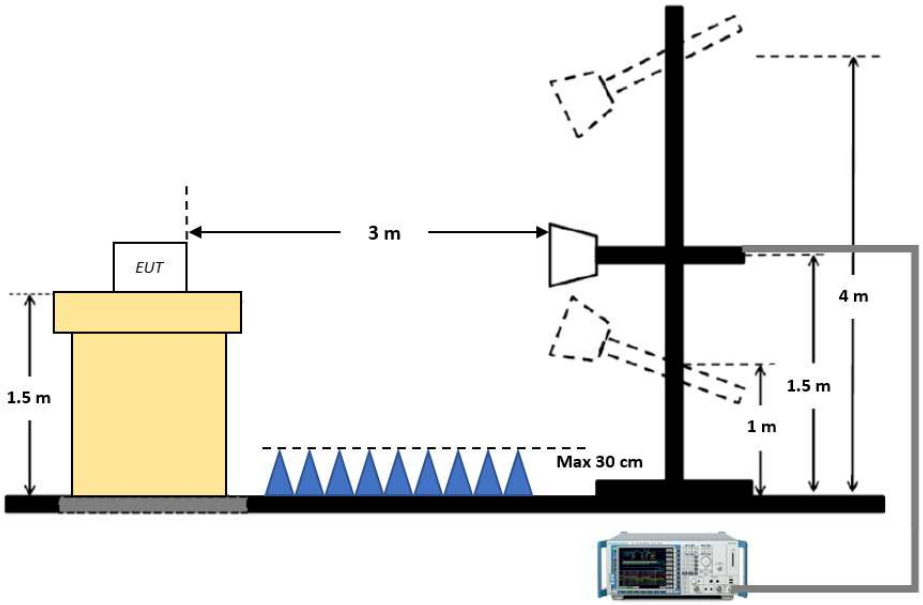
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



TEST PROCEDURE OF RADIATED SPURIOUS EMISSION (BELOW 30 MHz)

Section 8.5 and 8.6 in KDB 558074 D01 v05r02, Subclause 11.11 and 11.12 in ANSI 63.10-2020

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The loop antenna was placed at a location 3m from the EUT
3. The EUT is placed on a turntable, which is 0.8m above ground plane.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Distance Correction Factor (0.009 MHz – 0.490 MHz) = 40*log (3 m/300 m) = - 80 dB
   Measurement Distance: 3 m
7. Distance Correction Factor (0.490 MHz – 30 MHz) = 40*log (3 m/30 m) = - 40 dB
   Measurement Distance: 3 m
8. Spectrum Setting

   - Frequency Range = 9 kHz ~ 30 MHz
   - Detector = Peak
   - Trace = Max hold
   - RBW = 9 kHz
   - VBW ≥ 3*RBW

9. Total = Reading Value + Antenna Factor (A.F) + Cable Loss (C.L)
10. There is a comparison data both open-field test site and alternative test site – semi-Anechoic chamber according to 414788 D01. And the results are properly calibrated.

TEST PROCEDURE OF RADIATED SPURIOUS EMISSION (30 MHz – 1 GHz)

Section 8.5 and 8.6 in KDB 558074 D01 v05r02, Subclause 11.11 and 11.12 in ANSI 63.10-2020

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The EUT is placed on a turntable, which is 0.8 m above ground plane.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
5. Spectrum Setting

   (1) Measurement Type (Peak):
   - Measured Frequency Range: 30 MHz – 1 GHz
   - Detector = Peak
   - Trace = Max hold
   - RBW = 100 kHz
   - VBW ≥ 3*RBW

   (2) Measurement Type(Quasi-peak):
   - Measured Frequency Range: 30 MHz – 1 GHz
   - Detector = Quasi-Peak
   - RBW = 120 kHz

6. Total = Reading Value + Antenna Factor (A.F) + Cable Loss (C.L)

TEST PROCEDURE OF RADIATED SPURIOUS EMISSION (ABOVE 1 GHz)

Section 8.5 and 8.6 in KDB 558074 D01 v05r02, Subclause 11.11 and 11.12 in ANSI 63.10-2020

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. The unit was tested with its standard battery.
8. Spectrum Setting

(1) Measurement Type (Peak):
- Measured Frequency Range: 1 GHz – 25 GHz
- Detector = Peak
- Trace = Max hold
- RBW = 1 MHz
- VBW ≥ 3*RBW

(2) Measurement Type(Average): Duty cycle ≥ 98%
- Measured Frequency Range: 1 GHz – 25 GHz
- Detector = RMS
- Averaging type = power (*i.e.*, RMS)
- RBW = 1 MHz
- VBW ≥ 3*RBW
- Sweep time = auto.
- Trace mode = average (at least 100 traces).

(3) Measurement Type(Average): Duty cycle <98%, duty cycle variations are less than ±2%
- Measured Frequency Range: 1 GHz – 25 GHz
- Detector = RMS
- Averaging type = power (*i.e.*, RMS)
- RBW = 1 MHz
- VBW ≥ 3*RBW
- Sweep time = auto.
- Trace mode = average (at least 100 traces).
- Correction factor shall be added to the measurement results prior to comparing to the emission limit to compute the emission level that would have been measured had the test been performed at 100 % duty cycle.
- Duty Cycle Factor (dB): Please refer to the please refer to section 9.1.

10. Measurement value only up to 6 maximum emissions noted or would be lesser if no specific emissions from the EUT are recorded (i.e.: margin > 20 dB from the applicable limit) and considered that is already beyond the background noise floor.

11. Sample Calculation

(1) Total (Peak) = Reading Value + Antenna Factor (A.F) + Cable Loss (C.L) - Amp Gain(G)
(2) Total (Average, Duty ≥ 98%) = Reading Value + Antenna Factor (A.F) + Cable Loss (C.L) - Amp Gain(G)
(3) Total (Average, Duty < 98%) = Reading Value + Antenna Factor (A.F) + Cable Loss (C.L) - Amp Gain(G) + Duty Cycle Factor
(4) Alternative Method: Total (Average) = Total (Peak) + 20 log(Duty Cycle)

TEST PROCEDURE OF RADIATED RESTRICTED BAND EDGE

Section 8.5 and 8.6 in KDB 558074 D01 v05r02, Subclause 11.11 and 11.12 in ANSI 63.10-2020

1. Radiated test is performed with hopping off (if there is any)
2. The EUT is placed on a turntable, which is 1.5 m above ground plane.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
5. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. The unit was tested with its standard battery.
8. Spectrum Setting

(1) Measurement Type (Peak):
- Detector = Peak
- Trace = Max hold
- RBW = 1 MHz
- VBW ≥ 3*RBW

(2) Measurement Type(Average): Duty cycle ≥ 98%,
- Measured Frequency Range: 2310 MHz – 2390 MHz / 2483.5 MHz – 2500 MHz
- Detector = RMS
- Averaging type = power (*i.e.*, RMS)
- RBW = 1 MHz
- VBW ≥ 3*RBW
- Sweep time = auto.
- Trace mode = average (at least 100 traces).

(3) Measurement Type(Average): Duty cycle <98%, duty cycle variations are less than ±2%
- Measured Frequency Range: 2310 MHz – 2390 MHz / 2483.5 MHz – 2500 MHz
- Detector = RMS
- Averaging type = power (*i.e.*, RMS)
- RBW = 1 MHz
- VBW ≥ 3*RBW
- Sweep time = auto.
- Trace mode = average (at least 100 traces).
- Correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 % duty cycle.
- Duty Cycle Factor (dB): Please refer to the please refer to section 9.1.

9. Measurement value only up to 6 maximum emissions noted or would be lesser if no specific emissions from the EUT are recorded (i.e.: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

10. Sample Calculation

(1) Total (Peak) = Reading Value + Antenna Factor (A.F) + Cable Loss (C.L)
(2) Total (Average, Duty ≥ 98%) = Reading Value + Antenna Factor (A.F) + Cable Loss (C.L) - Amp Gain(G)
(3) Total (Average, Duty < 98%) = Reading Value + Antenna Factor (A.F) + Cable Loss (C.L) - Amp Gain(G) + Duty Cycle Factor

7.7. AC POWER LINE CONDUCTED EMISSIONS

LIMIT

47 CFR § 15.207, RSS-GEN Section 8.8
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 µH/50 ohms line impedance stabilization network (LISN).

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

*Decreases with the logarithm of the frequency.

Compliance with this provision shall be based on the measurement of the radio frequency.
voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

TEST SETUP

See test photographs attached in Annex A for the actual connections between EUT and support equipment.

TEST PROCEDURE

1. The EUT is placed on a wooden table 80 cm above the reference ground plane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detectors: Quasi Peak and Average Detector.

According to FCC KDB 174176 D01 Line Conducted FAQ v01r01:

Devices Operating Above 30 MHz

For a device with a permanent or detachable antenna operating above 30 MHz, measurements must be performed with the antenna connected as specified in clause 6.2 of ANSI C63.10-2020.

Devices Operating Below 30 MHz

For a device with a permanent or detachable antenna operating at or below 30 MHz, the FCC will accept measurements performed with a suitable dummy load in lieu of the antenna under the following conditions:
(1) Perform the AC power-line conducted tests with the antenna connected to determine compliance with Section 15.207 limits outside the transmitter's fundamental emission band.
(2) Retest with a dummy load in lieu of the antenna to determine compliance with Section 15.207 limits within the transmitter's fundamental emission band. For a detachable antenna, remove the antenna and connect a suitable dummy load to the antenna connector. For a permanent antenna, remove the antenna and terminate the RF output with a dummy load or network which simulates the antenna in the fundamental frequency band. All measurements must be performed as specified in clause 6.2 of ANSI C63.10-2020.

Sample Calculation

Quasi-peak (Final Result) = Reading Value + Correction Factor

8. SUMMARY OF TEST RESULTS

Test Description	FCC Part Section(s)	ISED Part Section(s)	Test Limit	Test Condition	Test Result
6 dB Bandwidth	§15.247(a)(2)	RSS-247, 6.3.1(a)	≥ 500 kHz	Conducted	PASS
Occupied Bandwidth	-	RSS-GEN, 6.7	-		PASS
Conducted Maximum Peak Output Power	§15.247(b)(3)	RSS-247, 6.3.2	≤ 1 W		PASS
Maximum e.i.r.p.	-	RSS-247, 6.3.2	≤ 4 W e.i.r.p.		PASS
Power Spectral Density	§15.247(e)	RSS-247, 6.3.1(b)	≤ 8 dBm / 3 kHz		PASS
Band Edge (Out of Band missions)	§15.247(d)	RSS-247, 6.6	≥ 20 dBc		PASS
AC Power line Conducted Emissions	§15.207	RSS-GEN, 8.8	cf. Section 7.7		PASS
Radiated Spurious Emissions	§15.247(d) §15.209	RSS-GEN, 8.9	cf. Section 7.6	Radiated	PASS
Radiated Restricted Band Edge	§15.247(d) §15.205(a)	RSS-GEN, 8.10	cf. Section 7.6		PASS
Receiver Spurious Emissions	-	RSS-GEN, 7.3	cf. Section 7.6		PASS

Note:

WORST CASE CONFIGURATION

RADIATED TEST

1. EUT Axis

All X, Y, and Z positions for horizontal / vertical antenna polarization were investigated to find the worst-case position.
X position was selected for the final evaluation.

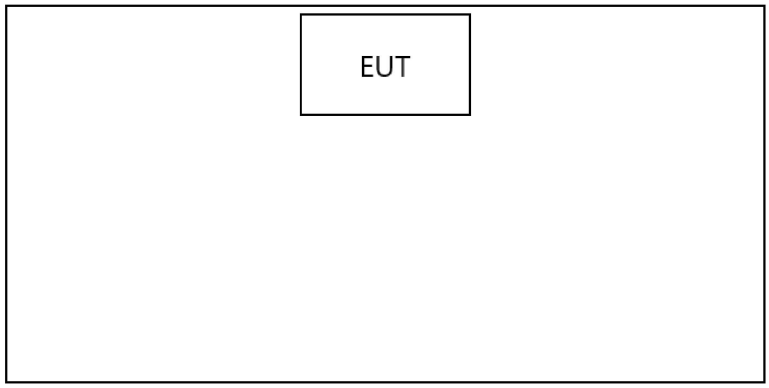
2. Co-location test
co-location test results reported in HA2511-0267-R01.

OUTPUT POWER SETTING

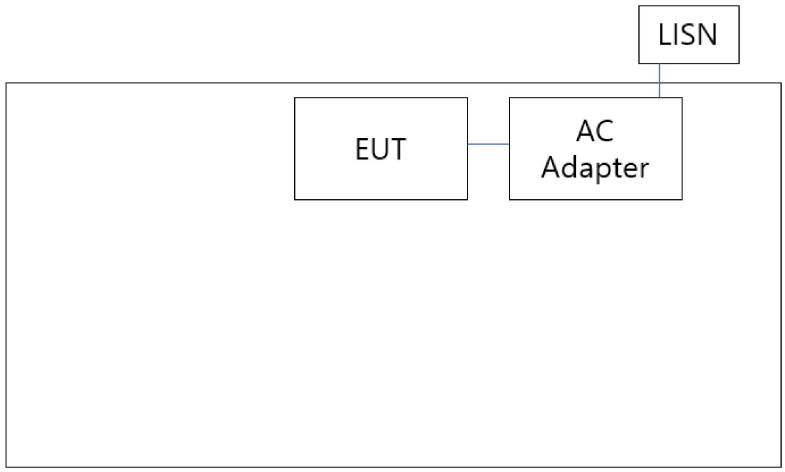
The output is preset as declared by the manufacturer

TEST CONFIGURATION

Radiated Emission



Conducted Emission



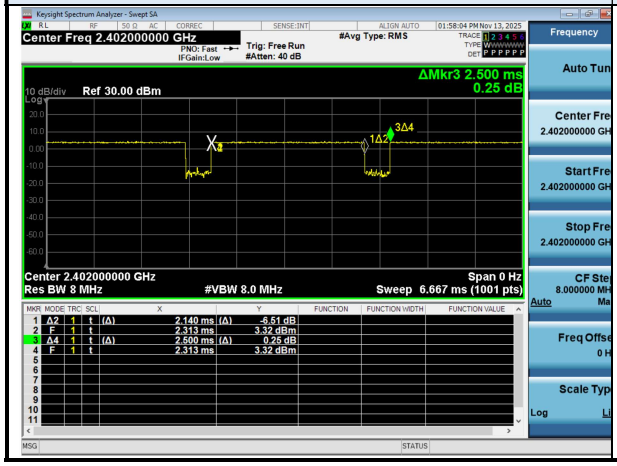
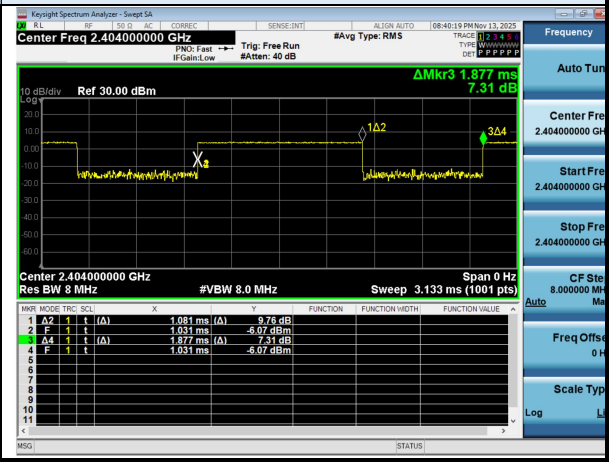
LIST OF SUPPORT EQUIPMENT

Equipment Type	Model No.	Serial No.	Manufacturer	Qty	Note
AC adapter	AQ27A-59CFA	-	PHIHONG TECH CO LTD	1	
USB-C to USB-C cable, 0.5 meters	320-01642-00	-	CSTAR ELECTRONICS INTERNATIONAL INC.	1	

9. TEST RESULT

9.1. DUTY CYCLE

Mode	Data Rate	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Factor (dB)	VBW(1/T) (Hz)
BLE1M	1 Mbps	2.14	2.500	0.856	0.675	467.289
BLE2M	2 Mbps	1.081	1.877	0.576	2.396	925.069

6dB BW : CH 0 (2 402 MHz)	99% OBW : CH 0 (2 402 MHz)
	

Note(s):

9.2. 6 dB BANDWIDTH / 99% BANDWIDTH MEASUREMENT

BLE 1M (GFSK)		99% Bandwidth (MHz)	6 dB Bandwidth (kHz)	
Frequency (MHz)	Channel	Result	Result	Limit
2 402	0	1.052	702.026	≥ 500
2 440	19	1.057	707.937	
2 480	39	1.058	716.518	

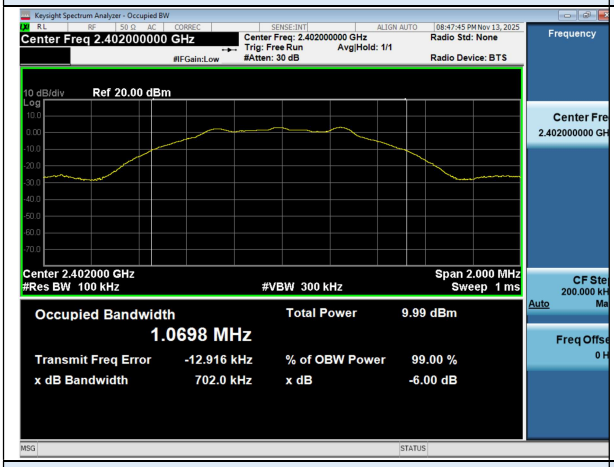
BLE 2M (GFSK)		99% Bandwidth (MHz)	6 dB Bandwidth (kHz)	
Frequency (MHz)	Channel	Result	Result	Limit
2 404	1	2.073	1 153.230	≥ 500
2 440	19	2.079	1 155.382	
2 478	38	2.082	1 159.968	

Note(s):

▣ TEST PLOTS

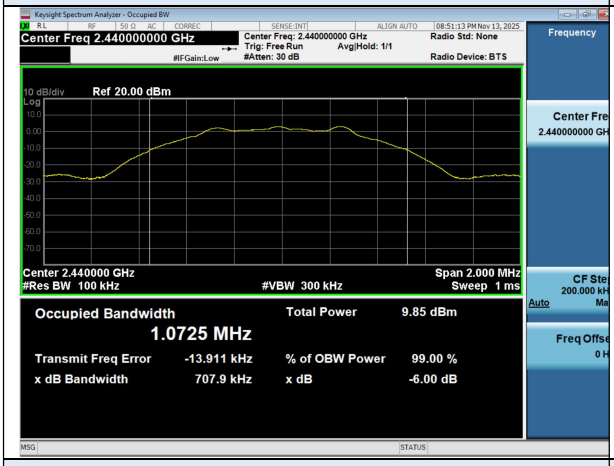
BLE 1M

6dB BW: CH 0 (2 402 MHz)



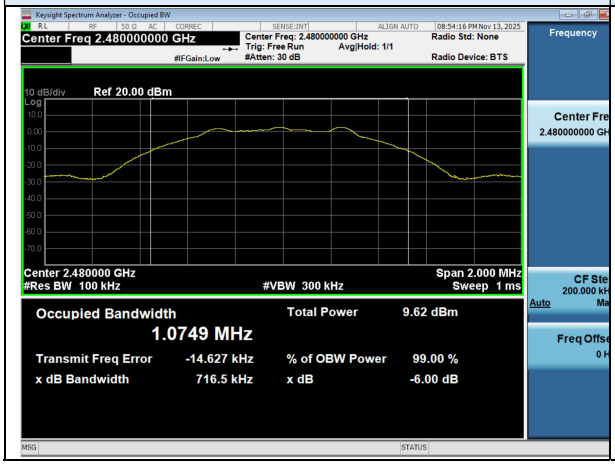
99% OBW: CH 0 (2 402 MHz)

6dB BW: CH 19 (2 440 MHz)

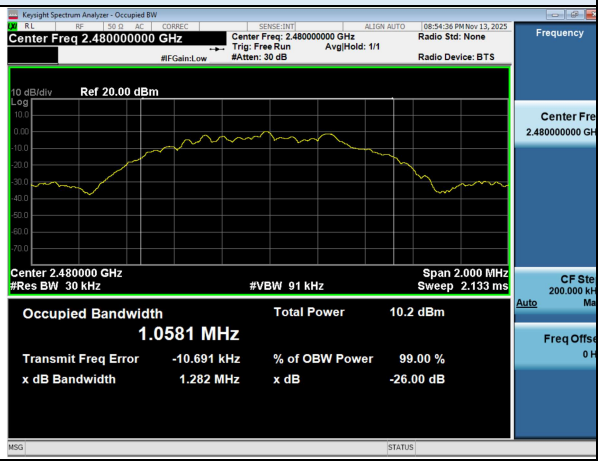


99% OBW: CH 19 (2 440 MHz)

6dB BW: CH 39 (2 480 MHz)



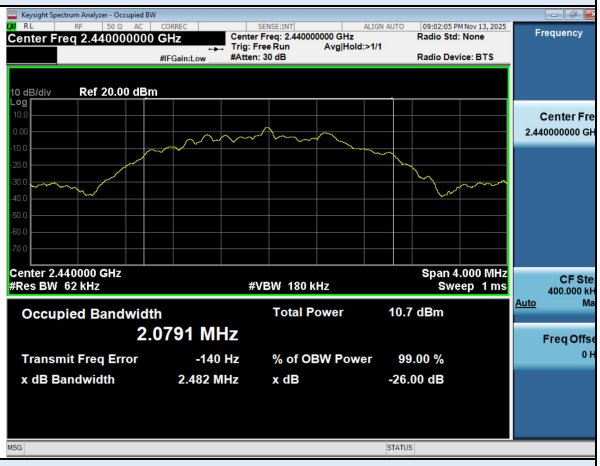
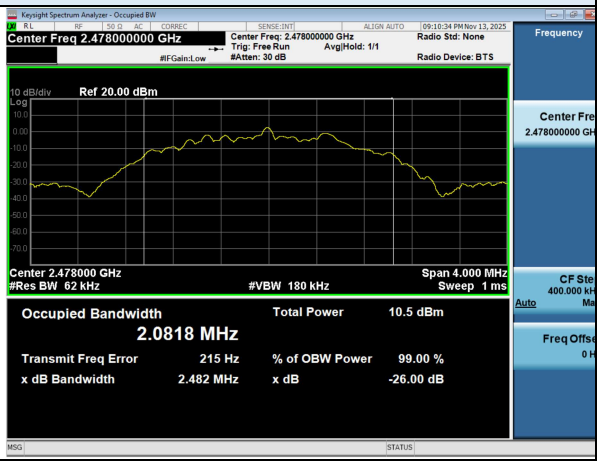
99% OBW: CH 39 (2 480 MHz)



Note(s):

▣ TEST PLOTS

BLE 2M

6dB BW: CH 1 (2 404 MHz)	99% OBW: CH 1 (2 404 MHz)
	
6dB BW: CH 19 (2 440 MHz)	**99% OBW: CH 19 (2 440 MHz)**
	
6dB BW: CH 38 (2 478 MHz)	**99% OBW: CH 38 (2 478 MHz)**
	

Note(s):

9.3. OUTPUT POWER

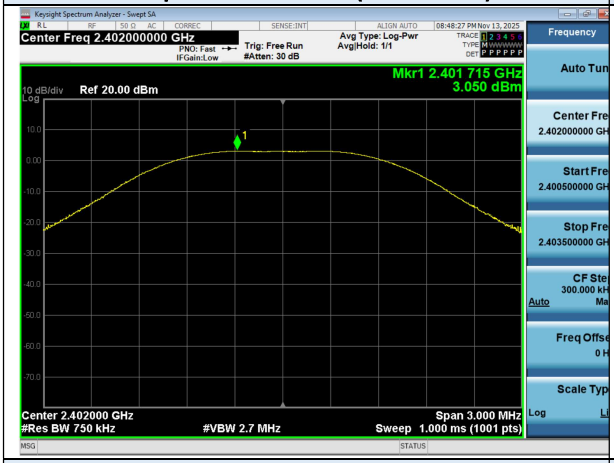
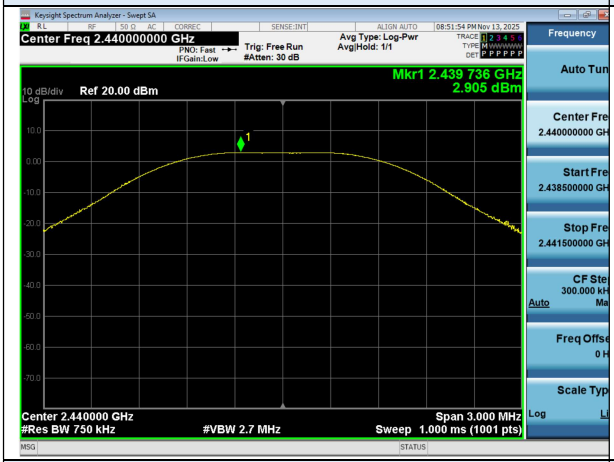
Peak Power

BLE 1M (GFSK)		Test Result		
Frequency (MHz)	Channel No.	Measured Power(dBm)	Limit (dBm)	Result
2 402	0	3.050	≤ 30	Compliant
2 440	19	2.905	≤ 30	Compliant
2 480	39	2.765	≤ 30	Compliant

BLE 2M (GFSK)		Test Result		
Frequency (MHz)	Channel No.	Measured Power(dBm)	Limit (dBm)	Result
2 404	1	3.126	≤ 30	Compliant
2 440	19	3.028	≤ 30	Compliant
2 478	38	2.845	≤ 30	Compliant

Note(s):

▣ TEST PLOTS

BLE 1M	BLE 2M
Output Power: CH 0 (2 402 MHz)	**Output Power: CH 1 (2 404 MHz)**
	
Output Power: CH 19 (2 440 MHz)	**Output Power: CH 19 (2 440 MHz)**
	
Output Power: CH 39 (2 480 MHz)	**Output Power: CH 38 (2 478 MHz)**
	

Note(s):

9.4. POWER SPECTRAL DENSITY

BLE 1M (GFSK)		Test Result		
Frequency (MHz)	Channel No.	Measured Level (dBm/3kHz)	Limit (dBm/3kHz)	Result
2 402	0	-10.893	≤ 8.000	Compliant
2 440	19	-11.101	≤ 8.000	Compliant
2 480	39	-11.570	≤ 8.000	Compliant

BLE 2M (GFSK)		Test Result		
Frequency (MHz)	Channel No.	Measured Level (dBm/3kHz)	Limit (dBm/3kHz)	Result
2 404	0	-10.303	≤ 8.000	Compliant
2 440	19	-10.232	≤ 8.000	Compliant
2 478	39	-15.046	≤ 8.000	Compliant

Note(s):

▣ TEST PLOTS

BLE 1M	BLE 2M
PSD: CH 0 (2 402 MHz)	PSD: CH 1 (2 404 MHz)
	
PSD: CH 19 (2 440 MHz)	PSD: CH 19 (2 440 MHz)
	
PSD: CH 39 (2 480 MHz)	PSD: CH 38 (2 478 MHz)
	

Note(s):

9.5. CONDUCTED BAND EDGE & SPURIOUS EMISSIONS

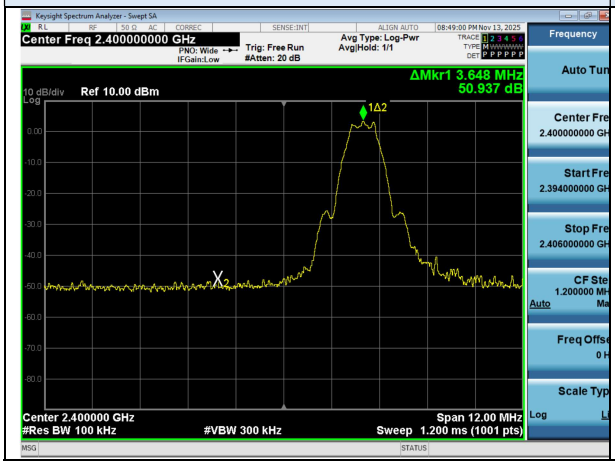
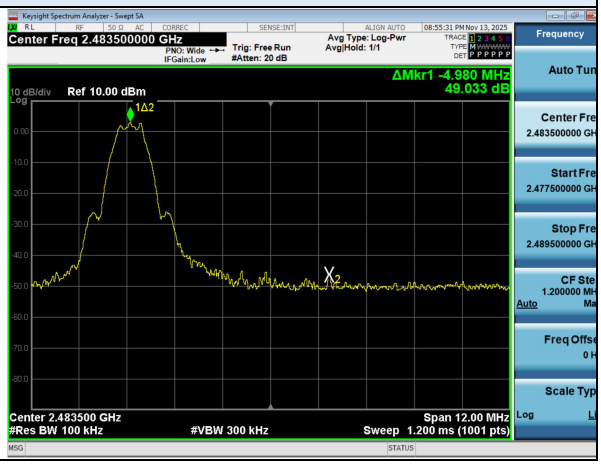
Out of Band Emissions at the Band Edge

BLE 1M (GFSK)			Test Result		
Frequency [MHz]	Channel No.	Position	Measured Level [dBc]	Limit [dBc]	Result
2 402	0	Low	50.937	≥ 20	Compliant
2 480	39	High	49.033	≥ 20	Compliant

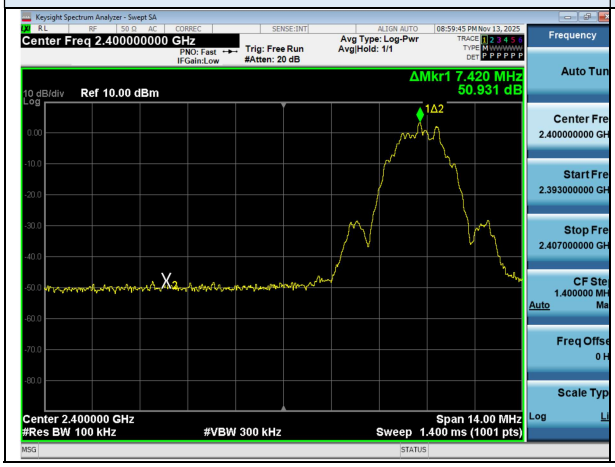
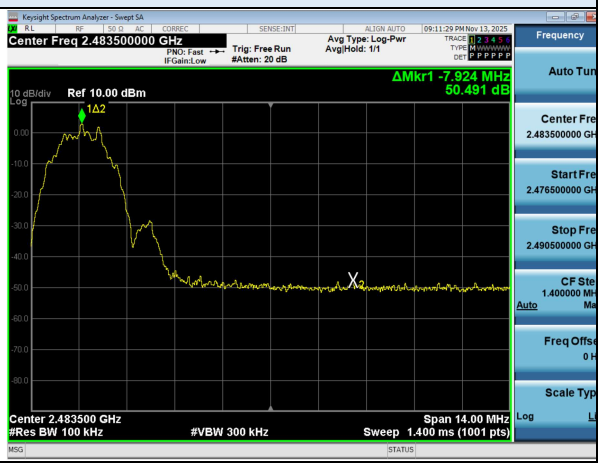
BLE 2M (GFSK)			Test Result		
Frequency [MHz]	Channel No.	Position	Measured Level [dBc]	Limit [dBc]	Result
2 404	1	Low	50.931	≥ 20	Compliant
2 478	38	High	50.491	≥ 20	Compliant

▣ TEST PLOTS

BLE 1M

CH 0 (2 402 MHz)	CH 39 (2 480 MHz)
	

BLE 2M

CH 0 (2 404 MHz)	CH 39 (2 478 MHz)
	

Note(s):

Conducted Spurious Emissions

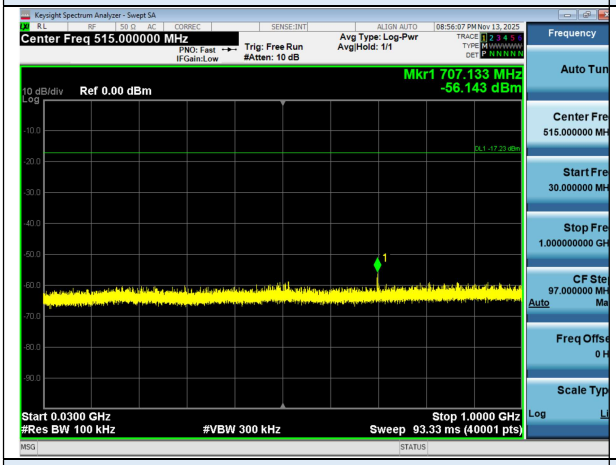
BLE 1M (GFSK)			Test Result		
Frequency [MHz]	Channel No.	Position	Measured Level [dBc]	Limit [dBc]	Result
2 402	0	Low	45.346	≥ 20	Compliant
2 440	19	Middle	46.579	≥ 20	Compliant
2 480	39	High	46.636	≥ 20	Compliant

BLE 1M (GFSK)			Test Result		
Frequency [MHz]	Channel No.	Position	Measured Level [dBc]	Limit [dBc]	Result
2 404	1	Low	46.989	≥ 20	Compliant
2 440	19	Middle	46.842	≥ 20	Compliant
2 478	38	High	46.202	≥ 20	Compliant

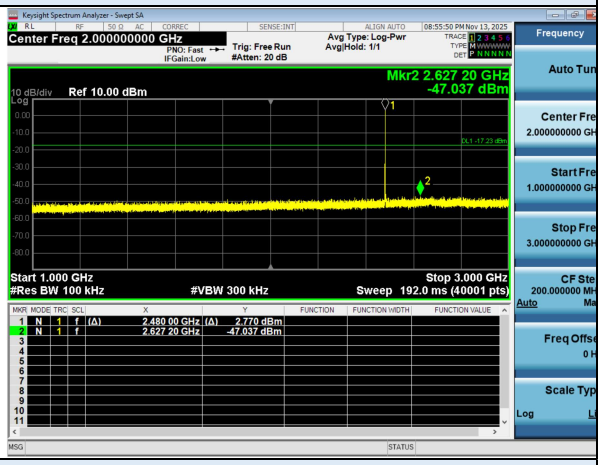
☒ TEST PLOTS

BLE 1M: CH 39 (2 480 MHz)

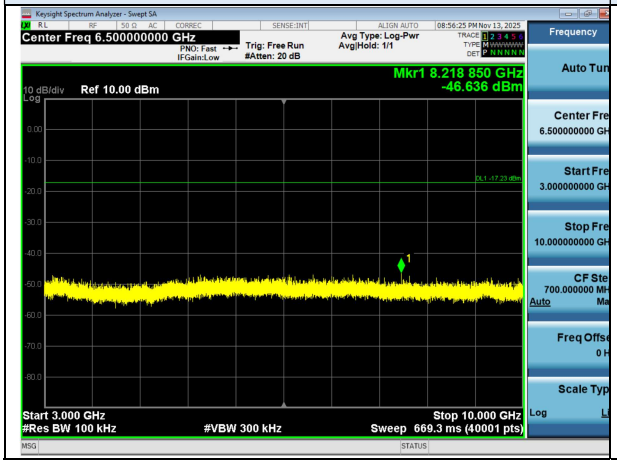
30 MHz – 1 GHz



1 GHz – 3 GHz



3 GHz – 10 GHz



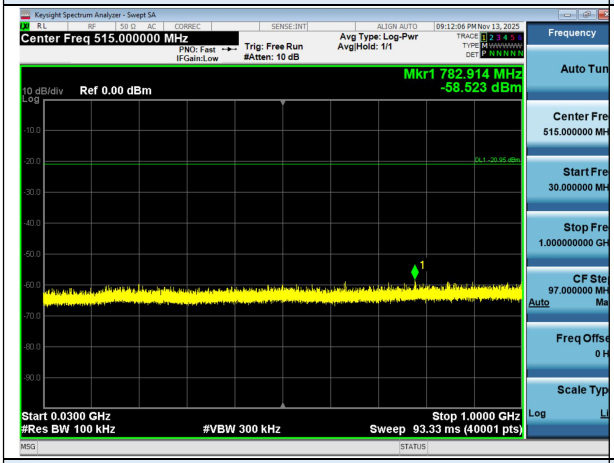
10 GHz – 25 GHz

Note(s):
The worst-case plot is included in this report.

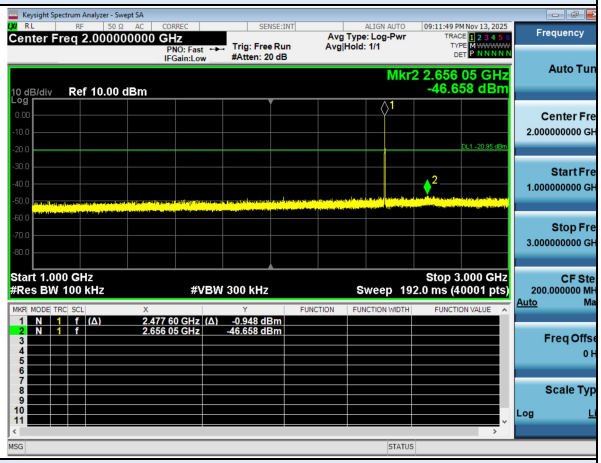
▣ TEST PLOTS

BLE 2M: CH 38 (2 478 MHz)

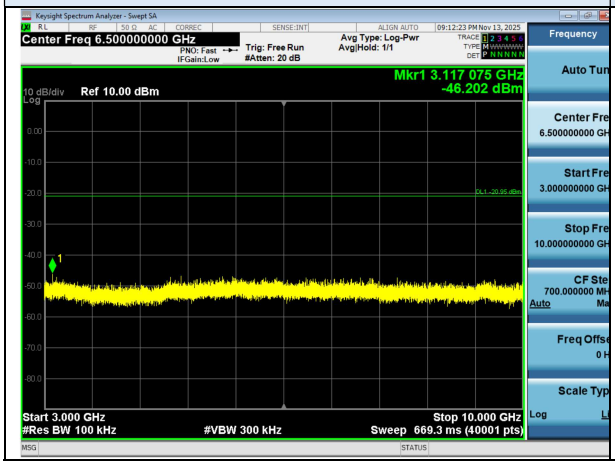
30 MHz – 1 GHz



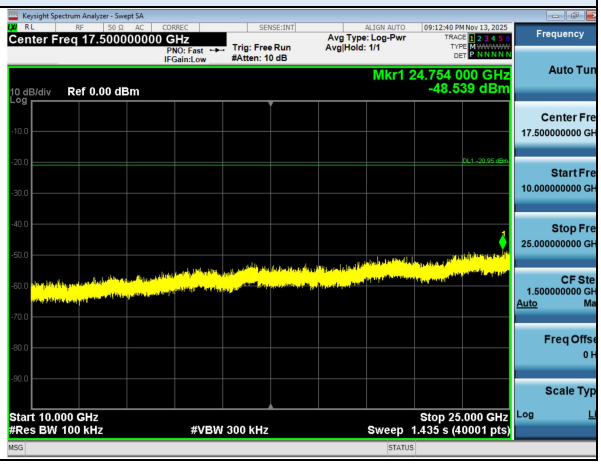
1 GHz – 3 GHz



3 GHz – 10 GHz



10 GHz – 25 GHz



Note(s):

The worst-case plot are included in this report.

9.6. RADIATED SPURIOUS EMISSIONS

Frequency Range: Below 1 GHz

Test Mode BLE 1M(GFSK)

Operating Frequency 2 402 MHz (CH 0)

Frequency (MHz)	Polarization	Reading (dBuV)	Corr. [1)] (dB)	Total (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement Type
No major peaks found							

Test Mode BLE 1M(GFSK)

Operating Frequency 2 440 MHz (CH 19)

Frequency (MHz)	Polarization	Reading (dBuV)	Corr. [1)] (dB)	Total (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement Type
No major peaks found							

Test Mode BLE 1M(GFSK)

Operating Frequency 2 480 MHz (CH 39)

Frequency (MHz)	Polarization	Reading (dBuV)	Corr. [1)] (dB)	Total (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement Type
No major peaks found							

Note(s):

1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain

Test Mode BLE 2M(GFSK)

Operating Frequency 2 402 MHz (CH 1)

Frequency (MHz)	Polarization	Reading (dBuV)	Corr. [1] (dB)	Total (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement Type
No major peaks found							

Test Mode BLE 2M(GFSK)

Operating Frequency 2 440 MHz (CH 19)

Frequency (MHz)	Polarization	Reading (dBuV)	Corr. [1] (dB)	Total (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement Type
No major peaks found							

Test Mode BLE 2M(GFSK)

Operating Frequency 2 480 MHz (CH 38)

Frequency (MHz)	Polarization	Reading (dBuV)	Corr. [1] (dB)	Total (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement Type
No major peaks found							

Note(s):

1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain

Frequency Range: Above 1 GHz

Test Mode BLE 1M (GFSK)

Operating Frequency 2 402 MHz (CH 0)

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	Duty	AV	PK	AV	PK	AV	PK
2 380.992	V	36.85	55.94	-10.73	0.68	26.80	45.21	54	74	27.21	28.79
2 382.986	H	36.07	53.65	-10.69	0.68	26.06	42.96	54	74	27.95	31.04

Test Mode BLE 1M (GFSK)

Operating Frequency 2 440 MHz (CH 19)

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	Duty	AV	PK	AV	PK	AV	PK
No major peaks found											

Test Mode BLE 1M (GFSK)

Operating Frequency 2 480 MHz (CH 39)

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	Duty	AV	PK	AV	PK	AV	PK
No major peaks found											

Note(s):

1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain
2. AV Level = Measured Power(dBm) + Correction Factor(dB) + Duty Cycle Correction Factor(dB).

Test Mode BLE 2M (GFSK)

Operating Frequency 2 404 MHz (CH 1)

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	Duty	AV	PK	AV	PK	AV	PK
2 380.992	V	36.85	55.94	-10.73	2.40	28.52	45.21	54	74	25.48	28.79
2 382.986	H	36.07	53.65	-10.69	2.40	27.78	42.96	54	74	26.22	31.04

Test Mode BLE 2M (GFSK)

Operating Frequency 2 440 MHz (CH 19)

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	Duty	AV	PK	AV	PK	AV	PK
No major peaks found											

Test Mode BLE 2M (GFSK)

Operating Frequency 2 478 MHz (CH 38)

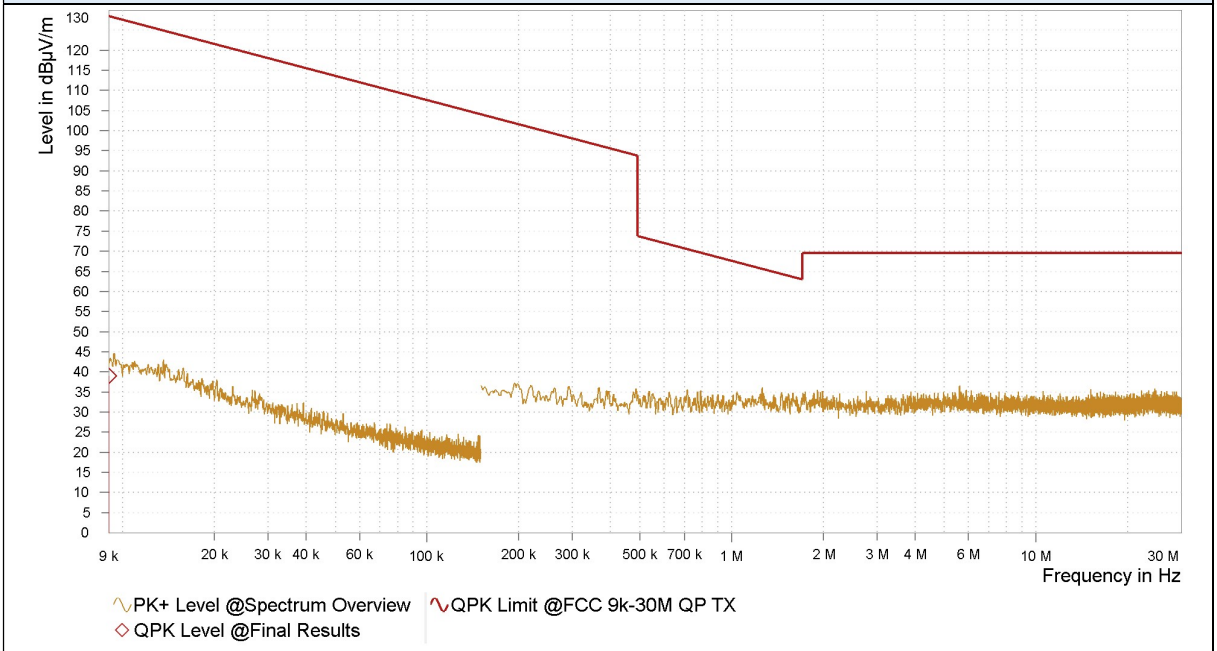
Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	Duty	AV	PK	AV	PK	AV	PK
No major peaks found											

Note(s):

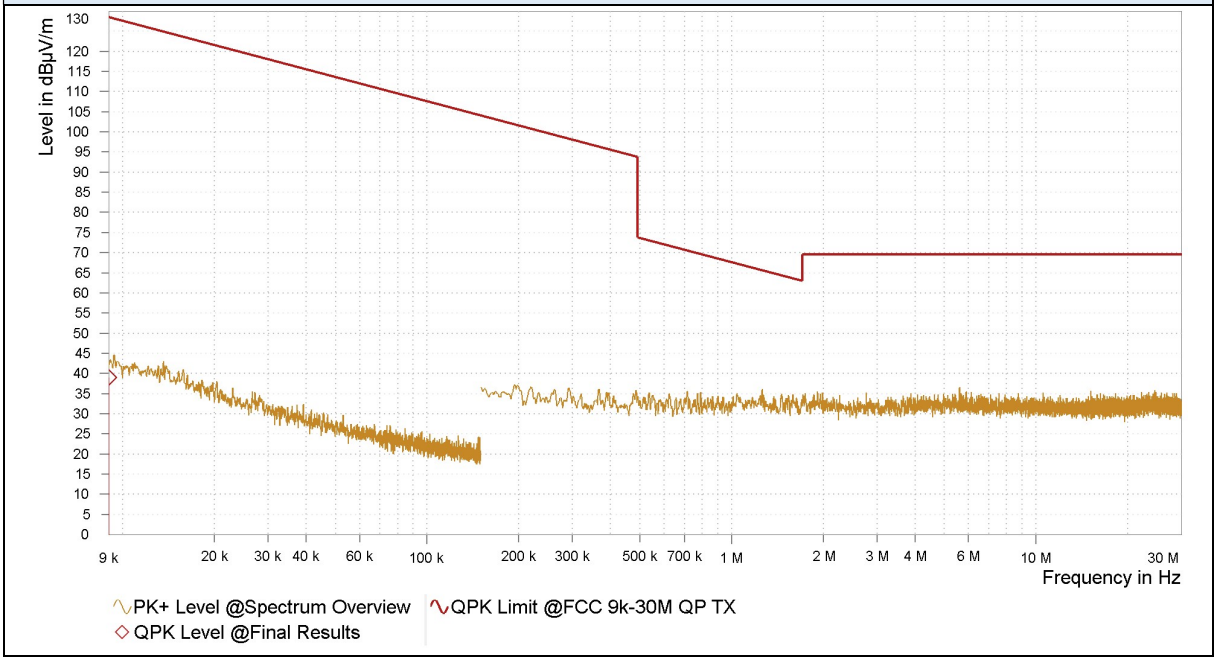
1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain
2. AV Level = Measured Power(dBm) + Correction Factor(dB) + Duty Cycle Correction Factor(dB).

▣ TEST PLOTS

Radiated Spurious Emission 9 kHz – 30 MHz (Antenna Position 90°) : BLE 1M (CH 0)



Radiated Spurious Emission 9 kHz – 30 MHz (Antenna Position 180°) : BLE 1M (CH 0)

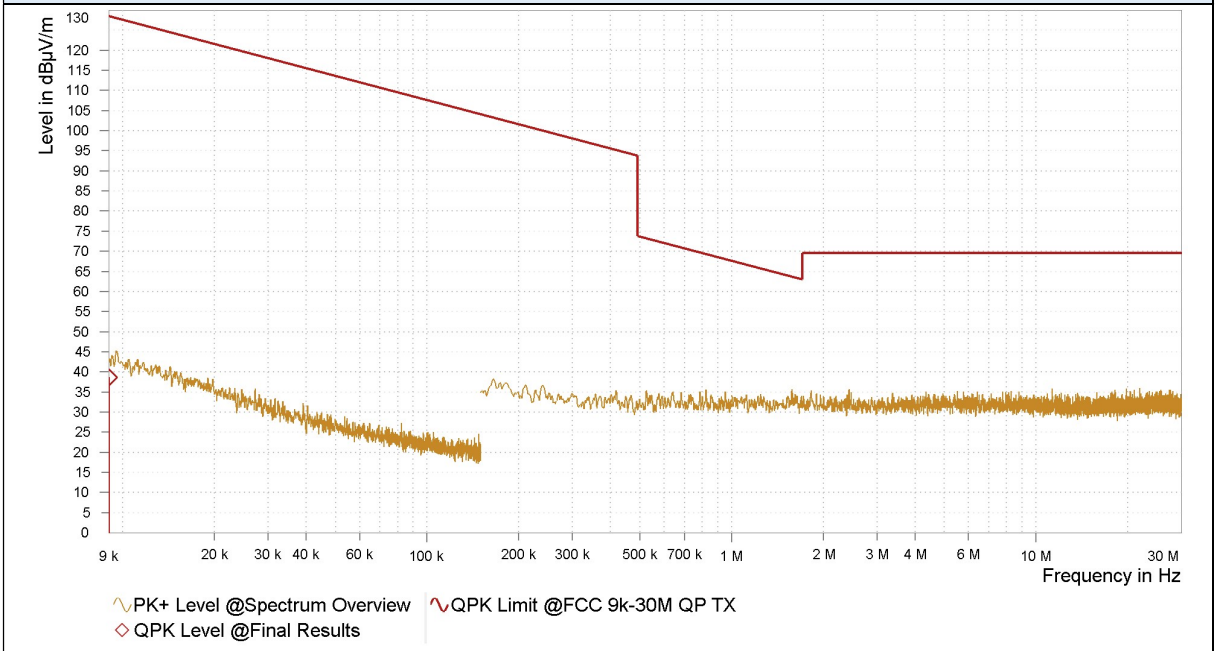


Note(s):

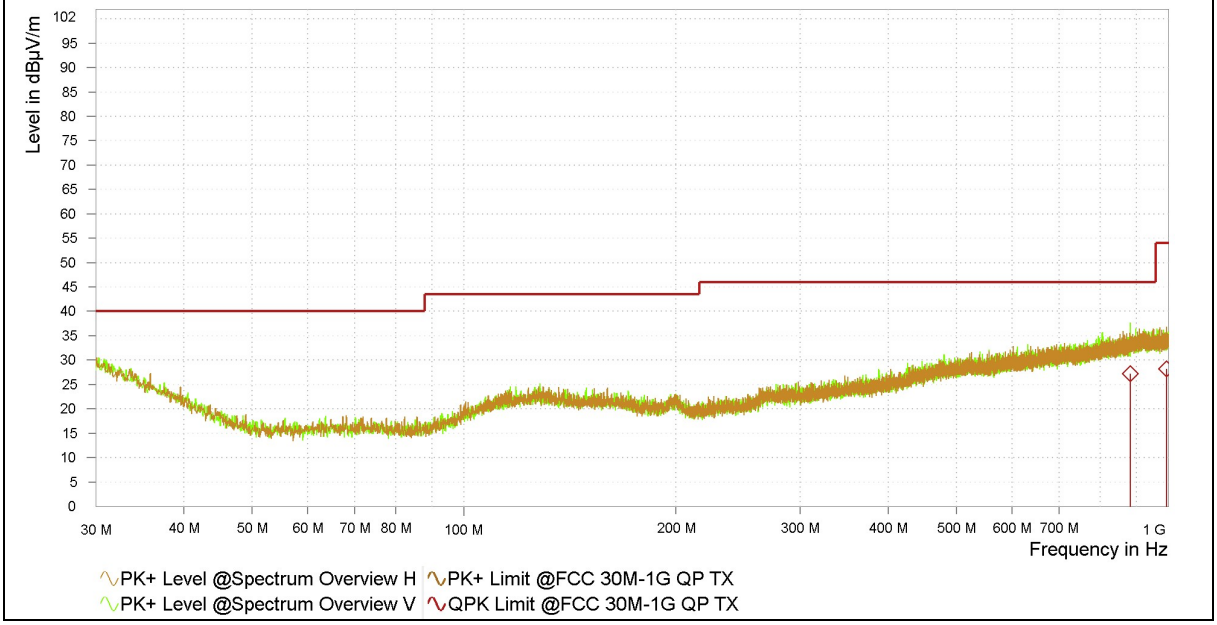
1. The worst-case plot are included in this report.

▣ TEST PLOTS

Radiated Spurious Emission 9 kHz – 30 MHz (Antenna Position Bent over) : BLE 1M (CH 0)



Radiated Spurious Emission 30 MHz – 1 GHz: BLE 1M (CH 0)

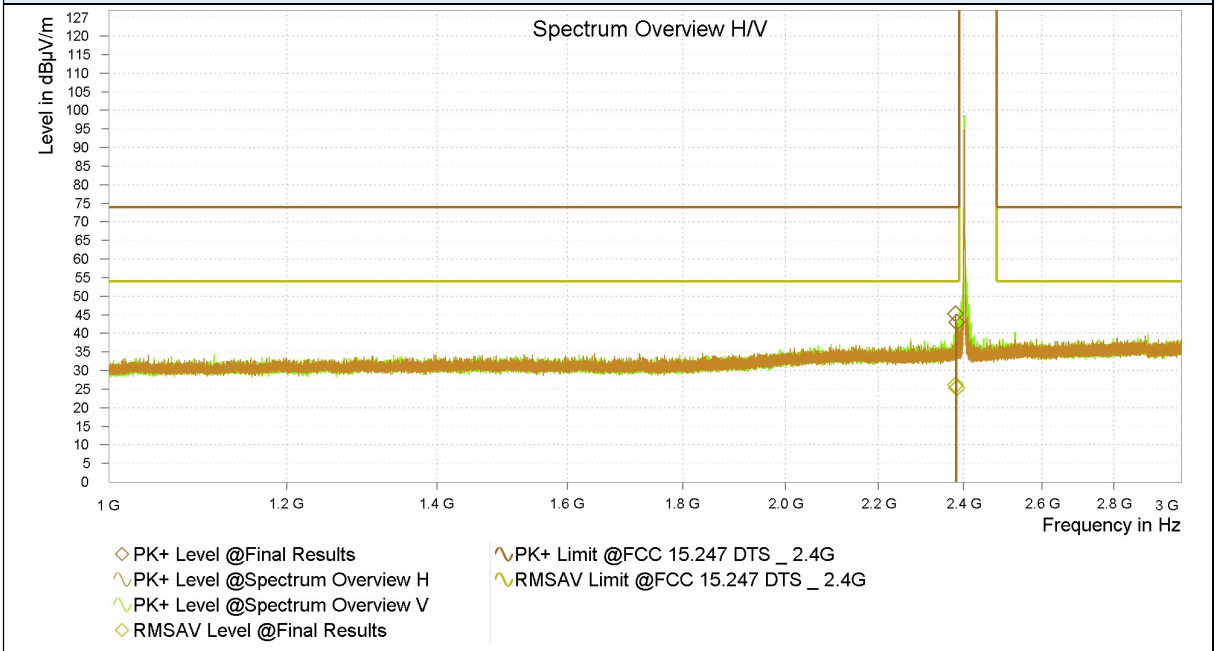


Note(s):

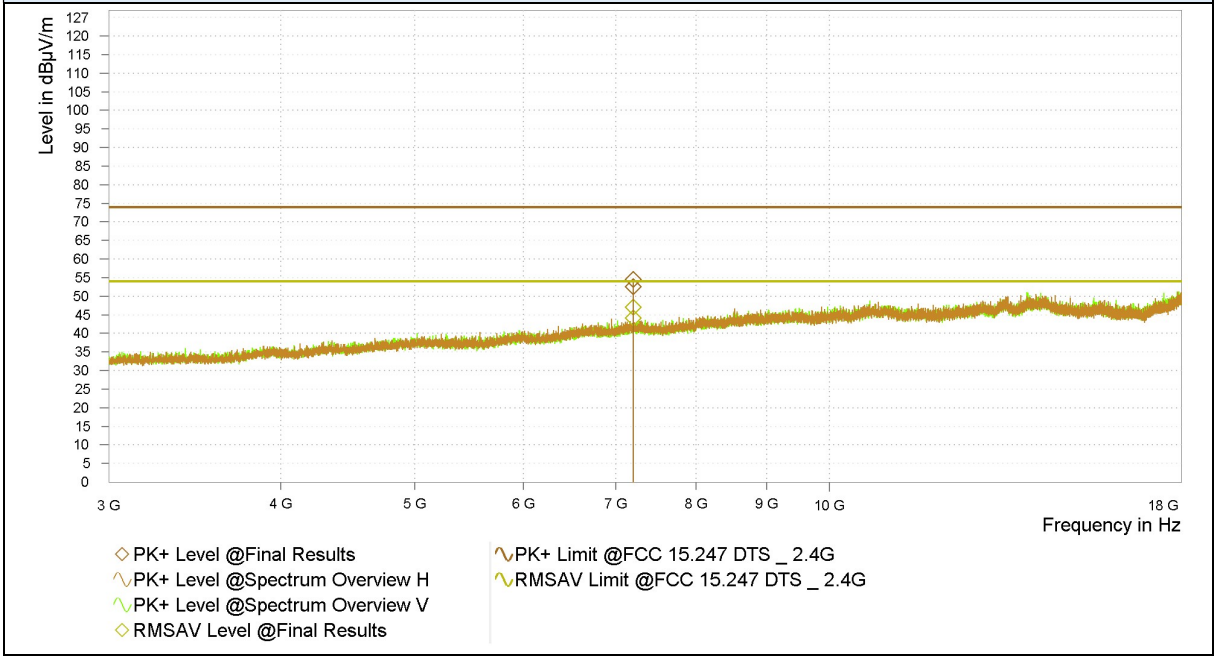
1. The worst-case plot are included in this report.

▣ TEST PLOTS

Radiated Spurious Emission 1 GHz – 3 GHz: BLE 1M (CH 0)



Radiated Spurious Emission 3 GHz – 18 GHz: BLE 1M (CH 0)

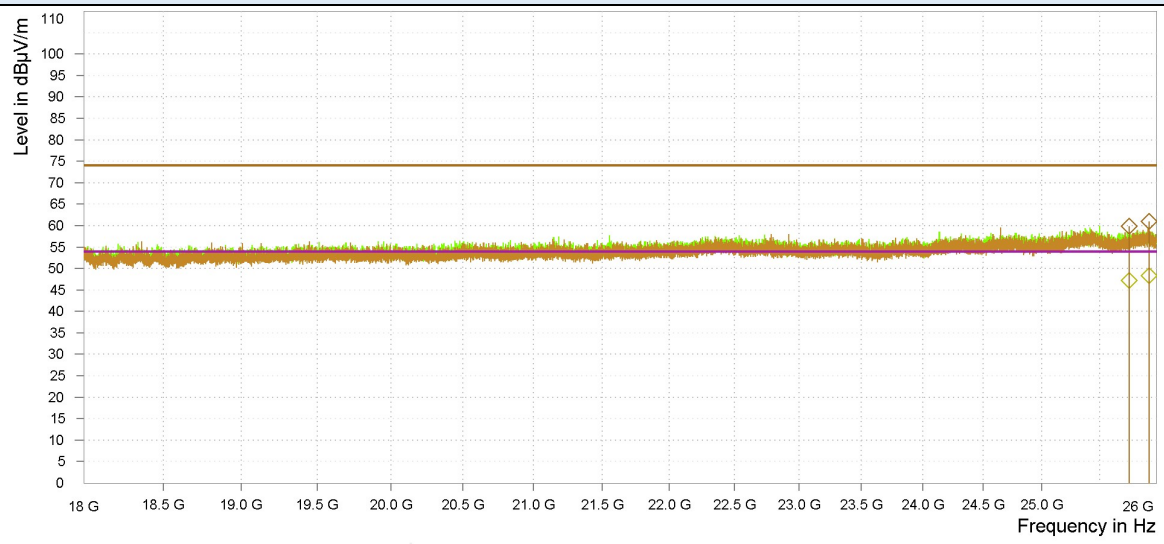


Note:

1. The worst-case plot are included in this report.

▣ TEST PLOTS

Radiated Spurious Emission 18 GHz – 26 GHz : BLE 1M (CH 0)



Note:

1. The worst-case plot are included in this report.

9.7. SIMULTANEOUS TRANSMISSION CONFIGURATION AND TEST RESULTS

Simultaneous transmission between BLE and 24 GHz radar was investigated.

- BLE (2402-2480 MHz) and 24 GHz radar (24.00-24.25 GHz)

NOTE: All measured emissions were below the specified limits when both transmitters operated simultaneously.

Frequency Range: Below 1 GHz

Test Mode BLE + 24GHz radar

Frequency (MHz)	Polarization	Reading (dBuV)	Corr. [1] (dB)	Total (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement Type
No major peaks found							

Note(s) :

1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain

Frequency Range: 1 GHz – 40 GHz

Test Mode BLE + 24GHz radar

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1]	Duty	AV	PK	AV	PK	AV	PK
36 217.011	V	53.16	66.33	-2.92	-	50.24	63.41	54	74	3.76	10.59

Note(s):

1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain
2. AV Level = Measured Power(dBm) + Correction Factor(dB) + Duty Cycle Factor(dB).

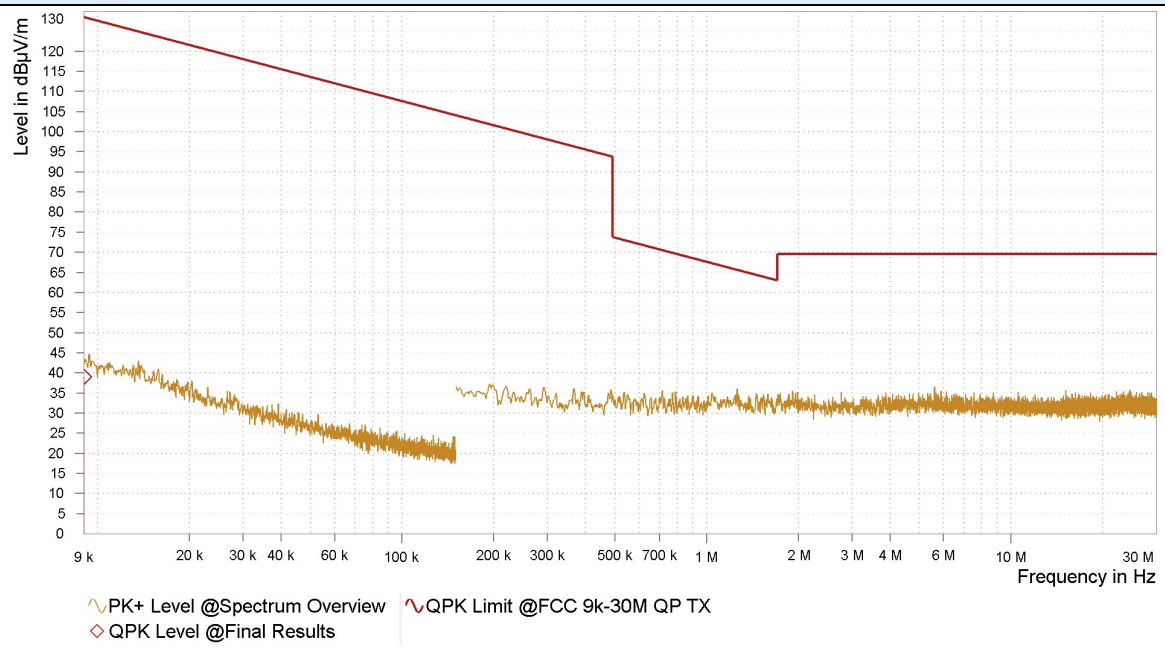
Frequency Range: 40 GHz – 100 GHz

Test Mode BLE + 24GHz radar

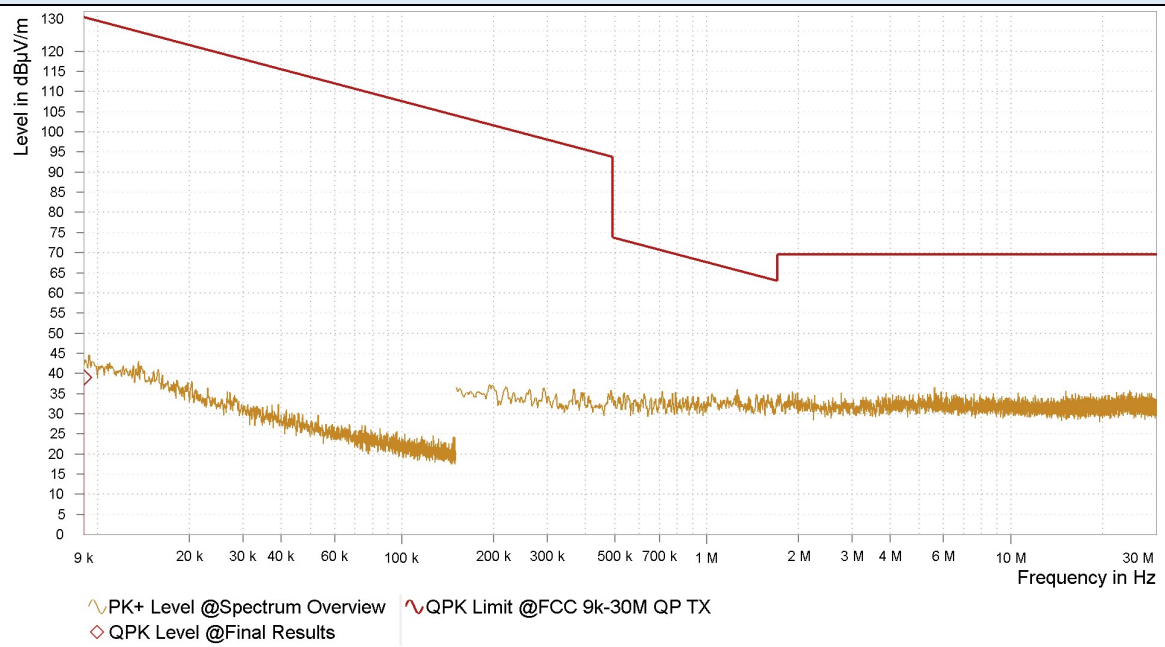
Frequency [GHz]	Measured Level [dBµV]	A.F. + C.L. - A.G. + D.F. [dB/m]	Ant. Pol. (H/V)	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]
No major peaks found						

▣ TEST PLOTS

Radiated Spurious Emission 9 kHz – 30 MHz (Antenna Position 90°)



Radiated Spurious Emission 9 kHz – 30 MHz (Antenna Position 180°)

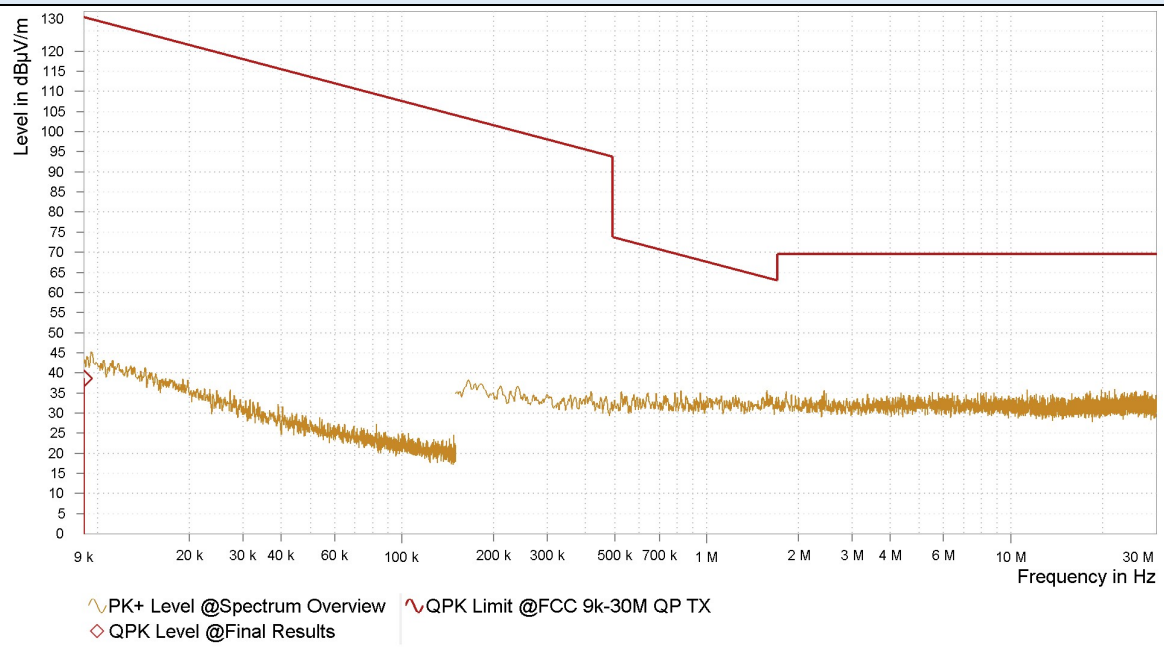


Note:

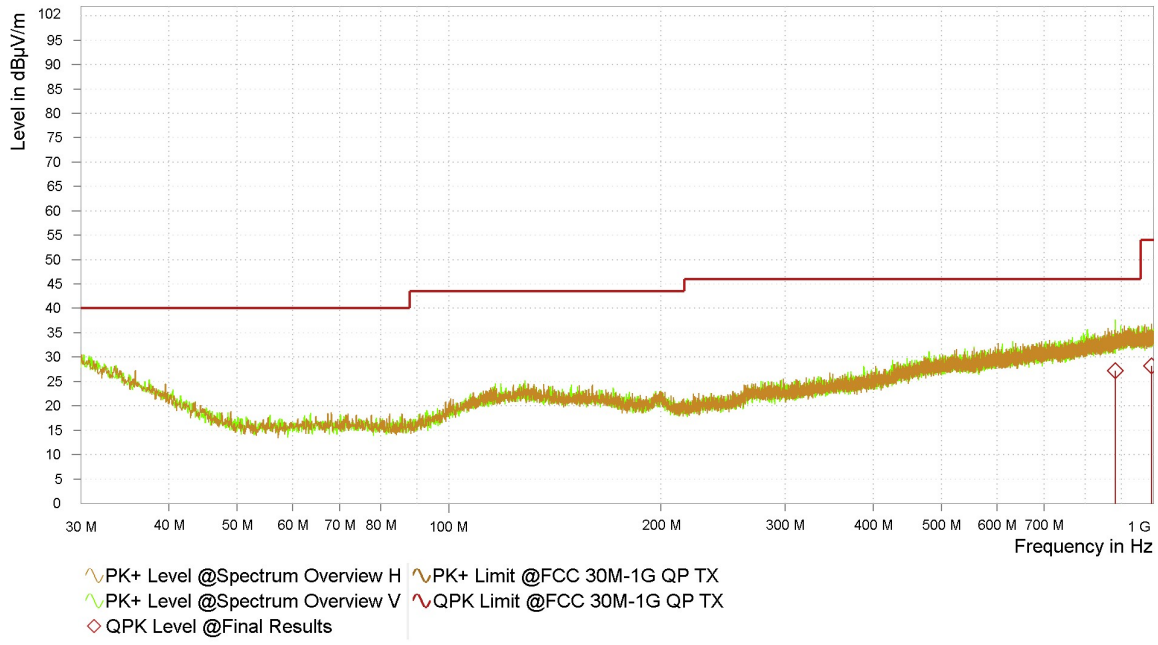
-

▣ TEST PLOTS

Radiated Spurious Emission 9 kHz – 30 MHz (Antenna Position Bent Over)



Radiated Spurious Emission 30 MHz – 1 GHz

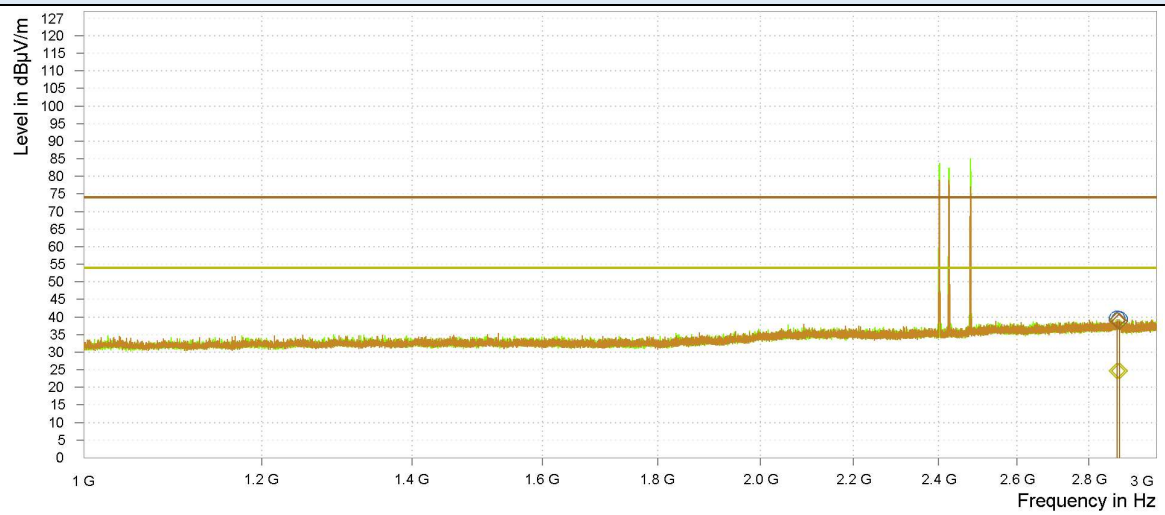


Note:

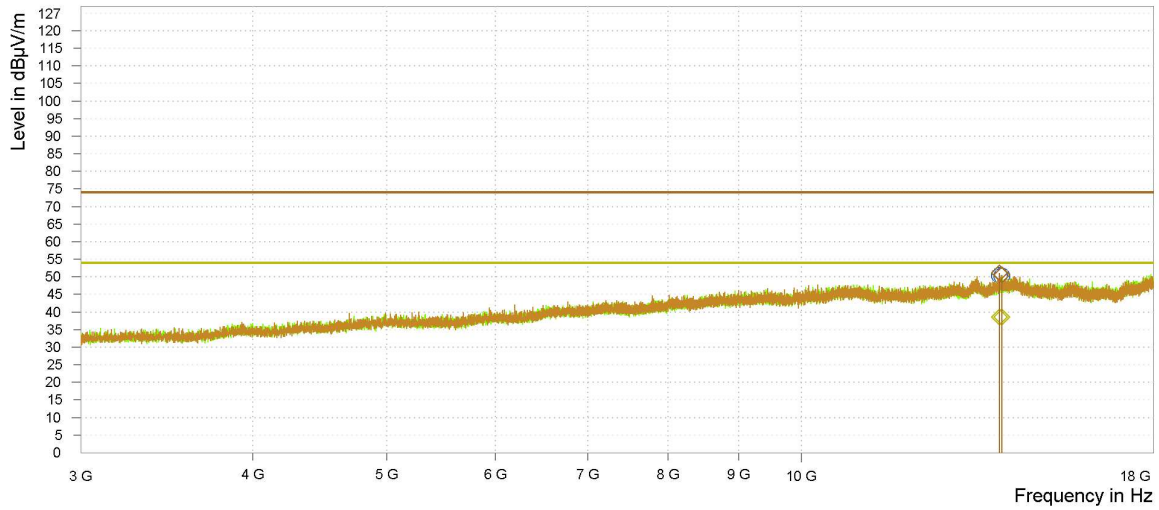
-

▣ TEST PLOTS

Radiated Spurious Emission 1 GHz – 3 GHz



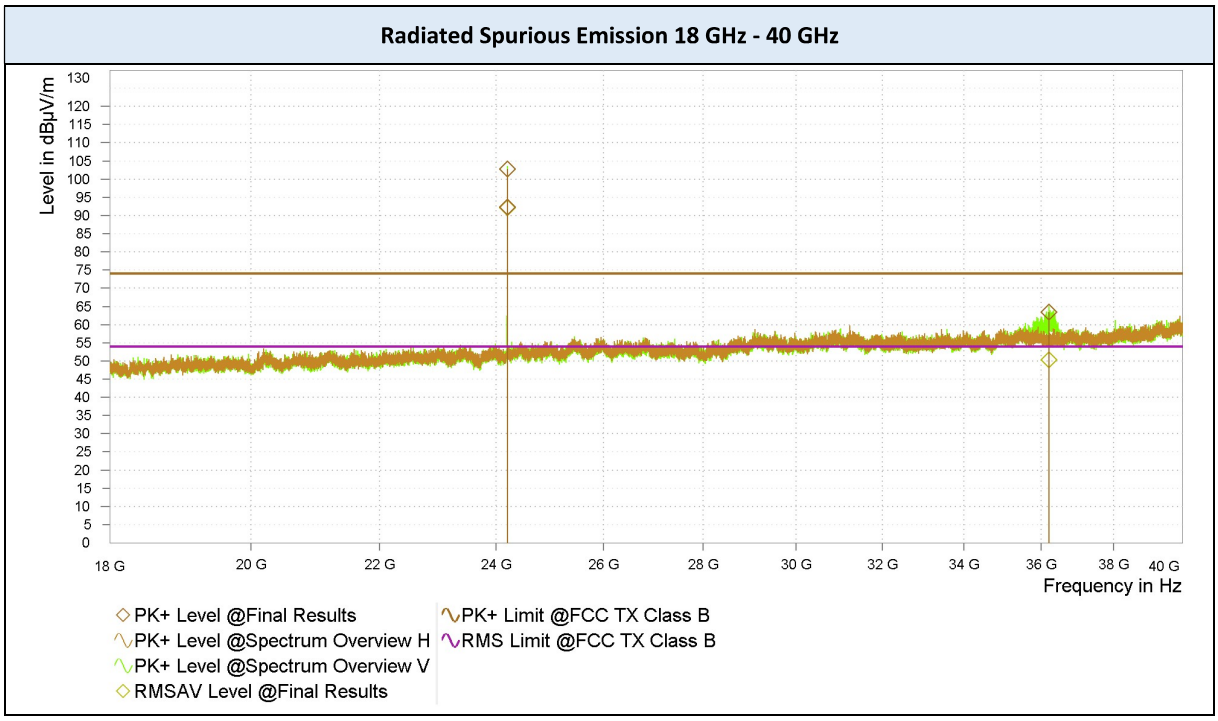
Radiated Spurious Emission 3 GHz - 18 GHz



Note:

-

▣ TEST PLOTS



Note:

9.7. RADIATED RESTRICTED BAND EDGES

Test Mode BLE 1M (GFSK)
Operating Frequency 2 402 MHz (CH 0)

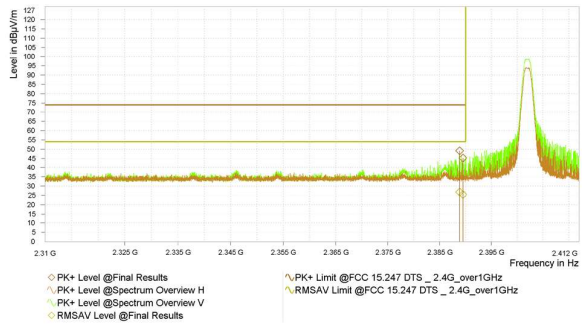
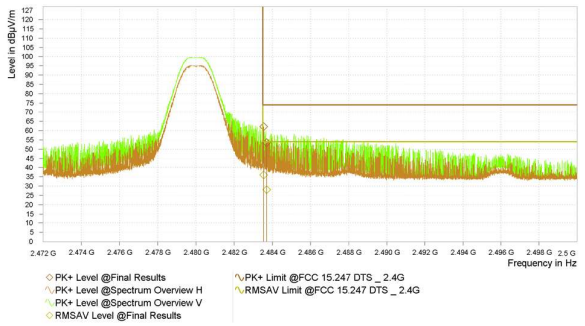
Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	Duty	AV	PK	AV	PK	AV	PK
2 388.838	V	37.52	59.87	-10.69	0.68	27.51	49.18	54	74	26.50	24.82
2 389.444	H	36.13	55.93	-10.67	0.68	26.14	45.26	54	74	27.87	28.74

Test Mode BLE 1M (GFSK)
Operating Frequency 2 480 MHz (CH 39)

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	Duty	AV	PK	AV	PK	AV	PK
2 483.546	V	46.24	72.34	-10.19	0.68	36.73	62.15	54	74	17.28	11.85
2 483.706	H	38.21	63.66	-10.2	0.68	28.69	53.46	54	74	25.32	20.54

Note(s):
1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain
2. AV Level = Measured Power(dBm) + Correction Factor(dB) + Duty Cycle Correction Factor(dB).

▣ TEST PLOTS

Radiated Band Edges: BLE 1M (CH 0)	Radiated Band Edges: BLE 1M (CH 39)
	

Note(s):

Test Mode BLE 2M (GFSK)
Operating Frequency 2 404 MHz (CH 1)

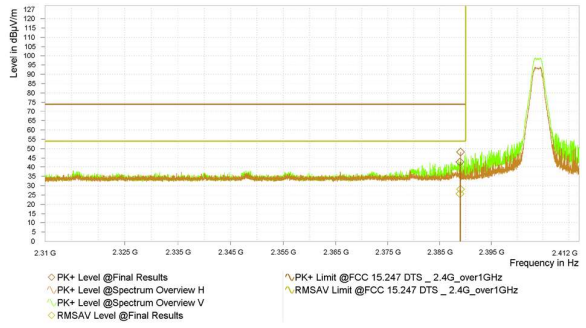
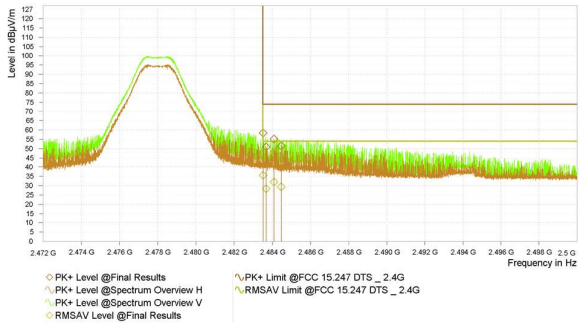
Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	Duty	AV	PK	AV	PK	AV	PK
2 388.899	H	36.23	53.51	-10.67	2.40	27.96	42.84	54	74	26.04	31.16
2 389.009	V	38.74	58.93	-10.69	2.40	30.45	48.24	54	74	23.55	25.76

Test Mode BLE 2M (GFSK)
Operating Frequency 2 478 MHz (CH 38)

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	Duty	AV	PK	AV	PK	AV	PK
2 483.519	V	45.76	68.52	-10.19	2.40	37.97	58.33	54	74	16.03	15.67
2 483.677	H	38.56	61.15	-10.2	2.40	30.76	50.95	54	74	23.24	23.05

Note(s):
1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain
2. AV Level = Measured Power(dBm) + Correction Factor(dB) + Duty Cycle Correction Factor(dB).

▣ TEST PLOTS

Radiated Band Edges: BLE 1M (CH 0)	Radiated Band Edges: BLE 1M (CH 39)
	

Note(s):

9.8. RECEIVER SPURIOUS EMISSION

Frequency Range: Below 1 GHz

Test Mode	BLE 1M (GFSK)
Operating Frequency	2 402 MHz (CH 0)

Frequency (MHz)	Polarization	Reading (dBuV)	Corr. [1)] (dB)	Total (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement Type
No major peaks found							

Frequency Range: Above 1 GHz

Test Mode	BLE 1M (GFSK)
Operating Frequency	2 402 MHz (CH 0)

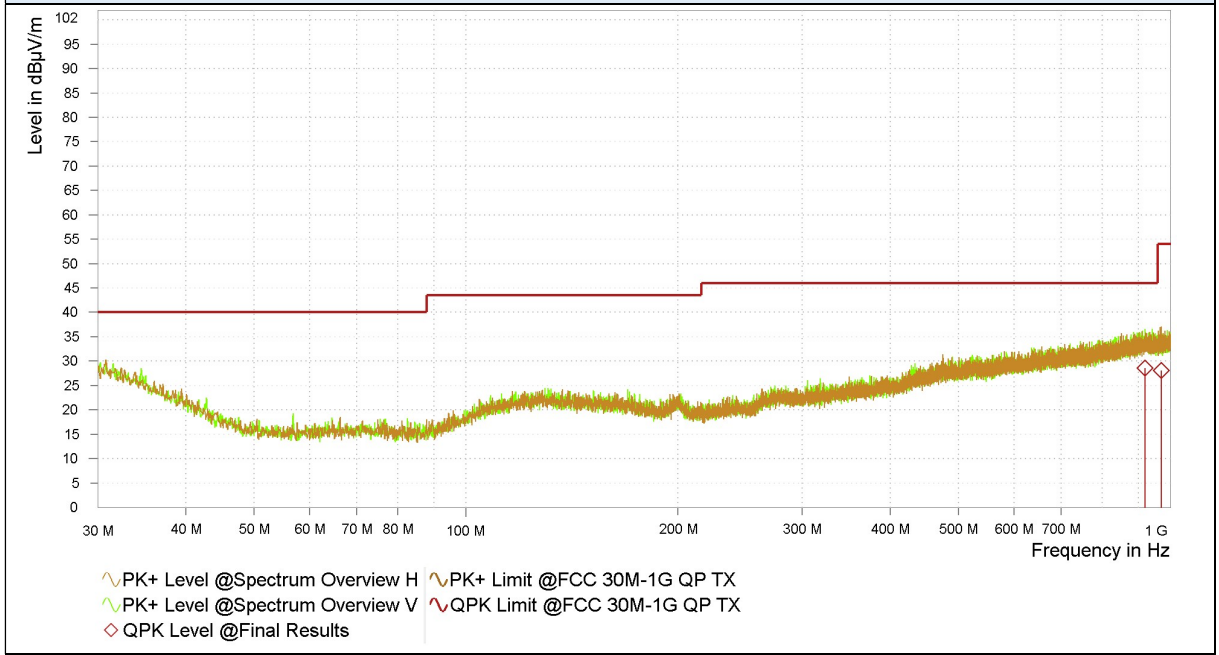
Frequency (MHz)	Polarization	Reading (dBuV)	Corr. [1)] (dB)	Total (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement Type
No major peaks found							

Note(s):

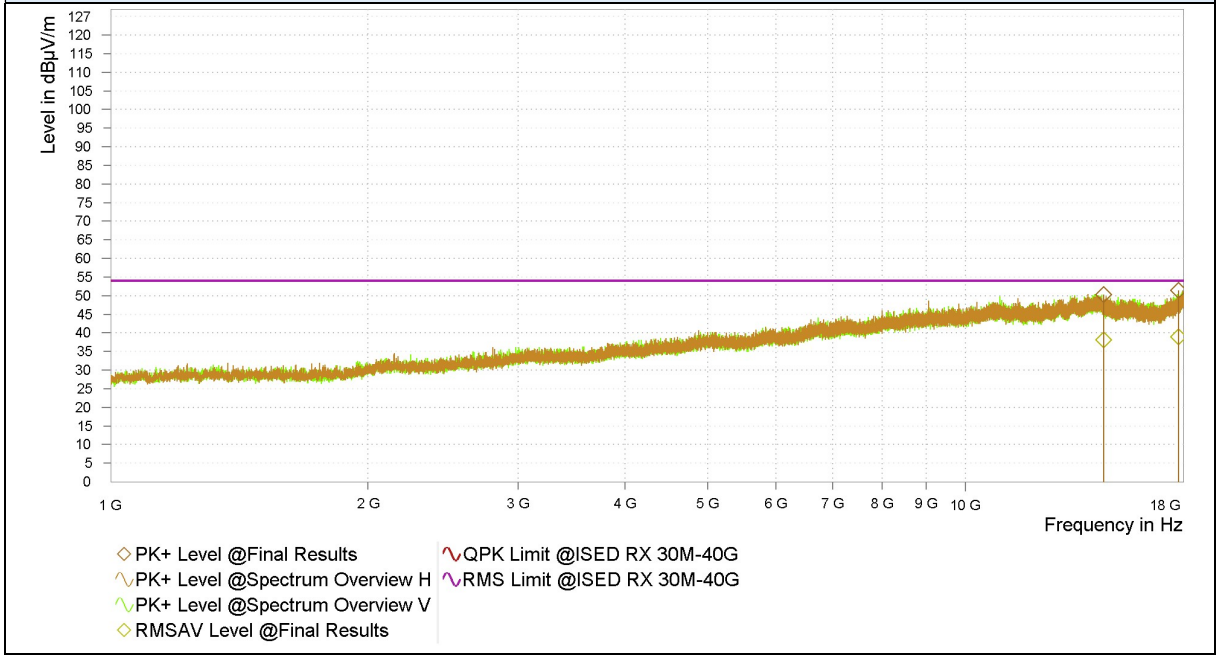
1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain
2. The test was conducted in CH 0, which is a worst-case mode

▣ TEST PLOTS

Receiver Spurious Emission below 1 GHz: BLE 1M (CH 0)



Receiver Spurious Emission above 1 GHz: BLE 1M (CH 0)



Note:

1. The worst-case plot are included in this report.

9.9. AC POWER LINE CONDUCTED EMISSIONS

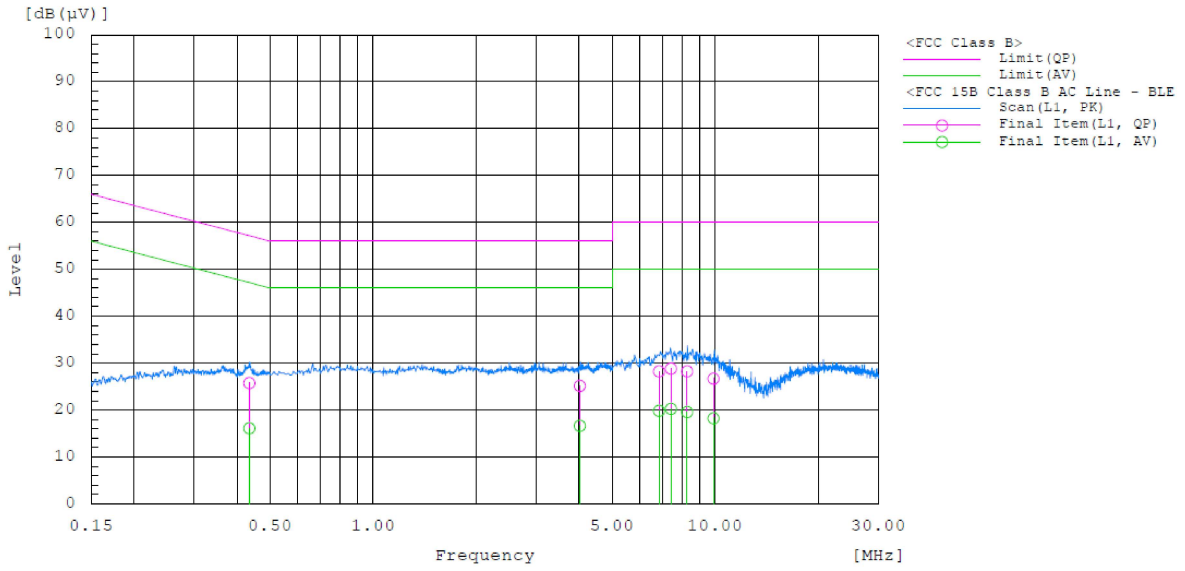
Frequency (MHz)	Line	Reading (dBuV)		Corr.[1] (dB)	Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		QP	CAV		QP	CAV	QP	CAV	QP	CAV
0.434	L1	16.1	6.5	9.6	25.7	16.1	57.2	47.2	31.5	31.1
4.019	L1	15.4	6.9	9.8	25.2	16.7	56.0	46.0	30.8	29.3
6.847	L1	18.3	9.8	10.0	28.3	19.8	60.0	50.0	31.7	30.2
7.427	L1	18.8	10.3	10.0	28.8	20.3	60.0	50.0	31.2	29.7
8.270	L1	18.3	9.6	10.0	28.3	19.6	60.0	50.0	31.7	30.4
9.884	L1	16.7	8.3	10.0	26.7	18.3	60.0	50.0	33.3	31.7

Frequency (MHz)	Line	Reading (dBuV)		Corr.[1] (dB)	Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		QP	CAV		QP	CAV	QP	CAV	QP	CAV
3.758	N	15.5	9.3	9.8	25.3	19.1	56.0	46.0	30.7	26.9
4.095	N	15.6	8.6	9.8	25.4	18.4	56.0	46.0	30.6	27.6
6.354	N	17.6	10.7	9.9	27.5	20.6	60.0	50.0	32.5	29.4
7.373	N	18.3	12.1	10.0	28.3	22.1	60.0	50.0	31.7	27.9
7.757	N	17.9	11.7	10.0	27.9	21.7	60.0	50.0	32.1	28.3
8.824	N	17.0	9.7	10.0	27.0	19.7	60.0	50.0	33.0	30.3

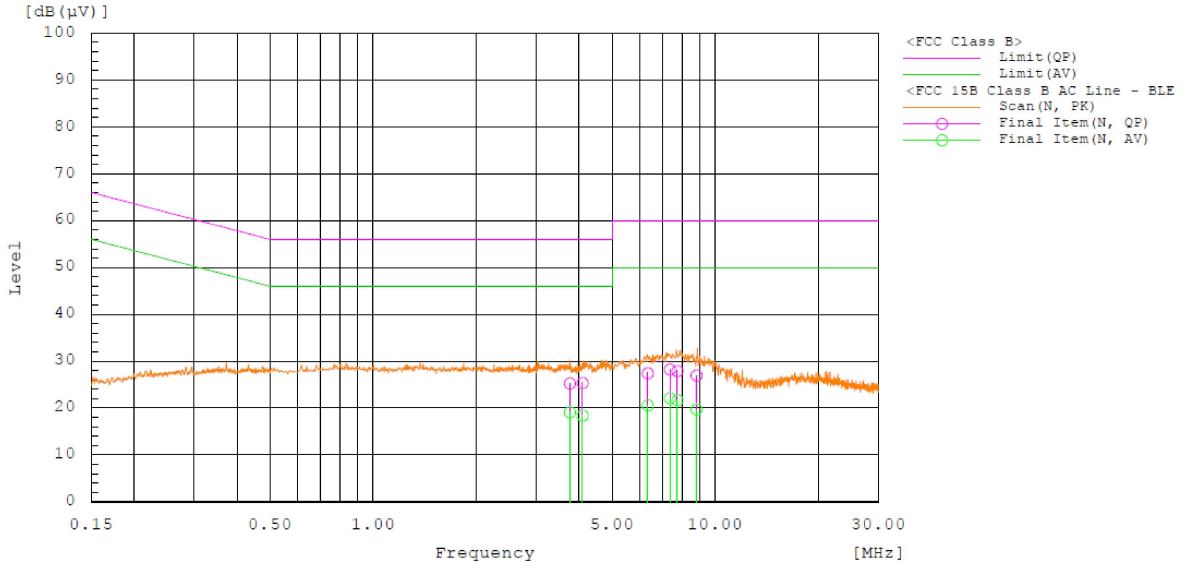
Note(s):
1.Quasi-peak (Final Result) = Reading Value + Correlation Factor

▣ TEST PLOTS

AC Line Conducted Emissions (L1)



AC Line Conducted Emissions (N)



10. LIST OF TEST EQUIPMENT

No.	Instrument	Model No.	Calibration Due (mm/dd/yy)	Manufacture	Serial No.
☒	Attenuator (20 dB, DC ~ 26.5 GHz)	CFADC262002	10/09/2026	CERNEX	-
☒	Signal Analyzer (1 Hz ~ 40.0 GHz)	ESW44	7/25/2026	Rohde & Schwarz	102015
☒	Signal Analyzer (10 Hz ~ 26.5 GHz)	N9020A	10/09/2026	Keysight	MY53280148
☒	Loop Antenna (0.009 MHz ~ 30 MHz)	HLA 6121	03/03/2027	TESEQ	43964
☒	BI-LOG Antenna (30 MHz ~ 6 GHz)	JB6	10/22/2026	Sunol	A071116
☒	Horn Antenna (1 GHz ~ 18 GHz)	DRH-118	12/04/2026	Sunol	A061616
☒	Horn Antenna (18 GHz ~ 40 GHz)	DRH-1840	01/16/2027	Sunol	17121
☒	High Pass Filter	WHK10-2520-3000-18000-40EF	10/06/2026	Wainwright	9
☒	LNA (1 GHz ~ 18 GHz)	PAM-118A	01/15/2026	Com-Power	18040074
☒	LNA (18 GHz ~ 40 GHz)	CBL18405045-01	12/03/2025	CERNEX, Inc.	27973
☒	Test Software	R&S*ELEKTRA	-	Rohde & Schwarz	-
☒	True RMS Multimeter	87	1/02/2026	Fluke	62150322
☒	ESR Test Receiver	ESR3	7/18/2026	Rohde & Schwarz	102363
☒	LISN	ENV216	12/05/2025	Rohde & Schwarz	101349
☒	Test Software	EP9CE	-	Toyo Corporation	-

Note(s):

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

APPENDIX A. TEST SETUP PHOTOS

The setup photos are provided as a separate document.

APPENDIX B. PHOTOGRAPHS OF EUT

B. INTERNAL PHOTOS

The internal photos are provided as a separate document.

END OF TEST REPORT

TEST REPORT

APPLICANT
Garmin International Inc

MODEL NAME
A05125

FCC ID
IPH-05125

ISED ID
1792A-05125

REPORT NUMBER
HA2511-0267-R02-01

TEST REPORT

Date of Issue
December 08, 2025

Test Site
HCT America, Inc.
840 Yosemite Way, Milpitas, CA 95035, USA

Applicant	Garmin International Inc
Applicant Address	1200 E. 151st Street Olathe, Kansas 66062, USA
FCC ID	IPH-05125
ISED ID	1792A-05125
Model Name	A05125
EUT Type	Low-Power transmitter
Modulation Type	Non-Modulation
FCC Classification	DTS with 24 GHz Radar
FCC Rule Part(s)	47 CFR FCC PART C § 15.245/15.205/15.207/15.209
ISED Rule Part(s)	RSS-210 ISSUE 11 RSS-GEN ISSUE 5 Amd 2
Test Procedure	ANSI C63.10-2020

The device bearing the trade name and model specified above, has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures required. The results of testing in this report apply only to the product which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

HCT America, Inc. certifies that no party to application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C 862

Tested By

Kevin Kim

Test Engineer

Reviewed By

Dan Coronia

Technical Manager

REVISION HISTORY

The revision history for this document is shown in table.

TEST REPORT NO.	REVISION	DATE	DESCRIPTION
HA2511-0267-R02	0	December 04, 2025	Initial Issue
HA2511-0267-R02-01	1	December 08, 2025	Updated Section 4: Facilities and Accreditations

TABLE OF CONTENTS

1. GENERAL INFORMATION

EUT DESCRIPTION

Model	A05125
Product Name	A05125
Serial Number	18089175
Power Supply	USB 5 VDC or Internal battery 3.4-4.2 VDC
RF Specification	Bluetooth 5.4 LE (1M/2M), 24 GHz Radar
Transmitter Chain	1

RF SPECIFICATION SUBJECT TO THE REPORT

RF Specification	24 GHz Radar
Transmitter Chain	1
Frequency Range	24 078 MHz – 24 172 MHz
Modulation Type	Non-Modulation
Antenna Specification [1)]	Antenna type TX: Patch Array Antenna RX: Patch Array Antenna
Firmware Version [2)]	2.09
Hardware Version [2)]	A05125
Sample Receipt Date	November 10 & 13, 2025
Date(s) of Tests	November 10, 2025, ~ November 20, 2025

Note(s):
1. Antenna information is based on the document provided.
2. Firmware and Hardware Versions are provided by the client.
3. This EUT transmit and receive simultaneously.

OPERATING FREQUENCY CHANNELS

24 GHz Radar	
Channel	**Frequency (MHz)**
Low	24 078.000
Mid	24 125.000
High	24 172.000

2. METHODOLOGY

The measurement procedure described in the "American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices" (ANSI C63.10-2020) Operating Under 47 CFR §15.245 were used in the measurement.

EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx Frequency that was for the purpose of the measurements.

GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2 of ANSI C63.10. (Version :2020) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane below 1GHz. Above 1GHz with 1.5m using absorbers between the EUT and receive antenna. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. Also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. To find out the maximum emission, the relative positions of this hand-held transmitter (EUT) were rotated through three orthogonal axes according to the requirements in Section 8 of ANSI C63.10.

DESCRIPTION OF TEST MODES

The EUT was tested under normal operating conditions.

3. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment's, which is traceable to recognized national standards. Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version: 2020).

4. FACILITIES AND ACCREDITATIONS

FACILITIES

HCT America, Inc. holds A2LA accreditation (certificate no. 4201.01) covering all testing included in the scope of this report. All tests were conducted at the facilities listed below.

	Address	ISED CABID	ISED Company Number	FCC Registration
☒	840 Yosemite Way, Milpitas, CA 95035 USA	US0189	11081A	898494
☐	1177 Comstock Road, Hollister, CA 95023 USA	US0189	11081A	898494

Accredited Laboratory

A2LA has accredited

HCT AMERICA, INC.

Milpitas, CA

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This laboratory also meets the A2LA – R256 – Specific Requirements. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system *(refer to joint ISO-ILAC-IAF Communiqué dated April 2017)*.

Presented this 22nd day of September 2025.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 4201.01
Valid to July 31, 2027

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

5. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203:
"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section."

(1) The antenna of this E.U.T is permanently attached and there is no provision for connection to an external antenna.
(2) The E.U.T Complies with the requirement of §15.203

According to RSS-Gen Issue 5 Amd 2 (Section 6.8):
The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below).

When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer.

The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.

6. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2020.

All measurement uncertainty values are shown with a coverage factor of k = 2 to indicate a 95 % level of confidence. The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty
Output Power, Conducted	± 0.54 dB
Occupied Bandwidth	± 120.66 kHz
Unwanted Emissions, Conducted	± 0.54 dB
Radiated Emissions (below 1 GHz)	± 5.29 dB
Radiated Emissions (Above 1~40 GHz)	± 4.29 dB
Radiated Emissions (Above 40 GHz)	± 5.58 dB

7. DESCRIPTION OF TESTS

7.1. BANDWIDTH

LIMIT

§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 SETUP

TEST PROCEDURE (20 dB BANDWIDTH)

ANSI C63.10:2020

The transmitter output is connected to the Spectrum Analyzer.
The Spectrum Analyzer setting:

- RBW = 100 kHz
- VBW ≥ 3 x RBW
- Detector = Peak
- Trace mode = max hold
- Sweep = auto couple
- Allow the trace to stabilize
- Use X dB bandwidth measurement function from the spectrum analyzer by setting X dB to 20 dB

TEST PROCEDURE (99% Bandwidth) for ISED

The transmitter output is connected to the spectrum analyzer.

- RBW = 1% ~ 5% of the occupied bandwidth
- VBW ≒ 3 x RBW
- Detector = Peak
- Trace mode = max hold
- Sweep = auto couple
- Allow the trace to stabilize

Note(s):
We tested OBW using the automatic bandwidth measurement capability of a spectrum analyzer.

7.2. FIELD STRENGTH OF FUNDAMENTAL

LIMIT

§15.245(b)

(a) Operation under the provisions of this section is limited to intentional radiators used as field disturbance sensors, excluding perimeter protection systems.

(b) The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

§RSS-210 Annex F

The provisions of this annex are specific to devices operating in the bands 902-928 MHz, 2435-2465 MHz, 5785-5815 MHz, 10.5-10.55 GHz, 24.075-24.175 GHz and 33.4-36 GHz.

F.1 Field disturbance sensors

This section sets out the requirements for field disturbance sensor (FDS) units operating in the frequency bands shown in table F1. An FDS is a device designed to detect changes in a radio frequency field as a result of movement of persons or objects within its range.

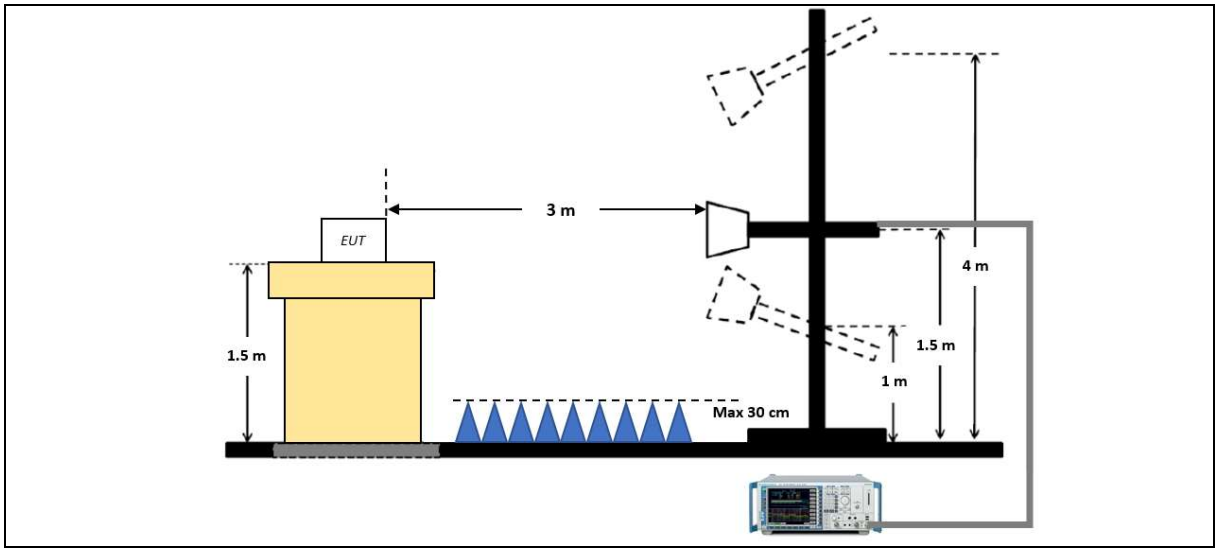
Perimeter protection systems, which employ a leaky transmission line as the radiating source, are excluded from the requirements of this section.

Devices shall comply with the following requirements:

a. The average field strength of fundamental and harmonic emissions measured at a distance of 3 m shall not exceed the limits shown in table F1.

Fundamental frequency (MHz)	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (millivolts/meter)
902-928	500	1.6
2435-2465	500	1.6
5785-5815	500	1.6
10500-10550	2500	25.0
24075-24175	**2500**	**25.0**

TEST SETUP



7.3. RADIATED EMISSIONS

RADIATION EMISSION LIMIT

FCC: 47 CFR § 15.209		
Frequency (MHz)	**Field Strength (uV/m)**	**Measurement Distance (m)**
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

ISED: RSS-GEN Section 8.9		
Frequency (MHz)	**Field Strength (uV/m)**	**Measurement Distance (m)**
0.009 – 0.490	6.37/F(kHz)	300
0.490 – 1.705	63.7/F(kHz)	30
1.705 – 30	0.08	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

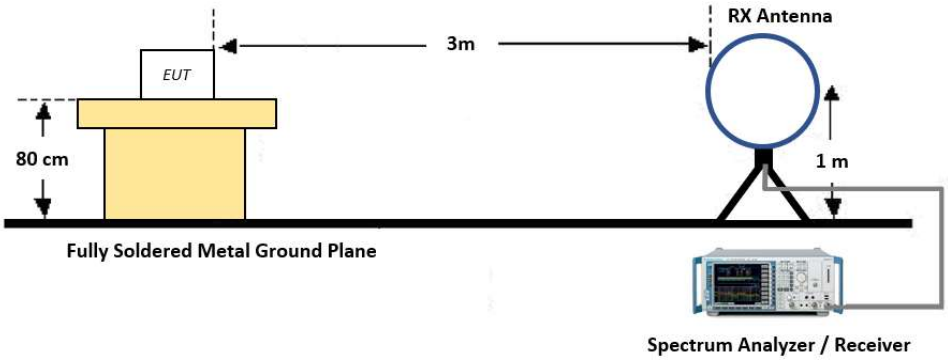
FCC: §15.245(b) ISED: RSS-210 Annex F		
Fundamental frequency (MHz)	**Field strength of fundamental (millivolts/meter)**	**Field strength of harmonics (millivolts/meter)**
902-928	500	1.6
2435-2465	500	1.6
5785-5815	500	1.6
10500-10550	2500	25.0
24075-24175	**2500**	**25.0**

RECEIVER RADIATED EMISSION LIMIT

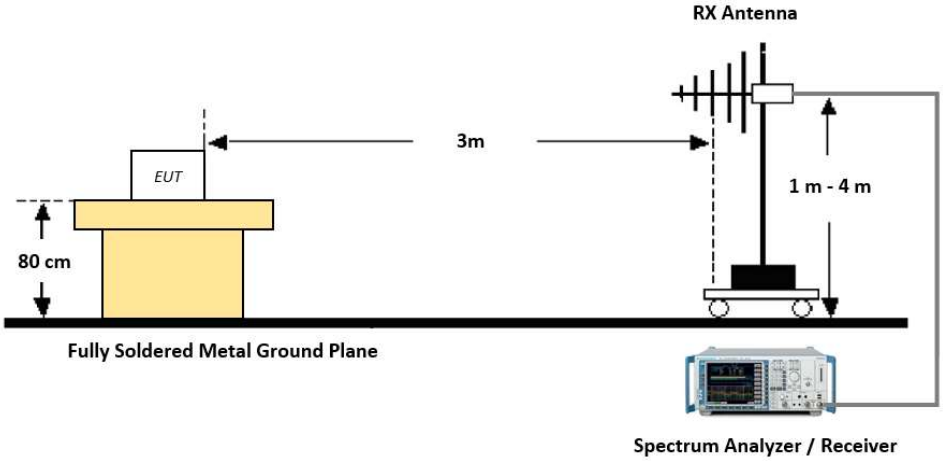
ISED: RSS-GEN Section 7.3		
Frequency (MHz)	**Field Strength (uV/m)**	**Measurement Distance (m)**
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

TEST SETUP

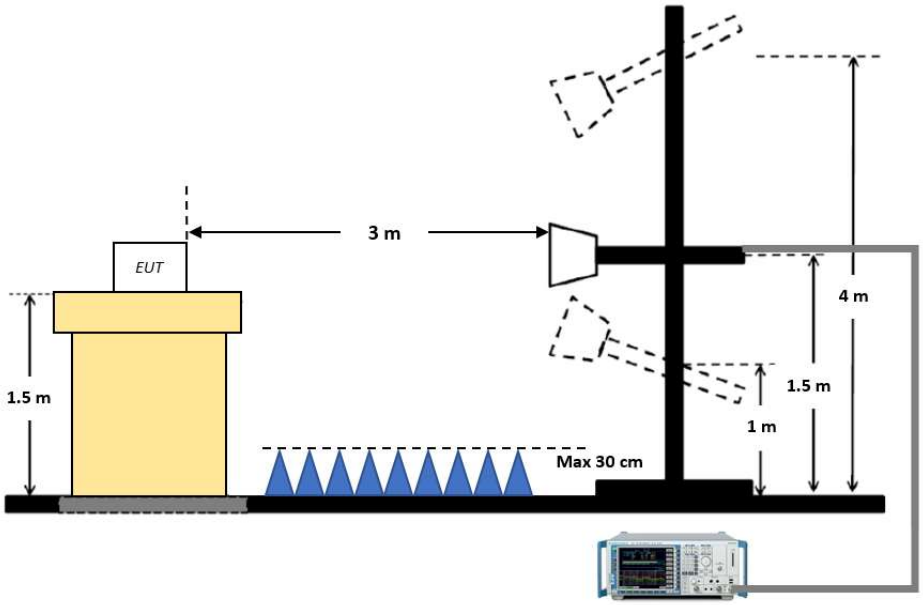
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



TEST PROCEDURE OF RADIATED SPURIOUS EMISSION (BELOW 30 MHz)

Subclause 11.11 and 11.12 in ANSI 63.10-2020

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The loop antenna was placed at a location 3m from the EUT
3. The EUT is placed on a turntable, which is 0.8m above ground plane.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Distance Correction Factor (0.009 MHz – 0.490 MHz) = 40*log (3 m/300 m) = - 80 dB
   Measurement Distance: 3 m
7. Distance Correction Factor (0.490 MHz – 30 MHz) = 40*log (3 m/30 m) = - 40 dB
   Measurement Distance: 3 m
8. Spectrum Setting

   - Frequency Range = 9 kHz ~ 30 MHz
   - Detector = Peak
   - Trace = Max hold
   - RBW = 9 kHz
   - VBW ≥ 3*RBW

9. Total = Reading Value + Antenna Factor (A.F) + Cable Loss (C.L)
10. There is a comparison data both open-field test site and alternative test site – semi-Anechoic chamber according to 414788 D01. And the results are properly calibrated.

TEST PROCEDURE OF RADIATED SPURIOUS EMISSION (30 MHz – 1 GHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The EUT is placed on a turntable, which is 0.8 m above ground plane.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
5. Spectrum Setting

   (1) Measurement Type (Peak):
   - Measured Frequency Range: 30 MHz – 1 GHz
   - Detector = Peak
   - Trace = Max hold
   - RBW = 100 kHz
   - VBW ≥ 3*RBW

   (2) Measurement Type(Quasi-peak):
   - Measured Frequency Range: 30 MHz – 1 GHz
   - Detector = Quasi-Peak
   - RBW = 120 kHz

6. Total = Reading Value + Antenna Factor (A.F) + Cable Loss (C.L)

TEST PROCEDURE OF RADIATED SPURIOUS EMISSION (ABOVE 1 GHz)

Subclause 11.11 and 11.12 in ANSI 63.10-2020

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. The unit was tested with its standard battery.
8. Spectrum Setting

(1) Measurement Type (Peak):
- Measured Frequency Range: 1 GHz – 25 GHz
- Detector = Peak
- Trace = Max hold
- RBW = 1 MHz
- VBW ≥ 3*RBW

(2) Measurement Type(Average): Duty cycle ≥ 98%
- Measured Frequency Range: 1 GHz – 25 GHz
- Detector = RMS
- Averaging type = power (*i.e.*, RMS)
- RBW = 1 MHz
- VBW ≥ 3*RBW
- Sweep time = auto.
- Trace mode = average (at least 100 traces).

(3) Measurement Type(Average): Duty cycle <98%, duty cycle variations are less than ±2%
- Measured Frequency Range: 1 GHz – 25 GHz
- Detector = RMS
- Averaging type = power (*i.e.*, RMS)
- RBW = 1 MHz
- VBW ≥ 3*RBW
- Sweep time = auto.
- Trace mode = average (at least 100 traces).
- Correction factor shall be added to the measurement results prior to comparing to the emission limit to compute the emission level that would have been measured had the test been performed at 100 % duty cycle.
- Duty Cycle Factor (dB): Please refer to the please refer to section 9.1.

10. Measurement value only up to 6 maximum emissions noted or would be lesser if no specific emissions from the EUT are recorded (i.e.: margin > 20 dB from the applicable limit) and considered that is already beyond the background noise floor.

11. Sample Calculation

(1) Total (Peak) = Reading Value + Antenna Factor (A.F) + Cable Loss (C.L) - Amp Gain(G)
(2) Total (Average, Duty ≥ 98%) = Reading Value + Antenna Factor (A.F) + Cable Loss (C.L) - Amp Gain(G)
(3) Total (Average, Duty < 98%) = Reading Value + Antenna Factor (A.F) + Cable Loss (C.L) - Amp Gain(G) + Duty Cycle Factor
(4) Alternative Method: Total (Average) = Total (Peak) + 20 log (Duty Cycle)

TEST PROCEDURE OF RADIATED RESTRICTED BAND EDGE

Subclause 11.11 and 11.12 in ANSI 63.10-2020

1. Radiated test is performed with hopping off (if there is any)
2. The EUT is placed on a turntable, which is 1.5 m above ground plane.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
5. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. The unit was tested with its standard battery.
8. Spectrum Setting

(1) Measurement Type (Peak):
- Detector = Peak
- Trace = Max hold
- RBW = 1 MHz
- VBW ≥ 3*RBW

(2) Measurement Type(Average): Duty cycle ≥ 98%,
- Measured Frequency Range: 2310 MHz – 2390 MHz / 2483.5 MHz – 2500 MHz
- Detector = RMS
- Averaging type = power (*i.e.*, RMS)
- RBW = 1 MHz
- VBW ≥ 3*RBW
- Sweep time = auto.
- Trace mode = average (at least 100 traces).

(3) Measurement Type(Average): Duty cycle <98%, duty cycle variations are less than ±2%
- Measured Frequency Range: 2310 MHz – 2390 MHz / 2483.5 MHz – 2500 MHz
- Detector = RMS
- Averaging type = power (*i.e.*, RMS)
- RBW = 1 MHz
- VBW ≥ 3*RBW
- Sweep time = auto.
- Trace mode = average (at least 100 traces).
- Correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 % duty cycle.
- Duty Cycle Factor (dB): Please refer to the please refer to section 9.1.

9. Measurement value only up to 6 maximum emissions noted or would be lesser if no specific emissions from the EUT are recorded (i.e.: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

10. Sample Calculation

(1) Total (Peak) = Reading Value + Antenna Factor (A.F) + Cable Loss (C.L)
(2) Total (Average, Duty ≥ 98%) = Reading Value + Antenna Factor (A.F) + Cable Loss (C.L) - Amp Gain(G)
(3) Total (Average, Duty < 98%) = Reading Value + Antenna Factor (A.F) + Cable Loss (C.L) - Amp Gain(G) + Duty Cycle Factor

7.4. AC POWER LINE CONDUCTED EMISSIONS

LIMIT

47 CFR § 15.207, RSS-GEN Section 8.8
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 µH/50 ohms line impedance stabilization network (LISN).

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

*Decreases with the logarithm of the frequency.

Compliance with this provision shall be based on the measurement of the radio frequency.
voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

TEST SETUP

See test photographs attached in Annex A for the actual connections between EUT and support equipment.

TEST PROCEDURE

1. The EUT is placed on a wooden table 80 cm above the reference ground plane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detectors: Quasi Peak and Average Detector.

According to FCC KDB 174176 D01 Line Conducted FAQ v01r01:

Devices Operating Above 30 MHz

For a device with a permanent or detachable antenna operating above 30 MHz, measurements must be performed with the antenna connected as specified in clause 6.2 of ANSI C63.10-2020.

Devices Operating Below 30 MHz

For a device with a permanent or detachable antenna operating at or below 30 MHz, the FCC will accept measurements performed with a suitable dummy load in lieu of the antenna under the following conditions:
(1) Perform the AC powerline conducted tests with the antenna connected to determine compliance with Section 15.207 limits outside the transmitter's fundamental emission band;
(2) Retest with a dummy load in lieu of the antenna to determine compliance with Section 15.207 limits within the transmitter's fundamental emission band. For a detachable antenna, remove the antenna and connect a suitable dummy load to the antenna connector. For a permanent antenna, remove the antenna and terminate the RF output with a dummy load or network which simulates the antenna in the fundamental frequency band. All measurements must be performed as specified in clause 6.2 of ANSI C63.10-2020.

Sample Calculation

Quasi-peak (Final Result) = Reading Value + Correction Factor

8. SUMMARY OF TEST RESULTS

Test Description	FCC Part Section(s)	ISED Part Section(s)	Test Condition	Test Result
20 dB Bandwidth	§15.215(c)	-	Radiated	PASS
99 % Bandwidth	-	RSS-GEN, 6.7		PASS
Field Strength of Fundamental	§15.245(b)	RSS-210, Annex F		PASS
Radiated Spurious Emissions	§15.209 §15.245(b)(1)(i)	RSS-GEN, 8.9		PASS
Band Edge (Out of Band Emissions)	§15.245(b)	RSS-210, Annex F		PASS
Receiver Spurious Emissions	-	RSS-GEN, 7.3		PASS
AC Power line Conducted Emissions	§15.207	RSS-GEN, 8.8	Conducted	PASS

WORST CASE CONFIGURATION

RADIATED TEST

1. EUT Axis

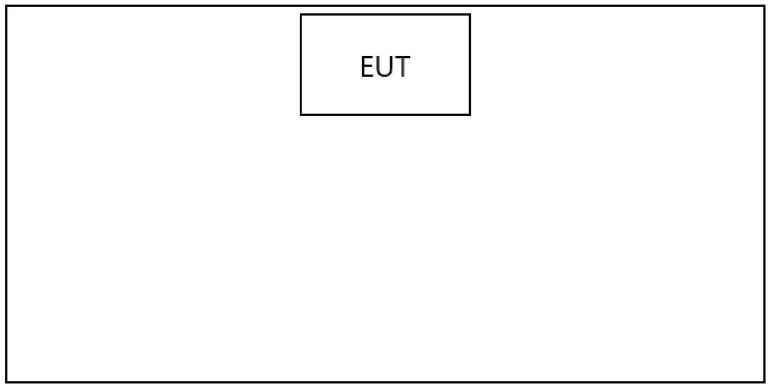
All X, Y, and Z positions for horizontal / vertical antenna polarization were investigated to find the worst-case position.
X position was selected for the final evaluation.

OUTPUT POWER SETTING

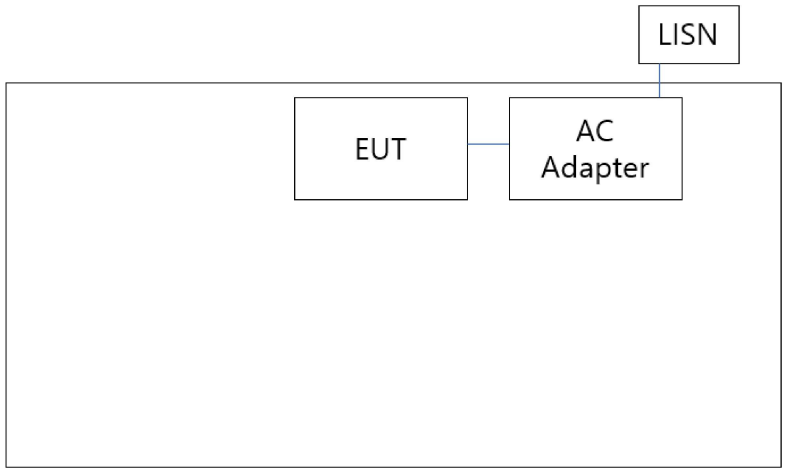
The output power setting is declared by the manufacturer.

TEST CONFIGURATION

Radiated Emission



Conducted Emission



LIST OF SUPPORT EQUIPMENT

Equipment Type	Model No.	Serial No.	Manufacturer	Qty	Note
AC adapter	AQ27A-59CFA	-	PHIHONG TECH CO LTD	1	
USB-C to USB-C cable, 0.5 meters	320-01642-00	-	CSTAR ELECTRONICS INTERNATIONAL INC.	1	

9. TEST RESULT

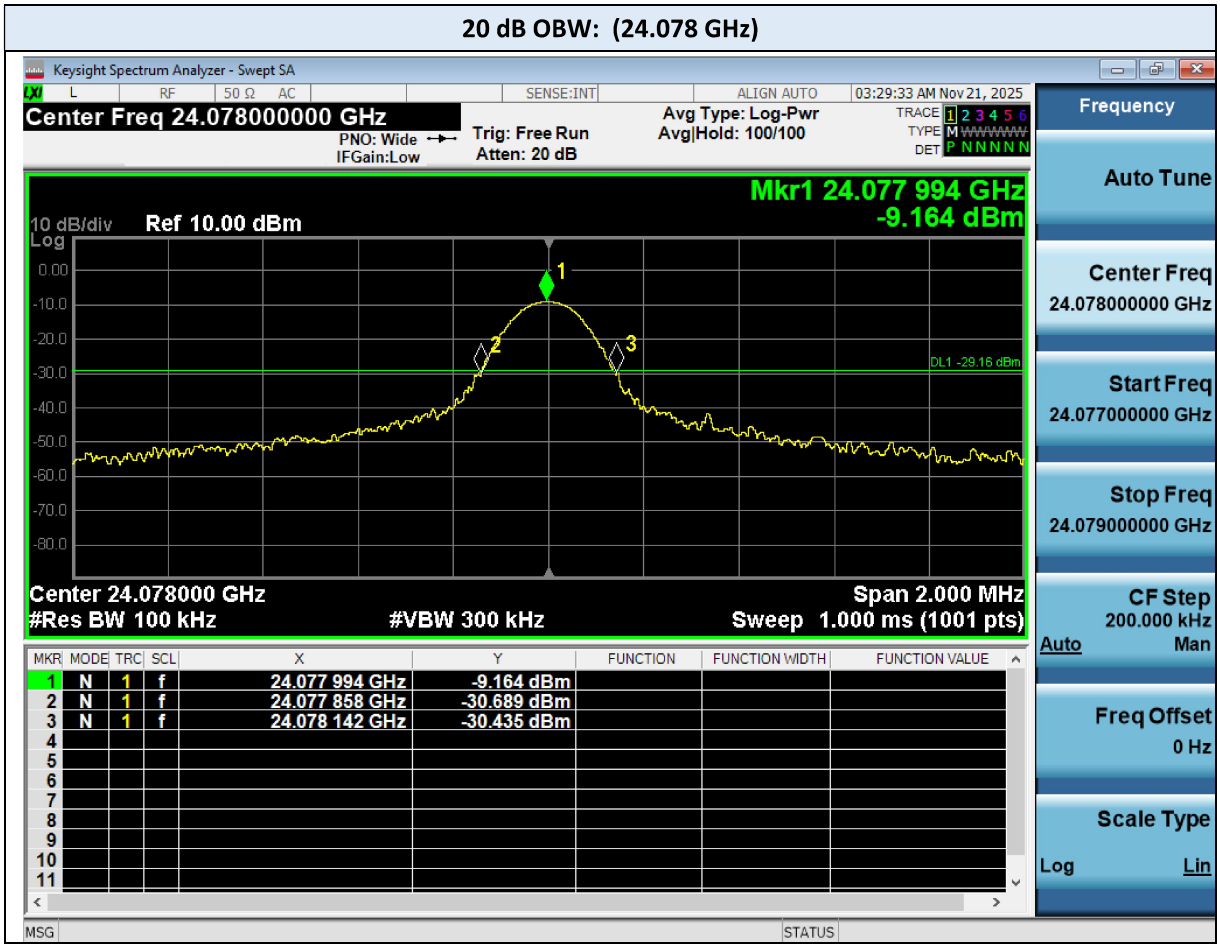
9.1. 99% BANDWIDTH / 20 dB BANDWIDTH MEASUREMENT

24 GHz Radar	99% Bandwidth (kHz)
Frequency (MHz)	Result
24 078	261.85
24 125	262.44
24 172	262.94

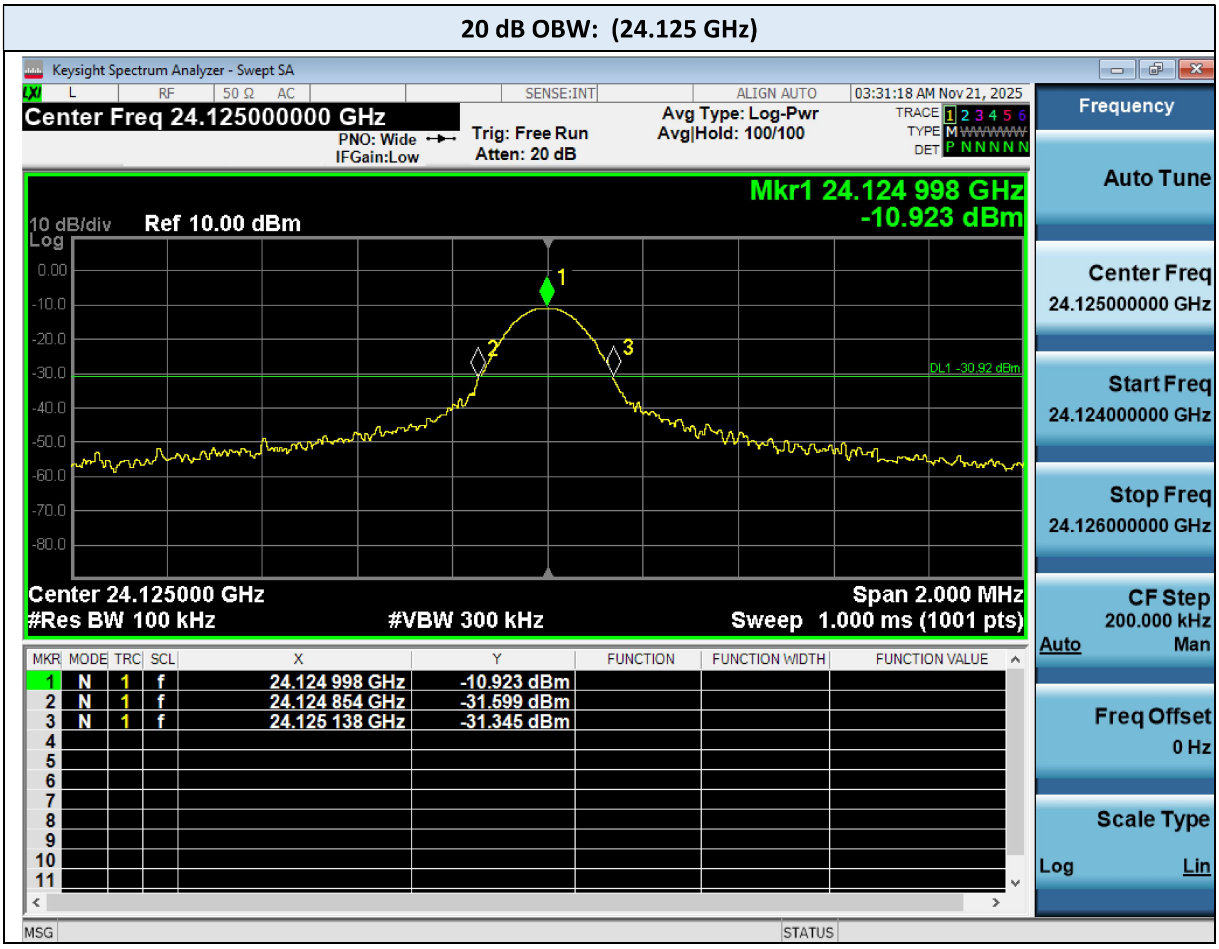
Frequency (MHz)	20 dB Bandwidth (kHz)	Meas FL (GHz)	FL Limit (GHz)	Meas FH (GHz)	FH Limit	Result
24 078	284	24.077 858	≥24.075	24.078 142	≤24.175	Pass
24 125	284	24.124 854	≥24.075	24.125 138	≤24.175	Pass
24 172	282	24.171 858	≥24.075	24.172 140	≤24.175	Pass

▣ TEST PLOTS

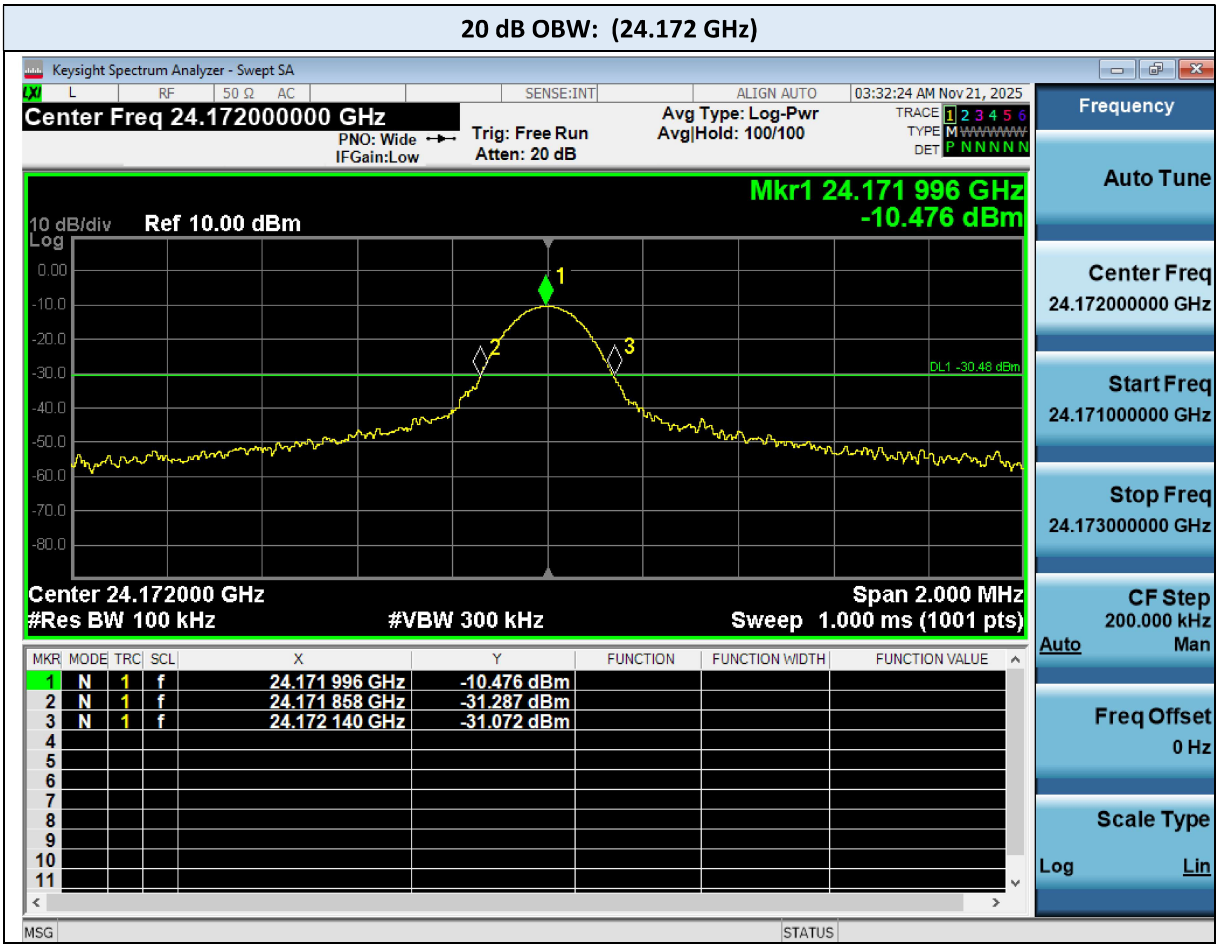
20 dB OBW: (24.078 GHz)



20 dB OBW: (24.125 GHz)



20 dB OBW: (24.172 GHz)



9.2. FIELD STRENGTH OF FUNDAMENTAL

Test Mode 24 GHz Radar
Operating Frequency 24 078 GHz

Frequency (GHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	Duty	AV	PK	AV	PK	AV	PK
24.078	H	107.30	107.38	-13.02	-	94.28	94.36	128	148	33.72	53.64
24.078	V	114.54	114.55	-13.02	-	101.52	101.53	128	148	26.48	46.47

Test Mode 24 GHz Radar
Operating Frequency 24 125 GHz

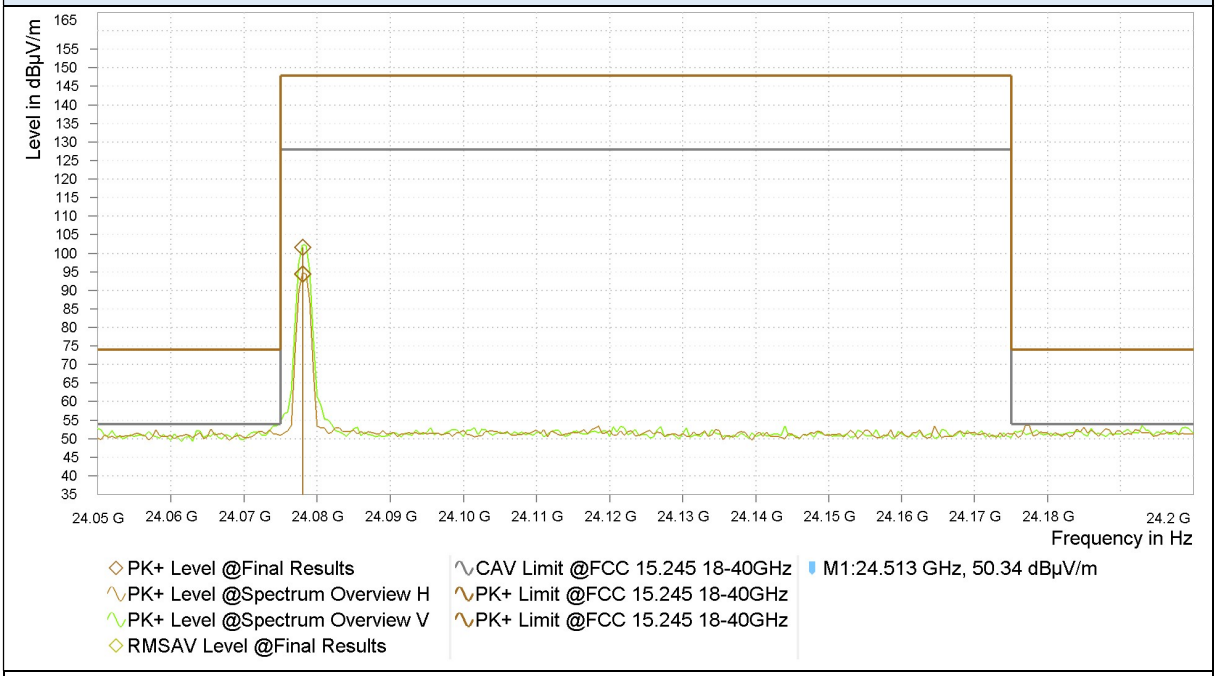
Frequency (GHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	Duty	AV	PK	AV	PK	AV	PK
24.125	H	101.98	102.12	-12.85	-	89.13	89.27	128	148	38.87	58.73
24.125	V	114.45	114.46	-12.85	-	101.60	101.61	128	148	26.40	46.39

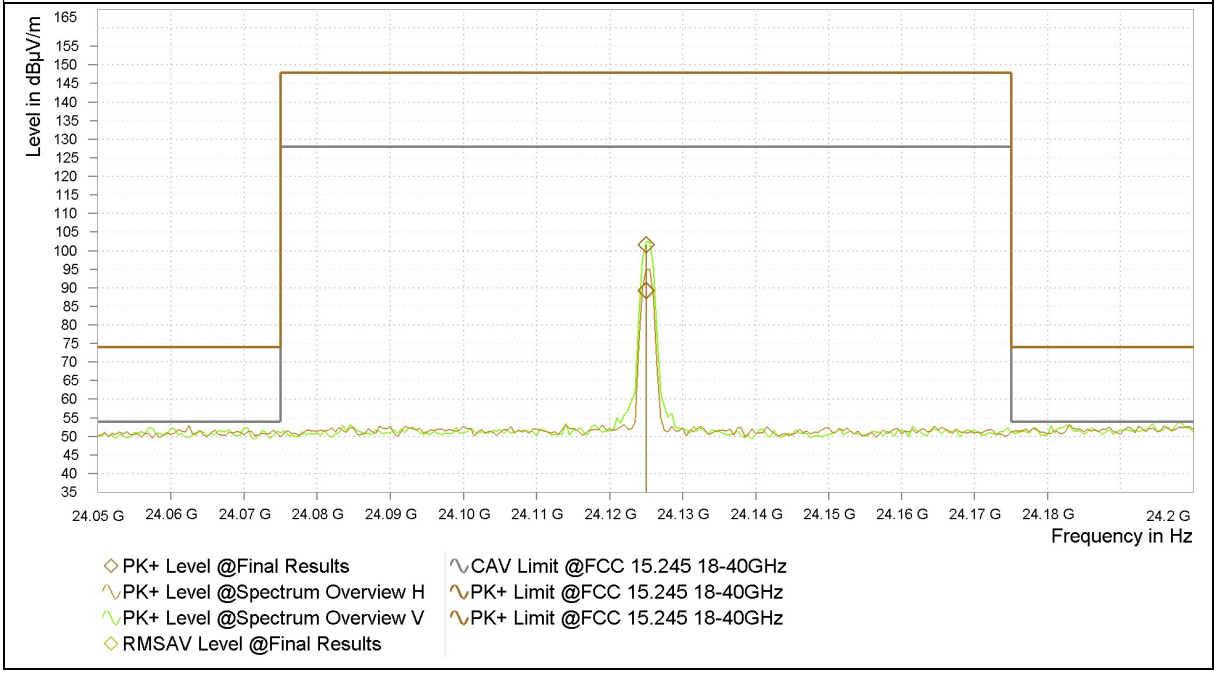
Test Mode 24 GHz Radar
Operating Frequency 24 172 GHz

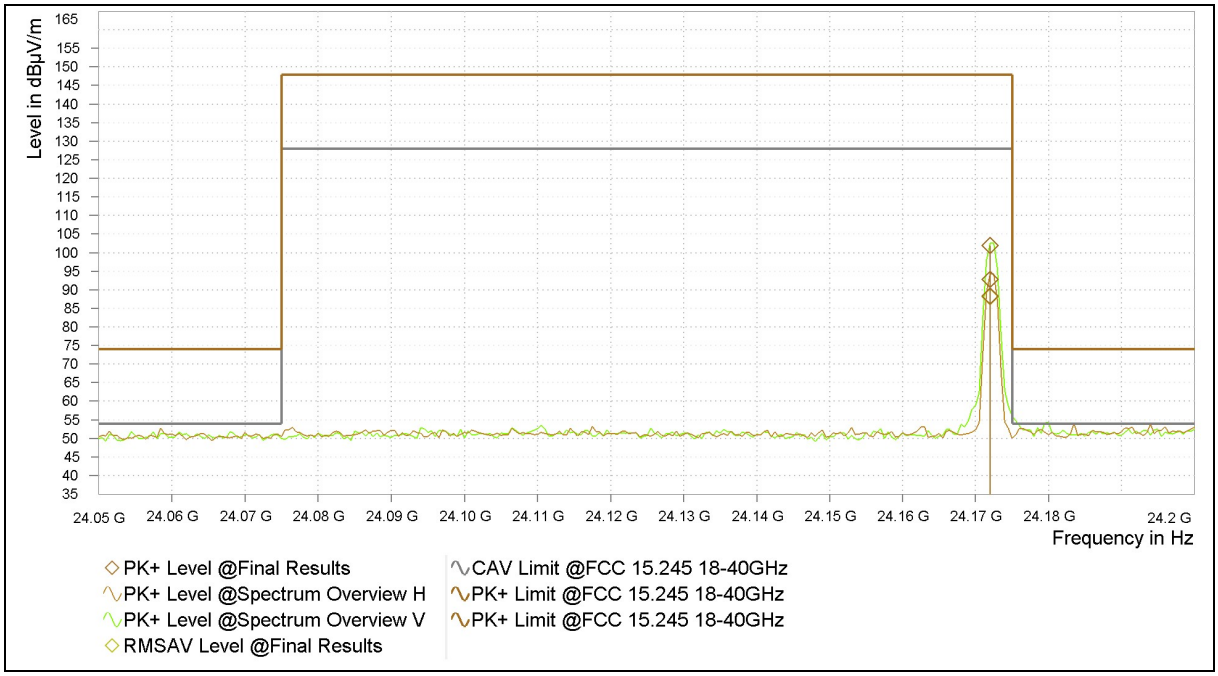
Frequency (GHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	Duty	AV	PK	AV	PK	AV	PK
24.172	H	105.39	105.49	-12.65	-	92.74	92.84	128	148	35.26	55.16
24.172	V	114.61	114.62	-12.65	-	101.96	101.97	128	148	26.04	46.03

▣ TEST PLOTS

FUNDAMENTAL (24.078 GHz, 24.125 GHz, 24.172 GHz)







9.3. RADIATED SPURIOUS EMISSIONS

Frequency Range: Below 1 GHz

Test Mode 24 GHz Radar
Operating Frequency 24 078 MHz

Frequency (MHz)	Polarization	Reading (dBuV)	Corr. [1] (dB)	Total (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement Type
No peak found							

Test Mode 24 GHz Radar
Operating Frequency 24 125 MHz

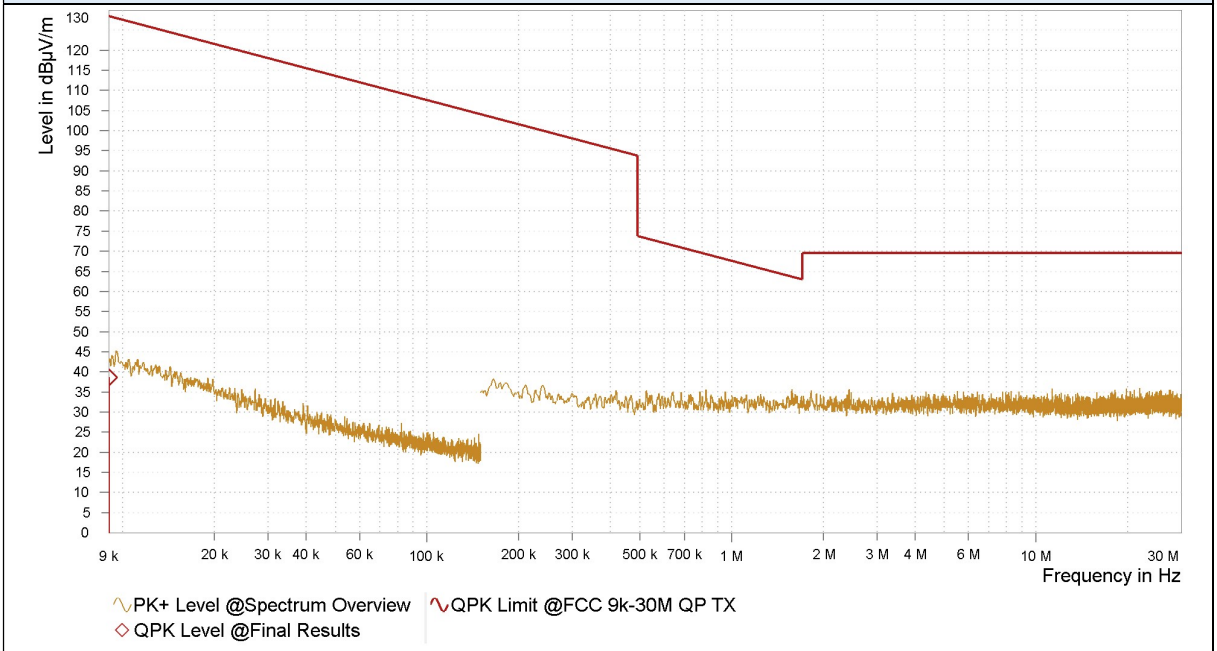
Frequency (MHz)	Polarization	Reading (dBuV)	Corr. [1] (dB)	Total (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement Type
No peak found							

Test Mode 24 GHz Radar
Operating Frequency 24 172 MHz

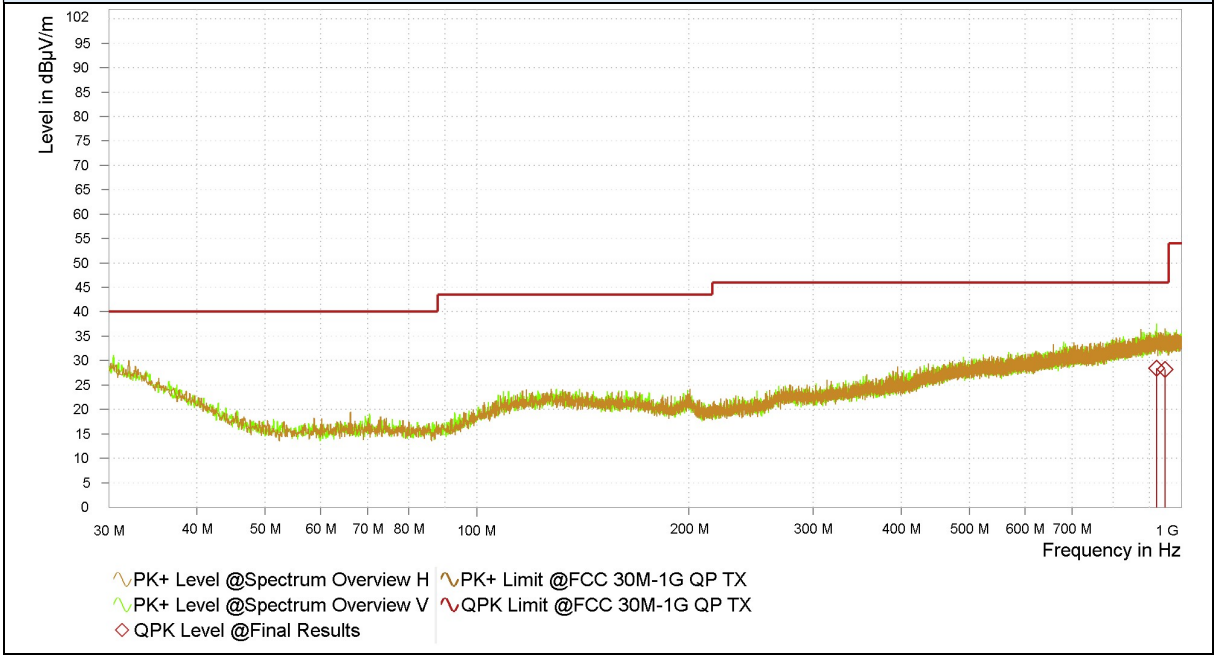
Frequency (MHz)	Polarization	Reading (dBuV)	Corr. [1] (dB)	Total (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement Type
No peak found							

▣ TEST PLOTS

Radiated Spurious Emission 9 kHz – 30 MHz (Antenna Position 90°)



Radiated Spurious Emission 30 MHz – 1 GHz



Note:

1. There were no major peaks, and representative plots are included in this report.
2. The plots include all used factor values for cables, antenna, preamplifier, etc.

Frequency Range: 1 GHz – 18 GHz

Test Mode 24 GHz Radar

Operating Frequency 24.078 MHz

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	Duty	AV	PK	AV	PK	AV	PK
14 084.009	H	30.43	42.56	7.80	-	38.23	50.36	54	74	15.77	23.64
17 823.824	V	29.94	42.34	8.03	-	37.97	50.37	54	74	16.03	23.63

Test Mode 24 GHz Radar

Operating Frequency 24.125 MHz

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	Duty	AV	PK	AV	PK	AV	PK
14 128.036	H	30.59	43.02	7.82	-	38.41	50.84	54	74	15.59	23.16
17 969.805	H	29.94	42.02	8.62	-	38.56	50.64	54	74	15.44	23.36

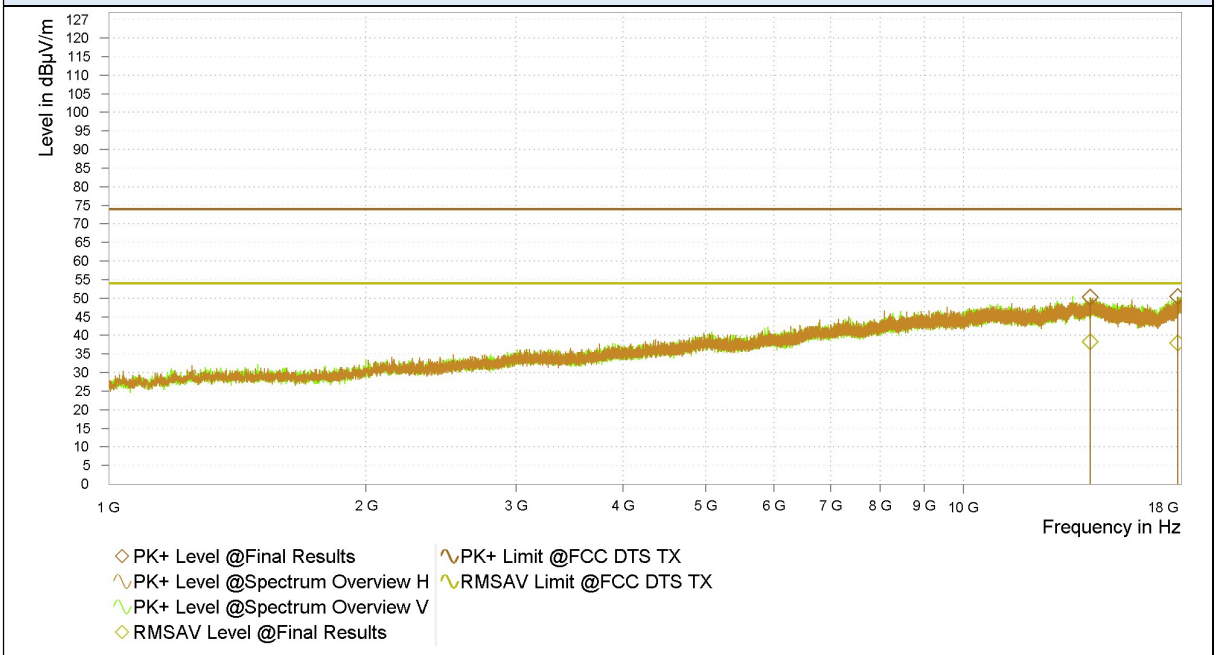
Test Mode 24 GHz Radar

Operating Frequency 24.172 MHz

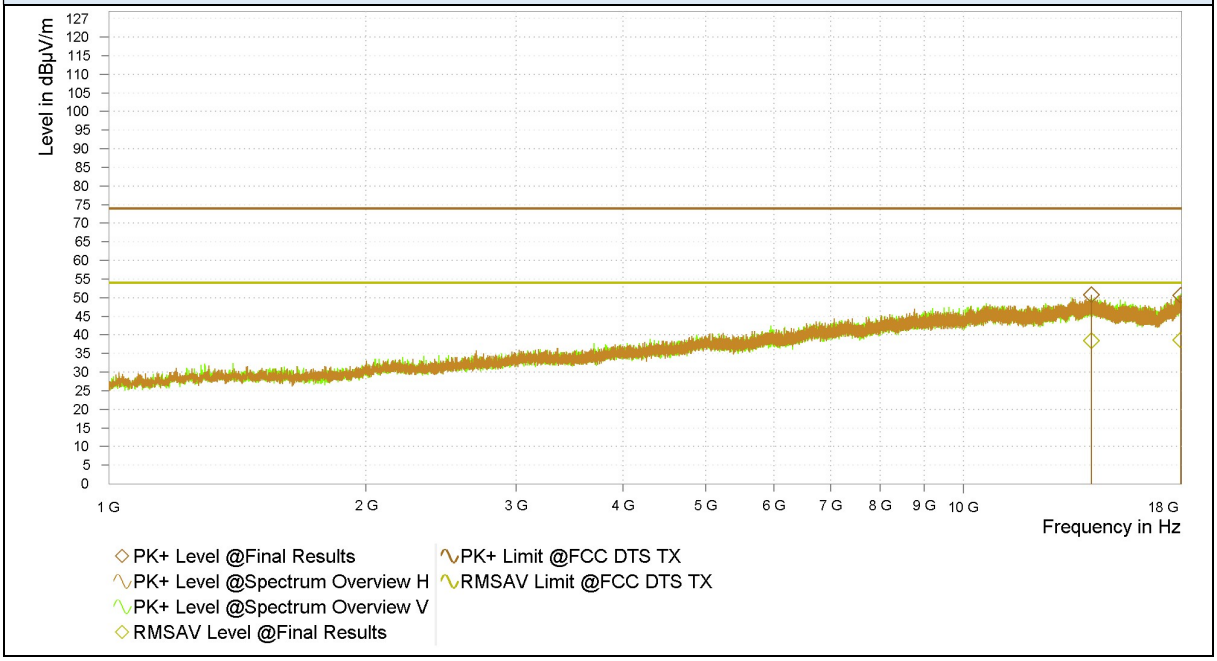
Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	Duty	AV	PK	AV	PK	AV	PK
17 923.096	H	30.25	43.20	8.41	-	38.66	51.61	54	74	15.34	22.39
17 934.544	V	29.99	42.81	8.66	-	38.65	51.47	54	74	15.35	22.53

▣ TEST PLOTS

Radiated Spurious Emission 1 GHz – 18 GHz : 24.078 GHz



Radiated Spurious Emission 1 GHz – 18 GHz : 24.125 GHz

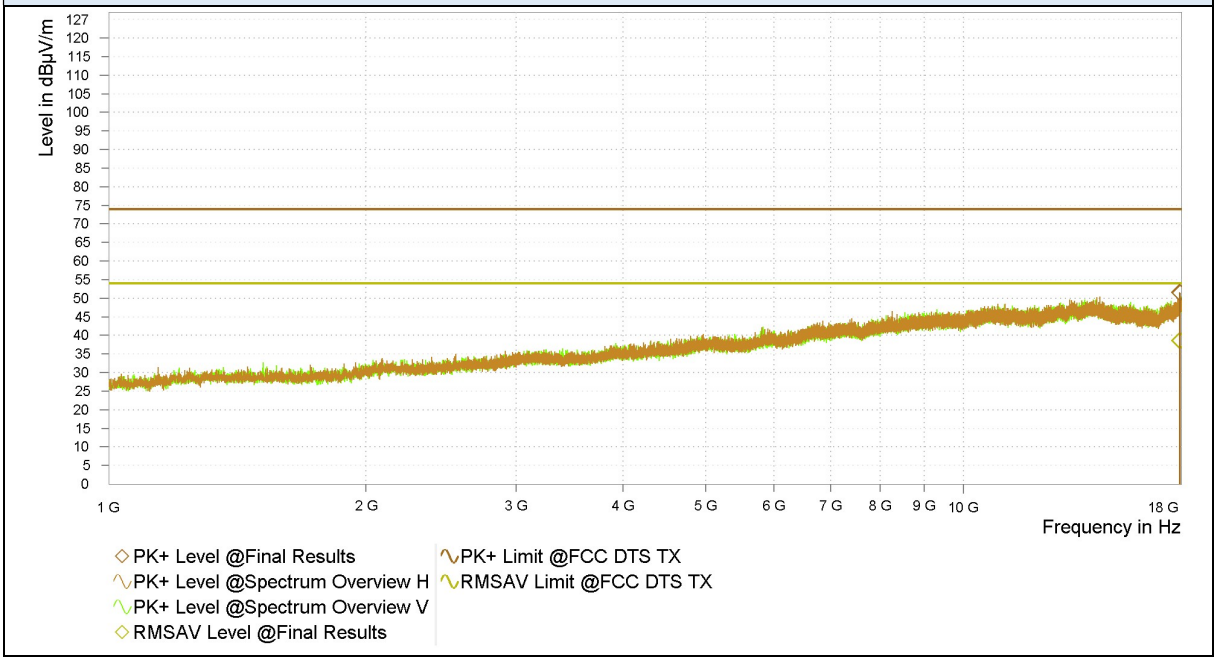


Note:

1. There were no major peaks, and representative plots are included in this report
2. The plots include all used factor values for cables, antenna, preamplifier, etc.

▣ TEST PLOTS

Radiated Spurious Emission 1 GHz – 18 GHz : 24.172 GHz



Note:

1. There were no major peaks and representative plots are included in this report
2. The plots include all used factor values for cables, antenna, preamplifier, etc.

Frequency Range: 18 GHz – 26 GHz (Band-Edge)

Test Mode 24 GHz Radar
Operating Frequency 24.078 MHz

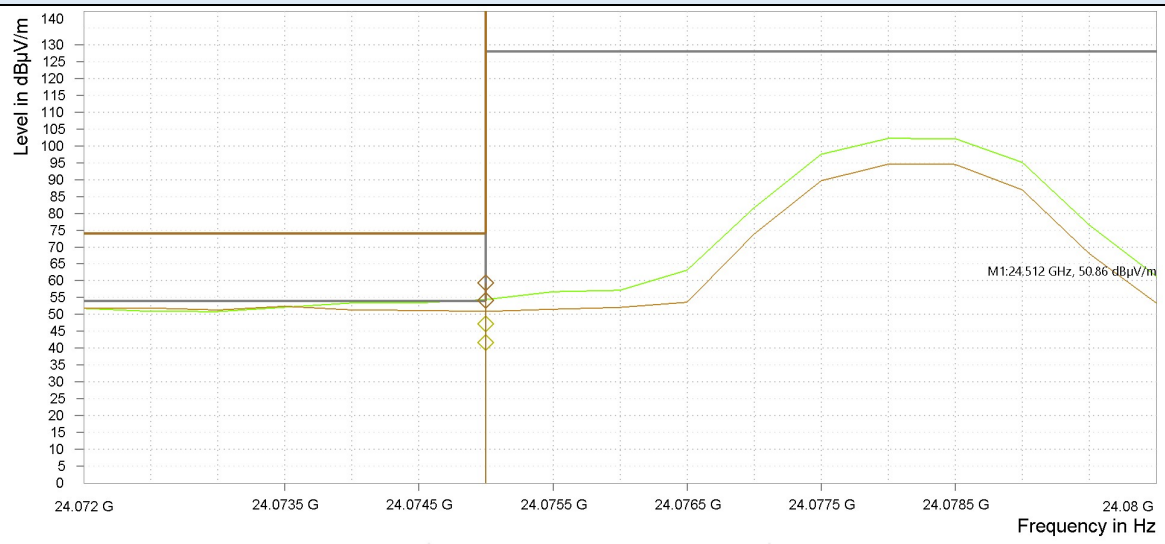
Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	Duty	AV	PK	AV	PK	AV	PK
24 075.000	H	54.74	67.29	-13.03	-	41.71	54.26	54	74	12.29	19.74
24 075.000	V	60.30	72.36	-13.03	-	47.27	59.33	54	74	6.73	14.67

Test Mode 24 GHz Radar
Operating Frequency 24.172 MHz

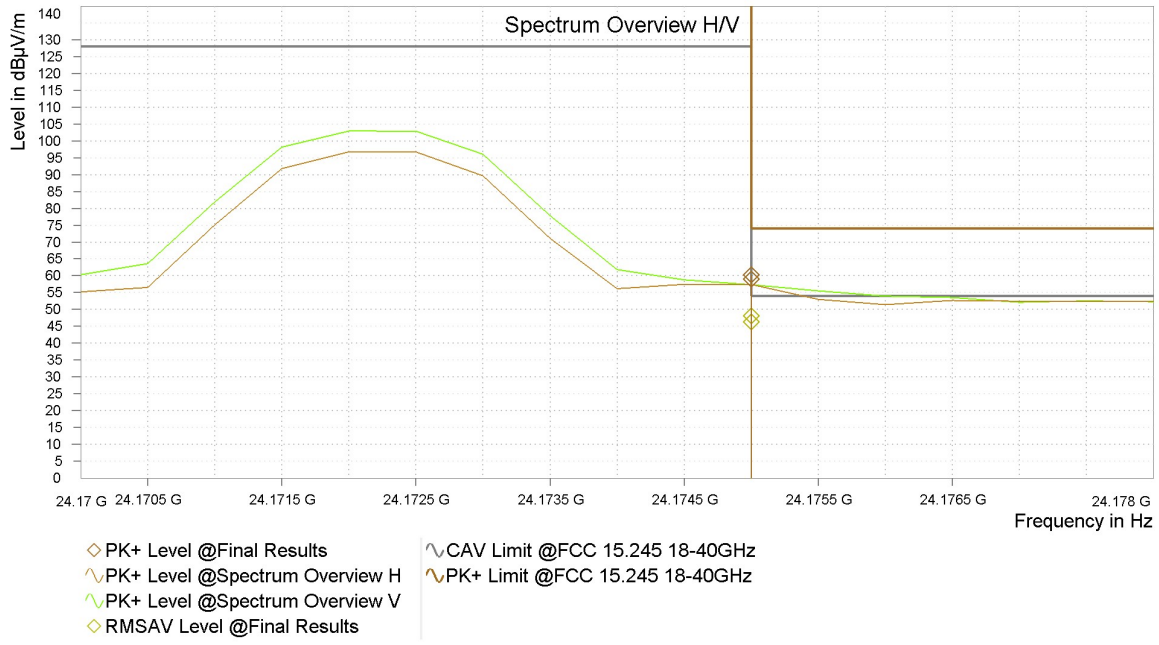
Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	Duty	AV	PK	AV	PK	AV	PK
24 175.000	H	58.85	71.59	-12.63	-	46.22	58.96	54	74	7.78	15.04
24 175.000	V	60.75	72.92	-12.63	-	48.12	60.29	54	74	5.88	13.71

▣ TEST PLOTS

Band Edge: 24.078 GHz



Band Edge: 24.172 GHz



Note:

1. There were no major peaks and representative plots are included in this report
2. The plots include all used factor values for cables, antenna, preamplifier, etc.

Frequency Range: 18 GHz – 26 GHz

Test Mode 24 GHz Radar
Operating Frequency 24.078 MHz

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	Duty	AV	PK	AV	PK	AV	PK
25 356.000	V	56.16	68.32	-12.17	-	43.99	56.15	54	74	10.01	17.85
25 747.000	H	56.02	68.27	-12.71	-	43.31	55.56	54	74	10.69	18.44

Test Mode 24 GHz Radar
Operating Frequency 24.125 MHz

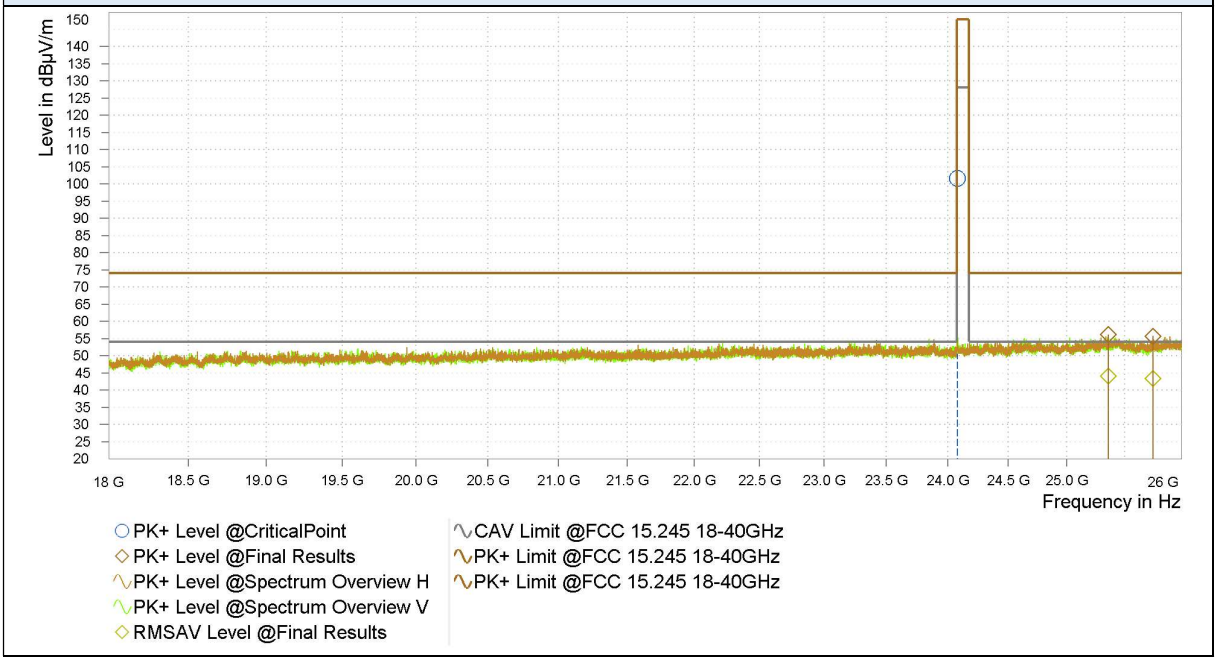
Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	Duty	AV	PK	AV	PK	AV	PK
25 467.800	V	56.42	68.99	-12.10	-	44.32	56.89	54	74	9.68	17.11
25 922.100	H	56.31	68.52	-12.06	-	44.25	56.46	54	74	9.75	17.54

Test Mode 24 GHz Radar
Operating Frequency 24.172 MHz

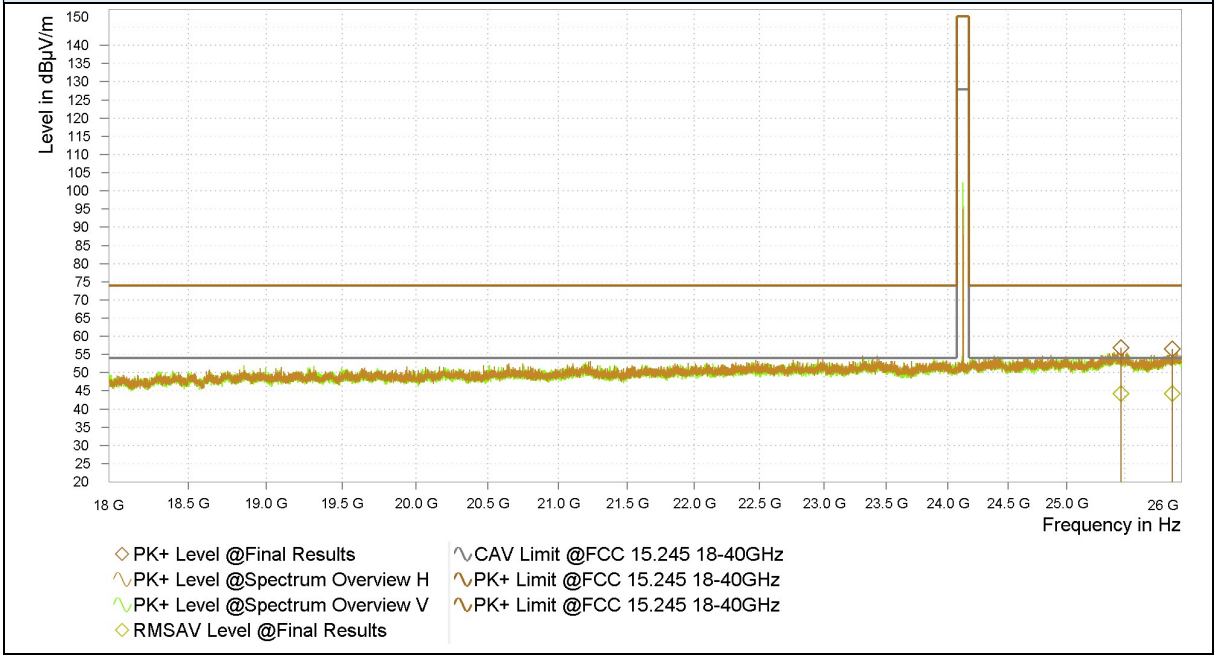
Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	Duty	AV	PK	AV	PK	AV	PK
25 413.600	V	56.87	69.09	-12.05	-	44.82	57.04	54	74	9.18	16.96
25 436.600	H	56.93	69.41	-12.04	-	44.89	57.37	54	74	9.11	16.63

▣ TEST PLOTS

Radiated Spurious Emission 18 GHz – 26 GHz: 24.078 GHz



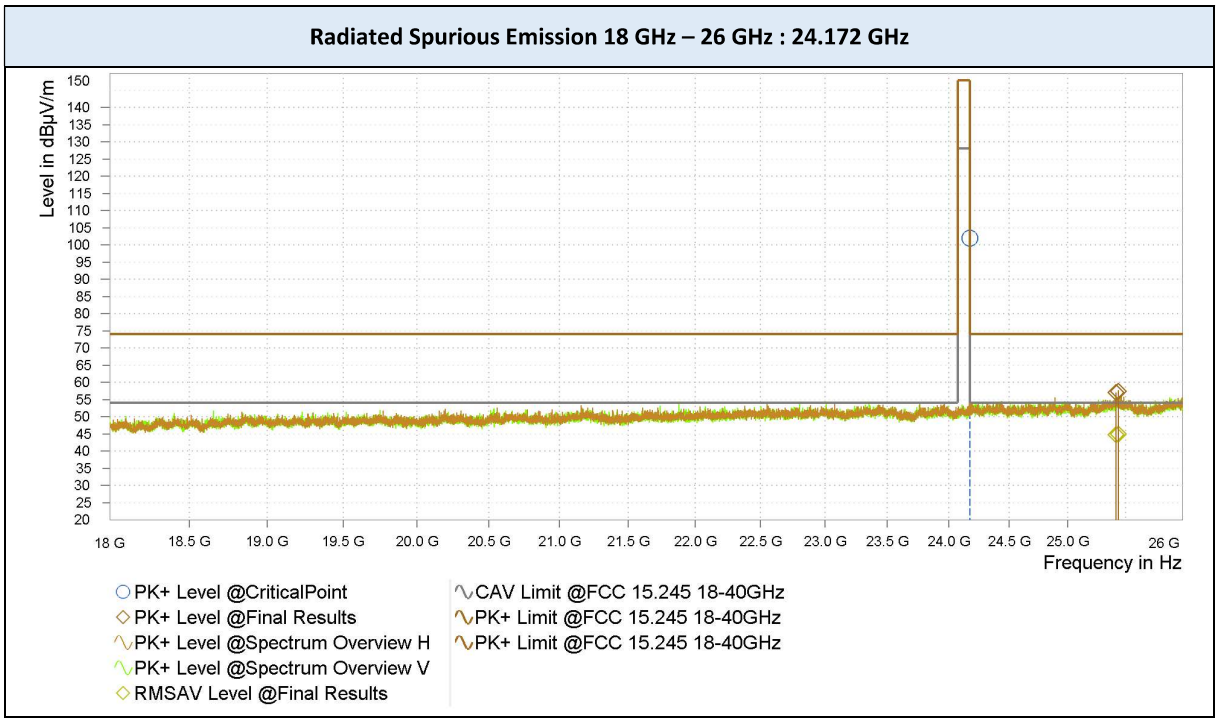
Radiated Spurious Emission 18 GHz – 26 GHz : 24.125 GHz



Note:

1. There were no major peaks, and representative plots are included in this report
2. The plots include all used factor values for cables, antenna, preamplifier, etc.

▣ TEST PLOTS



Note:

1. There were no major peaks and representative plots are included in this report
2. The plots include all used factor values for cables, antenna, preamplifier, etc.

Frequency Range: 26 GHz – 40 GHz

Test Mode 24 GHz Radar
Operating Frequency 24.078 MHz

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	Duty	AV	PK	AV	PK	AV	PK
39 318.400	H	52.55	65.53	-3.12	-	49.43	62.41	54	74	4.57	11.59
39 819.900	V	53.71	65.84	-3.97	-	49.74	61.87	54	74	4.26	12.13

Test Mode 24 GHz Radar
Operating Frequency 24.125 MHz

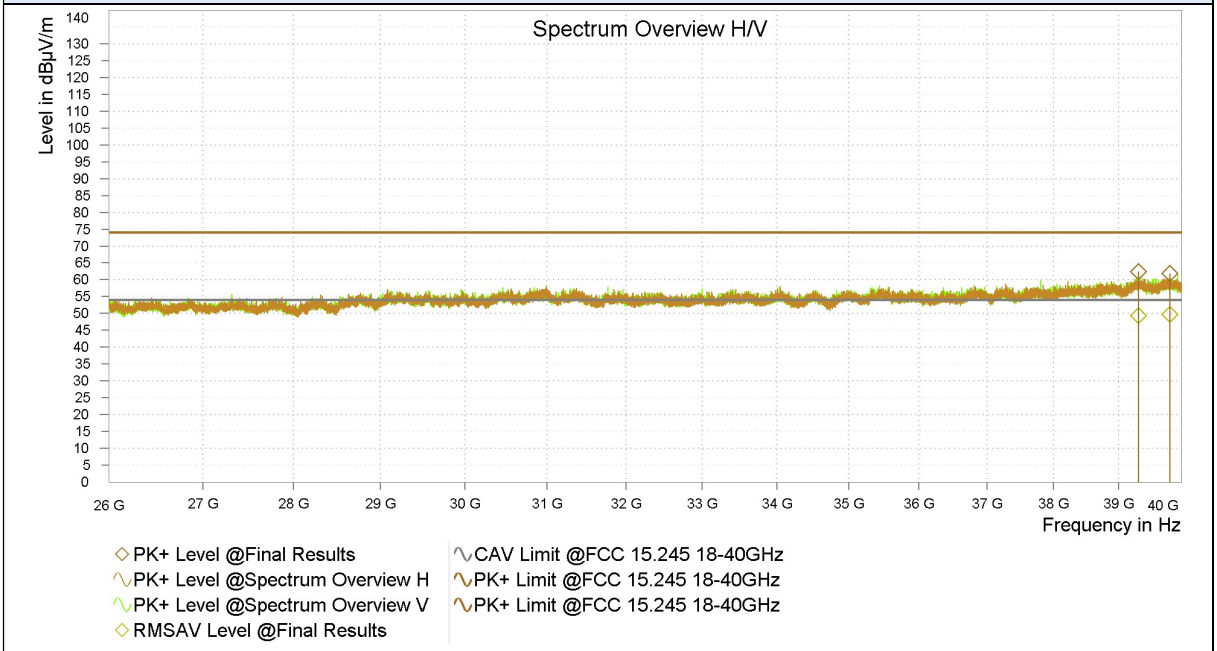
Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	Duty	AV	PK	AV	PK	AV	PK
39 255.000	V	52.74	64.96	-3.22	-	49.52	61.74	54	74	4.48	12.26
39 283.700	H	52.38	64.93	-3.13	-	49.25	61.80	54	74	4.75	12.20

Test Mode 24 GHz Radar
Operating Frequency 24.172 MHz

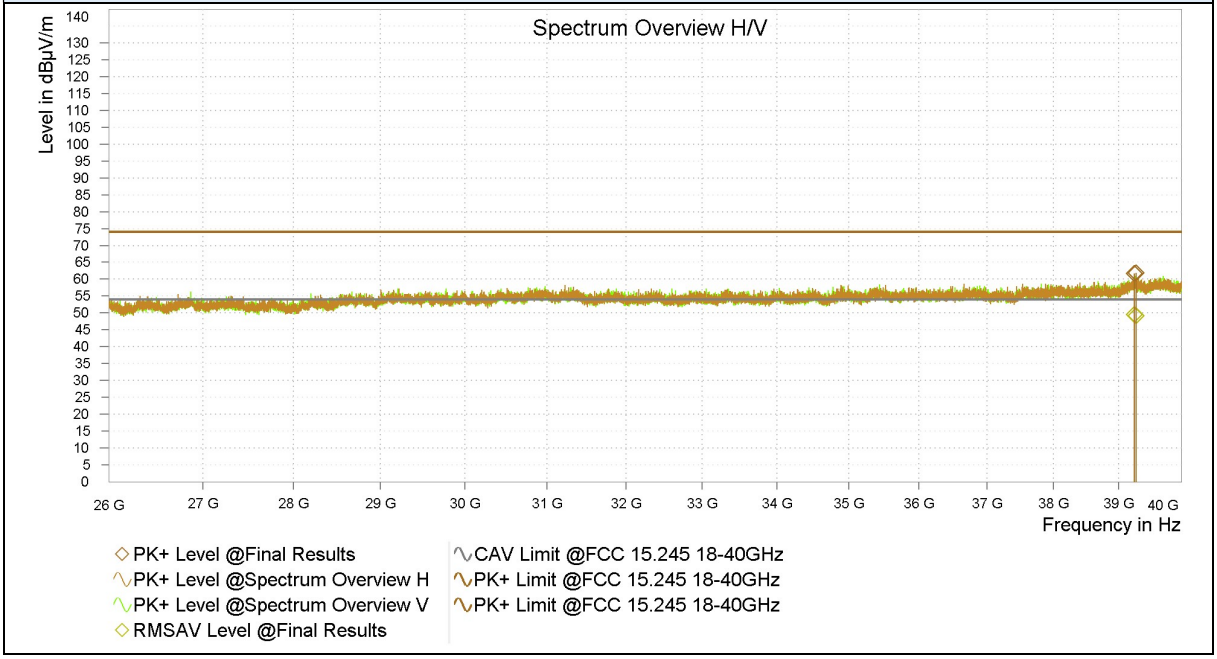
Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	Duty	AV	PK	AV	PK	AV	PK
39 597.100	V	52.62	64.99	-3.57	-	49.05	61.42	54	74	4.95	12.58
36 606.300	H	52.62	64.77	-3.58	-	49.04	61.19	54	74	4.96	12.81

▣ TEST PLOTS

Radiated Spurious Emission 26 GHz – 40 GHz : 24.078 GHz



Radiated Spurious Emission 26 GHz – 40 GHz : 24.125 GHz

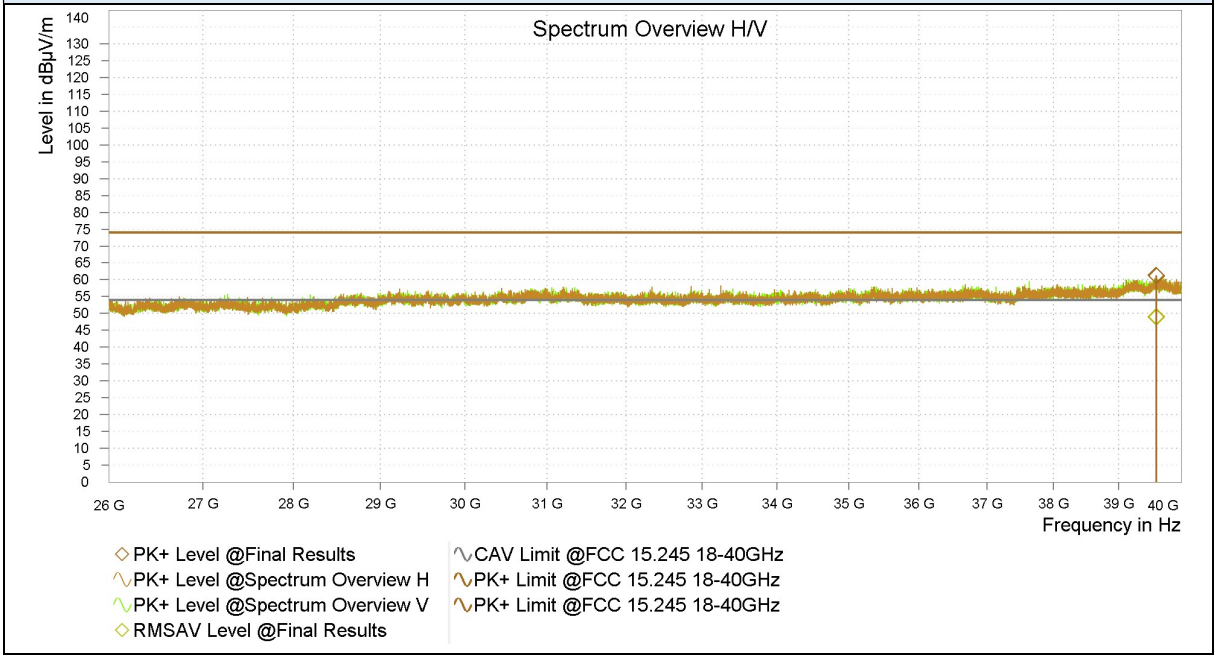


Note:

1. There were no major peaks, and representative plots are included in this report
2. The plots include all used factor values for cables, antenna, preamplifier, etc.

▣ TEST PLOTS

Radiated Spurious Emission 26 GHz – 40 GHz : 24.172 GHz



Note:

1. There were no major peaks and representative plots are included in this report
2. The plots include all used factor values for cables, antenna, preamplifier, etc.

Frequency Range: 40 GHz – 60 GHz

1. 2nd Harmonic

Test Mode 24 GHz Radar

Operating Frequency 24.078 MHz

Frequency (MHz)	Reading (dBm)		Factor (dB)	Level (dBm)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	AV	PK	Corr.[1)]	AV	PK	AV	PK	AV	PK	AV	PK
48 156.000	80.18	76.10	56.75	-23.43	-19.35	71.77	75.85	88	108	16.23	32.15

Test Mode 24 GHz Radar

Operating Frequency 24.125 MHz

Frequency (MHz)	Reading (dBm)		Factor (dB)	Level (dBm)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	AV	PK	Corr.[1)]	AV	PK	AV	PK	AV	PK	AV	PK
48 250.000	79.43	75.48	56.80	-22.63	-18.68	72.57	76.52	88	108	31.48	15.43

Test Mode 24 GHz Radar

Operating Frequency 24.172 MHz

Frequency (MHz)	Reading (dBm)		Factor (dB)	Level (dBm)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	AV	PK	Corr.[1)]	AV	PK	AV	PK	AV	PK	AV	PK
48 344.000	78.53	40.32	56.75	-21.78	-18.54	73.42	76.66	88	108	14.58	31.34

2. 40 – 60 GHz Spurious Emissions

Frequency (MHz)	Reading (dBm)		Factor (dB)	Level (dBm)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	AV	PK	Corr.[1)]	AV	PK	AV	PK	AV	PK	AV	PK
No major peaks found											

Note(s):

1. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
2. Factor (Corr[1)]) = Antenna Gain - Cable Loss – Conversion Loss + Amplifier Gain - FSPL
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Frequency Range: 60 GHz – 90 GHz

1. 3rd Harmonic

Test Mode 24 GHz Radar

Operating Frequency 24.078 MHz

Frequency (MHz)	Reading (dBm)		Factor (dB)	Level (dBm)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	AV	PK	Corr.[1)]	AV	PK	AV	PK	AV	PK	AV	PK
No major peaks found											

Test Mode 24 GHz Radar

Operating Frequency 24.125 MHz

Frequency (MHz)	Reading (dBm)		Factor (dB)	Level (dBm)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	AV	PK	Corr.[1)]	AV	PK	AV	PK	AV	PK	AV	PK
No major peaks found											

Test Mode 24 GHz Radar

Operating Frequency 24.172 MHz

Frequency (MHz)	Reading (dBm)		Factor (dB)	Level (dBm)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	AV	PK	Corr.[1)]	AV	PK	AV	PK	AV	PK	AV	PK
No major peaks found											

2. 60 – 90 GHz Spurious Emissions

Frequency (MHz)	Reading (dBm)		Factor (dB)	Level (dBm)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	AV	PK	Corr.[1)]	AV	PK	AV	PK	AV	PK	AV	PK
No major peaks found											

Note(s):

1. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
2. Factor (Corr[1)]) = Antenna Gain - Cable Loss – Conversion Loss + Amplifier Gain - FSPL
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Frequency Range: 90 GHz – 100 GHz

3. 4th Harmonic

Test Mode 24 GHz Radar
Operating Frequency 24.078 MHz

Frequency (MHz)	Reading (dBm)		Factor (dB)	Level (dBm)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	AV	PK	Corr.[1)]	AV	PK	AV	PK	AV	PK	AV	PK
No major peaks found											

Test Mode 24 GHz Radar
Operating Frequency 24.125 MHz

Frequency (MHz)	Reading (dBm)		Factor (dB)	Level (dBm)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	AV	PK	Corr.[1)]	AV	PK	AV	PK	AV	PK	AV	PK
No major peaks found											

Test Mode 24 GHz Radar
Operating Frequency 24.172 MHz

Frequency (MHz)	Reading (dBm)		Factor (dB)	Level (dBm)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	AV	PK	Corr.[1)]	AV	PK	AV	PK	AV	PK	AV	PK
No major peaks found											

4. 90 – 100 GHz Spurious Emissions

Frequency (MHz)	Reading (dBm)		Factor (dB)	Level (dBm)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	AV	PK	Corr.[1)]	AV	PK	AV	PK	AV	PK	AV	PK
No major peaks found											

Note(s):

4. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
5. Factor (Corr.[1)]) = Antenna Gain - Cable Loss – Conversion Loss + Amplifier Gain - FSPL
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

9.4. RECEIVER SPURIOUS EMISSION

Test Mode	24 GHz Radar
Operating Frequency	24 078 MHz

Frequency Range : Below 1 GHz

Frequency (MHz)	Polarization	Reading (dBuV)	Corr. [1)] (dB)	Total (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement Type
No major peaks found							

Frequency Range : Above 1 GHz

Frequency (MHz)	Polarization	Reading (dBuV)	Corr. [1)] (dB)	Total (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement Type
No major peaks found							

Notes:

1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain

9.5. AC LINE CONDUCTED EMISSIONS

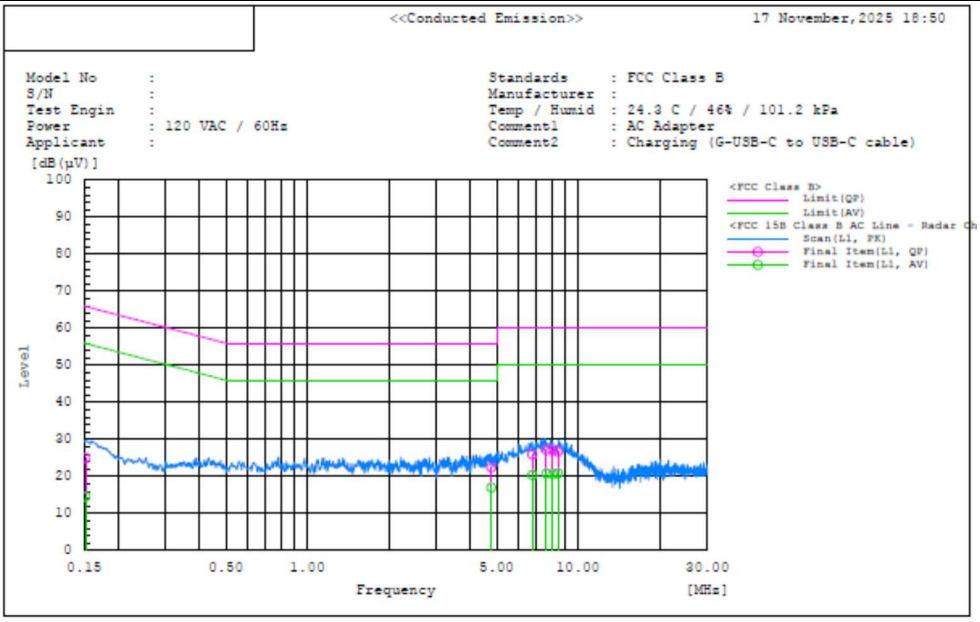
Frequency Range: Below 1 GHz

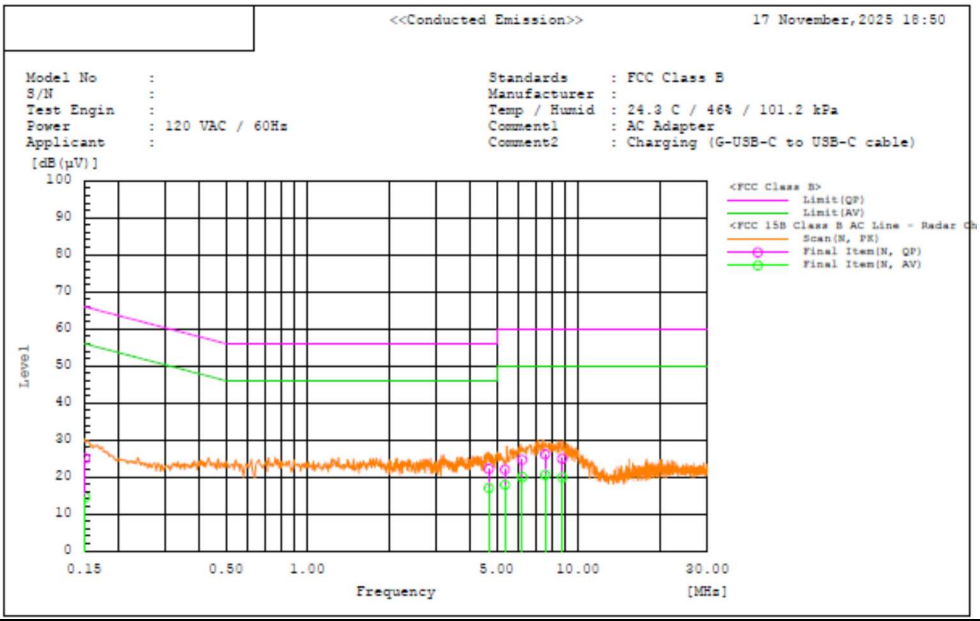
Test Mode	24 GHz Radar
Operating Frequency	24 078 MHz

Frequency (MHz)	Polarization	Reading (dBuV)	Corr. [1)] (dB)	Total (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement Type
No peak found							

☒ TEST PLOTS

AC Line Conducted Emission





10. LIST OF TEST EQUIPMENT

No.	Instrument	Model No.	Calibration Due (mm/dd/yy)	Manufacture	Serial No.
☒	Signal Analyzer (1 Hz ~ 40.0 GHz)	ESW44	03/18/2026	Rohde & Schwarz	103176
☒	Signal Analyzer (10 Hz ~ 26.5 GHz)	N9020A	07/16/2026	Keysight	MY52091291
☒	Attenuator (20 dB, DC ~ 26.5 GHz)	8493C 20 dB	01/06/2026	Keysight	89401
☒	Loop Antenna (0.009 MHz ~ 30 MHz)	HLA 6121	03/03/2027	TESEQ	43964
☒	BI-LOG Antenna (30 MHz ~ 6 GHz)	JB6	10/22/2026	Sunol	A071116
☒	Horn Antenna (1 GHz ~ 18 GHz)	DRH-118	12/04/2026	Sunol	A061616
☒	LNA (1 GHz ~ 18 GHz)	PAM-118A	01/15/2026	Com-Power	18040074
☒	Horn Antenna (18 GHz ~ 40 GHz)	DRH-1840	01/16/2027	Sunol	17121
☒	LNA (18 GHz ~ 40 GHz)	CBL18405550-01	05/06/2026	CERNEX, Inc.	35317
☒	EMI Test Receiver	ESR3	12/06/2025	Rohde & Schwarz	102363
☒	LISN	ENV216	12/06/2025	Rohde & Schwarz	101349
☒	Test Software	R&S®ELEKTRA	-	Rhode & Schwarz	-
☒	Horn Antenna	AT-SGA-25-19B	07/22/2027	AT Microwave	A5MA02
☒	Horn Antenna	AT-SGA-25-12B	07/22/2027	AT Microwave	A5MA02
☒	Horn Antenna	AT-SGA-25-08B	07/22/2027	AT Microwave	A5MA02
☒	mm Wave Frequency Extension Module (WR19)	FEM4060LP	11/21/2026	C&K Technologies, Inc	19AS1
☒	mm Wave Frequency Extension Module (WR12)	FEM6090LP	11/21/2026	C&K Technologies, Inc	12AS1
☒	mm Wave Frequency Extension Module (WR08)	FEM90140LP	11/21/2026	C&K Technologies, Inc	08AS1
☒	Down-Converter Module (WR19)	DC4060-SAX	11/21/2026	C&K Technologies, Inc	1904
☒	Down-Converter Module (WR12)	DC6090-SAX	11/21/2026	C&K Technologies, Inc	1206
☒	Down-Converter Module (WR08)	DC90140-SAX	11/21/2026	C&K Technologies, Inc	812

Note(s):

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

APPENDIX A. TEST SETUP PHOTOS

The setup photos are provided as a separate document.

APPENDIX B. PHOTOGRAPHS OF EUT

B.1. EXTERNAL PHOTOS

The external photos are provided as a separate document.

B.2. INTERNAL PHOTOS

The internal photos are provided as a separate document.

END OF TEST REPORT

Next Generation Test Laboratory Inc. (RF Safety Laboratory, LLC)
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ANAB 17025 Certificate No.: AT-3274; CAB Identifier: US0239
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SAR EVALUATION REPORT

FCC ID:	IPH-05125
IC:	1792A-05125
HVIN/PMN/Model(s):	A05125
FVIN:	2.09
Device Type:	Portable Digital Transceiver
Report Issue Date:	December 2, 2025

Garmin International, Inc.
1200 E. 151st Street,
Olathe, KS 66062, United States

Certification

Band	Body SAR [W/kg]	Body TER	Extremity SAR [W/kg]	Extremity TER
2.4 GHz Bluetooth LE	0.04	0.36	0.02	0.34
FCC Limit	**1.6**	**1.0**	**4.0**	**1.0**

Band	Body SAR [W/kg]	Body TER	Extremity SAR [W/kg]	Extremity TER
2.4 GHz Bluetooth LE	0.04	0.14	0.02	0.12
ISED Limits	**1.6**	**1.0**	**4.0**	**1.0**

The measurement evaluations presented in this report are based on the maximum performance of the tested device(s), which has been shown to be capable of compliance for localized specific absorption rate (SAR) for uncontrolled environment / general population exposure federal limits in 47CFR § 1.1310 and Health Canada Safety Code 6 and has been tested in accordance with the measurement procedures specified within this report.

This document has been revised and replaces all previously issued versions of this document with the same Test Report S/N.

Steve Liu
President

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Table of Contents

1. DUT Specifics

1.1. Device under Test

The device under test is a portable digital transceiver, incorporating the technologies listed in Table 1-1 below. The manufacturer has confirmed that the device is within operational tolerances expected for production units and has the same physical, mechanical, and thermal characteristics expected for production units. The serial number of the device used for each test is indicated alongside the results.

Software version 2.09 or higher was used during testing.

Table 1-1 Supported Technologies

Band/Mode	Frequency (MHz)
2.4 GHz Bluetooth LE	2402 - 2480 MHz
24 GHz Radar	24078 - 24172 MHz

1.2. Maximum Time-Averaged Power From Manufacturer

The manufacturer has confirmed that this device follows the below target output power specifications and tolerances. SAR values were scaled to the maximum allowed power (including tolerance) to determine compliance per KDB Publication 447498 D04v01.

Table 1-2 2.4 GHz Bluetooth Target RF Output Power

2.4 GHz Bluetooth Maximum Power [dBm]			
	Mode	Data Rate	A05125-A2
Max	BLE	1Mbps	2.5
	BLE	2Mbps	2.5
Tolerance: +/-2 dB			

1.3. Test Guidance Applied

- IEEE 1528-2013 (FCC)
- IEC/IEEE 62209-1528:2020 (ISED)
- RSS-102 Issue 6 (ISED)
- RSS-102.SAR.MEAS (ISED)
- Health Canada Safety Code 6 (ISED)
- FCC KDB Publication 248227 D01v02r02 (SAR Considerations for 802.11 Devices) (FCC/ISED)
- FCC KDB Publication 447498 D04v01 (General SAR Guidance) (FCC/ISED)
- FCC KDB Publication 865664 D01v01r04, D02v01r02 (SAR Measurements up to 6 GHz) (FCC)

2. DUT Conducted Powers

2.1. Power Measurement Setup

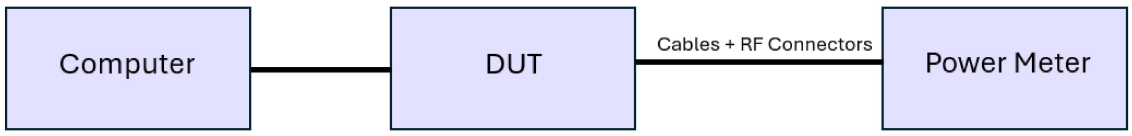
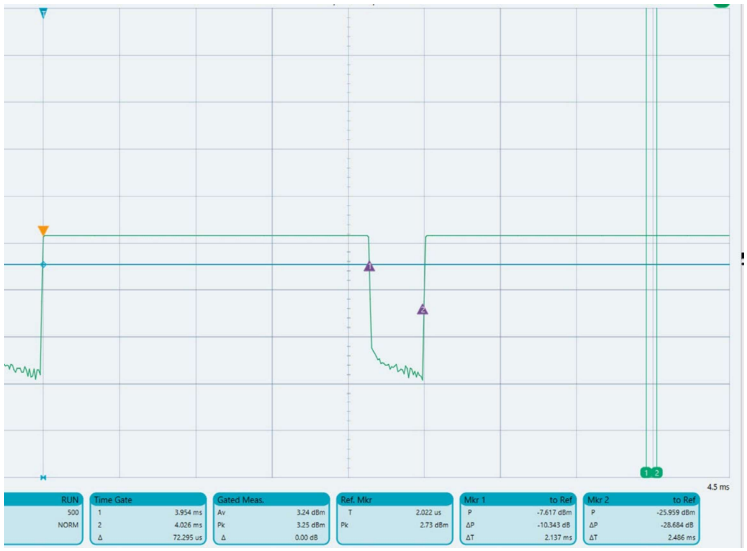


Figure 2-1 FTM Power Measurement Setup

2.2. Bluetooth Conducted Powers

Table 2-1

2.4 GHz Bluetooth Conducted Power [dBm]			
Power Level/Mode	Channel	Freq [MHz]	A05125-A2
Max / BLE	37	2402	3.28
	17	2440	3.10
	39	2480	2.93



Mode	Pulse Width (ms)	Pulse Period (ms)	Duty Cycle
BLE 1Mbps	2.137	2.486	0.860

Figure 2-2 2.4 GHz Bluetooth Duty Cycle Plot and Calculation

3. DUT SAR Test Results

3.1. Bluetooth SAR Data

Table 3-1

Exposure Condition	Band/Mode	Antenna	DUT SN	Power Drift [dB]	Maximum Duty Cycle [%]	Measured Duty Cycle [%]	Frequency [MHz]	Channel	Modulation/Configuration	Data Rate (Mbps)	Maximum Allowed Power [dBm]	Measured Conducted Power [dBm]	Separation Distance [mm]	Position	Measured 1g SAR [W/kg]	Reported 1g SAR [W/kg]	Measured 10g SAR [W/kg]	Reported 10g SAR [W/kg]	Test Plot
Body/Extremity	2.4 GHz Bluetooth LE	A05125-A2	56057	-0.10	100.0%	86.0%	2402	37	DSSS	1	4.50	3.28	0	Back	0.025	0.039	0.013	0.020	-
Body/Extremity	2.4 GHz Bluetooth LE	A05125-A2	56057	-0.20	100.0%	86.0%	2440	17	DSSS	1	4.50	3.10	0	Back	0.025	0.040	0.014	0.022	-
Body/Extremity	2.4 GHz Bluetooth LE	A05125-A2	56057	-0.19	100.0%	86.0%	2480	39	DSSS	1	4.50	2.93	0	Back	0.026	0.043	0.014	0.023	1
Body/Extremity	2.4 GHz Bluetooth LE	A05125-A2	56057	0.15	100.0%	86.0%	2402	37	DSSS	1	4.50	3.28	0	Front	0.009	0.014	0.004	0.006	-
Body/Extremity	2.4 GHz Bluetooth LE	A05125-A2	56057	-0.16	100.0%	86.0%	2402	37	DSSS	1	4.50	3.28	0	Top	0.000	0.000	0.000	0.000	-
Body/Extremity	2.4 GHz Bluetooth LE	A05125-A2	56057	0.17	100.0%	86.0%	2402	37	DSSS	1	4.50	3.28	0	Bottom	0.016	0.025	0.008	0.012	-
Body/Extremity	2.4 GHz Bluetooth LE	A05125-A2	56057	-0.10	100.0%	86.0%	2402	37	DSSS	1	4.50	3.28	0	Right	0.004	0.006	0.002	0.003	-
Body/Extremity	2.4 GHz Bluetooth LE	A05125-A2	56057	-0.09	100.0%	86.0%	2402	37	DSSS	1	4.50	3.28	0	Left	0.011	0.017	0.005	0.008	-

3.2. General SAR Testing Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in IEEE 1528-2013 and FCC KDB Publication 447498 D04v01 for FCC.
2. The test data reported are the worst-case SAR values according to test procedures specified in IEC/IEEE 62209-1528 and RSS-102.SAR.MEAS for ISED.
3. Per IEC/IEEE 62209-1528, SAR testing was performed using probes calibrated for the modulation specific signal.
4. SAR evaluations were made in accordance with the latest version of RSS-102 Issue 6 and RSS-102.SAR.MEAS, then IEC/IEEE 62209-1528. FCC KDB Publications listed in RSS-102 can be used as supplementary procedures due to limitation of technology specific testing protocols in the international standards.
5. Liquid tissue depth was at least 15.0 cm for all frequencies.
6. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D04v01.
7. Batteries are fully charged at the beginning of the SAR measurements.
8. Per IEC/IEEE 62209-1528, the worst case configuration was additionally evaluated for all channels.
9. When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds below.
10. Simultaneous transmission analysis is provided in Appendix E.

3.3. Bluetooth Note:

1. The device was configured to transmit continuously at the required data rate and signal modulation, using the highest transmission duty factor supported by the test mode tools. Per October 2016 TCB Workshop Notes, the reported SAR was scaled to the 100.0% transmission duty factor for Bluetooth to determine compliance. See Section 2.2 for the time domain plot and calculation for the duty factor of the device.

4. DUT SAR Measurement Variability Requirement

Per FCC KDB Publication 865664 D01v01r04, SAR measurement variability was not required since the measured SAR results for a frequency band were less than 0.8 W/kg for 1g SAR and 2.0 W/kg for 10g SAR.

5. General Introduction

Title 47 of the Code of Federal Regulations (CFR) pertains to United States Federal regulation for Telecommunications. The **Federal Communications Commission (FCC)** is the agency responsible for implementing and enforcing these regulations. The rules define a **radiofrequency device** as any device which in its operation is capable of emitting radiofrequency energy by radiation, conduction, or other means.

47CFR §2.1093(b) states, "A **portable device** is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that the RF source's radiating structure(s) **is/are within 20 centimeters of the body of the user**."

Also, 47CFR §2.1093(d)(6) states, that General population/uncontrolled exposure limits defined in §1.1310 "apply to portable devices intended for use by consumers or persons who are exposed as a consequence of their employment and may not be fully aware of the potential for exposure or cannot exercise control over their exposure."

47CFR §2.1093(d)(2) states that evaluation of compliance within FCC's SAR limits can be demonstrated by laboratory measurements. This test report serves this purpose.

6. Background on Radiofrequency (RF) Exposure Limits

6.1. Controlled Environment

Controlled environments are defined as locations where the RF field intensities have been adequately characterized by means of measurement or calculation and exposure is incurred by persons who are: aware of the potential for RF field exposure, cognizant of the intensity of the RF fields in their environment, aware of the potential health risks associated with RF field exposure and able to control their risk using mitigation strategies. In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels

may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

6.2. Uncontrolled Environment

Uncontrolled environments are defined as locations where either insufficient assessment of RF fields have been conducted or where persons who are allowed access to these areas have not received proper RF field awareness/safety training and have no means to assess or, if required, to mitigate their exposure to RF fields. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed, or in which persons who may not be made fully aware of the potential for exposure, or cannot exercise control over their exposure. Members of the general public would fall under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

6.3. RF Exposure Limits for 100kHz – 6 GHz

Table 6-1 Human Exposure to RF Radiation Limits in 47 CFR §1.1310 and Health Canada Safety Code 6- SAR Basic Restrictions for frequencies 100kHz ~ 6 GHz

Environment	Condition	**SAR**	Averaging volume
Uncontrolled / General Population	Head, Neck Trunk	**1.6 W/kg**	1g cube
	Extremity	**4.0 W/kg**	10g cube
Controlled	Head/Trunk	**8 W/kg**	1g cube
	Extremity / Limbs	**20 W/kg**	10g cube

7. RF Safety Laboratory SAR Measurement System

7.1. SAR Measurement Hardware and Software

Peak spatially averaged SAR (psSAR) measurements are performed using a DASY8 robot system with cDASY8 module SAR software. The DASY8 is made by SPEAG in Switzerland and consists of a 6-axis robot, robot controller, computer, dosimetric probe, probe alignment light beam unit, and various SAR phantoms.

7.2. E-Field Probe

Manufacturer	Schmid & Partner Engineering AG
Model	EX3DV4
Description	Smallest isotropic electric (E-) field probe for high precision specific absorption rate (SAR) measurements
Frequency Range	4 MHz - 10.0 GHz
Dynamic Range	10 µW/g – >100 mW/g
Overall Length (mm)	337
Body Diameter (mm)	12
Tip Length (mm)	9
Tip Diameter (mm)	2.5
Probe Tip to Sensor X Calibration Point (mm)	1
Probe Tip to Sensor Y Calibration Point (mm)	1
Applications	High precision dosimetric measurements in any exposure scenario (e.g. very strong gradient fields); the only probe that enables compliance testing for frequencies up to 6 GHz with precision of better than 30%
Compatibility	DASY8 robot + cDASY8 module SAR software

7.3. Peak Spatially Averaged SAR (psSAR) Measurements

SAR Evaluations are performed using the following procedure compliant to FCC KDB Publication 865664 D01v01r04, IEEE 1528:2013 and IEC/IEEE 62209-1528:

1. The SAR distribution at the exposed side of the head or body was measured at a distance no greater than 5.0 mm from the inner surface of the shell. The area covered the entire dimension of the device-head and body interface, and the horizontal grid resolution was determined per FCC KDB Publication 865664 D01v01r04, IEEE 1528:2013 and IEC/IEEE 62209-1528.
2. The point SAR measurement was taken at the maximum SAR region determined from Step 1 to enable the monitoring of SAR fluctuations/drifts during the 1g/10g cube evaluation. SAR at this fixed point was measured and used as a reference value.
3. Based on the area scan data, the peak of the region with maximum SAR was determined by spline interpolation. Around this point, a volume was assessed according to the measurement resolution and volume size requirements of FCC KDB Publication 865664 D01v01r04, IEEE 1528:2013 and IEC/IEEE 62209-1528. On the basis of this data set, the spatial peak SAR value was evaluated with the following procedure (see references or the DASY manual online for more details):
   a. SAR values at the inner surface of the phantom are extrapolated from the measured values along the line away from the surface with spacing no greater than the area scan and zoomscan resolutions specified in FCC KDB Publication 865664 D01v01v04 section 2.7.1, IEEE 1528:2013 table 6, and IEC/IEEE 62209-1528 table 3 & table 4. The extrapolation was based on a least-squares algorithm. A polynomial of the fourth order was calculated through the points in the z-axis (normal to the phantom shell).
   b. After the maximum interpolated values were calculated between the points in the cube, the SAR was averaged over the spatial volume (1g or 10g) using a 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the “Not a knot” condition (in x, y, and z directions). The volume was then integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were obtained through interpolation, in order to calculate the averaged SAR.
   c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.
   d. The zoom scan is confirmed to meet both of the following parameters if the result is > 0.1 W/kg. If the result does not meet the below parameters, it is re-measured with a finer resolution scan until the below parameters are met.
      (1) The smallest horizontal distance from the local SAR peaks to all points 3 dB below the SAR peak shall be larger than the horizontal grid steps in both x- and y-directions.
      (2) The ratio of the SAR at the second measured point (M2) to the SAR at the closest measured point (MI) at the x-y location of the measured maximum SAR value shall be at least 30%
4. The SAR reference value, at the same location as step 2, was re-measured after the zoom scan was complete to calculate the SAR drift. If the drift deviated by more than 5%, the SAR test and drift measurements were repeated.

7.4. Test Positions

7.4.1. Device Holder

The device holder is made out of low-loss POM material having the following dielectric parameters: relative permittivity ε = 3 and loss tangent δ = 0.02.

7.4.2. Body SAR Test

Body SAR is measured with all surfaces positioned against a flat phantom, representative of the operating conditions expected by users.

7.4.3. Extremity Exposure Configurations

Devices that are designed or intended for use on extremities or mainly operated in extremity only exposure conditions; i.e., hands, wrists, feet and ankles, may require extremity SAR evaluation. When the device also operates in close proximity to the user's body, SAR compliance for the body is also required. The 1g body and 10g extremity SAR Exclusion Thresholds found in KDB Publication 447498 D04v01 should be applied to determine SAR test requirements.

7.5. RF Safety Laboratory SAR System Measurement Uncertainty

SAR Uncertainty for DUTs According to 62209-1528 (Frequencies: 4 MHz - 3 GHz)										
Symbol	Input Quantity (Xi) (Source of Uncertainty)	62209-1528 Ref	Unc. (xi)	Prob. Dist. PDFi	Div(qi)	ci (1g)	ci (10g)	Std Unc (1g)	Std. Unc (10g)	vi
Measurement System Errors										
CF	Probe Calibration	8.4.1.1	13.3%	N (k=2)	2	1	1	6.65%	6.7%	∞
CFdrift	Probe Calibration Drift	8.4.1.2	1.7%	R	√3	1	1	1.0%	1.0%	∞
LIN	Probe Linearity and Detection Limit	8.4.1.3	4.7%	R	√3	1	1	2.7%	2.7%	∞
BBS	Broadband Signal	8.4.1.4	2.8%	R	√3	1	1	1.6%	1.6%	∞
ISO	Probe Isotropy	8.4.1.5	7.6%	R	√3	1	1	4.4%	4.4%	∞
DAE	Other probe and data acquisition errors	8.4.1.6	0.8%	N	1	1	1	0.8%	0.8%	∞
AMB	RF Ambient and Noise	8.4.1.7	1.8%	N	1	1	1	1.8%	1.8%	∞
Δxyz	Probe Positioning Errors	8.4.1.8	0.006 mm	N	1	0.14	0.14	0.1%	0.1%	
DAT	Data Processing Errors	8.4.1.9	1.2%	N	1	1	1	1.2%	1.2%	∞
Phantom and Device Errors										
LIQ(σ)	Measurement of Phantom Conductivity	8.4.2.1	2.5%	N	1	0.78	0.71	2.0%	1.8%	∞
LIQ(Tc)	Temperature Effects (Medium)	8.4.2.2	5.4%	R	√3	0.78	0.71	2.4%	2.2%	∞
EPS	Shell Permittivity	8.4.2.3	14.0%	R	√3	0	0	0.0%	0.0%	∞
DIS	Distance between the radiating element of the DUT and the phantom medium	8.4.2.4	2.0%	N	1	2	2	4.0%	4.0%	∞
Dxyz	Repeatability of Positioning the DUT or source against the phantom	8.4.2.5	1.0%	N	1	1	1	1.0%	1.0%	5
H	Device Holder Effects	8.4.2.6	3.6%	N	1	1	1	3.6%	3.6%	8
MOD	Effect of Operating mode on probe sensitivity	8.4.2.7	2.4%	R	√3	1	1	1.4%	1.4%	∞
RFdrift	Variation in SAR due to Drift in ouptput of DUT	8.4.2.9	2.5%	N	1	1	1	2.5%	2.5%	∞
VAL	Validation Antenna Uncertainty (Validation measurement only)	8.4.2.10	0.0%	N	1	1	1	0.0%	0.0%	∞
Pin	Uncertianty in Accepted Power (Validation Measurement only)	8.4.2.11	0.0%	N	1	1	1	0.0%	0.0%	∞
Correction to the SAR Results										
C(ε',σ)	Phantom Deviation from Target (ε',σ)	8.4.3.1	1.9%	N	1	1	0.84	1.9%	1.6%	∞
C(R)	SAR Scaling	8.4.3.2	0.0%	R	√3	1	1	0.0%	0.0%	∞
u(ΔS AR)							Combined Uncertainty	11.5%	11.3%	∞
U						Expanded Uncertainty and Effective Degrees of Freedom (k=2)		22.9%	22.7%	

8. Technology Specific Test Setup Requirements

8.1. Measured and Reported SAR

Per FCC KDB Publication 447498 D04v01, when SAR is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance. For simultaneous transmission, the measured aggregate SAR must be scaled according to the sum of the differences between the maximum tune-up tolerance and actual power used to test each transmitter. When SAR is measured at or scaled to the maximum tune-up tolerance limit, the results are referred to as *reported* SAR. The highest

reported SAR results are identified on the grant of equipment authorization according to procedures in KDB 690783 D01v01r03.

8.2. Procedures Used to Establish RF Signal for SAR

Devices under test are evaluated prior to testing, with a fully charged battery and were configured to operate at maximum output power. In order to verify that the device is tested throughout the SAR test at maximum output power, the SAR measurement system measures a "point SAR" at an arbitrary reference point at the start and end of the 1 gram and 10 gram SAR evaluation, to assess for any power drifts during the evaluation.

9. Equipment List

Manufacturer	Model	Description	Serial Number	Calibration Date	Calibration Due	CBT
Amplifier Research	5S1G4	RF Broadband Amplifier (800 MHz - 4.2 GHz)	331258			✓
Anritsu	S820E	Vector Network Analyzer	2348026	11/30/2023	11/30/2025	
Control Company	4040	Ambient Thermometer	250440190	07/17/2025	07/17/2027	
Control Company	4352	Long Stem Liquid Thermometer	230662212	4/23/2025	4/23/2027	
Micro-Coax	UFB205A-0-0240-30x30	SMA M-F RF test Cable (DC - 18 GHz)	-			✓
Mini-Circuits	BW-N20W20+	20dB RF Fixed Attenuator (DC - 18 GHz)	-			✓
Mini-Circuits	BW-S3W2+	3dB RF Fixed Attenuator (DC - 18 GHz)	-			✓
Mini-Circuits	BW-S3W2+	3dB RF Fixed Attenuator (DC - 18 GHz)	-			✓
Mini-Circuits	CBL-6FT-SMNM+	Precision Test Cable SMA/N (DC - 18 GHz)	3318			✓
Mini-Circuits	NF-SF50+	RF Adapter N Male to SMA Female (DC - 18 GHz)	-			✓
Mini-Circuits	VLF-3000+	Coaxial Low Pass Filter (DC - 3 GHz)	-			✓
Mitutoyo	CD-4"AX	Digital Caliper	B23243217	8/28/2025	8/28/2027	
Narda	24785-20	20 dB SMA Fixed Attenuator (DC - 4.0 GHz)	-			✓
Narda	4226-20 (26733)	20 dB SMA Directional Coupler (0.5 - 18 GHz)	0201			✓
Rohde & Schwarz	SMCV100B	R&S SMCV100B Vector Signal Generator (VSG)	103882	12/21/2023	12/19/2025	
SPEAG	D2450V2	2450 MHz System Validation Dipole	1112	11/15/2024	11/15/2026	
SPEAG	DAE4ip	Data Acquisition Electronics with Integ. Power	1905	4/25/2025	4/25/2026	
SPEAG	DAK-3.5	DAK-3.5 Dielectric Probe	1349	8/5/2025	8/5/2026	
SPEAG	EX3DV4	SAR Measurement Probe	7859	5/5/2025	5/5/2026	
SPEAG	SE UMS 171 E	MAIA Modulation and Interference Analyzer	1814			
SPEAG	SE UMS 176 C	ANT Wideband Communication Antenna	1579			

✓Note: Components calibrated before testing. Prior to testing, the measurement paths containing a cable, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator, power sensor, or VNA) to determine the losses of the measurement path. The power meter offset was then adjusted to compensate for the measurement

system losses. This level offset is stored within the power meter before measurements are made. This calibration verification procedure applies to the system verification and output power measurements. The calibrated reading is then taken directly from the power meter after compensation of the losses for all final power measurements.

10. Conclusion

The SAR evaluation indicates that the DUT is capable of compliance with the RF radiation exposure limits of the FCC and ISED, with respect to all parameters subject to this test. These measurements were taken to simulate the RF effects of RF exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The results and statements relate only to the item(s) tested.

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47 CFR §2.1093 - NEAR-FIELD INCIDENT POWER DENSITY TEST REPORT

FCC ID:	**IPH-05125**
Device Type:	Portable Digital Transceiver
Report Issue Date:	December 2, 2025

Garmin International, Inc.
1200 E. 151st Street,
Olathe, KS 66062, United States

Certification

Power Density	**psPD over 4cm²** [W/m²]
Result	3.34
FCC Limit	**10.00**

The measurement evaluations presented in this report is based on the maximum performance of the tested device(s) which has been shown to be capable of compliance for localized power density (PD) for uncontrolled environment/ general population exposure federal limits in 47CFR § 1.1310 and has been tested in accordance with the measurement procedures specified within this report.

This document has been revised and replaces all previously issued versions of this document with the same Test Report S/N.

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1. DUT Specifics

1.1. Device Under Test

Table 1-1
DUT Information

Frequency (MHz)	Signal
24078 - 24172	CW

This device is a portable digital transceiver incorporating a 24 GHz antenna and a 2.4 GHz BLE antenna. Both antennas can transmit simultaneously, see TER section of SAR report for simultaneous tx analysis.

The manufacturer has confirmed that the device is within operational tolerances expected for production units and has the same physical, mechanical, and thermal characteristics expected for production units. The serial number of the device used for each test is indicated alongside the results.

1.2. Maximum Power Density Details

Table 1-2
Maximum psPD

Frequency (MHz)	Measured psPD (W/m^2 avg area $4cm^2$)
24078 - 24172	3.34

1.3. Test Guidance Applied

- IEC/IEEE 63195-1:2022
- FCC KDB 865664 D02 v01r02
- FCC KDB 447498 D01 v06
- TCBC Workshop Notes (Nov 2017, Oct 2018, Apr 2019, Nov 2019)

2. Power Density Test Results

Table 2-1
Power Density Test Data

Frequency (MHz)	Signal	Surface/Edge	DUT Serial No.	Measurement Distance (mm)	Power Drift (dB)	Measured Normal psPD (W/m^2 avg area $4cm^2$)	Measured Total psPD (W/m^2 avg area $4cm^2$)	Test Plot
24078.0	CW	Back	56057	2	-0.01	3.130	3.270	-
24125.0	CW	Back	56057	2	-0.09	3.240	3.340	A1
24172.0	CW	Back	56057	2	-0.02	3.190	3.300	-
24125.0	CW	Front	56057	2	-0.07	0.099	0.125	-
24125.0	CW	Top	56057	2	0.05	0.055	0.081	-
24125.0	CW	Bottom	56057	2	0.06	0.048	0.063	-
24125.0	CW	Left	56057	2	-0.19	0.108	0.131	-
24125.0	CW	Right	56057	2	-0.11	0.117	0.127	-

2.1. Testing Notes

1. DUT was controlled via manufacturer software to ensure stable transmission for the duration of each power density test.
2. Power density measurements were performed using CW signal with 100% duty cycle.
3. Power density measurements were performed on two planes with a distance of λ/4mm between planes.
4. When the maximum reported psPD is ≤ 5.0 W/m^2, power density testing on additional channels for other surfaces was not required.
5. DUT batteries were charged completely before starting each power density test.

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3. General Introduction

Title 47 of the Code of Federal Regulations (CFR) pertains to United States Federal regulation for Telecommunications. The Federal Communications Commission (FCC) is the agency responsible for implementing and enforcing these regulations. The rules define a radiofrequency device as any device which in its operation is capable of emitting radiofrequency energy by radiation, conduction, or other means.

47CFR §2.1093(b) states, "A portable device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that the RF source's radiating structure(s) is/are within 20 centimeters of the body of the user."

Also, 47CFR §2.1093(d)(6) states, that General population/uncontrolled exposure limits defined in §1.1310 "apply to portable devices intended for use by consumers or persons who are exposed as a consequence of their employment and may not be fully aware of the potential for exposure or cannot exercise control over their exposure."

47CFR §2.1093(d)(2) states that evaluation of compliance within FCC's limits can be demonstrated by laboratory measurements. This test report serves this purpose.

4. Background on Radiofrequency (RF) Exposure Limits

4.1. Controlled Environment

Controlled environments are defined as locations where the RF field intensities have been adequately characterized by means of measurement or calculation and exposure is incurred by persons who are: aware of the potential for RF field exposure, cognizant of the intensity of the RF fields in their environment, aware of the potential health risks associated with RF field exposure and able to control their risk using mitigation strategies. In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

4.2. Uncontrolled Environment

Uncontrolled environments are defined as locations where either insufficient assessment of RF fields have been conducted or where persons who are allowed access to these areas have not received proper RF field awareness/safety training and have no means to assess or, if required, to mitigate their exposure to RF fields. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed, or in which persons who may not be made fully aware of the potential for exposure, or cannot exercise control over their exposure. Members of the general public would fall under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

4.3. RF Exposure Limits for 6 - 100 GHz

Per FCC 47 CFR §1.1310, the power density limits are applied for frequencies between 6 GHz and 100 GHz as shown below. Note that 10 W/m^2 is equivalent to 1 mW/cm^2.

Table 4-1
Human Exposure to RF Radiation Limits in 47 CFR §1.1310

Environment	Power Density (W/m^2)	Average Time (minutes)
Uncontrolled / General Population	10	30
Controlled	50	6

4.4. General FCC Policy on Human Exposure to RF

Quoted from the FCC OET website:

The FCC is required by the National Environmental Policy Act of 1969, among other things, to evaluate the effect of emissions from FCC-regulated transmitters on the quality of the human environment. Several organizations, such as the American National Standards Institute (ANSI), the Institute of Electrical and Electronics Engineers, Inc. (IEEE) ,and the National Council on Radiation Protection and Measurements (NRCP) have issued recommendations for human exposure to RF electromagnetic fields.

On August 1, 1996, the Commission adopted the NCRP's recommended Maximum Permissible Exposure limits for field strength and power density for the transmitters operating at frequencies of 300 kHz to 100 GHz. In addition, the Commission adopted the specific absorption rate (SAR) limits for devices operating within close proximity to the body as specified within the ANSI/IEEE C95.1-1992 guidelines. (See Report and Order, FCC 96-326)

The Commission's requirements are detailed in Parts 1 and 2 of the FCC's Rules and Regulations [47 C.F.R. 1.1307(b), 1.1310, 2.1091, 2.1093]. The potential hazards associated with RF electromagnetic fields are discussed in the FCC's RF Safety FAQ.

5. RF Safety Laboratory Power Density Measurement System

5.1. Power Density Measurement Hardware and Software

Peak spatially averaged power density (psPD) measurements are performed using a DASY8 robot system with cDASY8 module mmWave software. The DASY8 is made by SPEAG in Switzerland and consists of a 6-axis robot, robot controller, computer, dosimetric probe, and probe alignment light beam unit.

5.2. E-Field Probe

Manufacturer	Schmid & Partner Engineering AG
Model	EUmmWVx
Description	E-field probe for high precision power density (PD) measurements
Frequency Range	750 MHz - 110 GHz
Dynamic Range	< 20 - 10,000 V/m with PRE-10 (min < 50 - 3,000 V/m)
Overall Length (mm)	320
Body Diameter (mm)	8
Tip Length (mm)	23
Tip Diameter (mm)	8
Probe Tip to Sensor X Calibration Point (mm)	1.5
Probe Tip to Sensor Y Calibration Point (mm)	1.5
Applications	High precision dosimetric measurements of devices and transmitters above 6 GHz
Compatibility	DASY8 robot + cDASY8 module mmWave software
Reconstruction algorithm	< 24 GHz: ESR; > 24 GHz: PTP-PR

5.3. Peak Spatially Averaged Power Density (psPD) Measurements

Electromagnetic field reconstruction is based on Maxwell's equations and uses the Gerchberg-Saxton algorithm to calculate power density. The general measurement procedure is as follows:

1. Measure the local E-field at a point within the measurement region and where the field is higher than the noise level. This reference level will be used to assess output DUT drift during the measurement.
2. Measure the E-field over the measurement region. Measurement techniques are determined by the measurement system manufacturer. In the near-field, a step size of $\lambda/4$ or less is required.
3. Check that the peak is captured. Calculate the psPD on the evaluation surface from the measured fields and ensure the psPD is accurately calculated according to the equation below. Averaging area, A, and averaging shape is specified by the applicable exposure limits or regulatory requirements.

$$psPD = \frac{1}{2A_{av}} \iint_{A_{av}} \|Re\{E \times H\}\| dA$$

4. Measure the local E-field at the same location chosen in the first step. The DUT drift is estimated as the difference between the squared amplitude of the field values taken. When measurement drift was greater than 5%, the psPD measurement and drift measurements were repeated.

5.4. RF Safety Laboratory Power Density System Measurement Uncertainty

Power Density Uncertainty for DUTs According to IEC/IEEE 63195-1

Symbol	Description	Unc. (+/- dB)	Probab. Distri.	Div.	ci	Std. Unc. (+/- dB)	vi
Measurement System							
CAL	Calibration	0.49	N	1	1	0.49	∞
COR	Probe correction	0.00	R	√3	1	0.00	∞
FRS	Frequency Response	0.20	R	√3	1	0.12	∞
SCC	Sensor cross coupling	0.00	R	√3	1	0.00	∞
ISO	Isotropy	0.50	R	√3	1	0.29	∞
LIN	Linearity	0.20	R	√3	1	0.12	∞
PSC	Probe scattering	0.00	R	√3	1	0.00	∞
PPO	Probe postitioning offset	0.30	R	√3	1	0.17	∞
PPR	Probe positioning repeatability	0.04	R	√3	1	0.02	∞
SMO	Sensor mechanical offset	0.00	R	√3	1	0.00	∞
PSR	Probe spatial resolution	0.00	R	√3	1	0.00	∞
FLD	Field impedance dependance	0.00	R	√3	1	0.00	∞
MED	Measurement drift	0.05	R	√3	1	0.03	∞
APN	Amplitude and phase noise	0.04	R	√3	1	0.02	∞
TR	Measurement area truncation	0.00	R	√3	1	0.00	∞
DAQ	Data acquisition	0.03	N	1	1	0.03	∞
SMP	Sampling	0.00	R	√3	1	0.00	∞
REC	Field reconstruction	0.60	R	√3	1	0.35	∞
SNR	Signal-to-noise raio	0.00	R	√3	1	0.00	∞
TRA	FTE/MEO	0.00	R	√3	1	0.00	∞
SCA	Power density scaling	0.00	R	√3	1	0.00	∞
SAV	Spatial averaging	0.10	R	√3	1	0.06	∞
DUT and Environmental							
PC	Probe coupling with DUT	0.00	R	√3	1	0.00	∞
MOD	Modulation response	0.40	R	√3	1	0.23	∞
IT	Integration time	0.00	R	√3	1	0.00	∞
RT	Response time	0.00	R	√3	1	0.00	∞
DH	Device holder influence	0.10	R	√3	1	0.06	∞
DA	DUT alignment	0.00	R	√3	1	0.00	∞
AC	RF ambient conditions	0.04	R	√3	1	0.02	∞
TEM	Laboratory temperatures	0.05	R	√3	1	0.03	∞
REF	Laboratory reflections	0.04	R	√3	1	0.02	∞
MSI	Immunity / secondary reception	0.00	R	√3	1	0.00	∞
DRI	Drift of the DUT	0.21	R	√3	1	0.12	∞
					Combined Standard Uncertainty	0.76	∞
					Expanded Standard Uncertainty and Effective Degrees of Freedom (k=2)	1.52	

6. Power Density Testing Equipment List

Manufacturer	Model	Description	Serial Number	Calibration Date	Calibration Due
Control Company	4040	Ambient Thermometer	250440199	7/17/2025	7/17/2027
SPEAG	5G-Veri30	30 GHz System Verification Source	1114	9/15/2025	9/15/2026
SPEAG	EUmmWV4	E-field Probe	9690	9/17/2025	9/17/2026
SPEAG	DAE4ip	Data Acquisition Electronics with integrated power	1839	9/15/2025	9/15/2026
Staubli	TX2-90XL	DASY8 Robot TX2-90XL	F/23/0052572/A/003	-	-
Staubli	SCS9C	DASY8 Robot Controller CS9C	F/23/0052572/C/003	-	-
SPEAG	DASY8 Server	DASY8 Robot Measurement Server	10147	-	-

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7. Conclusion

The power density evaluation indicates that the DUT is capable of compliance with the RF radiation exposure limits of the FCC, with respect to all parameters subject to this test. These measurements were taken to simulate the RF effects of RF exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The results and statements relate only to the item(s) tested.

Please note that the absorption and distribution of electromagnetic energy in the body are very complex phenomena that depend on the mass, shape, and size of the body, the orientation of the body with respect to the field vectors, and the electrical properties of both the body and the environment. Other variables that may play a substantial role in possible biological effects are those that characterize the environment (e.g. ambient temperature, air velocity, relative humidity, and body insulation) and those that characterize the individual (e.g. age, gender, activity level, debilitation, or disease). Because various factors may interact with one another to vary the specific biological outcome of an exposure to electromagnetic fields, any protection guide should consider maximal amplification of biological effects as a result of field-body interactions, environmental conditions, and physiological variables.

Antenna Datasheet

Antenna Manufacturer Information:

Antenna(s) are manufactured and designed at Garmin headquarters located at 1200 E. 151st Street, Olathe, KS, 66062, USA. Garmin is an antenna manufacturer that specializes in antenna construction and has been a technology leader in high performance antenna design for over thirty years. State-of-the art equipment is used to design, measure, and analyze new designs that are superior to competitor designs and highly proprietary in nature.

Antenna Description:

This data sheet contains the antenna gain information for the A05125-A1/A2 for Garmin Model A05125. The approximate operational frequency band of these technologies is given, and the maximum gain within the frequency band is shown in table 1.

Table 1 Antenna Gain:

Antenna Model Number	Type	Band (MHz)	Maximum Gain (dBi) @ Frequency (MHz)
A05125-A1	Patch Array	24075 – 24175	N/A
A05125-A2	Inverted F	2400 – 2480	3.33 @ 2480

Additional Information:

Antenna gain is listed as N/A in the table where the specific antenna is only used for radios where the applicable rule parts are measured as a radiated field strength, and/or there are no rules pertaining to antenna gain limits.

As all measurements for Part 15.225 are made in radiated mode to comply with the field strength limits, gain information is not required to be noted in the reports or any additional documentation.

Contact Garmin for other information regarding antenna design, dimensions, cable length, etc.