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

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Reviewed By

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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

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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%

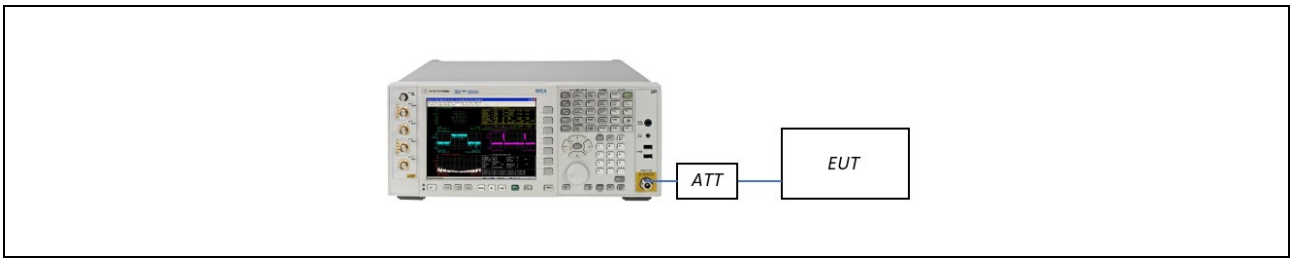
7.5. CONDUCTED BAND EDGE (OUT OF BAND EMISSIONS) / CONDUCTED SPURIOUS EMISSIONS

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

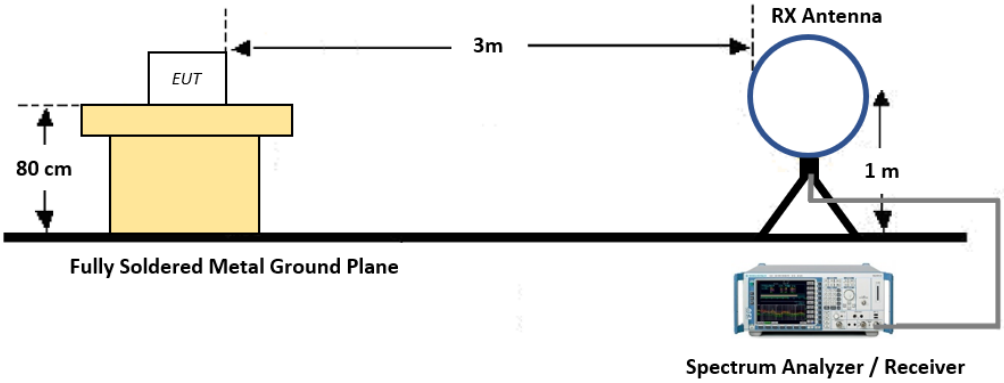
RESTRICTED BANDS OF OPERATION

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

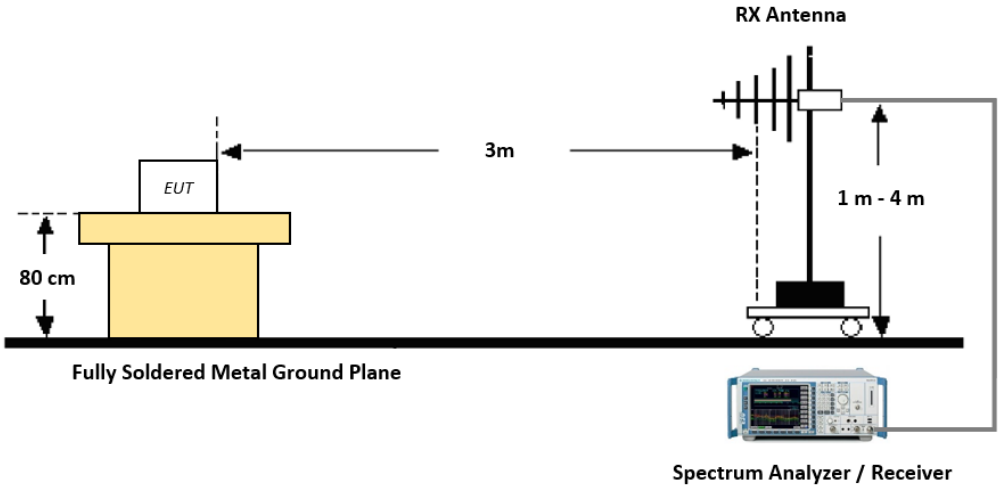
ISED: RSS-GEN Section 8.10				
Frequency (MHz)	**Frequency (MHz)**	**Frequency (MHz)**	**Frequency (MHz)**	**Frequency (MHz)**
0.090 - 0.110	8.37625 - 8.38675	108 – 138	1660 - 1710	8025 - 8500
0.495 - 0.505	8.41425 - 8.41475	149.9 - 150.05	1718.8 - 1722.2	9000 - 9200
2.1735 - 2.1905	12.29 - 12.293	156.52475 - 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

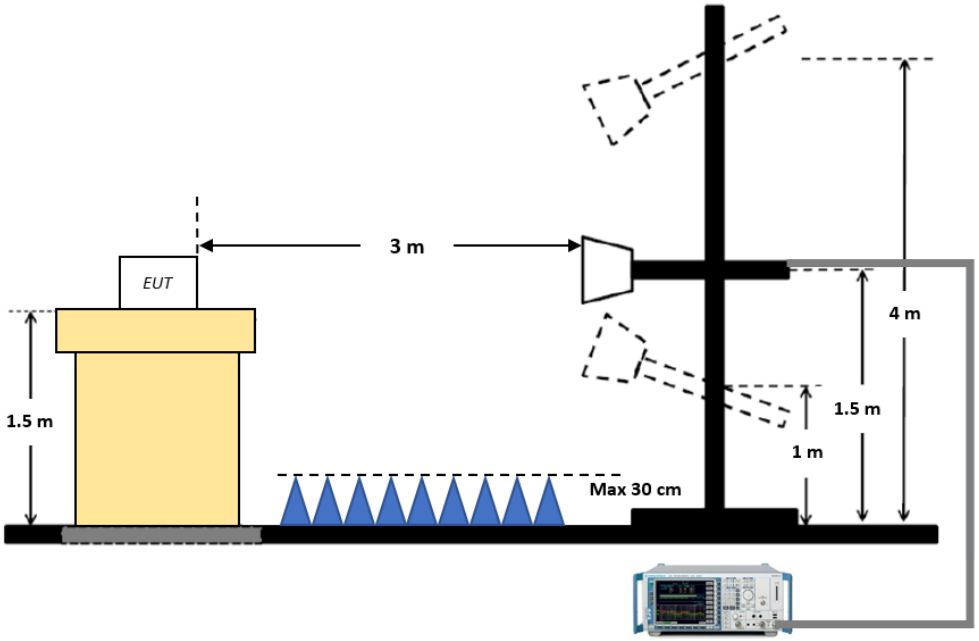
Below 30 MHz



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.

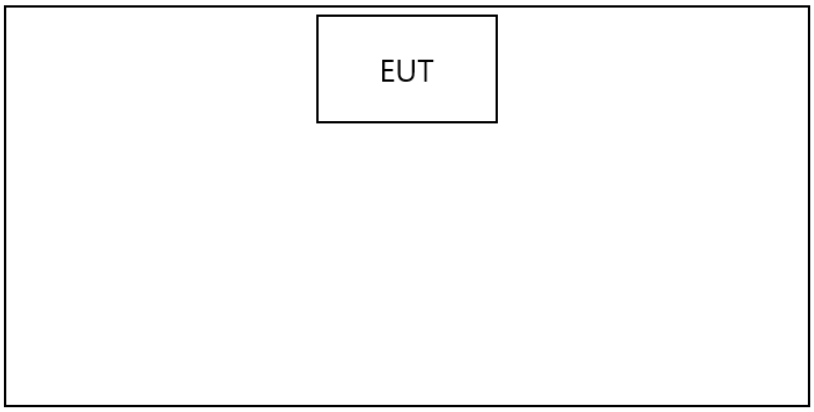
2. Co-location test
co-location test results reported in HA2511-0267-R01.

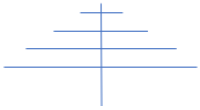
OUTPUT POWER SETTING

The output is preset as declared by the manufacturer

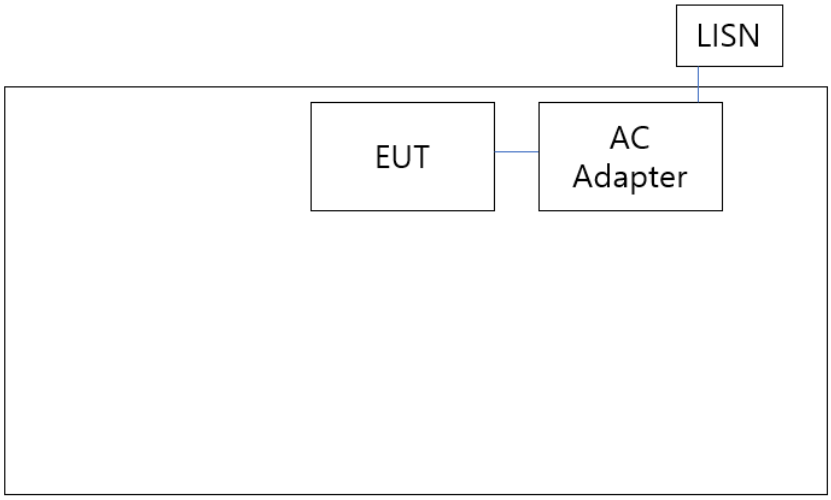
TEST CONFIGURATION

Radiated Emission





Conducted Emission



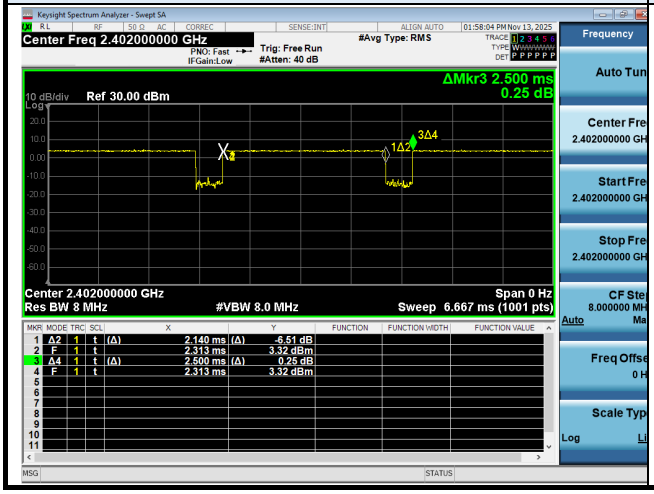
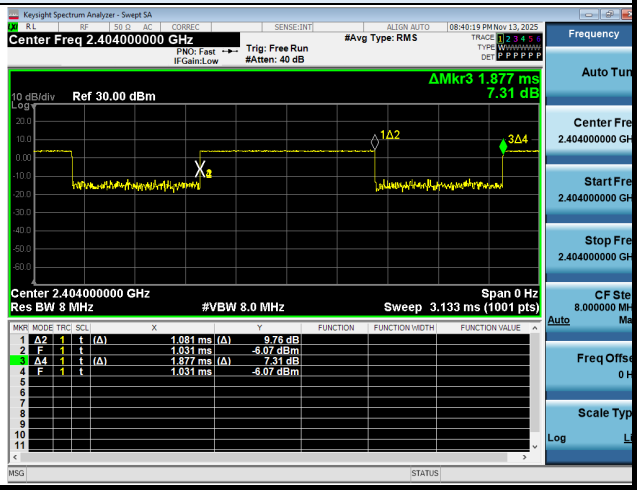
LIST OF SUPPORT EQUIPMENT

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	

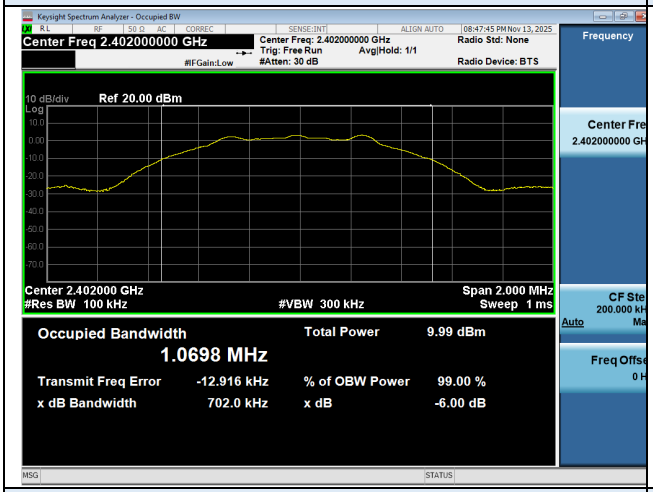
BLE 2M (GFSK)		99% Bandwidth (MHz)	6 dB Bandwidth (kHz)	
Frequency (MHz)	Channel	Result	Result	Limit
2 404	1	2.073	1 153.230	≥ 500
2 440	19	2.079	1 155.382	
2 478	38	2.082	1 159.968	

Note(s):

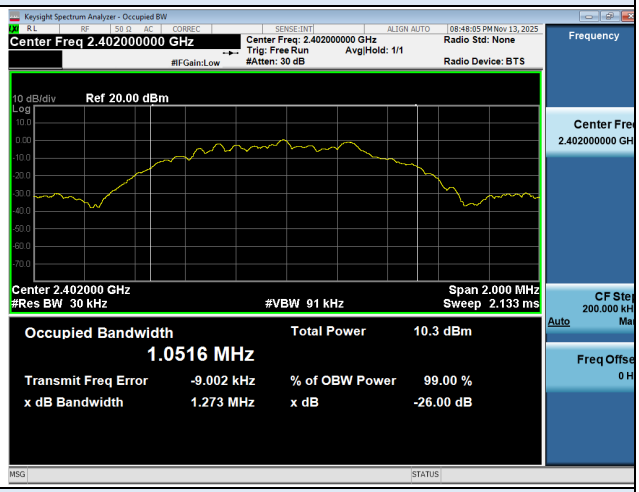
▣ TEST PLOTS

BLE 1M

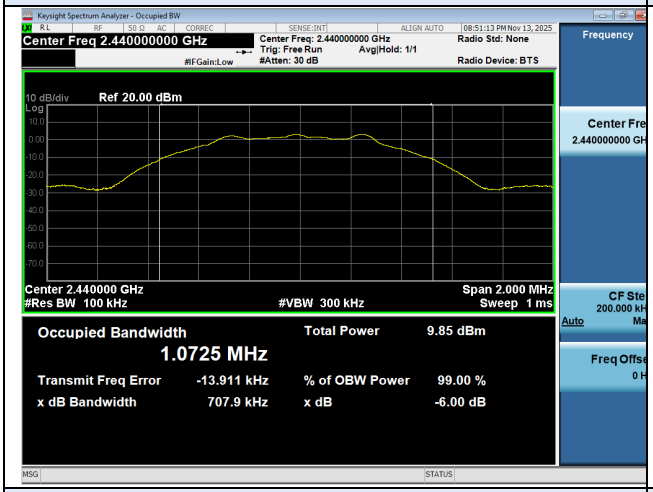
6dB BW: CH 0 (2 402 MHz)



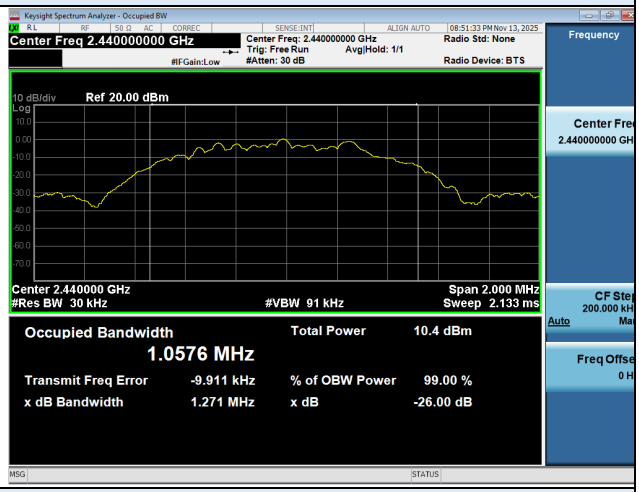
99% OBW: CH 0 (2 402 MHz)



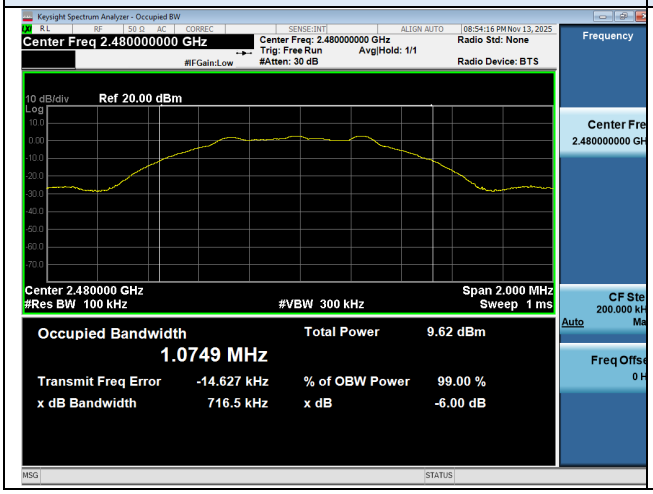
6dB BW: CH 19 (2 440 MHz)



99% OBW: CH 19 (2 440 MHz)



6dB BW: CH 39 (2 480 MHz)



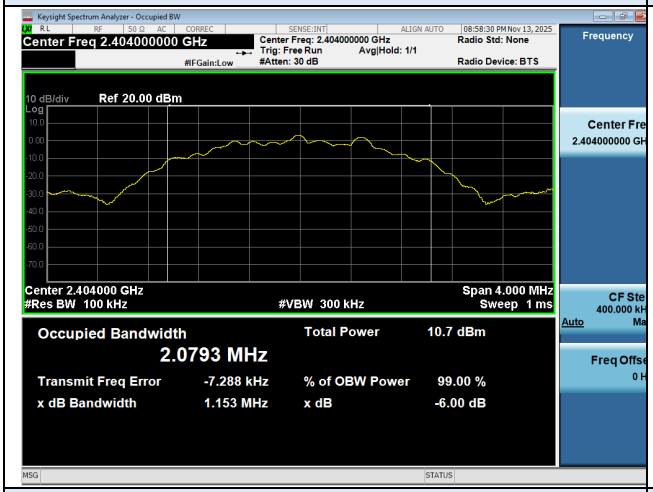
99% OBW: CH 39 (2 480 MHz)

Note(s):

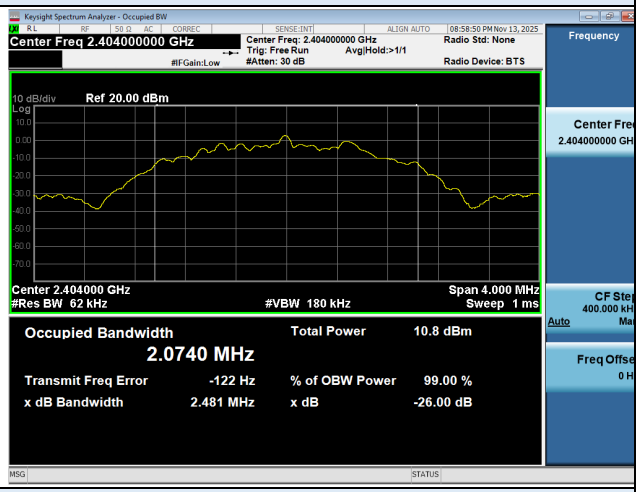
▣ TEST PLOTS

BLE 2M

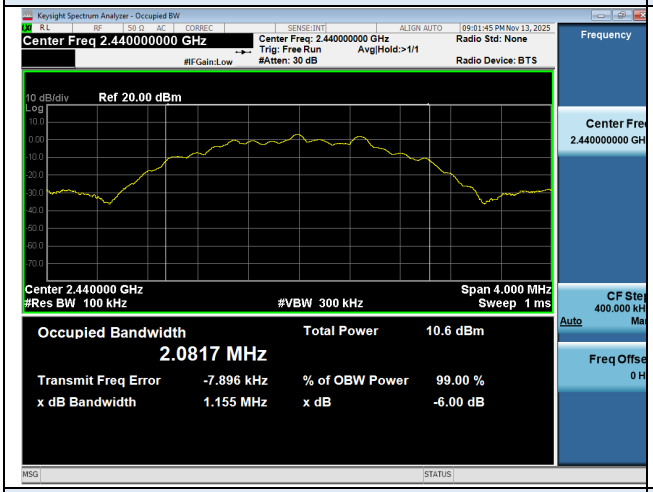
6dB BW: CH 1 (2 404 MHz)



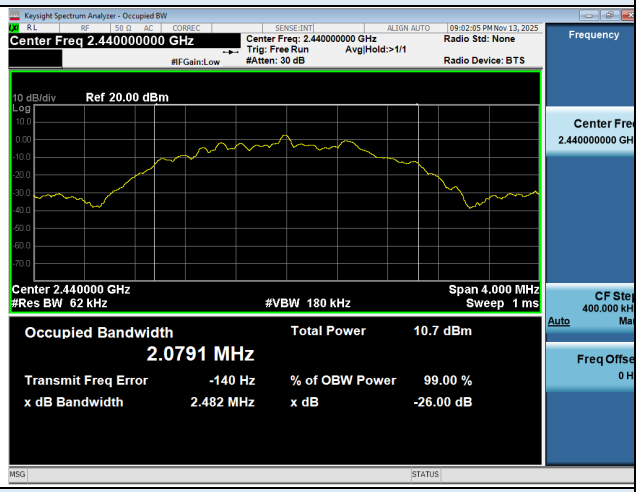
99% OBW: CH 1 (2 404 MHz)



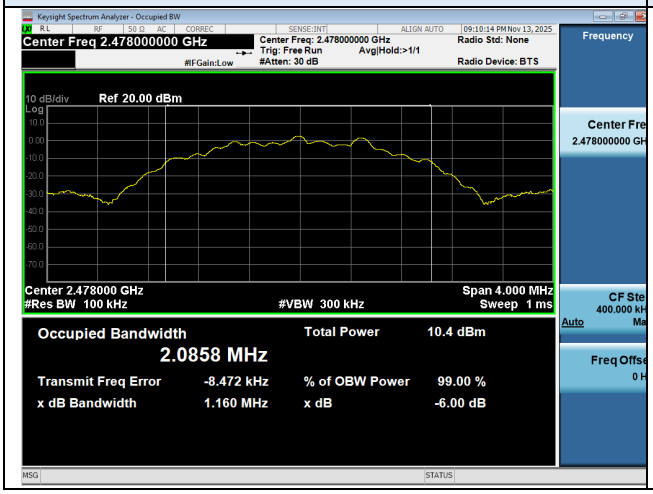
6dB BW: CH 19 (2 440 MHz)



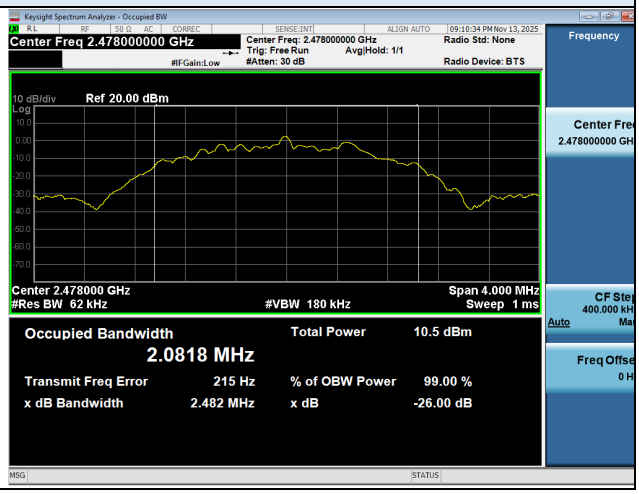
99% OBW: CH 19 (2 440 MHz)



6dB BW: CH 38 (2 478 MHz)



99% OBW: CH 38 (2 478 MHz)



Note(s):

9.3. OUTPUT POWER

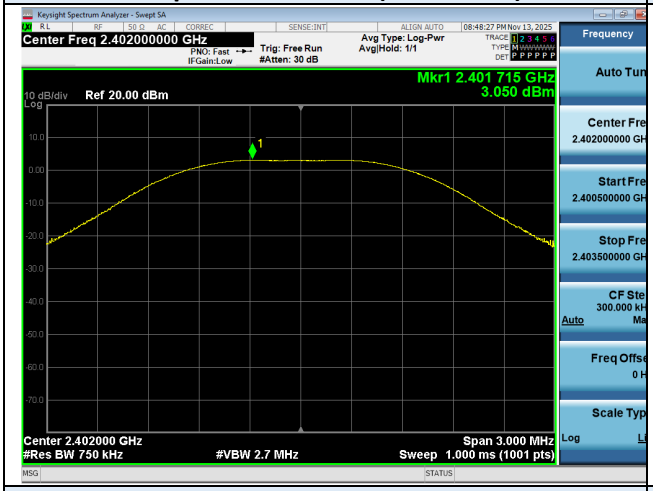
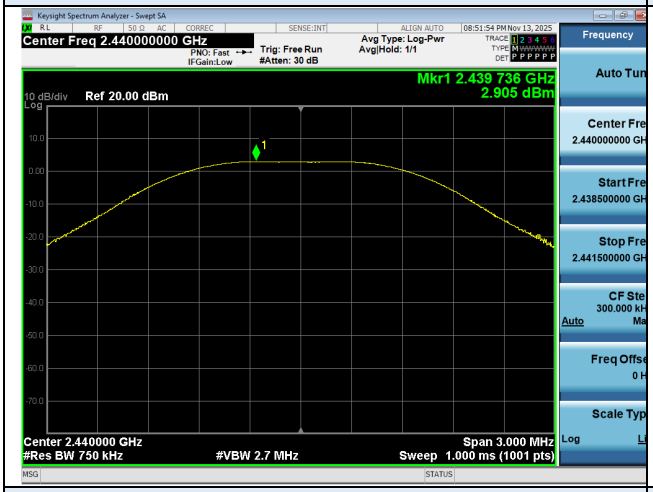
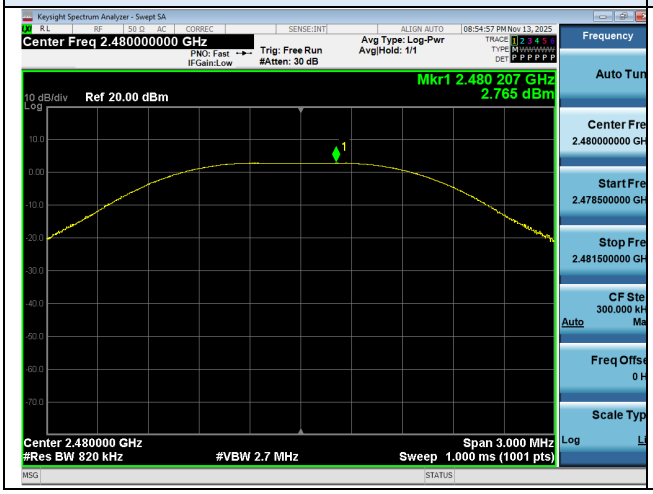
Peak Power

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):

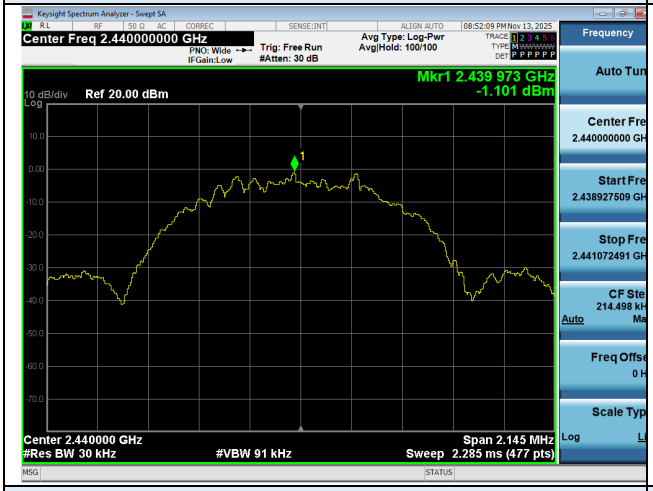
9.4. POWER SPECTRAL DENSITY

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

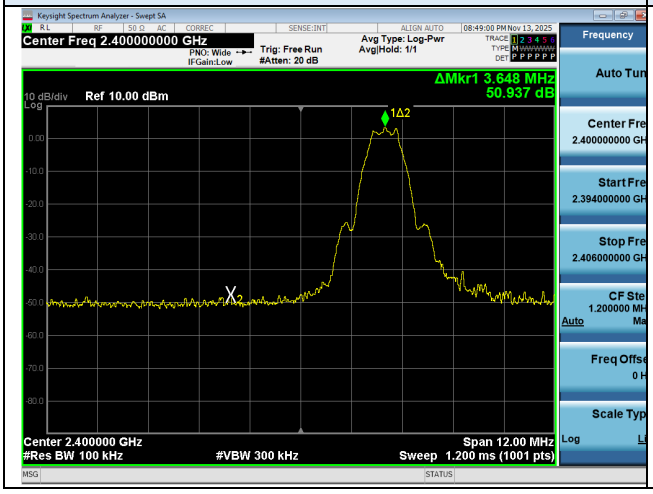
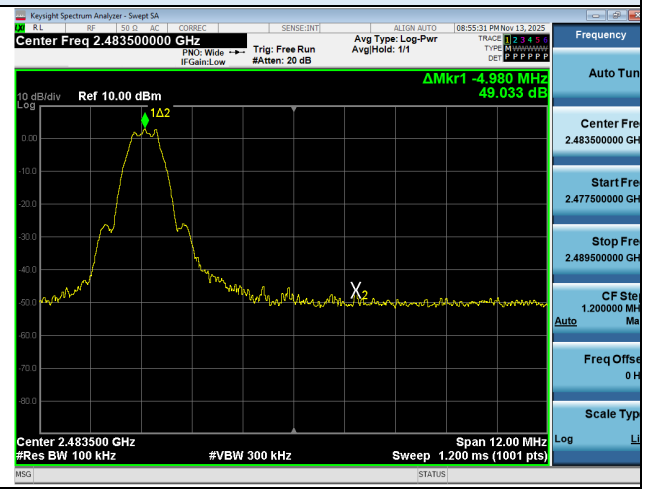
Out of Band Emissions at the Band Edge

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

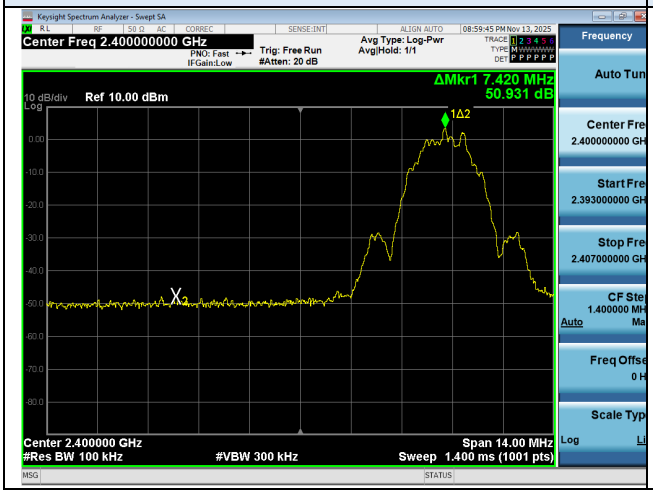
BLE 2M (GFSK)			Test Result		
Frequency [MHz]	Channel No.	Position	Measured Level [dBc]	Limit [dBc]	Result
2 404	1	Low	50.931	≥ 20	Compliant
2 478	38	High	50.491	≥ 20	Compliant

▣ 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

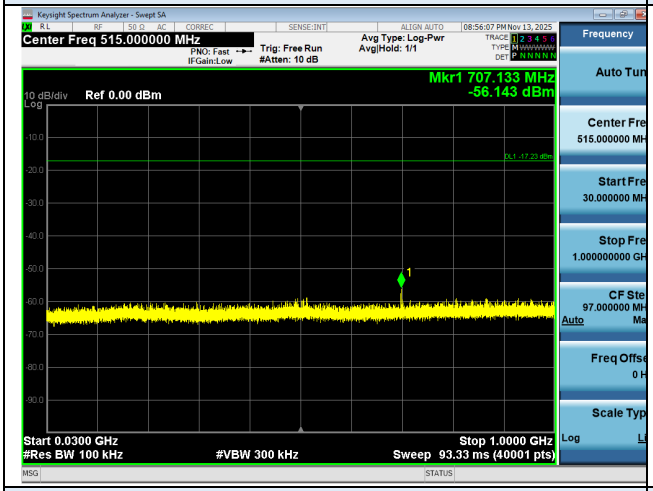
BLE 1M (GFSK)			Test Result		
Frequency [MHz]	Channel No.	Position	Measured Level [dBc]	Limit [dBc]	Result
2 402	0	Low	45.346	≥ 20	Compliant
2 440	19	Middle	46.579	≥ 20	Compliant
2 480	39	High	46.636	≥ 20	Compliant

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

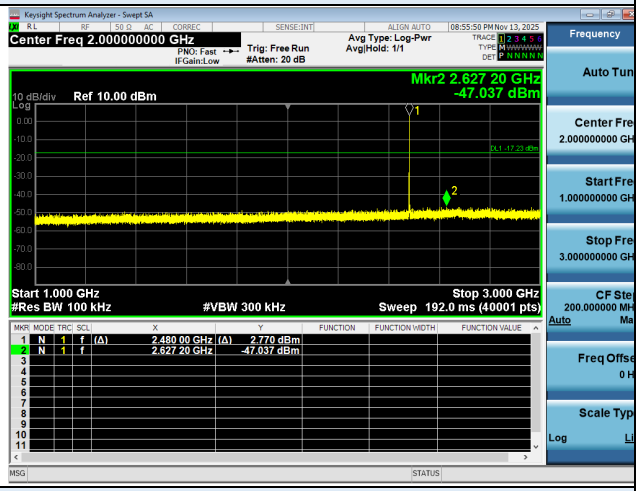
▣ TEST PLOTS

BLE 1M: CH 39 (2 480 MHz)

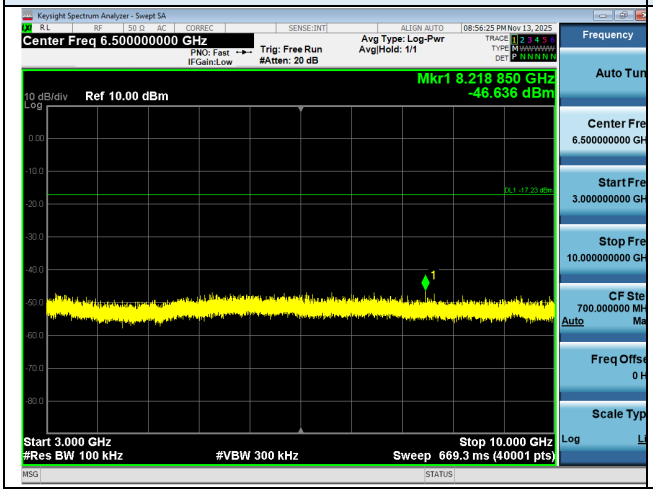
30 MHz – 1 GHz



1 GHz – 3 GHz



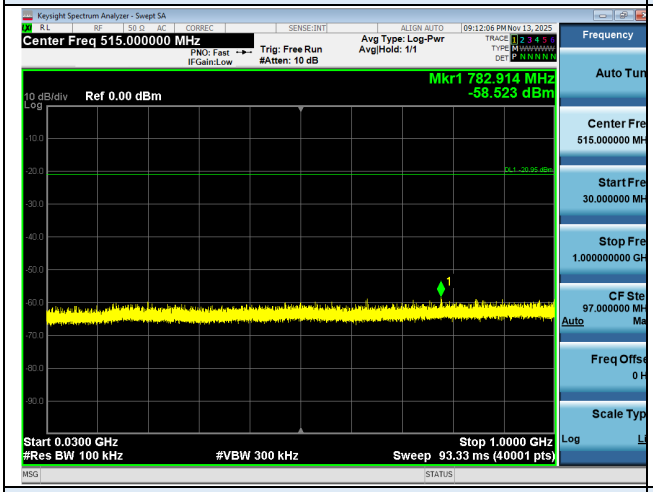
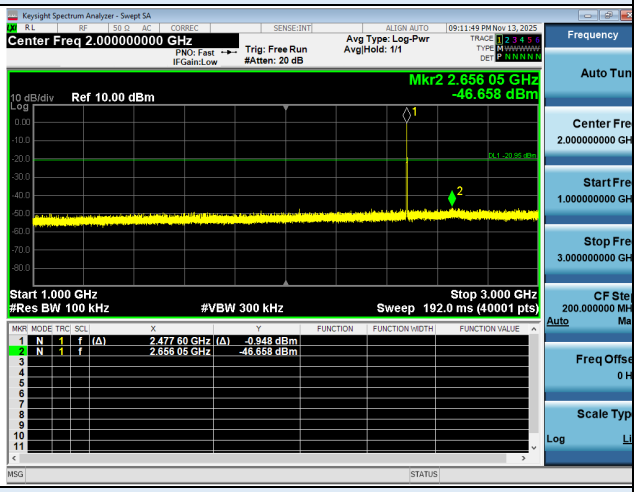
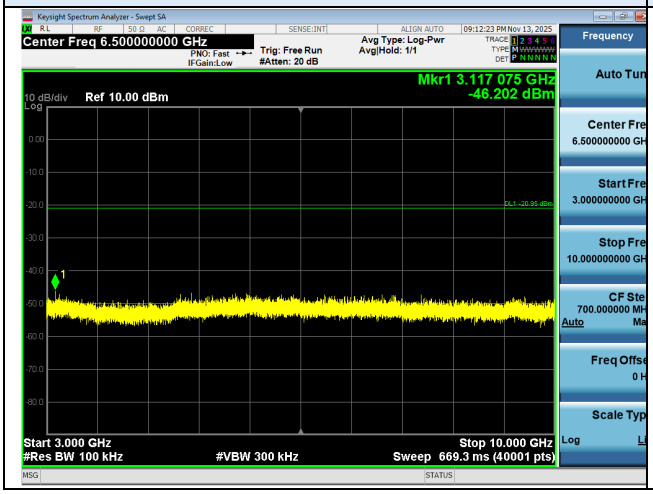
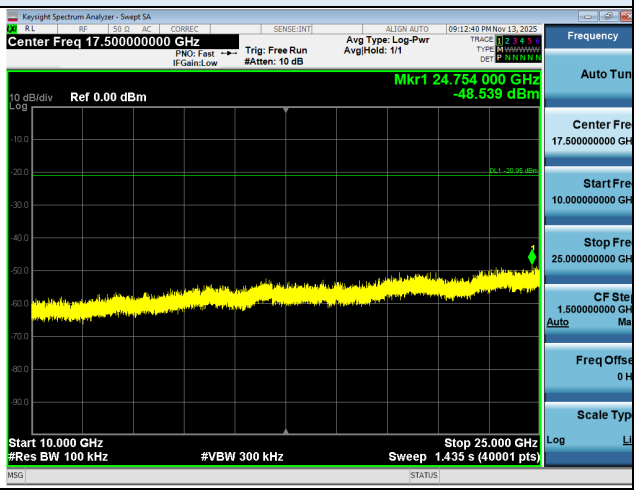
3 GHz – 10 GHz



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)

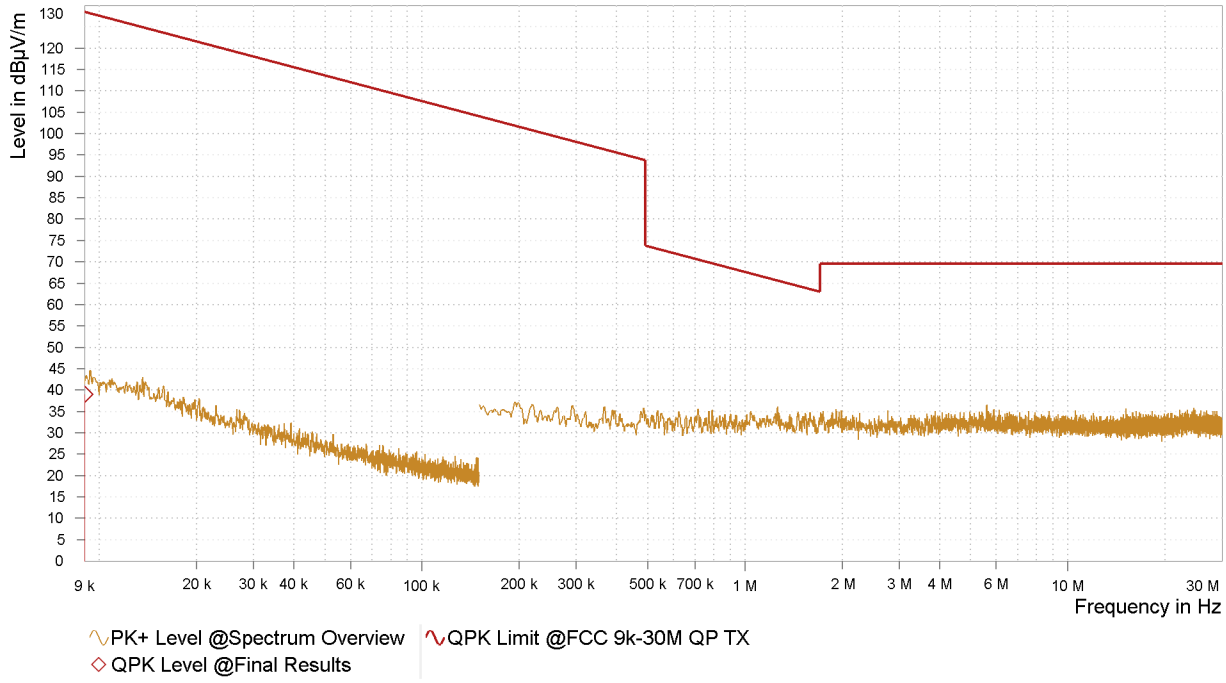
Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	Duty	AV	PK	AV	PK	AV	PK
No major peaks found											

Note(s):

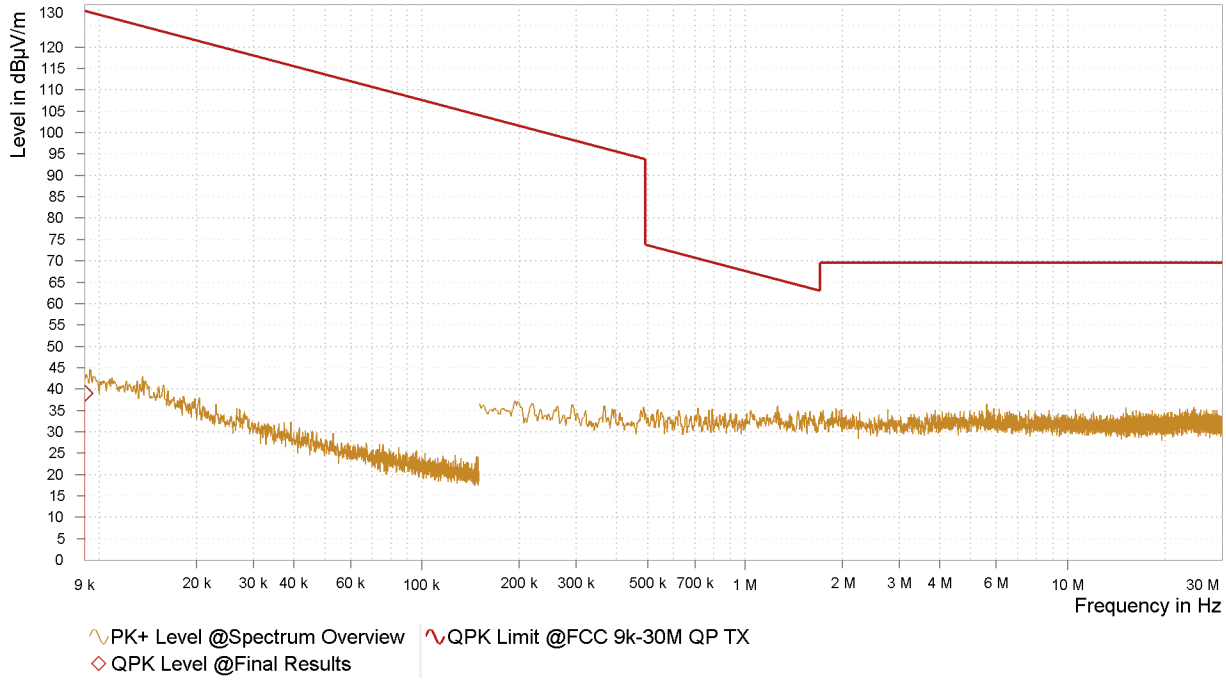
1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain
2. AV Level = Measured Power(dBm) + Correction Factor(dB) + Duty Cycle Correction Factor(dB).

▣ 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)

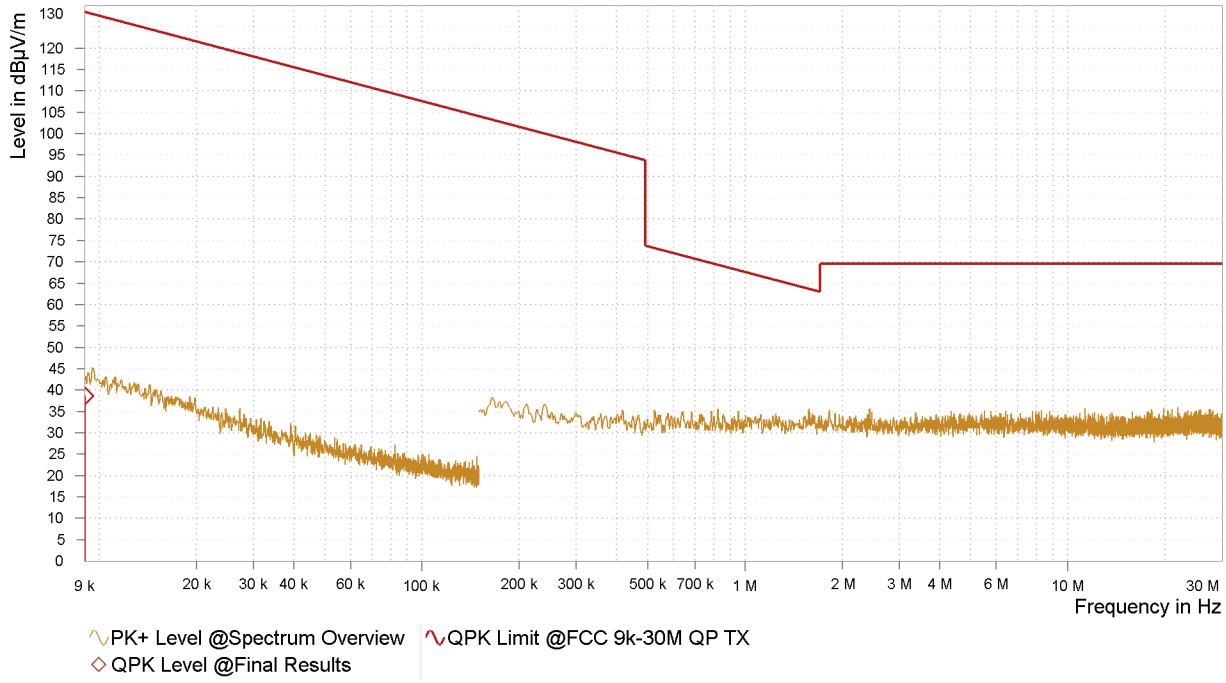


Note(s):

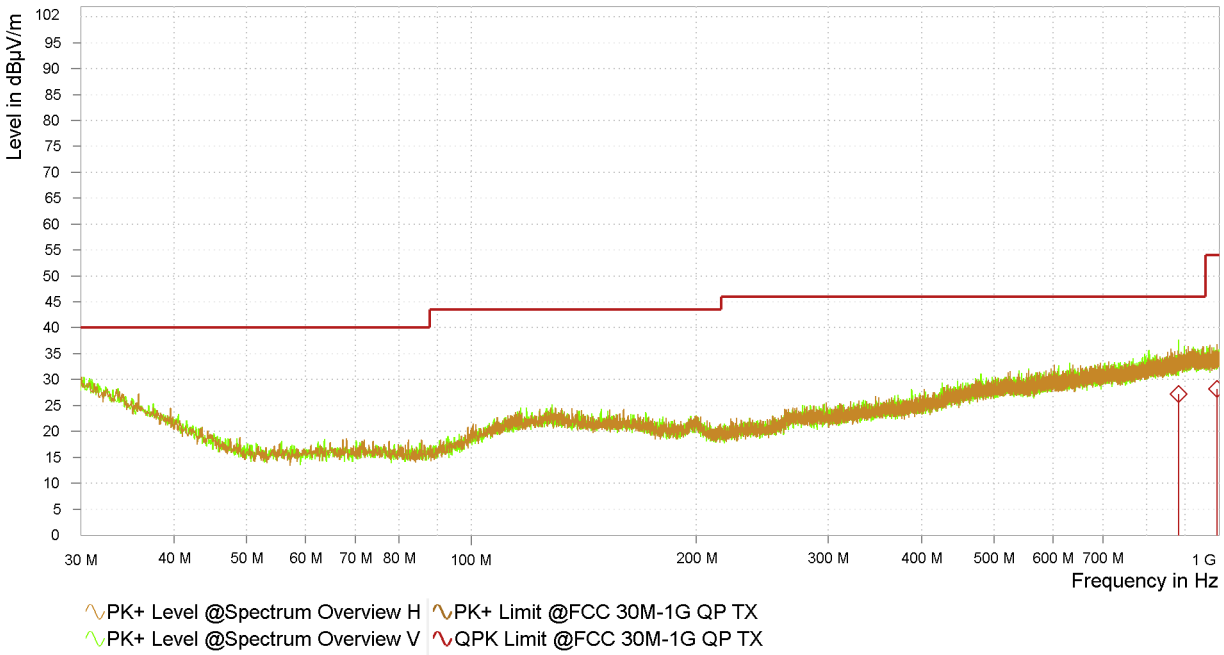
1. The worst-case plot are included in this report.

▣ 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)

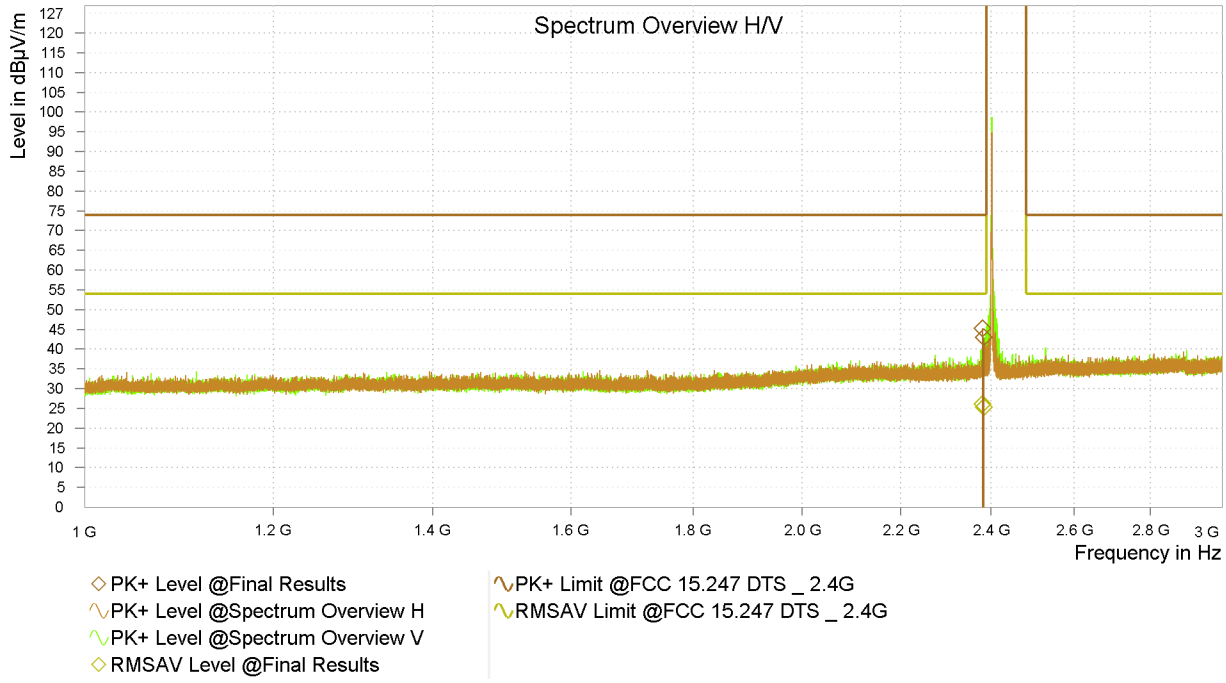


Note(s):

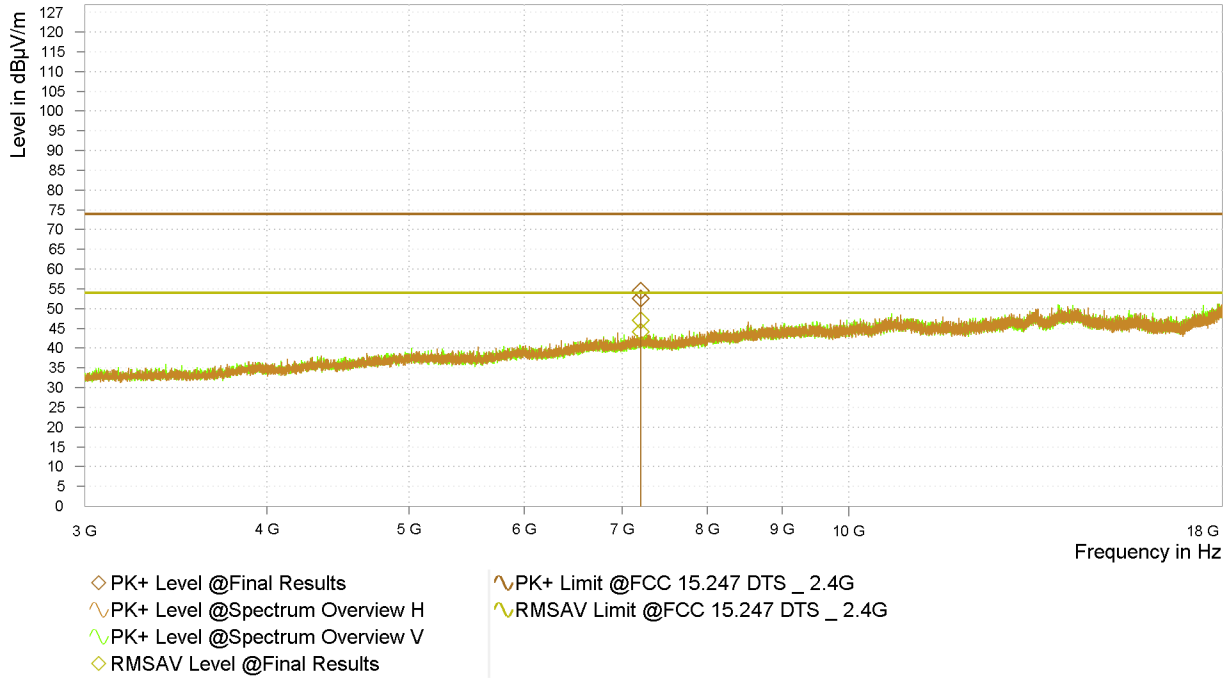
1. The worst-case plot are included in this report.

▣ TEST PLOTS

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



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

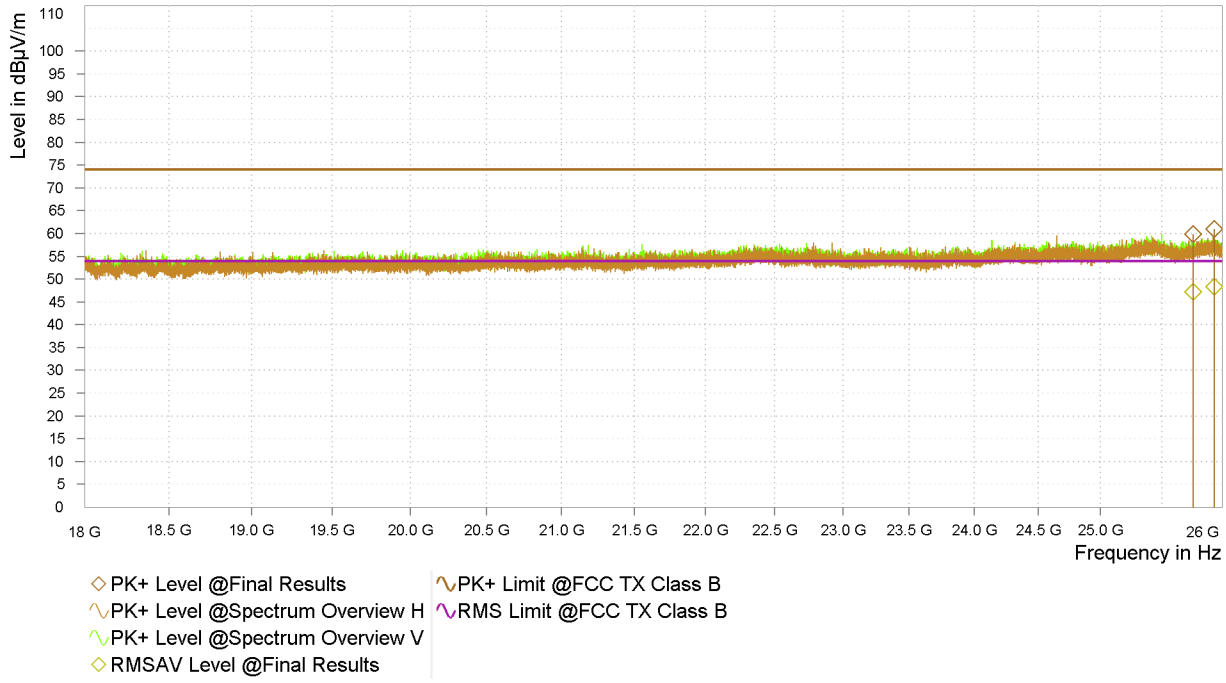


Note:

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).

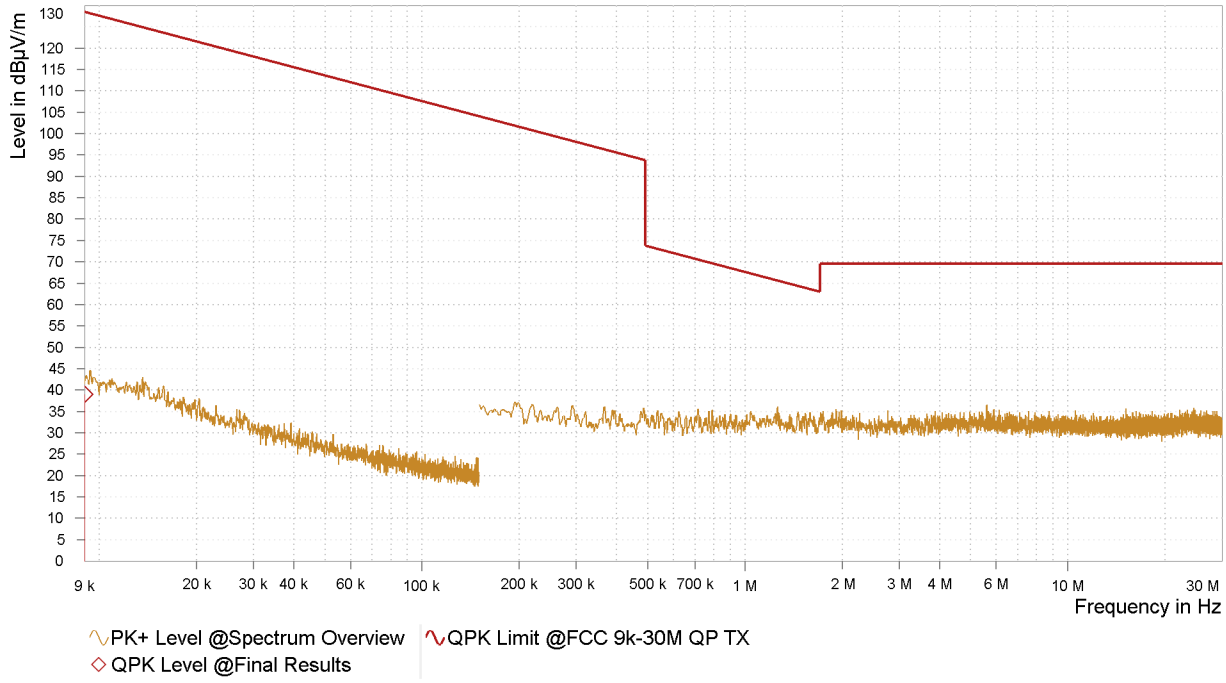
Frequency Range: 40 GHz – 100 GHz

Test Mode BLE + 24GHz radar

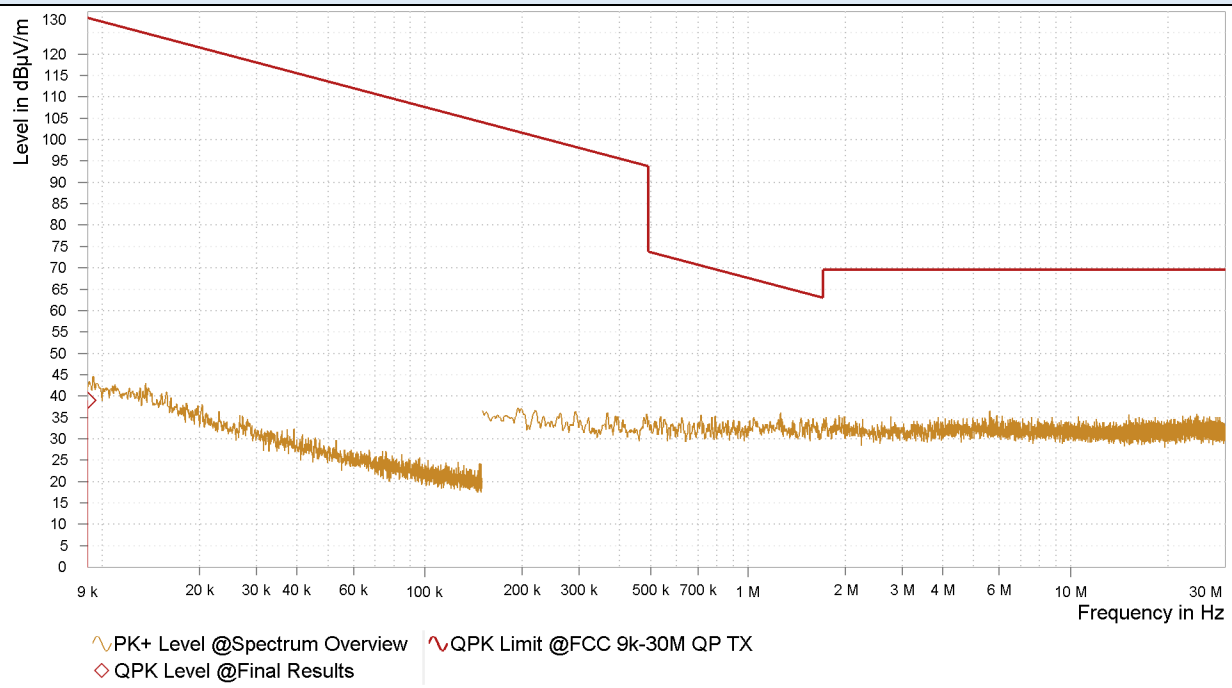
Frequency [GHz]	Measured Level [dBµV]	A.F. + C.L. - A.G. + D.F. [dB/m]	Ant. Pol. (H/V)	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]
No major peaks found						

▣ TEST PLOTS

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



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



Note:

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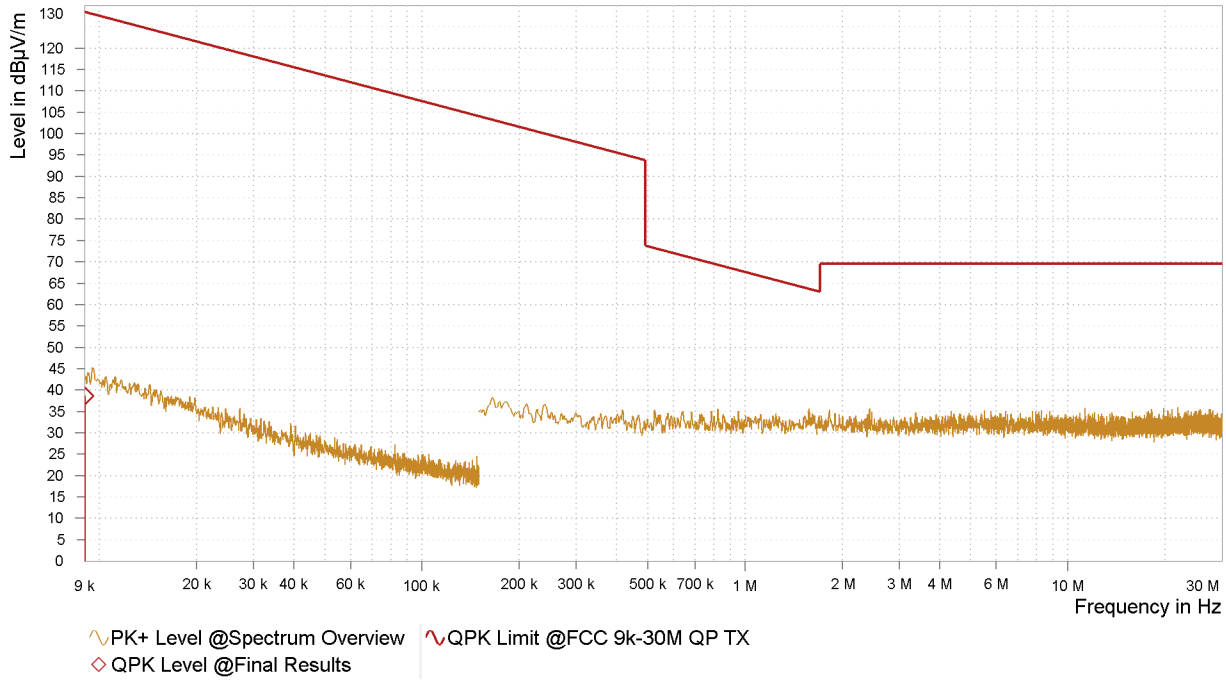
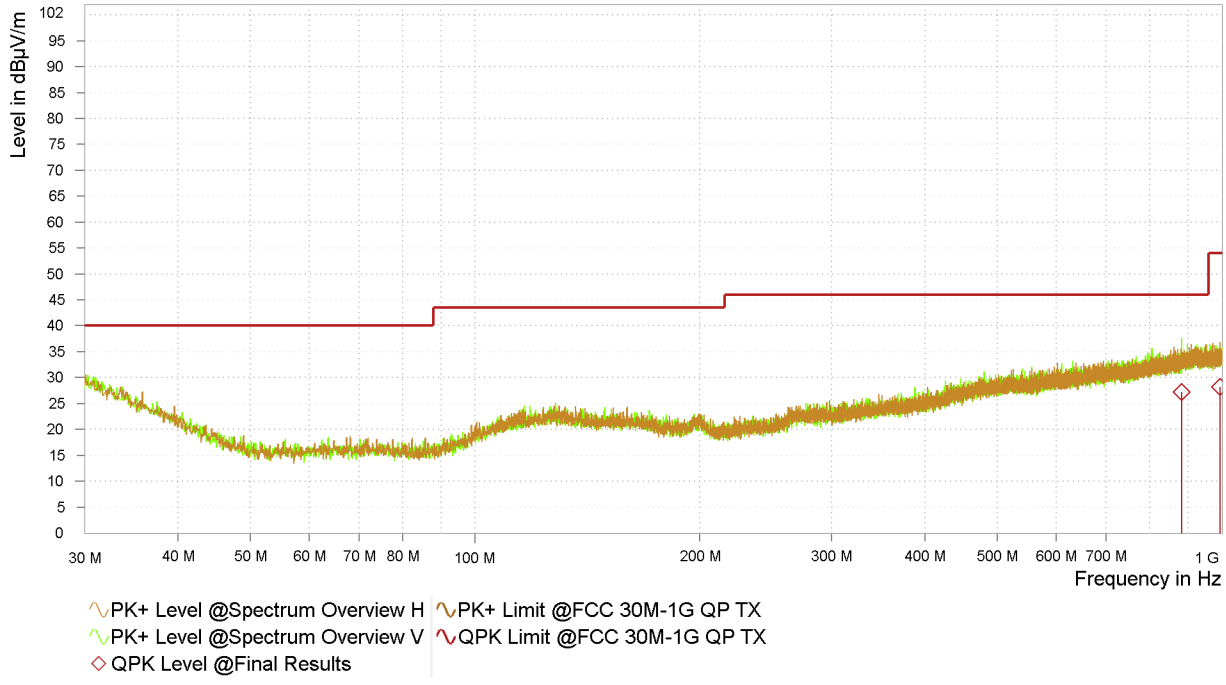
▣ TEST PLOTS

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



Radiated Spurious Emission 30 MHz – 1 GHz



Note:

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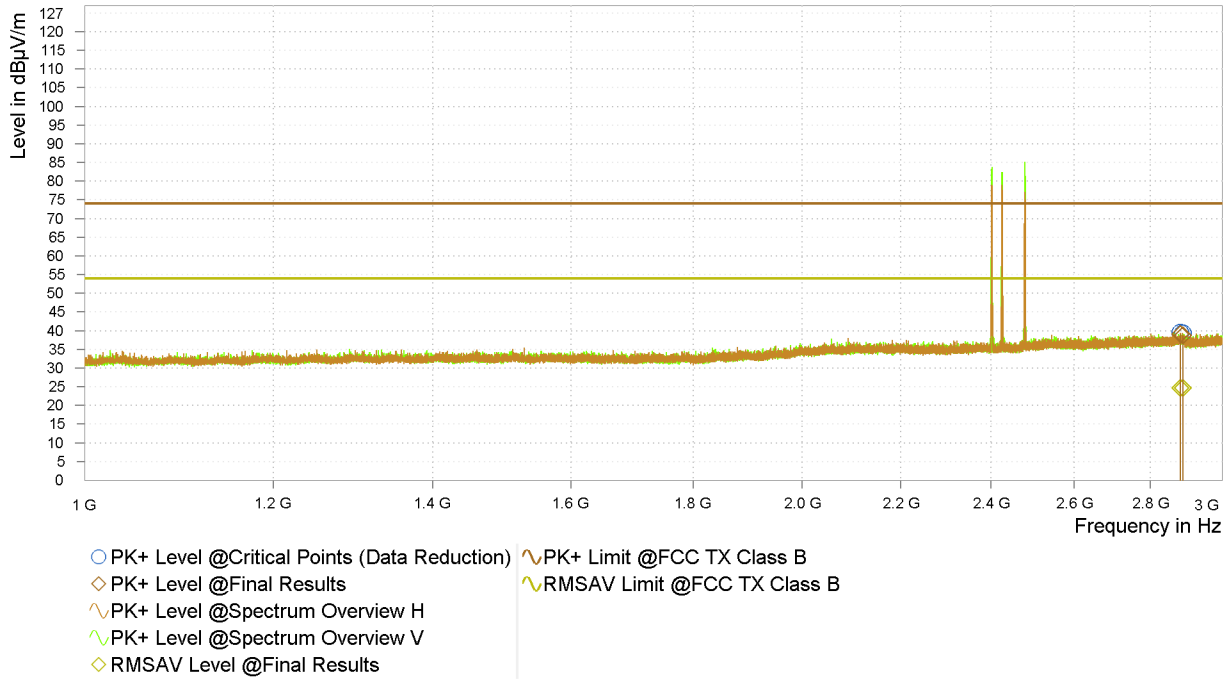
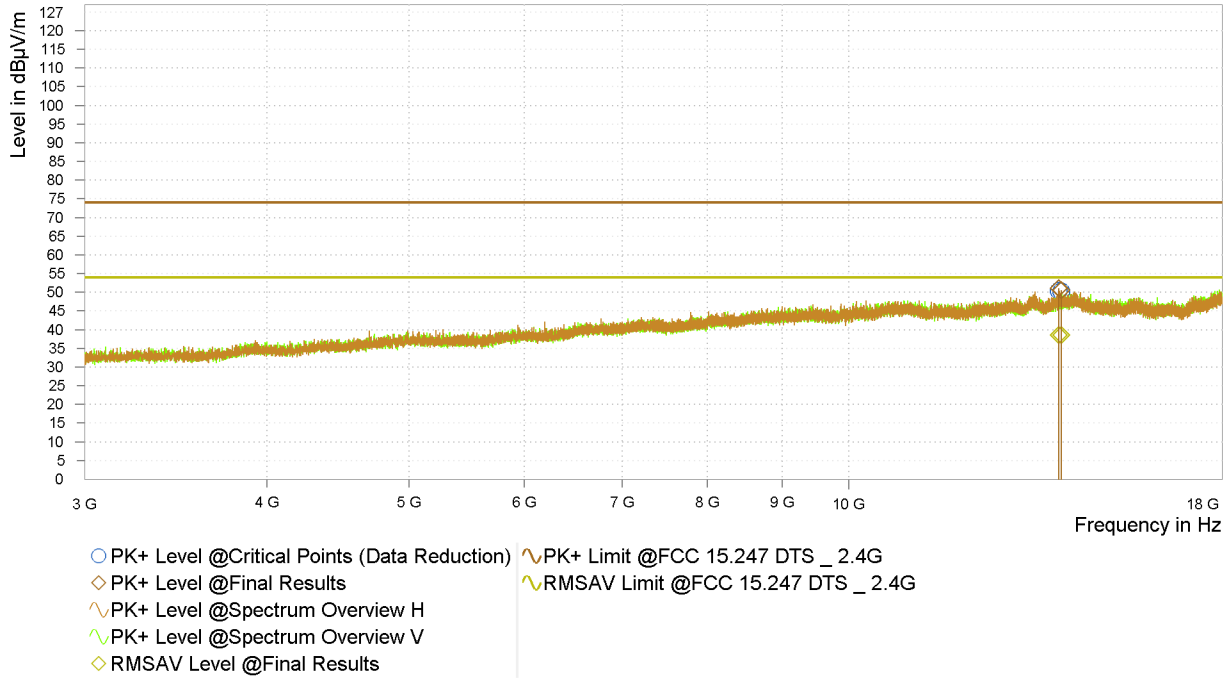
▣ TEST PLOTS

Radiated Spurious Emission 1 GHz – 3 GHz



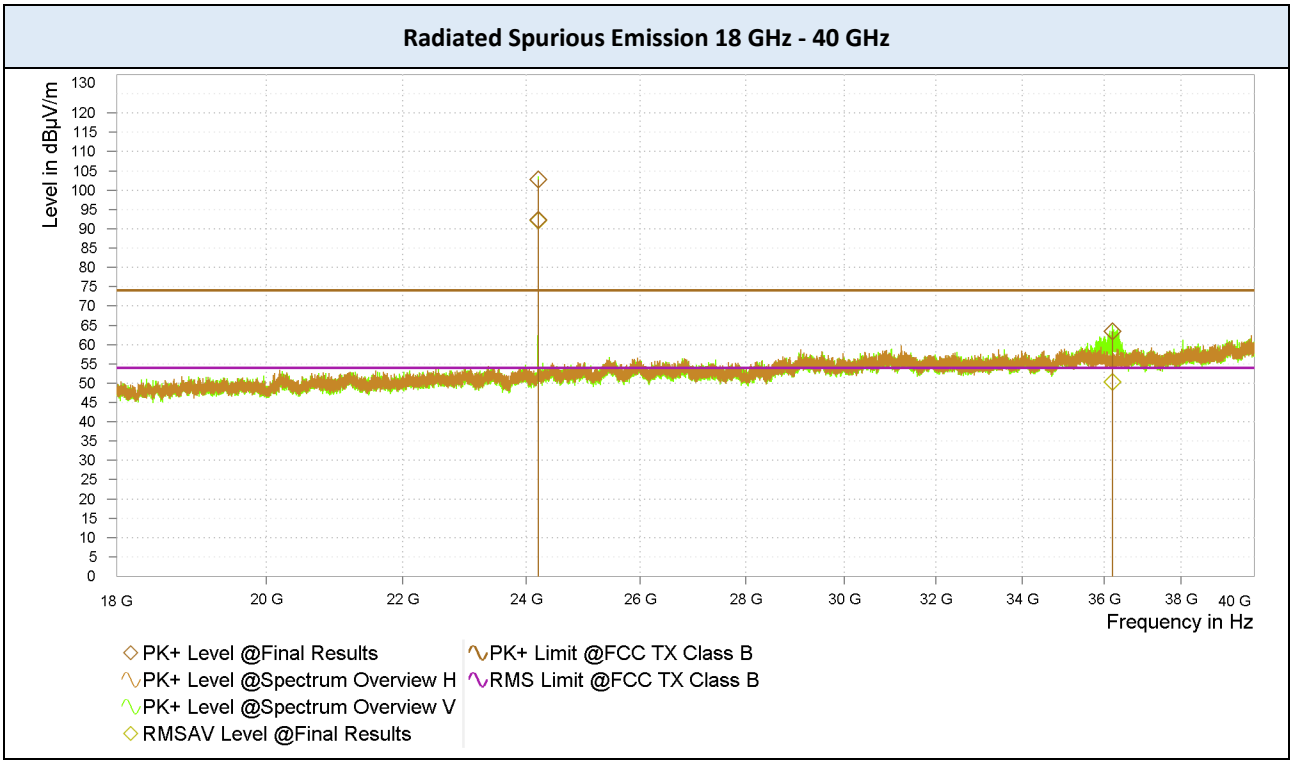
Radiated Spurious Emission 3 GHz - 18 GHz



Note:

-

▣ TEST PLOTS



Note:

9.7. RADIATED RESTRICTED BAND EDGES

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

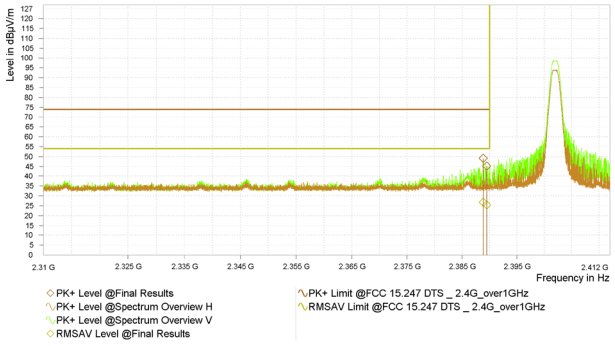
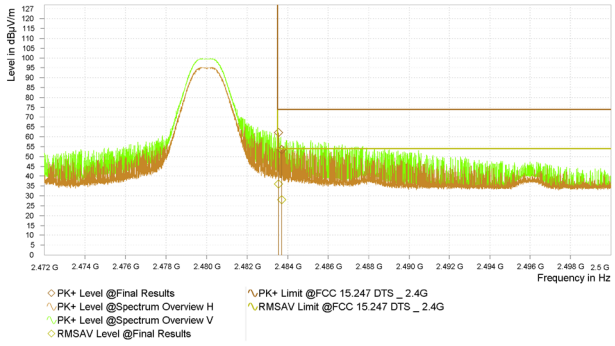
Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	Duty	AV	PK	AV	PK	AV	PK
2 388.838	V	37.52	59.87	-10.69	0.68	27.51	49.18	54	74	26.50	24.82
2 389.444	H	36.13	55.93	-10.67	0.68	26.14	45.26	54	74	27.87	28.74

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)

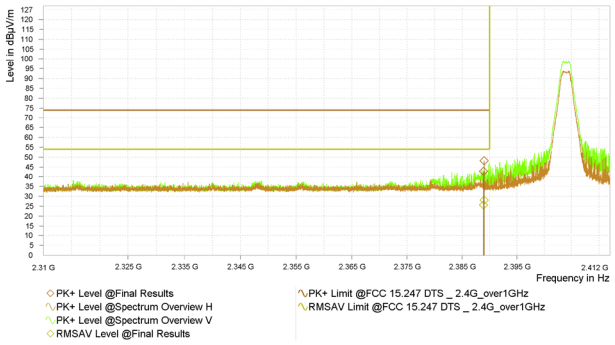
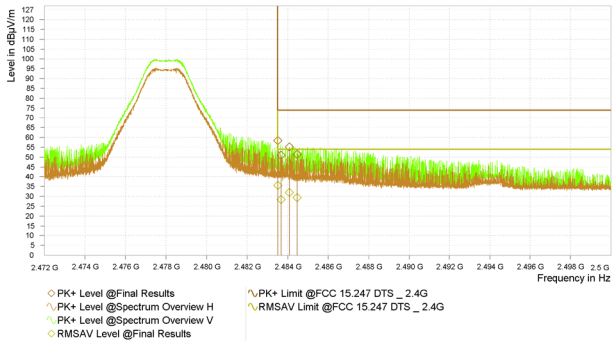
Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr.[1)]	Duty	AV	PK	AV	PK	AV	PK
2 388.899	H	36.23	53.51	-10.67	2.40	27.96	42.84	54	74	26.04	31.16
2 389.009	V	38.74	58.93	-10.69	2.40	30.45	48.24	54	74	23.55	25.76

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

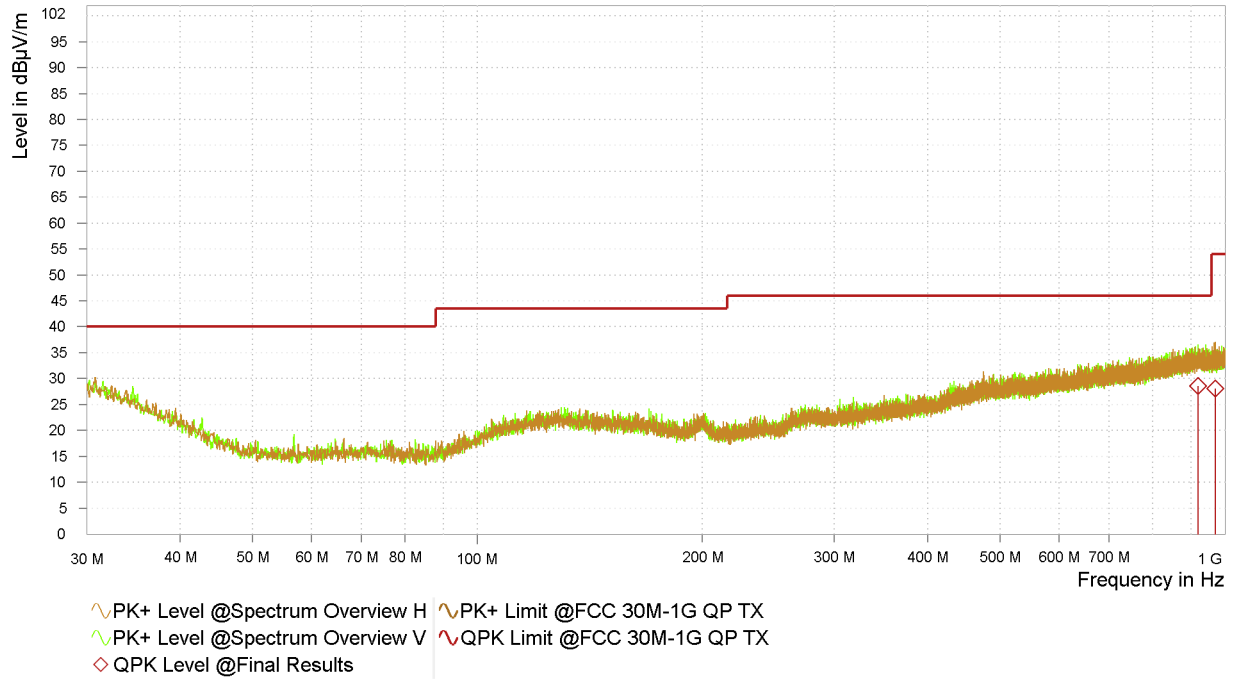
Test Mode	BLE 1M (GFSK)
Operating Frequency	2 402 MHz (CH 0)

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

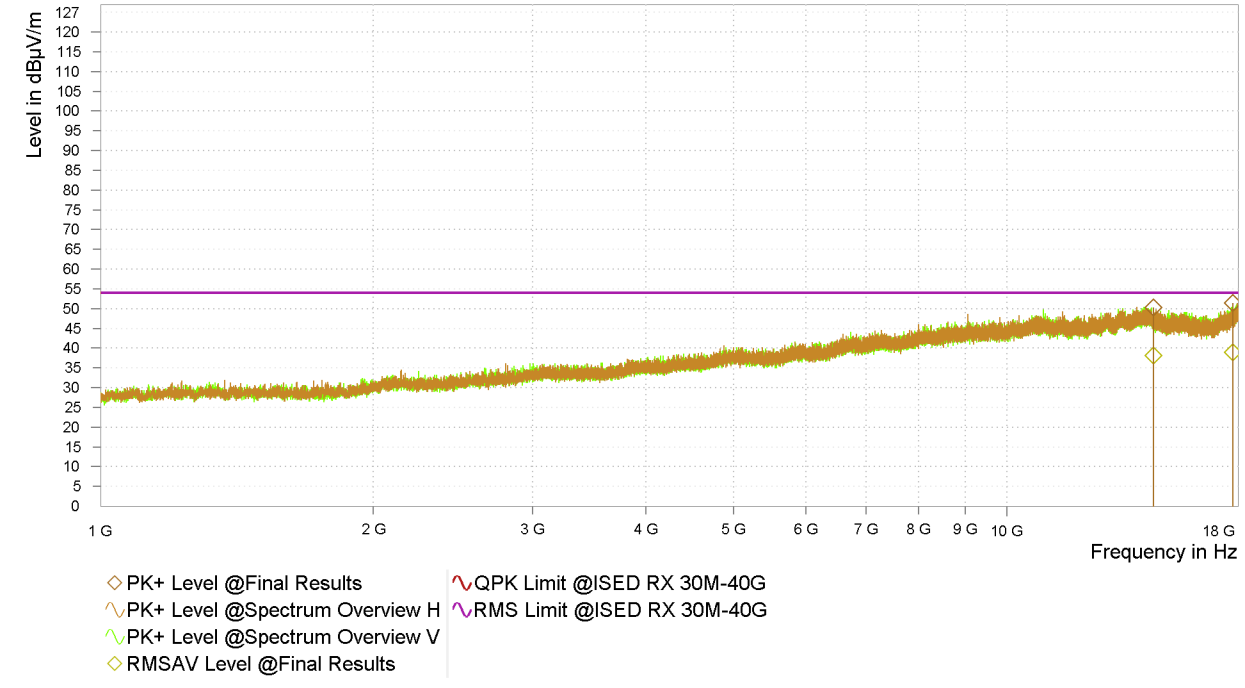
Note(s):
1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain
2. The test was conducted in CH 0, which is a worst-case mode

▣ 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

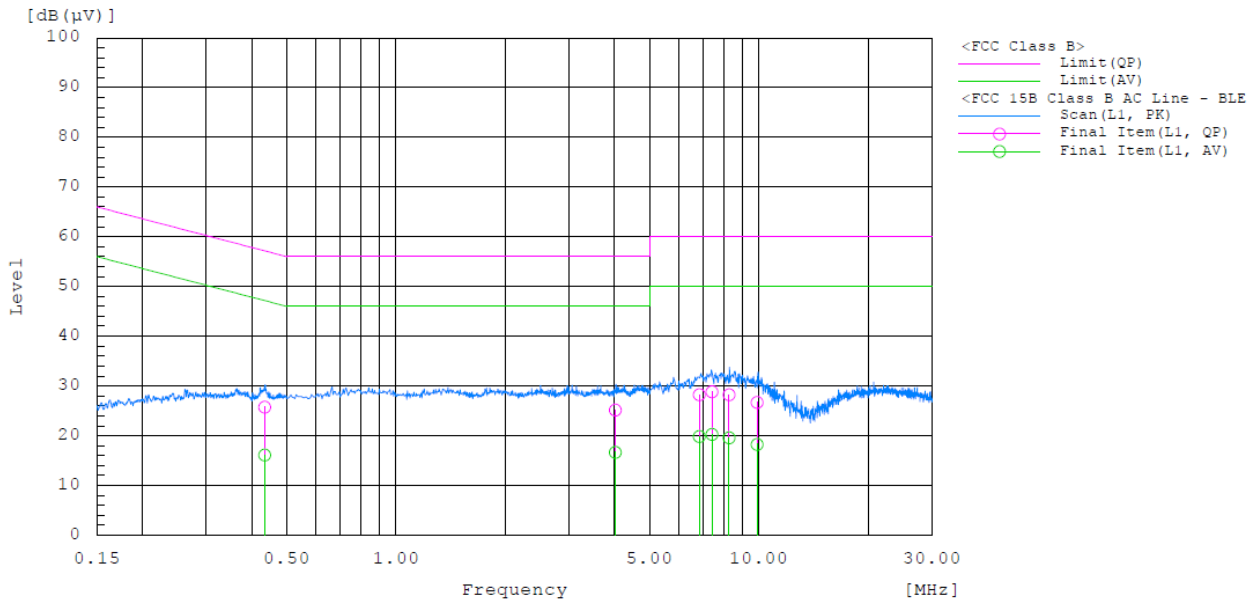
Frequency (MHz)	Line	Reading (dBuV)		Corr.[1] (dB)	Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		QP	CAV		QP	CAV	QP	CAV	QP	CAV
0.434	L1	16.1	6.5	9.6	25.7	16.1	57.2	47.2	31.5	31.1
4.019	L1	15.4	6.9	9.8	25.2	16.7	56.0	46.0	30.8	29.3
6.847	L1	18.3	9.8	10.0	28.3	19.8	60.0	50.0	31.7	30.2
7.427	L1	18.8	10.3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

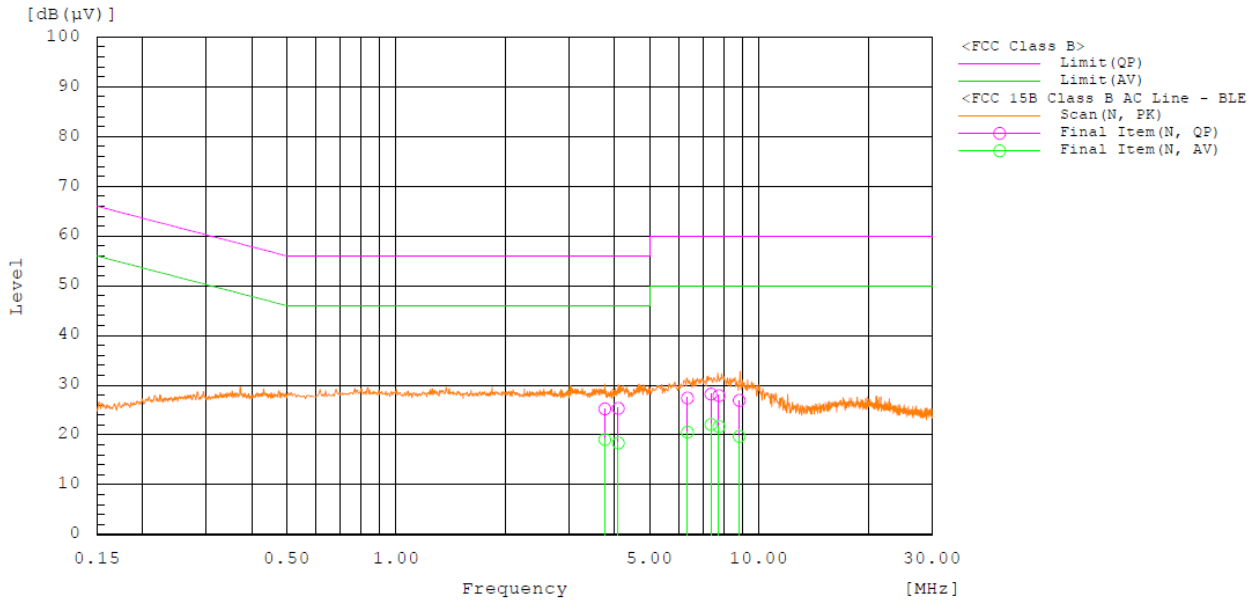
Note(s):
1.Quasi-peak (Final Result) = Reading Value + Correlation Factor

▣ 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