# Test Report 2025-103

## Version B
## Issued 29 Dec 2025

## Project GCL-0887
## Model Identifier: AB5206
## Primary Test Standard(s):
**CFR 47, FCC Part 15.247**
**RSS-247 Issue 4**


## Garmin Compliance Lab
**Garmin International**
**1200 E 151st Street**
**Olathe Kansas 66062 USA**


| | |
|---|---|
| **Client-supplied Information** | |
| FCC ID: | IPH-B5206 |
| IC ID: | 1792A-B5206 |

CERTIFICATE #6162.01

**See section 6 of this report regarding the presence or absence of accreditation logos or marks on this cover page.**

## 1. Summary

The equipment or product described in section 5 of this report was tested at the Garmin Compliance Lab according to standards listed in section 6. This report focuses on the Bluetooth low energy transceiver(s). The results are as follows.

| Parameter | Description | Key Performance Values | Result | Data starts at page |
|---|---|---|---|---|
| Radio Modulation | Summary of the kinds of communication this radio can achieve, as stated by the client. [RSS-GEN at Annex A item10b] | Digitally modulated spread spectrum at rates as high as 2 Mbps. | Reported | N/A |
| Hopping Channels | The radio manages it use of channels appropriately. [15.247(a)(1); RSS-247 at 5.1] | N/A. The radios described in this report are not subjected to the Frequency Hopping rules. | N/A | N/A |
| DTS Bandwidth | The nature of the radio signal is broadband, being at least 500 kHz wide. [15.247(a)(2); RSS-247 at 5.2(a)] | The 6 dB bandwidth is 714 kHz or greater. | PASS | 13 |
| Other Bandwidths | Regulatory agencies also require the reporting of signal bandwidths using alternate processes. [2.202; RSS-GEN at 6.7] | These values are reported but have no actual performance requirements. | Reported | 15 |
| Transmit Power | The transmit power presented to the antenna is no greater than 1 Watt or 30 dBm. The effective radiated power is limited to 4 Watts or 36 dBm EIRP. [15.247(b); RSS-247 at 5.4(d)] | The maximum transmit power is 3.47 dBm or 2.23 mW. | PASS | 19 |
| Antenna Gain | The radio should not focus too much energy in any direction. Unless additional rules are applied, the antenna gain is no greater than 6 dBi. [15.247(b)(4) and (c)] | NT. The client stated that the antenna gain was -2.26 dBi and will document antenna gain separately. | NT | NT |
| Unwanted (Spurious) Emissions | The radio should not provide too much radio energy to the antenna at frequencies beyond its intended frequency band. [15.247(d); 15.209, RSS-247 at 5.5, RSS-Gen at 8.9] | Emissions outside the band must meet the 'Class B' limits of 15.209 or be reduced at least 30 dB from in-band levels. The margin to the 'Class B' limit was 11.0 dB or greater. | PASS | 21 |
| Adjacent Restricted Bands | The radio must not emit in certain designated restricted frequency bands to the transmission band above a set of limit values. This entry focuses on bands adjacent to the operating band. [15.247(d) and 15.205; RSS-247 at 3.3] | Emissions in the adjacent restricted bands were at least 8.97 dB below the applicable limits.<br><br>Compliance for the remaining restricted bands is demonstrated by the spurious emission data. | PASS | 36 |

| | | | | |
|---|---|---|---|---|
| Power Spectral Density | The radio must not focus too much radio energy in a narrow frequency band. [15.247(e); RSS-247 at 5.2(b)] | The limit is 8 dBm in a 3 kHz band. The strongest emission level was -12.1 dBm in a band of at least 3 kHz. | PASS | 44 |
| Hybrid Systems | A radio that is both frequency hopping and digitally modulated should satisfy a combination of system rules. [15.247(f); RSS-247 at 5.3] | N/A. The radios described in this report are not subjected to the Hybrid System rules. | N/A | N/A |
| Frequency Hopping Rules | Frequency hopping systems have additional functional requirements. [15.247(g) and (h); RSS-247 at 5.1] | N/A. The radios described in this report are not subjected to the Frequency Hopping rules. | N/A | N/A |
| Radio Safety | The radio emissions must meet public health & safety guidelines related to human exposure. [15.247(i) and 1.1307; RSS-Gen at 3.4] | NT. Client will report radio energy safety results separately. | NT | NT |
| Frequency Stability | The radio tuning must be robust over a range of temperature and supply voltage conditions. [RSS-Gen at 6.11] | Radio emissions remained within the allowed radio band under all environmental conditions tested. | NT | NT |
| Unwanted Emissions (Mains Conducted) | While transmitting, the emissions conducted into the power mains must not be too strong. [15.207, RSS-Gen at 8.8] | Emissions other than the fundamental and harmonics must meet the 'Class B' limits. The measured emissions had at least 16.04 dB of margin. | PASS | 46 |

**NT** (Not Tested) means the requirement may or may not be applicable, but the relevant measurement or test was not performed as part of this test project.

**N/A** (Not Applicable) means the lab judged that the test sample is exempt from the requirement.

**Table 1: Summary of results**

Report Organization

For convenience of the reader, this report is organized as follows:

1. Summary
2. Test Background
3. Report History and Approval
4. Test Sample Modifications and Special Conditions
5. Description of Equipment Tested
6. Test Standards Applied
7. Measurement Instrumentation Uncertainty
8. Selected Examples of Calculations
9. Environmental Conditions During Test
10. 3m RF Chamber Block Diagrams

Annex: Test records are provided for each type of test, following the order and page numbering stated in the summary table. Concluding notes appear on the final page of this report.

Due to confidentiality, certain material (such as test setup photographs) has been removed from this report and placed in GCL Test Report 2025-105. That report is treated as a part of this document by way of this reference.

## 2. Test Background

2.1 The Test Lab

The testing reported here was performed at the Garmin Compliance Lab, an organization within Garmin International, located at 1200 E 151st St, Olathe Kansas, USA. The contact telephone number is +1.913.397.8200.

2.2 The Client

The testing was performed on behalf of the Garmin design group, a separate organization located at 1200 E 151st St, Olathe Kansas, USA. Witnesses from the business group included: None.

2.3 Other Information

| | |
|---|---|
| Test Sample received: | 14 Nov 2025 |
| Test Start Date: | 17 Nov 2025 |
| Test End Date: | 07 Dec 2025 |

The data in this test report apply only to the specific samples tested.

Upon receipt all test samples were believed to be properly assembled and ready for testing.

## 3. Report History and Approval

This report was written by Majid Farah and initially issued on 17 Dec 2025 as Version A.
Version B, issued on 29 Dec 2025, added FCC "Lab Registration Number" in section 6.4. Version B was written by Majid Farah.

**Report Technical Review**: ______________________

GCL only

Majid Farah
Senior EMC Engineer

**Report Approval:** ______________________

GCL only

Shruti Kohli
Senior Manager Operations

## 4. Test Sample Modifications and Special Conditions

The following special conditions or usage attributes were judged during test to be necessary to achieve compliance with one or more of the standards listed in section 6 of this report:
None.

The following modifications to the test sample(s) were made, and are judged necessary to achieve compliance with one or more of the standards listed in section 6 of this report:
None.

## 5. Description of the Equipment Tested

### 5.1 Unique Identification

| | |
|---|---|
| Product Model | AB5206 |
| Serial Numbers Tested | 3621678869, 3621678871, 3621679750 |

The product tested is a mobile device for collecting and sharing data with the user and nearby electronic devices.

The client affirmed that the test samples will be representative of production in all relevant aspects.

### 5.2 Key Parameters

| | |
|---|---|
| EUT Input Power: | 5 Vdc |
| I/O Ports: | USB |
| Radio Transceivers: | Bluetooth Low Energy, ANT |
| Radio Receivers: | GPS L1, Galileo E1, BeiDou, GLONASS |
| Primary Functions: | Data collection and communication |
| Typical use: | Body worn |
| Highest internal frequency: | 2.484 GHz |
| Highest digital frequency: | 192 MHz |
| Firmware Revision | 6.01 |

### 5.3 Operating modes

During test, the EUT was operated in one or more of the following modes.

M4 (BleTx): Bluetooth Low Energy radio transmitting consistently on a selected channel at 1 Mbps or 2 Mbps.

M6 (AntTx): ANT radio transmitting consistently on a selected channel.

M13 (RxBle): Bluetooth Low Energy radio was set to receive signals on a selected channel at 1 Mbps or 2 Mbps.

M14 (RxANT): ANT radio was set to receive signals on a selected channel.

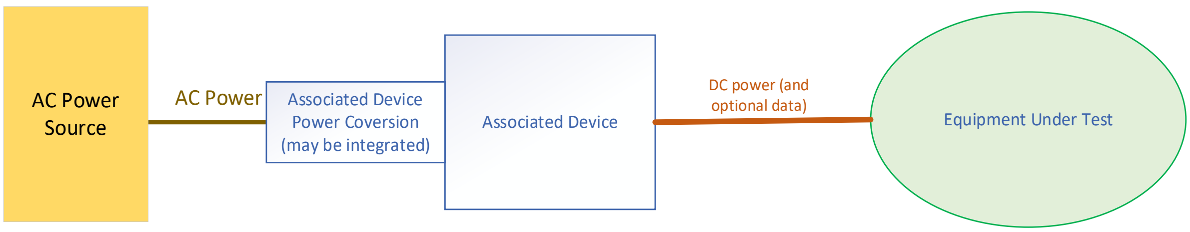
M18 (Gnss): The Global Navigation Satellite System receiver is monitoring the GNSS bands, attempting to detect a constellation and determine location. Unless otherwise noted, the EUT was provided simulated GNSS signals representing one of more constellation types. In addition, the EUT was reporting signal levels and satellite data to an attached computer to monitor link health.

## 5.4 EUT Arrangement

During test, the EUT components and associated support equipment were selected including the following arrangement sets.

A1: The test sample is attached to a Mains-powered device connected that provides dc power to the sample and user data over a cable. See the block diagram in Figure 1.

A2: The test sample is attached to a Mains-powered device connected that provides dc power to the sample over a cable but no user data. See the block diagram in Figure 1.




*This interconnect drawing is not to scale.*
*It does not indicate the placement of devices.*

**Figure 1: Block diagram of equipment arrangement A1 and A2**

A3: The test sample operates from its battery and no external physical connections. No block diagram is needed for this arrangement.

## 5.5 Associated Equipment (AE) used

| Description | Manufacturer | Model | Serial Number |
|---|---|---|---|
| USB C power adaptor | Phihong (Garmin) | AQ27A-59CFA | 362-00118-00 |
| Laptop | Dell | Precision 5540 | 3JYG33 |
| AC/DC Power Adapter | Dell | HA130PM130 | 0V363H-CH200-78G-0DC1-A01 |

**Table 2: List of associated equipment that may have been used during test**

## 5.6 Cables used

| Description | From | To | Length | EMC Treatment |
|---|---|---|---|---|
| USB C to custom cable | Power and/or Data source | EUT | 0.5 m | None |

**Table 3: List of cables that may have been used during test**

## 6. Test Standards Applied

### 6.1. Accredited Standards

The following test or measurement standards were applied and are within the scope of the lab's accreditation. All results in this report that cite these standards are presented as Accredited results consistent with ISO/IEC 17025.

CFR 47, FCC Part 15, Subpart C
ANSI C63.10: 2020 and ANSI C63.10: 2020 +Cor 1: 2023
RSS-GEN Issue 5 Amd 2
RSS-247 Issue 4

### 6.2 Non-accredited Standards

The following test or measurement standards were applied and are either outside the scope of the lab's accreditation, or were performed in such a way that results are not presented as being fully accredited.

FCC Part 2.202
TRC-43 Issue 3

### 6.3 Variances

The following variances were applied to standards cited in this section.

Where different test standards cover the same test parameter or phenomenon, and the standards have compatible differences, the stricter of the requirements is typically applied. For example, a consolidated limit may be applied to emission tests selecting the strictest of the limits at each frequency. Likewise, if one standard requires a vertical antenna sweep with boresighting and another does not, swept motion with boresighting will typically be used as it is the more stringent requirement.

Some standards that apply an Average detector provide a variety of methods to handle time-averaging, especially where the transmission is not continuous and the Duty Cycle (DC) is below a value such as 98%. The basic GCL process is to begin by applying an Average detector to the emission with the receiver in Max-Hold data mode. This Max Average method is worst-case compared to any of the methods of time-averaging provided. If the Max Average result complies with the limit, that result is provided in the test record and the emission judged to be compliant without additional detail. If the Max Average result is near or above the limit at one or more emission frequencies, then one of the appropriate time-averaging methods is applied to determine final compliance. When time-averaging is used, the test record will indicate which method of time-averaging was used.

Some standards ask for measurements made with a 'Time Domain Power' function, but that function is not defined in the standards. GCL addresses this gap as follows. Staff capture a zero-span Average detector data record of emission power, with a timespan covering a transmission burst. When the maximum power in the data record is clearly below the limit, this value will be reported. When the maximum power in the data record is near or above the limit, then the average of the power (in linear units) during a transmission burst is calculated and reported.

DISCLAIMER: In some test activities, the operation of a test or the result of a test depends on data provided by the client. The Garmin Compliance Lab disclaims responsibility for any error in the processes, results, or judgments in this report arising from incorrect client-provided data.

## 6.4 Laboratory Accreditation

The Garmin Compliance Lab, an organization within Garmin International, is registered with the US Federal Communication Commission (FCC) as:

Lab Registration Number: 273575
FCC Designation Number: US1311

The Garmin Compliance Lab, an organization within Garmin International, is recognized by the Canada Department of Innovation, Science, and Economic Development (ISED) under:

Company Number: 1792A
CAB Identifier: US0233

The Garmin Compliance Lab, an organization within Garmin International, is accredited by A2LA, Certificate No. 6162.01. The presence of the A2LA logo on the cover of this report indicates this is an accredited ISO/IEC 17025 test report. If the logo is absent, this report is not issued as an accredited report. Other marks and symbols adjacent to the A2LA logo are accreditation co-operations of which A2LA is a member under a mutual recognition agreement, and to which the Garmin Compliance Lab has been sublicensed.

## 7. Measurement Instrumentation Uncertainty

The lab has analyzed the sources of measurement instrumentation uncertainty. The analysis concludes that the actual measurement values cited in this report are accurate within the $U_{LAB}$ intervals shown below with approximately 95% statistical confidence.  Where the report shows a judgment that a test sample passes a test against a published limit based on these measured values, that judgment has a statistical confidence of 97.5% or greater. Measurement Instrumentation Uncertainty is one component of over-all measurement uncertainty, and other uncertainty components are not considered as part of this analysis.

The primary benchmark for measurement instrumentation uncertainty (MIU) in an electromagnetic compatibility (EMC) test lab is the set of $U_{CISPR}$ values published in CISPR 16-4-2. In all cases where a $U_{CISPR}$ value is published by CISPR, the analysis shows that $U_{LAB}$ – this lab's estimated MIU – is better than the $U_{CISPR}$ benchmark.

The secondary benchmark for MIU in an EMC lab performing radio transceiver tests is a set of uncertainty limit values published in various ETSI standards. In this report, $U_{ETSI}$ is the most restrictive of the values found in the ETSI EN standards listed in section 5 of this report. The analysis principles are described in the ETSI TR documents listed there. In most cases $U_{LAB}$ is better than the $U_{ETSI}$ benchmark. Where $U_{LAB}$ exceeds the $U_{ETSI}$ benchmark cited here, that entry is preceded by an asterisk. When required by the ETSI EN standards, excess uncertainty will be added to the measurand before comparison to a limit. In an individual test report, staff may re-evaluate that excess uncertainty based on the uncertainty of the method used and the uncertainty limits of the actual ETSI EN standard being applied, and the revised uncertainty values will be shown in the test report.

Some measurement uncertainties analyzed and reported here are not addressed in CISPR 16-4-2 or the ETSI standards, as indicated by the entry 'None.'

| **Test Type** | | **$U_{LAB}$** | **$U_{CISPR}$** | **$U_{ETSI}$** |
|---|---|---|---|---|
| Conducted DC voltage | | 0.09% + 2 x LSDPV | None | 1% |
| Conducted AC voltage below 500 Hz | | 1.0% + 3 x LSDPV | None | 2% |
| Conducted Emissions, Mains Voltage | | 0.10% + 10 mV | None | None |
| Conducted Emissions, Mains Current | | 0.10% + 3 mA | None | None |
| Conducted Emissions, Mains Power | | 0.15% + 100 mW | None | None |
| Conducted Emissions, Power Mains, 9 kHz to 150 kHz | | 1.70 dB | 3.8 dB | None |
| Conducted Emissions, Power Mains, 150 kHz to 30 MHz | | 1.48 dB | 3.4 dB | None |
| Conducted Emissions, Cat 6 LCL, 150 kHz to 30 MHz | | 1.57 dB | 5 dB | None |
| Conducted Emissions, Cat 5 LCL, 150 kHz to 30 MHz | | 3.06 dB | 5 dB | None |
| Conducted Emissions, Cat 3 LCL, 150 kHz to 30 MHz | | 4.27 dB | 5 dB | None |
| Radiated Emissions, below 30 MHz | | 0.88 dB | None | 6 dB |
| Radiated Emissions, 30 MHz to 1000 MHz | | 2.79 dB | 6.3 dB | 6 dB |
| Radiated Emissions, 1 GHz to 18 GHz | | 2.54 dB | 5.2 & 5.5 dB | 6 dB |
| Radiated Emissions, 18 GHz to 26.5 GHz | | 2.68 dB | None | 6 dB |
| Radiated Emissions, 26.5 GHz to 40 GHz | | 3.17 dB | None | 6 dB |
| *Radio Signal Frequency Accuracy | | *1.55 x 10^-7 | None | 1.0 x 10^-7 |
| Radio Signal Occupied Bandwidth | | 0.95% | None | 5% |
| Radio Power or Power Spectral Density | | 0.98 dB | None | 1 dB |
| Temperature | | 0.38 °C | None | 1 °C |
| Barometric Pressure | | 0.38 kPA | None | None |
| Relative Humidity | | 2.85% RH | None | ±5% RH |
| Signal Timing | The greater of these three... | 0.63 µsec | None | None |
| | | 0.01% of value | | |
| | | 0.5 x LSDPV | | |

***Note:*** *LSDPV stands for the Least Significant Digit Place Value reported. In the value 1470 msec, the least significant digit is the 7. It has a 10 msec place value. The LSDPV is thus 10 msec and the maximum error due to roundoff would be 5 msec. If the time value were reported as 147<u>0</u> msec, the underscore indicates that the 0 is a significant figure and the error due to roundoff would be 0.5 msec. All digits provided to the right of a decimal point radix are significant.*

## 8. Selected Example Calculations

Certain regulators require samples of the calculations that lead from the raw measurement to the final result for AC Mains conducted and unintended radiated emissions. The assumption is that the lab performs raw measurements, then adds, subtracts, multiplies, or divides based on transducer factors, amplifier gains, and losses in the signal transmission path. In this lab, our CISPR 16 Receiver does not work that way. The calibration factors and losses and gains are provided to the receiver as detailed data files. These factors are applied in the RF measurement path prior to the detector. But as a step in the lab measurement process, staff frequently verify that these factors are applied correctly. They make a measurement with the factors applied inside the receiver, then they disable the factors and remeasure the result manually adding in the various relevant factors.

The transmission loss is measured including the combined losses and gains of preamplifiers, cables, and any band-selective filters. In many cases above 1 GHz it is a negative value, indicating that the preamplifier gain is greater than these other losses.

Here are examples of these calculations. The data in these examples was not taken as part of this project:

### <u>8.1 AC Mains conducted emissions at 22 MHz</u>
(Raw measurement) + (AMN factor) + (transmission loss) = Result

(7.145 dBµV) + (9.812 dB) + (0.216 dB) = 17.173 dBµV

### <u>8.2 Radiated Emissions at 630 MHz</u>
(Raw measurement) + (Antenna factor) + (transmission loss) = Result

(2.25 dBµV) + (27.80 dB/m) + (2.89 dB) = 32.94 dBµV/m

### <u>8.3 Radiated Emissions at 2.7 GHz</u>
(Raw measurement) + (Antenna factor) + (transmission loss) = Result

(43.72 dBµV) + (32.22 dB/m) + (-36.09 dB) = 39.85 dBµV/m

## 9. Environmental Conditions During Test

Environmental conditions in the test lab were monitored during the test period. Temperature and humidity are controlled by an air handling system. As information to the reader, the conditions were observed at the values or within the ranges noted below. For any tests where environmental conditions are critical to test results and require further constraints or details, the test records in the annex may provide more specific information.

| | |
|---|---|
| Temperature: | 20.6 to 22.9 °C |
| Relative Humidity: | 41.5% to 49.3% (non-condensing) |
| Barometric Pressure | 96.7 to 99.2 kPa |

| Description | Make | Model # | Serial # | Last Cal/Ver | Next Due |
|---|---|---|---|---|---|
| Barometer | Traceable | 6453 | 240300703 | 9-Apr-2024 | 9-Apr-2027 |

**Table 4: Environmental monitoring device**

## 10. 3m RF Chamber Block Diagrams

The 3m chamber has three basic configurations which are shown in the figures below. These figures are not to scale.

Figure 1 shows a semi anechoic setup which is typically used for frequencies below 1 GHz. In this example, the antenna is mounted on a mast capable of 1-4 m elevation changes. If a preamplifier or RF filter is used, they are located at or just below floor level. The receiver is outside the chamber, typically in an adjacent separate shielded room.

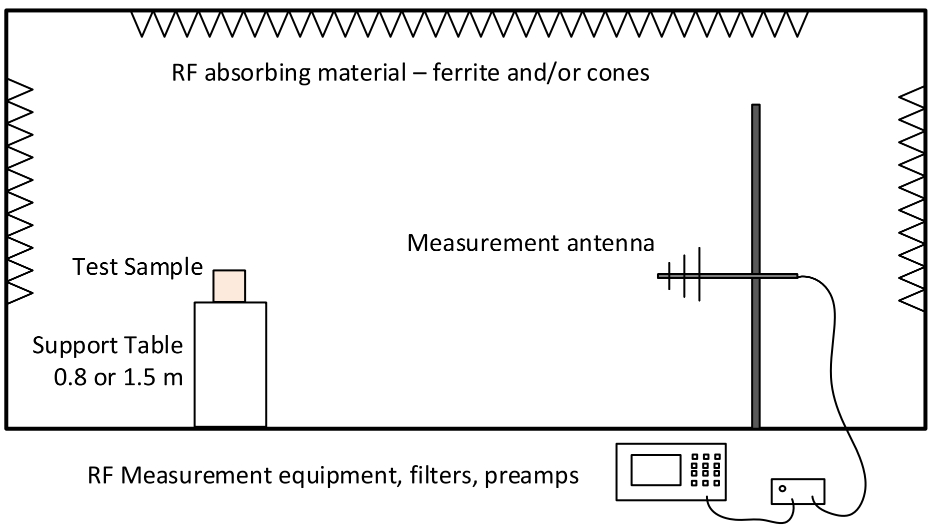



Figure 1: Typical configuration for measurements below 1 GHz

Figure 2 shows an FSOATS setup which is typically used for frequencies above 1 GHz but below an upper limit such as 14 or 18 GHz. In this example, the antenna is mounted on a mast capable of 1-4 m elevation changes and bore sighting. If a preamplifier or RF filter is used, they are located at or just below floor level. The receiver is outside the chamber, typically in an adjacent separate shielded room.

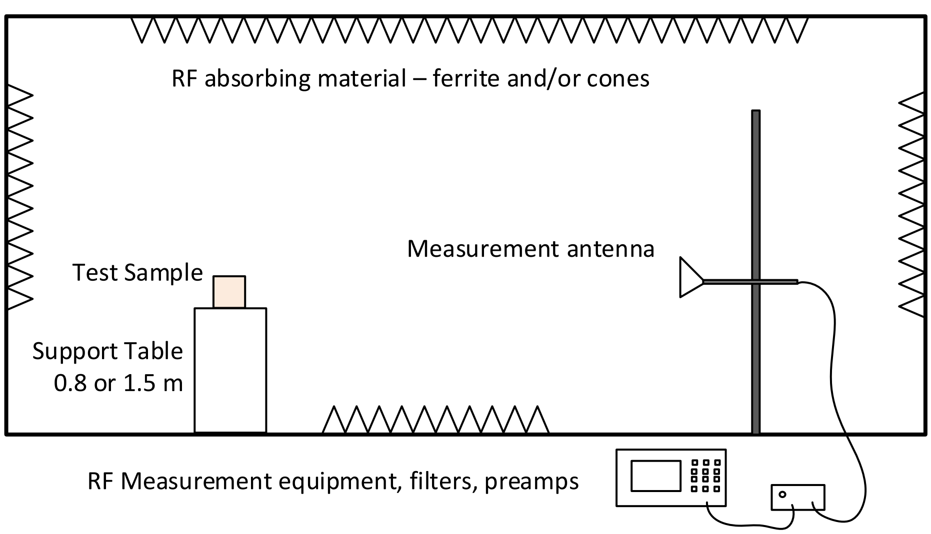



Figure 2: Typical configuration for measurements between 1 GHz and 14 GHz

Figure 3 shows an alternate FSOATS setup which is typically used for frequencies above 14 GHz. In this example, the antenna is mounted on a mast capable of 1-4 m elevation changes and bore sighting. A preamplifier is located on the mast just behind the antenna. The receiver is located in the chamber near floor level but outside the antenna beam. The receiver may be operated manually by an operator in the chamber and or remotely via an Ethernet connection.

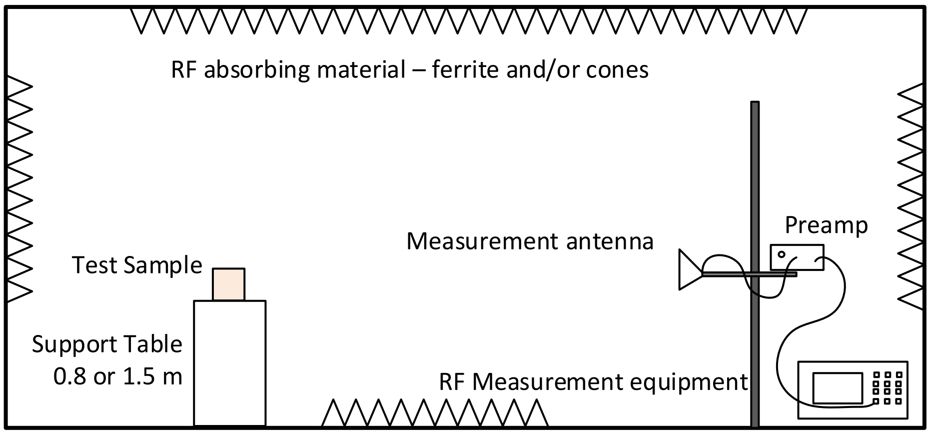



Figure 3: Typical configuration for measurements above 14 GHz

## ANNEX

The remainder of this report is an Annex containing individual test data records. These records are the basis for the judgments summarized in section 1 of this report. The Annex ends with a set of concluding notes regarding use of the report.

## Test Record
**Transmitter Bandwidth Tests**
**Test IDs TR11**
**Project GCL-0887**

Test Date(s) 18 Nov 2025
Test Personnel Vladimir Tolstik

Product Model AB5206
Serial Number tested 3621679750

Operating Mode M4 (BleTx)
Arrangement A2
Input Power 5Vdc

Test Standards: FCC Part 15, ANSI C63.10, RSS-GEN, RSS-247 (as noted in Section 6 of the report).

Radio Protocol Bluetooth Low Energy (BLE)
Radio Band 2400 to 2483.5 MHz

**Pass/Fail Judgment: PASS**

**Test record created by: Jim Solum**
**Date of this record: 04 Dec 2025**

### Test Equipment Used

| Description | Make | Model # | Serial # | Last Cal/Ver | Next Due |
|---|---|---|---|---|---|
| MXE Receiver 8.4 GHz | Keysight | N9038B | MY63460112 | 17-Mar-2025 | 17-Mar-2026 |

**Table TR11.1: List of test equipment used**

**Test Software Used:** Keysight MXE firmware version A.37.02

### Test Method

During this test the transmitter output is fed directly, or through RF attenuators, to the spectrum analyzer. The analyzer has a built-in capability to identify the minimum bandwidth that contains a specified portion of the total power observed, and also identify parameters such as the edge frequencies for that bandwidth and the center frequency error. The spectrum is scanned many times so that the varied effects of modulation are appropriately assessed. Since the focus is on the relative distribution of energy across a range of frequencies, the absolute amplitudes recorded during this test are not relevant and may not include cable losses or attenuation factors.

### Test Setup

This block diagram shows the test equipment setup.

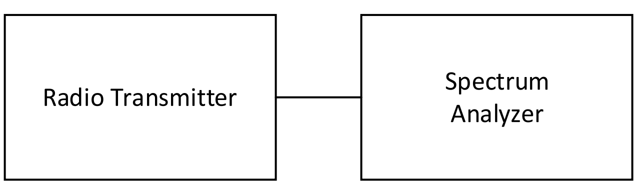



**Figure TR11.1: Test setup**

**Test Data**

The data for each test is summarized below, followed by the spectral data for each case highlighted in yellow.

The DTS Bandwidth is measured using a spectrum analyzer operating with a defined resolution bandwidth. The analysis finds the smallest continuous range of frequencies containing all emissions within 6 dB of the highest value. The requirement is that the DTS Bandwidth be greater than 500 kHz. As such the lowest measured bandwidth is worst case. All radios reported here are judged to have met this requirement.

| Frequency | (MHz) | 2402 | 2440 | 2480 |
|---|---|---|---|---|
| BT Low Energy | 1 Mbps | **0.7146** | **0.7280** | **0.7181** |

**Table TR11.2: Summary of bandwidth data in MHz for BLE 1 Mbps mode**

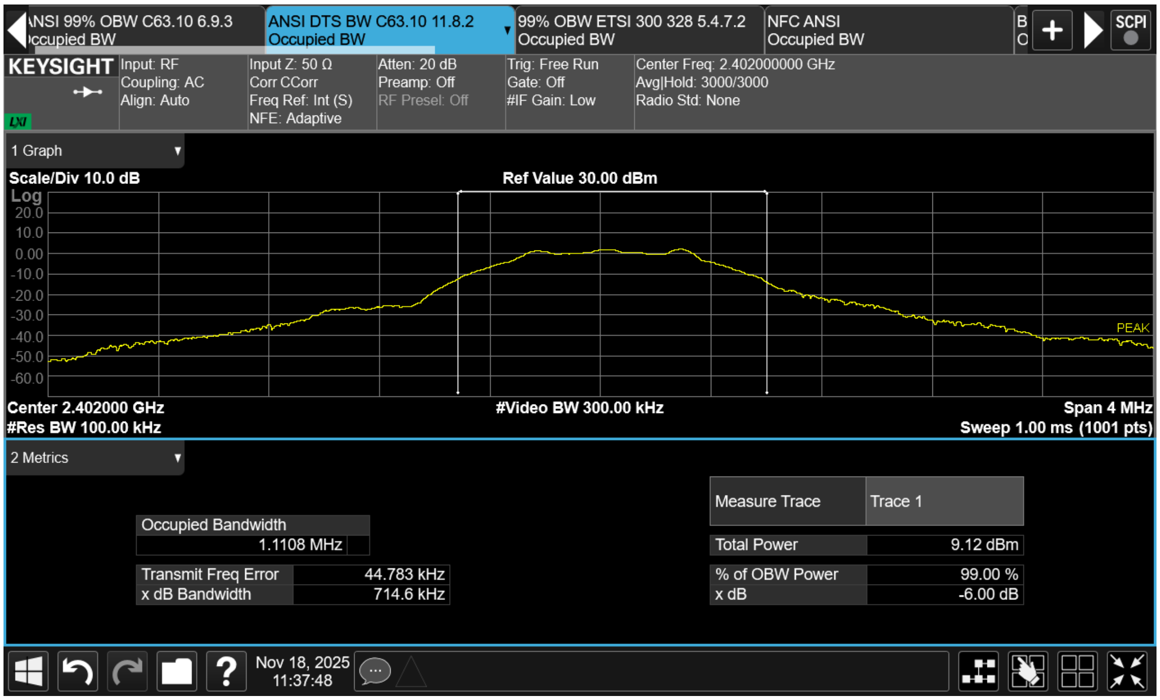


**Figure TR11.2: Bandwidth data for BLE 1 Mbps at low channel (2402 MHz)**

**This line is the end of the test record.**

## Test Record
**Transmitter Bandwidth Tests**
**Test IDs TR15**
**Project GCL0887**

Test Date(s) 18 Nov 2025
Test Personnel Vladimir Tolstik

Product Model AB5206
Serial Number tested 3621679750

Operating Mode M4(BleTx)
Arrangement A2
Input Power USB 5 Vdc

Test Standards: FCC Part 2.202, ANSI C63.10, TRC-43, RSS-GEN (as noted in Section 6 of the report).

Radio Protocol Bluetooth Low Energy (BLE)
Radio Band 2480 to 2483.5 MHz

**Pass/Fail Judgment:** **Reported**

**Test record created by:** Jim Solum
**Date of this record:** 10 Dec 2025

Original record, Version A.

**Test Equipment Used**

| Description | Make | Model # | Serial # | Last Cal/Ver | Next Due |
|---|---|---|---|---|---|
| MXE Receiver 8.4 GHz | Keysight | N9038B | MY63460112 | 17-Mar-2025 | 17-Mar-2026 |

**Table TR15.1 Equipment Used**

**Software used:** Keysight MXE software A.37.02

**Background**
There are regulatory requirements to present two additional types of bandwidth analyses: 99% Occupied Bandwidth and Necessary Bandwidth. There are no limits or functional requirements around these data, beyond a reporting requirement. The contents of this test record are for information, and do not affect compliance of the devices that are the subject of this report.

For BLE operating at 2 Mbps, the lowest operating frequency was 2404 MHz, and the highest operating frequency was 2478 MHz. For all other Bluetooth, BLE, and ANT radios reported here, the lowest operating frequency was 2402 MHz, and the highest operating frequency was 2480 MHz.

**Test Setup**

This block diagram shows the test equipment setup.

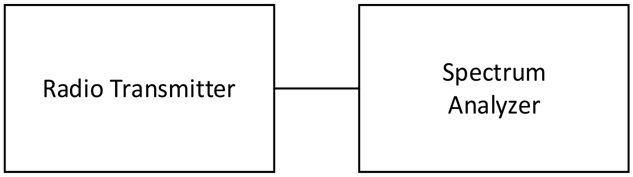



**Figure TR15.1: Test setup**

**Occupied Bandwidth, 99% Test Method**
During this test the transmitter output is fed directly, or through RF attenuators, to the spectrum analyzer. The analyzer has a built-in capability to identify the minimum bandwidth that contains a specified percentage of the total power observed.  The spectrum is scanned hundreds of times so that the varied effects of modulation are appropriately assessed.  Since the focus is on the relative distribution of energy across a range of frequencies, the absolute amplitudes recorded during this test are not relevant and may not include cable losses or attenuation factors.

**Occupied Bandwidth, 99% Test Data**
The data for each type of bandwidth is summarized below, followed by the spectral data for the cases highlighted in yellow. The analysis threshold for this test was the bandwidth containing 99% of the observed power using the ANSI C63.10 method. The standards require testing a frequency near the bottom, middle, and top of the band. The measured bandwidth data are in bold font and have MHz as their units of measure.

| Frequency | (MHz) | 2402 | 2404 | 2440 | 2478 | 2480 |
|---|---|---|---|---|---|---|
| BT Low Energy | 1 Mbps | **1.0655** | **NT** | **1.0604** | **NT** | **1.0560** |
| BT Low Energy | 2 Mbps | **NT** | **2.0651** | **2.0668** | **2.0628** | **NT** |

**Table TR15.2: Summary of 99% Occupied Bandwidth Data for BLE modes**

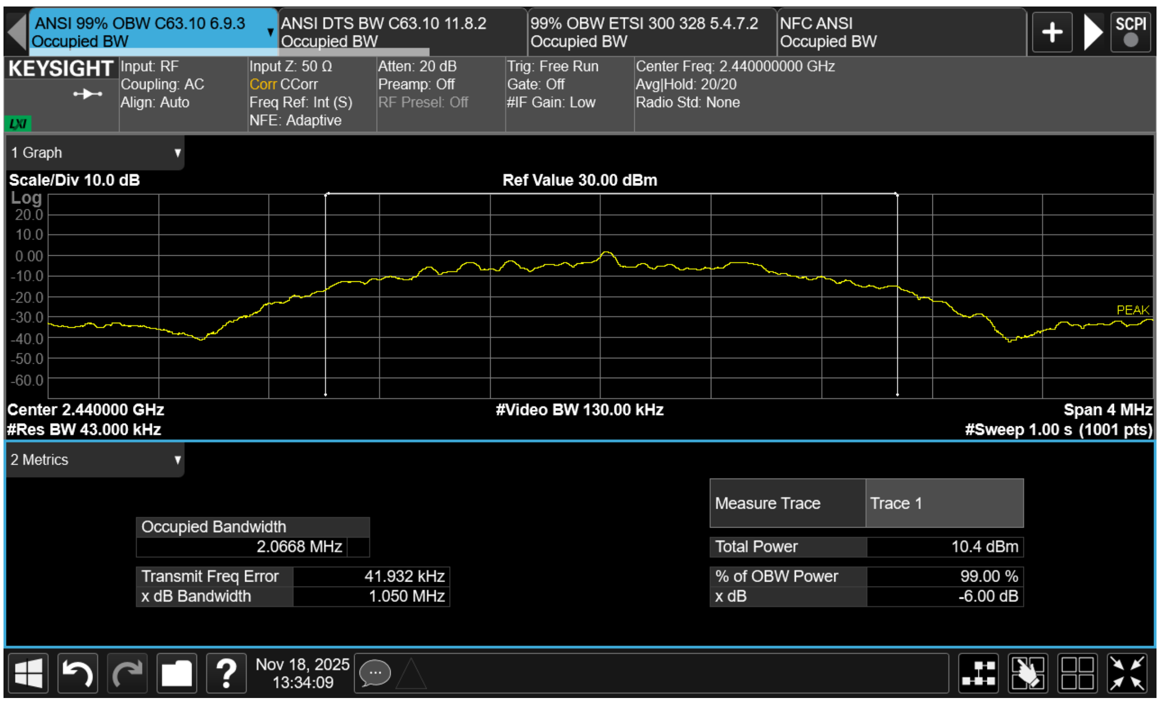


**Figure TR15.2: Occupied bandwidth data for BLE 2 Mbps at mid channel (2440 MHz)**

**Necessary Bandwidth Calculations**
The Necessary Bandwidth is a theoretical value based on the specifications for a communication protocol, rather than the hardware implementation and a subsequent lab measurement. The analysis methods in FCC Part 2.202 and TRC-43 are the same for NFC, Bluetooth, ANT, and IEEE 802.11b WiFi. However, they differ for IEEE 802.11g and 11n systems because the Canadian TRC-43 standard provides different analysis methods for Orthogonal Frequency Division Multiplexing systems (OFDM). The tables below will show the analysis for most of the radios signals as a combined approach, then separately analyze the results for IEEE 802.11g and n systems. The tables below may include radio protocols that are not part of the product being evaluated.

NFC (Near Field Communication) at 13.56 MHz uses continuous wave telegraphy without tone modulation. The bit rate ‘B’ in the FCC and TRC equations is split into two parts here. B is the baud rate. C is a coding factor. C=1 for Miller encoding where the transition speed is as high as the bit rate, or C=2 for Manchester encoding where the transition speed is as high as twice the bit rate). K is a factor set to 3 for non-fading circuits under the standards. The Necessary Bandwidth, $B_N$ is then:

$B_N = BCK$

| Radio Type | B (kbaud) | C | K | $B_N$ (kHz) |
|---|---|---|---|---|
| NFC A | 106 | 1 | 3 | 318.0 |
| NFC B | 212 | 2 | 3 | 1272.0 |
| NFC B | 424 | 2 | 3 | 2544.0 |

Table TR15.100: Necessary Bandwidth for NFC

The radio modulation schemes for Ant, for the various Bluetooth protocols, and for IEEE 802.11 b WiFi are a mix of Phase Shift Key (PSK) and Quadrature Amplitude Modulation (QAM) techniques. The Necessary Bandwidth calculations use the equations from 47CFR Part 2.202(g) table section 6. We have set the variable K=1, which leaves the equation for both PSK and QAM as:

$B_N = 2R / \text{Log}_2(S)$

where $B_N$ is the Necessary Bandwidth, R is the bit rate, and S is the number of signaling states.

| Radio Type | R Mbps | K | S | LogBase2 of (S) | $B_N$ (MHz) |
|---|---|---|---|---|---|
| ANT / ANT+ | 1 | 1 | 2 | 1 | 2 |

Table TR15.101: Necessary Bandwidth for ANT and ANT+ Radio Protocols (FCC and TRC-43)

| Radio Type | Sub-type | Method | R Mbps | K | S | LogBase2 of (S) | $B_N$ (MHz) |
|---|---|---|---|---|---|---|---|
| Bluetooth | BR | GFSK | 1 | 1 | 2 | 1 | 2 |
| | EDR2 | Pi/4 DPSK | 2 | 1 | 4 | 2 | 2 |
| | EDR3 | 8DPSK | 3 | 1 | 8 | 3 | 2 |
| BLE | 1Mbps | GFSK | 1 | 1 | 2 | 1 | 2 |
| | 2Mbps | DQPSK | 2 | 1 | 4 | 2 | 2 |

Table TR15.102: Necessary Bandwidth for Bluetooth Radio Protocols (FCC and TRC-43)

| Radio Type | Sub-type | R Mbps | K | S | LogBase2 of (S) | $B_N$ (MHz) |
|---|---|---|---|---|---|---|
| 802.11 b | 1 | 1 | 1 | 2 | 1 | 2 |
| | 2 | 2 | 1 | 4 | 2 | 2 |
| | 5.5 | 5.5 | 1 | 4 | 2 | 5.5 |
| | 11 | 11 | 1 | 4 | 2 | 11 |

Table TR15.103: Necessary Bandwidth for IEEE 802.11 b Radio Protocol (FCC and TRC-43)

| Radio Type | Sub-type | R Mbps | K | S | LogBase2 of (S) | $B_N$ (MHz) |
|---|---|---|---|---|---|---|
| 802.11 a/g | 6 | 6 | 1 | 2 | 1 | 12 |
| | 9 | 9 | 1 | 2 | 1 | 18 |
| | 12 | 12 | 1 | 4 | 2 | 12 |
| | 18 | 18 | 1 | 4 | 2 | 18 |
| | 24 | 24 | 1 | 16 | 4 | 12 |
| | 36 | 36 | 1 | 16 | 4 | 18 |
| | 48 | 48 | 1 | 64 | 6 | 16 |
| | 54 | 54 | 1 | 64 | 6 | 18 |
| 802.11 n/ac | MCS0 | 7.2 | 1 | 2 | 1 | 14.4 |
| | MCS1 | 14.4 | 1 | 4 | 2 | 14.4 |
| | MCS2 | 21.7 | 1 | 4 | 2 | 21.7 |
| | MCS3 | 28.9 | 1 | 16 | 4 | 14.5 |
| | MCS4 | 43.3 | 1 | 16 | 4 | 21.7 |
| | MCS5 | 57.8 | 1 | 64 | 6 | 19.3 |
| | MCS6 | 65 | 1 | 64 | 6 | 21.7 |
| | MCS7 | 72.2 | 1 | 64 | 6 | 24.1 |
| | MCS8 | 86.7 | 1 | 256 | 8 | 21.7 |

Table TR15.104: Necessary Bandwidth for IEEE 802.11 a, g, n, and ac 20 MHz Radio Protocols (FCC)

| Radio Type | Sub-type | R Mbps | K | S | LogBase2 of (S) | $B_N$ (MHz) |
|---|---|---|---|---|---|---|
| 802.11 n/ac | MCS0 | 15 | 1 | 2 | 1 | 30.0 |
| | MCS1 | 30 | 1 | 4 | 2 | 30.0 |
| | MCS2 | 45 | 1 | 4 | 2 | 45.0 |
| | MCS3 | 60 | 1 | 16 | 4 | 30.0 |
| | MCS4 | 90 | 1 | 16 | 4 | 45.0 |
| | MCS5 | 120 | 1 | 64 | 6 | 40.0 |
| | MCS6 | 135 | 1 | 64 | 6 | 45.0 |
| | MCS7 | 150 | 1 | 64 | 6 | 50.0 |
| | MCS8 | 180 | 1 | 256 | 8 | 45.0 |
| | MCS9 | 200 | 1 | 256 | 8 | 50.0 |

Table TR15.105: Necessary Bandwidth for IEEE 802.11 n and ac 40 MHz Radio Protocols (FCC)

As a note, the bit rate for IEEE 802.11 n or ac WiFi is calculated based on the IEEE standard's short guard interval of 400 nsec. If only the long guard interval of 800 nsec were implemented, the bit rates would decrease by a small amount.

The TRC-43 method for OFDM signals simply multiplies the number of subcarriers, K, and the subcarrier spacing, $N_S$. In both cases, Ns is 312.5 kHz. The count of subcarriers includes nulls. So for example, 802.11 n uses 4 pilot subcarriers, 52 data subcarriers, and one null suppressed subcarrier in the middle for 57 total subcarrier channels.

$$B_N = N_S * K$$

| Radio Type | Mode | $N_S$ (MHz) | K | $B_N$ (MHz) |
|---|---|---|---|---|
| 802.11a/g | 20 MHz | 0.3125 | 53 | 16.6 |
| 802.11n/ac | 20 MHz | 0.3125 | 57 | 17.8 |
| 802.11n/ac | 40 MHz | 0.3125 | 117 | 36.6 |

Table TR15.106: Necessary Bandwidth for IEEE 802.11 a, g, n, and ac Radio Protocols (TRC-43)

**This line is the end of the test record.**

## Test Record
**Transmitter Power, Duty Cycle**
**Test IDs TR03a**
**Project GCL0887**

Test Date(s) 17 Nov 2025
Test Personnel Vladimir Tolstik

Product Model AB5206
Serial Number 3621679750

Operating Mode M4 (BleTx)
Arrangement A2
Input Power 5Vdc

Test Standards: FCC Part 15.247; RSS-247; RSS-GEN; ANSI C63.10 (as noted in Section 6 of the report).

Antenna Gain -2.26 dBi, as reported by the client
Radio Protocol Bluetooth Low Energy

**Pass/Fail Judgment: PASS**

**Test record created by: Vladimir Tolstik**
**Date of this record: 21 Nov 2025**

Original record, Version A.

**Test Equipment Used**

| Description | Make | Model # | Serial # | Last Cal/Ver | Next Due |
|---|---|---|---|---|---|
| RF Power Sensor | Rohde&Schwarz | NRP8S | 109927 | 18-Jul-2024 | 18-Jul-2026 |

Table TR03a.1: List of test equipment used

Software used: Rohde & Schwarz Power Viewer V11.3; TimePowerAnalysisSpreadsheetV12d.xls

**Test Method**
The basic test standards provide options for the time evaluation test method. The following test methods were applied.
ANSI C63.10: 11.9.2.3.2 (Gated average power with broadband power meter)

**Transmit Power and Timing Data**
Each measurement is made conducted from the antenna port with the transmitter on a specified channel and in a selected transmission protocol. Where standards cited here apply harmonized test methods and different limits, the more strict limit has applied.

This test record will show results based on one or more of the following methods of analyzing the same set of raw power data vs. time. The ANSI peak power method looks for the highest power in the data record, with results in dBm units. The ANSI gated average power method determines the average power in the data record but only during times when the transmitter is keyed on, with results in dBm units. Under the US and Canadian rules a limit of 30 dBm is applied independent of which ANSI method is used. Many standards also care about duty cycle, the portion of the time when the transmitter was actually transmitting. That is presented as a percentage, and no limit applies. All of these results are drawn from the same trace of Tx power data. The results are shown below.

ANSI Power

| Frequency | (MHz) | 2402 | 2404 | 2440 | 2478 | 2480 |
|---|---|---|---|---|---|---|
| BT Low Energy | 1 Mbps | **3.47** | **NT** | **3.39** | **NT** | **3.32** |
| BT Low Energy | 2 Mbps | **NT** | **3.36** | **3.31** | **3.23** | **NT** |

Table TR03a.2: Transmit Power, ANSI method, in dBm

The following figures show the gate settings used for the test cases highlighted in yellow in Table TR03a.2. Gate setting diagrams may not be included for radio modes where the duty cycle reported in Table TR03a.3 is greater than 98%, since ANSI C63.10 treats these as continuous transmissions.

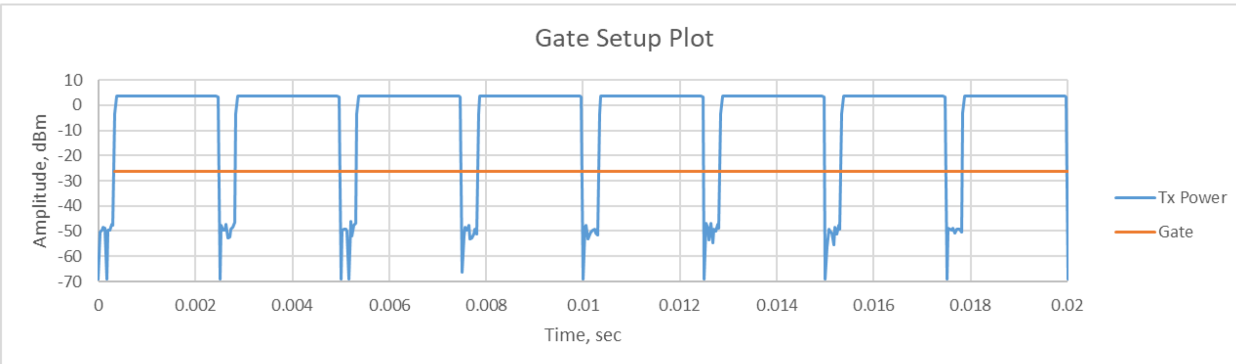



Figure TR03a.1: Gate setting diagram for BLE Radio, 1 Mbps modulation, 2402 MHz

Other Power Analyses

| Frequency | (MHz) | 2402 | 2404 | 2440 | 2478 | 2480 |
|---|---|---|---|---|---|---|
| BT Low Energy | 1 Mbps | **86.7%** | **NT** | **86.7%** | **NT** | **86.7%** |
| BT Low Energy | 2 Mbps | **NT** | **59.8%** | **59.8%** | **59.8%** | **NT** |

Table TR03a.3: Duty cycle for each radio mode

**Setup Diagram**
The following block diagrams show how the EUT and test equipment is arranged for test.

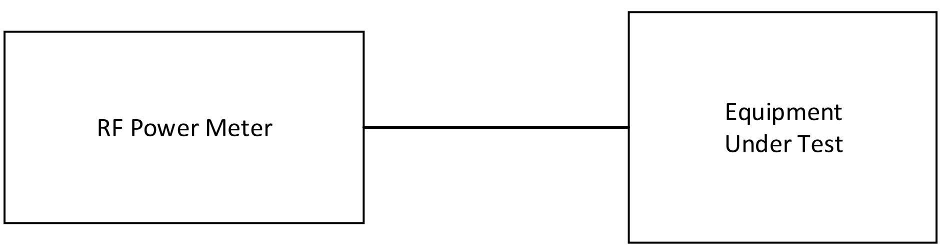



Figure TR03a.2: Test equipment setup

**This line is the end of the test record.**

## Test Record

**Radiated Emission Test RE22**
**Project GCL0887**

Test Date(s) 04 Dec 2025
Test Personnel David Kerr

Product Model AB5206
Serial Number tested 3621678869

Operating Mode M4 (BleTx)
Arrangement A2
Input Power USB 5 Vdc

Test Standards: FCC Part 15, ANSI C63.10, RSS-247, RSS-GEN (as noted in Section 6 of the report).

Frequency Range: 9 kHz - 30 MHz
**Pass/Fail Judgment: PASS**

Test record created by: Jim Solum
Date of this record: 08 Dec 2025

Original record, Version A.

### Test Equipment

| Description | Make | Model # | Serial # | Last Cal/Ver | Next Due |
|---|---|---|---|---|---|
| PXE Receiver 44 GHz | Keysight | N9048B | MY65140100 | 21-Nov-2025 | 21-Nov-2026 |
| Loop antenna, amplified | Schwarzbeck | FMZB 1519B | 00174 | 18-Jul-2024 | 18-Jul-2026 |
| SAC 3m, below 1 GHz | Frankonia | SAC3 | F199004 | 11-Dec-2024 | 11-Dec-2027 |
| Tape Measure, 1-3/16 in x 33 ft | Crecent Lufkin | L1135CME-02 | GMN0013783 | 26-Jun-2024 | 26-Jun-2027 |

**Table RE22.1: Test Equipment Used**

**Software Used:** Keysight PXE software A.41.06, RE 150k to 30M Signal Maximization Tool V1 2021Mar17.xlsx, RE 9k to 30M XYZ_orientations_TemplateV7.xlsm, RE 9k30m FccCanada Analysis4.xlsx

### Test Data

For test standards that require reorienting the test sample, preliminary scans were taken in those alternate orientations to find the orientation that produced that largest field at the receive antenna. With intentional radiators, that highest field is usually found at the carrier frequency. The alternate orientations are typically described as X, Y, and Z and explained with a photograph. Subsequent testing was done using on the orientation identified in this way.

The radiated emission test process continued with a preliminary scan at multiple turntable angles, and in the three loop antenna polarizations. The loop antenna was positioned at a 1.5 m height. Where the test standard requires cable manipulation, this was done at one of more likely worst case frequencies selected by the test personnel while observing the receiver display. At each of the frequencies selected for final measurements, the loop was set to the worst case orientation for that frequency and the turntable angle was explored to find the worst-case settings. Final field strength measurements were taken in that set of positions. Full maximization was not performed at frequencies that are noise floor measurements included per the test standard requirements.

At azimuth angle 0° the 'front' reference mark of the turntable is pointed Southward. At 90° the reference mark points West. At -90° it points East. At -7° the turntable reference mark is pointed directly at the antenna mast for tests that involve changes in antenna elevation. At 0° the turntable reference mark is pointed directly at the loop antenna location. The designation of the X, Y, and Z orientations of the test sample are sample dependent, so these are reported by use of photographs.

The table shows the selected final measurement data between 9 kHz and 30 MHz. It includes at least the six strongest emissions observed relative to the test limit, along with other data points of interest. Where a data point is highlighted is yellow, this is an aid to indicate the data point(s) with the least margin to the test limit. A positive margin value indicates that the emission was below the test limit. The test limit is the FCC Class B Limit at 3m. Any unintentional radio emission limits are not applied to intentional radio signals.

Test limits for electric fields above 30 MHz that are stated for a distance other than 3 m are adjusted to 3 m with a factor of 20 dB per decade of distance. Test limits for electric or magnetic fields below 30 MHz that are stated for a distance other than 3 m are adjusted to 3 m. The conservative method of ANSI C63.10 clause 6.4.4.1 is applied: 40 dB per decade for distances within the boundary (wavelength / 2 Pi), 20 dB per decade beyond that distance boundary.

In this test, fewer than six emissions were observed within 20 dB of the limit. The relevant emissions were measured, including one or more noise floor signals as judged appropriate to the spectrum.

| Freq. | 3 m Level | Detector | Distance | Dist Adj | Final Level | Limit | Margin | Peak 3 m | Peak Final | Pk Limit | Pk Margin | Antenna | Table |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MHz | dBuV/m | Type | m | dB | dBuV/m | dBuV/m | dB | dBuV/m | dBuV/m | dBuV/m | dB | Orientation | Azimuth, deg |
| 0.04885 | 36.51 | Avg | 300 | 80.00 | -43.49 | 33.83 | 77.32 | 44.46 | -35.54 | 53.83 | 89.37 | X | 46 |
| 1.311 | 30.40 | QP | 30 | 40.00 | -9.60 | 25.25 | 34.85 | 37.23 | -2.77 | None | None | X | 180 |

**Table RE22.2: Emission summary**

The graph below shows the background spectrum observed during pre-scan, as well as the final data points from the table above.

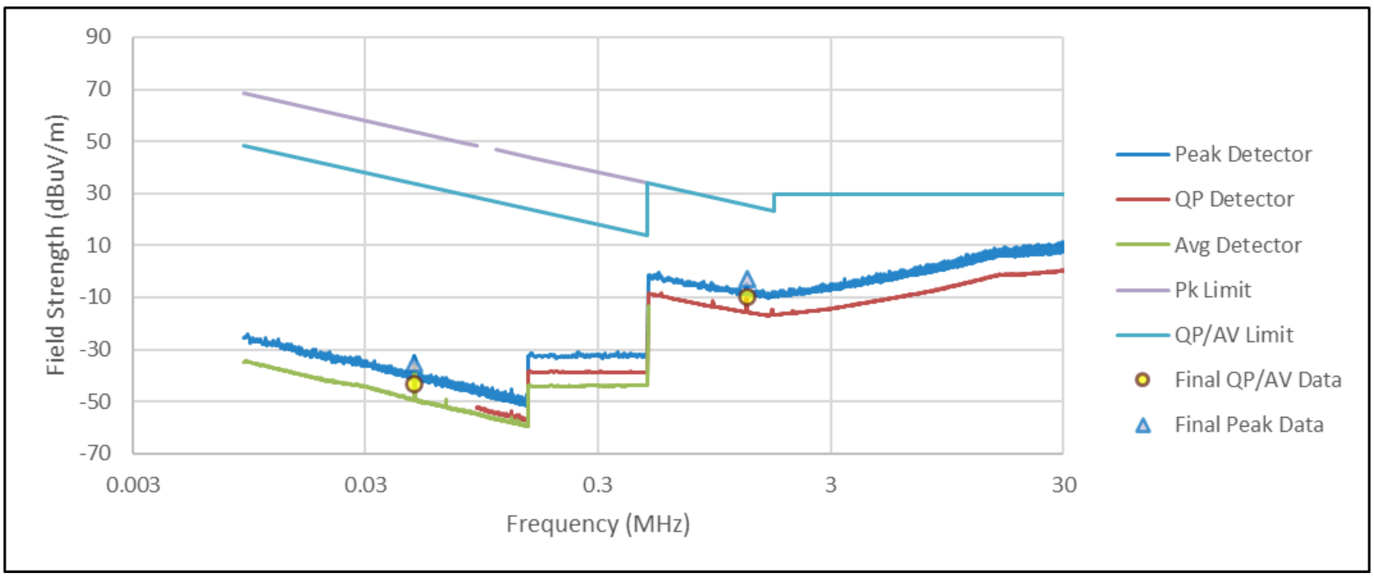



**Figure RE22.1: Spectral data**

**Setup Photographs**

The following photographs show the EUT configured and arranged in the manner in which it was measured.

**Image removed for client confidentiality.**
See section 1 of this report
to identify the report where
the photos may be viewed.

**Figure RE22.2: EUT test setup, first view**

**Image removed for client confidentiality.**
See section 1 of this report
to identify the report where
the photos may be viewed.

**Figure RE22.3: EUT test setup, second view (Antenna in X Polarization)**

**This line is the end of the test record.**

## Test Record
**Radiated Emission Test RE51**
**Project GCL0887**

Test Date(s) 03 Dec 2025
Test Personnel David Kerr

Product Model AB5206
Serial Number tested 321678869

Operating Mode M4 (BleTx)
Arrangement A2
Input Power USB 5 Vdc

Test Standards: FCC Part 15.247; RSS-247; RSS-GEN; ANSI C63.10 (as noted in Section 6 of the report).

Frequency Range: 30 MHz to 1000 MHz
**Pass/Fail Judgment: PASS**

Test record created by: David A Kerr
Date of this record: 03 Dec 2025

Original record, Version A.

**Test Equipment**

| Description | Make | Model # | Serial # | Last Cal/Ver | Next Due |
|---|---|---|---|---|---|
| PXE Receiver 44 GHz | Keysight | N9048B | MY65140100 | 21-Nov-2025 | 21-Nov-2026 |
| Antenna, Biconilog, 30M-6 GHz | ETS Lindgren | 3142E | 00233201 | 18-Jul-2024 | 18-Jul-2026 |
| SAC 3m, below 1 GHz | Frankonia | SAC3 | F199004 | 11-Dec-2024 | 11-Dec-2027 |
| Tape Measure, 1-3/16 in x 33 ft | Crecent Lufkin | L1135CME-02 | GMN0013783 | 26-Jun-2024 | 26-Jun-2027 |

**Table RE51.1: Test Equipment Used**

**Software Used:** Keysight PXE software A.41.06, EPX test software Version 2025.01.000

**Test Data**

For test standards that require reorienting the test sample, preliminary scans were taken in those alternate orientations to find the orientation that produced that largest field at the receive antenna. With intentional radiators, that highest field is usually found at the carrier frequency. The alternate orientations are typically described as X, Y, and Z and explained with a photograph. Subsequent testing was done using on the orientation identified in this way.

The radiated emission test process continued with a preliminary scan at multiple turntable angles, antenna heights, and both antenna polarizations. Where the test standard requires cable manipulation, this was done at one of more likely worst case frequencies selected by the test personnel while observing the receiver display. At each of the frequencies selected for final measurements, the turntable angle, antenna height, and antenna polarization were explored to find the worst-case settings. Final field strength measurements were taken in that set of positions. Full maximization was not performed at frequencies that are noise floor measurements included per the test standard requirements.

At azimuth angle 180° the ‘front’ reference mark of the turntable is pointed Southward. At 270° the reference mark points West. At 90° it points East. At 173° the turntable reference mark is pointed directly at the antenna. The designation of the X, Y, and Z orientations of the test sample are sample dependent, so these are reported by use of photographs.

The table shows the selected final measurement data between 30 MHz and 1 GHz. It includes at least the six strongest emissions observed relative to the test limit, along with other data points of interest. Where a data point is highlighted is yellow, this is an aid to indicate the data point(s) with the least margin to the test limit. A positive margin value indicates that the emission was below the test limit. The test limit is the FCC Class B Limit at 3m. Any unintentional radio emission limits are not applied to intentional radio signals.

Test limits for electric fields above 30 MHz that are stated for a distance other than 3 m are adjusted to 3 m with a factor of 20 dB per decade of distance. Test limits for electric or magnetic fields below 30 MHz that are stated for a distance other than 3 m are adjusted to 3 m. The conservative method of ANSI C63.10 clause 6.4.4.1 is applied: 40 dB per decade for distances within the boundary (wavelength / 2 Pi), 20 dB per decade beyond that distance boundary.

In this test, fewer than six emissions were observed within 20 dB of the limit. The relevant emissions were measured, including one or more noise floor signals as judged appropriate to the spectrum.

| Frequency | Pol. | Reading | Factor | Level | Limit | Margin | Height | Angle |
|---|---|---|---|---|---|---|---|---|
| MHz | | dB(μV) | dB(1/m) | dB(μV/m) | dB(μV/m) | dB | cm | deg |
| | | QP | | QP | QP | QP | | |
| 44.220 | V | 12.1 | 15.2 | 27.3 | 40.0 | 12.7 | 100.0 | 198.0 |
| 72.000 | V | 10.6 | 14.2 | 24.8 | 40.0 | 15.2 | 100.0 | 359.0 |
| 134.940 | V | 3.2 | 15.9 | 19.1 | 43.5 | 24.4 | 148.9 | 39.0 |
| 409.650 | V | 3.3 | 27.2 | 30.5 | 46.0 | 15.5 | 400.0 | 62.0 |

**Table RE51.2: Emission summary (BLE, 1 Mbps, 2480 MHz)**

The graph below shows the background spectrum observed during pre-scan, as well as the final data points from the table above.

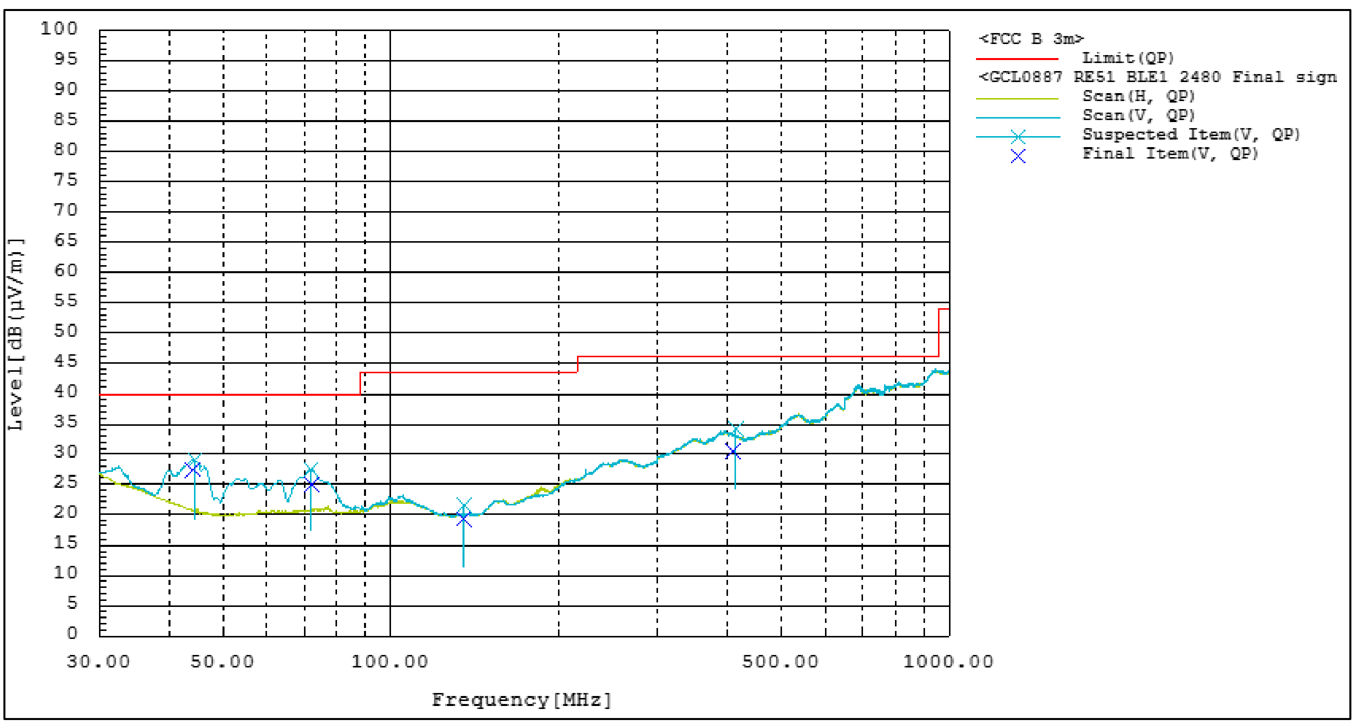



**Figure RE51.1: Spectral data (BLE, 1 Mbps, 2480 MHz)**

**Setup Photographs**

The following photographs show the EUT configured and arranged in the manner in which it was measured.

**Image removed for client confidentiality.**
See section 1 of this report
to identify the report where
the photos may be viewed.

**Figure RE51.2: EUT test setup, first view**

**Image removed for client confidentiality.**
See section 1 of this report
to identify the report where
the photos may be viewed.

**Figure RE51.3: EUT test setup, second view**

**This line is the end of the test record.**

## Test Record
**Radiated Emission Test RE11**
**Project GCL0887**

Test Date(s) 21 Nov 2025
Test Personnel David Kerr

Product Model AB5206
Serial Number tested 3621678869

Operating Mode M4 (BleTx)
Arrangement A2
Input Power USB 5 Vdc

Test Standards: FCC Part 15.247; RSS-247; RSS-GEN; ANSI C63.10 (as noted in Section 6 of the report).

Frequency Range: 1 GHz to 14 GHz
**Pass/Fail Judgment: PASS**

Test record created by: David A Kerr
Date of this record: 21 Nov 2025

Original record, Version A.

**Test Equipment**

| Description | Make | Model # | Serial # | Last Cal/Ver | Next Due |
|---|---|---|---|---|---|
| PXE Receiver 26 GHz | Keysight | N9048B | MY59290135 | 24-Oct-2024 | 29-Nov-2025 |
| Antenna, Horn, 1-18 GHz | ETS Lindgren | 3117 | 00259208 | 30-May-2024 | 30-May-2026 |
| FSOATS 3m, above 1 GHz | Frankonia | SAC3 | F199004 | 13-Dec-2024 | 13-Dec-2027 |
| Tape Measure, 1-3/16 in x 33 ft | Crecent Lufkin | L1135CME-02 | GMN0013783 | 26-Jun-2024 | 26-Jun-2027 |
| Preamplifier, 500 MHz 18 GHz | Com-Power | PAM-118A | 18040133 | Calibration | Not Required |
| Wifi Filter | K&L | 8NSL26-2437/E82.2-0/ | 1 | Calibration | Not Required |
| 3 GHz High Pass filter | Anatech Electronics | 0K0R2 | 01 | Calibration | Not Required |

**Table RE11.1: Test Equipment Used**

**Software Used:** Keysight PXE software A.32.06, EPX test software Version 2025.01.000

**Test Data**

For test standards that require reorienting the test sample, preliminary scans were taken in those alternate orientations to find the orientation that produced that largest field at the receive antenna. With intentional radiators, that highest field is usually found at the carrier frequency. The alternate orientations are typically described as X, Y, and Z and explained with a photograph. Subsequent testing was done using on the orientation identified in this way.

The radiated emission test process continued with a preliminary scan at multiple turntable angles, antenna heights, and both antenna polarizations. Where the test standard requires cable manipulation, this was done at one of more likely worst case frequencies selected by the test personnel while observing the receiver display. At each of the frequencies selected for final measurements, the turntable angle, antenna height, and antenna polarization were explored to find the worst-case settings. Final field strength measurements were taken in that set of positions. Full maximization was not performed at frequencies that are noise floor measurements included per the test standard requirements.

In the 1 GHz to 3.2 GHz frequency range, a Chebyshev 'Wifi' notch filter covering the 2.4 GHz ISM band was placed in series just before the preamplifier to ensure it operated in its linear range. This filter is accounted for in the system loss, so it appears in the prescan plots as high noise floor levels from 2400 – 2483 MHz. These are not failing emissions. A 3 GHz high pass filter was applied during testing between 3.2 GHz and 14 GHz to similarly protect the preamplifier.

In the 1 GHz to 14 GHz frequency range, pre-scan spectral data was taken at 1 meter and extrapolated to a 3 meter distance. Final measurements were made at 3 meters.

At azimuth angle 180° the 'front' reference mark of the turntable is pointed Southward. At 270° the reference mark points West. At 90° it points East. At 173° the turntable reference mark is pointed directly at the antenna. The designation of the X, Y, and Z orientations of the test sample are sample dependent, so these are reported by use of photographs.

The table shows the selected final measurement data between 1 GHz and 14 GHz. It includes at least the six strongest emissions observed relative to the test limit, along with other data points of interest. Where a data point is highlighted is yellow, this is an aid to indicate the data point(s) with the least margin to the test limit. A positive margin value indicates that the emission was below the test limit. The test limit is the  FCC Class B Limit at 3m. Any unintentional radio emission limits are not applied to intentional radio signals.

Test limits for electric fields above 30 MHz that are stated for a distance other than 3 m are adjusted to 3 m with a factor of 20 dB per decade of distance. Test limits for electric or magnetic fields below 30 MHz that are stated for a distance other than 3 m are adjusted to 3 m. The conservative method of ANSI C63.10 clause 6.4.4.1 is applied: 40 dB per decade for distances within the boundary (wavelength / 2 Pi), 20 dB per decade beyond that distance boundary.

Emissions within the restricted bands were measured with an averaging process described in the ANSI C63.10 methods noted in this paragraph. (See also section 6.3 of this test report.) The duty cycle for the BLE1 radio had a constant duty cycle less than 98% and so the trace-averaging method with duty cycle adjustment from clause 11.12.2.5.2.1 was applied.

In this test, fewer than six emissions were observed within 20 dB of the limit. The relevant emissions were measured, including one or more noise floor signals as judged appropriate to the spectrum.

| Frequency | Pol. | Reading | | Factor | Level | | Limit | | Margin | | Height | Angle |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MHz | | dB(μV) | | dB(1/m) | dB(μV/m) | | dB(μV/m) | | dB | | cm | deg |
| | | RMS | PK | | RMS | PK | AV | PK | RMS | PK | | |
| 7205.528 | H | 30.2 | 42.7 | 8.2 | 38.4 | 50.9 | 54.0 | 74.0 | 15.6 | 23.1 | 223.1 | 35.0 |
| 9607.501 | H | 27.5 | 38.7 | 13.1 | 40.6 | 51.8 | 54.0 | 74.0 | 13.4 | 22.2 | 201.3 | 353.0 |

**Table RE11.2: Emission summary (BLE, 1 Mbps, 2402 MHz)**

The graph below shows the background spectrum observed during pre-scan, as well as the final data points from the table above.

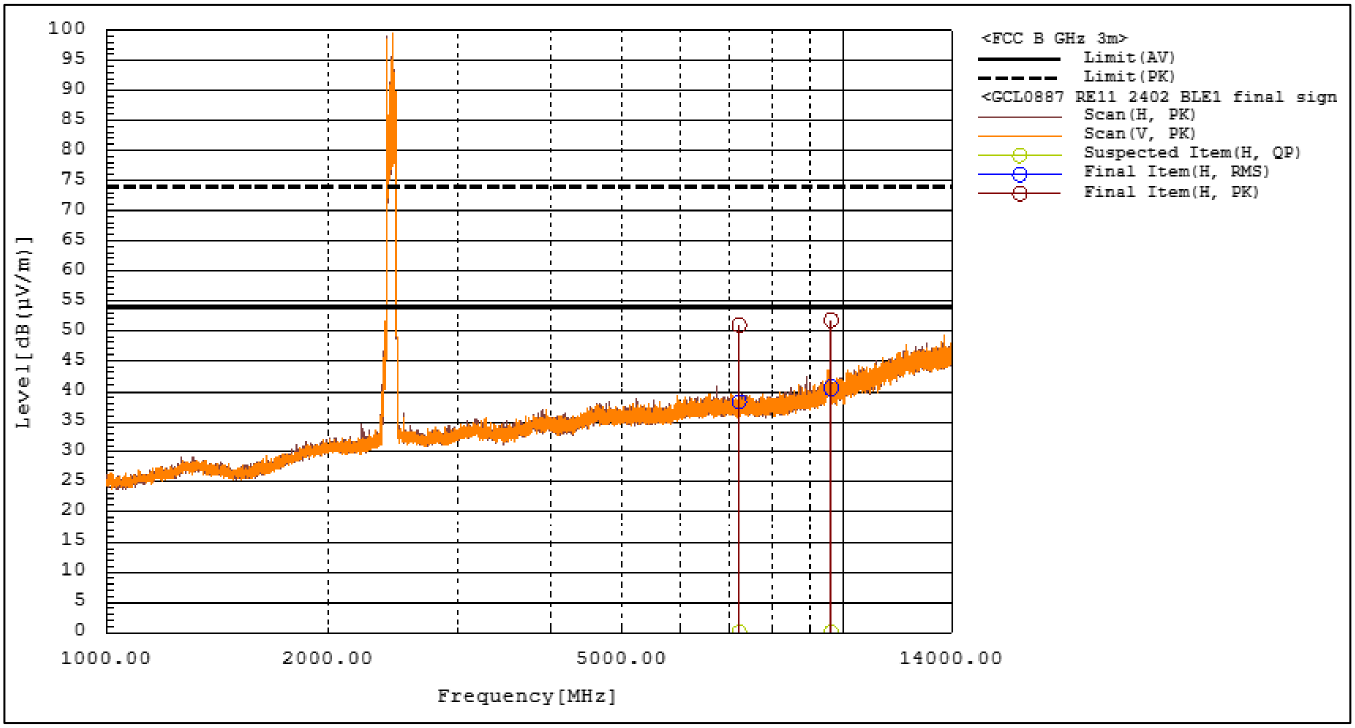



**Figure RE11.1: Spectral data (BLE, 1 Mbps, 2402 MHz)**

| Frequency | Pol. | Reading | | Factor | Level | | Limit | | Margin | | Height | Angle |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MHz | | dB(μ V) | | dB(1/m) | dB(μ V/m) | | dB(μ V/m) | | dB | | cm | deg |
| | | RMS | PK | | RMS | PK | AV | PK | RMS | PK | | |
| 7320.451 | H | 29.6 | 40.9 | 8.7 | 38.3 | 49.6 | 54.0 | 74.0 | 15.7 | 24.4 | 217.5 | 36.0 |
| 9759.530 | H | 28.8 | 39.5 | 12.6 | 41.4 | 52.1 | 54.0 | 74.0 | 12.6 | 21.9 | 205.3 | 354.0 |

**Table RE11.3: Emission summary (BLE, 1 Mbps, 2440 MHz)**

The graph below shows the background spectrum observed during pre-scan, as well as the final data points from the table above.

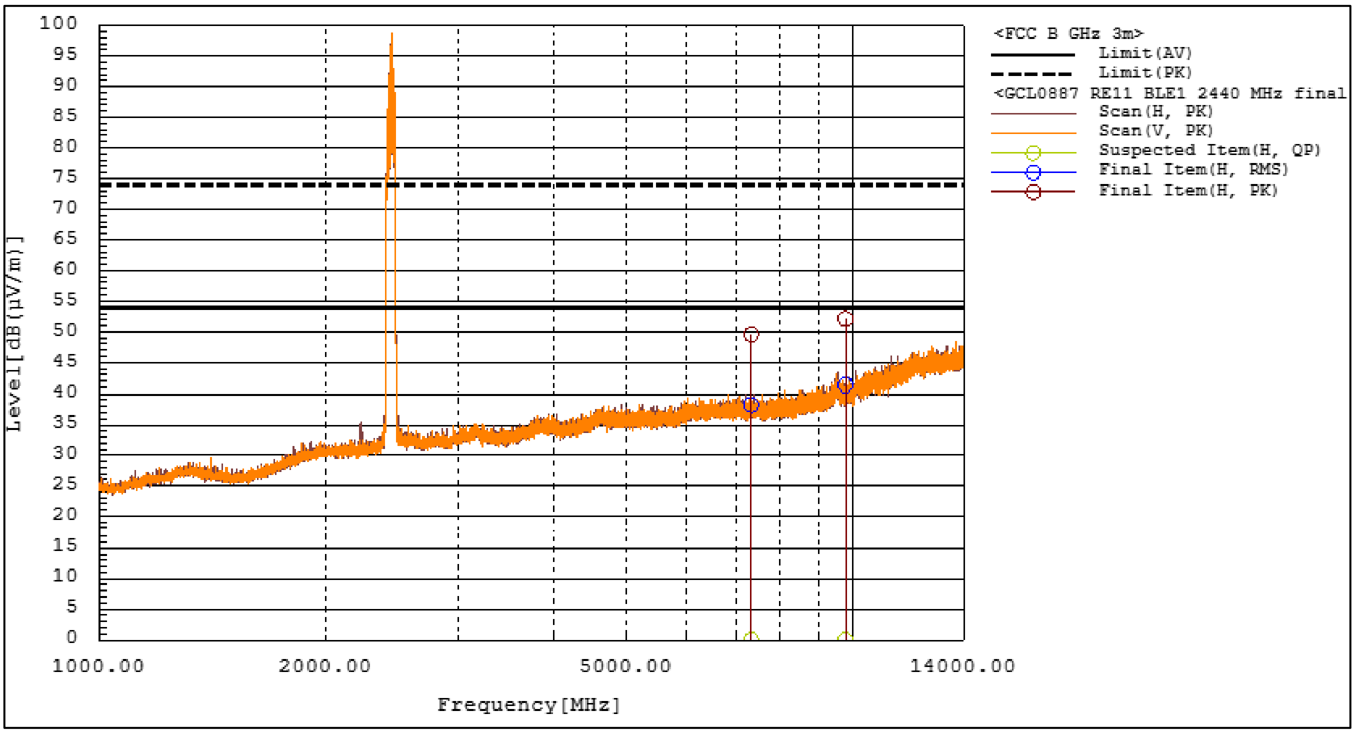



**Figure RE11.2: Spectral data (BLE, 1 Mbps, 2440 MHz)**

| Frequency | Pol. | Reading | | Factor | Level | | Limit | | Margin | | Height | Angle |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MHz | | dB(μ V) | | dB(1/m) | dB(μ V/m) | | dB(μ V/m) | | dB | | cm | deg |
| | | RMS | PK | | RMS | PK | AV | PK | RMS | PK | | |
| 7439.530 | H | 29.6 | 41.0 | 8.8 | 38.4 | 49.8 | 54.0 | 74.0 | 15.6 | 24.2 | 211.3 | 36.0 |
| 9920.935 | H | 29.6 | 40.5 | 13.4 | 43.0 | 53.9 | 54.0 | 74.0 | 11.0 | 20.1 | 193.4 | 34.0 |

**Table RE11.4: Emission summary (BLE, 1 Mbps, 2480 MHz)**

The graph below shows the background spectrum observed during pre-scan, as well as the final data points from the table above.

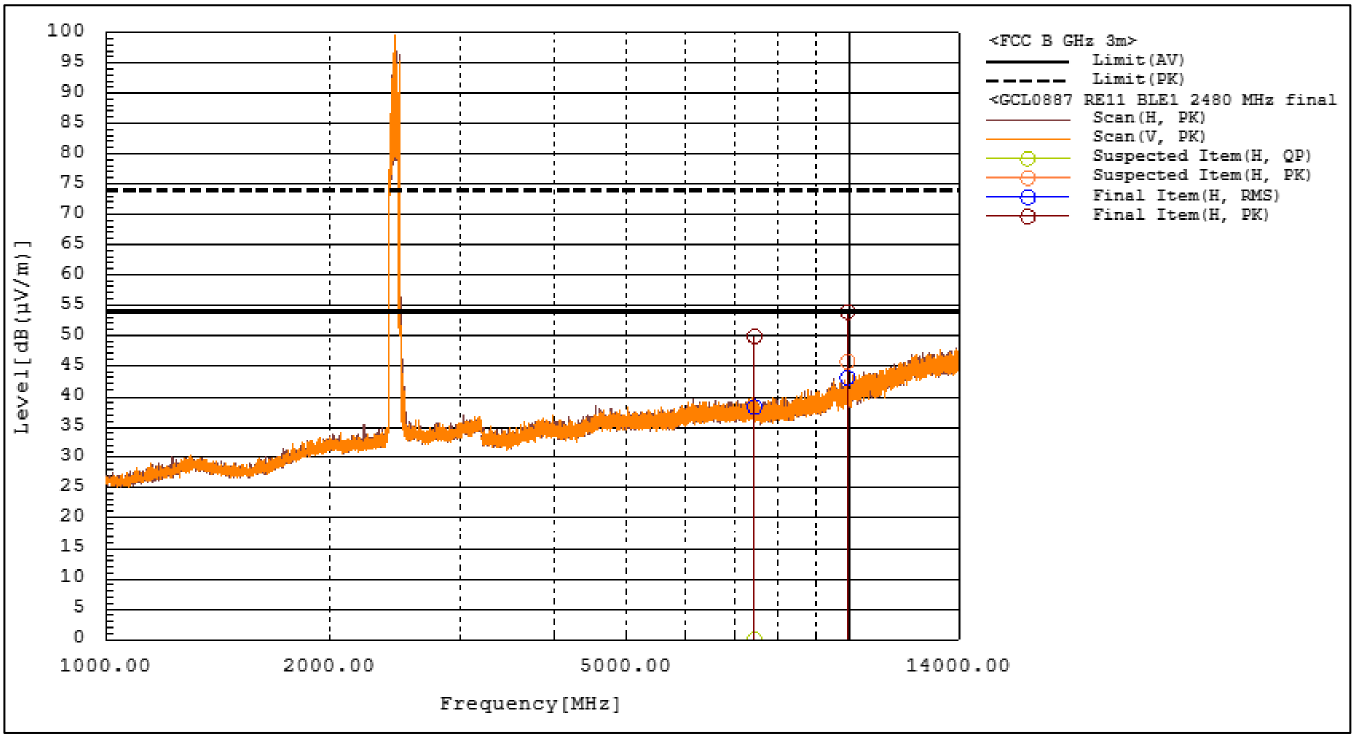



**Figure RE11.3: Spectral data (BLE, 1 Mbps, 2480 MHz)**

**Setup Photographs**

The following photographs show the EUT configured and arranged in the manner in which it was measured.

**Image removed for client confidentiality.**
See section 1 of this report
to identify the report where
the photos may be viewed.

**Figure RE11.4: EUT test setup, first view**

**Image removed for client confidentiality.**
See section 1 of this report
to identify the report where
the photos may be viewed.

**Figure RE11.5: EUT test setup, second view**

**This line is the end of the test record.**

## Test Record
**Radiated Emission Test RE16**
**Project GCL0887**

| | |
|---|---|
| Test Date(s) | 7 Dec 2025 |
| Test Personnel | David Kerr |
| | |
| Product Model | AB5206 |
| Serial Number tested | 3621678869 |
| | |
| Operating Mode | M4 (BleTx) |
| Arrangement | A2 |
| Input Power | USB 5 Vdc |
| | |
| Test Standards: | FCC Part 15, ANSI C63.10, RSS-247, RSS-GEN (as noted in Section 6 of the report). |
| | |
| Frequency Range: | 14 GHz to 25 GHz |
| **Pass/Fail Judgment:** | **PASS** |
| | |
| Test record created by: | Andy Heier |
| Date of this record: | 9 Dec 2025 |

Original record, Version A.

**Test Equipment**

| Description | Make | Model # | Serial # | Last Cal/Ver | Next Due |
|---|---|---|---|---|---|
| PXE Receiver 44 GHz | Keysight | N9048B | MY62220139 | 4-Sep-2025 | 4-Sep-2026 |
| Antenna, Horn, 10-40 GHz | ETS Lindgren | 3116C | 00259186 | 8-May-2025 | 8-May-2027 |
| FSOATS 3m, above 1 GHz | Frankonia | SAC3 | F199004 | 13-Dec-2024 | 13-Dec-2027 |
| Tape Measure, 1-3/16 in x 33 ft | Crecent Lufkin | L1135CME-02 | GMN0013783 | 26-Jun-2024 | 26-Jun-2027 |
| Preamplifier, 14 GHz to 40 GHz | Com-Power | PAM-840A | 461364 | Calibration | Not Required |

**Table RE16.1: Test Equipment Used**

**Software Used:** Keysight PXE software A.33.03, EPX test software Version 2025.01.000

**Test Data**

For test standards that require reorienting the test sample, preliminary scans were taken in those alternate orientations to find the orientation that produced that largest field at the receive antenna. With intentional radiators, that highest field is usually found at the carrier frequency. The alternate orientations are typically described as X, Y, and Z and explained with a photograph. Subsequent testing was done using on the orientation identified in this way.

The radiated emission test process continued with a preliminary scan at multiple turntable angles, antenna heights, and both antenna polarizations. Where the test standard requires cable manipulation, this was done at one of more likely worst case frequencies selected by the test personnel while observing the receiver display. At each of the frequencies selected for final measurements, the turntable angle, antenna height, and antenna polarization were explored to find the worst-case settings. Final field strength measurements were taken in that set of positions. Full maximization was not performed at frequencies that are noise floor measurements included per the test standard requirements.

In the 14 GHz to 25 GHz frequency range, pre-scan spectral data was taken at 1 meter and extrapolated to a 3 meter distance. Final measurements were made at 3 meters.

At azimuth angle 180° the 'front' reference mark of the turntable is pointed Southward. At 270° the reference mark points West. At 90° it points East. At 173° the turntable reference mark is pointed directly at the antenna. The designation of the X, Y, and Z orientations of the test sample are sample dependent, so these are reported by use of photographs.

The table shows the selected final measurement data between 14 GHz and 25 GHz. It includes at least the six strongest emissions observed relative to the test limit, along with other data points of interest. Where a data point is highlighted is yellow, this is an aid to indicate the data point(s) with the least margin to the test limit. A positive margin value indicates that the emission was below the test limit. The test limit is the Composite FCC Class B Limit at 3m. Any unintentional radio emission limits are not applied to intentional radio signals.

Test limits for electric fields above 30 MHz that are stated for a distance other than 3 m are adjusted to 3 m with a factor of 20 dB per decade of distance. Test limits for electric or magnetic fields below 30 MHz that are stated for a distance other than 3 m are adjusted to 3 m by one of two methods. For ETSI testing, the extrapolation uses the curve of ETSI EN 300 330 Annex H figure H.2. For FCC and ISED testing, the conservative method of ANSI C63.10 clause 6.4.4.1 is applied: 40 dB per decade for distances within the boundary (wavelength / 2 Pi), 20 dB per decade beyond that distance boundary.

Emissions within the restricted bands were measured with an averaging process described in the ANSI C63.10 methods noted in this paragraph. (See also section 6.3 of this test report.) The duty cycle for the BLE radios had a constant duty cycle less than 98% and so the trace-averaging method with duty cycle adjustment from clause 11.12.2.5.2.1 was applied.

| Frequency | Pol. | Reading | | Factor | Level | | Limit | | Margin | | Height | Angle |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MHz | | dB(μV) | | dB(1/m) | dB(μV/m) | | dB(μV/m) | | dB | | cm | deg |
| | | RMS | PK | | RMS | PK | AV | PK | RMS | PK | | |
| 20876.706 | H | 26.0 | 37.8 | 11.8 | 37.8 | 49.6 | 54.0 | 74.0 | 16.2 | 24.4 | 100.0 | 180.0 |

**Table RE16.2: Emission summary**

The graph below shows the background spectrum observed during pre-scan, as well as the final data points from the table above.

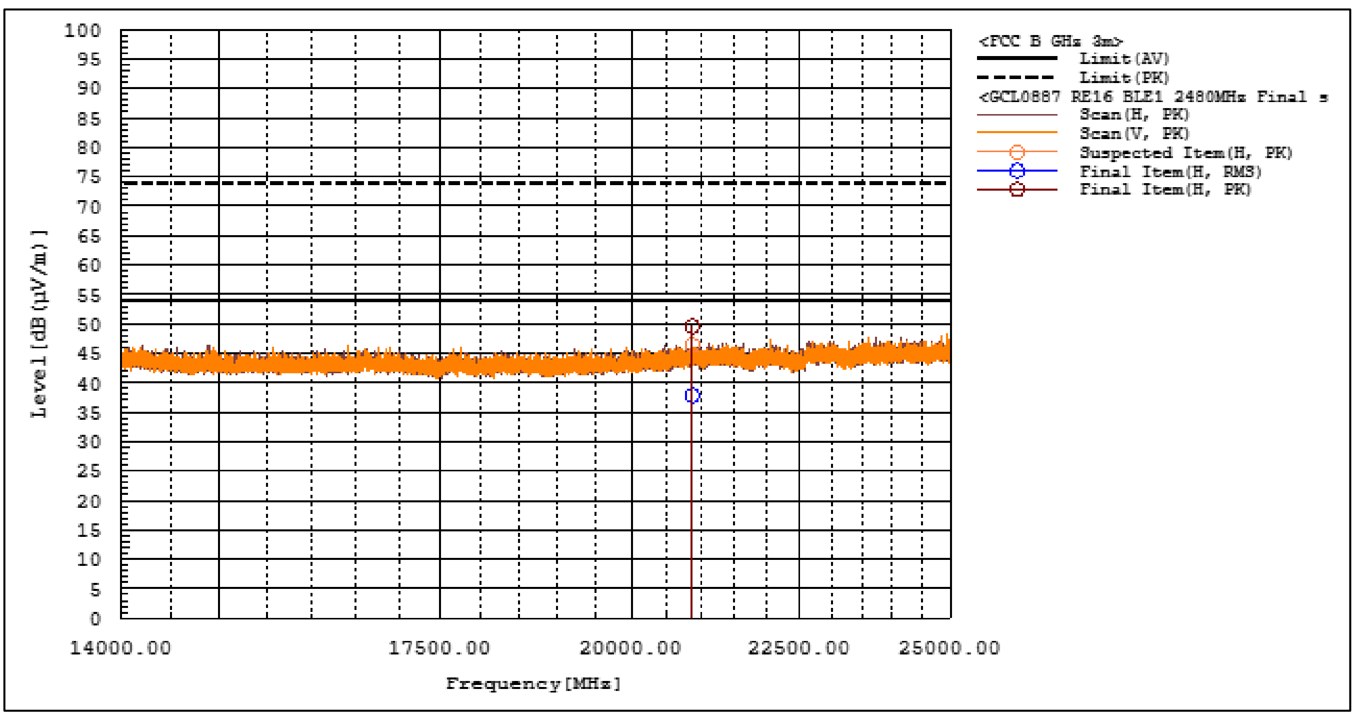



**Figure RE16.1: Spectral data**

### Setup Photographs

The following photographs show the EUT configured and arranged in the manner in which it was measured.

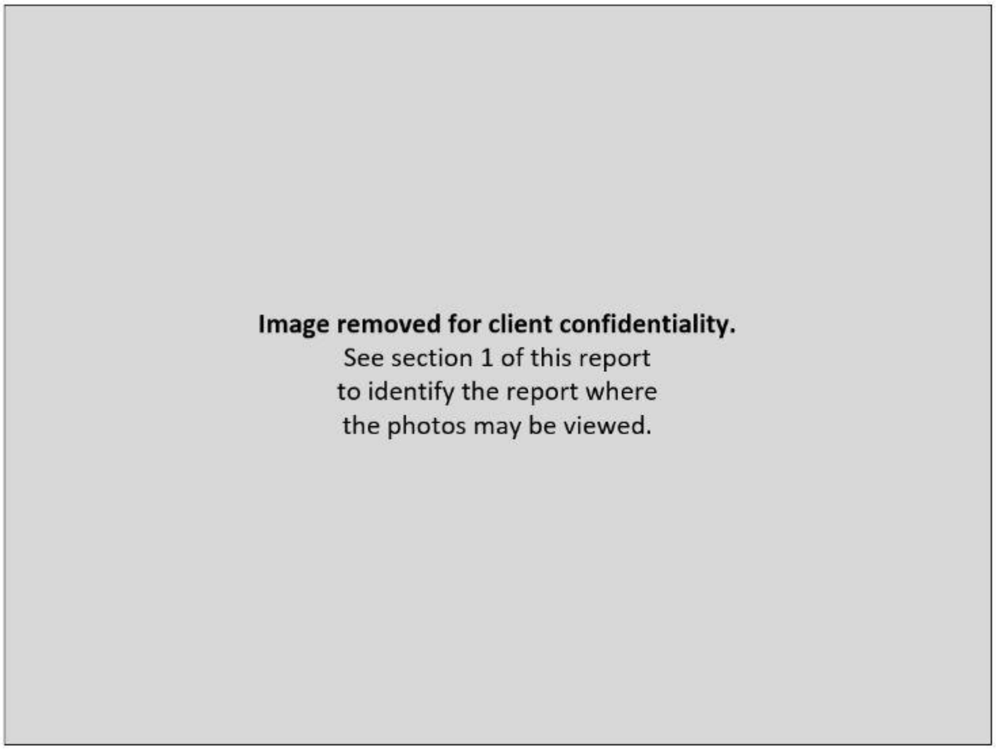



**Figure RE16.2: EUT test setup, first view**

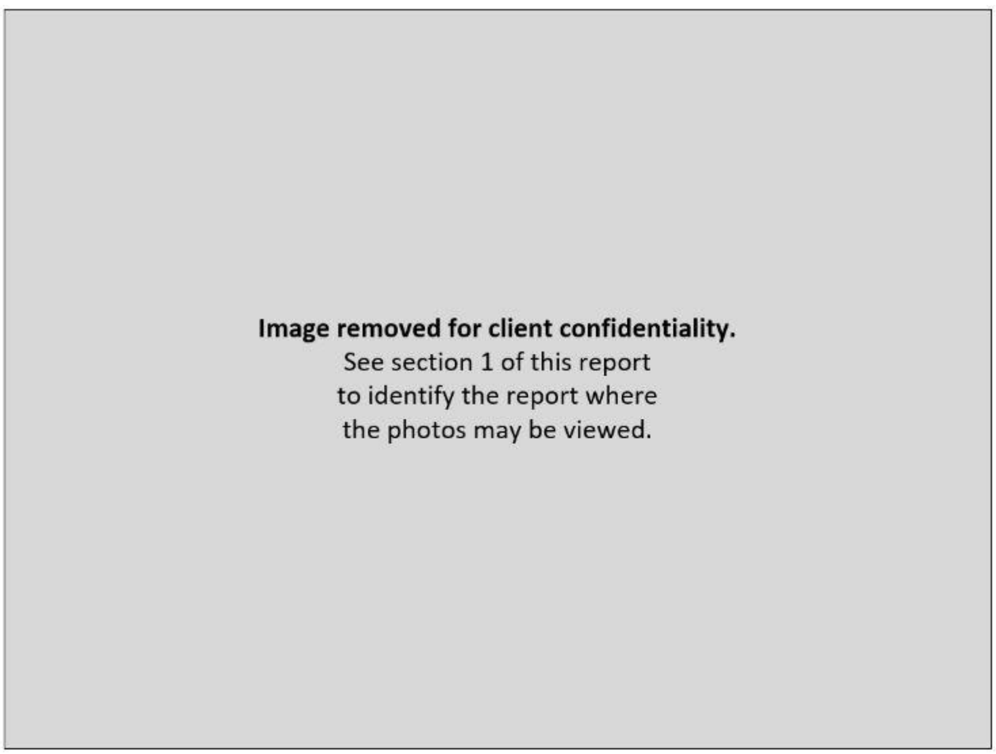



**Figure RE16.3: EUT test setup, second view**
**This line is the end of the test record.**

# Test Record
**Band Edge Conducted Spurious Emission Test TR42**
**Project GCL0887**

| | |
|---|---|
| Test Date(s) | 24 Nov 2025 |
| Test Personnel | Majid Farah |
| | |
| Product Model | AB5206 |
| Serial Number tested | 3621679750 |
| | |
| Operating Mode | M4 (BleTx) |
| Arrangement | A2 |
| Input Power | USB 5 Vdc |
| | |
| Test Standards: | FCC Part 15, ANSI C63.10, RSS-GEN, RSS-247 (as noted in Section 6 of the report). |
| | |
| Required reduction: | 30 dBc for out-of-band reduction relative to in-band levels |
| | |
| **Judgment:** | **PASS** |
| | |
| **Test record created by:** | Jim Solum |
| **Date of this test record:** | 10 Dec 2025 |

Original record, Version A.

**Test Equipment Used**

| Description | Make | Model # | Serial # | Last Cal/Ver | Next Due |
|---|---|---|---|---|---|
| MXE Receiver 8.4 GHz | Keysight | N9038B | MY63460112 | 17-Mar-2025 | 17-Mar-2026 |

**Table TR42.1: Test equipment used**

**Software used:** Keysight MXE software A.37.02

**Test Data**
This conducted spurious emission test measures the strength of radio signals conducted from the transmitter to the antenna in the range between the 2390 MHz upper edge of a restricted band and the 2400 MHz lower edge of the allocated band for a 2.4 GHz transceiver. Radiated testing in the 2483.5 – 2500 MHz restricted bands demonstrates compliance with the rules at the upper edge of the 2.4 GHz allocated band. This test is only performed at the lower end of the 2.4 GHz band because there is a 10 MHz gap between the restricted band and the allocated band. This test follows the ANSI methods for non-restricted bands.

This is a relative measurement. The measurement captures the energy both inside and outside the allocated band using a 100 kHz resolution bandwidth. All emissions outside the allocated band must be reduced relative to the highest emission inside the allocated band. The amount of the reduction is either 20 dB or 30 dB as indicated above, depending on how transmitter power was measured (using a peak or average detector).

This measurement requires that a coaxial feed line from the transmitter is available as a connector exterior to the test sample. This feed line and connector may be a part of the shipping product, or it may be a special modification to the product for testing purposes. The connector is attached via laboratory cables to the measurement instrument. The results may not have been adjusted to account for the losses in the laboratory cables or feed lines since it is a relative measurement across a small frequency span.

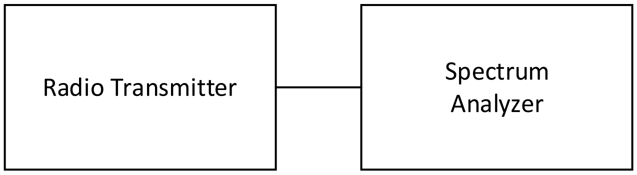



**Figure TR42.1:Typical test arrangement**

Testing meets the ANSI C63.10 requirements at 11.11 for DTS transmitters, 7.8.7 for FHSS transmitters, and 6.10.4 for other transmitters. Data is collected using the required peak detector function, in Max-Hold operation, across the frequency range. The instrument uses a 100 kHz bandwidth detector typically at half-bandwidth intervals to ensure overlapping measurements. ANSI C63.10 may recommend making two distinct measurements, one focused on the in-band signal and the other looking a broad span of frequencies. The ANSI method is intended for use across a wide frequency span, such as 30 MHz to 25 GHz, where identification of in-band signal levels could be more difficult. The measurement reported here happens across a span of 50 MHz, so the separated measurement approach is not pertinent.

Measurement to find the highest emission across the full 2400-2483.5 allocated band is not usually necessary. If some part of the emission spectrum extends above 2440 MHz (as is typical with frequency hopping transmitters) and the out of band data is reduced the necessary amount from the signal levels below 2440 MHz, then the transmitter would also be compliant when considering the possibility of higher in-band emissions above 2440 MHz.

| Radio Type | Frequency MHz | In band to band gap required reduction in dB | In band to band gap measurement in dB | Margin to limit in dB |
|---|---|---|---|---|
| BLE 1 Mbps | **2402** | **30** | **-45.19** | **15.19** |
| BLE 2 Mbps | **2404** | **30** | **-48.99** | **18.99** |

**Table TR42.2: Results Summary**

The graphs below show the spectral data as continuous curves. Marker 1 is the highest power level found inside the allocated band. Marker 2 is the highest power level found between 2390 and 2400 MHz. It is configured as a delta marker relative to Marker 1. A vertical green reference line at 2400 MHz shows the edge of the allocated band. A horizontal green reference line shows the allowed level, and is set 20 or 30 dB below Marker 1. Marker 2 is the highest signal peak found outside the allocated band. The table at the bottom shows the Y offset between Marker 1 and Marker 2.

Compliance is demonstrated when the Y offset shown for delta Marker 2 is larger than the required amplitude reduction (20 or 30 dB), or when there is no signal that is above and to the left of where the green lines cross.

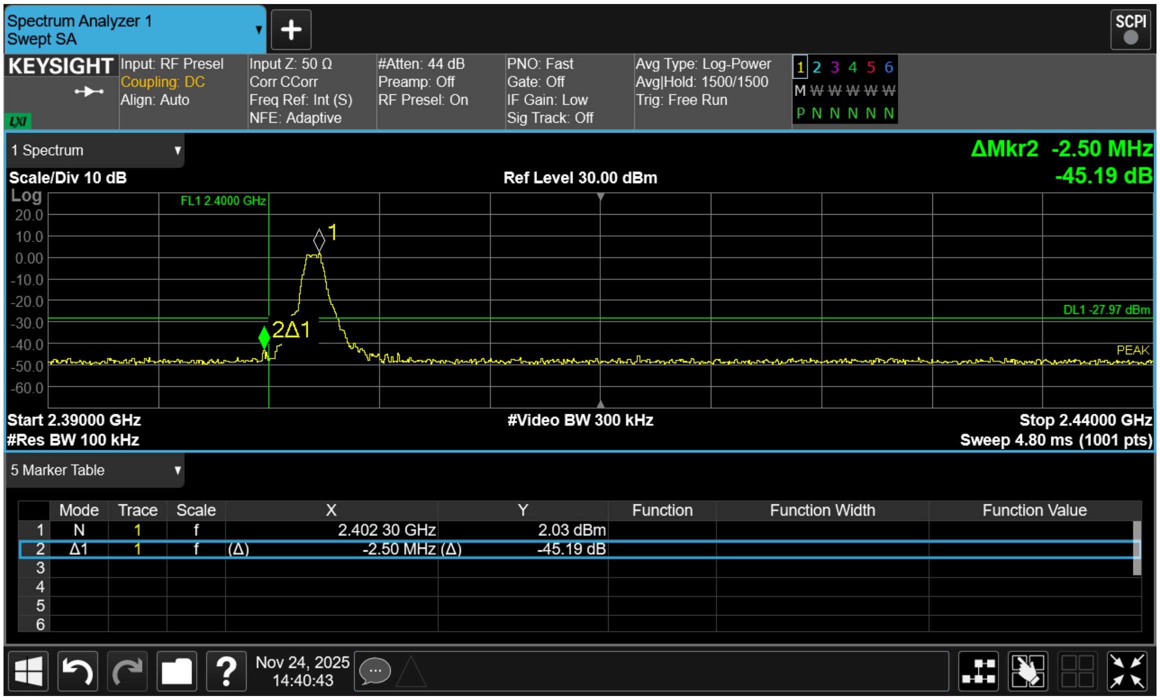



**Figure TR42.2: Band edge gap measurement for BLE 1 Mbps, 2402 MHz**

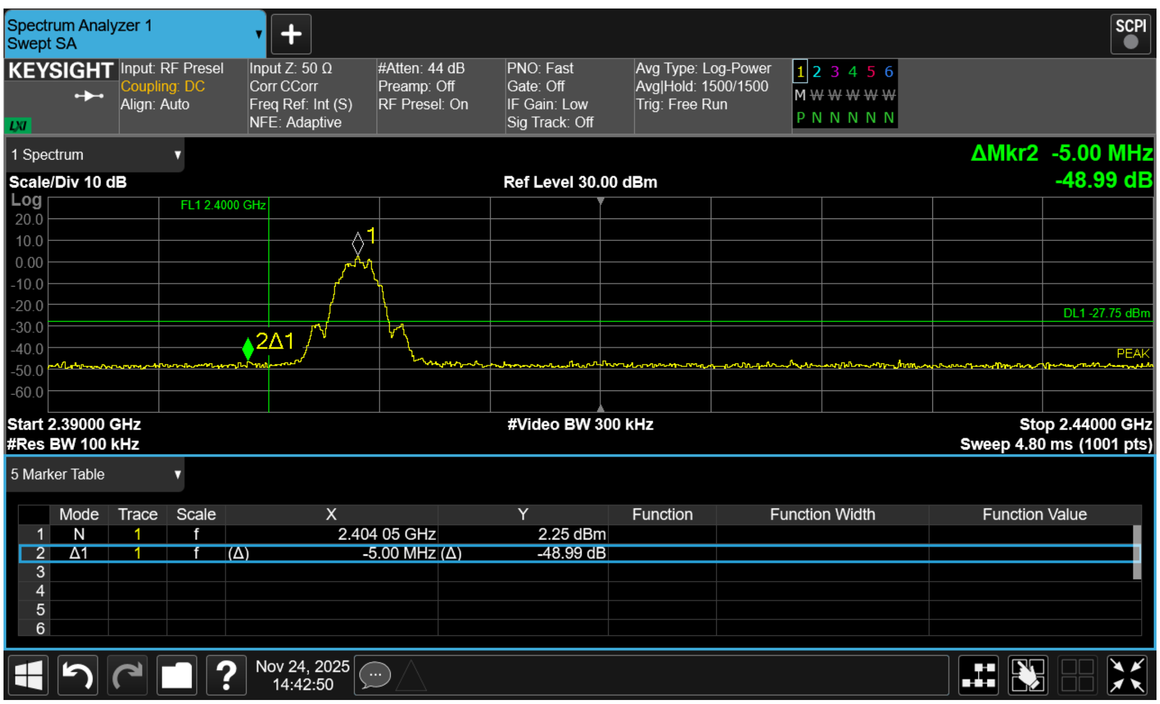



**Figure TR42.3: Band edge gap measurement for BLE 2 Mbps, 2404 MHz**

**This line is the end of the test record.**

# Test Record
**Radiated Emission Test RE03**
**Project GCL0887**

| | |
|---|---|
| Test Date(s) | 18 Nov 2025 |
| Test Personnel | David Kerr |
| Product Model | AB5206 |
| Serial Number tested | 3621678869 |
| Operating Mode | M4 (BleTx) |
| Arrangement | A2 |
| Input Power | USB 5 Vdc |
| Test Standards: | FCC Part 15, ANSI C63.10, RSS-247, RSS-GEN (as noted in Section 6 of the report) |
| Frequency Range: | Restricted Bands (2310-2390 MHz, 2483.5-2500 MHz) |
| **Pass/Fail Judgment:** | **PASS** |
| Test record created by: | Aditya Prakash |
| Date of this record: | 19 Nov 2025 |

Original record, Version A.

**Test Equipment**

| Description | Make | Model # | Serial # | Last Cal/Ver | Next Due |
|---|---|---|---|---|---|
| PXE Receiver 26 GHz | Keysight | N9048B | MY59290135 | 24-Oct-2024 | 29-Nov-2025 |
| Antenna, Horn, 1-18 GHz | ETS Lindgren | 3117 | 00259208 | 30-May-2024 | 30-May-2026 |
| FSOATS 3m, above 1 GHz | Frankonia | SAC3 | F199004 | 13-Dec-2024 | 13-Dec-2027 |
| Tape Measure, 1-3/16 in x 33 ft | Crecent Lufkin | L1135CME-02 | GMN0013783 | 26-Jun-2024 | 26-Jun-2027 |
| Preamplifier, 500 MHz 18 GHz | Com-Power | PAM-118A | 18040133 | Calibration | Not Required |
| Wifi Filter | K&L | 8NSL26-2437/E82.2-0/0 | 1 | Calibration | Not Required |

**Table RE03.1: Test Equipment Used**

**Software Used**
Keysight PXE receiver software A.32.06, FCC Restricted Band 2p4GHz Data Analysis Template v2a 2025May27, RE  Signal Maximization Tool v2025May27.xlsx

**Test Data**

US and Canadian laws contain dozens of bands where radio operation is restricted. Compliance with most of those band restrictions is typically demonstrated by a series of spurious emission tests covering a very wide span of frequencies from kilohertz to Gigahertz. This test record focuses on restricted bands that are immediately adjacent to the authorized band in which the test sample radio operate. It shows whether the modulation products are sufficiently suppressed to meet the restricted band requirements.

The radiated emission test began with a preliminary scan in each restricted band at multiple turntable angles, antenna heights, and both antenna polarizations. For test standards that require reorienting the test sample, further preliminary scans were taken in those alternate orientations typically described as X, Y, and Z. Subsequent testing was done using on the orientation(s) producing the highest result relative to the test limit. Final field strength measurements were taken in that set of positions.

Restricted band measurements in the lower band were made while the transmitter was tuned to its lowest frequency of 2402 MHz for the 1 Mbps data rate, and 2404 MHz for the 2 Mbps data rate. Measurements in the upper band were made while the transmitter was tuned to its highest frequency of 2480 MHz for the 1 Mbps data rate, and 2478 MHz for the 2 Mbps data rate.

At azimuth angle 0° the 'front' reference mark of the turntable is pointed Southward. At 90° the reference mark points West. At -90° it points East. At -7° the turntable reference mark is pointed directly at the antenna. The designation of the X, Y, and Z orientations of the test sample are sample dependent, so these are reported by use of photographs.

The tables show the selected final measurement data between the FCC restricted bands. It includes a the strongest emissions observed relative to the test limit, along with other data points of interest. Where a data point is highlighted is yellow, this is an aid to indicate the data point(s) with the least margin to the test limit. A positive margin value indicates that the emission was below the test limit. The test limit is the FCC restricted band 'Class B' Limit at 3 m listed at 15.209 and RSS-Gen clause 8.9.

Emissions within the restricted bands were measured with an averaging process described in the ANSI C63.10 methods noted in this paragraph. (See also section 6.3 of this test report. The duty cycle for the BLE radios had a constant duty cycle less than 98% and so the trace-averaging method with duty cycle adjustment from clause 11.12.2.5.2.1 was applied.

| Frequency | Avg Limit | Pk Limit | Avg Level | Pk Level | Av Margin | Pk Margin | Azimuth | Height | Polarity | Avg Type | DC Adjust |
|---|---|---|---|---|---|---|---|---|---|---|---|
| (MHz) | (dBµV/m) | (dBµV/m) | (dBµV/m) | (dBµV/m) | (dB) | (dB) | (degree) | (mm) | --- | --- | (dB) |
| 2390 | 54 | 74 | 32.77 | 57.31 | 21.23 | 16.69 | -113 | 3359 | VERT | RMS | 0.60 |
| 2370 | 54 | 74 | 33.69 | 49.94 | 20.31 | 24.06 | -113 | 3359 | VERT | RMS | 0.60 |

**Table RE03.2: FCC restricted bands from 2200 to 2390 MHz (BLE, 1 Mbps, 2402 MHz)**

| Frequency | Avg Limit | Pk Limit | Avg Level | Pk Level | Av Margin | Pk Margin | Azimuth | Height | Polarity | Avg Type | DC Adjust |
|---|---|---|---|---|---|---|---|---|---|---|---|
| (MHz) | (dBµV/m) | (dBµV/m) | (dBµV/m) | (dBµV/m) | (dB) | (dB) | (degree) | (mm) | --- | --- | (dB) |
| 2483.5 | 54 | 74 | 35.46 | 65.03 | 18.54 | 8.97 | -118 | 2865 | VERT | RMS | 0.60 |

**Table RE03.3: FCC restricted band from 2483.5 to 2500 MHz (BLE, 1 Mbps, 2480 MHz)**

| Frequency | Avg Limit | Pk Limit | Avg Level | Pk Level | Av Margin | Pk Margin | Azimuth | Height | Polarity | Avg Type | DC Adjust |
|---|---|---|---|---|---|---|---|---|---|---|---|
| (MHz) | (dBµV/m) | (dBµV/m) | (dBµV/m) | (dBµV/m) | (dB) | (dB) | (degree) | (mm) | --- | --- | (dB) |
| 2390 | 54 | 74 | 34.44 | 55.99 | 19.56 | 18.01 | -113 | 3359 | VERT | RMS | 2.22 |
| 2372 | 54 | 74 | 34.39 | 50.02 | 19.61 | 23.98 | -113 | 3359 | VERT | RMS | 2.22 |

**Table RE03.4: FCC restricted bands from 2200 to 2390 MHz (BLE, 2 Mbps, 2404 MHz)**

| Frequency | Avg Limit | Pk Limit | Avg Level | Pk Level | Av Margin | Pk Margin | Azimuth | Height | Polarity | Avg Type | DC Adjust |
|---|---|---|---|---|---|---|---|---|---|---|---|
| (MHz) | (dBµV/m) | (dBµV/m) | (dBµV/m) | (dBµV/m) | (dB) | (dB) | (degree) | (mm) | --- | --- | (dB) |
| 2483.5 | 54 | 74 | 36.94 | 61.70 | 17.06 | 12.30 | -118 | 2865 | VERT | RMS | 2.22 |

**Table RE03.5: FCC restricted band from 2483.5 to 2500 MHz (BLE, 2 Mbps, 2478 MHz)**

The graphs below show the background spectrum observed during pre-scan, as well as the final data points from the tables above.

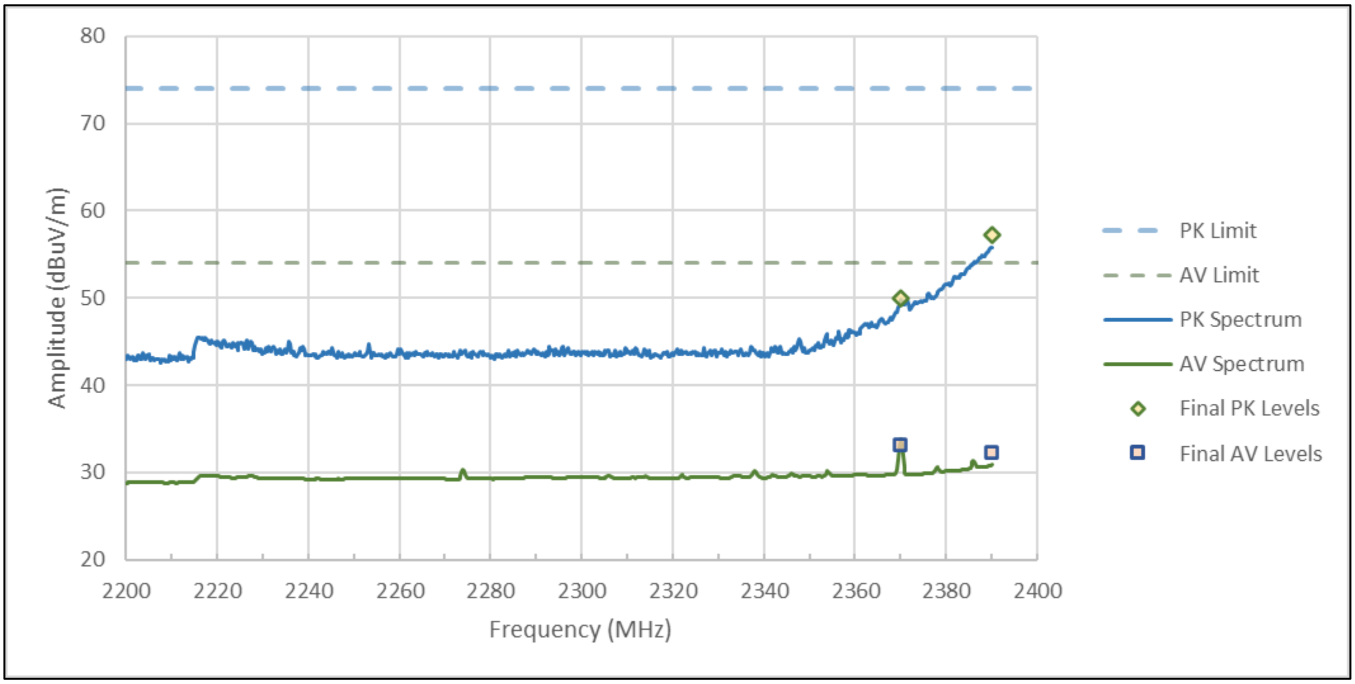



**Figure RE03.1: FCC restricted band spectral data from 2200 to 2390 MHz (BLE, 1 Mbps, 2402 MHz)**

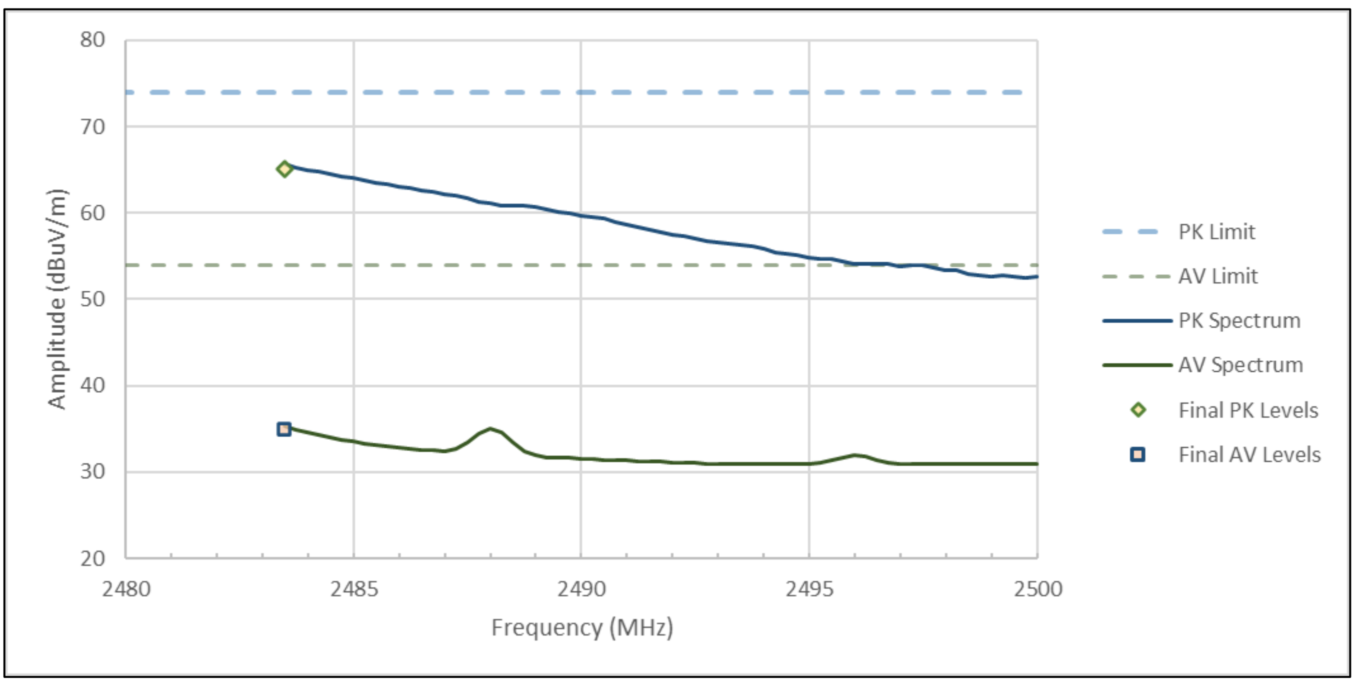



**Figure RE03.2: FCC restricted band spectral data from 2483.5 to 2500 MHz (BLE, 1 Mbps, 2480 MHz)**

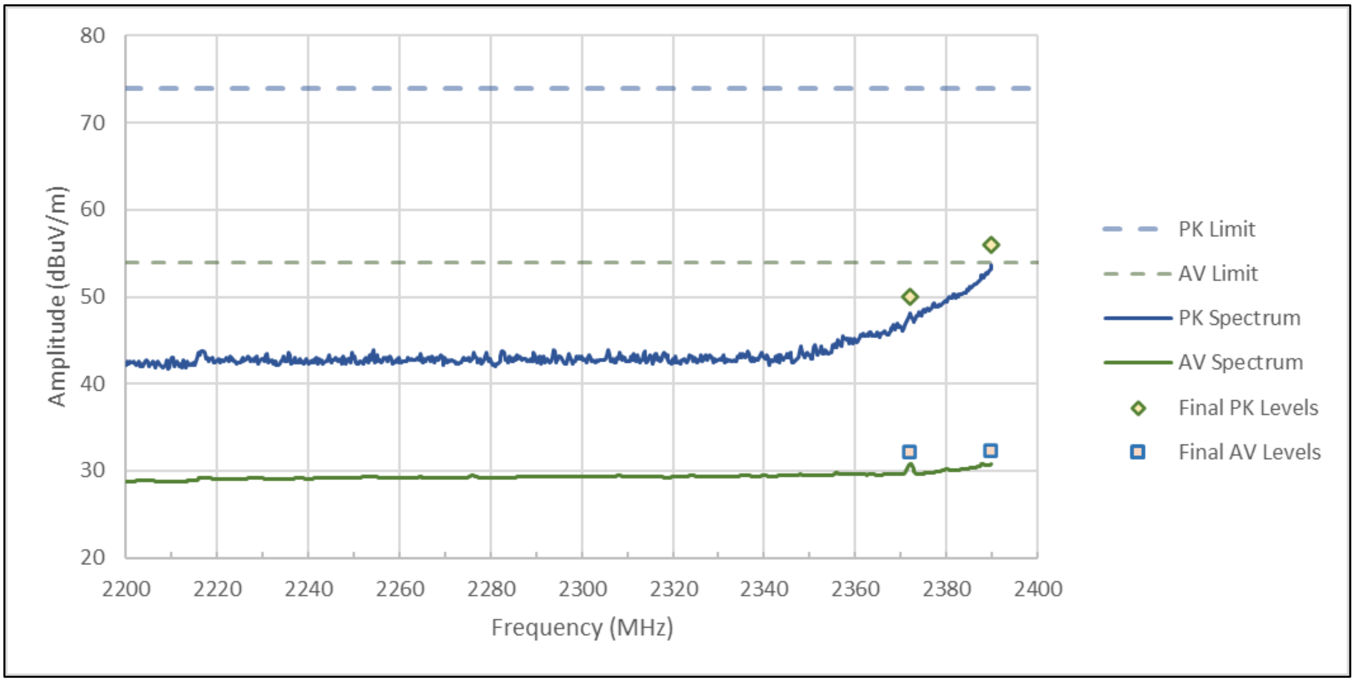



**Figure RE03.3: FCC restricted band spectral data from 2200 to 2390 MHz (BLE, 2 Mbps, 2404 MHz)**

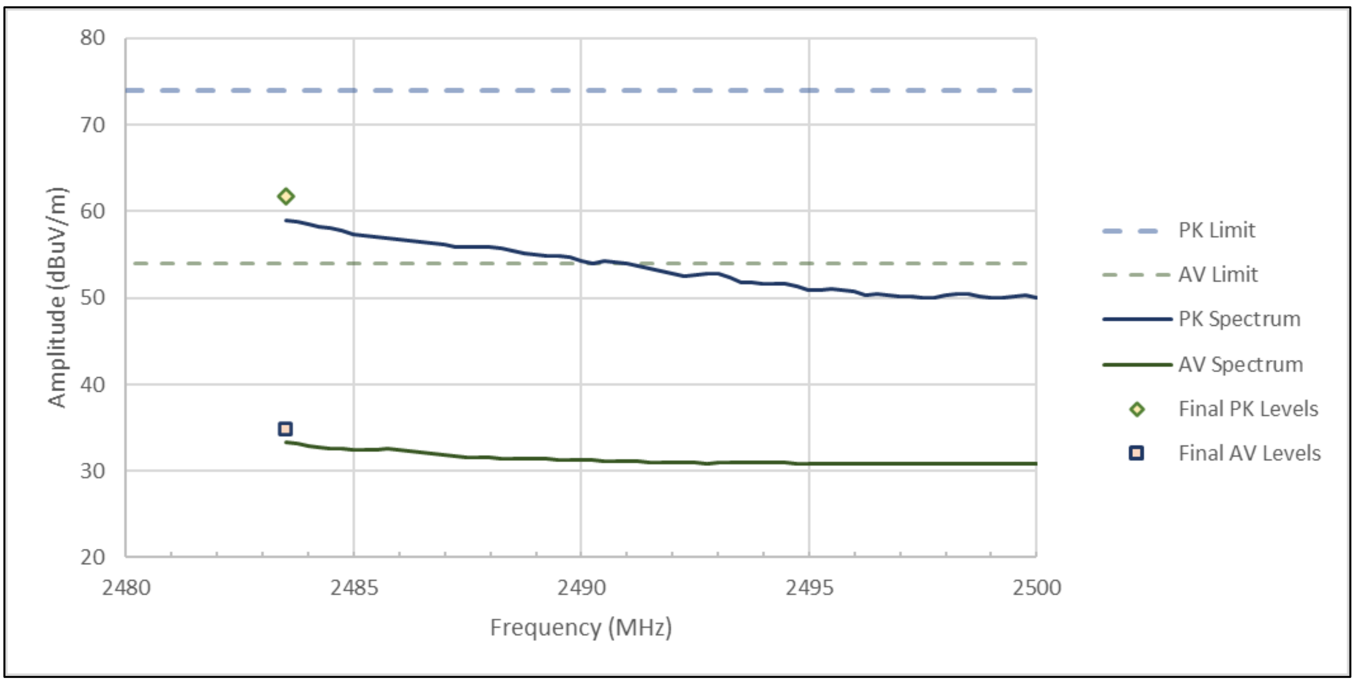



**Figure RE03.4: FCC restricted band spectral data from 2483.5 to 2500 MHz (BLE, 2 Mbps, 2478 MHz)**

**Setup Photographs**

The following photographs show the EUT configured and arranged in the manner in which it was measured.

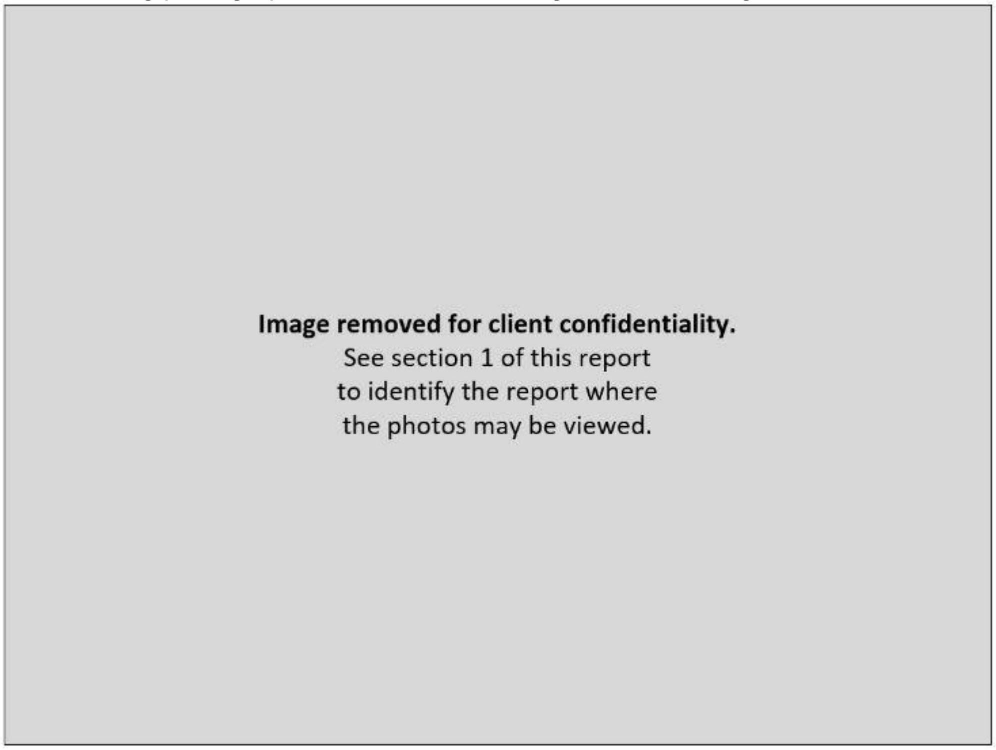



**Figure RE03.5: EUT test setup, primary view**

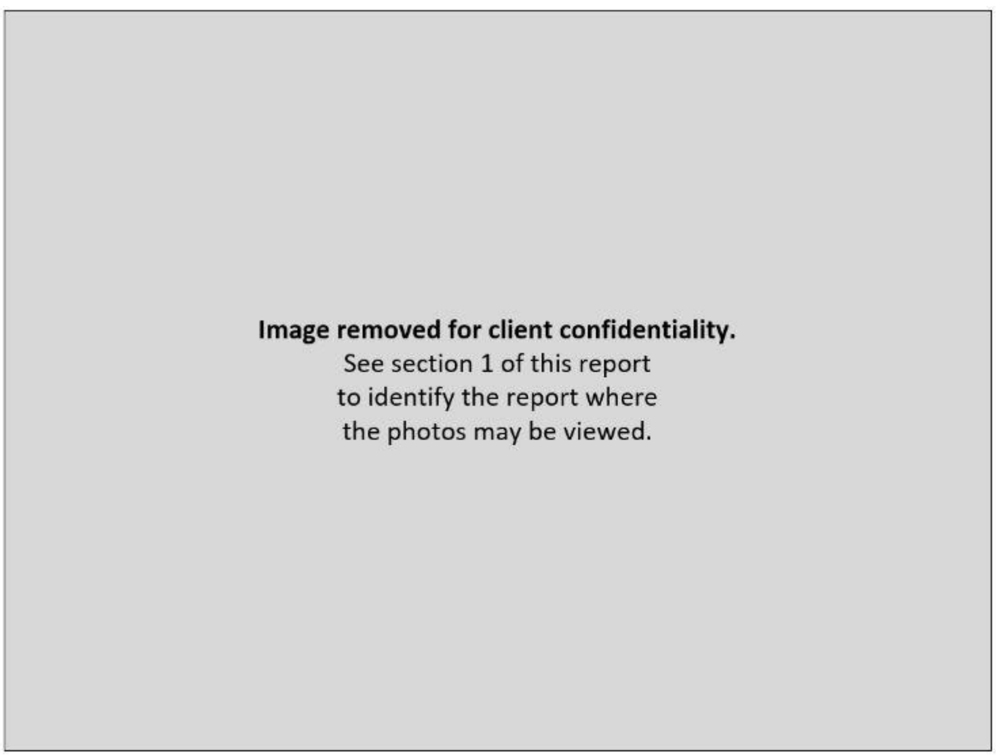



**Figure RE03.6: EUT test setup, reverse view**

**This line is the end of the test record.**

## Test Record

**Transmitter Power Spectral Density**
**Test IDs TR30**
**Project GCL-0887**

| | |
|---|---|
| Test Date(s) | 24 Nov 2025 |
| Test Personnel | Jim Solum |
| Product Model | AB5206 |
| Serial Number tested | 3621679750 |
| Operating Mode | M4 (BleTx) |
| Arrangement | A2 |
| Input Power | 5Vdc |
| Test Standards: | FCC Part 15, ANSI C63.10, RSS-GEN, RSS-247 (as noted in Section 6 of the report). |
| Antenna Gain | -2.26 dBi, as reported by the client |
| Radio Protocol | Bluetooth Low Energy (BLE) |
| **Pass/Fail Judgment:** | **PASS** |
| **Test record created by:** | **Jim Solum** |
| **Date of this record:** | **04 Dec 2025** |

Original record, Version A.

**Test Equipment Used**

| Description | Make | Model # | Serial # | Last Cal/Ver | Next Due |
|---|---|---|---|---|---|
| PXE Receiver 44 GHz | Keysight | N9048B | MY62220139 | 4-Sep-2025 | 4-Sep-2026 |

**Table TR30.1: Test equipment used**

**Software Used:** Keysight PXE software A.33.03

**Test Method**

The basic test standards provide options for the test method. The following test methods were applied.
ANSI C63.10: PKPSD (11.10.2)

**Test Setup**

This block diagram shows the test equipment setup.

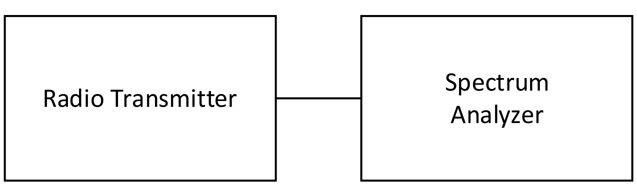



**Figure TR30.1: Test setup**

**Test Data**

Each measurement is made conducted from the antenna port with the transmitter on a specified channel and in a selected transmission protocol. The results include the effects of any measurement cable losses. Results reported are in units of dBm/Bandwidth and do not include the effect of antenna gain. The standard limit is 8 dBm / 3 kHz, and meeting the limit with a wider resolution bandwidths is permitted. All data met the limit using a 3 kHz resolution bandwidth.

The highest PSD levels for each mode are highlighted in yellow, and graphical results are provided for those cases.

| | 2402 | 2440 | 2480 |
|---|---|---|---|
| BLE 1 Mbps | **-12.10** | **-12.35** | **-12.43** |

**Table TR30.2: Summary of results for BLE 1 Mbps in dBm / 3 kHz**

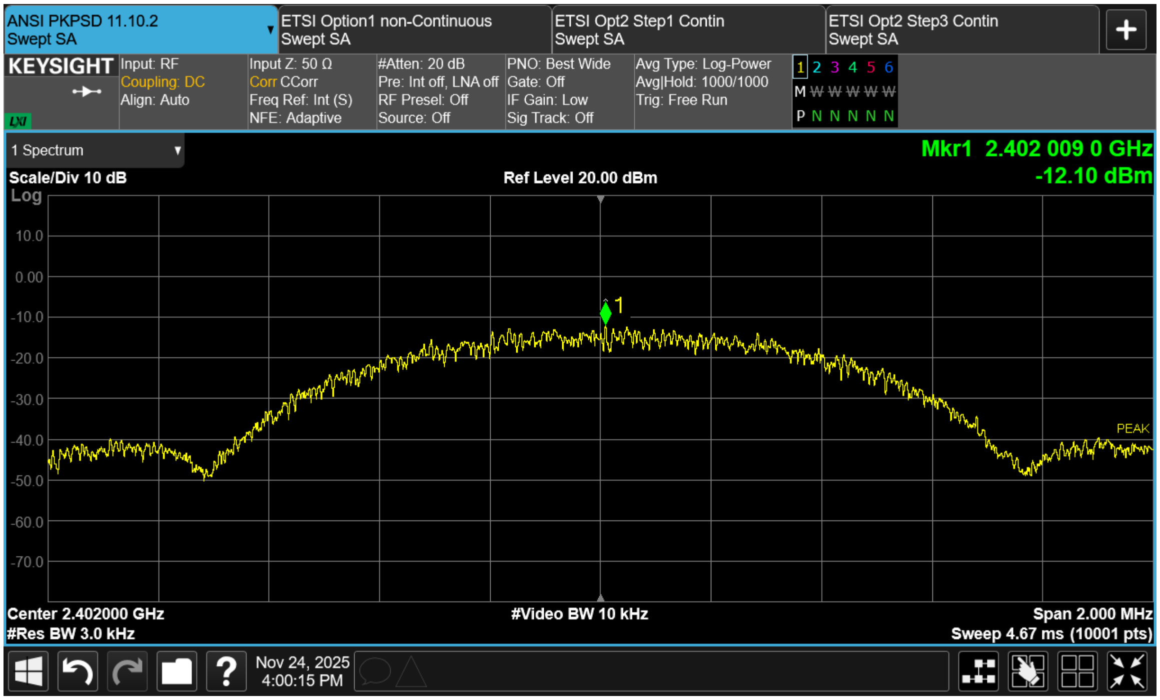



**Figure TR30.2: Test data for BLE 1 Mbps at 2402 MHz**

**This line is the end of the test record.**

## Test Record

**Conducted Emissions Mains Test CE01**
**Project GCL0887**

| | |
|---|---|
| Test Date(s) | 04-Dec-2025 |
| Test Personnel | Andy Heier |
| Product Model | AB5206 |
| Serial Number tested | 3621678871 |
| Operating Mode | M4 (BleTx) |
| Arrangement | A2 |
| Input Power | 120 Vac 60 Hz |
| Test Standards: | FCC Part 15, ANSI C63.10, RSS-247, RSS-GEN (as noted in Section 6 of the report). |
| Frequency Range: | 150 kHz to 30 MHz |
| **Pass/Fail Judgment:** | **PASS** |
| Test record created by: | Andy Heier |
| Date of this record: | 05 Dec 2025 |

Original record, Version A.

### Test Equipment

| Description | Make | Model # | Serial # | Last Cal/Ver | Next Due |
|---|---|---|---|---|---|
| PXE Receiver 44 GHz | Keysight | N9048B | MY62220139 | 4-Sep-2025 | 4-Sep-2026 |
| Tape Measure, 1-3/16 in x 33 ft | Crecent Lufkin | L1135CME-02 | GMN0013782 | 26-Jun-2024 | 26-Jun-2027 |
| LISN multiline; 20A 50uH | Com-Power | LIN-120C | 20160005 | 3-Apr-2024 | 1-Apr-2027 |
| Coaxial Power Cable | Com-Power | RG214/U | 20230124-01 | 3-Apr-2024 | 1-Apr-2027 |

**Table CE01.1: Test Equipment Used**

### Software Used

Keysight PXE software A.33.03, CE Mains 150k to 30M Data Analysis V3a 2025Oct23.xlsx

### Test Data

The conducted emission test process began with a set of preliminary scans on both power conductors using both Quasi-Peak and Average detectors across the frequency range. Where the test standard requires cable manipulation, one or more likely worst case frequencies selected by the test personnel. Cables were manipulated to find the maximal signal strength while observing the receiver levels at those selected frequencies. At each of the frequencies selected for final measurements, Quasi-peak and Average detector readings were taken on each conductor.

The table shows the selected final measurement data. It includes at least the six strongest emissions observed relative to the limit lines, along with other data points of interest. The yellow highlight indicate the data points with the least margin to the quasi-peak detector limit and the average detector limit. A positive margin value indicates that the emission was below the test limit. The test limit is the FCC Class B Limit.

In this test, fewer than six emissions were observed within 20 dB of the limit. The relevant emissions were measured, including one or more noise floor signals as judged appropriate to the spectrum.

| Frequency | QP Limit | AV Limit | L1 QP | L2 QP | L1 AV | L2 AV | QP Margin | AV Margin |
|---|---|---|---|---|---|---|---|---|
| (kHz) | (dBμV) | (dBμV) | (dBμV) | (dBμV) | (dBμV) | (dBμV) | (dB) | (dB) |
| 503 | 56.00 | 46.00 | 33.78 | 29.39 | 29.96 | 24.90 | 22.22 | 16.04 |
| 30000 | 60.00 | 50.00 | 28.92 | 29.38 | 23.66 | 24.27 | 30.62 | 25.73 |

**Table CE01.2: Emission summary (BLE, 1 Mbps, 2440 MHz)**

The graph below shows preliminary scan data as continuous curves. Superimposed are the final measurement data points reported in the table above.

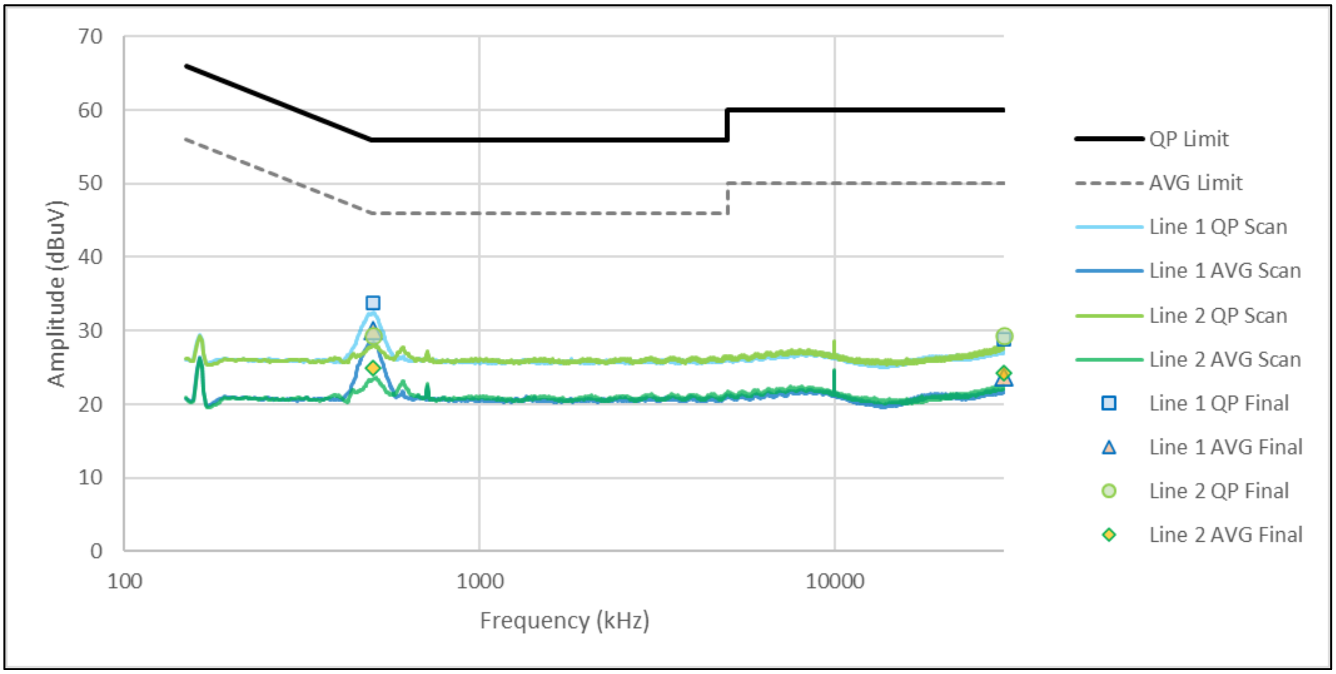



**Figure CE01.1: Spectral data (BLE, 1 Mbps, 2440 MHz)**

**Setup Photographs**

The following photographs show the EUT configured and arranged in the manner in which it was measured.

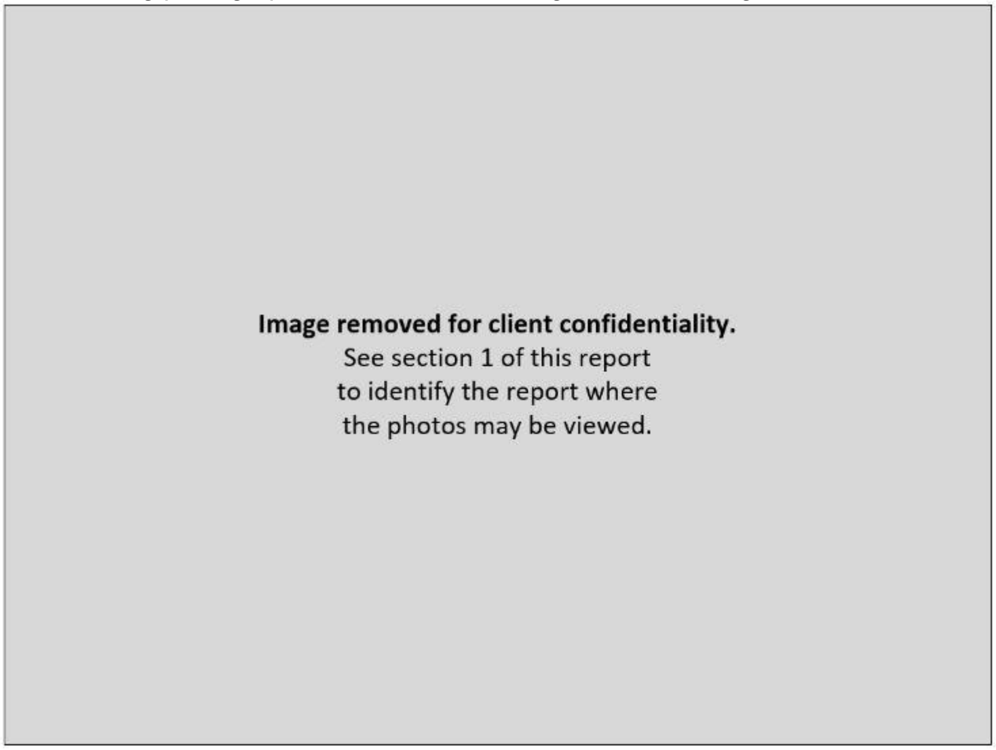



**Figure CE01.2: Test setup, first view**

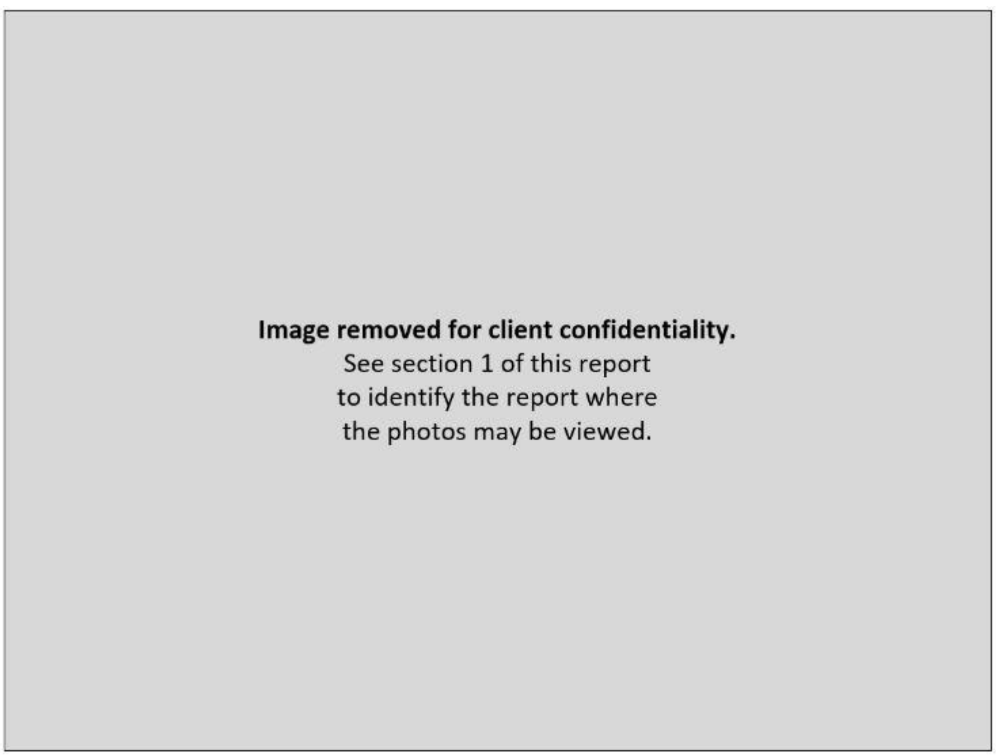



**Figure CE01.3: Test setup, second view**

**This line is the end of the test record.**

**Concluding Notes**

This report stands as an integrated record of the tests performed and must be copied or distributed in its complete form. The reproduction of selected pages or sections separate from the complete report would require specific approval from the manager of the Garmin Compliance Lab.

**This is the final page of the report.**