FCC PART 15, SUBPART C

TEST REPORT

For

Bluush, Inc.

1770 Broadway St.
San Francisco, CA 94109, USA

FCC ID: 2BN4DPIONEERAUDIOV1

Report Type:	Product Type:
Original Report	Wireless BLE Microphone

Prepared By:	Kevin Chau RF Test Engineer
Report Number:	R2503031-247
Report Date:	2025-05-29
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CERTIFICATE #3297.02

* This test report may contain data and test methods that are not covered by BACL's scope of accreditation as of the test report date shown above. These items are marked within the test report text with an asterisk "*"

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R2503031-247	Original Report	2025-05-29

1 General Description

1.1 Product Description for Equipment Under Test (EUT)

This test report is prepared on behalf of *Bluush, Inc.*, and their product model: PIONEERAUDIOV1, FCC ID: 2BN4DPIONEERAUDIOV1, the "EUT" as referred to in this report. The EUT is a Battery Powered BLE Beacon and has Bluetooth LE capability.

1.2 Mechanical Description of EUT

The UUT measures approximately 1.0 cm (L) x 3.0 cm (W) x 1.0 cm (H) and weighs approximately 0.02 kg.

The data gathered were from production samples provided by Bluush, Inc. with S/N: None. The EUTs were received in good and working conditions on March 10, 2025.

1.3 Objective

This report is prepared on behalf of *Bluush, Inc.* in accordance with Part 2, Subpart J, and Part 15, Subpart C of the Federal Communication Commission's rules.

The objective is to determine compliance with FCC Part 15.247 for Antenna Requirement, RF Exposure, AC Line Conducted Emissions, Radiated Spurious Emissions, Emission Bandwidth, Maximum Output Power, Peak Power Spectral Density, and 100 kHz at Antenna Terminal (-20 dBc).

In order to determine compliance, the manufacturer or a contracted laboratory makes measurements and takes the necessary steps to ensure that the equipment complies with the appropriate technical standards.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product maybe which result in lowering the immunity should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing and/or I/O cable changes, etc.).

1.4 Related Submittal(s)/Grant(s)

N/A

1.5 Test Methodology

All measurements contained in this report were conducted in accordance with ANSI C63.10-2020, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices and FCC KDB 558074 D01 DTS Meas Guidance v05r02: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247.

1.6 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Parameter	Measurement uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±0.57 dB
Power Spectral Density, conducted	±1.48dB
Unwanted Emissions, conducted	±1.57dB
All emissions, radiated	±4.0 dB
AC power line Conducted Emission	±2.0 dB
Temperature	±2 º C
Humidity	±5 %
DC and low frequency voltages	±1.0 %
Time	±2 %
Duty Cycle	±3 %

1.7 Test Facility Registrations

BACLs test facilities that are used to perform Radiated and Conducted Emissions tests are currently recognized by the Federal Communications Commission as Accredited with NIST Designation Number US1129.

BACL's test facilities that are used to perform Radiated and Conducted Emissions tests are currently registered with Industry Canada under Registration Numbers: 3062A.

BACL is a Chinese Taipei Bureau of Standards Metrology and Inspection (BSMI) validated Conformity Assessment Body (CAB), under Appendix B, Phase I Procedures of the APEC Mutual Recognition Arrangement (MRA). BACL's BSMI Lab Code Number is: SL2-IN-E-1002R

BACL's test facilities that are used to perform AC Line Conducted Emissions, Telecommunications Line Conducted Emissions, Radiated Emissions from 30 MHz to 1 GHz, and Radiated Emissions from 1 GHz to 6 GHz are currently recognized as Accredited in accordance with the Voluntary Control Council for Interference [VCCI] Article 15 procedures under Registration Number A-0428.

1.8 Test Facility Accreditations

Bay Area Compliance Laboratories Corp. (BACL) is:

A- ***An independent, 3rd-Party, Commercial Test Laboratory accredited to ISO/IEC 17025:2017 by A2LA (Test Laboratory Accreditation Certificate Number 3297.02),*** in the fields of: Electromagnetic Compatibility and Telecommunications. Unless noted by an Asterisk (*) in the Compliance Matrix (See Section 3 of this Test Report), BACL's ISO/IEC 17025:2005 Scope of Accreditation includes all of the Test Method Standards and/or the Product Family Standards detailed in this Test Report..

BACL's ISO/IEC 17025:2005 Scope of Accreditation includes a comprehensive suite of EMC Emissions, EMC Immunity, Radio, RF Exposure, Safety and wireline Telecommunications test methods applicable to a wide range of product categories. These product categories include Central Office Telecommunications Equipment [including NEBS - Network Equipment Building Systems], Unlicensed and Licensed Wireless and RF devices, Information Technology Equipment (ITE); Telecommunications Terminal Equipment (TTE); Medical Electrical Equipment; Industrial, Scientific and Medical Test Equipment; Professional Audio and Video Equipment; Industrial and Scientific Instruments and Laboratory Apparatus; Cable Distribution Systems, and Energy Efficient Lighting.

B- ***A Product Certification Body accredited to ISO/IEC 17065:2012 by A2LA (Product Certification Body Accreditation Certificate Number 3297.03)*** to certify

- For the USA (Federal Communications Commission):
  - 1- All Unlicensed radio frequency devices within FCC Scopes A1, A2, A3, and A4;
  - 2- All Licensed radio frequency devices within FCC Scopes B1, B2, B3, and B4;
  - 3- All Telephone Terminal Equipment within FCC Scope C.
- For the Canada (Industry Canada):
  - 1 All Scope 1-Licence-Exempt Radio Frequency Devices;
  - 2 All Scope 2-Licensed Personal Mobile Radio Services;
  - 3 All Scope 3-Licensed General Mobile & Fixed Radio Services;
  - 4 All Scope 4-Licensed Maritime & Aviation Radio Services;
  - 5 All Scope 5-Licensed Fixed Microwave Radio Services
  - 6 All Broadcasting Technical Standards (BETS) in the Category I Equipment Standards List.
- For Singapore (Info-Communications Development Authority (IDA)):
  - 1 All Line Terminal Equipment: All Technical Specifications for Line Terminal Equipment – Table 1 of IDA MRA Recognition Scheme: 2011, Annex 2
  - 2. All Radio-Communication Equipment: All Technical Specifications for Radio-Communication Equipment – Table 2 of IDA MRA Recognition Scheme: 2011, Annex 2
- For the Hong Kong Special Administrative Region:
  - 1 All Radio Equipment, per KHCA 10XX-series Specifications;
  - 2 All GMDSS Marine Radio Equipment, per HKCA 12XX-series Specifications;
  - 3 All Fixed Network Equipment, per HKCA 20XX-series Specifications.
- For Japan:
  - 1 MIC Telecommunication Business Law (Terminal Equipment):
    - All Scope A1 - Terminal Equipment for the Purpose of Calls;
    - All Scope A2 - Other Terminal Equipment
  - 2 Radio Law (Radio Equipment):
    - All Scope B1 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 1 of the Radio Law
    - All Scope B2 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 2 of the Radio Law
    - All Scope B3 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 3 of the Radio Law

C- ***A Product Certification Body accredited to ISO/IEC 17065:2012 by A2LA (Product Certification Body Accreditation Certificate Number 3297.01)*** to certify Products to USA's Environmental Protection Agency (EPA) ENERGY STAR Product Specifications for:

1 Electronics and Office Equipment:
- for Telephony (ver. 3.0)
- for Audio/Video (ver. 3.0)
- for Battery Charging Systems (ver. 1.1)
- for Set-top Boxes & Cable Boxes (ver. 4.1)
- for Televisions (ver. 6.1)
- for Computers (ver. 6.0)
- for Displays (ver. 6.0)
- for Imaging Equipment (ver. 2.0)
- for Computer Servers (ver. 2.0)

2 Commercial Food Service Equipment
- for Commercial Dishwashers (ver. 2.0)
- for Commercial Ice Machines (ver. 2.0)
- for Commercial Ovens (ver. 2.1)
- for Commercial Refrigerators and Freezers

3 Lighting Products
- For Decorative Light Strings (ver. 1.5)
- For Luminaires (including sub-components) and Lamps (ver. 1.2)
- For Compact Fluorescent Lamps (CFLs) (ver. 4.3)
- For Integral LED Lamps (ver. 1.4)

4 Heating, Ventilation, and AC Products
- for Residential Ceiling Fans (ver. 3.0)
- for Residential Ventilating Fans (ver. 3.2)

5 Other
- For Water Coolers (ver. 3.0)

D- ***A NIST Designated Phase-I and Phase-II Conformity Assessment Body (CAB) for the following economies and regulatory authorities under the terms of the stated MRAs/Treaties:***

- Australia: ACMA (Australian Communication and Media Authority) – APEC Tel MRA -Phase I;
- Canada: (Innovation, Science and Economic development Canada - ISED) Foreign Certification Body – FCB – APEC Tel MRA -Phase I & Phase II;
- Chinese Taipei (Republic of China – Taiwan):
  - BSMI (Bureau of Standards, Metrology and Inspection) APEC Tel MRA -Phase I;
  - NCC (National Communications Commission) APEC Tel MRA -Phase I;
- European Union:
  - EMC Directive 2014/30/EU US-EU EMC & Telecom MRA CAB (NB)
  - Radio Equipment (RE) Directive 2014/53/EU US-EU EMC & Telecom MRA CAB (NB)
  - Low Voltage Directive (LVD) 2014/35/EU
- Hong Kong Special Administrative Region: (Office of the Telecommunications Authority – OFTA) APEC Tel MRA -Phase I & Phase II
- Israel – US-Israel MRA Phase I
- Republic of Korea (Ministry of Communications - Radio Research Laboratory) APEC Tel MRA -Phase I
- Singapore: (Infocomm Media Development Authority - IMDA) APEC Tel MRA -Phase I & Phase II;
- Japan: VCCI - Voluntary Control Council for Interference US-Japan Telecom Treaty VCCI Side Letter-
- USA:
  - ENERGY STAR Recognized Test Laboratory – US EPA
  - Telecommunications Certification Body (TCB) – US FCC;
  - Nationally Recognized Test Laboratory (NRTL) – US OSHA
- Vietnam: APEC Tel MRA -Phase I;

2 System Test Configuration

2.1 Justification

The EUT was configured for testing according to ANSI C63.10-2020 and FCC KDB 558074 D01 DTS Meas Guidance v05r02.

The EUT was tested in a testing mode to represent worst-case results during the final qualification test.

2.2 EUT Exercise Software

The exercising software used during testing was "RFTool v1.6.5", provided by hard&softWERK GmbH. The software is compliant with the standard requirements being tested against.

Radio	Mode	Channel	Frequency (MHz)	Power Setting
Bluetooth LE	1M PHY	Low	2402	8
		Middle	2440	8
		High	2480	8
	2M PHY	Low	2402	8
		Middle	2440	8
		High	2480	8

Data rates used:
1M PHY: 1Mbps
2M PHY: 2Mbps

2.3 Duty Cycle Correction Factor

According to KDB 558074 D01 DTS Meas Guidance v05r02 section 6.0:

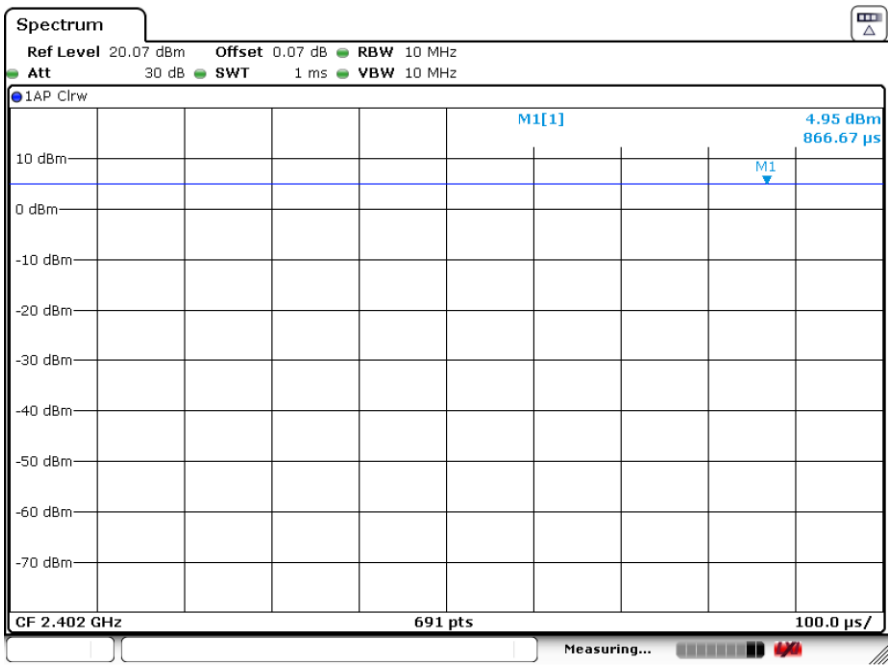
All measurements are to be performed with the EUT transmitting at 100% duty cycle at its maximum power control level; however, if 100% duty cycle cannot be achieved, measurements of duty cycle, x, and maximum-power transmission duration, T, are required for each tested mode of operation.

Radio Mode	On Time (µs)	Period (µs)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
1M PHY	1000	1000	100	0
2M PHY	1000	1000	100	0

Note: Duty Cycle Correction Factor (dB) = 10*log(1/duty cycle)

Please refer to plots below for detailed Duty Cycle measurements.

BLE, 1M PHY



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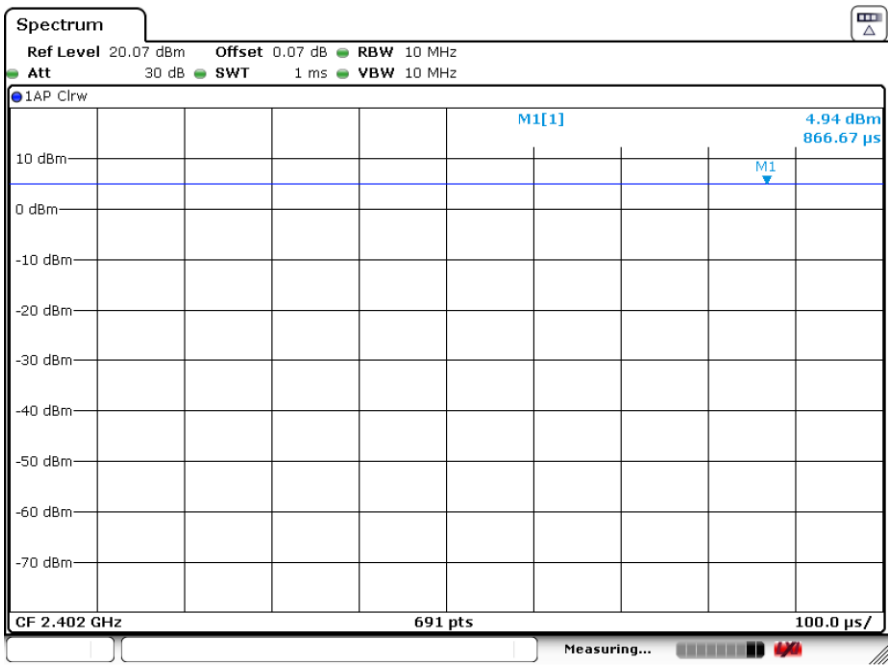
BLE, 2M PHY



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2.4 Equipment Modification

No modifications were made to the EUT during testing.

2.5 Local Support Equipment

Manufacturer	Description	Model	Serial Number
Dell	Laptop	Latitude E7440	C71SYZ1

2.6 Remote Support Equipment

None

2.7 Power Supply and Line Filters

Manufacturer	Description	Model	Serial Number
Something High Electric (Xiamen) Company Inc.	AC/DC Adapter[1]	P12DUSB050100 US	-
-	Internal Battery	-	-

Note[1]: The AC/DC adapter will not be sold with the EUT and was used for testing purposes only.

2.8 Interface Ports and Cabling

Cable Description	Length (m)	From	To
UART Cable	2.0	EUT	Laptop

3 Summary of Test Results

FCC Rules	Description of Test	Results
FCC §15.203	Antenna Requirements	Compliant
FCC §2.1093, §15.247(i)	RF Exposure	Compliant
FCC §15.207	AC Line Conducted Emissions	Compliant
FCC §2.1053, §15.35(b), §15.205, §15.209, §15.247(d)	Radiated Spurious Emissions	Compliant
FCC §15.247(a)(2)	6 dB & 99% Emission Bandwidth	Compliant
FCC §15.247(b)(3)	Maximum Output Power	Compliant
FCC §15.247(e)	Peak Power Spectral Density	Compliant
FCC §2.1051, §15.247 (d)	Spurious Emissions at Antenna Terminal (dBc)	Compliant
FCC §2.1051, §15.247(d)	100 kHz Bandwidth of Frequency Band Edges	Compliant

BACL is responsible for all the information provided in this report, except when information is provided by the customer as identified in this report. Information provided by the customer, e.g., antenna gain, can affect the validity of results.

4 FCC §15.203 – Antenna Requirements

4.1 Applicable Standards

According to FCC §15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall 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. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

And according to FCC §15.247 (b) (4), if transmitting antennas of directional gain greater than 6 dBi are used the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

4.2 Antenna Description

External/Internal/ Integral	Part Number	Antenna Type	Frequency Range (MHz)	Maximum Antenna Gain (dBi)
Integral	N/A	Wire Monopole	2400-2480	5.4

Note: Antenna gain information was provided by the customer.

5 FCC §2.1093, FCC §15.247(i) – RF Exposure

5.1 Applicable Standards

As per KDB 447498 D01 General RF Exposure Guidance v06: Standalone SAR test exclusion considerations

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Test Exclusion Threshold condition(s), listed below, is (are) satisfied. These test exclusion conditions are based on source-based time-averaged maximum conducted output power of the RF channel requiring evaluation, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.28 The minimum test separation distance defined in 4.1 f) is determined by the smallest distance from the antenna and radiating structures or outer surface of the device, according to the host form factor, exposure conditions and platform requirements, to any part of the body or extremity of a user or bystander. To qualify for SAR test exclusion, the test separation distances applied must be fully explained and justified, typically in the SAR measurement or SAR analysis report, by the operating configurations and exposure conditions of the transmitter and applicable host platform requirements, according to the required published RF exposure KDB procedures. When no other RF exposure testing or reporting are required, a statement of justification and compliance must be included in the equipment approval, in lieu of the SAR report, to qualify for SAR test exclusion. When required, the device specific conditions described in the other published RF exposure KDB procedures must be satisfied before applying these SAR test exclusion provisions; for example, handheld PTT two-way radios, handsets, laptops and tablets, etc.[29]

a) For 100 MHz to 6 GHz and test separation distances $\leqslant$ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following: [(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] $\cdot$ [$\sqrt{}$f(GHz)] $\leqslant$ 3.0 for 1-g SAR, and $\leqslant$ 7.5 for 10-g extremity SAR,[30] where

   - f(GHz) is the RF channel transmit frequency in GHz
   - Power and distance are rounded to the nearest mW and mm before calculation[31]
   - The result is rounded to one decimal place for comparison
   - The values 3.0 and 7.5 are referred to as numeric thresholds in step b) below

   The test exclusions are applicable only when the minimum test separation distance is $\leqslant$ 50 mm, and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to 4.1 f) is applied to determine SAR test exclusion.

b) For 100 MHz to 6 GHz and test separation distances > 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following (also illustrated in Appendix B):[32]
   1) {[Power allowed at numeric threshold for 50 mm in step a)] + [(test separation distance – 50mm)$\cdot$(f(MHz)/150)]} mW, for 100 MHz to 1500 MHz
   2) {[Power allowed at numeric threshold for 50 mm in step a)] + [(test separation distance – 50mm) • 10]} mW, for > 1500 MHz and $\leqslant$ 6 GHz

c) For frequencies below 100 MHz, the following may be considered for SAR test exclusion (also illustrated in Appendix C):[33]
   1) For test separation distances > 50 mm and < 200 mm, the power threshold at the corresponding test separation distance at 100 MHz in step b) is multiplied by [1 + log(100/f(MHz))]
   2) For test separation distances $\leqslant$ 50 mm, the power threshold determined by the equation in c) 1) for 50 mm and 100 MHz is multiplied by ½
   3) SAR measurement procedures are not established below 100 MHz

When SAR test exclusion cannot be applied, a KDB inquiry is required to determine SAR evaluation requirements for any SAR test results below 100 MHz to be acceptable.[34]

[28] Test exclusion is applied to the required test channels on a channel by channel basis.

[29] When SAR evaluation is required by the hotspot mode or UMPC mini-tablet procedures, that is, where an antenna is ≤ 2.5 cm from a surface or edge, the test separation distance from the phantom to the antenna or device enclosure, as appropriate, should be applied to determine further SAR test exclusion according to the criteria in this document. Do not use the antenna to device surface or edge distance.

[30] This is equivalent to the formula written as: [(max. power of channel, including tune-up tolerance, mW)/(60 √f(GHz) mW)] • [20 mm/(min. test separation distance, mm)] ≤ 1.0 for 1-g SAR; also see Appendix A for approximate exclusion threshold numerical values at selected frequencies and distances.

Appendix A

***SAR Test Exclusion Thresholds* for 100 MHz – 6 GHz and ≤ 50 mm**

Approximate SAR Test Exclusion Power Thresholds at Selected Frequencies and Test Separation Distances are illustrated in the following Table. The equation and threshold in 4.3.1 must be applied to determine SAR test exclusion.

MHz	5	10	15	20	25	mm
150	39	77	116	155	194	*SAR Test Exclusion Threshold* (mW)
300	27	55	82	110	137	
450	22	45	67	89	112	
835	16	33	49	66	82	
900	16	32	47	63	79	
1500	12	24	37	49	61	
1900	11	22	33	44	54	
2450	10	19	29	38	48	
3600	8	16	24	32	40	
5200	7	13	20	26	33	
5400	6	13	19	26	32	
5800	6	12	19	25	31	

MHz	30	35	40	45	50	mm
150	232	271	310	349	387	*SAR Test Exclusion Threshold* (mW)
300	164	192	219	246	274	
450	134	157	179	201	224	
835	98	115	131	148	164	
900	95	111	126	142	158	
1500	73	86	98	110	122	
1900	65	76	87	98	109	
2450	57	67	77	86	96	
3600	47	55	63	71	79	
5200	39	46	53	59	66	
5400	39	45	52	58	65	
5800	37	44	50	56	62	

Note: 10-g Extremity SAR Test Exclusion Power Thresholds are 2.5 times higher than the 1-g *SAR Test Exclusion Thresholds* indicated above. These thresholds do not apply, by extrapolation or other means, to occupational exposure limits.

5.2 FCC Test Exclusion

Bluetooth LE, 2M PHY

Maximum output power, including tune-up tolerance (dBm):	6.00
Maximum output power, including tune-up tolerance (mW):	3.981
Transmit frequency (GHz):	2.480
Minimum test separation distance (mm):	5
Calculated SAR test exclusion threshold:	1.254
SAR test exclusion threshold limit:	≤ 3

The device is compliant with the SAR test exclusion threshold limit. The maximum SAR test exclusion threshold calculated is 1.254. Limit is ≤ 3.

6 FCC §15.207 – AC Line Conducted Emissions

6.1 Applicable Standards

As per FCC §15.207: Conducted limits

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). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequencies ranges.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15-0.5	66 to 56 Note1	56 to 46 Note2
0.5-5	56	46
5-30	60	50

Note1: Decreases with the logarithm of the frequency.
Note2: A linear average detector is required

6.2 Test Setup

The measurement was performed at shield room, using the setup per ANSI C63.10-2020 measurement procedure. The specification used were FCC §15.207 limits.

External I/O cables were draped along the edge of the test table and bundle when necessary.

The AC/DC power adapter of the EUT was connected with LISN-1 which provided 120 V / 60 Hz AC power.

6.3 Test Procedure

During the conducted emissions test, the power cord of the EUT host system was connected to the mains outlet of the LISN-1 and the power cords of support equipment were connected to LISN-2.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data were recorded in the peak, quasi-peak, and average detection mode. Quasi-Peak readings are distinguished with a “QP.” Average readings are distinguished with an “Ave”.

6.4 Corrected Amplitude & Margin Calculation

The Corrected Amplitude (CA) is calculated by adding the Cable Loss (CL), the Attenuator Factor (Atten) to indicated Amplitude (Ai) reading. The basic equation is as follows:

$$CA = Ai + CL + Atten$$

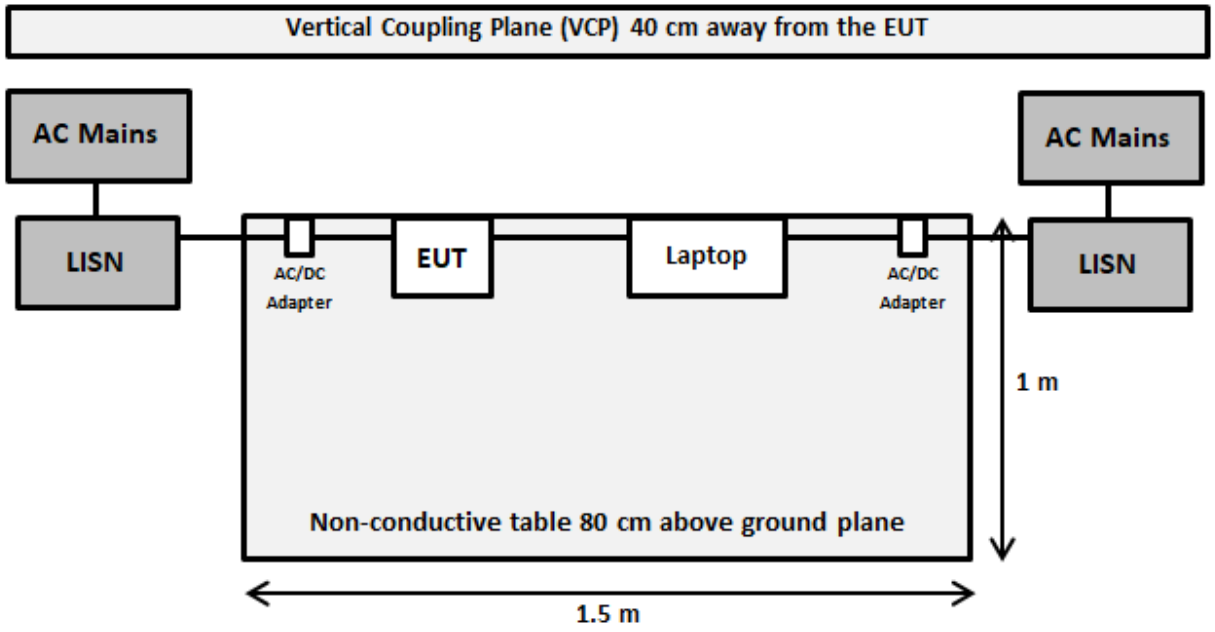
For example, a corrected amplitude of 46.2 dBuV = Indicated Reading (32.5 dBuV) + Cable Loss (3.7 dB) + Attenuator (10 dB)

The "Margin" column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the maximum limit. The equation for margin calculation is as follows:

$$Margin = Corrected\ Amplitude - Limit$$

6.5 Test Setup Block Diagram

AC Line (Charging via AC/DC Adapter)



6.6 Test Equipment List and Details

BACL No	Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
1413	Rohde & Schwarz	ESR EMI Test Receiver	ESR3 1316.3003K03	103191	2025-02-26	1 year
681	Rohde & Schwarz	Impulse Limiter	ESH3-Z2	101962	2025-03-11	6 months
725	Solar Electronics Company	High Pass Filter	Type 7930-100	7930150203	2025-03-11	6 months
1425	Pasternack	Ground Plane RG58 Coaxial Cable	PE3441-500CM	NA	2025-01-07	6 months
732	Fischer Custom Communications, Inc.	LISN	FCC-LISN-50-25-2-10-CISPR16	160129	2024-09-13	1 year
733	Fischer Custom Communications, Inc.	LISN	FCC-LISN-50-25-2-10-CISPR16	160130	2025-02-28	1 year
485	California Instruments	Source, AC/DC	5001iX	54024	2023-10-11	2 years

Statement of Traceability: BACL Corp. *attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with the latest version of A2LA policy P102 "A2LA Policy on Metrological Traceability".*

6.7 Test Environmental Conditions

Temperature:	23.9 ºC
Relative Humidity:	47.1 %
ATM Pressure:	101.6 kPa

The testing was performed by Michael Papa on 2025-05-29 at Ground Plane test site.

6.8 Summary of Test Results

According to the recorded data in following table, the EUT complied with the FCC 15C standard's conducted emissions limits, with the margin reading of:

AC Line (Charging via AC/DC Adapter): BLE, 2M PHY, 2440 MHz

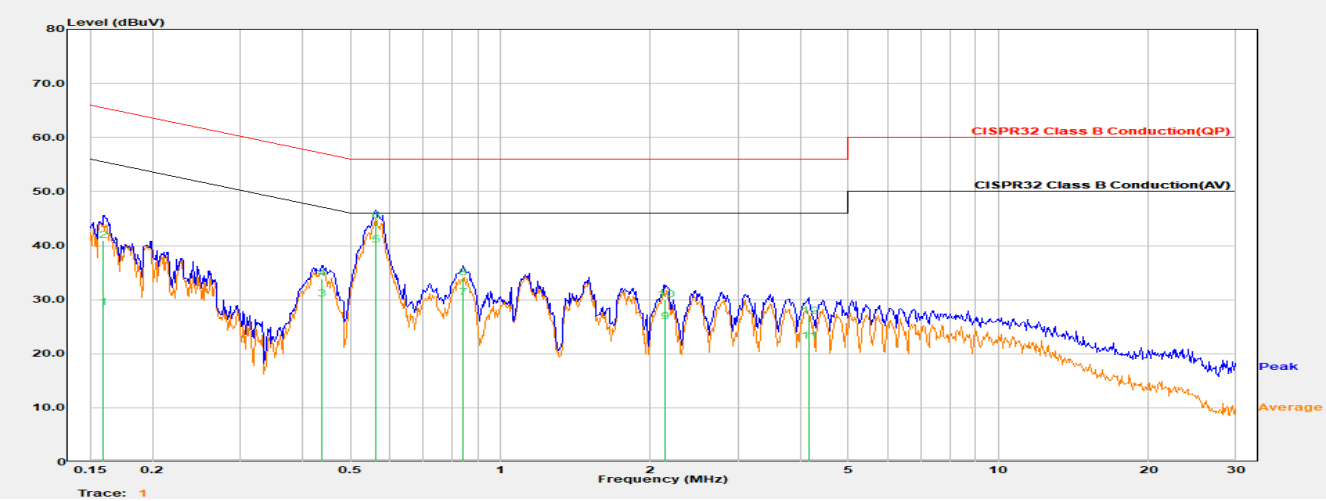
Worst Case – AC Line: 120V, 60Hz			
Margin (dB)	**Frequency (MHz)**	**Conductor Mode (Hot/Neutral)**	**Range (MHz)**
-5.87	0.561	Hot	0.15 to 30

Please refer to the tables and plots in the next section for detailed test results.

6.9 Conducted Emissions Test Plots and Data

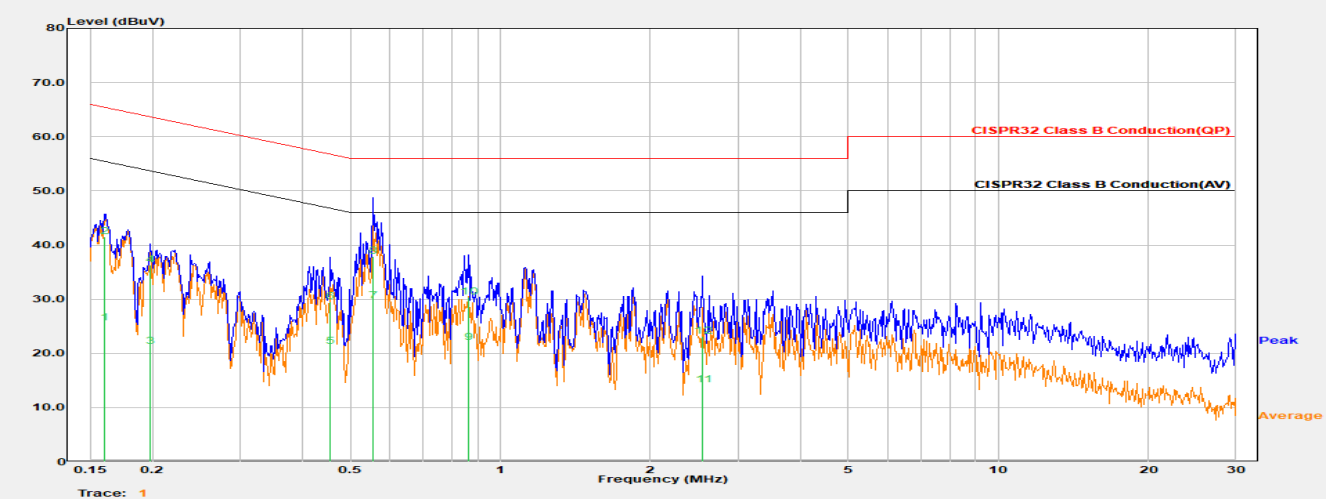
Worst Mode: BLE, 2M PHY, 2440 MHz

AC Line (Charging via AC/DC Adapter): 120V, 60Hz – Hot Conductor



Frequency (MHz)	Ai. Reading (dBuV)	Correction Factor (dB)	Corrected Amplitude (dBµV)	Limit (dBµV)	Margin (dB)	Detector
0.160	15.04	13.46	28.50	55.47	-26.97	Average
0.160	27.41	13.46	40.87	65.47	-24.60	QP
0.437	19.06	11.06	30.12	47.11	-16.99	Average
0.437	22.75	11.06	33.81	57.11	-23.30	QP
0.561	**29.27**	**10.86**	**40.13**	**46.00**	**-5.87**	**Average**
0.561	33.64	10.86	44.50	56.00	-11.50	QP
0.844	19.83	10.61	30.44	46.00	-15.56	Average
0.844	23.45	10.61	34.07	56.00	-21.93	QP
2.144	15.55	10.36	25.91	46.00	-20.09	Average
2.144	19.56	10.36	29.92	56.00	-26.08	QP
4.158	11.85	10.38	22.22	46.00	-23.78	Average
4.158	16.53	10.38	26.91	56.00	-29.09	QP

AC Line (Charging via AC/DC Adapter): 120V, 60Hz – Neutral Conductor



Frequency (MHz)	Ai. Reading (dBuV)	Correction Factor (dB)	Corrected Amplitude (dBµV)	Limit (dBµV)	Margin (dB)	Detector
0.161	12.29	13.37	25.66	55.43	-29.77	Average
0.161	28.22	13.37	41.59	65.43	-23.84	QP
0.198	8.50	12.80	21.30	53.71	-32.41	Average
0.198	23.57	12.80	36.37	63.71	-27.34	QP
0.456	10.29	10.95	21.24	46.76	-25.52	Average
0.456	18.52	10.95	29.47	56.76	-27.29	QP
0.555	18.79	10.80	29.59	46.00	-16.41	Average
0.555	27.17	10.80	37.97	56.00	-18.03	QP
0.862	11.42	10.55	21.97	46.00	-24.03	Average
0.862	19.90	10.55	30.45	56.00	-25.55	QP
2.554	3.92	10.30	14.22	46.00	-31.78	Average
2.554	12.79	10.30	23.10	56.00	-32.90	QP

7 FCC §15.35(b), §15.205, §15.209, §15.247(d) – Radiated Spurious Emissions

7.1 Applicable Standards

As per FCC §15.35(b): Unless otherwise specified, on any frequency or frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1 MHz.

As Per FCC §15.205(a) except as show in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 – 0.110 0.495 – 0.505 2.1735 – 2.1905 4.125 – 4.128 4.17725 – 4.17775 4.20725 – 4.20775 6.215 – 6.218 6.26775 – 6.26825 6.31175 – 6.31225 8.291 – 8.294 8.362 – 8.366 8.37625 – 8.38675 8.41425 – 8.41475 12.29 – 12.293 12.51975 – 12.52025 12.57675 – 12.57725 13.36 – 13.41	16.42 – 16.423 16.69475 – 16.69525 25.5 – 25.67 37.5 – 38.25 73 – 74.6 74.8 – 75.2 108 – 121.94 123 – 138 149.9 – 150.05 156.52475 – 156.52525 156.7 – 156.9 162.0125 –167.17 167.72 – 173.2 240 – 285 322 – 335.4 399.9 – 410 608 – 614	960 – 1240 1300 – 1427 1435 – 1626.5 1645.5 – 1646.5 1660 – 1710 1718.8 – 1722.2 2200 – 2300 2310 – 2390 2483.5 – 2500 2690 – 2900 3260 – 3267 3.332 – 3.339 3 3458 – 3 358 3.600 – 4.400	4. 5 – 5. 15 5. 35 – 5. 46 7.25 – 7.75 8.025 – 8.5 9.0 – 9.2 9.3 – 9.5 10.6 – 12.7 13.25 – 13.4 14.47 – 14.5 15.35 – 16.2 17.7 – 21.4 22.01 – 23.12 23.6 – 24.0 31.2 – 31.8 36.43 – 36.5 Above 38.6

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

Frequency (MHz)	Field Strength (micro volts/meter)	Measurement Distance (meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100**	3
88 - 216	150**	3
216 - 960	200**	3
Above 960	500	3

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

As per FCC §15.247 (d),

in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c).

7.2 Test Setup

The radiated emissions tests were performed in the 5-meter chamber, using the setup in accordance with ANSI C63.10-2020. The specification used was the FCC §15.247 limits.

The spacing between the peripherals was 10 centimeters.

External I/O cables were draped along the edge of the test table and bundled when necessary.

7.3 Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The EUT was set 3 meter away from the testing antenna, which was varied from 1-4 meters, and the EUT was placed on a turntable, which was 0.8 meters and 1.5 meters above the ground plane for below and above 1000 MHz measurements, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna’s polarity should be changed between horizontal and vertical.

The spectrum analyzer or receiver was set as:

Below 1000 MHz:

RBW = 100 kHz / VBW = 300 kHz / Sweep = Auto

Above 1000 MHz:

(1) Peak: RBW = 1MHz / VBW = 1MHz / Sweep = Auto
(2) Average: RBW = 1MHz / VBW = 10Hz or 1/T / Sweep = Auto

7.4 Corrected Amplitude and Margin Calculation

For emissions below 1 GHz,

The Corrected Amplitude (CA) is calculated by adding the Correction Factor to the S.A. Reading. The basic equation is as follows:

CA = S.A. Reading + Correction Factor

For example, a corrected amplitude of 40.3 dBuV/m = S.A. Reading (32.5 dBuV) + Correction Factor (7.8 dB/m)

The Correction Factor is calculated by adding the Antenna Factor (AF), the Cable Loss (CL), the Attenuator Factor (Atten) and subtracting the Amplifier Gain (Ga) together. This calculation is done in the measurement software, and reported in the test result section. The basic equation is as follows:

Correction Factor = AF + CL + Atten – Ga

The "Margin" column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the maximum limit. The equation for margin calculation is as follows:

Margin = Corrected Amplitude – Limit

For emission above 1 GHz,

The Corrected Amplitude (CA) is calculated by adding the Antenna Factor (AF), the Cable Loss (CL), the Attenuator Factor (Atten) and subtracting the Amplifier Gain (Ga) to indicated Amplitude (Ai) reading. The basic equation is as follows:

CA = Ai + AF + CL + Atten – Ga

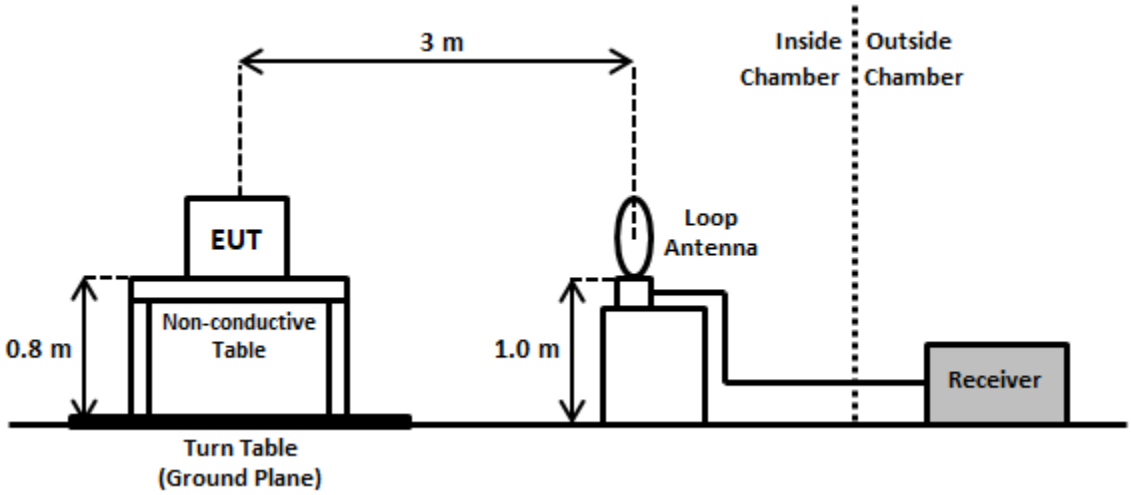
For example, a corrected amplitude of 40.3 dBuV/m = Indicated Reading (32.5 dBuV) + Antenna Factor (+23.5dB) + Cable Loss (3.7 dB) + Attenuator (10 dB) - Amplifier Gain (29.4 dB)

The "Margin" column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the maximum limit. The equation for margin calculation is as follows:

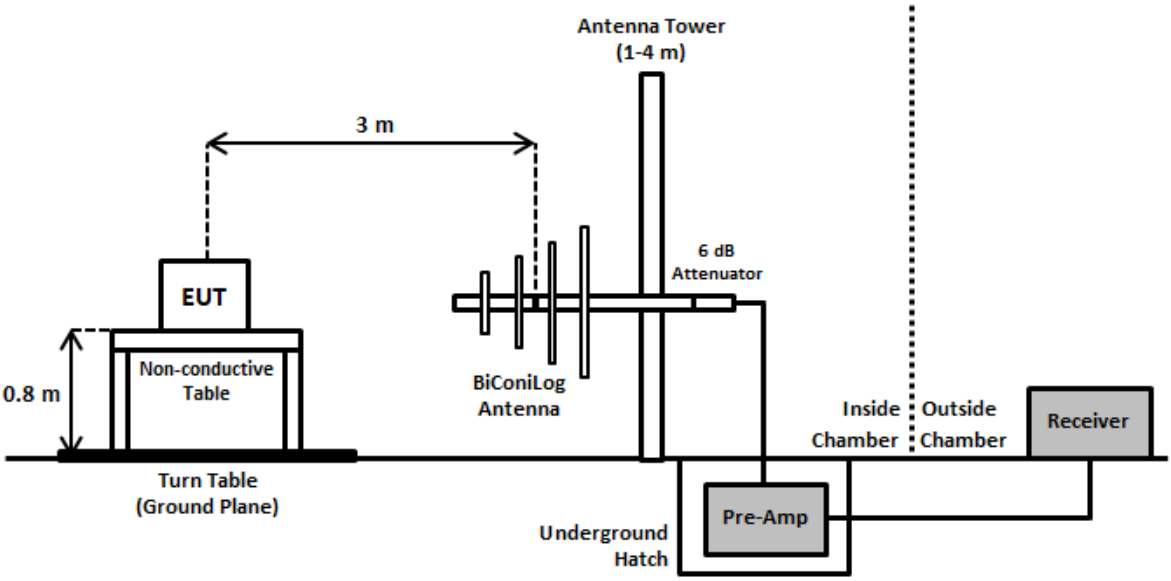
Margin = Corrected Amplitude – Limit

7.5 Test Setup Block Diagram

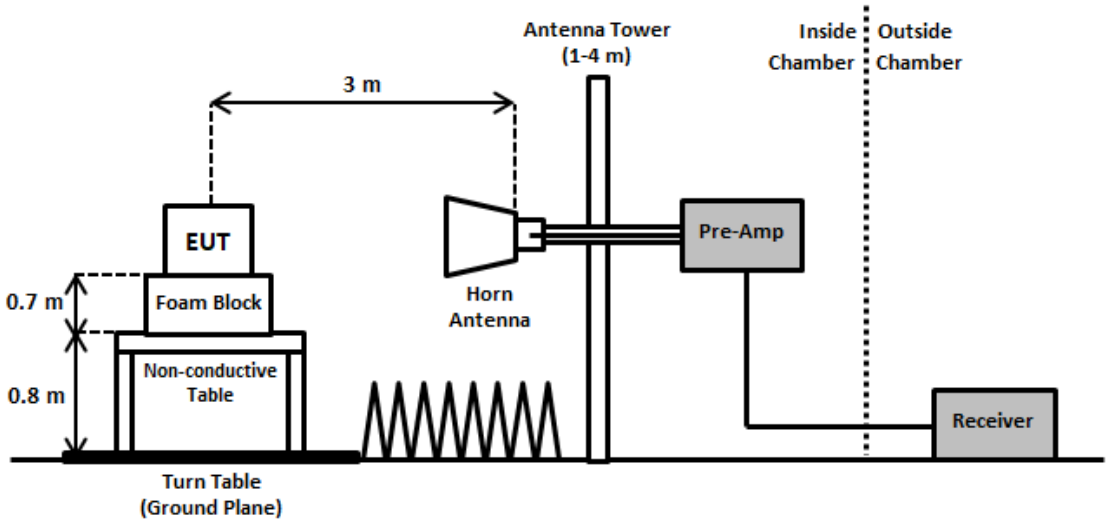
9 kHz to 30 MHz



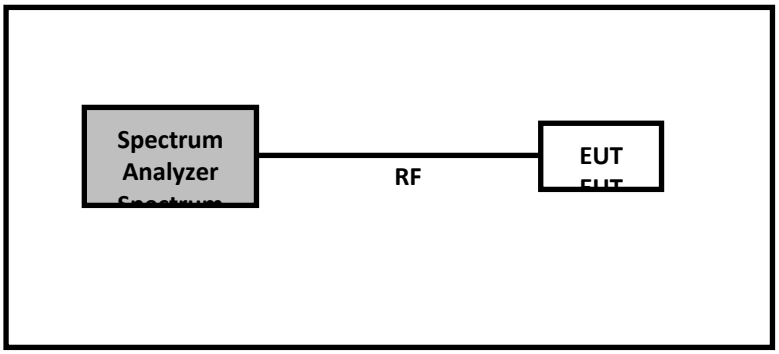
30 MHz to 1 GHz



1 GHz to 26.5 GHz



Band-Edges



7.6 Test Equipment List and Details

Radiated Spurious Emissions

BACL No	Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
327	Sunol Sciences	System Controller	SC110V	122303-1	N/R	N/R
1075	Sunol Sciences	Boresight Tower	TLT3	050119-7	N/R	N/R
1388	Sunol Sciences	Flush Mount Turntable	FM	112005-2	N/R	N/R
1432	Keysight Technologies	MXE EMI Receiver, Multi-touch	N9038B	MY60180008	2025-01-03	1 year
310	Rhode & Schwarz	EMI Test Receiver	ESCI 1166.5950.03	100338	2024-05-29	1 year
316	Sonoma Instruments	Preamplifier 10 kHz - 2.5 GHz	317	260406	2025-02-20	6 months
321	Sunol Sciences	Biconilog Antenna	JB3	A020106-2; 1504	2023-12-18	2 years
1245	-	6dB Attenuator	PE7390-6	01182018A	2023-12-18	2 years
1246	Hewlet Packard	RF Limiter	11867A	1734	2024-04-09	1 year
1248	Pasternack	RG214 COAX Cable	PE3062	-	2024-10-01	6 months
1249	Time microwave	LMR-400 Cable Dc-3 GHz	AE13684	2k80612-5 6fts	2024-04-09	1 year
1359	Pasternack	N 600in RF Cable	PE3496LF-600	-	2025-01-02	6 months
1192	ETS Lindgren	Horn Antenna	3117	218973	2024-10-23	2 years
1393	Mini Circuit	CBL ASSY 2.92MM PLUG TO PLUG 12"	FL086-12KM+	QN2318110-2318	2025-02-18	6 months
1449	BACL	Preamplifier	BACL1313-A100M18G	4052472	2025-02-19	6 months
90	Wisewave	Horn Antenna	ARH-4223-02	10555-01	2023-05-02	2 years
1394	Mini Circuit	CBL ASSY 2.92MM PLUG TO PLUG 12"	FL086-12KM+	QN2318110-2318	2025-02-18	6 months
1451	BACL	Preamplifier	BACL-1313-A1840	4052432	2025-02-19	6 months
1334	Micro-Tronics	Notch Filter 2.4GHz	BRM50702	G361	2024-12-31	1 year
393	Com-Power	Loop Antenna, Active	AL-130	17043	2023-05-26	2 years

Statement of Traceability: BACL Corp. *attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with the latest version of A2LA policy P102 "A2LA Policy on Metrological Traceability".*

Band-Edges

BACL No	Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
912	Rhode & Schwarz	Signal Analyzer	FSV40	1321.3008k39-101203-UW	2024-07-25	1 year
-	-	RF Cable	-	-	Each Time[1]	N/A

Note[1]: cable included in the test set-up was checked each time before testing.

Statement of Traceability: BACL Corp. *attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with the latest version of A2LA policy P102 "A2LA Policy on Metrological Traceability".*

7.7 Test Environmental Conditions

Radiated Spurious Emissions

Temperature:	22.7 to 23.2 ºC
Relative Humidity:	38.8 to 42.1 %
ATM Pressure:	101.4 to 101.7

The testing was performed by Kevin Chau from 2025-03-10 to 2025-03-12 in 5m chamber 3.

Band-Edges

Temperature:	22.8 ºC
Relative Humidity:	46.5 %
ATM Pressure:	101.7 kPa

The testing was performed by Kevin Chau on 2025-05-28 at RF test site.

7.8 Summary of Test Results

According to the data hereinafter, the EUT complied with the FCC Part 15.209, 15.247 standards' radiated emissions limits, and had the worst margin of:

Worst Case – Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Configuration**
-1.45	360.2706	Horizontal	2402 MHz, 2M PHY

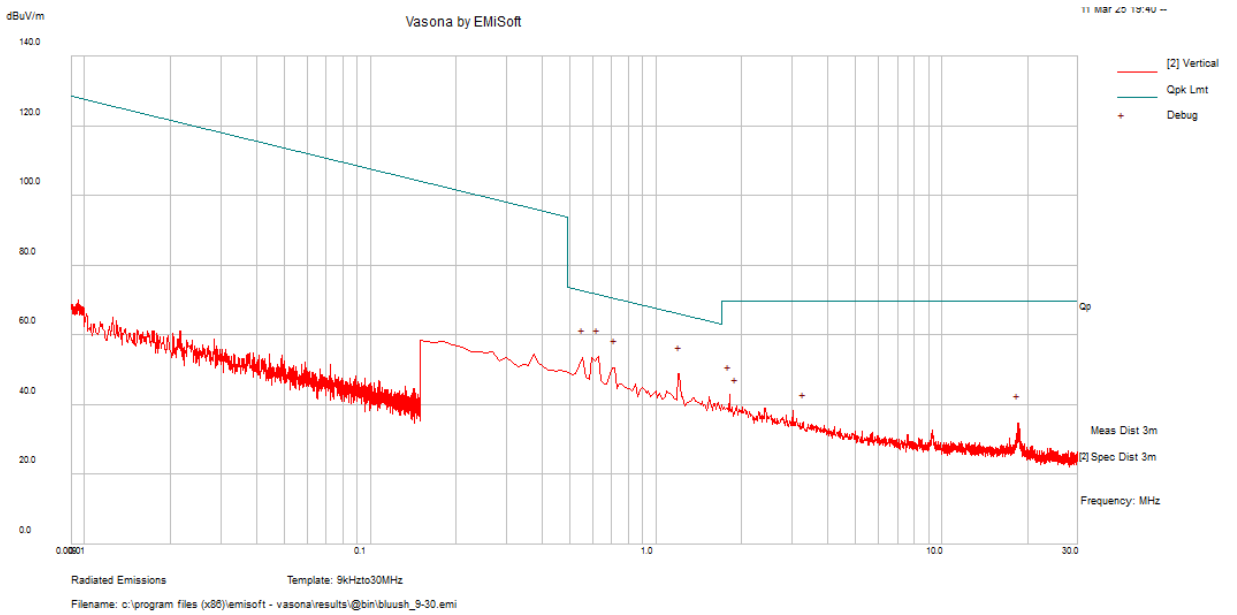
Please refer to the tables and plots in the next section for detailed test results.

7.9 Radiated Emissions Test Results

Note 1: Please refer to Annex E for detailed FCC §15.209 band-edges test result.
Note 2: Only Parallel and Perpendicular polarizations were tested at 9kHz-30MHz range to identify worst cases since there were no significant emissions recorded. All emissions (excluding noise floor) were greater than 20dB below the limit.
Note 3: Testing in the 9kHz-30MHz range was performed with table fully rotated 360° to capture worst case emissions. The orientation of EUT tested is shown in Appendix A.

1) 9 kHz – 30 MHz, Measured at 3 meters

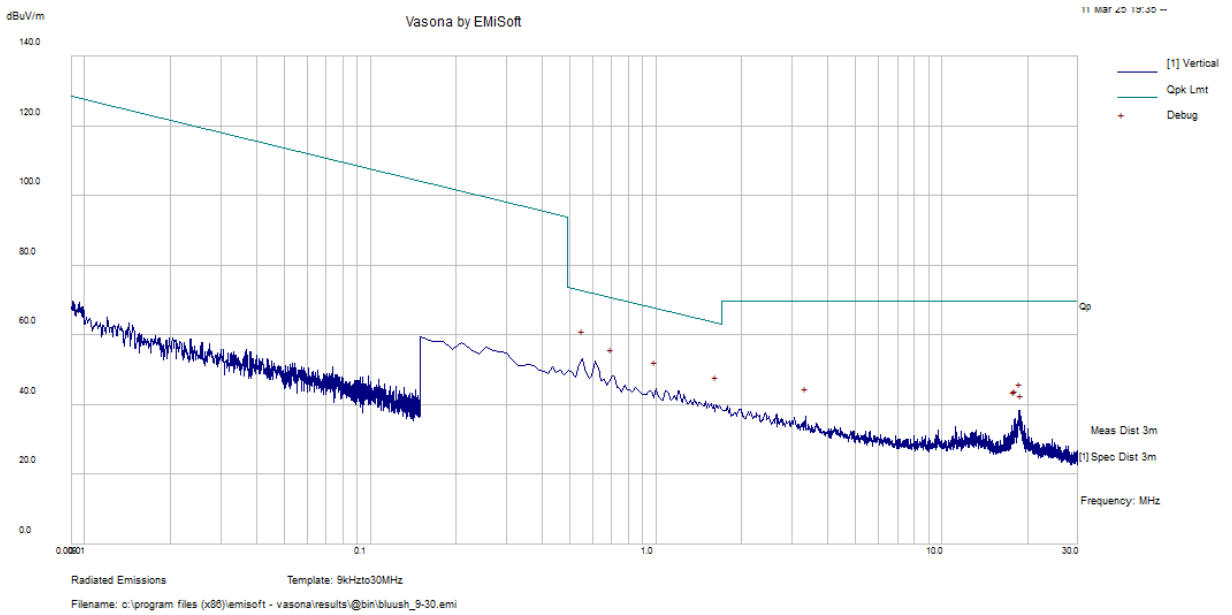
BLE, 2M PHY, 2440 MHz, Parallel



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1.209675	38.64	10.13	48.77	65.95	-17.18	Peak
0.6276	43.52	10.15	53.68	71.65	-17.97	Peak
0.552975	43.29	10.18	53.47	72.75	-19.29	Peak
0.71715	40.43	10.13	50.56	70.49	-19.93	Peak
1.806675	32.69	10.3	42.99	69.54	-26.55	Peak
1.91115	29.18	10.32	39.5	69.54	-30.04	Peak

Note 1: Radiated Spurious Emissions at 9kHz-30MHz was only evaluated at worst case configuration.
Note 2: Peak measurement was evaluated against the Quasi-Peak limit to show worst-case compliance.

BLE, 2M PHY, 2440 MHz, Perpendicular

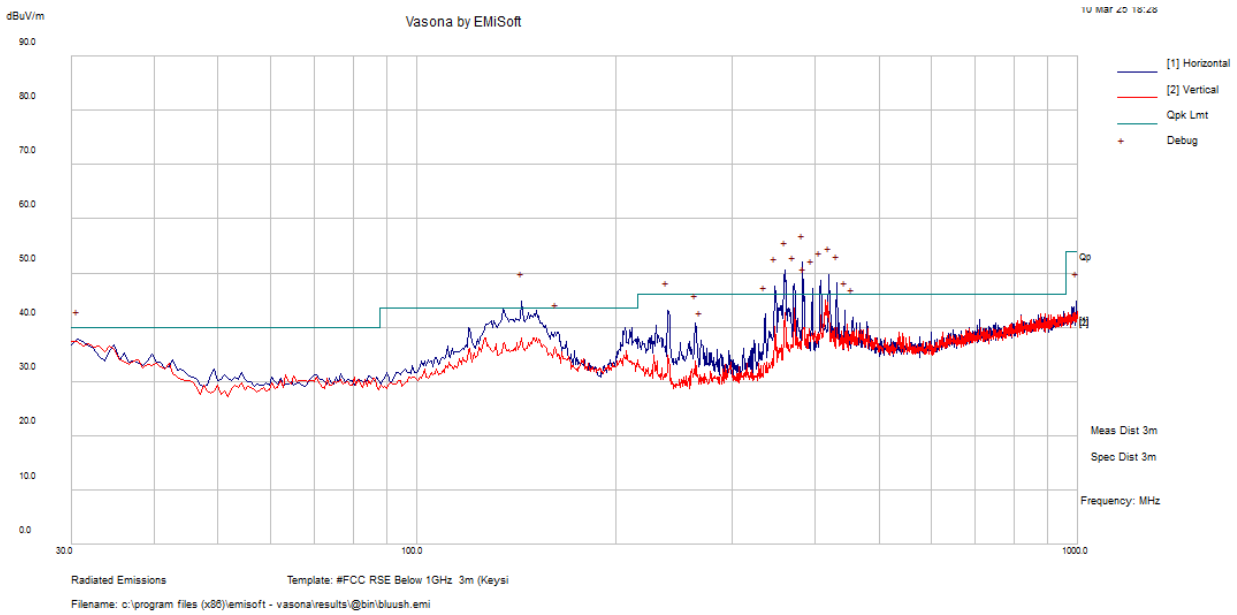


Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
0.552975	42.98	10.18	53.16	72.75	-19.59	Peak
0.702225	37.98	10.14	48.12	70.68	-22.56	Peak
1.000725	34.43	10.05	44.48	67.6	-23.12	Peak
1.627575	29.83	10.26	40.09	63.37	-23.29	Peak
18.85103	28.28	9.89	38.17	69.54	-31.37	Peak
3.34395	26.2	10.39	36.59	69.54	-32.95	Peak

Note 1: Radiated Spurious Emissions at 9kHz-30MHz was only evaluated at worst case configuration.
Note 2: Peak measurement was evaluated against the Quasi-Peak limit to show worst-case compliance.

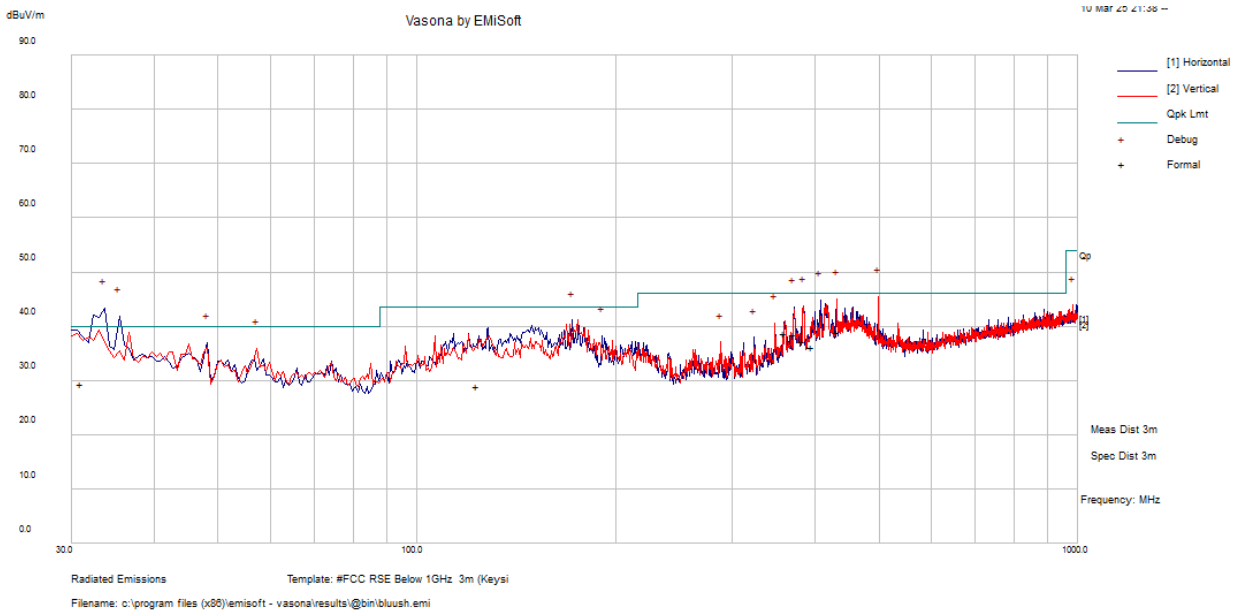
2) 30 MHz – 1 GHz, Measured at 3 meters

BLE, 1M PHY, 2402 MHz



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
383.6838	46.7	-4.71	41.99	103	H	311	46	-4.01	QP
360.6144	45.85	-4.73	41.12	267	H	145	46	-4.89	QP
419.7856	42.11	-3.36	38.75	190	H	223	46	-7.25	QP
407.9378	47.37	-3.87	43.49	174	H	112	46	-2.51	QP
432.0206	43.81	-2.95	40.86	226	H	223	46	-5.14	QP
371.8306	46.96	-4.7	42.26	110	H	223	46	-3.74	QP
348.2103	46.14	-5.56	40.59	119	H	140	46	-5.41	QP
144.0191	45.04	-7.75	37.29	250	H	104	43.5	-6.22	QP
395.9897	41.91	-4.36	37.54	100	H	145	46	-8.46	QP

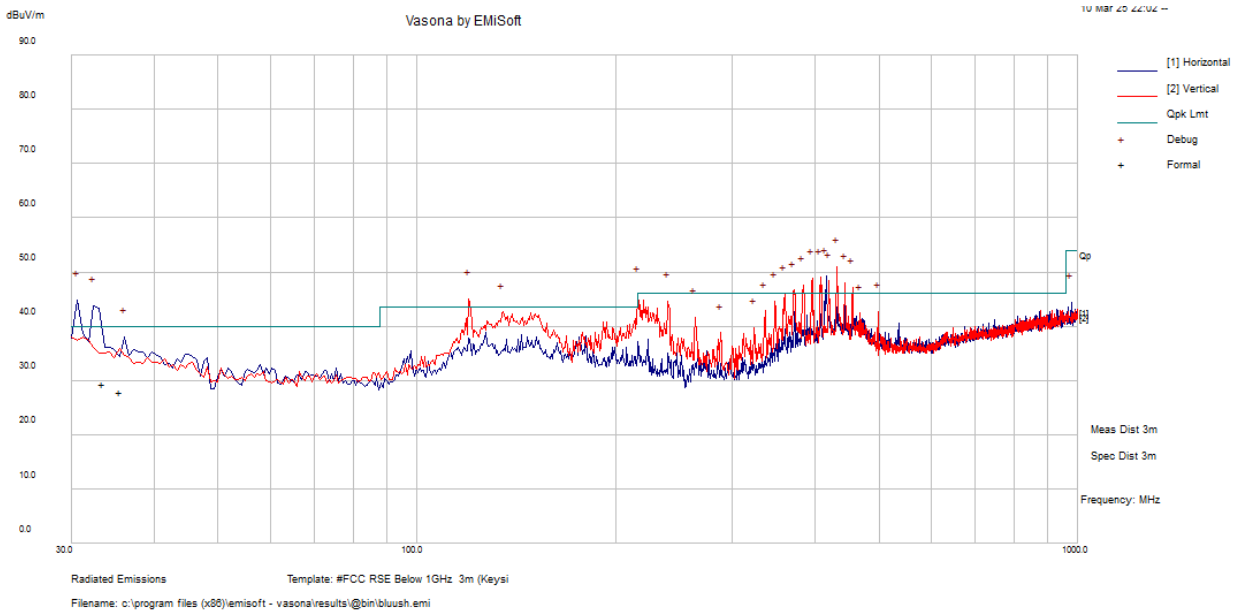
BLE, 1M PHY, 2440 MHz



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
33.51406	32.54	-3.16	29.39	219	H	241	40	-10.62	QP
35.49188	32.26	-4.37	27.9	213	H	7	40	-12.2	QP

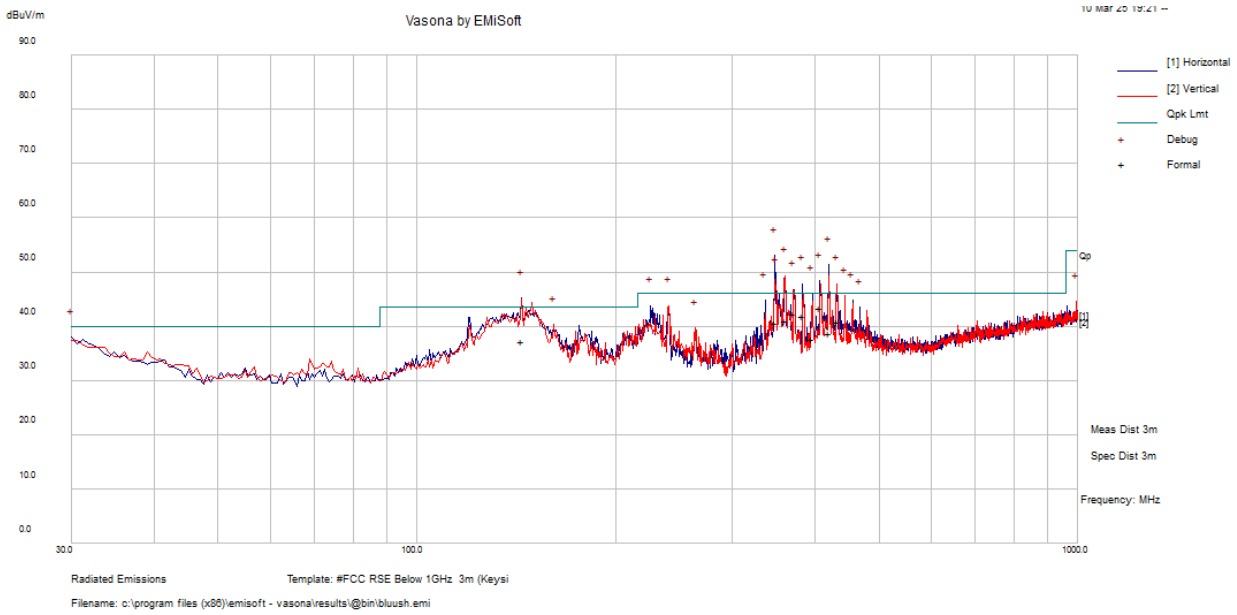
Note: All other peak emissions in the plot above are shown to be below the Quasi-Peak limit.

BLE, 1M PHY, 2480 MHz



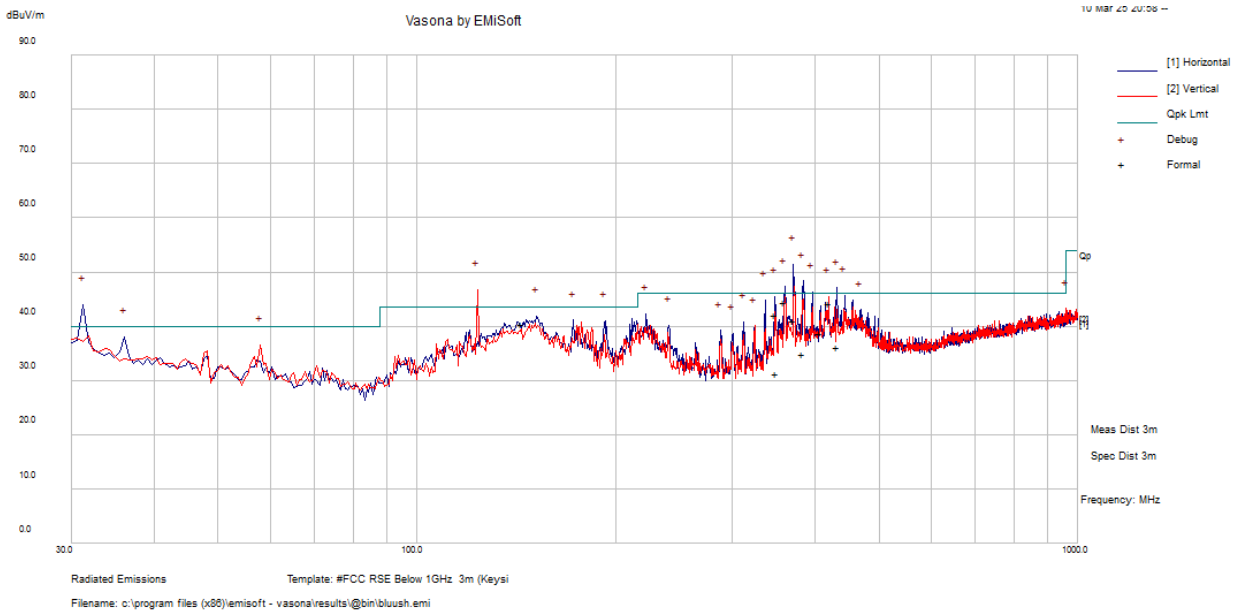
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
431.7219	38.17	-2.95	35.21	231	V	169	46	-10.79	QP
30.58219	31.4	-1.05	30.35	114	H	14	40	-9.65	QP
32.32188	32.09	-2.38	29.71	158	H	113	40	-10.29	QP
416.1159	39.88	-3.51	36.36	195	H	80	46	-9.64	QP
407.66	44.78	-3.89	40.89	271	V	28	46	-5.11	QP
396.3481	44.59	-4.35	40.24	244	V	42	46	-5.76	QP
420.0634	47.08	-3.35	43.73	215	V	126	46	-2.27	QP
444.2363	43.72	-2.7	41.01	216	V	127	46	-4.99	QP
384.2934	46.44	-4.69	41.75	198	V	33	46	-4.26	QP
119.7922	48.72	-6.73	41.98	254	V	95	43.5	-1.52	QP
456.0866	45.76	-2.25	43.5	180	V	124	46	-2.5	QP
371.9556	45.92	-4.7	41.21	107	V	306	46	-4.79	QP

BLE, 2M PHY, 2402 MHz



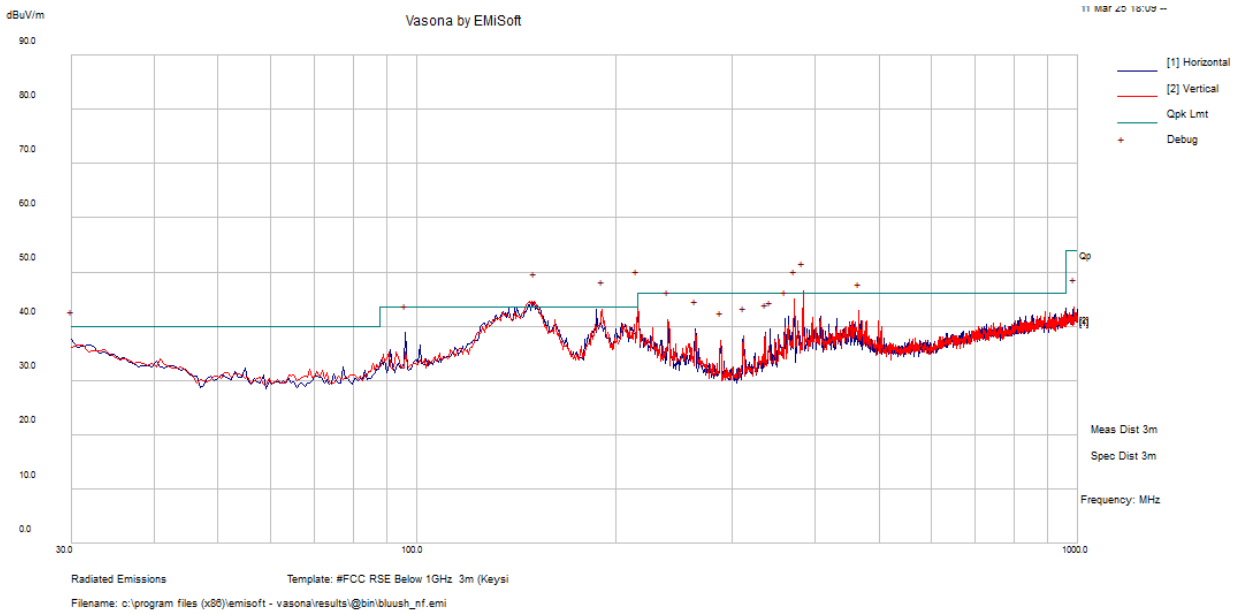
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
348.3584	47.6	-5.55	42.05	100	H	360	46	-3.95	QP
419.8291	47.5	-3.35	44.14	222	H	182	46	-1.86	QP
360.2706	**49.29**	**-4.74**	**44.55**	**109**	**H**	**215**	**46**	**-1.45**	**QP**
407.0219	42.7	-3.92	38.78	206	H	181	46	-7.22	QP
432.0475	39.04	-2.95	36.09	190	V	147	46	-9.91	QP
383.2522	39.52	-4.71	34.81	109	H	191	46	-11.19	QP
144.0691	48.21	-7.76	40.45	234	H	233	43.5	-3.05	QP
349.2956	36.81	-5.49	31.31	264	V	37	46	-14.69	QP
371.9813	45.75	-4.71	41.05	103	H	160	46	-4.95	QP

BLE, 2M PHY, 2440 MHz



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
371.4406	43.25	-4.7	38.55	125	H	325	46	-7.45	QP
31.03594	30.69	-1.4	29.29	132	H	213	40	-10.72	QP
123.4309	35.52	-6.54	28.98	234	V	74	43.5	-14.52	QP
384.0825	41.97	-4.69	37.28	243	H	175	46	-8.72	QP
360.0378	43.41	-4.75	38.67	106	H	317	46	-7.33	QP
431.9697	41.91	-2.95	38.96	218	H	65	46	-7.04	QP
396.1253	40.47	-4.36	36.11	110	H	34	46	-9.89	QP

BLE, 2M PHY, 2480 MHz



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
215.7294	50.44	-9.79	40.66	118	V	60	43.5	-2.84	QP
150.6066	45.43	-7.98	37.45	174	H	326	43.5	-6.06	QP
383.825	37.5	-4.7	32.8	134	V	100	46	-13.2	QP

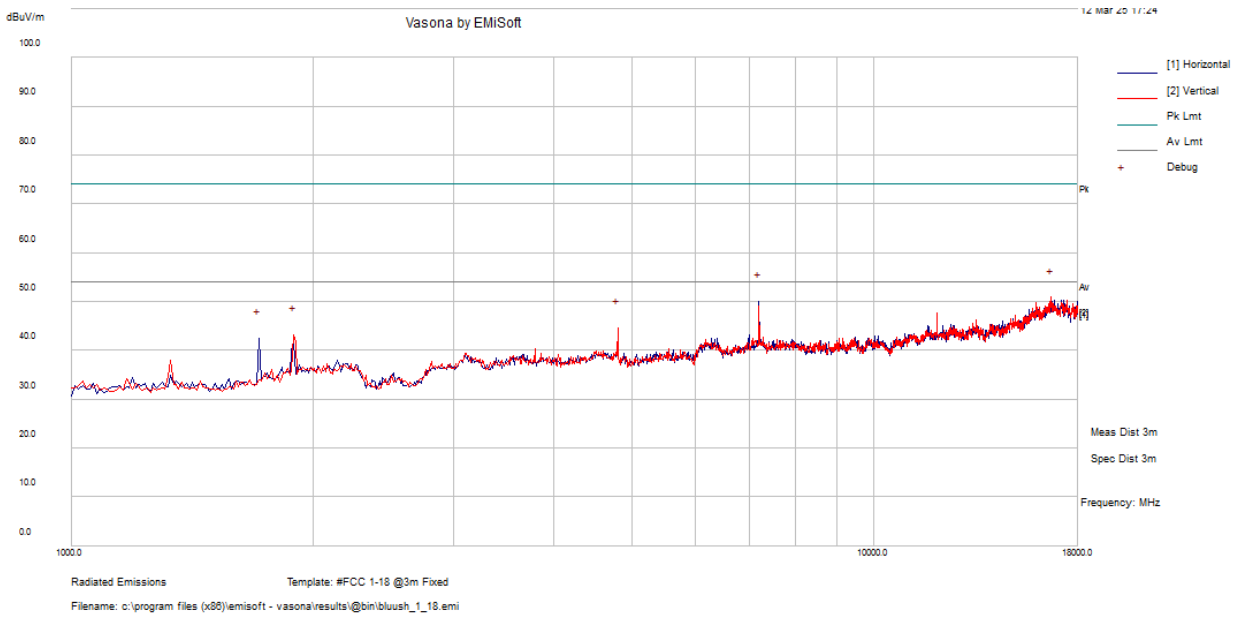
Note: All other peak emissions in the plot above are shown to be below the Quasi-Peak limit.

FCC/IC Limits for 1 GHz to 26.5 GHz			
Applicability	**(dBm)**	**(uV/m at 3meters)**	**(dBuV/m at 3meters)**
Restricted Band Average Limit	-	500	54[2]
Restricted Band Peak Limit[1]	-	-	74

Note 1: Restricted Band Peak Limit is defined to be 20dB higher than Average Limit.
Note 2: Above 1GHz limit calculation:
dBuV/m = 20*log(V/m) + 120 = 20*log((500 [uV/m]/1000000)) + 120 = 54 [dBuV/m]

3) 1 GHz – 18 GHz, Measured at 3 meters

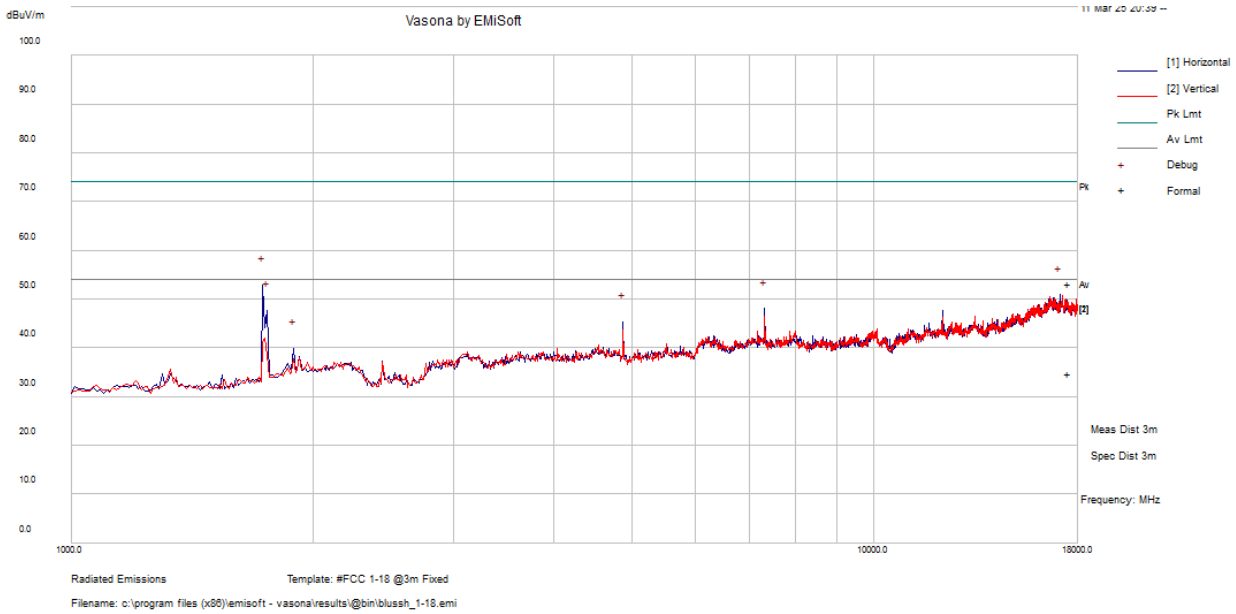
BLE, 1M PHY, 2402 MHz



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
16681.43	36.14	17.24	53.38	164	V	17	74	-20.62	Peak
7206.773	48.71	3.47	52.18	123	H	65	74	-21.82	Peak
16681.43	18.26	17.24	35.49	164	V	17	54	-18.51	Average
7206.773	40.29	3.47	43.76	123	H	65	54	-10.24	Average

Note: All other peak emissions in the plot above are shown to be below the Average limit.

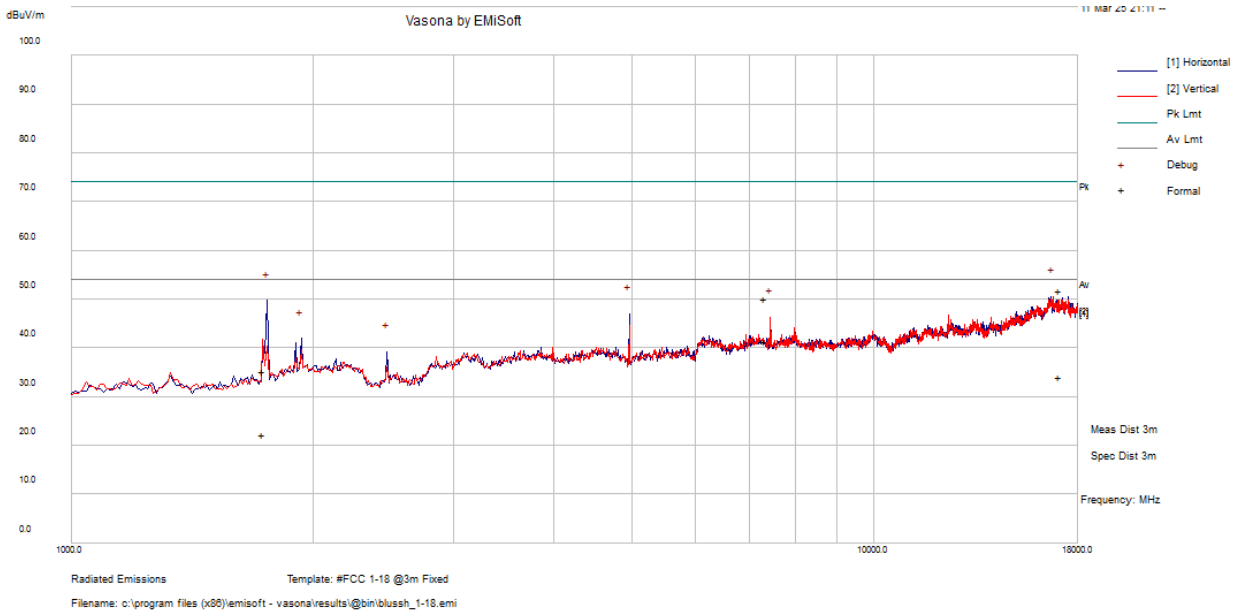
BLE, 1M PHY, 2440 MHz



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
1734.89	42.27	-6.99	35.28	135	H	191	74	-38.72	Peak
17098.83	35.07	16.62	51.68	248	H	235	74	-22.32	Peak
7320.768	46.5	3.6	50.1	187	H	63	74	-23.9	Peak
1734.89	29.25	-6.99	22.26	135	H	191	54	-31.74	Average
17098.83	17.52	16.62	34.14	248	H	235	54	-19.86	Average
7320.768	37.69	3.6	41.29	187	H	63	54	-12.71	Average

Note: All other peak emissions in the plot above are shown to be below the Average limit.

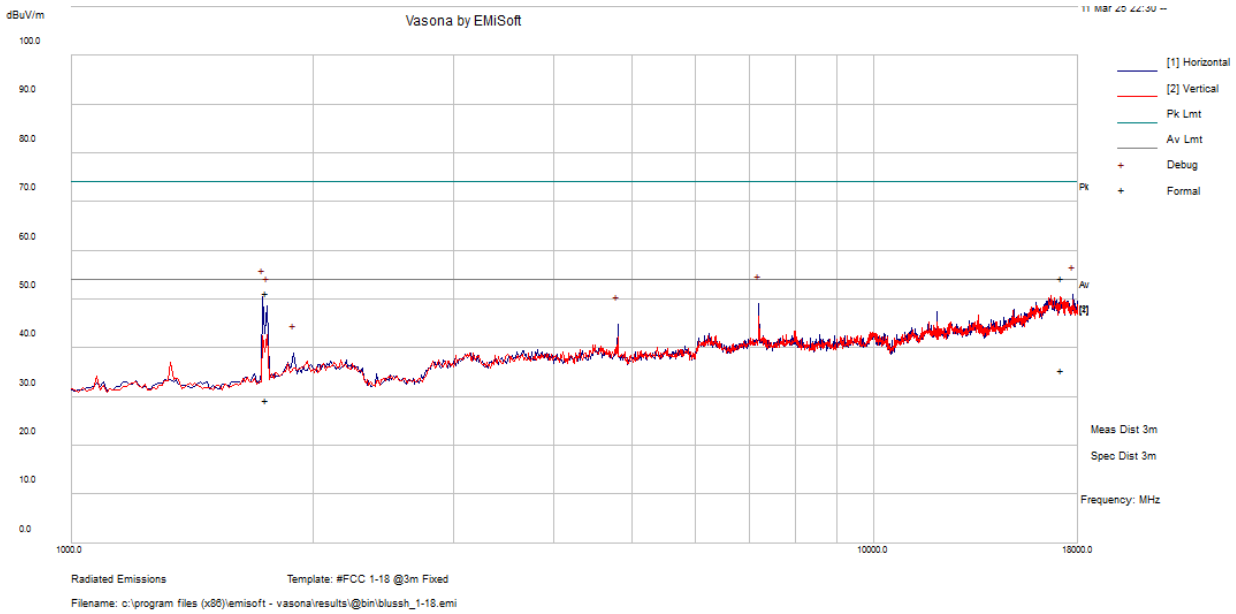
BLE, 1M PHY, 2480 MHz



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
16757.42	35.02	17.05	52.07	273	V	67	74	-21.93	Peak
1753.213	54.52	-6.79	47.73	156	H	290	74	-26.27	Peak
16757.42	17.5	17.05	34.55	273	V	67	54	-19.45	Average
1753.213	32.62	-6.79	25.83	156	H	290	54	-28.17	Average

Note: All other peak emissions in the plot above are shown to be below the Average limit.

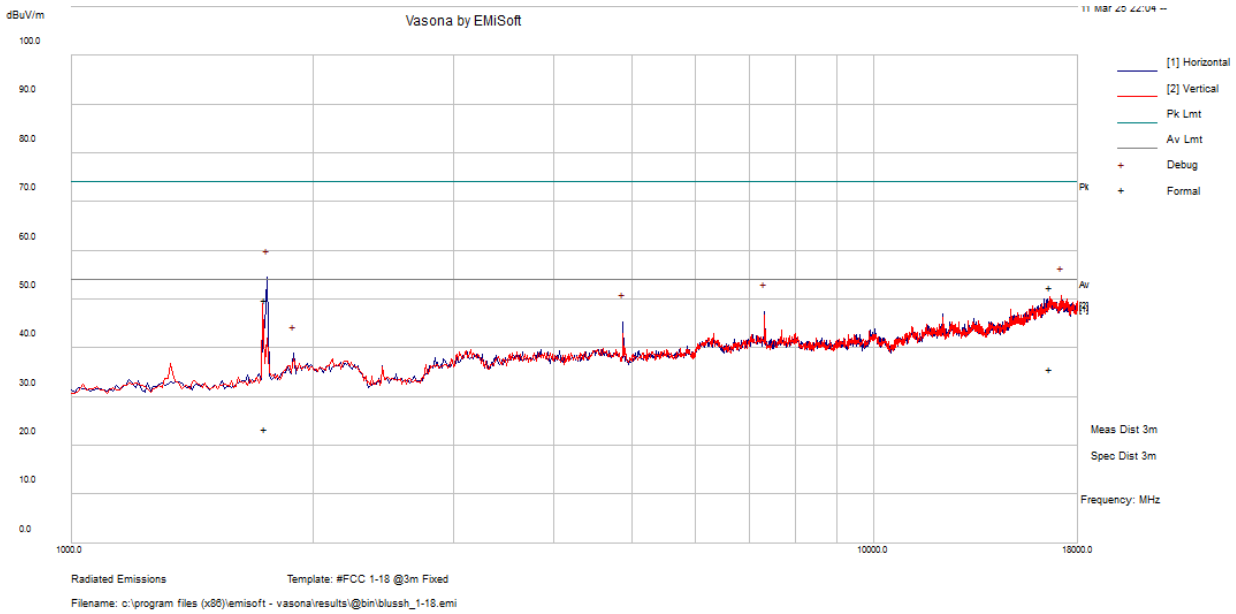
BLE, 2M PHY, 2402 MHz



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
17764.74	36.42	15.77	52.18	196	H	264	74	-21.82	Peak
1732.368	42.16	-7.02	35.14	128	H	205	74	-38.86	Peak
7204.853	45.98	3.47	49.45	228	H	65	74	-24.56	Peak
1753.145	44.13	-6.79	37.34	150	H	167	74	-36.66	Peak
17764.74	19.04	15.77	34.81	196	H	264	54	-19.19	Average
1732.368	29.2	-7.02	22.18	128	H	205	54	-31.83	Average
7204.853	36.64	3.47	40.1	228	H	65	54	-13.9	Average
1753.145	31.15	-6.79	24.36	150	H	167	54	-29.64	Average

Note: All other peak emissions in the plot above are shown to be below the Average limit.

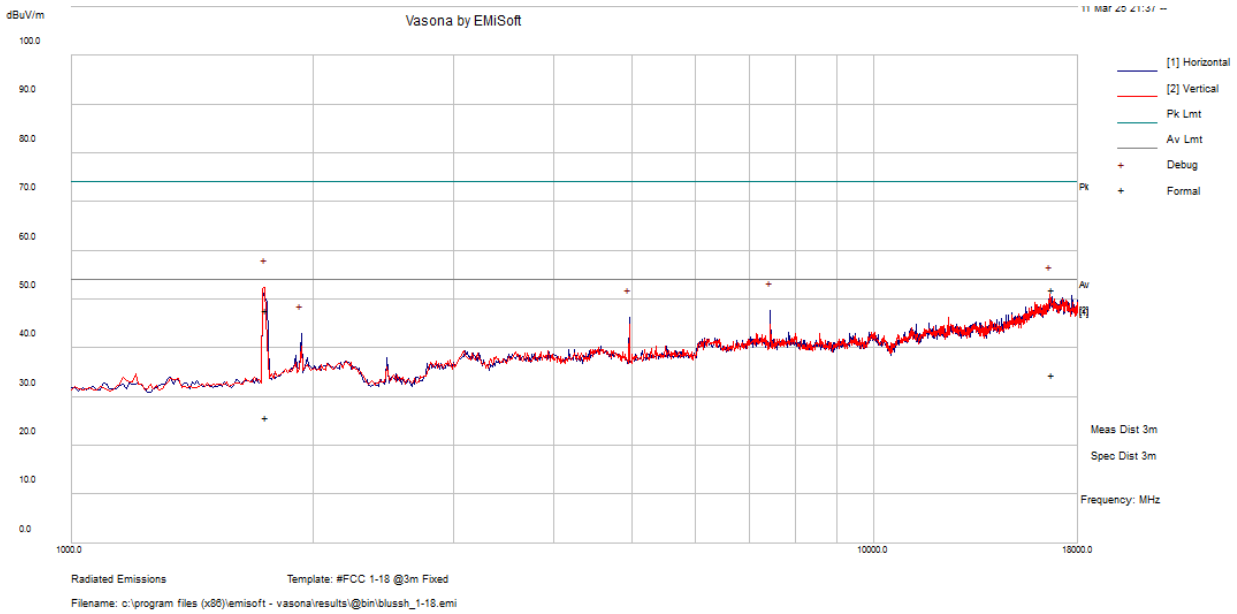
BLE, 2M PHY, 2440 MHz



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
1753.068	58.12	-6.79	51.33	100	H	79	74	-22.67	Peak
17169.4	37.09	17.15	54.24	259	V	173	74	-19.76	Peak
1753.068	36.06	-6.79	29.27	100	H	79	54	-24.73	Average
17169.4	18.36	17.15	35.51	259	V	173	54	-18.49	Average

Note: All other peak emissions in the plot above are shown to be below the Average limit.

BLE, 2M PHY, 2480 MHz

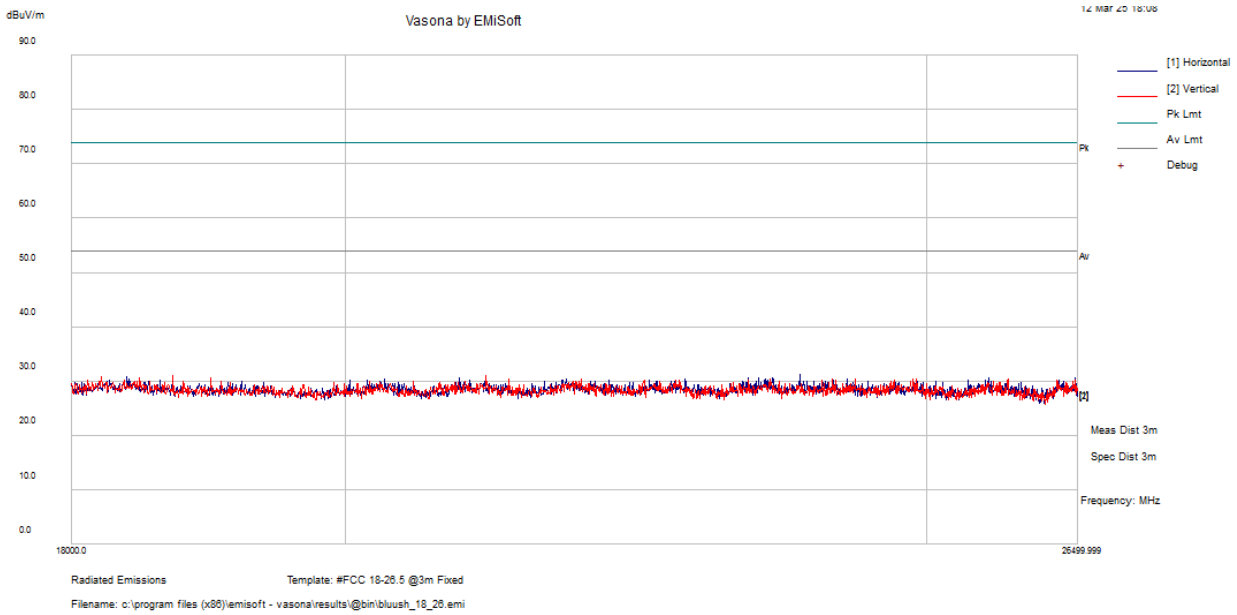


Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
1745.165	56.76	-6.87	49.89	192	V	199	74	-24.11	Peak
16617.79	35.26	17.26	52.53	103	V	54	74	-21.47	Peak
1745.165	30.29	-6.87	23.42	192	V	199	54	-30.58	Average
16617.79	18.36	17.26	35.62	103	V	54	54	-18.38	Average

Note: All other peak emissions in the plot above are shown to be below the Average limit.

4) 18 GHz – 26.5 GHz, Measured at 3 meters

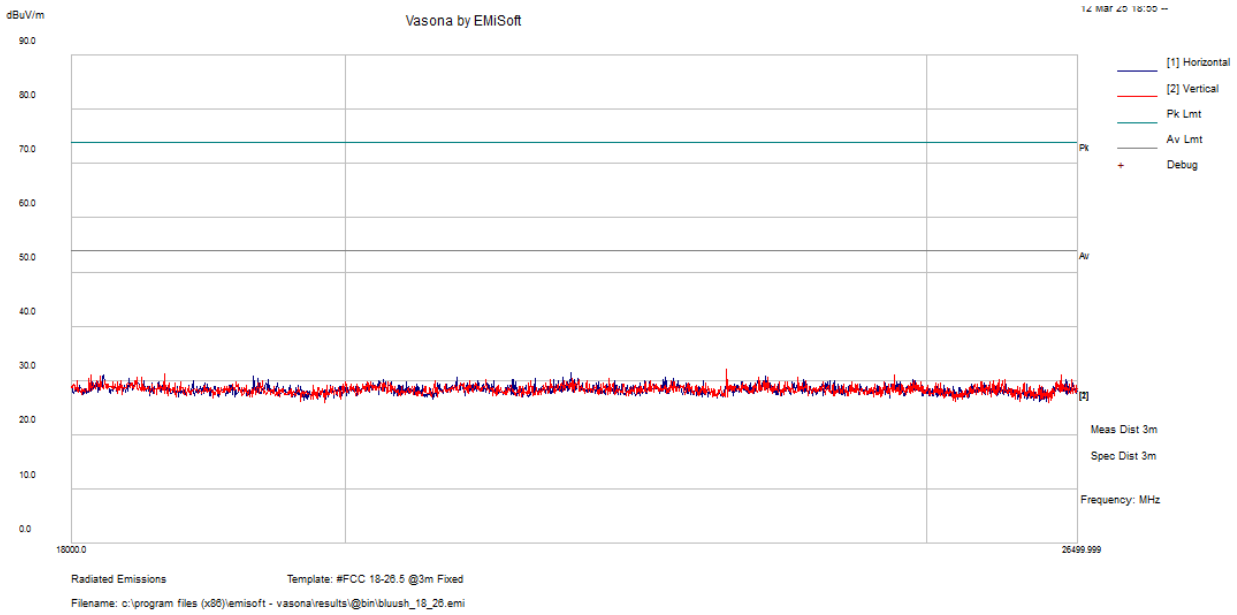
BLE, 1M PHY, 2402 MHz



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Polarity (H/V)	Limit (dBµV/m)	Margin (dB)	Detector
23849.16	39.85	-9.84	30.01	V	54	-23.99	Peak

Note 1: Peak measurement was evaluated against the Average limit to show worst-case compliance.
Note 2: All peak emissions in the plot above are shown to be below the Average limit.

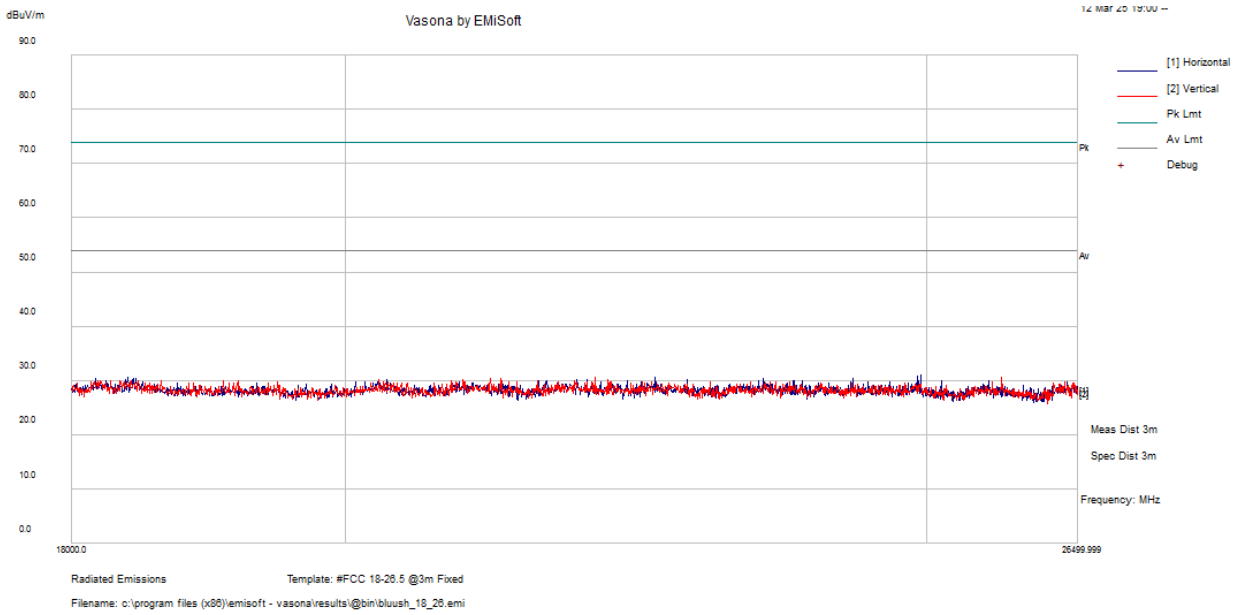
BLE, 1M PHY, 2440 MHz



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Polarity (H/V)	Limit (dBµV/m)	Margin (dB)	Detector
23171.76	38.83	-10.44	28.39	V	54	-25.61	Peak

Note 1: Peak measurement was evaluated against the Average limit to show worst-case compliance.
Note 2: All peak emissions in the plot above are shown to be below the Average limit.

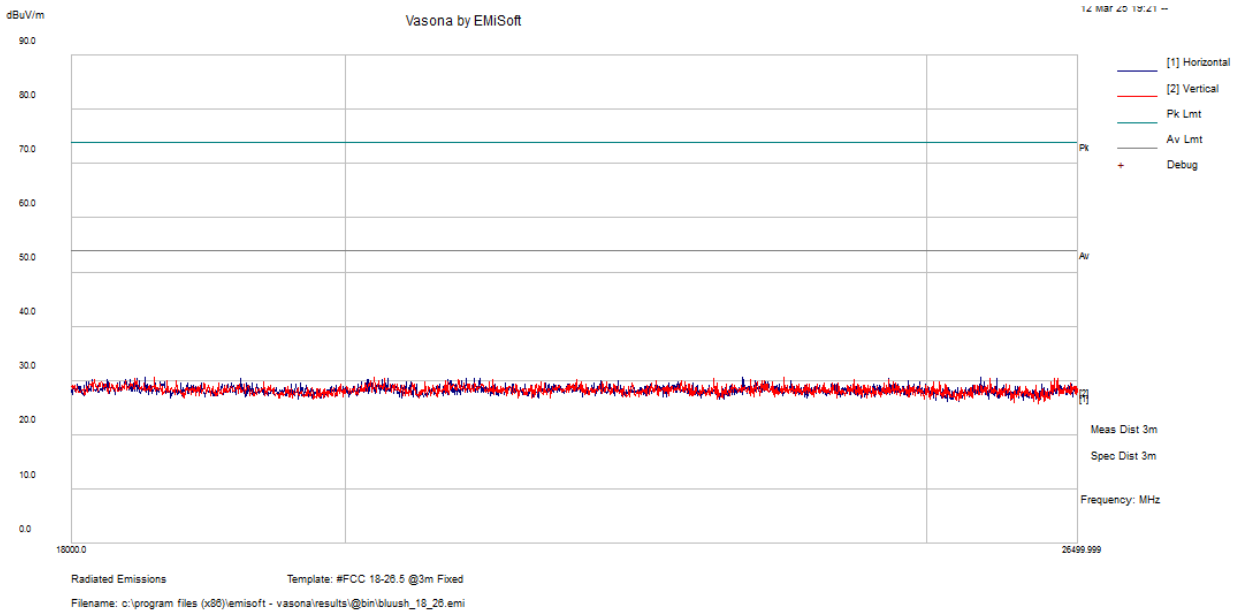
BLE, 1M PHY, 2480 MHz



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Polarity (H/V)	Limit (dBµV/m)	Margin (dB)	Detector
24948.36	37.33	-9.24	28.09	V	54	-25.91	Peak

Note 1: Peak measurement was evaluated against the Average limit to show worst-case compliance.
Note 2: All peak emissions in the plot above are shown to be below the Average limit.

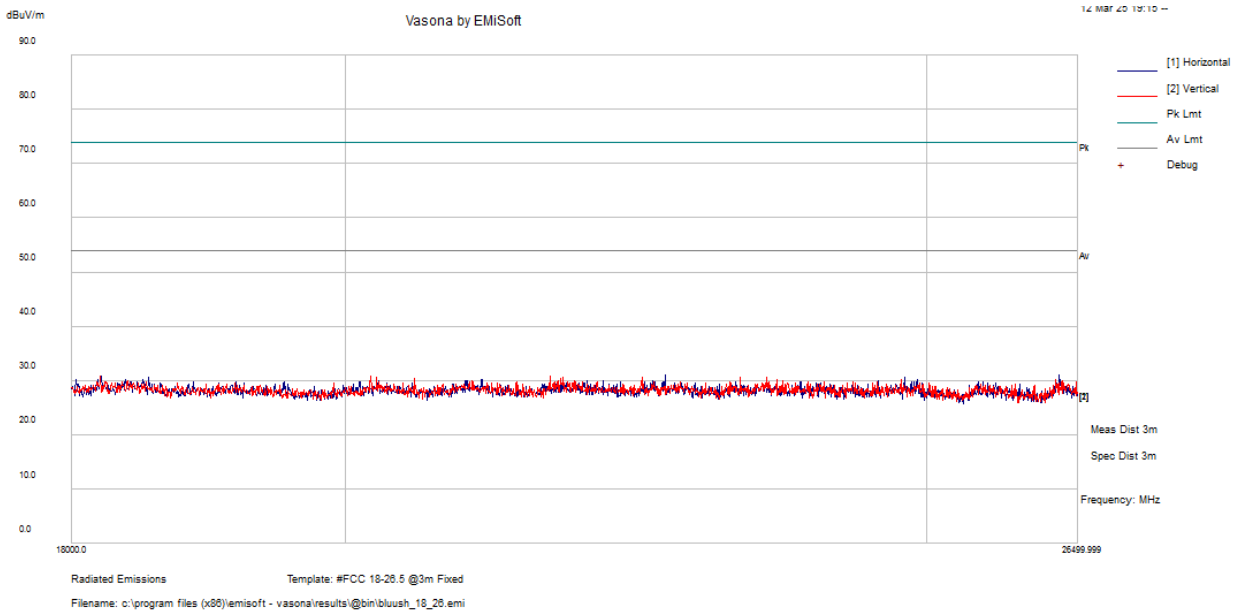
BLE, 2M PHY, 2402 MHz



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Polarity (H/V)	Limit (dBµV/m)	Margin (dB)	Detector
25529.15	38.76	-8.94	29.83	V	54	-24.17	Peak

Note 1: Peak measurement was evaluated against the Average limit to show worst-case compliance.
Note 2: All peak emissions in the plot above are shown to be below the Average limit.

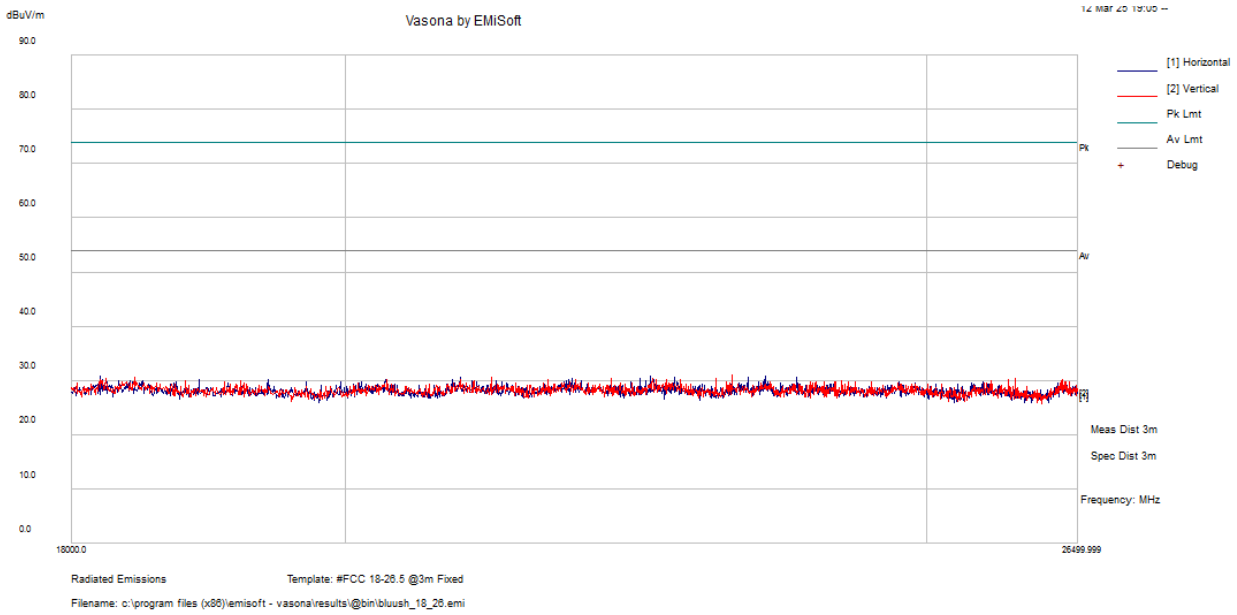
BLE, 2M PHY, 2440 MHz



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Polarity (H/V)	Limit (dBµV/m)	Margin (dB)	Detector
22635.85	38.31	-10.37	27.94	V	54	-26.06	Peak

Note 1: Peak measurement was evaluated against the Average limit to show worst-case compliance.
Note 2: All peak emissions in the plot above are shown to be below the Average limit.

BLE, 2M PHY, 2480 MHz



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Polarity (H/V)	Limit (dBµV/m)	Margin (dB)	Detector
23510.3	38.24	-9.52	28.72	V	54	-25.28	Peak

Note 1: Peak measurement was evaluated against the Average limit to show worst-case compliance.
Note 2: All peak emissions in the plot above are shown to be below the Average limit.

8 FCC §15.247(a) (2) – Emission Bandwidth

8.1 Applicable Standards

According to FCC §15.247(a) (2): the minimum 6 dB bandwidth shall be 500 kHz.

8.2 Measurement Procedure

The measurements are based on FCC KDB 558074 D01 DTS Meas Guidance v05r02: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 section 8: DTS bandwidth.

As per ANSI C63.10 Clause 6.9.3: Occupied bandwidth—power bandwidth (99%) measurement procedure

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission.

The following procedure shall be used for measuring 99% power bandwidth:

a. The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 times the OBW.
b. The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW, and VBW shall be approximately three times the RBW, unless otherwise specified by the applicable requirement.
c. Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.5.2.
d. Step a) through step c) might require iteration to adjust within the specified range.
e. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
f. Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth.
g. If the instrument does not have a 99% power bandwidth function, then the trace data points are recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% power bandwidth is the difference between these two frequencies.
h. The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

As per ANSI C63.10 Clause 11.8: DTS bandwidth

One of the following procedures may be used to determine the modulated DTS bandwidth.

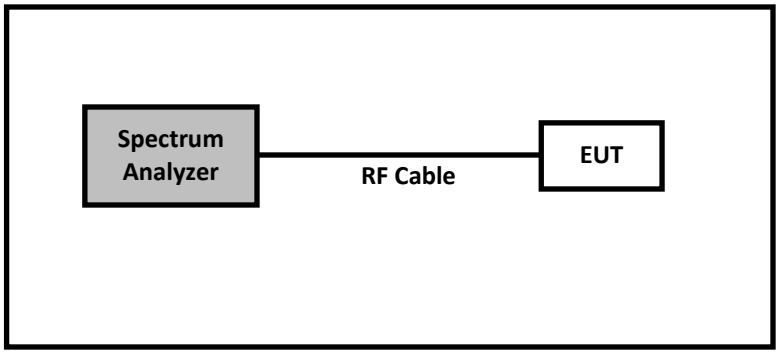
Option 1:

a. Set RBW = 100 kHz.
b. Set the VBW $\geqslant$ [3 $\times$ RBW].
c. Detector = peak.
d. Trace mode = max hold.
e. Sweep = auto couple.
f. Allow the trace to stabilize.
g. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Option 2:

The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described in 11.8.1 (i.e., RBW = 100 kHz, VBW $\geqslant$ 3 $\times$ RBW, and peak detector with maximum hold) is implemented by the instrumentation function.
When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be $\geqslant$6 dB.

8.3 Test Setup Block Diagram



8.4 Test Equipment List and Details

BACL No	Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
912	Rhode & Schwarz	Spectrum Analyzer	FSV40	1321.3008k39-101203-UW	2024-07-25	1 year
-	-	RF Cable	-	-	Each Time[1]	N/A

Note[1]: cable and attenuator included in the test set-up were checked each time before testing.

Statement of Traceability: BACL Corp. *attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with the latest version of A2LA policy P102 "A2LA Policy on Metrological Traceability".*

8.5 Test Environmental Conditions

Temperature:	19.8 ºC
Relative Humidity:	40.2 %
ATM Pressure:	101.3 kPa

The testing was performed by Kevin Chau on 2025-03-14 at RF test site.

8.6 Test Results

Channel	Frequency (MHz)	99% OBW (MHz)	6 dB OBW (kHz)	6 dB OBW Limit (kHz)	Result
BLE, 1M PHY					
Low	2402	1.0636	746.7	≥ 500	Pass
Middle	2440	1.0723	746.7	≥ 500	Pass
High	2480	1.0723	738.1	≥ 500	Pass
BLE, 2M PHY					
Low	2402	2.0709	1224.3	≥ 500	Pass
Middle	2440	2.0709	1315.5	≥ 500	Pass
High	2480	2.0795	1228.7	≥ 500	Pass

Please refer to Annex A for detailed Emissions Bandwidth test results.

9 FCC §15.247(b)(3) – Maximum Output Power

9.1 Applicable Standards

According to FCC §15.247(b)(3): For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

9.2 Measurement Procedure

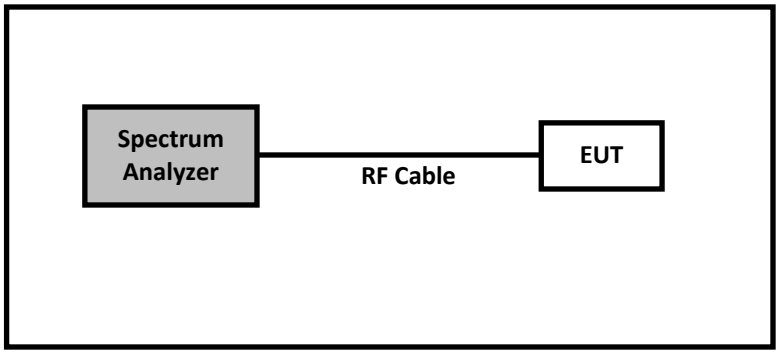
The measurements are based on ANSI C63.10-2020, Section 11.9.1.1.

11.9.1.1 RBW $\geqslant$ DTS bandwidth

The following procedure shall be used when an instrument with a resolution bandwidth that is greater than the DTS bandwidth is available to perform the measurement:

a. Set the RBW $\geqslant$ DTS bandwidth.
b. Set VBW $\geqslant$ [3 $\times$ RBW].
c. Set span $\geqslant$ [3 $\times$ RBW].
d. Sweep time = No faster than coupled (auto) time.
e. Detector = peak.
f. Trace mode = max-hold.
g. Allow trace to fully stabilize.
h. Use peak marker function to determine the peak amplitude level.

9.3 Test Setup Block Diagram



9.4 Test Equipment List and Details

BACL No	Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
912	Rhode & Schwarz	Spectrum Analyzer	FSV40	1321.3008k39-101203-UW	2024-07-25	1 year
-	-	RF Cable	-	-	Each Time[1]	N/A

Note[1]: cable included in the test set-up was checked each time before testing.

Statement of Traceability: BACL Corp. *attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with the latest version of A2LA policy P102 "A2LA Policy on Metrological Traceability".*

9.5 Test Environmental Conditions

Temperature:	20.7 ºC
Relative Humidity:	44.2 %
ATM Pressure:	101.6 kPa

The testing was performed by Kevin Chau on 2025-03-13 at RF test site.

9.6 Test Results

Channel	Frequency (MHz)	Conducted Output Power (dBm)	Conducted Output Power Limit (dBm)	Result
BLE, 1M PHY				
Low	2402	5.06	≤ 30	Pass
Middle	2440	5.14	≤ 30	Pass
High	2480	5.03	≤ 30	Pass
BLE, 2M PHY				
Low	2402	5.03	≤ 30	Pass
Middle	2440	5.15	≤ 30	Pass
High	2480	5.02	≤ 30	Pass

Note: Conducted Output Power Limit [dBm] = 10*log(Power[mW]/1mW) = 10*log(1000mW/1mW) = 30 dBm

Please refer to Annex B for detailed Maximum Output Power test results.

10 FCC §15.247(e) – Peak Power Spectral Density

10.1 Applicable Standards

According to eCFR §15.247(e), for digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

10.2 Measurement Procedure

The measurements are based on FCC KDB 558074 D01 DTS Meas Guidance v05r02: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 section 8.4: Maximum power spectral density level in the fundamental emission.

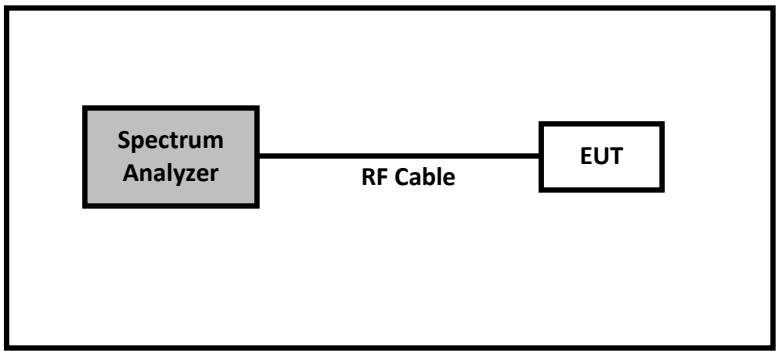
As per ANSI C63.10 Clause 11.10: Maximum power spectral density level in the fundamental emission

Some regulatory requirements specify a conducted PSD limit within the DTS bandwidth during any time interval of continuous transmission.88 Such specifications require that the same method as used to determine the conducted output power shall be used to determine the power spectral density. If maximum peak conducted output power was measured, then the peak PSD procedure 11.10.2 (method PKPSD) shall be used. If maximum conducted output power was measured, then one of the average PSD procedures shall be used, as applicable based on the following criteria (the peak PSD procedure is also an acceptable option):

Method PKPSD (peak PSD): The following procedure shall be used if maximum peak conducted output power was used to determine compliance, and it is optional if the maximum conducted (average) output power was used to determine compliance:

a. Set analyzer center frequency to DTS channel center frequency.
b. Set the span to 1.5 times the DTS bandwidth.
c. Set the RBW to 3 kHz $\leqslant$ RBW $\leqslant$ 100 kHz.
d. Set the VBW $\geqslant$ [3 $\times$ RBW].
e. Detector = peak.
f. Sweep time = auto couple.
g. Trace mode = max hold.
h. Allow trace to fully stabilize.
i. Use the peak marker function to determine the maximum amplitude level within the RBW.
j. If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.

10.3 Test Setup Block Diagram



10.4 Test Equipment List and Details

BACL No	Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
1128	Agilent	EXA Signal Analyzer	N9010A	MY48030852	2024-05-23	1 year
-	-	RF Cable	-	-	Each Time[1]	N/A

Note[1]: cable included in the test set-up was checked each time before testing.

Statement of Traceability: BACL Corp. *attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with the latest version of A2LA policy P102 "A2LA Policy on Metrological Traceability".*

10.5 Test Environmental Conditions

Temperature:	19.8 ºC
Relative Humidity:	40.2 %
ATM Pressure:	101.3 kPa

The testing was performed by Kevin Chau on 2025-03-14 at RF test site.

10.6 Test Results

Channel	Frequency (MHz)	PSD[1] [dBm/10kHz]	Limit (dBm/3kHz)	Result
BLE, 1M PHY				
Low	2402	-8.127	≤ 8	Pass
Middle	2440	-8.047	≤ 8	Pass
High	2480	-7.575	≤ 8	Pass
BLE, 2M PHY				
Low	2402	-10.660	≤ 8	Pass
Middle	2440	-11.055	≤ 8	Pass
High	2480	-11.095	≤ 8	Pass

Note: The EUT passed with wider RBW of 10kHz, thus it complies with FCC/IC RBW requirement of 3kHz as compliance is shown under a worse-case circumstance

Please refer to Annex C for detailed Peak Power Spectral Density test results.

11 FCC §15.247(d) – 100 kHz Spurious Emissions at Antenna Terminal (-20 dBc)

11.1 Applicable Standards

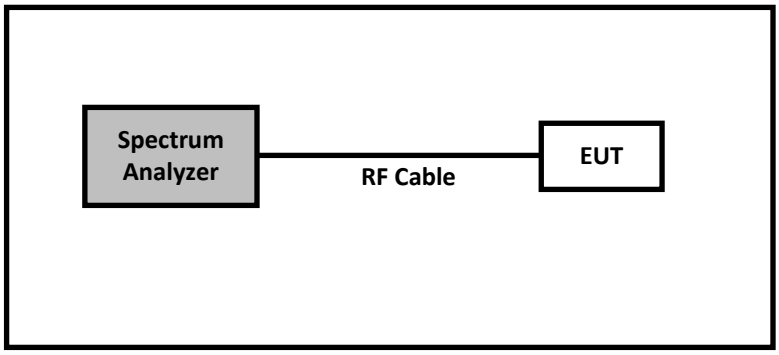
According to FCC §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emissions limits specified in §15.209(a) see §15.205(c).

11.2 Measurement Procedure

Span = wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products which fall outside of the authorized band of operation

RBW = 100 kHz
VBW = 300 kHz
Sweep = coupled
Detector function = peak
Trace = max hold

11.3 Test Setup Block Diagram



11.4 Test Equipment List and Details

BACL No	Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
1128	Agilent	EXA Signal Analyzer	N9010A	MY48030852	2024-05-23	1 year
-	-	RF Cable	-	-	Each Time[1]	N/A

Note[1]: cable included in the test set-up was checked each time before testing.

Statement of Traceability: BACL Corp. *attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with the latest version of A2LA policy P102 "A2LA Policy on Metrological Traceability".*

11.5 Test Environmental Conditions

Temperature:	19.8 ºC
Relative Humidity:	40.2 %
ATM Pressure:	101.3 kPa

The testing was performed by Kevin Chau on 2025-03-14 at RF test site.

11.6 Test Results

Test Result: Pass

Please refer to Annex D for detailed 100 kHz Spurious Emissions and Band Edges at Antenna Terminal (-20 dBc) test results.

12 Annex A – Emission Bandwidth

Please refer to the attachment.

13 Annex B – Maximum Output Power

Please refer to the attachment.

14 Annex C – Peak Power Spectral Density

Please refer to the attachment.

15 Annex D – 100 kHz Spurious Emissions at Antenna Terminal (-20 dBc)

Please refer to the attachment.

16 Annex E – FCC §15.209 Band Edges

Please refer to the attachment.

17 Appendix A (Normative) – EUT Test Setup Photographs

Please refer to the attachment.

18 Appendix B (Normative) – EUT External Photographs

Please refer to the attachment

19 Appendix C (Normative) – EUT Internal Photographs

Please refer to the attachment

20 Appendix D (Normative) – A2LA Electrical Testing Certificate

Accredited Laboratory

A2LA has accredited

BAY AREA COMPLIANCE LABORATORIES CORP.

Sunnyvale, 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 A2LA R222 - Specific Requirements EPA ENERGY STAR Accreditation Program. 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 13th day of September 2024.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3297.02
Valid to September 30, 2026

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

Please follow the web link below for a full ISO 17025 scope

https://www.a2la.org/scopepdf/3297-02.pdf

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