



PRODUCT ASSURANCE ENGINEERING
Wireless Transceiver Bluetooth Low Energy Test Report

FCC ID: A94440108 IC: 3232A-440108



Test Type: Emissions Immunity

Product Type: Wireless Headphones

Product Name/Number: Model Number(s): 440108
FCC ID: A94440108
IC: 3232A-440108

Prepared For: Product Assurance Engineering Department,
Bose Corporation

Name of manufacturing agency applying for equipment type approval: Bose Corporation

Postal Address of manufacturing Agency: The Mountain
Framingham, MA 01701
USA

Test Results: Pass Fail

Applicable Standards: FCC CFR 47 Part 15 Subpart C
Industry Canada RSS-247 Issue 2
Industry Canada RSS-GEN Issue 5

Report Number: EMC.440108.23.161.1

General Comments/Special Test Conditions:

This report relates only to the items tested. This report covers EMC marking requirements for model 440108

	Print Name	Signature	Date
Prepared By:	Bryan Cerqua	<i>Bryan H Cerqua</i>	June 9, 2023
Electrical Engineer Review* By:	Michael Royer	<i>Michael A. Royer</i>	June 9, 2023

* Since every test result is separately reviewed after its completion, the electrical engineer review indicated above represents a higher-level review to ensure this report lists and contains all applicable and appropriate requirements.

If the report carries the "accredited" logo, the reviewer must verify all the tests in this report are covered under the current ISO17025 accreditation. The A2LA-accredited logo must be removed if any of the tests in the report are not performed under the current scope of accreditation. It is the responsibility of the reviewer to ensure the A2LA advertising policy is followed.



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1. Test Report Summary

Product Information:

Description

The EUT is a wireless headphone that contains DSS/DTS transceiver IC manufactured by Qualcomm Technologies.

Setup (Cables and Accessories)

For radio tests the radio was configured with Qualcomm Blue Suite software (details provided in SOFTWARE AND FIRMWARE section).

EUT Antenna Description

The antenna is a PCB etch antenna with a maximum gain of 1.1 dBi.

SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was version 0.2.15+g34dc106.
The test utility software used during testing was Blue Suite version 3.3.16.

Scope:

This report covers EMC requirements. FCC CFR 47 PART 15 SUBPART C, Industry Canada RSS-247 Issue 2, and Industry Canada RSS-GEN Issue 5.

All radiated emissions measurements have been done using the internal non-removable PCB etch antenna. The antenna is permanently attached, complies with 15.203.

All conducted RF measurements were done with the trace to the internal PCB etch antenna cut. A short 8" coaxial cable with SMA connector soldered to the trace that would normally be connected to the internal EUT antenna.

Test Objective:

Verify product meets all applicable EMC requirements.

Measurement Methods:

ANSI C63.10 (2013).
RSS-Gen Issue 5 (2018)

Results:

Product complies with all applicable EMC requirements. All final results represent worst-case emissions and/or immunity.

Conclusions:

The device under test (D.U.T.):
 meets all test standards selected in section 2 of this report.
 does not meet all test standards selected in section 2 of this report.



2. Test Results Summary

TEST NAME	TEST RESULT PASS or N/A	COMMENT(S)
On Time and Duty Cycle	N/A	For reporting only
6 dB Occupied Bandwidth	Pass	
99% Occupied Bandwidth	N/A	For reporting only
Conducted Output Power	Pass	
Power Spectral Density	Pass	
Conducted Spurious Emissions	Pass	
Radiated Emissions 1 to 25 GHz	Pass	
Radiated Emissions 30 to 1000 MHz	Pass	
AC Line Conducted Emissions	Pass	

EUT serial numbers used for this test report:

Conducted RF: SN C1B002HDT6660F086
 Radiated emissions: SN C1B002HDT6660F061, SN C1B002HDT6660F145
 Conducted AC mains emissions: SN C1B002HDT6660F145

Note: BLE LE1M uses channels between and including 2402 to 2480 MHz which are determined by the Qualcomm Bluetooth IC.

BLE LE2M uses channels between and including 2404 to 2478 MHz which are determined by the Qualcomm Bluetooth IC.



3. Test Standards & Environmental Conditions

Test Standards

Emissions:

	Standard
<input checked="" type="checkbox"/>	FCC Part 15C
<input checked="" type="checkbox"/>	Canada RSS-247
<input checked="" type="checkbox"/>	Canada RSS-GEN

Environmental Conditions

Ambient:	
Temperature:	22±4 °C
Humidity:	30-60 % RH
Internal Battery	3.7 VDC
Voltage:	Nominal



4. Lab Accreditations / Registrations

FCC Test Site Accreditation.

Firm Name	Location	Expiration Date	Accreditation	MRA	Designation Number	Contact	Contact Title	Address	PO Box	Mail Stop	City	State	Zip Code	Country	Email	Phone	Fax
Bose Corporation	1 New York Avenue, Framingham, MA	07/31/2024	American Association for Laboratory Accreditation	N/A	US1088	Mr. Cable Best	Quality Manager	Mail Stop 450 The Mountain	N/A	450	Framingham	Massachusetts	01701	United States	Cable_Best@bose.com	1 508 766 6137	508 766 1145

Canadian Test Site Registration.

<p>BOSE CORPORATION</p> <p>1 New York Avenue Framingham, MA 01701 UNITED STATES</p> <p>Company Number: 3232A</p> <p>Contact: Mario Espinal mario_espinal@bose.com</p>	US0210	<p>RSS-GEN (2019-02-11)</p> <p>RSS-210 (2019-02-11)</p> <p>RSS-247 (2019-02-11)</p> <p>RSS-248 (2021-11-19)</p>	<p>RECOGNIZED UNTIL: 2024-07-31</p> <p>A2LA ISO/IEC 17025:2017 Expires: 2024-07-31</p>
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5. On Time & Duty Cycle

Requirement:

None; for reporting purposes only.

Measurement Method:

KDB 558074 D01 15.247 Meas Guidance v05r02 April 2, 2019 Section 6 b), zero span method.

On time & duty cycle test results:

All testing is done using the maximum packet length for maximum duty cycle shown in the table below.

Frequency (MHz)	Mode	Packet Type	Data Rate (Mbps)	Max Packet Length (Bytes)	On Time (ms)	Period (ms)	Duty Cycle (%)	1/Ton (Hz)	1/Period (Hz)
2440	BLE	LE1M	1	255	2.124	3.126	67.9	470.8	319.9
2440	BLE	LE2M	2	255	1.062	2.505	42.4	941.5	399.2

The duty cycle in the above table represents the maximum worst case duty cycle possible using the maximum packet length of 255 bytes. In a normal usage case the duty cycle will be less than what is shown above and will be dependent on packet length but never more than 255 bytes can be used.



6. 6 dB and 99% Occupied Bandwidth

Requirement:

None; 99% occupied bandwidth is for reporting purposes only.

FCC 15.247(a) (2) (DTS BW = 6 dB OBW)

RSS-247 5.2 (a) (6 dB OBW)

6 dB (DTS) occupied bandwidth > 500 kHz

Measurement Method:

ANSI C63.10-2013 Subclause 11.8.1 option 1 (6 dB Bandwidth)

ANSI C63.10-2013 Subclause 6.9.3 (99% Bandwidth)

RSS-Gen Issue 5, 6.7 (6 dB & 99% Bandwidth)

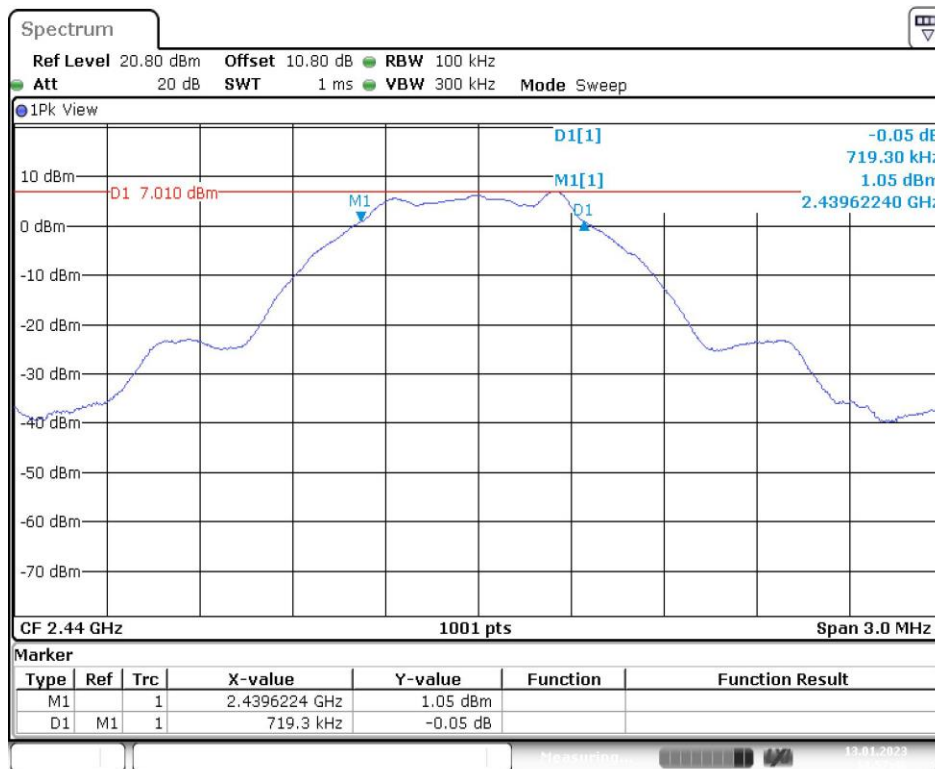
The EUT is connected to a spectrum analyzer, the 10 dB external pad and test cable loss (0.8 dB) is accounted for using the reference level offset feature of the spectrum analyzer. The reference level offset is set to 10.8 dB.

6 dB Occupied Bandwidth Results:

LE1M

BLE DTS Occupied Bandwidth							
Channel	Frequency (MHz)	Mode	Data Rate Mbps	6 dB OBW (kHz)	Limit kHz	Margin (kHz)	Result
Low	2402	BLE LE1M	1	716	500	216	Pass
Middle	2440	BLE LE1M	1	719	500	219	Pass
High	2480	BLE LE1M	1	719	500	219	Pass

6 dB (DTS) OBW plot for 2440 MHz, other frequencies measured the same way.



Date: 13. JAN. 2023 14:57:45



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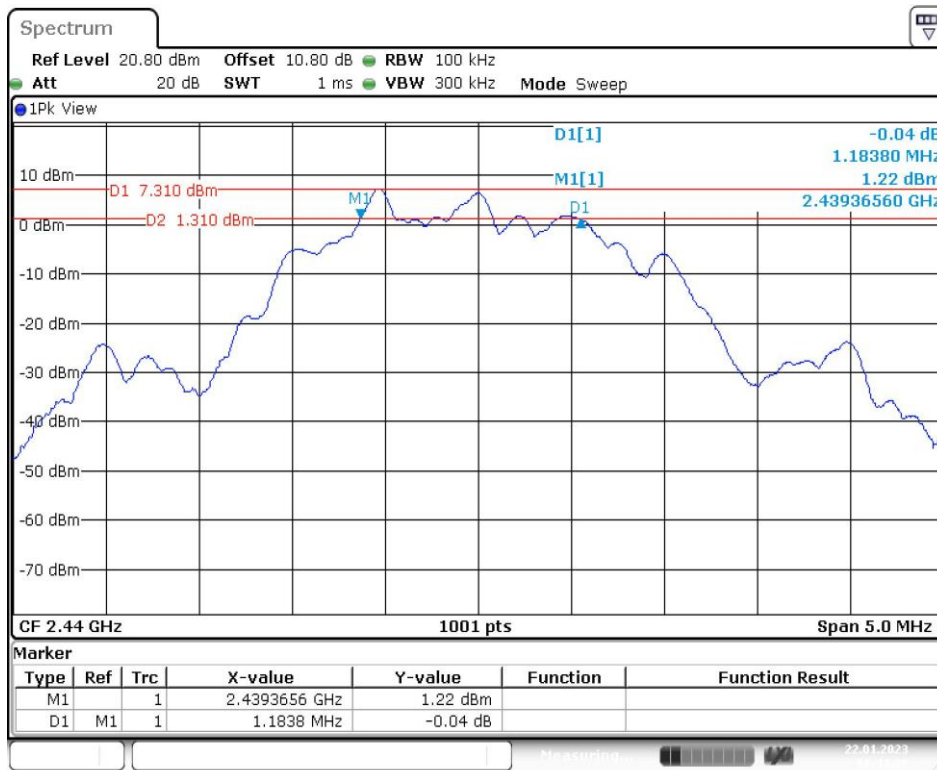
FCC ID: A94440108 IC: 3232A-440108



LE2M

BLE DTS Occupied Bandwidth							
Channel	Frequency (MHz)	Mode	Data Rate Mbps	6 dB OBW (kHz)	Limit kHz	Margin (kHz)	Result
Low	2404	BLE LE2M	2	1189	500	689	Pass
Middle	2440	BLE LE2M	2	1184	500	684	Pass
High	2478	BLE LE2M	2	1169	500	669	Pass

6 dB (DTS) OBW plot for 2440 MHz, other frequencies measured the same way.



Date: 22.JAN.2023 08:44:29

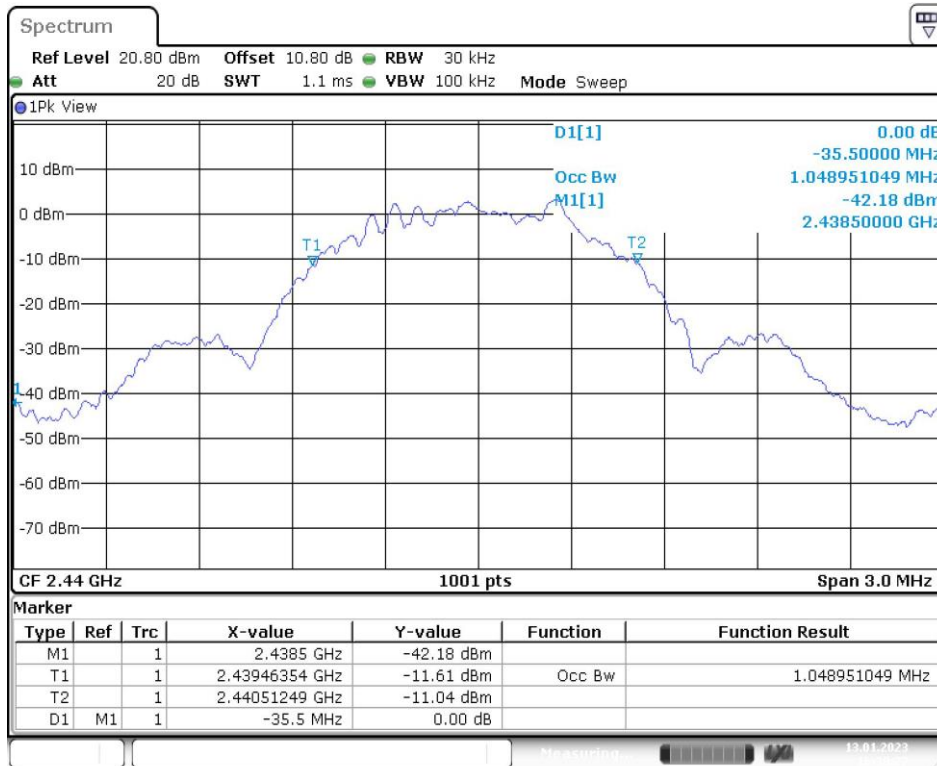


99% Occupied bandwidth test results:

LE1M

99% OBW Summary Table					
Channel	Frequency (MHz)	Mode	Data Rate Mbps	99% OBW (kHz)	Limit NA
Low	2402	BLE LE1M	1	1049	-
Middle	2440	BLE LE1M	1	1049	-
High	2480	BLE LE1M	1	1046	-

99% OBW plot for 2440 MHz, other frequencies measured the same way.



Date: 13.JAN.2023 16:30:27



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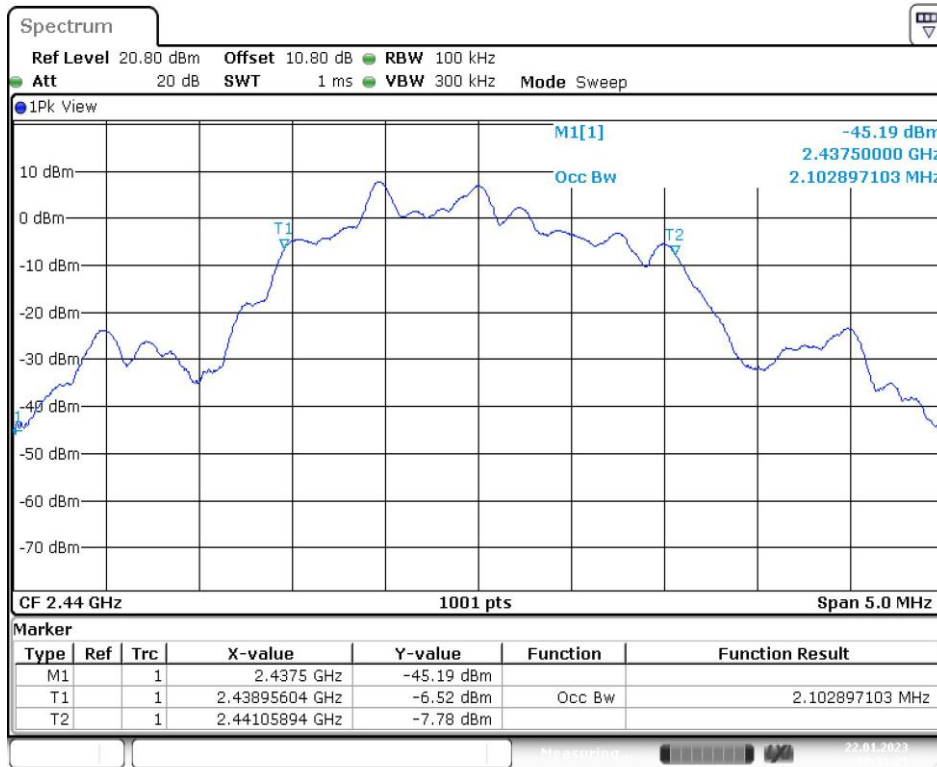
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LE2M

99% OBW Summary Table					
Channel	Frequency (MHz)	Mode	Data Rate Mbps	99% OBW (kHz)	Limit NA
Low	2404	BLE LE2M	2	2103	-
Middle	2440	BLE LE2M	2	2103	-
High	2478	BLE LE2M	2	2098	-

99% OBW plot for 2440 MHz, other frequencies measured the same way.



Date: 22.JAN.2023 08:31:24



7. Conducted Output Power

Requirements:

FCC 15.247 (b) (3)

The maximum peak conducted output power of digital modulation systems operating in the 2400 – 2483.5 MHz band is 1 Watt

RSS-247 5.4 (d)

For DTS devices employing digital modulation techniques operating in the 2400 – 2483.5 MHz band, the maximum peak conducted power shall not exceed 1W. The e.i.r.p shall not exceed 4W, except as provided in section 5.4 (e)

Measurement Method:

ANSI C63.10-2013 Subclause 11.9.1.1

RSS-Gen Issue 5, 6.12

The EUT is connected to a spectrum analyzer, the 10 dB external pad and test cable loss (0.8 dB) is accounted for using the reference level offset feature of the spectrum analyzer. The reference level offset is set to 10.8 dB.

Maximum antenna gain is 1.1 dBi therefore maximum e.i.r.p will be less than 4W (36 dBm) with the maximum power shown below in the following tables:

Conducted output power:

BLE LE1M

Output Power Summary Table							
Channel	Frequency (MHz)	Mode	Data Rate Mbps	Output Power (dBm)	Limit (dBm)	Margin (dB)	Result
Low	2402	BLE LE1M	1	7.58	30	22.4	Pass
Middle	2440	BLE LE1M	1	7.82	30	22.2	Pass
High	2480	BLE LE1M	1	7.73	30	22.3	Pass

BLE LE2M

Output Power Summary Table							
Channel	Frequency (MHz)	Mode	Data Rate Mbps	Output Power (dBm)	Limit (dBm)	Margin (dB)	Result
Low	2404	BLE LE2M	2	7.73	30	22.3	Pass
Middle	2440	BLE LE2M	2	7.86	30	22.1	Pass
High	2478	BLE LE2M	2	7.92	30	22.1	Pass



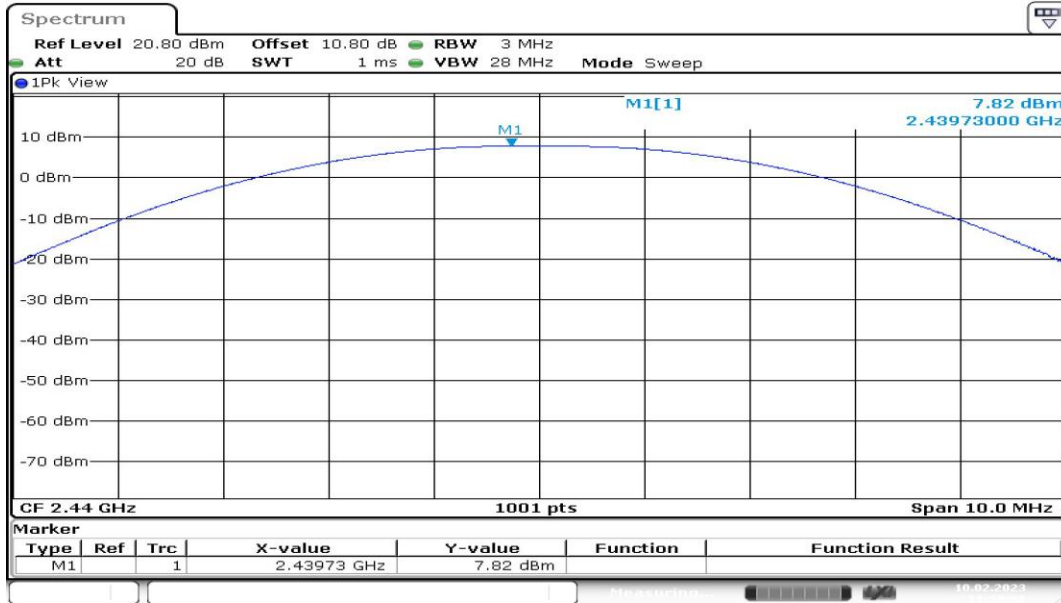
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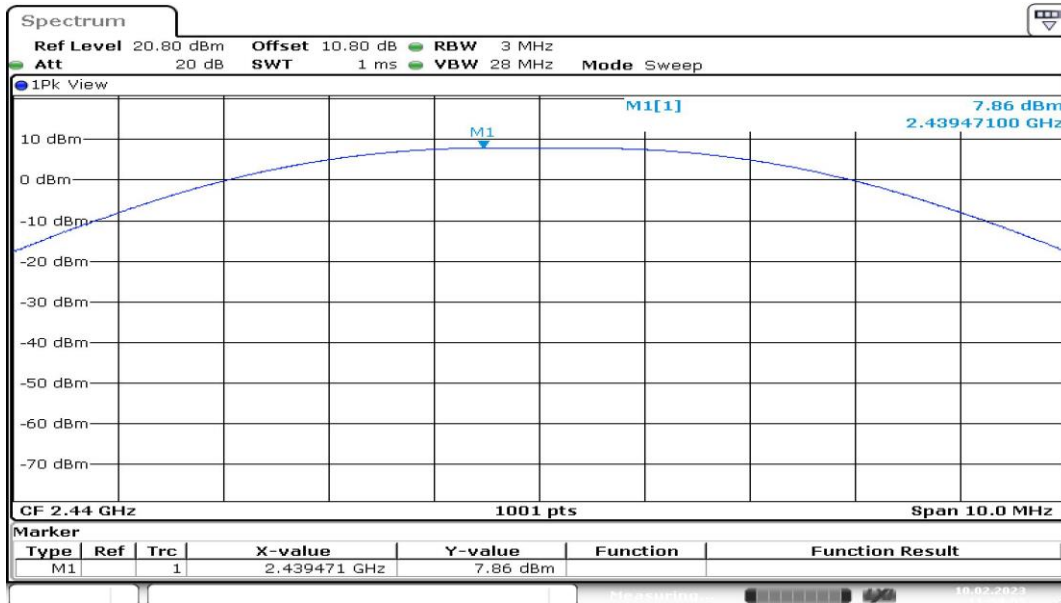
Output power plots for 2440 MHz, other frequencies measured the same way.

BLE LE1M



Date: 10.FEB.2023 11:59:38

BLE LE2M



Date: 10.FEB.2023 11:54:06



8. Power Spectral Density

Requirements:

FCC 15.247 (e)

RSS-247 5.2 (b)

The maximum permissible power spectral density is 8 dBm using 3 kHz resolution bandwidth.

Measurement Method:

ANSI C63.10-2013 Subclause 11.10.2

The EUT is connected to a spectrum analyzer, the 10 dB external pad and test cable loss (0.8 dB) is accounted for using the reference level offset feature of the spectrum analyzer. The reference level offset is set to 10.8 dB.

Power spectral density test results:

LE1M

Power Spectral Density Summary Table							
Channel	Frequency (MHz)	Mode	Data Rate (Mbps)	PSD (dBm)	Limit (dB)	Margin (dB)	Result
Low	2402	BLE LE1M	1	-9.6	8	17.59	Pass
Middle	2440	BLE LE1M	1	-9.4	8	17.36	Pass
High	2480	BLE LE1M	1	-9.5	8	17.45	Pass

LE2M

Power Spectral Density Summary Table							
Channel	Frequency (MHz)	Mode	Data Rate (Mbps)	PSD (dBm)	Limit (dB)	Margin (dB)	Result
Low	2404	BLE LE2M	2	-11.8	8	19.83	Pass
Middle	2440	BLE LE2M	2	-11.7	8	19.72	Pass
High	2478	BLE LE2M	2	-12.0	8	20.03	Pass



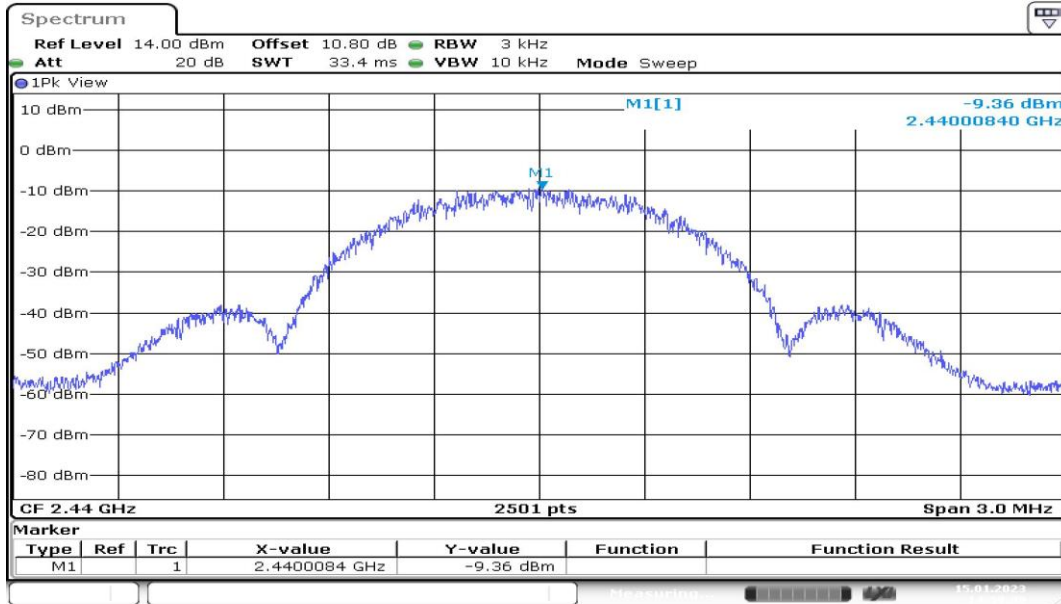
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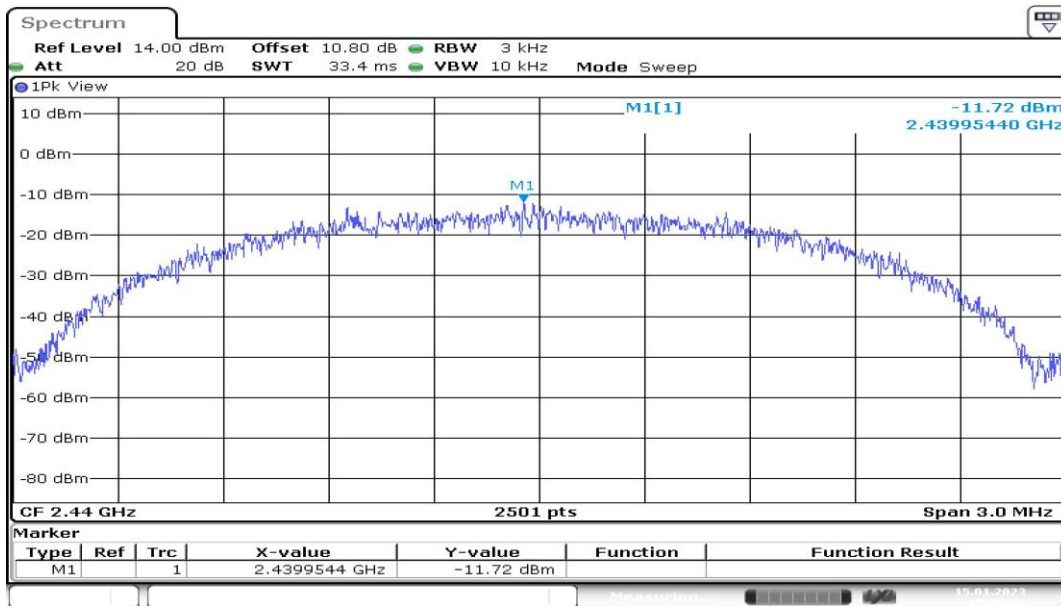
PSD plots for 2440 MHz, other frequencies measured the same way.

BLE LE1M



Date: 15.JAN.2023 14:59:00

BLE LE2M



Date: 15.JAN.2023 15:09:26



9. Conducted Spurious Emissions

Requirements:

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)).

IC RSS-247 5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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 that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section A8.4 (4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

Note: Antenna gain outside of the wanted band was assumed to be zero. The conducted spurious readings are for additional information as the radiated readings take precedence.

Measurement Method:

ANSI C63.10-2013 Subclause 11.11.3

The EUT was tested at the maximum power setting for each mode.

Note analyzer marker search limit featured used to block out peak search from finding in band emissions.

The EUT is connected to a spectrum analyzer, the 10 dB external pad and test cable loss (0.8 dB) is accounted for using the reference level offset feature of the spectrum analyzer. The reference level offset is set to 10.8 dB.

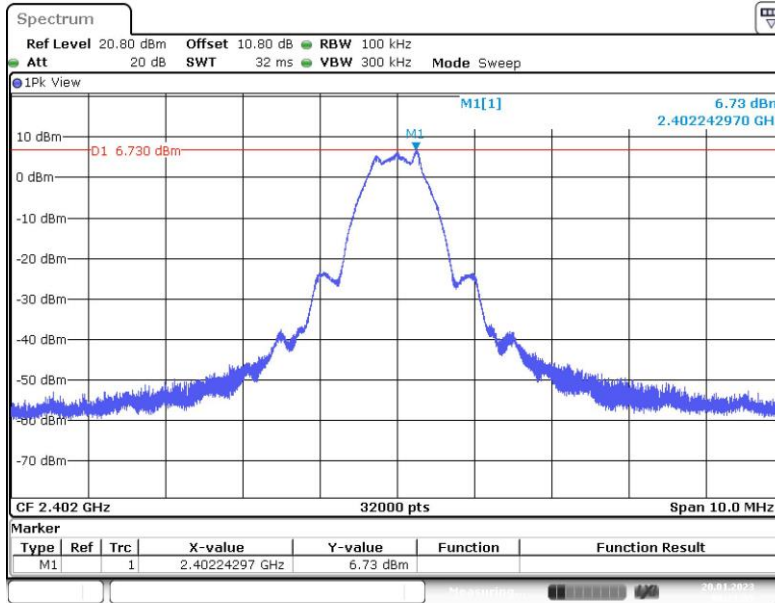
Auto sweep mode was used on the spectrum analyzer for the following measurements.

Conducted spurious emissions test results:

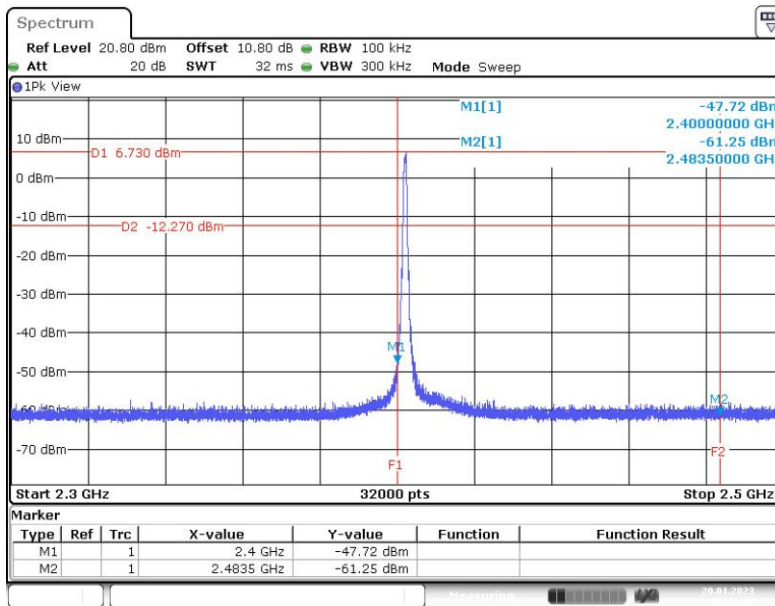
Low Channel

CH0 (2402 MHz) LE1M

D1 = reference peak of fundamental



Date: 20 JAN 2023 08:21:36



Date: 20 JAN 2023 08:26:08

F1 = 2400 MHz, F2 = 2483.5 MHz (In band), D2 is at 20 dBc
Emissions are more than 20 dBc, pass.



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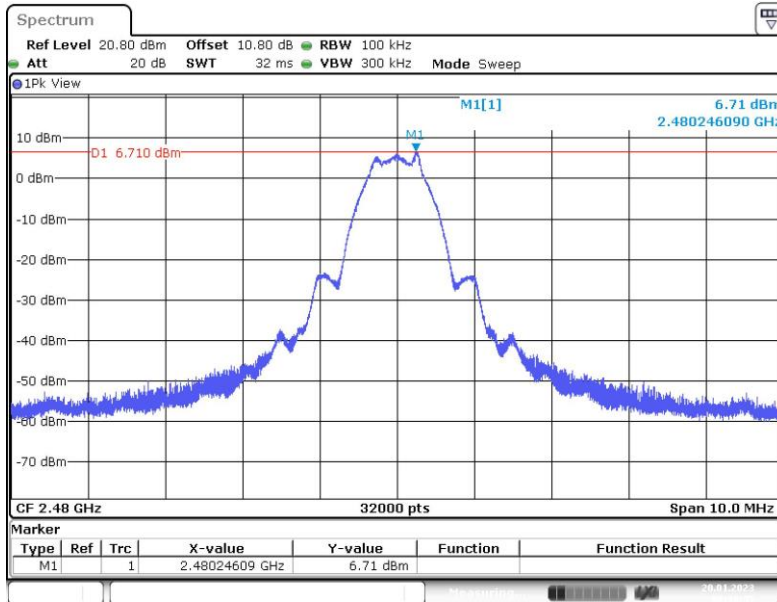
FCC ID: A94440108 IC: 3232A-440108



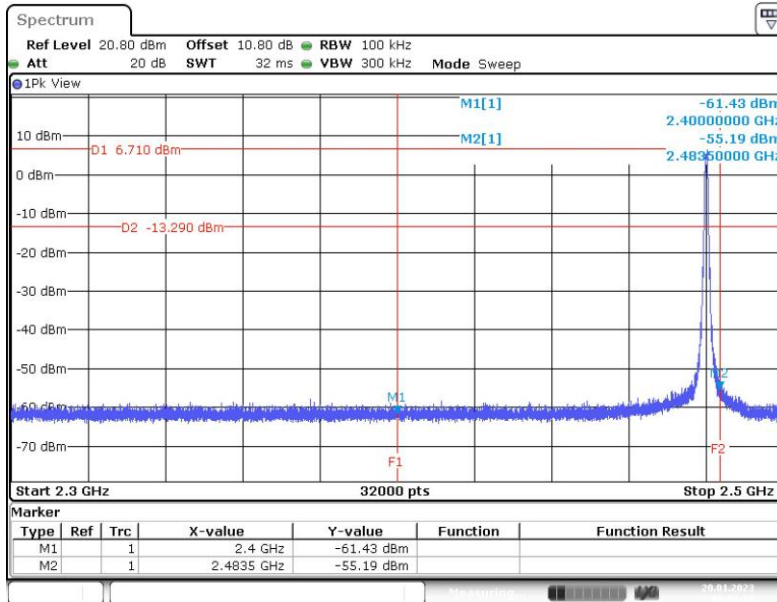
High Channel

CH39 (2480 MHz) LE1M

D1 = reference peak of fundamental



Date: 20 JAN 2023 08:30:46



Date: 20 JAN 2023 08:34:35

F1 = 2400 MHz, F2 = 2483.5 MHz (In band), D2 is at 20 dBc
Emissions are more than 20 dBc, pass.



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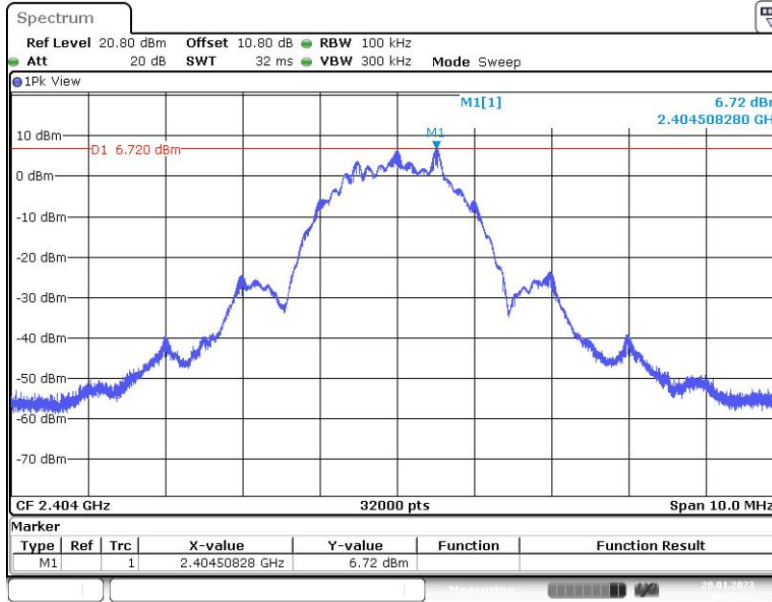
FCC ID: A94440108 IC: 3232A-440108



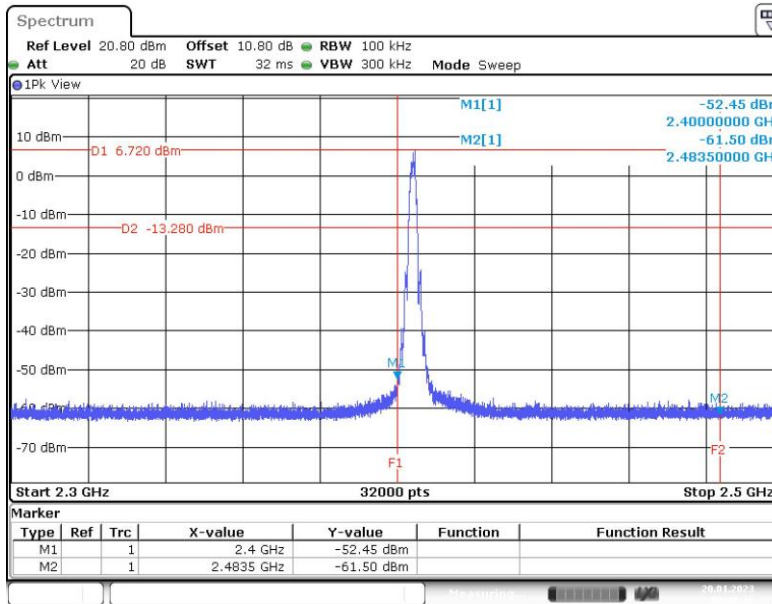
Low Channel

CH1 (2404 MHz) LE2M

D1 = reference peak of fundamental



Date: 20 JAN 2023 08:37:16



Date: 20 JAN 2023 08:40:10

F1 = 2400 MHz, F2 = 2483.5 MHz (In band), D2 is at 20 dBc
Emissions are more than 20 dBc, pass.



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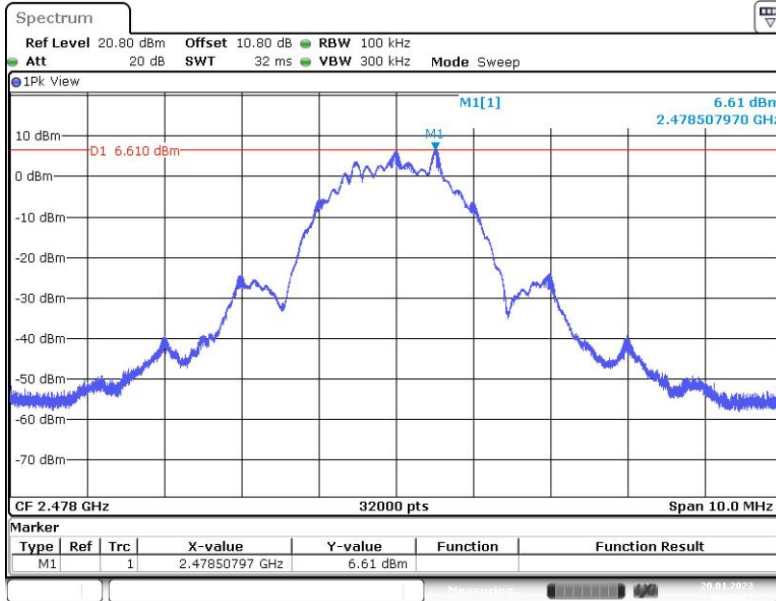
FCC ID: A94440108 IC: 3232A-440108



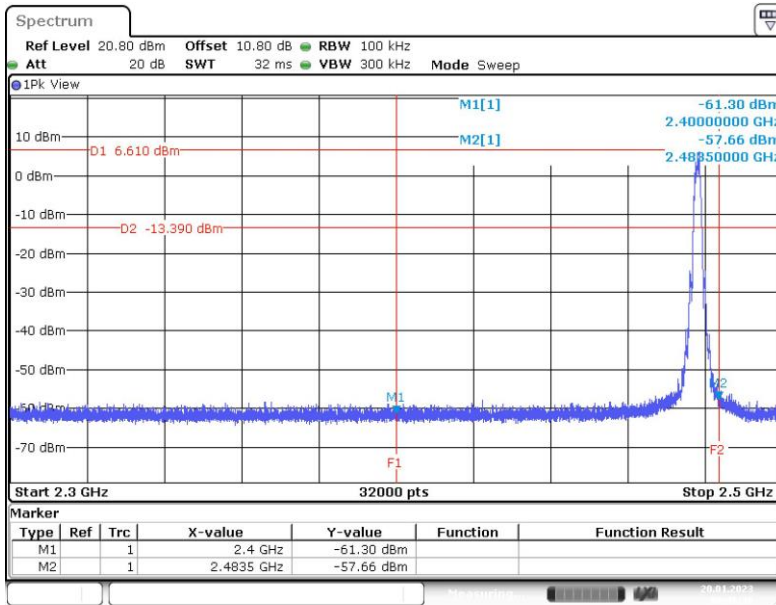
High Channel

CH38 (2478 MHz) LE2M

D1 = reference peak of fundamental



Date: 20 JAN 2023 08:43:18



Date: 20 JAN 2023 08:46:30

F1 = 2400 MHz, F2 = 2483.5 MHz (In band), D2 is at 20 dBc
 Emissions are more than 20 dBc, pass.



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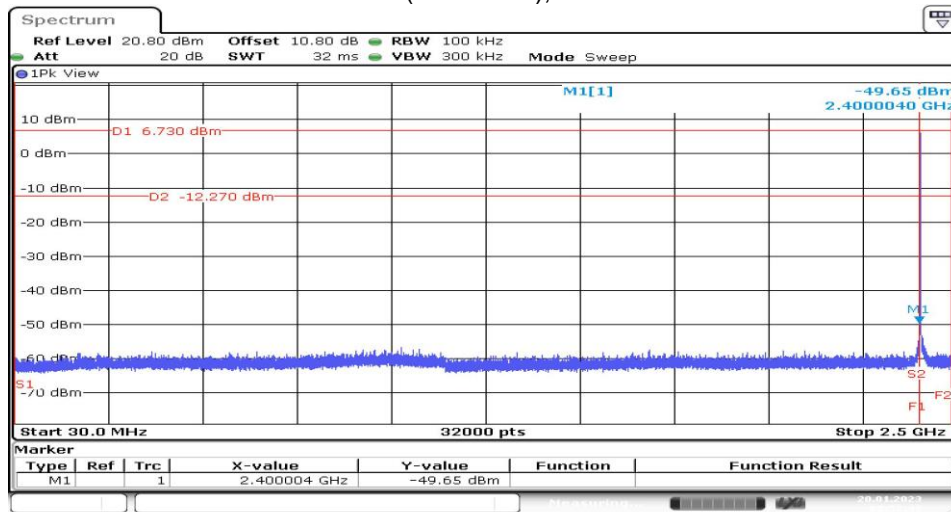


Conducted spurious emissions, 30 MHz to 2500 MHz

Marker search limits: S1 = 30 MHz, S2 = 2400 MHz.
F1 = 2400 MHz, F2 = 2483.5 MHz

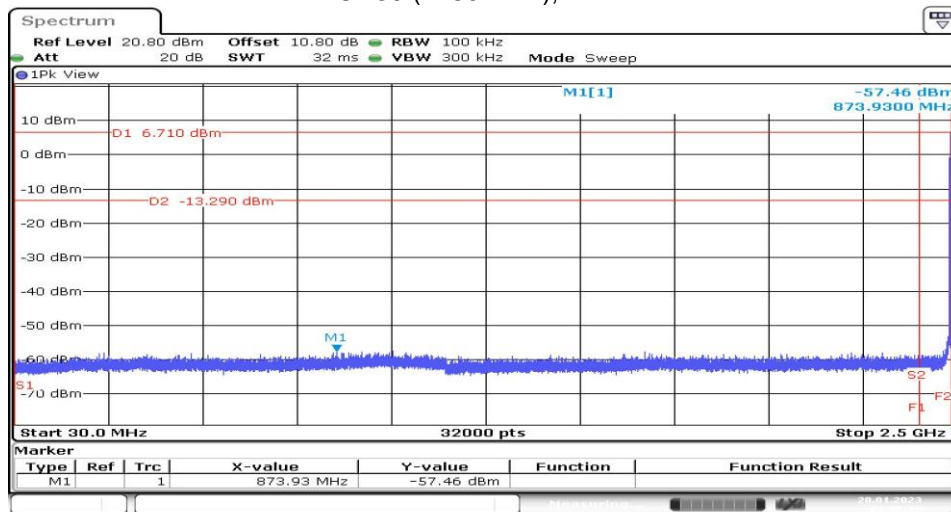
Note: In band peak power reference based on previous measurement for the same channel and mode.

Low Channel
CH0 (2402 MHz), LE1M



Date: 20 JAN 2023 08:52:49

High Channel
CH39 (2480 MHz), LE1M



Date: 20 JAN 2023 09:05:19

Emissions are more than 20 dBc, pass.

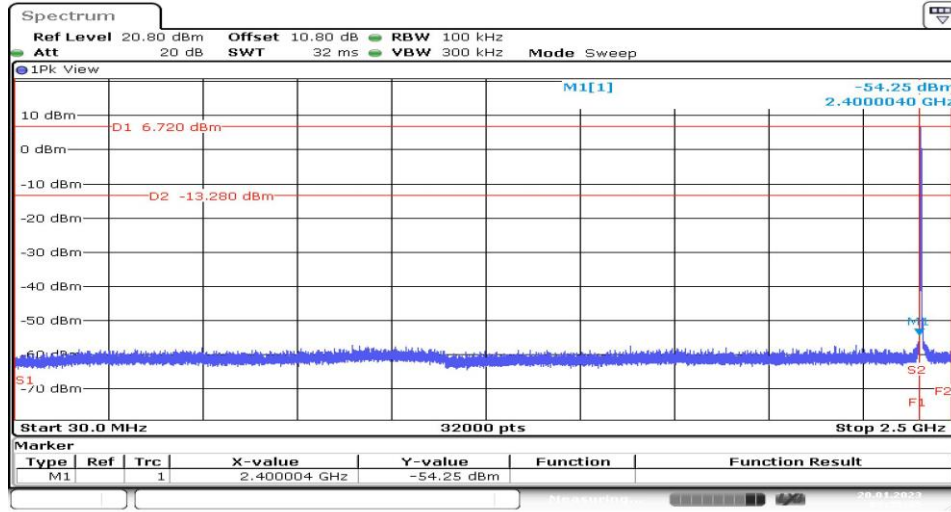


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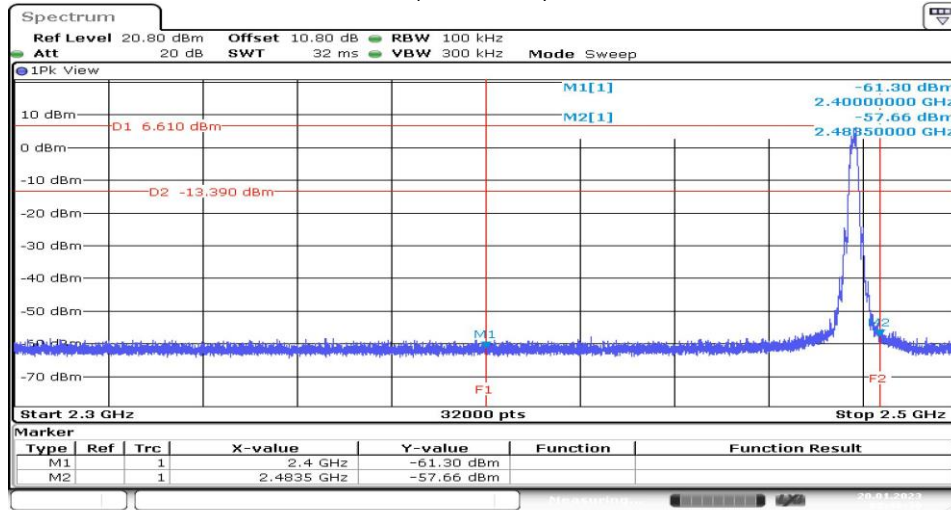


Low Channel
CH1 (2404 MHz), LE2M



Date: 20 JAN 2023 09:35:34

High Channel
CH38 (2478 MHz), LE2M



Date: 20 JAN 2023 08:46:30

Emissions are more than 20 dBc, pass.



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Conducted spurious emissions, 2400 MHz to 26 GHz

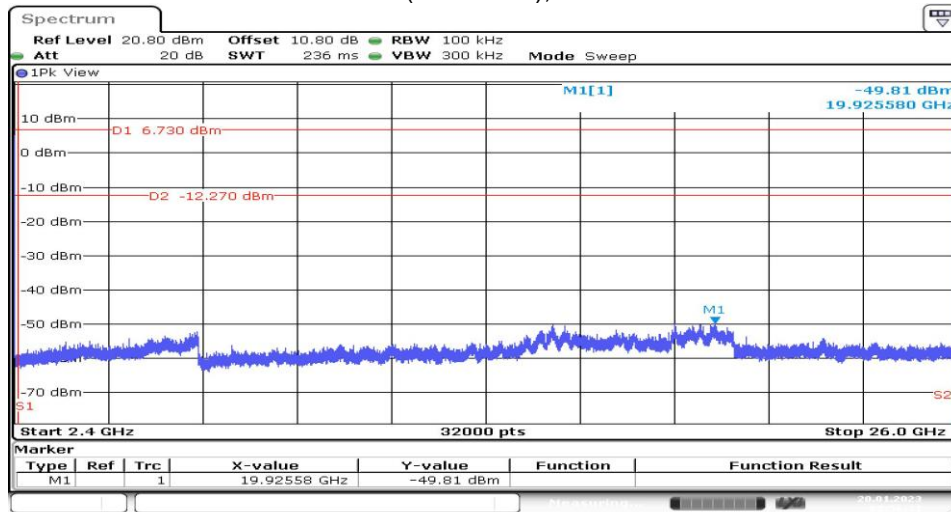
Marker search limits: S1 = 2483.5 MHz, S2 = 26 GHz.

F1 =2400 MHz, F2 = 2483.5 MHz

Note: In band peak power reference based on previous measurement for the same channel and mode.

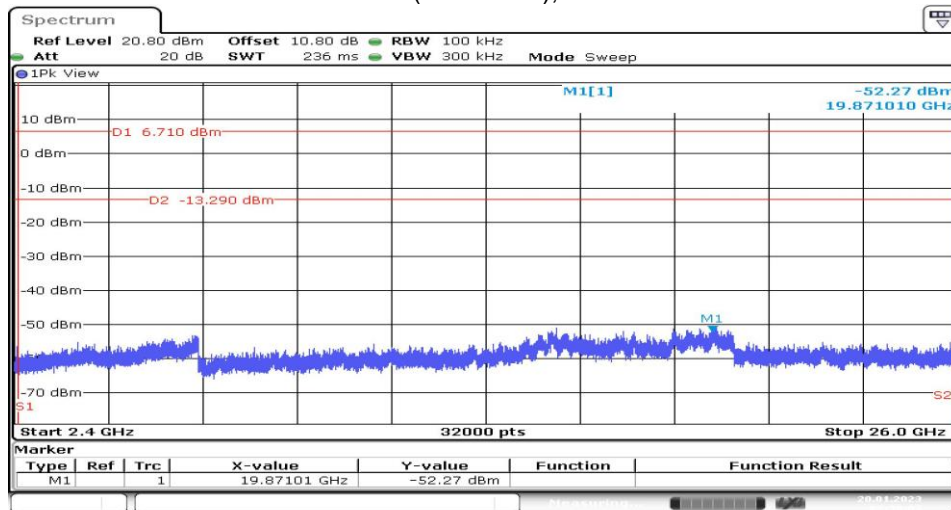
D2 is at 20 dBc

Low Channel
CH0 (2402 MHz), LE1M



Date: 20. JAN. 2023 08:56:11

High Channel
CH39 (2480 MHz), LE1M



Date: 20. JAN. 2023 09:30:04

Emissions are more than 20 dBc, pass.

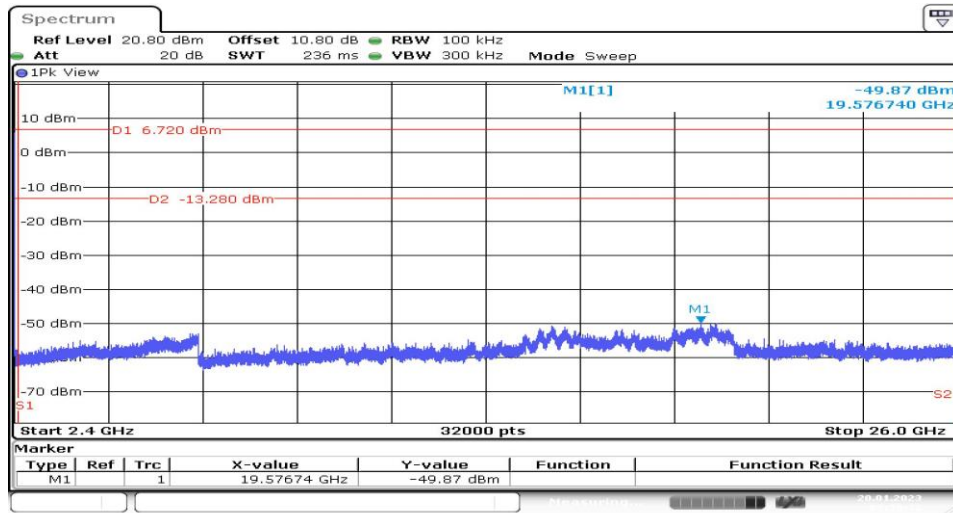


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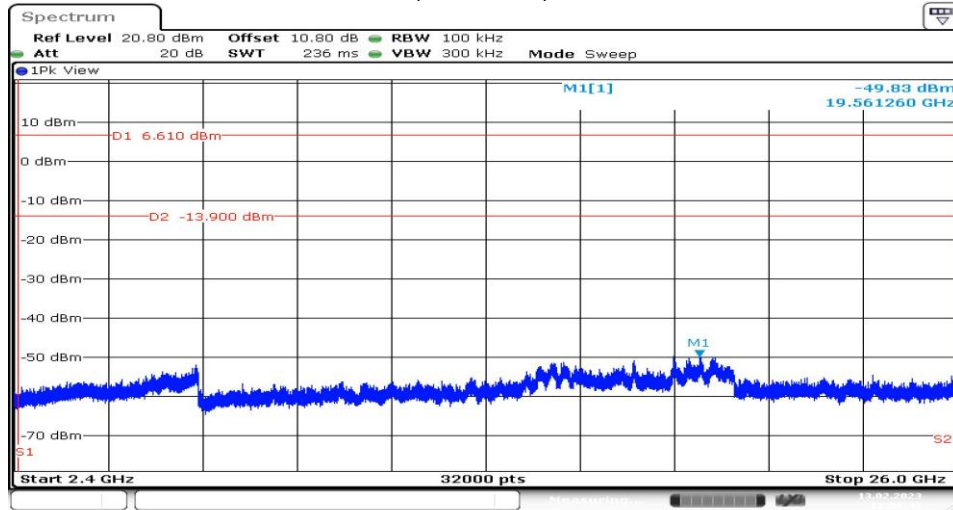


Low Channel
CH1 (2404 MHz), LE2M



Date: 20.JAN.2023 09:39:33

High Channel
CH38 (2478 MHz), LE2M



Date: 13.FEB.2023 11:01:42

Emissions are more than 20 dBc, pass.



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Conducted Spurious Harmonics (Pre-Screen)

Analyzer settings: RBW = 1 MHz, VBW = 3 MHz, Span = 50 MHz, **Peak Detector**, ATTN = 0 dB
Trace Max hold for 3 seconds

Reference level offset on analyzer set to 10.8 dB to account for 10 dB pad and 0.8 dB SMA test cable loss.

Setup: EUT output => 10 dB Pad => 2.4 GHz notch filter input, 2.4 GHz notch filter output => analyzer input.

Using if peak value is below the average conducted limit of -41 dBm then it is considered passing. This is a more stringent requirement than using the equivalent conducted peak limit of -21 dBm. The average conducted limit is derived from the 54 dBuV/m radiated limit at 3 meters minus a 95.2 dB correction factor which equals -41 dBm based on 0 dBi out of band EUT antenna gain. Note maximum in-band antenna gain is 1.1 dBi.

Note: Radiated emissions are the preferred method and will be shown later in this report.

Conducted Spurious Harmonics Summary Table (LE 1M)

Mode	Harmonic	CF (MHz)	Measured Frequency (MHz)	Max Peak Conducted (dBm)	Limit (dBm)	Margin (dB)	Test Results (P/F)
BLE (1 Mbps)	1	2402	2402.1	-53.0	NA	NA	NA
BLE (1 Mbps)	2	4804	4791.2	-65.6	-41	24.6	Pass
BLE (1 Mbps)	3	7206	7205.7	-59.4	-41	18.4	Pass
BLE (1 Mbps)	4	9608	9607.3	-58.0	-41	17.0	Pass
BLE (1 Mbps)	5	12010	12010.9	-58.8	-41	17.8	Pass
BLE (1 Mbps)	6	14412	14412.9	-64.5	-41	23.5	Pass
BLE (1 Mbps)	7	16814	16812.8	-62.1	-41	21.1	Pass
BLE (1 Mbps)	8	19216	19214.6	-59.6	-41	18.6	Pass
BLE (1 Mbps)	9	21618	21619.3	-64.2	-41	23.2	Pass
BLE (1 Mbps)	10	24020	24006.9	-65.1	-41	24.1	Pass
Mode	Harmonic	CF (MHz)	Measured Frequency (MHz)	Max Peak Conducted (dBm)	Limit (dBm)	Margin (dB)	Test Results (P/F)
BLE (1 Mbps)	1	2440	2440.2	-49.7	NA	NA	NA
BLE (1 Mbps)	2	4880	4897.5	-65.8	-41	24.8	Pass
BLE (1 Mbps)	3	7320	7320.8	-60.2	-41	19.2	Pass
BLE (1 Mbps)	4	9760	9761.1	-57.7	-41	16.7	Pass
BLE (1 Mbps)	5	12200	12198.5	-54.5	-41	13.5	Pass
BLE (1 Mbps)	6	14640	14638.6	-64.6	-41	23.6	Pass
BLE (1 Mbps)	7	17080	17102.0	-62.3	-41	21.3	Pass
BLE (1 Mbps)	8	19520	19517.7	-58.4	-41	17.4	Pass
BLE (1 Mbps)	9	21960	21951.9	-65.0	-41	24.0	Pass
BLE (1 Mbps)	10	24400	24402.2	-63.7	-41	22.7	Pass
Mode	Harmonic	CF (MHz)	Measured Frequency (MHz)	Max Peak Conducted (dBm)	Limit (dBm)	Margin (dB)	Test Results (P/F)
BLE (1 Mbps)	1	2480	2479.8	-47.5	NA	NA	NA
BLE (1 Mbps)	2	4960	4943.1	-65.3	-41	24.3	Pass
BLE (1 Mbps)	3	7440	7440.2	-63.6	-41	22.6	Pass
BLE (1 Mbps)	4	9920	9921.1	-56.9	-41	15.9	Pass
BLE (1 Mbps)	5	12400	12398.6	-56.3	-41	15.3	Pass
BLE (1 Mbps)	6	14880	14878.7	-64.7	-41	23.7	Pass
BLE (1 Mbps)	7	17360	17372.4	-62.5	-41	21.5	Pass
BLE (1 Mbps)	8	19840	19853.0	-58.9	-41	17.9	Pass
BLE (1 Mbps)	9	22320	22329.1	-65.0	-41	24.0	Pass
BLE (1 Mbps)	10	24800	24815.6	-65.0	-41	24.0	Pass

Note: The fundamental is being attenuated by about 60 dB due to the 2.4 GHz notch filter.



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FCC ID: A94440108 IC: 3232A-440108



Conducted Spurious Harmonics Summary Table (LE 2M)

Mode	Harmonic	CF (MHz)	Measured Frequency (MHz)	Max Peak Conducted (dBm)	Limit (dBm)	Margin (dB)	Test Results (P/F)
BLE (2 Mbps)	1	2404	2404.5	-53.0	NA	NA	NA
BLE (2 Mbps)	2	4808	4805.7	-65.7	-41	24.7	Pass
BLE (2 Mbps)	3	7212	7213.6	-59.5	-41	18.5	Pass
BLE (2 Mbps)	4	9616	9617.9	-58.4	-41	17.4	Pass
BLE (2 Mbps)	5	12020	12017.4	-58.6	-41	17.6	Pass
BLE (2 Mbps)	6	14424	14408.2	-64.6	-41	23.6	Pass
BLE (2 Mbps)	7	16828	16830.4	-62.2	-41	21.2	Pass
BLE (2 Mbps)	8	19232	19236.1	-59.7	-41	18.7	Pass
BLE (2 Mbps)	9	21636	21651.0	-65.0	-41	24.0	Pass
BLE (2 Mbps)	10	24040	24045.9	-65.0	-41	24.0	Pass
Mode	Harmonic	CF (MHz)	Measured Frequency (MHz)	Max Peak Conducted (dBm)	Limit (dBm)	Margin (dB)	Test Results (P/F)
BLE (2 Mbps)	1	2440	2440.5	-49.4	NA	NA	NA
BLE (2 Mbps)	2	4880	4900.4	-65.5	-41	24.5	Pass
BLE (2 Mbps)	3	7320	7321.6	-61.1	-41	20.1	Pass
BLE (2 Mbps)	4	9760	9757.9	-57.7	-41	16.7	Pass
BLE (2 Mbps)	5	12200	12202.4	-54.6	-41	13.6	Pass
BLE (2 Mbps)	6	14640	14636.4	-64.9	-41	23.9	Pass
BLE (2 Mbps)	7	17080	17096.4	-62.7	-41	21.7	Pass
BLE (2 Mbps)	8	19520	19524.1	-58.1	-41	17.1	Pass
BLE (2 Mbps)	9	21960	21940.1	-65.0	-41	24.0	Pass
BLE (2 Mbps)	10	24400	24405.1	-65.0	-41	24.0	Pass
Mode	Harmonic	CF (MHz)	Measured Frequency (MHz)	Max Peak Conducted (dBm)	Limit (dBm)	Margin (dB)	Test Results (P/F)
BLE (2 Mbps)	1	2478	2478.6	-47.5	NA	NA	NA
BLE (2 Mbps)	2	4956	4960.7	-65.0	-41	24.0	Pass
BLE (2 Mbps)	3	7434	7432.7	-63.4	-41	22.4	Pass
BLE (2 Mbps)	4	9912	9909.8	-57.1	-41	16.1	Pass
BLE (2 Mbps)	5	12390	12387.4	-56.4	-41	15.4	Pass
BLE (2 Mbps)	6	14868	14864.5	-64.1	-41	23.1	Pass
BLE (2 Mbps)	7	17346	17325.7	-62.7	-41	21.7	Pass
BLE (2 Mbps)	8	19824	19823.7	-59.6	-41	18.6	Pass
BLE (2 Mbps)	9	22302	22287.7	-64.7	-41	23.7	Pass
BLE (2 Mbps)	10	24780	24788.6	-65.4	-41	24.4	Pass

Note: The fundamental is being attenuated by about 60 dB due to the usage of a 2.4 GHz notch filter.



10. Radiated Emissions 1 GHz to 25 GHz

Requirement:

FCC 15.205, 15.209, 15.247 (d),
RSS-GEN Clause 8.9 (Transmitter)

Measurement Method:

ANSI C63.10-2013 11.12 (Emissions in restricted bands)
11.12.2.5.3 (Reduced VBW averaging across on and off times using trace max hold, $D < 98\%$)
RSS-Gen 6.13

Reduced video bandwidth method used for making average measurements for lower and upper adjacent restricted bands using a peak detector. Trace max hold was left running for several minutes to allow meeting the $50x(1/D)$ trace requirement.

Note: The procedure listed in ANSI C63.10-2013 footnote **23** on page 28 was used to demonstrate that the proper analyzer settings were used for an average measurement using reduced video bandwidth method. The result was -6 dB different between peak using VBW = 3 MHz and average using VBW = 1 Hz.

VBW = 1kHz > 1/Ton; (LE1M 1/Ton = 471 Hz) , (LE2M 1/Ton = 941 Hz), Reference section 5 this report.

For radiated emissions above 1 GHz the EUT is positioned 1.5m off the ground plane.
The EUT was tested in three orientations per ANSI C63.10 6.3.1.
The EUT was tested at the maximum power setting for each mode.

For emissions other than the lower and upper adjacent restricted bands a 2.4 GHz notch filter is used between the measurement horn antenna and measurement preamp to prevent overload to the preamp due to the EUT fundamental.
The restricted band edge measurement is done using high dynamic range preamp.

Reference: ANSI C63.10 6.6.4.1:

Install an appropriate filter at the input of the measurement system power amplifier. This filter shall attenuate the fundamental emission of the EUT and allow an accurate measurement of the associated harmonics and spurious emissions. The filter shall be characterized, and any attenuation/loss factors shall be accounted for in the measurement results.

EUT was tested in **3 orientations with vertical orientation being worst case** showing the highest emissions.

Radiated emission measurements performed using both horizontal and vertical measurement antenna polarizations with worst case highest emission being with **vertical** antenna polarization.

Spectrum analyzer auto sweep mode used on the following plots.

For lower restricted band:

Marker search limits used: Left S1 = 2310 MHz, Right S2 = 2390 MHz
F1 = 2310 MHz, F2 = 2390 MHz

For higher restricted band:

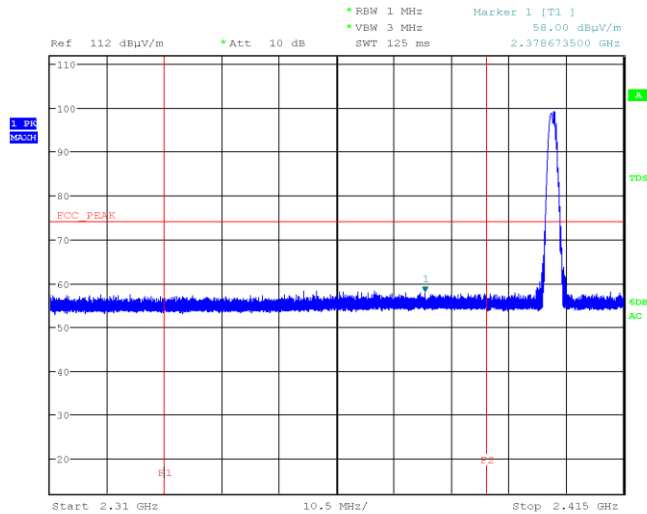
Marker search limits used: Left S1 = 2483.5 MHz, Right S2 = 2500 MHz
F1 = 2483.5 MHz, F2 = 2500 MHz



Radiated emissions 1 GHz to 25 GHz test results:

Lower restricted band; BLE LE1M (CH0, 2402 MHz)

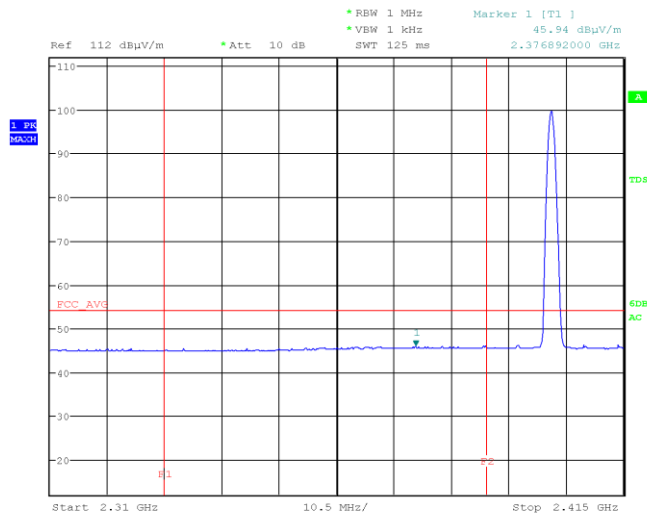
Peak detector, Peak emission below the peak limit.



Date: 11.MAY.2023 11:52:19

Average measurement using reduced video bandwidth of 1 kHz.

Emissions are below average limit.

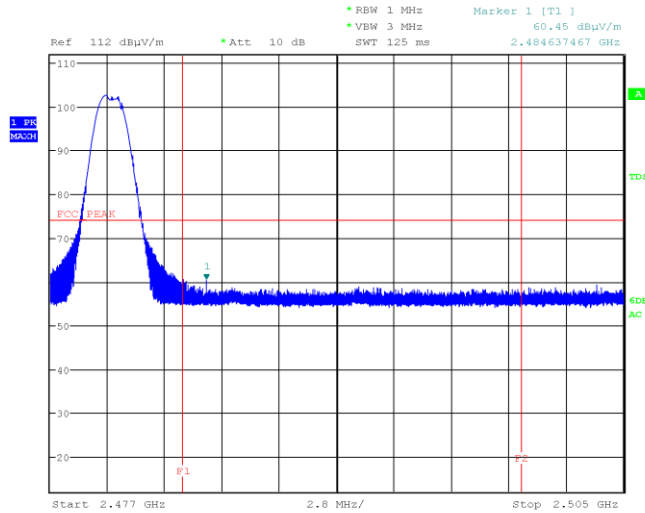


Date: 11.MAY.2023 11:57:19



Upper restricted band; BLE LE1M (CH39, 2480 MHz)

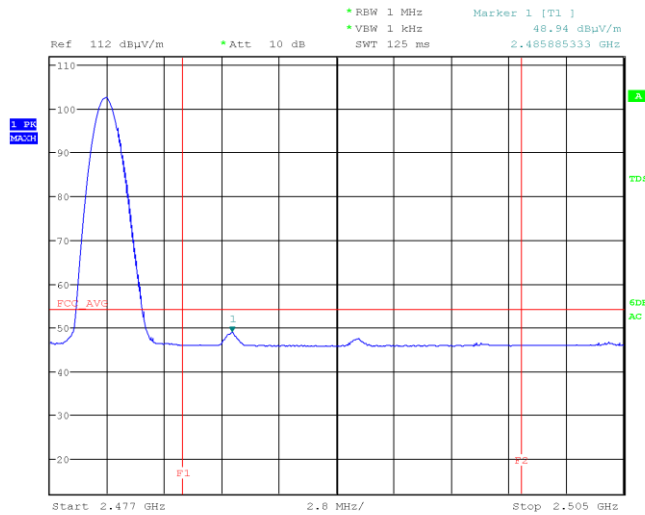
Peak detector, Peak emission below the peak limit.



Date: 11.MAY.2023 10:57:52

Average measurement using reduced video bandwidth of 1 kHz.

Emissions are below average limit.



Date: 11.MAY.2023 11:00:40

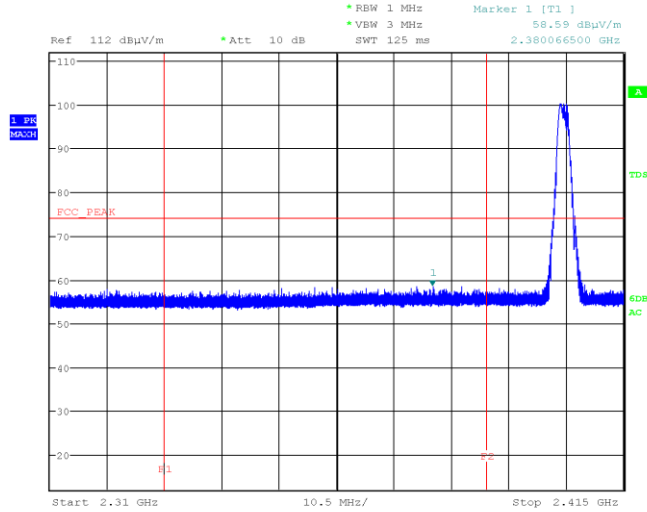


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Lower restricted band; BLE LE2M (CH1, 2404 MHz)

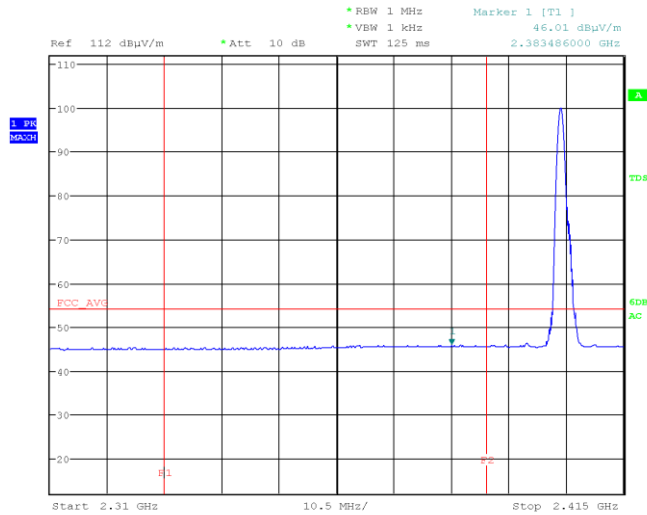
Peak detector, Peak emission below the peak limit.



Date: 11.MAY.2023 12:06:45

Average measurement using reduced video bandwidth of 1 kHz.

Emissions are below average limit.



Date: 11.MAY.2023 12:01:58

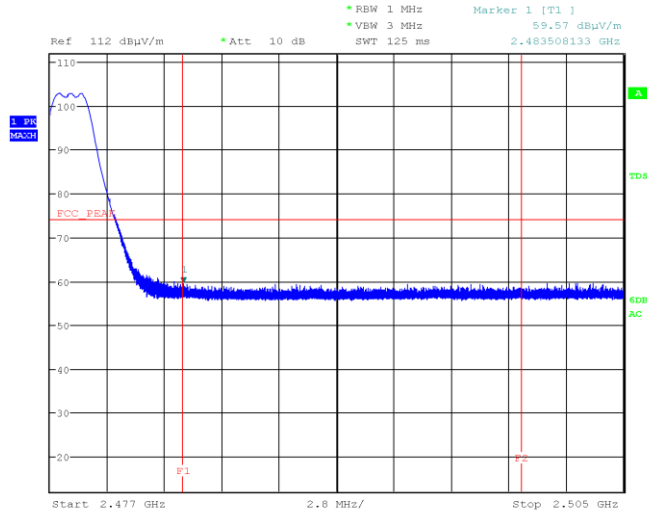


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Upper restricted band; BLE LE2M (CH38, 2478 MHz)

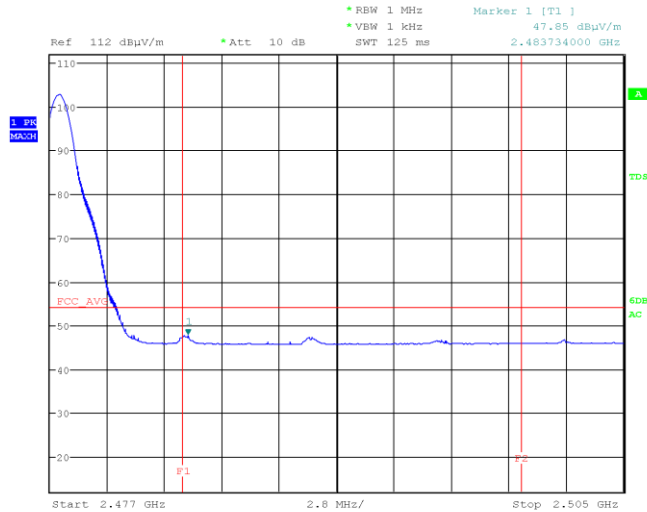
Peak detector, Peak emission below the peak limit.



Date: 11.MAY.2023 11:44:19

Average measurement using reduced video bandwidth of 1 kHz.

Emissions are below average limit.



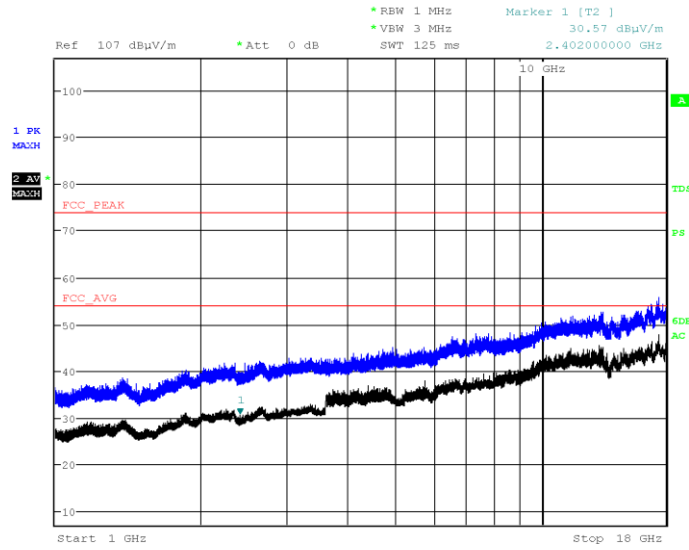
Date: 11.MAY.2023 11:07:12

Radiated emissions 1 GHz to 18 GHz

Measurements made at a 3 meter distance.

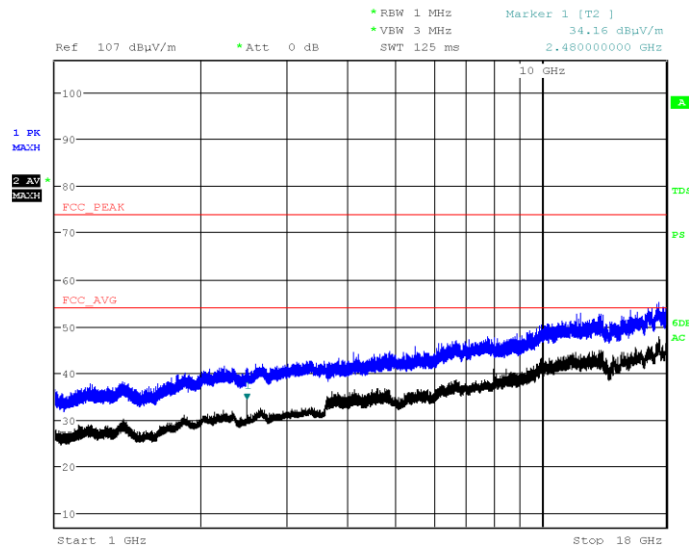
Blue trace is peak detector; black trace is average detector. (30,000 sweep points)
Measurement noise floor more than 6 dB below the respective limits.

Low Channel CH0 (2402 MHz) BLE LE1M



Date: 21.FEB.2023 15:04:01

High Channel CH39 (2480 MHz) BLE LE1M



Date: 21.FEB.2023 15:13:03

Emissions are below their respective limits.

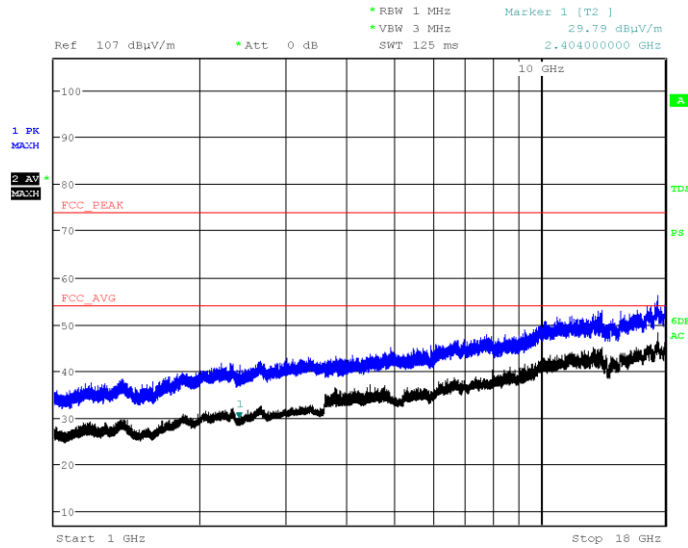
Fundamental emission is attenuated by approximately 60 dB due to the usage of a 2.4 GHz notch filter.



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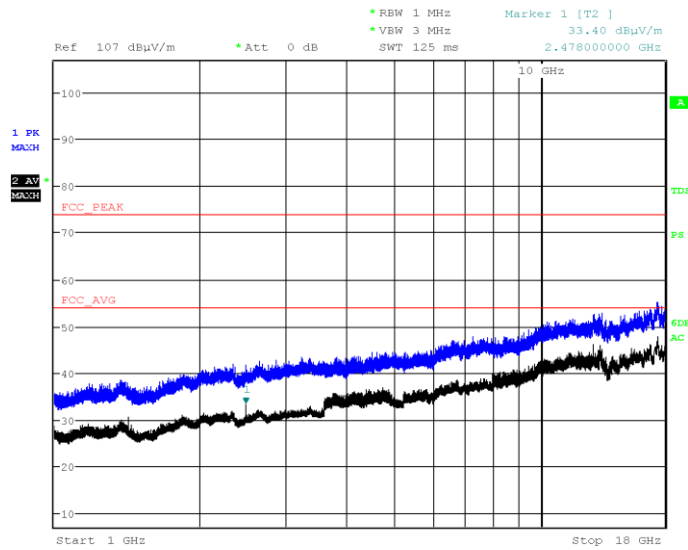


Low Channel CH1 (2404 MHz) BLE LE2M



Date: 21.FEB.2023 15:22:41

High Channel CH38 (2478 MHz) BLE LE2M



Date: 21.FEB.2023 15:32:35

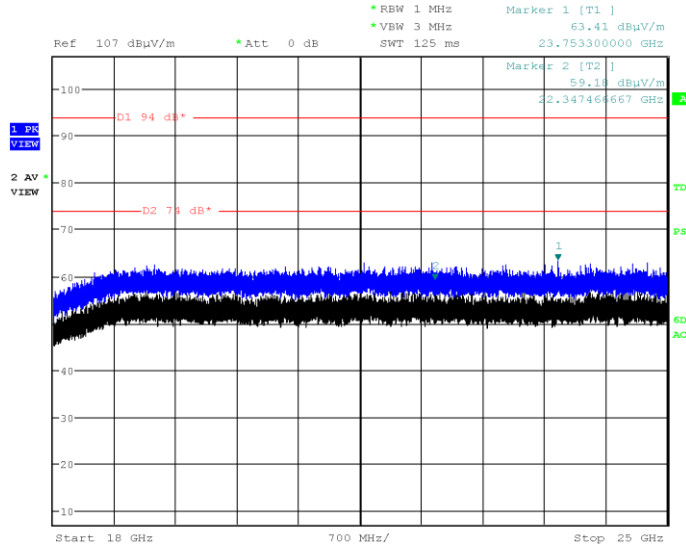
Emissions are below their respective limits.

Fundamental emission is attenuated by approximately 60 dB due to the usage of a 2.4 GHz notch filter.

Radiated emissions 18 GHz to 25 GHz at 30 centimeter distance.

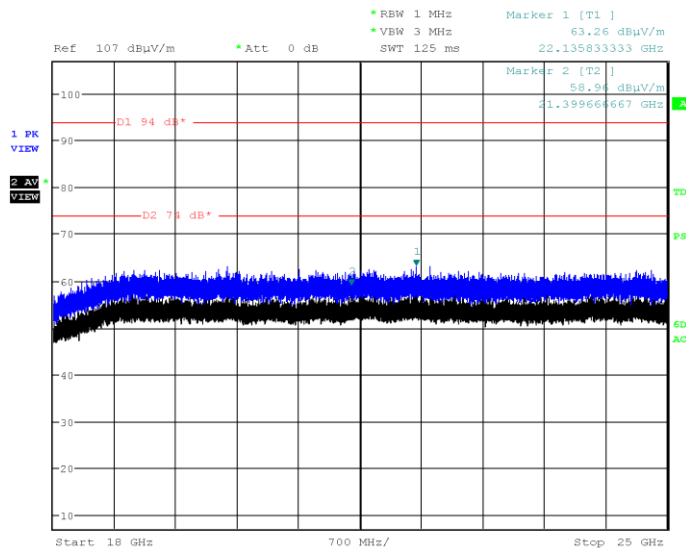
Distance is 30cm (0.3 meters), Limit lines settings based on scaling of $20\text{Log}(D1/D2) = 20\text{Log}(3\text{m}/.3) = 20\text{Log}(10) = 20 \text{ dB}$
 Peak limit = $74 + 20 = 94 \text{ dBuV/m}$ (Display line 1)
 Average limit = $54 + 20 = 74 \text{ dBuV/m}$ (Display line 2)

**BLE LE1M, CH0 = 2402 MHz @ 30cm distance.
Measurement horn antenna polarization = Vertical**



Date: 7.MAR.2023 11:47:35

**BLE LE1M, CH0 = 2402 MHz @ 30 cm distance.
Measurement horn antenna polarization = Horizontal**



Date: 7.MAR.2023 12:37:19

Peak emissions below the average limit.



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The following table summarizes radiated emissions for LMH Channels for BLE LE1M and LE2M.

Plot for other frequencies is similar to plots above and will not be shown.

Radiated Emissions 18 to 25 GHz

Mode	Channel Frequency (MHz)	18 GHz to 25 GHz @ 30 centimeter distance								Measurement Antenna Polarization
		Emission Frequency Average (MHz)	Emission Frequency Peak (MHz)	Measured Amplitude (dBµV/m)	Measured Amplitude (dBµV/m)	FCC 15.247 (d)				
						Limit (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Margin (dB)	
						AVG	Peak	AVG	Peak	
LE1M	2402	22347.0	23753.0	59.20	63.40	74.0	94.0	14.8	30.6	Vertical
LE1M	2402	21399.0	22135.0	58.90	63.20	74.0	94.0	15.1	30.8	Horizontal
LE1M	2440	24408.0	21585.0	58.10	62.90	74.0	94.0	15.9	31.1	Vertical
LE1M	2440	24121.0	23711.0	57.60	63.10	74.0	94.0	16.4	30.9	Horizontal
LE1M	2480	24695.0	21731.0	58.70	63.20	74.0	94.0	15.3	30.8	Vertical
LE1M	2480	21427.0	21540.0	58.10	62.70	74.0	94.0	15.9	31.3	Horizontal
LE2M	2404	22215.0	24120.0	58.50	63.00	74.0	94.0	15.5	31.0	Vertical
LE2M	2404	24543.0	21055.0	58.10	63.70	74.0	94.0	15.9	30.3	Horizontal
LE2M	2440	22014.0	19043.0	58.80	63.30	74.0	94.0	15.2	30.7	Vertical
LE2M	2440	20038.0	21669.0	58.10	63.00	74.0	94.0	15.9	31.0	Horizontal
LE2M	2478	24192.0	22012.0	58.00	63.10	74.0	94.0	16.0	30.9	Vertical
LE2M	2478	22579.0	24647.0	57.80	63.00	74.0	94.0	16.2	31.0	Horizontal

Emissions are more than 10 dB below their respective limits.

11. Radiated Emissions 30 MHz to 1 GHz

Requirement:

FCC 15.205, 15.209

RSS-Gen Clause 8.9

Measurement Method:

ANSI C63.10-2013 Subclause 6.5

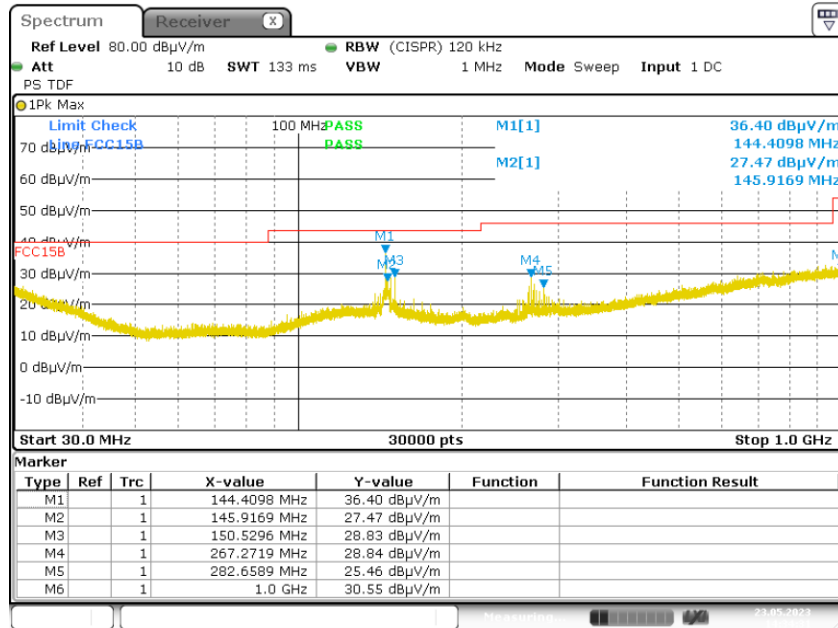
EUT on wooden table 80cm off ground plane.

Radiated emissions below 1 GHz test results:

Bluetooth mode: Playing maximum volume pink noise via Bluetooth connection from iPod.

EUT tested in 3 different orientations with and without cables attached with worst case orientation being EUT facing down on turn table without cables attached. See separate test setup photos document for details.

Horizontal antenna polarization is worst case.



Date: 23.MAY.2023 14:34:31



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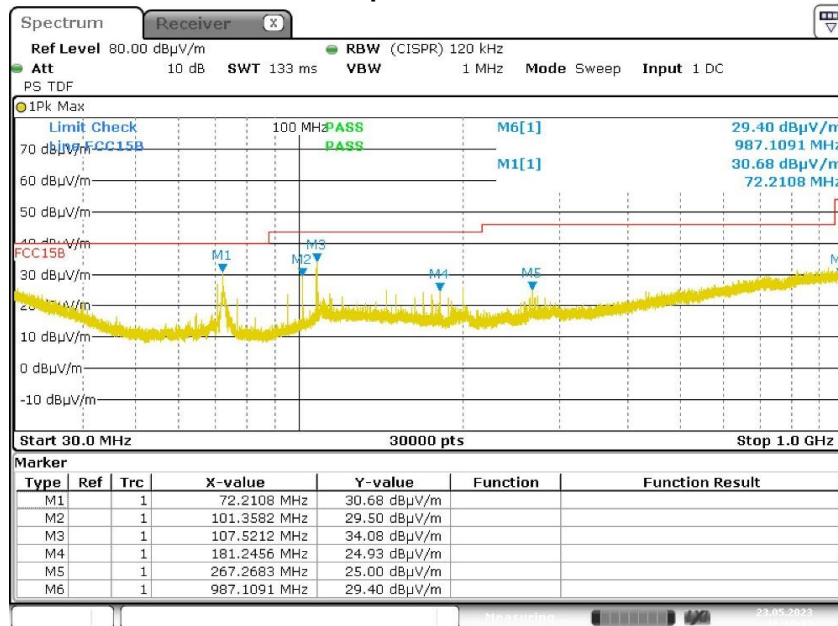


QP Measurements for plot on previous page.

Emission Frequency (MHz)	Measured Amplitude (dBµV/m) QP/AVG*	Measured Amplitude (dBµV/m) Peak	15.247 (d)				Table Azimuth (0° closest to ant)	Receiving Antenna	
			Limit (dBµV/m) QP/AVG*	Limit (dBµV/m) Peak	Margin (dB) QP/AVG*	Margin (dB) Peak		Pol (H/V)	Height (Meters)
144.396	36.10	38.30	43.5	N/A	7.4	N/A	360	H	2.0
144.410	35.40	37.90	43.5	N/A	8.1	N/A	160	H	1.9
145.917	26.20	31.60	43.5	N/A	17.3	N/A	360	H	2.1
150.530	27.10	30.50	43.5	N/A	16.4	N/A	0	H	1.9
267.272	27.90	31.40	46.0	N/A	18.1	N/A	237	H	1.0
282.659	21.70	27.10	46.0	N/A	24.3	N/A	69	H	1.0
999.999	22.00	31.80	54.0	N/A	32.0	N/A	69	H	1.0

AUX Input mode: Playing maximum volume pink noise via supplied AUX cable between EUT AUX input and iPod 3.5mm output. EUT tested in 3 different orientations with worst case being with EUT facing down on turn table with all cables connected. See separate test setup photos document for details.

Vertical antenna polarization is worst case.



Date: 23.MAY.2023 15:10:37

QP Measurements for above plot.

Emission Frequency (MHz)	Measured Amplitude (dBµV/m) QP/AVG*	Measured Amplitude (dBµV/m) Peak	15.247 (d)				Table Azimuth (0° closest to ant)	Receiving Antenna	
			Limit (dBµV/m) QP/AVG*	Limit (dBµV/m) Peak	Margin (dB) QP/AVG*	Margin (dB) Peak		Pol (H/V)	Height (Meters)
72.211	27.80	33.00	40.0	N/A	12.2	N/A	187	V	1.9
101.358	28.40	30.10	43.5	N/A	15.1	N/A	60	V	1.0
107.521	33.30	34.90	43.5	N/A	10.2	N/A	360	V	1.0
181.246	23.30	26.30	43.5	N/A	20.2	N/A	177	V	1.0
267.268	25.00	29.00	46.0	N/A	21.0	N/A	188	V	1.0
987.109	21.90	32.10	54.0	N/A	32.1	N/A	188	V	1.0



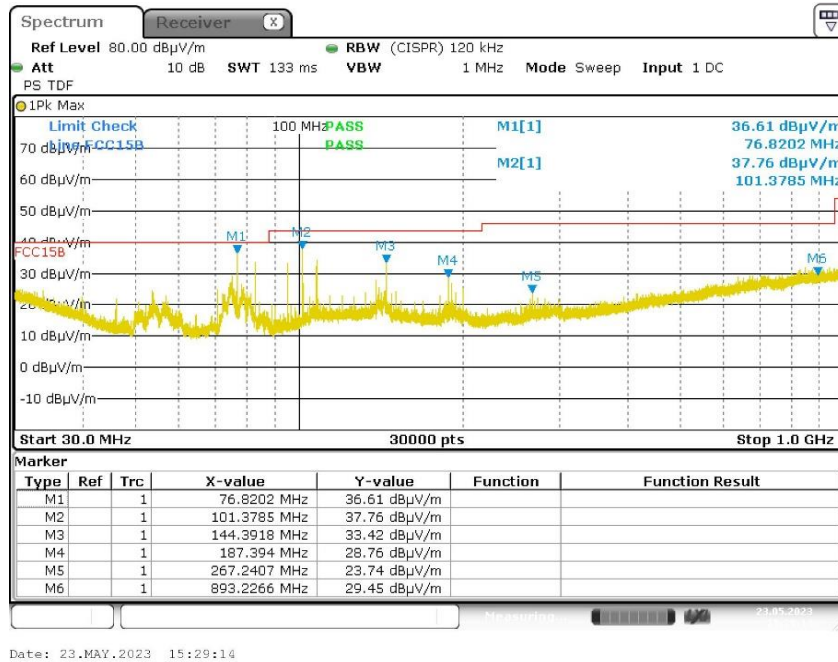
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Charging mode: EUT 's supplied USBC cable plugged into 5V USB charger plugged into 120VAC 60Hz. AUX cable plugged into EUT AUX port, far end of AUX cable is not connected to anything. See separate test setup photos document for details.

Vertical antenna polarization is worst case.



QP Measurements for above plot.

Emission Frequency (MHz)	Measured Amplitude (dBμV/m) QP/AVG*	Measured Amplitude (dBμV/m) Peak	15.247 (d)				Table Azimuth (0° closest to ant)	Receiving Antenna	
			Limit (dBμV/m) QP/AVG*	Limit (dBμV/m) Peak	Margin (dB) QP/AVG*	Margin (dB) Peak		Pol (H/V)	Height (Meters)
76.820	36.10	37.40	40.0	N/A	3.9	N/A	176	V	1.1
101.379	36.90	37.70	43.5	N/A	6.6	N/A	360	V	1.0
144.392	32.00	34.60	43.5	N/A	11.5	N/A	109	V	1.1
187.394	27.40	30.40	43.5	N/A	16.1	N/A	71	V	1.0
267.241	22.80	26.90	46.0	N/A	23.2	N/A	119	V	1.0
893.227	20.90	30.90	46.0	N/A	25.1	N/A	0	V	1.0

12. AC Line Conducted Emissions

Requirement:

FCC 15.207 (a)

RSS-Gen 8.8

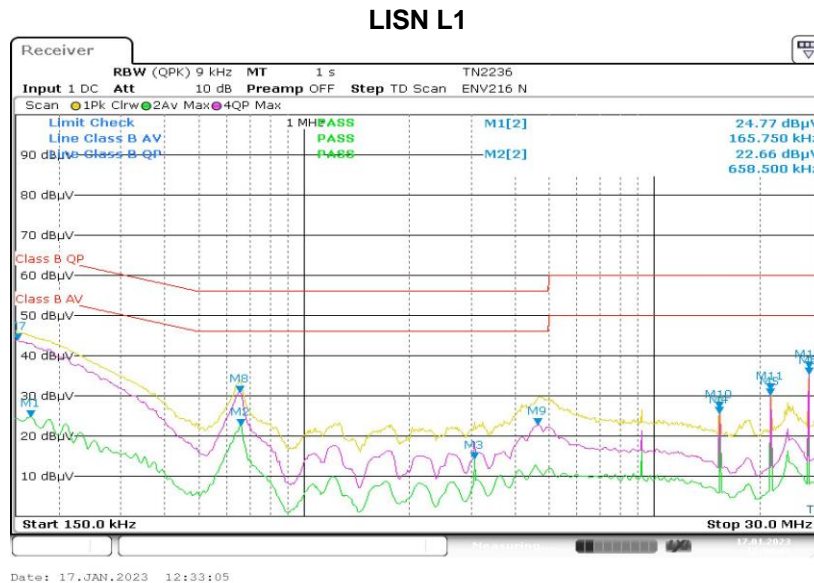
Measurement Method:

ANSI C63.10-2013 Subclause 6.2

EUT on wooden table 80cm off ground plane.

AC Line conducted emissions test results:

EUT pair with iPod playing 1.5 kHz tone with power supply connected to 120VAC 60 Hz.



Mk #	Frequency MHz	MEASURED		LIMIT		MARGIN		Notes
		dBµV QP	dBµV AVG	dBµV QP	dBµV AVG	dB QP	dB AVG	
1	27.65	37.00	35.40	60.0	50.0	23.0	14.6	LISN L1: EUT Charging & Operating BT, 120VAC 60Hz
2	27.65	37.00	35.40	60.0	50.0	23.0	14.6	LISN L1: EUT Charging & Operating BT, 120VAC 60Hz
3	21.50	31.50	30.20	60.0	50.0	28.5	19.8	LISN L1: EUT Charging & Operating BT, 120VAC 60Hz
4	21.50	31.50	30.20	60.0	50.0	28.5	19.8	LISN L1: EUT Charging & Operating BT, 120VAC 60Hz
5	0.15	43.90	24.50	65.9	55.9	22.0	31.4	LISN L1: EUT Charging & Operating BT, 120VAC 60Hz
6	0.17	43.10	24.80	65.2	55.2	22.1	30.4	LISN L1: EUT Charging & Operating BT, 120VAC 60Hz
7	0.66	30.60	22.70	56.0	46.0	25.4	23.3	LISN L1: EUT Charging & Operating BT, 120VAC 60Hz
8	0.65	30.90	22.60	56.0	46.0	25.1	23.4	LISN L1: EUT Charging & Operating BT, 120VAC 60Hz
9	15.36	26.90	25.60	60.0	50.0	33.1	24.4	LISN L1: EUT Charging & Operating BT, 120VAC 60Hz
10	15.36	26.90	25.60	60.0	50.0	33.1	24.4	LISN L1: EUT Charging & Operating BT, 120VAC 60Hz
11	3.07	18.60	14.30	56.0	46.0	37.4	31.7	LISN L1: EUT Charging & Operating BT, 120VAC 60Hz
12	4.66	22.70	11.80	56.0	46.0	33.3	34.2	LISN L1: EUT Charging & Operating BT, 120VAC 60Hz

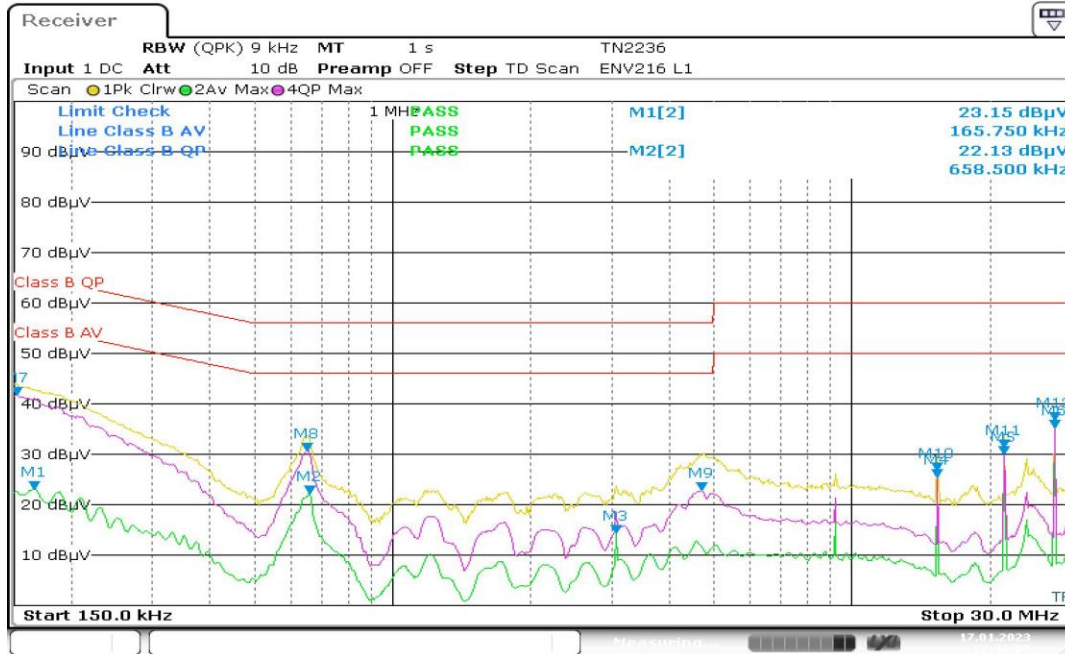


PRODUCT ASSURANCE ENGINEERING

Wireless Transceiver Bluetooth Low Energy Test Report



LISN Neutral



Date: 17.JAN.2023 12:40:09

Mk #	Frequency MHz	MEASURED		LIMIT		MARGIN		Notes
		dBµV QP	dBµV AVG	dBµV QP	dBµV AVG	dB QP	dB AVG	
1	27.65	36.70	35.20	60.0	50.0	23.3	14.8	LISN N: EUT Charging & Operating BT, 120VAC 60Hz
2	27.65	36.70	35.20	60.0	50.0	23.3	14.8	LISN N: EUT Charging & Operating BT, 120VAC 60Hz
3	21.50	31.40	30.10	60.0	50.0	28.6	19.9	LISN N: EUT Charging & Operating BT, 120VAC 60Hz
4	21.50	31.40	30.10	60.0	50.0	28.6	19.9	LISN N: EUT Charging & Operating BT, 120VAC 60Hz
5	0.66	30.10	22.10	56.0	46.0	25.9	23.9	LISN N: EUT Charging & Operating BT, 120VAC 60Hz
6	0.15	41.70	22.60	65.9	55.9	24.2	33.3	LISN N: EUT Charging & Operating BT, 120VAC 60Hz
7	0.17	41.00	23.10	65.2	55.2	24.2	32.1	LISN N: EUT Charging & Operating BT, 120VAC 60Hz
8	0.65	30.70	21.60	56.0	46.0	25.3	24.4	LISN N: EUT Charging & Operating BT, 120VAC 60Hz
9	15.36	26.80	25.40	60.0	50.0	33.2	24.6	LISN N: EUT Charging & Operating BT, 120VAC 60Hz
10	15.36	26.80	25.40	60.0	50.0	33.2	24.6	LISN N: EUT Charging & Operating BT, 120VAC 60Hz
11	3.07	18.50	14.20	56.0	46.0	37.5	31.8	LISN N: EUT Charging & Operating BT, 120VAC 60Hz
12	4.72	22.80	11.70	56.0	46.0	33.2	34.3	LISN N: EUT Charging & Operating BT, 120VAC 60Hz



PRODUCT ASSURANCE ENGINEERING
Wireless Transceiver Bluetooth Low Energy Test Report



13. Equipment List

Used For	Tracking Number	Description	Model	Make	Serial Number	Most recent calibration	Calibration Due Date	Most Recent Verification	Verification Due Date
AC Mains CE	2247	Spectrum Analyzer	ESR7	Rohde & Schwarz	101263	3/21/2022	3/20/2023		
AC Mains CE	2236	LISN	NV216	Rohde & Schwarz	101193	3/29/2022	3/28/2024		
AC Mains CE	1380	Comb Generator	CGC-510	Com-Power	311559	7/13/2022	7/13/2023		
AC Mains CE	2114	Henry Screen Room	N/A	Panashield	1698C			10/7/2022	10/7/2023
AC Mains CE	3724	Cable	RG223 16' with N connectors	Pasternack	N/A			7/6/2022	7/6/2023
RE Below 1 GHz	1375	Positioner	SC99V	Sunol Sciences	050905-1	NA	NA	NA	NA
RE Below 1 GHz	2319	EMI Analyzer	ESR26	Rohde & Schwarz	101276	3/29/2023	3/28/2024		
RE Below 1 GHz	644	3m Chamber	AP191	Rantec	1698A	10/7/2022	10/7/2023		
RE Below 1 GHz	1541	Antenna	JB6	Sunol Sciences	A050807	12/14/2021	12/14/2023		
RE Below 1 GHz	2077	Pre-Amp	Bose	MN ZX60-3018G+	N/A			9/1/2022	9/1/2023
RE Below 1 GHz	1445	Cable Set	4G	NA	NA			9/1/2022	9/1/2023
RE Below 1 GHz	2281	iPod	4G	Apple	CCQM2PAUFFCJ	N/A	N/A	N/A	N/A
RE Above 1 GHz	2602	Pre-Amp	AFS42-01001800-28-10P-42	Miteq	N/A			7/7/2022	7/7/2023
RE Above 1 GHz	1663	EMI Analyzer	ESU40	Rohde & Schwarz	100098	3/20/2022	3/19/2024		
RE Above 1 GHz	2414	2.4 GHz Notch Filter	BRMS0702-07	Micro-Tronics	003			3/28/2022	3/27/2023
RE Above 1 GHz	2342	2.4 GHz Notch Filter	BRMS0702-07	Micro-Tronics	001			3/28/2022	3/27/2023
RE Above 1 GHz	2385	Chamber	3 Meter	AP Americas	N/A	10/7/2022	10/7/2023		
RE Above 1 GHz	1757	Pre-Amp	JS4018004000-30-8P-A1	Miteq	1406279			7/7/2022	7/7/2023
RE Above 1 GHz	1596	Horn	AT4640	Amplifier Research	309234			7/7/2022	7/7/2023
RE Above 1 GHz	2349	Horn	3117	ETS Lindgren	00152406	2/24/2023	2/23/2025		
RE Above 1 GHz	2368	Cable	TRU-210	TRU Corporation	TRU-12767-35			3/28/2023	3/27/2024
RE Above 1 GHz	3685	Cable Set	2373, 2479, 2357	N/A	N/A			3/28/2022	3/27/2023
RE Restricted Bands	2602	Pre-Amp	AFS42-01001800-28-10P-42	Miteq	N/A			7/7/2022	7/7/2023
RE Restricted Bands	1663	EMI Analyzer	ESU40	Rohde & Schwarz	100098	3/20/2022	3/19/2024		
RE Restricted Bands	2385	Chamber	3 Meter	AP Americas	N/A	10/7/2022	10/7/2023		
RE Restricted Bands	2349	Horn	3117	ETS Lindgren	00152406	2/24/2023	2/23/2025	3/28/2023	3/28/2024
RE Restricted Bands	3685	Cable Set	2373, 2479, 2357	N/A	N/A			3/28/2022	3/27/2023
RF Conducted	2342	2.4 GHz Notch Filter	BRMS0702-07	Micro-Tronics	001			3/28/2022	3/27/2023
RF Conducted	2408	EMI Analyzer	FSV40	Rohde & Schwarz	101414	3/23/2022	3/22/2023		
RF Conducted	2409	EMI Analyzer	FSV40	Rohde & Schwarz	101413	3/21/2023	3/21/2024		
RF Conducted	2404	ETS Probe	7002-008	ETS Lindgren	160035	10/24/2022	10/24/2023		



14 Measurement Uncertainty

AC Mains conducted emissions uncertainty.

Uncertainty Budget (AC mains measurements)				
Title:		Conducted RF Emissions (Mains)		
Source of Uncertainty	Value units:± dB	Distribution	Divisor	Uncertainty (± dB)
Receiver - absolute level	0.3	Rect.	1.73	0.17
Receiver - frequency response	1.0	Rect.	1.73	0.58
Receiver - attenuator switching	0.2	Rect.	1.73	0.12
Receiver - bandwidth switching	0.2	Rect.	1.73	0.12
Receiver - display	0.5	Rect.	1.73	0.29
LISN impedance	2.6	Triang.	2.45	1.06
LISN insertion loss	0.6	Norm.	2.00	0.30
Cable correction factor	0.1	Norm.	2.00	0.05
Combined uncertainty (RSS):				1.30
Coverage factor (2 sigma):				2.00
Extended uncertainty (95% confidence):				2.60

Radiated emission uncertainty (30 MHz – 1 GHz)

Uncertainty Budget				
Title:		Radiated RF Emissions (30MHz-1GHz)		
Source of Uncertainty	Value units:± dB	Distribution	Divisor	Uncertainty (± dB)
Receiver - absolute level	0.3	Rect.	1.73	0.17
Receiver - frequency response	0.8	Rect.	1.73	0.46
Receiver - attenuator switching	0.2	Rect.	1.73	0.12
Receiver - bandwidth switching	0.2	Rect.	1.73	0.12
Receiver - display	0.5	Rect.	1.73	0.29
Antenna factor	0.8	Norm.	2.00	0.38
Antenna directivity	1.0	Norm.	2.00	0.50
Preamp correction factor	0.5	Norm.	2.00	0.25
Cable correction factor	0.5	Norm.	2.00	0.25
Site imperfection - NSA	4.0	Triang.	2.45	1.63
Test table impact	1.1	Rect.	1.73	0.64
Combined uncertainty (RSS):				1.98
Coverage factor (2 sigma):				2.00
Extended uncertainty (95% confidence):				3.97

Radiated emissions above 1 GHz

Uncertainty Budget				
Title:		Radiated Emissions above 1 GHz		
Source of Uncertainty	Value units:± dB	Distribution	Divisor	Uncertainty (± dB)
RF spec anal-level-Ref.	0.6	Rect.	1.73	0.35
RF spec anal-level-Freq resp.	1.0	Rect.	1.73	0.58
RF spec anal-level-Display	0.3	Rect.	1.73	0.17
RF spec anal-level-QP det.	1.0	Rect.	1.73	0.58
Antenna factor	0.9	Norm.	2.00	0.45
Preamp corr. Factor	0.5	Rect.	1.73	0.29
Cable corr. Factor	0.5	Rect.	1.73	0.29
Combined uncertainty (RSS):				1.09
Coverage factor (2 sigma):				2.00
Extended uncertainty (95% confidence):				2.18

Conducted RF measurements

Uncertainty Budget				
Title:		Conducted RF measurements		
Source of Uncertainty	Value units:± dB	Distribution	Divisor	Uncertainty (± dB)
Analyzer - absolute level	0.3	Rect.	1.73	0.17
Analyzer - frequency response	0.5	Rect.	1.73	0.29
Analyzer - attenuator switching	0.2	Rect.	1.73	0.12
Analyzer - bandwidth switching	0.2	Rect.	1.73	0.12
Analyzer - display	0.5	Rect.	1.73	0.29
Cable correction factor	0.5	Norm.	2.00	0.25
Combined uncertainty (RSS):				0.54
Coverage factor (2 sigma):				2.00
Extended uncertainty (95% confidence):				1.07



End of Report