

FCC Test Report

Product Name	Bluetooth Headset
Model No.	HSC175
FCC ID	BCE-HSC175

Applicant	GN Audio USA Inc.
Address	900 Chelmsfort St, Tower 2, Floor 8 , Lowell, Massachusetts, 1851 United States

Date of Receipt	Aug. 09, 2022
Issued Date	Sep. 05, 2022
Report No.	2280310R-RFUSBLEV01-A
Report Version	V1.0



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.

This report must not be used to claim product endorsement by TAF or any agency of the government.

The test report shall not be reproduced without the written approval of DEKRA Testing and Certification Co., Ltd.

Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Test Report

Issued Date: Sep. 05, 2022

Report No.: 2280310R-RFUSBLEV01-A



Product Name	Bluetooth Headset
Applicant	GN Audio USA Inc.
Address	900 Chelmsfort St, Tower 2, Floor 8 , Lowell, Massachusetts, 1851 United States
Manufacturer	GN Audio USA Inc.
Model No.	HSC175
FCC ID	BCE-HSC175
EUT Rated Voltage	DC 5V by USB
EUT Test Voltage	DC 5V by USB
Trade Name	Jabra
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C ANSI C63.4: 2014, ANSI C63.10: 2013
Test Result	Complied

Documented By

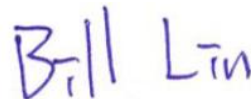
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(Senior Project Specialist / Joanne Lin)

Tested By

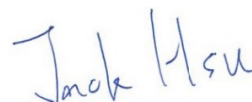
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(Senior Engineer / Bill Lin)

Approved By

:



(Senior Engineer / Jack Hsu)

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Appendix 1: EUT Test Photographs

Appendix 2: Product Photos-Please refer to the file: 2280310R-Product Photos

Revision History

Report No.	Version	Description	Issued Date
2280310R-RFUSBLEV01-A	V1.0	Initial issue of report.	Sep. 05, 2022

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Bluetooth Headset
Trade Name	Jabra
Model No.	HSC175
FCC ID	BCE-HSC175
Frequency Range	2402-2480MHz
Channel Number	40CH
Type of Modulation	GFSK
Antenna Type	PCB Antenna
Channel Control	Auto
Antenna Gain	Refer to the table “Antenna List”

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	GN Audio A/S	HSC175	PCB Antenna	3.73 dBi for 2.4 GHz

Note: The antenna of EUT is conforming to FCC 15.203.

Center Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 00:	2402 MHz	Channel 01:	2404 MHz	Channel 02:	2406 MHz	Channel 03:	2408 MHz
Channel 04:	2410 MHz	Channel 05:	2412 MHz	Channel 06:	2414 MHz	Channel 07:	2416 MHz
Channel 08:	2418 MHz	Channel 09:	2420 MHz	Channel 10:	2422 MHz	Channel 11:	2424 MHz
Channel 12:	2426 MHz	Channel 13:	2428 MHz	Channel 14:	2430 MHz	Channel 15:	2432 MHz
Channel 16:	2434 MHz	Channel 17:	2436 MHz	Channel 18:	2438 MHz	Channel 19:	2440 MHz
Channel 20:	2442 MHz	Channel 21:	2444 MHz	Channel 22:	2446 MHz	Channel 23:	2448 MHz
Channel 24:	2450 MHz	Channel 25:	2452 MHz	Channel 26:	2454 MHz	Channel 27:	2456 MHz
Channel 28:	2458 MHz	Channel 29:	2460 MHz	Channel 30:	2462 MHz	Channel 31:	2464 MHz
Channel 32:	2466 MHz	Channel 33:	2468 MHz	Channel 34:	2470 MHz	Channel 35:	2472 MHz
Channel 36:	2474 MHz	Channel 37:	2476 MHz	Channel 38:	2478 MHz	Channel 39:	2480 MHz

Note:

1. The EUT is a Bluetooth Headset with built-in Bluetooth (5.0 and V3.0+HS, V2.1+EDR) transceiver, this report for Bluetooth V5.0.
2. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report
3. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
4. DEKRA has evaluated each test mode. Only the worst case (Stereo headsets) is shown in the report.
5. Mono and Stereo headsets are different in the amount of the speaker only. Their Bluetooth chip and antenna is completely the same, while the duo left-hand side only holds additional beads, protection-diodes, and another speaker.
6. These tests were conducted on a sample for the purpose of demonstrating compliance of transmitter with Part 15 Subpart C Paragraph 15.247 for spread spectrum devices.

Test Mode	Mode 1: Transmit - 1Mbps-BLE Mode 2: Transmit - 2Mbps-BLE
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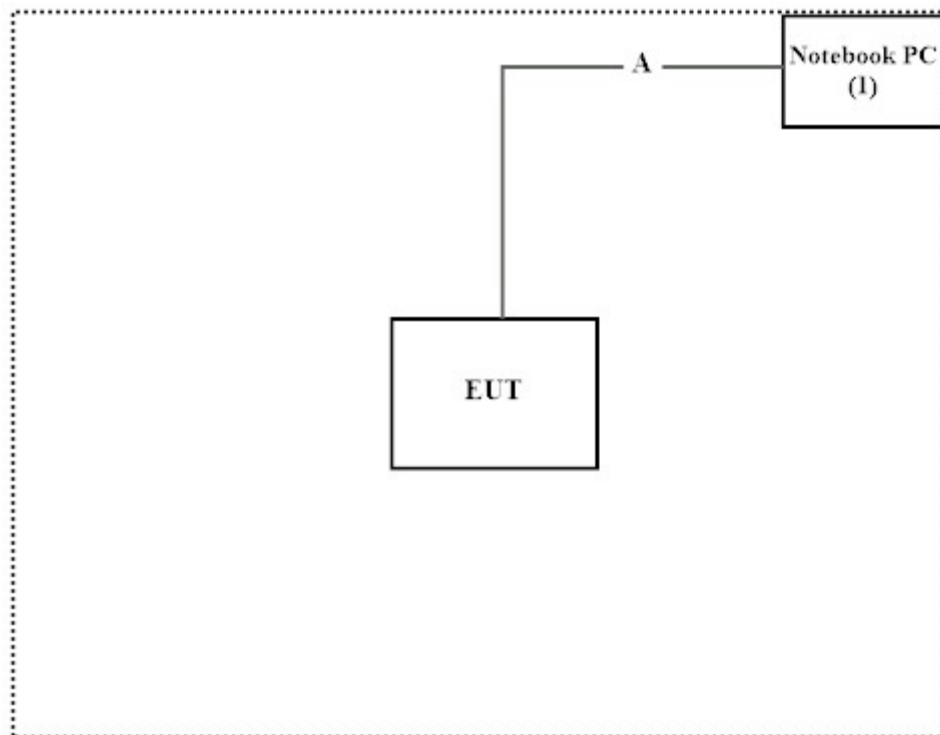
1.2. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product		Manufacturer	Model No.	Serial No.	Power Cord
1	Notebook PC	DELL	Latitude 5580	GDZN7H2	N/A

Signal Cable Type		Signal cable Description
A	USB Cable	Shielded, 1.7m

1.3. Configuration of Tested System



1.4. EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.3.
- (2) Execute software “BlueTest3 Version 3.3.5” on the notebook PC.
- (3) Configure the test mode, the test channel, and the data rate.
- (4) Press “OK” to start the continuous Transmit.
- (5) Verify that the EUT works properly.

1.5. Test Facility

Ambient conditions in the laboratory:

Performed Item	Items	Required	Actual
Conducted Emission	Temperature (°C)	10~40 °C	23.4 °C
	Humidity (%RH)	10~90 %	55.2 %
Radiated Emission	Temperature (°C)	10~40 °C	21.3 °C
	Humidity (%RH)	10~90 %	59.6 %
Conductive	Temperature (°C)	10~40 °C	25.5 °C
	Humidity (%RH)	10~90 %	55 %

USA : **FCC Registration Number: TW0033**

Canada : **CAB Identifier Number: TW3023 / Company Number: 26930**

Site Description : Accredited by TAF
Accredited Number: 3023

Test Laboratory : DEKRA Testing and Certification Co., Ltd
Address : No. 5-22, Ruishukeng Linkou District, New Taipei City, 24451, Taiwan
Performed Location : No. 26, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan, R.O.C.
Phone number : +886-3-275-7255
Fax number : +886-3-327-8031
Email address : info.tw@dekra.com
Website : <http://www.dekra.com.tw>

1.6. List of Test Equipment

For Conduction measurements / HY-SR01

	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due. Date
X	EMI Test Receiver	R&S	ESR7	101601	2022.06.23	2023.06.22
X	Two-Line V-Network	R&S	ENV216	101306	2022.05.23	2023.05.22
X	Two-Line V-Network	R&S	ENV216	101307	2022.07.04	2023.07.03
X	Coaxial Cable	SUHNER	RG400_BNC	RF001	2022.05.24	2023.05.23

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : E3 210616 dekra V9.

For Conducted measurements / HY-SR02

	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due. Date
X	Spectrum Analyzer	R&S	FSV30	103466	2021.12.27	2022.12.26
X	Peak Power Analyzer	KEYSIGHT	8900B	MY51000539	2022.05.27	2023.05.26
X	Power Sensor	KEYSIGHT	N1923A	MY59240002	2022.05.19	2023.05.18
X	Power Sensor	KEYSIGHT	N1923A	MY59240003	2022.05.19	2023.05.18

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : RF Conducted Test Tools R3 V3.0.1.19.

For Radiated measurements / HY-CB02

	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due. Date
	Loop Antenna	AMETEK	HLA6121	56736	2022.05.14	2023.05.13
X	Bi-Log Antenna	SCHWARZBECK	VULB9168	9168-675	2021.08.11	2023.08.10
X	Horn Antenna	RF SPIN	DRH18-E	210503A18ES	2022.06.08	2023.06.07
	Horn Antenna	Com-Power	AH-840	101087	2022.06.16	2023.06.15
X	Pre-Amplifier	SGH	SGH0301-9	20211007-11	2022.02.22	2023.02.21
X	Pre-Amplifier	EMCI	EMC051845SE	980632	2021.09.07	2022.09.06
	Pre-Amplifier	EMCI	EMC05820SE	980361	2021.12.16	2022.12.15
	Pre-Amplifier	EMCI	EMC184045SE	980369	2022.05.12	2023.05.11
	Coaxial Cable	EMCI	EMC102-KM-KM-600	1160314		
	Coaxial Cable	EMCI	EMC102-KM-KM-7000	170242		
X	Filter	MICRO TRONICS	BRM50702	G251	2021.09.16	2022.09.15
	Filter	MICRO TRONICS	BRM50716	G188	2021.09.16	2022.09.15
X	EMI Test Receiver	R&S	ESR3	102793	2021.12.15	2022.12.14
X	Spectrum Analyzer	R&S	FSV3044	101114	2022.02.11	2023.02.10
X	Coaxial Cable	SGH	HA800	GD20110223-2	2022.03.17	2023.03.16
	Coaxial Cable	SGH	HA800	GD20110222-4		
	Coaxial Cable	SGH	SGH18	2021005-2		
	Coaxial Cable	SGH	SGH18	202108-5		

Note:

1. Bi-Log Antenna is calibrated every two years, the other equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : E3 210616 dekra V9.

1.7. Uncertainty

Uncertainties have been calculated according to the DEKRA internal document.

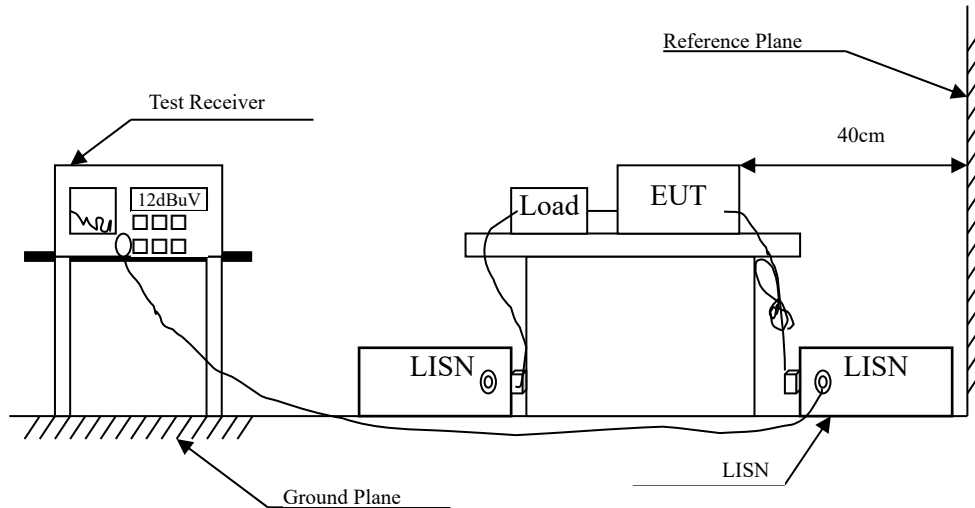
The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Test item	Uncertainty	
Conducted Emission	± 3.42 dB	
Peak Power Output	± 0.89 dB	
Radiated Emission	Under 1GHz ± 4.05 dB	Above 1GHz ± 3.73 dB
RF Antenna Conducted Test	± 2.06 dB	
Band Edge	Under 1GHz ± 4.05 dB	Above 1GHz ± 3.73 dB
6dB Bandwidth	± 1544.74 Hz	
Power Density	± 2.06 dB	
Duty Cycle	± 2.31 ms	

2. Conducted Emission

2.1. Test Setup



2.2. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit		
Frequency MHz	Limits	
	QP	AV
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

Remarks: In the above table, the tighter limit applies at the band edges.

2.3. Test Procedure

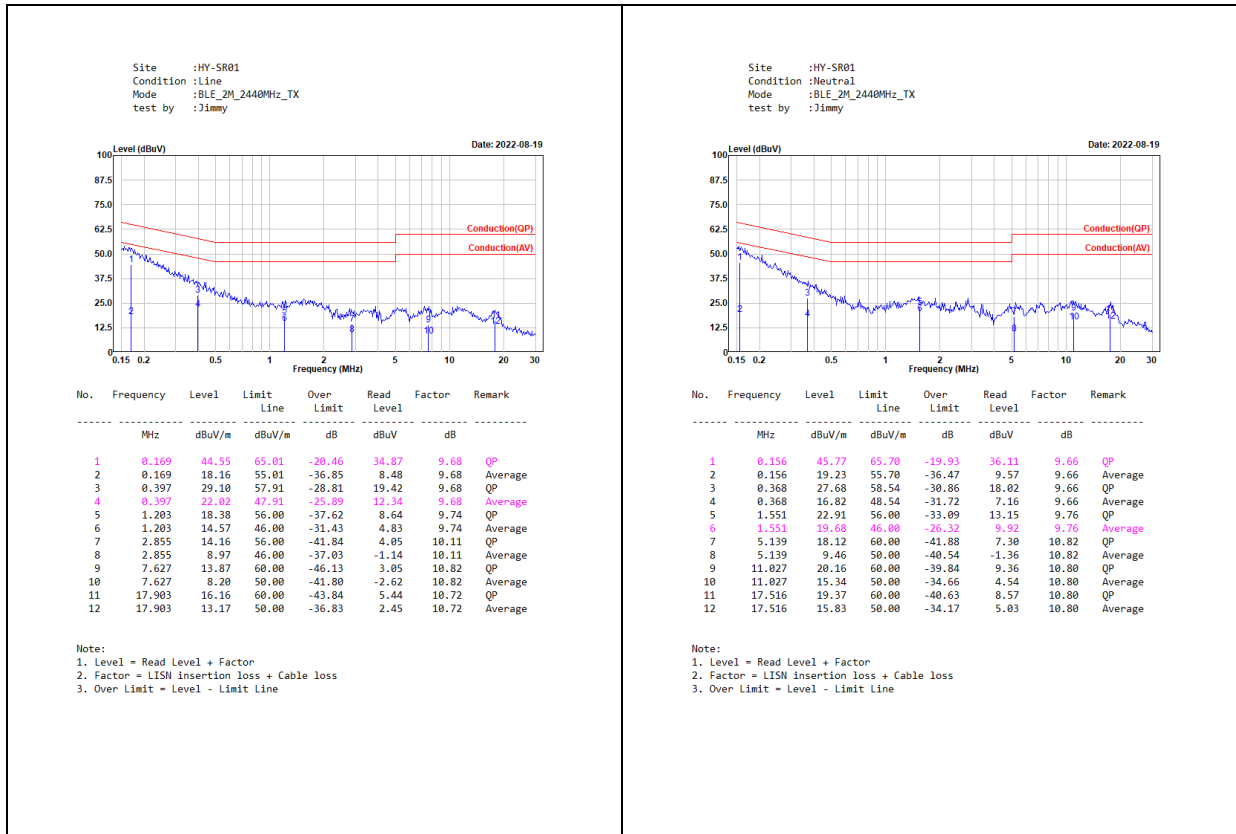
The EUT and Peripherals are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

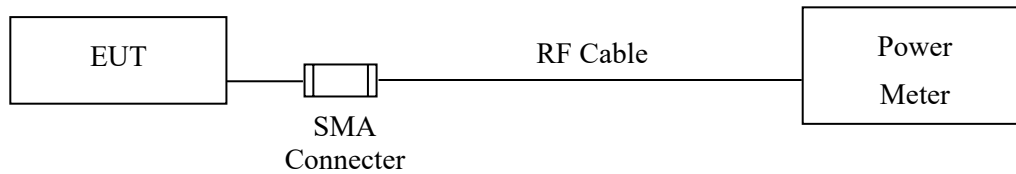
The EUT was setup to ANSI C63.4, 2014; tested to DTS test procedure of FCC KDB-558074 for compliance to FCC 47CFR Subpart C requirements.

2.4. Test Result of Conducted Emission



3. Peak Power Output

3.1. Test Setup



3.2. Limit

The maximum peak power shall be less 1Watt.

3.3. Test Procedure

The EUT was tested according to C63.10:2013 for compliance to FCC 47CFR 15.247 requirements. The maximum peak conducted output power using C63.10:2013 Section 11.9.1.3 PKPM1 Peak power meter method.

3.4. Test Result of Peak Power Output

Product : Bluetooth Headset
Test Item : Peak Power Output
Test Mode : Mode 1: Transmit - 1Mbps-BLE
Test Date : 2022/08/12

Channel No.	Frequency (MHz)	Measurement (dBm)	Required Limit	Result
00	2402	3.55	1 Watt= 30 dBm	Pass
19	2440	3.52	1 Watt= 30 dBm	Pass
39	2480	3.56	1 Watt= 30 dBm	Pass

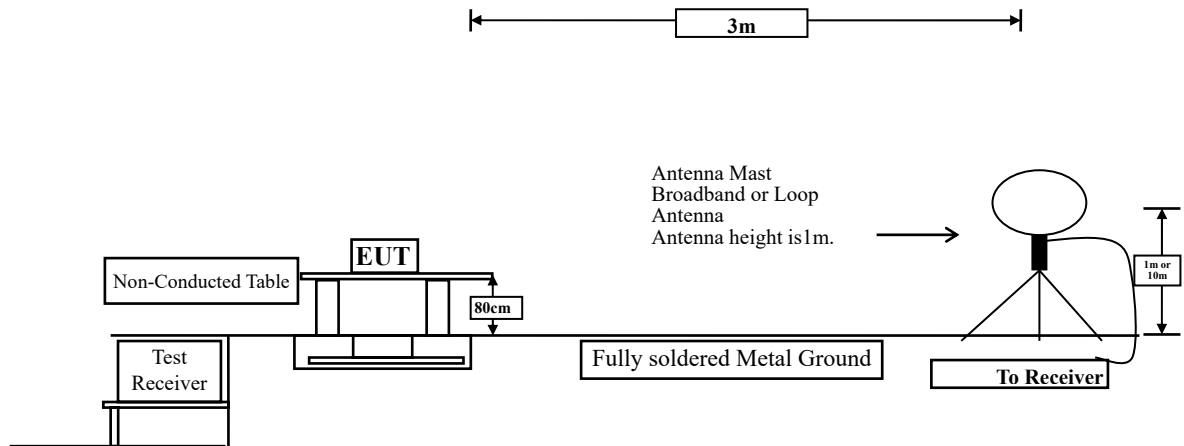
Product : Bluetooth Headset
Test Item : Peak Power Output
Test Mode : Mode 2: Transmit - 2Mbps-BLE
Test Date : 2022/08/12

Channel No.	Frequency (MHz)	Measurement (dBm)	Required Limit	Result
00	2402	3.47	1 Watt= 30 dBm	Pass
19	2440	3.44	1 Watt= 30 dBm	Pass
39	2480	3.57	1 Watt= 30 dBm	Pass

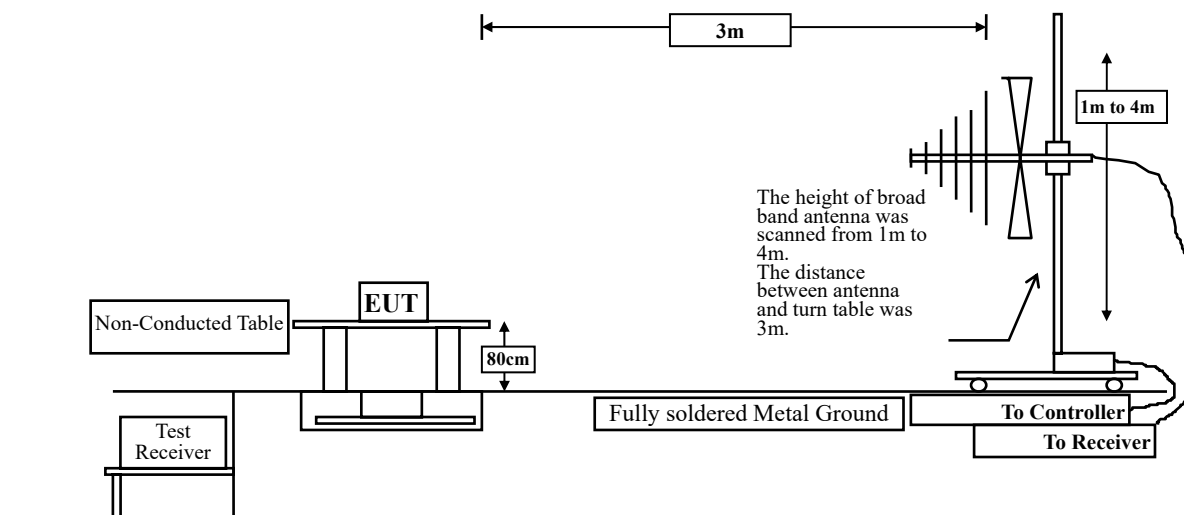
4. Radiated Emission

4.1. Test Setup

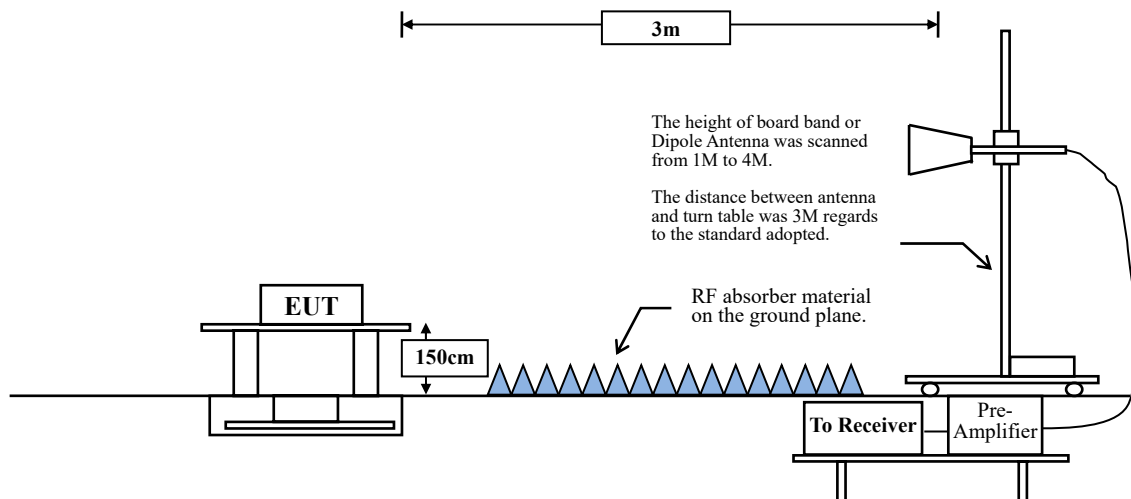
Radiated Emission Under 30MHz



Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



4.2. Limits

➤ General Radiated Emission Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209 Limits		
Frequency MHz	Field strength (microvolts/meter)	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

- Remarks:
1. RF Voltage (dBuV) = 20 log RF Voltage (uV)
 2. In the Above Table, the tighter limit applies at the band edges.
 3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

4.3. Test Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested according to C63.10:2013 Section 11.12.1 for compliance to FCC 47CFR 15.247 requirements.

Measuring the frequency range below 1GHz, the EUT is placed on a turn table which is 0.8 meter above ground, when measuring the frequency range above 1GHz, the EUT is placed on a turn table which is 1.5 meter above ground.

The turn table is rotated 360 degrees to determine the position of the maximum emission level.

The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10: 2013 on radiated measurement.

The resolution bandwidth below 30MHz setting on the field strength meter is 9kHz and 30MHz~1GHz is 120kHz and above 1GHz is 1MHz.

Radiated emission measurements below 30MHz are made using Loop Antenna and 30MHz~1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna. The measurement frequency range from 9kHz - 10th Harmonic of fundamental was investigated.

RBW and VBW Parameter setting:

According to C63.10 Section 11.12.2.4 Peak measurement procedure.

RBW = as specified in Table 1.

$VBW \geq 3 \times RBW$.

Table 1 - RBW as a function of frequency

Frequency	RBW
9-150 kHz	200-300 Hz
0.15-30 MHz	9-10 kHz
30-1000 MHz	100-120 kHz
> 1000 MHz	1 MHz

According to C63.10 Section 11.12.2.5 Average measurement procedure.

RBW = 1MHz.

VBW = 10Hz, when duty cycle $\geq 98\%$

$VBW \geq 1/T$, when duty cycle $< 98\%$

(T refers to the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.)

2.4GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
BLE 1M	84.80	2.1200	472	500
BLE 2M	56.38	1.0600	943	1000

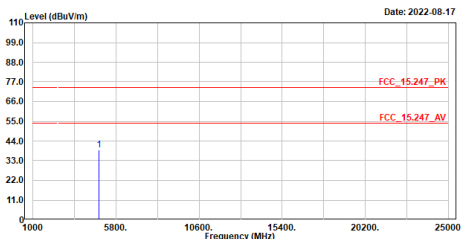
Note: Duty Cycle Refer to Section 9.

4.4. Test Result of Radiated Emission

Site :HY-CB02
Condition :3m ,HORIZONTAL
mode :TX_B1elm_2402MHz
Test by :Peter

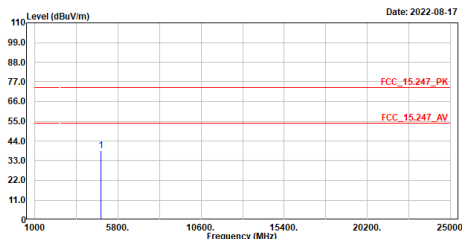
Site :HY-CB02
Condition :3m ,VERTICAL
mode :TX_B1elm_2402MHz
Test by :Peter

Date: 2022-08-17



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	4804.000	39.20	74.00	-34.80	53.96	-14.76	Peak

Date: 2022-08-17



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	4804.000	38.70	74.00	-35.30	53.46	-14.76	Peak

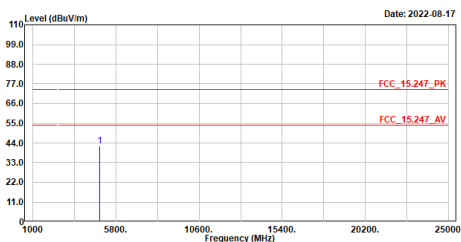
Note:
1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Note:
1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :HY-CB02
Condition :3m ,HORIZONTAL
mode :TX_B1elm_2440MHz
Test by :Peter

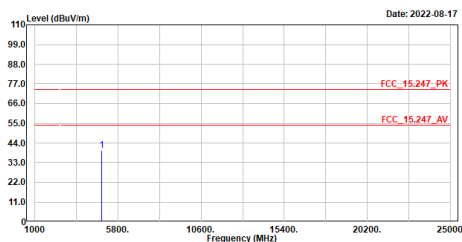
Site :HY-CB02
Condition :3m ,VERTICAL
mode :TX_B1elm_2440MHz
Test by :Peter

Date: 2022-08-17



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	4880.000	42.40	74.00	-31.60	57.12	-14.72	Peak

Date: 2022-08-17

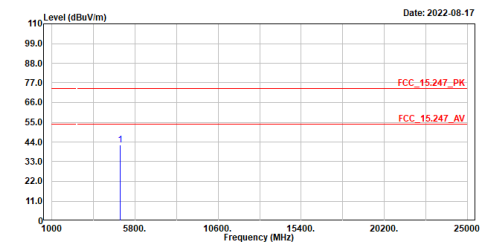


No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	4880.000	39.72	74.00	-34.28	54.44	-14.72	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Note:
1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

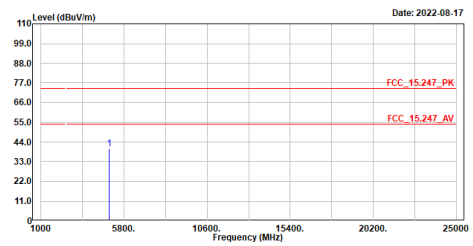
Site :HY-CB02
Condition :3m ,HORIZONTAL
mode :TX_B1e1m_2480MHz
Test by :Peter



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level	dB	
1	4960.000	42.25	74.00	-31.75	56.84	-14.59	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

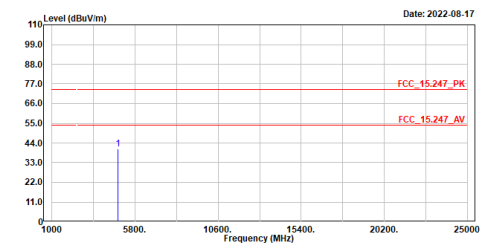
Site :HY-CB02
Condition :3m ,VERTICAL
mode :TX_B1e1m_2480MHz
Test by :Peter



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level	dB	
1	4960.000	40.09	74.00	-33.91	54.68	-14.59	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

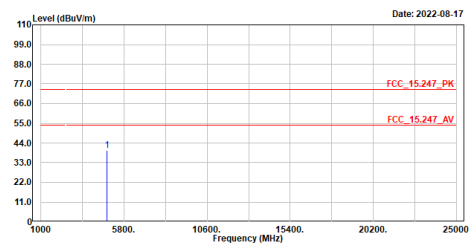
Site :HY-CB02
Condition :3m ,HORIZONTAL
mode :TX_B1e2m_2402MHz
Test by :Peter



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level	dB	
1	4884.000	40.51	74.00	-33.49	55.27	-14.76	Peak

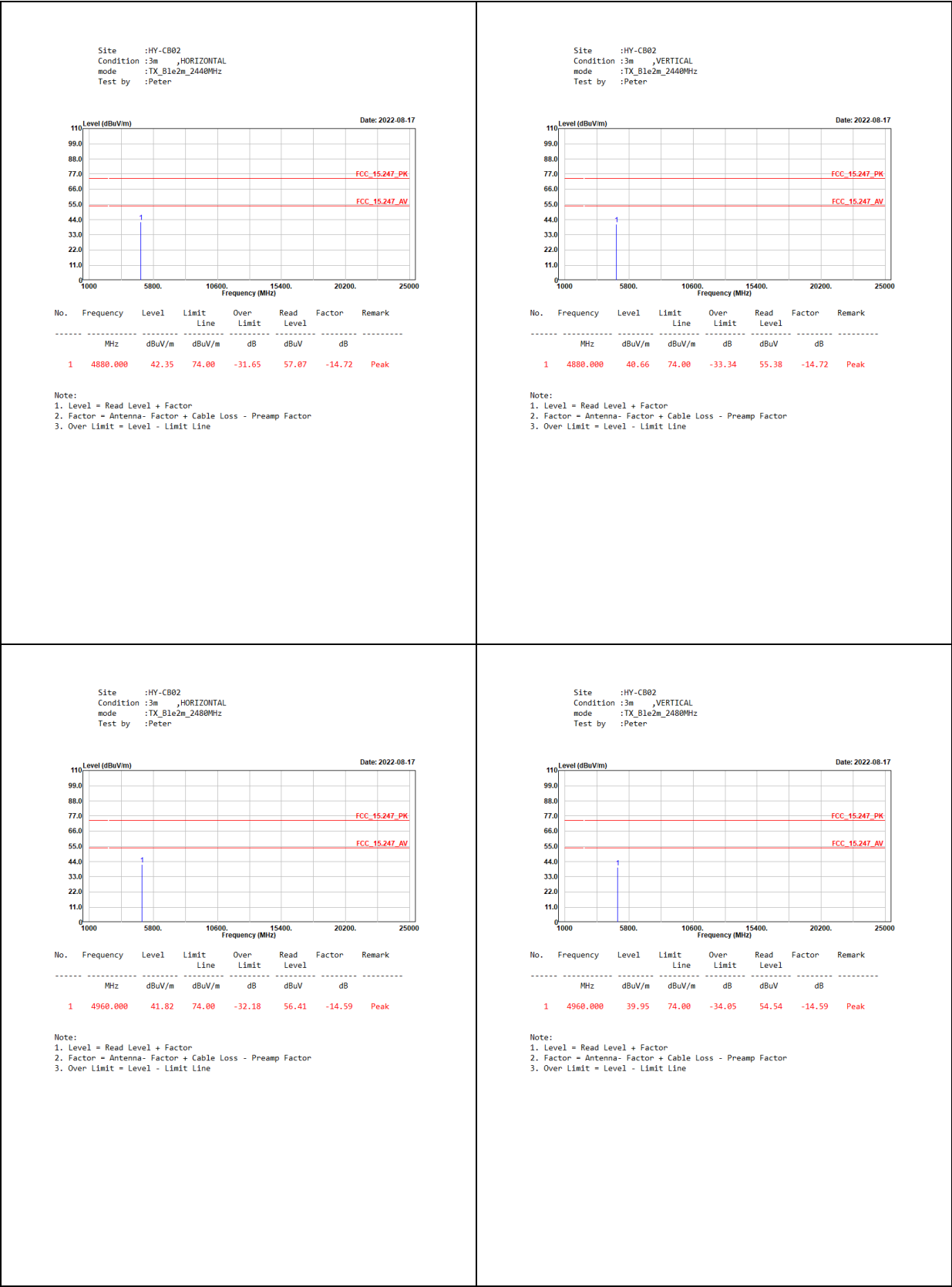
Note:
1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

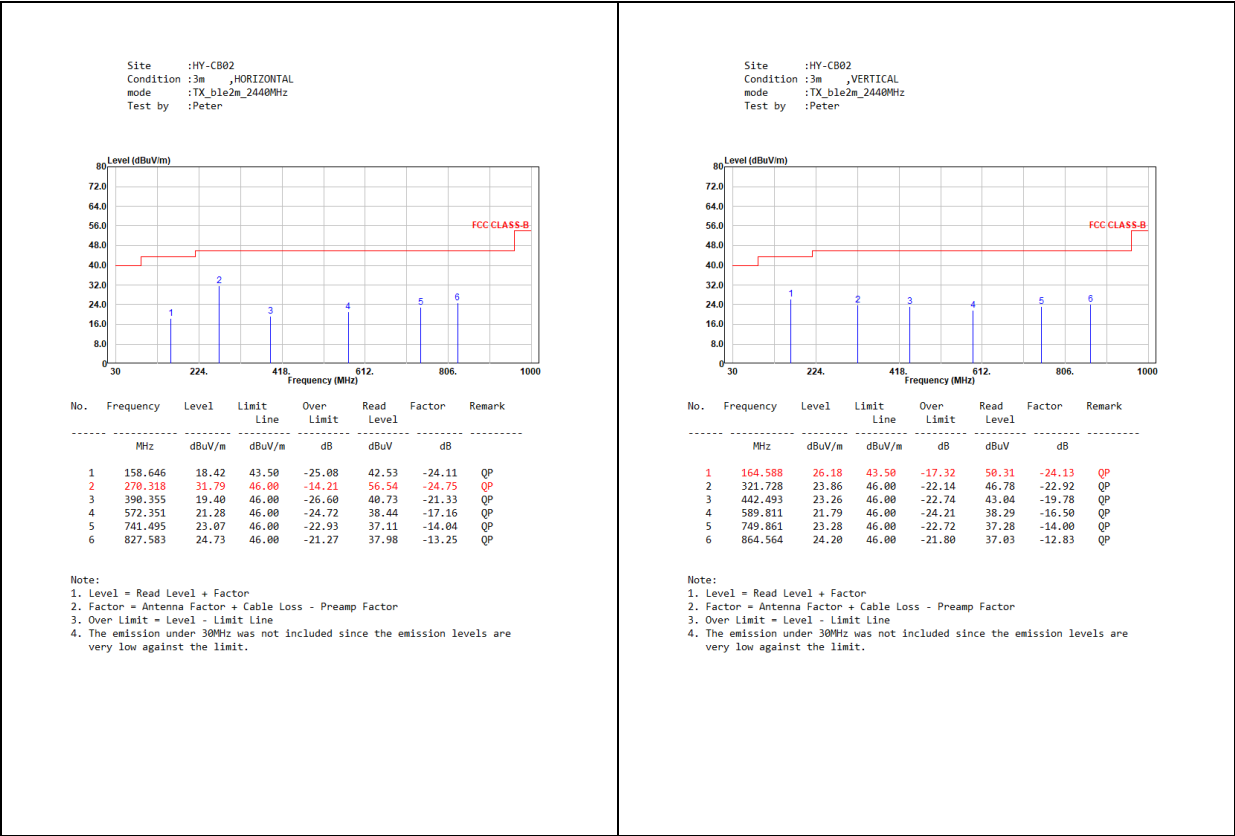
Site :HY-CB02
Condition :3m ,VERTICAL
mode :TX_B1e2m_2402MHz
Test by :Peter



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level	dB	
1	4884.000	39.89	74.00	-34.11	54.65	-14.76	Peak

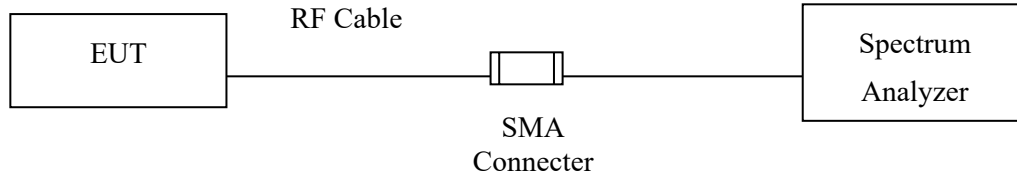
Note:
1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line





5. RF Antenna Conducted Test

5.1. Test Setup



5.2. Limits

According to FCC Section 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 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, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

5.3. Test Procedure

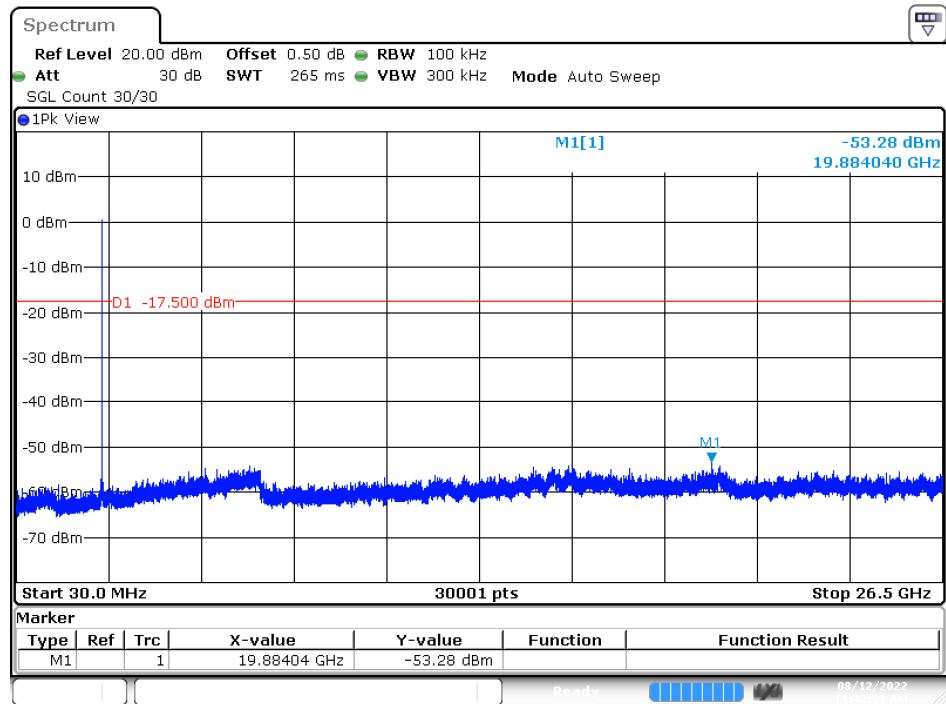
The EUT was tested according to C63.10:2013 Section 11.11 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 100 kHz, Set VBW > RBW, scan up through 10th harmonic.

5.4. Test Result of RF Antenna Conducted Test

Product : Bluetooth Headset
 Test Item : RF Antenna Conducted Test
 Test Mode : Mode 1: Transmit - 1Mbps-BLE
 Test Date : 2022/08/12

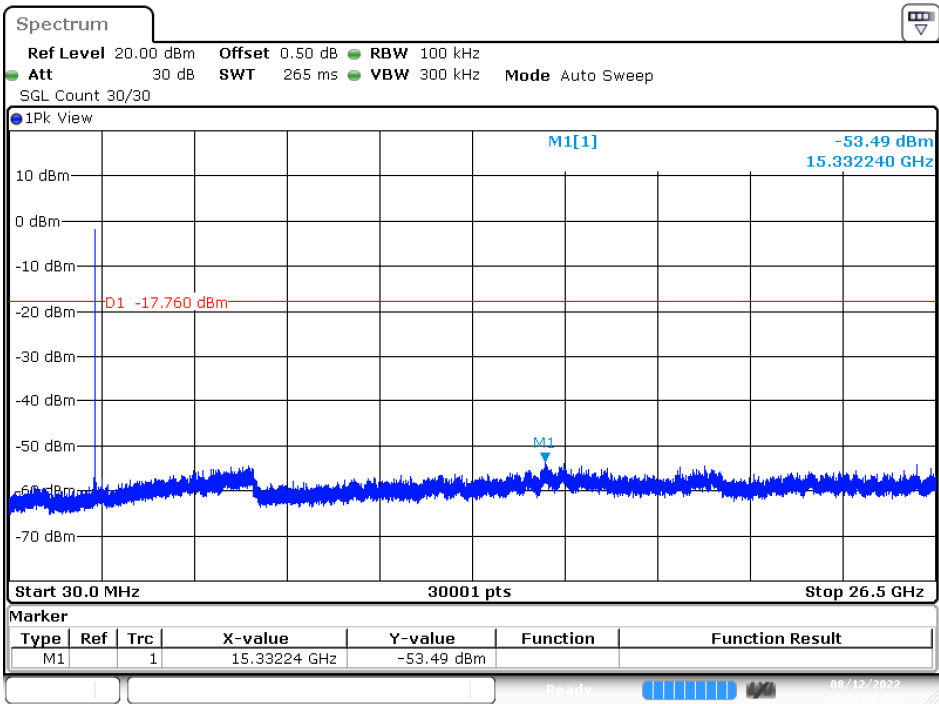
Figure Channel 39:



Date: 12.AUG.2022 11:42:52

Product : Bluetooth Headset
Test Item : RF Antenna Conducted Test
Test Mode : Mode 2: Transmit - 2Mbps-BLE
Test Date : 2022/08/12

Figure Channel 39:

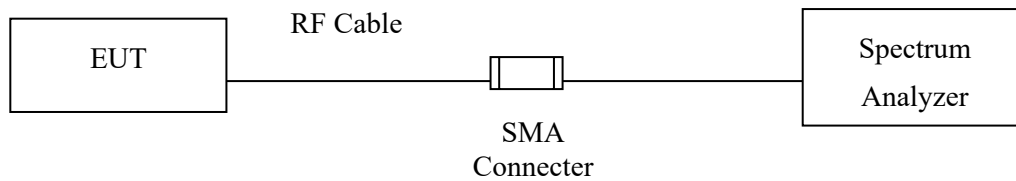


Date: 12.AUG.2022 11:51:53

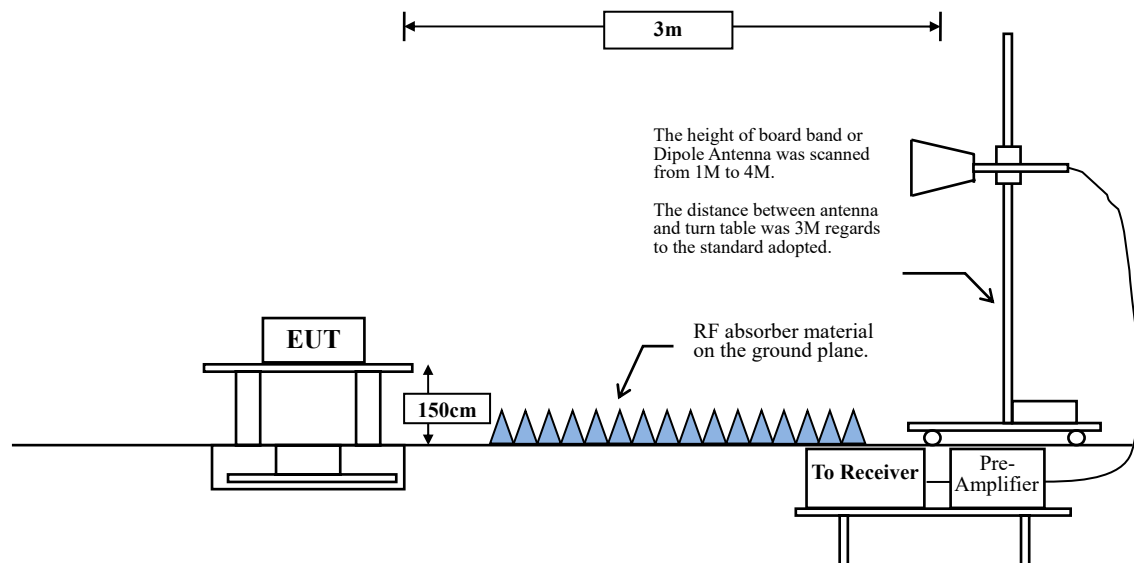
6. Band Edge

6.1. Test Setup

RF Conducted Measurement



RF Radiated Measurement:



6.2. Limit

According to FCC Section 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 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, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

6.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 and tested according to C63.10:2013 Section 11.12.1 for compliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.

RBW and VBW Parameter setting:

According to C63.10 Section 11.12.2.4 Peak measurement procedure.

RBW = as specified in Table 1.

$VBW \geq 3 \times RBW$.

Table 1 - RBW as a function of frequency

Frequency	RBW
9-150 kHz	200-300 Hz
0.15-30 MHz	9-10 kHz
30-1000 MHz	100-120 kHz
> 1000 MHz	1 MHz

According to C63.10 Section 11.12.2.5 Average measurement procedure.

RBW = 1MHz.

VBW = 10Hz, when duty cycle $\geq 98\%$

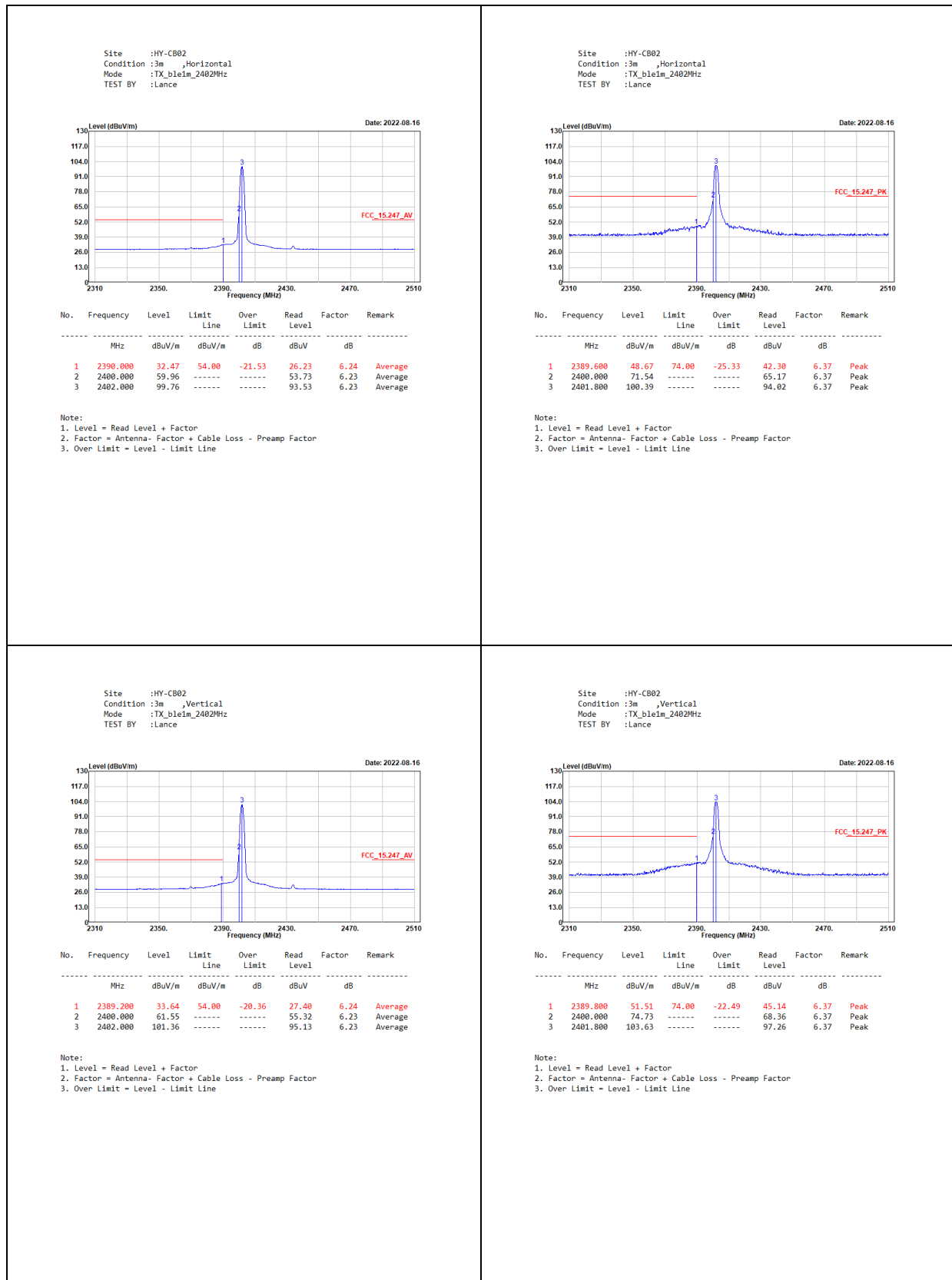
$VBW \geq 1/T$, when duty cycle $< 98\%$

(T refers to the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.)

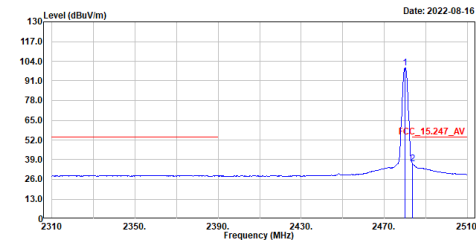
2.4GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
BLE 1M	84.80	2.1200	472	500
BLE 2M	56.38	1.0600	943	1000

Note: Duty Cycle Refer to Section 9.

6.4. Test Result of Band Edge



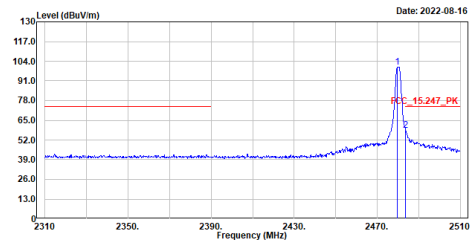
Site :HY-CB02
Condition :3m ,Horizontal
Mode :TX_ble1m_2480MHz
TEST BY :Lance



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level	dB	
1	2480.000	99.51	-----	-----	93.31	6.20	Average
2	2483.600	36.48	54.00	-17.52	30.27	6.21	Average

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

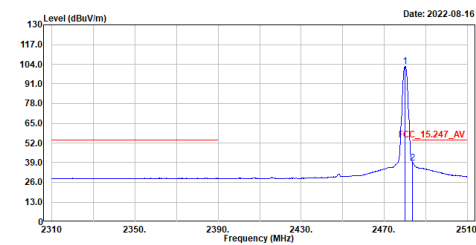
Site :HY-CB02
Condition :3m ,Horizontal
Mode :TX_ble1m_2480MHz
TEST BY :Lance



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level	dB	
1	2479.800	100.12	-----	-----	93.78	6.34	Peak
2	2483.600	58.18	74.00	-15.82	51.83	6.35	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

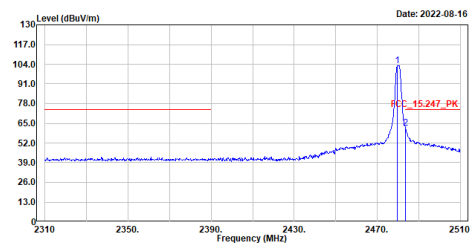
Site :HY-CB02
Condition :3m ,Vertical
Mode :TX_ble1m_2480MHz
TEST BY :Lance



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level	dB	
1	2480.000	102.57	-----	-----	96.37	6.20	Average
2	2483.600	38.90	54.00	-15.10	32.69	6.21	Average

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

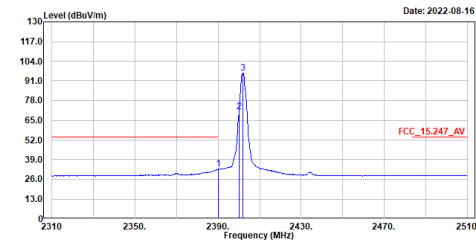
Site :HY-CB02
Condition :3m ,Vertical
Mode :TX_ble1m_2480MHz
TEST BY :Lance



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level	dB	
1	2479.800	103.17	-----	-----	96.83	6.34	Peak
2	2483.600	61.70	74.00	-12.30	55.35	6.35	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

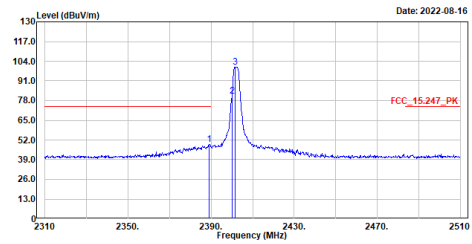
Site :HY-CB02
Condition :3m ,Horizontal
Mode :TX_ble2m_2402MHz
TEST BY :Lance



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level		
1	2399.000	32.73	54.00	-21.27	26.49	6.24	Average
2	2400.000	70.69	-----	-----	64.46	6.23	Average
3	2402.000	96.33	-----	-----	90.10	6.23	Average

Note:
1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

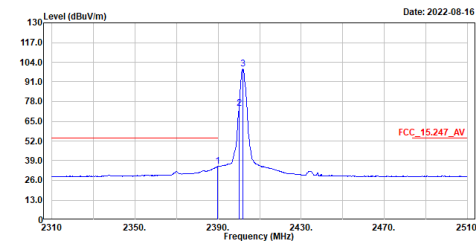
Site :HY-CB02
Condition :3m ,Horizontal
Mode :TX_ble2m_2402MHz
TEST BY :Lance



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level		
1	2389.000	49.19	74.00	-24.81	42.82	6.37	Peak
2	2400.000	81.16	-----	-----	74.79	6.37	Peak
3	2401.600	100.27	-----	-----	93.90	6.37	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

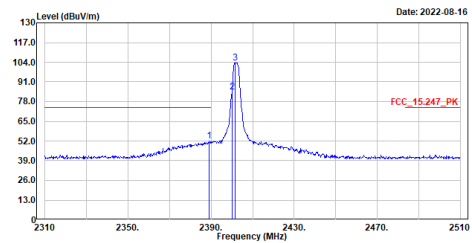
Site :HY-CB02
Condition :3m ,Vertical
Mode :TX_ble2m_2402MHz
TEST BY :Lance



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level		
1	2389.800	35.37	54.00	-18.63	29.13	6.24	Average
2	2400.000	73.47	-----	-----	67.24	6.23	Average
3	2402.000	99.52	-----	-----	93.29	6.23	Average

Note:
1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

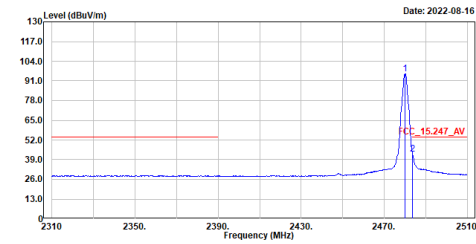
Site :HY-CB02
Condition :3m ,Vertical
Mode :TX_ble2m_2402MHz
TEST BY :Lance



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level		
1	2389.200	51.98	74.00	-22.02	45.61	6.37	Peak
2	2400.000	84.56	-----	-----	78.19	6.37	Peak
3	2401.600	103.60	-----	-----	97.23	6.37	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

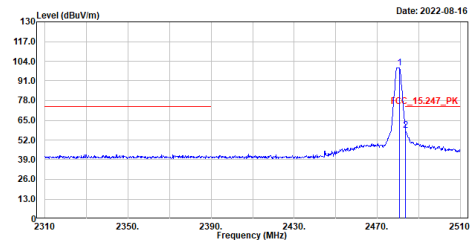
Site :HY-CB02
Condition :3m ,Horizontal
Mode :TX_ble2m_2480MHz
TEST BY :Lance



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level	dB	
1	2480.000	95.70	-----	-----	89.50	6.20	Average
2	2483.600	42.64	54.00	-11.36	36.43	6.21	Average

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

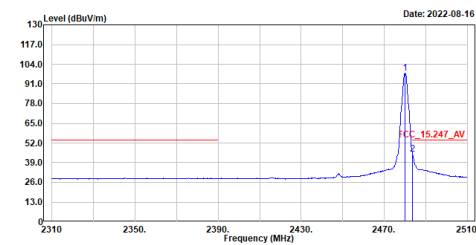
Site :HY-CB02
Condition :3m ,Horizontal
Mode :TX_ble2m_2480MHz
TEST BY :Lance



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level	dB	
1	2480.600	99.62	-----	-----	93.28	6.34	Peak
2	2483.600	58.43	74.00	-15.57	52.08	6.35	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

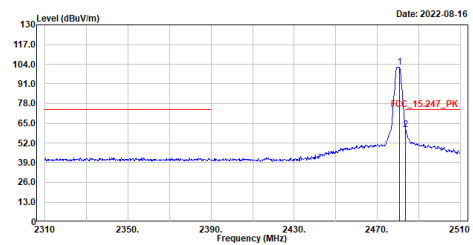
Site :HY-CB02
Condition :3m ,Vertical
Mode :TX_ble2m_2480MHz
TEST BY :Lance



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level	dB	
1	2480.000	97.97	-----	-----	91.77	6.20	Average
2	2483.600	44.59	54.00	-9.41	38.38	6.21	Average

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :HY-CB02
Condition :3m ,Vertical
Mode :TX_ble2m_2480MHz
TEST BY :Lance



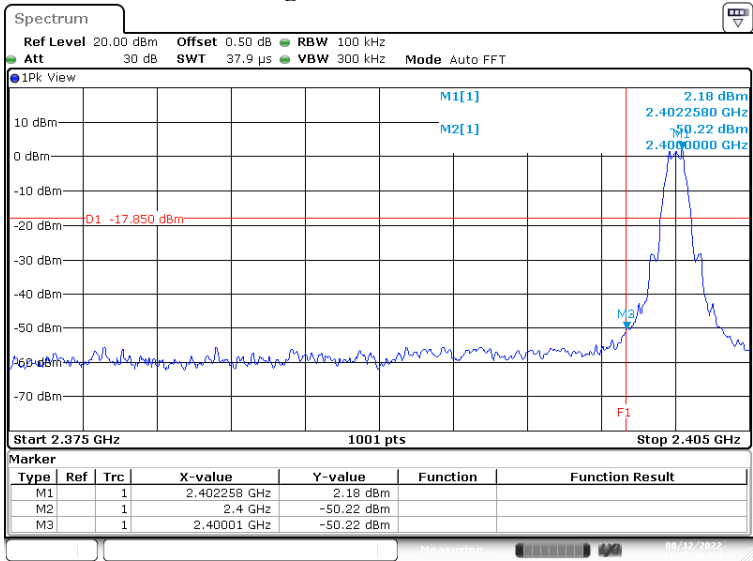
No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level	dB	
1	2480.600	101.92	-----	-----	95.58	6.34	Peak
2	2483.600	60.85	74.00	-13.15	54.50	6.35	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Product : Bluetooth Headset
Test Item : Band Edge
Test Mode : Mode 1: Transmit - 1Mbps-BLE
Test Date : 2022/08/12

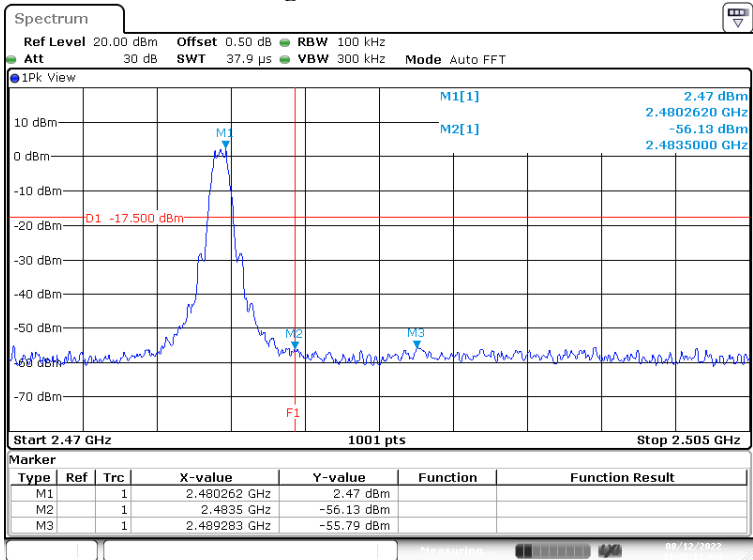
Measurement Level	Result
Δ (dB)	
> 20	PASS

Figure Channel 00:



Date: 12.AUG.2022 11:35:50

Figure Channel 39:

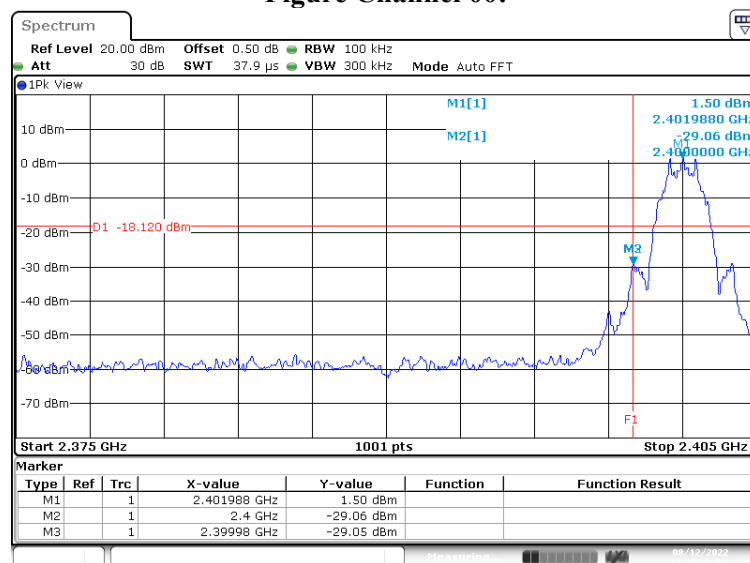


Date: 12.AUG.2022 11:42:13

Product : Bluetooth Headset
 Test Item : Band Edge
 Test Mode : Mode 2: Transmit - 2Mbps-BLE
 Test Date : 2022/08/12

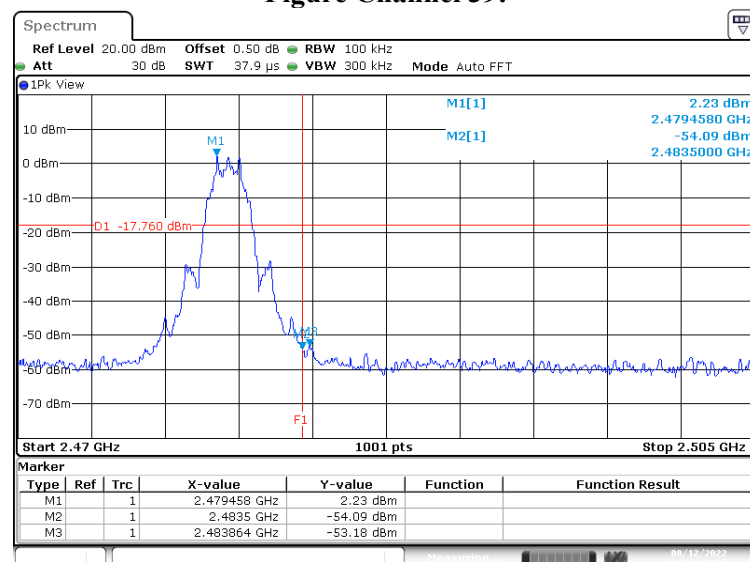
Measurement Level	Result
Δ (dB)	
> 20	PASS

Figure Channel 00:



Date: 12.AUG.2022 11:45:36

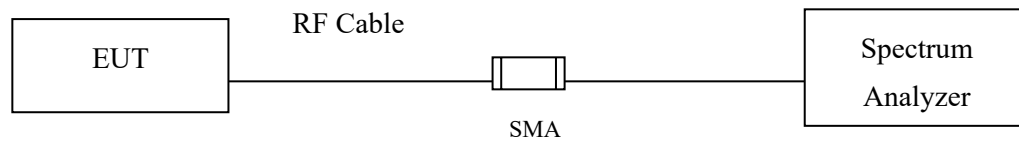
Figure Channel 39:



Date: 12.AUG.2022 11:51:12

7. 6dB Bandwidth

7.1. Test Setup



7.2. Limits

The minimum bandwidth shall be at least 500 kHz.

7.3. Test Procedure

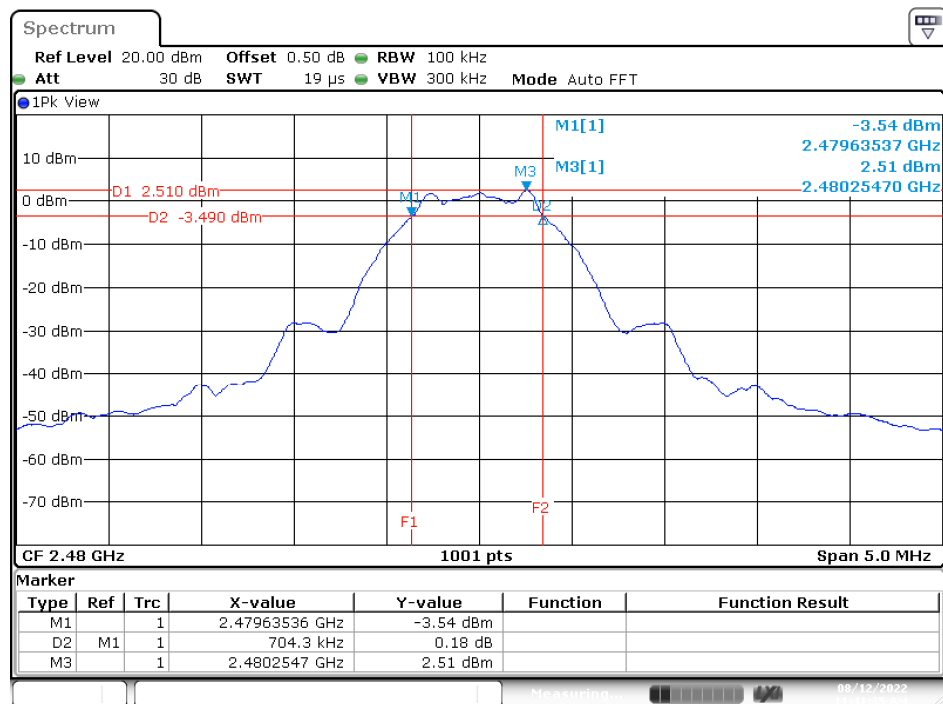
The EUT was setup according to ANSI C63.4, 2014; tested according to ANSI C63.10 Section 11.8 for compliance to FCC 47CFR 15.247 requirements.

7.4. Test Result of 6dB Bandwidth

Product : Bluetooth Headset
 Test Item : 6dB Bandwidth Data
 Test Mode : Mode 1: Transmit - 1Mbps-BLE
 Test Date : 2022/08/12

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
00	2402	704	>500	Pass
19	2440	709	>500	Pass
39	2480	704	>500	Pass

Figure Channel 39:

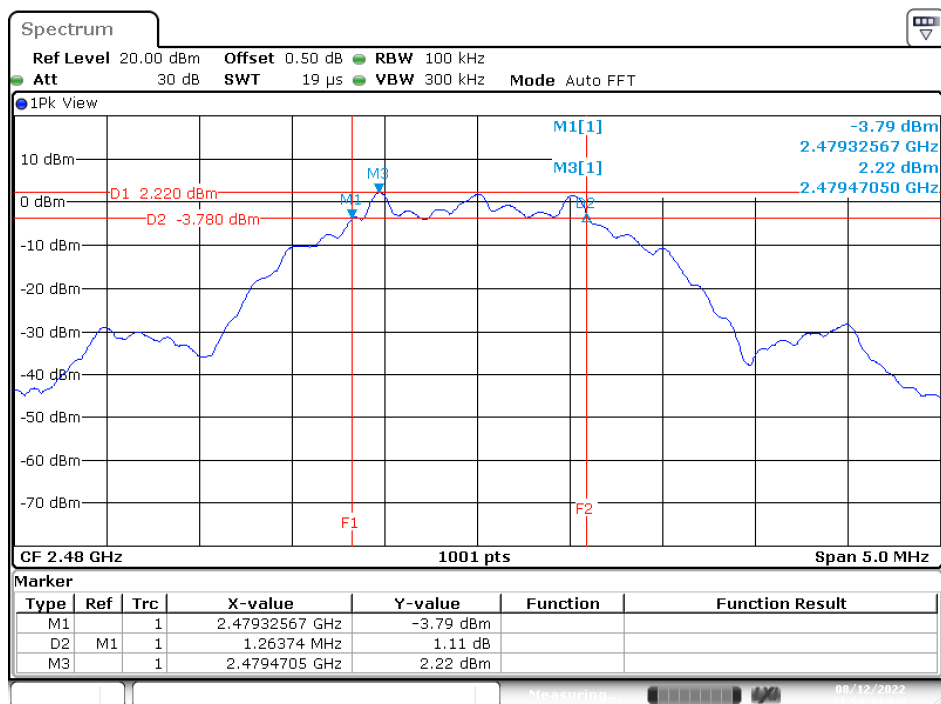


Date: 12.AUG.2022 11:41:35

Product : Bluetooth Headset
 Test Item : 6dB Bandwidth Data
 Test Mode : Mode 2: Transmit - 2Mbps-BLE
 Test Date : 2022/08/12

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
00	2402	1263	>500	Pass
19	2440	1263	>500	Pass
39	2480	1263	>500	Pass

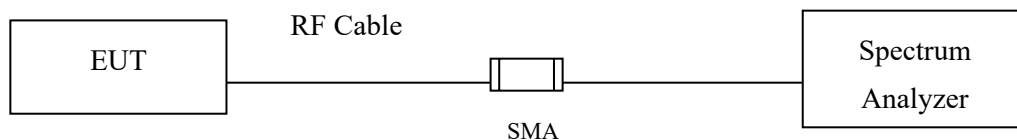
Figure Channel 39:



Date: 12.AUG.2022 11:50:35

8. Power Density

8.1. Test Setup



8.2. Limits

The transmitted power density averaged over any 1 second interval shall not be greater +8dBm in any 3kHz bandwidth.

8.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013; tested according to DTS test procedure of KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

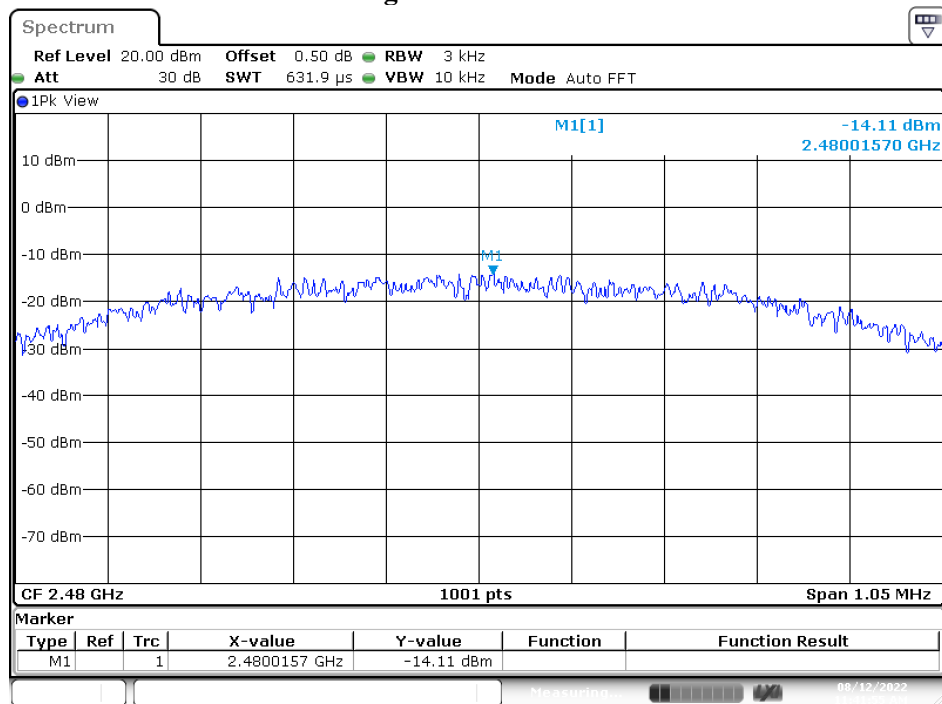
The maximum power spectral density using C63.10 Section 11.10.2 Method PKPSD (peak PSD)

8.4. Test Result of Power Density

Product : Bluetooth Headset
 Test Item : Power Density Data
 Test Mode : Mode 1: Transmit - 1Mbps-BLE
 Test Date : 2022/08/12

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
00	2402	-14.55	$\leq 8\text{dBm}$	Pass
19	2440	-14.34	$\leq 8\text{dBm}$	Pass
39	2480	-14.11	$\leq 8\text{dBm}$	Pass

Figure Channel 39:

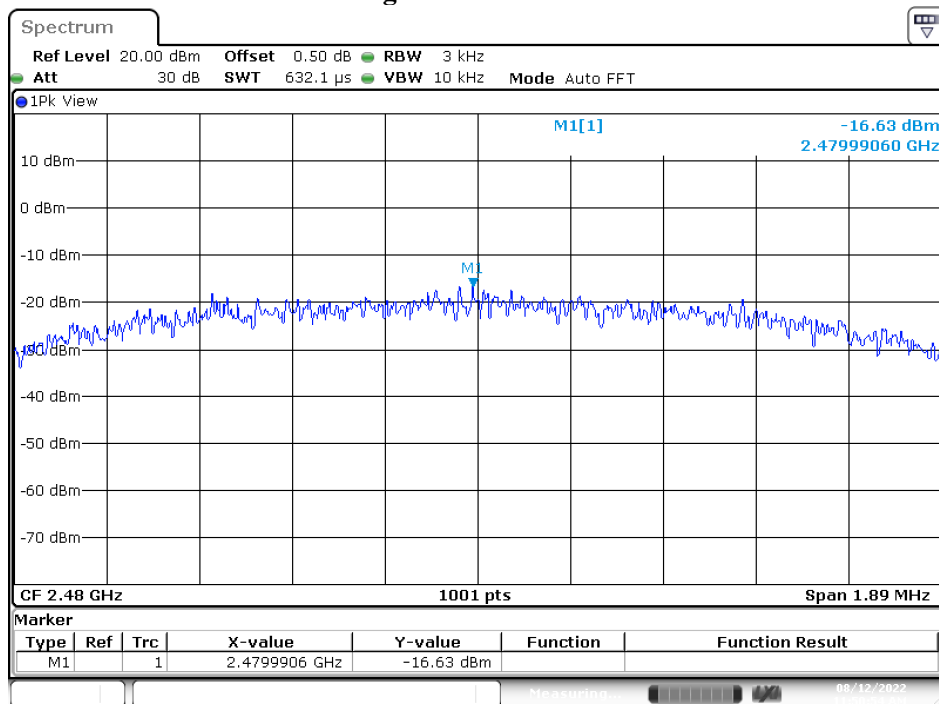


Date: 12.AUG.2022 11:41:55

Product : Bluetooth Headset
 Test Item : Power Density Data
 Test Mode : Mode 2: Transmit - 2Mbps-BLE
 Test Date : 2022/08/12

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
00	2402	-17.04	$\leq 8\text{dBm}$	Pass
19	2440	-16.92	$\leq 8\text{dBm}$	Pass
39	2480	-16.63	$\leq 8\text{dBm}$	Pass

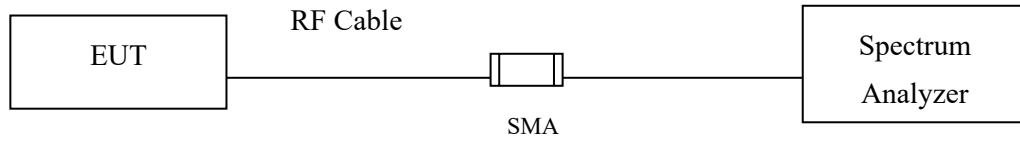
Figure Channel 39:



Date: 12.AUG.2022 11:50:54

9. Duty Cycle

9.1. Test Setup



9.2. Test Procedure

The EUT was setup according to ANSI C63.10 2013; tested according to ANSI C63.10 2013 for compliance to FCC 47CFR 15.247 requirements.

9.3. Test Result of Duty Cycle

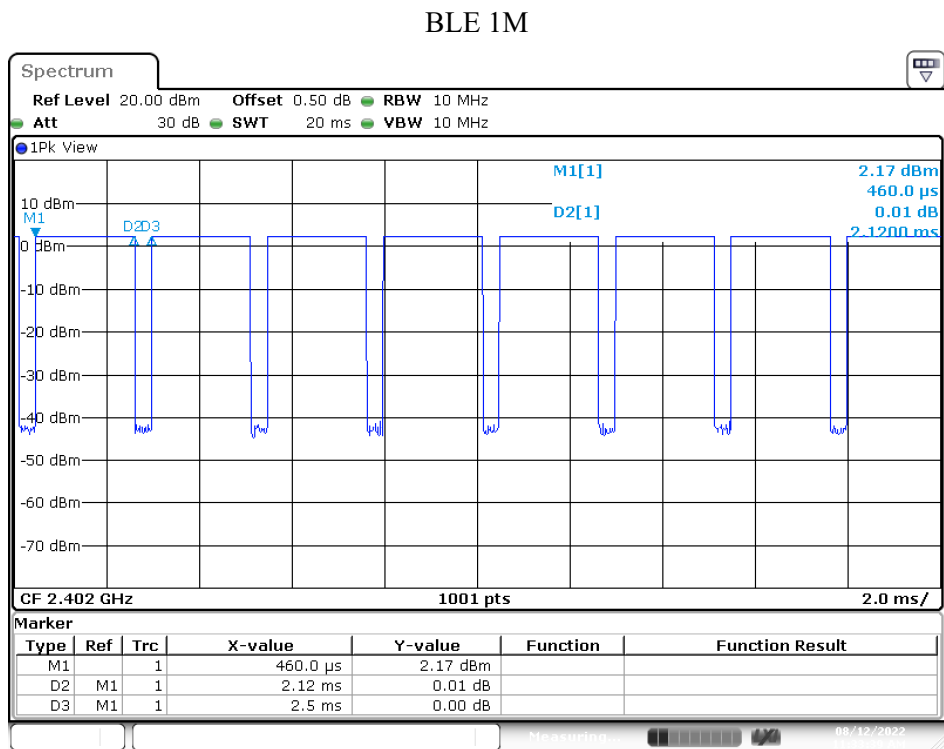
Product : Bluetooth Headset
 Test Item : Duty Cycle
 Test Mode : Mode 1: Transmit - 1Mbps-BLE

Formula:

Duty Cycle = $T_{on} / (T_{on} + T_{off})$

Duty Factor = $10 \text{ Log } (1/\text{Duty Cycle})$

2.4GHz band	Ton (ms)	Ton + Toff (ms)	Duty Cycle (%)	Duty Factor (dB)
BLE 1M	2.1200	2.5000	84.80	0.72



Date: 12.AUG.2022 11:33:39

Product : Bluetooth Headset
 Test Item : Duty Cycle
 Test Mode : Mode 2: Transmit - 2Mbps-BLE

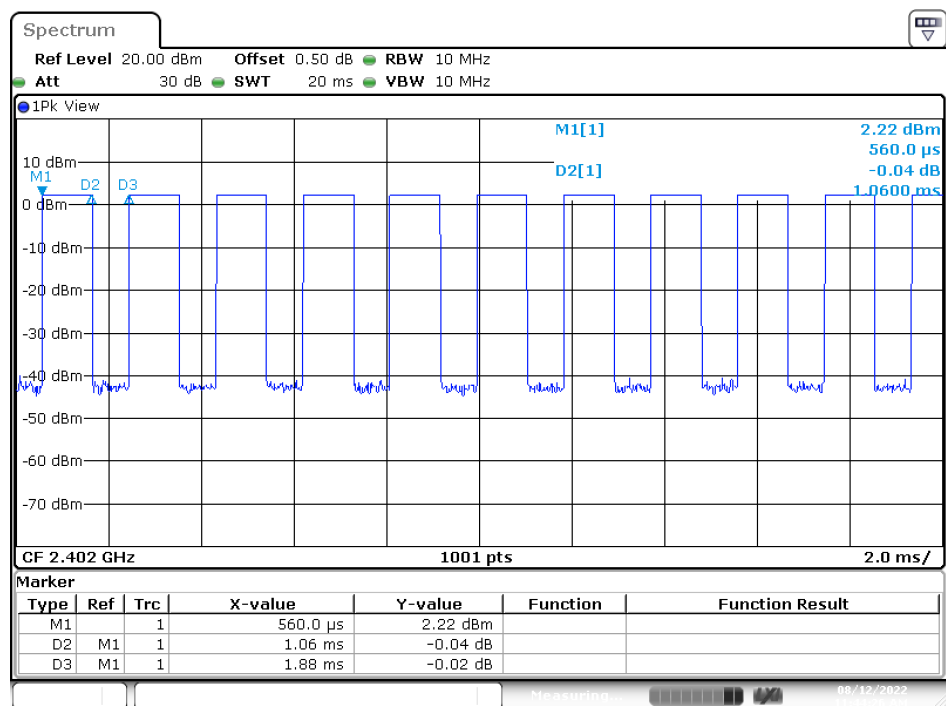
Formula:

Duty Cycle = $T_{on} / (T_{on} + T_{off})$

Duty Factor = $10 \log (1/\text{Duty Cycle})$

2.4GHz band	Ton (ms)	Ton + Toff (ms)	Duty Cycle (%)	Duty Factor (dB)
BLE 2M	1.0600	1.8800	56.38	2.49

BLE 2M



Date: 12.AUG.2022 11:44:25