

# FCC Test Report

Product Name	Bluetooth Headset
Model No.	HSC170W
FCC ID.	BCE-HSC170W

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	Oct. 26, 2022
Report No.	2280273R-RFUSBT2V01-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.

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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: Oct. 26, 2022

Report No.: 2280273R-RFUSBT2V01-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.	HSC170W
FCC ID.	BCE-HSC170W
EUT Rated Voltage	DC 5V by USB or DC 3.7V by Battery
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 : April Chen  
(Senior Project Specialist / April Chen)

Tested By : Bill Lin  
(Senior Engineer / Bill Lin)

Approved By : Alan Chen  
(Senior Engineer / Alan Chen)

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Appendix 1: EUT Test Photographs

Appendix 2: Product Photos-Please refer to the file: 2280273R-Product Photos

## Revision History

Report No.	Version	Description	Issued Date
2280273R-RFUSBT2V01-A	V1.0	Initial issue of report.	Oct. 26, 2022

## 1. GENERAL INFORMATION

### 1.1. EUT Description

Product Name	Bluetooth Headset
Trade Name	Jabra
Model No.	HSC170W
FCC ID.	BCE-HSC170W
Frequency Range	2402 – 2480MHz
Channel Number	V3.0, V2.1+EDR:79
Type of Modulation	V3.0, V2.1+EDR: GFSK(1Mbps) / $\pi$ /4DQPSK(2Mbps) / 8DPSK(3Mbps)
Antenna Type	PCB Antenna
Channel Control	Auto
Antenna Gain	Refer to the table “Antenna List”
Desk Stand	MFR: GN Audio A/S, M/N: DIV040
Bluetooth USB Dongle	MFR: Jabra, M/N: END060W,
Type C to Type C Cable	Shielded, 1.2m
Type C to USB Cable	Shielded, 1.2m

#### Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	GN Audio A/S	HSC170W	PCB Antenna	3.69dBi for 2.4 GHz

Note: The antenna of EUT conforms to FCC 15.203.

## Center Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 00:	2402 MHz	Channel 20:	2422 MHz	Channel 40:	2442 MHz	Channel 60:	2462 MHz
Channel 01:	2403 MHz	Channel 21:	2423 MHz	Channel 41:	2443 MHz	Channel 61:	2463 MHz
Channel 02:	2404 MHz	Channel 22:	2424 MHz	Channel 42:	2444 MHz	Channel 62:	2464 MHz
Channel 03:	2405 MHz	Channel 23:	2425 MHz	Channel 43:	2445 MHz	Channel 63:	2465 MHz
Channel 04:	2406 MHz	Channel 24:	2426 MHz	Channel 44:	2446 MHz	Channel 64:	2466 MHz
Channel 05:	2407 MHz	Channel 25:	2427 MHz	Channel 45:	2447 MHz	Channel 65:	2467 MHz
Channel 06:	2408 MHz	Channel 26:	2428 MHz	Channel 46:	2448 MHz	Channel 66:	2468 MHz
Channel 07:	2409 MHz	Channel 27:	2429 MHz	Channel 47:	2449 MHz	Channel 67:	2469 MHz
Channel 08:	2410 MHz	Channel 28:	2430 MHz	Channel 48:	2450 MHz	Channel 68:	2470 MHz
Channel 09:	2411 MHz	Channel 29:	2431 MHz	Channel 49:	2451 MHz	Channel 69:	2471 MHz
Channel 10:	2412 MHz	Channel 30:	2432 MHz	Channel 50:	2452 MHz	Channel 70:	2472 MHz
Channel 11:	2413 MHz	Channel 31:	2433 MHz	Channel 51:	2453 MHz	Channel 71:	2473 MHz
Channel 12:	2414 MHz	Channel 32:	2434 MHz	Channel 52:	2454 MHz	Channel 72:	2474 MHz
Channel 13:	2415 MHz	Channel 33:	2435 MHz	Channel 53:	2455 MHz	Channel 73:	2475 MHz
Channel 14:	2416 MHz	Channel 34:	2436 MHz	Channel 54:	2456 MHz	Channel 74:	2476 MHz
Channel 15:	2417 MHz	Channel 35:	2437 MHz	Channel 55:	2457 MHz	Channel 75:	2477 MHz
Channel 16:	2418 MHz	Channel 36:	2438 MHz	Channel 56:	2458 MHz	Channel 76:	2478 MHz
Channel 17:	2419 MHz	Channel 37:	2439 MHz	Channel 57:	2459 MHz	Channel 77:	2479 MHz
Channel 18:	2420 MHz	Channel 38:	2440 MHz	Channel 58:	2460 MHz	Channel 78:	2480 MHz
Channel 19:	2421 MHz	Channel 39:	2441 MHz	Channel 59:	2461 MHz		

## Note:

1. The EUT is a Bluetooth Headset with built-in Bluetooth (5.2 and V3.0+HS, V2.1+EDR) transceiver, this report for Bluetooth V3.0+HS, V2.1+EDR.
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. 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.
5. DEKRA has evaluated each test mode. Only the worst case is shown in the report.
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.
7. The test mode is based on the Bluetooth technology, while testing 1Mbps, 2Mbps and 3Mbps, the worst case is 1Mbps and 3Mbps, and only worse case data is recorded in this report.

Test Mode	Mode 1: Transmit - 1Mbps Mode 2: Transmit - 3Mbps Mode 3: Charge Mode
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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:

### Transmit

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

Signal Cable Type	Manufacturer	Model No.	Signal cable Description
A   Type C to USB Cable	DEKRA	Type C to USB Cable-1	Shielded, 0.8m

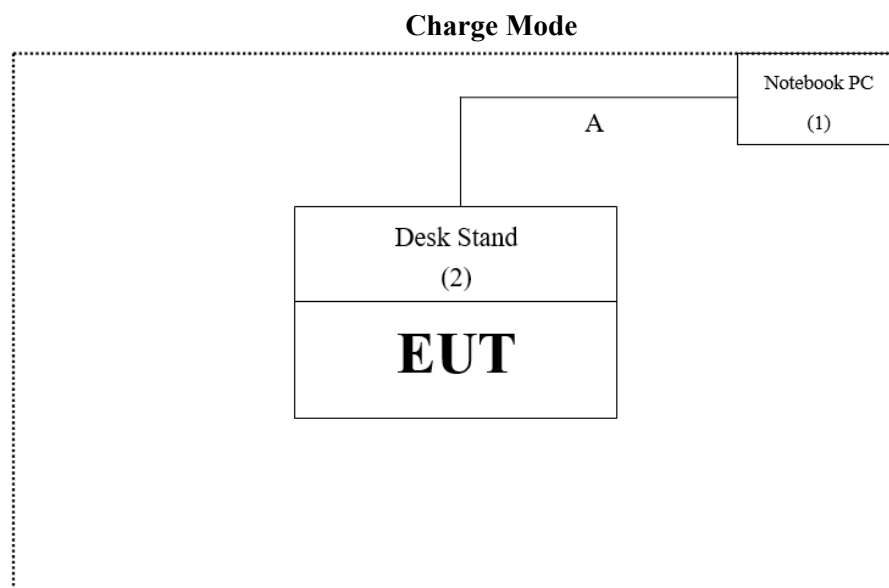
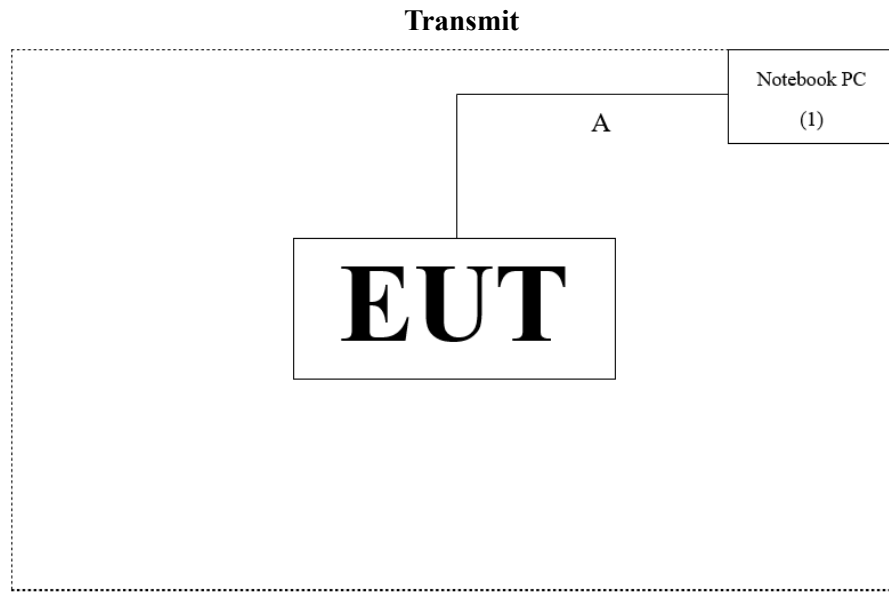
### Charge Mode

Product	Manufacturer	Model No.	Serial No.	Power Cord
1   Notebook PC	DELL	Latitude 5580	GDZN7H2	N/A
2   Desk Stand	GN Audio A/S	DIV040	N/A	N/A

Signal Cable Type	Manufacturer	Model No.	Signal cable Description
A   Type C to USB Cable	GN Audio A/S	Type C to USB	Shielded, 1.5m



### 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 EUT.
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	22.6 °C
	Humidity (%RH)	10~90 %	58.2 %
Conductive	Temperature (°C)	10~40 °C	25.6 °C
	Humidity (%RH)	10~90 %	52.8 %

**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  
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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	2022/05/04	2023/05/03
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	FSV40	101149	2022/08/12	2023/03/24
X	Peak Power Analyzer	KEYSIGHT	8990B	MY51000410	2022/08/06	2023/08/05
X	Wideband Power Sensor	KEYSIGHT	N1923A	MY56080003	2022/08/05	2023/08/04
X	Wideband Power Sensor	KEYSIGHT	N1923A	MY56080004	2022/08/05	2023/08/04

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-CB03

	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due. Date
	Loop Antenna	AMETEK	HLA6121	49611	2022/03/18	2023/03/17
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
X	Horn Antenna	Com-Power	AH-840	101100	2021/10/04	2022/10/03
X	Pre-Amplifier	SGH	0301-9	20211007-11	2022/02/22	2023/02/21
X	Pre-Amplifier	EMCI	EMC051835SE	980632	2021/09/07	2022/09/06
X	Pre-Amplifier	EMCI	EMC05820SE	980285	2021/12/16	2022/12/15
	Pre-Amplifier	EMCI	EMC184045SE	980369		
	Coaxial Cable	EMCI	EMC102-KM-KM-600	1160314	2022/05/12	2023/05/11
	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	ESR	102793	2021/12/15	2022/12/14
X	Spectrum Analyzer	R&S	FSV3044	101114	2022/02/11	2023/02/10
	Coaxial Cable	SGH	HA800	GD20110223-2		
	Coaxial Cable	SGH	HA800	GD20110222-4		
X	Coaxial Cable	SGH	SGH18	2021005-2	2022/01/05	2023/01/04
	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.

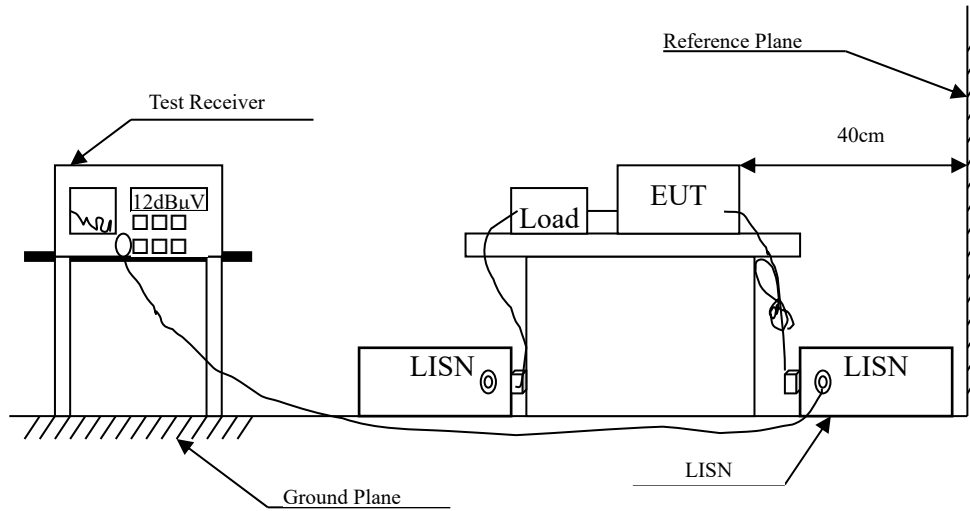
The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately 95%.

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	±0.91 dB	
Radiated Emission	Under 1GHz ±4.06 dB	Above 1GHz ±3.73 dB
RF Antenna Conducted Test	±2.53 dB	
Band Edge	Under 1GHz ±4.06 dB	Above 1GHz ±3.73 dB
Channel Number	N/A	
Channel Separation	±682.83 Hz	
Dwell Time	±2.31 ms	
Occupied Bandwidth	±682.83 Hz	
Duty Cycle	±2.31 ms	

## 2. Conducted Emission

### 2.1. Test Setup



### 2.2. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dB $\mu$ V) 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

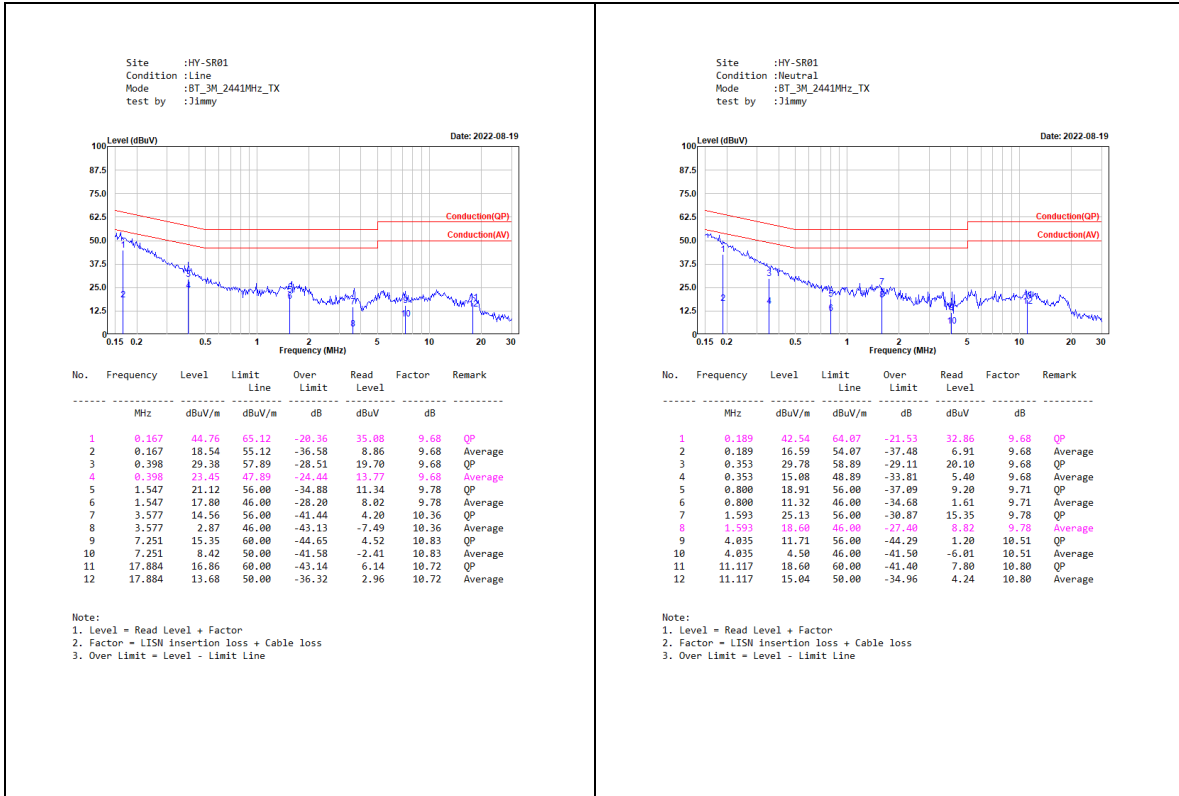
The EUT and Peripherals are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling 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.

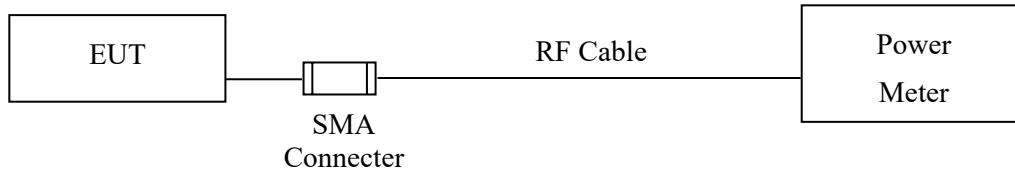
The EUT setup and the test procedure are according to ANSI C63.4, 2014 to comply with the requirements of FCC 47CFR Subpart C.

## 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

Tested according to FHSS test procedure of KDB 558074 section 9 (b for compliance to FCC 47CFR 15.247 requirements.



### 3.4. Test Result of Peak Power Output

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

Channel No.	Frequency (MHz)	Measurement (dBm)	Required Limit	Result
Channel 00	2402	12.20	1 Watt= 30 dBm	Pass
Channel 39	2441	12.27	1 Watt= 30 dBm	Pass
Channel 78	2480	12.30	1 Watt= 30 dBm	Pass

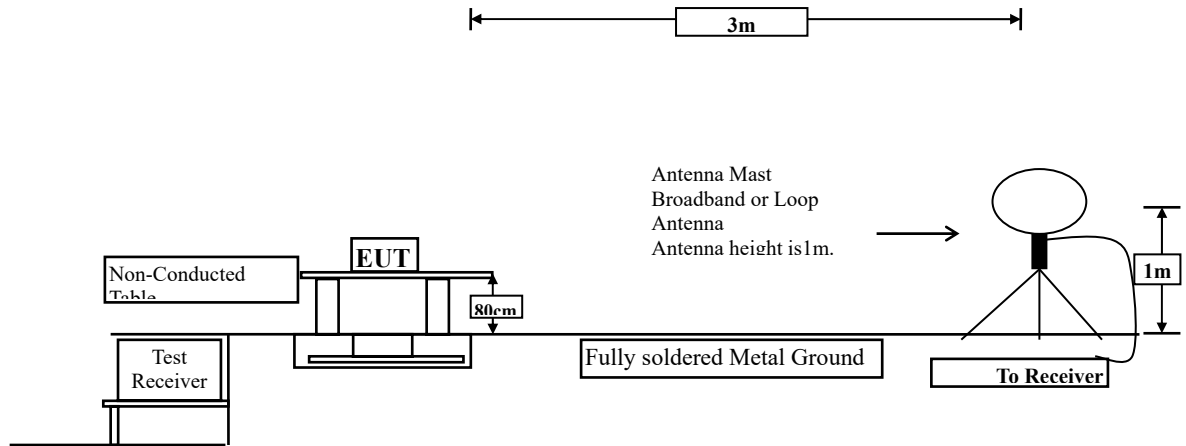
Product : Bluetooth Headset  
Test Item : Peak Power Output  
Test Mode : Mode 2: Transmit - 3Mbps  
Test Date : 2022/08/12

Channel No.	Frequency (MHz)	Measurement (dBm)	Required Limit	Result
Channel 00	2402	12.47	1 Watt= 30 dBm	Pass
Channel 39	2441	12.50	1 Watt= 30 dBm	Pass
Channel 78	2480	12.51	1 Watt= 30 dBm	Pass

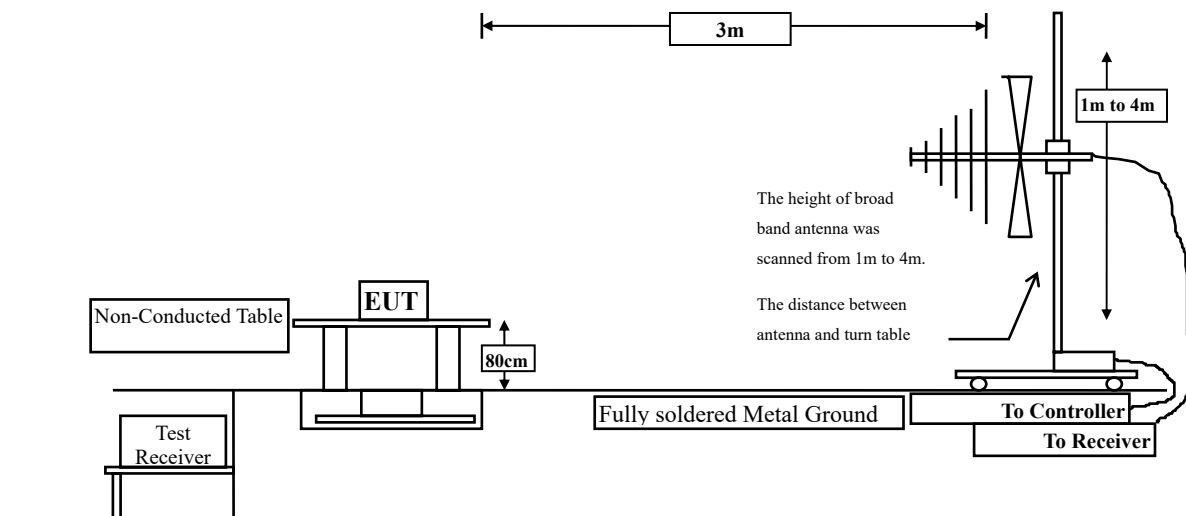
## 4. Radiated Emission

### 4.1. Test Setup

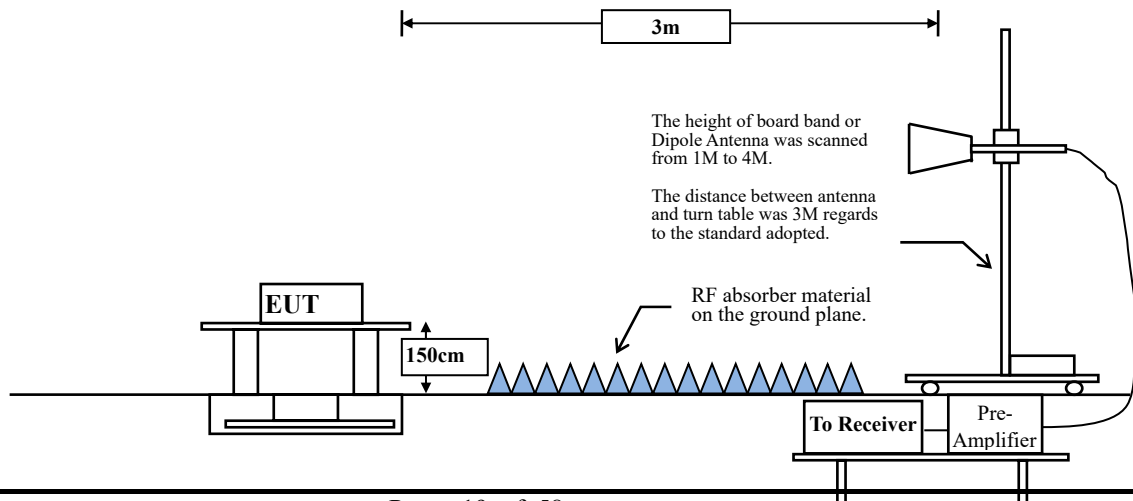
Radiated Emission Under 30MHz



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.

<b>FCC Part 15 Subpart C Paragraph 15.209 Limits</b>		
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 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.

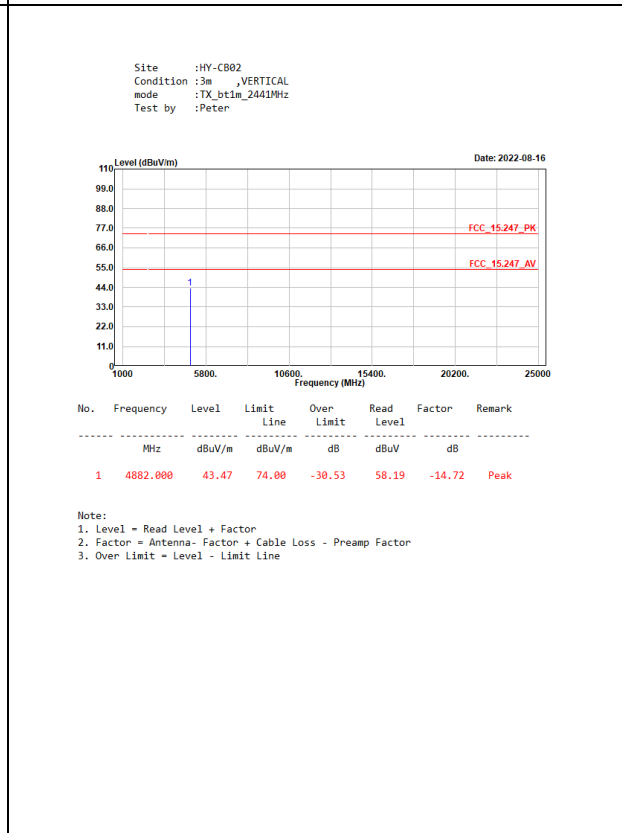
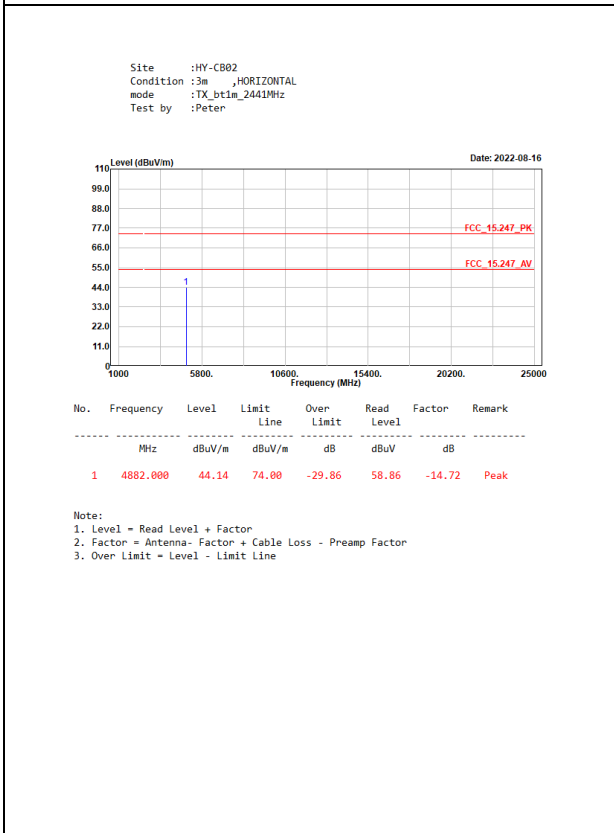
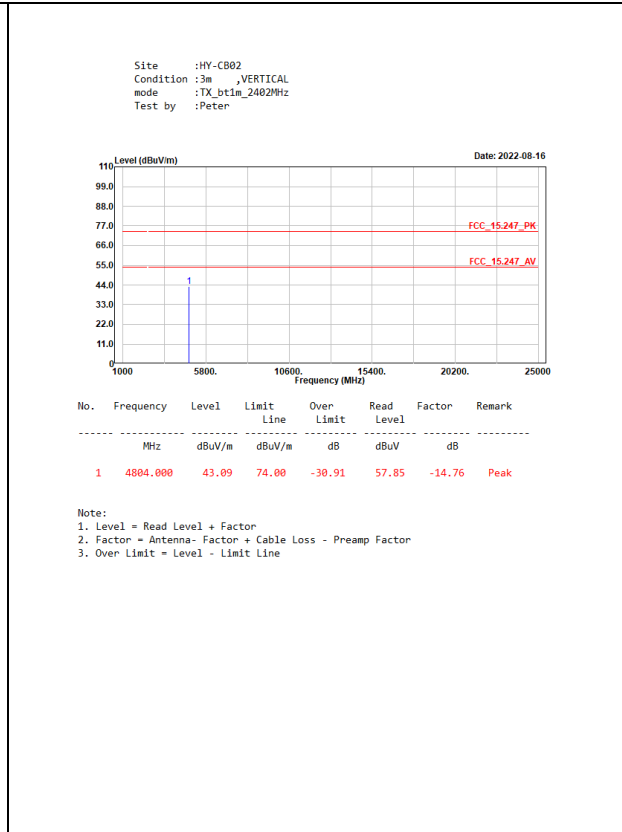
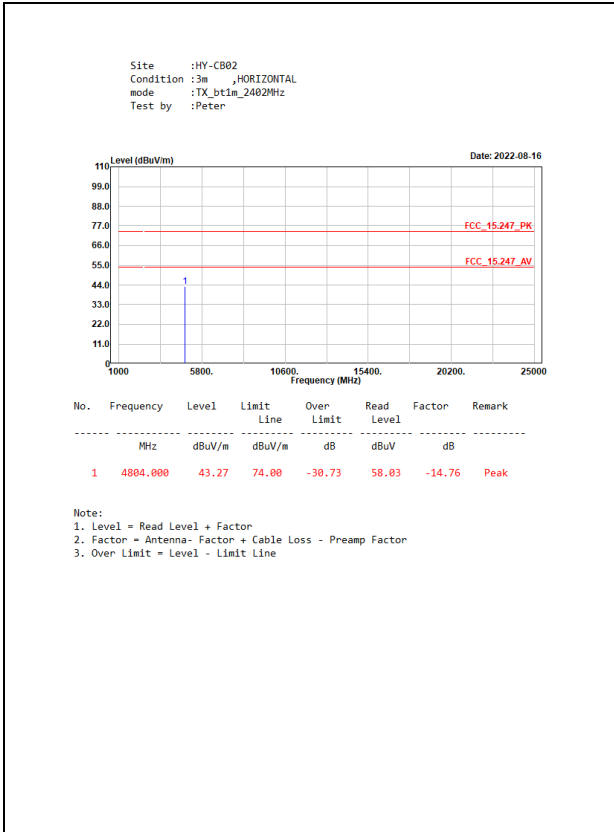
Radiated emission measurements below 30MHz are made using Loop Antenna and 30MHz~1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

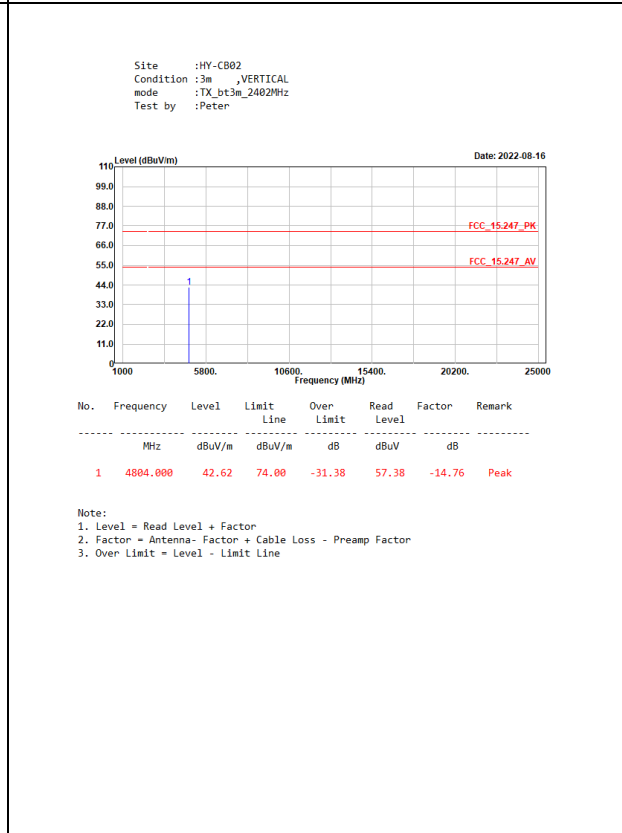
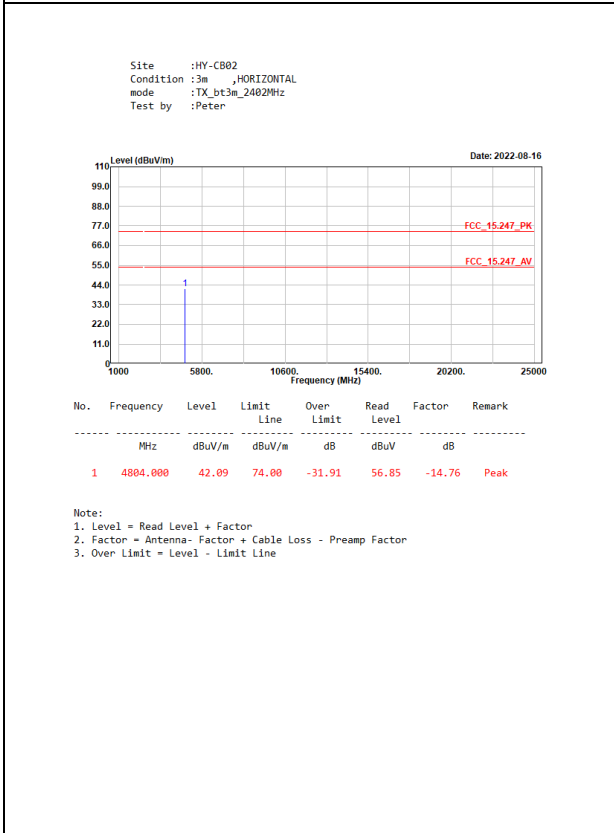
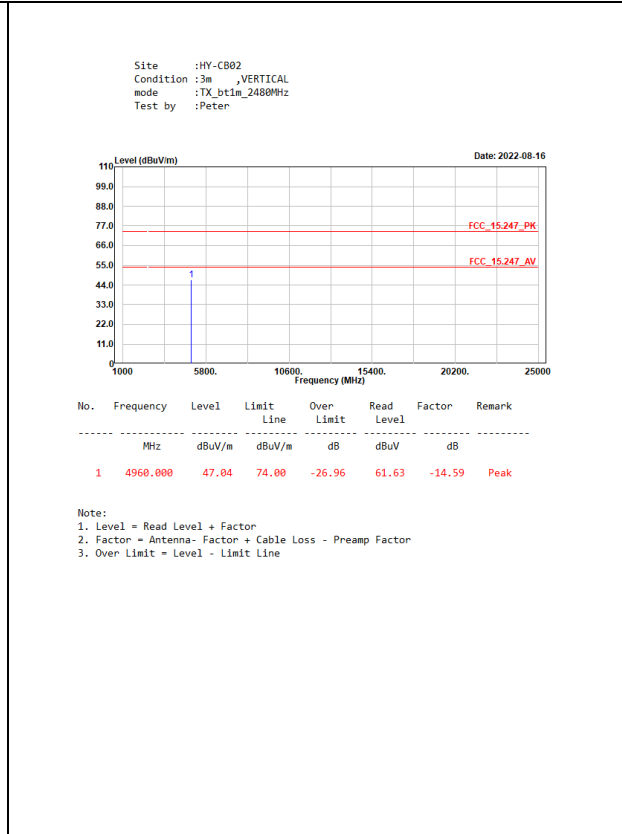
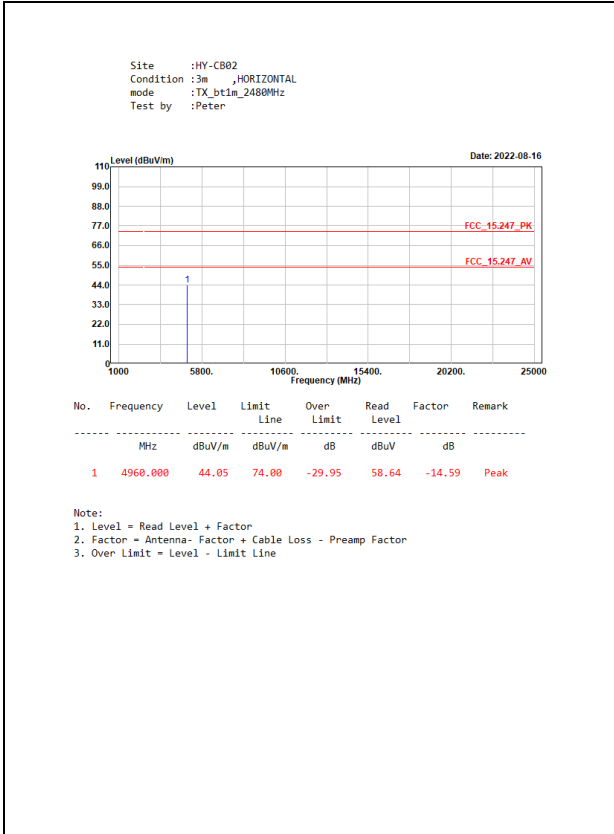
The measurement is divided into the Preliminary Measurement and the Final Measurement.

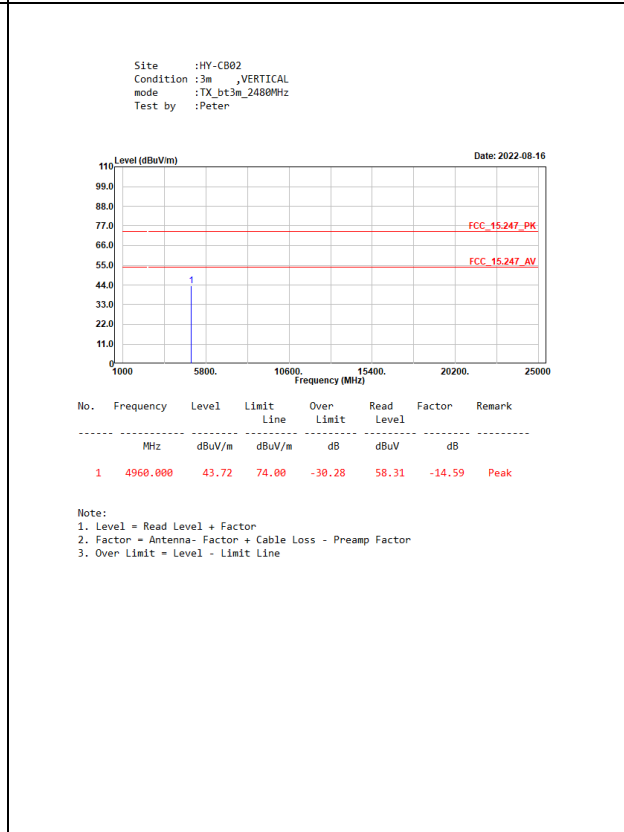
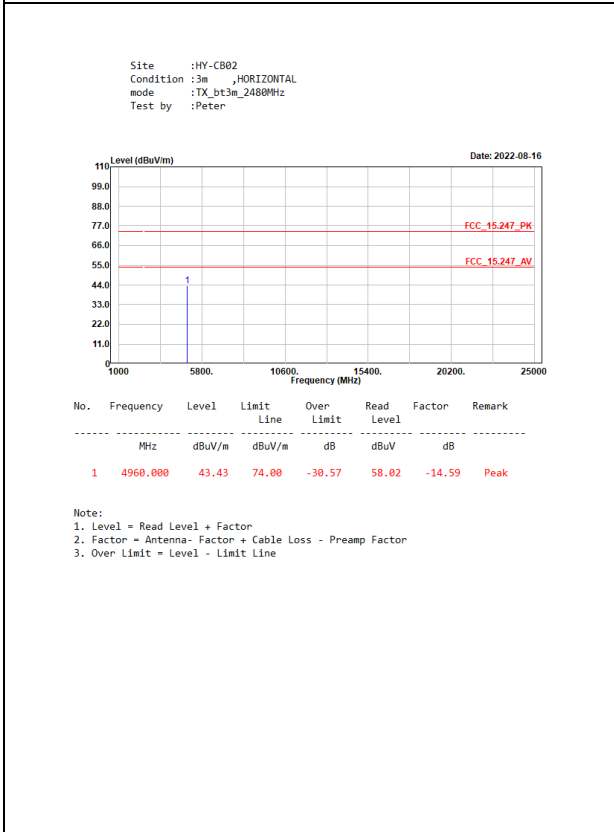
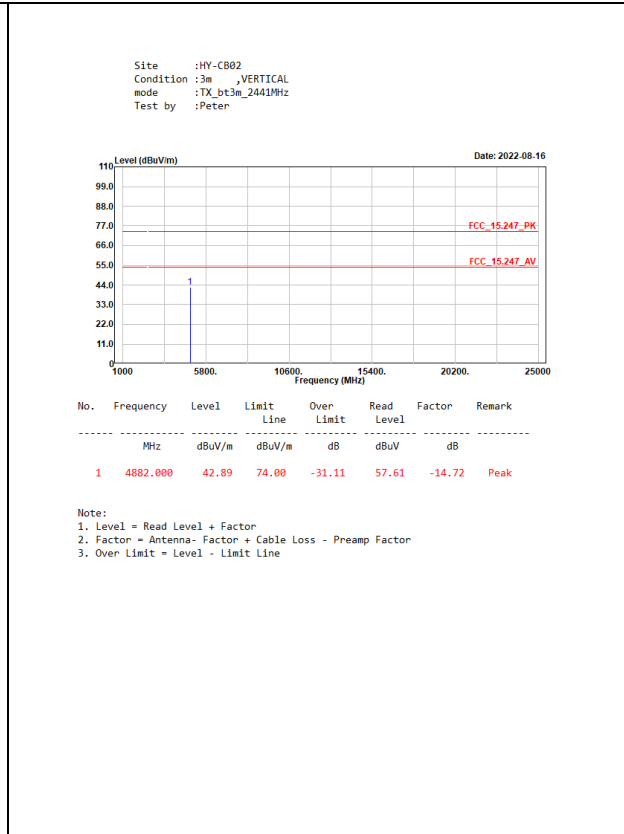
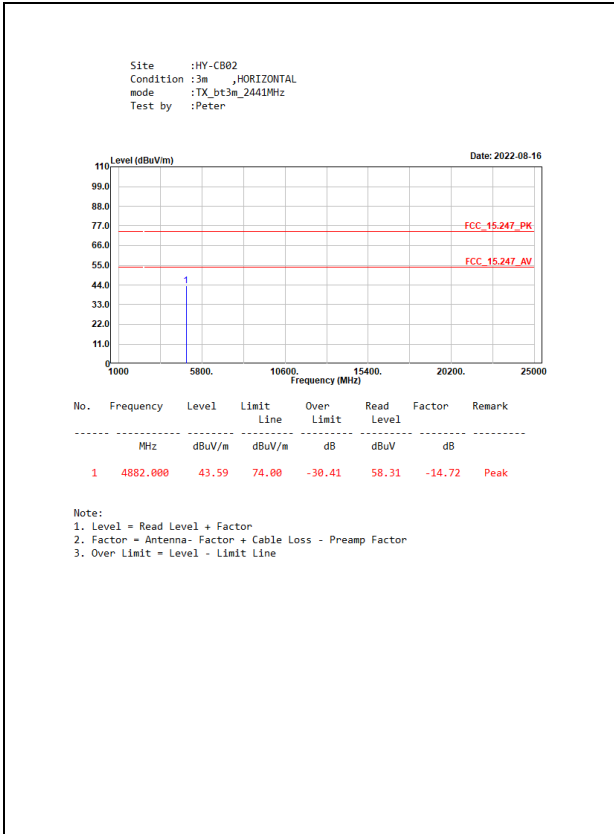
The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the 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.

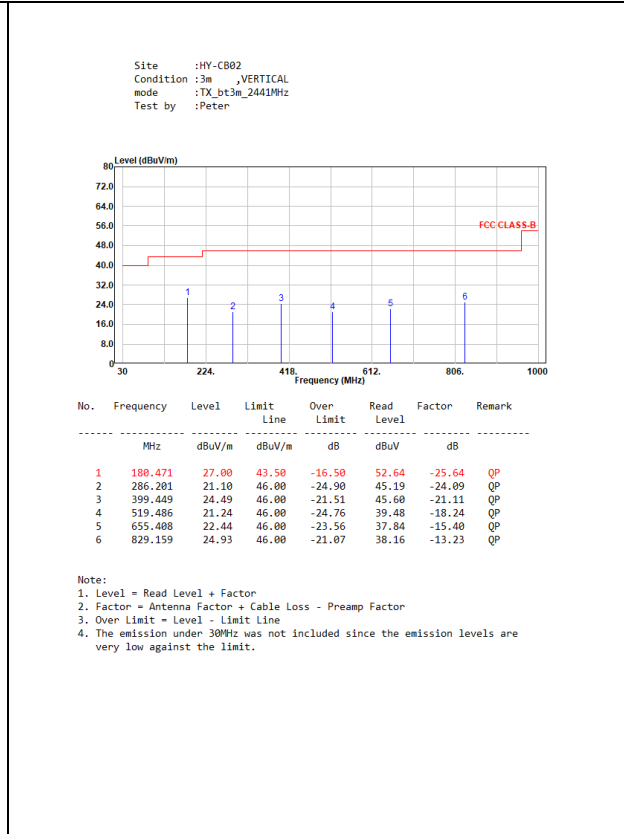
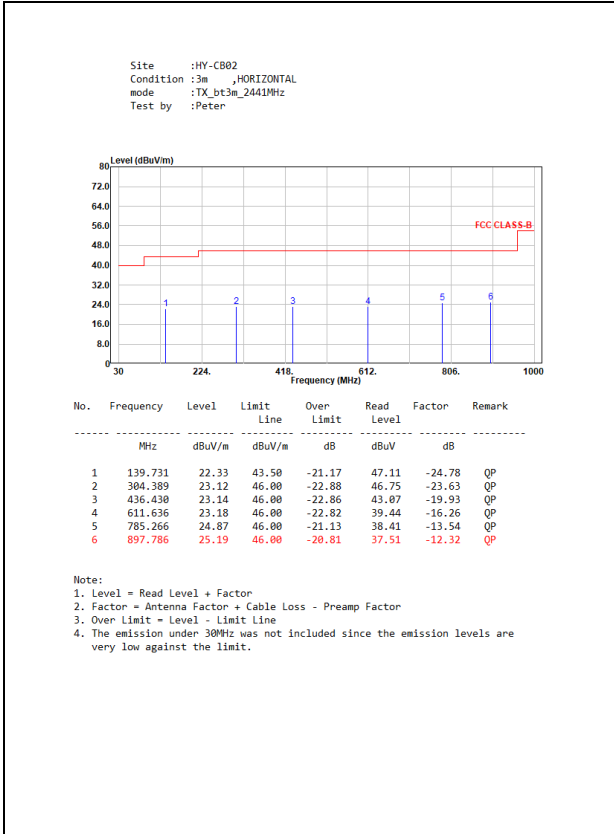
### 4.4. Test Result of Radiated Emission



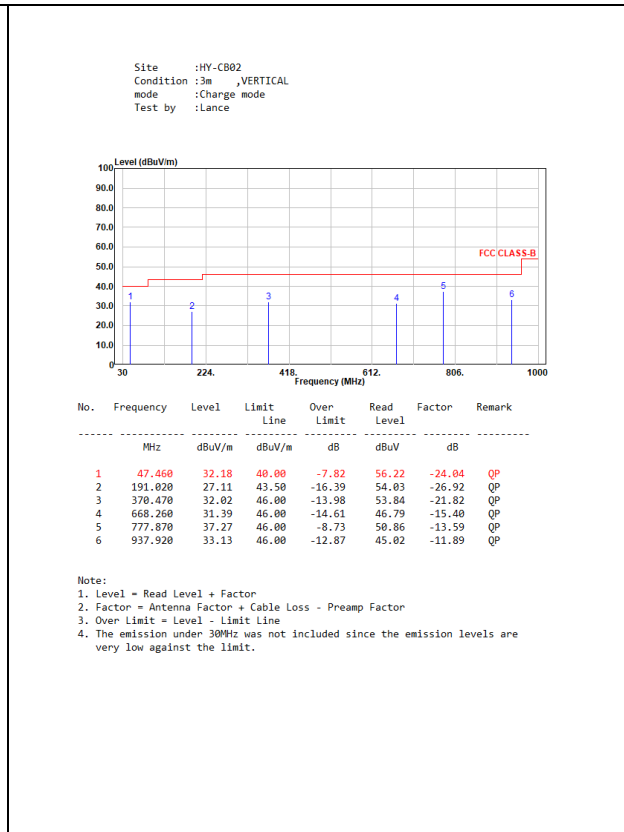
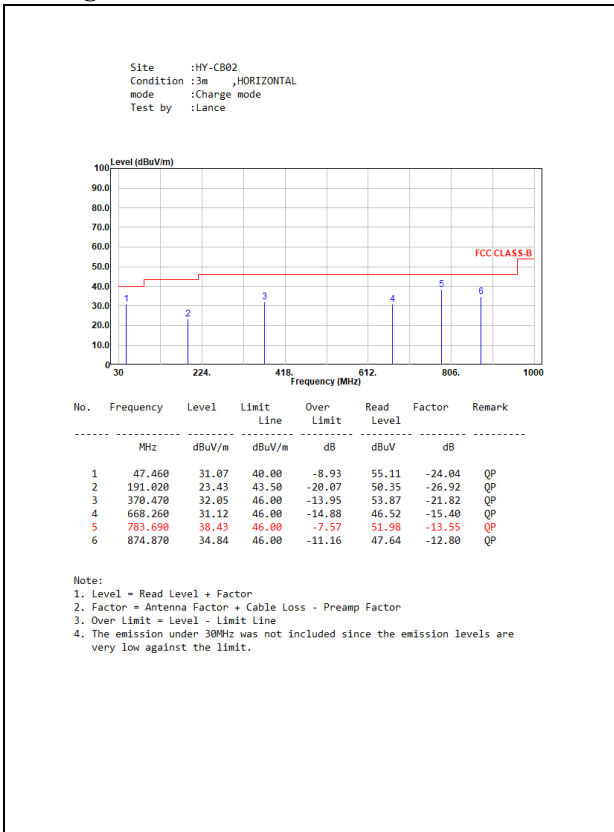






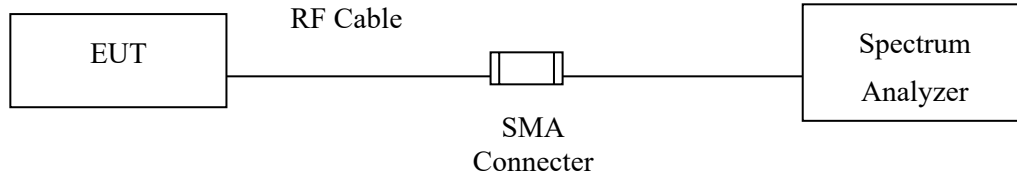


### Charge Mode



## 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.

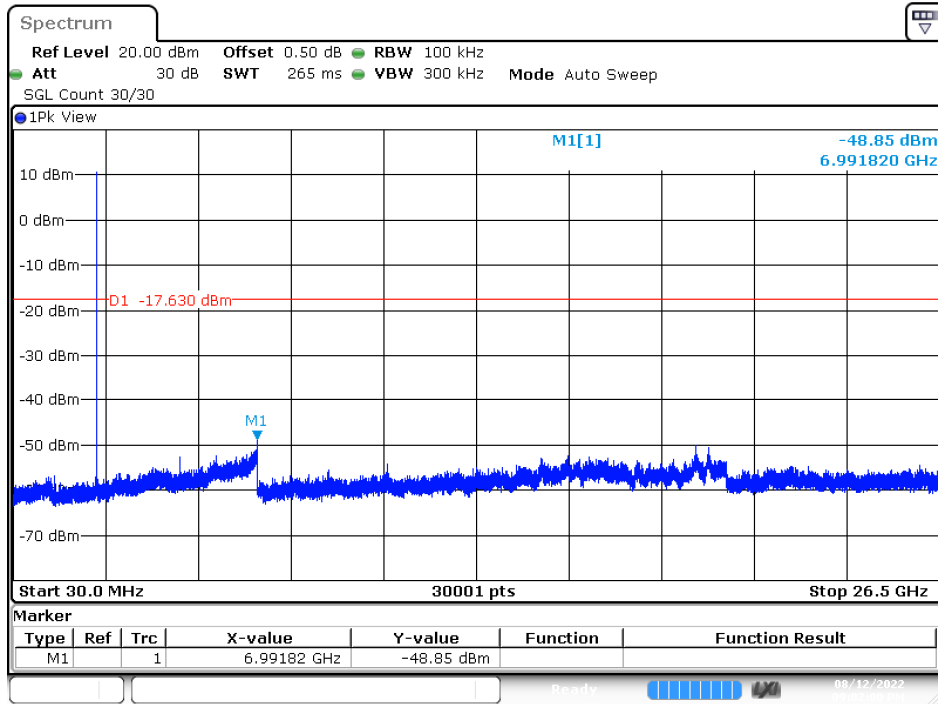
### 5.3. Test Procedure

Tested according to FHSS test procedure of KDB558074 section 9 b) for compliance to FCC 47CFR 15.247 requirements.

### 5.4. Test Result of RF Antenna Conducted Test

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

Figure Channel 00:

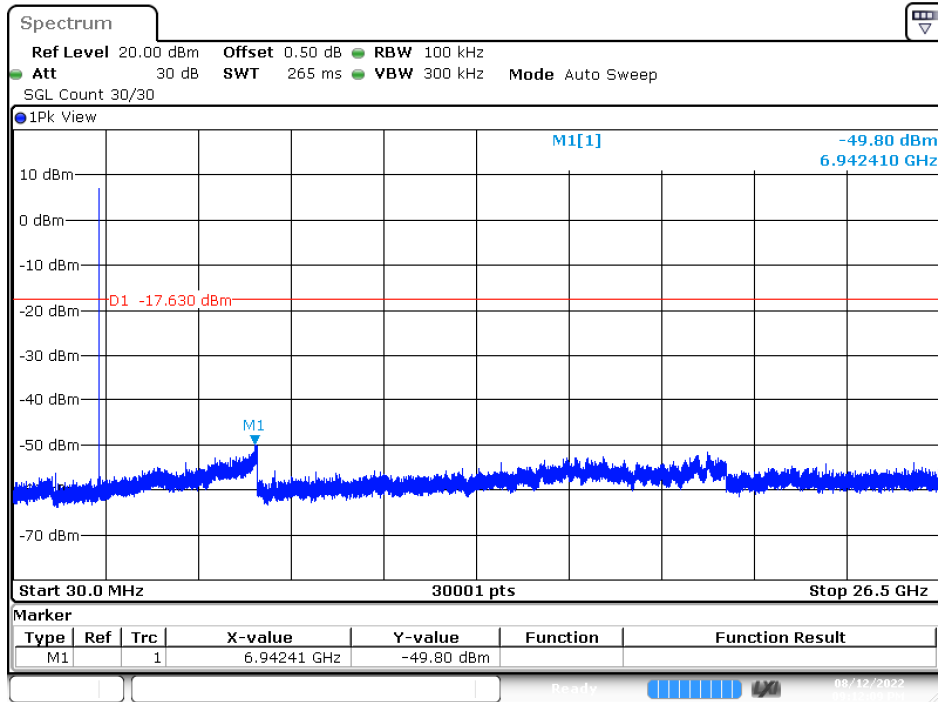


Date: 12.AUG.2022 21:02:00

Note: The above test pattern is synthesized by multiple of the frequency range.

Product : Bluetooth Headset  
 Test Item : RF Antenna Conducted Test  
 Test Mode : Mode 2: Transmit - 3Mbps  
 Test Date : 2022/08/12

Figure Channel 78:



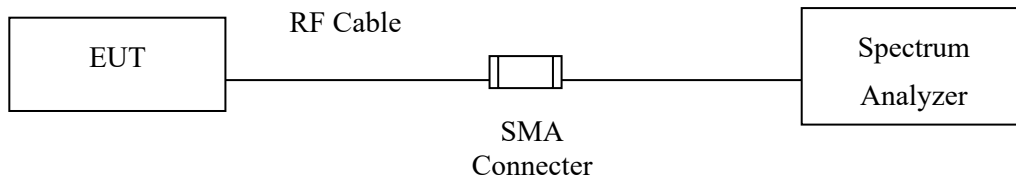
Date: 12.AUG.2022 21:12:09

Note: The above test pattern is synthesized by multiple of the frequency range.

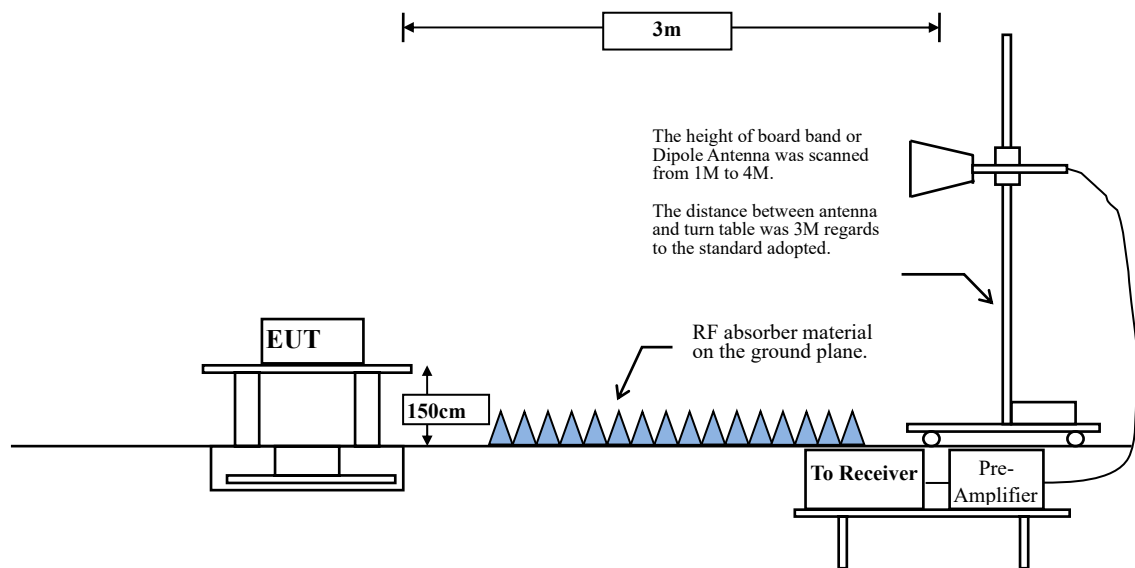
## 6. Band Edge

### 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 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 can move up and down between 1 meter and 4 meters to find out the maximum emission level.

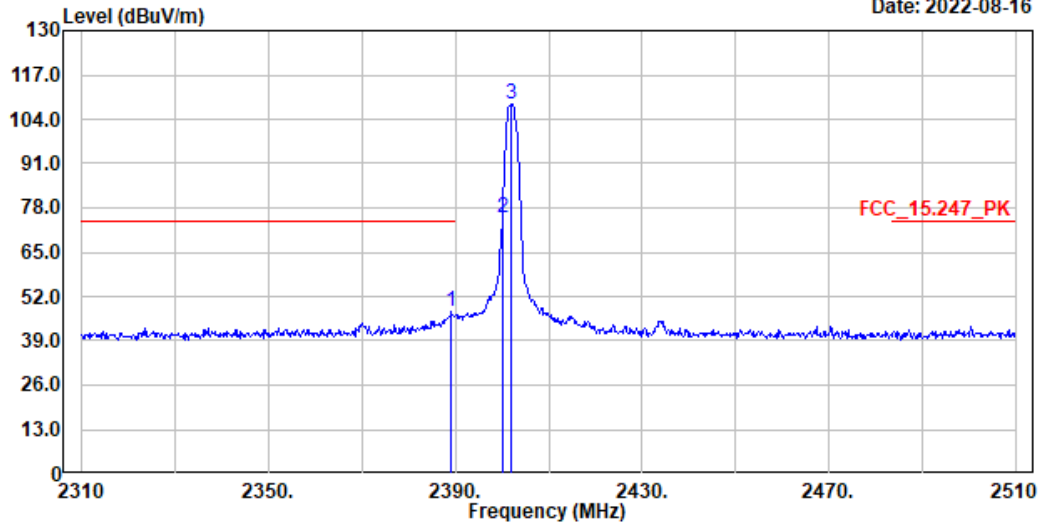
Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated measurement.

The bandwidth setting below 1GHz and above 1GHz on the field strength meter is 120 kHz and 1MHz, respectively.

### 6.4. Test Result of Band Edge

Site :HY-CB02  
 Condition :3m ,Horizontal  
 Mode :TX\_bt1m\_2402MHz  
 TEST BY :Lance

Date: 2022-08-16



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	2389.200	47.56	74.00	-26.44	41.19	6.37	Peak
2	2400.000	74.96	-----	-----	68.59	6.37	Peak
3	2402.000	108.46	-----	-----	102.09	6.37	Peak

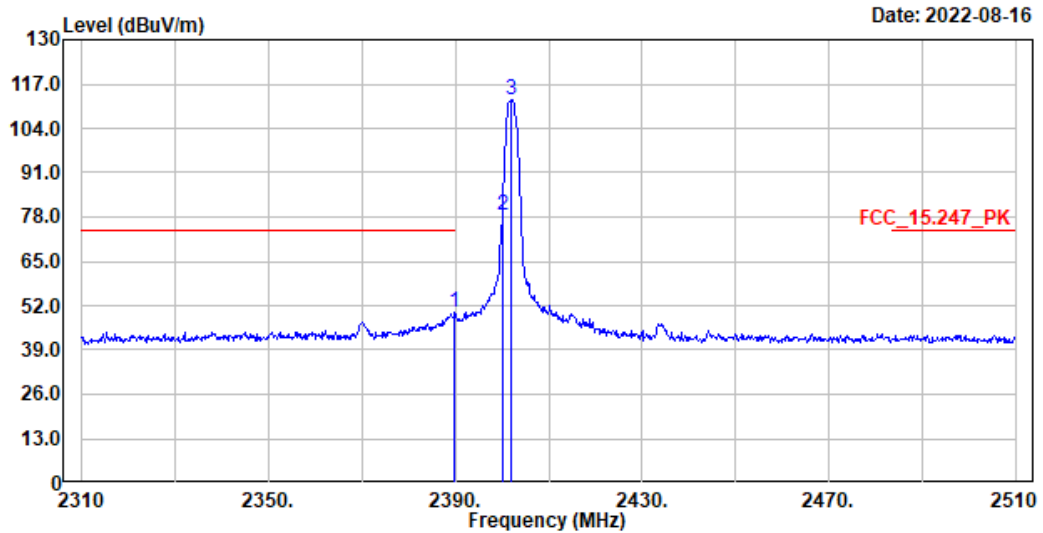
Note:

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

#### Horizontal -Average Detector:

Frequency	Peak	Duty Cycle	Measurement	Margin	Limit
MHz	Measurement	Factor	Level	dB	dBuV/m
	dBuV/m	dB	dBuV/m		
2389.2	47.56	-24.746	22.814	-31.186	54.000
2400	74.96	-24.746	50.214	--	--
2402	108.46	-24.746	83.714	--	--

Site :HY-CB02  
 Condition :3m ,Vertical  
 Mode :TX\_bt1m\_2402MHz  
 TEST BY :Lance



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	2389.800	50.11	74.00	-23.89	43.74	6.37	Peak
2	2400.000	78.67	-----	-----	72.30	6.37	Peak
3	2402.000	112.30	-----	-----	105.93	6.37	Peak

Note:

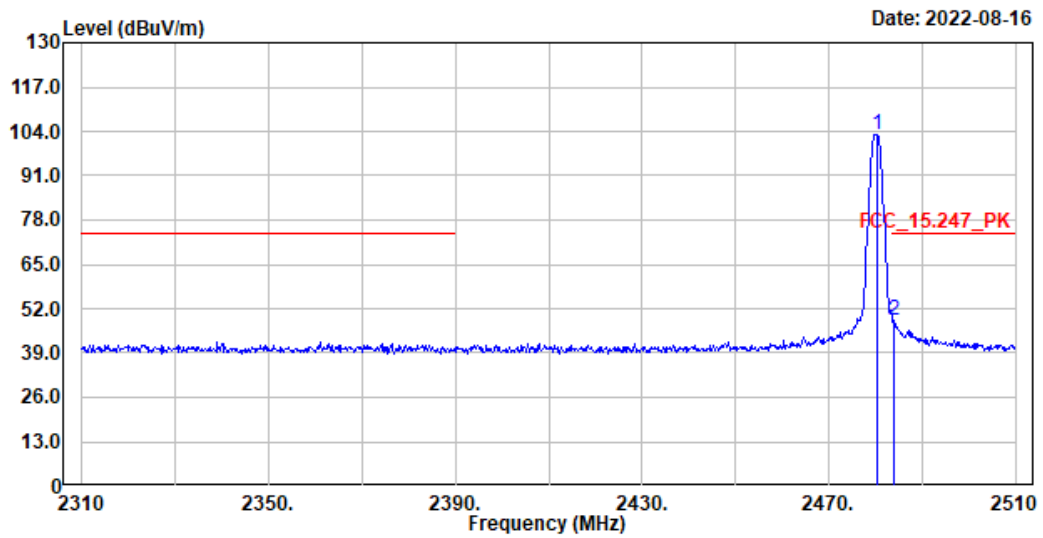
1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

**Vertical -Average Detector:**

Frequency	Peak	Duty Cycle	Measurement	Margin	Limit
MHz	Measurement	Factor	Level	dB	dBuV/m
	dBuV/m	dB	dBuV/m		
2389.8	50.11	-24.746	25.364	-28.636	54.000
2400	78.67	-24.746	53.924	--	--
2402	112.3	-24.746	87.554	--	--



Site :HY-CB02  
 Condition :3m ,Horizontal  
 Mode :TX\_bt1m\_2480MHz  
 TEST BY :Lance



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	2480.200	103.01	-----	-----	96.67	6.34	Peak
2	2483.800	48.66	74.00	-25.34	42.31	6.35	Peak

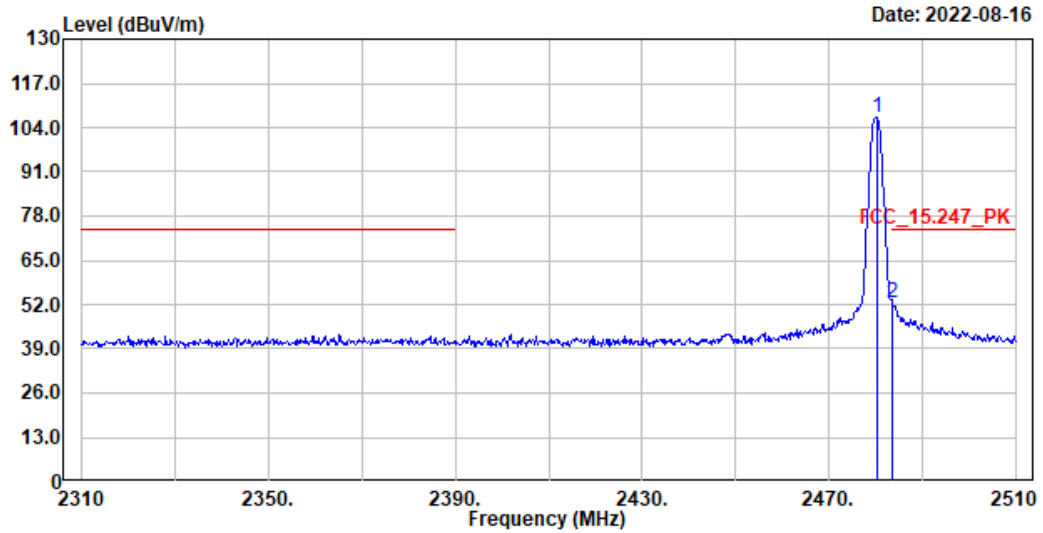
Note:

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

**Horizontal -Average Detector:**

Frequency	Peak	Duty Cycle	Measurement	Margin	Limit
MHz	Measurement	Factor	Level	dB	dBuV/m
	dBuV/m	dB	dBuV/m		
2480.2	103.01	-24.746	78.264	--	--
2483.8	48.66	-24.746	23.914	-30.086	54.000

Site :HY-CB02  
 Condition :3m ,Vertical  
 Mode :TX\_bt1m\_2480MHz  
 TEST BY :Lance



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	2480.200	106.72	-----	-----	100.38	6.34	Peak
2	2483.600	52.33	74.00	-21.67	45.98	6.35	Peak

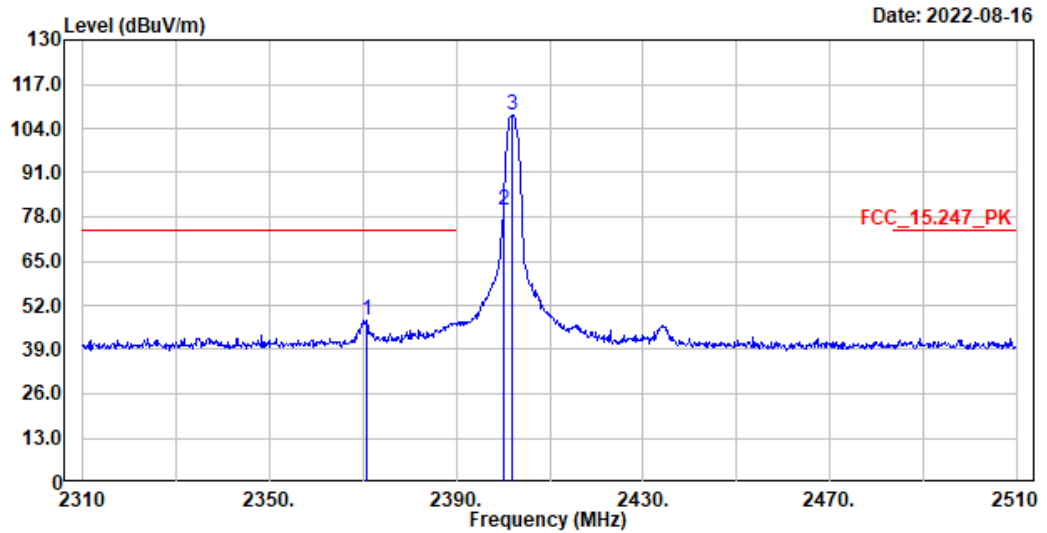
Note:

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

Vertical -Average Detector:

Frequency	Peak	Duty Cycle	Measurement	Margin	Limit
MHz	Measurement	Factor	Level	dB	dBuV/m
	dBuV/m	dB	dBuV/m		
2480.2	106.72	-24.746	81.974	--	--
2483.6	52.33	-24.746	27.584	-26.416	54.000

Site :HY-CB02  
 Condition :3m ,Horizontal  
 Mode :TX\_bt3m\_2402MHz  
 TEST BY :Lance



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	2370.800	47.66	74.00	-26.34	41.25	6.41	Peak
2	2400.000	79.73	-----	-----	73.36	6.37	Peak
3	2402.000	108.07	-----	-----	101.70	6.37	Peak

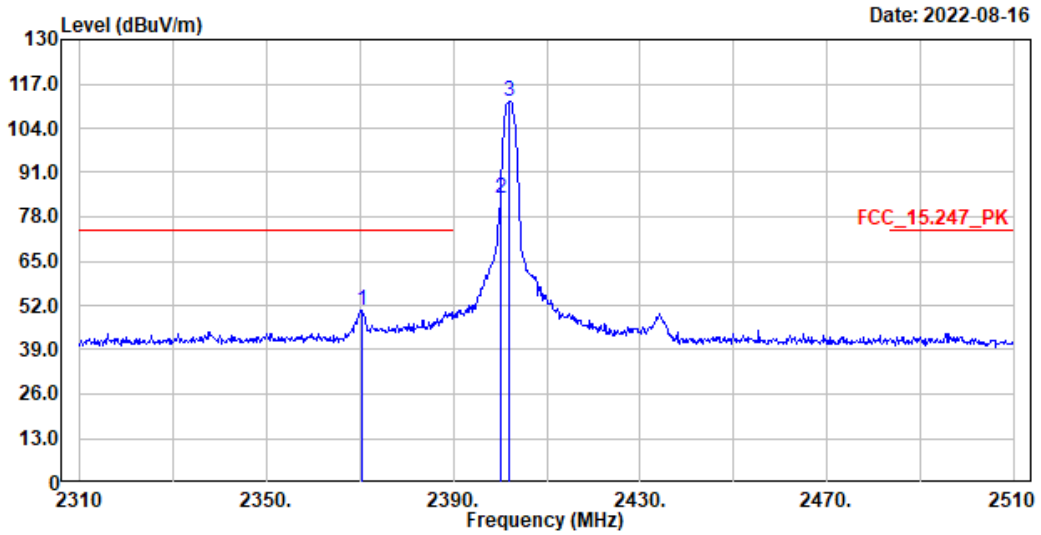
Note:

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

**Horizontal -Average Detector:**

Frequency	Peak	Duty Cycle	Measurement	Margin	Limit
MHz	Measurement	Factor	Level	dB	dBuV/m
	dBuV/m	dB	dBuV/m		
2370.8	47.66	-24.746	22.914	-31.086	54.000
2400	79.73	-24.746	54.984	--	--
2402	108.07	-24.746	83.324	--	--

Site :HY-CB02  
 Condition :3m ,Vertical  
 Mode :TX\_bt3m\_2402MHz  
 TEST BY :Lance



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	Limit	Level	dB	
1	2370.400	50.60	74.00	-23.40	44.20	6.40	Peak
2	2400.000	83.43	-----	-----	77.06	6.37	Peak
3	2402.000	112.08	-----	-----	105.71	6.37	Peak

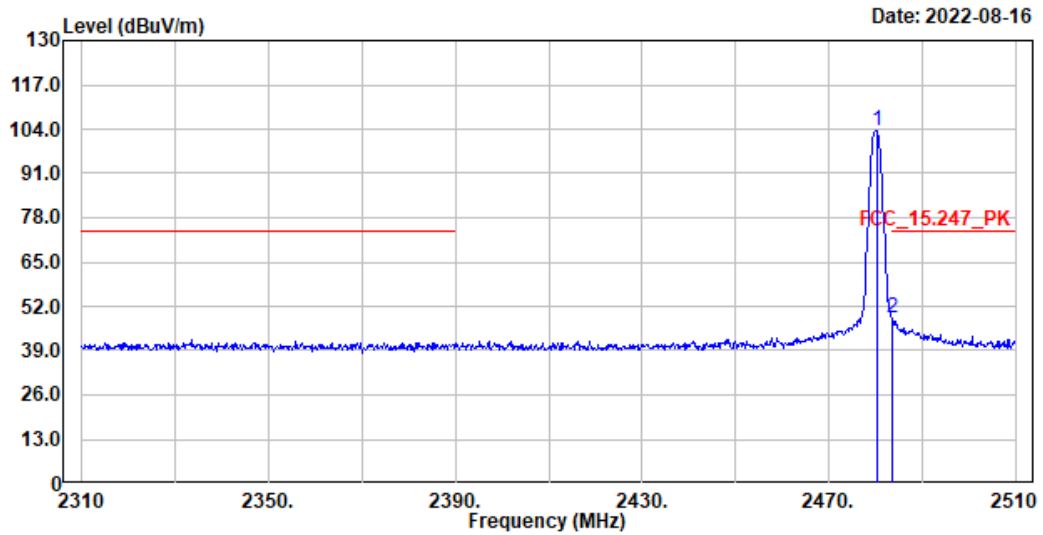
Note:

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

Vertical -Average Detector:

Frequency	Peak	Duty Cycle	Measurement	Margin	Limit
MHz	Measurement	Factor	Level	dB	dBuV/m
	dBuV/m	dB	dBuV/m		
2370.4	50.6	-24.746	25.854	-28.146	54.000
2400	83.43	-24.746	58.684	--	--
2402	112.08	-24.746	87.334	--	--

Site :HY-CB02  
 Condition :3m ,Horizontal  
 Mode :TX\_bt3m\_2480MHz  
 TEST BY :Lance



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	2480.200	103.48	-----	-----	97.14	6.34	Peak
2	2483.600	48.35	74.00	-25.65	42.00	6.35	Peak

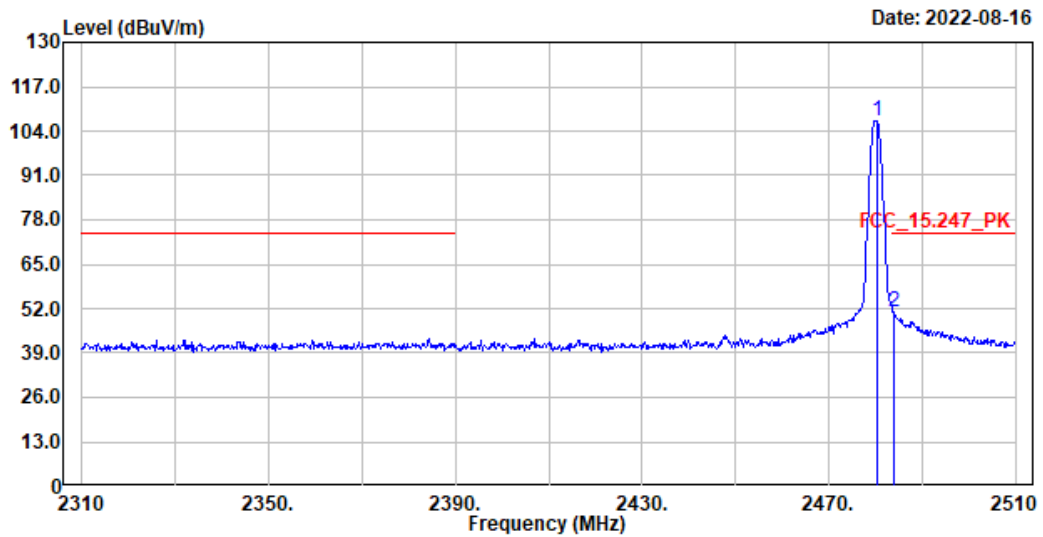
Note:

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

**Horizontal -Average Detector:**

Frequency	Peak	Duty Cycle	Measurement	Margin	Limit
MHz	Measurement	Factor	Level	dB	dBuV/m
	dBuV/m	dB	dBuV/m		
2480.2	103.48	-24.746	78.734	--	--
2483.6	48.35	-24.746	23.604	-30.396	54.000

Site :HY-CB02  
 Condition :3m ,Vertical  
 Mode :TX\_bt3m\_2480MHz  
 TEST BY :Lance



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	2480.200	107.19	-----	-----	100.85	6.34	Peak
2	2483.800	51.06	74.00	-22.94	44.71	6.35	Peak

Note:

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

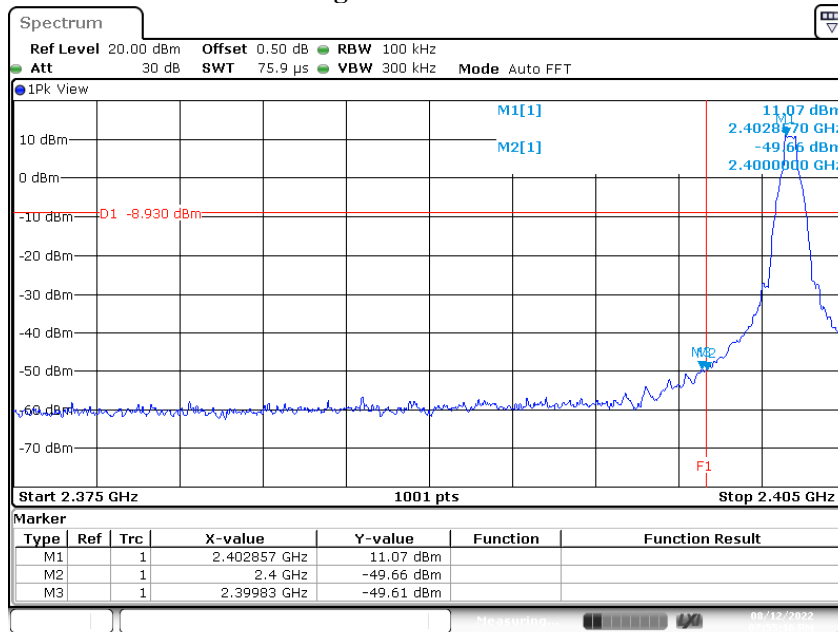
**Vertical -Average Detector:**

Frequency	Peak Measurement	Duty Cycle Factor	Measurement Level	Margin	Limit
MHz	dBuV/m	dB	dBuV/m	dB	dBuV/m
2480.2	107.19	-24.746	82.444	--	--
2483.8	51.06	-24.746	26.314	-27.686	54.000

Product : Bluetooth Headset  
 Test Item : Band Edge  
 Test Mode : Mode 1: Transmit - 1Mbps(Hopping off)  
 Test Date : 2022/08/12

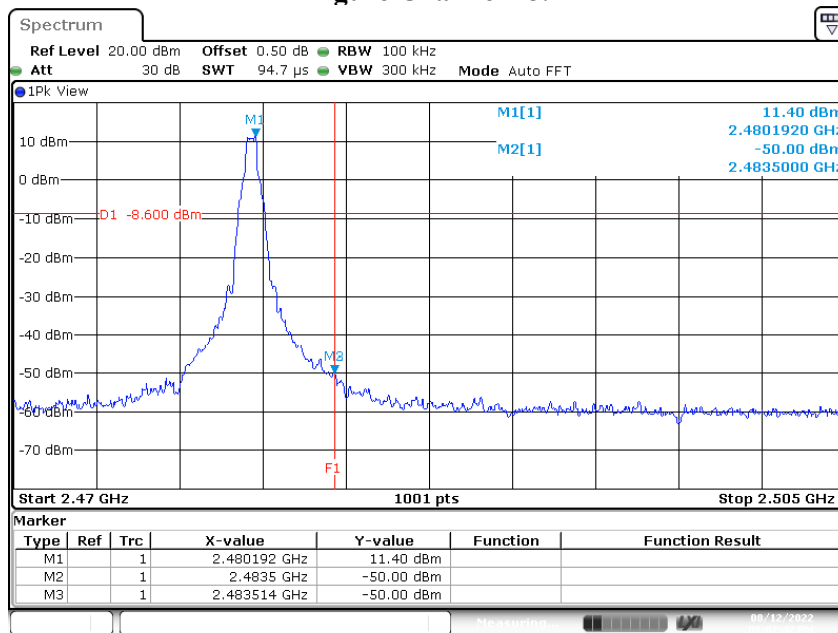
Measurement Level	Result
$\Delta$ (dB)	
> 20	PASS

Figure Channel 00:



Date: 12.AUG.2022 19:55:17

Figure Channel 78:

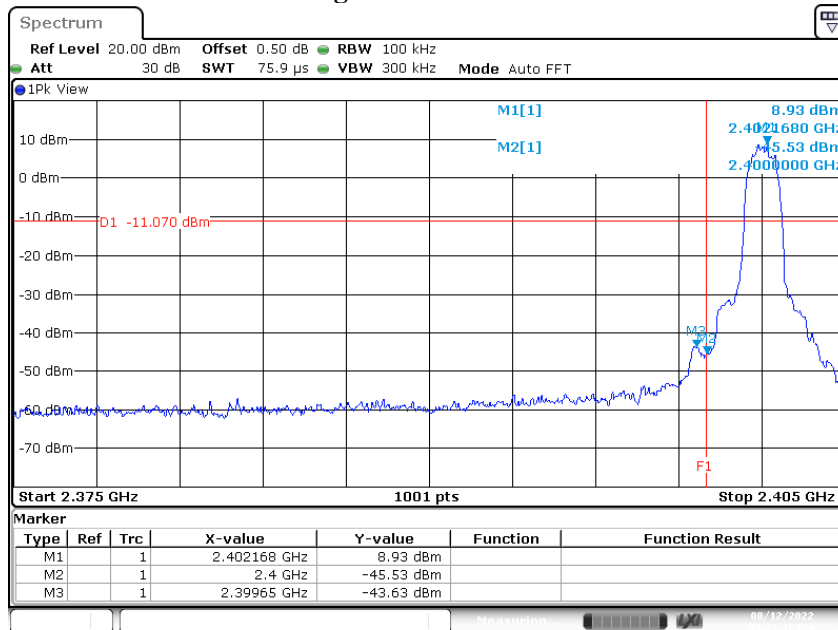


Date: 12.AUG.2022 20:02:42

Product : Bluetooth Headset  
 Test Item : Band Edge  
 Test Mode : Mode 2: Transmit - 3Mbps (Hopping off)  
 Test Date : 2022/08/12

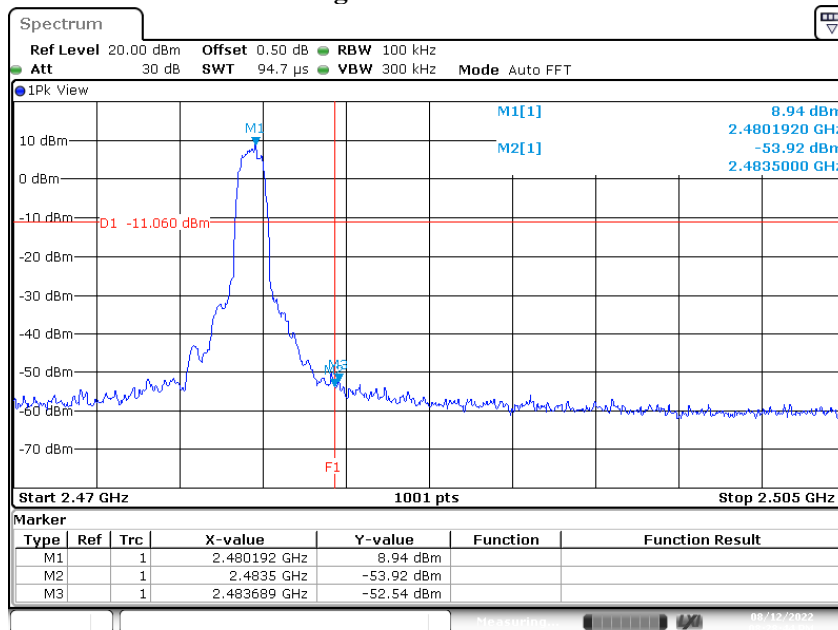
Measurement Level	Result
$\Delta$ (dB)	
> 20	PASS

Figure Channel 00:



Date: 12.AUG.2022 20:21:12

Figure Channel 78:



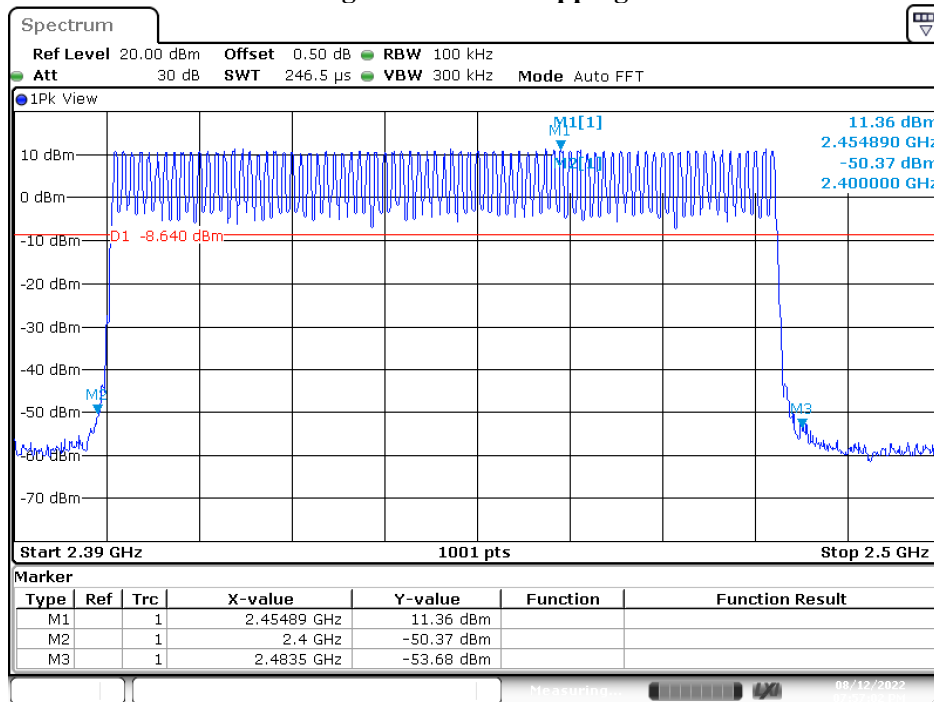
Date: 12.AUG.2022 20:28:44



Product : Bluetooth Headset  
 Test Item : Band Edge  
 Test Mode : Mode 1: Transmit - 1Mbps(Hopping on)  
 Test Date : 2022/08/12

Measurement Level	Result
$\Delta$ (dB)	
> 20	PASS

Figure Channel Hopping:

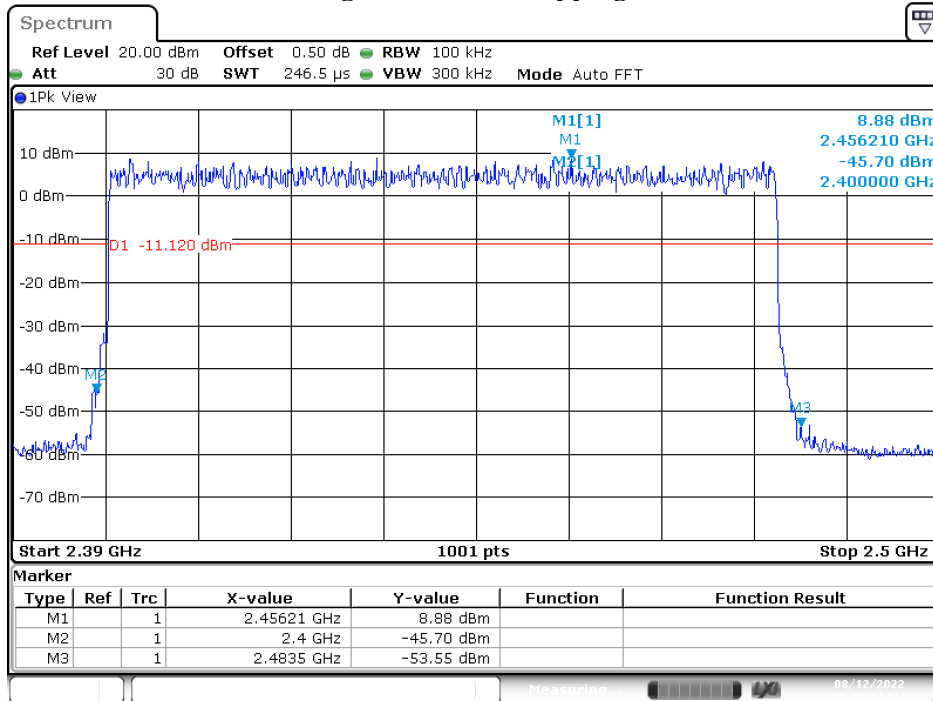


Date: 12.AUG.2022 19:57:02

Product : Bluetooth Headset  
 Test Item : Band Edge  
 Test Mode : Mode 2: Transmit - 3Mbps (Hopping on)  
 Test Date : 2022/08/12

Measurement Level	Result
$\Delta$ (dB)	
> 20	PASS

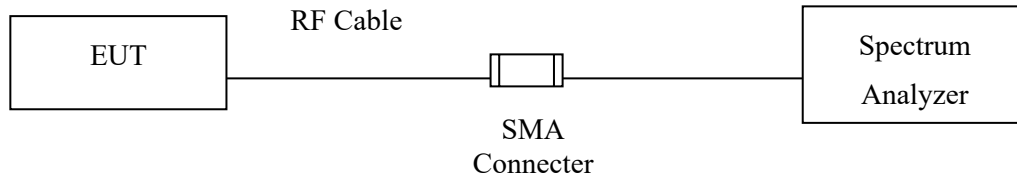
Figure Channel Hopping:



Date: 12.AUG.2022 20:23:24

## 7. Channel Number

### 7.1. Test Setup



### 7.2. Limit

Frequency hopping systems operating in the 2400-2483.5 MHz bands shall use at least 75 hopping frequencies.

### 7.3. Test Procedure

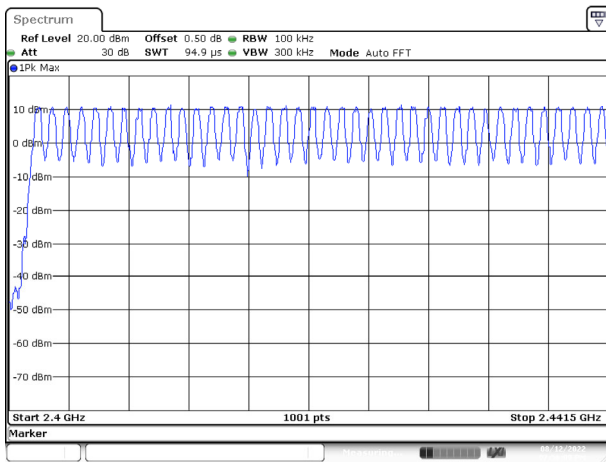
Tested according to FHSS test procedure of KDB558074 section 9 (b for compliance to FCC 47CFR 15.247 requirements.

### 7.4. Test Result of Channel Number

Product : Bluetooth Headset  
 Test Item : Channel Number  
 Test Mode : Mode 1: Transmit - 1Mbps  
 Test Date : 2022/08/12

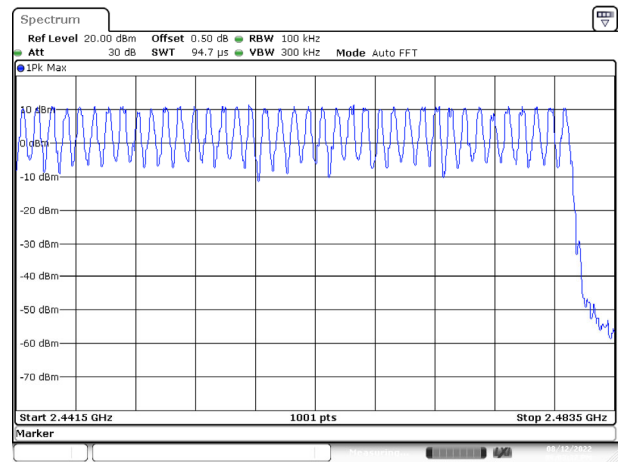
Frequency Range (MHz)	Measurement (Hopping Channel)	Required Limit (Hopping Channel)	Result
2402 ~ 2480	79	>75	Pass

2402MHz



Date: 12.AUG.2022 19:56:10

2480MHz

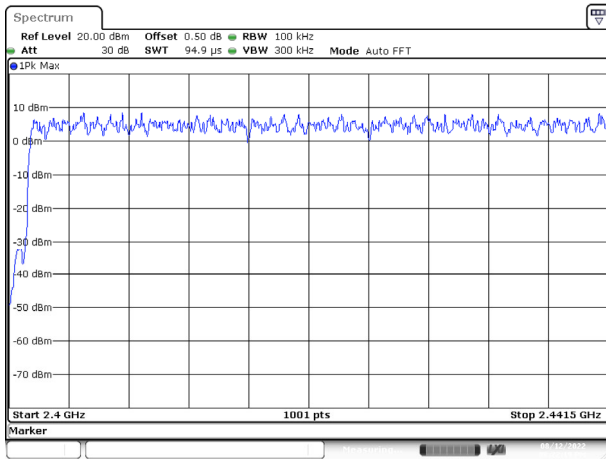


Date: 12.AUG.2022 20:03:32

Product : Bluetooth Headset  
 Test Item : Channel Number  
 Test Mode : Mode 2: Transmit - 3Mbps  
 Test Date : 2022/08/12

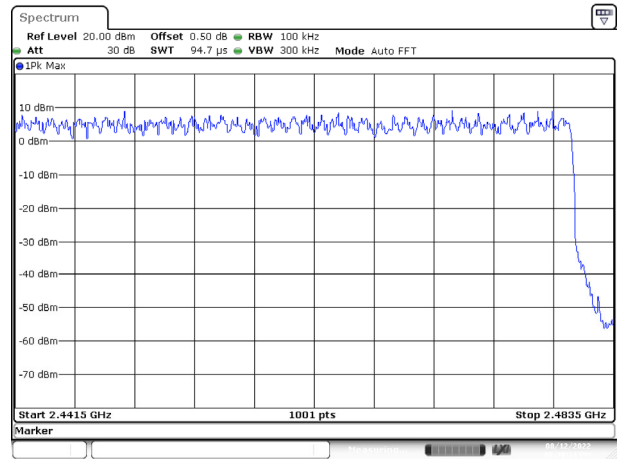
Frequency Range (MHz)	Measurement (Hopping Channel)	Required Limit (Hopping Channel)	Result
2402 ~ 2480	79	>75	Pass

2402MHz



Date: 12.AUG.2022 20:22:19

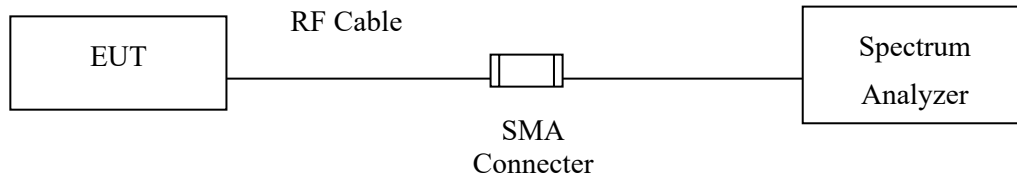
2480MHz



Date: 12.AUG.2022 20:30:11

## 8. Channel Separation

### 8.1. Test Setup



### 8.2. Limit

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

### 8.3. Test Procedure

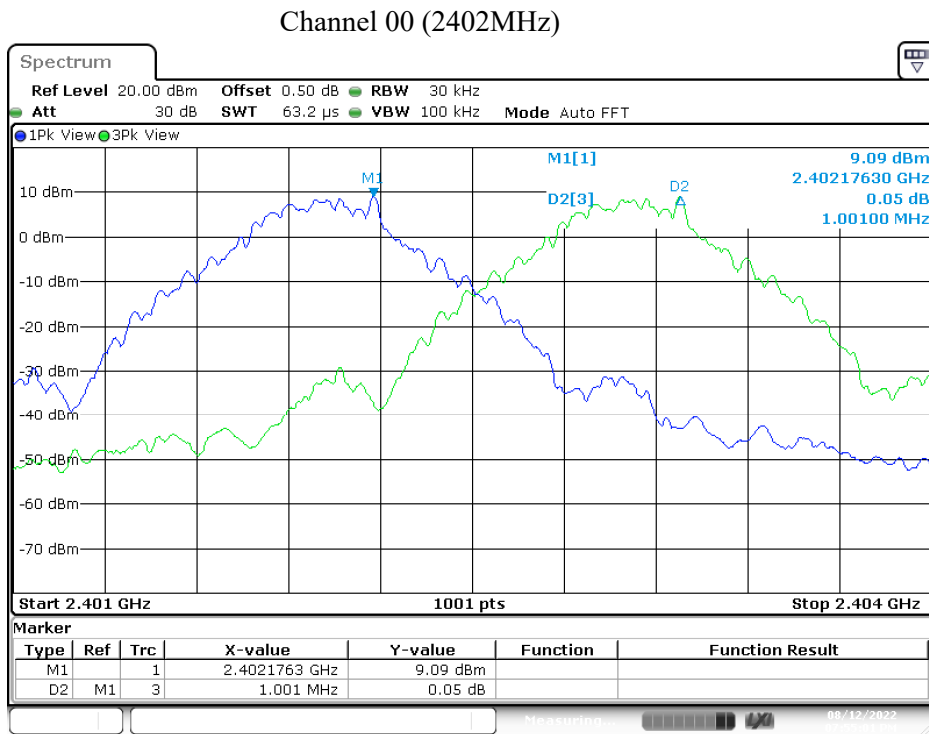
Tested according to FHSS test procedure of KDB558074 section 9 (b for compliance to FCC 47CFR 15.247 requirements).

### 8.4. Test Result of Channel Separation

Product : Bluetooth Headset  
 Test Item : Channel Separation  
 Test Mode : Mode 1: Transmit - 1Mbps  
 Test Date : 2022/08/12

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Limit (kHz)	Limit of (2/3)*20dB Bandwidth (kHz)	Result
00	2402	1001	>25 kHz	644.0	Pass
39	2441	1001	>25 kHz	644.0	Pass
78	2480	1001	>25 kHz	644.0	Pass

NOTE: The 20dB Bandwidth is refer to section 10.

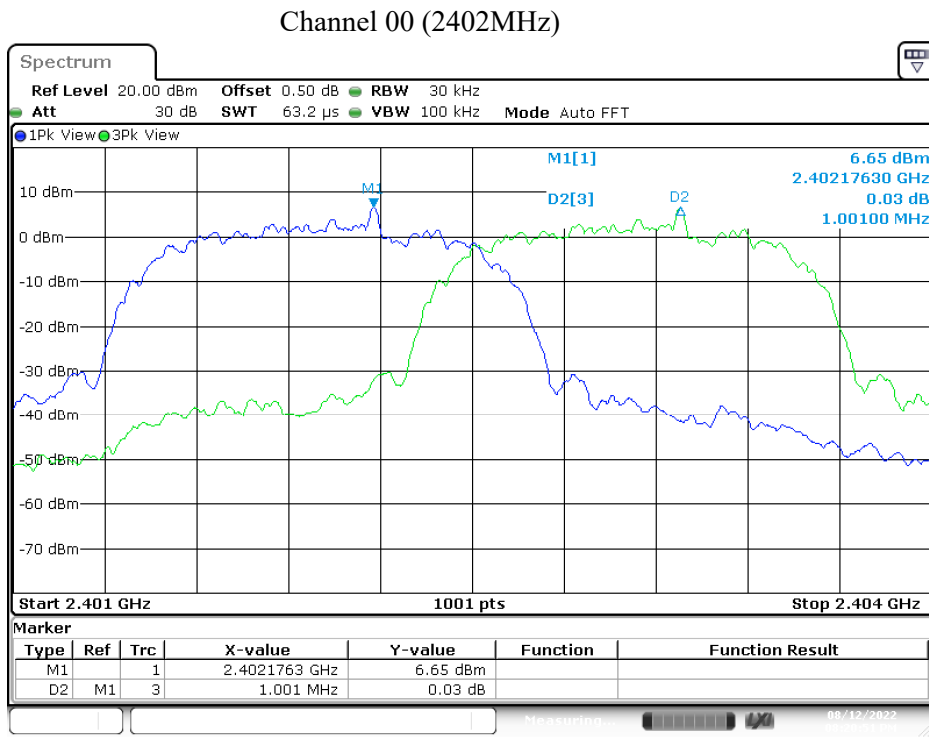


Date: 12.AUG.2022 19:55:02

Product : Bluetooth Headset  
 Test Item : Channel Separation  
 Test Mode : Mode 2: Transmit - 3Mbps  
 Test Date : 2022/08/12

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Limit (kHz)	Limit of (2/3)*20dB Bandwidth (kHz)	Result
00	2402	1001	>25 kHz	876.0	Pass
39	2441	998	>25 kHz	876.0	Pass
78	2480	1001	>25 kHz	876.0	Pass

NOTE: The 20dB Bandwidth is refer to section 10.

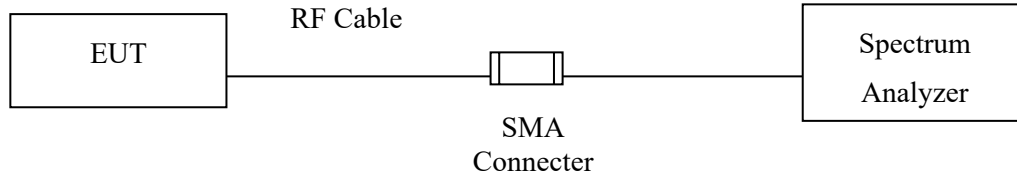


Date: 12.AUG.2022 20:20:51



## 9. Dwell Time

### 9.1. Test Setup



### 9.2. Limit

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

### 9.3. Test Procedure

Tested according to FHSS test procedure of KDB558074 section 9 (b for compliance to FCC 47CFR 15.247 requirements).

### 9.4. Test Result of Dwell Time

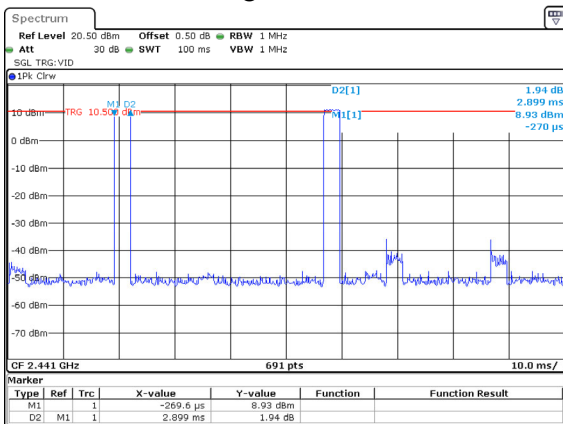
Product : Bluetooth Headset  
 Test Item : Dwell Time  
 Test Mode : Mode 1: Transmit - 1Mbps (Channel 00,39,78)  
 Test Date : 2022/08/12

Frequency (MHz)	Time slot length (ms)	Hopping of Number	Sweep time (ms)	Dwell Time (ms)	Limit (ms)	Result
2402	2.899	107	31600	310.193	400	Pass
2441	2.899	107	31600	310.193	400	Pass
2480	2.899	107	31600	310.193	400	Pass

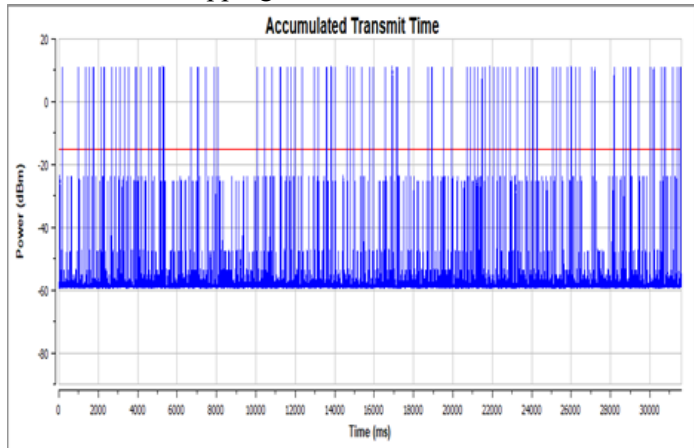
Dwell time = Time slot length (ms)\*Hopping of Number

Hopping of Number is S.A software calculated value.

CH 40 Time slot length



CH 40 Hopping of Number

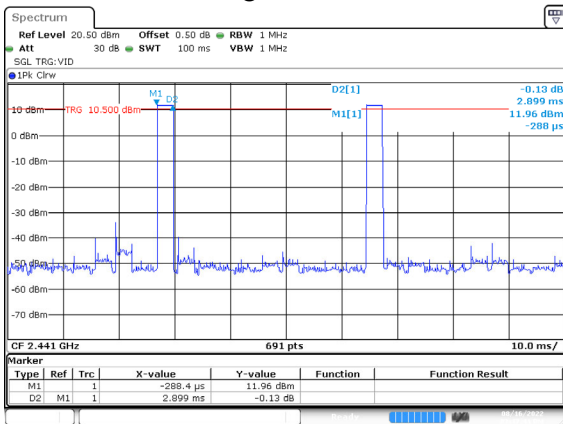


Product : Bluetooth Headset  
 Test Item : Dwell Time  
 Test Mode : Mode 2: Transmit - 3Mbps (Channel 00,39,78)  
 Test Date : 2022/08/12

Frequency (MHz)	Time slot length (ms)	Hopping of Number	Sweep time (ms)	Dwell Time (ms)	Limit (ms)	Result
2402	2.899	109	31600	315.991	400	Pass
2441	2.899	109	31600	315.991	400	Pass
2480	2.899	109	31600	315.991	400	Pass

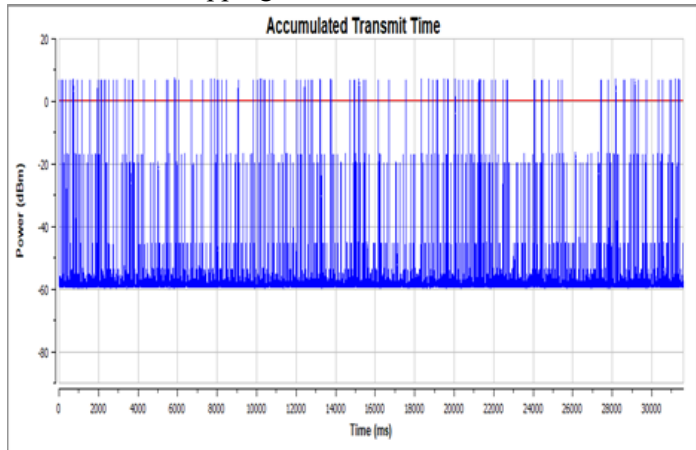
Dwell time = Time slot length (ms)\*Hopping of Number  
 Hopping of Number is S.A software calculated value.

CH 39 Time slot length



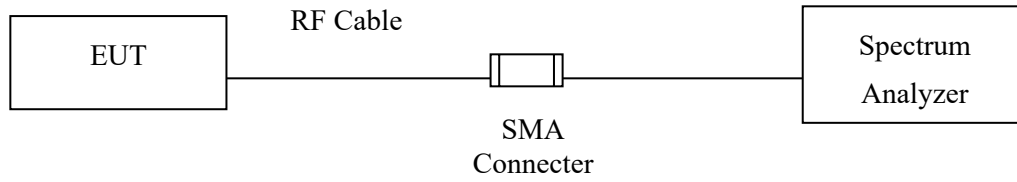
Date: 16 AUG 2022 15:47:41

CH 39 Hopping of Number



## 10. Occupied Bandwidth

### 10.1. Test Setup



### 10.2. Limits

N/A

### 10.3. Test Procedure

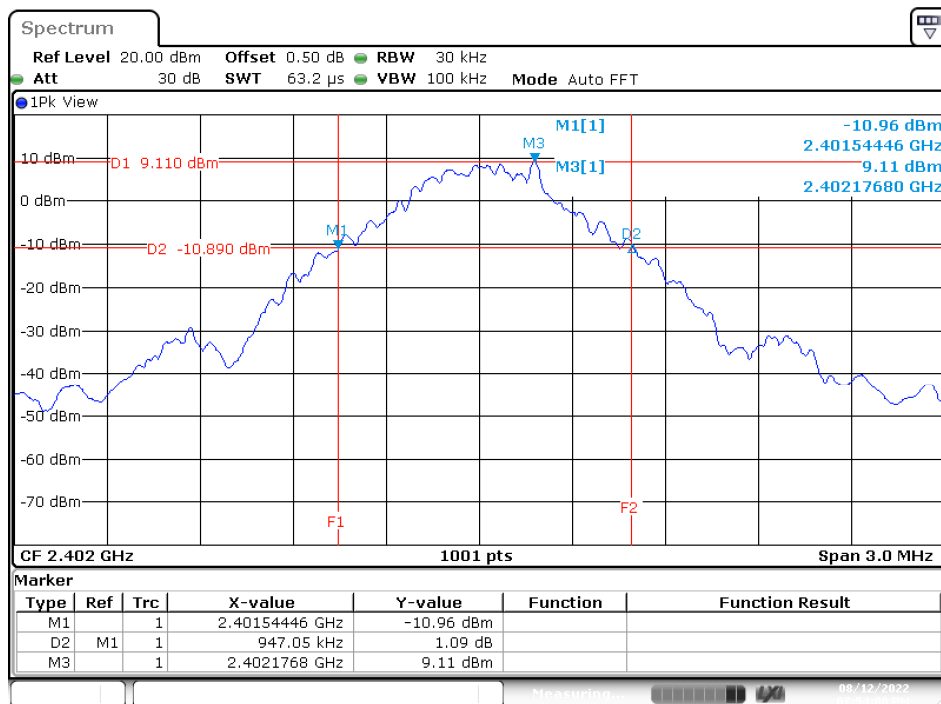
Tested according to FHSS test procedure of KDB558074 section 9 (b for compliance to FCC 47CFR 15.247 requirements.

### 10.4. Test Result of Occupied Bandwidth

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

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
00	2402	947	--	NA
39	2441	950	--	NA
78	2480	950	--	NA

Figure Channel 00:

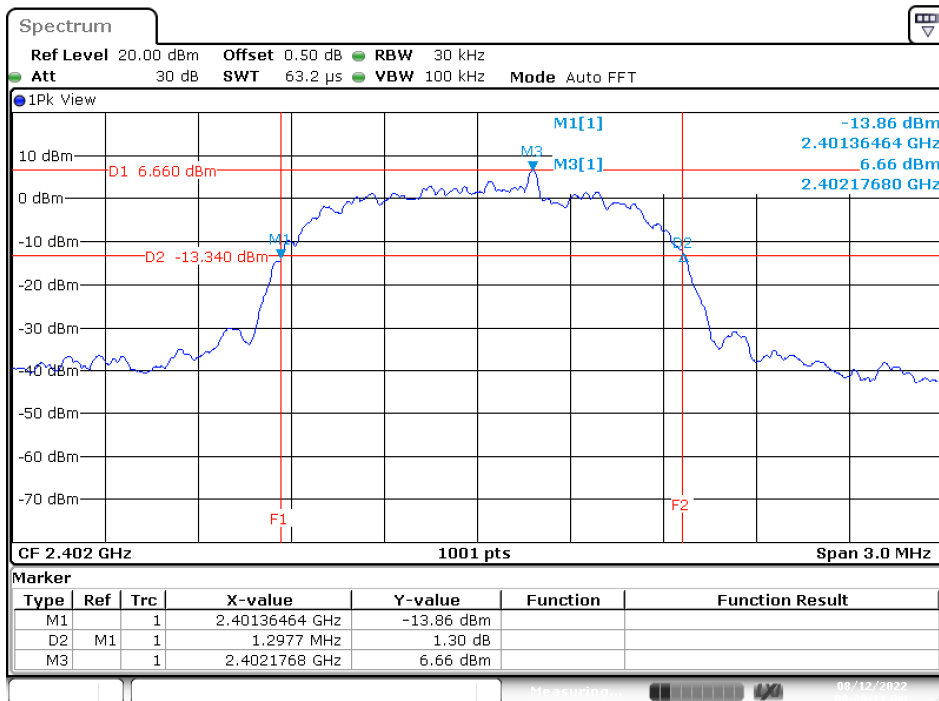


Date: 12.AUG.2022 19:54:01

Product : Bluetooth Headset  
 Test Item : Occupied Bandwidth Data  
 Test Mode : Mode 2: Transmit - 3Mbps  
 Test Date : 2022/08/12

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
00	2402	1297	--	NA
39	2441	1300	--	NA
78	2480	1300	--	NA

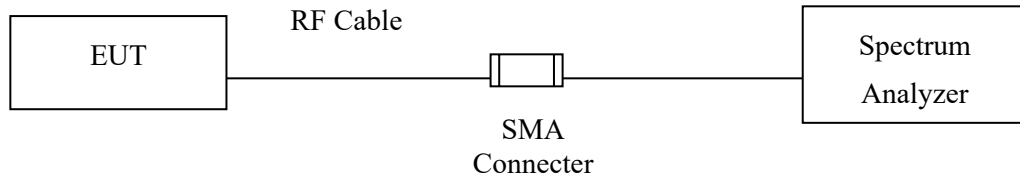
Figure Channel 00:



Date: 12.AUG.2022 20:20:11

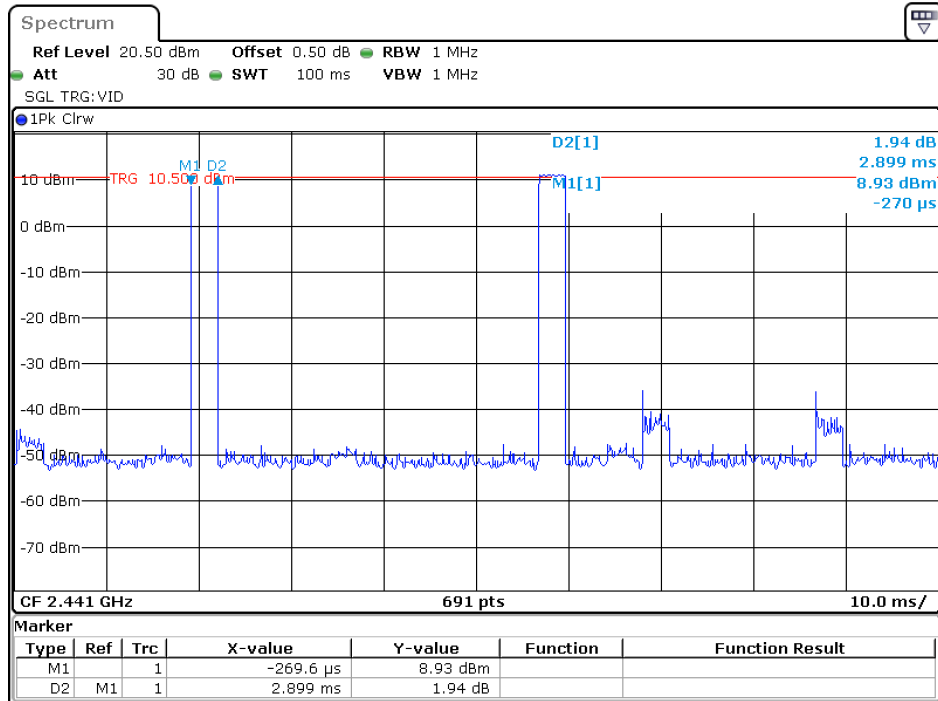
## 11. Duty Cycle

### 11.1. Test Setup



### 11.2. Test Result of Duty Cycle

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



Date: 18.AUG.2022 12:04:52

Time on of 100ms= 5.79ms

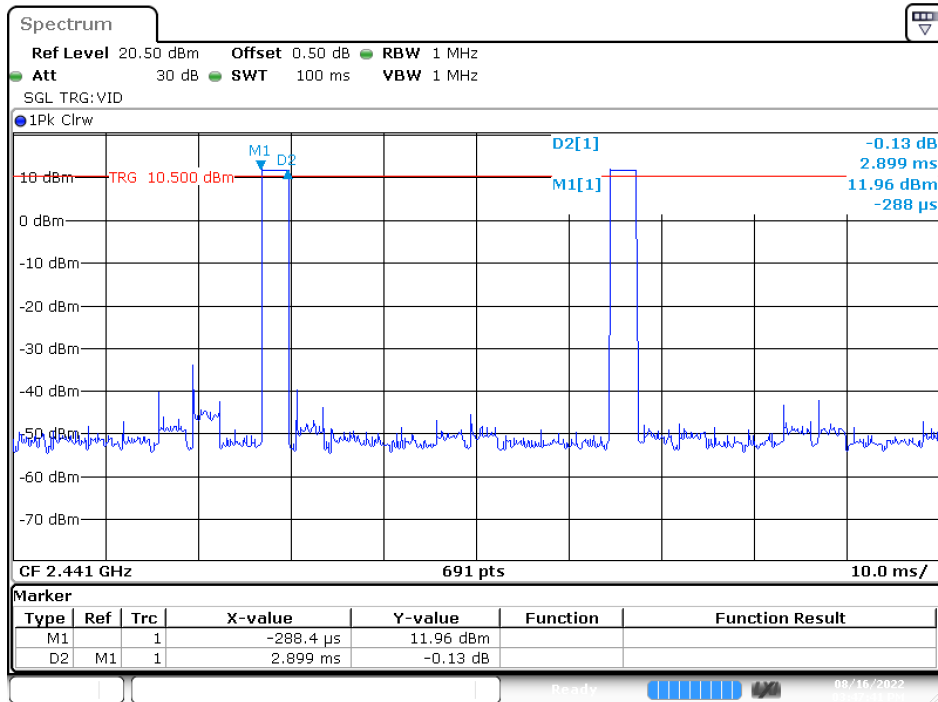
Duty Cycle=5.79ms / 100msec=0.0579

Duty Cycle correction factor= 20 LOG 0.0579= -24.746 dB

<b>Duty Cycle correction factor</b>	<b>-24.746</b>	<b>dB</b>
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Product : Bluetooth Headset  
 Test Item : Duty Cycle Data  
 Test Mode : Mode 2: Transmit - 3Mbps



Date: 16.AUG.2022 15:47:41

Time on of 100ms= 5.79ms

Duty Cycle=5.79ms / 100msec=0.0579

Duty Cycle correction factor= 20 LOG 0.0579= -24.746 dB

<b>Duty Cycle correction factor</b>	<b>-24.746</b>	<b>dB</b>
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## **12. EMI Reduction Method During Compliance Testing**

No modification was made during testing.