

FCC Test Report

Product Name	Hearing Aid
Model No.	HL203
FCC ID.	2ABTAHNL203

Applicant	Health & Life Co., Ltd.
Address	9F, No. 186, Jian Yi Road, Zhonghe District, New Taipei City, Taiwan

Date of Receipt	Mar. 27, 2020
Issued Date	Apr. 20, 2020
Report No.	2030771R-E3032110108
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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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.

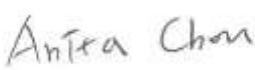
Test Report


Issued Date: Apr. 20, 2020

Report No.: 2030771R-E3032110108



Product Name	Hearing Aid
Applicant	Health & Life Co., Ltd.
Address	9F, No. 186, Jian Yi Road, Zhonghe District, New Taipei City, Taiwan
Manufacturer	Health & Life Co., Ltd.
factory (ies)	1. Health & Life (Suzhou) Co., Ltd. 2. Living Science Co., Ltd.
Model No.	HL203
FCC ID.	2ABTAHNL203
EUT Rated Voltage	4.2V/250mA
EUT Test Voltage	AC 120V / 60Hz (by Adapter), DC 4.2V (by Battery)
Trade Name	Health & Life
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C ANSI C63.4: 2014, ANSI C63.10: 2013
Test Result	Complied

Documented By : 
 (Senior Engineering Adm. Specialist / Anita Chou)

Tested By : 
 (Engineer / Trista Huang)


Approved By : 
 (Director / Vincent Lin)

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Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Hearing Aid
Trade Name	Health & Life
Model No.	HL203
FCC ID.	2ABTAHNL203
Frequency Range	2402-2480MHz
Channel Number	79
Type of Modulation	FHSS: GFSK(1Mbps) / π /4DQPSK(2Mbps) / 8DPSK(3Mbps)
Antenna Type	Chip Antenna
Channel Control	Auto
Antenna Gain	Refer to the table "Antenna List"
Type C USB Cable	Health & Life Co. Ltd., HL203-USB-CABLE, Shielded, 0.2m
Earphone	Health & Life Co. Ltd., HL203-EARPHONE
USB Adapter	MFR: DVE, M/N: DSA-5PFK-05 FUS 050100a Input: AC 100-240V~ 50/60Hz, 0.2A Output: DC 5V, 1A

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	Advanced Ceramic X	AT1608-A2R4NAA_	Chip Antenna	0.5dBi for 2.4GHz

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 Hearing Aid with a built-in Bluetooth V4.0, V3.0, V2.1+EDR transceiver, this report for Bluetooth V3.0, V2.1+EDR.
2. These tests were conducted on a sample for the purpose of demonstrating compliance of Bluetooth transmitter with Part 15 Subpart C Paragraph 15.247 for spread spectrum devices.
3. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test
4. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report
5. Bluetooth operation was evaluated at both 1Mb/s and 3Mb/s data rates. 2Mb/s data rate was found, through pre-testing, to produce emissions similar to those for 3Mb/s.

Test Mode	Mode 1: Transmit - 1Mbps (GFSK) Mode 2: Transmit - 3Mbps (8DPSK)
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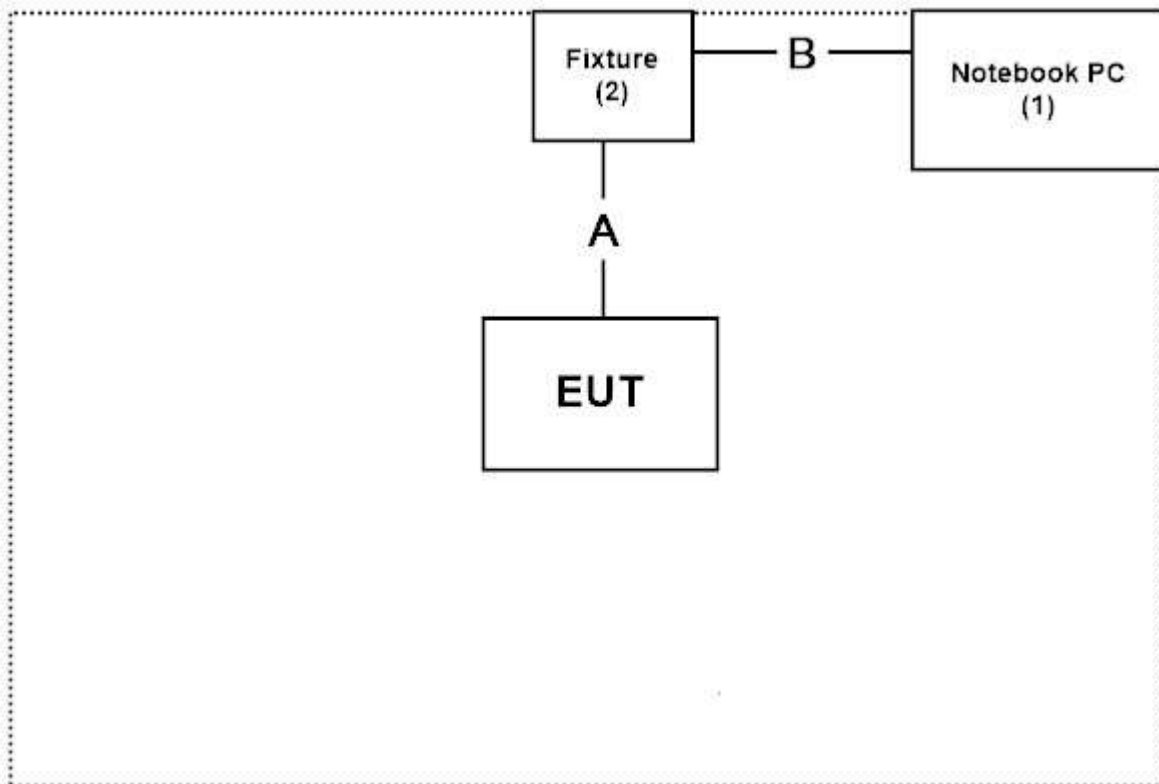
1.3. Tested System Details

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 E5440	74BTK32	Non-Shielded, 0.8m
2	Fixture	warehouse	FT232	N/A	N/A

Signal Cable Type	Signal cable Description	
A	Type C USB Cable	Non-Shielded, 0.2m
B	USB cable	Shielded, 1.2m

1.4. Configuration of Tested System



1.5. EUT Exercise Software

1. Setup the EUT as shown in Section 1.4.
2. Execute software “Airoha.AB152x Ver.2.1.4.20365” 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.

1.6. 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 %	51%
Radiated Emission	Temperature (°C)	10~40 °C	20.8°C
	Humidity (%RH)	10~90 %	60%
Conductive	Temperature (°C)	10~40 °C	23°C
	Humidity (%RH)	10~90 %	64.9%

USA : FCC Registration Number: TW3023

Canada : IC Registration Number: 4075A

Site Description: Accredited by TAF
Accredited Number: 3023

Test Laboratory: DEKRA Testing and Certification Co., Ltd
Address: No.5-22, Ruishukeng, Linkou Dist., New Taipei City 24451,
Taiwan, R.O.C.
Phone number: 886-2-8601-3788
Fax number: 886-2-8601-3789
Email address: info.tw@dekra.com
Website: <http://www.dekra.com.tw>

1.7. List of Test Equipment

For Conducted measurements /CB3/SR8

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Date	Due. Date
	Temperature Chamber	WIT GROUP	TH-1S-B	EQ-201-00146	2020/02/25	2021/02/24
X	Spectrum Analyzer	Agilent	N9010A	MY53470892	2019/09/25	2020/09/24
X	Peak Power Analyzer	Keysight	8990B	MY51000410	2019/07/30	2020/07/29
X	Wideband Power Sensor	Keysight	N1923A	MY56080003	2019/07/30	2020/07/29
X	Wideband Power Sensor	Keysight	N1923A	MY56080004	2019/07/30	2020/07/29
X	EMI Test Receiver	R&S	ESCS 30	100369	2019/11/19	2020/11/18
X	LISN	R&S	ENV216	101105	2020/04/09	2021/04/08
X	LISN	R&S	ESH3-Z5	836679/014	2020/04/09	2021/04/08
X	Coaxial Cable	DEKRA	RG 400	LC018-RG	2019/06/20	2020/06/19

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 : DEKRA Conduction Test SystemV9.0.5.

For Radiated measurements /Site3/CB8

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Date	Due. Date
X	Test Receiver	R&S	ESR7	101602	2019/12/16	2020/12/15
X	Signal Analyzer	R&S	FSV40	101869	2019/07/04	2020/07/03
X	Loop Antenna	Teseq	HLA6121	37133	2019/10/15	2021/10/14
X	Bilog Antenna	Schaffner Chase	CBL6112B	2916	2020/01/20	2021/01/19
X	Coaxial Cable	DEKRA	L1907-001C	280280.F141.1000D	2019/07/10	2020/07/09
X	Amplifier	EMCI	EMC001330	980254	2019/08/22	2020/08/21
X	Horn Antenna	ETS-LINDGREN	3117	00228113	2019/05/02	2020/05/01
X	Coaxial Cable	DEKRA	L1907-002C	280280.F141.1000D	2019/07/10	2020/07/09
X	Amplifier	EMCI	EMC05820SE	980362	2019/06/26	2020/06/25
X	Amplifier	EMCI	EMC051845SE	980632	2019/08/08	2020/08/07
	Horn Antenna	Com-Power	AH-1840	101101	2019/10/31	2020/10/30
	Amplifier + Cable	EMCI	EMC184045SE	980369	2020/04/15	2021/04/14
	Bilog Antenna	Schaffner Chase	CBL6112B	2925	2020/02/20	2021/02/19
	Coaxial Cable	DEKRA	L1907-003C	00100A1B3A120M	2019/07/10	2020/07/09
	Amplifier	EMCI	EMC001330	980255	2019/06/28	2020/06/27
X	Filter	MICRO-TRONICS	BRM50702	G270	2019/08/08	2020/08/07
	Filter	MICRO-TRONICS	BRM50716	G196	2019/08/08	2020/08/07

Note:

1. Loop 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 : DEKRA Test SystemV1.1.

1.8. Uncertainty

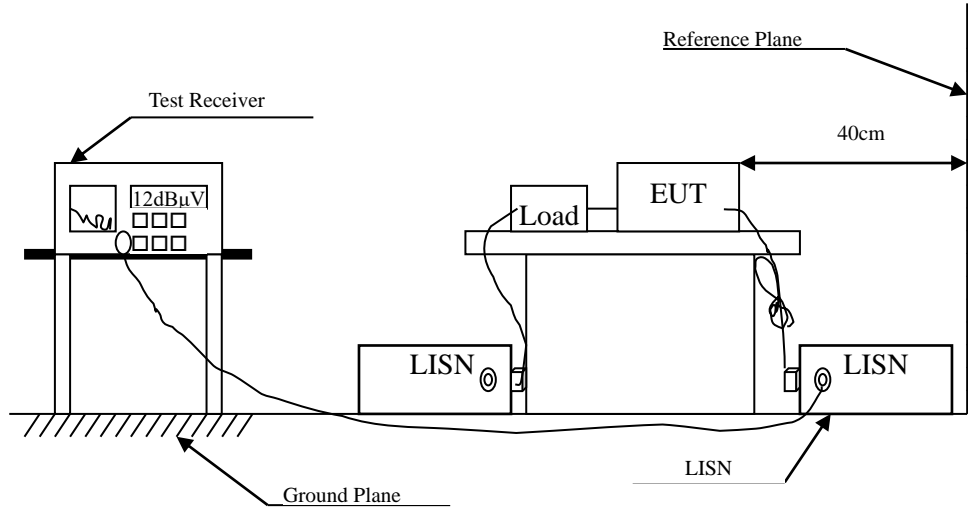
Uncertainties have been calculated according to the DEKRA internal document, and is described in each test chapter of this report.

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.

2. Conducted Emission

2.1. Test Setup



2.2. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dB μ 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.

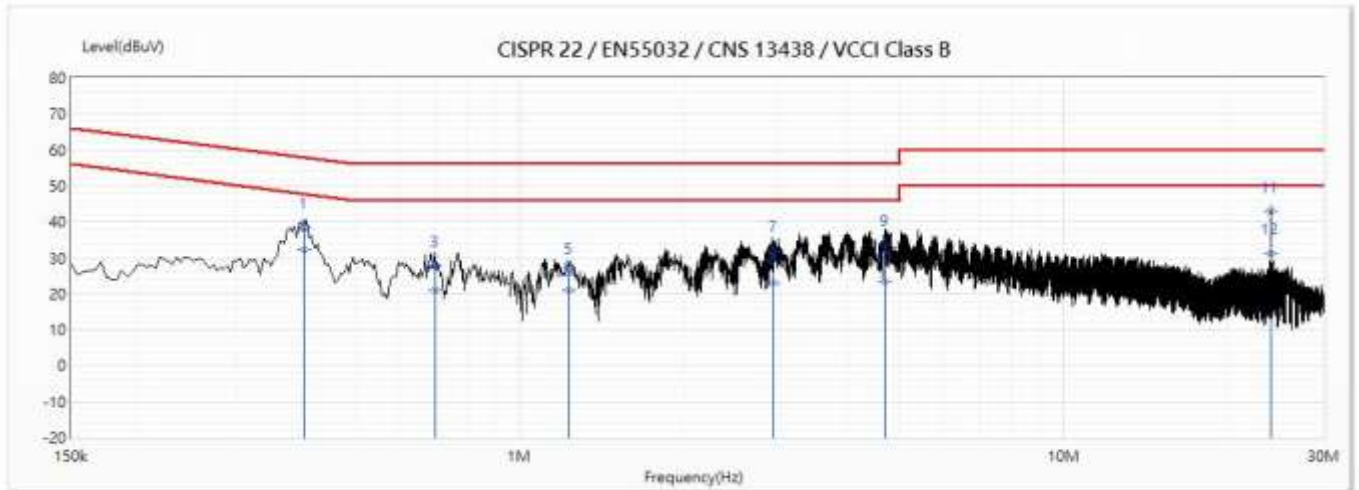
2.4. Uncertainty

± 2.26 dB

2.5. Test Result of Conducted Emission

Product : Hearing Aid
 Test Item : Conducted Emission Test
 Test date : 2020/04/16
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (2441MHz)

Line 1



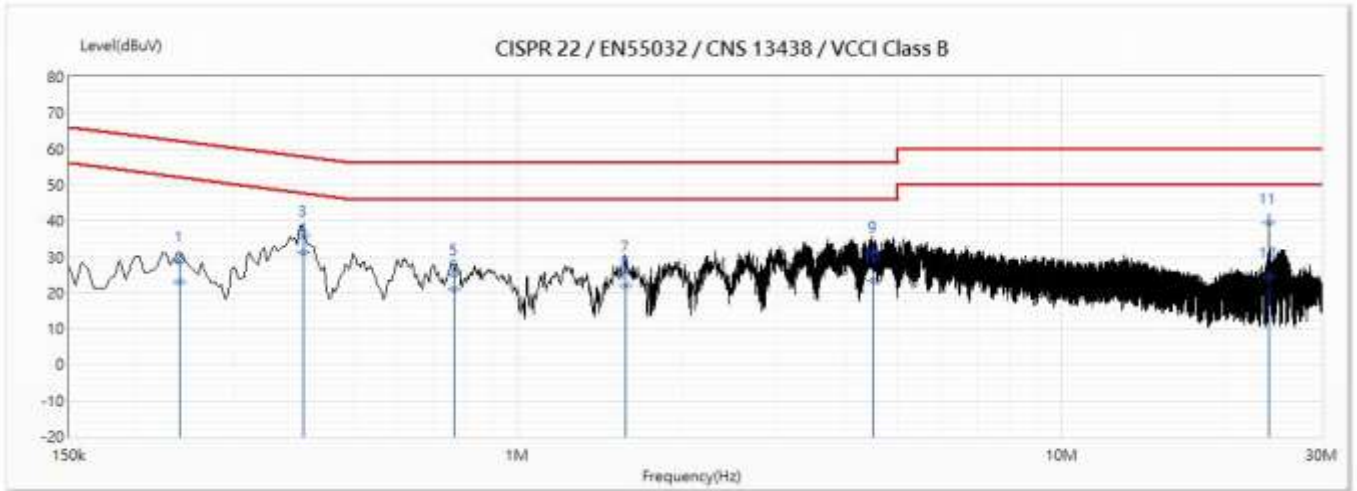
No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	0.401	38.31	57.83	-19.51	28.53	9.79	QP
*2	0.401	32.12	47.83	-15.71	22.33	9.79	AV
3	0.699	27.75	56.00	-28.25	17.95	9.80	QP
4	0.699	20.86	46.00	-25.14	11.06	9.80	AV
5	1.234	25.85	56.00	-30.15	16.02	9.83	QP
6	1.234	20.87	46.00	-25.13	11.04	9.83	AV
7	2.92	31.80	56.00	-24.20	21.90	9.90	QP
8	2.92	23.16	46.00	-22.84	13.26	9.90	AV
9	4.699	33.56	56.00	-22.44	23.59	9.96	QP
10	4.699	23.45	46.00	-22.55	13.48	9.96	AV
11	24	42.82	60.00	-17.18	32.56	10.26	QP
12	24	31.31	50.00	-18.69	21.05	10.26	AV

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Hearing Aid
 Test Item : Conducted Emission Test
 Test date : 2020/04/16
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (2441MHz)

Line 2



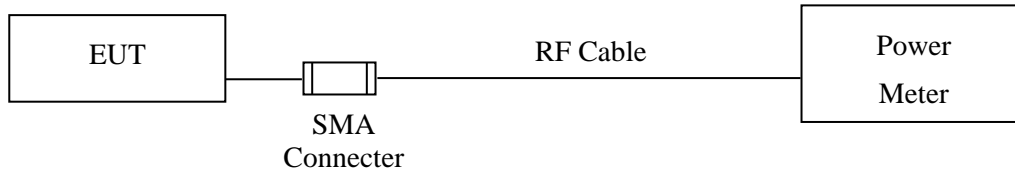
No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	0.239	28.68	62.14	-33.45	18.91	9.77	QP
2	0.239	23.10	52.14	-29.04	13.33	9.77	AV
3	0.404	36.09	57.76	-21.68	26.31	9.78	QP
*4	0.404	31.17	47.76	-16.59	21.40	9.78	AV
5	0.765	25.09	56.00	-30.91	15.30	9.80	QP
6	0.765	20.87	46.00	-25.13	11.08	9.80	AV
7	1.577	26.02	56.00	-29.98	16.18	9.84	QP
8	1.577	21.90	46.00	-24.10	12.06	9.84	AV
9	4.489	31.47	56.00	-24.53	21.53	9.95	QP
10	4.489	23.49	46.00	-22.51	13.54	9.95	AV
11	24.039	39.44	60.00	-20.56	29.00	10.44	QP
12	24.039	24.33	50.00	-25.67	13.90	10.44	AV

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

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. Uncertainty

± 1.19 dB

3.5. Test Result of Peak Power Output

Product : Hearing Aid
Test Item : Peak Power Output
Test date : 2020/04/07
Test Mode : Mode 1: Transmit - 1Mbps (GFSK)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit	Result
Channel 00	2402	2.77	1 Watt= 30 dBm	Pass
Channel 39	2441	3.95	1 Watt= 30 dBm	Pass
Channel 78	2480	3.91	1 Watt= 30 dBm	Pass

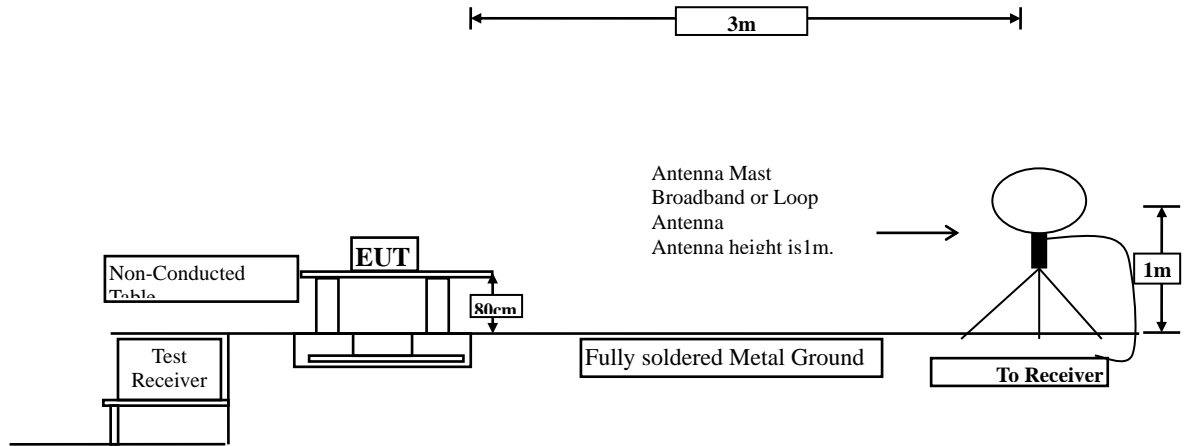
Product : Hearing Aid
Test Item : Peak Power Output
Test date : 2020/04/07
Test Mode : Mode 2: Transmit - 3Mbps (8DPSK)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit	Result
Channel 00	2402	3.54	1 Watt= 30 dBm	Pass
Channel 39	2441	3.80	1 Watt= 30 dBm	Pass
Channel 78	2480	3.64	1 Watt= 30 dBm	Pass

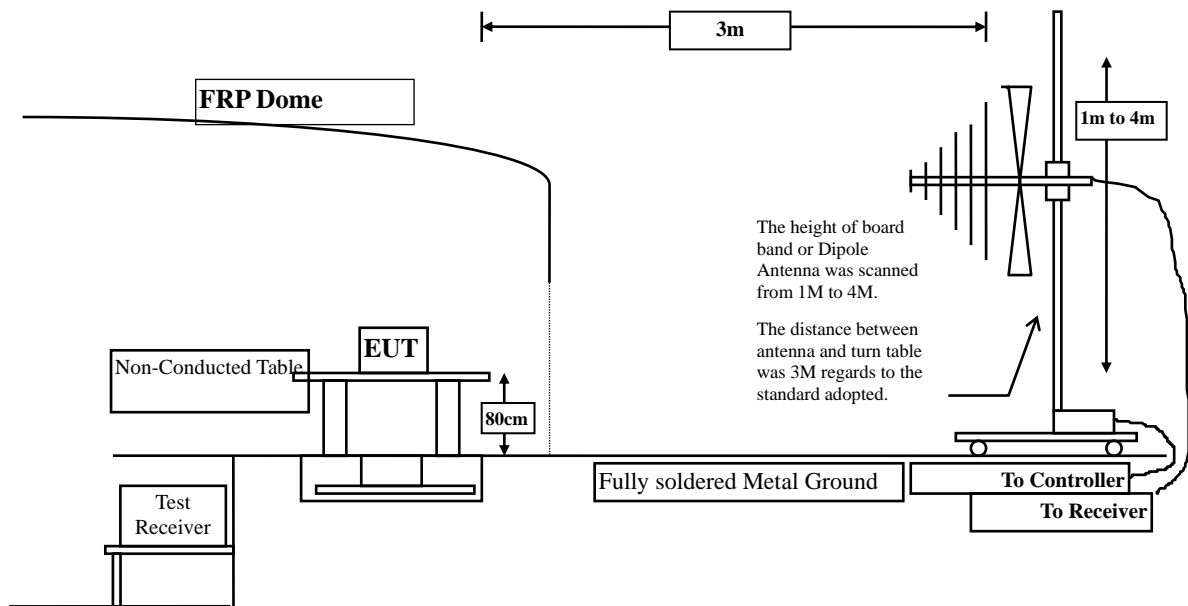
4. Radiated Emission

4.1. Test Setup

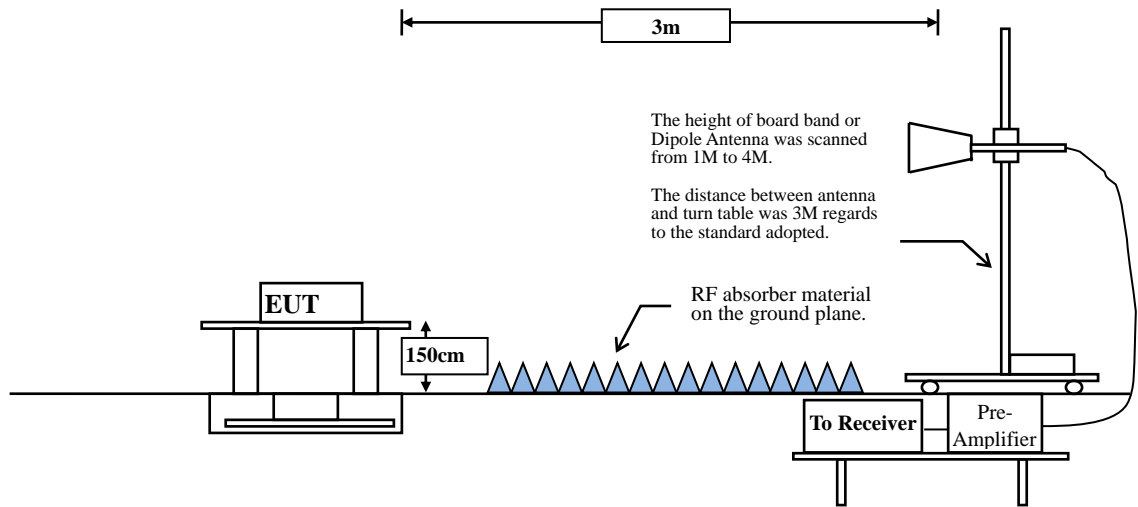
Under 30MHz



Below 1GHz



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 (dBμV) = 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. Uncertainty

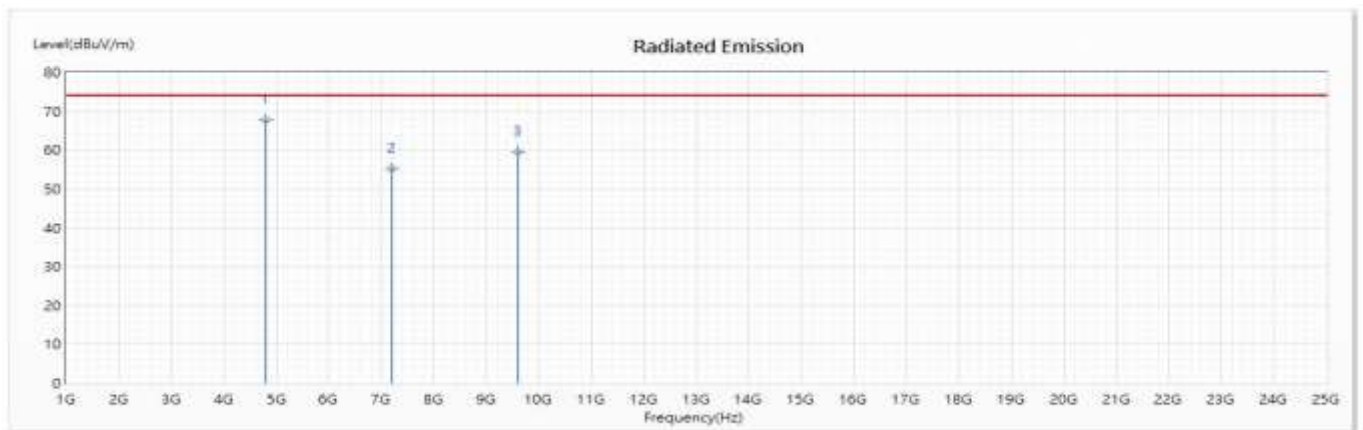
± 4.08 dB above 1GHz

± 4.22 dB below 1GHz

4.5. Test Result of Radiated Emission

Product : Hearing Aid
 Test Item : Harmonic Radiated Emission
 Test date : 2020/04/09
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK)(2402MHz)

Horizontal



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	4804	67.74	74.00	-6.26	63.14	4.60	PK
2	7206	55.26	74.00	-18.74	43.60	11.66	PK
3	9608	59.54	74.00	-14.46	47.64	11.90	PK

Note:

- All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- Emission Level = Reading Level + Correct Factor.
- Correct Factor = Antenna factor + Cable loss – Amplifier gain.
- The average measurement was not performed when the peak measured data under the limit of average detection.
- The emission levels of other frequencies are very lower than the limit and not show in test report.

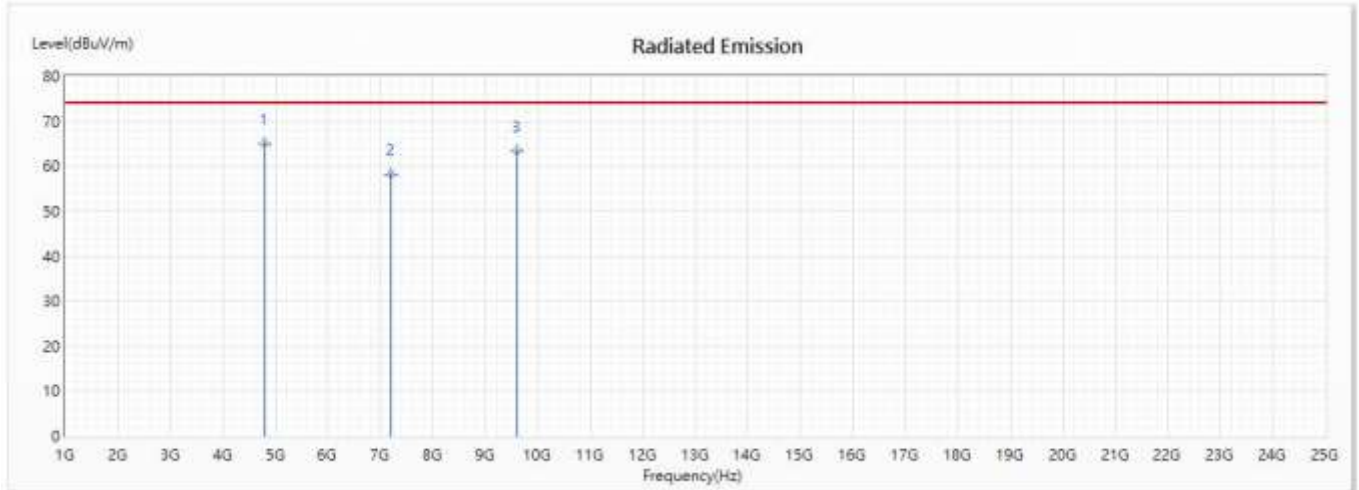
Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Measurement Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)
Average Detector:					
4804	67.74	-30.716	37.024	-16.976	54.000
7206	55.26	-30.716	24.544	-29.456	54.000
9608	59.54	-30.716	28.824	-25.176	54.000

Note:

- AVG Measurement=Peak Measurement + Duty Cycle Correct Factor
- The Duty Cycle is refer to section 11.

Product : Hearing Aid
 Test Item : Harmonic Radiated Emission
 Test date : 2020/04/09
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK)(2402MHz)

Vertical



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	4804	65.02	74.00	-8.98	60.42	4.60	PK
2	7206	58.12	74.00	-15.88	46.46	11.66	PK
3	9608	63.38	74.00	-10.62	51.48	11.90	PK

Note:

- All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- Emission Level = Reading Level + Correct Factor.
- Correct Factor = Antenna factor + Cable loss – Amplifier gain.
- The average measurement was not performed when the peak measured data under the limit of average detection.
- The emission levels of other frequencies are very lower than the limit and not show in test report.

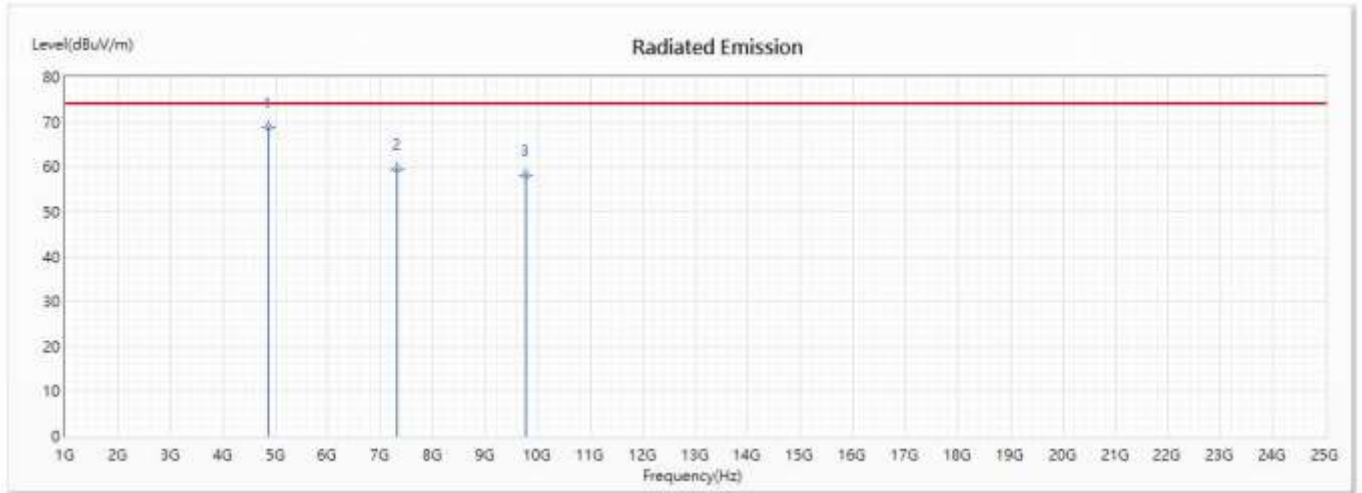
Frequency MHz	Peak Measurement dBuV/m	Duty Cycle Factor dB	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Average Detector:					
4804	65.02	-30.716	34.304	-19.696	54.000
7206	58.12	-30.716	27.404	-26.596	54.000
9608	63.38	-30.716	32.664	-21.336	54.000

Note:

- AVG Measurement=Peak Measurement + Duty Cycle Correct Factor
- The Duty Cycle is refer to section 11.

Product : Hearing Aid
 Test Item : Harmonic Radiated Emission
 Test date : 2020/04/09
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK)(2441MHz)

Horizontal



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	4882	68.71	74.00	-5.29	63.40	5.31	PK
2	7323	59.50	74.00	-14.50	47.73	11.77	PK
3	9764	58.07	74.00	-15.93	46.12	11.95	PK

Note:

- All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- Emission Level = Reading Level + Correct Factor.
- Correct Factor = Antenna factor + Cable loss – Amplifier gain.
- The average measurement was not performed when the peak measured data under the limit of average detection.
- The emission levels of other frequencies are very lower than the limit and not show in test report.

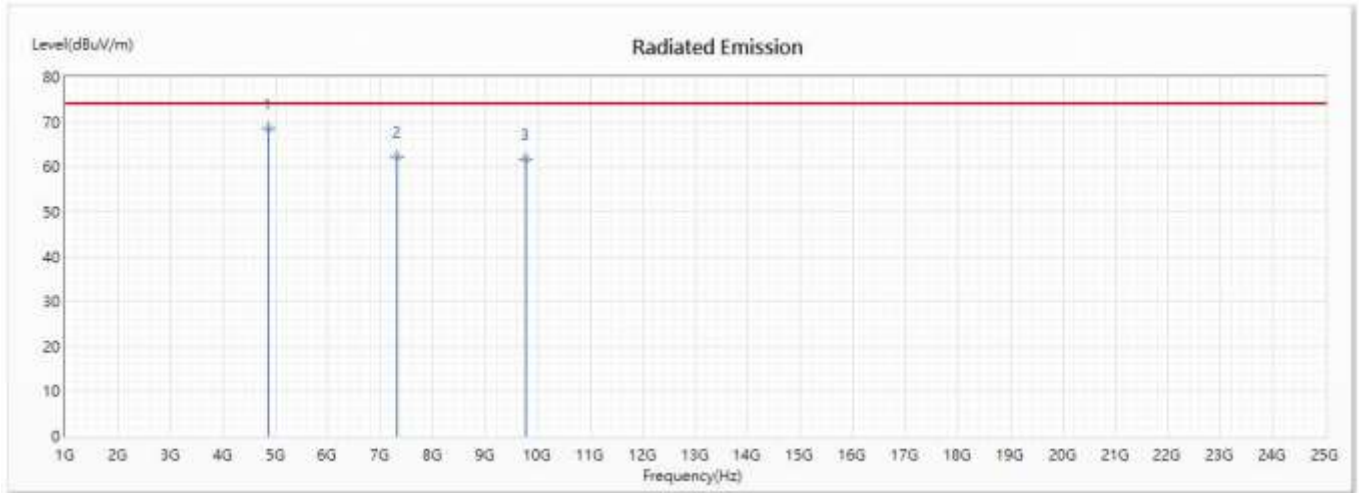
Frequency MHz	Peak Measurement dBμV/m	Duty Cycle Factor dB	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Average Detector:					
4882	68.71	-30.716	37.994	-16.006	54.000
7323	59.50	-30.716	28.784	-25.216	54.000
9764	58.07	-30.716	27.354	-26.646	54.000

Note:

- AVG Measurement=Peak Measurement + Duty Cycle Correct Factor
- The Duty Cycle is refer to section 11.

Product : Hearing Aid
 Test Item : Harmonic Radiated Emission
 Test date : 2020/04/09
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK)(2441MHz)

Vertical



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	4882	68.61	74.00	-5.39	63.30	5.31	PK
2	7323	62.25	74.00	-11.75	50.48	11.77	PK
3	9764	61.67	74.00	-12.33	49.72	11.95	PK

Note:

- All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- Emission Level = Reading Level + Correct Factor.
- Correct Factor = Antenna factor + Cable loss – Amplifier gain.
- The average measurement was not performed when the peak measured data under the limit of average detection.
- The emission levels of other frequencies are very lower than the limit and not show in test report.

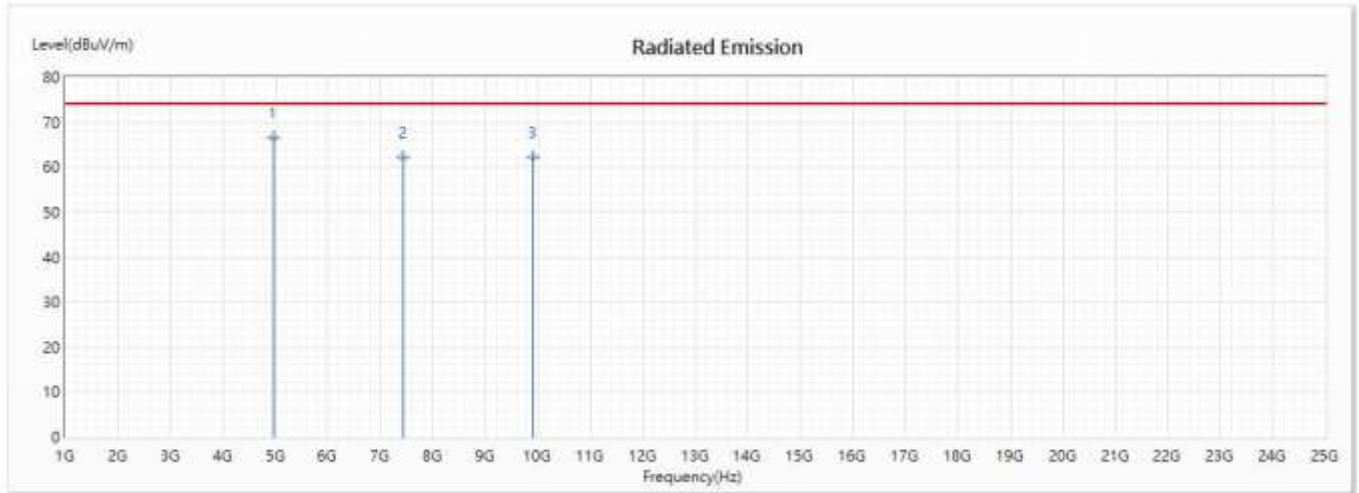
Frequency MHz	Peak Measurement dBμV/m	Duty Cycle Factor dB	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Average Detector:					
4882	68.61	-30.716	37.894	-16.106	54.000
7323	62.25	-30.716	31.534	-22.466	54.000
9764	61.67	-30.716	30.954	-23.046	54.000

Note:

- AVG Measurement=Peak Measurement + Duty Cycle Correct Factor
- The Duty Cycle is refer to section 11.

Product : Hearing Aid
 Test Item : Harmonic Radiated Emission
 Test date : 2020/04/09
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK)(2480MHz)

Horizontal



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	4960	66.55	74.00	-7.45	60.52	6.03	PK
2	7440	62.17	74.00	-11.83	51.20	10.97	PK
3	9920	62.24	74.00	-11.76	49.48	12.76	PK

Note:

- All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- Emission Level = Reading Level + Correct Factor.
- Correct Factor = Antenna factor + Cable loss – Amplifier gain.
- The average measurement was not performed when the peak measured data under the limit of average detection.
- The emission levels of other frequencies are very lower than the limit and not show in test report.

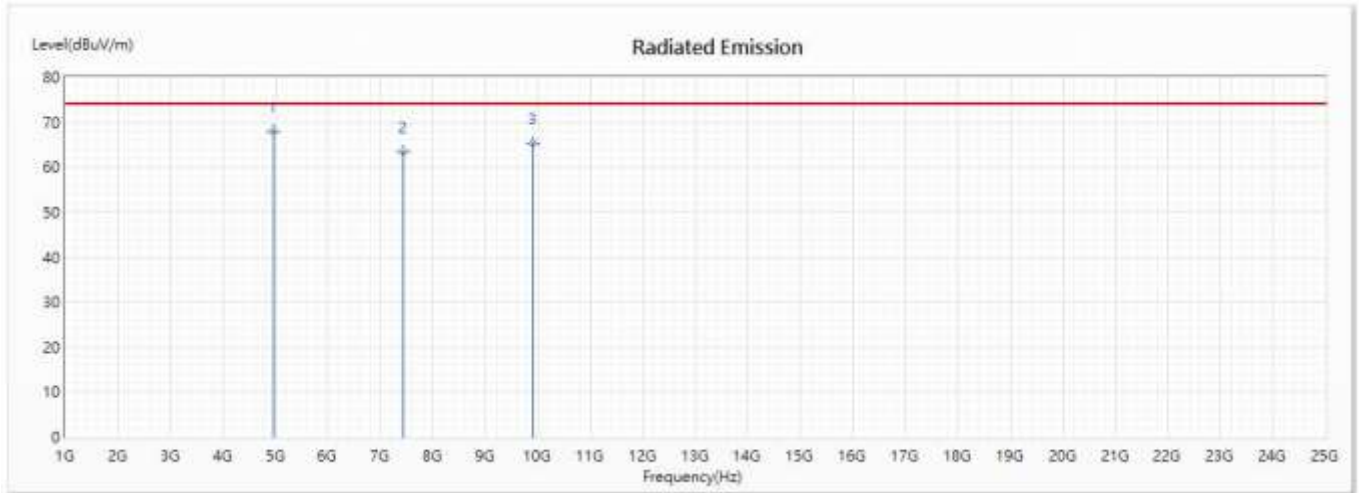
Frequency MHz	Peak Measurement dBμV/m	Duty Cycle Factor dB	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Average Detector:					
4960	66.55	-30.716	35.834	-18.166	54.000
7440	62.17	-30.716	31.454	-22.546	54.000
9920	62.24	-30.716	31.524	-22.476	54.000

Note:

- AVG Measurement=Peak Measurement + Duty Cycle Correct Factor
- The Duty Cycle is refer to section 11.

Product : Hearing Aid
 Test Item : Harmonic Radiated Emission
 Test date : 2020/04/09
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK)(2480MHz)

Vertical



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	4960	67.96	74.00	-6.04	61.93	6.03	PK
2	7440	63.25	74.00	-10.75	52.28	10.97	PK
3	9920	65.14	74.00	-8.86	52.38	12.76	PK

Note:

- All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- Emission Level = Reading Level + Correct Factor.
- Correct Factor = Antenna factor + Cable loss – Amplifier gain.
- The average measurement was not performed when the peak measured data under the limit of average detection.
- The emission levels of other frequencies are very lower than the limit and not show in test report.

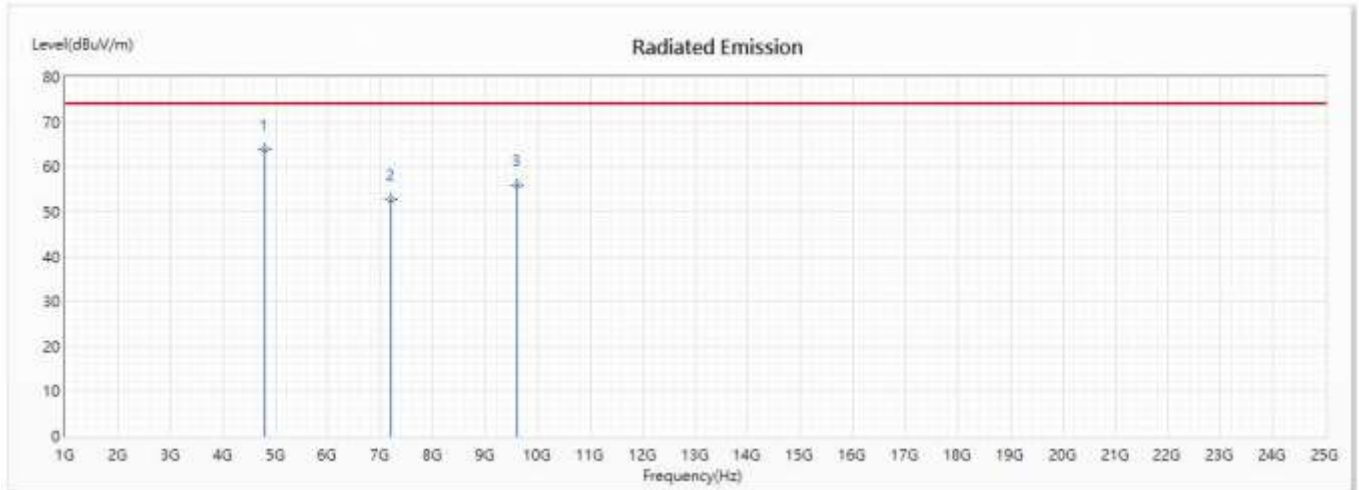
Frequency MHz	Peak Measurement dBμV/m	Duty Cycle Factor dB	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Average Detector:					
4960	67.96	-30.716	37.244	-16.756	54.000
7440	63.25	-30.716	32.534	-21.466	54.000
9920	65.14	-30.716	34.424	-19.576	54.000

Note:

- AVG Measurement=Peak Measurement + Duty Cycle Correct Factor
- The Duty Cycle is refer to section 11.

Product : Hearing Aid
 Test Item : Harmonic Radiated Emission
 Test date : 2020/04/09
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK)(2402MHz)

Horizontal



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	4804	63.79	74.00	-10.21	59.19	4.60	PK
2	7206	52.75	74.00	-21.25	41.09	11.66	PK
3	9608	55.84	74.00	-18.16	43.94	11.90	PK

Note:

- All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- Emission Level = Reading Level + Correct Factor.
- Correct Factor = Antenna factor + Cable loss – Amplifier gain.
- The average measurement was not performed when the peak measured data under the limit of average detection.
- The emission levels of other frequencies are very lower than the limit and not show in test report.

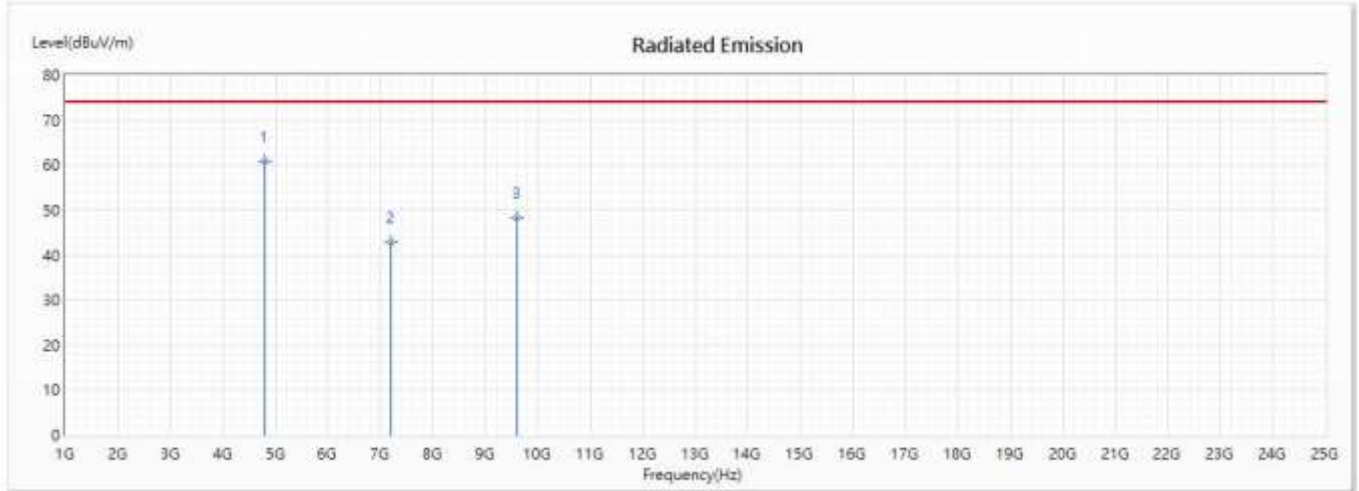
Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Measurement Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)
Average Detector:					
4804	63.79	-30.645	33.145	-20.855	54.000
7206	52.75	-30.645	22.105	-31.895	54.000
9608	55.84	-30.645	25.195	-28.805	54.000

Note:

- AVG Measurement=Peak Measurement + Duty Cycle Correct Factor
- The Duty Cycle is refer to section 11.

Product : Hearing Aid
 Test Item : Harmonic Radiated Emission
 Test date : 2020/04/09
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK)(2402MHz)

Vertical



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	4804	60.97	74.00	-13.03	56.37	4.60	PK
2	7206	42.93	74.00	-31.07	31.27	11.66	PK
3	9608	48.42	74.00	-25.58	36.52	11.90	PK

Note:

- All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- Emission Level = Reading Level + Correct Factor.
- Correct Factor = Antenna factor + Cable loss – Amplifier gain.
- The average measurement was not performed when the peak measured data under the limit of average detection.
- The emission levels of other frequencies are very lower than the limit and not show in test report.

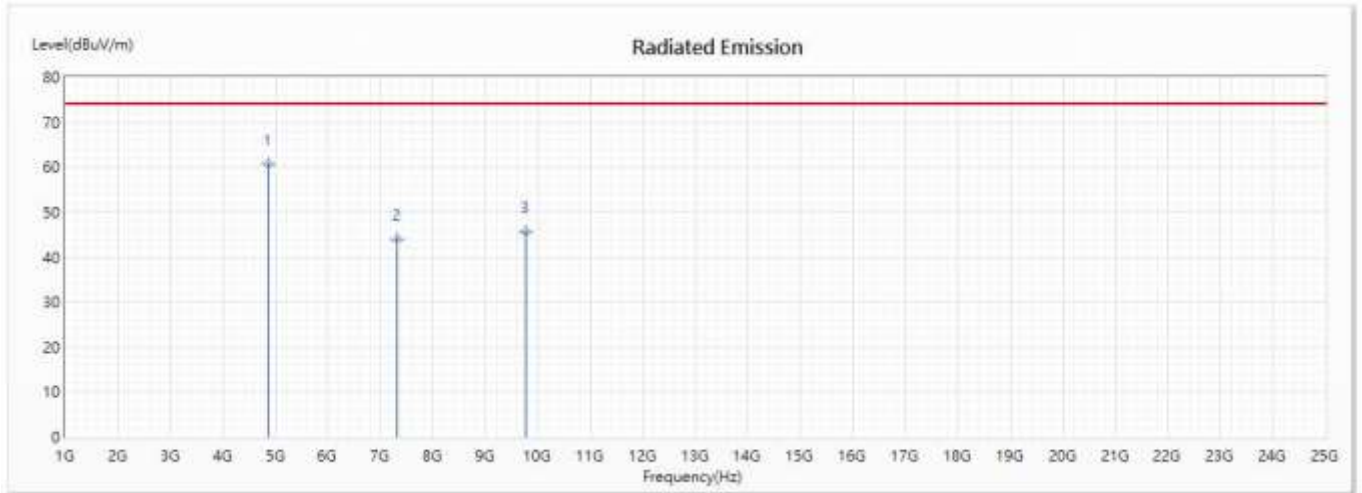
Frequency MHz	Peak Measurement dBμV/m	Duty Cycle Factor dB	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Average Detector:					
4804	60.97	-30.645	30.325	-23.675	54.000
7206	42.93	-30.645	12.285	-41.715	54.000
9608	48.42	-30.645	17.775	-36.225	54.000

Note:

- AVG Measurement=Peak Measurement + Duty Cycle Correct Factor
- The Duty Cycle is refer to section 11.

Product : Hearing Aid
 Test Item : Harmonic Radiated Emission
 Test date : 2020/04/09
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (2441MHz)

Horizontal



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	4882	60.60	74.00	-13.40	55.29	5.31	PK
2	7323	43.85	74.00	-30.15	32.08	11.77	PK
3	9764	45.51	74.00	-28.49	33.56	11.95	PK

Note:

- All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- Emission Level = Reading Level + Correct Factor.
- Correct Factor = Antenna factor + Cable loss – Amplifier gain.
- The average measurement was not performed when the peak measured data under the limit of average detection.
- The emission levels of other frequencies are very lower than the limit and not show in test report.

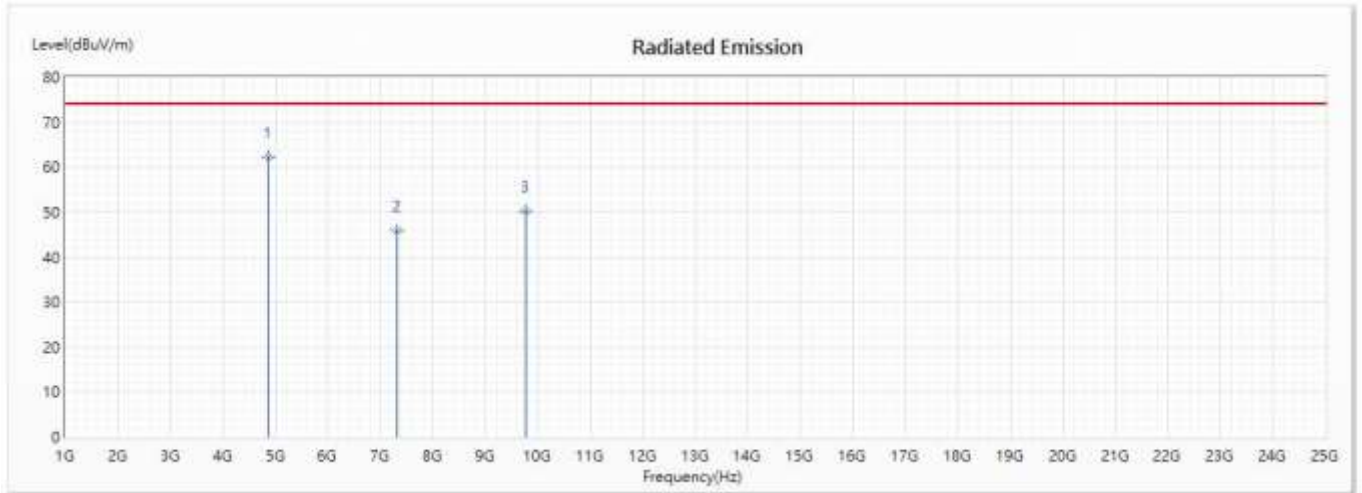
Frequency MHz	Peak Measurement dBμV/m	Duty Cycle Factor dB	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Average Detector:					
4882	60.6	-30.645	29.955	-24.045	54.000
7323	43.85	-30.645	13.205	-40.795	54.000
9764	45.51	-30.645	14.865	-39.135	54.000

Note:

- AVG Measurement=Peak Measurement + Duty Cycle Correct Factor
- The Duty Cycle is refer to section 11.

Product : Hearing Aid
 Test Item : Harmonic Radiated Emission
 Test date : 2020/04/09
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (2441MHz)

Vertical



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	4882	62.38	74.00	-11.62	57.07	5.31	PK
2	7323	45.76	74.00	-28.24	33.99	11.77	PK
3	9764	50.29	74.00	-23.71	38.34	11.95	PK

Note:

- All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- Emission Level = Reading Level + Correct Factor.
- Correct Factor = Antenna factor + Cable loss – Amplifier gain.
- The average measurement was not performed when the peak measured data under the limit of average detection.
- The emission levels of other frequencies are very lower than the limit and not show in test report.

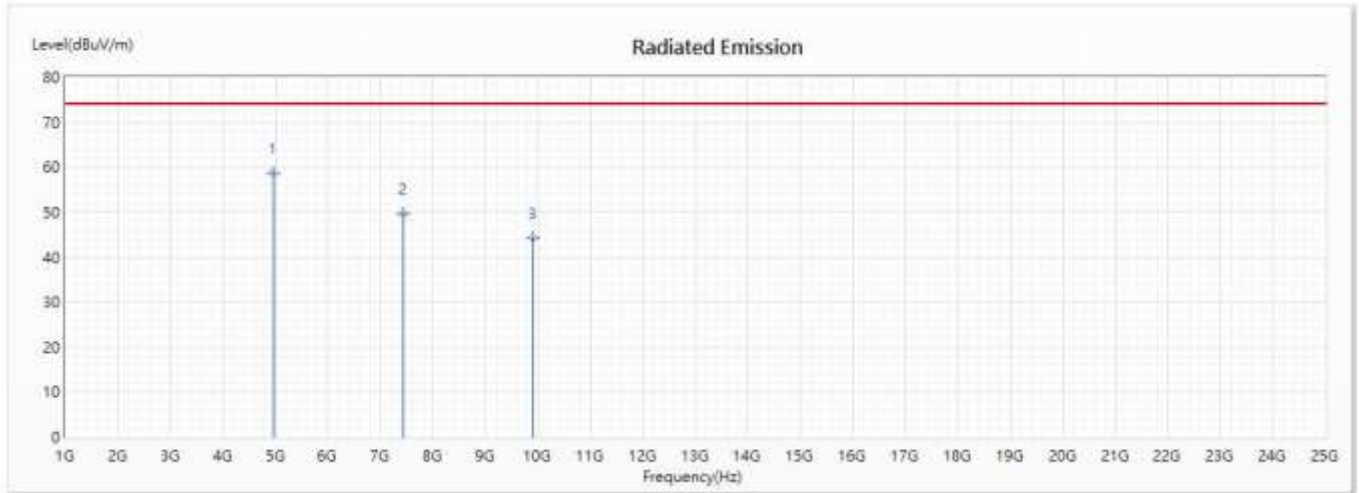
Frequency MHz	Peak Measurement dBμV/m	Duty Cycle Factor dB	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Average Detector:					
4882	62.38	-30.645	31.735	-22.265	54.000
7323	45.76	-30.645	15.115	-38.885	54.000
9764	50.29	-30.645	19.645	-34.355	54.000

Note:

- AVG Measurement=Peak Measurement + Duty Cycle Correct Factor
- The Duty Cycle is refer to section 11.

Product : Hearing Aid
 Test Item : Harmonic Radiated Emission
 Test date : 2020/04/09
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (2480MHz)

Horizontal



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	4960	58.57	74.00	-15.43	52.54	6.03	PK
2	7440	49.77	74.00	-24.23	38.80	10.97	PK
3	9920	44.31	74.00	-29.69	31.55	12.76	PK

Note:

- All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- Emission Level = Reading Level + Correct Factor.
- Correct Factor = Antenna factor + Cable loss – Amplifier gain.
- The average measurement was not performed when the peak measured data under the limit of average detection.
- The emission levels of other frequencies are very lower than the limit and not show in test report.

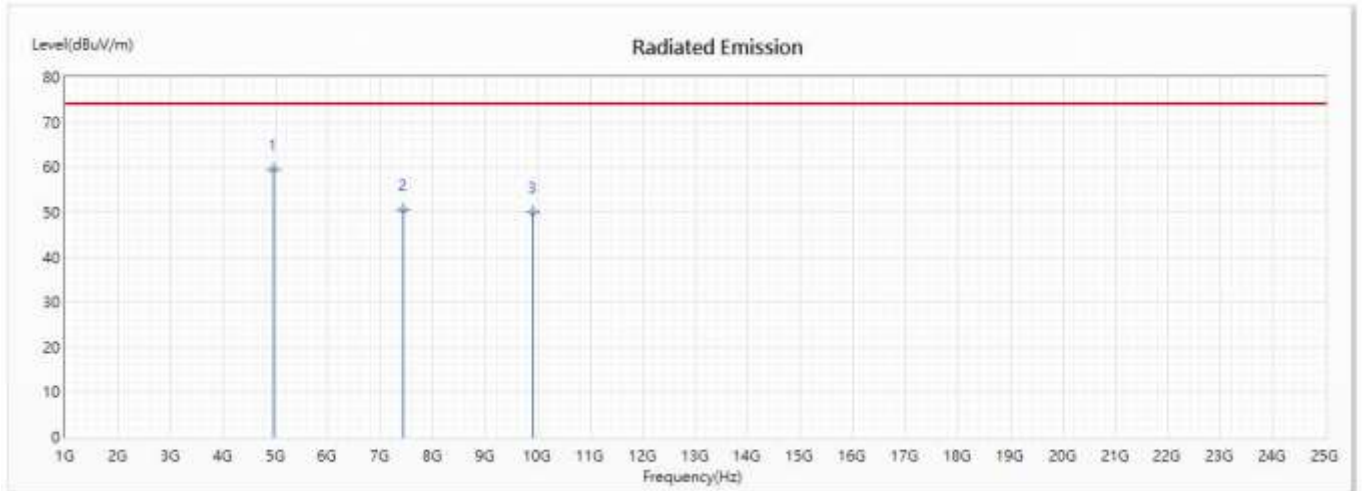
Frequency MHz	Peak Measurement dBμV/m	Duty Cycle Factor dB	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Average Detector:					
4960	58.57	-30.645	27.925	-26.075	54.000
7440	49.77	-30.645	19.125	-34.875	54.000
9920	44.31	-30.645	13.665	-40.335	54.000

Note:

- AVG Measurement=Peak Measurement + Duty Cycle Correct Factor
- The Duty Cycle is refer to section 11.

Product : Hearing Aid
 Test Item : Harmonic Radiated Emission
 Test date : 2020/04/09
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (2480MHz)

Vertical



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	4960	59.58	74.00	-14.42	53.55	6.03	PK
2	7440	50.62	74.00	-23.38	39.65	10.97	PK
3	9920	50.03	74.00	-23.97	37.27	12.76	PK

Note:

- All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- Emission Level = Reading Level + Correct Factor.
- Correct Factor = Antenna factor + Cable loss – Amplifier gain.
- The average measurement was not performed when the peak measured data under the limit of average detection.
- The emission levels of other frequencies are very lower than the limit and not show in test report.

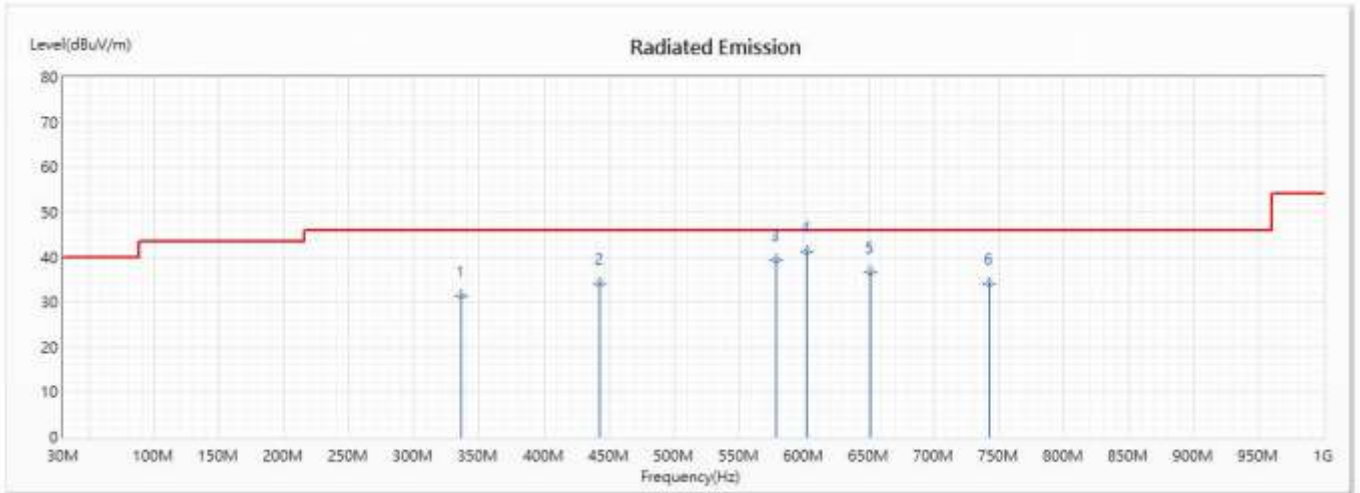
Frequency MHz	Peak Measurement dBμV/m	Duty Cycle Factor dB	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Average Detector:					
4960	59.58	-30.645	28.935	-25.065	54.000
7440	50.62	-30.645	19.975	-34.025	54.000
9920	50.03	-30.645	19.385	-34.615	54.000

Note:

- AVG Measurement=Peak Measurement + Duty Cycle Correct Factor
- The Duty Cycle is refer to section 11.

Product : Hearing Aid
 Test Item : General Radiated Emission
 Test date : 2020/04/09
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK) (2441MHz)

Horizontal



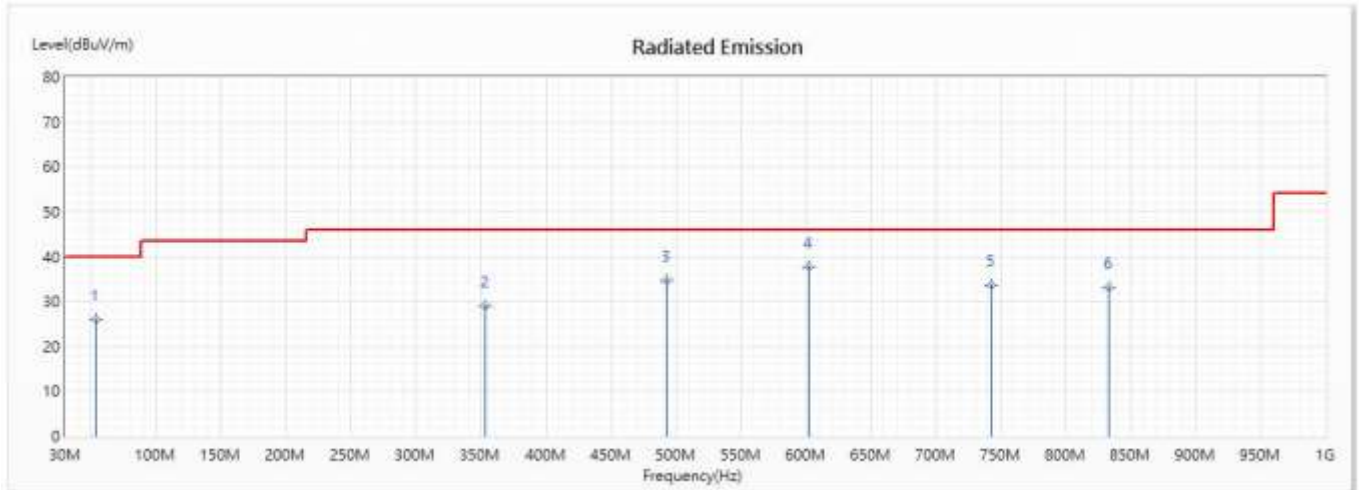
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	336.464	31.53	46.00	-14.47	37.76	-6.23	QP
2	443.304	34.18	46.00	-11.82	36.14	-1.96	QP
3	578.261	39.41	46.00	-6.59	40.43	-1.02	QP
* 4	602.159	41.31	46.00	-4.69	41.68	-0.37	QP
5	651.362	36.53	46.00	-9.47	38.35	-1.82	QP
6	742.739	34.03	46.00	-11.97	34.73	-0.70	QP

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

Product : Hearing Aid
 Test Item : General Radiated Emission
 Test date : 2020/04/09
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK) (2441MHz)

Vertical



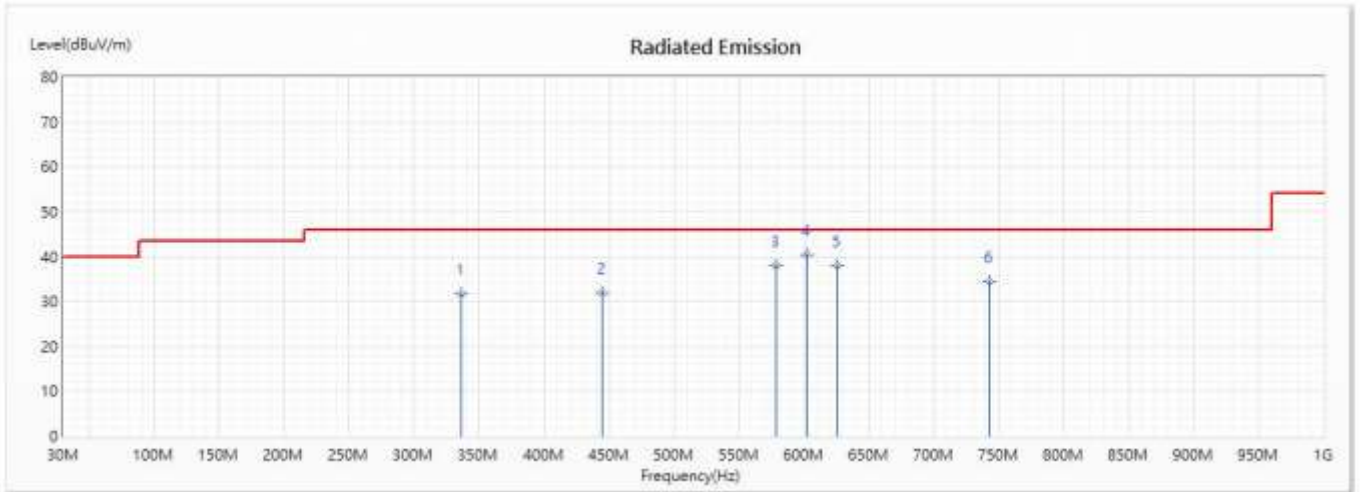
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	53.899	25.90	40.00	-14.10	37.20	-11.30	QP
2	353.333	28.84	46.00	-17.16	33.40	-4.56	QP
3	492.507	34.60	46.00	-11.40	38.46	-3.86	QP
* 4	602.159	37.64	46.00	-8.36	38.01	-0.37	QP
5	742.739	33.65	46.00	-12.35	34.35	-0.70	QP
6	832.71	33.15	46.00	-12.85	34.75	-1.60	QP

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

Product : Hearing Aid
 Test Item : General Radiated Emission
 Test date : 2020/04/09
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (2441MHz)

Horizontal



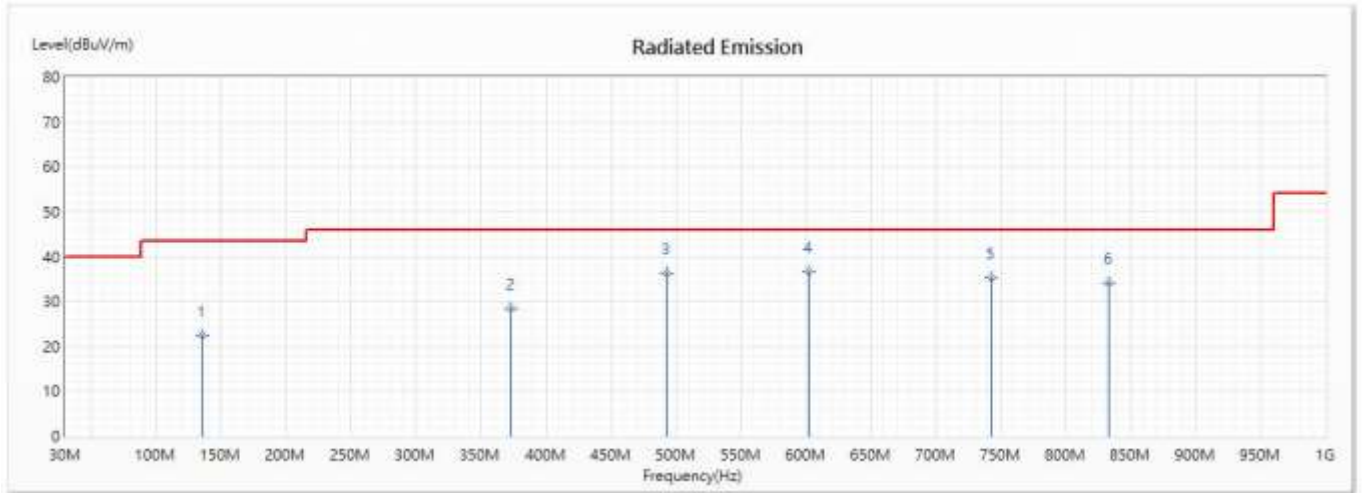
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	336.464	31.56	46.00	-14.44	37.79	-6.23	QP
2	444.71	32.01	46.00	-13.99	34.03	-2.02	QP
3	578.261	38.03	46.00	-7.97	39.05	-1.02	QP
* 4	602.159	40.45	46.00	-5.55	40.82	-0.37	QP
5	626.058	37.97	46.00	-8.03	39.36	-1.39	QP
6	742.739	34.29	46.00	-11.71	34.99	-0.70	QP

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

Product : Hearing Aid
 Test Item : General Radiated Emission
 Test date : 2020/04/09
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (2441MHz)

Vertical



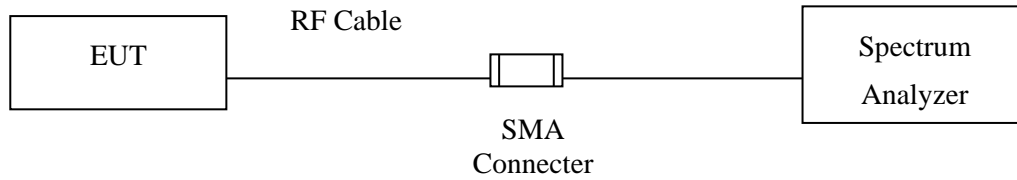
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	135.435	22.48	43.50	-21.02	31.26	-8.78	QP
2	373.014	28.37	46.00	-17.63	33.08	-4.71	QP
3	492.507	36.27	46.00	-9.73	40.13	-3.86	QP
* 4	602.159	36.62	46.00	-9.38	36.99	-0.37	QP
5	742.739	35.12	46.00	-10.88	35.82	-0.70	QP
6	832.71	34.11	46.00	-11.89	35.71	-1.60	QP

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

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. Uncertainty

$\pm 1.20\text{dB}$

5.5. Test Result of RF Antenna Conducted Test

Product : Hearing Aid
 Test Item : RF Antenna Conducted Test
 Test date : 2020/04/16
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK)

Figure Channel 00:

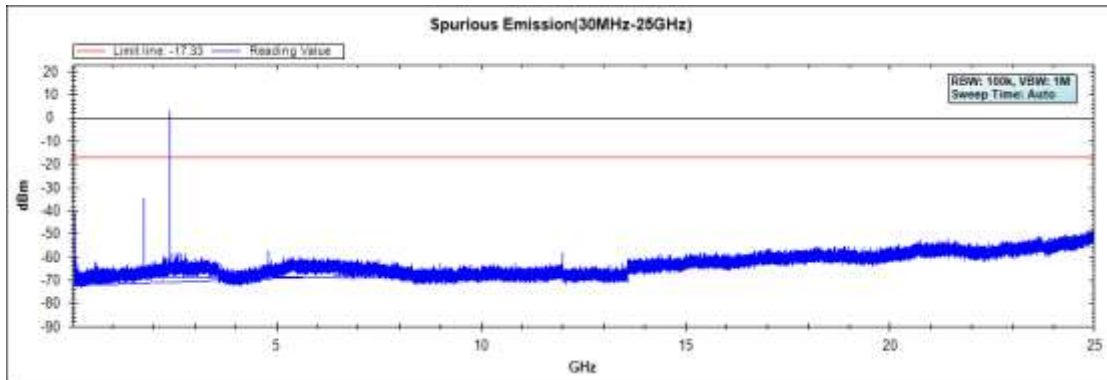


Figure Channel 39:

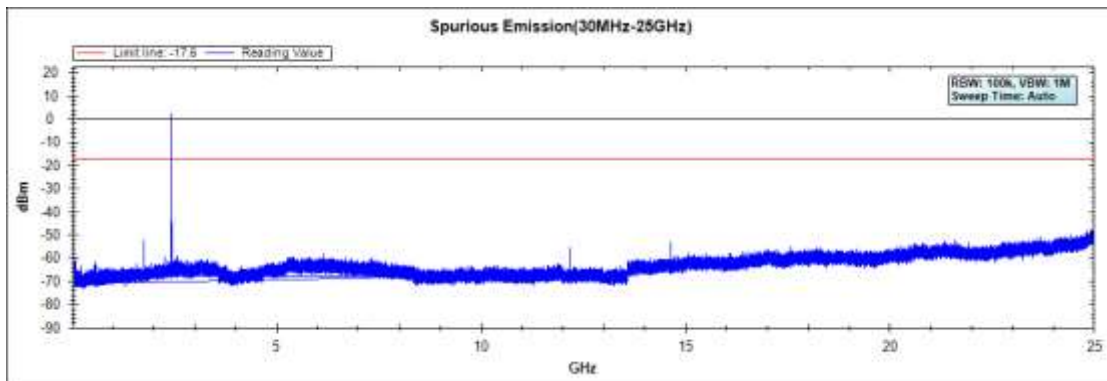
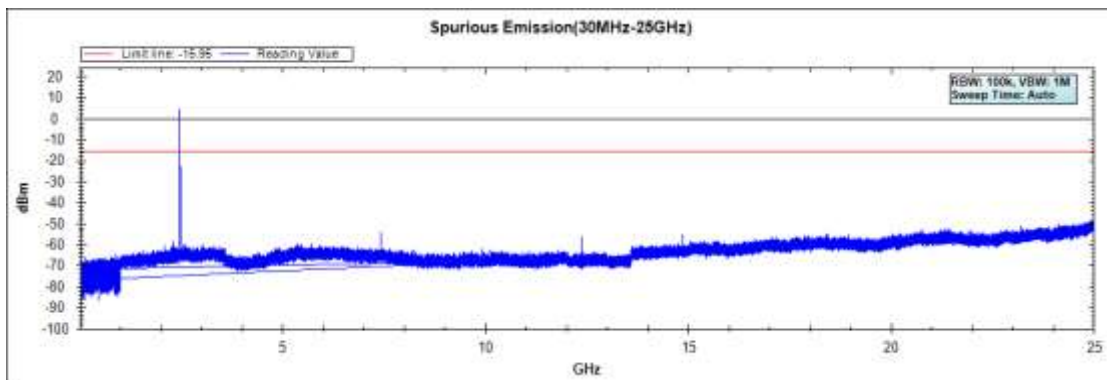


Figure Channel 78:



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

Product : Hearing Aid
Test Item : RF Antenna Conducted Test
Test date : 2020/04/16
Test Mode : Mode 2: Transmit - 3Mbps (8DPSK)

Figure Channel 00:

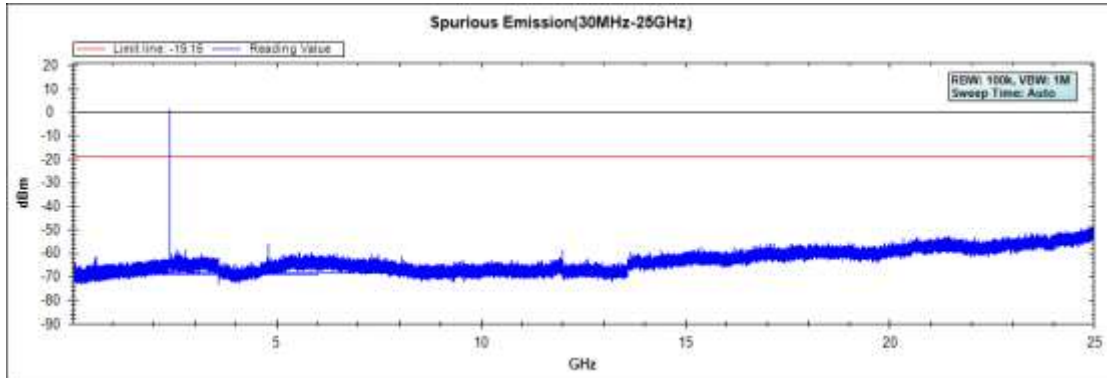


Figure Channel 39:

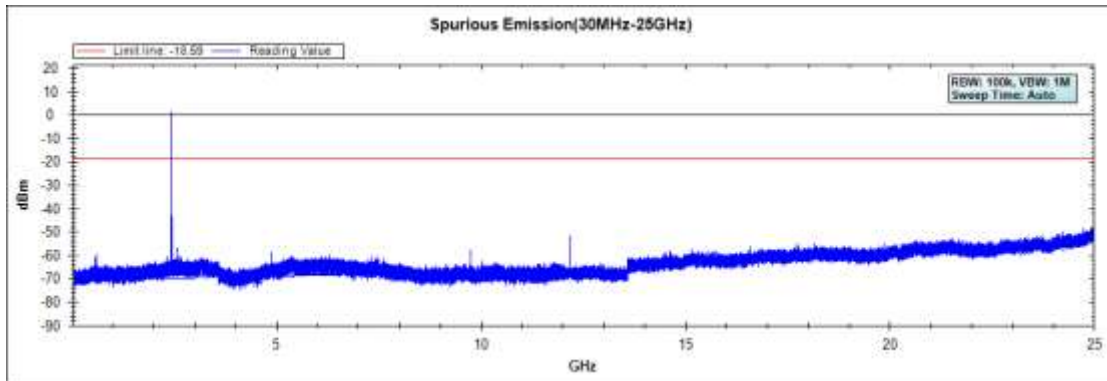
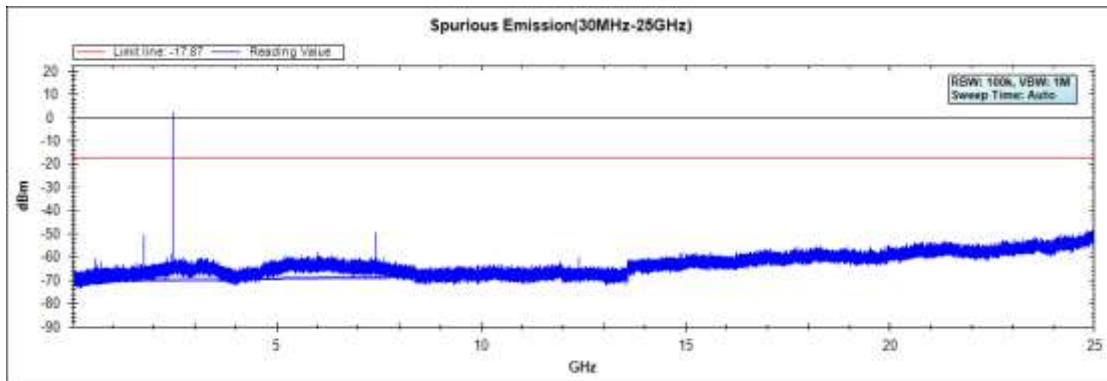


Figure Channel 78:



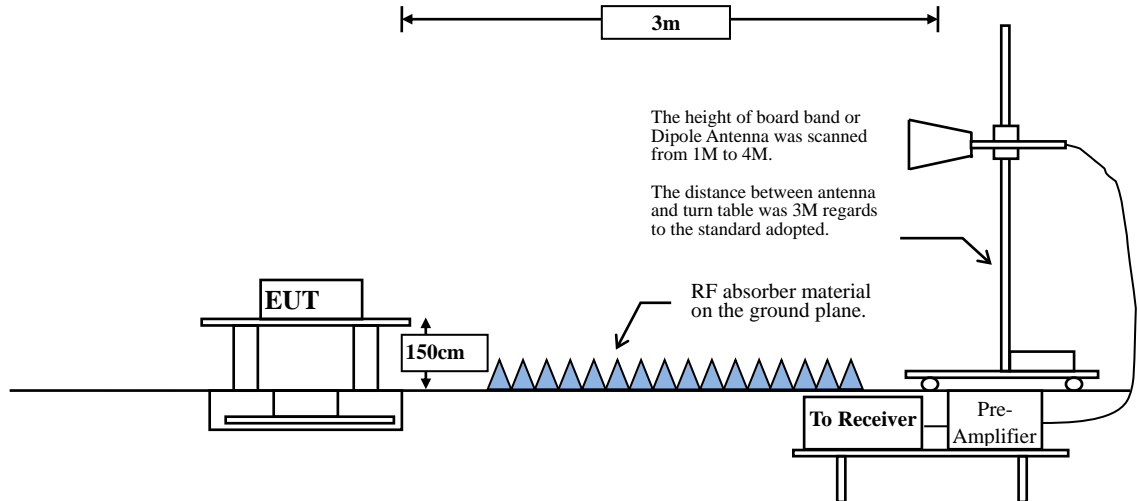
Note: The above test pattern is synthesized by multiple of the frequency range.

6. Band Edge

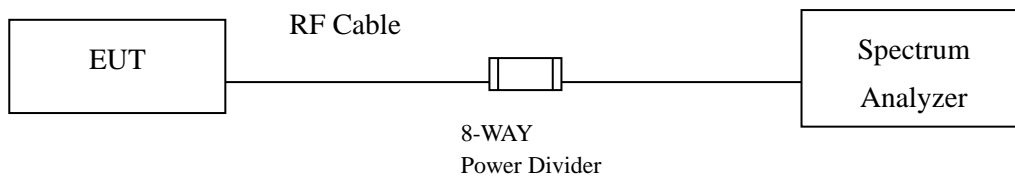
6.1. Test Setup

RF Radiated Measurement:

Above 1GHz



RF Conducted 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. Uncertainty

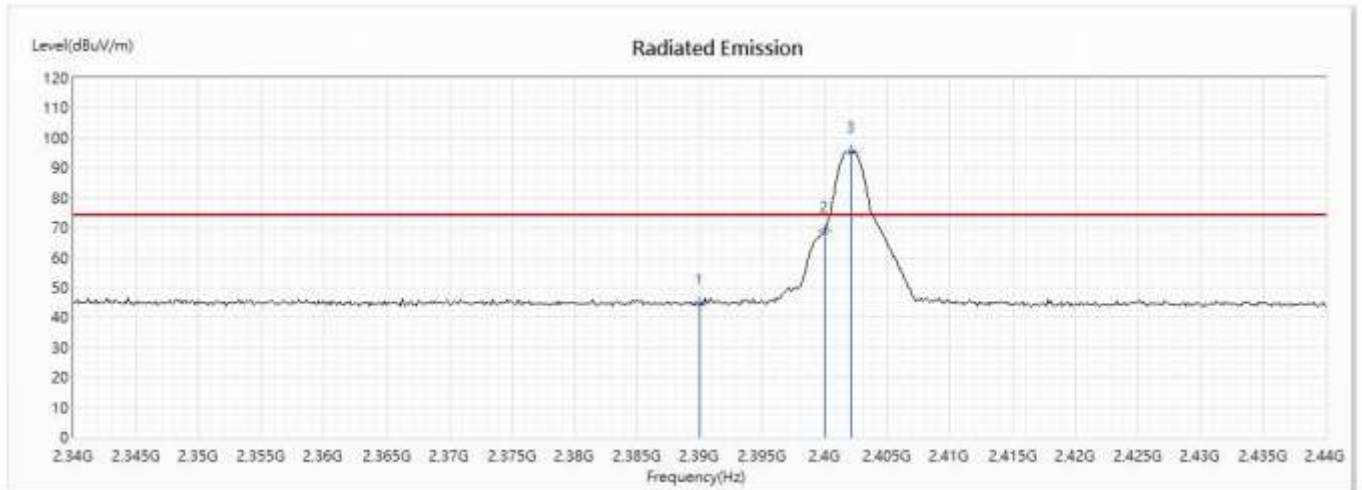
± 4.08 dB above 1GHz

± 4.22 dB below 1GHz

6.5. Test Result of Band Edge

Product : Hearing Aid
 Test Item : Band Edge
 Test date : 2020/04/07
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK) (2402MHz)

Horizontal



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	2390	44.71	74.00	-29.29	46.26	-1.55	PK
2	2400	68.70	--	--	70.31	-1.61	PK
! 3	2402.174	95.40	--	--	97.02	-1.62	PK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Emission Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection.

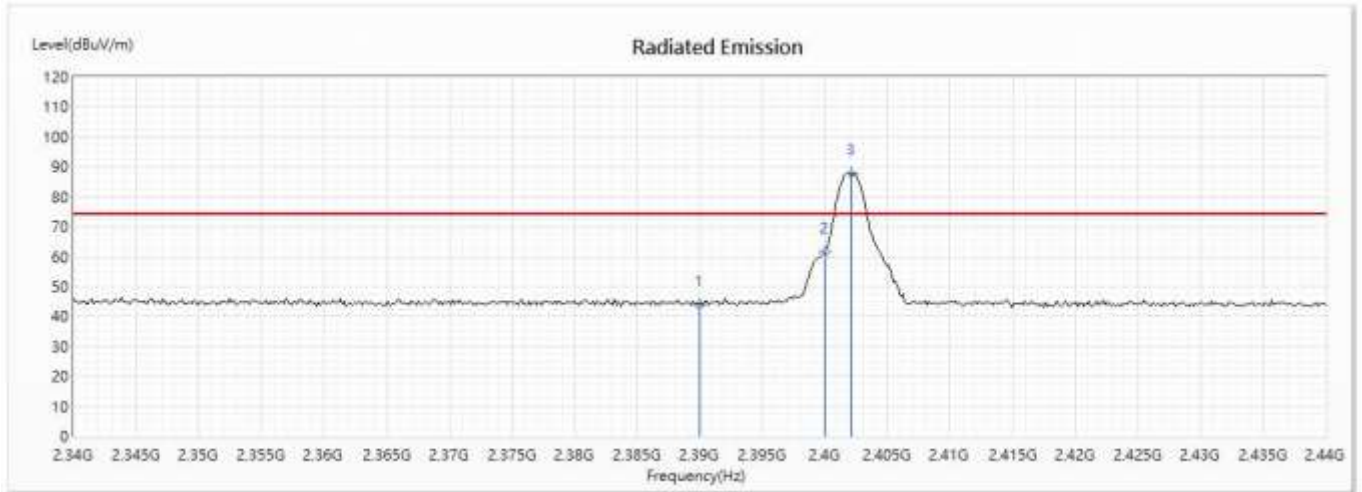
Channel No.	Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Measurement (dBμV/m)	Margin (dB)	Limit (dBuV/m)
00 (Average)	2390	44.71	-30.716	13.994	-40.006	54.000
00 (Average)	2400	68.70	-30.716	37.984	--	--
00 (Average)	2402.174	95.40	-30.716	64.684	--	--

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 11.

Product : Hearing Aid
 Test Item : Band Edge
 Test date : 2020/04/07
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK) (2402MHz)

Vertical



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	2390	43.95	74.00	-30.05	45.50	-1.55	PK
2	2400	61.26	--	--	62.87	-1.61	PK
! 3	2402.174	87.69	--	--	89.31	-1.62	PK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Emission Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection.

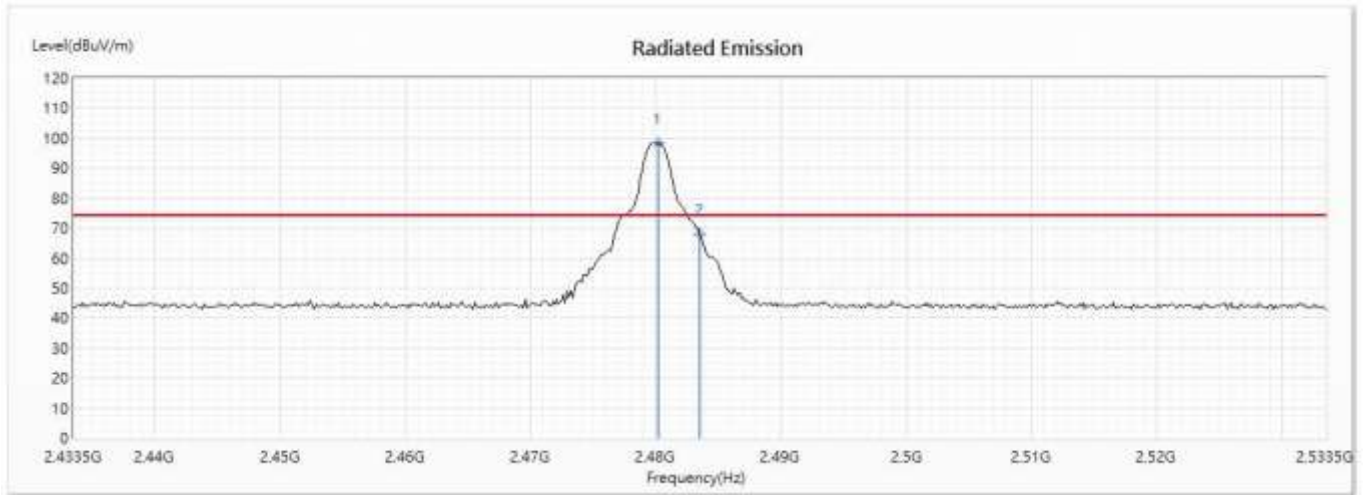
Channel No.	Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Measurement (dBμV/m)	Margin (dB)	Limit (dBuV/m)
00 (Average)	2390	43.95	-30.716	13.234	-40.766	54.000
00 (Average)	2400	61.26	-30.716	30.544	--	--
00 (Average)	2402.174	87.69	-30.716	56.974	--	--

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 11.

Product : Hearing Aid
 Test Item : Band Edge
 Test date : 2020/04/07
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK) (2480MHz)

Horizontal



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
! 1	2480.167	98.47	--	--	100.57	-2.10	PK
2	2483.5	67.92	74.00	-6.08	70.04	-2.12	PK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Emission Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection.

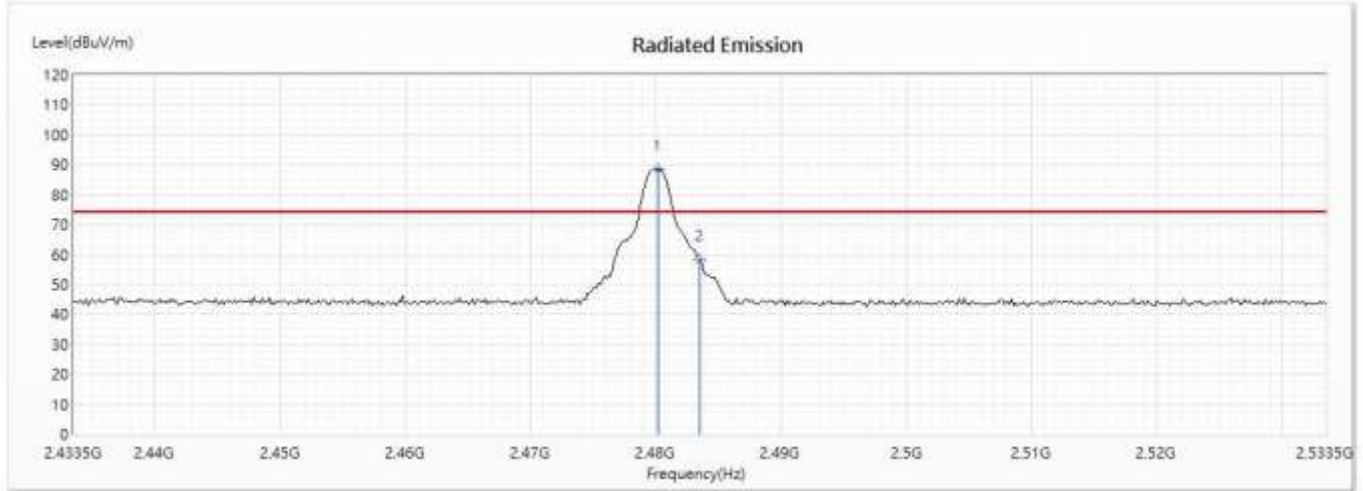
Channel No.	Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Measurement (dBμV/m)	Margin (dB)	Limit (dBuV/m)
78 (Average)	2480.167	98.47	-30.716	67.754	--	--
78 (Average)	2483.5	67.92	-30.716	37.204	-16.796	54.000

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 11.

Product : Hearing Aid
 Test Item : Band Edge
 Test date : 2020/04/07
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK) (2480MHz)

Vertical



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
! 1	2480.167	88.54	--	--	90.64	-2.10	PK
2	2483.5	57.96	74.00	-16.04	60.08	-2.12	PK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Emission Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection.

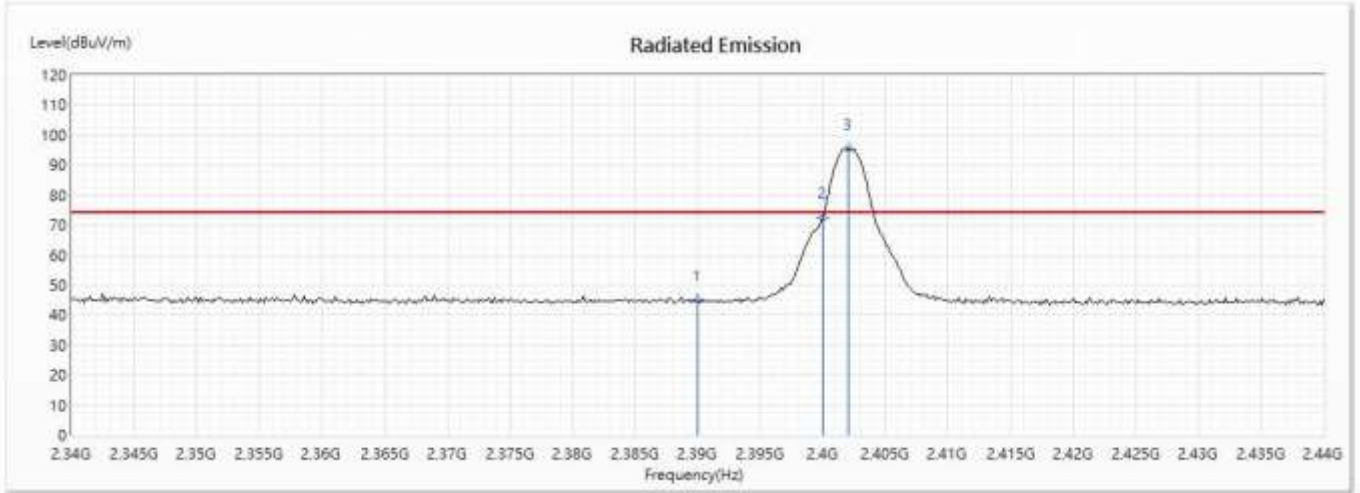
Channel No.	Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Measurement (dBμV/m)	Margin (dB)	Limit (dBuV/m)
78 (Average)	2480.167	88.54	-30.716	57.824	--	--
78 (Average)	2483.5	57.96	-30.716	27.244	-26.756	54.000

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 11.

Product : Hearing Aid
 Test Item : Band Edge
 Test date : 2020/04/07
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (2402MHz)

Horizontal



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	2390	45.24	74.00	-28.76	46.79	-1.55	PK
2	2400	72.57	--	--	74.18	-1.61	PK
! 3	2402.029	95.42	--	--	97.04	-1.62	PK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Emission Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection.

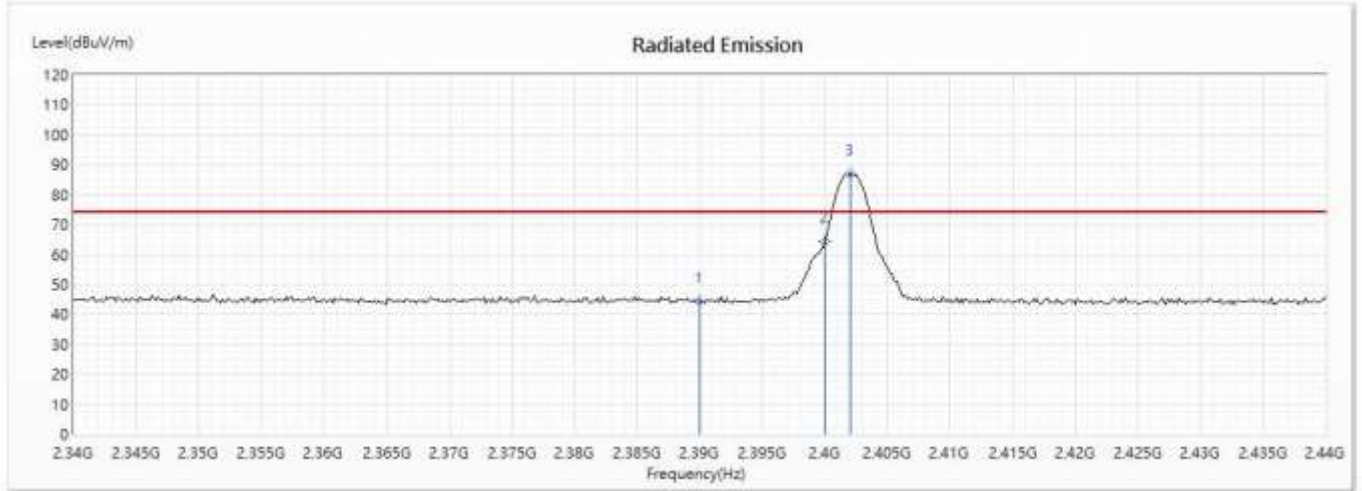
Channel No.	Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Measurement (dBμV/m)	Margin (dB)	Limit (dBuV/m)
00 (Average)	2390	45.24	-30.645	14.595	-39.405	54.000
00 (Average)	2400	72.57	-30.645	41.925	--	--
00 (Average)	2402.029	95.42	-30.645	64.775	--	--

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 11.

Product : Hearing Aid
 Test Item : Band Edge
 Test date : 2020/04/07
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (2402MHz)

Vertical



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	2390	44.29	74.00	-29.71	45.84	-1.55	PK
2	2400	64.50	--	--	66.11	-1.61	PK
! 3	2402.029	86.90	--	--	88.52	-1.62	PK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Emission Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection.

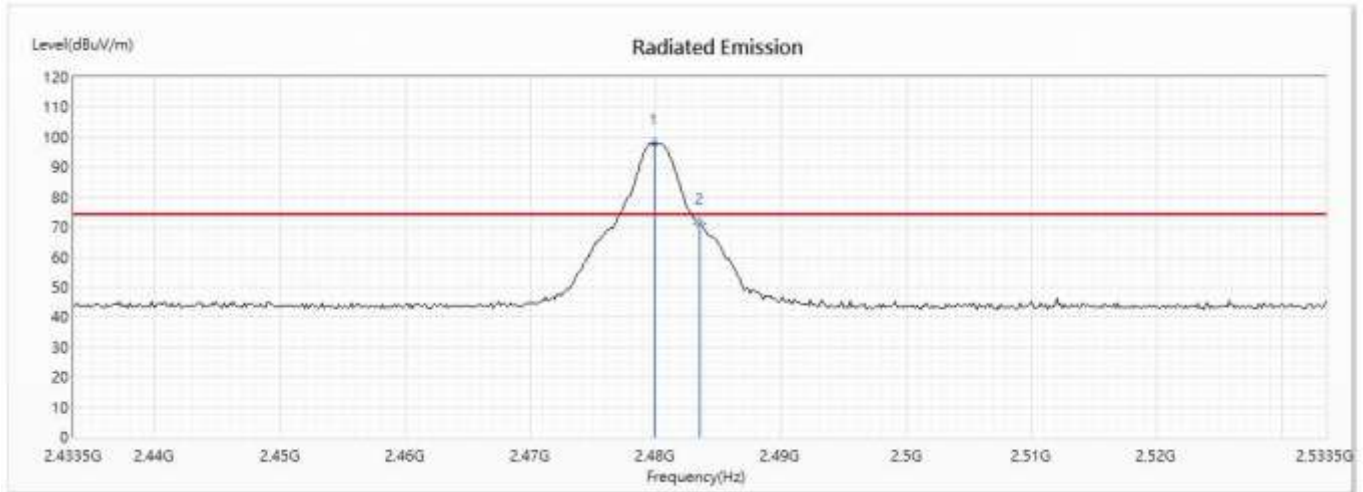
Channel No.	Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Measurement (dBμV/m)	Margin (dB)	Limit (dBuV/m)
00 (Average)	2390	44.29	-30.645	13.645	-40.355	54.000
00 (Average)	2400	64.50	-30.645	33.855	--	--
00 (Average)	2402.029	86.90	-30.645	56.255	--	--

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 11.

Product : Hearing Aid
 Test Item : Band Edge
 Test date : 2020/04/07
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (2480MHz)

Horizontal



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
! 1	2479.877	98.04	--	--	100.14	-2.10	PK
2	2483.5	71.38	74.00	-2.62	73.50	-2.12	PK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Emission Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection.

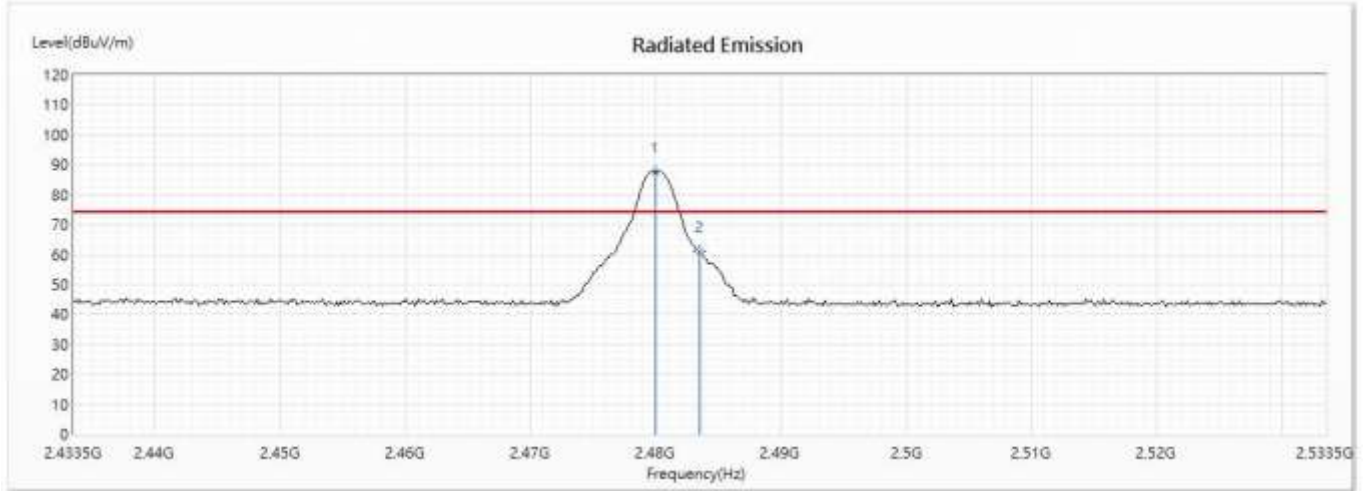
Channel No.	Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Measurement (dBμV/m)	Margin (dB)	Limit (dBuV/m)
78 (Average)	2479.877	98.04	-30.645	67.395	--	--
78 (Average)	2483.5	71.38	-30.645	40.735	-13.265	54.000

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 11.

Product : Hearing Aid
 Test Item : Band Edge
 Test date : 2020/04/07
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (2480MHz)

Vertical



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
! 1	2480.022	87.82	--	--	89.92	-2.10	PK
2	2483.5	61.07	74.00	-12.93	63.19	-2.12	PK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Emission Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection.

Channel No.	Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Measurement (dBμV/m)	Margin (dB)	Limit (dBuV/m)
78 (Average)	2480.022	87.82	-30.645	57.175	--	--
78 (Average)	2483.5	61.07	-30.645	30.425	-23.575	54.000

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 11.

Product : Hearing Aid
 Test Item : Band Edge
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK)(Hopping off)
 Test date : 2020/04/07

Measurement Level	Result
Δ (dB)	
> 20	PASS

Figure Channel 00:

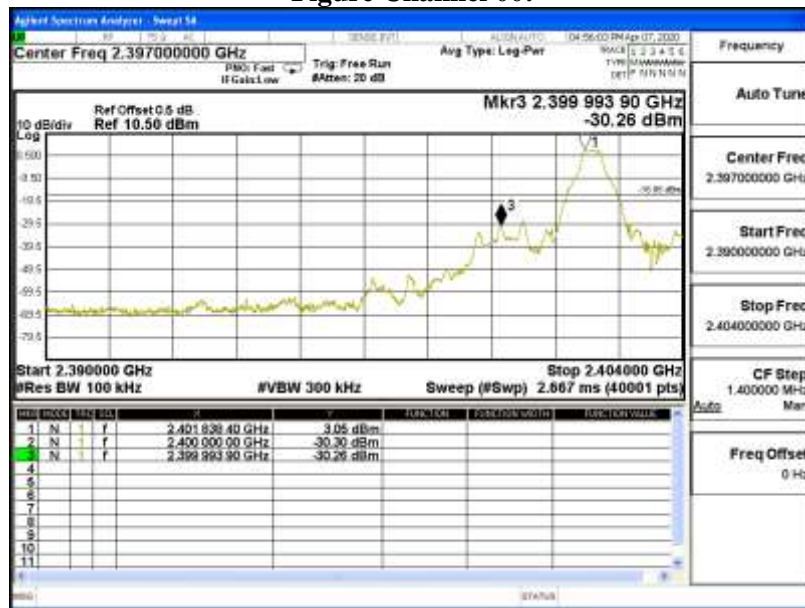
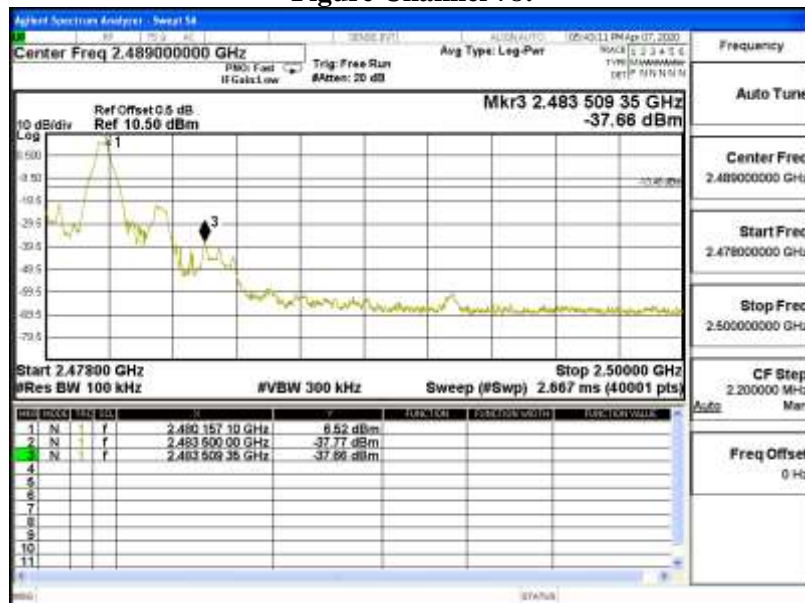


Figure Channel 78:



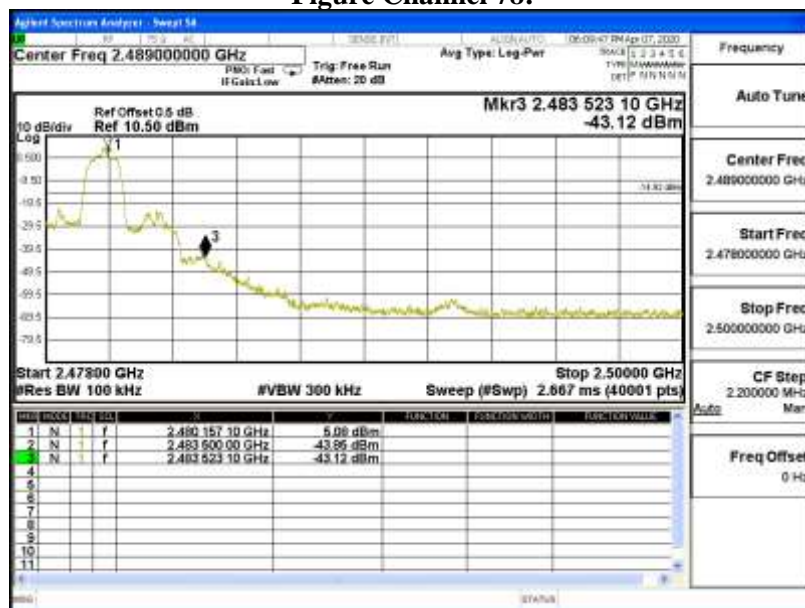
Product : Hearing Aid
 Test Item : Band Edge
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (Hopping off)
 Test date : 2020/04/07

Measurement Level	Result
Δ (dB)	
> 20	PASS

Figure Channel 00:



Figure Channel 78:



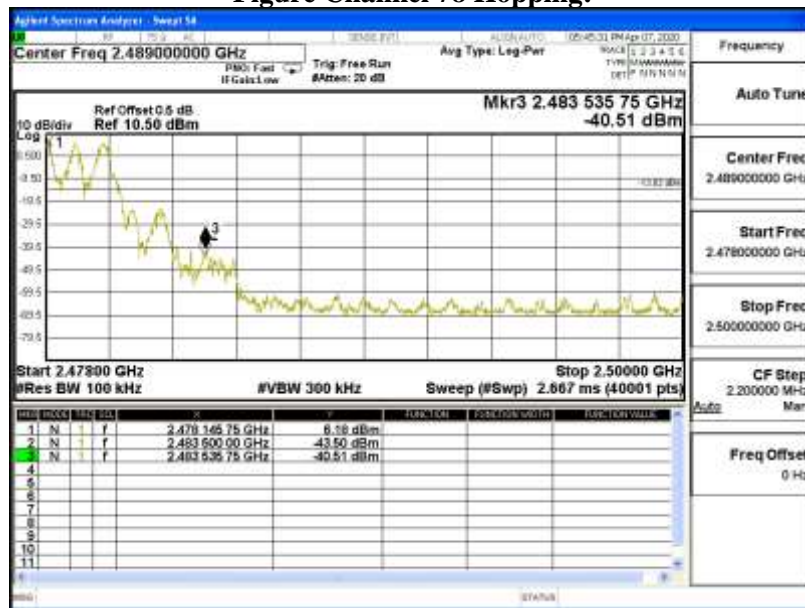
Product : Hearing Aid
 Test Item : Band Edge
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK)(Hopping on)
 Test date : 2020/04/07

Measurement Level	Result
Δ (dB)	
> 20	PASS

Figure Channel 00 Hopping:



Figure Channel 78 Hopping:



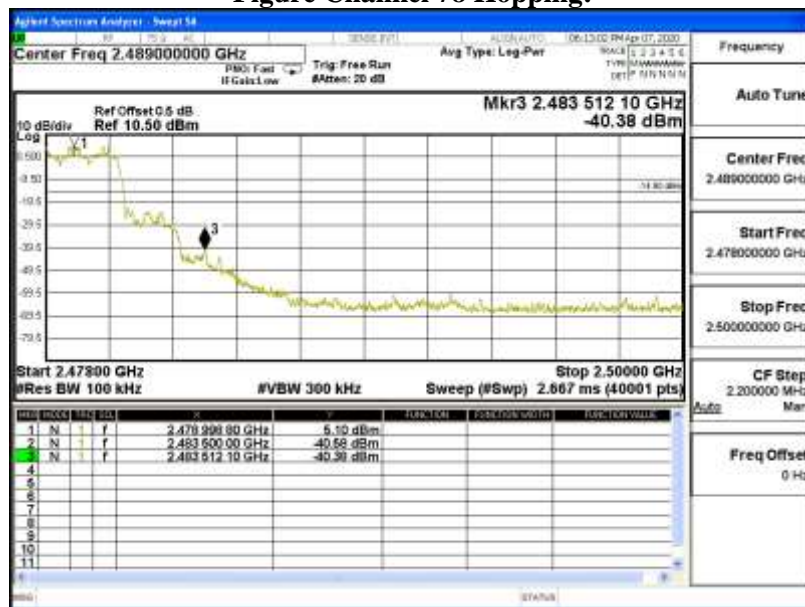
Product : Hearing Aid
 Test Item : Band Edge
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (Hopping on)
 Test date : 2020/04/07

Measurement Level	Result
Δ (dB)	
> 20	PASS

Figure Channel 00 Hopping:

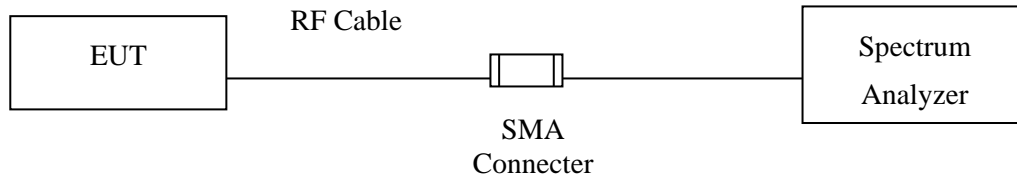


Figure Channel 78 Hopping:



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. Uncertainty

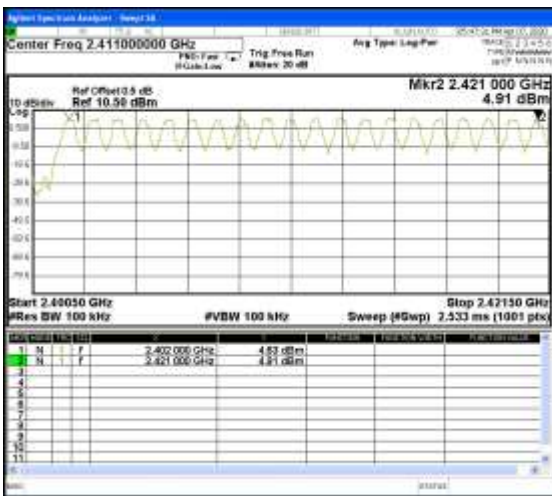
N/A

7.5. Test Result of Channel Number

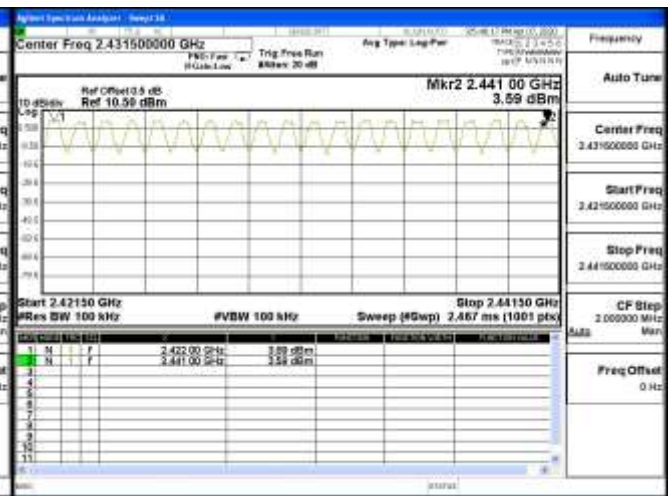
Product : Hearing Aid
 Test Item : Channel Number
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK)
 Test date : 2020/04/07

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

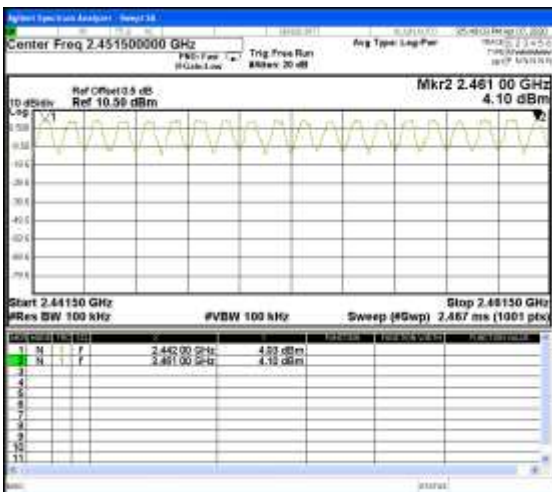
2402-2421MHz



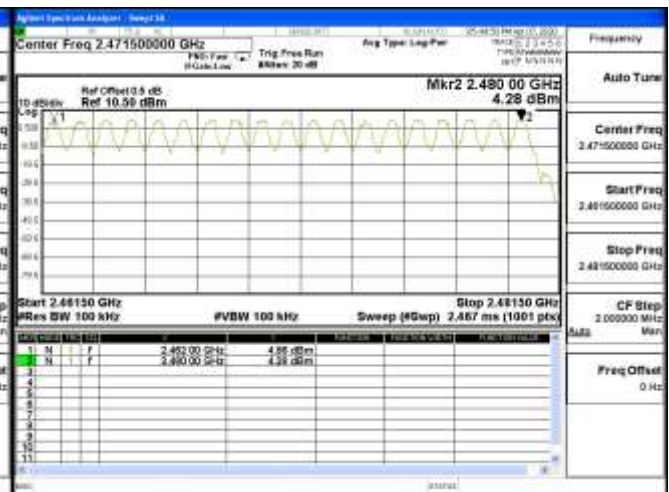
2422-2441MHz



2442-2461MHz



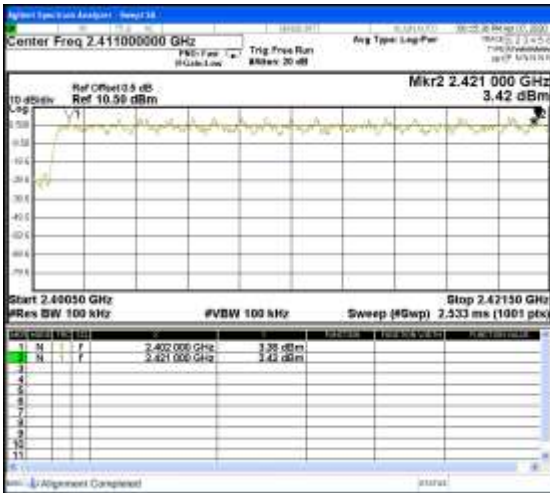
2462-2480MHz



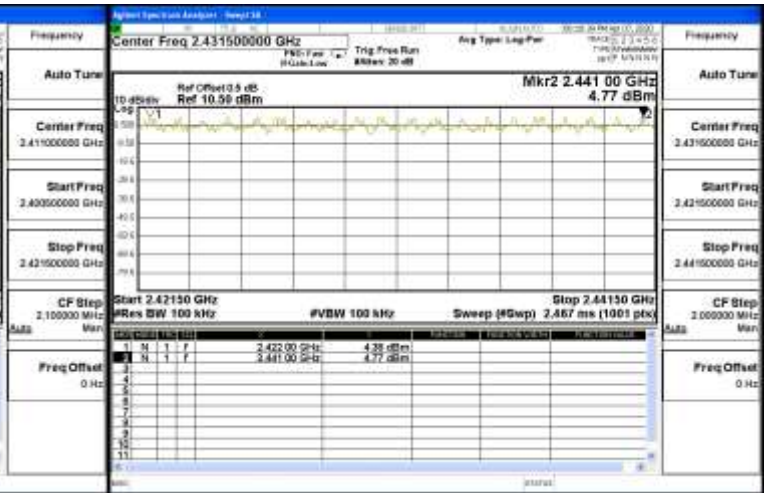
Product : Hearing Aid
 Test Item : Channel Number
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK)
 Test date : 2020/04/07

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

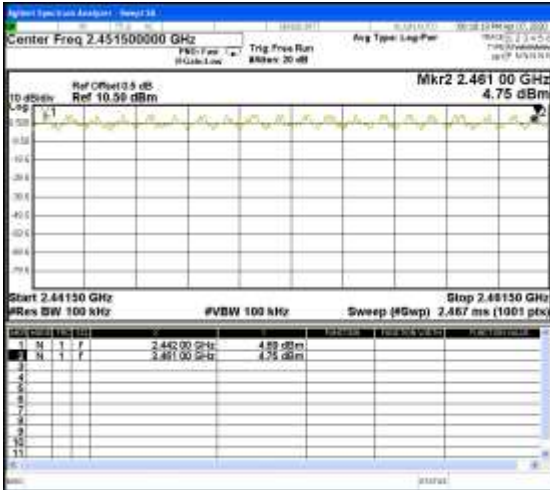
2402-2421MHz



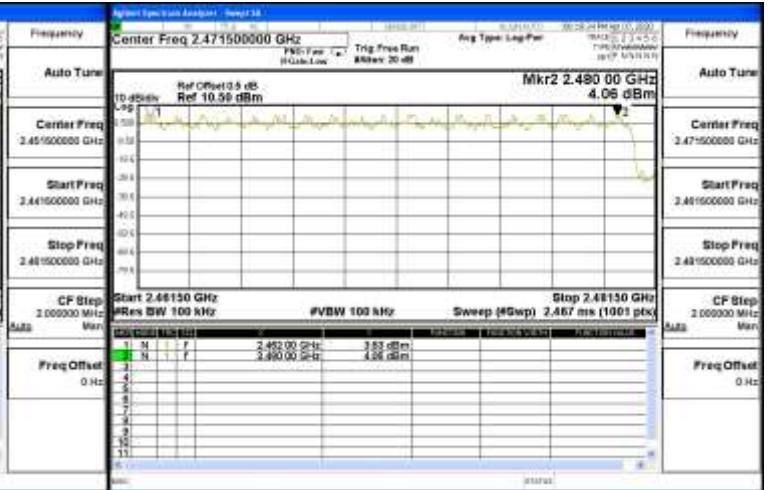
2422-2441MHz



2442-2461MHz

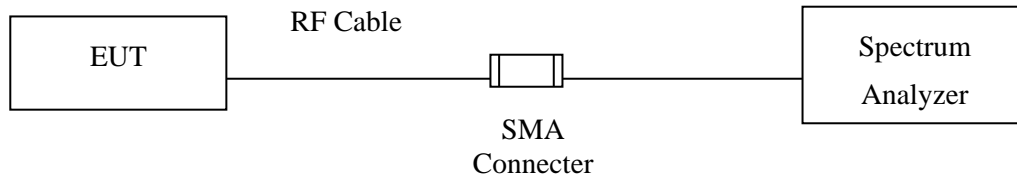


2462-2480MHz



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. Uncertainty

$\pm 283\text{Hz}$

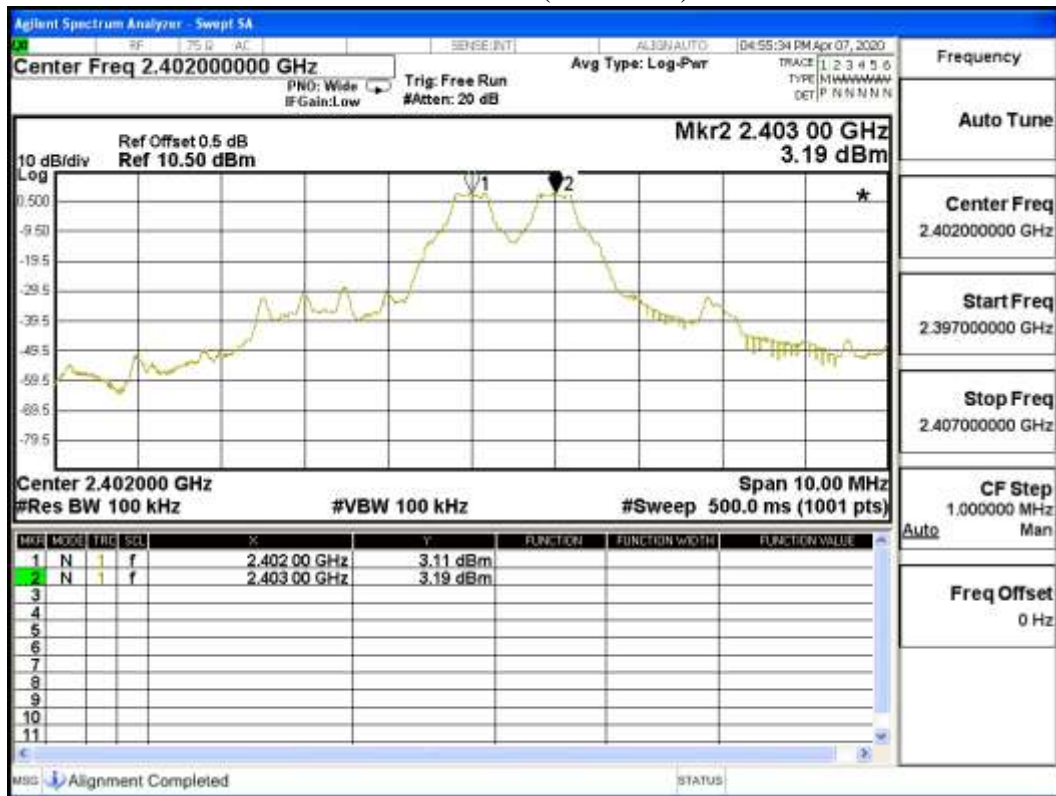
8.5. Test Result of Channel Separation

Product : Hearing Aid
 Test Item : Channel Separation
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK)
 Test date : 2020/04/07

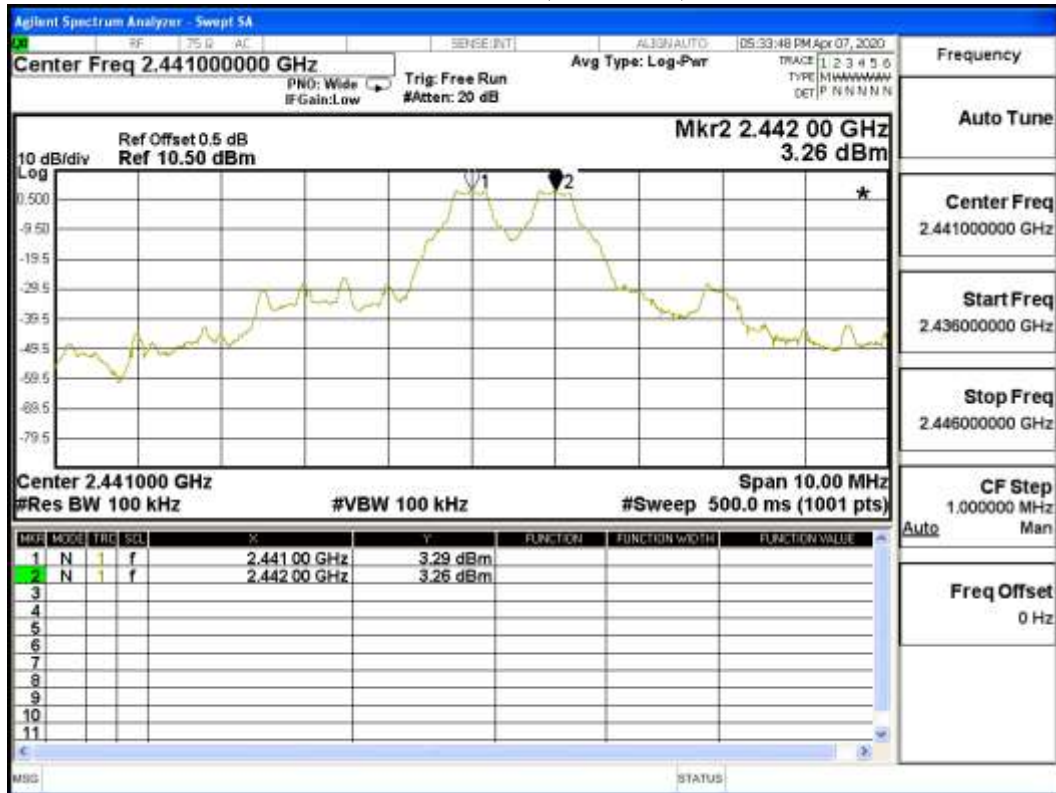
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Limit	Limit of (2/3)*20dB	Result
			(kHz)	Bandwidth (kHz)	
00	2402	1000	>25 kHz	618.0	Pass
39	2441	1000	>25 kHz	620.0	Pass
78	2480	1000	>25 kHz	622.0	Pass

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

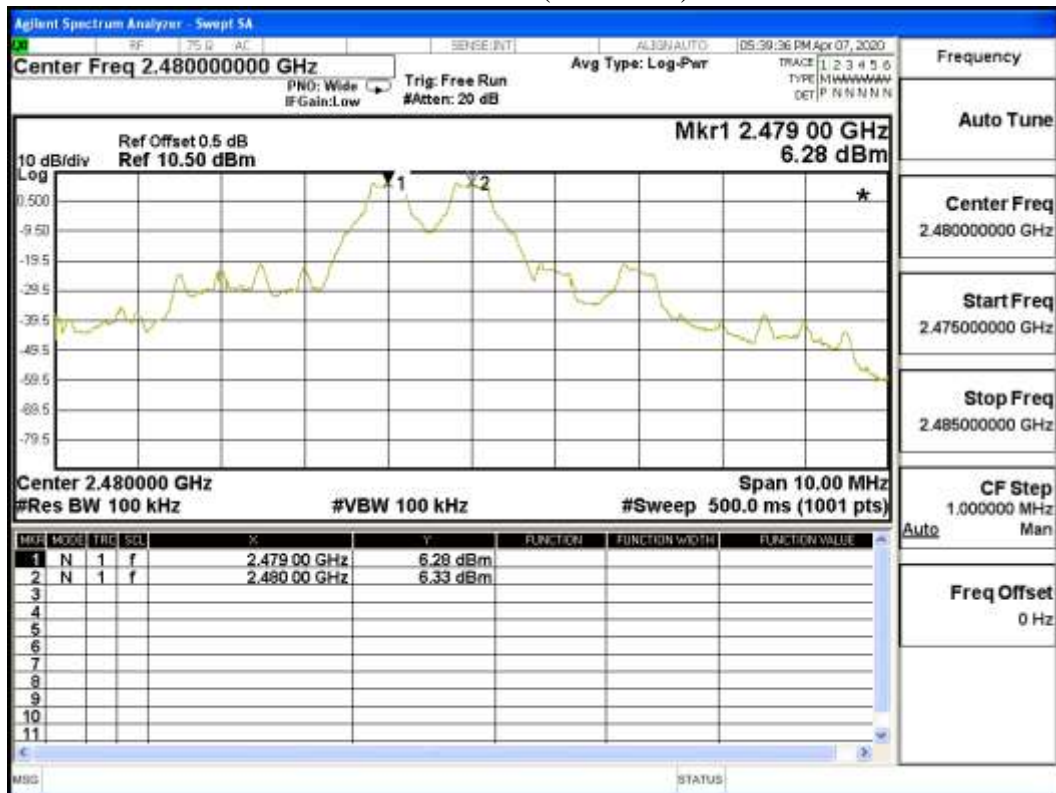
Channel 00 (2402MHz)



Channel 39 (2441MHz)



Channel 78 (2480MHz)

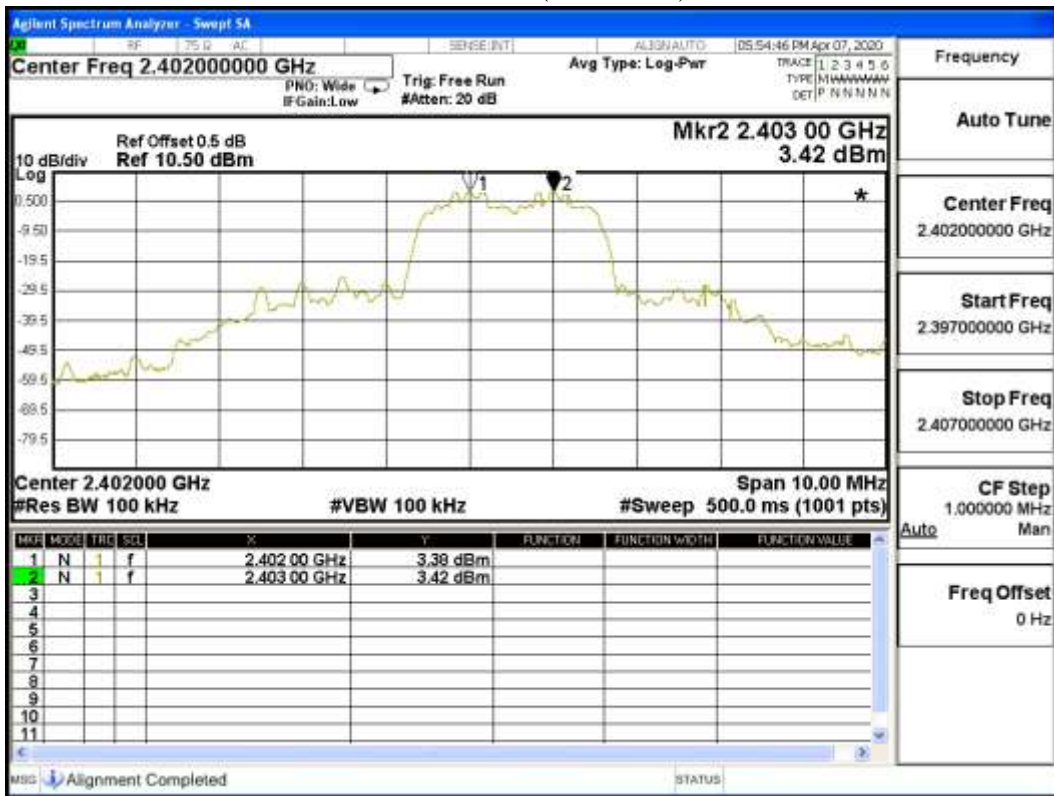


Product : Hearing Aid
 Test Item : Channel Separation
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK)
 Test date : 2020/04/07

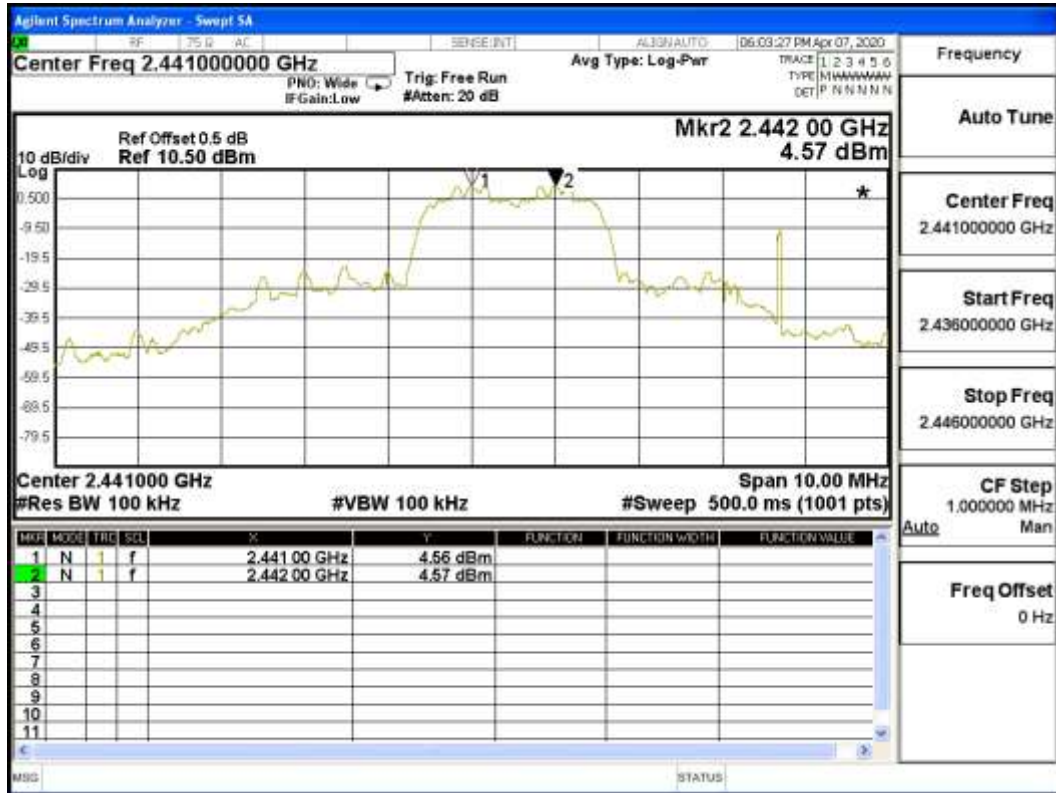
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Limit	Limit of (2/3)*20dB	Result
			(kHz)	Bandwidth (kHz)	
00	2402	1000	>25 kHz	775.3	Pass
39	2441	1000	>25 kHz	781.3	Pass
78	2480	1000	>25 kHz	854.0	Pass

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

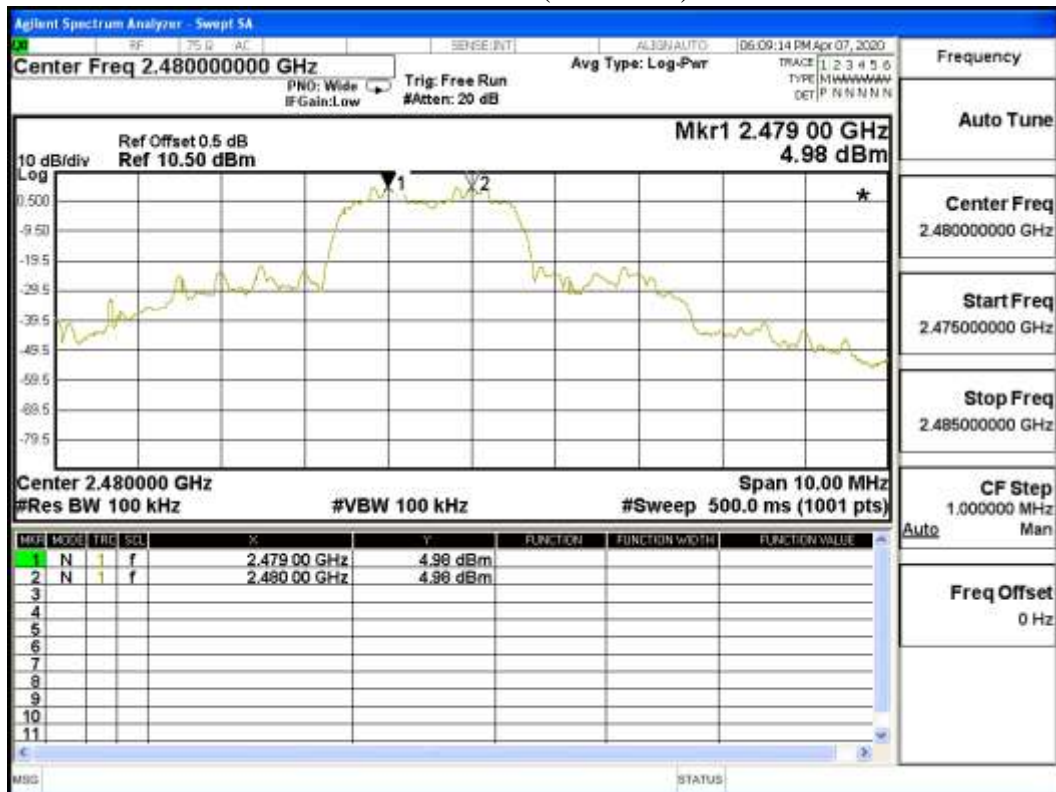
Channel 00 (2402MHz)



Channel 39 (2441MHz)

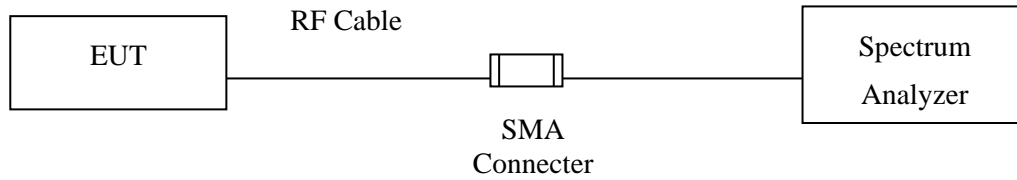


Channel 78 (2480MHz)



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. Uncertainty

$\pm 25\text{msec}$

9.5. Test Result of Dwell Time

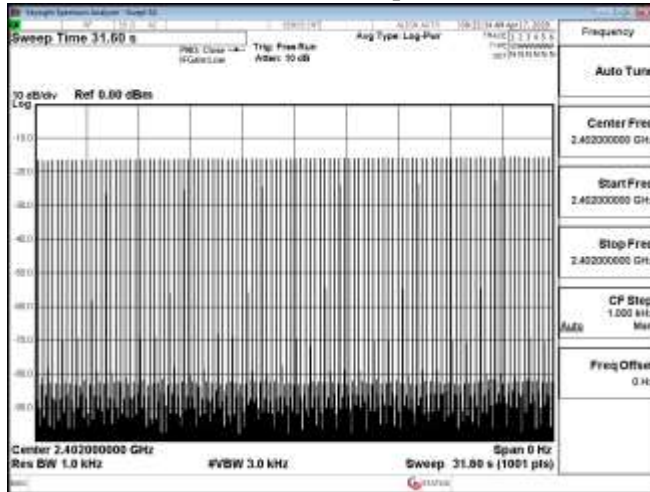
Product : Hearing Aid
Test Item : Dwell Time
Test Mode : Mode 1: Transmit - 1Mbps (GFSK) (Channel 00,39,78 –DH5)
Test date : 2020/04/17

Frequency (MHz)	Time slot length (ms)	Hopping of Number	Sweep time (ms)	Dwell Time (ms)	Limit (ms)	Result
2402	2.912	105	31600	305.760	400	Pass
2441	2.912	108	31600	314.496	400	Pass
2480	2.912	107	31600	311.584	400	Pass

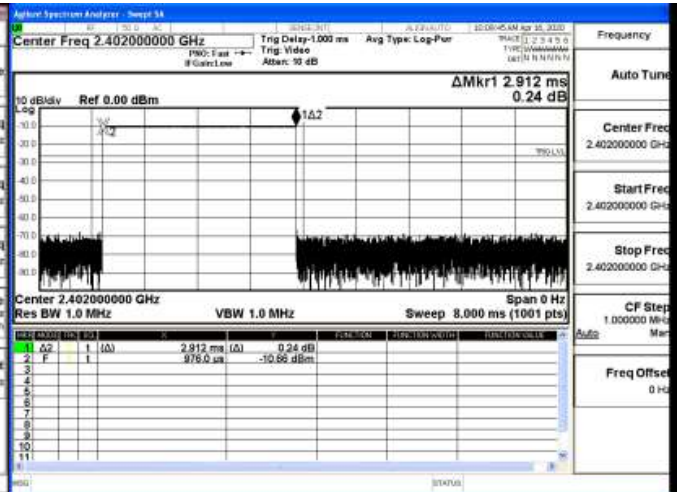
Dwell time = Time slot length*Hopping of number

Sweep time= 79 CHannel * 0.4

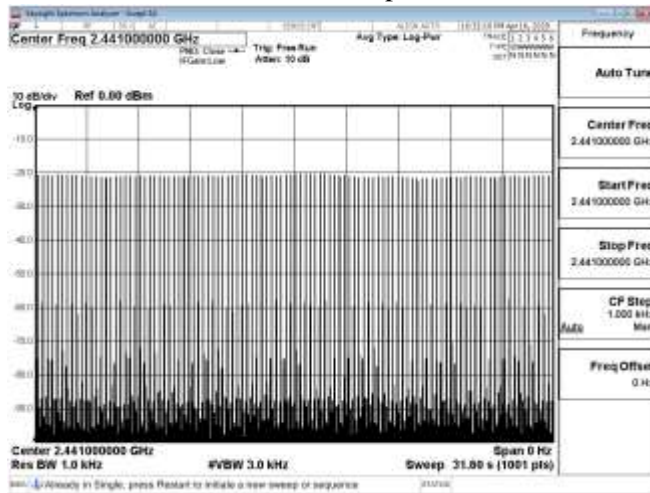
CH 00 Time Interval between hops



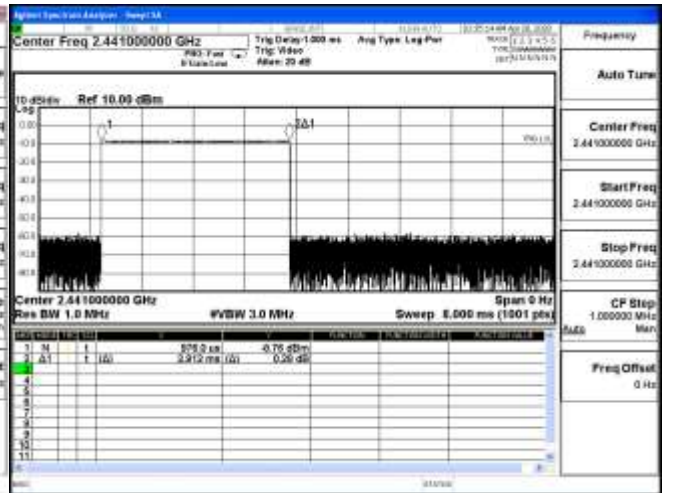
CH 00 Transmission Time



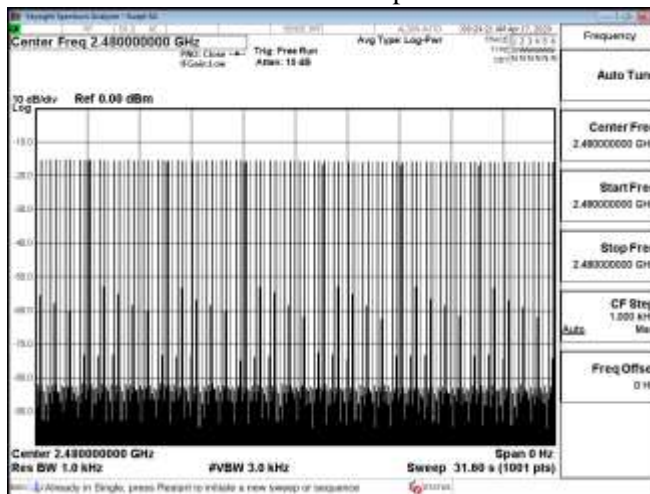
CH39 Time Interval between hops



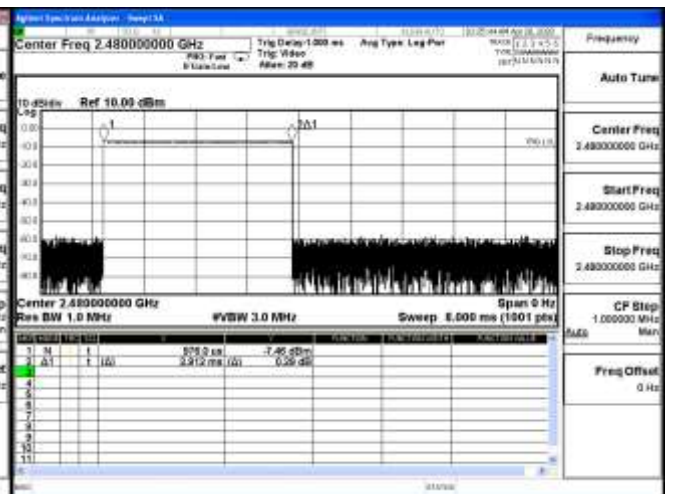
CH 39 Transmission Time



CH 78 Time Interval between hops



CH 78 Transmission Time



Note:

The dwell times of the packet type of DH1, DH3, and DH5 are tested. Only the worst case is shown on the report.

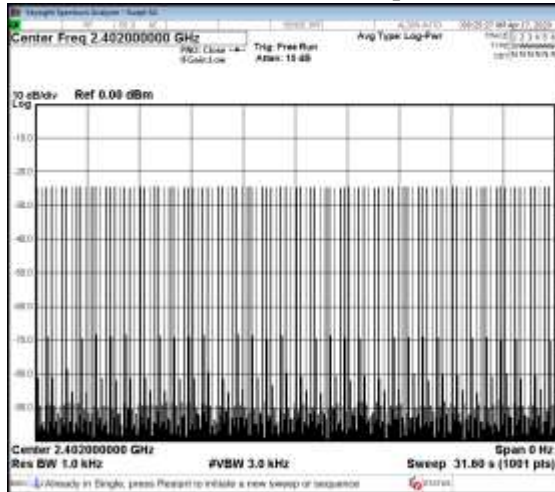
Product : Hearing Aid
Test Item : Dwell Time
Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (Channel 00,39,78 –DH5)
Test date : 2020/04/17

Frequency (MHz)	Time slot length (ms)	Hopping of Number	Sweep time (ms)	Dwell Time (ms)	Limit (ms)	Result
2402	2.888	110	31600	317.680	400	Pass
2441	2.888	106	31600	306.128	400	Pass
2480	2.912	109	31600	317.408	400	Pass

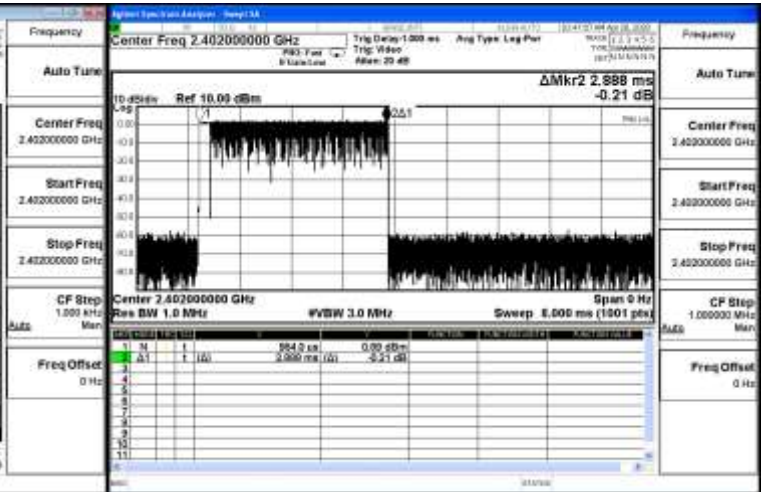
Dwell time = Time slot length*Hopping of number

Sweep time= 79 CHannel * 0.4

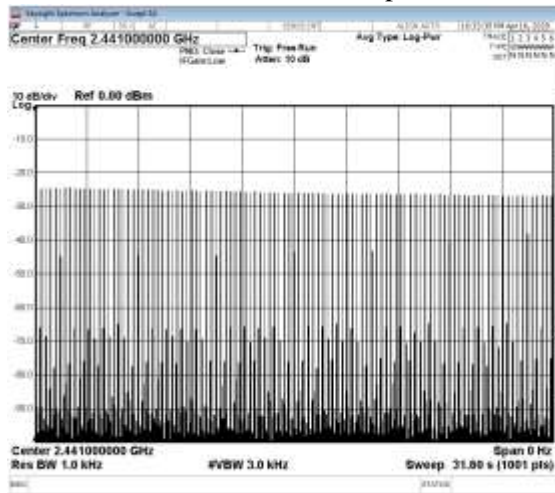
CH 00 Time Interval between hops



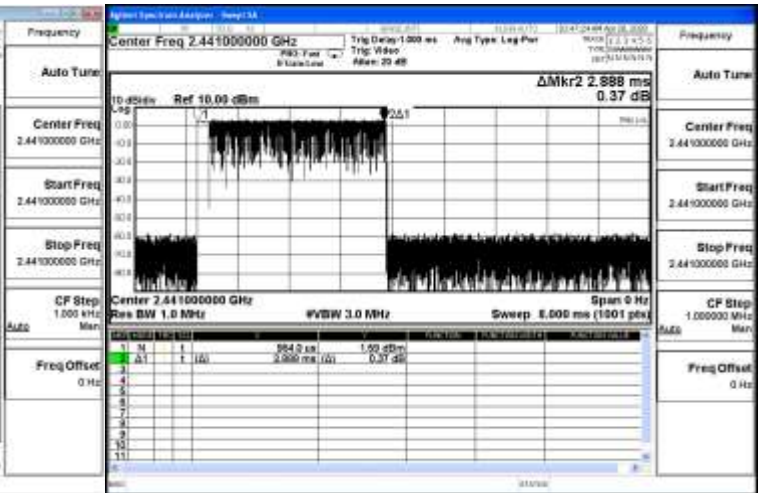
CH 00 Transmission Time



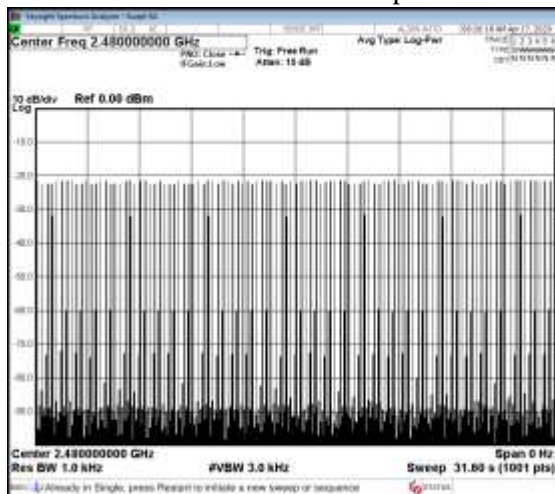
CH39 Time Interval between hops



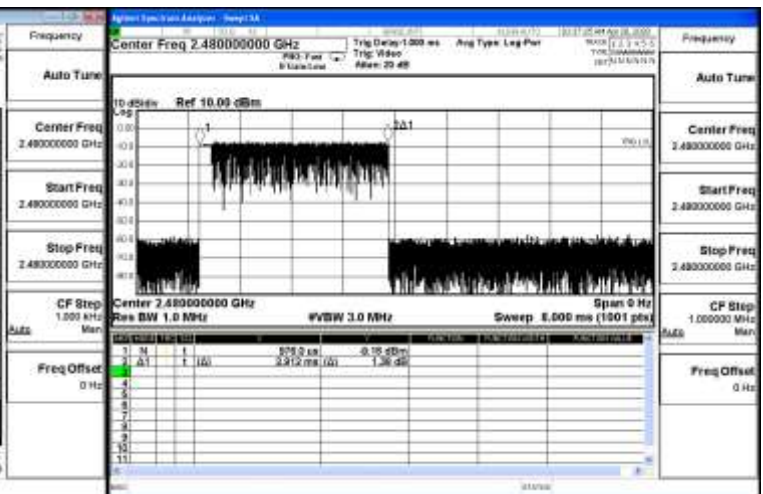
CH 39 Transmission Time



CH 78 Time Interval between hops



CH 78 Transmission Time

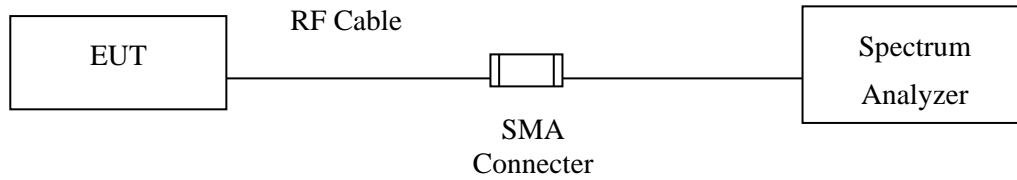


Note:

The dwell times of the packet type of DH1, DH3, and DH5 are tested. Only the worst case is shown on the report.

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. Uncertainty

$\pm 283\text{Hz}$

10.5. Test Result of Occupied Bandwidth

Product : Hearing Aid
 Test Item : Occupied Bandwidth Data
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK)
 Test date : 2020/04/07

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
00	2402	927	--	NA
39	2441	930	--	NA
78	2480	933	--	NA

Figure Channel 00:

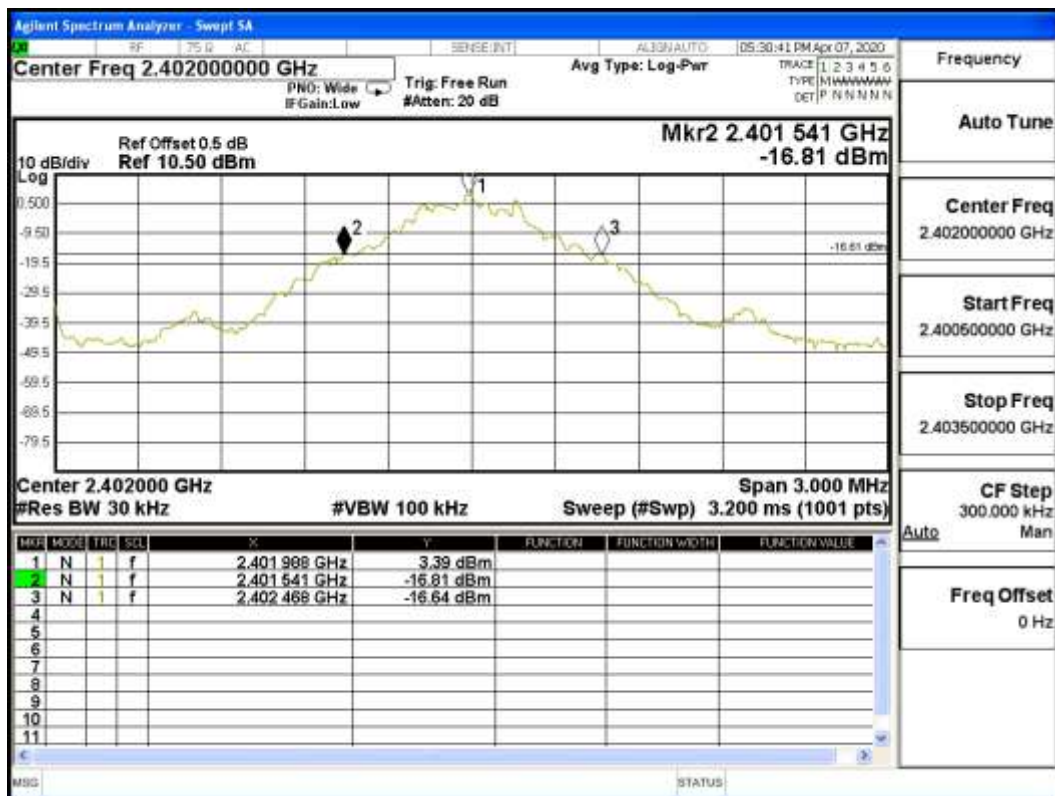


Figure Channel 39:

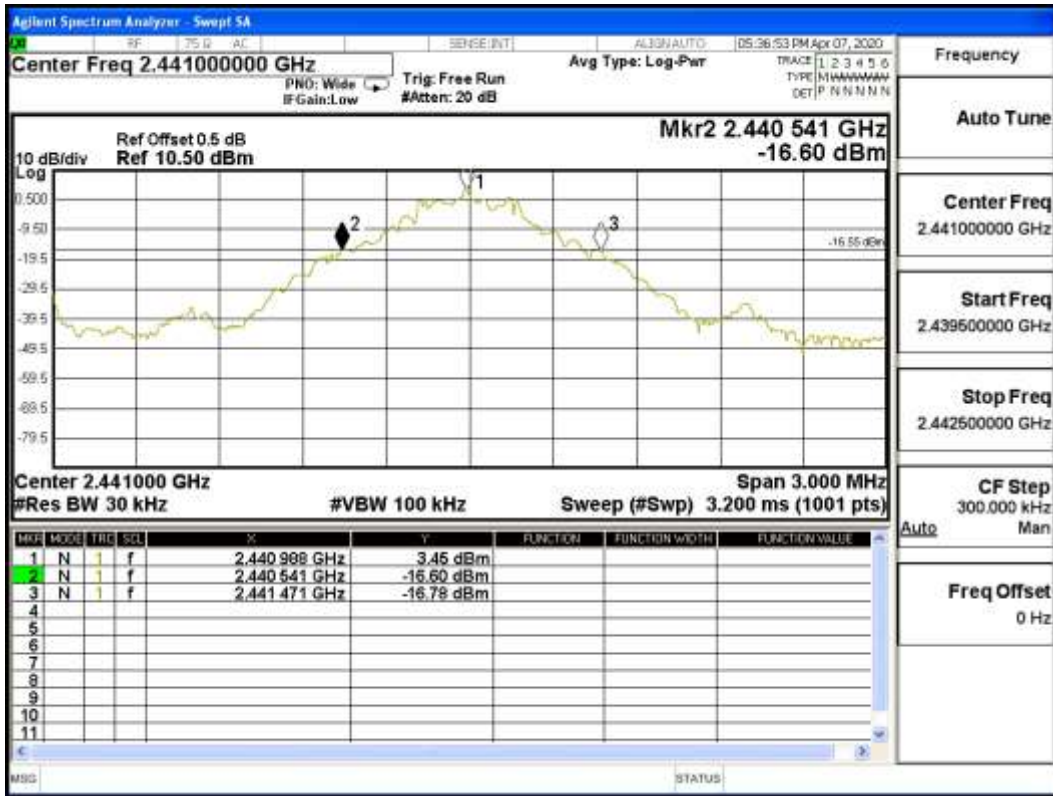
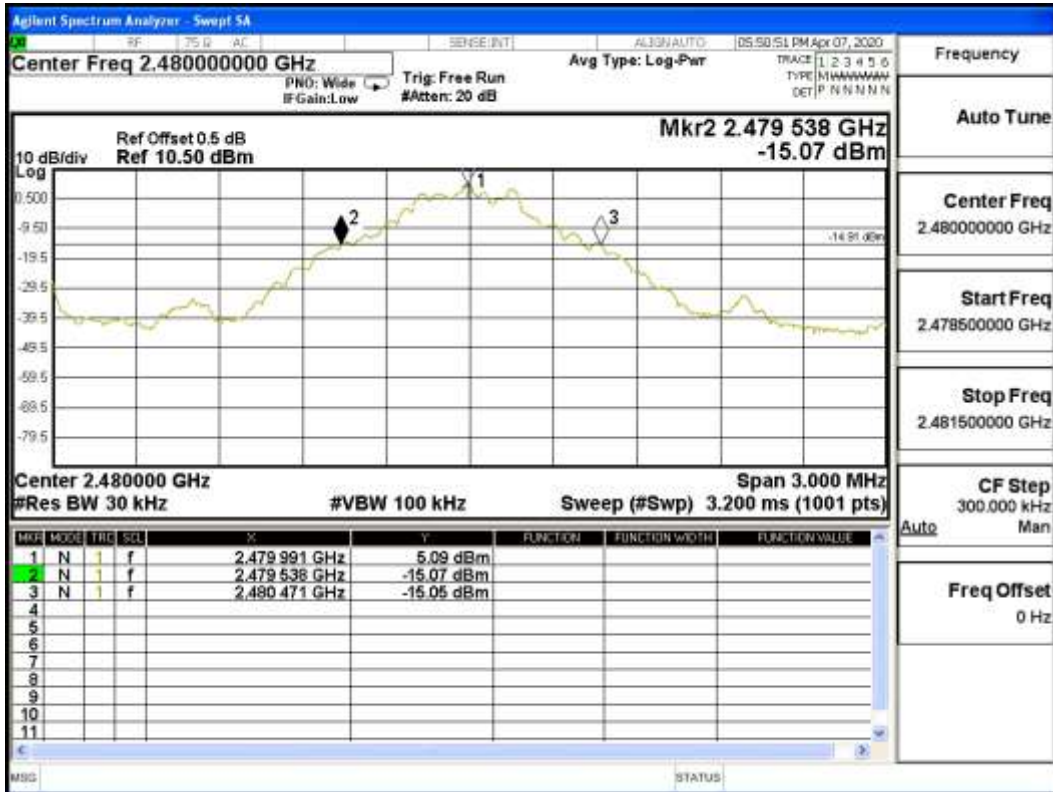


Figure Channel 78:



Product : Hearing Aid
 Test Item : Occupied Bandwidth Data
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (2402MHz)
 Test date : 2020/04/07

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
00	2402	1163	--	NA
39	2441	1172	--	NA
78	2480	1281	--	NA

Figure Channel 00:

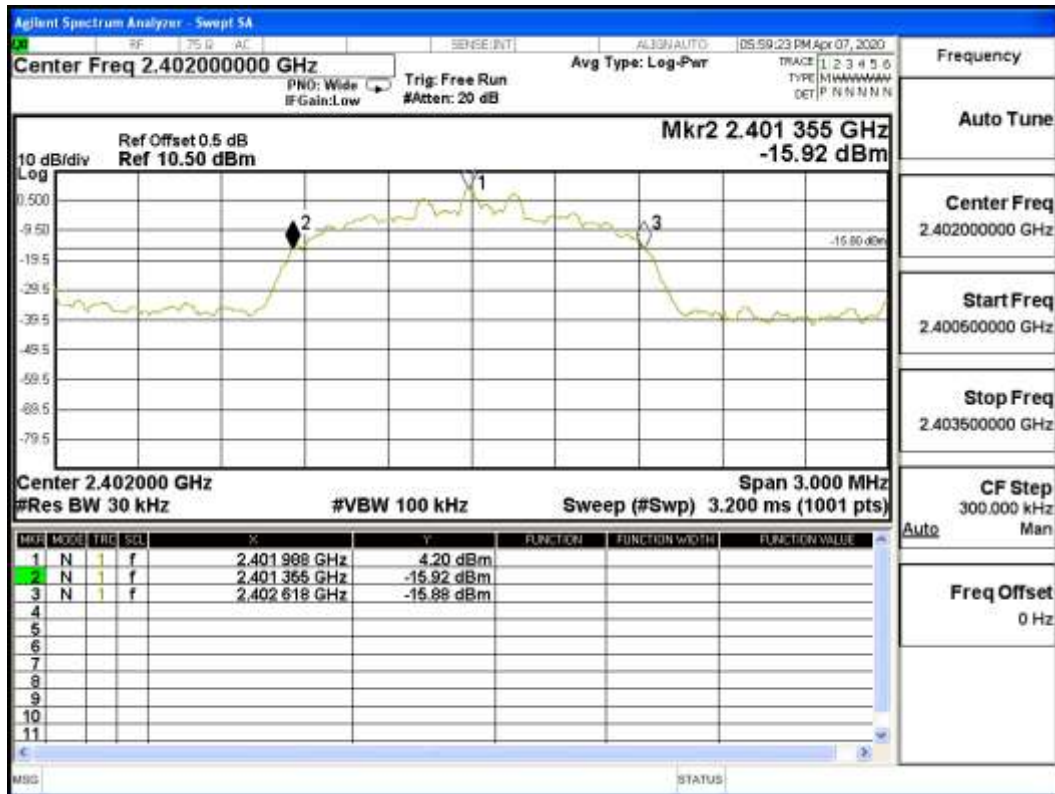


Figure Channel 39:

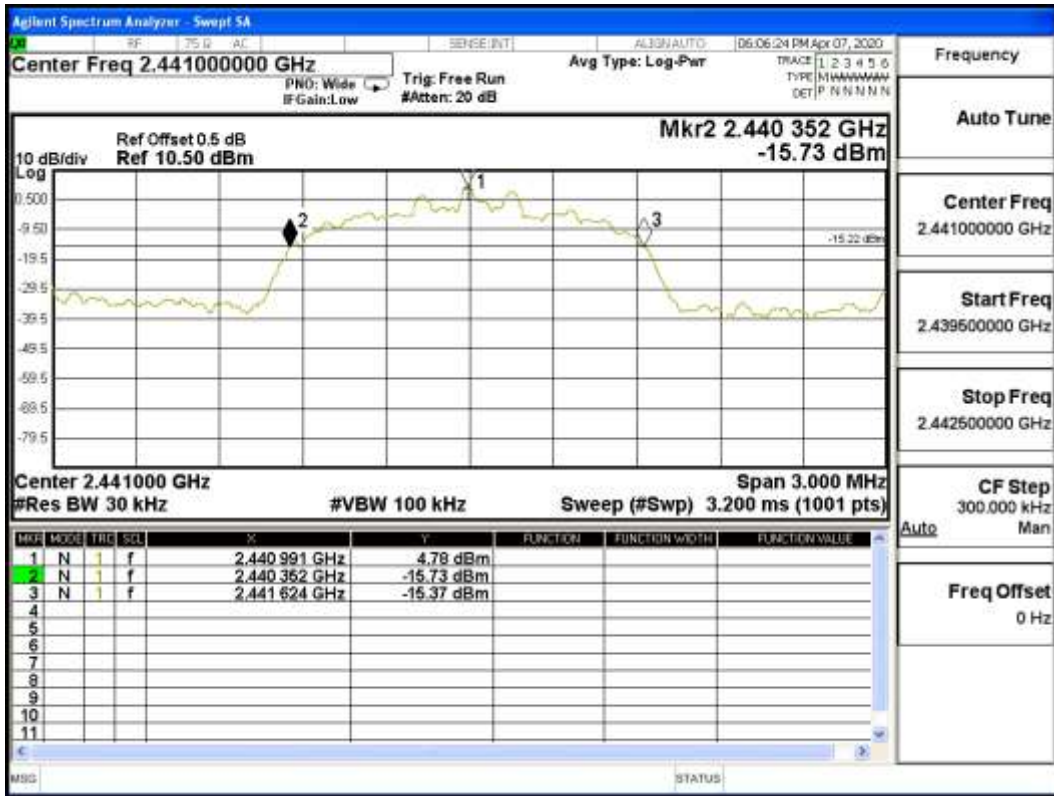
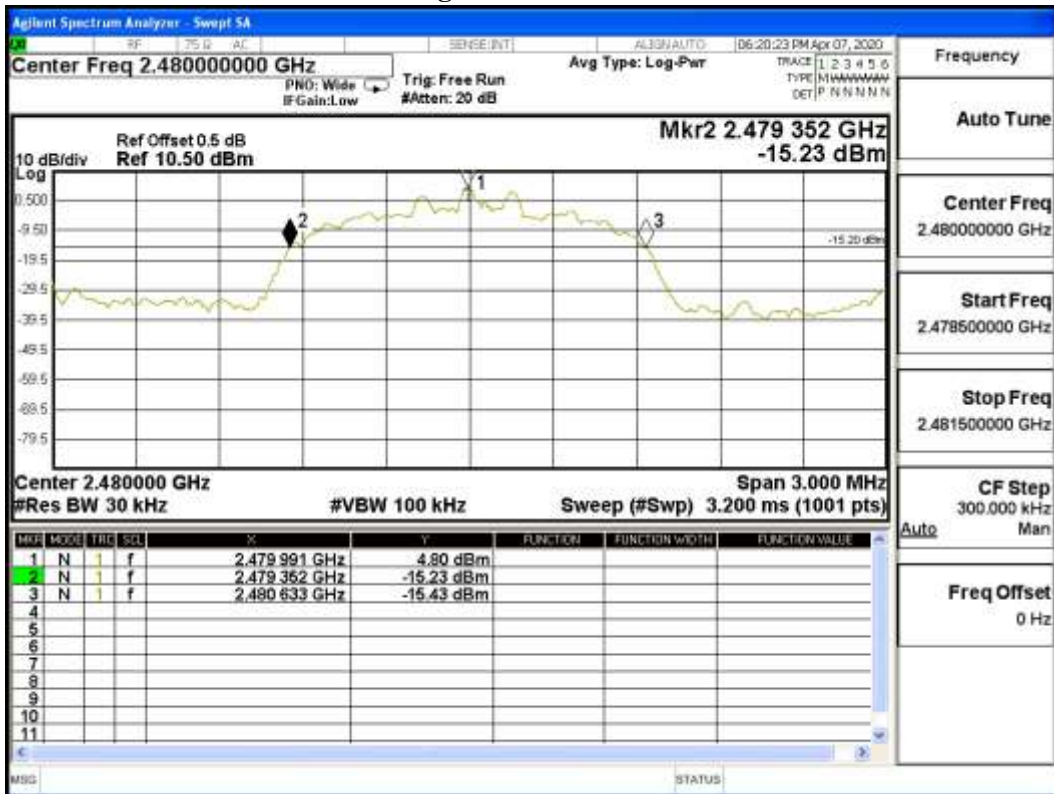
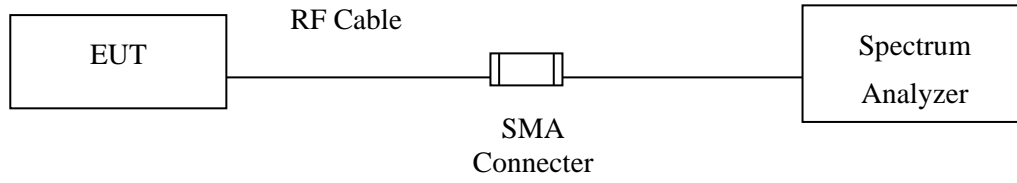


Figure Channel 78:



11. Duty Cycle

11.1. Test Setup

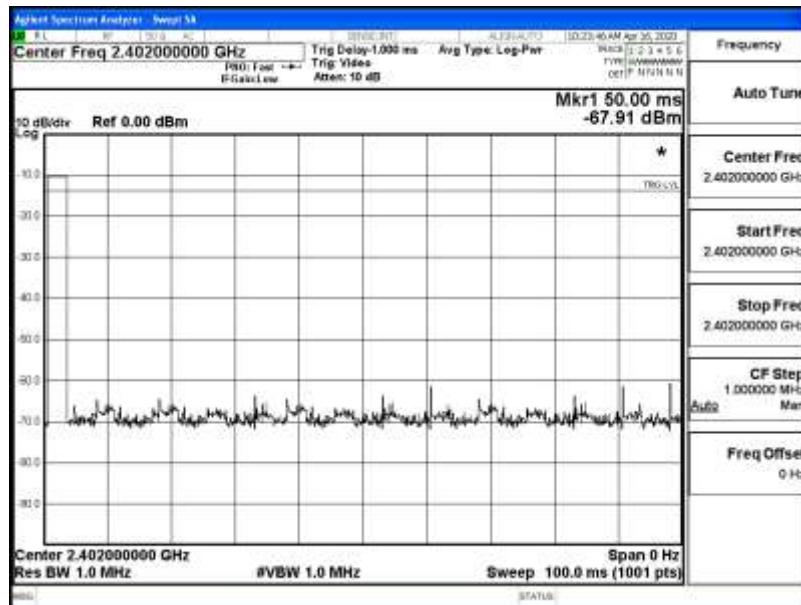
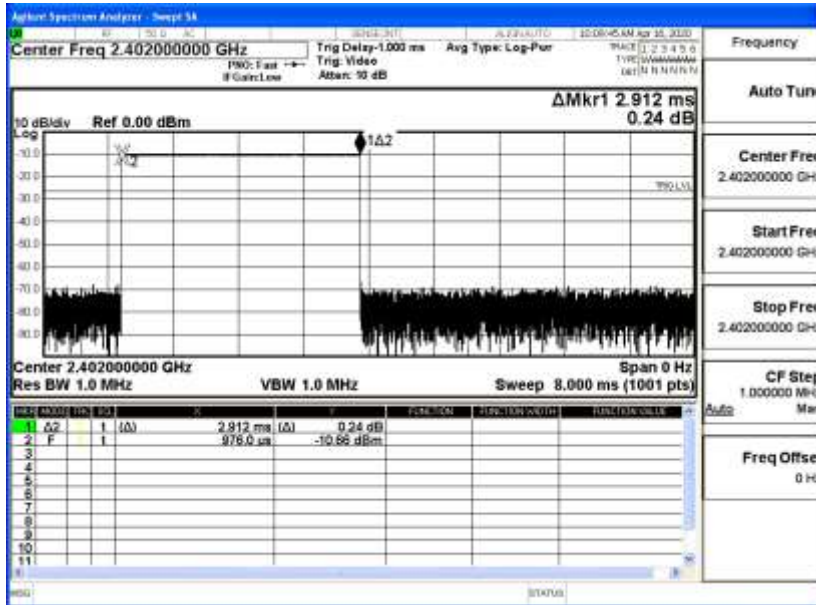


11.2. Uncertainty

$\pm 25\text{msec}$

11.3. Test Result of Duty Cycle

Product : Hearing Aid
 Test Item : Duty Cycle
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK)
 Test date : 2020/04/16



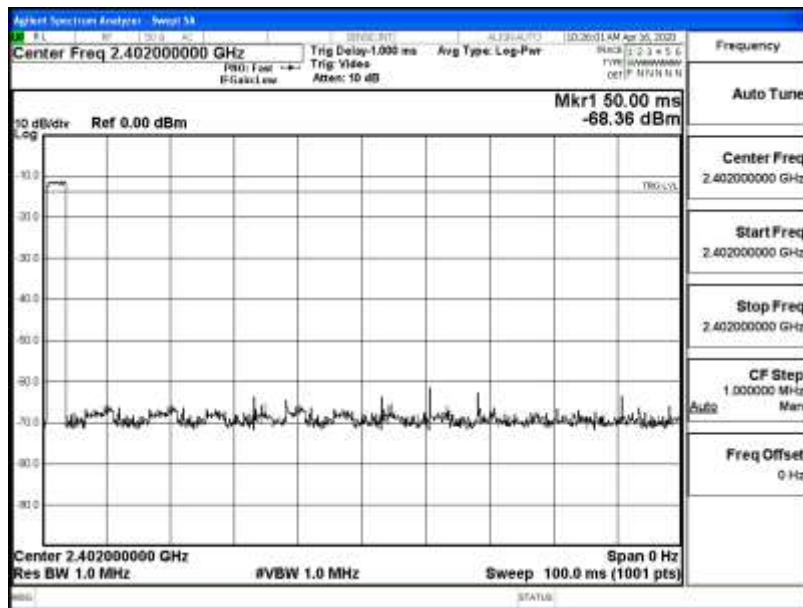
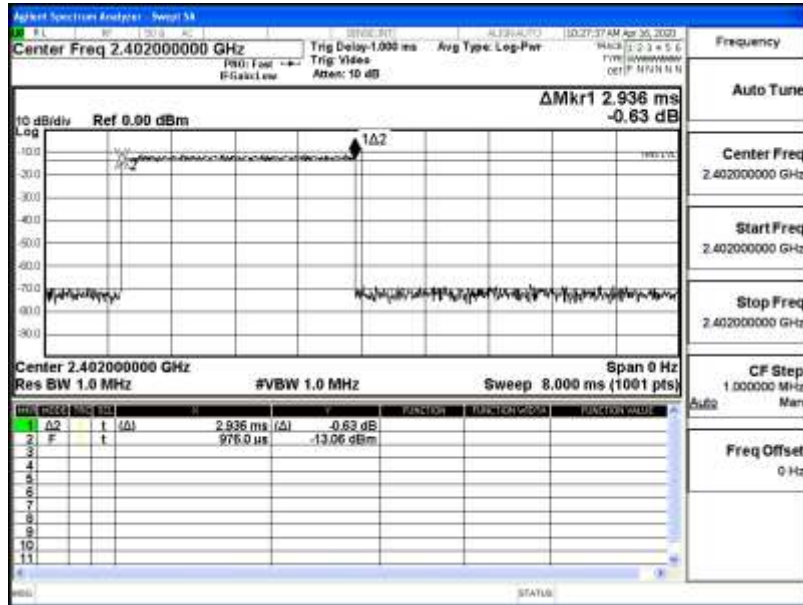
Time on of 100ms= 2.912 ms

Duty Cycle=2.912ms / 100ms= 0.02912

Duty Cycle correction factor= 20 LOG 0.02912= -30.716 dB

Duty Cycle correction factor	-30.716	dB
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Product : Hearing Aid
 Test Item : Duty Cycle
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK)
 Test date : 2020/04/16



Time on of 100ms= 2.936 ms

Duty Cycle=2.936ms / 100ms= 0.02936

Duty Cycle correction factor= 20 LOG 0.02936= -30.645 dB

Duty Cycle correction factor	-30.645	dB
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12. EMI Reduction Method During Compliance Testing

No modification was made during testing.