

TEST REPORT

Product : Silencer BT 2.0
Trade mark : Walker's
Model/Type reference : GWP-SLCR2-BT, GWP-SLCR2-BT-XXX,
GWP-SF-SLCR2-BT, GWP-SF-SLCR2-BT-XXX
(Where X=0 to 9 or A to Z for different color or
package)
Serial Number : N/A
Report Number : EED32M00142402
FCC ID : MV3-GWPSLCR2BT
Date of Issue: : Jul. 08, 2020
Test Standards : 47 CFR Part 15 Subpart C
Test result : PASS

Prepared for:

Country Mate Technology Ltd.
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Prepared by:

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Date:

Jul. 08, 2020

Check No.:3096303496



2 Version

Version No.	Date	Description
00	Jul. 08, 2020	Original

3 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15, Subpart C Section 15.203/15.247 (c)	ANSI C63.10-2013	PASS
AC Power Line Conducted Emission	47 CFR Part 15, Subpart C Section 15.207	ANSI C63.10-2013	PASS
Conducted Peak Output Power	47 CFR Part 15, Subpart C Section 15.247 (b)(1)	ANSI C63.10-2013	PASS
20dB Occupied Bandwidth	47 CFR Part 15, Subpart C Section 15.247 (a)(1)	ANSI C63.10-2013	PASS
Carrier Frequencies Separation	47 CFR Part 15, Subpart C Section 15.247 (a)(1)	ANSI C63.10-2013	PASS
Hopping Channel Number	47 CFR Part 15, Subpart C Section 15.247 (b)	ANSI C63.10-2013	PASS
Dwell Time	47 CFR Part 15, Subpart C Section 15.247 (a)(1)	ANSI C63.10-2013	PASS
Pseudorandom Frequency Hopping Sequence	47 CFR Part 15, Subpart C Section 15.247(b)(4)&TCB Exclusion List (7 July 2002)	ANSI C63.10-2013	PASS
RF Conducted Spurious Emissions	47 CFR Part 15, Subpart C Section 15.247(d)	ANSI C63.10-2013	PASS
Radiated Spurious emissions	47 CFR Part 15, Subpart C Section 15.205/15.209	ANSI C63.10-2013	PASS
Restricted bands around fundamental frequency (Radiated Emission)	47 CFR Part 15 Subpart C Section 15.205/15.209	ANSI C63.10-2013	PASS

Remark:

Test according to ANSI C63.4-2014 & ANSI C63.10-2013.

The tested samples and the sample information are provided by the client.

Model No.: GWP-SLCR2-BT, GWP-SLCR2-BT-XXX, GWP-SF-SLCR2-BT, GWP-SF-SLCR2-BT-XXX
(Where X=0 to 9 or A to Z for different color or package)

Only the model GWP-SLCR2-BT was tested, since the electrical circuit design, layout, components used and internal wiring were identical for the above models, with difference being color or package.

The left and right headphone are same electrical circuit design and color.

Difference: structure mirror, PCB Layout nearly mirror, appearance mirror.

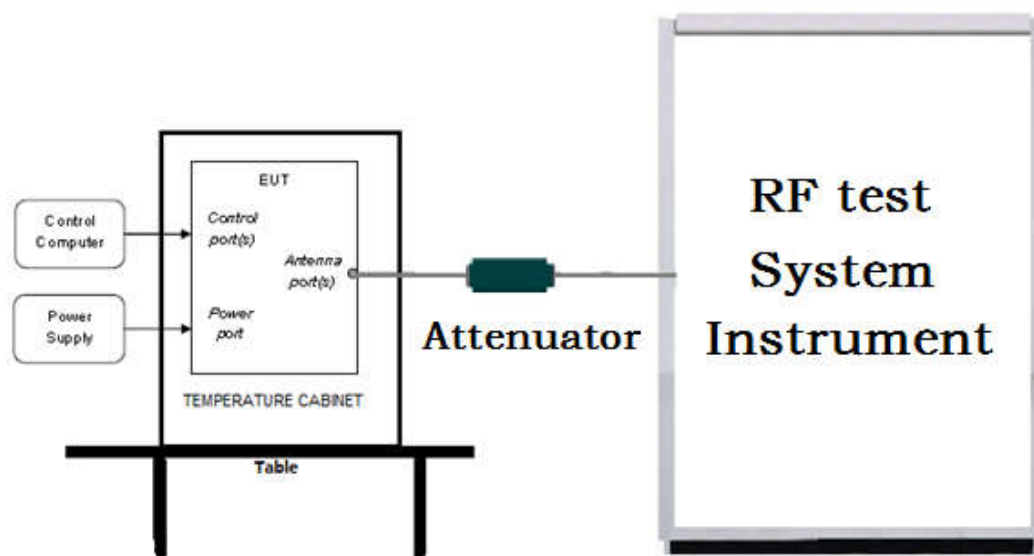
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5 Test Requirement

5.1 Test setup

5.1.1 For Conducted test setup



5.1.2 For Radiated Emissions test setup

Radiated Emissions setup:

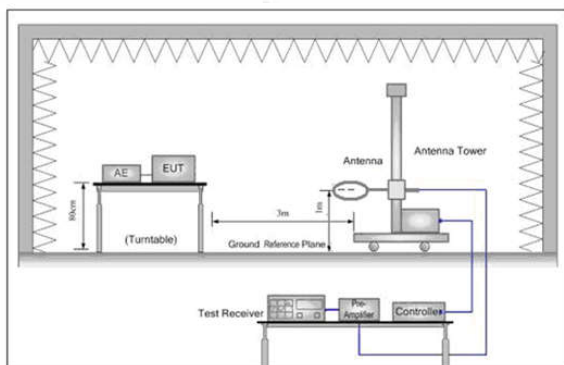


Figure 1. Below 30MHz

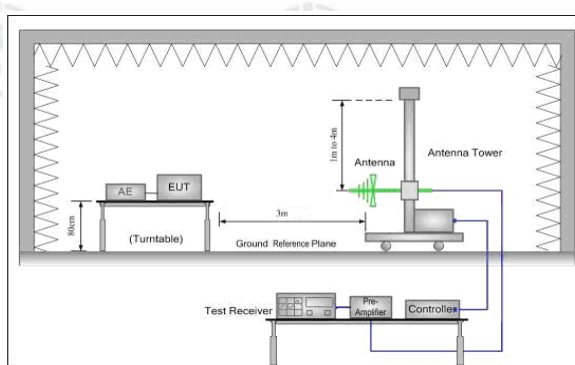


Figure 2. 30MHz to 1GHz

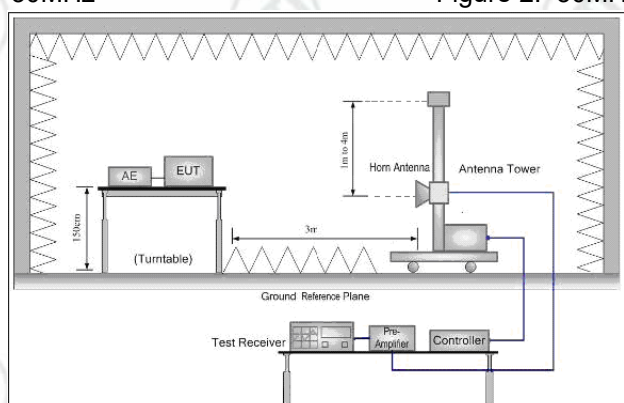
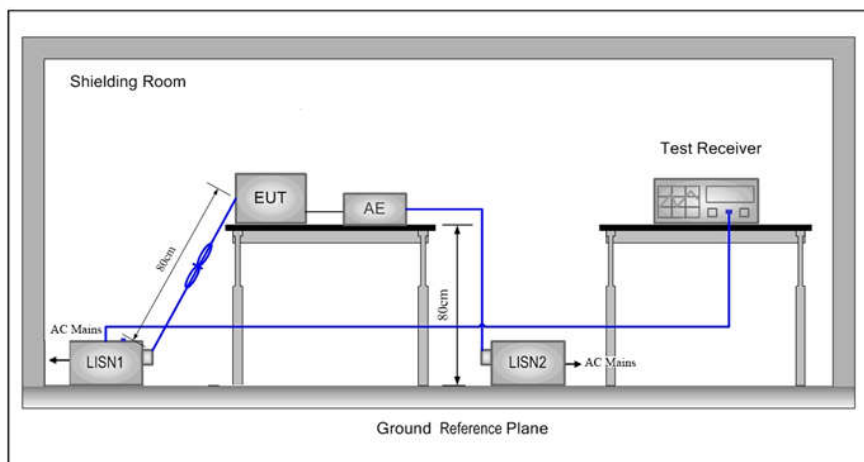


Figure 3. Above 1GHz

5.1.3 For Conducted Emissions test setup

Conducted Emissions setup



5.2 Test Environment

Operating Environment:	
Temperature:	24.0 °C
Humidity:	53 % RH
Atmospheric Pressure:	1010mbar

5.3 Test Condition

Test Mode	Tx/Rx	RF Channel		
		Low(L)	Middle(M)	High(H)
GFSK/π/4DQPSK/ 8DPSK(DH1,DH3,DH5)	2402MHz ~2480 MHz	Channel 0	Channel 39	Channel 78
		2402MHz	2441MHz	2480MHz

6 General Information

6.1 Client Information

Applicant:	Country Mate Technology Ltd.
Address of Applicant:	5/F,Blk E, Hing Yip Center, 31 Hing Yip Street, Kwun Tong, Kln, Hong Kong
Manufacturer:	Country Mate Technology Ltd.
Address of Manufacturer:	5/F,Blk E, Hing Yip Center, 31 Hing Yip Street, Kwun Tong, Kln, Hong Kong
Factory:	Concord Electronic (Huizhou) Ltd.
Address of Factory:	21, Ping An Rd, Shuikou Street, Hui Cheng District , Huizhou City, Guangdong Province, China

6.2 General Description of EUT

Product Name:	Silencer BT 2.0
Model No.(EUT):	GWP-SLCR2-BT, GWP-SLCR2-BT-XXX, GWP-SF-SLCR2-BT, GWP-SF-SLCR2-BT-XXX (Where X=0 to 9 or A to Z for different color or package)
Test Model No.:	GWP-SLCR2-BT
Trade mark:	Walker's
EUT Supports Radios application:	BT 5.0 Dual mode, 2402MHz to 2480MHz
Power Supply:	DC 3.8V
Sample Received Date:	May 25, 2020
Sample tested Date:	May 25, 2020 to Jun. 29, 2020

6.3 Product Specification subjective to this standard

Operation Frequency:	2402MHz~2480MHz
Bluetooth Version:	5.0
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:	GFSK, $\pi/4$ DQPSK, 8DPSK
Number of Channel:	79
Hopping Channel Type:	Adaptive Frequency Hopping systems
Test Power Grade:	GFSK: LCH:2,MCH:5, HCH:1, $\pi/4$ DQPSK: LCH:2,MCH:0, HCH:1, , 8DPSK: LCH:2,MCH:0, HCH:1
Test Software of EUT:	Bluetest3
Antenna Type:	FPC Antenna
Antenna Gain:	0.8dBi
Test Voltage:	DC 3.8V

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	2402MHz	20	2422MHz	40	2442MHz	60	2462MHz
1	2403MHz	21	2423MHz	41	2443MHz	61	2463MHz
2	2404MHz	22	2424MHz	42	2444MHz	62	2464MHz
3	2405MHz	23	2425MHz	43	2445MHz	63	2465MHz
4	2406MHz	24	2426MHz	44	2446MHz	64	2466MHz
5	2407MHz	25	2427MHz	45	2447MHz	65	2467MHz
6	2408MHz	26	2428MHz	46	2448MHz	66	2468MHz
7	2409MHz	27	2429MHz	47	2449MHz	67	2469MHz
8	2410MHz	28	2430MHz	48	2450MHz	68	2470MHz
9	2411MHz	29	2431MHz	49	2451MHz	69	2471MHz
10	2412MHz	30	2432MHz	50	2452MHz	70	2472MHz
11	2413MHz	31	2433MHz	51	2453MHz	71	2473MHz
12	2414MHz	32	2434MHz	52	2454MHz	72	2474MHz
13	2415MHz	33	2435MHz	53	2455MHz	73	2475MHz
14	2416MHz	34	2436MHz	54	2456MHz	74	2476MHz
15	2417MHz	35	2437MHz	55	2457MHz	75	2477MHz
16	2418MHz	36	2438MHz	56	2458MHz	76	2478MHz
17	2419MHz	37	2439MHz	57	2459MHz	77	2479MHz
18	2420MHz	38	2440MHz	58	2460MHz	78	2480MHz
19	2421MHz	39	2441MHz	59	2461MHz		

6.4 Description of Support Units

The EUT has been tested with associated equipment below

Associated equipment name		Manufacturer	Model	S/N serial number	Certification	Supplied by
AE1	Notebook	DELL	DELL 3490	D245DX2	CE & FCC	DELL

6.5 Test Location

All tests were performed at:

Centre Testing International Group Co., Ltd.

Building C, Hongwei Industrial Park Block 70, Bao'an District, Shenzhen, China

Telephone: +86 (0) 755 33683668 Fax: +86 (0) 755 33683385

No tests were sub-contracted.

FCC Designation No.: CN1164

6.6 Deviation from Standards

None.

6.7 Abnormalities from Standard Conditions

None.

6.8 Other Information Requested by the Customer

None.

6.9 Measurement Uncertainty(95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Radio Frequency	7.9×10^{-8}
2	RF power, conducted	0.46dB (30MHz-1GHz)
		0.55dB (1GHz-18GHz)
3	Radiated Spurious emission test	4.3dB (30MHz-1GHz)
		4.5dB (1GHz-12.75GHz)
4	Conduction emission	3.5dB (9kHz to 150kHz)
		3.1dB (150kHz to 30MHz)
5	Temperature test	0.64°C
6	Humidity test	3.8%
7	DC power voltages	0.026%

7 Equipment List

RF test system					
Equipment	Manufacturer	Model No.	Serial Number	Cal. Date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
Spectrum Analyzer	Keysight	N9010A	MY54510339	02-17-2020	02-16-2021
Signal Generator	Keysight	N5182B	MY53051549	02-17-2020	02-16-2021
Temperature/ Humidity Indicator	biaozhi	HM10	1804186	07-26-2019	07-25-2020
High-pass filter	Sinoscite	FL3CX03WG18N M12-0398-002	---	---	---
High-pass filter	MICRO-TRONICS	SPA-F-63029-4	---	---	---
DC Power	Keysight	E3642A	MY56376072	02-17-2020	02-16-2021
PC-1	Lenovo	R4960d	---	---	---
BT&WI-FI Automatic control	R&S	OSP120	101374	02-17-2020	02-16-2021
RF control unit	JS Tonscend	JS0806-2	158060006	02-17-2020	02-16-2021
BT&WI-FI Automatic test software	JS Tonscend	JS1120-3	---	---	---

Conducted disturbance Test					
Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
Receiver	R&S	ESCI	100435	04-28-2020	04-27-2021
Temperature/ Humidity Indicator	Defu	TH128	/	---	---
LISN	R&S	ENV216	100098	03-05-2020	03-04-2021
Barometer	changchun	DYM3	1188	---	---

3M Semi/full-anechoic Chamber					
Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
3M Chamber & Accessory Equipment	TDK	SAC-3	---	05-24-2019	05-23-2022
TRILOG Broadband Antenna	Schwarzbeck	VULB9163	9163-618	07-26-2019	07-25-2020
Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-076	04-25-2018	04-24-2021
Receiver	R&S	ESCI7	100938-003	10-21-2019	10-20-2020
Multi device Controller	maturo	NCD/070/107 11112	---	---	---
Temperature/ Humidity Indicator	Shanghai qixiang	HM10	1804298	07-26-2019	07-25-2020
Cable line	Fulai(7M)	SF106	5219/6A	---	---
Cable line	Fulai(6M)	SF106	5220/6A	---	---
Cable line	Fulai(3M)	SF106	5216/6A	---	---
Cable line	Fulai(3M)	SF106	5217/6A	---	---

3M full-anechoic Chamber					
Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
RSE Automatic test software	JS Tonscend	JS36-RSE	10166	---	---
Receiver	Keysight	N9038A	MY57290136	03-05-2020	03-04-2021
Spectrum Analyzer	Keysight	N9020B	MY57111112	03-05-2020	03-04-2021
Spectrum Analyzer	Keysight	N9030B	MY57140871	03-05-2020	03-04-2021
TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	9163-1148	04-25-2018	04-24-2021
Horn Antenna	Schwarzbeck	BBHA 9170	9170-832	04-25-2018	04-24-2021
Horn Antenna	ETS-LINDGREN	3117	00057407	07-10-2018	07-09-2021
Preamplifier	EMCI	EMC184055SE	980596	05-20-2020	05-19-2021
Preamplifier	EMCI	EMC001330	980563	04-22-2020	04-21-2021
Preamplifier	JS Tonscend	980380	EMC051845 SE	01-09-2020	01-08-2021
Temperature/Humidity Indicator	biaozhi	GM1360	EE1186631	04-27-2020	04-26-2021
Fully Anechoic Chamber	TDK	FAC-3	---	01-17-2018	01-16-2021
Filter bank	JS Tonscend	JS0806-F	188060094	04-10-2018	04-09-2021
Cable line	Times	SFT205-NMSM-2.50M	394812-0001	---	---
Cable line	Times	SFT205-NMSM-2.50M	394812-0002	---	---
Cable line	Times	SFT205-NMSM-2.50M	394812-0003	---	---
Cable line	Times	SFT205-NMSM-2.50M	393495-0001	---	---
Cable line	Times	EMC104-NMNM-1000	SN160710	---	---
Cable line	Times	SFT205-NMSM-3.00M	394813-0001	---	---
Cable line	Times	SFT205-NMNM-1.50M	381964-0001	---	---
Cable line	Times	SFT205-NMSM-7.00M	394815-0001	---	---
Cable line	Times	HF160-KMKM-3.00M	393493-0001	---	---

8 Radio Technical Requirements Specification

Reference documents for testing:

No.	Identity	Document Title
1	FCC Part15C	Subpart C-Intentional Radiators
2	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

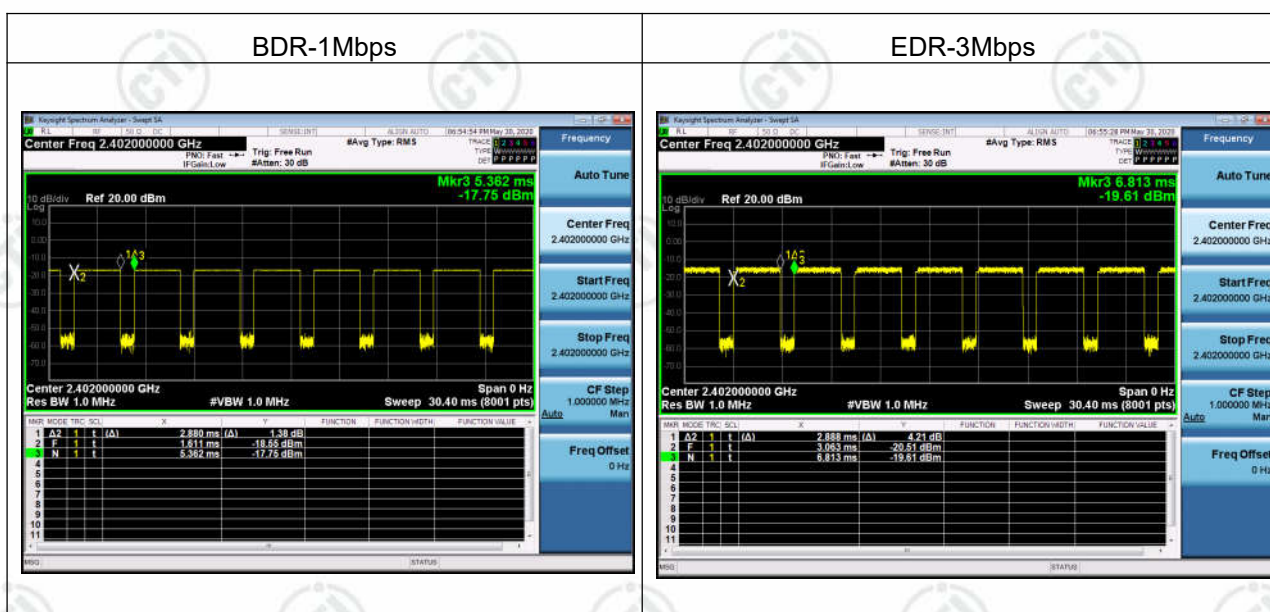
Test Results List:

Test requirement	Test method	Test item	Verdict	Note
Part15C Section 15.247 (a)(1)	ANSI 63.10	20dB Occupied Bandwidth	PASS	Appendix A)
Part15C Section 15.247 (a)(1)	ANSI 63.10	Carrier Frequencies Separation	PASS	Appendix B)
Part15C Section 15.247 (a)(1)	ANSI 63.10	Dwell Time	PASS	Appendix C)
Part15C Section 15.247 (b)	ANSI 63.10	Hopping Channel Number	PASS	Appendix D)
Part15C Section 15.247 (b)(1)	ANSI 63.10	Conducted Peak Output Power	PASS	Appendix E)
Part15C Section 15.247(d)	ANSI 63.10	Band-edge for RF Conducted Emissions	PASS	Appendix F)
Part15C Section 15.247(d)	ANSI 63.10	RF Conducted Spurious Emissions	PASS	Appendix G)
Part15C Section 15.247 (a)(1)	ANSI 63.10	Pseudorandom Frequency Hopping Sequence	PASS	Appendix H)
Part15C Section 15.203/15.247 (c)	ANSI 63.10	Antenna Requirement	PASS	Appendix I)
Part15C Section 15.207	ANSI 63.10	AC Power Line Conducted Emission	PASS	Appendix J)
Part15C Section 15.205/15.209	ANSI 63.10	Restricted bands around fundamental frequency (Radiated) Emission)	PASS	Appendix K)
Part15C Section 15.205/15.209	ANSI 63.10	Radiated Spurious Emissions	PASS	Appendix L)

EUT DUTY CYCLE

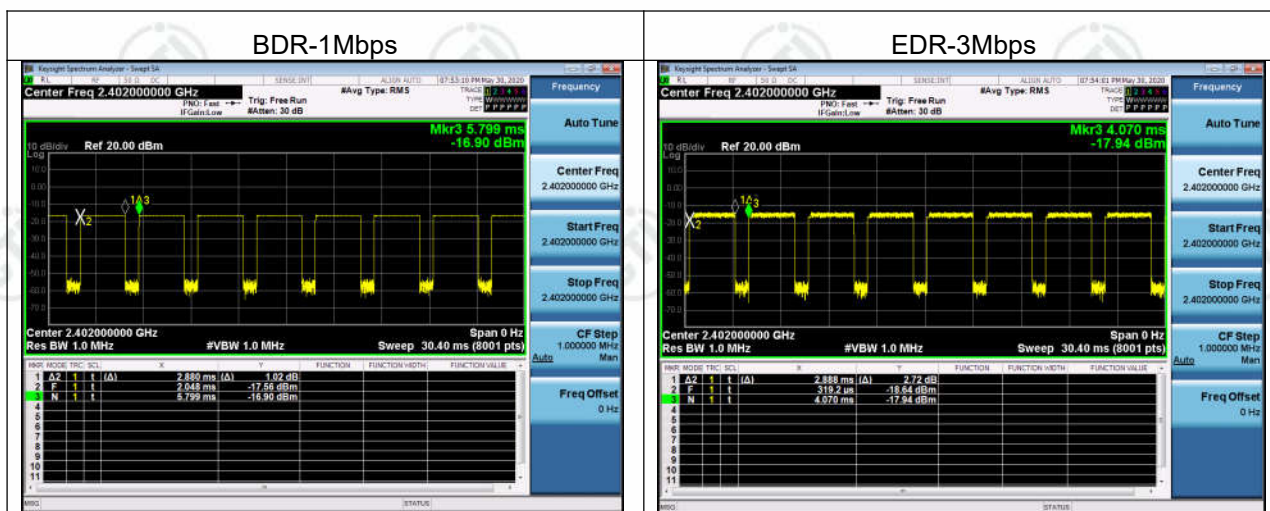
Left ear:

Duty Cycle			
Configuration	TX ON(ms)	TX ALL(ms)	Duty Cycle(%)
BDR-1Mbps	2.880	3.751	76.78%
EDR-3Mbps	2.888	3.75	77.01%



Right ear:

Duty Cycle			
Configuration	TX ON(ms)	TX ALL(ms)	Duty Cycle(%)
BDR-1Mbps	2.880	3.751	76.78%
EDR-3Mbps	2.888	3.7508	77.00%



Appendix A): 20dB Occupied Bandwidth

Test Limit

According to §15.247(a) (1),

20 dB Bandwidth : For reporting purposes only.

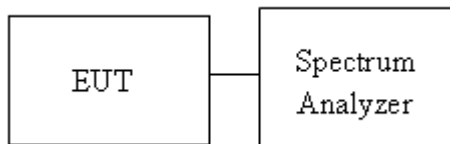
Occupied Bandwidth(99%) : For reporting purposes only.

Test Procedure

Test method Refer as Section 8.1 and ANSI C63.10: 2013 clause 7.8.7,

1. The EUT RF output connected to the spectrum analyzer by RF cable.
2. Setting maximum power transmit of EUT
3. SA set RBW =30kHz, VBW = 100kHz and Detector = Peak, to measurement 20dB Bandwidth.
4. SA set RBW = 1% ~ 5% OBW, VBW = three times the RBW and Detector = Peak, to measurement 99% Bandwidth.
5. Measure and record the result of 20 dB Bandwidth and 99% Bandwidth. in the test report.

Test Setup



Test Result

Left ear:

Mode	Channel.	20dB Bandwidth [MHz]	99% OBW [MHz]	Verdict
GFSK	LCH	0.9598	0.86458	PASS
GFSK	MCH	0.9624	0.87028	PASS
GFSK	HCH	0.9620	0.86526	PASS
$\pi/4$ DQPSK	LCH	1.488	1.9559	PASS
$\pi/4$ DQPSK	MCH	1.337	1.9646	PASS
$\pi/4$ DQPSK	HCH	1.339	1.9625	PASS
8DPSK	LCH	1.298	1.6943	PASS
8DPSK	MCH	1.299	1.7016	PASS
8DPSK	HCH	1.300	1.7205	PASS

Right ear:

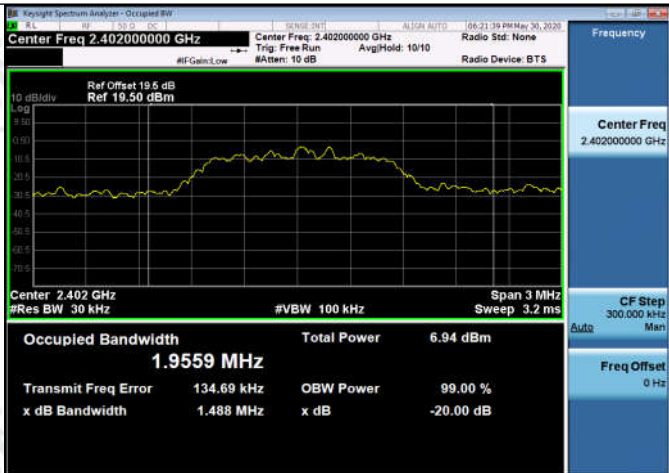
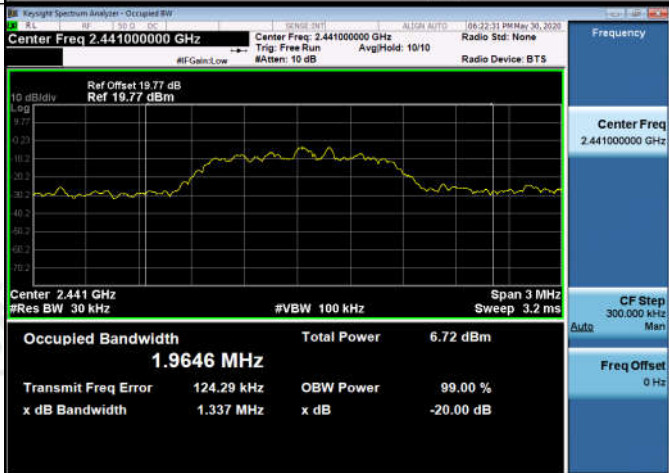
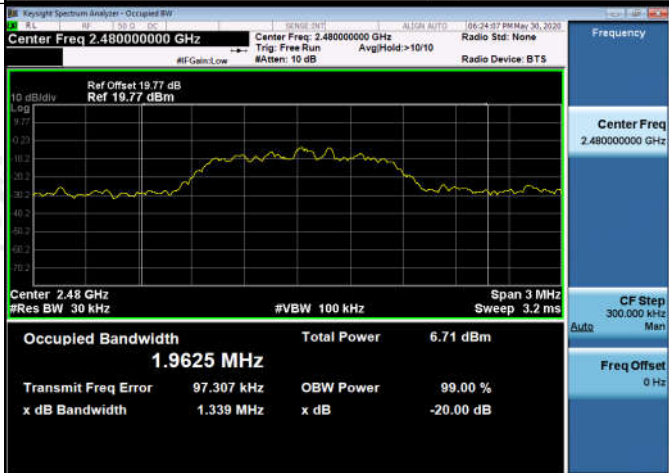
Mode	Channel.	20dB Bandwidth [MHz]	99% OBW [MHz]	Verdict
GFSK	LCH	0.9581	0.86214	PASS
GFSK	MCH	0.9585	0.86185	PASS
GFSK	HCH	0.9575	0.85781	PASS
$\pi/4$ DQPSK	LCH	1.329	1.7856	PASS
$\pi/4$ DQPSK	MCH	1.334	1.7712	PASS
$\pi/4$ DQPSK	HCH	1.330	1.7449	PASS
8DPSK	LCH	1.300	1.4596	PASS
8DPSK	MCH	1.301	1.4782	PASS
8DPSK	HCH	1.305	1.5250	PASS

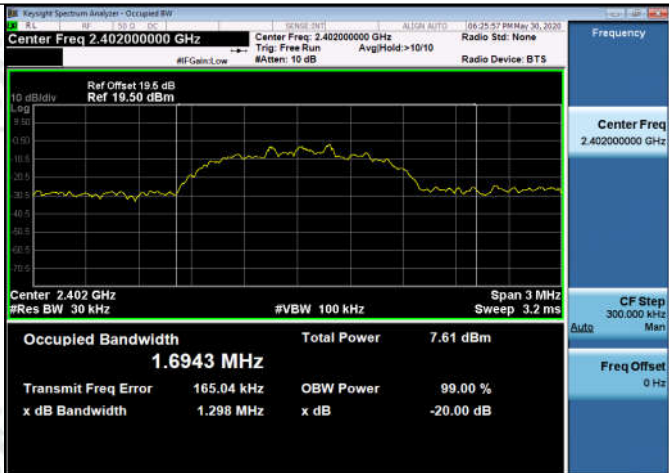
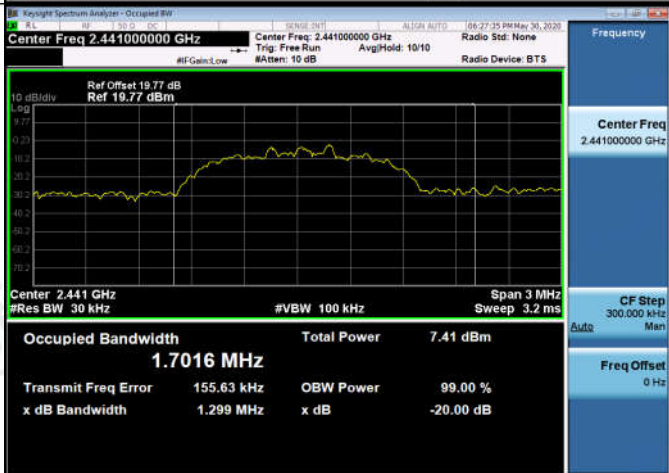
Test Graph

Left ear:

Graphs

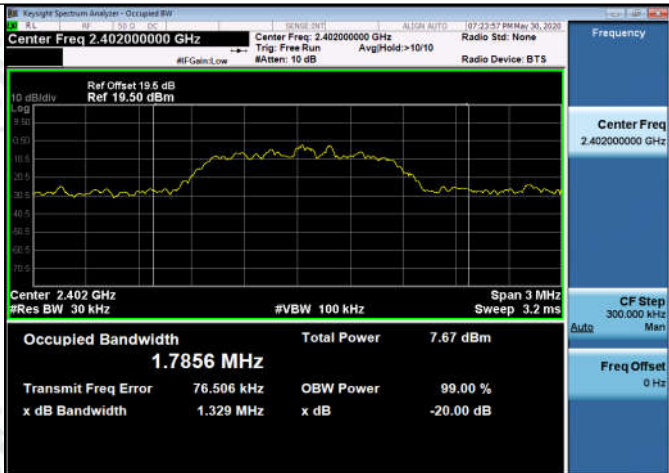
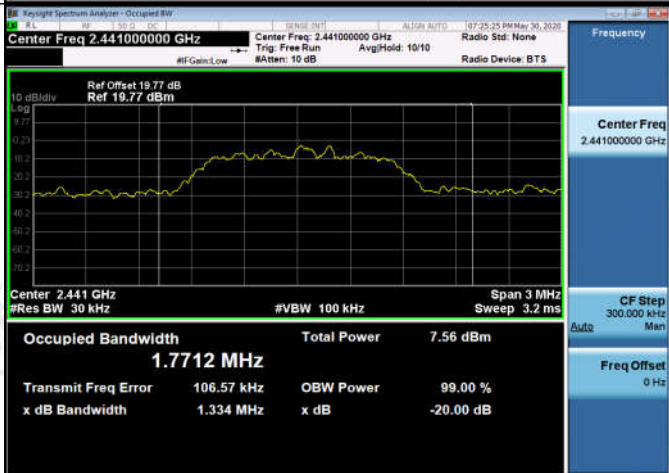
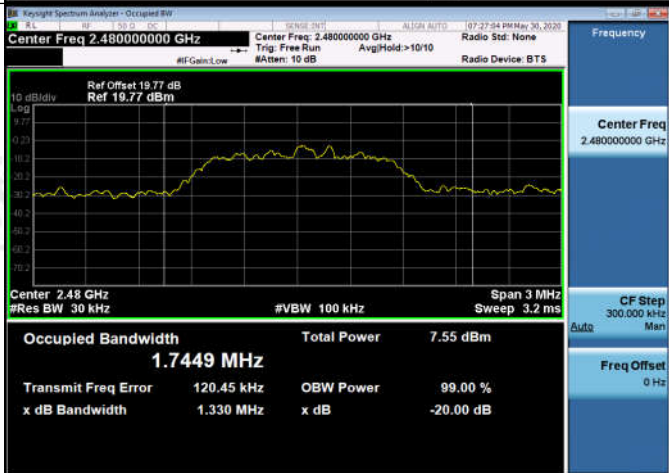
GFSK/LCH	KeySight Spectrum Analyzer - Occupied BW Center Freq 2.402000000 GHz Center Freq: 2.402000000 GHz Trig: Free Run Avg/Hold: >10/10 Radio Std: None Radio Device: BTS Ref Offset 19.5 dB Ref 19.50 dBm 10 dB/div Center 2.402 GHz #Res BW 30 kHz #VBW 100 kHz Span 3 MHz Sweep 3.2 ms Occupied Bandwidth 864.58 kHz Total Power 10.2 dBm Transmit Freq Error 16.730 kHz OBW Power 99.00 % x dB Bandwidth 959.8 kHz x dB -20.00 dB Frequency Center Freq 2.402000000 GHz CF Step 300.000 kHz Auto Man Freq Offset 0 Hz
GFSK/MCH	KeySight Spectrum Analyzer - Occupied BW Center Freq 2.441000000 GHz Center Freq: 2.441000000 GHz Trig: Free Run Avg/Hold: >10/10 Radio Std: None Radio Device: BTS Ref Offset 19.77 dB Ref 19.77 dBm 10 dB/div Center 2.441 GHz #Res BW 30 kHz #VBW 100 kHz Span 3 MHz Sweep 3.2 ms Occupied Bandwidth 870.28 kHz Total Power 9.91 dBm Transmit Freq Error 17.416 kHz OBW Power 99.00 % x dB Bandwidth 962.4 kHz x dB -20.00 dB Frequency Center Freq 2.441000000 GHz CF Step 300.000 kHz Auto Man Freq Offset 0 Hz
GFSK/HCH	KeySight Spectrum Analyzer - Occupied BW Center Freq 2.480000000 GHz Center Freq: 2.480000000 GHz Trig: Free Run Avg/Hold: >10/10 Radio Std: None Radio Device: BTS Ref Offset 19.77 dB Ref 19.77 dBm 10 dB/div Center 2.48 GHz #Res BW 30 kHz #VBW 100 kHz Span 3 MHz Sweep 3.2 ms Occupied Bandwidth 865.26 kHz Total Power 9.83 dBm Transmit Freq Error 17.374 kHz OBW Power 99.00 % x dB Bandwidth 962.0 kHz x dB -20.00 dB Frequency Center Freq 2.480000000 GHz CF Step 300.000 kHz Auto Man Freq Offset 0 Hz

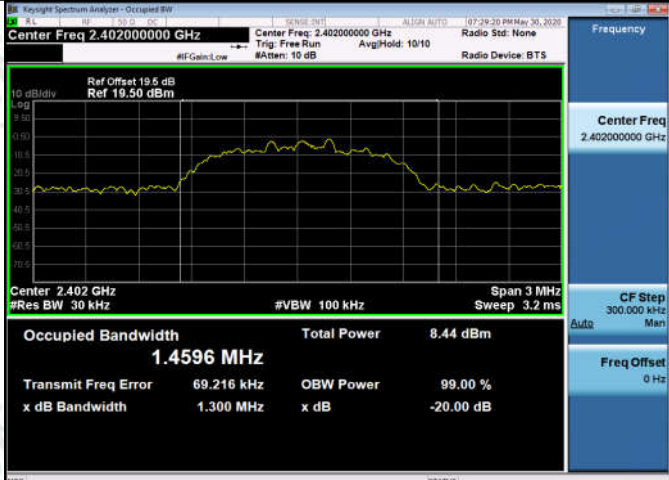
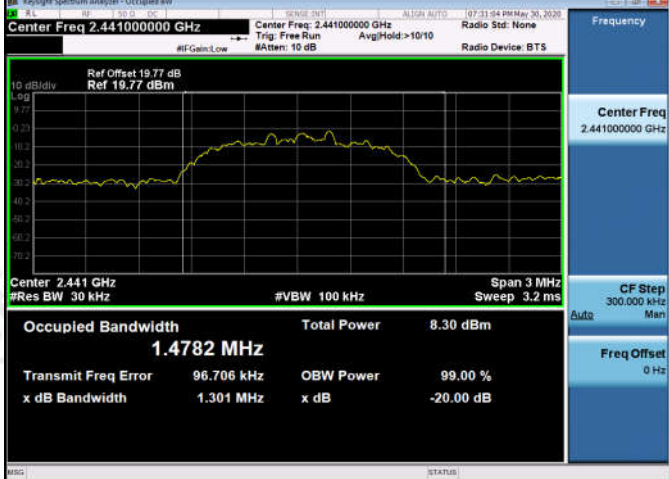
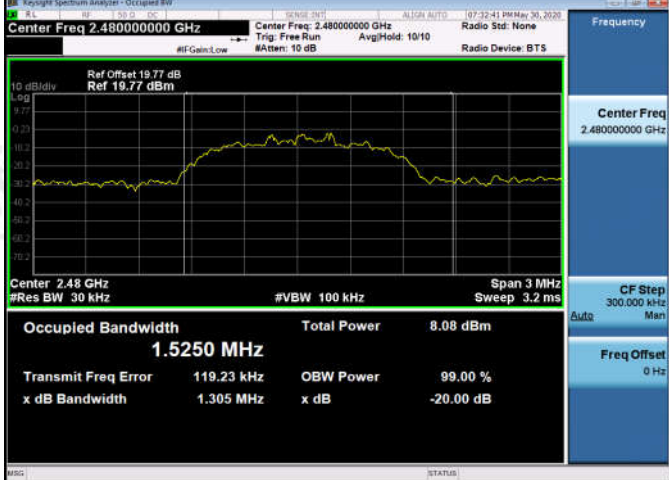
$\pi/4$DQPSK/LCH	 Keyight Spectrum Analyzer - Occupied BW Center Freq 2.40200000 GHz Ref Offset 19.5 dB Ref 19.50 dBm Center 2.402 GHz #Res BW 30 kHz Occupied Bandwidth 1.9559 MHz Total Power 6.94 dBm Transmit Freq Error 134.69 kHz x dB Bandwidth 1.488 MHz OBW Power 99.00 % x dB -20.00 dB
$\pi/4$DQPSK/MCH	 Keyight Spectrum Analyzer - Occupied BW Center Freq 2.44100000 GHz Ref Offset 19.77 dB Ref 19.77 dBm Center 2.441 GHz #Res BW 30 kHz Occupied Bandwidth 1.9646 MHz Total Power 6.72 dBm Transmit Freq Error 124.29 kHz x dB Bandwidth 1.337 MHz OBW Power 99.00 % x dB -20.00 dB
$\pi/4$DQPSK/HCH	 Keyight Spectrum Analyzer - Occupied BW Center Freq 2.48000000 GHz Ref Offset 19.77 dB Ref 19.77 dBm Center 2.48 GHz #Res BW 30 kHz Occupied Bandwidth 1.9625 MHz Total Power 6.71 dBm Transmit Freq Error 97.307 kHz x dB Bandwidth 1.339 MHz OBW Power 99.00 % x dB -20.00 dB

8DPSK/LCH	 Keyight Spectrum Analyzer - Occupied BW Center Freq 2.40200000 GHz Ref Offset 19.5 dB Ref 19.50 dBm Center 2.402 GHz #Res BW 30 kHz Span 3 MHz Sweep 3.2 ms #VBW 100 kHz Occupied Bandwidth 1.6943 MHz Total Power 7.61 dBm Transmit Freq Error 165.04 kHz OBW Power 99.00 % x dB Bandwidth 1.298 MHz x dB -20.00 dB
8DPSK/MCH	 Keyight Spectrum Analyzer - Occupied BW Center Freq 2.44100000 GHz Ref Offset 19.77 dB Ref 19.77 dBm Center 2.441 GHz #Res BW 30 kHz Span 3 MHz Sweep 3.2 ms #VBW 100 kHz Occupied Bandwidth 1.7016 MHz Total Power 7.41 dBm Transmit Freq Error 155.63 kHz OBW Power 99.00 % x dB Bandwidth 1.299 MHz x dB -20.00 dB
8DPSK/HCH	 Keyight Spectrum Analyzer - Occupied BW Center Freq 2.48000000 GHz Ref Offset 19.77 dB Ref 19.77 dBm Center 2.48 GHz #Res BW 30 kHz Span 3 MHz Sweep 3.2 ms #VBW 100 kHz Occupied Bandwidth 1.7205 MHz Total Power 7.42 dBm Transmit Freq Error 124.57 kHz OBW Power 99.00 % x dB Bandwidth 1.300 MHz x dB -20.00 dB

Right ear:

Graphs	
GFSK/LCH	Keynote Spectrum Analyzer - Occupied BW Center Freq 2.402000000 GHz Center Freq: 2.402000000 GHz Radio Std: None Ref Offset 19.5 dB Ref 19.50 dBm Center 2.402 GHz Span 3 MHz #Res BW 30 kHz #VBW 100 kHz Sweep 3.2 ms Occupied Bandwidth 862.14 kHz Total Power 10.7 dBm Transmit Freq Error 18.822 kHz OBW Power 99.00 % x dB Bandwidth 958.1 kHz x dB -20.00 dB
GFSK/MCH	Keynote Spectrum Analyzer - Occupied BW Center Freq 2.441000000 GHz Center Freq: 2.441000000 GHz Radio Std: None Ref Offset 19.77 dB Ref 19.77 dBm Center 2.441 GHz Span 3 MHz #Res BW 30 kHz #VBW 100 kHz Sweep 3.2 ms Occupied Bandwidth 861.85 kHz Total Power 10.5 dBm Transmit Freq Error 17.848 kHz OBW Power 99.00 % x dB Bandwidth 958.5 kHz x dB -20.00 dB
GFSK/HCH	Keynote Spectrum Analyzer - Occupied BW Center Freq 2.480000000 GHz Center Freq: 2.480000000 GHz Radio Std: None Ref Offset 19.77 dB Ref 19.77 dBm Center 2.48 GHz Span 3 MHz #Res BW 30 kHz #VBW 100 kHz Sweep 3.2 ms Occupied Bandwidth 857.81 kHz Total Power 10.5 dBm Transmit Freq Error 17.675 kHz OBW Power 99.00 % x dB Bandwidth 957.5 kHz x dB -20.00 dB

$\pi/4$DQPSK/LCH	 Center Freq 2.402000000 GHz Ref Offset 19.5 dB Ref 19.50 dBm Center 2.402 GHz #Res BW 30 kHz Span 3 MHz Sweep 3.2 ms #VBW 100 kHz Occupied Bandwidth 1.7856 MHz Total Power 7.67 dBm Transmit Freq Error 76.506 kHz OBW Power 99.00 % x dB Bandwidth 1.329 MHz x dB -20.00 dB
$\pi/4$DQPSK/MCH	 Center Freq 2.441000000 GHz Ref Offset 19.77 dB Ref 19.77 dBm Center 2.441 GHz #Res BW 30 kHz Span 3 MHz Sweep 3.2 ms #VBW 100 kHz Occupied Bandwidth 1.7712 MHz Total Power 7.56 dBm Transmit Freq Error 106.57 kHz OBW Power 99.00 % x dB Bandwidth 1.334 MHz x dB -20.00 dB
$\pi/4$DQPSK/HCH	 Center Freq 2.480000000 GHz Ref Offset 19.77 dB Ref 19.77 dBm Center 2.48 GHz #Res BW 30 kHz Span 3 MHz Sweep 3.2 ms #VBW 100 kHz Occupied Bandwidth 1.7449 MHz Total Power 7.55 dBm Transmit Freq Error 120.45 kHz OBW Power 99.00 % x dB Bandwidth 1.330 MHz x dB -20.00 dB

8DPSK/LCH	 Keyight Spectrum Analyzer - Occupied BW Center Freq 2.402000000 GHz Ref Offset 19.5 dB Ref 19.50 dBm Center 2.402 GHz #Res BW 30 kHz #VBW 100 kHz Span 3 MHz Sweep 3.2 ms Occupied Bandwidth 1.4596 MHz Total Power 8.44 dBm Transmit Freq Error 69.216 kHz OBW Power 99.00 % x dB Bandwidth 1.300 MHz x dB -20.00 dB
8DPSK/MCH	 Keyight Spectrum Analyzer - Occupied BW Center Freq 2.441000000 GHz Ref Offset 19.77 dB Ref 19.77 dBm Center 2.441 GHz #Res BW 30 kHz #VBW 100 kHz Span 3 MHz Sweep 3.2 ms Occupied Bandwidth 1.4782 MHz Total Power 8.30 dBm Transmit Freq Error 96.706 kHz OBW Power 99.00 % x dB Bandwidth 1.301 MHz x dB -20.00 dB
8DPSK/HCH	 Keyight Spectrum Analyzer - Occupied BW Center Freq 2.480000000 GHz Ref Offset 19.77 dB Ref 19.77 dBm Center 2.48 GHz #Res BW 30 kHz #VBW 100 kHz Span 3 MHz Sweep 3.2 ms Occupied Bandwidth 1.5250 MHz Total Power 8.08 dBm Transmit Freq Error 119.23 kHz OBW Power 99.00 % x dB Bandwidth 1.305 MHz x dB -20.00 dB

Appendix B): Carrier Frequency Separation

Test Limit

According to §15.247(a)(1),

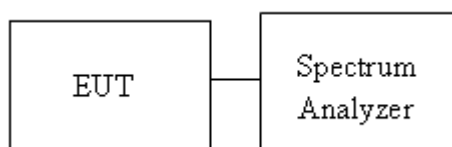
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

Limit	> two-thirds of the 20 dB bandwidth
-------	-------------------------------------

Test Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. EUT RF output port connected to the SA by RF cable.
3. Set the spectrum analyzer as RBW = 30kHz, VBW = 100kHz, Sweep = auto.
Max hold, mark 3 peaks of hopping channel and record the 3 peaks frequency

Test Setup



Result Table

Left ear:

Mode	Channel.	Carrier Frequency Separation [MHz]	Verdict
GFSK	LCH	1.086	PASS
GFSK	MCH	1.166	PASS
GFSK	HCH	1.006	PASS
$\pi/4$ DQPSK	LCH	1.186	PASS
$\pi/4$ DQPSK	MCH	1.142	PASS
$\pi/4$ DQPSK	HCH	1.050	PASS
8DPSK	LCH	1.000	PASS
8DPSK	MCH	0.980	PASS
8DPSK	HCH	0.992	PASS

Right ear:

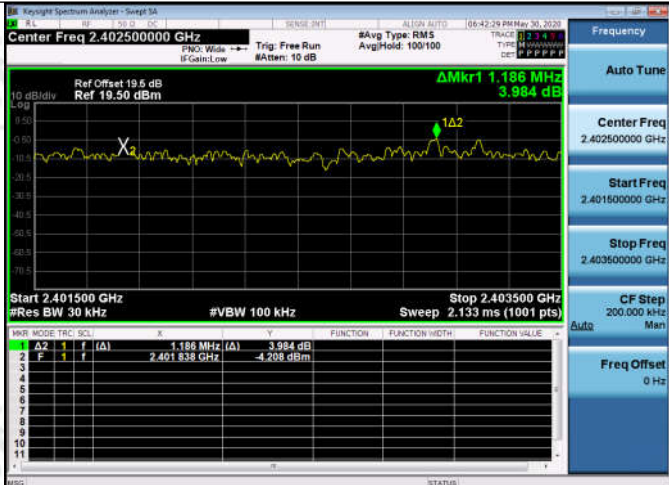
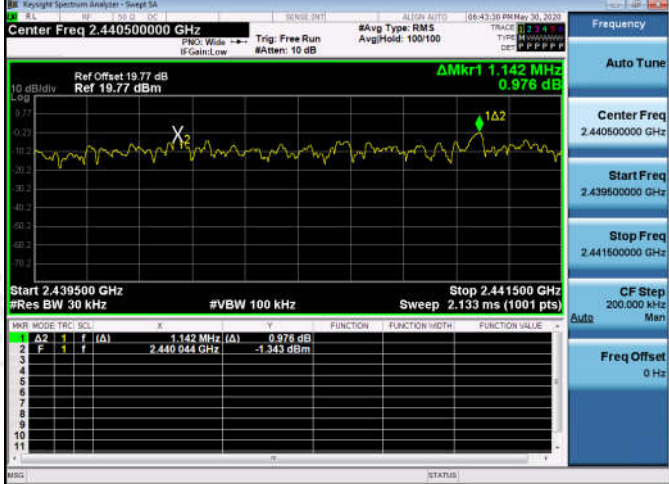
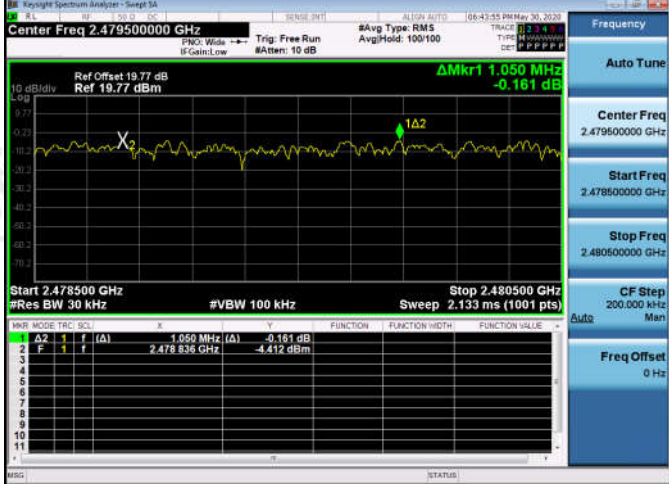
Mode	Channel.	Carrier Frequency Separation [MHz]	Verdict
GFSK	LCH	1.074	PASS
GFSK	MCH	1.000	PASS
GFSK	HCH	0.986	PASS
$\pi/4$ DQPSK	LCH	1.112	PASS
$\pi/4$ DQPSK	MCH	1.006	PASS
$\pi/4$ DQPSK	HCH	0.976	PASS
8DPSK	LCH	0.994	PASS
8DPSK	MCH	0.986	PASS
8DPSK	HCH	1.004	PASS

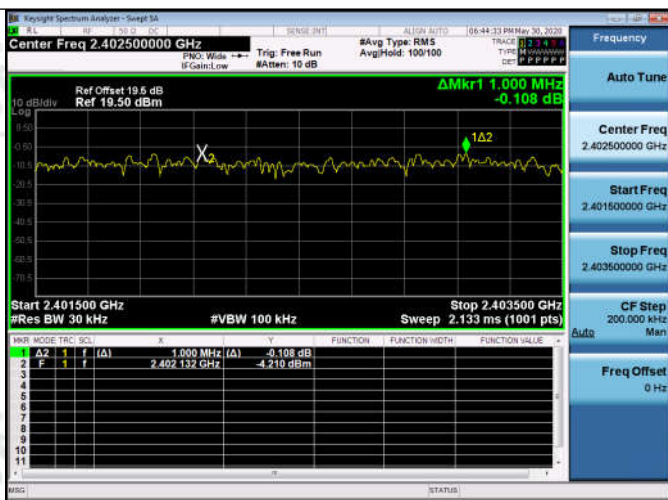
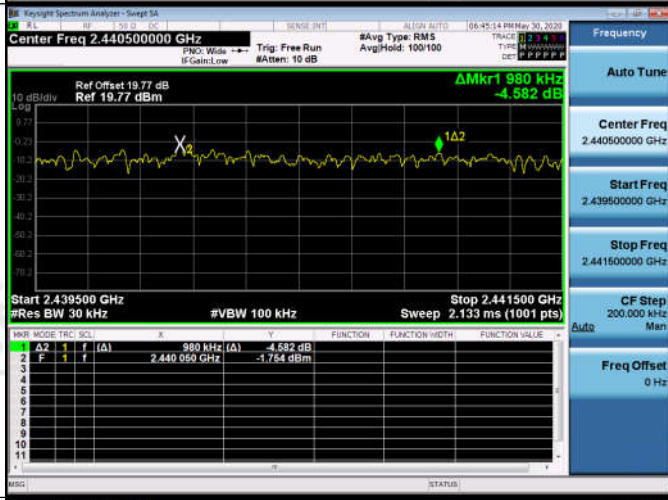
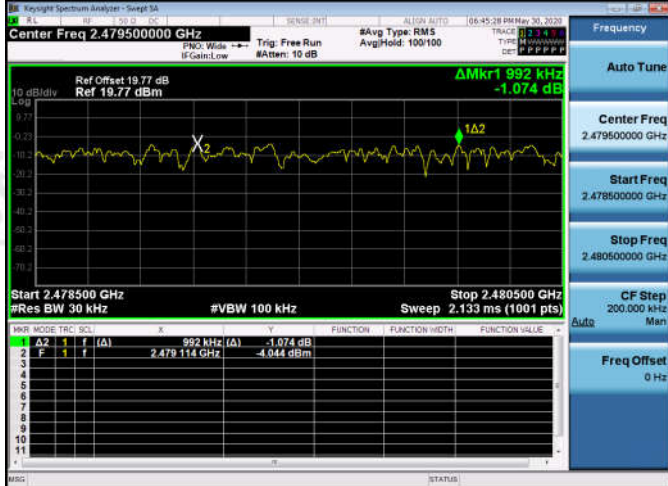
Test Graph

Left ear:

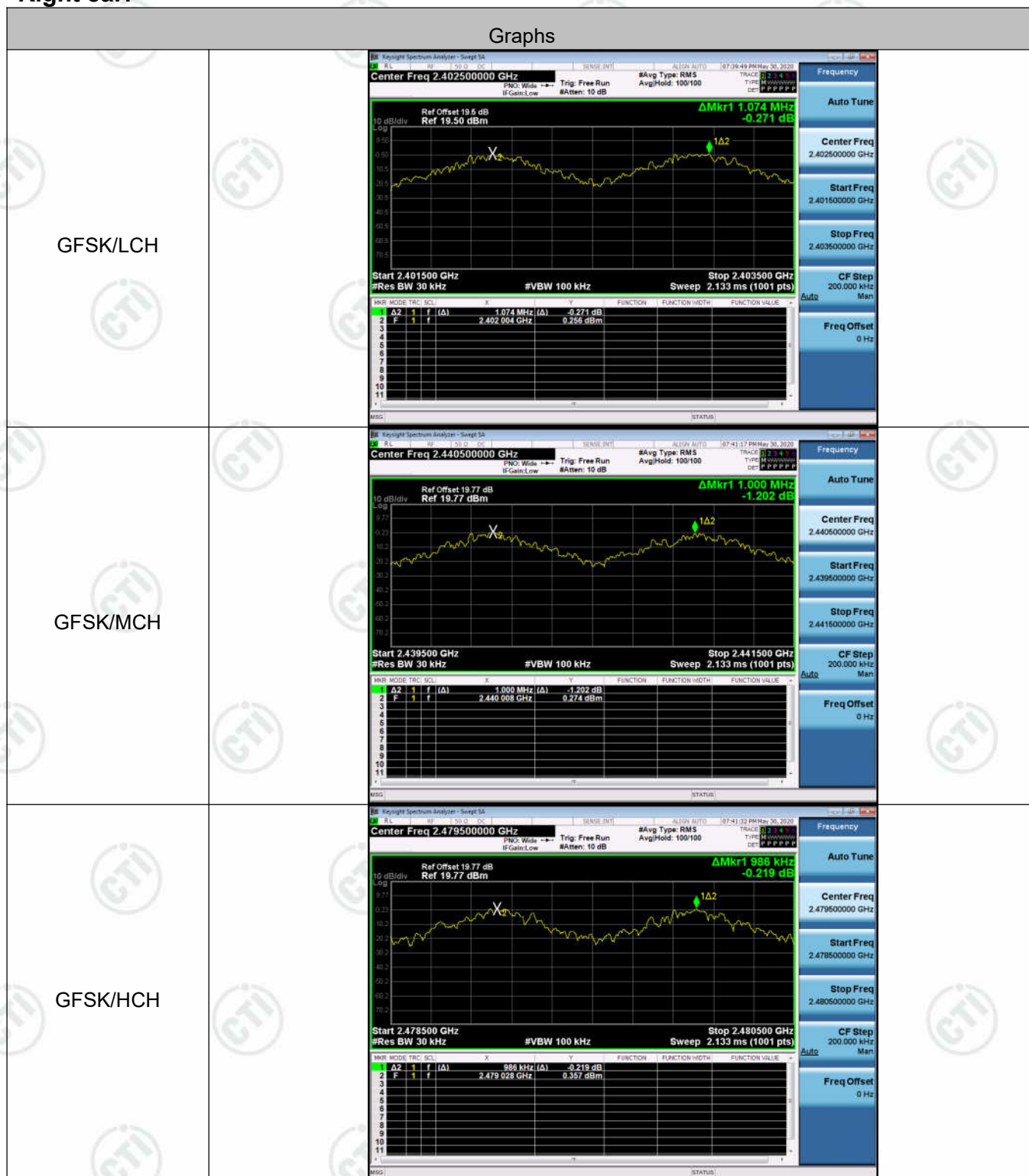
Graphs

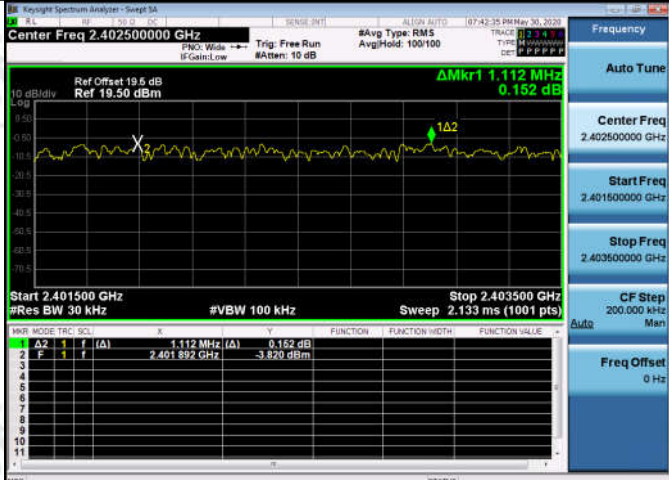
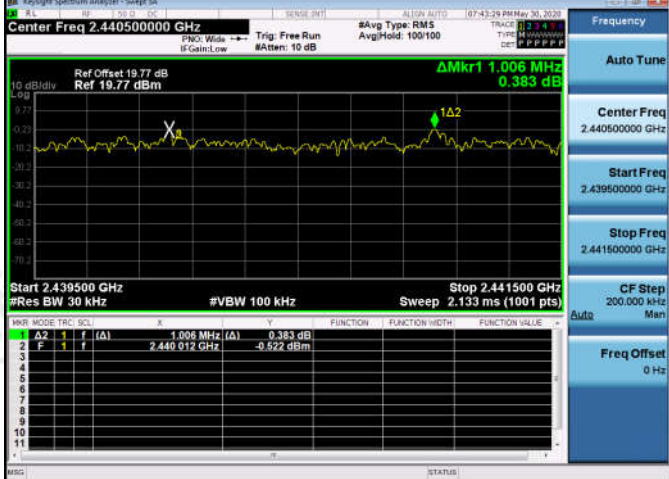
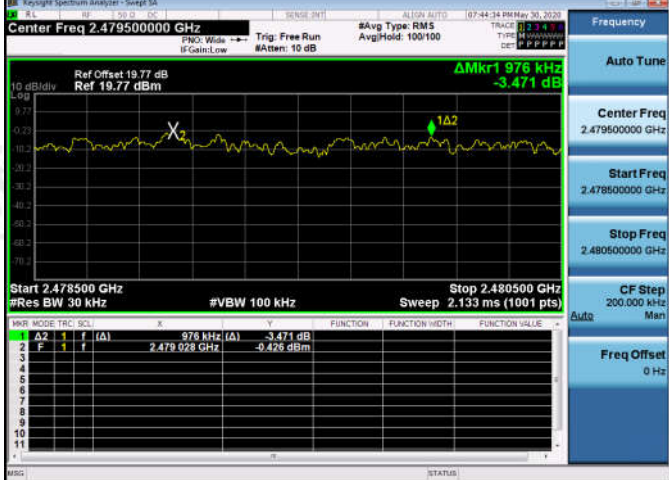
GFSK/LCH	
GFSK/MCH	
GFSK/HCH	

$\pi/4$DQPSK/LCH	
$\pi/4$DQPSK/MCH	
$\pi/4$DQPSK/HCH	

8DPSK/LCH	
8DPSK/MCH	
8DPSK/HCH	

Right ear:



$\pi/4$DQPSK/LCH	
$\pi/4$DQPSK/MCH	
$\pi/4$DQPSK/HCH	

8DPSK/LCH	Key parameters for 8DPSK/LCH: - Center Freq: 2.402500000 GHz - Ref Offset: 19.5 dB, Ref: 19.50 dBm - Delta Mk r1: 994 kHz, -0.625 dB - Start: 2.401500 GHz, Stop: 2.403500 GHz - Res BW: 30 kHz, #VBW: 100 kHz, Sweep: 2.133 ms (1001 pts)
8DPSK/MCH	Key parameters for 8DPSK/MCH: - Center Freq: 2.440500000 GHz - Ref Offset: 19.77 dB, Ref: 19.77 dBm - Delta Mk r1: 986 kHz, -0.685 dB - Start: 2.439500 GHz, Stop: 2.441500 GHz - Res BW: 30 kHz, #VBW: 100 kHz, Sweep: 2.133 ms (1001 pts)
8DPSK/HCH	Key parameters for 8DPSK/HCH: - Center Freq: 2.479500000 GHz - Ref Offset: 19.77 dB, Ref: 19.77 dBm - Delta Mk r1: 1.004 MHz, 0.056 dB - Start: 2.478500 GHz, Stop: 2.480500 GHz - Res BW: 30 kHz, #VBW: 100 kHz, Sweep: 2.133 ms (1001 pts)

Appendix C): Dwell Time

Test Limit

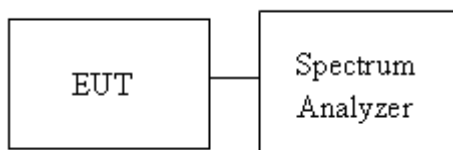
According to §15.247(a)(1)(iii),

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.

Test Procedure

1. EUT RF output port connected to the SA by RF cable.
2. Set center frequency of spectrum analyzer = operating frequency.
3. *Set the spectrum analyzer as RBW=1MHz, VBW=3MHz, Sweep = auto*

Test Setup



Result Table

Left ear:

Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Duty Cycle [%]	Verdict
GFSK	DH1	LCH	0.38	320	0.122	0.30	PASS
GFSK	DH1	MCH	0.378734	320	0.121	0.30	PASS
GFSK	DH1	HCH	0.38	320	0.122	0.30	PASS
GFSK	DH3	LCH	1.63527	160	0.262	0.65	PASS
GFSK	DH3	MCH	1.63526	160	0.262	0.65	PASS
GFSK	DH3	HCH	1.63527	160	0.262	0.65	PASS
GFSK	DH5	LCH	2.8704	106.7	0.306	0.77	PASS
GFSK	DH5	MCH	2.8612	106.7	0.305	0.76	PASS
GFSK	DH5	HCH	2.8704	106.7	0.306	0.76	PASS

Right ear:

Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Duty Cycle [%]	Verdict
GFSK	DH1	LCH	0.381267	320	0.122	0.30	PASS
GFSK	DH1	MCH	0.38127	320	0.122	0.30	PASS
GFSK	DH1	HCH	0.381267	320	0.122	0.30	PASS
GFSK	DH3	LCH	1.636533	160	0.262	0.65	PASS
GFSK	DH3	MCH	1.63527	160	0.262	0.65	PASS
GFSK	DH3	HCH	1.636537	160	0.262	0.65	PASS
GFSK	DH5	LCH	2.8704	106.7	0.306	0.77	PASS
GFSK	DH5	MCH	2.8704	106.7	0.306	0.76	PASS
GFSK	DH5	HCH	2.8704	106.7	0.306	0.76	PASS

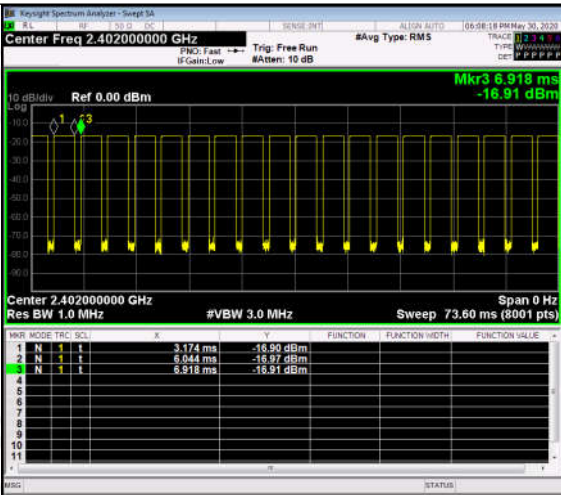
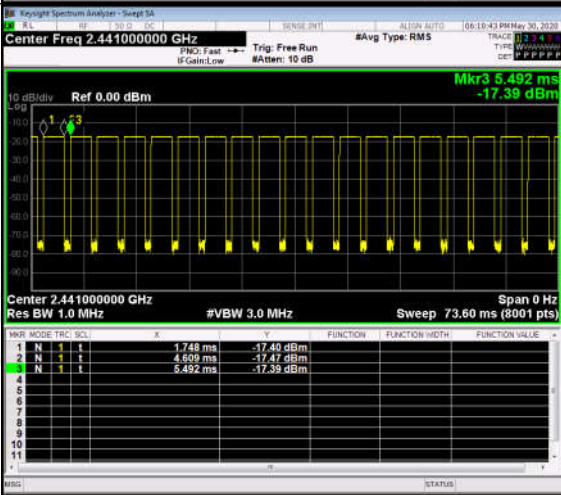
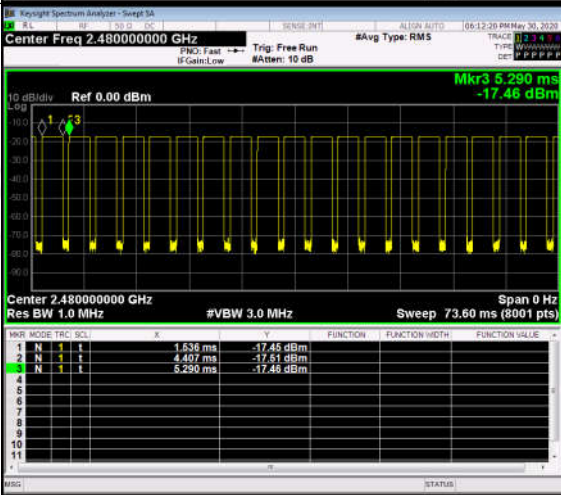
Test Graph

Left ear:

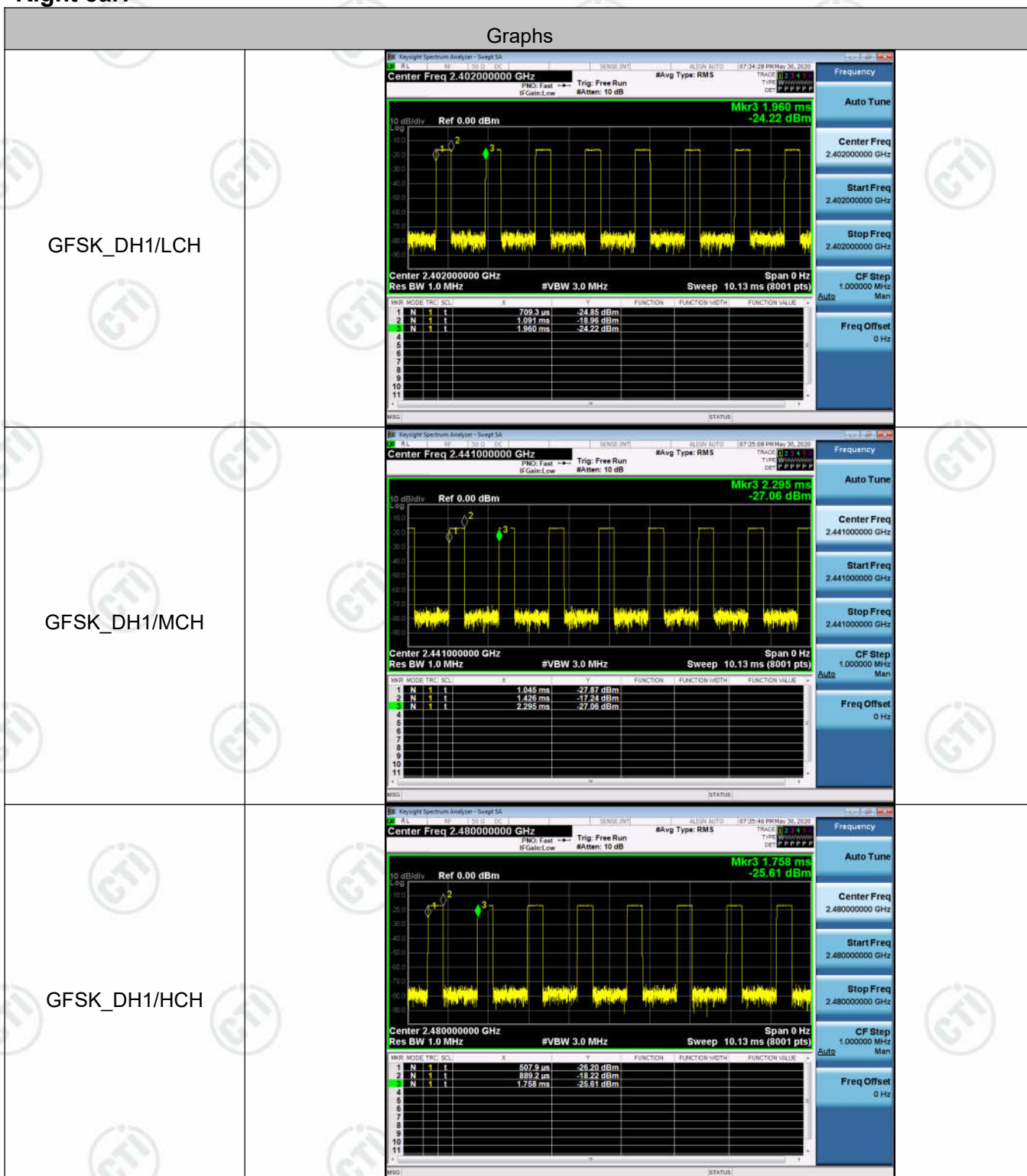
Graphs

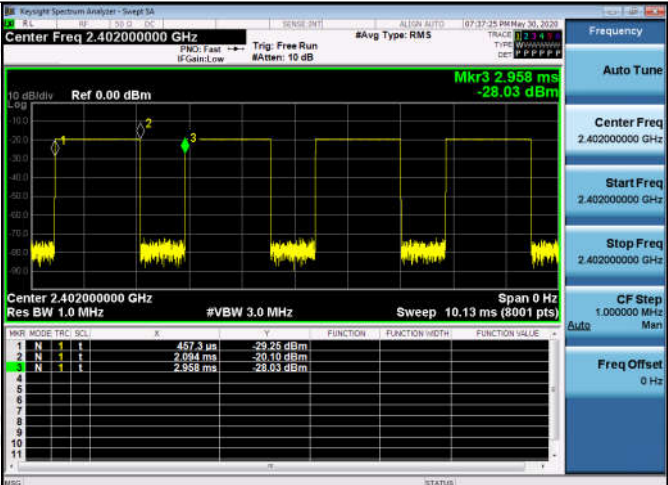
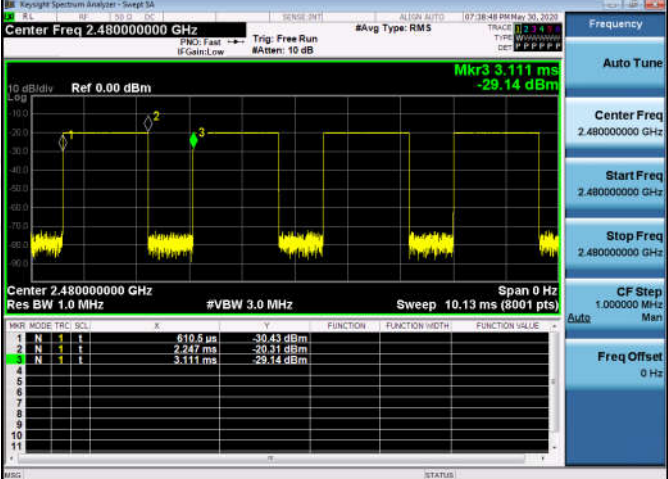


GFSK_DH3/LCH	Keyight Spectrum Analyzer - Swept SA Center Freq 2.402000000 GHz Ref 0.00 dBm Mkr3 2.587 ms -30.62 dBm Center 2.402000000 GHz Res BW 1.0 MHz #VBW 3.0 MHz Sweep 10.13 ms (8001 pts) <table><tr><th>MKR</th><th>MODE</th><th>TRC</th><th>SCL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>N</td><td>1</td><td>1</td><td>87.40 μs</td><td>-27.62 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>1</td><td>1.723 ms</td><td>-28.81 dBm</td><td></td><td></td><td></td></tr><tr><td>3</td><td>N</td><td>1</td><td>1</td><td>2.587 ms</td><td>-30.62 dBm</td><td></td><td></td><td></td></tr></table> Frequency Auto Tune Center Freq 2.402000000 GHz Start Freq 2.402000000 GHz Stop Freq 2.402000000 GHz CF Step 1.000000 MHz Freq Offset 0 Hz	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	1	1	87.40 μs	-27.62 dBm				2	N	1	1	1.723 ms	-28.81 dBm				3	N	1	1	2.587 ms	-30.62 dBm			
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																													
1	N	1	1	87.40 μs	-27.62 dBm																																
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GFSK_DH3/MCH	Keyight Spectrum Analyzer - Swept SA Center Freq 2.441000000 GHz Ref 0.00 dBm Mkr3 4.963 ms -31.45 dBm Center 2.441000000 GHz Res BW 1.0 MHz #VBW 3.0 MHz Sweep 10.13 ms (8001 pts) <table><tr><th>MKR</th><th>MODE</th><th>TRC</th><th>SCL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>N</td><td>1</td><td>1</td><td>2.484 ms</td><td>-28.48 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>1</td><td>4.099 ms</td><td>-31.13 dBm</td><td></td><td></td><td></td></tr><tr><td>3</td><td>N</td><td>1</td><td>1</td><td>4.963 ms</td><td>-31.45 dBm</td><td></td><td></td><td></td></tr></table> Frequency Auto Tune Center Freq 2.441000000 GHz Start Freq 2.441000000 GHz Stop Freq 2.441000000 GHz CF Step 1.000000 MHz Freq Offset 0 Hz	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	1	1	2.484 ms	-28.48 dBm				2	N	1	1	4.099 ms	-31.13 dBm				3	N	1	1	4.963 ms	-31.45 dBm			
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																													
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2	N	1	1	4.099 ms	-31.13 dBm																																
3	N	1	1	4.963 ms	-31.45 dBm																																
GFSK_DH3/HCH	Keyight Spectrum Analyzer - Swept SA Center Freq 2.480000000 GHz Ref 0.00 dBm Mkr3 3.930 ms -31.18 dBm Center 2.480000000 GHz Res BW 1.0 MHz #VBW 3.0 MHz Sweep 10.13 ms (8001 pts) <table><tr><th>MKR</th><th>MODE</th><th>TRC</th><th>SCL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>N</td><td>1</td><td>1</td><td>1.431 ms</td><td>-28.09 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>1</td><td>3.067 ms</td><td>-31.31 dBm</td><td></td><td></td><td></td></tr><tr><td>3</td><td>N</td><td>1</td><td>1</td><td>3.930 ms</td><td>-31.18 dBm</td><td></td><td></td><td></td></tr></table> Frequency Auto Tune Center Freq 2.480000000 GHz Start Freq 2.480000000 GHz Stop Freq 2.480000000 GHz CF Step 1.000000 MHz Freq Offset 0 Hz	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	1	1	1.431 ms	-28.09 dBm				2	N	1	1	3.067 ms	-31.31 dBm				3	N	1	1	3.930 ms	-31.18 dBm			
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																													
1	N	1	1	1.431 ms	-28.09 dBm																																
2	N	1	1	3.067 ms	-31.31 dBm																																
3	N	1	1	3.930 ms	-31.18 dBm																																

GFSK_DH5/LCH	 <table border="1"> <thead> <tr> <th>Marker</th> <th>Time</th> <th>Amplitude</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>3.174 ms</td> <td>-16.90 dBm</td> </tr> <tr> <td>2</td> <td>6.044 ms</td> <td>-16.91 dBm</td> </tr> <tr> <td>3</td> <td>8.918 ms</td> <td>-16.91 dBm</td> </tr> </tbody> </table>	Marker	Time	Amplitude	1	3.174 ms	-16.90 dBm	2	6.044 ms	-16.91 dBm	3	8.918 ms	-16.91 dBm	Frequency Auto Tune Center Freq 2.402000000 GHz Start Freq 2.402000000 GHz Stop Freq 2.402000000 GHz CF Step 1.000000 MHz Freq Offset 0 Hz
Marker	Time	Amplitude												
1	3.174 ms	-16.90 dBm												
2	6.044 ms	-16.91 dBm												
3	8.918 ms	-16.91 dBm												
GFSK_DH5/MCH	 <table border="1"> <thead> <tr> <th>Marker</th> <th>Time</th> <th>Amplitude</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1.748 ms</td> <td>-17.40 dBm</td> </tr> <tr> <td>2</td> <td>4.609 ms</td> <td>-17.41 dBm</td> </tr> <tr> <td>3</td> <td>5.492 ms</td> <td>-17.39 dBm</td> </tr> </tbody> </table>	Marker	Time	Amplitude	1	1.748 ms	-17.40 dBm	2	4.609 ms	-17.41 dBm	3	5.492 ms	-17.39 dBm	Frequency Auto Tune Center Freq 2.441000000 GHz Start Freq 2.441000000 GHz Stop Freq 2.441000000 GHz CF Step 1.000000 MHz Freq Offset 0 Hz
Marker	Time	Amplitude												
1	1.748 ms	-17.40 dBm												
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3	5.492 ms	-17.39 dBm												
GFSK_DH5/HCH	 <table border="1"> <thead> <tr> <th>Marker</th> <th>Time</th> <th>Amplitude</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1.636 ms</td> <td>-17.45 dBm</td> </tr> <tr> <td>2</td> <td>4.407 ms</td> <td>-17.51 dBm</td> </tr> <tr> <td>3</td> <td>5.290 ms</td> <td>-17.46 dBm</td> </tr> </tbody> </table>	Marker	Time	Amplitude	1	1.636 ms	-17.45 dBm	2	4.407 ms	-17.51 dBm	3	5.290 ms	-17.46 dBm	Frequency Auto Tune Center Freq 2.480000000 GHz Start Freq 2.480000000 GHz Stop Freq 2.480000000 GHz CF Step 1.000000 MHz Freq Offset 0 Hz
Marker	Time	Amplitude												
1	1.636 ms	-17.45 dBm												
2	4.407 ms	-17.51 dBm												
3	5.290 ms	-17.46 dBm												

Right ear:



GFSK_DH3/LCH	
GFSK_DH3/MCH	
GFSK_DH3/HCH	

GFSK_DH5/LCH	Keyight Spectrum Analyzer - Sweep SA W 15.000000 GHz 10.000000 MHz 1
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Appendix D): Hopping Channel Number

Test Limit

According to §15.247(a)(1)(iii)

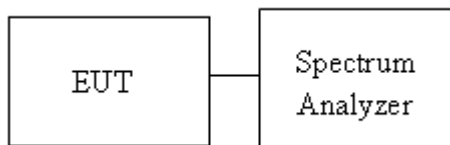
Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

Test Procedure

Test method Refer as ANSI C63.10: 2013 clause 7.8.3

1. Place the EUT on the table and set it in transmitting mode.
2. EUT RF output port connected to the SA by RF cable.
3. Set spectrum analyzer Start Freq. = 2400 MHz, Stop Freq. = 2483.5 MHz,
RBW = 100KHz, VBW = 300KHz.
4. Max hold, view and count how many channel in the band.

Test Setup



Result Table

Left ear:

Mode	Channel.	Number of Hopping Channel	Verdict
GFSK	Hop	79	PASS
$\pi/4$ DQPSK	Hop	79	PASS
8DPSK	Hop	79	PASS

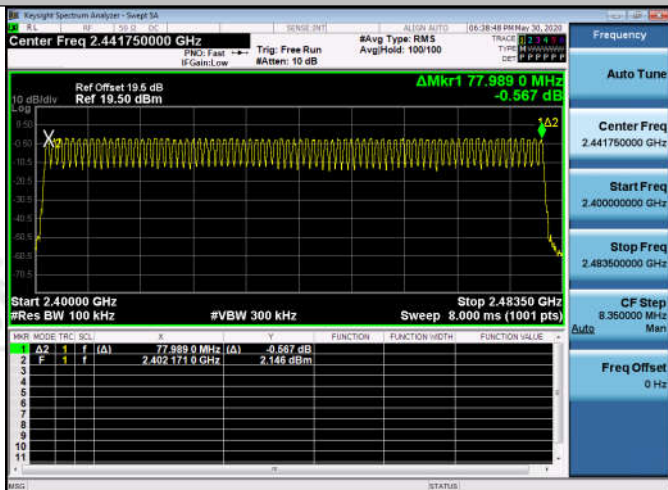
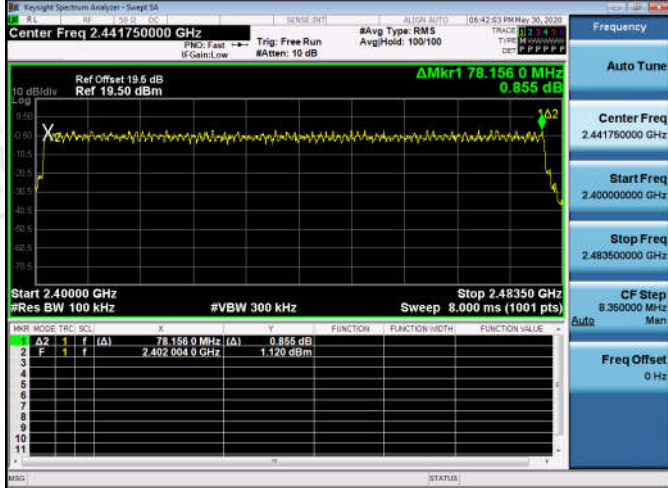
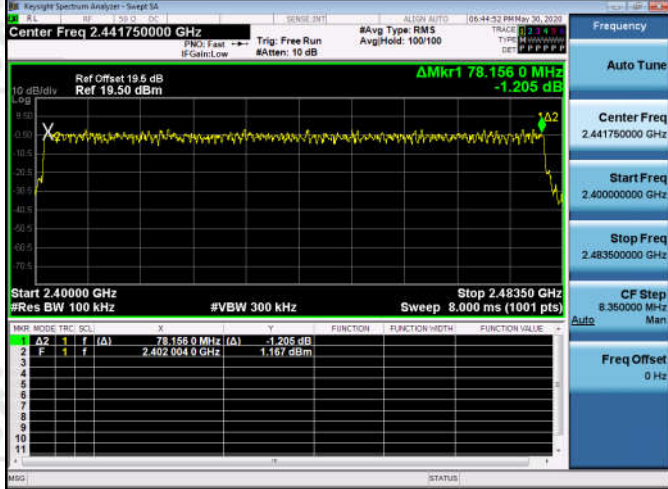
Right ear:

Mode	Channel.	Number of Hopping Channel	Verdict
GFSK	Hop	79	PASS
$\pi/4$ DQPSK	Hop	79	PASS
8DPSK	Hop	79	PASS

Test Graph

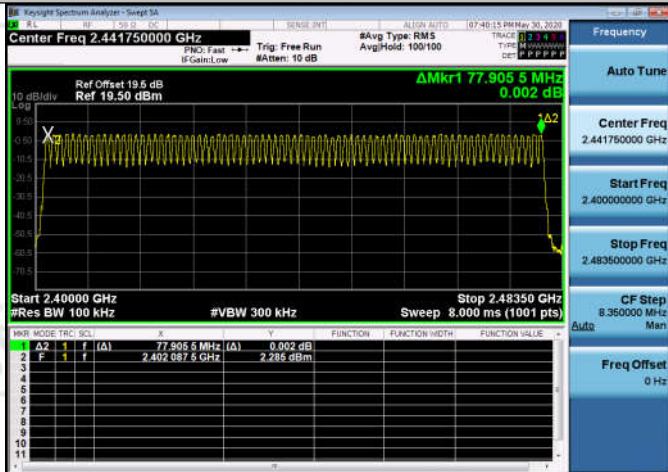
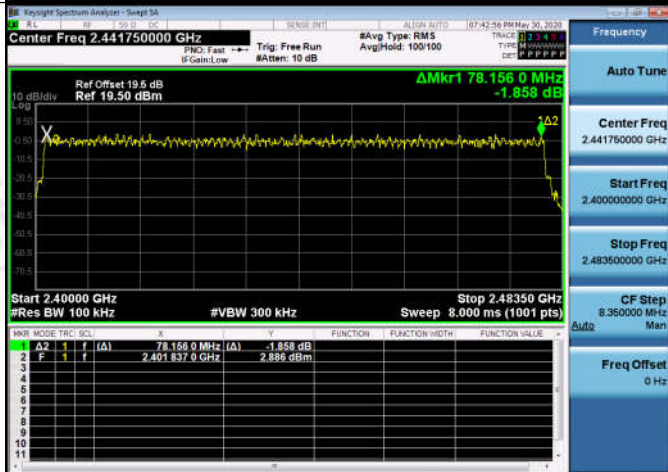
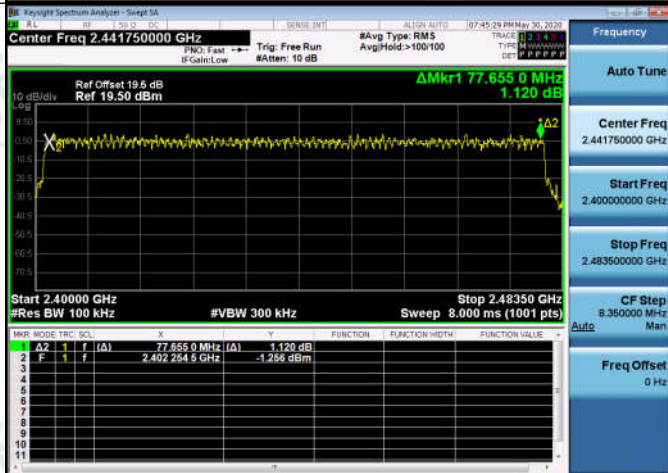
Left ear:

Graphs

GFSK/Hop	
$\pi/4$ DQPSK/Hop	
8DPSK/Hop	

Right ear:

Graphs

GFSK/Hop	
$\pi/4$ DQPSK/Hop	
8DPSK/Hop	

Appendix E): Conducted Peak Output Power

Test Limit

According to §15.247(b)(1).

Peak output power :

FCC

Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

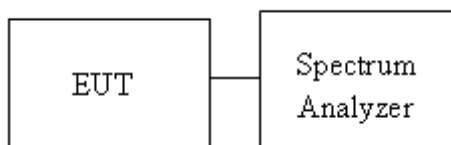
Limit	☒ Antenna not exceed 6 dBi : 21dBm ☐ Antenna with DG greater than 6 dBi : 21dBm [Limit = 30 – (DG – 6)]
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Average output power : For reporting purposes only.

Test Procedure

1. The EUT RF output connected to the spectrum analyzer by RF cable.
2. Setting maximum power transmit of EUT.
3. Spectrum analyzer settings are as follows :
 - a) Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel.
 - b) RBW > 20 dB bandwidth of the emission being measured.
 - c) VBW ≥ RBW.
 - d) Sweep: Auto.
 - e) Detector function: Peak.
 - f) Trace: Max hold.
 - g) Allow trace to stabilize.
 - h) Use the marker-to-peak function to set the marker to the peak of the emission
4. Measure and record the result in the test report.

Test Setup



Result Table

Left ear:

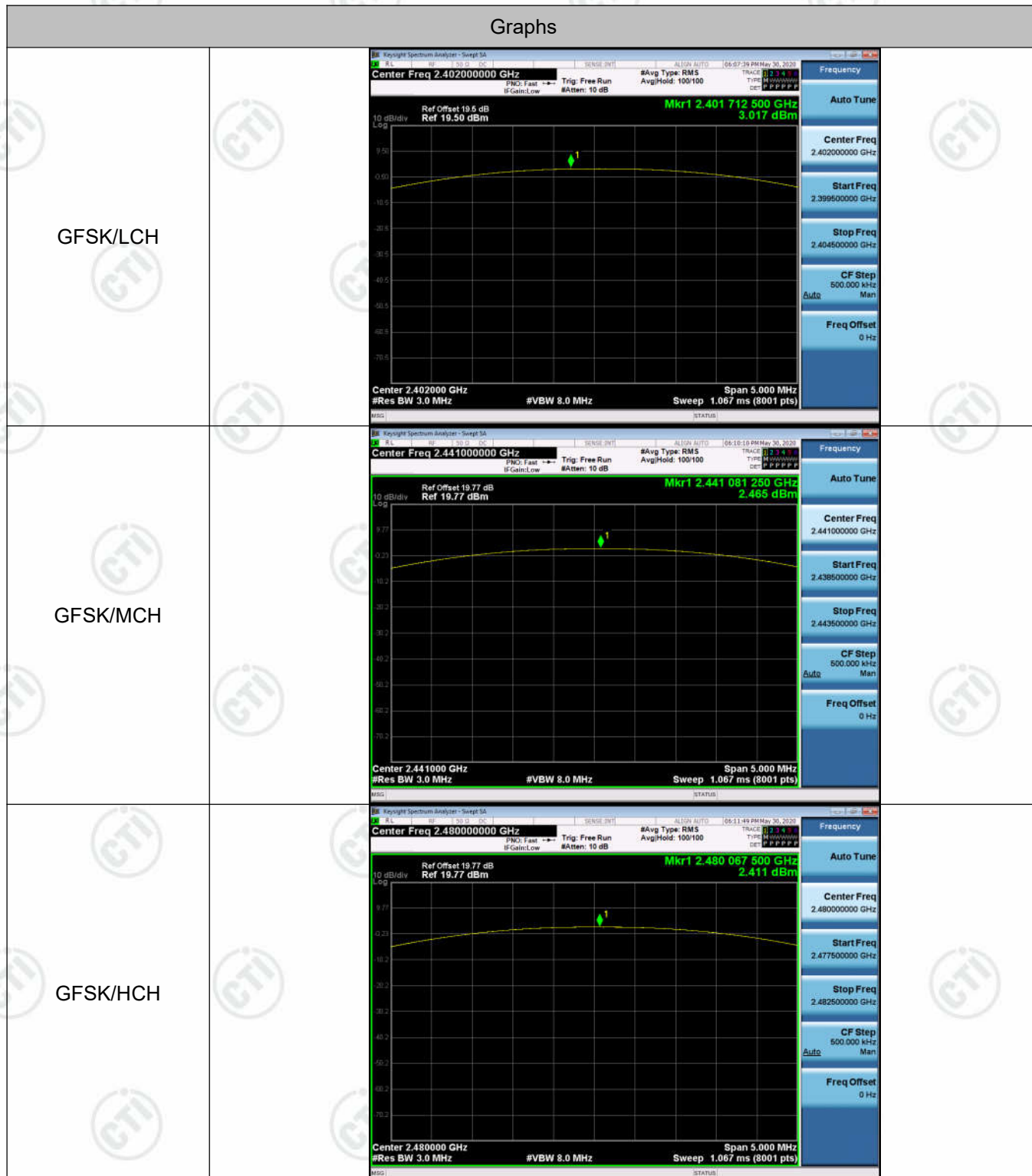
Mode	Channel.	Maximum Peak Output Power [dBm]	Verdict
GFSK	LCH	3.017	PASS
GFSK	MCH	2.465	PASS
GFSK	HCH	2.411	PASS
$\pi/4$ DQPSK	LCH	2.670	PASS
$\pi/4$ DQPSK	MCH	2.460	PASS
$\pi/4$ DQPSK	HCH	2.416	PASS
8DPSK	LCH	3.488	PASS
8DPSK	MCH	3.270	PASS
8DPSK	HCH	3.226	PASS

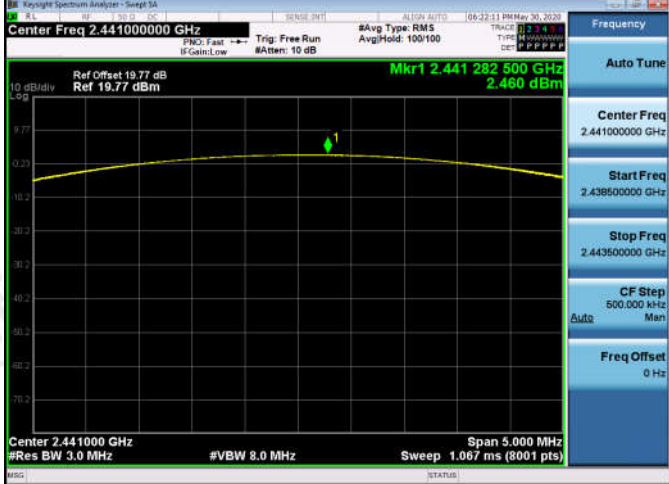
Right ear:

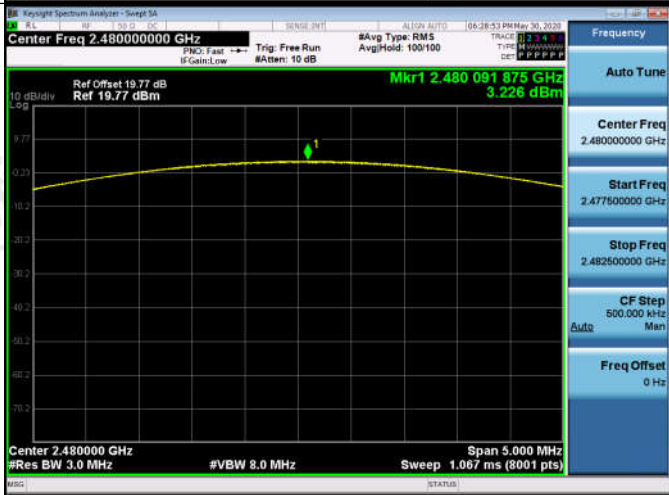
Mode	Channel.	Maximum Peak Output Power [dBm]	Verdict
GFSK	LCH	3.245	PASS
GFSK	MCH	3.079	PASS
GFSK	HCH	2.995	PASS
$\pi/4$ DQPSK	LCH	3.228	PASS
$\pi/4$ DQPSK	MCH	3.080	PASS
$\pi/4$ DQPSK	HCH	3.011	PASS
8DPSK	LCH	3.959	PASS
8DPSK	MCH	3.842	PASS
8DPSK	HCH	3.771	PASS

Test Graph

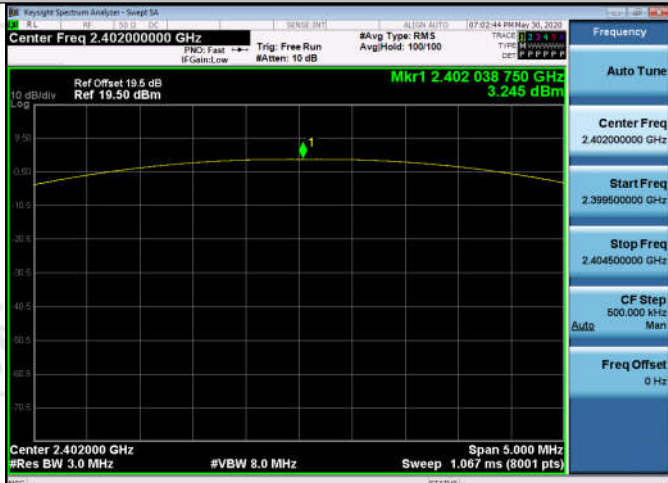
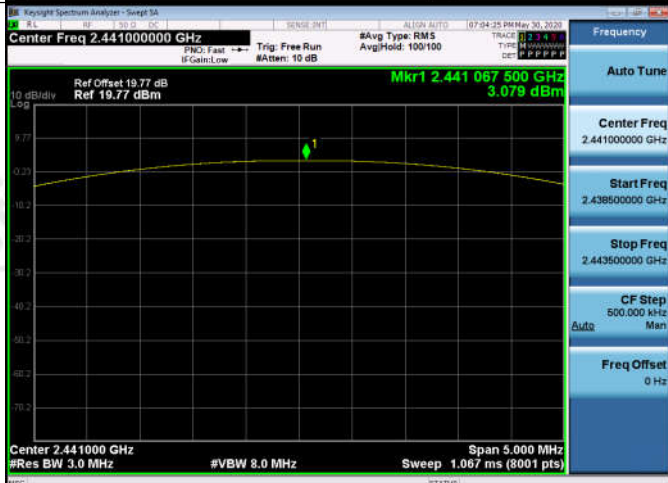
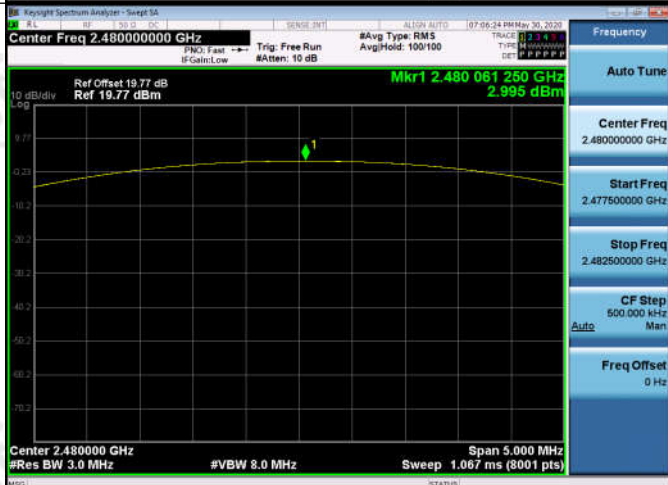
Left ear:

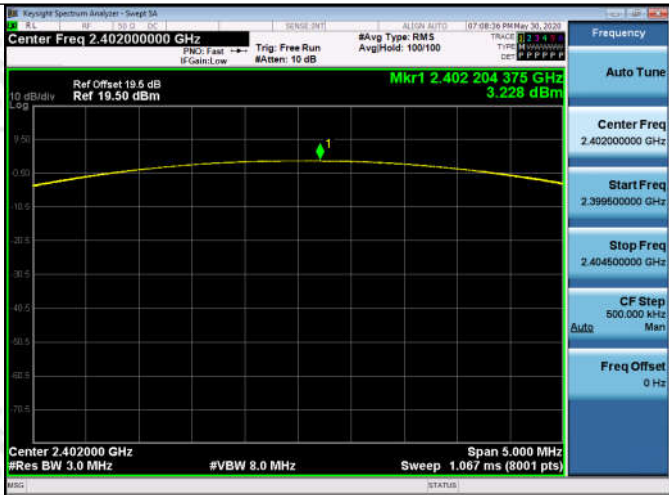
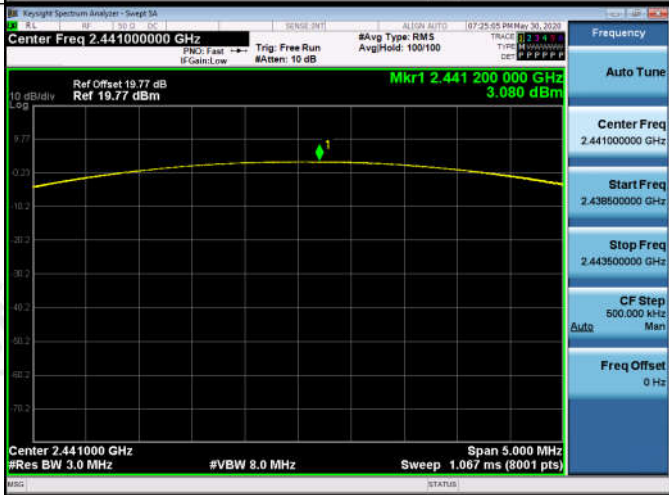
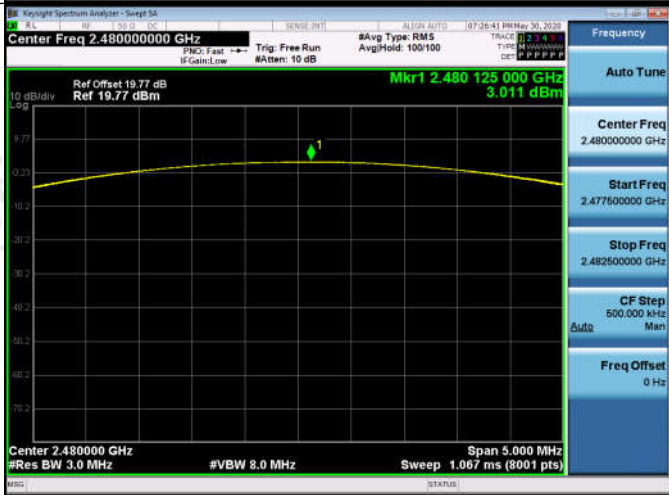


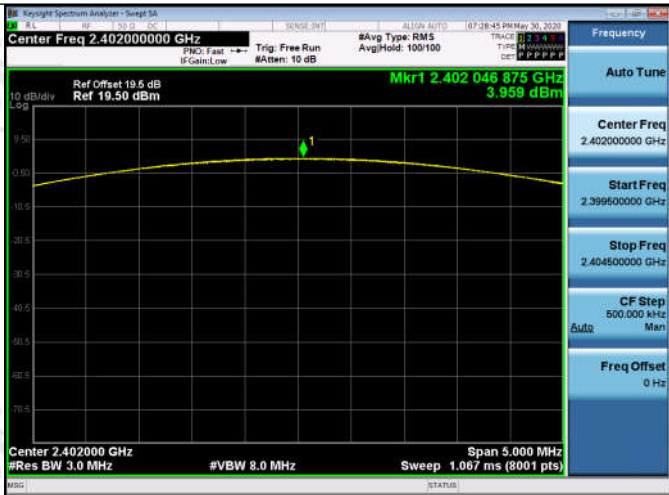
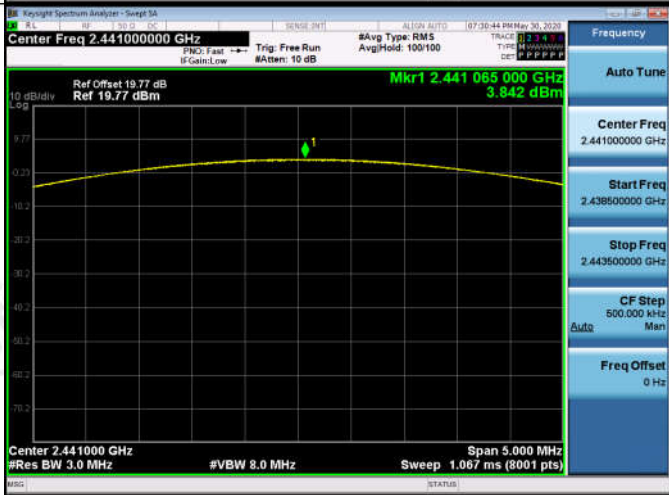
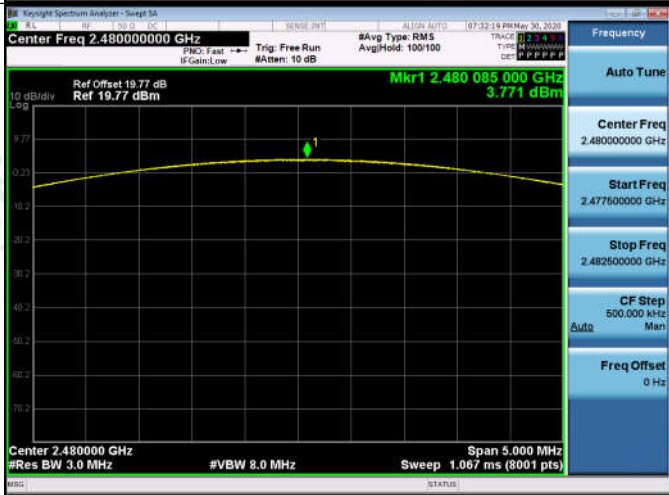
$\pi/4$DQPSK/LCH	
$\pi/4$DQPSK/MCH	
$\pi/4$DQPSK/HCH	

8DPSK/LCH	
8DPSK/MCH	
8DPSK/HCH	

Right ear:

Graphs	
GFSK/LCH	
GFSK/MCH	
GFSK/HCH	

$\pi/4$DQPSK/LCH	
$\pi/4$DQPSK/MCH	
$\pi/4$DQPSK/HCH	

8DPSK/LCH	
8DPSK/MCH	
8DPSK/HCH	

Appendix F): Band-edge for RF Conducted Emissions

Test Limit

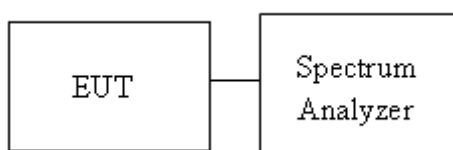
According to §15.247(d),

Limit	-20 dBc
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Test Procedure

1. EUT RF output port connected to the SA by RF cable, and the path loss was compensated to result.
2. SA setting, RBW=100kHz, VBW=300kHz, Detector=Peak, Trace mode = max hold, SWT = Auto.
3. The Band Edge at 2.4GHz and 2.4835GHz are investigated with normal hopping mode.

Test Setup



Result Table
Left ear:

Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	2.637	Off	-59.555	-17.36	PASS
			2.543	On	-59.152	-17.46	PASS
GFSK	HCH	2480	2.309	Off	-57.746	-17.69	PASS
			2.289	On	-58.727	-17.71	PASS
$\pi/4$ DQPSK	LCH	2402	-0.849	Off	-59.266	-20.85	PASS
			1.152	On	-59.944	-18.85	PASS
$\pi/4$ DQPSK	HCH	2480	-1.013	Off	-38.411	-21.01	PASS
			1.105	On	-38.102	-18.9	PASS
8DPSK	LCH	2402	-0.791	Off	-57.419	-20.79	PASS
			2.091	On	-56.162	-17.91	PASS
8DPSK	HCH	2480	-1.006	Off	-37.704	-21.01	PASS
			2.474	On	-34.675	-17.53	PASS

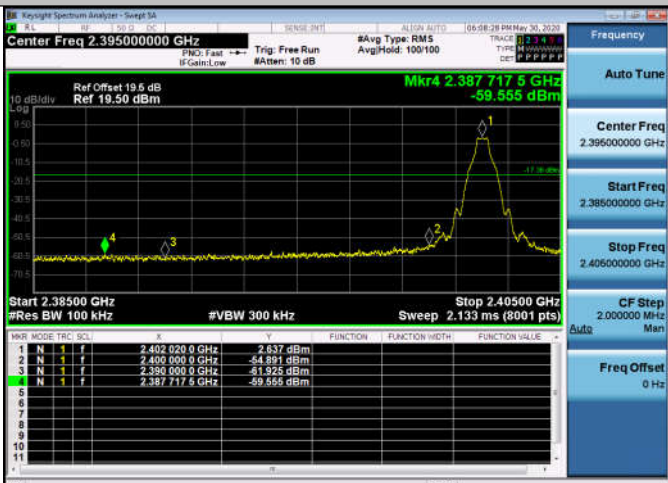
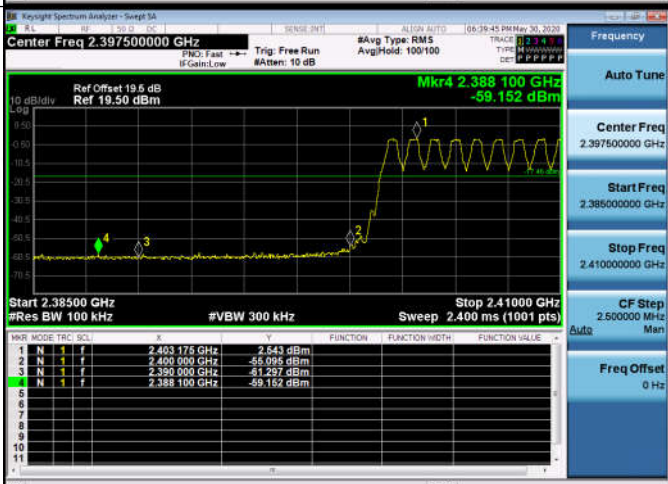
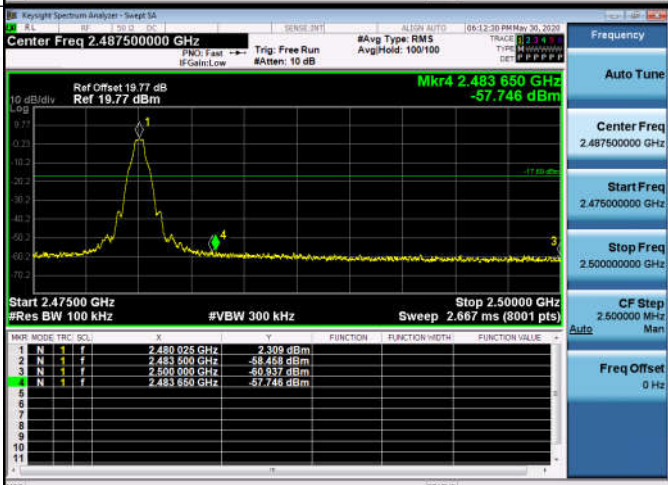
Right ear:

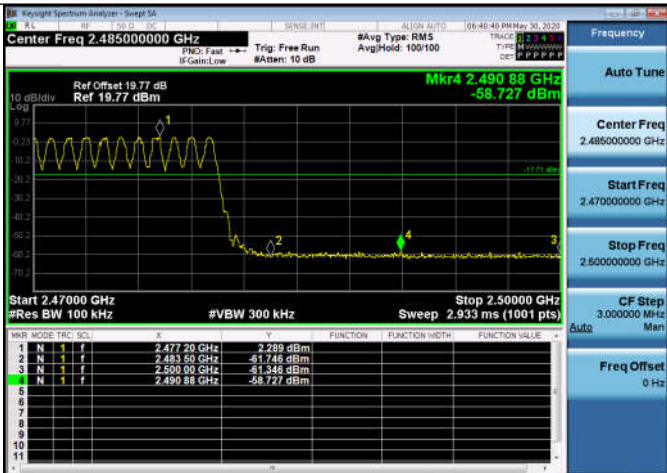
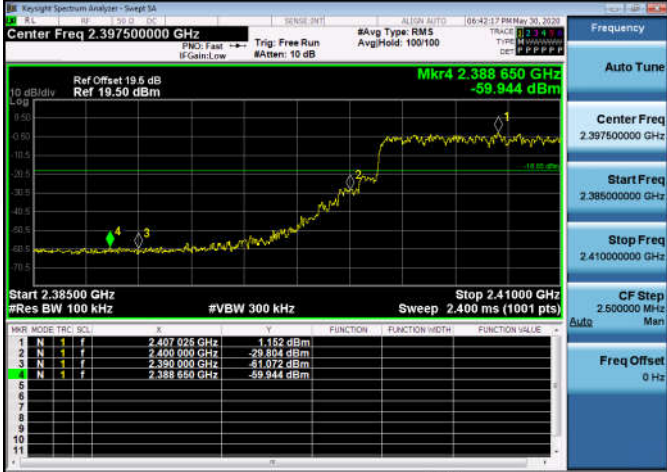
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	3.169	Off	-59.117	-16.83	PASS
			3.114	On	-59.544	-16.89	PASS
GFSK	HCH	2480	2.933	Off	-55.241	-17.07	PASS
			3.016	On	-58.172	-16.98	PASS
$\pi/4$ DQPSK	LCH	2402	-0.030	Off	-59.254	-20.03	PASS
			2.183	On	-58.567	-17.82	PASS
$\pi/4$ DQPSK	HCH	2480	-0.182	Off	-36.767	-20.18	PASS
			2.898	On	-39.622	-17.1	PASS
8DPSK	LCH	2402	-0.014	Off	-56.357	-20.01	PASS
			3.000	On	-58.179	-17	PASS
8DPSK	HCH	2480	-0.187	Off	-34.741	-20.19	PASS
			2.991	On	-34.525	-17.01	PASS

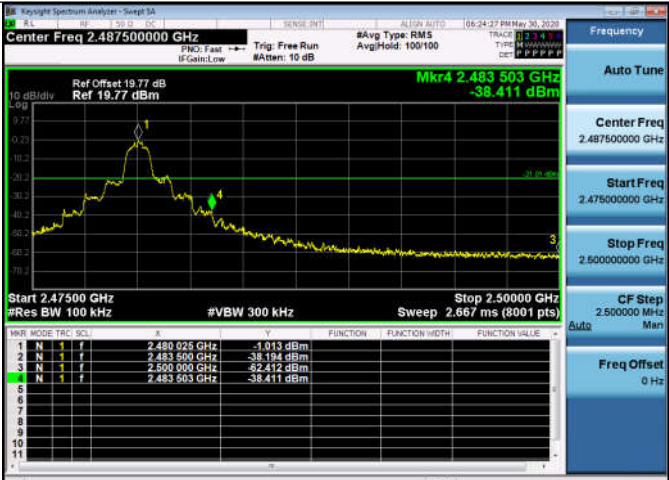
Test Graph

Left ear:

Graphs

GFSK/LCH/No Hop	
GFSK/LCH/Hop	
GFSK/HCH/No Hop	

GFSK/HCH/Hop	 <table><thead><tr><th>NR</th><th>MODE</th><th>TRC</th><th>SCL</th><th>F</th><th>M</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr></thead><tbody><tr><td>1</td><td>N</td><td>1</td><td>f</td><td>2.47720 GHz</td><td>-2.289 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>f</td><td>2.48350 GHz</td><td>-1.746 dBm</td><td></td><td></td><td></td></tr><tr><td>3</td><td>N</td><td>1</td><td>f</td><td>2.50000 GHz</td><td>-1.346 dBm</td><td></td><td></td><td></td></tr><tr><td>4</td><td>N</td><td>1</td><td>f</td><td>2.49088 GHz</td><td>-58.727 dBm</td><td></td><td></td><td></td></tr></tbody></table>	NR	MODE	TRC	SCL	F	M	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	1	f	2.47720 GHz	-2.289 dBm				2	N	1	f	2.48350 GHz	-1.746 dBm				3	N	1	f	2.50000 GHz	-1.346 dBm				4	N	1	f	2.49088 GHz	-58.727 dBm			
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$\pi/4$ DQPSK/LCH/No Hop	 <table><thead><tr><th>NR</th><th>MODE</th><th>TRC</th><th>SCL</th><th>F</th><th>M</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr></thead><tbody><tr><td>1</td><td>N</td><td>1</td><td>f</td><td>2.402182 GHz</td><td>-6.849 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>f</td><td>2.400000 GHz</td><td>-32.029 dBm</td><td></td><td></td><td></td></tr><tr><td>3</td><td>N</td><td>1</td><td>f</td><td>2.390000 GHz</td><td>-60.802 dBm</td><td></td><td></td><td></td></tr><tr><td>4</td><td>N</td><td>1</td><td>f</td><td>2.387130 GHz</td><td>-59.266 dBm</td><td></td><td></td><td></td></tr></tbody></table>	NR	MODE	TRC	SCL	F	M	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	1	f	2.402182 GHz	-6.849 dBm				2	N	1	f	2.400000 GHz	-32.029 dBm				3	N	1	f	2.390000 GHz	-60.802 dBm				4	N	1	f	2.387130 GHz	-59.266 dBm			
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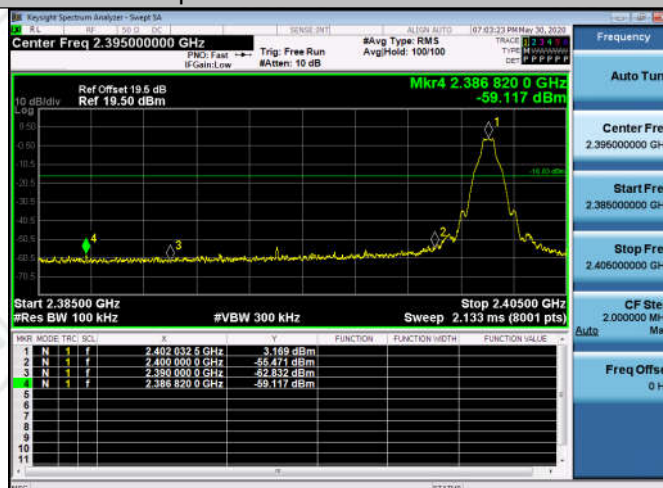
$\pi/4$DQPSK/HCH/No Hop	
$\pi/4$DQPSK/HCH/Hop	
8DPSK/LCH/No Hop	

8DPSK/LCH/Hop	 Keynote Spectrum Analyzer - Sweep SA Center Freq 2.397500000 GHz Ref Offset 19.5 dB Ref 19.50 dBm Mkr4 2.389 275 GHz -56.162 dBm Start 2.38500 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 2.400 ms (1001 pts) <table><tr><th>NR</th><th>MODE</th><th>TRC</th><th>SCL</th><th>F</th><th>F</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>N</td><td>1</td><td>f</td><td>2.407 200 GHz</td><td>-2.091 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>f</td><td>2.400 000 GHz</td><td>-29.774 dBm</td><td></td><td></td><td></td></tr><tr><td>3</td><td>N</td><td>1</td><td>f</td><td>2.390 000 GHz</td><td>-58.428 dBm</td><td></td><td></td><td></td></tr><tr><td>4</td><td>N</td><td>1</td><td>f</td><td>2.389 275 GHz</td><td>-56.162 dBm</td><td></td><td></td><td></td></tr></table>	NR	MODE	TRC	SCL	F	F	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	1	f	2.407 200 GHz	-2.091 dBm				2	N	1	f	2.400 000 GHz	-29.774 dBm				3	N	1	f	2.390 000 GHz	-58.428 dBm				4	N	1	f	2.389 275 GHz	-56.162 dBm			
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8DPSK/HCH/No Hop	 Keynote Spectrum Analyzer - Sweep SA Center Freq 2.487500000 GHz Ref Offset 19.77 dB Ref 19.77 dBm Mkr4 2.483 503 GHz -37.704 dBm Start 2.47500 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 2.667 ms (8001 pts) <table><tr><th>NR</th><th>MODE</th><th>TRC</th><th>SCL</th><th>F</th><th>F</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>N</td><td>1</td><td>f</td><td>2.480 181 GHz</td><td>-1.000 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>f</td><td>2.483 503 GHz</td><td>-37.448 dBm</td><td></td><td></td><td></td></tr><tr><td>3</td><td>N</td><td>1</td><td>f</td><td>2.500 000 GHz</td><td>-41.880 dBm</td><td></td><td></td><td></td></tr><tr><td>4</td><td>N</td><td>1</td><td>f</td><td>2.483 503 GHz</td><td>-37.704 dBm</td><td></td><td></td><td></td></tr></table>	NR	MODE	TRC	SCL	F	F	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	1	f	2.480 181 GHz	-1.000 dBm				2	N	1	f	2.483 503 GHz	-37.448 dBm				3	N	1	f	2.500 000 GHz	-41.880 dBm				4	N	1	f	2.483 503 GHz	-37.704 dBm			
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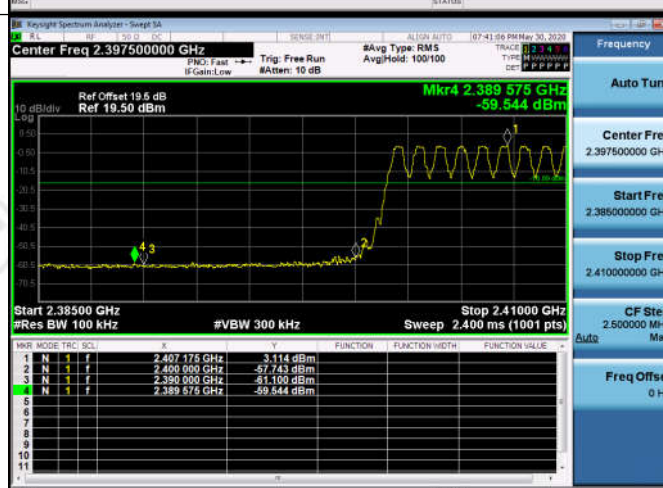
Right ear:

Graphs

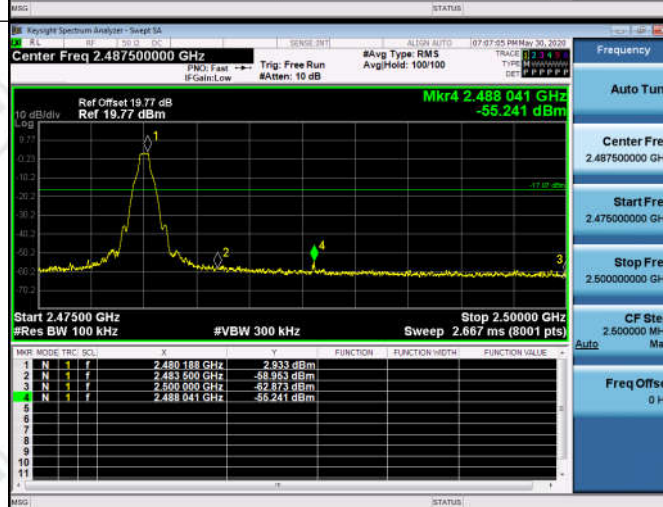
GFSK/LCH/No Hop

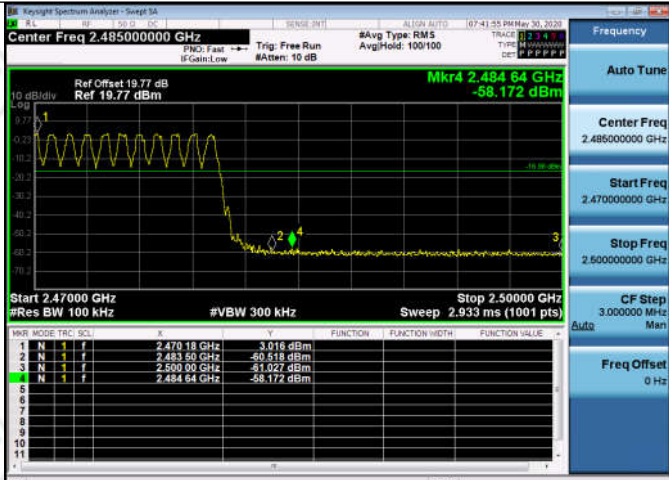


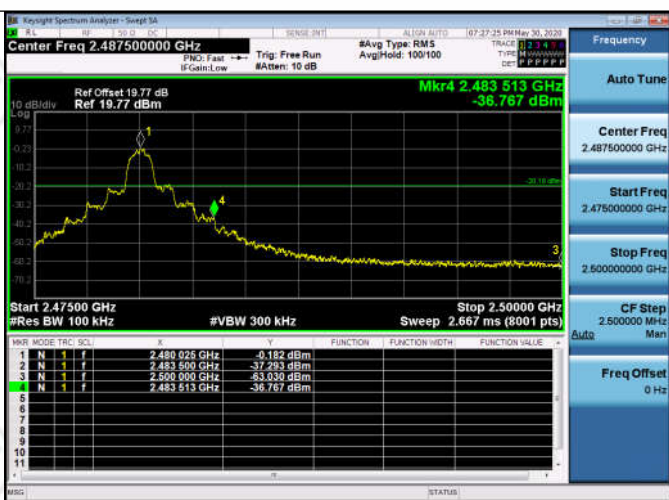
GFSK/LCH/Hop

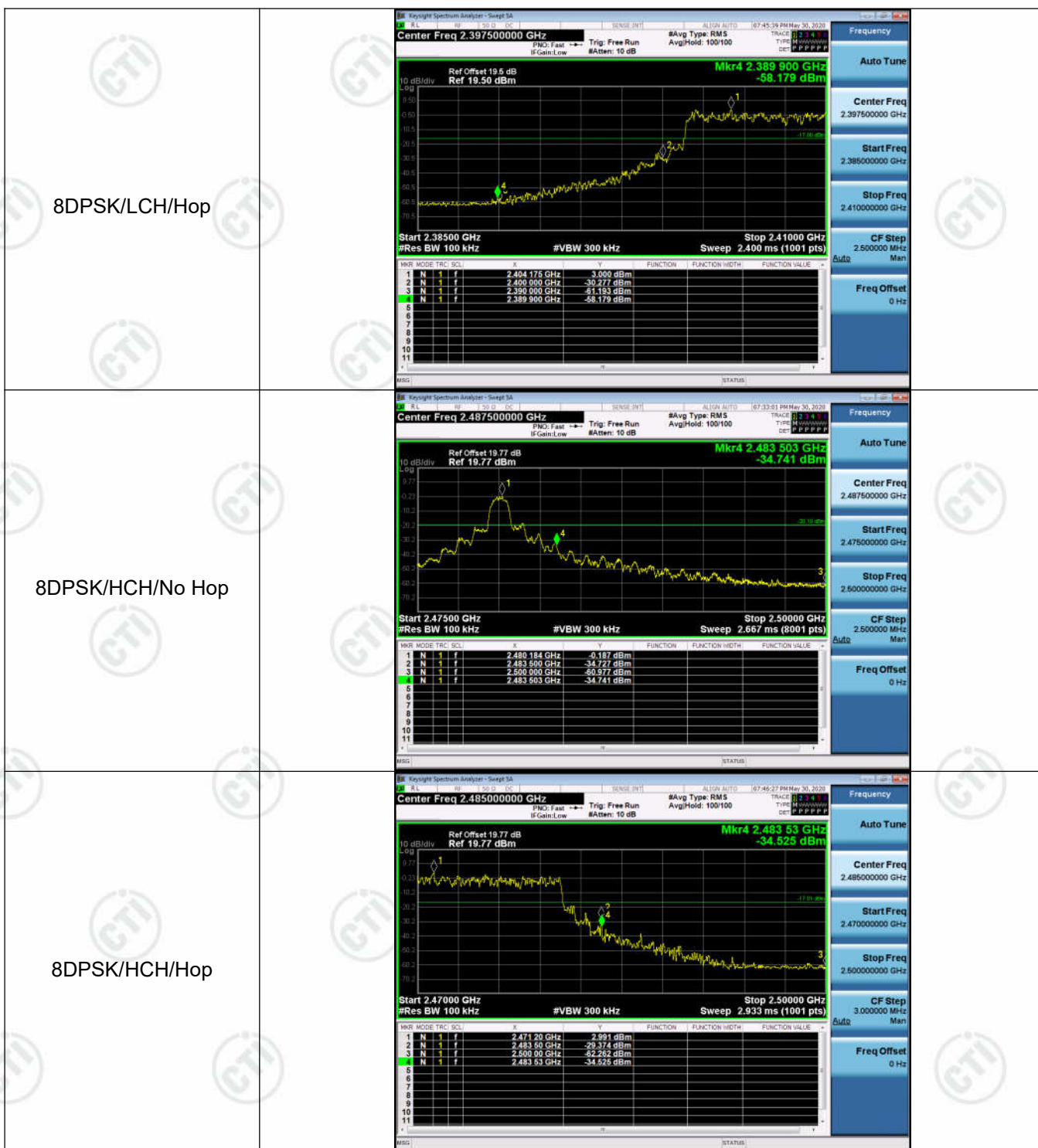


GFSK/HCH/No Hop



GFSK/HCH/Hop	
$\pi/4$ DQPSK/LCH/No Hop	
$\pi/4$ DQPSK/LCH/Hop	

$\pi/4$DQPSK/HCH/No Hop	
$\pi/4$DQPSK/HCH/Hop	
8DPSK/LCH/No Hop	



Appendix G): RF Conducted Spurious Emissions

Test Limit

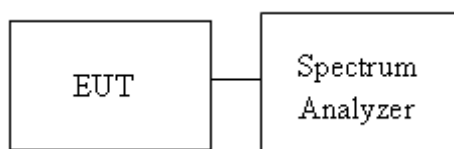
According to §15.247(d),

Limit	-20 dBc
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Test Procedure

1. EUT RF output port connected to the SA by RF cable, and the path loss was compensated to result.
2. SA setting, RBW=100kHz, VBW=300kHz, Detector=Peak, Trace mode = max hold, SWT = Auto.

Test Setup



Result Table
Left ear:

Mode	Channel	Pref [dBm]	Puw[dBm]	Verdict
GFSK	LCH	2.51	<Limit	PASS
GFSK	MCH	2.346	<Limit	PASS
GFSK	HCH	2.235	<Limit	PASS
$\pi/4$ DQPSK	LCH	-0.981	<Limit	PASS
$\pi/4$ DQPSK	MCH	-1.123	<Limit	PASS
$\pi/4$ DQPSK	HCH	-1.295	<Limit	PASS
8DPSK	LCH	-0.826	<Limit	PASS
8DPSK	MCH	-1.029	<Limit	PASS
8DPSK	HCH	-1.078	<Limit	PASS

Right ear:

Mode	Channel	Pref [dBm]	Puw[dBm]	Verdict
GFSK	LCH	3.143	<Limit	PASS
GFSK	MCH	2.919	<Limit	PASS
GFSK	HCH	2.913	<Limit	PASS
$\pi/4$ DQPSK	LCH	-0.597	<Limit	PASS
$\pi/4$ DQPSK	MCH	-0.304	<Limit	PASS
$\pi/4$ DQPSK	HCH	-0.256	<Limit	PASS
8DPSK	LCH	-0.051	<Limit	PASS
8DPSK	MCH	-0.168	<Limit	PASS
8DPSK	HCH	-0.218	<Limit	PASS

Test Graph

Left ear:

