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Report Template Version: V03 Report Template Revision Date: Mar.1st, 2017

# **Test Report**

Report No. :	CQASZ20210300015EX-01					
Applicant:	GL Grup-2015 Ltd.					
Address of Applicant:	36 Vasil Levski street, 5370 Dryanovo Bulgaria					
Manufacturer:	GL Grup-2015 Ltd.					
Address of Manufacturer:	36 Vasil Levski street, 5370 Dryanovo Bulgaria					
Equipment Under Test (E	UT):					
Product:	Wireless headphone					
All Model No.:	2AYL2-P1, 2AYL2 -P2, 2AYL2 -P1 Kids, 2AYL2 -P2 Kids, 2AYL2-CD ANC, 2AYL2-P6 ANC, 2AYL2-Edge					
Test Model No.:	2AYL2-P1					
Brand Name:	PowerLocus					
FCC ID:	2AYL2-P1					
Standards:	47 CFR Part 15, Subpart C					
Date of Test:	2021-03-09 to 2021-04-6					
Date of Issue:	2021-04-6					
Test Result :	PASS*					

(Ares Liu) Reviewed By: Approved By: Shlek, Luc

(Sheek Luo)



\* In the configuration tested, the EUT complied with the standards specified above.

The test report is effective only with both signature and specialized stamp, The result(s) shown in this report refer only to the sample(s) tested. Without written approval of CQA, this report can't be reproduced except in full.



# 1 Version

# **Revision History Of Report**

Report No.	Version	Description	Issue Date
CQASZ20210300015EX-01	Rev.01	Initial report	2021-04-6



# 2 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 (a)(1)	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
Band-edge for RF Conducted Emissions	47 CFR Part 15, Subpart C Section 15.247(d)	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

N/A: Not Applicable



# 3 Contents

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# 4 General Information

### **4.1** Client Information

Applicant:	GL Grup-2015 Ltd.
Address of Applicant:	36 Vasil Levski street, 5370 Dryanovo Bulgaria
Manufacturer:	GL Grup-2015 Ltd.
Address of Manufacturer:	36 Vasil Levski street, 5370 Dryanovo Bulgaria

## 4.2 General Description of EUT

Product Name:	Wireless headphone
All Model No.:	2AYL2-P1, 2AYL2 -P2, 2AYL2 -P1 Kids, 2AYL2 -P2 Kids, 2AYL2-CD ANC, 2AYL2-P6 ANC, 2AYL2-Edge
Test Model No.:	2AYL2-P1
Trade Mark:	PowerLocus
Hardware Version:	V1.5
Software Version:	VER01
Operation Frequency:	2402MHz~2480MHz
Bluetooth Version:	EDR
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:	GFSK, π/4DQPSK
Transfer Rate:	1Mbps/2Mbps
Number of Channel:	79
Hopping Channel Type:	Adaptive Frequency Hopping systems
Product Type:	□ Mobile
Test Software of EUT:	FCC Assist 1.5
Antenna Type:	PCB antenna
Antenna Gain:	0dBi
Power Supply:	DC5V 1A

Note:

All model:2AYL2-P1, 2AYL2 -P2, 2AYL2 -P1 Kids, 2AYL2 -P2 Kids, 2AYL2-CD ANC, 2AYL2-P6 ANC, 2AYL2-Edge

Only the model 2AYL2-P1 was tested, since the electrical circuit design, layout, components used and internal wiring were identical for the above models, with difference being model name.



Operation F	- requency 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		

### Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The Lowest channel	2402MHz
The Middle channel	2441MHz
The Highest channel	2480MHz



# **4.3** Additional Instructions

EUT Test Software Settings:							
Mode:	<ul> <li>Special software is used.</li> <li>Through engineering command into the engineering mode.</li> <li>engineering command: *#*#3646633#*#*</li> </ul>						
EUT Power level:	Class2 (Power level is built-in set parameters and cannot be changed and selected)						
Use test software to set the low	vest frequency, the middle frequency and	the highest frequency keep					
transmitting of the EUT.							
Mode	Channel	Frequency(MHz)					
	СН0	2402					
DH1/DH3/DH5	DH1/DH3/DH5 CH39 2441						
	CH78 2480						
	СН0	2402					
2DH1/2DH3/2DH5	CH39	2441					
	CH78	2480					

### Run Software:

Parameter						
MODE	TX 🔻					
Channel	0 •	Packet type	1-DH5 -	Data Types	Pn9	•
Transmit Power	10 -	Hopping	OFF -	Serial Port		•
					Send configurat	
		Desc	ription:			
			ription: Channel: range 0-7	'8, correspondin	g frequency 2.4	02GHz-2.48



### 4.4 Test Environment

Operating Environment	:
Radiated Emissions:	
Temperature:	25.5 °C
Humidity:	53 % RH
Atmospheric Pressure:	1009 mbar
Conducted Emissions:	
Temperature:	24.5 °C
Humidity:	54 % RH
Atmospheric Pressure:	1009 mbar
Radio conducted item t	est (RF Conducted test room):
Temperature:	25.7°C
Humidity:	53 % RH
Atmospheric Pressure:	1009 mbar
Test mode:	
Test Mode:	Use test software to set the lowest frequency, the middle frequency and the highest frequency keep transmitting of the EUT.

# 4.5 Description of Support Units

The EUT has been tested with associated equipment below.

Description	Manufacturer	Model No.	Remark	FCC certification
AC-DC Adapter	shenzhenMin gxin Power technology Co.,Ltd	MODEL: MX24W1-2401000U INPUT:100-240 50/60Hz 0.7A OUTPUT:24V 1A	Provided by applicant	SDOC



# 4.6 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate.

The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities.

The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the **Shenzhen Huaxia Testing Technology Co., Ltd.** quality system acc. to DIN EN ISO/IEC 17025.

Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

No.	Item	Uncertainty	Notes
1	Radiated Emission (Below 1GHz)	±5.12dB	(1)
2	Radiated Emission (Above 1GHz)	±4.60dB	(1)
3	Conducted Disturbance (0.15~30MHz)	±3.34dB	(1)
4	Radio Frequency	3×10 <sup>-8</sup>	(1)
5	Duty cycle	0.6 %.	(1)
6	Occupied Bandwidth	1.1%	(1)
7	RF conducted power	0.86dB	(1)
8	RF power density	0.74	(1)
9	Conducted Spurious emissions	0.86dB	(1)
10	Temperature test	0.8°C	(1)
11	Humidity test	2.0%	(1)
12	Supply voltages	0.5 %.	(1)
13	time	0.6 %.	(1)
14	Frequency Error	5.5 Hz	(1)

Hereafter the best measurement capability for CQA laboratory is reported:

(1)This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



# 4.7 Test Location

### Shenzhen Huaxia Testing Technology Co., Ltd,

1F., Block A of Tongsheng Technology Building, Huahui Road, Dalang Street, Longhua District, Shenzhen, China

### 4.8 Test Facility

The test facility is recognized, certified, or accredited by the following organizations: **IC Registration No.: 22984-1** 

The 3m Semi-anechoic chamber of Shenzhen Huaxia Testing Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing

The test facility is recognized, certified, or accredited by the following organizations:

### • CNAS (No. CNAS L5785)

CNAS has accredited Shenzhen Huaxia Testing Technology Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

### • A2LA (Certificate No. 4742.01)

Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 4742.01.

### • FCC Registration No.: 522263

Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.:522263

### **4.9** Abnormalities from Standard Conditions

None.

### 4.10 Other Information Requested by the Customer

None.





# 4.11 Equipment List

Test Equipment	Manufacturer	Model No.	Instrument No.	Calibration Date	Calibration Due Date
EMI Test Receiver	R&S	ESR7	CQA-005	2020/10/25	2021/10/24
Spectrum analyzer	R&S	FSU26	CQA-038	2020/10/25	2021/10/24
EXA spectrum alalyzer	Keysight	N9010A	CQA-106	2020/9/26	2021/9/25
Preamplifier	MITEQ	AMF-6D-02001800-29- 20P	CQA-036	2020/10/25	2021/10/24
Loop antenna	Schwarzbeck	FMZB1516	CQA-060	2020/10/21	2020/10/20
Bilog Antenna	R&S	HL562	CQA-011	2020/9/26	2021/9/25
Horn Antenna	R&S	HF906	CQA-012	2020/9/26	2021/9/25
Horn Antenna	Schwarzbeck	BBHA 9170	CQA-088	2020/9/25	2021/9/24
Coaxial Cable (Above 1GHz)	CQA	N/A	C007	2020/9/26	2021/9/25
Coaxial Cable (Below 1GHz)	CQA	N/A	C013	2020/9/26	2021/9/25
Antenna Connector	CQA	RFC-01	CQA-080	2020/9/26	2021/9/25
RF cable(9KHz~40GHz)	CQA	RF-01	CQA-079	2020/9/26	2021/9/25
Power divider	MIDWEST	PWD-2533-02-SMA-79	CQA-067	2020/9/26	2021/9/25
EMI Test Receiver	R&S	ESR7	CQA-005	2020/10/25	2021/10/24
LISN	R&S	ENV216	CQA-003	2020/10/23	2021/10/22
Coaxial cable	CQA	N/A	CQA-C009	2020/9/26	2021/9/25

Test software:

	Manufacturer	Software brand
Radiated Emissions test software	Tonscend	JS1120-3
Conducted Emissions test software	Audix	e3
RF Conducted test software	Audix	e3

Note:

The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.



# 5 Test results and Measurement Data

# 5.1 Antenna Requirement



### 15.203 requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

### 15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

# EUT Antenna: PCB ANT

The antenna is integral antenna. The best case gain of the antenna is 0dBi.





# 5.2 Conducted Emissions

 Conducted Linissi	713					
Test Requirement:	47 CFR Part 15C Section 15.207					
Test Method:	ANSI C63.10: 2013					
Test Frequency Range:	150kHz to 30MHz					
Limit:		Limit (c	lBuV)			
	Frequency range (MHz)	Quasi-peak	Average			
	0.15-0.5	66 to 56*	56 to 46*			
	0.5-5	56	46			
	5-30	60	50			
	* Decreases with the logarithm	n of the frequency.				
Test Procedure:	<ul> <li>5-30 00 50 00 00 00 00 00 00 00 00 00 00 00</li></ul>					
Test Setup:	Shielding Room	AE	Test Receiver			

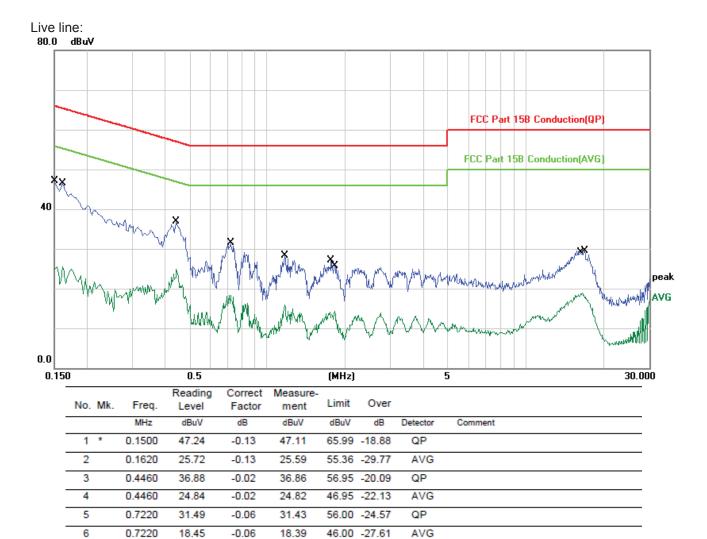




Exploratory Test Mode:	Non-hopping transmitting mode with all kind of modulation and all kind of data type at the lowest, middle, high channel.
Final Test Mode:	Through Pre-scan, find the 2DH5 of data type and $\pi$ /4 DQPSK modulation at the lowest channel is the worst case. Only the worst case is recorded in the report.
Test Voltage:	AC 120V/60Hz
Test Results:	Pass

### Measurement Data





56.00 -27.71

46.00 -30.02

56.00 -28.80

46.00 -31.78

50.00 -31.03

60.00 -30.53

QP

AVG QP

AVG

AVG

QP

### Remark:

7

8

9

10

11

12

1.1700

1.1700

1.7660

1.8260

16.5060

16.9260

28.44

16.13

27.41

14.44

19.25

29.76

-0.15

-0.15

-0.21

-0.22

-0.28

-0.29

28.29

15.98

27.20

14.22

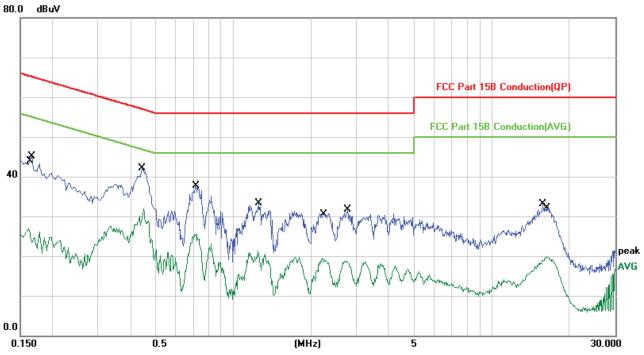
18.97

29.47

- 1. The following Quasi-Peak and Average measurements were performed on the EUT:
- 2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.
- 3. If the Peak value under Average limit, the Average value is not recorded in the report.







No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1620	27.07	-0.13	26.94	55.36	-28.42	AVG	
2		0.1660	45.15	-0.13	45.02	65.15	-20.13	QP	
3	*	0.4460	42.09	-0.02	42.07	56.95	-14.88	QP	
4		0.4500	31.95	-0.02	31.93	46.87	-14.94	AVG	
5		0.7180	37.72	-0.06	37.66	56.00	-18.34	QP	
6		0.7220	25.61	-0.06	25.55	46.00	-20.45	AVG	
7		1.2460	21.53	-0.16	21.37	46.00	-24.63	AVG	
8		1.2579	33.39	-0.16	33.23	56.00	-22.77	QP	
9		2.2300	19.47	-0.24	19.23	46.00	-26.77	AVG	
10		2.7740	31.93	-0.17	31.76	56.00	-24.24	QP	
11		15.7220	33.34	-0.26	33.08	60.00	-26.92	QP	
12		16.1700	20.08	-0.27	19.81	50.00	-30.19	AVG	

Remark:

1. The following Quasi-Peak and Average measurements were performed on the EUT:

2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.

3. If the Peak value under Average limit, the Average value is not recorded in the report.



# 5.3 Conducted Peak Output Power

Test Requirement:	47 CFR Part 15C Section 15.247 (b)(1)			
Test Method:	ANSI C63.10:2013			
Test Setup:	Spectrum Analyzer E.U.T Non-Conducted Table			
	Ground Reference Plane			
	Remark: Offset=Cable loss+ attenuation factor.			
Limit:	21dBm			
Exploratory Test Mode:	Non-hopping transmitting with all kind of modulation and all kind of data type			
Final Test Mode:	Through Pre-scan, find the DH5 of data type is the worst case of GFSK modulation type, 2-DH5 of data type is the worst case of $\pi$ /4DQPSK modulation type. Only the worst case is recorded in the report.			
Test Results:	Pass			

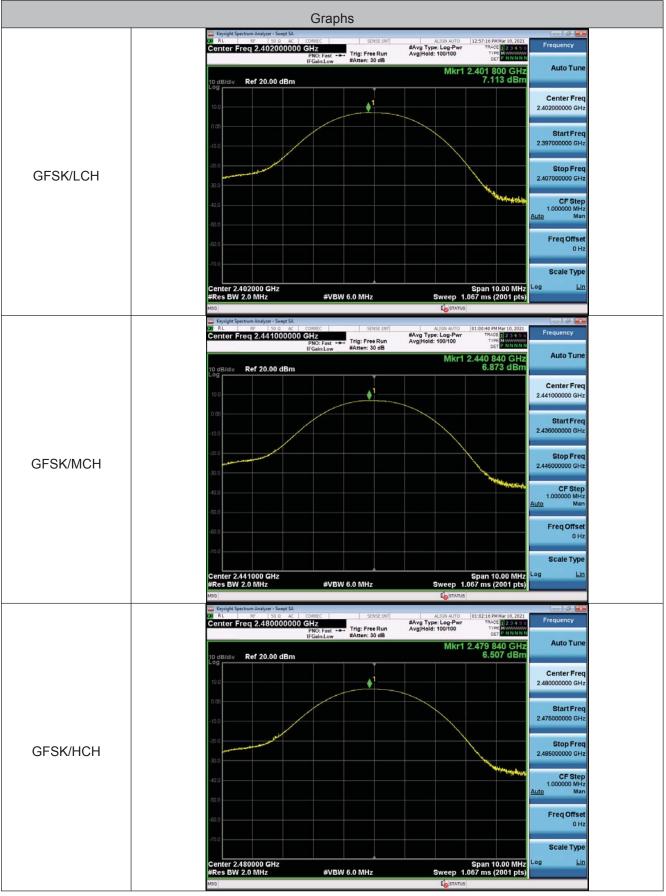


# Measurement Data

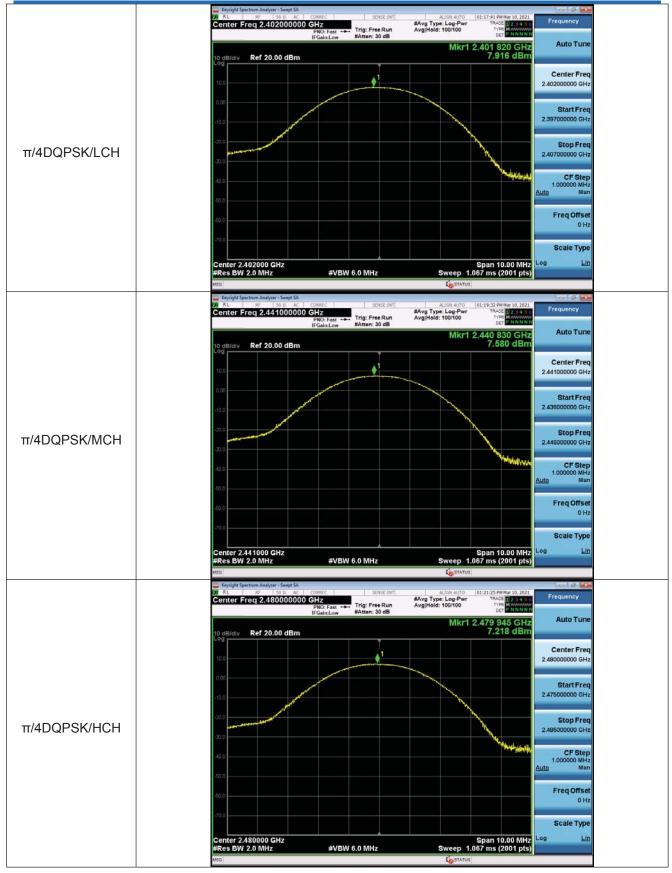
GFSK mode						
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result			
Lowest	7.113	30.00	Pass			
Middle	6.873	30.00	Pass			
Highest	6.507	30.00	Pass			
	π/4DQPSK mo	ode				
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result			
Lowest	7.916	30.00	Pass			
Middle	7.58	30.00	Pass			
Highest	7.218	30.00	Pass			



### Test plot as follows:









# 5.4 20dB Occupy Bandwidth

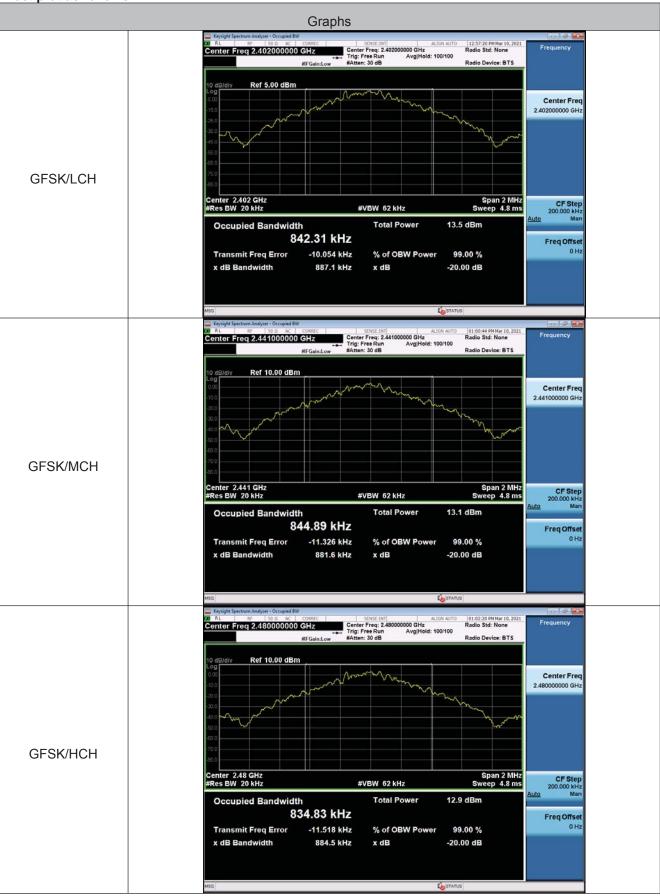
Test Requirement:	47 CFR Part 15C Section 15.247 (a)(1)				
Test Method:	ANSI C63.10:2013				
Test Setup:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane Remark: Offset=Cable loss+ attenuation factor.				
Limit:	NA				
Exploratory Test Mode:	Non-hopping transmitting with all kind of modulation and all kind of data type				
Final Test Mode:	Through Pre-scan, find the DH5 of data type is the worst case of GFSK modulation type, 2-DH5 of data type is the worst case of $\pi$ /4DQPSK modulation type Only the worst case is recorded in the report.				
Test Results:	Pass				

### Measurement Data

Test channel	20	z)	
rest channel	GFSK	π/4DQPSK	1
Lowest	0.8871	1.325	1
Middle	0.8816	1.284	/
Highest	0.8845	1.309	1



### Test plot as follows:

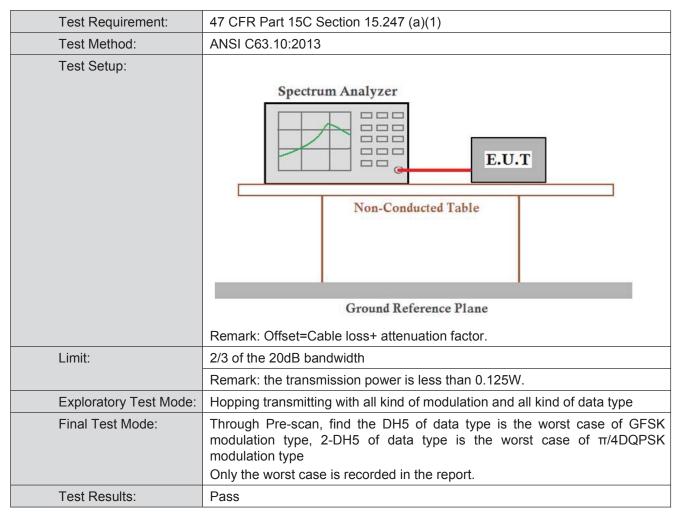




	Constant Reptions Analysis = Occupied BW     Son Acc CONSEC = SERVELINI 24.004 AUTO 01:26:33 PH Mar 10,2021     Center Freq 2.4022000000 GHz     Center Freq 2.402000000 GHz     Center Freq 2.402000000 GHz     Center Freq 2.402000000 GHz
	Trig: Free Run Avg Hold: 100/100 #FGain:Low #Atten: 30 dB Radio Device: BTS
	10 dB/div Ref 10.00 dBm
	000 Center Freq 100 2.40200000 GHz
π/4DQPSK/LCH	
	Center 2.402 GHz Span 2 MHz CF Step #Res BW 20 KHz #VBW 62 kHz Sweep 4.8 ms
	#Kes BW 20 kHz         #VBW 62 kHz         Sweep 4.8 ms         200,000 kHz           Occupied Bandwidth         Total Power         12.2 dBm         Man
	1.2038 MHz Freq Offset
	Transmit Freq Error     -5.248 kHz     % of OBW Power     99.00 %     0 Hz       x dB Bandwidth     1.325 MHz     x dB     -20.00 dB
	MSG Constant Spectrum Analyzer - Occupied BW
	001 RL RF 50 R AC CORREC SENSESINI ALION AUTO 01:19:37 PM Mar 10, 2021 Center Freq 2.441000000 GHz Radio Std: None Frequency
	Trig: Free Run Avg Hold: 100/100 #FGein:Low #Atten: 30 dB Radio Device: BTS
	10 dB/div Ref 10.00 dBm
	0.00 Center Freq 100 C2.441000000 GHz
π/4DQPSK/MCH	40.0
	Center 2.441 GHz Span 2 MHz CF Step #Res BW 20 kHz #VBW 62 kHz Sweep 4.8 ms 200.000 kHz
	Occupied Bandwidth Total Power 12.5 dBm
	1.1843 MHz Freq Offset
	Transmit Freq Error     -9.142 kHz     % of OBW Power     99.00 %       x dB Bandwidth     1.284 MHz     x dB     -20.00 dB
	M95 Girls The Status
	Out         RL         INF         Start         Constraint         ALLON AUTO         D122129 MMAI 10 2021         Frequency           Center Freq 2.480000000 GHz         Center Freq: 24000000 GHz         Center Freq: 24000000 GHz         Radio Std: None         Frequency
	#If Gain:Low #Atten: 30 dB Radio Device: BTS
	10 dB/div Ref 15.00 dBm
	500 500 Center Freq 2.480000000 GHz
	450 mm mm
π/4DQPSK/HCH	75.0
	Center 2.48 GHz Span 2 MHz CF Step #Res BW 20 kHz #VBW 62 kHz Sweep 4.8 ms 200.000 kHz
	Occupied Bandwidth Total Power 12.0 dBm
	1.1912 MHz Freq Offset
	Transmit Freq Error     -2.942 kHz     % of OBW Power     99.00 %     000000000000000000000000000000000000
	Meg



### 5.5 Carrier Frequencies Separation





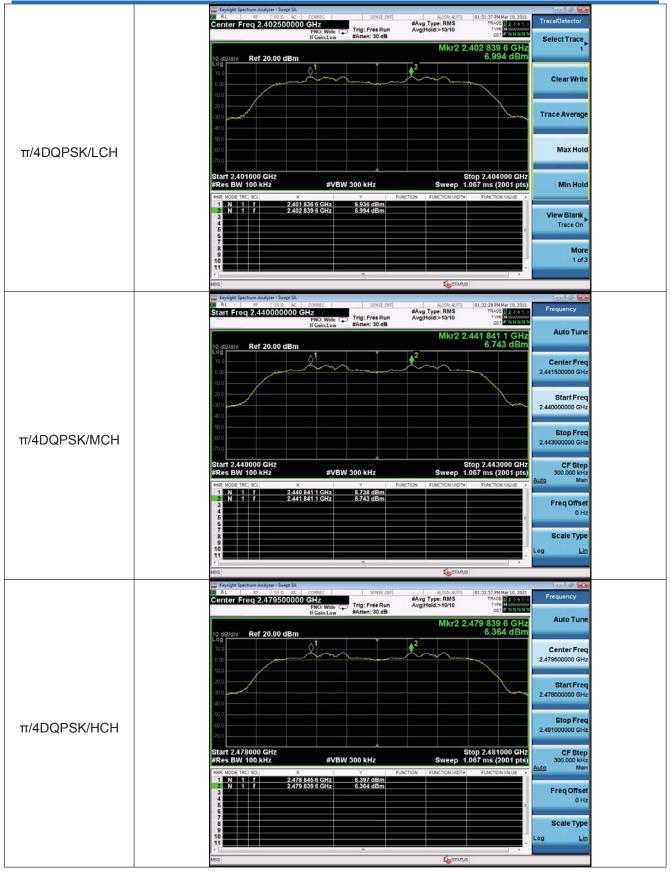
Modulation	Channel	Channel Separation (MHz)	Limit(MHz)	Result
	CH00	0.000		Pass
	CH01	0.998	_	
OFOK	CH39	0.000	25KHz or 2/3*20dB	
GFSK	CH40	0.996	bandwidth	
	CH77	0.007		
	CH78	0.997		
	CH00	1 000		Pass
	CH01	1.003	_	
	CH39	1 000	1.000 25KHz or 2/3*20dB bandwidth	
pi/4DQPSK	CH40	1.000		
	CH77	0.004		
	CH78	0.994		



### Test plot as follows:

	Graphs
	Explight Spectrum Analyzer - Swept SA     AL R     A So to AC COMPACE     SENCEINT ALLON AUTO 0127-35 PM Mar 10, 2021     Frequency     Start Freq 2.401000000 GHz     Frequency
	PRO: Wide Thg: Free Run AvgjHeid:>10/10 The Det Det Det Det Det Det Det Det Det De
	10 dB/div Ref 20.00 dBm 6.848 dBm 10 dB/div Ref 20.00 dBm 2.40250000 GHz 10 0 2.402500000 GHz
	500 300 400 400 500 500 500 500 500 5
GFSK/LCH	Stop Freq         Stop Freq         Stop Freq           700         500
	#Res BW 100 kHz         #VBW 300 kHz         Sweep 1.067 ms (2001 pts)         300.000 kHz           IMRE MODE TRCI SCL         X         Y         Function worth         Fun
	2 N 1 f 2.402 832 1 GHz 6.848 dBm 4 4 5 6 6 7 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9
	Scale Type
	Keydigitä Spectrum Analyzer - Swegt SA     Konger Severation     Keydigitä Spectrum Analyzer - Swegt SA     Keydigitä Spectrum Analyzer - Swegt SA     Keydigitä Spectrum     Keydigitä     Keydigitä Spectrum     Keydigitä Spectrum     Keydigitä     Keydigitä Spectrum     Keydigitä     Keydigit     Keydigitä     Keydigitä     Keydigitä     Keydigitä     Keydigi
	PRO: Wilds CF Trig: Free Run If Gain: Low #Atten: 30 dB Mkr2 2.441 832 1 GHz 10 dB/div Ref 20.00 dBm 6.649 dBm
	Log 10.0 1
	200 300 400
GFSK/MCH	600         Stop Freq           600         2.44300000 GHz
	Start 2.440000 GHz         Stop 2.443000 GHz         CF Step 300.000 KHz           #Res BW 100 kHz         #VBW 300 kHz         Sweep 1.067 ms (2001 pts)           MVR MODE TRC SCL         X         Y         FUNCTION WIDTH         FUNCTION WIDTH
	1 N 1 f 2.440 835 6 GHz 6.714 dBm 2 N 1 f 2.441 832 1 GHz 6.649 dBm 3 4 6 6 6 6 6 9 dBm 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 7 6 6 6 7 6 6 6 7 6 7 6 6 6 7
	7 8 9 10 11 12 12 12 12 12 12 12 12 12 12 12 12
	MSG         Startus           Keysight Spectrum Analyzer - Swept SA.         Image: Solid Spectrum Analyzer - Swept SA.           MR         NF         SO 0, AL         CORREC         SSINSE:INT]         ALSIN AUTO         01:28:32 PM Mar 10, 2021
	Center Freq 2.479500000 GHz PNO: Wide Trig: Free Run Avg[Hold>10/10 Trig: Free Run Avg[Hold>10/
	Mkr2 2.479 988 0 GHz 10 dB/div Ref 20.00 dBm 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	0 00 100 200
	300 400
GFSK/HCH	Stop Freq         Stop Freq         Stop Freq         Stop Freq         Stop Freq         CH         Stop Freq         Stop Freq         Stop Freq         S
	#Res BW 100 kHz         #VBW 300 kHz         Sweep 1.067 ms (2001 pts)         300.000 kHz           IMR MODE TRC SCL         X         Y         FUNCTION FUNCTION WOTH         FUNCTION VALUE         Man
	2 N 1 f 2479 998 0 GHz 6209 dBm 4 4 6 7 7 998 0 GHz 6209 dBm 6 7 7 9 98 0 GHz 6 209 dBm 7 7 9 98 0 GHz 6 209 dBm 7 7 9 98 0 GHz 6 209 dBm 7 9 98 0 GHz 6 209 dBm 7 98 0 GHz 6 209 0 GHz 6 200 0 GHz 6
	8 Scale Type
	MSG Contraction Contraction







# 5.6 Hopping Channel Number

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(1)	
Test Method:	ANSI C63.10:2013	
Test Setup:	Spectrum Analyzer F.U.T Non-Conducted Table Ground Reference Plane Remark: Offset=Cable loss+ attenuation factor.	
Limit:	At least 15 channels	
Exploratory Test Mode:	hopping transmitting with all kind of modulation and all kind of data type	
Final Test Mode:	Through Pre-scan, find the DH5 of data type is the worst case of GFSK modulation type, 2-DH5 of data type is the worst case of $\pi$ /4DQPSK modulation type Only the worst case is recorded in the report.	
Test Results:	Pass	

### **Measurement Data**

Mode	Hopping channel numbers	Limit
GFSK	79	≥15
π/4DQPSK	79	≥15



# Test plot as follows:

	Graphs
	Kysight Spectrum Autyper - Swept SA.         CORREC         SENSCINT         ALION AUTO         01:26:27 PM Mar 10, 2021         Frequency           Center Freq 2.441750000 GHz         PNO: Fast         Frequency         #AvgiHold:>10/10         Trig: Free Run         #AvgiHold:>10/10         Trig: Trig: Tree Run         Auto Tune
GFSK/Hop	Do dB/dalv         Ref 20.00 dBm         Center Freq 2.441750000 GHz           100         1 <t< td=""></t<>
	20 0 30 0 40 0 40 0 50 0 40 0 50 0
	50 0 50 0 70 0 Start 2.40000 CHz Stop 2.48350 CHz
	#Res BW 100 kHz #VBW 300 kHz Sweep 8.000 ms (2001 pts)
	Kysiglet Spectrum Audyer - Swegt SA.         COMPLEC         SENSE INT         ALION AUTO 0133:00 PM Mar 10, 2021           VM R L         MP         30 B         AC         COMPLEC         SENSE INT         ALION AUTO 0133:00 PM Mar 10, 2021           Center Freq 2.441750000 GHz         Trig: Free Run         Avg[Riddl:>10/10         Trig: 2.94.5 m         Frequency           FVG: Fast         Trig: Free Run         Avg[Riddl:>10/10         Trig: Prevence         MArm. 30 dB
	Mkr2 2.480 00 GHz AutoTune 2.056 dBm
	Log 100 1 000 1 100 100 1 100 100 1 100 100 100 100 100 100 100 100 100 100
π/4DQPSK/Hop	000 / 100 /
π/4DQPSK/Hop	200 D 300 D 300 D
π/4DQPSK/Hop	2.483500000 GHz
π/4DQPSK/Hop	30.0 4 2.49350000 GHz
π/4DQPSK/Hop	300         2.493500000 GHz           400         300           500         3550000 MHz           600         Man           Freq Offset



# 5.7 Dwell Time

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013
Test Setup:	Spectrum Analyzer E.U.T Non-Conducted Table
	Ground Reference Plane
	Remark: Offset=Cable loss+ attenuation factor.
Test Mode:	Hopping transmitting with all kind of modulation and all kind of data type.
Limit:	0.4 Second
Test Results:	Pass



### **Measurement Data**

Mode	Packet	Channel	Burst Width [ms/hop/ch]	Dwell Time[ms]	Limit (second)
GFSK	DH1	LCH	0.3787	121.184	≤0.4
GFSK	DH1	МСН	0.3827	122.464	≤0.4
GFSK	DH1	НСН	0.3832	122.624	≤0.4
GFSK	DH3	LCH	1.638	262.080	≤0.4
GFSK	DH3	MCH	1.638	262.080	≤0.4
GFSK	DH3	НСН	1.637	261.920	≤0.4
GFSK	DH5	LCH	2.884	307.627	≤0.4
GFSK	DH5	MCH	2.884	307.627	≤0.4
GFSK	DH5	НСН	2.884	307.627	≤0.4
π/4DQPSK	2DH1	LCH	0.3929	125.728	≤0.4
π/4DQPSK	2DH1	MCH	0.3929	125.728	≤0.4
π/4DQPSK	2DH1	НСН	0.3923	125.536	≤0.4
π/4DQPSK	2DH3	LCH	1.644	263.040	≤0.4
π/4DQPSK	2DH3	MCH	1.643	262.880	≤0.4
π/4DQPSK	2DH3	НСН	1.640	262.400	≤0.4
π/4DQPSK	2DH5	LCH	2.889	308.160	≤0.4
π/4DQPSK	2DH5	MCH	2.888	308.053	≤0.4
π/4DQPSK	2DH5	НСН	2.893	308.587	≤0.4

### Remark:

The test period: T= 0.4 Second/Channel x 79 Channel = 31.6 s DH1/2DH1 Dwell time = Burst Width(ms)\*(1600/ (2\*79))\*31.6 DH3/2DH3Dwell time = Burst Width (ms)\*(1600/ (4\*79))\*31.6 DH5/2DH5 Dwell time = Burst Width (ms)\*(1600/ (6\*79))\*31.6



### Test plot as follows:

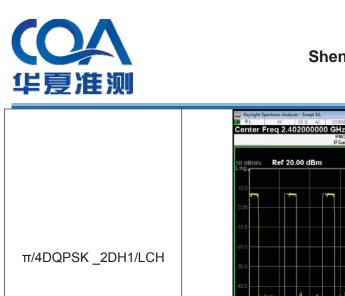
	Graphs
GFSK_DH1/LCH	Koysigkt Spectrum Audyser - Sweg SA           W         Iso to ACC         Street Int         ALIGN AUTO         01:15:28 PM Mar 10, 2021         Frequency           Center Freq 2:40200000 GHz         Trig: Free Run IF GainLow         Trig: Free Run Atten: 30 dB         Mkr1 7, 370 ms 7.00 dBm         Auto Tune           10 dB/div         Ref 20.00 dBm         Center Freq 2.402000000 GHz         Center Freq 2.402000000 GHz         Center Freq 2.402000000 GHz         Center Freq 2.402000000 GHz           000
	1.000000 MHz           1.000000 MHz           1.000000 MHz           1.00000 MHz           1.00
GFSK_DH1/MCH	PNO: Fast         Trig: Free Run         Auto Tune           10 dB/alv         Ref 20.00 dBm         6.76 dBm         6.76 dBm         Center Freq         2.44100000 GHz           10 dB/alv         Ref 20.00 dBm         -20.00 dB         -20.00 dB         Center Freq         2.44100000 GHz           10 dB/alv         Ref 20.00 dBm         -20.00 dB         Start Freq         2.44100000 GHz           10 dB/alv         1 data         -20.00 dB         -20.00 dB         Start Freq           10 dB/alv         1 data         -20.00 dB         -20.00 dB         Start Freq           10 dB/alv         -20.00 dB         -20.00 dB         Start Freq         2.441000000 GHz           20 data         -20.00 dB         -20.00 dB         -20.00 dB         Start Freq           2.41000000 GHz         -20.00 ms         -20.00 ms         -20.00 ms         -20.00 ms           20 data         -20.00 dB         -20.00 dB         -20.00 ms         -20.00 ms         -20.00 ms           2.00 data         -20.00 ms
GFSK_DH1/HCH	Weight Spectrum Audger - Sweet SA         RL       SPECENT       ALIM AITO       ITHE INFORMATION INFORMATION AND ALTON AND ALTON INFORMATION AND ALTON INFORMATION AND ALTON INFORMATION AND ALTON AND ALTO



	Keylight Spectrum Analyzer - Swept SA     W     RL     N     S0     RL     N     S0     RL     R     S0     RL     R     S0     RL     R     S0     R     R     R     S0     R     R     R     S0     R     R     R     S0     R     R     R     R     S0     R
	Center Freq 2.402000000 GHz PNC: Fast Trig: Free Run IF GainLow #Arten: 30 dB DET PHILINIT
	Mkr1 7.580 ms Auto Tuno
	10 dB/div Ref 20.00 dBm 6.98 dBm
	10.9 Center Free 2.402000000 GH
	10.0
	000 Start Free
	-10.0 -20.00 dB 2.402000000 GH
	→ 1.638 ms →
FSK_DH3/LCH	2010 Stop Free 2.40200000 GH
	-30.0
	-000 CF Step 1.000000 MH
	400 OH
	-72.0 Scale Type
	Center 2.402000000 GHz Span 0 Hz Loo Span 0 Hz Loo Span 0 Hz Loo Span 0 Hz Loo State Streep 10.00 ms (2001 pts)
	MSG LosTATUS
	Keysight Spectrum Analyzer - Saregt SA     W     RL     R <sup>2</sup> So 2: AC     COMBEC     SENSEINT     RLION AUTO     DI1:5:00 PM Mar 10, 2021     Frequency     Frequency
	Center Freq 2.441000000 GHz PNC: Fast IFIG: Free Run #Arten: 30 dB Trig: Free Run #Arten: 30 dB Trig: Free Run #Arten: 30 dB
	Mkr1 6.735 ms
	10 dB/div Ref 20.00 dBm 6.75 dBm
	Center Free
	10.0 2.441000000 GH
	0.00 Start Free
	-10.0
	1.638 ms
SK_DH3/MCH	2010 Stop Free 2.441000000 GH
_	
	-43.0 CF Step 1.000000 MH
	500 Freq Offse
	800 OH
	-700 Scale Type
	Center 2.441000000 GHz Span 0 Hz
	Res BW 1.0 MHz #VBW 3.0 MHz Sweep 10.00 ms (2001 pts)
	MOG 🔓 Tartus
	DI RL NF 50 0. AC COMPEC SENSEINT ALIGN AUTO 01:15:14 9M Mar 10, 2021 Frequency
	IFGein:Low #Atten: 30 dB DET PINNING
	Mkr1 3.495 ms 10 dB/dly Ref 20.00 dBm 6.41 dBm
	10.0 Center Free 2.48000000 GH
	Start Free
	-10.0 dB - 248000000 GH
	-200 Stop Free
GFSK DH3/HCH	30.0 2.48000000 GH
-SK_DH3/HCH	
FSK_DH3/HCH	
FSK_DH3/HCH	43.0 CF Ster 1.00000 MH
SK_DH3/HCH	and Life and the second of a second s
SK_DH3/HCH	20.0 Min bit market and a
SK_DH3/HCH	
SK_DH3/HCH	Aug
FSK_DH3/HCH	Auto         Auto         Auto         Auto         Mar           60.0
FSK_DH3/HCH	Aug



	Keysüght Spectrum Analyzer - Sweet SA     CORREC SENSE-INT ALION AUTO 01:14:08 PM Mar 10, 2021     Ere πμιστολ
	Center Freq 2.402000000 GHz #Avg Type: RMS TRACE 12.34356 Frequency
	10 dB/div Ref 20.00 dBm 6.94 dBm
	Log
	10.0 Center Freq 2.402000000 GHz
	0.00 Start Freq
	-10.0
	2.884 ms
	200 Stop Freq
GFSK_DH5/LCH	30.0
	CF Step
	1.000000 MHz
	Freq Offset
	60.0
	70.0
	Scale Type
	Center 2.402000000 GHz Span 0 Hz
	Res BW 1.0 MHz #VBW 3.0 MHz Sweep 10.00 ms (2001 pts)
	MOG Destatus
	Keydight Spectrum Analyzer - Swept SA     CORREC SENSE:INT ALLON AUTO [01:14-21 PM Mar 10, 2021     Constant: Encode 2 4/4 10.000.00 CH     Encode Characteria Characte
	PNC: Fast Trig: Free Run Trig: Stree Run
	IFGein:Low #Atten: 30 dB DET MINING Mkr1 1.335 ms Auto Tune
	10 dB/div Ref 20.00 dBm 6.74 dBm
	Log Center Freq
	10.0 2.441000000 GHz
	ومحمدها ويجربون الأراكا المتراكر ويحد ومجرور أأكار إرا
	600 Start Freq
	-100 -20.00 dB
	2.884 ms
FSK_DH5/MCH	200 Stop Freq
	30.0 2.441000000 GHz
	CF Step
	1.000000 MHz
	Auto Man
	Freq Offset
	60.0 0 Hz
	-72.0
	Scale Type
	Center 2.441000000 GHz Span 0 Hz Log Lin
	Res BW 1.0 MHz #VBW 3.0 MHz Sweep 10.00 ms (2001 pts)
	Res BW 1.0 MHz #VBW 3.0 MHz Sweep 10.00 ms (2001 pts)
	Res BW 1.0 MHz #VBW 3.0 MHz Stweep 10.00 ms (2001 pts)
	Res BW 1.0 MHz #VBW 3.0 MHz Stweep 10.00 ms (2001 pts)
	Res BW 1.0 MHz         #VBW 3.0 MHz         Sweep         10.00 ms (2001 pts)           MSD         Costatus         Costatus         Frequency           Keybight Spectrum Analyzer - Sweet SA.         Strist-INIT         Allon Autro         ID: 14-32 PM Mar 10, 2021           Zenter Freq 2.480000000 GHz         Frequency         Frequency         Frequency           If Gain Cost         Mater: 30 dB         Det PHNINK
	Res BW 1.0 MHz         #VBW 3.0 MHz         Sweep         10.00 ms (2001 pts)           MS0         Control of the second secon
	Res BW 1.0 MHz         #VBW 3.0 MHz         Sweep 10.00 ms (2001 pts)           wso         Control         Control           Keysight Spectrum Analyzer - Sweet SA         Frequency         Frequency           Center Freq 2.480000000 GHz IFGainLow         Trig: Free Run #Atten: 30 dB         Mkr1 535.0 µs 6.41 dBm         Frequency           10 dB/div         Ref 20.00 dBm         6.41 dBm         Auto Tune
	Res BW 1.0 MHz         #VBW 3.0 MHz         Sweep         10.00 ms (2001 pts)           MSD         Costanus         Status           Keydylf Spectrum Audyter - Sweet SA.         Status         Status           Rt         MSD         Status         Status           Center Freq 2.480000000 GHz         Frequency         Trig: Free Run #Atten: 30 dB         Trig: Free Run trig: Free Run         Trig: Free Run tot Philippin         Trig: Free Run tot Philippin         Auto Tune
	Res BW 1.0 MHz         #VBW 3.0 MHz         Sweep 10.00 ms (2001 pts)           Woold Spectrum Analyser-Sweet SA         Conter Freq 2.480000000 GHz         School Spectrum         RL 00 Auto Tune           Woold Spectrum Analyser-Sweet SA         PNO: Fast
	Res BW 1.0 MHz         #VBW 3.0 MHz         Sweep 10.00 ms (2001 pts)           M33         Content Find Section Analyse - Sweet 5A.         Content Find Section Analyse - Sweet 5A.           PR RL         Section Analyse - Sweet 5A.         States 100 dB14 32 MMar 10, 2011           Center Freq 2.480000000 GHz         Find Fine Run #Atten: 30 dB         Mkr1 535.0 µs 6.41 dBm           10 dB/div         Ref 20.00 dBm         Center Freq
	Res BW 1.0 MHz         #VBW 3.0 MHz         Sweep 10.00 ms (2001 pts)           M33         Control Section Analyse - Serve 5A.         Conter Freq 2.480000000 GHz           PR.L         Section Analyse - Serve 5A.         Conter Freq 2.480000000 GHz           PMC First
	Res BW 1.0 MHz         #VBW 3.0 MHz         Sweep 10.00 ms (2001 pts)           M30         Control         Control           Mail         Contro         Contro           <
	Res BW 1.0 MHz         #VBW 3.0 MHz         Sweep 10.00 ms (2001 pts)           #33         Control Section         Control Section           Knydeht Section Analyser - Seet 5.         Section 1         Allow with 0.0201           PR. L         Section 2         Section 1         Allow with 0.0201           Conter Freq 2.480000000 GHz         Trig: Free Run #Atten: 30 dB         Mkr1 535.0 µS 6.41 dBm         Frequency           10 dB/cliv         Ref 20.00 dBm         Center Freq 2.480000000 GHz         Center Freq 2.480000000 GHz         Start Freq 2.480000000 GHz           100         -20.00 dB         -20.00 dB         Start Freq 2.480000000 GHz         Start Freq 2.480000000 GHz
	Res BW 1.0 MHz         #VBW 3.0 MHz         Sweep 10.00 ms (2001 pts)           Work         Sweep 10.00 ms (2001 pts)         Sweep 10.00 ms (2001 pts)           Work         Sweep 10.00 ms (2001 pts)         Sweep 10.00 ms (2001 pts)           Work         Sweep 10.00 ms (2001 pts)         Sweep 10.00 ms (2001 pts)           Work         Sweep 10.00 ms (2001 pts)         Sweep 10.00 ms (2001 pts)           Work         Sweep 10.00 ms (2001 pts)         Sweep 10.00 ms (2001 pts)           Work         Sweep 10.00 ms (2001 pts)         Sweep 10.00 ms (2001 pts)           Work         Sweep 10.00 ms (2001 pts)         Sweep 10.00 ms (2001 pts)           Work         Sweep 10.00 ms (2001 pts)         Sweep 10.00 ms (2001 pts)           Work         Sweep 10.00 ms (2001 pts)         Sweep 10.00 ms (2001 pts)           Work         Sweep 10.00 ms (2001 pts)         Sweep 10.00 ms (2001 pts)           Work         Start Freq 2.000 dBm         Start Freq 2.480000000 GHz           Work         S.84 ms         Sweep 10.00 ms (2001 pts)         Start Freq 2.480000000 GHz
-SK_DH5/HCH	Res BW 1.0 MHz         #VBW 3.0 MHz         Sweep 10.00 ms (2001 pts)           #33         Control         Control           Kas BW 1.0 MHz         Second         Second           In dB/div         Ref 20.00 dB         Second         Second           In dB/div         Second         Second         Second         Second           In dB/div         Second         Second         Second         Second           In dB/div         Second         Second         Second         Second         Second           In dB/div         Second
-SK_DH5/HCH	Res BW 1.0 MHz         #VBW 3.0 MHz         Sweep 10.00 ms (2001 pts)           #30         Control         Control           Koylight Spectrum Audyser - Same SA         Control         ALL ON AUTO [01:14:32 PMAR 10, 201           RL         #V         S0 B         ALL ON AUTO [01:14:32 PMAR 10, 201           PND: Fast         Trig: Free Run #Arten: 30 dB         Mkr1 535.0 µS 0.00         ALL ON AUTO [01:14:32 PMAR 10, 201           10 dB/d/v         Ref 20.00 dBm         Start Freq 2.480000000 GHz         Center Freq 2.480000000 GHz         ALL ON AUTO [01:14:32 PMAR 10, 201           100 dB/d/v         Ref 20.00 dBm         Start Freq 2.480000000 GHz         Start Freq 2.480000000 GHz         ALL ON AUTO [01:14:32 PMAR 10, 201           100 dB/d/v         Ref 20.00 dBm         Start Freq 2.480000000 GHz         Center Freq 2.480000000 GHz         Center Freq 2.480000000 GHz           100 dB/d/v         -20.00 dB         -20.00 dB         Center Freq 2.48000000 GHz         Center Freq 2.480000000 GHz         Center Freq 2.480000000 GHz
-SK_DH5/HCH	Res BW 1.0 MHz         #VBW 3.0 MHz         Sweep 10.00 ms (2001 pts)           #30         Control         Control           Koylight Spectrum Audyser - Same SA         Control         ALL ON AUTO [01:14:32 PMAR 10, 201]           Rt.         #V         So is AC         Control         Frequency           PNO: Fast         Trig: Free Run If Gaind.ow         #Auton Xurto (01:14:32 PMAR 10, 201]         Frequency           Nkrt 535.0 µS         Mkrt 535.0 µS         Center Freq 2.480000000 GHz         Auton Tune           100 dB/div         Ref 20.00 dB         Center Freq 2.88000000 GHz         Start Freq 2.48000000 GHz           100 dB/div         -20.00 dB         Start Freq 2.48000000 GHz         Start Freq 2.48000000 GHz           100 dB/div         -20.00 dB         Center Freq 2.48000000 GHz         Center Freq 2.48000000 GHz
-SK_DH5/HCH	Res BW 1.0 MHz         #VBW 3.0 MHz         Sweep 10.00 ms (2001 pts)           #30         Control         Control           * Krysight Spectrum Audyner - Smeet SA.         Autor Auto         Intervention           RL         #V         S0 B         Autor Auto         Intervention           PNO: Fast         Trig: Free Run         #Autor Auto         Intervention         Autor Tune           10 dB/div         Ref 20.00 dBm         6.41 dBm         Center Freq         2.480000000 GHz           100         -20.00 dB         -20.00 dB         Center Freq         2.480000000 GHz           100         -20.00 dB         Center Freq         2.480000000 GHz         Storp Freq           100         -20.00 dB         Center Freq         2.480000000 GHz         Storp Freq           100         -20.00 dB         -20.00 dB         -20.00 dB         -20.00 dB         -20.00 dB           100         -20.00 dB
-SK_DH5/HCH	Res BW 1.0 MHz         #VBW 3.0 MHz         Sweep 10.00 ms (2001 pts)           #30         Image: Status         Image: Status           Image: Status         Image: Status         Image: Status           Image: Status         Image: Status         Image: Status           Image: Status         Image: Status         Image: Status         Image: Status           Image: Status         Image: Status         Image: Status         Image: Status         Image: Status           Image: Status         Image: Status         Image: Status         Image: Status         Image: Status         Image: Status           Image: Status         <
-SK_DH5/HCH	Res BW 1.0 MHz         #VBW 3.0 MHz         Sweep 10.00 ms (2001 pts)           #30         Control File         Control File           Keysight Spectrum Analyzer - Sampe SA.         Control File         ALL 00 ALTO [01:14:32 PMKet 10, 201]           RL         #V         S0 B         ALLON ALTO [01:14:32 PMKet 10, 201]           PNO: Fast +
FSK_DH5/HCH	Res BW 1.0 MHz         #VBW 3.0 MHz         Sweep 10.00 ms (2001 pts)           #30         Control         Control         Control           Knydph Spectrum Analyzer - Snept 5A         Context
-SK_DH5/HCH	Res BW 1.0 MHz         #VBW 3.0 MHz         Sweep 10.00 ms (2001 pts)           #33         Image: Status         Image: Status           Image: Status         Image: Status         Image: Status         Image: Status           Image: Status         Image: Status         Image: Status         Image: Status         Image: Status           Image: Status
SK_DH5/HCH	Res BW 1.0 MHz         #VBW 3.0 MHz         Sweep 10.00 ms (2001 pts)           100         Frequency         State







	Keysight Spectrum Analyzer - Swept SA     GM RL     RF 50 Ω AC CORREC SENSE:INT ALION AUTO 01:23:37 PM Mar 10, 2021
	Center Freq 2.402000000 GHz #Avg Type: RMS TRACE 2.3.4.5.0 Frequency
	IFGein:Low #Atten: 30 dB DET Extended
	10 dB/div Ref 20.00 dBm 7.43 dBm
	100 Center Freq 2.40200000 GHz
	000 Start Freq
	-10.0 -20.00 dB 2.40200000 GHz
	1.644 ms
	500 Stop Freq
π/4DQPSK _2DH3/LCH	30.0 2.402000000 GHz
	40.0 CF Step 1.000000 MHz
	💿 🚧
	600 FreqOffset
	Scale Type
	Center 2.402000000 GHz Span 0 Hz Log Lin
	Res BW 1.0 MHz #VBW 3.0 MHz Sweep 10.00 ms (2001 pts)
	MBG COSTATUS
	Keysight Spectrum Analyzer - Sweet SA     R.L     RF     S0 0: AC     CORREC     SERVEEINT     ALION AUTO     01:23:44 PM Mar 10, 2021
	Center Freq 2.441000000 GHz #Avg Type: RMS TRACE 234.50 Frequency
	IFGein-Low #Atten: 30 dB DET PINNING
	Mkr1 4.235 ms 10 dB/div Ref 20.00 dBm 7.17 dBm
	100 Center Freq 2.44100000 GHz
	Patronytopolog Z24100000 GHZ
	000
	10.0 C0
	-10.0
	-200 Stop Freq
π/4DQPSK _2DH3/MCH	2.441000000 GHz
	40.0 CF Step 1.000000 MHz
	Directional Auto Man
	600 FreqOffset
	0Hz
	578.0 Scale Type
	Center 2.441000000 GHz Span 0 Hz Log Lin Res BW 1.0 MHz #VBW 3.0 MHz Sweep 10.00 ms (2001 pts)
	Meg
	🔤 Keysight Spectrum Analyzer - Swept SA
	XX R L RF 50 Ω AC CORREC SENSEINT ALIGN AUTO 01:23:52 PM Mar 10, 2021
	Center Freq 2.480000000 GHz #Avg Type: RMS TRACE Requency
	Center Freq 2.480000000 GHz PNO: Fast
	Center Freq 2.480000000 GHz PNC: Fast ++ Trig: Free Run IF Gelin:Low #Atten: 30 dB #Wrg Type: RMS Tree Run Mkr1 2.350 ms Auto Tune
	Center Freq 2.480000000 GHz PNC: Fast
	Center Freq 2.48000000 GHz PRO: Fast
	Center Freq 2.480000000 GHz         Frequency           PRO: Fast IF Gain: Low         Trig: Free Run #Atten: 30 dB         TRuce 12.3 450 Tog Type: RMS         TRuce 12.3 450 Tog Type: RMS         Frequency           Mkr1 2.350 ms 0df         Auto Tune           0 dB/div         Ref 20.00 dBm         Center Freq 2.480000000 GHz
	Center Freq 2.480000000 GHz PRO: Fast IFGein.Low DO: Block IFGein.Low Atten: 30 dB Mkr1 2.350 ms 6.85 dBm Contor Freq Mkr2 2.350 ms 6.85 dBm
	Center Freq 2.480000000 GHz PRO: Fast IFGain.Low Atten: 30 dB 10 dB/div Ref 20.00 dBm 10 dB/div Ref 20.00 dBm 10 dB/div 10
	Center Freq 2.480000000 GHz PRO: Fast IFGain.Low Atten: 30 dB 10 dB/div Ref 20.00 dBm 10 dB/div 10 dB/di
	Center Freq 2.480000000 GHz         Frequency         Frequency         Frequency         Frequency         Frequency         Frequency         Frequency         Auto Tune           0 dB/dd/v         Ref 20.00 dBm         6.85 dBm         0.85 dBm         0.00 GHz         2.480000000 GHz         2.480000000 GHz           100         1         1         1         1         1         2.480000000 GHz         2.480000000 GHz           100         -         -20,00 dB         -         2.480000000 GHz         2.480000000 GHz
	Center Freq 2.480000000 GHz         Trig: Free Run PRO: Fail: Low         Trig: Free Run Atten: 30 dB         #Avg Type: RMS         Truce II 2.3 cs Turber II 2.3 cs Tu
π/4DQPSK _2DH3/HCH	Center Freq 2.480000000 GHz         Trig: Free Run Brean.Low         #Avg Type: RMS         Truce Truce To a set Truce To a set Truce To a set To dB/div         Frequency           0 dB/div         Ref 20.00 dBm         Mkr1 2.350 ms 6.85 dBm         Auto Tune           10 dB/div         Ref 20.00 dBm         Center Freq 2.480000000 GHz         Center Freq 2.480000000 GHz           10 d1
π/4DQPSK _2DH3/HCH	Center Freq 2.480000000 GHz         Trig: Free Run Breant.cov         #Avg Type: RMS         Trice Trace Toget 12.3450         Frequency           10 dB/div         Ref 20.00 dBm         0.85 dBm         0.85 dBm         Auto Tune           10 dB/div         1         0.00 dBm         0.85 dBm         Center Freq 2.480000000 GHz           10 dB/div         1         1         1         1         1           0.00 dB         1         1         1         1         1           10 dB/div         1         1         1         1         1         1           10 dB/div         1 </td
π/4DQPSK_2DH3/HCH	Center Freq 2.480000000 GHz         Trig: Free Run Brean.Low         #Avg Type: RMS         Truce Truce Toget         Truce Truce Truce Toget         Truce Truce Truce Toget         Truce Tr
π/4DQPSK_2DH3/HCH	Center Freq 2.480000000 GHz         Trig: Free Run Brean.Low         #Avg Type: RMS         Truce Tip 2.3 + 50 Truce Tip 2.3 + 50 Truce Tip 2.3 + 50 Truce Tip 2.4 + 50 Truc
π/4DQPSK _2DH3/HCH	Center Freq 2.480000000 GHz         Trig: Free Run Brean.Low         #Avg Type: RMS         Truce Trace Toget         Truce Trace         Truce Trace<
π/4DQPSK _2DH3/HCH	Center Freq 2.480000000 GHz         Trig: Free Run IFGainLow         #Avg Type: RMS         Trace II: 2: 3: 6: Trace II: 3: 7: Trace II: 3
π/4DQPSK _2DH3/HCH	Center Freq 2.480000000 GHz         Work Fast
π/4DQPSK _2DH3/HCH	Center Freq 2.480000000 GHz IFGain.low         Trig: Free Run BAtter: 30 dB         Wavg Type: RMS         Trace II: 2.3 so Unit Mathematical Solution         Frequency           0 dB/ddiv         Ref 20.00 dBm         Mkr1 2.350 ms 6.85 dBm         Auto Tune           0 dB/ddiv         Ref 20.00 dBm         Center Freq 2.480000000 GHz         Center Freq 2.480000000 GHz           0 dB/ddiv         -20,00 dB         Start Freq 2.480000000 GHz         Start Freq 2.480000000 GHz           0 dD         -20,00 dB         Center Freq 2.480000000 GHz         Start Freq 2.480000000 GHz           0 dD         -20,00 dB         Center Freq 2.480000000 GHz         Start Freq 2.480000000 GHz           0 dD         -20,00 dB         Center Freq 2.480000000 GHz         Start Freq 2.480000000 GHz           0 dD         -20,00 dB         Center Freq 2.480000000 GHz         Start Freq 2.480000000 GHz           0 dD         -1.640 ms         -2.48000000 GHz         CF Step 1.00000 MHz           0 dD         -1.640 ms         -2.48000000 GHz         -2.48000000 GHz           0 dD         -1.640 ms         -2.48000000 GHz         -2.48000000 GHz           0 dD         -1.640 ms         -2.48000000 GHz         -2.480000000 GHz           0 dD         -1.640 ms         -2.48000000 GHz         -2.480000000 GHz           0 dD </td
π/4DQPSK _2DH3/HCH	Center Freq 2.480000000 GHz         Trig: Free Run Britain.tow         Ways Type: RMS         Trice Trice Trice Off         Frequency           0.0 dB/div         Ref 20.00 dBm         Mkr1 2.350 ms 6.85 dBm         Auto Tune           0.0 dB/div         Ref 20.00 dBm         Center Freq 2.480000000 GHz         Center Freq 2.480000000 GHz           0.00
π/4DQPSK _2DH3/HCH	Center Freq 2.48000000 GHz       HAve Type: RMS       The Draws       Frequency         Index Ref 20.00 dBm       Mkr1 2.350 ms       G.85 dBm       Center Freq         10 dBidly       Ref 20.00 dBm       Center Freq       2.480000000 GHz         10 dBidly       -20.00 dB       The Draws       Center Freq         10 dBidly       -20.00 dB       Center Freq       2.480000000 GHz         10 dBidly       -20.00 dB       CF Step       2.480000000 GHz         10 dBidly       -20.00 dB       CF Step       1.00000 MHz         10 dBidly       -2.480000000 GHz       CF Step       1.00000 Miz         10 dB







### **5.8** Band-edge for RF Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10:2013
Test Setup:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane Remark: Offset=cable loss+ attenuation factor.
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Exploratory Test Mode:	Hopping and Non-hopping transmitting with all kind of modulation and all kind of data type
Final Test Mode:	Through Pre-scan, find the DH5 of data type is the worst case of GFSK modulation type, 2-DH5 of data type is the worst case of $\pi$ /4DQPSK modulation type Only the worst case is recorded in the report.
Test Results:	Pass

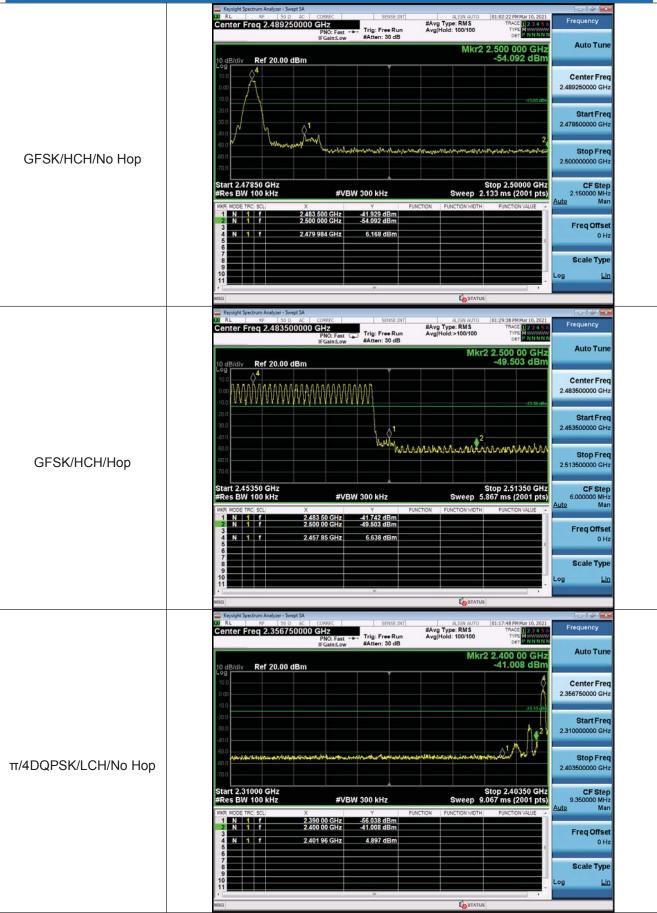


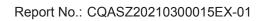










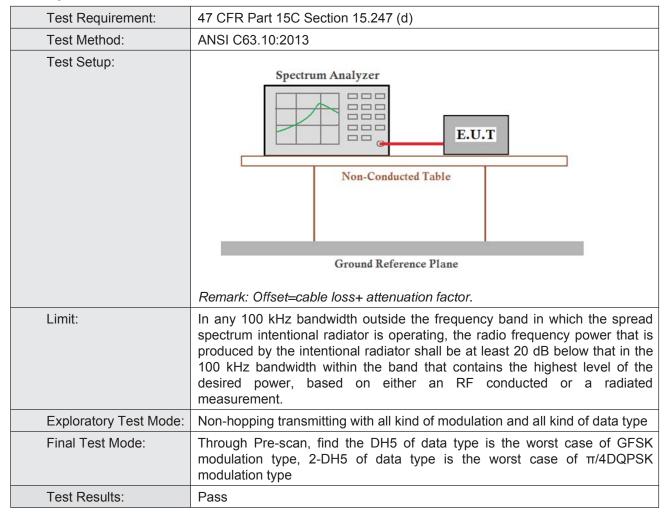




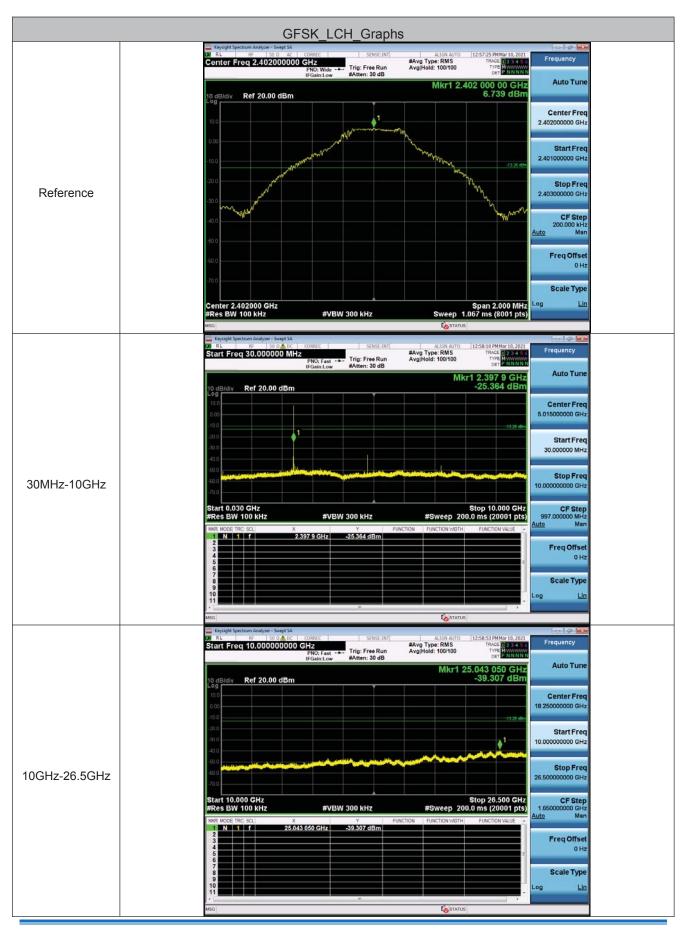
	🔤 Keysight Spectrum Analyzer - Swept SA
	Center Freq 2.400000000 GHz Trig: Free Run PN0: Fast → Trig: Free Run Comparing Free Run Avg Hold:>100/100 Trig: Free Run Avg Hold:>100/100 Trig: Free Run
	IFGainLow #Atten: 30 dB Mkr2 2,400 00 GHz Auto Tune
	10 dB/dlv Ref 20.00 dBm -28.420 dBm
	0.00 MANAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
	200 Start Freq
π/4DQPSK/LCH/Hop	50.0 Stop Freq 60.0 2.43000000 GHz
	Start 2.37000 GHz         Stop 2.43000 GHz         CCF Step 6.000000 MHz           #Res BW 100 kHz         #VBW 300 kHz         Sweep 5.867 ms (2001 pts)         6.000000 MHz
	MRR MODE TECI SCL         X         Y         FUNCTION         FUNCTION WIDTH         FUNCTION VALUE         FUNCTION VALUE           1         N         1         f         2.390.00.GHz         -52.451.dBm         FUNCTION WIDTH         FUNCTION VALUE         Freq Offset           3         N         1         f         2.400.00.GHz         -52.451.dBm         Freq Offset
	4 N 1 f 2.406 84 GHz 6.904 dBm 0 Hz
	7 Scale Type
	Keylight Spectrum Analyzer - Snept SA     No. 201     Keylight Spectrum Analyzer - Snept SA     No. 201     Keylight Spectrum Analyzer - Snept SA     No. 201     Keylight Spectrum Analyzer - Snept SA     Conter Freq 2.489250000 GHz     Frequency     Frequency     Frequency     Frequency     Keylight Statt.exe
	PRO: Fast
	10 dB/dlv Ref 20.00 dBm -55.676 dBm
	10.0 Center Freq 0.00 2.489250000 GHz
	10.0
	30.0 June 2,478500000 GHz
	100 100 200 200 200 200 200 200 200 200
π/4DQPSK/HCH/No Hop	2.50000000 GHz
	Start 2.47850 GHz         Stop 2.50000 GHz         CF Step 2.150000 MHz           #Res BW 100 kHz         #VBW 300 kHz         Sweep 2.133 ms (2001 pts)         2.150000 MHz
	MMR MODE TRC: SCI.         X         Y         FUNCTION         FUNCTION WDTH         FUNCTION VALUE         Auto         Man           1         N         1         f         2.493 500 GHz         -47.632 dBm         FUNCTION WDTH         FUNCTION VALUE         Auto         Man           N         1         f         2.56.765 dBm         FUNCTION FUNCTION VALUE         FUNCTION FUNCTION FUNCTION VALUE         FUNCTION FUNCTION FUNCTION VALUE         FUNCTION FUNCTION FUNCTION VALUE         FUNCTION FUNCTION FUNCTION FUNCTION VALUE         FUNCTION FUN
	N         1         2.00 00 0Hz         50070 0BH         Freq Offset           4         N         1         f         2.479 984 GHz         6.035 dBm         0 Hz
	6 7 8 Scale Type
	9 10 11
	Keysight Spectrum Analyzer - Swegt SA     Keysight Spectrum Analyze
	PNO: Fast C Trig: Free Run Avg Hold:>100/100 TYPE MUNITY Atten: 30 dB
	Mkr2 2.500 00 GHz 10 dB/div Ref 20.00 dBm -51.297 dBm
	100 Center Freq 000 //////////////////////////////////
	-10.0
	30.0 2.453500000 GHz
	500 Stop Fred
π/4DQPSK/HCH/Hop	2.513500000 GHz
	Start 2.45350 GHz Stop 2.51350 GHz CF Step #Res BW 100 kHz #VBW 300 kHz Sweep 5.867 ms (2001 pts) 6.00000 MHz
	MKR MODE TRC SCL X Y FUNCTION FUNCTION WITH FUNCTION VALUE Auto Man
	1         N         1         f         2.483.60 GHz         -43.631 dBm           2         N         1         f         2.500 00 GHz         -51.297 dBm         Freq Offset           3         N         1         f         2.465 17 GHz         6.449 dBm         0 Hz
	8 Scale Type 9 10 Log Lin
	MSG Bostatus



#### **5.9** Spurious RF Conducted Emissions

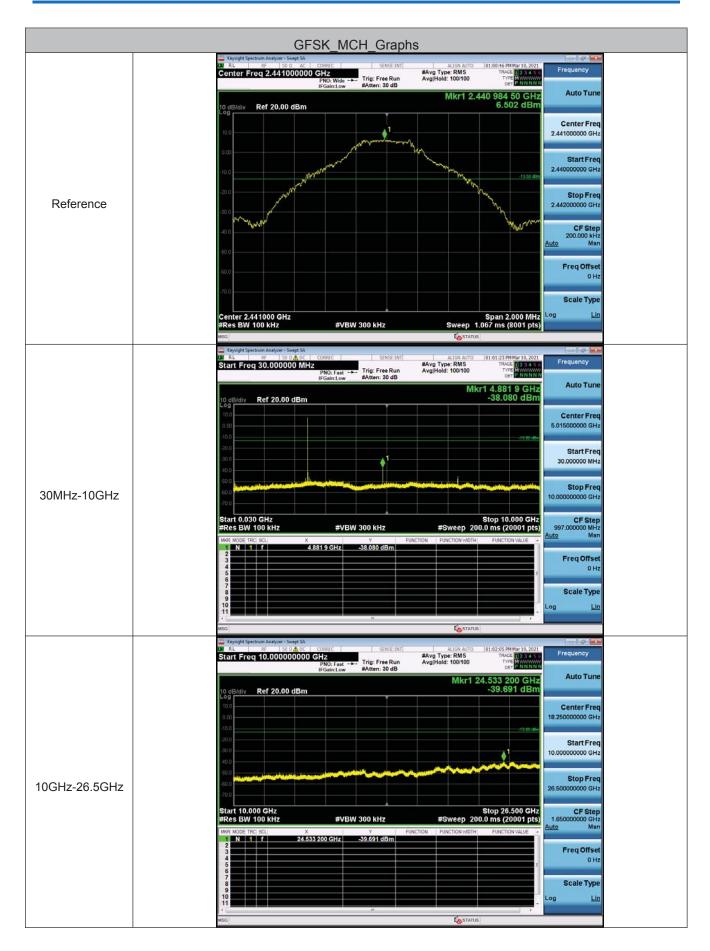






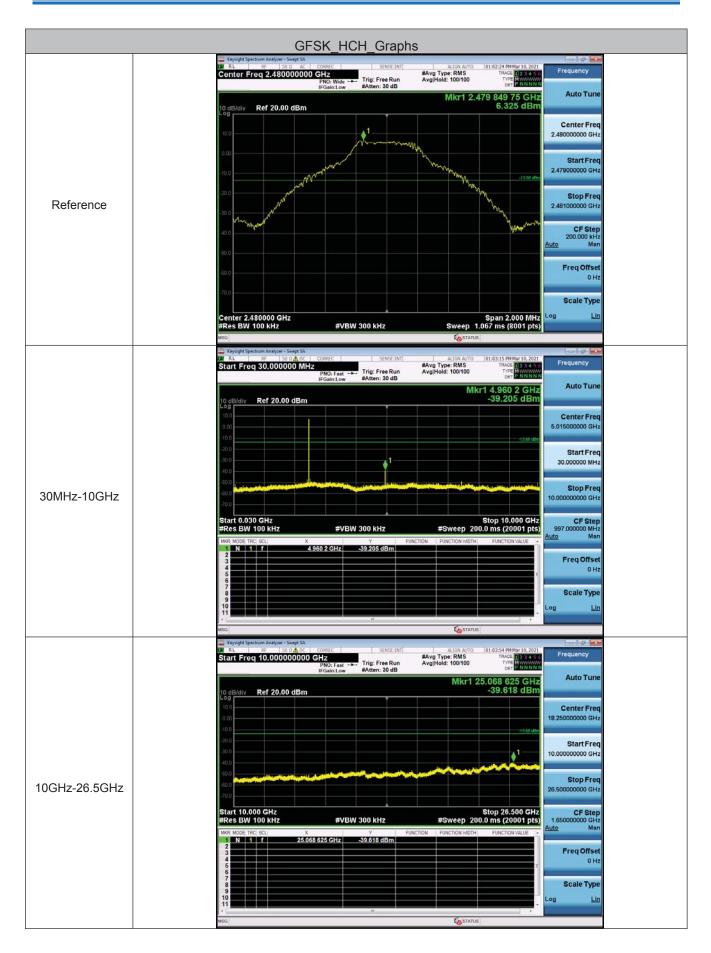






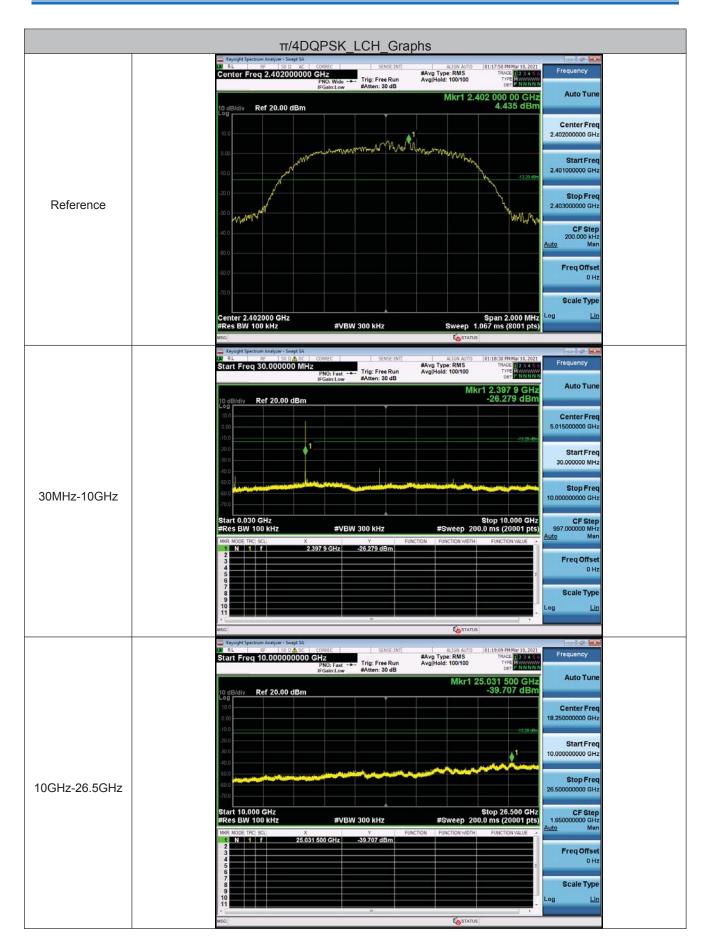






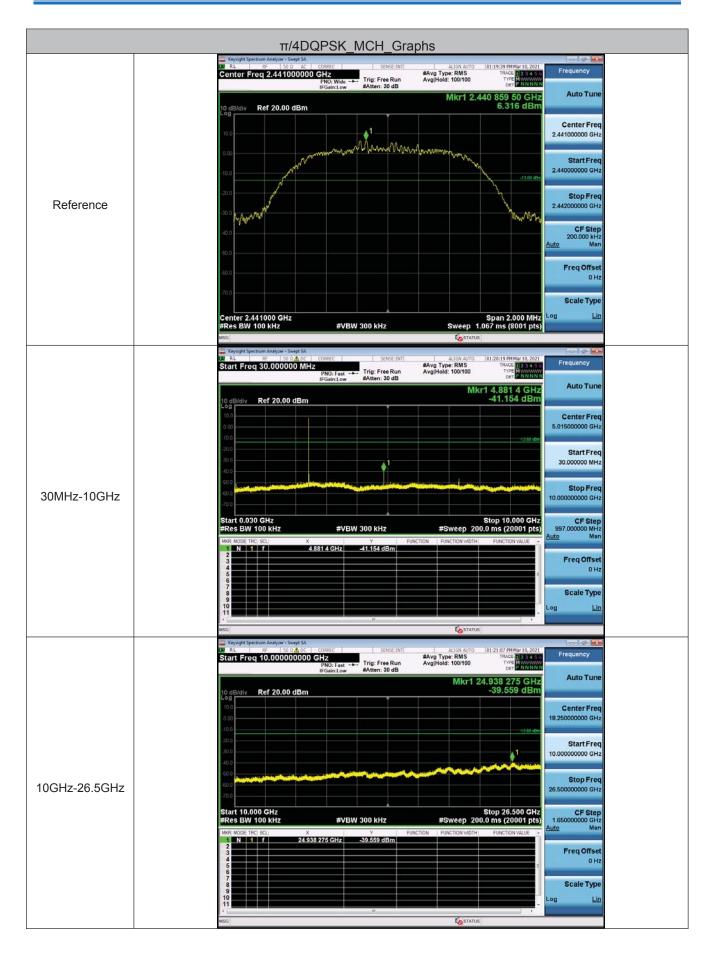






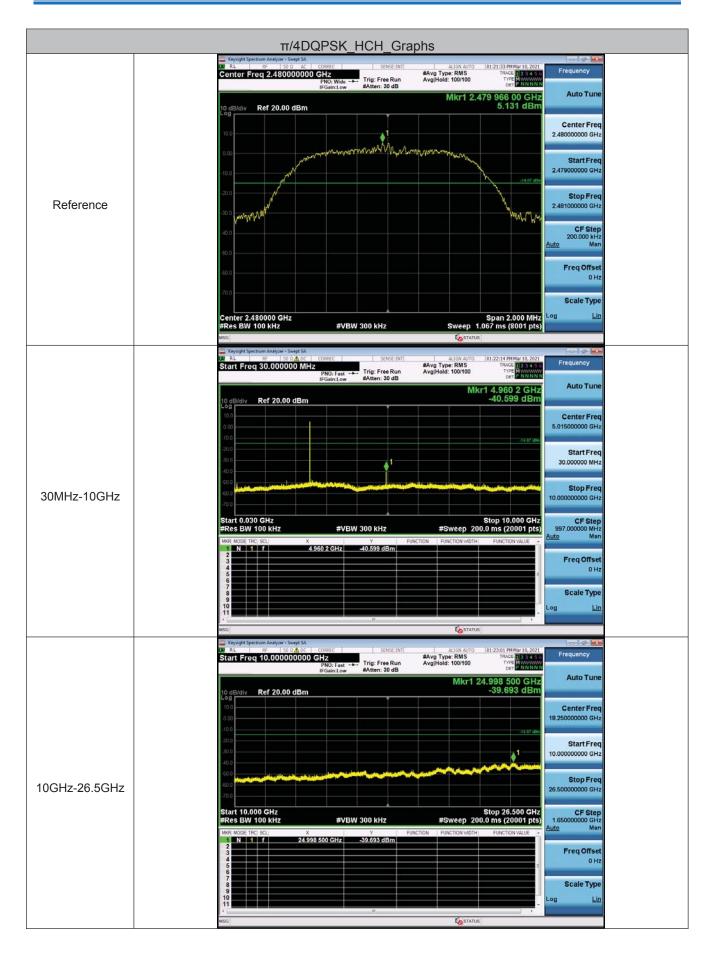














Remark:

Pre test 9kHz to 25GHz, find the highest point when testing, so only the worst data were shown in the test report. Per FCC Part 15.33 (a) and 15.31 (o) ,The amplitude of spurious emissions from intentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this part.



### 5.10 Other requirements Frequency Hopping Spread Spectrum System

-		
Test Requirement:	47 CFR Part 15C Section 15.247 (a)(1), (h) requirement:	
rate from a Pseudorandom o on the average by each trans	nnel frequencies that are selected at the system hopping ordered list of hopping frequencies. Each frequency must be used smitter. The system receivers shall have input bandwidths that ma s of their corresponding transmitters and shall shift frequencies in asmitted signals.	
channels during each transm receiver, must be designed t transmitter be presented with employing short transmission	spectrum systems are not required to employ all available hopping nission. However, the system, consisting of both the transmitter ar to comply with all of the regulations in this section should the h a continuous data (or information) stream. In addition, a system n bursts must comply with the definition of a frequency hopping sy missions over the minimum number of hopping channels specified	nd the /stem
the system to recognize othe independently chooses and The coordination of frequence	ence within a frequency hopping spread spectrum system that perr er users within the spectrum band so that it individually and adapts its hopsets to avoid hopping on occupied channels is perr cy hopping systems in any other manner for the express purpose of ccupancy of individual hopping frequencies by multiple transmitter	nitted. of
Compliance for section 15.	.247(a)(1)	
stage shift register whose 5th outputs are added in a modu	ulo-two addition stage. And the result is fed back to the input of the with the first ONE of 9 consecutive ONEs; i.e. the shift register is ages: 9 sequence: 2 <sup>9</sup> -1 = 511 bits	e first
Linear Feedback Si	hift Register for Generation of the PRBS sequence	
	m Frequency Hopping Sequence as follow:	
According to Bluetooth Cord bandwidths that match the	y on the average by each transmitter. e Specification, Bluetooth receivers are designed to have input hopping channel bandwidths of any Bluetooth transmitters a on with the transmitted signals.	
Compliance for section 15.	.247(g)	
pseudorandom hopping freq	re Specification, the Bluetooth system transmits the packet v juency with a continuous data and the short burst transmission f ansmitted under the frequency hopping system with the pseudo	from the



#### Compliance for section 15.247(h)

According to Bluetooth Core specification, the Bluetooth system incorporates with an adaptive system to detect other user within the spectrum band so that it individually and independently to avoid hopping on the occupied channels.

According to the Bluetooth Core specification, the Bluetooth system is designed not have the ability to coordinated with other FHSS System in an effort to avoid the simultaneous occupancy of individual hopping frequencies by multiple transmitter.



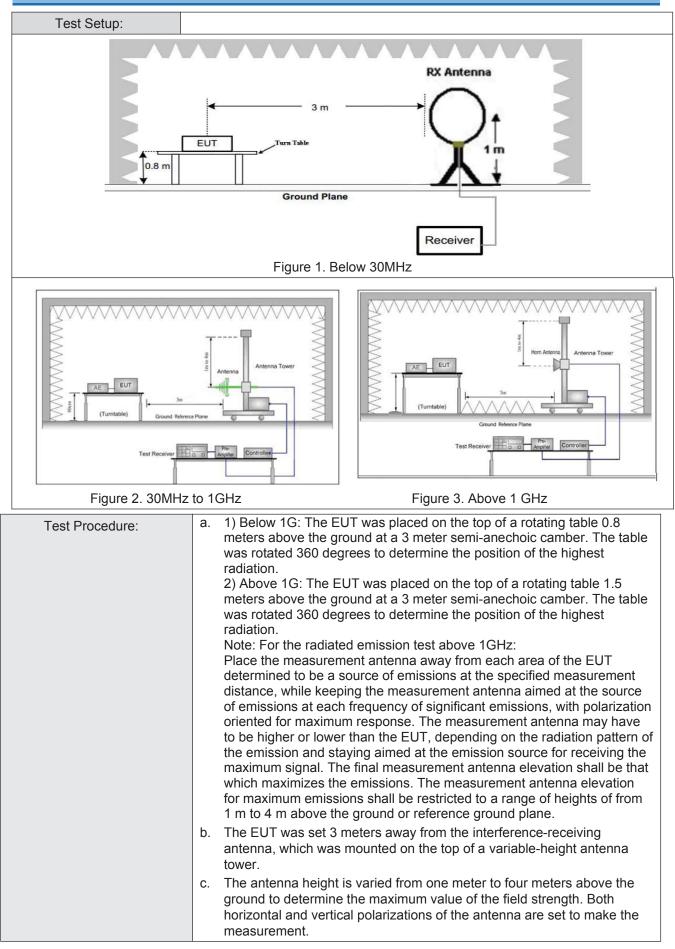


# 5.11 Radiated Spurious Emission & Restricted bands

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205								
Test Method:	ANSI C63.10: 2013								
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)								
Receiver Setup:	Frequency		Detector	RBW	VBW	Remark			
	0.009MHz-0.090MH	z	Peak	10kHz	z 30kHz	Peak			
	0.009MHz-0.090MH	Z	Average	10kHz	z 30kHz	Average			
	0.090MHz-0.110MH	Z	Quasi-peak	10kHz	z 30kHz	Quasi-peak			
	0.110MHz-0.490MH	z	Peak	10kHz	z 30kHz	Peak			
	0.110MHz-0.490MH	z	Average	10kHz	z 30kHz	Average			
	0.490MHz -30MHz		Quasi-peak	10kHz	z 30kHz	Quasi-peak			
	30MHz-1GHz		Peak	100 k⊢	lz 300kHz	Peak			
			Peak	1MHz	: 3MHz	Peak			
	Above 1GHz		Peak	1MHz	: 10Hz	Average			
Limit:	Frequency		eld strength crovolt/meter)	Limit (dBuV/m)	Remark	Measureme distance (m			
	0.009MHz-0.490MHz	2	400/F(kHz)	-	-	300			
	0.490MHz-1.705MHz	24	4000/F(kHz)	-	-	30			
	1.705MHz-30MHz		30	-	-	30			
	30MHz-88MHz		100	40.0	Quasi-peak	3			
	88MHz-216MHz		150	43.5	Quasi-peak	3			
	216MHz-960MHz		200	46.0	Quasi-peak	3			
	960MHz-1GHz		500	54.0	Quasi-peak	3			
	Above 1GHz 500 54.0 Average 3								
	Note: 15.35(b), Unless emissions is 20dE applicable to the peak emission lev	3 ab equi	ove the maxin pment under t	num perm est. This p	itted average	emission limit			







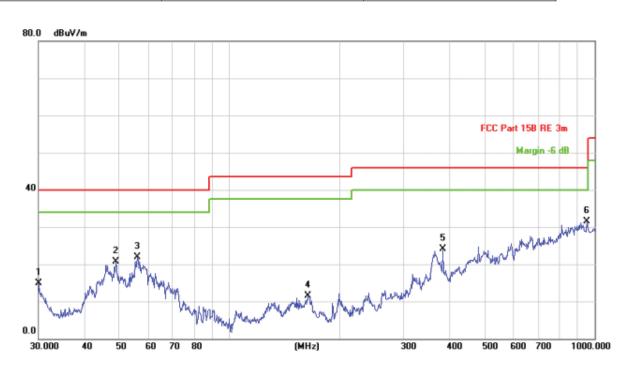


	<ul> <li>d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.</li> <li>e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> <li>f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</li> <li>g. Test the EUT in the lowest channel (2402MHz),the middle channel (2441MHz),the Highest channel (2480MHz)</li> <li>h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.</li> <li>i. Repeat above procedures until all frequencies measured was complete.</li> </ul>
Exploratory Test Mode:	Non-hopping transmitting mode with all kind of modulation and all kind of data type Transmitting mode, Charge + Transmitting mode.
Final Test Mode:	Through Pre-scan, find the DH5 of data type and GFSK modulation is the worst case. Pretest the EUT at Transmitting mode, AUX mode, FM(RX) mode and Transmitting mode, found the Charging mode which it is worse case For below 1GHz part, through pre-scan, the worst case is the lowest channel.
Test Results:	Pass



#### 5.11.1 Radiated Emission below 1GHz

30MHz~1GHz		
Test mode:	TX mode	Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		30.1054	22.56	-7.66	14.90	40.00	-25.10	QP			
2		48.8429	37.02	-16.39	20.63	40.00	-19.37	QP			
3		56.0007	38.66	-16.82	21.84	40.00	-18.16	QP			
4		164.3301	26.75	-15.28	11.47	43.50	-32.03	QP			
5		383.9318	32.57	-8.38	24.19	46.00	-21.81	QP			
6	*	952.0937	24.65	6.94	31.59	46.00	-14.41	QP			

Remark:

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Factor= Antenna Factor + Cable Factor - Preamplifier Factor,

Level = Read Level + Factor,

Over Limit=Level-Limit Line.







No. N	٨k.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	3	30.0000	20.65	-7.51	13.14	40.00	-26.86	QP			
2	1	52.5753	37.05	- <mark>16.79</mark>	20.26	40.00	-19.74	QP			
3	1	62.2128	34.89	-17.02	17.87	40.00	-22.13	QP			
4	1	129.9226	23.00	-12.76	10.24	43.50	-33.26	QP			
5	Ę	586.8437	29.16	-1.01	28.15	46.00	-17.85	QP			
6 *	8	887.6099	22.96	7.43	30.39	46.00	-15.61	QP			

Remark:

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Factor= Antenna Factor + Cable Factor - Preamplifier Factor,

Level = Read Level + Factor,

Over Limit=Level-Limit Line.



## 5.11.2 Transmitter Emission above 1GHz

Worse case	mode:	GFSK(DH5)		Test channel:		Lowest	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)		H/V
2390	63.80	-9.2	54.60	74	-19.40	Peak	н
2400	64.58	-9.39	55.19	74	-18.81	Peak	Н
4804	63.60	-4.33	59.27	74	-14.73	Peak	Н
7206	62.60	1.01	63.61	74	-10.39	Peak	Н
2390	65.45	-9.2	56.25	74	-17.75	Peak	v
2400	64.31	-9.39	54.92	74	-19.08	Peak	V
4804	62.09	-4.33	57.76	74	-16.24	Peak	V
7206	62.61	1.01	63.62	74	-10.38	Peak	V

Worse case	Worse case mode:		GFSK(DH5)		el:	Middle	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)		H/V
4882	62.26	-4.11	58.15	74	-15.85	peak	н
7323	57.50	1.51	59.01	74	-14.99	peak	н
4882	62.33	-4.11	58.22	74	-15.78	peak	V
7323	57.18	1.51	58.69	74	-15.31	peak	V

Worse case	mode:	GFSK(DH	5)	Test channel:		Highest	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)		H/V
2483.5	62.70	-9.29	53.41	74	-20.59	Peak	н
4960	59.67	-4.04	55.63	74	-18.37	Peak	н
7440	58.88	1.57	60.45	74	-13.55	Peak	н
2483.5	61.45	-9.29	52.16	74	-21.84	Peak	v
4960	59.43	-4.04	55.39	74	-18.61	Peak	V
7440	57.88	1.57	59.45	74	-14.55	Peak	V



Worse case	mode:	π/4DQPSk	(2DH5)	Test chann	el:	Lowest	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)		H/V
2390	63.73	-9.2	54.53	74	-19.47	Peak	н
2400	63.91	-9.39	54.52	74	-19.48	Peak	Н
4804	63.03	-4.33	58.70	74	-15.30	Peak	Н
7206	62.04	1.01	63.05	74	-10.95	Peak	н
2390	64.41	-9.2	55.21	74	-18.79	Peak	v
2400	64.21	-9.39	54.82	74	-19.18	Peak	V
4804	62.52	-4.33	58.19	74	-15.81	Peak	V
7206	61.51	1.01	62.52	74	-11.48	Peak	V

Worse case mode:		π/4DQPSK (2DH5)		Test channel:		Middle	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)		H/V
4882	62.57	-4.11	58.46	74	-15.54	peak	Н
7323	56.86	1.51	58.37	74	-15.63	peak	Н
4882	62.34	-4.11	58.23	74	-15.77	peak	V
7323	55.90	1.51	57.41	74	-16.59	peak	V

Worse case mode:		π/4DQPSK (2DH5)		Test channel:		Highest	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)		H/V
2483.5	62.33	-9.29	53.04	74	-20.96	Peak	н
4960	59.77	-4.04	55.73	74	-18.27	Peak	н
7440	59.06	1.57	60.63	74	-13.37	Peak	н
2483.5	62.45	-9.29	53.16	74	-20.84	Peak	v
4960	59.64	-4.04	55.60	74	-18.40	Peak	V
7440	58.34	1.57	59.91	74	-14.09	Peak	V

Remark:

1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

2) Scan from 9kHz to 25GHz, the disturbance above 10GHz and below 30MHz was very low. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak measurements were shown in the report.



# 6 Photographs - EUT Test Setup

## 6.1 Radiated Emission

9kHz~30MHz:



30MHz~1GHz:









Above 1GHz:



Conducted Emissions Test Setup





# 7 Photographs - EUT Constructional Details

















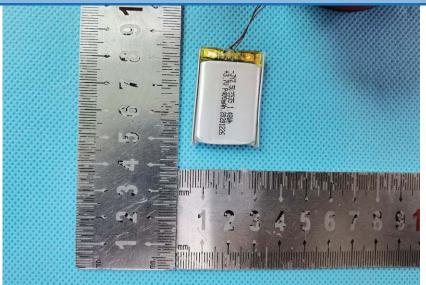


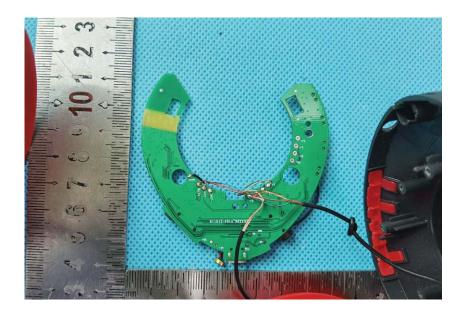
#### Internal Photos

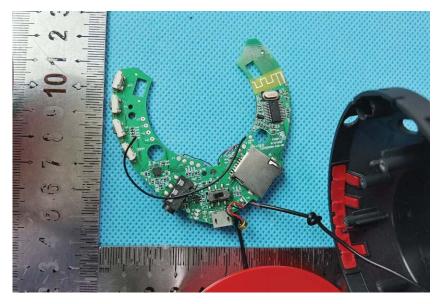






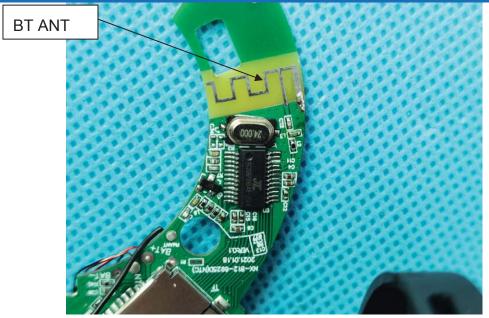








Report No.: CQASZ20210300015EX-01



The End