

## 12.4 Test Result

Modulation	Test Channel	Separation (MHz)	Limit(MHz)	Result
GFSK	Low	1.004	0.583	PASS
GFSK	Middle	0.998	0.583	PASS
GFSK	High	1.002	0.585	PASS
π/4DQPSK	Low	1.000	0.822	PASS
π/4DQPSK	Middle	1.000	0.839	PASS
π/4DQPSK	High	1.002	0.838	PASS



## Test plots GFSK Low Channel



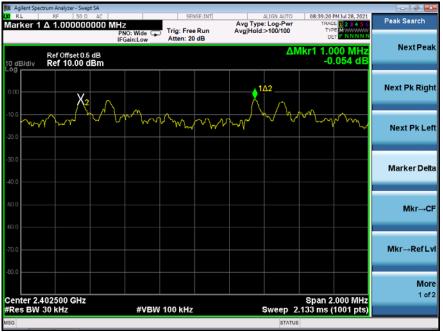


**GFSK Middle Channel** 

**GFSK High Channel** 

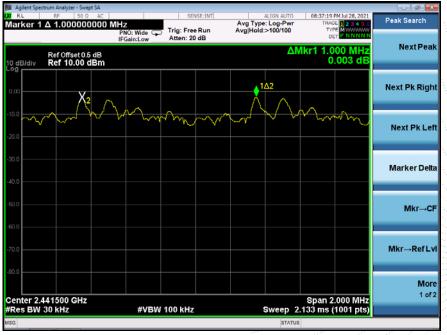






#### π/4DQPSK Low Channel

π/4DQPSK Middle Channel





Agilent Spectrum Analyzer - Swept SA		- errigiterr		
RL RF 50 Ω AC Marker 1 Δ 1.002000000 N		SE:INT ALIGN AUTO Avg Type: Log-Pwr Run Avg Hold:>100/100	TYPE MWWWWW	Peak Search
Ref Offset 0.5 dB 0 dB/div Ref 10.00 dBm	IFGain:Low Atten: 20	dB	Mkr1 1.002 MHz -0.059 dB	NextPea
× × × ×				Next Pk Righ
10.0 <b>May 10 May 10 May</b>	Lon Mary	mun profil	Month	Next Pk Le
40.0				Marker Del
50 0				Mkr→C
70.0				Mkr→RefL
Center 2.479500 GHz Res BW 30 kHz	#VBW 100 kHz	Sweep	Span 2.000 MHz 2.133 ms (1001 pts)	Mor 1 of
G		STAT		

## π/4DQPSK High Channel

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# 13. NUMBER OF HOPPING FREQUENCY

13.1 Block Diagram Of Test Setup



#### 13.2 Limit

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

#### 13.3 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

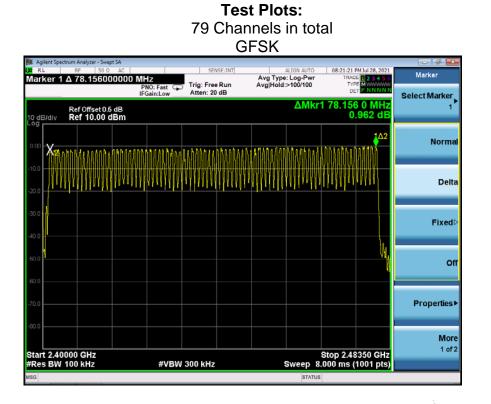
2. Set the spectrum analyzer: RBW = 100kHz. VBW = 300kHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.

3. Allow the trace to stabilize. It may prove necessary to break the span up to sections. in order to clearly show all of the hopping frequencies. The limit is specified in one of the subparagraphs of this Section.

4. Set the spectrum analyzer: Start Frequency = 2.4GHz, Stop Frequency = 2.4835GHz. Sweep=auto;



## 13.4 Test Result



π/	4	D	Q	Ρ	S	K
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- 6 🛋									Analyzer - Swep		
Marker	PM Jul 28, 2021	TRAC	LIGN AUTO	Avg Type	ISE:INT			AC   00000 MH	F 50 Ω 78.07250		n <sub>RL</sub> Mari
Select Marker		DE	>100/100	Avg Hold:		Trig: Free Atten: 20	NO:Fast 🕞 Gain:Low	PI IF(			
1	2 5 MHz .050 dB	1 78.072 1	ΔMkr1					i dB IBM	f Offset 0.5 ef 10.00 d	Re Mdiv <b>R</b> e	10 dE
Norma	<u>1</u> Δ2		144.80 5544	1 m 1 - 1 - h		4 F + 4 + F - F				v	0.00
	WWW	MMMM	MANNA	MMMM	AMAAAAAA	WWWW	NNNNN		NAMAN (	WWW	-10.0
Delta											
											-20.0
Fixed	k										-30.0
										r	-40.0
Of											-50.0
											-60.0
Properties											-70.0
											-80.0
More 1 of 2											
	350 GHz 1001 pts)	Stop 2.48 000 ms (	Sweep 8.			300 kHz	#VBW			2.40000 BW 100	
			STATUS								MSG



# 14. DWELL TIME

## 14.1 Block Diagram Of Test Setup



#### 14.2 Limit

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. 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. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

#### 14.3 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

2. Set spectrum analyzer span = 0. Centred on a hopping channel;

3. Set RBW = 1MHz and VBW = 3MHz.Sweep = as necessary to capture the entire dwell time per hopping channel. Set the EUT for DH5, DH3 and DH1 packet transmitting.

4. Use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s).



#### 14.4 Test Result

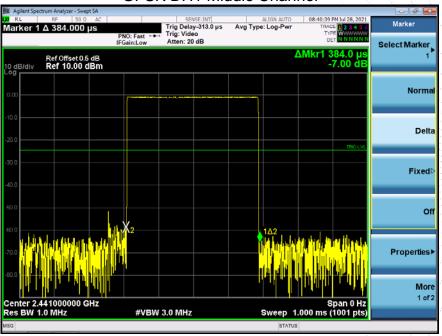
DH5 Packet permit maximum 1600 / 79 / 6 hops per second in each channel (5 time slots RX, 1 time slot TX).

DH3 Packet permit maximum 1600 / 79 / 4 hops per second in each channel (3 time slots BX 1 time slot TX)

(3 time slots RX, 1 time slot TX). DH1 Packet permit maximum 1600 / 79 /2 hops per second in each channel (1 time slot RX, 1 time slot TX). So, the Dwell Time can be calculated as follows:

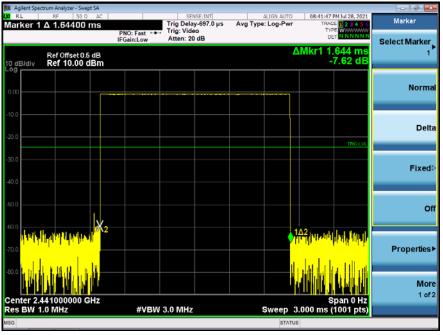
DH5:1600/79/6\*0.4\*79\*(MkrDelta)/1000 DH3:1600/79/4\*0.4\*79\*(MkrDelta)/1000 DH1:1600/79/2\*0.4\*79\*(MkrDelta)/1000 Remark: Mkr Delta is once pulse time.

Modulation	Channel Data	Packet	pulse time(ms)	Dwell Time(s)	Limits(s)
		DH1	0.384	0.123	0.4
GFSK	Middle	DH3	1.644	0.263	0.4
		DH5	2.900	0.309	0.4
		2DH1	0.391	0.125	0.4
π/4DQPSK	Middle	2DH3 1.650 0.264	0.4		
		2DH5	2.910	0.310	0.4 0.4 0.4 0.4 0.4



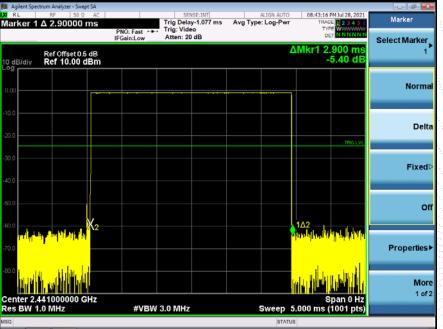
Test Plots GFSK DH1 Middle Channel



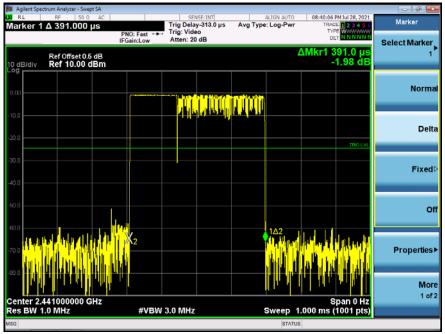


#### GFSK DH3 Middle Channel

GFSK DH5 High Middle Channel

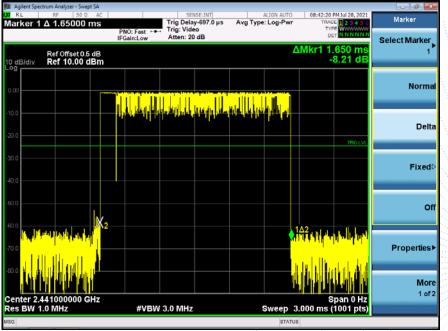




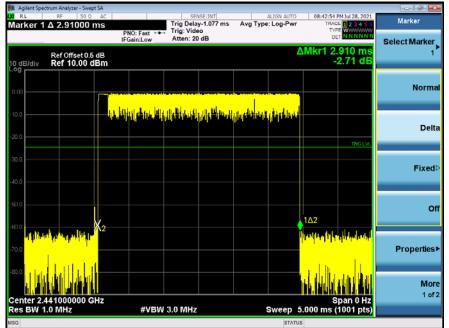


#### π/4DQPSK DH1 Middle Channel

#### $\pi$ /4DQPSK DH3 Middle Channel







#### $\pi/4DQPSK$ DH5 Middle Channel



# **15. ANTENNA REQUIREMENT**

#### 15.1 Limit

15.203 requirement: For intentional device, according to 15.203: 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.

#### 15.2 Test Result

The EUT antenna is PCB antenna, fulfill the requirement of this section.

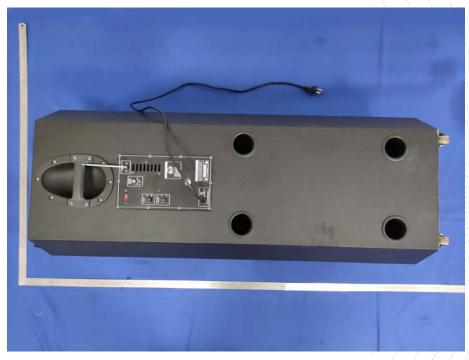


# 16. EUT PHOTOGRAPHS

### EUT Photo 1



#### EUT Photo 2



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# **17. EUT TEST SETUP PHOTOGRAPHS**

#### **Conducted emissions**



**Radiated Measurement Photos** 







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# STATEMENT

1. The equipment lists are traceable to the national reference standards.

2. The test report can not be partially copied unless prior written approval is issued from our lab.

3. The test report is invalid without stamp of laboratory.

4. The test report is invalid without signature of person(s) testing and authorizing.

5. The test process and test result is only related to the Unit Under Test.

6. The quality system of our laboratory is in accordance with ISO/IEC17025.

7.If there is any objection to report, the client should inform issuing laboratory within 15 days from the date of receiving test report.

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Website : http://www.chnbctc.com

E-Mail : <u>bctc@bctc-lab.com.cn</u>

#### **\*\*\*\*\*\* END \*\*\*\*\***

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