

Trig: Free Run Atten: 20 dB	Avg Type: Log-Pwr Avg/Hold:>100/100	10.56:35 AM Set 07, 2020 INAU: 11203 4	Peak Search
Atten: 20 dB		CET P NIN N N	
	Mkr1	2.440 89 GHz -2.027 dBm	NextPeal
•1			Next Pk Righ
			Next Pk Lef
			Marker Delt
			Mkr→C
			Mkr -RefL
/ 3.0 MHz	Sweep 1.	Span 10.00 MHz 000 ms (1001 pts)	Mor 1 of
	1 	13.0 MHz Sweep 1.	Span 10.00 MHz 3.0 MHz Sweep 1.000 ms (1001 pts)

GFSK Middle Channel

GFSK High Channel





Peak Search	INST:18 M Set 02, 2020 INAU: 112 3 4 5 1 DTE NUMBER CET F NUMBER	Avg Type: Log-Pwr Avg Mold:>100/100	Trig: Free Run Atten: 20 dB		8F 510 2.402200000	Marker 1
NextPea	2.402 20 GHz -1.341 dBm	Mkr		5 dB	Ref Offset 0.5 s Ref 10.00 dB	0 dE/div
Next Pk Rigi			• ¹			d. 00
Next Pk Le						000
Marker Del						30.0
Mkr→C						57,0] 63.0
Mkr-RefL						720
Mor 1 of	Span 10.00 MHz 000 ms (1001 pts)	Sweep 1	3.0 MHz		402000 GHz 3.0 MHz	Center 2.4
		STATUS				56

Pi/4 DQPSK Low Channel

Pi/4 DQPSK Middle Channel





and the second second					
Trig: Free Run	Avg Type: Log-Pwr Avg/Hold:>100/100	10.5550 M Set 07, 2000 INAUE 112 3 4 5 OTE N MARKAN	Peak Search		
Ref Offset 0.5 dB Mkr1 2.480 14 GHz Ekdiv Ref 10.00 dBm -1.481 dBm					
•1			Next Pk Righ		
			Next Pk Lei		
			Marker Delt		
			Mkr→C		
			Mkr→RefL		
BW 3.0 MHz	Sweep 1.	Span 10.00 MHz 000 ms (1001 pts)	Mor 1 of		
		Trig: Pree Run Attain: 20 dB MKC	The Pres Run Action: 20 dB Avgirioid:>100 ¹¹⁰⁰ Cet Material Mikr1 2.490 14 GHz -1.481 dBm		

Pi/4 DQPSK High Channel



12. HOPPING CHANNEL SEPARATION

12.1 Block Diagram Of Test Setup



12.2 Limit

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. 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 0.125W.

12.3 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 = 30kHz. VBW = 100kHz , Span = 2.0MHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.

3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section Submit this plot.



12.4 Test Result

Modulation	Test Channel	Separation (MHz)	Limit(MHz)	Result
GFSK	Low	1.000	0.522	PASS
GFSK	Middle	1.002	0.521	PASS
GFSK	High	1.000	0.532	PASS
Pi/4 DQPSK	Low	0.996	0.821	PASS
Pi/4 DQPSK	Middle	1.000	0.822	PASS
Pi/4 DQPSK	High	1.002	0.811	PASS

Test plots GFSK Low Channel







GFSK Middle Channel

GFSK High Channel







Pi/4 DQPSK Low Channel

Pi/4 DQPSK Middle Channel







Pi/4 DQPSK High Channel



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;

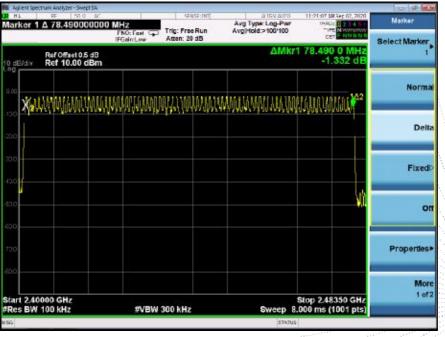


13.4 Test Result



Test Plots: 79 Channels in total GFSK

Pi/4 DQPSK





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

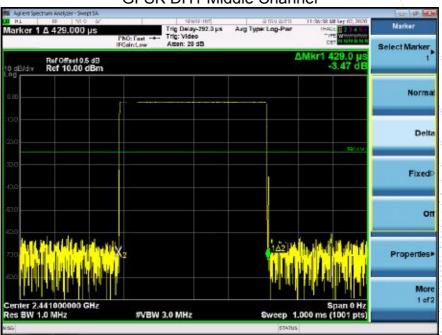
DH5 Packet permit maximum 1600 / 79 / 6 hops per second in each channel (5 time slots RX, 1 time slot TX).

DH3 Packet permit maximum 1600 / 79 / 4 hops per second in each channel (3 time slots 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	0.429	0.137	0.4
GFSK	Middle	DH3	1.698	0.272	0.4
		DH5	2.960	0.316	0.4
		2DH1	0.444	0.142	0.4
Pi/4DQPSK	Middle	2DH3	1.710	0.274	0.4
		2DH5	2.960	0.316	0.4



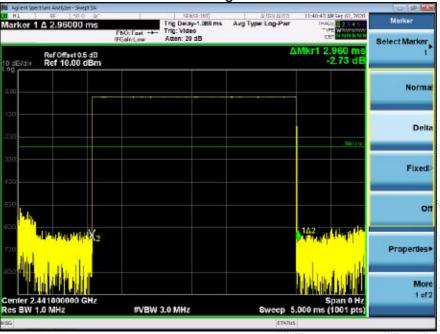
Test Plots GFSK DH1 Middle Channel



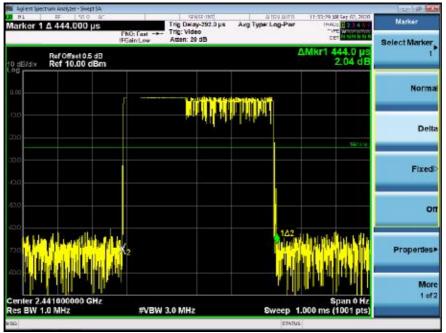
Marker Select Marker 1	11:37:18 M Set 02, 2020 INAU: 0 2 3:4 S CITE WINNING NO	Avg Type: Log-Pwr	Trig Delay-673.0 µs Trig: Video	FNO: Fast -+-	trum anolyzer - Swept SA	larker 1
	Mkr1 1.698 ms -0.11 dB	Δ	Atten: 20 dB	IFGain:Low	Ref Offset 0.5 dB Ref 10.00 dBm	0 gB/div
Norm						100
Deli						
Fixed	1901-01					00
						2,03 2,03
0	A2					
Properties	la a posta da se De tale canada					
Moi 1 of	Span 0 Hz				441000000 GHz	enter 2.4
<u> </u>	000 ms (1001 pts)	Sweep 3.	3.0 MHz	#VBW 3		es BW 1

GFSK DH3 Middle Channel

GFSK DH5 High Middle Channel

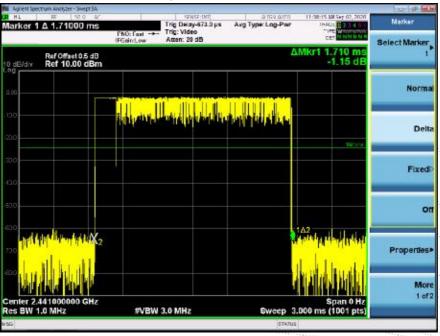




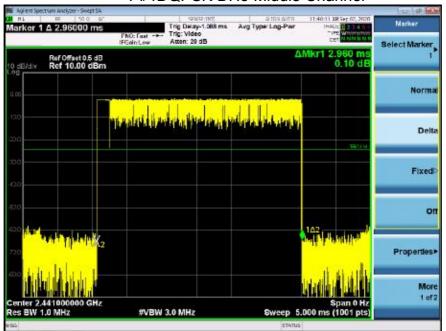


Pi/4DQPSK DH1 Middle Channel

Pi/4DQPSK DH3 Middle Channel







Pi/4DQPSK DH5 Middle Channel



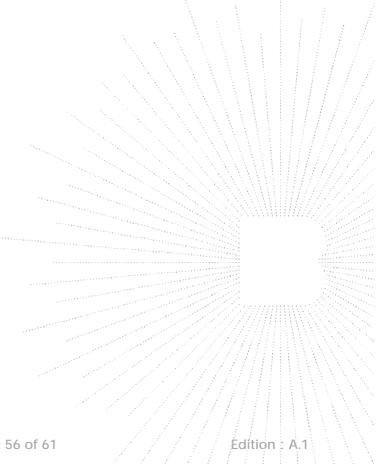
ANTENNA REQUIREMENT 15.

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 Chip antenna, fulfill the requirement of this section.





16. EUT PHOTOGRAPHS

EUT Photo 1

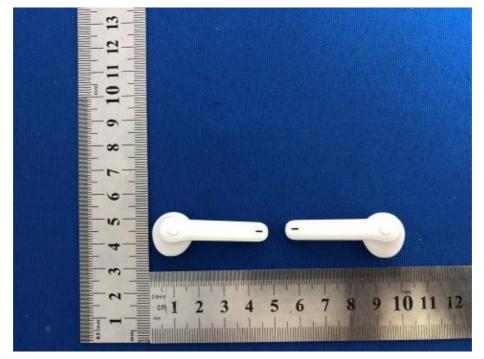


EUT Photo 2





EUT Photo 3



EUT Photo 4





17. EUT TEST SETUP PHOTOGRAPHS

Conducted emissions



Radiated Measurement Photos













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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FAX: 0755-33229357

Website : http://www.bctc-lab.com

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

***** END *****