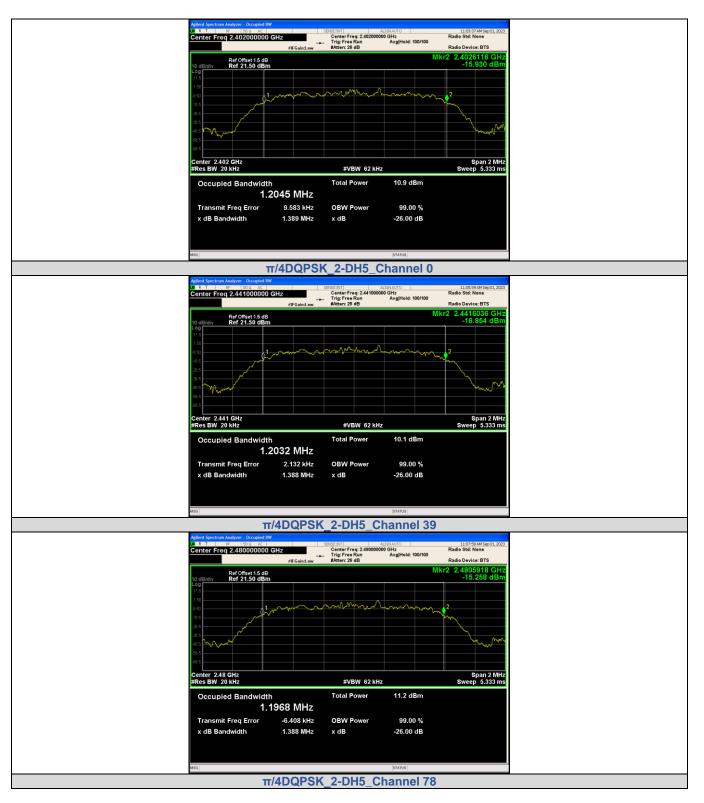


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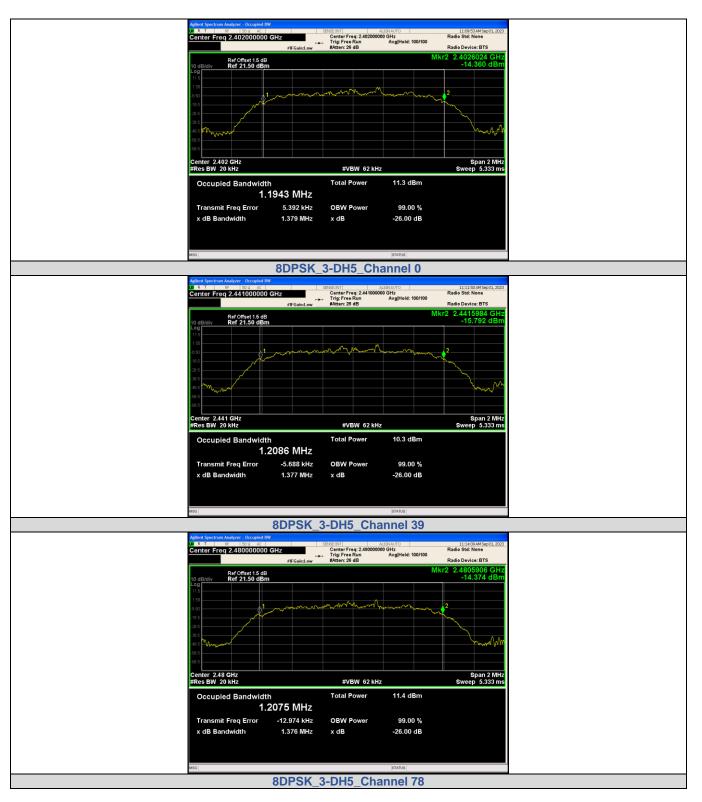




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#### 20dB Bandwidth:

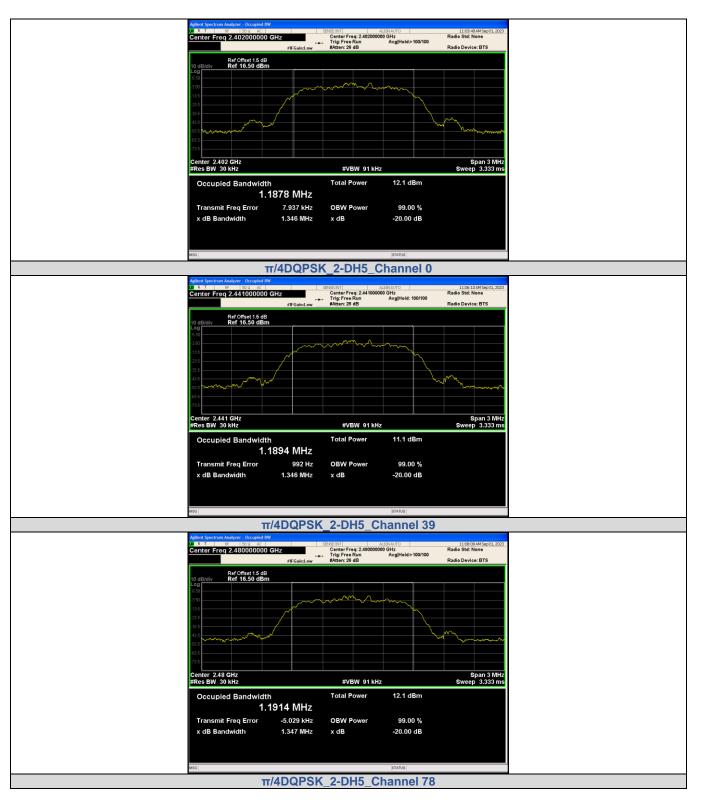


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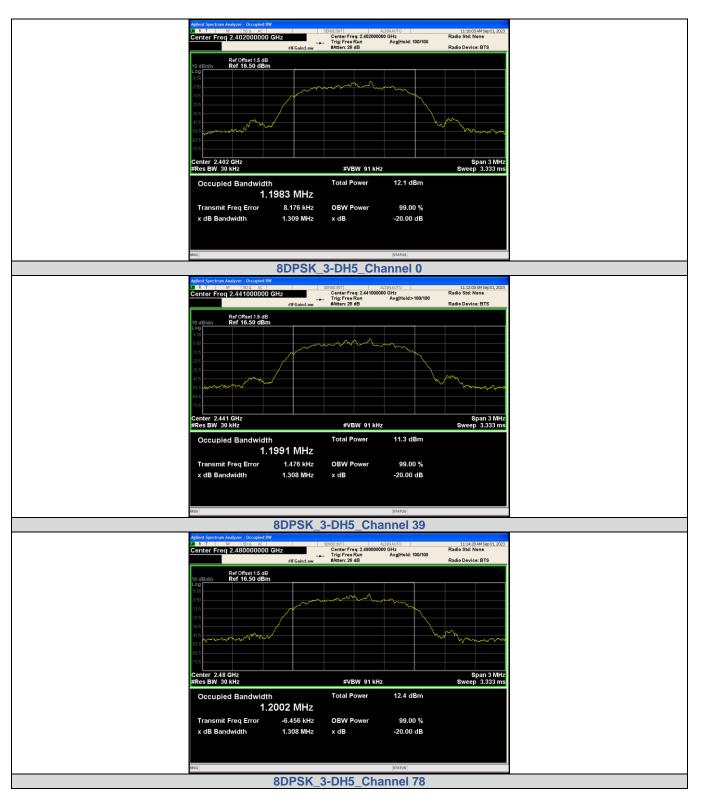




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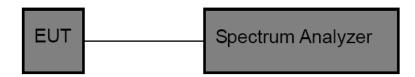
# 3.6. Channel Separation

Limit

# FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(1)

Test Item	Limit	Frequency Range (MHz)
Channel Separation	>25kHz or >two-thirds of the 20 dB bandwidth Which is greater	2400~2483.5

# **Test Configuration**



### **Test Procedure**

1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.

- 2. Spectrum Setting:
  - (1) Set RBW = 100 kHz.
  - (2) Set the video bandwidth (VBW)  $\geq$  3 RBW.
  - (3) Detector = Peak.
  - (4) Trace mode = Max hold.
  - (5) Sweep = Auto couple.

### Test Mode

Please refer to the clause 2.4.

### Test Result

Test Mode	Frequency (MHz)	Carrier Frequencies Separation (MHz)	Limit (MHz)	Verdict
GFSK	Hop_2441	1.0483	0.677	Pass
π/4-DQPSK	Hop_2441	1.1617	0.898	Pass
8-DPSK	Hop_2441	1.0021	0.873	Pass

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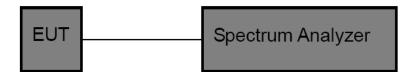
# 3.7. Number of Hopping Channel

<u>Limit</u>

# FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(iii)

Section	Test Item	Limit
15.247 (a)(iii) RSS-247 5.1 d	Number of Hopping Channel	≥15

# **Test Configuration**



### Test Procedure

1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.

2. Spectrum Setting:

(1) Peak Detector: RBW=100 kHz, VBW≥RBW, Sweep time= Auto.

### Test Mode

Please refer to the clause 2.4.

### Test Result

Test Mode	Channel Number	Limit	Verdict
GFSK	79	≥15	Pass
π/4-DQPSK	79	≥15	Pass
8-DPSK	79	≥15	Pass

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T/4DQPSK
Center Freq 2.441750000 GHz PHO: Fail A Grant A Agrin (Leg-Pur True) Freq Angle (Leg-Pur True) Freq Agrin (Leg-Pur True) F
Start 2.40000 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 8.000 ms (1001 pts)
asta asta
Hopping Plot 8DPSK

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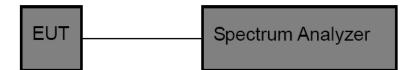
#### **Dwell Time** 3.8.

Limit

# FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(iii)

Section	Test Item	Limit
15.247 (a)(iii) RSS-247 5.1 d	Average Time of Occupancy	0.4 sec

## **Test Configuration**



### **Test Procedure**

- 1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- 2. Spectrum Setting:
  - (1) Spectrum Setting: RBW=1MHz, VBW≥RBW.
  - (2) Use video trigger with the trigger level set to enable triggering only on full pulses.
  - (3) Sweep Time is more than once pulse time.
  - (4) Set the center frequency on any frequency would be measure and set the frequency span to

zero.

- (5) Measure the maximum time duration of one single pulse.
- (6) Set the EUT for packet transmitting.

### **Test Mode**

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Please refer to the clause 2.4.



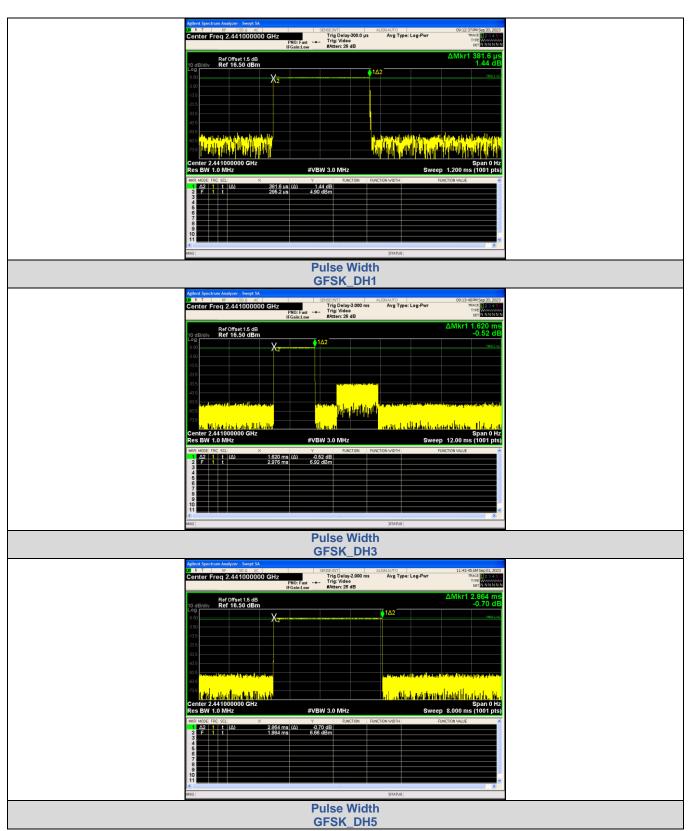
#### **Test Result**

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Test Mode	Channel	Frequency (MHz)	Pulse Time (ms)	Total of Dwell (ms)	Period Time (ms)	Limit (second)	Verdict
	DH1	2441	0.382	122.1	31.60		
GFSK	DH3	2441	1.620	259.2	31.60	≤0.40	Pass
	DH5	2441	2.864	305.5	31.60		
	2DH1	2441	0.386	123.6	31.60		
π/4-DQPSK	2DH3	2441	1.656	265.0	31.60	≤0.40	Pass
	2DH5	2441	2.896	308.9	31.60		
	3DH1	2441	0.389	124.4	31.60		
8-DPSK	3DH3	2441	1.632	261.1	31.60	≤0.40	Pass
	3DH5	2441	2.896	308.9	31.60		

Note: 1DH1/2DH1/3DH1 Total of Dwell = Pulse Time\*(1600/2)\*31.6/79 1DH3/2DH3/3DH3 Total of Dwell = Pulse Time\*(1600/4)\*31.6/79 1DH5/2DH5/3DH5 Total of Dwell = Pulse Time\*(1600/6)\*31.6/79

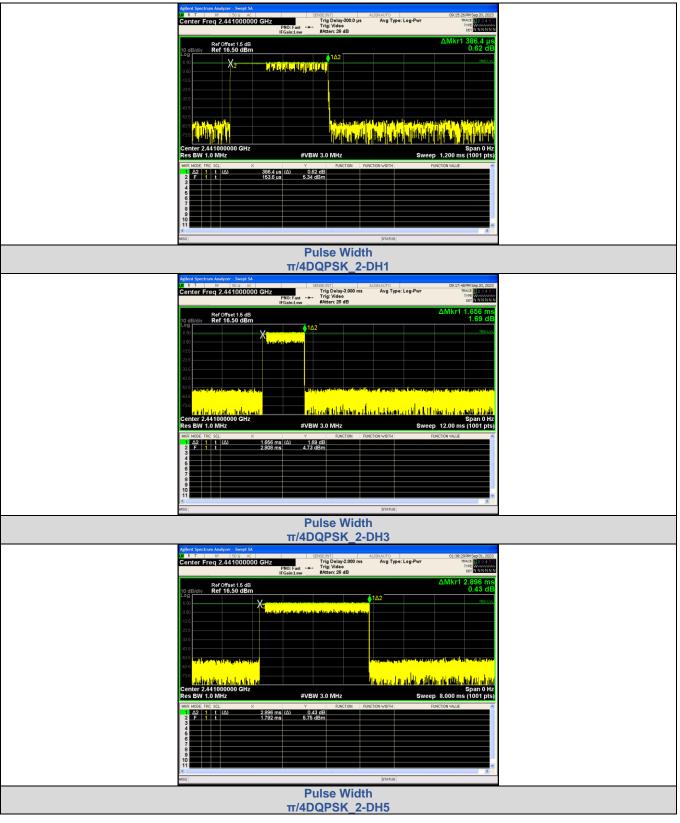




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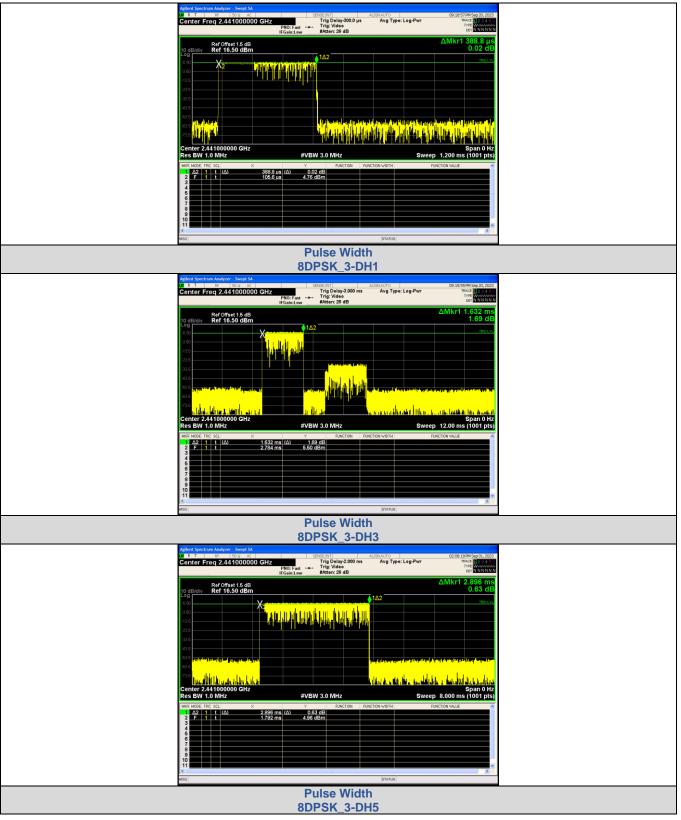




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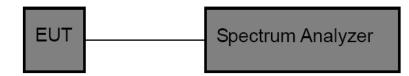
# 3.9. Peak Output Power

Limit

# FCC CFR Title 47 Part 15 Subpart C Section 15.247 (b)(1)

Section	Test Item	Limit	Frequency Range (MHz)
FCC CFR 47 Part15.247 (b)(1)	Maximum Conducted Output Power	Hopping Channels≥75, Power <1W(30dBm); Others <125mW(21dBm)	2400~2483.5

# **Test Configuration**



# **Test Procedure**

1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.

- 2. Spectrum Setting:
  - (1) Set RBW > 20dB Bandwidth.
  - (2) Set  $VBW \ge RBW$ .
  - (3) Detector = Peak.
  - (4) Trace mode = Max hold.
  - (5) Sweep = Auto couple.
  - (6) Span = Approximately five times the 20dB bandwidth, centered on a hopping channel.

### **Test Mode**

Please refer to the clause 2.4.

### **Test Result**

Test Mode	Frequency (MHz)	Conducted Output Power (dBm)	Limit (dBm)	Verdict
	2402	7.097	≤30	Pass
GFSK	2441	6.561	≤30	Pass
	2480	5.977	≤30	Pass
	2402	6.833	≤30	Pass
π/4-DQPSK	2441	5.980	≤30	Pass
	2480	6.962	≤30	Pass
	2402	7.360	≤30	Pass
8-DPSK	2441	6.461	≤30	Pass
	2480	7.474	≤30	Pass

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_			
Agilent Spectrum Analyzer - Swept SA	SENSE:INT	ALIGN AUTO 10:52:44 AM Sep 01, 202	3
Center Freq 2.402000000 GHz	PNO: Fast Trig: Free Run IFGain:Low #Atten: 26 dB	Avg Type: Log-Pwr Avg[Hold: 100/100	6
Ref Offset 1.5 dB	IFGain:Low #Atten: 26 dB	Mkr1 2.401 720 GH 7.097 dBr	
Ref Offset 1.5 dB 10 dB/div Ref 16.50 dBm		7.097 dBr	
C 70	↓ <sup>1</sup>		
6.50			
-3.50			
-13.5			
-23.5			
-33.5			
~43.5			
-53.6			
-63.6			
-73.5			
Center 2.402000 GHz		Span 5.000 MH	7
Center 2.402000 GHz #Res BW 3.0 MHz	#VBW 3.0 MHz	Span 5.000 MH #Sweep 1.000 ms (1001 pts	5)
 Kon I	Book Output D	STATUS	
	Peak Output P	ower	
Astant Construm An Astan Frunt FA	GFSK_Chann	eru	
Aglient Spectrum Analyzer - Swept SA	SENSE:INT	ALIGNAUTO 10:59:47 AM Sep01, 202 Avg Type: Log-Pwr TRACE	3
Canter Freq 2.441000000 GHz	PNO: Fast ++- Trig: Free Run IFGain:Low #Atten: 26 dB	Avg Type: Log-Pwr Avg JHold: 100/100 TRACE 1234 DEF PPPP	en P
Ref Offset 1.5 dB		Mkr1 2.441 035 GH 6.561 dBr	
10 dB/div Ref 16.50 dBm		6.561 dBr	
6.50	<b>↓</b> <sup>1</sup>		
-3.90			
-13.6			
-23.6			
-33.5			
-43.5			
-53.6			
-63.6			
70.6			
43.5			
Center 2.441000 GHz #Res BW 3.0 MHz		Span 5.000 MH #Sweep 1.000 ms (1001 pts	z
#Res BW 3.0 MHz	#VBW 3.0 MHz	#Sweep 1.000 ms (1001 pts status	31
	Peak Output P		
	GFSK_Channe		
Agilent Spectrum Analyzer - Swept SA	GFSK_Channe	51.00	
Center Freq 2.480000000 GHz	SENSE:INT	ALIGNAUTO 11:01:57 AM Sep01, 202 Avg Type: Log-Pwr TRACE	3
Serier - eq 2.46000000 GHz	PNO: Fast ++- Trig: Free Run IFGain:Low #Atten: 26 dB	Avg Type: Log-Pwr TRACE 2349 Avg Hold: 100/100 Type Det PPPP	
Ref Offset 1.5 dB		Mkr1 2.480 095 GH 5.977 dBr	
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6.50	↓1		
3.00			
-13.6			
-23.6			
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-53.6			
-63.6			
-73.5			
Center 2.480000 GHz #Res BW 3.0 MHz	#\/B\W_2.0.1411-	Span 5.000 MH #Sweep 1.000 ms (1001 pts	
MKes BW 5.0 WHZ	#VBW 3.0 MHz	#Sweep 1.000 ms (1001 pts status	2
	Peak Output P		
	GFSK_Channe	2178	
		110	

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Aglend Spectrum Analyzer - Swyd SA 20 R T 8F [90:0 ac   SENEE.BIT] ALIBNAUTO   11:03:54:04/56001,2023	
Center Freq 2.402000000 GHz Avg Type: Log-Pur PN0: Fest Trig: Free Run Avg Type: Log-Pur Fisain:Low Avg Type: Log-Pur Avg Type: Log-Pur	
Ref Offiset 15 dB Mkr1 2.402.095 GHz	
10 dBiddiv Ref 16.50 dBm 6.533 dBm	
3 50	
-13.6	
.716	
-33.5	
435	
63.6	
.735	
Center 2.402000 GHz Span 5.000 MHz #Res BW 3.0 MHz #VBW 3.0 MHz #Sweep 1.000 ms (1001 pts)	
 wsg status	
Peak Output Power	
m/4DQPSK_Channel 0	
U         R.T         RF         SO(2)         SENEE NIT         ALISINATIO         11:05:15:04 Seo(1):023           Constant Encode 2: MARCONDO CALL         SENEE NIT         ALISINATIO         11:05:16:04 Seo(1):023	
IFGaint.ow #Atten: 26 dB Det	
Ref Offset 15 dB Mkr1 2.441 030 GHz	
650 <b>1</b>	
-330	
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-33.5	
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\$3.5	
Center 2.441000 GHz Span 5.000 MHz #Res BW 3.0 MHz #VBW 3.0 MHz #Sweep 1.000 ms (1001 pts)	
ISGO STATUS	
Peak Output Power	
π/4DQPSK_Channel 39 Agilent Spectrum Analyzer - Swept SA	
0 R T RF 50 G AC SENSEDIT ALISMANTO 1108:15AM 5901,2023 Center Fred 2480000000 GHz KAV 579€-L09-Pwr TRACK B201560	
IFGain:Low #Atten: 26 dB Det Calabatitation	
RefOffset 15 dB Mkr1 2.479 850 GHz	
6.50	
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-135	
421.6	
33.5	
435	
43.6	
43.5 43.5 73.5	
635 635 735 Center 2.480000 GHz Span 5.000 MHz	
61         63           63         63           734         734           Center 2.480000 GHz         \$\$pan 5.000 MHz           #Res BW 3.0 MHz         #\$Weep 1.000 ms (1001 pts)	
Center 2.480000 GHz #Kes BW 3.0 MHz #See BW 3.0 MHz Brans Beak Output Power	

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Agitent Spectrum Analyzer - Swept SA L R T RF ISO & AC	SENSE:INT	ALIGNAUTO 11:10:10 AM Sep 01, 2023	
Center Freq 2.40200000	PN0: Fast + Trig: Free Run IFGain:Low #Atten: 26 dB	ALIGNAUTO 11:10:10AM Sep01, 2023 Avg Type: Log-Pwr TRACE 12:3 41 Avg[Hold: 100/100 Type Let PPPPP	
Ref Offset 1.5 dB 10 dB/div Ref 16.50 dBm		Mkr1 2.401 950 GHz 7.360 dBm	
	<b>\</b> 1		
6.50	and the second		
-3.60			
-13.5			
-23.6			
-33.6			
43.5			
52			
-03.0			
63.6			
-73.5			
Center 2.402000 GHz #Res BW 3.0 MHz		Span 5.000 MHz #Sweep 1.000 ms (1001 pts)	
#Res BW 3.0 MHz	#VBW 3.0 MHz	#Sweep 1.000 ms (1001 pts) status	2
	Peak Output P		
	8DPSK_Chan		
Alfilm Synchronia Audyor a synchronia Audyor a synchronia (1993) 1. Rin training (1993) a store Center Freq 2.4441000000 Center Freq 2.4441000000	SENSE:INT	ALIGNAUTO 11:12:06 AM Sep 01, 2023 Avg Type: Log-Pwr TRACE	
	PN0: Fast Trig: Free Run IFGain:Low #Atten: 26 dB	ALIGVAUTO 11:12:06 AM Sep01, 2023 Avg Type: Log-Pwr TRACE Avg[Hold: 100/100 Det PPPP P	
Ref Offset 1.5 dB 10 dB/div Ref 16.50 dBm		Mkr1 2.440 915 GHz 6.461 dBm	
Log	<b>1</b>		
6:50			
-3 50			
-13.5			
-23.5			
-33.6			
-43.5			
-53.5			
-73.6			
Center 2.441000 GHz #Res BW 3.0 MHz	#VBW 3.0 MHz	Span 5.000 MHz #Sweep 1.000 ms (1001 pts)	
MSG		STATUS	
	Peak Output P	ower	
Aglent Spectrum Analyzer - Swept SA	8DPSK_Chann		
Center Freq 2.48000000	GHZ	ALIGNAUTO 11:14:26 AM Sep01, 2023 Avg Type: Log-Pwr TRACE 12:26 AM Sep01, 2023 Avg  Hold: 100/100 Type Mathematical Control of the temperature of temperatur	
	PNO: Fast Trig: Free Run IFGain:Low #Atten: 26 dB	Mkr1 2.479 950 GHz	-
Ref Offset 1.5 dB 10 dB/div Ref 16.50 dBm Log		7.474 dBm	
6.41	<u>1</u>		
1550			
13.5			
-23.5			
-33.5			
43.5			
-53.5			
43.5			
73.5			
Center 2.480000 GHz #Res BW 3.0 MHz	#VBW 3.0 MHz	Span 5.000 MHz #Sweep 1.000 ms (1001 pts)	
мад	Pools Output D	STATUS	
	Peak Output P 8DPSK_Chann		

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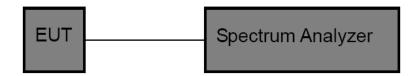


# 3.10. Duty Cycle

# Limit

None, for report purposes only.

# **Test Configuration**



### **Test Procedure**

- 1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- 2. The EUT was directly connected to the Spectrum Analyzer and antenna output port as show in the block diagram above. The measurement according to section 10.2 of KDB 558074 D01 DTS Meas Guidance v05r02.

3. Spectrum Setting: Set analyzer center frequency to test channel center frequency. Set the span to 0Hz. Set the RBW to 10MHz. Set the VBW to 10MHz. Detector: Peak. Sweep time: Auto. Allow trace to fully stabilize. Then use the peak marker function to determine the maximum amplitude level.

### **Test Mode**

Please refer to the clause 2.4.

### **Test Result**

Test Mode	Frequency (MHz)	Transmission Duration (ms)	Transmission Period (ms)	Duty Cycle (%)	1/T Minimum VBW (kHz)	Final Setting for VBW (kHz)
GFSK	2402	2.887	3.749	77.01	0.35	1
	2441	2.885	3.749	76.96	0.35	1
	2480	2.885	3.747	77.00	0.35	1
π/4-DQPSK	2402	2.887	3.749	77.01	0.35	1
	2441	2.887	3.749	77.01	0.35	1
	2480	2.887	3.747	77.05	0.35	1
8-DPSK	2402	2.889	3.747	77.11	0.35	1
	2441	2.889	3.747	77.11	0.35	1
	2480	2.889	3.749	77.07	0.35	1

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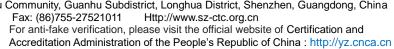
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# 3.11. Antenna Requirement

# **Requirement**

### FCC CFR Title 47 Part 15 Subpart C Section 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. The use of a permanently attached antenna or of 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.

### FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1)(i)

(i) Systems operating in the 2400~2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

### Test Result

The directional gain of the antenna is less than 6dBi, please refer to the EUT internal photographs antenna photo.

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