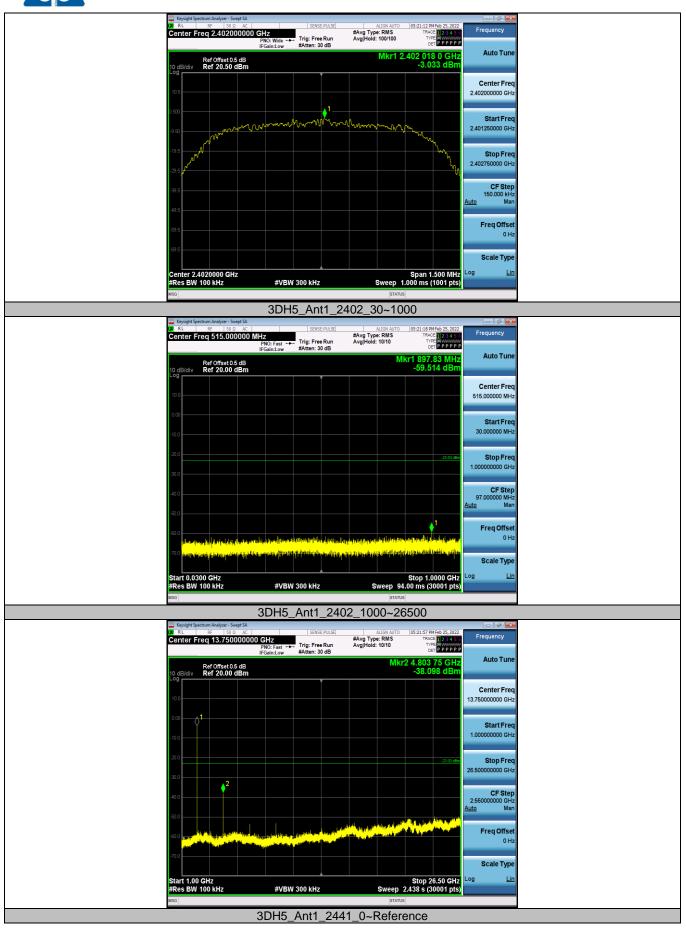


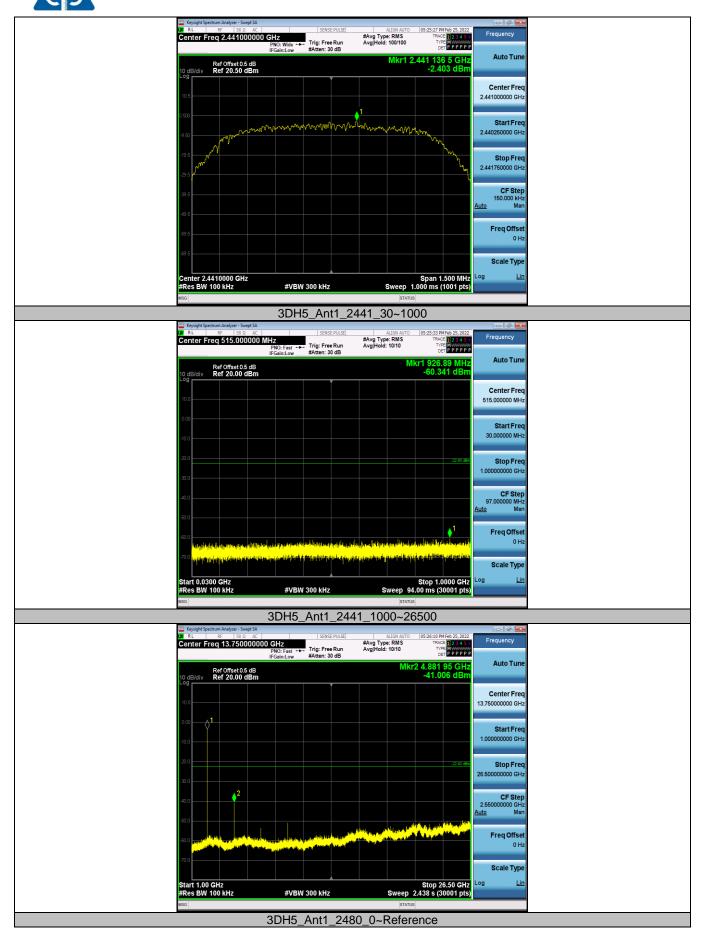
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	Keysight Spectrum Analyzer - Swept SA RL RF 50 Ω AC	SENSE:PULSE	ALIGN AUTO 05	29:24 PM Feb 25, 2022	Frequency	
	Center Freq 2.480000000 GH	O: Wide ↔ Trig: Free Run Gain:Low #Atten: 30 dB	#Avg Type: RMS Avg Hold: 100/100	TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P P P P P P	riequency	
	Ref Offset 0.5 dB		Mkr1 2.48	0 001 5 GHz -1.825 dBm	Auto Tune	
	10 dB/div Ref 20.50 dBm	The second se		-1.025 dBill	Comton Error	
	10.5				Center Freq 2.48000000 GHz	
	0.500	1				
	950	menter fresher when	man many		Start Freq 2.479250000 GHz	
	n north					
	-19.5			m	Stop Freq 2.480750000 GHz	
	-29.5			¥		
	-39.5				CF Step 150.000 kHz	
	-49.5				<u>Auto</u> Man	
	-59.5				Freq Offset	
	.89.5				0 Hz	
	-09.5				Scale Type	
	Center 2.4800000 GHz #Res BW 100 kHz	#\/B\M 300 kHz	Swaan 1.000	pan 1.500 MHz ms (1001 pts)	Log <u>Lin</u>	
	MSG	#VBW 300 kHz	Sweep 1.000 STATUS	nis (1001 pts)		
		3DH5_Ant1_24	480_30~1000			
	Keyzight Spectrum Analyzer - Swept SA X RL RF 50 Ω AC	SENSE:PULSE	ALIGN AUTO 05	29:30 PM Feb 25, 2022	Frequency	
	Center Freq 515.000000 MHz	NO: Fast ↔ Trig: Free Run Gain:Low #Atten: 30 dB	#Avg Type: RMS Avg Hold: 10/10	TRACE 1 2 3 4 5 6 TYPE MWWWWW DET PPPPP		
	Ref Offset 0.5 dB		Mkr1	700.21 MHz 60.658 dBm	Auto Tune	
	10 dB/div Ref 20.00 dBm			00.038 GBII		
	10.0				Center Freq 515.000000 MHz	
	0.00					
	10.0				Start Freq 30.000000 MHz	
	-10.0					
	-20.0			-21.83 dBm	Stop Freq 1.00000000 GHz	
	-30.0				1.00000000 GH2	
	-40.0				CF Step 97.000000 MHz	
	-50.0				<u>Auto</u> Man	
			↓ 1		Freq Offset	
	and a second	and we have a state of the stat	and the second se	Huddel Restauration	0 Hz	
	-70.0 phyliol and principal and phyliol film.	unanimity a print of the print of the second	te han a prize a parte data parte	al anticipanti anci a	Scale Type	
	Start 0.0300 GHz			op 1.0000 GHz	Log <u>Lin</u>	
	#Res BW 100 kHz	#VBW 300 kHz	Sweep 94.00	ms (30001 pts)		
		DH5_Ant1_248		00		
	Keysight Spectrum Analyzer - Swept SA RL RF 50 Ω AC	SENSE:PULSE	ALIGN AUTO 05	30:09 PM Feb 25, 2022		
	Center Freq 13.750000000 G	HZ NO: Fast ↔ Trig: Free Run	#Avg Type: RMS Avg Hold: 10/10	TRACE 1 2 3 4 5 6 TYPE MWWWW DET P P P P P P	Frequency	
	IFC	Gain:Low #Atten: 30 dB	Mkr2 4	.960 15 GHz	Auto Tune	
	Ref Offset 0.5 dB 10 dB/div Ref 20.00 dBm			41.661 dBm		
	10.0				Center Freq 13.75000000 GHz	
					Start Freq 1.00000000 GHz	
	=10.0				1.00000000 GHZ	
	-20.0			-21.83 dBm	Stop Freq	
	-30.0				26.50000000 GHz	
	-40.0				CF Step 2.55000000 GHz	
	50.0				Auto Man	
					Freq Offset	
	-60.0				0 Hz	
	-70.0				Scale Type	
	Start 1.00 GHz		s	top 26.50 GHz		
	#Res BW 100 kHz	#VBW 300 kHz	Sweep 2.43	8 s (30001 pts)		
L			STATUS			

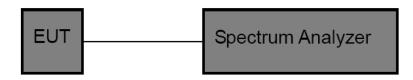


3.5. Bandwidth

Limit

N/A

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. OCB and 20dB Spectrum Setting:
 - (1) Set RBW = $1\% \sim 5\%$ occupied bandwidth.
 - (2) Set the video bandwidth (VBW) \geq 3 RBW.
 - (3) Detector = Peak.
 - (4) Trace mode = Max hold.
 - (5) Sweep = Auto couple.

Note: The EUT was set to continuously transmitting in each mode and low, Middle and high channel for the test.

Test Mode

Please refer to the clause 2.4.

Test Results

Modulation type	Channel	Occupied Bandwidth (MHz)	20dB Bandwidth (MHz)	20dB Bandwidth *2/3 (MHz)
	00	0.810	0.888	0.592
GFSK	39	0.825	0.882	0.588
	78	0.817	0.885	0.590
π /4-DQPSK	00	1.181	1.326	0.884
	39	1.180	1.332	0.888
	78	1.180	1.326	0.884
	00	1.179	1.314	0.876
8-DPSK	39	1.184	1.311	0.874
	78	1.186	1.320	0.880

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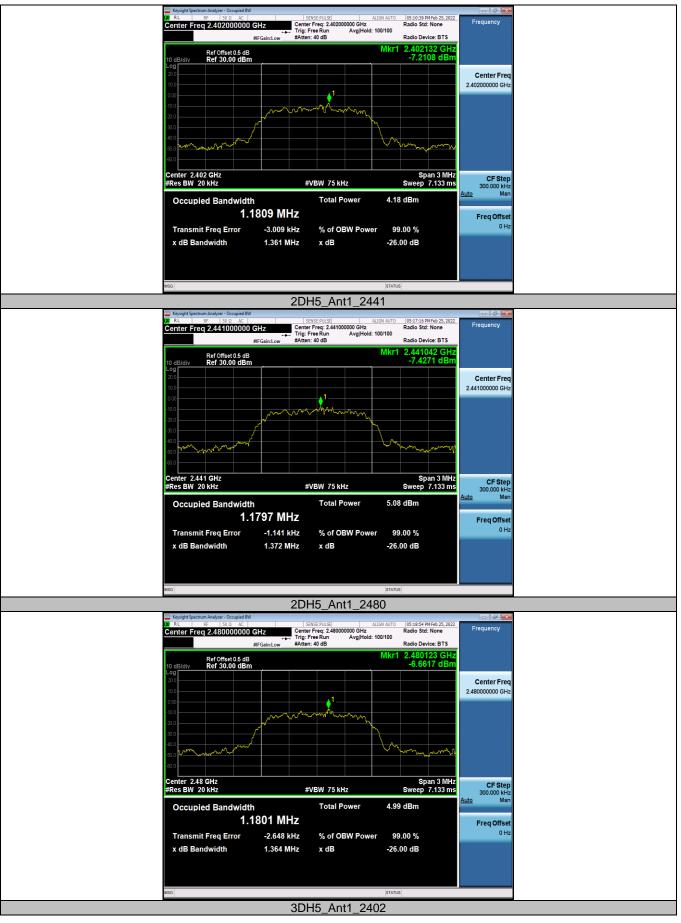




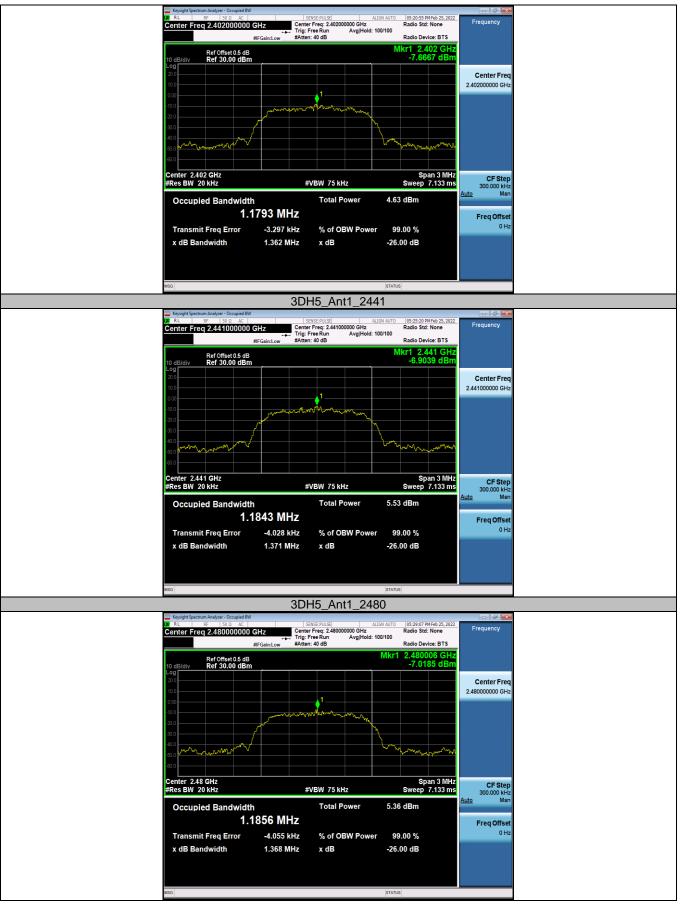


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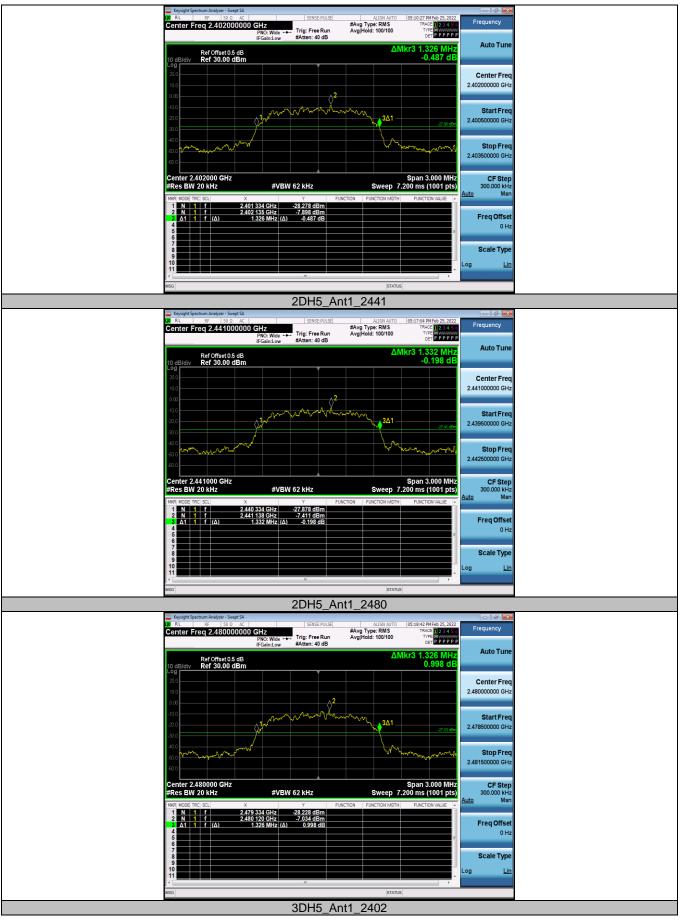




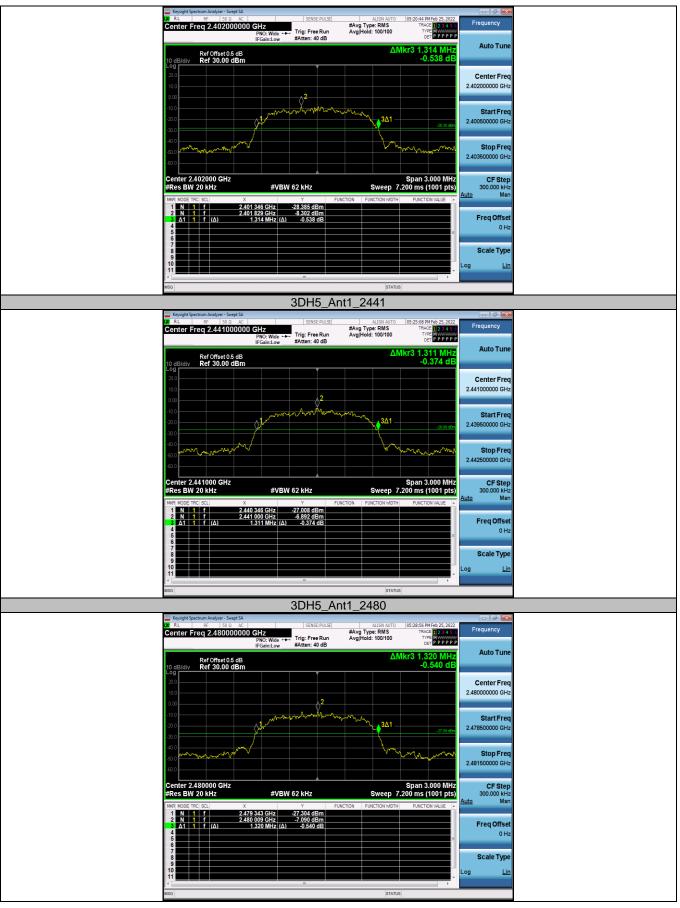












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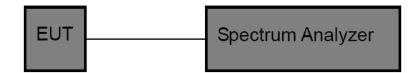
3.6. Channel Separation

<u>Limit</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(1)/ RSS-247 5.1 b :

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 Results

Modulation type	Channel	Carrier Frequencies Separation (MHz)	Limit (MHz)	Result
GFSK	39	1.012	0.588	Pass
π /4-DQPSK	39	1.018	0.888	Pass
8-DPSK	39	0.992	0.874	Pass









3.7. Number of Hopping Channel

<u>Limit</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(iii)/ RSS-247 5.1 d:

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

Modulation type	Channel number	Limit	Result
GFSK	79		
π /4-DQPSK	79	≥15.00	Pass
8DPSK	79		



Test plot as follows:		
	R R S0 0 AC SENSE-DUILSE ALTON AUTO 05-22-07 DM Exh 25 2022	e 💌
	Center Freq 2.441750000 GHz Freque #Avg Type: RMS There is a set in the set of t	ncy D Tune
	20.0	tFreq
		p Freq 00 GHz F Step 00 MHz
	400 Auto	Man Offset 0 Hz e Type
	Start 2.40000 GHz Stop 2.48350 GHz Log #Res BW 100 kHz #VBW 300 kHz Sweep 8.000 ms (1001 pts) Log	Lin
	2DH5_Ant1_Hop	
	Keysight Spectrum Analyzer - Swept SA SENSE PULSE ALIGN AUTO 05:36:32 PM Feb 25, 2022	
	Center Freq 2:44 fr 30000 offiz Trig: Free Run IFGainLow Avg Hold: 1000/1000 Trig: Free Run e Avg Hold: 1000/1000 Trig: Free Run official content Ref Offset 0.5 dB Autor Autor Autor Autor Autor) Tune
		r Freq 00 GHz
		rt Freq 00 GHz p Freq
	2000 2.4335000 2.4350000 2.435000000000000000000000000000000000000	00 GHz F Step 00 HHz Man
		Offset 0 Hz
	Scal Start 2.40000 GHz Stop 2.48350 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 8.000 ms (1001 pts)	E Type Lin
	asci istatus	
	Keysight Spectrum Analyzer - Swept SA RL RF 50.0, AC SENSE-PULSE ALIGN AUTO 05:42:28 PM Feb 25:2022	2 <u>2</u>
	PNO Fast →→ PNO Fast →→ Figure Factors and Augitedia: 1000/1000 Tree Factors and Augitedia: 1000/1000/1000 Tree Factors and Augitedia: 1000/100	Tune
	10 dididiv Ref 30.00 dBm	r Freq 00 GHz
	2.4836000 200	p Freq 00 GHz F Step 00 MHz
		Man Offset 0 Hz
		e Type Lin
	Start 2.40000 GHz Stop 2.48350 GHz Log #Res BW 100 kHz #VBW 300 kHz Sweep 8.000 ms (1001 pts)	

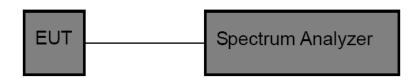


3.8. Dwell Time

<u>Limit</u>

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

Please refer to the clause 2.4.

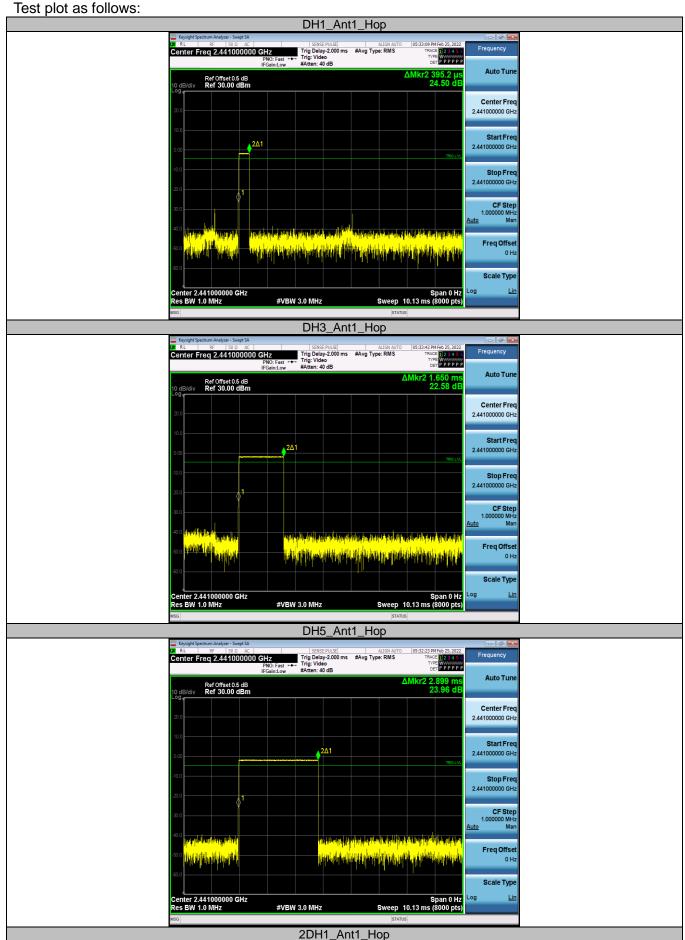


Test Result

Modulation type	Channel	Channel (MHz)	Pulse Time (ms)	Total of Dwell (ms)	Period Time (ms)	Limit (Second)	Result
	DH1	2441	0.40	128.00	31.60		
GFSK	DH3	2441	1.65	264.00	31.60	≤ 0.40	Pass
	DH5	2441	2.90	309.33	31.60		
	2DH1	2441	0.40	128.00	31.60		
π /4-DQPSK	2DH3	2441	1.66	265.60	31.60	≤ 0.40	Pass
74-DQF3N	2DH5	2441	2.90	309.33	31.60		
	3DH1	2441	0.41	131.20	31.60		
8-DPSK	3DH3	2441	1.66	265.60	31.60	≤ 0.40	Pass
	3DH5	2441	2.91	310.40	31.60		

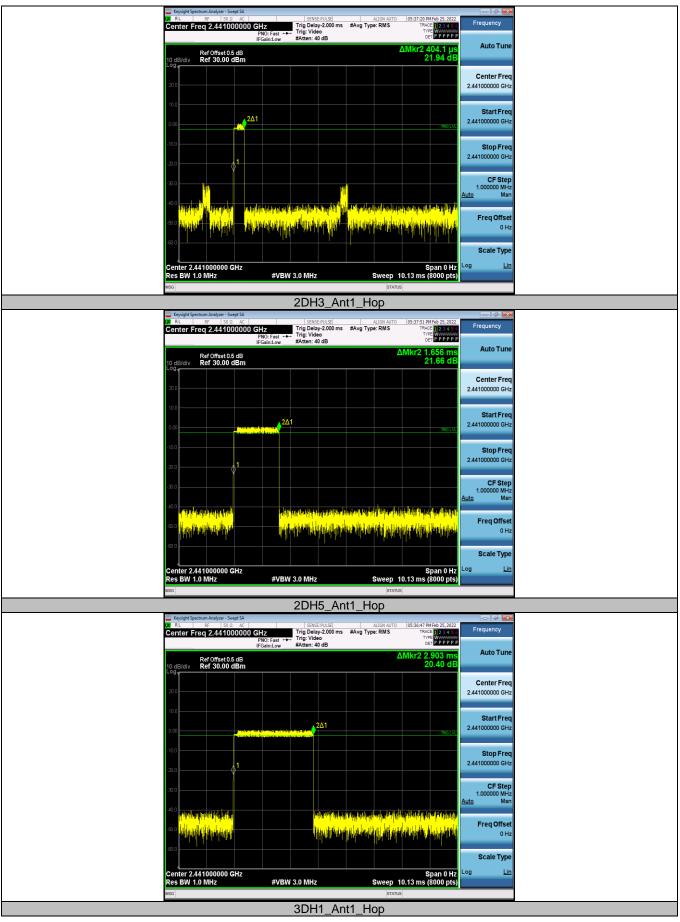
Note: 1DH1/2DH1/3DH1 Total of Dwell = Pulse Time*(1600/2)*31.6/79 1DH3/2DH3/3DH3 Total of Dwell = Pulse Time*(1600/4)*31.6/79 1DH5/2DH5/3DH5 Total of Dwell = Pulse Time*(1600/6)*31.6/79



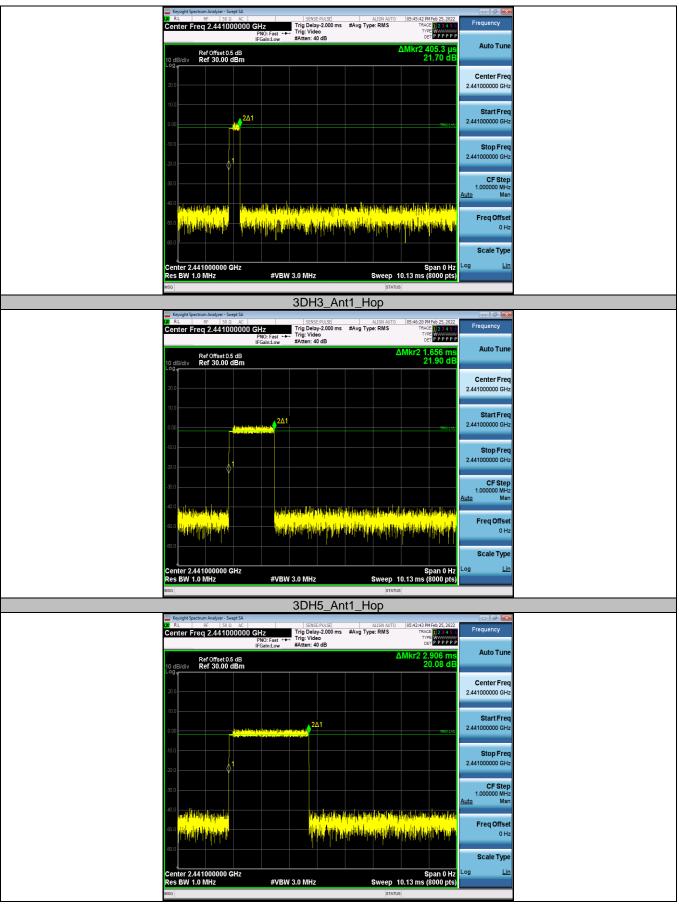














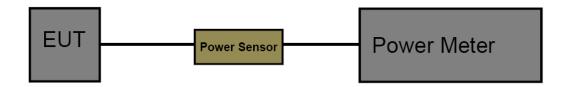
3.9. Peak Output Power

Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (b)(1) / RSS-247 5.4 b:

Test Item	Limit	Frequency Range(MHz)
Peak Output Power	Hopping Channels>75 Power<1W(30dBm) Other <125mW(21dBm)	2400~2483.5

Test Configuration



Test Procedure

- 1. The maximum conducted output power may be measured using a broadband Peak RF power meter.
- Peak power measurements were performed only when the EUT was transmitting at its maximum 2. power control level using a broadband power meter with a pulse sensor.
- The power meter implemented triggering and gating capabilities which were set up such that power 3. measurements were recorded only during the ON time of the transmitter.
- 4. Record the measurement data.

Test Mode

Please refer to the clause 2.4.

Test Result

Modulation type	Channel	Output power (dBm)	Limit (dBm)	Result
	00	-2.28		Pass
GFSK	39	-1.48	< 21.00	
	78	-1.62		
	00	0.43		Pass
π /4-DQPSK	39	1.21	< 21.00	
	78	1.20		
	00	1.23		
8-DPSK	39	1.99	< 21.00	Pass
	78	1.85		



3.10. 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 less than 6dBi, please refer to the EUT internal photographs antenna photo.