



9. HOPPING CHANNEL SEPARATION

Test Requirement:	FCC Part15 C Section 15.247 (a)(1), RSS 247 5.1
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=30KHz, VBW=100KHz, detector=Peak
Limit:	GFSK: 20dB bandwidth π/4-DQPSK & 8DSK: 0.025MHz or 2/3 of the 20dB bandwidth (whichever is greater)

Project No.: ZHT-240410003E

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9.1 Test Setup

FECTROM	
NALYZER	
4	ANALYZER

9.2 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.

9.3 DEVIATION FROM STANDARD No deviation.

9.4 Test Result

Mode	Hopping Freq1 (MHz)	Hopping Freq2 (MHz)	HFS (MHz)	Limit (MHz)	Verdict
1-DH5	2401.872	2403.042	1.17	0.986	Pass
1-DH5	2441.062	2442.092	1.03	0.983	Pass
1-DH5	2479.01	2480.016	1.006	0.983	Pass
2-DH5	2401.856	2402.98	1.124	0.890	Pass
2-DH5	2441.032	2442.024	0.992	0.897	Pass
2-DH5	2479.034	2480.026	0.992	0.896	Pass
3-DH5	2402.03	2403.022	0.992	0.895	Pass
3-DH5	2441.024	2442.196	1.172	0.894	Pass
3-DH5	2478.868	2479.86	0.992	0.891	Pass











Center Freq 2.479500	AC SENSELINT DOOD GHz PNO: Wide IFGain:Low #Atten: 30 dB	Avg Type: Log-Pwr Avg Hold:>100/100	11:57:03 AM Apr18, 2024 TRACE 2 3 4 5 6 TYPE M WWWWW DET P NNNN
Ref Offset 2.03 10 dB/div Ref 20.00 dE	dB Bm	Mkr	1 2.479 010 GHz 5.412 dBm
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Center 2.479500 GHz #Res BW 30 kHz	#VBW 100 kHz	Sween	Span 2.000 MHz 2.133 ms (1001 pts)
MKR MODE TRO SCL	2.479 010 GHz 5.412 dBm		
2 N f 3 4	2.480 016 GHz 6.527 dBm		
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Keysight Spectrum Analyzer - Swept	AC SENSE(INT		11:59:17 AM Apr18, 2024
	AC SENSE(INT	Avg Type: Log-Pwr Avg Hold:>100/100	11:59:17 AM Apr18, 2024 TRACE 1 2 3 4 5 6 TYPE M WWWWW DET P N N N N N
020 RL RF 50 Ω Center Freq 2.402500 Ref Offset 2.03 10 dB/div Ref 20.00 dB	AC SENSE(INT) 000 GHz PNO: Wide IFGain:Low HAtten: 30 dB dB	Avg Type: Log-Pwr Avg Hold:>100/100	11:59:17 AM Apr 18, 2024
M RL RF 50 Q Center Freq 2.402500 Ref Offset 2.03 10 dB/div Ref Offset 2.03 10 dB/div Ref 20.00 dB 10 dB/div Ref 20.00 dB	AC SENSE(INT) 000 GHz PNO: Wide IFGain:Low HAtten: 30 dB dB	Avg Type: Log-Pwr Avg Hold:>100/100	11:59:17 AM APT18, 2024 TRACE 23 4 5 6 TYPE M WWWWW DET P NNNNN 2.401 856 GHz
020 RL RF 50 Ω Center Freq 2.402500 Ref Offset 2.03 10 dB/div Ref 20.00 dB	AC SENSE(INT) 000 GHz PNO: Wide IFGain:Low HAtten: 30 dB dB	Avg Type: Log-Pwr Avg Hold:>100/100	11:59:17 AM APT18, 2024 TRACE 23 4 5 6 TYPE M WWWWW DET P NNNNN 2.401 856 GHz
Center Freq 2.402500 Center Freq 2.402500 Ref Offset 2.03 10 dB/div Ref 20.00 dB 10 dB/div Ref 20.00 dB	AC SENSE(INT) 000 GHz PNO: Wide IFGain:Low HAtten: 30 dB dB	Avg Type: Log-Pwr Avg Hold:>100/100	11:59:17 AM APT18, 2024 TRACE 23 4 5 6 TYPE M WWWWW DET P NNNNN 2.401 856 GHz
M RL RF 50 Q Center Freq 2.402500 Ref Offset 2.03 10 dB/div Ref 20.00 dE 20 dB/div Ref 20.00 dE	AC SENSE(INT) 000 GHz PNO: Wide IFGain:Low HAtten: 30 dB dB	Avg Type: Log-Pwr Avg Hold:>100/100	11:59:17 AM APT18, 2024 TRACE 23 4 5 6 TYPE M WWWWW DET P NNNNN 2.401 856 GHz
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M RL RE 50 2 Center Freq 2.402500 Ref Offset 2.03 Ref Offset 2.03 10 dB/div Ref 20.00 dB Ref 20.00 dB 20.0	AC SENSE(INT) 000 GHz PNO: Wide IFGain:Low HAtten: 30 dB dB	Avg Type: Log-Pwr Avg Hold:>100/100 Mkr	11:59:17 AM Aprils, 2024 TRACE 12 3 + 5 6 TYPE IM WWWWWW DETIP NINNN 1 2.401 856 GHz 5.723 dBm
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MKR MO	DE TRC SCL	402 030 GHz	Y FUNCTION 6.703 dBm	FUNCTION WDTH	FUNCTION V		
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Keysig	ht Spectrum Analyzer - Swept SA RF 50 Ω AC		VNT 3-DH5 24	141MHz Ant1	12	2'33'17 PM Ant 18, 2024	
Keysig			SENSE (INT)	- Y - Y - S	og-Pwr 00/100	- 6 💌	
10 dB/c	RF 50 Ω AC	DO GHz PNO: Wid IFGain:Lo	SENSE (INT)	141MHz Ant1	og-Pwr 00/100	2'33'17 PM Ant 18, 2024	
10 dB/c 10 dB/c 10 dB/c	Ref Offset 2.04 dE	DO GHz PNO: Wid IFGain:Lo	SENSE (INT)	141MHz Ant1	og-Pwr 00/100	2:33:17 PM Apr 18, 2024 TRACE 12 3 5 6 TYPE M WWWW DET P N N N N 441 024 GHz	
UN RL Cente	RF 50 Ω AC	DO GHz PNO: Wid IFGain:Lo	SENSE (INT)	141MHz Ant1	og-Pwr 00/100	2:33:17 PM Apr 18, 2024 TRACE 12 3 5 6 TYPE M WWWW DET P N N N N 441 024 GHz	
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Cent	er Freq 2.4795	500000 GHz		g: Free Run ten: 30 dB	Avg Ty Avg Hol	pe: Log-Pwr d:>100/100	T	ACE 1 2 3 4 5 O
10 dE	Ref Offset 2					М	kr1 2.478 6.3	868 GHz 331 dBm
Log		A1				<u>^2</u>		
10.0		2				ham	44	
0.00	mon	- mm	man	Simo	mond	4 min	mm	mon
-10.0								
-20.0								
-30.0								
1.5.2								
-40,0								
-50.0						-		
-60.0								
-70,0								
	er 2.479500 GH	z				No.	Span	2.000 MHz
#Res	BW 30 kHz		#VBW 10	0 kHz		Swee	p 2.133 ms	(1001 pts
	ODE TRC SCL	X 2.478 868 GH	z 6.331 dBm	FUNCTION	FUNCTION WIDTH		FUNCTION VALUE	
2	N f N f	2.479 860 GH	z 6.839 dBm					
3 4								
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10.NUMBER OF HOPPING FREQUENCY

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Test Requirement:	FCC Part15 C Section 15.247 (a)(1)(iii), RSS-247 5.1
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=100kHz, VBW=300kHz, Frequency range=2400MHz-2483.5MHz, Detector=Peak
Limit:	15 channels
	23.5 P3.5 P3.5 P3.5

10.1 Test Setup

EUT	SPECTRUM]
	ANALYZER	

10.2 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;

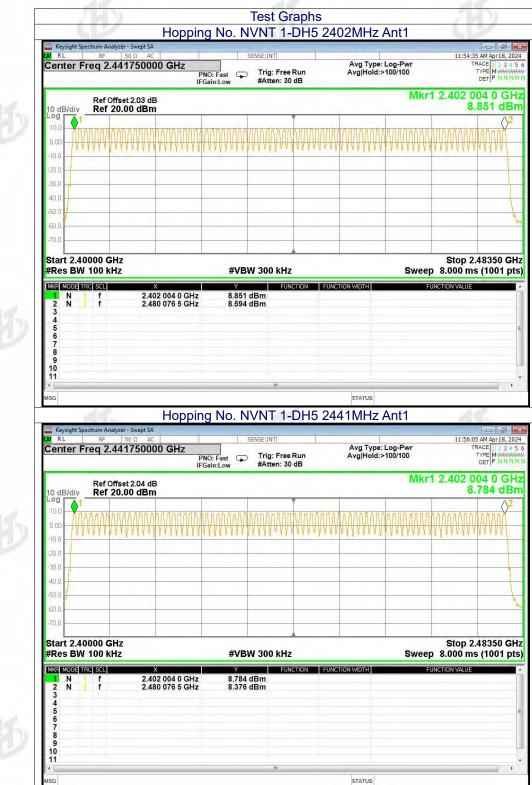
10.3 DEVIATION FROM STANDARD

No deviation.





10.4 Test Result







	enter Freq 2.4417	Pi IFC	NO: Fast 😱 T Gain:Low #	rig: Free Run Atten: 30 dB	Avg Type: Log-F Avg Hold:>100/1	00	TRACE 12 3 4 5 6 TYPE MWWWW DET P NNNN 920 5 GHZ	
	0 dB/div Pg 1 Ref Offset 2. Ref 20.00			Ť.			8.386 dBm	
			MMMM	WWWWW	WWWWWWWWW	MANAAAAA	VAAAAA	
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	tart 2.40000 GHz Res BW 100 kHz		#VBW 3	00 kHz	2 2	Stop Sweep 8.000	2.48350 GHz ms (1001 pts)	
	KR MODE TRC SCL 1 N 1 f 2 N f	X 2.401 920 5 GHz	8.386 dBr	n	UNCTION WIDTH	FUNCTION VAL	UE A	
1	3 4	2.480 076 5 GHz	8.587 dBr	n				
	5 6 7							
	8 9 10							
Ms				m	STATUS			
		Honnin						
		I IUUUUI	g No. NVI	NT 2-DH5 2	402MHz Ant	1		
	Keysight Spectrum Analyzer - Sw RL RF 50 S	vept SA 2 AC		NT 2-DH5 2	2402MHz Ant	11:5	69:57 AM Apr 18, 2024	
		wept SA 2 AC 50000 GHz	SENSI	Contraction of the second	2402MHz Ant Avg Type: Log-F Avg Hold:>100/1			
C	RL RF 50 S Ref Offset 2.	AC 2	SENSI	E:INT	Avg Type: Log-F	^{11:5} 00 Mkr1 2.402	39:57 AM Apr 18, 2024 TRACE 1 2 3 4 5 6 TYPE MWWWW DET P N N N N 087 5 GHz	
C 11 L	RL RF 50 2 enter Freq 2.44173 Ref Offset 2. 0 dB/div Ref Offset 2. 0 dB/div Ref 20.00	AC A	SENSI NO: Fast CP T Sain:Low #	E:INT Trig: Free Run Atten: 30 dB	Avg Type: Log-F Avg Hold:>100/1	11:5 200 Mkr1 2.402	9:57 AM Apr 18, 2024 TRACE 23 4 5 6 TYPE MWWWW DET P NMNNN 087 5 GHz 7.569 dBm	
() 11 12 13 14 14 14 14 14 14 14 14 14 14 14 14 14	RL RF 50 ft enter Freq 2.4417 Ref Offset 2. 0 dB/div Ref Offset 2. 0 dB/div Ref 20.00 0 dB/div Ref 20.00	AC A	SENSI NO: Fast CP T Sain:Low #	E:INT Trig: Free Run Atten: 30 dB	Avg Type: Log-F	11:5 200 Mkr1 2.402	9:57 AM Apr 18, 2024 TRACE 23 4 5 6 TYPE MWWWW DET P NMNNN 087 5 GHz 7.569 dBm	
() 1 1 1 1 1 1 1 1 1	RL RF 50 2 enter Freq 2.44173 0 dB/div Ref 20.00	AC A	SENSI NO: Fast CP T Sain:Low #	E:INT Trig: Free Run Atten: 30 dB	Avg Type: Log-F Avg Hold:>100/1	11:5 200 Mkr1 2.402	9:57 AM Apr 18, 2024 TRACE 23 4 5 6 TYPE MWWWW DET P NMNNN 087 5 GHz 7.569 dBm	
ور ال ال ال ال ال ال ال ال ال	RL RF 50 C	AC A	SENSI NO: Fast CP T Sain:Low #	E:INT Trig: Free Run Atten: 30 dB	Avg Type: Log-F Avg Hold:>100/1	11:5 200 Mkr1 2.402	9:57 AM Apr 18, 2024 TRACE 2, 2 3 4 5 6 TYPE MWWWW DET P NANNN 087 5 GHz 7.569 dBm	
() 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	RL RF 50 5 Ref Offset 2. 0 dB/div Ref 20.00 0 dB/div Ref 20.00 0 dB/div Ref 20.00 0 dB/div Ref 20.00 0 dB/div Ref 20.00	AC A	SENSI NO: Fast CP T Sain:Low #	E:INT Trig: Free Run Atten: 30 dB	Avg Type: Log-F Avg Hold:>100/1	11:5 200 Mkr1 2.402	9:57 AM Apr 18, 2024 TRACE 2, 2 3 4 5 6 TYPE MWWWW DET P NANNN 087 5 GHz 7.569 dBm	
() 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	RL RF 50 C	AC A	SENSI NO: Fast CP T Sain:Low #	E:INT Trig: Free Run Atten: 30 dB	Avg Type: Log-F Avg Hold:>100/1	11:5 200 Mkr1 2.402	9:57 AM Apr 18, 2024 TRACE 2, 2 3 4 5 6 TYPE MWWWW DET P NANNN 087 5 GHz 7.569 dBm	
C 11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	RL RF 50 ff Center Freq 2.4417 Ref Offset 2. Ref Offset 2. 0 dB/div Ref 20.00 Ref 20.00 Ref 20.00 0 dB/div Ref 20.00 Ref 20.00 Ref 20.00 Ref 20.00 0 dB/div Ref 20.00 Ref 20.	AC A	VO: Fast T Sain:Low #	EINT	Avg Type: Log-F Avg Hold:>100/1	Mkr1 2.402	99:57 Maprills, 2024 TRACE 1 3 4 5 6 TYPE M WWWW DET P MINNIN 087 5 GHz 7.569 dBm 2.48350 GHz	
C 11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	RL RF 50 C center Freq 2.4417 Ref Offset 2. 0 dB/div Ref 20.00 0 dB/div Ref 20.00 <	vept SA 2 AC 50000 GHz Pi IF4 03 dB dBm	VO: Fast T jain:Low #	Eant rig: Free Run Atten: 30 dB	Avg Type: Log- Avg Hold:>100/1	Mkr1 2.402	9:9:73 Maprills 2024 TRACE 3 5 6 TYPE MANNAW DET P MANNA DET P MANNA 2 2.48350 GHz ms (1001 pts)	
C 11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	RL RF 50 C center Freq 2.4417 Ref Offset 2. 0 dB/div Ref 20.00 0 dB/div Ref 20.00 <	AC A	VO: Fast T Sain:Low #	EANT rig: Free Run Atten: 30 dB AMANANANANANANANANANANANANANANANANANANA	Avg Type: Log- Avg Hold:>100/1	Mkr1 2.402	9:9:73 Maprills 2024 TRACE 3 5 6 TYPE MANNAW DET P MANNA DET P MANNA 2 2.48350 GHz ms (1001 pts)	
C 11 12 13 14 14 14 14 14 14 14 14 14 14 14 14 14	RL RF 50 S center Freq 2.4417 Ref Offset 2. 0 dB/div Ref 20.00 0 g 1 0.00 1 0.01 1 0.02 1 0.03 1 0.04 1 0.05 1 0.06 1 0.07 1 0.08 1 0.09 1 0.00 1 0.00 1 0.00 1 0.00 1 0.00 1 0.00 1 0.00 1 0.00 1 0.00 1 0.00 1 0.00 1 0.00 1 0.00 1 0.00 1 0.00 1 0.00 1 0.00 1 0.00 1 0.00 1 <t< td=""><td>xept SA 2 AC 50000 GHz PI IF(0.3 dB dBm WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW</td><td>VO: Fast T jain:Low # WWW/WWWW WWWWWWWWW WWWWWWWWWWWWWWWWWW</td><td>EANT rig: Free Run Atten: 30 dB AMANANANANANANANANANANANANANANANANANANA</td><td>Avg Type: Log- Avg Hold:>100/1</td><td>Mkr1 2.402</td><td>9:9:73 Maprills 2024 TRACE 3 5 6 TYPE MANNAW DET P MANNA DET P MANNA 2 2.48350 GHz ms (1001 pts)</td><td></td></t<>	xept SA 2 AC 50000 GHz PI IF(0.3 dB dBm WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW	VO: Fast T jain:Low # WWW/WWWW WWWWWWWWW WWWWWWWWWWWWWWWWWW	EANT rig: Free Run Atten: 30 dB AMANANANANANANANANANANANANANANANANANANA	Avg Type: Log- Avg Hold:>100/1	Mkr1 2.402	9:9:73 Maprills 2024 TRACE 3 5 6 TYPE MANNAW DET P MANNA DET P MANNA 2 2.48350 GHz ms (1001 pts)	
11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	RL RF 50 S center Freq 2.4417 Ref Offset 2. 0 dB/div Ref 20.00 00 0 0 dB/div Ref 20.00 00 0 00 0 000<	xept SA 2 AC 50000 GHz PI IF(0.3 dB dBm WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW	VO: Fast T jain:Low # WWW/WWWW WWWWWWWWW WWWWWWWWWWWWWWWWWW	EANT rig: Free Run Atten: 30 dB AMANANANANANANANANANANANANANANANANANANA	Avg Type: Log- Avg Hold:>100/1	Mkr1 2.402	9:9:73 Maprills 2024 TRACE 3 5 6 TYPE MANNAW DET P MANNA DET P MANNA 2 2.48350 GHz ms (1001 pts)	





	DO GHZ PNO: Fast IFGain:Low	Trig: Free Run #Atten: 30 dB	Avg Type: Log-Pwr Avg Hold:>100/100	TRACE 1 2 3 4 5 6 TYPE MWWWW DET P NNNN
Ref Offset 2.04 dB	3		Mk	r1 2.402 004 0 GHz 8.384 dBm
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-20.0				
-30.0				4
-50.0				+
-60.0				
Start 2.40000 GHz				Stop 2.48350 GHz
#Res BW 100 kHz	#V	BW 300 kHz	Swe	ep 8.000 ms (1001 pts)
1 N 1 f 2.40 2 N f 2.43	02 004 0 GHz 8.38	84 dBm 86 dBm		
3 4 5				=
6 7 8				
9 10				
		m	1	· *
MSG	Hopping No		STATUS 2480MHz Ant1	
Keysight Spectrum Analyzer - Swept SA		SENSE:INT		12:04:26 PM Apr 18, 2024
Center Freq 2.44175000		22.2.1.2.1.		
		Trig: Free Run	Avg Type: Log-Pwr Avg Hold:>100/100	TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P NNNNN
Ref Offset 2.03 dl	IFGain:Low	#Atten: 30 dB	Avg Hold:>100/100	TRACE 1 2 3 4 5 6 TYPE M WWWW DET P NNNN r1 2.401 670 0 GHz
Ref Offset 2.03 db	IFGain:Low		Avg Hold:>100/100	TRACE 2 3 4 5 6 TYPE MWWWW DET P NNNN
10 dB/div Ref 20.00 dBm	IFGain:Low	#Atten: 30 dB	Avg Hold:>100/100	TRACE 123456 Type MWWWW DET P NNNN r1 2.401 670 0 GHz 6.510 dBm
10 dB/div Ref 20.00 dBm Log 10.0 -10.0 -10.0 -10.0	IFGain:Low	#Atten: 30 dB	Avg Hold:>100/100	TRACE 123456 Type MWWWW DET P NNNN r1 2.401 670 0 GHz 6.510 dBm
10 dB/div Ref 20.00 dBn	IFGain:Low	#Atten: 30 dB	Avg Hold:>100/100	TRACE 123456 Type MWWWW DET P NNNN r1 2.401 670 0 GHz 6.510 dBm
10 dB/div Ref 20.00 dBm 10.0 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	IFGain:Low	#Atten: 30 dB	Avg Hold:>100/100	TRACE 123456 Type MWWWW DET P NNNN r1 2.401 670 0 GHz 6.510 dBm
10 dB/div Ref 20.00 dBm 10.0 -10.0 -10.0 -10.0 -10.0 -30.0 -30.0	IFGain:Low	#Atten: 30 dB	Avg Hold:>100/100	TRACE 123456 Type MWWWW DET P NNNN r1 2.401 670 0 GHz 6.510 dBm
10 dB/div Ref 20.00 dBm 10.0	IFGain:Low	#Atten: 30 dB	Avg Hold:>100/100	TRACE 123456 Type MINNN r1 2.401 670 0 GHz 6.510 dBm
10 dB/div Ref 20.00 dBm 10.0		#Atten: 30 dB	Avg Hold:>100/100	TRACE 123456 Type MWWWW DET P NNNN r1 2.401 670 0 GHz 6.510 dBm
10 dB/div Ref 20.00 dBr 10 dB/div Ref 20.00 dB/d 10 dB/div Ref 20.00 dB/div Ref 20.00 dB/d 10 dB/div Ref 20.00 dB/div	IFGain:Low	#Atten: 30 dB	AvgjHold:>100/100	TRACE 123456 Type MINNN r1 2.401 670 0 GHz 6.510 dBm
10 dB/div Ref 20.00 dBm 10.0 1	IFGain:Low	#Atten: 30 dB	AvgjHold:>100/100	TRACE 123456 Type MNNNN per PNNNNN r1 2.401 670 0 GHz 6.510 dBm ywwwww per PNNNN 2 ywwwww per PNNNN 2 ywwwww per PNNNN 2 ywwwww per PNNNN 2 ywwwww per PNNNN 2 ywwwww per PNNNN 2 ywwwww per PNNNN 2 ywwwww per PNNNN 2 ywwwww per PNNNN 2 ywwwww per PNNNN 2 ywwwwww per PNNNN 2 ywwwwwww per PNNNNN 2 ywwwwwwww per PNNNN 2 ywwwwwww per PNNNN 2 ywwwwwwww per PNNNN 2 ywwwwwwww per PNNNNN 2 ywwwwwwwww per PNNNN 2 ywwwwwwwww per PNNNN 2 ywwwwwwwww per PNNNN 2 ywwwwwwwww per PNNNN 2 ywwwwwwwwwww per PNNNN 2 ywwwwwwwwwwwww per PNNNN 2 ywwwwwwwww per PNNNN 2 ywwwwwwwwwwww per PNNNN 2 ywwwwwwwwwwww per PNNNN 2 ywwwwwwwwww per PNNNN 2 ywwwwwwwwwwwwwwwww per PNNN 2 ywwwwwwwwwwwwwwwwwwwwwwwww per PNNNN 2 ywwwwwwwwwwwwwwwwwwwwwwwwwwwwwww per PNNN 2 ywwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwww
10 dB/div Ref 20.00 dBr 10 dB/div Ref 20.00 dB/d 10 dB/div Ref 20.00 dB/div	IFGain:Low	#Atten: 30 dB	AvgjHold:>100/100	TRACE 123456 Type MNNNN per PNNNNN r1 2.401 670 0 GHz 6.510 dBm ywwwww per PNNNN 2 ywwwww per PNNNN 2 ywwwww per PNNNN 2 ywwwww per PNNNN 2 ywwwww per PNNNN 2 ywwwww per PNNNN 2 ywwwww per PNNNN 2 ywwwww per PNNNN 2 ywwwww per PNNNN 2 ywwwww per PNNNN 2 ywwwwww per PNNNN 2 ywwwwwww per PNNNNN 2 ywwwwwwww per PNNNN 2 ywwwwwww per PNNNN 2 ywwwwwwww per PNNNN 2 ywwwwwwww per PNNNNN 2 ywwwwwwwww per PNNNN 2 ywwwwwwwww per PNNNN 2 ywwwwwwwww per PNNNN 2 ywwwwwwwww per PNNNN 2 ywwwwwwwwwww per PNNNN 2 ywwwwwwwwwwwww per PNNNN 2 ywwwwwwwww per PNNNN 2 ywwwwwwwwwwww per PNNNN 2 ywwwwwwwwwwww per PNNNN 2 ywwwwwwwwww per PNNNN 2 ywwwwwwwwwwwwwwwww per PNNN 2 ywwwwwwwwwwwwwwwwwwwwwwwww per PNNNN 2 ywwwwwwwwwwwwwwwwwwwwwwwwwwwwwww per PNNN 2 ywwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwww





	GHz PNO: Fast IFGain:Low #Atten: 30 dB	Avg Type: Log-Pwr Avg Hold:>100/100	TRACE 2 3 4 5 6 TYPE MWWWWW DET P NNNNN
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-40.0			
-60.0			<u>.</u>
Start 2.40000 GHz			Stop 2.48350 GHz
#Res BW 100 kHz	#VBW 300 kHz		8.000 ms (1001 pts)
1 N 1 f 2.401	503 0 GHz 3.669 dBm 327 0 GHz 6.796 dBm	1	
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7 8 9			
10 11	17		*
MSG		STATUS	
Keysight Spectrum Analyzer - Swept SA	Hopping No. NVNT 3-DH	5 2441MHz Ant1	- ā 🔀
LXI RL RF 50Ω AC	SENSE(INT		
Center Freq 2.441750000		Avg Type: Log-Pwr Avg Hold:>100/100	12:13:42 PM Apr18, 2024 TRACE 1 2 3 4 5 6 TYPE M WWWWW
	GHZ PNO: Fast IFGain:Low Trig: Free Run #Atten: 30 dB	Avg Hold:>100/100	12:13:42 PM Apr18, 2024 TRACE 1 2 3 4 5 6 TYPE MWWWW DET P NMNNN 2.401 837 0 GHz
Ref Offset 2.04 dB 10 dB/div Cog ▲1	PNO: Fast Trig: Free Run	Avg Hold:>100/100	TRACE 2 3 4 5 6 TYPE M WWWWW DET P N N N N N
10 dB/div Log	PNO: Fast Trig: Free Run	Avg Hold:>100/100	TRACE 1 2 3 4 5 6 TYPE MWWWW DET P NNNN 2.401 837 0 GHz
10 dB/div Ref Offset 2.04 dB Ref 20.00 dBm	PNO: Fast Trig: Free Run IFGain:Low #Atten: 30 dB	Avg Hold:>100/100	1740E 12 34 5 6 TYPE MWWWWW DET P NNNN 2.401 837 0 GHz 9.501 dBm
Ref Offset 2.04 dB 10 dB/div Ref 20.00 dBm 10 0 10	PNO: Fast Trig: Free Run IFGain:Low #Atten: 30 dB	Avg Hold:>100/100	1740E 12 34 5 6 TYPE MWWWWW DET P NNNN 2.401 837 0 GHz 9.501 dBm
Ref Offset 2.04 dB 10 dB/div Ref 20.00 dBm 10 0 10	PNO: Fast Trig: Free Run IFGain:Low #Atten: 30 dB	Avg Hold:>100/100	1740E 12 34 5 6 TYPE MWWWWW DET P NNNN 2.401 837 0 GHz 9.501 dBm
Ref Offset 2.04 dB 10 dB/div Ref 20.00 dBm 10 0 0.00 -20.0 -30.0 -40.0	PNO: Fast Trig: Free Run IFGain:Low #Atten: 30 dB	Avg Hold:>100/100	1740E 12 34 5 6 TYPE MWWWWW DET P NNNN 2.401 837 0 GHz 9.501 dBm
Ref Offset 2.04 dB 10 dB/div Ref 20.00 dBm 10.0 10	PNO: Fast IFGain:Low #Atten: 30 dB	Avg Hold:>100/100 Mkr1	ТКАСЕ 12 3.4 5.6 TYPE MWWWWW DET P NNNN 2.401 837 0 GHz 9.501 dBm 2.401 837 0 GHz 9.501 dbm
Ref Offset 2.04 dB 10 dB/div Ref 20.00 dBm 10 0 1 10 0 1 10 0 1 10 0 1 10 0 1 10 0 1 10 0 1 10 0 1 10 0 1 10 0 1 10 0 1 10 0 1 10 0 1 10 0 1 10 0 1 10 0 1 10 0 1 10 0 1 10 0 10 0 10 0 10 0 10 0 10 0 10 0 10 0 10 0 10 0 10 0 10 0 10 0 10 0 10 0 10 0 10 0 10 0 10 0 10 0 10 0 10 0 10 0 10 0 10 0 10 0	PNO: Fast IFGain:Low Trig: Free Run #Atten: 30 dB why hy company of the second seco	AvgiHold:>100/100 Mkr1	ткасе 11 2 3 4 5 6 туре Муминини DET P NNNN 2.401 837 0 GHz 9.501 dBm
Ref Offset 2.04 dB 10 dB/div Ref 20.00 dBm 20 dB/div Ref 20.00 dBm 30.0 Ref 20.00 dBm	PNO: Fast IFGain:Low Trig: Free Run #Atten: 30 dB	AvgiHold:>100/100 Mkr1	ткасе 11 2 3 4 5 6 туре Мужинини DET P NNNN 2.401 837 0 GHz 9.501 dBm 2.401 % 100 GHz 9.501 dBm 2.401 837 0 GHz 9.501 dBm
Ref Offset 2.04 dB 10 dB/div Ref 20.00 dBm 20 d Ref 20.00 dBm <	PNO: Fast IFGain:Low Trig: Free Run #Atten: 30 dB why hy Loop Helphill (1990) #VBW 300 kHz #VBW 300 kHz FUNCTION 837 0 GHz 9.501 dBm	AvgiHold:>100/100 Mkr1	ткасе 11 2 3 4 5 6 туре Мужинини DET P NNNN 2.401 837 0 GHz 9.501 dBm 2.401 % 100 GHz 9.501 dBm 2.401 837 0 GHz 9.501 dBm





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	RF				SENSE	INT	-				9 PM Apr 18, 2024
iter Fr	req 2.4	4175000	F	PNO: Fast C FGain:Low				Avg Type: Avg Hold:>	Log-Pwr •100/100	Т	RACE 1 2 3 4 5 TYPE MWWWW DET P NNNN
B/div									Mkr		04 0 GHz 662 dBm
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1		2.40		1.5	a a dan						
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	B/div	Ref Off Ref 2.4 Ref Off Ref 20 Ref 20	Ref Offset 2.03 dE B/div Ref 20.00 dBr Providence of the set of	L RF 50 P. AC Iter Freq 2.441750000 GHz Ref Offset 2.03 dB Ref 20.00 dBm 1 1 1 1 1 1 1 1 1 1 1 1 1	L RF 50 2 AC Iter Freq 2.441750000 GHz FRO: Fast C IFGain:Low Ref Offset 2.03 dB B/dly Ref 20.00 dBm T 2.40000 GHz s BW 100 kHz #V MODE IFRC SCI X Y	L RF 50 2 AC SENSE tter Freq 2.441750000 GHz From Freq 2.441750000 GHz Ref Offset 2.03 dB B/dlv Ref 20.00 dBm t 2.40000 GHz s BW 100 KHz #VBW 3 MODE TRC SCL X Y N 1 C 2.402 004 0 GHz S662 dBn	L RF 50 2 AC SENSE.INT Iter Freq 2.441750000 GHz FRO: Fast Free F IFGain:Low Free F #Atten: 30 Ref Offset 2.03 dB Ref 20.00 dBm Trig: Free F #Atten: 30 Trig: Free F #Atten: 30 #Atten: 30 #Atte	Ref 50 g AC SENSE:INT Iter Freq 2.441750000 GHz Trig: Free Run #Atten: 30 dB B/div Ref Offset 2.03 dB B/div Ref 20.00 dBm Image: Action of the set of the	Ref 50.0 AC SENSE(INT) Avg Type: Avg Type: PN0: Fast IFGain:Low Trig: Free Run #Atten: 30 dB B/div Ref Offset 2.03 dB Ref 20.00 dBm Ref 20.00 dBm Avg Type: AvgI/Hold: Image: Sense (Int) Image: Sense (Int) Image: Sense (Int) Avg Type: AvgI/Hold: Image: Sense (Int) Image: Sense (Int) Image: Sense (Int) Avg Type: AvgI/Hold: Image: Sense (Int) Image: Sense (Int) Image: Sense (Int) Image: Sense (Int) Image: Sense (Int) Image: Sense (Int) Image: Sense (Int) Image: Sense (Int) Image: Sense (Int) Image: Sense (Int) Image: Sense (Int) Image: Sense (Int) Image: Sense (Int) Image: Sense (Int) Image: Sense (Int) Image: Sense (Int) Image: Sense (Int) Image: Sense (Int) Image: Sense (Int) Image: Sense (Int) Image: Sense (Int) Image: Sense (Int) Image: Sense (Int) Image: Sense (Int) Image: Sense (Int) Image: Sense (Int) Image: Sense (Int) Image: Sense (Int) Image: Sense (Int) Image: Sense (Int) Image: Sense (Int) Image: Sense (Int) Image: Sense (Int) Image: Sense (Int) Image: Sense (Int)	L 2.40000 GHz s BW 100 KHz x 2.402 004 0 GHz x 2.402	Ref 50.0 AC SENSE:UNT Avg Type: Log-Pwr Tr Iter Freq 2.441750000 GHz PNO: Fast Trig: Free Run Avg Type: Log-Pwr Tr Ref Offset 2.03 dB Mkr1 2.402 0 Mkr1 2.402 0 8. B/div Ref 20.00 dBm 8. 8. Image: Sense data Image: Sense data 8. Image: Sense data Sense data Sense data Image: Sense data Sense data Sense data Image: Sense data Function Function Function Image: Sense data Sense data Sense data Sense data Image: Sense data Sense data Sensedata Sense data



11. DWELL TIME

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)(iii), RSS-247 5.1
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=1MHz, VBW=3MHz, Span=0Hz, Detector=Peak
Limit:	0.4 Second

11.1 Test Setup

EUT	SPECTRUM
	ANALYZER

11.2 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 = 0Hz;

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).

11.3 DEVIATION FROM STANDARD No deviation.





11.4 Test Result

	and the second sec		the second se			August and August an	
Mode	Frequency (MHz)	Pulse Time (ms)	Total Dwell Time (ms)	Burst Count	Period Time (ms)	Limit (ms)	Verdict
1-DH1	2441	0.383	121.028	316	31600	400	Pass
1-DH3	2441	1.639	257.323	157	31600	400	Pass
1-DH5	2441	2.887	280.039	97	31600	400	Pass
2-DH1	2441	0.391	123.556	316	31600	400	Pass
2-DH3	2441	1.643	253.022	154	31600	400	Pass
2-DH5	2441	2.891	318.01	110	31600	400	Pass
3-DH1	2441	0.391	123.165	315	31600	400	Pass
3-DH3	2441	1.642	257.794	157	31600	400	Pass
3-DH5	2441	2.893	350.053	121	31600	400	Pass

Remarks:

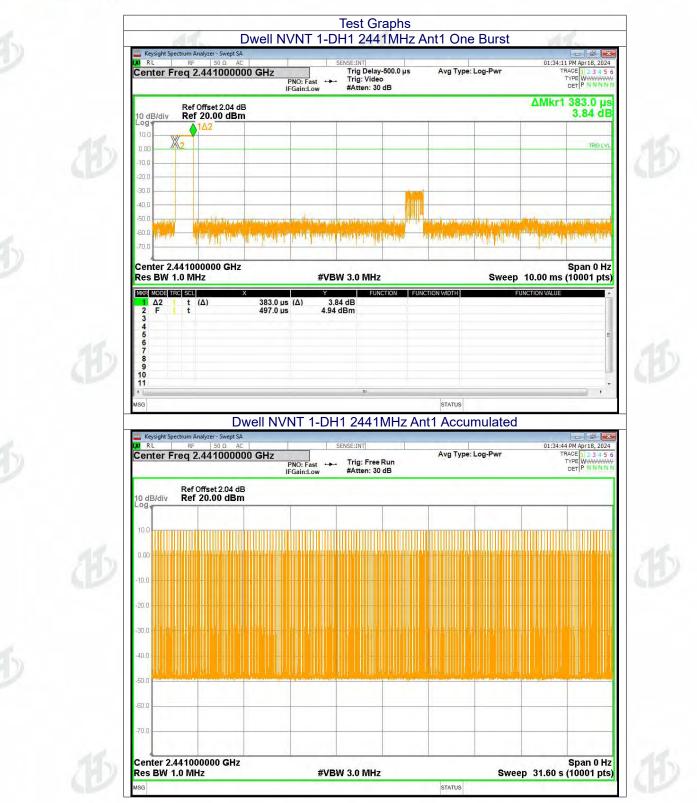
The test period: T= 0.4 Second/Channel x 79 Channel = 31.6 s (1 / 2 / 3)-DH1: Dwell time (ms) = Pulse Time (ms) * [1600 / (2 * 79)] * 31.6s(1 / 2 / 3)-DH3: Dwell time (ms) = Pulse Time (ms) * [1600 / (4 * 79)] * 31.6s(1 / 2 / 3)-DH5: Dwell time (ms) = Pulse Time (ms) * [1600 / (6 * 79)] * 31.6s

🖀 0755-27782934 🛛 🖂 admin@zht-lab.cn 🌑 🏐 http://www.zht-lab.cn



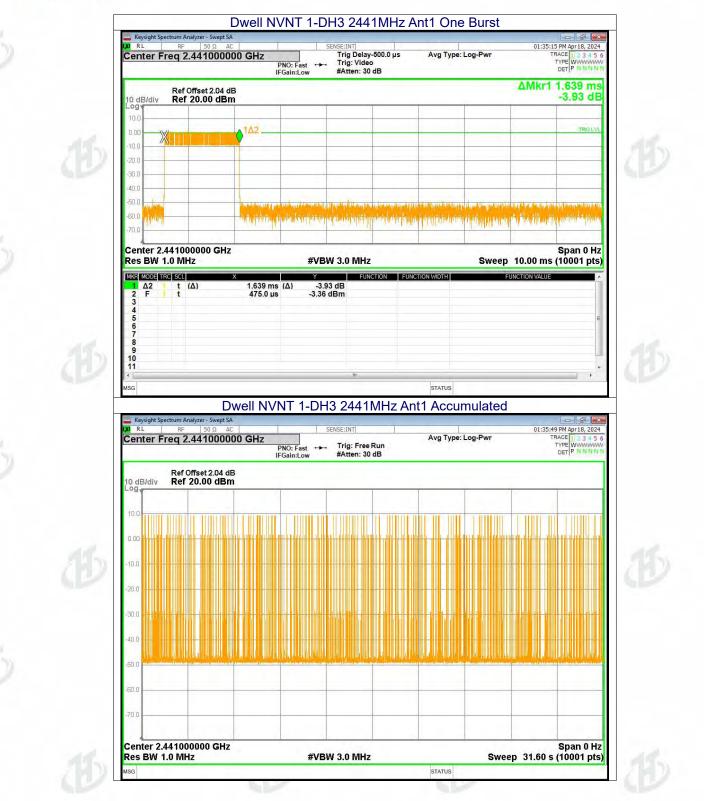






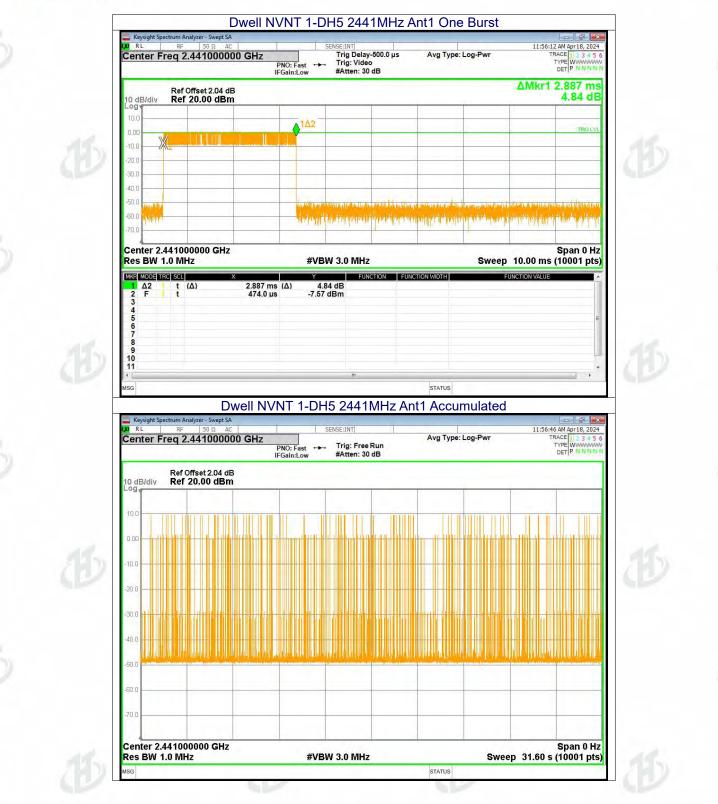






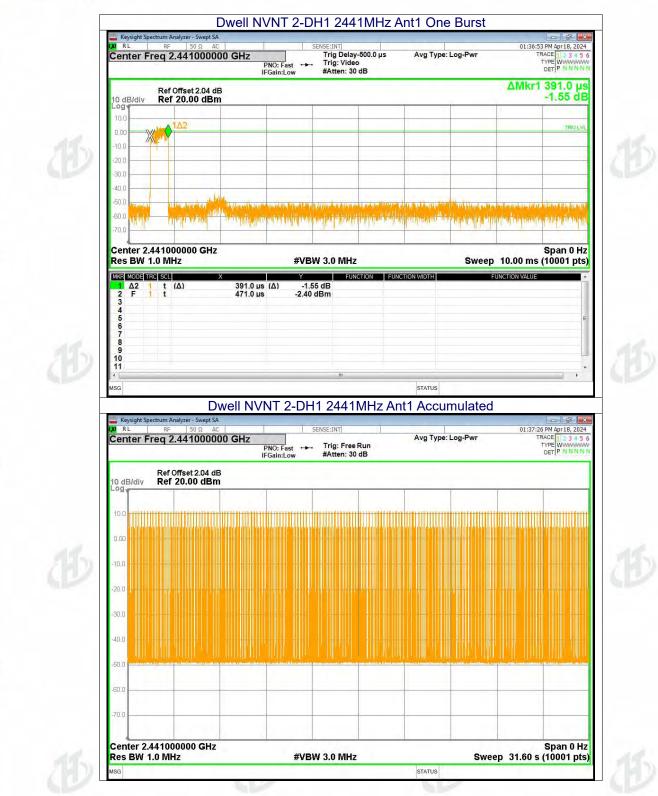






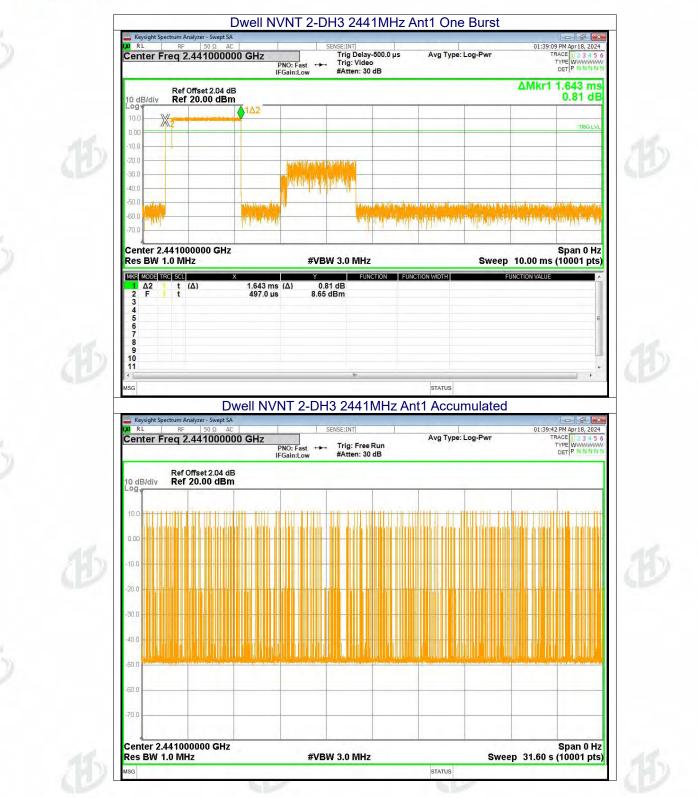


















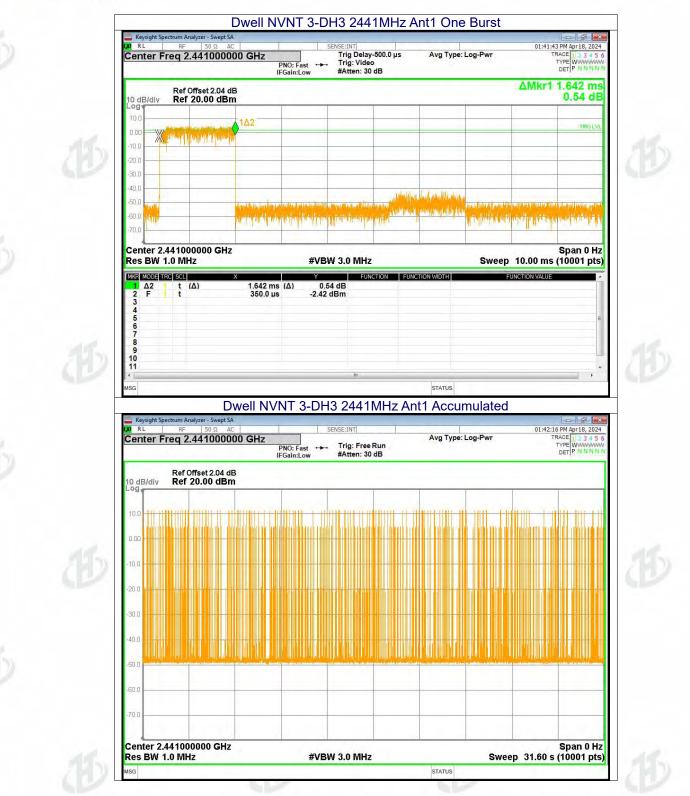




	0 GHz PNO: Fast IFGain:Low → Xitten: 30 dB	Avg Type: Log-Pwr	01:40:32 PM Apr18, 2024 TRACE 1 2 3 4 5 6 TYPE WWWWWW DET P N N N N
Ref Offset 2.04 dB 10 dB/div Ref 20.00 dBm Log		4	Mkr1 391.0 µs 0.55 dB
			TRIG LVL
-10.0			
-20.0			
-40,0 -50,0	และหางหนึ่งหางการสารณ์ในการสารสารการสารทางการสารการสาร	artino, za anti-fattalitadi canta titla anta alcada a canta	
Center 2.441000000 GHz			Span 0 Hz
Res BW 1.0 MHz	#VBW 3.0 MHz Y FUNCTION FUT		00 ms (10001 pts)
1 Δ2 1 t (Δ) 2 F 1 t 3	391.0 μs (Δ) 0.55 dB 350.0 μs -2.21 dBm		
4 5 6			E
7 8 9			
	17		
MSG		STATUS	
Keysight Spectrum Analyzer - Swept SA	vell NVNT 3-DH1 2441MHz A	nt1 Accumulated	- 6 💌
Center Freq 2.44100000	PNO: Fast +++ Trig: Free Run	Avg Type: Log-Pwr	01:41:06 PM Apr18, 2024 TRACE 1 2 3 4 5 6 TYPE WWWWW DET P N N N N
Ref Offset 2.04 dB	IFGain:Low #Atten: 30 dB		DEIT
10 dB/div Ref 20.00 dBm			
10.0 • • • • • • • • • • • • • • • • • •			
0.00			
-10.0			
-10.0			
-10.0			
-10.0			
-10.0			
-10.0			

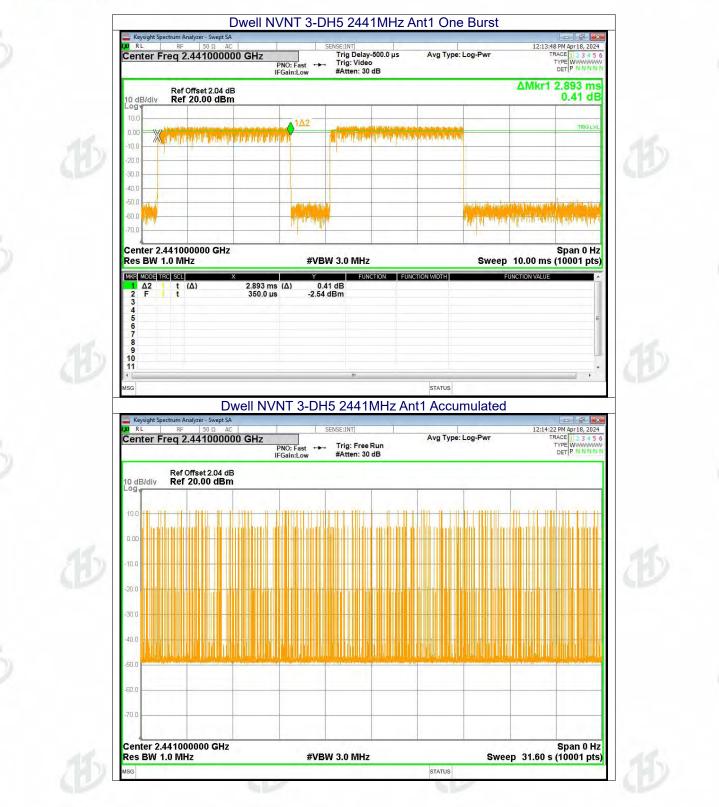














12. Antenna Requirement

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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.

The applicant for equipment certification, as per RSP-100, must provide a list of all antenna types that may be used with the licence-exempt transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. Licence-exempt transmitters that have received equipment certification may operate with different types of antennas. However, it is not permissible to exceed the maximum equivalent is tropically radiated power (EIRP) limits specified in the applicable standard (RSS) for the licence-exempt transmitter and antenna type, with the transmitter output power set at the maximum level.9 When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna manufacturer.

EUT Antenna:

The antenna is FPC Antenna, the best case gain of the antennas is 2.16dBi, reference to the appendix II for details

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13. Test Setup Photo

Reference to the appendix I for details.

14. EUT Constructional Details

Reference to the appendix II for details.

******** END OF REPORT *******

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