

	CFS NVNT 3-DH1	2480MHz	
Agilent Spectrum Analyzer - Swept SA Dd RL RF S0 Ω AC Center Freq 2.479500000 GHz	SENSE:INT PNO: Wide IFGain:Low #Atten: 30 dB	ALIGNAUTO #Avg Type: RMS Avg Hold>100/100	02:01:06 PM Apr 21, 2023 TRACE 12 3 4 5 6 TYPE MAMMAN DET P NINNIN
Ref Offset 2.44 dB 10 dB/div Ref 20.00 dBm		Ν	/lkr1 2.478 998 GHz -2.678 dBm
Log 10.0 0.00 -10.0 -20.0 -30.0		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
-40.0 -50.0 			
Center 2.479500 GHz #Res BW 30 kHz	#VBW 100 kHz	Swe	Span 2.000 MHz ep 2.133 ms (1001 pts)
MKR         MODE         TRC         SCL         X           1         N         1         f         2.478         998         G1           2         N         1         f         2.478         998         G1           3         - <th>Y FUNCTION Hz -2.678 dBm Hz -2.681 dBm</th> <th>FUNCTION WIDTH</th> <th>FUNCTION VALUE</th>	Y FUNCTION Hz -2.678 dBm Hz -2.681 dBm	FUNCTION WIDTH	FUNCTION VALUE
MSG		STATUS	<u>&gt;</u>



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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

Condition	Mode	Hopping Number	Limit	Verdict
NVNT	1-DH1	79	15	Pass
NVNT	2-DH1	79	15	Pass
NVNT	3-DH1	79	15	Pass

No. : BCTC/RF-EMC-007

E



	Hopping	Test Graph No. NVNT 1-D	IS )H1 2441MH <del>7</del>	
ilent Spectrum Analyzer - Swept S	A			
RL RF 50Ω A enter Freq 2.4417500			ALIGNAUTO #Avg Type: RMS Avg Hold:>100/100	11:45:02 AM Apr 21, 2023 TRACE 1 2 3 4 5 6 TYPE MWWWWWW DET P N N N N N
Ref Offset 2.39 d dB/div Ref 20.00 dBr			Mkr	1 2.401 837 0 GHz -1.932 dBm
a a b b b b b b b b b b b b b b b b b b	×	#VBW 300 kHz		Stop 2.48350 GHz p 8.000 ms (1001 pts)
1         N         1         f         2.4           2         N         1         f         2.4           3         -         -         -         -           4         -         -         -         -         -           5         - <td></td> <td>-1.932 dBm 0.958 dBm</td> <td></td> <td></td>		-1.932 dBm 0.958 dBm		
1				>
	Hopping	y No. NVNT 2-D		
ilent Spectrum Analyzer - Swept S	A			
RL RF 50Ω A enter Freq 2.4417500	00 GHz PNO: Fas		ALIGNAUTO #Avg Type: RMS Avg Hold:>100/100	11:54:38 AM Apr 21, 2023 TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P N N N N N
Ref Offset 2.39 d		w #Atten: 30 dB	Mkr	1 2.402 004 0 GHz -5.377 dBm
0 dB/div Ref 20.00 dBr 99 00 00 00 1 00 0.00		Marin Marina Marina Marina Marina M	angraar	
0.0				
0.0				
tart 2.40000 GHz Res BW 100 kHz		#VBW 300 kHz	Swee	Stop 2.48350 GHz p  8.000 ms (1001 pts)
2 N 1 f 2.4 3 4 5 6 7 7 8	X 02 004 0 GHz 80 160 0 GHz	Y FUNCTION 5.377 dBm -2.937 dBm	FUNCTION WIDTH	FUNCTION VALUE
9				







Нор	ping No. NV	/NT 3-DH	1 2441MHz		
		गा j: Free Run :en: 30 dB	ALIGN AUTO #Avg Type: RI Avg Hold:>100	MS	:40 PM Apr 21, 2023 TRACE 123456 TYPE MWWWWW DET PNNNNN
Ref Offset 2.39 dB 10 dB/div Ref 20.00 dBm				Mkr1 2.401	837 0 GHz 5.997 dBm
10.0 0.00 -10.0 -20.0 -30.0 -40.0 -50.0	ALLIN MULLEN	<u>\</u>	ኦላቂዉሏሏሌልኒፓላሴ		
60.0 70.0 Start 2.40000 GHz #Res BW 100 KHz	#VBW 300			Sweep 8.000 n	· · · · ·
MKR MODE         TRC SCL         ×           1         N         1         f         2.401 837 0 GHz           2         N         1         f         2.401 837 0 GHz           3         1         f         2.480 160 0 GHz           3         1         f         2.480 160 0 GHz           4         5         5         5           6         7         7         7           9         9         10         11		FUNCTION F		FUNCTION VALUE	
MSG			STATUS		



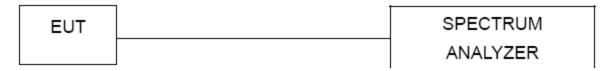


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### 14. Dwell Time

#### 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

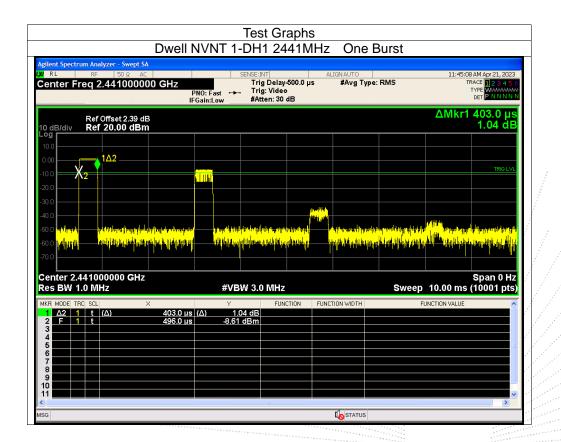
DH5 Packet permit maximum 1600 / 79 / 6 hops per second in each channel (5 time slots RX, 1 time slot TX). DH3 Packet permit maximum 1600 / 79 / 4 hops per second in each channel (3 time slots RX, 1 time slot TX).

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

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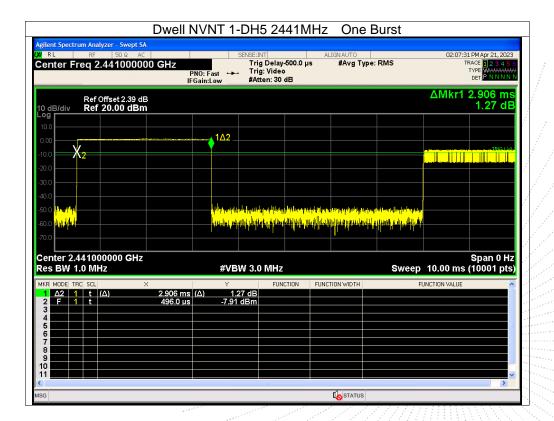
Modulation	Channel Data	Packet	pulse time(ms)	Dwell Time(s)	Limits(s)
		1DH1	0.403	0.129	0.4
GFSK	Middle	1DH3	1.658	0.265	0.4
		1DH5	2.906	0.310	0.4
		2DH1	0.406	0.130	0.4
π/ 4 DQPSK	Middle	2DH3	1.619	0.259	0.4
		2DH5	2.865	0.306	0.4
		3DH1	0.415	0.133	0.4
8DPSK	Middle	3DH3	1.618	0.259	0.4
		3DH5	2.909	0.310	0.4



C. CO., LTA



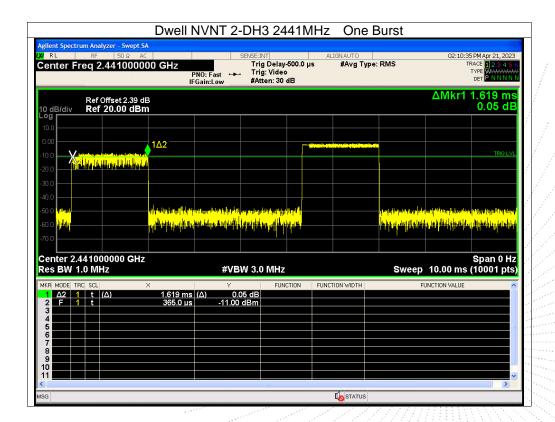
	Dwell NVNT 1-D	H3 2441MHz	One Burst	
Agilent Spectrum Analyzer - Swept SA RL RF 50 Ω AC Center Freq 2.44100000	PNO: Fast +++ T	nt Al nig Delay-500.0 μs rig: Video Atten: 30 dB	IGNAUTO #Avg Type: RMS	02:03:16 PMApr 21, 2023 TRACE 1 2 3 4 5 TYPE WWWWWW DET P N N N
Ref Offset 2.39 dB 10 dB/div Ref 20.00 dBm				ΔMkr1 1.658 ms -0.98 dE
0.00 -10.0 -20.0	1Δ2			TRIG LVL
-30.0 -40.0 -50.0 4000	<mark>e hand had had had naved bakkensender och stere menet det sp</mark>			and the second as the first of a provide state of the
-60.0 41.04 -70.0 Center 2.441000000 GHz		4, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,		Span 0 Hz
Res BW 1.0 MHz	#VBW 3	.0 MHz	Sweep	10.00 ms (10001 pts
MKR         MODE         TRC         SCL         X           1         Δ2         1         t         (Δ)           2         F         1         t         3           3         4         -         -         -           4         -         -         -         -           6         -         -         -         -           7         -         -         -         -	1.658 ms (Δ) -0.98 dB 497.0 μs -10.52 dBn	3	TION WIDTH FI	INCTION VALUE
8 9 10 10 11 11 11 11 11 11 11 11 11 11 11				





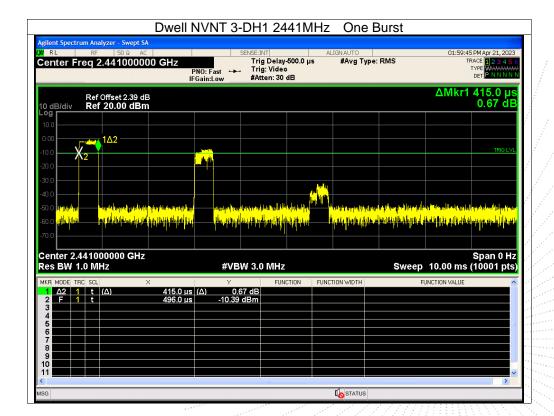


Dwell N	NVNT 2-DH1 2441MHz	One Burst
	SENSE:INT A Trig Delay-500.0 µs Trig:Video Gain:Low #Atten:30 dB	LIGNAUTO 11:54:44 AM Apr 21, 2023 #Avg Type: RMS TRACE 12:34 45 6 TYPE WAY DET PINNINN
Ref Offset 2.39 dB           10 dB/div         Ref 20.00 dBm           -20 dB/div         Ref		
Center 2.441000000 GHz Res BW 1.0 MHz	#VBW 3.0 MHz	Span 0 Hz Sweep 10.00 ms (10001 pts)
MKR         MODE         TRC         SCL         X           1         A2         1         t         (A)         406.0 µs           2         F         1         t         344.0 µs           3         -         -         -         -           4         -         -         -         -           5         -         -         -         -           6         -         -         -         -           7         -         -         -         -         -           9         -         -         -         -         -         -           10         -         -         -         -         -         -         -		CTION WIDTH FUNCTION VALUE
MSG		STATUS





Dweii i	NVNT 2-DH	H5 2441M	Hz One	Burst	
Agilent Spectrum Analyzer - Swept SA					
	NO:East ++ T	≕nπ rig Delay-500.0 μs rig: Video Atten: 30 dB	ALIGNAUTO 5 #Avg Ty	pe: RMS	02:12:05 PM Apr 21, 2023 TRACE 1 2 3 4 5 6 TYPE WWWWWW DET P N N N N
Ref Offset 2.39 dB 10 dB/div Ref 20.00 dBm					∆Mkr1 2.865 ms 0.94 dB
	<u>1Δ2</u>				
	turen.				TRIG LVL
-30.0					
-50.0	and with the still the st	tall littling guilton littl	والمراجع والمراجع والمروا	الحج والمساول ومنافر الأع	
-60.0 4.10	<mark>teloj terranov planenta</mark> r	le al fal arter provident d			
-70.0		<mark>da, da balan (</mark> alba) bilan dina ji	<mark>i dente per ped</mark> ig de el di	and in the second s a second second a second s a second	Snan 0 Hz
-70.0 Center 2.441000000 GHz	#VBW 3	din, din tang salawat pilang salawat pil	is in a second secon	1044   Abreek / Aby 140	Span 0 Hz 10.00 ms (10001 pts)
-70.0 Center 2.441000000 GHz Res BW 1.0 MHz	#VBW 3 (∆) 0.94 dt	<b>.0 MHz</b>	FUNCTION WIDTH	Sweep	
-70.0 Center 2.441000000 GHz Res BW 1.0 MHz	#VBW 3	<b>.0 MHz</b>	i li solar pelig ji soj di	Sweep	10.00 ms (10001 pts
-70.0 Center 2.441000000 GHz Res BW 1.0 MHz MKR MODEL TRC SCL × 1 Δ2 1 t (Δ) 2.865 ms 365.0 μs	#VBW 3 (∆) 0.94 dt	<b>.0 MHz</b>	i li solar pelig ji soj di	Sweep	10.00 ms (10001 pts
Δ         Δ	#VBW 3 (∆) 0.94 dt	<b>.0 MHz</b>	i li solar pelig ji soj di	Sweep	10.00 ms (10001 pts
Μ         MODE         TRC         SCL         ×           1         Δ2         1         t         (Δ)         2.865 ms           2         F         1         t         365.0 μs           3         4         5         5         5           6         7         8         9         9	#VBW 3 (∆) 0.94 dt	<b>.0 MHz</b>	i li solar pelig ji soj di	Sweep	10.00 ms (10001 pts
-70.0 Center 2.441000000 GHz Res BW 1.0 MHz MKR MODE TRC SCL Χ 1 Δ2 1 t (Δ) 2.865 ms 2 F 1 t 365.0 μs 3 4 4 5 5 5 6 7 7 8 8	#VBW 3 (∆) 0.94 dt	<b>.0 MHz</b>	i li solar pelig ji soj di	Sweep	10.00 ms (10001 pts)





	Dwell N	IVNT 3-D	DH3 244	41MHz	One E	Burst		
Agilent Spectrum Analyzer - Swe RL RF 50Ω Center Freq 2.44100	AC 0000 GHz P	SE NO: Fast ↔→→ Gain:Low	ENSE:INT Trig Delay-5 Trig: Video #Atten: 30 d	i00.0 µs	IGNAUTO #Avg Type:	RMS	TF	3 PM Apr 21, 202 RACE <b>1 2 3 4 5</b> TYPE WWWWW DET PNNNN
Ref Offset 2.3 10 dB/div Ref 20.00 d							ΔMkr1	1.618 m 0.15 dI
- <b>og</b> 10.0 0.00	1Δ2							TRIG LV
20.0								
40.0 50.0 <mark>01/11</mark> 60.0 14/14		<mark>nin en internet in der staten in d</mark>		uda ju 19 <mark>11</mark>			and intering the formation Alternation produces of	
enter 2.441000000 G es BW 1.0 MHz	Hz	#VBW	√ 3.0 MHz			Sweep	10.00 ms	Span 0 H (10001 pt
MKR         MODE         TRC         SCL           1         Δ2         1         t         (Δ)           2         F         1         t         (Δ)           3         -         -         -         -           4         -         -         -         -           5         -         -         -         -	× 1.618 ms 366.0 µs	⊻ ( <u>∆) 0.15</u> -11.00 d	FUNC dB Bm	FION FUNC	TION WIDTH	F	UNCTION VALUE	
6 7 8 9 9 0 1								
G			IIII		<b>I</b> STATUS			

1

gilent Spectrum Anal RL RF Center Freq 2.	yzer - Swept SA 50 Ω AC 441000000 GHz	PNO: Fast ++ Tri	NT g Delay-500.0 µ g: Video tten: 30 dB	ALIGNAUTO S #Avg Tyj	e: RMS	TF	7 PM Apr 21, 2023 RACE 12345 TYPE WAAAAAA DET PNNNN
0 dB/div Ref 0g 10.0	offset 2.39 dB 20.00 dBm			ntadalina 162 -		∆Mkr1	2.909 ms -0.02 dB
300.0 40.0 50.0 50.0 70.0 20.0 50.0 50.0 50.0 50.0 50.0 50.0 5							Span 0 Hz
Res         BW         1.0 MH           KR         MODE         TRC         SCL           1         Δ2         1         t         (           2         F         1         t         (           3         -         -         -         -           4         -         -         -         -           5         -         -         -         -           6         -         -         -         -	×		FUNCTION	FUNCTION WIDTH		5.000 ms	(10001 pts
7 8 9 0 1				STATUS			



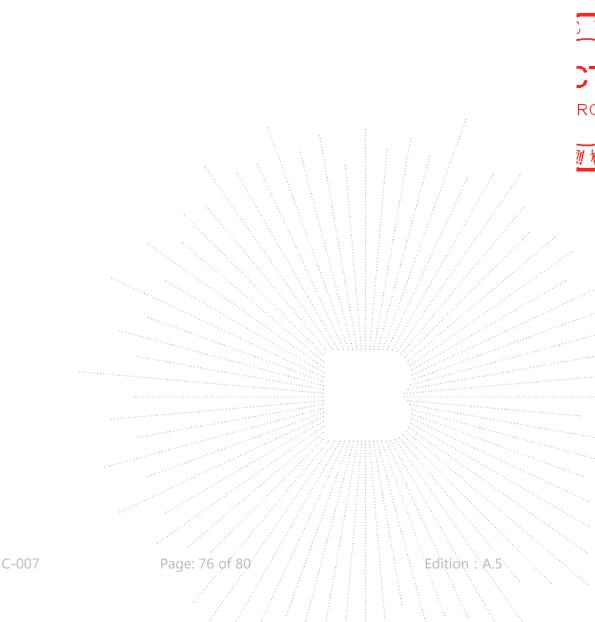
## 15. Antenna Requirement

#### 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.



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## 16. EUT Photographs



#### NOTE: Appendix-Photographs Of EUT Constructional Details

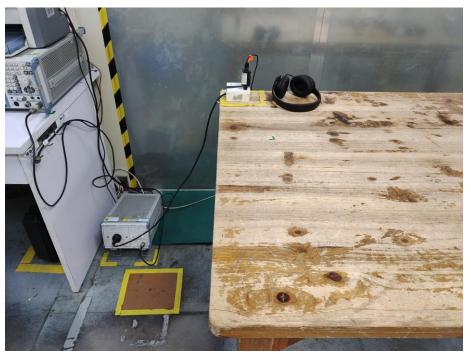
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# 17. EUT Test Setup Photographs

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 the "special seal for inspection and testing".
- 4. The test report is invalid without the signature of the approver.
- 5. The test process and test result is only related to the Unit Under Test.

6. Sample information is provided by the client and the laboratory is not responsible for its authenticity.

7. The test report without CMA mark is only used for scientific research, teaching, enterprise product development and internal quality control purposes.

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

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

#### Address:

1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China

TEL: 400-788-9558

P.C.: 518103

FAX: 0755-33229357

Website : http://www.chnbctc.com

E-Mail : bctc@bctc-lab.com.cn

\*\*\*\*\* END \*\*\*\*\*

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