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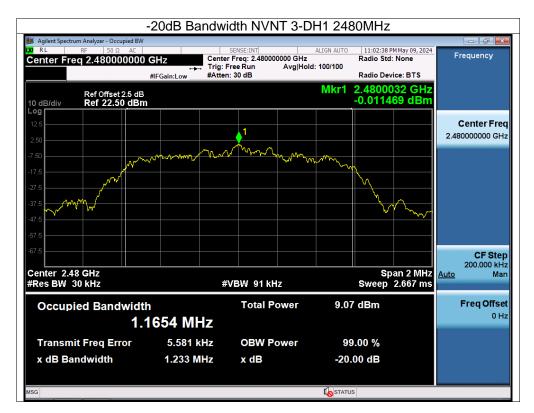
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# 11. Maximum Peak Output Power

# 11.1 Block Diagram Of Test Setup



### 11.2 Limit

FCC Part15 (15.247) , Subpart C							
Section	Test Item	Limit	Frequency Range (MHz)	Result			
15.247(b)(1)	Peak Output Power	0.125 watt or 21dBm	2400-2483.5	PASS			

### 11.3 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

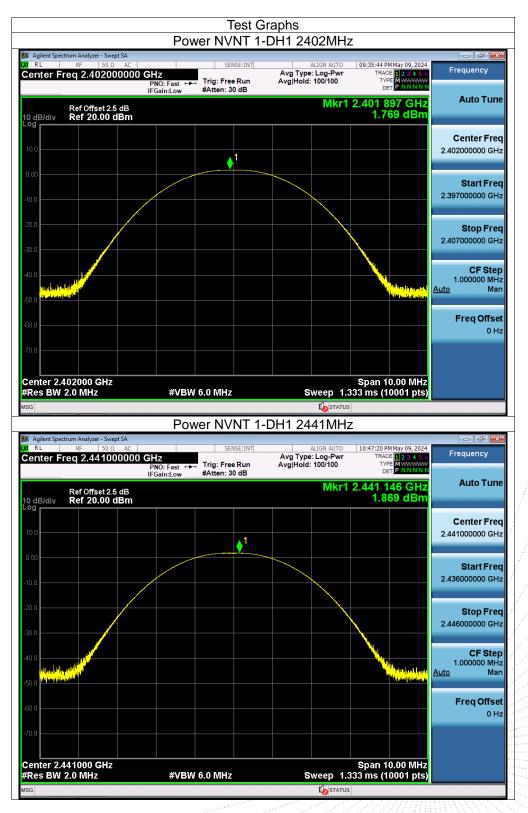
2. Set the spectrum analyzer: RBW = 2MHz. VBW = 6MHz. Sweep = auto; Detector Function = Peak.

3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

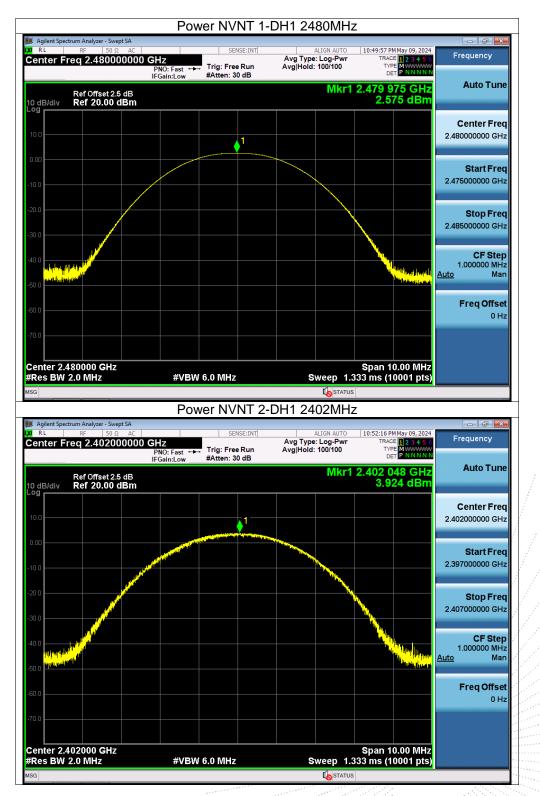
# 11.4 Test Result

Condition	Mode	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	1-DH1	2402	1.77	21	Pass
NVNT	1-DH1	2441	1.87	21	Pass
NVNT	1-DH1	2480	2.58	21	Pass
NVNT	2-DH1	2402	3.92	21	Pass
NVNT	2-DH1	2441	4.27	21	Pass
NVNT	2-DH1	2480	5.14	21	Pass
NVNT	3-DH1	2402	4.75	21	Pass
NVNT	3-DH1	2441	4.95	21	Pass
NVNT	3-DH1	2480	5.61	21	Pass









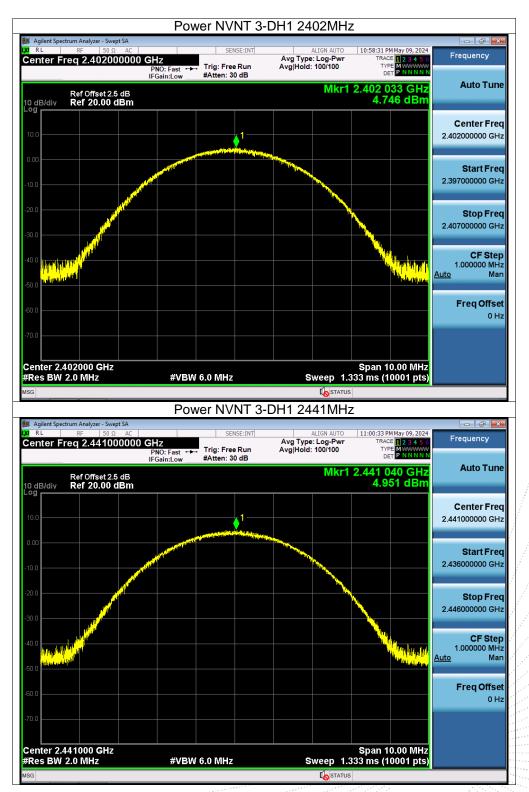




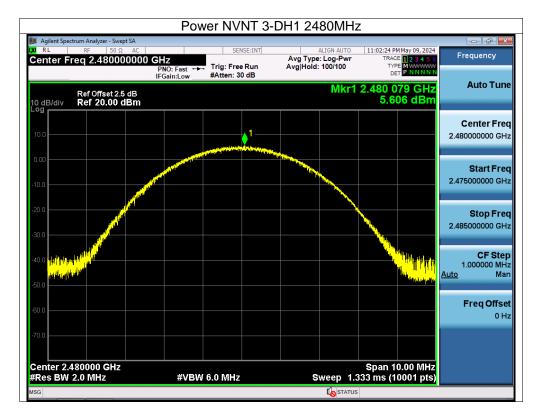
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# 12. Hopping Channel Separation

# 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.

odulation	Test Channel	Separation (MHz)	Limit(MHz)	Result
GFSK	Low Man	0.998	0.617	PASS
GFSK	Middle	1.000	0.588	PASS
GFSK	High ••••	0.990	0.585	PASS
π/4 DQPSK	Low	0.998	0.852	PASS
π/4 DQPSK	Middle	1.010	0.870	PASS
π/4 DQPSK	High	1.000	0.870	PASS
8DPSK	Low	1.002	0.826	PASS
8DPSK	Middle	1.000	0.843	PASS
8DPSK	High	0.826	0.822	PASS

### 12.4 Test Result



	CI	Test G S NVNT 1-E	raphs )H1 2402MHz		
Agilent Spectrum Analyzer - Swe		SENSE:INT		09:39:36 PM May 09, 2024	
enter Freq 2.4025			Avg Type: Log-Pwr Avg Hold:>100/100	TRACE 1 2 3 4 5 6 TYPE MWWWW DET P NNNN	Frequency
Ref Offset 2 0 dB/div Ref 20.00	5 dB dBm		Mkr1 2	.402 002 GHz -0.809 dBm	Auto Tun
			2	<u> </u>	Center Free 2.402500000 GH
					<b>Start Fre</b> 2.401500000 GH
0.0					<b>Stop Fre</b> 2.403500000 GH
enter 2.402500 GHz Res BW 30 kHz kri model troj soli		V 100 kHz	Sweep 2.1	Span 2.000 MHz 33 ms (1001 pts)	CF Stej 200.000 kH Auto Ma
1  N  1  f    2  N  1  f    2  N  1  f    3  -  -  -    4  -  -  -    5  -  -  -    6  -  -  -    7  -  -  -    8  -  -  -    9  -  -  -    0  -  -  -	2.402 002 GHz 2.403 000 GHz	-0.809 dBm -0.817 dBm			Freq Offse 0 H
		"" FS NVNT 1-D	DH1 2441MHz	· ·	
Agilent Spectrum Analyzer - Swe RL RF 50 G enter Freq 2.4415	AC 00000 GHz PNO: Wide	SENSE:INT ☐ Trig: Free Run #Atten: 30 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	09:44:11 PM May 09, 2024 TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P N N N N N	Frequency
Ref Offset 2 dB/div Ref 20.00	IFGain:Low 5 dB dBm	#Atten: 50 dB	Mkr1 2	.440 828 GHz -0.018 dBm	Auto Tun
			2		Center Fre 2.441500000 GH
0.0					<b>Start Fre</b> 2.440500000 GH
0.0					<b>Stop Fre</b> 2.442500000 GH
enter 2.441500 GHz Res BW 30 kHz	#VBV	V 100 kHz	-	Span 2.000 MHz 33 ms (1001 pts)	CF Stej 200.000 kH Auto Ma
KRI MODE  TRC  SCL  1 N 1 f 2 N 1 f 3 4 5 5 5 6 6 7 4 7 8	X 2.440 828 GHz 2.441 828 GHz	Y FUI -0.018 dBm -0.450 dBm	ICTION FUNCTION WIDTH	FUNCTION VALUE	Freq Offse 0 H
9					



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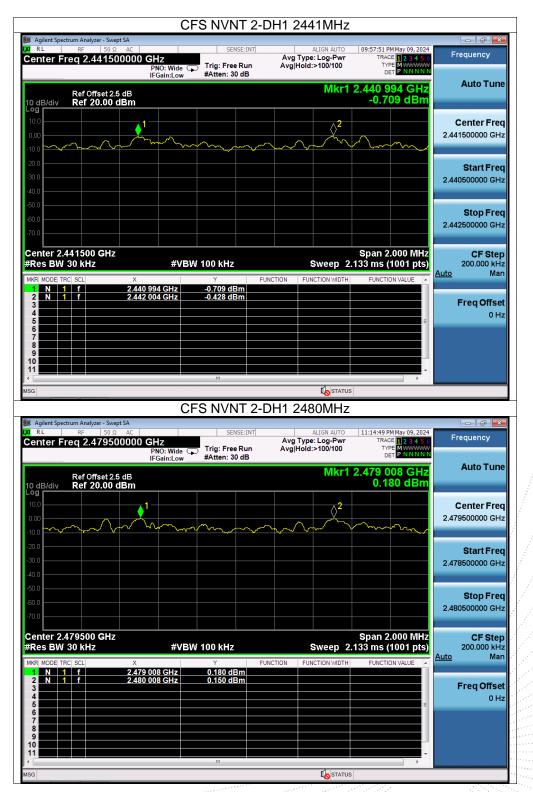




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	C	CFS NVNT	3-DH1 2	480MHz			
Agilent Spectrum Analyzer - Swe		SENSE:IN	т	ALIGN AUTO	11:35:46 PMI	May 09 2024	- ē <mark>e</mark>
Center Freq 2.4795			Avg 1	'ype: Log-Pwr old:>100/100	TRACE	1 2 3 4 5 6 M WWWW P N N N N N	Frequency
Ref Offset 2. 10 dB/div Ref 20.00				Mkr1	2.479 00 0.23	4 GHz 4 dBm	Auto Tun
Log 10.0 -10.0	1		~~~~~	2	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	<u> </u>	<b>Center Fre</b> 2.479500000 GH
-20.0							<b>Start Fre</b> 2.478500000 G⊢
-50.0							<b>Stop Fre</b> 2.480500000 GF
Center 2.479500 GHz #Res BW 30 kHz		3W 100 kHz		Sweep 2	Span 2.0 .133 ms (10	001 pts)	CF Ste 200.000 kH
MKR MODE TRC SCL	× 2.479 004 GHz	۲ 0.234 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION	VALUE	<u>Auto</u> Ma
2 N 1 f 3 4 5	2.479 830 GHz	0.726 dBm					FreqOffse 0 ⊢
6 7 8							
9 10 11						-	
MSG				To STATU:	s		

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#### **Number Of Hopping Frequency** 13.

#### 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

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Anilant Success And			Graphs T 1-DH1 2441N	1Hz	
RL RF Sectrum Analyzer -	50 Ω AC	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr	09:46:01 PM May 09, 2024	Frequency
	PNO: Fast ( IFGain:Low	Trig: Free Run #Atten: 30 dB	Avg Hold:>100/100	TYPE MWWWWW DET PNNNN	
Ref Offse dB/div <b>Ref 20.</b> 0			Mkr1 2.	401 837 0 GHz 1.169 dBm	Auto Tune
					Center Frec 2.441750000 GHz Start Frec
					2.400000000 GHz Stop Free 2.483500000 GHz
tart 2.40000 GHz Res BW 100 kHz	Х	W 300 kHz		Stop 2.48350 GHz 000 ms (1001 pts)	CF Step 8.350000 MHz <u>Auto</u> Mar
1  N  1  f    2  N  1  f    3	2.401 837 0 GHz 2.480 160 0 GHz	1.169 dBm 2.306 dBm			<b>Freq Offse</b> 0 Hz
9 0 1					
G		III	<b>I</b> STATUS		
	Норр	ing No. NVN	T 2-DH1 2441N	1Hz	
Agilent Spectrum Analyzer - RL RF S enter Freq 2.44*	50 Ω AC	SENSE:INT Trig: Free Run #Atten: 30 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	10:00:05 PM May 09, 2024 TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P NNNN	Frequency
Ref Offse dB/div Ref 20.0			Mkr1 2.	402 004 0 GHz 1.545 dBm	Auto Tune
	n www.www.	<sub>ጥ</sub> <del>ላኪእሳላሌስላሌ</del> ለ <del>አ</del> ክለሉ	MANNA MANNAN	^2	<b>Center Fre</b> 2.441750000 GH
					Start Free 2.400000000 GH:
io.0 .0					Stop Fred 2.483500000 GH:
tart 2.40000 GHz Res BW 100 kHz	#VB	W 300 kHz		Stop 2.48350 GHz 000 ms (1001 pts)	CF Step 8.350000 MH:
KR MODE TRC SCL	× 2.402 004 0 GHz 2.480 327 0 GHz	Y F 1.545 dBm -0.758 dBm	UNCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Mar Freq Offse
2 N 1 f					0 H:
				E	





	Hoppir	ng No. NV	/NT 3-DH	1 2441N	/Hz	
Magilent Spectrum Analyzer - Swep		SENSE:II	NT I	ALIGN AUTO	10:14:31 PM May 09, 2024	
Center Freq 2.44175	0000 GHz		Avg Ty	/pe: Log-Pwr	TRACE 1 2 3 4 5 6	Frequency
	PNO: Fast G	Trig: Free Rui #Atten: 30 dB	n Avg Ho	old:>100/100		
Ref Offset 2.5	5 dB			Mkr1 2.	401 503 0 GHz	Auto Tune
10 dB/div Ref 20.00 d					-3.087 dBm	
10.0					<u>^2</u>	Center Freq
	᠕ᡰᢢᠬᠰᡘᠰ᠕ᠰᠯ᠕᠕᠕	www.www	www.www.ww	MMMM	wwwwwww	2.441750000 GHz
-10.0						
-20.0						Start Freq
-30.0						2.400000000 GHz
-40.0						
-50.0					\v	Stop Freq
-60.0						2.483500000 GHz
-70.0						
Start 2.40000 GHz #Res BW 100 kHz	#VBW	/ 300 kHz			Stop 2.48350 GHz 000 ms (1001 pts)	CF Step 8.350000 MHz
MKR MODE TRC SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Man
1 N 1 f 2 N 1 f	2.401 503 0 GHz 2.480 410 5 GHz	-3.087 dBm -0.480 dBm				
3		0.100 4211				Freq Offset
5					E	0 Hz
6 7						
8						
10						
•		m			•	
MSG				🚺 STATUS		

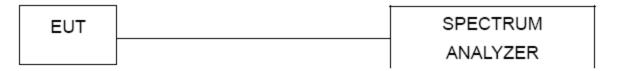
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# 14. Dwell Time

# 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).

Mode	Frequency (MHz)	Pulse Time (ms)	Total Dwell Time (ms)	Burst Count	Period Time (ms)	Limit (ms)	Verdict
1-DH1	2441	0.384	122.496	319	31600	400	Pass
1-DH3	2441	1.640	262.400	160	31600	400	Pass
1-DH5	2441	2.871	307.197	107	31600	400	Pass
2-DH1	2441	0.360	114.840	319	31600	400	Pass
2-DH3	2441	1.640	260.760	159	31600	400	Pass
2-DH5	2441	2.860	306.020	107	31600	400	Pass
3-DH1	2441	0.380	121.220	319	31600	400	Pass
3-DH3	2441	1.620	257.580	159	31600	400	Pass
3-DH5	2441	2.860	306.020	107	31600	400	Pass

#### 14.4 Test Result

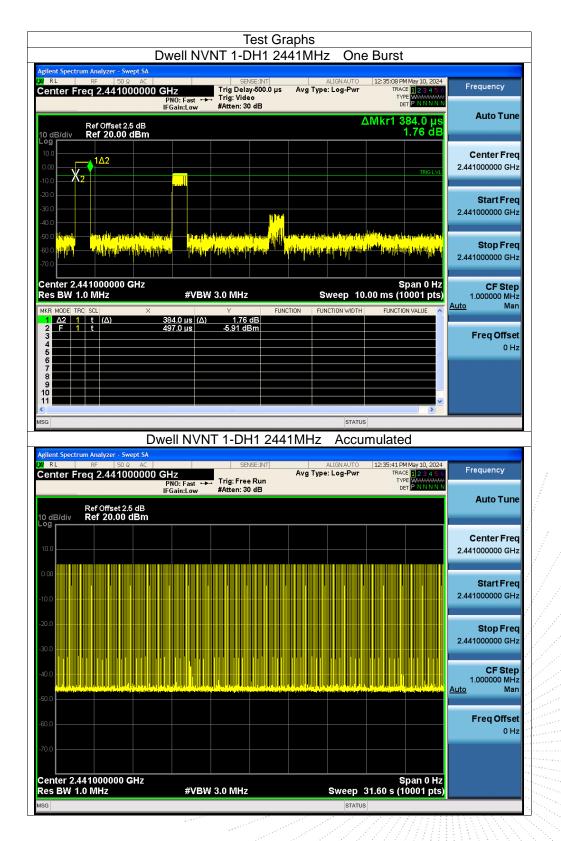
Note: Total Dwell Time (ms) = Pulse Time (ms)\*Burst Count

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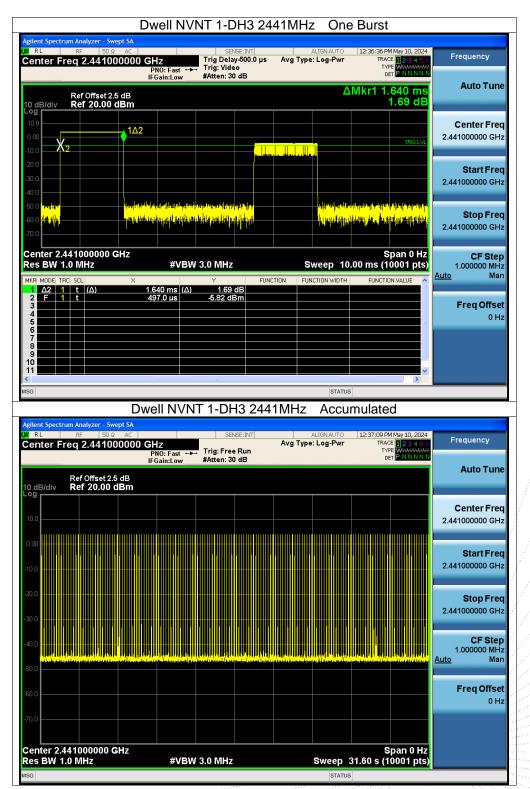
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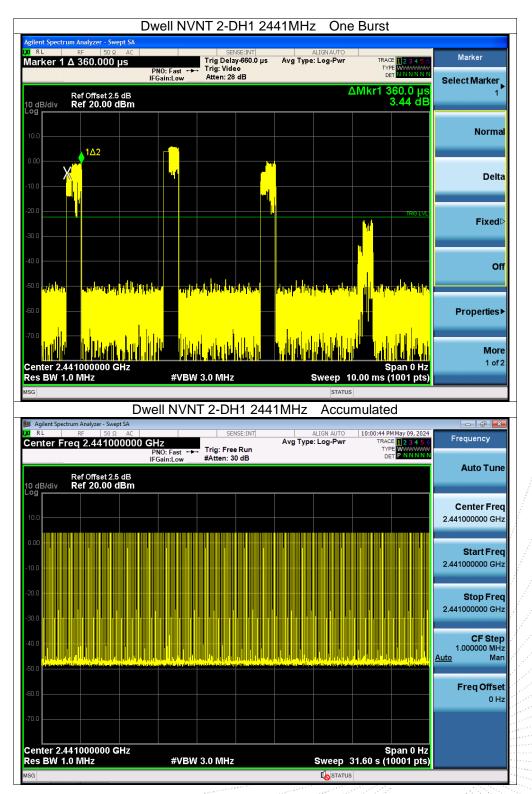


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Dw Agilent Spectrum Analyzer - Swept SA	ell NVNT 1-DH5	2441MHz One	e Burst	
RL RF 50 Ω AC enter Freq 2.441000000 GH	IO: Fast 🛶 Trig: Video	ALIGN AUTO D µs Avg Type: Log-Pwr	10:25:17 PM May 09, 2024 TRACE 1 2 3 4 5 6 TYPE WWWWWWW DET P NNNNN	Frequency
Ref Offset 2.5 dB	ain:Low #Atten: 30 dB	Δ	Mkr1 2.871 ms 0.55 dB	Auto Tun
	1Δ2		TRIG LVL	Center Fre 2.441000000 G⊦
				<b>Start Fre</b> 2.441000000 GF
0.0 <mark>Ango</mark> 0.0 <mark>Ango/ 0.0</mark>	per transfer for stille needle stad bedre bergen om 1. efter og stiller i ter storpen i smelje piljederfle	hinner her den senerin der here her her den sener der Angeleichen senerin sind der beschen stellen Angeleichen senerin sind der beschen stellen		<b>Stop Fre</b> 2.441000000 GH
enter 2.441000000 GHz es BW 1.0 MHz	#VBW 3.0 MHz	Sweep 10	Span 0 Hz 0.00 ms (10001 pts)	CF Ste 1.000000 MH
	71 ms (Δ) 0.55 dB 7.0 μs -7.37 dBm	FUNCTION FUNCTION WIDTH	FUNCTION VALUE	Auto Ma Freq Offso 0 H
	III	To STATU:	×	
Dwe	II NVNT 1-DH5 2	<b>~</b>	mulated	
Agilent Spectrum Analyzer - Swept SA    RL  RF  50 Ω  AC    enter Freq 2.441000000 GH	SENSE:INT Z O: Fast ↔ Trig: Free Run	ALIGN AUTO Avg Type: Log-Pwr	10:25:51 PM May 09, 2024 TRACE <b>1 2 3 4 5 6</b> TYPE WWWWWW	Frequency
	ain:Low #Atten: 30 dB		DET P NNNN	Auto Tur
				Center Fre 2.441000000 GH
				<b>Start Fre</b> 2.441000000 GF
10				<b>Stop Fre</b> 2.441000000 GH
				CF Ste 1.000000 MH <u>Auto</u> Ma
				Freq Offs
0.0				0 H
0.0				0 F

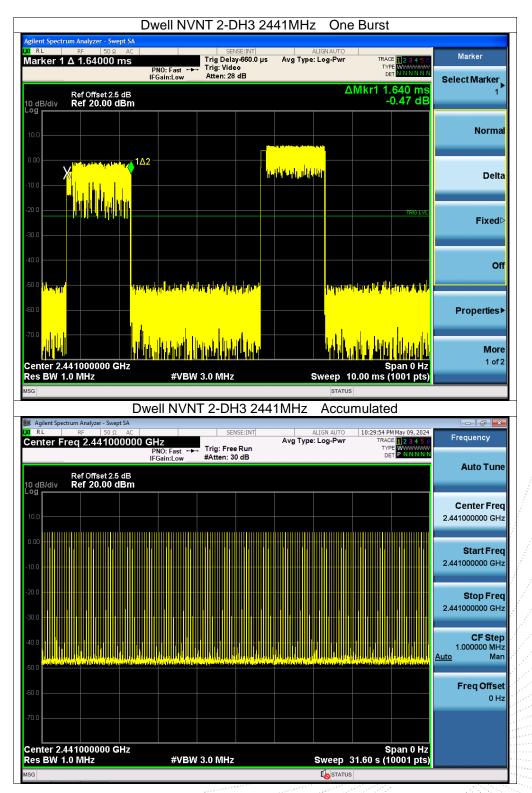




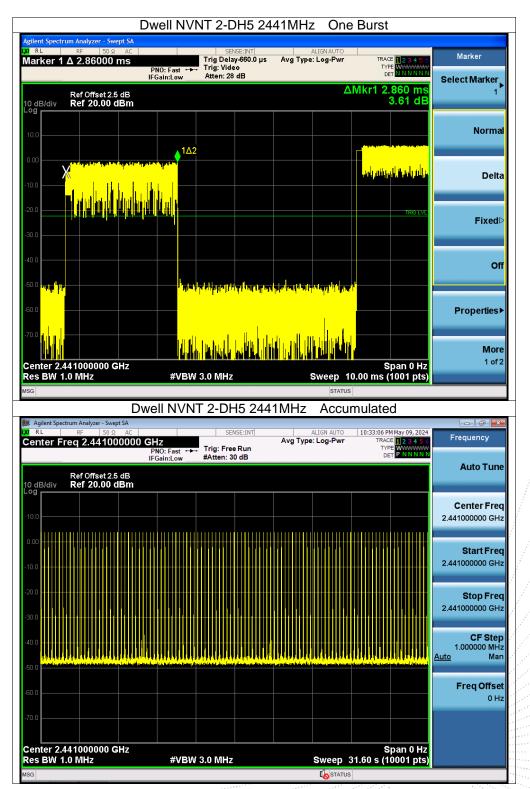


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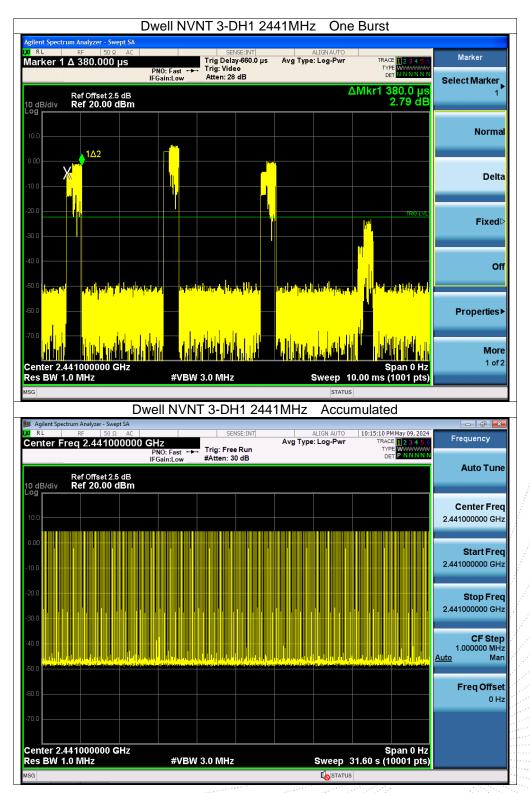






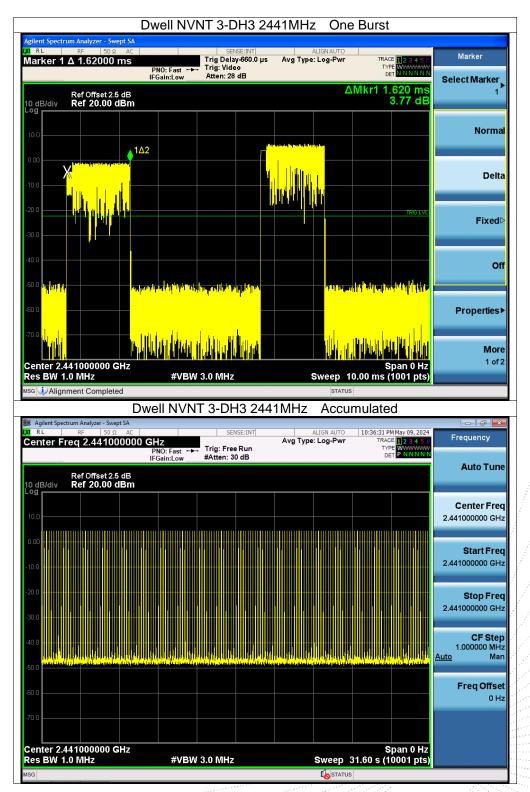
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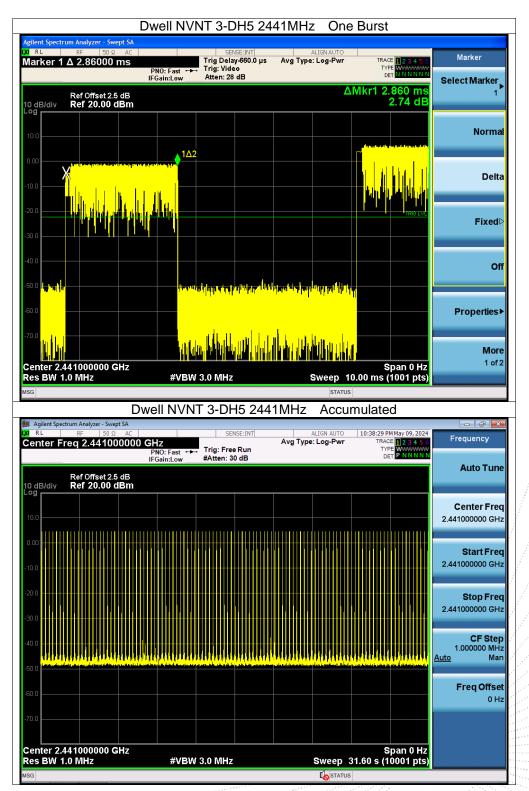


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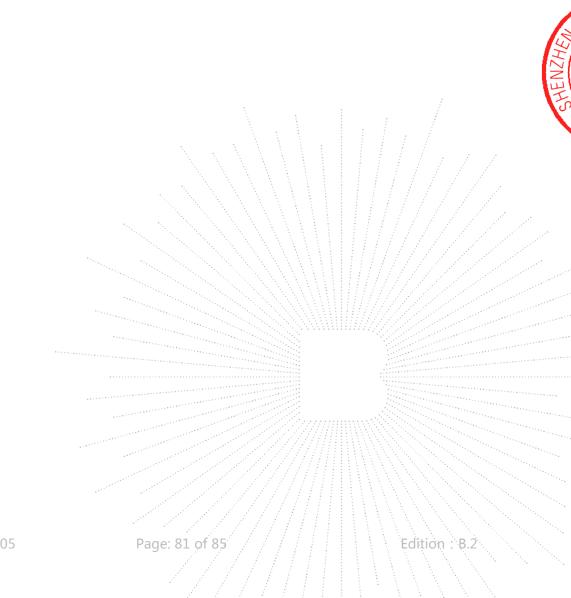
# 15. Antenna Requirement

#### 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 Chip antenna, fulfill the requirement of this section.





# 16. EUT Photographs

EUT Photo



NOTE: Appendix-Photographs Of EUT Constructional Details

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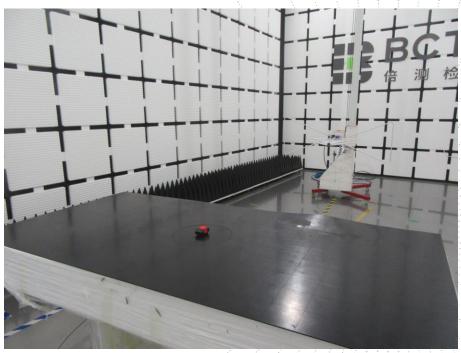


# 17. EUT Test Setup Photographs

#### Conducted emissions



Radiated Measurement Photos



No. : BCTC/RF-EMC-005

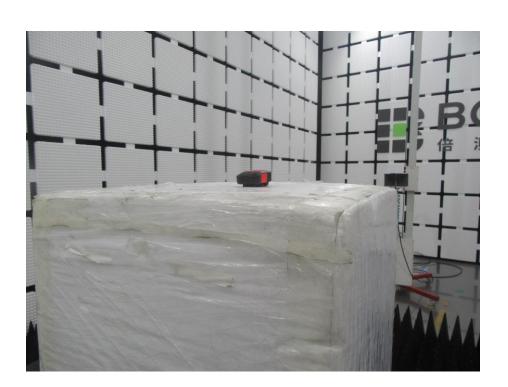
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# STATEMENT

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

8. 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

Consultation E-mail: bctc@bctc-lab.com.cn

Complaint/Advice E-mail: advice@bctc-lab.com.cn

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

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