











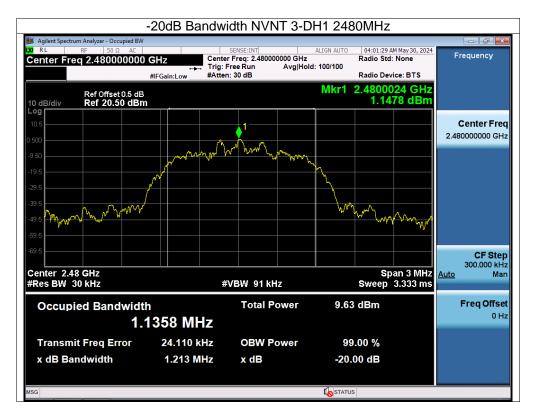
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## 11. Maximum Peak Output Power

## 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.

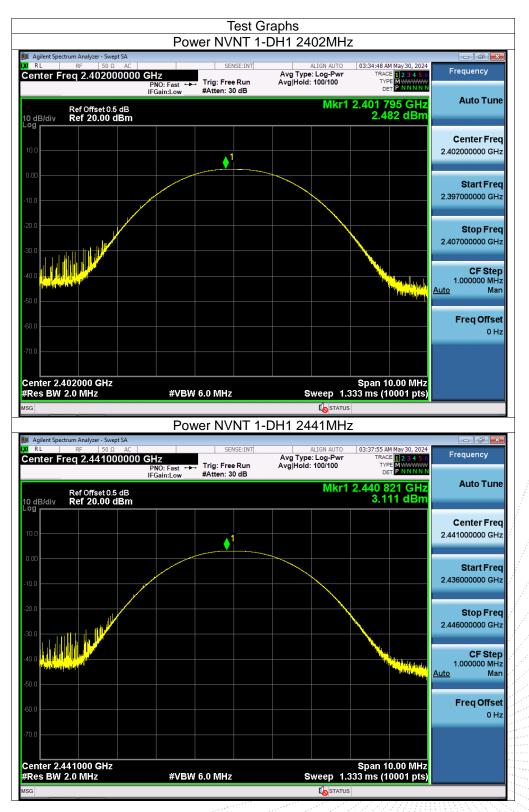
2. Set the spectrum analyzer: RBW = 2MHz. VBW = 6MHz. Sweep = auto; Detector Function = Peak.

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

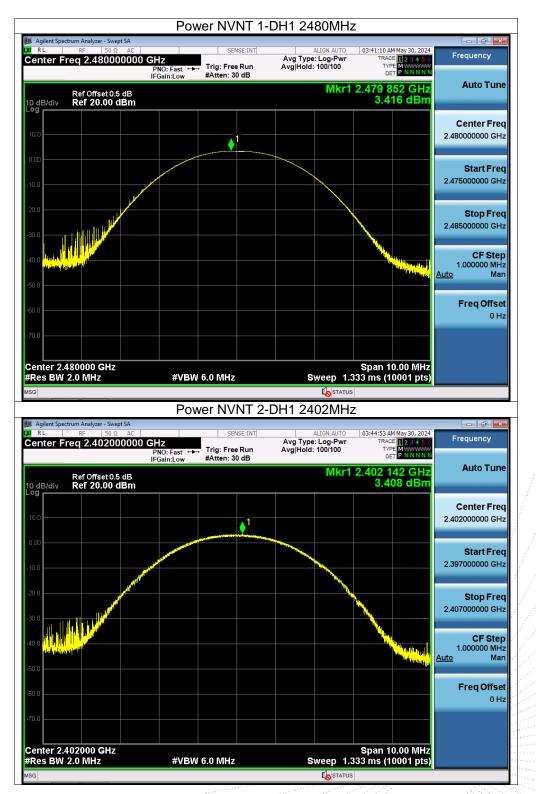
## 11.4 Test Result

Condition	Mode	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	1-DH1	2402	2.48	21	Pass
NVNT	1-DH1	2441	3.11	21	Pass
NVNT	1-DH1	2480	3.42	21	Pass
NVNT	2-DH1	2402	3.41	21	Pass
NVNT	2-DH1	2441	3.92	21	Pass
NVNT	2-DH1	2480	4.24	21	Pass
NVNT	3-DH1	2402	3.97	21	Pass
NVNT	3-DH1	2441	4.51	21	Pass
NVNT	3-DH1	2480	4.75	21	Pass

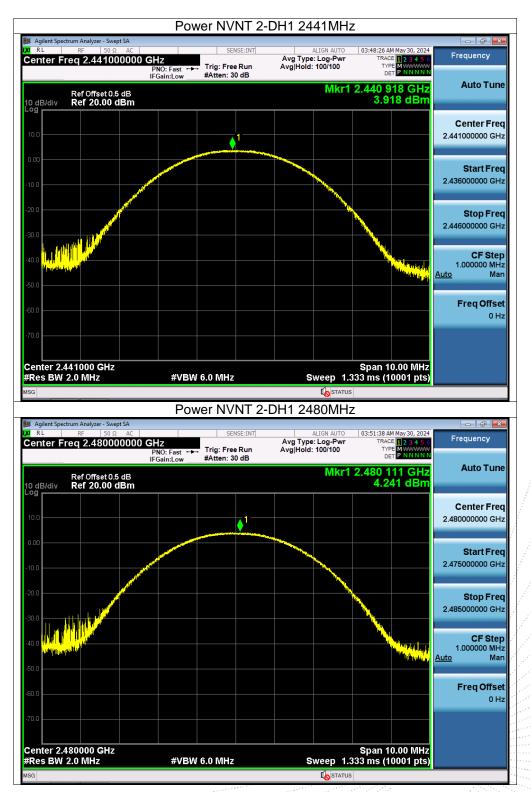








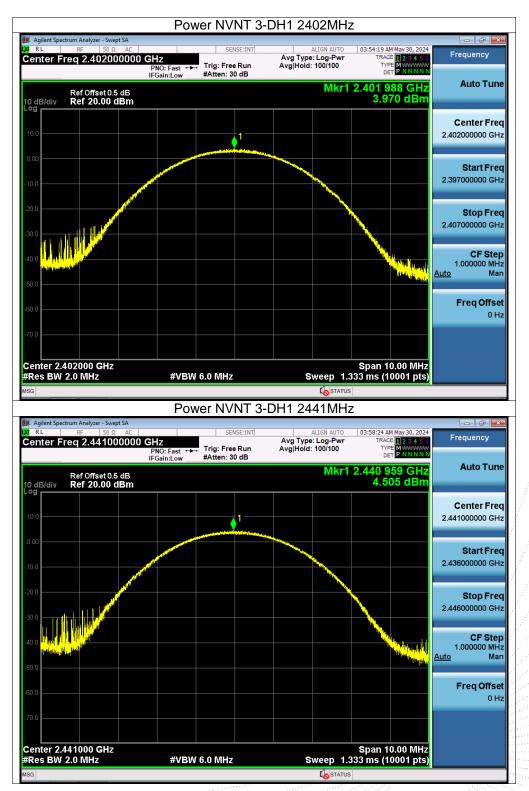




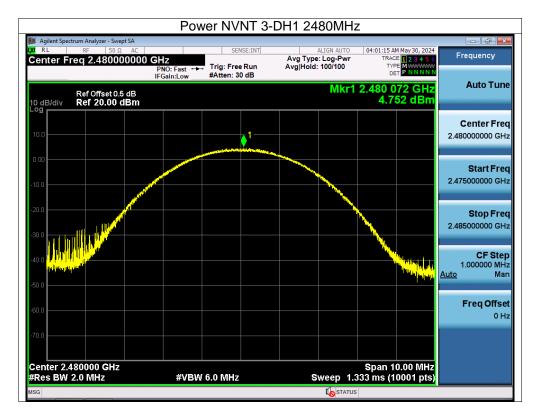
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## 12. Hopping Channel Separation

## 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 Market	1.000	0.587	PASS
GFSK	Middle	1.000	0.579	PASS
GFSK	High ••••	1.002	0.568	PASS
π/4 DQPSK	Low	1.000	0.828	PASS
π/4 DQPSK	Middle	0.998	0.821	PASS
π/4 DQPSK	High	1.000	0.826	PASS
8DPSK	Low	1.000	0.823	PASS
8DPSK	Middle	1.000	0.805	PASS
8DPSK	High	0.996	0.809	PASS

#### 12.4 Test Result



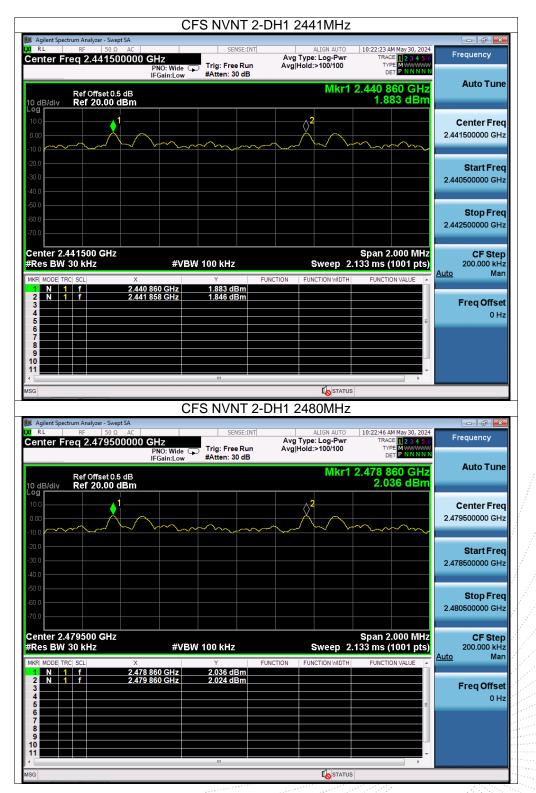
Agilent Spectrum Analyzer - Swept S		FS NVNI 1-L	DH1 2402MHz		
RL RF 50 Ω enter Freq 2.402500	ac 000 GHz	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	10:19:42 AM May 30, 2024 TRACE 1 2 3 4 5 6 TYPE M MAAAAAAAA	Frequency
	PNO: Wide C	#Atten: 30 dB			Auto Tune
Ref Offset 0.5 d dB/div Ref 20.00 dB	B im		Mkr1 2	.401 860 GHz 1.403 dBm	
.0			2		Center Free
	~~~~~				2.402500000 GH
					Start Free
1.0 1.0					2.401500000 GH
					Stop Free
1.0					2.403500000 GH
enter 2.402500 GHz				Span 2.000 MHz	CF Step
Res BW 30 kHz	X	N 100 kHz Y FU	NCTION   FUNCTION WIDTH	33 ms (1001 pts)	200.000 kH <u>Auto</u> Mai
N 1 f N 1 f	2.401 860 GHz 2.402 860 GHz	1.403 dBm 1.416 dBm			Freq Offse
				=	0 H:
			<b>I</b> A STATUS	- F	
	С	FS NVNT 1-[	DH1 2441MHz		
Agilent Spectrum Analyzer - Swept S RL RF 50 Ω	A	SENSE:INT	ALIGN AUTO	10:21:05 AM May 30, 2024	& <b></b> _
enter Freq 2.441500	000 GHz PNO: Wide ⊂ 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 NNNNN	Frequency
Ref Offset 0.5 d	в		Mkr1 2	.440 860 GHz 1.905 dBm	Auto Tune
dB/div Ref 20.00 dB	im		A.2	1.903 dBm	Conter
	~~~~				Center Free 2.441500000 GH
		have			04- · -
.0					Start Free 2.440500000 GH
1.0					
					Stop Free 2.442500000 GH
				Spap 2 000 MU	
enter 2.441500 GHz Res BW 30 kHz	#VB	N 100 kHz	Sweep 2.1	Span 2.000 MHz 33 ms (1001 pts)	CF Step 200.000 kH Auto Mar
R MODE TRC SCL	× 2.440 860 GHz	1.905 dBm	NCTION FUNCTION WIDTH	FUNCTION VALUE	iviai
N 1 f	2.441 860 GHz	1.911 dBm			Freq Offse 0 Hi
					5 H.
2 N 1 f				E	
2 N 1 f				=E	





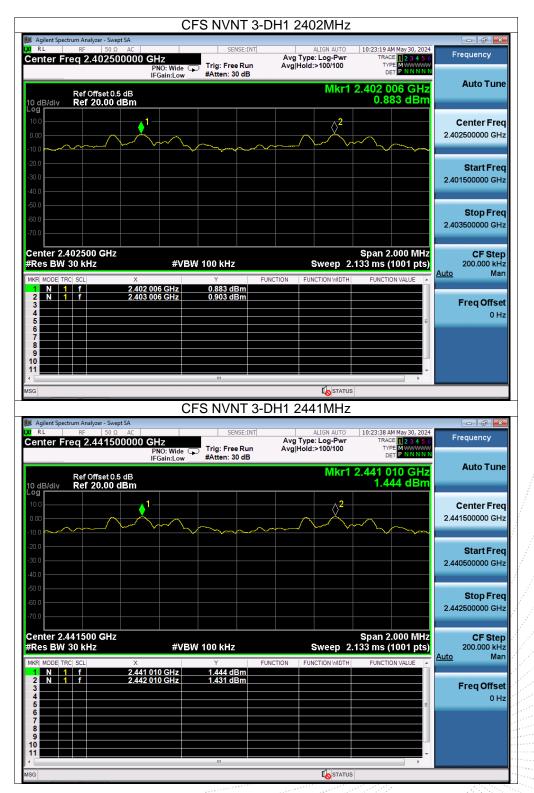






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		CFS NVNT	3-DH1 2	2480MHz			
Agilent Spectrum Analyze	r - Swept SA 50 Ω AC	SENSE:	NT	ALIGN AUTO	10:24:00 4	4 May 30, 2024	
Center Freq 2.47	79500000 GHz		Avg	Type: Log-Pwr told:>100/100	TRAC	E 1 2 3 4 5 6 E MWWWWW	Frequency
	PNO: Wide IFGain:Lov				DE		Auto Tune
10 dB/div Ref 20	set 0.5 dB .00 dBm			Mkr1	2.479 0 1.57	12 GHz 71 dBm	Auto Tune
Log 10.0	1			^ <b>2</b>			Center Freq
0.00					~		2.479500000 GHz
-10.0		$\sim$				~~~~	
-20.0							Start Freq
-30.0							2.478500000 GHz
-50.0							
-60.0							Stop Freq 2.480500000 GHz
-70.0							2.480500000 GH2
Center 2.479500 ( #Res BW 30 kHz		/BW 100 kHz		Sweep 2	Span 2. .133 ms (′	.000 MHz 1001 pts)	CF Step 200.000 kHz
MKR MODE TRC SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTIO	N VALUE	<u>Auto</u> Man
2 N 1 f	2.479 012 GHz 2.480 008 GHz	1.571 dBm 1.552 dBm					Freq Offset
3 4							0 Hz
5 6 7							
8							
10							
MSG					6		



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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.

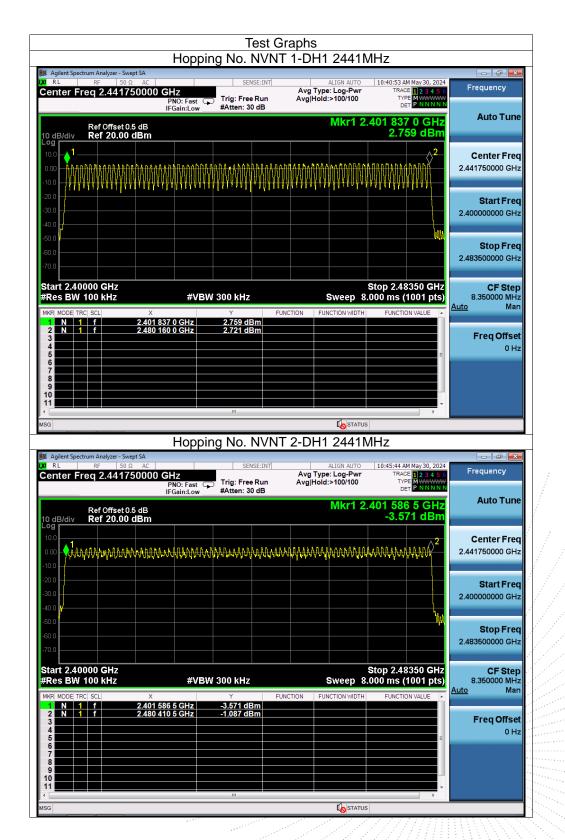
4. Set the spectrum analyzer: Start Frequency = 2.4GHz, Stop Frequency = 2.4835GHz. Sweep=auto;

#### 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

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ŀ	lopping No. NVNT	3-DH1 2441	ЛНz	
Agilent Spectrum Analyzer - Swept SA   RL RF 50 Ω AC   Center Freq 2.441750000 GHz PNC	D: Fast Trig: Free Run	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	10:49:41 AM May 30, 2024 TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P NNNNN	Frequency
Ref Offset 0.5 dB	ain:Low #Atten: 30 dB	Mkr1 2	401 503 0 GHz -2.680 dBm	Auto Tune
Log 10.0 10.0 10.0 10.0	unnus washing garden	MIN MANA MANA		Center Freq 2.441750000 GHz
-20 0 - -20 0 - -30 0 - -40 0 M				Start Freq 2.400000000 GHz
-50.0 -60.0 -70.0				Stop Fred 2.483500000 GHz
Start 2.40000 GHz #Res BW 100 kHz	#VBW 300 kHz		Stop 2.48350 GHz .000 ms (1001 pts)	CF Step 8.350000 MHz Auto Mar
MKR MODE TRC SCL X   1 N 1 f 2.401 503.0   2 N 1 f 2.401 503.0   3 4 5 5 5 5	GHz -2.680 dBm	CTION FUNCTION WIDTH	FUNCTION VALUE	Freq Offset
6 7 8 9 10				
← MSG	III		4	





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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).

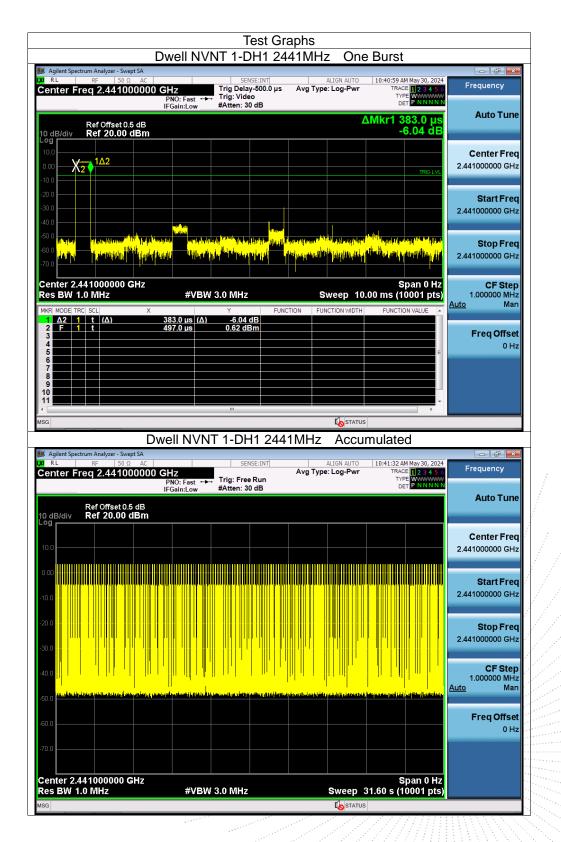
Mode	Frequency (MHz)	Pulse Time (ms)	Total Dwell Time (ms)	Burst Count	Period Time (ms)	Limit (ms)	Verdict
1-DH1	2441	0.383	120.645	315	31600	400	Pass
1-DH3	2441	1.639	267.157	163	31600	400	Pass
1-DH5	2441	2.887	332.005	115	31600	400	Pass
2-DH1	2441	0.386	121.976	316	31600	400	Pass
2-DH3	2441	1.642	257.794	157	31600	400	Pass
2-DH5	2441	2.892	268.956	93	31600	400	Pass
3-DH1	2441	0.391	123.165	315	31600	400	Pass
3-DH3	2441	1.641	254.355	155	31600	400	Pass
3-DH5	2441	2.893	318.23	110	31600	400	Pass

#### 14.4 Test Result

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

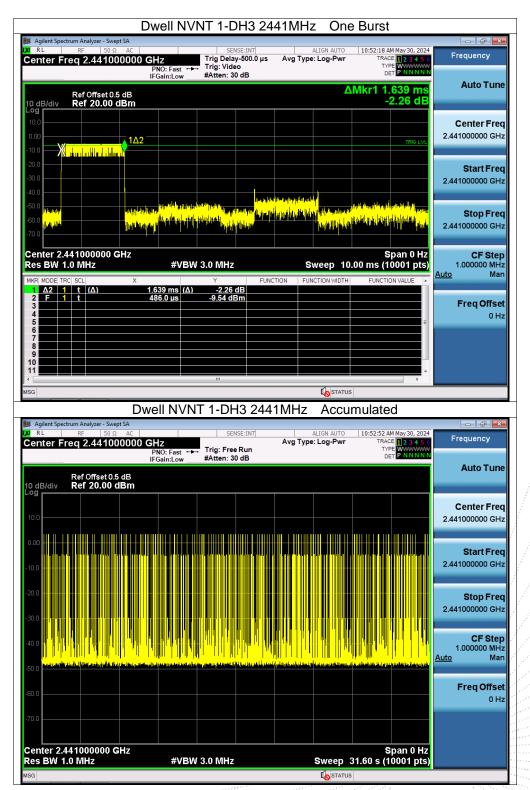
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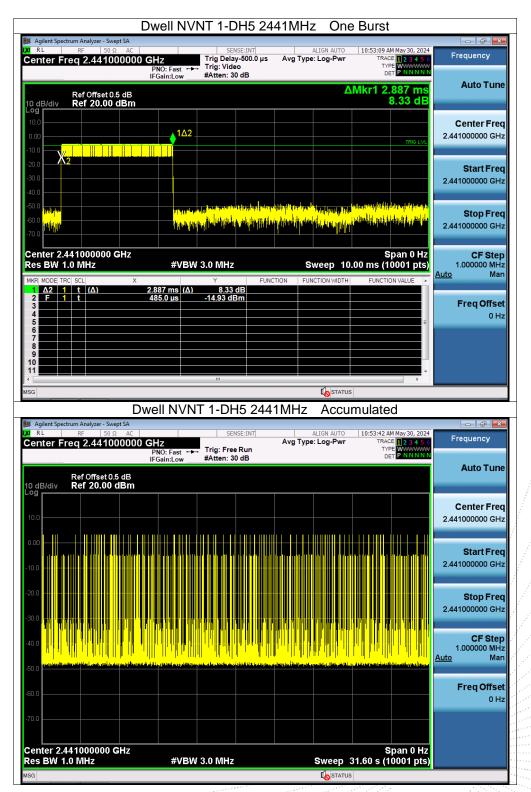


TE. OVI

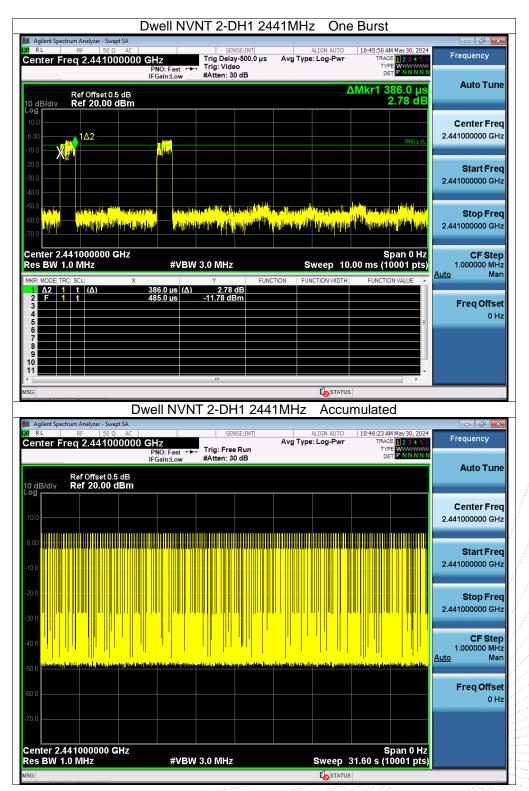








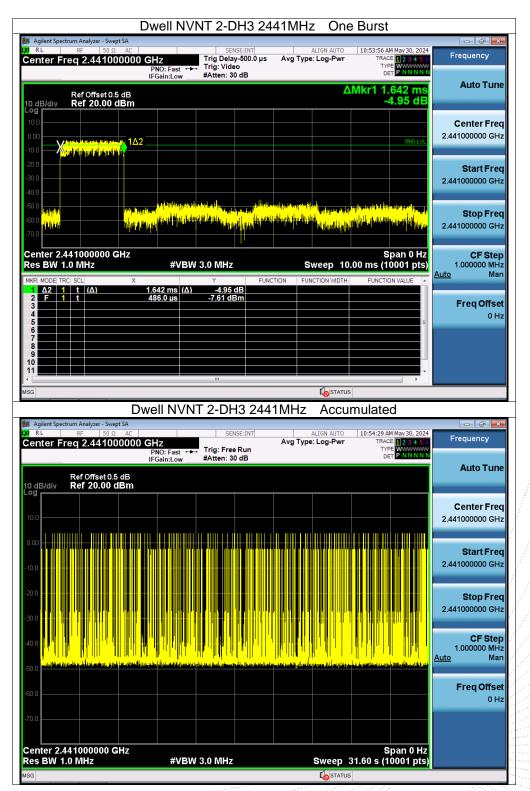




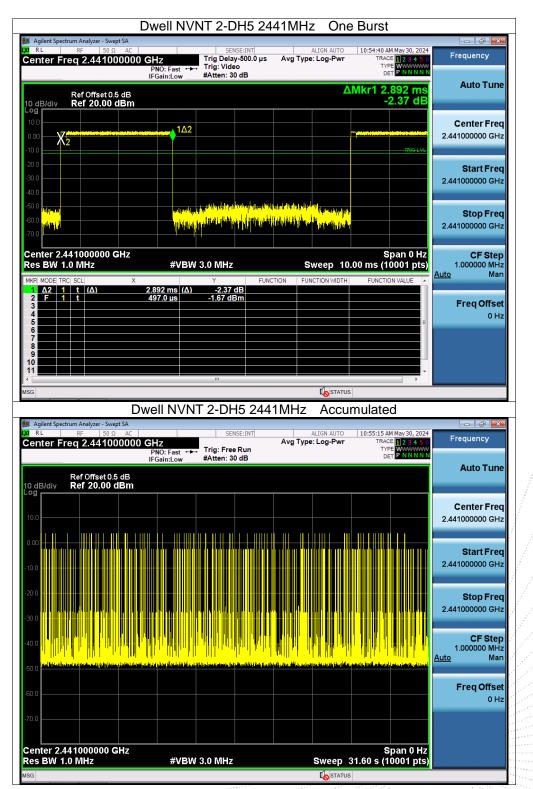


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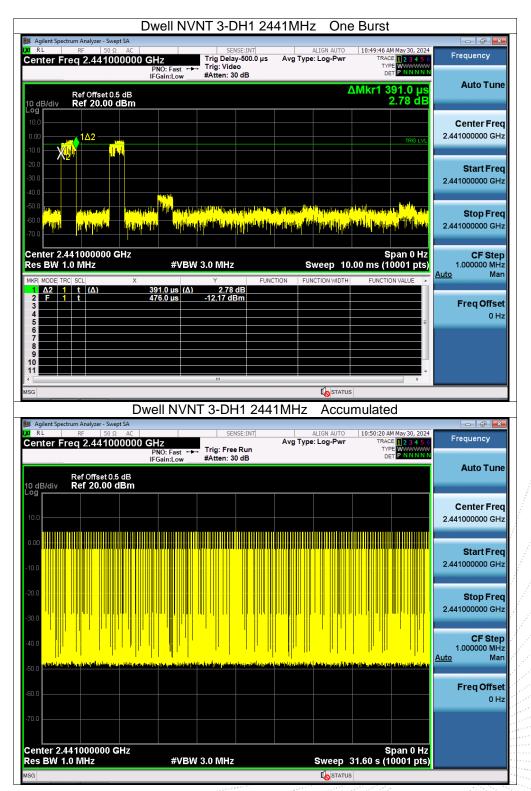




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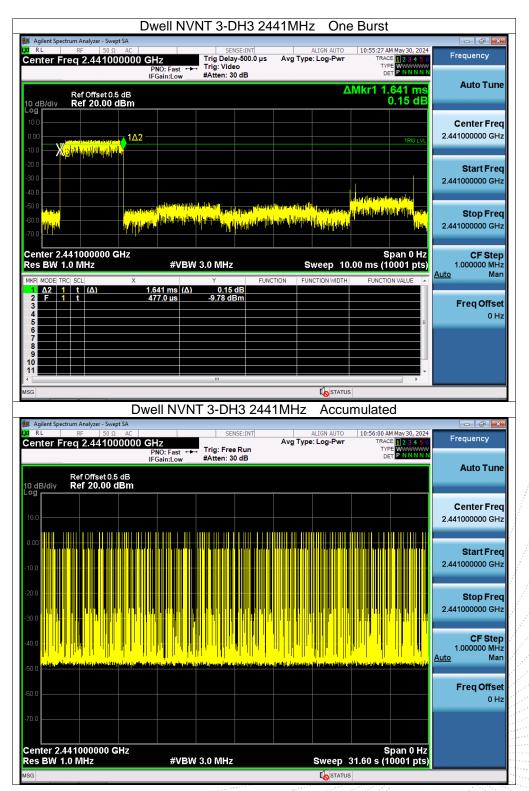
еро



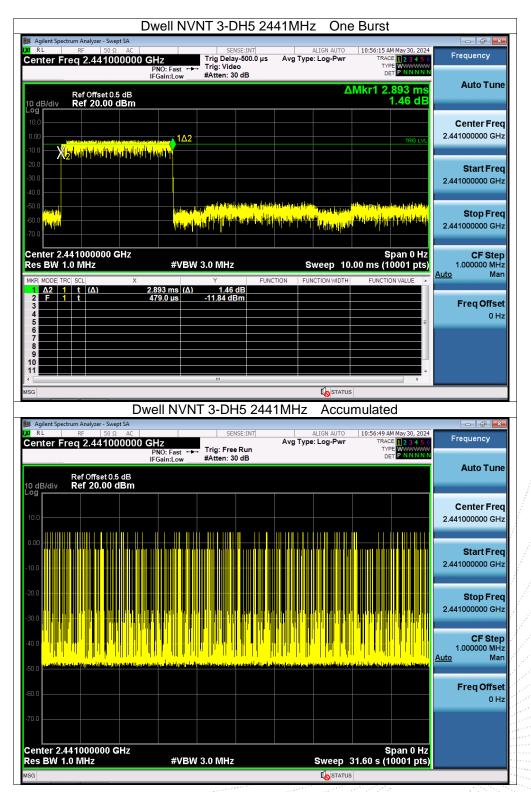


TE OVE











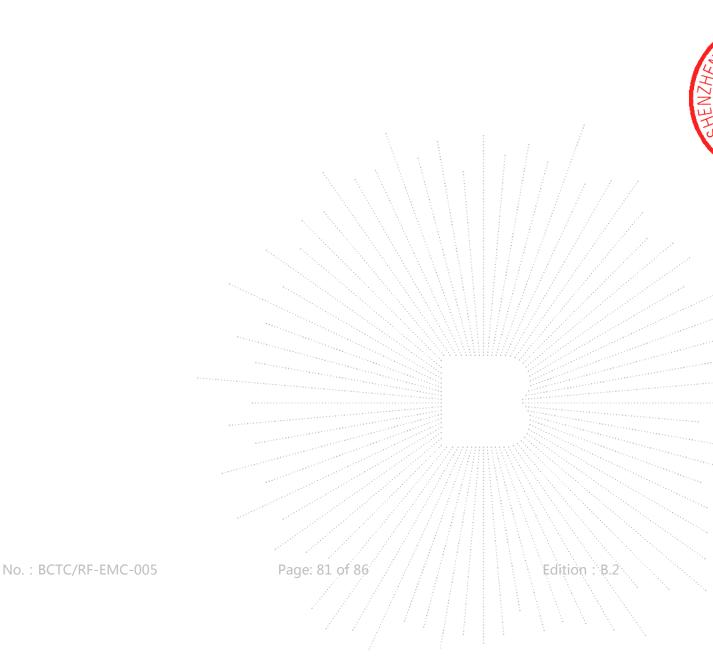
## 15. Antenna Requirement

#### 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 Photos** 





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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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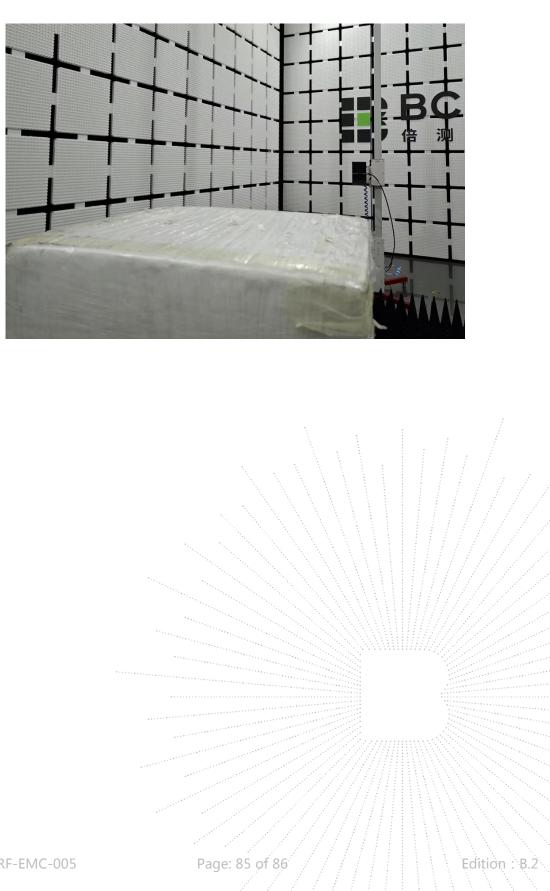
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No. : BCTC/RF-EMC-005



## 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

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Website: http://www.chnbctc.com

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

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

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