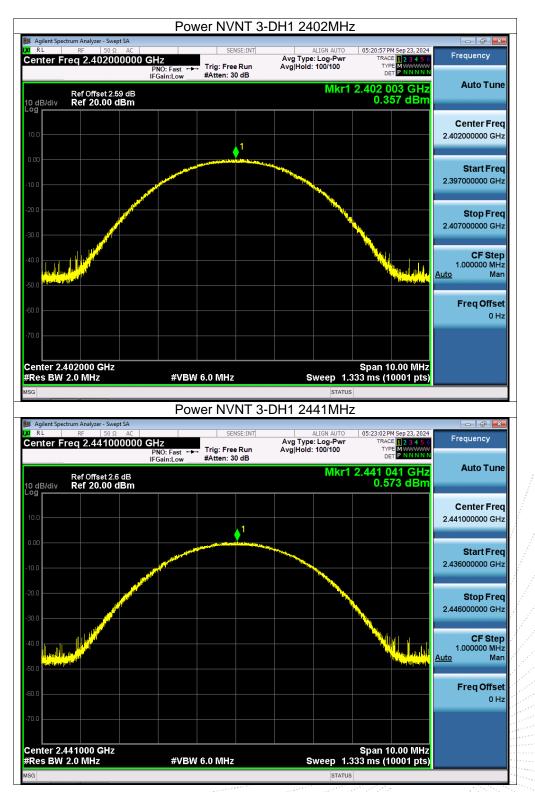
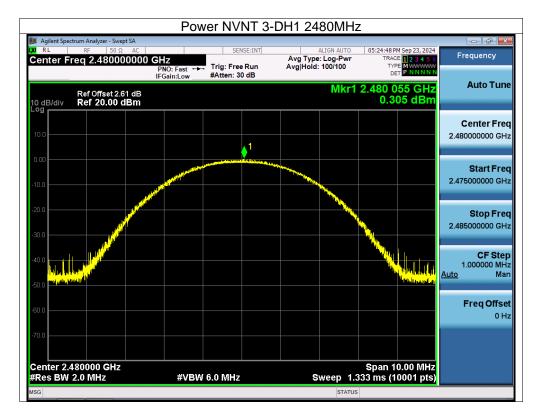


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## 12. Hopping Channel Separation

### 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.

Relative Humidity:

54%

0.832

Test Voltage:	DC 3.7V		Remar	'k:	N/A	
		· · · · ·				
Condition	Mode	Hopping Freq1 (MHz)	Hopping Freq2 (MHz)	HFS (MHz)	Limit (MHz)	Verdict
NVNT	1-DH1	2401.852	2402.852	1	0.674	Pass
NVNT	1-DH1	2440.854	2441.85	0.996	0.688	Pass
NVNT	1-DH1	2478.852	2479.852	1	0.689	Pass
NVNT	2-DH1	2401.85	2402.852	1.002	0.865	Pass
NVNT	2-DH1	2440.852	2441.852	1	0.854	Pass
NVNT	2-DH1	2478.854	2479.852	0.998	0.842	Pass
NVNT	3-DH1	2401.85	2402.85	1	0.802	Pass
NVNT	3-DH1	2440.85	2441.85	1	0.821	Pass

2479.852

#### 12.4 Test Result

**26**℃

3-DH1

2478.852

Temperature:

**NVNT** 

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Pass

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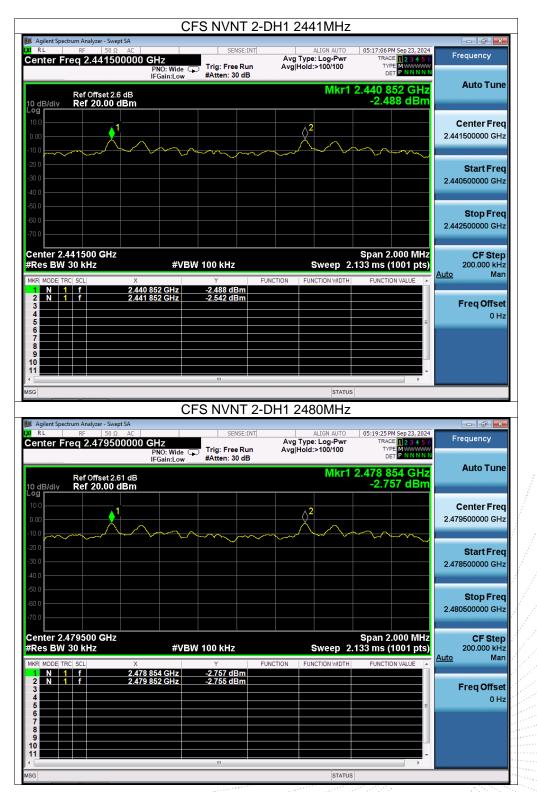


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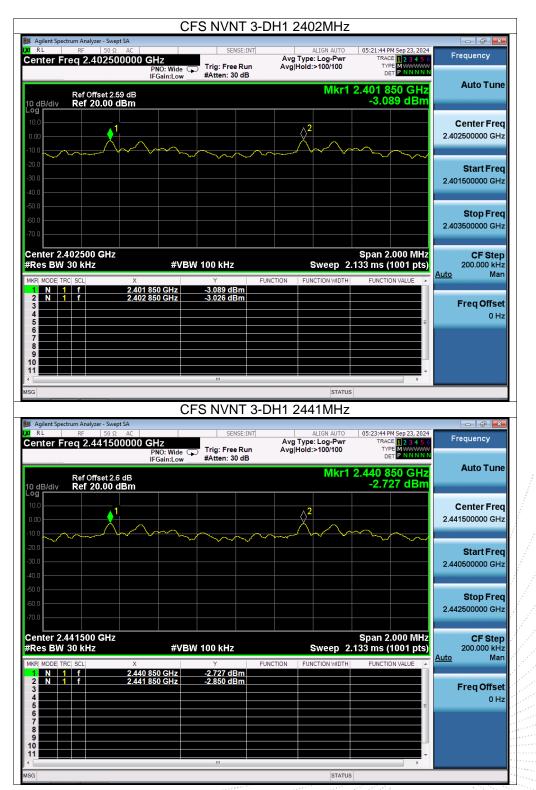




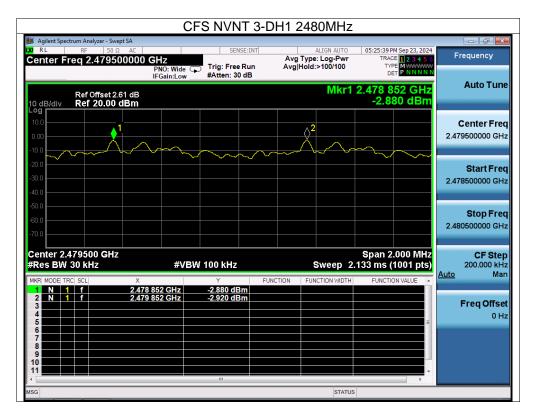


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No.: BCTC/RF-EMC-005



## 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;

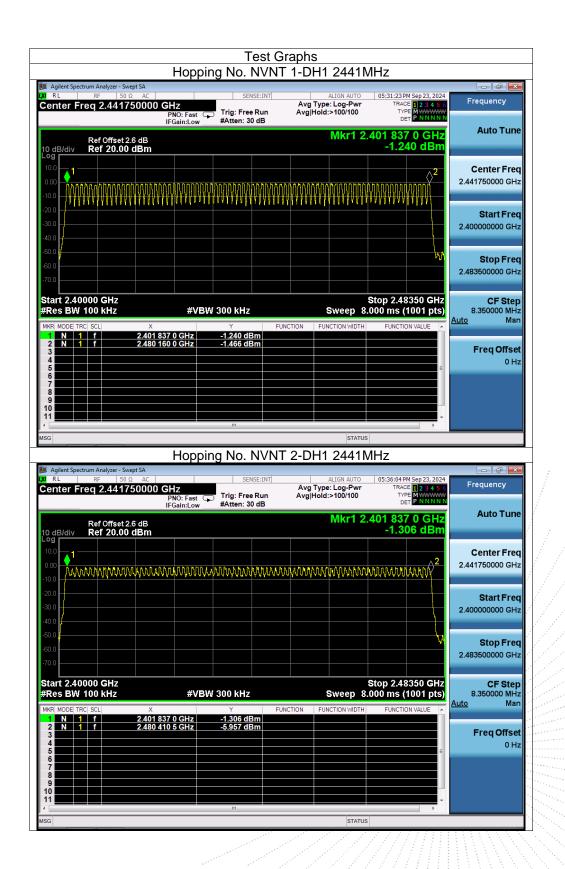
#### 13.4 Test Result

Temperature:	<b>26</b> ℃	Relative Humidity:	54%		
Test Voltage:	DC 3.7V	Remark:	N/A		
				11	

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

t Sea





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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).

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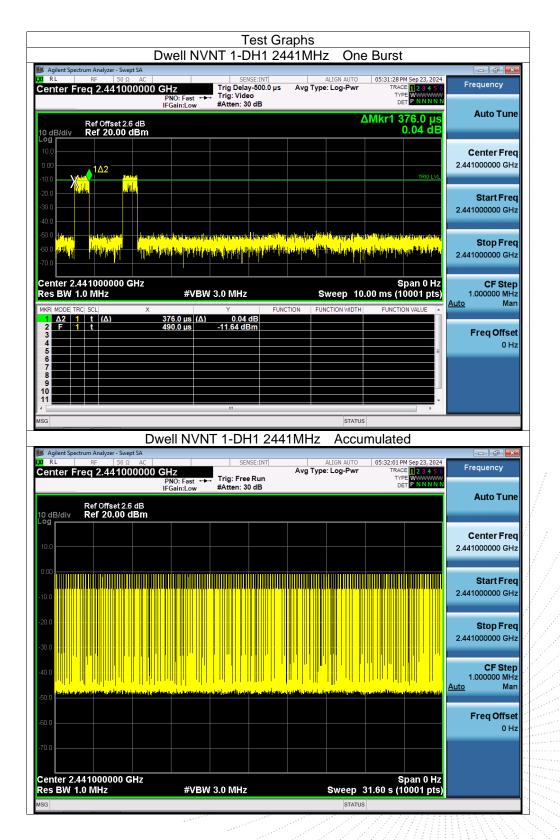
# 14.4 Test Result

Temperature:	2	<b>6</b> °C		Relative	Humidity:	54%		
Test Voltage:	D	C 3.7V		Remark		N/A		
Condition	Mode	Frequency (MHz)	Pulse Time (ms)	Total Dwell Time (ms)	Burst Count	Period Time (ms)	Limit (ms)	Verdict
NVNT	1-DH	1 2441	0.376	118.44	315	31600	400	Pass
NVNT	1-DH:	3 2441	1.631	274.008	168	31600	400	Pass
NVNT	1-DH	5 2441	2.88	322.56	112	31600	400	Pass
NVNT	2-DH	1 2441	0.386	121.204	314	31600	400	Pass
NVNT	2-DH	3 2441	1.638	253.89	155	31600	400	Pass
NVNT	2-DH	5 2441	2.885	291.385	101	31600	400	Pass
NVNT	3-DH	1 2441	0.387	122.292	316	31600	400	Pass
NVNT	3-DH	3 2441	1.637	278.29	170	31600	400	Pass
NVNT	3-DH	5 2441	2.887	329.118	114	31600	400	Pass

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

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A silest Construct Analysis		IVNT 1-DH3 2	441MHz One	e Burst	
	er - Swept SA 50 Ω AC 41000000 GHz PNO: Fast	SENSE:INT Trig Delay-500.0 µs →→ Trig: Video	ALIGN AUTO S Avg Type: Log-Pwr	05:44:40 PM Sep 23, 2024 TRACE 123456 TYPE WWWWWW	Frequency
Ref Off	IFGain:Low set 2.6 dB 0.00 dBm		Δ	Mkr1 1.631 ms -1.64 dB	Auto Tune
0 dB/div Ref 20					Center Free 2.441000000 GH
				TRIG LVL	Start Free
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enter 2.4410000 es BW 1.0 MHz		BW 3.0 MHz	Sweep 10.	Span 0 Hz 00 ms (10001 pts)	CF Stej 1.000000 MH
R MODE TRC SCL Δ2 1 t (Δ) F 1 t	х 1.631 ms 492.0 µs		INCTION FUNCTION WIDTH	FUNCTION VALUE	Auto Ma
3 4 5 6				=	Freq Offse 0 H
7 7					
à			STATUS		
Agilent Spectrum Analyze	er - Swept SA	/NT 1-DH3 24		mulated	
enter Freq 2.4	50 Ω AC 41000000 GHz PNO: Fast		ALIGN AUTO Avg Type: Log-Pwr	05:45:13 PM Sep 23, 2024 TRACE 1 2 3 4 5 6 TYPE WWWWW DET P NNNNN	Frequency
Ref Offs	IFGain:Low set 2.6 dB 1.00 dBm	, #Atten: 30 dB			Auto Tun
dB/div Ref 20	.00 dBm				Center Fre
).0					2.441000000 GH
					Start Free 2.441000000 GH
.0					
.0					<b>Stop Fre</b> 2.441000000 GH
1.0					CF Stej 1.000000 MH
10 <b>11 1 11 11 11 11 11 11 11 11 11</b>	a na ana amin'ny mandritra dia mampika dia 1990. Ny kaodim-paositra dia mampika dia mampi	anter estatute a dipert al sera a pri e a L'hanne estatute a dipert al sera a pri e a	- 19   4   19   19   19   19   19   19	en an	<u>Auto</u> Ma
.0					Freq Offse 0 H
nter 2.4410000	100 GHz			Span 0 Hz	

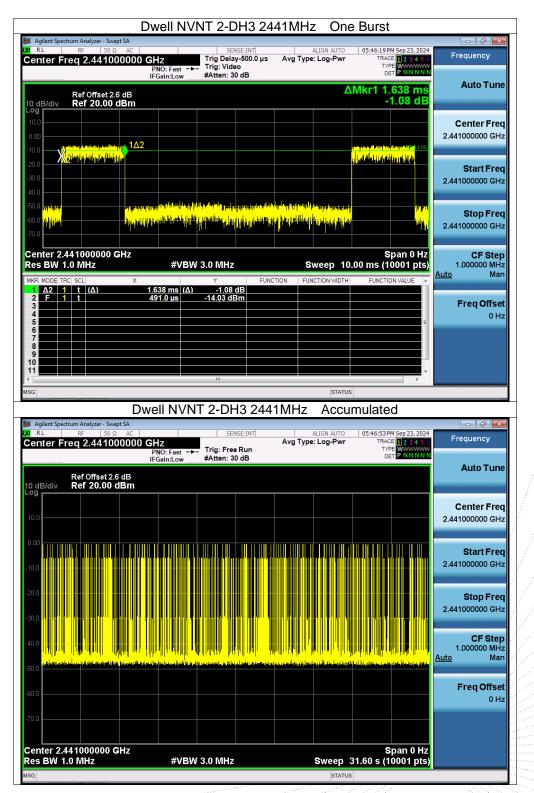


Agilent Spectrum Analyzer - Swept SA	Owell NVNT 1-DH5 2	441MHz One	Burst	
RL         RF         50 Ω         AC           enter Freq 2.441000000         β	PNO: Fast ++++ Trig: Video	ALIGN AUTO Avg Type: Log-Pwr	05:45:31 PM Sep 23, 2024 TRACE 1 2 3 4 5 6 TYPE WWWWWW DET P N N N N N	Frequency
Ref Offset 2.6 dB 0 dB/div Ref 20.00 dBm	IFGain:Low #Atten: 30 dB	ΔN	lkr1 2.880 ms -1.99 dB	Auto Tune
0 dB/div Ref 20.00 dBm	1Δ2		TRIG LVL	Center Free 2.441000000 GH
0.0				<b>Start Fre</b> 2.441000000 GH
	han	en alle a di se di s Nel di far alle se fara ci di se d	aliteration and a second s	<b>Stop Fre</b> 2.441000000 GH
enter 2.441000000 GHz es BW 1.0 MHz	#VBW 3.0 MHz	Sweep 10.0	Span 0 Hz 0 ms (10001 pts)	CF Stej 1.000000 MH Auto Ma
2 F 1 t 3 4 5 5 6	Υ         FU           2.880 ms         (Δ)         -1.99 dB           497.0 μs         -3.08 dBm	NCTION FUNCTION WIDTH	FUNCTION VALUE	Freq Offse 0 H
7 8 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	m			
	vell NVNT 1-DH5 24	41MHz Accum	ulated	
Agilent Spectrum Analyzer - Swept SA           RL         RF         50 Ω         AC           enter Freq 2.4410000000         C	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr	05:46:04 PM Sep 23, 2024 TRACE 1 2 3 4 5 6 TYPE WWWWWW	Frequency
Ref Offset 2.6 dB	IFGain:Low #Atten: 30 dB		DET <b>PNNNN</b>	Auto Tun
dB/div Ref 20.00 dBm				<b>Center Fre</b> 2.441000000 GH
				Start Fre 2.441000000 G⊢
				Stop Fre 2.441000000 G⊢ CF Ste
		i i i i i i i i i i i i i i i i i i i	A fact with the second	1.000000 MH Auto Ma
				<b>Freq Offse</b> 0 H



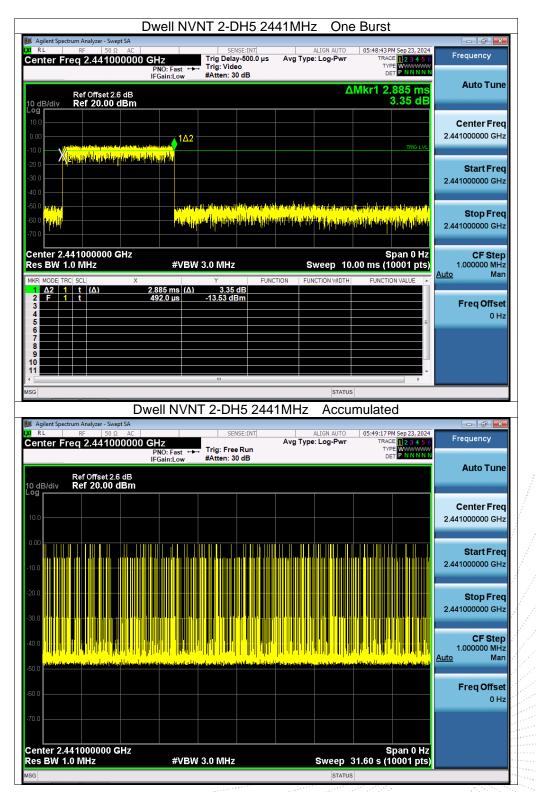
	Dwell NVNT 2-DH1	2441MHz One	e Burst	
Agilent Spectrum Analyzer - Swept SA RL RF 50 Ω AC	SENSE:IN		05:36:10 PM Sep 23, 2024	Frequency
enter Freq 2.44100000	PNO: Fast ++++ Trig: Video	.0 μs Avg Type: Log-Pwr	TRACE 1 2 3 4 5 6 TYPE WWWWW DET P N N N N N	requercy
	IFGain:Low #Atten: 30 dB		∆Mkr1 386.0 µs	Auto Tune
Ref Offset 2.6 dB 0 dB/div Ref 20.00 dBm			-1.79 ḋB	
10.0 <b>▲ 1∆2</b>				Center Freq
			TRIG LVL	2.441000000 GHz
20.0				
30.0				Start Freq 2.441000000 GHz
40.0			(a patied)	
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	an a		and shirt of a solution.	2.441000000 GHz
Center 2.441000000 GHz			Span 0 Hz	CF Step
Res BW 1.0 MHz	#VBW 3.0 MHz	-	.00 ms (10001 pts)	1.000000 MHz <u>Auto</u> Man
$\frac{1}{\Delta 2} \frac{\Delta 2}{1} \frac{1}{t} \frac{1}{\Delta 2} \frac{1}{t} \frac{1}{t$	386.0 μs (Δ) -1.79 dB	FUNCTION FUNCTION WIDTH	FUNCTION VALUE	
2 F 1 t 3 4	497.0 µs -2.58 dBm			Freq Offset
5 6			=	0 Hz
7 8				
9				
			• •	
SG		STATUS		
Agilent Spectrum Analyzer - Swept SA	Well NVNT 2-DH1 2	2441MHz Accu	mulated	
RL         RF         50 Ω         AC           Center Freq 2.44100000         Center Freq 2.441000000         Center Freq 2.4410000000         Center F	SENSE:IN	ALIGN AUTO	05:36:43 PM Sep 23, 2024 TRACE 1 2 3 4 5 6	Frequency
enter Fred 2.44100000	PNO: Fast +++ IFGain:Low #Atten: 30 dB	Ang Type. Logi m		
Ref Offset 2.6 dB				Auto Tune
o dB/div Ref 20.00 dBm				
				Center Freq
10.0				2.441000000 GHz
				Start Freq
10.0				2.441000000 GHz
20.0				Stop Freq
80.0. <mark>.</mark>				2.441000000 GHz
10.0				
			The second s	
50.0	line triany field is an it day and a field and a strike on the strike in the second second second second second	in a final with a first state. White provide the partial state of the difference of the state of	na nyatiki atak di dana para pikiniki birkalikan	
50.0				
				UHZ
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enter 2.441000000 GHz			Span 0 Hz	
				CF Step 1.000000 MHz <u>Auto</u> Man Freq Offset 0 Hz



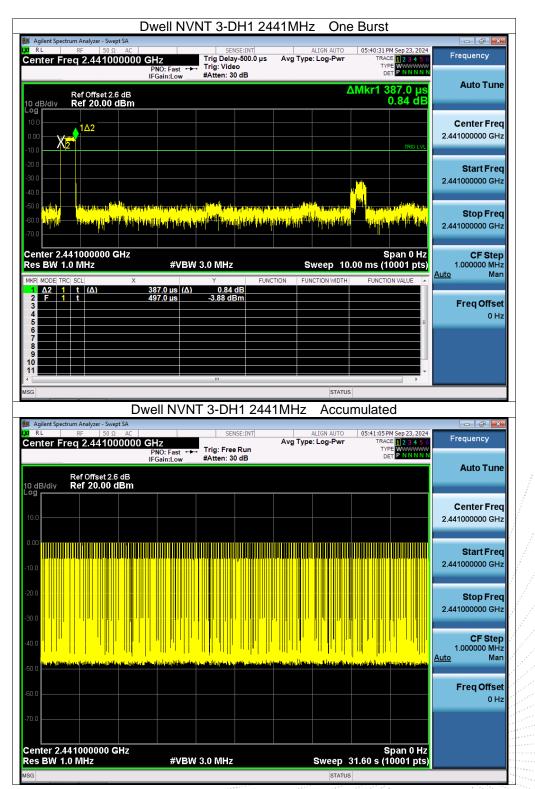


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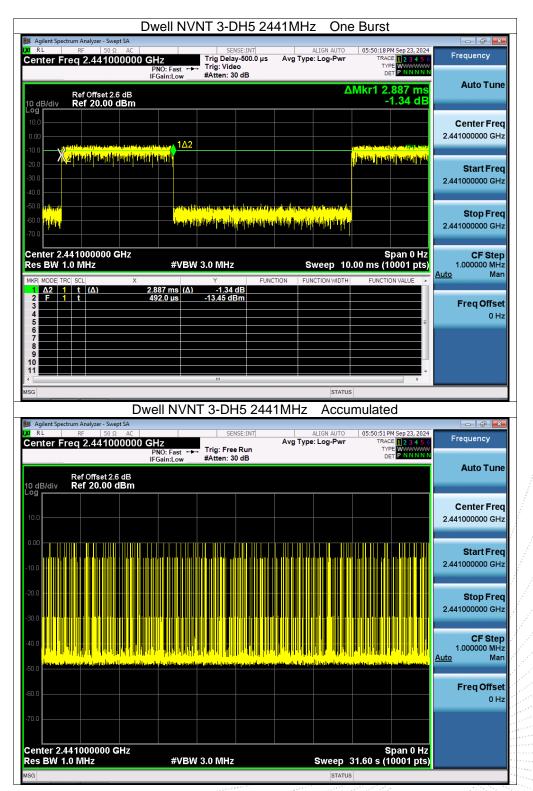


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Agilent Spectrum Analyzer - Swept SA				e Burst	
RL RF 50 Ω AC enter Freq 2.44100000	PNO: Fast +++	SENSE:INT Trig Delay-500.0 µs Trig: Video	ALIGN AUTO Avg Type: Log-Pwr	05:49:31 PM Sep 23, 2024 TRACE 1 2 3 4 5 6 TYPE WWWWW DET P NNNNN	Frequency
Ref Offset 2.6 dB	IFGain:Low	#Atten: 30 dB	L	∆Mkr1 1.637 ms 2.05 dB	Auto Tune
0 dB/div Ref 20.00 dBm 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0				TRIG LVL	<b>Center Free</b> 2.441000000 GH:
					<b>Start Fre</b> 2.441000000 GH
0.0 <mark>119-00 011 0.0 119-00 011 0.0 00 0110 0110 0110 0110 0110 0</mark>		a da da da da da da para da	and for the formation of the state of the st	e de la constitute de la c La constitute de la constit La constitute de la constit	<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 Stej 1.000000 MH
R MODE TRC SCL X	1.637 ms (Δ)	Y FUN 2.05 dB	VCTION FUNCTION WIDTH		<u>Auto</u> Mai
2 F 1 t 3 4 5 5 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	497.0 µs	-5.87 dBm			<b>Freq Offse</b> 0 H
B B		III			
a			STATU	S	
Agilent Spectrum Analyzer - Swept SA	Dwell NVN	T 3-DH3 244	41MHz Accu	umulated	
RL RF 50 Ω AC enter Freq 2.44100000	PNO: Fast ↔	SENSE:INT Trig: Free Run #Atten: 30 dB	ALIGN AUTO Avg Type: Log-Pwr	05:50:04 PM Sep 23, 2024 TRACE 1 2 3 4 5 6 TYPE WWWWWW DET P NNNNN	Frequency
Ref Offset 2.6 dB dB/div Ref 20.00 dBm g	IFGain:Low	#Atten: 50 dB			Auto Tun
.0					<b>Center Fre</b> 2.441000000 GH
					<b>Start Fre</b> 2.441000000 GH
					2.441000000 GH CF Ste 1.000000 MH
					2.44100000 GH CF Ster 1.000000 MH <u>Auto</u> Mai
					Stop Free 2.441000000 GH CF Ster 1.000000 MH <u>Auto</u> Man Freq Offse 0 H





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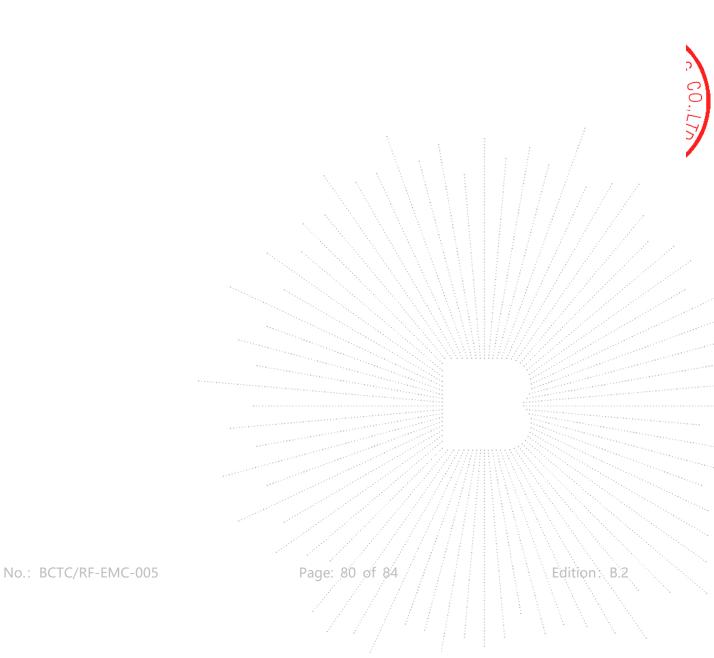
# 15. Antenna Requirement

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



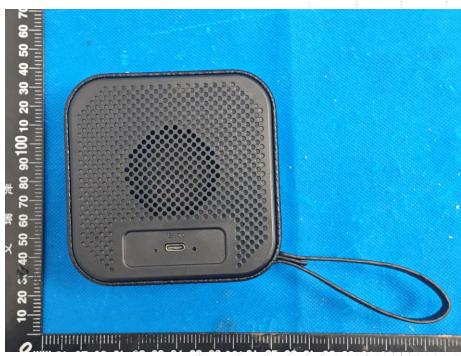


# 16. EUT Photographs

EUT Photo 1



#### EUT Photo 2



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

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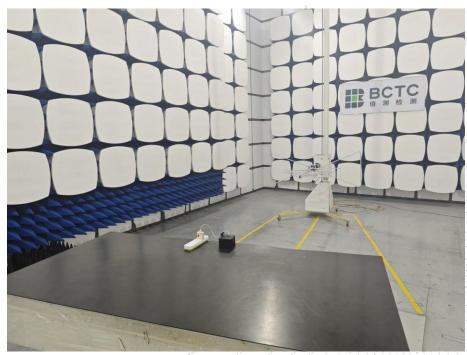


# 17. EUT Test Setup Photographs

# **Conducted Emissions Photo**



Radiated Measurement Photos



No.: BCTC/RF-EMC-005

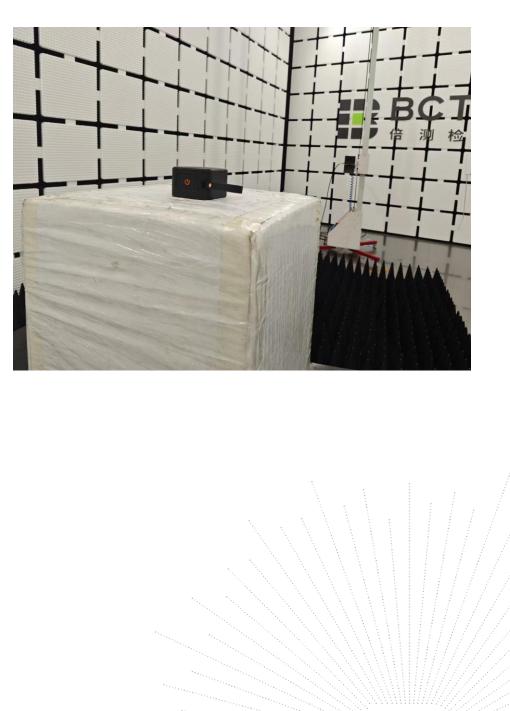
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TEST

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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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