

TEST REPORT

Report No.:	BCTC2309402169E						
Applicant:	Shenzhen HanHong Digital Technology Co., Ltd						
Product Name:	Sound Bar	Sound Bar					
Model/Type Reference:	HD-016LSD-Q						
Tested Date:	2023-09-15 to 2023-09-18						
Issued Date:	2023-10-18						
Sh	enzhen BCTC Testing Co., Ltd.						
No.: BCTC/RF-EMC-00	7 Page: 1 of 80//////	Edition: A.4					



FCC ID: 2ASKOHD-016LSD-Q

Product Name:	Sound Bar				
Trademark:	Sonic Blast				
Model/Type Reference:	HD-016LSD-Q, HD-005LSD-Q,HD-008LSD-Q,HD-020LSD-Q,HD-001LSD-Q				
Prepared For:	Shenzhen HanHong Digital Technology Co., Ltd				
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Sample Received Date:	2023-09-14				
Sample Tested Date:	2023-09-15 to 2023-09-18				
Report No.:	BCTC2309402169E				
Test Standards	FCC Part15.247 ANSI C63.10-2013				
Test Results	PASS				
Remark:	This is Bluetooth Classic radio test report.				
Tested	by: Approved by:				

Lei Chen

Lei Chen/Project Handler

Zero Zhou/Reviewer

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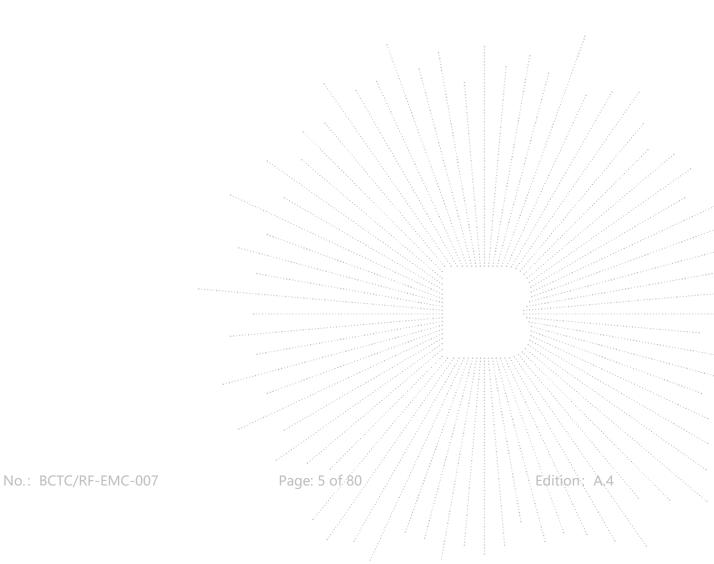
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1. Version

Report No.	Issue Date	Description	Approved
BCTC2309402169E	2023-10-18	Original	Valid





Test Summary 2.

The Product has been tested according to the following specifications:

No.	Test Parameter	Clause No.	Results
1	Conducted emission AC power port	§15.207	PASS
2	Conducted peak output power for FHSS	§15.247(b)(1)	PASS
3	20dB Occupied bandwidth	§15.247(a)(1)	PASS
4	Number of hopping frequencies	§15.247(a)(1)(iii)	PASS
5	Dwell Time	§15.247(a)(1)(iii)	PASS
6	Spurious RF conducted emissions	§15.247(d)	PASS
7	Band edge	§15.247(d)	PASS
8	Spurious radiated emissions for transmitter	§15.247(d) & §15.209 & §15.205	PASS
9	Antenna Requirement	15.203	PASS

NOTE1: N/A (Not Applicable) NOTE2: According to FCC OET KDB 558074, the report use radiated measurements in the restricted frequency bands. In addition, the radiated test is also performed to ensure the emissions emanating from the device cabinet also comply with the applicable limits.

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3. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

No.	Item	Uncertainty
1	3m chamber Radiated spurious emission(30MHz-1GHz)	U=4.3dB
2	3m chamber Radiated spurious emission(9KHz-30MHz)	U=3.7dB
3	3m chamber Radiated spurious emission(1GHz-18GHz)	U=4.5dB
4	3m chamber Radiated spurious emission(18GHz-40GHz)	U=3.34dB
5	Conducted Emission (150kHz-30MHz)	U=3.20dB
6	Conducted Adjacent channel power	U=1.38dB
7	Conducted output power uncertainty Above 1G	U=1.576dB
8	Conducted output power uncertainty below 1G	U=1.28dB
9	humidity uncertainty	U=5.3%
10	Temperature uncertainty	U=0.59°C



4. Product Information and Test Setup

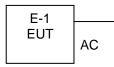
4.1 Product Information

Model/Type reference:	HD-016LSD-Q, HD-005LSD-Q,HD-008LSD-Q,HD-020LSD-Q,HD-001LSD-Q
Model differences:	Our production units bearing the following model numbers are identical in circuitry and electrical, mechanical and physical construction; The difference is only in model names
Bluetooth Version:	N/A
Hardware Version:	N/A
Software Version:	N/A
Operation Frequency:	Bluetooth: 2402-2480MHz
Type of Modulation:	Bluetooth: GFSK, π/ 4 DQPSK,8DPSK
Number Of Channel	79CH
Antenna installation:	Internal antenna,
Antenna Gain:	1.68dBi
Ratings:	AC100-240V 50/60HZ

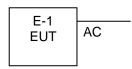
4.2 Test Setup Configuration

See test photographs attached in eut test setup photographs for the actual connections between product and support equipment.

Conducted Emission:



Radiated Spurious Emission



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4.3 Support Equipment

No.	Device Type	Brand	Model	Series No.	Note
E-2					
E-3					

ltem	Shielded Type	Ferrite Core	Length	Note
C-1	N/A	N/A	N/A	N/A

Notes:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.

2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

4.4 Channel List

СН	Frequency (MHz)	СН	Frequency (MHz)	СН	Frequency (MHz)	СН	Frequency (MHz)
0	2402	1	2403	2	2404	3	2405
4	2406	5	2407	6	2408	7	2409
8	2410	9	2411	10	2412	11	2413
12	2414	13	2415	14	2416	15	2417
16	2418	17	2419	18	2420	19	2421
20	2422	21	2423	22	2424	23	2425
24	2426	25	2427	26	2428	27	2429
28	2430	29	2431	30	2432	31	2433
32	2434	33	2435	34	2436	35	2437
36	2438	37	2439	38	2440	39	2441
40	2442	41	2443	42	2444	43	2445
44	2446	45	2447	46	2448	47	2449
48	2450	49	2451	50	2452	51	2453
52	2454	53	2455	54	2456	55	2457
56	2458	57	2459	58	2460	59	2461
60	2462	61	2463	62	2464	63	2465
64	2466	65	2467	66	2468	67	2469
68	2470	69	2471	70	2472	71	2473
72	2474	73	2475	74	2476	75	2477
76	2478	77	2479	78	2480	79	·····



4.5 Test Mode

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Test Mode	Test mode	Low channel	Middle channel	High channel		
1	Transmitting(GFSK)	2402MHz	2441MHz	2480MHz		
2	Transmitting(π/ 4 DQPSK)	2402MHz	2441MHz	2480MHz		
3	Transmitting(8DPSK)	2402MHz	2441MHz	2480MHz		
4	Transmitting (Conducted emission & Radiated emission)					

Note:

(1) The measurements are performed at the highest, middle, lowest available channels.

(2) Fully-charged battery is used during the test

4.6 Table Of Parameters Of Text Software Setting

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters

Test software Version	FCC_assist 1.0.1.2					
Frequency	2402 MHz	2441 MHz	2480 MHz			
Parameters	DEF	DEF	DEF			

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5. Test Facility And Test Instrument Used

5.1 Test Facility

All measurement facilities used to collect the measurement data are located at Shenzhen BCTC Testing Co., Ltd. Address: 1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Tangwei, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards. FCC Test Firm Registration Number: 712850 IC Registered No.: 23583

5.2 Test Instrument Used

Conducted Emissions Test									
Equipment	Manufacturer	Model#	Last Cal.	Next Cal.					
Receiver	R&S	ESR3	102075	May 15, 2023	May 14, 2024				
LISN	R&S	ENV216	101375	May 15, 2023	May 14, 2024				
Software	Frad	EZ-EMC	EMC-CON 3A1	/	\				
Attenuator	\	10dB DC-6GHz	1650	May 15, 2023	May 14, 2024				

RF Conducted Test									
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.				
Power Metter	Keysight	E4419	I	May 15, 2023	May 14, 2024				
Power Sensor (AV)	Keysight	E9300A		May 15, 2023	May 14, 2024				
Signal Analyzer20kH z-26.5GHz	Keysight	N9020A	MY49100060	May 15, 2023	May 14, 2024				
Spectrum Analyzer9kHz- 40GHz	R&S	FSP40		May 15, 2023	May 14, 2024				

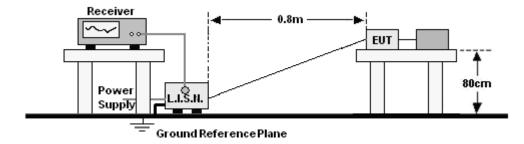


Radiated Emissions Test (966 Chamber)								
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.			
966 chamber	ChengYu	966 Room	966	May 15, 2023	May 14, 2026			
Receiver	R&S	ESR3	102075	May 15, 2023	May 14, 2024			
Receiver	R&S	ESRP	101154	May 15, 2023	May 14, 2024			
Amplifier	SKET	LAPA_01G18 G-45dB	١	May 15, 2023	May 14, 2024			
Amplifier	Schwarzbeck	BBV9744	9744-0037	May 15, 2023	May 14, 2024			
TRILOG Broadband Antenna	Schwarzbeck	VULB9163	942	May 15, 2023	May 14, 2024			
Horn Antenna	Schwarzbeck	BBHA9120D	1541	May 15, 2023	May 14, 2024			
Horn Antenn(18GH z-40GHz)	Schwarzbeck	BBHA9170	00822	May 15, 2023	May 14, 2024			
Amplifier(18G Hz-40GHz)	MITEQ	TTA1840-35- HG	2034381	May 15, 2023	May 14, 2024			
Loop Antenna(9KHz -30MHz)	Schwarzbeck	FMZB1519B	00014	May 15, 2023	May 14, 2024			
RF cables1(9kHz- 30MHz)	Huber+Suhnar	9kHz-30MHz	B1702988-000 8	May 15, 2023	May 14, 2024			
RF cables2(30MH z-1GHz)	Huber+Suhnar	30MHz-1GHz	1486150	May 15, 2023	May 14, 2024			
RF cables3(1GHz -40GHz)	Huber+Suhnar	1GHz-40GHz	1607106	May 15, 2023	May 14, 2024			
Power Metter	Keysight	E4419	1	May 15, 2023	May 14, 2024			
Power Sensor (AV)	Keysight	E9300A		May 15, 2023	May 14, 2024			
Signal Analyzer20kH z-26.5GHz	Keysight	N9020A	MY49100060	May 15, 2023	May 14, 2024			
Spectrum Analyzer9kHz- 40GHz	R&S	FSP40		May 15, 2023	May 14, 2024			
Software	Frad	EZ-EMC	FA-03A2 RE	١				



6. Conducted Emissions

6.1 Block Diagram Of Test Setup



6.2 Limit

	Limit (dBuV)			
Frequency (MHz)	Quas-peak	Average		
0.15 -0.5	66 - 56 *	56 - 46 *		
0.50 -5.0	56.00	46.00		
5.0 -30.0	60.00	50.00		

Notes:

1. *Decreasing linearly with logarithm of frequency.

2. The lower limit shall apply at the transition frequencies.

6.3 Test procedure

Receiver Parameters		Setting	
Attenuation		10 dB	
Start Frequency		0.15 MHz	
Stop Frequency		30 MHz	
IF Bandwidth		9 kHz	

a. The Product was placed on a nonconductive table 0.8 m above the horizontal ground reference plane, and 0.4 m from the vertical ground reference plane, and connected to the main through Line Impedance Stability Network (L.I.S.N).

b. The RBW of the receiver was set at 9 kHz in 150 kHz ~ 30MHz with Peak and AVG detector in Max Hold mode. Run the receiver's pre-scan to record the maximum disturbance generated from Product in all power lines in the full band.

c. For each frequency whose maximum record was higher or close to limit, measure its QP and AVG values and record.

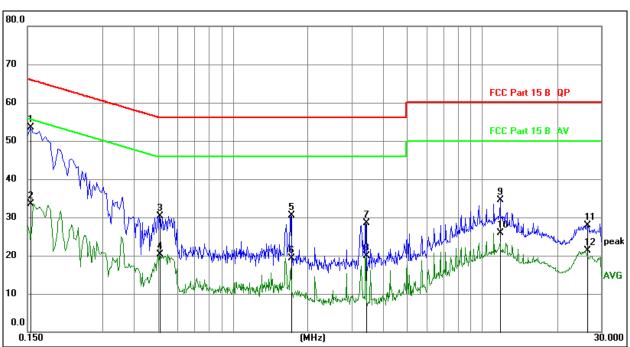
6.4 EUT operating Conditions

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.



6.5 Test Result

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Phase :	L
Test Mode:	Mode 4	Test Voltage :	AC120V/60Hz



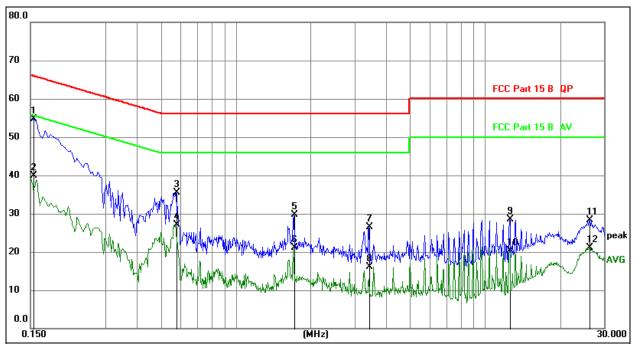
Remark:

- All readings are Quasi-Peak and Average values.
 Factor = Insertion Loss + Cable Loss.
 Measurement = Reading Level + Correct Factor
 Over = Measurement Limit

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MHz		dB	dBuV	dBuV	dB	Detector	Comment	
1		0.1545	43.24	10.31	53.55	65.75	-12.20	QP		
2		0.1545	23.16	10.31	33.47	55.75	-22.28	AVG		
3		0.5100	20.04	10.31	30.35	56.00	-25.65	QP		
4		0.5100	10.08	10.31	20.39	46.00	-25.61	AVG		
5		1.7115	20.24	10.21	30.45	56.00	-25.55	QP		
6		1.7115	9.00	10.21	19.21	46.00	-26.79	AVG		
7		3.4215	18.22	10.21	28.43	56.00	-27.57	QP		
8		3.4215	9.69	10.21	19.90	46.00	-26.10	AVG		
9		11.8680	23.77	10.66	34.43	60.00	-25.57	QP		
10		11.8680	15.25	10.66	25.91	50.00	-24.09	AVG		
11		26.3490	17.09	10.87	27.96	60.00	-32.04	QP		
12		26.3490	10.49	10.87	21.36	50.00	-28.64	AVG		



Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Phase :	Ν
Test Mode:	Mode 4	Test Voltage :	AC120V/60HZ



Remark:

All readings are Quasi-Peak and Average values.
 Factor = Insertion Loss + Cable Loss.

3. Measurement = Reading Level + Correct Facto
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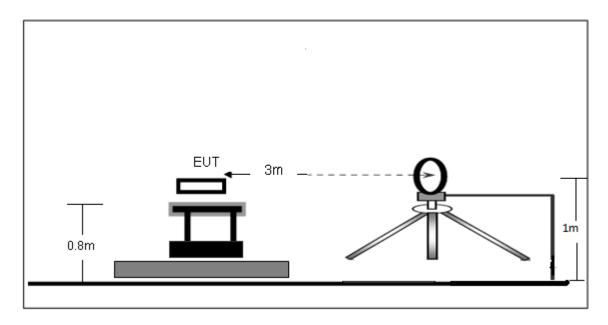
. 00		leasuren	nent - Lim		Measure-						
No.	Mk.	Freq.	Reading Level	Correct Factor	measure- ment	Limit	Over				
		MHz		dB	dBuV	dBuV	dB	Detector	Comme	nt	
1		0.1544	44.46	10.31	54.77	65.76	-10.99	QP			
2		0.1544	29.65	10.31	39.96	55.76	-15.80	AVG			
3		0.5774	25.12	10.31	35.43	56.00	-20.57	QP			
4		0.5774	16.83	10.31	27.14	46.00	-18.86	AVG			
5		1.7114	19.58	10.21	29.79	56.00	-26.21	QP			
6		1.7114	10.99	10.21	21.20	46.00	-24.80	AVG			
7		3.4215	16.24	10.21	26.45	56.00	-29.55	QP			
8		3.4215	5.90	10.21	16.11	46.00	-29.89	AVG			
9		12.5745	17.88	10.68	28.56	60.00	-31.44	QP			
10		12.5745	9.61	10.68	20.29	50.00	-29.71	AVG			
11		26.1780	17.42	10.87	28.29	60.00	-31.71	QP			
12		26.1780	10.30	10.87	21.17	50.00	-28.83	AVG			



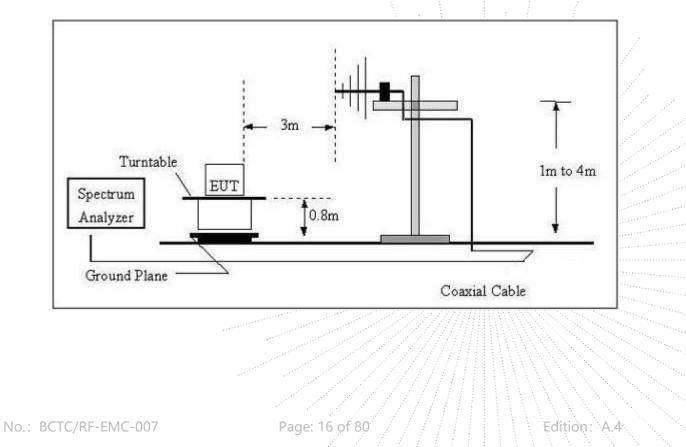
7. Radiated emissions

7.1 Block Diagram Of Test Setup

(A) Radiated Emission Test-Up Frequency Below 30MHz

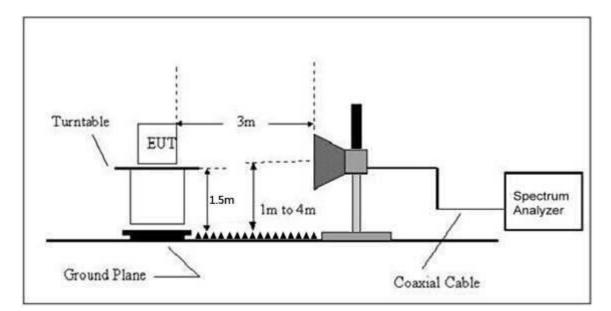


(B) Radiated Emission Test-Up Frequency 30MHz~1GHz





(C) Radiated Emission Test-Up Frequency Above 1GHz



7.2 Limit

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequency	Field Strength	Distance	Field Strength Limit at 3m Distance					
(MHz)	uV/m	(m)	uV/m	dBuV/m				
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	20log ^{(2400/F(kHz))} + 80				
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	20log ^{(24000/F(kHz))} + 40				
1.705 ~ 30	30	30	100 * 30	20log ⁽³⁰⁾ + 40				
30 ~ 88	100	3	100	20log ⁽¹⁰⁰⁾				
88 ~ 216	150	3	150	20log ⁽¹⁵⁰⁾				
216 ~ 960	200	3	200	20log ⁽²⁰⁰⁾				
Above 960	500	3	500	20log ⁽⁵⁰⁰⁾				

Limits Of Radiated Emission Measurement (Above 1000MHz)

	Limit (dBuV/m)) (at 3M)		
Frequency (MHZ)	Frequency (MHz) Peak Average			
Above 1000	74	54		

Notes:

(1)The limit for radiated test was performed according to FCC PART 15C.

(2)The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).



Frequency Range Of Radiated Measurement

(a) For an intentional radiator the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to at least the frequency shown in this paragraph:

(1) If the intentional radiator operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

(2) If the intentional radiator operates at or above 10 GHz and below 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.

(3) If the intentional radiator operates at or above 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 200 GHz, whichever is lower, unless specified otherwise elsewhere in the rules.

(4) If the intentional radiator operates at or above 95 GHz: To the third harmonic of the highest fundamental frequency or to 750 GHz, whichever is lower, unless specified otherwise elsewhere in the rules.

(5) If the intentional radiator contains a digital device, regardless of whether this digital device controls the functions of the intentional radiator or the digital device is used for additional control or function purposes other than to enable the operation of the intentional radiator, the frequency range shall be investigated up to the range specified in paragraphs (a) (1)through (4) of this section or the range applicable to the digital device, as shown in paragraph (b)(1) of this section, whichever is the higher frequency range of investigation.

7.3 Test procedure

Receiver Parameter	Setting		
Attenuation	Auto		
9kHz~150kHz	RBW 200Hz for QP		
150kHz~30MHz	RBW 9kHz for QP		
30MHz~1000MHz	RBW 120kHz for QP		
	$= \sum_{i=1}^{N} \sum_{j=1}^{N} \sum_{i=1}^{N} \sum_$		

Spectrum Parameter	Setting
1-25GHz	RBW 1 MHz /VBW 1 MHz for Peak, RBW 1 MHz / VBW 10Hz for Average

Below 1GHz test procedure as below:

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.



d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Above 1GHz test procedure as below:

a. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.

b.The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d.For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.

e.The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

g. Test the EUT in the lowest channel, the middlest channel, the Highest channel.

Note:

Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.

7.4 EUT operating Conditions

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

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7.5 Test Result

Below 30MHz

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage :	AC120V/60HZ
Test Mode:	Mode 4	Test vollage.	

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
				PASS
				PASS

Note:

The amplitude of spurious emissions which are attenuated by more than 20dB below the

permissible value has no need to be reported.

Distance extrapolation factor =40 log (specific distance/test distance)(dB);

Limit line = specific limits(dBuv) + distance extrapolation factor.

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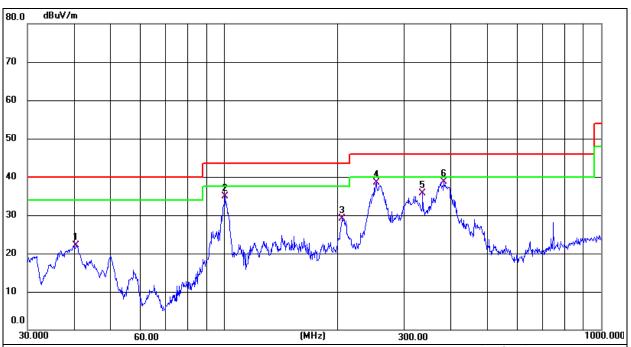
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Between 30MHz – 1GHz

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Phase :	Horizontal
Test Mode:	Mode 4	Test Voltage:	AC120V/60HZ



Remark:

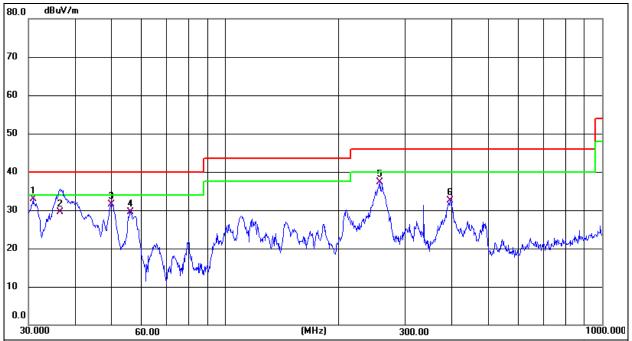
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Measurement = Reading Level + Correct Factor
 Over = Measurement - Limit

I							
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	40.4172	43.05	-21.01	22.04	40.00	-17.96	QP
2	100.2286	57.54	-22.63	34.91	43.50	-8.59	QP
3	205.6751	50.47	-21.29	29.18	43.50	-14.32	QP
4	252.9482	57.79	-19.23	38.56	46.00	-7.44	QP
5	336.0352	51.71	-16.08	35.63	46.00	-10.37	QP
6 *	382.5879	53.15	-14.36	38.79	46.00	-7.21	QP



Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Phase :	Vertical
Test Mode:	Mode 4	Test Voltage:	AC120V/60HZ



Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.
 Measurement = Reading Level + Correct Factor
 Over = Measurement - Limit

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1.*	30.8535	54.30	-21.40	32.90	40.00	-7.10	QP
2	36.3814	50.57	-20.97	29.60	40.00	-10.40	QP
3	49.7068	52.79	-21.28	31.51	40.00	-8.49	QP
4	56.0007	51.30	-21.74	29.56	40.00	-10.44	QP
5	257.4222	56.12	-18.91	37.21	46.00	-8.79	QP
6	394.8545	46.73	-14.16	32.57	46.00	-13.43	QP



Between 1GHz – 25GHz

Polar	Frequency	Reading Level	Correct Factor	Measure- ment	Limits	Over	Detector
(H/V)	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/ m)	(dB)	Туре
			GFSK Low ch	annel			
V	4804.00	72.06	-19.99	52.07	74.00	-21.93	PK
V	4804.00	61.27	-19.99	41.28	54.00	-12.72	AV
V	7206.00	61.99	-14.22	47.77	74.00	-26.23	PK
V	7206.00	51.71	-14.22	37.49	54.00	-16.51	AV
Н	4804.00	68.54	-19.99	48.55	74.00	-25.45	PK
Н	4804.00	58.34	-19.99	38.35	54.00	-15.65	AV
Н	7206.00	60.77	-14.22	46.55	74.00	-27.45	PK
Н	7206.00	53.03	-14.22	38.81	54.00	-15.19	AV
		G	FSK Middle c	hannel			
V	4882.00	70.89	-19.84	51.05	74.00	-22.95	PK
V	4882.00	63.23	-19.84	43.39	54.00	-10.61	AV
V	7323.00	60.65	-13.90	46.75	74.00	-27.25	PK
V	7323.00	50.75	-13.90	36.85	54.00	-17.15	AV
Н	4882.00	66.21	-19.84	46.37	74.00	-27.63	PK
Н	4882.00	55.50	-19.84	35.66	54.00	-18.34	AV
Н	7323.00	59.25	-13.90	45.35	74.00	-28.65	PK
Н	7323.00	51.04	-13.90	37.14	54.00	-16.86	AV
		(GFSK High ch	annel			
V	4960.00	72.99	-19.68	53.31	74.00	-20.69	PK
V	4960.00	63.64	-19.68	43.96	54.00	-10.04	AV
V	7440.00	65.52	-13.57	51.95	74.00	-22.05	/ PK
V	7440.00	55.88	-13.57	42.31	54.00	-11.69	AV
Н	4960.00	70.93	-19.68	51.25	74.00	-22.75	PK
Н	4960.00	61.74	-19.68	42.06	54.00	-11.94	AV
Н	7440.00	63.02	-13.57	49.45	74.00	-24.55	PK
Н	7440.00	55.45	-13.57	41.88	54.00	-12.12	AV

Remark:

1.Emission Level = Meter Reading + Factor, Factor = Antenna Factor + Cable Loss – Pre-amplifier. Over= Emission Level - Limit

2.If peak below the average limit, the average emission was no test.

3. In restricted bands of operation, The spurious emissions below the permissible value more than 20dB

4. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

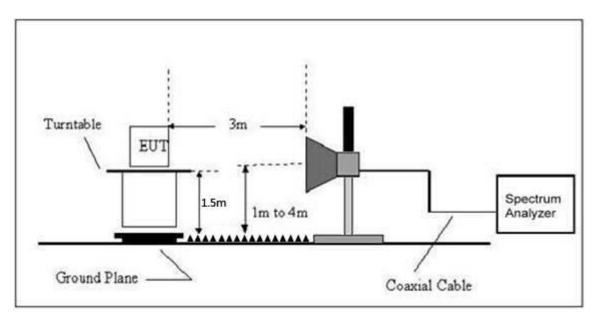
5.All the Modulation are test, the worst mode is GFSK, the data recording in the report.



8. Radiated Band Emission Measurement and Restricted Bands of Operation

8.1 Block Diagram Of Test Setup

Radiated Emission Test-Up Frequency Above 1GHz



8.2 Limit

FCC Part15 C Section 15.209 and 15.205

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
¹ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(²)
13.36-13.41			



Limits Of Radiated Emission Measurement (Above 1000MHz)

	Limit (dBuV/m) (at 3M)			
Frequency (MHz)	Peak	Average		
Above 1000	74	54		

Notes:

(1)The limit for radiated test was performed according to FCC PART 15C.

(2) The tighter limit applies at the band edges.

(3)Emission level (dBuV/m)=20log Emission level (uV/m).

8.3 Test procedure

Receiver Parameter	Setting
Attenuation	Auto
Start Frequency	2300MHz
Stop Frequency	2520
RB / VB (Emission In Restricted Band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

Above 1GHz test procedure as below:

a. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.

b.The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c.The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d.For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.

e.The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

g. Test the EUT in the lowest channel, the middlest channel, the Highest channel.

Note:

Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.

8.4 EUT operating Conditions

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.



8.5 Test Result

Test mode	Polar Frequency (H/V) (MHz)	Frequency (MHz)	Reading Level (dBuV/m)	Correct Factor (dB)	Measure- ment (dBuV/m)	Limits (dBuV/m)		Result			
		(PK	PK	AV				
	Low Channel 2402MHz										
GFSK	Н	2390.00	73.05	-25.43	47.62	74.00	54.00	PASS			
	Н	2400.00	74.96	-25.40	49.56	74.00	54.00	PASS			
	V	2390.00	73.83	-25.43	48.40	74.00	54.00	PASS			
	V	2400.00	73.90	-25.40	48.50	74.00	54.00	PASS			
	High Channel 2480MHz										
	Н	2483.50	71.97	-25.15	46.82	74.00	54.00	PASS			
	Н	2500.00	68.99	-25.10	43.89	74.00	54.00	PASS			
	V	2483.50	74.17	-25.15	49.02	74.00	54.00	PASS			
	V	2500.00	70.21	-25.10	45.11	74.00	54.00	PASS			
π/4DQPSK		Low Channel 2402MHz									
	Н	2390.00	72.00	-25.43	46.57	74.00	54.00	PASS			
	Н	2400.00	73.27	-25.40	47.87	74.00	54.00	PASS			
	V	2390.00	72.48	-25.43	47.05	74.00	54.00	PASS			
	V	2400.00	72.48	-25.40	47.08	74.00	54.00	PASS			
	High Channel 2480MHz										
	Н	2483.50	72.16	-25.15	47.01	74.00	54.00	PASS			
	Н	2500.00	67.54	-25.10	42.44	74.00	54.00	PASS			
	V	2483.50	71.94	-25.15	46.79	74.00	54.00	PASS			
	V	2500.00	68.33	-25.10	43.23	74.00	54.00	PASS			
8DPSK	Low Channel 2402MHz										
	Н	2390.00	72.51	-25.43	47.08	74.00	54.00	PASS			
	Н	2400.00	74.63	-25.40	49.23	74.00	54.00	PASS			
	V	2390.00	72.11	-25.43	46.68	74.00	54.00	PASS			
	V	2400.00	72.70	-25.40	47.30	74.00	54.00	PASS			
		High Channel 2480MHz									
	Н	2483.50	72.42	-25.15	47.27	74.00	54.00	PASS			
	Н	2500.00	67.92	-25.10	42.82	74.00	54.00	PASS			
	V	2483.50	71.80	-25.15	46.65	74.00	54.00	PASS			
	V	2500.00	68.46	-25.10	43.36	74.00	54.00	PASS			

Remark:

1. Emission Level = Meter Reading + Factor, Factor = Antenna Factor + Cable Loss - Pre-amplifier. Over= Emission Level - Limit

2. If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.

3 In restricted bands of operation, The spurious emissions below the permissible value more than 20dB

4. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



9. Spurious RF Conducted Emissions

9.1 Block Diagram Of Test Setup



9.2 Limit

Regulation 15.247 (d),In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.205(c))

9.3 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: Below 30MHz: RBW = 100kHz, VBW = 300kHz, Sweep = auto Detector function = peak, Trace = max hold Above 30MHz: RBW = 100KHz, VBW = 300KHz, Sweep = auto Detector function = peak, Trace = max hold

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9.4 Test Result



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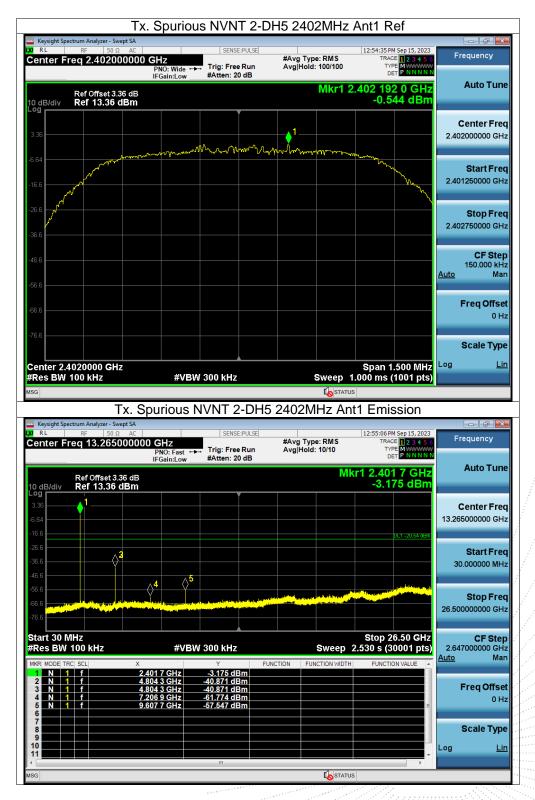


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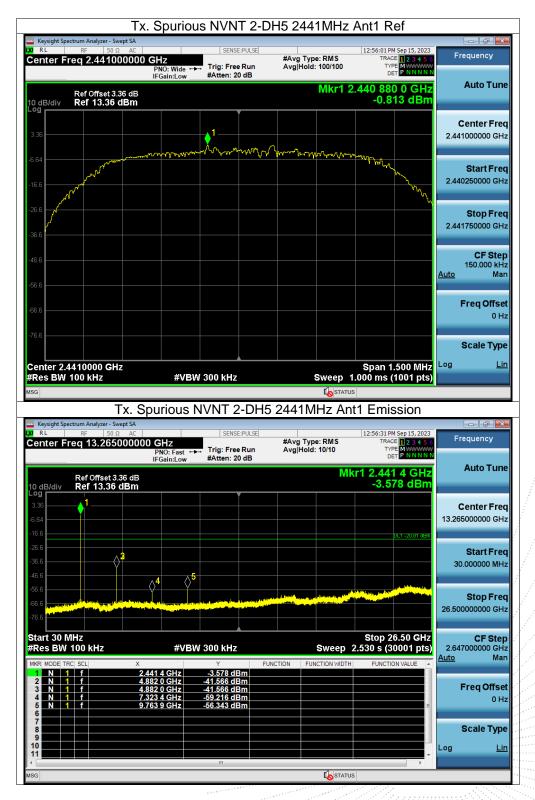






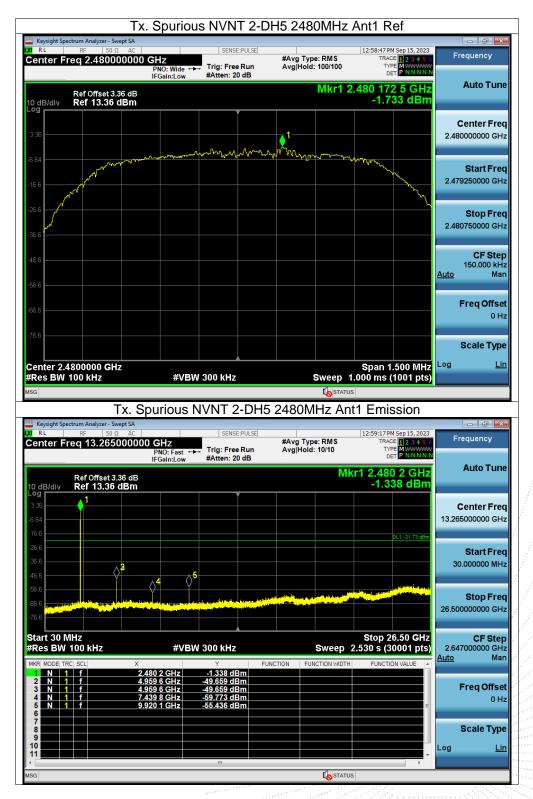
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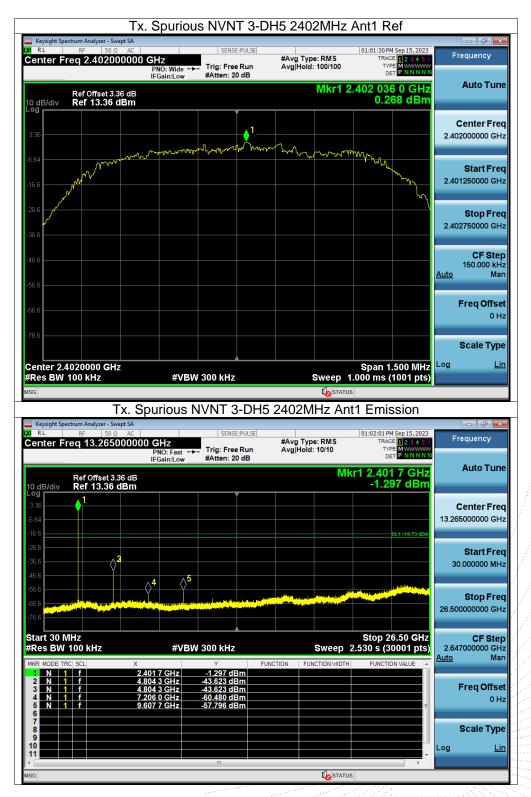


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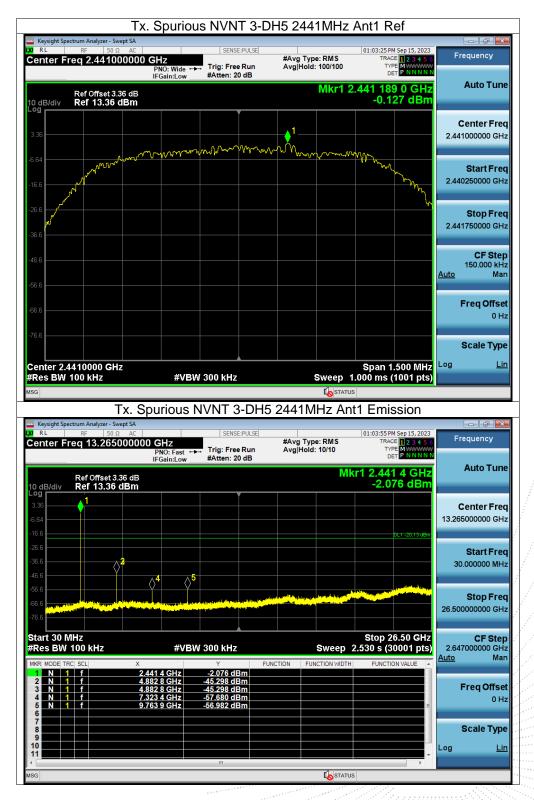






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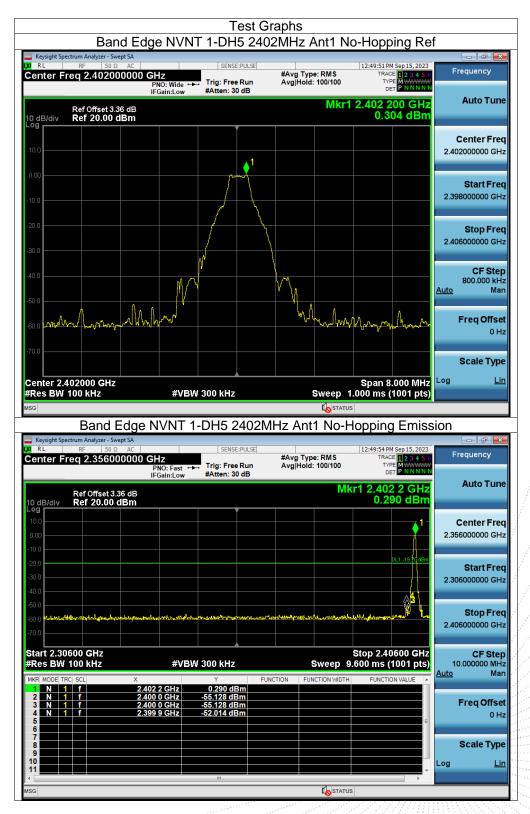






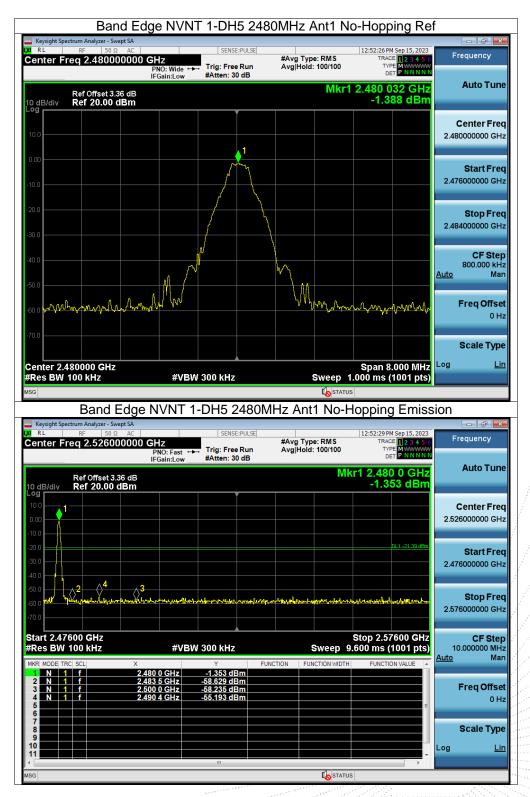
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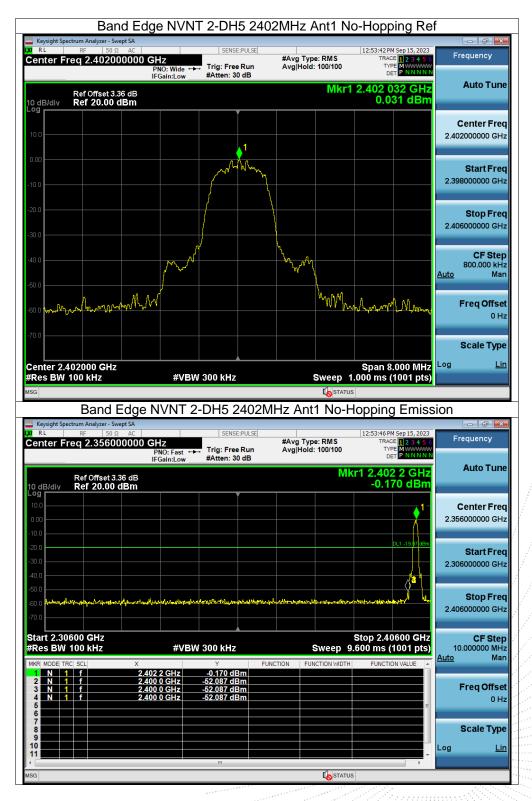


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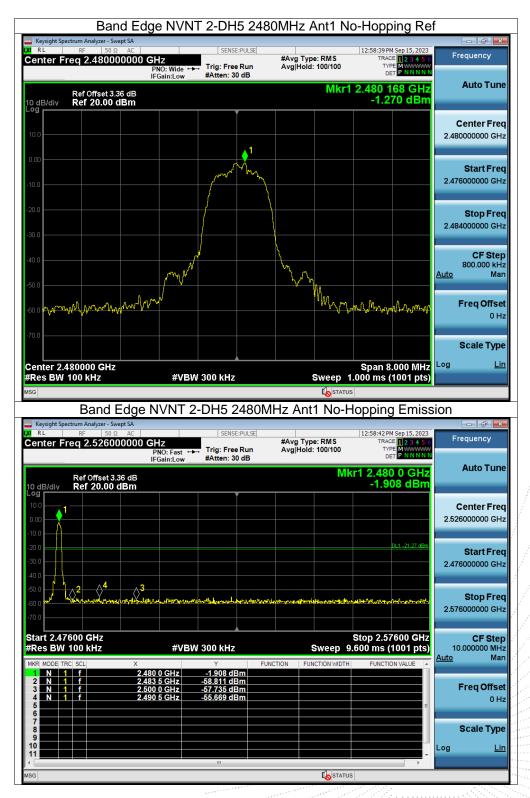




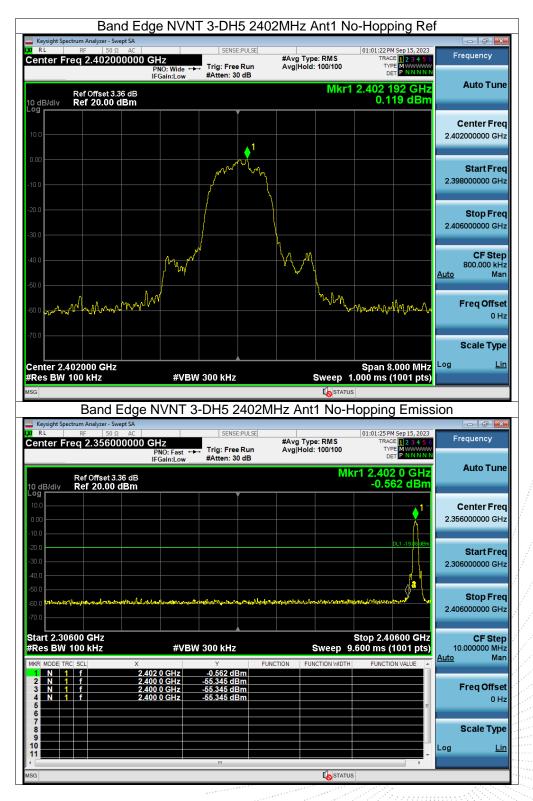




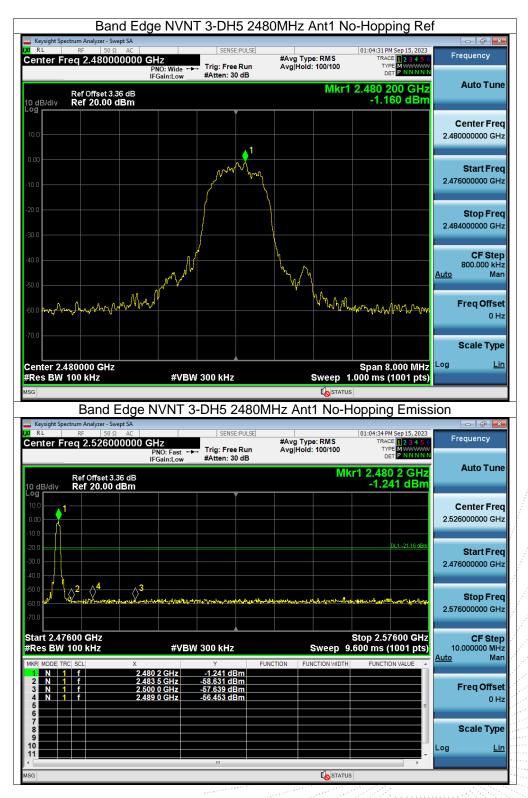












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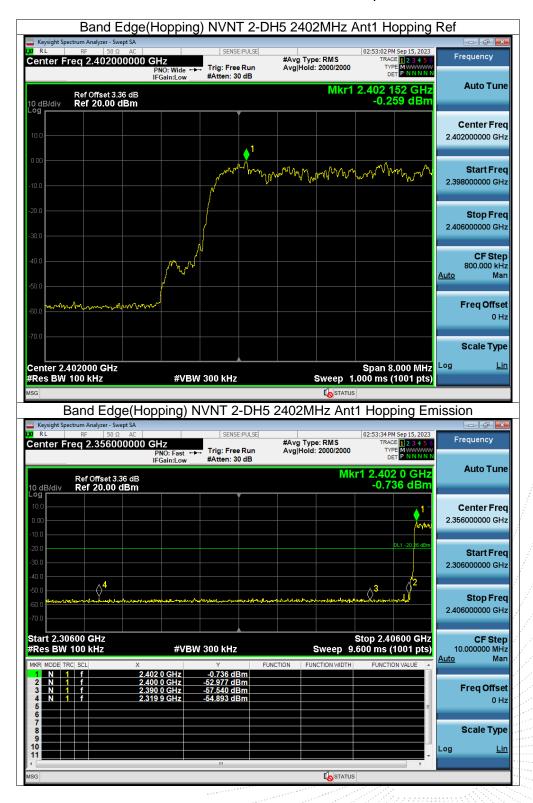
Keysight Spectrum Analyzer - Sw	vept SA	-	DH5 2402MHz /		
RL RF 50 G enter Freq 2.4020		SENSE:PULSE	#Avg Type: RMS	03:24:34 PM Sep 15, 2023 TRACE 1 2 3 4 5 6	Frequency
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Band Edc Keysight Spectrum Analyzer - Sw RL RF 50 Ω Center Freq 2.35600 Ref Offset 3. 0 dB/div Ref 20.00 9 10.0 0 0 0 0 0 0 0 0 0 0 0 0 0	ge(Hopping)	NVNT 1-DH SENSE:PULSE Trig: Free Run #Atten: 30 dB	5 2402MHz Ant #Avg Type: RMS Avg Hold: 1000/1000 MK	.000 ms (1001 pts) 1 Hopping En 03:24:51 PM Sep 15, 2023 TRACE 12 3 4 5 6 TRACE 12 3 4 5 6 TRACE 0.085 dBm 0.085 dBm 0.085 dBm 0.1 20 4 5 6 0.085 dBm 1 0.085 dBm 1 0.085 dBm 0.085 dBm	nission Frequency Auto Tur Center Fre 2.356000000 GH Start Fre 2.306000000 GH Stop Fre 2.406000000 GH
Band Edc Keysight Spectrum Analyzer - Sw RL RF 50 Ω center Freq 2.355601 0 dB/div Ref Offset 3. 0 dB/div Ref 20.00 0 0 0	ge(Hopping)	NVNT 1-DH SENSE:PULSE] Trig: Free Run #Atten: 30 dB	5 2402MHz Ant #Avg Type: RMS Avg Hold: 1000/1000 Mk	.000 ms (1001 pts) 1 Hopping En 03:24:51 PM Sep 15, 2023 TRACE 12 3:4 5 6 TRACE	nission Frequency Auto Tur Center Fre 2.356000000 GH Start Fre 2.306000000 GH Stop Fre 2.406000000 GH
Keysight Spectrum Analyzer - Sw RL RF 50 Ω Center Freq 2.35600 Ref Offset 3. Ref Offset 3. O dB/div Ref 20.00 9 9 10.0 9 9 9 9 10.0 9 9 9 9 9 10.0 9	2e(Hopping)	NVNT 1-DH SENSE:PULSE Trig: Free Run #Atten: 30 dB	5 2402MHz Ant #Avg Type: RMS Avg Hold: 1000/1000 MK	.000 ms (1001 pts) 1 Hopping En 03:24:51 PM Sep 15, 2023 TRACE 12 3 4 5 6 TRACE 12 3 4 5 6 TRACE 0.085 dBm 0.085 dBm 0.085 dBm 0.1 20 4 5 6 0.085 dBm 1 0.085 dBm 1 0.085 dBm 0.085 dBm	nission Frequency Auto Tur Center Fre 2.356000000 GH Start Fre 2.306000000 GH Stop Fre 2.406000000 GH
Band Edg Keysight Spectrum Analyzer - Sw RL RF Some Center Freq 2.35600 Comber Freq 2.35600 O dB/div Ref Offset 3. O dB/div Ref 20.00 O dB/div Good and and and and and and and and and an	ge(Hopping) xept SA 2 AC PNO: Fast IFGain:Low 36 dB dBm #VB 2.406 0 GHz 2.400 0 GHz 2.400 0 GHz 2.400 0 GHz 2.400 0 GHz	NVNT 1-DH SENSE:PULSE Trig: Free Run #Atten: 30 dB	5 2402MHz Ant #Avg Type: RMS Avg Hold: 1000/1000 Mk	.000 ms (1001 pts) 1 Hopping En 03:24:51 PM Sep 15, 2023 TRACE 12 3:4 5 6 TRACE	nission Frequency Auto Tur Center Fre 2.356000000 GH Start Fre 2.306000000 GH Stop Fre 2.406000000 GH CF Ste 10.000000 MH Auto Ma
Band Edc Keysight Spectrum Analyzer - Sw RL RF 50 Ω center Freq 2.35600 Ref Offset 3. 0 dE/div Ref 20.00	ge(Hopping) rept SA 2 AC D00000 GHz PN0: Fast IFGain:Low 36 dB dBm 36 dB dBm #VB X 2.400 0 GHz	NVNT 1-DH SENSE:PULSE] → Trig: Free Run #Atten: 30 dB	5 2402MHz Ant #Avg Type: RMS Avg Hold: 1000/1000 Mk	.000 ms (1001 pts) 1 Hopping En 03:24:51 PM Sep 15, 2023 TRACE 12 3:4 5 6 TRACE	nission Frequency Auto Tur Center Fre 2.356000000 GH Start Fre 2.306000000 GH Stop Fre 2.406000000 GH
Band Edg Keysight Spectrum Analyzer - Sw RL RF Sw Genter Freq 2.35600 Ref Offset 3. 0 dB/div Ref 20.00 0 db	ge(Hopping) xept SA 2 AC PNO: Fast IFGain:Low 36 dB dBm #VB 2.406 0 GHz 2.400 0 GHz 2.400 0 GHz 2.400 0 GHz 2.400 0 GHz	NVNT 1-DH SENSE:PULSE Trig: Free Run #Atten: 30 dB	5 2402MHz Ant #Avg Type: RMS Avg Hold: 1000/1000 Mk	.000 ms (1001 pts) 1 Hopping En 03:24:51 PM Sep 15, 2023 TRACE 12:23 4:5 6 TYPE	nission Frequency Auto Tur Center Fre 2.356000000 GH Start Fre 2.306000000 GH Stop Fre 2.406000000 GH CF Ste 10.000000 MH Auto Ma
Band Edc Keysight Spectrum Analyzer - Sw RL<	ge(Hopping) xept SA 2 AC PNO: Fast IFGain:Low 36 dB dBm #VB 2.406 0 GHz 2.400 0 GHz 2.400 0 GHz 2.400 0 GHz 2.400 0 GHz	NVNT 1-DH SENSE:PULSE Trig: Free Run #Atten: 30 dB	5 2402MHz Ant #Avg Type: RMS Avg Hold: 1000/1000 Mk	.000 ms (1001 pts) 1 Hopping En 03:24:51 PM Sep 15, 2023 TRACE 12:23 4:5 6 TYPE	nission Frequency Auto Tur Center Fre 2.356000000 GH Start Fre 2.306000000 GH 2.406000000 GH CF Ste 10.00000 MH Auto Mi Freq Offs 0 H

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10. 20 dB Bandwidth

10.1 Block Diagram Of Test Setup



10.2 Limit

N/A

- 10.3 Test procedure
- 1. Set RBW = 30kHz.
- 2. Set the video bandwidth (VBW) \ge 3 x RBW.
- 3. Detector = Peak.
- 4. Trace mode = max hold.
- 5. Sweep = auto couple.

6. Allow the trace to stabilize.

7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

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10.4 Test Result

Condition	Mode	Frequency (MHz)	-20 dB Bandwidth (MHz)	Verdict
NVNT	1-DH5	2402	0.942	Pass
NVNT	1-DH5	2441	0.948	Pass
NVNT	1-DH5	2480	0.936	Pass
NVNT	2-DH5	2402	1.31	Pass
NVNT	2-DH5	2441	1.316	Pass
NVNT	2-DH5	2480	1.318	Pass
NVNT	3-DH5	2402	1.288	Pass
NVNT	3-DH5	2441	1.294	Pass
NVNT	3-DH5	2480	1.283	Pass

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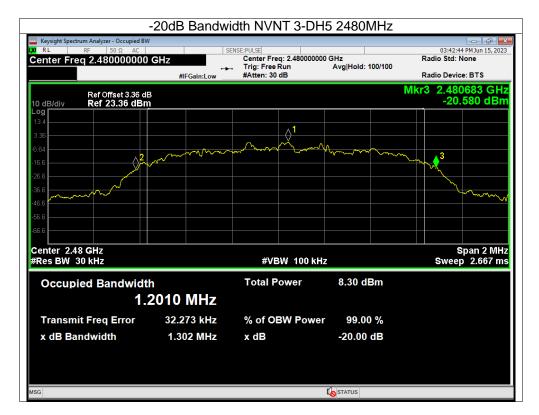
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11. Maximum Peak Output Power

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.

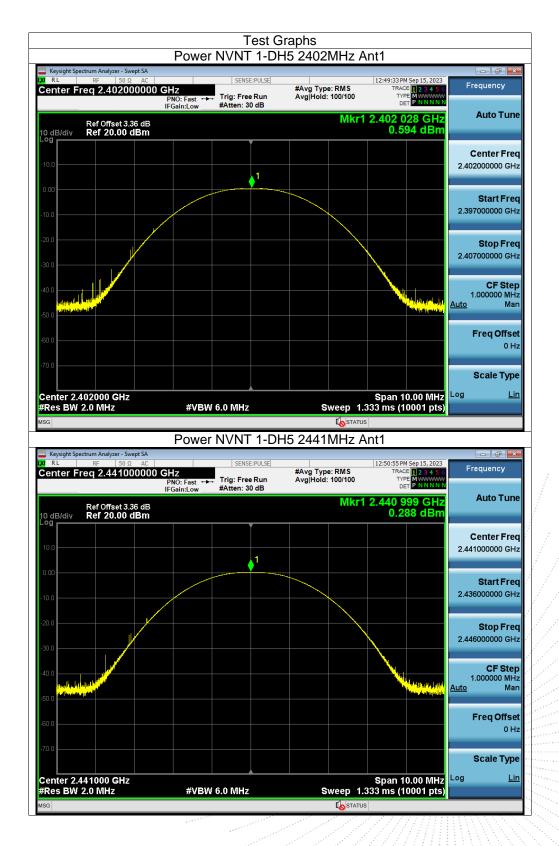
3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

11.4 Test Result

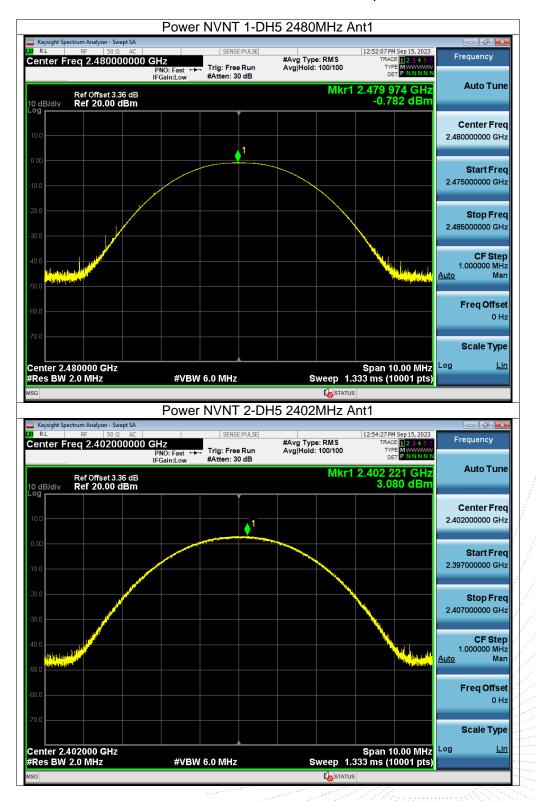
Condition	Mode	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	1-DH5	2402	0.59	21	Pass
NVNT	1-DH5	2441	0.29	21	Pass
NVNT	1-DH5	2480	-0.78	21	Pass
NVNT	2-DH5	2402	3.08	21	Pass
NVNT	2-DH5	2441	2.75	21	Pass
NVNT	2-DH5	2480	1.59	21	Pass
NVNT	3-DH5	2402	3.73	21	Pass
NVNT	3-DH5	2441	3.41	21	Pass
NVNT	3-DH5	2480	2.15	21	Pass

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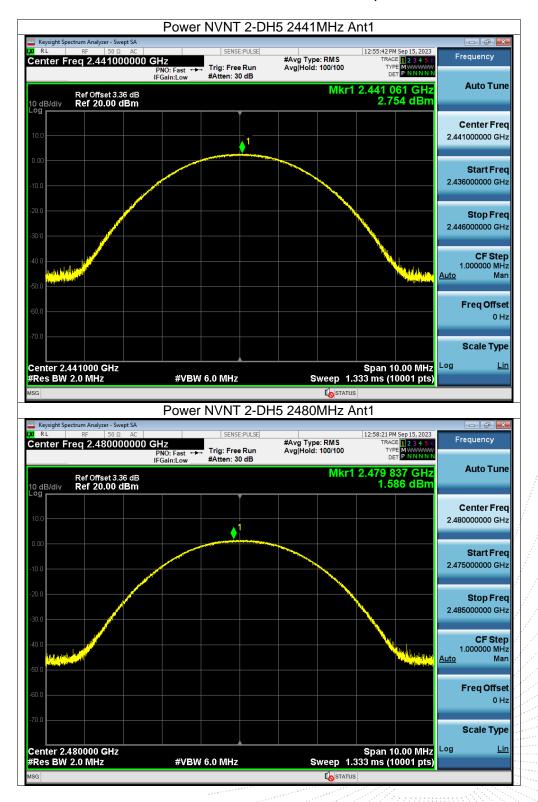






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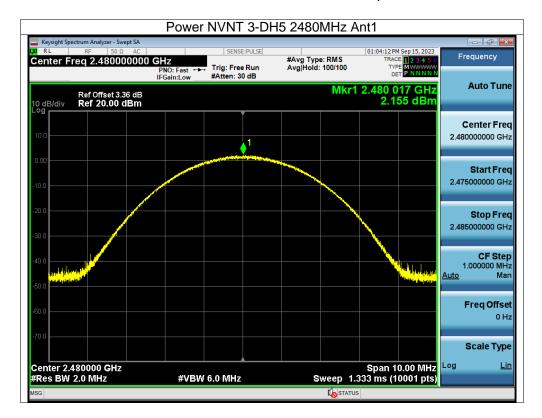
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12. Hopping Channel Separation

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.

Condition	Mode	Hopping Freq1 (MHz)	Hopping Freq2 (MHz)	HFS (MHz)	Limit (MHz)	Verdict
NVNT	1-DH5	2402.052	2403.006	0.954	0.628	Pass
NVNT	1-DH5	2441	2442.046	1.046	0.632	Pass
NVNT	1-DH5	2478.998	2480.004	1.006	0.624	Pass
NVNT	2-DH5	2401.858	2403.15	1.292	0.873	Pass
NVNT	2-DH5	2441	2442.14	1.14	0.877	Pass
NVNT	2-DH5	2479.158	2480.042	0.884	0.879	Pass
NVNT	3-DH5	2402.022	2403.03	1.008	0.859	Pass
NVNT	3-DH5	2441.036	2442.016	0.98	0.863	Pass
NVNT	3-DH5	2479.026	2480.004	0.978	0.855	Pass

12.4 Test Result



			Graphs 15 2402MHz Ar	nt1	
Keysight Spectrum Analyzer - 5					- ¢ -
URL RF 50	Ω AC	SENSE:PULSE	#Ave Turner DMC	02:49:10 PM Sep 15, 2023	Frequency
Center Freq 2.402	PNO: Wide 🖵	Trig: Free Run	#Avg Type: RMS Avg Hold:>100/100	TRACE 1 2 3 4 5 6 TYPE MWWWW DET P NNNN	
	IFGain:Low	#Atten: 30 dB			Auto Tun
Ref Offset	3.36 dB		MKr1	2.402 052 GHz -2.455 dBm	
10 dB/div Ref 20.00		Y			
10.0	1		^2		Center Fre
0.00	many		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	W h	2.402500000 GH
-10.0	n	~~~~~		· m	
-20.0		- m		- A A A A A A A A A A A A A A A A A A A	Start Fre
-40.0					2.401500000 GH
-50.0					
-60.0					Stop Fre
-70.0					2.403500000 GH
Center 2.402500 GH				Snop 2 000 Mile	
Center 2.402500 GH #Res BW 30 kHz		100 kHz	Sweep 2	Span 2.000 MHz 133 ms (1001 pts).	CF Ste 200.000 k⊦
MKR MODE TRC SCL	X		UNCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Ma
1 N 1 f 2 N 1 f	2.402 052 GHz 2.403 006 GHz	-2.455 dBm -2.243 dBm			
3					Freq Offse
5					0 H
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10					Log <u>Li</u>
				· ·	
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ISG			STATU		
ISG	CFS		status 15 2441MHz Ar		
	Swept SA	NVNT 1-DH		nt1	
Keysight Spectrum Analyzer - :	Swept SA Ω AC 500000 GHz	NVNT 1-DH	15 2441MHz Ar #Avg Type: RMS	02:50:21 PM Sep 15, 2023	
Keysight Spectrum Analyzer - :	Swept SA Ω AC	NVNT 1-DH	15 2441MHz Ar	02:50:21 PM Sep 15, 2023	Frequency
Keysight Spectrum Analyzer - :	Swept SA Ω AC 5000000 GHz PNO: Wide IFGain:Low	NVNT 1-DH SENSE:PULSE Trig: Free Run	15 2441MHz Ar #Avg Type: RMS Avg Hold:>100/100	02:50:21 PM Sep 15, 2023 TRACE 2 3 5 6 TYPE NUMININ DET P NUMININ 2.441 000 GHz	
Keysight Spectrum Analyzer - 3 R RL RF 50 Center Freq 2.441 Ref Offset 3 10 dB/div Ref 20.00	Swept SA Q AC 500000 GHz PN0: Wide IFGain:Low 3.36 dB	NVNT 1-DH SENSE:PULSE Trig: Free Run	15 2441MHz Ar #Avg Type: RMS Avg Hold:>100/100	02:50:21 PM Sep 15, 2023 TRACE 23 4 5 6 TYPE WWWWWW DET P NNNNN	Frequency
Keysight Spectrum Analyzer - R RL RF 50 Center Freq 2.441 Ref Offset :	Swept SA Q AC 500000 GHz PN0: Wide IFGain:Low 3.36 dB	NVNT 1-DH SENSE:PULSE Trig: Free Run	15 2441MHz Ar #Avg Type: RMS Avg Hold:>100/100 MKr1	02:50:21 PM Sep 15, 2023 TRACE 1 2 3 4 5 6 TRACE 1 2 3 4 5 6 TRACE 1 2 4 5 6 TRACE 1 4 5 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	Frequency Auto Tun
Keysight Spectrum Analyzer - 50 X RL RF 50 Center Freq 2.441 Ref Offset 3 Ref Offset 3 10 dB/div Ref 20.00 10 0.0 0.00 000	Swept SA AC 500000 GHz PN0: Wide IFGain:Low 3.36 dB 0 dBm	NVNT 1-DH SENSE:PULSE Trig: Free Run	15 2441MHz Ar #Avg Type: RMS Avg Hold:>100/100 Mkr1	02:50:21 PM Sep 15, 2023 TRACE 1 2 3 4 5 6 TRACE 1 2 3 4 5 6 TRACE 1 2 4 5 6 TRACE 1 4 5 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	Frequency Auto Tun Center Fre
Keysight Spectrum Analyzer - 50 X RL RF 50 Center Freq 2.441 Ref Offset 3 Ref Offset 3 10 dB/div Ref 20.00 10 0.0 0.00 000	Swept SA AC 500000 GHz PN0: Wide IFGain:Low 3.36 dB 0 dBm	NVNT 1-DH SENSE:PULSE Trig: Free Run	15 2441MHz Ar #Avg Type: RMS Avg Hold:>100/100 Mkr1	02:50:21 PM Sep 15, 2023 TRACE 12 2 3 4 5 6 TYPE MUNICIPAL DET MININA 2.441 000 GHz -2.465 dBm	Frequency
Keysight Spectrum Analyzer K RL RF 50 Center Freq 2.441 Ref Offset: Ref Offset: 10 dB/div Ref 20.00 0 00	Swept SA AC 500000 GHz PN0: Wide IFGain:Low 3.36 dB 0 dBm	NVNT 1-DH SENSE:PULSE Trig: Free Run	15 2441MHz Ar #Avg Type: RMS Avg Hold:>100/100 MKr1	02:50:21 PM Sep 15, 2023 TRACE 1 2 3 4 5 6 TRACE 1 2 3 4 5 6 TRACE 1 2 4 5 6 TRACE 1 4 5 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	Frequency Auto Turn Center Fre 2.441500000 GH
Keysight Spectrum Analyzer - 1 R RL RF 50 Center Freq 2.441 Ref Offset: 10 dB/div Ref 20.00 10.0 000 -10.0	Swept SA AC 500000 GHz PN0: Wide IFGain:Low 3.36 dB 0 dBm	NVNT 1-DH SENSE:PULSE Trig: Free Run	15 2441MHz Ar #Avg Type: RMS Avg Hold:>100/100 Mkr1	02:50:21 PM Sep 15, 2023 TRACE 12 2 3 4 5 6 TYPE MUNICIPAL DET MININA 2.441 000 GHz -2.465 dBm	Frequency Auto Tun Center Fre
Keysight Spectrum Analyzer K RL RF 50 Center Freq 2.441 Ref Offset State Ref Offset Ref Offset State 10 dB/div Ref 20.00 Ref 20.00 000	Swept SA AC 500000 GHz PN0: Wide IFGain:Low 3.36 dB 0 dBm	NVNT 1-DH SENSE:PULSE Trig: Free Run	15 2441MHz Ar #Avg Type: RMS Avg Hold:>100/100 Mkr1	02:50:21 PM Sep 15, 2023 TRACE 12 2 3 4 5 6 TYPE MUNICIPAL DET MININA 2.441 000 GHz -2.465 dBm	Auto Tur Center Fre 2.44150000 GH
Keysight Spectrum Analyzer	Swept SA AC 500000 GHz PN0: Wide IFGain:Low 3.36 dB 0 dBm	NVNT 1-DH SENSE:PULSE Trig: Free Run	15 2441MHz Ar #Avg Type: RMS Avg Hold:>100/100 Mkr1	02:50:21 PM Sep 15, 2023 TRACE 12 2 3 4 5 6 TYPE MUNICIPAL DET MININA 2.441 000 GHz -2.465 dBm	Frequency Auto Tun Center Fre 2.441500000 GH Start Fre 2.440500000 GH
Keysight Spectrum Analyzer	Swept SA AC 500000 GHz PN0: Wide IFGain:Low 3.36 dB 0 dBm	NVNT 1-DH SENSE:PULSE Trig: Free Run	15 2441MHz Ar #Avg Type: RMS Avg Hold:>100/100 Mkr1	02:50:21 PM Sep 15, 2023 TRACE 12 2 3 4 5 6 TYPE MUNICIPAL DET MININA 2.441 000 GHz -2.465 dBm	Frequency Auto Turn Center Fre 2.441500000 GF Start Fre 2.440500000 GF
Keysight Spectrum Analyzer	Swept SA AC 500000 GHz PN0: Wide IFGain:Low 3.36 dB 0 dBm	NVNT 1-DH SENSE:PULSE Trig: Free Run	15 2441MHz Ar #Avg Type: RMS Avg Hold:>100/100 Mkr1	02:50:21 PM Sep 15, 2023 TRACE 12 2 3 4 5 6 TYPE MUNICIPAL DET MININA 2.441 000 GHz -2.465 dBm	Auto Tur Center Fre 2.44150000 GH
Keysight Spectrum Analyzer - 3 R RL RF 50 Center Freq 2.4413 Ref Offset 3 30 10 dB/div Ref 20.00 30 30 -10.0	Swept SA Q AC PNO: Wide IFGain:Low 3.36 dB 0 dBm 1 1 4 4 4 4 4 4 4 4 4 4 4 4 4	VVNT 1-DF	15 2441MHz Ar #Avg Type: RMS Avg Hold:>100/100 Mkr1	111 102:50:21 PM Sep 15, 2023 TRACE 1 2 3 4 5 6 TOPE 1 2 5 6 T	Auto Tur Center Fre 2.44150000 GF 2.44050000 GF 2.44250000 GF 2.44250000 GF
Keysight Spectrum Analyzer - 3 R RL RF 50 Center Freq 2.4413 Ref Offset 3 30 10 dB/div Ref 20.00 30 30 -10.0	Swept SA Q AC PNO: Wide IFGain:Low 3.36 dB 0 dBm 1 1 4 4 4 4 4 4 4 4 4 4 4 4 4	NVNT 1-DH SENSE:PULSE Trig: Free Run	15 2441MHz Ar #Avg Type: RMS Avg Hold:>100/100 Mkr1	2.441 000 GHz -2.465 dBm	Center Fre 2.441500000 GH Start Fre 2.442500000 GH Stop Fre 2.442500000 GH
Ref Offset 10 dB/div Ref 20.00 10 dB	Swept SA AC 500000 GHz PN0: Wide IFGain:Low 3.36 dB 0 dBm 4 4 4 4 4 4 4 4 4 4 4 4 4	VVNT 1-DH	15 2441MHz Ar #Avg Type: RMS Avg Hold:>100/100 Mkr1	111 102:50:21 PM Sep 15, 2023 TRACE 1 2 3 4 5 6 TOPE 1 2 5 6 T	Auto Tur Center Fre 2.44150000 GF 2.44050000 GF 2.44250000 GF 2.44250000 GF
Keysight Spectrum Analyzer - 3 R L RF 50 Center Freq 2.4413 Ref Offset 3 30 10 dB/div Ref Offset 3 30 30 10 dB/div Ref 20.00 30 30 30 -10 dB/div Ref 0ffset 3 30 40 30 </td <td>Swept SA R AC FROM OGHZ PNO: Wide IFGain:Low 3.36 dB O dBm A A A A A B A A A A A A A A A A A A A</td> <td>VVNT 1-DF</td> <td>15 2441MHz Ar #Avg Type: RMS Avg Hold:>100/100 Mkr1</td> <td>111 102:50:21 PM Sep 15, 2023 TRACE 12 23 4 5 6 TYPE 12:50:21 PM Sep 15, 2023 TRACE 12 23 4 5 6 TYPE 12:50:21 PM Sep 15, 2023 0 FT 1000 GHz -2.465 dBm 5 FT 10000 GHZ -2.465 dBm 5 FT 1000 GHZ -2.465 d</td> <td>Frequency Auto Tur Center Fre 2.441500000 GF Start Fre 2.442500000 GF Stop Fre 2.442500000 GF CF Ste 200.000 kF Auto Mag</td>	Swept SA R AC FROM OGHZ PNO: Wide IFGain:Low 3.36 dB O dBm A A A A A B A A A A A A A A A A A A A	VVNT 1-DF	15 2441MHz Ar #Avg Type: RMS Avg Hold:>100/100 Mkr1	111 102:50:21 PM Sep 15, 2023 TRACE 12 23 4 5 6 TYPE 12:50:21 PM Sep 15, 2023 TRACE 12 23 4 5 6 TYPE 12:50:21 PM Sep 15, 2023 0 FT 1000 GHz -2.465 dBm 5 FT 10000 GHZ -2.465 dBm 5 FT 1000 GHZ -2.465 d	Frequency Auto Tur Center Fre 2.441500000 GF Start Fre 2.442500000 GF Stop Fre 2.442500000 GF CF Ste 200.000 kF Auto Mag
Keysight Spectrum Analyzer - 3 R RL RF 50 Center Freq 2.4413 Ref Offset 3 Second 3 10 dB/div Ref 20.00 Second 3 20 dB/div Ref 20.00 Second 3 30 dB/div Ref 20.00 Ref 20.00 30 dB/div Ref 20.00 Ref 20.00	Swept SA R AC PN0: Wide IFGain:Low 3.36 dB dBm dBm dBm dBm dBm dBm dBm d	VVNT 1-DH	15 2441MHz Ar #Avg Type: RMS Avg Hold:>100/100 Mkr1	111 102:50:21 PM Sep 15, 2023 TRACE 12 23 4 5 6 TYPE 12:50:21 PM Sep 15, 2023 TRACE 12 23 4 5 6 TYPE 12:50:21 PM Sep 15, 2023 0 FT 1000 GHz -2.465 dBm 5 FT 10000 GHZ -2.465 dBm 5 FT 1000 GHZ -2.465 d	Auto Turn Center Fre 2.441500000 GH 2.442500000 GH 2.442500000 GH 2.442500000 GH 2.442500000 GH 2.442500000 GH 2.442500000 GH
Keysight Spectrum Analyzer - 3 R L RF 50 Center Freq 2.4413 Ref Offset 3 Ref Offset 3 Ref Offset 3 Ref Offset 3 Ref Offset 3 Ref Offset 3 Ref Offset 3 Ref Offset 3 Ref Offset 3 Ref Offset 3 Ref Offset 3 Ref Offset 3 Ref 0 Ref 0 Ref 0 Out of the set 3 Ref 0 Ref 0 Ref 0 Out of the set 3 Ref 0 Ref 0 Ref 0 Ref 0 Out of the set 3 Ref 0 Ref 0 </td <td>Swept SA R AC PN0: Wide IFGain:Low 3.36 dB dBm dBm dBm dBm dBm dBm dBm d</td> <td>VVNT 1-DH</td> <td>15 2441MHz Ar #Avg Type: RMS Avg Hold:>100/100 Mkr1</td> <td>111 102:50:21 PM Sep 15, 2023 TRACE 12 23 4 5 6 TYPE 12:50:21 PM Sep 15, 2023 TRACE 12 23 4 5 6 TYPE 12:50:21 PM Sep 15, 2023 0 FT 1000 GHz -2.465 dBm 5 FT 10000 GHZ -2.465 dBm 5 FT 1000 GHZ -2.465 d</td> <td>Auto Turn Center Fre 2.441500000 GH 2.442500000 GH 2.442500000 GH 2.442500000 GH 2.442500000 GH 2.442500000 GH 2.442500000 GH</td>	Swept SA R AC PN0: Wide IFGain:Low 3.36 dB dBm dBm dBm dBm dBm dBm dBm d	VVNT 1-DH	15 2441MHz Ar #Avg Type: RMS Avg Hold:>100/100 Mkr1	111 102:50:21 PM Sep 15, 2023 TRACE 12 23 4 5 6 TYPE 12:50:21 PM Sep 15, 2023 TRACE 12 23 4 5 6 TYPE 12:50:21 PM Sep 15, 2023 0 FT 1000 GHz -2.465 dBm 5 FT 10000 GHZ -2.465 dBm 5 FT 1000 GHZ -2.465 d	Auto Turn Center Fre 2.441500000 GH 2.442500000 GH 2.442500000 GH 2.442500000 GH 2.442500000 GH 2.442500000 GH 2.442500000 GH
Keysight Spectrum Analyzer - 3 RL RF 50 Center Freq 2.4413 Ref Offset 3 30 10 dB/div Ref 20.00 30 30 -10.0	Swept SA R AC PN0: Wide IFGain:Low 3.36 dB dBm dBm dBm dBm dBm dBm dBm d	VVNT 1-DH	15 2441MHz Ar #Avg Type: RMS Avg Hold:>100/100 Mkr1	2.441 000 GHz -2.465 dBm Span 2.000 MHz .133 ms (1001 pts)	Auto Turn Center Fre 2.441500000 GF 2.440500000 GF 2.442500000 GF 2.442500000 GF 2.442500000 GF CF Ste 200.000 kF Auto Ma
Keysight Spectrum Analyzer - 3 R Ref Offset : Center Freq 2.4413 Ref Offset : 10 dB/div Ref Offset : 20 0	Swept SA R AC PN0: Wide IFGain:Low 3.36 dB dBm dBm dBm dBm dBm dBm dBm d	VVNT 1-DH	15 2441MHz Ar #Avg Type: RMS Avg Hold:>100/100 Mkr1	2.441 000 GHz -2.465 dBm Span 2.000 MHz .133 ms (1001 pts)	Frequency Auto Tur Center Fre 2.441500000 GH 2.442500000 GH 2.442500000 GH 2.442500000 GH 2.442500000 GH CF Ste 200.000 KH Auto Ma
	Swept SA R AC PN0: Wide IFGain:Low 3.36 dB dBm dBm dBm dBm dBm dBm dBm d	VVNT 1-DH	15 2441MHz Ar #Avg Type: RMS Avg Hold:>100/100 Mkr1	2.441 000 GHz -2.465 dBm Span 2.000 MHz .133 ms (1001 pts)	Frequency Auto Tur Center Fre 2.441500000 GH 2.442500000 GH 2.442500000 GH 2.442500000 GH 2.442500000 GH CF Ste 200.000 KH Auto Ma
	Swept SA R AC PN0: Wide IFGain:Low 3.36 dB dBm dBm dBm dBm dBm dBm dBm d	VVNT 1-DH	15 2441MHz Ar #Avg Type: RMS Avg Hold:>100/100 Mkr1	111 102:50:21 PM Sep 15,2023 TRACE 12 23 45 6 TYPE 12:50:21 PM Sep 15,2023 TRACE 12:23 45 6 TYPE 12:50:21 PM Sep 15,2023 DET 10:50:21 PM Sep 15,2023 2:441 000 GHz -2:465 dBm Span 2:000 MHz :133 ms (1001 pts) FUNCTION VALUE	Frequency Auto Turn Center Fre 2.441500000 GF 2.442500000 GF 2.442500000 GF 2.442500000 GF 2.442500000 GF CF Ste 200.000 KF Auto Ma Freq Offsa 0 F

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Keysight Spectrum Analyzer - S	wept SA		15 2480MHz An		
Center Freq 2.4795	Ω AC 000000 GHz PNO: Wide C	SENSE:PULSE	#Avg Type: RMS Avg Hold:>100/100	02:50:48 PM Sep 15, 2023 TRACE 1 2 3 4 5 6 TYPE M WWWWW DET P N N N N N	Frequency
	IFGain:Low	#Atten: 30 dB			Auto Tur
Ref Offset 3 10 dB/div Ref 20.00			Mkr1	2.478 998 GHz -3.665 dBm	
10.0		Ĭ			Center Fre
0.00	1		<mark>2</mark>		2.479500000 GH
-10.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
-20.0					Start Fre
-40.0					2.478500000 GH
-50.0					Stop Fre
-60.0					2.480500000 GH
Center 2.479500 GH #Res BW 30 kHz		W 100 kHz	Sweep 2.	Span 2.000 MHz 133 ms (1001 pts)	CF Ste 200.000 k⊢
MKR MODE TRC SCL	X		UNCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Ma
1 N 1 F 2 N 1 F 3	2.478 998 GHz 2.480 004 GHz	-3.665 dBm -3.594 dBm			Freq Offs
4 5				=	01
6 7					O a a la Tra
8 9 10					Scale Typ
11					Log <u>L</u>
ISG			STATUS		
	CFS	NVNT 2-DF	15 2402MHz An	t1	
Keysight Spectrum Analyzer - S	wept SA Ω AC	SENSE:PULSE		02:52:13 PM Sep 15, 2023	
Center Freq 2.4025	00000 GHz PNO: Wide	Trig: Free Run	#Avg Type: RMS Avg Hold:>100/100	TRACE 1 2 3 4 5 6 TYPE M WWWW DET P N N N N N	Frequency
	IFGain:Low	#Atten: 30 dB	Miced	2.401 858 GHz	Auto Tur
Ref Offset 3 10 dB/div Ref 20.00				-4.250 dBm	
10.0					Center Fre
0.00					2.402500000 GH
-10.0	mannathread	mon		Mundan	
-20.0					Start Fre 2.401500000 GH
-40.0					2.40100000 01
-50.0					Stop Fre
-60.0					2.403500000 GH
Center 2.402500 GH	,			Span 2.000 MHz	CF Ste
#Res BW 30 kHz		W 100 kHz	Sweep 2.	133 ms (1001 pts)	200.000 kH
MKR MODE TRC SCL	× 2.401 858 GHz	Y F -4.250 dBm	UNCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Ma
1 N 1 f	2.403 150 GHz	-2.928 dBm			Freq Offse
1 N 1 f 2 N 1 f 3				=	0 H
1 N 1 f 2 N 1 f 3 4 5 1					
1 N 1 f 2 N 1 f 3 - - - 4 - - - 5 - - - 6 - - - 7 - - -					Scale Tvn
1 N 1 f 2 N 1 f 3 - - - 4 - - - 5 - - - 6 - - - -					
1 N 1 f 2 N 1 f 3 - - - 4 - - - 5 - - - 6 - - - 7 - - - 8 - - - 9 - - -		III		•	Scale Typ

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	CFS	NVNT 2-DH	15 2441MHz An	t1	
Keysight Spectrum Analyzer - S		CENCE-DUI CE		02-54-42-04-5-5-15-2022	
Center Freq 2.4415		Trig: Free Run #Atten: 30 dB	#Avg Type: RMS Avg Hold:>100/100	02:54:43 PM Sep 15, 2023 TRACE 1 2 3 4 5 6 TYPE MWWWW DET P NNNNN	Frequency
Ref Offset 3	3.36 dB		Mkr1	2.441 000 GHz -4.868 dBm	Auto Tur
Log 10.0					Contor Fra
0.00	1			∂ ²	Center Fre 2.441500000 GH
-10.0	mar han	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	mann	hann	
-20.0					Start Fre
-30.0					2.440500000 GH
-40.0					
-50.0					Stop Fre
-70.0					2.442500000 GH
Center 2.441500 GH	<u> </u>			Span 2.000 MHz	CE Sta
#Res BW 30 kHz		V 100 kHz	Sweep 2.	133 ms (1001 pts)	CF Ste 200.000 kł
MKR MODE TRC SCL	x		UNCTION FUNCTION WIDTH	FUNCTION VALUE	Auto Ma
1 N 1 f 2 N 1 f	2.441 000 GHz 2.442 140 GHz	-4.868 dBm -4.537 dBm			Freq Offs
3					01
5 6				E	
7					Scale Typ
9 10 11					Log <u>L</u>
				4	
MSG					
		NVNT 2-DF	15 2480MHz An	t1	
Keysight Spectrum Analyzer - S	Ω AC	SENSE:PULSE		03:16:14 PM Sep 15, 2023	Frequency
Center Freq 2.4795	PNO: Wide	Trig: Free Run #Atten: 30 dB	#Avg Type: RMS Avg Hold:>100/100	TRACE 1 2 3 4 5 6 TYPE M WWWWW DET P N N N N N	
	IFGain:Low	#Atten: 30 dB	Mkr1	2.479 158 GHz	Auto Tur
Ref Offset 3 10 dB/div Ref 20.00				-3.926 dBm	
10.0					Center Fre
0.00	_ 1				2.479500000 Gł
-10.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
-20.0					Start Fre
-30.0					2.478500000 GI
-40.0					
-60.0					Stop Fre
-70.0					2.480500000 GH
Center 2.479500 GH	z			Span 2.000 MHz	CF Ste
#Res BW 30 kHz		N 100 kHz	Sweep 2.	133 ms (1001 pts)	200.000 kH
MKR MODE TRC SCL	× 2.479 158 GHz	Y F -3.926 dBm	UNCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Ma
2 N 1 f	2.480 042 GHz	-4.558 dBm			Freq Offs
4					. 01
6 7					
8					Scale Typ
10					Log <u>L</u>
11					
		ш	The status	•	



Keysight Spectrum Analyzer -		-5 NVNT 3-I	DH5 2402MHz Ar		
	0 Ω AC 500000 GHz	SENSE:PUL	#Avg Type: RMS	02:57:00 PM Sep 15, 2023 TRACE 1 2 3 4 5 6	Frequency
	PNO: Wie IFGain:Le	de Trig: Free Run w #Atten: 30 dB			A
Ref Offset 0 dB/div Ref 20.0			Mkr1	2.402 022 GHz -2.996 dBm	Auto Tur
- og 10.0					Center Fre
0.00					2.402500000 GH
10.0 ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		hand	Man Mar A M		
30.0					Start Fre 2.401500000 GH
40.0					
50.0 60.0					Stop Fre
70.0					2.403500000 GH
Center 2.402500 GF			Euroon of	Span 2.000 MHz	CF Ste
KR MODE TRC SCL		VBW 100 kHz	FUNCTION FUNCTION WIDTH	FUNCTION VALUE	200.000 kH Auto Ma
1 N 1 f 2 N 1 f	2.402 022 GHz 2.403 030 GHz				Eron Offe
3 4 5					Freq Offs 0 F
6 7					
8 9 10					Scale Typ
				-	Log <u>L</u>
				•	
SG			10 STATUS	S	
			CH5 2441MHz Ar		
Keysight Spectrum Analyzer - RL RF 50	Swept SA 0 Ω AC		DH5 2441MHz Ar	03:18:02 PM Sep 15, 2023	
Keysight Spectrum Analyzer -	Swept SA 0 Ω AC 500000 GHz PNO: Wit	FS NVNT 3-I	DH5 2441MHz Ar #Avg Type: RMS Avg Hold:>100/100	nt1	Frequency
Keysight Spectrum Analyzer - RL RF 50 Center Freq 2.441	Swept SA 0 Ω AC 500000 GHz PNO: Wi IFGain:Lo	FS NVNT 3-I	DH5 2441MHz Ar #Avg Type: RMS Avg Hold:>100/100	03:18:02 PM Sep 15, 2023 TRACE 2 2 3 4 5 6 TYPE NUMIN N DET PNNIN N 2.441 036 GHz	Frequency
Keysight Spectrum Analyzer - RL RF 50	Swept SA 0 Ω AC 500000 GHz PNO: Wi IFGain:Lo 3.36 dB	FS NVNT 3-I	DH5 2441MHz Ar #Avg Type: RMS Avg Hold:>100/100	03:18:02 PM Sep 15, 2023 TRACE 23 4 5 6 TYPE MWWWWW DET P NNNNN	Frequency
RL RF 50 RL RF 50 RL RF 50 Ref Offset 0 dB/div Ref 20.00	Swept SA 0 Ω AC 500000 GHz PNO: Wi IFGain:Lo 3.36 dB	FS NVNT 3-I	DH5 2441MHz Ar #Avg Type: RMS Avg Hold:>100/100	03:18:02 PM Sep 15, 2023 TRACE 2 2 3 4 5 6 TYPE NUMIN N DET PNNIN N 2.441 036 GHz	Frequency Auto Tur Center Fre
Reysight Spectrum Analyzer - RL RF 50 Center Freq 2.441 Ref Offset 0 dB/div Ref 20.00 9	Swept SA 0 Ω AC 500000 GHz PNO: Wi IFGain:Lo 3.36 dB	FS NVNT 3-I	DH5 2441MHz Ar #Avg Type: RMS Avg Hold:>100/100	03:18:02 PM Sep 15, 2023 TRACE 2 2 3 5 6 TYPE NUMIN N DET P NUMIN N 2.441 036 GHz	Frequency Auto Tur Center Fre
RL RF St RL RF St Renter Freq 2.441 Ref Offset 0 dB/div Ref 20.00 00 00 00 00 00 00	Swept SA 0 Ω AC 500000 GHz PNO: Wi IFGain:Lo 3.36 dB	FS NVNT 3-I	DH5 2441MHz Ar #Avg Type: RMS Avg Hold:>100/100	03:18:02 PM Sep 15, 2023 TRACE 2 2 3 5 6 TYPE NUMIN N DET P NUMIN N 2.441 036 GHz	Frequency Auto Tur Center Fre 2.441500000 GH Start Fre
RL RF St RL RF St Renter Freq 2.441 Ref Offset 0 dB/div Ref 20.00	Swept SA 0 Ω AC 500000 GHz PNO: Wi IFGain:Lo 3.36 dB	FS NVNT 3-I	DH5 2441MHz Ar #Avg Type: RMS Avg Hold:>100/100	03:18:02 PM Sep 15, 2023 TRACE 2 2 3 5 6 TYPE NUMIN N DET P NUMIN N 2.441 036 GHz	Frequency Auto Tur Center Fre 2.441500000 GH Start Fre
Keysight Spectrum Analyzer - RL RF St Center Freq 2.441 Ref Offset 0 dB/div Ref 20.00 0 0 0 0 0 00 0 0 0 00 0 0 0 00 0 0 0 00 0 0	Swept SA 0 Ω AC 500000 GHz PNO: Wi IFGain:Lo 3.36 dB	FS NVNT 3-I	DH5 2441MHz Ar #Avg Type: RMS Avg Hold:>100/100	03:18:02 PM Sep 15, 2023 TRACE 2 2 3 5 6 TYPE NUMIN N DET P NUMIN N 2.441 036 GHz	Frequency Auto Tur Center Fre 2.441500000 GH Start Fre 2.440500000 GH
Keysight Spectrum Analyzer - RL RF St Center Freq 2.441 Ref Offset 0 dB/div Ref 20.00 0 0 0 0 0 00 0 0 0 00 0 0 0 00 0 0 0 00 0 0 0 00 0 0 0 00 0 0 0 00 0 0	Swept SA 0 Ω AC 500000 GHz PNO: Wi IFGain:Lo 3.36 dB	FS NVNT 3-I	DH5 2441MHz Ar #Avg Type: RMS Avg Hold:>100/100	03:18:02 PM Sep 15, 2023 TRACE 2 2 3 5 6 TYPE NUMIN N DET P NUMIN N 2.441 036 GHz	Frequency Auto Tur Center Fre 2.441500000 GH Start Fre 2.440500000 GH
Reysight Spectrum Analyzer - RL RF SC Center Freq 2.441 Ref Offset Ref Offset 0 dB/div Ref 20.01 Ref 20.01 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Swept SA 0.0. AC 500000 GHz PN0: Wir IFGain:Lo 3.36 dB 0 dBm 1 1 1 1 1 1 1 1 1 1 1 1 1	FS NVNT 3-I	DH5 2441MHz Ar #Avg Type: RMS Avg Hold:>100/100	03:18:02 PM Sep 15, 2023 TRACE 1 23 4 5 6 TYPE WWWWW DET NNNNN 2.441 036 GHz -2.132 dBm	Frequency Auto Tur Center Fre 2.441500000 GF Start Fre 2.440500000 GF Stop Fre 2.442500000 GF
Reysight Spectrum Analyzer - RL RF St Center Freq 2.441: Ref Offset Od 0 dB/div Ref 20.00 Od 0 0 Od Od Od 0 0 Od Od Od Od 0 0 Od Od<	Swept SA 20 AC 500000 GHz PNO: Wir IFGain:Lo 3.36 dB 0 dBm 1 1 1 1 1 4 4 4 4	FS NVNT 3-I	DH5 2441MHz Ar	111 103:18:02 PM Sep 15, 2023 TRACE 12 23 45 6 TYPE 12	Frequency Auto Tur Center Fre 2.441500000 GF Start Fre 2.440500000 GF Stop Fre 2.442500000 GF CF Ste 200.000 kF
Keysight Spectrum Analyzer - RL RF St Ref Offset O dB/div Ref Offset 0 B Colspan="2">Colspan="2" Colspan="2" Colspan="2" Colspan="2" Colspan="2" Colspan="2" Colspan="2" Colspan="2" Colspan="2" Colspan="2" Colspan="2" Colspan="2" Colspan="2" Colspan="2" Colspan="2" Colspan= 2"	Swept SA 20 AC 500000 GHz PN0: Will IFGain:Lo 3.36 dB 0 dBm 1 1 2 4 2 4 4 2 4 4 1 3 4 4 4 1 3 4 4 4 4 4 4 4 4 4 4 4 4 4	FS NVNT 3-I	DH5 2441MHz Ar	111 103:18:02 PM Sep 15, 2023 TRACE 12 23 45 6 TYPE 12	Frequency Auto Tur Center Fre 2.441500000 GH Start Fre 2.440500000 GH Stop Fre 2.442500000 GH CF Ste 200.000 kH Auto
Keysight Spectrum Analyzer - RL RF St Center Freq 2.441 Ref Offset O dB/div Ref Offset 0	Swept SA 0.0 AC 500000 GHz PNO: Wir IFGain:L 3.36 dB 0 dBm 1 1 1 1 1 1 1 1 1 1 1 1 1	FS NVNT 3-I	DH5 2441MHz Ar	111 103:18:02 PM Sep 15, 2023 TRACE 12 23 45 6 TYPE 12	Frequency Auto Tur Center Fre 2.441500000 GH Start Fre 2.440500000 GH Stop Fre 2.442500000 GH CF Ste 200.000 kH Auto Ma
Keysight Spectrum Analyzer - RL RF St Ref Offset O dB/div Ref 20.01 Og Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2"Colspan=	Swept SA 20 AC 500000 GHz PN0: Will IFGain:Lo 3.36 dB 0 dBm 1 1 2 4 2 4 4 2 4 4 1 3 4 4 4 1 3 4 4 4 4 4 4 4 4 4 4 4 4 4	FS NVNT 3-I	DH5 2441MHz Ar	111 103:18:02 PM Sep 15, 2023 TRACE 12 23 45 6 TYPE 12	Erequency Auto Tur Center Fre 2.441500000 GF Start Fre 2.440500000 GF Stop Fre 2.442500000 GF CF Ste 200.000 kF Auto Auto Stop Fre 2.442500000 GF Freq Offse
Keysight Spectrum Analyzer - RL RF St Center Freq 2.441 Ref Offset O dB/div Ref Offset O data O data O data Center 2.441500 GH Res BW 30 KHz MKR MODE TRCI SCL N 1 A A A A A A A A A A A A A A A A A A	Swept SA 20 AC 500000 GHz PN0: Will IFGain:Lo 3.36 dB 0 dBm 1 1 2 4 2 4 4 2 4 4 1 3 4 4 4 1 3 4 4 4 4 4 4 4 4 4 4 4 4 4	FS NVNT 3-I	DH5 2441MHz Ar	111 103:18:02 PM Sep 15, 2023 TRACE 12 23 45 6 TYPE 12	Start Fre 2.441500000 GH Start Fre 2.440500000 GH Stop Fre 2.442500000 GH CF Ste 200.000 kH Auto Mato Freq Offs: 0 H
RL RF Scenter Freq 2.441 Ref Offset O dB/div Ref Offset O data O data O data Center 2.441500 GF Res BW 30 kHz MR MODE TRCI SCL A A A A A A A A A A A A A A A A	Swept SA 20 AC 500000 GHz PN0: Will IFGain:Lo 3.36 dB 0 dBm 1 1 2 4 2 4 4 2 4 4 1 3 4 4 4 1 3 4 4 4 4 4 4 4 4 4 4 4 4 4	FS NVNT 3-I	DH5 2441MHz Ar	111 103:18:02 PM Sep 15, 2023 TRACE 12 23 45 6 TYPE 12	Frequency Auto Tur Center Fre 2.441500000 GF Start Fre 2.440500000 GF Stop Fre 2.442500000 GF CF Ste 200.000 kF

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	CFS	S NVNT 3-E	DH5 248	30MHz Ai	nt1			
Keysight Spectrum Analyzer - Swe							_	
tx RL RF 50 Ω Center Freq 2.47950		Trig: Free Run #Atten: 30 dB	#Avg	g Type: RMS Hold:>100/100	TRAC	Sep 15, 2023 E 1 2 3 4 5 6 E M W N N N N T P N N N N N	F	requency
Ref Offset 3.3 10 dB/div Ref 20.00 d				Mkr1	2.479 0 -2.56	26 GHz 66 dBm		Auto Tune
10.0 0.00 -10.0			Jum	^2	Land March	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		Center Fred 9500000 GH:
-20.0							2.47	Start Free 8500000 GH
-50.0							2.48	Stop Fre 0500000 GH
Center 2.479500 GHz #Res BW 30 kHz	#VE	W 100 kHz		Sweep 2	Span 2. 2.133 ms (′	000 MHz 1001 pts)	0	CF Ste 200.000 kH
MKR MODE TRC SCL	× 2.479 026 GHz	Ƴ -2.566 dBm	FUNCTION	FUNCTION WIDTH	FUNCTIO	N VALUE	<u>Auto</u>	Ma
2 N 1 F 3 4 4 5 6	2.480 004 GHz	-5.895 dBm				=		Freq Offse 0 H
7 8 9 10							Log	Scale Typ
11							5	
MSG				ίοstatu	s			

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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-DH5	79	15	Pass
NVNT	2-DH5	79	15	Pass
NVNT	3-DH5	79	15	Pass



			t Graphs		
		NO. NVNT 1	-DH5 2402MH	z Ant1	
Keysight Spectrum Analyzer - Swe RL RF 50 Ω		SENSE:PULSE		02:48:17 PM Sep 15, 2023	- 6 2
Center Freq 2.44175		Trian Error Durn	#Avg Type: RMS Avg Hold:>100/100	TRACE 1 2 3 4 5 6 TYPE MWWWW DET P NNNN	Frequency
Ref Offset 3.3 10 dB/div Ref 20.00 d	36 dB		Mkr1 2	402 087 5 GHz -0.188 dBm	Auto Tun
		///////////////////////////////////////			Center Fre 2.441750000 GH
-20.0					Start Fre 2.400000000 GH
-60.0 4					Stop Fre 2.483500000 GH
Start 2.40000 GHz #Res BW 100 kHz MKR MODE TRC SCL	#VBV	V 300 kHz		Stop 2.48350 GHz 000 ms (1001 pts) FUNCTION VALUE	CF Ste 8.350000 MH <u>Auto</u> Ma
1 N 1 f 2 N 1 f 3 4 5 6	2.402 087 5 GHz 2.479 993 0 GHz	-0.188 dBm -1.356 dBm		E	Freq Offse 0 H
7 8 9 10					Scale Typ
11 ISG			To STATUS		
	Hopping	No. NVNT 2	2-DH5 2402MH	z Ant1	
Keysight Spectrum Analyzer - Swe					- F Z
α RL RF 50 Ω Center Freq 2.44175		Trig: Free Run #Atten: 30 dB	#Avg Type: RMS Avg Hold:>100/100	02:52:49 PM Sep 15, 2023 TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P NNNNN	Frequency
				DET P NNNNN	
Ref Offset 3.3 10 dB/div Ref 20.00 d	36 dB		Mkr1 2	401 837 0 GHz -0.568 dBm	Auto Tun
10 dB/div Ref 20.00 d 10.0 1 10.0 1 10.0	36 dB 1Bm	unananan	Mkr1 2	401 837 0 GHz -0.568 dBm	Center Fre
10 dB/div Ref 20.00 c	36 dB 1Bm	unnannann		401 837 0 GHz -0.568 dBm	Center Fre 2.441750000 GH Start Fre
10 dB/div Ref 20.00 d 0 d 0 d 0 d 0 d 0 d 0 d 0 d	36 dB 1Bm			401 837 0 GHz -0.568 dBm	Center Fre 2.441750000 GH Start Fre 2.400000000 GH Stop Fre
10 dB/div Ref 20.00 d - 9g 10 1 10 1 10 20 0 10 0	36 dB 18m 	V 300 KHz	Sweep 8	401 837 0 GHz -0.568 dBm 	Auto Tun Center Fre 2.441750000 GH Start Fre 2.400000000 GH Stop Fre 2.48350000 GH CF Ste 8.350000 MH Auto Ma
10 dB/div Ref 20.00 d - og 10 10 10 10 10 10 10 00 10 0 10		V 300 KHz		401 837 0 GHz -0.568 dBm	Center Fre 2.441750000 GH Start Fre 2.400000000 GH Stop Fre 2.48350000 GH CF Ste 8.350000 MH
10 dB/div Ref 20.00 d 9 d 10	36 dB 38 m 44	V 300 kHz -0.568 dBm	Sweep 8	401 837 0 GHz -0.568 dBm	Center Fre 2.441750000 GF 2.400000000 GF 2.400000000 GF 2.483500000 GF 2.48350000 MF Auto Ma Freq Offse 0 F Scale Typ
10 dB/div Ref 20.00 d 9 d 10	36 dB 38 m 44	V 300 kHz -0.568 dBm	Sweep 8	401 837 0 GHz -0.568 dBm	Center Fre 2.441750000 GF Start Fre 2.400000000 GF 2.483500000 GF 2.48350000 GF 8.350000 MF Auto Ma Freq Offso 0 F

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Hoppin	g No. NVNT 3-	DH5 2402MH	z Ant1	
Keysight Spectrum Analyzer - Swept SA K R L R F 50 Ω AC	SENSE:PULSE		02:56:34 PM Sep 15, 2023	
Center Freq 2.441750000 GHz		#Avg Type: RMS Avg Hold:>100/100	TRACE 1 2 3 4 5 6	Frequency
PNO: Fast IFGain:Low	· ↓ · · · · · · · · · · · · · · · · · ·	-	DET P NNNN	Auto Tune
Ref Offset 3.36 dB 10 dB/div Ref 20.00 dBm		Mkr1 2.	402 004 0 GHz 0.232 dBm	Auto Tulle
10.0 10.0				Center Freq
0.00 Janwarawarananananananananananananananana	out of the second of the secon	www.www.han	Mr Muran	2.441750000 GHz
-10.0				
-30.0				Start Freq 2.40000000 GHz
-40.0 p				
-50.0			h.	Stop Freq
-60.0				2.483500000 GHz
Start 2.40000 GHz			Stop 2.48350 GHz	CF Step
	BW 300 kHz		.000 ms (1001 pts)	8.350000 MHz
MKR MODE TRC SCL X 1 N 1 f 2.402 004 0 GHz	Y FUN 0.232 dBm	ICTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Man
2 N 1 f 2.480 410 5 GHz 3	-4.943 dBm			Freq Offset
4 5			=	0 Hz
6 7 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9				
8				Scale Type
10				Log <u>Lin</u>
MSG				

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Dwell Time

14.1 Block Diagram Of Test Setup

EUT	SPECTRUM
	ANALYZER

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).

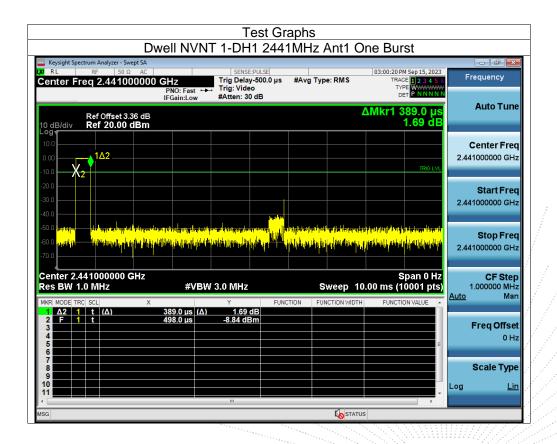
DH1 Packet permit maximum 1600 / 79 /2 hops per second in each channel (1 time slot RX, 1 time slot TX). So, the Dwell Time can be calculated as follows:

DH5:1600/79/6*0.4*79*(MkrDelta)/1000	
DH3:1600/79/4*0.4*79*(MkrDelta)/1000	
DH1:1600/79/2*0.4*79*(MkrDelta)/1000	
Remark: Mkr Delta is once pulse time.	

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Condition	Mode	Frequency (MHz)	Pulse Time (ms)	Total Dwell Time (ms)	Limit (ms)	Verdict
NVNT	1-DH1	2441	0.389	122.924	400	Pass
NVNT	1-DH3	2441	1.645	254.975	400	Pass
NVNT	1-DH5	2441	2.891	303.555	400	Pass
NVNT	2-DH1	2441	0.393	124.188	400	Pass
NVNT	2-DH3	2441	1.65	259.05	400	Pass
NVNT	2-DH5	2441	2.898	309.120	400	Pass
NVNT	3-DH1	2441	0.399	126.084	400	Pass
NVNT	3-DH3	2441	1.649	270.436	400	Pass
NVNT	3-DH5	2441	2.9	309.333	400	Pass



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	Dwell NV	NT 1-DH3 2	441MHz Ant1	One Burst	
Keysight Spectrum Analyzer - So RL RF 50 9 Center Freq 2.4410	Ω AC	SENSE:PULS		TYPE WWWWWW	Frequency
Ref Offset 3	IFGain:Low	#Atten: 30 dB		ΔMkr1 1.645 ms 7.88 dB	Auto Tune
10.0 -10.0 X2	1Δ2			TRIO LYL	Center Freq 2.441000000 GHz
-20.0 -30.0 -40.0	a a a a a a a a a a a a a a a a a a a	16 10 10 10 10 10 10 10 10 10 10 10 10 10		ng part friga segan participan agreement per	Start Fred 2.441000000 GH:
-60.0 <mark>-1779-00</mark> -60.0 <mark>-1974 pt</mark> -70.0	and Constant Specific and the specific	<mark>. Malaka kala</mark> tan kalan kal Kalan kalan kal		<mark>n sente la sente de la sente La sente de la s La sente de la s</mark>	Stop Fred 2.441000000 GH
Center 2.441000000 Res BW 1.0 MHz		3W 3.0 MHz	Sweep	Span 0 Hz 10.00 ms (10001 pts)	CF Step 1.000000 MH Auto Mar
MKR MODE TRC SCL	× 1.645 ms (FUNCTION FUNCTION W	IDTH FUNCTION VALUE	
2 F 1 t 3 4 5 6	498.0 µs	-9.60 dBm		E	Freq Offse 0 H
7 8 9 10					Scale Type
11		m	I os	TATUS	

	Dwell NVN	IT 1-DH5 2	2441MHz	z Ant1 O	ne Burst	
Keysight Spectrum Analyzer - Swep						
IX RL RF 50 Ω Center Freq 2.441000		Trig Delay-500		Гуре: RMS	02:49:16 PM Sep 15, 2 TRACE 1 2 3 4 TYPE WWW	Frequency
	IFGain:Low	#Atten: 30 dB			DET	
Ref Offset 3.36 10 dB/div Ref 20.00 dl				Δ	Mkr1 2.891 n 3.47 d	ins in the second se
10.0						Center Freq
-10.0	1 ∆:	2				2.441000000 GHz
-10.0 -20.0 X2	dtalaatabita meda.ata					Otout From
-30.0						Start Fred 2.441000000 GHz
-40.0						
-50.0 <mark>- 1977 </mark>					n an	
-70.0	p	ten eek tiere heer		and some first of	In a langul to the	2.441000000 GHz
Center 2.441000000 GI Res BW 1.0 MHz		W 3.0 MHz		Sween 10	Span 0 .00 ms (10001 p	
MKRI MODEI TRCI SCLI	# V D	Y 5.0 WITZ	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	Auto Man
1 Δ2 1 t (Δ)	2.891 ms (Δ) 3.47 dB	TONCHON	T DIVETION WIDTH	T ONCHON VALUE	1
2 F 1 t	493.0 µs	-17.88 dBm				Freq Offset
4 5						0 Hz
6						
8						Scale Type
10						Log <u>Lin</u>
•				-1		
MSG					5	



Dwe	ell NVNT 2-DH1 244	11MHz Ant1 C	ne Burst	
Keysight Spectrum Analyzer - Swept SA RL RF 50 Ω AC Center Freq 2.441000000 G		s #Avg Type: RMS	03:18:24 PM Sep 15, 2023 TRACE 2 3 4 5 6 TYPE WWWWWW	Frequency
Ref Offset 3.36 dB	PNO: Fast -→- Trig: Video IFGain:Low #Atten: 30 dB		ΔMkr1 393.0 μs -2.46 dB	Auto Tune
			TRIG LVL	Center Freq 2.441000000 GHz
-20.0 -30.0 -40.0				Start Fred 2.441000000 GHz
	en beste sol di filosofi de la consecte di sense de la solo di sense de la solo di sense de la solo di sense d In terreto di filosofi en terreto di sense di sen	and the second		Stop Fred 2.441000000 GH:
Center 2.441000000 GHz Res BW 1.0 MHz	#VBW 3.0 MHz	Sweep 10	Span 0 Hz 0.00 ms (10001 pts)	CF Step 1.000000 MH Auto Mar
	Y FU 393.0 μs (Δ) -2.46 dB 365.0 μs -11.60 dBm	INCTION FUNCTION WIDTH	FUNCTION VALUE	Freq Offset 0 Hz
7 8 9 10 11				Scale Type
MSG		I STATU	IS	

	Dw	ell NVN	T 2-DH3 :	2441M⊦	Iz Ant1 O	ne Burst		
	n Analyzer - Swept SA							- 8 💌
	³⁶ 50 Ω AC 2.441000000 C	PNO: Fast ++-	SENSE:PUL Trig Delay-50 Trig: Video		Type: RMS	03:19:25 PM Sep 15, 2023 TRACE 1 2 3 4 5 TYPE WWWWWW DET P N N N N		equency
10 dB/div	ef Offset 3.36 dB ef 20.00 dBm	IFGain:Low	#Atten: 30 dB		Δ	Mkr1 1.650 ms 5.50 dB		Auto Tune
10.0 0.00 -10.0	<u>1Δ2</u>					TRIG LVL		Center Free 1000000 GH
-20.0							2.44	Start Free
-50.0	arden see	1940	1 State		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	n a far a far a far a star star far far far star star star star star star star st	2.44	Stop Fre 1000000 GH
Center 2.441 Res BW 1.0 M		#VBW	/ 3.0 MHz		Sweep 10	Span 0 Hz 00 ms (10001 pts)	1 Auto	CF Stej .000000 MH Ma
MKR MODE TRC SC			Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	Auto	IVIA
1 Δ2 1 t 2 F 1 t 3 4 5		.650 ms (∆) 498.0 µs	5.50 dB -7.89 dBm			=		F req Offse 0 H:
6 7 8 9 10								Scale Type
11							Log	Lir
					-	4		
MSG								



	Dwell	NVN	T 2-DH5	2441	IMHz /	Ant1 O	ne Bur	st		
Keysight Spectrum Anal	50 Ω AC 141000000 GHz	:Fast ++	SENSE:PI Trig Delay-5 Trig: Video		#Avg Typ	e: RMS	TRAC	M Sep 15, 2023 E 1 2 3 4 5 6 E WWWWWWW	Fi	requency
		: Fast ↔ in:Low	#Atten: 30 d	В		Δ	Mkr1 2	898 ms 5.82 dB		Auto Tune
10.0 -10.0	1Δ2							TRIG LVL		Center Fred 1000000 GH:
-20.0 -30.0 -40.0									2.44	Start Free 1000000 GH
-50.0 (1990) -60.0 (1990) -70.0			dage til kirde for det det for Alle poster det giller og på palgi Alle poster det giller og på palgi						2.44	Stop Fre 1000000 GH
Center 2.441000 Res BW 1.0 MHz		#VBW	3.0 MHz		s	weep 15		pan 0 Hz 0001 pts)	Auto	CF Stej 0.000000 MH Ma
MKR MODE TRC SCL 1 $\Delta 2$ 1 t ($\Delta 2$ 2 F 1 t	× () 2.898 496.1	ims (Δ) 8 μs	Y 5.82 dB -7.28 dBm		TION FUI	NCTION WIDTH	FUNCTION	DN VALUE		Freq Offse
3 4 5 6								=		0 H
7 8 9 10										Scale Type
10 11 MSG			m			I STATUS		+	Log	Lir

	Dwe		110011		••••••					
Keysight Spectrum Analyze										- F
RL RF	50 Ω AC 1000000 G	iHz	SENSE: Trig Delay-	-500.0 µs a	#Avg Typ	e: RMS	TRA	M Sep 15, 2023 CE 1 2 3 4 5 6	F	requency
		PNO: Fast • FGain:Low	Trig: Video #Atten: 30					PE WWWWWW ET P N N N N N		
		r Galli.Low	m them ou				AMke1 1	899.0 µs		Auto Tu
	et 3.36 dB . 00 dBm							3.06 dB		
og	.ov ubili									
10.0 Δ 1Δ2										Center Fi
								TRIG LVL	2.44	1000000 G
10.0										
20.0										Start Fr
30.0									2.44	1000000 0
40.0										
40.0	territik Territik	عدرابطانه والمناصلية	land to be too your by a pt	egineri fin Materian ^{da} ter	Interative and mart	h <mark>illere Kardlah</mark> nur	ire in particular	tersisteration		Oton F
40.0	and the second		1	1. Sec.			1990 B.		244	•
40.0	and the second		<mark>in de la constant de l La constant de la cons</mark>	1. Sec.			1990 B.		2.44	•
40.0 50.0 <mark>00.0 0 00.000000000000000000000000</mark>	aler all a state and		1	1. Sec.			1 ⁶⁴⁶ 10 ⁶⁴⁶ 411	uhriya and <mark>Andr</mark>	2.44	1000000 0
10.0 50.0	aler all a state and	and a state of the second	and a full the provided of the second se	1. Sec.	<mark>ring and and and and and and and and and and</mark>	nin en nin heren	n <mark>inanan ananananan anananan anananan ananan anan anan Sanan anan </mark>	Span 0 Hz		1000000 CF St
40.0 50.0 70.0 Hundo Conter 2.4410000 tes BW 1.0 MHz	00 GHz	and a state of the second	1	<mark>ylisineley</mark> di	s	weep 10	ال ^{مالي} ة (1 2.00 ms (1	6 (* 10))))))))))))))))))))))))))))))))))))		CF St 1.000000 0
40.0 40.0	۲ <mark>۳۰۵ (۱۹۵۹)</mark> 00 GHz × 3	#VB 399.0 µs (/	44 (¹¹) 44 (14) BW 3.0 MHz	FUNCTION	s	nin en nin heren	ال ^{مالي} ة (1 2.00 ms (1	Span 0 Hz		CF S1
40.0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	۲ <mark>۳۰۵ (۱۹۵۹)</mark> 00 GHz × 3	#VB	W 3.0 MHz	FUNCTION	s	weep 10	ال ^{مالي} ة (1 2.00 ms (1	6 (* 10))))))))))))))))))))))))))))))))))))	<u>Auto</u>	1000000 CF St CF St 1.000000 N
40 0 50 0 40 0 50 0	۲ <mark>۳۰۵ (۱۹۵۹)</mark> 00 GHz × 3	#VB 399.0 µs (/	44 (¹¹) 44 (14) BW 3.0 MHz	FUNCTION	s	weep 10	ال ^{مالي} ة (1 2.00 ms (1	6 (* 10))))))))))))))))))))))))))))))))))))	<u>Auto</u>	CF Si 1.000000 M 1.000000 M
40 0 50 0 40 0 50 0	۲ <mark>۳۰۵ (۱۹۵۹)</mark> 00 GHz × 3	#VB 399.0 µs (/	44 (¹¹) 44 (14) BW 3.0 MHz	FUNCTION	s	weep 10	ال ^{مالي} ة (1 2.00 ms (1	6 (* 10))))))))))))))))))))))))))))))))))))	<u>Auto</u>	CF Si 1.000000 M 1.000000 M
40.0 40.0	۲ <mark>۳۰۵ (۱۹۵۹)</mark> 00 GHz × 3	#VB 399.0 µs (/	44 (¹¹) 44 (14) BW 3.0 MHz	FUNCTION	s	weep 10	ال ^{مالي} ة (1 2.00 ms (1	6 (* 10))))))))))))))))))))))))))))))))))))	Auto	CF St 1.000000 M N Freq Off
40.0 40.0	۲ <mark>۳۰۵ (۱۹۵۹)</mark> 00 GHz × 3	#VB 399.0 µs (/	44 (¹¹) 44 (14) BW 3.0 MHz	FUNCTION	s	weep 10	ال ^{مالي} ة (1 2.00 ms (1	6 0 0 0 Hz Span 0 Hz 10001 pts)	Auto	CF St 1.000000 M Freq Off Scale Ty
40.0 μηστό μηστό <td< td=""><td>۲<mark>۳۰۵ (۱۹۵۹)</mark> 00 GHz × 3</td><td>#VB 399.0 µs (/</td><td>44 (¹¹) 44 (14) BW 3.0 MHz</td><td>FUNCTION</td><td>s</td><td>weep 10</td><td>ال^{مالي}ة (1 2.00 ms (1</td><td>6 0 0 0 Hz Span 0 Hz 10001 pts)</td><td>Auto</td><td>Stop Fr 11000000 C CF St 1.000000 N Freq Off: 0 Scale Ty</td></td<>	۲ <mark>۳۰۵ (۱۹۵۹)</mark> 00 GHz × 3	#VB 399.0 µs (/	44 (¹¹) 44 (14) BW 3.0 MHz	FUNCTION	s	weep 10	ال ^{مالي} ة (1 2.00 ms (1	6 0 0 0 Hz Span 0 Hz 10001 pts)	Auto	Stop Fr 11000000 C CF St 1.000000 N Freq Off: 0 Scale Ty
40.0 50.0	۲ <mark>۳۰۵ (۱۹۵۹)</mark> 00 GHz × 3	#VB 399.0 µs (/	44 (¹¹) 44 (14) BW 3.0 MHz	FUNCTION	s	weep 10	9.00 ms (1	6 0 0 0 Hz Span 0 Hz 10001 pts)	Auto	CF St 1.000000 M Freq Off Scale Ty



	Dwell NV	'NT 3-DH3 24	441MHz Ant1	One Burst	
Keysight Spectrum Analyzer - Sv X RL RF 50 S Center Freq 2.4410	2 AC		µs #Avg Type: RMS	03:21:40 PM Sep 15, 2023 TRACE 1 2 3 4 5 6 TYPE WWWWWW DET P NNNN	Frequency
Ref Offset 3 10 dB/div Ref 20.00	.36 dB	#Atten: 00 0D		ΔMkr1 1.649 ms 6.59 dB	Auto Tune
10.0 0.00 -10.0	142			TRIG LVL	Center Freq 2.441000000 GHz
-20.0 -30.0 -40.0					Start Fred 2.441000000 GHz
-50.0 ###################################				genderpersteren fildet ander vergenderet. Verstall polytikkelselselse kangeleer wedde.	Stop Fred 2.441000000 GHz
Center 2.441000000 Res BW 1.0 MHz		BW 3.0 MHz	Sweep ′	Span 0 Hz 10.00 ms (10001 pts)	CF Step 1.000000 MH Auto Mar
MKR MODE TRC SCL 1 Δ2 1 t (Δ) 2 F 1 t (Δ) 3 4 4 4 4	Х 1.649 ms 498.0 µs		FUNCTION FUNCTION WID	TH FUNCTION VALUE	Freq Offse
5 6 7 8 9					Scale Type
10 11 MSG		III	In STA		Log <u>Lir</u>

	Dwell NVN	T 3-DH5 24	41MHz Ant1	l One Burst	
Keysight Spectrum Analyzer - Swept SA					- 6 🐱
κ so Ω AG Center Freq 2.4410000		SENSE:PULSE Trig Delay-500.0	us #Avg Type: RMS		Frequency
	PNO: Fast ↔ IFGain:Low	Trig: Video #Atten: 30 dB		TYPE WWWWWW DET P N N N N	
	IFGalli:Low	#Atten: 00 aB		ΔMkr1 2.900 ms	Auto Tune
Ref Offset 3.36 d 10 dB/div Ref 20.00 dBr				5.53 dB	
10.0					0
					Center Freq 2.441000000 GHz
10.0 X2				TRIG LVL	2.441000000 GHZ
-20.0					
-30.0					Start Freq
-40.0					2.441000000 GHz
		Listen and a		and the second second second	
-50.0 test p.	and the second		and the second	den er profil angen er seideligt og kommen for het samt sinder som. Som het i den som er stande som er stande som er som er stande som er	Stop Freq
-60.0 ///////////////////////////////////		allen der Friedersteinen	harded fold to provide the second	and subselvents be attributed and	2.441000000 GHz
-70.0					
Center 2.441000000 GHz				Span 0 Hz	CF Step
Res BW 1.0 MHz	#VBV	V 3.0 MHz	Sweep	10.00 ms (10001 pts)	1.000000 MHz Auto Man
MKR MODE TRC SCL	× 2.900 ms (Δ)	Y 5,53 dB	UNCTION FUNCTION \	VIDTH FUNCTION VALUE	
2 F 1 t	498.0 µs	-6.48 dBm			Freq Offset
3 4					0 Hz
5				Ξ	
7					Scale Type
8					Scale Type
10				-	Log <u>Lin</u>
				Þ	
MSG			1 0	STATUS	



14. 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.



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15. EUT Test Setup Photographs

Conducted emissions

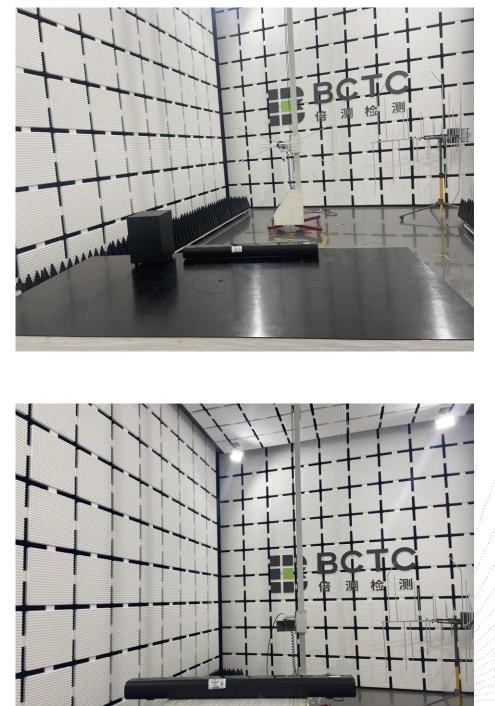


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Radiated Measurement Photos





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 stamp of laboratory.

4. The test report is invalid without signature of person(s) testing and authorizing.

5. The test process and test result is only related to the Unit Under Test.

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

7.If there is any objection to 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, Tangwei, 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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