Radio Test Report

Report No.:STS2408061W04

Issued for

Shenzhen Buzz Tech CO.,LTD

10th Floor, Guang Chang Bldg,74#, BaoMin 1st Rd, Bao An, Shenzhen, Guangdong, China

Product Name:	Smart watch
Brand Name:	N/A
Model Name:	P111
Series Model(s):	P140, P141, P142, P143, P144, P145, S87, S88, S89, S90, S91, S92, S93, S94, S95, S96, P45Pro, P45
FCC ID:	2AGFWP111
Test Standards:	FCC Part15.247

The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Shenzhen STS Test Services Co., Ltd.



TEST REPORT

Applicant's Name	Shenzhen Buzz Tech CO.,LTD
Address	10th Floor, Guang Chang Bldg,74#, BaoMin 1st Rd, Bao An, Shenzhen, Guangdong, China
Manufacturer's Name	Shenzhen Buzz Tech CO.,LTD
Address	10th Floor, Guang Chang Bldg,74#, BaoMin 1st Rd, Bao An, Shenzhen, Guangdong, China
Product Description	
Product Name	Smart watch
Brand Name	N/A
Model Name:	
Series Model(s)	P140, P141, P142, P143, P144, P145, S87, S88, S89, S90, S91,
	S92. S93. S94. S95. S96. P45Pro. P45
Test Standards	392. 393. 394. 395. 390. F45F10. F45
	FCC Part15.247

This device described above has been tested by STS, the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Shenzhen STS Test Services Co., Ltd.

Date of Test.....

Date of receipt of test item: 08 Aug. 2024

Date (s) of performance of tests : 08 Aug. 2024~10 Sept. 2024

Date of Issue: 10 Sept. 2024

Test Result: Pass

Testing Engineer

Jann Bu

(Aaron Bu)

Technical Manager

Authorized Signatory :

(Tony Liu)

howy





(Bovey Yang)



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Revision History

Rev.	Issue Date	Report No.	Effect Page	Contents
00	10 Sept. 2024	STS2408061W04	ALL	Initial Issue
			2	9





1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards: KDB 558074 D01 15.247 Meas Guidance v05r02.

	FCC Part 15.247,Subpart C					
Standard Section	Lest Item					
15.207	Conducted Emission	PASS				
15.247(a)(1)	Hopping Channel Separation	PASS				
15.247(a)(1)&(b)(1)	Output Power	PASS				
15.209	Radiated Spurious Emission	PASS				
15.247(d)	Conducted Spurious & Band Edge Emission	PASS				
15.247(a)(1)(iii)	Number of Hopping Frequency	PASS	-			
15.247(a)(1)(iii)	Dwell Time	PASS				
15.247(a)(1)	Bandwidth	PASS				
15.205	Restricted bands of operation	PASS				
Part 15.247(d)/part 15.209(a)	Band Edge Emission	PASS				
15.203	Antenna Requirement	PASS	-			

NOTE:

(1) 'N/A' denotes test is not applicable in this Test Report.

(2) All tests are according to ANSI C63.10-2020.



1.1 TEST FACTORY

SHENZHEN STS TEST SERVICES CO., LTD Add. : 101, Building B, Zhuoke Science Park, No.190 Chongqing Road, ZhanChengShequ, Fuhai Sub-District, Bao'an District, Shenzhen, Guang Dong, China FCC test Firm Registration Number: 625569 IC test Firm Registration Number: 12108A A2LA Certificate No.: 4338.01

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	RF output power, conducted	±0.755dB
2	Unwanted Emissions, conducted	±2.874dB
3	All emissions, radiated 9K-30MHz	±3.80dB
4	All emissions, radiated 30M-1GHz	±4.18dB
5	All emissions, radiated 1G-6GHz	±4.90dB
6	All emissions, radiated>6G	±5.24dB
7	Conducted Emission (9KHz-150KHz)	±2.19dB
8	Conducted Emission (150KHz-30MHz)	±2.53dB
9	Occupied Channel Bandwidth	±3.5%
10	Dwell Time	±3.2%



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

Product Name	Smart watch
Brand Name	N/A
Model Name	P111
Series Model(s)	P140, P141, P142, P143, P144, P145, S87, S88, S89, S90, S91, S92, S93, S94, S95, S96, P45Pro, P45
Model Difference	Strap, color, model name is different
Channel List	Please refer to the Note 3.
Bluetooth	Frequency:2402 – 2480 MHz Modulation: BT BR(1Mbps): GFSK BT EDR(2Mbps): π/4-DQPSK BT EDR(3Mbps): 8DPSK
Bluetooth Configuration	BR+EDR
Antenna Type	Monopole
Antenna Gain	2.89dBi
Rating	Input: DC 5V 130mAh
Battery	Rated Voltage:3.7V Charge Limit Voltage:4.2V Capacity: 175mAh
Hardware version number	T3672-V1.0
Software version number	V1.0
Connecting I/O Port(s)	Please refer to the Note 1.

Note:

- 1. For a more detailed features description, please refer to the manufacturer's specifications or the User Manual.
- 2. The antenna information refer the manufacturer provide report, applicable only to the tested sample identified in the report. Due to the incorrect antenna information, a series of problems such as the accuracy of the test results will be borne by the customer.



3.

		Chanı	nel List		
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	27	2429	54	2456
01	2403	28	2430	55	2457
02	2404	29	2431	56	2458
03	2405	30	2432	57	2459
04	2406	31	2433	58	2460
05	2407	32	2434	59	2461
06	2408	33	2435	60	2462
07	2409	34	2436	61	2463
08	2410	35	2437	62	2464
09	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454		
26	2428	53	2455		



2.2 DESCRIPTION OF THE TEST MODES

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.

Worst Mode	Description	Data Rate/Modulation
Mode 1	TX CH00	1Mbps/GFSK
Mode 2	TX CH39	1Mbps/GFSK
Mode 3	TX CH78	1Mbps/GFSK
Mode 4	TX CH00	2 Mbps/π/4-DQPSK
Mode 5	TX CH39	2 Mbps/π/4-DQPSK
Mode 6	TX CH78	2 Mbps/π/4-DQPSK
Mode7	TX CH00	3 Mbps/8DPSK
Mode 8	TX CH39	3 Mbps/8DPSK
Mode 9	TX CH78	3 Mbps/8DPSK
Mode 10	Hopping	GFSK
Mode 11	Hopping	π/4-DQPSK
Mode 12	Hopping	8DPSK

Note:

(1) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported.

(2) We tested for all available U.S. voltage and frequencies (For 120V, 50/60Hz and 240V, 50/60Hz) for which the device is capable of operation, and the worst case of 120V/ 60Hz is shown in the report.

(3) The battery is fully-charged during the radiated and RF conducted test.

For AC Conducted Emission

Test Case		
AC Conducted Emission	Mode 13 : Keeping BT TX	

2.3 FREQUENCY HOPPING SYSTEM REQUIREMENTS

(1)Standard and Limit

According to FCC Part 15.247(a)(1), The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

Frequency hopping spread spectrum systems are not required to employ all available hopping channels during each transmission. However, the system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this section should the transmitter be presented with a continuous data (or information) stream. In addition, a system employing short transmission bursts must comply with the definition of a frequency hopping system and must distribute its transmissions over the minimum number of hopping channels specified in this section.

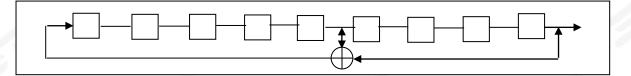


The incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hop sets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

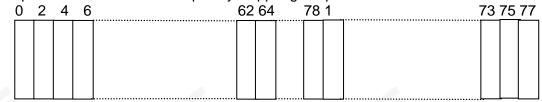
(2)The Pseudorandom sequence may be generated in a nin-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first one of 9 consecutive ones: i.e. the shift register is initialized with nine ones.

Numver of shift register stages:9 Length of pseudo-random sequence:2⁹-1=511bits

Longest sequence of zeros: 8(non-inverted signal)



Liner Feedback Shift Register for Generator of the PRBS sequence An example of Pseudorandom Frequency Hoppong Sequence as follow:



Each frequency used equally on th average by each transmitter. The system receivers have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shift frequencies ini synchronization with the transmitted signals.

(3) Frequency Hopping System

This transmitter device is frequency hopping device, and complies with FCC part 15.247 rule.

This device uses Bluetooth radio which operates in 2400-2483.5 MHz band. Bluetooth uses a radio technology called frequency-hopping spread spectrum, which chops up the data being sent and transmits chunks of it on up to 79 bands (1 MHz each; centred from 2402 to 2480 MHz) in the range 2,400-2,483.5MHz. The transmitter switches hop frequencies 1,600 times per second to assure a high degree of data security. All Bluetooth devices participating in a given piconet are synchronized to the frequency-hopping channel for the piconet. The frequency hopping sequence is determined by the master's device address and the phase of the hopping sequence (the frequency to hop at a specific time) is determined by the master's internal clock. Therefore, all slaves in a piconet must know the master's device address and must synchronize their clocks with the master's clock.

Adaptive Frequency Hopping (AFH) was introduced in the Bluetooth specification to provide an effective way for a Bluetooth radio to counteract normal interference. AFH identifies "bad" channels, where either other wireless devices are interfering with the Bluetooth signal or the Bluetooth signal is interfering with another device. The AFH-enabled Bluetooth device will then communicate with other devices within its piconet to share details of any identified bad channels. The devices will then switch to alternative available "good" channels, away from the areas of interference, thus having no impact on the bandwidth used.

This device was tested with a bluetooth system receiver to check that the device maintained hopping synchronization, and the device complied with these requirements FCC Part 15.247 rule.



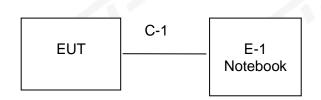
2.4 TABLE OF PARAMETERS OF TEST SOFTWARE SETTING

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 of FHSS.

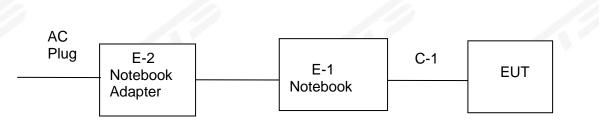
		Test program: Bluetooth	
(Control software) Parameters(1/2/3Mbps)	Packet type: DH1:4:27 2DH1:20:54 3DH1:24:83	Packet type: DH3:11:183 2DH3:26:367 3DH3:27:552	Packet type: DH5:15:339 2DH5:30:679 3DH5:31:1021

RF Function	Туре	Mode Or Modulation type	ANT Gain(dBi)	Power Class	Software For Testing
		GFSK	2.89	Default	
ВТ	BR+EDR	π/4-DQPSK	2.89	Default	RTLBTAPP
		8DPSK	2.89	Default	

2.5 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED Radiated Spurious Emission Test



Conducted Emission Test





2.6 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	lecessary accessories Model/Type No.	Length	Note
N/A	N/A	N/A	N/A	N/A	N/A

Support units

Item	Equipment	Mfr/Brand	Model/Type No.	Length	Note
E-2	Notebook Adapter	LENOVO	ADLX45DLC3A	N/A	N/A
E-1	Notebook	LENOVO	Think Pad E470	N/A	N/A
C-1	USB Cable	HUA WEI	N/A	150cm	N/A

Note:

- (1) For detachable type I/O cable should be specified the length in cm in ^r Length ^a column.
- (2) "YES" is means "with core"; "NO" is means "without core".



2.7 EQUIPMENTS LIST

	RF Rad	iation Test Equipmen	t			
Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated Until	
Temperature & Humidity	SW-108	SuWei	N/A	2024.03.15	2025.03.14	
Pre-Amplifier(0.1M-3GHz)	EM	EM330	060665	2024.02.23	2025.02.22	
Pre-Amplifier(1G-18GHz)	SKET	LNPA-01018G-45	SK2018080901	2023.09.26	2024.09.25	
Pre-Amplifier(18G-40GHz)	SKET	LNPA_1840-50	SK2018101801	2024.02.23	2025.02.22	
Active loop Antenna	ZHINAN	ZN30900C	16035	2023.02.28	2025.02.27	
Bilog Antenna	TESEQ	CBL6111D	34678	2022.09.30	2024.09.29	
Horn Antenna	SCHWARZBECK	BBHA 9120D	02014	2023.09.24	2025.09.23	
Horn Antenna	A-INFOMW	LB-180400-KF	J211020657	2023.10.10	2025.10.09	
Positioning Controller	MF	MF-7802	MF-780208587	N/A	N/A	
Signal Analyzer	R&S	FSV 40-N	101823	2023.09.26	2024.09.25	
Switch Control Box	N/A	N/A	N/A	N/A	N/A	
Filter Box	BALUN Technology	SU319E	BL-SZ1530051	N/A	N/A	
Antenna Mast	MF	MFA-440H	N/A	N/A	N/A	
Turn Table	MF	SC100_1	60531	N/A	N/A	
AC Power Source	APC	KDF-11010G	F214050035	N/A	N/A	
DC power supply	HONGSHENGFENG	DPS-305AF	17064939	2023.09.26	2024.09.25	
Test SW	EZ-EMC	Ver.STSLAB-03A1 RE				
	Condu	ction Test equipment				
Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	
Test Receiver	R&S	ESCI	101427	2023.09.25	2024.09.24	
Limtter	CYBERTEK	EM5010	N/A	2023.09.25	2024.09.24	
LISN	R&S	ENV216	101242	2023.09.25	2024.09.24	
LISN	EMCO	3810/2NM	23625	2023.09.25	2024.09.24	
Temperature & Humidity	SW-108	SuWei	N/A	2024.03.15	2025.03.14	
Test SW	EZ-EMC		Ver.STSLAB-03/	A1 CE		
	RF	Connected Test				
Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	
Signal Analyzer	Agilent	N9020A	MY51510623	2024.02.23	2025.02.22	
Power detector group	Keysight	NW2021031	N/A	2023.09.26	2024.09.25	
Switch control box	MW	MW100-RFCB	N/A	N/A	N/A	
Temperature & Humidity	SW-108	SuWei	N/A	2024.03.15	2025.03.14	
Test SW	MW		MTS 8310_2.0	0.0.0		



3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION LIMITS

The radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table.

FREQUENCY (MHz)	Conducted Emissionlimit (dBuV)		
FREQUENCT (MHZ)	Quasi-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	

Note:

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

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

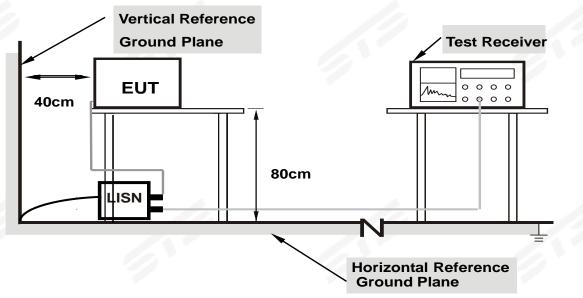
Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz



3.1.2 TEST PROCEDURE

- a. The EUT is 0.8 m from the horizontal ground plane and 0.4 m from the vertical ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments are powered from additional LISN(s). The LISN provides 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN is at least 80 cm from the nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item -EUT Test Photos.

3.1.3 TEST SETUP



Note: 1. Support units were connected to second LISN.

2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes support units.

3.1.4 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.



3.1.5 TEST RESULT

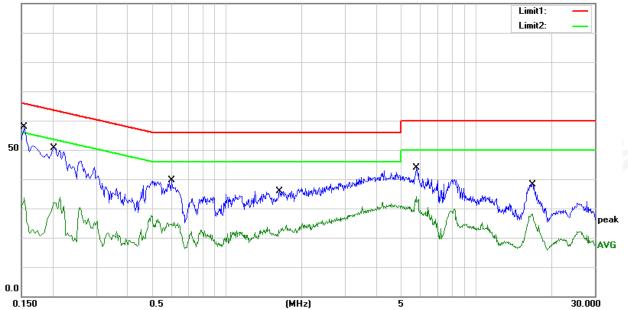
Temperature:	25.1(C)	Relative Humidity:	59%RH
Test Voltage:	AC 120V/60Hz	Phase:	L
Test Mode:	Mode 13	65	68

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB)	(dBuV)	(dBuV)	(dB)	
1	0.1540	38.16	19.78	57.94	65.78	-7.84	QP
2	0.1540	13.79	19.78	33.57	55.78	-22.21	AVG
3	0.2020	30.94	19.78	50.72	63.53	-12.81	QP
4	0.2020	14.10	19.78	33.88	53.53	-19.65	AVG
5	0.6020	19.72	19.91	39.63	56.00	-16.37	QP
6	0.6020	5.46	19.91	25.37	46.00	-20.63	AVG
7	1.6340	16.19	19.79	35.98	56.00	-20.02	QP
8	1.6340	4.64	19.79	24.43	46.00	-21.57	AVG
9	5.7740	24.05	19.80	43.85	60.00	-16.15	QP
10	5.7740	14.43	19.80	34.23	50.00	-15.77	AVG
11	16.8540	17.70	20.44	38.14	60.00	-21.86	QP
12	16.8540	7.78	20.44	28.22	50.00	-21.78	AVG

Remark:

- All readings are Quasi-Peak and Average values
 Margin = Result (Result =Reading + Factor)–Limit
 Factor=LISN factor+Cable loss+Limiter (10dB)

100.0 dBuV





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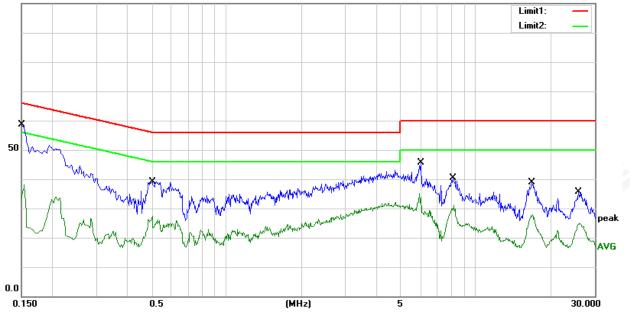
Temperature:	25.1(C)	Relative Humidity:	59%RH
Test Voltage:	AC 120V/60Hz	Phase:	N
Test Mode:	Mode 13	17	12

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB)	(dBuV)	(dBuV)	(dB)	
1	0.1500	38.79	19.78	58.57	66.00	-7.43	QP
2	0.1500	18.29	19.78	38.07	56.00	-17.93	AVG
3	0.5020	19.17	20.01	39.18	56.00	-16.82	QP
4	0.5020	7.28	20.01	27.29	46.00	-18.71	AVG
5	6.0220	25.78	19.79	45.57	60.00	-14.43	QP
6	6.0220	15.41	19.79	35.20	50.00	-14.80	AVG
7	8.1020	20.40	20.01	40.41	60.00	-19.59	QP
8	8.1020	11.10	20.01	31.11	50.00	-18.89	AVG
9	16.7540	18.48	20.44	38.92	60.00	-21.08	QP
10	16.7540	7.48	20.44	27.92	50.00	-22.08	AVG
11	25.8540	15.41	20.14	35.55	60.00	-24.45	QP
12	25.8540	4.67	20.14	24.81	50.00	-25.19	AVG

Remark:

- All readings are Quasi-Peak and Average values
 Margin = Result (Result =Reading + Factor)–Limit
 Factor=LISN factor+Cable loss+Limiter (10dB)
 100.0 dBuV





3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS

In any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the Restricted band specified on Part15.205 (a)&209(a) limit in the table and according to ANSI C63.10-2020 below has to be followed.

LIMITS OF RADIATED EMISSION MEASUREMENT (0.009MHz - 1000MHz)

Frequencies	Field Strength	Measurement Distance
(MHz)	(micorvolts/meter)	(meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (1GHz-25 GHz)

	(dBuV/m) (at 3M)		
FREQUENCY (MHz)	PEAK	AVERAGE	
Above 1000	74	54	
Materia			

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).

LIMITS OF RESTRICTED FREQUENCY BANDS

FREQUENCY (MHz)	FREQUENCY (MHz)	FREQUENCY (MHz)	FREQUENCY (GHz)
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
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	Above 38.6
13.36-13.41			



For Radiated Emission

Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak/QP/AV
Start Frequency	9 KHz/150KHz(Peak/QP/AV)
Stop Frequency	150KHz/30MHz(Peak/QP/AV)
	200Hz (From 9kHz to 0.15MHz)/
RB / VB (emission in restricted	9KHz (From 0.15MHz to 30MHz);
band)	200Hz (From 9kHz to 0.15MHz)/
	9KHz (From 0.15MHz to 30MHz)

Spectrum Parameter	Setting	
Attenuation	Auto	
Detector	Peak/QP	
Start Frequency	30 MHz(Peak/QP)	
Stop Frequency	1000 MHz (Peak/QP)	
RB / VB (emission in restricted		
band)	120 KHz / 300 KHz	

Spectrum Parameter	Setting		
Attenuation	Auto		
Detector	Peak/AV		
Start Frequency	1000 MHz(Peak/AV)		
Stop Frequency	10th carrier hamonic(Peak/AV)		
RB / VB (emission in restricted	1 MHz / 3 MHz(Peak)		
band)	1 MHz/1/T MHz(AVG)		

For Restricted band

	Spectrum Parameter	Setting			
é	Detector	Peak/AV			
	Start/Stop Frequency	Lower Band Edge: 2310 to 2410 MHz			
		Upper Band Edge: 2476 to 2500 MHz			
		1 MHz / 3 MHz(Peak)			
	RB / VB	1 MHz/1/T MHz(AVG)			

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Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~90kHz / RB 200Hz for PK & AV
Start ~ Stop Frequency	90kHz~110kHz / RB 200Hz for QP
Start ~ Stop Frequency	110kHz~490kHz / RB 200Hz for PK & AV
Start ~ Stop Frequency	490kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.2.2 TEST PROCEDURE

- a. The measuring distance at 3 m shall be used for measurements at frequency 0.009MHz up to 1GHz, and above 1GHz.
- b. The EUT was placed on the top of a rotating table 0.8 m (above 1GHz is 1.5 m) above the ground at a 3 m anechoic chamber test site. The table was rotated 360 degree to determine the position of the highest radiation.
- c. The height of the equipment shall be 0.8 m (above 1GHz is 1.5 m); the height of the test antenna shall vary between 1 m to 4 m. Horizontal and vertical polarization of the antenna are set to make the measurement.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and QuasiPeak detector mode will be re-measured.
- e. If the Peak Mode measured value is compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and no additional QP Mode measurement was performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos. Note:

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

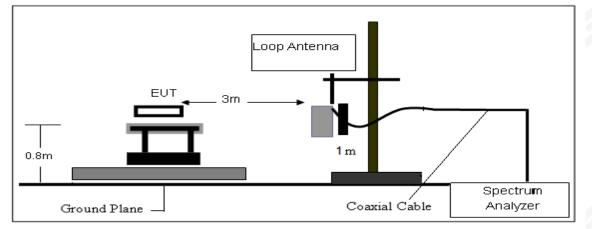
3.2.3 DEVIATION FROM TEST STANDARD

No deviation.

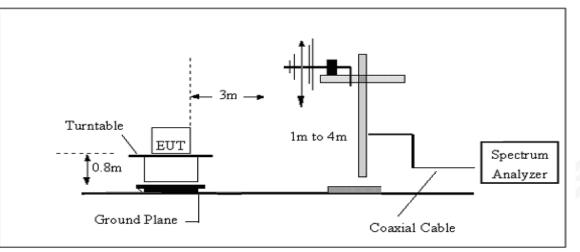


3.2.4 TESTSETUP

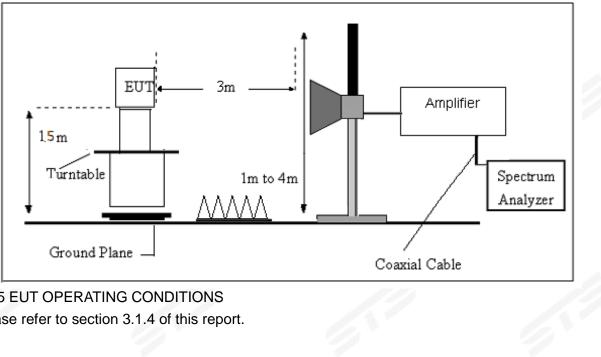
(A) Radiated Emission Test-Up Frequency Below 30MHz

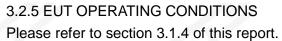


(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



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







3.2.6 FIELD STRENGTH CALCULATION

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AGWhere FS = Field Strength CL = Cable Attenuation Factor (Cable Loss) RA = Reading Amplitude AG = Amplifier Gain

AF = Antenna Factor

For example

Frequency	FS	RA	AF	CL	AG	Factor
(MHz)	(dBµV/m)	(dBµV/m)	(dB)	(dB)	(dB)	(dB)
300	40	58.1	12.2	1.6	31.9	-18.1

Factor=AF+CL-AG









3.2.7 TEST RESULTS

(9KHz-30MHz)

Temperature:	23.4(C)	Relative Humidity:	60%RH
Test Voltage:	DC 3.7V	Test Mode:	TX Mode

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



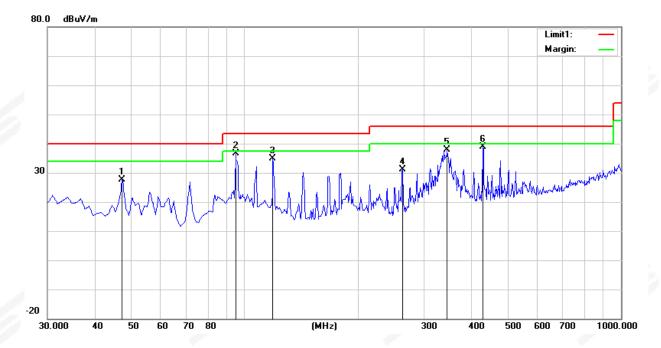
(30MHz-1000MHz)

Temperature:	23.4(C)	Relative Humidity:	60%RH		
Test Voltage:	DC 3.7V	Phase:	Horizontal		
Test Mode:	Mode 1/2/3/4/5/6/7/8/9(Mode 8 worst mode)				

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	47.4600	49.57	-21.92	27.65	40.00	-12.35	peak
2	94.9900	57.29	-20.78	36.51	43.50	-6.99	peak
3	119.2400	53.38	-18.38	35.00	43.50	-8.50	peak
4	263.7700	45.85	-14.75	31.10	46.00	-14.90	peak
5	346.2200	51.09	-13.19	37.90	46.00	-8.10	peak
6	430.6100	49.11	-10.14	38.97	46.00	-7.03	peak

Remark:

- 1. Margin = Result (Result = Reading + Factor)-Limit
- 2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain
- 3. All modes have been tested, only show the worst case.



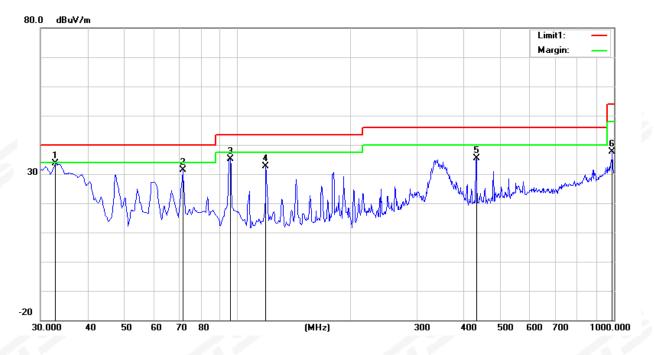


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Temperature:	23.4(C)	Relative Humidity:	60%RH	
Test Voltage:	DC 3.7V	Phase:	Vertical	
Test Mode:	Mode 1/2/3/4/5/6/7/8/9(Mode 8 worst mode)			

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	32.9100	47.92	-14.33	33.59	40.00	-6.41	peak
2	71.7100	56.03	-24.56	31.47	40.00	-8.53	peak
3	95.9600	55.76	-20.67	35.09	43.50	-8.41	peak
4	119.2400	50.98	-18.38	32.60	43.50	-10.90	peak
5	431.5800	45.52	-10.13	35.39	46.00	-10.61	peak
6	990.3000	35.68	2.05	37.73	54.00	-16.27	peak
emark:			n . En stan) linsit				

Margin = Result (Result = Reading + Factor)–Limit
 Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain





(1GHz~25GHz) Spurious emission Requirements

Frequency	Meter Reading	Amplifier	Loss	Antenna Factor	Corrected Factor	Emission Level	Limits	Margin	Detector	Comment
(MHz)	(dBµV)	(dB)	(dB)	(dB/m)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре	
111	-		1.12	Low Ch	annel (8DPSK	/2402 MHz)	•		100	
3264.84	61.31	44.70	6.70	28.20	-9.80	51.51	74.00	-22.49	PK	Vertical
3264.84	51.76	44.70	6.70	28.20	-9.80	41.96	54.00	-12.04	AV	Vertical
3264.71	62.23	44.70	6.70	28.20	-9.80	52.43	74.00	-21.57	PK	Horizontal
3264.71	50.00	44.70	6.70	28.20	-9.80	40.20	54.00	-13.80	AV	Horizontal
4804.55	59.32	44.20	9.04	31.60	-3.56	55.76	74.00	-18.24	PK	Vertical
4804.55	49.53	44.20	9.04	31.60	-3.56	45.97	54.00	-8.03	AV	Vertical
4804.37	59.44	44.20	9.04	31.60	-3.56	55.88	74.00	-18.12	PK	Horizontal
4804.37	49.53	44.20	9.04	31.60	-3.56	45.97	54.00	-8.03	AV	Horizontal
5359.88	48.54	44.20	9.86	32.00	-2.34	46.20	74.00	-27.80	PK	Vertical
5359.88	39.32	44.20	9.86	32.00	-2.34	36.98	54.00	-17.02	AV	Vertical
5359.76	47.96	44.20	9.86	32.00	-2.34	45.62	74.00	-28.38	PK	Horizontal
5359.76	38.96	44.20	9.86	32.00	-2.34	36.62	54.00	-17.38	AV	Horizontal
7205.94	53.80	43.50	11.40	35.50	3.40	57.20	74.00	-16.80	PK	Vertical
7205.94	43.84	43.50	11.40	35.50	3.40	47.24	54.00	-6.76	AV	Vertical
7205.69	54.54	43.50	11.40	35.50	3.40	57.94	74.00	-16.06	PK	Horizontal
7205.69	44.30	43.50	11.40	35.50	3.40	47.70	54.00	-6.30	AV	Horizontal
		•	•	Middle C	hannel (8DPSI	√/2441 MHz)	•	•	•	
3264.65	62.17	44.70	6.70	28.20	-9.80	52.37	74.00	-21.63	PK	Vertical
3264.65	51.21	44.70	6.70	28.20	-9.80	41.41	54.00	-12.59	AV	Vertical
3264.59	60.77	44.70	6.70	28.20	-9.80	50.97	74.00	-23.03	PK	Horizontal
3264.59	51.23	44.70	6.70	28.20	-9.80	41.43	54.00	-12.57	AV	Horizontal
4882.33	58.67	44.20	9.04	31.60	-3.56	55.11	74.00	-18.89	PK	Vertical
4882.33	49.15	44.20	9.04	31.60	-3.56	45.59	54.00	-8.41	AV	Vertical
4882.48	59.00	44.20	9.04	31.60	-3.56	55.44	74.00	-18.56	PK	Horizontal
4882.48	50.58	44.20	9.04	31.60	-3.56	47.02	54.00	-6.98	AV	Horizontal
5359.78	48.84	44.20	9.86	32.00	-2.34	46.49	74.00	-27.51	PK	Vertical
5359.78	39.78	44.20	9.86	32.00	-2.34	37.43	54.00	-16.57	AV	Vertical
5359.63	48.23	44.20	9.86	32.00	-2.34	45.89	74.00	-28.11	PK	Horizontal
5359.63	39.41	44.20	9.86	32.00	-2.34	37.07	54.00	-16.93	AV	Horizontal
7323.82	54.30	43.50	11.40	35.50	3.40	57.70	74.00	-16.30	PK	Vertical
7323.82	44.37	43.50	11.40	35.50	3.40	47.77	54.00	-6.23	AV	Vertical
7323.86	53.71	43.50	11.40	35.50	3.40	57.11	74.00	-16.89	PK	Horizontal
7323.86	44.54	43.50	11.40	35.50	3.40	47.94	54.00	-6.06	AV	Horizontal



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				High Chan	nel (8DPSK	/2480 MHz)				
3264.74	61.31	44.70	6.70	28.20	-9.80	51.51	74.00	-22.49	PK	Vertical
3264.74	50.23	44.70	6.70	28.20	-9.80	40.43	54.00	-13.57	AV	Vertical
3264.71	61.19	44.70	6.70	28.20	-9.80	51.39	74.00	-22.61	PK	Horizontal
3264.71	50.24	44.70	6.70	28.20	-9.80	40.44	54.00	-13.56	AV	Horizontal
4960.53	58.87	44.20	9.04	31.60	-3.56	55.31	74.00	-18.69	PK	Vertical
4960.53	50.56	44.20	9.04	31.60	-3.56	47.00	54.00	-7.00	AV	Vertical
4960.44	58.43	44.20	9.04	31.60	-3.56	54.87	74.00	-19.13	PK	Horizontal
4960.44	50.28	44.20	9.04	31.60	-3.56	46.72	54.00	-7.28	AV	Horizontal
5359.67	48.43	44.20	9.86	32.00	-2.34	46.08	74.00	-27.92	PK	Vertical
5359.67	40.35	44.20	9.86	32.00	-2.34	38.00	54.00	-16.00	AV	Vertical
5359.87	47.43	44.20	9.86	32.00	-2.34	45.08	74.00	-28.92	PK	Horizontal
5359.87	39.40	44.20	9.86	32.00	-2.34	37.05	54.00	-16.95	AV	Horizontal
7439.92	54.43	43.50	11.40	35.50	3.40	57.83	74.00	-16.17	PK	Vertical
7439.92	44.39	43.50	11.40	35.50	3.40	47.79	54.00	-6.21	AV	Vertical
7439.75	54.94	43.50	11.40	35.50	3.40	58.34	74.00	-15.66	PK	Horizontal
7439.75	43.80	43.50	11.40	35.50	3.40	47.20	54.00	-6.80	AV	Horizontal

Note:

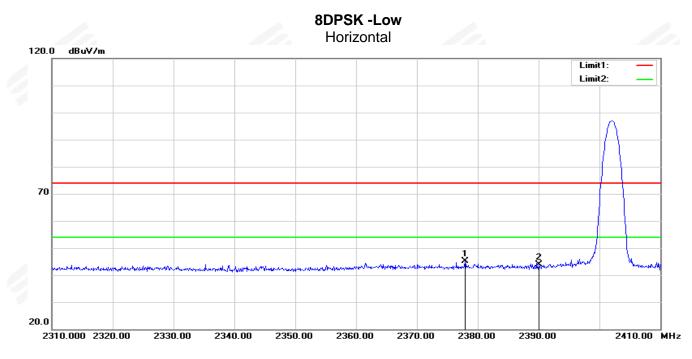
- 1) All modes have been measurement, only worst mode was reported.
- 2) Factor = Antenna Factor + Cable Loss Pre-amplifier.

Emission Level = Reading + Factor

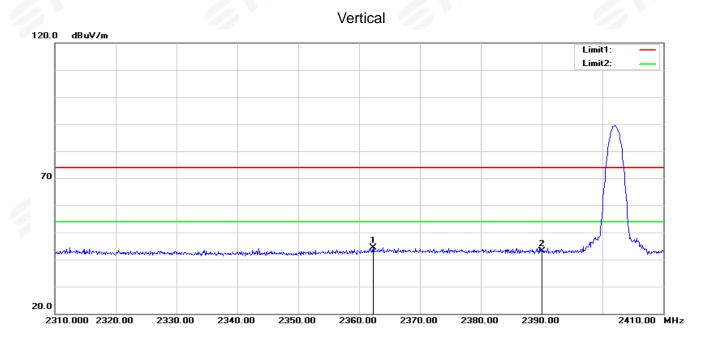
3) The frequency emission of peak points that did not show above the forms are at least 20dB below the limit, the frequency emission is mainly from the environment noise.



Restricted band Requirements



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2377.900	41.06	4.15	45.21	74.00	-28.79	peak
2	2390.000	39.43	4.34	43.77	74.00	-30.23	peak

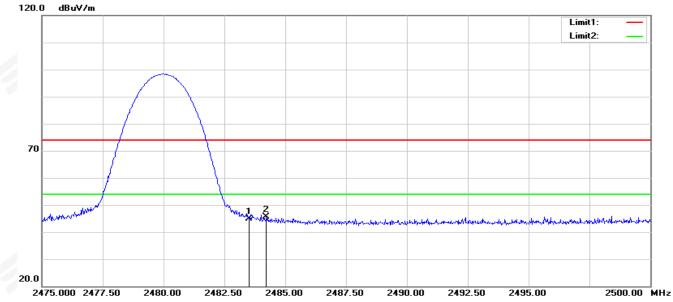


No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
1	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2362.300	40.58	3.92	44.50	74.00	-29.50	peak
2	2390.000	38.78	4.34	43.12	74.00	-30.88	peak

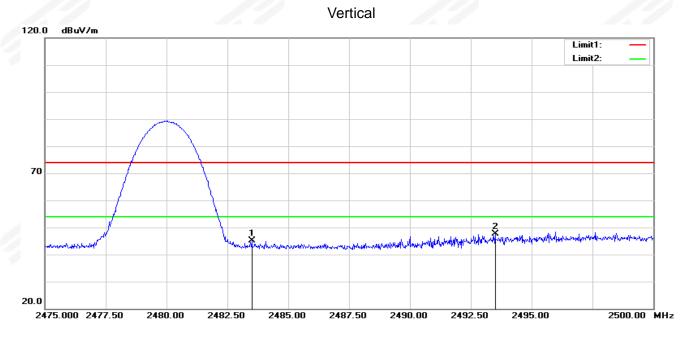


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8DPSK -High Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2483.500	40.37	4.60	44.97	74.00	-29.03	peak
2	2484.225	41.00	4.61	45.61	74.00	-28.39	peak



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2483.500	40.59	4.60	45.19	74.00	-28.81	peak
2	2493.500	42.91	4.64	47.55	74.00	-26.45	peak

4. CONDUCTED SPURIOUS & BAND EDGE EMISSION

4.1 LIMIT

According to FCC section 15.247(d), in any 100kHz 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 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

4.2 TEST PROCEDURE

Spectrum Parameter	Setting
Detector	Peak
Start/Stop Frequency	30 MHz to 10th carrier harmonic
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	Max hold

For Band edge

Spectrum Parameter	Setting
Detector	Peak
	Lower Band Edge: 2300 – 2407 MHz
Start/Stop Frequency	Upper Band Edge: 2475 – 2500 MHz
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	Max hold

For Hopping Band edge

Spectrum Parameter	Setting
Detector	Peak
Stort/Stop Fraguenay	Lower Band Edge: 2300– 2403 MHz
Start/Stop Frequency	Upper Band Edge: 2479 – 2500 MHz
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	Max hold





The EUT is connected to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. Tune the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, the span is set to be greater than RBW.

4.4 EUT OPERATION CONDITIONS

Please refer to section 3.1.4 of this report.

4.5 TEST RESULTS



5. NUMBER OF HOPPING CHANNEL

5.1 LIMIT

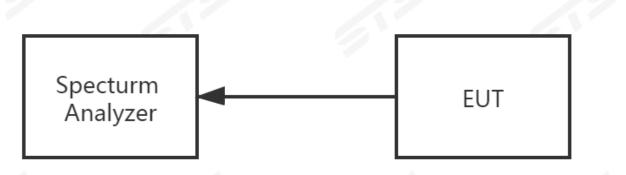
	FCC Pa	art 15.247,Subpa	rt C	
Section	Section Test Item		FrequencyRange (MHz)	Result
15.247 (a)(1)(iii)	Number of Hopping Channel	≥15	2400-2483.5	PASS

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> Operating FrequencyRange
RB	100KHz
VB	300KHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

5.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- b. Spectrum Setting: RBW= 100KHz, VBW=300KHz, Sweep time = Auto.

5.3 TEST SETUP



5.4 EUT OPERATION CONDITIONS

Please refer to section 3.1.4 of this report.

5.5 TEST RESULTS



6. AVERAGE TIME OF OCCUPANCY

6.1 LIMIT

	С			
Section	Test Item	Limit	FrequencyRange (MHz)	Result
15.247 (a)(1)(iii)	Average Time of Occupancy	0.4sec	2400-2483.5	PASS

6.2 TEST PROCEDURE

- a. The transmitter output (antenna port) was connected to the spectrum analyzer.
- b. Set RBW =1MHz/VBW =3MHz.
- c. Use a video trigger with the trigger level set to enable triggering only on full pulses.
- d. Sweep Time is more than once pulse time.
- Set the center frequency on any frequency would be measure and set the frequency span to e. zero span.
- f. Measure the maximum time duration of one single pulse.
- g. Set the EUT for DH5, DH3 and DH1 packet transmitting.
- h. Measure the maximum time duration of one single pulse.
- i. DH5 Packet permit maximum 1600/ 79 / 6 = 3.37 hops per second in each channel (5 time slots RX, 1 time slot TX). So the number of pulses in the observation period of 31.6 seconds is $3.37 \times 31.6 = 106.6$.
- j. DH3 Packet permit maximum 1600 / 79 / 4 = 5.06 hops per second in each channel (3 time slots RX, 1 time slot TX). So the number of pulses in the observation period of 31.6 seconds is $5.06 \times 31.6 = 160$.
- k. DH1 Packet permit maximum 1600 / 79 / 2 = 10.12 hops per second in each channel (1 time slot RX, 1 time slot TX). So the number of pulses in the observation period of 31.6 seconds is $10.12 \times 31.6 = 320$.

6.3 TEST SETUP



6.4 EUT OPERATION CONDITIONS

Please refer to section 3.1.4 of this report.

6.5 TEST RESULTS



7. HOPPING CHANNEL SEPARATION MEASUREMEN

7.1 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 125 mW.

Spectrum Parameter	Setting	
Attenuation	Auto	
Span Frequency	> 20 dB Bandwidth or Channel Separation	
RB	30 kHz (20dB Bandwidth) / 30 kHz (Channel Separation)	
VB	100 kHz (20dB Bandwidth) / 100 kHz (Channel Separation)	
Detector	Peak	
Trace	Max Hold	
Sweep Time	Auto	

7.2 TEST PROCEDURE

- a. The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
- b. The resolution bandwidth of 30 kHz and the video bandwidth of 100 kHz were utilised for 20 dB bandwidth measurement.
- c. The resolution bandwidth of 30 kHz and the video bandwidth of 100 kHz were utilised for channel separation measurement.

7.3 TEST SETUP



7.4 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

7.5 TEST RESULTS



8.1 LIMIT

FCC Part15 15.247,Subpart C					
Section	Test Item	Limit	FrequencyRange (MHz)	Result	
15.247 (a)(1)	Bandwidth	N/A	2400-2483.5	PASS	

Spectrum Parameter	Setting	
Attenuation	Auto	
Span Frequency	> Measurement Bandwidth or Channel Separation	
RB	30 kHz (20dB Bandwidth) / 30 kHz (Channel Separation)	
VB	100 kHz (20dB Bandwidth) / 100 kHz (Channel Separation)	
Detector	Peak	
Trace	Max Hold	
Sweep Time	Auto	

8.2 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.

b. Spectrum Setting: RBW= 30KHz, VBW=100KHz, Sweep time = Auto.

8.3 TEST SETUP



8.4 EUT OPERATION CONDITIONS

Please refer to section 3.1.4 of this report.

8.5 TEST RESULTS



9. OUTPUT POWER TEST

9.1 LIMIT

		FCC Part 15.247,Subpart	C	
Section	Test Item	Limit	Frequency Range (MHz)	Result
		1 W or 0.125W		
15.247 (a)(1)&(b)(1)	Output Power	if channel separation > 2/3 bandwidthprovided thesystems operatewith an output power no greater	2400-2483.5	PASS
		than125 mW(20.97dBm)		

9.2 TEST PROCEDURE

This is an RF-conducted test to evaluate maximum peak output power. Use a direct connection between the antenna port of the unlicensed wireless device and the spectrum analyzer, through suitable attenuation. The hopping shall be disabled for this test:

Use the following spectrum analyzer settings:

a) Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel.

b) RBW > 20 dB bandwidth of the emission being measured.

c) VBW ≥ RBW.

d) Sweep: Auto.

e) Detector function: Peak.

f) Trace: Max hold.

g) Allow trace to stabilize.

h) Use the marker-to-peak function to set the marker to the peak of the emission.

i) The indicated level is the peak output power, after any corrections for external attenuators and cables.

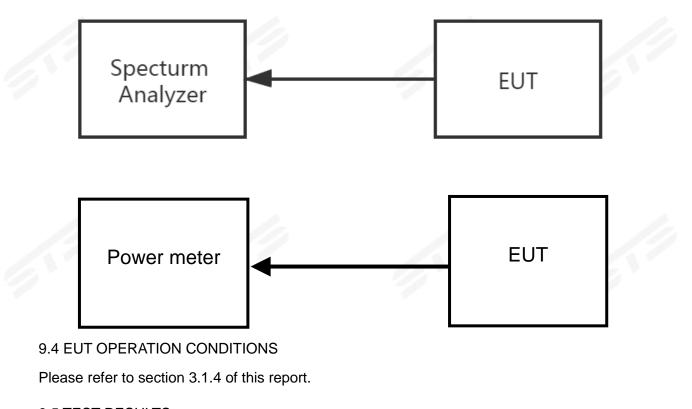
j) A plot of the test results and setup description shall be included in the test report.

NOTE—A peak responding power meter may be used, where the power meter and sensor system video bandwidth is greater than the occupied bandwidth of the unlicensed wireless device, rather than a spectrum analyzer.

PKPM1 Peak power meter method:

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DSS bandwidth and shall use a fast-responding diode detector.





9.5 TEST RESULTS Note: The test data please refer to APPENDIX 1.



10. ANTENNA REQUIREMENT

10.1 STANDARD REQUIREMENT

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.

10.2 EUT ANTENNA

The EUT antenna is Monopole Antenna. It comply with the standard requirement.

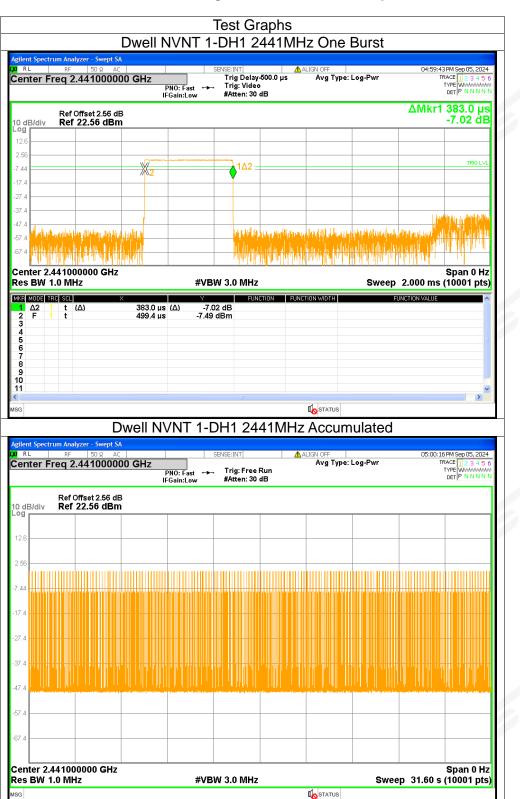


1. Dwell Time

Condition	Mode	Frequency	Pulse	Total Dwell	Burst	Period	Limit	Verdict
		(MHz)	Time (ms)	Time (ms)	Count	Time (ms)	(ms)	
NVNT	1-DH1	2441	0.383	121.794	318	31600	<=400	Pass
NVNT	1-DH3	2441	1.639	258.962	158	31600	<=400	Pass
NVNT	1-DH5	2441	2.887	326.231	113	31600	<=400	Pass
NVNT	2-DH1	2441	0.391	124.729	319	31600	<=400	Pass
NVNT	2-DH3	2441	1.644	277.836	169	31600	<=400	Pass
NVNT	2-DH5	2441	2.892	271.848	94	31600	<=400	Pass
NVNT	3-DH1	2441	0.391	124.338	318	31600	<=400	Pass
NVNT	3-DH3	2441	1.642	256.152	156	31600	<=400	Pass
NVNT	3-DH5	2441	2.893	297.979	103	31600	<=400	Pass

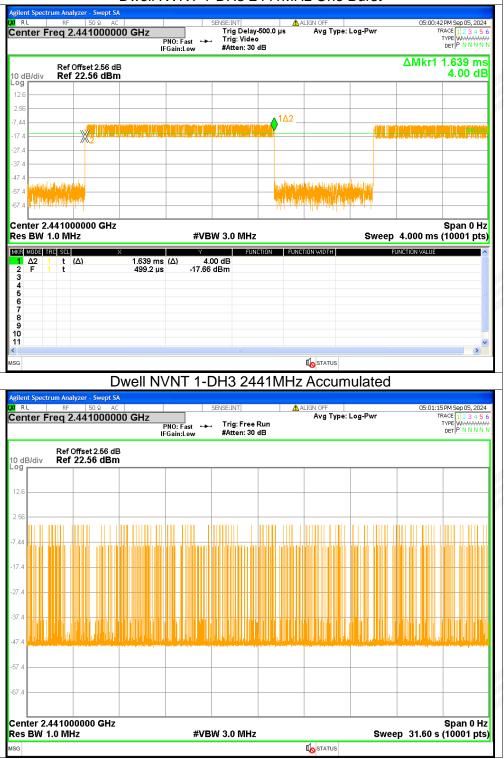


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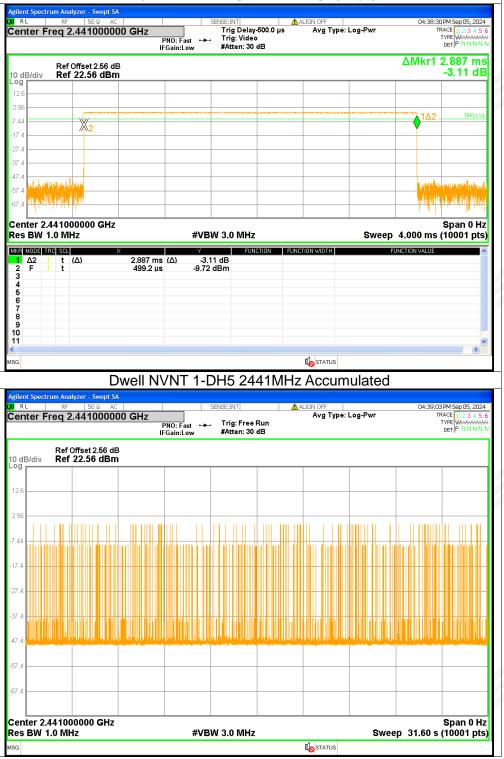






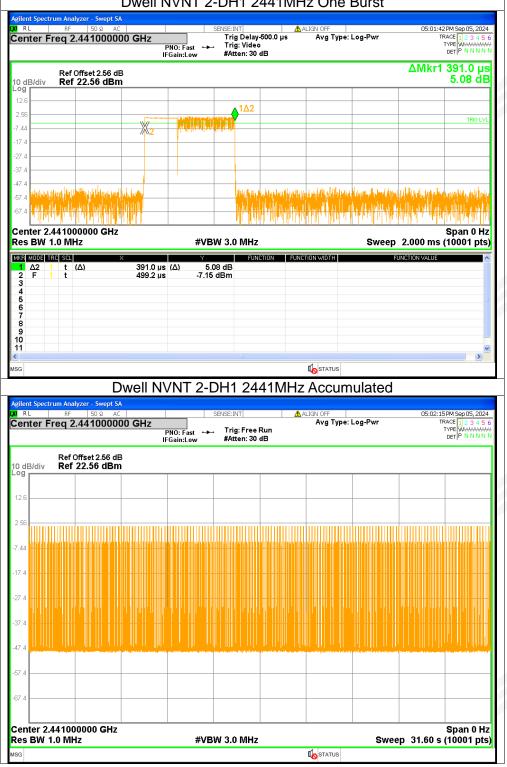








Dwell NVNT 2-DH1 2441MHz One Burst





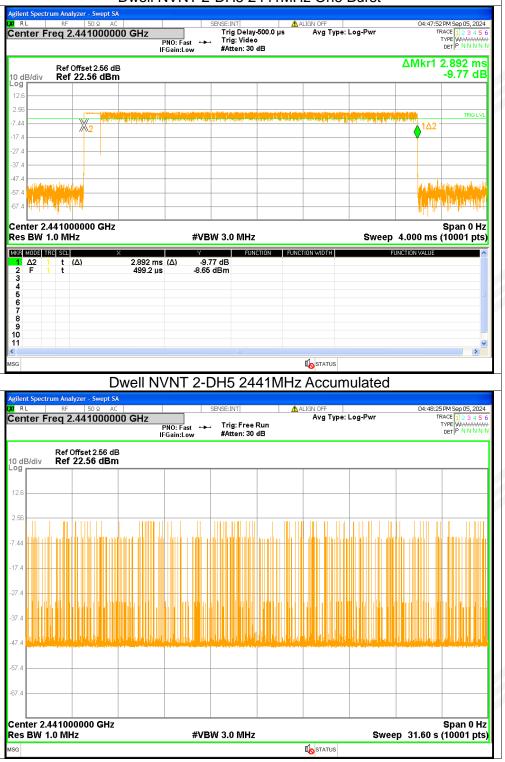
Dwell NVNT 2-DH3 2441MHz One Burst



1

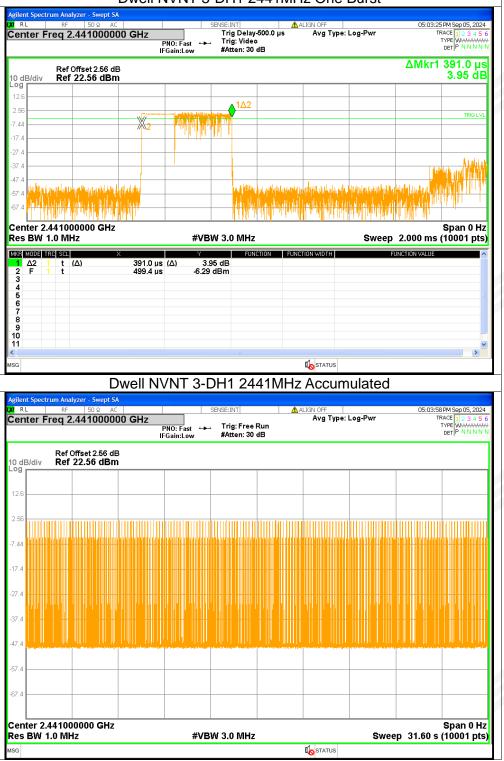










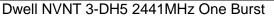


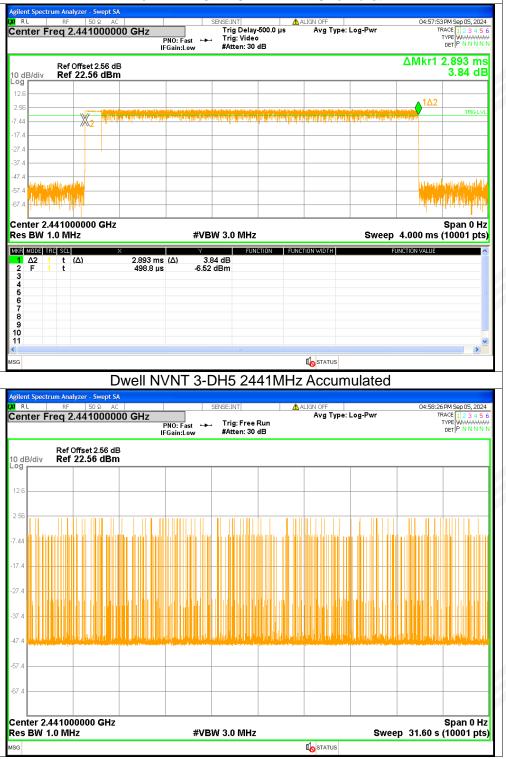


Dwell NVNT 3-DH3 2441MHz One Burst









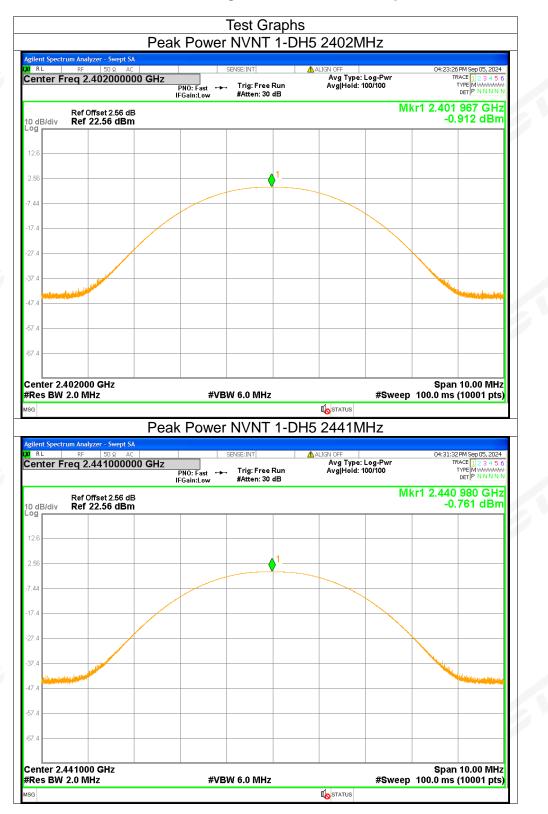


2. Maximum Peak Conducted Output Power

Condition	Mode	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	1-DH5	2402	-0.91	<=21	Pass
NVNT	1-DH5	2441	-0.76	<=21	Pass
NVNT	1-DH5	2480	-1.37	<=21	Pass
NVNT	2-DH5	2402	1.57	<=21	Pass
NVNT	2-DH5	2441	1.7	<=21	Pass
NVNT	2-DH5	2480	1.03	<=21	Pass
NVNT	3-DH5	2402	2.19	<=21	Pass
NVNT	3-DH5	2441	2.26	<=21	Pass
NVNT	3-DH5	2480	2.02	<=21	Pass



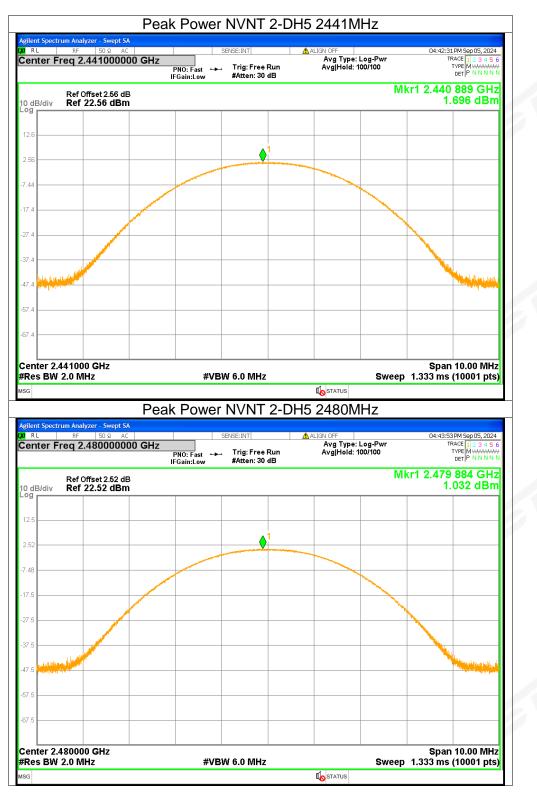
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Peak Power NVNT 1-DH5 2480MHz 4:34:06 PM Sep 05, 2024 TRACE 1 2 3 4 5 6 TYPE MWWWW DET P N N N N R L Center Freq 2.480000000 GHz Avg Type: Log-Pwr Avg|Hold: 100/100 PNO: Fast ---- Trig: Free Run IFGain:Low #Atten: 30 dB Mkr1 2.479 957 GHz Ref Offset 2.52 dB Ref 22.52 dBm -1.372 dBm 10 dB/div 7 <u>A</u>1 37 47. Center 2.480000 GHz Span 10.00 MHz #VBW 6.0 MHz #Sweep 100.0 ms (10001 pts) #Res BW 2.0 MHz **I**STATUS ISG Peak Power NVNT 2-DH5 2402MHz gilent Spectrum Analyzer - Swept SA 04:40:54 PM Sep 05, 2024 TRACE 1 2 3 4 5 6 TYPE M WWWW DET P N N N N N B L Center Freq 2.402000000 GHz Avg Type: Log-Pwr Avg|Hold: 100/100 PNO: Fast +++ Trig: Free Run IFGain:Low #Atten: 30 dB Mkr1 2.402 059 GHz Ref Offset 2.56 dB Ref 22.56 dBm 1.570 dBm 10 dB/div 7.4 37. 47. Center 2.402000 GHz Span 10.00 MHz #Res BW 2.0 MHz #VBW 6.0 MHz #Sweep 100.0 ms (10001 pts) **I**STATUS SG







Peak Power NVNT 3-DH5 2402MHz 24 PM Sep 05 TRACE 1 2 3 TYPE MWW DET P N N R L 5ep 05, 2024 Center Freq 2.402000000 GHz Avg Type: Log-Pwr Avg|Hold: 100/100 PNO: Fast ---- Trig: Free Run IFGain:Low #Atten: 30 dB Mkr1 2.402 014 GHz Ref Offset 2.56 dB Ref 22.56 dBm 2.190 dBm 10 dB/div E 7 4 47.7 Center 2.402000 GHz Span 10.00 MHz #VBW 6.0 MHz Sweep 1.333 ms (10001 pts) #Res BW 2.0 MHz **I**STATUS ISG Peak Power NVNT 3-DH5 2441MHz gilent Spectrum Analyzer - Swept SA 04:53:13 PM Sep 05, 2024 TRACE 1 2 3 4 5 6 TYPE M WWWW DET P N N N N N B L Center Freq 2.441000000 GHz Avg Type: Log-Pwr Avg|Hold: 100/100 PNO: Fast +++ Trig: Free Run IFGain:Low #Atten: 30 dB Mkr1 2.440 979 GHz Ref Offset 2.56 dB Ref 22.56 dBm 2.258 dBm 10 dB/div 7.4 37. 47. Center 2.441000 GHz Span 10.00 MHz #Res BW 2.0 MHz #VBW 6.0 MHz Sweep 1.333 ms (10001 pts) **I**STATUS SG



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		Peak Power N	VNT 3-DH5	2480MHz	
	trum Analyzer - Swept SA				
enter F	RF 50Ω AC Freq 2.480000000 C	PNO East +++ T	EINT 🔥 🔥	ALIGN OFF Avg Type: Log-Pwr Avg Hold: 100/100	04:54:36 PM Sep 05, 2024 TRACE 1 2 3 4 5 6 TYPE M WWWWW DET P N N N N
0 dB/div	Ref Offset 2.52 dB Ref 22.52 dBm			M	kr1 2.480 005 GHz 2.015 dBm
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2.52			1		
.48					
7.5					
7.5					
7.5					
7.5					
7.5					
	480000 GHz 2.0 MHz	#VBW 6	.0 MHz	Sweep	Span 10.00 MHz 5 1.333 ms (10001 pts)
SG				STATUS	

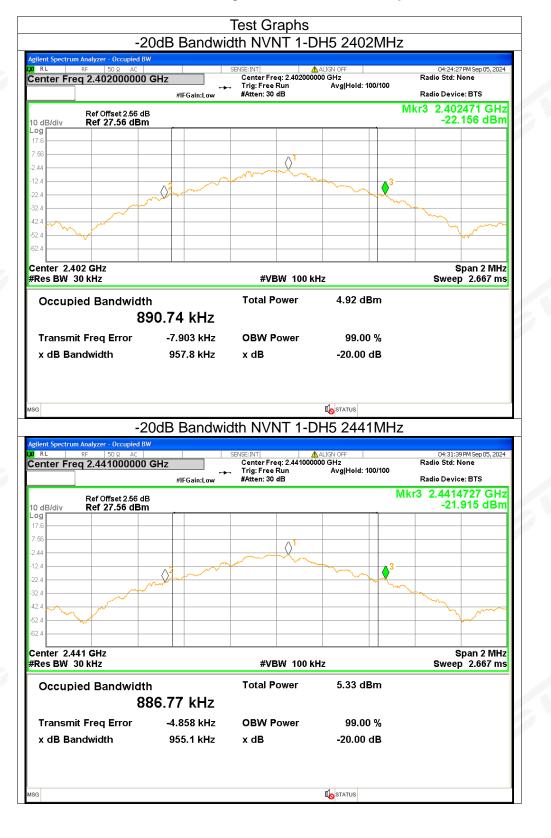
Peak Power NVNT 3-DH5 2480MHz



3. -20dB Bandwidth

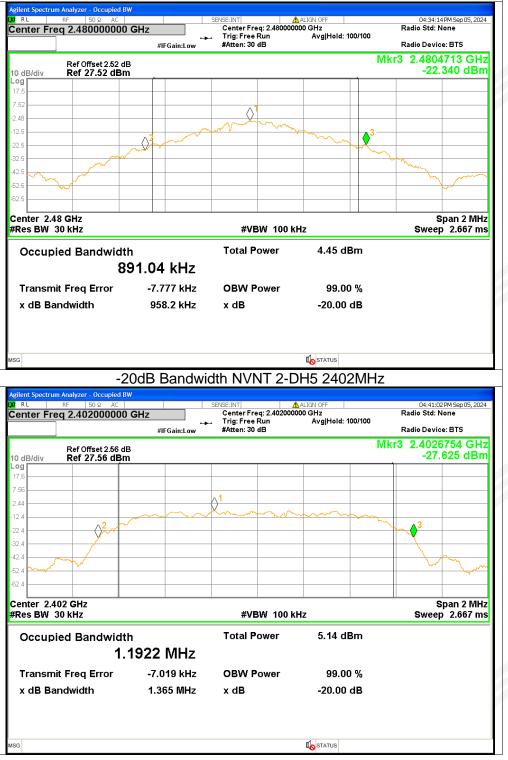
Condition	Mode	Frequency (MHz)	-20 dB Bandwidth (MHz)	Verdict
NVNT	1-DH5	2402	0.9578	Pass
NVNT	1-DH5	2441	0.9551	Pass
NVNT	1-DH5	2480	0.9582	Pass
NVNT	2-DH5	2402	1.3649	Pass
NVNT	2-DH5	2441	1.3656	Pass
NVNT	2-DH5	2480	1.3642	Pass
NVNT	3-DH5	2402	1.347	Pass
NVNT	3-DH5	2441	1.3467	Pass
NVNT	3-DH5	2480	1.3477	Pass





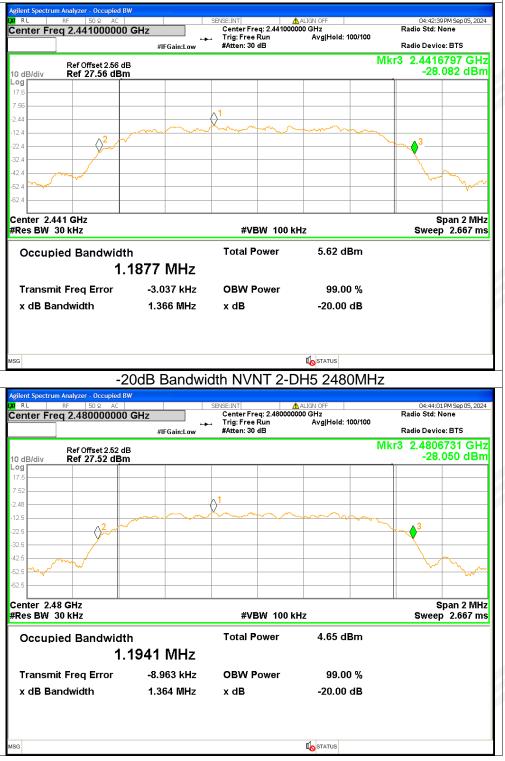


-20dB Bandwidth NVNT 1-DH5 2480MHz



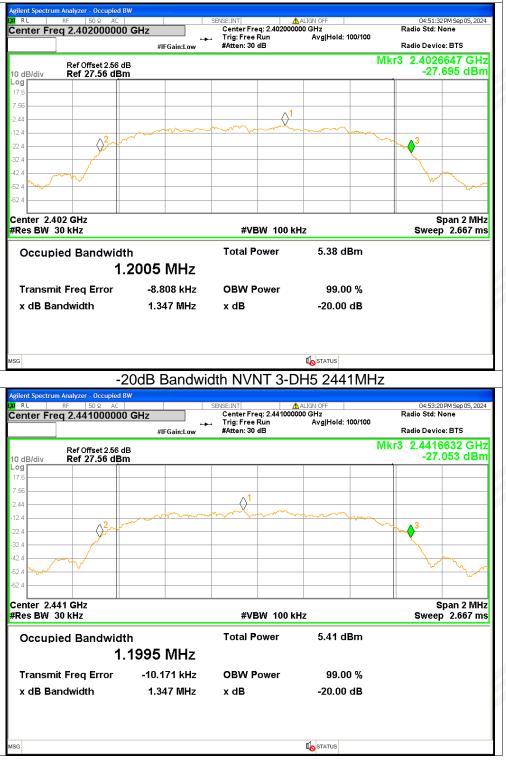


-20dB Bandwidth NVNT 2-DH5 2441MHz



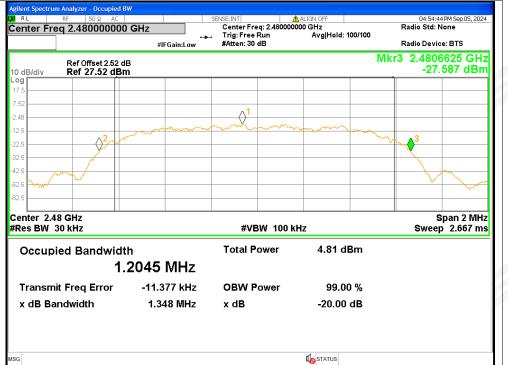


-20dB Bandwidth NVNT 3-DH5 2402MHz





-20dB Bandwidth NVNT 3-DH5 2480MHz



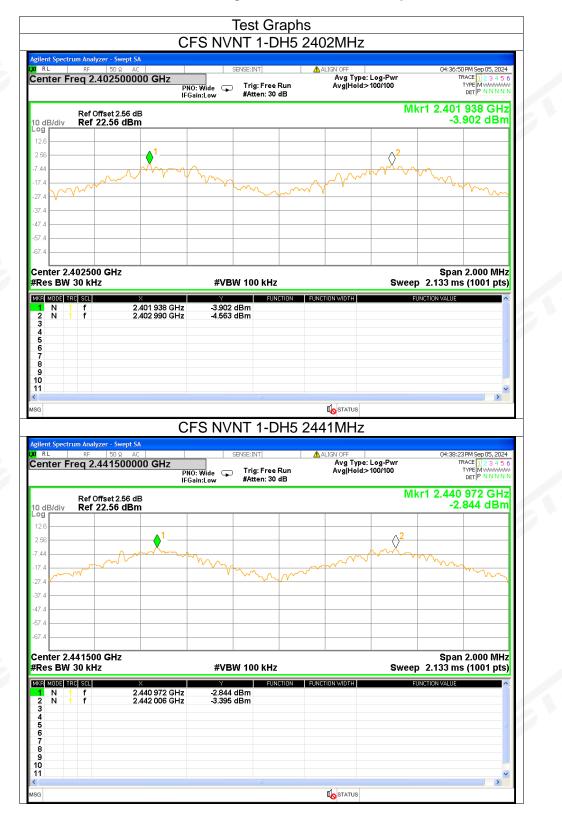


4. Carrier Frequencies Separation

Condition	Mode	Hopping Freq1 (MHz)	Hopping Freq2 (MHz)	HFS (MHz)	Limit (MHz)	Verdict
NVNT	1-DH5	2401.938	2402.99	1.052	>=0.639	Pass
NVNT	1-DH5	2440.972	2442.006	1.034	>=0.637	Pass
NVNT	1-DH5	2478.998	2480.012	1.014	>=0.639	Pass
NVNT	2-DH5	2402.134	2403.14	1.006	>=0.91	Pass
NVNT	2-DH5	2441.138	2442.25	1.112	>=0.91	Pass
NVNT	2-DH5	2478.682	2479.828	1.146	>=0.909	Pass
NVNT	3-DH5	2401.668	2402.998	1.33	>=0.898	Pass
NVNT	3-DH5	2440.974	2442.14	1.166	>=0.898	Pass
NVNT	3-DH5	2478.814	2479.978	1.164	>=0.898	Pass

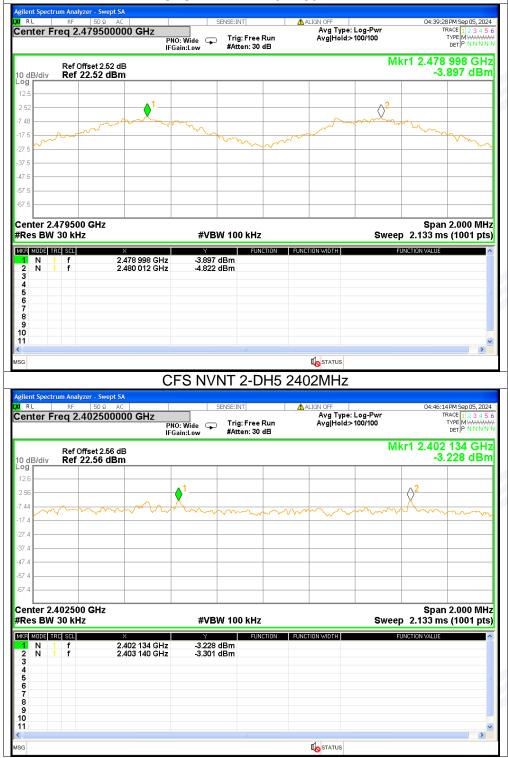


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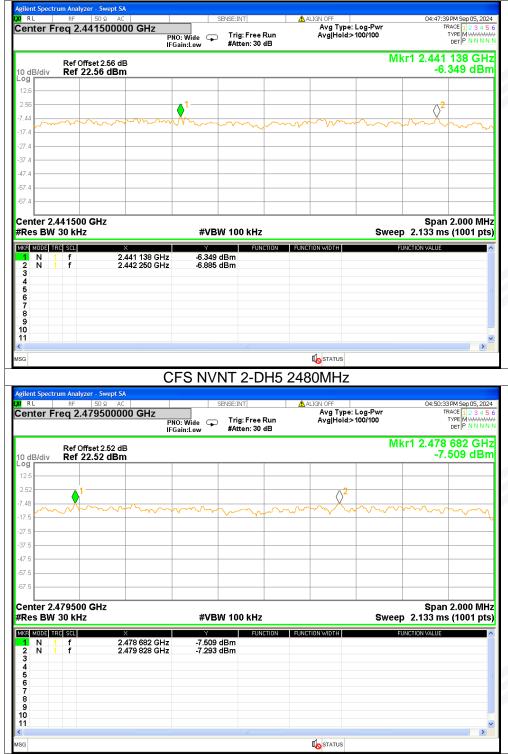


CFS NVNT 1-DH5 2480MHz



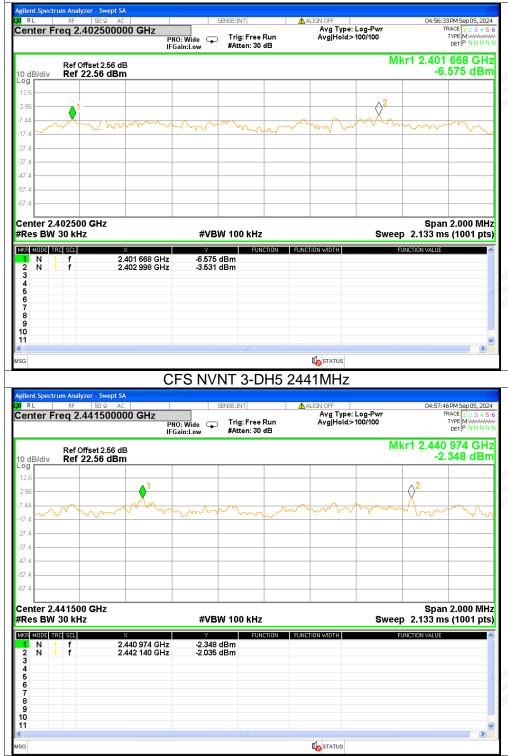


CFS NVNT 2-DH5 2441MHz





CFS NVNT 3-DH5 2402MHz





CFS NVNT 3-DH5 2480MHz

t Spectrum Analyzer - Swept SA				
ter Freg 2.479500000 GHz	SENSE:INT	ALIGN OFF Avg Type:	Log-Pwr	1 PM Sep 05, 2024 RACE 1 2 3 4 5 6
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Ref Offset 2.52 dB 3/div Ref 22.52 dBm			Mkr1 2.478 -3.	814 GHz 258 dBm
1			2	
- A -	A amount		MALAN	m
		www.ww		Tw
ter 2.479500 GHz s BW 30 kHz	#VBW 100 kHz		Spar Sweep 2.133 ms	2.000 MHz s (1001 pts)
IN 1 F 2.478 814 GHz	Y FUNC -3.258 dBm	TION FUNCTION WIDTH	FUNCTION VALUE	^
N 1 f 2.479 978 GHz	-2.758 dBm			
				~













5. Number of Hopping Channel

Condition	Mode	Hopping Number	Limit	Verdict
NVNT	1-DH5	79	>=15	Pass
NVNT	2-DH5	79	>=15	Pass
NVNT	3-DH5	79	>=15	Pass





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			est Graph NVNT 1-[s DH5 Hoppiı	ng		
	50 Ω AC	SENS	E:INT	ALIGN OFF	og-Pwr	04:37:1	6 PM Sep 05, 2024 RACE 1 2 3 4 5 1
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art 2.40000 GHz tes BW 100 kHz		#VBW (300 kHz		Sweep		.48350 GHz s (1001 pts)
R MODE TRC SCL N 1 f	× 2.402 087 5 GHz	-1.774 dBi	FUNCTION	FUNCTION WIDTH	-	NCTION VALUE	~
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	Норг	oing No. I	NVNT 2-[to status DH5 Hoppin	ng		
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lent Spectrum Analyzer -	- Swept SA 50 Ω AC	SENS	E:INT	DH5 Hoppin	.og-Pwr	Т	0 PM Sep 05, 2024 RACE 1 2 3 4 5
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ent Spectrum Analyzer RL RF Senter Freq 2.44* Bidiv Ref Offse dB/div Ref 22.5 1 4 4 4 4 4 4 4 4 4 4 4 4 4	Swept SA 50 © AC 1750000 GHz 1750000 GHz 12.56 dB 56 dBm	Serve PNO: Fast	EINT	ALIGN OFF Avg Type: L Avg Hoid>1	og-Pwr 00/100 Mkr1	2.401 5 -4. //www.m./p.m.r	0PM Sep05, 2024 RACE 12 3 4 5 TYPE MANNAU BET P NANNA 991 dBm
RL RF Sectrum Analyzer RL RF Sector Ref Offse dB/div Ref 22.4	Swept SA 50 © AC 1750000 GHz 1750000 GHz 12.56 dB 56 dBm	Serve PNO: Fast	EINT Frig: Free Run Atten: 30 dB	ALIGN OFF Avg Type: L Avg Hoid>1	og-Pwr 00/100 Mkr1	2.401 5 -4. //www.m./p.m.r	0PM Sep05, 2024 RACE 12:3:4:5- TYPE M NNNN DETP NNNNN 86:5 GHz 991 dBm
Ref Offse dB/div Ref 2.44 Ref Offse dB/div Ref 22.4 Ref Offse dB/div Ref 22.4 A A A A A A A A A A A A A	Swept SA 50 9 AC 1750000 GHz 1750000 GHz 1750000 GHz 1750000 GHz 10 10 10 10 10 10 10 10 10 10	SENS PN0: Fast Gain:Low ************************************	SEINT	Augnorf Avg Type: L AvgHoid>1	og-Pwr 00/100 Mkr1	2.401 5 -4. //www.m./p.co. Stop 2. 8.000 ms	0PM Sep05, 2024 RACE 12 3 4 5 TYPE MANNAU BEF PINNNU 991 dBm
Image: sector of the	Swept SA 50 2 AC 1750000 GHz 1750000 GHz 1750000 GHZ 17500000 GHZ 17500000 GHZ 17500000 GHZ 175000000000000000000000000000000000000	Serves	SEINT	Augnorf Avg Type: L AvgHoid>1	og-Pwr 00/100 Mkr1	2.401 5 -4. //www.m./p.co. Stop 2. 8.000 ms	0PM Sep05, 2024 RACE 12 3 4 5 TYPE MANNAU BEF PINNNU 991 dBm
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ent Spectrum Analyzer RL RF S enter Freq 2.44* Bidiv Ref 22.4 GB/div Ref 22.4 GB/div Ref 22.4 art 2.40000 GHz Res BW 100 KHz R M009 TRC SCL N 1 f	Swept SA 50 9 AC 1750000 GHz 1750000 GHz 1750000 GHz 1750000 GHz 10 10 10 10 10 10 10 10 10 10	SENS PN0: Fast Gain:Low ************************************	SEINT	Augnorf Avg Type: L AvgHoid>1	og-Pwr 00/100 Mkr1	2.401 5 -4. //www.m./p.co. Stop 2. 8.000 ms	0PM Sep05, 2024 RACE 12 3 4 5 TYPE MANNAU BEF PINNNU 991 dBm
ent Spectrum Analyzer RL RF S enter Freq 2.44 Bidiv Ref 22.4 Ref Offse GB/div Ref 22.4 art 2.40000 GHz Res BW 100 KHz R MODE TRC SCL N 1 f	Swept SA 50 9 AC 1750000 GHz 1750000 GHz 1750000 GHz 1750000 GHz 10 10 10 10 10 10 10 10 10 10	SENS PN0: Fast Gain:Low ************************************	SEINT	Augnorf Avg Type: L AvgHoid>1	og-Pwr 00/100 Mkr1	2.401 5 -4. //www.m./p.co. Stop 2. 8.000 ms	0PM Sep05, 2024 RACE 12 3 4 5 TYPE MANNAU BEF PINNNU 991 dBm
ent Spectrum Analyzer RL RF Senter Freq 2.44* dB/div Ref Offse dB/div Ref 22.3	Swept SA 50 9 AC 1750000 GHz 1750000 GHz 1750000 GHz 1750000 GHz 10 10 10 10 10 10 10 10 10 10	SENS NO: Fast Gain:Low WMMMMMMMMM WMMMMMMMMM	SEINT	Augnorf Avg Type: L AvgHoid>1	og-Pwr 00/100 Mkr1	2.401 5 -4. //www.m./p.co. Stop 2. 8.000 ms	0PM Sep05, 2024 RACE 12 3 4 5 TYPE MANNAU BEF PINNNU 991 dBm



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Hopping No. NVNT 3-DH5 Hopping

		ctrun		lyzer - Swept SA	<u>،</u>								
XI R	-	_	RF	50 Ω AC			SENSE:INT		🔥 🕰	IGN OFF Avg Type:	Law Dum		9 PM Sep 05, 2024 RACE 1 2 3 4 5 6
Cen	ter	Fre	eq Z	.44175000		PNO: Fast 🖵 Gain:Low	Trig: Fre #Atten: 3			Avg Hold>			TYPE MWWWWW DET P N N N N N
10 d	B/div			Offset 2.56 dE 22.56 dBm							Mkr		53 5 GHz 352 dBm
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5													
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ISG										STATUS			

















6. Band Edge

Condition	Mode	Frequency (MHz)	Hopping Mode	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	1-DH5	2402	No-Hopping	-53.12	<=-20	Pass
NVNT	1-DH5	2480	No-Hopping	-54.45	<=-20	Pass
NVNT	2-DH5	2402	No-Hopping	-52.6	<=-20	Pass
NVNT	2-DH5	2480	No-Hopping	-53.17	<=-20	Pass
NVNT	3-DH5	2402	No-Hopping	-52.59	<=-20	Pass
NVNT	3-DH5	2480	No-Hopping	-53.11	<=-20	Pass











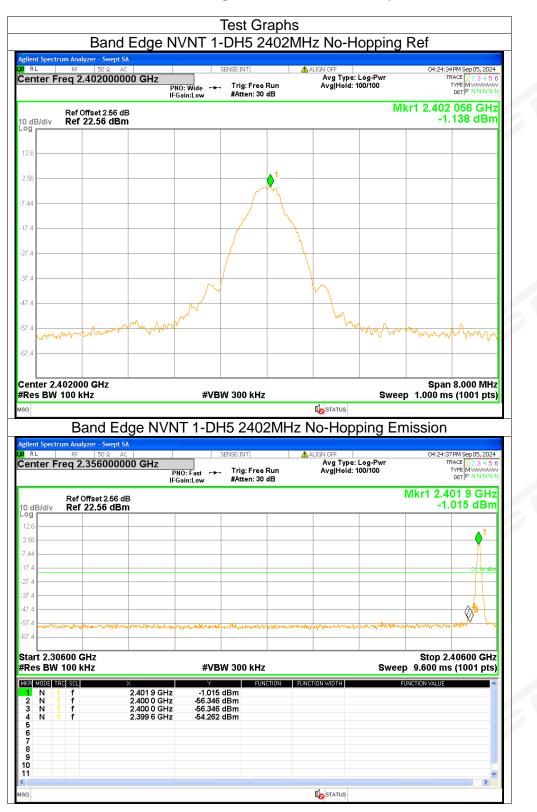








Page 72 of 95



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gilent Spectrum Analyzer					
enter Freq 2.48	P	NO: Wide	eeRun Avg H	ype: Log-Pwr old: 100/100	04:34:21 PM Sep 05, 2024 TRACE 1 2 3 4 5 6 TYPE MWWWW DET P N N N N N
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G			STATU		
Ban	d Edge NVN	NT 1-DH5 248	30MHz No-H	opping Emi	ssion
i <mark>lent Spectrum Analyzer</mark> RL RF	- Swept SA 50 Ω AC 6000000 GHz	SENSE:INT	ALIGN OFF	opping Emi	04:34:24 PM Sep 05, 2024 TRACE 1 2 3 4 5 6 TYPE M MARAAMAA
i <mark>lent Spectrum Analyzer</mark> RL RF	- Swept SA 50 Ω AC 6000000 GHz	SENSE:INT	ALIGN OFF Avg T ee Run Avg H	ype: Log-Pwr old: 100/100	04:34:24 PM Sep 05, 2024 TRACE 1 2 3 4 5 6 TYPE M WWWWW DET P N N N N N
Ient Spectrum Analyzer RL RF enter Freq 2.52 Ref Offse dB/div Ref 22.	- Swept SA 50 Ω AC 60000000 GHz	SENSE:INT	ALIGN OFF Avg T ee Run Avg H	ype: Log-Pwr old: 100/100	04:34:24 PM Sep 05, 2024 TRACE 1 2 3 4 5 6 TYPE M MARAAMAA
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Ient Spectrum Analyzer RL RF enter Freq 2.52 Ref Offse d dB/div Ref 22 29 2.5	- Swept SA 50 Ω AC 60000000 GHz	SENSE:INT	ALIGN OFF Avg T ee Run Avg H	ype: Log-Pwr old: 100/100	04:34:24PM Sep 05, 2024 TRACE 1 2 3 4 5 6 TYPE M WWWW DET P N N N N Ikr1 2.480 0 GHz
Ient Spectrum Analyzer RL RF enter Freq 2.52 Ref Offse d B/div Ref 22. 9 2.5 52 48	- Swept SA 50 Ω AC 60000000 GHz	SENSE:INT	ALIGN OFF Avg T ee Run Avg H	ype: Log-Pwr old: 100/100	04:34:24 PM Sep 05, 2024 TRACE 1 2 3 4 5 6 TYPE MWWWW DET P NNNNN
Ient Spectrum Analyzer RL RF enter Freq 2.52 dB/div Ref Offse 2.5 52 48 7.5	- Swept SA 50 Ω AC 60000000 GHz	SENSE:INT	ALIGN OFF Avg T ee Run Avg H	ype: Log-Pwr old: 100/100	04:34:24PM Sep 05, 2024 TRACE 1 2 3 4 5 6 TYPE M WWWW DET P N N N N Ikr1 2.480 0 GHz
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nt Spectrum Analyzer - L RF 5	Swept SA D Q AC 0000000 GHz	NT 2-DH5 2 SENSE:IN PNO: Fast	2402MH	Z NO-HOPPII	ng Emiss ^{g-Pwr}	000 ms (1001 pts SiON 04:41:11PM Sep 05, 2024 TRACE 1 2 3 4 5 TYPE MWWWW DET P NNNN
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n <mark>t Spectrum Analyzer</mark> - L RF 5	Swept SA 10 Ω AC 50000000 GHz P	SENSE:INT	02MHz No-Hop	04: : Log-Pwr 100/100	51:41 PM Sep 05, 2024 TRACE 1 2 3 4 5 TYPE MWWWW DET P N N N N
nt Spectrum Analyzer - L RF 5 nter Freq 2.356 Ref Offset	Swept SA 10 Ω AC 5000000 GHz P IF t 2.56 dB	SENSE:INT	02MHz No-Hop	04: : Log-Pwr 100/100 Mkr1 2	51:41PM Sep 05, 2024 TRACE 12 3 4 5 TYPE MWWWW DET P N N N N 2.402 0 GHz
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nt Spectrum Analyzer - 1	Swept SA 10 Ω AC 5000000 GHz P IF t 2.56 dB	SENSE:INT	02MHz No-Hop	04: : Log-Pwr 100/100 Mkr1 2	51:41PM Sep05, 2024 TRACE 12 3 4 5 TYPE MWWWW DET P NNNN 2.402 0 GHz -2.471 dBm
Ref Offset	Swept SA 10 Ω AC 5000000 GHz P IF t 2.56 dB	SENSE:INT	02MHz No-Hop	04: : Log-Pwr 100/100 Mkr1 2	51:41PM Sep05, 2024 TRACE 1 2 3 4 5 TYPE MMWWWW DET P NNNN 2.402 0 GHz -2.471 dBm
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7. Band Edge(Hopping)

Condition	Mode	Frequency (MHz)	Hopping Mode	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	1-DH5	2402	Hopping	-54.68	<=-20	Pass
NVNT	1-DH5	2480	Hopping	-53.85	<=-20	Pass
NVNT	2-DH5	2402	Hopping	-55.46	<=-20	Pass
NVNT	2-DH5	2480	Hopping	-54.72	<=-20	Pass
NVNT	3-DH5	2402	Hopping	-55.71	<=-20	Pass
NVNT	3-DH5	2480	Hopping	-56.48	<=-20	Pass











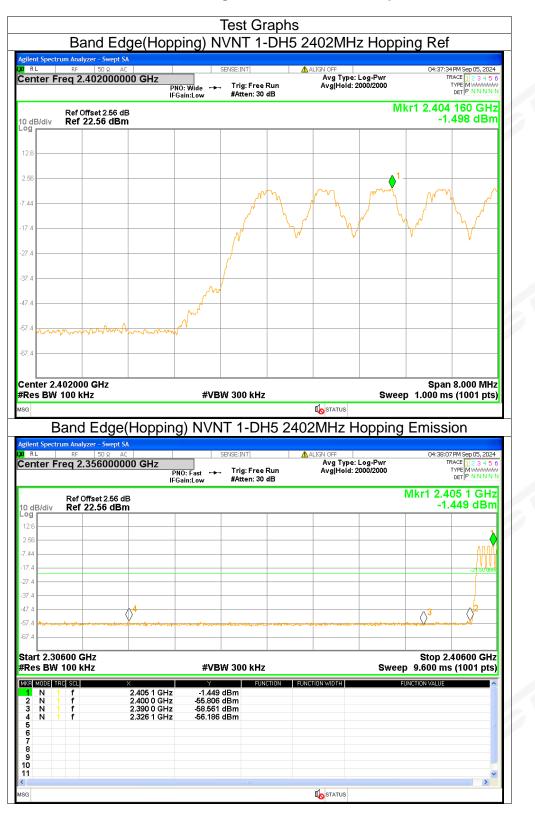








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Band Edge(Hopping) NVNT 1-DH5 2480MHz Hopping Ref :46 PM Sep 05, 202 TRACE 1 2 3 4 5 TYPE MWWWW DET P N N N N R L Center Freq 2.480000000 GHz Avg Type: Log-Pwr Avg|Hold: 2000/2000 Trig: Free Run #Atten: 30 dB PNO: Wide IFGain:Low -----Mkr1 2.476 840 GHz Ref Offset 2.52 dB Ref 22.52 dBm -1.530 dBm 10 dB/div 7 4 47. Center 2.480000 GHz Span 8.000 MHz #VBW 300 kHz Sweep 1.000 ms (1001 pts) #Res BW 100 kHz **I**STATUS SG Band Edge(Hopping) NVNT 1-DH5 2480MHz Hopping Emission gilent Spectrum Analyzer - Swept SA B L Center Freq 2.526000000 GHz Avg Type: Log-Pwr Avg|Hold: 1000/1000 TRACE 1 2 3 4 5 0 TYPE MWWWW DET P N N N N PNO: Fast +++ Trig: Free Run IFGain:Low #Atten: 30 dB Mkr1 2.477 0 GHz Ref Offset 2 52 dB -2.019 dBm 10 dB/div Ref 22.52 dBm 7.48 47. $\langle \rangle$ $\langle \rangle^2$ Start 2.47600 GHz Stop 2.57600 GHz #VBW 300 kHz #Res BW 100 kHz Sweep 9.600 ms (1001 pts) MKR MODE TRC SCL FUNCTION W TION VALUE -2.019 dBm -57.538 dBm -57.415 dBm -55.382 dBm 2.477 0 GHz 2.483 5 GHz 2.500 0 GHz 2.499 1 GHz N N N 2 3 4 5 6 7 8 9 10 11 > **I**STATUS SG