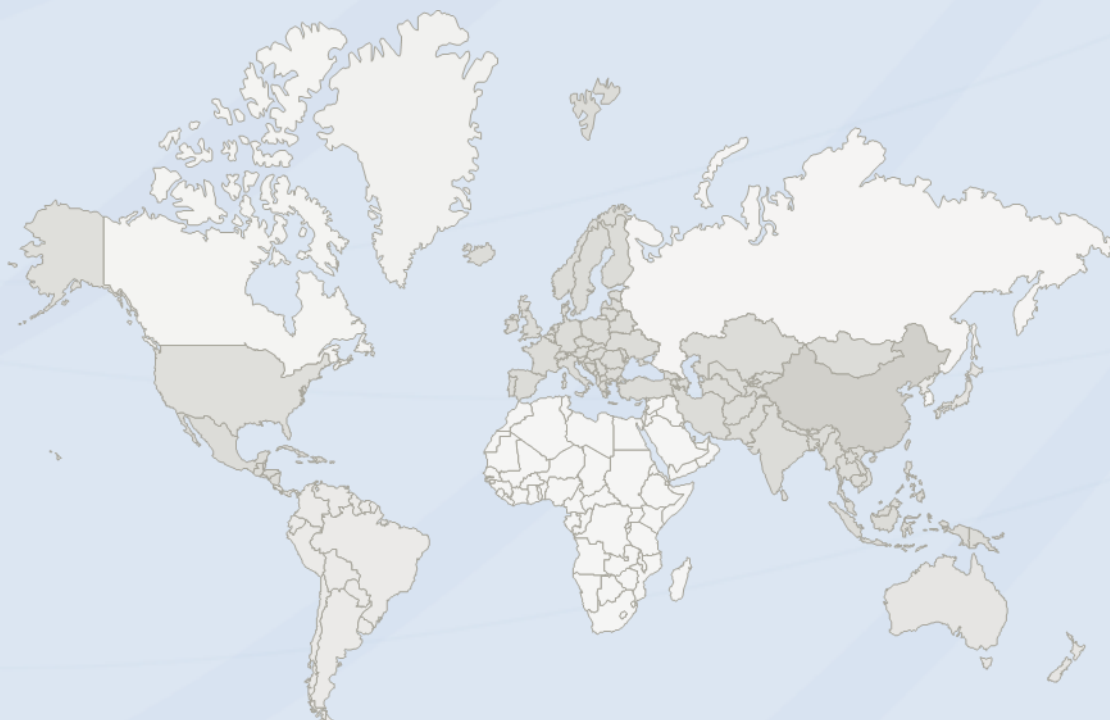


FCC TEST REPORT

Report No.: NTC-ER2010025
Applicant's name: BOOMPODS (HK) LTD.
Address.....: RM 303-304 Hankow Centre 5-15,Hankow Road
T.S.T. Kowloon, HONG KONG.



DONGGUAN NEW TESTING CENTRE CO., LTD

Ⓞ Address: 3F, No. 1 the 1st North Industry Road, Songshan Lake Science & Technology Park, Dongguan, Guangdong, China, 523808

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TEST REPORT DECLARE

FCC ID	: 2AFAX-ZERO
Applicant	: BOOMPODS (HK) LTD.
Address	: RM 303-304 Hankow Centre 5-15,Hankow Road T.S.T. Kowloon, HONG KONG.
Equipment under Test	: Bluetooth Speaker
Model No	: ZERO
Trade Mark	: N/A
Manufacturer	: Dongguan Linyar Technology Co., Ltd.
Address	: No.2,PujiangRoad,DaningCommunity,Humen, Dongguan, Guangdong, China.
Test Laboratory	: Dongguan New Testing Centre Co., Ltd
Address	: 3F, No. 1 the 1st North Industry Road, Songshan Lake Science &Technology Park, Dongguan, Guangdong, China, 523808

Test Standard Used:

FCC Rules and Regulations Part 15 Subpart C: 2017, ANSI C63.10:2013.

We Declare:

The equipment described above is tested by Dongguan New Testing Centre Co., Ltd and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and Dongguan New Testing Centre Co., Ltd is assumed of full responsibility for the accuracy and completeness of these tests.

After test and evaluation, our opinion is that the equipment provided for test compliance with the requirement of the above FCC standards.

Report No.:	NTC-ER2010025		
Date of Test:	Oct.12,2020 to Oct.27,2020	Date of Report:	Oct.28,2020

Prepared By:

Jeffrey Zhang

Jeffrey Zhang/Engineer

Approved By:



Dave Gao/LAB Manager

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Dongguan New Testing Centre Co., Ltd

1. Summary of test results

Description of Test Item	Standard	Results
Antenna Requirement	Section 15.247(c)	PASS
Conduction Emissions	Section 15.207(a)	PASS
Radiated Emissions	Section 15.247(d)	PASS
Carrier Frequencies Separated	Section 15.247(a)(1)	PASS
Hopping Channel Number	Section 15.247(a)(1) (iii)	PASS
Dwell Time	Section 15.247(a)(1) (iii)	PASS
Maximum Peak Output Power	Section 15.247(b)	PASS
Band edge	Section 15.247(d)	PASS
Conducted Spurious Emissions	Section 15.247(d)	PASS

2. General test information

2.1. Description of EUT

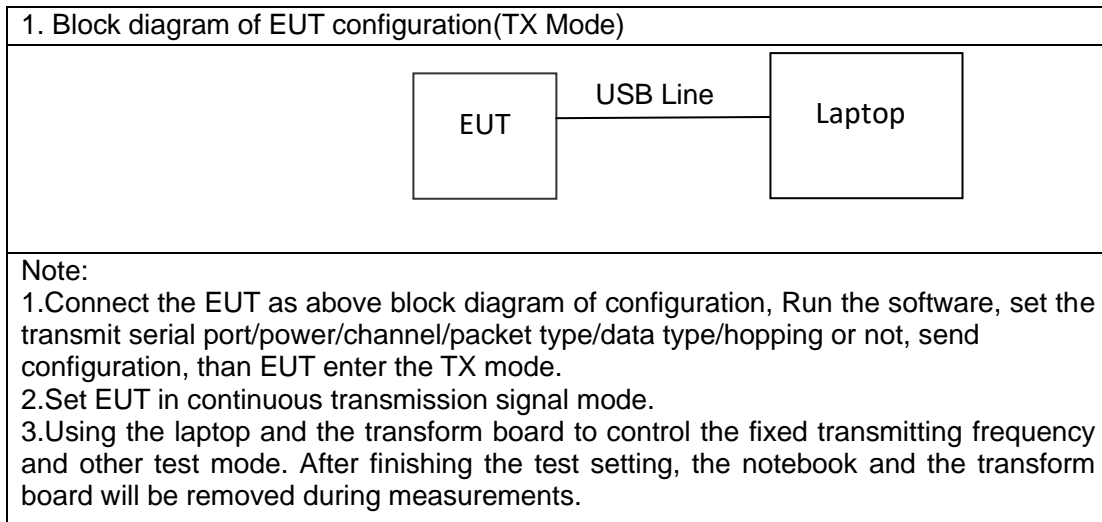
EUT* Name	: Bluetooth Speaker
Test model	: ZERO
EUT function description	: Please reference user manual of this device
Power supply	: 5Vdc from Type C port or 3.7Vdc from battery
Trade mark	: N/A
Operation frequency	: 2402-2480MHz
Number of channel	: 79
Modulation Technology	: GFSK, $\pi/4$ -DQPSK
Bluetooth version	: 5.0
H/W No.	: V 1.0
S/W No.	: V 1.0
BT Antenna Type	: PCB antenna
BT Antenna Gain	: 0 dBi
Wireless Charge Antenna Type	: Coil Antenna
Wireless Charge Antenna Gain	: 0 dBi

Note: 1,EUT is the ab. of equipment under test.

2.2. Detail models

Model	Rating	Note
ZERO	5Vdc from Type C port or 3.7Vdc from battery	/

2.3. Block diagram EUT configuration for test



2.4. Test environment conditions

During the measurement the environmental conditions were within the listed ranges:

(1) E.U.T. test conditions:

15.31(e): For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

(2) Test frequencies:

According to the 15.31(m) Measurements on intentional radiators or receivers, other than TV broadcast receivers, shall be performed and. If required reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table:

Frequency range over which device operates	Number of frequencies	Location in the range of operation
1 MHz or less	1	Middle
1 to 10 MHz	2	1 near top and 1 near bottom
More than 10 MHz	3	1 near top, 1 near middle and 1 near bottom

(3) Frequency range of radiated measurements:

According to the 15.33, the test range will be up to the tenth harmonic of the highest fundamental frequency.

(4) Pre-test the EUT in all transmitting mode at the lowest (2402 MHz), middle (2441 MHz) and highest (2480 MHz) channel with different data packet and conducted to determine the worst-case mode,

The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.

2.5. Measurement uncertainty

Test Item	Uncertainty
Uncertainty for Conduction emission test	2.44dB
Uncertainty for Radiation Emission test (30MHz – 1GHz)	3.14 dB (Polarize: V)
	3.16 dB (Polarize: H)
Uncertainty for Radiation Emission test (1GHz – 18GHz)	4.27 dB (Polarize: V)
	4.51 dB (Polarize: H)
Uncertainty for conducted RF Power	0.63dB
Stop Transmitting Time Test	±0.5%
Uncertainty for frequency error	5.8 x 10 ⁻⁸

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

2.6. Test Peripheral List

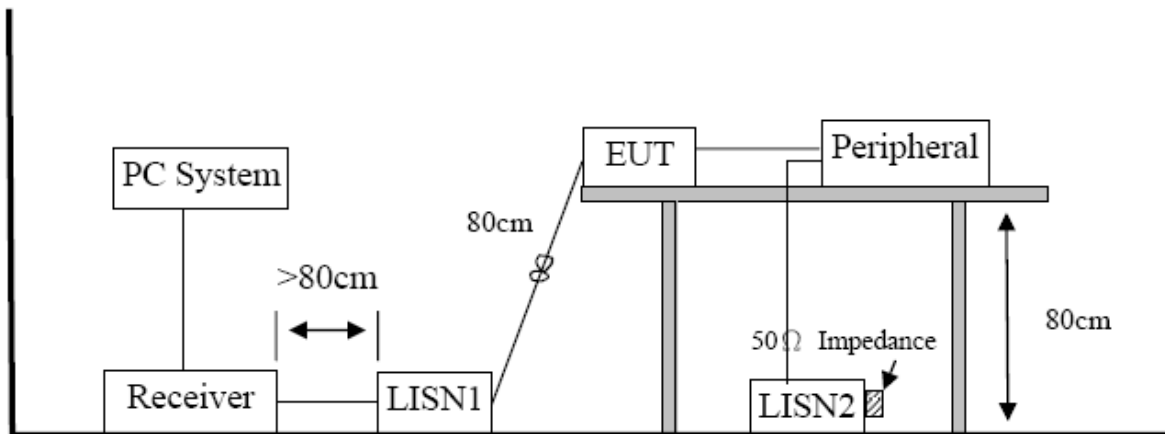
No.	Equipment	Manufacturer	FCC approved	Model No.	Serial No.	signal cable
1	Lap top	lenovo	DOC	7457	7457A82	N/A

3. Power Line Conducted Emission Test

3.1. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Test Receiver	R&S	ESPI	100146	2019-12-09	1 Year
2	LISN	R&S	ENV216	3650.6550.06	2020-05-25	1 Year
3	Pulse Limiter	R&S	ESH3-Z2	0357-8810.54	2020-05-25	1 Year
4	RF Cable	HUBER	SUCOFLEX100	30722/4E	2019-05-13	2 Year
5	MEASUREMENT SOFTWARE	FARAD	EZ-EMC(VER:1.1.4.2)	N/A	N/A	N/A

3.2. BLOCK DIAGRAM OF TEST SETUP



3.3. Power Line Conducted Emission Limits (Class B)

Frequency	Quasi-Peak Level dB(μ V)	Average Level dB(μ V)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Note 1: * Decreasing linearly with logarithm of frequency.

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

3.4. Test Procedure

The EUT and Support equipment, if needed, were put placed on a non-metallic table, 80cm above the ground plane.

Configuration EUT to simulate typical usage as described in clause 2.3 and test equipment as described in clause 3.2 of this report.

All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.

All support equipment power received from a second LISN.

Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.

The Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.

During the above scans, the emissions were maximized by cable manipulation.

The test mode(s) described in clause 2.3 were scanned during the preliminary test.

After the preliminary scan, we found the test mode producing the highest emission level.

The EUT configuration and worse cable configuration of the above highest emission levels were recorded for reference of the final test.

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.

A scan was taken on both power lines, Neutral and Line, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.

The test data of the worst-case condition(s) was recorded.

The bandwidth of test receiver is set at 9 KHz.

3.5. Test Result

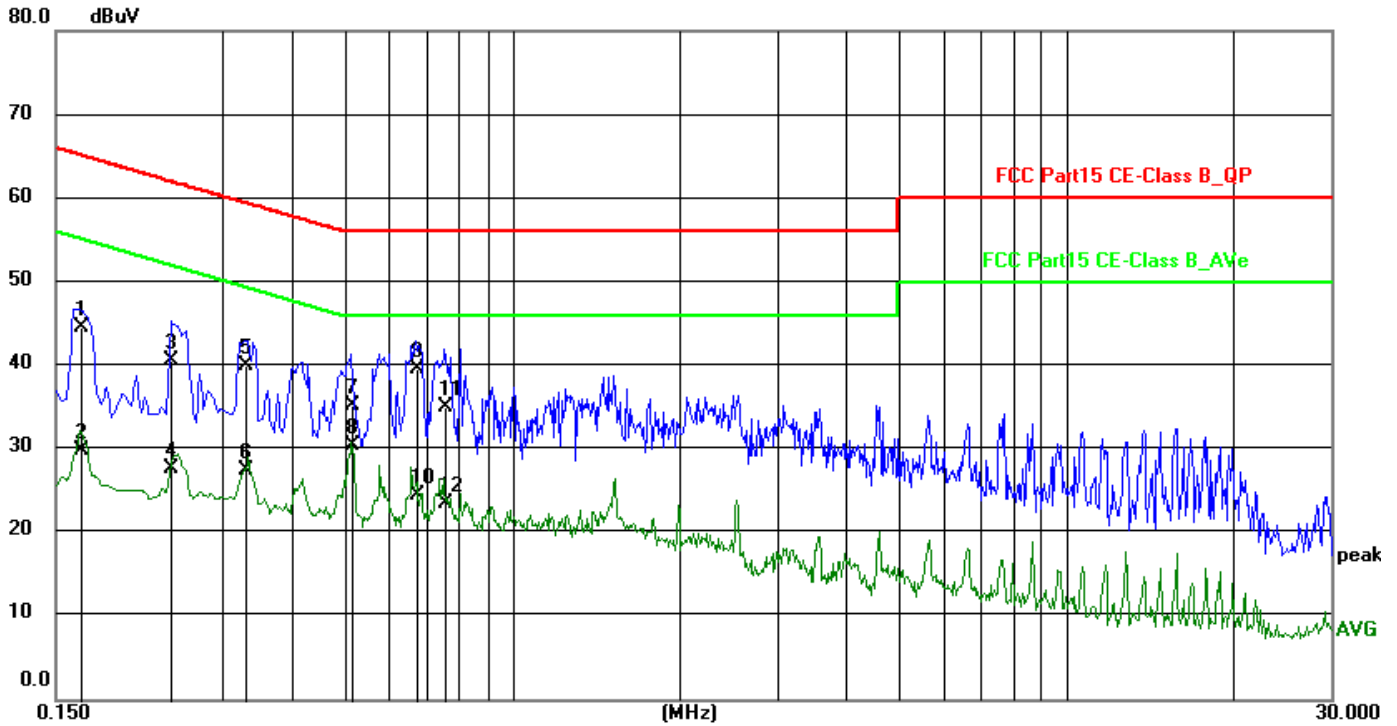
PASS. (See below detailed test result)

Note1: All emissions not reported below are too low against the prescribed limits.

Note2: “-----” means Peak detection; “-----” means Average detection

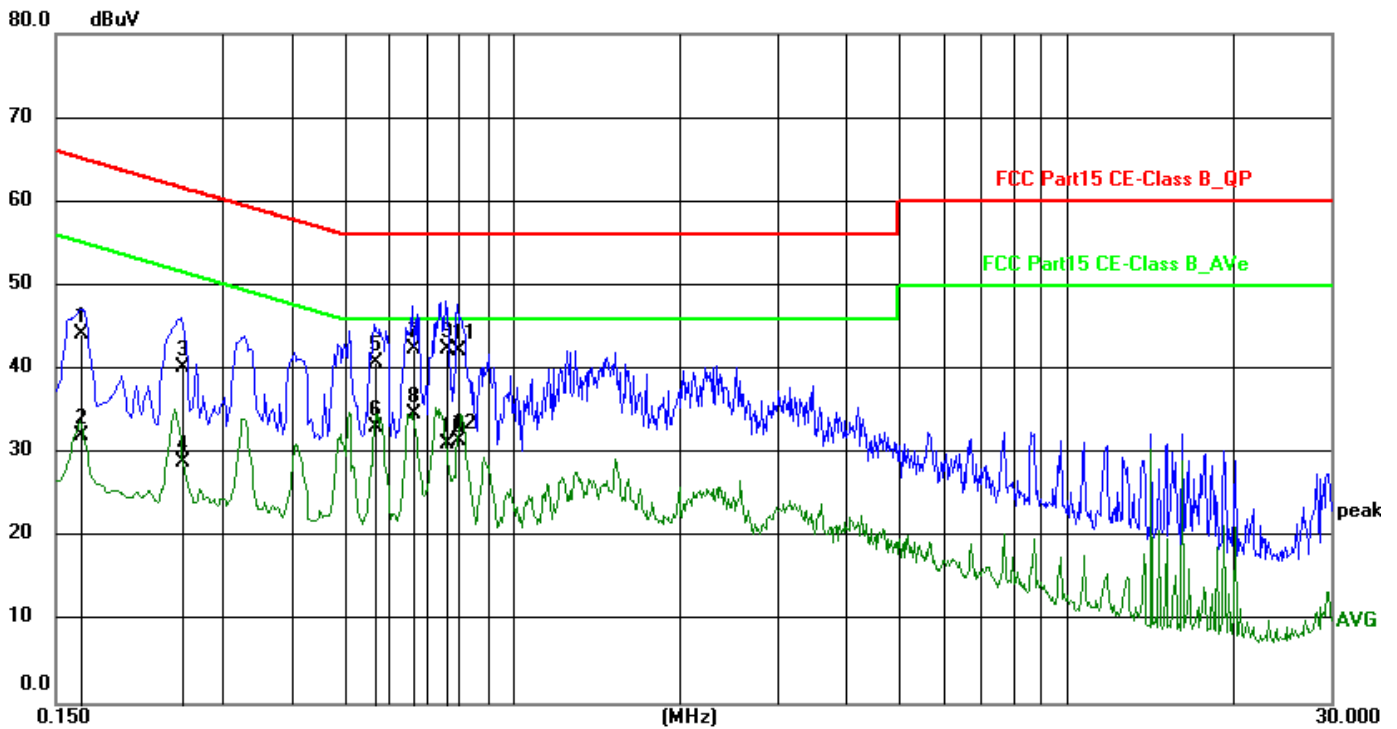
Note3: Measurement = Reading Level + Factor, Margin= Measurement-Limit

Conducted Emission Test Result



Site:	844LAB	Phase: L1	Temperature(C):24(C)
Limit:	FCC Part15 CE-Class B_QP		Humidity(%):63%
EUT:	Bluetooth Speaker	Test Time:	2020/10/19 14:23:08
M/N.:	ZERO	Power Rating:	DC 5V by adapter input 120V/60Hz
Mode:	Tx mode (2402MHz- Worst case)	Test Engineer:	
Note:			

No.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB)	Measurement(dBuV)	Limit (dBuV)	Margin (dB)	Detector	Comment
1	0.1660	34.75	9.72	44.47	65.16	-20.69	QP	
2	0.1660	20.16	9.72	29.88	55.16	-25.28	AVG	
3	0.2420	30.77	9.79	40.56	62.03	-21.47	QP	
4	0.2420	17.99	9.79	27.78	52.03	-24.25	AVG	
5	0.3300	30.07	9.84	39.91	59.45	-19.54	QP	
6	0.3300	17.60	9.84	27.44	49.45	-22.01	AVG	
7	0.5140	25.76	9.57	35.33	56.00	-20.67	QP	
8 *	0.5140	20.90	9.57	30.47	46.00	-15.53	AVG	
9	0.6700	29.92	9.61	39.53	56.00	-16.47	QP	
10	0.6700	14.86	9.61	24.47	46.00	-21.53	AVG	
11	0.7580	25.50	9.62	35.12	56.00	-20.88	QP	
12	0.7580	13.98	9.62	23.60	46.00	-22.40	AVG	



Site:	844LAB	Phase:	N	Temperature(C):	24(C)
Limit:	FCC Part15 CE-Class B_QP	Test Time:	2020/10/19 14:28:16	Humidity(%):	63%
EUT:	Bluetooth Speaker	Power Rating:	DC 5V by adapter input		
M/N.:	ZERO	Test Engineer:			
Mode:	Tx mode (2402MHz- Worst case)				
Note:					

No.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB)	Measurement(dBuV)	Limit (dBuV)	Margin (dB)	Detector	Comment
1	0.1660	34.35	9.84	44.19	65.16	-20.97	QP	
2	0.1660	22.15	9.84	31.99	55.16	-23.17	AVG	
3	0.2540	30.43	9.82	40.25	61.63	-21.38	QP	
4	0.2540	19.11	9.82	28.93	51.63	-22.70	AVG	
5	0.5660	31.16	9.65	40.81	56.00	-15.19	QP	
6	0.5660	23.43	9.65	33.08	46.00	-12.92	AVG	
7	0.6620	32.75	9.65	42.40	56.00	-13.60	QP	
8 *	0.6620	25.02	9.65	34.67	46.00	-11.33	AVG	
9	0.7620	32.78	9.64	42.42	56.00	-13.58	QP	
10	0.7620	21.50	9.64	31.14	46.00	-14.86	AVG	
11	0.7980	32.47	9.64	42.11	56.00	-13.89	QP	
12	0.7980	21.75	9.64	31.39	46.00	-14.61	AVG	

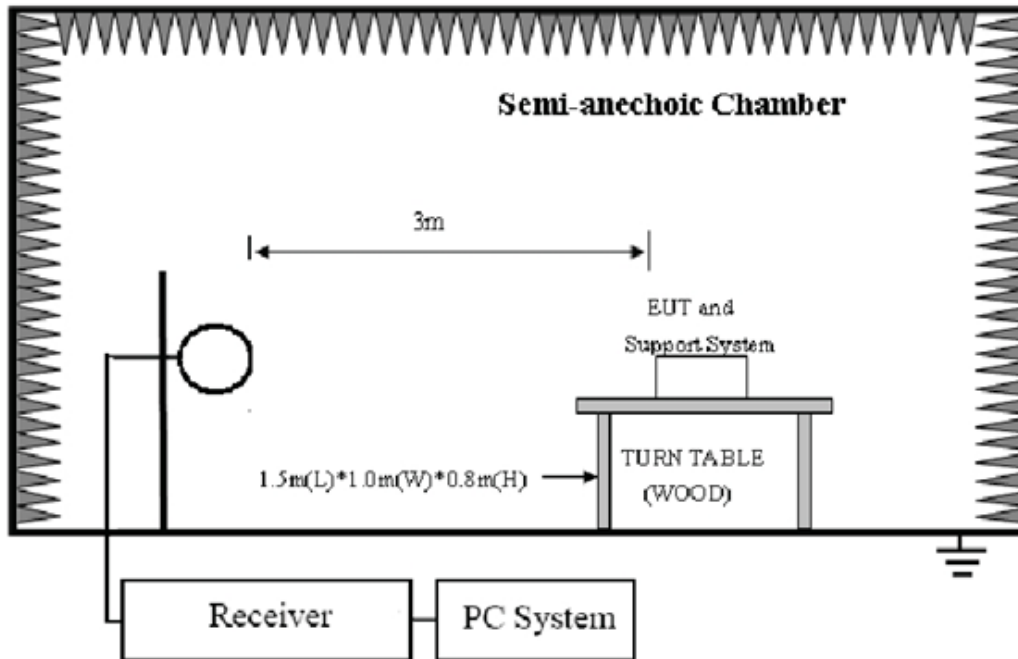
4. Radiated emission test

4.1. Test equipment

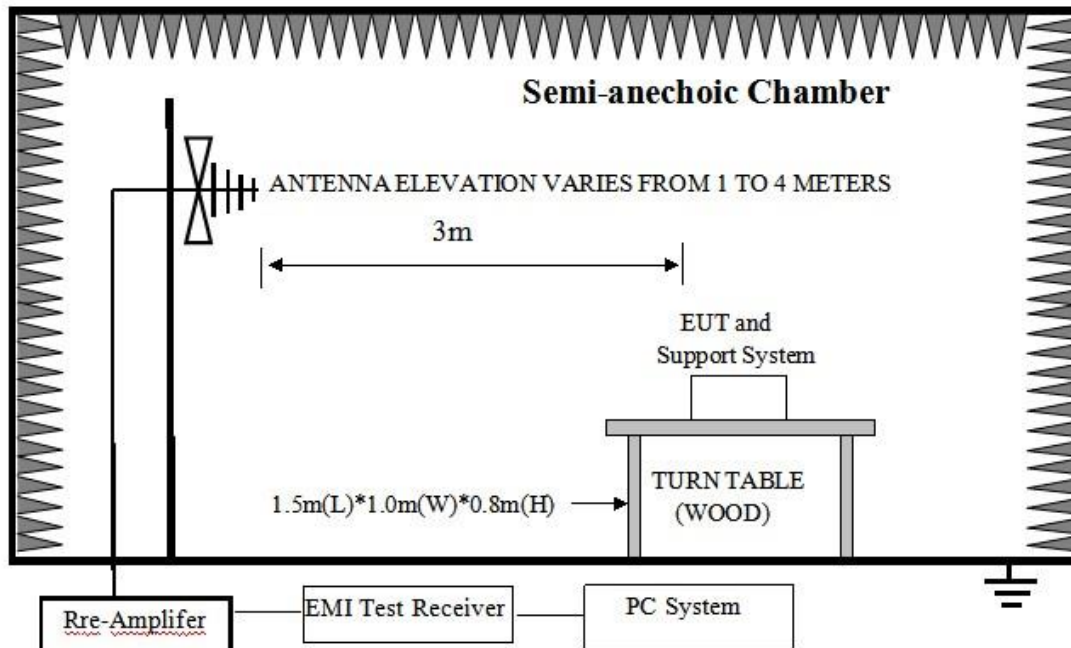
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	EMI Test Receiver	R&S	ESR	7250-30406 7528	2020-05-25	1Year
2	Trilog Broadband Antenna	Schwarzbeck	VULB9168	00969	2019-06-14	2 Year
3	Active Loop antenna	Schwarzbeck	FMZB-1519	1519-038	2019-05-23	2Year
4	Horn antenna	Schwarzbeck	BBHA9120D	453	2019-05-23	2Year
5	Double Ridged Horn Antenna	A.H. System	SAS-574	584	2019-05-23	2Year
6	Pre-amplifier	R&S	SCU18	105326	2020-05-25	1Year
7	RF Cable	GORE	OSQ01Q010 78.7	SN1545847 3	2019-05-13	2 Year
8	RF Cable	GORE	OSQ01Q010 78.7	SN1545847 4	2019-05-13	2 Year
9	Measurement software	Farad	EZ-EMC(VE R:1.1.4.2)	N/A	N/A	N/A

4.2. Block diagram of test setup

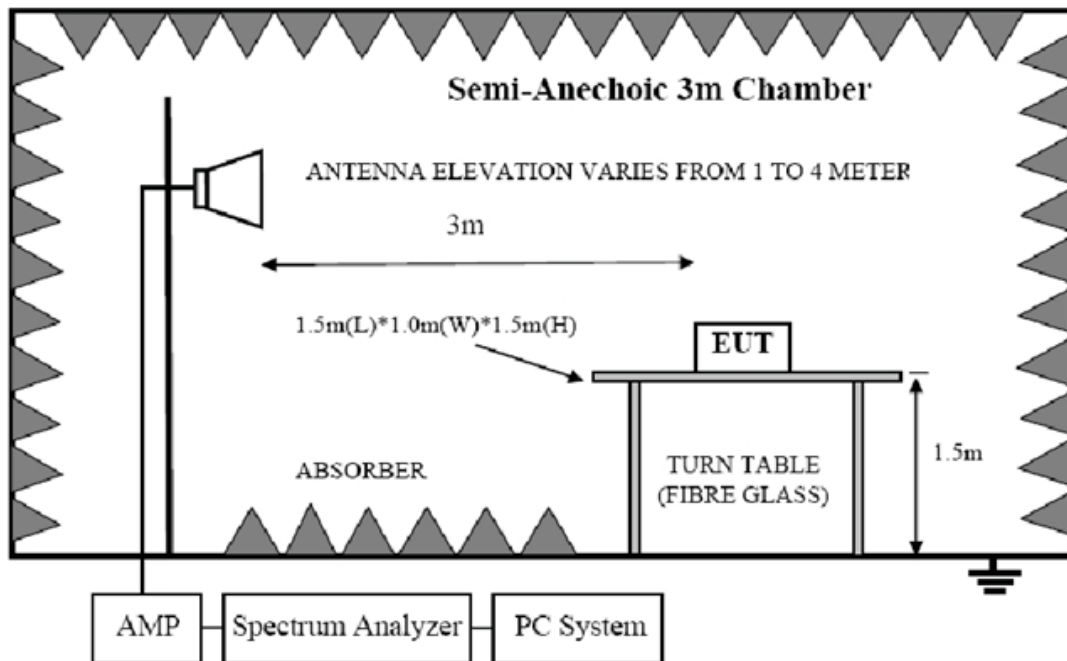
In 3m Anechoic Chamber Test Setup Diagram for 9KHz to 30MHz:



In 3m Anechoic Chamber Test Setup Diagram for 30MHz to 1GHz:



In 3m Anechoic Chamber Test Setup Diagram for frequency above 1GHz:



4.3. Limit

FCC 15.205 Restricted frequency band:

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)

FCC 15.109 Limit

Frequency (MHz)	Distance (Meters)	Field Strengths Limits dB(μV)/m
30--88	3	40.0
88--216	3	43.5
216--960	3	46.0
960--1000	3	54.0
Above 1GHz	3	Peak: 74.0
	3	Average:54.0

Note: (1) The smaller limit shall apply at the cross point between two frequency bands.

(2)Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

(3)The emission limits shown in the above table are based on measurements employing a CISPR QP detector except for the frequency bands 9-90KHz, 110-490KHz and above 1000MHz.Radiated emissions limits in these three bands are based on measurements employing an average detector.

(4) At frequencies below 30MHz, measurement may be performed at a distance closer then that specified, and the limit at closer measurement distance can be extrapolated by below formula:

$$\text{Limit}_{3m}(\text{dBuV}/\text{m}) = \text{Limit}_{30m}(\text{dBuV}/\text{m}) + 40\text{Log}(30\text{m}/3\text{m})$$

(5)All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.109, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.109 limits.

4.4. Test Procedure

Procedure of Preliminary Test

Configuration EUT to simulate typical usage as described in clause 2.3 and test equipment as described in clause 4.2 of this report.

Mains cables, telephone lines or other connections to auxiliary equipment located outside the test are shall drape to the floor, be fitted with ferrite clamps or ferrite tubes placed on the floor at the point where the cable reaches the floor and then routed to the place where they leave the turntable. No extension cords shall be used to mains receptacle.

EUT height should be 0.8m for below 1GHz and 1.5m for above 1GHz at ground with absorbers.

The antenna was placed at 3 meter away from the EUT as stated in ANSI C63.10. The antenna connected to the Spectrum Analyzer via a cable and at times a pre-amplifier would be used.

The Analyzer / Receiver quickly scanned from 30MHz to 18GHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.

The X, Y, Z three axial are tested and the report only the worst case.

The emissions from 9KHz to 1GHz, QP or average values were measured with EMI receiver with below RBW:

Frequency band	RBW
9KHz-150KHz	200Hz
150KHz-30MHz	9KHz
30MHz-1GHz	120KHz

For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz, VBW is set at 3MHz for Peak measure; RMS detector RBW 1MHz VBW 3MHz for Average measure.

4.5. Test result

PASS. (See below detailed test result)

All the emissions except fundamental emission from 9 KHz to 40GHz were comply with FCC PART 15.109 limits limit.

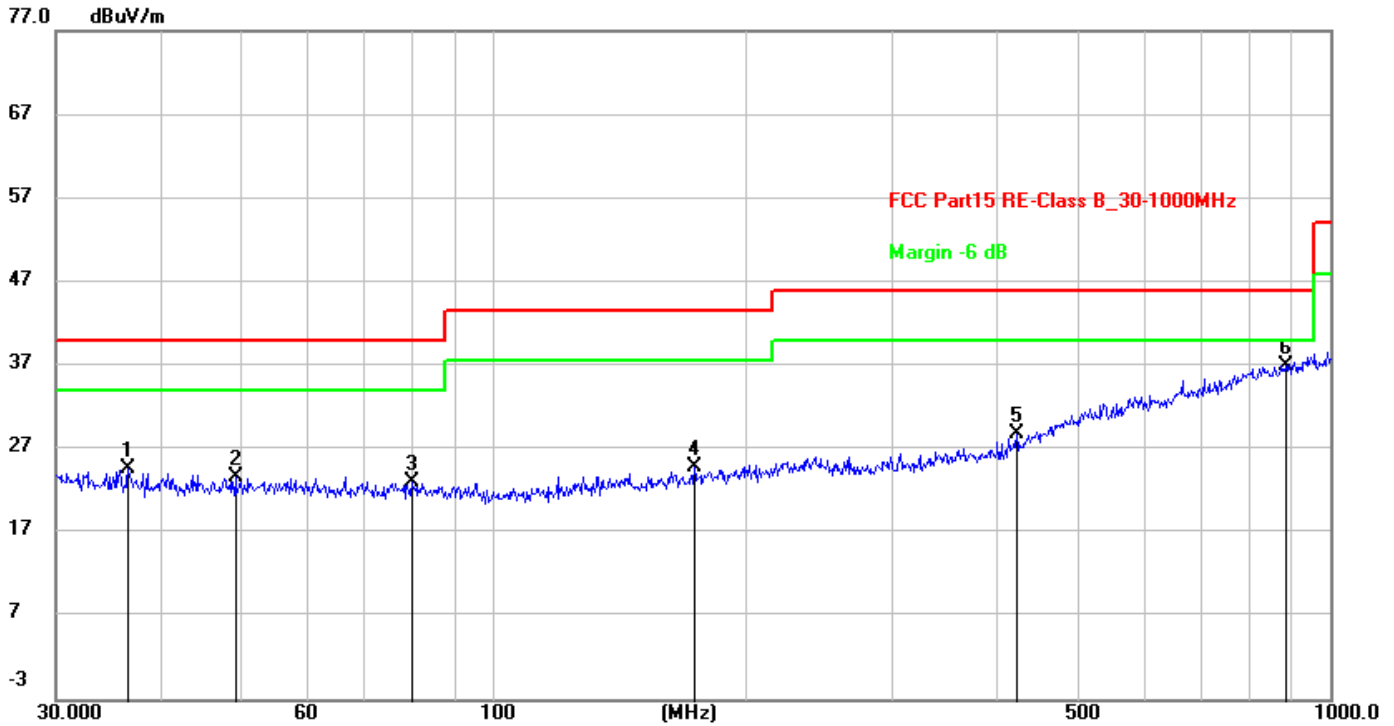
Note1: According exploratory test no any obvious emission were detected from 9KHz to 30MHz and

18GHz to 40GHz, so the final test was performed with frequency range from 30MHz to 18GHz and recorded in below.

Note2: For emissions above 1GHz. If peak results comply with AV limit, AV Result is deemed to comply with AV limit.

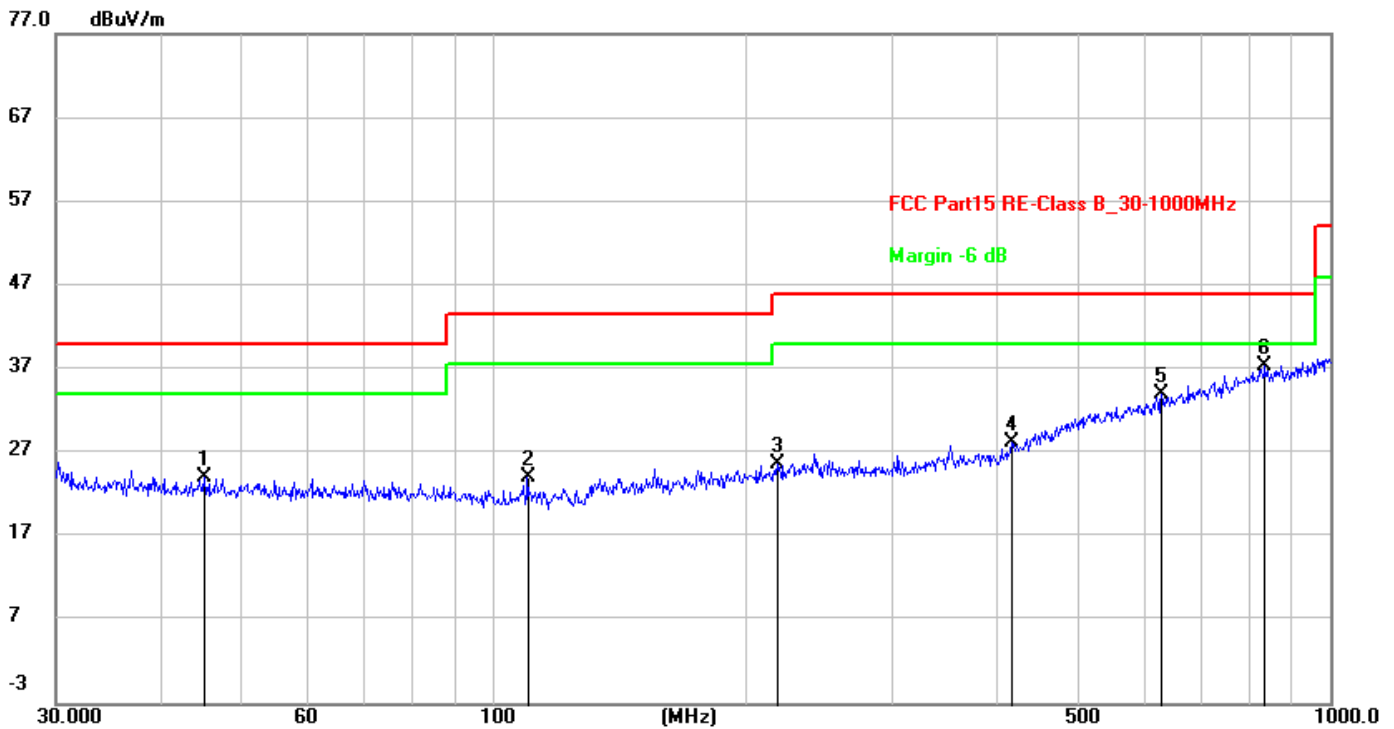
Note3: Level = Reading Level + Factor, Margin= Level-Limit

Radiated Emission Test Result



Site:	966LAB	Antenna::	Horizontal	Temperature(C):	24(C)
Limit:	FCC Part15 RE_30-1000MHz			Humidity(%):	60%
EUT:	Bluetooth Speaker	Test Time:	2020/10/19 13:49:56		
M/N.:	ZERO	Power Rating:	DC 5V by adapter input		
			120V/60Hz		
Mode:	Tx mode (2402MHz- Worst case)	Test Engineer:			
Note:					

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)	Remark
1	36.6374	11.38	13.27	24.65	40.00	-15.35	peak	100	171	
2	49.1865	10.64	13.11	23.75	40.00	-16.25	peak	200	56	
3	80.0805	11.55	11.49	23.04	40.00	-16.96	peak	200	4	
4	173.8135	11.99	12.82	24.81	43.50	-18.69	peak	200	4	
5	422.0577	12.72	16.13	28.85	46.00	-17.15	peak	200	263	
6 *	884.5028	13.15	23.89	37.04	46.00	-8.96	peak	200	339	



Site:	966LAB	Antenna::	Vertical	Temperature(C):	24(C)
Limit:	FCC Part15 RE_30-1000MHz			Humidity(%):	60%
EUT:	Bluetooth Speaker	Test Time:	2020/10/19 13:55:28		
M/N.:	ZERO	Power Rating:	DC 5V by adapter input		
			120V/60Hz		
Mode:	Tx mode (2402MHz- Worst case)	Test Engineer:			
Note:					

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)	Remark
1	45.2166	10.98	13.13	24.11	40.00	-15.89	peak	100	197	
2	109.7960	12.52	11.64	24.16	43.50	-19.34	peak	100	179	
3	218.3085	11.80	13.83	25.63	46.00	-20.37	peak	100	325	
4	416.1791	12.28	15.94	28.22	46.00	-17.78	peak	100	245	
5	629.4772	13.67	20.30	33.97	46.00	-12.03	peak	200	257	
6 *	836.2443	13.72	23.73	37.45	46.00	-8.55	peak	200	76	

EUT:	Bluetooth Speaker	Model Name :	ZERO
Temperature:	23 °C	Test Engineer	Jack
Pressure:	1010 hPa	Relative Humidity:	60%
Test Mode :	Tx pi/4QPSK (worst)	Test Voltage :	DC 5V by adapter input 120V/60Hz
Measurement Distance	3 m	Frequency Range	1-25 GHz
RBW/VBW	Spurious emission: 1MHz/3MHz for Peak, 1MHz/10Hz for Average, PK detector is for them all.		

(a) Antenna polarization: Horizontal

Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector Type
2390.00	48.74	4.68	53.42	74.00	-20.58	peak
2390.00	38.42	4.68	43.10	54.00	-10.90	AVG
4804.00	49.15	5.06	54.21	74.00	-19.79	peak
4804.00	41.50	5.06	46.56	54.00	-7.44	AVG
7206.00	42.92	7.03	49.95	74.00	-24.05	peak
7206.00	34.03	7.03	41.06	54.00	-12.94	AVG

(b) Antenna polarization: Vertical

Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector Type
2390.00	47.56	4.68	52.24	74.00	-21.76	peak
2390.00	38.72	4.68	43.40	54.00	-10.60	AVG
4804.00	49.70	5.06	54.76	74.00	-19.24	peak
4804.00	38.96	5.06	44.02	54.00	-9.98	AVG
7206.00	47.83	7.03	54.86	74.00	-19.14	peak
7206.00	35.04	7.03	42.07	54.00	-11.93	AVG

Note:

8~25GHz at least have 20dB margin. No recording in the test report.

Measurement Level = Reading Level + Factor

Remark: Factor = Antenna Factor + Cable Loss–Pre-amplifier

Lowest Channel: 2402 MHz

Data rate: 2Mbps

(a) Antenna polarization: Horizontal

Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector Type
4882.00	49.45	5.14	54.59	74.00	-19.41	peak
4882.00	40.22	5.14	45.36	54.00	-8.64	AVG
7323.00	45.51	7.54	53.05	74.00	-20.95	peak
7323.00	32.82	7.54	40.36	54.00	-13.64	AVG

(b) Antenna polarization: Vertical

Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector Type
4882.00	49.21	5.14	54.35	74.00	-19.65	peak
4882.00	41.36	5.14	46.50	54.00	-7.50	AVG
7323.00	41.95	7.54	49.49	74.00	-24.51	peak
7323.00	35.71	7.54	43.25	54.00	-10.75	AVG

Note:

8~25GHz at least have 20dB margin. No recording in the test report.

Measurement Level = Reading Level + Factor

Remark: Factor = Antenna Factor + Cable Loss-Pre-amplifier

Middle Channel: 2441 MHz

Data rate: 2Mbps

(a) Antenna polarization: Horizontal

Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector Type
2483.50	51.25	4.71	55.96	74.00	-18.04	peak
2483.50	36.59	4.71	41.30	54.00	-12.70	AVG
4960.00	49.32	5.22	54.54	74.00	-19.46	peak
4960.00	37.69	5.22	42.91	54.00	-11.09	AVG
7440.00	41.80	8.06	49.86	74.00	-24.14	peak
7440.00	31.73	8.06	39.79	54.00	-14.21	AVG

(b) Antenna polarization: Vertical

Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector Type
2483.50	53.24	4.71	57.95	74.00	-16.05	peak
2483.50	41.50	4.71	46.21	54.00	-7.79	AVG
4960.00	48.01	5.22	53.23	74.00	-20.77	peak
4960.00	39.34	5.22	44.56	54.00	-9.44	AVG
7440.00	46.24	8.06	54.30	74.00	-19.70	peak
7440.00	33.01	8.06	41.07	54.00	-12.93	AVG

Note:

8~25GHz at least have 20dB margin. No recording in the test report.

Measurement Level = Reading Level + Factor

Remark: Factor = Antenna Factor + Cable Loss–Pre-amplifier

Highest channel: 2480 MHz

Data rate: 2Mbps

5. Maximum Peak Output Power

5.1. Applied procedures / Limit

15.247(a) (1) 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.

15.247(b) (1) For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

5.2. Test procedure

- (1) Connected the antenna port to the Spectrum Analyzer, set the Spectrum Analyzer as
Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel
RBW > the 20 dB bandwidth of the emission being measured, VBW ≥ RBW, Sweep = auto
Detector function = peak, Trace = max hold
- (2) The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power.
- (3) The above procedure shall be repeated at the lowest, the middle, and the highest frequency of the stated frequency range with modulated mode. Also shall be performed at different modes of operation.

5.3. Deviation from standard

No deviation.

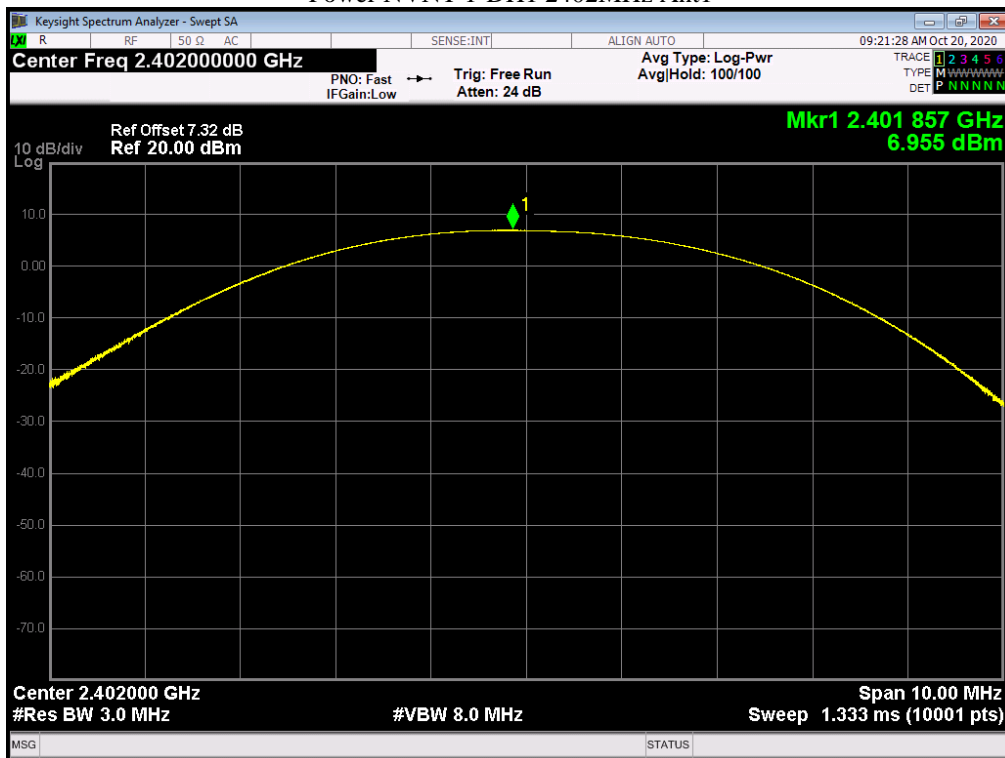
5.4. Test setup



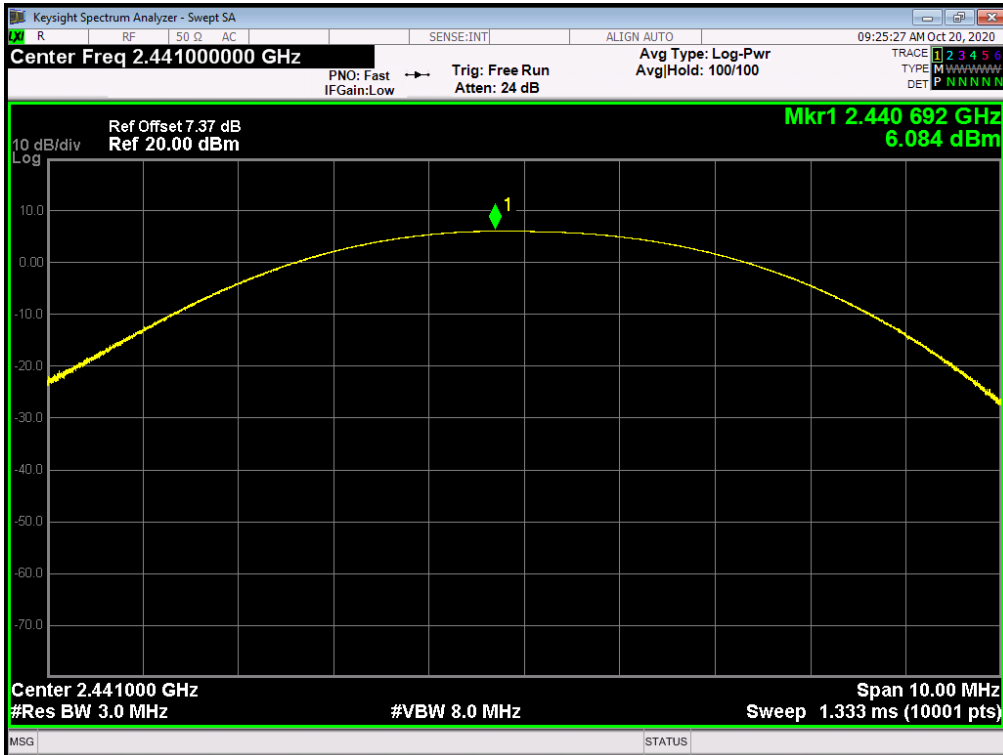
5.5. TEST RESULTS

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Duty Factor (dB)	Total Power (dBm)	Limit (dBm)	Verdict
NVNT	1-DH1	2402	Ant 1	6.955	0	6.955	21	Pass
NVNT	1-DH1	2441	Ant 1	6.084	0	6.084	21	Pass
NVNT	1-DH1	2480	Ant 1	5.694	0	5.694	21	Pass

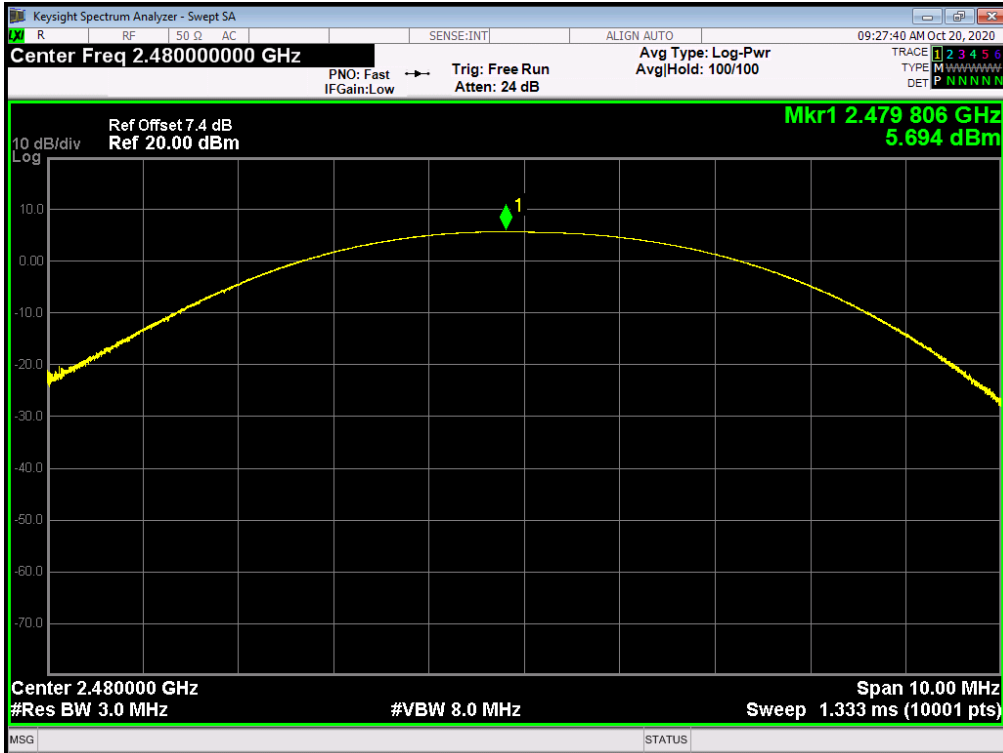
Power NVNT 1-DH1 2402MHz Ant1



Power NVNT 1-DH1 2441MHz Ant1

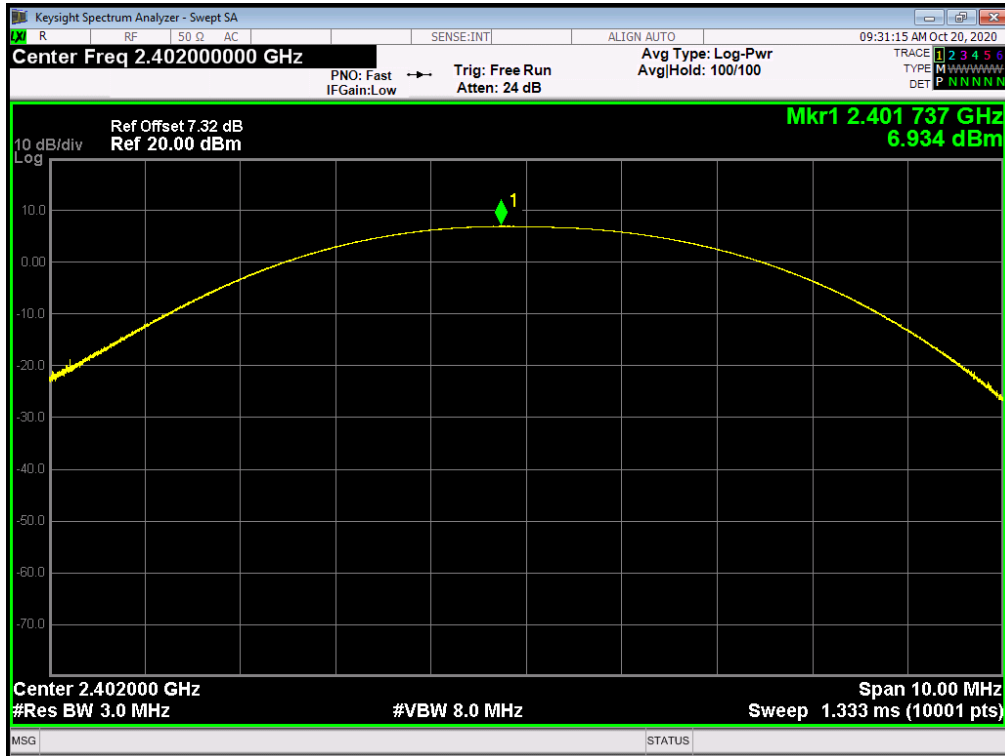


Power NVNT 1-DH1 2480MHz Ant1

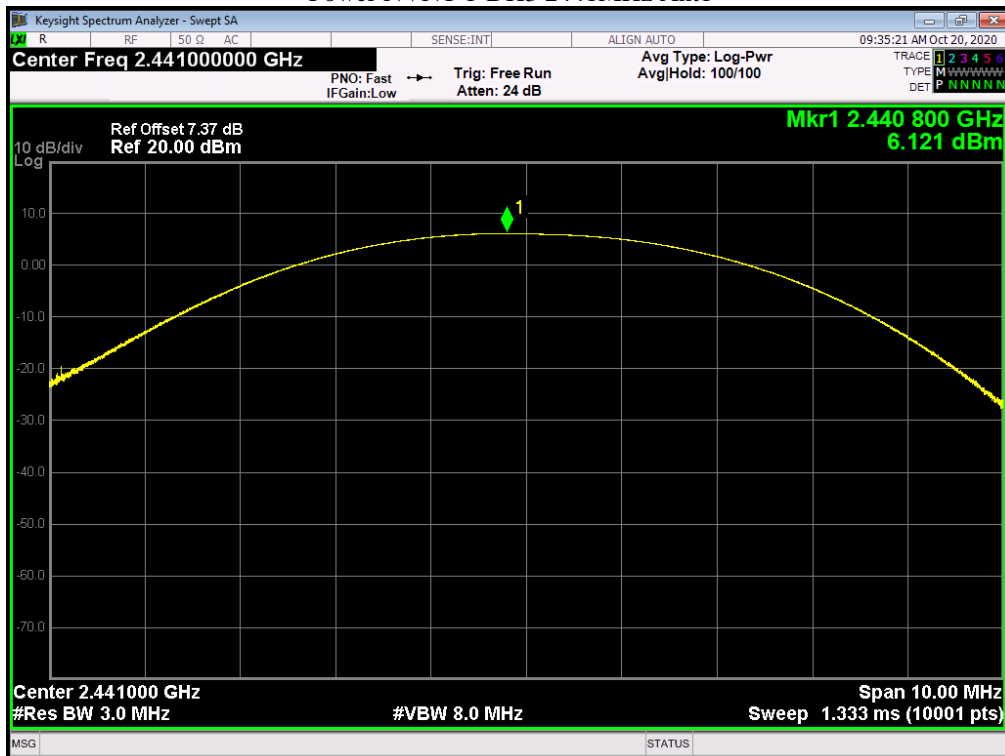


Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Duty Factor (dB)	Total Power (dBm)	Limit (dBm)	Verdict
NVNT	1-DH3	2402	Ant 1	6.934	0	6.934	21	Pass
NVNT	1-DH3	2441	Ant 1	6.121	0	6.121	21	Pass
NVNT	1-DH3	2480	Ant 1	5.71	0	5.71	21	Pass

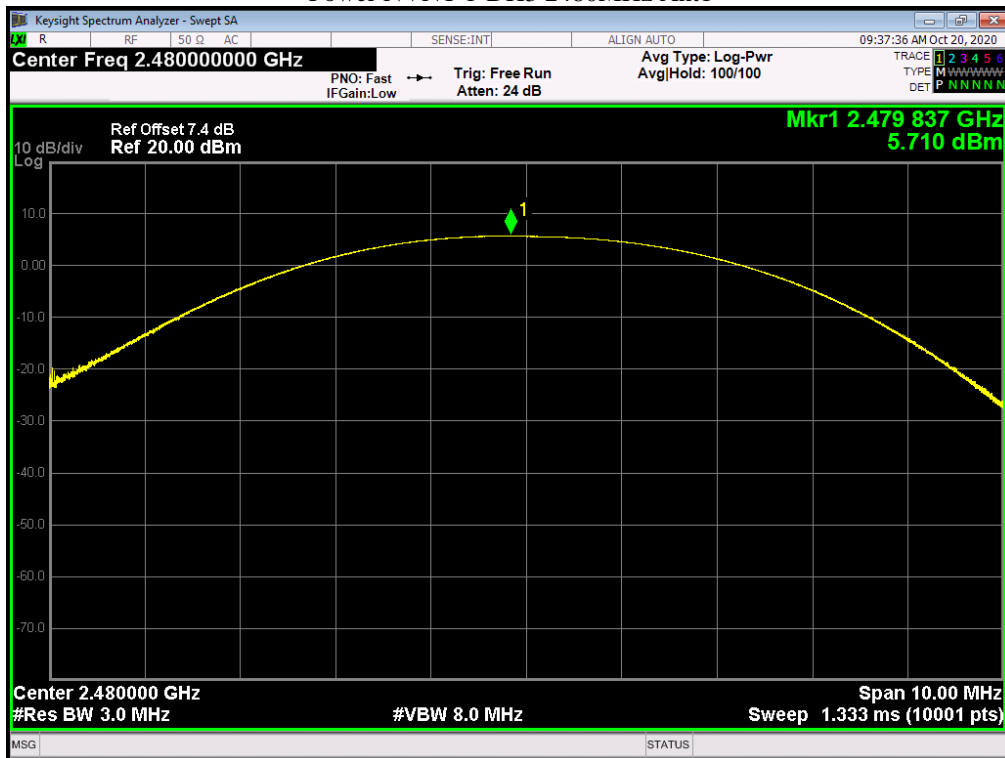
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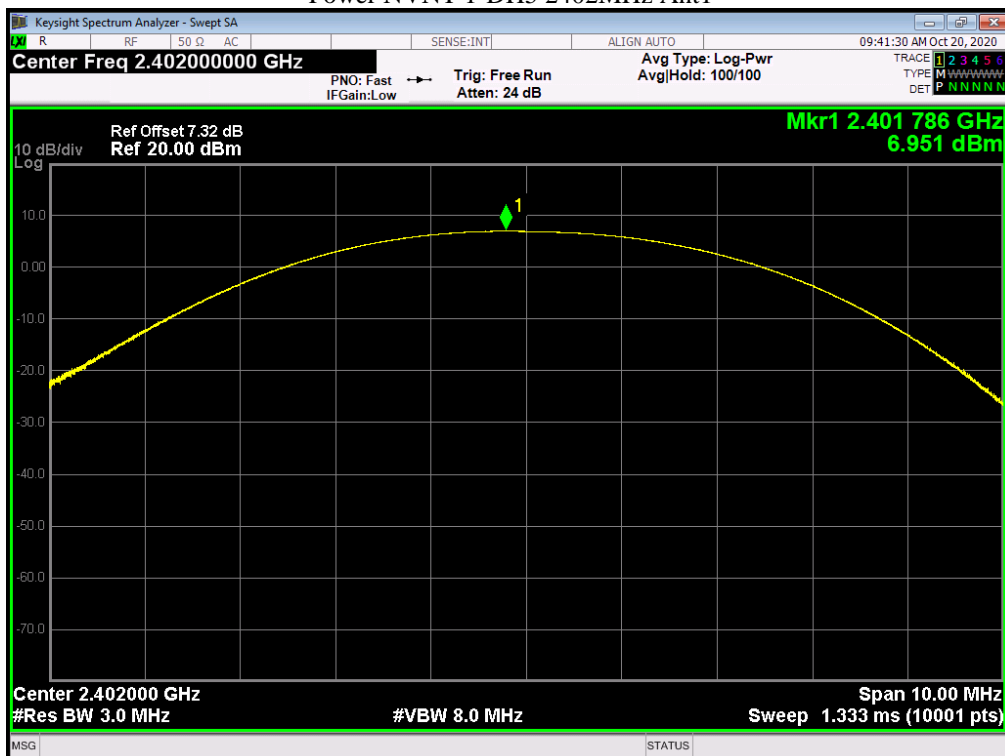


Power NVNT 1-DH3 2480MHz Ant1

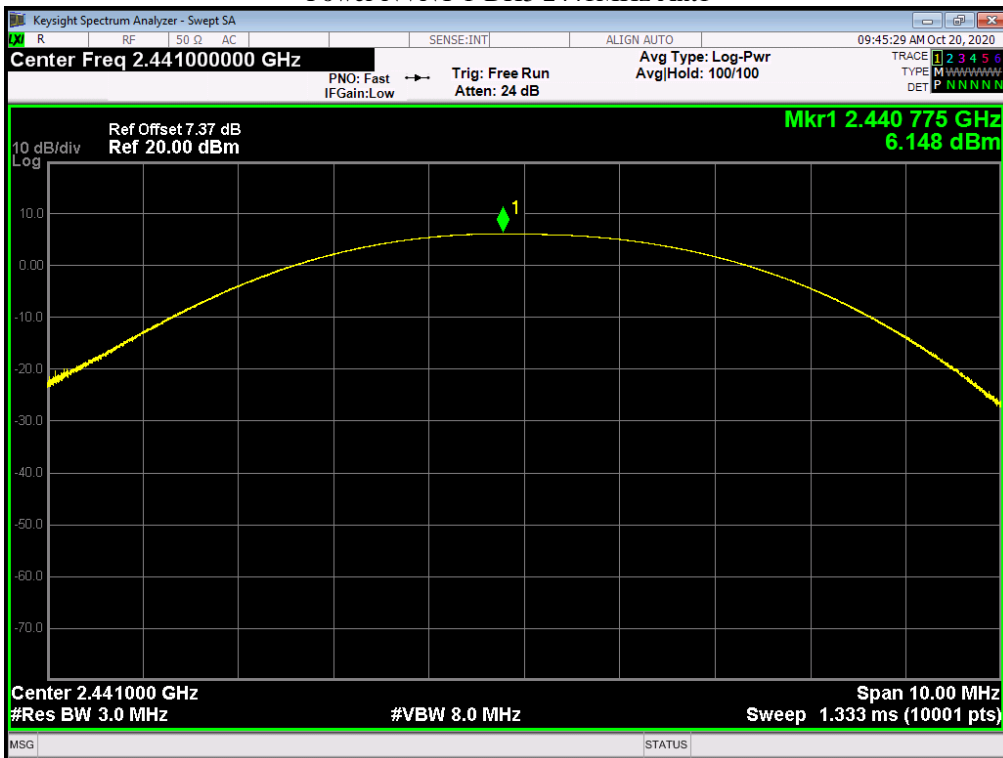


Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Duty Factor (dB)	Total Power (dBm)	Limit (dBm)	Verdict
NVNT	1-DH5	2402	Ant 1	6.951	0	6.951	21	Pass
NVNT	1-DH5	2441	Ant 1	6.148	0	6.148	21	Pass
NVNT	1-DH5	2480	Ant 1	5.719	0	5.719	21	Pass

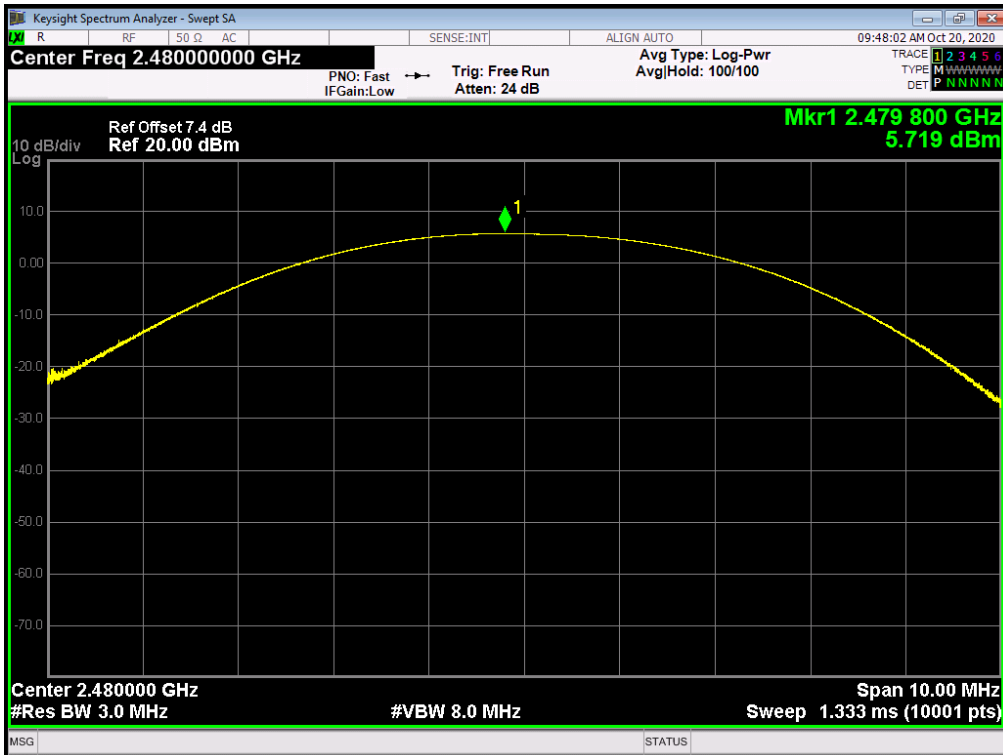
Power NVNT 1-DH5 2402MHz Ant1



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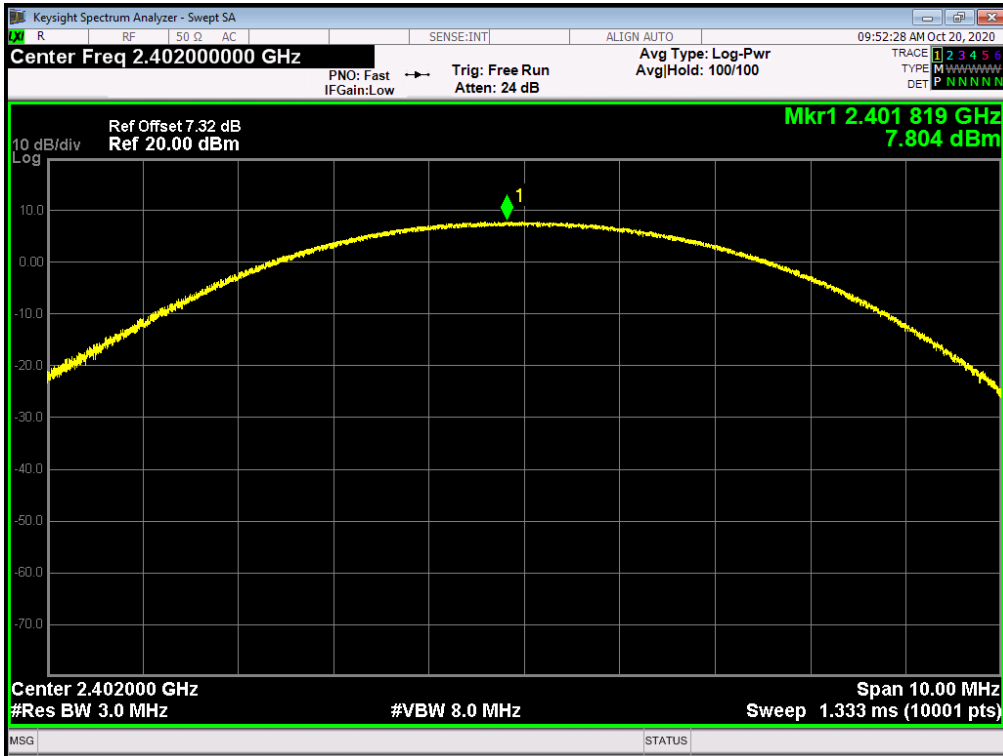


Power NVNT 1-DH5 2480MHz Ant1

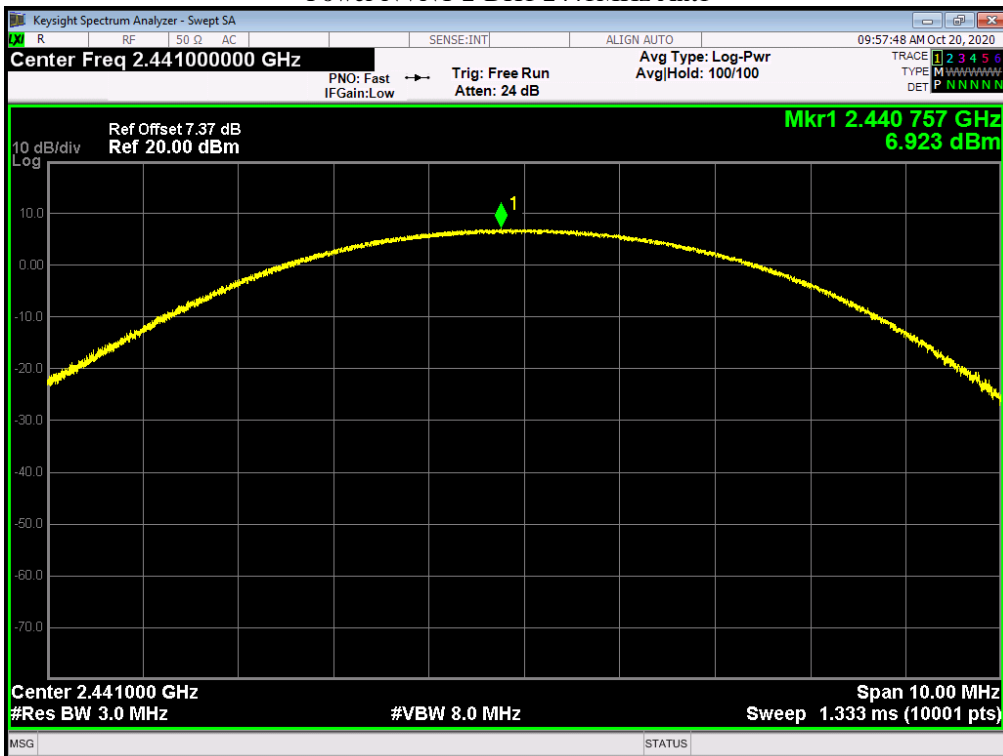


Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Duty Factor (dB)	Total Power (dBm)	Limit (dBm)	Verdict
NVNT	2-DH1	2402	Ant 1	7.804	0	7.804	21	Pass
NVNT	2-DH1	2441	Ant 1	6.923	0	6.923	21	Pass
NVNT	2-DH1	2480	Ant 1	6.508	0	6.508	21	Pass

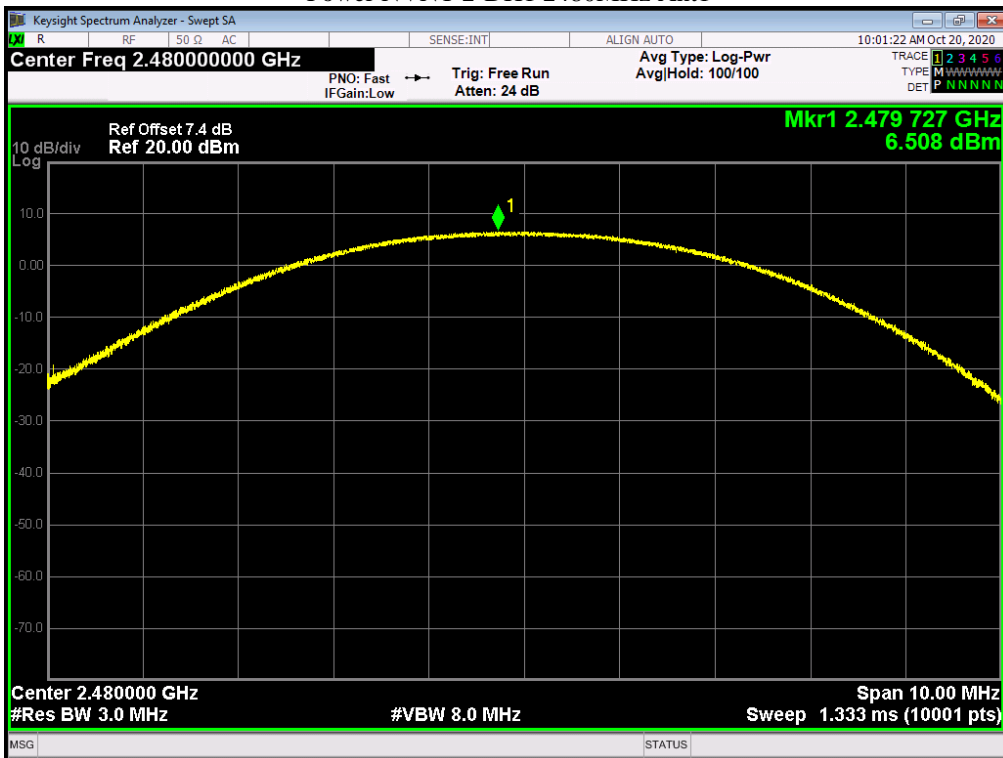
Power NVNT 2-DH1 2402MHz Ant1



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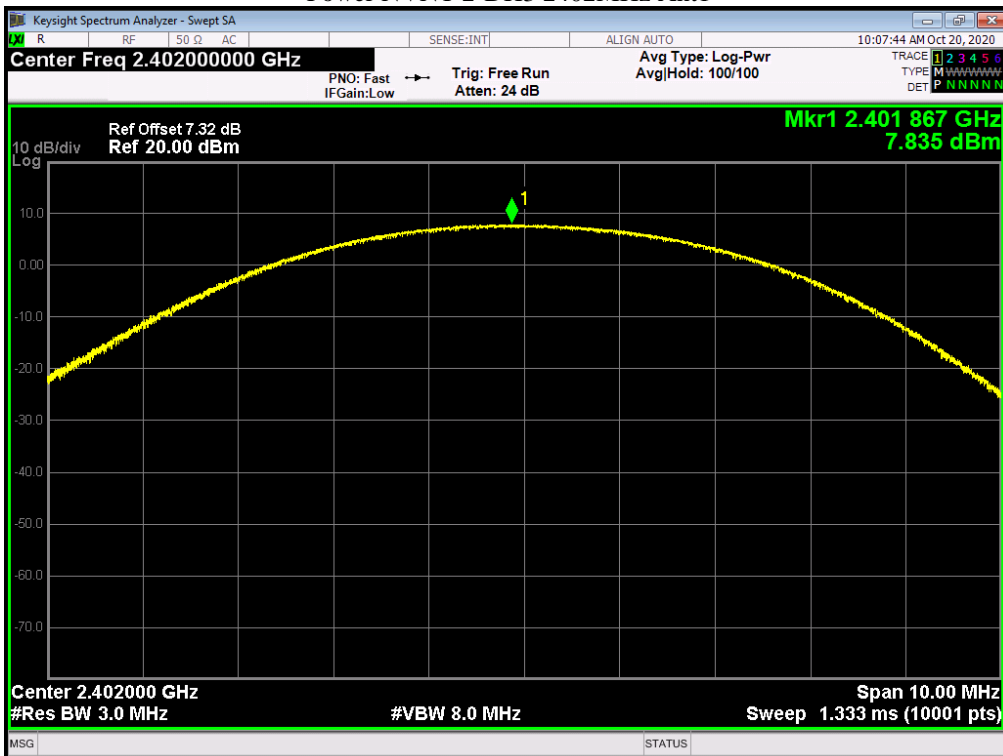


Power NVNT 2-DH1 2480MHz Ant1

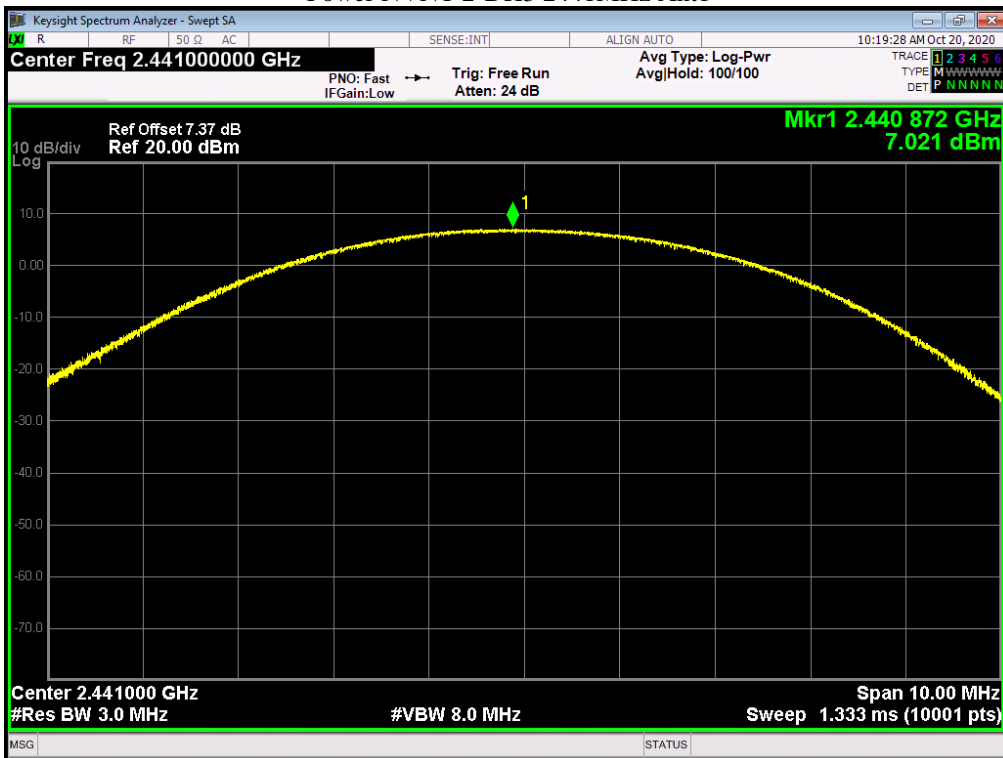


Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Duty Factor (dB)	Total Power (dBm)	Limit (dBm)	Verdict
NVNT	2-DH3	2402	Ant 1	7.835	0	7.835	21	Pass
NVNT	2-DH3	2441	Ant 1	7.021	0	7.021	21	Pass
NVNT	2-DH3	2480	Ant 1	6.551	0	6.551	21	Pass

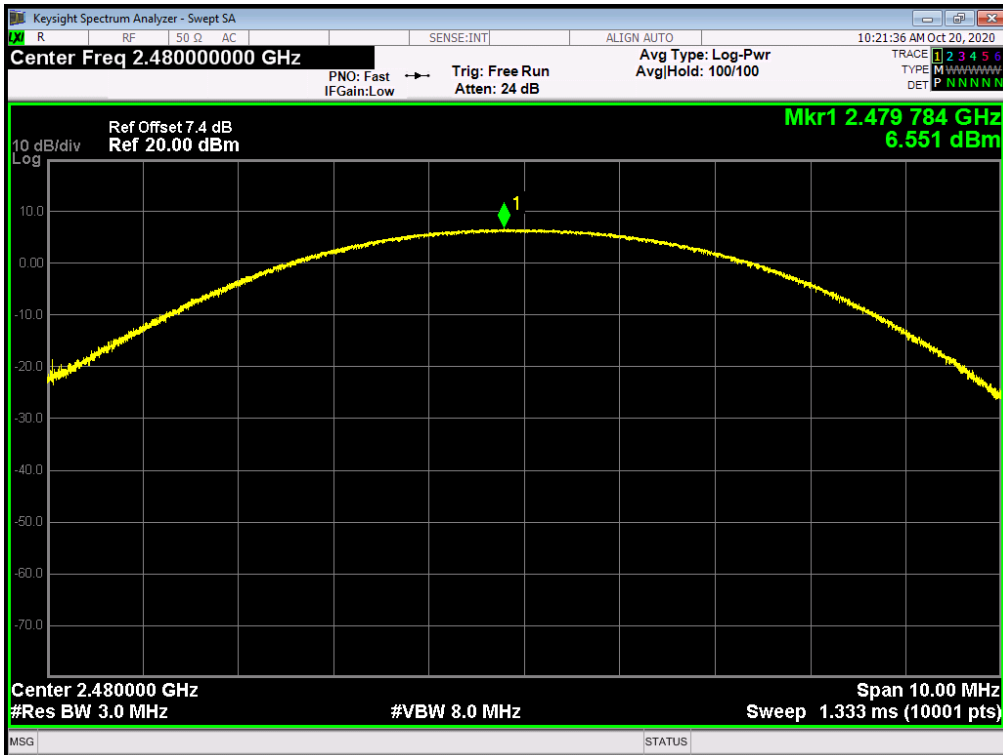
Power NVNT 2-DH3 2402MHz Ant1



Power NVNT 2-DH3 2441MHz Ant1

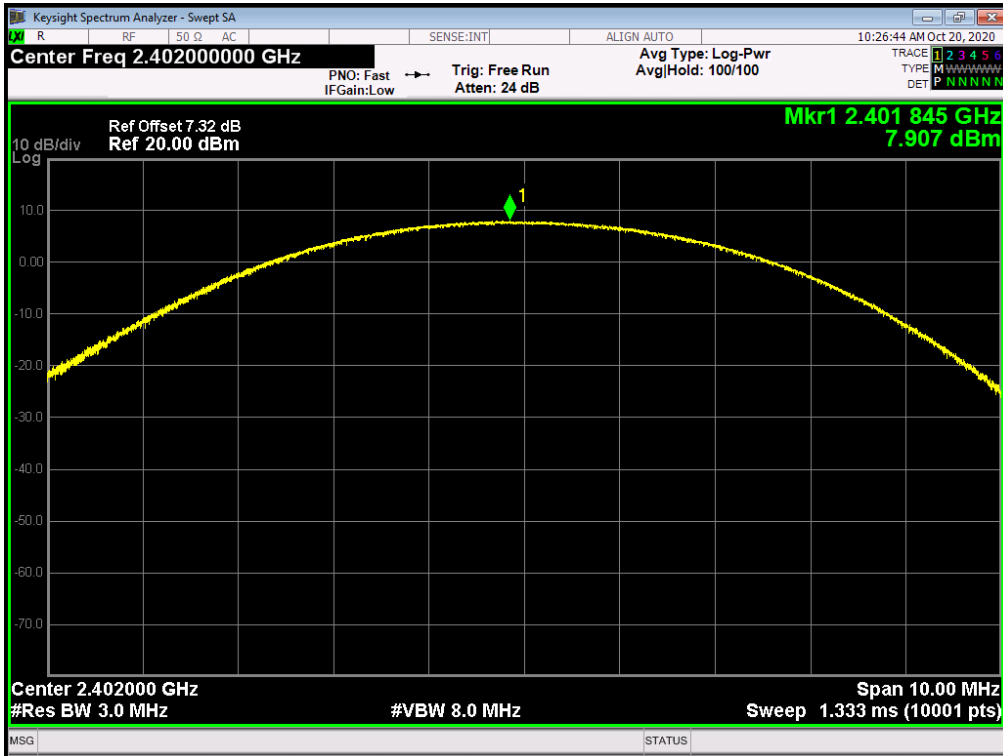


Power NVNT 2-DH3 2480MHz Ant1

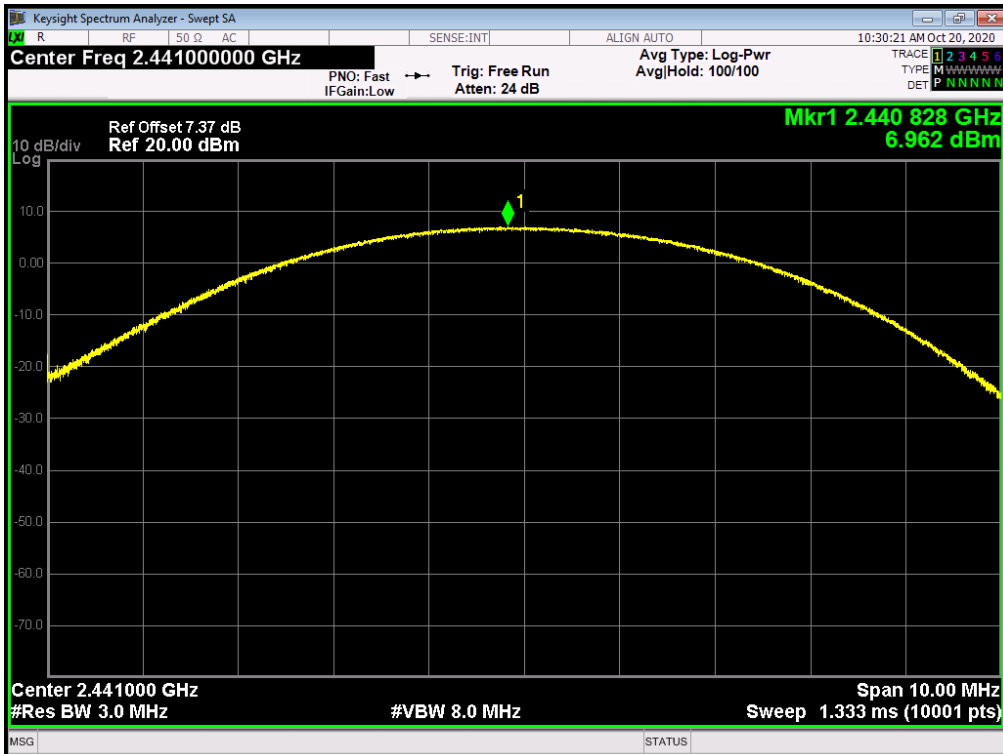


Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Duty Factor (dB)	Total Power (dBm)	Limit (dBm)	Verdict
NVNT	2-DH5	2402	Ant 1	7.907	0	7.907	21	Pass
NVNT	2-DH5	2441	Ant 1	6.962	0	6.962	21	Pass
NVNT	2-DH5	2480	Ant 1	6.575	0	6.575	21	Pass

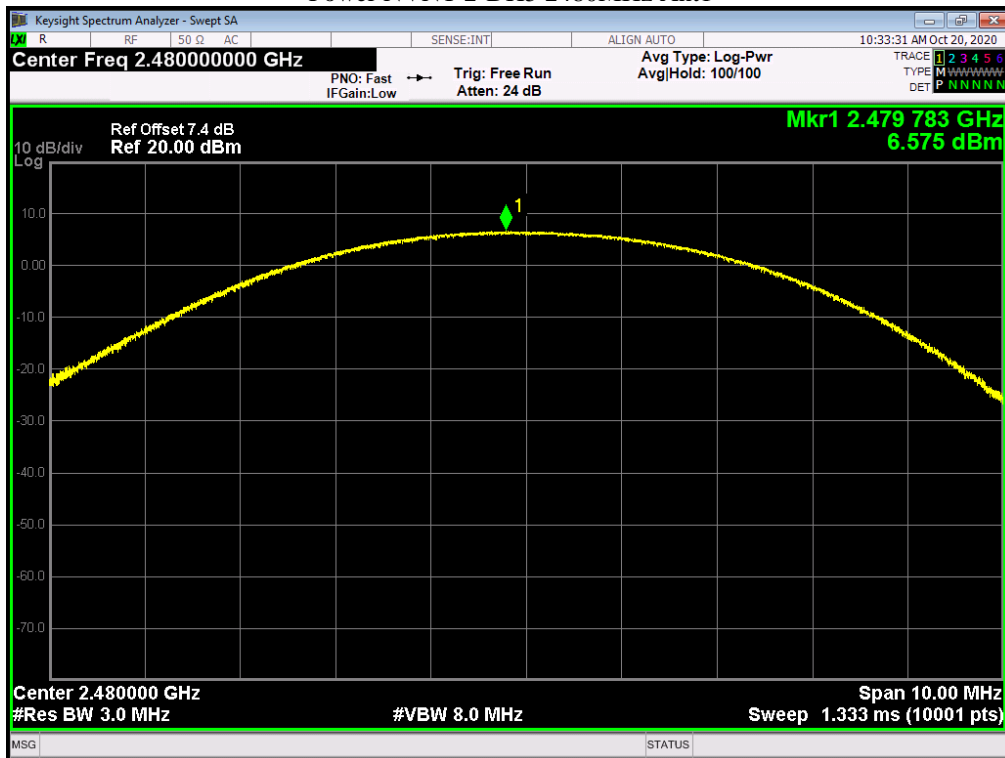
Power NVNT 2-DH5 2402MHz Ant1



Power NVNT 2-DH5 2441MHz Ant1



Power NVNT 2-DH5 2480MHz Ant1



6. BANDWIDTH TEST

6.1. Applied procedures / Limit

For frequency hopping system operating in the 2400-2483.5MHz, If the 20dB bandwidth of hopping channel is greater than 25kHz, two-thirds 20dB bandwidth of hopping channel shall be a minimum limit for the hopping channel separation.

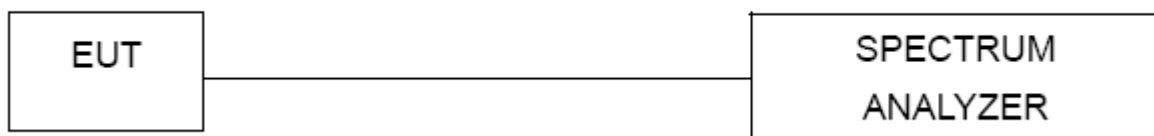
6.2. Test procedure

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- b. Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel
RBW \geq 1% of the 20 dB bandwidth, VBW \geq RBW, Sweep = auto, Detector function = peak
Trace = max hold

6.3. Deviation from standard

No deviation.

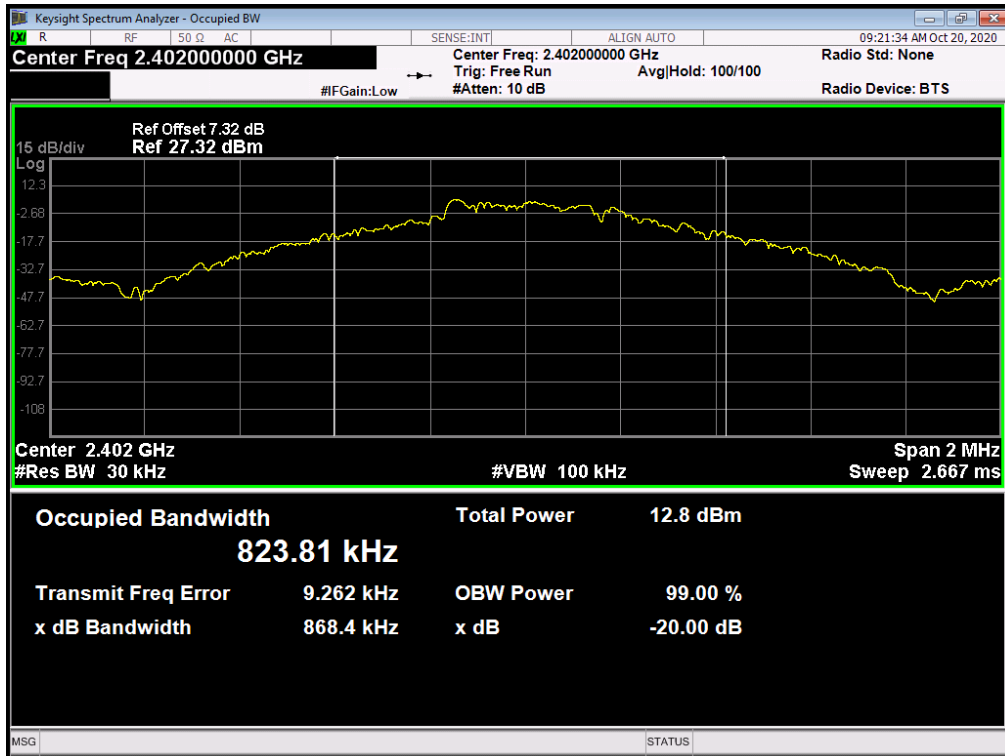
6.4. Test setup



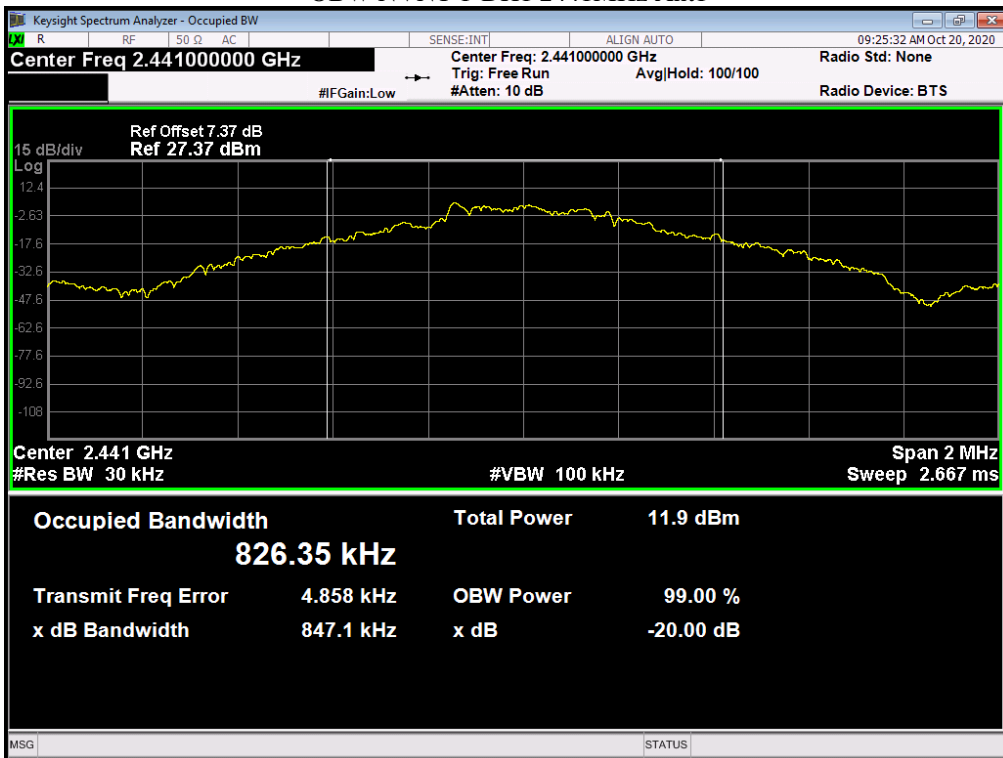
6.5. Test results

Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)	-20 dB Bandwidth (MHz)	Limit -20 dB Bandwidth (MHz)	Verdict
NVNT	1-DH1	2402	Ant 1	0.8238	0.8684	0	Pass
NVNT	1-DH1	2441	Ant 1	0.8263	0.8471	0	Pass
NVNT	1-DH1	2480	Ant 1	0.818	0.8576	0	Pass

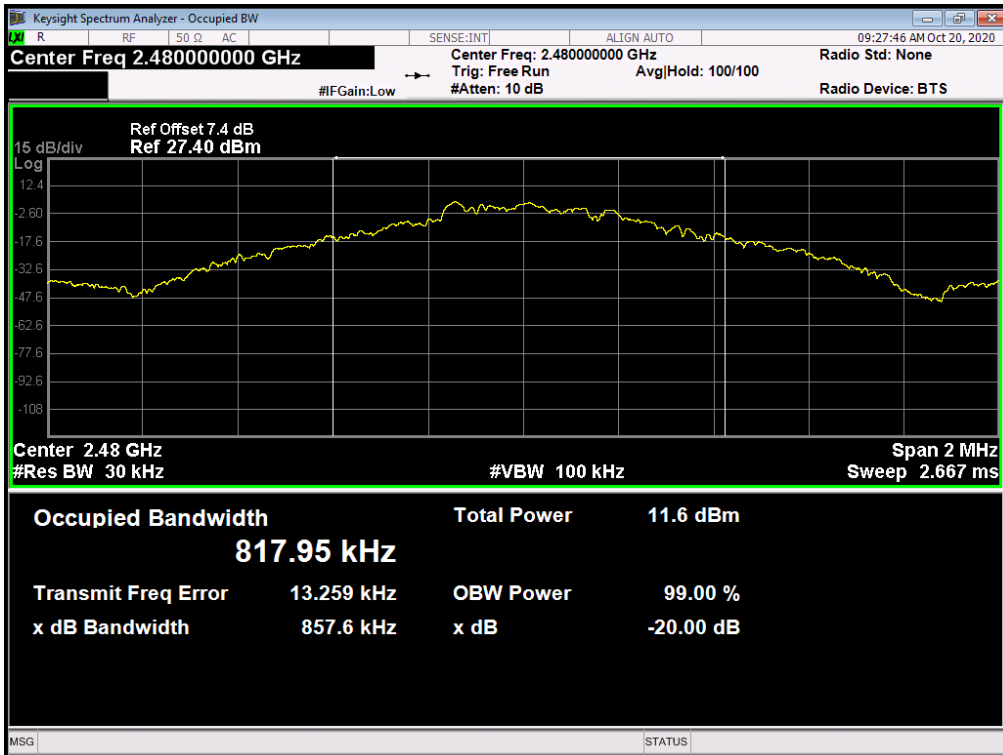
OBW NVNT 1-DH1 2402MHz Ant1



OBW NVNT 1-DH1 2441MHz Ant1

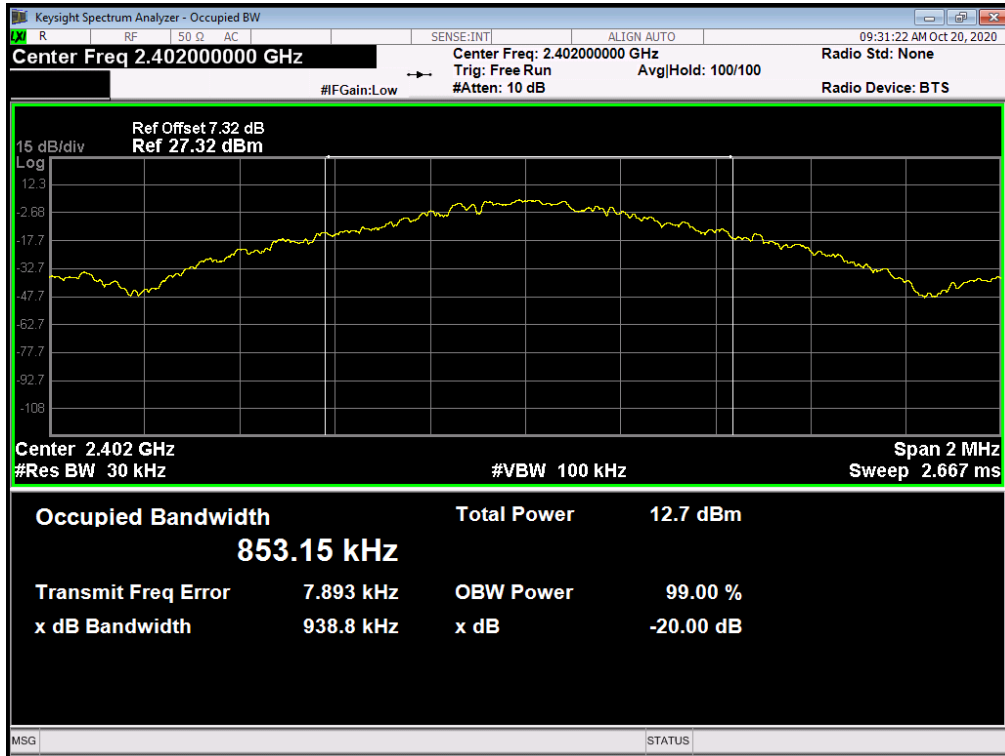


OBW NVNT 1-DH1 2480MHz Ant1

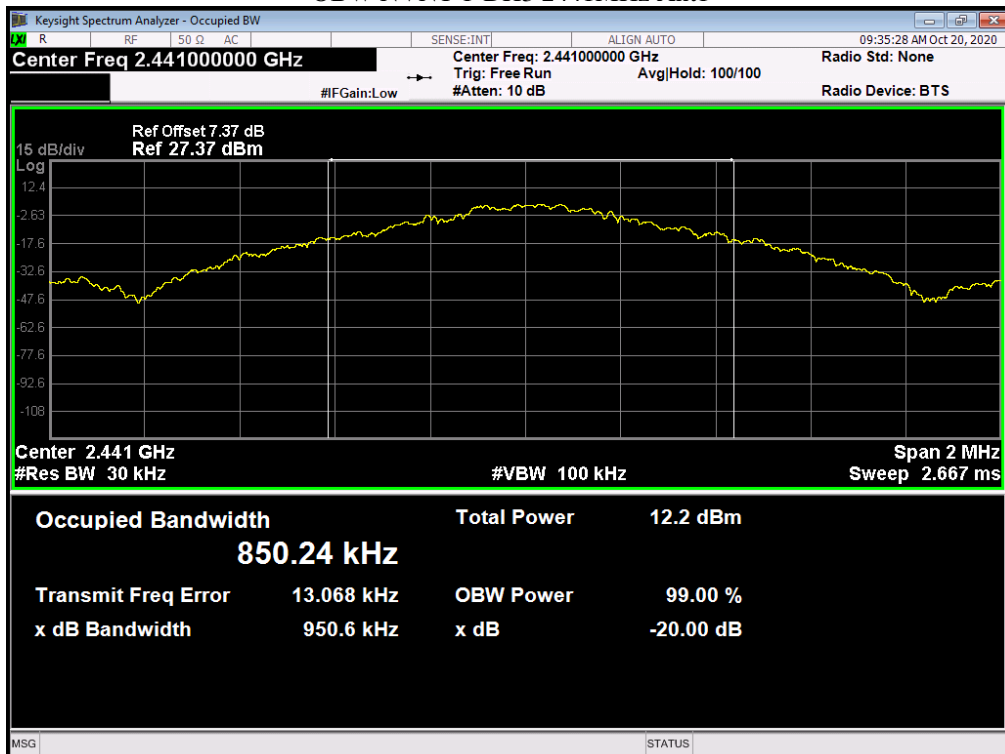


Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)	-20 dB Bandwidth (MHz)	Limit -20 dB Bandwidth (MHz)	Verdict
NVNT	1-DH3	2402	Ant 1	0.8531	0.9388	0	Pass
NVNT	1-DH3	2441	Ant 1	0.8502	0.9506	0	Pass
NVNT	1-DH3	2480	Ant 1	0.8565	0.9444	0	Pass

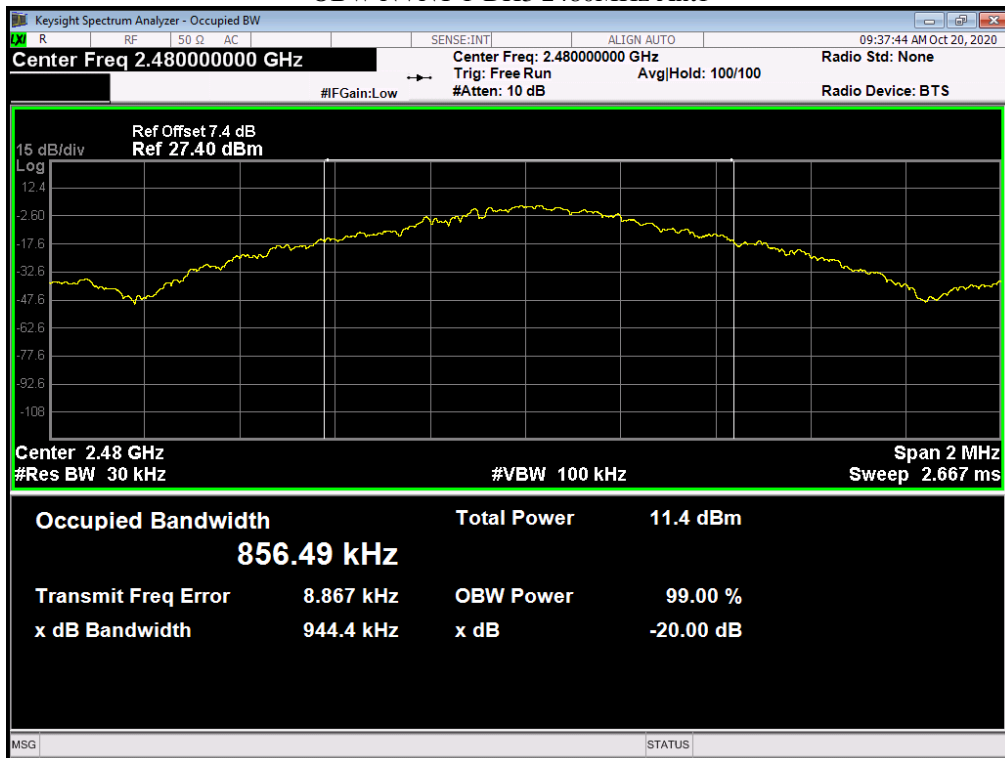
OBW NVNT 1-DH3 2402MHz Ant1



OBW NVNT 1-DH3 2441MHz Ant1

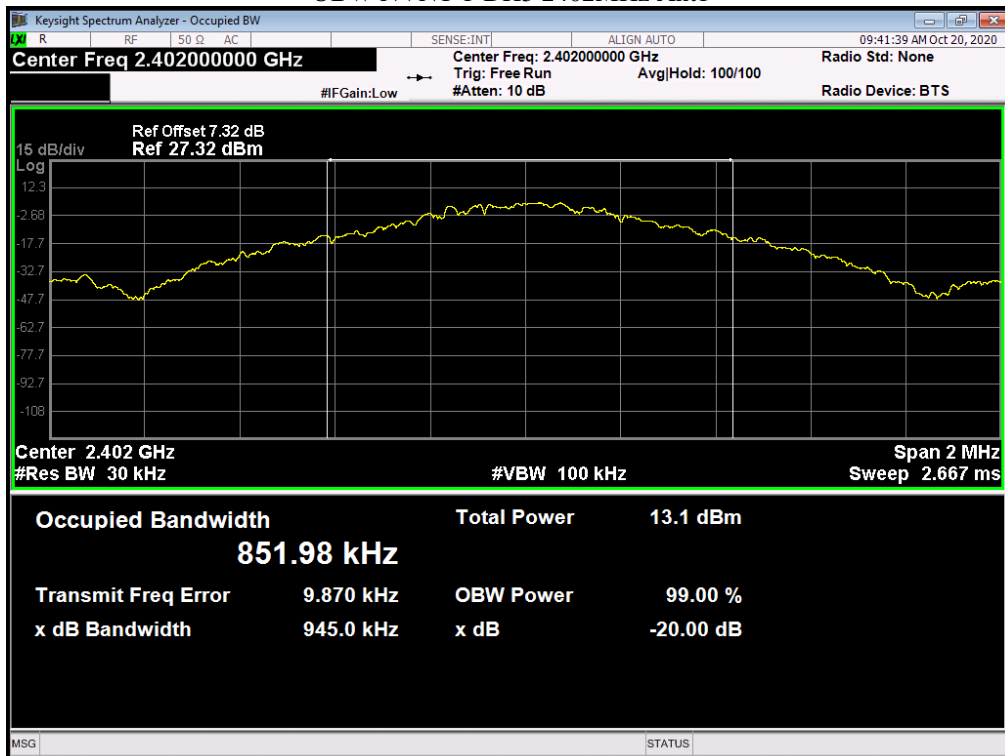


OBW NVNT 1-DH3 2480MHz Ant1

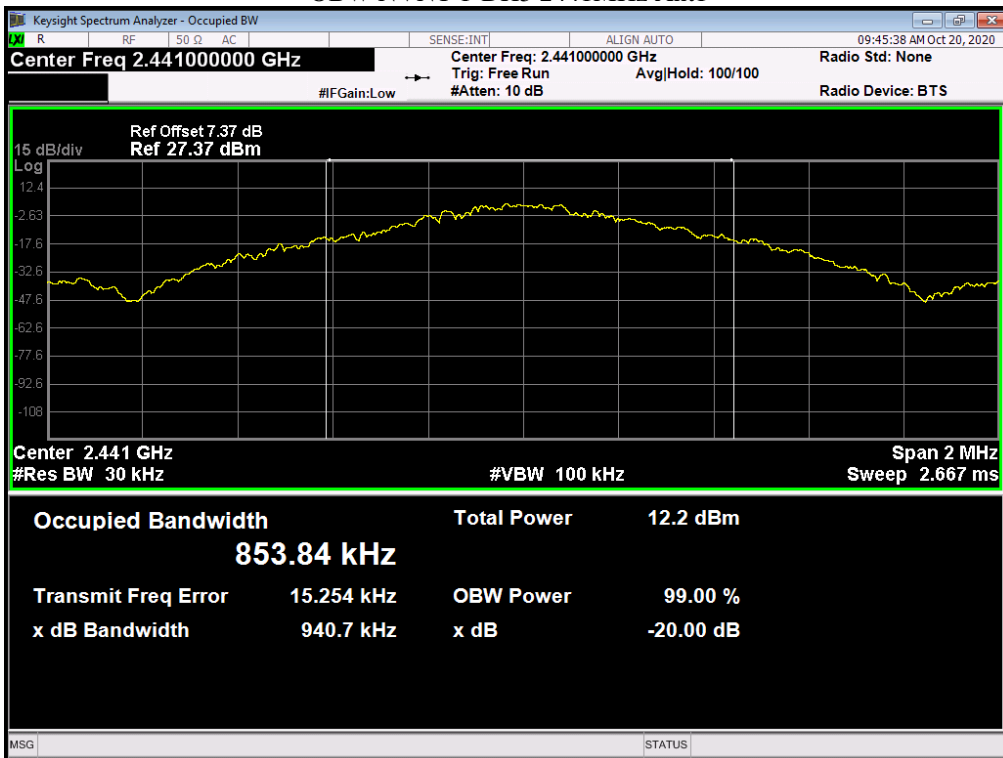


Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)	-20 dB Bandwidth (MHz)	Limit -20 dB Bandwidth (MHz)	Verdict
NVNT	1-DH5	2402	Ant 1	0.852	0.945	0	Pass
NVNT	1-DH5	2441	Ant 1	0.8538	0.9407	0	Pass
NVNT	1-DH5	2480	Ant 1	0.8589	0.9304	0	Pass

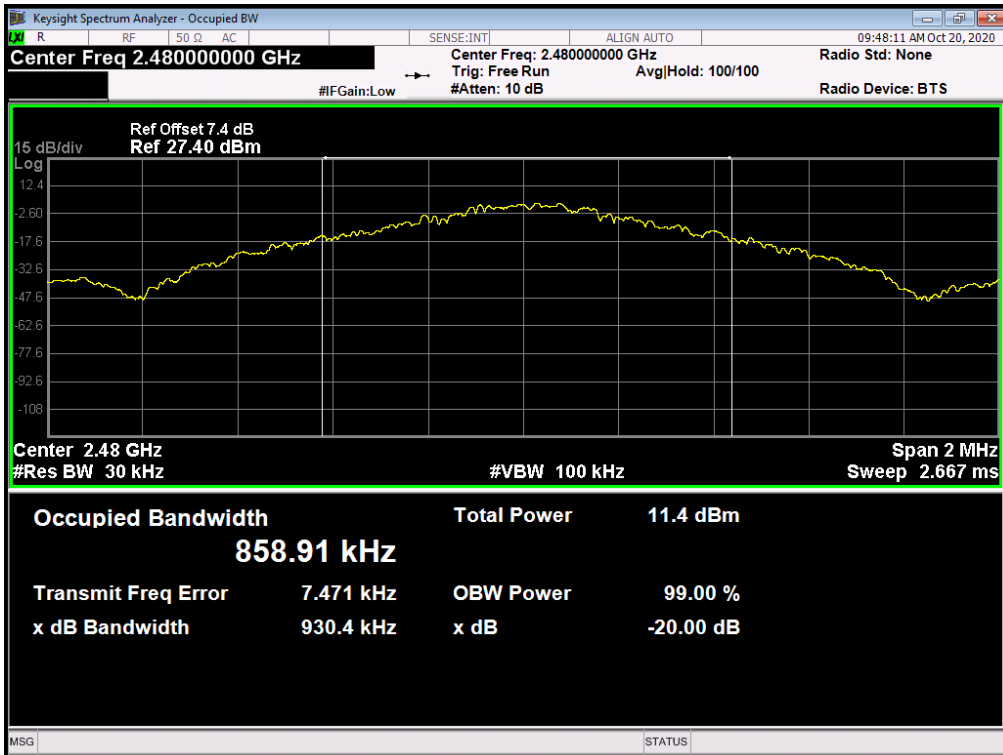
OBW NVNT 1-DH5 2402MHz Ant1



OBW NVNT 1-DH5 2441MHz Ant1

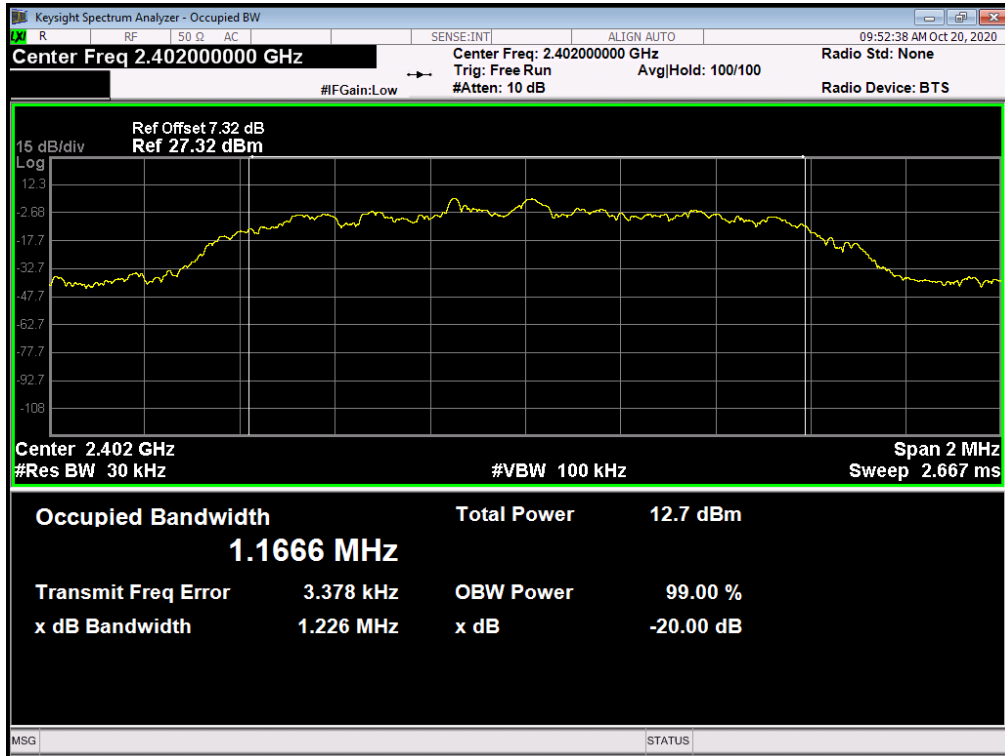


OBW NVNT 1-DH5 2480MHz Ant1



Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)	-20 dB Bandwidth (MHz)	Limit -20 dB Bandwidth (MHz)	Verdict
NVNT	2-DH1	2402	Ant 1	1.1666	1.2261	0	Pass
NVNT	2-DH1	2441	Ant 1	1.1691	1.2888	0	Pass
NVNT	2-DH1	2480	Ant 1	1.1504	1.2541	0	Pass

OBW NVNT 2-DH1 2402MHz Ant1



OBW NVNT 2-DH1 2441MHz Ant1

