



FCC TEST REPORT

FCC ID: 2BAYW-XPEJ011

On Behalf of

ZhenShi Information Technology (Shenzhen) Co., Ltd

Mibro OpenEar Pro

Model No.: XPEJ011

Prepared for : ZhenShi Information Technology (Shenzhen) Co., Ltd
Address : RM1401-1403, 1408, Tower E, Galaxy World, Minzhi Street, Longhua
District, Shenzhen, China

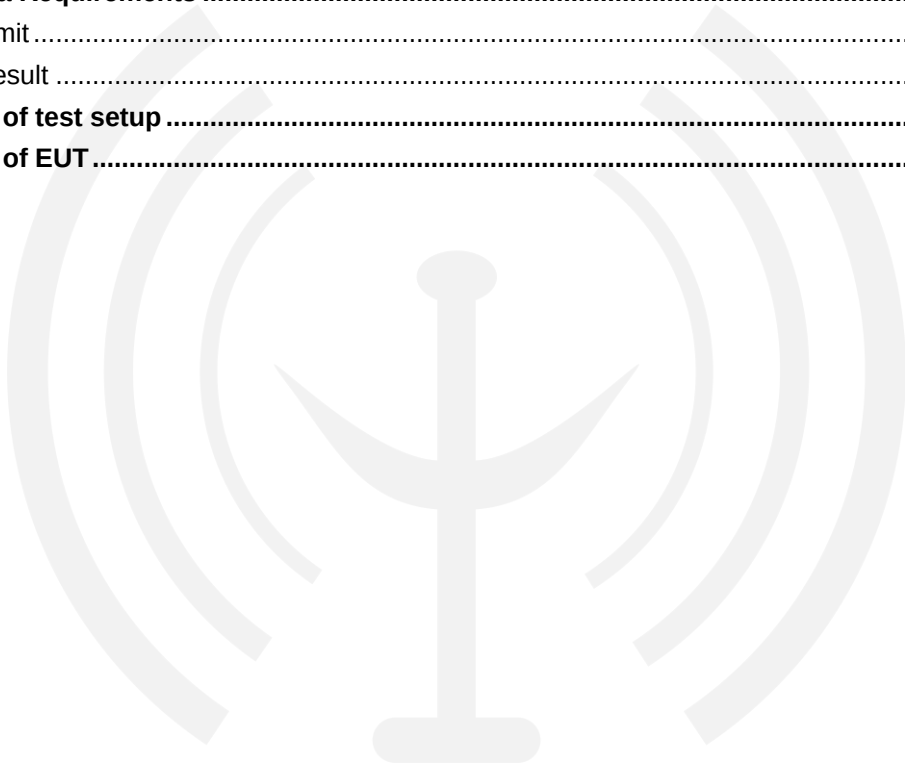
Prepared By : Shenzhen PSI Testing Co., Ltd.
Address : 1-2/F., Building 5, Yudafu Industrial Park, No.10, Xingye West Road,
Shajing Subdistrict, Bao'an District, Shenzhen, Guangdong, China

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TEST REPORT DECLARATION

Applicant : ZhenShi Information Technology (Shenzhen) Co., Ltd
Address : RM1401-1403, 1408, Tower E, Galaxy World, Minzhi Street, Longhua District,
Shenzhen, China
Manufacturer : ZhenShi Information Technology (Shanghai) Co., Ltd
Address : Room 4015, Building 2, No.588 Zixing Road, Minhang District, Shanghai, China
EUT Description : Mibro OpenEar Pro
(A) Model No. : XPEJ011
(B) Trademark : **mibro**

Measurement Standard Used:

**FCC Rules and Regulations Part 15 Subpart C Section 15.247,
ANSI C63.10-2013**

Test Result: PASS

The device described above is tested by Shenzhen PSI Testing Co., Ltd. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The test results are contained in this test report and Shenzhen PSI Testing Co., Ltd. is assumed full responsibility for the accuracy and completeness of test. Also, this report shows that the EUT is technically compliant with the FCC Part15 requirements.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen PSI Testing Co., Ltd.

Tested by (name + signature).....:	Jensen Wang Test Engineer	
Approved by (name + signature).....:	Simple Guan Project Manager	
Date of issue.....:	October 28, 2024	

Revision History

Revision	Issue Date	Revisions	Revised By
V0	October 28, 2024	Initial released Issue	Jensen Wang



1. Summary Of Standards And Results

1.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below:

Test Item	Standards Paragraph	Result
Maximum Peak Output Power	FCC Part 15: 15.247(b)(1)	P
Bandwidth	FCC Part 15:15.247(a)(1)	P
Carrier Frequency Separation	FCC Part 15: 15.247(a)(1)	P
Number Of Hopping Channel	FCC Part 15: 15.247(a)(1)	P
Dwell Time	FCC Part 15: 15.247(a)(1)	P
Radiated Spurious Emission	FCC Part 15: 15.209 FCC Part 15: 15.205	P
Out-of-band Emissions	FCC Part 15: 15.247(d)	P
Radiated Band Edge Emission	FCC Part 15: 15.247(d)	P
Power Line Conducted Emissions	FCC Part 15: 15.207	P
Antenna requirement	FCC Part 15: 15.203	P
Note: 1. P is an abbreviation for Pass. 2. F is an abbreviation for Fail. 3. N/A is an abbreviation for Not Applicable. 4. Conclusion determination rules of this report: Unless there are clear provisions on measurement uncertainty in the standard or customer requirements, decision by actual test data without considering measurement uncertainty. 5. Measurement method usage KDB 558074 D01 15.247 Meas Guidance v05r02.		

2. General Information

2.1. Description of Device (EUT)

Description/PMN : Mibro OpenEar Pro

Model List : XPEJ011

Diff : N/A

Test Voltage : DC 3.7V from battery, DC 5V from Charging Case

Radio Technology : Bluetooth V5.4 EDR

Operation frequency : 2402MHz-2480MHz

Modulation : GFSK, $\pi/4$ -DQPSK, 8 DPSK

Channel No. : 79 Channels

Channel Separation : 1MHz

Antenna Type : Left earphone :Internal Antenna, max gain -0.51dBi.
Right earphone :Internal Antenna, max gain -1.13dBi.

Software version : V1.0

Hardware version : V1.0

Intend use environment : Residential, commercial and light industrial environment

Note : Antenna information is provided by applicant.
Testing lab is not responsible for the accuracy of the information.

Because the antennas of the left and right earphones are different, they are both tested.

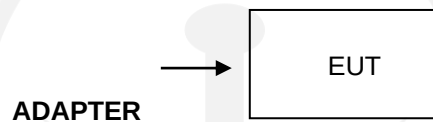
2.2. Accessories of Device (EUT)

Accessories	: Charging Case
Manufacturer	: ZhenShi Information Technology (Shanghai) Co., Ltd
Model	: N/A
Input	: N/A
Output	: N/A

2.3. Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number
1	Adapter	Baseus	CCXFK65CC	N/A
2	USB Cable	N/A	N/A	N/A

2.4. Block Diagram of connection between EUT and simulators



2.5. Test Mode Description

The test software used to control EUT work in Continuous TX mode, and select test channel, wireless mode

Tested mode, channel, and data rate information		
Mode	Channel	Frequency (MHz)
GFSK / Pi/4-DQPSK / 8 DPSK Carrier Tx Mode	CH0	2402
	CH39	2441
	CH78	2480
GFSK / Pi/4-DQPSK / 8 DPSK hopping on Tx Mode	CH0 to CH78	2402 to 2480
GFSK / Pi/4-DQPSK / 8 DPSK hopping off Tx Mode	CH0	2402
	CH39	2441
	CH78	2480

2.6. Test Conditions

Items	Required	Actual
Temperature range:	15-35°C	26°C
Humidity range:	25-75%	54%
Pressure range:	86-106kPa	98kPa

2.7. Test Facility

Shenzhen PSI Testing Co., Ltd.

1-2/F., Building 5, Yudafu Industrial Park, No.10, Xingye West Road, Shajing Subdistrict, Bao'an District, Shenzhen, Guangdong, China

September 13, 2023 File on Federal Communication Commission

Registration Number: 916281

2.8. Measurement Uncertainty

(95% confidence levels, k=2)

Item	Uncertainty
Uncertainty for Power line Conducted Emissions Test	2.17dB
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	3.5dB
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	2.74dB(Polarize: V)
	2.76dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 18GHz)	4.29dB(Polarize: V)
	4.82dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (18GHz to 40GHz)	4.31 dB(Polarize: V)
	4.30 dB(Polarize: H)
Uncertainty for radio frequency	48.24KHz
Uncertainty for conducted RF Power	0.41dB
Uncertainty for Power Spectral Density	0.39 dB
Occupied Bandwidth	968Hz
Conducted Spurious Emission	1.26dB

2.9. Test Equipment List

Item	Equipment	Manufacturer	Model No.	Serial No.	Firmware Version	Last Cal.	Cal. Interval
1.	9*6*6 anechoic chamber	SKET	9*6*6	N/A	/	2022.12.20	3 Year
2.	Test Receiver	Rohde&Schwarz	ESCI 7	101032/003	4.42 SP3	2023.12.19	1 Year
3.	L.I.S.N.#1	Rohde&Schwarz	ENV216	102282	/	2023.12.19	1 Year
4.	L.I.S.N.#2	RFT	NNB111	13835240	/	2023.12.19	1 Year
5.	Loop Antenna	Schwarz beck	FMZB 1519B	00128	/	2023.04.03	2 Year
6.	Bilog Antenna	Schwarz beck	VULB 9168	01448	/	2022.12.26	2 Year
7.	Spectrum Analyzer	Rohde&Schwarz	FSV-40N	101648	3.70	2023.12.19	1 Year
8.	Horn Antenna	Schwarz beck	BBHA 9120 D	02706	/	2022.12.26	2 Year
9.	Amplifier	SKET	LAPA_01G18 G-45dB	SK20220329 01	/	2023.12.19	1 Year
10.	Horn Antenna	Schwarz beck	BBHA 9170	00946	/	2022.12.25	2 Year
11.	Amplifier	SKET	LNPA_0118G -45	SK20200108 01	/	2023.12.19	1 Year
12	RF Power Probe	Rohde&Schwarz	NRP-Z11	1138.3004.02 -1111533-Fz	/	2023.12.19	1 Year
13	RF Sensor Unit	Tachoy	TR1029-2	20220428P0 08	/	2023.12.19	1 Year
14	Temp. & Humid Chamber	Auchno	9606	/	/	2023.12.19	1 Year
15	Regulated DC Power Supply	Xinouhua	ADC120V10 A	2022112516 38		2023.12.19	1 Year
16	Spectrum Analyzer	Agilent	N9020A	MY51281067	A.14.03	2023.12.19	1 Year

For Test Software Information

Item	Software Name	Manufacturer	Version
RE	EZ_EMC	Farad	PSI-3A1
CE	EZ_EMC	Farad	PSI-3A1
RF	RTS	TACHOY	V1.0.0

3. Maximum Peak Output Power

3.1. Limit

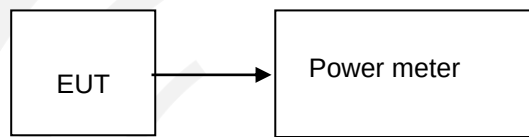
Please refer FCC part 15.247 & RSS-247.

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, the e.i.r.p shall not exceed 4W

3.2. Test Procedure

The transmitter output is connected to the RF Power meter. The Power meter is set to the peak power detection.

3.3. Test Setup



3.4. Test Result

Left earphone:

Condition	Antenna	Modulation	Frequency (MHz)	Max. Conducted Power(dBm)	Max. Conducted Power(mW)	Limit(mW)	Result
NVNT	ANT1	1-DH1	2402.00	2.26	1.68	1000	Pass
NVNT	ANT1	1-DH1	2441.00	2.66	1.84	125	Pass
NVNT	ANT1	1-DH1	2480.00	2.74	1.88	125	Pass
NVNT	ANT1	2-DH1	2402.00	3.09	2.04	125	Pass
NVNT	ANT1	2-DH1	2441.00	3.38	2.18	125	Pass
NVNT	ANT1	2-DH1	2480.00	3.52	2.25	125	Pass
NVNT	ANT1	3-DH1	2402.00	1.96	1.57	125	Pass
NVNT	ANT1	3-DH1	2441.00	2.16	1.64	125	Pass
NVNT	ANT1	3-DH1	2480.00	2.23	1.67	125	Pass

Right earphone:

Condition	Antenna	Modulation	Frequency (MHz)	Max. Conducted Power(dBm)	Max. Conducted Power(mW)	Limit(mW)	Result
NVNT	ANT1	1-DH1	2402.00	2.08	1.61	1000	Pass
NVNT	ANT1	1-DH1	2441.00	2.34	1.71	125	Pass
NVNT	ANT1	1-DH1	2480.00	2.39	1.73	125	Pass
NVNT	ANT1	2-DH1	2402.00	2.76	1.89	125	Pass
NVNT	ANT1	2-DH1	2441.00	3.00	2.00	125	Pass
NVNT	ANT1	2-DH1	2480.00	3.06	2.02	125	Pass
NVNT	ANT1	3-DH1	2402.00	1.50	1.41	125	Pass
NVNT	ANT1	3-DH1	2441.00	1.71	1.48	125	Pass
NVNT	ANT1	3-DH1	2480.00	1.69	1.47	125	Pass

4. Bandwidth

4.1. Limit

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in RSS-GEN, FCC Section 15.247(a)(1), must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

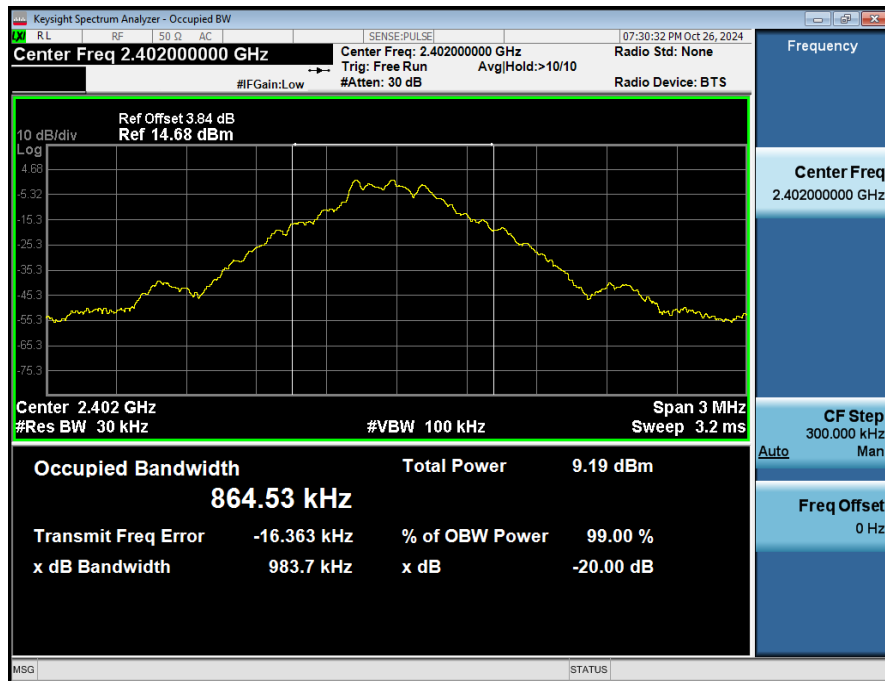
4.2. Test Procedure

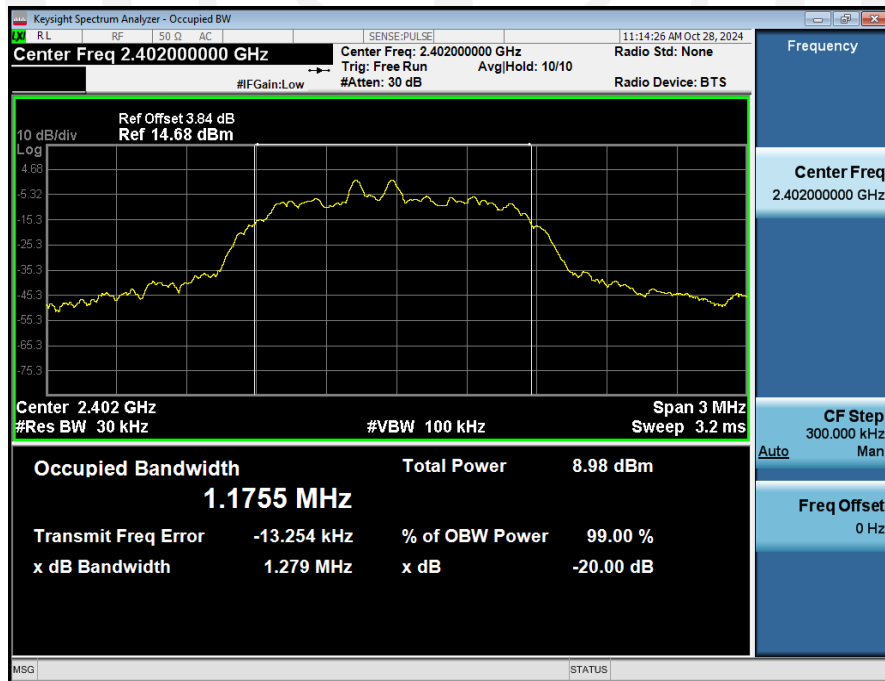
The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30kHz RBW and 100kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

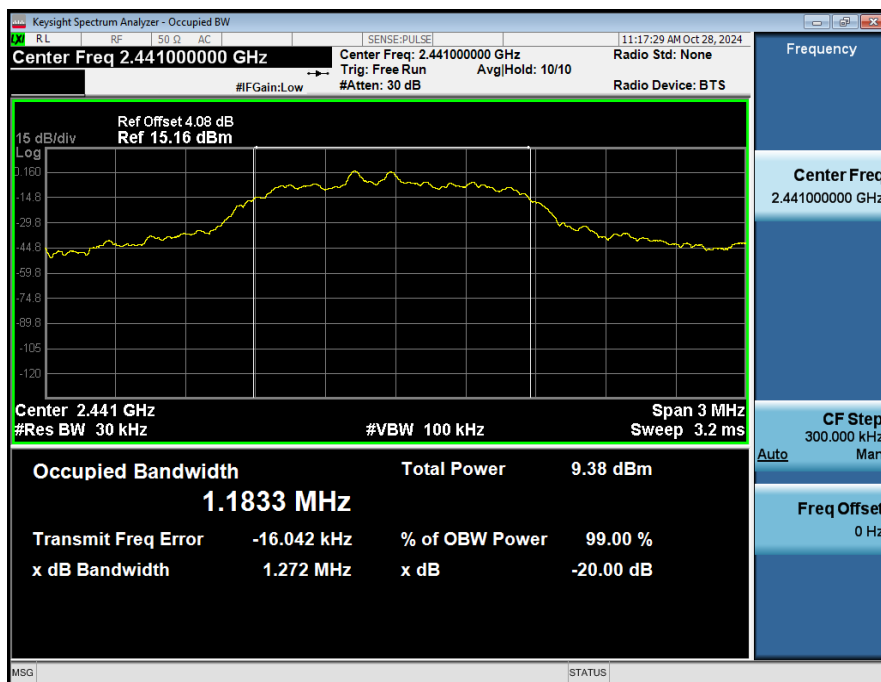
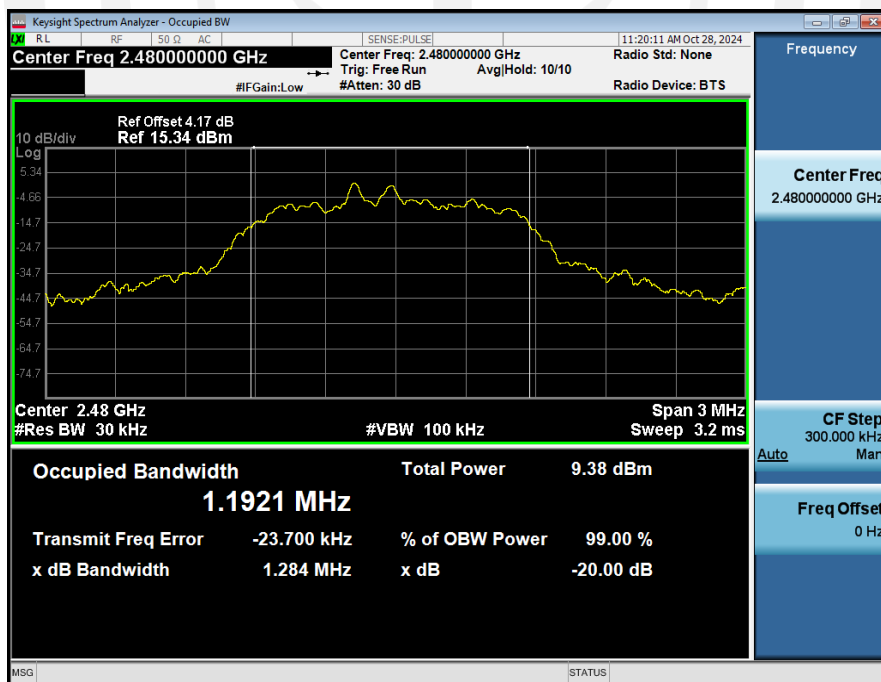
4.3. Test Result

Left earphone:

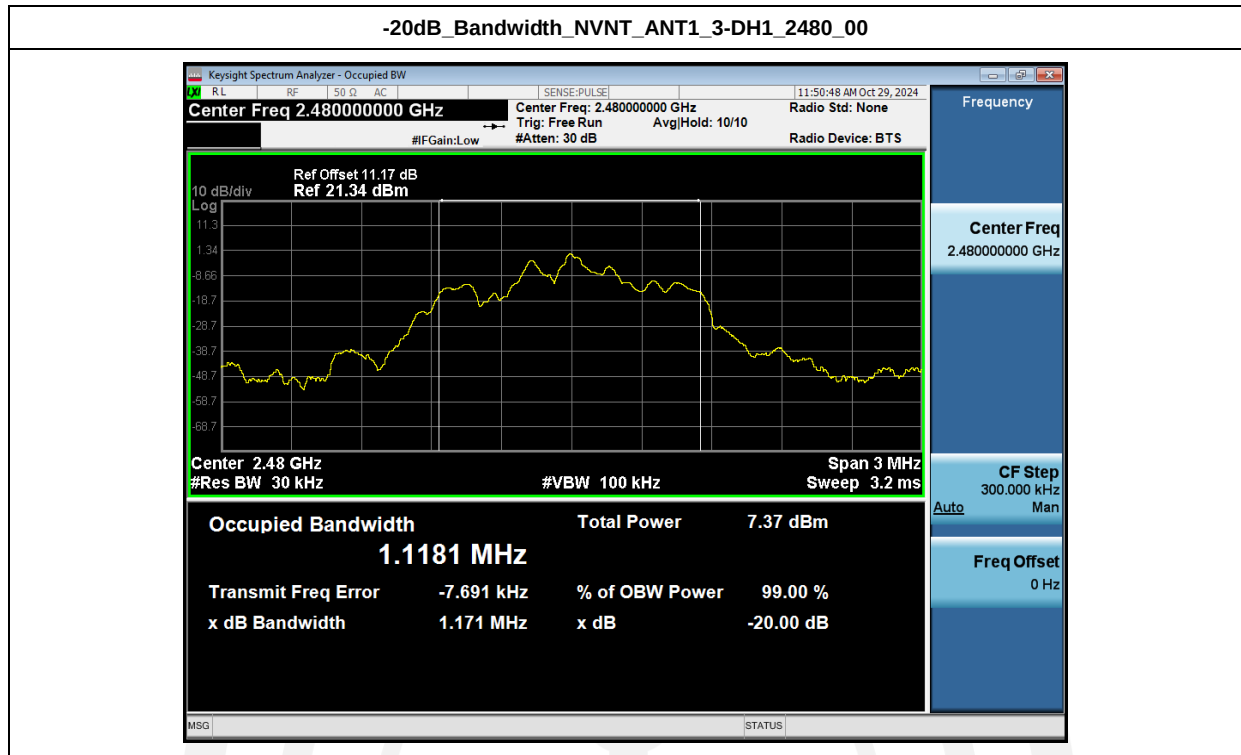
Condition	Antenna	Modulation	Frequency (MHz)	-20dB BW(MHz)	if larger than CFS
NVNT	ANT1	1-DH1	2402.00	0.984	No
NVNT	ANT1	1-DH1	2441.00	1.016	Yes
NVNT	ANT1	1-DH1	2480.00	1.029	Yes
NVNT	ANT1	2-DH1	2402.00	1.279	Yes
NVNT	ANT1	2-DH1	2441.00	1.272	Yes
NVNT	ANT1	2-DH1	2480.00	1.284	Yes
NVNT	ANT1	3-DH1	2402.00	1.171	Yes
NVNT	ANT1	3-DH1	2441.00	1.171	Yes
NVNT	ANT1	3-DH1	2480.00	1.171	Yes

-20dB_Bandwidth_NVNT_ANT1_1-DH1_2402_00**-20dB_Bandwidth_NVNT_ANT1_1-DH1_2441_00**

-20dB_Bandwidth_NVNT_ANT1_1-DH1_2480_00**-20dB_Bandwidth_NVNT_ANT1_2-DH1_2402_00**

-20dB_Bandwidth_NVNT_ANT1_2-DH1_2441_00**-20dB_Bandwidth_NVNT_ANT1_2-DH1_2480_00**

-20dB_Bandwidth_NVNT_ANT1_3-DH1_2402_00**-20dB_Bandwidth_NVNT_ANT1_3-DH1_2441_00**



Condition	Antenna	Modulation	Frequency (MHz)	99%BW(MHz)
NVNT	ANT1	1-DH1	2402.00	0.866
NVNT	ANT1	1-DH1	2441.00	0.915
NVNT	ANT1	1-DH1	2480.00	0.949
NVNT	ANT1	2-DH1	2402.00	1.177
NVNT	ANT1	2-DH1	2441.00	1.183
NVNT	ANT1	2-DH1	2480.00	1.194
NVNT	ANT1	3-DH1	2402.00	1.117
NVNT	ANT1	3-DH1	2441.00	1.118
NVNT	ANT1	3-DH1	2480.00	1.118

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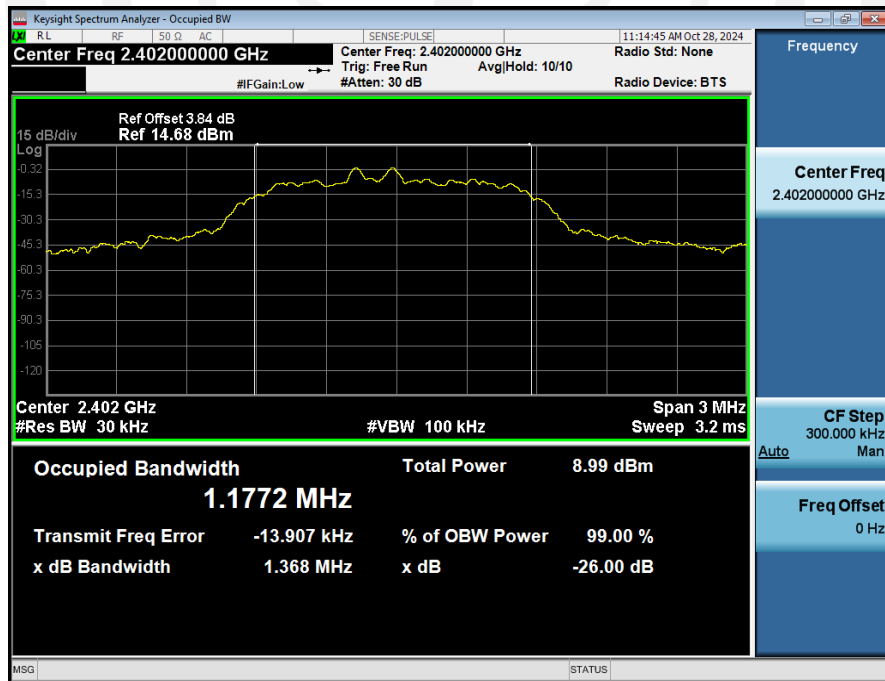
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99%_Occupied_Bandwidth_NVNT_ANT1_1-DH1_2480_00



99%_Occupied_Bandwidth_NVNT_ANT1_2-DH1_2402_00



99%_Occupied_Bandwidth_NVNT_ANT1_2-DH1_2441_00



99%_Occupied_Bandwidth_NVNT_ANT1_2-DH1_2480_00

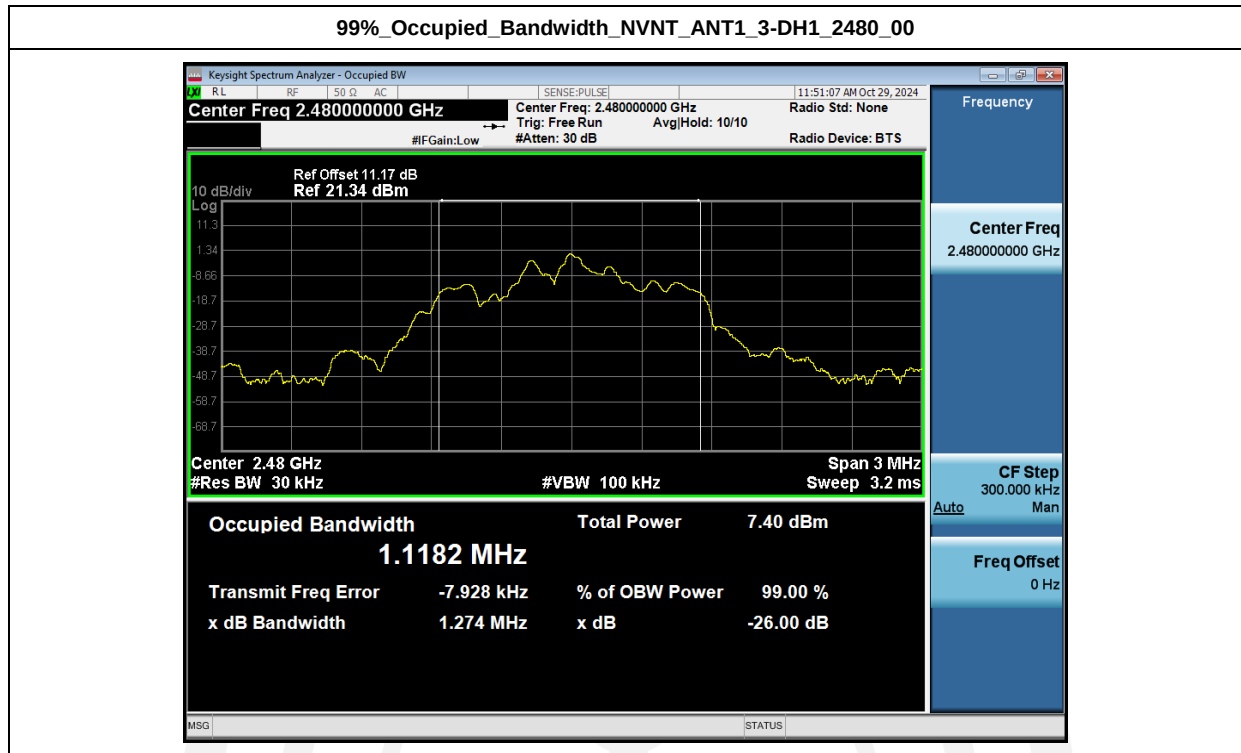


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99%_Occupied_Bandwidth_NVNT_ANT1_3-DH1_2441_00

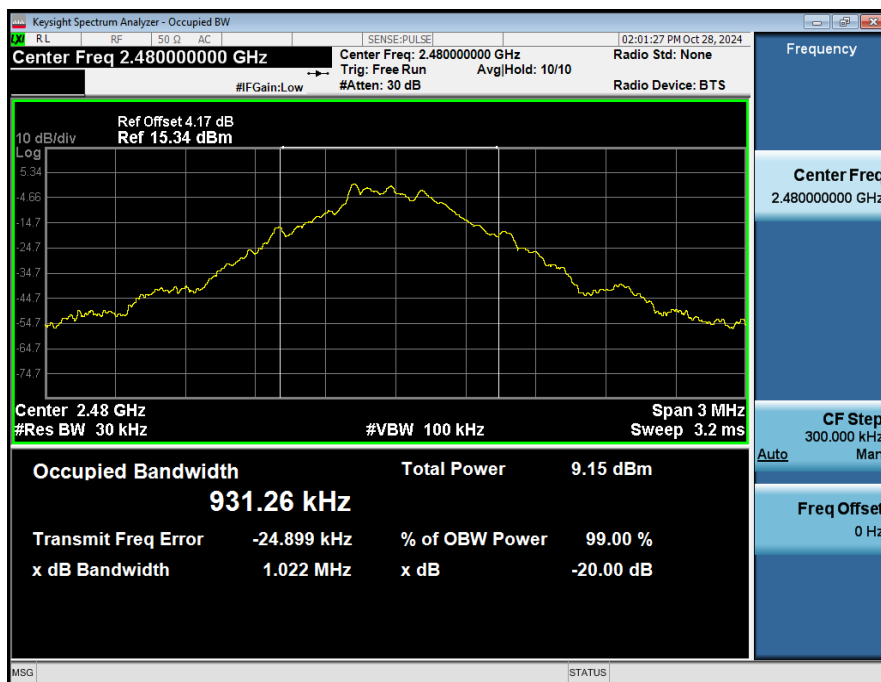
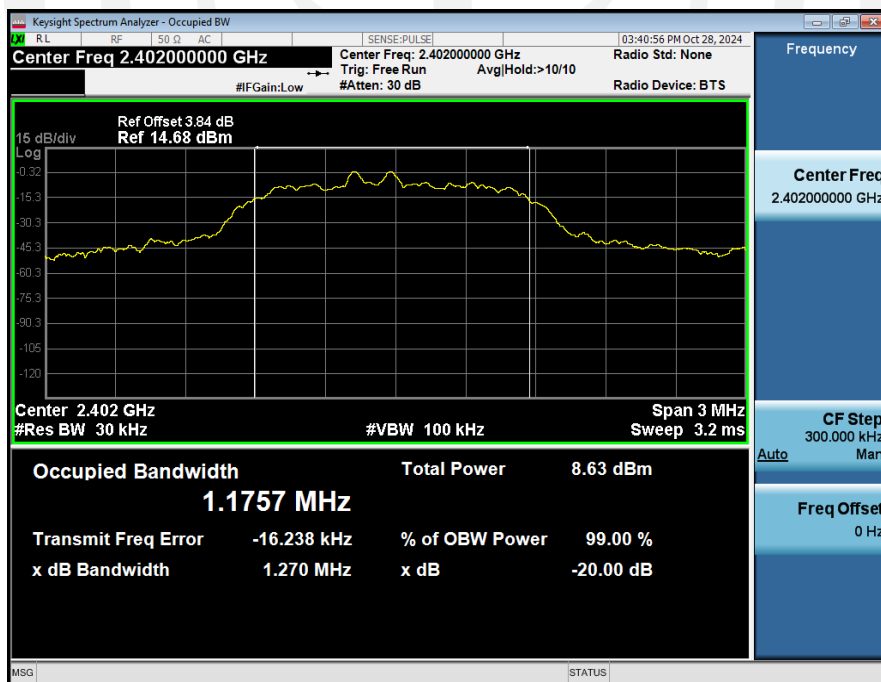


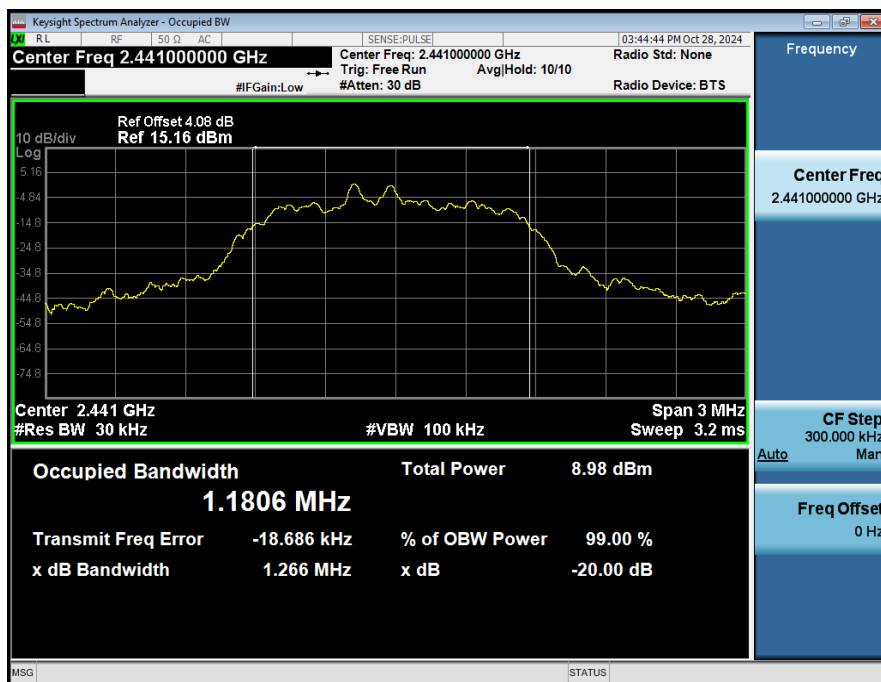
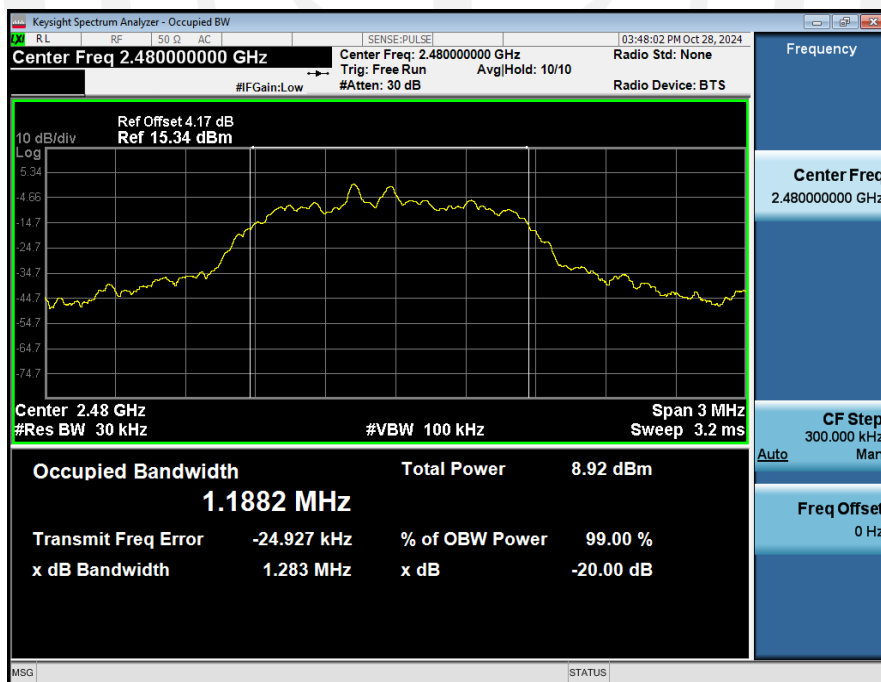


Right earphone:

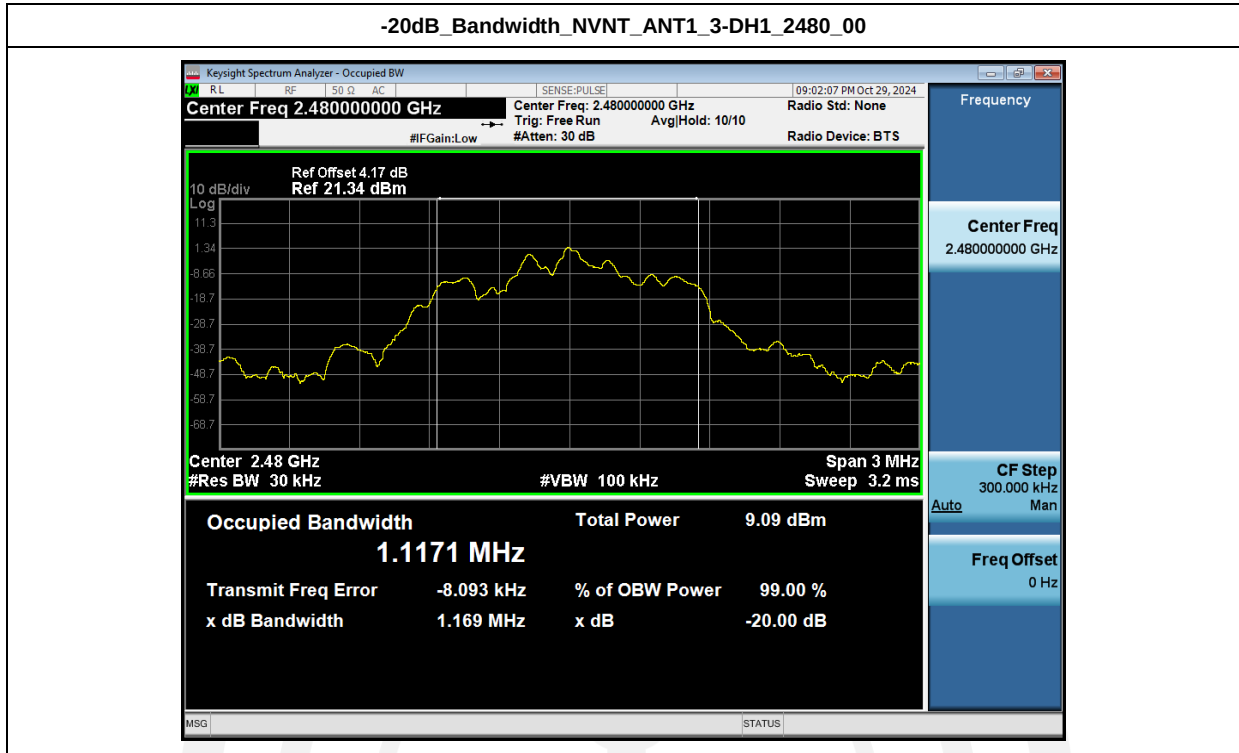
Condition	Antenna	Modulation	Frequency (MHz)	-20dB BW(MHz)	if larger than CFS
NVNT	ANT1	1-DH1	2402.00	0.975	No
NVNT	ANT1	1-DH1	2441.00	1.001	Yes
NVNT	ANT1	1-DH1	2480.00	1.022	Yes
NVNT	ANT1	2-DH1	2402.00	1.270	Yes
NVNT	ANT1	2-DH1	2441.00	1.266	Yes
NVNT	ANT1	2-DH1	2480.00	1.283	Yes
NVNT	ANT1	3-DH1	2402.00	1.011	Yes
NVNT	ANT1	3-DH1	2441.00	1.023	Yes
NVNT	ANT1	3-DH1	2480.00	1.038	Yes

-20dB_Bandwidth_NVNT_ANT1_1-DH1_2402_00**-20dB_Bandwidth_NVNT_ANT1_1-DH1_2441_00**

-20dB_Bandwidth_NVNT_ANT1_1-DH1_2480_00**-20dB_Bandwidth_NVNT_ANT1_2-DH1_2402_00**

-20dB_Bandwidth_NVNT_ANT1_2-DH1_2441_00**-20dB_Bandwidth_NVNT_ANT1_2-DH1_2480_00**

-20dB_Bandwidth_NVNT_ANT1_3-DH1_2402_00**-20dB_Bandwidth_NVNT_ANT1_3-DH1_2441_00**

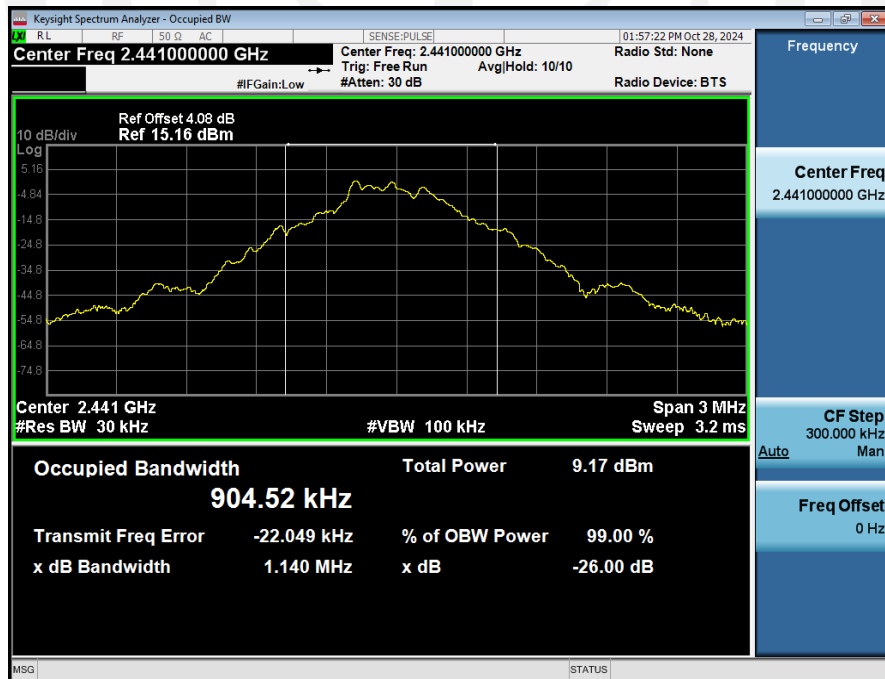


Condition	Antenna	Modulation	Frequency (MHz)	99%BW(MHz)
NVNT	ANT1	1-DH1	2402.00	0.862
NVNT	ANT1	1-DH1	2441.00	0.905
NVNT	ANT1	1-DH1	2480.00	0.931
NVNT	ANT1	2-DH1	2402.00	1.176
NVNT	ANT1	2-DH1	2441.00	1.183
NVNT	ANT1	2-DH1	2480.00	1.189
NVNT	ANT1	3-DH1	2402.00	1.117
NVNT	ANT1	3-DH1	2441.00	1.118
NVNT	ANT1	3-DH1	2480.00	1.118

99%_Occupied_Bandwidth_NVNT_ANT1_1-DH1_2402_00



99%_Occupied_Bandwidth_NVNT_ANT1_1-DH1_2441_00



99%_Occupied_Bandwidth_NVNT_ANT1_1-DH1_2480_00



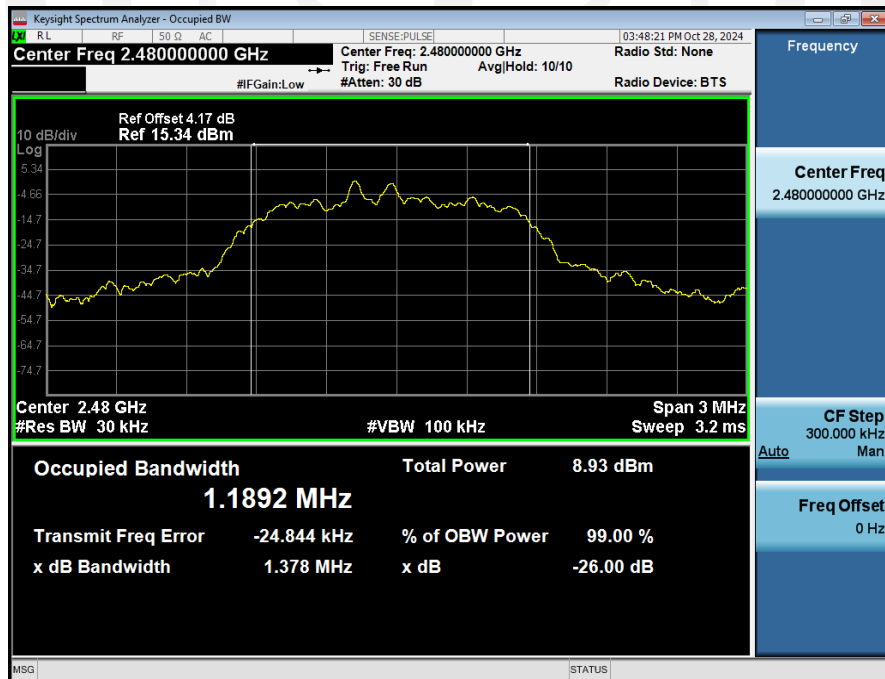
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99%_Occupied_Bandwidth_NVNT_ANT1_2-DH1_2441_00



99%_Occupied_Bandwidth_NVNT_ANT1_2-DH1_2480_00



99%_Occupied_Bandwidth_NVNT_ANT1_3-DH1_2402_00



99%_Occupied_Bandwidth_NVNT_ANT1_3-DH1_2441_00



99%_Occupied_Bandwidth_NVNT_ANT1_3-DH1_2480_00



5. Carrier Frequency Separation

5.1. 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

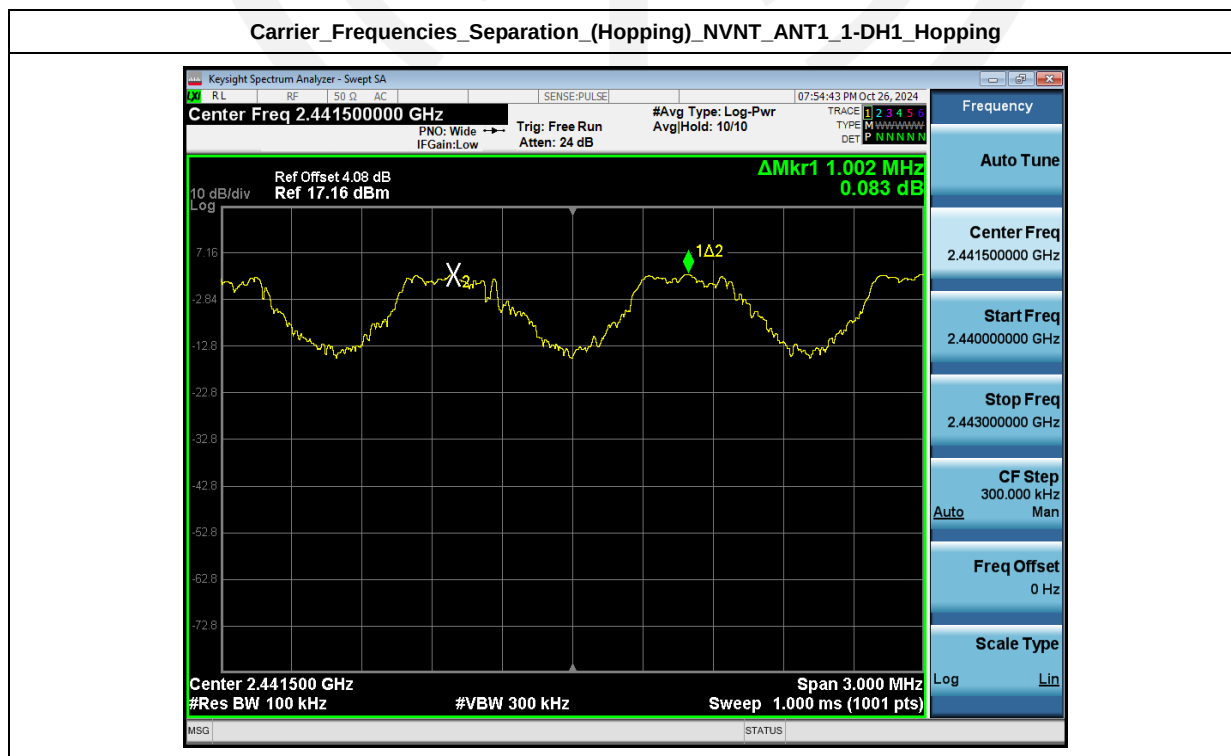
5.2. Test Procedure

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The carrier frequency was measured by spectrum analyzer with 100kHz RBW and 300kHz VBW.

5.3. Test Result

Left earphone:

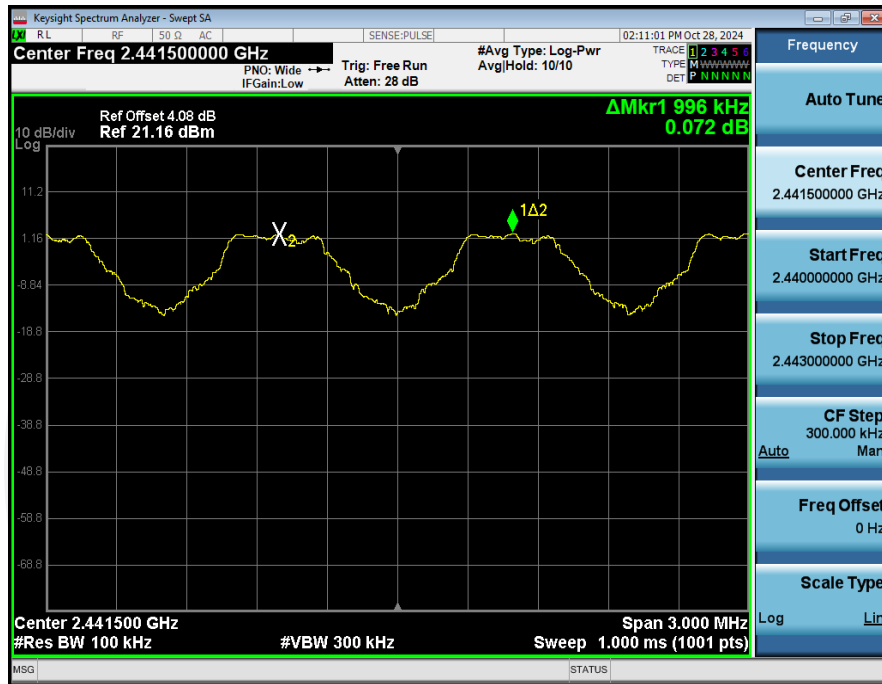
Condition	Antenna	Modulation	Frequency(MHz)	Hopping NO.0 (MHz)	Hopping NO.1 (MHz)	Carrier Frequencies Separation(MHz)	Limit(MHz)	Result
NVNT	ANT1	1-DH1	2441.00	2440.993	2441.995	1.00	0.677	Pass
NVNT	ANT1	2-DH1	2441.00	2440.831	2441.995	1.16	0.848	Pass
NVNT	ANT1	3-DH1	2441.00	2440.831	2441.833	1.00	0.781	Pass



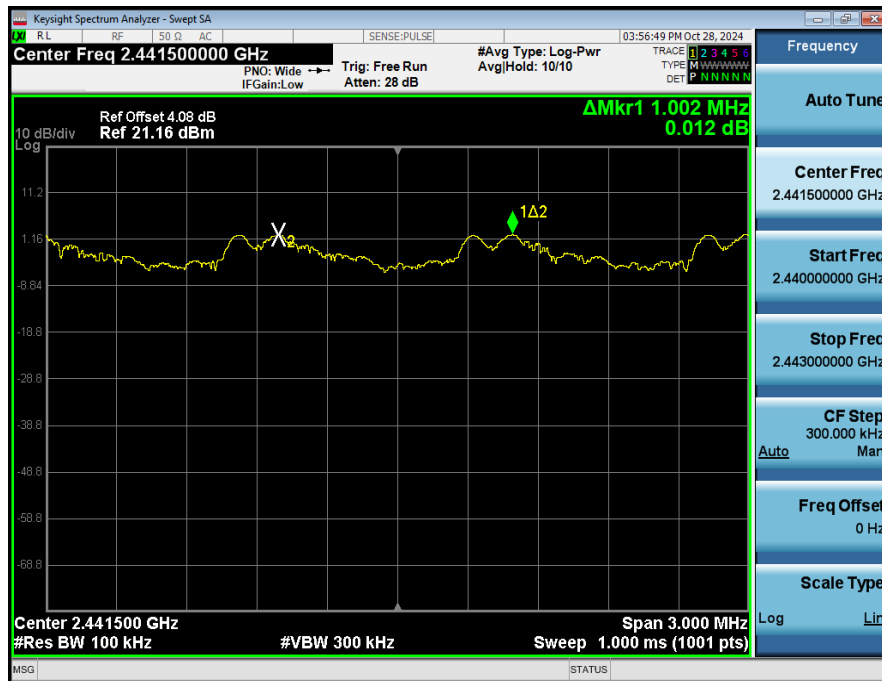
Right earphone:

Condition	Antenna	Modulation	Frequency(MHz)	Hopping NO.0 (MHz)	Hopping NO.1 (MHz)	Carrier Frequencies Separation(MHz)	Limit(MHz)	Result
NVNT	ANT1	1-DH1	2441.00	2440.996	2441.992	1.00	0.667	Pass
NVNT	ANT1	2-DH1	2441.00	2440.990	2441.992	1.00	0.844	Pass
NVNT	ANT1	3-DH1	2441.00	2441.032	2441.836	0.80	0.778	Pass

Carrier_Frequencies_Separation_(Hopping)_NVNT_ANT1_1-DH1_Hopping



Carrier_Frequencies_Separation_(Hopping)_NVNT_ANT1_2-DH1_Hopping



Carrier_Frequencies_Separation_(Hopping)_NVNT_ANT1_3-DH1_Hopping



6. Number Of Hopping Channel

6.1. Limit

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels

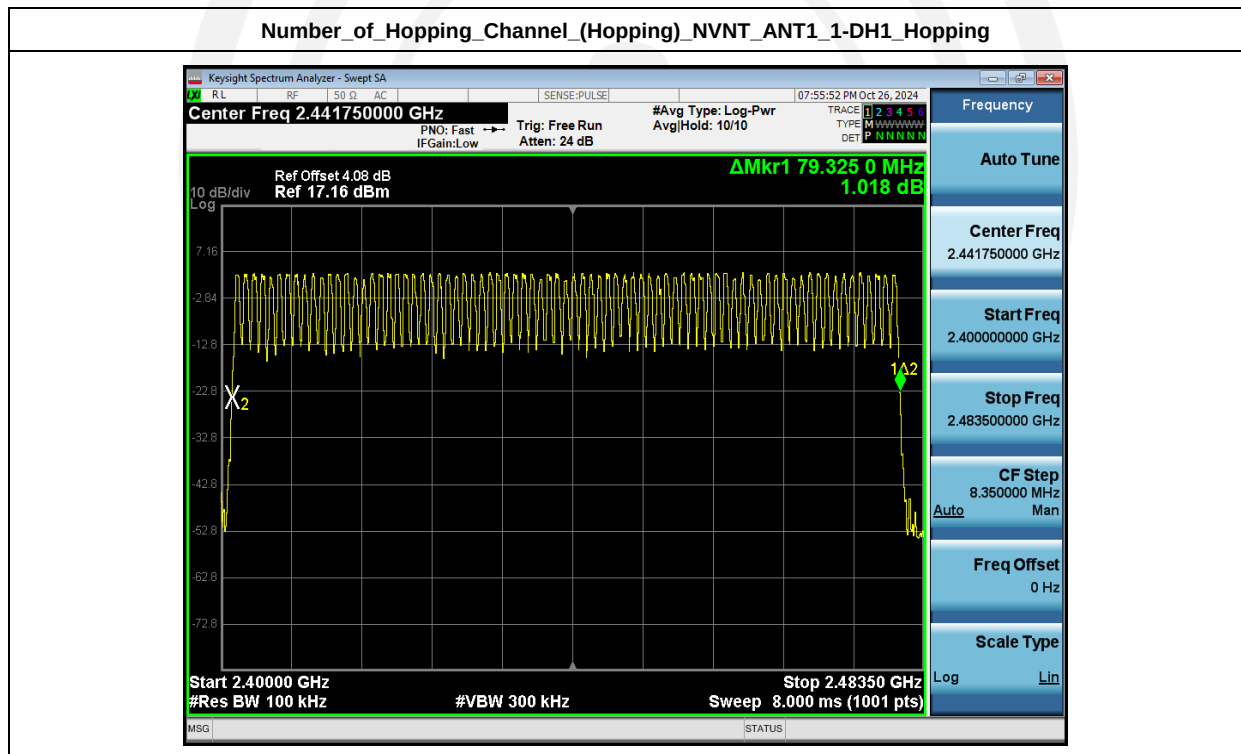
6.2. Test Procedure

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The number of hopping channel was measured by spectrum analyzer with 100kHz RBW and 300KHz VBW.

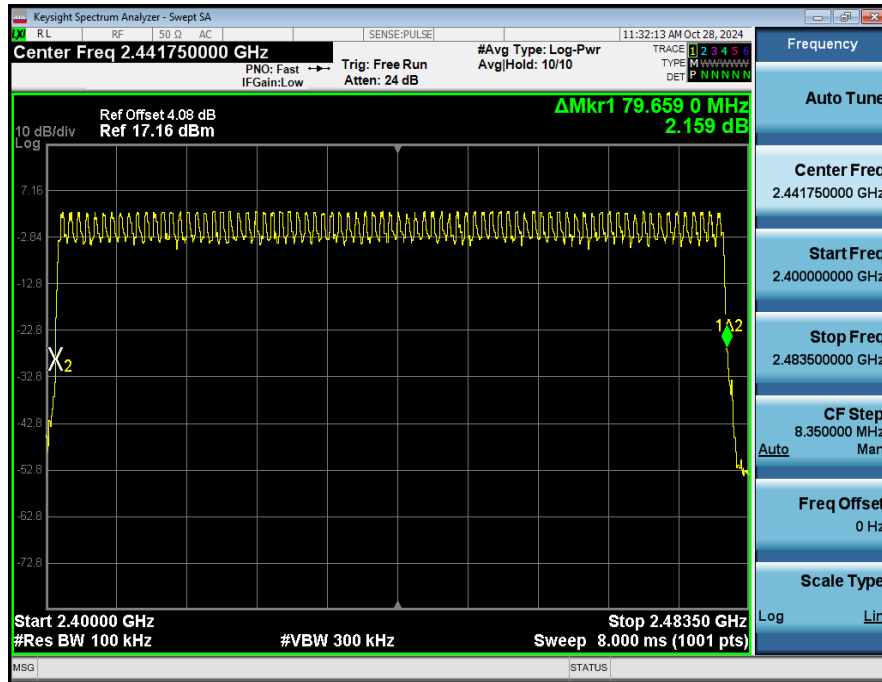
6.3. Test Result

Left earphone:

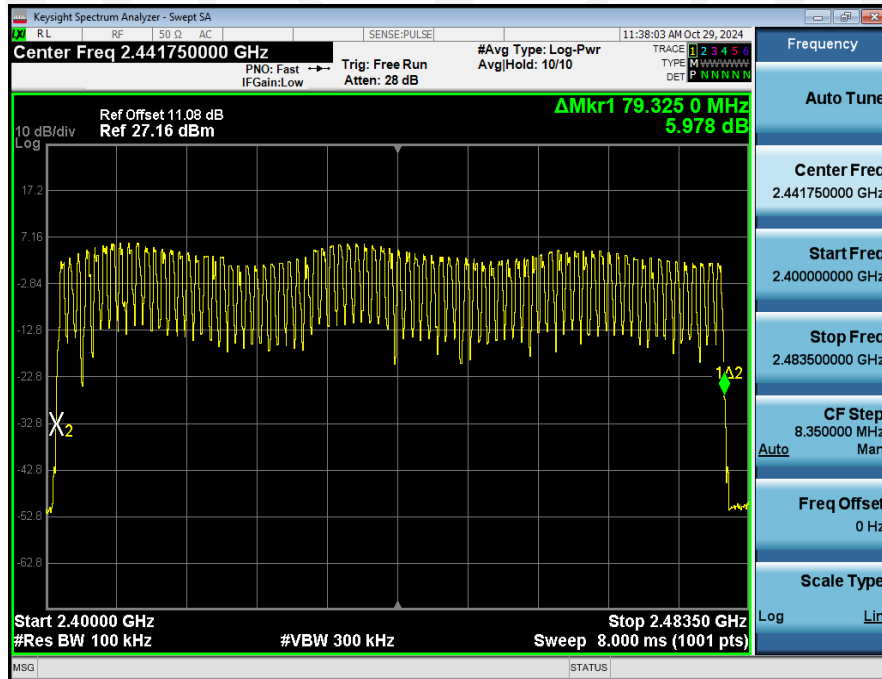
Condition	Antenna	Modulation	Hopping Num	Limit	Result
NVNT	ANT1	1-DH1	79	15	Pass
NVNT	ANT1	2-DH1	79	15	Pass
NVNT	ANT1	3-DH1	79	15	Pass



Number_of_Hopping_Channel_(Hopping)_NVNT_ANT1_2-DH1_Hopping



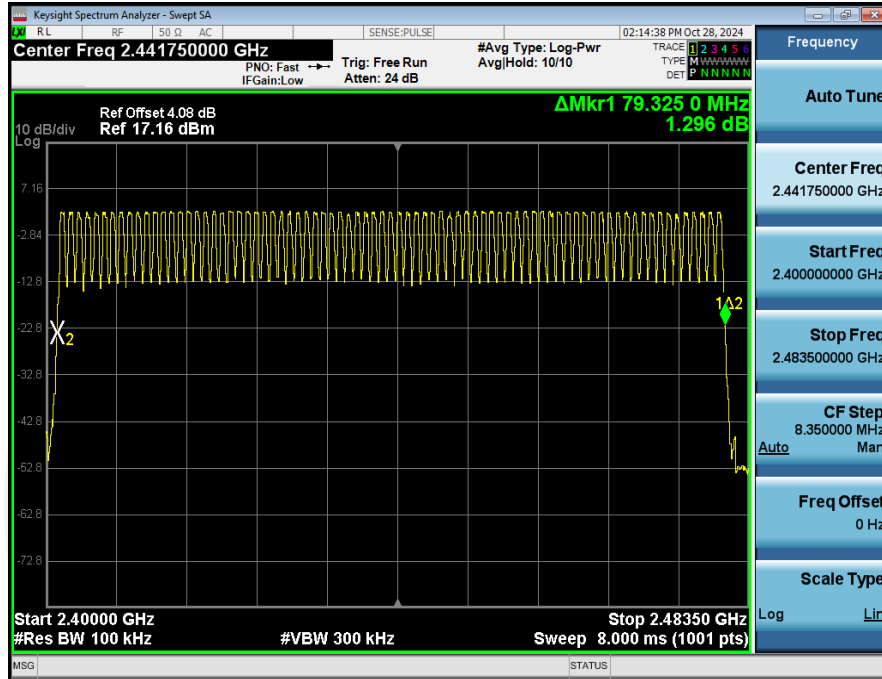
Number_of_Hopping_Channel_(Hopping)_NVNT_ANT1_3-DH1_Hopping



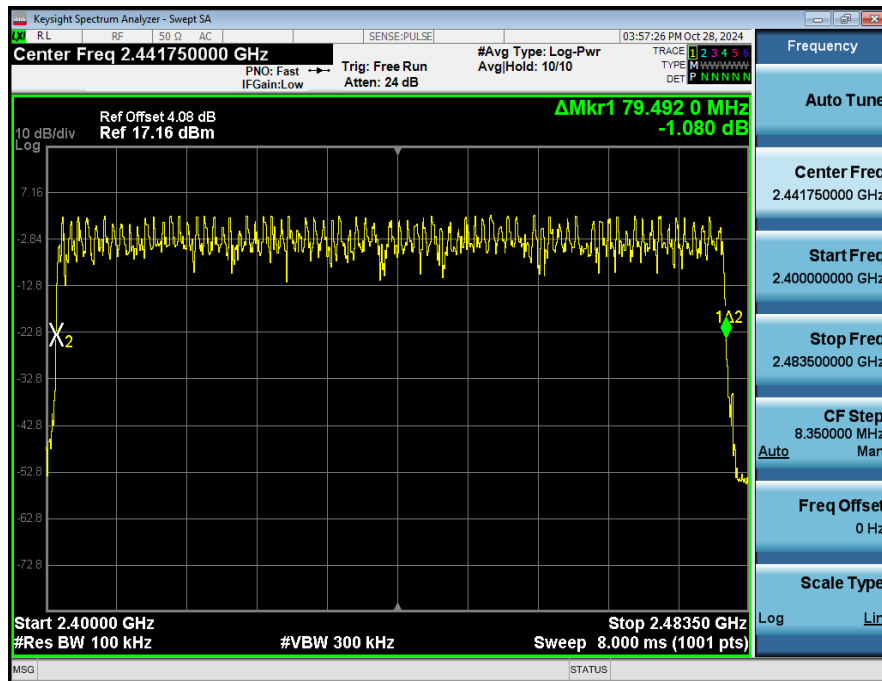
Right earphone:

Condition	Antenna	Modulation	Hopping Num	Limit	Result
NVNT	ANT1	1-DH1	79	15	Pass
NVNT	ANT1	2-DH1	79	15	Pass
NVNT	ANT1	3-DH1	79	15	Pass

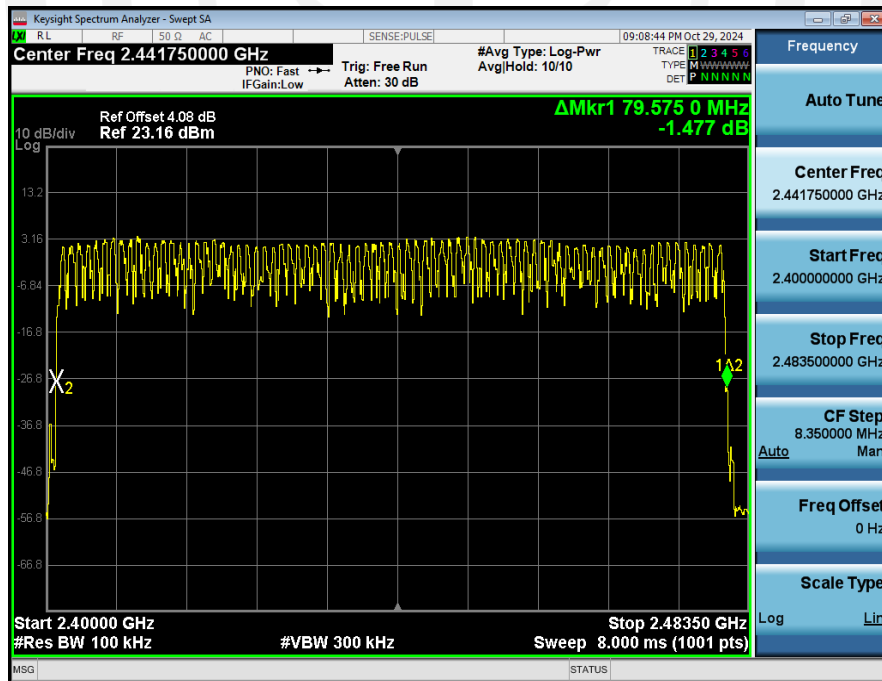
Number_of_Hopping_Channel_(Hopping)_NVNT_ANT1_1-DH1_Hopping



Number_of_Hopping_Channel_(Hopping)_NVNT_ANT1_2-DH1_Hopping



Number_of_Hopping_Channel_(Hopping)_NVNT_ANT1_3-DH1_Hopping



7. Dwell Time

7.1. Test limit

Please refer FCC part 15.247 & RSS-247.

Frequency hopping systems operating in the 2400MHz-2483.5 MHz. The average time of occupancy on any frequency shall not greater than 0.4 s within period of 0.4 seconds multiplied by the number of hopping channel employed.

7.2. Test Procedure

7.2.1. Place the EUT on the table and set it in transmitting mode.

7.2.2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

7.2.3. Set center frequency of spectrum analyzer = operating frequency.

7.2.4. Set the spectrum analyzer as RBW, VBW=1MHz, Span = 0Hz, Sweep = auto.

7.2.5. Repeat above procedures until all frequency measured were complete.

7.3. Test Result

Note:

1. The test period: $T = 0.4 \text{ Second/Channel} \times 79 \text{ Channel} = 31.6 \text{ s}$

2. Dwell Time=Pulse Time* Hops Number

Left earphone:

Condition	Antenna	Packet Type	Pulse Time(ms)	Hops	Dwell Time(ms)	Limit(s)	Result
NVNT	ANT1	1-DH1	0.383	319.00	122.177	0.40	Pass
NVNT	ANT1	2-DH1	0.393	319.00	125.367	0.40	Pass
NVNT	ANT1	3-DH1	0.407	318.00	129.426	0.40	Pass
NVNT	ANT1	1-DH3	1.640	158.00	259.120	0.40	Pass
NVNT	ANT1	1-DH5	2.888	115.00	332.120	0.40	Pass
NVNT	ANT1	2-DH3	1.639	153.00	250.767	0.40	Pass
NVNT	ANT1	2-DH5	2.888	106.00	306.128	0.40	Pass
NVNT	ANT1	3-DH3	1.663	164.00	272.732	0.40	Pass
NVNT	ANT1	3-DH5	2.910	115.00	334.650	0.40	Pass

Time (Hopping)_NVNT_ANT1_1-DH1_2441_00_One_Burst_Time

Keysight Spectrum Analyzer - Sweep SA

Center Freq 2.441000000 GHz

Trig Delay: 500.0 μ s

#Avg Type: Log-Pwr

Trig: Video

Atten: 24 dB

Ref Offset: 4.08 dB

Ref: 17.16 dBm

AMkr1 383.0 μ s

5.61 dB

10 dB/div

Log

Center 2.441000000 GHz

Res BW 1.0 MHz

#VBW 1.0 MHz

Sweep 10.00 ms (30001 pts)

Span 0 Hz

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	Δ 2	1	t	(Δ)	383.0 μ s	(Δ)	5.61 dB	
2	F	1	t		499.0 μ s	-28.21 dBm		
3								
4								
5								
6								
7								
8								
9								
10								
11								

MSG

STATUS

Frequency

Auto Tune

Center Freq
2.441000000 GHz

Start Freq
2.441000000 GHz

Stop Freq
2.441000000 GHz

CF Step
1.000000 MHz

Auto

Freq Offset
0 Hz

Scale Type
Log Lin

KeySight Spectrum Analyzer - Swept SA

Center Freq 2.441000000 GHz

Ref Offset 4.08 dB
Ref 24.08 dBm

10 dB/div
Log

Mkr1 2.679 s
2.59 dBm

Auto Tune

Center Freq
2.441000000 GHz

Start Freq
2.441000000 GHz

Stop Freq
2.441000000 GHz

CF Step
1.000000 MHz
Man

Auto

Freq Offset
0 Hz

Scale Type
Log

Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 1.0 MHz
Sweep 31.60 s (30001 pts)

Span 0 Hz

MSG | STATUS

Keysight Spectrum Analyzer - Swept SA

Center Freq 2.441000000 GHz Trig Delay 500.0 μs #Avg Type: Log-Pwr
 PNO: Fast → IF Gain: Low Trig: Video Atten: 24 dB 11:32:29 AM Oct 28, 2024

Ref Offset 4.08 dB ΔMkr1 393.0 μs
 Ref 17.16 dBm 20.44 dB

10 dB/div Log

X₂ TRIG LVL

Center 2.441000000 GHz Span 0 Hz
 Res BW 1.0 MHz #VBW 1.0 MHz Sweep 10.00 ms (30001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	Δ2	t	(Δ)	393.0 μs	20.44 dB			
2	F	t		499.0 μs	-36.97 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

MSG STATUS

Frequency

- Auto Tune
- Center Freq 2.441000000 GHz
- Start Freq 2.441000000 GHz
- Stop Freq 2.441000000 GHz
- CF Step 1.000000 MHz Man
- Freq Offset 0 Hz
- Scale Type Log Lin

Dwell_Time_(Hopping)_NVNT_ANT1_2-DH1_2441_00_Accumulated

Keysight Spectrum Analyzer - Swept SA

Center Freq 2.441000000 GHz

Ref Offset 4.08 dB
Ref 24.08 dBm

Mkr1 11.48 s
2.72 dBm

Frequency

Auto Tune

Center Freq
2.441000000 GHz

Start Freq
2.441000000 GHz

Stop Freq
2.441000000 GHz

CF Step
1.000000 MHz
Man

Auto

Freq Offset
0 Hz

Scale Type
Log

Center 2.441000000 GHz

Res BW 1.0 MHz

#VBW 1.0 MHz

Span 0 Hz

Sweep 31.60 s (30001 pts)

MSG

STATUS

Keysight Spectrum Analyzer - Sweep SA

Center Freq 2.441000000 GHz

Trig Delay: 500.0 μ s #Avg Type: Log-Pwr

PNO: Fast IFGain: Low Atten: 32 dB

11:38:18 AM Oct 29, 2024

Ref Offset 11.08 dB Ref 31.16 dBm

Δ Mkr1 407.0 μ s -18.92 dB

10 dB/div Log

Center 2.441000000 GHz Span 0 Hz

Res BW 1.0 MHz #VBW 1.0 MHz Sweep 10.00 ms (30001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	Δ 2	f	t	(Δ)	407.0 μ s	(Δ)	-18.92 dB	
2	F	f	t		500.0 μ s		-14.29 dBm	

MSG STATUS

Frequency

Auto Tune

Center Freq 2.441000000 GHz

Start Freq 2.441000000 GHz

Stop Freq 2.441000000 GHz

CF Step 1.000000 MHz Man

Freq Offset 0 Hz

Scale Type Log Lin

KeySight Spectrum Analyzer - Swept SA

Center Freq 2.441000000 GHz

Ref Offset 11.08 dB
Ref 31.08 dBm

Mkr1 5.936 s
4.71 dBm

10 dB/div
Log

Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 1.0 MHz
Sweep 31.60 s (30001 pts)

Span 0 Hz

Frequency

Auto Tune

Center Freq
2.441000000 GHz

Start Freq
2.441000000 GHz

Stop Freq
2.441000000 GHz

CF Step
1.000000 MHz
Auto

Freq Offset
0 Hz

Scale Type
Log

Dwell_Time_(Hopping)_NVNT_ANT1_1-DH5_2441_00_One_Burst_Time

The screenshot displays a Keysight Spectrum Analyzer interface. The main plot shows a yellow signal trace on a black background with a green grid. A horizontal green line indicates the reference level at -28.87 dBm. A yellow marker labeled 'Δ2' is positioned at the peak of the signal, which is centered at 2.441 GHz. The signal has a bandwidth of 1.0 MHz and a sweep time of 10.00 ms. The frequency offset from the center is 4.08 dB, and the reference level is 17.16 dBm. The signal-to-noise ratio (SNR) is 2.888 ms, and the power spectral density (PSD) is 12.58 dB.

Keysight Spectrum Analyzer - Swept SA

Center Freq 2.441000000 GHz Trig Delay-500.0 μs #Avg Type: Log-Pwr TRACE 1 2 3 4 5 6
PNO: Fast → IFGain: Low Trig: Video Atten: 24 dB TYPE W W W W W W W W
DET P N N N N N N

Ref Offset 4.08 dB ΔMkr1 2.888 ms
Ref 17.16 dBm 12.58 dBm

10 dB/div X2 TRIG LVL

Center 2.441000000 GHz Span 0 Hz
Res BW 1.0 MHz #VBW 1.0 MHz Sweep 10.00 ms (30001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	Δ2	1	t (Δ)	2.888 ms (Δ)	12.58 dBm			
2	F	1	t	499.0 μs	-28.87 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

MSG [STATUS]

Frequency

Auto Tune

Center Freq
2.441000000 GHz

Start Freq
2.441000000 GHz

Stop Freq
2.441000000 GHz

CF Step
1.000000 MHz
Man

Auto

Freq Offset
0 Hz

Scale Type
Log Lin

KeySight Spectrum Analyzer - Swept SA

Center Freq 2.441000000 GHz

Ref Offset 4.08 dB
Ref 24.08 dBm

10 dB/div
Log

14.1
4.08
-5.92
-15.9
-25.9
-35.9
-45.9
-55.9
-65.9

Mkr1 4.264 s
2.28 dBm

Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 1.0 MHz
Sweep 31.60 s (30001 pts)

Span 0 Hz

Frequency

Auto Tune

Center Freq
2.441000000 GHz

Start Freq
2.441000000 GHz

Stop Freq
2.441000000 GHz

CF Step
1.000000 MHz
Auto Man

Freq Offset
0 Hz

Scale Type
Log Lin

Dwell_Time (Hopping)_NVNT_ANT1_2-DH3_2441_00_One_Burst_Time

Keysight Spectrum Analyzer - Swept SA

Center Freq 2.441000000 GHz **Trig Delay-500.0 μ s** **#Avg Type: Log-Pwr** **TRACE 1 2 3 4 5 6**
PNO: Fast **Trig: Video** **TYPE W W W W W W W W**
IFGain: Low **Atten: 24 dB** **DET P N N N N N** **11:52:56 AM Oct 28, 2024**

Ref Offset 4.08 dB **Δ Mkr1 1.639 ms**
Ref 17.16 dBm **-28.65 dB**

Center 2.441000000 GHz **Span 0 Hz**
Res BW 1.0 MHz **#VBW 1.0 MHz** **Sweep 10.00 ms (30001 pts)**

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	Δ 2	t	(Δ)	1.639 ms	(Δ)	-28.65 dB		
2	F	t		500.0 μ s		-4.89 dBm		
3								
4								
5								
6								
7								
8								
9								
10								
11								

Frequency
Auto Tune

Center Freq
2.441000000 GHz

Start Freq
2.441000000 GHz

Stop Freq
2.441000000 GHz

CF Step
1.000000 MHz
Auto Man

Freq Offset
0 Hz

Scale Type
Log Lin

MSG **STATUS**

KeySight Spectrum Analyzer - Swept SA

Center Freq 2.441000000 GHz

Ref Offset 4.08 dB
Ref 24.08 dBm

Mkr1 8.533 s
2.30 dBm

Auto Tune

Center Freq
2.441000000 GHz

Start Freq
2.441000000 GHz

Stop Freq
2.441000000 GHz

CF Step
1.000000 MHz
Auto

Freq Offset
0 Hz

Scale Type
Log

Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 1.0 MHz
Sweep 31.60 s (30001 pts)

Span 0 Hz

MSG | STATUS

[illegible]

Keysight Spectrum Analyzer - Swept SA

Center Freq 2.441000000 GHz

Ref Offset 4.08 dB
Ref 24.08 dBm

10 dB/div
Log

Mkr1 7.862 s
2.25 dBm

Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 1.0 MHz
Sweep 31.60 s (30001 pts)

Span 0 Hz

Frequency

Auto Tune

Center Freq
2.441000000 GHz

Start Freq
2.441000000 GHz

Stop Freq
2.441000000 GHz

CF Step
1.000000 MHz
Man

Auto

Freq Offset
0 Hz

Scale Type
Log

MSG

STATUS

Dwell Time (Hopping)_NVNT_ANT1_3-DH3_2441_00_One_Burst_Time

Keysight Spectrum Analyzer - Swept SA
RL RF 50 Ω AC SENSE:PULSE 11:58:54 AM Oct 29, 2024

Center Freq 2.441000000 GHz Trg Delay-500.0 μs #Avg Type: Log-Pwr TRACE [1] 2 3 4 5 TYPE W NNNN DET P NNNN

PNO: Fast → IFGain: Low Trig: Video Atten: 32 dB

Ref Offset 11.08 dB ΔMkr1 1.663 ms Ref 31.16 dBm -25.87 dBrms

Log 10 dB/div X₂ 1Δ2 TRO LVL

Center 2.441000000 GHz Span 0 Hz Res BW 1.0 MHz #VBW 1.0 MHz Sweep 10.00 ms (30001 pts)

MKR MODE TRC SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1 Δ2 1 t (Δ)	1.663 ms (Δ)	-25.87 dBrms			
2 F 1 t	500.0 μs	-4.38 dBrms			
3					
4					
5					
6					
7					
8					
9					
10					
11					

MSG STATUS

Frequency
Auto Tune
Center Freq 2.441000000 GHz
Start Freq 2.441000000 GHz
Stop Freq 2.441000000 GHz
CF Step 1.000000 MHz Man
Freq Offset 0 Hz
Scale Type Log Lin

Dwell_Time_(Hopping)_NVNT_ANT1_3-DH3_2441_00_Accumulated

Keysight Spectrum Analyzer - Swept SA

Center Freq 2.441000000 GHz

Ref Offset 11.08 dB
Ref 31.08 dBm

Mkr1 18.68 s
4.88 dBm

Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 1.0 MHz
Sweep 31.60 s (30001 pts)

Span 0 Hz

Frequency

Auto Tune

Center Freq
2.441000000 GHz

Start Freq
2.441000000 GHz

Stop Freq
2.441000000 GHz

CF Step
1.000000 MHz
Man

Auto

Freq Offset
0 Hz

Scale Type
Log

MSG

STATUS

[illegible]

The screenshot displays a Keysight Spectrum Analyzer interface. The main display area shows a spectrum plot with a yellow trace. The plot has a logarithmic frequency scale on the x-axis and a logarithmic power scale on the y-axis. The y-axis is labeled '10 dB/div Log' and ranges from -58.9 to 21.1 dBm. The x-axis is labeled 'Center Freq 2.441000000 GHz' and ranges from 2.440999999 GHz to 2.441000001 GHz. A peak marker is visible at 16.79 dBm, labeled 'Mkr1 16.79 s 4.83 dBm'. The plot shows a noisy signal with a peak at 16.79 dBm. The plot is titled 'Center Freq 2.441000000 GHz' and 'Res BW 1.0 MHz'. The plot is titled 'Center Freq 2.441000000 GHz' and 'Res BW 1.0 MHz'. The plot is titled 'Center Freq 2.441000000 GHz' and 'Res BW 1.0 MHz'.

Right earphone:

Condition	Antenna	Packet Type	Pulse Time(ms)	Hops	Dwell Time(ms)	Limit(s)	Result
NVNT	ANT1	1-DH1	0.384	317.00	121.728	0.40	Pass
NVNT	ANT1	2-DH1	0.393	320.00	125.760	0.40	Pass
NVNT	ANT1	3-DH1	0.407	320.00	130.240	0.40	Pass
NVNT	ANT1	1-DH3	1.639	167.00	273.713	0.40	Pass
NVNT	ANT1	1-DH5	2.888	104.00	300.352	0.40	Pass
NVNT	ANT1	2-DH3	1.640	160.00	262.400	0.40	Pass
NVNT	ANT1	2-DH5	2.887	122.00	352.214	0.40	Pass
NVNT	ANT1	3-DH3	1.662	150.00	249.300	0.40	Pass
NVNT	ANT1	3-DH5	2.911	107.00	311.477	0.40	Pass



Keysight Spectrum Analyzer - Sweep SA

Center Freq 2.441000000 GHz

Trig Delay: 500.0 μ s #Avg Type: Log-Pwr

PNO: Fast IFGain: Low Atten: 24 dB

Ref Offset 4.08 dB Ref 17.16 dBm

Δ Mkr1 384.0 μ s -28.39 dB

10 dB/div Log

Center 2.441000000 GHz Span 0 Hz

Res BW 1.0 MHz #VBW 1.0 MHz Sweep 10.00 ms (30001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	Δ 2	1	t	(Δ)	384.0 μ s (Δ)	-28.39 dB		
2	F	1	t		500.0 μ s	-5.19 dBm		
3								
4								
5								
6								
7								
8								
9								
10								
11								

MSG STATUS

Frequency

Auto Tune

Center Freq 2.441000000 GHz

Start Freq 2.441000000 GHz

Stop Freq 2.441000000 GHz

CF Step 1.000000 MHz Man

Freq Offset 0 Hz

Scale Type Log Lin

Keysight Spectrum Analyzer - Swept SA

Center Freq 2.441000000 GHz

Ref Offset 4.08 dB
Ref 24.08 dBm

Mkr1 28.93 s
2.31 dBm

10 dB/div
Log

Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 1.0 MHz
Sweep 31.60 s (30001 pts)

Span 0 Hz

Frequency

Auto Tune

Center Freq
2.441000000 GHz

Start Freq
2.441000000 GHz

Stop Freq
2.441000000 GHz

CF Step
1.000000 MHz
Man

Auto

Freq Offset
0 Hz

Scale Type
Log

MSG

STATUS

The screenshot displays a Keysight Spectrum Analyzer interface. The main display area shows a dense, yellow signal centered at 2.441 GHz. The vertical axis represents power in dBm, ranging from -65.9 to 14.1, with a 10 dB/div scale. The horizontal axis represents frequency. A green marker '1' is placed on the signal at 28.93 s and 2.31 dBm. The interface includes various control panels: a top panel with settings like Center Freq, Ref Offset, and Mkr1; a right panel with Auto Tune, Center Freq, Start Freq, Stop Freq, CF Step, Freq Offset, and Scale Type; and a bottom panel with Center, Res BW, #VBW, Sweep, and Span. The status bar at the bottom shows MSG and STATUS indicators.

Dwell Time (Hopping) NVNT_ANT1_2-DH1_2441_00_One_Burst_Time

Keysight Spectrum Analyzer - Swept SA

Center Freq 2.441000000 GHz

Ref Offset 4.08 dB
Ref 17.16 dBm

ΔMkr1 393.0 μs
-31.40 dB

10 dB/div
Log

Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 1.0 MHz
Sweep 10.00 ms (30001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	Δ2	1	t (Δ)	393.0 μs (Δ)	-31.40 dB			
2	F	1	t	500.0 μs	-4.69 dBm			

MSG STATUS

Frequency

Auto Tune

Center Freq
2.441000000 GHz

Start Freq
2.441000000 GHz

Stop Freq
2.441000000 GHz

CF Step
1.000000 MHz
Auto Man

Freq Offset
0 Hz

Scale Type
Log Lin

Dwell Time (Hopping) NVNT_ANT1_2-DH1_2441_00_Accumulated

Keysight Spectrum Analyzer - Swept SA

Center Freq 2.441000000 GHz

Ref Offset 4.08 dB
Ref 24.08 dBm

Mkr1 30.65 s
2.44 dBm

10 dB/div
Log

Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 1.0 MHz
Sweep 31.60 s (30001 pts)

MSG STATUS

Frequency

Auto Tune

Center Freq
2.441000000 GHz

Start Freq
2.441000000 GHz

Stop Freq
2.441000000 GHz

CF Step
1.000000 MHz
Auto Man

Freq Offset
0 Hz

Scale Type
Log Lin

[illegible]

KeySight Spectrum Analyzer - Swept SA

Center Freq 2.441000000 GHz

Ref Offset 4.08 dB
Ref 24.08 dBm

Trig: Free Run
Atten: 30 dB

#Avg Type: Log-Pwr

TRACE 1 2 3 4 5 6
TYPE W W W W W W
DET P N N N N N

Mkr1 11.28 s
4.22 dBm

10 dB/div
Log

Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 1.0 MHz
Sweep 31.60 s (30001 pts)

Span 0 Hz

Frequency

Auto Tune

Center Freq
2.441000000 GHz

Start Freq
2.441000000 GHz

Stop Freq
2.441000000 GHz

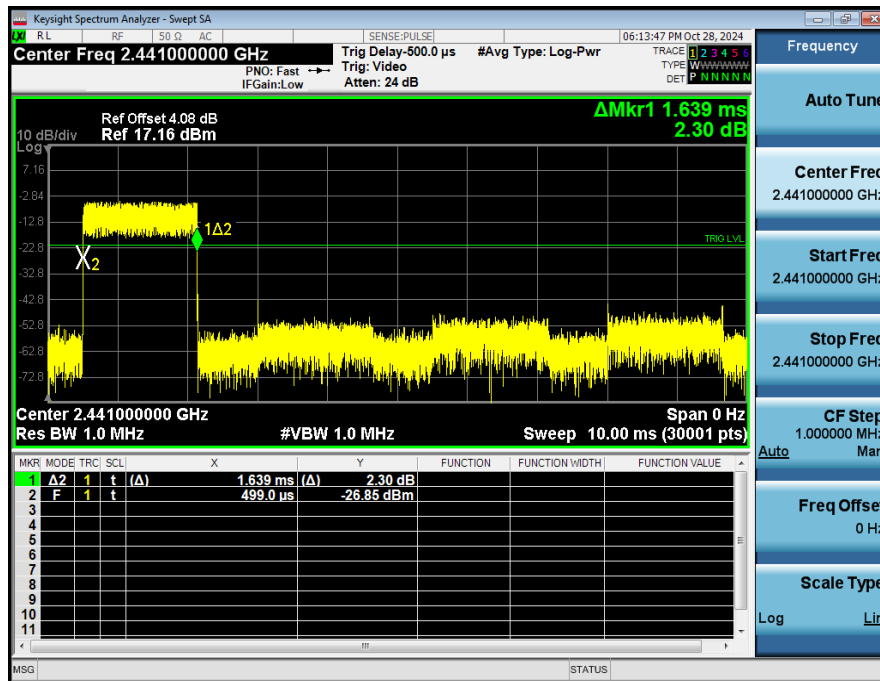
CF Step
1.000000 MHz
Auto

Freq Offset
0 Hz

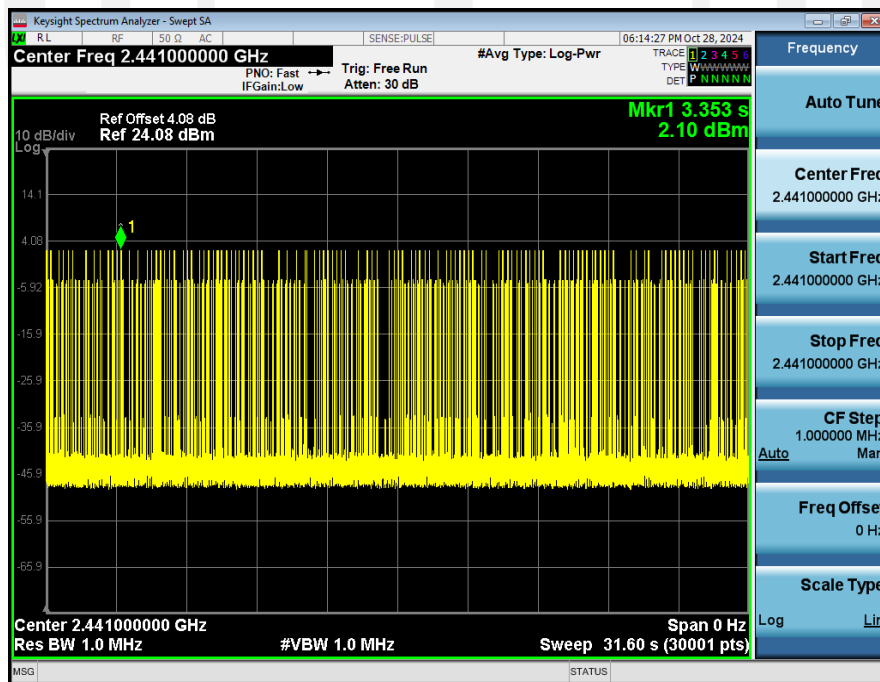
Scale Type
Log

MSG | STATUS |

Dwell_Time_(Hopping)_NVNT_ANT1_1-DH3_2441_00_One_Burst_Time



Dwell_Time_(Hopping)_NVNT_ANT1_1-DH3_2441_00_Accumulated



[illegible]

KeySight Spectrum Analyzer - Swept SA

Center Freq 2.441000000 GHz

Ref Offset 4.08 dB
Ref 24.08 dBm

10 dB/div
Log

Mkr1 4.241 s
1.98 dBm

Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 1.0 MHz
Sweep 31.60 s (30001 pts)

Span 0 Hz

Frequency

Auto Tune

Center Freq
2.441000000 GHz

Start Freq
2.441000000 GHz

Stop Freq
2.441000000 GHz

CF Step
1.000000 MHz
Auto

Freq Offset
0 Hz

Scale Type
Log

Dwell Time (Hopping) NVNT_ANT1_2-DH3_2441_00_One_Burst_Time

Keysight Spectrum Analyzer - Swept SA
Center Freq 2.441000000 GHz
PNO: Fast IFGain:Low
Trig Delay: 500.0 μ s
#Avg Type: Log-Pwr
Trig: Video
Atten: 28 dB
06:15:56 PM Oct 28, 2024

Ref Offset 4.08 dB
Ref 21.16 dBm
 Δ Mkr1 1.640 ms
-30.15 dB

10 dB/div
Log

Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 1.0 MHz
Span 0 Hz
Sweep 10.00 ms (30001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	Δ 2	1	t	(Δ)	1.640 ms	(Δ)	-30.15 dB	
2	F	1	t		500.0 μ s		-6.35 dBm	

MSG STATUS

Frequency
Auto Tune
Center Freq 2.441000000 GHz
Start Freq 2.441000000 GHz
Stop Freq 2.441000000 GHz
CF Step 1.000000 MHz
Auto Man
Freq Offset 0 Hz
Scale Type Log Lin

Dwell Time (Hopping) NVNT_ANT1_2-DH3_2441_00_Accumulated

Keysight Spectrum Analyzer - Swept SA
Center Freq 2.441000000 GHz
PNO: Fast IFGain:Low
Trig: Free Run
#Avg Type: Log-Pwr
Trig: Video
Atten: 30 dB
06:16:37 PM Oct 28, 2024

Ref Offset 4.08 dB
Ref 24.08 dBm
Mkr1 19.53 s
2.05 dBm

10 dB/div
Log

Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 1.0 MHz
Span 0 Hz
Sweep 31.60 s (30001 pts)

MSG STATUS

Frequency
Auto Tune
Center Freq 2.441000000 GHz
Start Freq 2.441000000 GHz
Stop Freq 2.441000000 GHz
CF Step 1.000000 MHz
Auto Man
Freq Offset 0 Hz
Scale Type Log Lin