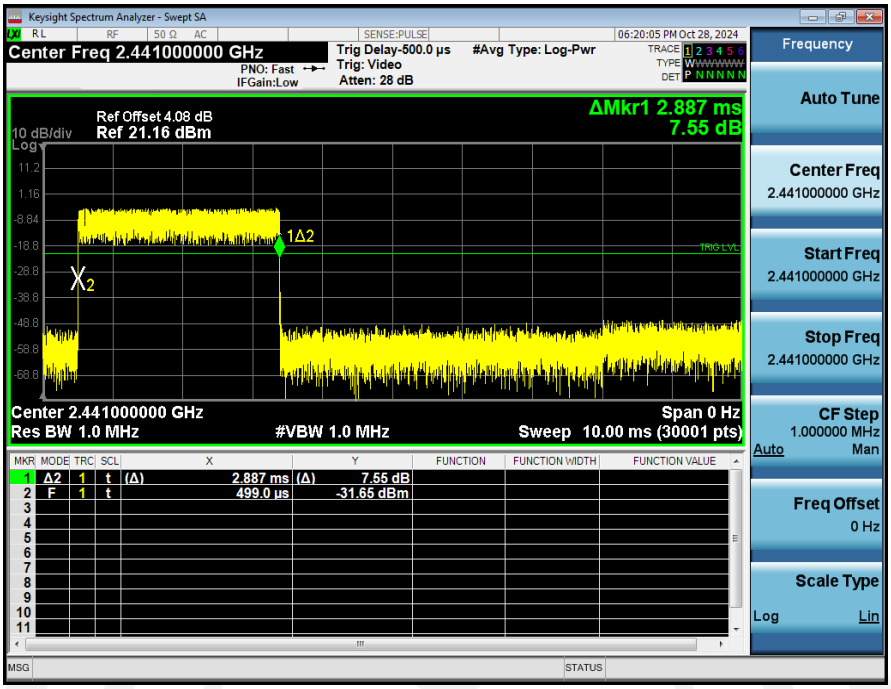
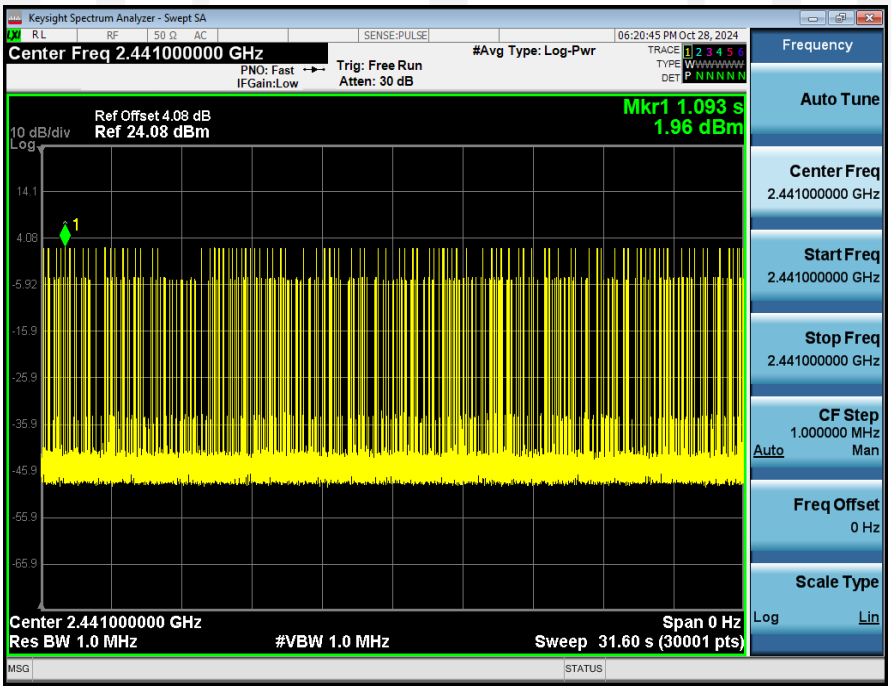
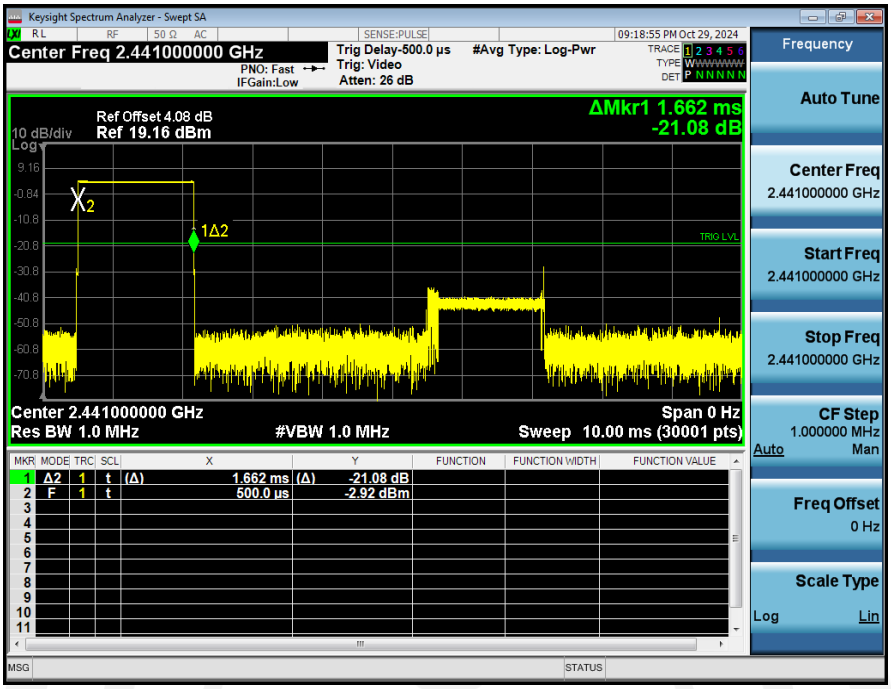
Dwell_Time_(Hopping)_NVNT_ANT1_2-DH5_2441_00_One_Burst_Time



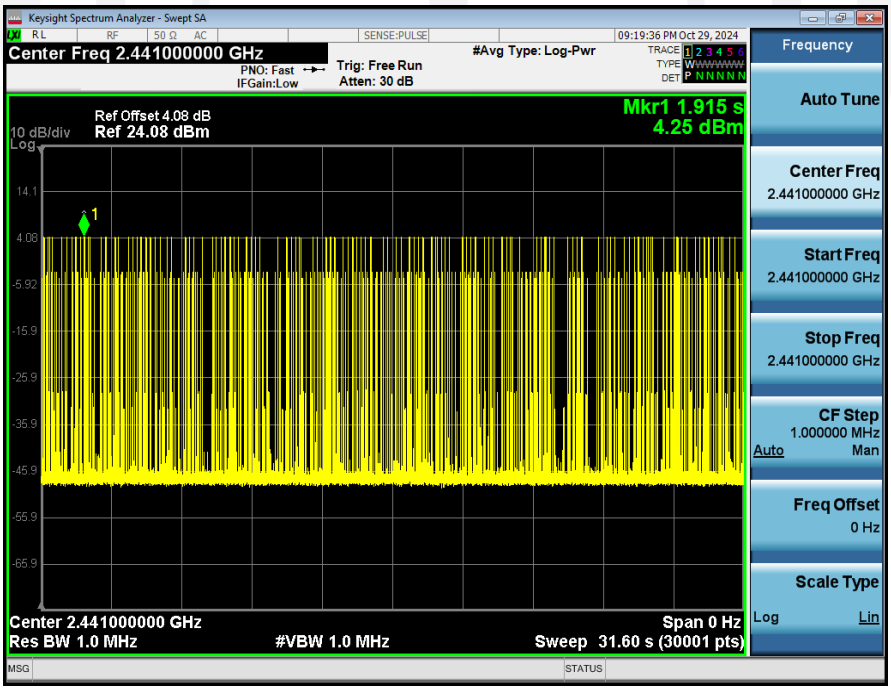
Dwell_Time_(Hopping)_NVNT_ANT1_2-DH5_2441_00_Accumulated



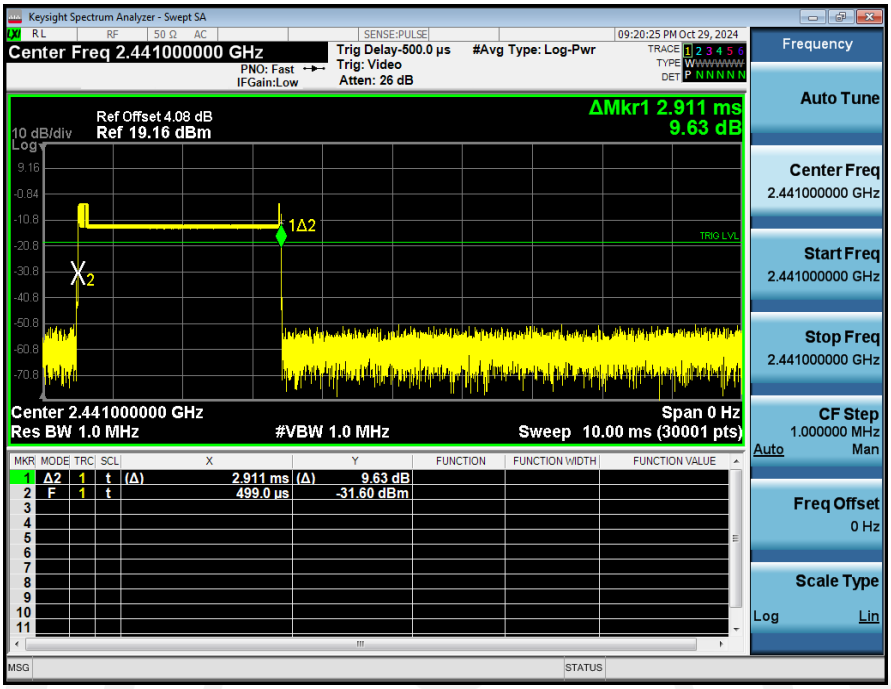
Dwell_Time_(Hopping)_NVNT_ANT1_3-DH3_2441_00_One_Burst_Time



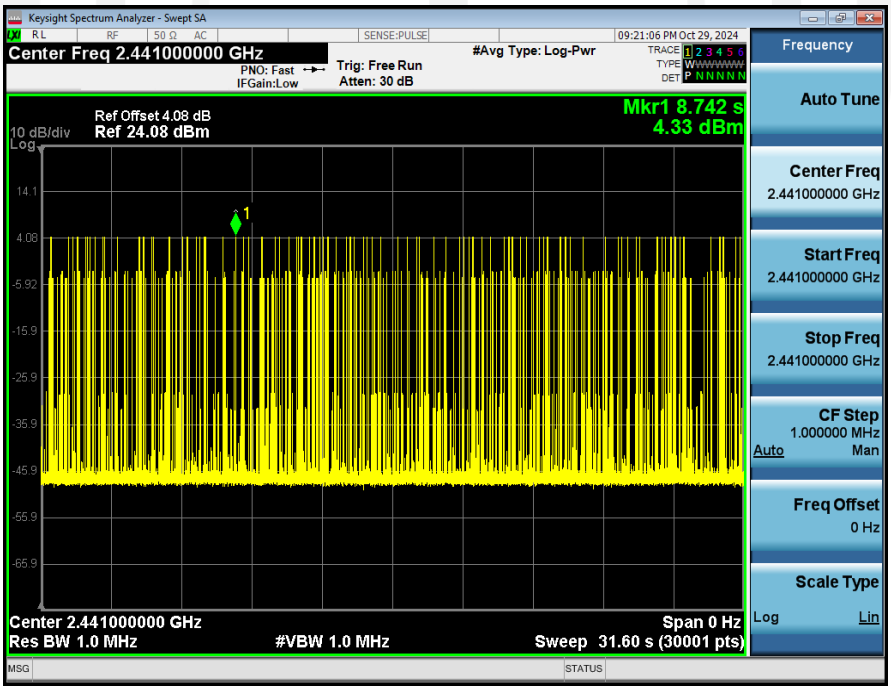
Dwell_Time_(Hopping)_NVNT_ANT1_3-DH3_2441_00_Accumulated



Dwell_Time_(Hopping)_NVNT_ANT1_3-DH5_2441_00_One_Burst_Time



Dwell_Time_(Hopping)_NVNT_ANT1_3-DH5_2441_00_Accumulated



8. Out-of-band Emissions

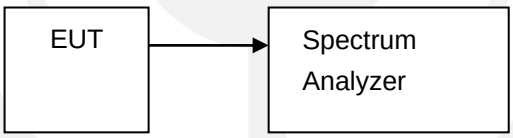
8.1. Test Limits

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

8.2. Test Procedure

Connect the transmitter ouput to spectrum analvzer using a low loss RF cable, and set the spectrum analvzerto RBW=100 kHz, VBW= 300 kHz, peak detector, and max hold. Measurements utilizing these setting aremade of the in-band reference level, bandedge and out-of-band emissions.

8.3. Test Setup



8.4. Test Results

PASS.

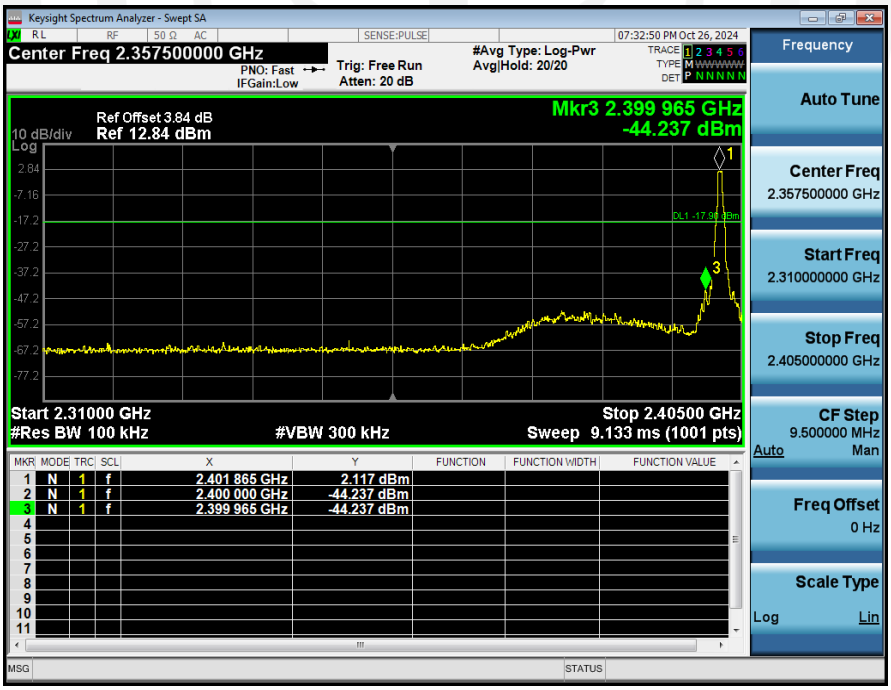
The test results are listed in next pages.

Left earphone:

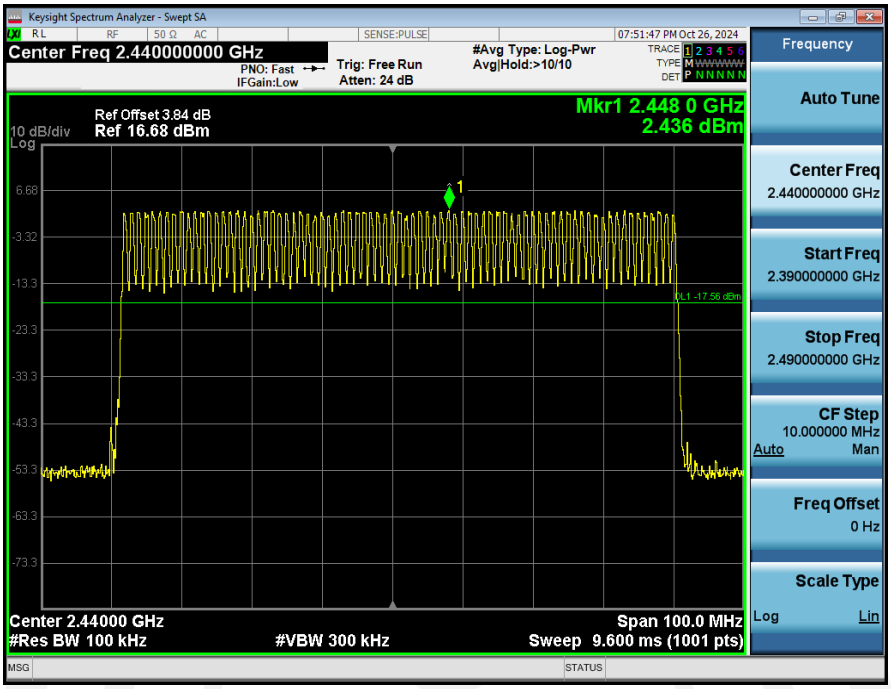
Band Edge: Pass

1_Reference_Level_NVNT_ANT1_1-DH1_2402_00

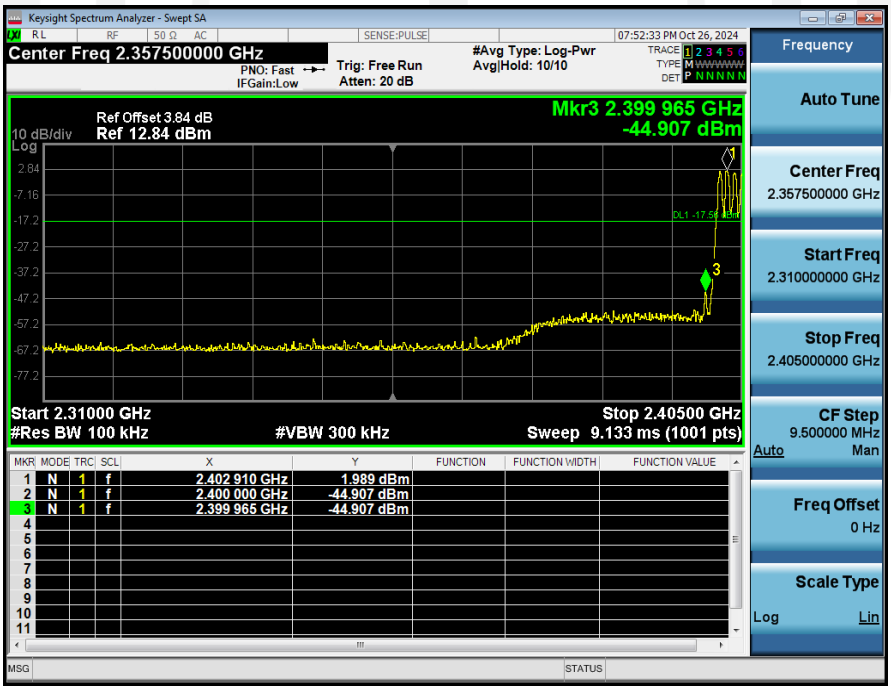
2_Bandedge_NVNT_ANT1_1-DH1_2402_00



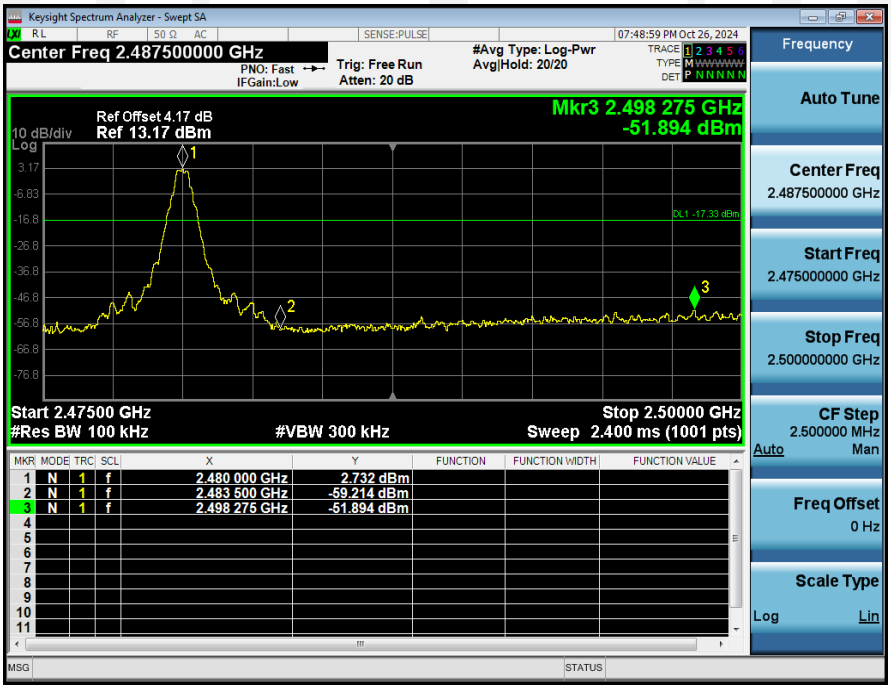
1_Reference_Level_Hopping_NVNT_ANT1_1-DH1_Hopping



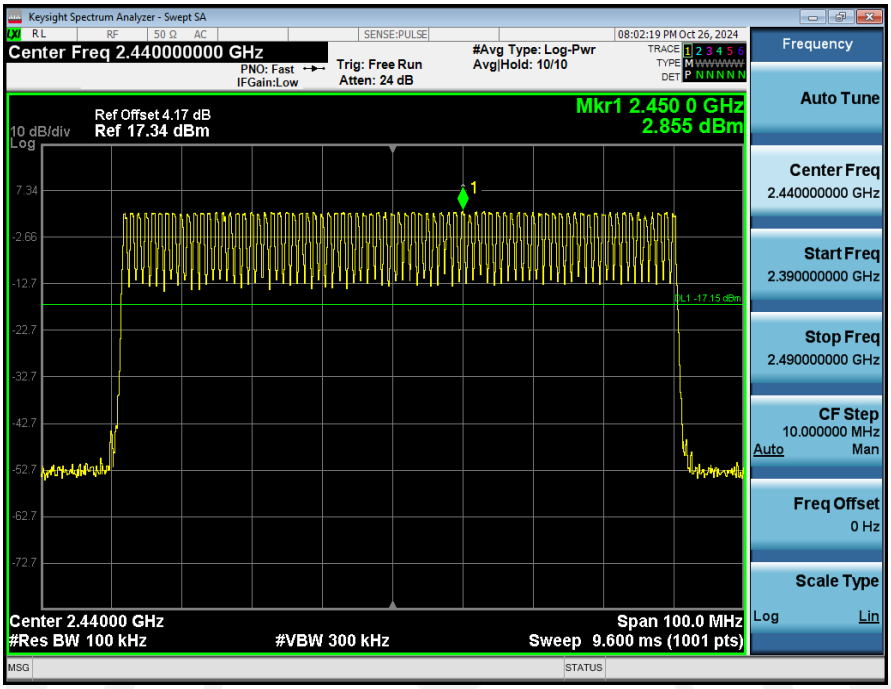
2_Band_Edge_(Hopping)_NVNT_ANT1_1-DH1_Hopping



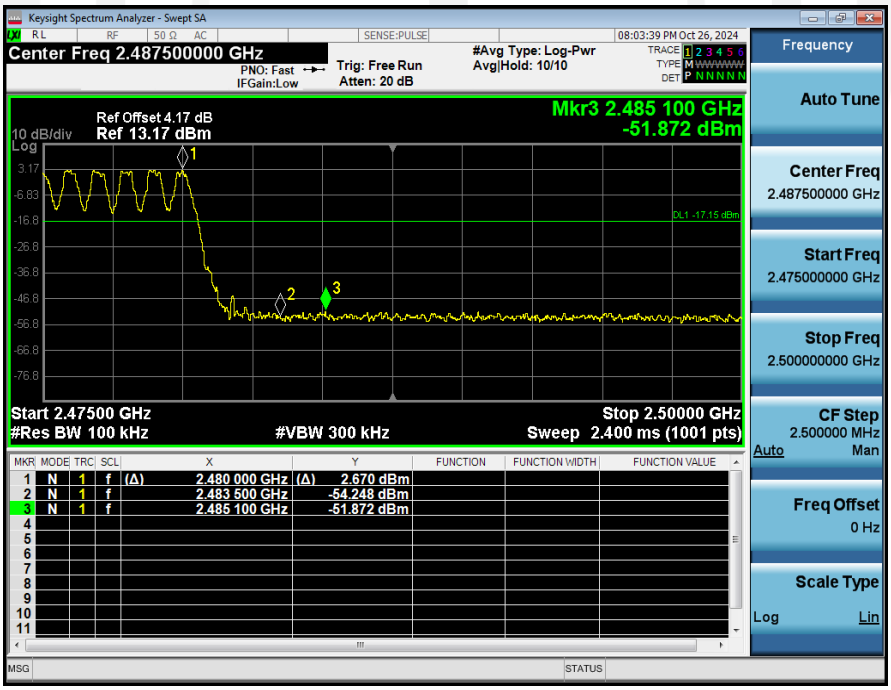
1_Reference_Level_NVNT_ANT1_1-DH1_2480_00

2_Bandedge_NVNT_ANT1_1-DH1_2480_00


1_Reference_Level_Hopping_NVNT_ANT1_1-DH1_Hopping

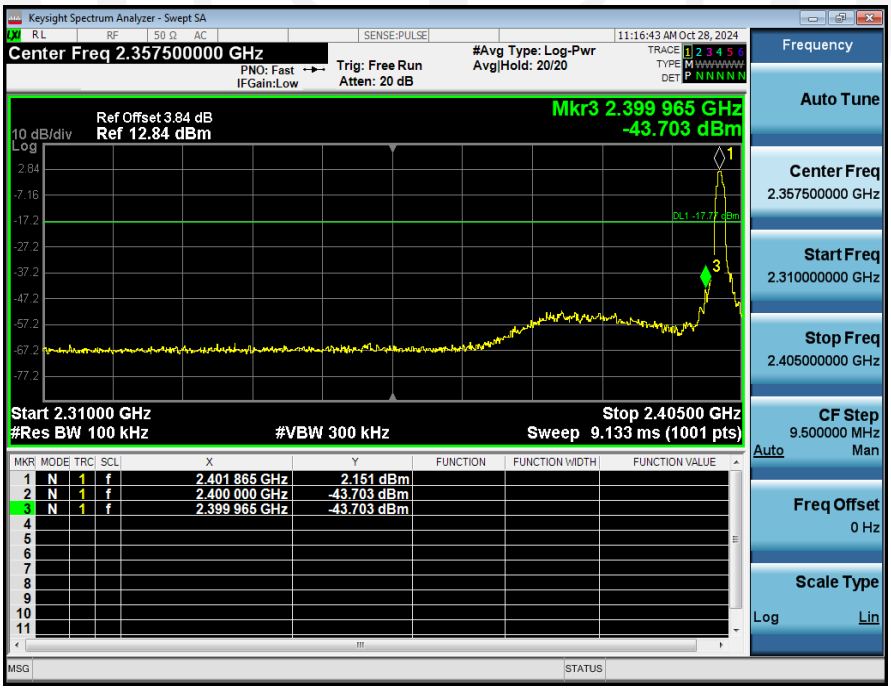


2_Band_Edge_(Hopping)_NVNT_ANT1_1-DH1_Hopping

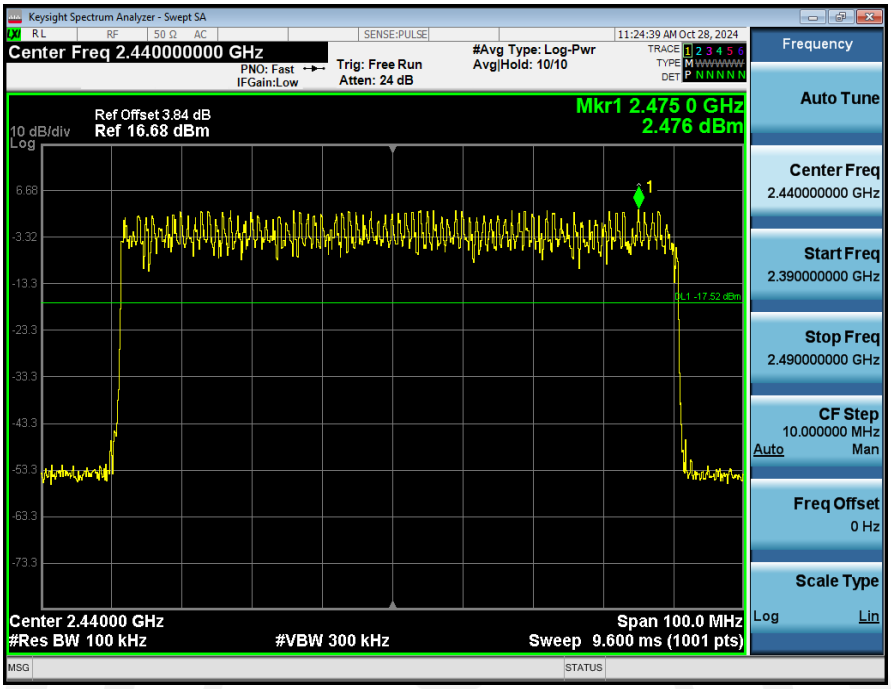


1_Reference_Level_NVNT_ANT1_2-DH1_2402_00

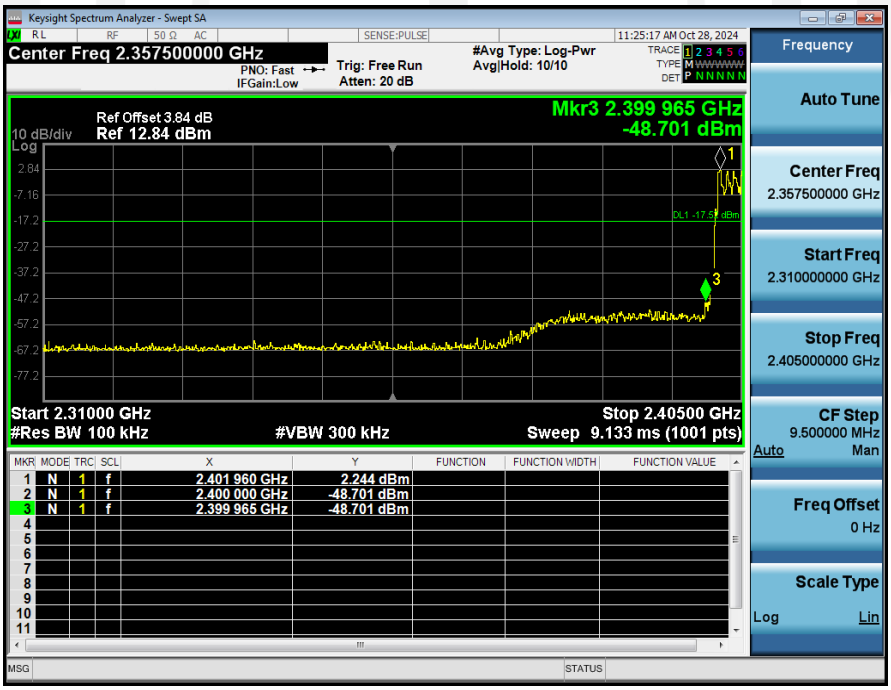
2_Bandedge_NVNT_ANT1_2-DH1_2402_00



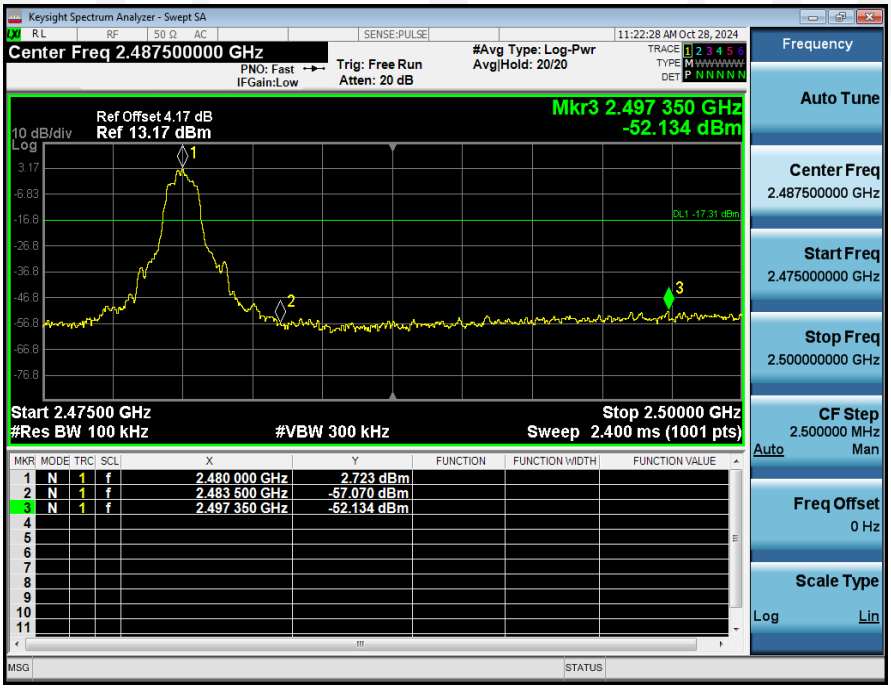
1_Reference_Level_Hopping_NVNT_ANT1_2-DH1_Hopping

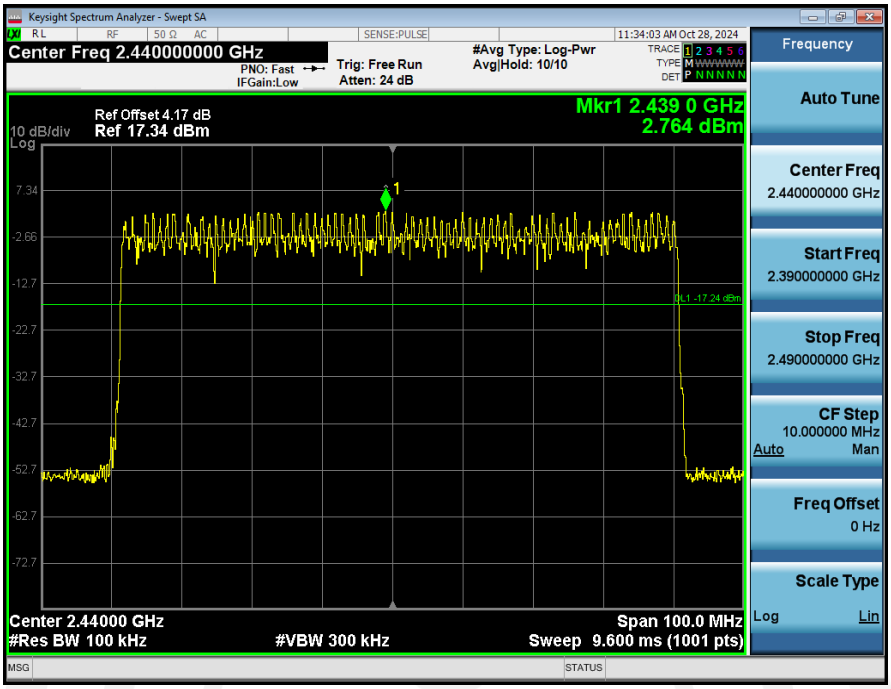
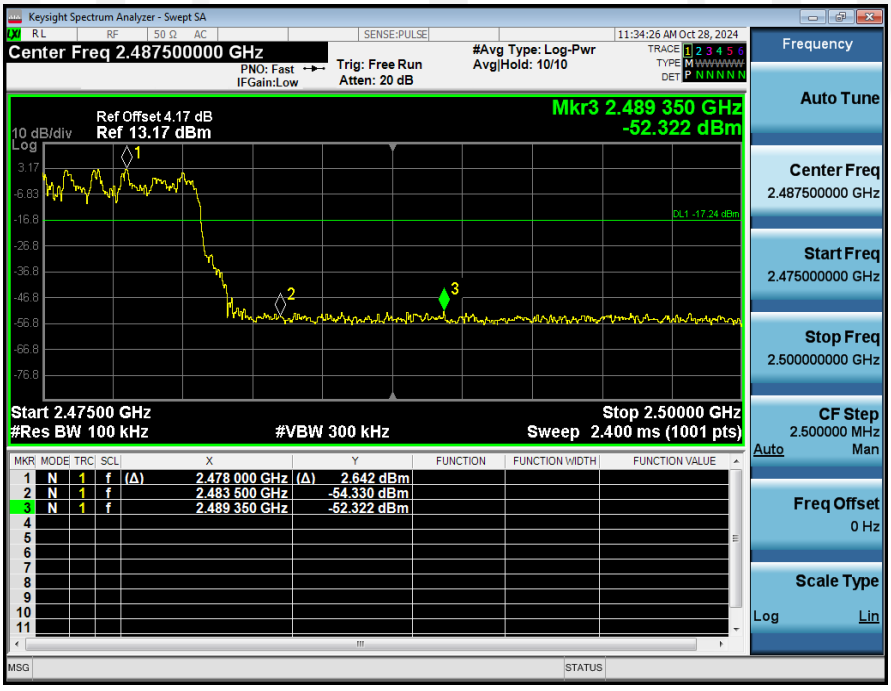


2_Band_Edge_(Hopping)_NVNT_ANT1_2-DH1_Hopping

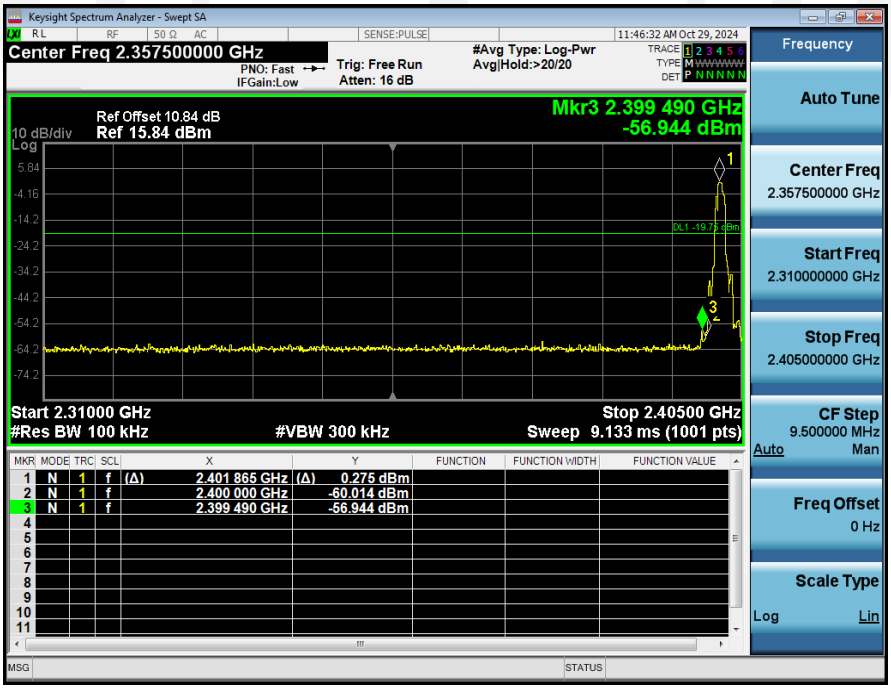


1_Reference_Level_NVNT_ANT1_2-DH1_2480_00

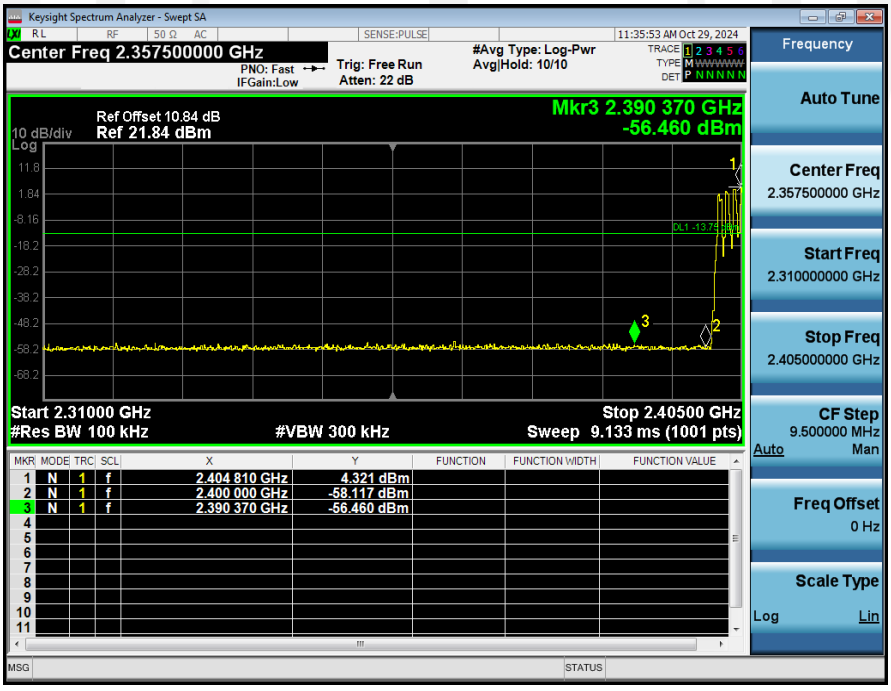
2_Bandedge_NVNT_ANT1_2-DH1_2480_00


1_Reference_Level_Hopping_NVNT_ANT1_2-DH1_Hopping

2_Band_Edge_(Hopping)_NVNT_ANT1_2-DH1_Hopping


1_Reference_Level_NVNT_ANT1_3-DH1_2402_00

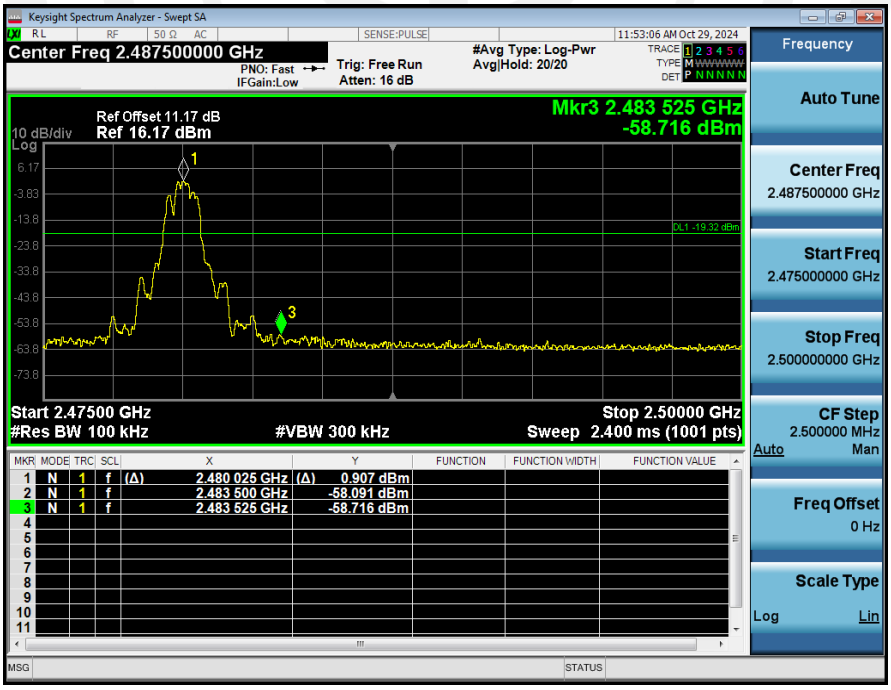
2_Bandedge_NVNT_ANT1_3-DH1_2402_00


1_Reference_Level_Hopping_NVNT_ANT1_3-DH1_Hopping

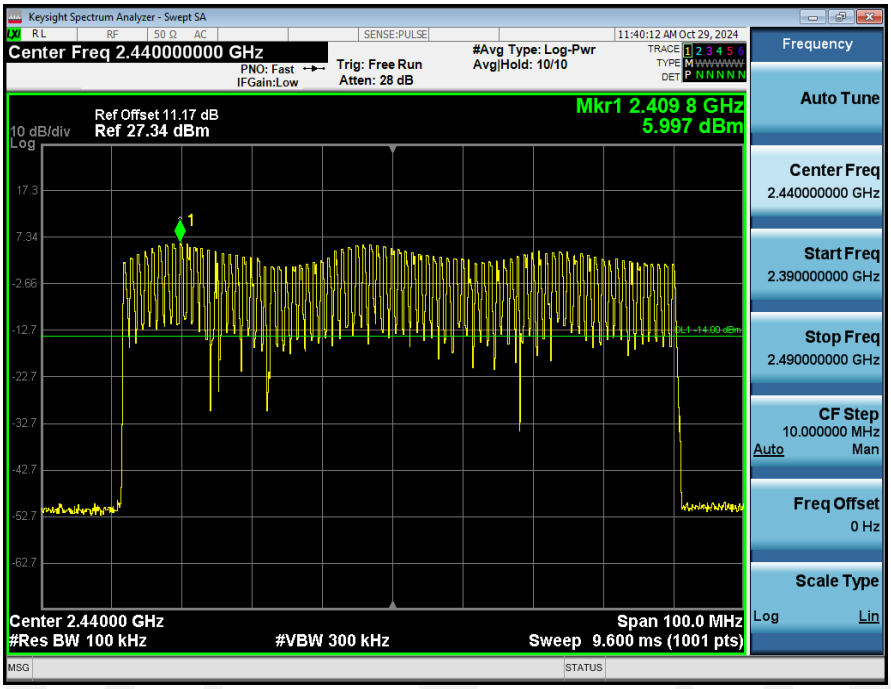
2_Band_Edge_(Hopping)_NVNT_ANT1_3-DH1_Hopping


1_Reference_Level_Hopping_NVNT_ANT1_3-DH1_Hopping

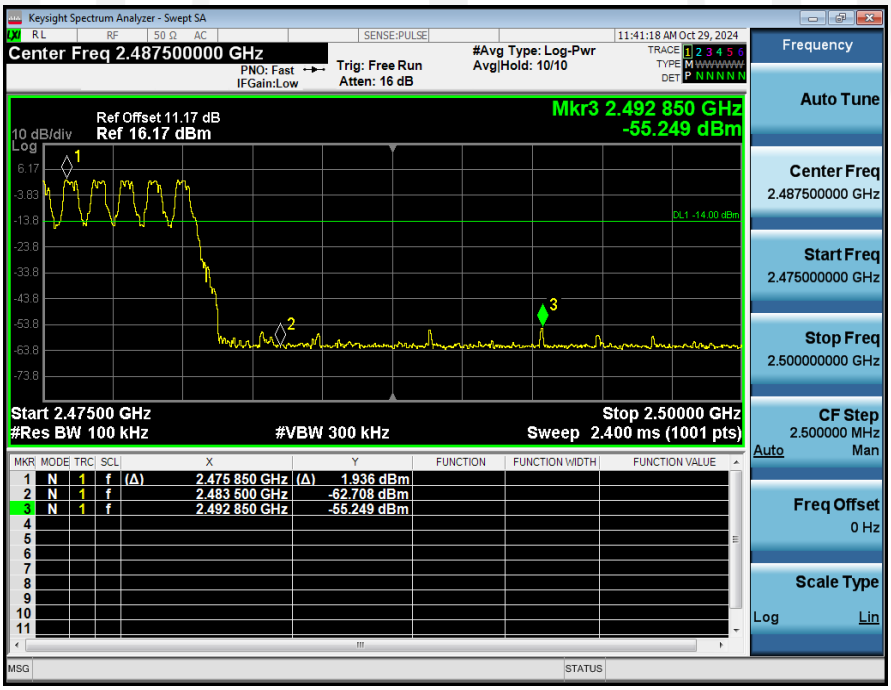
1_Reference_Level_NVNT_ANT1_3-DH1_2480_00

2_Bandedge_NVNT_ANT1_3-DH1_2480_00


1_Reference_Level_Hopping_NVNT_ANT1_3-DH1_Hopping

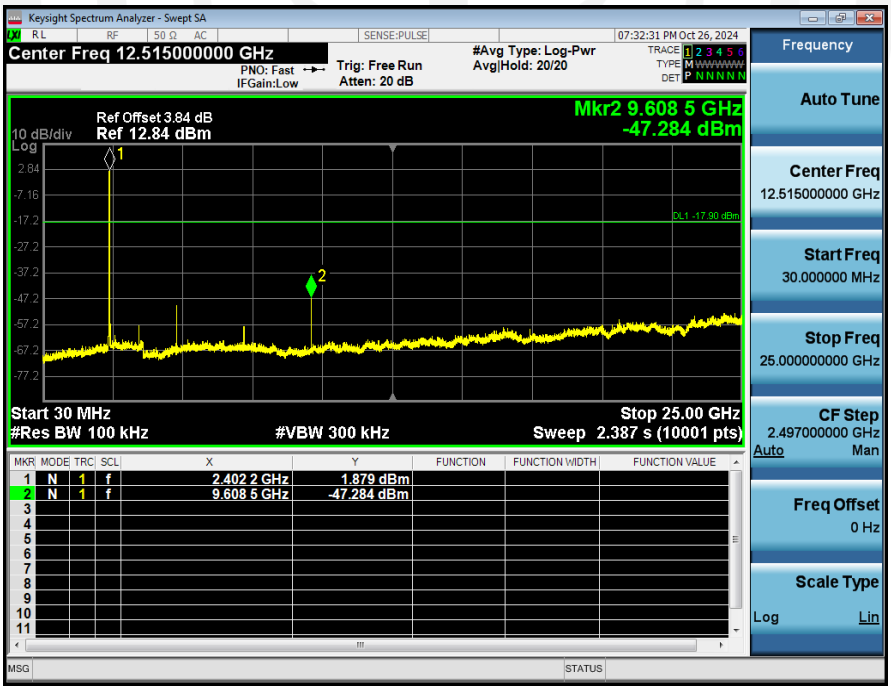


2_Band_Edge_(Hopping)_NVNT_ANT1_3-DH1_Hopping

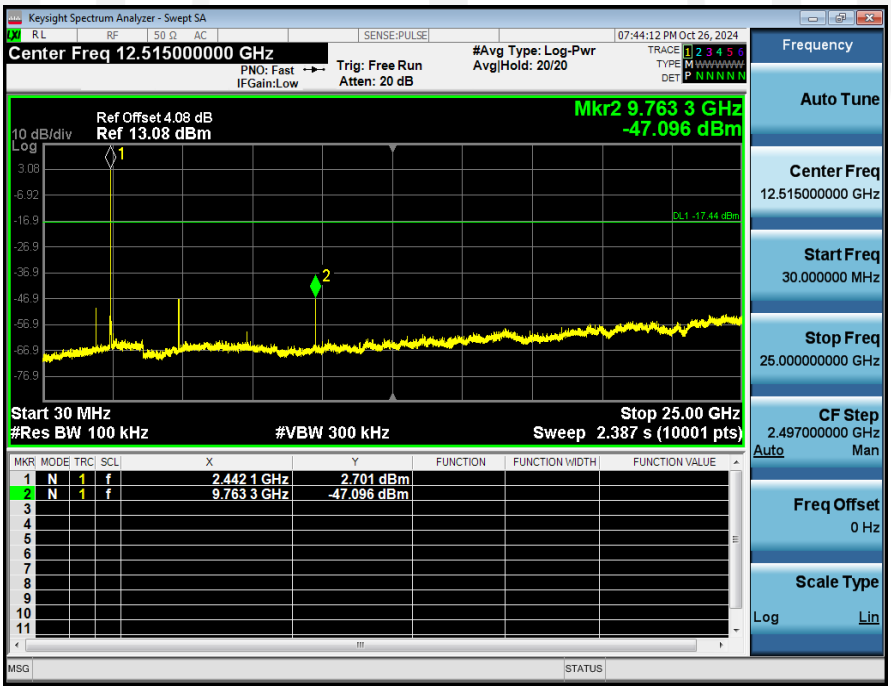


Conducted spurious emission: Pass

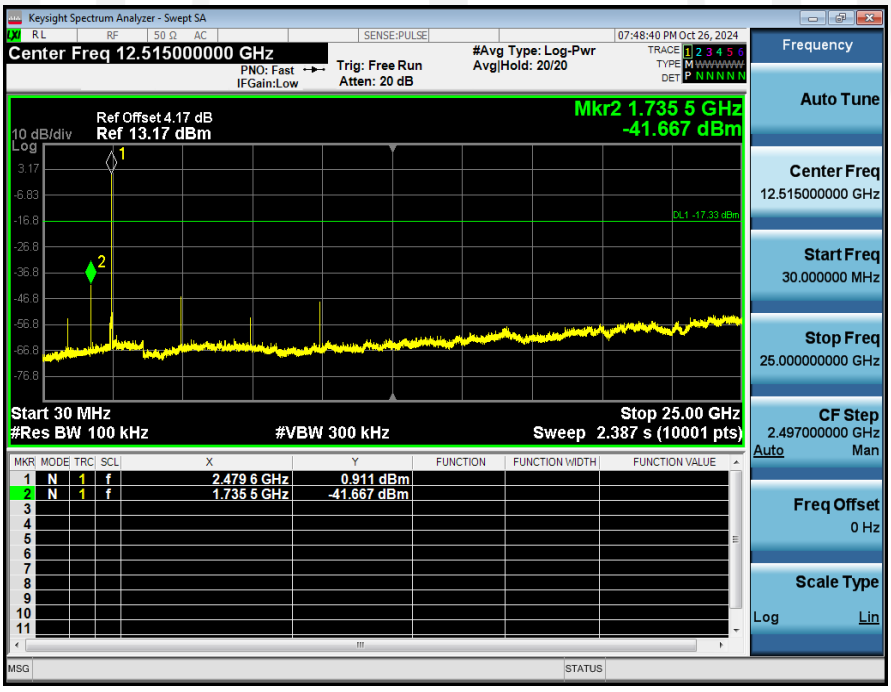
1_Reference_Level_NVNT_ANT1_1-DH1_2402_00

2_Spurious_Emissions_NVNT_ANT1_1-DH1_2402_00


1_Reference_Level_NVNT_ANT1_1-DH1_2441_00

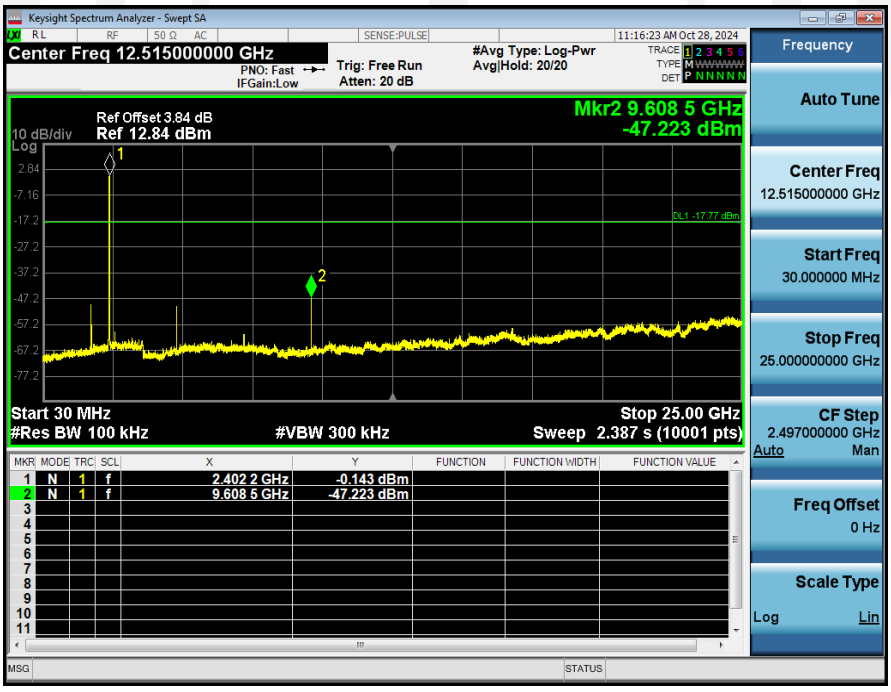

2_Spurious_Emissions_NVNT_ANT1_1-DH1_2441_00


1_Reference_Level_NVNT_ANT1_1-DH1_2480_00

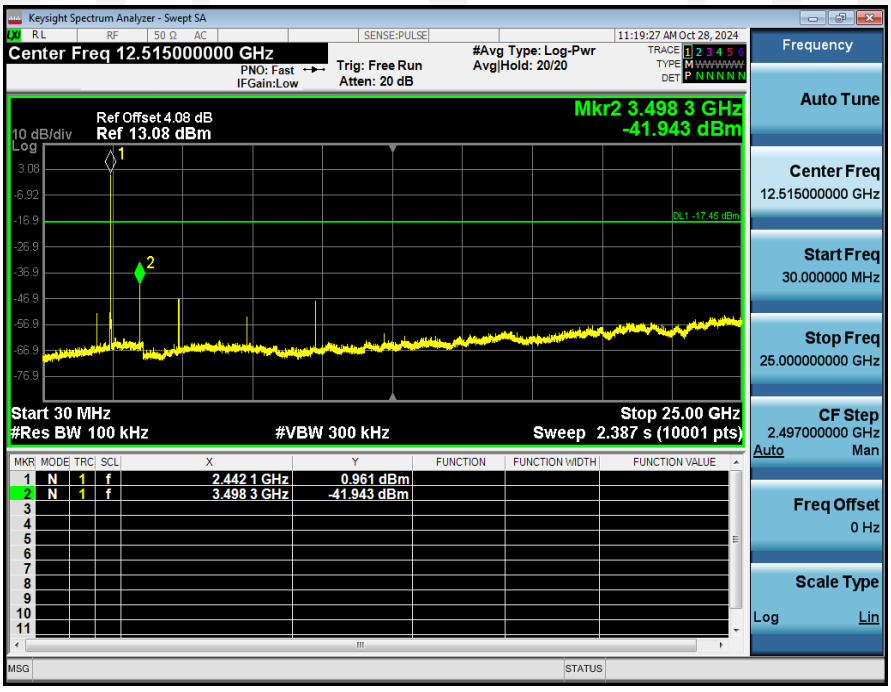

2_Spurious_Emissions_NVNT_ANT1_1-DH1_2480_00


1_Reference_Level_NVNT_ANT1_2-DH1_2402_00

2_Spurious_Emissions_NVNT_ANT1_2-DH1_2402_00

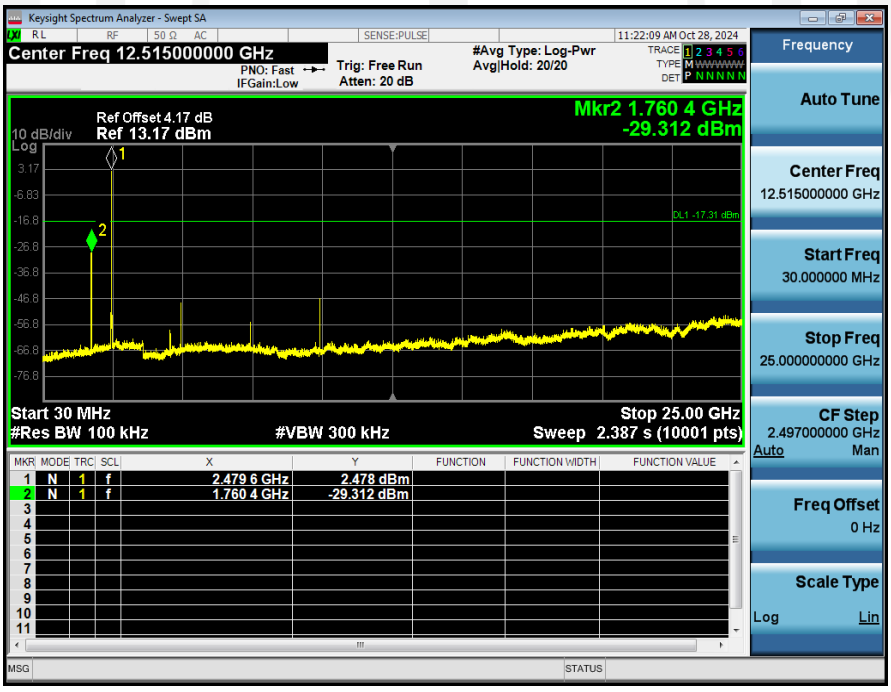


1_Reference_Level_NVNT_ANT1_2-DH1_2441_00


2_Spurious_Emissions_NVNT_ANT1_2-DH1_2441_00


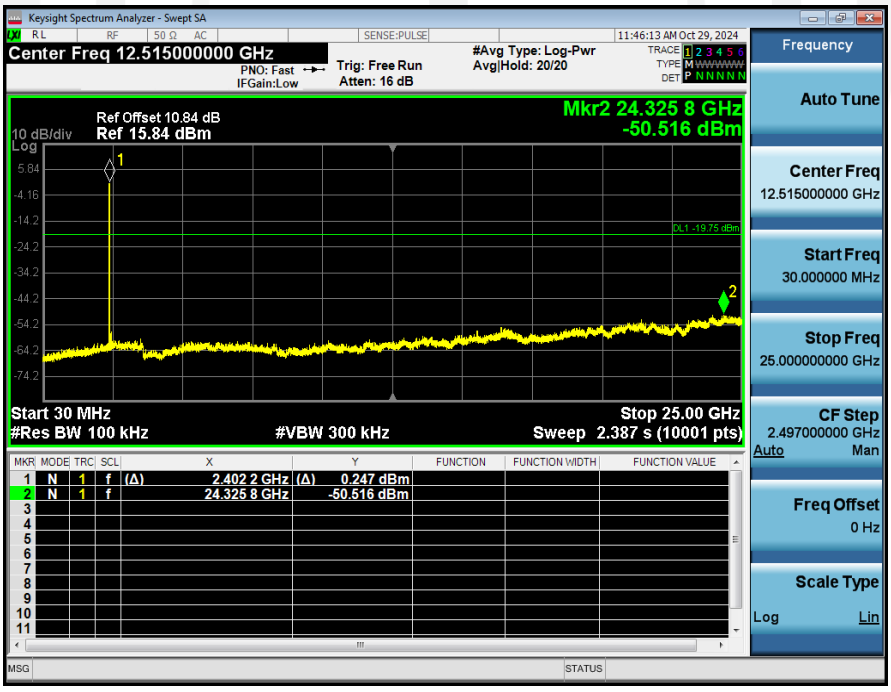
1_Reference_Level_NVNT_ANT1_2-DH1_2480_00

2_Spurious_Emissions_NVNT_ANT1_2-DH1_2480_00

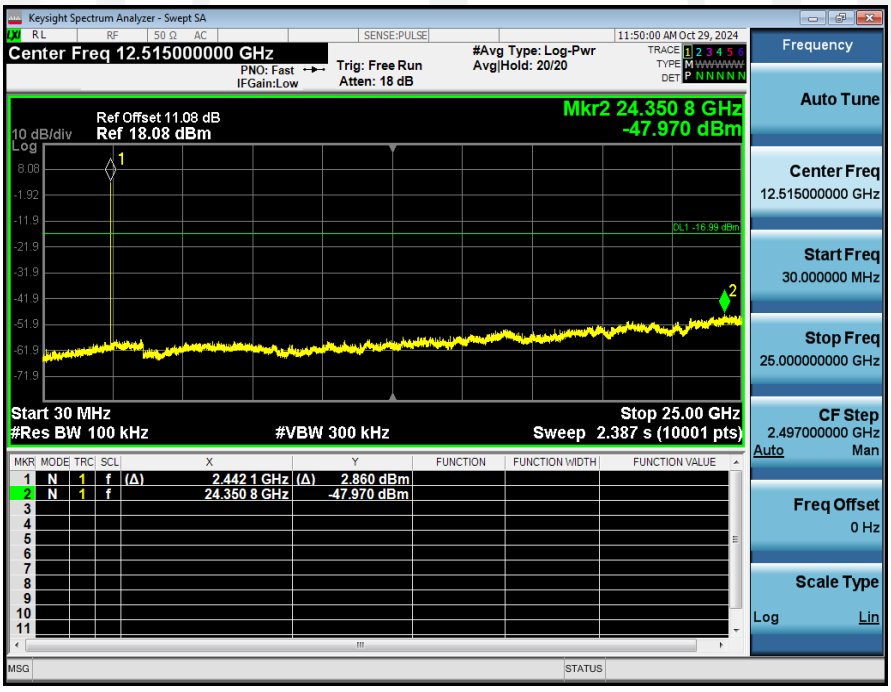


1_Reference_Level_NVNT_ANT1_3-DH1_2402_00

2_Spurious_Emissions_NVNT_ANT1_3-DH1_2402_00

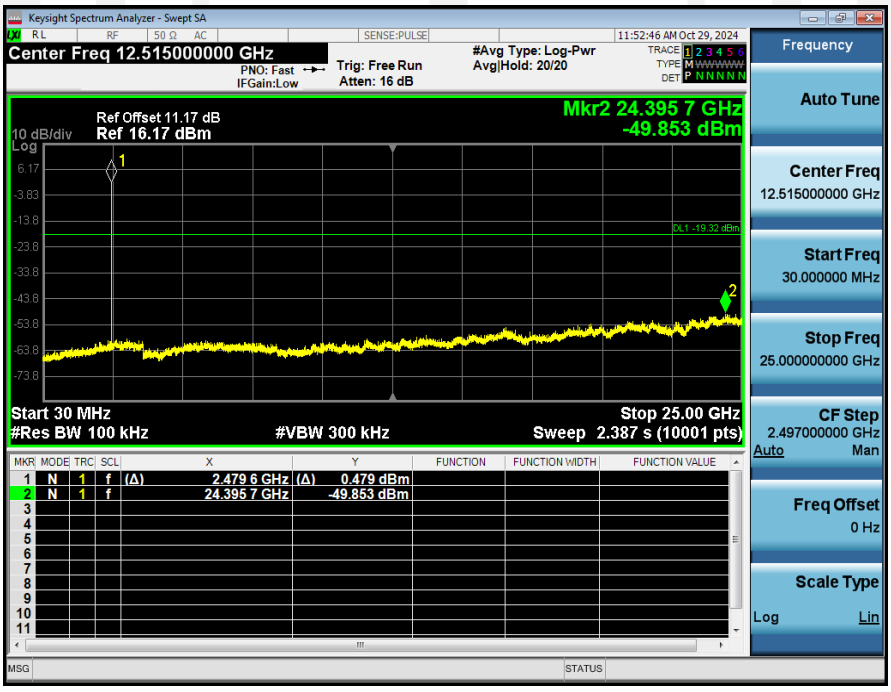


1_Reference_Level_NVNT_ANT1_3-DH1_2441_00


2_Spurious_Emissions_NVNT_ANT1_3-DH1_2441_00


1_Reference_Level_NVNT_ANT1_3-DH1_2480_00

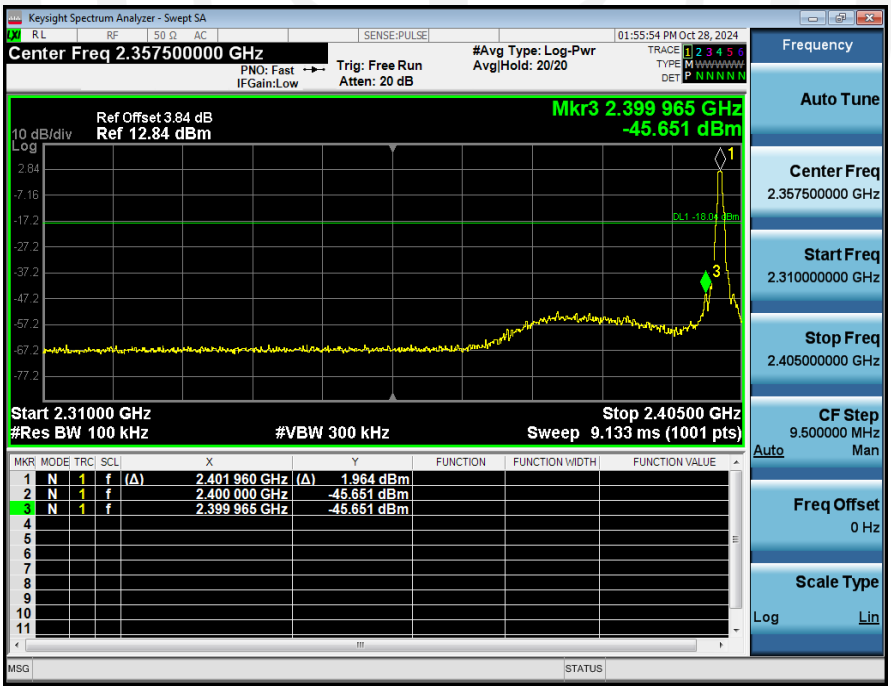
2_Spurious_Emissions_NVNT_ANT1_3-DH1_2480_00



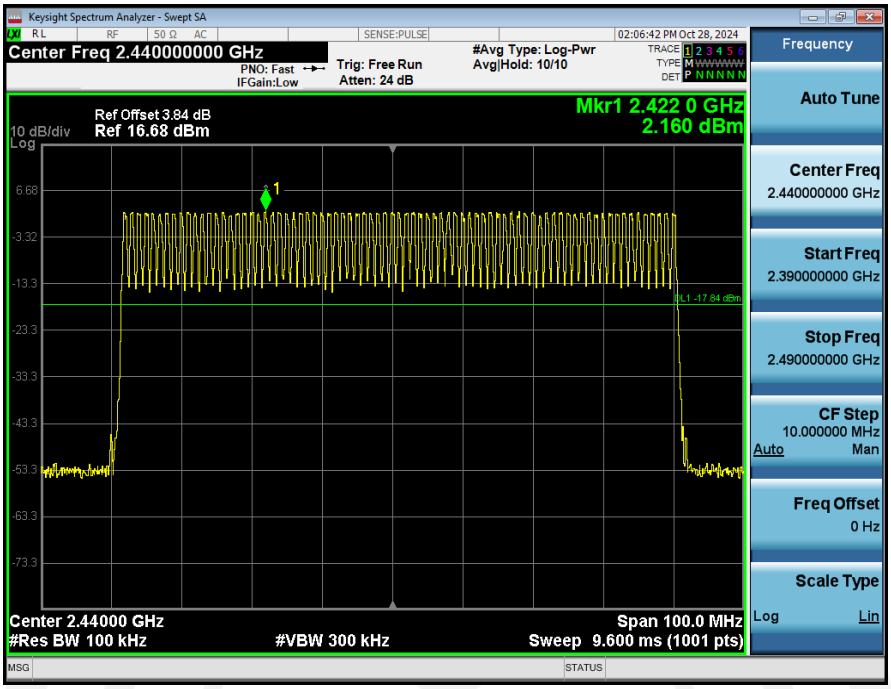
Right earphone:

Band Edge: Pass

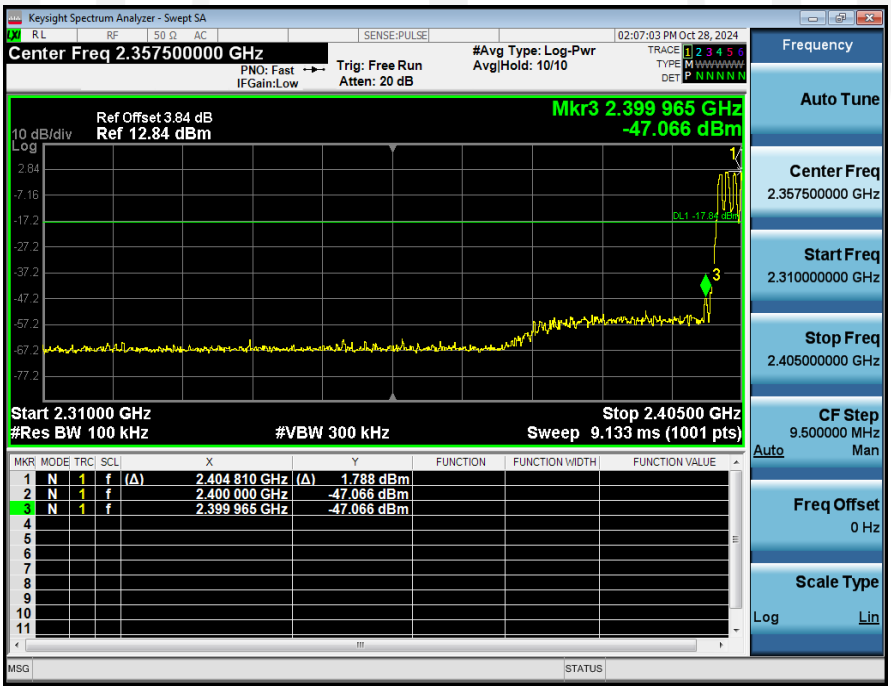
1_Reference_Level_NVNT_ANT1_1-DH1_2402_00

2_Bandedge_NVNT_ANT1_1-DH1_2402_00


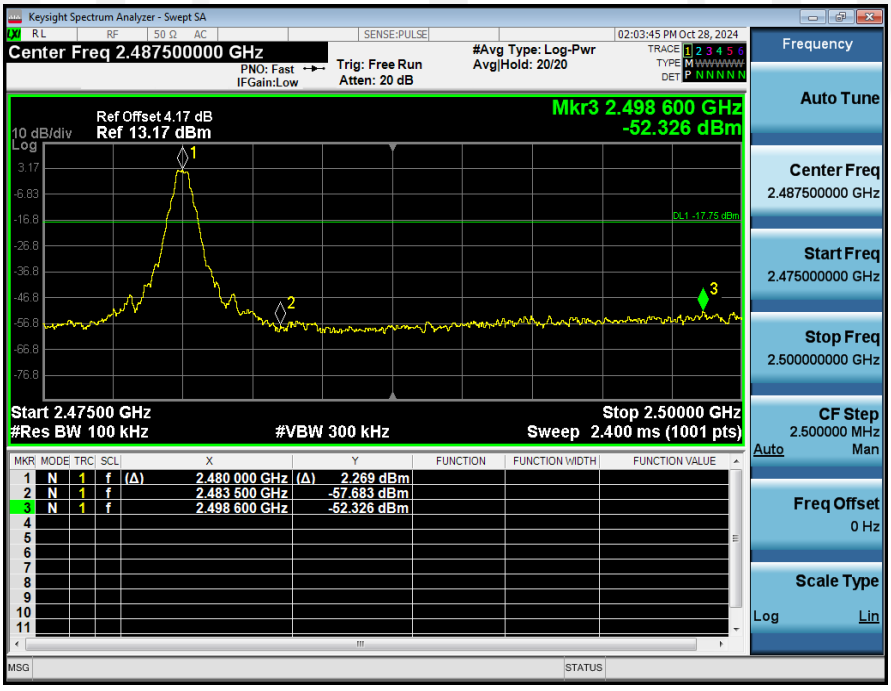
1_Reference_Level_Hopping_NVNT_ANT1_1-DH1_Hopping



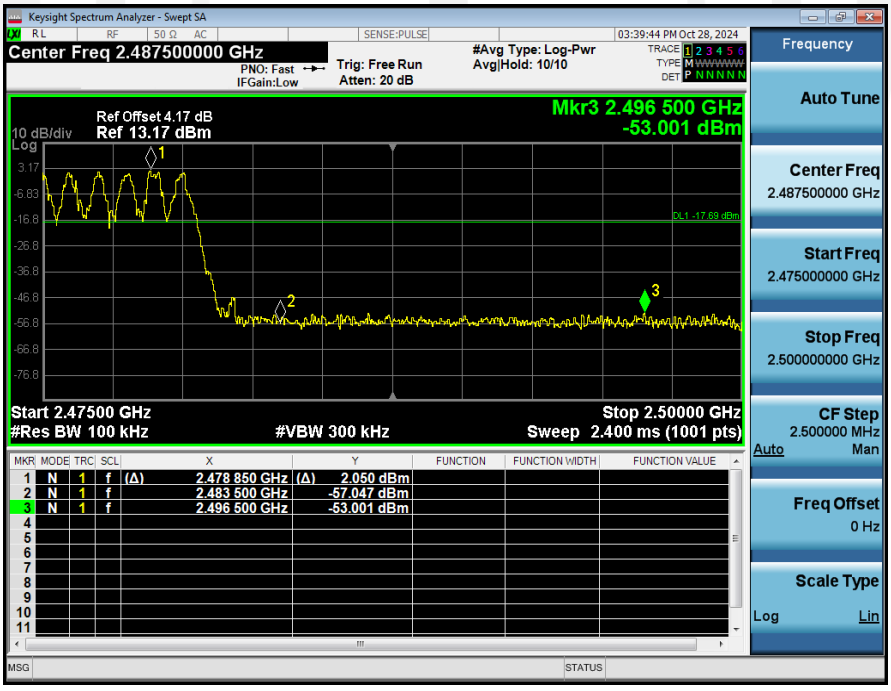
2_Band_Edge_(Hopping)_NVNT_ANT1_1-DH1_Hopping



1_Reference_Level_NVNT_ANT1_1-DH1_2480_00

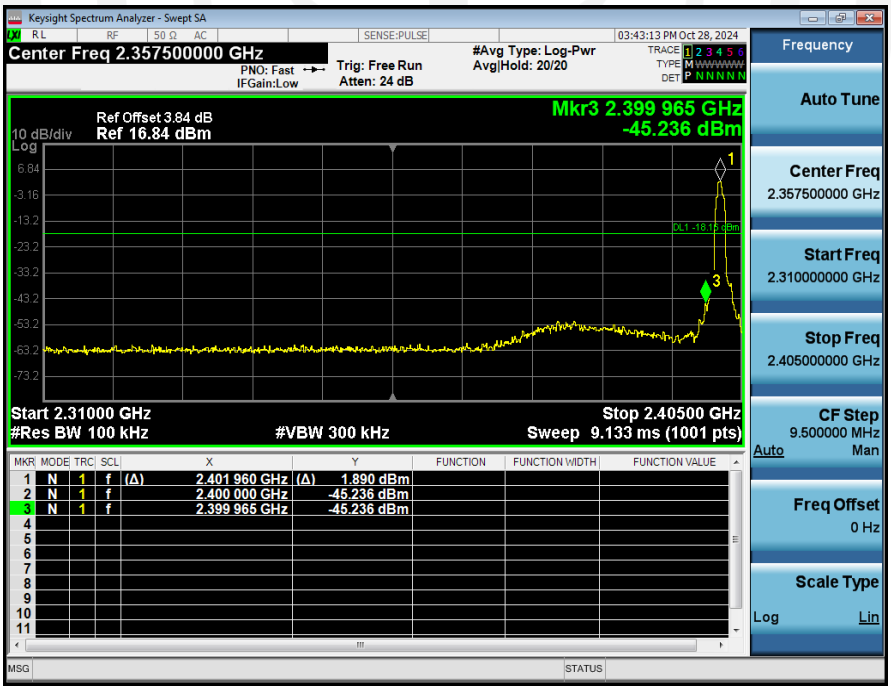
2_Bandedge_NVNT_ANT1_1-DH1_2480_00


1_Reference_Level_Hopping_NVNT_ANT1_1-DH1_Hopping

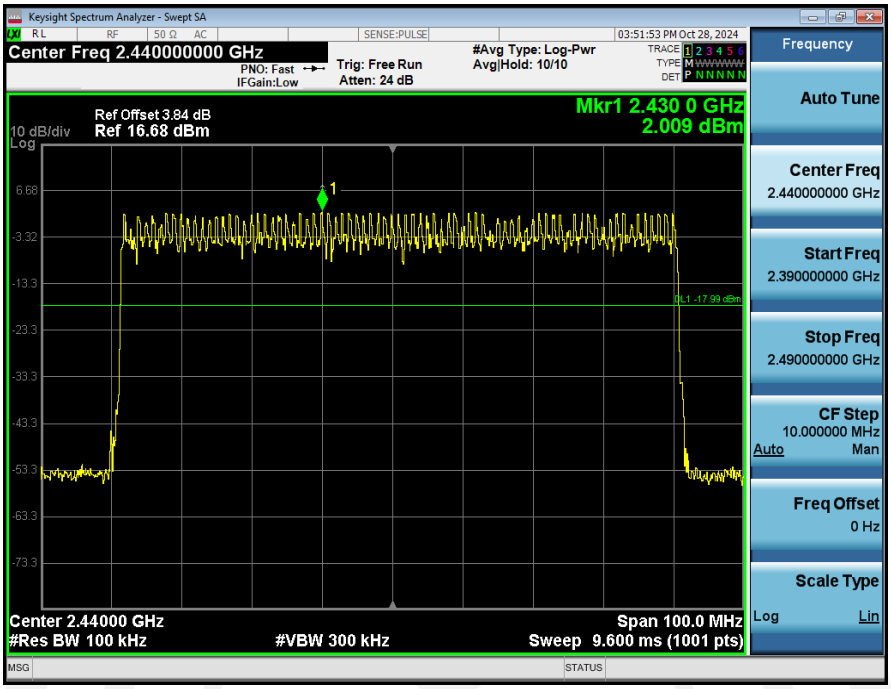
2_Band_Edge_(Hopping)_NVNT_ANT1_1-DH1_Hopping


1_Reference_Level_NVNT_ANT1_2-DH1_2402_00

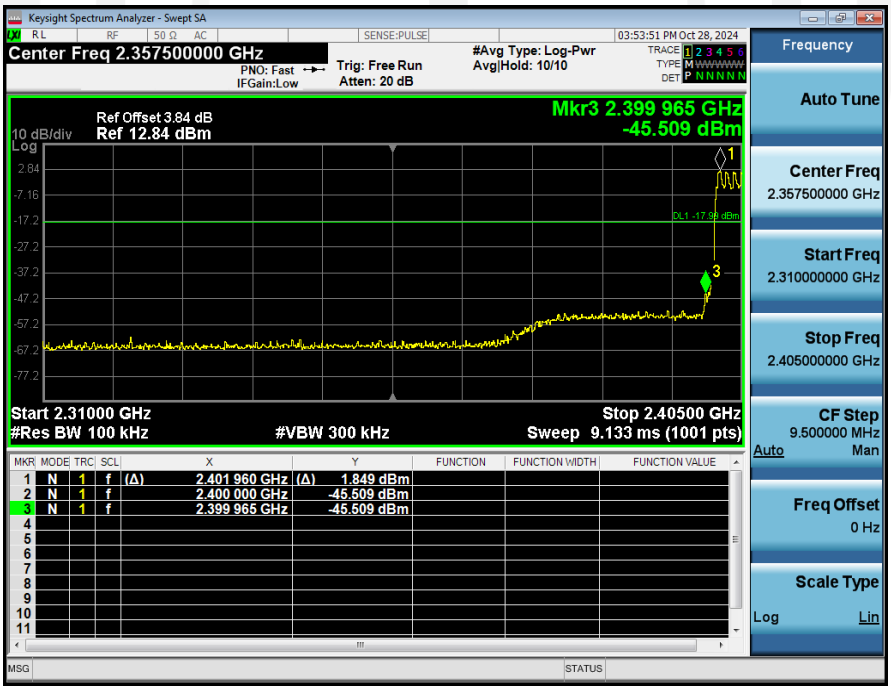
2_Bandedge_NVNT_ANT1_2-DH1_2402_00



1_Reference_Level_Hopping_NVNT_ANT1_2-DH1_Hopping

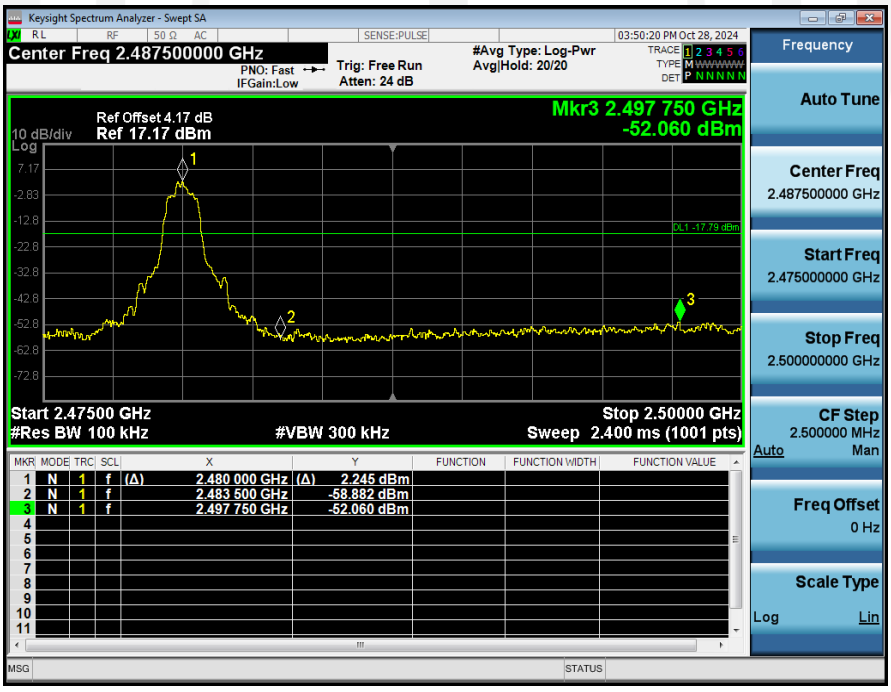


2_Band_Edge_(Hopping)_NVNT_ANT1_2-DH1_Hopping

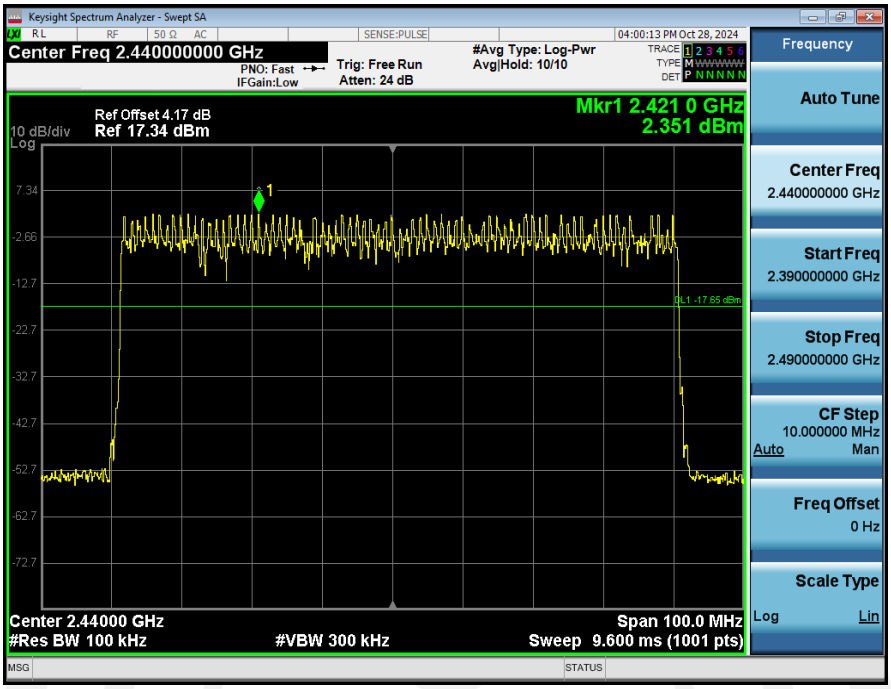


1_Reference_Level_NVNT_ANT1_2-DH1_2480_00

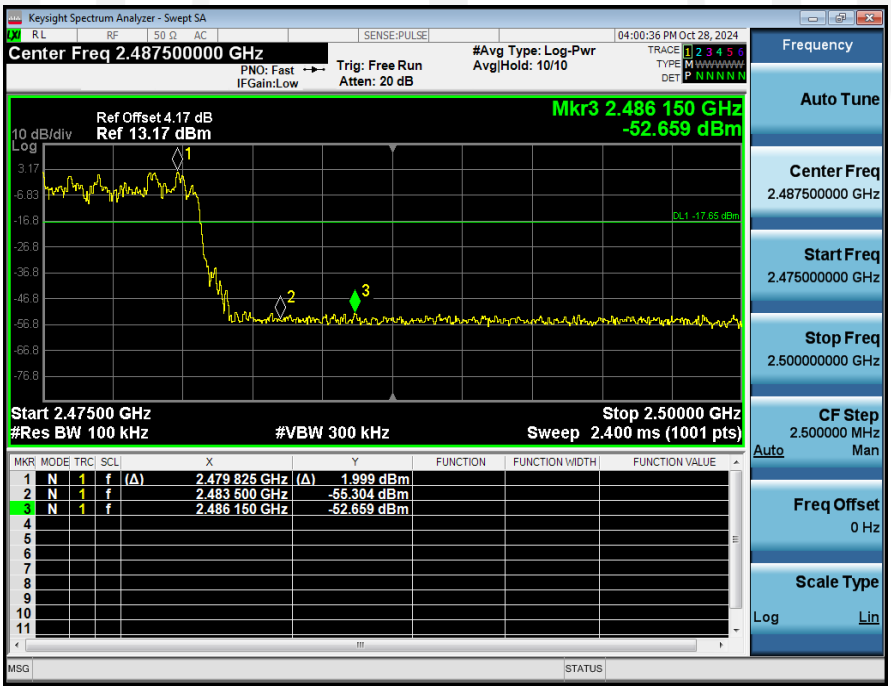
2_Bandedge_NVNT_ANT1_2-DH1_2480_00



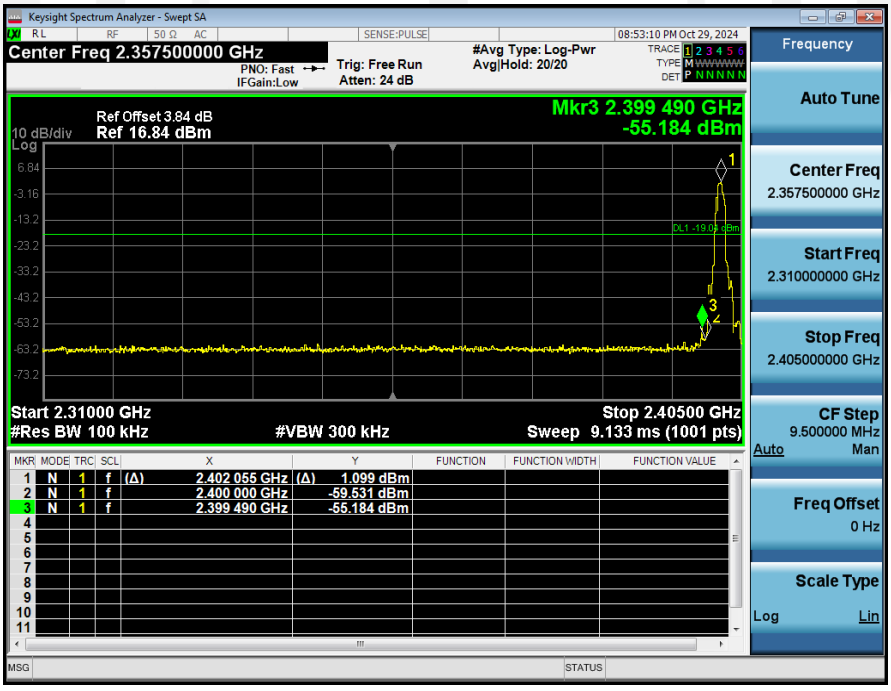
1_Reference_Level_Hopping_NVNT_ANT1_2-DH1_Hopping



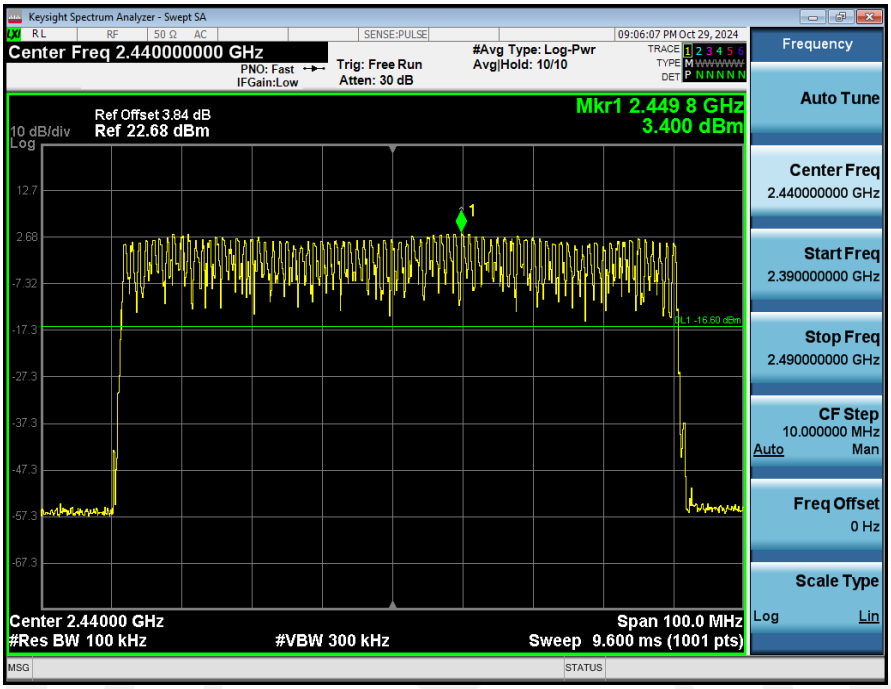
2_Band_Edge_(Hopping)_NVNT_ANT1_2-DH1_Hopping



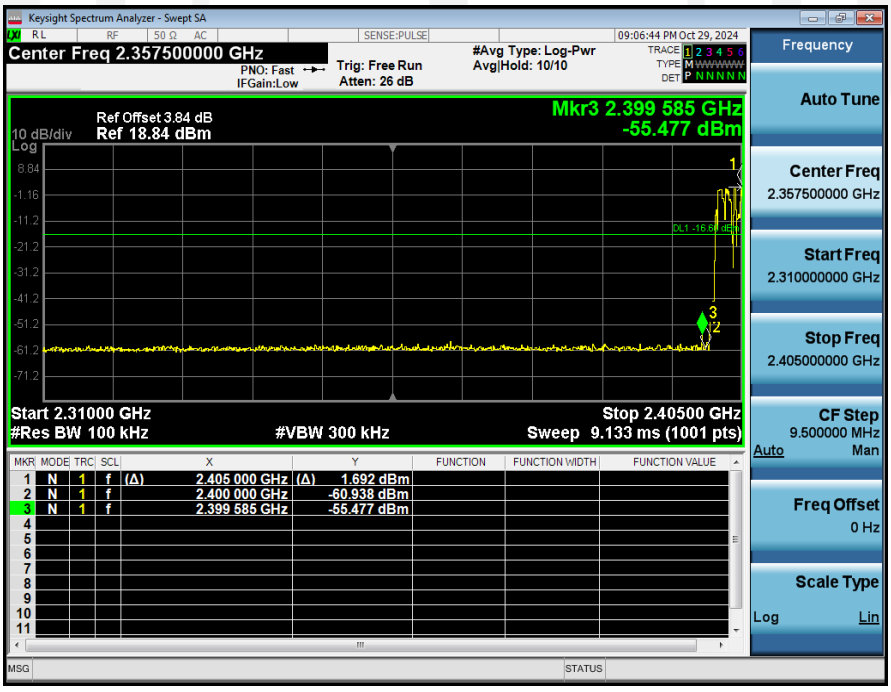
1_Reference_Level_NVNT_ANT1_3-DH1_2402_00

2_Bandedge_NVNT_ANT1_3-DH1_2402_00


1_Reference_Level_Hopping_NVNT_ANT1_3-DH1_Hopping

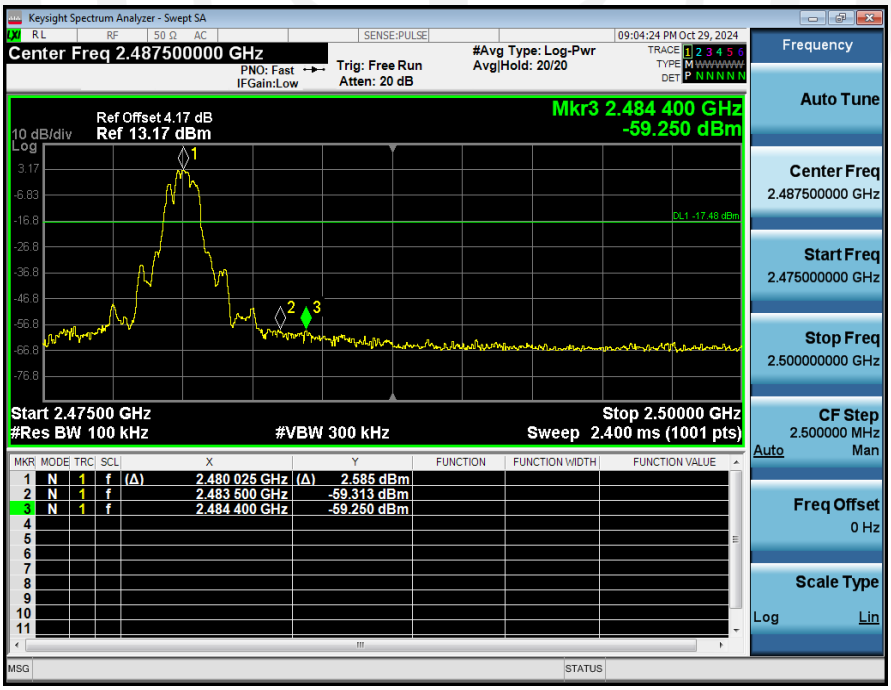


2_Band_Edge_(Hopping)_NVNT_ANT1_3-DH1_Hopping

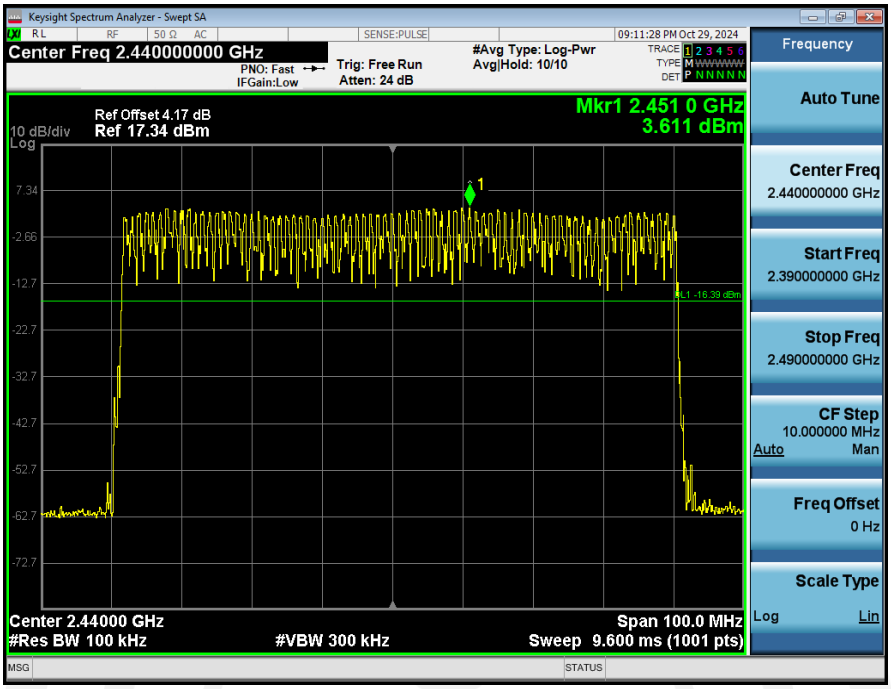


1_Reference_Level_NVNT_ANT1_3-DH1_2480_00

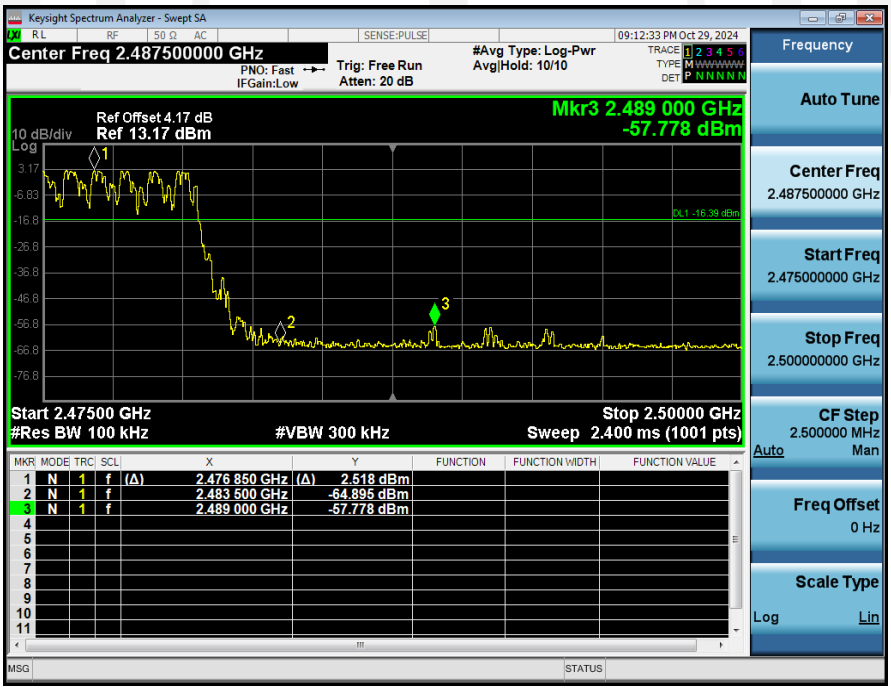
2_Bandedge_NVNT_ANT1_3-DH1_2480_00



1_Reference_Level_Hopping_NVNT_ANT1_3-DH1_Hopping

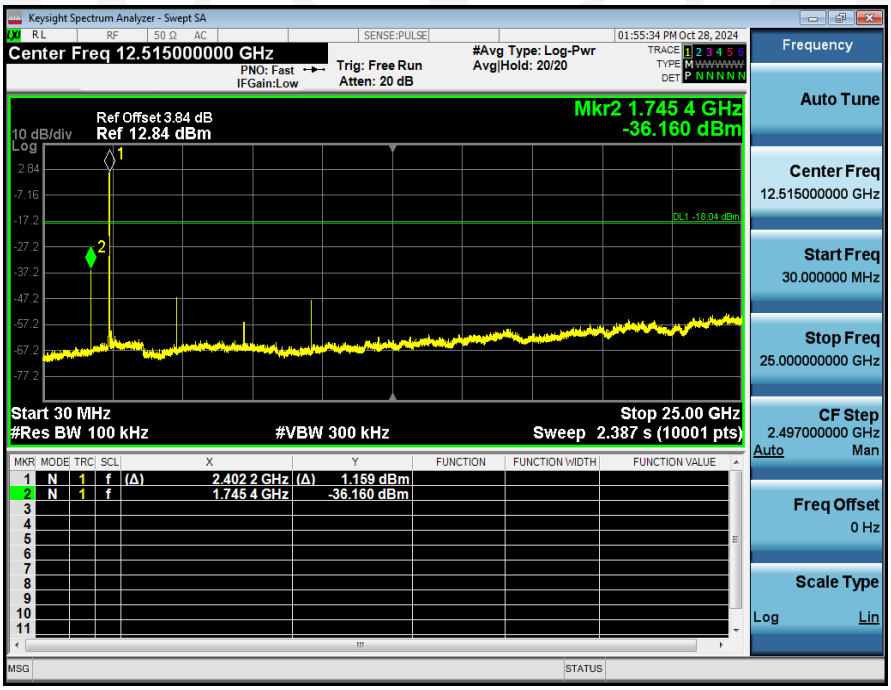


2_Band_Edge_(Hopping)_NVNT_ANT1_3-DH1_Hopping

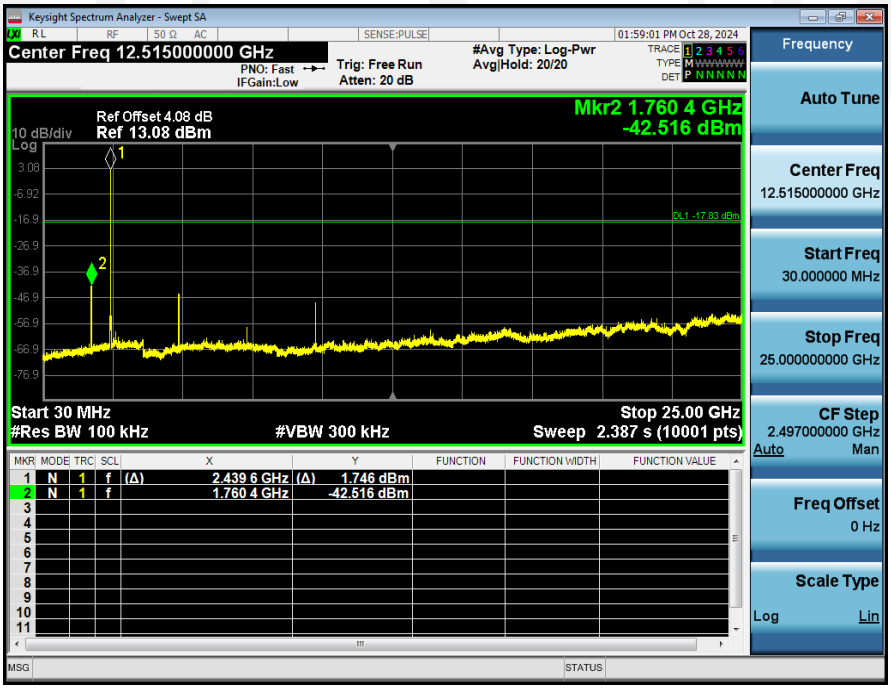


Conducted spurious emission: Pass

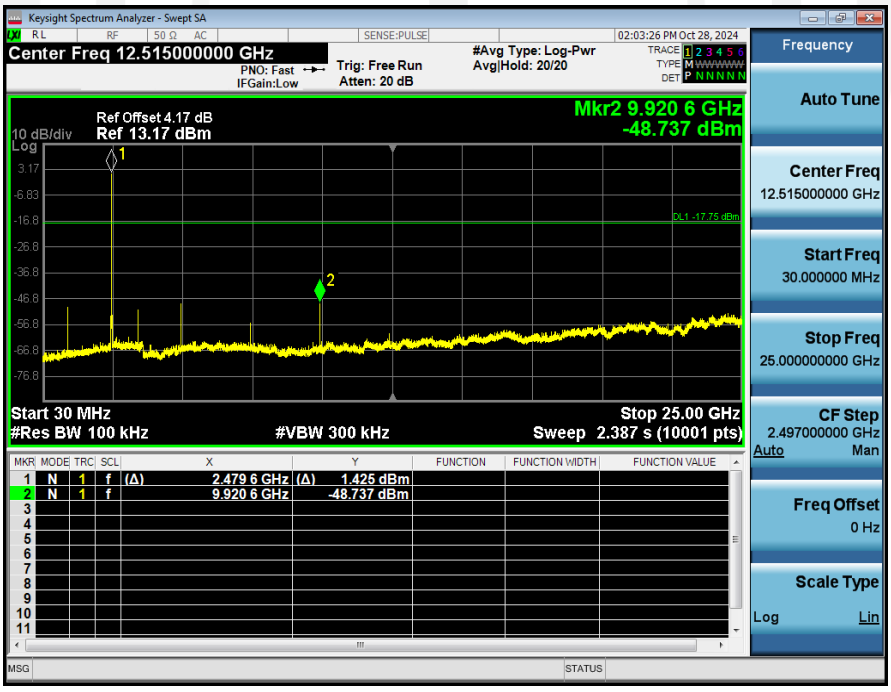
1_Reference_Level_NVNT_ANT1_1-DH1_2402_00

2_Spurious_Emissions_NVNT_ANT1_1-DH1_2402_00


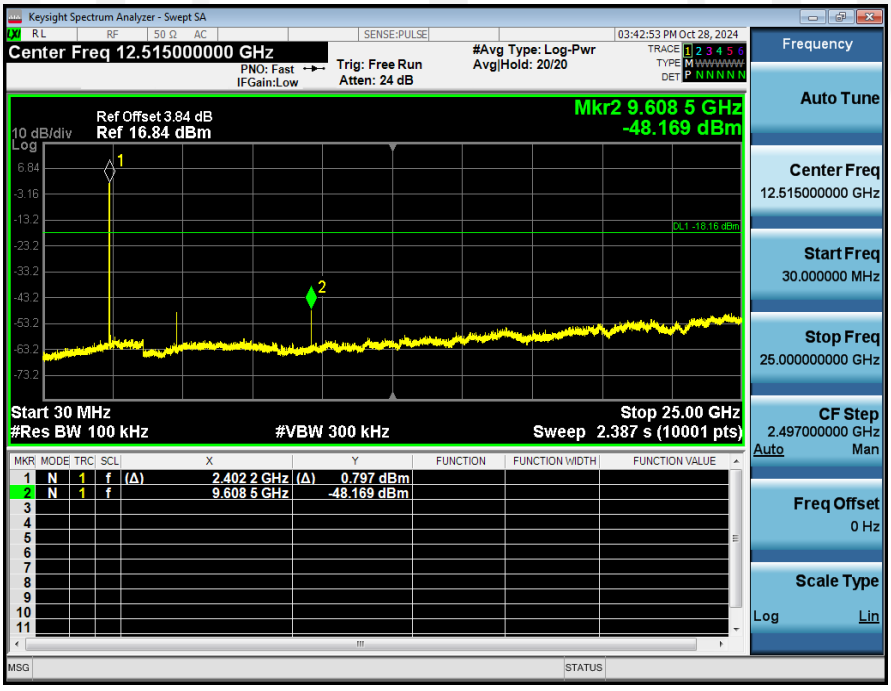
1_Reference_Level_NVNT_ANT1_1-DH1_2441_00

2_Spurious_Emissions_NVNT_ANT1_1-DH1_2441_00


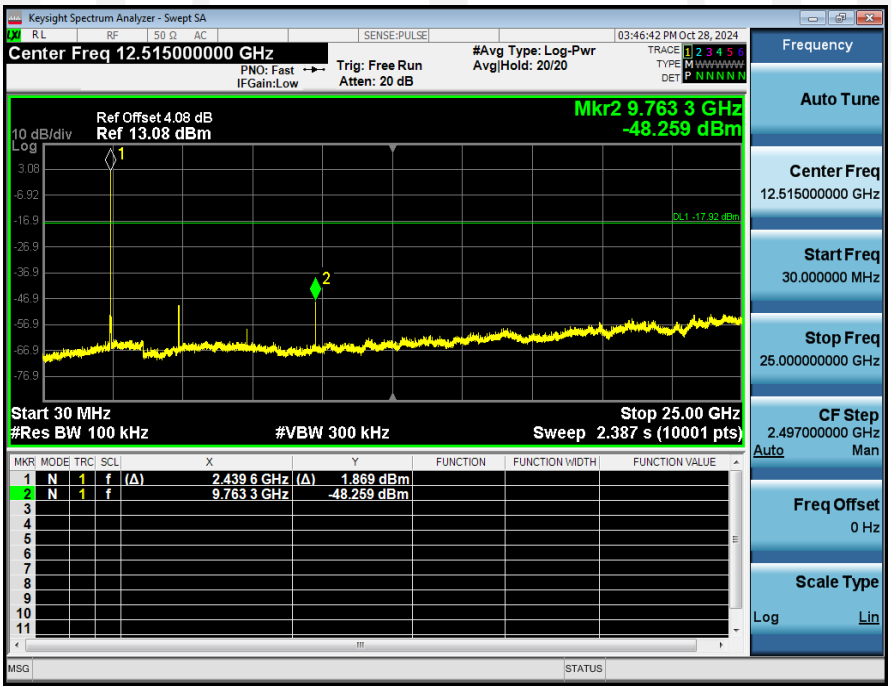
1_Reference_Level_NVNT_ANT1_1-DH1_2480_00


2_Spurious_Emissions_NVNT_ANT1_1-DH1_2480_00


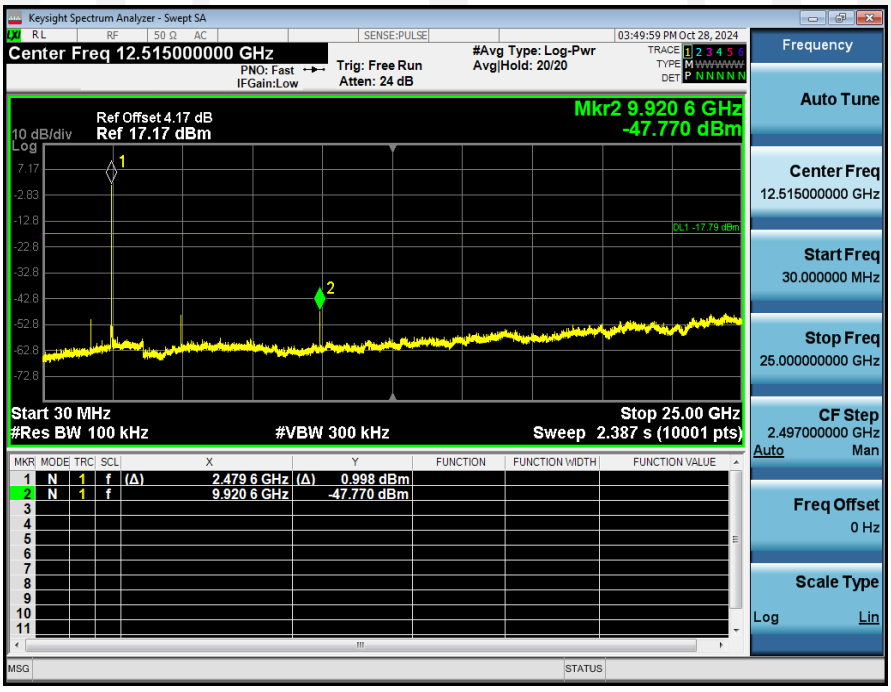
1_Reference_Level_NVNT_ANT1_2-DH1_2402_00


2_Spurious_Emissions_NVNT_ANT1_2-DH1_2402_00


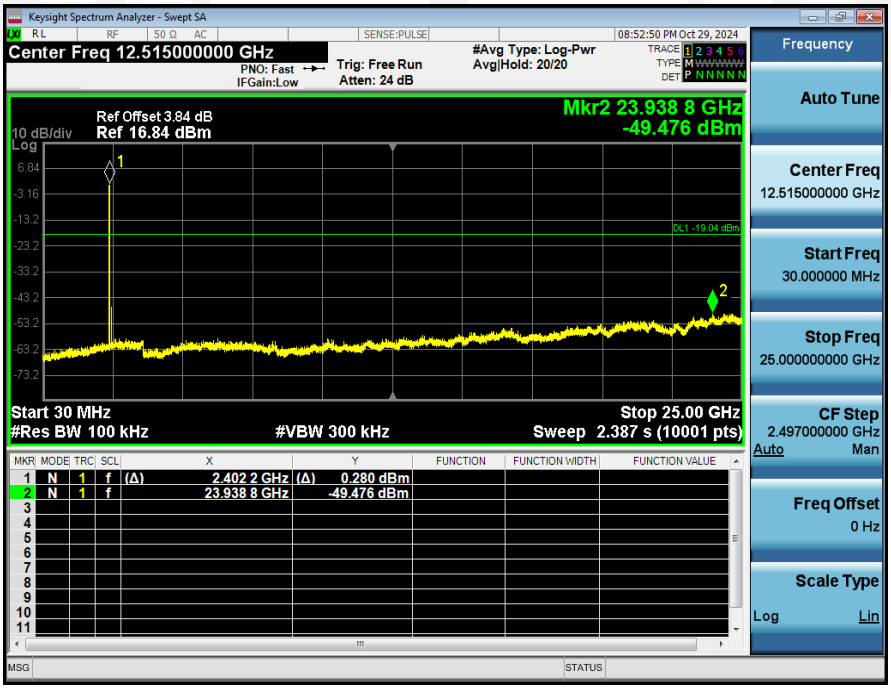
1_Reference_Level_NVNT_ANT1_2-DH1_2441_00


2_Spurious_Emissions_NVNT_ANT1_2-DH1_2441_00


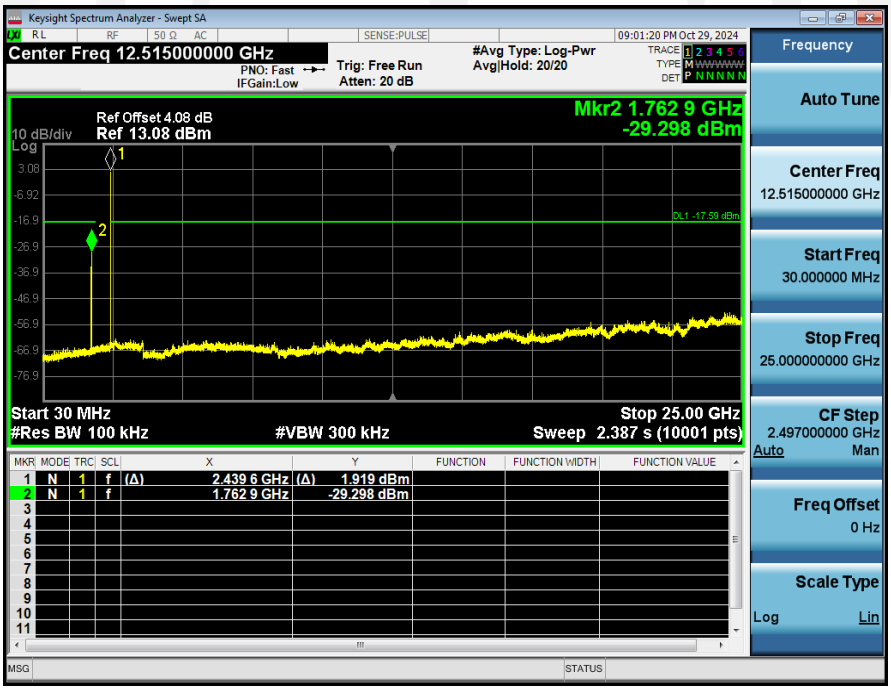
1_Reference_Level_NVNT_ANT1_2-DH1_2480_00


2_Spurious_Emissions_NVNT_ANT1_2-DH1_2480_00


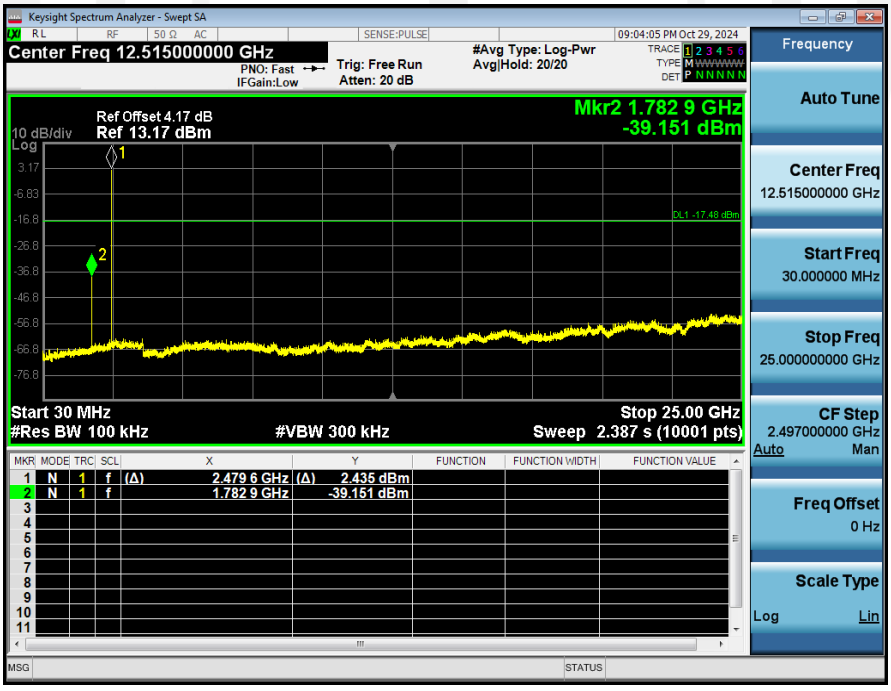
1_Reference_Level_NVNT_ANT1_3-DH1_2402_00

2_Spurious_Emissions_NVNT_ANT1_3-DH1_2402_00


1_Reference_Level_NVNT_ANT1_3-DH1_2441_00


2_Spurious_Emissions_NVNT_ANT1_3-DH1_2441_00


1_Reference_Level_NVNT_ANT1_3-DH1_2480_00

2_Spurious_Emissions_NVNT_ANT1_3-DH1_2480_00


9. Radiated Emissions

9.1. Limit

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

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])

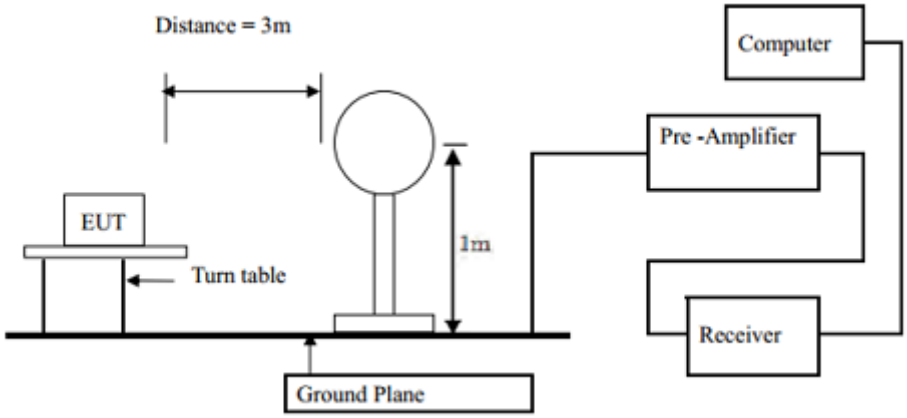
15.209 Limit

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
0.009-0.490	300	2400/F(KHz)	/
0.490-1.705	30	24000/F(KHz)	/
1.705-30	30	30	29.5
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

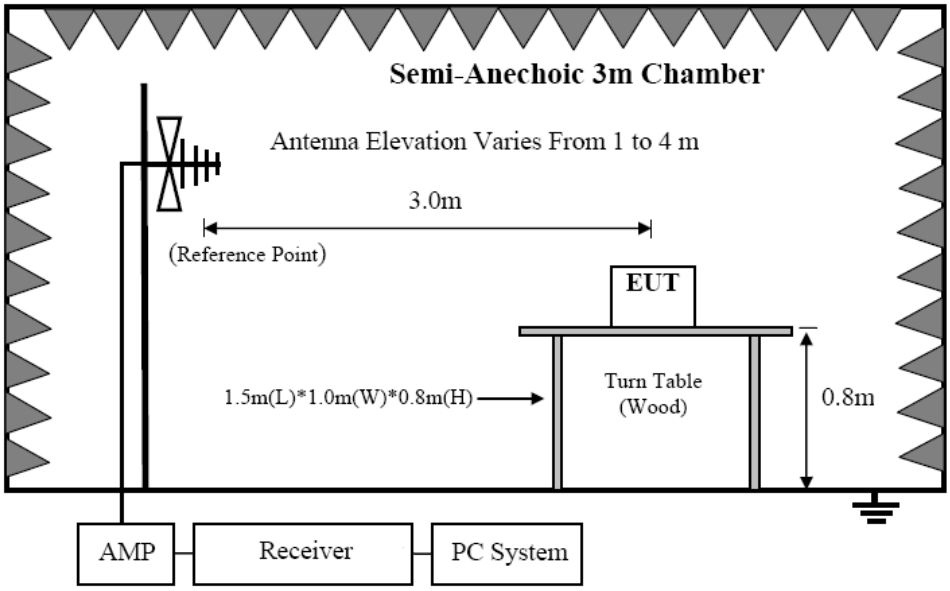
Note: The peak limit is 20 dB higher than the average limit

9.2. Block Diagram of Test setup

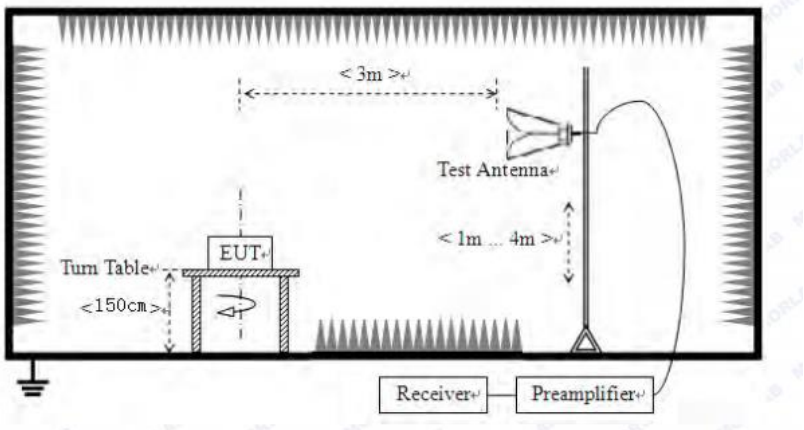
9.2.1 In 3m Anechoic Chamber Test Setup Diagram for below 30MHz



9.2.1 In 3m Anechoic Chamber Test Setup Diagram for below 1GHz



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



Note: For harmonic emissions test a appropriate high pass filter was inserted in the input port of AMP.

9.3. Test Procedure

(1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber.

(2) Setup EUT and simulator

(3) Test antenna was located 3m from the EUT on an adjustable mast. Below pre-scan procedure was first performed in order to find prominent radiated emissions.

(a) Change work frequency or channel of device if practicable.

(b) Change modulation type of device if practicable.

(c) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions

(4) Spectrum frequency from 9KHz to 25GHz (tenth harmonic of fundamental frequency) was investigated

(5) For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10 :2013on Radiated Emission test.

(6) 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; RBW is set at 1MHz, VBW is set at 10Hz for Average measure.

9.4. Test Results

We have scanned from 9kHz to the 10th harmonic of the EUT's highest frequency.

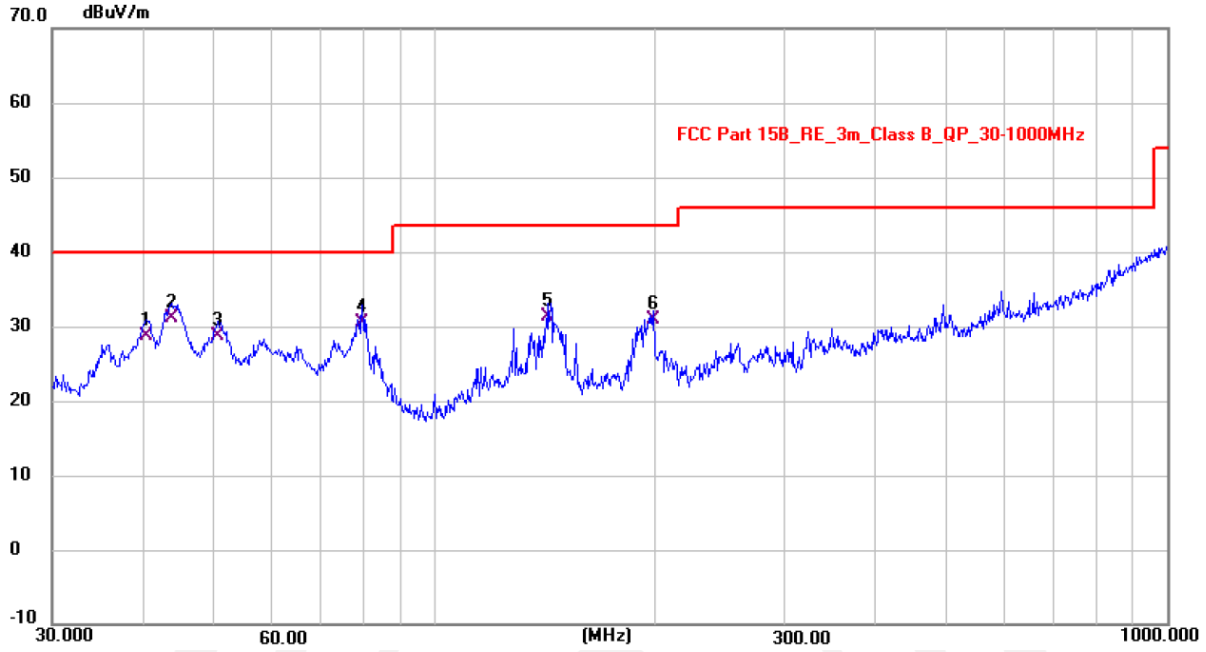
Detailed information please see the following page.

<table>
<tr><td colspan="4">From 9KHz to 30MHz:</td></tr>
<tr><td>Test Date</td><td>: 2024.10.22</td><td>Temperature</td><td>: 26℃</td></tr>
<tr><td>Test Engineer</td><td>: Jensen Wang</td><td>Humidity</td><td>: 54%</td></tr>
<tr><td>Test Mode</td><td colspan="3">: GFSK, π/4 DQPSK, 8 DPSK mode</td></tr>
<tr><td>Test Results</td><td colspan="3">: PASS</td></tr>
<tr><td>Note:</td><td colspan="3">The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.</td></tr>
</table>

From 30MHz to 1000MHz:					
Test Date	:	2024.10.22	Temperature	:	26℃
Test Engineer	:	Jensen Wang	Humidity	:	54%
Test Mode	:	GFSK, π/4 DQPSK, 8 DPSK mode			
Test Results	:	**PASS**			
Note:	1. The test results are listed in next pages. 2. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector and quasi-peak detector need not be carried out. 3. All modes have been tested, and only worst data of GFSK mode, Channel 2402MHz (DC 3.7V) was listed in this report.				

Left earphone:

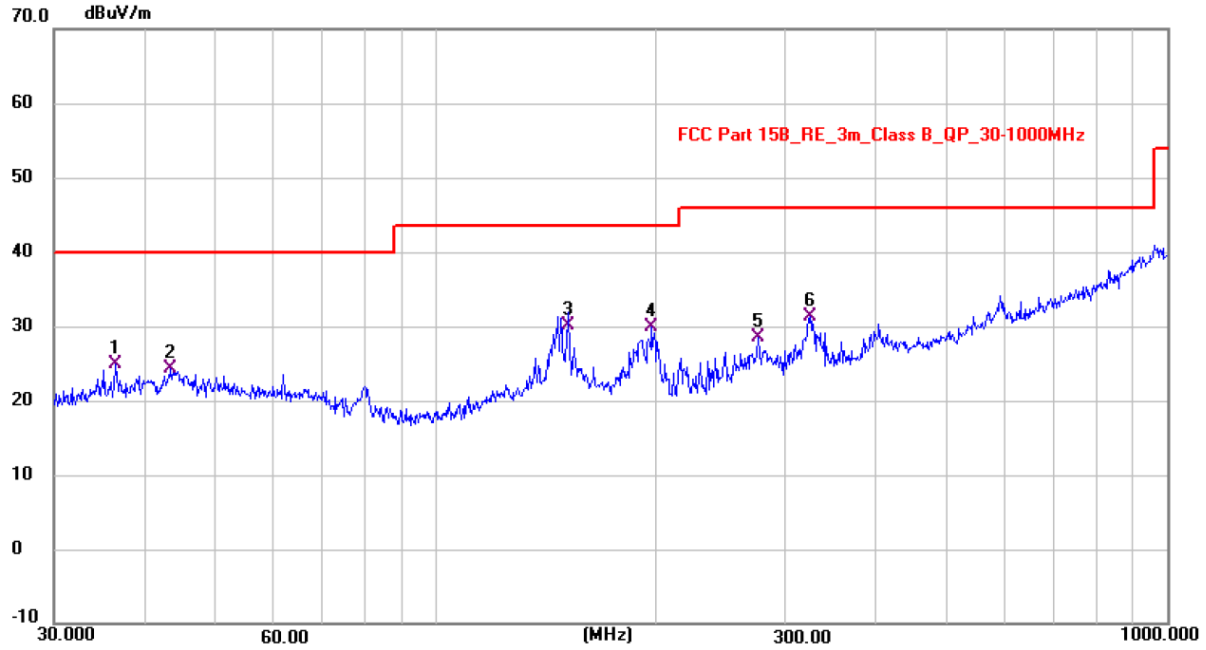
Polarization: Vertical



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	40.3995	14.11	14.55	28.66	40.00	-11.34	QP
2 *	43.6777	16.67	14.42	31.09	40.00	-8.91	QP
3	50.7192	14.62	14.07	28.69	40.00	-11.31	QP
4	79.5907	21.02	9.56	30.58	40.00	-9.42	QP
5	143.1377	17.31	13.97	31.28	43.50	-12.22	QP
6	198.5880	19.74	11.24	30.98	43.50	-12.52	QP

Note: Level = Reading + Factor Margin = Level - Limit

Polarization: Horizontal

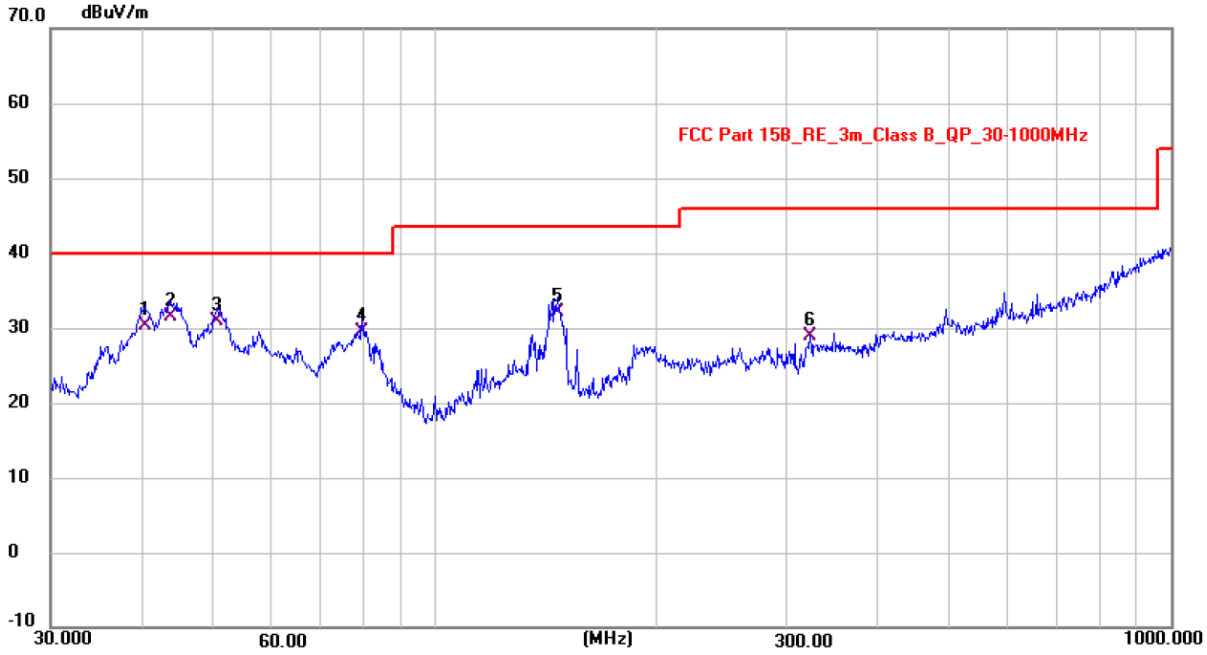


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	36.4772	10.80	14.06	24.86	40.00	-15.14	QP
2	43.4867	9.93	14.43	24.36	40.00	-15.64	QP
3 *	151.7302	15.86	14.16	30.02	43.50	-13.48	QP
4	197.8061	18.60	11.28	29.88	43.50	-13.62	QP
5	275.5191	14.12	14.34	28.46	46.00	-17.54	QP
6	324.5983	15.73	15.60	31.33	46.00	-14.67	QP

Note: Level = Reading + Factor Margin = Level – Limit

Right earphone:

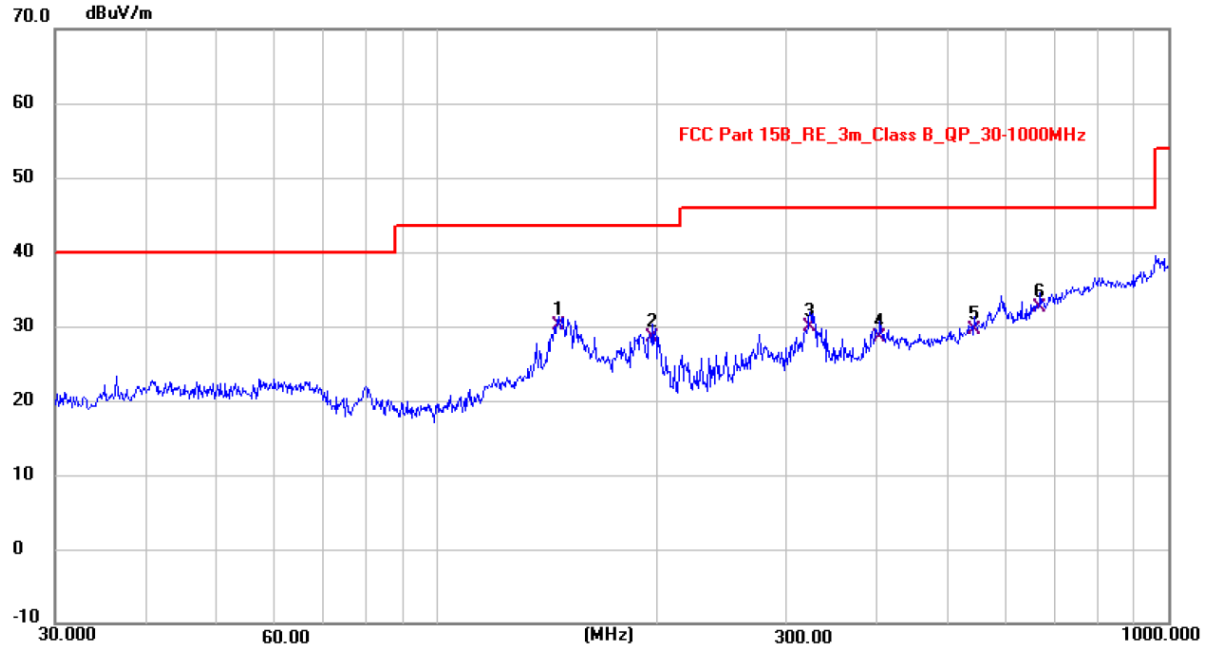
Polarization: Vertical



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	40.3992	15.70	14.55	30.25	40.00	-9.75	QP
2 *	43.6775	17.12	14.42	31.54	40.00	-8.46	QP
3	50.7190	16.80	14.07	30.87	40.00	-9.13	QP
4	79.5904	20.02	9.56	29.58	40.00	-10.42	QP
5	146.5018	18.14	14.05	32.19	43.50	-11.31	QP
6	323.7456	13.26	15.57	28.83	46.00	-17.17	QP

Note: Level = Reading + Factor Margin = Level - Limit

Polarization: Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	146.9520	15.99	14.06	30.05	43.50	-13.45	QP
2	197.8059	17.31	11.28	28.59	43.50	-14.91	QP
3	323.6040	14.30	15.57	29.87	46.00	-16.13	QP
4	403.2500	10.74	17.81	28.55	46.00	-17.45	QP
5	543.5122	8.17	21.34	29.51	46.00	-16.49	QP
6	668.7282	8.49	24.00	32.49	46.00	-13.51	QP

Note: Level = Reading + Factor Margin = Level - Limit

From 1GHz to 25GHz:			
Test Date	: 2024.10.22	Temperature	: 26℃
Test Engineer	: Jensen Wang	Humidity	: 54%
Test Mode	: GFSK, π/4 DQPSK, 8 DPSK mode		
Test Results	: **PASS**		
Note:	1. The test results are listed in next pages. 2. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector and quasi-peak detector need not be carried out. 3. If the limits for the measurement with the average detector are met when using a receiver with a quasi-peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector need not be carried out.		

Left earphone:

Test Mode : GFSK TX Low								
No.	Freq MHz	Polarity	Reading (dBuV/m)	Correct Factor	Result (dBuV/m)	Limit (dBuV/m)	Margin	Remark
1	4804	V	86.12	-27.27	58.85	74.00	-15.15	Peak
2	4804	V	63.58	-27.27	36.31	54.00	-17.69	Avg
3	7206	--	--	--	--	--	--	--
4	9608	--	--	--	--	--	--	--
5	4804	H	82.02	-27.27	54.75	74.00	-19.25	Peak
6	4804	H	62.56	-27.27	35.29	54.00	-18.71	Avg
7	7206	--	--	--	--	--	--	--
8	9608	--	--	--	--	--	--	--
Test Mode : GFSK TX Mid								
1	4882	V	85.20	-27.79	57.41	74.00	-16.59	Peak
2	4882	V	65.72	-27.79	37.93	54.00	-16.07	Avg
3	7323	--	--	--	--	--	--	--
4	9764	--	--	--	--	--	--	--
5	4882	H	82.01	-27.79	54.22	74.00	-19.78	Peak
6	4882	H	66.10	-27.79	38.31	54.00	-15.69	Avg
7	7323	--	--	--	--	--	--	--
8	9764	--	--	--	--	--	--	--
Test Mode : GFSK TX High								
1	4960	V	86.66	-28.30	58.36	74.00	-15.64	Peak
2	4960	V	70.56	-28.30	42.26	54.00	-11.74	Avg
3	7440	--	--	--	--	--	--	--
4	9920	--	--	--	--	--	--	--
5	4960	H	83.81	-28.30	55.51	74.00	-18.49	Peak
6	4960	H	66.22	-28.30	37.92	54.00	-16.08	Avg
7	7440	--	--	--	--	--	--	--
8	9920	--	--	--	--	--	--	--
Note:	1. Means other frequency and mode comply with standard requirements and at least have 20dB margin. 2. Correct Factor=Cable Loss+ Antenna Factor-Amplifier Gain. Result=Reading + Correct Factor. Margin= Result-Limit.							