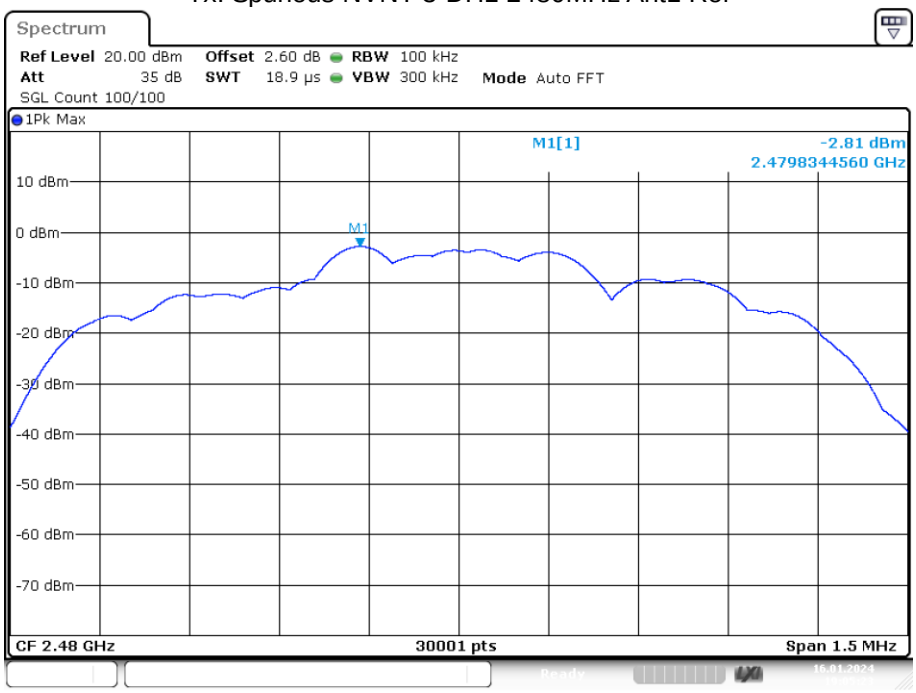
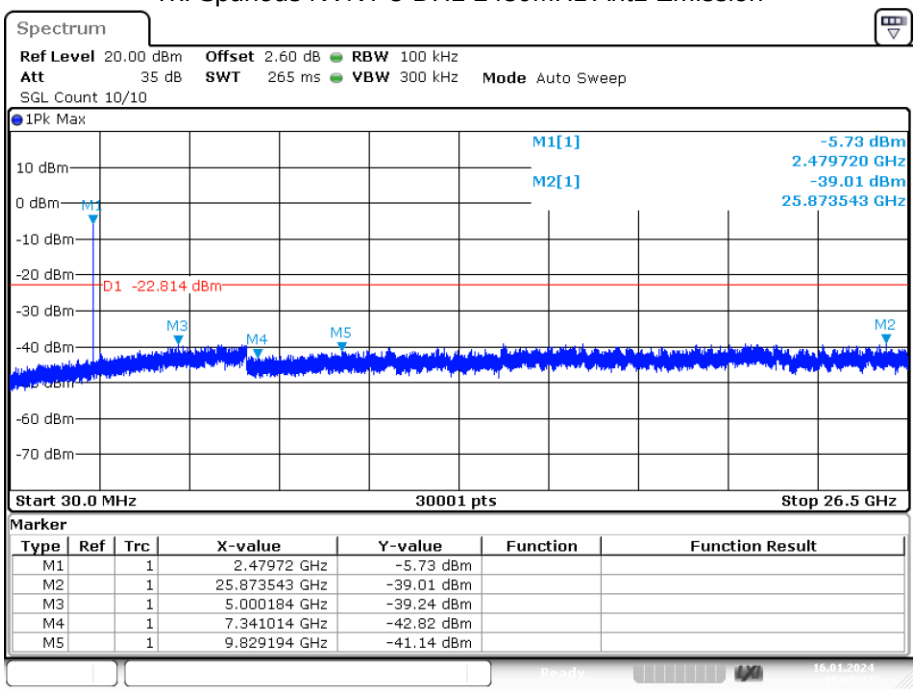
Tx. Spurious NVNT 3-DH1 2480MHz Ant1 Ref



Date: 16.JAN.2024 19:05:23

Tx. Spurious NVNT 3-DH1 2480MHz Ant1 Emission



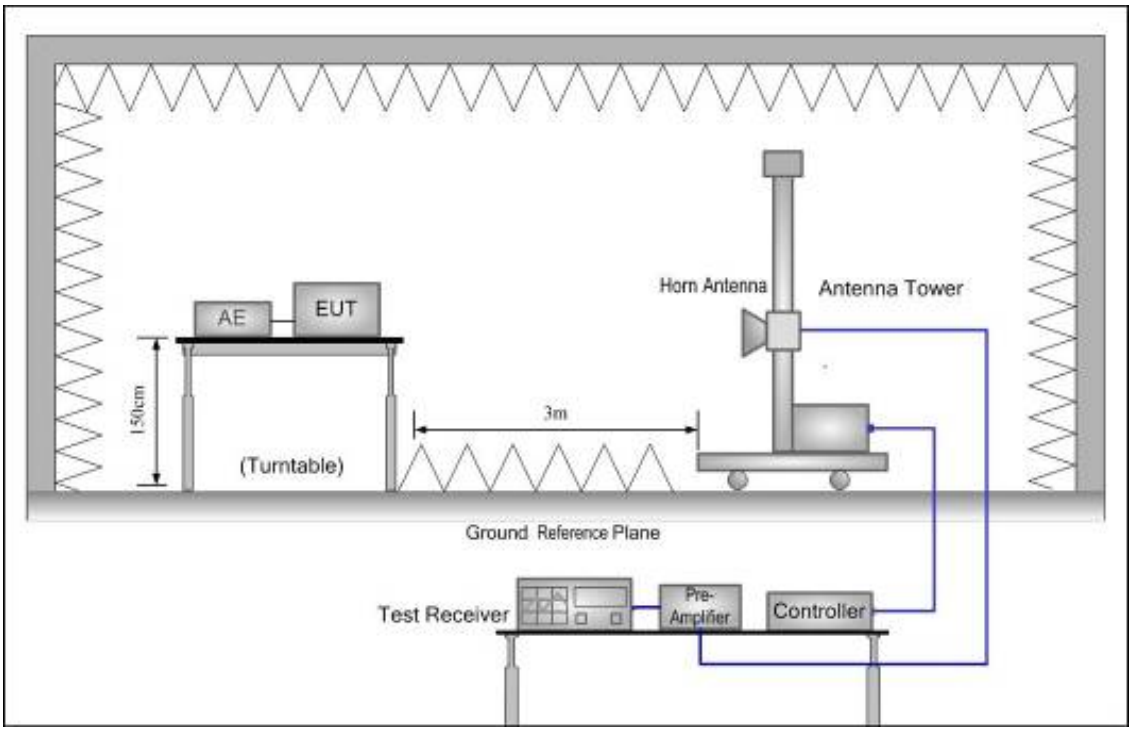
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.47972 GHz	-5.73 dBm		
M2		1	25.873543 GHz	-39.01 dBm		
M3		1	5.000184 GHz	-39.24 dBm		
M4		1	7.341014 GHz	-42.82 dBm		
M5		1	9.829194 GHz	-41.14 dBm		

Date: 16.JAN.2024 19:05:37

9. BAND EDGE COMPLIANCE

9.1. Block Diagram of Test Setup



9.2. Limit

All the lower and upper band-edges emissions appearing within restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions outside operation shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

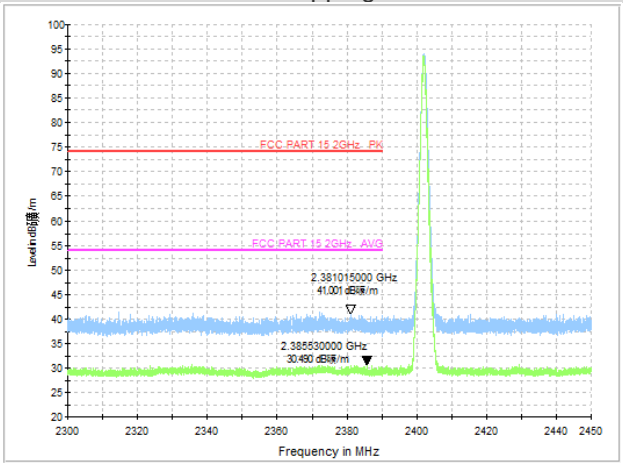
9.3. Test Procedure

All restriction band and non- restriction band have been tested ， only worse case is reported.

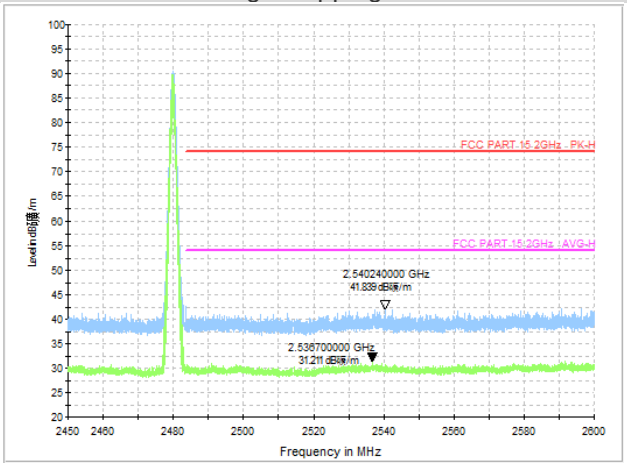
9.4. Test Result

PASS. (See below detailed test data)

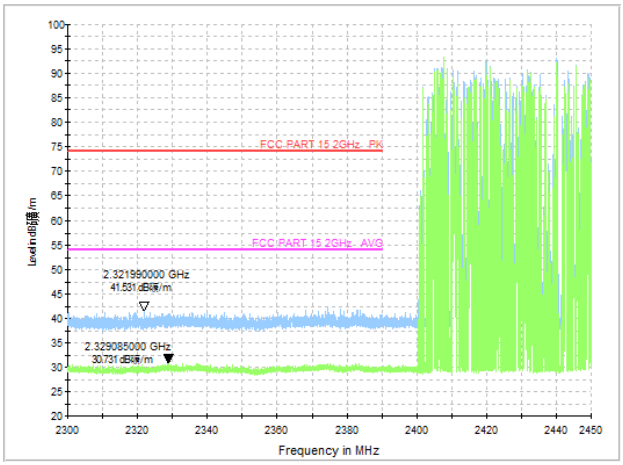
Test Mode: GFSK-Low Hopping-off



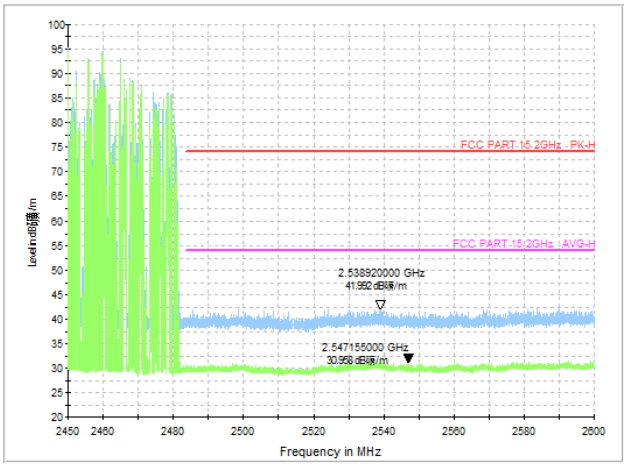
Test Mode: GFSK-High Hopping-off



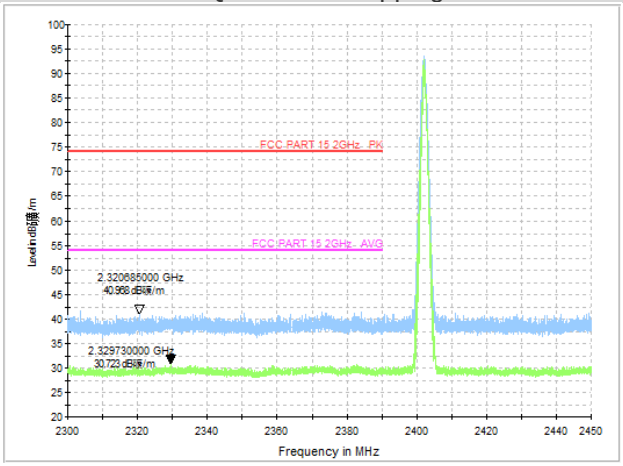
Test Mode: GFSK-Low Hopping-on



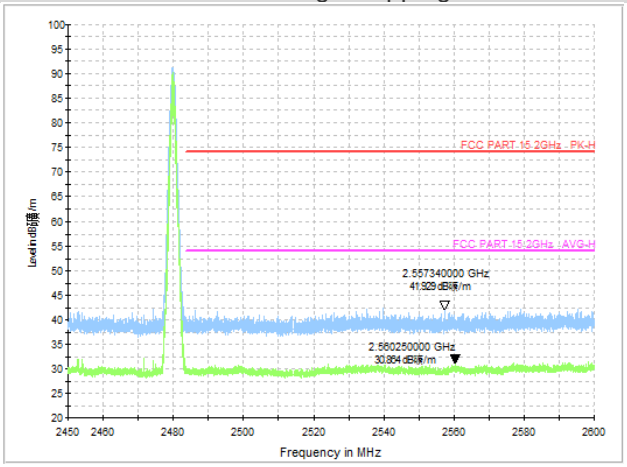
Test Mode: GFSK-High Hopping-on



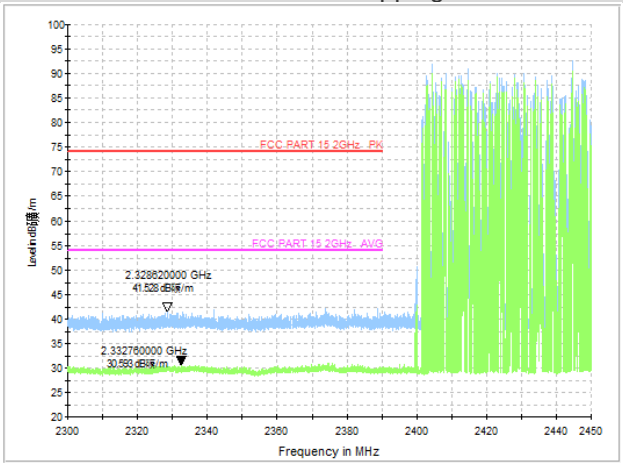
Test Mode: π/4 DQPSK-Low Hopping-off



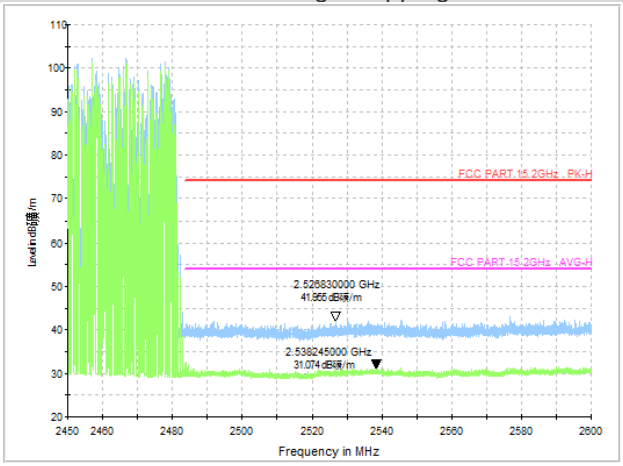
Test Mode: π/4 DQPSK-High Hopping-off



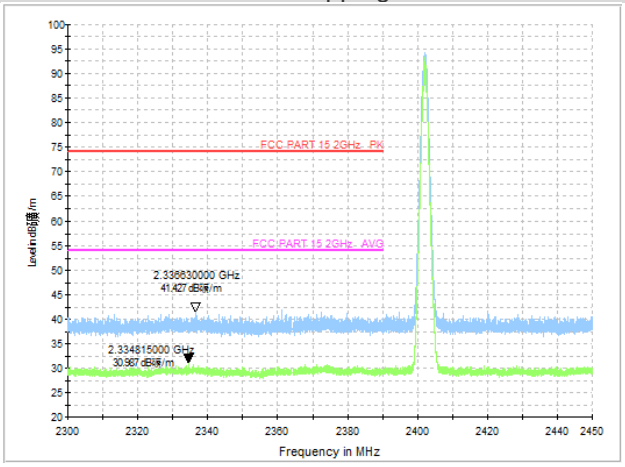
Test Mode: π/4 DQPSK-Low Hopping-on



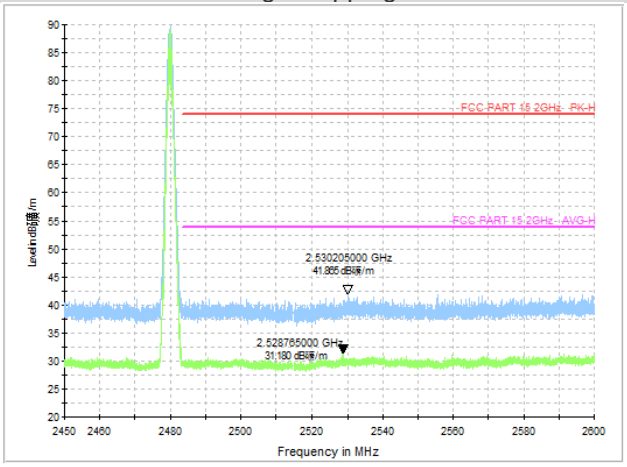
Test Mode: π/4 DQPSK-High Hopping-on



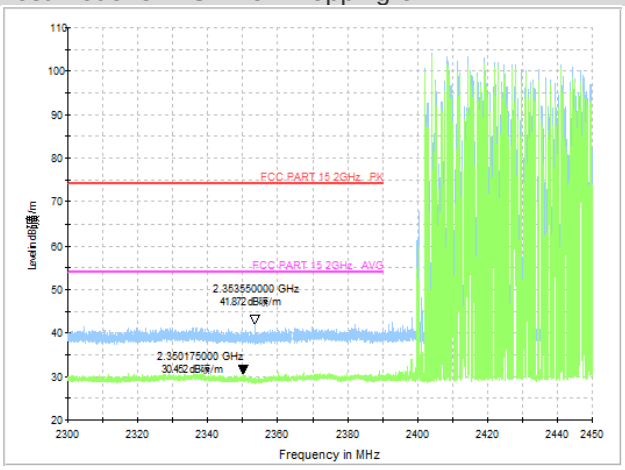
Test Mode: 8DPSK-Low Hopping-off



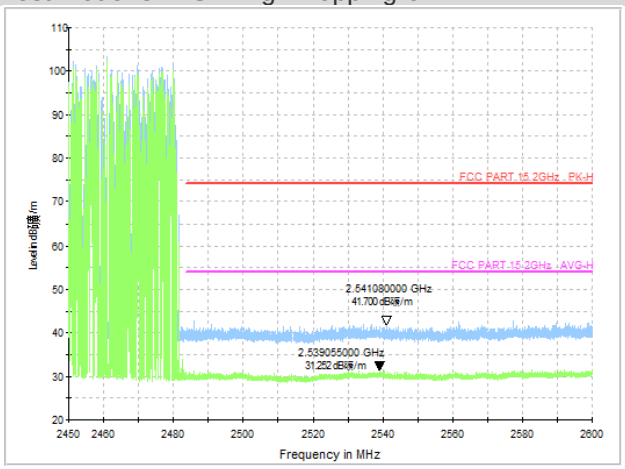
Test Mode: 8DPSK-High Hopping-off



Test Mode: 8DPSK-Low Hopping-on

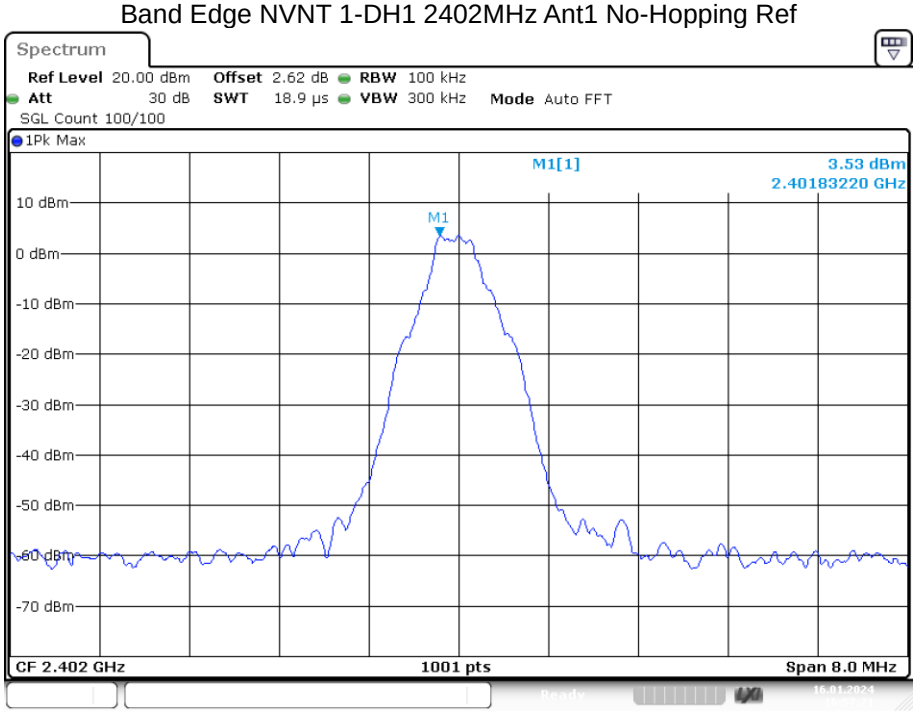


Test Mode: 8DPSK-High Hopping-on



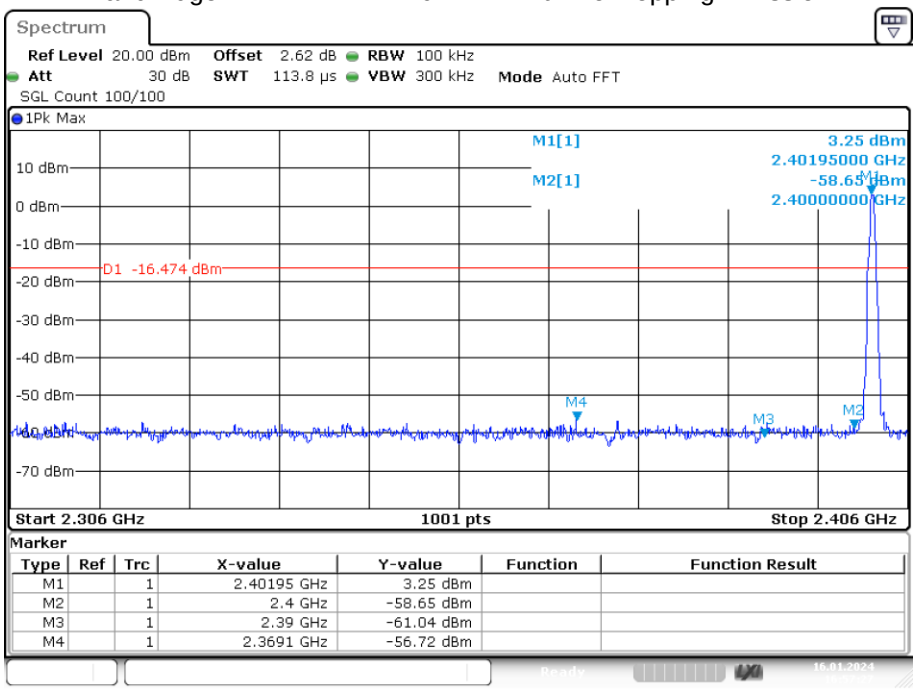
Conducted Method
Band Edge:

Band Edge NVNT 1-DH1 2402MHz Ant1 No-Hopping Ref



Date: 16.JAN.2024 16:57:21

Band Edge NVNT 1-DH1 2402MHz Ant1 No-Hopping Emission

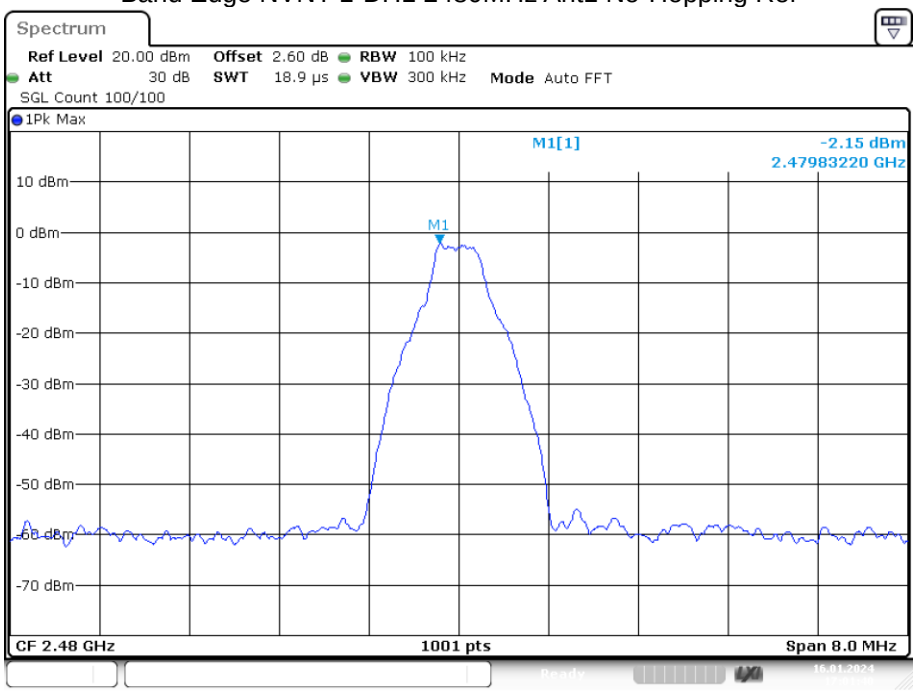


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.40195 GHz	3.25 dBm		
M2		1	2.4 GHz	-58.65 dBm		
M3		1	2.39 GHz	-61.04 dBm		
M4		1	2.3691 GHz	-56.72 dBm		

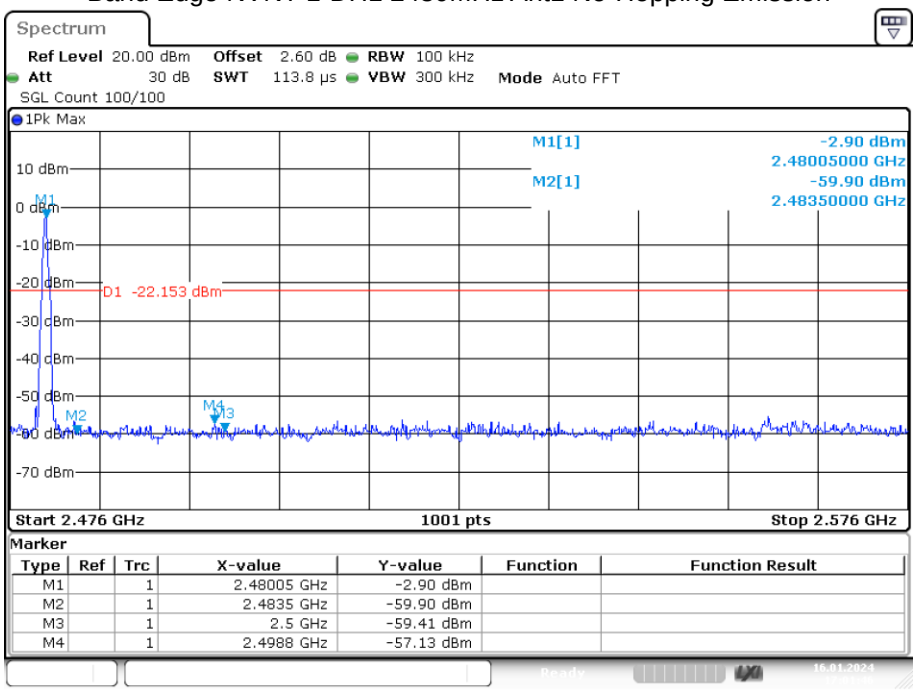
Date: 16.JAN.2024 16:57:27

Band Edge NVNT 1-DH1 2480MHz Ant1 No-Hopping Ref



Date: 16.JAN.2024 17:01:40

Band Edge NVNT 1-DH1 2480MHz Ant1 No-Hopping Emission

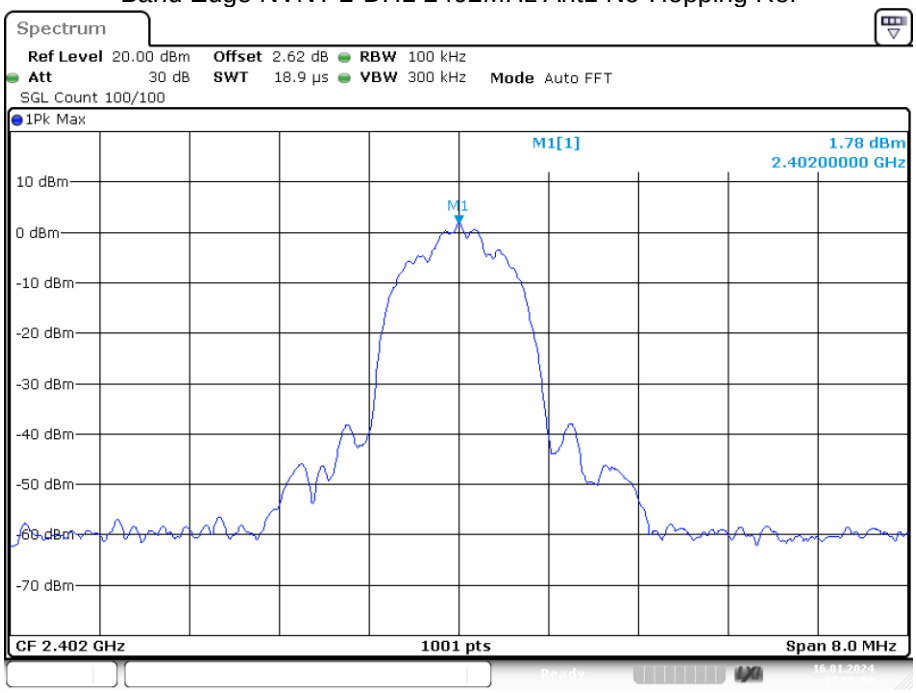


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.48005 GHz	-2.90 dBm		
M2		1	2.4835 GHz	-59.90 dBm		
M3		1	2.5 GHz	-59.41 dBm		
M4		1	2.4988 GHz	-57.13 dBm		

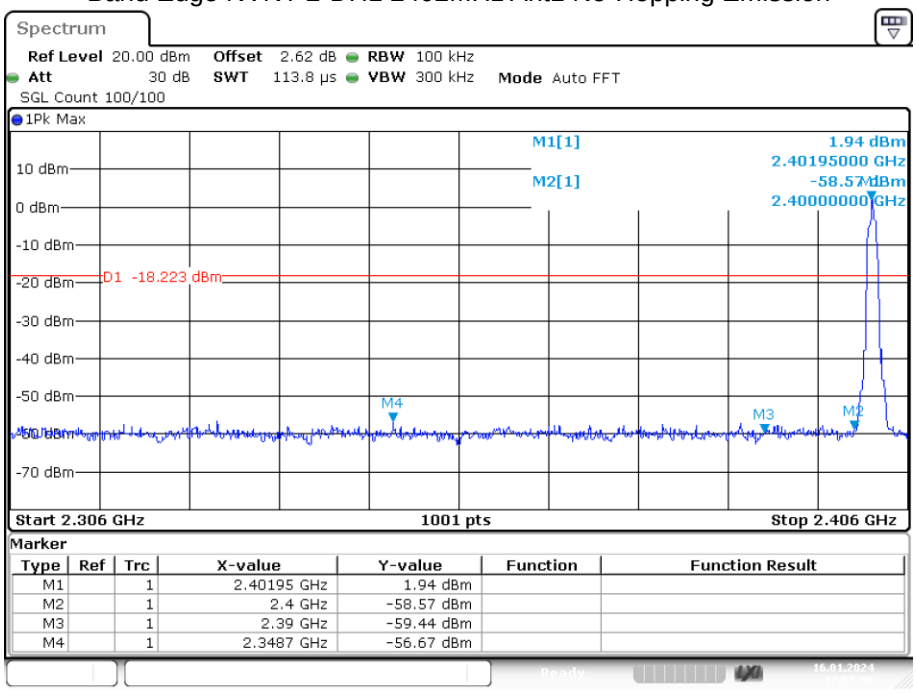
Date: 16.JAN.2024 17:01:46

Band Edge NVNT 2-DH1 2402MHz Ant1 No-Hopping Ref



Date: 16.JAN.2024 17:55:50

Band Edge NVNT 2-DH1 2402MHz Ant1 No-Hopping Emission

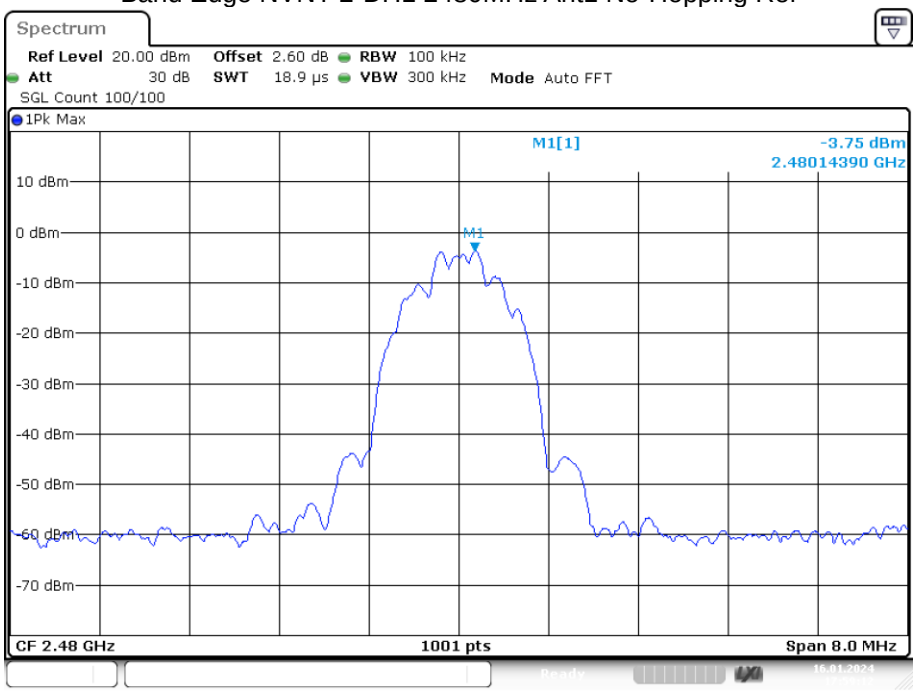


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.40195 GHz	1.94 dBm		
M2		1	2.4 GHz	-58.57 dBm		
M3		1	2.39 GHz	-59.44 dBm		
M4		1	2.3487 GHz	-56.67 dBm		

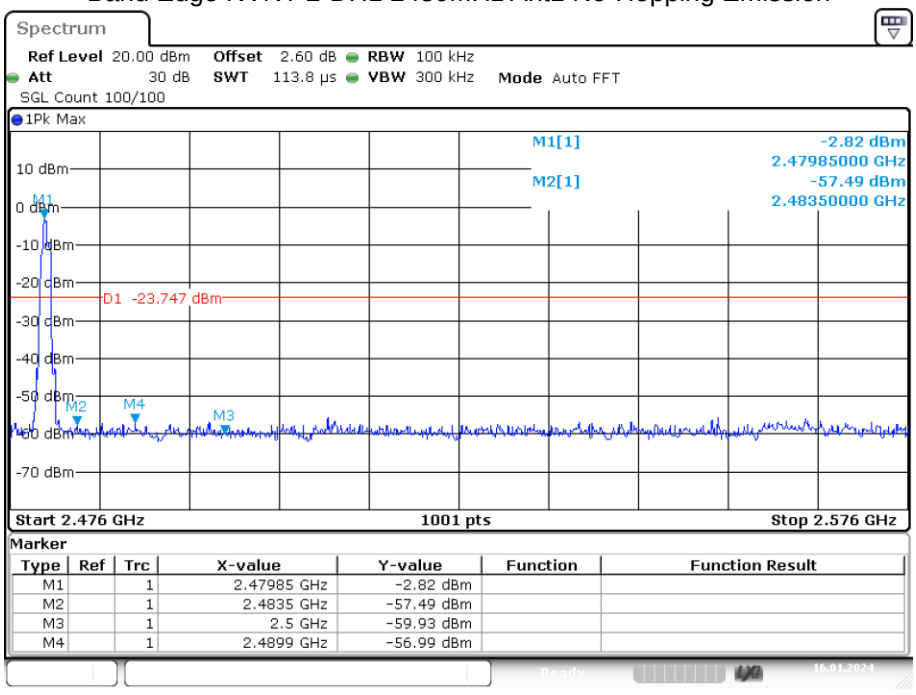
Date: 16.JAN.2024 17:55:56

Band Edge NVNT 2-DH1 2480MHz Ant1 No-Hopping Ref



Date: 16.JAN.2024 17:59:12

Band Edge NVNT 2-DH1 2480MHz Ant1 No-Hopping Emission

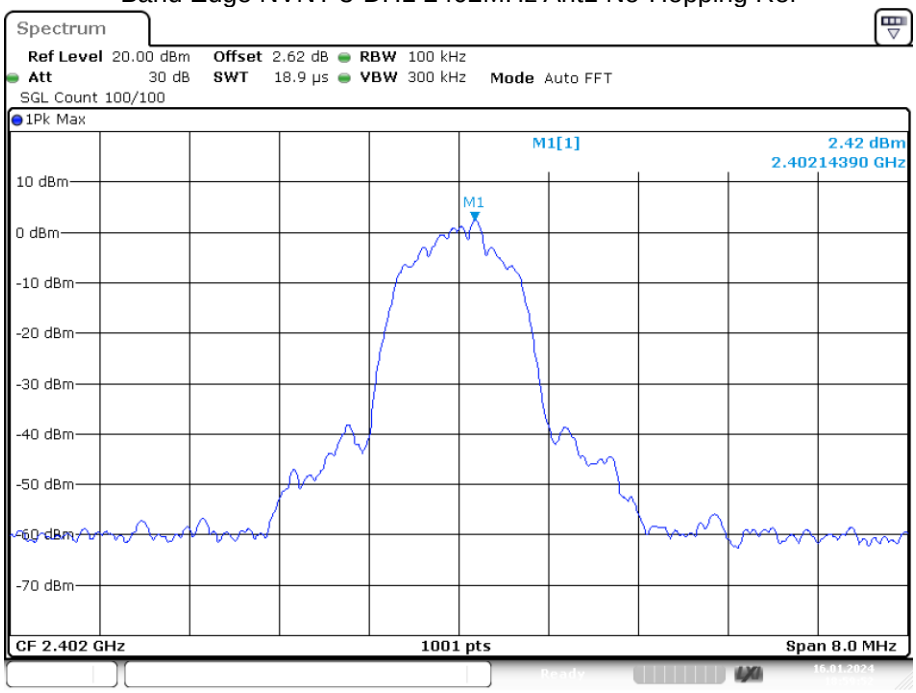


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.47985 GHz	-2.82 dBm		
M2		1	2.4835 GHz	-57.49 dBm		
M3		1	2.5 GHz	-59.93 dBm		
M4		1	2.4899 GHz	-56.99 dBm		

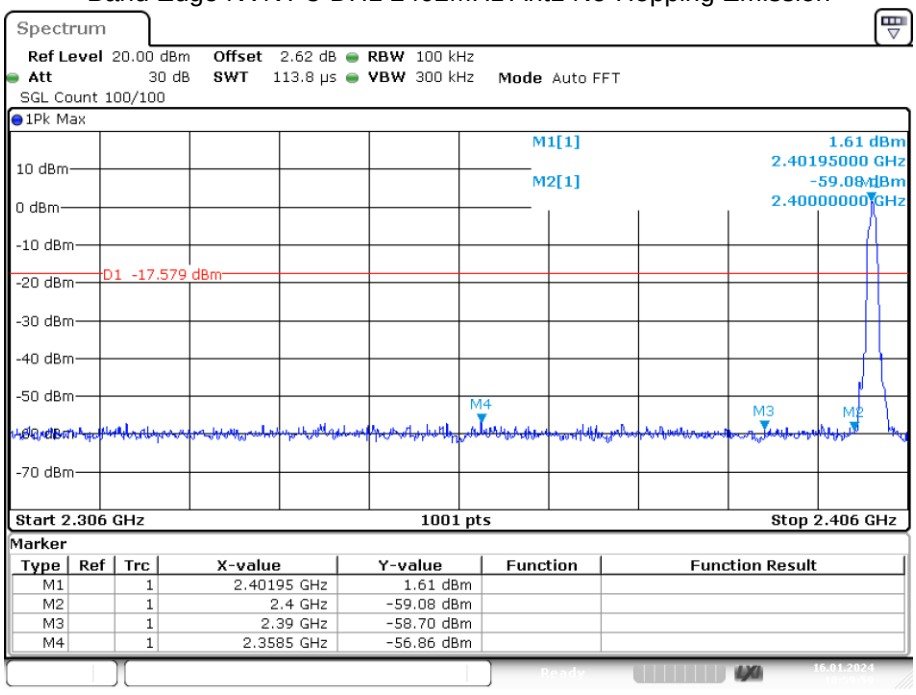
Date: 16.JAN.2024 17:59:18

Band Edge NVNT 3-DH1 2402MHz Ant1 No-Hopping Ref



Date: 16.JAN.2024 18:59:52

Band Edge NVNT 3-DH1 2402MHz Ant1 No-Hopping Emission

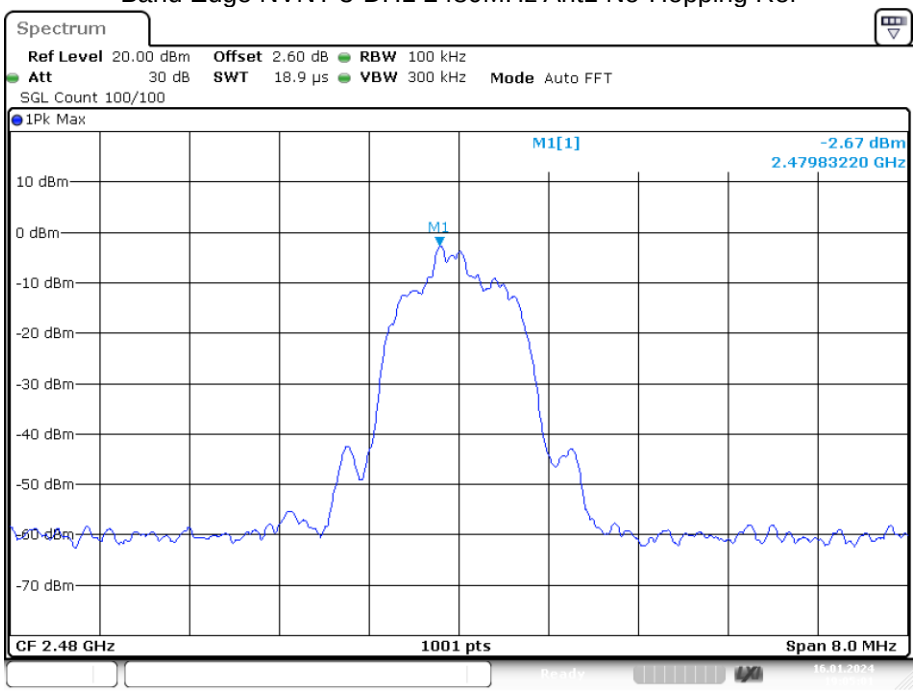


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.40195 GHz	1.61 dBm		
M2		1	2.4 GHz	-59.08 dBm		
M3		1	2.39 GHz	-58.70 dBm		
M4		1	2.3585 GHz	-56.86 dBm		

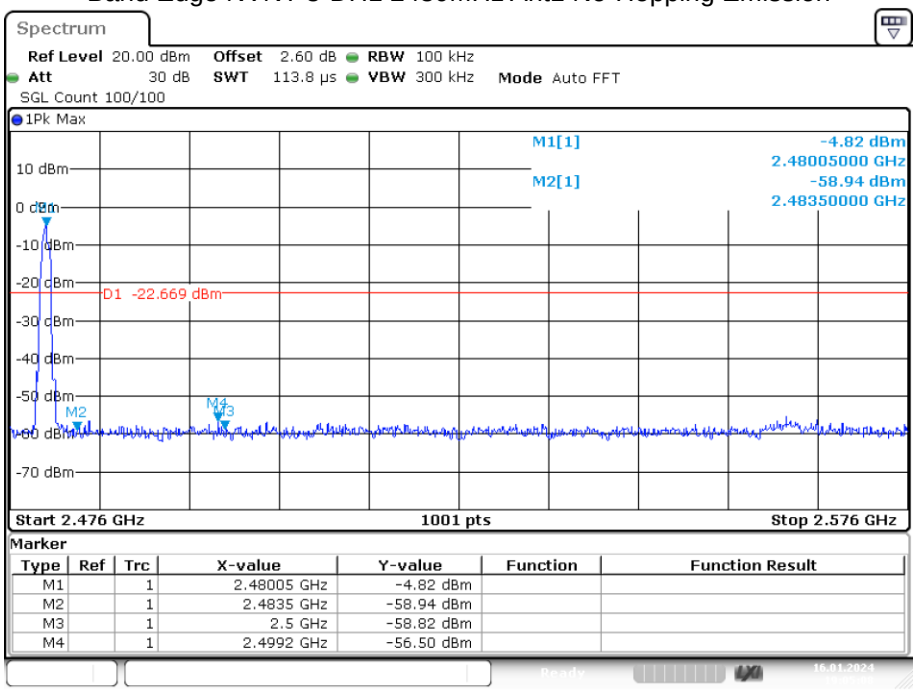
Date: 16.JAN.2024 18:59:58

Band Edge NVNT 3-DH1 2480MHz Ant1 No-Hopping Ref



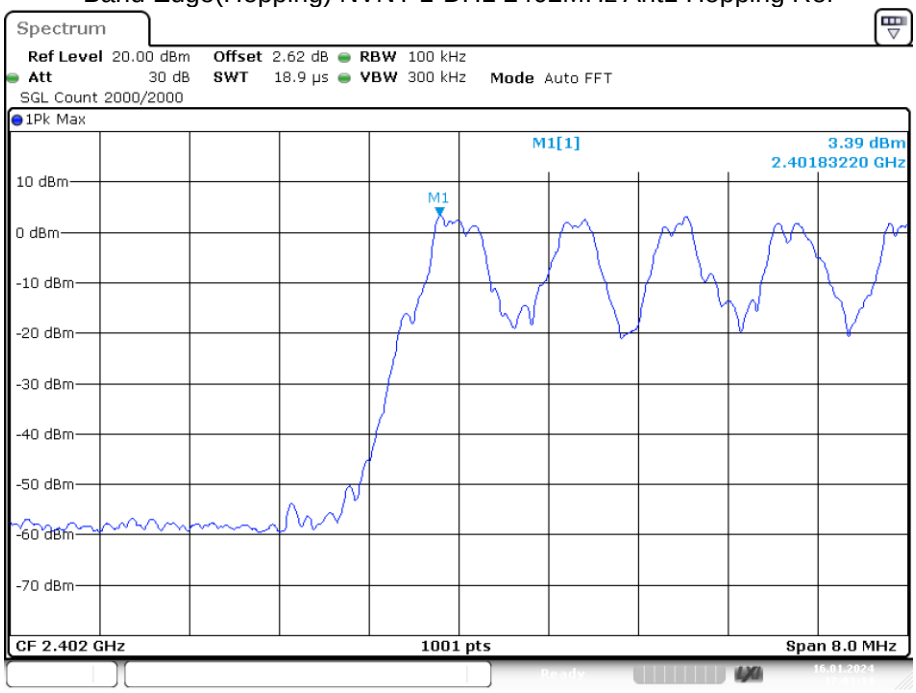
Date: 16.JAN.2024 19:05:02

Band Edge NVNT 3-DH1 2480MHz Ant1 No-Hopping Emission



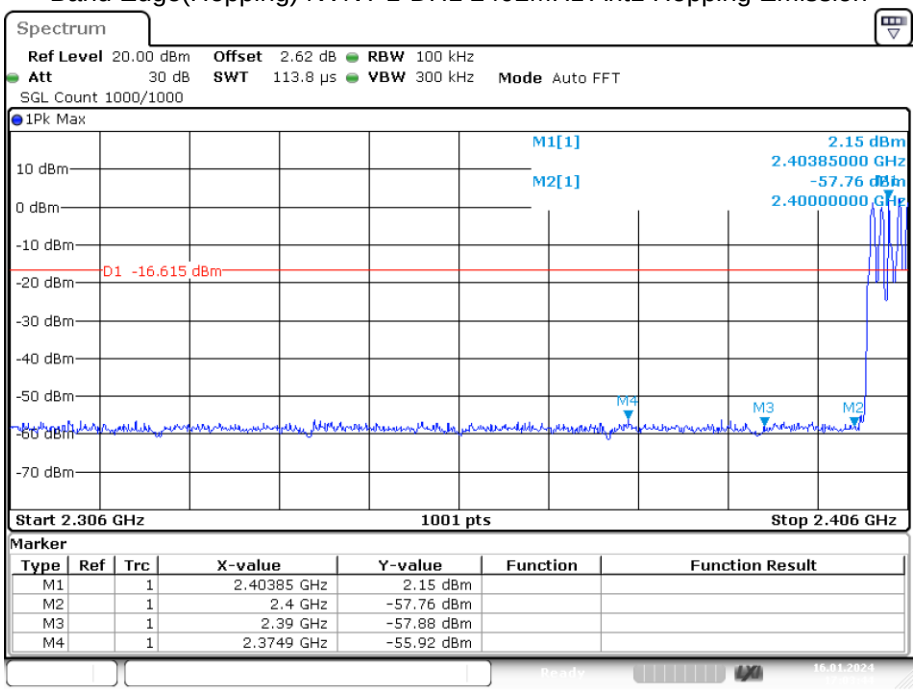
Date: 16.JAN.2024 19:05:07

Band Edge(Hopping) NVNT 1-DH1 2402MHz Ant1 Hopping Ref



Date: 16.JAN.2024 17:03:13

Band Edge(Hopping) NVNT 1-DH1 2402MHz Ant1 Hopping Emission

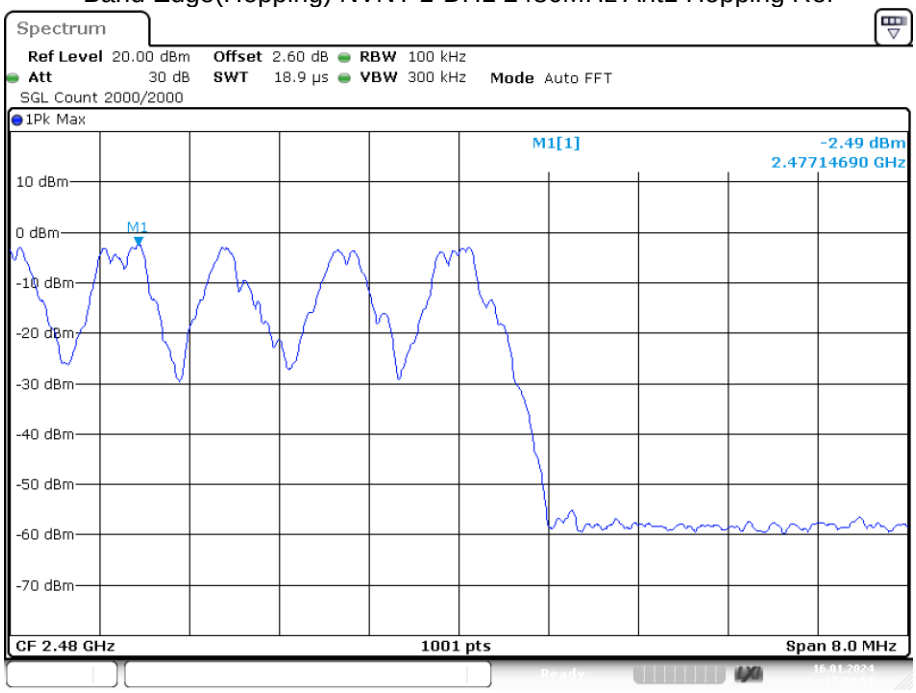


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.40385 GHz	2.15 dBm		
M2		1	2.4 GHz	-57.76 dBm		
M3		1	2.39 GHz	-57.88 dBm		
M4		1	2.3749 GHz	-55.92 dBm		

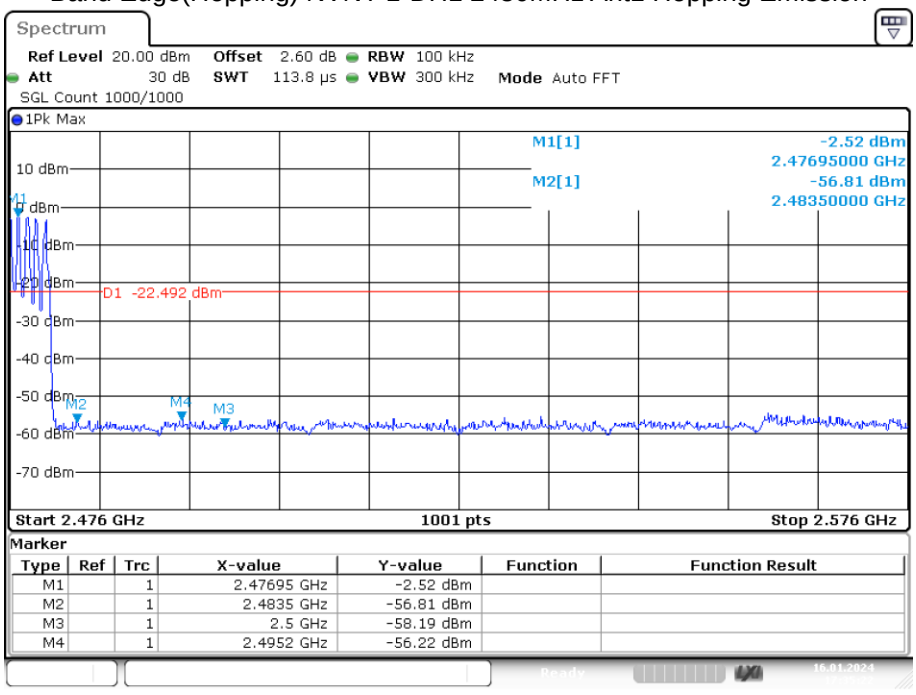
Date: 16.JAN.2024 17:03:44

Band Edge(Hopping) NVNT 1-DH1 2480MHz Ant1 Hopping Ref



Date: 16.JAN.2024 17:34:54

Band Edge(Hopping) NVNT 1-DH1 2480MHz Ant1 Hopping Emission

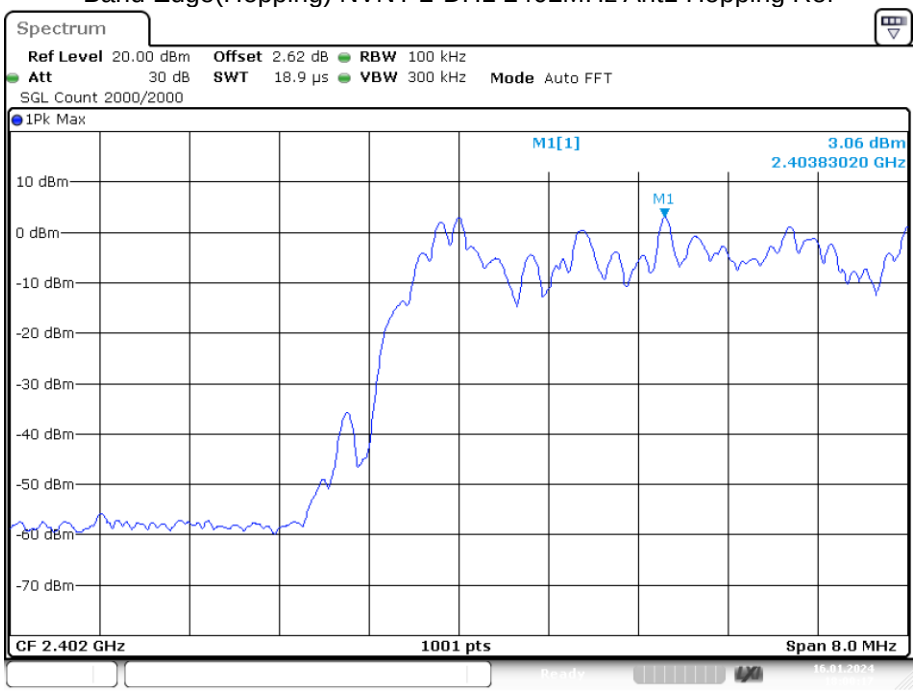


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.47695 GHz	-2.52 dBm		
M2		1	2.4835 GHz	-56.81 dBm		
M3		1	2.5 GHz	-58.19 dBm		
M4		1	2.4952 GHz	-56.22 dBm		

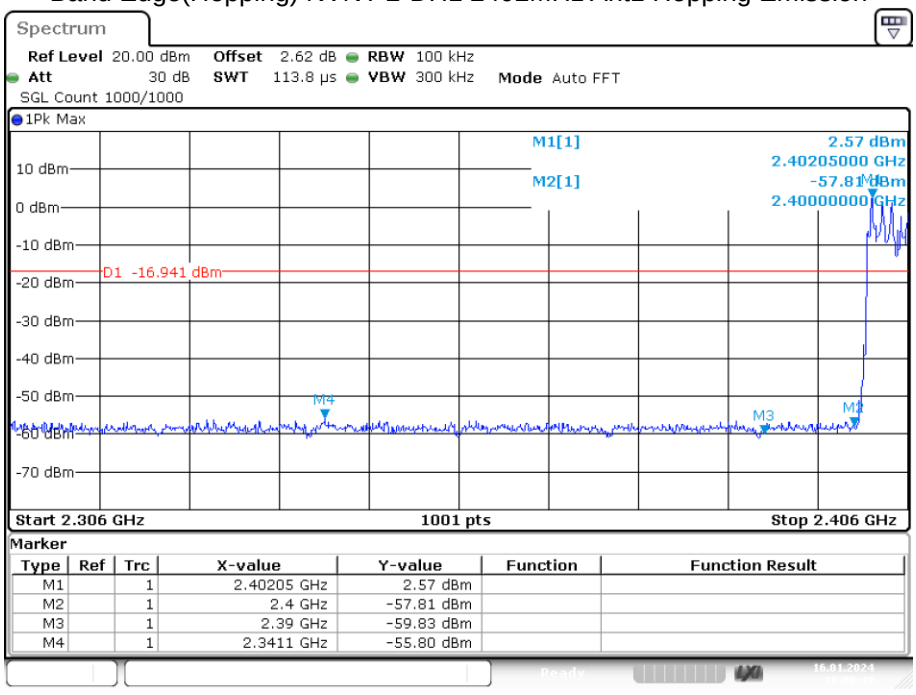
Date: 16.JAN.2024 17:35:22

Band Edge(Hopping) NVNT 2-DH1 2402MHz Ant1 Hopping Ref



Date: 16.JAN.2024 18:00:17

Band Edge(Hopping) NVNT 2-DH1 2402MHz Ant1 Hopping Emission

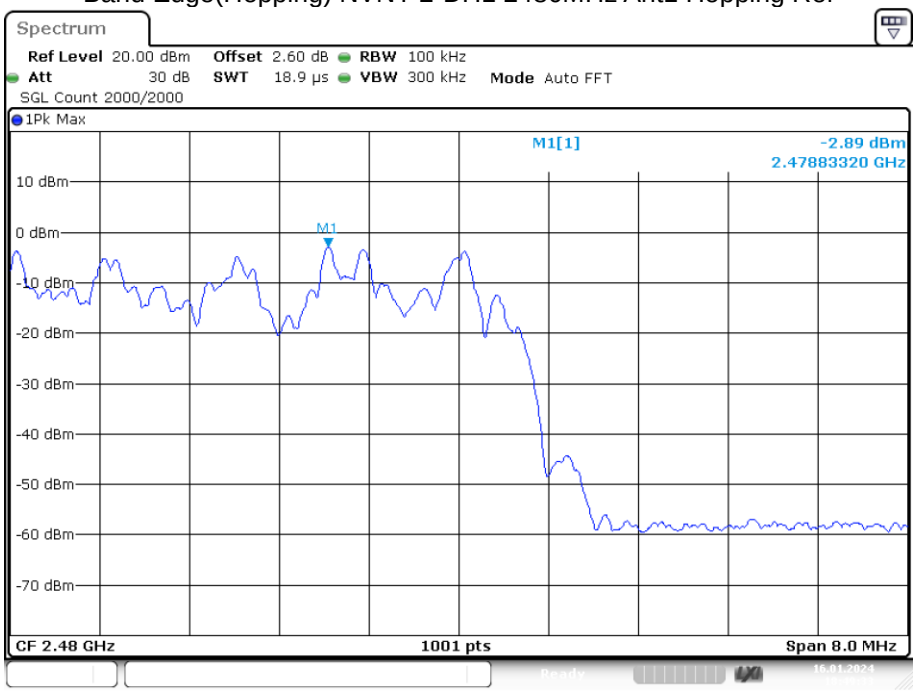


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.40205 GHz	2.57 dBm		
M2		1	2.4 GHz	-57.81 dBm		
M3		1	2.39 GHz	-59.83 dBm		
M4		1	2.3411 GHz	-55.80 dBm		

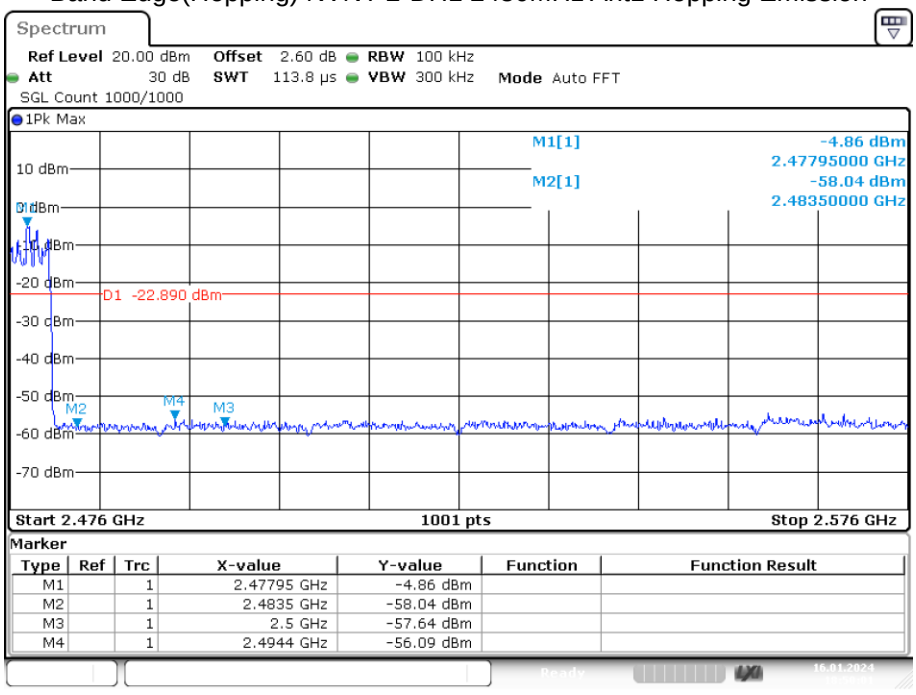
Date: 16.JAN.2024 18:00:48

Band Edge(Hopping) NVNT 2-DH1 2480MHz Ant1 Hopping Ref



Date: 16.JAN.2024 18:49:33

Band Edge(Hopping) NVNT 2-DH1 2480MHz Ant1 Hopping Emission

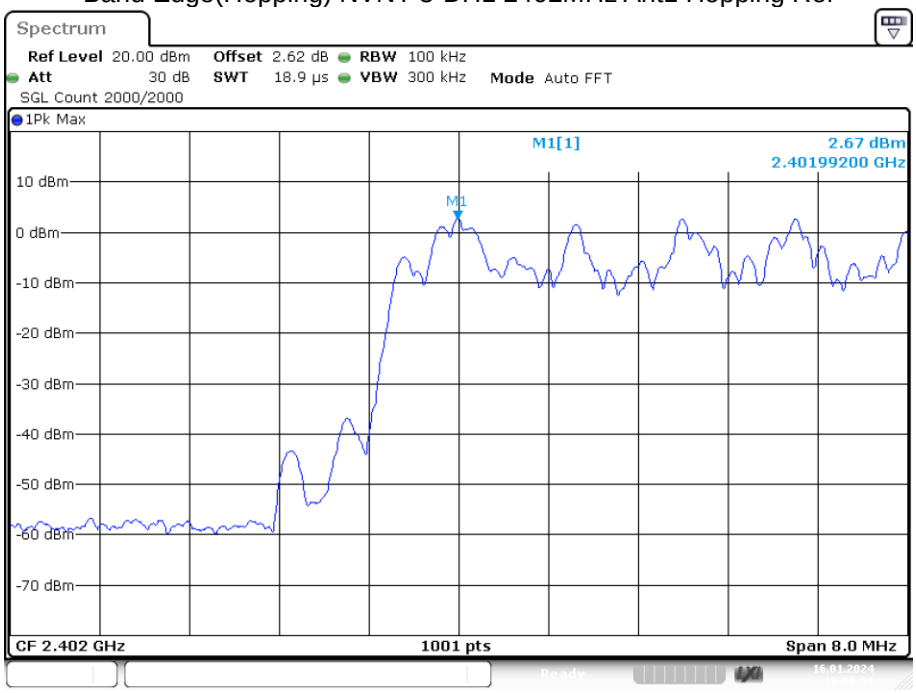


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.47795 GHz	-4.86 dBm		
M2		1	2.4835 GHz	-58.04 dBm		
M3		1	2.5 GHz	-57.64 dBm		
M4		1	2.4944 GHz	-56.09 dBm		

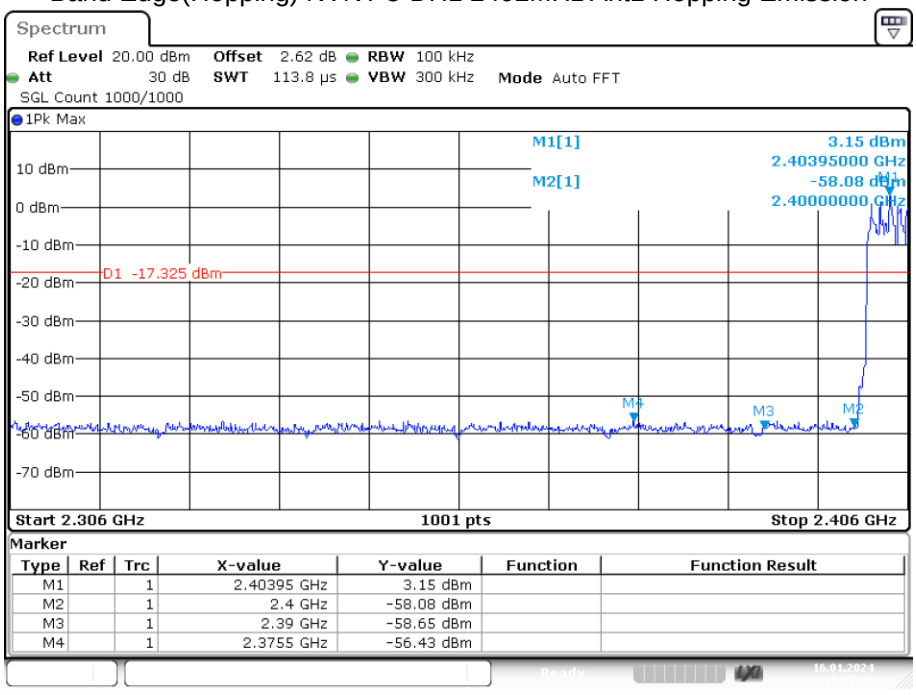
Date: 16.JAN.2024 18:50:01

Band Edge(Hopping) NVNT 3-DH1 2402MHz Ant1 Hopping Ref



Date: 16.JAN.2024 19:06:51

Band Edge(Hopping) NVNT 3-DH1 2402MHz Ant1 Hopping Emission



Marker

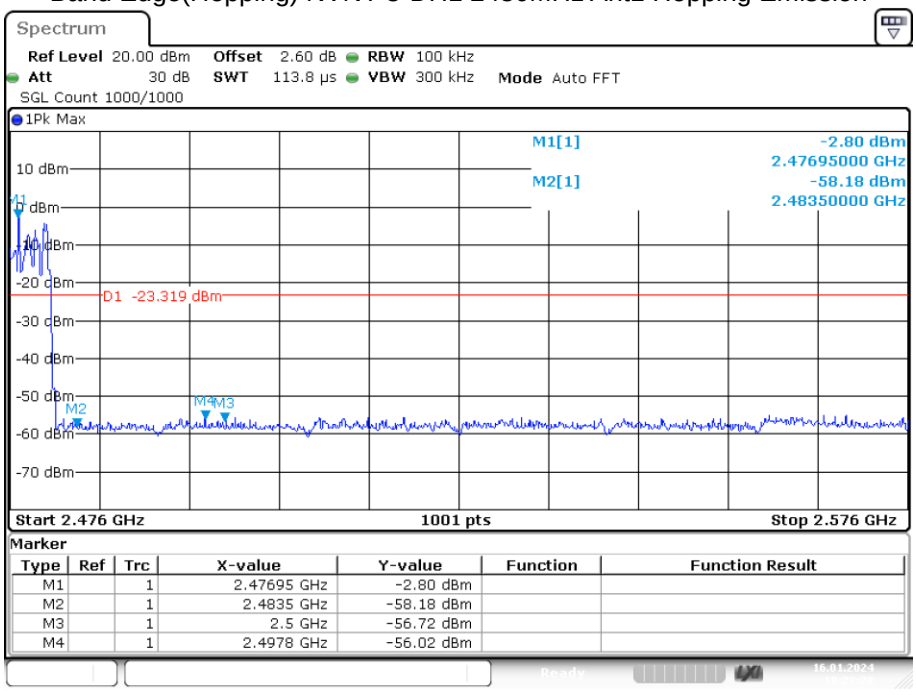
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.40395 GHz	3.15 dBm		
M2		1	2.4 GHz	-58.08 dBm		
M3		1	2.39 GHz	-58.65 dBm		
M4		1	2.3755 GHz	-56.43 dBm		

Date: 16.JAN.2024 19:07:22

Band Edge(Hopping) NVNT 3-DH1 2480MHz Ant1 Hopping Ref

Date: 16.JAN.2024 19:22:00

Band Edge(Hopping) NVNT 3-DH1 2480MHz Ant1 Hopping Emission



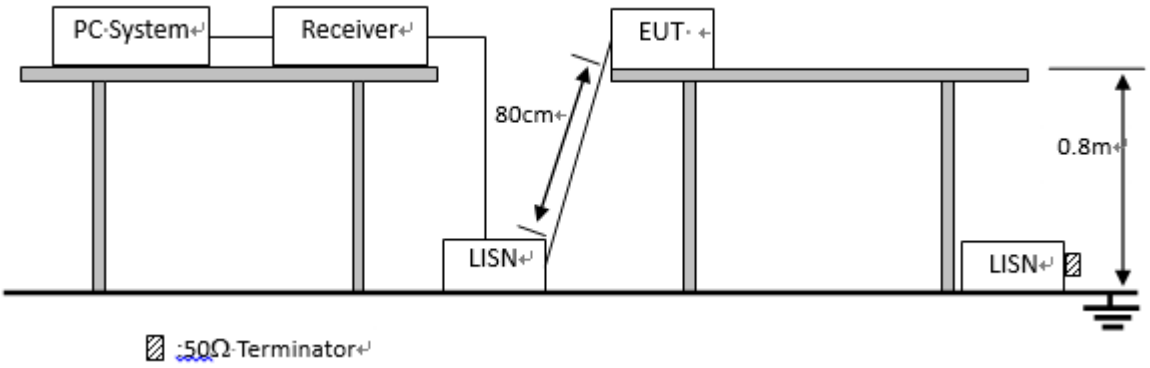
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.47695 GHz	-2.80 dBm		
M2		1	2.4835 GHz	-58.18 dBm		
M3		1	2.5 GHz	-56.72 dBm		
M4		1	2.4978 GHz	-56.02 dBm		

Date: 16.JAN.2024 19:22:29

10. POWER LINE CONDUCTED EMISSIONS

10.1.Block Diagram of Test Setup



10.2.Limit

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Notes: 1. * Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

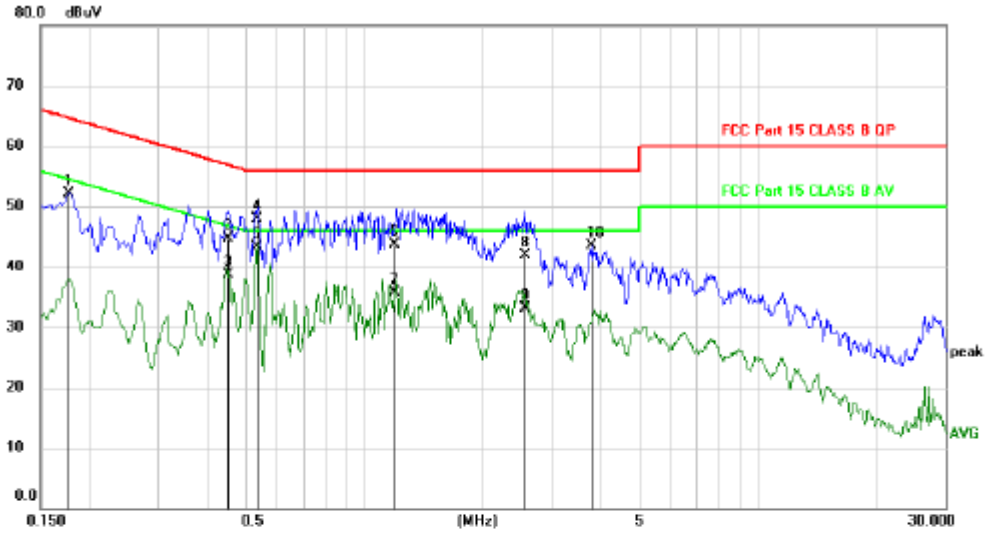
10.3.Test Procedure

(1) The EUT was placed on a non-metallic table, 80cm above the ground plane.
(2) Setup the EUT and simulator as shown in 10.1
(3) The EUT Power connected to the power mains through a power adapter and a line impedance stabilization network (L.I.S.N1). The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N2), this provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). Both sides of power line were checked for maximum conducted interference. 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 conducted Emission test.
(4) The bandwidth of test receiver is set at 10KHz.
(5) The frequency range from 150 KHz to 30MHz is checked.

10.4.Test Result

PASS. (See below detailed test data)
Note: If peak Result comply with AV limit, QP and AV Result is deemed to comply with AV limit

Line:

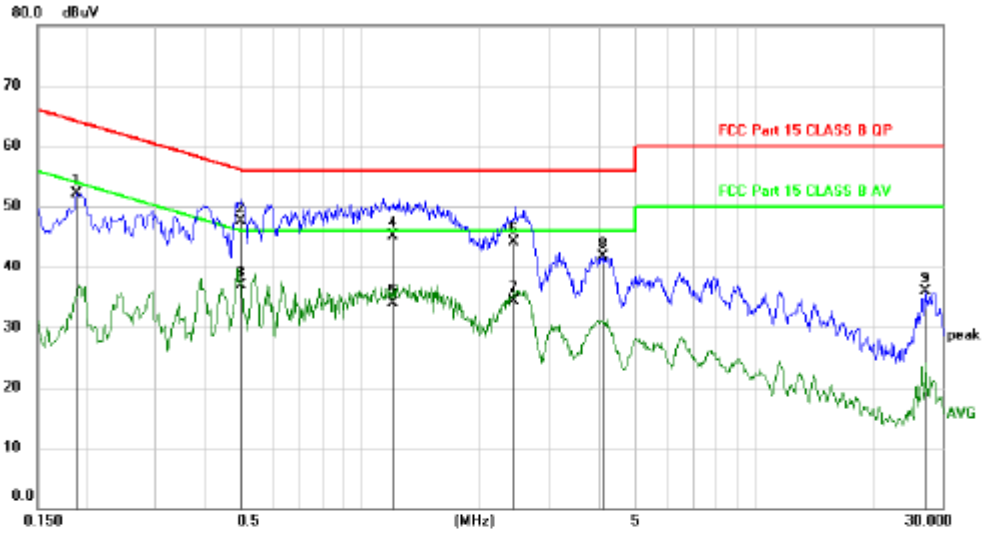


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1770	42.24	9.93	52.17	64.63	-12.46	peak	
2		0.4474	34.79	9.95	44.74	56.92	-12.18	QP	
3		0.4474	28.80	9.95	38.75	46.92	-8.17	AVG	
4		0.5344	37.98	9.95	47.93	56.00	-8.07	QP	
5	*	0.5344	33.43	9.95	43.38	46.00	-2.62	AVG	
6		1.1951	33.81	9.89	43.70	56.00	-12.30	QP	
7		1.1951	25.88	9.89	35.77	46.00	-10.23	AVG	
8		2.5662	32.04	9.91	41.95	56.00	-14.05	QP	
9		2.5662	23.24	9.91	33.15	46.00	-12.85	AVG	
10		3.7950	33.45	9.96	43.41	56.00	-12.59	peak	

*:Maximum data x:Over limit !:over margin 〈Reference Only

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

Neutral:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1890	42.23	9.92	52.15	64.08	-11.93	peak	
2	*	0.4936	37.59	9.96	47.55	56.11	-8.56	QP	
3		0.4936	27.04	9.96	37.00	46.11	-9.11	AVG	
4		1.2047	35.29	9.89	45.18	56.00	-10.82	QP	
5		1.2047	23.94	9.89	33.83	46.00	-12.17	AVG	
6		2.4422	34.27	9.90	44.17	56.00	-11.83	QP	
7		2.4422	24.48	9.90	34.38	46.00	-11.62	AVG	
8		4.1159	31.77	9.97	41.74	56.00	-14.26	peak	
9		27.1590	25.38	10.54	35.92	60.00	-24.08	peak	

*:Maximum data x:Over limit !:over margin 〈Reference Only

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

Note: 1. All modes and channels have been tested and only the GFSK 2402MHz mode with the worst data is listed.

11. ANTENNA REQUIREMENTS

11.1.Limit

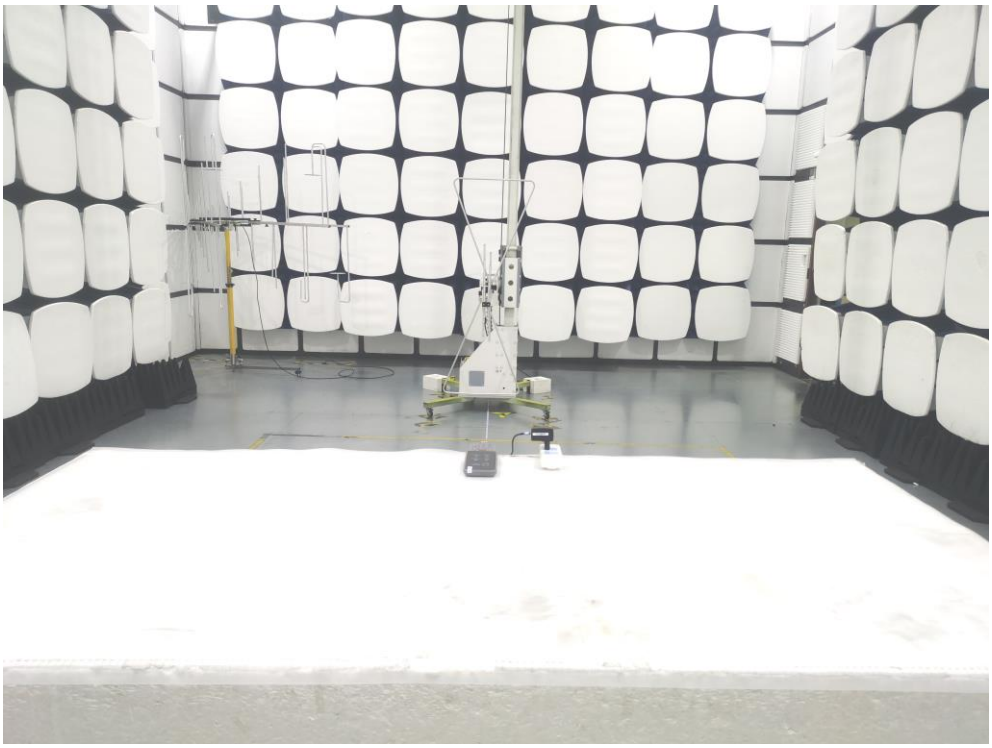
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

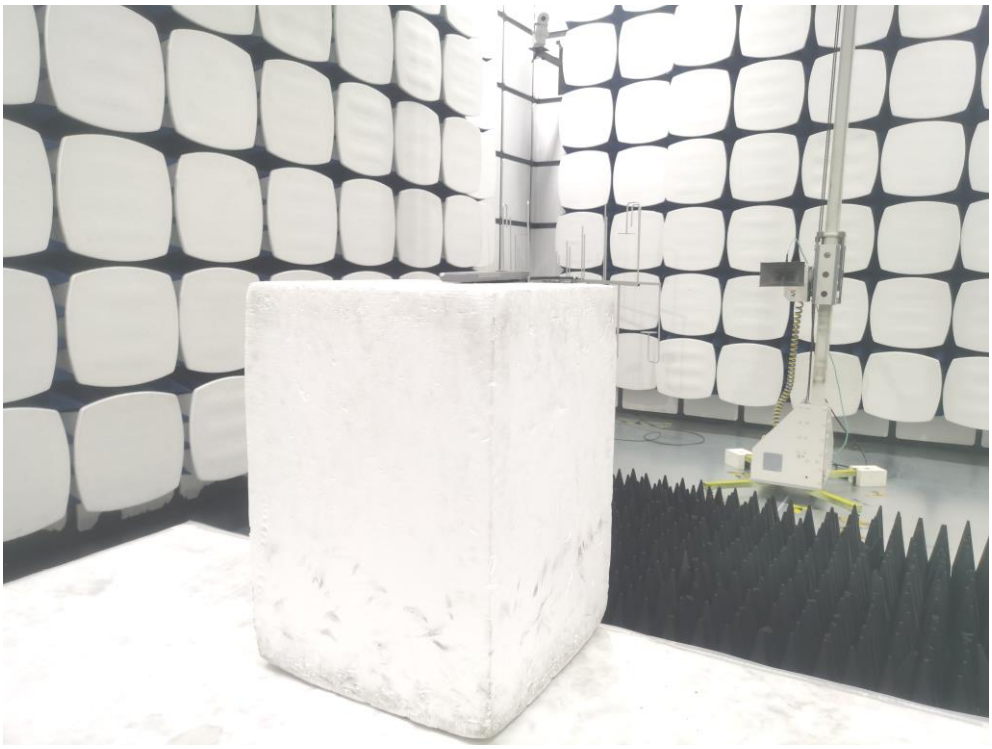
11.2.Result

The use of an antenna that is uniquely coupled to the intended radiator shall be considered sufficient to comply with the provisions of this section.

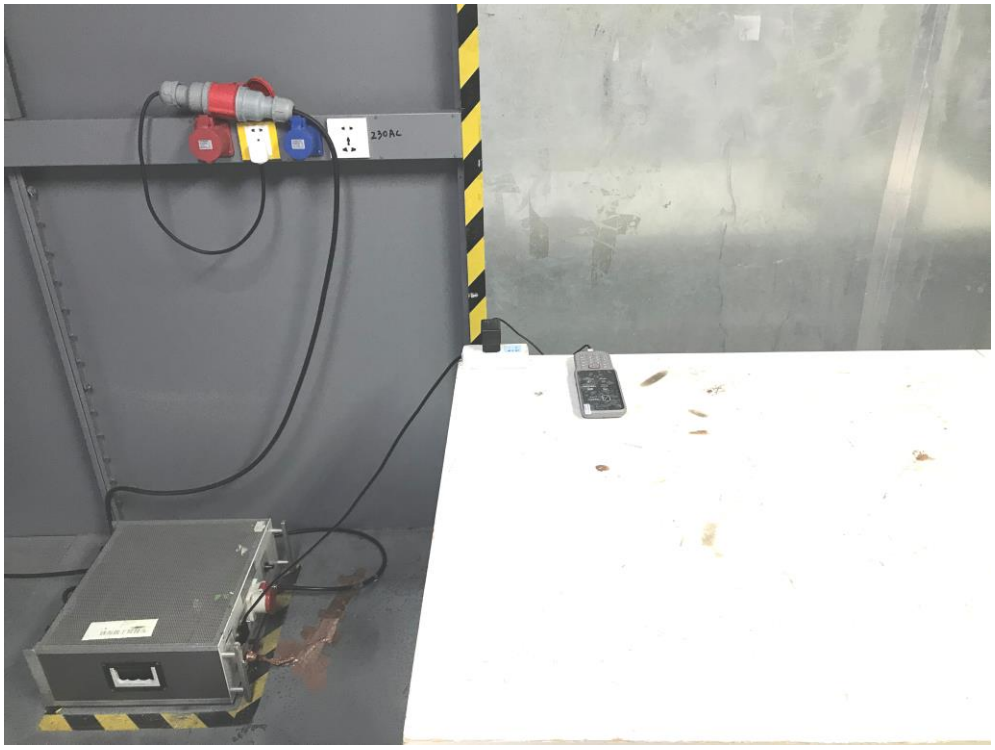
12. TEST SETUP PHOTO

12.1.Photo of Radiated Emission test





12.2.Photo of Conducted Emission test



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