CFR 47 FCC PART 15 SUBPART C(DTS)

TEST REPORT

For

LED Desktop Whiteboard

MODEL NUMBER: NTR180-1, NTR180-2, NTR720-1, NTR730-1

REPORT NUMBER: E01A23070874F01001

ISSUE DATE: September 27, 2023

FCC ID: 2BCD4-NTR180

Trademark: Note Tower

Prepared for

NoteTower LLC

98 Cuttermill Road, Suite 466S, Great Neck, NY 11021, United States

Prepared by

Guangdong Global Testing Technology Co., Ltd.

Room 101-105, 203-210, Building 1, No.2, Keji 8 Road, Songshan Lake Park, Dongguan city, Guangdong, People’s Republic of China, 523808

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Revision History

Rev.	Issue Date	Revisions	Revised By
V0	September 27, 2023	Initial Issue	Joson

Summary of Test Results			
Test Item	**Clause**	**Limit/Requirement**	**Result**
Antenna Requirement	N/A	FCC Part 15.203/15.247 (c)	Pass
AC Power Line Conducted Emission	ANSI C63.10-2013, Clause 6.2	FCC Part 15.207	Pass
Conducted Output Power	ANSI C63.10-2013, Clause 11.9.1.3	FCC Part 15.247 (b)(3)	Pass
6dB Bandwidth and 99% Occupied Bandwidth	ANSI C63.10-2013, Clause 11.8.1	FCC Part 15.247 (a)(2)	Pass
Power Spectral Density	ANSI C63.10-2013, Clause 11.10.2	FCC Part 15.247 (e)	Pass
Conducted Band edge and spurious emission	ANSI C63.10-2013, Clause 11.11	FCC Part 15.247(d)	Pass
Radiated Band edge and Spurious Emission	ANSI C63.10-2013, Clause 11.11 & Clause 11.12	FCC Part 15.205/15.209	Pass
Duty Cycle	ANSI C63.10-2013, Clause 11.6	None; for reporting purposes only.	Pass

*This test report is only published to and used by the applicant, and it is not for evidence purpose in China.
*The measurement result for the sample received is <Pass> according to <CFR 47 FCC PART 15 SUBPART C(DTS)> when <Accuracy Method> decision rule is applied.

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1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name:	NoteTower LLC
Address:	98 Cuttermill Road, Suite 466S, Great Neck, NY 11021, United States

Manufacturer Information

Company Name:	NoteTower LLC
Address:	98 Cuttermill Road, Suite 466S, Great Neck, NY 11021, United States

EUT Information

EUT Name:	LED Desktop Whiteboard
Model:	NTR180-1, NTR180-2, NTR720-1, NTR730-1 (Note: There is no difference except for the model name , so we performed on the model NTR180-1)
Sample Received Date:	August 04, 2023
Sample Status:	Normal
Sample ID:	A23070874 001
Date of Tested:	August 05, 2023 to August 22, 2023
Hardware version:	V1.0
Software version:	V1.0

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 FCC PART 15 SUBPART C(DTS)	**Pass**

Prepared By:

Joson Peng
Project Engineer

Checked By:

Alan He
Project Leader

Approved By:

Shawn Wen
Laboratory Manager

Guangdong Global Testing Technology Co., Ltd. GTG CERTIFICATE

2. TEST METHODOLOGY

All tests were performed in accordance with the standard CFR 47 FCC PART 15 SUBPART C(DTS)

3. FACILITIES AND ACCREDITATION

Accreditation Certificate	**A2LA (Certificate No.: 6947.01)** Guangdong Global Testing Technology Co., Ltd. has been assessed and proved to be in compliance with A2LA. **FCC (FCC Designation No.: CN1343)** Guangdong Global Testing Technology Co., Ltd. has been recognized to perform compliance testing on equipment subject to Supplier's Declaration of Conformity (SDoC) and Certification rules **ISED (Company No.: 30714)** Guangdong Global Testing Technology Co., Ltd. has been registered and fully described in a report filed with ISED. The Company Number is 30714 and the test lab Conformity Assessment Body Identifier (CABID) is CN0148.

Note: All tests measurement facilities use to collect the measurement data are located at Room 101-105, 203-210, Building 1, No.2, Keji 8 Road, Songshan Lake Park, Dongguan city, Guangdong, People’s Republic of China, 523808

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations and is traceable to recognized national standards.

4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test Item	Measurement Frequency Range	K	U(dB)
AC Power Line Conducted Emission	0.009 MHz ~ 0.15 MHz	2	4.00
	0.15 MHz ~ 30 MHz	2	3.62
Radiated Band edge and Spurious Emission	9kHz ~ 30MHz	2	2.20
	30 MHz ~ 1 GHz	2	3.16
	1 GHz ~ 18 GHz	2	5.64
	18 GHz ~ 26.5 GHz	2	5.54
Conducted Output Power	/	2	0.73
6dB Bandwidth and 99% Occupied Bandwidth	/	2	9.2ppm
Power Spectral Density	/	2	1.84
Conducted Band edge and spurious emission	9kHz ~ 30MHz	2	0.95
	30 MHz ~ 1 GHz	2	1.49
	1 GHz ~ 18 GHz	2	1.75
	18 GHz ~ 26.5 GHz	2	2.06
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.			

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

EUT Name		LED Desktop Whiteboard
Model		NTR180-1
Series Model		NTR180-2, NTR720-1, NTR730-1
EUT Classification		Class B
Internal Frequency		2400MHz
Ratings		DC 5V
Power Supply	AC	120V/60Hz
	Battery	/

Frequency Band:	2400 MHz to 2483.5 MHz
Frequency Range:	2412 MHz to 2462 MHz
Support Standards:	IEEE 802.11b, IEEE 802.11g, IEEE 802.11n-HT20, IEEE 802.11n-HT40
Type of Modulation:	IEEE 802.11b: DSSS(CCK, DQPSK, DBPSK) IEEE 802.11g/n: OFDM(64-QAM, 16-QAM, QPSK, BPSK)
Data Rate:	IEEE 802.11b: Up to 11 Mbps IEEE 802.11g: Up to 54 Mbps IEEE 802.11n: Up to MCS7
Number of Channels:	IEEE 802.11b/g/n-HT20: 11 IEEE 802.11n-HT40: 7
Maximum Peak Power:	IEEE 802.11b: 15.43 dBm IEEE 802.11g: 13.59 dBm IEEE 802.11n-HT20: 13.48 dBm IEEE 802.11n-HT40: 13.22 dBm
Antenna Type:	PCB Antenna
Antenna Gain:	2dBi
Hardware version:	V1.0
Software version:	V1.0

5.2. CHANNEL LIST

Channel List for 802.11b/g/n (20 MHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	4	2427	7	2442	10	2457
2	2417	5	2432	8	2447	11	2462
3	2422	6	2437	9	2452	/	/

Channel List for 802.11n (40 MHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
3	2422	5	2432	7	2442	9	2452
4	2427	6	2437	8	2447	/	/

5.3. MAXIMUM AVERAGE EIRP

IEEE Std. 802.11	Frequency (MHz)	Channel Number	Maximum Conducted AVG Output Power (dBm)
b	2412 ~ 2462	1-11[11]	15.43
g	2412 ~ 2462	1-11[11]	13.59
n HT20	2412 ~ 2462	1-11[11]	13.48
n HT40	2422 ~ 2452	3-9[7]	13.22

5.1. TEST CHANNEL CONFIGURATION

IEEE Std. 802.11	Test Channel Number	Frequency
b	CH 1(Low Channel), CH 6(MID Channel), CH 11(High Channel)	2412 MHz, 2437 MHz, 2462 MHz
g	CH 1(Low Channel), CH 6(MID Channel), CH 11(High Channel)	2412 MHz, 2437 MHz, 2462 MHz
n HT20	CH 1(Low Channel), CH 6(MID Channel), CH 11(High Channel)	2412 MHz, 2437 MHz, 2462 MHz
n HT40	CH 3(Low Channel), CH 6(MID Channel), CH 9(High Channel)	2422 MHz, 2437 MHz, 2452 MHz

5.2. THE WORSE CASE POWER SETTING PARAMETER

The Worse Case Power Setting Parameter under 2400 ~ 2483.5MHz Band							
Test Software		Beken WIFI Test Tool V1.6.0					
Modulation Mode	Transmit Antenna Number	Test Channel					
		NCB: 20MHz			NCB: 40MHz		
		CH 1	CH 6	CH 11	CH 3	CH 6	CH 9
802.11b	1	0	0	0			
802.11g	1	0	0	0			
802.11n HT20	1	0	0	0			
802.11n HT40	1				0	0	0

WORST-CASE CONFIGURATIONS

The EUT was tested in the following configuration(s):

Controlled in test mode using a software application on the EUT supplied by customer. The application was used to enable a continuous transmission and to select the mode, test channels, bandwidth, data rates as required.

Test channels referring to section 5.4.

Maximum power setting referring to section 5.5.

Worst-case data rates as provided by the client were:

802.11b mode: 1 Mbps
802.11g mode: 6 Mbps
802.11n HT20 mode: MCS0
802.11n HT40 mode: MCS0

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

Antenna	Frequency (MHz)	Antenna Type	MAX Antenna Gain (dBi)
1	2412-2462	PCB Antenna	2

Test Mode	Transmit and Receive Mode	Description
IEEE 802.11b	☒1TX, 1RX	ANT 1 can be used as transmitting/receiving antenna.
IEEE 802.11g	☒1TX, 1RX	ANT 1 can be used as transmitting/receiving antenna.
IEEE 802.11n HT20	☒1TX, 1RX	ANT 1 can be used as transmitting/receiving antenna.
IEEE 802.11n HT40	☒1TX, 1RX	ANT 1 can be used as transmitting/receiving antenna.

Note: The value of the antenna gain was declared by customer.

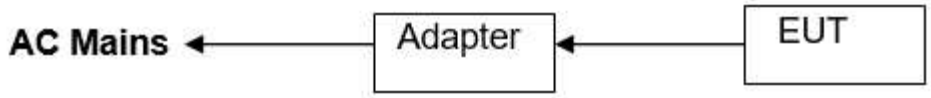
5.4. SUPPORT UNITS FOR SYSTEM TEST

The EUT has been tested as an independent unit

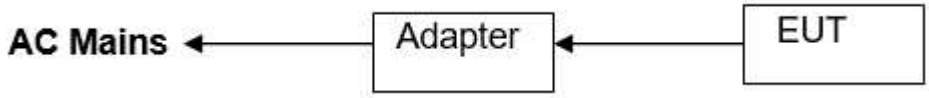
Item	Equipment	Trademark	Model No.	FCC ID	Note
1.	LED Desktop Whiteboard	Note Tower	NTR180-1	2BCD4-NTR180	***EUT***
2.	AC/DC adapter	/	CD170	/	***AE***

5.5. SETUP DIAGRAM

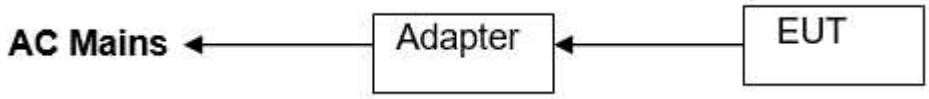
AC conducted emission



Radiated Emission:



RF conducted:



6. MEASURING EQUIPMENT AND SOFTWARE USED

Test Equipment of Conducted RF					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Due Date**
Spectrum Analyzer	Rohde & Schwarz	FSV40	102257	2022/10/08	2023/10/07
EXG Analog Signal Generator	KEYSIGHT	N5173B	MY61253075	2022/10/08	2023/10/07
Vector Signal Generator	Rohde & Schwarz	SMM100A	101899	2023/03/16	2024/03/15
RF Control box	MWRF-test	MW100-RFCB	MW220926GTG	2022/10/08	2023/10/07
Wideband Radio Communication Tester	Rohde & Schwarz	CMW270	102792	2023/03/16	2024/03/15
Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	103235	2022/10/08	2023/10/07
temperature humidity chamber	Espec	SH-241	SH-241-2014	2022/10/08	2023/10/07
RF Test Software	MWRF-test	MTS8310E (Ver. V2/0)	N/A	N/A	N/A

Test Equipment of Radiated emissions below 1GHz					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Due Date**
3m Semi-anechoic Chamber	ETS	9m*6m*6m	Q2146	2022/08/30	2025/08/29
EMI Test Receiver	Rohde & Schwarz	ESCI3	101409	2022/10/08	2023/10/07
Pre-Amplifier	HzEMC	HPA-9K0130	HYPA21001	2022/10/29	2023/10/28
Biconilog Antenna	Schwarzbeck	VULB 9168	01315	2022/10/10	2025/10/09
Biconilog Antenna	ETS	3142E	00243646	2022/03/23	2025/03/22
Loop Antenna	ETS	6502	243668	2022/03/30	2025/03/29
Test Software	Farad	EZ-EMC (Ver.FA-03A2 RE)	N/A	N/A	N/A

Test Equipment of Radiated emissions above 1GHz					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Due Date**
3m Semi-anechoic Chamber	ETS	9m*6m*6m	Q2149	2022/08/30	2025/08/29
Spectrum Analyzer	Rohde & Schwarz	FSV40	101413	2022/10/08	2023/10/07
Pre-Amplifier	A-INFO	HPA-1G1850	HYPA21003	2022/10/29	2023/10/28
Horn antenna	A-INFO	3117	246069	2022/03/11	2023/03/10
Pre-Amplifier	ZKJC	HPA-184057	HYPA21004	2022/10/29	2023/10/28
Horn antenna	ZKJC	3116C	246265	2022/03/29	2023/03/28
Test Software	Farad	EZ-EMC (Ver.FA-03A2 RE+)	N/A	N/A	N/A

Test Equipment of Conducted emissions					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Due Date**
Shielded Room	CHENG YU	8m*5m*4m	N/A	2022/10/29	2025/10/28
EMI Test Receiver	Rohde & Schwarz	ESR3	102647	2022/12/03	2023/12/02
LISN/AMN	Rohde & Schwarz	ENV216	102843	2022/10/08	2023/10/07
NNLK 8129 RC	Schwarzbeck	NNLK 8129 RC	5046	2023/03/30	2024/03/29
Test Software	Farad	EZ-EMC (Ver. EMC-con-3A1 1+)	N/A	N/A	N/A

7. ANTENNA PORT TEST RESULTS

7.1. CONDUCTED OUTPUT POWER

LIMITS

CFR 47 FCC Part15 (15.247) Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC 15.247(b)(3)	Peak Conduct Output Power	1 watt or 30 dBm	2400-2483.5

TEST PROCEDURE

Connect the EUT to a low loss RF cable from the antenna port to the power sensor (video bandwidth is greater than the occupied bandwidth).
Measure peak emission level, the indicated level is the peak output power, after any corrections for external attenuators and cables.

TEST ENVIRONMENT

Temperature	24℃	Relative Humidity	55%
Atmosphere Pressure	101kPa		

TEST RESULTS

Please refer to section "Test Data"

7.2. 6DB BANDWIDTH

LIMITS

CFR 47 FCC Part15 (15.247) Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC 15.247(a)(2)	6 dB Bandwidth	≥ 500 kHz	2400-2483.5

TEST PROCEDURE

Refer to ANSI C63.10-2013 clause 11.8 for DTS bandwidth and clause 6.9 for Occupied Bandwidth.

Connect the EUT to the spectrum analyser and use the following settings:

Center Frequency	The center frequency of the channel under test
Frequency Span	For 6 dB Bandwidth: Enough to capture all products of the modulation carrier emission
Detector	Peak
RBW	For 6 dB Bandwidth: 100 kHz
VBW	For 6 dB Bandwidth: ≥3 × RBW
Trace	Max hold
Sweep	Auto couple

a) Use the 99 % power bandwidth function of the instrument, allow the trace to stabilize and report the measured bandwidth.

b) Allow the trace to stabilize and measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

TEST ENVIRONMENT

Temperature	24℃	Relative Humidity	55%
Atmosphere Pressure	101kPa		

TEST RESULTS

Please refer to section "Test Data"

7.3. POWER SPECTRAL DENSITY

LIMITS

CFR 47 FCC Part15 (15.247) Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC §15.247 (e)	Power Spectral Density	8 dBm in any 3 kHz band	2400-2483.5

TEST PROCEDURE

Refer to ANSI C63.10-2013 clause 11.10.

Connect the EUT to the spectrum analyser and use the following settings:

Center Frequency	The center frequency of the channel under test
Detector	PEAK
RBW	3 kHz ≤ RBW ≤ 100 kHz
VBW	≥3 × RBW
Span	1.5 x DTS bandwidth
Trace	Max hold
Sweep time	Auto couple

Allow trace to fully stabilize and use the peak marker function to determine the maximum amplitude level within the RBW.
If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

TEST ENVIRONMENT

Temperature	24℃	Relative Humidity	55%
Atmosphere Pressure	101kPa		

TEST RESULTS

Please refer to section "Test Data"

7.4. CONDUCTED BAND EDGE AND SPURIOUS EMISSION

LIMITS

CFR 47 FCC Part15 (15.247) Subpart C		
Section	Test Item	Limit
CFR 47 FCC §15.247 (d)	Conducted Bandedge and Spurious Emissions	at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power

TEST PROCEDURE

Refer to ANSI C63.10-2013 clause 11.11 and 11.13.

Connect the EUT to the spectrum analyser and use the following settings for reference level measurement:

Center Frequency	The center frequency of the channel under test
Detector	Peak
RBW	100 kHz
VBW	≥3 × RBW
Span	1.5 x DTS bandwidth
Trace	Max hold
Sweep time	Auto couple.

Allow trace to fully stabilize and use the peak marker function to determine the maximum PSD level.
Change the settings for emission level measurement:

Span	Set the center frequency and span to encompass frequency range to be measured
Detector	Peak
RBW	100 kHz
VBW	≥3 × RBW
measurement points	≥span/RBW
Trace	Max hold
Sweep time	Auto couple.

Allow trace to fully stabilize and use the peak marker function to determine the maximum PSD level. Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) is attenuated by at least the minimum requirements specified in 11.11.

TEST ENVIRONMENT

Temperature	24℃	Relative Humidity	55%
Atmosphere Pressure	101kPa		

TEST RESULTS

Please refer to section "Test Data"

7.5. DUTY CYCLE

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

Refer to ANSI C63.10-2013 clause 11.6 Zero – Span Spectrum Analyzer method.

TEST ENVIRONMENT

Temperature	24℃	Relative Humidity	55%
Atmosphere Pressure	101kPa		

TEST RESULTS

Please refer to section "Test Data"

8. RADIATED TEST RESULTS

LIMITS

Please refer to CFR 47 FCC §15.205 and §15.209.

Radiation Disturbance Test Limit for FCC (Class B) (9 kHz ~ 1 GHz)

Emissions radiated outside of the specified frequency bands above 30 MHz			
Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m	
		Quasi-Peak	
30 - 88	100	40	
88 - 216	150	43.5	
216 - 960	200	46	
Above 960	500	54	
Above 1000	500	Peak	Average
		74	54

FCC Emissions radiated outside of the specified frequency bands below 30 MHz		
Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30

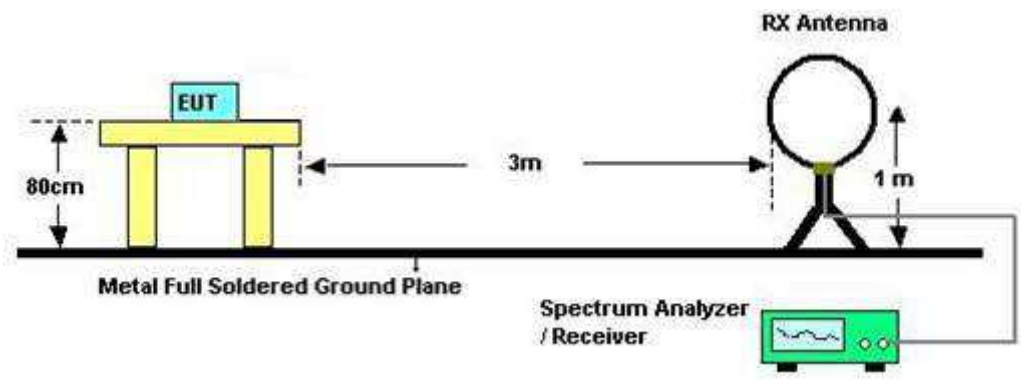
FCC Restricted bands of operation refer to FCC §15.205 (a):

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])
13.36-13.41			

Note: [1]Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
[2]Above 38.6c

TEST PROCEDURE

Below 30 MHz



The setting of the spectrum analyser

RBW	200 Hz (From 9 kHz to 0.15 MHz)/ 9 kHz (From 0.15 MHz to 30 MHz)
VBW	200 Hz (From 9 kHz to 0.15 MHz)/ 9 kHz (From 0.15 MHz to 30 MHz)
Sweep	Auto

1. The testing follows the guidelines in ANSI C63.10-2013 clause 6.4.

2. The EUT was arranged to its worst case and then turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both Horizontal, Face-on and Face-off polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 80 cm above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a 1 m height antenna tower.

5. The radiated emission limits are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz Radiated emission limits in these three bands are based on measurements employing an average detector.

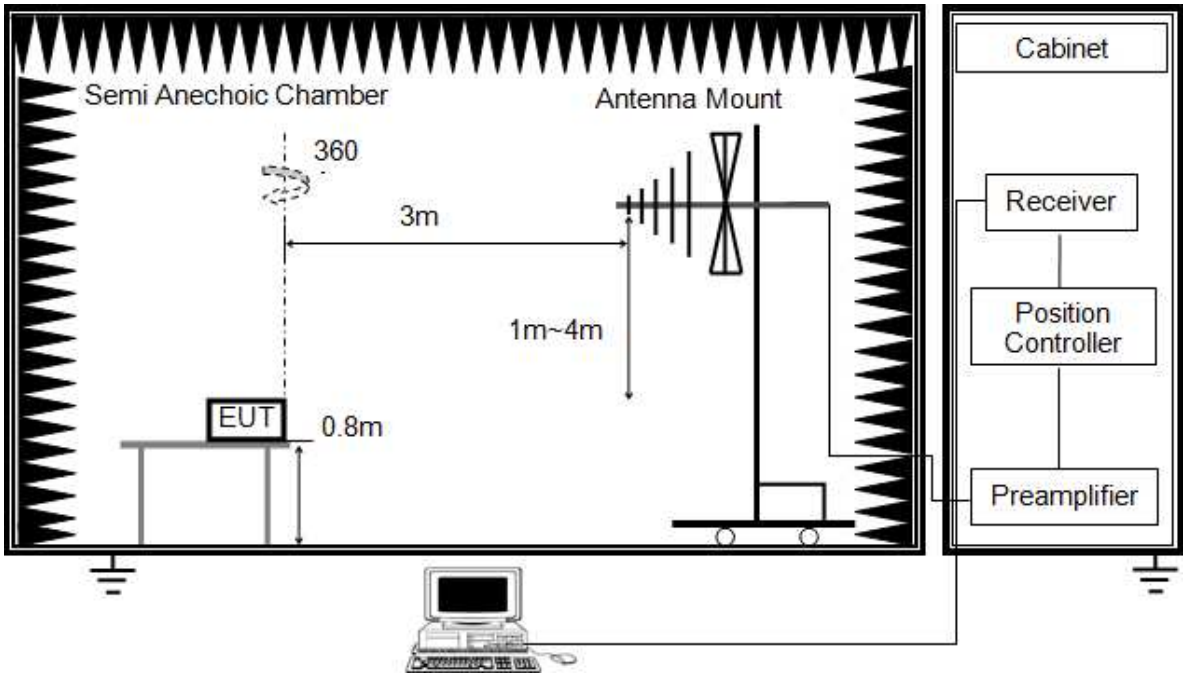
6. For measurement below 1 GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak and average detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak and average detector and reported.

7. Although these tests were performed other than open field site, adequate comparison measurements were confirmed against 30m open field site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field site based on KDB 414788.

8. The limits in CFR 47, Part 15, Subpart C, paragraph 15.209 (a), are identical to those in RSS-GEN Section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377Ω. For example, the measurement frequency X KHz resulted in a level of

Y dBuV/m, which is equivalent to Y-51.5 = Z dBuA/m, which has the same margin, W dB, to the corresponding RSS-GEN Table 6 limit as it has to be 15.209(a) limit.

Below 1 GHz and above 30 MHz



The setting of the spectrum analyser

RBW	120 kHz
VBW	300 kHz
Sweep	Auto
Detector	Peak/QP
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013 clause 6.5.

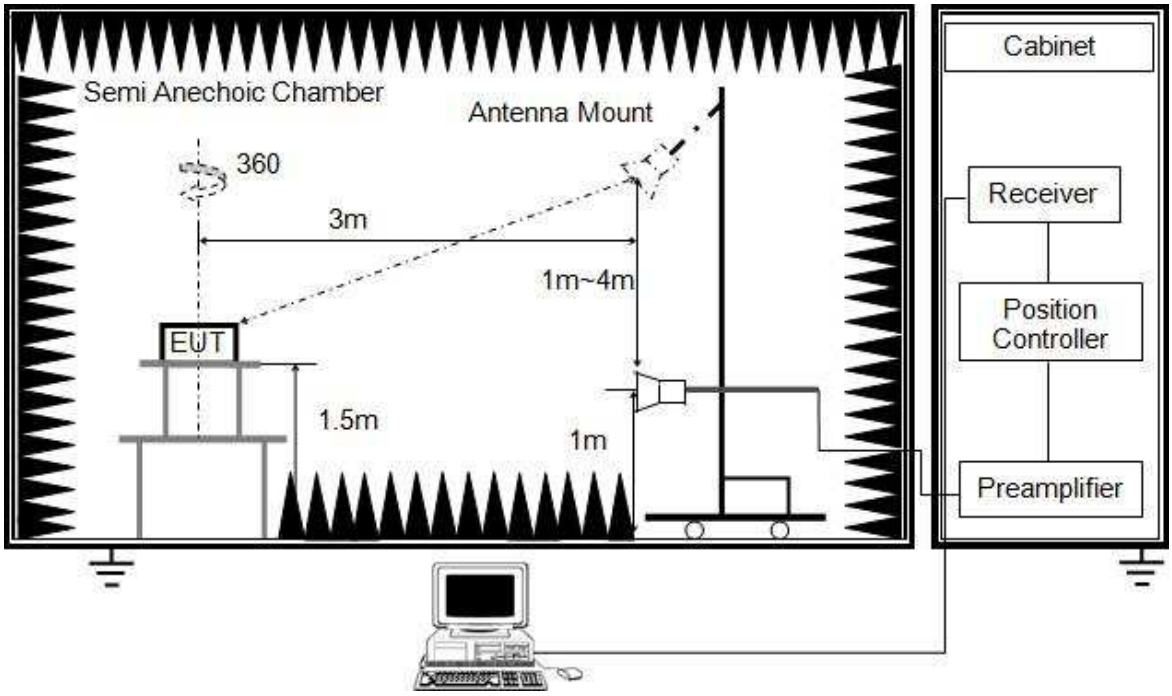
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 80 cm above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

5. For measurement below 1 GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

Above 1G



The setting of the spectrum analyser

RBW	1 MHz
VBW	PEAK: 3 MHz AVG: see note 6
Sweep	Auto
Detector	Peak
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013 clause 6.6.

2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

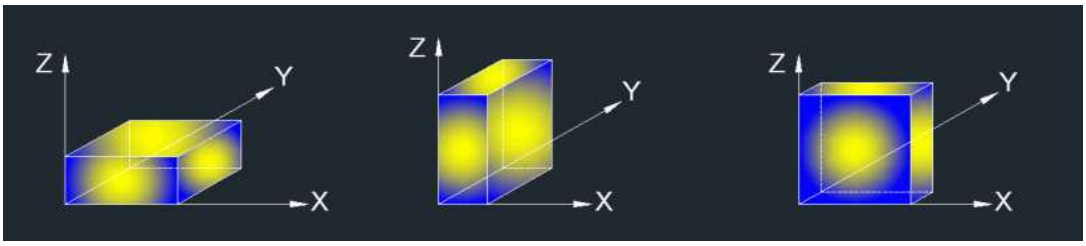
3. The EUT was placed on a turntable with 1.5 m above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

5. For measurement above 1 GHz, the emission measurement will be measured by the peak detector. This peak level, once corrected, must comply with the limit specified in Section 15.209.

6. For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T video bandwidth with peak detector for average measurements. For the Duty Cycle please refer to clause 7.1.ON TIME AND DUTY CYCLE.

X axis, Y axis, Z axis positions:



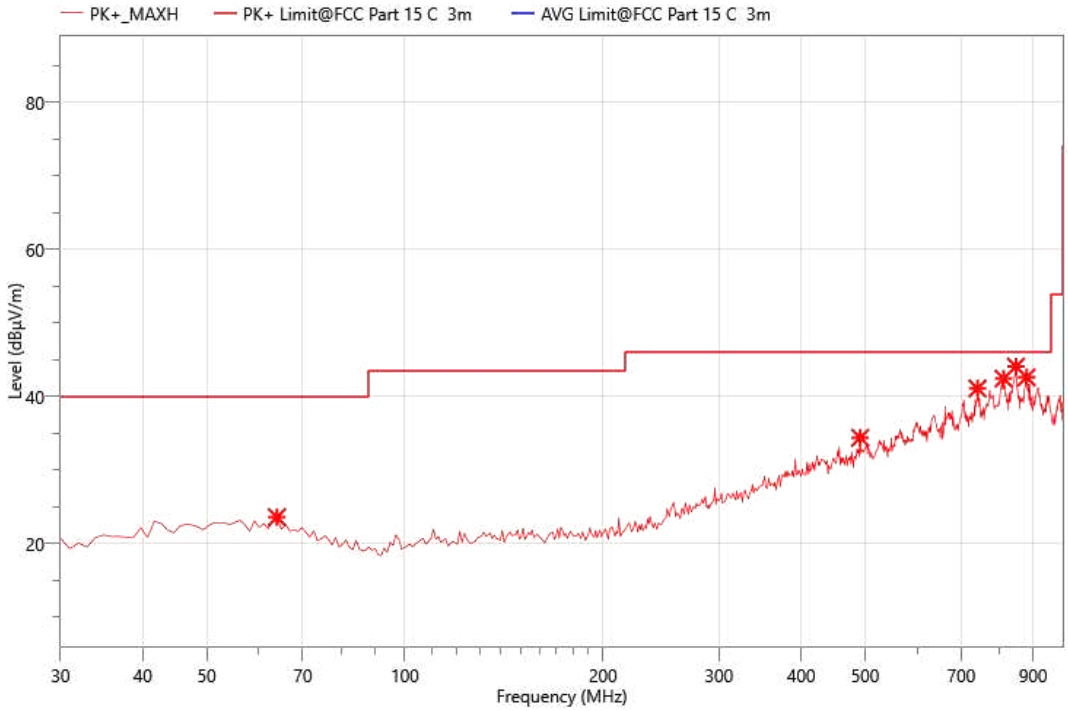
Note 1: For all radiated test, EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.

TEST ENVIRONMENT

Temperature	24℃	Relative Humidity	55%
Atmosphere Pressure	101kPa		

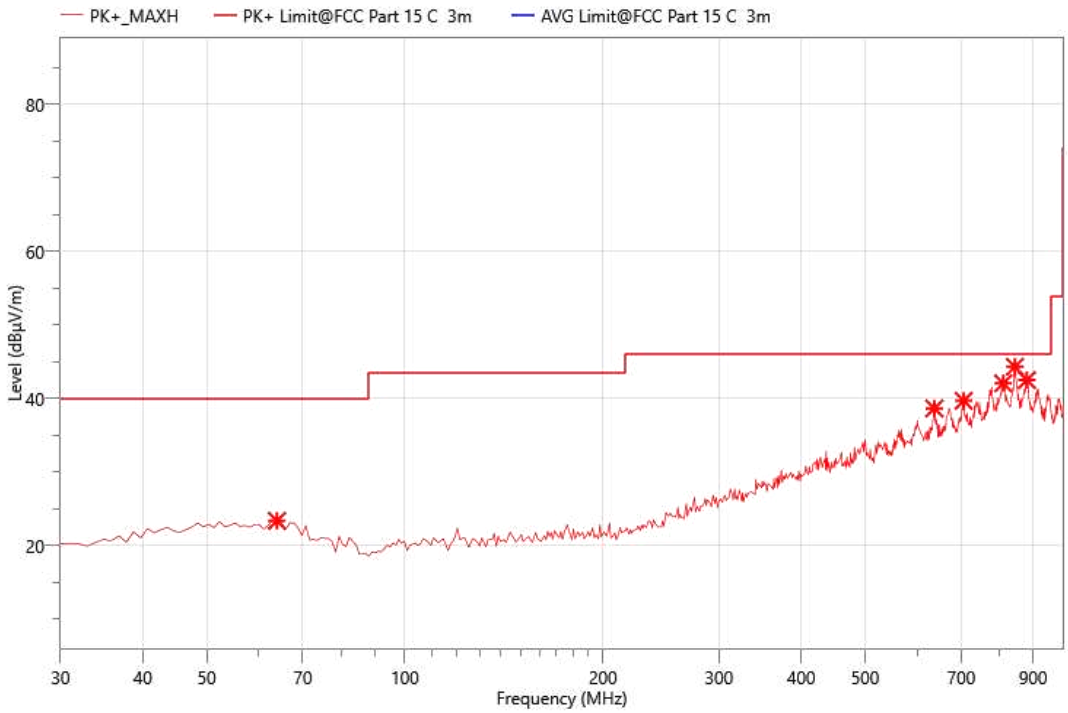
TEST RESULTS

The worst data of the mode (802.11b 2412MHz) are recorded in the following pages.



Site:	**LAB**	**Antenna: Horizontal**	**Temperature(C):23(C)**
Limit:	**FCC Part 15 C 3m Radiation(QP)**		**Humidity(%):57%**
EUT:	**LED Desktop Whiteboard**	**Test Time:**	**2023-08-04**
M/N.:	**NTR180-1**	**Power Rating:**	**AC 120V**
Mode:	**802.11b 2412MHz**	**Test Engineer:**	**Luffy**
Note:			

No.	Freq. (MHz)	Reading (dBµV)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
1	63.950	27.15	23.57	40.00	16.43	PK+	H	-3.58
2	491.720	29.32	34.37	46.00	11.63	PK+	H	5.05
3	741.010	30.22	41.08	46.00	4.92	PK+	H	10.86
4	811.820	29.62	42.43	46.00	3.57	PK+	H	12.81
5	847.710	30.08	44.06	46.00	1.94	PK+	H	13.98
6	879.720	29.72	42.59	46.00	3.41	PK+	H	12.87



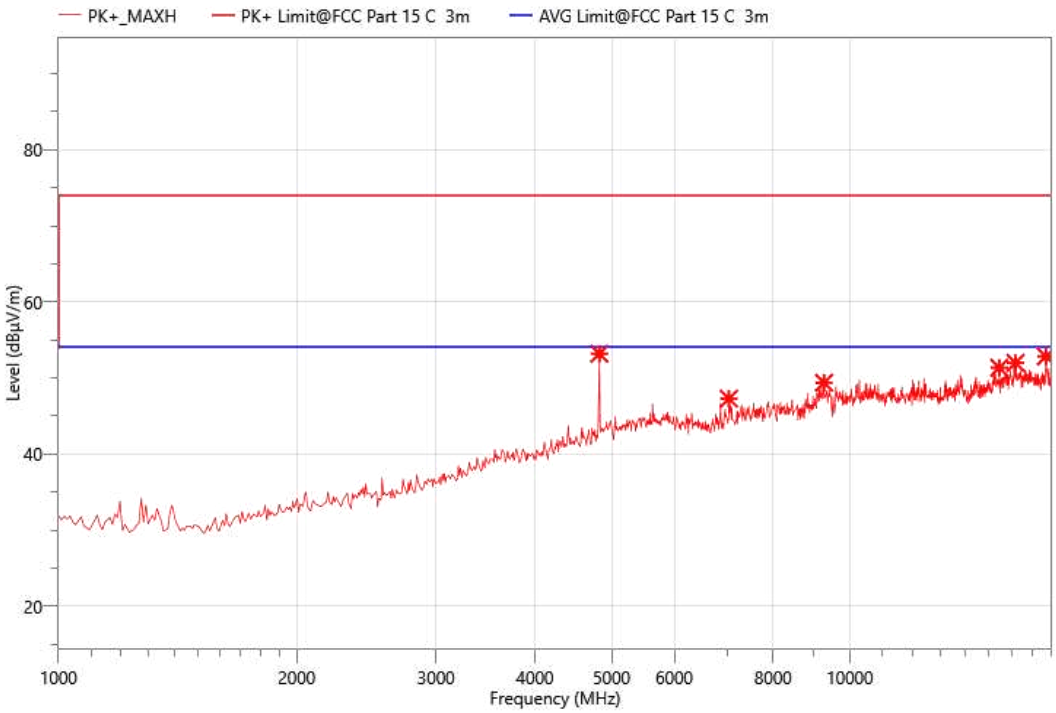
Site:	**LAB**	**Antenna: Vertical**	**Temperature(C):23(C)**
Limit:	**FCC Part 15 C 3m Radiation(QP)**		**Humidity(%):57%**
EUT:	**LED Desktop Whiteboard**	**Test Time:**	**2023-08-04**
M/N.:	**NTR180-1**	**Power Rating:**	**AC 120V**
Mode:	**802.11b 2412MHz**	**Test Engineer:**	**Luffy**
Note:			

No.	Freq. (MHz)	Reading (dBµV)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
1	63.950	26.93	23.35	40.00	16.65	PK+	V	-3.58
2	637.220	30.03	38.63	46.00	7.37	PK+	V	8.6
3	706.090	29.49	39.68	46.00	6.32	PK+	V	10.19
4	810.850	29.20	42.05	46.00	3.95	PK+	V	12.85
5	844.800	30.29	44.31	46.00	1.69	PK+	V	14.02
6	880.690	29.62	42.49	46.00	3.51	PK+	V	12.87

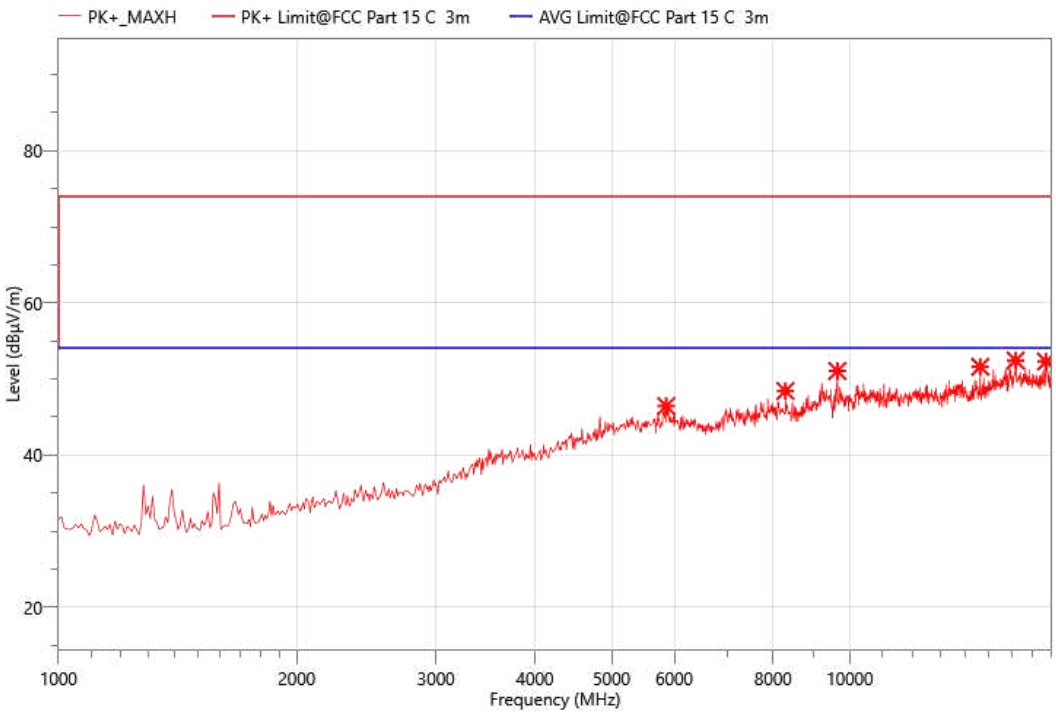
Above 1000MHz~10th Harmonics:

All the modulation modes were tested the data of the worst mode (TX 802.11b) are recorded in the following pages and the others modulation methods do not exceed the limits. The frequency range from 1GHz to 25GHz is investigated.

Temperature :	24℃	Test Date :	2023-08-22
Humidity :	55 %	Test By:	Vier
Test mode:	801.11b(2412MHz)	Frequency(MHz):	2412

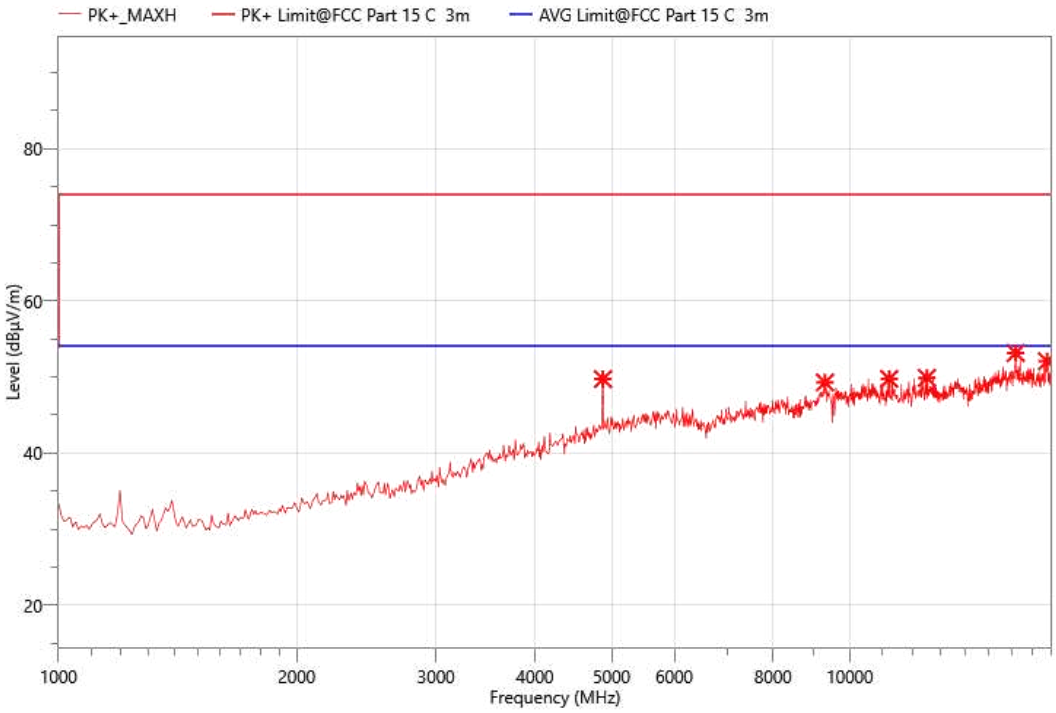


No.	Freq. (MHz)	Reading (dBµV)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
1	4825.000	62.20	53.19	74.00	20.81	PK+	H	-9.01
2	7035.000	50.00	47.29	74.00	26.71	PK+	H	-2.71
3	9279.000	50.16	49.39	74.00	24.61	PK+	H	-0.77
4	15450.000	48.94	51.35	74.00	22.65	PK+	H	2.41
5	16198.000	46.98	52.00	74.00	22.00	PK+	H	5.02
6	17694.000	48.25	52.84	74.00	21.16	PK+	H	4.59

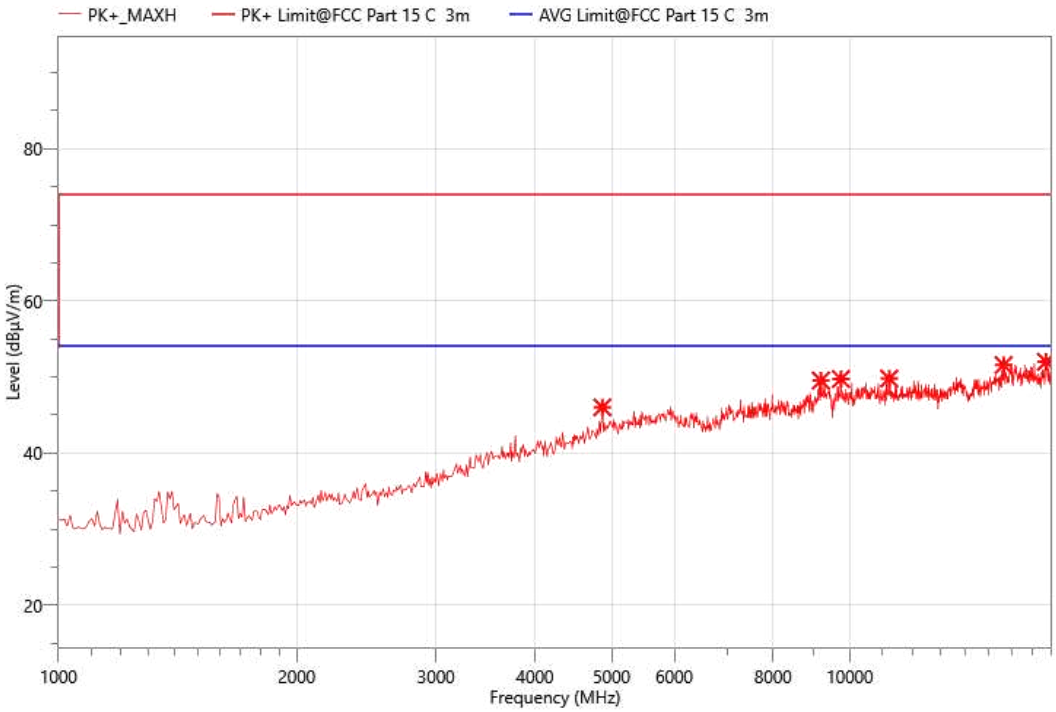


No.	Freq. (MHz)	Reading (dBµV)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
1	5862.000	51.78	46.45	74.00	27.55	PK+	V	-5.33
2	8293.000	50.74	48.43	74.00	25.57	PK+	V	-2.31
3	9644.500	51.40	51.06	74.00	22.94	PK+	V	-0.34
4	14617.000	50.16	51.61	74.00	22.39	PK+	V	1.45
5	16206.500	47.84	52.44	74.00	21.56	PK+	V	4.6
6	17702.500	47.71	52.30	74.00	21.70	PK+	V	4.59

Temperature :	24℃	Test Date :	2023-08-22
Humidity :	55 %	Test By:	Vier
Test mode:	801.11b(2437MHz)	Frequency(MHz):	2437

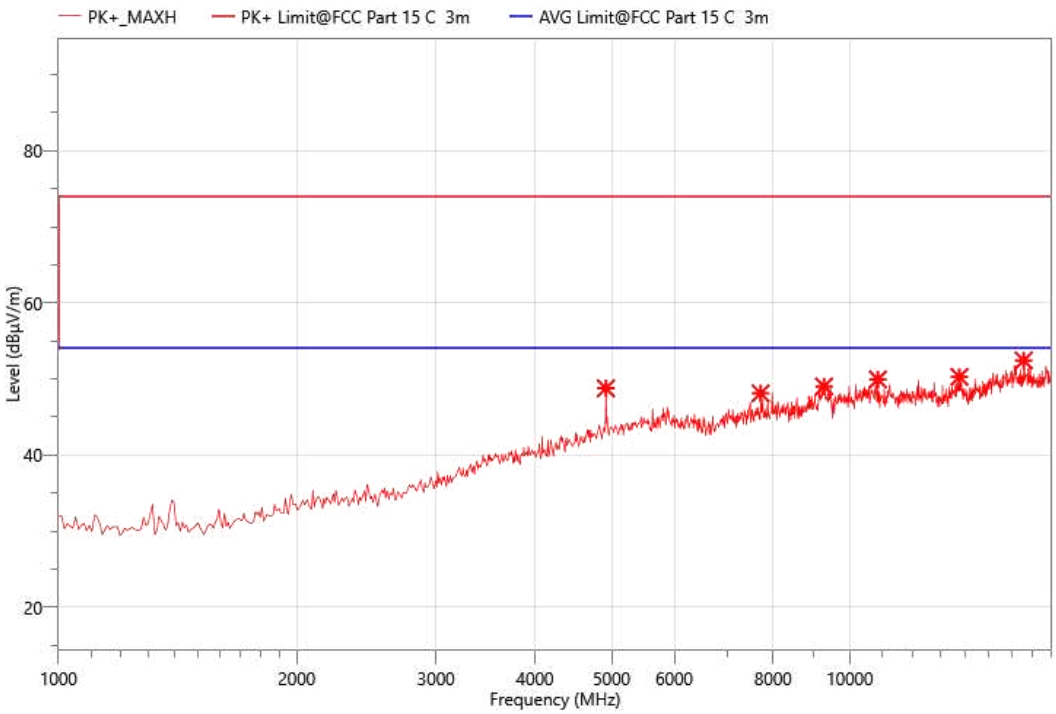


No.	Freq. (MHz)	Reading (dBµV)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
1	4876.000	58.60	49.73	74.00	24.27	PK+	H	-8.87
2	9304.500	50.23	49.29	74.00	24.71	PK+	H	-0.94
3	11217.000	48.36	49.76	74.00	24.24	PK+	H	1.4
4	12517.500	49.87	49.89	74.00	24.11	PK+	H	0.02
5	16206.500	48.55	53.15	74.00	20.85	PK+	H	4.6
6	17753.500	47.12	52.08	74.00	21.92	PK+	H	4.96

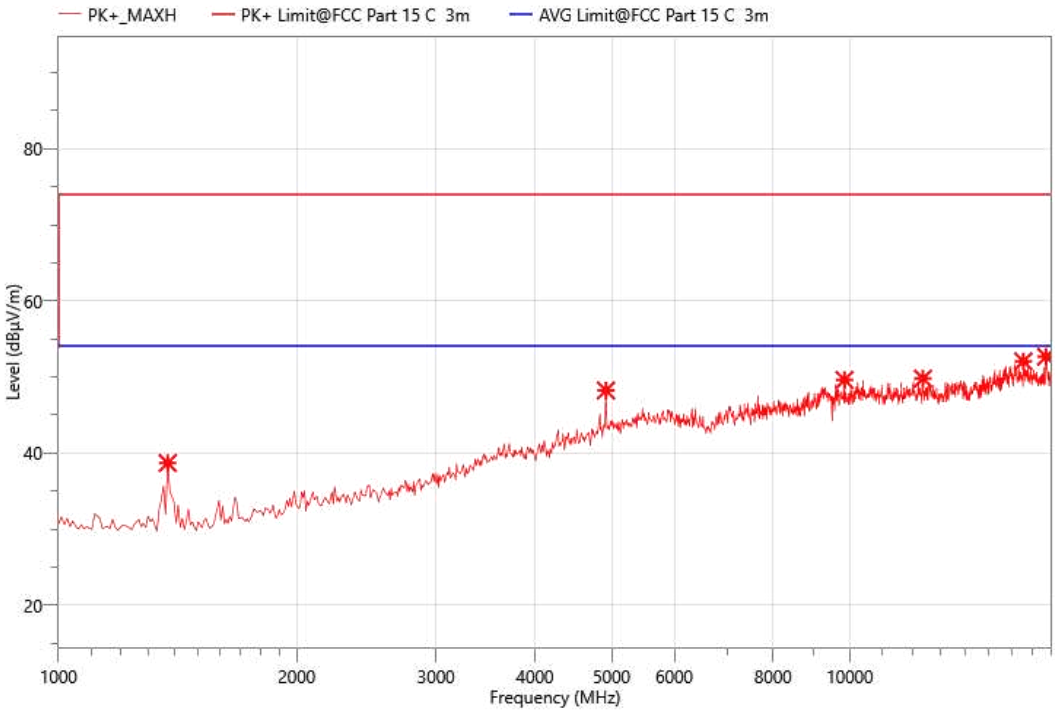


No.	Freq. (MHz)	Reading (dBµV)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
1	4867.500	55.11	46.02	74.00	27.98	PK+	V	-9.09
2	9194.000	49.79	49.54	74.00	24.46	PK+	V	-0.25
3	9746.500	50.57	49.74	74.00	24.26	PK+	V	-0.83
4	11217.000	48.41	49.81	74.00	24.19	PK+	V	1.4
5	15645.500	48.90	51.58	74.00	22.42	PK+	V	2.68
6	17702.500	47.42	52.01	74.00	21.99	PK+	V	4.59

Temperature :	24℃	Test Date :	2023-07-13
Humidity :	55 %	Test By:	Vier
Test mode:	801.11b(2462MHz)	Frequency(MHz):	2462



No.	Freq. (MHz)	Reading (dBµV)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
1	4918.500	57.60	48.78	74.00	25.22	PK+	H	-8.82
2	7715.000	51.04	48.12	74.00	25.88	PK+	H	-2.92
3	9279.000	49.80	49.03	74.00	24.97	PK+	H	-0.77
4	10851.500	50.28	49.95	74.00	24.05	PK+	H	-0.33
5	13758.500	47.91	50.28	74.00	23.72	PK+	H	2.37
6	16589.000	48.55	52.45	74.00	21.55	PK+	H	3.9



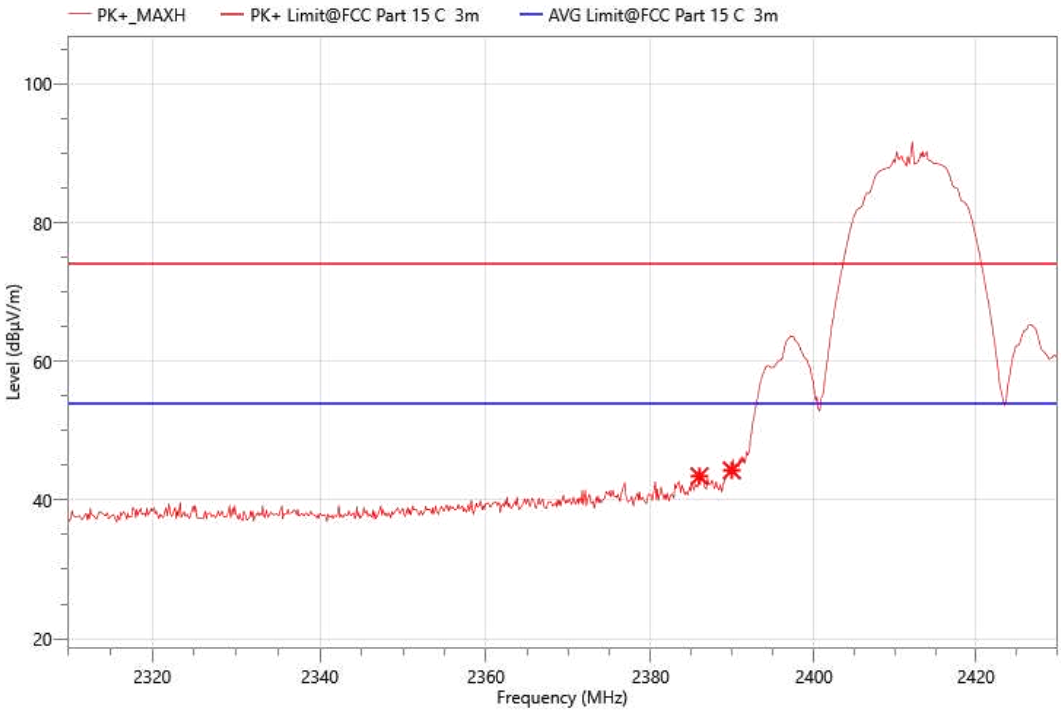
No.	Freq. (MHz)	Reading (dBµV)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
1	1374.000	64.77	38.69	74.00	35.31	PK+	V	-26.08
2	4918.500	57.06	48.24	74.00	25.76	PK+	V	-8.82
3	9848.500	51.09	49.63	74.00	24.37	PK+	V	-1.46
4	12373.000	49.86	49.80	74.00	24.20	PK+	V	-0.06
5	16572.000	48.25	52.07	74.00	21.93	PK+	V	3.82
6	17702.500	48.08	52.67	74.00	21.33	PK+	V	4.59

No others harmonics emissions are higher than 20 dB below the limits of 47 CFR Part 15.247.

Note: (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss.
(3) Data of measurement within this frequency range shown " – " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

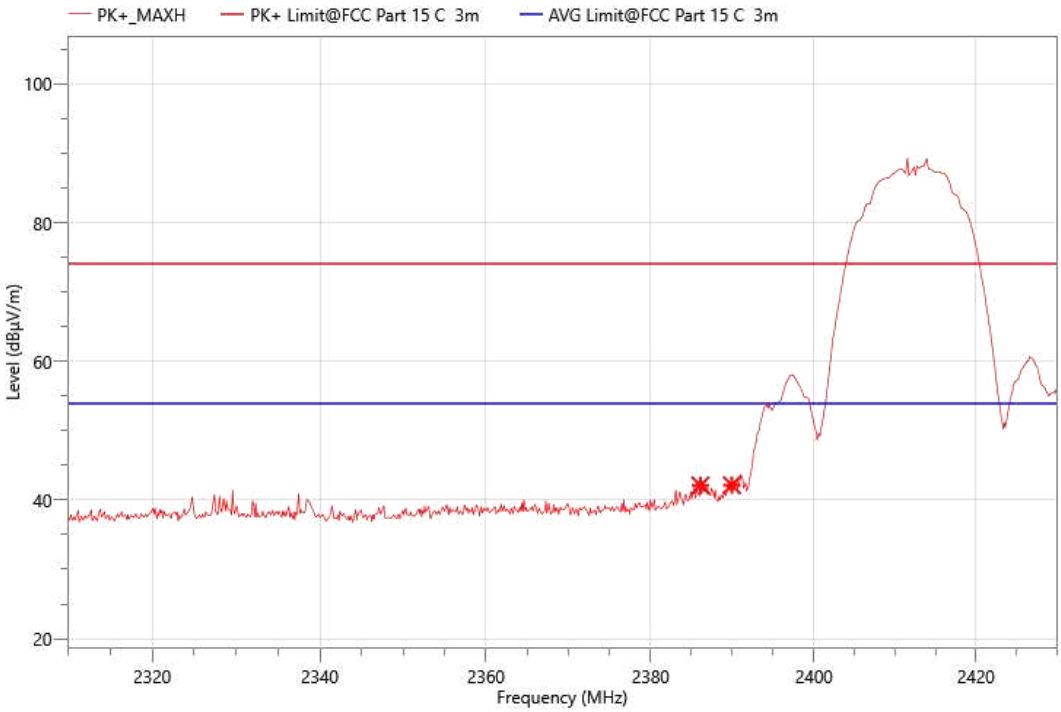
Band Edge (Radiated Test)

802.11b 2412MHz
Horizontal



Freq. (MHz)	Reading (dBµV)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dBµV/m)	Det.	Pol.	Corr. (dB)
2385.960	64.17	43.43	74.00	30.57	PK+	H	-20.74
2389.920	65.00	44.27	74.00	29.73	PK+	H	-20.73

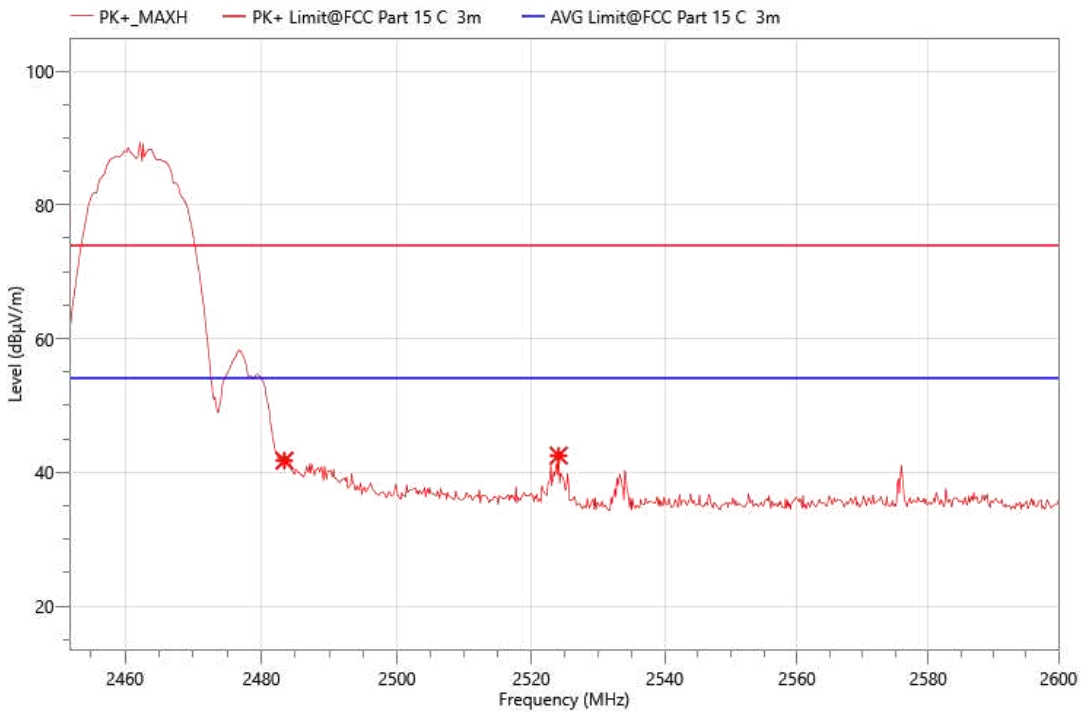
Vertical



Freq. (MHz)	Reading (dBµV)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dBµV/m)	Det.	Pol.	Corr. (dB)
2386.080	62.85	42.11	74.00	31.89	PK+	V	-20.74
2389.920	62.88	42.15	74.00	31.85	PK+	V	-20.73

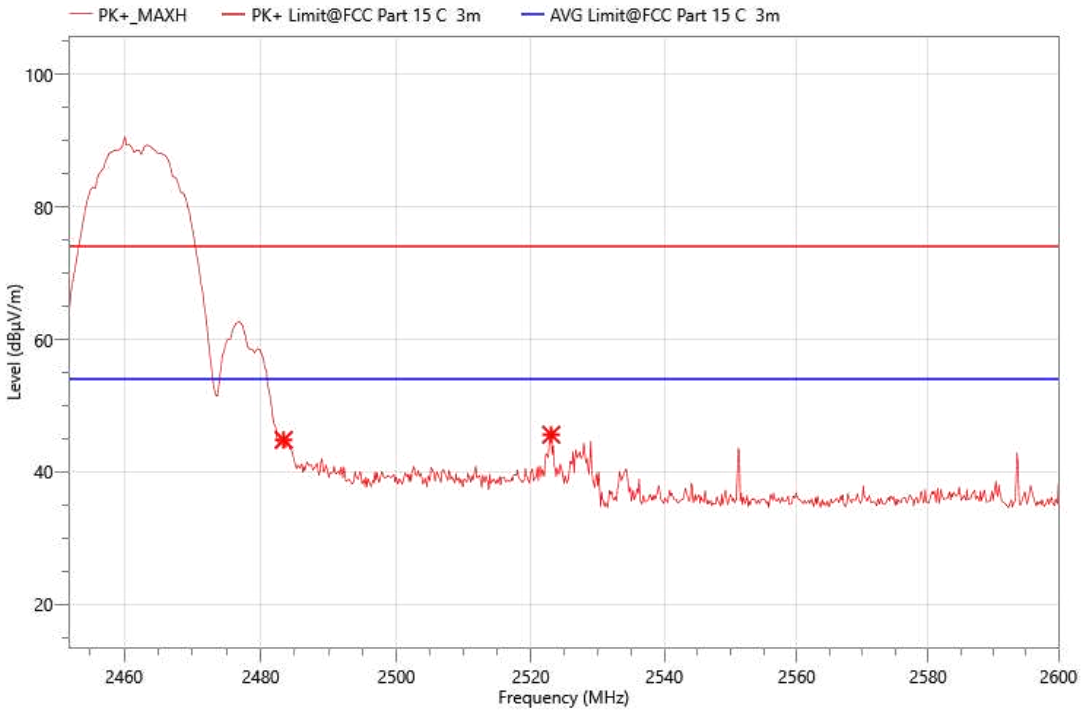
802.11b 2462MHz

Horizontal



Freq. (MHz)	Reading (dBµV)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dBµV/m)	Det.	Pol.	Corr. (dB)
2483.376	62.04	41.74	74.00	32.26	PK+	H	-20.3
2524.076	62.66	42.50	74.00	31.50	PK+	H	-20.16

Vertical



Freq. (MHz)	Reading (dBµV)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dBµV/m)	Det.	Pol.	Corr. (dB)
2483.376	65.13	44.83	74.00	29.17	PK+	V	-20.3
2523.040	65.79	45.63	74.00	28.37	PK+	V	-20.16

Note:802.11b, 802.11g, 802.11n (HT-20), 802.11n (HT-40), 802.11n (VHT-20), 802.11ax (HE-20), 802.11ac (VHT-40), 802.11ax (HE-40) all has been tested, the worst case is 802.11a, only shown the worst case.

9. ANTENNA REQUIREMENT

REQUIREMENT

The EUT'S antenna is met the requirement of FCC part 15C section 15.203 and 15.247.

FCC part 15C section 15.247 requirements:

Systems operating in the 2402-2480MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum peak output power of the intentional radiator is reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

DESCRIPTION

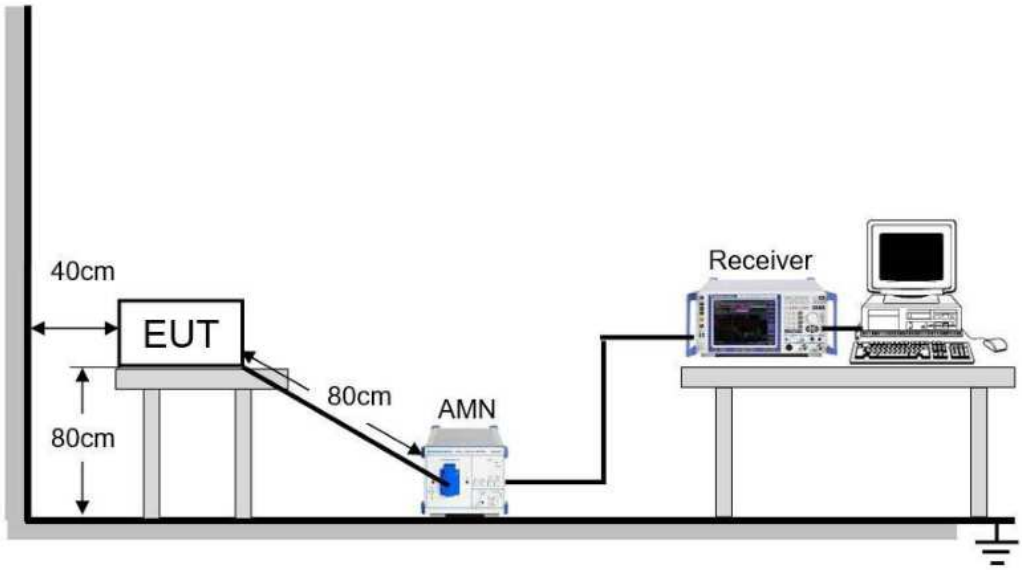
The EUT's antenna, permanent attached antenna, used Internal PCB antenna and integrated on PCB, The antenna's gain is 2dBi and meets the requirement.

10. AC POWER LINE CONDUCTED EMISSION

LIMITS

Please refer to CFR 47 FCC §15.207 (a)

FREQUENCY (MHz)	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00



TEST PROCEDURE

The EUT is put on a table of non-conducting material that is 80 cm high. The vertical conducting wall of shielding is located 40 cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.). A EMI Measurement Receiver used to test the emissions from both sides of AC line. According to the requirements in Section 6.2 of ANSI C63.10-2013.Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode. The bandwidth of EMI test receiver is set at 9 kHz.

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application.

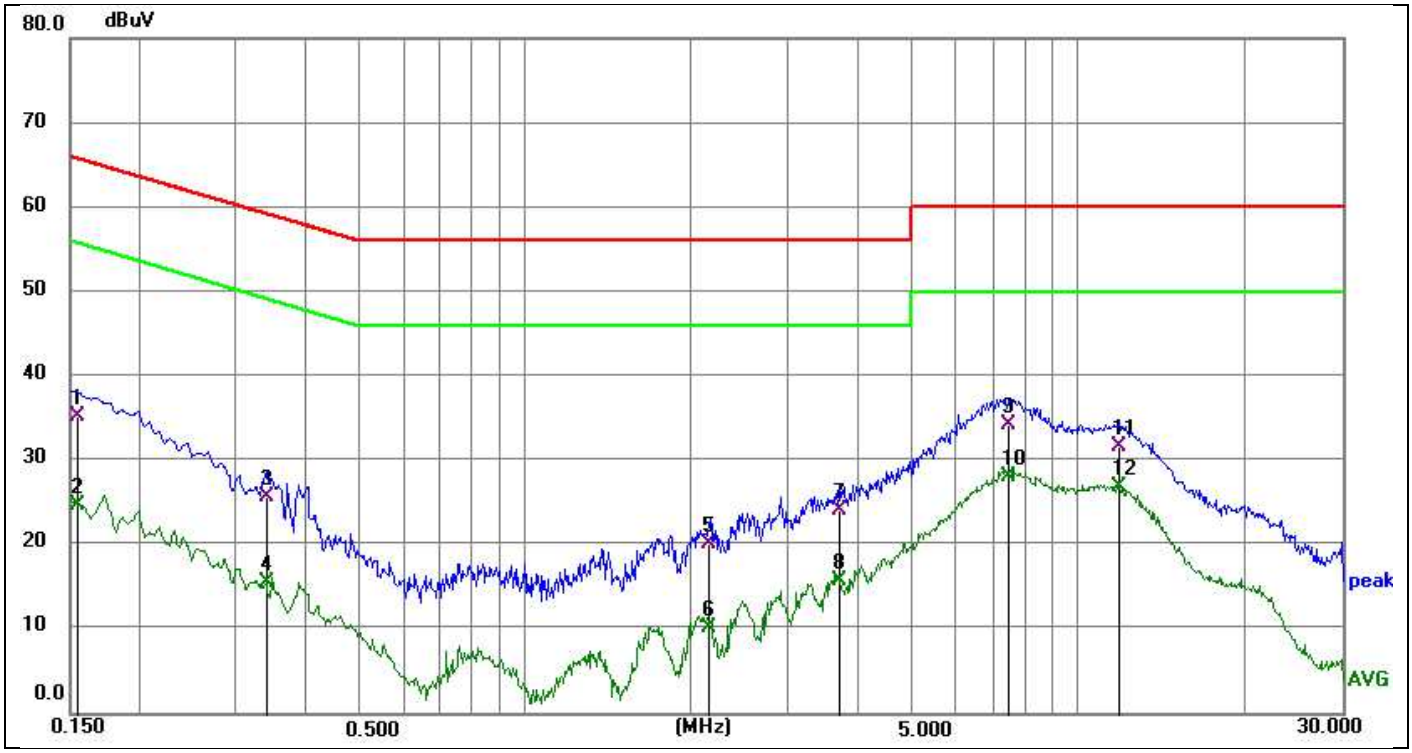
TEST ENVIRONMENT

Temperature	23.5℃	Relative Humidity	52.6%
Atmosphere Pressure	101kPa		

TEST RESULTS

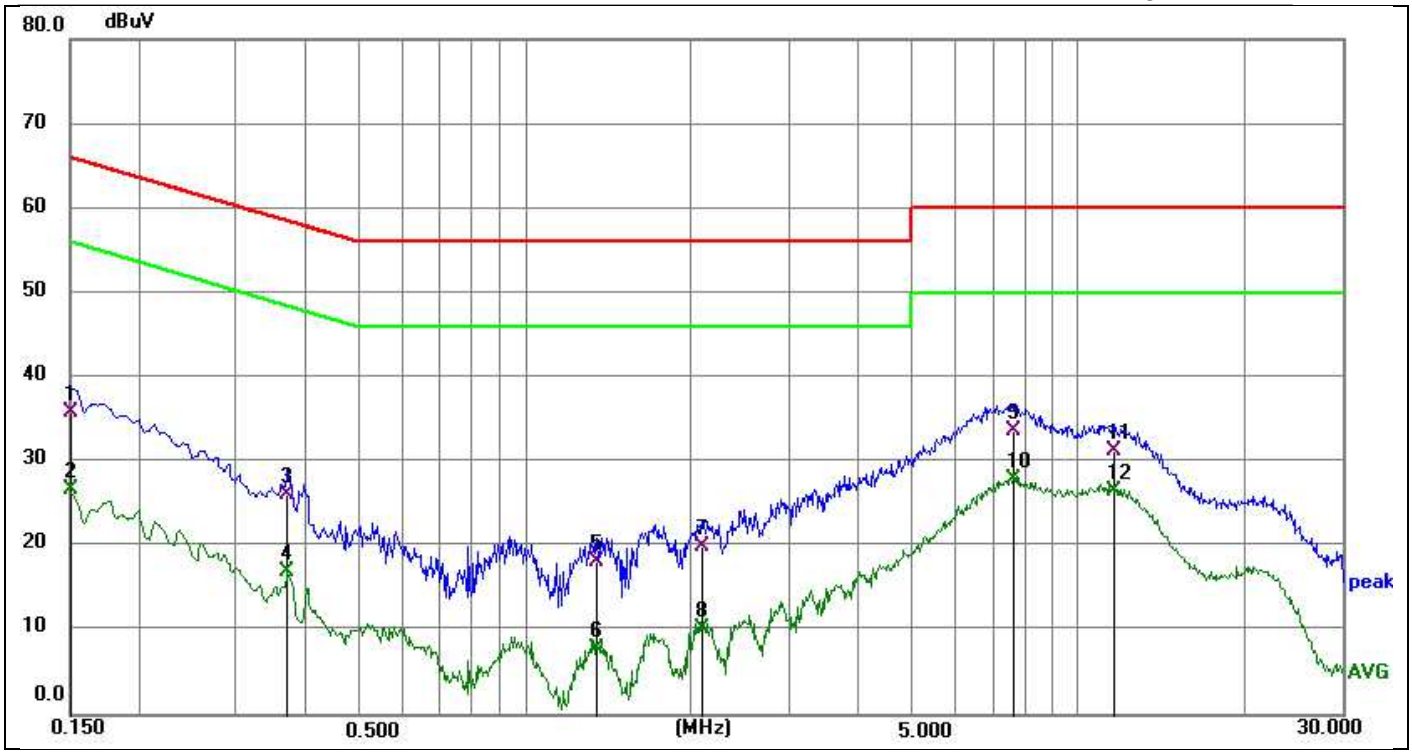
Passs

All the modulation modes were tested the data of the worst mode (802.11 b TX2462) are recorded in the following pages and the others modulation methods do not exceed the limits. Please refer to following pages.



Site:	**843**	**Phase:L1**	**Temperature(C):24.2(C)**
Limit:	**FCC Part 15 C Conduction(QP)**		**Humidity(%):51.9%**
EUT:	**LED Desktop Whiteboard**	**Test Time:**	**2023-08-04**
M/N.:	**NTR180-1**	**Power Rating:**	**AC 120V**
Mode:	**TX2462**	**Test Engineer:**	**Luffy**
Note:			

No.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB)	Measure-ment(dBuV)	Limit (dBuV)	Over (dB)	Detector	Comment
1	0.1545	25.40	9.90	35.30	65.75	-30.45	QP	
2	0.1545	14.88	9.90	24.78	55.75	-30.97	AVG	
3	0.3390	15.86	9.94	25.80	59.23	-33.43	QP	
4	0.3390	5.73	9.94	15.67	49.23	-33.56	AVG	
5	2.1614	10.05	10.15	20.20	56.00	-35.80	QP	
6	2.1614	0.00	10.15	10.15	46.00	-35.85	AVG	
7	3.7140	13.93	10.17	24.10	56.00	-31.90	QP	
8	3.7140	5.65	10.17	15.82	46.00	-30.18	AVG	
9	7.4940	23.67	10.63	34.30	60.00	-25.70	QP	
10	7.4940	17.50	10.63	28.13	50.00	-21.87	AVG	
11	11.8364	20.61	10.99	31.60	60.00	-28.40	QP	
12	11.8364	15.89	10.99	26.88	50.00	-23.12	AVG	



Site:	**843**	**Phase:N**	**Temperature(C):24.2(C)**
Limit:	**FCC Part 15 C Conduction(QP)**		**Humidity(%):51.9%**
EUT:	**LED Desktop Whiteboard**	**Test Time:**	**2023-08-04**
M/N.:	**NTR180-1**	**Power Rating:**	**AC 120V**
Mode:	**TX2462**	**Test Engineer:**	**Luffy**
Note:			

No.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB)	Measure-ment(dBuV)	Limit (dBuV)	Over (dB)	Detector	Comment
1	0.1508	25.80	10.00	35.80	65.96	-30.16	QP	
2	0.1508	16.66	10.00	26.66	55.96	-29.30	AVG	
3	0.3704	16.18	9.92	26.10	58.49	-32.39	QP	
4	0.3704	7.08	9.92	17.00	48.49	-31.49	AVG	
5	1.3470	7.93	10.17	18.10	56.00	-37.90	QP	
6 *	1.3470	-2.24	10.17	7.93	46.00	-38.07	AVG	
7	2.0985	9.75	10.15	19.90	56.00	-36.10	QP	
8	2.0985	0.10	10.15	10.25	46.00	-35.75	AVG	
9	7.6515	23.11	10.59	33.70	60.00	-26.30	QP	
10	7.6515	17.34	10.59	27.93	50.00	-22.07	AVG	
11	11.6610	20.33	10.97	31.30	60.00	-28.70	QP	
12	11.6610	15.54	10.97	26.51	50.00	-23.49	AVG	

*:Maximum data x:Over limit !:over margin

Note: 1. Result = Reading + Correct Factor.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz ~ 150 kHz), 9 kHz (150 kHz ~ 30 MHz).
4. Step size: 80 Hz (0.009 MHz ~ 0.15 MHz), 4 kHz (0.15 MHz ~ 30 MHz), Scan time: auto.

Note: All the modes have been tested, only the worst data was recorded in the report.

11. Maximum Conducted Output Power Test

Maximum Conducted Output Power

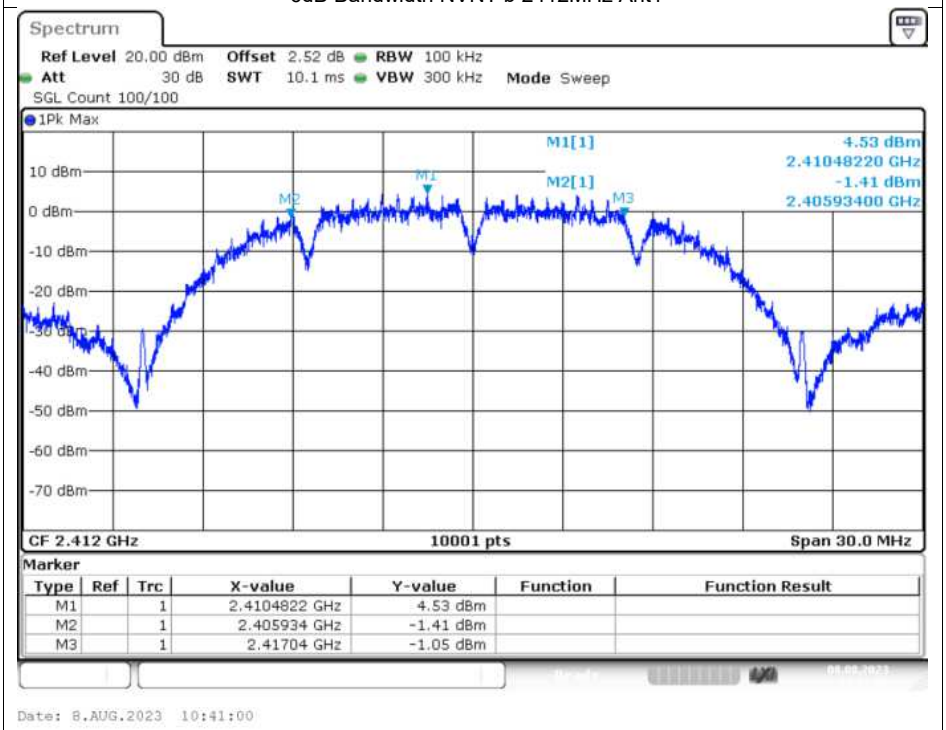
Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	b	2412	Ant1	15.43	30	Pass
NVNT	b	2437	Ant1	14.96	30	Pass
NVNT	b	2462	Ant1	14.4	30	Pass
NVNT	g	2412	Ant1	13.59	30	Pass
NVNT	g	2437	Ant1	13.31	30	Pass
NVNT	g	2462	Ant1	12.52	30	Pass
NVNT	n20	2412	Ant1	13.48	30	Pass
NVNT	n20	2437	Ant1	13.35	30	Pass
NVNT	n20	2462	Ant1	12.49	30	Pass
NVNT	n40	2422	Ant1	13.22	30	Pass
NVNT	n40	2437	Ant1	12.66	30	Pass
NVNT	n40	2452	Ant1	11.93	30	Pass

-6dB Bandwidth

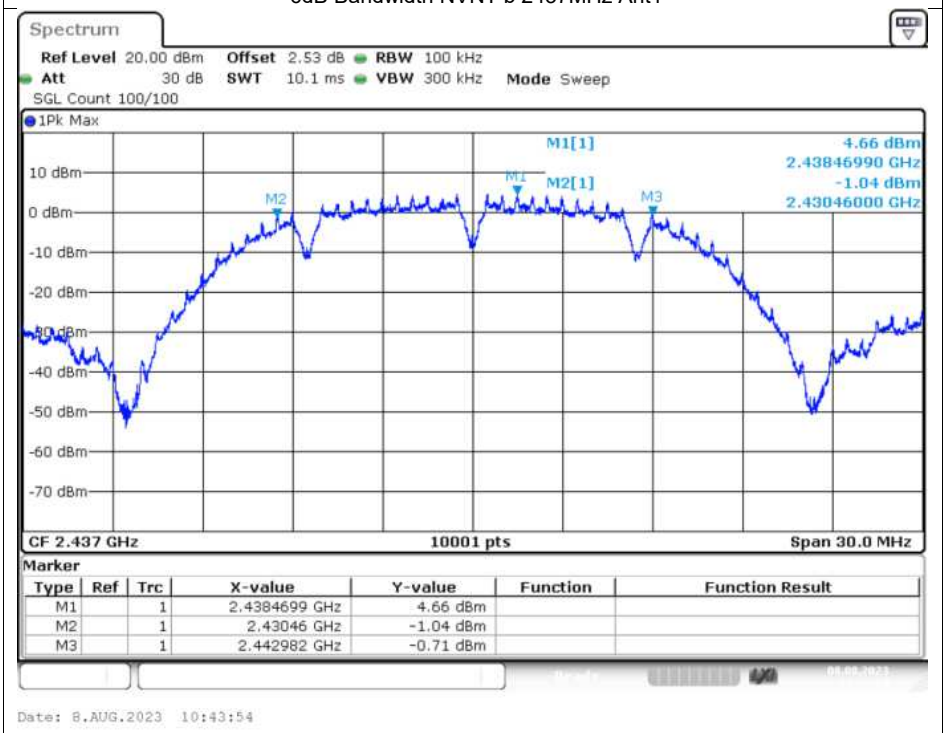
Condition	Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	b	2412	Ant1	11.106	0.5	Pass
NVNT	b	2437	Ant1	12.522	0.5	Pass
NVNT	b	2462	Ant1	12.531	0.5	Pass
NVNT	g	2412	Ant1	16.395	0.5	Pass
NVNT	g	2437	Ant1	16.386	0.5	Pass
NVNT	g	2462	Ant1	16.635	0.5	Pass
NVNT	n20	2412	Ant1	15.087	0.5	Pass
NVNT	n20	2437	Ant1	15.048	0.5	Pass
NVNT	n20	2462	Ant1	15.099	0.5	Pass
NVNT	n40	2422	Ant1	35.07	0.5	Pass
NVNT	n40	2437	Ant1	33.816	0.5	Pass
NVNT	n40	2452	Ant1	35.082	0.5	Pass

Test Graphs

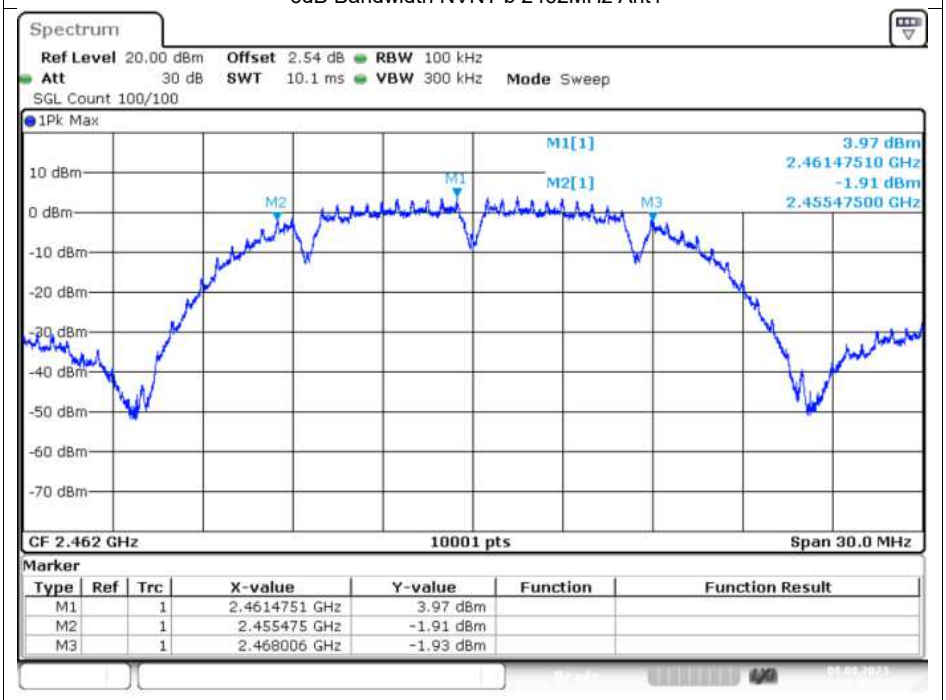
-6dB Bandwidth NVNT b 2412MHz Ant1



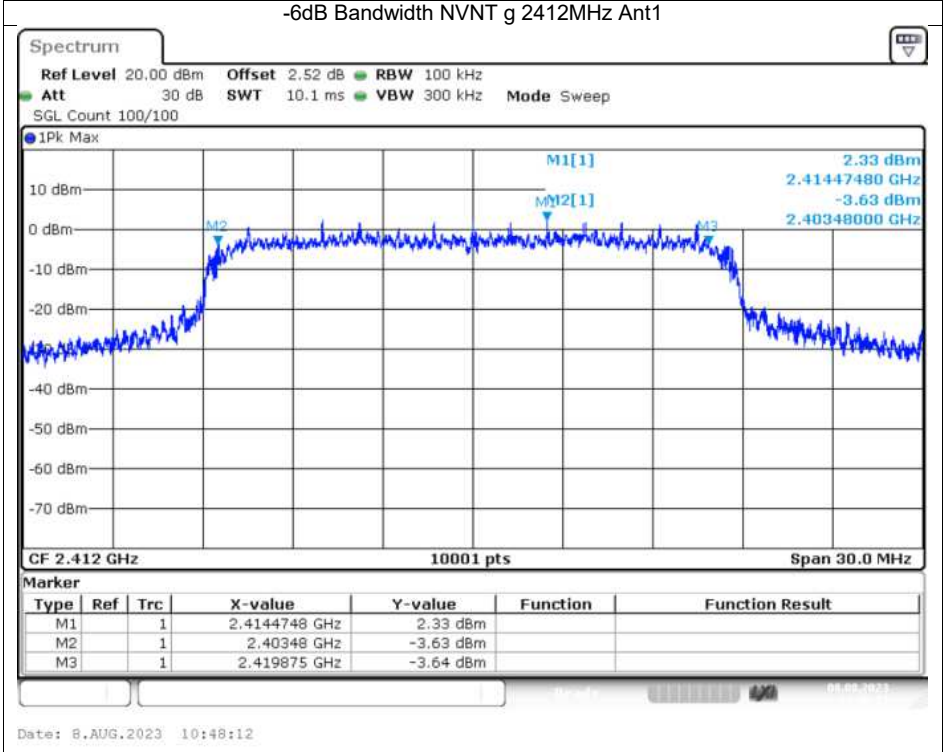
-6dB Bandwidth NVNT b 2437MHz Ant1



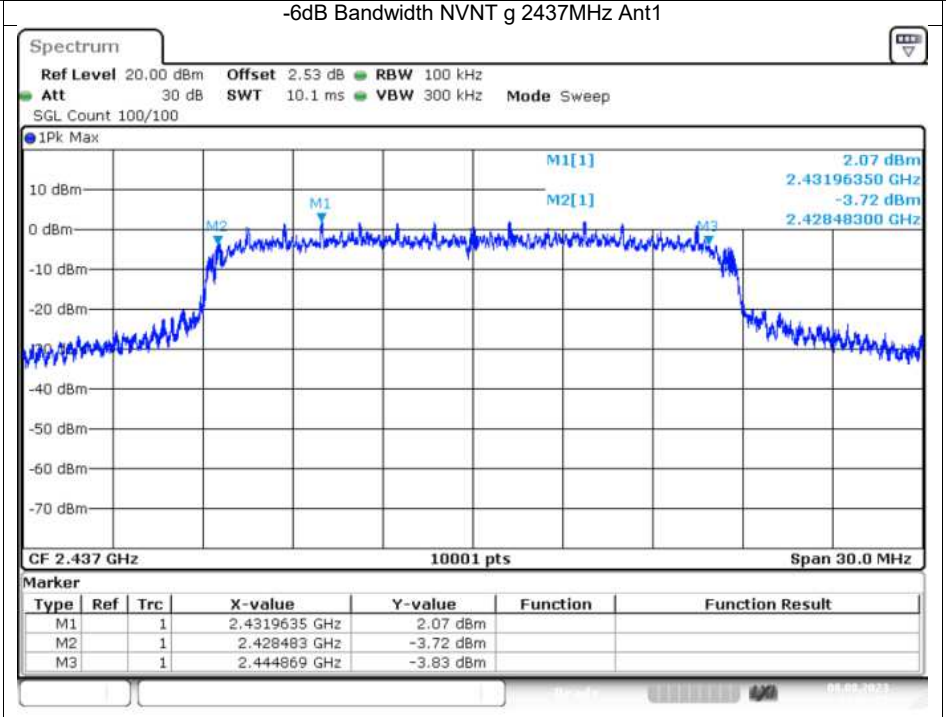
-6dB Bandwidth NVNT b 2462MHz Ant1



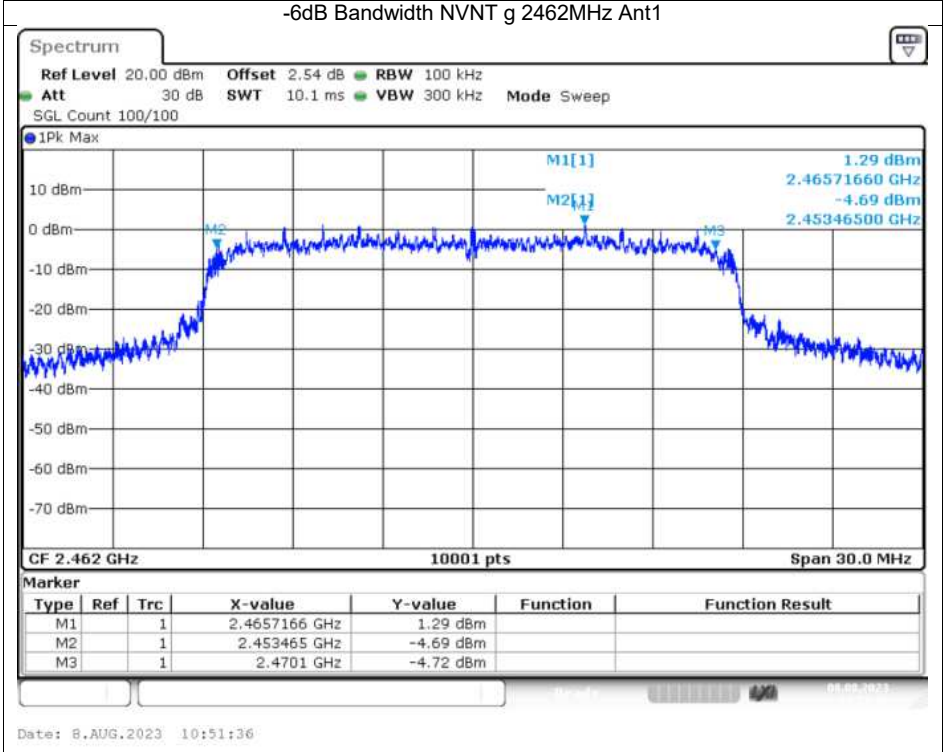
-6dB Bandwidth NVNT g 2412MHz Ant1



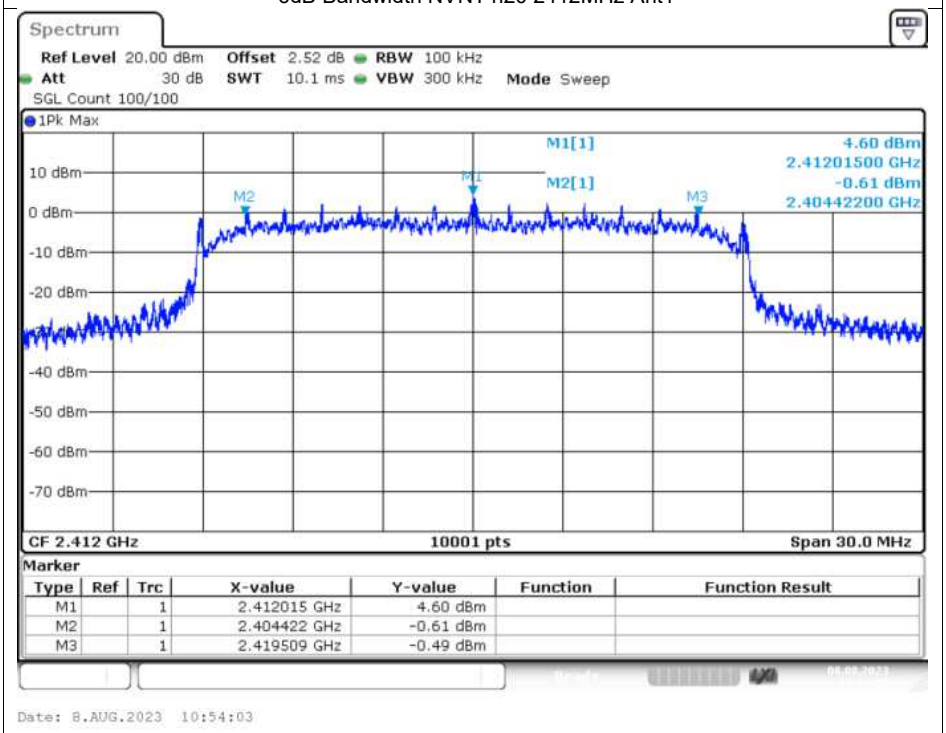
-6dB Bandwidth NVNT g 2437MHz Ant1



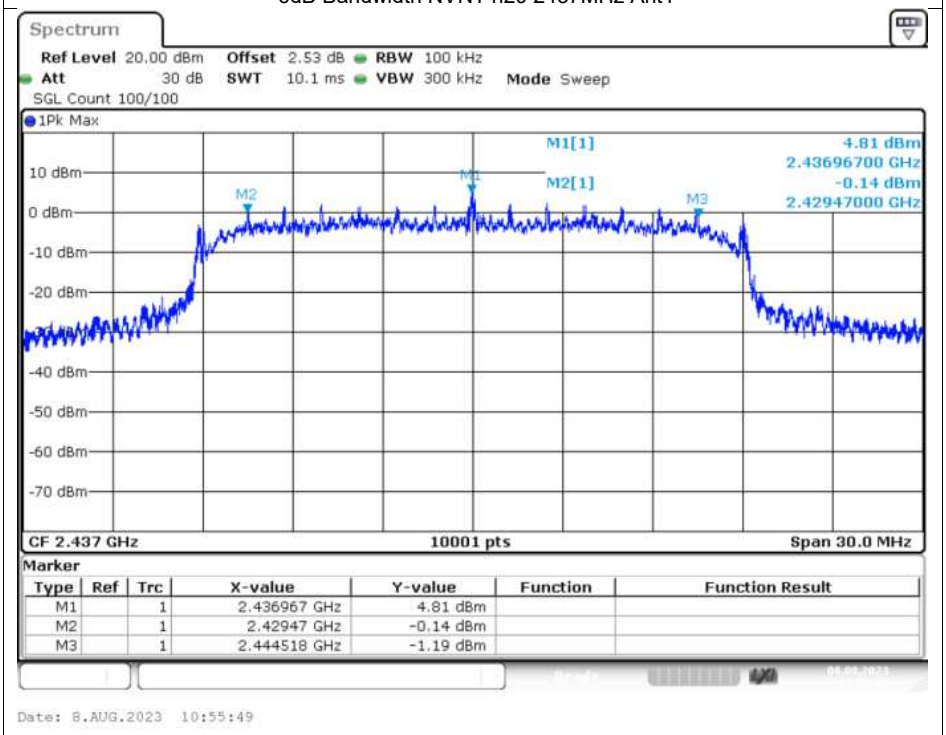
-6dB Bandwidth NVNT g 2462MHz Ant1



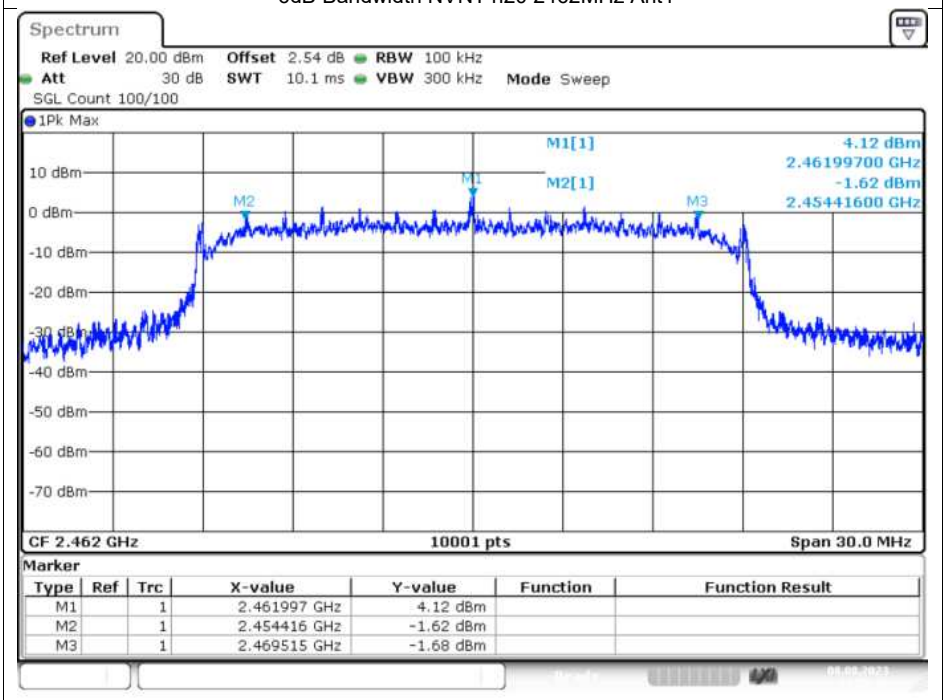
-6dB Bandwidth NVNT n20 2412MHz Ant1



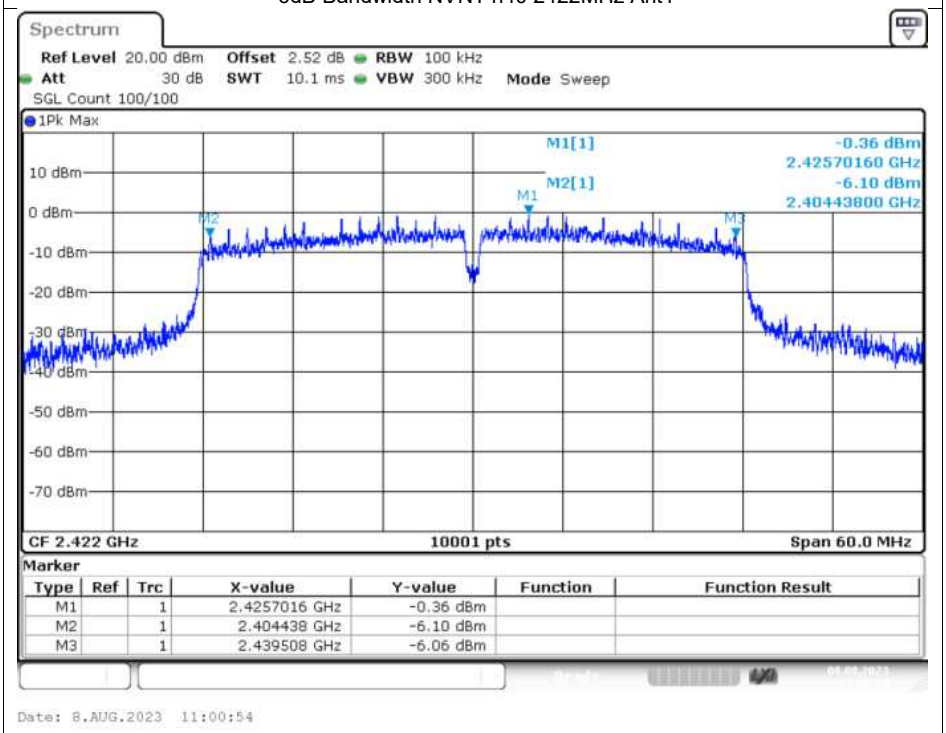
-6dB Bandwidth NVNT n20 2437MHz Ant1



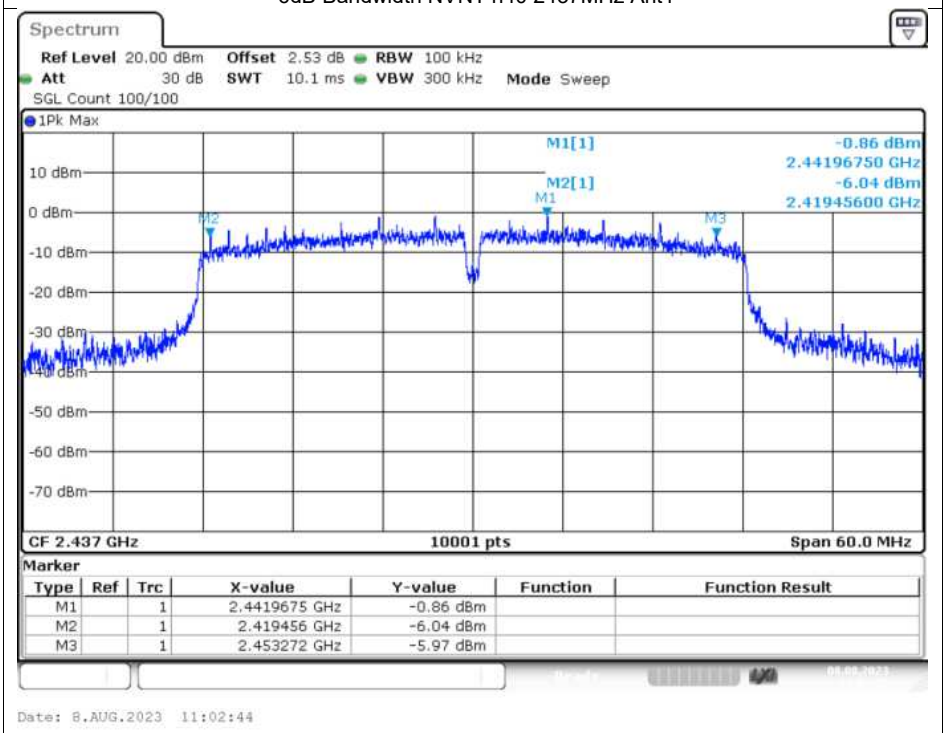
-6dB Bandwidth NVNT n20 2462MHz Ant1



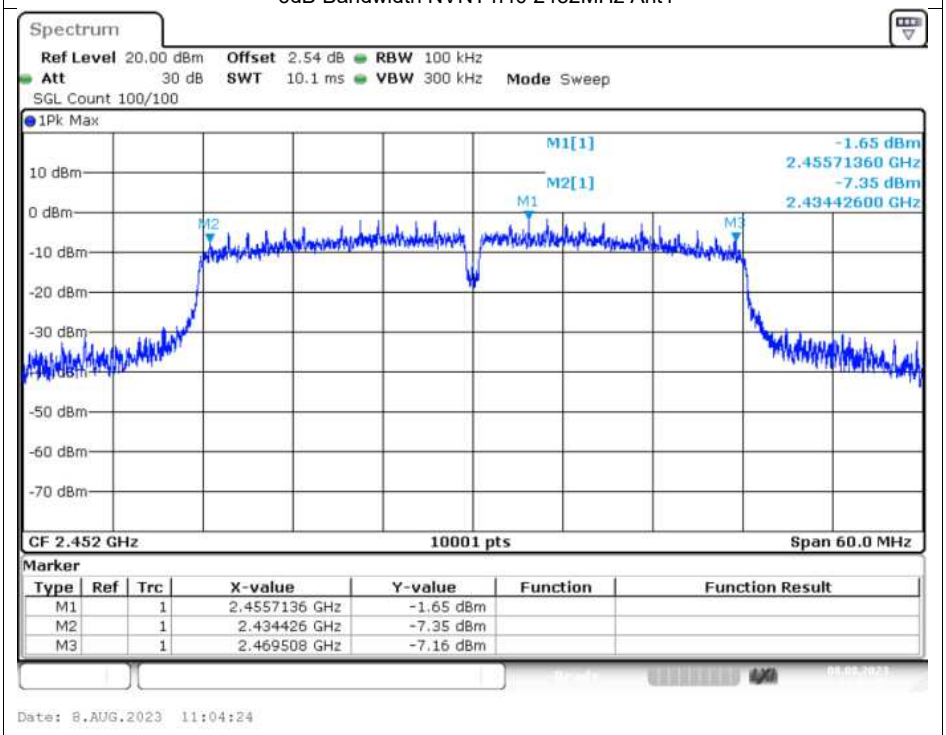
-6dB Bandwidth NVNT n40 2422MHz Ant1



-6dB Bandwidth NVNT n40 2437MHz Ant1



-6dB Bandwidth NVNT n40 2452MHz Ant1

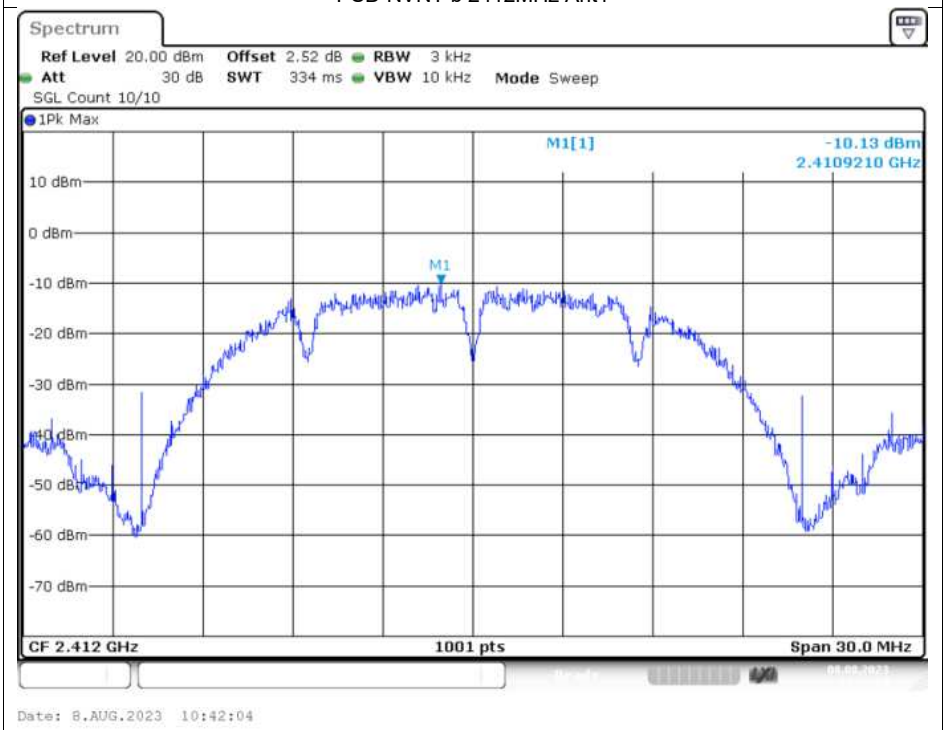


Maximum Power Spectral Density Level

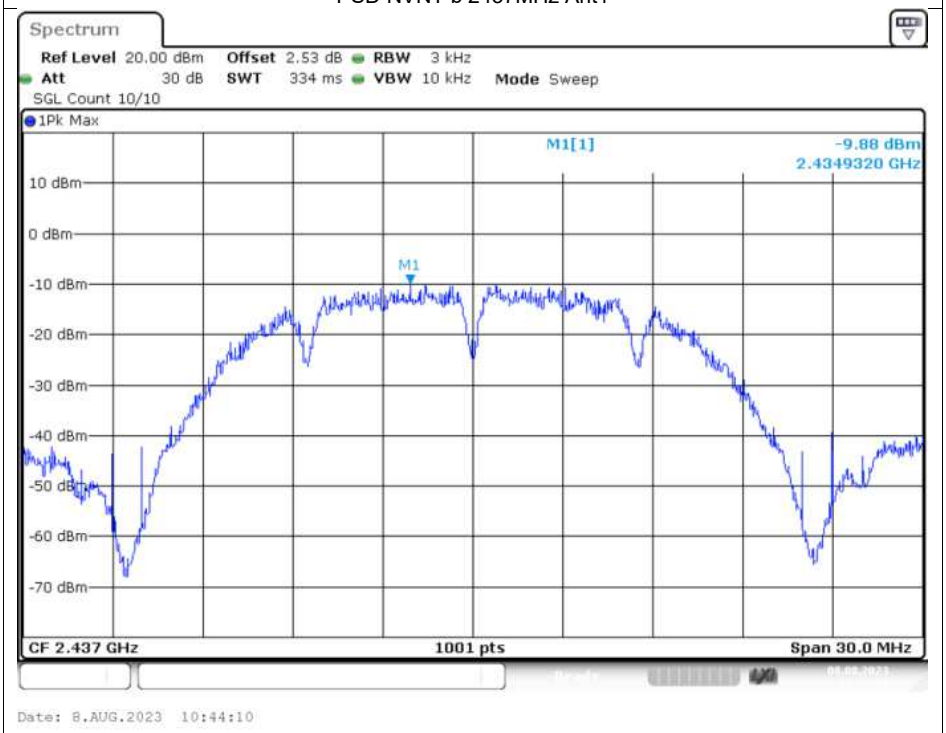
Condition	Mode	Frequency (MHz)	Antenna	Conducted PSD (dBm/3kHz)	Duty Factor (dB)	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
NVNT	b	2412	Ant1	-10.13	0	-10.13	8	Pass
NVNT	b	2437	Ant1	-9.88	0	-9.88	8	Pass
NVNT	b	2462	Ant1	-10.58	0	-10.58	8	Pass
NVNT	g	2412	Ant1	-11.62	0	-11.62	8	Pass
NVNT	g	2437	Ant1	-11.62	0	-11.62	8	Pass
NVNT	g	2462	Ant1	-13.22	0	-13.22	8	Pass
NVNT	n20	2412	Ant1	-12.27	0	-12.27	8	Pass
NVNT	n20	2437	Ant1	-11.06	0	-11.06	8	Pass
NVNT	n20	2462	Ant1	-11.73	0	-11.73	8	Pass
NVNT	n40	2422	Ant1	-14.54	0	-14.54	8	Pass
NVNT	n40	2437	Ant1	-14.72	0	-14.72	8	Pass
NVNT	n40	2452	Ant1	-15.74	0	-15.74	8	Pass

Test Graphs

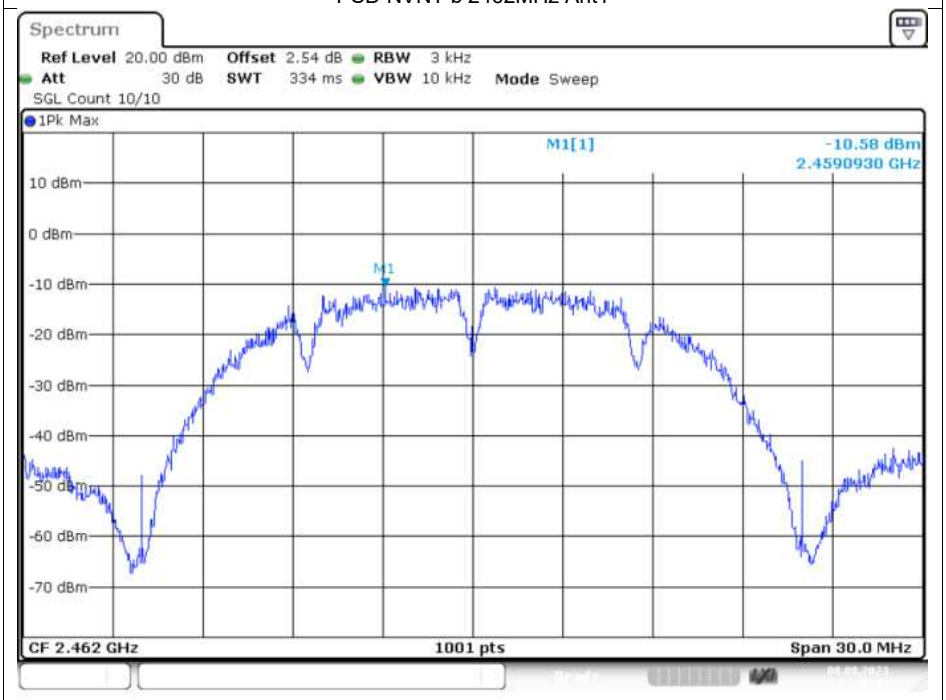
PSD NVNT b 2412MHz Ant1



PSD NVNT b 2437MHz Ant1

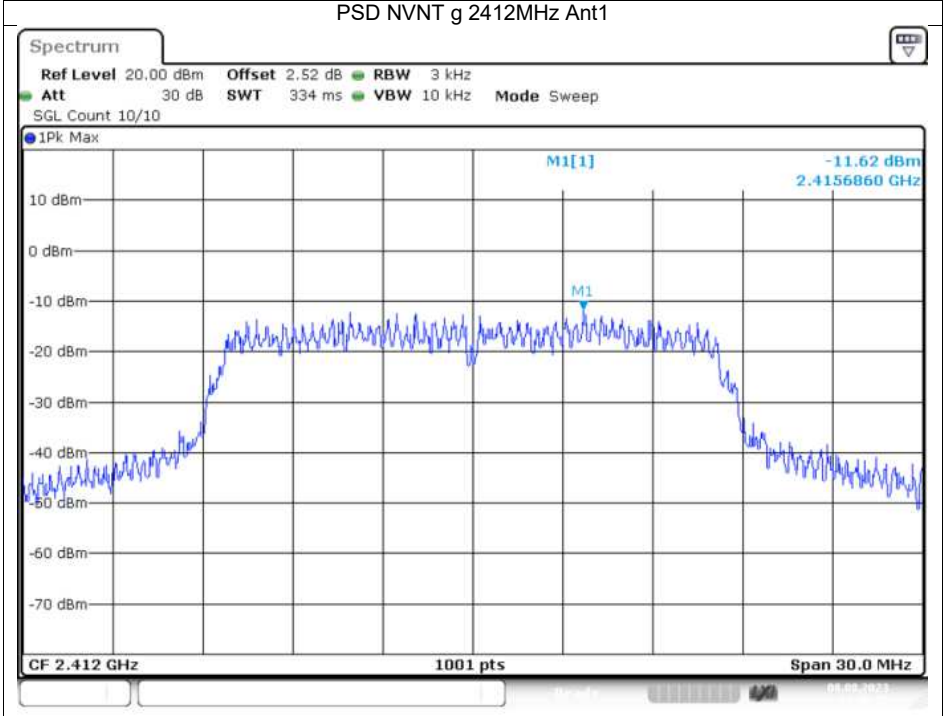


PSD NVNT b 2462MHz Ant1



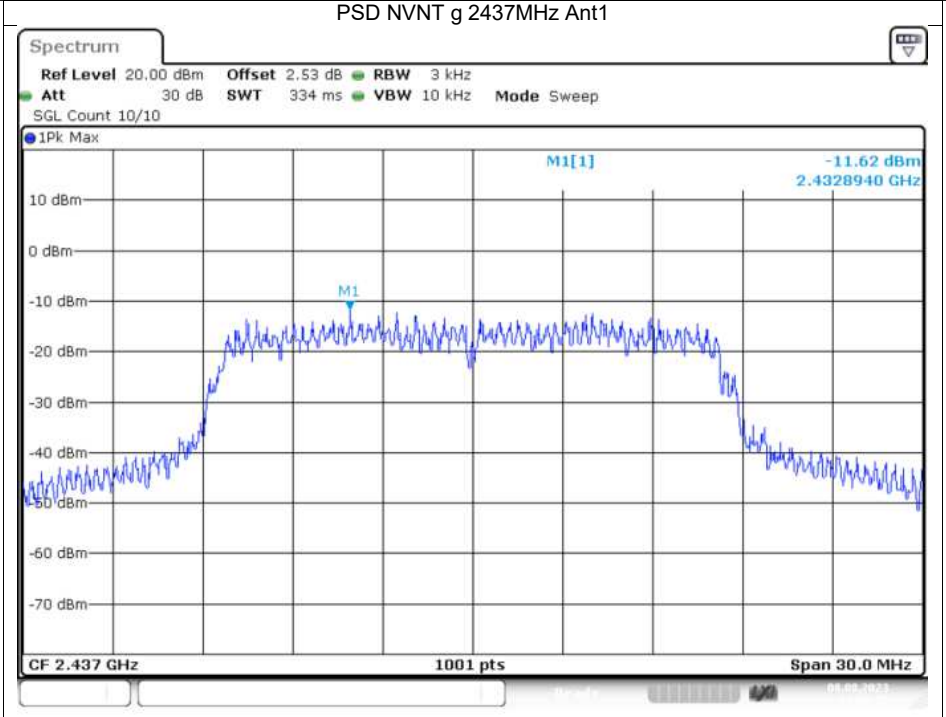
Date: 8.AUG.2023 10:45:44

PSD NVNT g 2412MHz Ant1



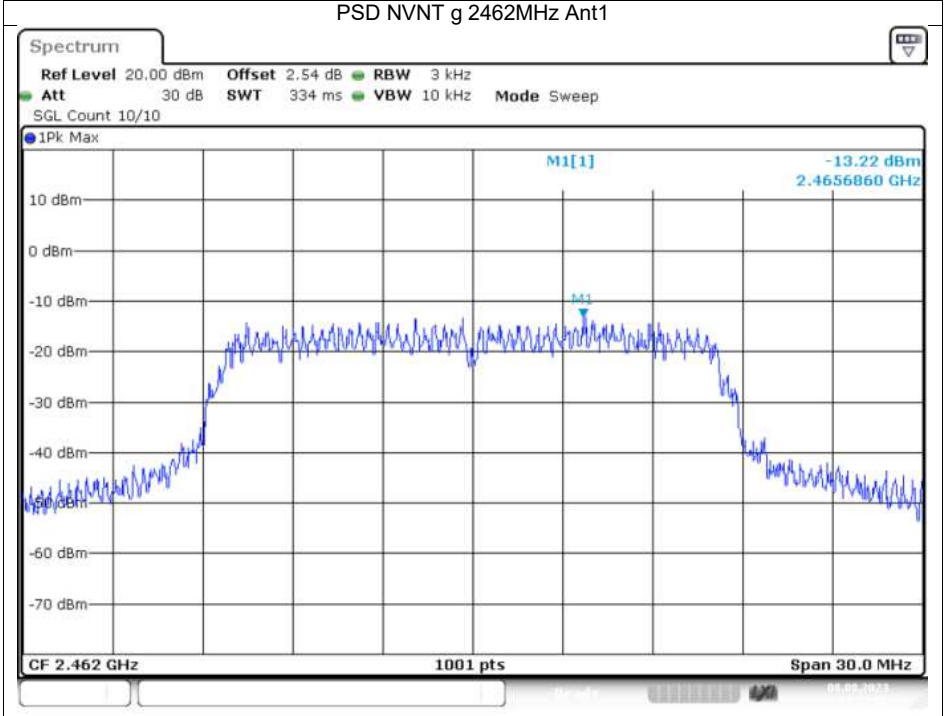
Date: 8.AUG.2023 10:48:26

PSD NVNT g 2437MHz Ant1



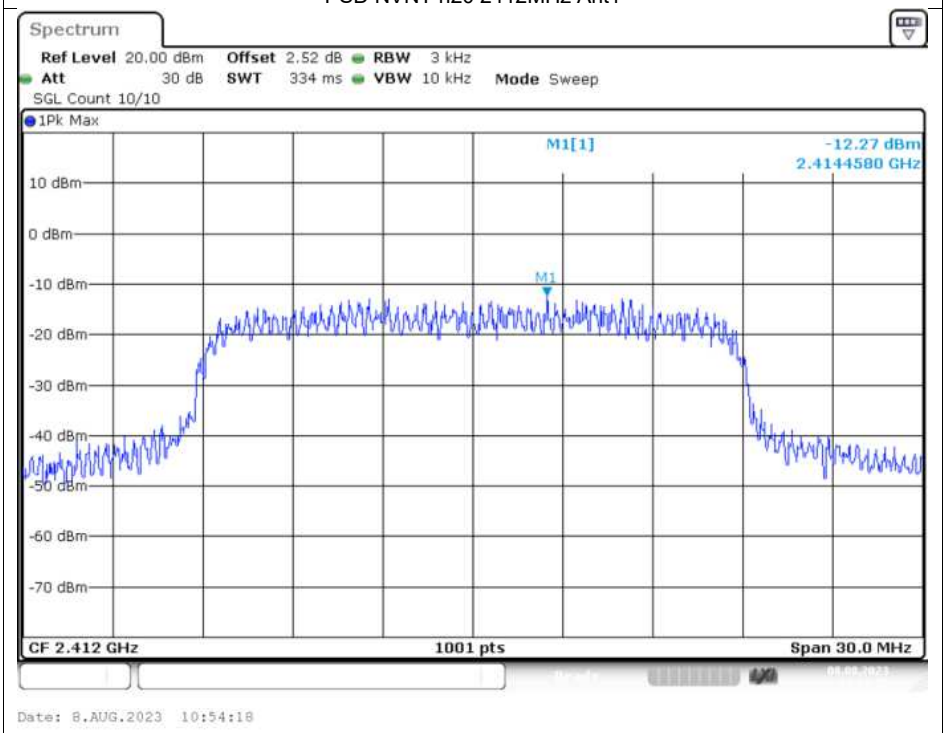
Date: 8.AUG.2023 10:50:15

PSD NVNT g 2462MHz Ant1

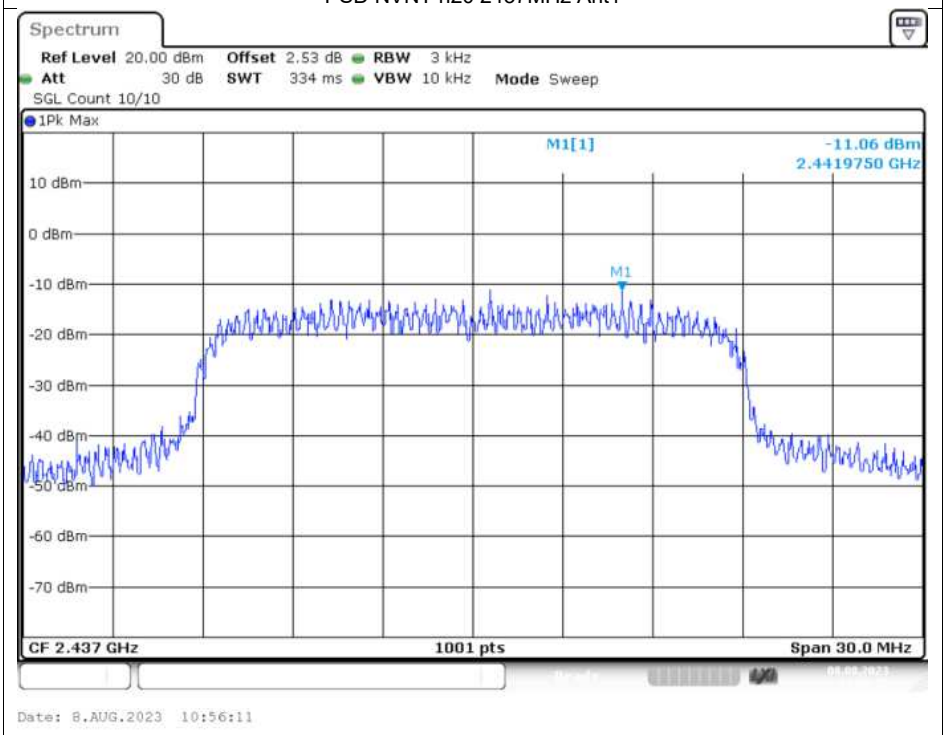


Date: 8.AUG.2023 10:51:56

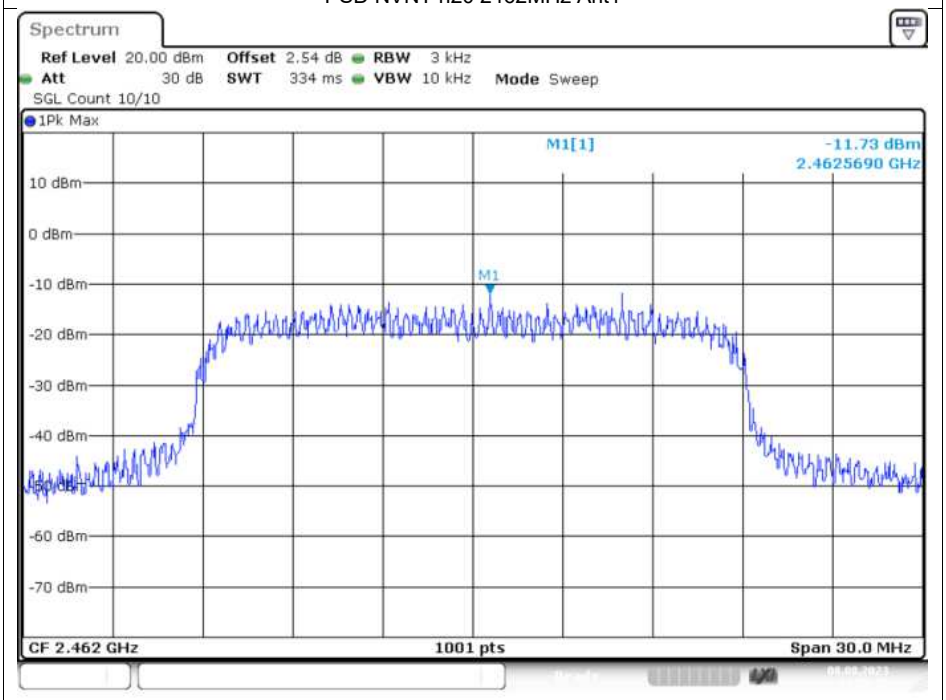
PSD NVNT n20 2412MHz Ant1



PSD NVNT n20 2437MHz Ant1

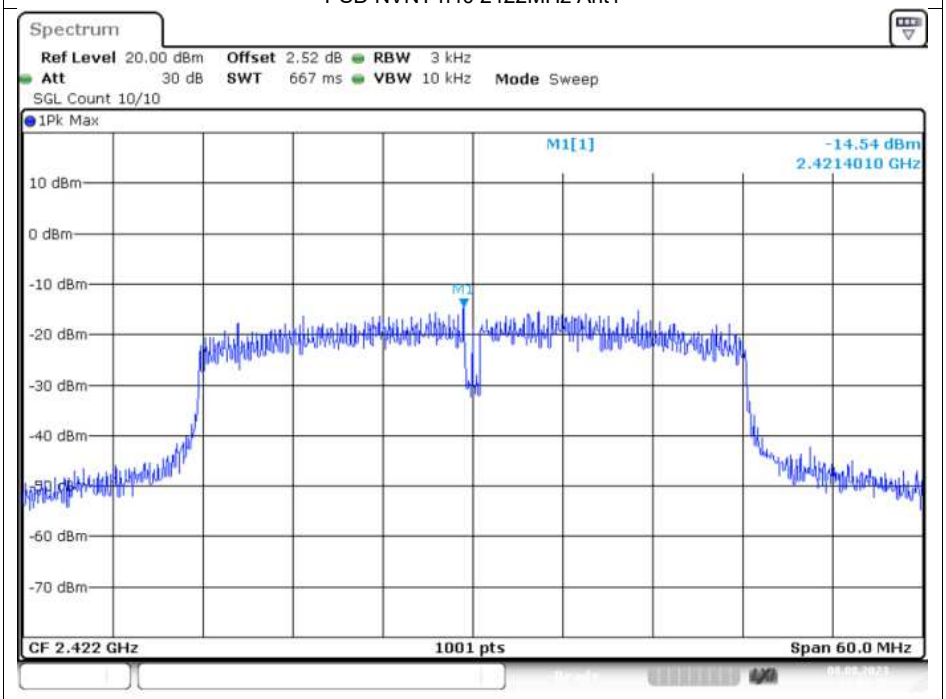


PSD NVNT n20 2462MHz Ant1



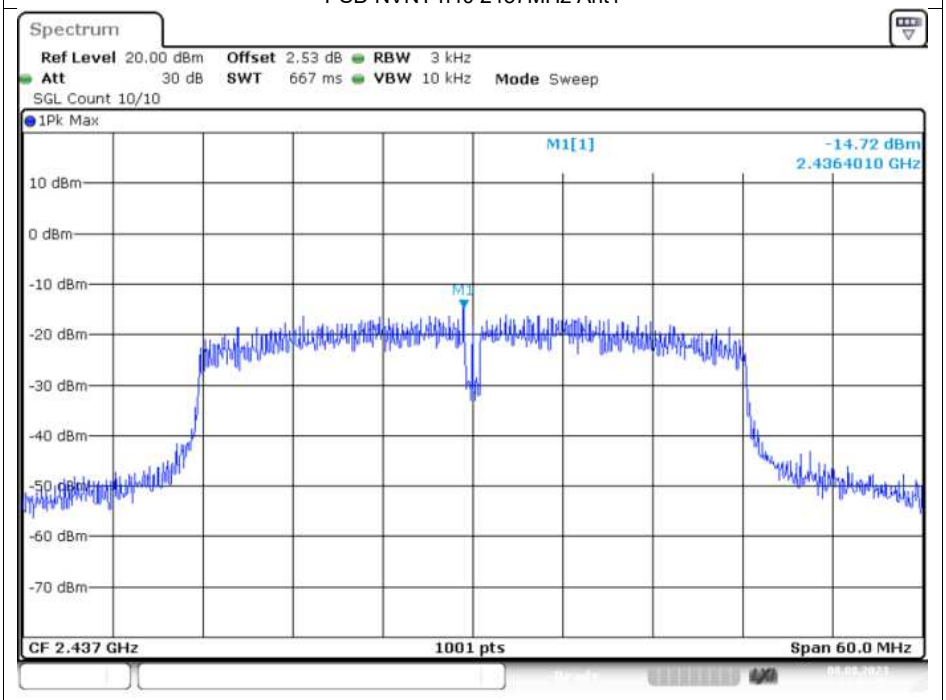
Date: 8.AUG.2023 10:58:50

PSD NVNT n40 2422MHz Ant1



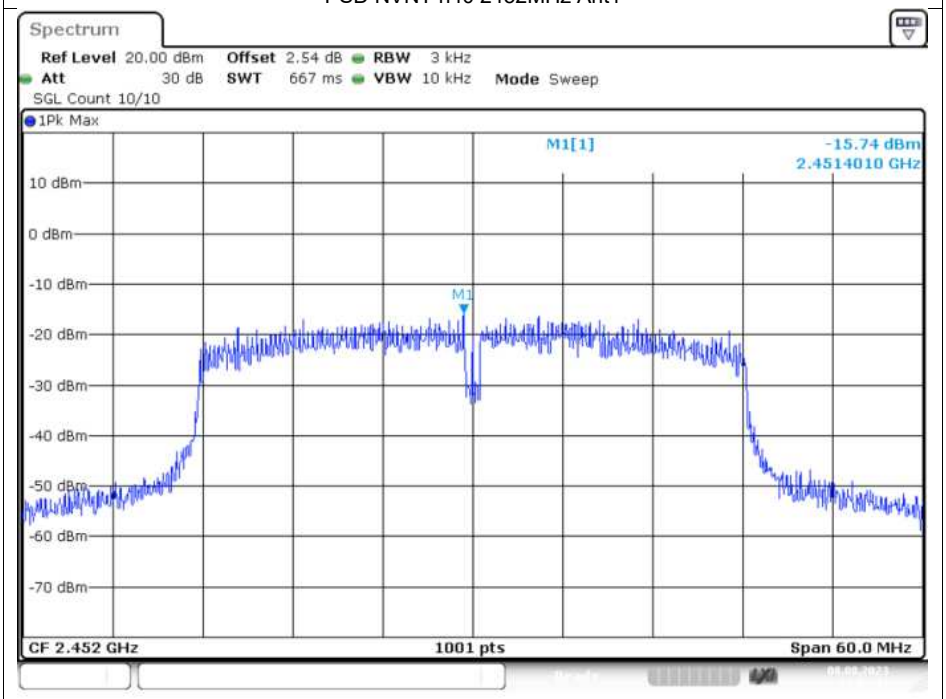
Date: 8.AUG.2023 11:01:12

PSD NVNT n40 2437MHz Ant1



Date: 8.AUG.2023 11:03:06

PSD NVNT n40 2452MHz Ant1



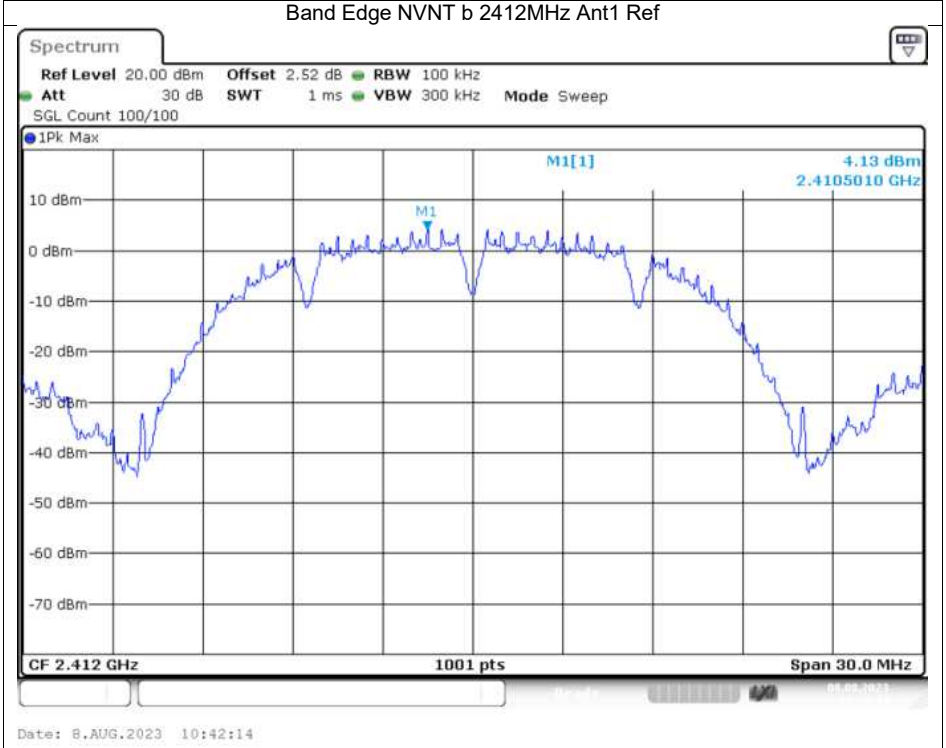
Date: 8.AUG.2023 11:04:43

Band Edge(Conducted Test)

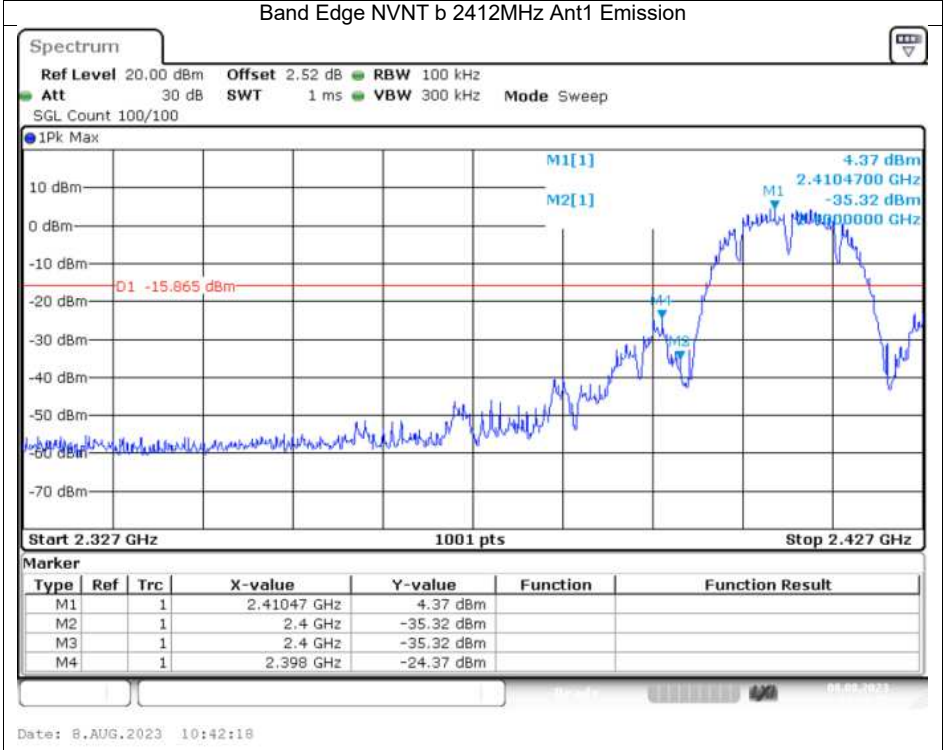
Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	b	2412	Ant1	-28.49	-20	Pass
NVNT	b	2462	Ant1	-54.03	-20	Pass
NVNT	g	2412	Ant1	-28.67	-20	Pass
NVNT	g	2462	Ant1	-42.86	-20	Pass
NVNT	n20	2412	Ant1	-28.22	-20	Pass
NVNT	n20	2462	Ant1	-44.63	-20	Pass
NVNT	n40	2422	Ant1	-29.09	-20	Pass
NVNT	n40	2452	Ant1	-31.74	-20	Pass

Test Graphs

Band Edge NVNT b 2412MHz Ant1 Ref



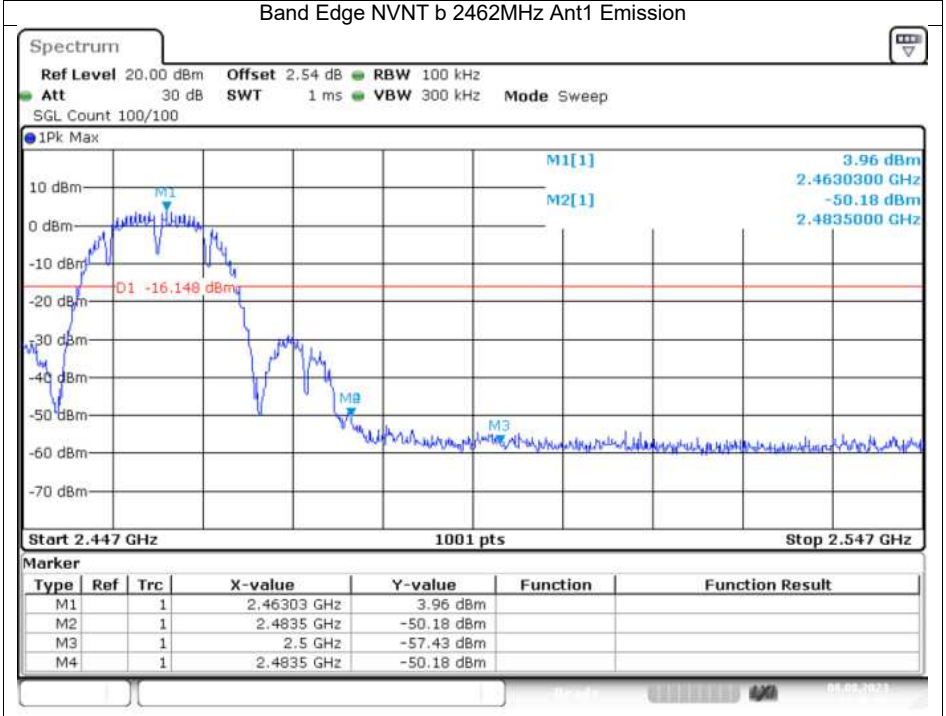
Band Edge NVNT b 2412MHz Ant1 Emission



Band Edge NVNT b 2462MHz Ant1 Ref

Date: 8.AUG.2023 10:46:02

Band Edge NVNT b 2462MHz Ant1 Emission

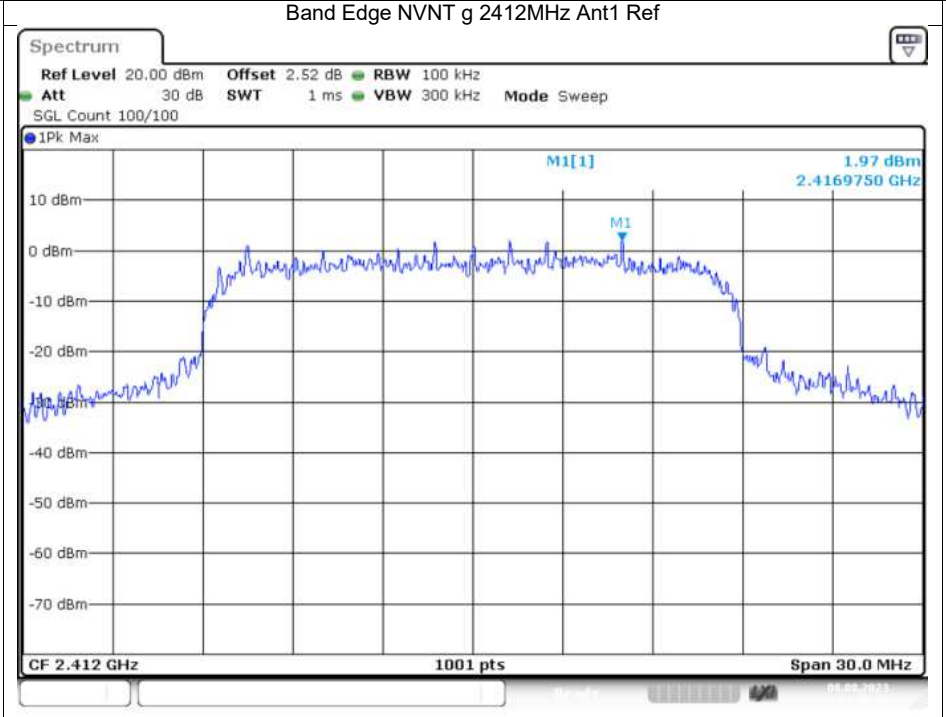


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.46303 GHz	3.96 dBm		
M2		1	2.4835 GHz	-50.18 dBm		
M3		1	2.5 GHz	-57.43 dBm		
M4		1	2.4835 GHz	-50.18 dBm		

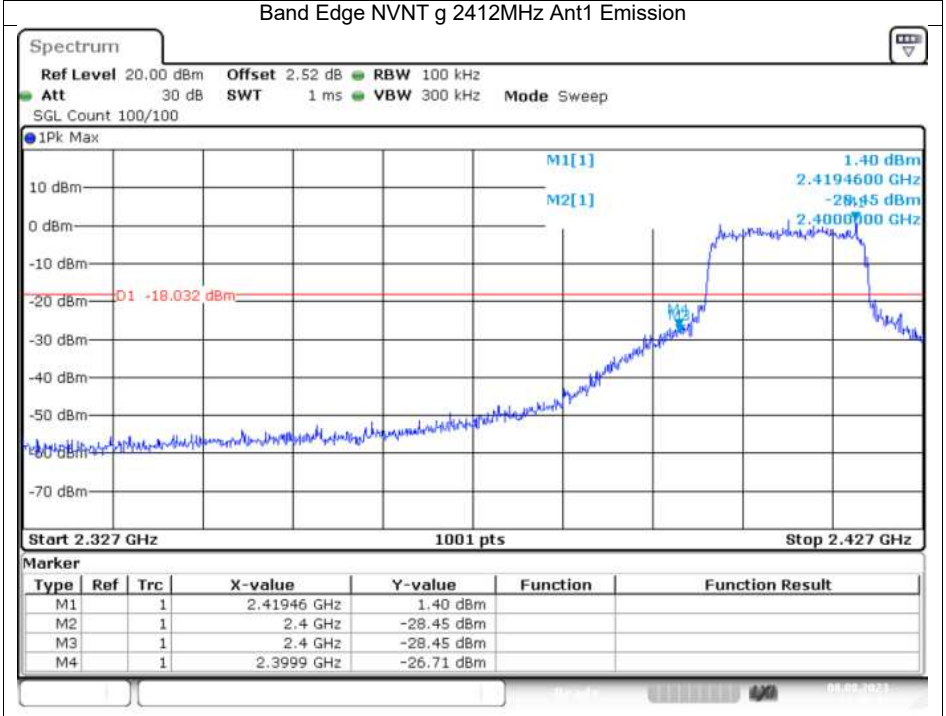
Date: 8.AUG.2023 10:46:05

Band Edge NVNT g 2412MHz Ant1 Ref



Date: 8.AUG.2023 10:48:40

Band Edge NVNT g 2412MHz Ant1 Emission

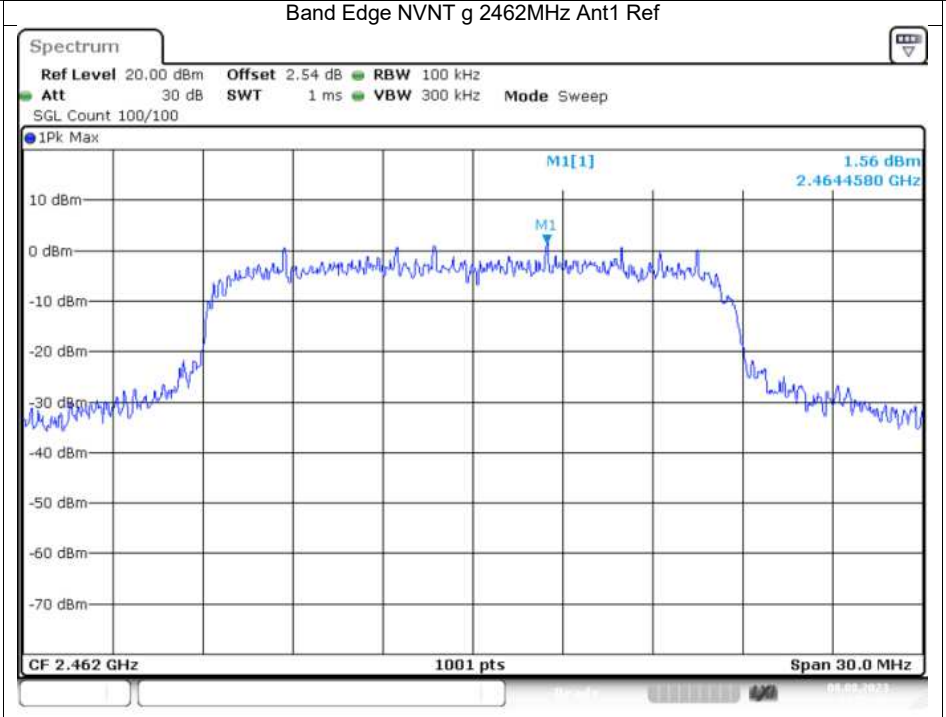


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.41946 GHz	1.40 dBm		
M2		1	2.4 GHz	-28.45 dBm		
M3		1	2.4 GHz	-28.45 dBm		
M4		1	2.3999 GHz	-26.71 dBm		

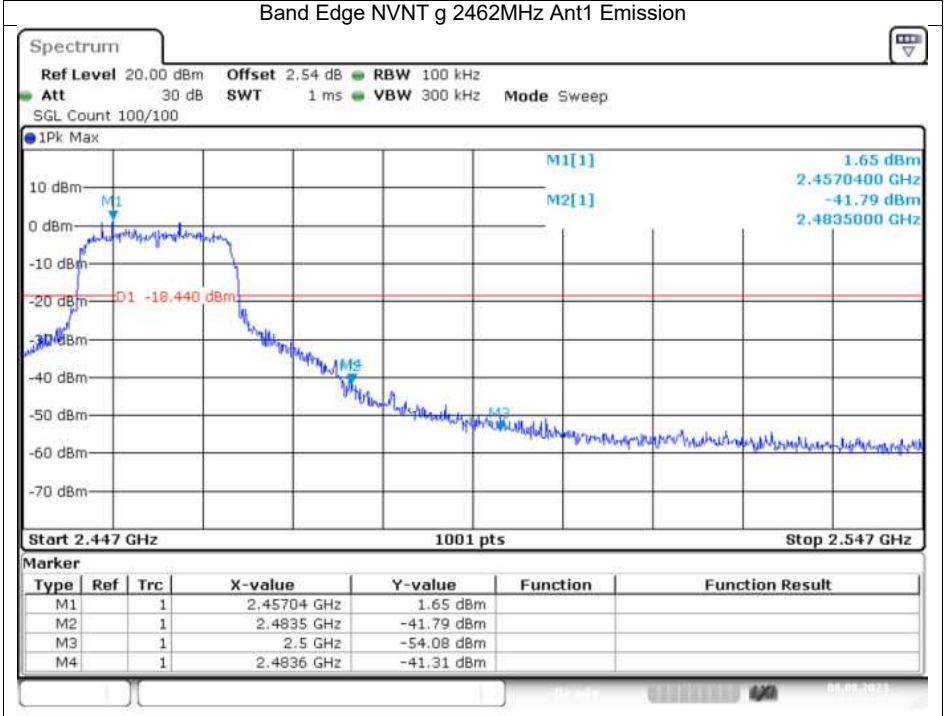
Date: 8.AUG.2023 10:48:43

Band Edge NVNT g 2462MHz Ant1 Ref



Date: 8.AUG.2023 10:52:06

Band Edge NVNT g 2462MHz Ant1 Emission

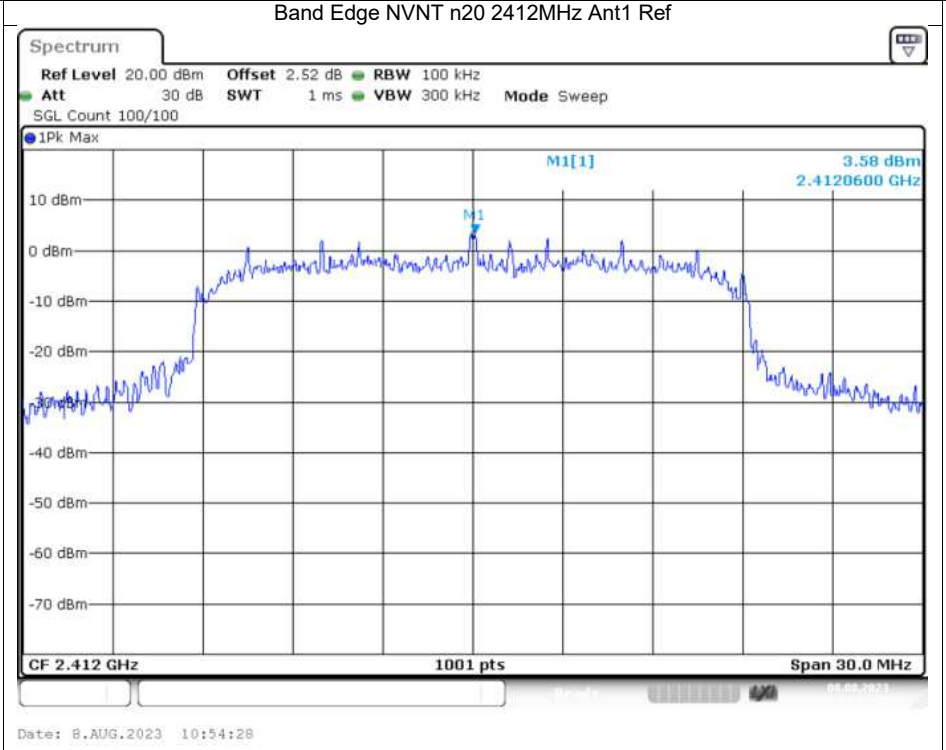


Marker

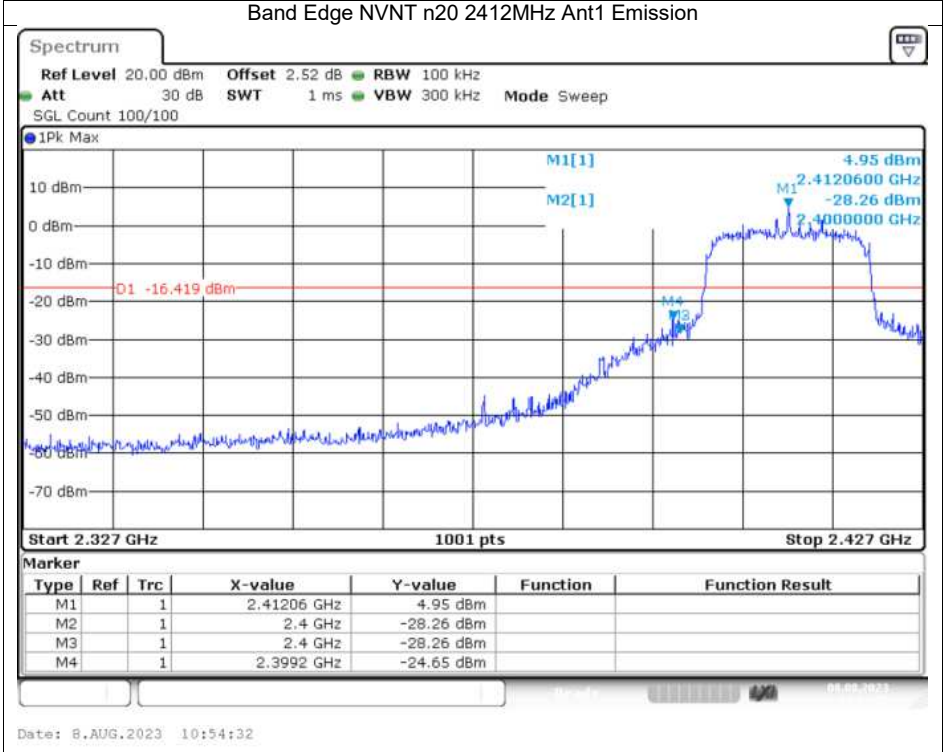
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.45704 GHz	1.65 dBm		
M2		1	2.4835 GHz	-41.79 dBm		
M3		1	2.5 GHz	-54.08 dBm		
M4		1	2.4836 GHz	-41.31 dBm		

Date: 8.AUG.2023 10:52:09

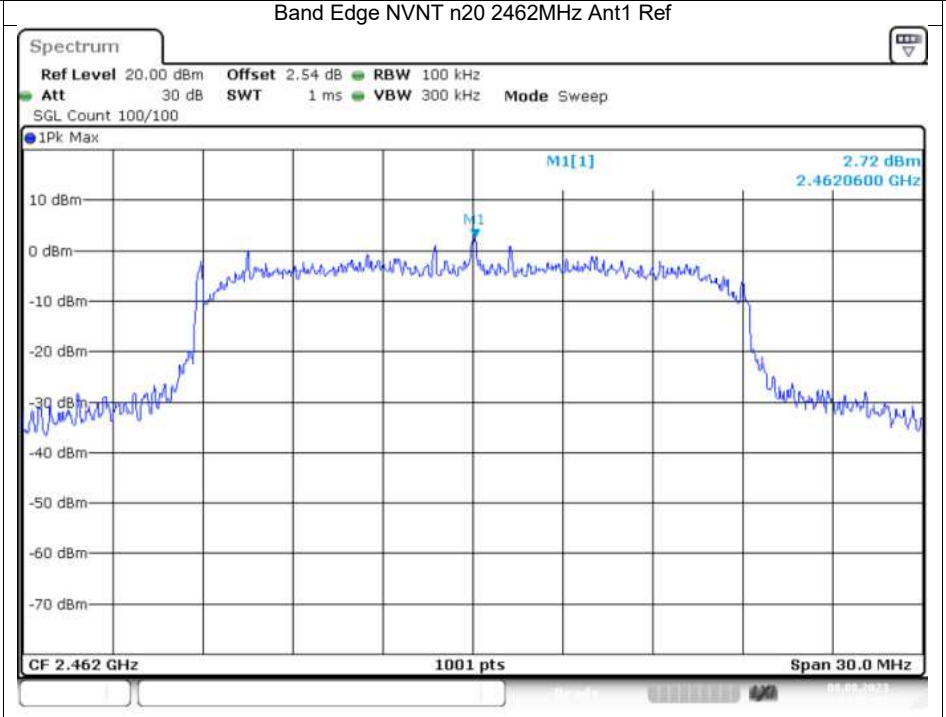
Band Edge NVNT n20 2412MHz Ant1 Ref



Band Edge NVNT n20 2412MHz Ant1 Emission

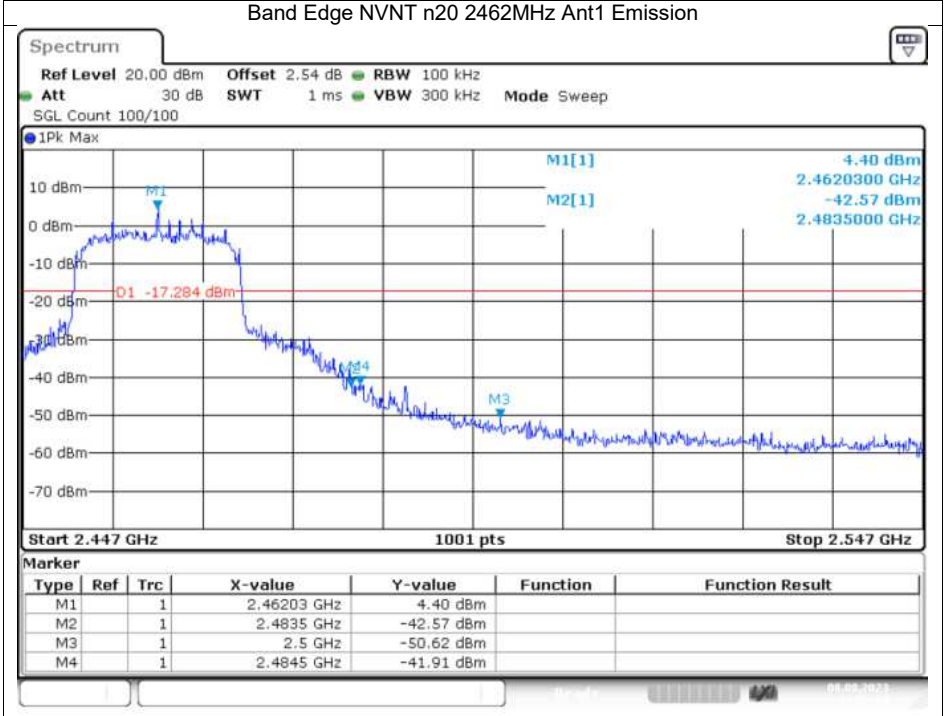


Band Edge NVNT n20 2462MHz Ant1 Ref



Date: 8.AUG.2023 10:59:01

Band Edge NVNT n20 2462MHz Ant1 Emission

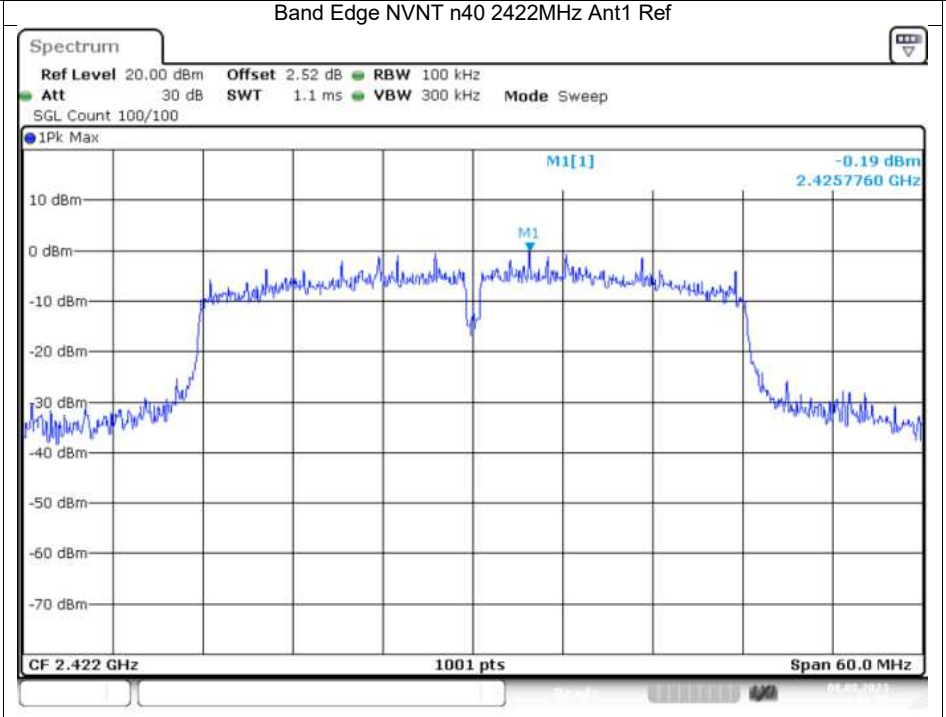


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.46203 GHz	4.40 dBm		
M2		1	2.4835 GHz	-42.57 dBm		
M3		1	2.5 GHz	-50.62 dBm		
M4		1	2.4845 GHz	-41.91 dBm		

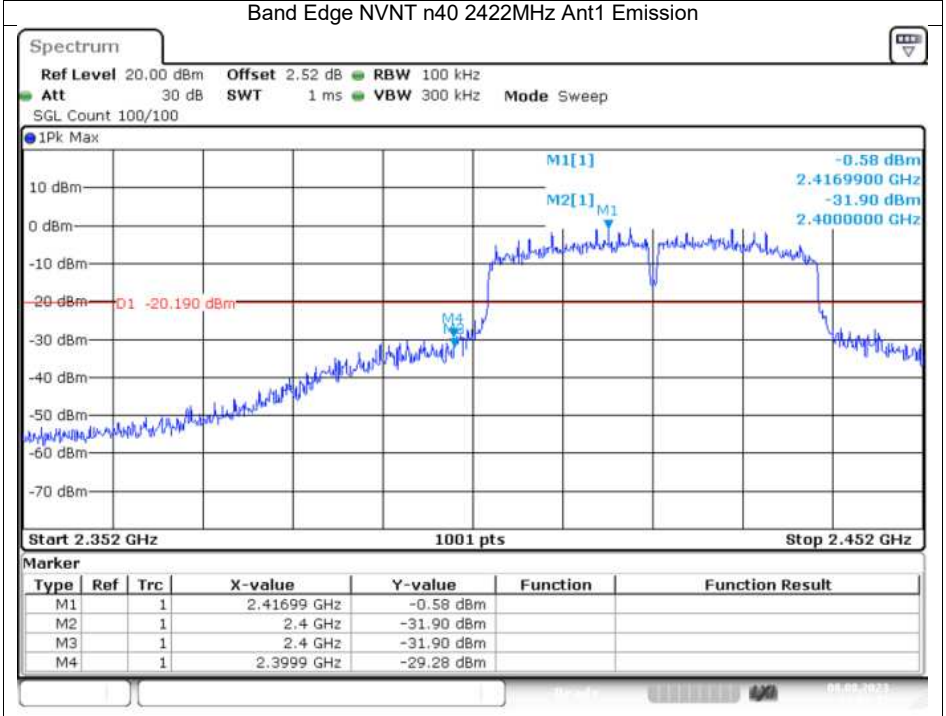
Date: 8.AUG.2023 10:59:04

Band Edge NVNT n40 2422MHz Ant1 Ref



Date: 8.AUG.2023 11:01:28

Band Edge NVNT n40 2422MHz Ant1 Emission

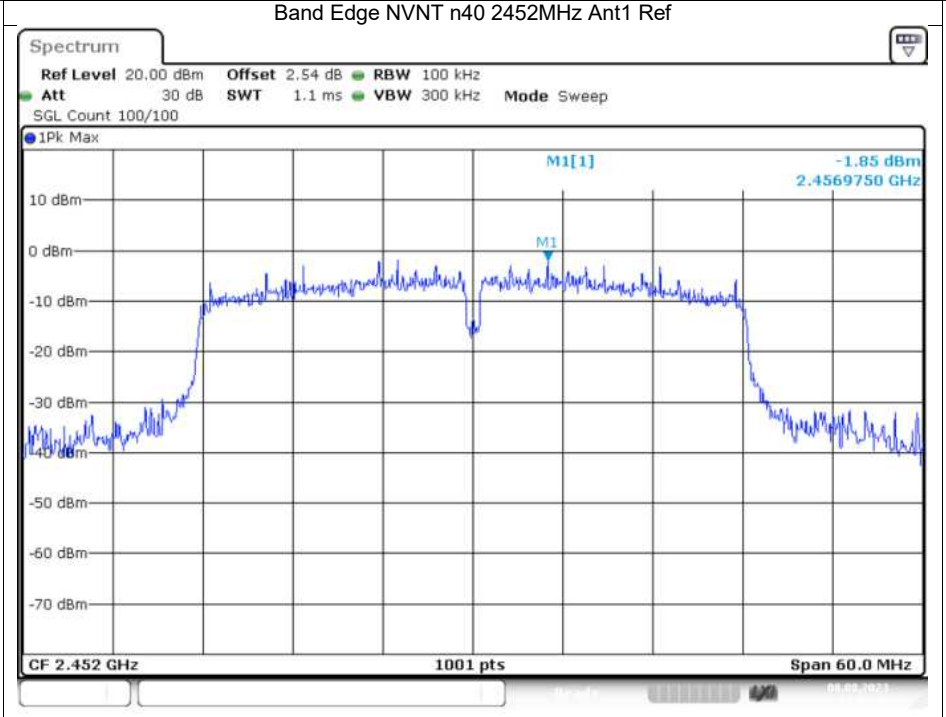


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.41699 GHz	-0.58 dBm		
M2		1	2.4 GHz	-31.90 dBm		
M3		1	2.4 GHz	-31.90 dBm		
M4		1	2.3999 GHz	-29.28 dBm		

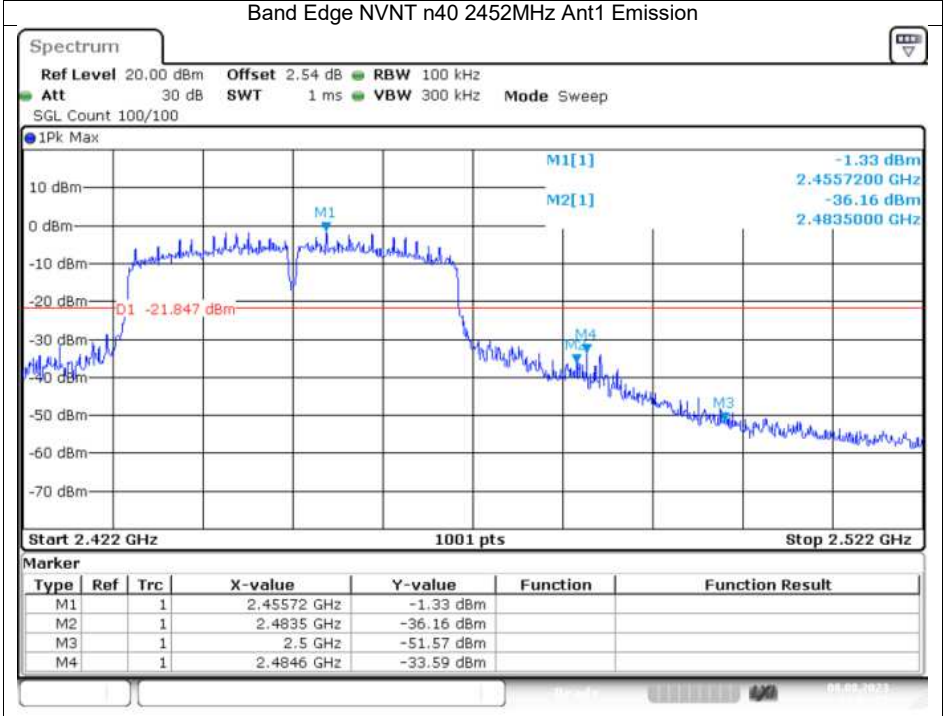
Date: 8.AUG.2023 11:01:31

Band Edge NVNT n40 2452MHz Ant1 Ref



Date: 8.AUG.2023 11:04:48

Band Edge NVNT n40 2452MHz Ant1 Emission



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.45572 GHz	-1.33 dBm		
M2		1	2.4835 GHz	-36.16 dBm		
M3		1	2.5 GHz	-51.57 dBm		
M4		1	2.4846 GHz	-33.59 dBm		

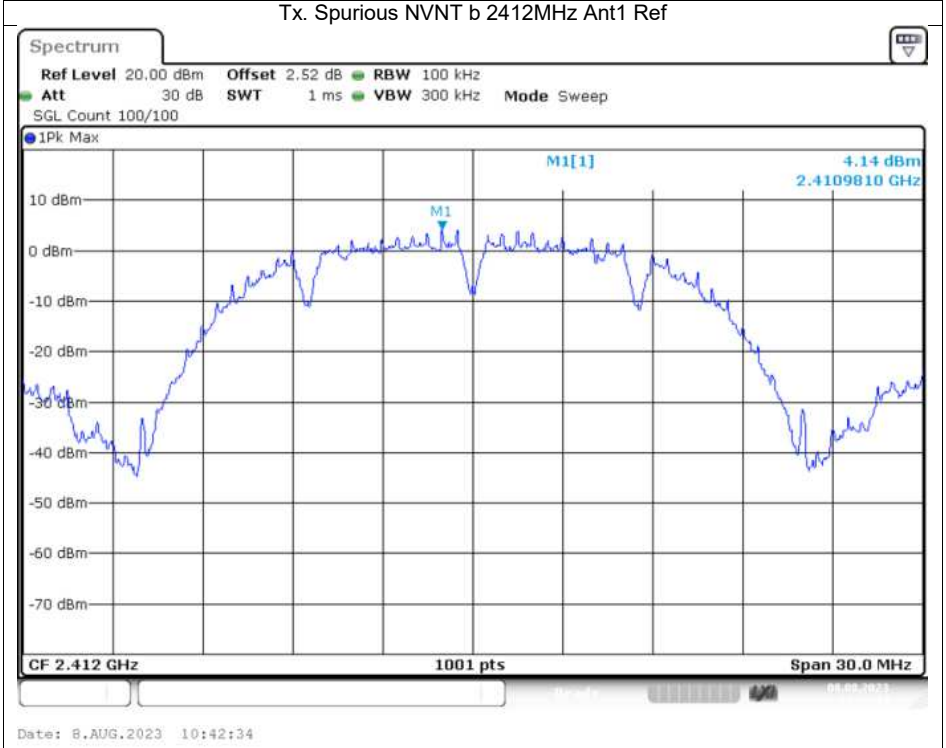
Date: 8.AUG.2023 11:04:51

Conducted RF Spurious Emission

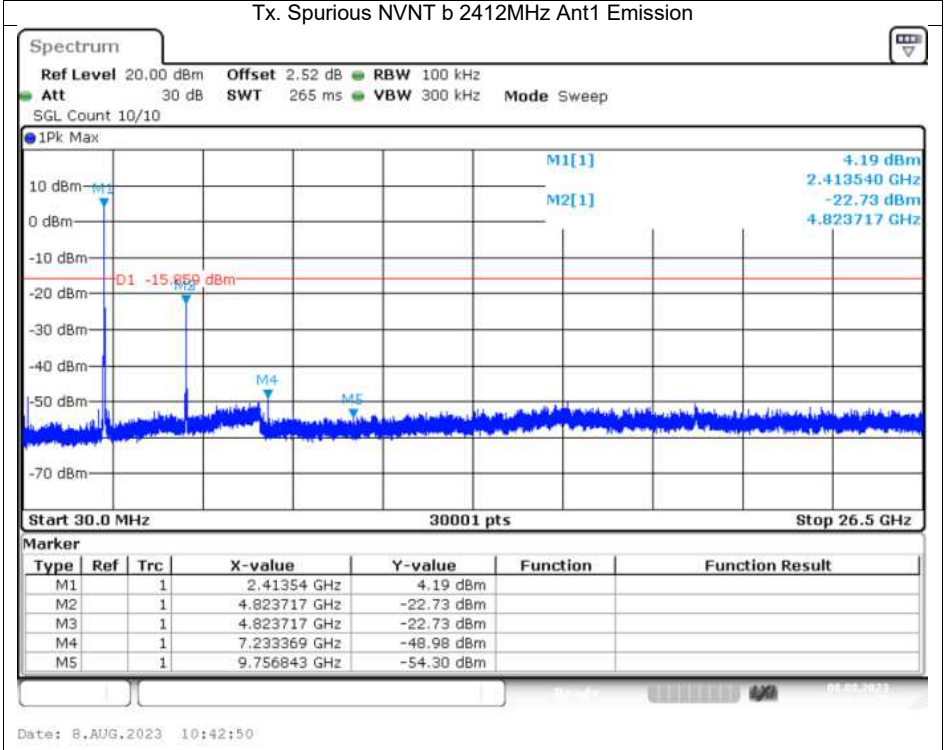
Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	b	2412	Ant1	-26.86	-20	Pass
NVNT	b	2437	Ant1	-31.76	-20	Pass
NVNT	b	2462	Ant1	-37.44	-20	Pass
NVNT	g	2412	Ant1	-37.9	-20	Pass
NVNT	g	2437	Ant1	-38.12	-20	Pass
NVNT	g	2462	Ant1	-40.84	-20	Pass
NVNT	n20	2412	Ant1	-41.23	-20	Pass
NVNT	n20	2437	Ant1	-39.6	-20	Pass
NVNT	n20	2462	Ant1	-41.47	-20	Pass
NVNT	n40	2422	Ant1	-40.84	-20	Pass
NVNT	n40	2437	Ant1	-42.28	-20	Pass
NVNT	n40	2452	Ant1	-44.46	-20	Pass

Test Graphs

Tx. Spurious NVNT b 2412MHz Ant1 Ref



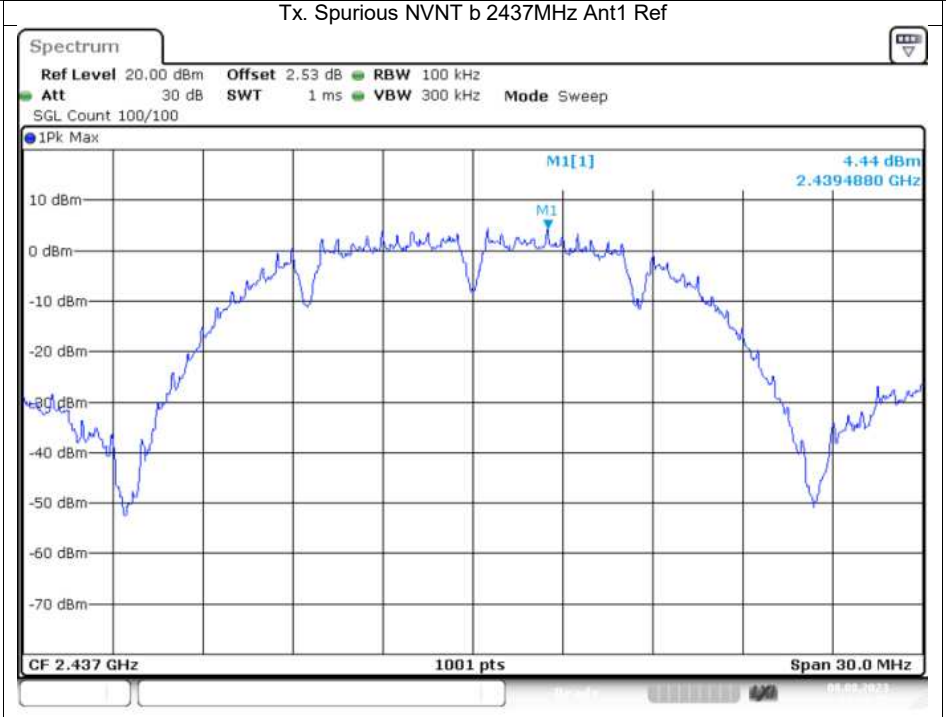
Tx. Spurious NVNT b 2412MHz Ant1 Emission



Marker

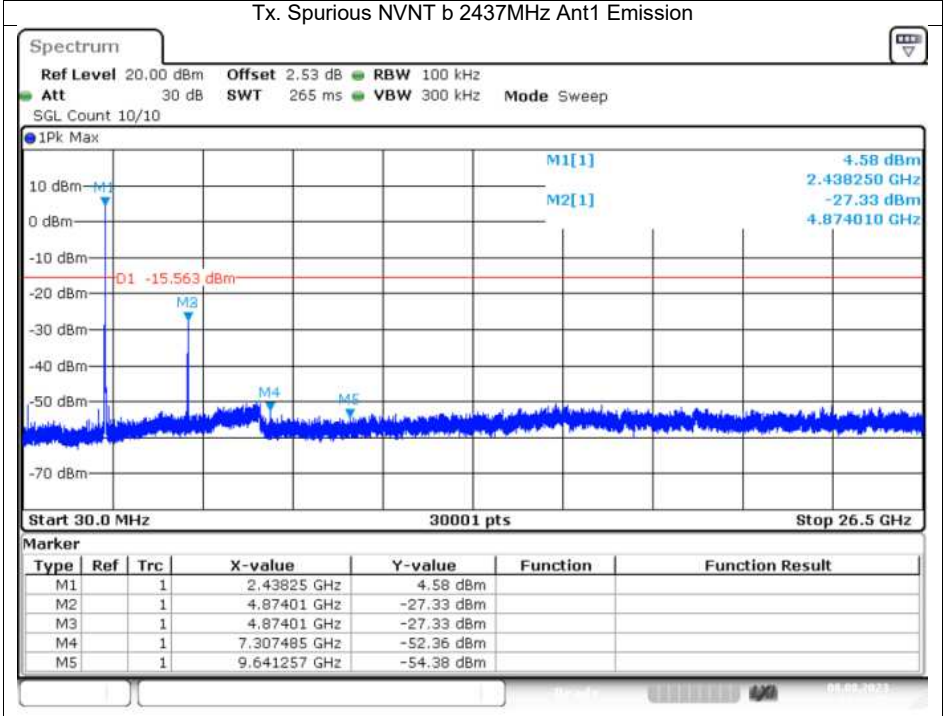
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.41354 GHz	4.19 dBm		
M2		1	4.823717 GHz	-22.73 dBm		
M3		1	4.823717 GHz	-22.73 dBm		
M4		1	7.233369 GHz	-48.98 dBm		
M5		1	9.756843 GHz	-54.30 dBm		

Tx. Spurious NVNT b 2437MHz Ant1 Ref



Date: 8.AUG.2023 10:44:19

Tx. Spurious NVNT b 2437MHz Ant1 Emission

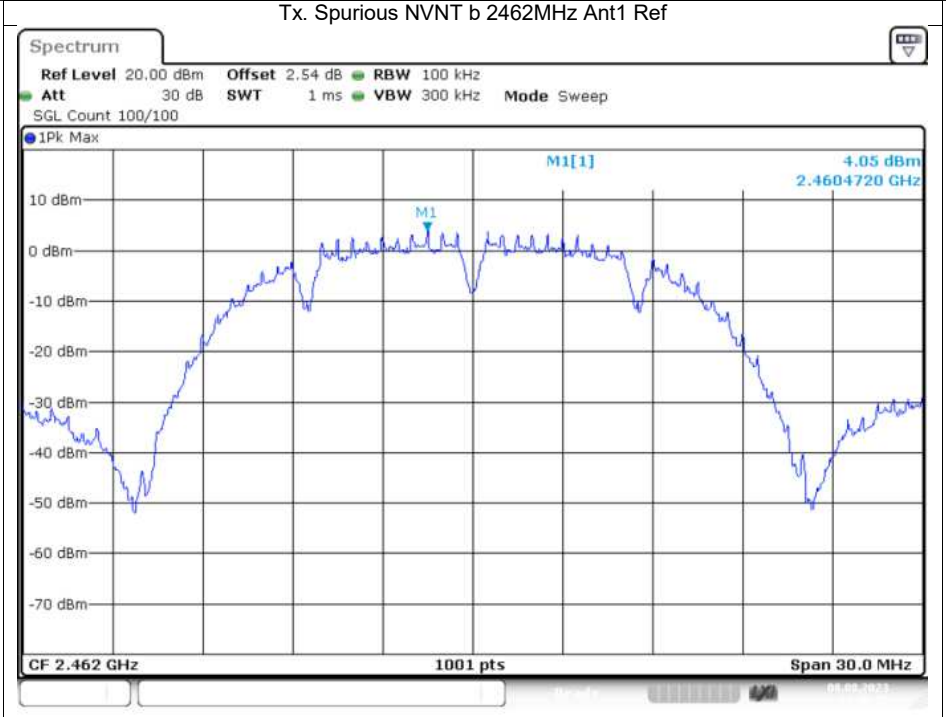


Marker

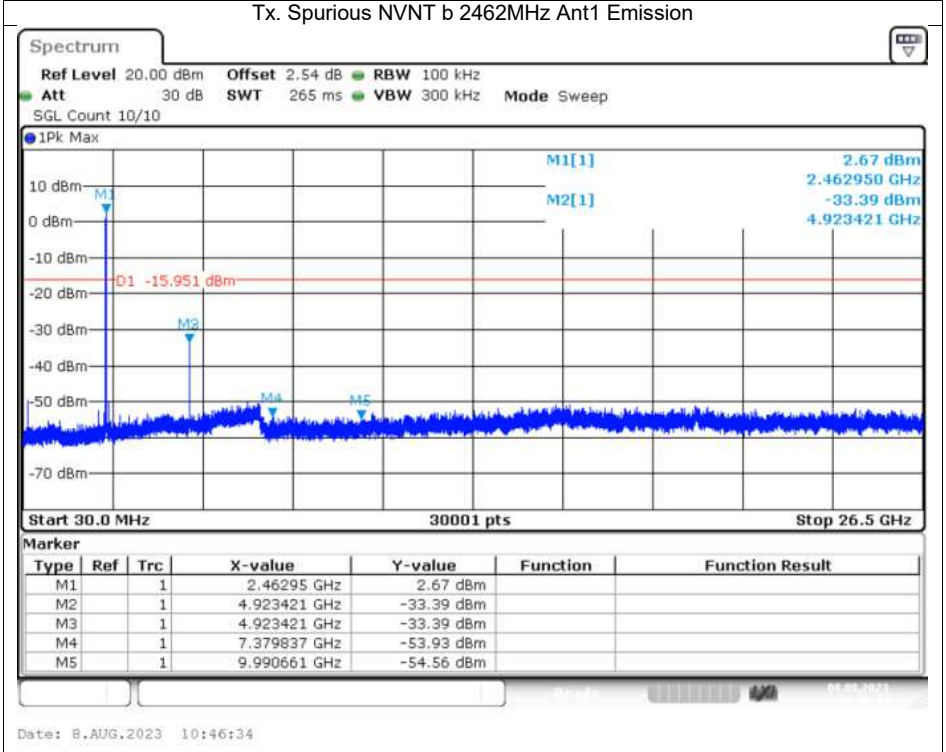
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.43825 GHz	4.58 dBm		
M2		1	4.87401 GHz	-27.33 dBm		
M3		1	4.87401 GHz	-27.33 dBm		
M4		1	7.307485 GHz	-52.36 dBm		
M5		1	9.641257 GHz	-54.38 dBm		

Date: 8.AUG.2023 10:44:35

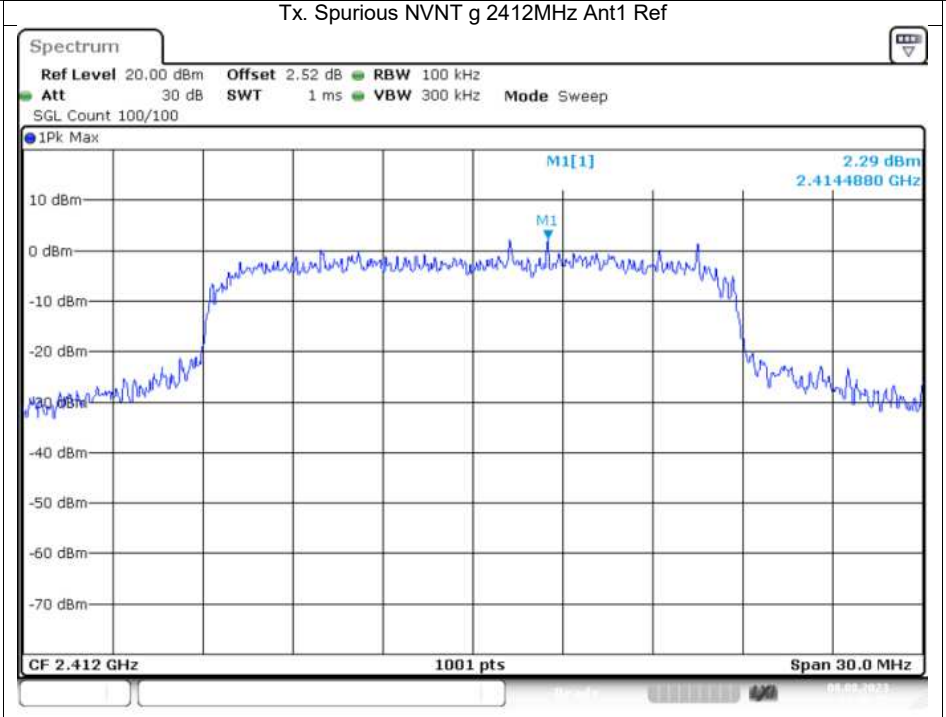
Tx. Spurious NVNT b 2462MHz Ant1 Ref



Tx. Spurious NVNT b 2462MHz Ant1 Emission

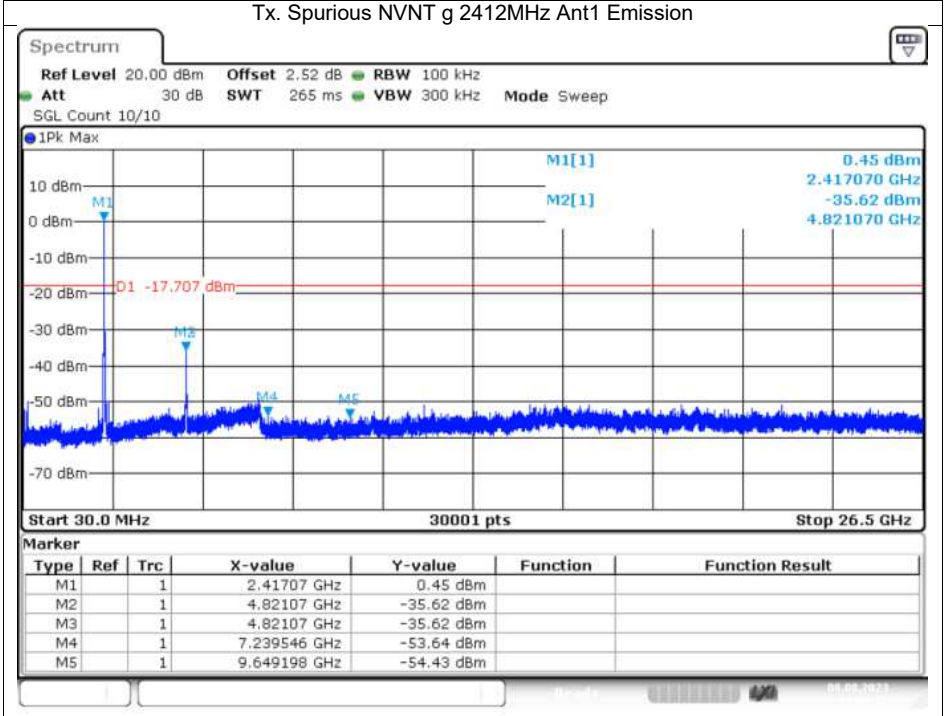


Tx. Spurious NVNT g 2412MHz Ant1 Ref



Date: 8.AUG.2023 10:48:59

Tx. Spurious NVNT g 2412MHz Ant1 Emission

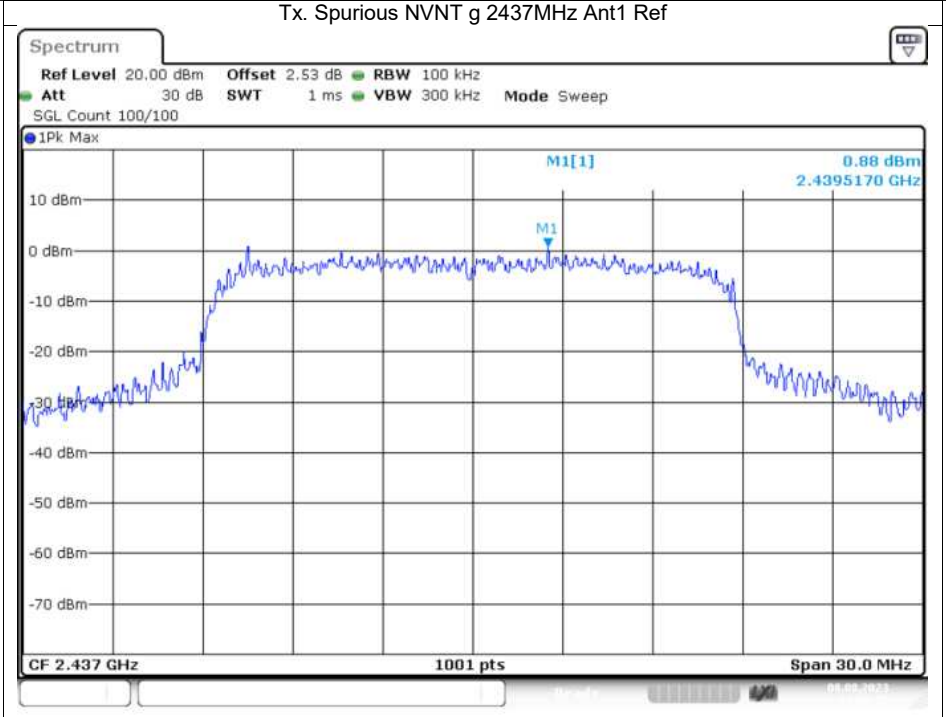


Marker

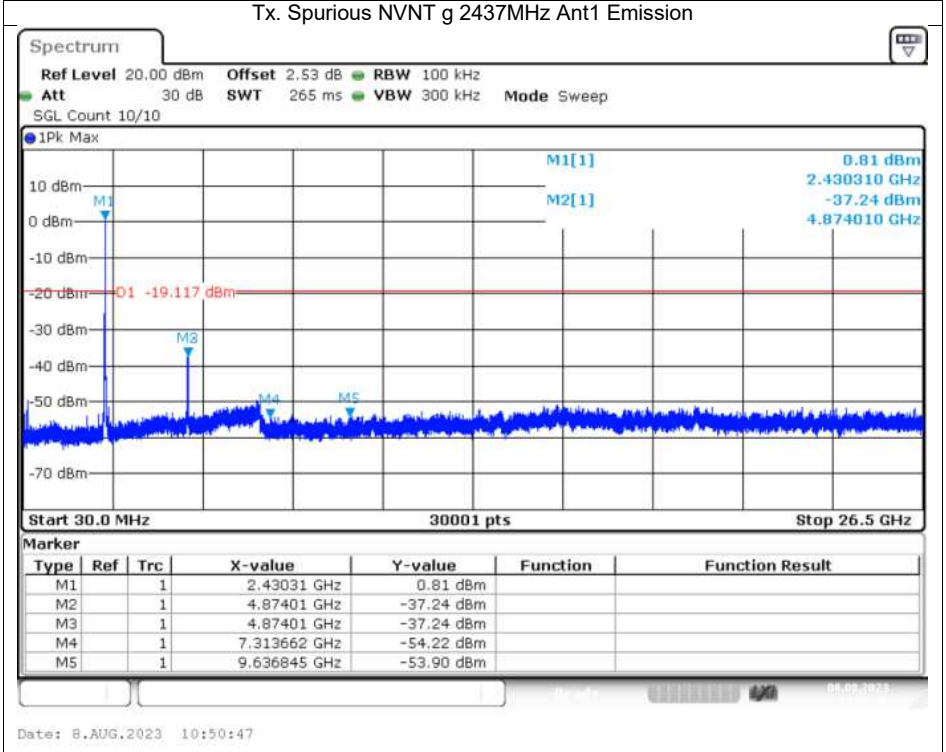
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.41707 GHz	0.45 dBm		
M2		1	4.82107 GHz	-35.62 dBm		
M3		1	4.82107 GHz	-35.62 dBm		
M4		1	7.239546 GHz	-53.64 dBm		
M5		1	9.649198 GHz	-54.43 dBm		

Date: 8.AUG.2023 10:49:14

Tx. Spurious NVNT g 2437MHz Ant1 Ref



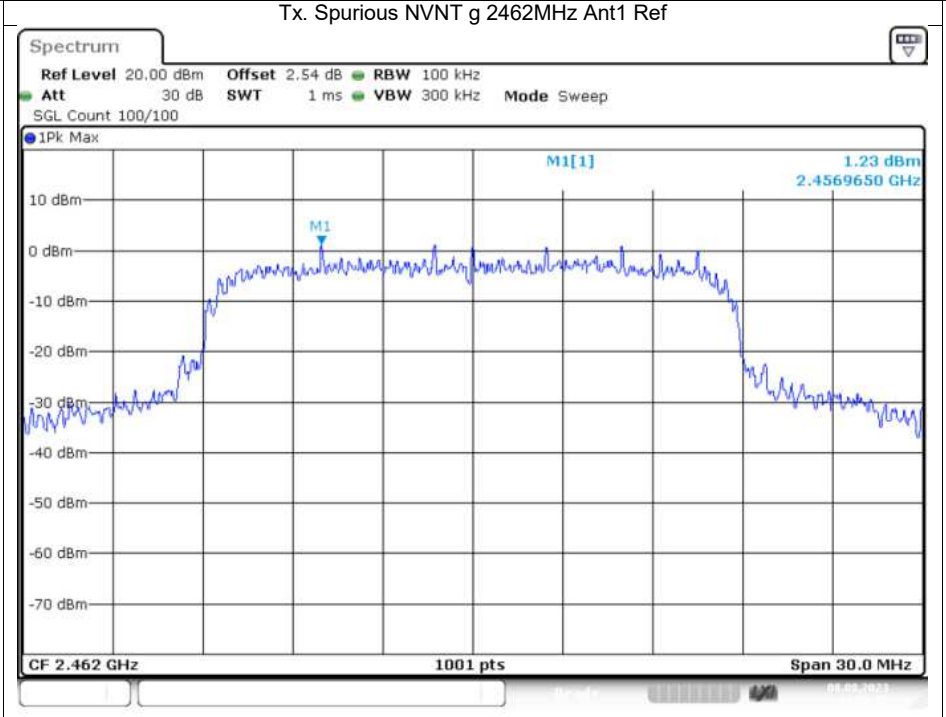
Tx. Spurious NVNT g 2437MHz Ant1 Emission



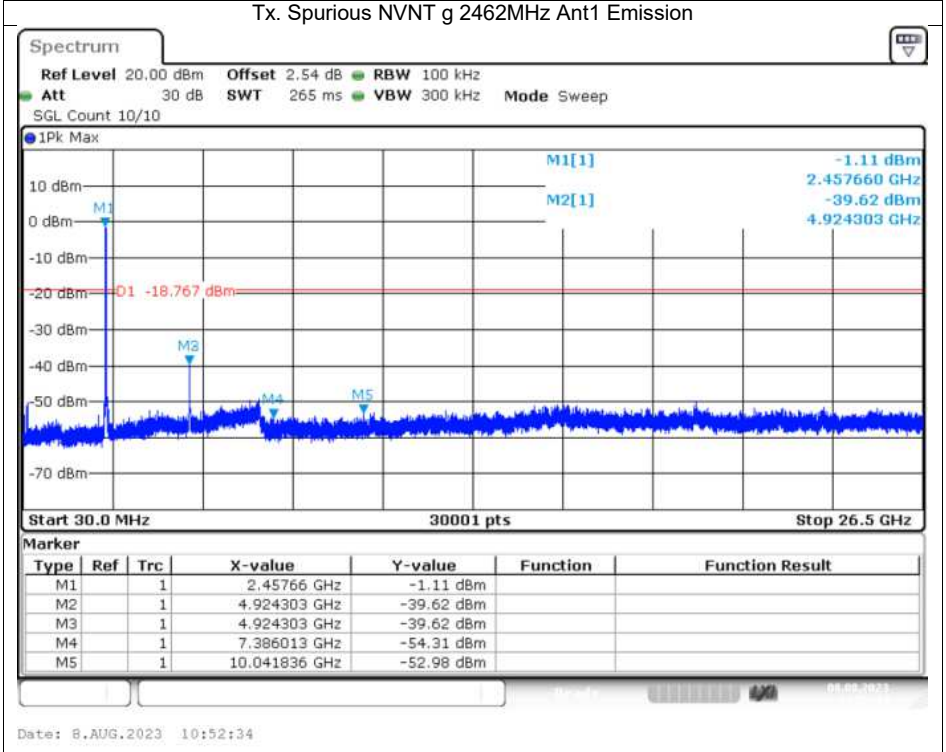
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.43031 GHz	0.81 dBm		
M2		1	4.87401 GHz	-37.24 dBm		
M3		1	4.87401 GHz	-37.24 dBm		
M4		1	7.313662 GHz	-54.22 dBm		
M5		1	9.636845 GHz	-53.90 dBm		

Tx. Spurious NVNT g 2462MHz Ant1 Ref



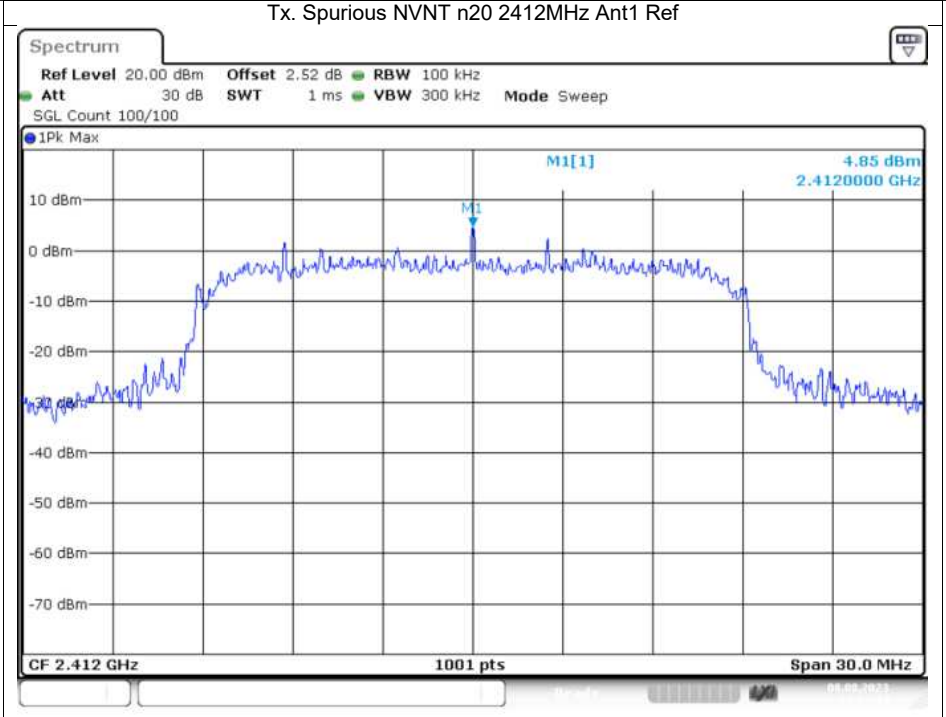
Tx. Spurious NVNT g 2462MHz Ant1 Emission



Marker

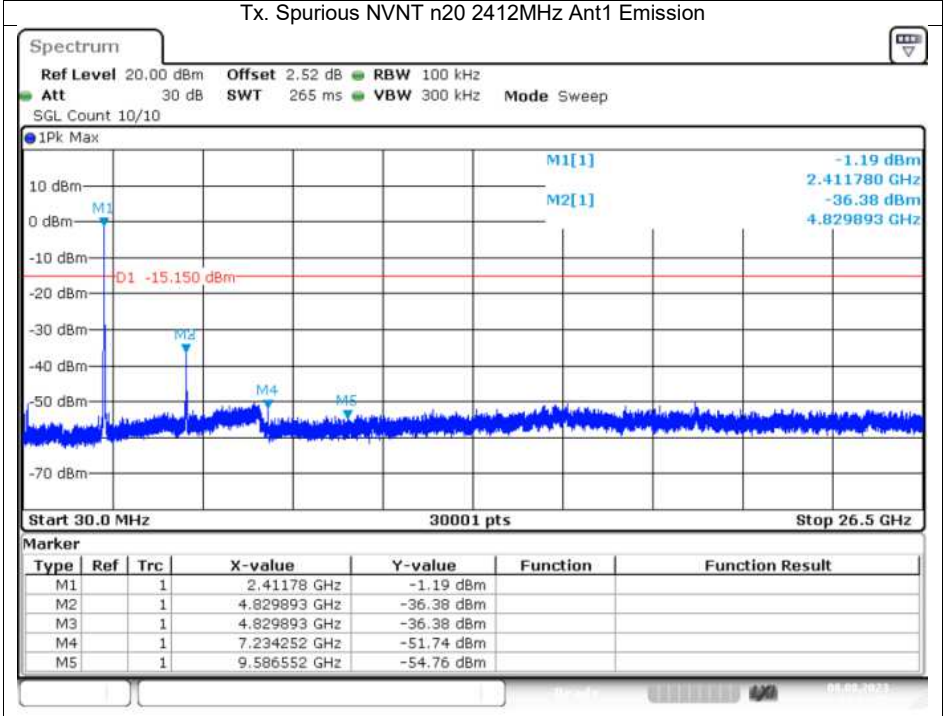
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.45766 GHz	-1.11 dBm		
M2		1	4.924303 GHz	-39.62 dBm		
M3		1	4.924303 GHz	-39.62 dBm		
M4		1	7.386013 GHz	-54.31 dBm		
M5		1	10.041836 GHz	-52.98 dBm		

Tx. Spurious NVNT n20 2412MHz Ant1 Ref



Date: 8.AUG.2023 10:54:43

Tx. Spurious NVNT n20 2412MHz Ant1 Emission

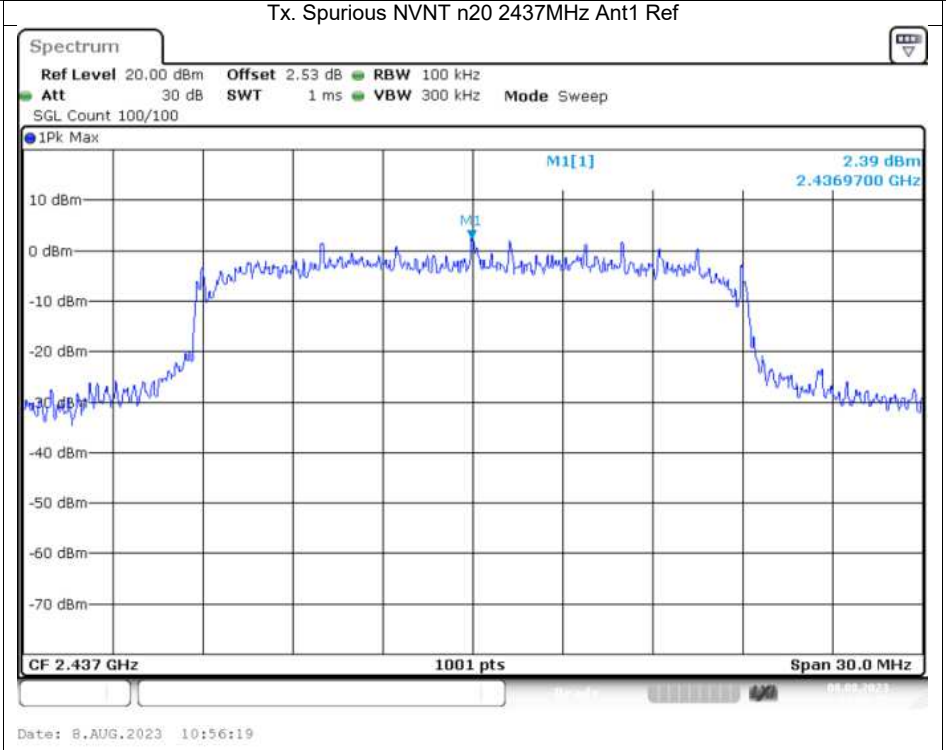


Marker

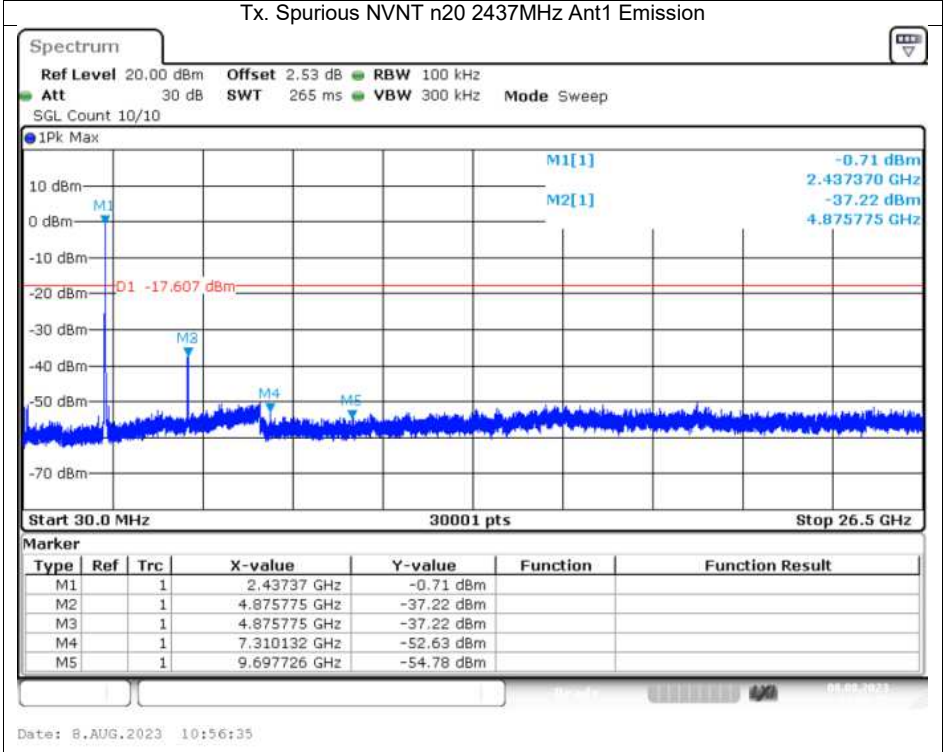
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.41178 GHz	-1.19 dBm		
M2		1	4.829893 GHz	-36.38 dBm		
M3		1	4.829893 GHz	-36.38 dBm		
M4		1	7.234252 GHz	-51.74 dBm		
M5		1	9.586552 GHz	-54.76 dBm		

Date: 8.AUG.2023 10:54:59

Tx. Spurious NVNT n20 2437MHz Ant1 Ref



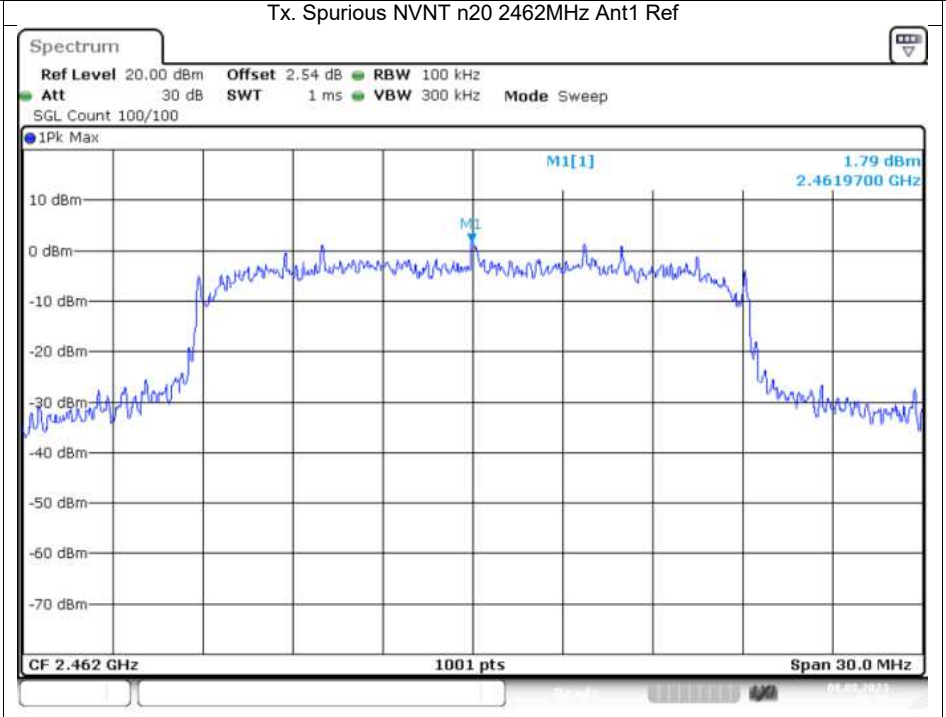
Tx. Spurious NVNT n20 2437MHz Ant1 Emission



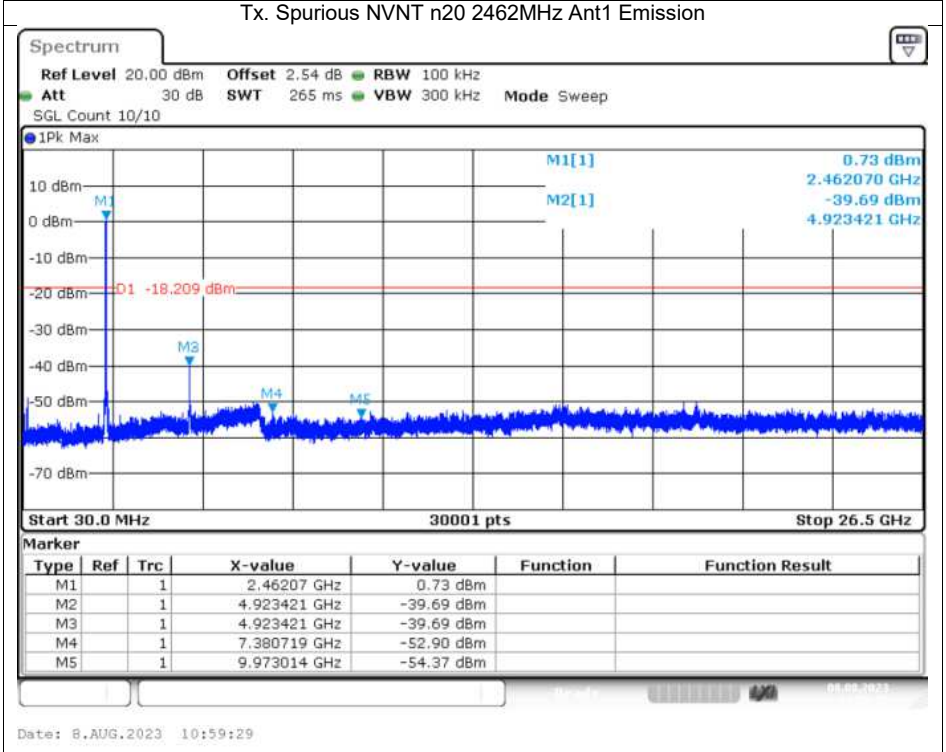
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.43737 GHz	-0.71 dBm		
M2		1	4.875775 GHz	-37.22 dBm		
M3		1	4.875775 GHz	-37.22 dBm		
M4		1	7.310132 GHz	-52.63 dBm		
M5		1	9.697726 GHz	-54.78 dBm		

Tx. Spurious NVNT n20 2462MHz Ant1 Ref



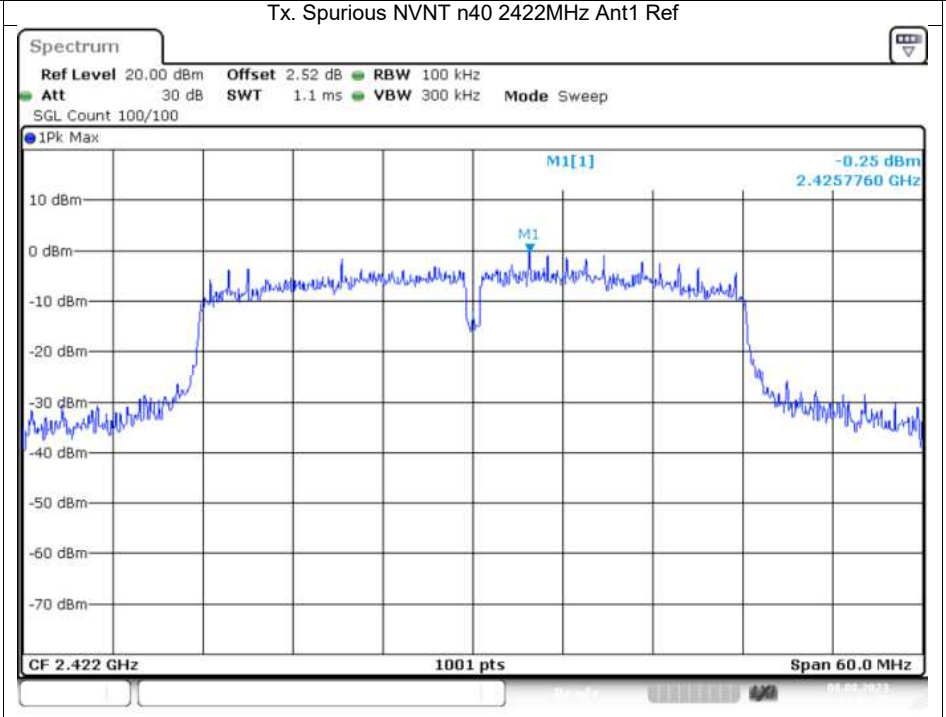
Tx. Spurious NVNT n20 2462MHz Ant1 Emission



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.46207 GHz	0.73 dBm		
M2		1	4.923421 GHz	-39.69 dBm		
M3		1	4.923421 GHz	-39.69 dBm		
M4		1	7.380719 GHz	-52.90 dBm		
M5		1	9.973014 GHz	-54.37 dBm		

Tx. Spurious NVNT n40 2422MHz Ant1 Ref



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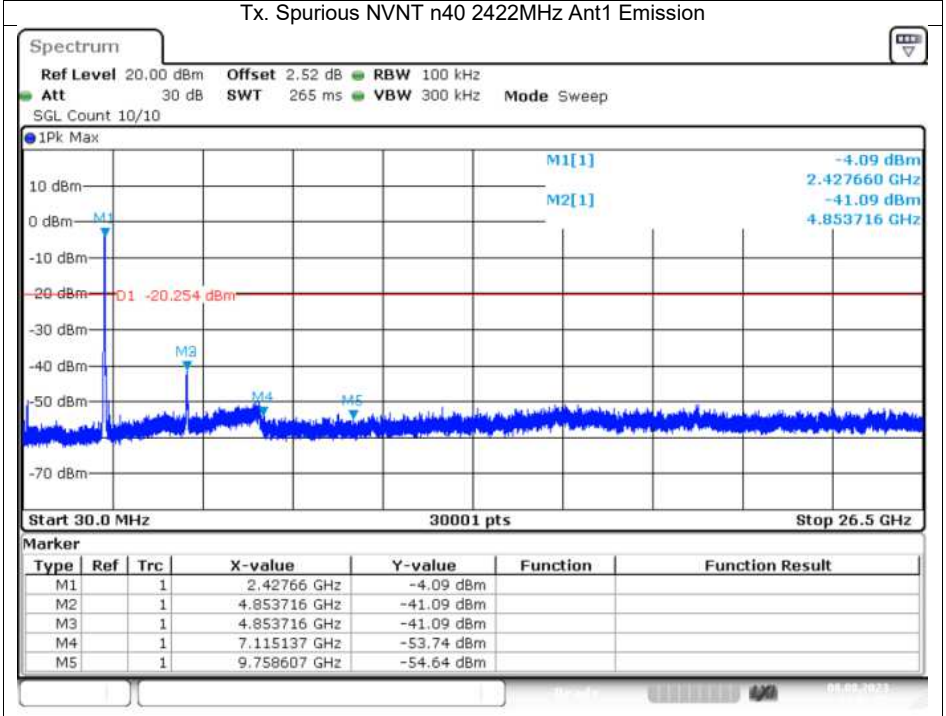
Tx. Spurious NVNT n40 2422MHz Ant1 Emission

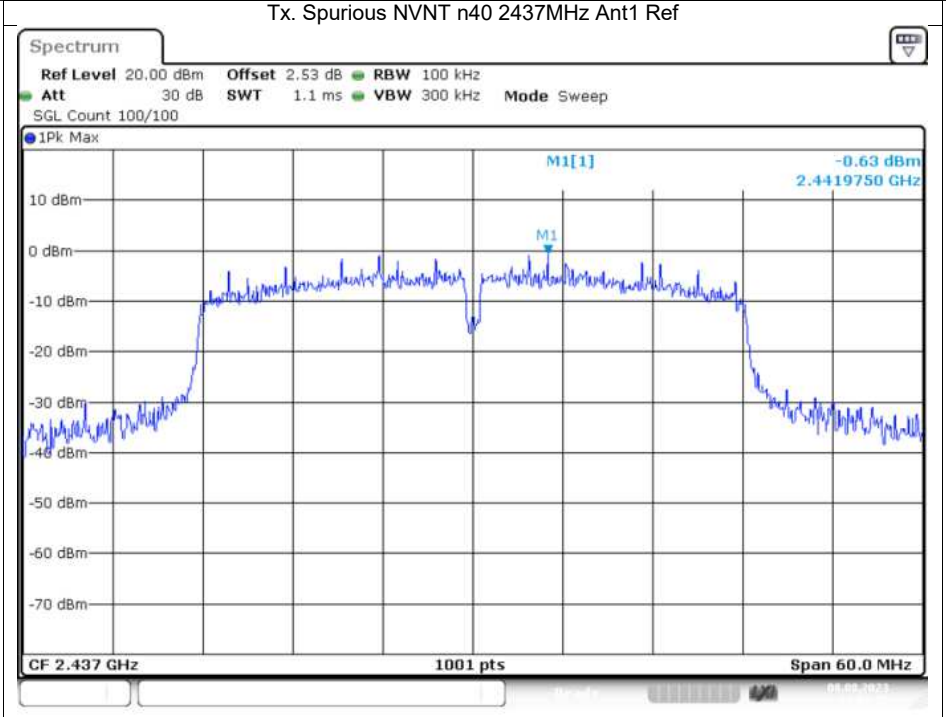


Marker

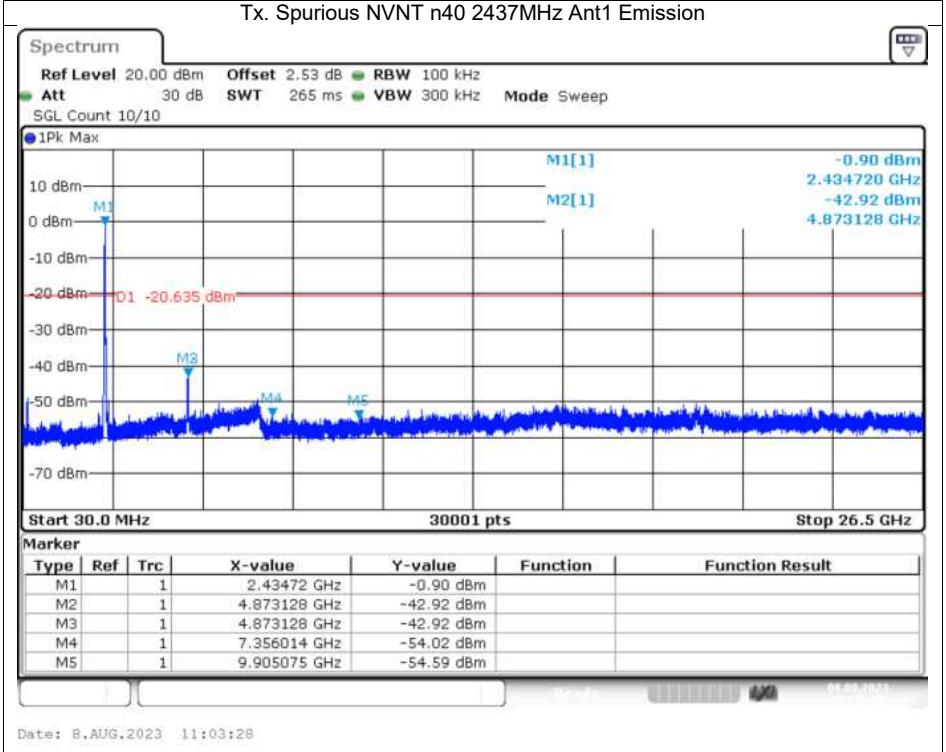
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.42766 GHz	-4.09 dBm		
M2		1	4.853716 GHz	-41.09 dBm		
M3		1	4.853716 GHz	-41.09 dBm		
M4		1	7.115137 GHz	-53.74 dBm		
M5		1	9.758607 GHz	-54.64 dBm		

Date: 8.AUG.2023 11:01:52

Tx. Spurious NVNT n40 2437MHz Ant1 Ref



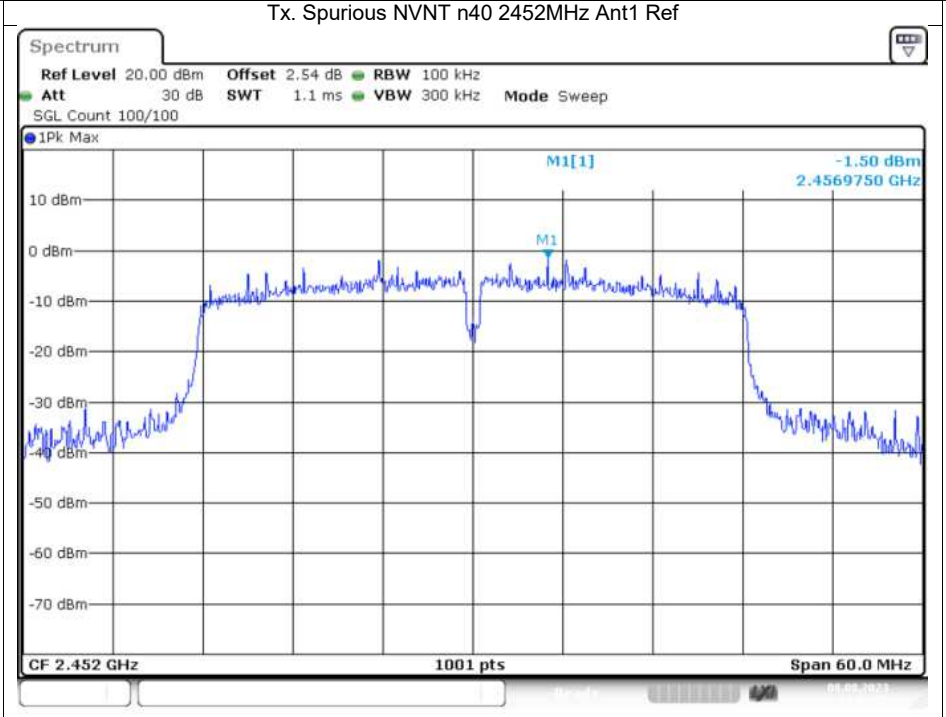
Tx. Spurious NVNT n40 2437MHz Ant1 Emission



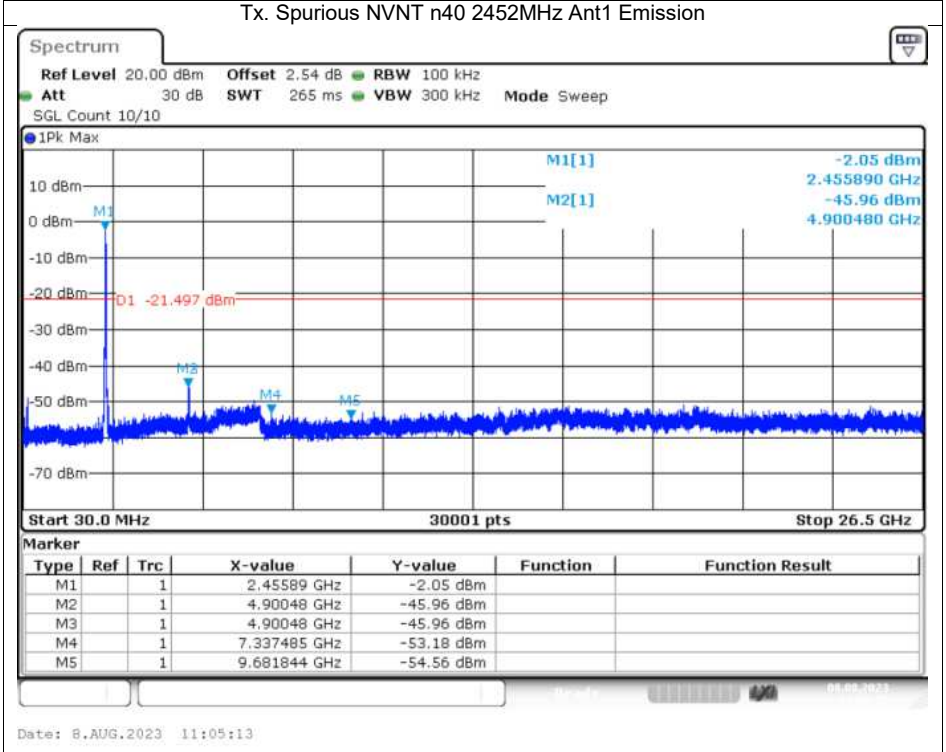
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.43472 GHz	-0.90 dBm		
M2		1	4.873128 GHz	-42.92 dBm		
M3		1	4.873128 GHz	-42.92 dBm		
M4		1	7.356014 GHz	-54.02 dBm		
M5		1	9.905075 GHz	-54.59 dBm		

Tx. Spurious NVNT n40 2452MHz Ant1 Ref



Tx. Spurious NVNT n40 2452MHz Ant1 Emission

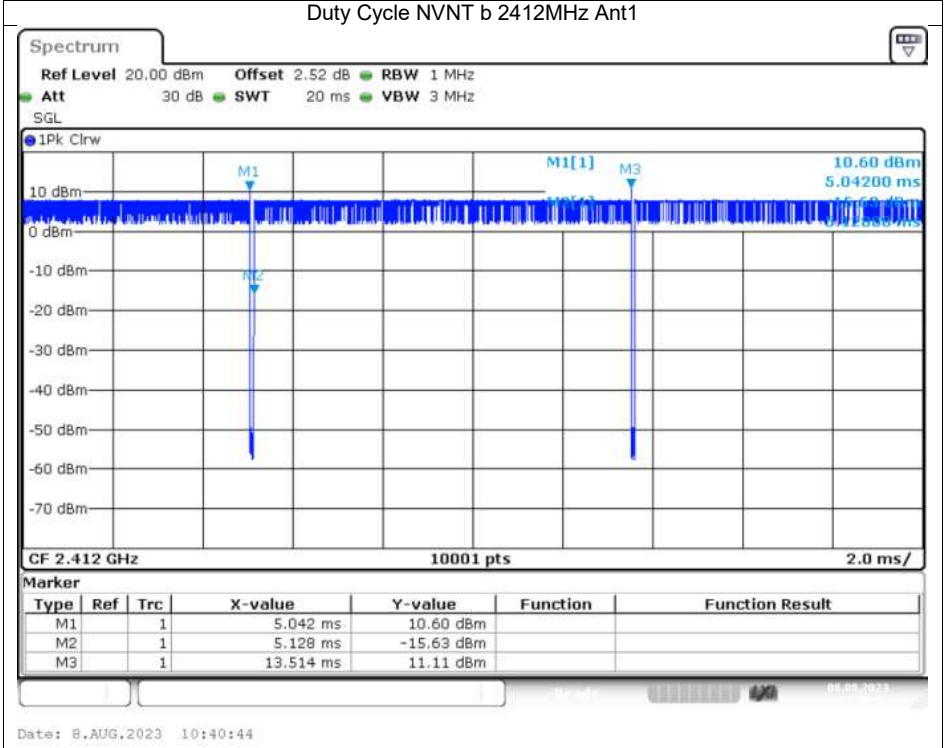


Duty Cycle

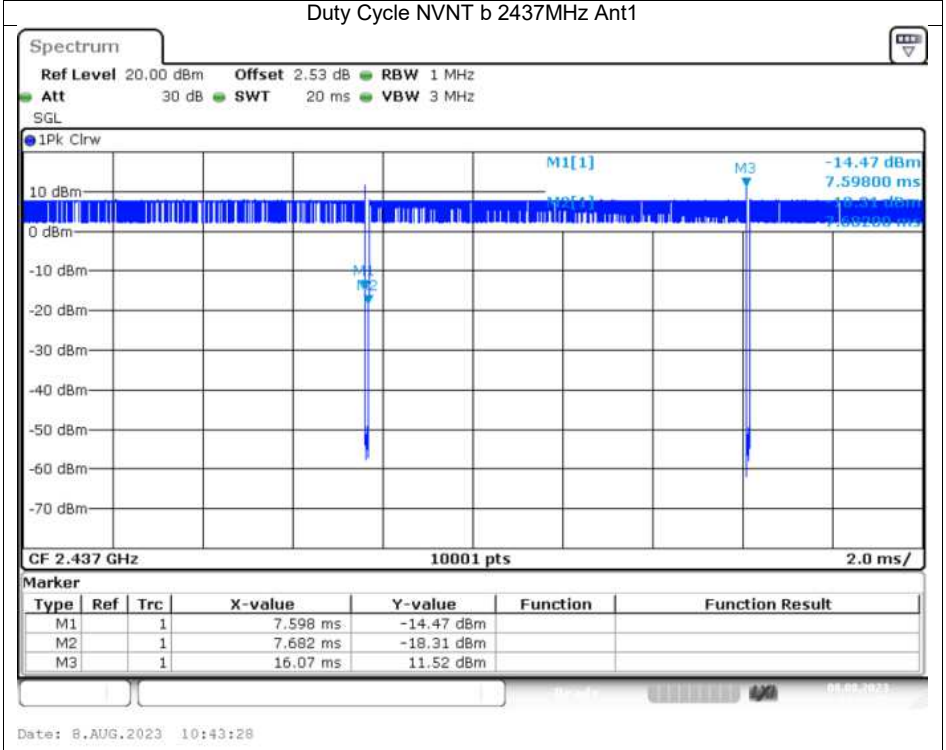
Condition	Mode	Frequency (MHz)	Antenna	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	b	2412	Ant1	98.98	0	0.12
NVNT	b	2437	Ant1	99.01	0	0.12
NVNT	b	2462	Ant1	99.01	0	0.12
NVNT	g	2412	Ant1	98.87	0	0.72
NVNT	g	2437	Ant1	98.87	0	0.72
NVNT	g	2462	Ant1	99.01	0	0.72
NVNT	n20	2412	Ant1	98.94	0	0.77
NVNT	n20	2437	Ant1	98.94	0	0.77
NVNT	n20	2462	Ant1	98.79	0	0.77
NVNT	n40	2422	Ant1	98.78	0	1.54
NVNT	n40	2437	Ant1	98.78	0	1.54
NVNT	n40	2452	Ant1	99.09	0	1.54

Test Graphs

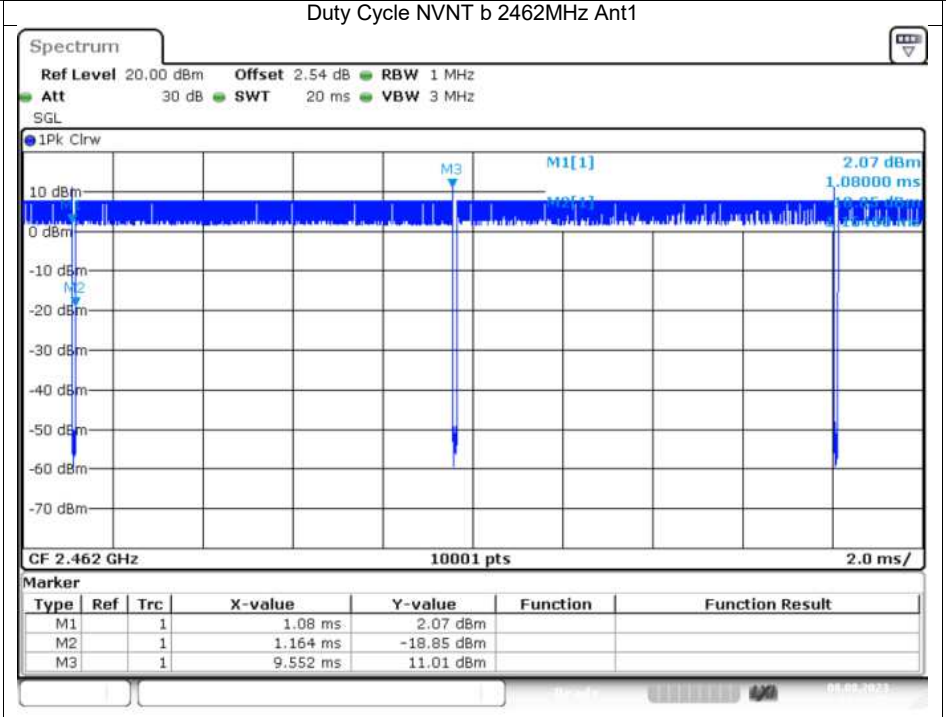
Duty Cycle NVNT b 2412MHz Ant1



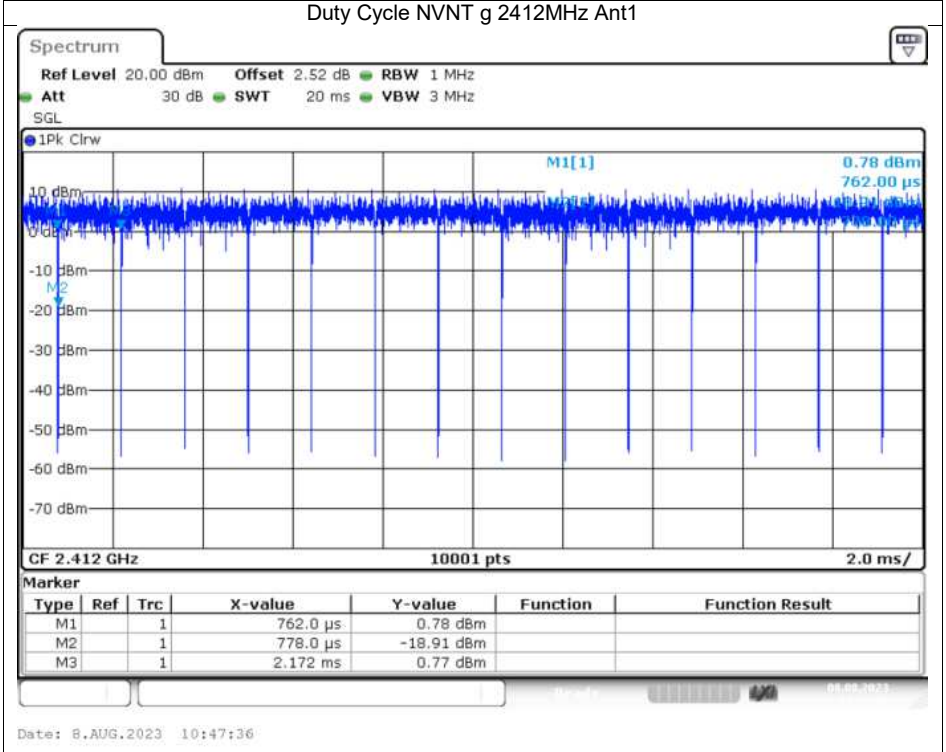
Duty Cycle NVNT b 2437MHz Ant1



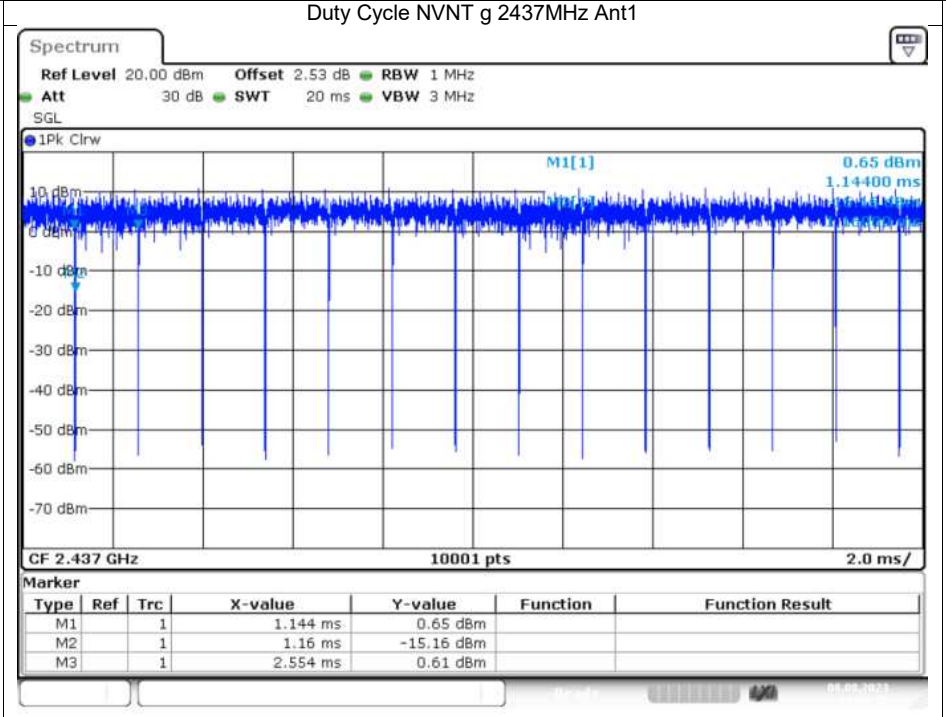
Duty Cycle NVNT b 2462MHz Ant1



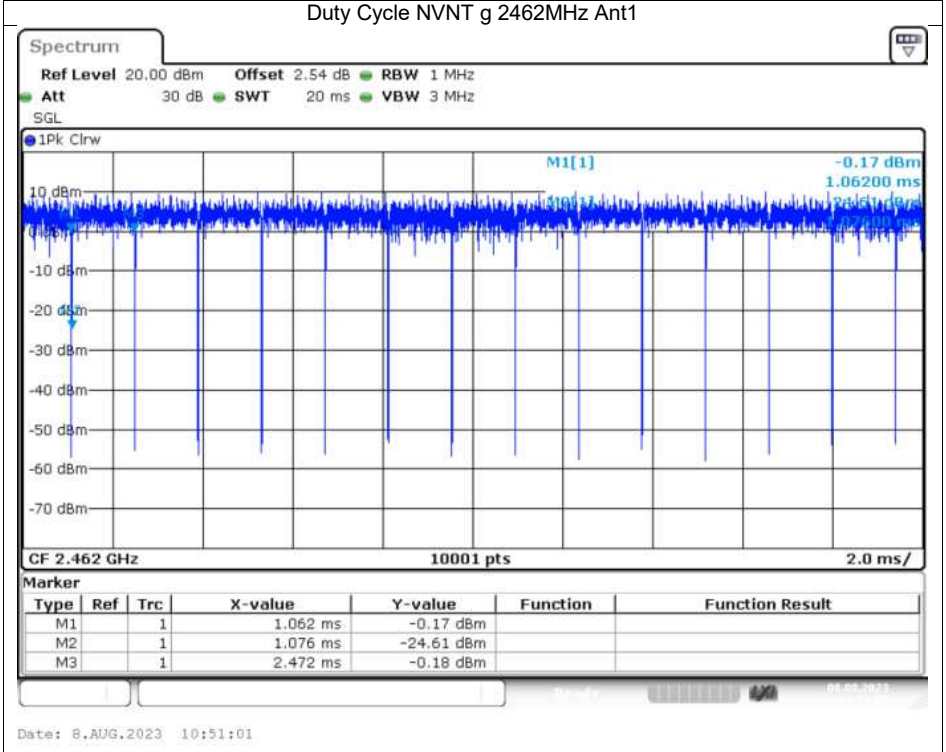
Duty Cycle NVNT g 2412MHz Ant1



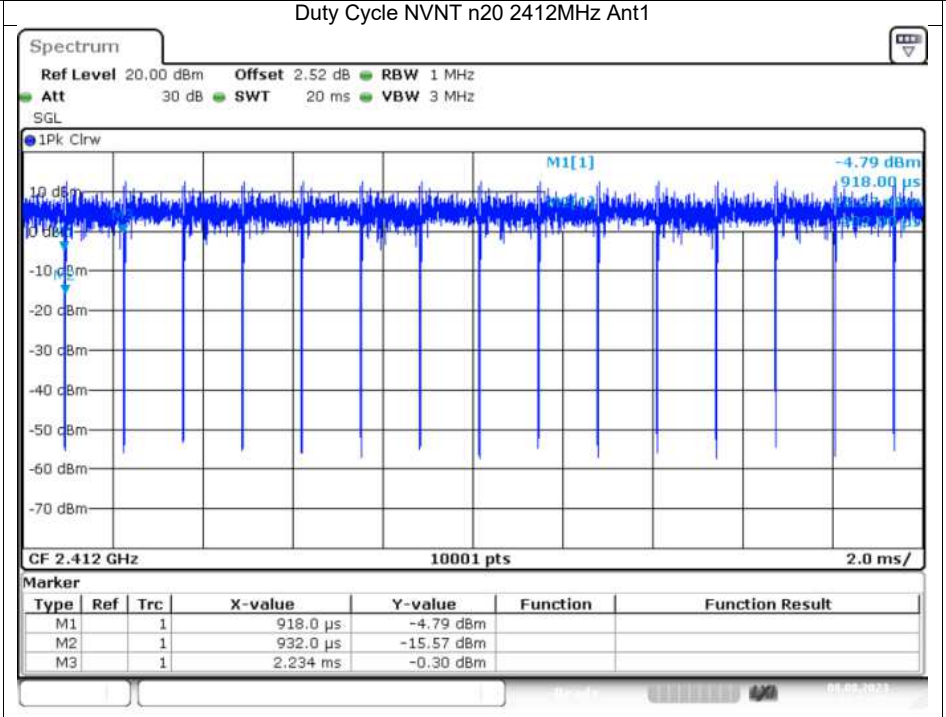
Duty Cycle NVNT g 2437MHz Ant1



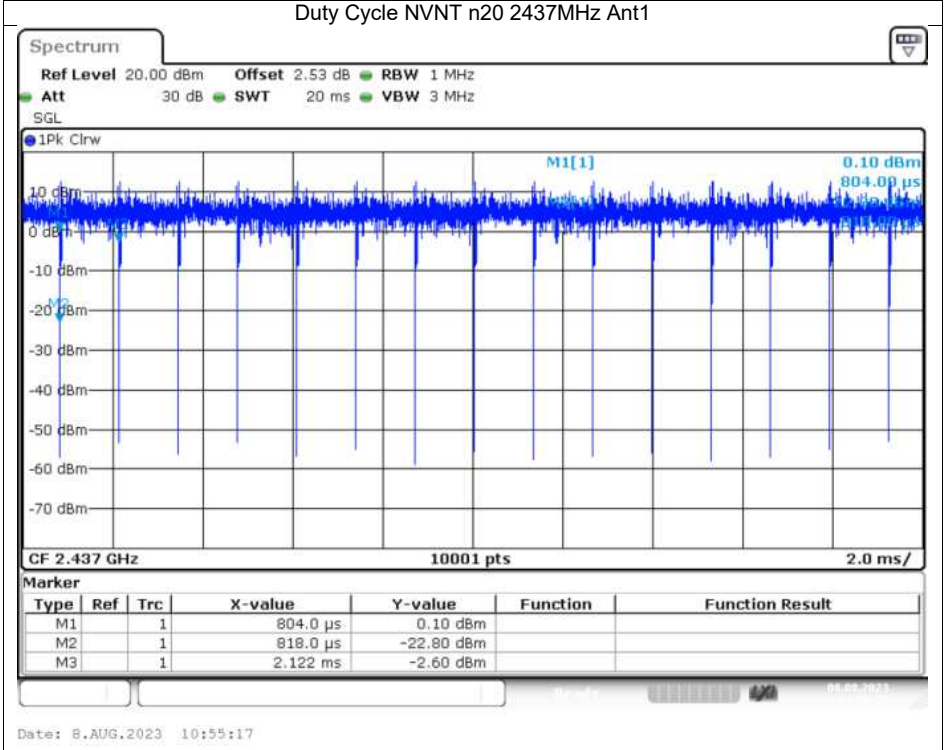
Duty Cycle NVNT g 2462MHz Ant1



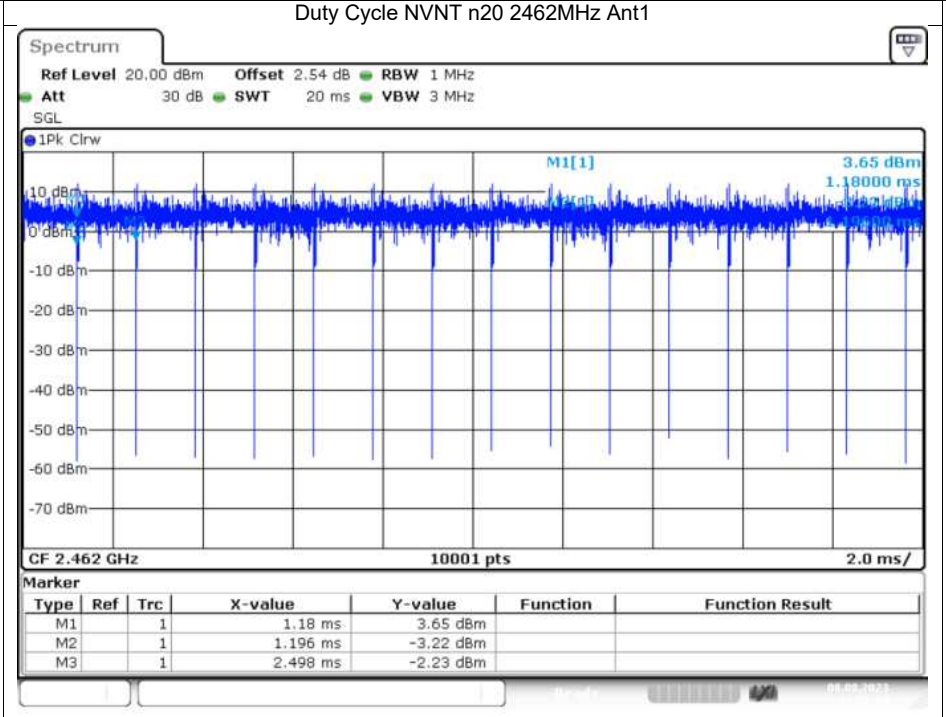
Duty Cycle NVNT n20 2412MHz Ant1



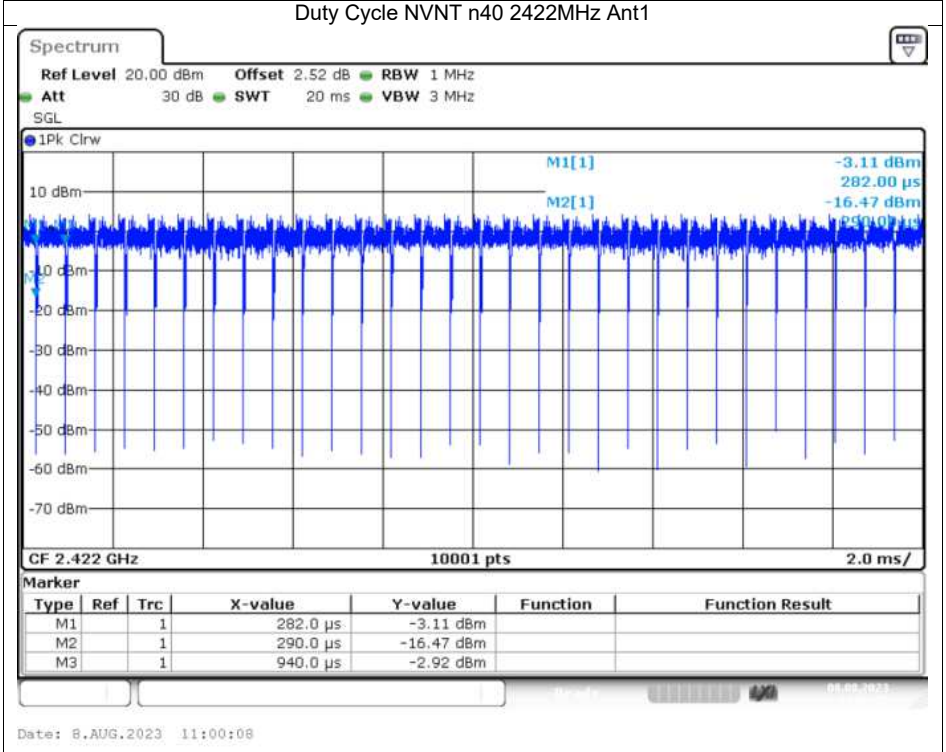
Duty Cycle NVNT n20 2437MHz Ant1



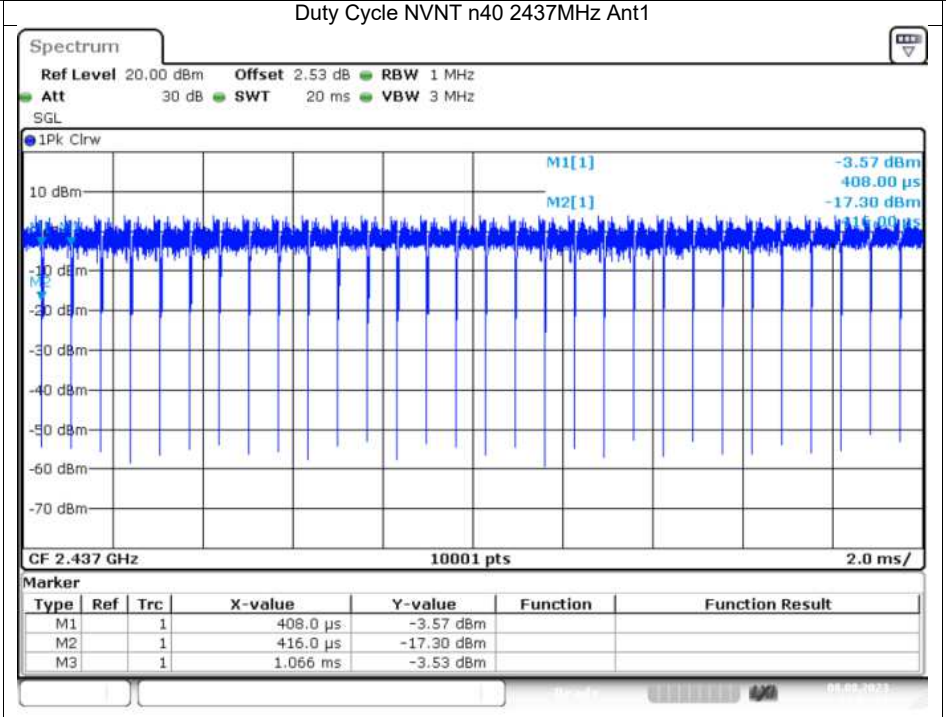
Duty Cycle NVNT n20 2462MHz Ant1



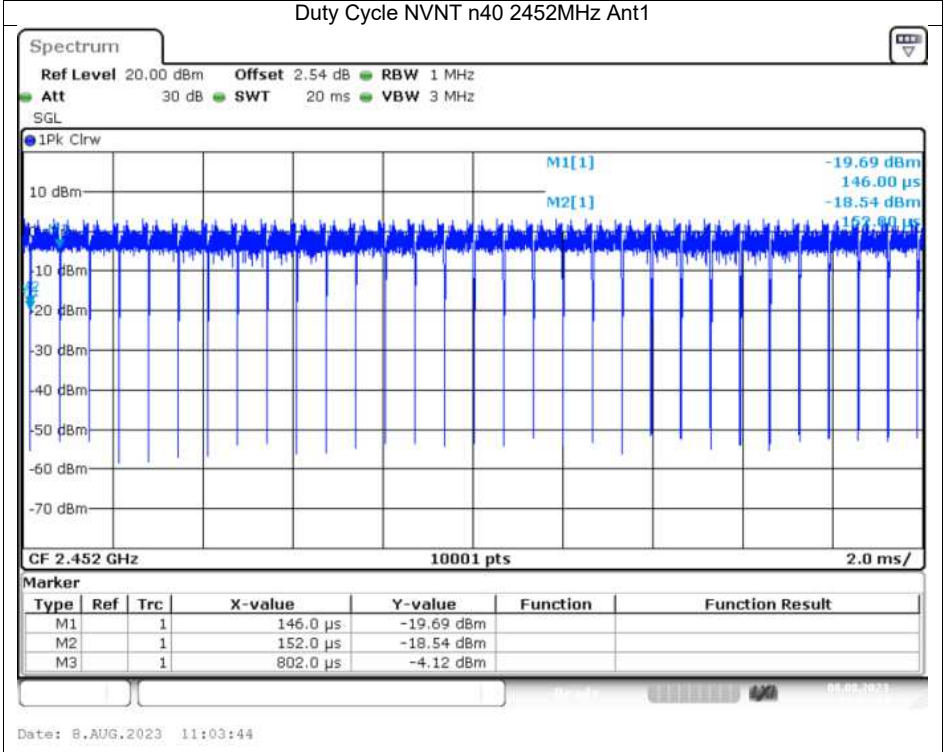
Duty Cycle NVNT n40 2422MHz Ant1



Duty Cycle NVNT n40 2437MHz Ant1



Duty Cycle NVNT n40 2452MHz Ant1



12. Antenna Application

Antenna requirement

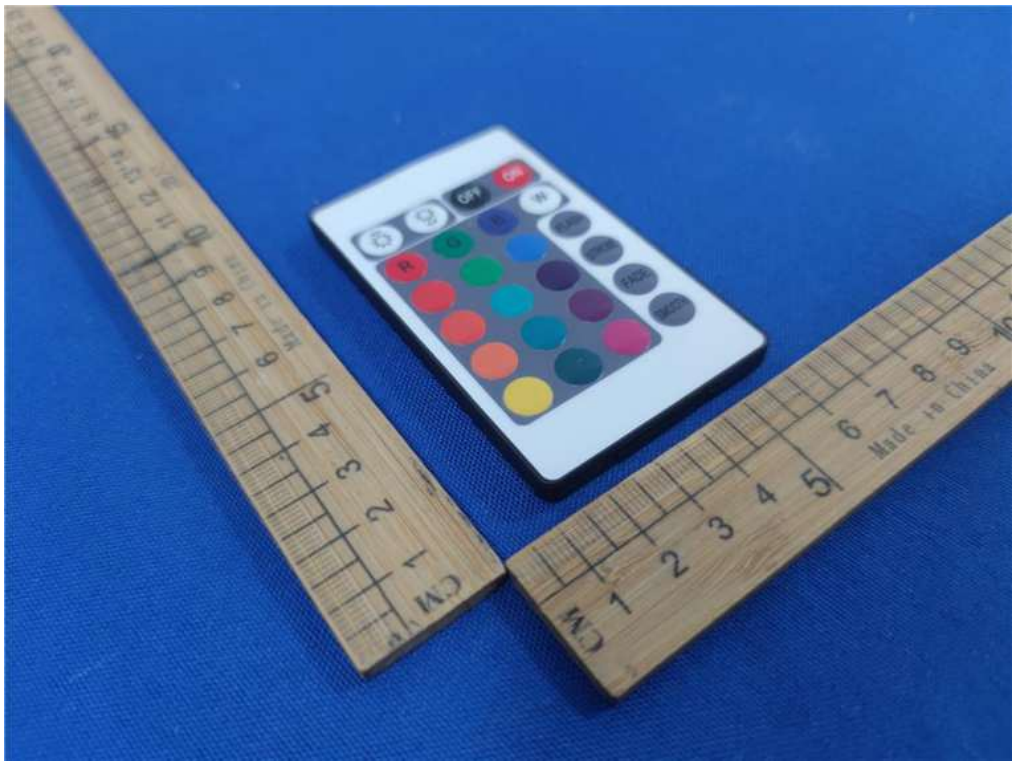
The EUT'S antenna is met the requirement of FCC part 15C section 15.203 and 15.247.

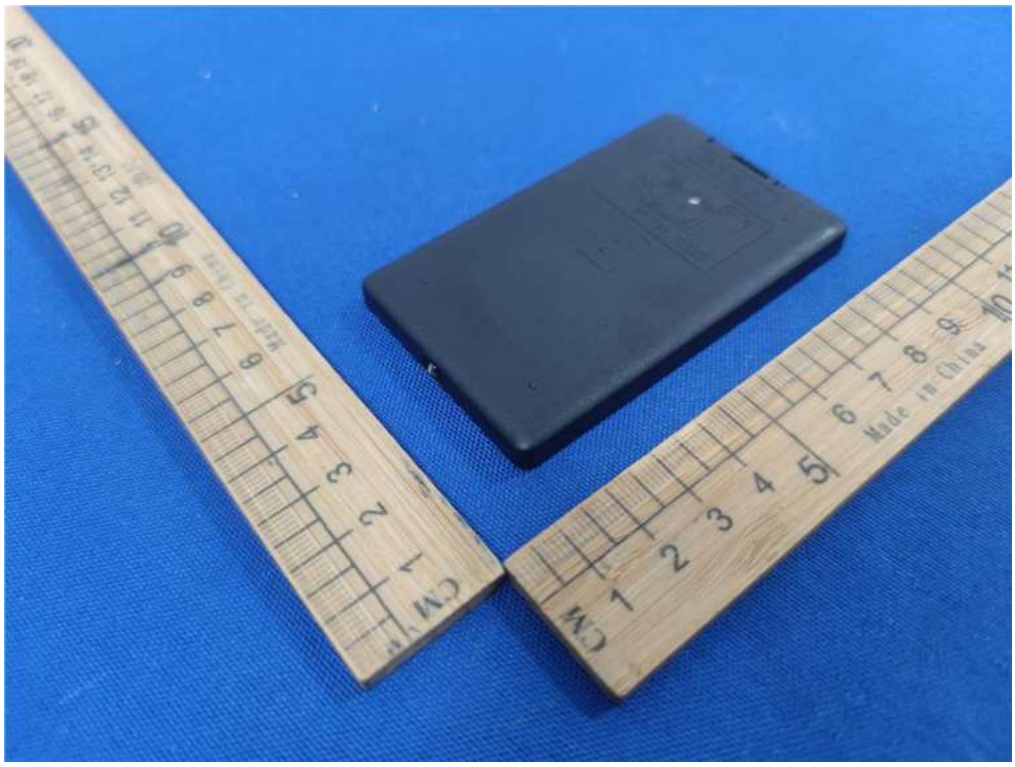
FCC part 15C section 15.247 requirements:
Systems operating in the 2402-2480MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum peak output power of the intentional radiator is reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

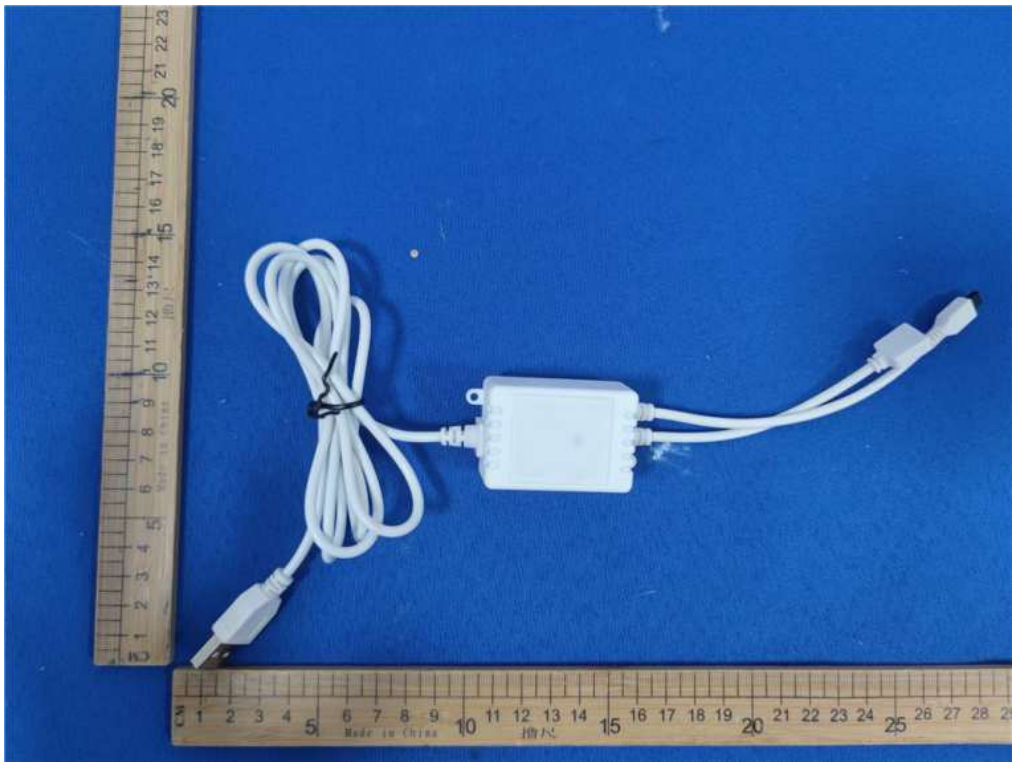
Result

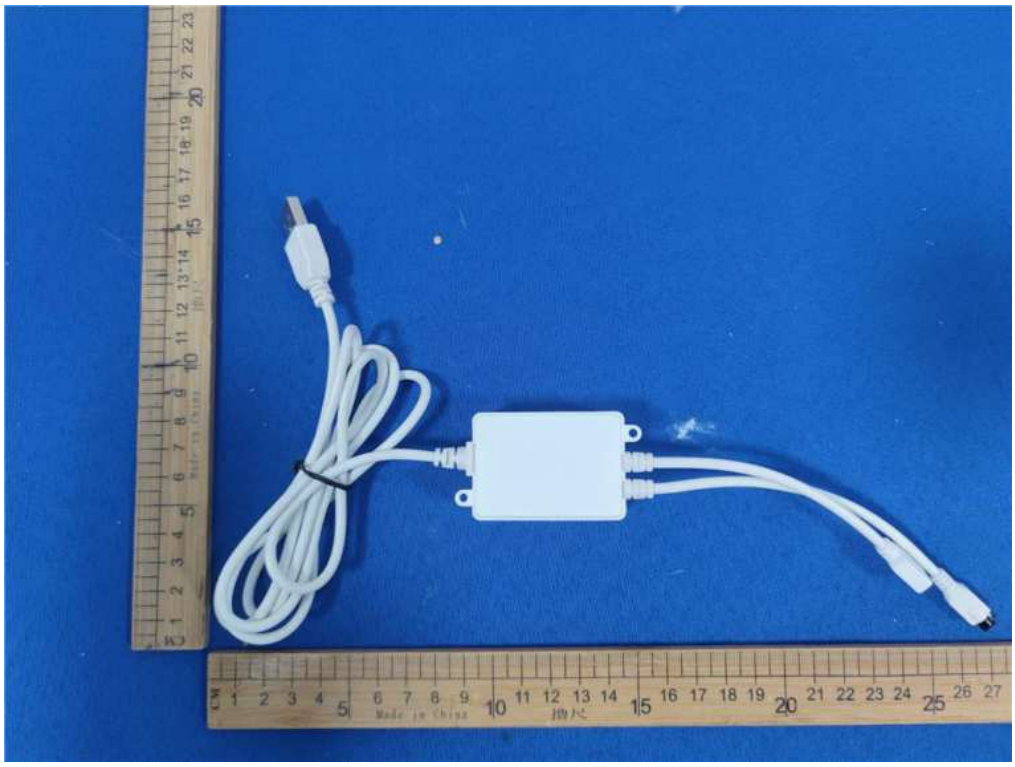
The EUT's antenna, permanent attached antenna, used PCB Antenna, The antenna's gain is 2dBi and meets the requirement.

External

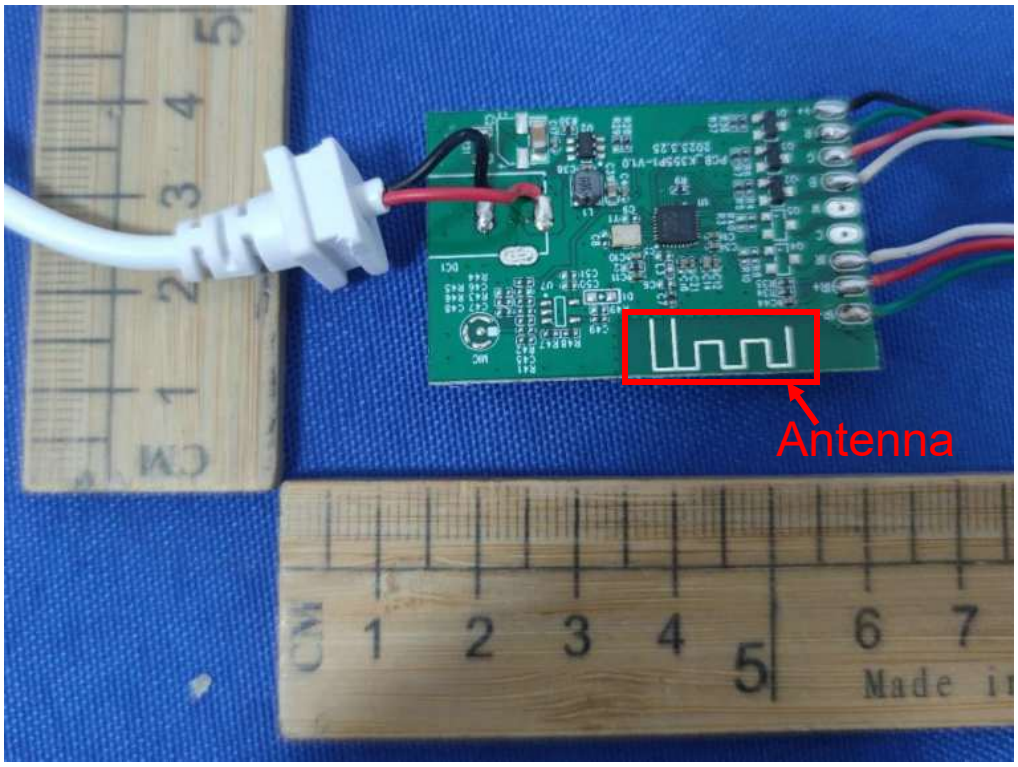


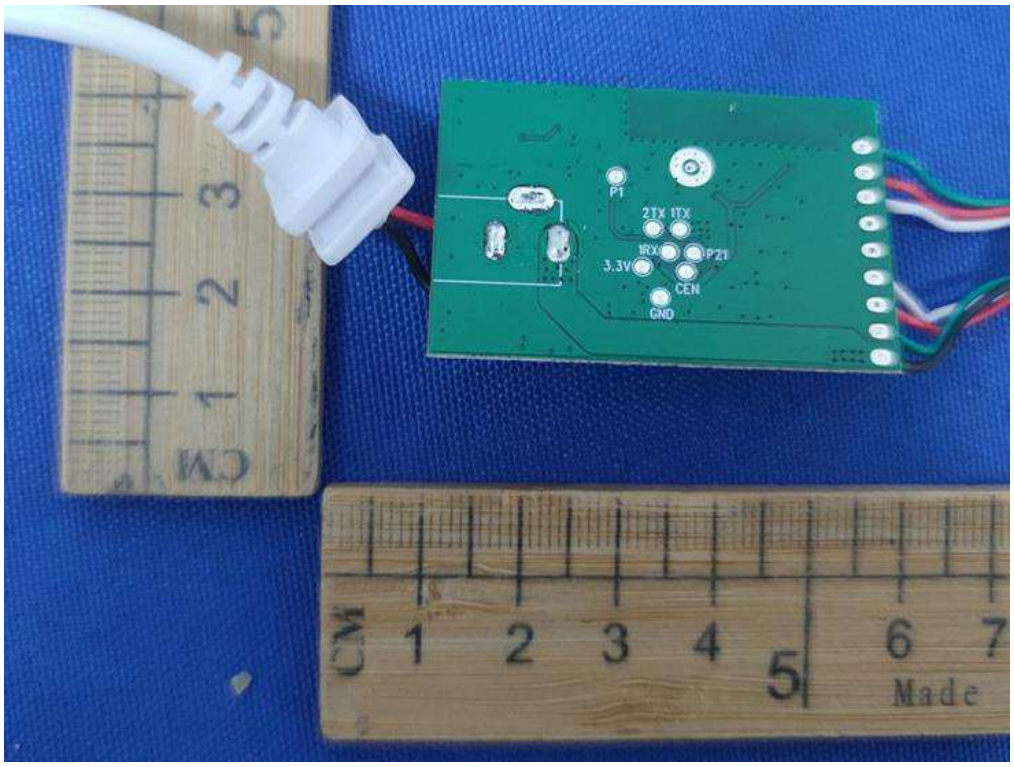






Internal photos





END OF REPORT