



FCC TEST REPORT

FCC ID: 2AF2V-MOTICAM

On Behalf of

Motic China Group Co., Ltd.

Moticam

Model No.: Moticam 4000X, Moticam 4000X BMH

Prepared for : Motic China Group Co., Ltd.
Address : No 810 Fangshan Nan Road, XiangAn, Xiamen 361101, P.R. China

Prepared By : Shenzhen Alpha Product Testing Co., Ltd.
Address : Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103,
Shenzhen, Guangdong, China

Report Number : A2312080-C01-R09
Date of Receipt : December 18, 2024
Date of Test : December 18, 2023 - March 9, 2024
Date of Report : March 9, 2024
Version Number : V0
Result **Pass**

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TEST REPORT DECLARATION

Applicant : Motic China Group Co., Ltd.
Address : No 810 Fangshan Nan Road, XiangAn, Xiamen 361101, P.R. China
Manufacturer : Motic China Group Co., Ltd.
Address : No 810 Fangshan Nan Road, XiangAn, Xiamen 361101, P.R. China
EUT Description : Moticam
(A) Model No. : Moticam 4000X, Moticam 4000X BMH
(B) Trademark : N/A

Measurement Standard Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247,

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C limits both conducted and radiated emissions. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After the test, our opinion is that EUT compliance with the requirement of the above standards.

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

Tested by (name + signature).....:	Yannis Wen Project Engineer	
Approved by (name + signature).....:	Reak Yang Project Manager	
Date of issue.....:	March 8, 2024	

Revision History

Revision	Issue Date	Revisions	Revised By
V0	March 8, 2024	Initial released Issue	Yannis Wen

1. SUMMARY OF STANDARDS AND RESULTS

1.1. Description of Standards and Results

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

Test Item	Standards Paragraph	Result
Conducted Emission	FCC Part 15: 15.207 ANSI C63.10 :2013	P
6dB Bandwidth	FCC PART 15:15.247(a)(2) ANSI C63.10 :2013	P
Output Power	FCC Part 15: 15.247(b)(3) ANSI C63.10 :2013	P
Radiated Spurious Emission	FCC Part 15: 15.209 FCC Part 15: 15.247(d) ANSI C63.10 :2013	P
Conducted Spurious & Band Edge Emission	FCC Part 15: 15.247(d) ANSI C63.10 :2013	P
Power Spectral Density	FCC PART 15:15.247(e) ANSI C63.10 :2013	P
Radiated Band Edge Emission	FCC Part 15: 15.247(d) ANSI C63.10 :2013	P
Antenna Requirement	FCC Part 15: 15.203	P
Note: 1. P is an abbreviation for Pass. 2. F is an abbreviation for Fail. 3. N/A is an abbreviation for Not Applicable. 4. Decision rules for the conclusion of this test report: decision by actual test data without considering measurement uncertainty.		

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

Description/PMN : Moticam

Model : Moticam 4000X, Moticam 4000X BMH
 Number/HVIN(s) :
 Diff. : The Moticam 4000X BMH adds a display screen and a display connection bracket on top of the Moticam 4000X, making the camera part completely identical. So all the test were performed on the model Moticam 4000X BMH.

Test Voltage : DC 12V from adapter

Radio Technology : 2.4G WIFI

Operation frequency : 2412MHz-2462MHz for IEEE 802.11 b, g, n/HT20
 2422MHz~2452MHz for IEEE802.11n/HT40

Channel No. : 802.11b/802.11g /802.11n(HT20): 11
 802.11(HT40): 7

Modulation type : IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK)
 IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK)
 IEEE 802.11n :OFDM(64QAM, 16QAM, QPSK, BPSK)

Antenna Type : FPC Antenna A, max gain 4dBi,
 FPC Antenna A, max gain 4dBi,
 The antenna MIMO combining gain is 7.01dBi.
 (Antenna information is provided by applicant.)

Software Version : MC988M-MAIN-A2248A11

Hardware version/FVIN : V224

Remark:

1. The worst-case simultaneous transmission configuration was evaluated with no non-compliance found. Results in this report are only for 2.4G Wi-Fi function, and there is no other transmitter involved.

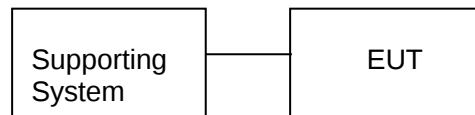
2.2. Accessories of Device (EUT)

Accessories1 : Power Supply
Manufacturer : Shen Zhen Shi Yingyuan Electronics Co.,Ltd ,
Model : ICP301-120-2500
Input : 100-240V~50/60Hz 0.8A
Output : 12.0 = 2.5A 30.0W

2.3. Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number	Certification or SDOC
1	Notebook PC	Lenovo	Thinkpad E14	N/A	N/A

2.4. Block Diagram of connection between EUT and simulators



2.5. Test Mode Description

Duty cycle :100%Keeping TX			
Mode	Data rate (Mbps)	Channel	Frequency (MHz)
IEEE 802.11b	1	Low :CH1	2412
	1	Middle: CH6	2437
	1	High: CH11	2462
IEEE 802.11g	6	Low :CH1	2412
	6	Middle: CH6	2437
	6	High: CH11	2462
IEEE 802.11 n/HT20	6.5	Low :CH1	2412
	6.5	Middle: CH6	2437
	6.5	High: CH11	2462
IEEE 802.11 n/HT40	13	Low :CH3	2422
	13	Middle: CH6	2437
	13	High: CH9	2452
Note: According exploratory test, EUT will have maximum output power in those data rate. So those data rate were used for all test.			

Channel list:					
For IEEE 802.11b, g, n/HT20, n/HT40					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
CH1	2412	CH5	2432	CH9	2452
CH2	2417	CH6	2437	CH10	2457
CH3	2422	CH7	2442	CH11	2462
CH4	2427	CH8	2447		

2.6. Test Conditions

Items	Required	Actual
Temperature range:	15-35°C	24°C
Humidity range:	25-75%	56%
Pressure range:	86-106kPa	98kPa

2.7. Test Facility

Shenzhen Alpha Product Testing Co., Ltd

Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103,
Shenzhen, Guangdong, China

June 21, 2018 File on Federal Communication Commission

Registration Number: 293961

Designation Number: CN1236

July 15, 2019 Certificated by IC

Registration Number: 12135A

2.8. Measurement Uncertainty

(95% confidence levels, k=2)

Item	Uncertainty
Uncertainty for Power point Conducted Emissions Test	1.63dB
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	3.5dB
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.74dB(Polarize: V)
	3.76dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	3.77dB(Polarize: V)
	3.80dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (18GHz to 40GHz)	4.31 dB(Polarize: V)
	4.30 dB(Polarize: H)
Uncertainty for radio frequency	5.06×10^{-8} GHz
Uncertainty for conducted RF Power	0.40dB
Uncertainty for temperature	0.2°C
Uncertainty for humidity	1%
Uncertainty for DC and low frequency voltages	0.06%

2.9. Test Equipment List

Equipment	Manufacture	Model No.	Firmware version	Serial No.	Last cal.	Cal Interval
9*6*6 anechoic chamber	CHENYU	9*6*6	/	N/A	2022.05.17	3Year
Spectrum analyzer	ROHDE&SCHWARZ	FSV40-N	2.3	102137	2023.08.16	1Year
Spectrum analyzer	Agilent	N9020A	A.14.16	MY499100060	2023.08.16	1Year
Receiver	ROHDE&SCHWARZ	ESR	2.28 SP1	1316.3003K03-10 2082-Wa	2023.08.16	1Year
Receiver	R&S	ESCI	4.42 SP1	101165	2023.08.16	1Year
Bilog Antenna	Schwarzbeck	VULB 9168	/	VULB 9168#627	2023.08.28	1Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	/	2106	2023.08.19	1Year
Loop Antenna	SCHWARZBECK	FMZB 1519B	/	00128	2023.08.19	1Year
RF Cable	Resenberger	Cable 1	/	RE1	2023.08.16	1Year
RF Cable	Resenberger	Cable 2	/	RE2	2023.08.16	1Year
RF Cable	Resenberger	Cable 3	/	CE1	2023.08.16	1Year
Pre-amplifier	HP	HP8347A	/	2834A00455	2023.08.16	1Year
Pre-amplifier	Agilent	8449B	/	3008A02664	2023.08.16	1Year
L.I.S.N.#1	Schwarzbeck	NSLK8126	/	8126-466	2023.08.16	1Year
L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	/	101043	2023.08.16	1Year
Horn Antenna	SCHWARZBECK	BBHA 9170	/	00946	2023.08.19	1Year
Preamplifier	SKET	LNPA_1840 -50	/	SK2018101801	2023.08.16	1 Year
Power Meter	Agilent	E9300A	/	MY41496628	2023.08.16	1 Year
Power Sensor	DARE	RPR3006W	/	15100041SNO91	2023.08.16	1 Year
Temp. & Humid. Chamber	Teelong	TL-HW408S	/	TL-20191205-01	2023.07.25	1 Year
Switching Mode Power Supply	JUNKE	JK12010S	/	20140927-6	2023.08.16	1 Year
Adjustable attenuator	MWRFTest	N/A	/	N/A	N/A	N/A
10dB Attenuator	Mini-Circuits	DC-6G	/	N/A	N/A	N/A

Software Information			
Test Item	Software Name	Manufacturer	Version
RE	EZ-EMC	Farad	Alpha-3A1
CE	EZ-EMC	Farad	Alpha-3A1
RF-CE	MTS 8310	MW	V2.0.0.0

3. SPURIOUS EMISSION

3.1. Test Limits

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	
		$\mu\text{V}/\text{m}$	$\text{dB}(\mu\text{V})/\text{m}$
0.009-0.490	300	$2400/\text{F}(\text{KHz})$	/
0.490-1.705	30	$24000/\text{F}(\text{KHz})$	/
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 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) 54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average)	

Note 1: The peak limit is 20 dB higher than the average limit

Harmonic emissions limits comply with below 54 dBuV/m at 3m. Other emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or comply with the radiated emissions limits specified in section 15.209(a) limit in the table below has to be followed.

Table 5 – General field strength limits at frequencies above 30 MHz

Frequency (MHz)	Field strength ($\mu\text{V}/\text{m}$ at 3 m)
30 – 88	100
88 – 216	150
216 – 960	200
Above 960	500

Table 6 – General field strength limits at frequencies below 30 MHz

Frequency	Magnetic field strength (H-Field) ($\mu\text{A}/\text{m}$)	Measurement distance (m)
9 - 490 kHz ^{Note 1}	$6.37/F$ (F in kHz)	300
490 - 1705 kHz	$63.7/F$ (F in kHz)	30
1.705 - 30 MHz	0.08	30

Note 1: The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.

3.2. Test Procedure

The measuring distance of 3m shall be used for measurements at frequency up to 1GHz and above 1GHz.

The EUT was placed on a rotating 0.8 m high above ground for below 1GHz and 1.5m high for above 1GHz testing, the table was rotated 360 degrees to determine the position of the highest radiation

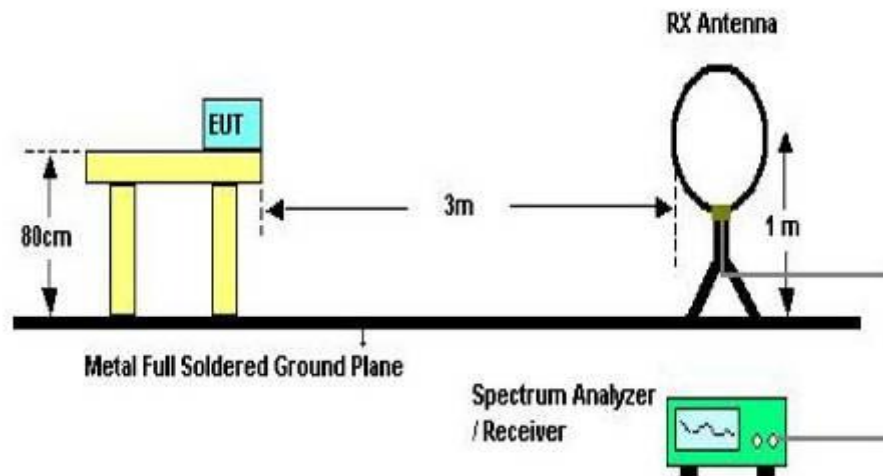
The Test antenna shall vary between 1m and 4m, both Horizontal and Vertical antenna are set of make measurement.

The initial step in collecting radiated 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 premeasured

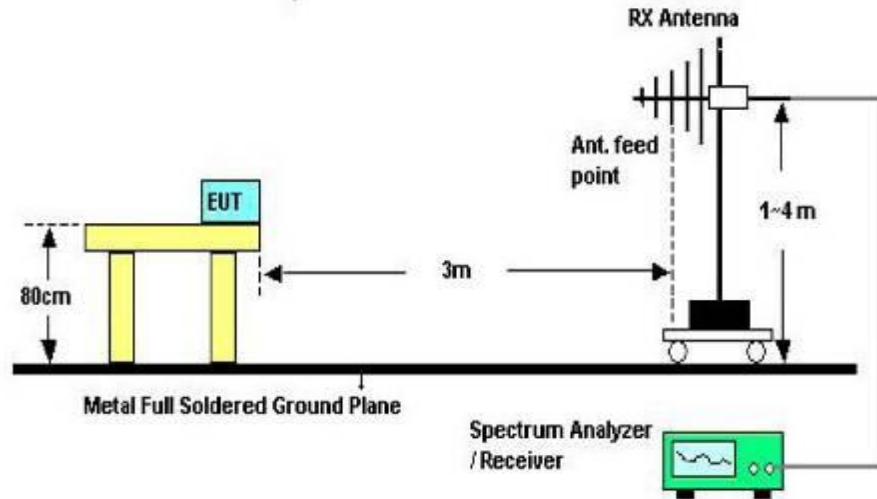
If Peak value comply with QP limit below 1GHz, the EUT deemed to comply with QP limit. But the Peak value and average value both need to comply with applicable limit above 1GHz.

For the actual test configuration, please see the test setup photo.

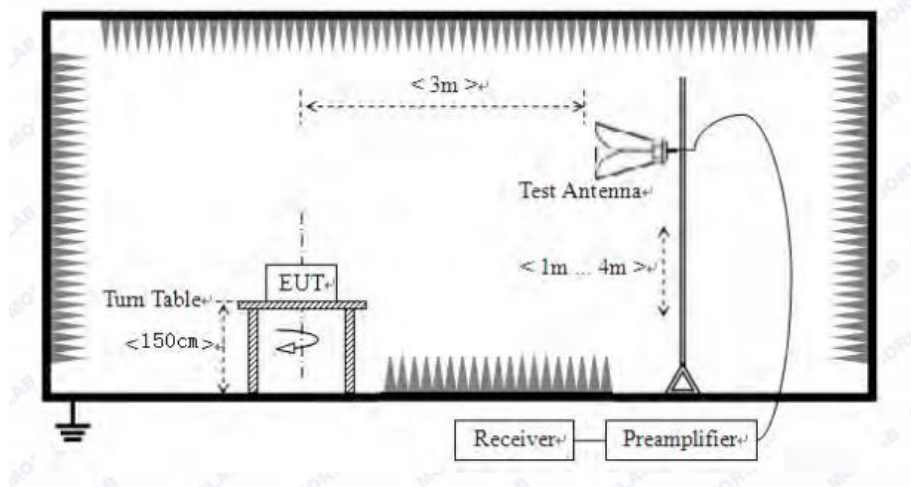
3.3. Test Setup



Below 30MHz Test Setup



Above 30MHz Test Setup



Above 1GHz Test Setup

3.4. Test Results

Test Condition

Continual Transmitting in maximum power.

9KHz~150KHz	RBW200Hz	VBW1KHz
150KHz~30MHz	RBW9KHz	VBW 30KHz
30MHZ~1GHz	RBW120KHz	VBW 300KHz
Above1GHz	RBW1MHz	VBW 3MHz

We have scanned the EUT from 9kHz up to the 10th harmonic of the fundamental.

Detailed information please see the following page.

From 9KHz to 30MHz: Conclusion: PASS

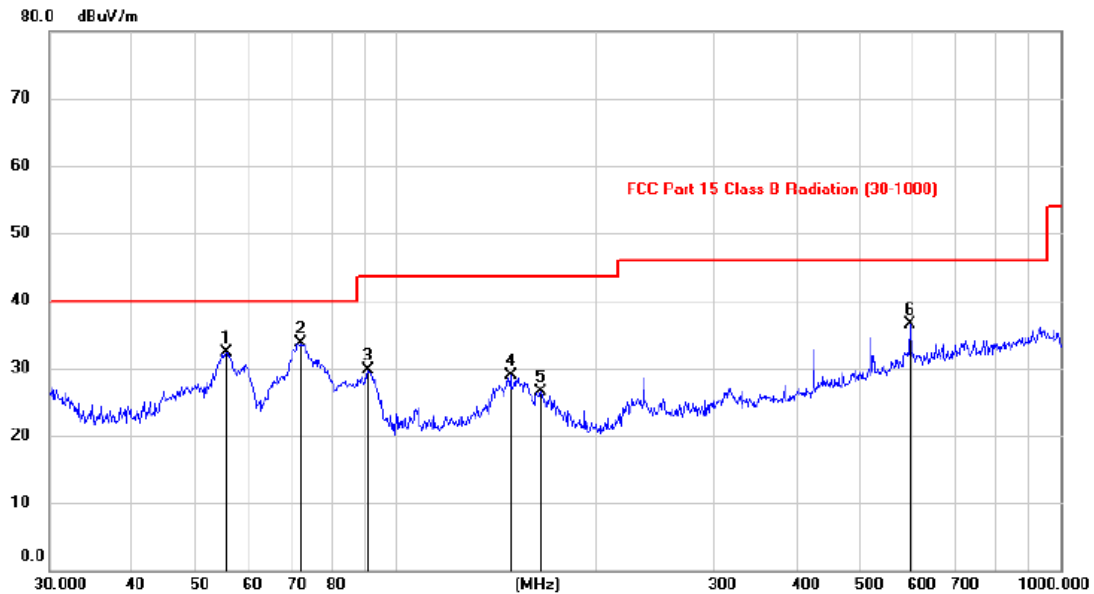
Note: 1. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

2. Except for mode b/g, other modes test the MIMO status.

3. All antennas have been tested, only the worst data of each pattern is reflected.

Test result for 802.11b (High Channel)

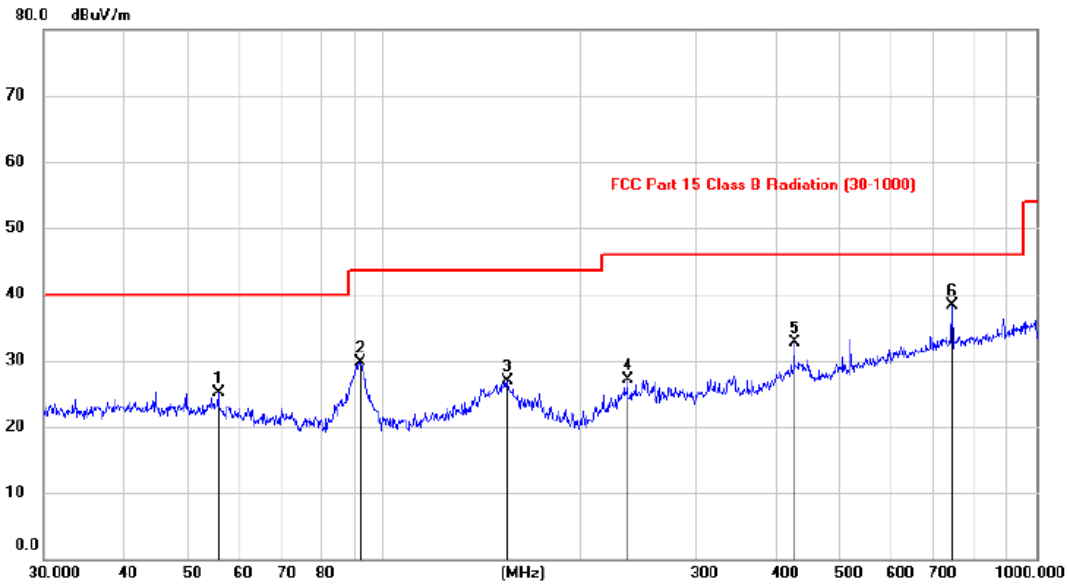
Vertical:



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	dBuV	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1		55.5444	18.80	13.57	32.37	40.00	-7.63	peak		
2	*	72.0674	22.67	11.09	33.76	40.00	-6.24	peak		
3		90.8448	19.62	10.17	29.79	43.50	-13.71	peak		
4		148.5104	13.91	14.95	28.86	43.50	-14.64	peak		
5		164.9842	11.93	14.56	26.49	43.50	-17.01	peak		
6		594.0208	16.31	20.10	36.41	46.00	-9.59	peak		

Note: 1. *: Maximum data; x: Over limit; !: over margin.

2. Measurement = Reading Level + Correct Factor; Correct Factor = Antenna Factor + Cable Loss.

Horizontal:

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		55.6677	11.52	13.57	25.09	40.00	-14.91	peak		
2		92.0310	19.51	10.20	29.71	43.50	-13.79	peak		
3		154.6212	11.87	15.05	26.92	43.50	-16.58	peak		
4		236.2578	14.63	12.46	27.09	46.00	-18.91	peak		
5		425.2764	15.88	16.91	32.79	46.00	-13.21	peak		
6	*	742.5190	16.02	22.31	38.33	46.00	-7.67	peak		

Note: 1. *: Maximum data; x: Over limit; !: over margin.

2. Measurement = Reading Level + Correct Factor; Correct Factor = Antenna Factor + Cable Loss.

Notes: Above is below 1GHz test data. This report only shall the worst case mode for b 2412MHz.

Test Mode: IEEE 802.11b TX Low									
Freq (MHz)	Read Level (dBuV/m)	Polar (H/V)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4824	45.04	V	33.95	10.18	34.26	54.91	74	-19.09	PK
4824	35.67	V	33.95	10.18	34.26	45.54	54	-8.46	AV
7236	/	/	/	/	/	/	/	/	/
9648	/	/	/	/	/	/	/	/	/
4824	43.14	H	33.95	10.18	34.26	53.01	74	-20.99	PK
4824	34.27	H	33.95	10.18	34.26	44.14	54	-9.86	AV
7236	/	/	/	/	/	/	/	/	/
9648	/	/	/	/	/	/	/	/	/
Test Mode: IEEE 802.11b TX Mid									
4874	45.63	V	33.93	10.2	34.29	55.47	74	-18.53	PK
4874	32.07	V	33.93	10.2	34.29	41.91	54	-12.09	AV
7311	/	/	/	/	/	/	/	/	/
9748	/	/	/	/	/	/	/	/	/
4874	46.68	H	33.93	10.2	34.29	56.52	74	-17.48	PK
4874	32.88	H	33.93	10.2	34.29	42.72	54	-11.28	AV
7311	/	/	/	/	/	/	/	/	/
9748	/	/	/	/	/	/	/	/	/
Test Mode: IEEE 802.11b TX High									
4924	46.15	V	33.98	10.22	34.25	56.10	74	-17.90	PK
4924	34.31	V	33.98	10.22	34.25	44.26	54	-9.74	AV
7386	/	/	/	/	/	/	/	/	/
9848	/	/	/	/	/	/	/	/	/
4924	48.02	H	33.98	10.22	34.25	57.97	74	-16.03	PK
4924	35.13	H	33.98	10.22	34.25	45.08	54	-8.92	AV
7386	/	/	/	/	/	/	/	/	/
9848	/	/	/	/	/	/	/	/	/

Note:

1, Result = Read level + Antenna factor + cable loss-Amp factor

2, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

Note:

1, Result = Read level + Antenna factor + cable loss-Amp factor

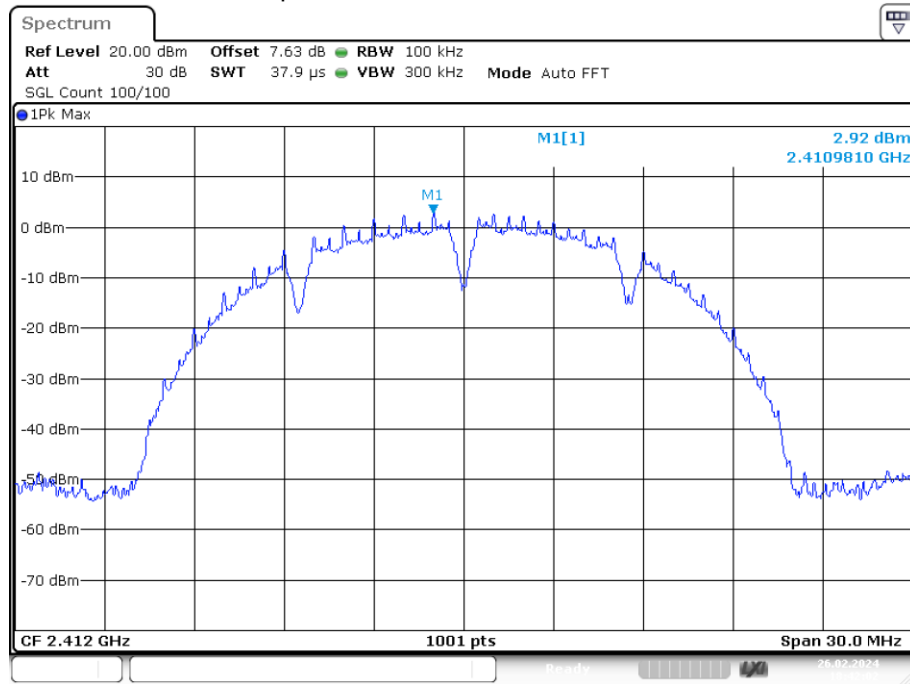
2, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

Note:

Note:

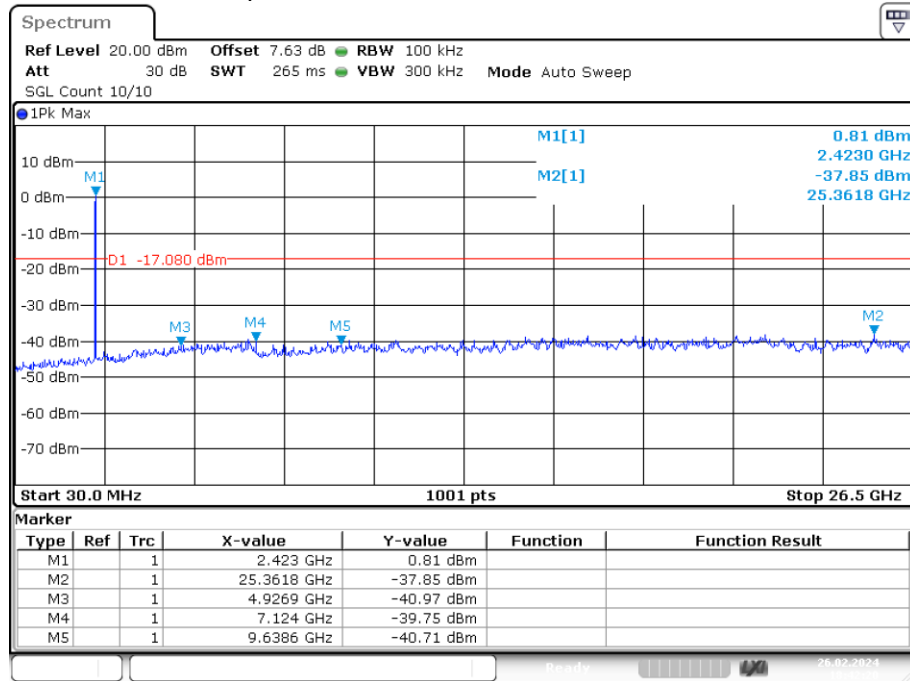
Conducted RF Spurious Emission

Tx. Spurious NVNT b 2412MHz Ant A Ref



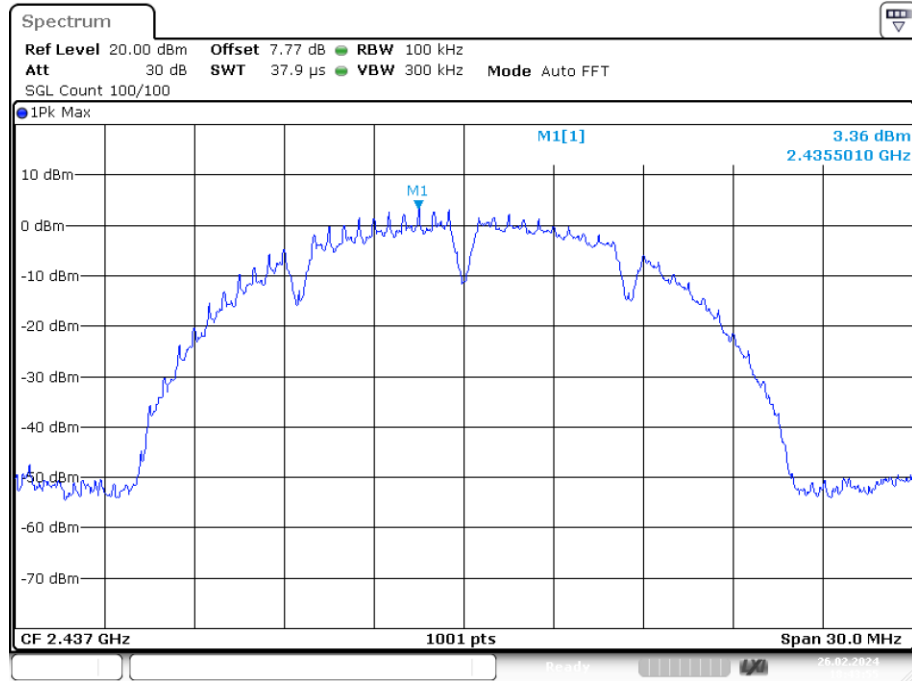
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Tx. Spurious NVNT b 2412MHz Ant A Emission



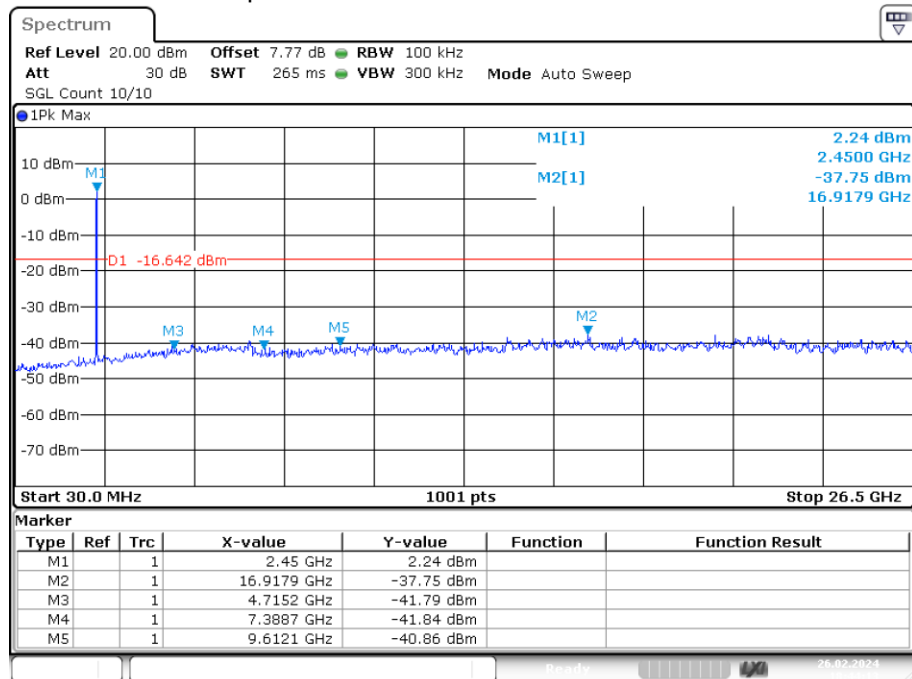
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Tx. Spurious NVNT b 2437MHz Ant A Ref



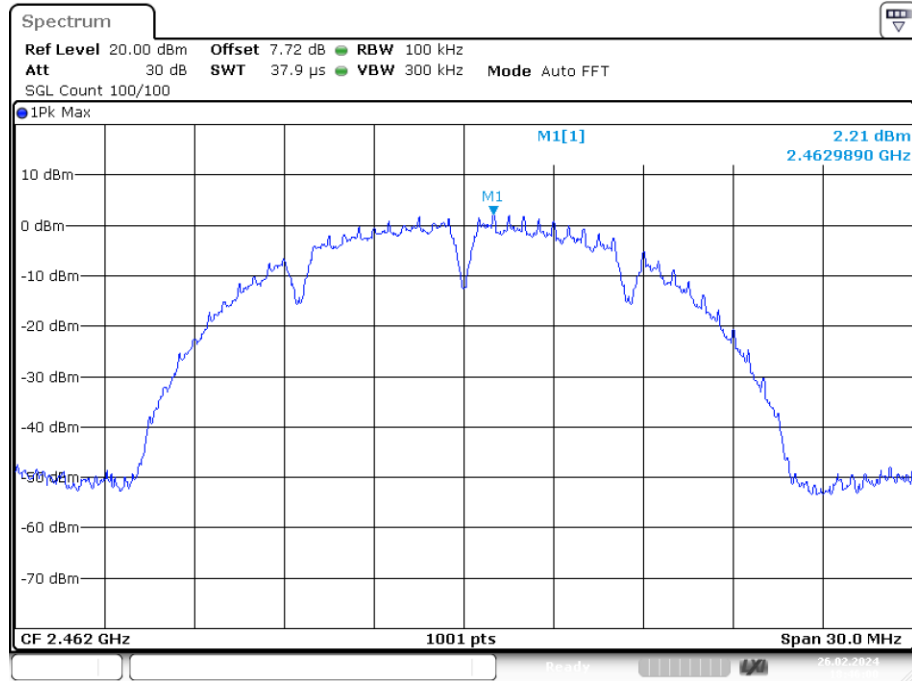
Date: 26.FEB.2024 18:43:55

Tx. Spurious NVNT b 2437MHz Ant A Emission



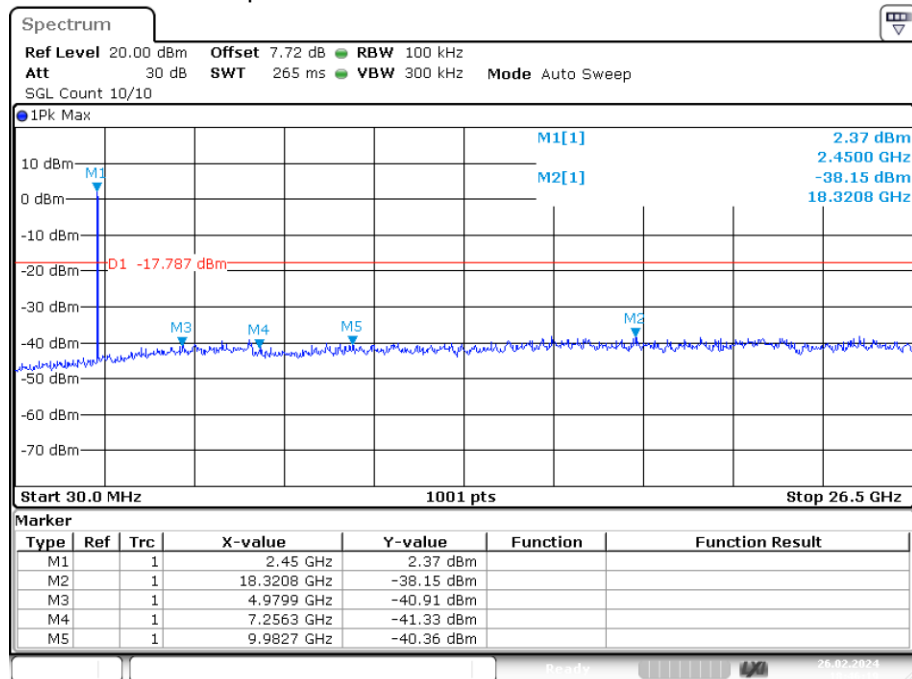
Date: 26.FEB.2024 18:44:13

Tx. Spurious NVNT b 2462MHz Ant A Ref



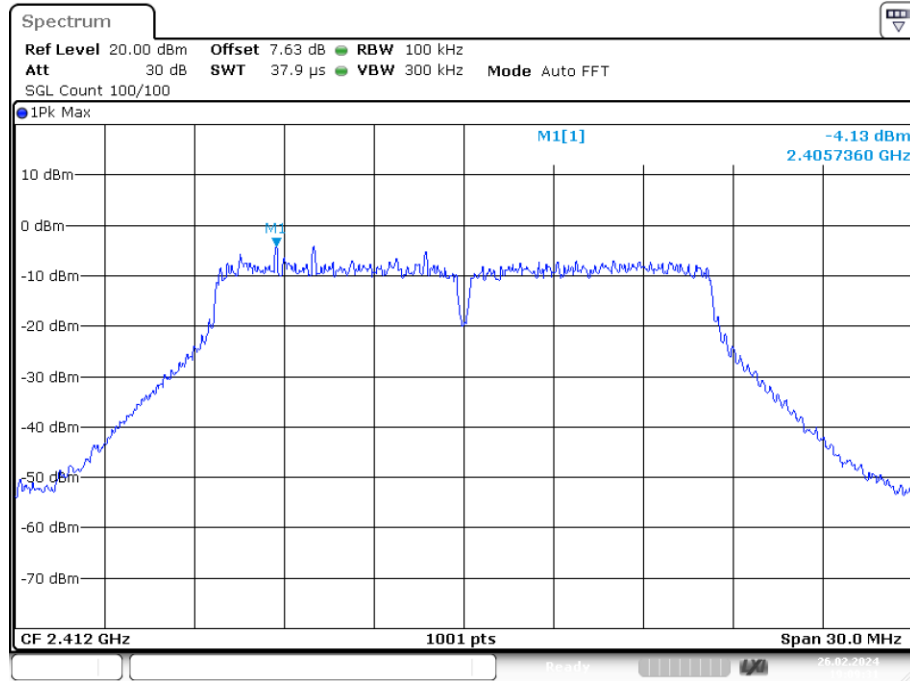
Date: 26.FEB.2024 18:46:00

Tx. Spurious NVNT b 2462MHz Ant A Emission



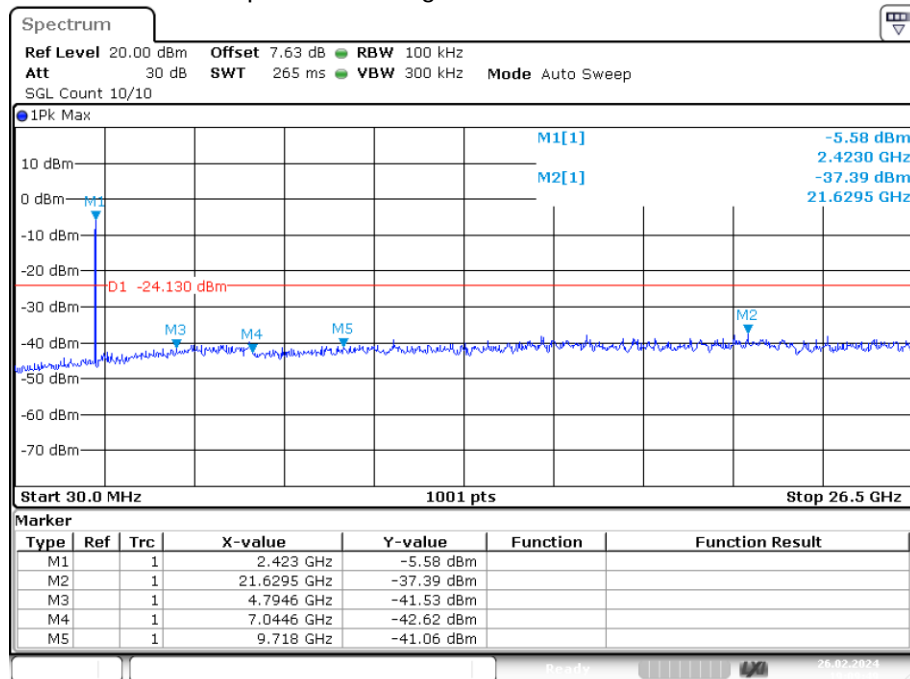
Date: 26.FEB.2024 18:46:18

Tx. Spurious NVNT g 2412MHz Ant A Ref



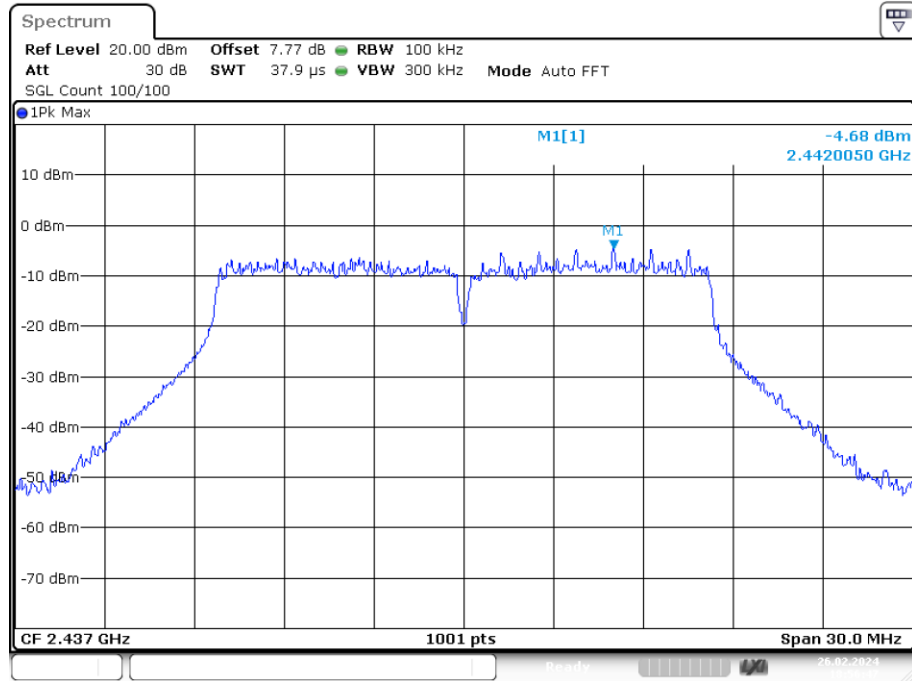
Date: 26.FEB.2024 19:09:31

Tx. Spurious NVNT g 2412MHz Ant A Emission



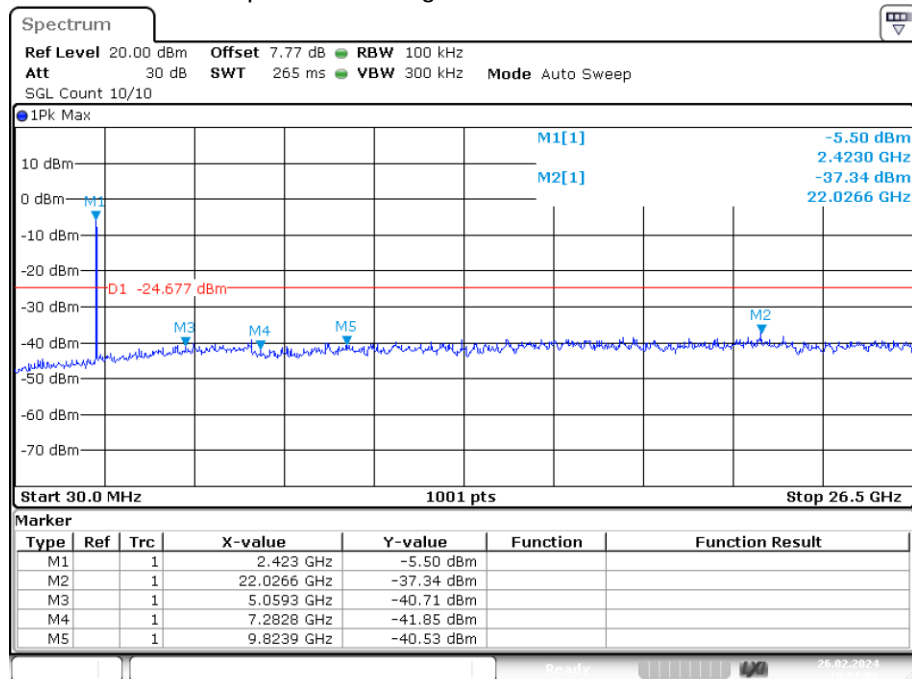
Date: 26.FEB.2024 19:09:49

Tx. Spurious NVNT g 2437MHz Ant A Ref



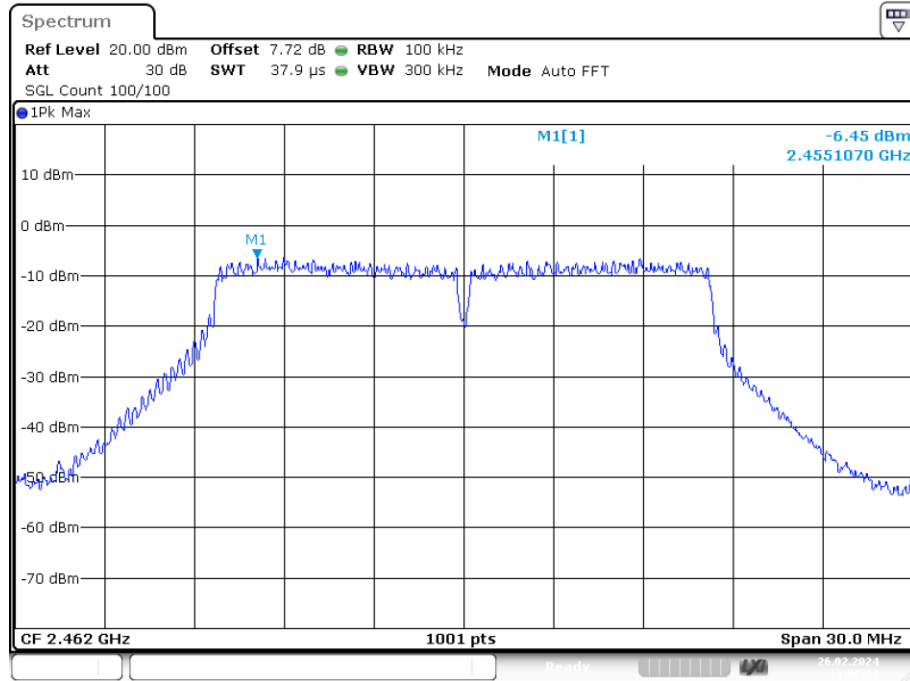
Date: 26.FEB.2024 18:56:47

Tx. Spurious NVNT g 2437MHz Ant A Emission



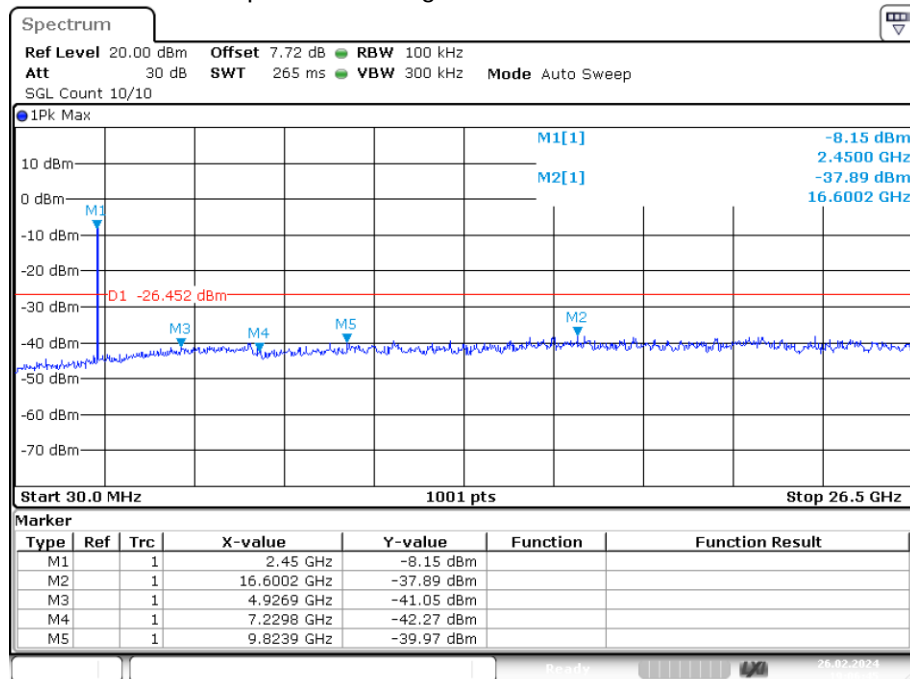
Date: 26.FEB.2024 18:57:05

Tx. Spurious NVNT g 2462MHz Ant A Ref



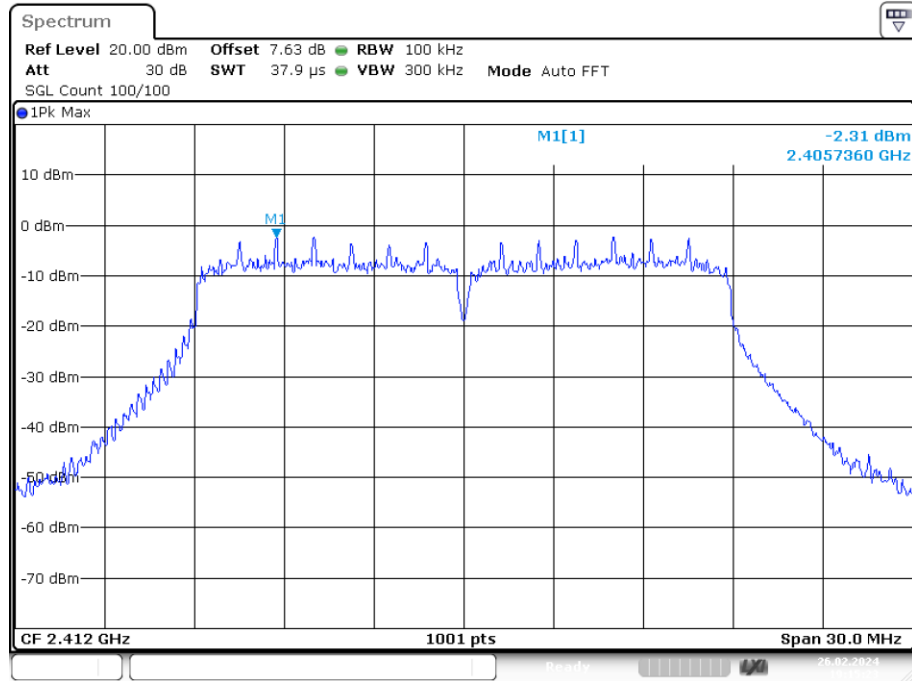
Date: 26.FEB.2024 19:06:27

Tx. Spurious NVNT g 2462MHz Ant A Emission



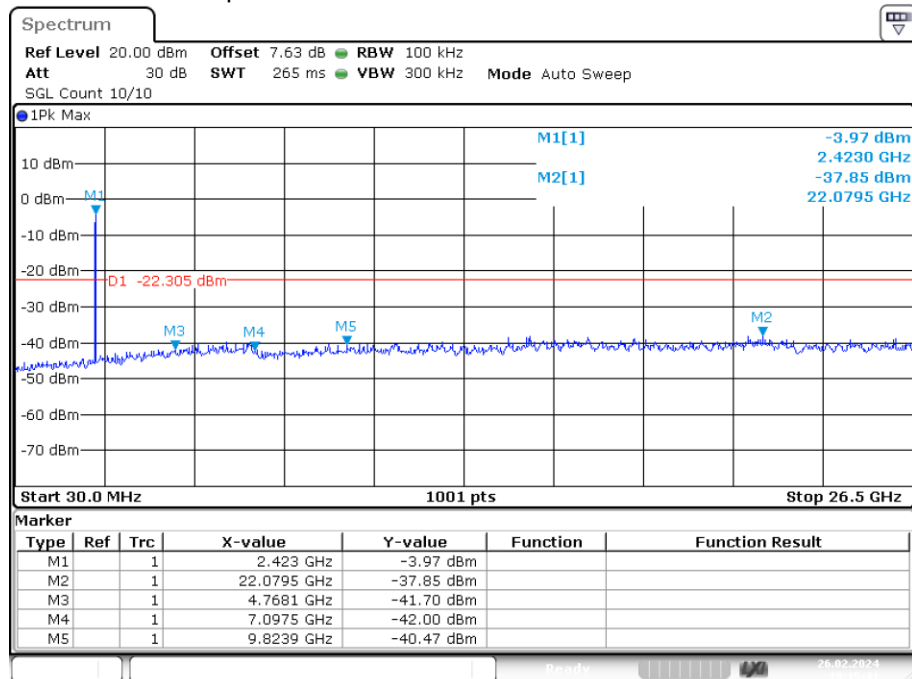
Date: 26.FEB.2024 19:06:45

Tx. Spurious NVNT n20 2412MHz MIMO Ref



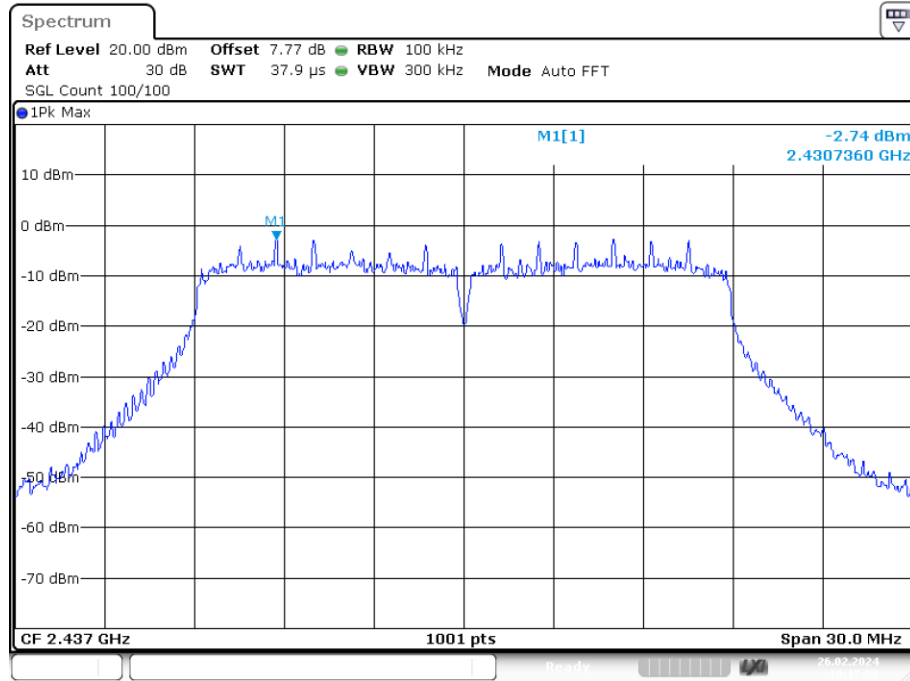
Date: 26.FEB.2024 19:15:23

Tx. Spurious NVNT n20 2412MHz MIMO Emission



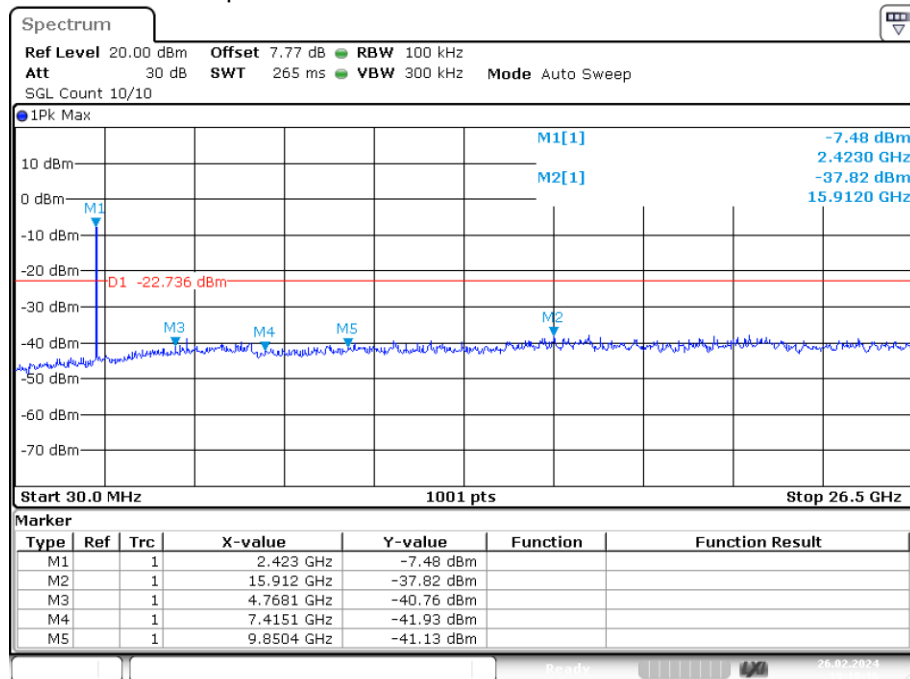
Date: 26.FEB.2024 19:15:41

Tx. Spurious NVNT n20 2437MHz MIMO Ref



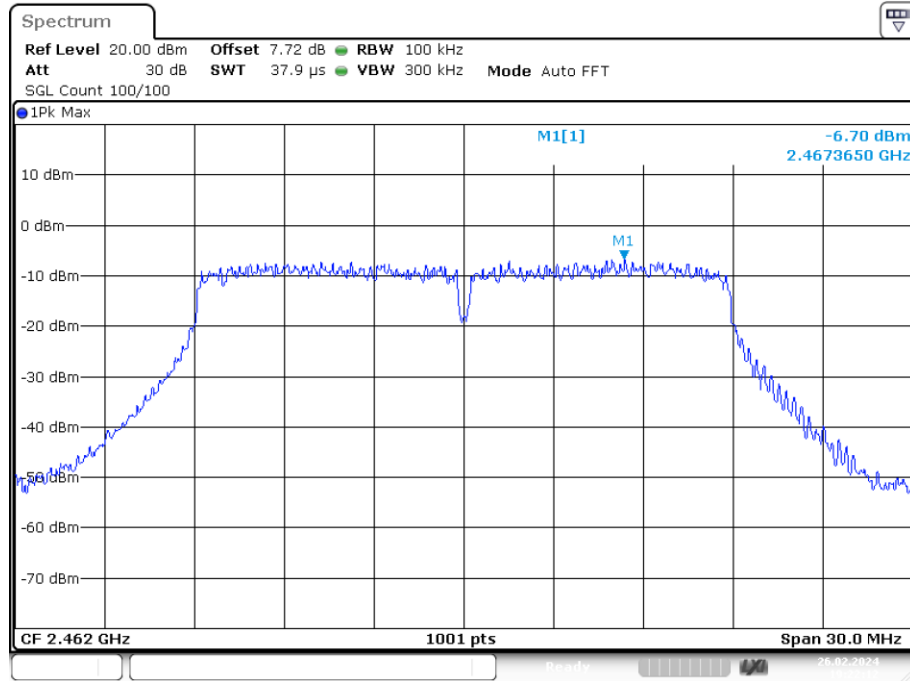
Date: 26.FEB.2024 19:17:58

Tx. Spurious NVNT n20 2437MHz MIMO Emission



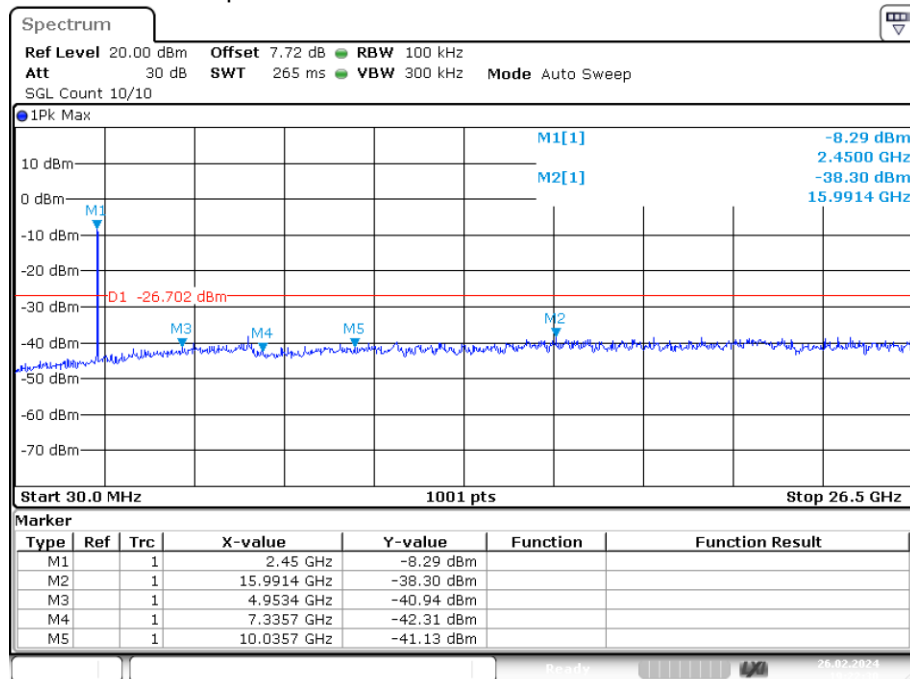
Date: 26.FEB.2024 19:18:16

Tx. Spurious NVNT n20 2462MHz MIMO Ref



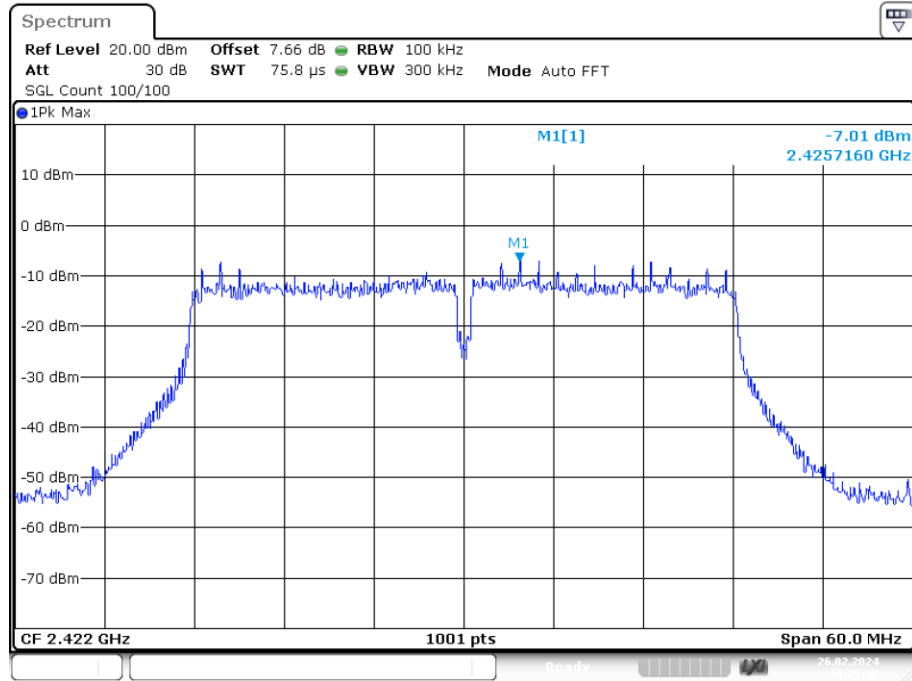
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Tx. Spurious NVNT n20 2462MHz MIMO Emission



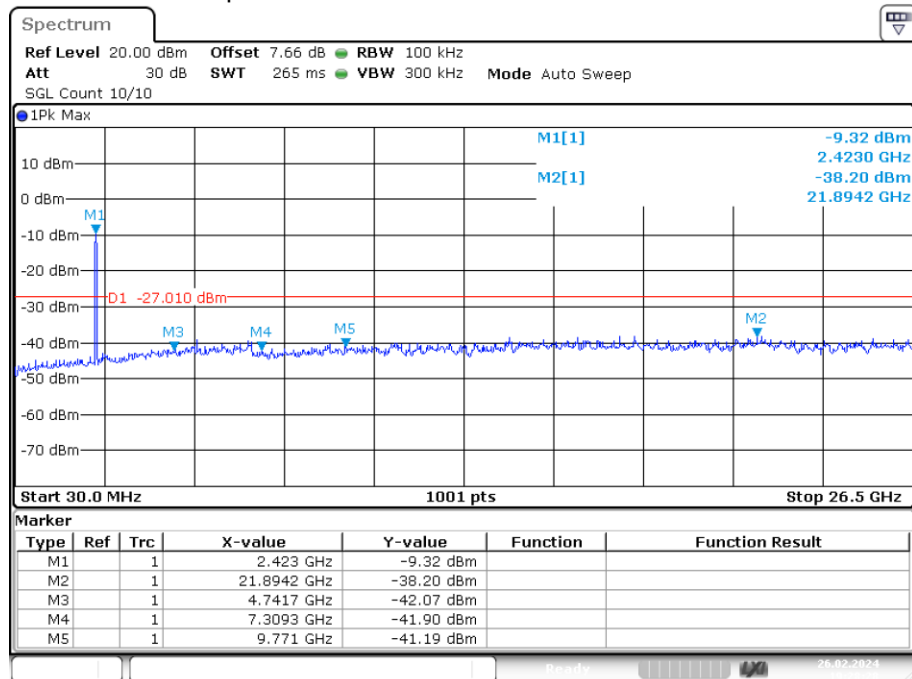
Date: 26.FEB.2024 19:22:30

Tx. Spurious NVNT n40 2422MHz MIMO Ref



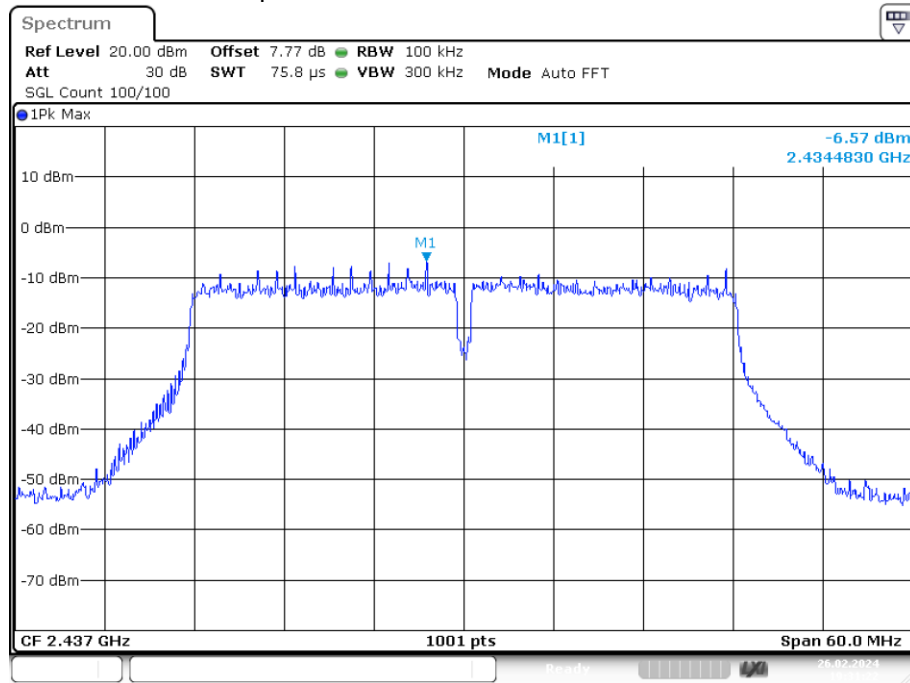
Date: 26.FEB.2024 19:28:10

Tx. Spurious NVNT n40 2422MHz MIMO Emission



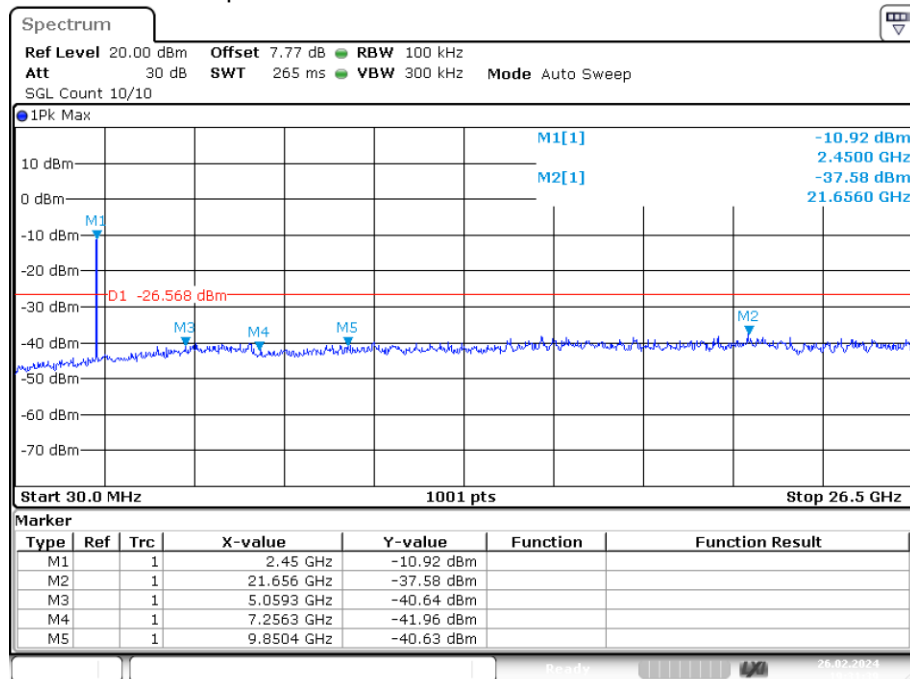
Date: 26.FEB.2024 19:28:28

Tx. Spurious NVNT n40 2437MHz MIMO Ref



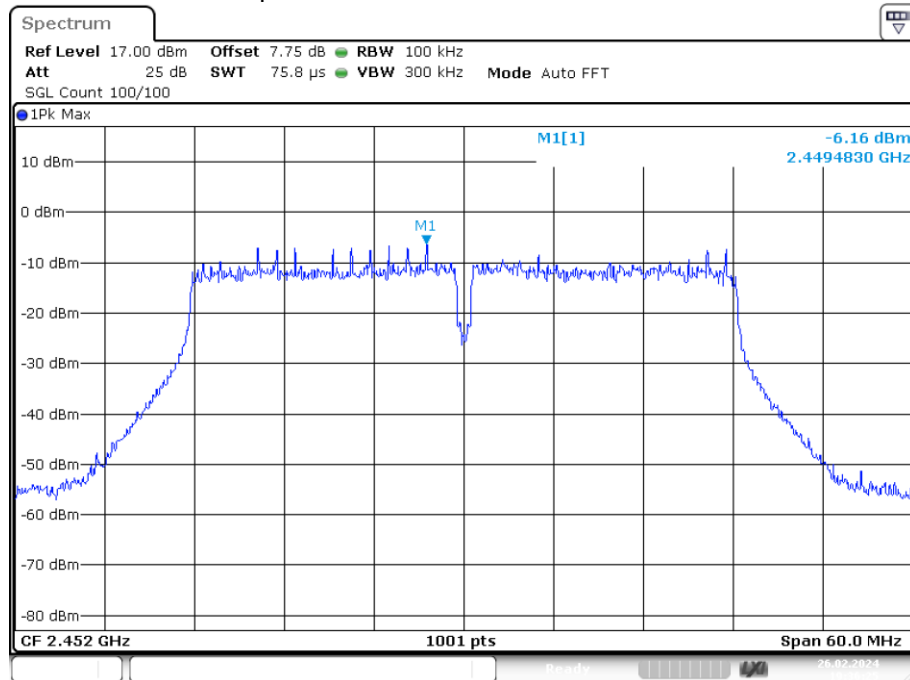
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Tx. Spurious NVNT n40 2437MHz MIMO Emission



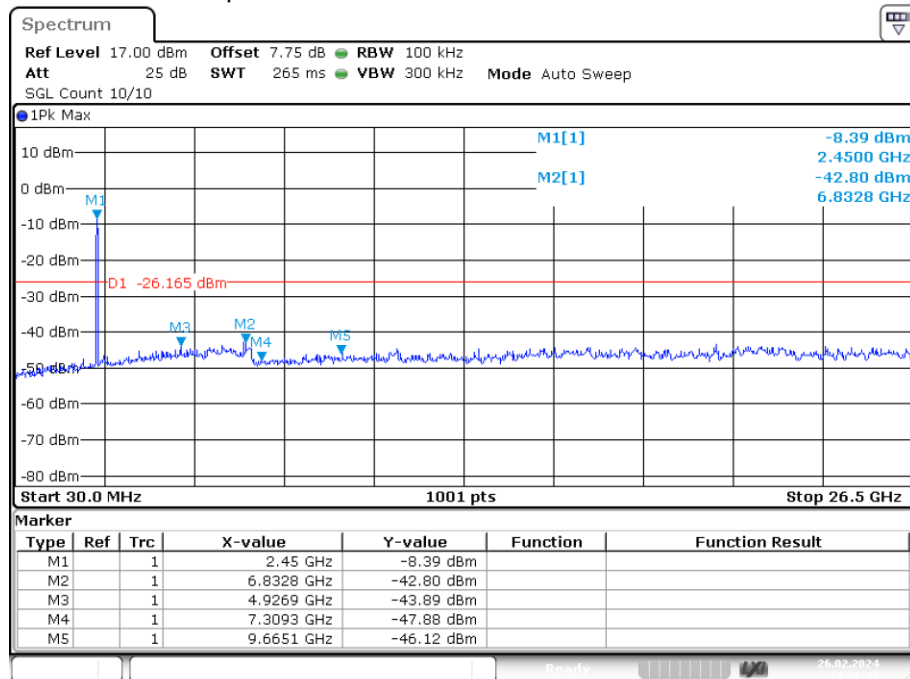
Date: 26.FEB.2024 19:31:39

Tx. Spurious NVNT n40 2452MHz MIMO Ref



Date: 26.FEB.2024 19:36:25

Tx. Spurious NVNT n40 2452MHz MIMO Emission



Date: 26.FEB.2024 19:36:43

- Note: 1. Except for mode b/g, other modes test the MIMO status.
2. All antennas have been tested, only the worst data of each pattern is reflected.

4. POWER LINE CONDUCTED EMISSION

4.1. Test Limits

Frequency MHz	Limits dB(μ V)	
	Quasi-peak Level	Average Level
0.15 -0.50	66 -56*	56 - 46*
0.50 -5.00	56	46
5.00 -30.00	60	50

Notes: 1. *Decreasing linearly with logarithm of frequency.

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

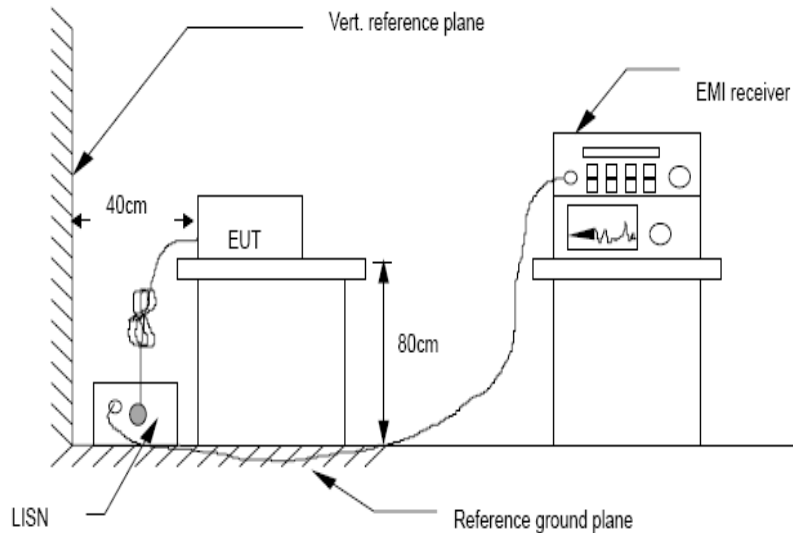
3. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

4.2. Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC lines are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.10:2013 on Conducted Emission Measurement.

The bandwidth of test receiver is set at 9 kHz.

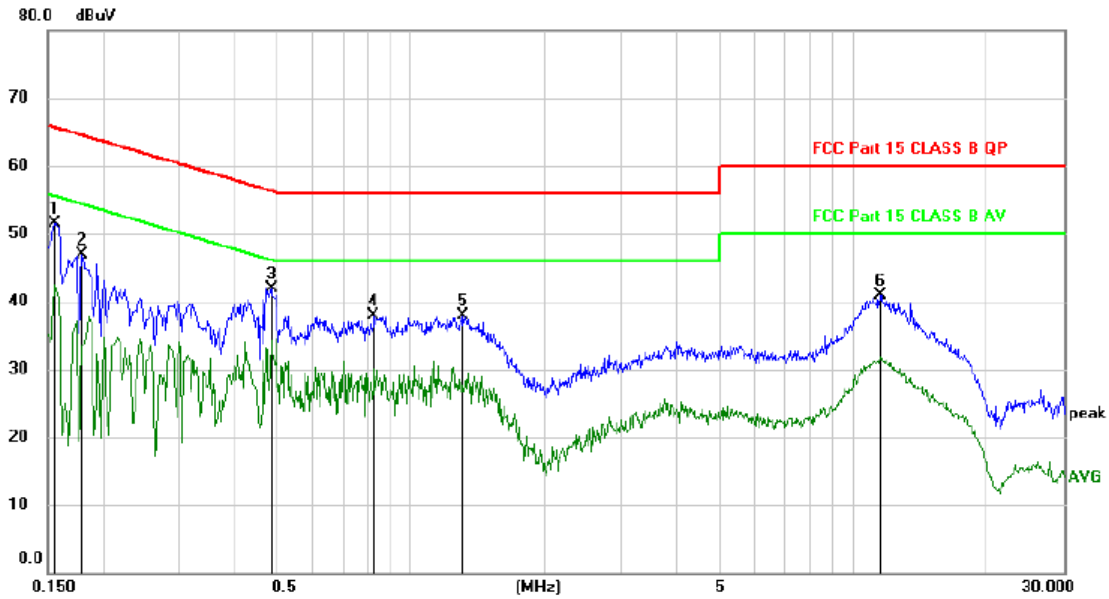
4.3. Test Setup



4.4. Test Results

Test result for 802.11b (2412MHz), AC 120V/ 60Hz

Line:



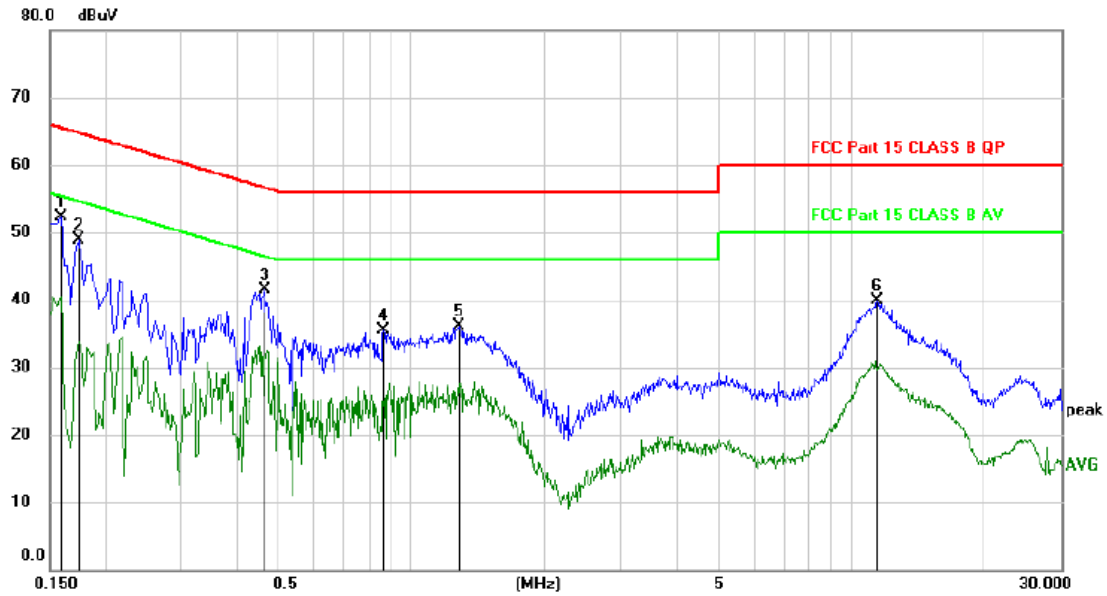
No.	Mk.	Freq. MHz	Reading Level dBμV	Correct Factor dB	Measure- ment dBμV	Limit dBμV	Margin dB	Detector	Comment
1	*	0.1560	41.65	9.94	51.59	65.67	-14.08	peak	
2		0.1800	37.04	9.93	46.97	64.49	-17.52	peak	
3		0.4830	31.90	9.96	41.86	56.29	-14.43	peak	
4		0.8220	27.91	9.95	37.86	56.00	-18.14	peak	
5		1.3140	28.00	9.90	37.90	56.00	-18.10	peak	
6		11.5260	30.59	10.25	40.84	60.00	-19.16	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. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	*	0.1590	42.32	9.94	52.26	65.52	-13.26	peak	
2		0.1740	38.95	9.93	48.88	64.77	-15.89	peak	
3		0.4620	31.60	9.95	41.55	56.66	-15.11	peak	
4		0.8640	25.61	9.96	35.57	56.00	-20.43	peak	
5		1.2780	26.13	9.89	36.02	56.00	-19.98	peak	
6		11.4750	29.56	10.25	39.81	60.00	-20.19	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

Notes: This report only shall the worst case mode for b 2412MHz.

5. CONDUCTED MAXIMUM OUTPUT POWER

5.1. Test limits

Please refer FCC PART 15: 15.247.

Regulation 15.247(b) The limit of Maximum Peak Output Power Measurement is 1W(30dBm).

5.2. Test Procedure

Details see the KDB558074 D01 Meas Guidance v05r02

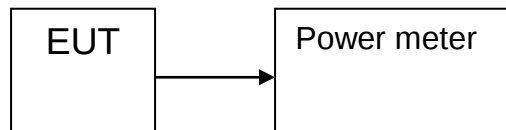
5.2.1 Place the EUT on the table and set it in transmitting mode.

5.2.2 Connected the EUT's antenna port to peak power meter by 20dB attenuator.

5.2.3 Measure out each mode and each bands peak output power of EUT.

Note: The cable loss and attenuator loss were offset into measure device as amplitude offset.

5.3. Test Setup



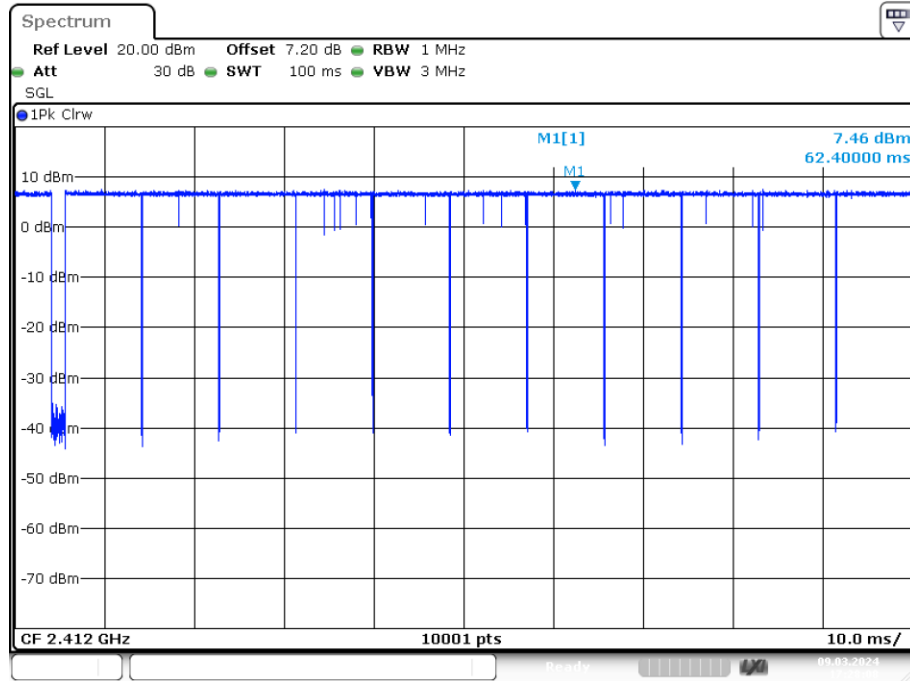
5.4. Test Results

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	EIRP (dBm)	Limit (dBm)	Verdict
NVNT	b	2412	Ant A	10.679	14.679	30	Pass
NVNT	b	2437	Ant A	10.843	14.843	30	Pass
NVNT	b	2462	Ant A	10.611	14.611	30	Pass
NVNT	g	2412	Ant A	10.501	14.501	30	Pass
NVNT	g	2437	Ant A	10.636	14.636	30	Pass
NVNT	g	2462	Ant A	10.397	14.397	30	Pass
NVNT	n20	2412	Ant A	11.557	15.557	30	Pass
NVNT	n20	2437	Ant A	11.143	15.143	30	Pass
NVNT	n20	2462	Ant A	11.227	15.227	30	Pass
NVNT	n40	2422	Ant A	11.013	15.013	30	Pass
NVNT	n40	2437	Ant A	11.599	15.599	30	Pass
NVNT	n40	2452	Ant A	11.503	15.503	30	Pass

Duty Cycle

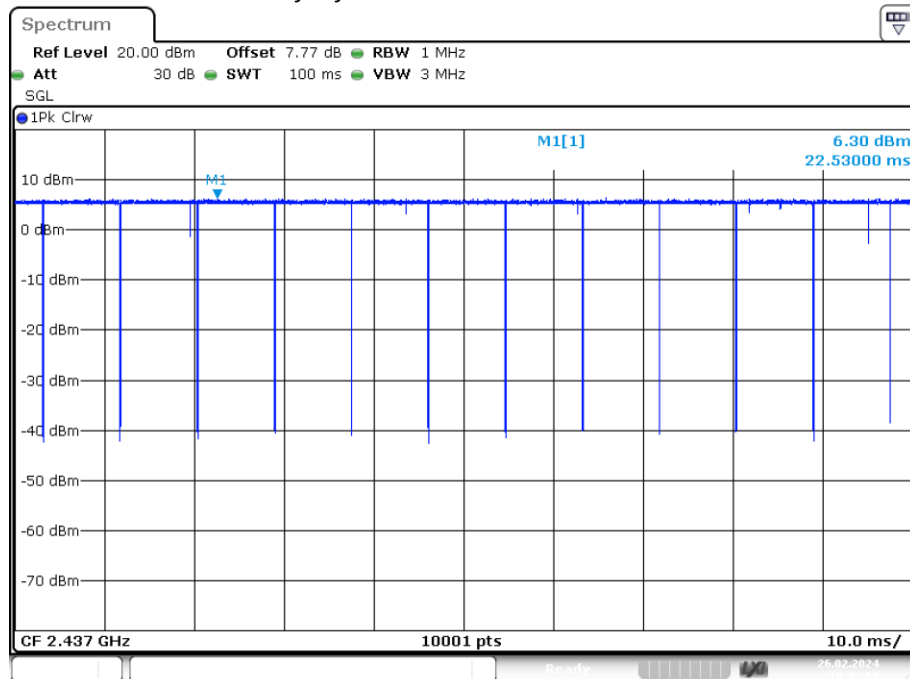
Condition	Mode	Frequency (MHz)	Antenna	Duty Cycle (%)
NVNT	b	2412	Ant A	97.49
NVNT	b	2437	Ant A	98.99
NVNT	b	2462	Ant A	99
NVNT	g	2412	Ant A	88.79
NVNT	g	2437	Ant A	94.16
NVNT	g	2462	Ant A	94.02
NVNT	n20	2412	Ant A	90.55
NVNT	n20	2437	Ant A	93.47
NVNT	n20	2462	Ant A	93.51
NVNT	n40	2422	Ant A	94.61
NVNT	n40	2437	Ant A	90.83
NVNT	n40	2452	Ant A	96.62

Duty Cycle NVNT b 2412MHz Ant A



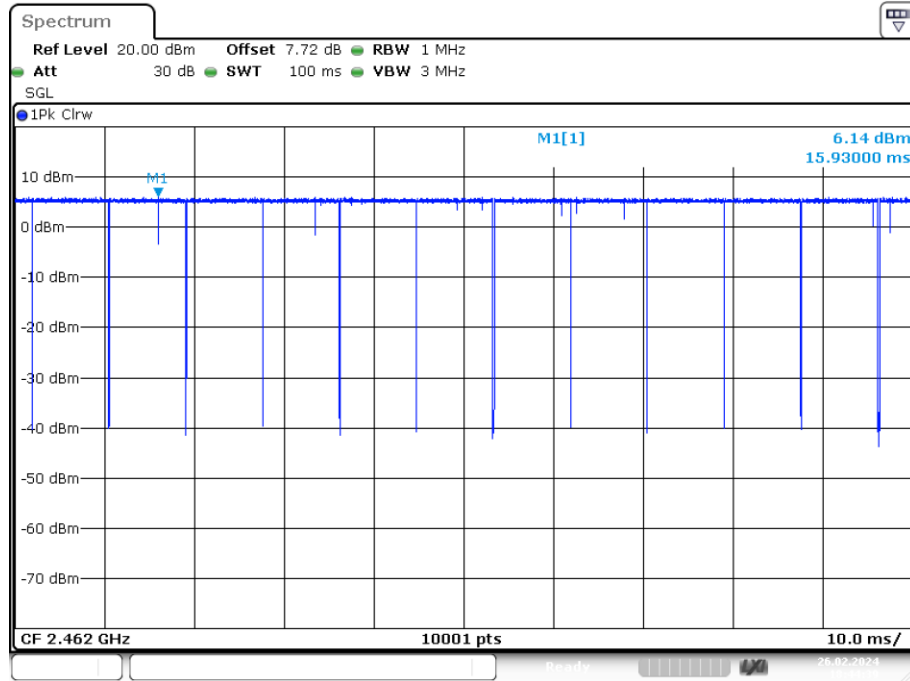
Date: 9.MAR.2024 17:28:08

Duty Cycle NVNT b 2437MHz Ant A



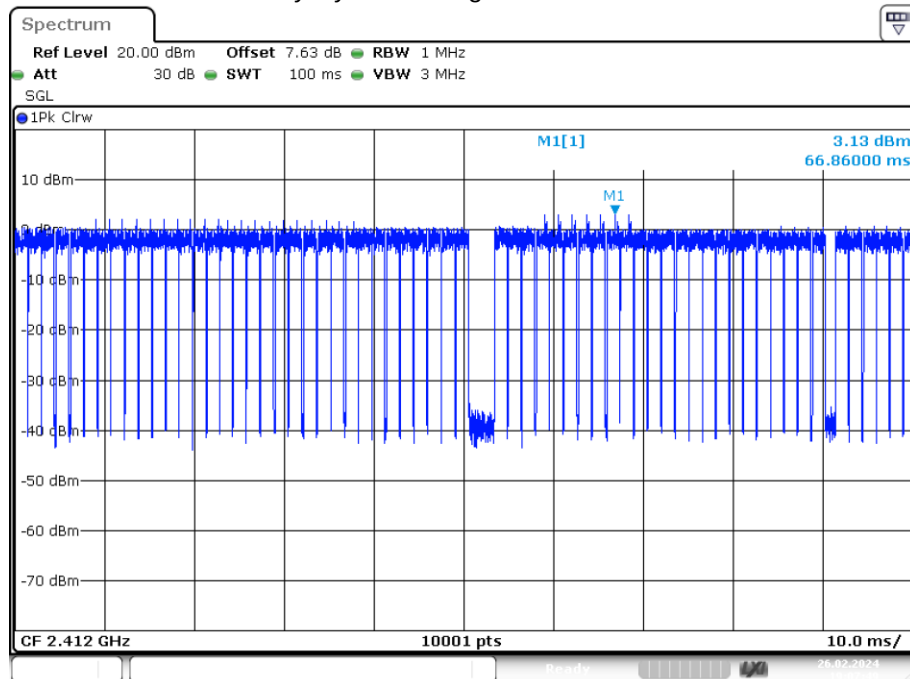
Date: 26.FEB.2024 18:42:58

Duty Cycle NVNT b 2462MHz Ant A



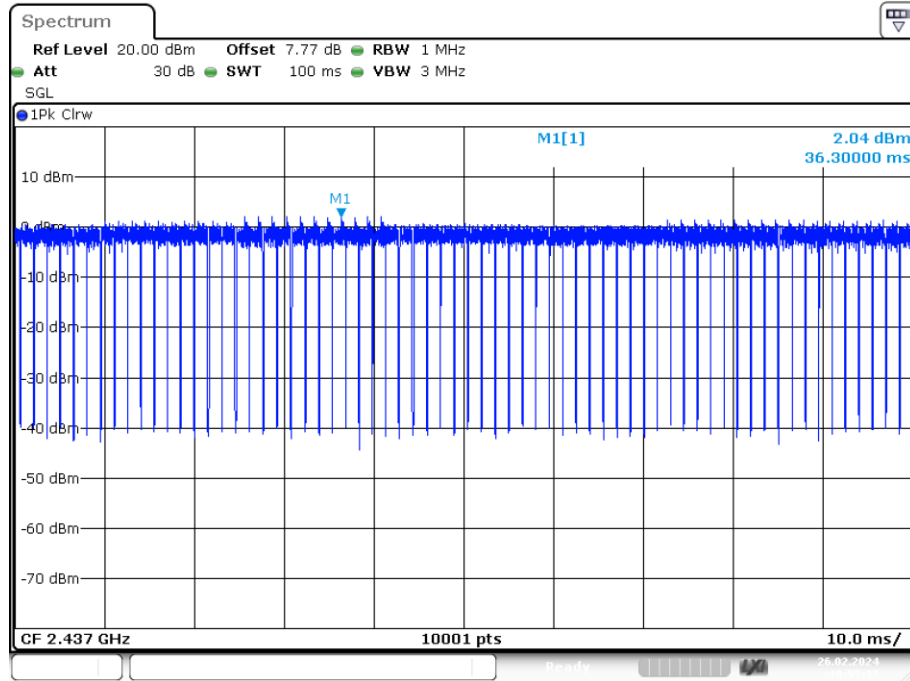
Date: 26.FEB.2024 18:44:39

Duty Cycle NVNT g 2412MHz Ant A



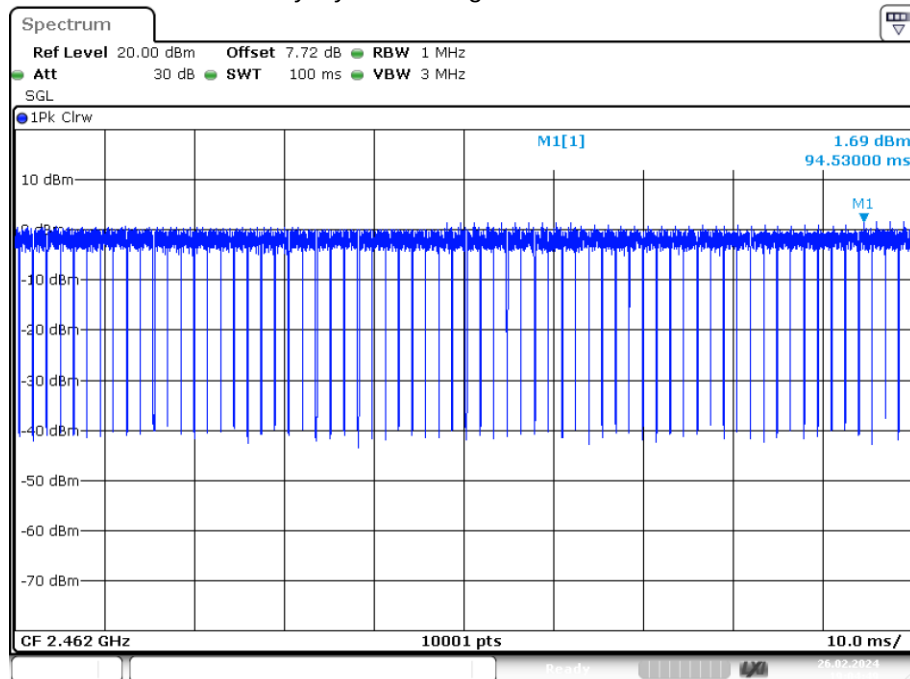
Date: 26.FEB.2024 19:07:49

Duty Cycle NVNT g 2437MHz Ant A



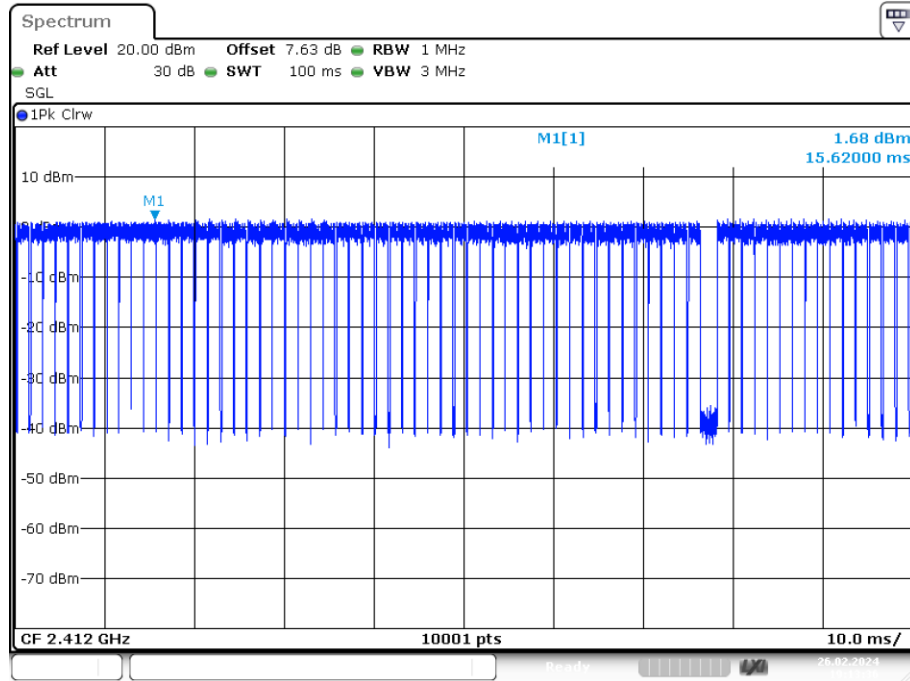
Date: 26.FEB.2024 18:55:36

Duty Cycle NVNT g 2462MHz Ant A



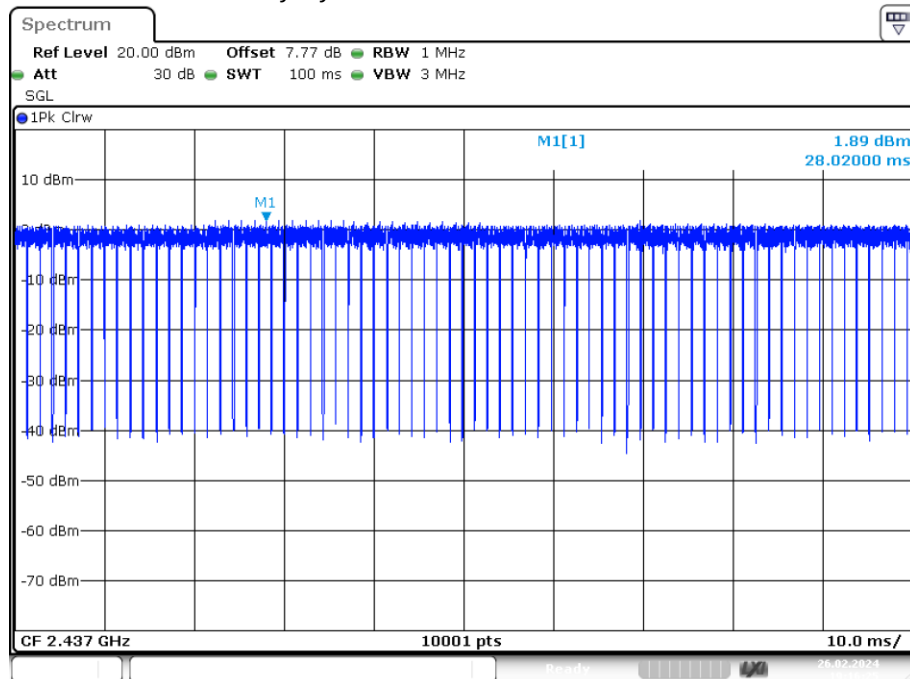
Date: 26.FEB.2024 19:04:49

Duty Cycle NVNT n20 2412MHz Ant A



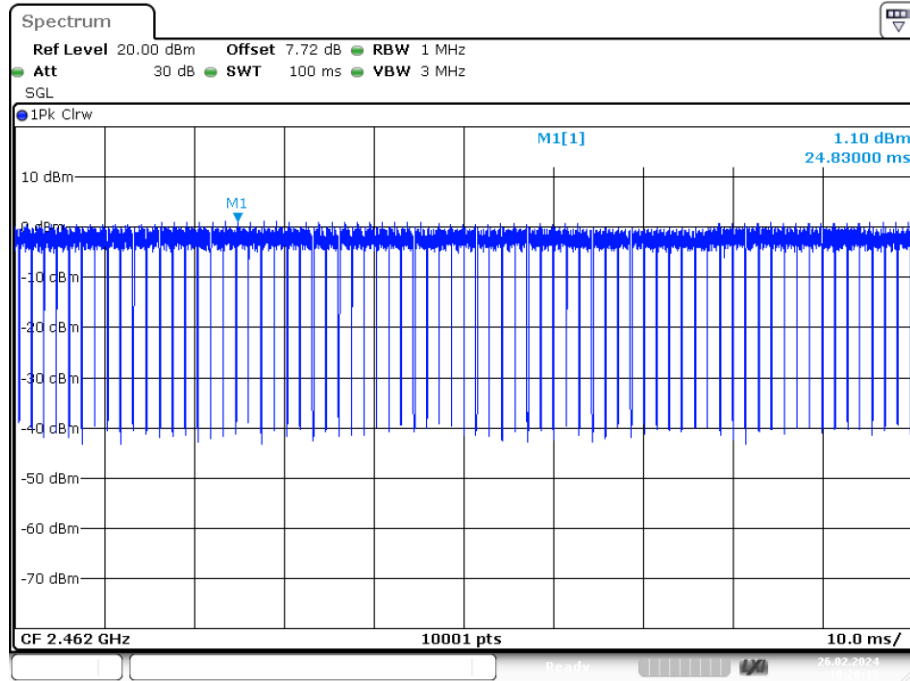
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Duty Cycle NVNT n20 2437MHz Ant A



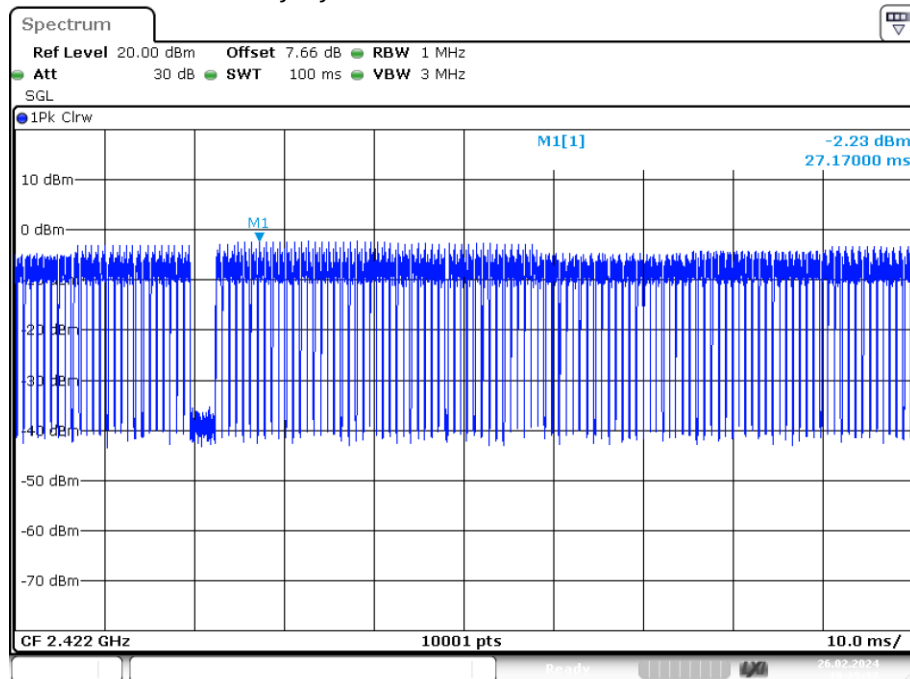
Date: 26.FEB.2024 19:16:25

Duty Cycle NVNT n20 2462MHz Ant A



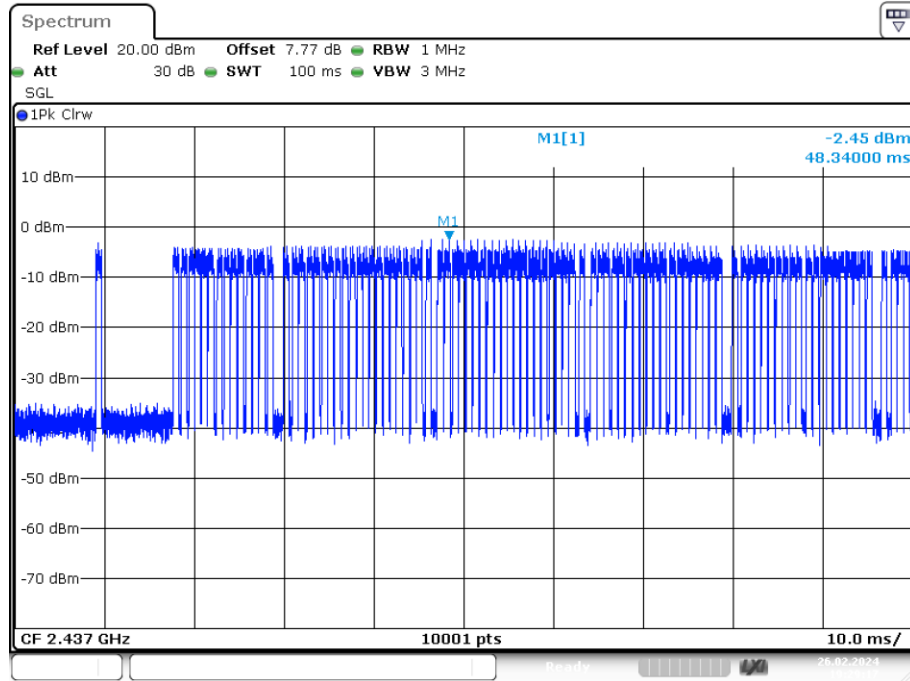
Date: 26.FEB.2024 19:20:13

Duty Cycle NVNT n40 2422MHz Ant A



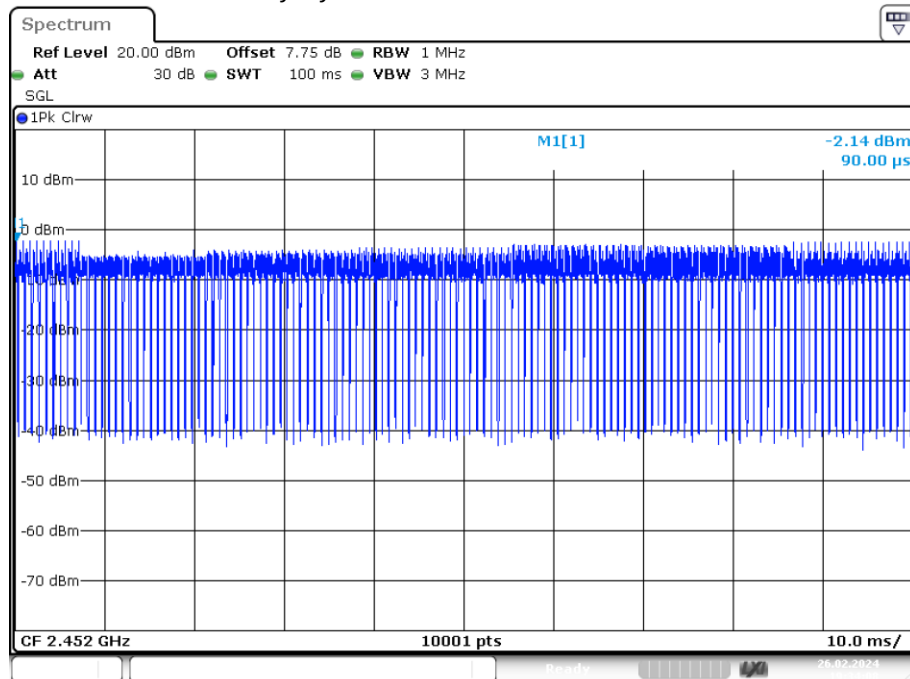
Date: 26.FEB.2024 19:25:36

Duty Cycle NVNT n40 2437MHz Ant A



Date: 26.FEB.2024 19:29:18

Duty Cycle NVNT n40 2452MHz Ant A



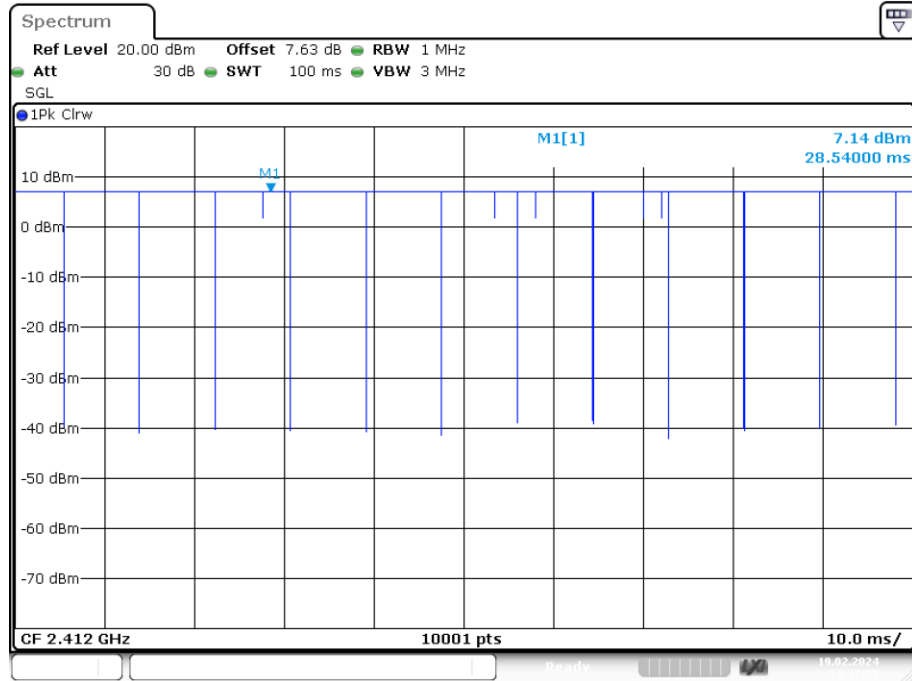
Date: 26.FEB.2024 19:34:08

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	EIRP (dBm)	Limit (dBm)	Verdict
NVNT	b	2412	Ant B	10.593	14.593	30	Pass
NVNT	b	2437	Ant B	10.674	14.674	30	Pass
NVNT	b	2462	Ant B	10.623	14.623	30	Pass
NVNT	g	2412	Ant B	11.174	15.174	30	Pass
NVNT	g	2437	Ant B	10.78	14.78	30	Pass
NVNT	g	2462	Ant B	11.308	15.308	30	Pass
NVNT	n20	2412	Ant B	10.925	14.925	30	Pass
NVNT	n20	2437	Ant B	10.696	14.696	30	Pass
NVNT	n20	2462	Ant B	11.204	15.204	30	Pass
NVNT	n40	2422	Ant B	10.732	14.732	30	Pass
NVNT	n40	2437	Ant B	10.828	14.828	30	Pass
NVNT	n40	2452	Ant B	11.224	15.224	30	Pass

Duty Cycle

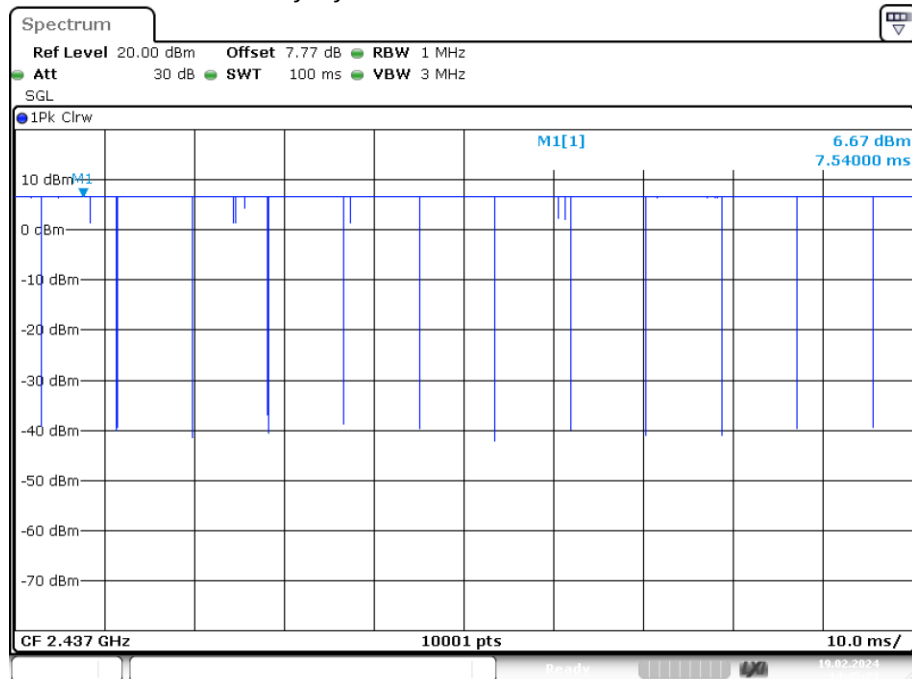
Condition	Mode	Frequency (MHz)	Antenna	Duty Cycle (%)
NVNT	b	2412	Ant B	99.68
NVNT	b	2437	Ant B	99.68
NVNT	b	2462	Ant B	99.68
NVNT	g	2412	Ant B	97.63
NVNT	g	2437	Ant B	97.61
NVNT	g	2462	Ant B	97.6
NVNT	n20	2412	Ant B	97.45
NVNT	n20	2437	Ant B	97.47
NVNT	n20	2462	Ant B	97.48
NVNT	n40	2422	Ant B	98.76
NVNT	n40	2437	Ant B	98.98
NVNT	n40	2452	Ant B	98.89

Duty Cycle NVNT b 2412MHz Ant B



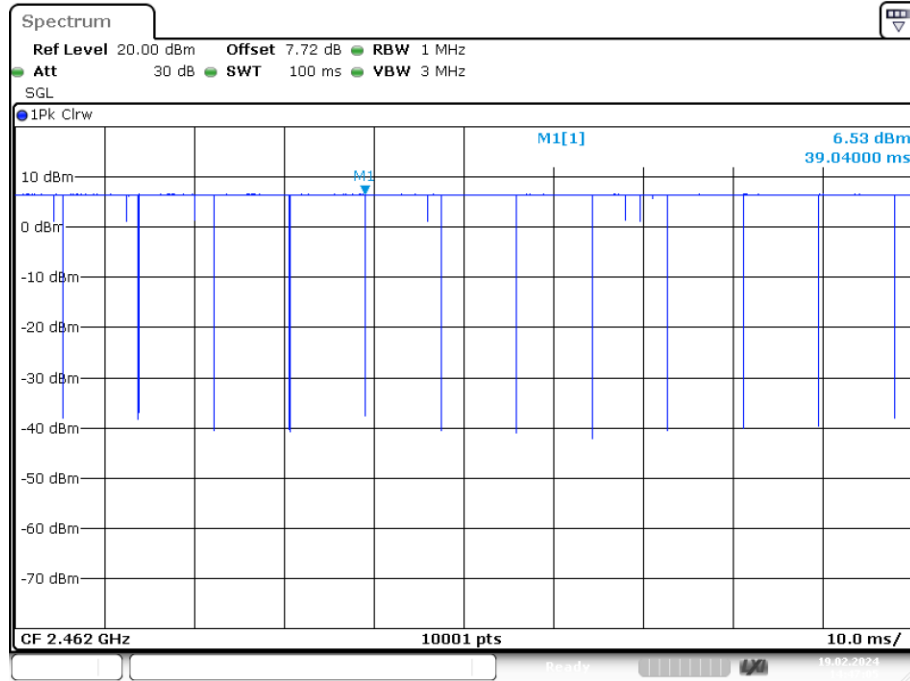
Date: 19.FEB.2024 14:42:54

Duty Cycle NVNT b 2437MHz Ant B



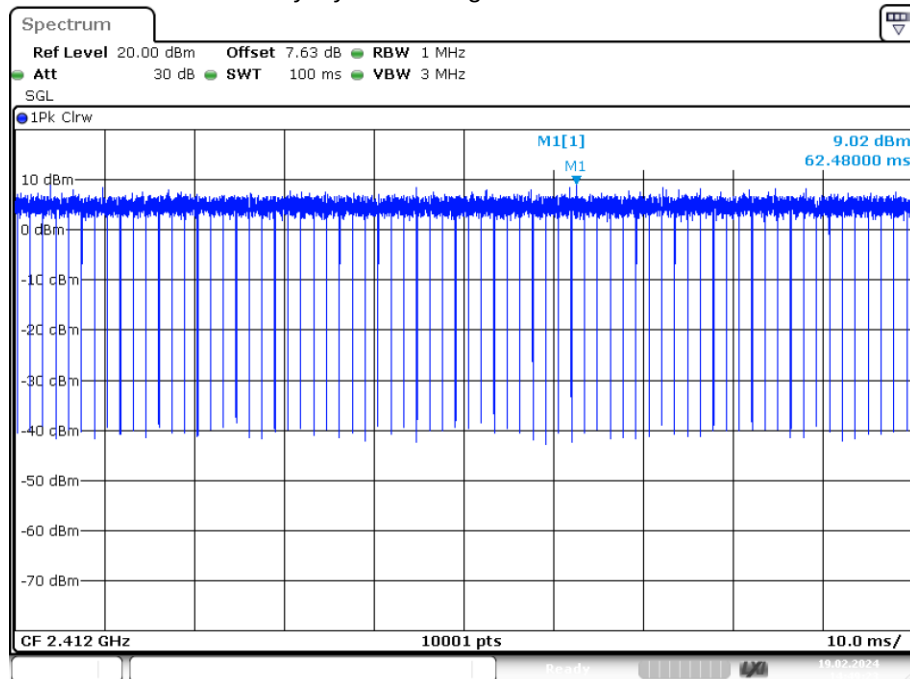
Date: 19.FEB.2024 14:45:23

Duty Cycle NVNT b 2462MHz Ant B



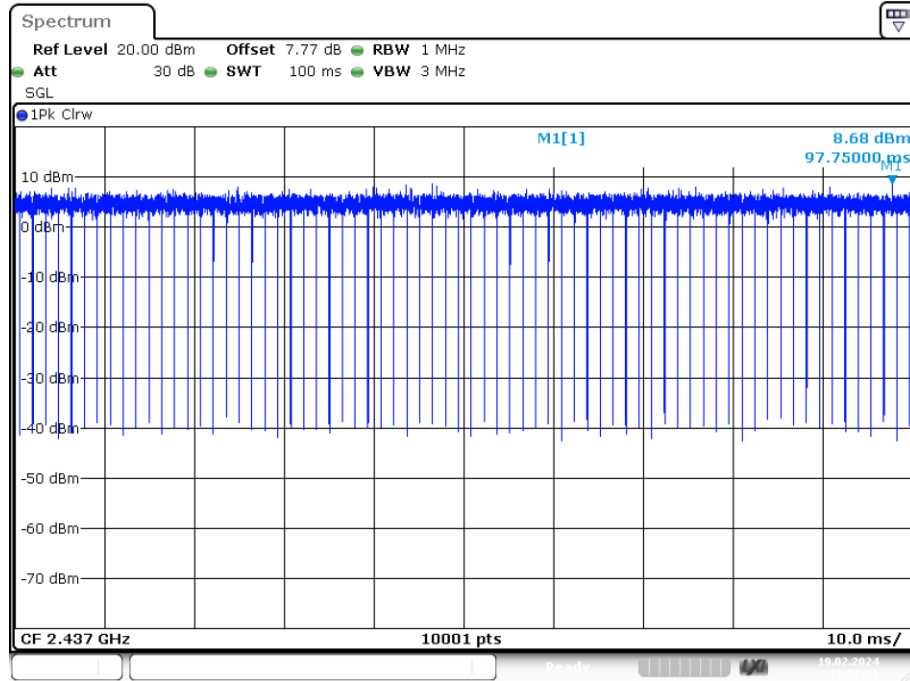
Date: 19.FEB.2024 14:47:05

Duty Cycle NVNT g 2412MHz Ant B



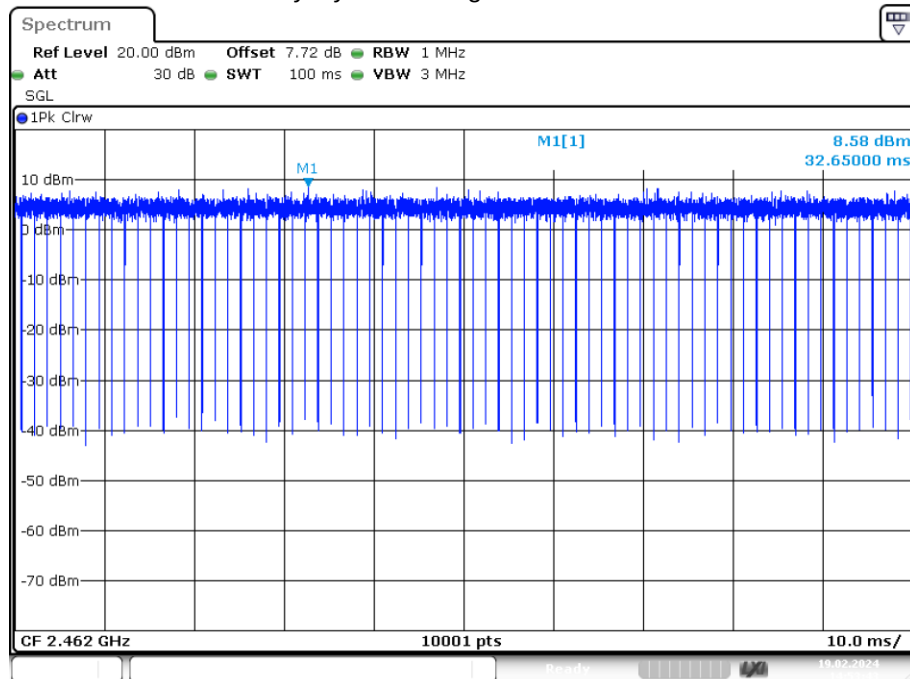
Date: 19.FEB.2024 14:49:23

Duty Cycle NVNT g 2437MHz Ant B



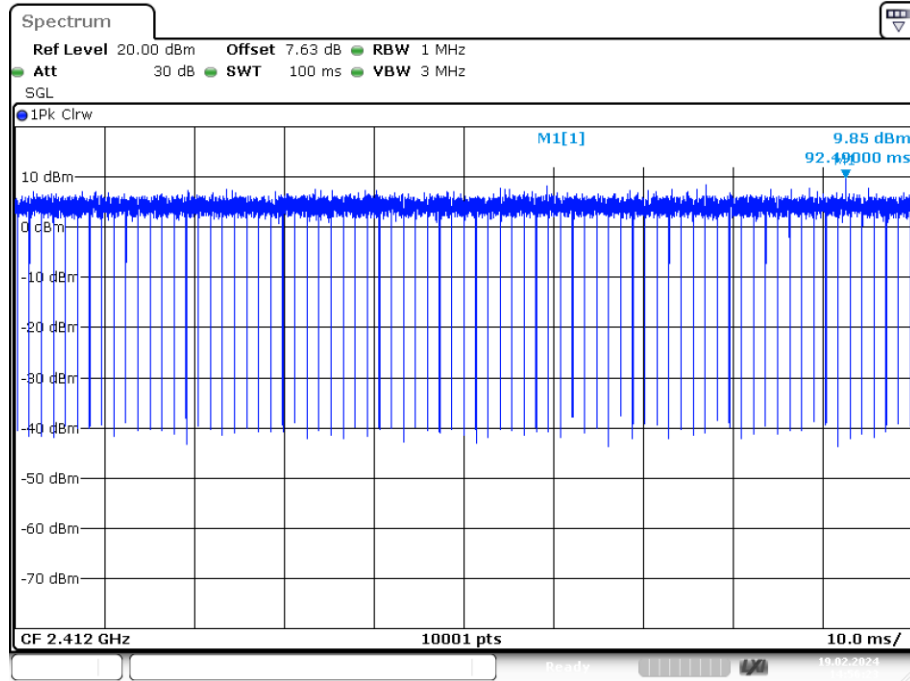
Date: 19.FEB.2024 14:51:32

Duty Cycle NVNT g 2462MHz Ant B



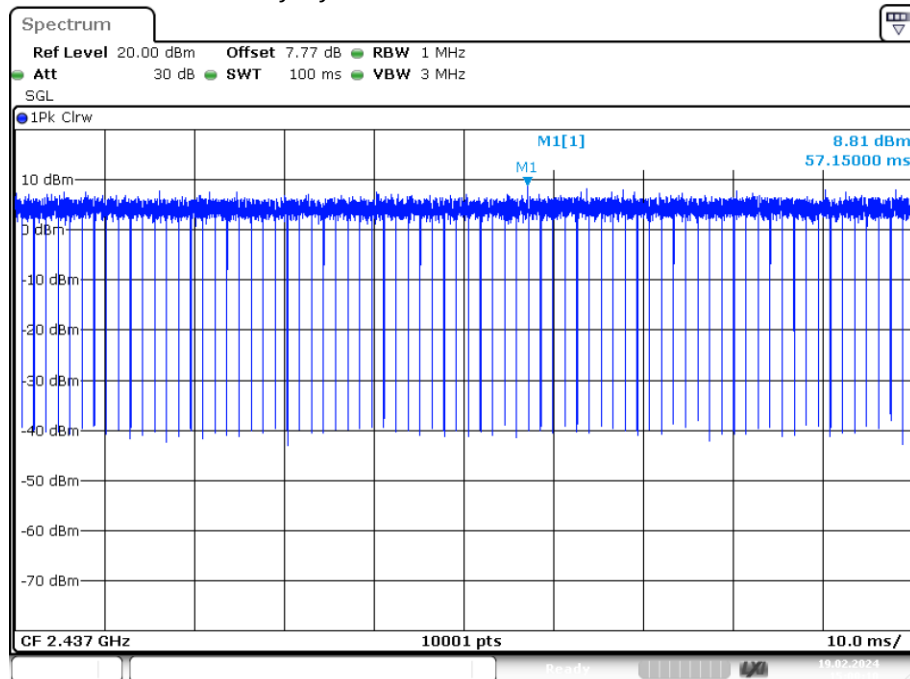
Date: 19.FEB.2024 14:53:44

Duty Cycle NVNT n20 2412MHz Ant B



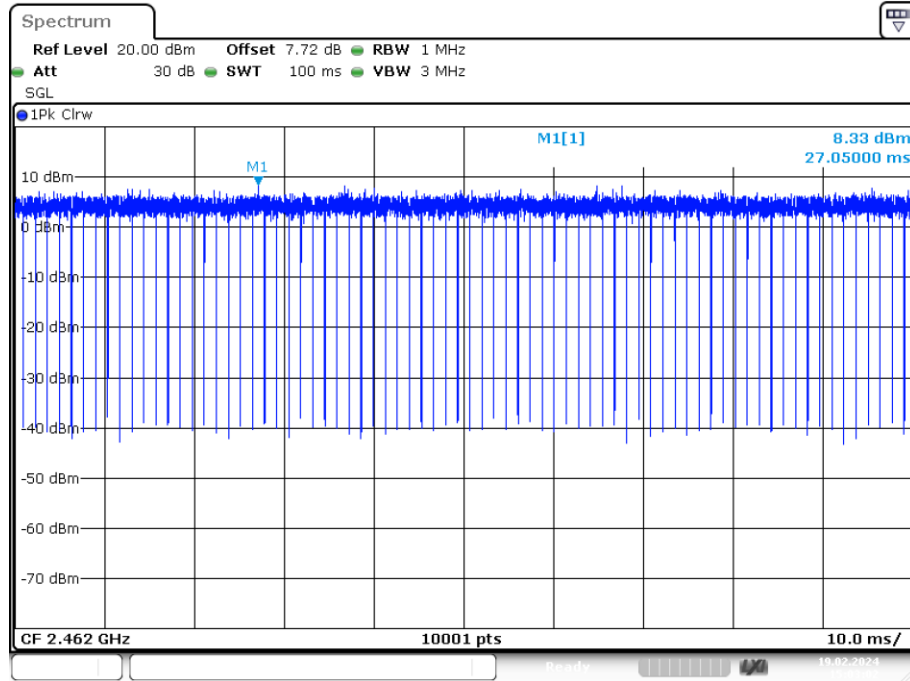
Date: 19.FEB.2024 14:56:23

Duty Cycle NVNT n20 2437MHz Ant B



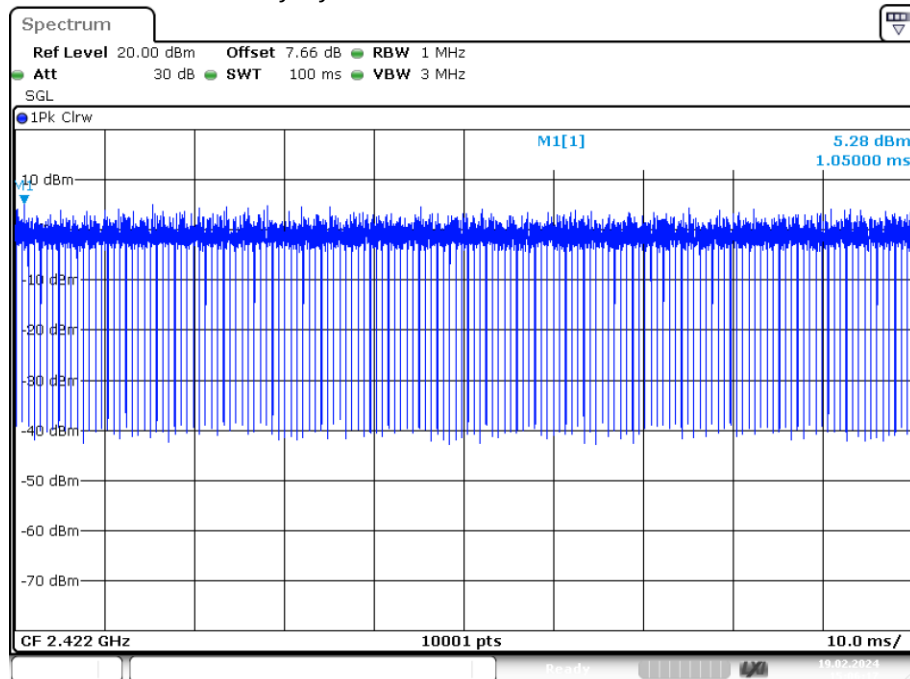
Date: 19.FEB.2024 15:00:10

Duty Cycle NVNT n20 2462MHz Ant B



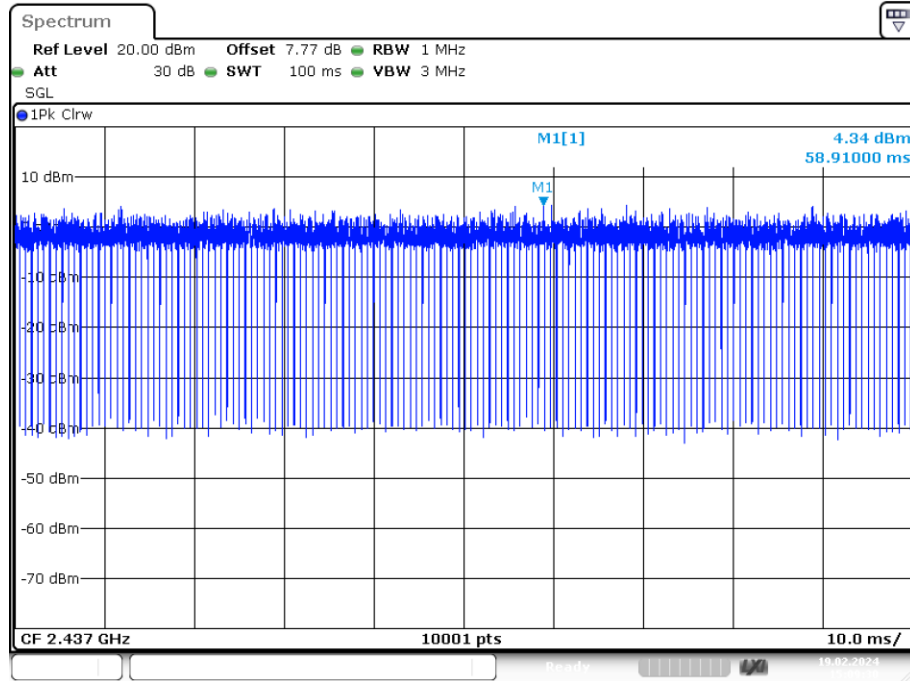
Date: 19.FEB.2024 15:03:02

Duty Cycle NVNT n40 2422MHz Ant B



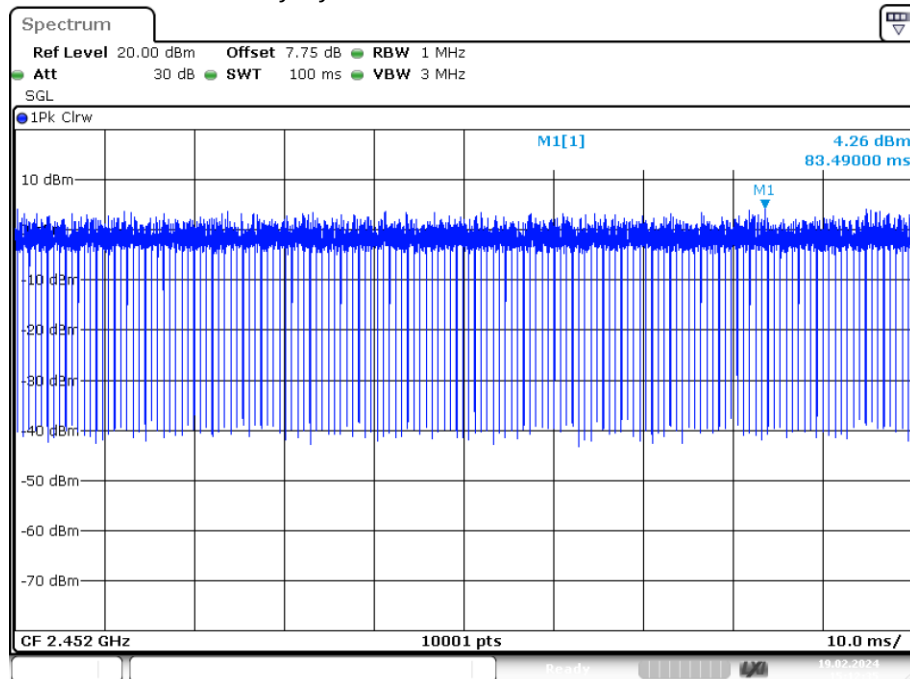
Date: 19.FEB.2024 15:06:17

Duty Cycle NVNT n40 2437MHz Ant B



Date: 19.FEB.2024 15:09:30

Duty Cycle NVNT n40 2452MHz Ant B



Date: 19.FEB.2024 15:12:35

Condition	Mode	Frequency (MHz)	Antenna	Total Power (dBm)	Limit (dBm)	Verdict
NVNT	n20	2412	MIMO	18.263	28.99	Pass
NVNT	n20	2437	MIMO	17.936	28.99	Pass
NVNT	n20	2462	MIMO	18.226	28.99	Pass
NVNT	n40	2422	MIMO	17.885	28.99	Pass
NVNT	n40	2437	MIMO	18.241	28.99	Pass
NVNT	n40	2452	MIMO	18.376	28.99	Pass

Note: 1. Directional gain=7.01dBi, so the Conducted Power Limit need to reduce1.01.

6. PEAK POWER SPECTRAL DENSITY

6.1. Test limits

6.1.1 Please refer FCC PART 15: 15.247.

6.1.2 For direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.

6.1.3 The direct sequence operating of the hybrid system, with the frequency hopping operation turned off, shall comply with the power density requirements of paragraph (d) of this section.

6.2. Test Procedure

Details see the KDB558074 D01 Meas Guidance v05r02

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

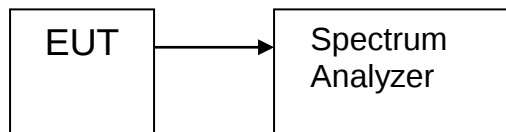
6.2.2 Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

6.2.3 Set the spectrum analyzer as RBW = 3kHz(Set the RBW to: $3\text{ kHz} \leq \text{RBW} \leq 100\text{ kHz}$.), VBW = 10kHz(Set the $\text{VBW} \geq 3 \times \text{RBW}$), span $\geq 1.5 \times \text{DTS bandwidth}$., detail see the test plot.

6.2.4 Record the max reading.

6.2.5 Repeat the above procedure until the measurements for all frequencies are completed.

6.3. Test Setup



6.4. Test Results

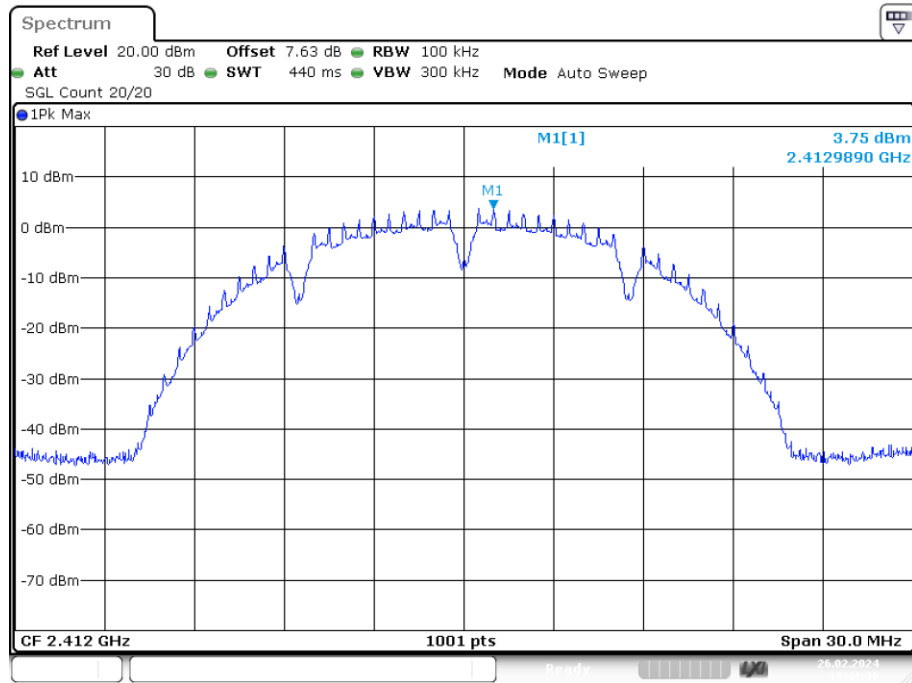
Condition	Mode	Frequency (MHz)	Antenna	Max PSD (dBm)	Limit (dBm)	Verdict
NVNT	b	2412	Ant A	3.746	8	Pass
NVNT	b	2437	Ant A	3.928	8	Pass
NVNT	b	2462	Ant A	3.71	8	Pass
NVNT	g	2412	Ant A	-3.23	8	Pass
NVNT	g	2437	Ant A	-2.849	8	Pass
NVNT	g	2462	Ant A	-3.08	8	Pass
NVNT	n20	2412	Ant A	-1.725	8	Pass
NVNT	n20	2437	Ant A	-2.278	8	Pass
NVNT	n20	2462	Ant A	-2.129	8	Pass
NVNT	n40	2422	Ant A	-7.506	8	Pass
NVNT	n40	2437	Ant A	-7.649	8	Pass
NVNT	n40	2452	Ant A	-7.286	8	Pass

Condition	Mode	Frequency (MHz)	Antenna	Max PSD (dBm)	Limit (dBm)	Verdict
NVNT	b	2412	Ant B	3.166	8	Pass
NVNT	b	2437	Ant B	3.767	8	Pass
NVNT	b	2462	Ant B	3.947	8	Pass
NVNT	g	2412	Ant B	-4.895	8	Pass
NVNT	g	2437	Ant B	-2.095	8	Pass
NVNT	g	2462	Ant B	-2.421	8	Pass
NVNT	n20	2412	Ant B	-1.263	8	Pass
NVNT	n20	2437	Ant B	-1.925	8	Pass
NVNT	n20	2462	Ant B	-0.091	8	Pass
NVNT	n40	2422	Ant B	-7.852	8	Pass
NVNT	n40	2437	Ant B	-7.753	8	Pass
NVNT	n40	2452	Ant B	-7.159	8	Pass

Condition	Mode	Frequency (MHz)	Antenna	Max PSD (dBm)	Limit (dBm)	Verdict
NVNT	n20	2412	MIMO	1.522	6.99	Pass
NVNT	n20	2437	MIMO	0.912	6.99	Pass
NVNT	n20	2462	MIMO	2.019	6.99	Pass
NVNT	n40	2422	MIMO	-4.665	6.99	Pass
NVNT	n40	2437	MIMO	-4.690	6.99	Pass
NVNT	n40	2452	MIMO	-4.212	6.99	Pass

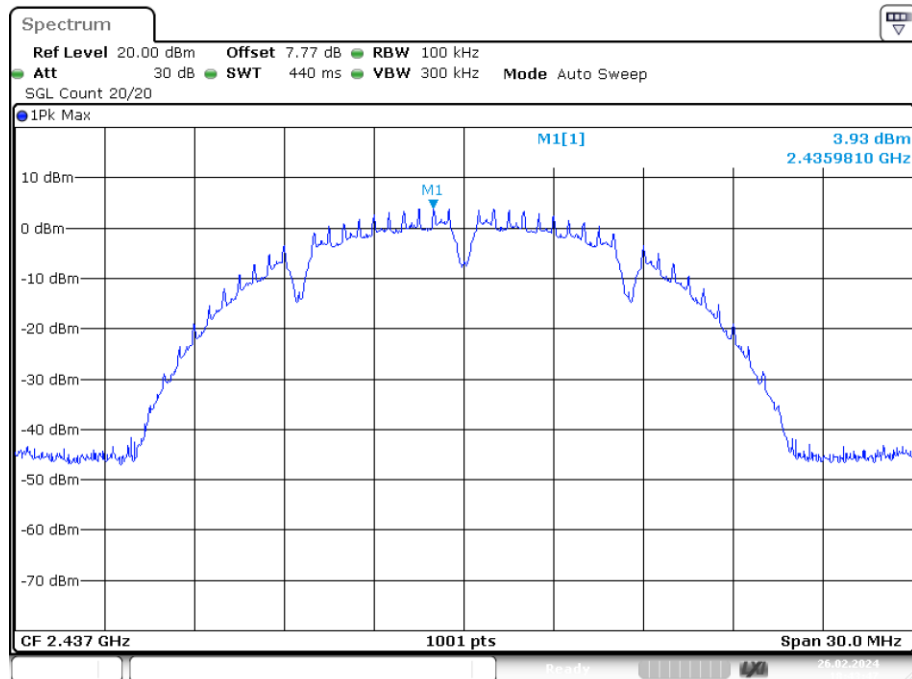
Note: 1. Directional gain=7.01dBi, so the Conducted Power Limit need to reduce 1.01.

PSD NVNT b 2412MHz Ant A



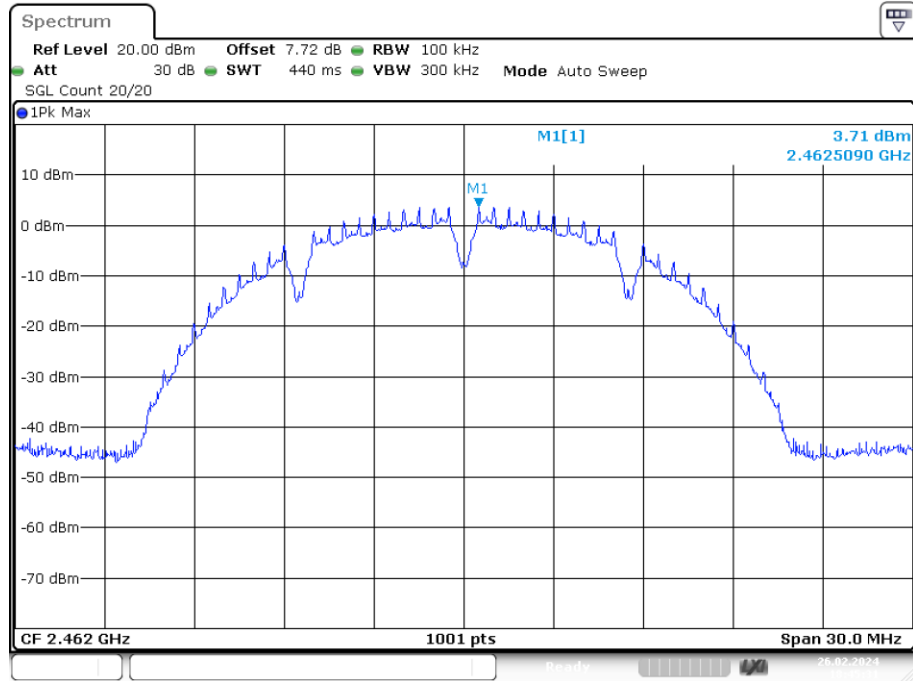
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PSD NVNT b 2437MHz Ant A



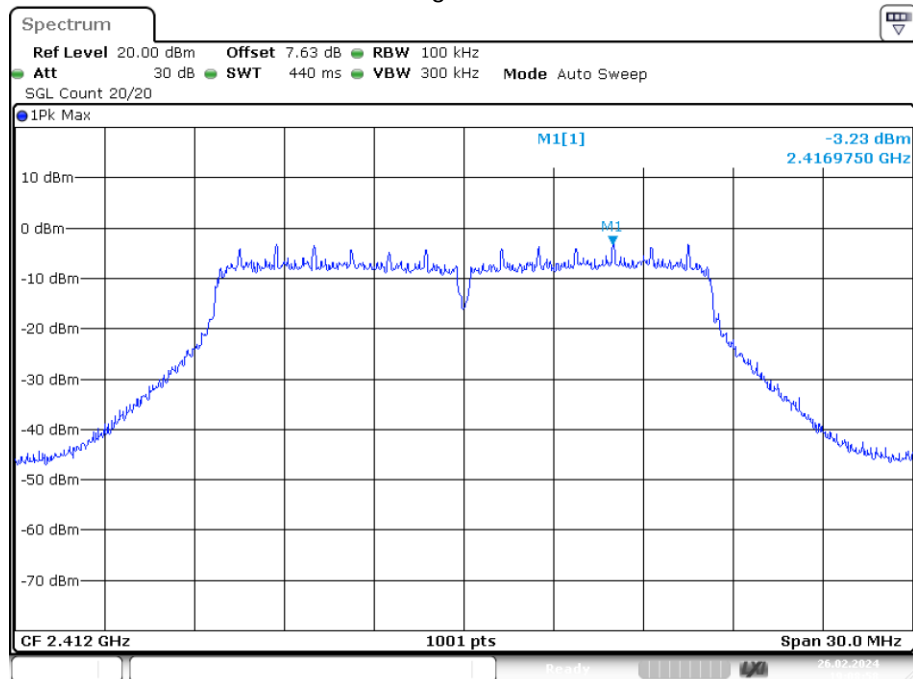
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PSD NVNT b 2462MHz Ant A



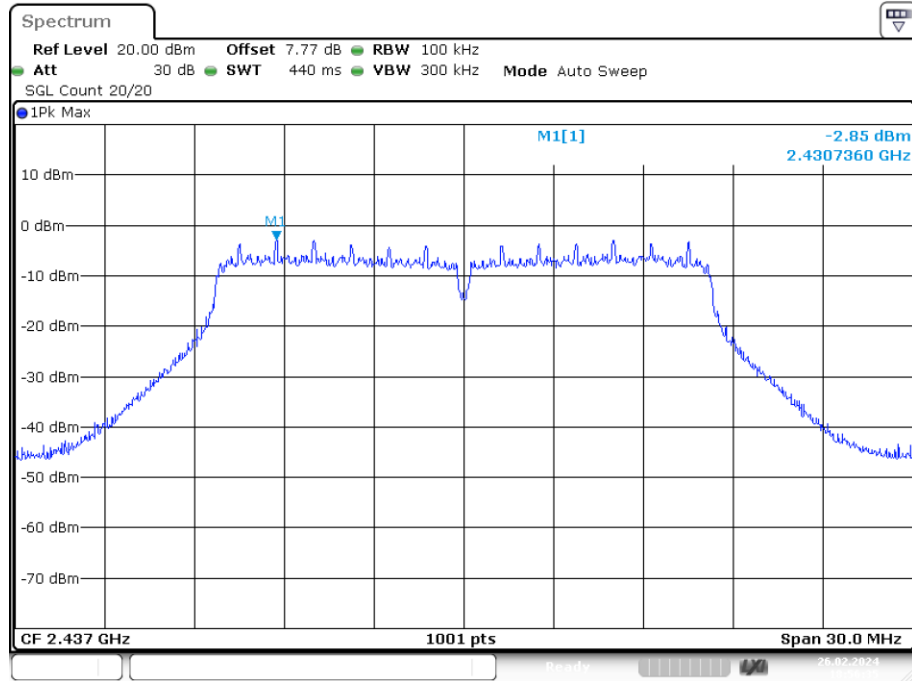
Date: 26.FEB.2024 18:45:32

PSD NVNT g 2412MHz Ant A



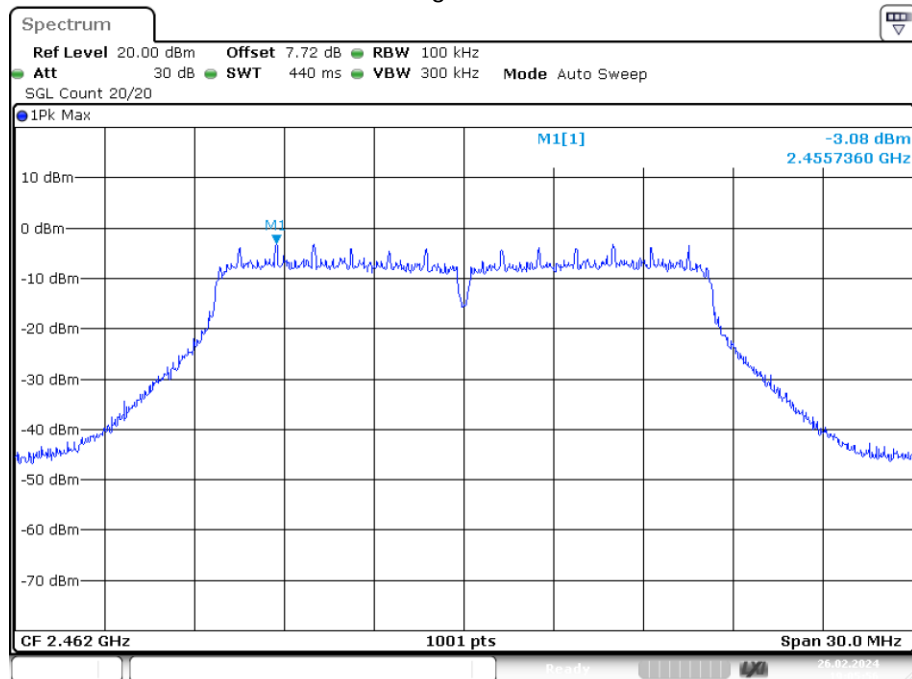
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PSD NVNT g 2437MHz Ant A



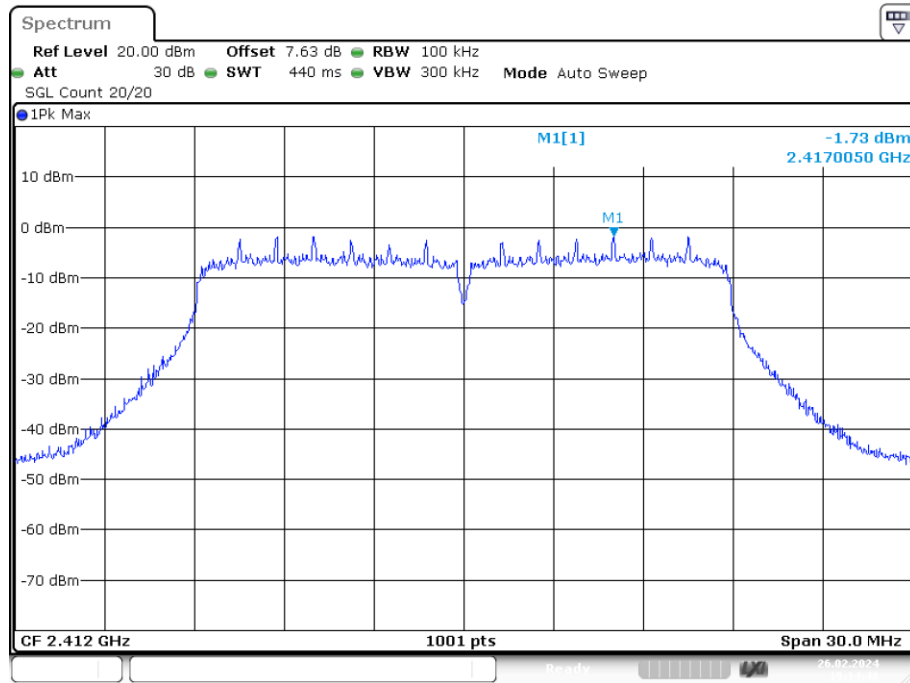
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PSD NVNT g 2462MHz Ant A



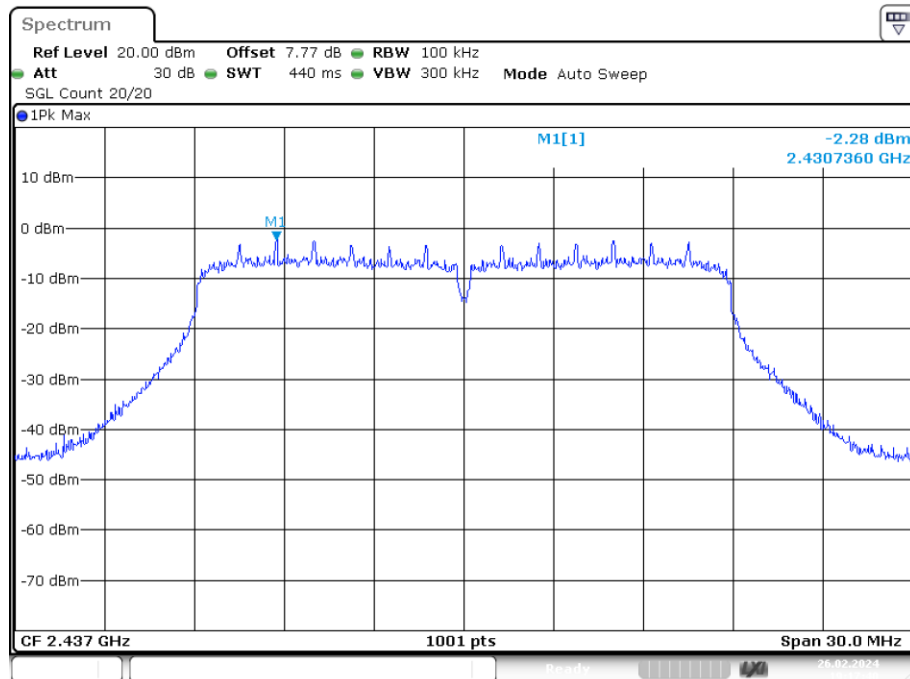
Date: 26.FEB.2024 19:05:56

PSD NVNT n20 2412MHz Ant A



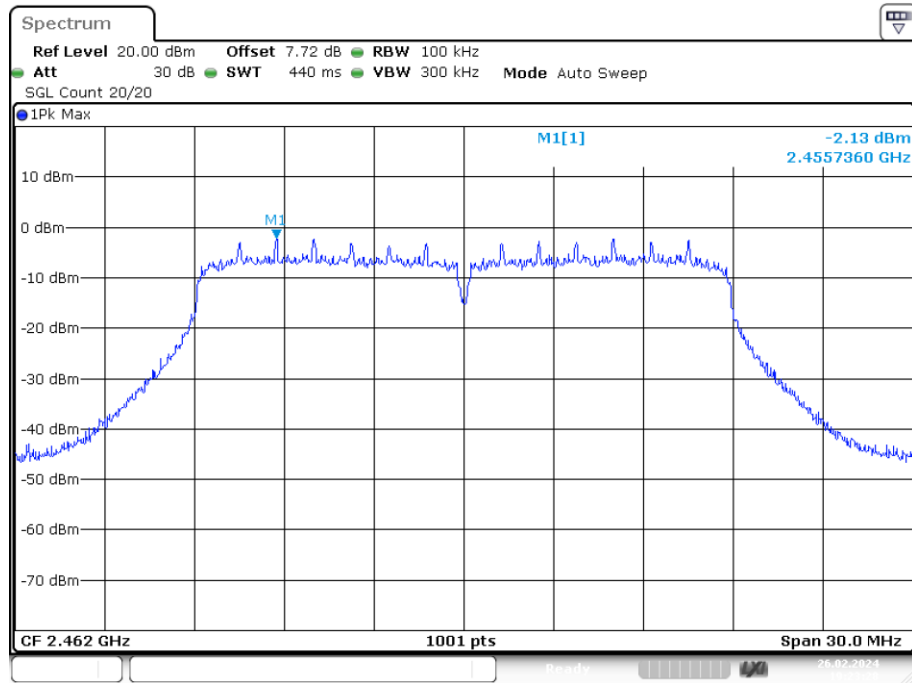
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PSD NVNT n20 2437MHz Ant A



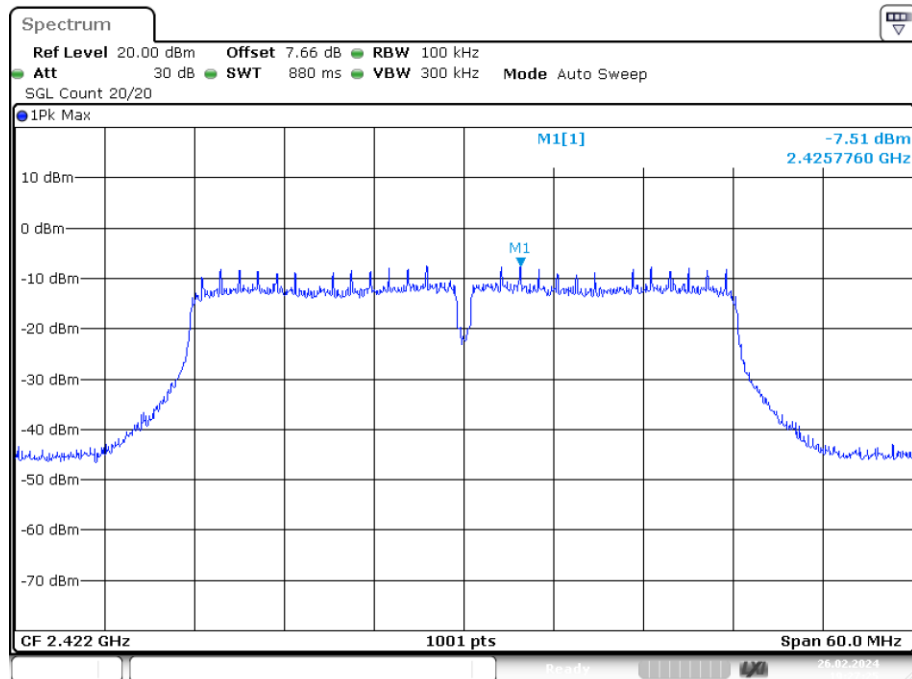
Date: 26.FEB.2024 19:17:40

PSD NVNT n20 2462MHz Ant A



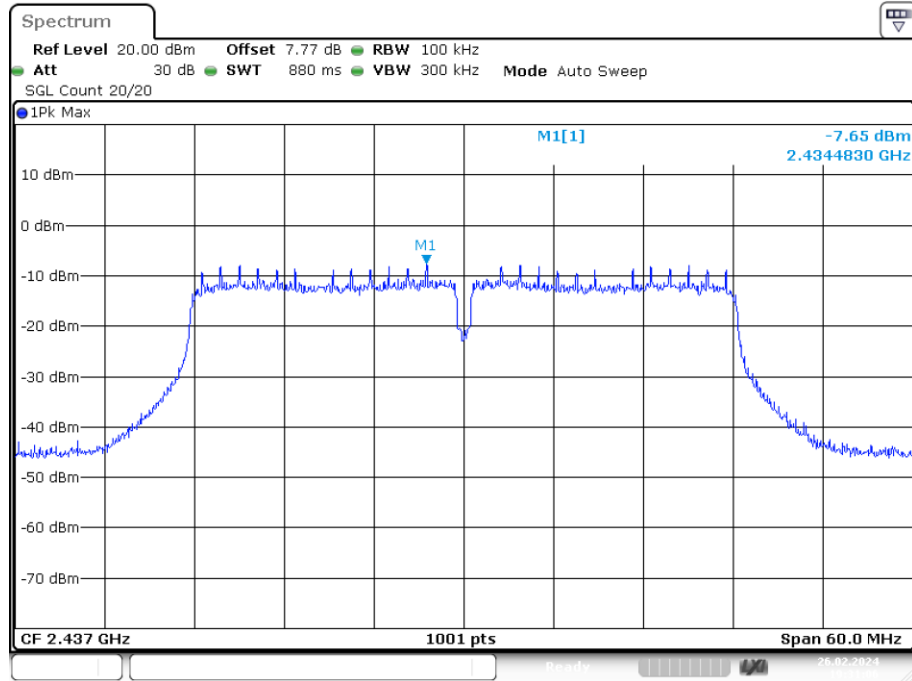
Date: 26.FEB.2024 19:23:27

PSD NVNT n40 2422MHz Ant A



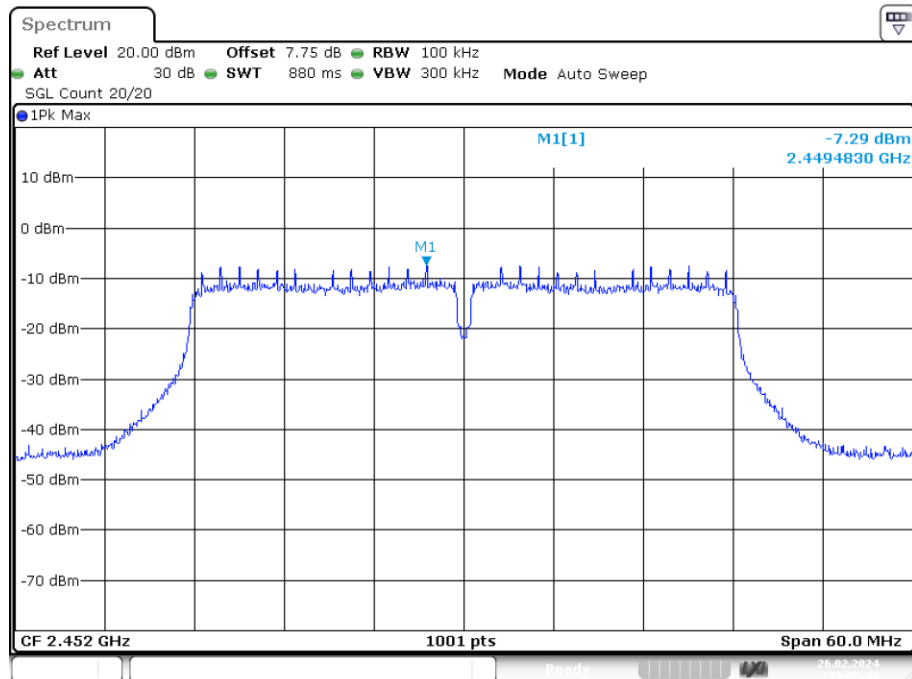
Date: 26.FEB.2024 19:27:25

PSD NVNT n40 2437MHz Ant A



Date: 26.FEB.2024 19:31:06

PSD NVNT n40 2452MHz Ant A



Date: 26.FEB.2024 19:35:45