FCC&IC TEST REPORT

FCC ID: 2A6KK-HV10

IC: 30008-HV10

On Behalf of

SHENZHEN WOPET SMART TECHNOLOGY CO., LTD.

WiFi Automatic Pet Feeder

Model No.: HA10DP, FW50D Plus, HV10, HV10DP, HA10P

Prepared for	:	SHENZHEN WOPET SMART TECHNOLOGY CO., LTD.
Address	:	ROOM 923, BLOCK A, ECONOMIC BUILDING, HUAFENG, HEADQUARTERS NO. 288, XIXIANG AVENUE, LAODONG COMMUNITY, XIXIANG STREET, BAOAN DISTRICT, SHENZHEN CHINA

Prepared By	:	Shenzhen Alpha Product Testing Co., Ltd.
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Report Number	:	A2311277-C01-R07
Date of Receipt	:	December 1, 2023
Date of Test	:	December 1, 2023 - January 15, 2024
Date of Report	:	January 15, 2024
Version Number	:	V0
Result		**Pass**

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TEST REPORT DECLARATION

Applicant	:	SHENZHEN WOPET SMART TECHNOLOGY CO., LTD.
Address	:	ROOM 923, BLOCK A, ECONOMIC BUILDING, HUAFENG, HEADQUARTERS NO. 288, XIXIANG AVENUE, LAODONG COMMUNITY, XIXIANG STREET, BAOAN DISTRICT, SHENZHEN CHINA
Manufacturer	:	SHENZHEN WOPET SMART TECHNOLOGY CO., LTD.
Address	:	ROOM 923, BLOCK A, ECONOMIC BUILDING, HUAFENG, HEADQUARTERS NO. 288, XIXIANG AVENUE, LAODONG COMMUNITY, XIXIANG STREET, BAOAN DISTRICT, SHENZHEN CHINA
EUT Description	:	WiFi Automatic Pet Feeder
		(A) Model No. : HA10DP, FW50D Plus, HV10, HV10DP, HA10P
		(B) Trademark : N/A

Measurement Standard Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247,

RSS-247 Issue 2, RSS-Gen Issue 5, ANSI C63.10:2013, CISPR 16-1-4:2010

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	Yannis Wen
Approved by (name + signature)…....:	Reak Yang Project Manager	
Date of issue……..:	January 15, 2024	

Revision History

Revision	Issue Date	Revisions	Revised By
V0	January 15, 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 RSS-GEN(8.8) ANSI C63.10 :2013	P
6dB Bandwidth	FCC PART 15:15.247(a)(2) RSS-247(5.2 a) ANSI C63.10 :2013	P
Output Power	FCC Part 15: 15.247(b)(3) RSS-247(5.4 d) ANSI C63.10 :2013	P
Radiated Spurious Emission	FCC Part 15: 15.209 FCC Part 15: 15.247(d) RSS-Gen(8.9), RSS-247(5.5) ANSI C63.10 :2013	P
Conducted Spurious & Band Edge Emission	FCC Part 15: 15.247(d) RSS-Gen(8.9), RSS-247(5.5) ANSI C63.10 :2013	P
Power Spectral Density	FCC PART 15:15.247(e) RSS-247(5.2 b) ANSI C63.10 :2013	P
Radiated Band Edge Emission	FCC Part 15: 15.247(d) RSS-GEN(6.13) ANSI C63.10 :2013	P
Frequency stability	RSS-GEN(6.11)	P
Antenna Requirement	FCC Part 15: 15.203 RSS-GEN(6.8)	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	:	WiFi Automatic Pet Feeder
Model Number/HVIN(s)	:	HA10DP, FW50D Plus, HV10, HV10DP, HA10P
Diff.	:	There is no difference between HA10DP, HV10, HV10DP, and HA10P, except for the feeding method and capacity size. The circuit and principle are the same. There is no other difference between HA10DP and FW50D Plus except for the model name. All tests are made with the HA10DP model.
Test Voltage	:	DC 5V 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	:	Internal antenna, Maximum Gain is 1.95dBi. Antenna information is provided by applicant.
Software Version	:	V1.0
Hardware version/FVIN	:	V1.0

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. In this report, the main test model is HV10, and the main test model serial number is F0000001

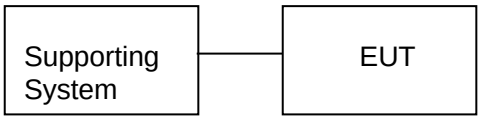
2.2. Accessories of Device (EUT)

Accessories	:	ADAPTER
Manufacturer	:	andsmps
Model	:	AS011Z-0501000UU
Ratings	:	Input: 100-240V~ 50/60Hz 0.45A Output: 5.0V⎓1.0A

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 and IEEE 802.11 n/HT40 with 2.4G					
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℃	24℃
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℃
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	1316.3003K03-102082-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])

RSS-GEN Restricted frequency band

Table 7 – Restricted frequency bands[Note 1]

MHz	MHz	GHz
0.090 - 0.110	149.9 - 150.05	9.0 - 9.2
0.495 - 0.505	156.52475 - 156.52525	9.3 - 9.5
2.1735 - 2.1905	156.7 - 156.9	10.6 - 12.7
3.020 - 3.026	162.0125 - 167.17	13.25 - 13.4
4.125 - 4.128	167.72 - 173.2	14.47 - 14.5
4.17725 - 4.17775	240 – 285	15.35 - 16.2
4.20725 - 4.20775	322 - 335.4	17.7 - 21.4
5.677 - 5.683	399.9 - 410	22.01 - 23.12

6.215 - 6.218	608 - 614	23.6 - 24.0
6.26775 - 6.26825	960 - 1427	31.2 - 31.8
6.31175 - 6.31225	1435 - 1626.5	36.43 - 36.5
8.291 - 8.294	1645.5 - 1646.5	Above 38.6
8.362 - 8.366	1660 - 1710	
8.37625 - 8.38675	1718.8 - 1722.2	
8.41425 - 8.41475	2200 - 2300	
12.29 - 12.293	2310 - 2390	
12.51975 - 12.52025	2483.5 - 2500	
12.57675 - 12.57725	2655 - 2900	
13.36 - 13.41	3260 – 3267	
16.42 - 16.423	3332 - 3339	
16.69475 - 16.69525	3345.8 - 3358	
16.80425 - 16.80475	3500 - 4400	
25.5 - 25.67	4500 - 5150	
37.5 - 38.25	5350 - 5460	
73 - 74.6	7250 - 7750	
74.8 - 75.2	8025 – 8500	
108 – 138		

Note 1: Certain frequency bands listed in table 7 and in bands above 38.6 GHz are designated for licence-exempt applications. These frequency bands and the requirements that apply to related devices are set out in the 200 and 300 series of RSSs.

15.209 Limit

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
0.009-0.490	300	2400/F(KHz)	/
0.490-1.705	30	24000/F(KHz)	/
1.705-30	30	30	29.5
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	
Note 1: The peak limit is 20 dB higher than the average limit			
Note 2: Peak limit applies (AVG limit + 20 dB) as well as RSS-247 Section 5.5			

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 (μV/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) (μA/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 1GH and above 1GHz.

The EUT was placed on a rotating 0.8 m high above ground for below 1GHz and 1.5m high for above1GHz testing, the table was rotated 360 degrees to determine the position of the highest radiation

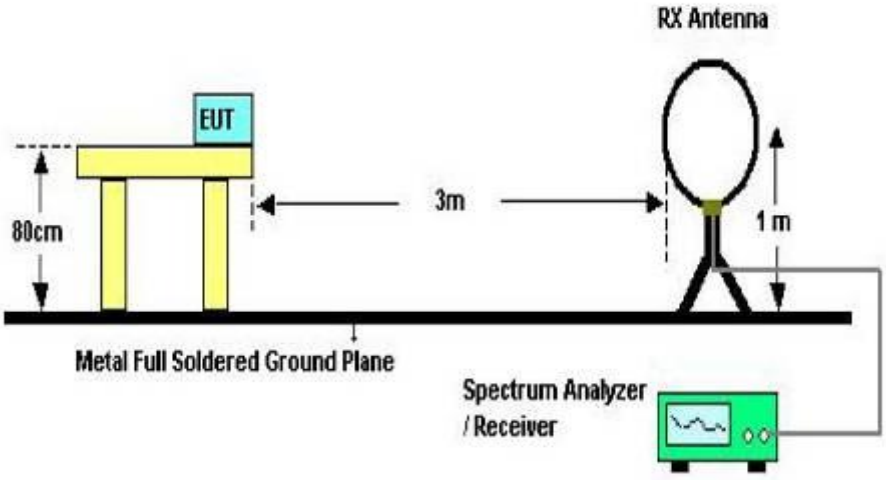
The Test antenna shall vary between 1m and 4m, both Horizontal and Vertical antenna are set of make measurement.

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

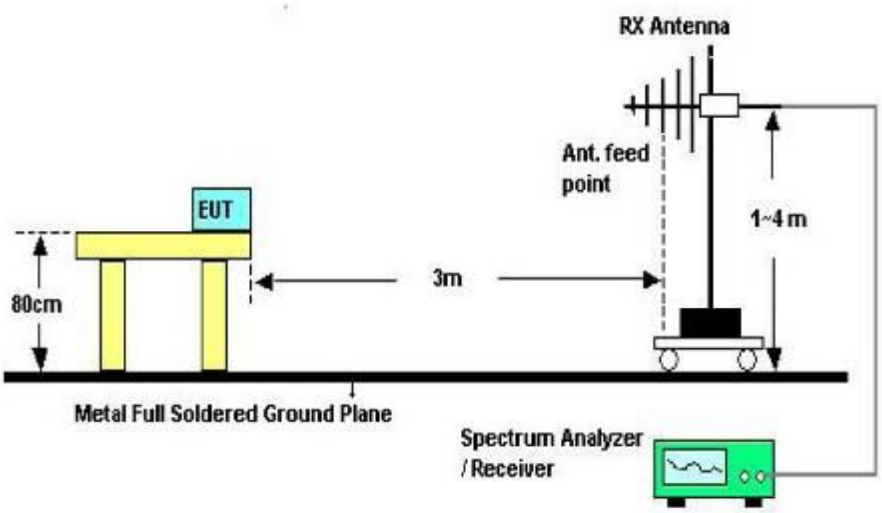
If Peak value comply with QP limit below 1GHz, the EUT deemed to comply with QP limit. But the Peak value and average value both need to comply with applicable limit above 1GHz.

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

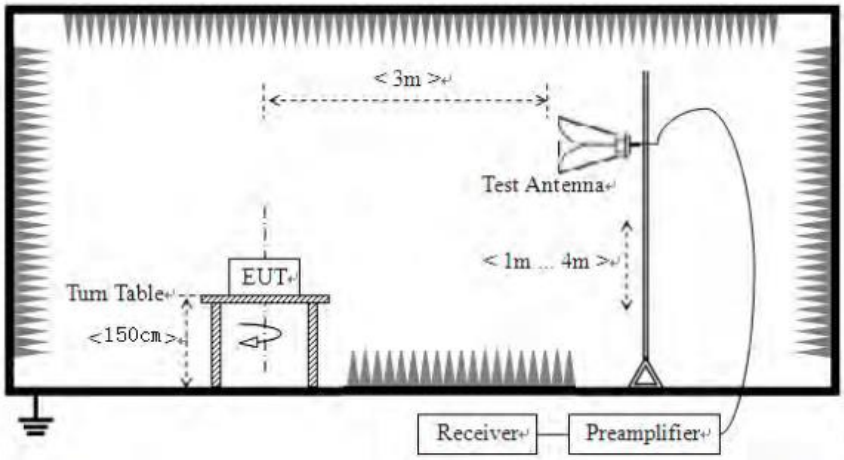
3.3. Test Setup



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.

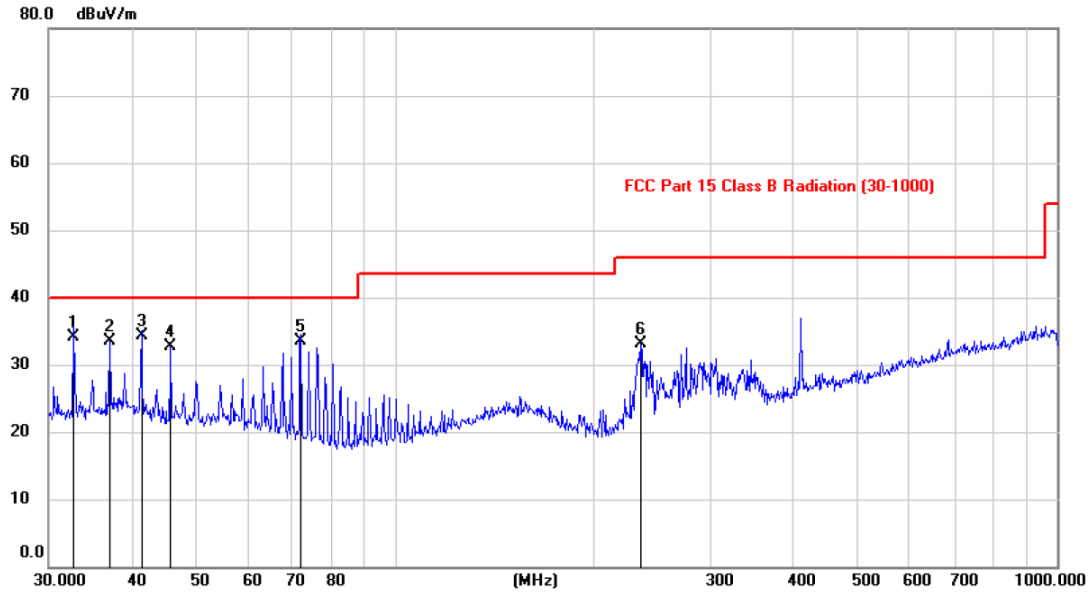
From 9KHz to 30MHz: Conclusion: PASS

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.Only show the test data of the worst Channel in this report.

Test result for 802.11b (High Channel), AC 120V/ 60Hz

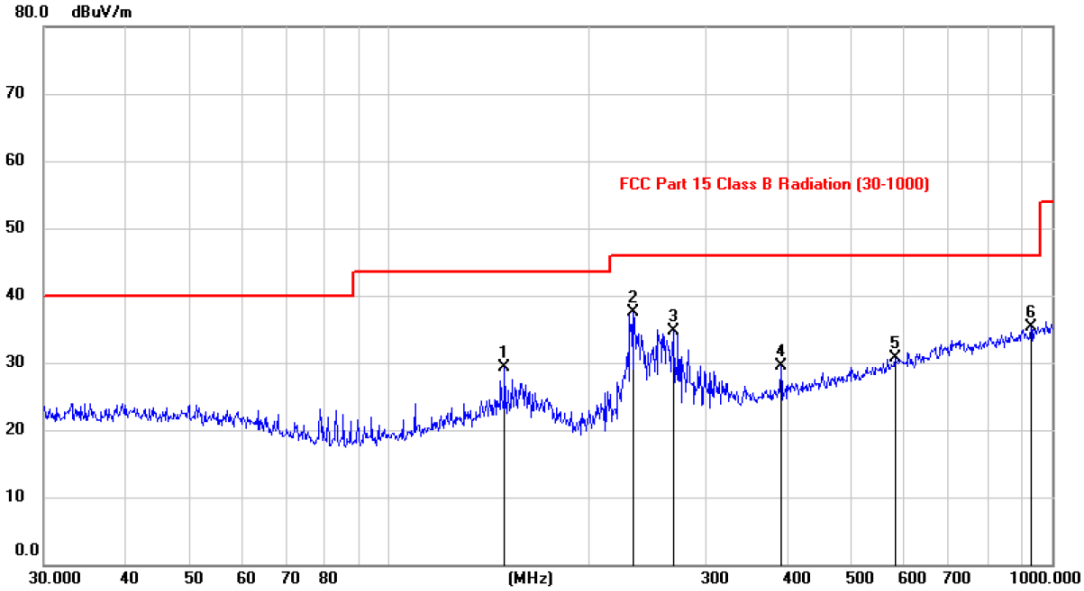
Vertical:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		32.8445	20.47	13.65	34.12	40.00	-5.88	QP			
2		37.1680	19.49	14.10	33.59	40.00	-6.41	peak			
3	*	41.4845	19.88	14.34	34.22	40.00	-5.78	QP			
4		45.9197	18.61	14.11	32.72	40.00	-7.28	peak			
5		72.1012	22.44	11.08	33.52	40.00	-6.48	QP			
6		235.3208	20.69	12.44	33.13	46.00	-12.87	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 Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		149.4333	14.36	15.01	29.37	43.50	-14.13	peak			
2	*	233.6489	25.05	12.40	37.45	46.00	-8.55	peak			
3		268.7049	21.44	13.25	34.69	46.00	-11.31	peak			
4		389.9470	13.42	16.08	29.50	46.00	-16.50	peak			
5		579.8209	10.97	19.83	30.80	46.00	-15.20	peak			
6		930.5297	10.83	24.42	35.25	46.00	-10.75	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.

From 1G-25GHz

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	46.88	V	33.95	10.18	34.26	56.75	74	-17.25	PK
4824	37.66	V	33.95	10.18	34.26	47.53	54	-6.47	AV
7236	/	/	/	/	/	/	/	/	/
9648	/	/	/	/	/	/	/	/	/
4824	47.29	H	33.95	10.18	34.26	57.16	74	-16.84	PK
4824	34.51	H	33.95	10.18	34.26	44.38	54	-9.62	AV
7236	/	/	/	/	/	/	/	/	/
9648	/	/	/	/	/	/	/	/	/
Test Mode: IEEE 802.11b TX Mid									
4874	45.32	V	33.93	10.2	34.29	55.16	74	-18.84	PK
4874	32.63	V	33.93	10.2	34.29	42.47	54	-11.53	AV
7311	/	/	/	/	/	/	/	/	/
9748	/	/	/	/	/	/	/	/	/
4874	45.70	H	33.93	10.2	34.29	55.54	74	-18.46	PK
4874	32.82	H	33.93	10.2	34.29	42.66	54	-11.34	AV
7311	/	/	/	/	/	/	/	/	/
9748	/	/	/	/	/	/	/	/	/
Test Mode: IEEE 802.11b TX High									
4924	45.10	V	33.98	10.22	34.25	55.05	74	-18.95	PK
4924	36.40	V	33.98	10.22	34.25	46.35	54	-7.65	AV
7386	/	/	/	/	/	/	/	/	/
9848	/	/	/	/	/	/	/	/	/
4924	46.20	H	33.98	10.22	34.25	56.15	74	-17.85	PK
4924	34.88	H	33.98	10.22	34.25	44.83	54	-9.17	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.

Test Mode: IEEE 802.11g 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	45.93	V	33.95	10.18	34.26	55.80	74	-18.20	PK
4824	37.13	V	33.95	10.18	34.26	47.00	54	-7.00	AV
7236	/	/	/	/	/	/	/	/	/
9648	/	/	/	/	/	/	/	/	/
4824	48.01	H	33.95	10.18	34.26	57.88	74	-16.12	PK
4824	34.34	H	33.95	10.18	34.26	44.21	54	-9.79	AV
7236	/	/	/	/	/	/	/	/	/
9648	/	/	/	/	/	/	/	/	/
Test Mode: IEEE 802.11g TX Mid									
4874	43.54	V	33.93	10.2	34.29	53.38	74	-20.62	PK
4874	30.93	V	33.93	10.2	34.29	40.77	54	-13.23	AV
7311	/	/	/	/	/	/	/	/	/
9748	/	/	/	/	/	/	/	/	/
4874	44.48	H	33.93	10.2	34.29	54.32	74	-19.68	PK
4874	33.31	H	33.93	10.2	34.29	43.15	54	-10.85	AV
7311	/	/	/	/	/	/	/	/	/
9748	/	/	/	/	/	/	/	/	/
Test Mode: IEEE 802.11g TX High									
4924	48.05	V	33.98	10.22	34.25	58.00	74	-16.00	PK
4924	37.57	V	33.98	10.22	34.25	47.52	54	-6.48	AV
7386	/	/	/	/	/	/	/	/	/
9848	/	/	/	/	/	/	/	/	/
4924	48.77	H	33.98	10.22	34.25	58.72	74	-15.28	PK
4924	33.43	H	33.98	10.22	34.25	43.38	54	-10.62	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.

Test Mode: IEEE 802.11n HT20 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	47.34	V	33.95	10.18	34.26	57.21	74	-16.79	PK
4824	36.15	V	33.95	10.18	34.26	46.02	54	-7.98	AV
7236	/	/	/	/	/	/	/	/	/
9648	/	/	/	/	/	/	/	/	/
4824	49.67	H	33.95	10.18	34.26	59.54	74	-14.46	PK
4824	35.93	H	33.95	10.18	34.26	45.80	54	-8.20	AV
7236	/	/	/	/	/	/	/	/	/
9648	/	/	/	/	/	/	/	/	/
Test Mode: IEEE 802.11n HT20 TX Mid									
4874	44.08	V	33.93	10.2	34.29	53.92	74	-20.08	PK
4874	33.02	V	33.93	10.2	34.29	42.86	54	-11.14	AV
7311	/	/	/	/	/	/	/	/	/
9748	/	/	/	/	/	/	/	/	/
4874	44.92	H	33.93	10.2	34.29	54.76	74	-19.24	PK
4874	33.08	H	33.93	10.2	34.29	42.92	54	-11.08	AV
7311	/	/	/	/	/	/	/	/	/
9748	/	/	/	/	/	/	/	/	/
Test Mode: IEEE 802.11n HT20 TX High									
4924	47.22	V	33.98	10.22	34.25	57.17	74	-16.83	PK
4924	35.66	V	33.98	10.22	34.25	45.61	54	-8.39	AV
7386	/	/	/	/	/	/	/	/	/
9848	/	/	/	/	/	/	/	/	/
4924	49.28	H	33.98	10.22	34.25	59.23	74	-14.77	PK
4924	34.29	H	33.98	10.22	34.25	44.24	54	-9.76	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.

Test Mode: IEEE 802.11n HT40 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
4844	46.74	V	33.95	10.18	34.26	56.61	74	-17.39	PK
4844	34.91	V	33.95	10.18	34.26	44.78	54	-9.22	AV
7266	/	/	/	/	/	/	/	/	/
9688	/	/	/	/	/	/	/	/	/
4844	47.23	H	33.95	10.18	34.26	57.10	74	-16.90	PK
4844	33.60	H	33.95	10.18	34.26	43.47	54	-10.53	AV
7266	/	/	/	/	/	/	/	/	/
9688	/	/	/	/	/	/	/	/	/
Test Mode: IEEE 802.11n HT40 TX Mid									
4874	45.77	V	33.93	10.2	34.29	55.61	74	-18.39	PK
4874	34.06	V	33.93	10.2	34.29	43.90	54	-10.10	AV
7311	/	/	/	/	/	/	/	/	/
9748	/	/	/	/	/	/	/	/	/
4874	46.45	H	33.93	10.2	34.29	56.29	74	-17.71	PK
4874	33.16	H	33.93	10.2	34.29	43.00	54	-11.00	AV
7311	/	/	/	/	/	/	/	/	/
9748	/	/	/	/	/	/	/	/	/
Test Mode: IEEE 802.11n HT40 TX High									
4904	47.25	V	33.98	10.22	34.25	57.20	74	-16.80	PK
4904	36.01	V	33.98	10.22	34.25	45.96	54	-8.04	AV
7356	/	/	/	/	/	/	/	/	/
9808	/	/	/	/	/	/	/	/	/
4904	47.86	H	33.98	10.22	34.25	57.81	74	-16.19	PK
4904	33.37	H	33.98	10.22	34.25	43.32	54	-10.68	AV
7356	/	/	/	/	/	/	/	/	/
9808	/	/	/	/	/	/	/	/	/

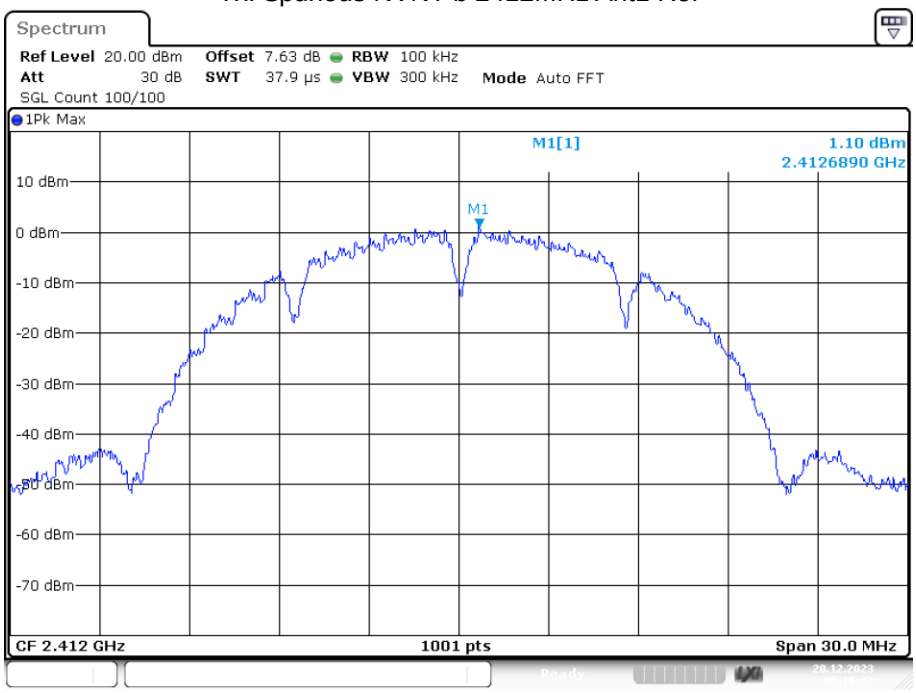
Note:

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.

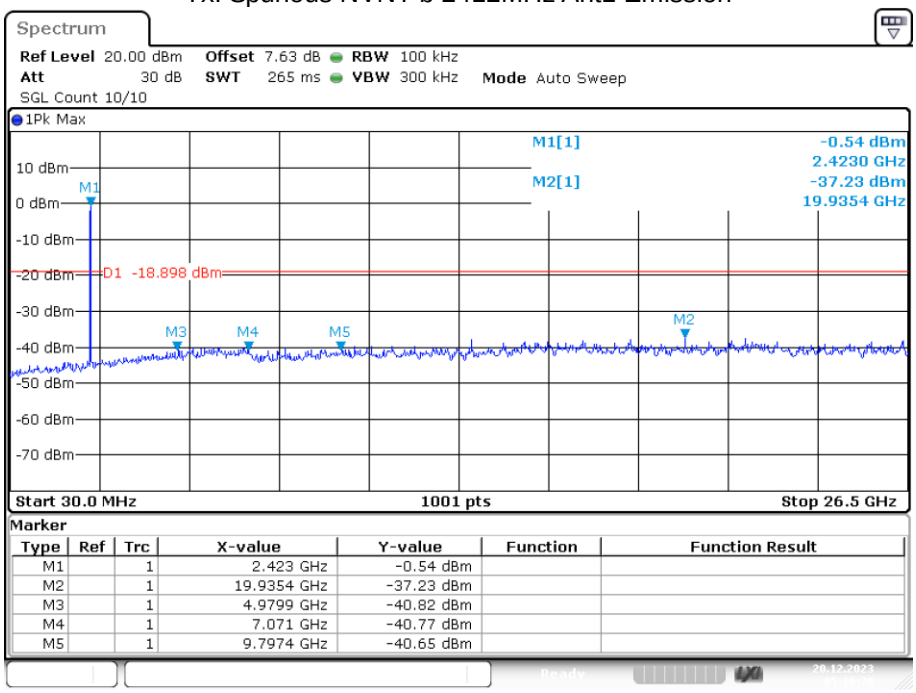
Conducted RF Spurious Emission

Tx. Spurious NVNT b 2412MHz Ant1 Ref



Date: 20.DEC.2023 05:16:02

Tx. Spurious NVNT b 2412MHz Ant1 Emission

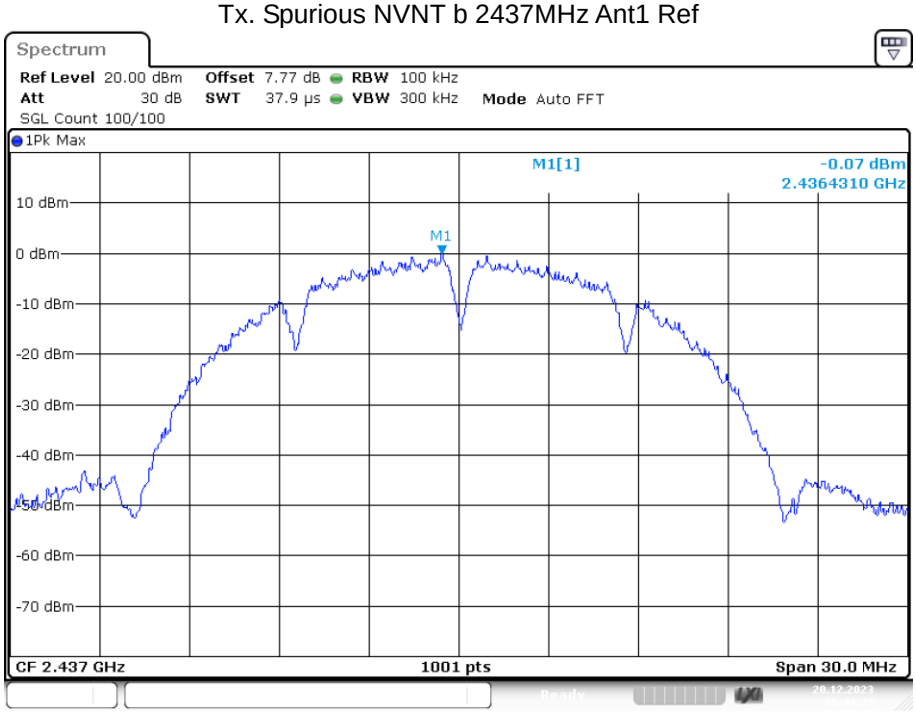


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.423 GHz	-0.54 dBm		
M2		1	19.9354 GHz	-37.23 dBm		
M3		1	4.9799 GHz	-40.82 dBm		
M4		1	7.071 GHz	-40.77 dBm		
M5		1	9.7974 GHz	-40.65 dBm		

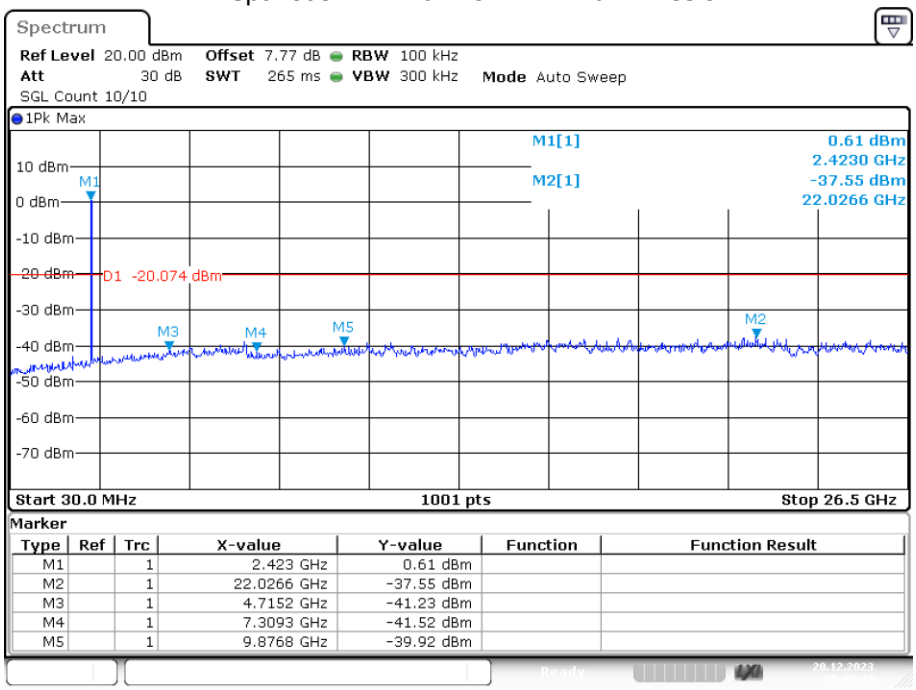
Date: 20.DEC.2023 05:16:20

Tx. Spurious NVNT b 2437MHz Ant1 Ref



Date: 20.DEC.2023 05:44:25

Tx. Spurious NVNT b 2437MHz Ant1 Emission

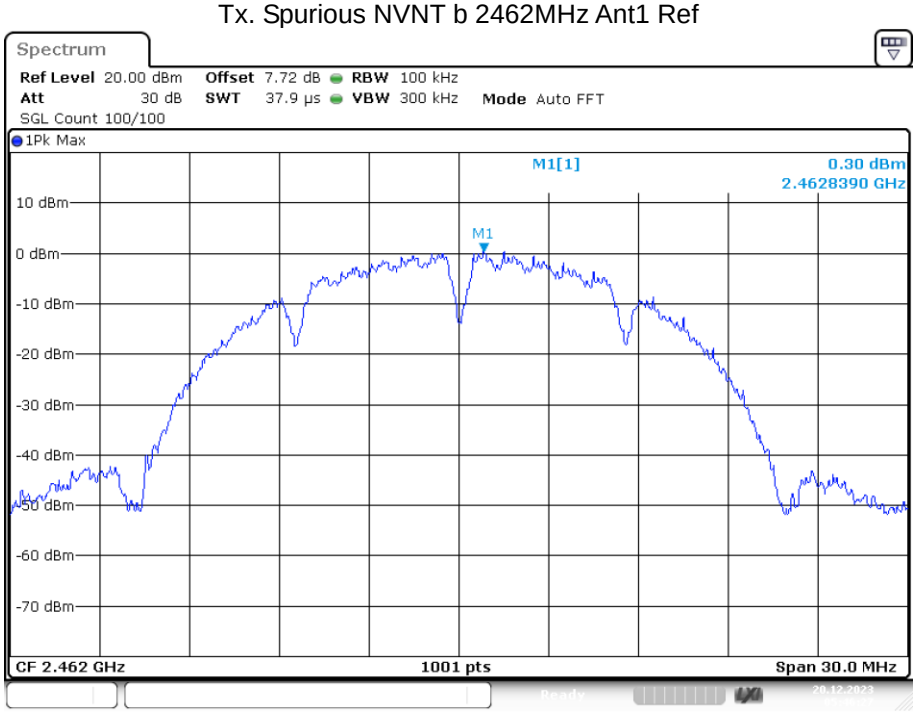


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.423 GHz	0.61 dBm		
M2		1	22.0266 GHz	-37.55 dBm		
M3		1	4.7152 GHz	-41.23 dBm		
M4		1	7.3093 GHz	-41.52 dBm		
M5		1	9.8768 GHz	-39.92 dBm		

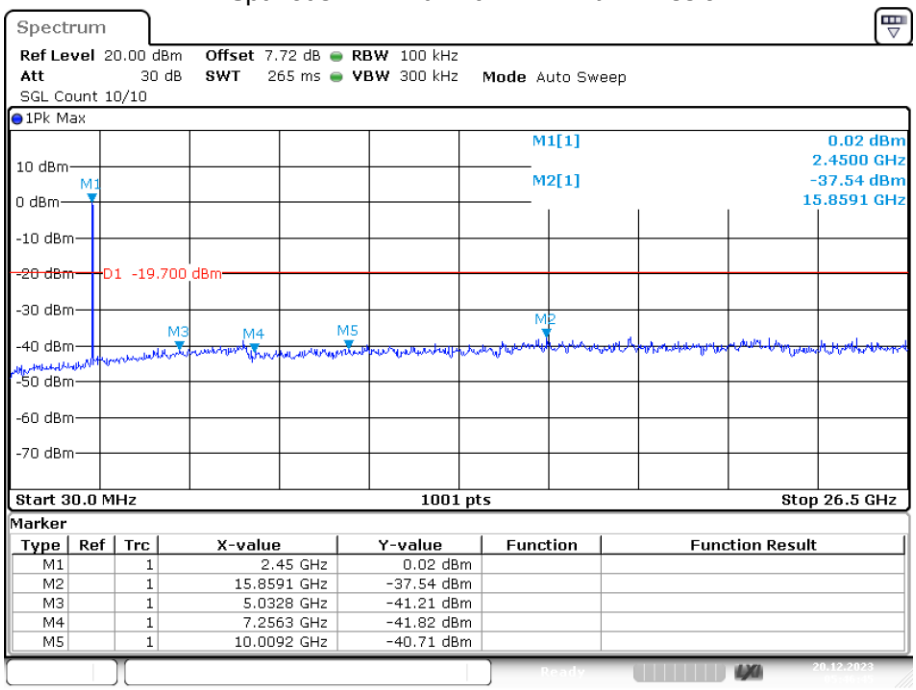
Date: 20.DEC.2023 05:44:43

Tx. Spurious NVNT b 2462MHz Ant1 Ref



Date: 20.DEC.2023 05:46:26

Tx. Spurious NVNT b 2462MHz Ant1 Emission

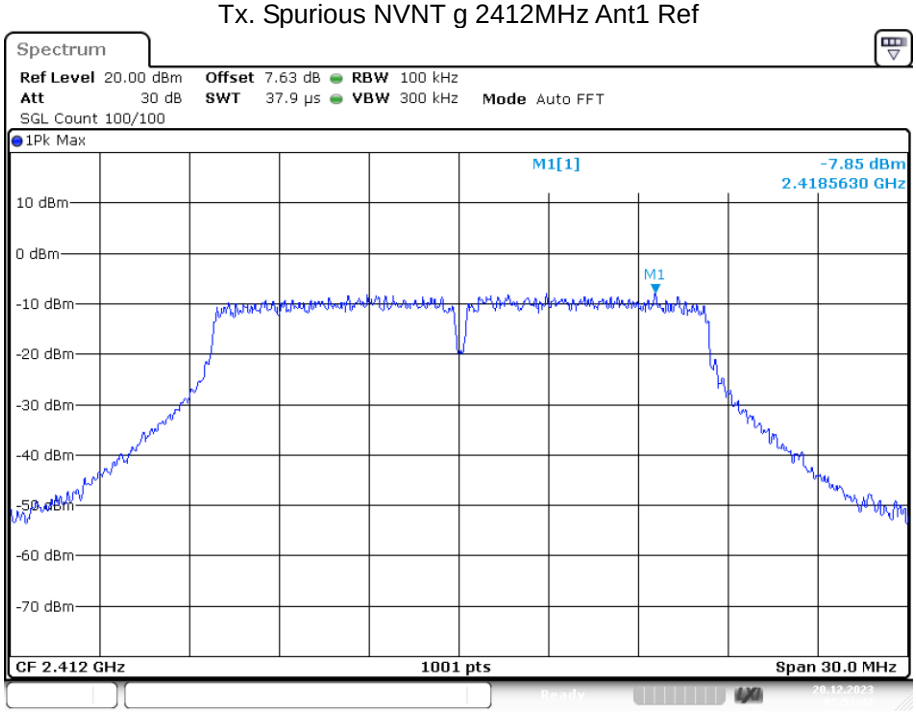


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.45 GHz	0.02 dBm		
M2		1	15.8591 GHz	-37.54 dBm		
M3		1	5.0328 GHz	-41.21 dBm		
M4		1	7.2563 GHz	-41.82 dBm		
M5		1	10.0092 GHz	-40.71 dBm		

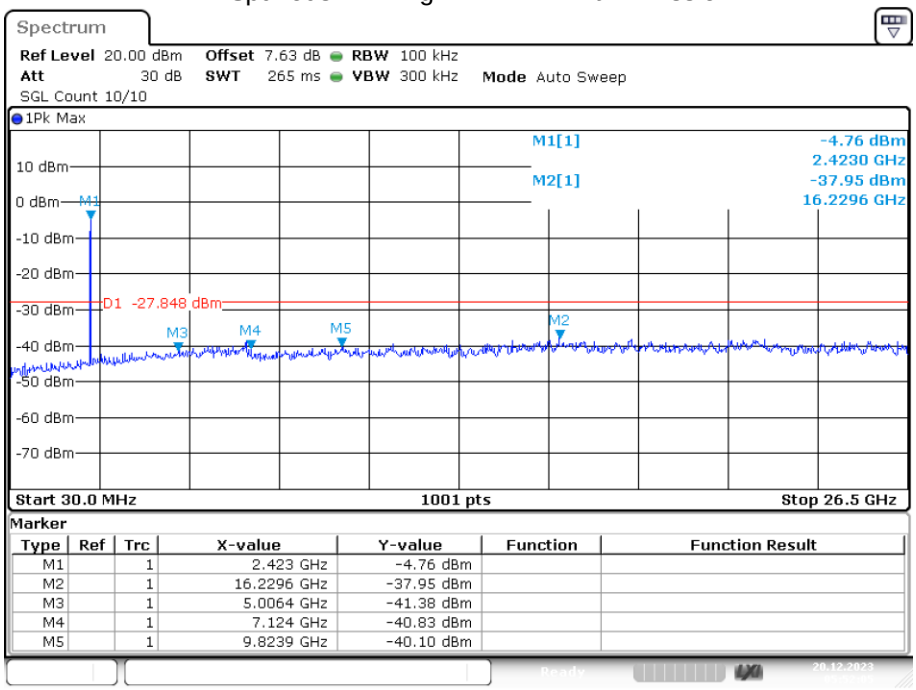
Date: 20.DEC.2023 05:46:44

Tx. Spurious NVNT g 2412MHz Ant1 Ref



Date: 20.DEC.2023 05:51:47

Tx. Spurious NVNT g 2412MHz Ant1 Emission

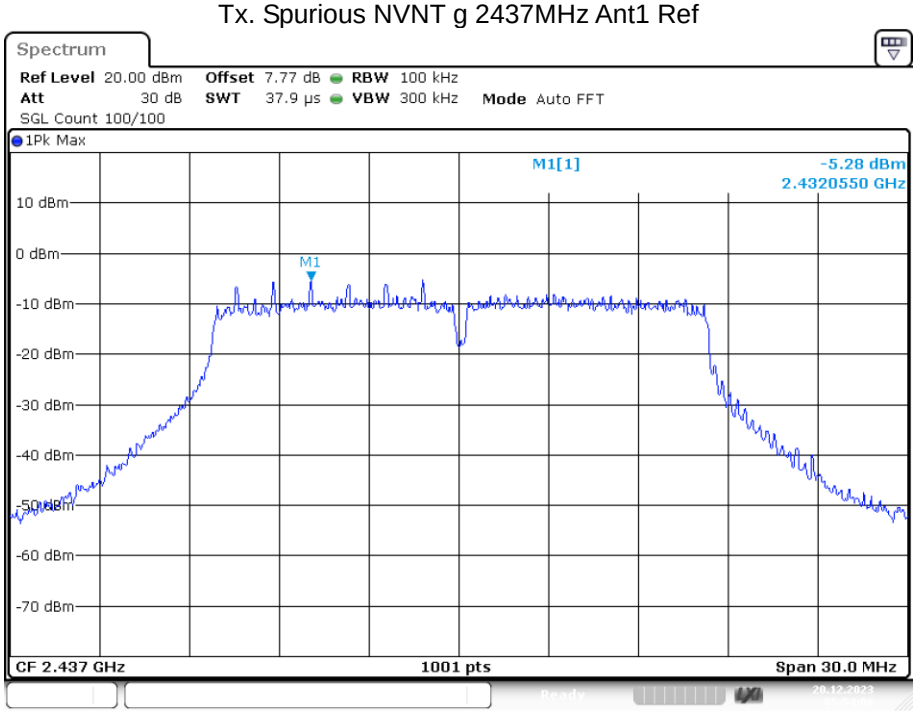


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.423 GHz	-4.76 dBm		
M2		1	16.2296 GHz	-37.95 dBm		
M3		1	5.0064 GHz	-41.38 dBm		
M4		1	7.124 GHz	-40.83 dBm		
M5		1	9.8239 GHz	-40.10 dBm		

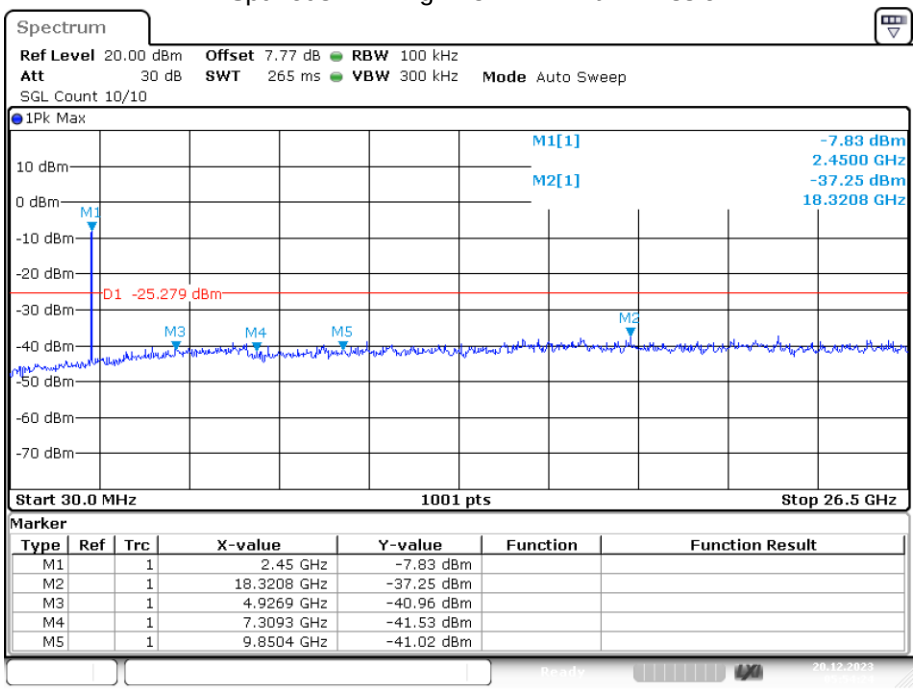
Date: 20.DEC.2023 05:52:05

Tx. Spurious NVNT g 2437MHz Ant1 Ref



Date: 20.DEC.2023 05:54:06

Tx. Spurious NVNT g 2437MHz Ant1 Emission

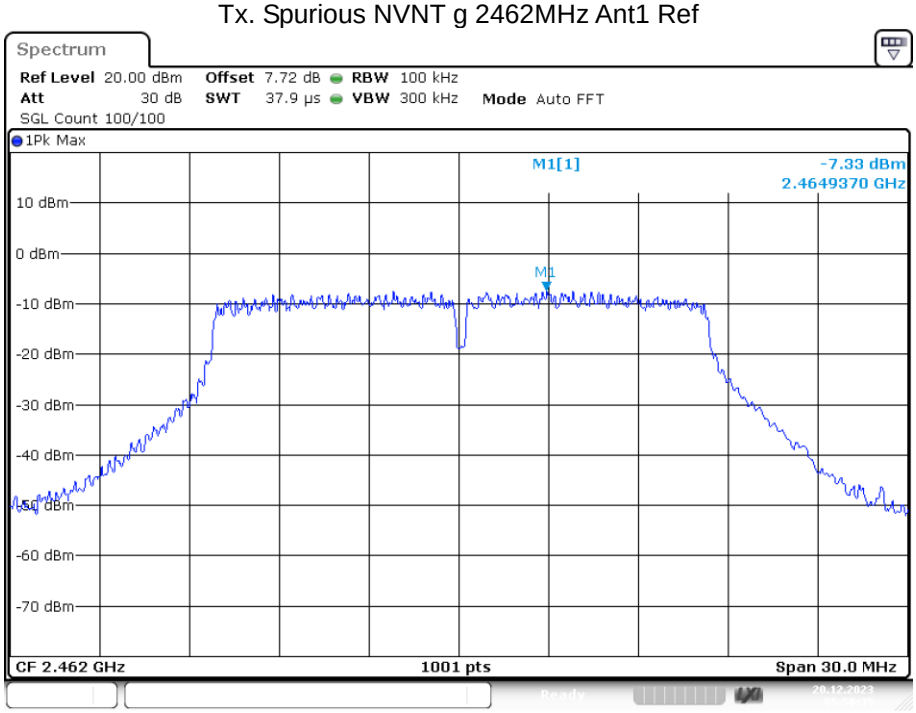


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.45 GHz	-7.83 dBm		
M2		1	18.3208 GHz	-37.25 dBm		
M3		1	4.9269 GHz	-40.96 dBm		
M4		1	7.3093 GHz	-41.53 dBm		
M5		1	9.8504 GHz	-41.02 dBm		

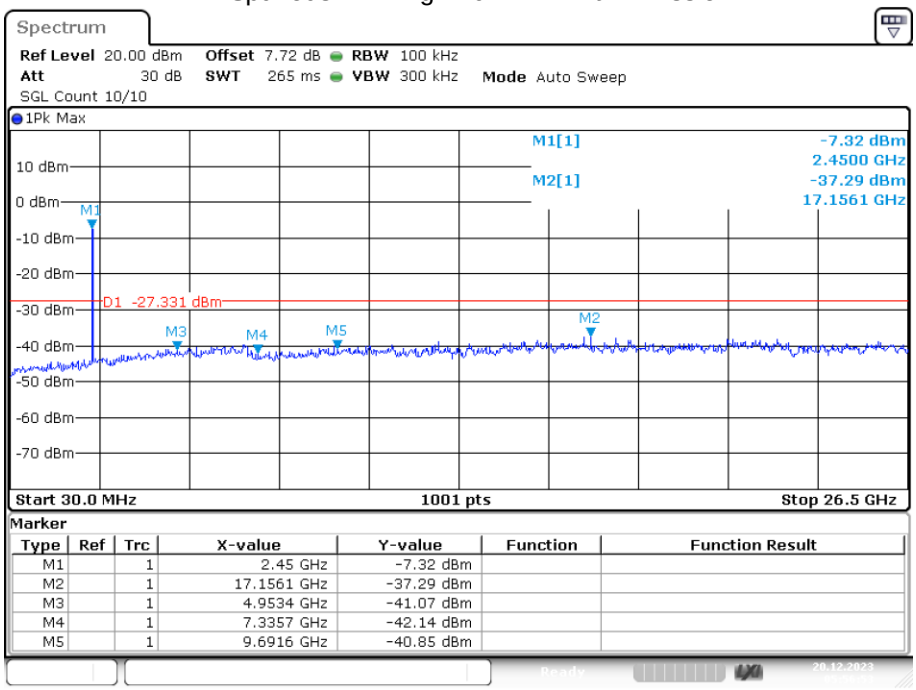
Date: 20.DEC.2023 05:54:24

Tx. Spurious NVNT g 2462MHz Ant1 Ref



Date: 20.DEC.2023 05:56:35

Tx. Spurious NVNT g 2462MHz Ant1 Emission

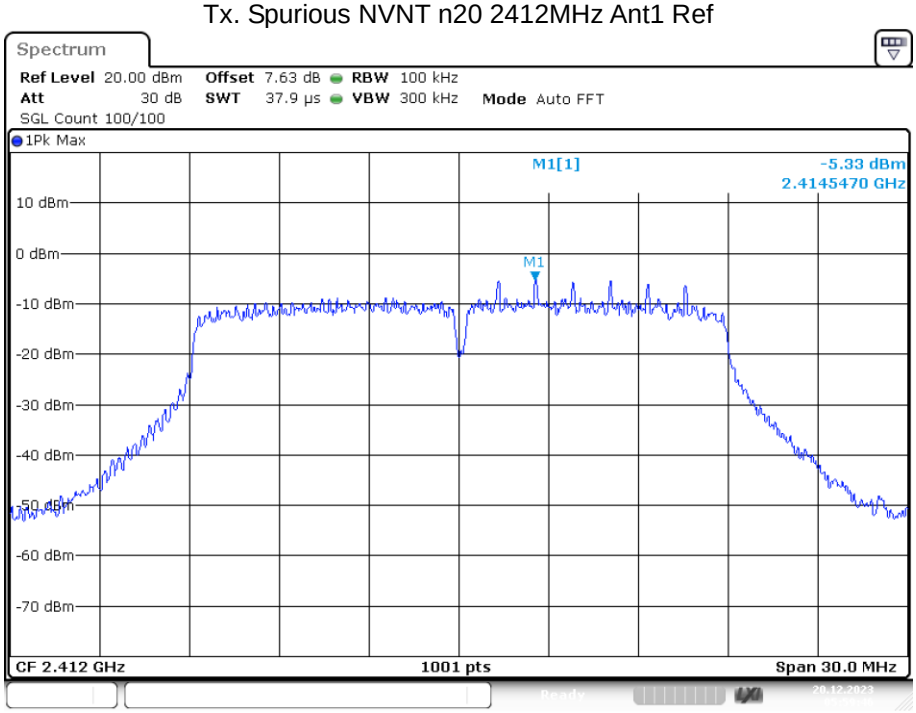


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.45 GHz	-7.32 dBm		
M2		1	17.1561 GHz	-37.29 dBm		
M3		1	4.9534 GHz	-41.07 dBm		
M4		1	7.3357 GHz	-42.14 dBm		
M5		1	9.6916 GHz	-40.85 dBm		

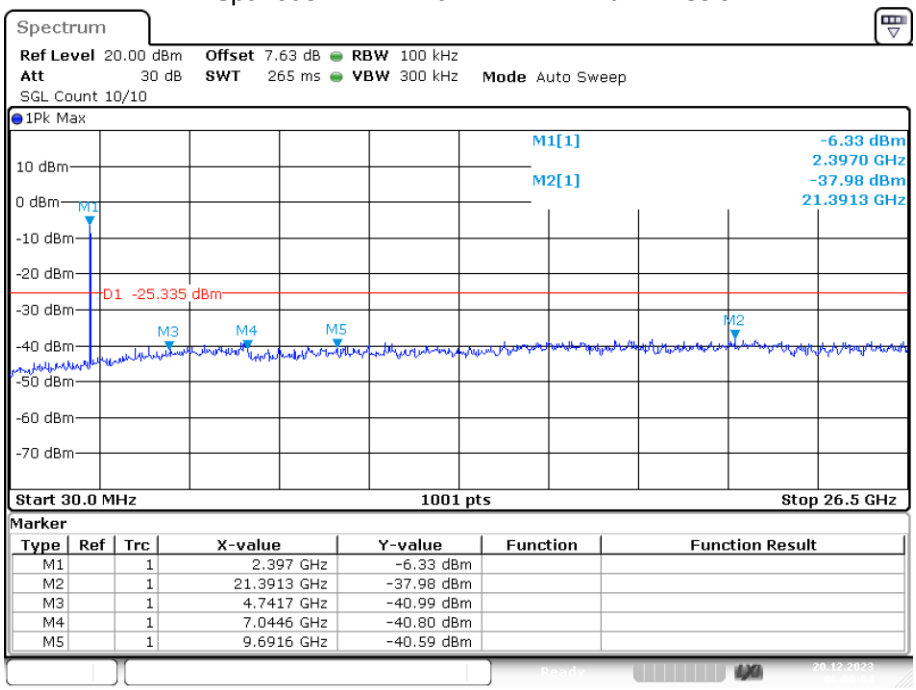
Date: 20.DEC.2023 05:56:52

Tx. Spurious NVNT n20 2412MHz Ant1 Ref



Date: 20.DEC.2023 05:59:46

Tx. Spurious NVNT n20 2412MHz Ant1 Emission

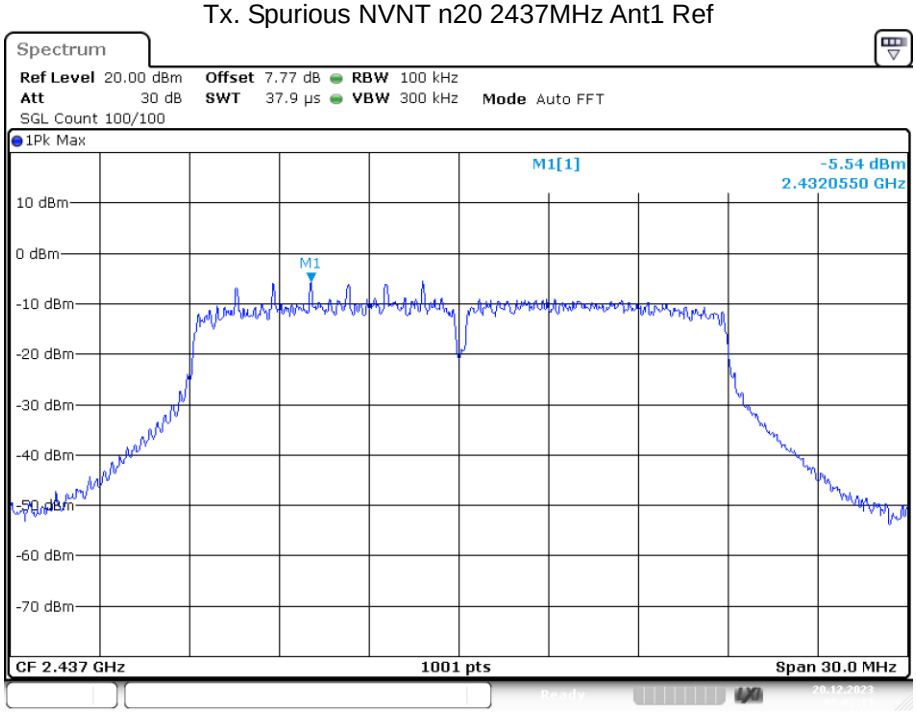


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.397 GHz	-6.33 dBm		
M2		1	21.3913 GHz	-37.98 dBm		
M3		1	4.7417 GHz	-40.99 dBm		
M4		1	7.0446 GHz	-40.80 dBm		
M5		1	9.6916 GHz	-40.59 dBm		

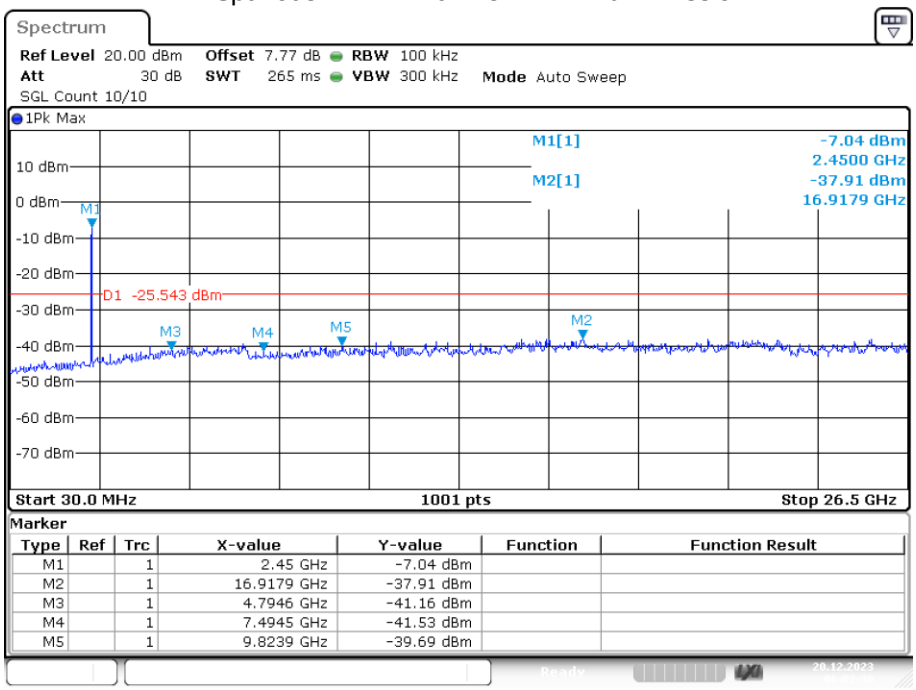
Date: 20.DEC.2023 06:00:04

Tx. Spurious NVNT n20 2437MHz Ant1 Ref



Date: 20.DEC.2023 06:02:13

Tx. Spurious NVNT n20 2437MHz Ant1 Emission

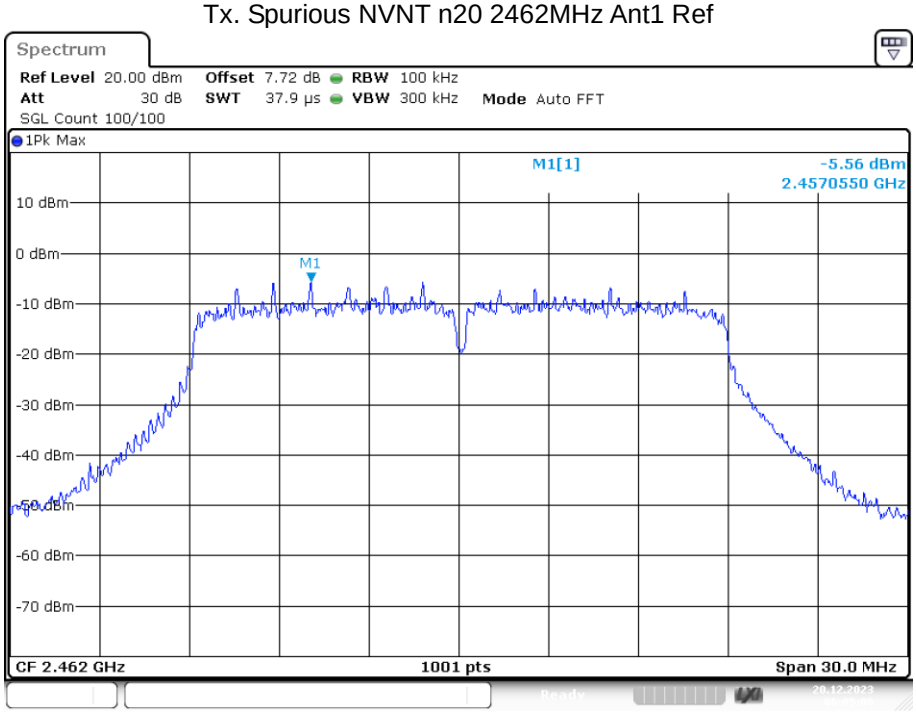


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.45 GHz	-7.04 dBm		
M2		1	16.9179 GHz	-37.91 dBm		
M3		1	4.7946 GHz	-41.16 dBm		
M4		1	7.4945 GHz	-41.53 dBm		
M5		1	9.8239 GHz	-39.69 dBm		

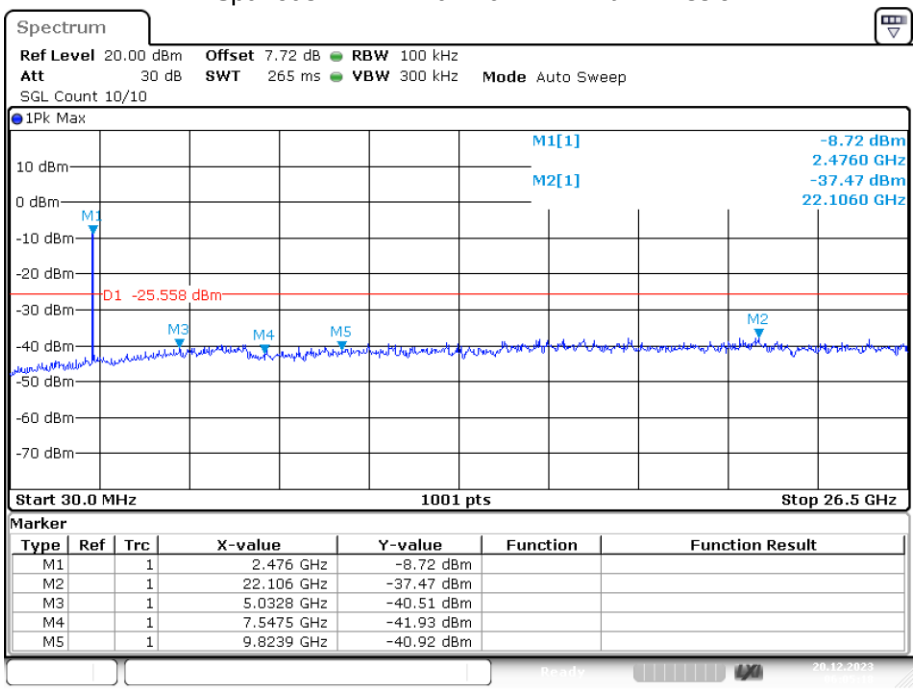
Date: 20.DEC.2023 06:02:31

Tx. Spurious NVNT n20 2462MHz Ant1 Ref



Date: 20.DEC.2023 06:05:00

Tx. Spurious NVNT n20 2462MHz Ant1 Emission

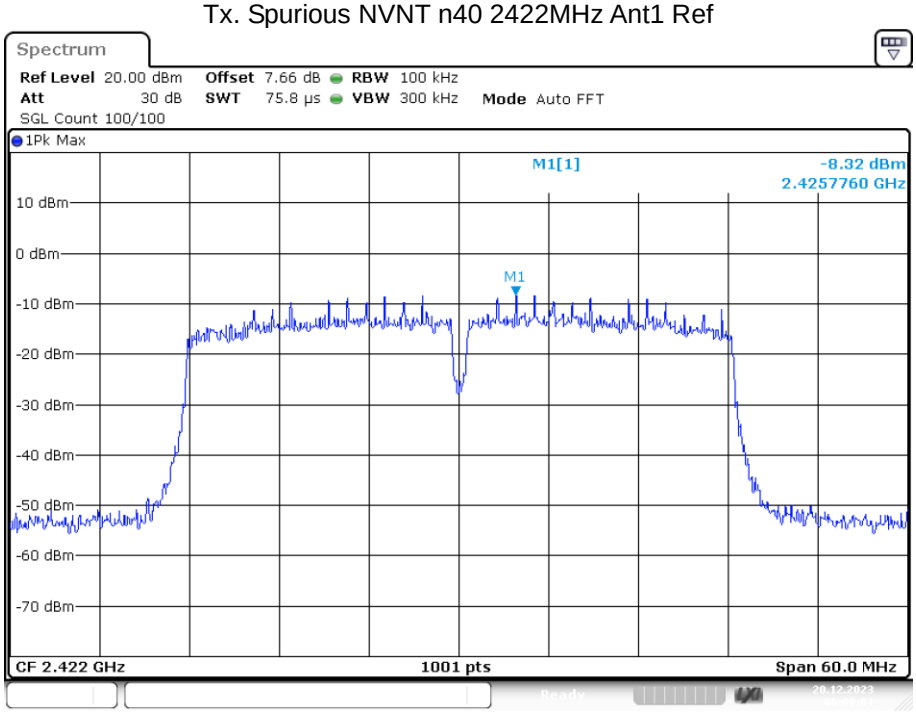


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.476 GHz	-8.72 dBm		
M2		1	22.106 GHz	-37.47 dBm		
M3		1	5.0328 GHz	-40.51 dBm		
M4		1	7.5475 GHz	-41.93 dBm		
M5		1	9.8239 GHz	-40.92 dBm		

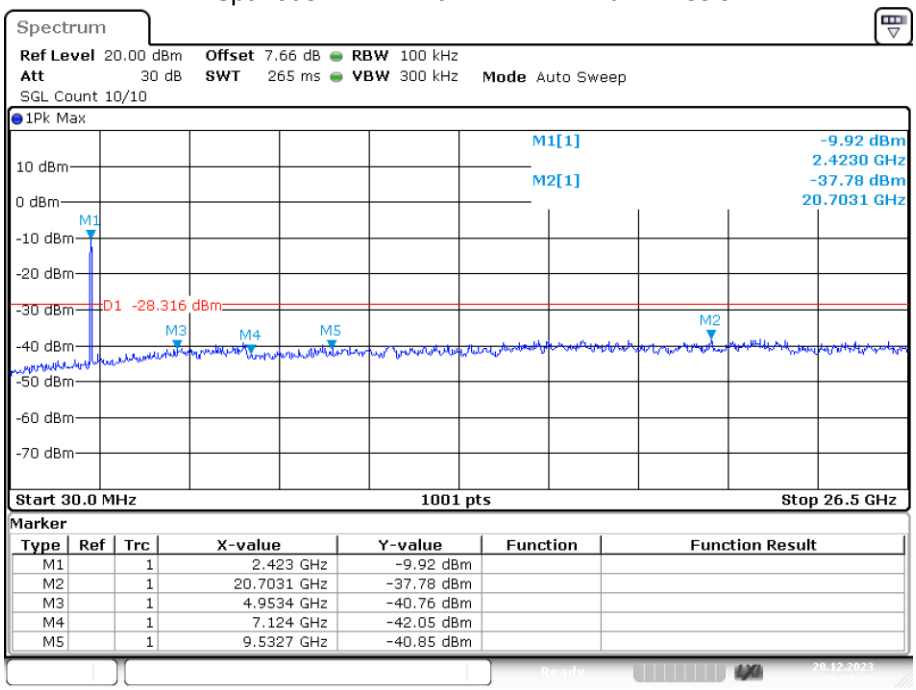
Date: 20.DEC.2023 06:05:18

Tx. Spurious NVNT n40 2422MHz Ant1 Ref



Date: 20.DEC.2023 06:09:01

Tx. Spurious NVNT n40 2422MHz Ant1 Emission

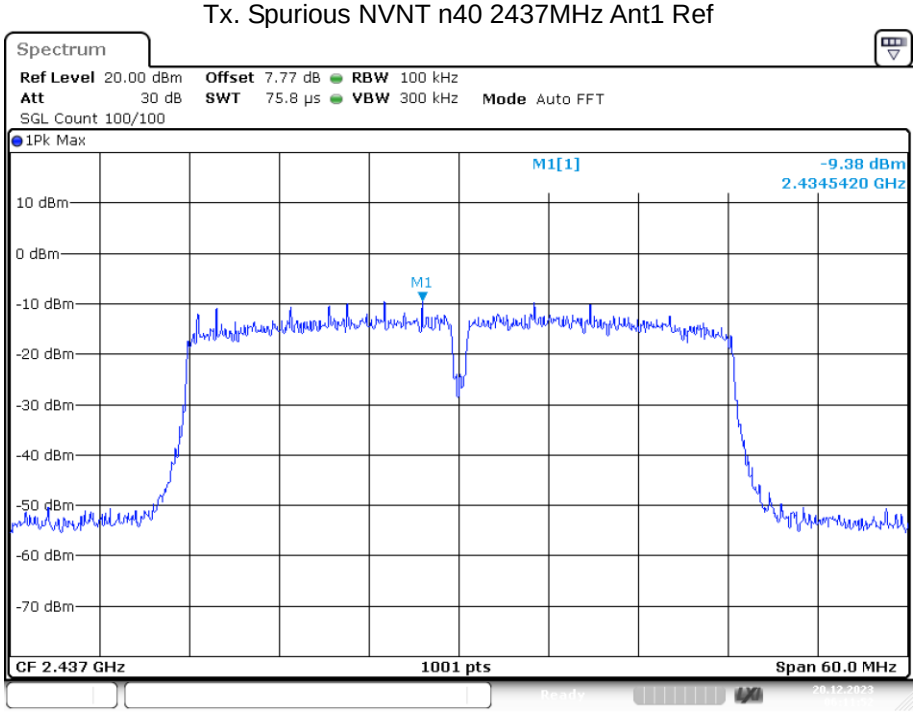


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.423 GHz	-9.92 dBm		
M2		1	20.7031 GHz	-37.78 dBm		
M3		1	4.9534 GHz	-40.76 dBm		
M4		1	7.124 GHz	-42.05 dBm		
M5		1	9.5327 GHz	-40.85 dBm		

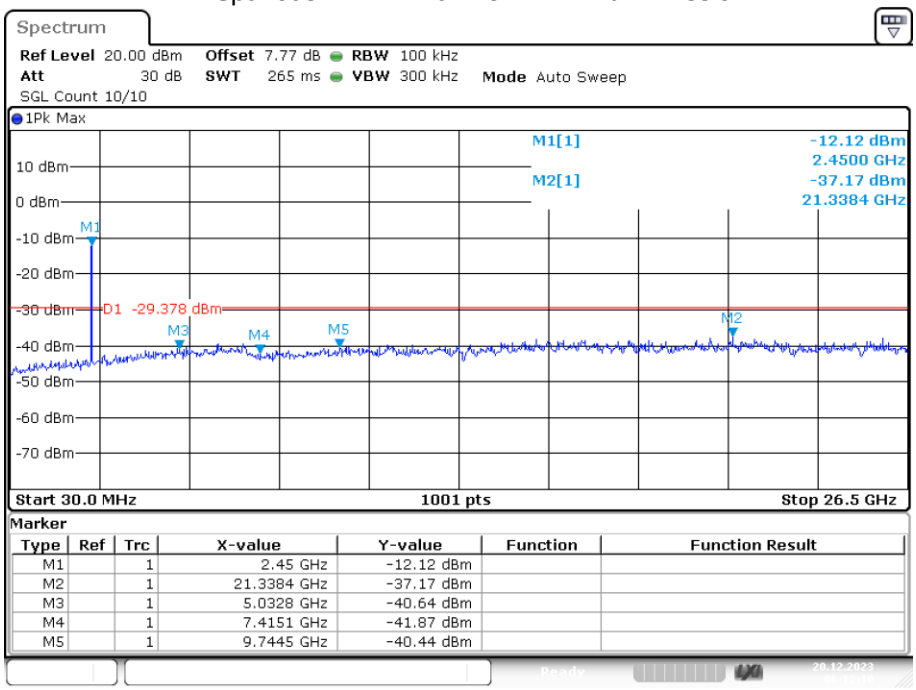
Date: 20.DEC.2023 06:09:19

Tx. Spurious NVNT n40 2437MHz Ant1 Ref



Date: 20.DEC.2023 06:11:52

Tx. Spurious NVNT n40 2437MHz Ant1 Emission

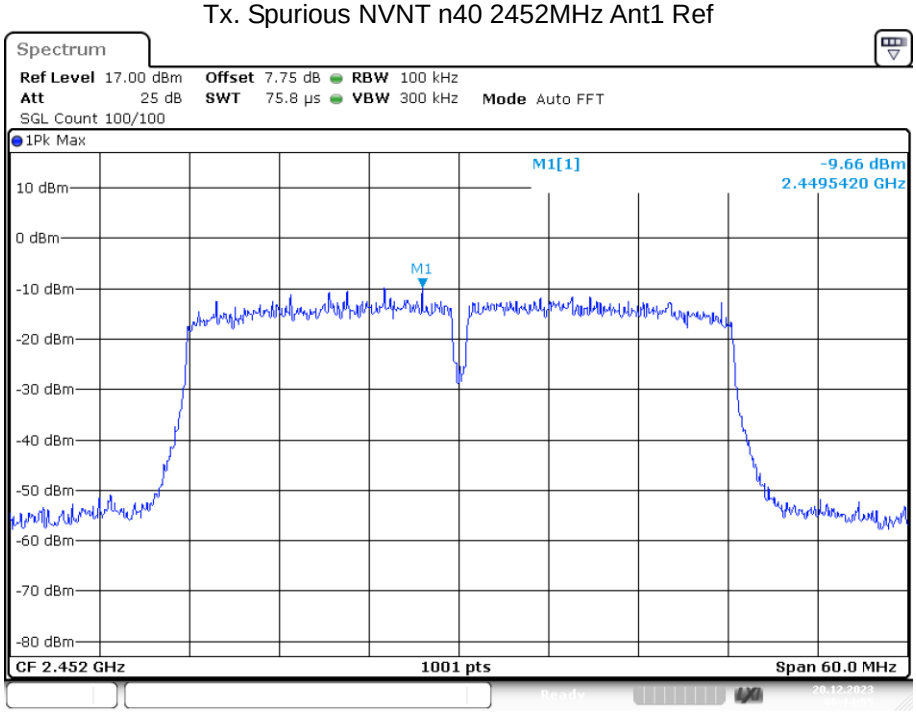


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.45 GHz	-12.12 dBm		
M2		1	21.3384 GHz	-37.17 dBm		
M3		1	5.0328 GHz	-40.64 dBm		
M4		1	7.4151 GHz	-41.87 dBm		
M5		1	9.7445 GHz	-40.44 dBm		

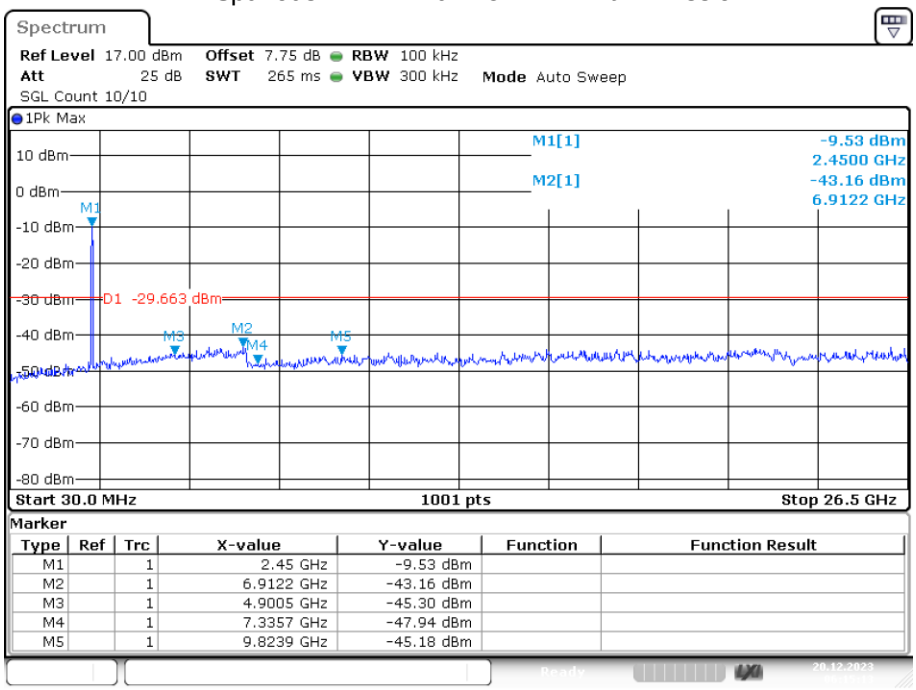
Date: 20.DEC.2023 06:12:10

Tx. Spurious NVNT n40 2452MHz Ant1 Ref



Date: 20.DEC.2023 06:14:54

Tx. Spurious NVNT n40 2452MHz Ant1 Emission



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.45 GHz	-9.53 dBm		
M2		1	6.9122 GHz	-43.16 dBm		
M3		1	4.9005 GHz	-45.30 dBm		
M4		1	7.3357 GHz	-47.94 dBm		
M5		1	9.8239 GHz	-45.18 dBm		

Date: 20.DEC.2023 06:15:12

4. POWER LINE CONDUCTED EMISSION

4.1. Test Limits

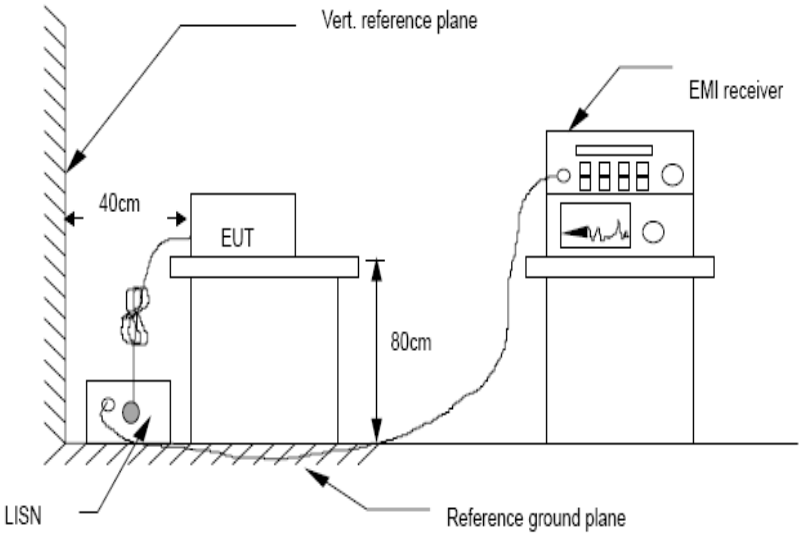
Frequency	Limits dB(μV)	
MHz	Quasi-peak Level	Average Level
0.15 -0.50	66 -56*	56 - 46*
0.50 -5.00	56	46
5.00 -30.00	60	50

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.

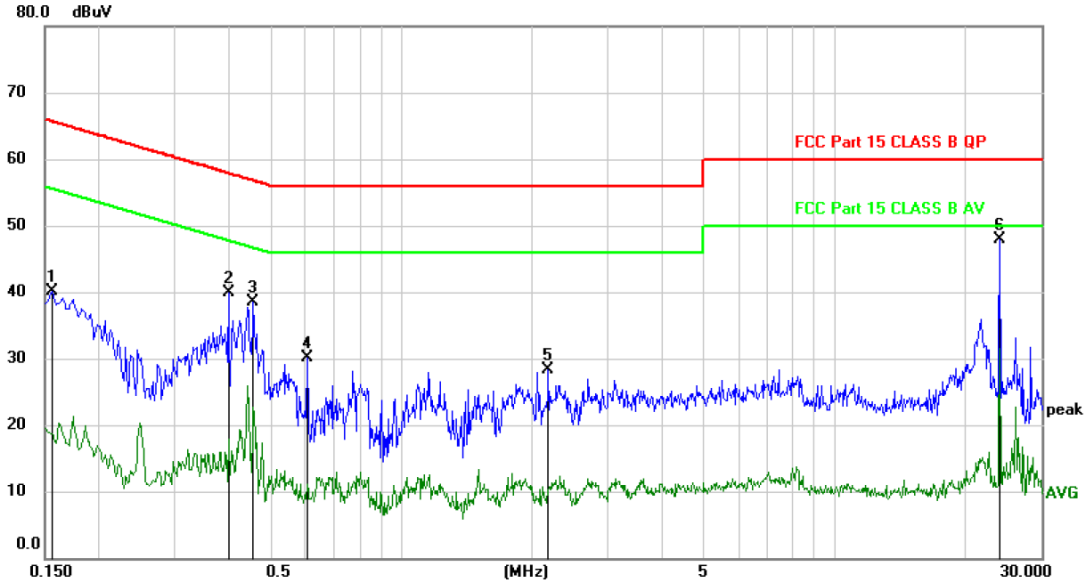
4.3. Test Setup



4.4. Test Results

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

Line:

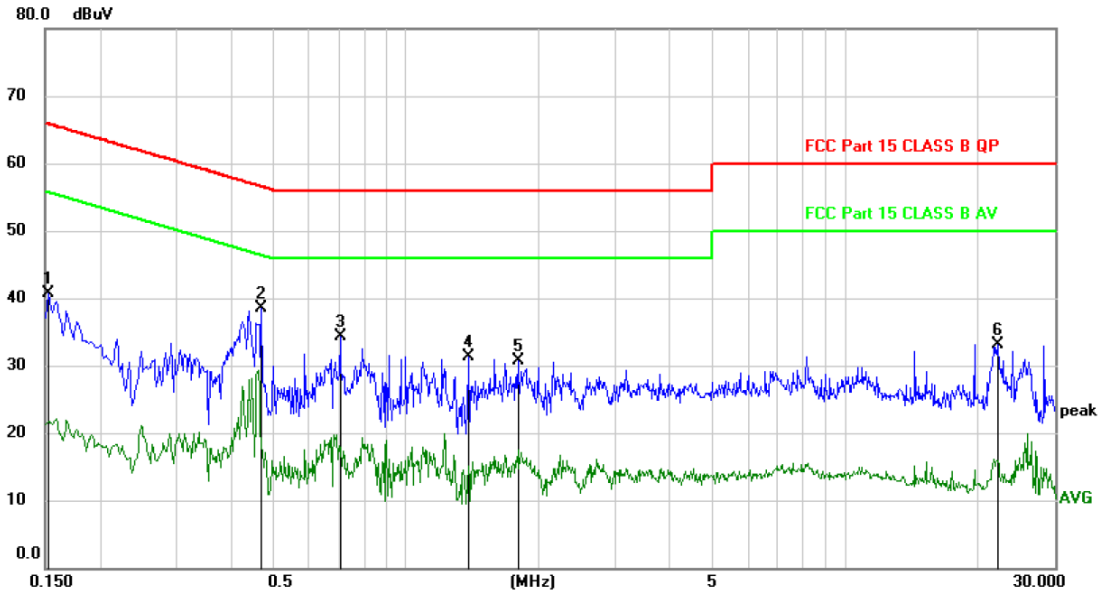


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1560	30.24	9.94	40.18	65.67	-25.49	peak	
2		0.3990	29.87	9.94	39.81	57.87	-18.06	peak	
3		0.4560	28.54	9.95	38.49	56.77	-18.28	peak	
4		0.6060	20.24	9.92	30.16	56.00	-25.84	peak	
5		2.1810	18.34	9.89	28.23	56.00	-27.77	peak	
6	*	24.0419	37.43	10.45	47.88	60.00	-12.12	peak	

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

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

Neutral:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1530	30.68	9.94	40.62	65.84	-25.22	peak	
2	*	0.4680	28.53	9.95	38.48	56.55	-18.07	peak	
3		0.7050	24.37	9.93	34.30	56.00	-21.70	peak	
4		1.3829	21.46	9.89	31.35	56.00	-24.65	peak	
5		1.7940	20.86	9.89	30.75	56.00	-25.25	peak	
6		22.2360	22.72	10.46	33.18	60.00	-26.82	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

5. CONDUCTED MAXIMUM OUTPUT POWER

5.1. Test limits

Please refer RSS-247 & 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

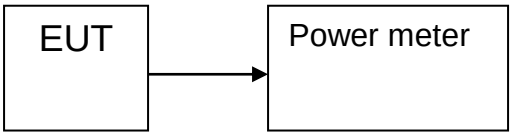
5.2.1 Place the EUT on the table and set it in transmitting mode.

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



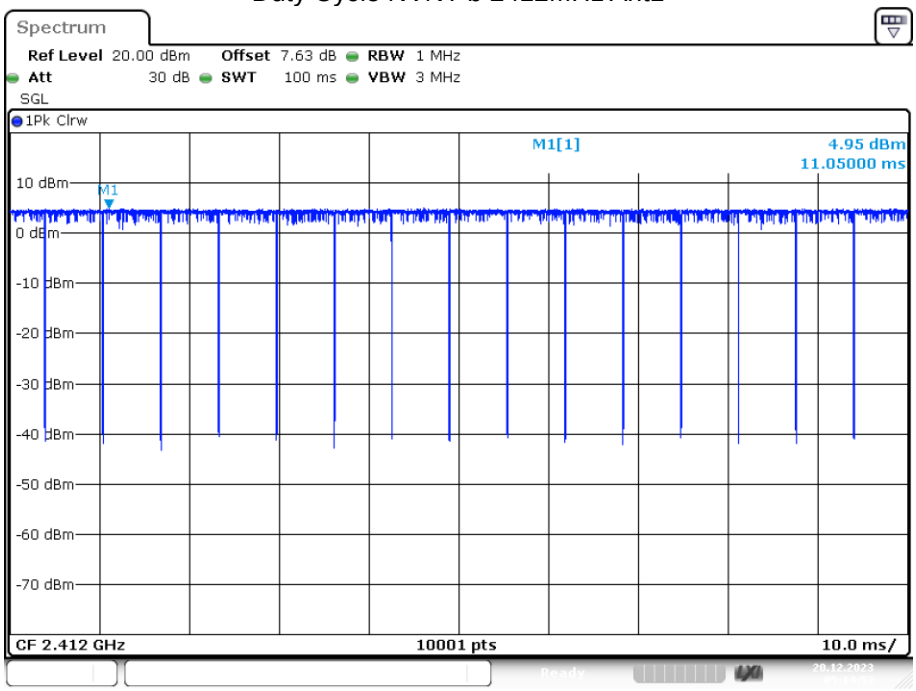
5.4. Test Results

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Ant (dBi)	EIRP (dBm)	Limit (dBm)	Verdict
NVNT	b	2412	Ant1	11.988	1.95	13.938	30	Pass
NVNT	b	2437	Ant1	12.148	1.95	14.098	30	Pass
NVNT	b	2462	Ant1	12.393	1.95	14.343	30	Pass
NVNT	g	2412	Ant1	12.361	1.95	14.311	30	Pass
NVNT	g	2437	Ant1	11.989	1.95	13.939	30	Pass
NVNT	g	2462	Ant1	12.529	1.95	14.479	30	Pass
NVNT	n20	2412	Ant1	11.571	1.95	13.521	30	Pass
NVNT	n20	2437	Ant1	11.893	1.95	13.843	30	Pass
NVNT	n20	2462	Ant1	11.93	1.95	13.88	30	Pass
NVNT	n40	2422	Ant1	12.421	1.95	14.371	30	Pass
NVNT	n40	2437	Ant1	12.329	1.95	14.279	30	Pass
NVNT	n40	2452	Ant1	12.225	1.95	14.175	30	Pass

Duty Cycle

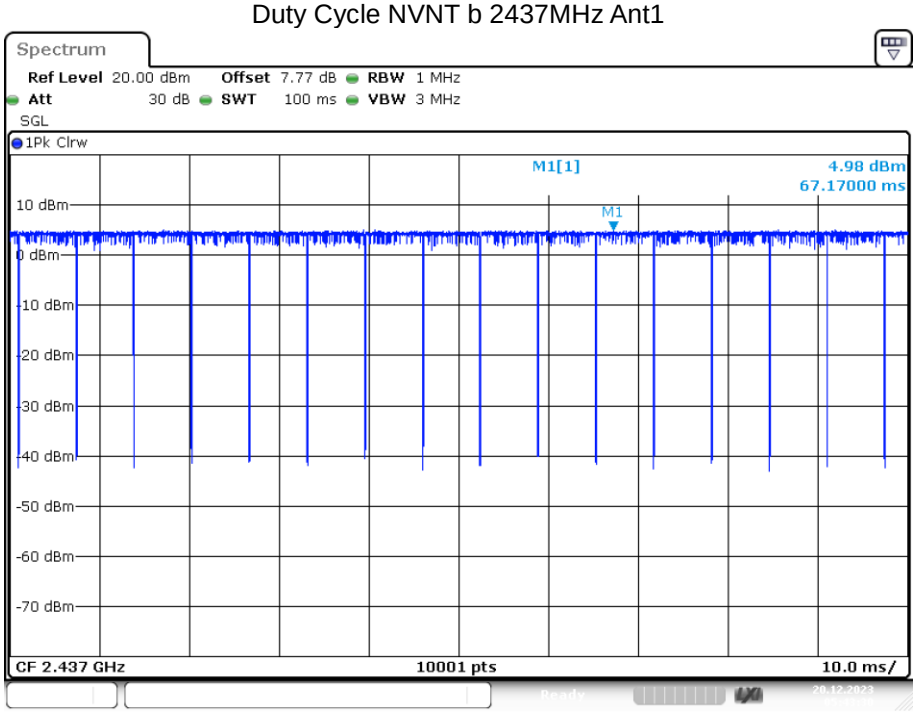
Condition	Mode	Frequency (MHz)	Antenna	Duty Cycle (%)
NVNT	b	2412	Ant1	99.51
NVNT	b	2437	Ant1	99.48
NVNT	b	2462	Ant1	99.66
NVNT	g	2412	Ant1	98.36
NVNT	g	2437	Ant1	98.88
NVNT	g	2462	Ant1	98.72
NVNT	n20	2412	Ant1	98.36
NVNT	n20	2437	Ant1	98.72
NVNT	n20	2462	Ant1	98.82
NVNT	n40	2422	Ant1	96.88
NVNT	n40	2437	Ant1	97.56
NVNT	n40	2452	Ant1	97.46

Duty Cycle NVNT b 2412MHz Ant1



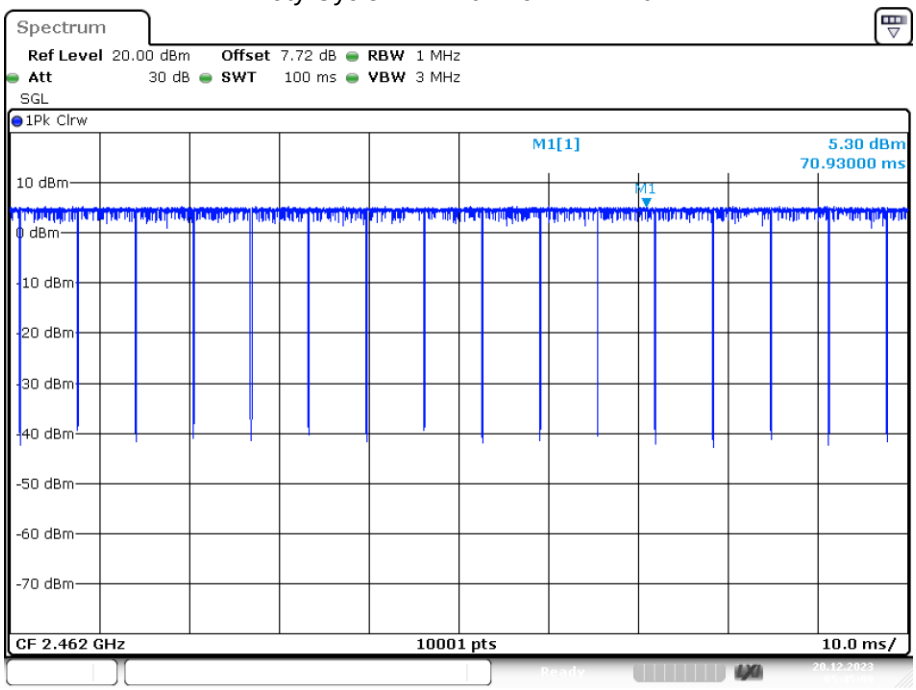
Date: 20.DEC.2023 05:14:53

Duty Cycle NVNT b 2437MHz Ant1



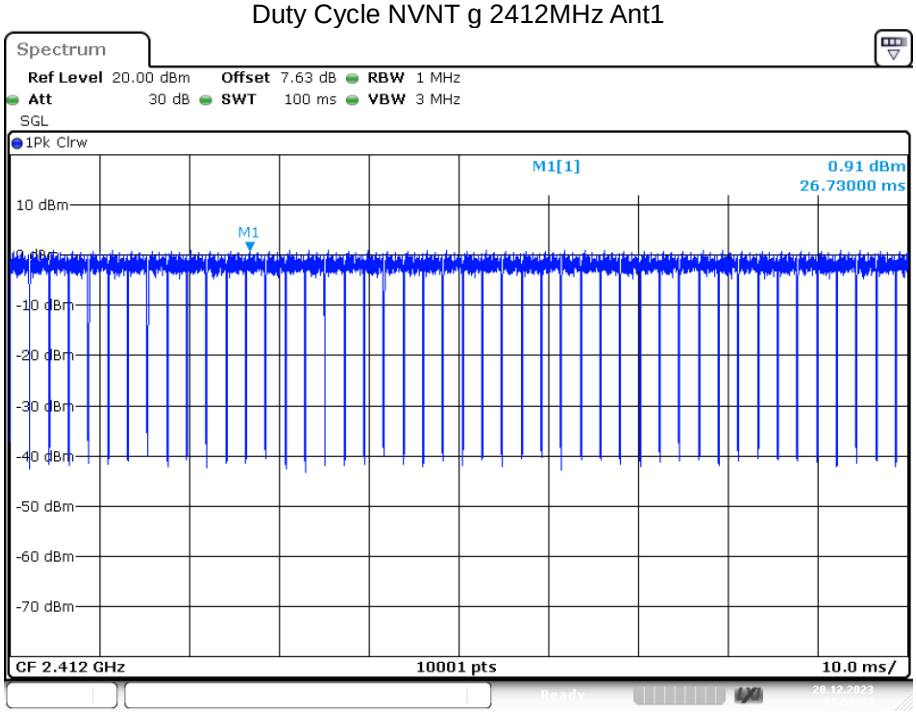
Date: 20.DEC.2023 05:43:30

Duty Cycle NVNT b 2462MHz Ant1



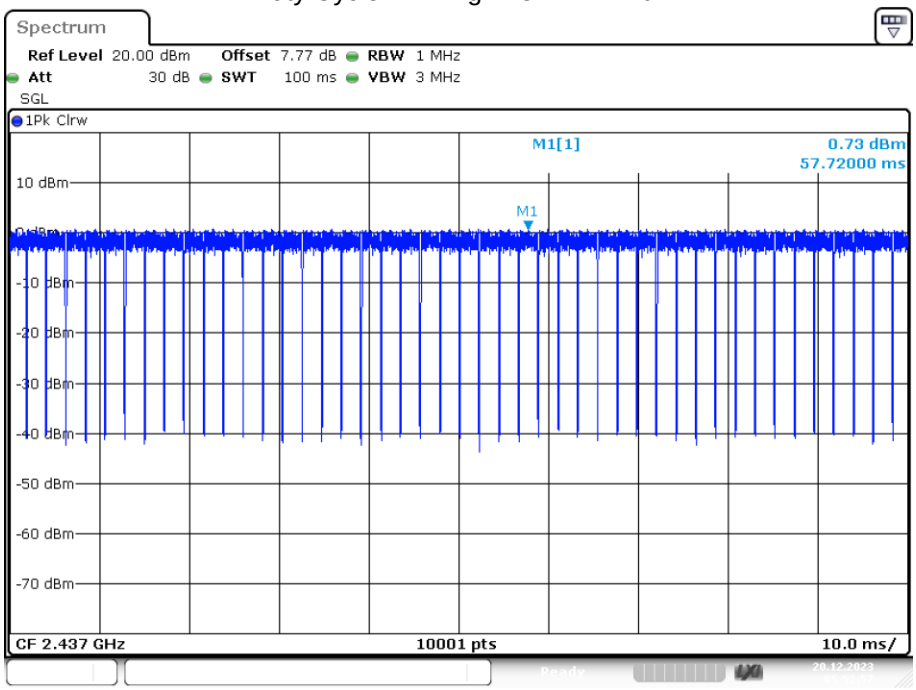
Date: 20.DEC.2023 05:45:08

Duty Cycle NVNT g 2412MHz Ant1



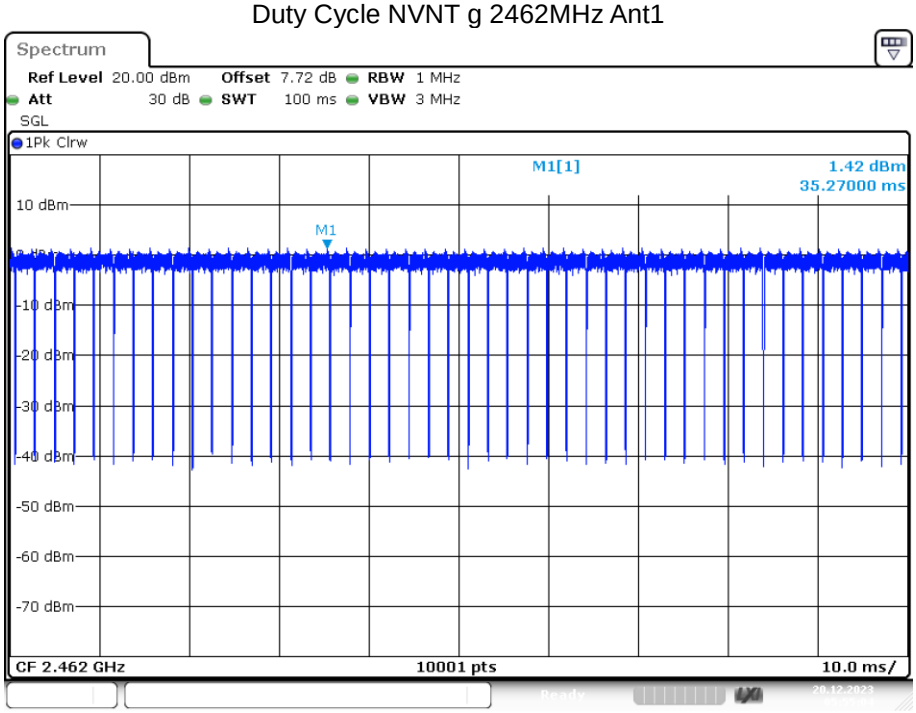
Date: 20.DEC.2023 05:50:32

Duty Cycle NVNT g 2437MHz Ant1



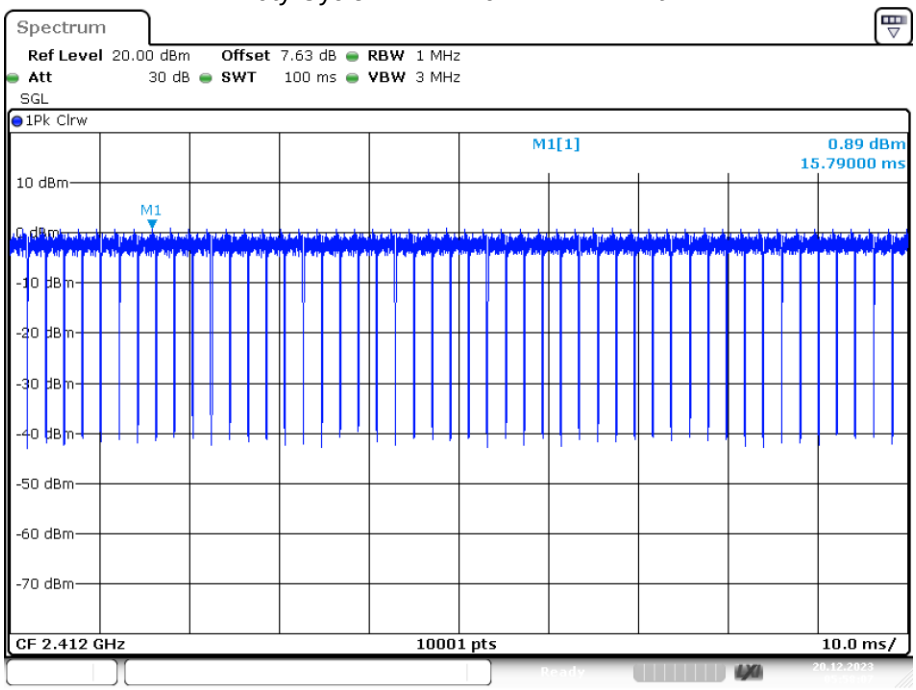
Date: 20.DEC.2023 05:52:57

Duty Cycle NVNT g 2462MHz Ant1



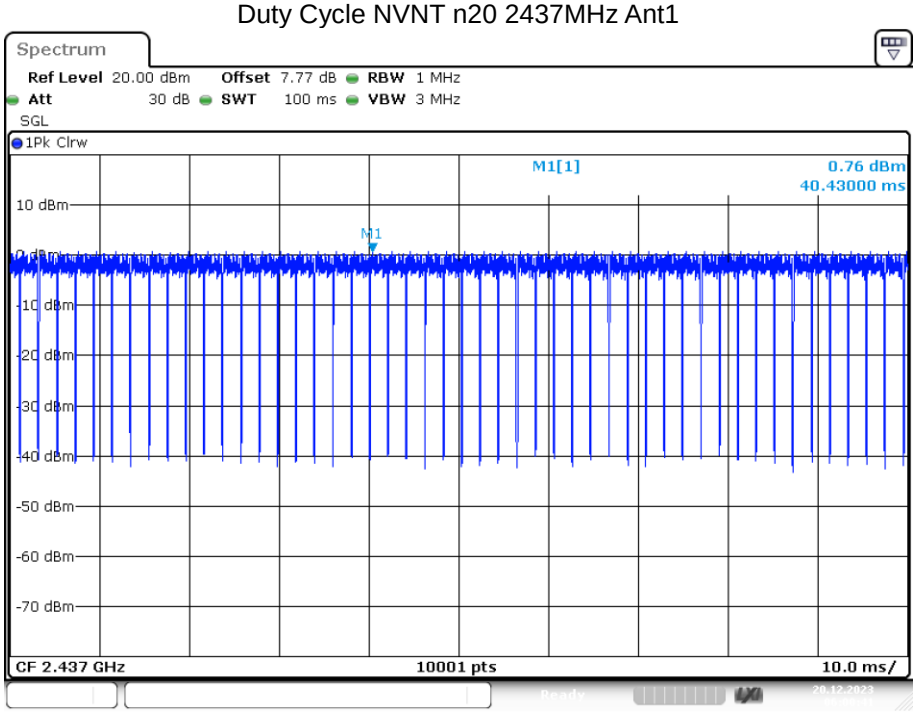
Date: 20.DEC.2023 05:55:04

Duty Cycle NVNT n20 2412MHz Ant1



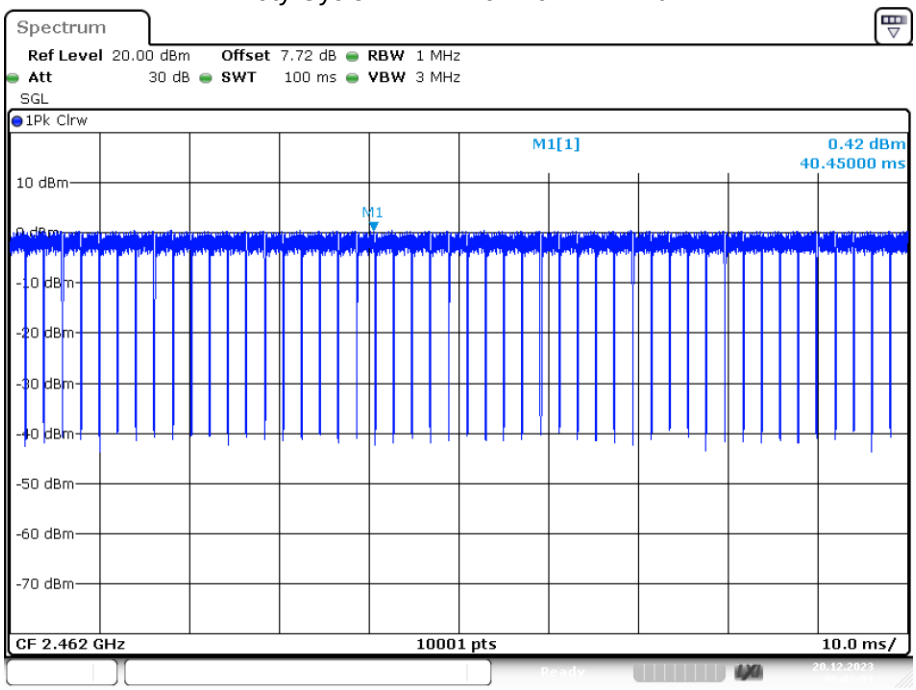
Date: 20.DEC.2023 05:58:07

Duty Cycle NVNT n20 2437MHz Ant1



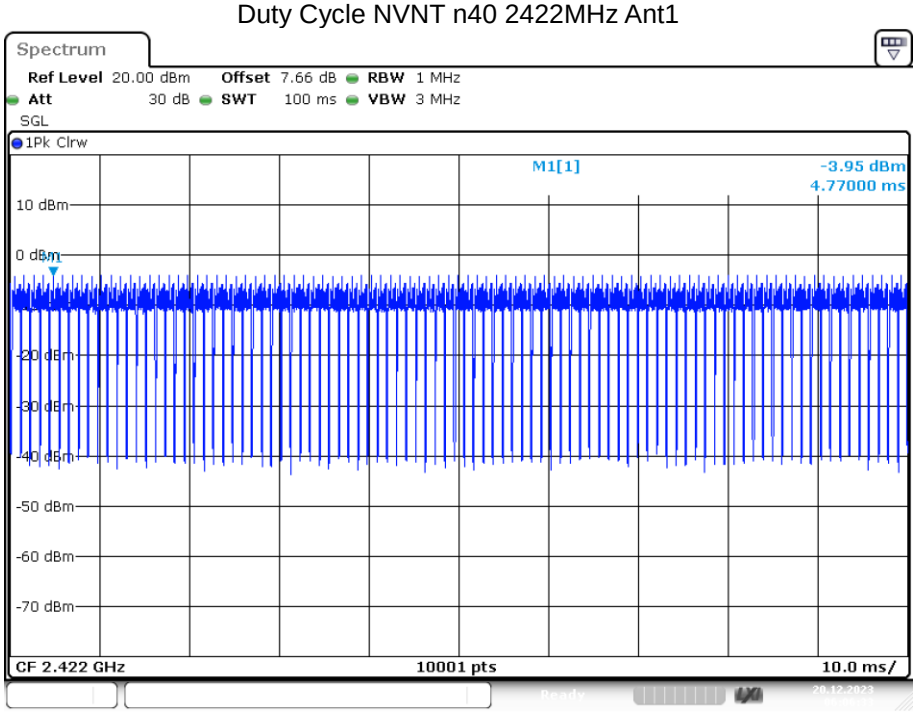
Date: 20.DEC.2023 06:00:42

Duty Cycle NVNT n20 2462MHz Ant1



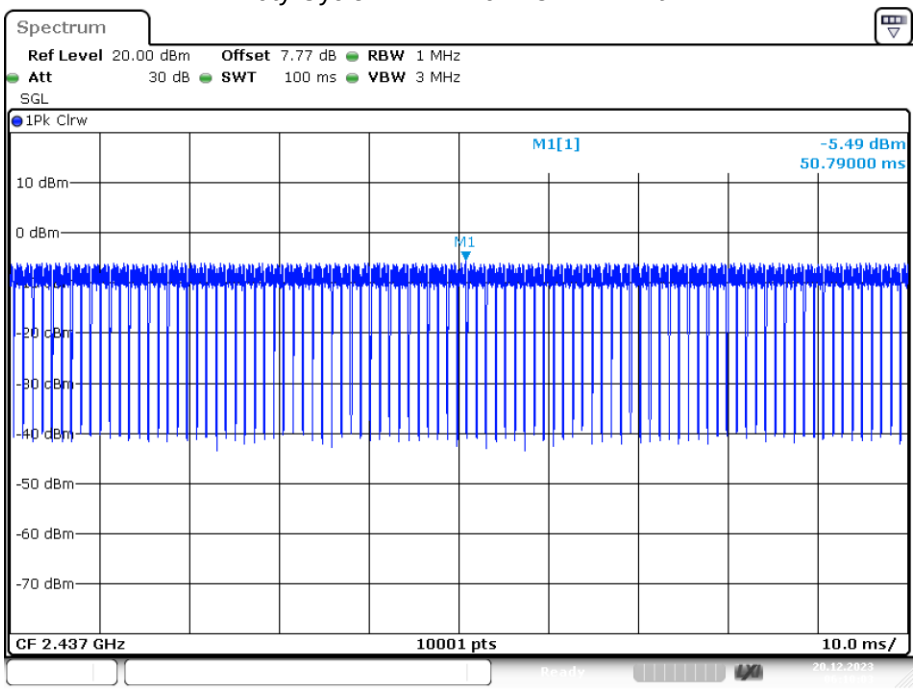
Date: 20.DEC.2023 06:03:03

Duty Cycle NVNT n40 2422MHz Ant1



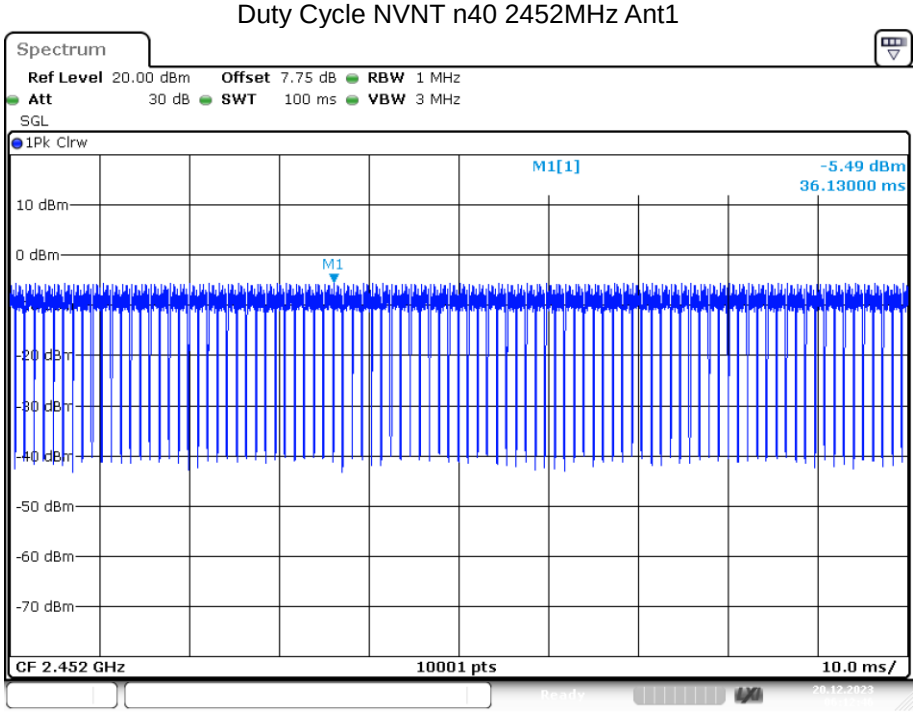
Date: 20.DEC.2023 06:06:33

Duty Cycle NVNT n40 2437MHz Ant1



Date: 20.DEC.2023 06:10:04

Duty Cycle NVNT n40 2452MHz Ant1



Date: 20.DEC.2023 06:12:46

6. PEAK POWER SPECTRAL DENSITY

6.1. Test limits

6.1.1 Please refer RSS-247 & 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.

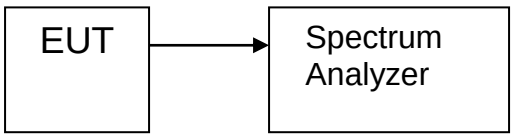
6.2.2 Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

6.2.3 Set the spectrum analyzer as RBW = 3kHz(Set the RBW to: 3 kHz≤RBW≤100 kHz.), VBW = 10kHz(Set the VBW≥3×RBW), span≥1.5×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.

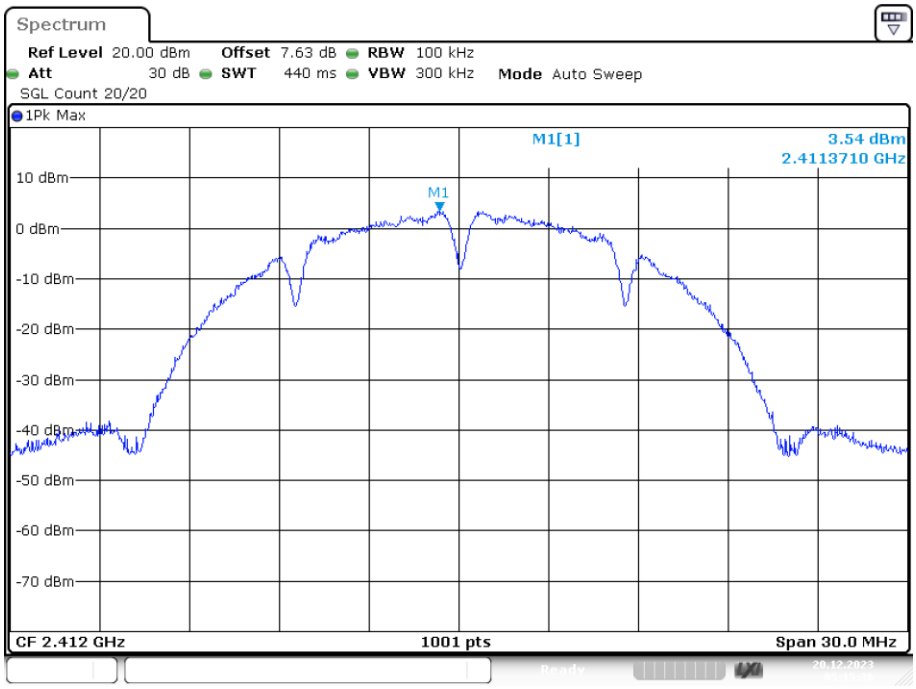
6.3. Test Setup



6.4. Test Results

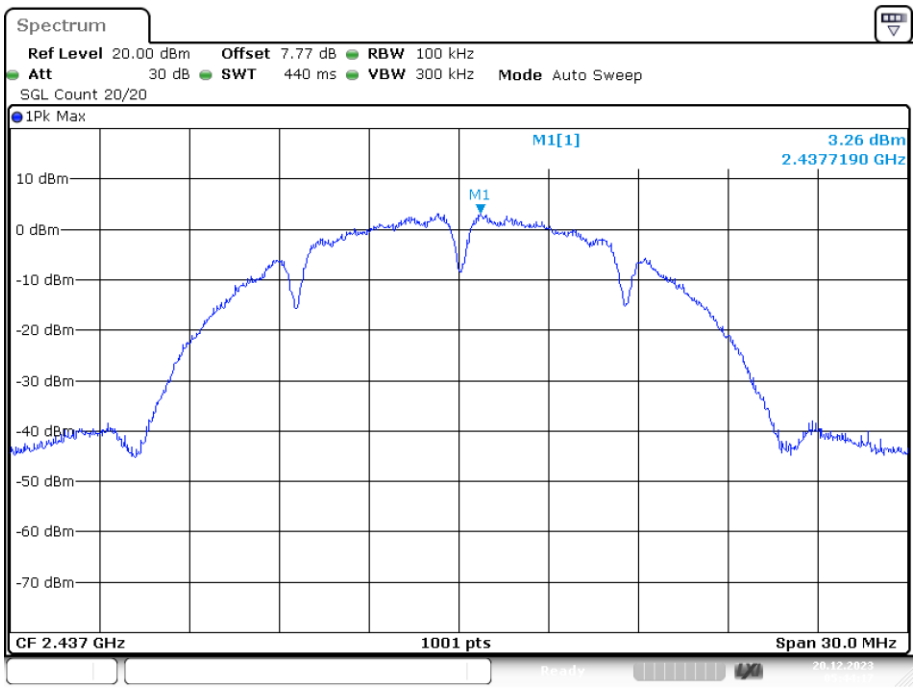
Condition	Mode	Frequency (MHz)	Antenna	Conducted PSD (dBm)	Limit (dBm)	Verdict
NVNT	b	2412	Ant1	3.536	8	Pass
NVNT	b	2437	Ant1	3.258	8	Pass
NVNT	b	2462	Ant1	4.5	8	Pass
NVNT	g	2412	Ant1	-2.74	8	Pass
NVNT	g	2437	Ant1	-3.29	8	Pass
NVNT	g	2462	Ant1	-2.333	8	Pass
NVNT	n20	2412	Ant1	-3.211	8	Pass
NVNT	n20	2437	Ant1	-3.233	8	Pass
NVNT	n20	2462	Ant1	-2.734	8	Pass
NVNT	n40	2422	Ant1	-8.268	8	Pass
NVNT	n40	2437	Ant1	-7.814	8	Pass
NVNT	n40	2452	Ant1	-7.843	8	Pass

PSD NVNT b 2412MHz Ant1



Date: 20.DEC.2023 05:15:37

PSD NVNT b 2437MHz Ant1



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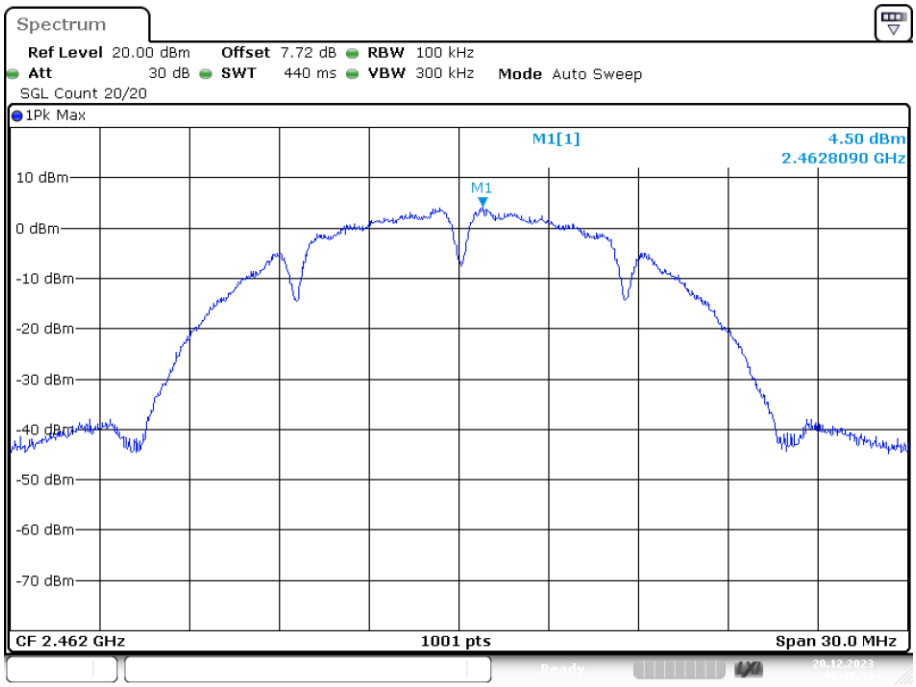
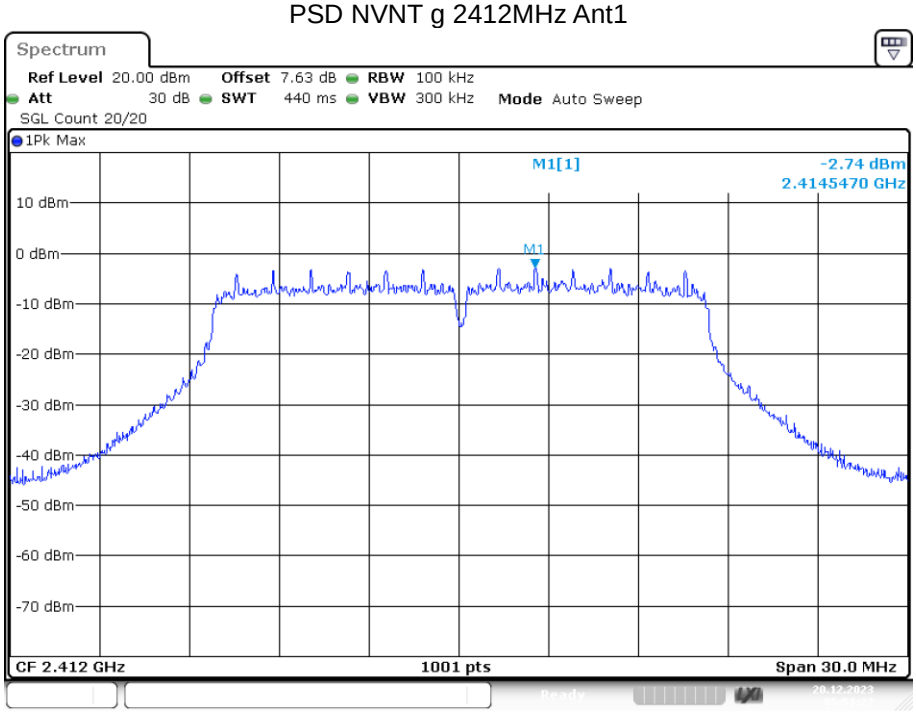
PSD NVNT b 2462MHz Ant1



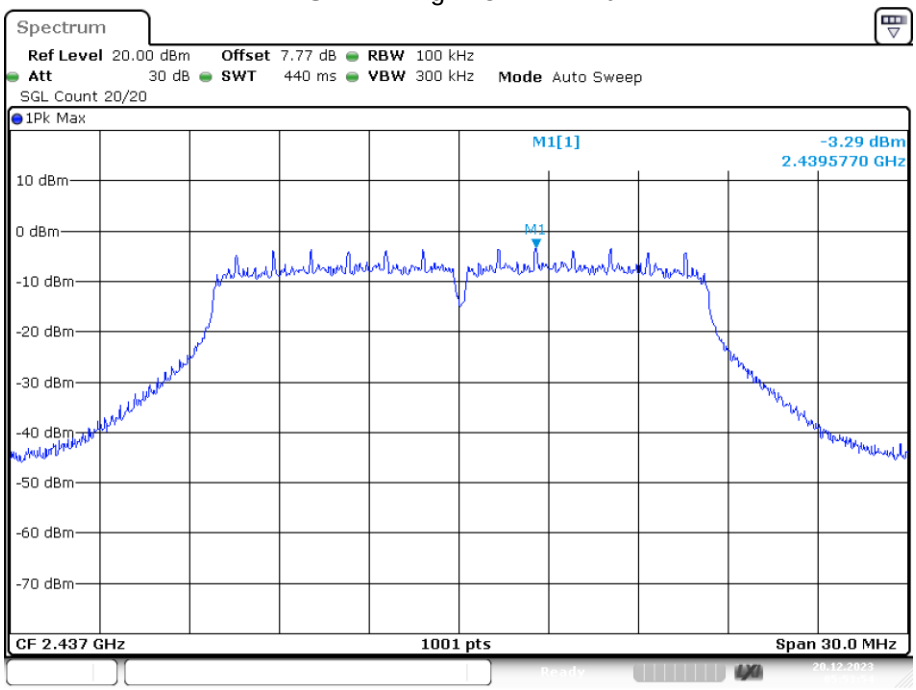
Date: 20.DEC.2023 05:45:59

PSD NVNT g 2412MHz Ant1



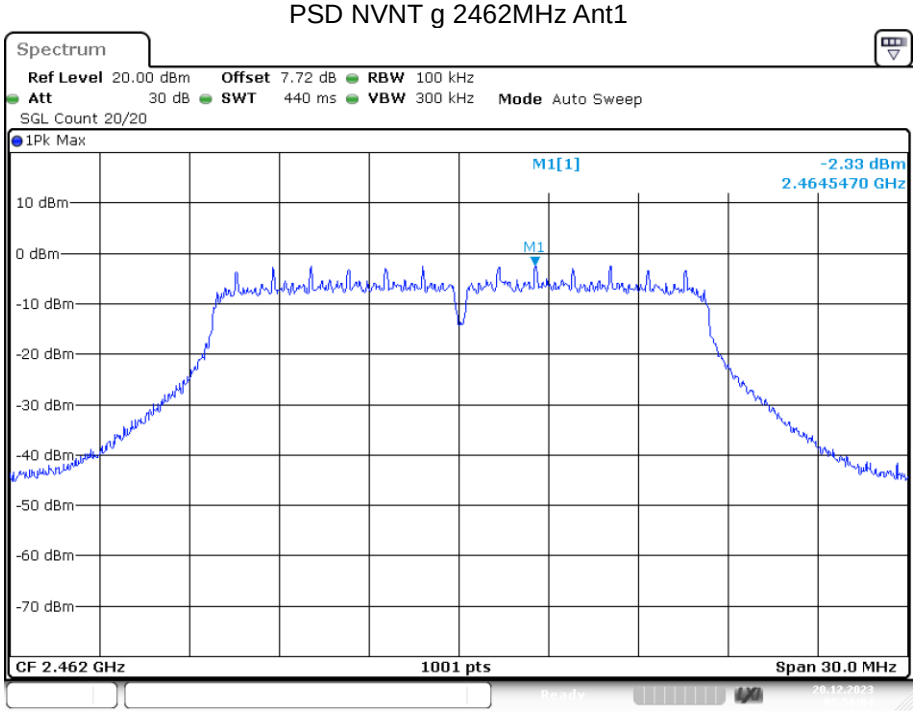
Date: 20.DEC.2023 05:51:22

PSD NVNT g 2437MHz Ant1



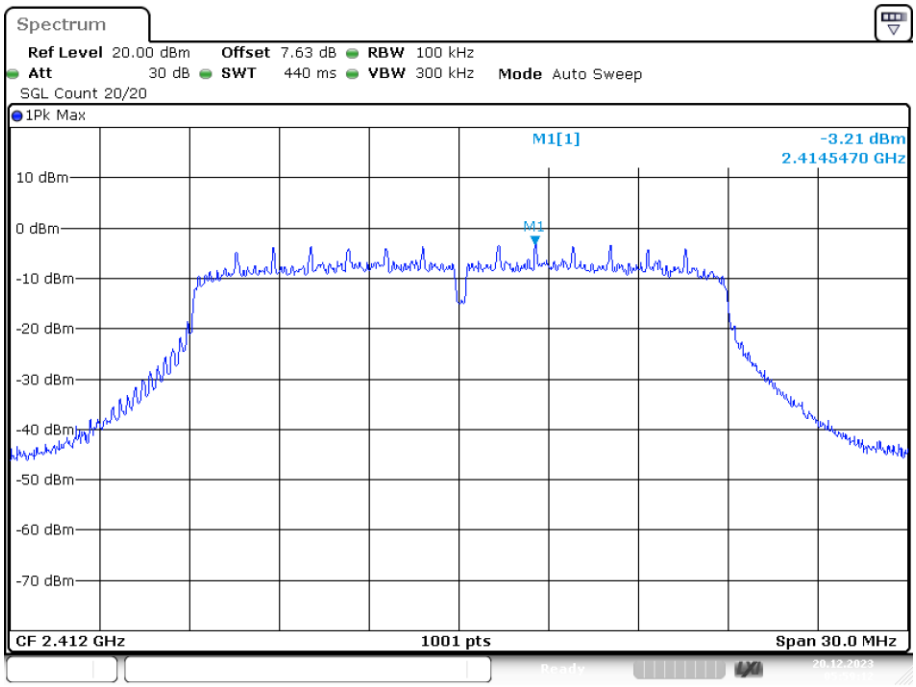
Date: 20.DEC.2023 05:53:54

PSD NVNT g 2462MHz Ant1



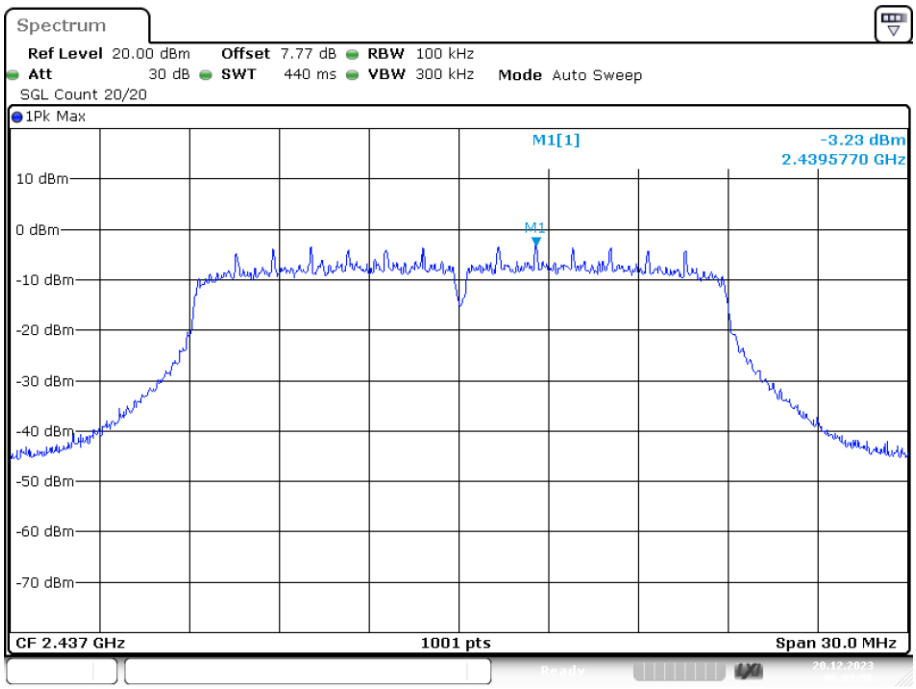
Date: 20.DEC.2023 05:56:04

PSD NVNT n20 2412MHz Ant1



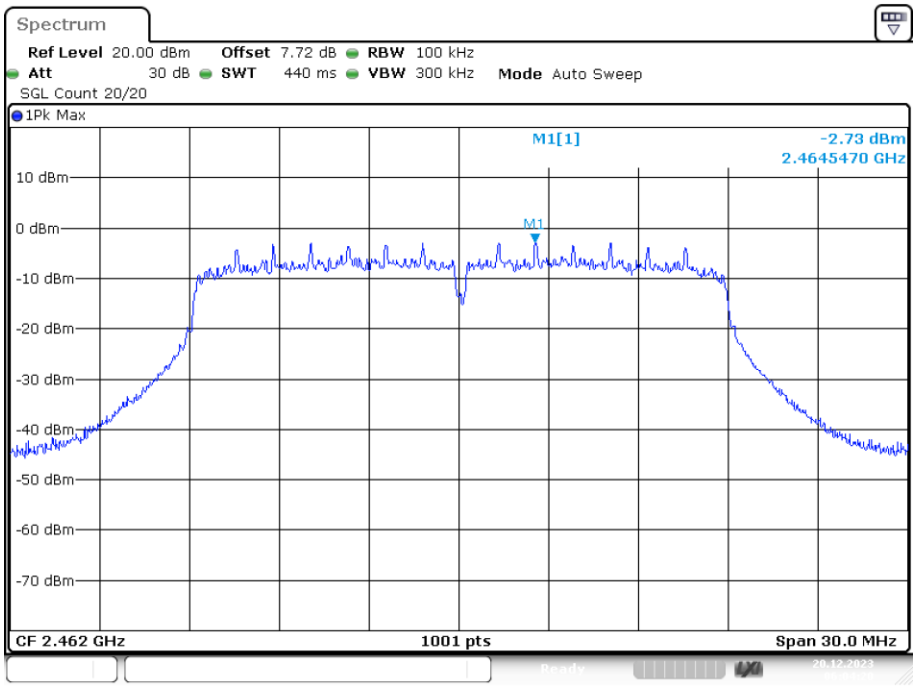
Date: 20.DEC.2023 05:59:12

PSD NVNT n20 2437MHz Ant1



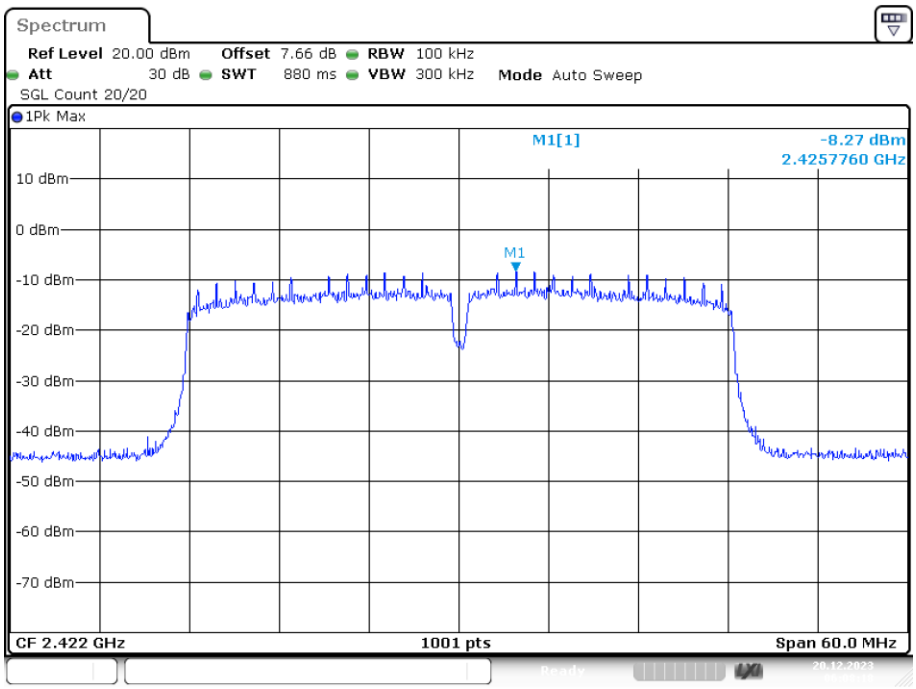
Date: 20.DEC.2023 06:01:56

PSD NVNT n20 2462MHz Ant1



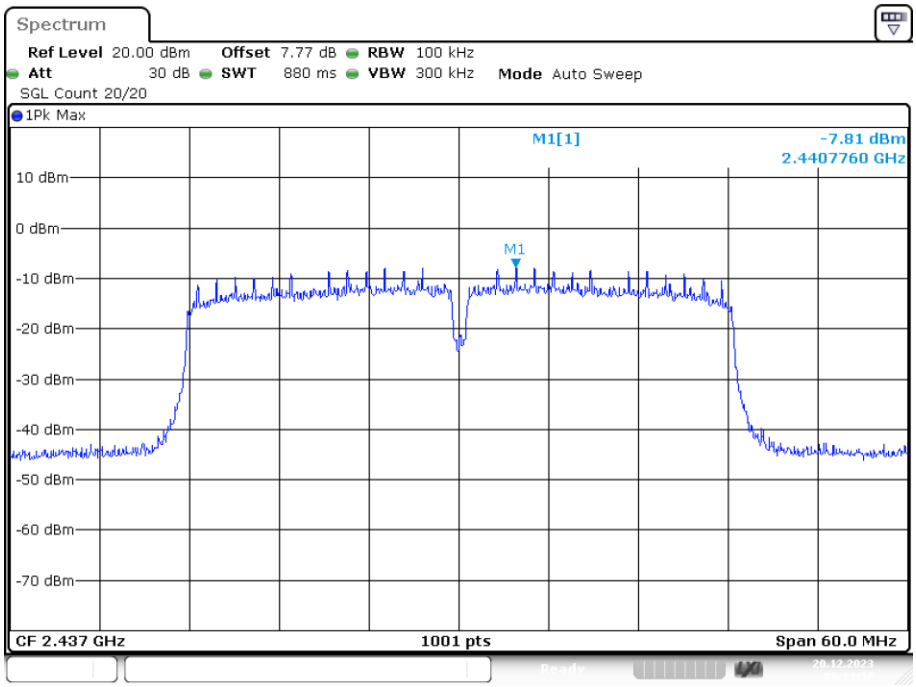
Date: 20.DEC.2023 06:04:21

PSD NVNT n40 2422MHz Ant1



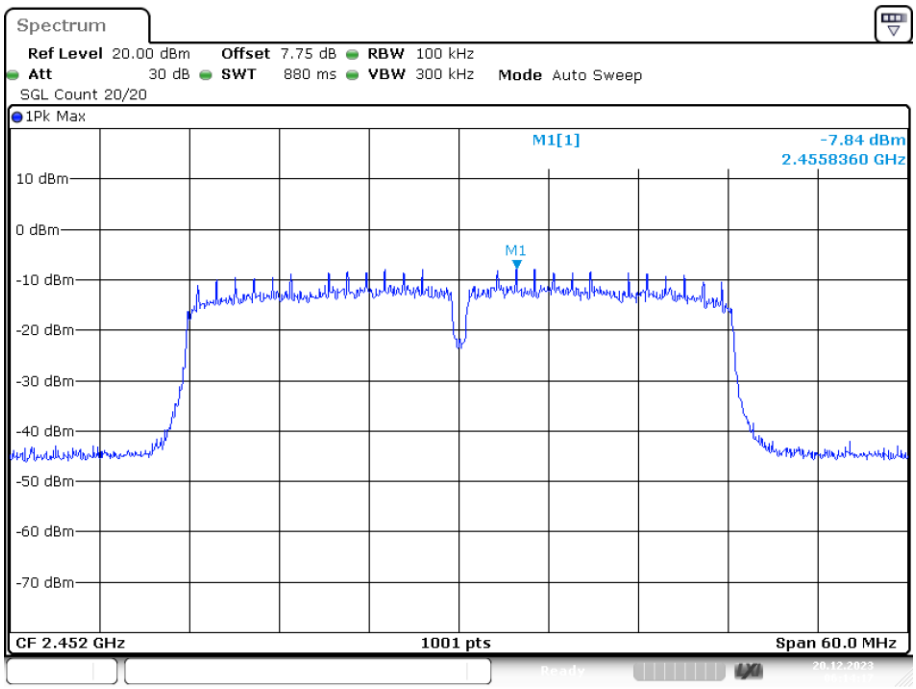
Date: 20.DEC.2023 06:08:18

PSD NVNT n40 2437MHz Ant1



Date: 20.DEC.2023 06:11:37

PSD NVNT n40 2452MHz Ant1



Date: 20.DEC.2023 06:14:17

7. BANDWIDTH

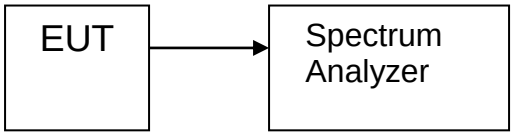
7.1. Test limits

Please refer RSS-247 & FCC PART 15: 15.247
For direct sequence systems, the minimum 6dB bandwidth shall be at least 500 kHz.

7.2. Test Procedure

Details see the KDB558074 D01 Meas Guidance v05r02
a) The bandwidth is measured at an amplitude level reduced 6dB from the reference level. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.
b) The test receiver set RBW =1-5%BW, VBW≥3*RBW, Sweep time set auto, detail see the test plot for 99% Bandwidth.
c) The test receiver set RBW = 100kHz, VBW≥3*RBW =300kHz, Sweep time set auto, detail see the test plot for 6dB Bandwidth.

7.3. Test Setup



7.4. Test Results

-6dB Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	b	2412	Ant1	9.6	0.5	Pass
NVNT	b	2437	Ant1	9.72	0.5	Pass
NVNT	b	2462	Ant1	9.69	0.5	Pass
NVNT	g	2412	Ant1	16.5	0.5	Pass
NVNT	g	2437	Ant1	16.5	0.5	Pass
NVNT	g	2462	Ant1	16.26	0.5	Pass
NVNT	n20	2412	Ant1	17.58	0.5	Pass
NVNT	n20	2437	Ant1	16.77	0.5	Pass
NVNT	n20	2462	Ant1	17.64	0.5	Pass
NVNT	n40	2422	Ant1	34.08	0.5	Pass
NVNT	n40	2437	Ant1	36	0.5	Pass
NVNT	n40	2452	Ant1	35.28	0.5	Pass