



FCC TEST REPORT

FCC ID: 2BEQP-INDS-S27

On Behalf of

Clear Digital Solutions, Inc.

Advertising machine display

Model No.: CDS-MUV27-INDS-S27

Prepared for : Clear Digital Solutions, Inc.
Address : 1100 Thousand Oaks Blvd Greenville, SC 29607

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 : A2312001-C01-R13
Date of Receipt : December 6, 2023
Date of Test : December 6, 2023 - January 10, 2024
Date of Report : January 10, 2024
Version Number : V0
Test Result : Pass

TABLE OF CONTENTS

<u>Description</u>	<u>Page</u>
1. Summary of Standards And Results -----	5
1.1. Description of Standards and Results -----	5
2. General Information -----	6
2.1. Description of Device (EUT) -----	6
2.2. Accessories of Device (EUT) -----	7
2.3. Tested Supporting System Details -----	7
2.4. Block Diagram of connection between EUT and simulators -----	7
2.5. Test Mode Description -----	8
2.6. Test Conditions -----	9
2.7. Test Facility -----	9
2.8. Measurement Uncertainty -----	9
2.9. Test Equipment List -----	10
3. Spurious Emission -----	11
3.1. Test Limits -----	11
3.2. Test Procedure -----	12
3.3. Test Setup -----	12
3.4. Test Results -----	13
4. Power line Conducted Emission -----	28
4.1. Test Limits -----	28
4.2. Test Procedure -----	28
4.3. Test Setup -----	28
4.4. Test Results -----	28
5. Conducted Maximum Output Power -----	31
5.1. Test limits -----	31
5.2. Test Procedure -----	31
5.3. Test Setup -----	31
5.4. Test Results -----	31
6. Peak Power Spectral Density -----	38
6.1. Test limits -----	38
6.2. Test Procedure -----	38
6.3. Test Setup -----	38
6.4. Test Results -----	39
7. Bandwidth -----	49
7.1. Test limits -----	49
7.2. Test Procedure -----	49
7.3. Test Setup -----	49
7.4. Test Results -----	49
8. Band Edge Check -----	60
8.1. Test limits -----	60
8.2. Test Procedure -----	60
8.3. Test Setup -----	60
8.4. Test Results -----	60
9. Antenna Requirement -----	69
9.1. Standard Requirement -----	69
9.2. Antenna Connected Construction -----	69
9.3. Results -----	69
10. Test setup photo -----	70
10.1. Photos of Radiated emission -----	70
10.2. Photos of Conducted Emission test -----	71

TEST REPORT DECLARATION

Applicant : Clear Digital Solutions, Inc.
Address : 1100 Thousand Oaks Blvd Greenville, SC 29607
Manufacturer : Clear Digital Solutions, Inc.
Address : 1100 Thousand Oaks Blvd Greenville, SC 29607
EUT Description : Advertising machine display
(A) Model No. : CDS-MUV27-INDS-S27
(B) Trademark : N/A

Measurement Standard Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247

ANSI C63.10-2013

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.....: January 10, 2024

Revision History

Revision	Issue Date	Revisions	Revised By
V0	January 10, 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	P
6dB Bandwidth	FCC PART 15:15.247(a)(2) ANSI C63.10	P
Output Power	FCC Part 15: 15.247(b)(3) ANSI C63.10	P
Radiated Spurious Emission	FCC Part 15: 15.209 FCC Part 15: 15.247(d) ANSI C63.10	P
Conducted Spurious & Band Edge Emission	FCC Part 15: 15.247(d) ANSI C63.10	P
Power Spectral Density	FCC PART 15:15.247(e) ANSI C63.10	P
Radiated Band Edge Emission	FCC Part 15: 15.247(d) ANSI C63.10	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. The conclusion of this test report is judged by actual test data without considering measurement uncertainty.

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

EUT Name : Advertising machine display
Model No. : CDS-MUV27-INDS-S27
DIFF. : N/A
Power supply : DC 24V from adapter, DC 19.2V from battery.

Radio Technology	: 2.4G WIF
Operation frequency	: 2412MHz-2462MHz for IEEE 802.11 b, g, n/HT20
Channel No.	: 802.11b/802.11g /802.11n(HT20): 11CH
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 1, max gain -1.83dBi Internal antenna 2, max gain -1.83dBi The antenna MIMO combining gain is 1.17dBi. (Antenna information is provided by applicant.)
Software version	: V1.0
Hardware version	: V1.0

2.2. Accessories of Device (EUT)

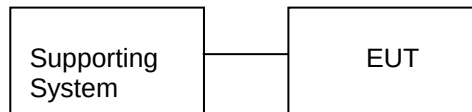
Accessories 1 : SWITCHING ADAPTER
Manufacturer : ShenZhen SOY Technology Co., Ltd
Model : SOY-2400625-094-A
Ratings : INPUT: 100-240V~50/60Hz 2.5A MAX
OUTPUT: 24.0V=6.25A 150.0W

Accessories 2 : SWITCHING ADAPTER
Manufacturer : ShenZhen SOY Technology Co., Ltd
Model : SOY-2400500-410-B
Ratings : INPUT: 100-240V~50/60Hz 2.5A MAX
OUTPUT: 24.0V=5.0A 120.0W

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)(see Note)	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
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					
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 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	1316.3003K03-10 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	
		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			

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 0.1 m high above ground, the table was rotated 360 degrees to determine the position of the highest radiation

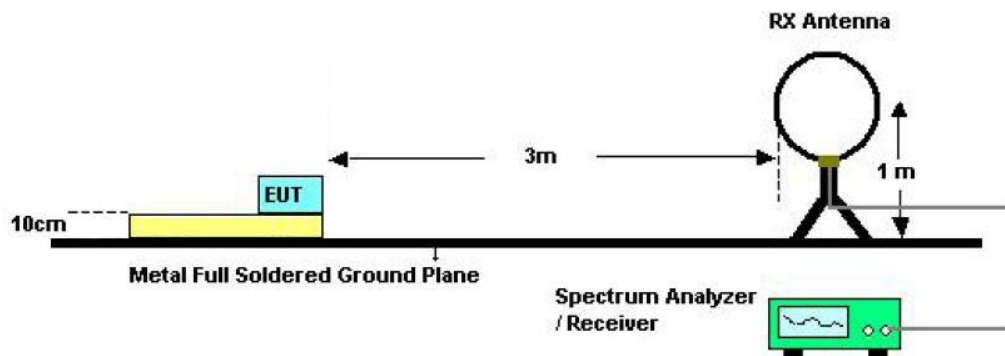
The Test antenna shall vary between 1m and 4m, both Horizontal and Vertical antenna are set of make measurement.

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

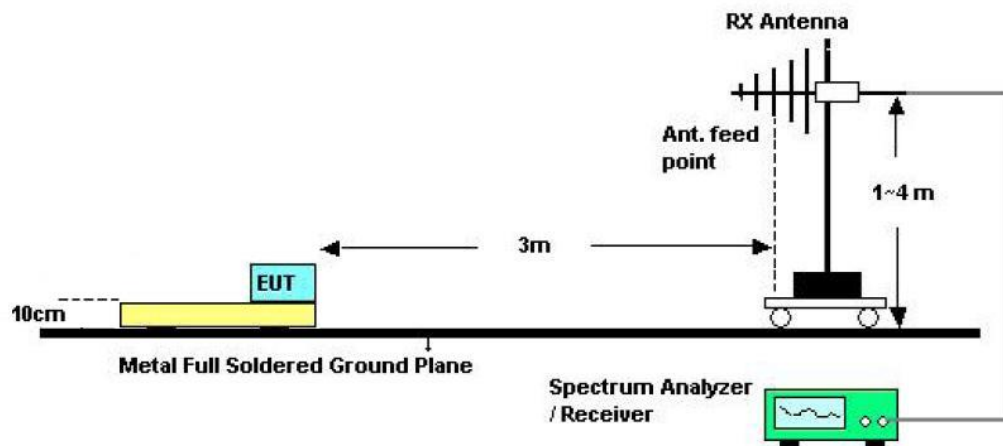
If Peak value comply with QP limit below 1GHz, the EUT deemed to comply with QP limit. But the Peak value and average value both need to comply with applicable limit above 1GHz.

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

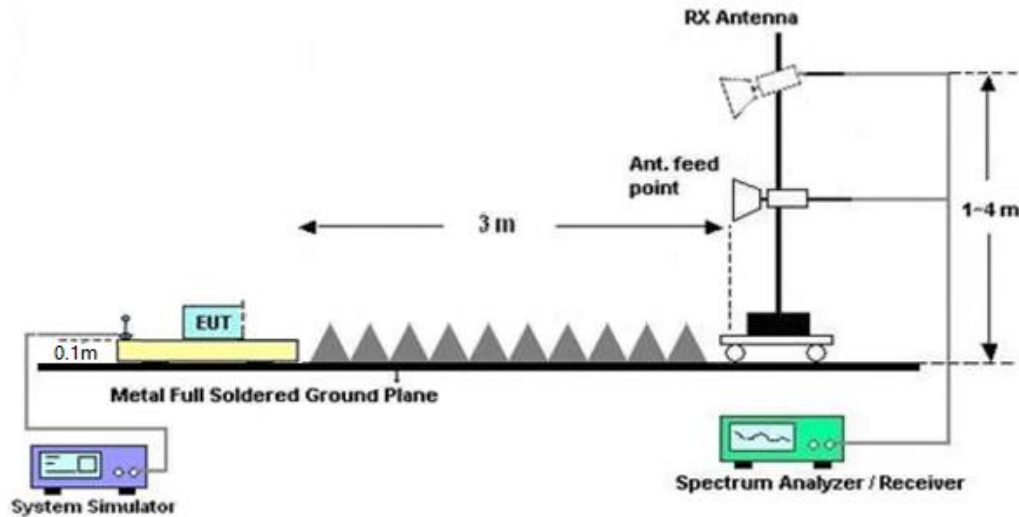
3.3. Test Setup



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.

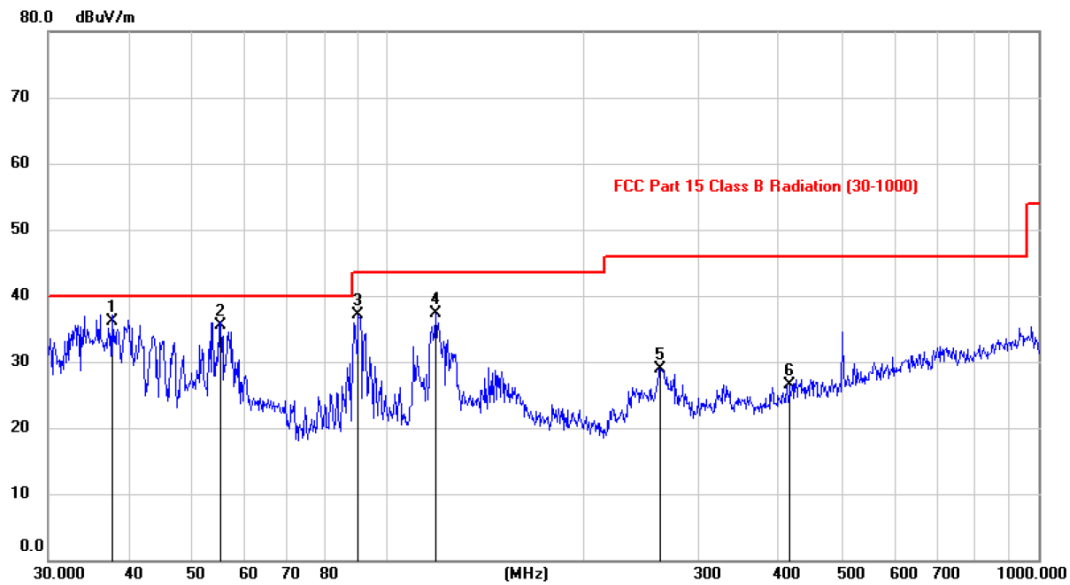
From 9KHz to 30MHz: Conclusion: PASS

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.

From 30MHz to 1000MHz: Conclusion: PASS

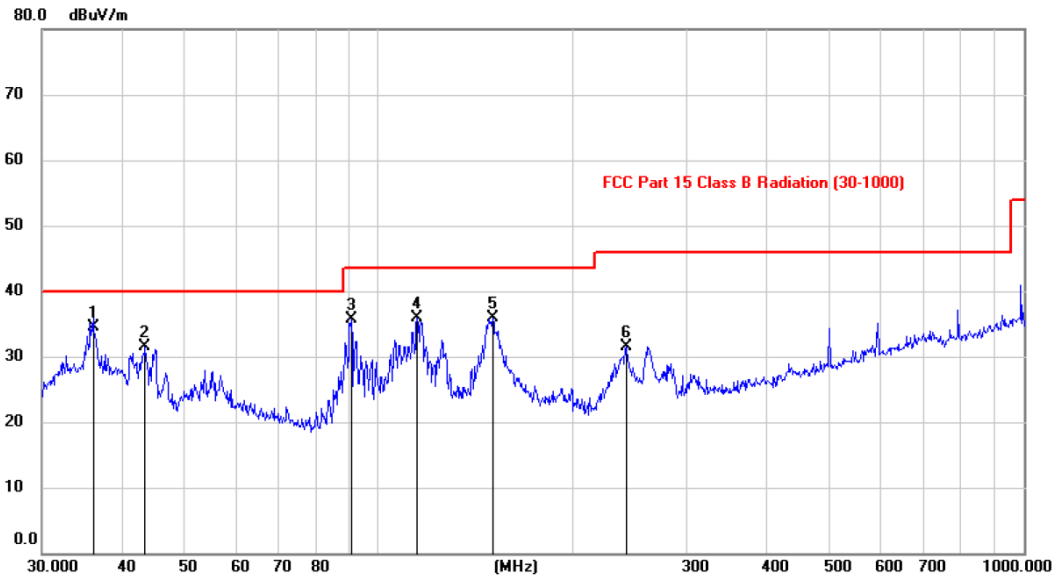
Vertical:



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Antenna Height cm	Table Degree	Comment
1	*	37.6050	22.00	14.11	36.11	40.00	-3.89	QP		
2		55.2918	21.84	13.57	35.41	40.00	-4.59	QP		
3		90.2205	27.10	10.07	37.17	43.50	-6.33	peak		
4		118.2415	24.43	12.82	37.25	43.50	-6.25	peak		
5		262.3123	15.90	13.04	28.94	46.00	-17.06	peak		
6		415.8388	9.96	16.63	26.59	46.00	-19.41	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	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	36.1018	20.74	13.78	34.52	40.00	-5.48	QP		
2		43.3889	17.31	14.22	31.53	40.00	-8.47	peak		
3		90.6221	25.60	10.14	35.74	43.50	-7.76	peak		
4		114.7961	23.49	12.41	35.90	43.50	-7.60	peak		
5		150.1862	20.82	15.06	35.88	43.50	-7.62	peak		
6		242.0438	18.99	12.59	31.58	46.00	-14.42	peak		

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

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

Remark: 1. Both adapters have been tested and only the worst data is displayed. (Adapter Model: SOY-2400625-094-A)

2. All modes have been tested, and only worst data of b mode, Channel 2412MHz was listed in this report.

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	46.40	V	33.95	10.18	34.26	56.27	74	-17.73	PK
4824	37.59	V	33.95	10.18	34.26	47.46	54	-6.54	AV
7236	/	/	/	/	/	/	/	/	/
9648	/	/	/	/	/	/	/	/	/
4824	48.95	H	33.95	10.18	34.26	58.82	74	-15.18	PK
4824	33.63	H	33.95	10.18	34.26	43.50	54	-10.50	AV
7236	/	/	/	/	/	/	/	/	/
9648	/	/	/	/	/	/	/	/	/
Test Mode: IEEE 802.11b TX Mid									
4874	46.47	V	33.93	10.2	34.29	56.31	74	-17.69	PK
4874	32.78	V	33.93	10.2	34.29	42.62	54	-11.38	AV
7311	/	/	/	/	/	/	/	/	/
9748	/	/	/	/	/	/	/	/	/
4874	46.19	H	33.93	10.2	34.29	56.03	74	-17.97	PK
4874	33.15	H	33.93	10.2	34.29	42.99	54	-11.01	AV
7311	/	/	/	/	/	/	/	/	/
9748	/	/	/	/	/	/	/	/	/
Test Mode: IEEE 802.11b TX High									
4924	45.06	V	33.98	10.22	34.25	55.01	74	-18.99	PK
4924	37.07	V	33.98	10.22	34.25	47.02	54	-6.98	AV
7386	/	/	/	/	/	/	/	/	/
9848	/	/	/	/	/	/	/	/	/
4924	47.71	H	33.98	10.22	34.25	57.66	74	-16.34	PK
4924	35.42	H	33.98	10.22	34.25	45.37	54	-8.63	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.									

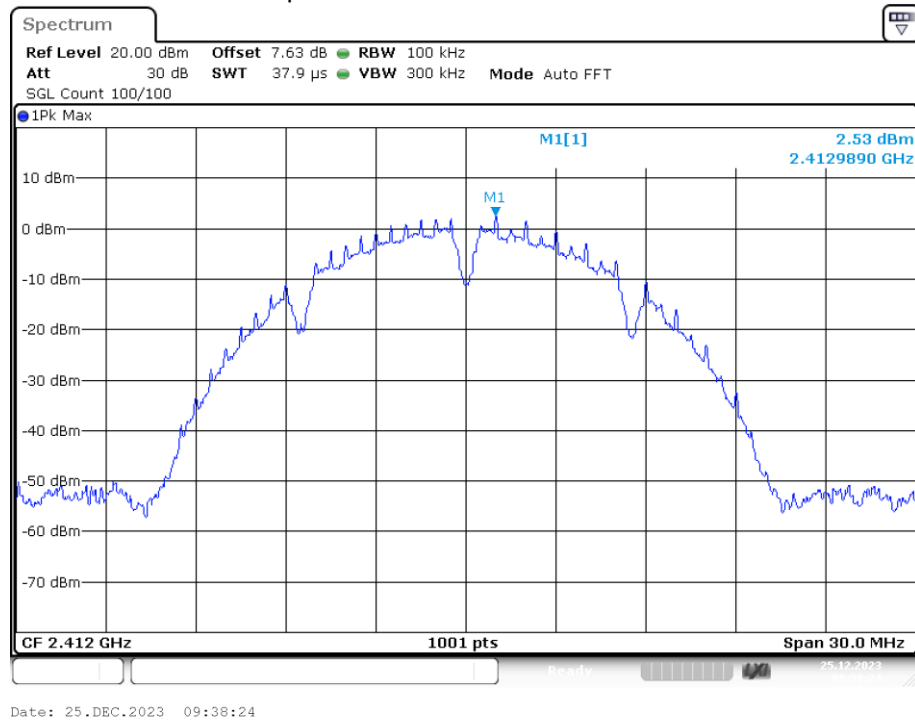
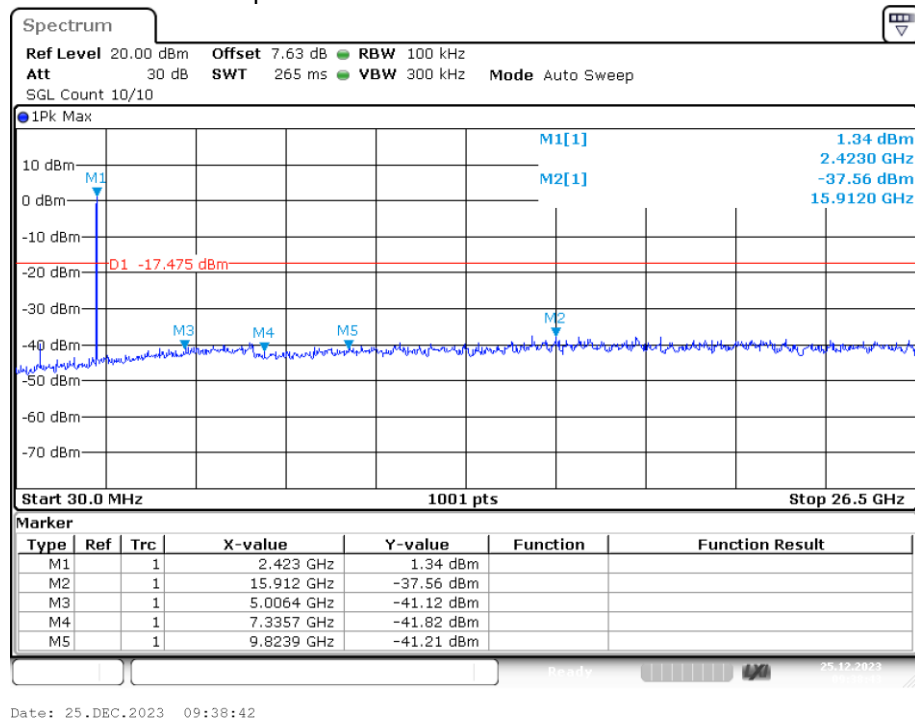
Note:

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	44.88	V	33.95	10.18	34.26	54.75	74	-19.25	PK
4824	35.57	V	33.95	10.18	34.26	45.44	54	-8.56	AV
7236	/	/	/	/	/	/	/	/	/
9648	/	/	/	/	/	/	/	/	/
4824	48.93	H	33.95	10.18	34.26	58.80	74	-15.20	PK
4824	36.04	H	33.95	10.18	34.26	45.91	54	-8.09	AV
7236	/	/	/	/	/	/	/	/	/
9648	/	/	/	/	/	/	/	/	/
Test Mode: IEEE 802.11n HT20 TX Mid									
4874	46.19	V	33.93	10.2	34.29	56.03	74	-17.97	PK
4874	31.97	V	33.93	10.2	34.29	41.81	54	-12.19	AV
7311	/	/	/	/	/	/	/	/	/
9748	/	/	/	/	/	/	/	/	/
4874	46.85	H	33.93	10.2	34.29	56.69	74	-17.31	PK
4874	32.07	H	33.93	10.2	34.29	41.91	54	-12.09	AV
7311	/	/	/	/	/	/	/	/	/
9748	/	/	/	/	/	/	/	/	/
Test Mode: IEEE 802.11n HT20 TX High									
4924	47.80	V	33.98	10.22	34.25	57.75	74	-16.25	PK
4924	34.81	V	33.98	10.22	34.25	44.76	54	-9.24	AV
7386	/	/	/	/	/	/	/	/	/
9848	/	/	/	/	/	/	/	/	/
4924	48.74	H	33.98	10.22	34.25	58.69	74	-15.31	PK
4924	36.25	H	33.98	10.22	34.25	46.20	54	-7.80	AV
7386	/	/	/	/	/	/	/	/	/
9848	/	/	/	/	/	/	/	/	/

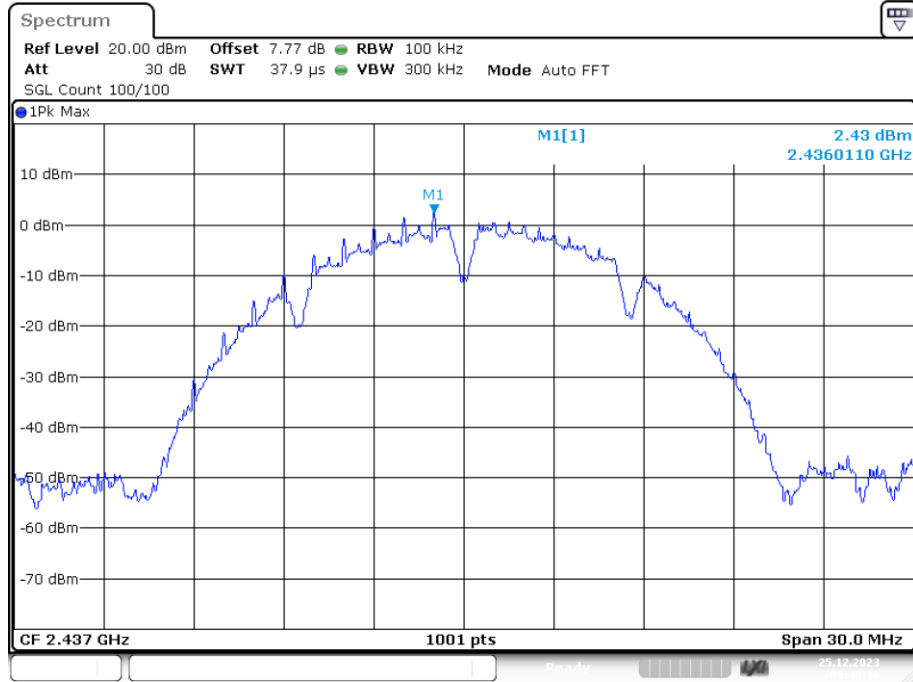
Note:

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.

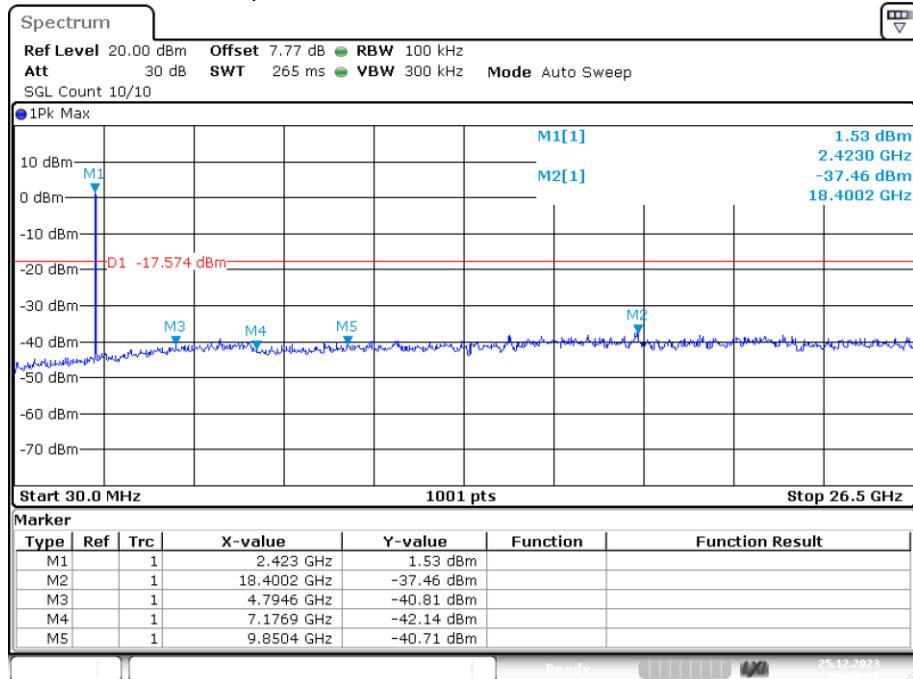
Conducted RF Spurious Emission**Tx. Spurious NVNT b 2412MHz Ant1 Ref****Tx. Spurious NVNT b 2412MHz Ant1 Emission**

Tx. Spurious NVNT b 2437MHz Ant1 Ref



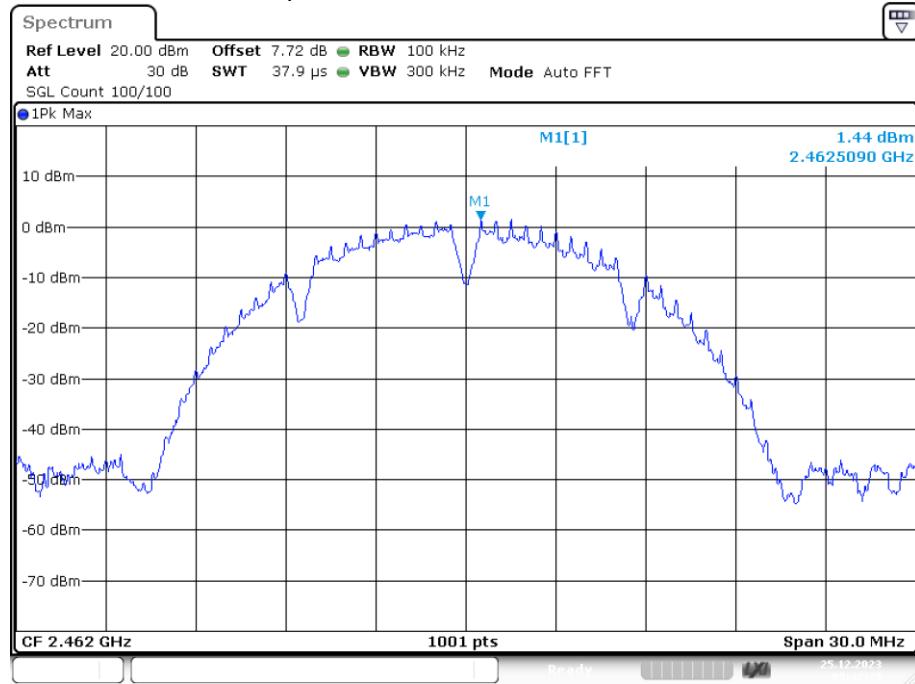
Date: 25.DEC.2023 09:40:19

Tx. Spurious NVNT b 2437MHz Ant1 Emission



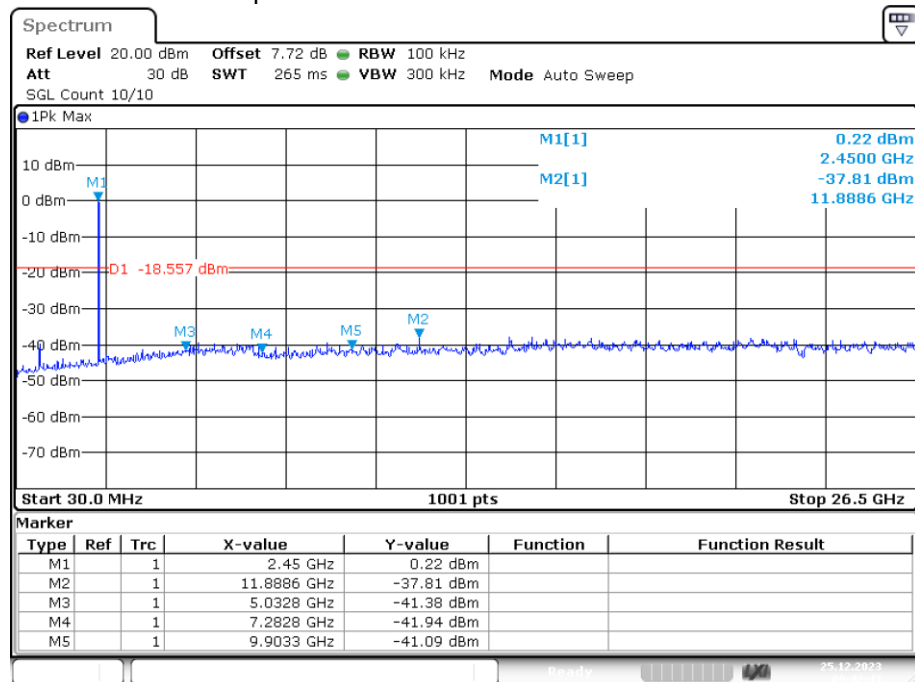
Date: 25.DEC.2023 09:40:36

Tx. Spurious NVNT b 2462MHz Ant1 Ref



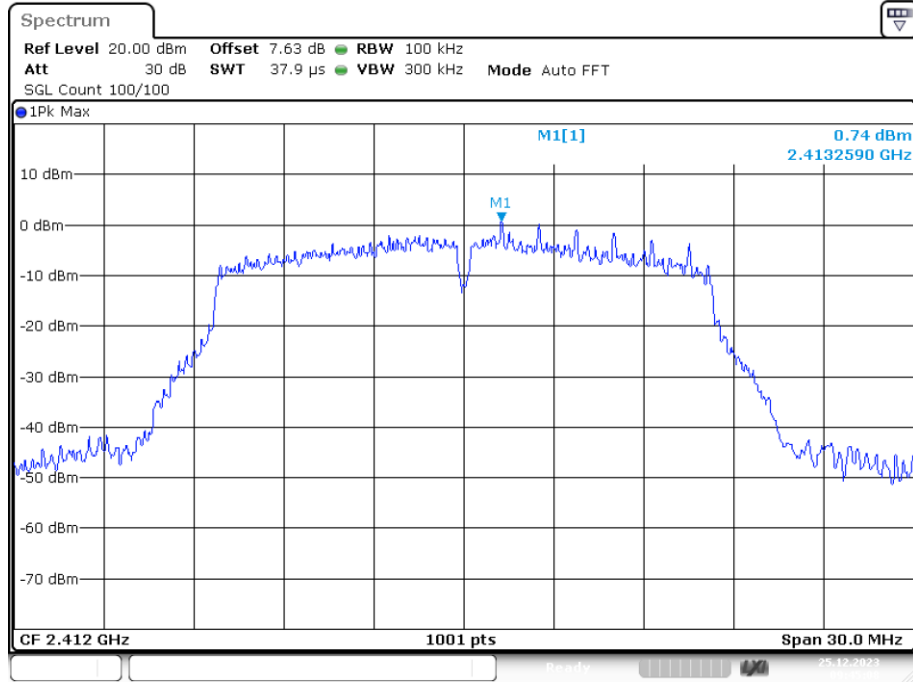
Date: 25.DEC.2023 09:42:25

Tx. Spurious NVNT b 2462MHz Ant1 Emission



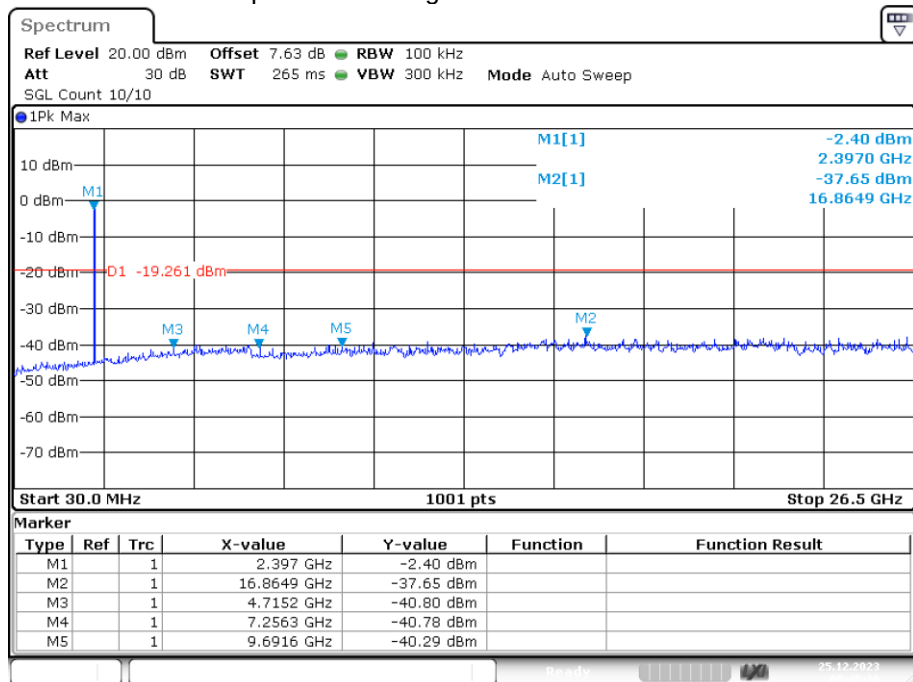
Date: 25.DEC.2023 09:42:43

Tx. Spurious NVNT g 2412MHz Ant1 Ref



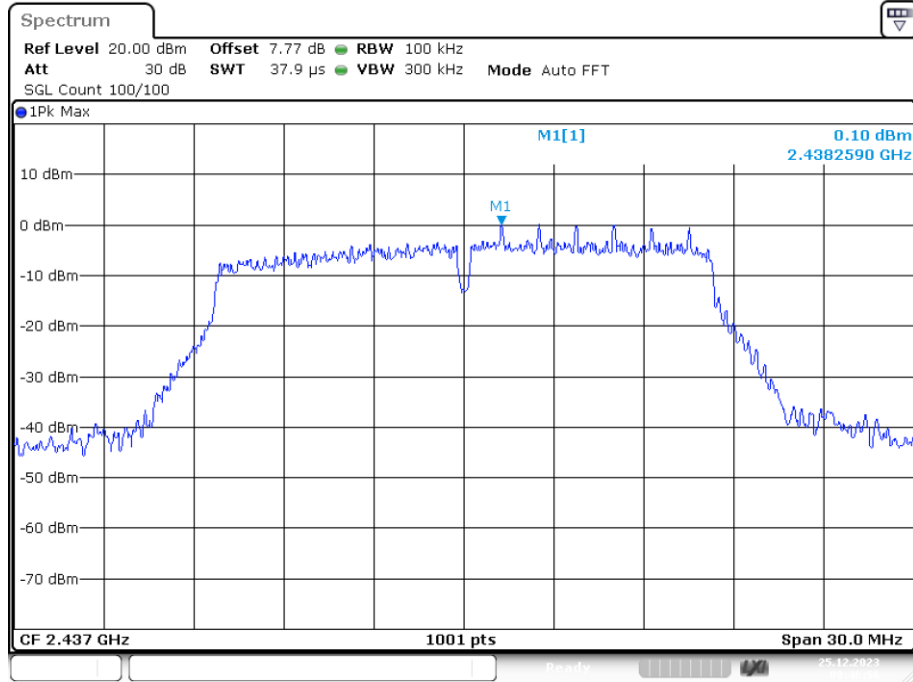
Date: 25.DEC.2023 09:45:08

Tx. Spurious NVNT g 2412MHz Ant1 Emission



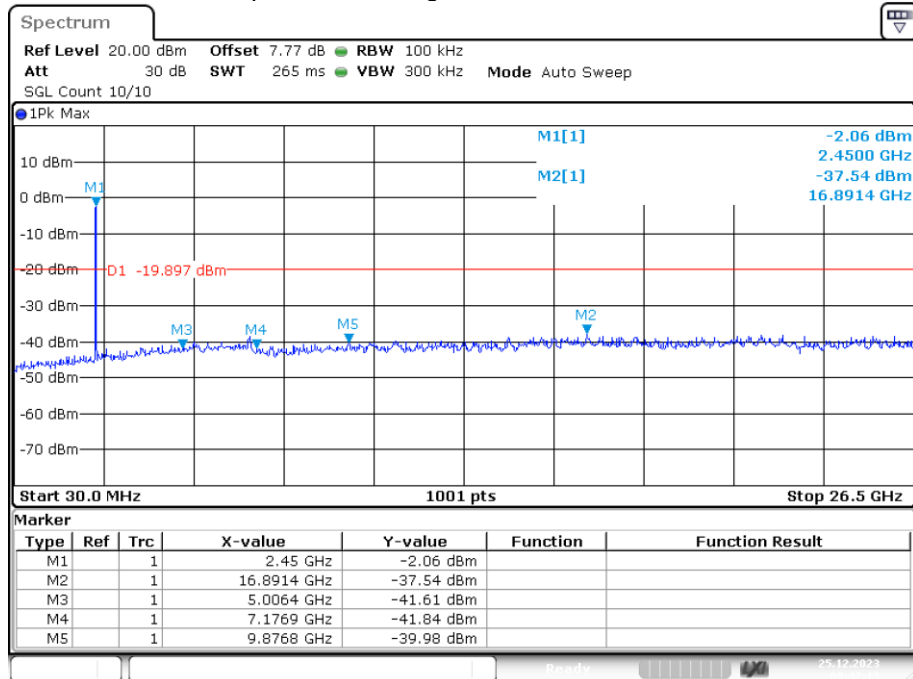
Date: 25.DEC.2023 09:45:26

Tx. Spurious NVNT g 2437MHz Ant1 Ref



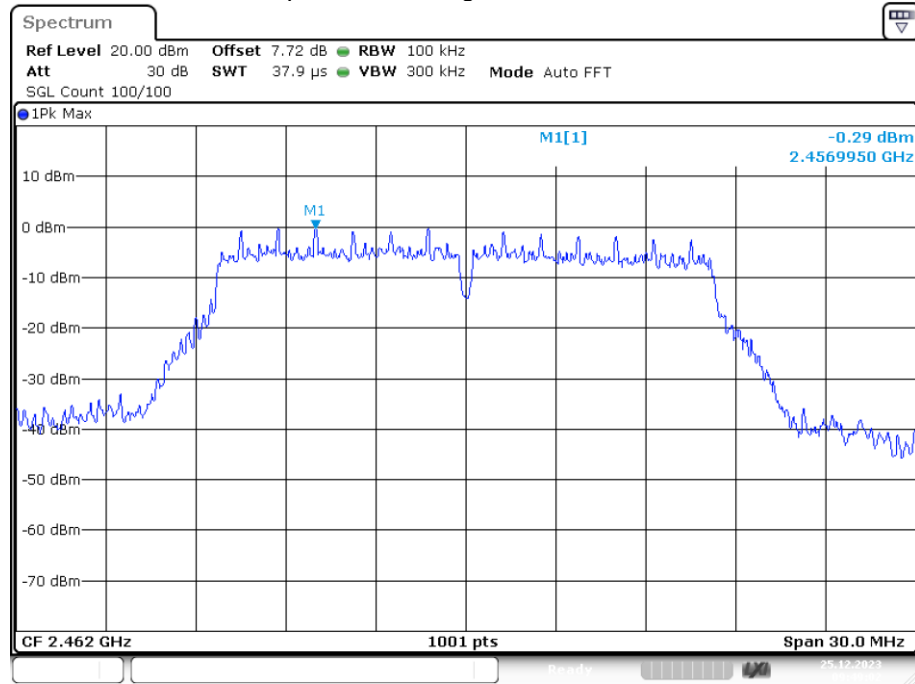
Date: 25.DEC.2023 09:46:55

Tx. Spurious NVNT g 2437MHz Ant1 Emission



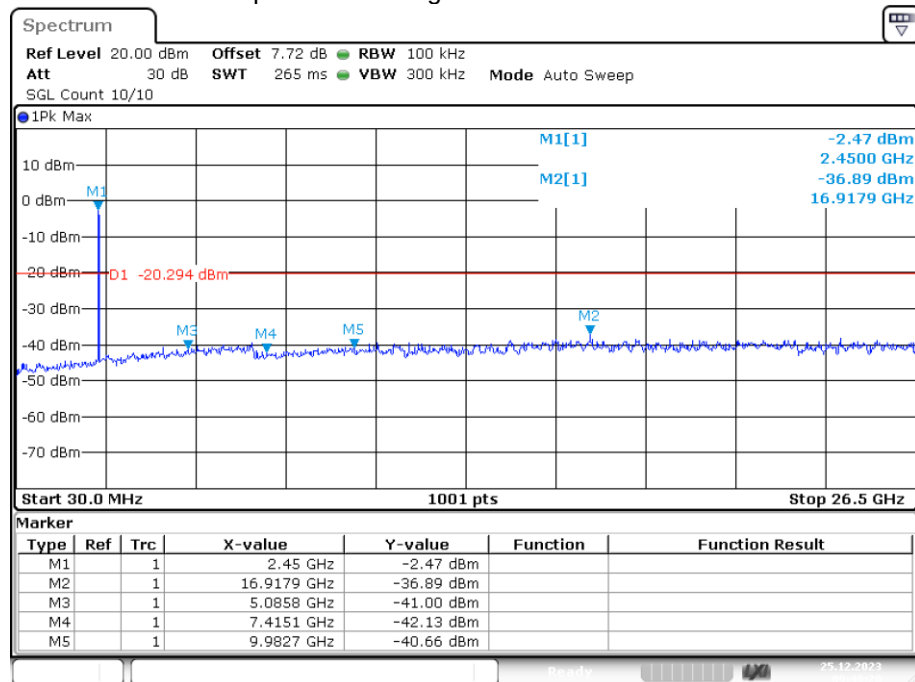
Date: 25.DEC.2023 09:47:13

Tx. Spurious NVNT g 2462MHz Ant1 Ref



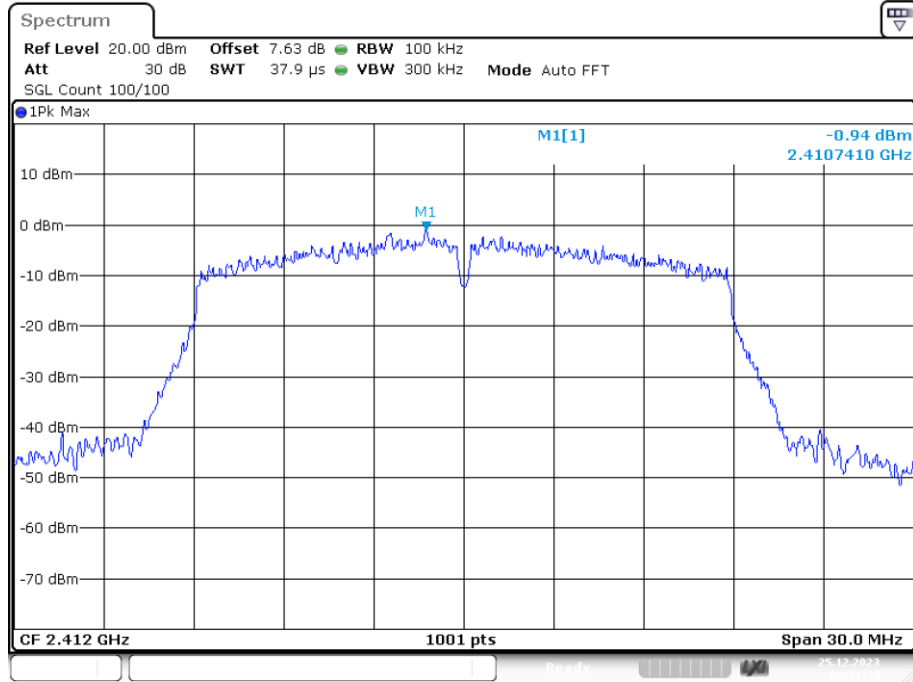
Date: 25.DEC.2023 09:49:02

Tx. Spurious NVNT g 2462MHz Ant1 Emission



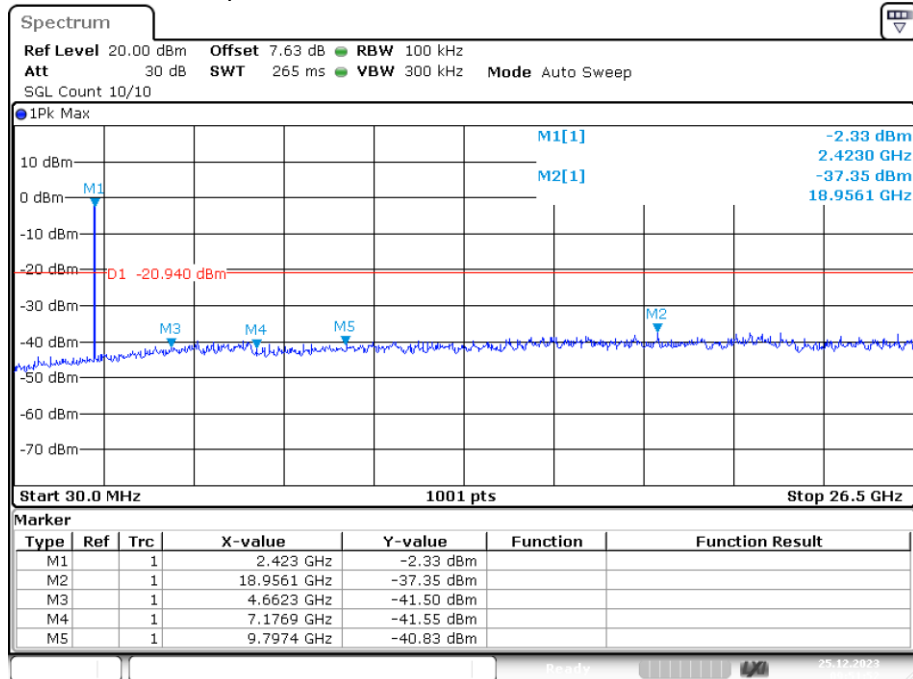
Date: 25.DEC.2023 09:49:20

Tx. Spurious NVNT n20 2412MHz MIMO Ref



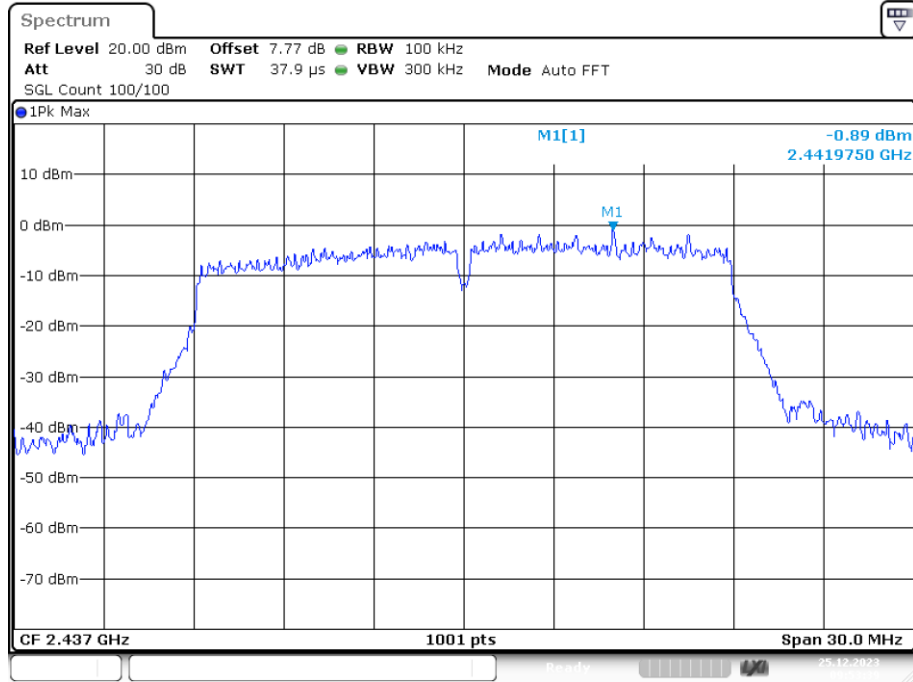
Date: 25.DEC.2023 09:51:34

Tx. Spurious NVNT n20 2412MHz MIMO Emission



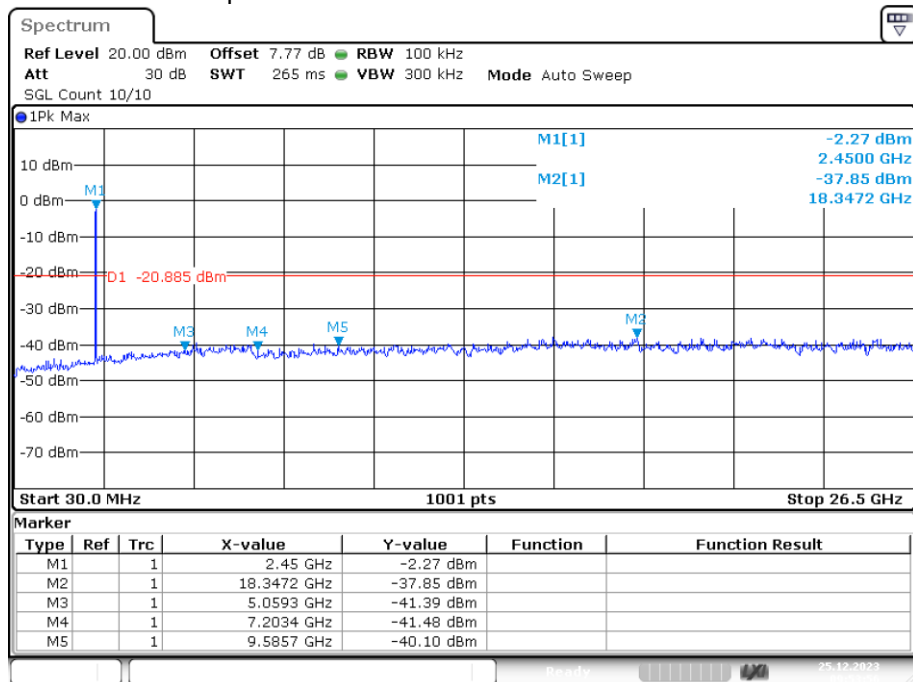
Date: 25.DEC.2023 09:51:51

Tx. Spurious NVNT n20 2437MHz MIMO Ref



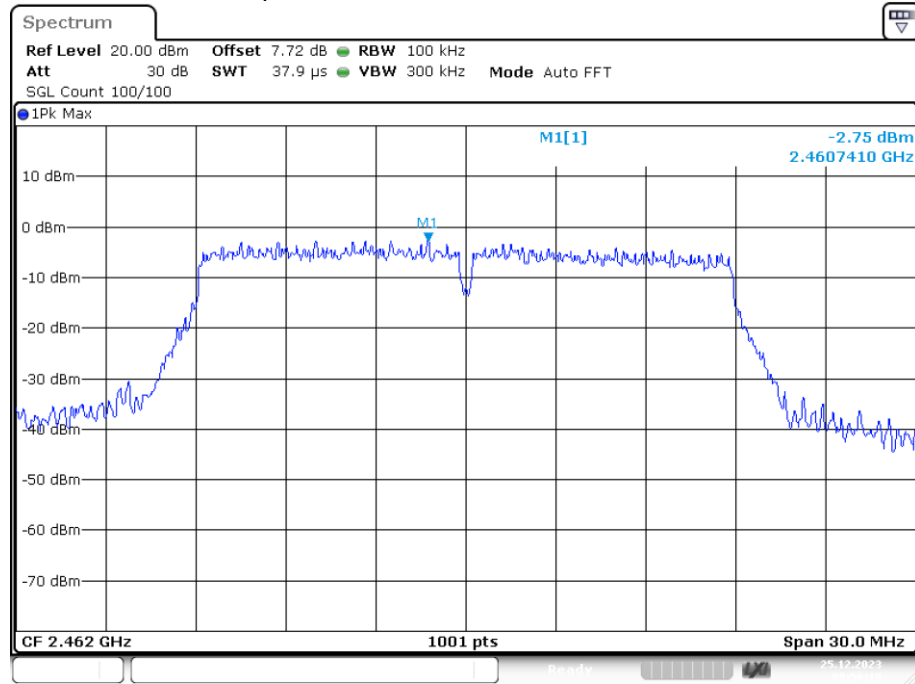
Date: 25.DEC.2023 09:53:38

Tx. Spurious NVNT n20 2437MHz MIMO Emission



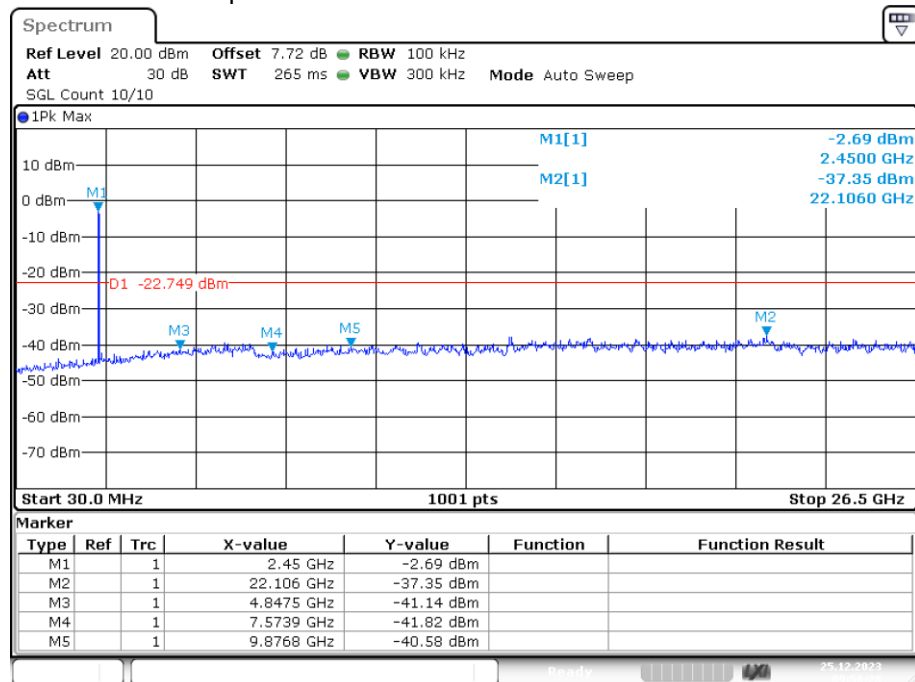
Date: 25.DEC.2023 09:53:56

Tx. Spurious NVNT n20 2462MHz MIMO Ref



Date: 25.DEC.2023 09:56:09

Tx. Spurious NVNT n20 2462MHz MIMO Emission



Date: 25.DEC.2023 09:56:27

- 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.

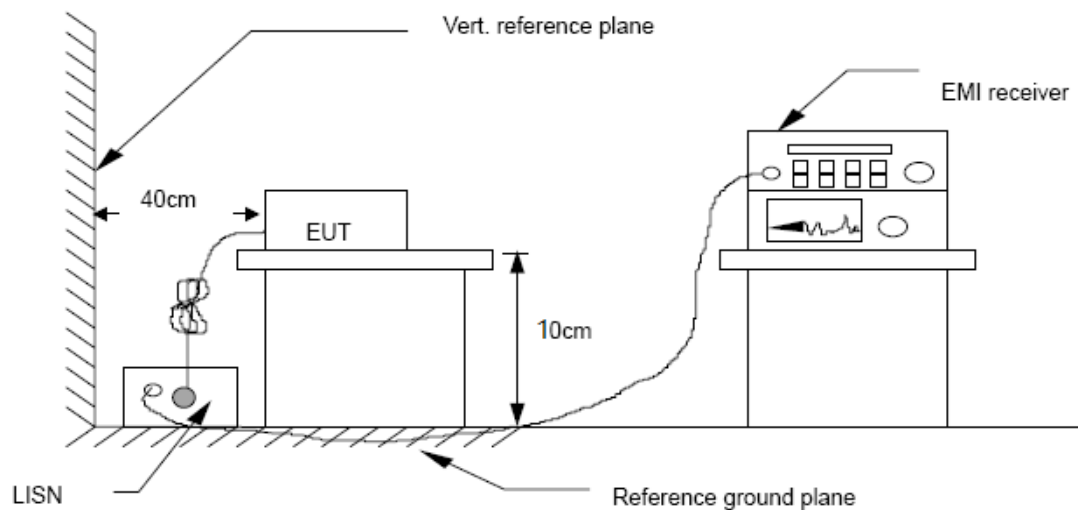
3. The limit decreases in line with the logarithm of the frequency in the rang of 0.15 to 0.50 MHz.

4.2. Test Procedure

The EUT is put on the plane 0.1m 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

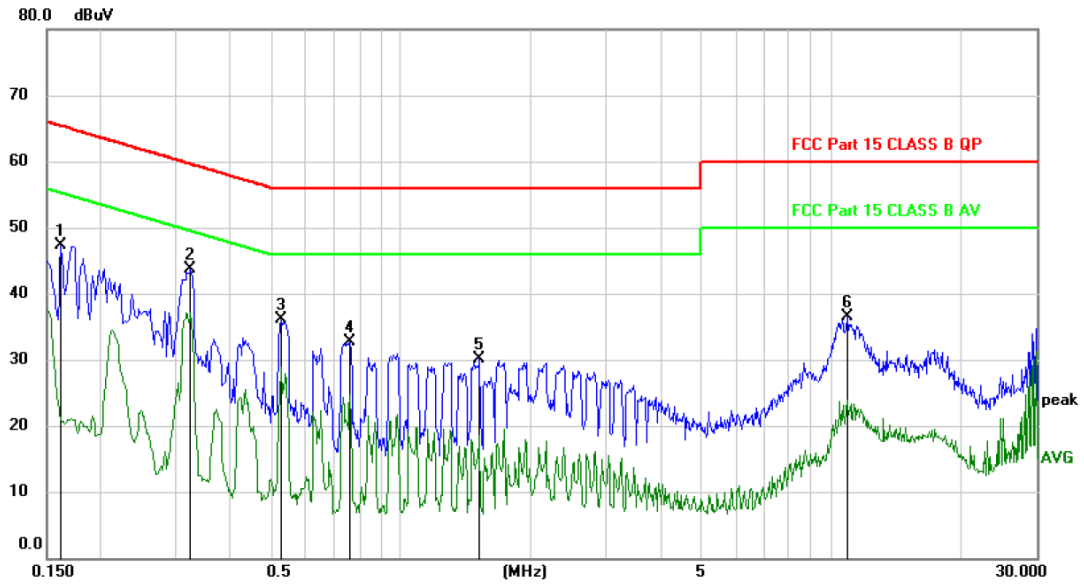


4.4. Test Results

PASS. (See below detailed test data)

Note: If peak Result comply with AV limit, QP and AV Result is deemed to comply with AV limit

Line:

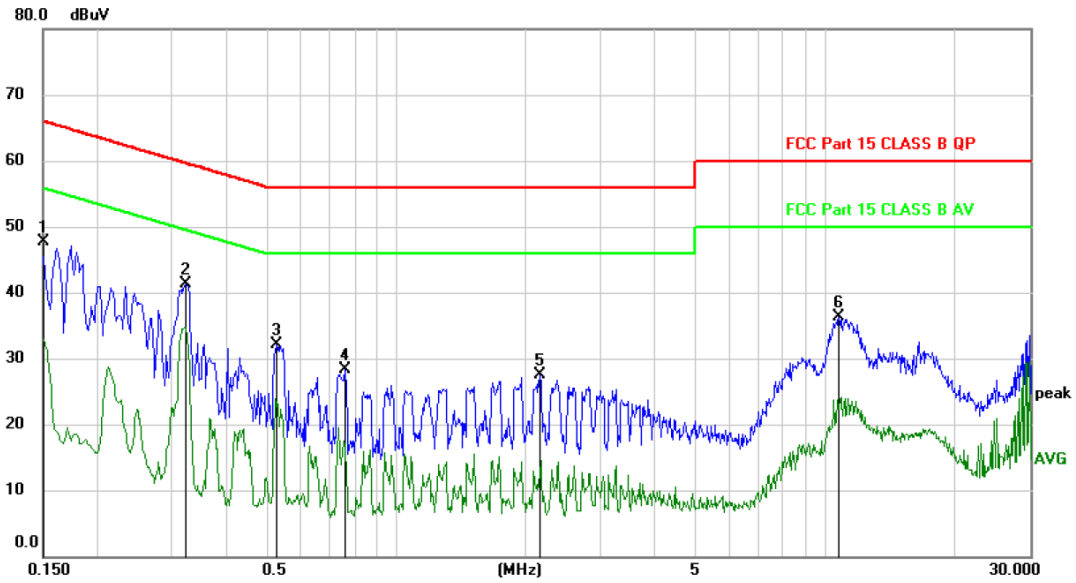


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.1620	37.34	9.93	47.27	65.36	-18.09	peak	
2	*	0.3240	33.73	9.93	43.66	59.60	-15.94	peak	
3		0.5280	26.25	9.95	36.20	56.00	-19.80	peak	
4		0.7590	22.85	9.94	32.79	56.00	-23.21	peak	
5		1.5210	20.15	9.90	30.05	56.00	-25.95	peak	
6		10.9080	26.25	10.23	36.48	60.00	-23.52	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		0.1500	37.83	9.94	47.77	66.00	-18.23	peak	
2	*	0.3240	31.46	9.93	41.39	59.60	-18.21	peak	
3		0.5280	22.11	9.95	32.06	56.00	-23.94	peak	
4		0.7590	18.31	9.94	28.25	56.00	-27.75	peak	
5		2.1600	17.58	9.88	27.46	56.00	-28.54	peak	
6		10.7370	26.13	10.23	36.36	60.00	-23.64	peak	

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

(Reference Only)

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

Note: 1. Both adapters have been tested and only the worst data is displayed. (Adapter Model: SOY-2400625-094-A)

2. All modes and channels have been tested and only the B mode 2412MHz mode with the worst data is listed.

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 1 W(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.

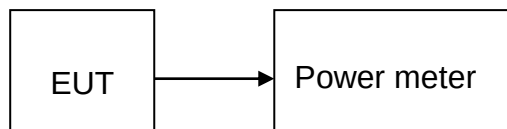
Note: The cable loss and attenuator loss were offset into measure device as amplitude offset.

5.2.4 The measure-and-sum technique shall be used for measuring in-band transmit power of a device.

Total power is the sum of the conducted power levels measured at the various output ports.

(First measure the power (mW) of each antenna separately, and the total power is equal to $\text{Ant1}^{\text{mW}} + \text{Ant2}^{\text{mW}} + \dots$)

5.3. Test Setup



5.4. Test Results

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	EIRP (dBm)	Limit (dBm)	Verdict
NVNT	b	2412	Ant1	16.733	14.903	30	Pass
NVNT	b	2437	Ant1	15.977	14.147	30	Pass
NVNT	b	2462	Ant1	16.26	14.43	30	Pass
NVNT	g	2412	Ant1	15.773	13.943	30	Pass
NVNT	g	2437	Ant1	16.368	14.538	30	Pass
NVNT	g	2462	Ant1	16.78	14.95	30	Pass
NVNT	n20	2412	Ant1	16.492	14.662	30	Pass
NVNT	n20	2437	Ant1	16.359	14.529	30	Pass
NVNT	n20	2462	Ant1	15.967	14.137	30	Pass

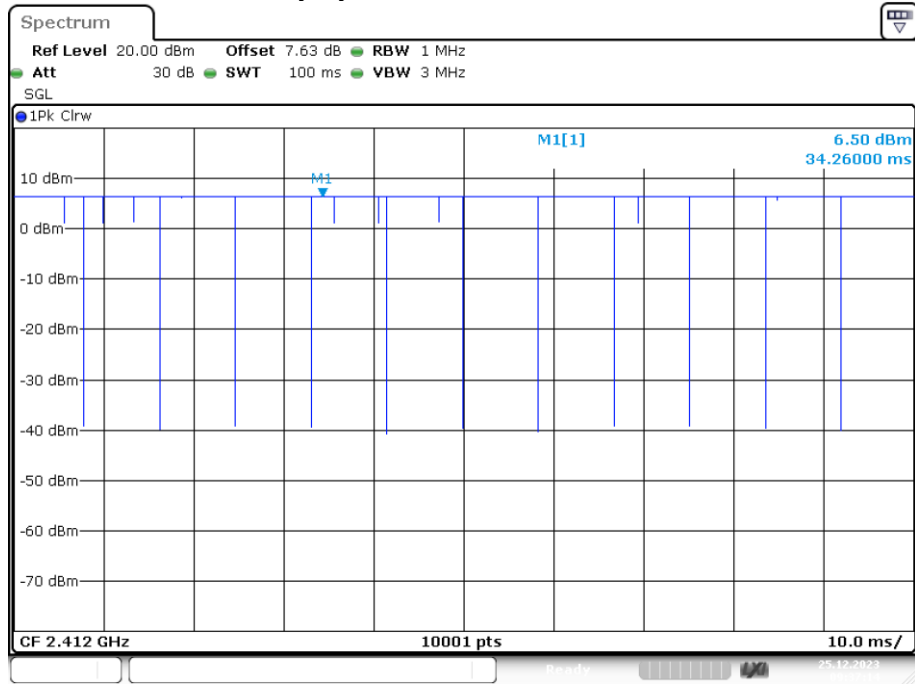
Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	EIRP (dBm)	Limit (dBm)	Verdict
NVNT	b	2412	Ant2	16.019	14.189	30	Pass
NVNT	b	2437	Ant2	15.959	14.129	30	Pass
NVNT	b	2462	Ant2	16.152	14.322	30	Pass
NVNT	g	2412	Ant2	16.62	14.79	30	Pass
NVNT	g	2437	Ant2	16.648	14.818	30	Pass
NVNT	g	2462	Ant2	16.703	14.873	30	Pass
NVNT	n20	2412	Ant2	16.339	14.509	30	Pass
NVNT	n20	2437	Ant2	16.397	14.567	30	Pass
NVNT	n20	2462	Ant2	16.708	14.878	30	Pass

Condition	Mode	Frequency (MHz)	Antenna	EIRP (dBm)	Limit (dBm)	Verdict
NVNT	n20	2412	MIMO	17.60	30	Pass
NVNT	n20	2437	MIMO	17.56	30	Pass
NVNT	n20	2462	MIMO	17.53	30	Pass

Duty Cycle

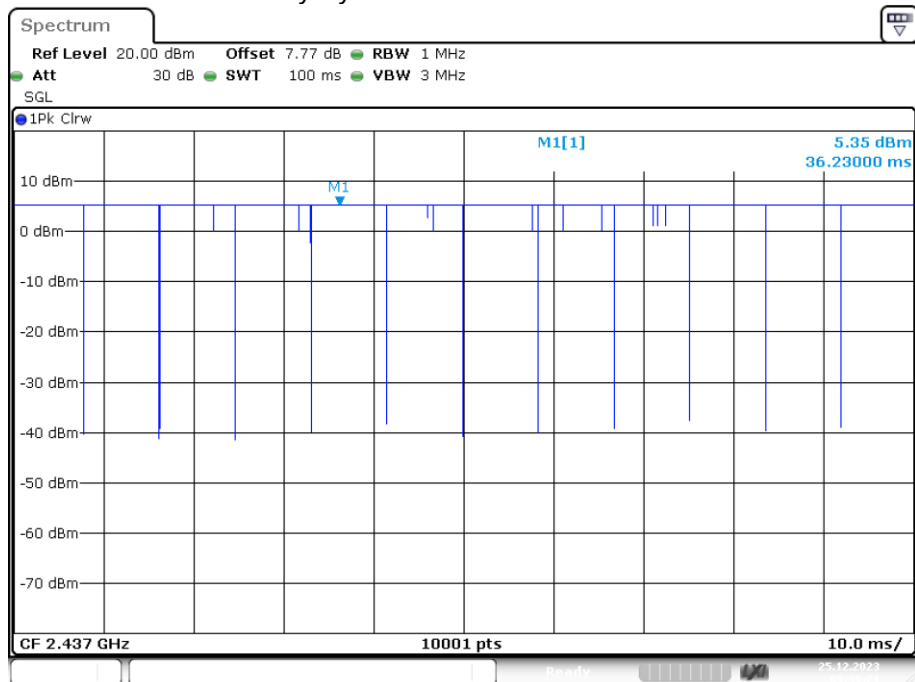
Condition	Mode	Frequency (MHz)	Antenna	Duty Cycle (%)
NVNT	b	2412	Ant1	99.97
NVNT	b	2437	Ant1	99.93
NVNT	b	2462	Ant1	99.94
NVNT	g	2412	Ant1	99.33
NVNT	g	2437	Ant1	99.52
NVNT	g	2462	Ant1	99.51
NVNT	n20	2412	Ant1	99.41
NVNT	n20	2437	Ant1	99.54
NVNT	n20	2462	Ant1	99.45

Duty Cycle NVNT b 2412MHz Ant1



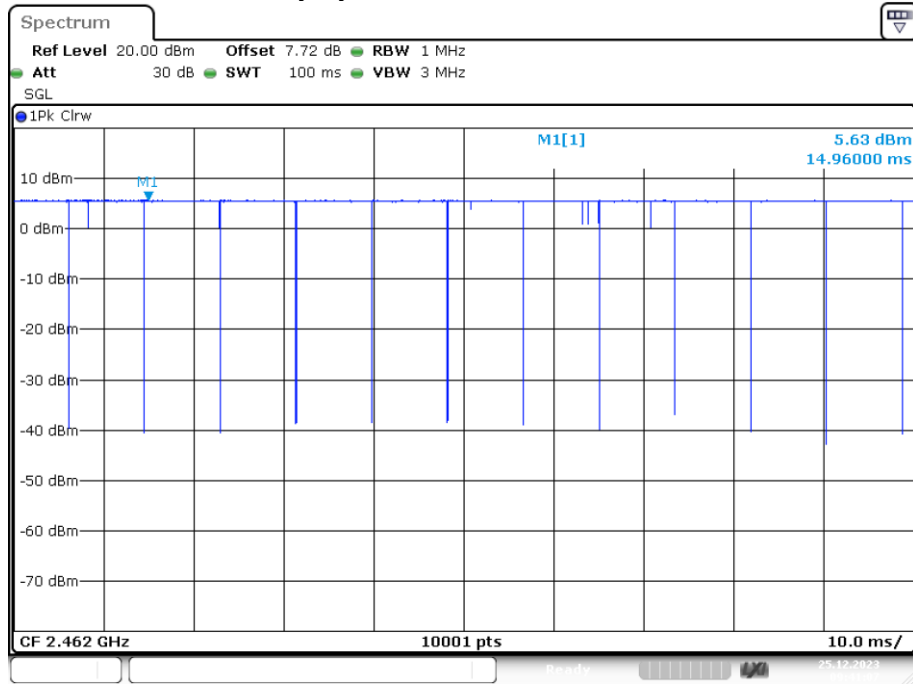
Date: 25.DEC.2023 09:37:13

Duty Cycle NVNT b 2437MHz Ant1



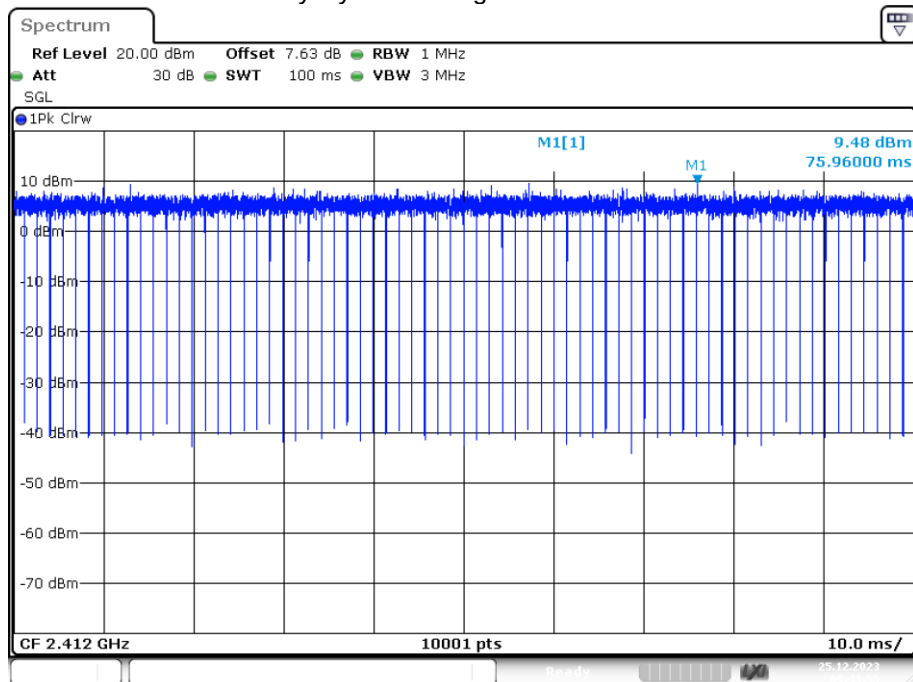
Date: 25.DEC.2023 09:39:20

Duty Cycle NVNT b 2462MHz Ant1



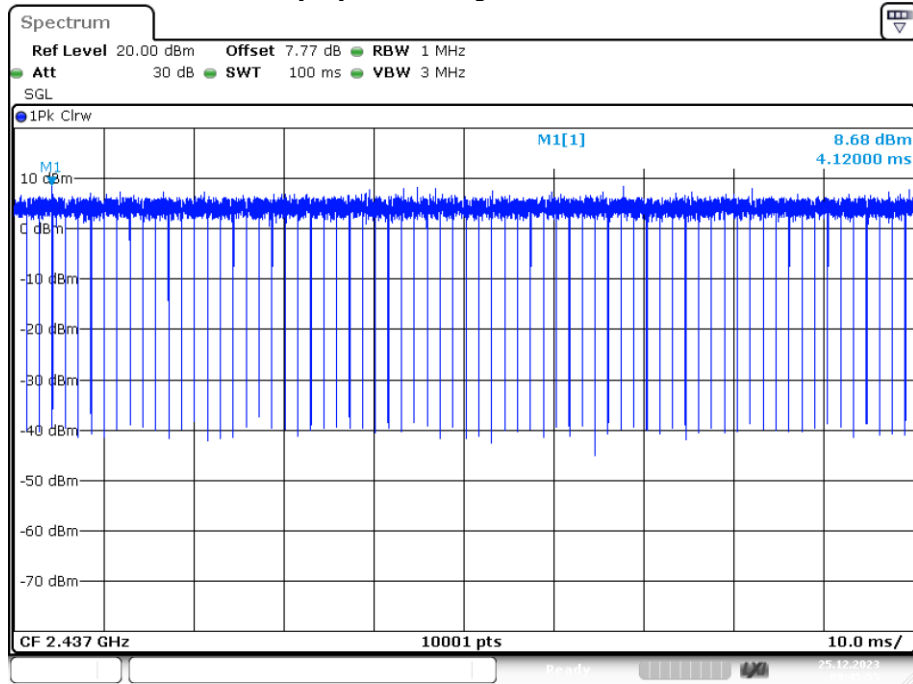
Date: 25.DEC.2023 09:41:07

Duty Cycle NVNT g 2412MHz Ant1



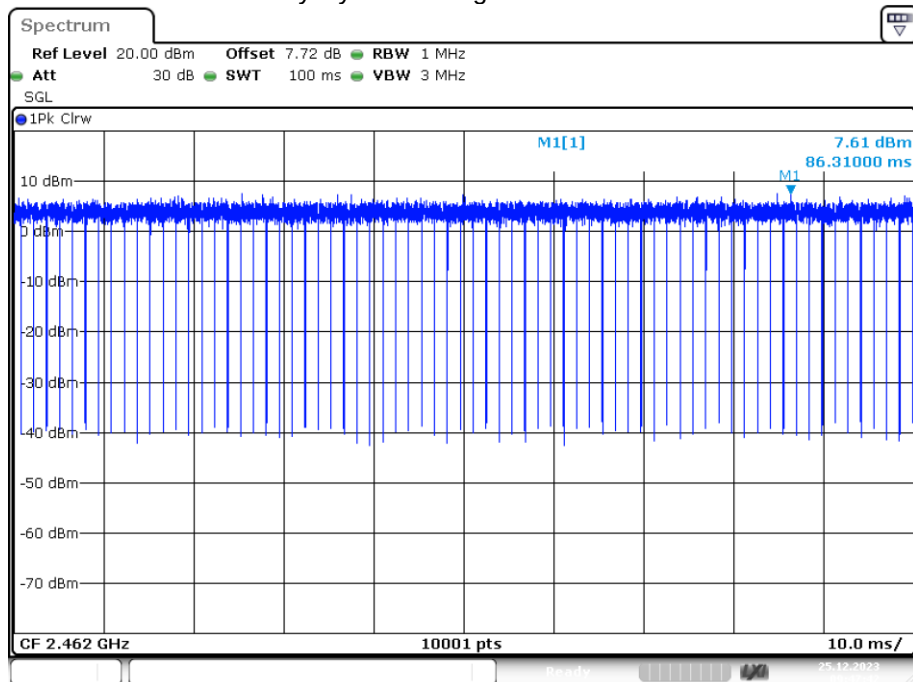
Date: 25.DEC.2023 09:43:55

Duty Cycle NVNT g 2437MHz Ant1



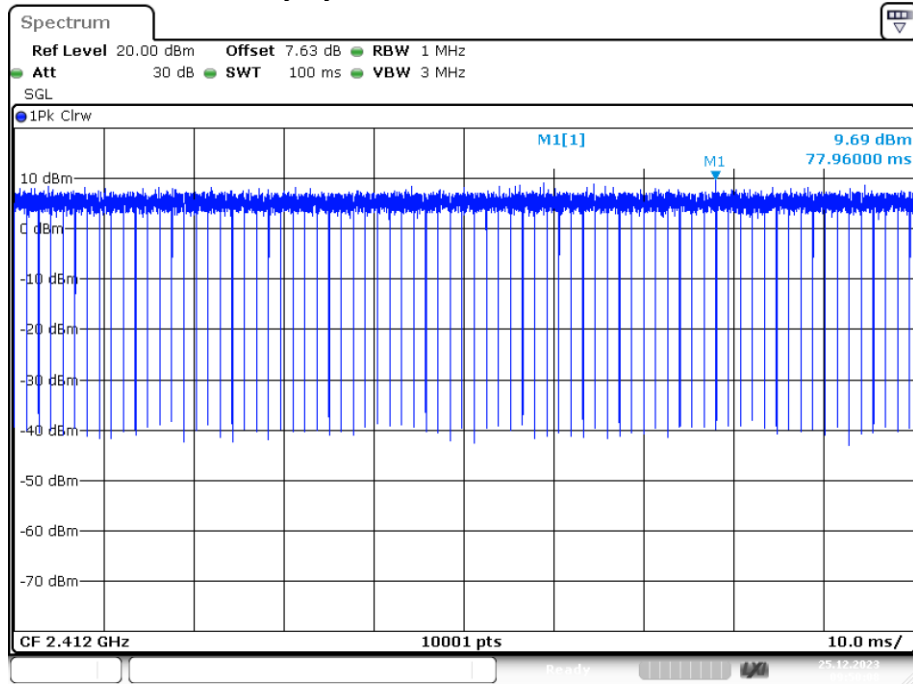
Date: 25.DEC.2023 09:45:55

Duty Cycle NVNT g 2462MHz Ant1



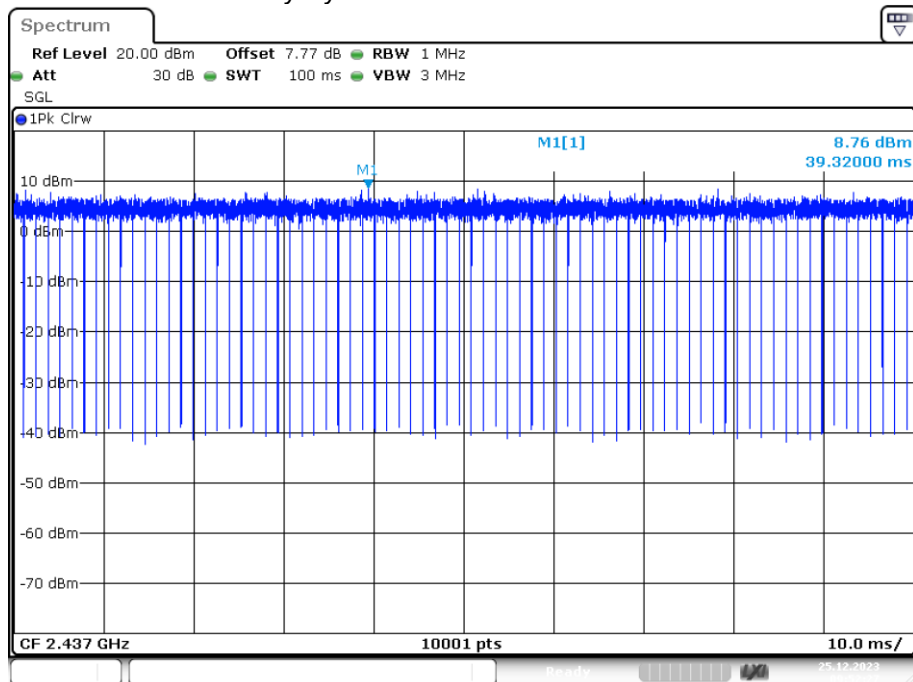
Date: 25.DEC.2023 09:47:41

Duty Cycle NVNT n20 2412MHz Ant1



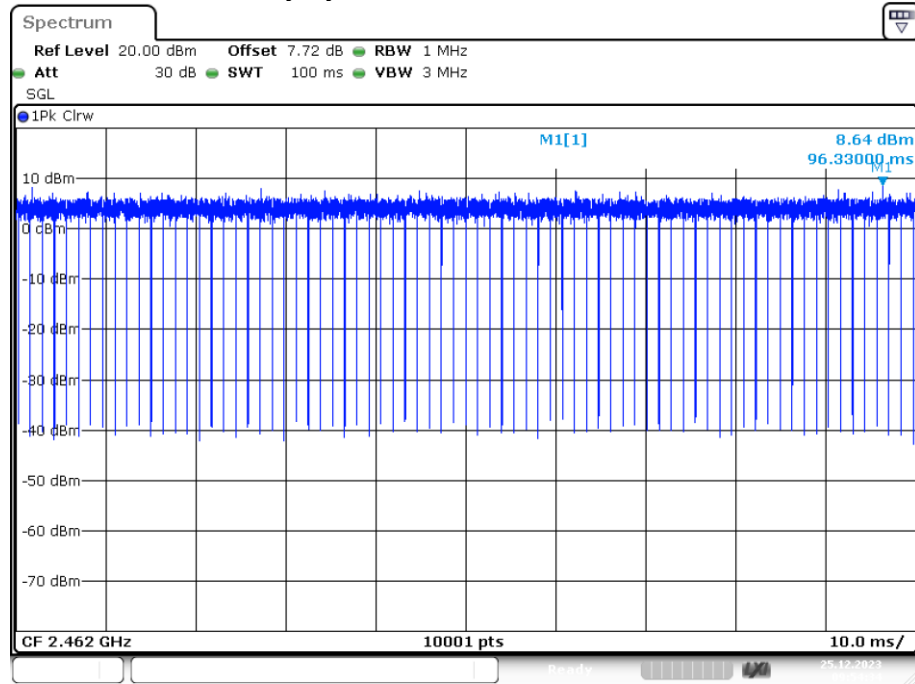
Date: 25.DEC.2023 09:50:08

Duty Cycle NVNT n20 2437MHz Ant1



Date: 25.DEC.2023 09:52:27

Duty Cycle NVNT n20 2462MHz Ant1



Date: 25.DEC.2023 09:54:34

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.

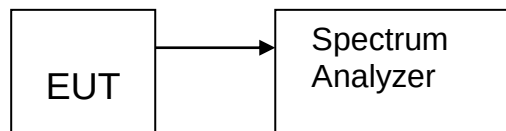
6.2.2 Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

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



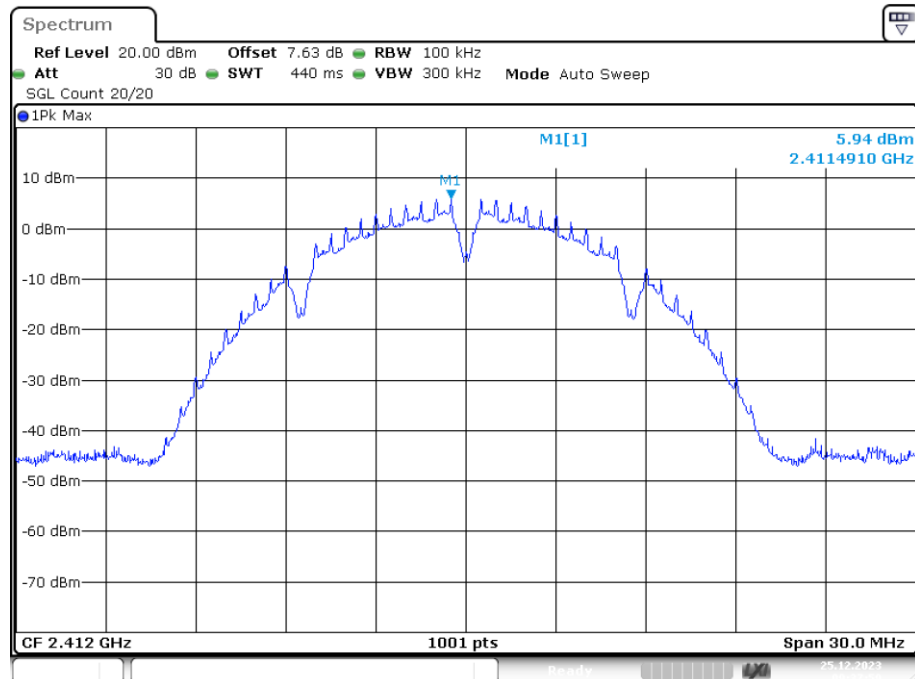
6.4. Test Results

Condition	Mode	Frequency (MHz)	Antenna	Max PSD (dBm)	Limit (dBm)	Verdict
NVNT	b	2412	Ant1	5.94	8	Pass
NVNT	b	2437	Ant1	5.094	8	Pass
NVNT	b	2462	Ant1	4.816	8	Pass
NVNT	g	2412	Ant1	3.118	8	Pass
NVNT	g	2437	Ant1	2.599	8	Pass
NVNT	g	2462	Ant1	2.324	8	Pass
NVNT	n20	2412	Ant1	3.611	8	Pass
NVNT	n20	2437	Ant1	3.149	8	Pass
NVNT	n20	2462	Ant1	2.513	8	Pass

Condition	Mode	Frequency (MHz)	Antenna	Max PSD (dBm)	Limit (dBm)	Verdict
NVNT	b	2412	Ant2	4.825	8	Pass
NVNT	b	2437	Ant2	4.323	8	Pass
NVNT	b	2462	Ant2	4.425	8	Pass
NVNT	g	2412	Ant2	-0.842	8	Pass
NVNT	g	2437	Ant2	-1.727	8	Pass
NVNT	g	2462	Ant2	-2.076	8	Pass
NVNT	n20	2412	Ant2	-0.932	8	Pass
NVNT	n20	2437	Ant2	-1.569	8	Pass
NVNT	n20	2462	Ant2	-2.318	8	Pass

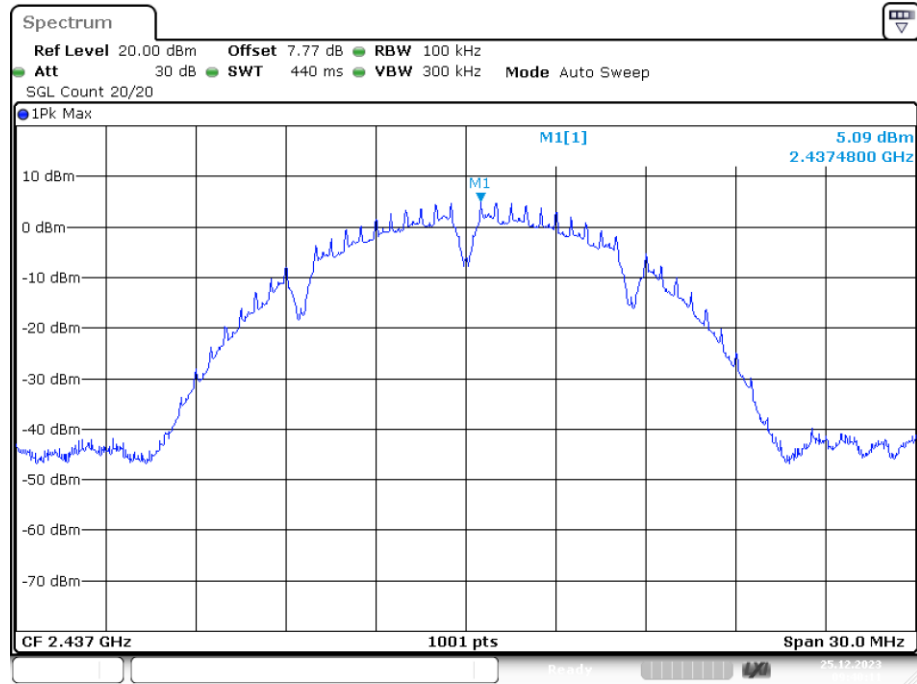
Condition	Mode	Frequency (MHz)	Antenna	Max PSD (dBm)	Limit (dBm)	Verdict
NVNT	n20	2412	MIMO	4.92	8	Pass
NVNT	n20	2437	MIMO	4.41	8	Pass
NVNT	n20	2462	MIMO	3.75	8	Pass

PSD NVNT b 2412MHz Ant1



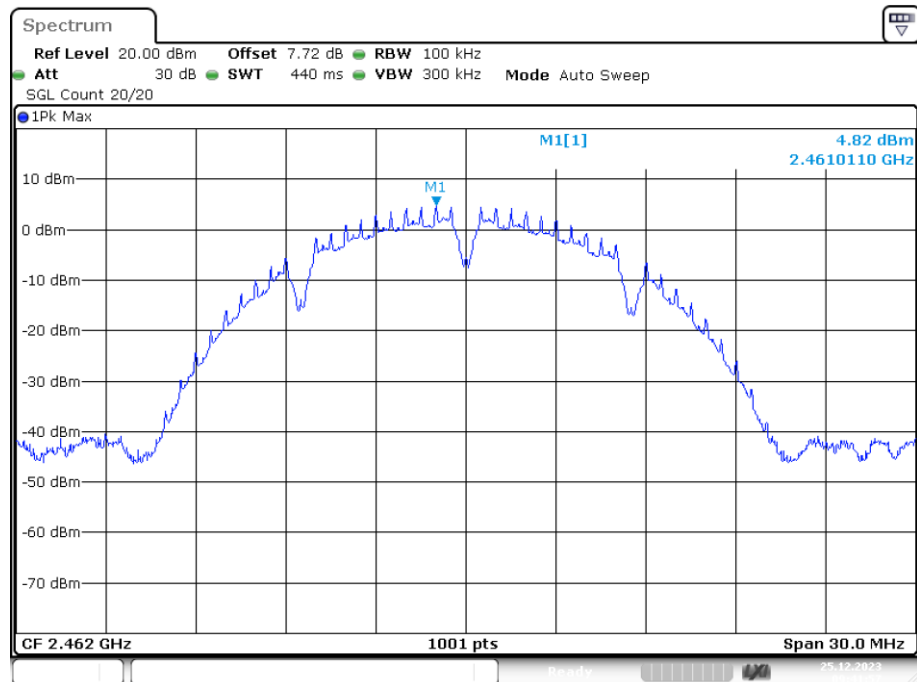
Date: 25.DEC.2023 09:37:59

PSD NVNT b 2437MHz Ant1



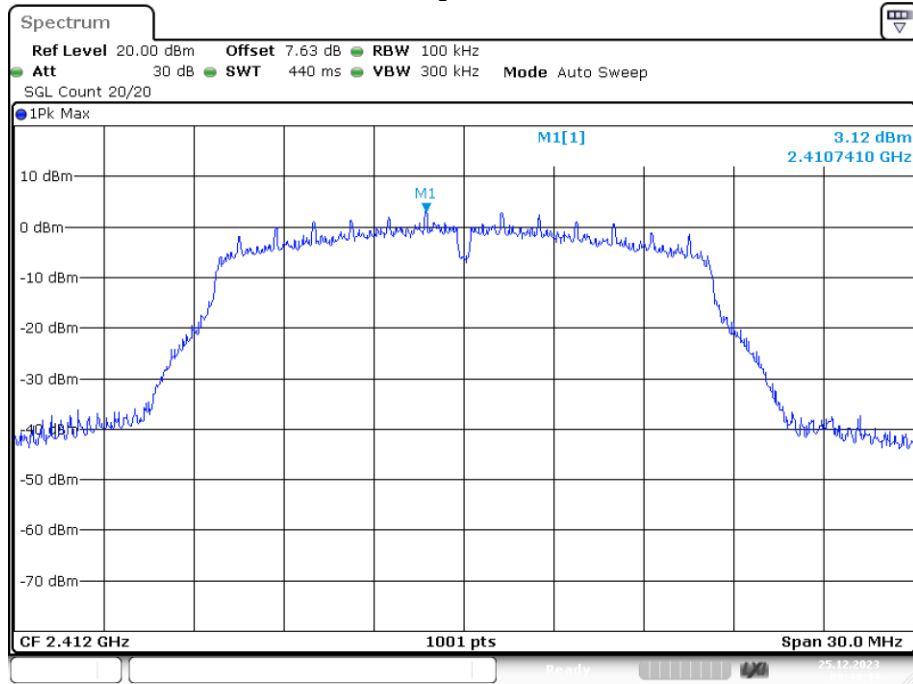
Date: 25.DEC.2023 09:40:11

PSD NVNT b 2462MHz Ant1



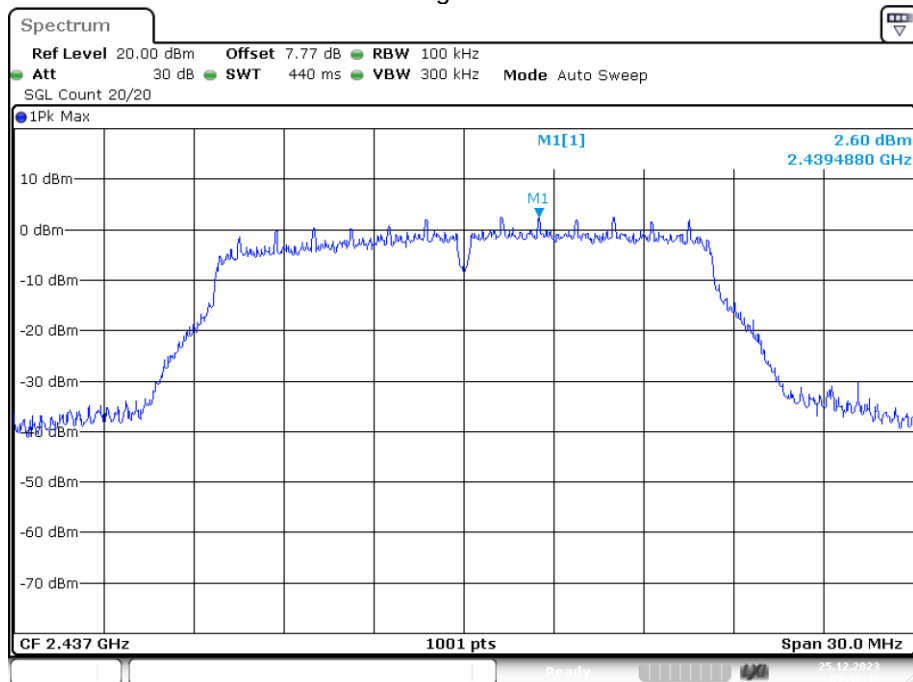
Date: 25.DEC.2023 09:41:57

PSD NVNT g 2412MHz Ant1



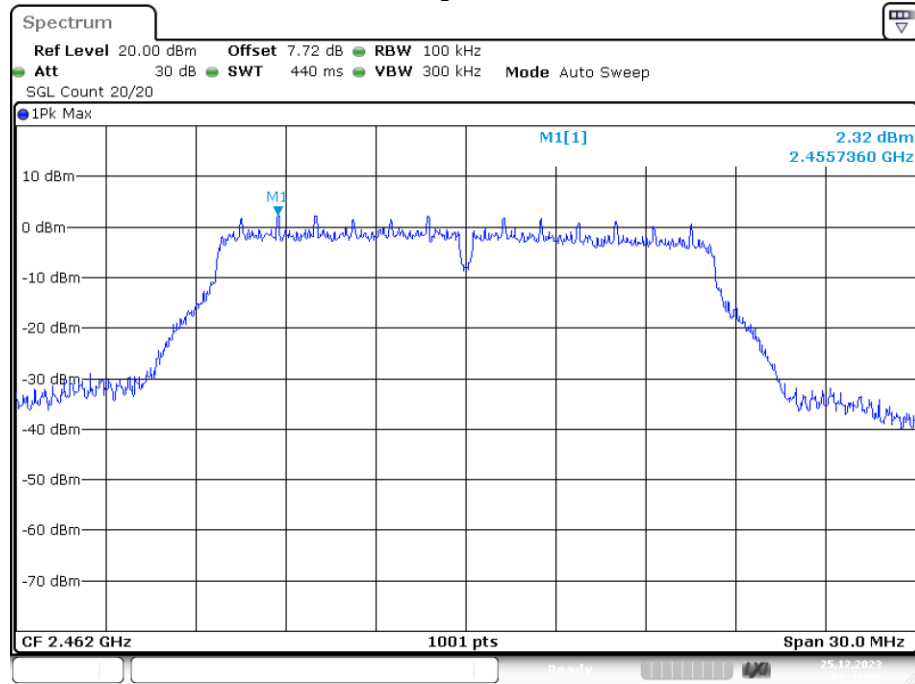
Date: 25.DEC.2023 09:44:44

PSD NVNT g 2437MHz Ant1



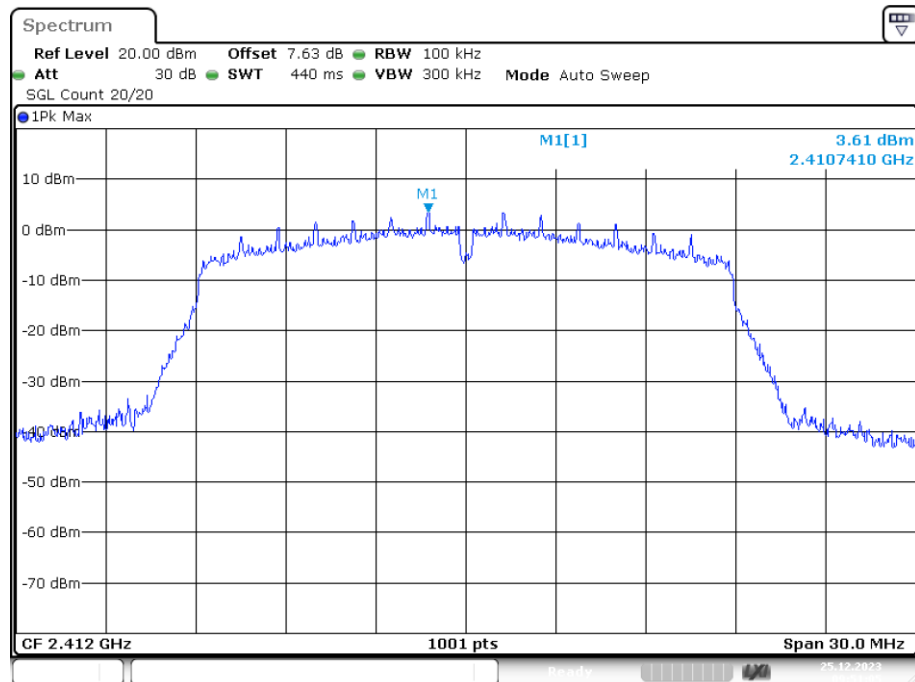
Date: 25.DEC.2023 09:46:46

PSD NVNT g 2462MHz Ant1



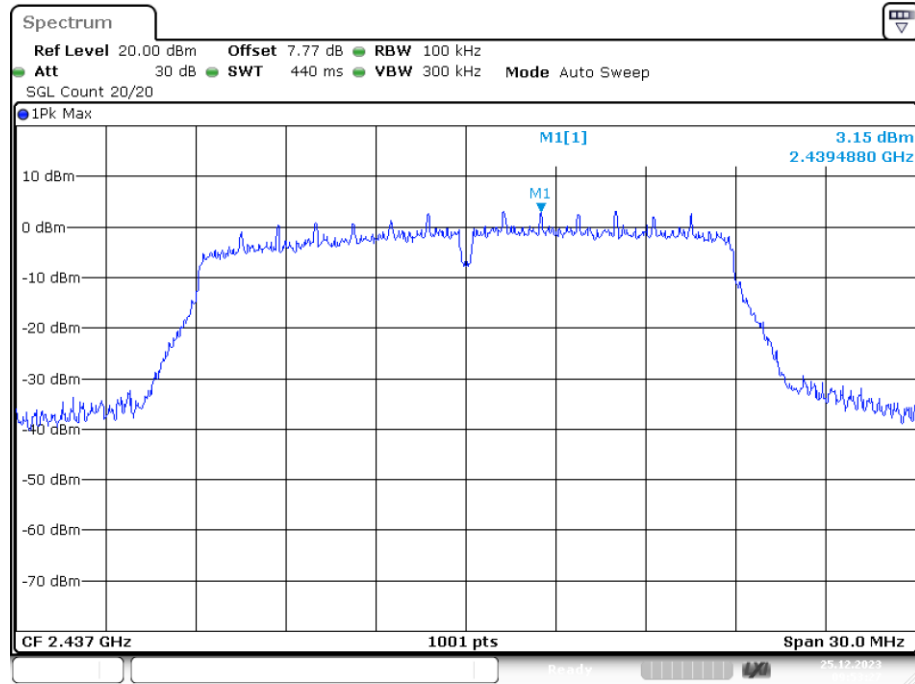
Date: 25.DEC.2023 09:48:35

PSD NVNT n20 2412MHz Ant1



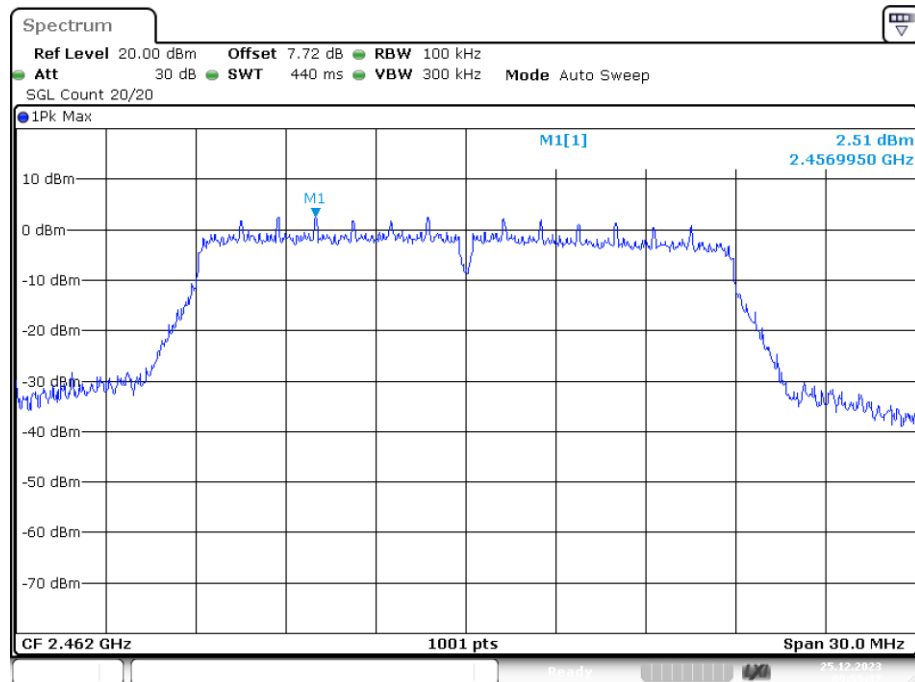
Date: 25.DEC.2023 09:51:05

PSD NVNT n20 2437MHz Ant1



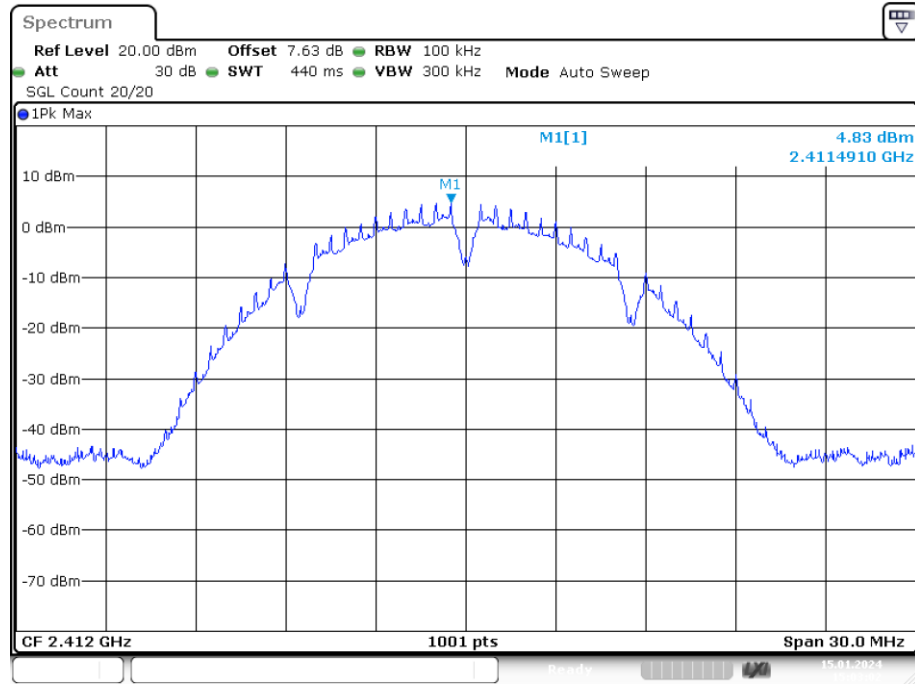
Date: 25.DEC.2023 09:53:26

PSD NVNT n20 2462MHz Ant1



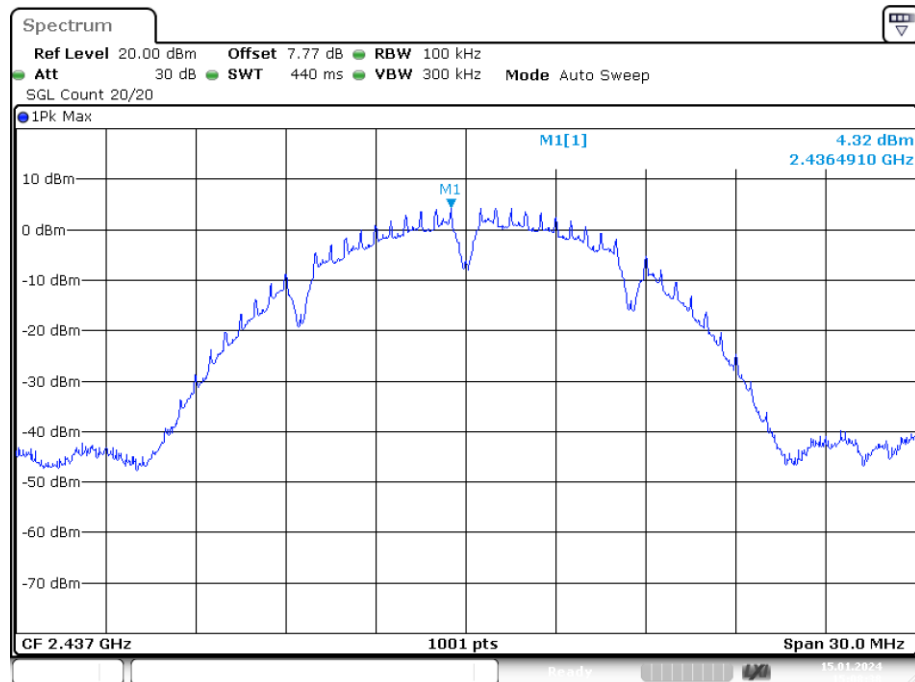
Date: 25.DEC.2023 09:55:37

PSD NVNT b 2412MHz Ant2



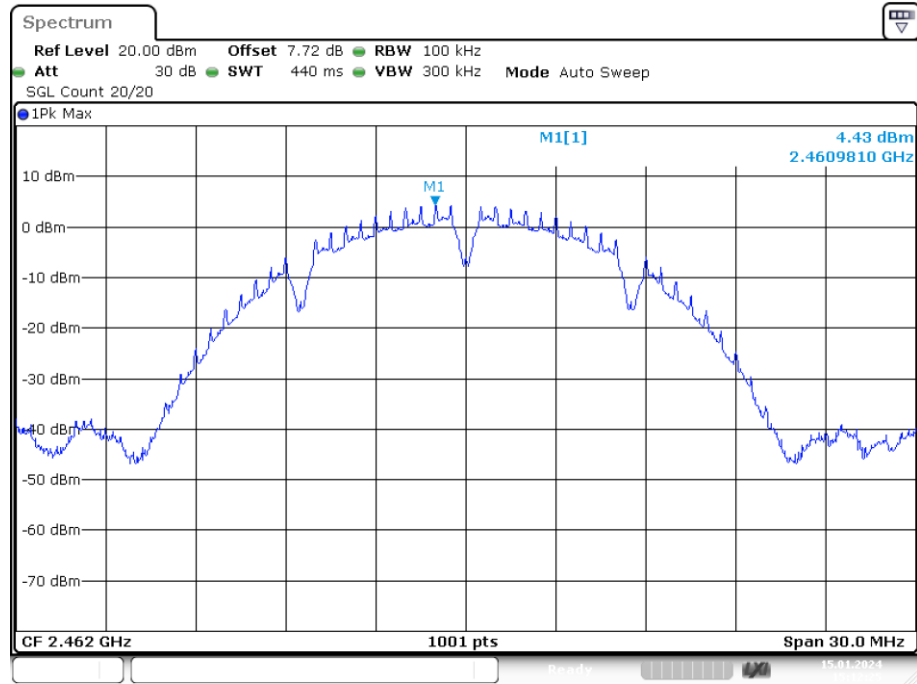
Date: 15.JAN.2024 15:03:02

PSD NVNT b 2437MHz Ant2



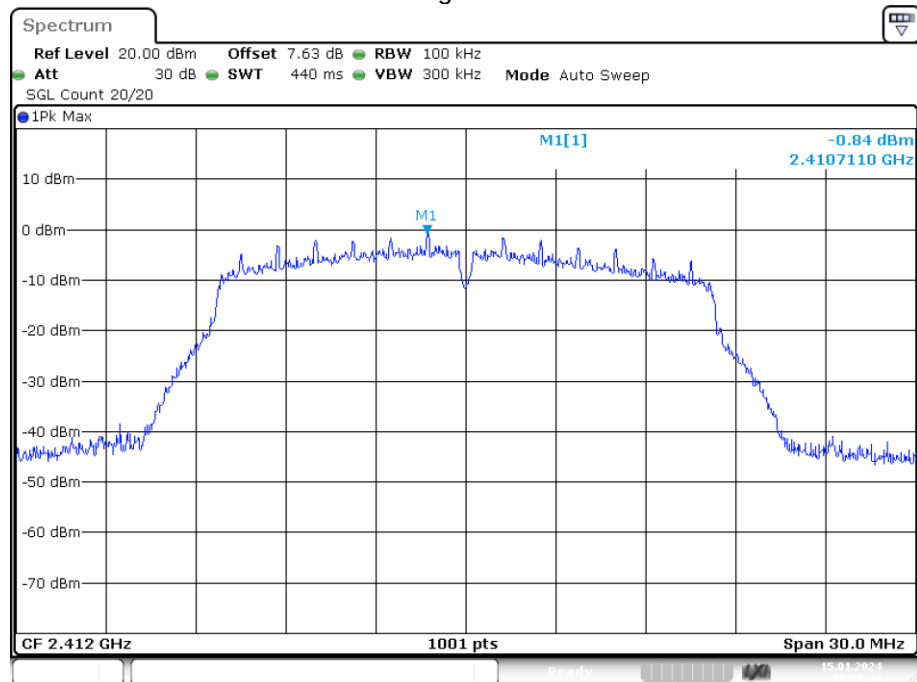
Date: 15.JAN.2024 15:08:38

PSD NVNT b 2462MHz Ant2



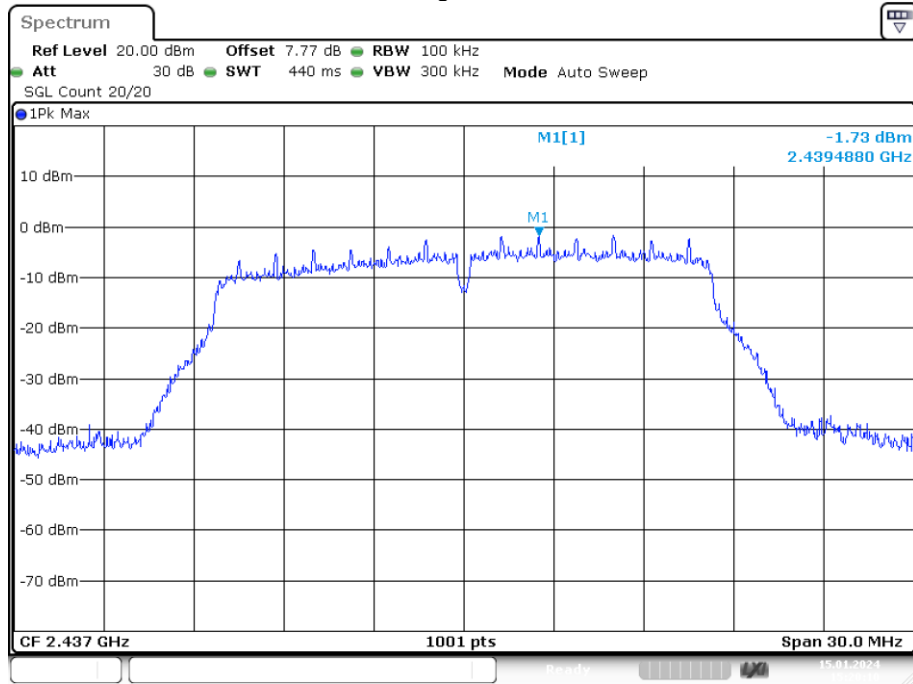
Date: 15.JAN.2024 15:12:24

PSD NVNT g 2412MHz Ant2



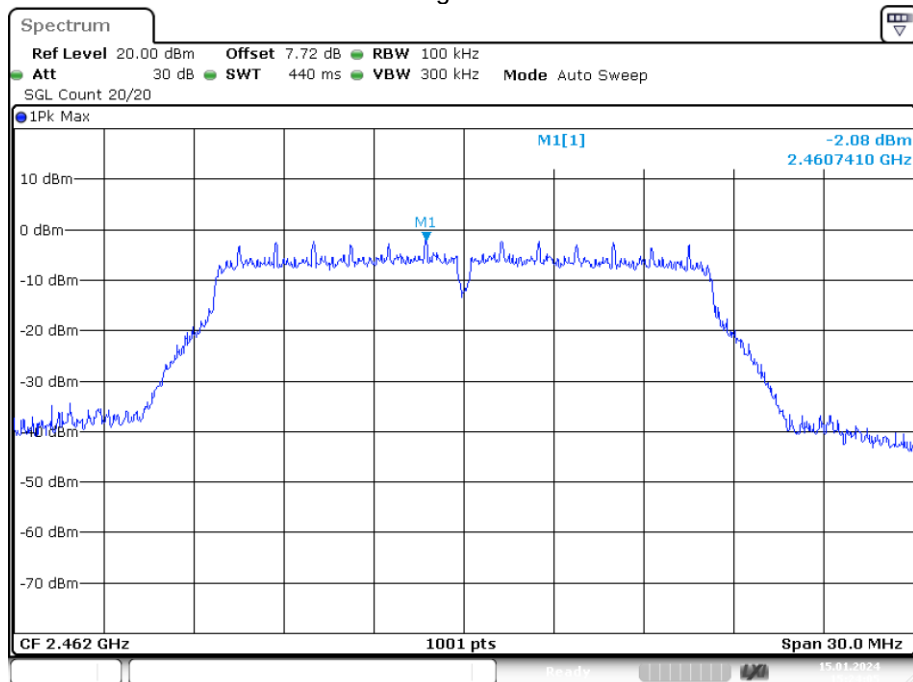
Date: 15.JAN.2024 15:17:04

PSD NVNT g 2437MHz Ant2



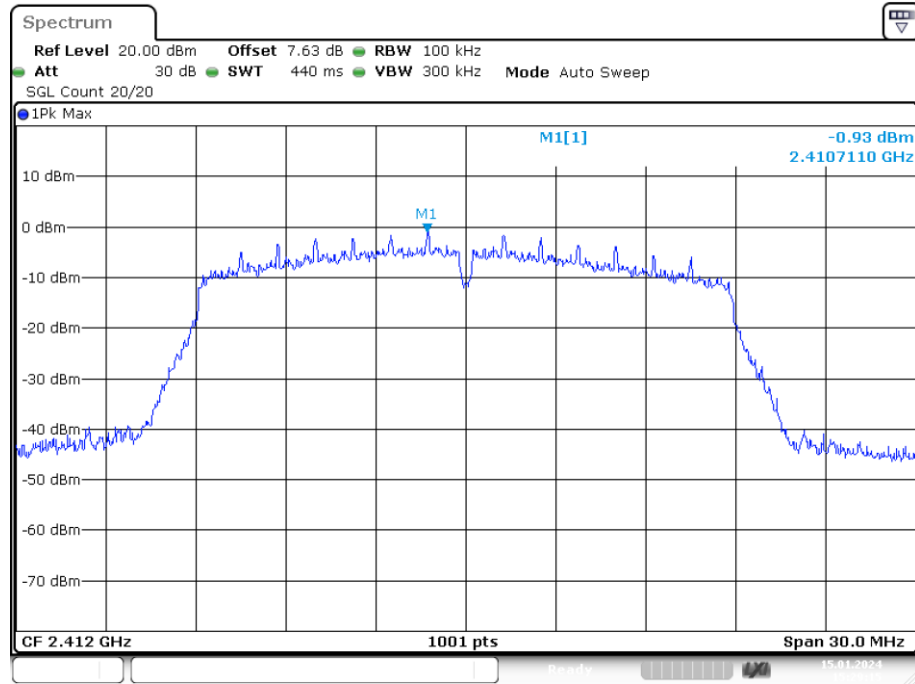
Date: 15.JAN.2024 15:20:10

PSD NVNT g 2462MHz Ant2



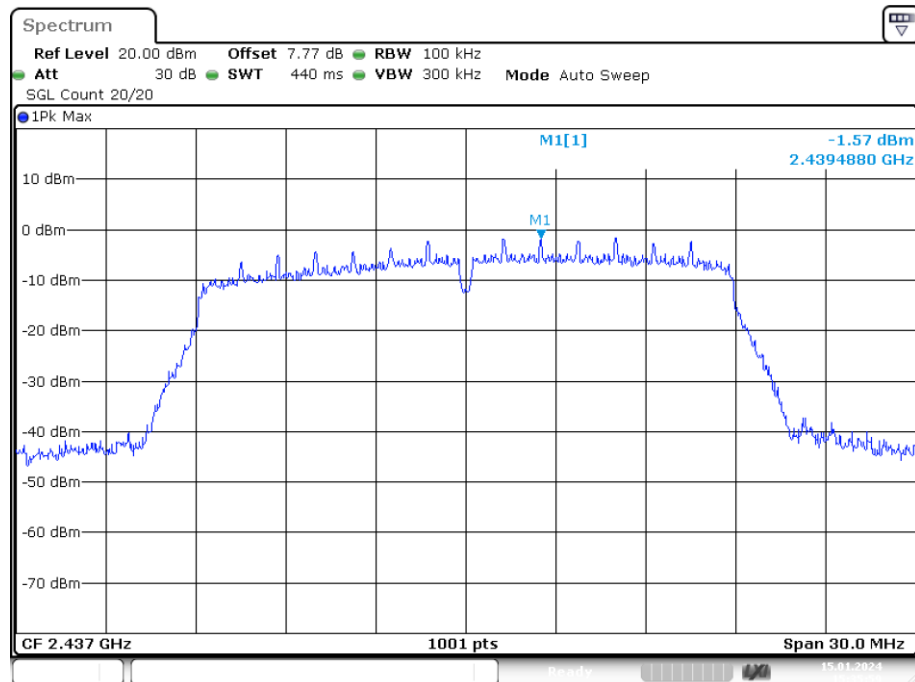
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PSD NVNT n20 2412MHz Ant2



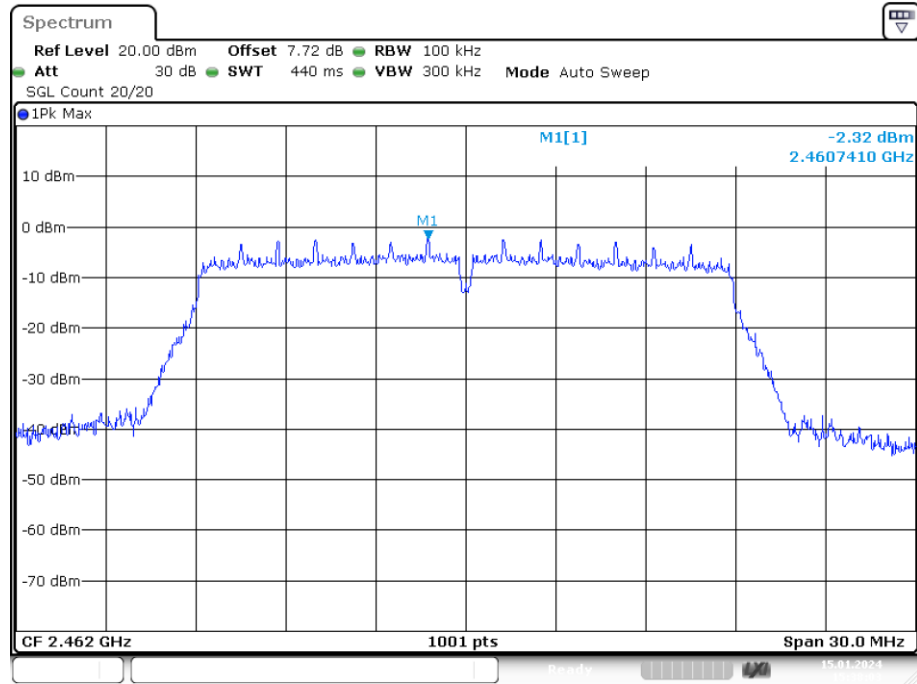
Date: 15.JAN.2024 15:29:14

PSD NVNT n20 2437MHz Ant2



Date: 15.JAN.2024 15:35:58

PSD NVNT n20 2462MHz Ant2



Date: 15.JAN.2024 15:38:03

7. BANDWIDTH

7.1. Test limits

Please refer RSS-247 & FCC PART 15: 15.247

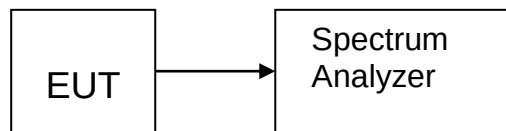
For direct sequence systems, the minimum 6dB bandwidth shall be at least 500 kHz.

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 = 100kHz, VBW $\geq$ 3*RBW =300kHz,, Peak Detector, Sweep time set auto, detail see the test plot.

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	7.08	0.5	Pass
NVNT	b	2437	Ant1	7.59	0.5	Pass
NVNT	b	2462	Ant1	8.55	0.5	Pass
NVNT	g	2412	Ant1	15.06	0.5	Pass
NVNT	g	2437	Ant1	15.72	0.5	Pass
NVNT	g	2462	Ant1	16.44	0.5	Pass
NVNT	n20	2412	Ant1	13.2	0.5	Pass
NVNT	n20	2437	Ant1	17.67	0.5	Pass
NVNT	n20	2462	Ant1	17.67	0.5	Pass