ETSI EN 300 328 V2.2.2: 2019

TEST REPORT

FOR

Base station

Model No.: SID-ESL-19A，SID-ESL-0xA（x=1，2，3，4，6，...，100）

Trademark: N/A

Report No.: E01A23030814R00202

Issue Date: April 13, 2023

Prepared for

Guangdong SID Technology Co., Ltd.

Room 101, Building 5, No. 21, Dongke Road, Dongcheng Street, Dongguan City, Guangdong Province.

Prepared by

Dong Guan Anci Electronic Technology Co., Ltd.
1-2 Floor, Building A, No.11, Headquarters 2 Road, Songshan, Lake Hi-tech Industrial Development Zone, Dongguan City, Guangdong Pr., China.

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TABLE OF CONTENTS

1 TEST RESULT CERTIFICATION

Applicant	:	Guangdong SID Technology Co., Ltd. Room 101, Building 5, No. 21, Dongke Road, Dongcheng Street, Dongguan City, Guangdong Province.
Manufacturer	:	Guangdong SID Technology Co., Ltd. Room 101, Building 5, No. 21, Dongke Road, Dongcheng Street, Dongguan City, Guangdong Province.
EUT	:	Base station
Model Name	:	SID-ESL-19A, SID-ESL-0xA（x=1，2，3，4，6，...，100）
Input Rating	:	DC 12V, 1A from Adapter

Measurement Procedure Used:

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
ETSI EN 300 328 V2.2.2: 2019	PASS

The device described above is tested by Dong Guan Anci Electronic Technology Co., Ltd. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Dong Guan Anci Electronic Technology Co., Ltd.is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the ETSI EN 300 328 V2.2.2: 2019 requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Dong Guan Anci Electronic Technology Co., Ltd.

Date of Test : March 29, 2023 to April 08, 2023

Prepared by : Duke Liu / EMC Engineer

Reviewer & Authorized Signer : Tiger Xu / Supervisor

2 EUT DESCRIPTION

Product:	Base station	
Model Number:	SID-ESL-19A, SID-ESL-0xA（x=1，2，3，4，6，...，100） (All models are identical except for the model name. We choose SID-ESL-19A for all tests)	
Modulation:	☒WIFI	DSSS with DBPSK/DQPSK/CCK for 802.11b; OFDM with BPSK/QPSK/16QAM/64QAM for 802.11g/n;
Frequency Range:	☒WIFI	☒2412-2472MHz for 802.11b; ☒2412-2472MHz for 802.11g; ☒2412-2472MHz for 802.11n(HT20); ☒2422-2462MHz for 802.11n(HT40);
Number of Channels:	☒WIFI	☒13 Channels for 802.11b; ☒13 Channels for 802.11g; ☒13 Channels for 802.11n(HT20); ☒13 Channels for 802.11n(HT40);
Smart system:	☒SISO	☐MIMO
Max Transmit Power:	☒WIFI	8.5dBm
Antenna:	☒WIFI	External antenna
Antenna Gain:	☒WIFI	0.5dBi
Input rating:	DC 12V, 1A	
Power supply:	DC 12V	
Temperature Range:	0° C ~ +40° C	
Hardware version:	V1.0	
Software version:	V1.0	

Note: For more details, please refer to the User's manual of the EUT.
Wifi means Wifi 2.4G for 2412-2472MHz

INFORMATION AS REQUIRED BY EN 300 328 V2.2.2

EN 300 328	Information Is Provided By The Manufacturer	
The Type Of Modulation Used By The Equipment	☐ FHSS ☒ other forms of modulation	
Adaptive/non-adaptive equipment:	☐ non-adaptive Equipment ☒ adaptive Equipment without the possibility to switch to a non-adaptive mode ☐ adaptive Equipment which can also operate in a non-adaptive mode	
In case of adaptive equipment:	The maximum Channel Occupancy Time implemented by the equipment: 2.91ms ☒ The equipment has implemented an LBT based DAA mechanism ● In case of equipment using modulation different from FHSS: ☐ The equipment is Frame Based equipment ☒ The equipment is Load Based equipment ☐ The equipment can switch dynamically between Frame Based and Load Based equipment ☐ The equipment has implemented an non-LBT based DAA mechanism ☐ The equipment can operate in more than one adaptive mode	
The Worst Case Operational Mode For Each Of The Following Tests:		
	RF Output Power	16.46dBm
	Power Spectral Density	7.92 dBm/MHz
	Duty Cycle, Tx-Sequence, Tx-gap.	N/A
	Dwell Time, Minimum Frequency Occupation & Hopping Sequence (only for FHSS equipment)	N/A
	Hopping Frequency Separation (only for FHSS equipment)	N/A
	Medium Utilisation.	N/A
	Adaptivity & Receiver Blocking.	PASS
	Occupied Channel Bandwidth	36.359MHz
	Transmitter Unwanted Emissions in the OOB domain.	PASS
	Transmitter Unwanted Emissions in the spurious domain	PASS
	Receiver spurious emissions	

<table>
<tr><td rowspan="3">The Different Transmit Operating Modes (Tick All That Apply):</td><td>☒ Operating mode 1: Single Antenna Equipment
☒ Equipment with only 1 antenna
☐ Equipment with 2 diversity antennas but only 1 antenna active at any moment in time
☐ Smart Antenna Systems with 2 or more antennas, but operating in a (legacy) mode where only 1 antenna is used. (e.g. IEEE 802.11™ [i.3] legacy mode in smart antenna systems)</td></tr>
<tr><td>☐ Operating mode 2: Smart Antenna Systems - Multiple Antennas without beam forming
☐ Single spatial stream / Standard throughput / (e.g. IEEE 802.11™ [i.3] legacy mode)
☐ High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 1
☐ High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 2</td></tr>
<tr><td>☐ Operating mode 3: Smart Antenna Systems - Multiple Antennas with beam forming
☐ Single spatial stream / Standard throughput (e.g. IEEE 802.11™ [i.3] legacy mode)
☐ High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 1
☐ High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 2</td></tr>
<tr><td>Operating Frequency Range(S) Of The Equipment:</td><td>☒WIFI Operating Frequency Range: 2412 MHz to 2472 MHz</td></tr>
<tr><td>Nominal Channel Bandwidth(s):</td><td>Occupied Channel Bandwidth: 36.359MHz</td></tr>
<tr><td>Type of Equipment (stand-alone, combined, plug-in radio device, etc.):</td><td>☒ Stand-alone
☐ Combined Equipment (Equipment where the radio part is fully integrated within another type of equipment)
☐ Plug-in radio device (Equipment intended for a variety of host systems)
☐ Other</td></tr>
<tr><td>Describe the test modes available which can facilitate testing:</td><td>Modulation Mode: ☒WIFI DSSS with DBPSK/DQPSK/CCK for OFDM with802.11b;
BPSK/QPSK/16QAM/64QAM for 802.11g/n;
Test Frequency: Low Frequency Middle Frequency High Frequency</td></tr>
<tr><td>The Equipment Type</td><td>WIFI(802.11b/g/n(HT20))</td></tr>
<tr><td colspan="2">NOTE:
N/A means not applicable
Wifi means Wifi 2.4G for 2412-2472MHz</td></tr>
</table>

Modified History

Rev.	Summary	Date of Rev.	Report No.
Ver.1.0	Original Report	/	E01A23030814R00202

3 SUMMARY OF TEST RESULT

Wifi 2.4G			
Clause (EN 300 328)	Test Parameter	Verdict	Remark
4.3.2.2	RF Output Power	PASS	
4.3.2.3	Power Spectral Density	PASS	
4.3.2.4	Duty Cycle and Tx-Sequence and Tx-Gap	N/A (See Note1)	Only applicable for non-adaptive equipment Output Power >10dBm
4.3.2.5	Medium Utilisation Factor	N/A (See Note1)	Only applicable for non-adaptive equipment Output Power >10dBm
4.3.2.6	Adaptivity (adaptive equipment using modulations other than FHSS)	N/A (See Note1)	Only applicable for equipment Output Power >10dBm
4.3.2.7	Occupied Channel Bandwidth	PASS	
4.3.2.8	Transmitter Unwanted Emission in the Out-of Band	PASS	
4.3.2.9	Transmitter Unwanted Emissions in the Spurious Domain	PASS	
4.3.2.10	Receiver Spurious Emissions	PASS	
4.3.2.11	Receiver Blocking	PASS	
4.3.2.12	Geo-location capability	N/A (See Note1)	Only applicable for have Geo-location function equipment
NOTE1: N/A (Not Applicable)			

4 TEST METHODOLOGY

4.1 GENERAL DESCRIPTION OF APPLIED STANDARDS

According to its specifications, the EUT must comply with the requirements of the following standards:

ETSI EN 300 328 V2.2.2 Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques; Harmonized EN covering essential requirements under article 3.2 of Directive 2014/53/EU.

4.2 MEASUREMENT EQUIPMENT USED

For Spurious Emissions Test

Equipment Type	Manufacturer	Model No.	Serial Number	Calibrated until
EMI Test Receiver	Rohde & Schwarz	ESPI	100502	2023-11-12
EMI Test Receiver	Rohde & Schwarz	FSV40	102257	2023-11-12
Pre-Amplifier	HP	8447D	2727A06172	2023-05-22
Pre-Amplifier	A-INFO	LA1018N4009	J1013130524001	2023-05-22
Bilog Antenna	Schwarzbeck	VULB9163	VULB9163-588	2023-05-22
Horn Antenna	A-INFO	LB-10180-SF	J2031090612123	2023-05-22
Cable	N/A	N/A	6#	2023-05-22
Cable	N/A	N/A	1-1#	2023-05-22
Cable	N/A	N/A	1-2#	2023-05-22
Cable	N/A	N/A	7#	2023-05-22
3m Semi-anechoic Chamber	chengyu	9m*6m*6m	N/A	2023-05-22
Test Software	Farad	EZ-EMC Ver:ANCI-3A1	N/A	N/A
Band reject Filter(50dB)	WI/DE	WRCGV-2400(2400-2485MHz)	2	2023-11-12

For Other Test Items:

Equipment Type	Manufacturer	Model No.	Serial Number	Calibrated until
Spectrum Analyzer	Rohde & Schwarz	FSV40	102257	2023-11-12
WIDEBAND RADIO COMMUNICATION	Rohde & Schwarz	CMW500	157423	2023-11-12
Vector Signal Generator	Agilent	5182A	MY50140563	2023-11-12
ESG SERIES SIGNAL GENERATOR	Agilent	E4421B	40050971	2023-11-12
USB RF Power sensor	RadiPower	RPR3006W	17I00015SNO88	2023-11-12
RF Test Software	MAIWEI	MTS 8310	N/A	N/A
Dc source	RUIYUAN	WYK-6030K	180828026030	2023-05-22

4.3 DESCRIPTION OF TEST MODES

The EUT has been tested under its typical operating condition.
The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.
The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

Test of channel included the lowest and middle and highest frequency to perform the test, then record on this report.

The EUT has been tested under its typical operating condition. so those data rates (802.11b: 1 Mbps; 802.11g: 6 Mbps; 802.11n(HT20): MCS0) were used for all test.

Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Wifi 2.4G Frequency and Channel list for 802.11b/g/n(HT20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	5	2432	10	2457
2	2417	6	2437	11	2462
3	2422	7	2442	12	2467
4	2427	8	2447	13	2472
		9	2452		

Test Wifi 2.4G Frequency and Channel for 802.11b/g/n(HT20):

Lowest Frequency		Middle Frequency		Highest Frequency	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	7	2442	13	2472

5 FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at:

Dong Guan Anci Electronic Technology Co., Ltd..
1-2 Floor, Building A, No.11, Headquarters 2 Road, Songshan, Lake Hi-tech Industrial Development Zone, Dongguan City, Guangdong Pr., China.

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with preselectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

5.3 LABORATORY ACCREDITATIONS AND LISTINGS

Site Description		
Name of Firm	:	Dong Guan Anci Electronic Technology Co., Ltd.
Site Location	:	1-2 Floor, Building A, No.11, Headquarters 2 Road, Songshan, Lake Hi-tech Industrial Development Zone, Dongguan City, Guangdong Pr., China.

6 TEST SYSTEM UNCERTAINTY

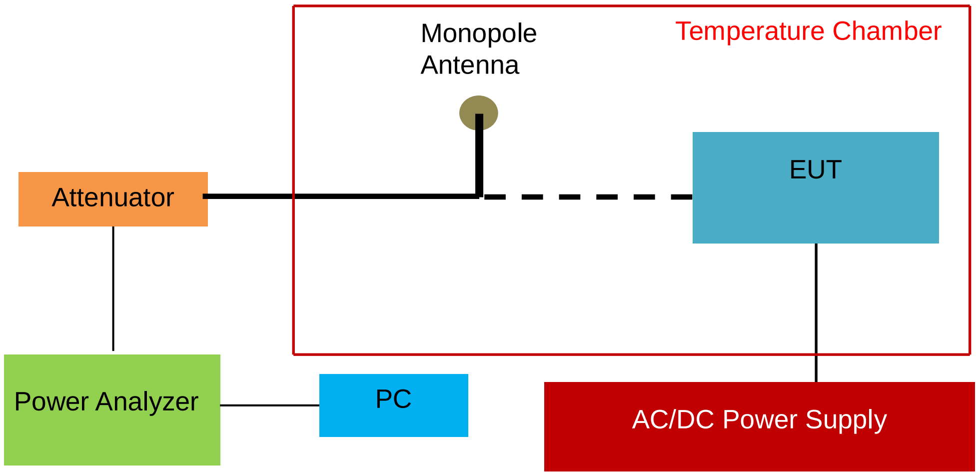
Maximum measurement uncertainty of the test system

Test Parameter	Measurement Uncertainty
RF Output Power	±1.0%
Power Spectral Density	±0.9%
Duty Cycle and Tx-Sequence and Tx-Gap	±0.9%
Dwell Time and Minimum Frequency Occupation	±1.3%
Medium Utilisation Factor	±1.5%
Occupied Channel Bandwidth	±2.3%
Transmitter Unwanted Emission in the out-of Band	±1.2%
Transmitter Unwanted Emissions in the Spurious Domain	±2.7%
Receiver Spurious Emissions	±2.7%
Temperature	±3.2%
Humidity	±2.5%

7 SETUP OF EQUIPMENT UNDER TEST

7.1 SETUP CONFIGURATION OF EUT

Conducted measurements configuration of EUT shall be as follows:

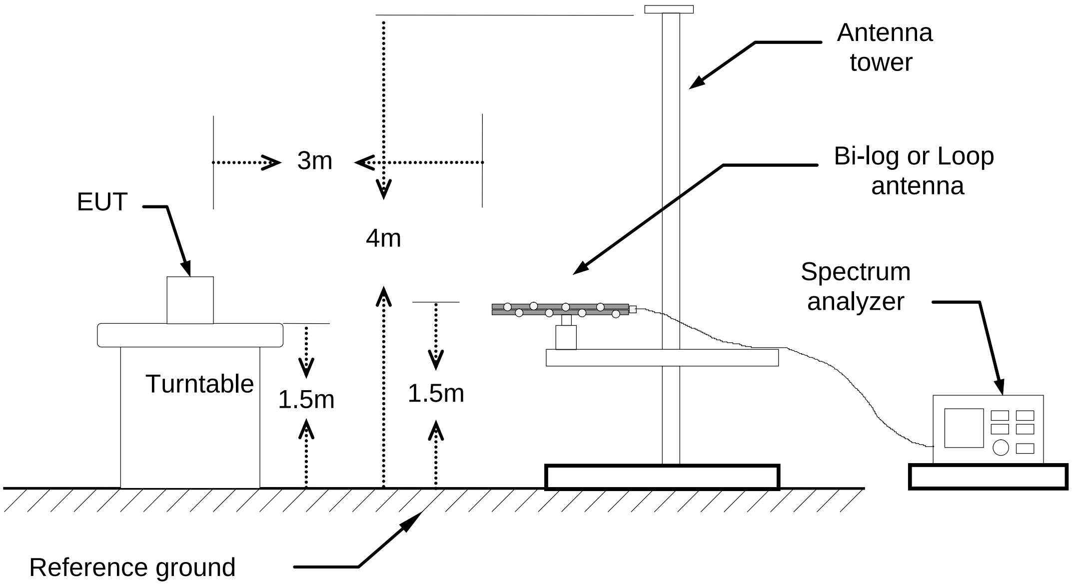


Remarks:

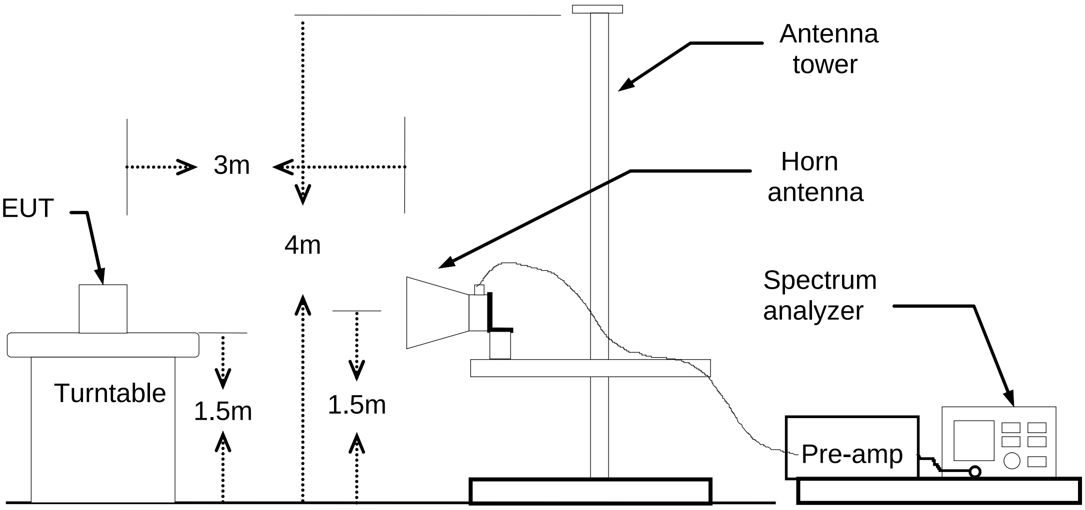
The Signal Analyzer could be connected to a monopole antenna or directly connected to the EUT, if the EUT has already employing an antenna connector.

Radiated measurements configuration of EUT shall be as follows:

Below 1GHz



Above 1GHz



7.2 SUPPORT EQUIPMENT

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
1.	N/A	N/A	N/A	N/A	

Notes:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

8 ETSI EN 300 328 REQUIREMENTS

8.1 RF OUTPUT POWER

8.1.1 Applicable standard

EN 300 328 Clause 4.3.1.2, Clause 4.3.2.2

8.1.2 Conformance Limit

The Maximum RF Output Power <= 100 mW (20 dBm) (EIRP) at both normal environmental conditions and at the extremes of the operating temperature range.

8.1.3 Test Configuration

The measurements for RF output power shall be performed at both normal environmental conditions and at the extremes of the operating temperature range.

Radiated measurements shall only be used for integral antenna equipment that does not have a temporary antenna connector(s) provided.
Conducted measurements shall be used for antenna equipment provided a temporary antenna connector(s).

8.1.4 Test Procedure

1. Please refer to ETSI EN 300 328 (V2.2.2) clause 5.4.2.1 for the test conditions.

2. Please refer to ETSI EN 300 328 (V2.2.2) clause 5.4.2.2 for the measurement method.

The test procedure shall be as follows:

■ Conducted measurements

Step 1:

• Use a fast power sensor suitable for 2,4 GHz and capable of minimum 1 MS/s.

• Use the following settings:

- Sample speed 1 MS/s or faster.
- The samples shall represent the RMS power of the signal.
- Measurement duration: For non-adaptive equipment: equal to the observation period defined in clause 4.3.1.3.2 or clause 4.3.2.4.2. For adaptive equipment, the measurement duration shall be long enough to ensure a minimum number of bursts (at least 10) are captured.
  For adaptive equipment, to increase the measurement accuracy, a higher number of bursts may be used.

Step 2:

• For conducted measurements on devices with one transmit chain:

- Connect the power sensor to the transmit port, sample the transmit signal and store the raw data. Use these stored samples in all following steps.

• For conducted measurements on devices with multiple transmit chains:

- Connect one power sensor to each transmit port for a synchronous measurement on all transmit ports.
- Trigger the power sensors so that they start sampling at the same time. Make sure the time difference between the samples of all sensors is less than 500 ns.

- For each individual sampling point (time domain), sum the coincident power samples of all ports and store them. Use these summed samples in all following steps.

Step 3:

• Find the start and stop times of each burst in the stored measurement samples.

The start and stop times are defined as the points where the power is at least 30 dB below the highest value of the stored samples in step 2.

In case of insufficient dynamic range, the value of 30 dB may need to be reduced appropriately.

Step 4:

• Between the start and stop times of each individual burst calculate the RMS power over the burst using the formula below. Save these Pburst values, as well as the start and stop times for each burst.

$$P_{burst} = \frac{1}{k}\sum_{n=1}^{k} P_{sample}(n)$$

with k being the total number of samples and n the actual sample number.

Step 5:

• The highest of all Pburst values (value "A" in dBm) will be used for maximum e.i.r.p. calculations.

Step 6:

• Add the (stated) antenna assembly gain "G" in dBi of the individual antenna.

• If applicable, add the additional beamforming gain "Y" in dB.

• If more than one antenna assembly is intended for this power setting, the maximum overall antenna gain (G or G + Y) shall be used.

• The RF Output Power (P) shall be calculated using the formula below: P = A + G + Y

• This value, which shall comply with the limit given in clause 4.3.1.2.3 or clause 4.3.2.2.3, shall be recorded in the test report.

■ Radiated measurements

This method shall only be used for integral antenna equipment that does not have a temporary antenna connector(s) provided.

When performing radiated measurements, the UUT shall be configured and antenna(s) positioned (including smart antenna systems and equipment capable of beamforming) for maximum e.i.r.p. towards the measuring antenna. This position shall be recorded.

A test site as described in annex B and applicable measurement procedures as described in annex C shall be used.

Taking into account the calibration factor from the measurement site, the test procedure for RF Output Power is further as described under clause 5.4.2.2.1.2, step 1 to step 5. The RF Output Power P is equal to the value A obtained in step 5. The test procedure for Duty Cycle, Tx-sequence, Tx-gap is further as described in clause 5.4.2.2.1.3 and the test procedure for Medium Utilization is further as described in clause 5.4.2.2.1.4.

8.1.5 Test Results

Wifi 2.4G			
Temperature:	Refer to the following table	Test Date:	April 07, 2023
Humidity:	55 % RH	Tested by:	Fan

Test Conditions		Measured Power (dBm)	Limit (dBm)	Margin (dB)
Temperature (°C)	Channel			
Nom	Channel 1	7.65	20	-12.35
Tmin -20℃		7.39	20	-12.61
Tmax 50° C		7.37	20	-12.63
Nom	Channel 7	8.36	20	-11.64
Tmin -20℃		8.31	20	-11.69
Tmax 50° C		8.28	20	-11.72
Nom	Channel 13	8.31	20	-11.69
Tmin -20℃		8.29	20	-11.71
Tmax 50° C		8.28	20	-11.72

(802.11g ANT1)

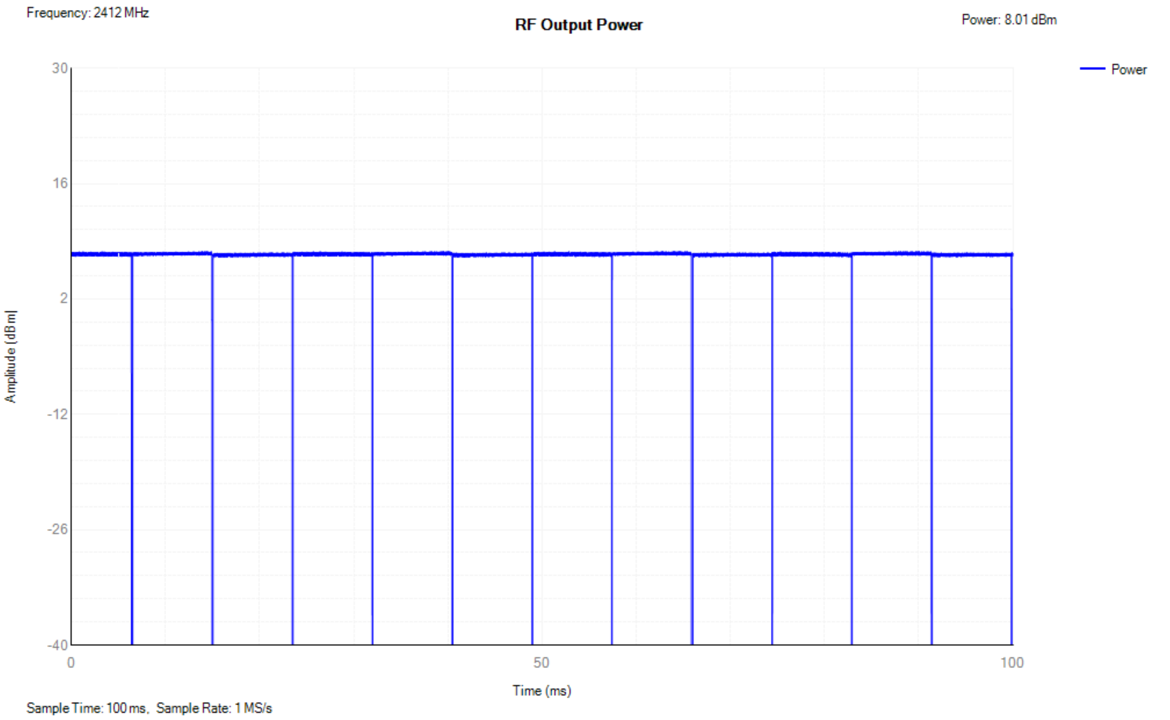
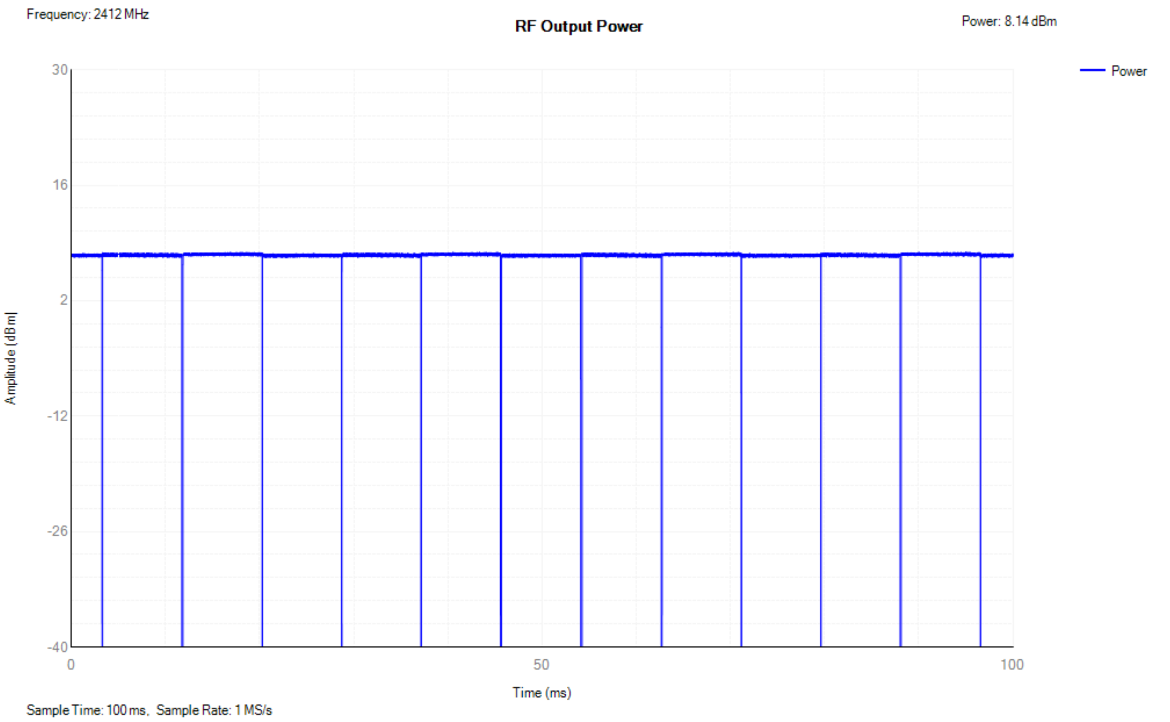
Test Conditions		Measured Power (dBm)	Limit (dBm)	Margin (dB)
Temperature (°C)	Channel			
Nom	Channel 1	7.86	20	-12.14
Tmin -20℃		7.84	20	-12.16
Tmax 50° C		7.81	20	-12.19
Nom	Channel 7	8.06	20	-11.94
Tmin -20℃		7.85	20	-12.15
Tmax 50° C		7.81	20	-12.19
Nom	Channel 13	7.84	20	-12.16
Tmin -20℃		7.82	20	-12.18
Tmax 50° C		7.80	20	-12.2

(802.11n-HT20 ANT1)

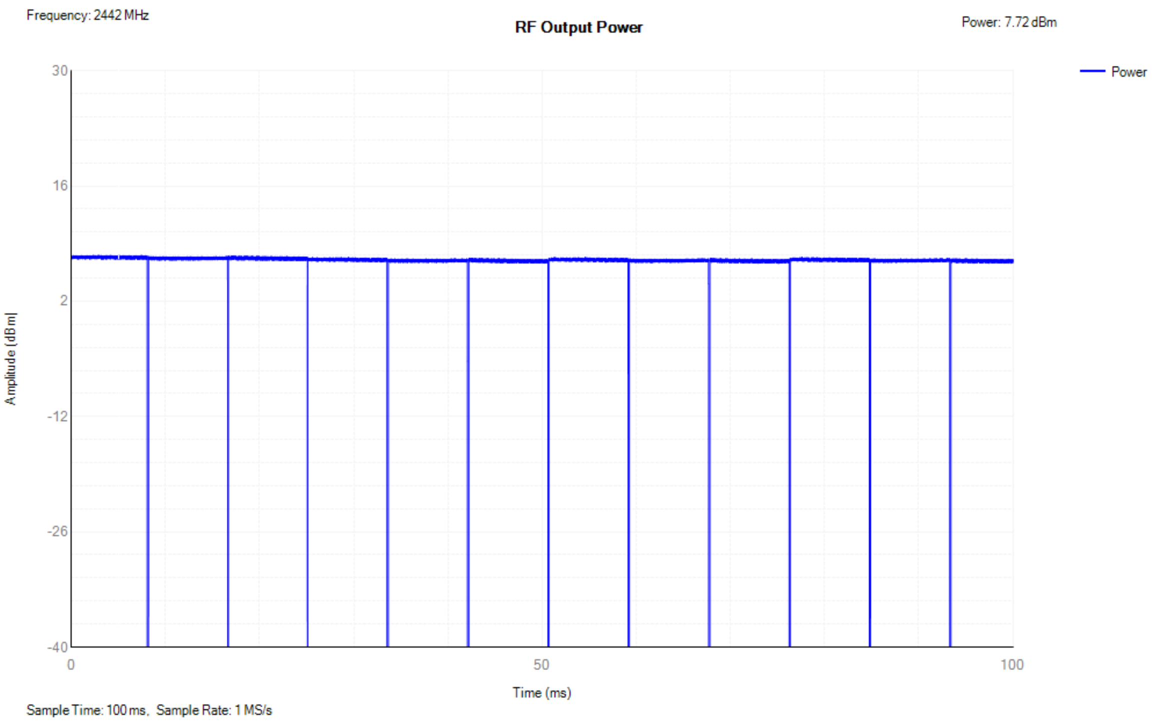
Test Conditions		Measured Power (dBm)	Limit (dBm)	Margin (dB)
Temperature (°C)	Channel			
Nom	Channel 1	7.88	20	-12.12
Tmin -20℃		7.78	20	-12.22
Tmax 50° C		7.75	20	-12.25
Nom	Channel 7	7.47	20	-12.53
Tmin -20℃		7.43	20	-12.57
Tmax 50° C		7.44	20	-12.56
Nom	Channel 13	8.50	20	-11.50
Tmin -20℃		8.46	20	-12.12
Tmax 50° C		8.42	20	-12.22

(802.11n(HT40) ANT1)

Test Conditions		Measured Power (dBm)	Limit (dBm)	Margin (dB)
Temperature (°C)	Channel			
Nom	Channel 3	7.56	20	-12.44
Tmin -20℃		7.53	20	-12.47
Tmax 50° C		7.51	20	-12.49
Nom	Channel 7	7.14	20	-12.86
Tmin -20℃		7.12	20	-12.88
Tmax 50° C		7.06	20	-12.94
Nom	Channel 11	8.25	20	-11.75
Tmin -20℃		8.11	20	-11.89
Tmax 50° C		8.08	20	-11.92

Test Graphs
Power NVNT b 2412MHz Ant1

Power NVNT b 2412MHz Ant2


Power NVNT b 2442MHz Ant1



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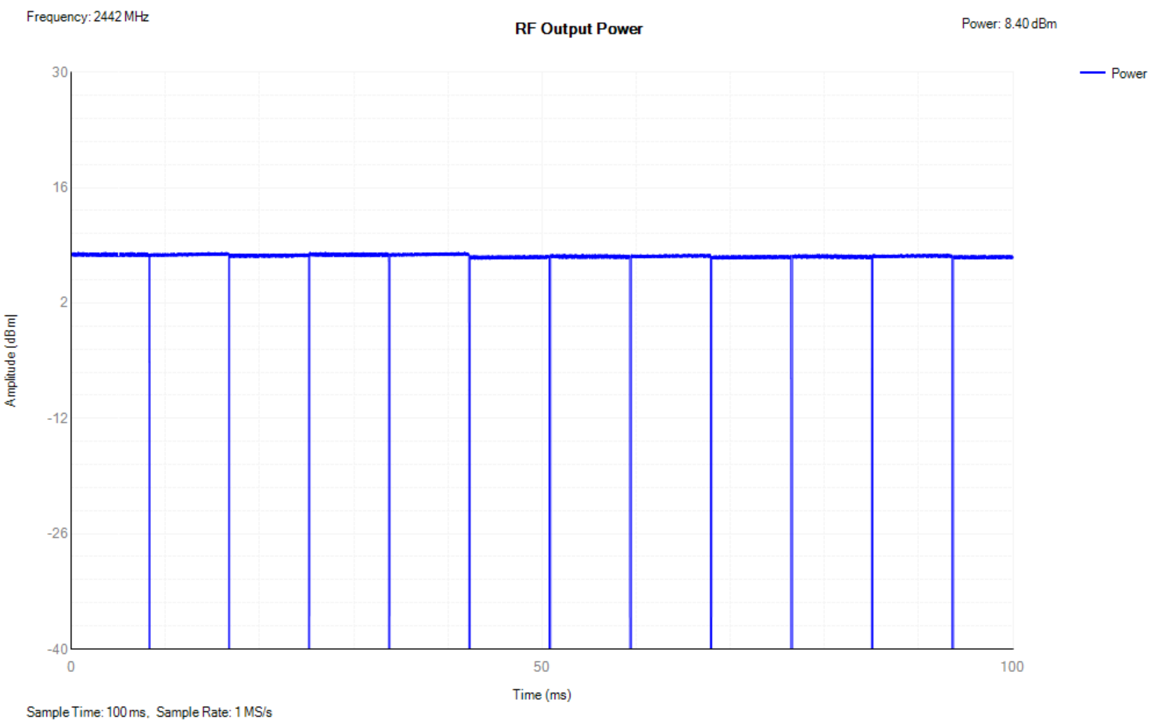
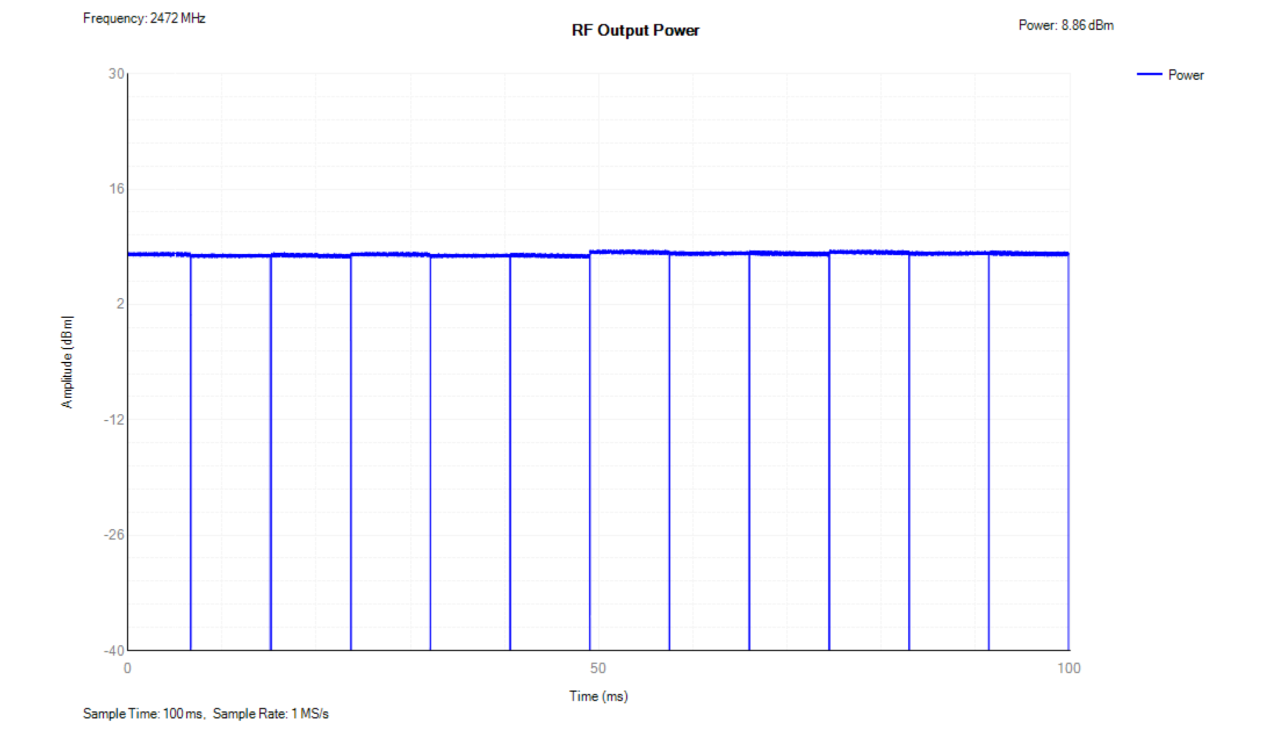
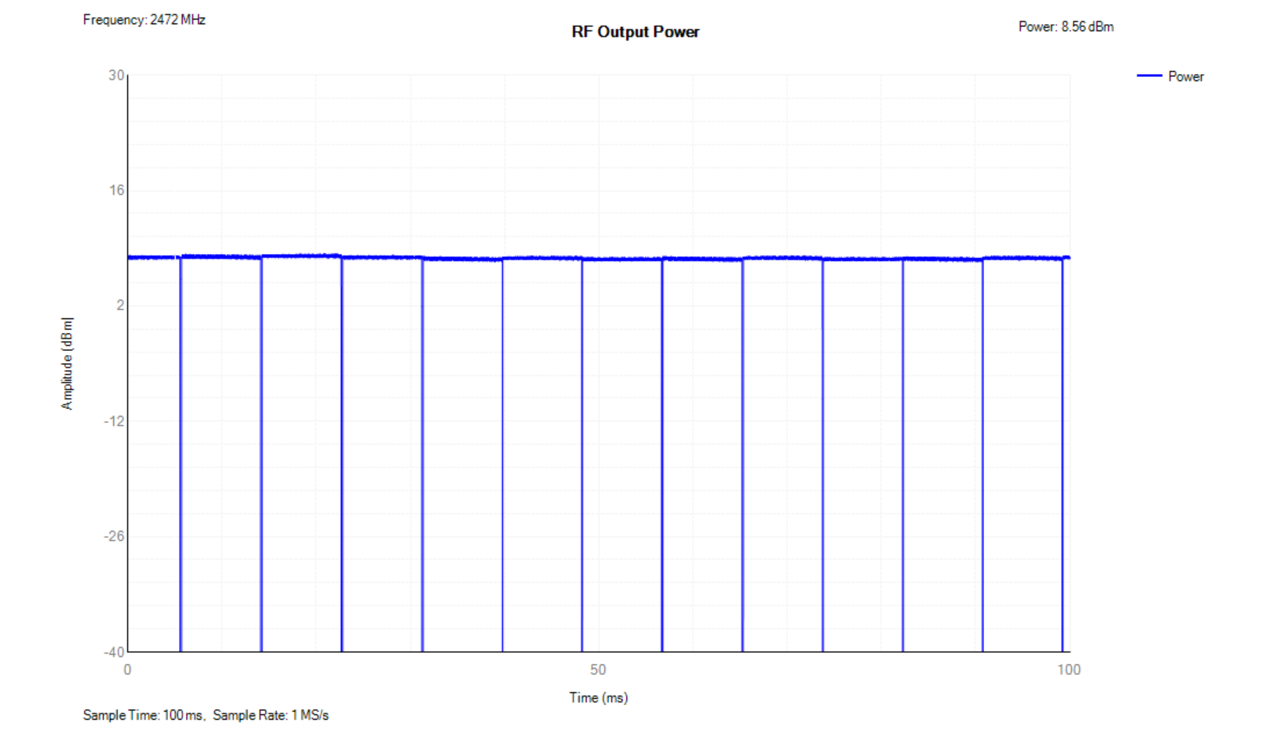


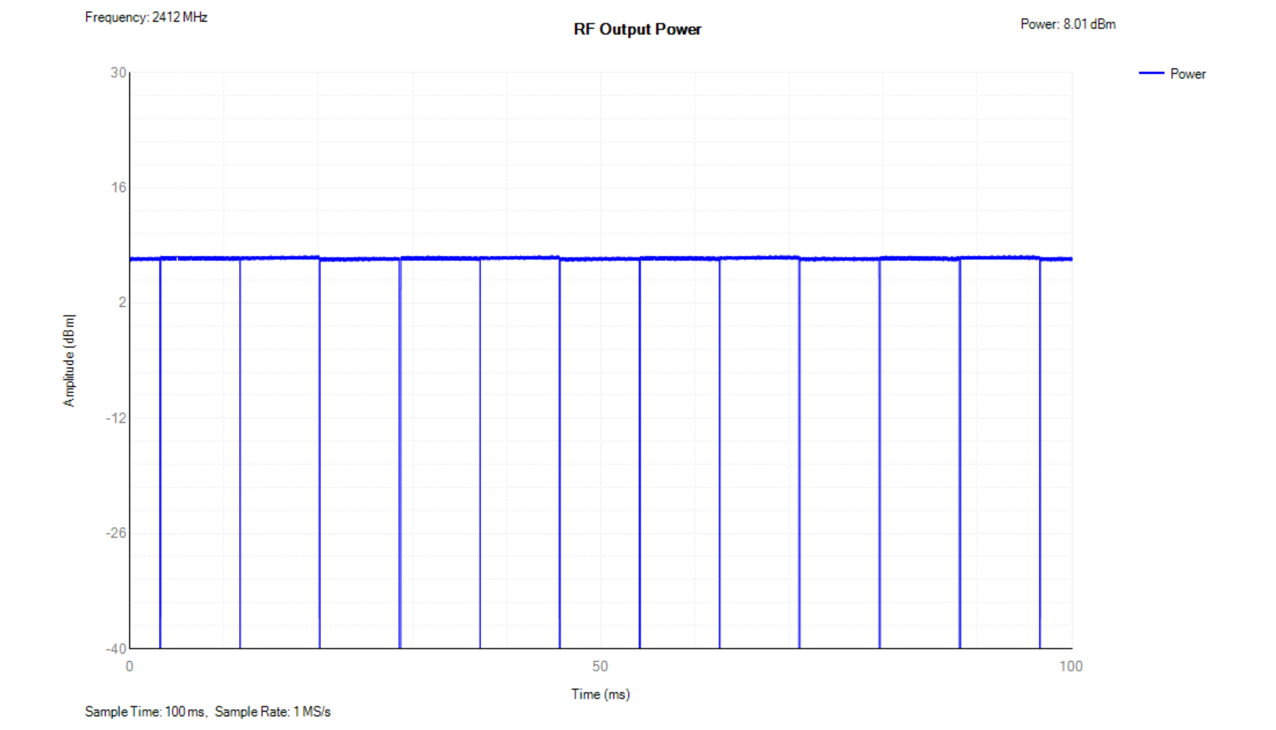
Power NVNT b 2472MHz Ant1



Power NVNT b 2472MHz Ant2



Power NVLT b 2412MHz Ant1



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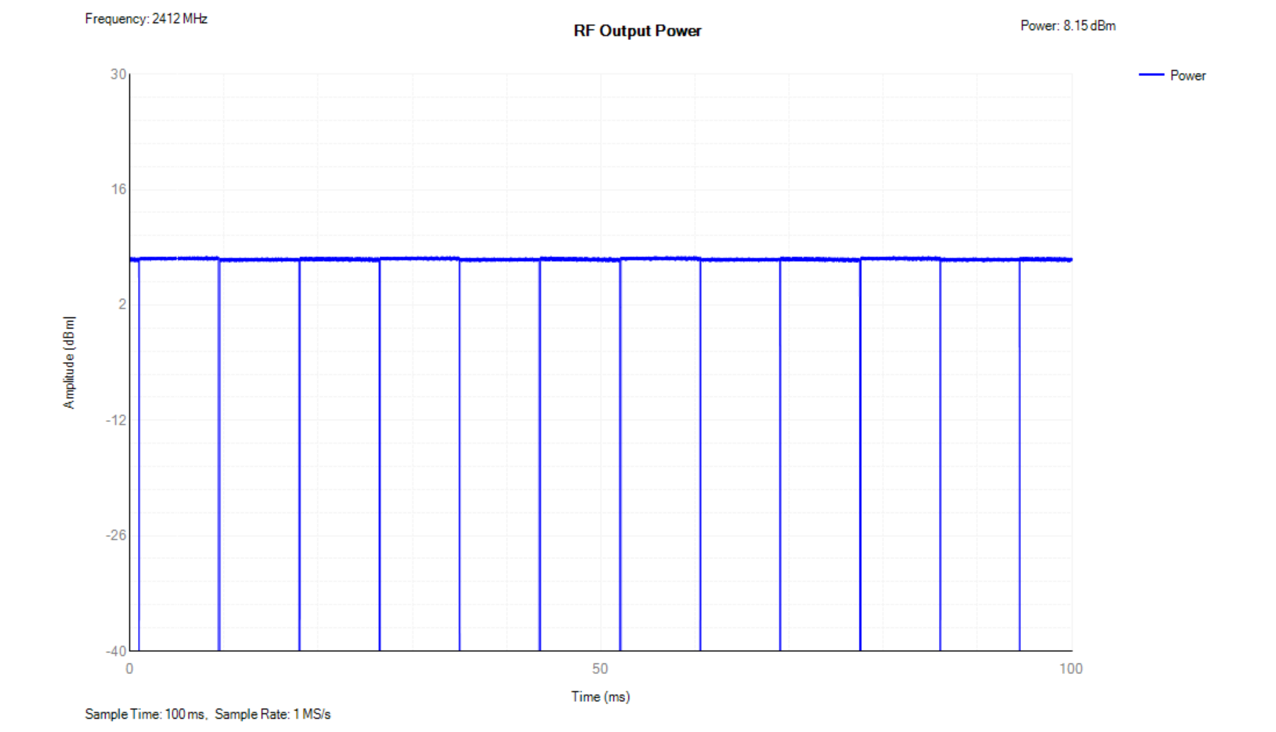
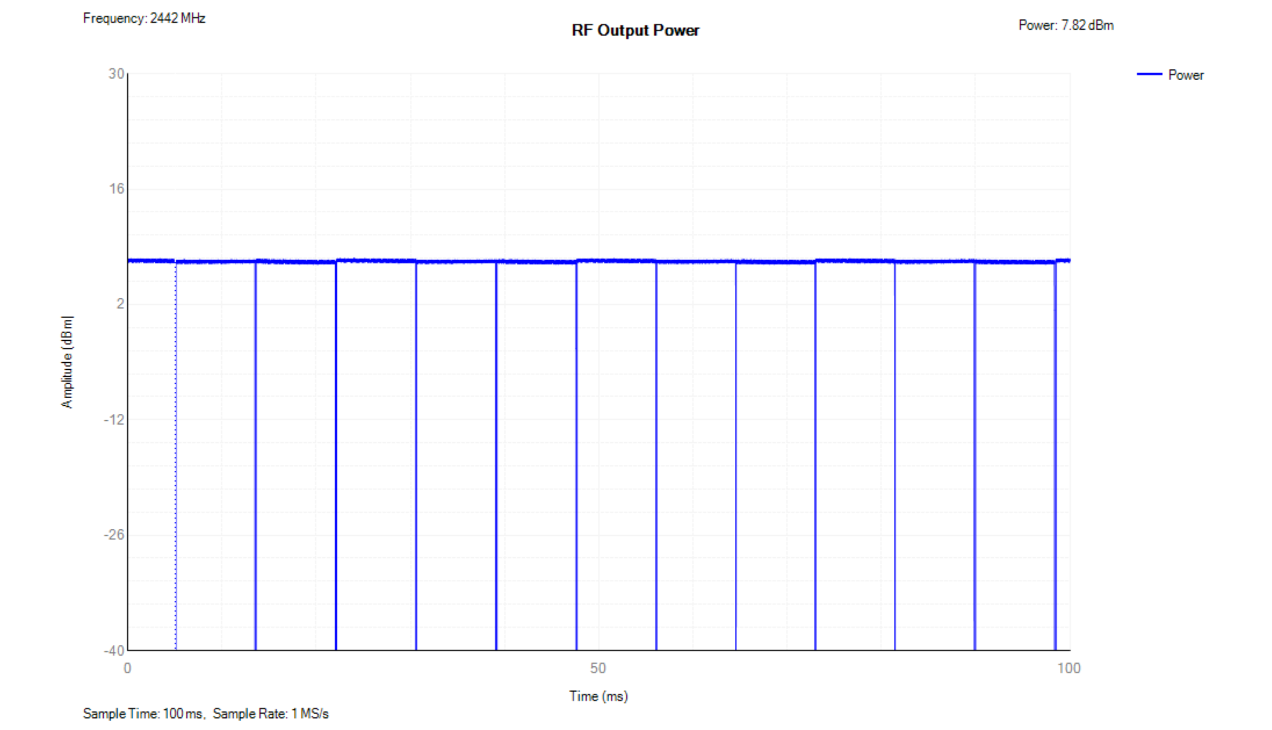
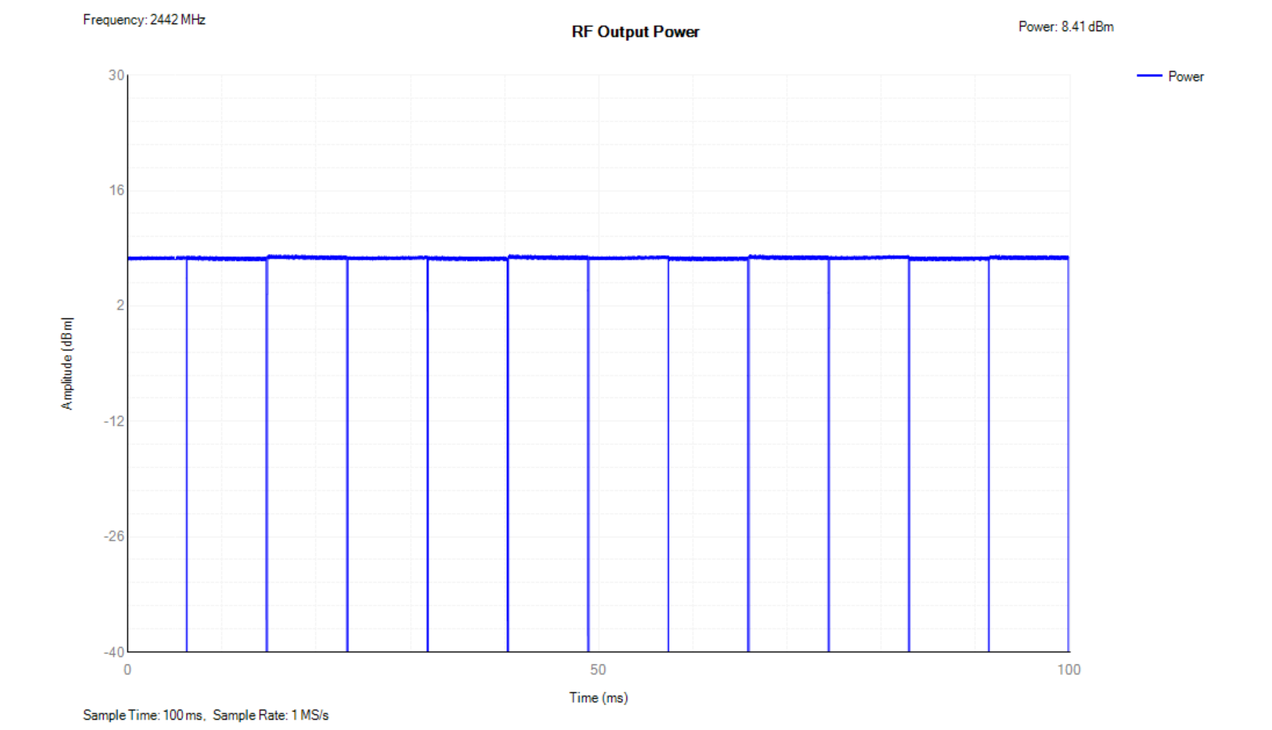


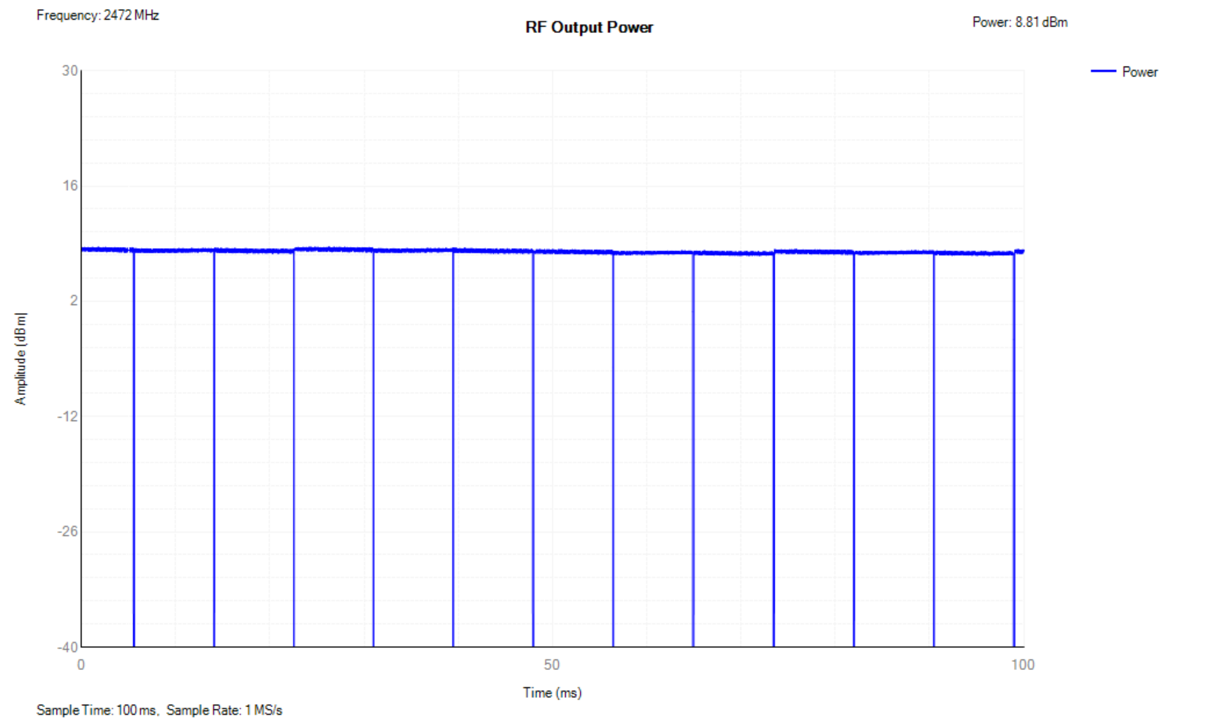
Power NVLT b 2442MHz Ant1



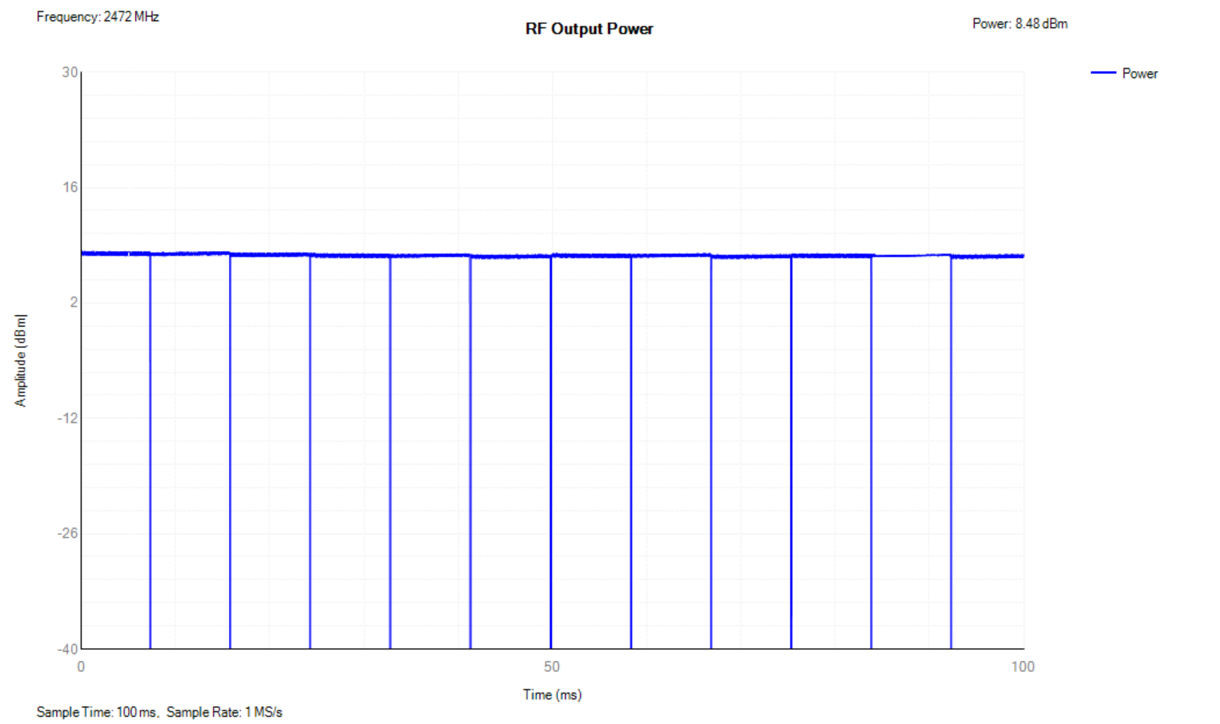
Power NVLT b 2442MHz Ant2



Power NVLT b 2472MHz Ant1



Power NVLT b 2472MHz Ant2



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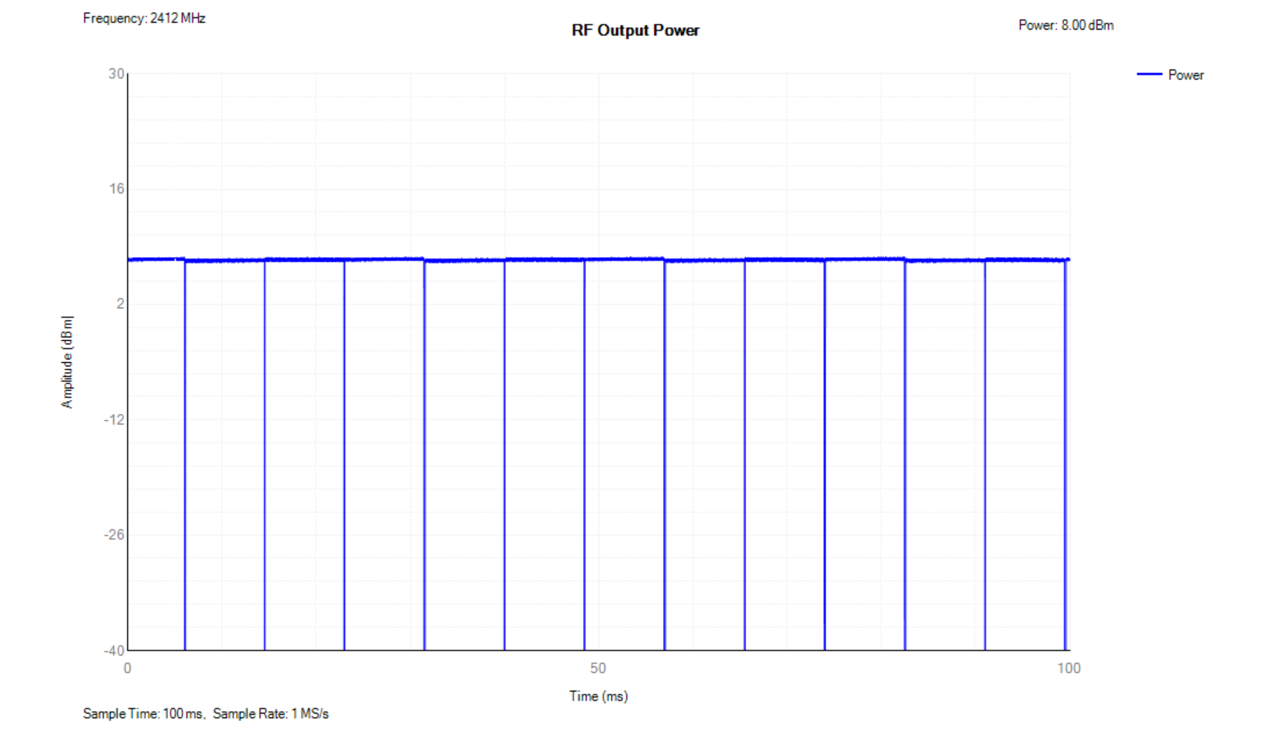

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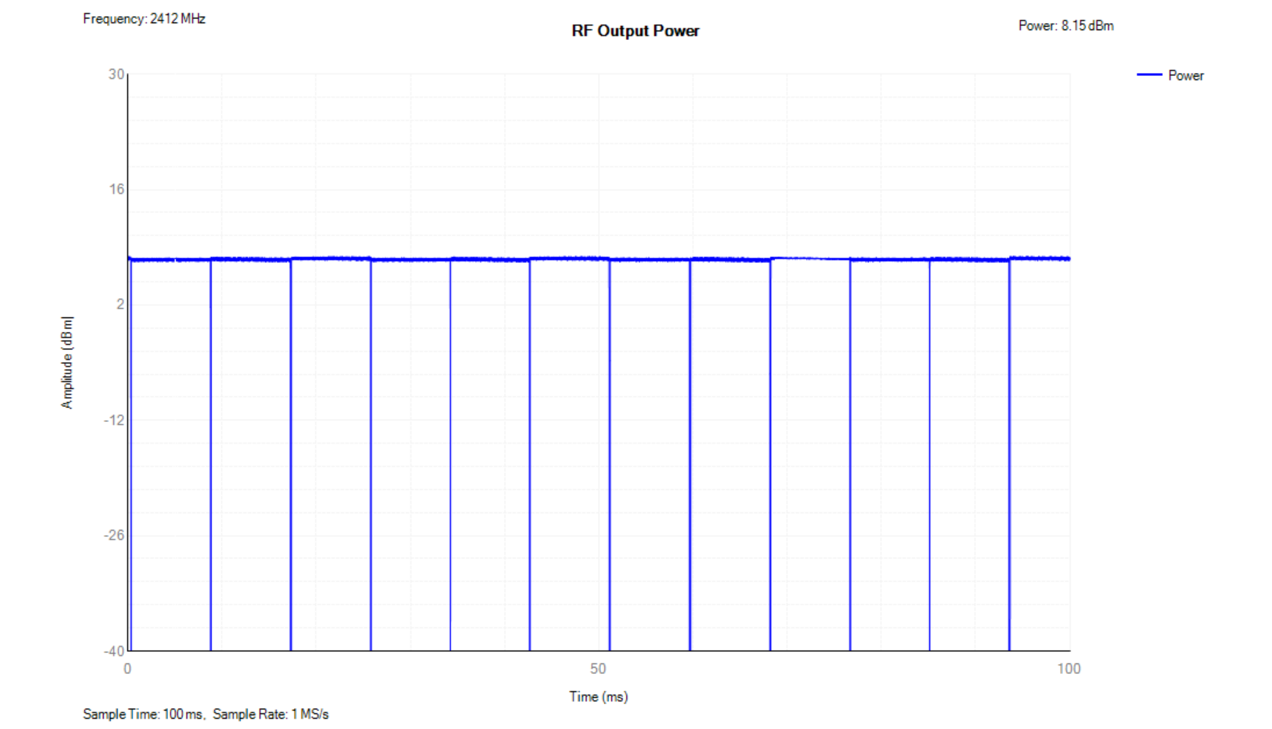

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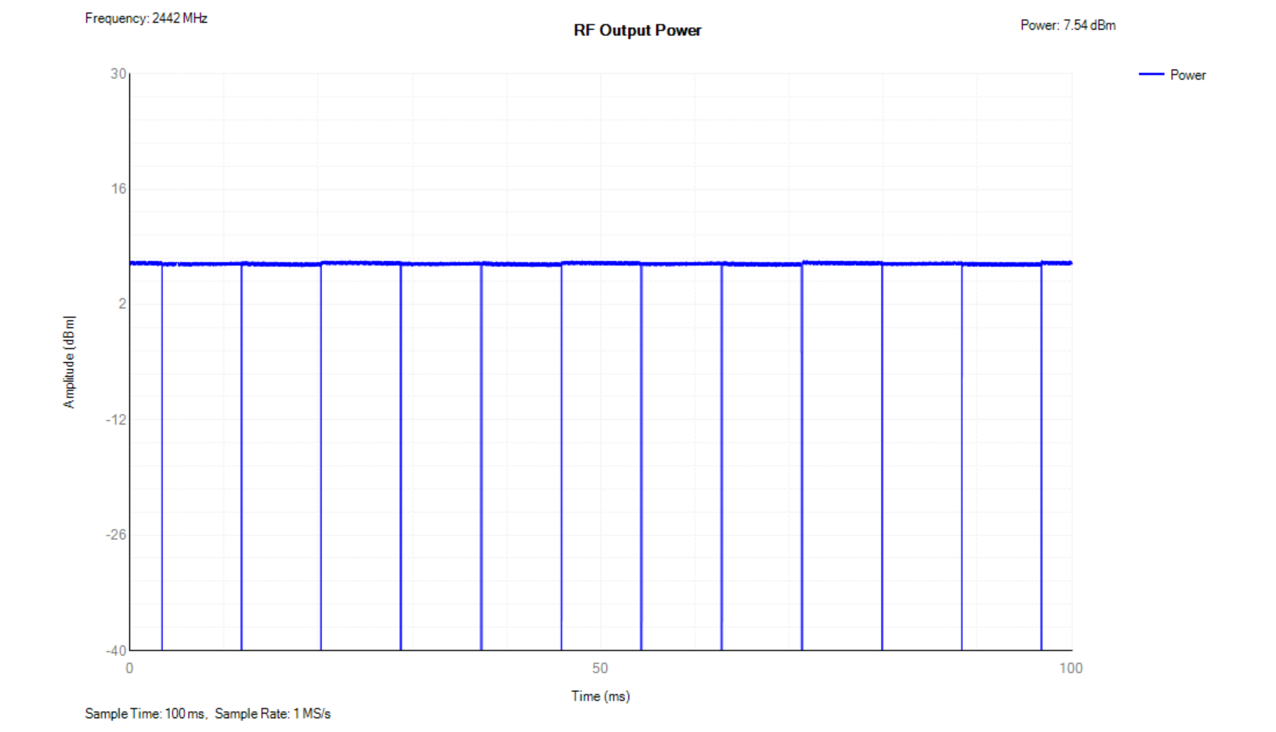

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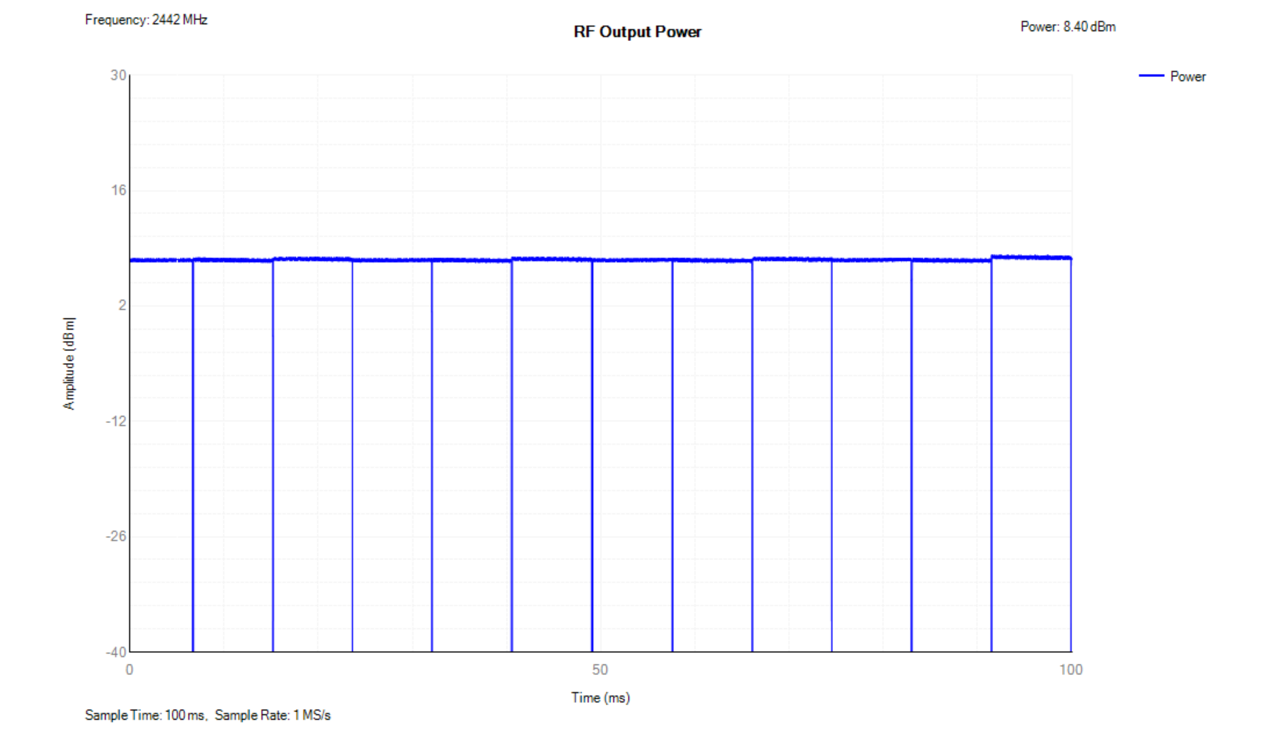

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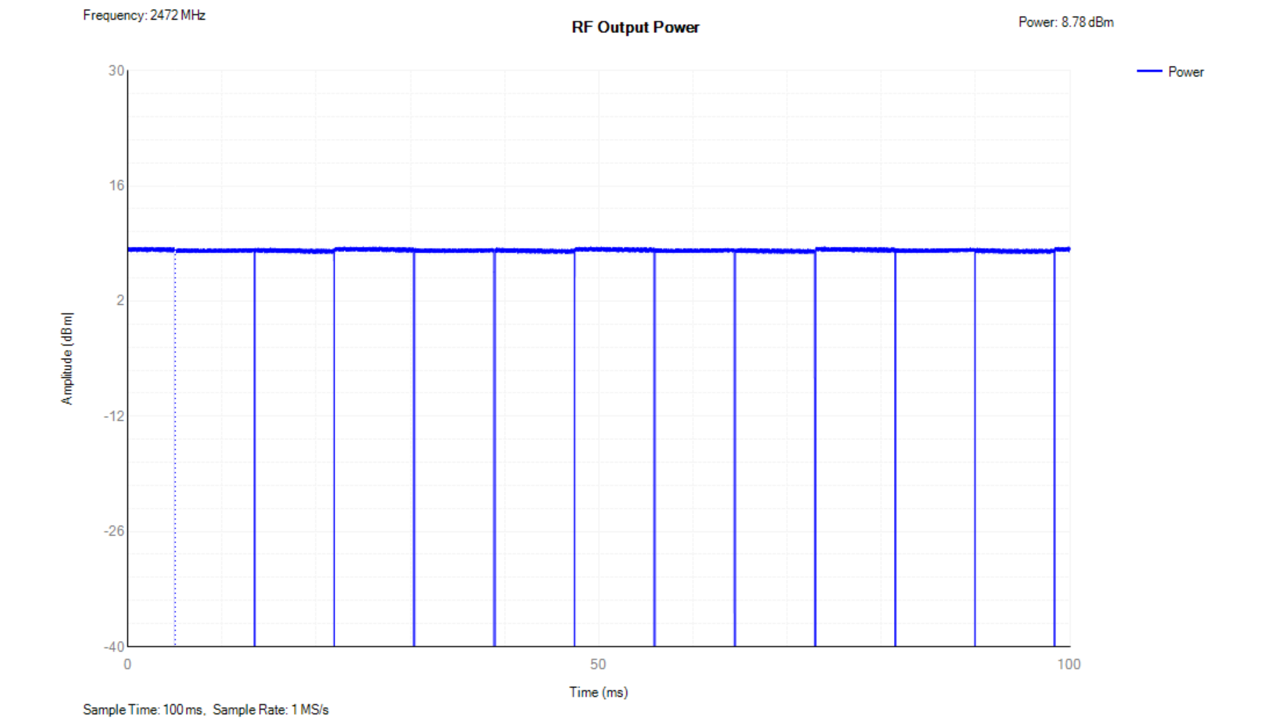

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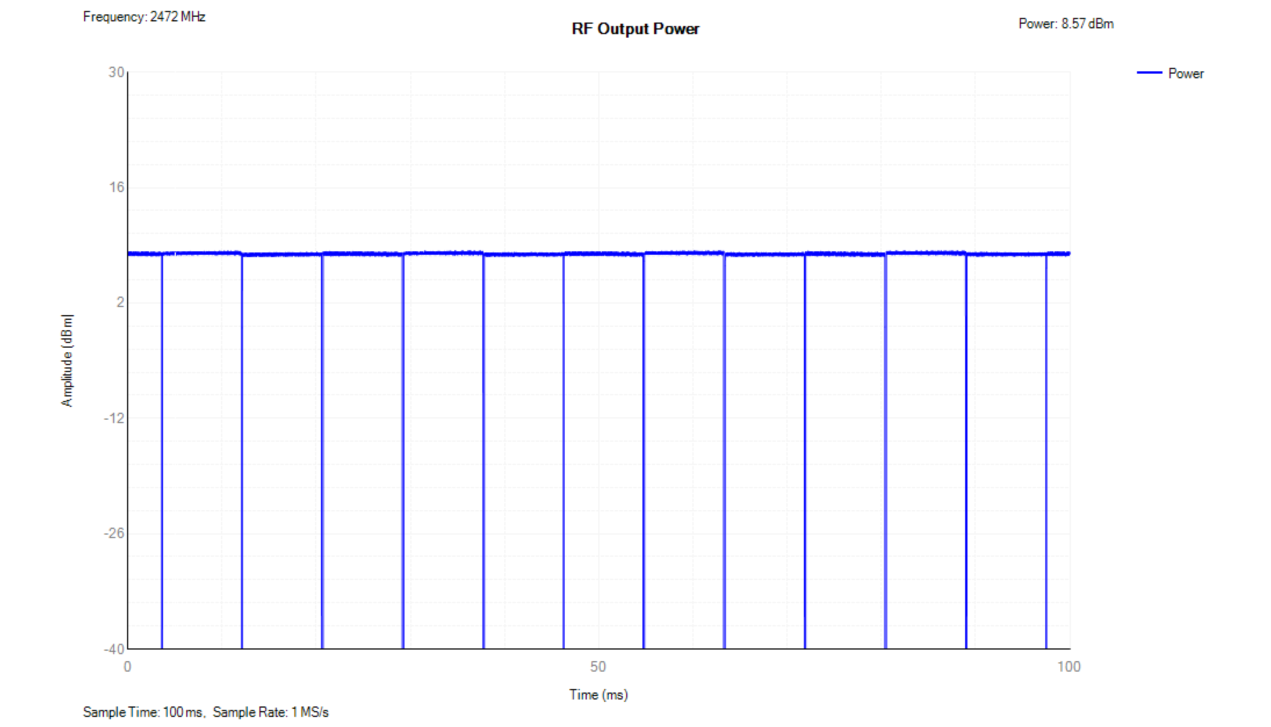

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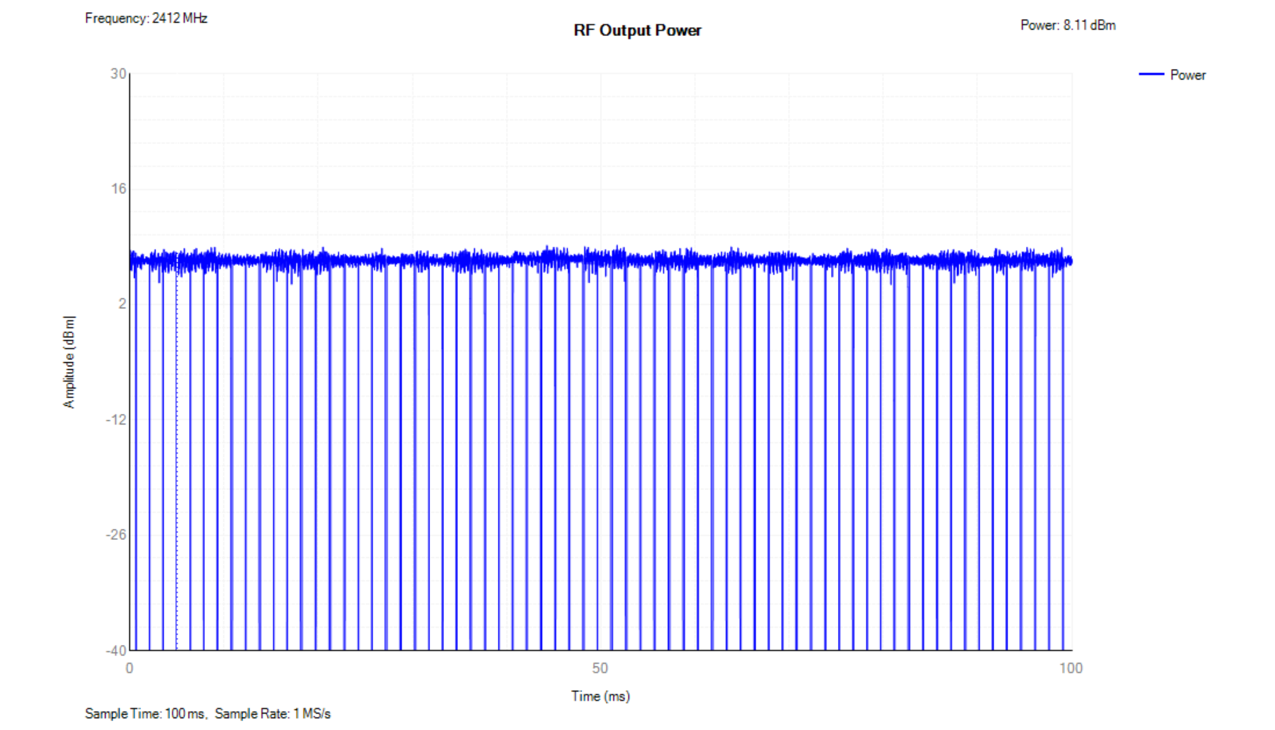

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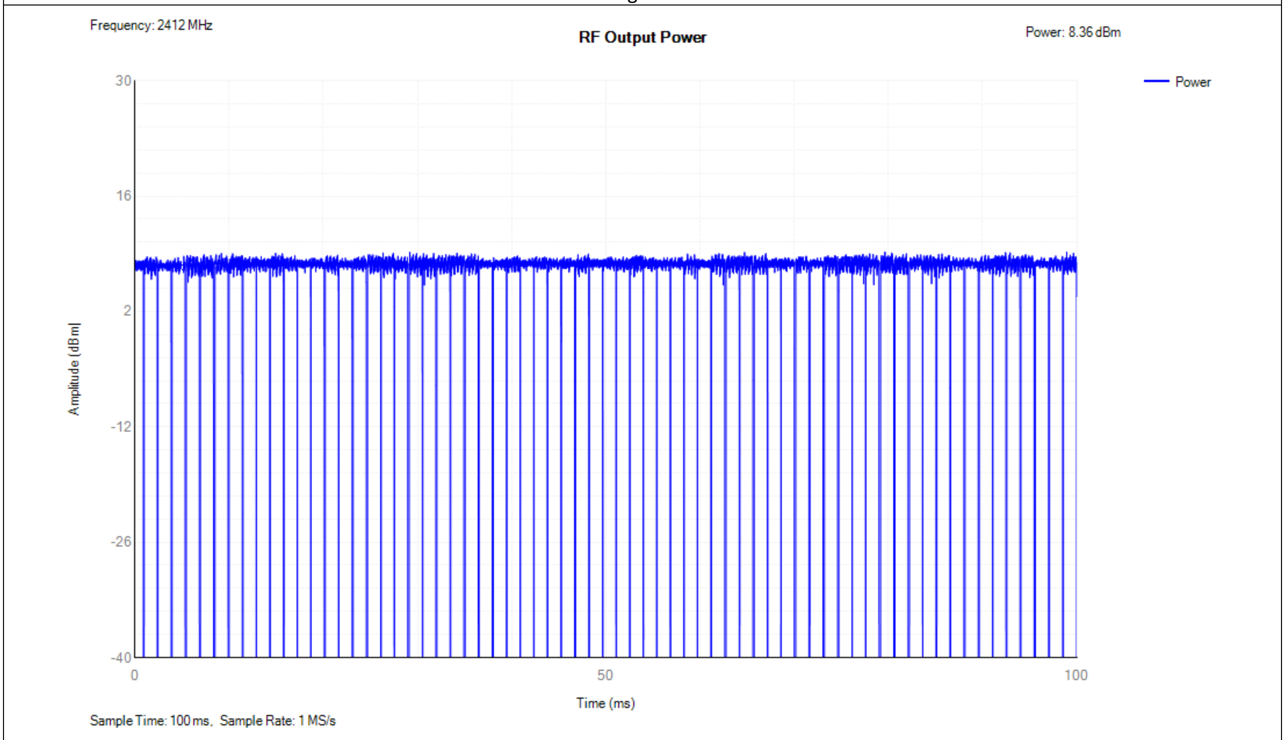

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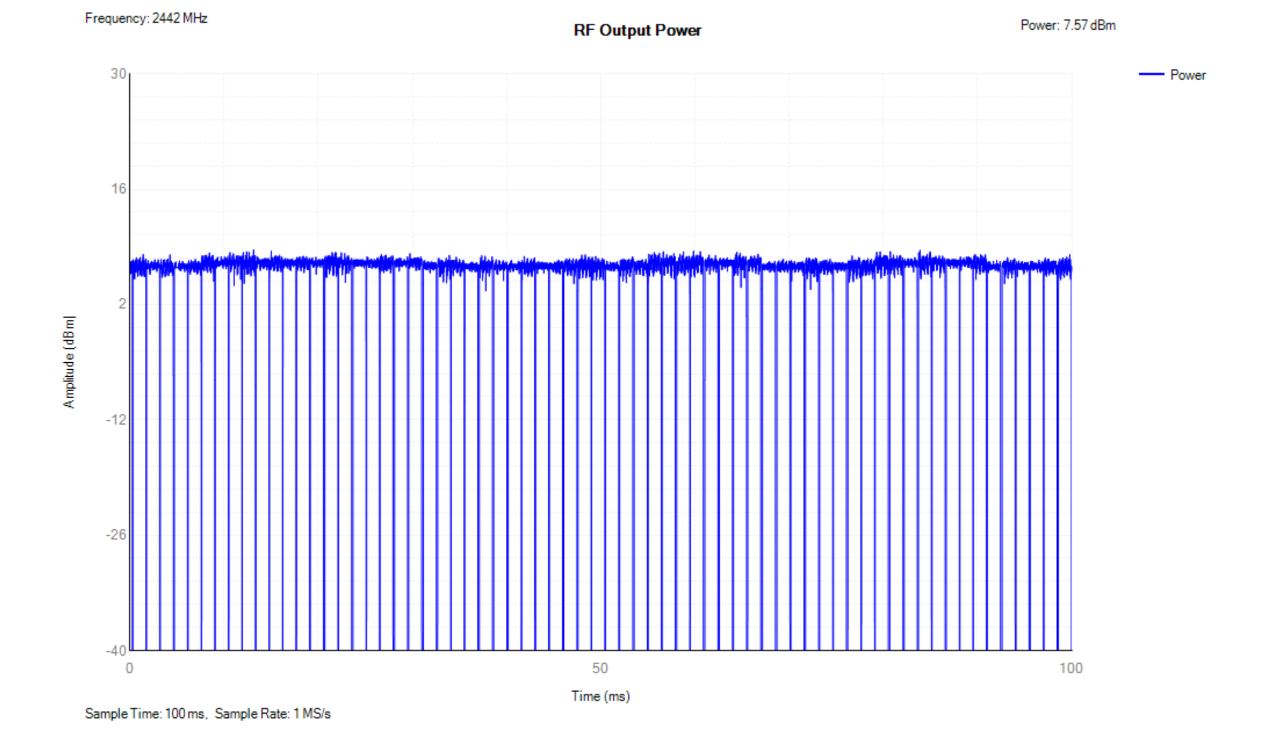

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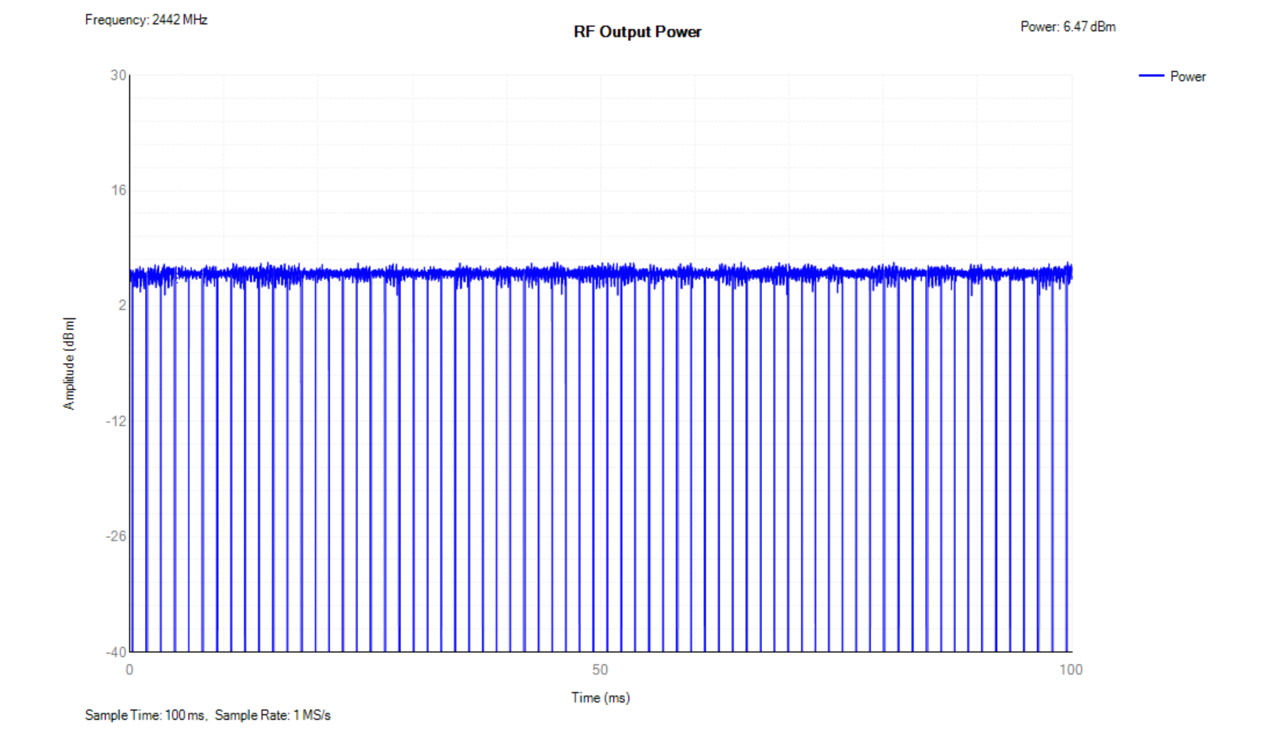

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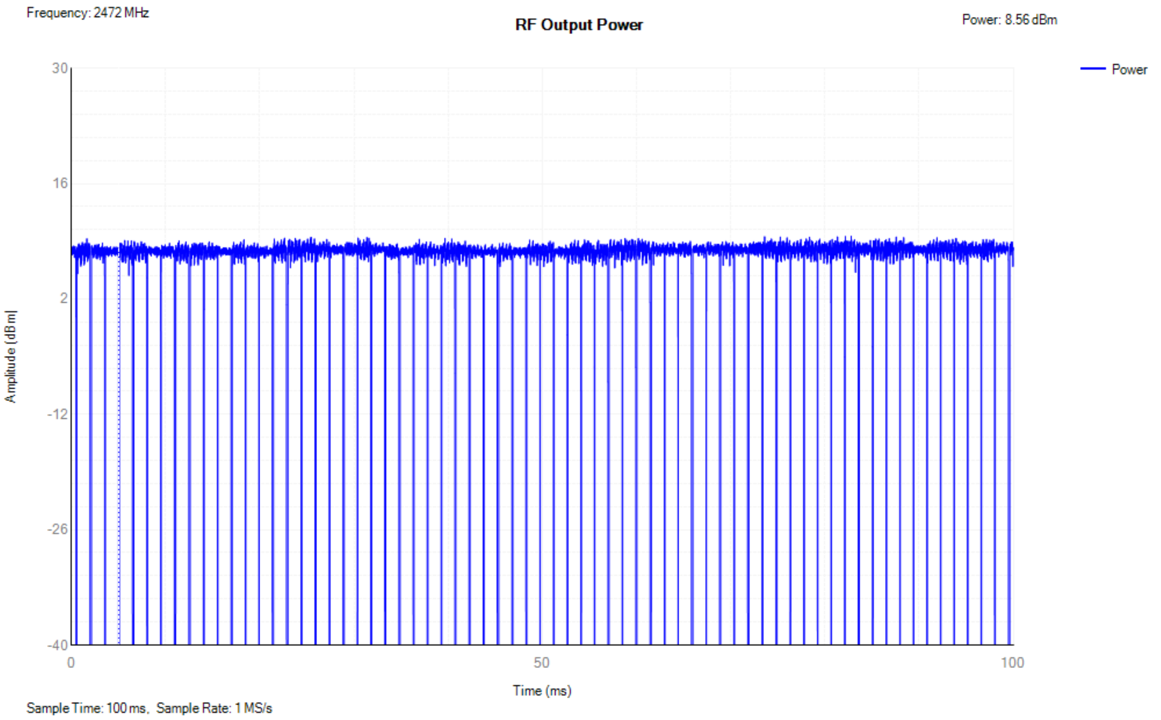

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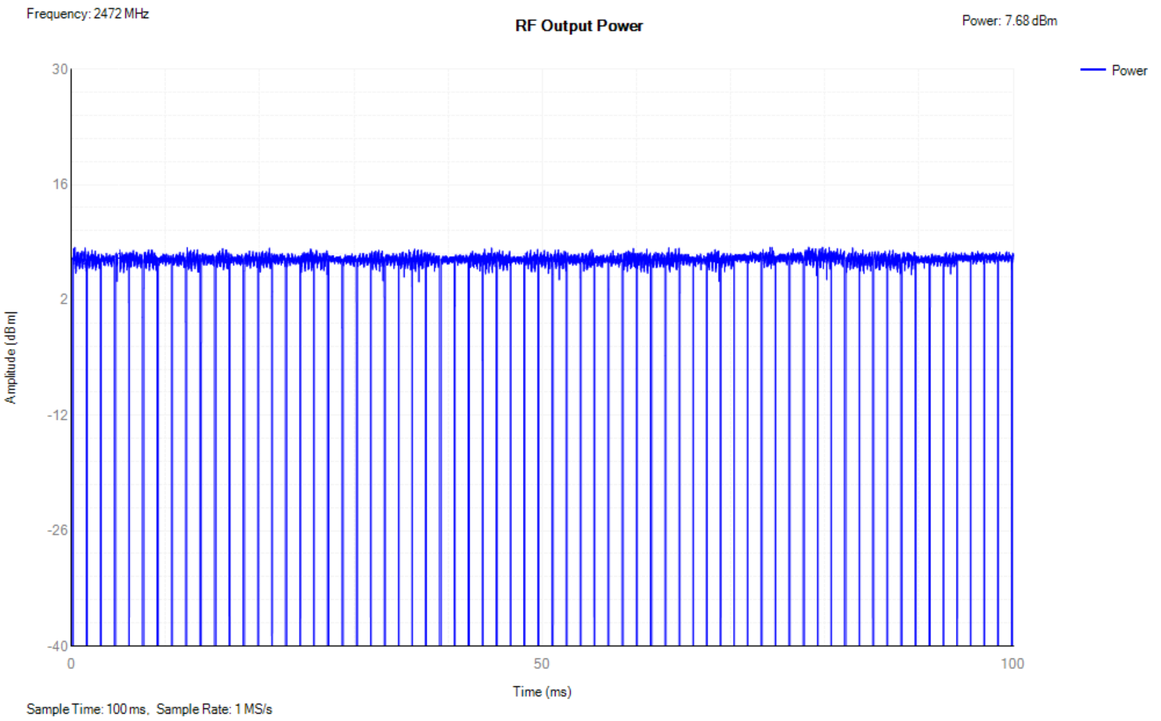

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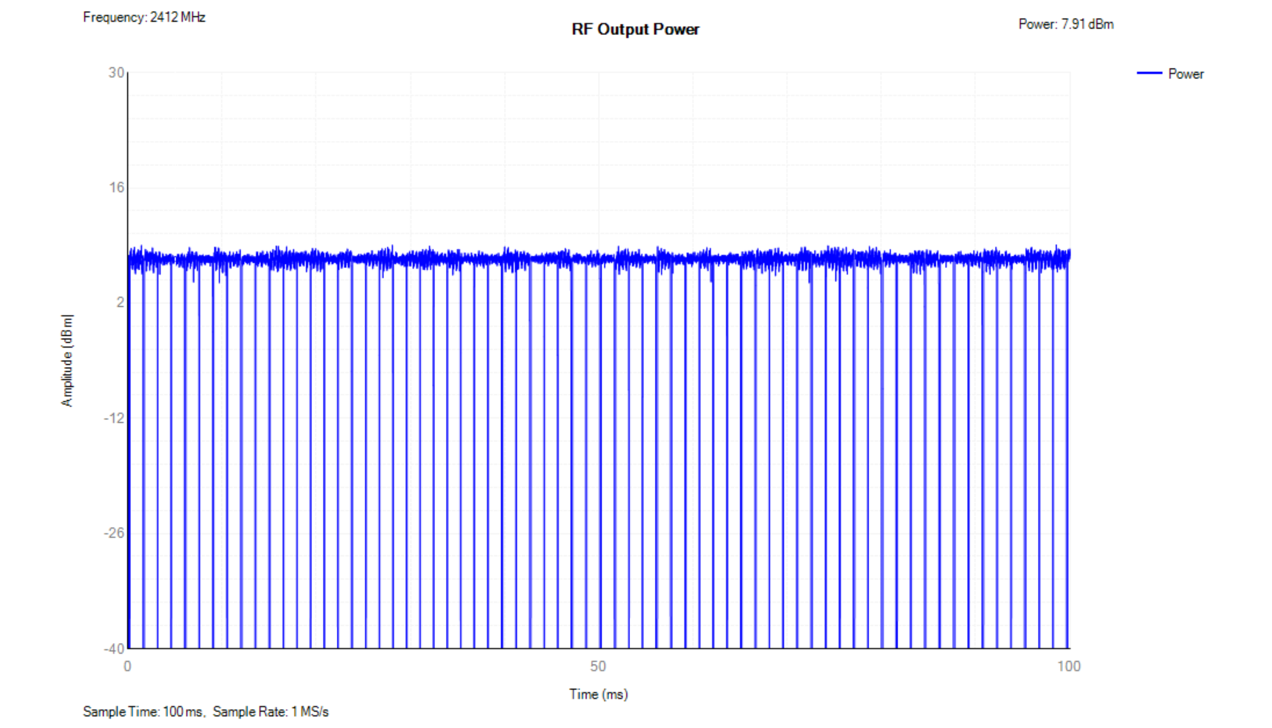

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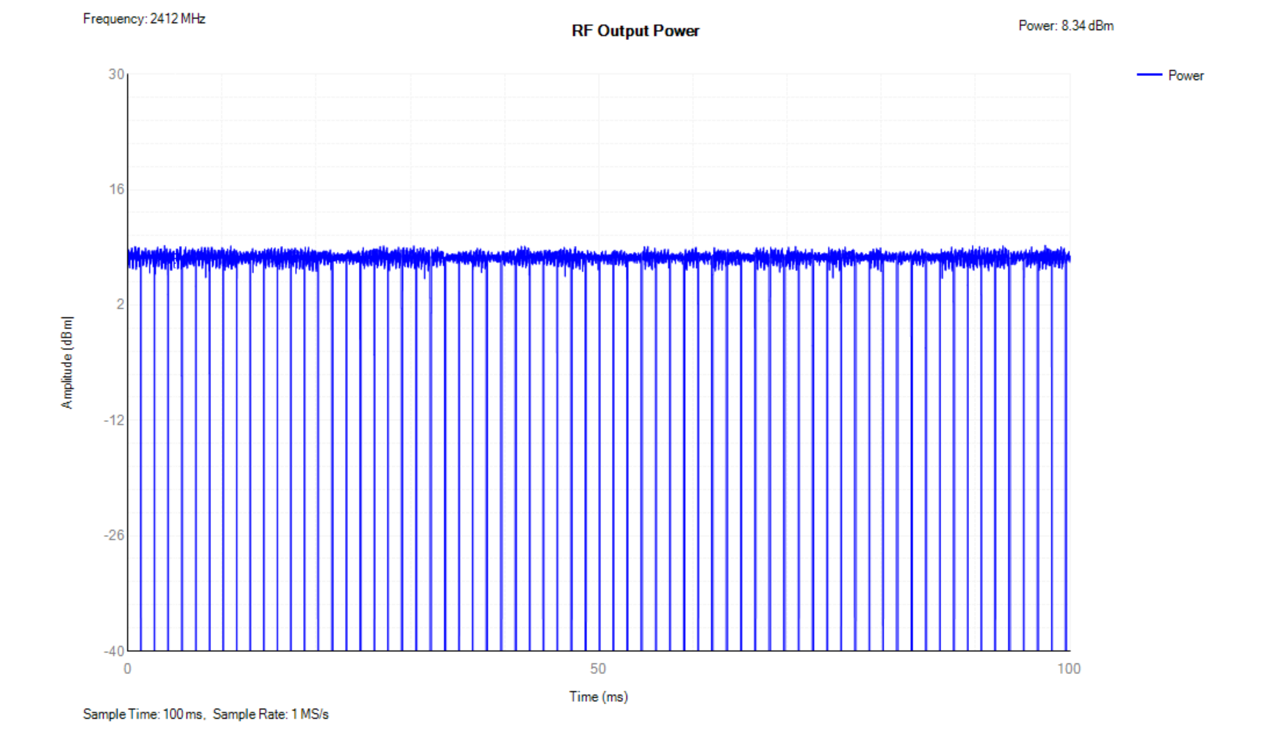

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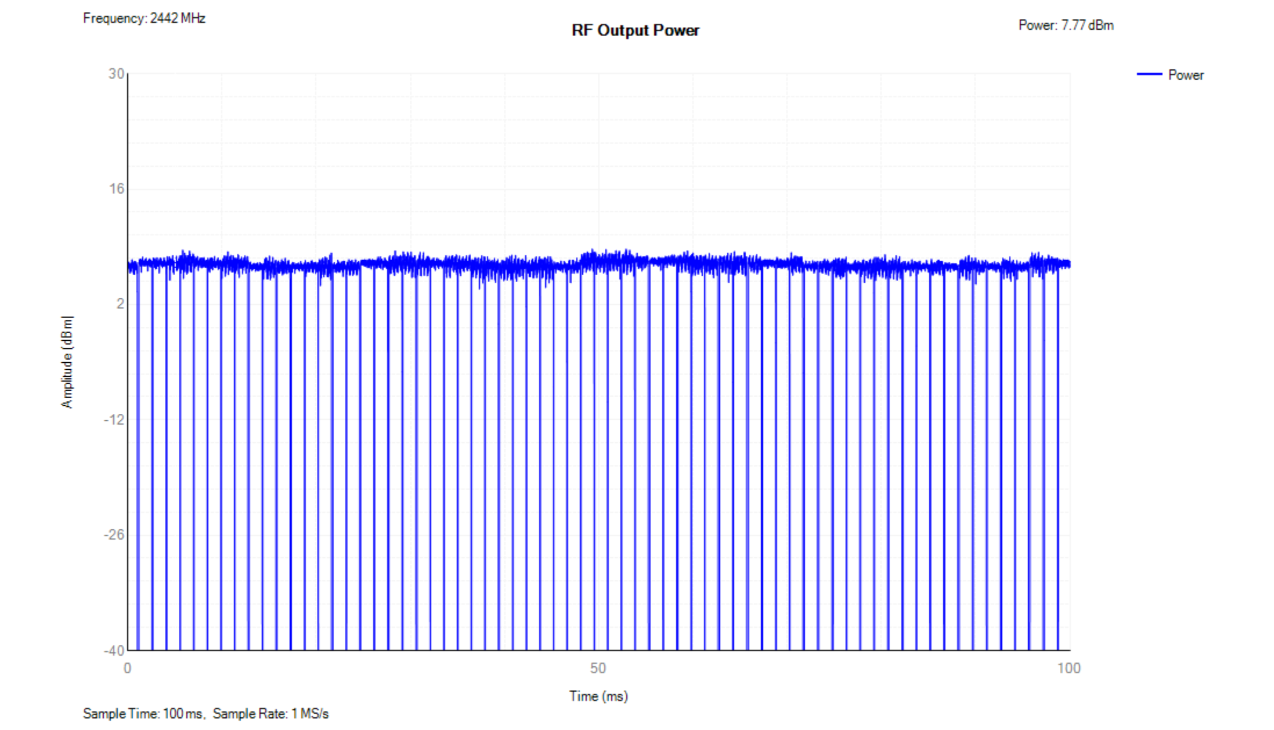

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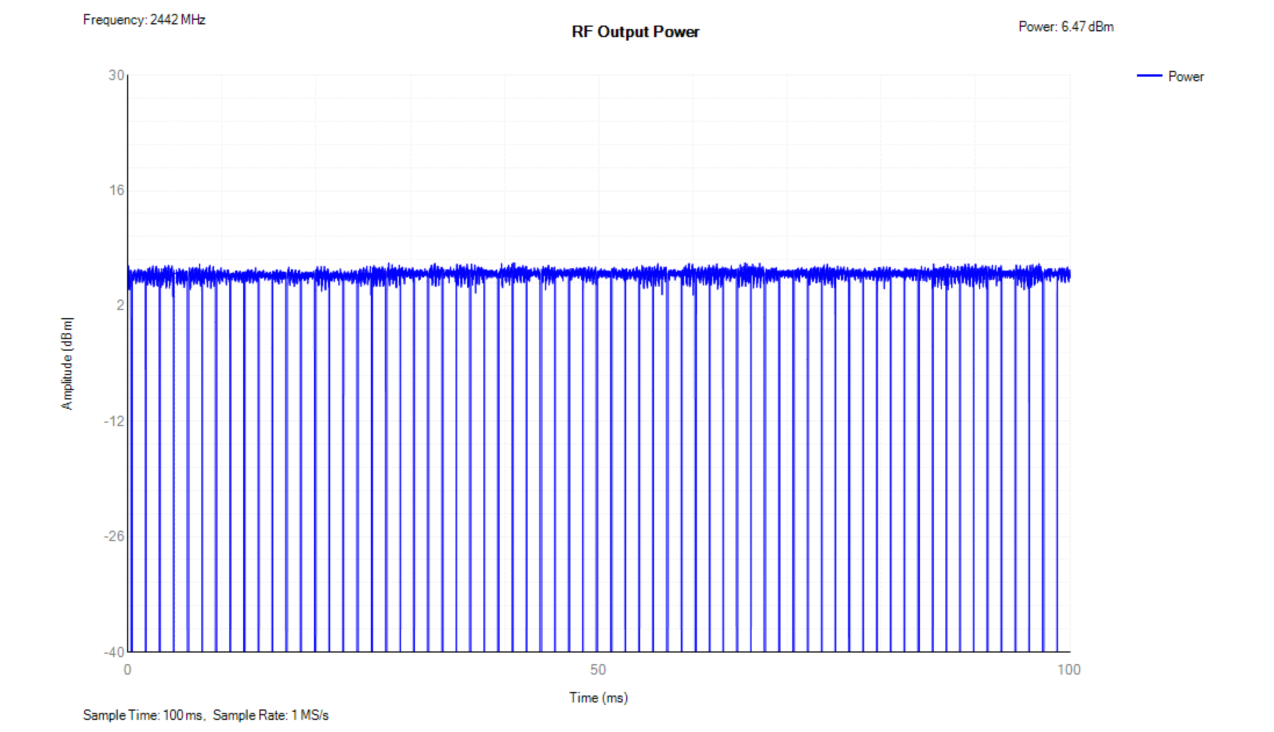

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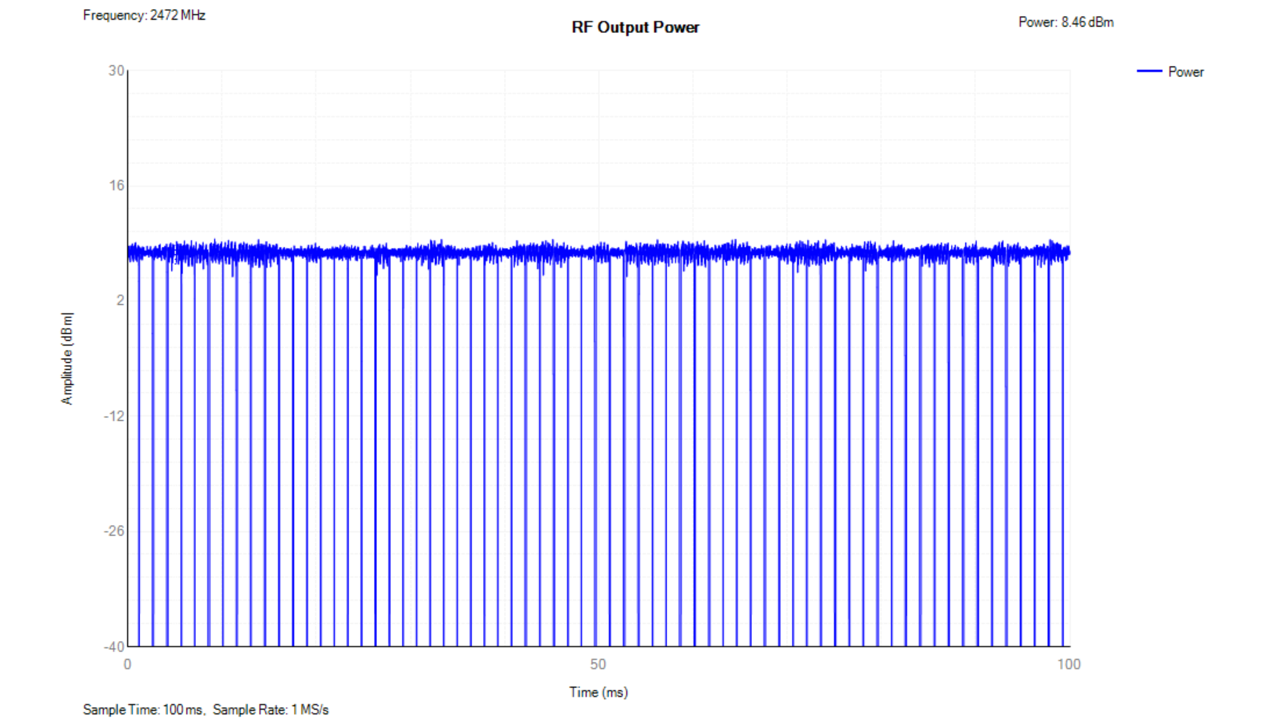

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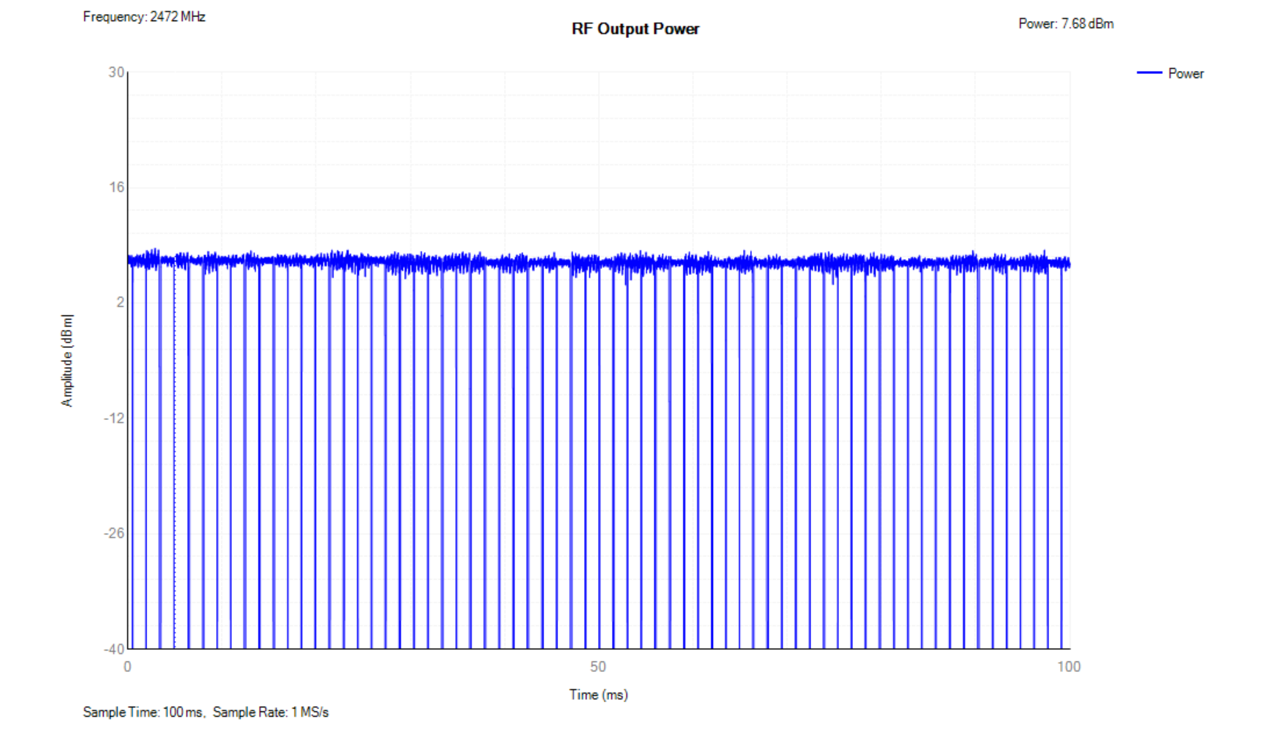

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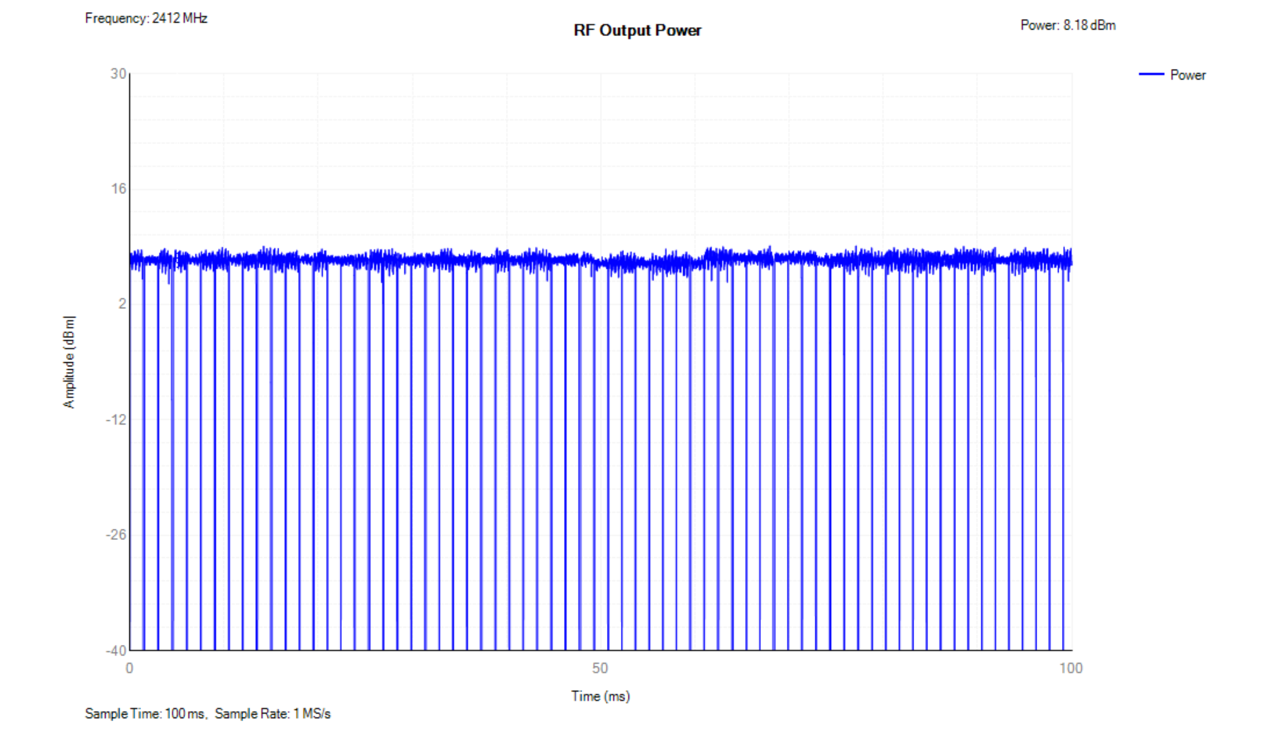

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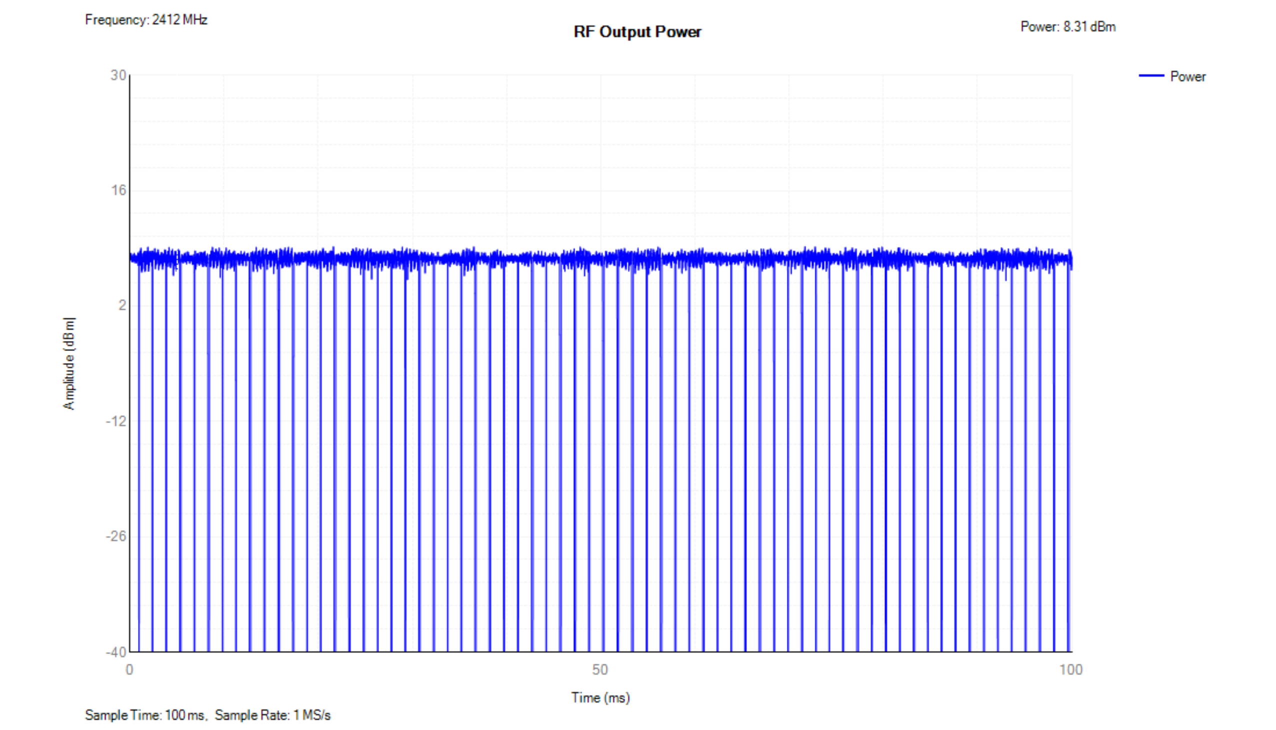

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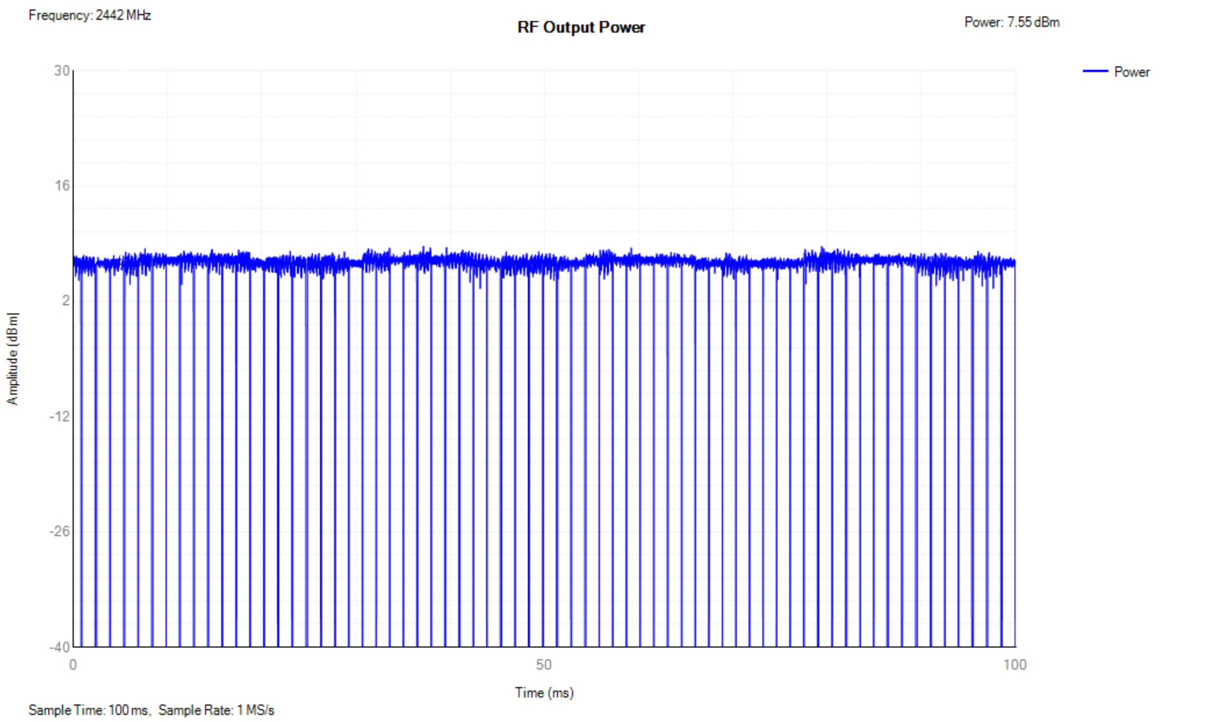

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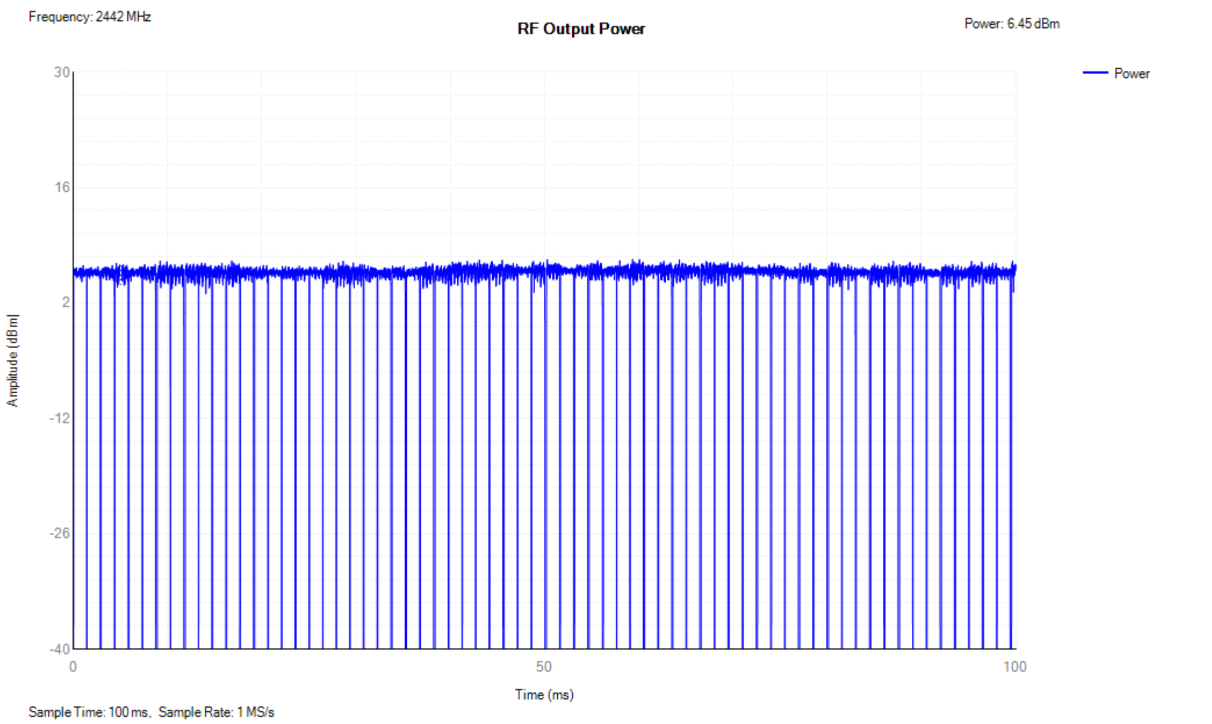

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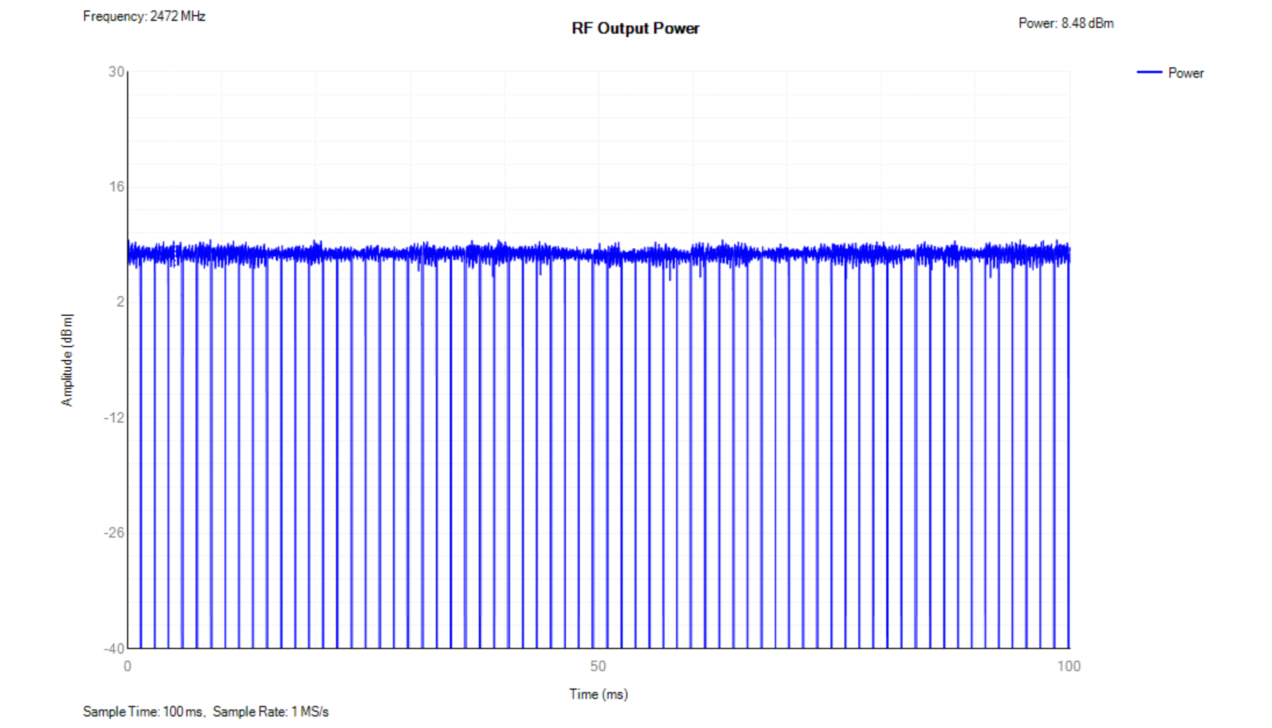

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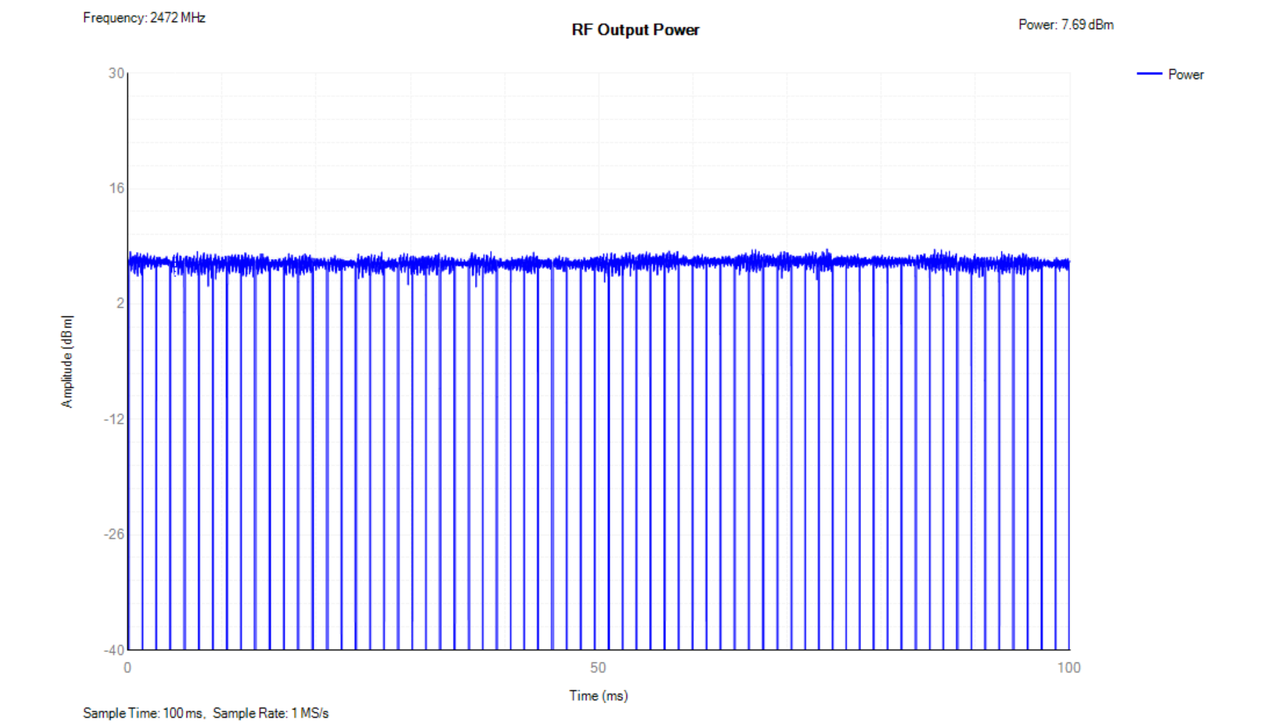

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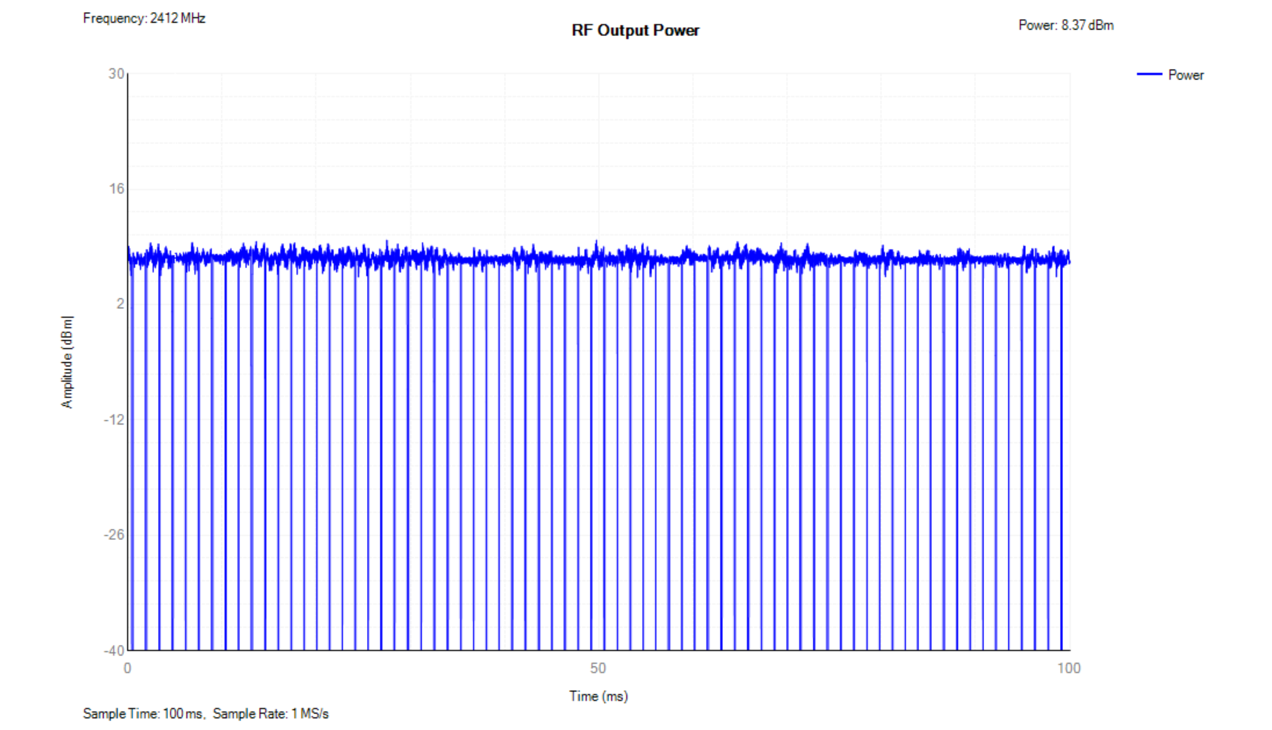

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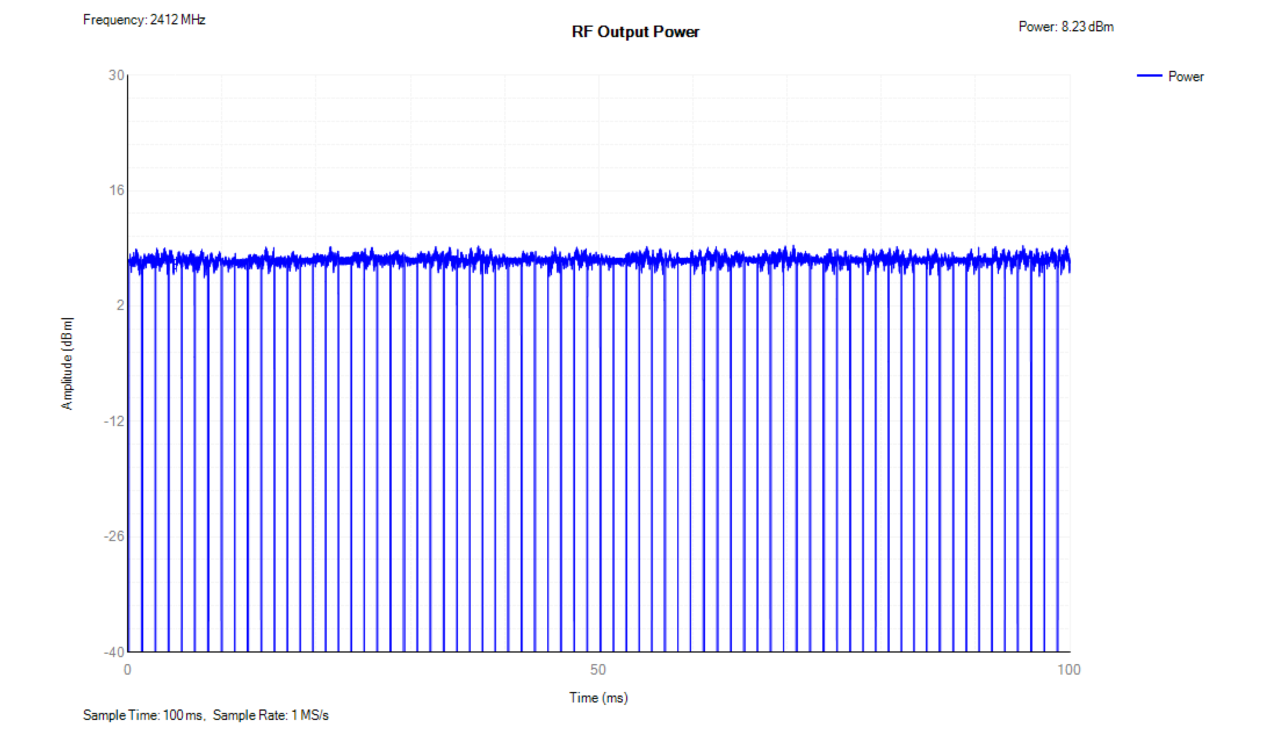

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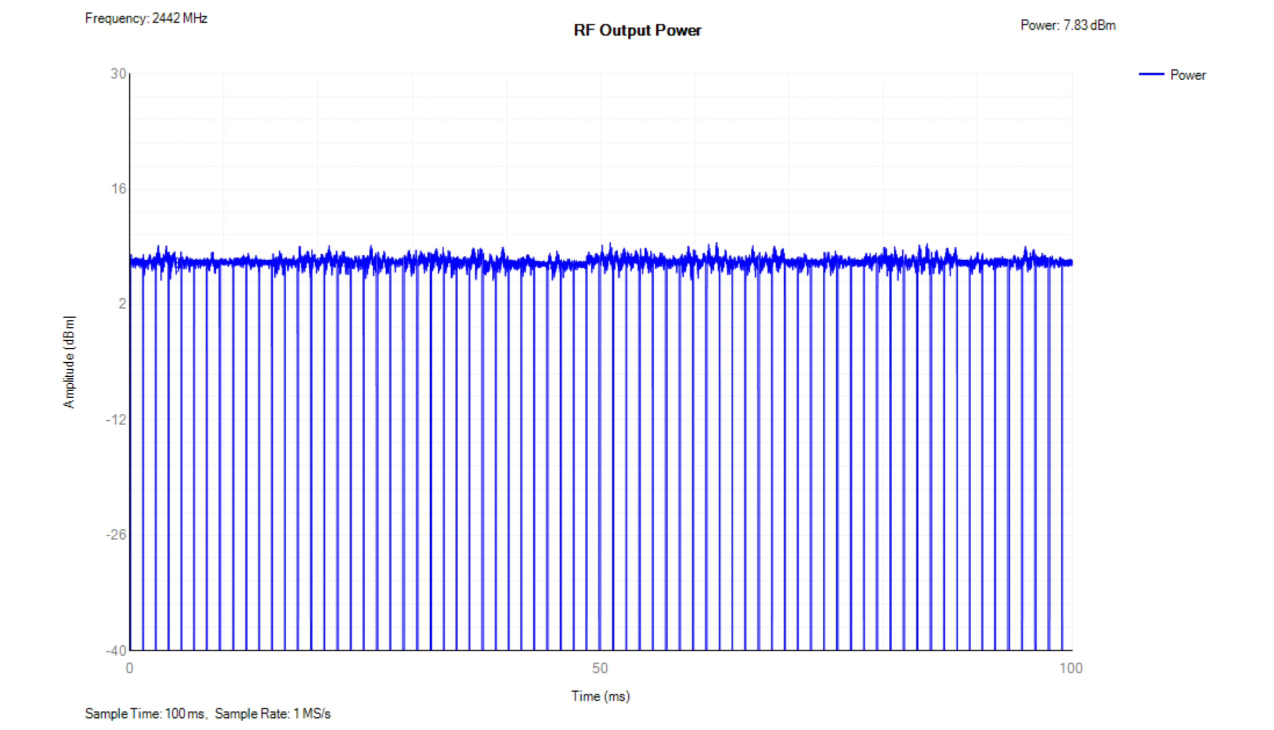

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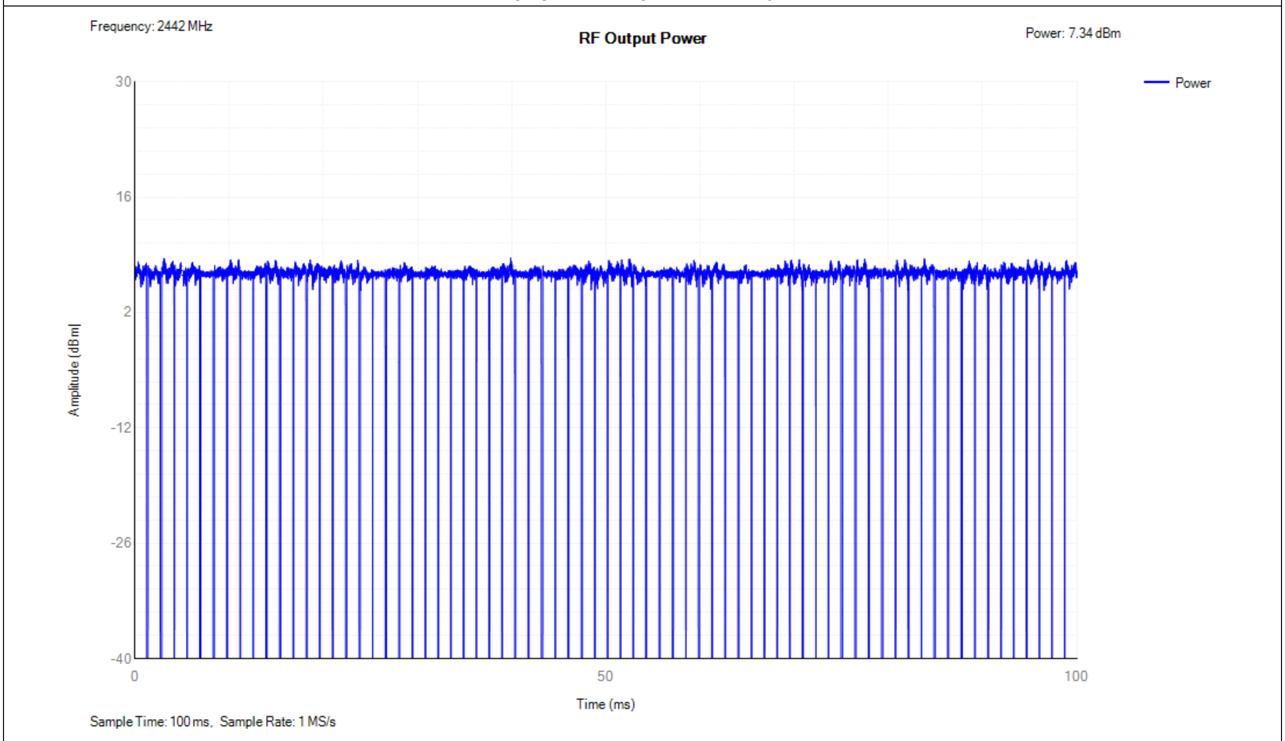

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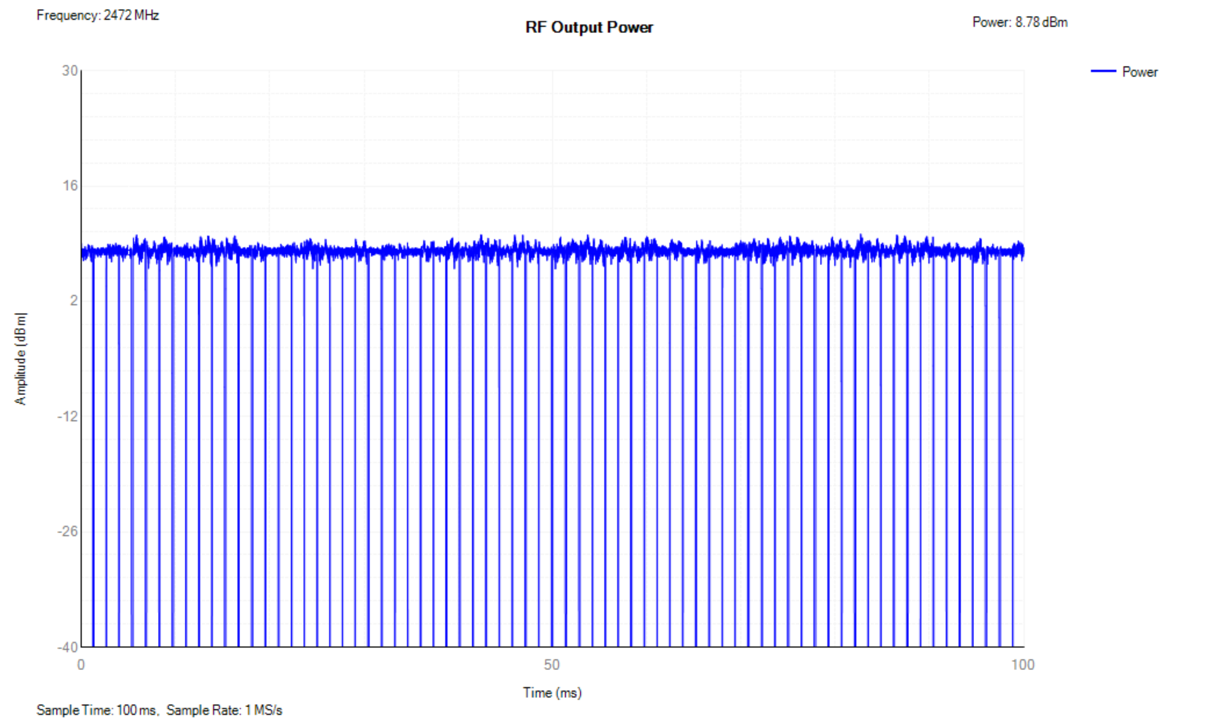

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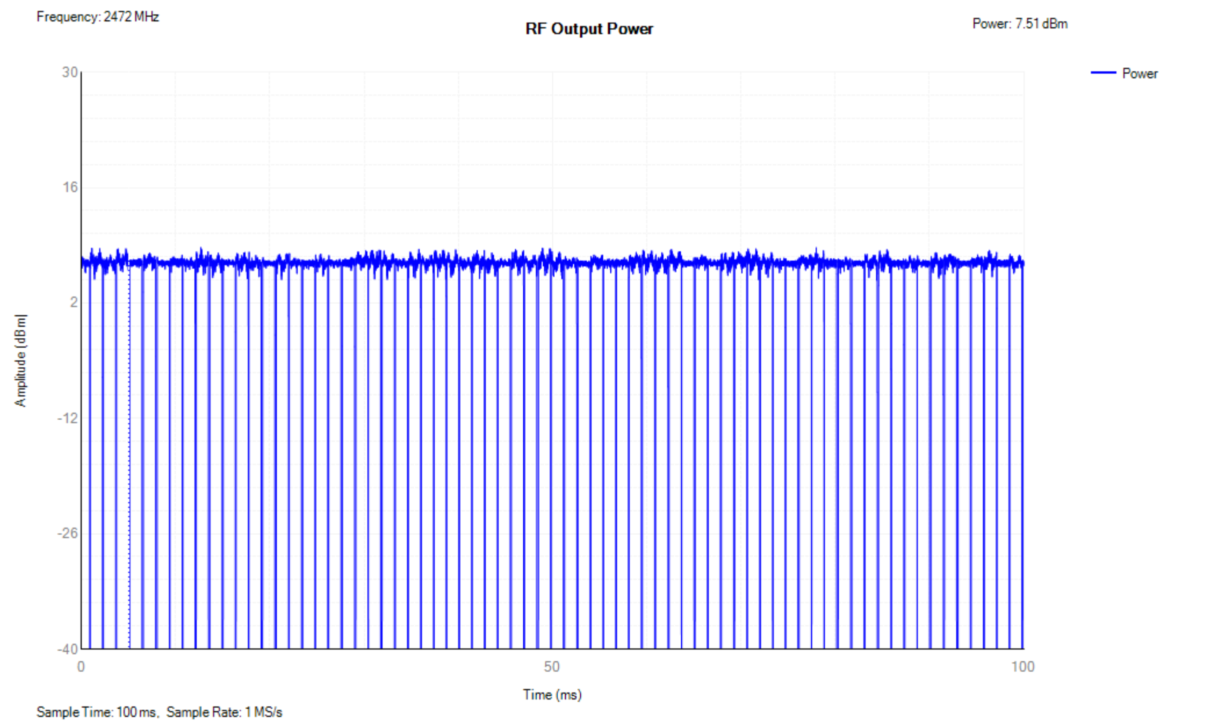

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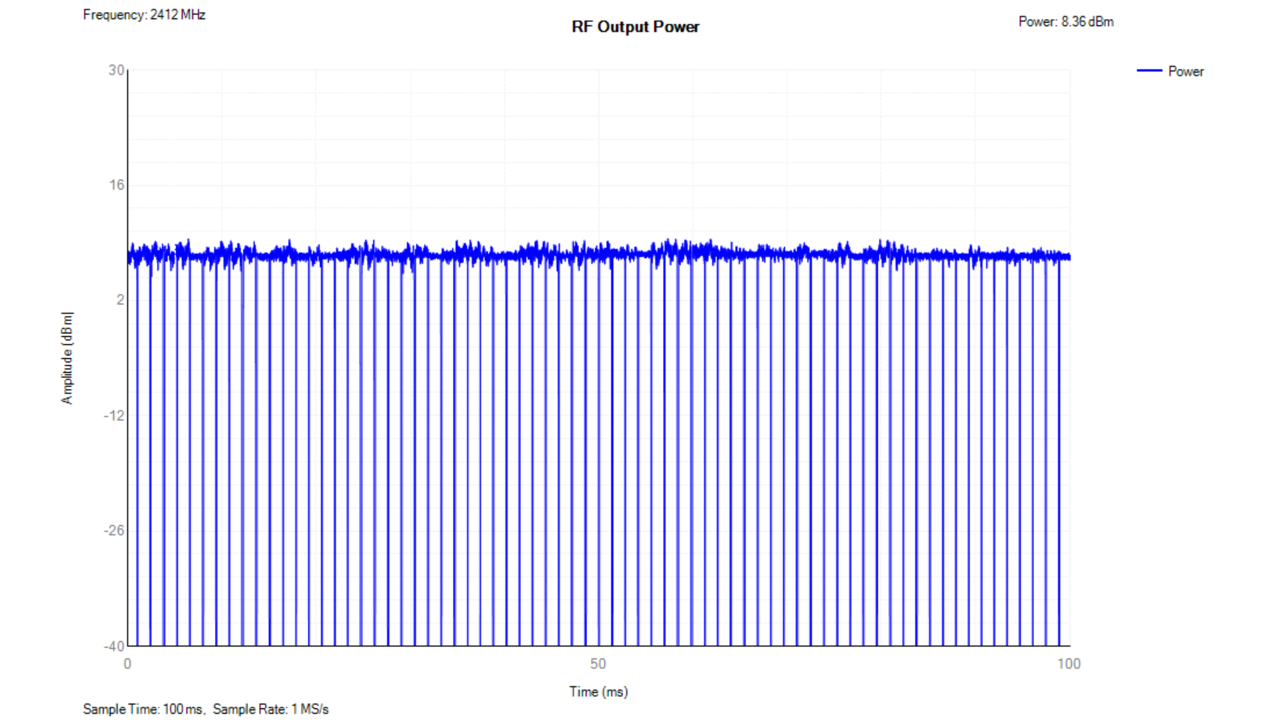

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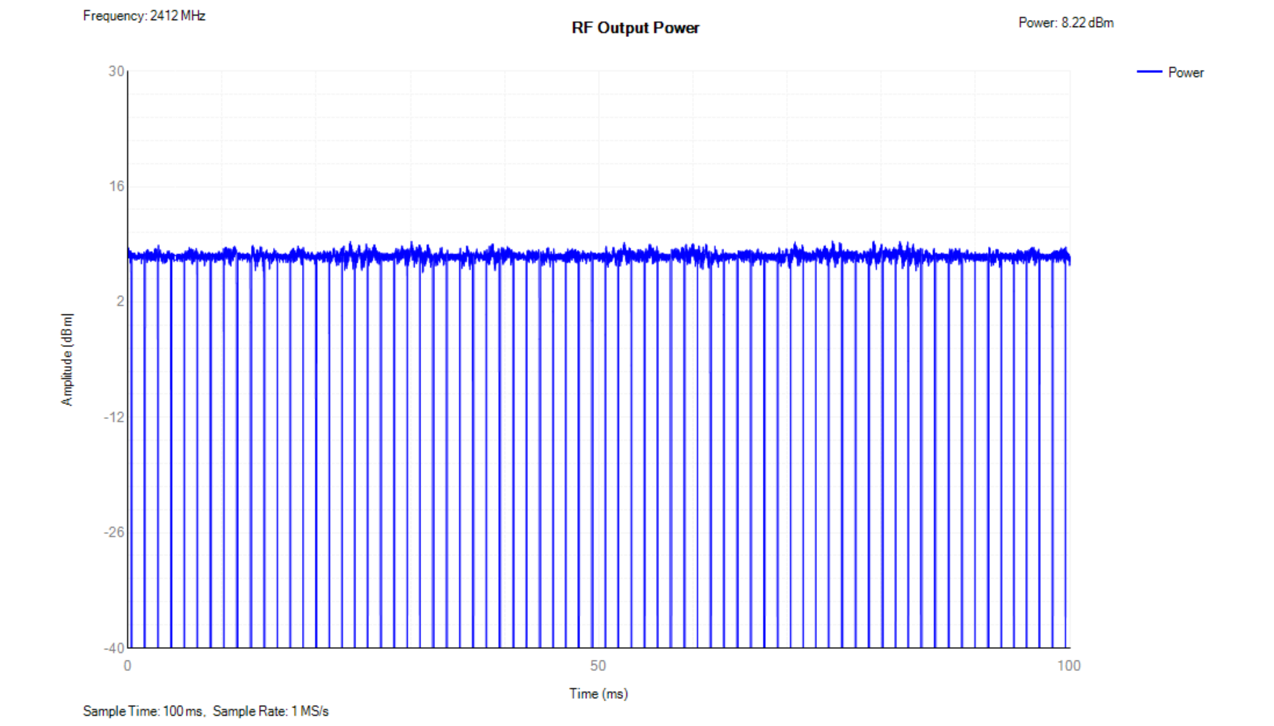

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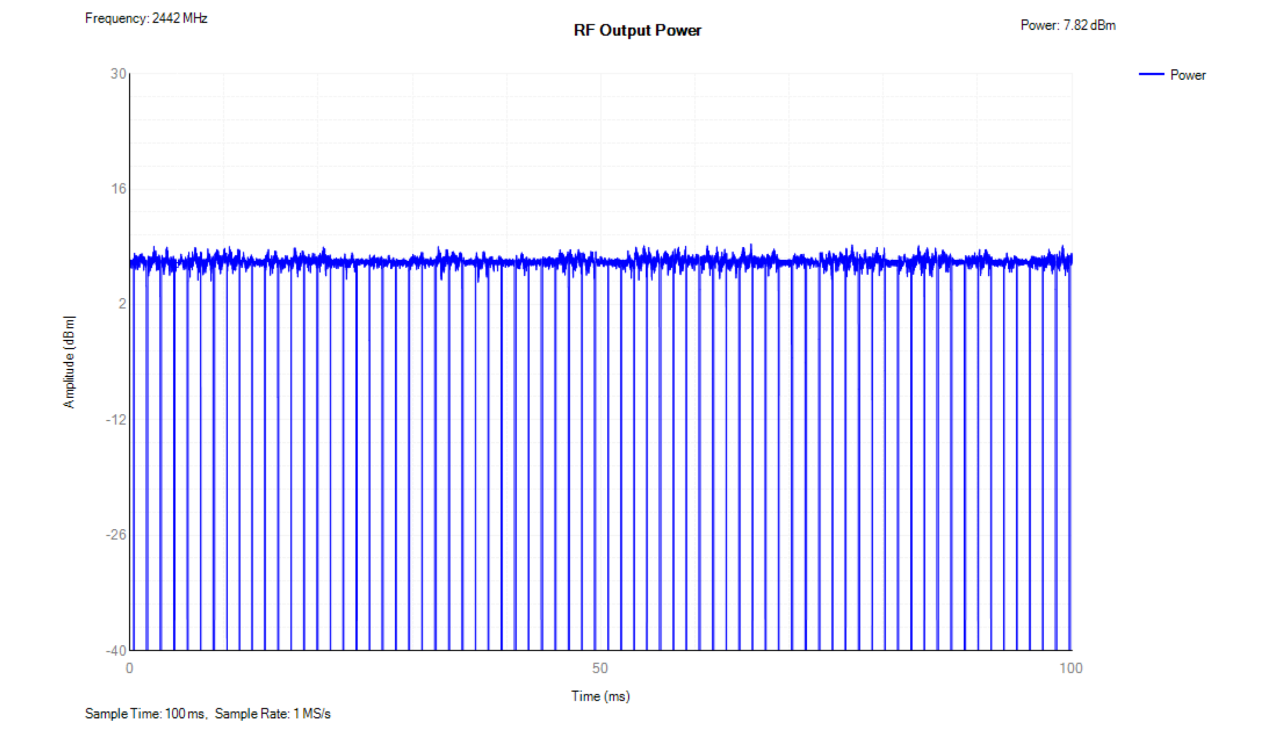

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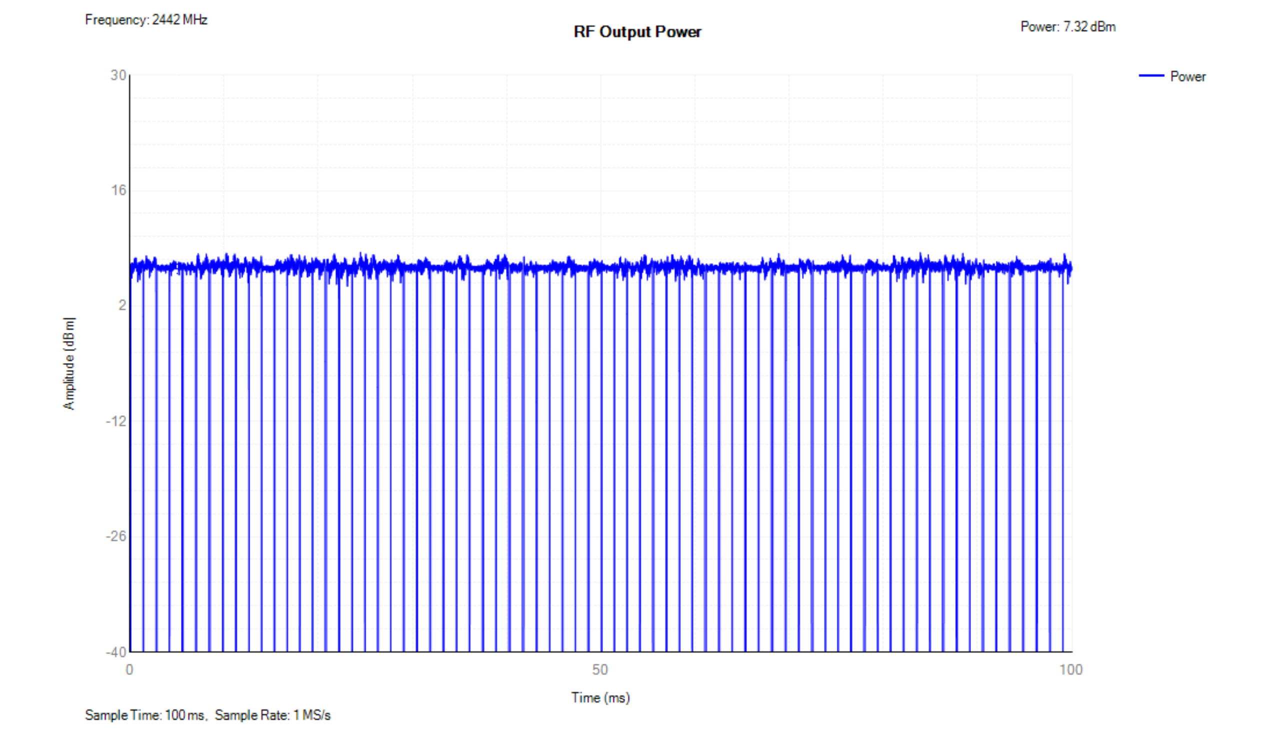

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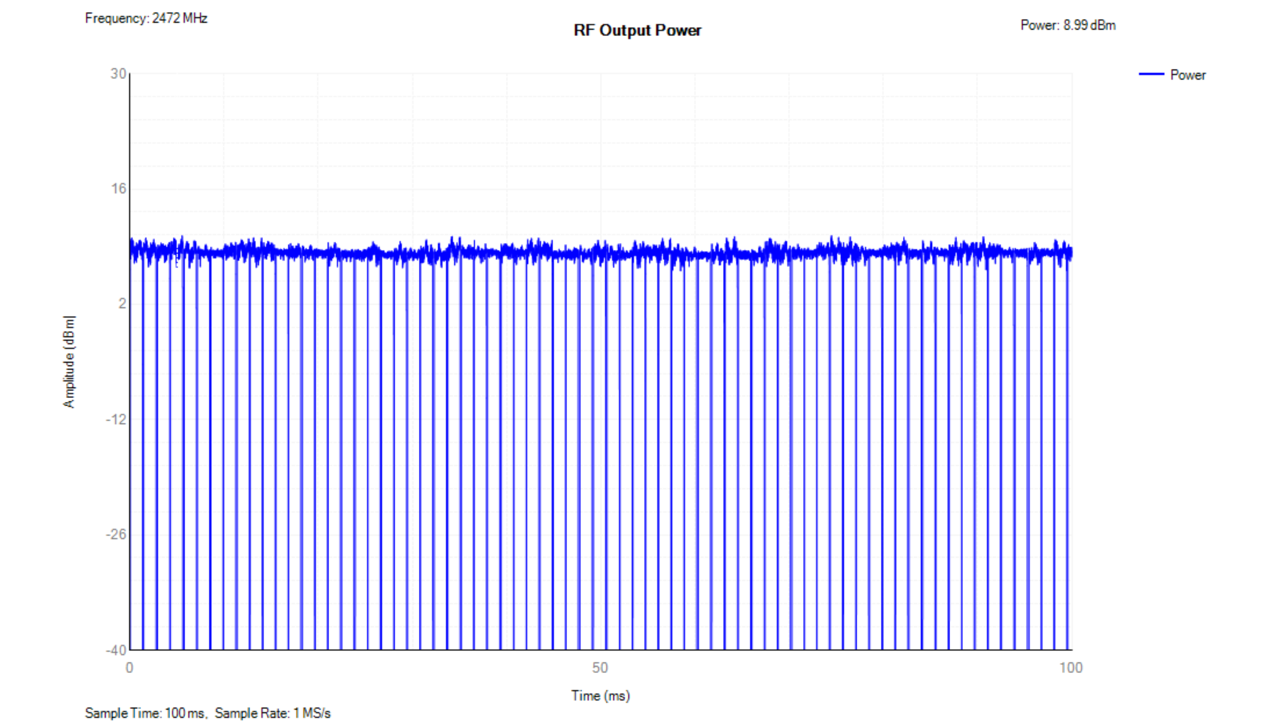

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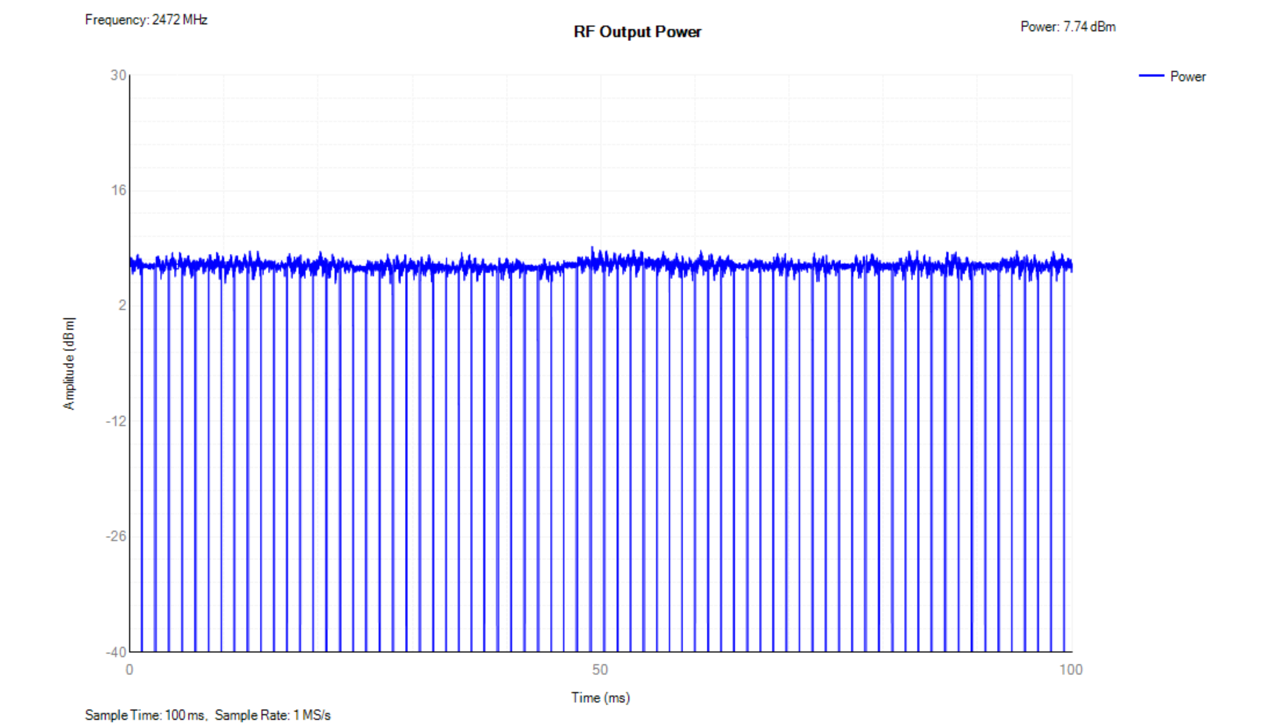

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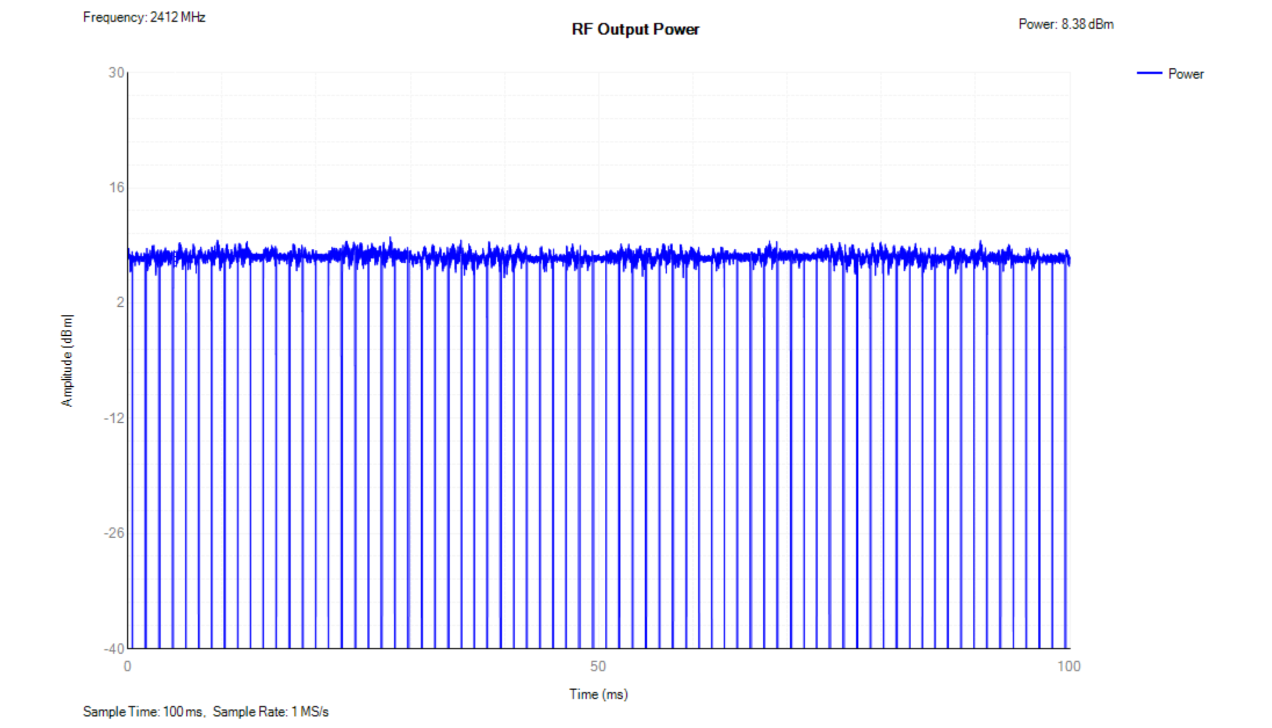

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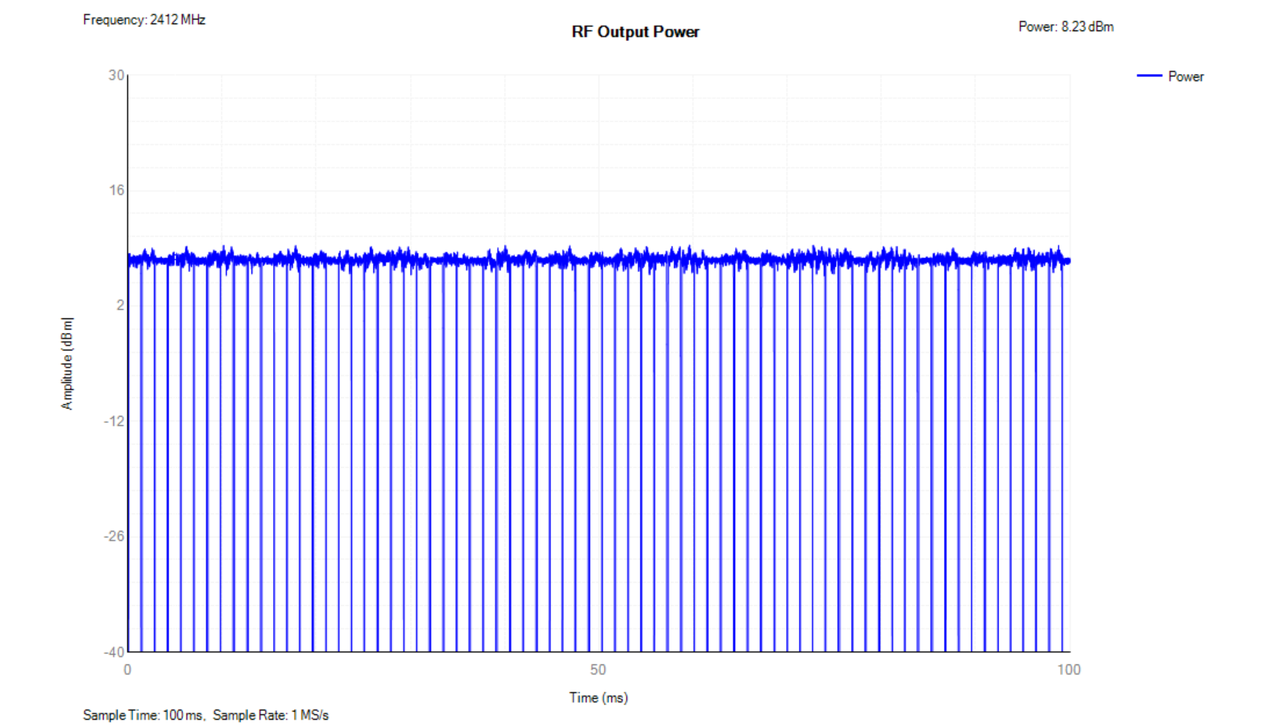

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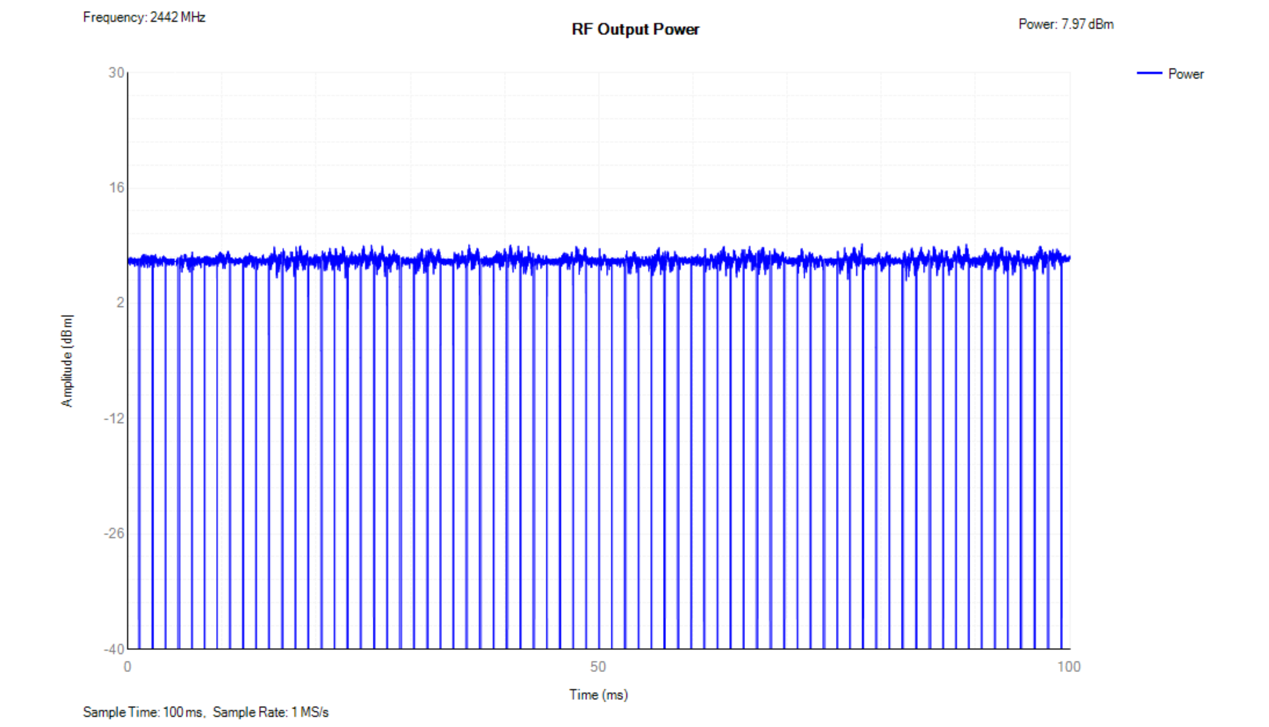

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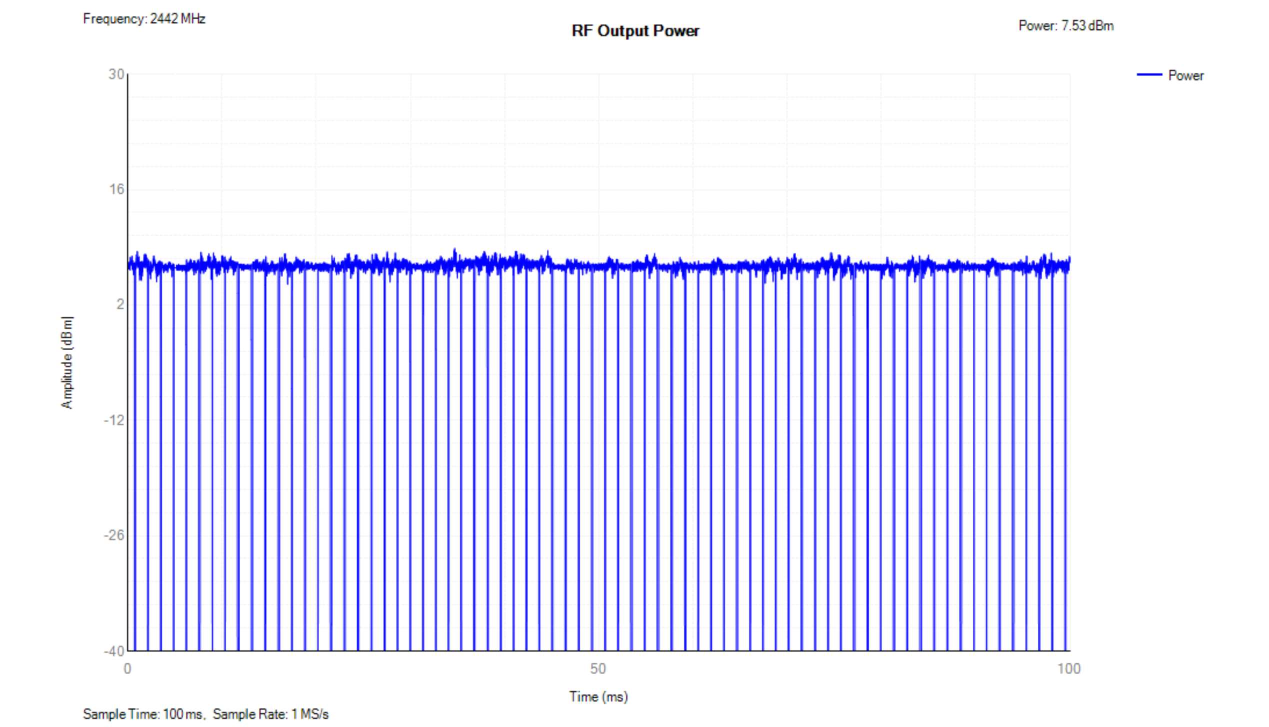

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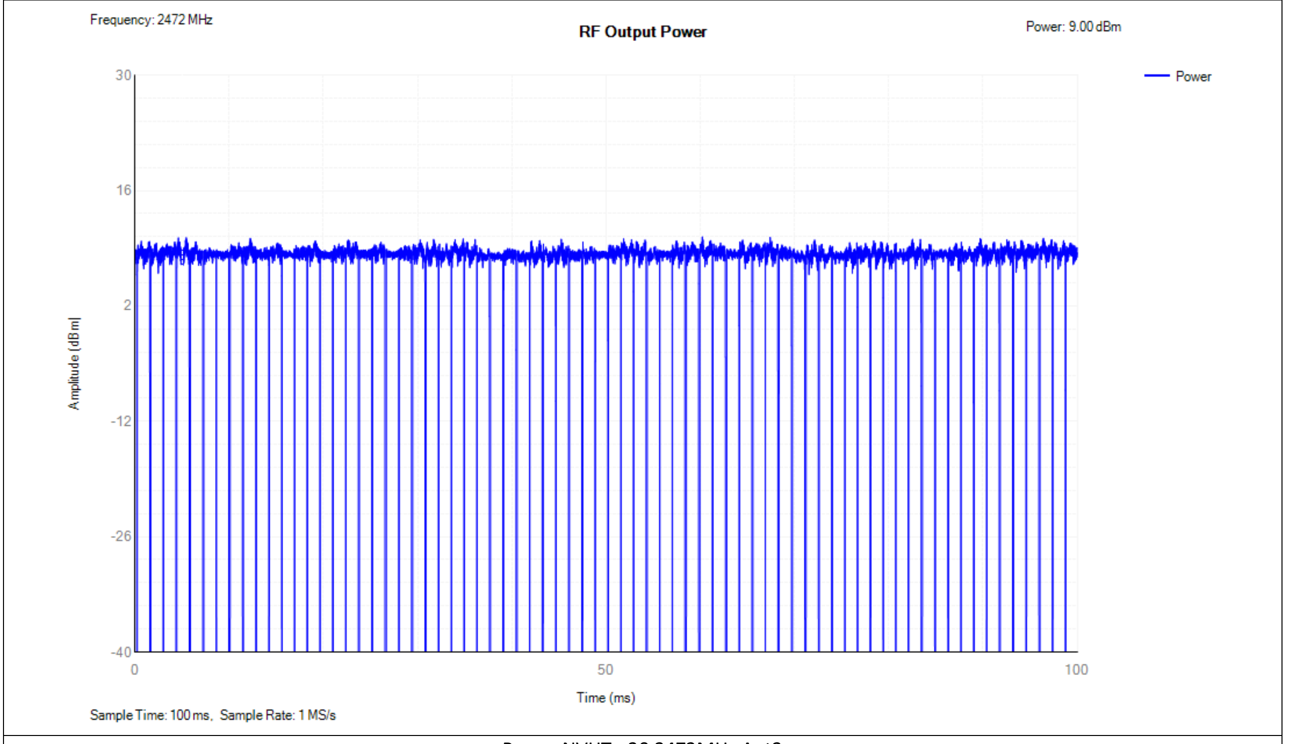

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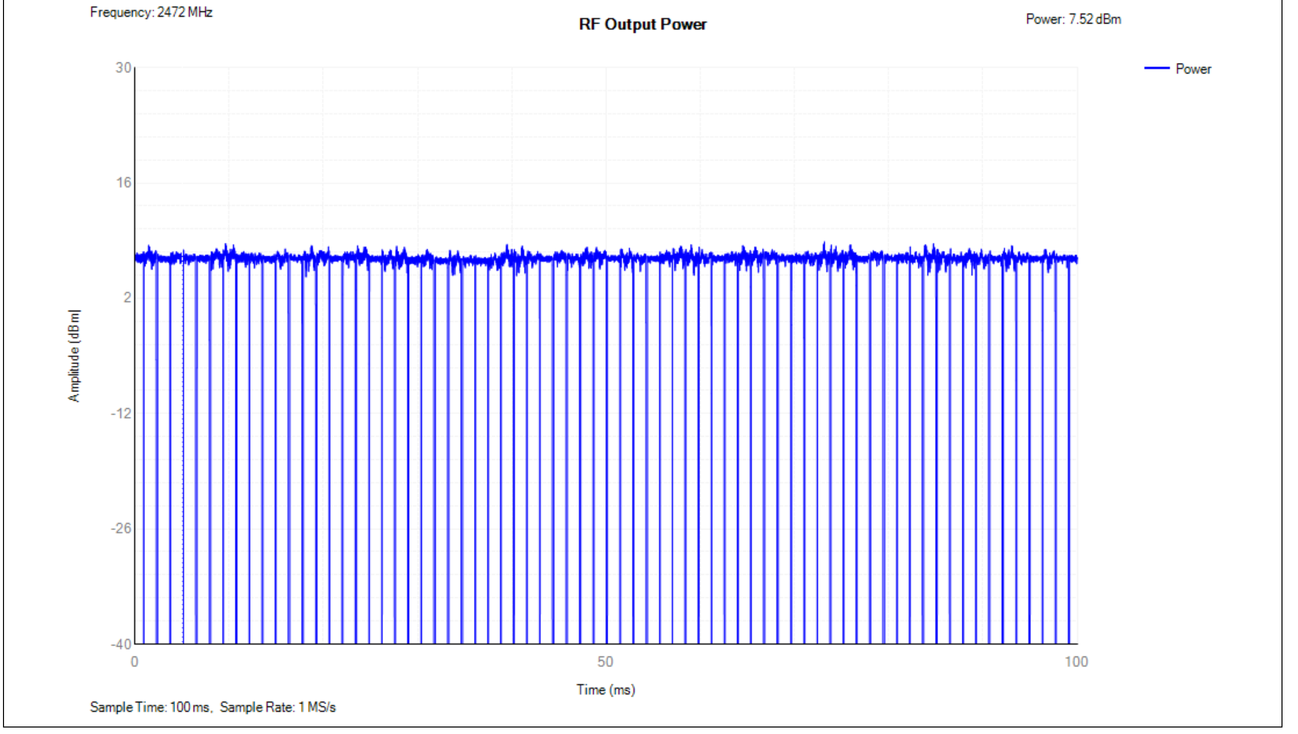

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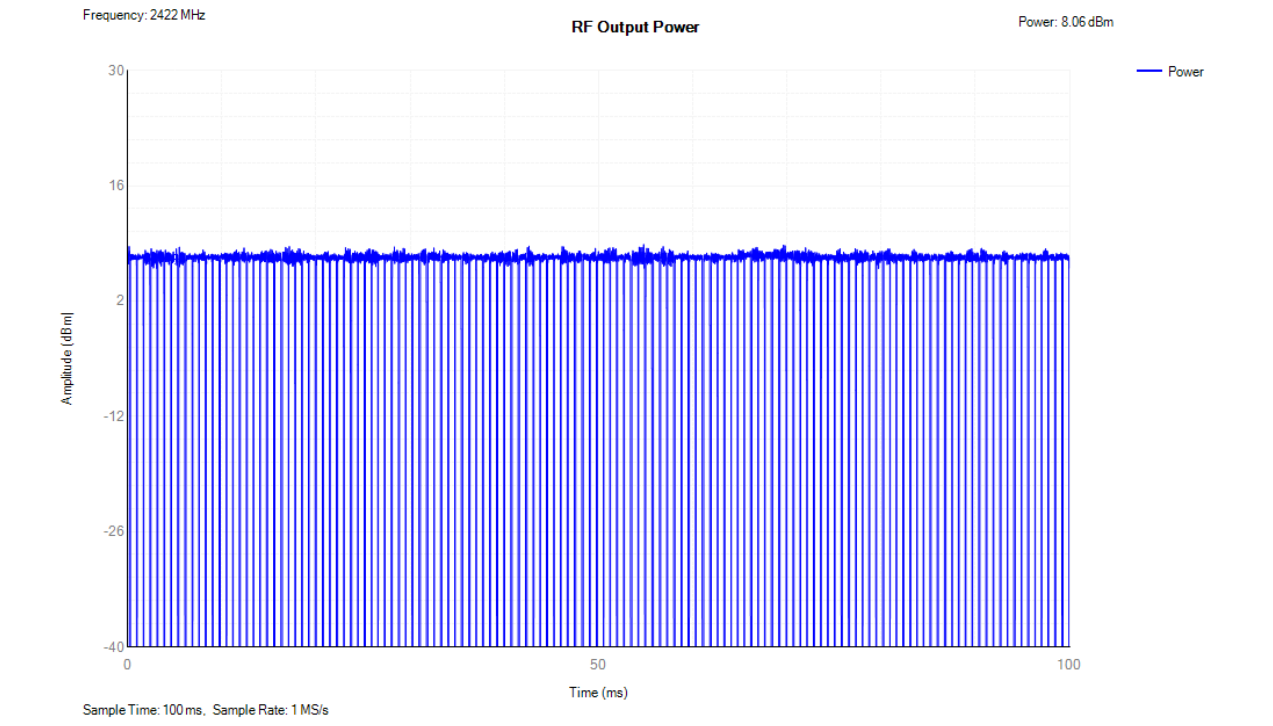

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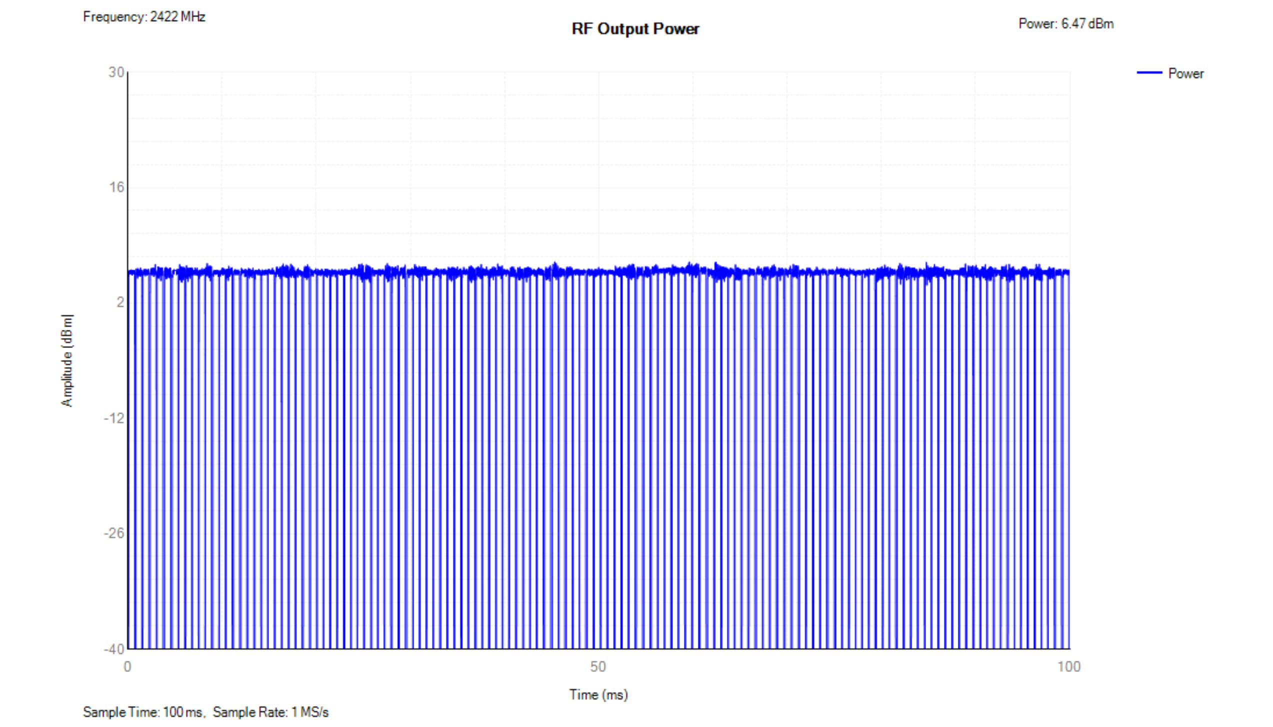

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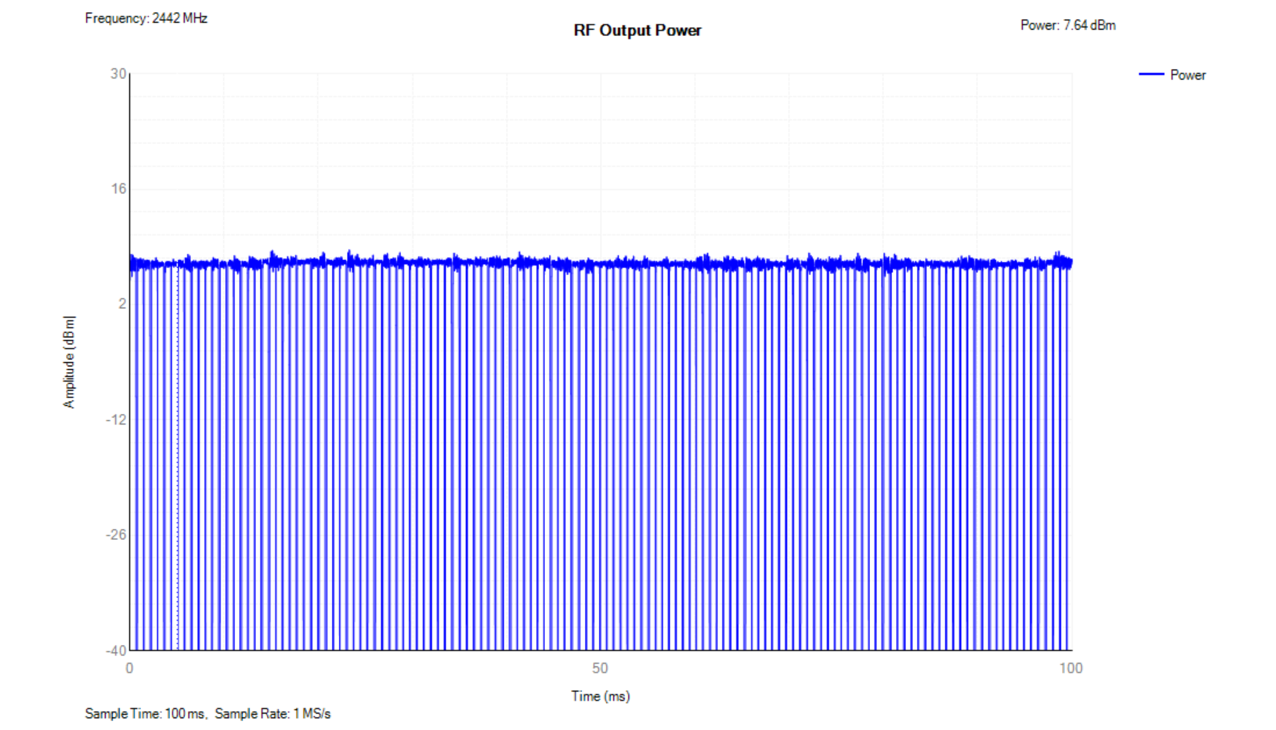

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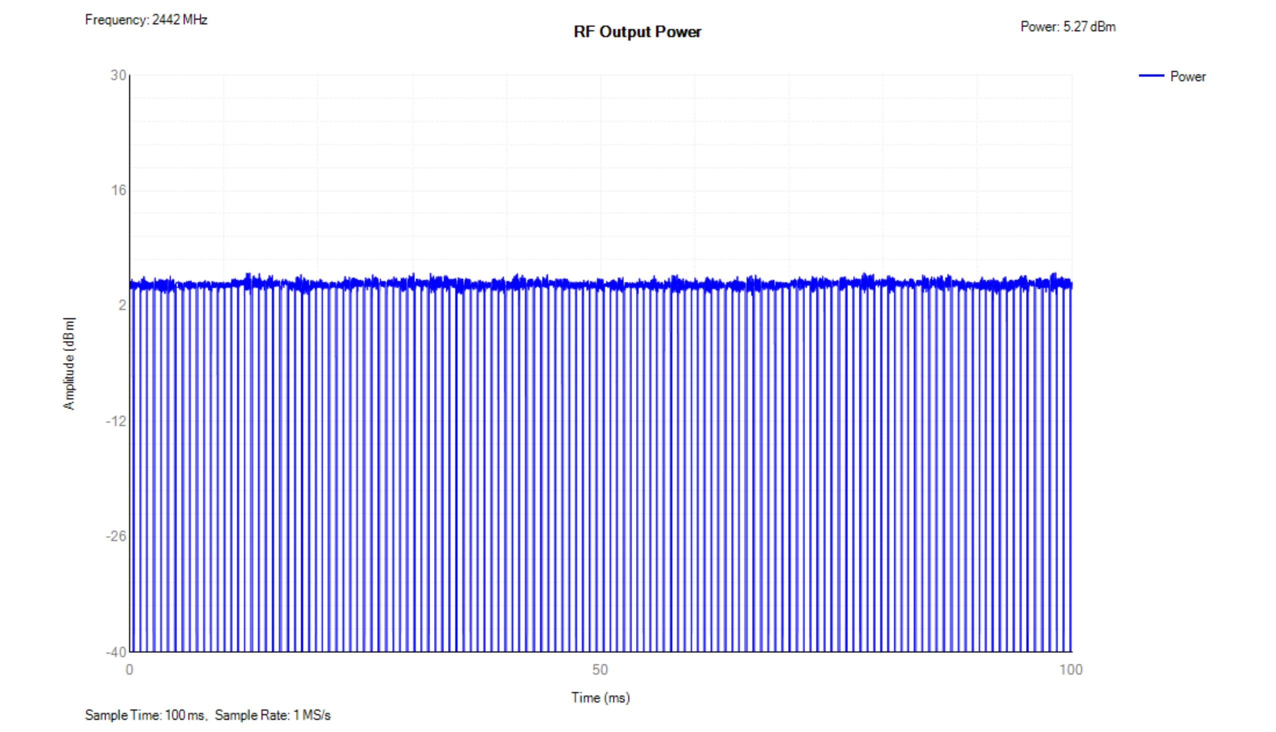

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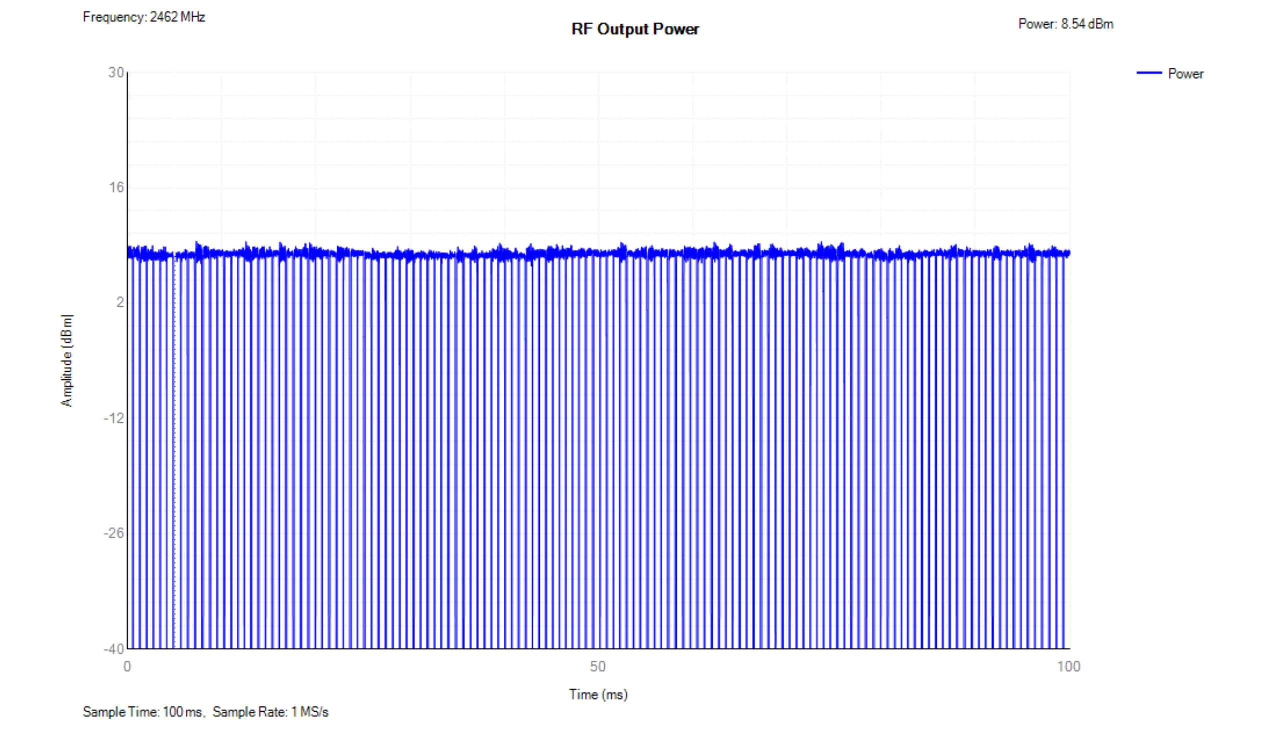

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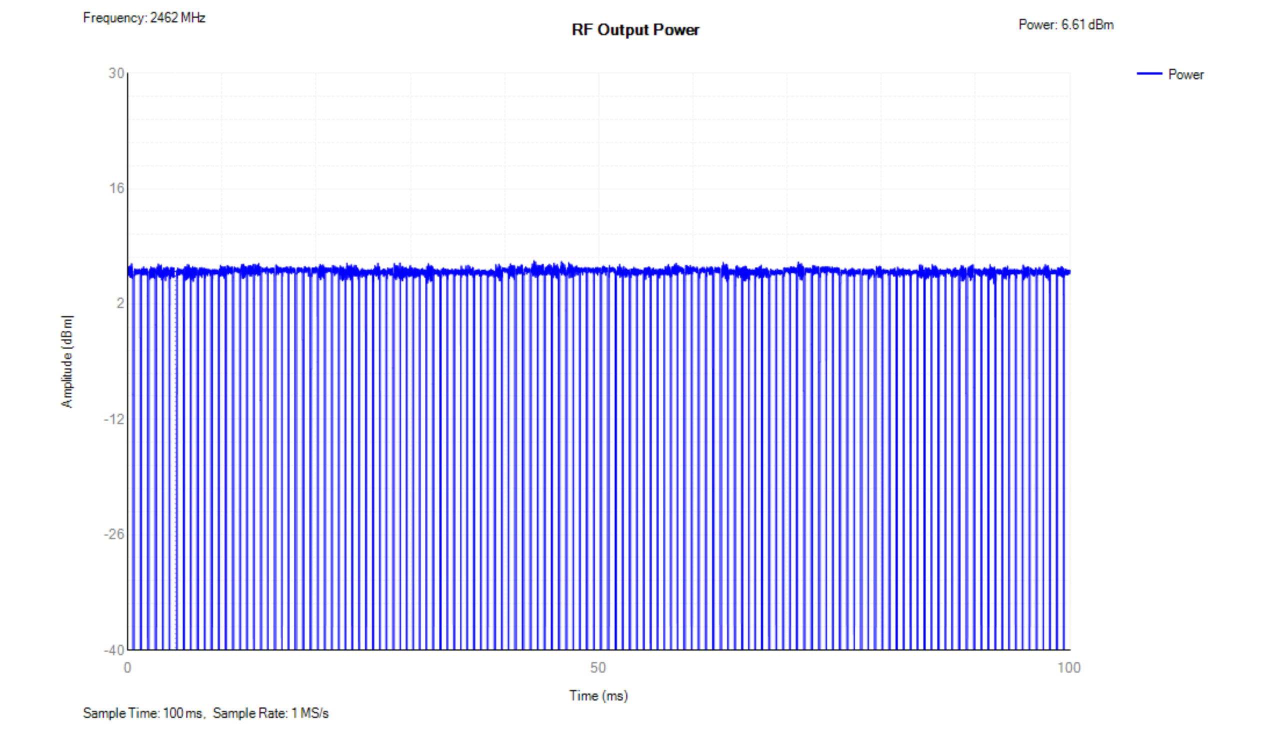

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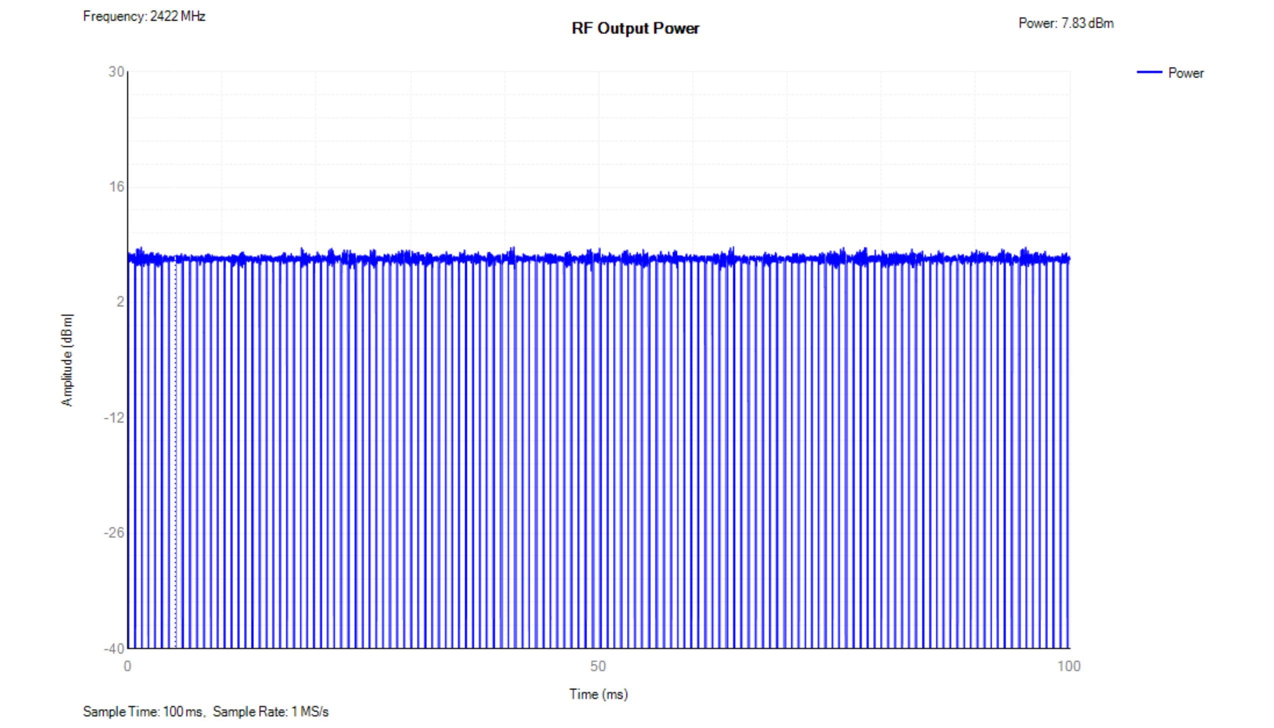

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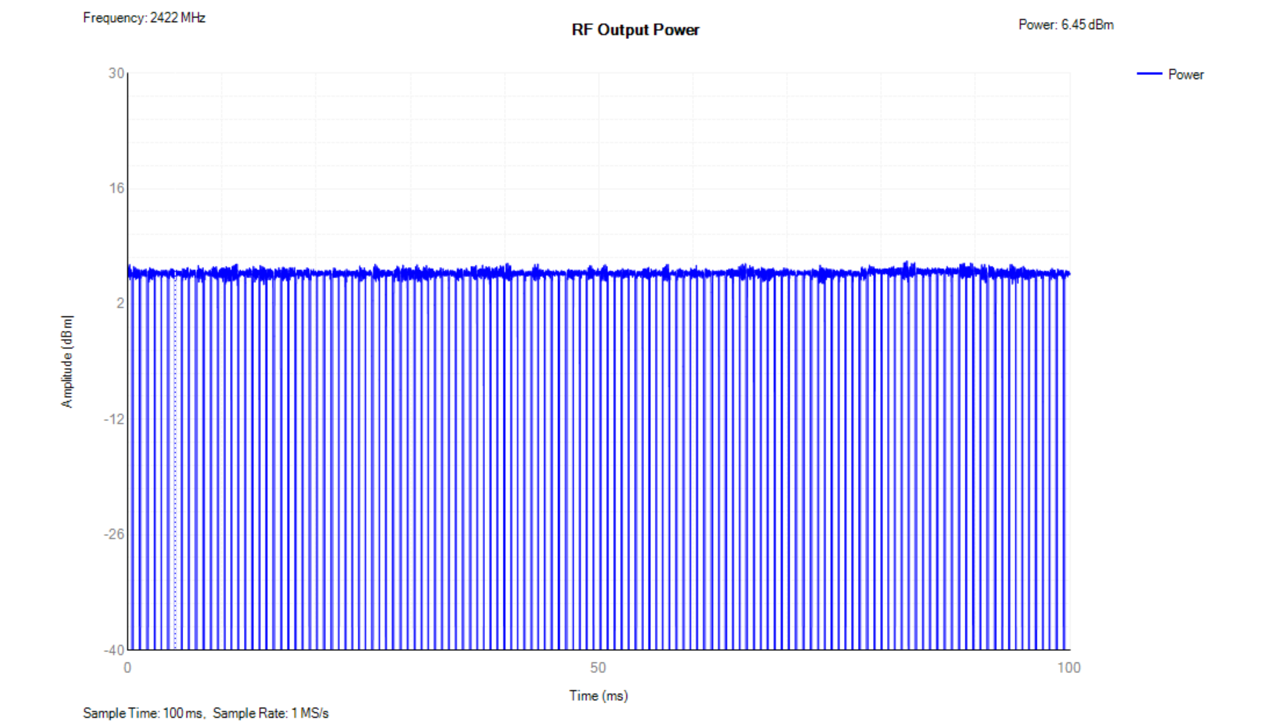

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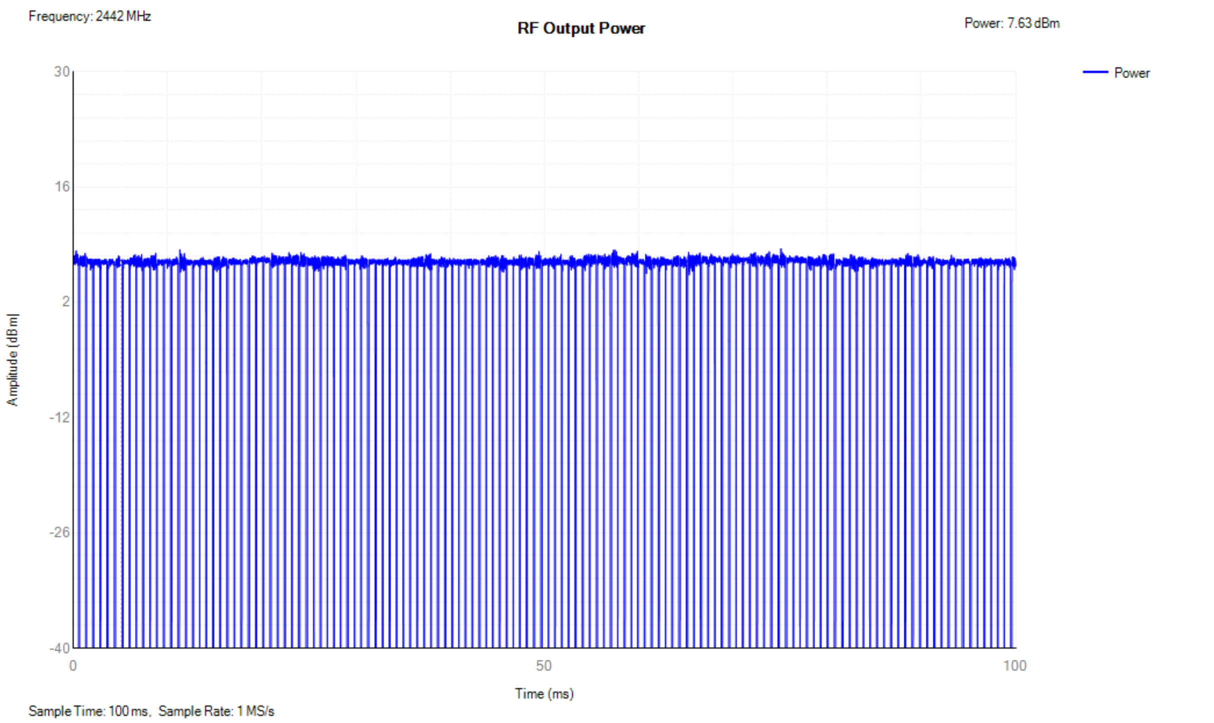

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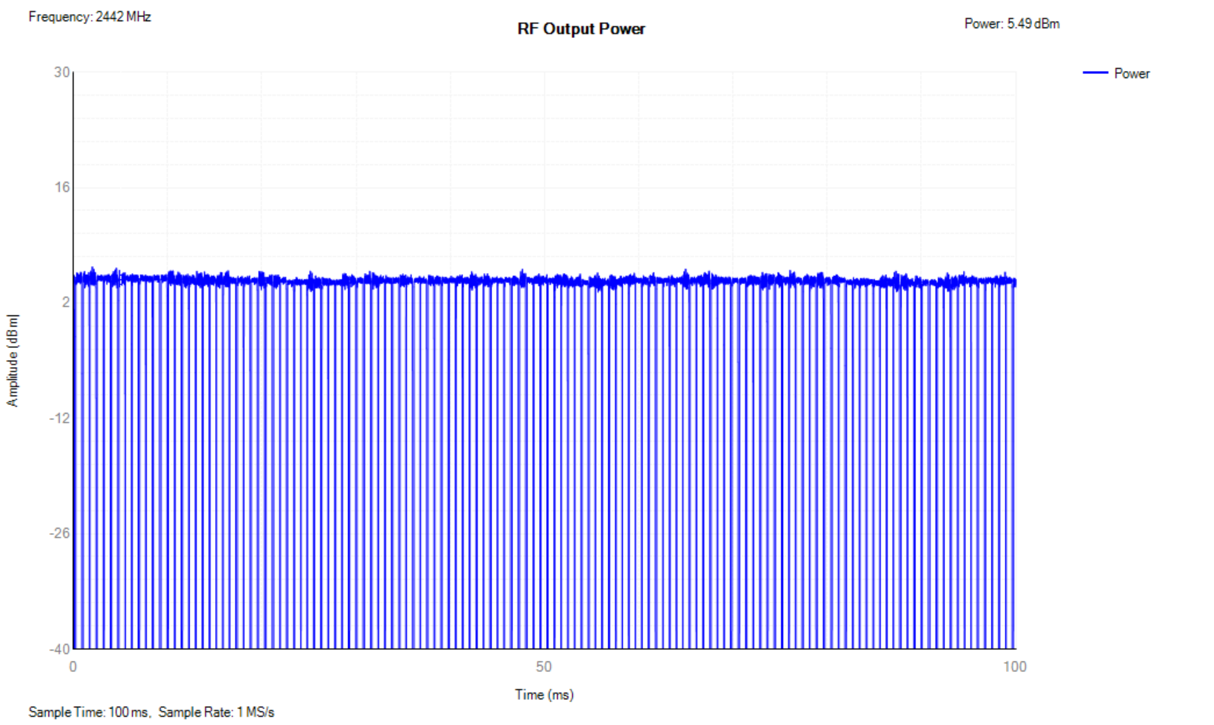

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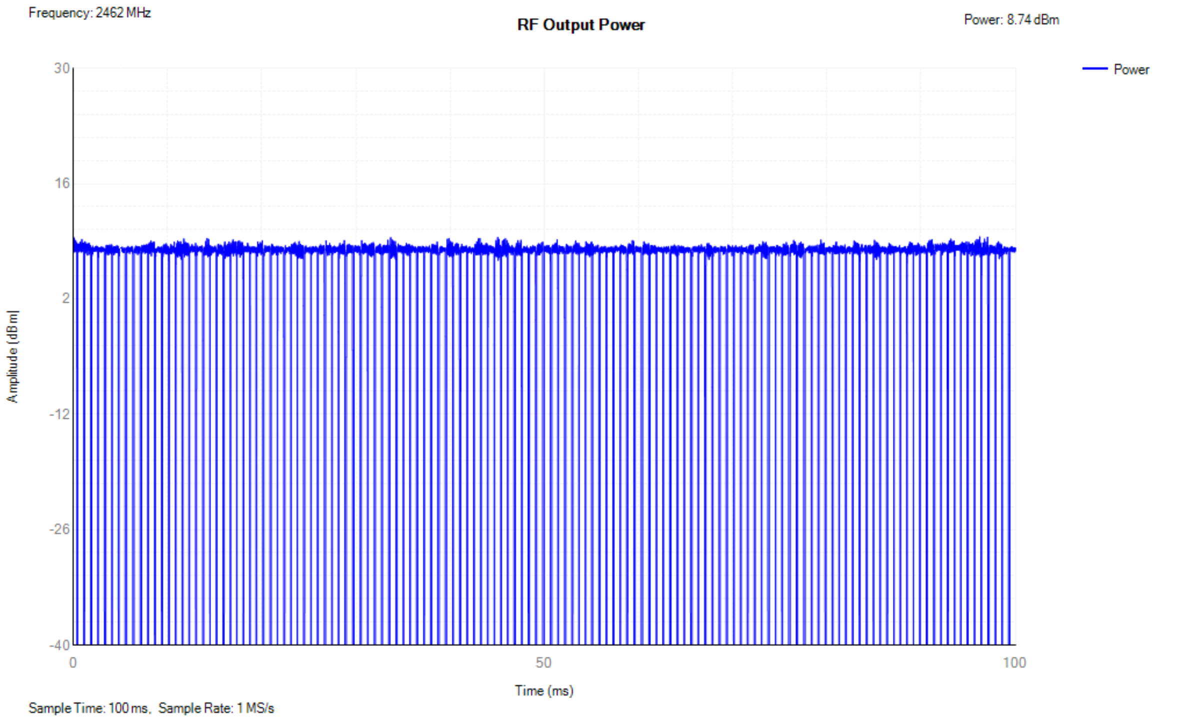

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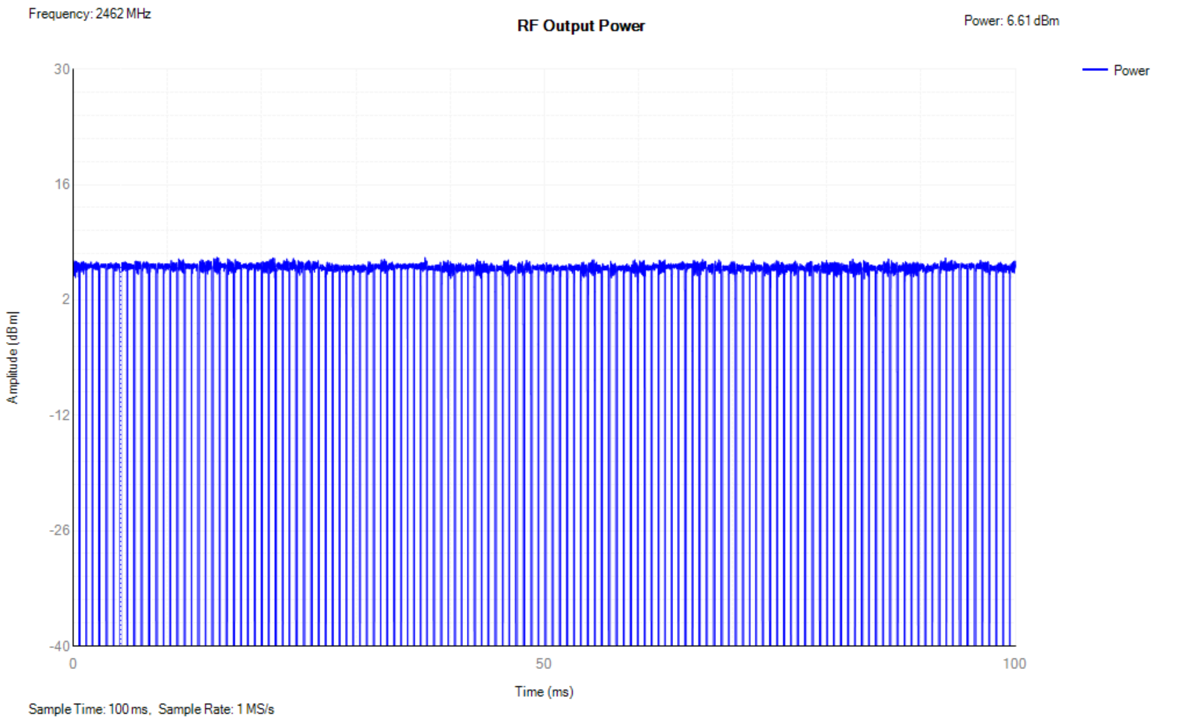

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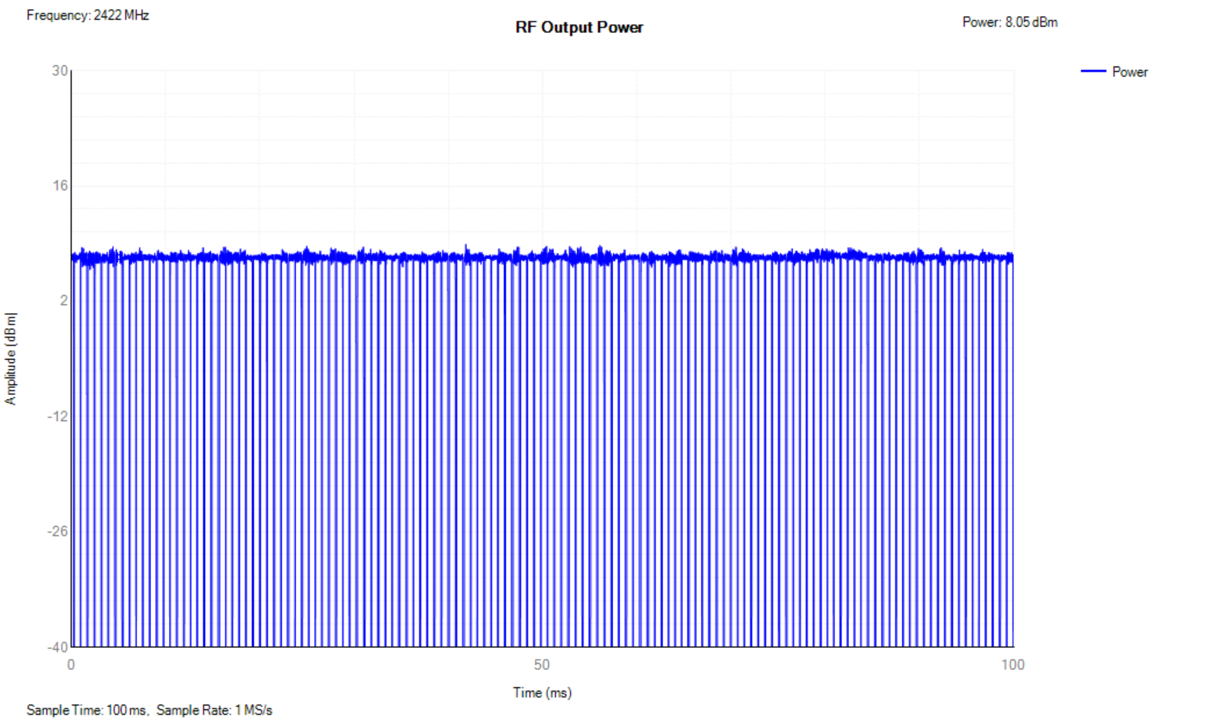

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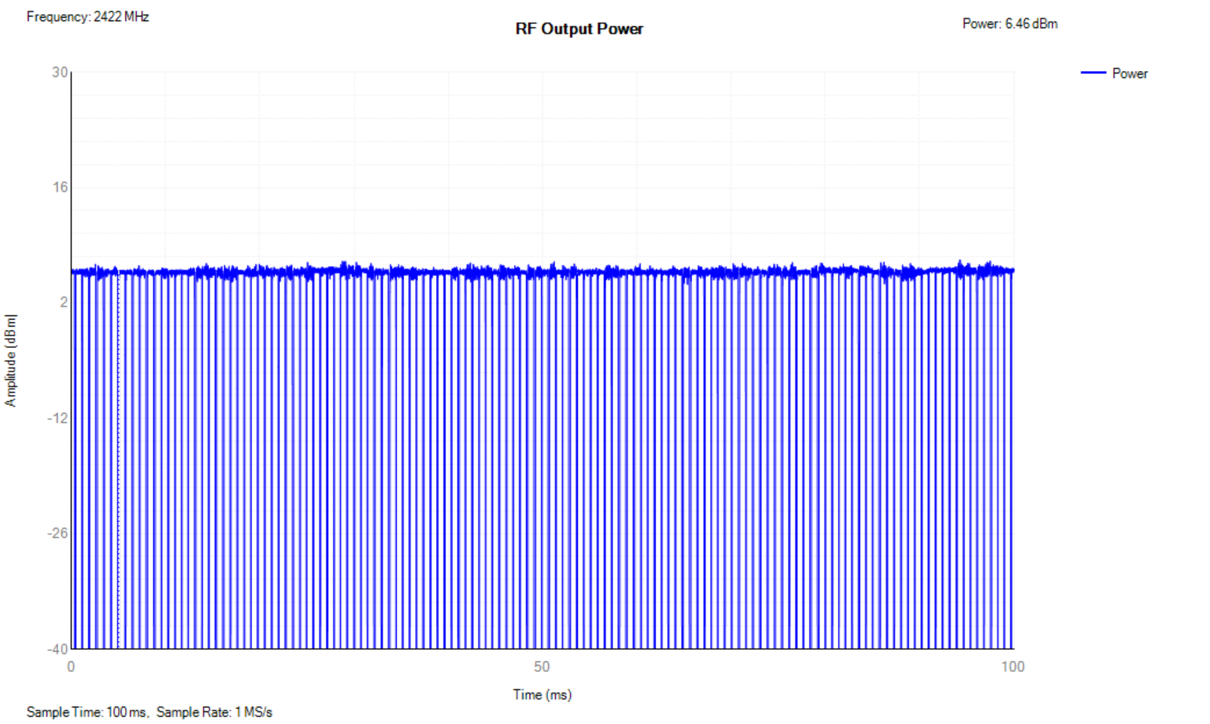

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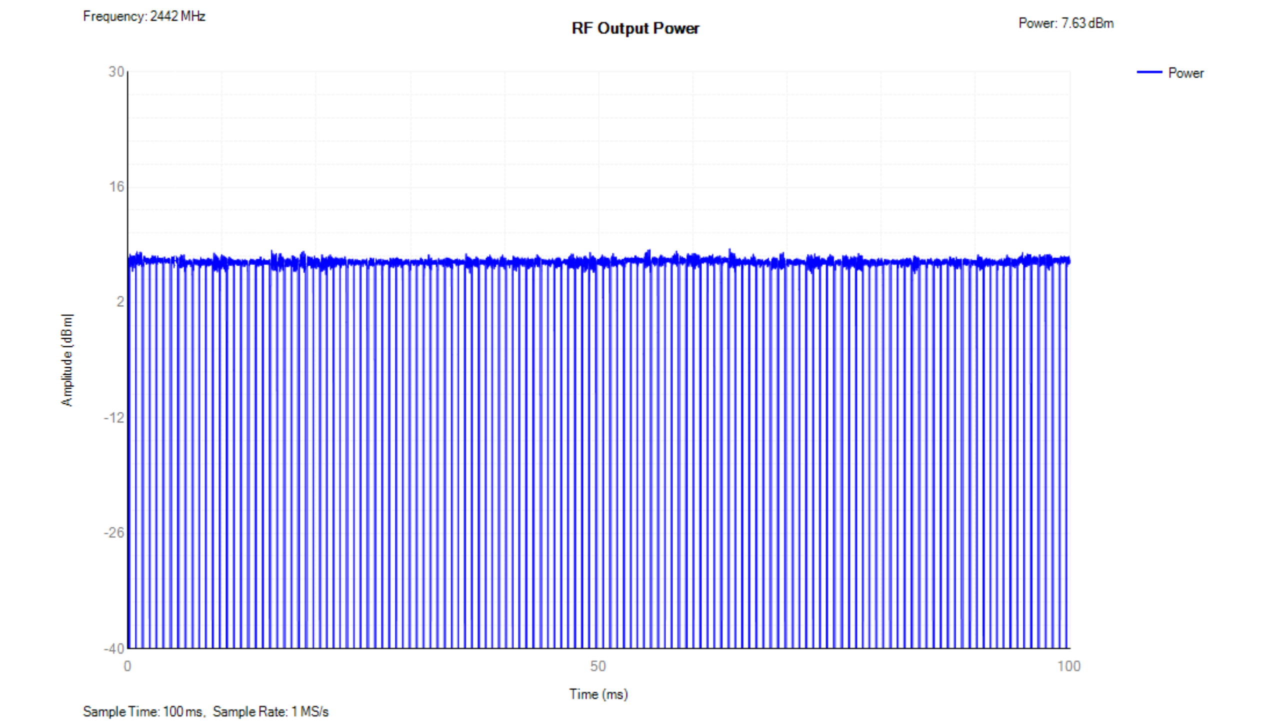

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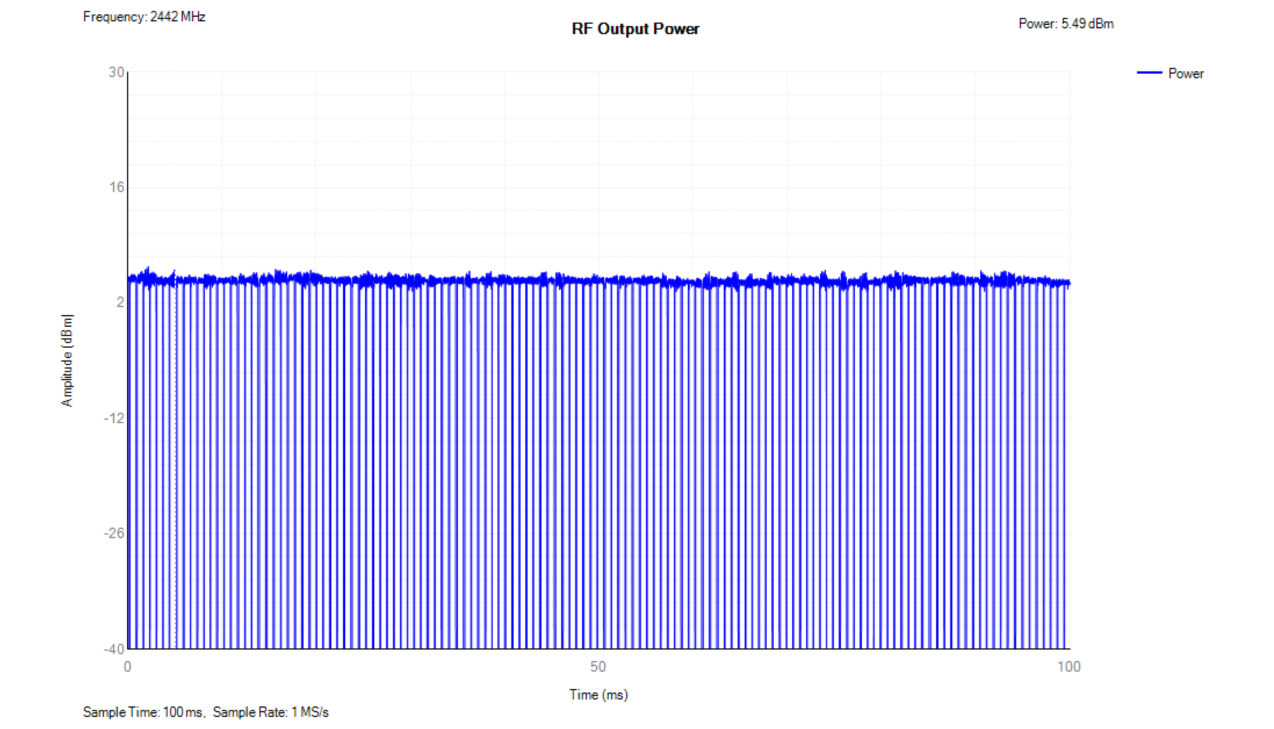

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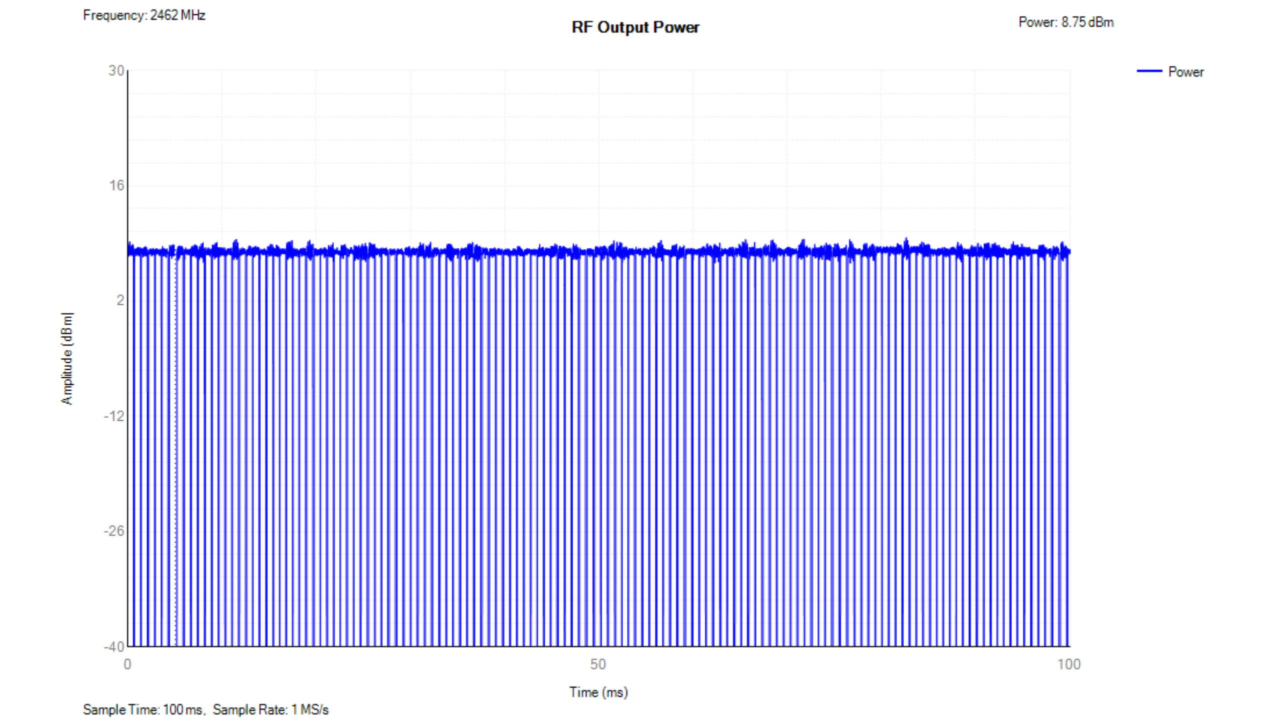

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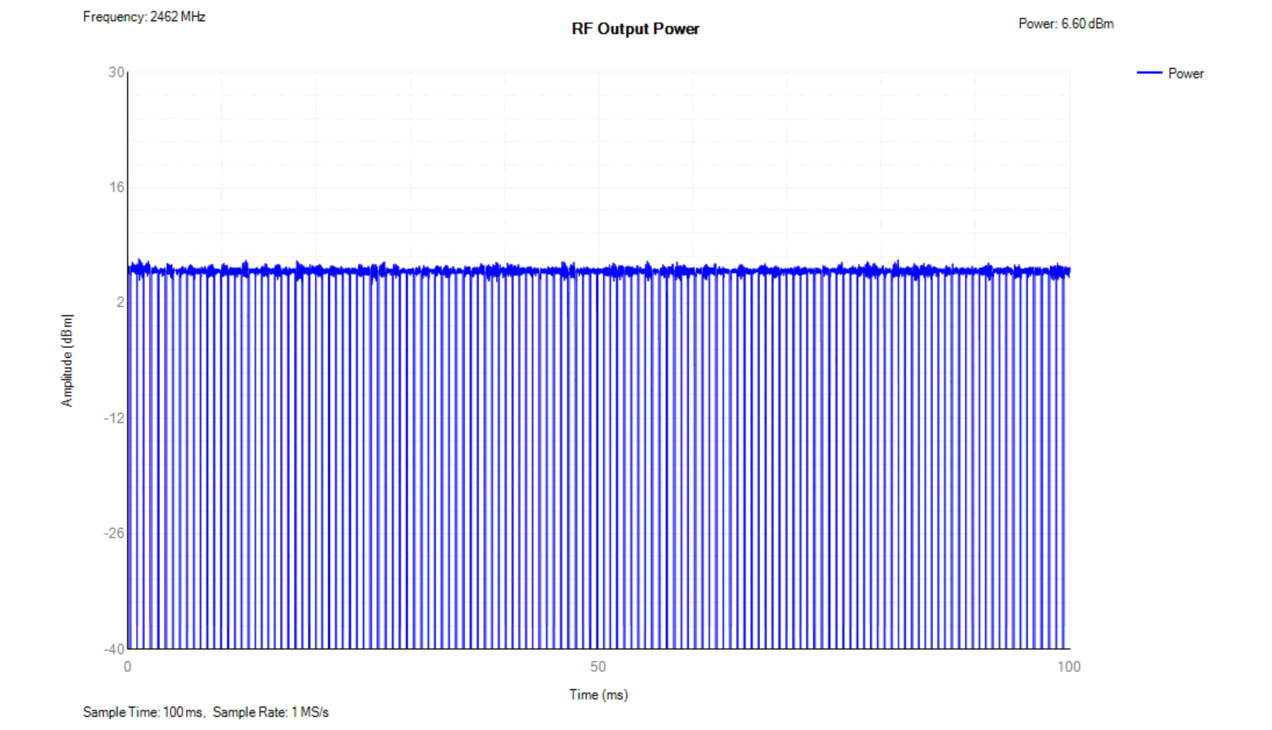


8.2 POWER SPECTRAL DENSITY

8.2.1 Applicable standard

According to ETSI EN 300 328 clause 4.3.2.3

8.2.2 Conformance Limit

The Maximum Power Spectrum Density <=10 dBm/MHz

8.2.3 Test Configuration

The measurements for power spectral density shall only be performed at normal test conditions.

Radiated measurements shall only be used for integral antenna equipment that does not have a temporary antenna connector(s) provided.
Conducted measurements shall be used for antenna equipment provided a temporary antenna connector(s) provided.

8.2.4 Test Procedure

1. Please refer to ETSI EN 300 328 (V2.2.2) clause 5.4.3.1 for the test conditions.

2. Please refer to ETSI EN 300 328 (V2.2.2) clause 5.4.3.2 for the measurement method.

The test procedure shall be as follows:

■Conducted measurement

●Option 1: For equipment with continuous and non-continuous transmissions

The transmitter shall be connected to a spectrum analyser and the Power Spectral Density (PSD) as defined in clause 4.3.2.3 shall be measured and recorded.

Step 1:

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

- Start Frequency: 2 400 MHz
- Stop Frequency: 2 483,5 MHz
- Resolution BW: 10 kHz
- Video BW: 30 kHz
- Sweep Points: > 8 350; for spectrum analysers not supporting this number of sweep points, the frequency band may be segmented
- Detector: RMS
- Trace Mode: Max Hold
- Sweep time: For non-continuous transmissions: 2 × Channel Occupancy Time × number of sweep points
  For continuous transmissions: 10 s; the sweep time may be increased further until a value where the sweep time has no further impact anymore on the RMS value of the signal.

For non-continuous signals, wait for the trace to stabilize.

Save the data (trace data) set to a file.

Step 2:

For conducted measurements on smart antenna systems using either operating mode 2 or operating mode 3 (see clause 5.3.2.2), repeat the measurement for each of the transmit ports. For each sampling point (frequency domain), add up the coincident power values (in mW) for the different transmit chains and use this as the new data set.

Step 3:

Add up the values for power for all the samples in the file using the formula below.

$$P_{burst} = \frac{1}{k}\sum_{n=1}^{k} P_{sample}(n)$$

with k being the total number of samples and n the actual sample number.

Step 4:

Normalize the individual values for power (in dBm) so that the sum is equal to the RF Output Power (e.i.r.p.) measured in clause 5.4.2 and save the corrected data. The following formulas can be used:

$$C_{Corr} = P_{Sum} - P_{e.i.r.p.}$$

$$P_{Samplecorr}(n) = P_{Sample}(n) - C_{Corr}$$

with n being the actual sample number

Step 5:

Starting from the first sample $P_{Samplecorr}(n)$ (lowest frequency), add up the power (in mW) of the following samples representing a 1 MHz segment and record the results for power and position (i.e. sample #1 to sample #100). This is the Power Spectral Density (e.i.r.p.) for the first 1 MHz segment which shall be recorded.

Step 6:

Shift the start point of the samples added up in step 5 by one sample and repeat the procedure in step 5 (i.e. sample #2 to sample #101).

Step 7:

Repeat step 6 until the end of the data set and record the Power Spectral Density values for each of the 1 MHz segments.

From all the recorded results, the highest value is the maximum Power Spectral Density (PSD) for the UUT. This value, which shall comply with the limit given in clause 4.3.2.3.3, shall be recorded in the test report.

●Option 2: For equipment with continuous transmission capability or for equipment operating (or with the capability to operate) with a constant duty cycle (e.g. Frame Based equipment)

This option is for equipment that can be configured to operate in a continuous transmit mode (100 % DC) or with a constant Duty Cycle (DC).

Step 1:

• Connect the UUT to the spectrum analyser and use the following settings:

- Centre Frequency: The centre frequency of the channel under test
- RBW: 1 MHz
- VBW: 3 MHz

- Frequency Span: 2 × Nominal Bandwidth (e.g. 40 MHz for a 20 MHz channel)

- Detector Mode: Peak

- Trace Mode: Max Hold

Step 2:

• When the trace is complete, find the peak value of the power envelope and record the frequency.

Step 3:

• Make the following changes to the settings of the spectrum analyser:

- Centre Frequency: Equal to the frequency recorded in step 2

- Frequency Span: 3 MHz

- RBW: 1 MHz

- VBW: 3 MHz

- Sweep Time: 1 minute

- Detector Mode: RMS

- Trace Mode: Max Hold

Step 4:

• When the trace is complete, the trace shall be captured using the "Hold" or "View" option on the spectrum analyser.

• Find the peak value of the trace and place the analyser marker on this peak. This level is recorded as the highest mean power (power spectral density) D in a 1 MHz band.

• Alternatively, where a spectrum analyser is equipped with a function to measure power spectral density, this function may be used to display the power spectral density D in dBm / MHz.

• In case of conducted measurements on smart antenna systems operating in a mode with multiple transmit chains active simultaneously, the power spectral density of each transmit chain shall be measured separately to calculate the total power spectral density (value D in dBm / MHz) for the UUT.

Step 5:

• The maximum Power Spectral Density (PSD) e.i.r.p. is calculated from the above measured power spectral density D, the observed Duty Cycle (DC) (see clause 5.4.2.2.1.3, step 4), the applicable antenna assembly gain G in dBi and if applicable the beamforming gain Y in dB, according to the formula below. This value shall be recorded in the test report. If more than one antenna assembly is intended for this power setting, the gain of the antenna assembly with the highest gain shall be used.

$$PSD = D + G + Y + 10 \times \log(1 / DC) \text{ (dBm / MHz)}$$

■Radiated measurement

When performing radiated measurements, the UUT shall be configured and antenna(s) positioned (including smart antenna systems and equipment capable of beamforming) for maximum e.i.r.p. towards the measuring antenna. A test site as described in annex B and applicable measurement procedures as described in annex C shall be used.

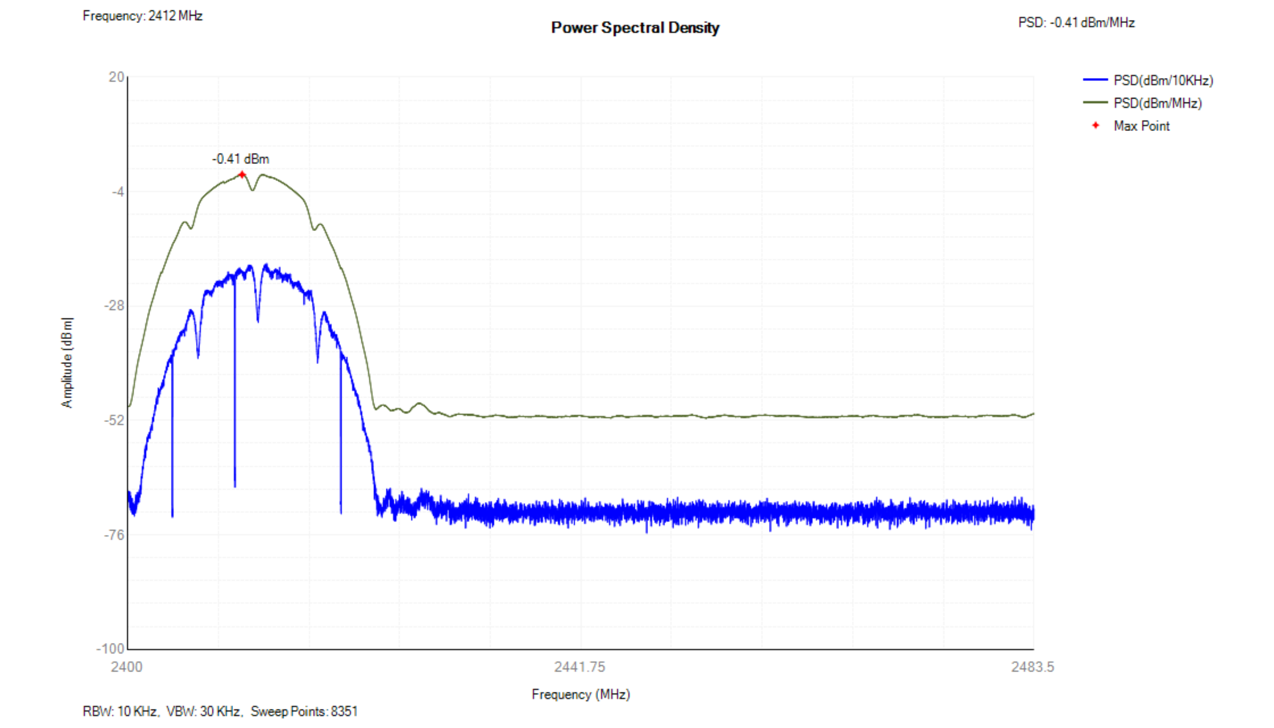
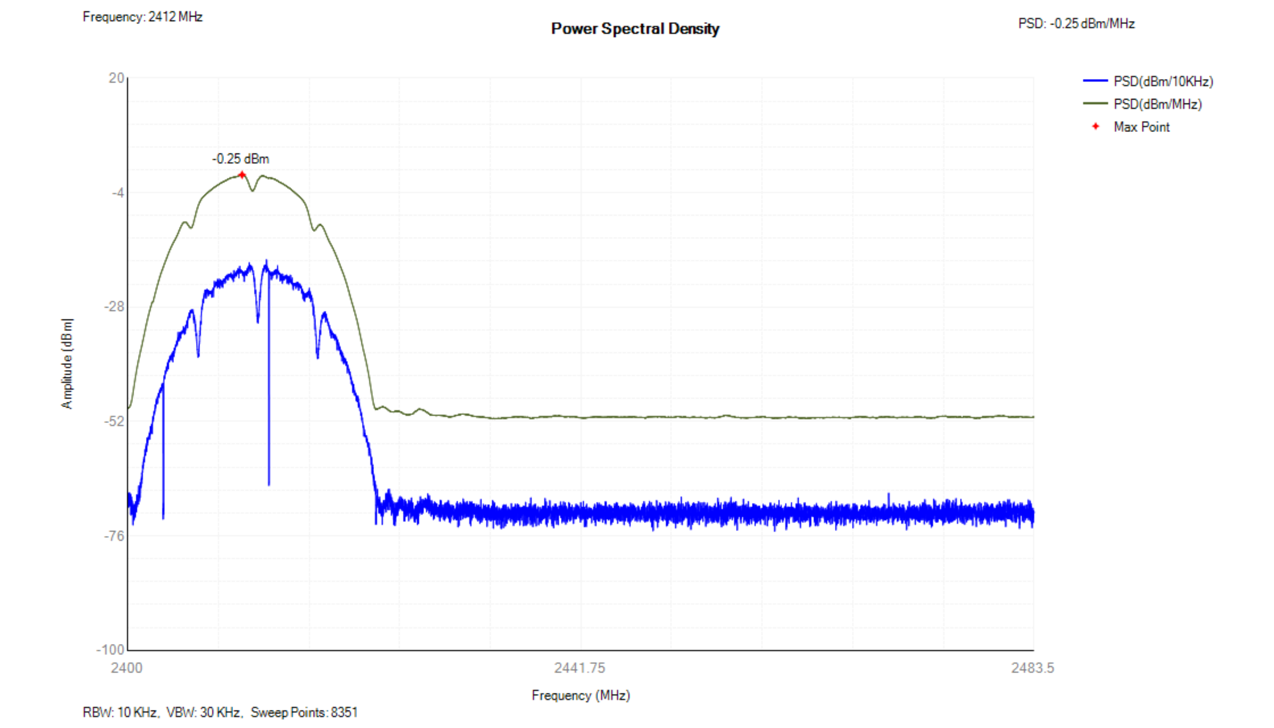
Taking into account the calibration factor from the measurement site, the test procedure is further as described under
clause 5.4.3.2.1.

8.2.5 Test Results

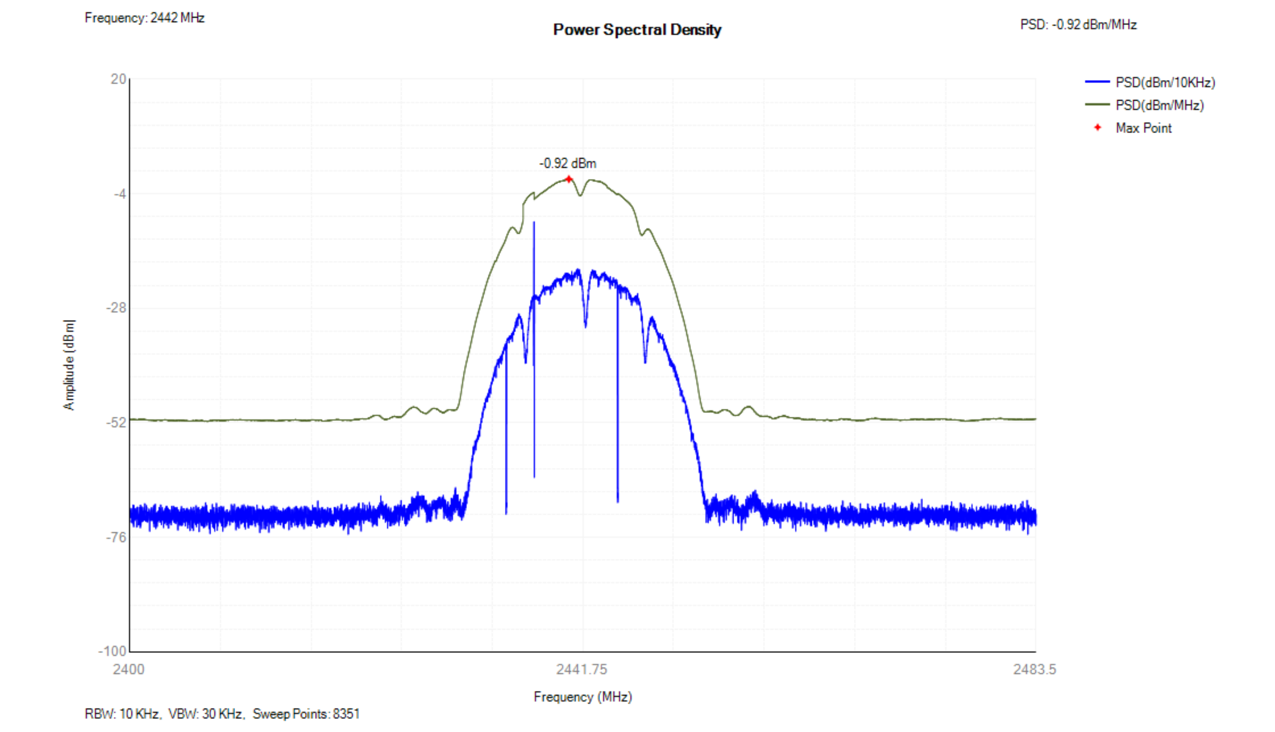
Temperature:	25ºC	Test Date:	April 07, 2023
Humidity:	55 % RH	Tested by:	Fan

Condition	Mode	Frequency (MHz)	Antenna	Max PSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
NVNT	b	2412	Ant1	-0.41	10	Pass
NVNT	b	2412	Ant2	-0.25	10	Pass
NVNT	b	2442	Ant1	-0.92	10	Pass
NVNT	b	2442	Ant2	-0.17	10	Pass
NVNT	b	2472	Ant1	0.38	10	Pass
NVNT	b	2472	Ant2	1.23	10	Pass
NVNT	g	2412	Ant1	-2.03	10	Pass
NVNT	g	2412	Ant2	-1.89	10	Pass
NVNT	g	2442	Ant1	-2.87	10	Pass
NVNT	g	2442	Ant2	-2.04	10	Pass
NVNT	g	2472	Ant1	-1.81	10	Pass
NVNT	g	2472	Ant2	-1.62	10	Pass
NVNT	n20	2412	Ant1	-1.96	10	Pass
NVNT	n20	2412	Ant2	-2.23	10	Pass
NVNT	n20	2412	Sum	0.92	10	Pass
NVNT	n20	2442	Ant1	-2.48	10	Pass
NVNT	n20	2442	Ant2	-2.9	10	Pass
NVNT	n20	2442	Sum	0.33	10	Pass
NVNT	n20	2472	Ant1	-1.44	10	Pass
NVNT	n20	2472	Ant2	-2.92	10	Pass
NVNT	n20	2472	Sum	0.89	10	Pass
NVNT	n40	2422	Ant1	-5.35	10	Pass
NVNT	n40	2422	Ant2	-7.15	10	Pass
NVNT	n40	2422	Sum	-3.15	10	Pass
NVNT	n40	2442	Ant1	-5.75	10	Pass
NVNT	n40	2442	Ant2	-7.95	10	Pass
NVNT	n40	2442	Sum	-3.7	10	Pass
NVNT	n40	2462	Ant1	-4.86	10	Pass
NVNT	n40	2462	Ant2	-6.99	10	Pass
NVNT	n40	2462	Sum	-2.79	10	Pass

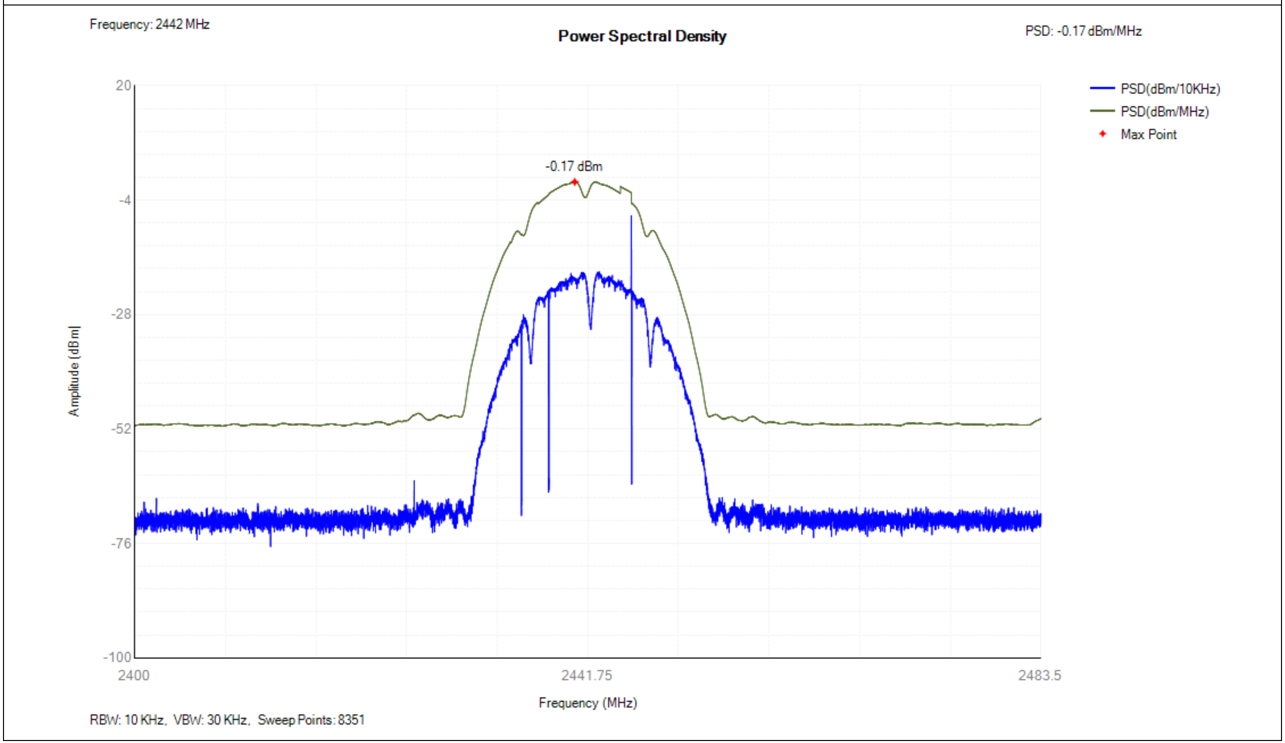
All the modulation modes were tested, the data of the worst mode are described in the following table.

Test Graphs
PSD NVNT b 2412MHz Ant1

PSD NVNT b 2412MHz Ant2


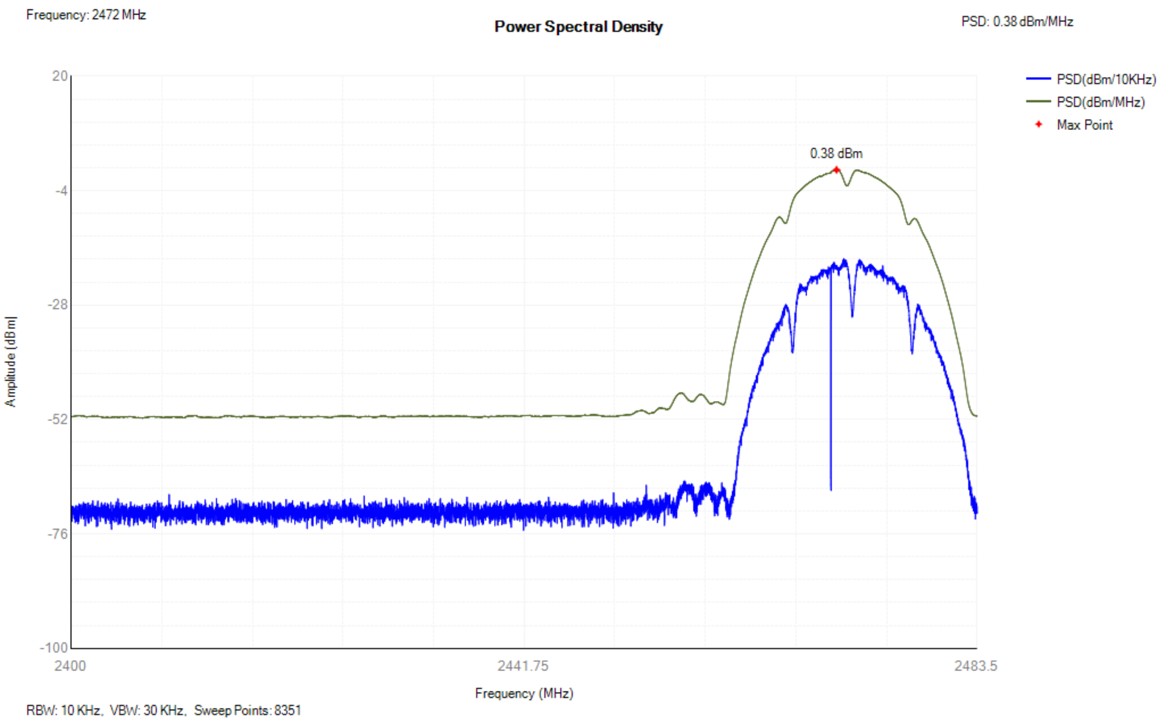
PSD NVNT b 2442MHz Ant1



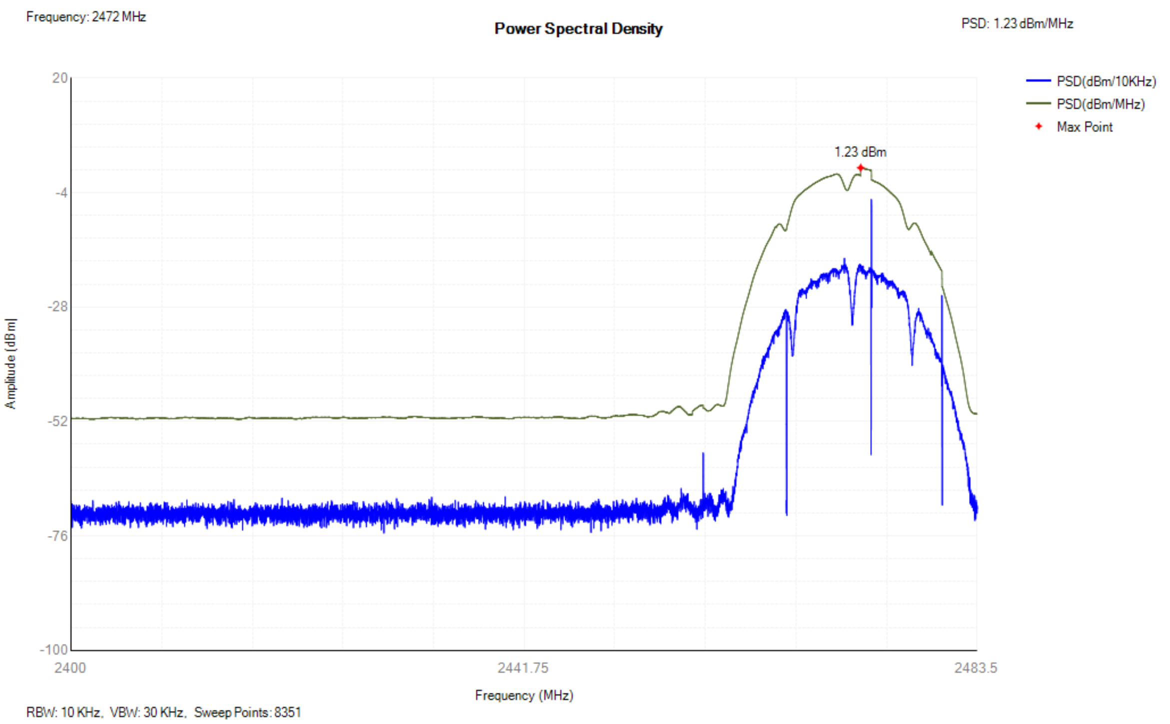
PSD NVNT b 2442MHz Ant2



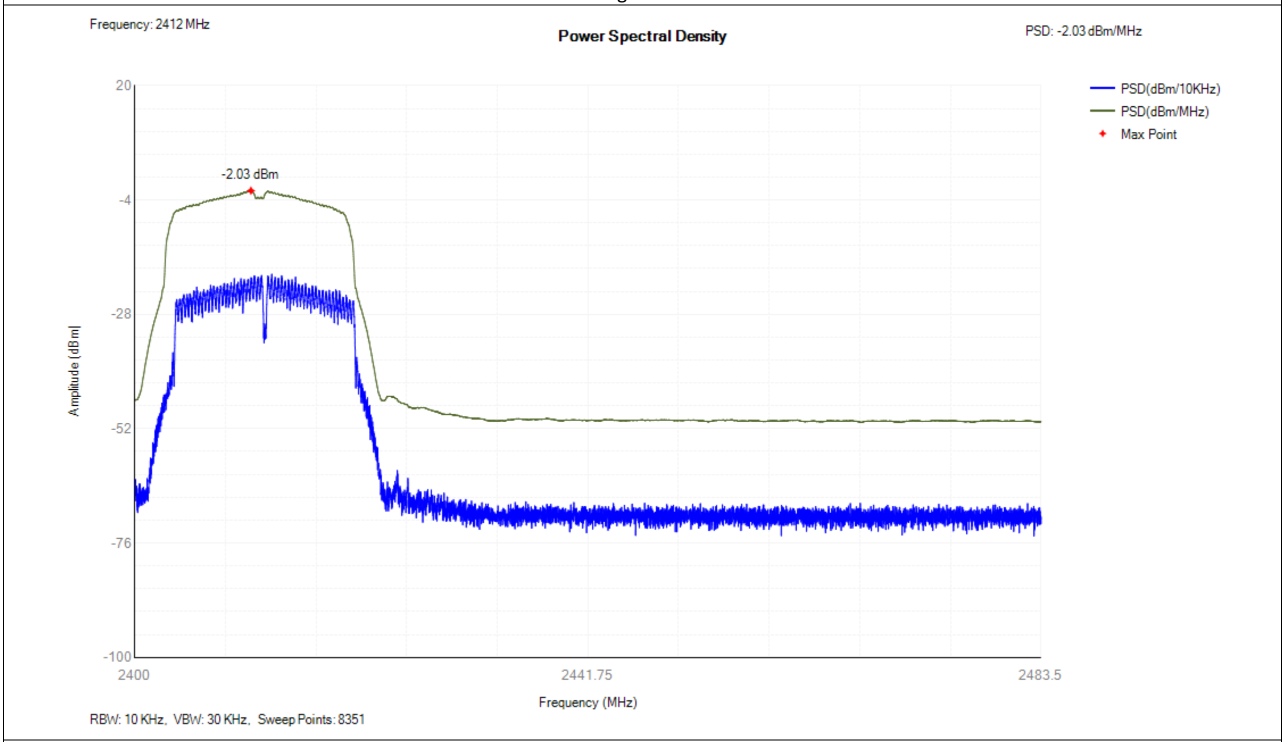
PSD NVNT b 2472MHz Ant1



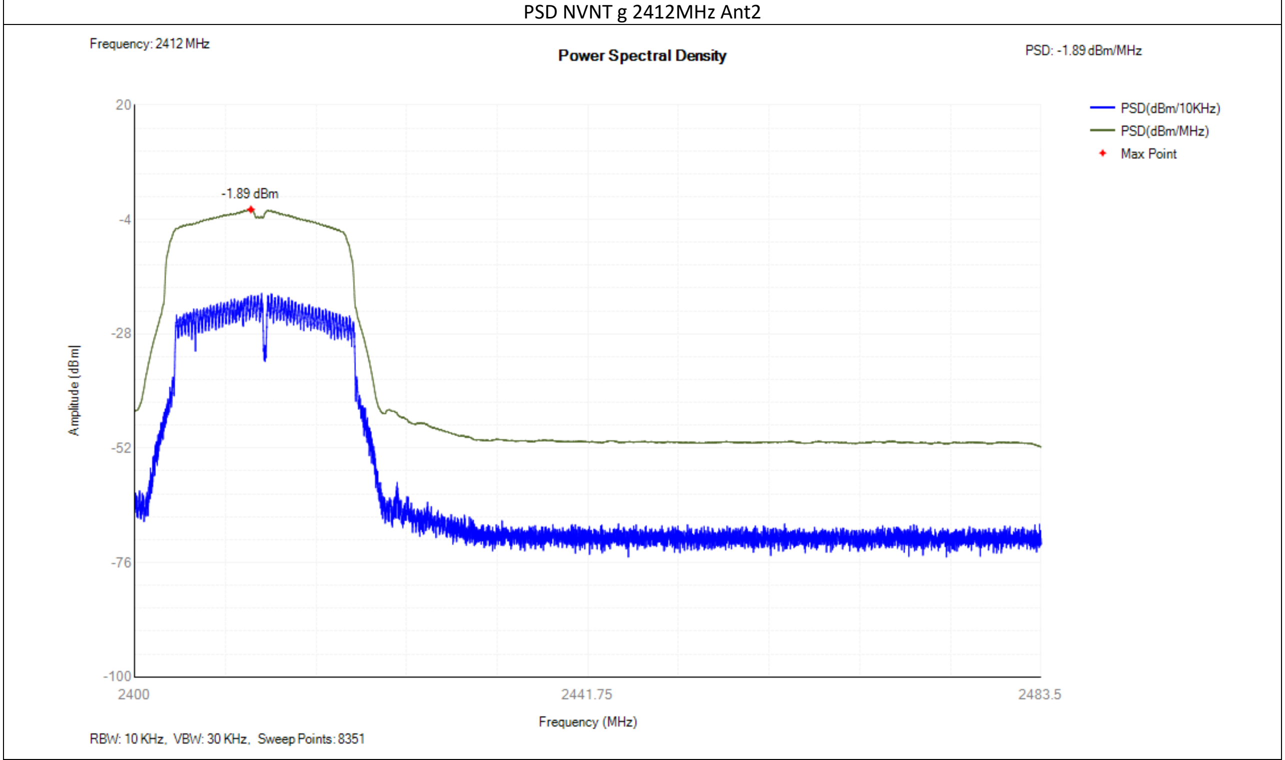
PSD NVNT b 2472MHz Ant2



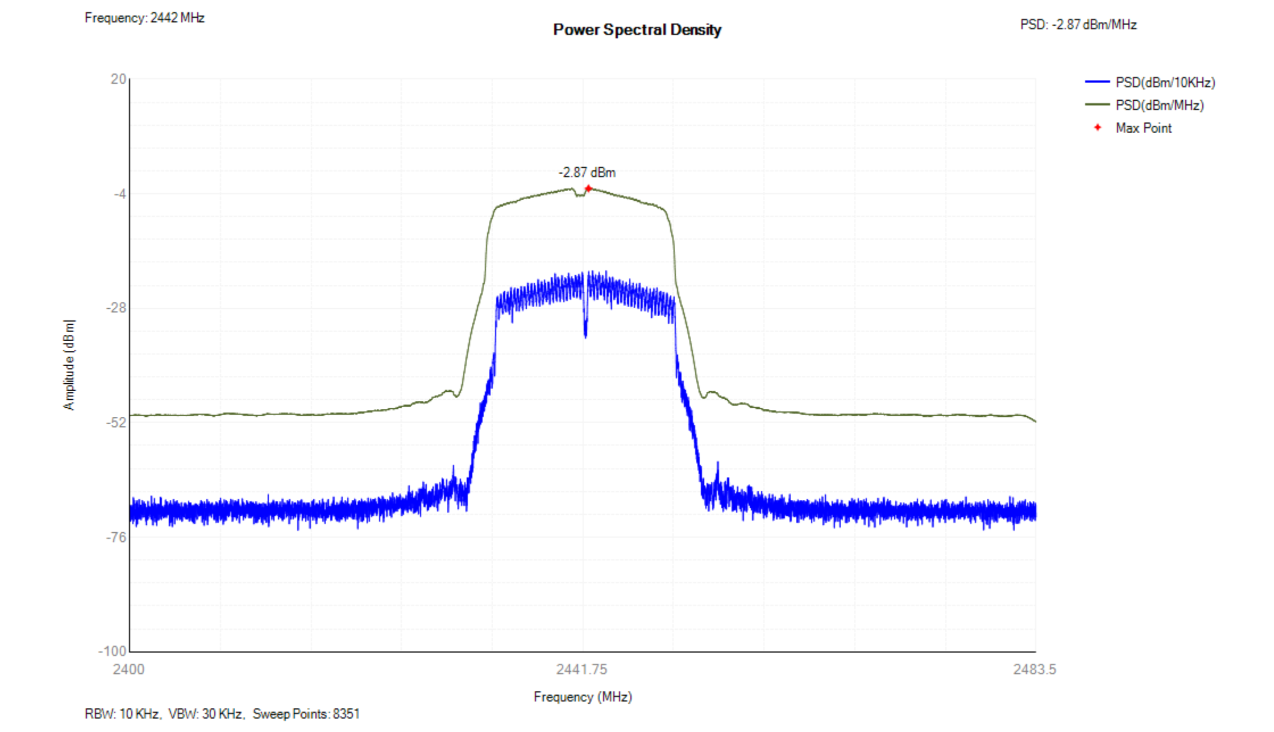
PSD NVNT g 2412MHz Ant1



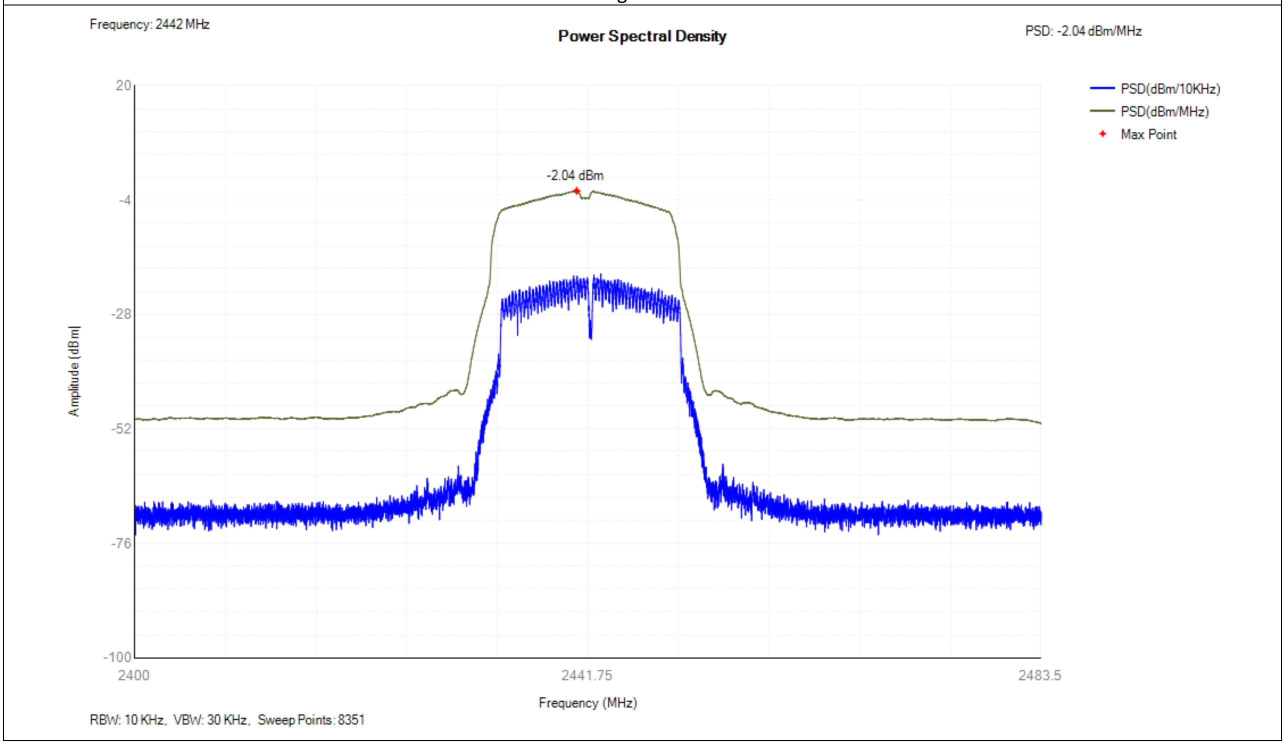
PSD NVNT g 2412MHz Ant2



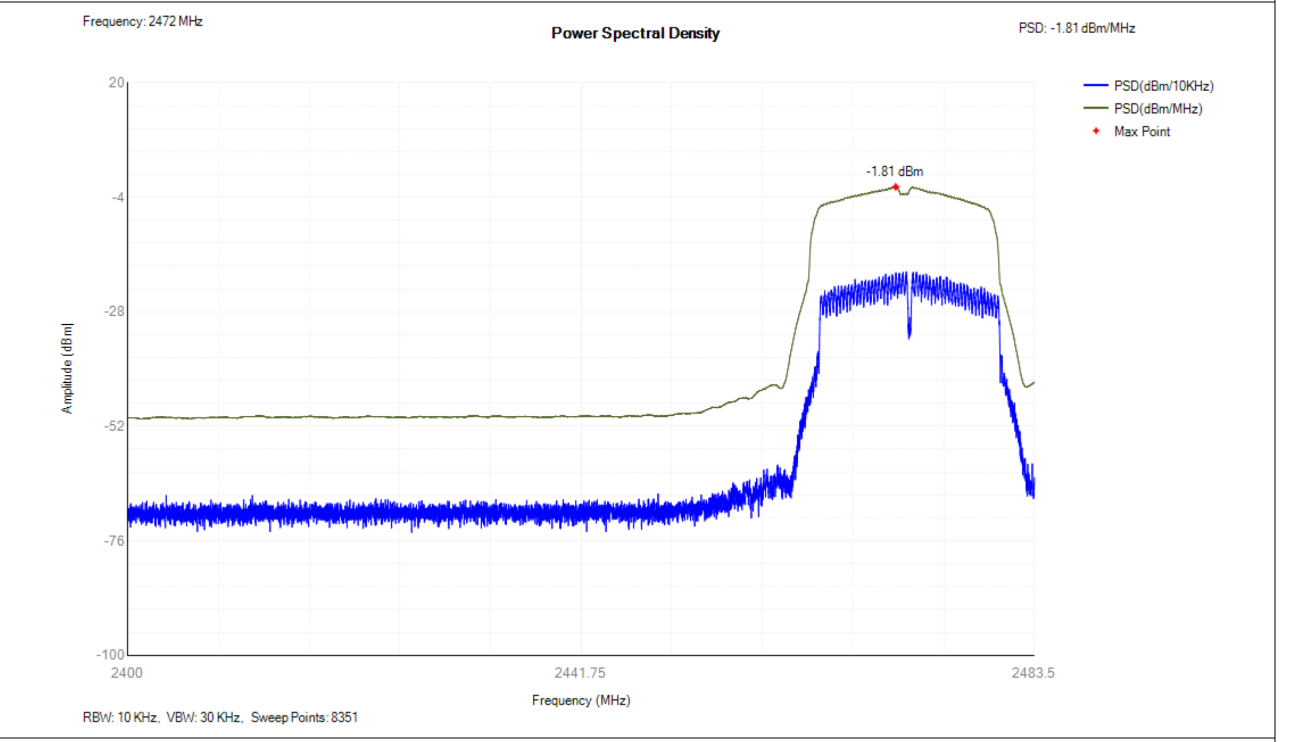
PSD NVNT g 2442MHz Ant1



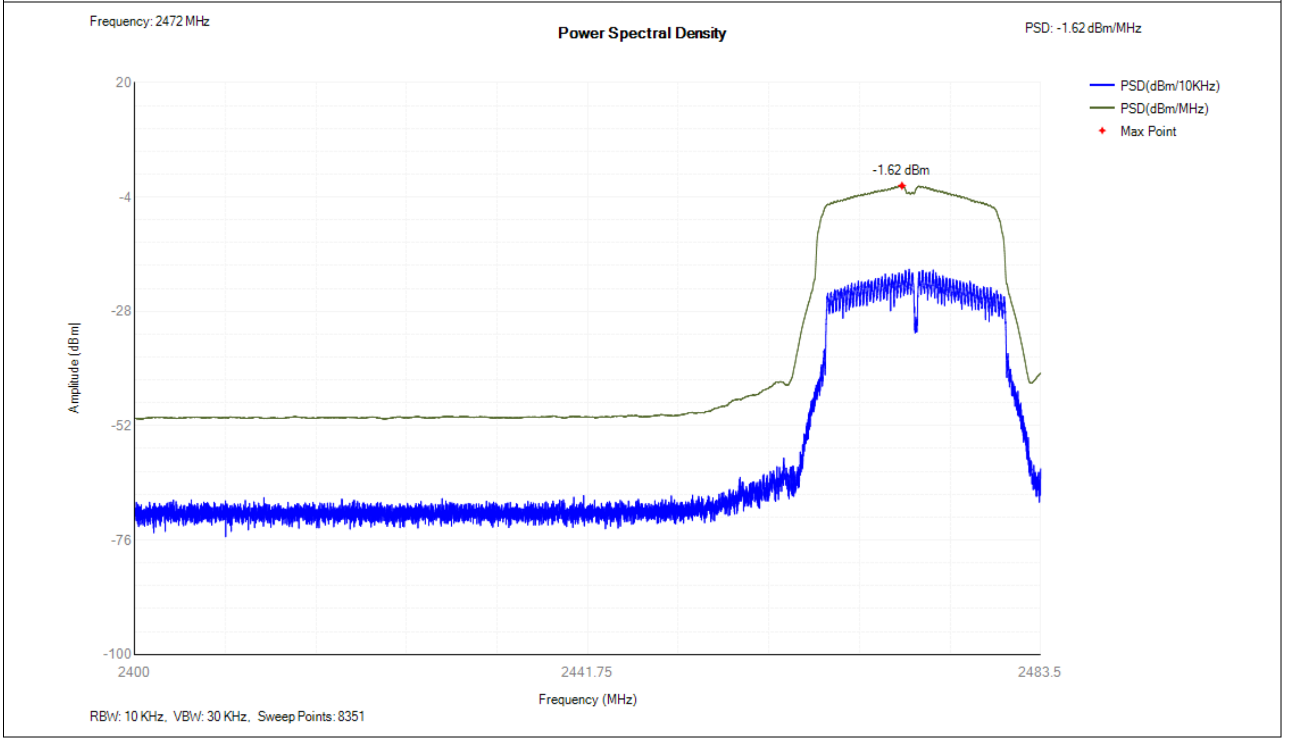
PSD NVNT g 2442MHz Ant2



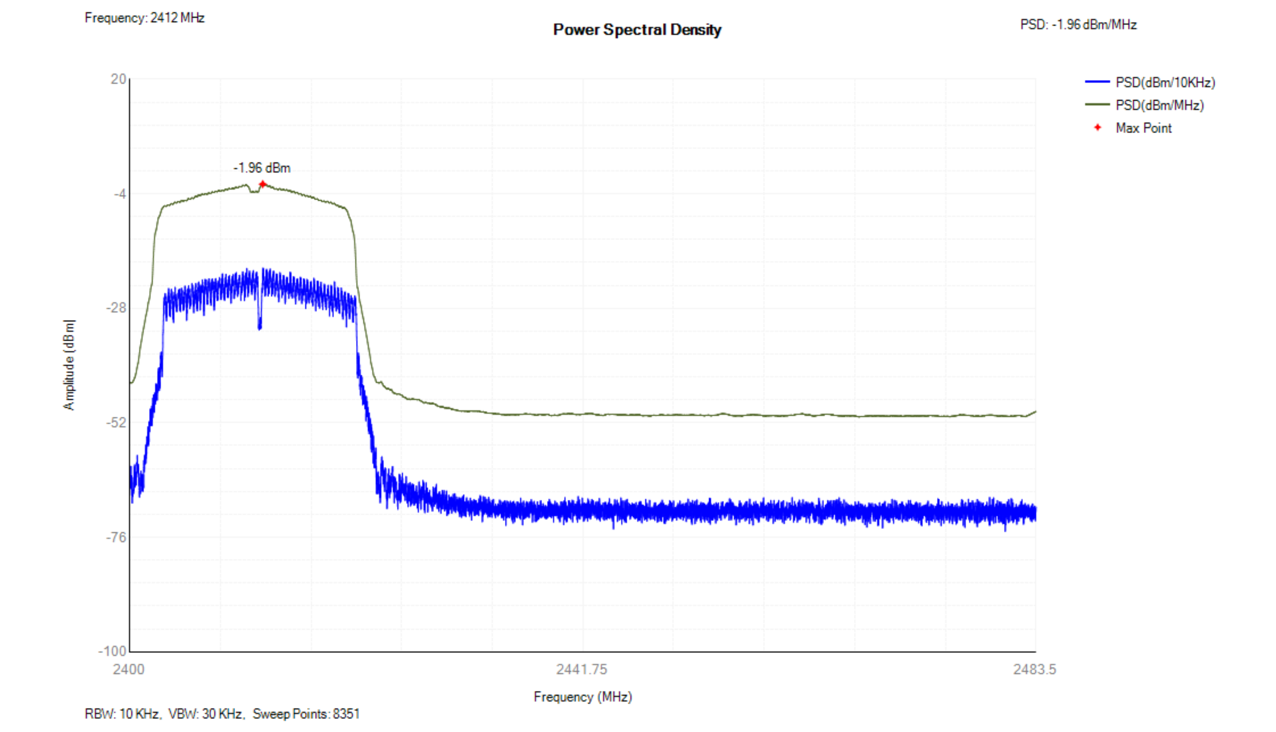
PSD NVNT g 2472MHz Ant1



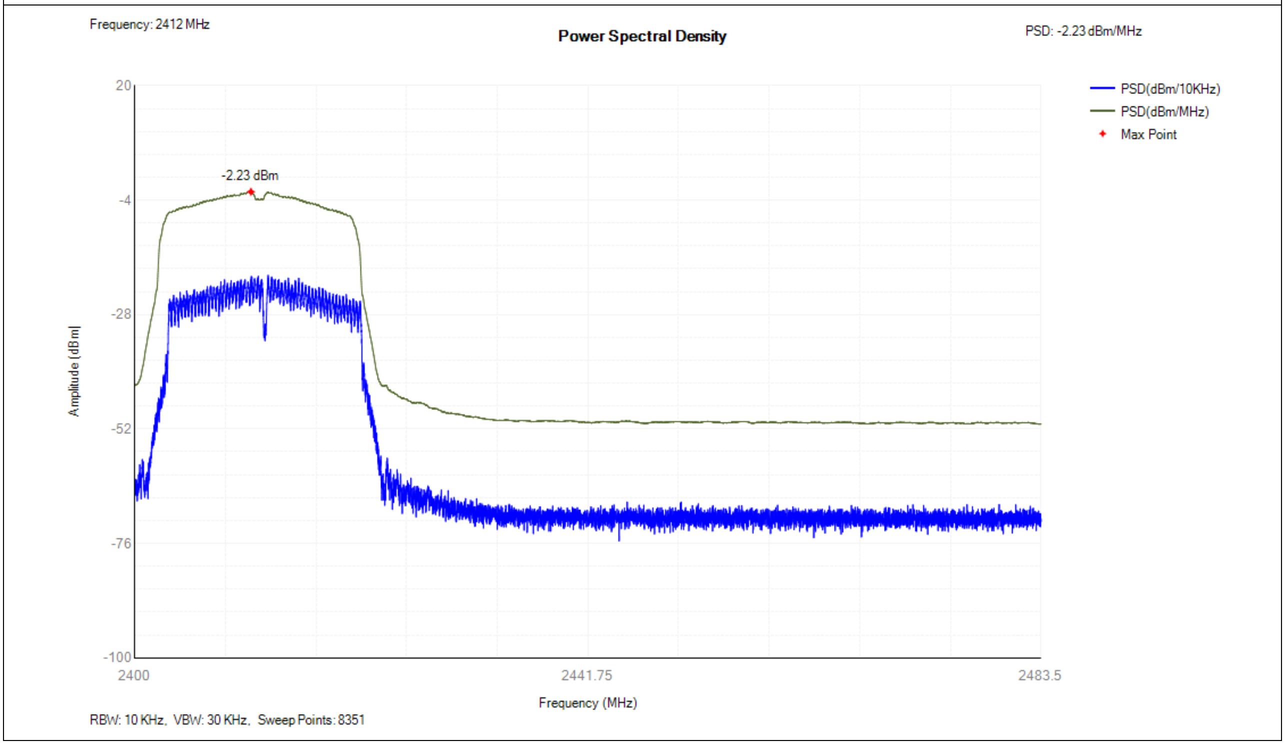
PSD NVNT g 2472MHz Ant2



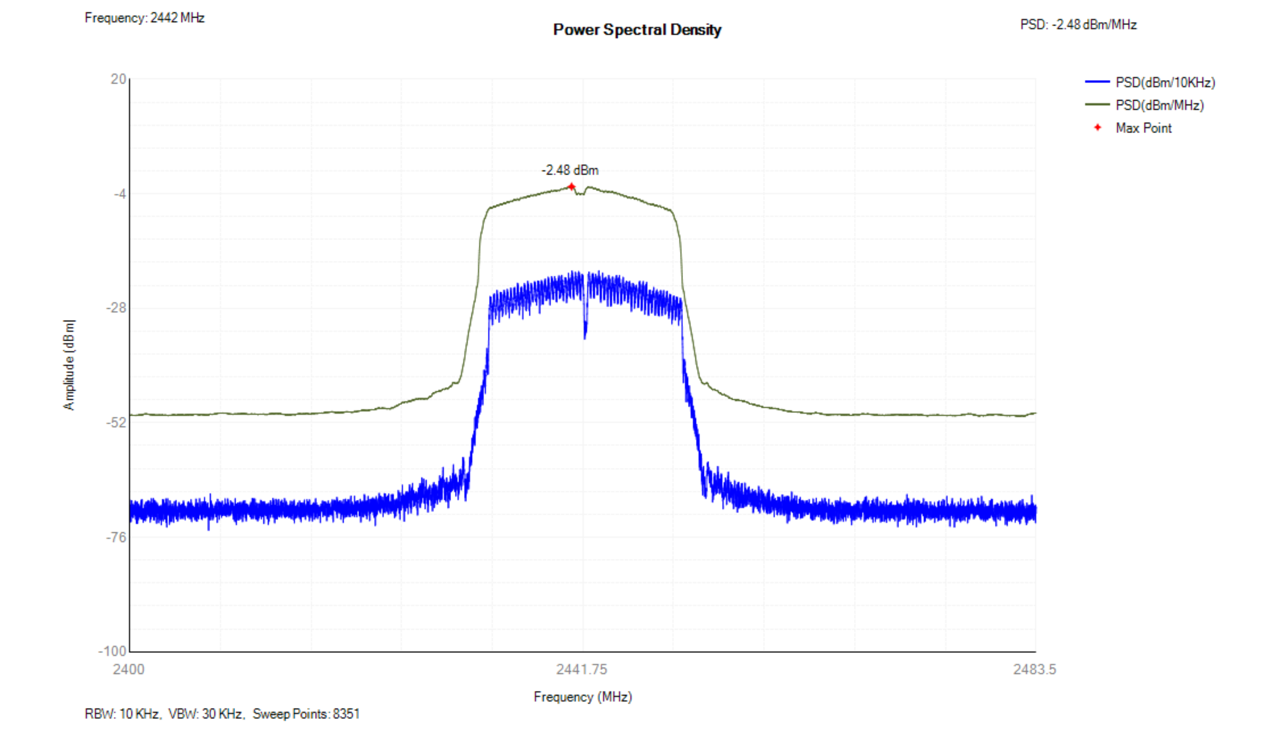
PSD NVNT n20 2412MHz Ant1



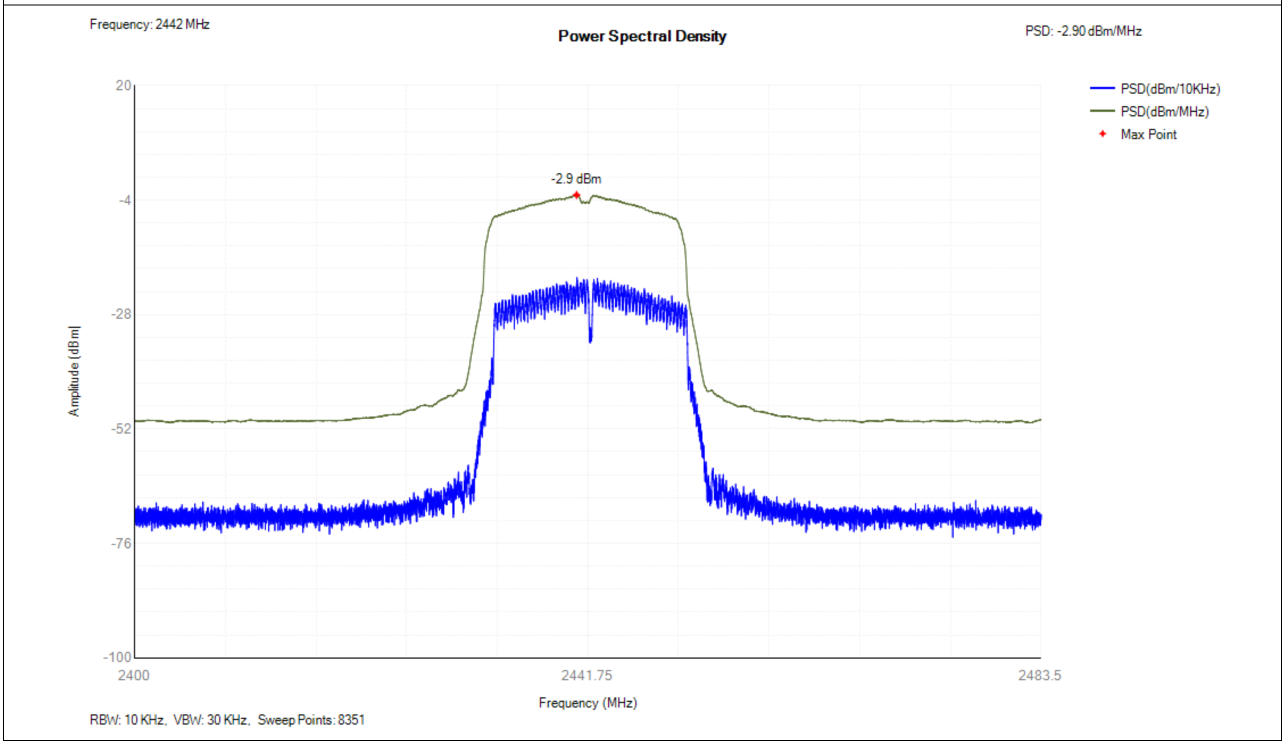
PSD NVNT n20 2412MHz Ant2



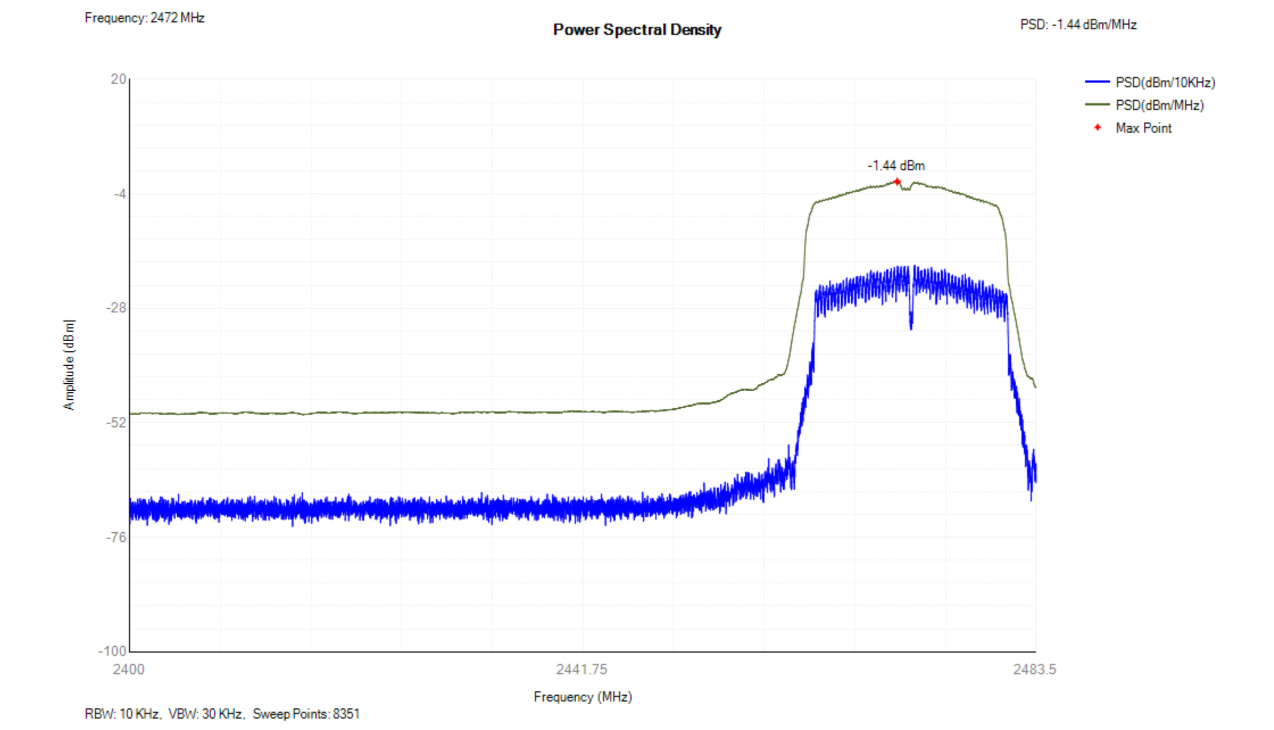
PSD NVNT n20 2442MHz Ant1



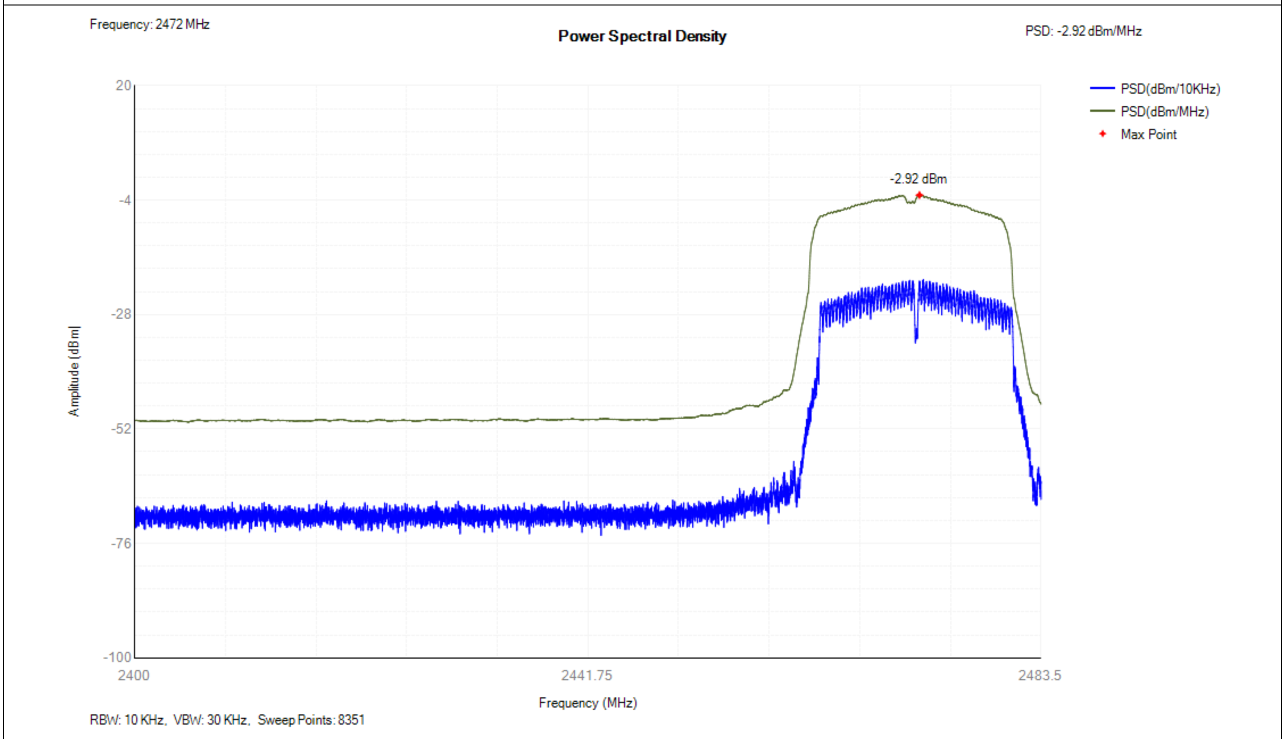
PSD NVNT n20 2442MHz Ant2



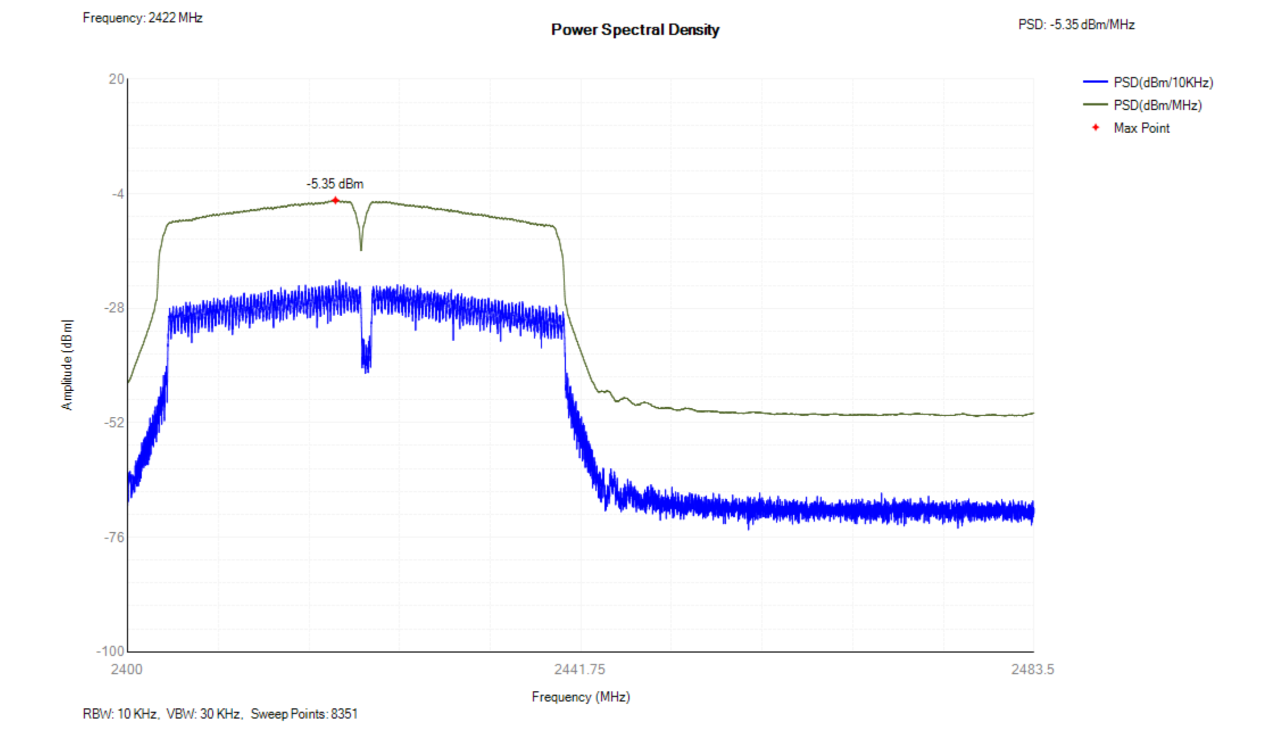
PSD NVNT n20 2472MHz Ant1



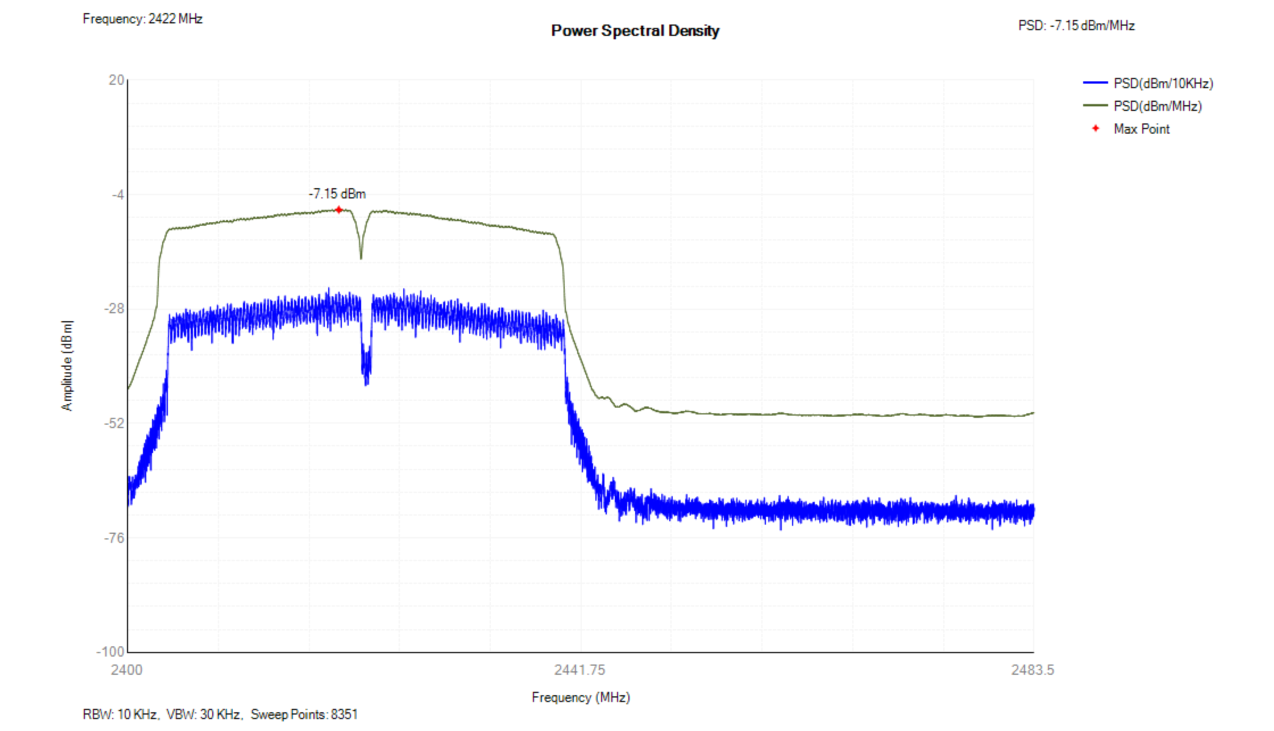
PSD NVNT n20 2472MHz Ant2



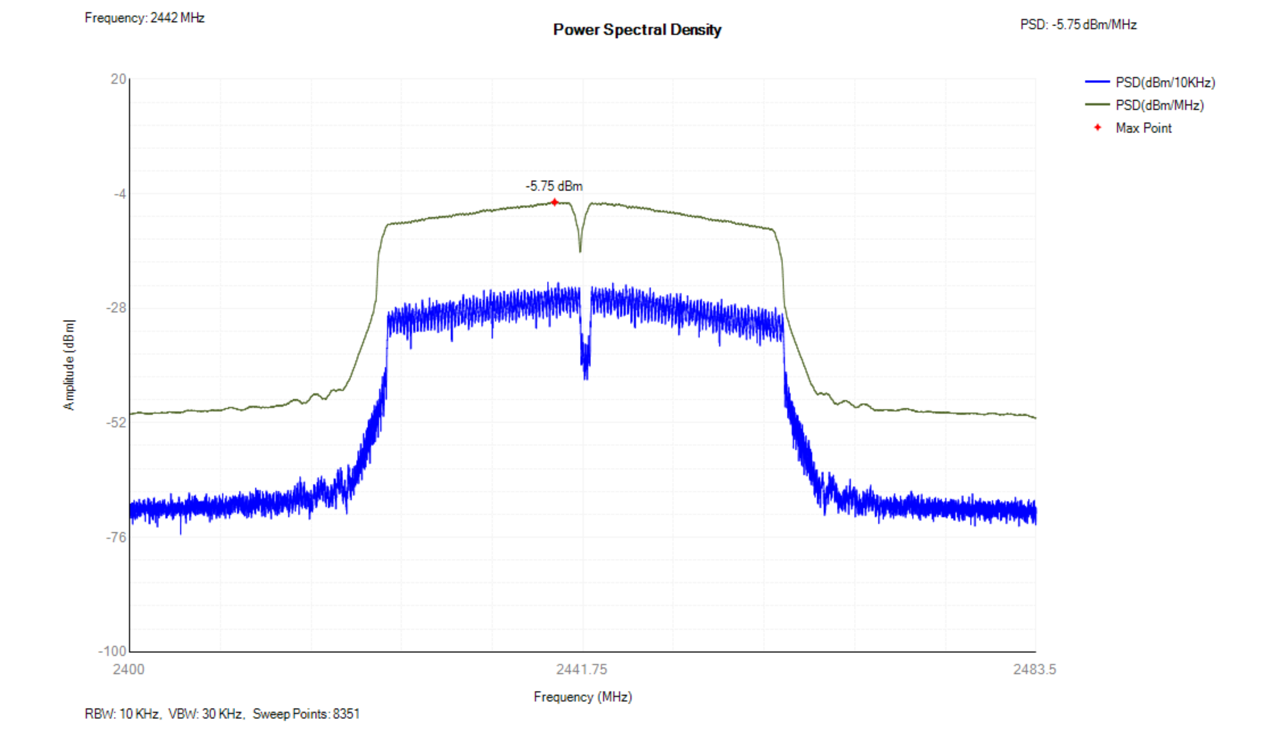
PSD NVNT n40 2422MHz Ant1



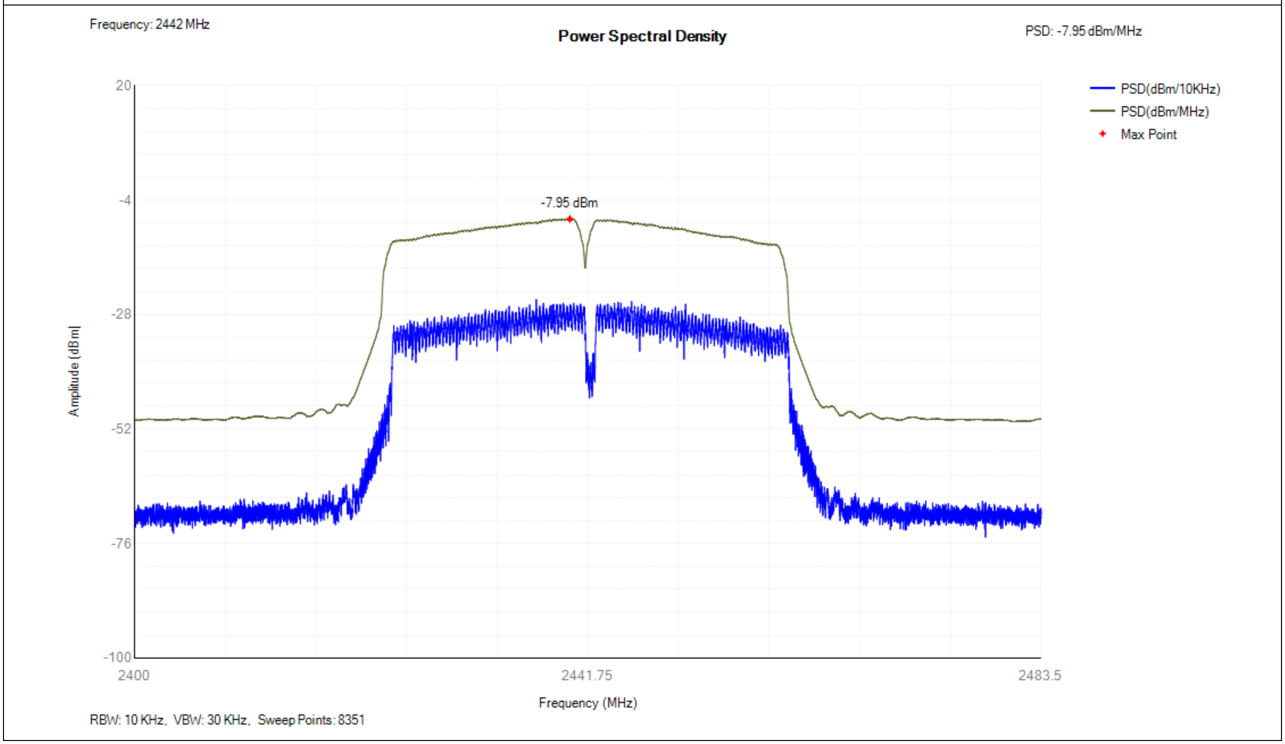
PSD NVNT n40 2422MHz Ant2



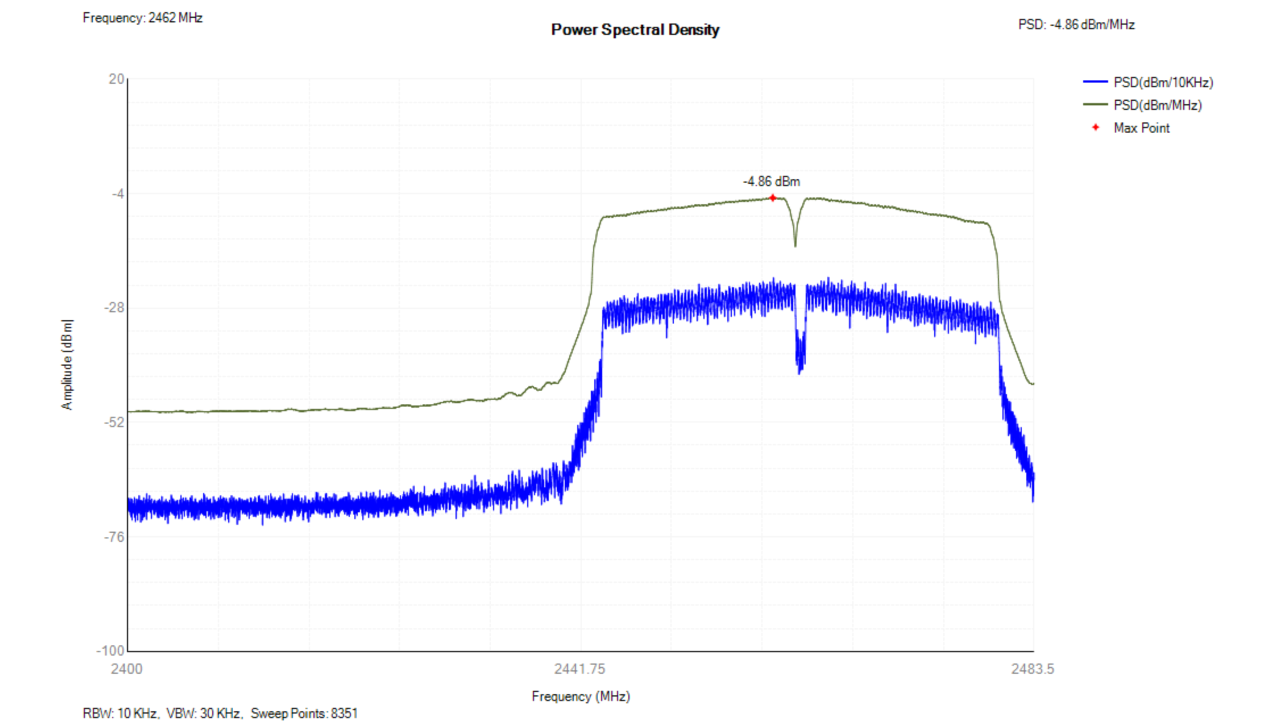
PSD NVNT n40 2442MHz Ant1



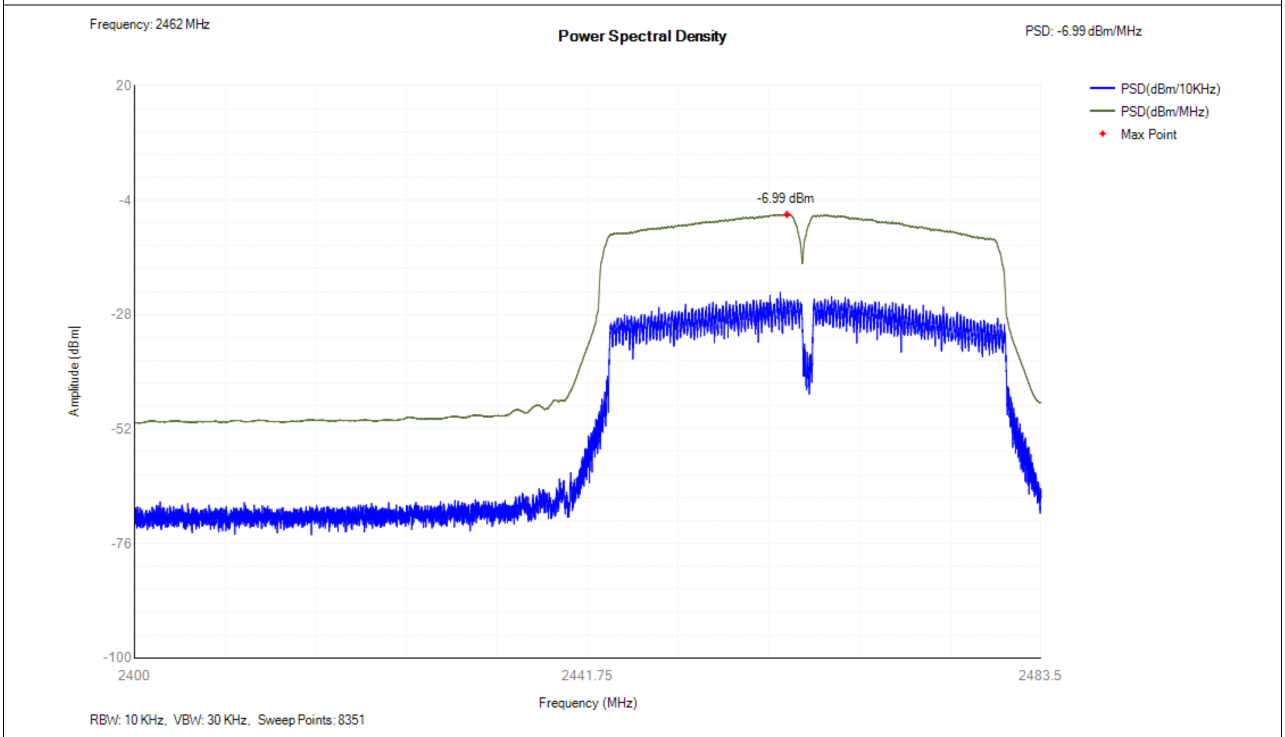
PSD NVNT n40 2442MHz Ant2



PSD NVNT n40 2462MHz Ant1



PSD NVNT n40 2462MHz Ant2



8.3 OCCUPIED CHANNEL BANDWIDTH

8.3.1 Applicable standard

ETSI EN 300 328 clause 4.3.2.7

8.3.2 Conformance Limit

The Occupied Channel Bandwidth for each hopping frequency shall fall completely within the band 2400-2483.5MHz.
For non-adaptive Frequency Hopping equipment with e.i.r.p. greater than 10 dBm, the Occupied Channel Bandwidth for every occupied hopping frequency shall be equal to or less than the Nominal Channel Bandwidth declared by the manufacturer. See clause 5.4.1 j). This declared value shall not be greater than 5 MHz.

The requirement applies to all types of equipment using wide band modulation other than FHSS
The occupied channel bandwidth is the bandwidth that contains 99% of the power of the signal
The Occupied Channel Bandwidth shall fall completely within the band 2400-2483.5MHz
In addition, for non-adaptive equipment using wide band modulations other than FHSS and with e.i.r.p. greater than 10 dBm, the occupied channel bandwidth shall be less than 20 MHz.

8.3.3 Test Configuration

The measurements for occupied channel bandwidth shall be performed at normal environmental conditions of the operating temperature range.

Radiated measurements shall only be used for integral antenna equipment that does not have a temporary antenna connector(s) provided.

Conducted measurements shall be used for antenna equipment provided a temporary antenna connector(s).

8.3.4 Test Procedure

1. Please refer to ETSI EN 300 328(V2.2.2) clause 5.4.7.1 for the test conditions.
2. Please refer to ETSI EN 300 328 (V2.2.2) clause 5.4.7.2 for the measurement method.

The measurement procedure shall be as follows:
■ Conducted measurement
Step 1:
Connect the UUT to the spectrum analyser and use the following settings:
• Centre Frequency: The centre frequency of the channel under test
• Resolution BW: ~ 1 % of the span without going below 1 %
• Video BW: 3 × RBW
• Frequency Span: 2 × Nominal Channel Bandwidth
• Detector Mode: RMS
• Trace Mode: Max Hold
• Sweep time: 1 s
Step 2:
Wait for the trace to stabilize.
Find the peak value of the trace and place the analyser marker on this peak.
Step 3:
Use the 99 % bandwidth function of the spectrum analyser to measure the Occupied Channel Bandwidth of the UUT. This value shall be recorded.
Make sure that the power envelope is sufficiently above the noise floor of the analyser to avoid the noise signals left and right from the power envelope being taken into account by this measurement.
■ Radiated measurement
The test set up as described in annex B and the applicable measurement procedures described in annex C shall be used.
Alternatively, a test fixture may be used.
The test procedure is as described under clause 5.4.7.2.1.

8.3.5 Test Results

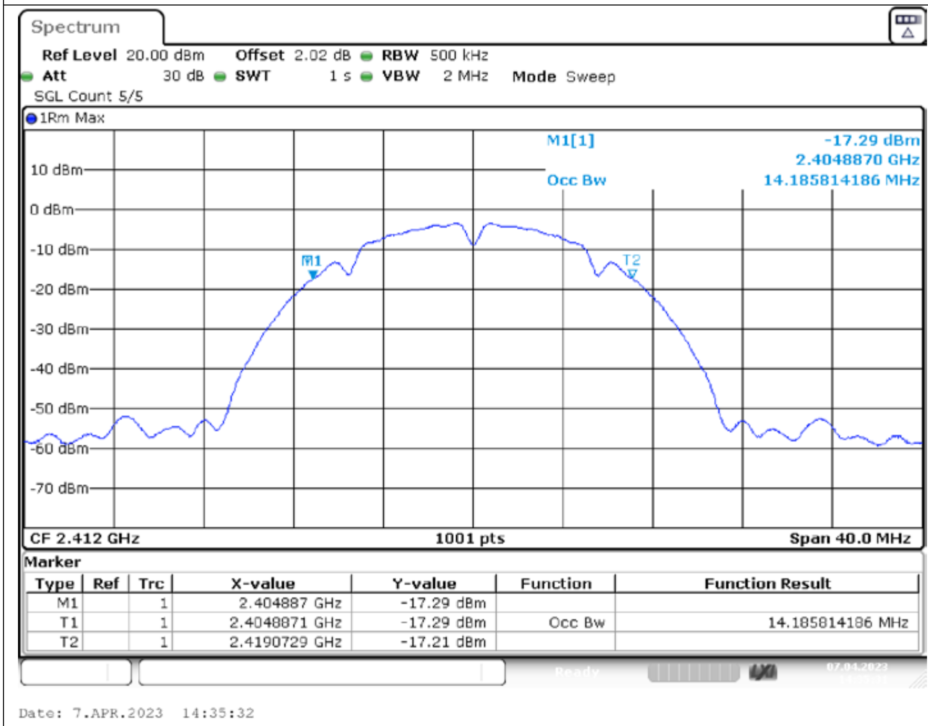
Wifi 2.4G ANT1			
Temperature:	25ºC	Test Date:	April 07, 2023
Humidity:	55 % RH	Tested by:	Fan

Condition	Mode	Frequency (MHz)	Antenna	Center Frequency (MHz)	OBW (MHz)	Lower Edge (MHz)	Upper Edge (MHz)	Limit OBW (MHz)	Verdict
NVNT	b	2412	Ant1	2411.98	14.186	2404.887	2419.073	20	Pass
NVNT	b	2412	Ant2	2411.96	14.146	2404.887	2419.033	20	Pass
NVNT	b	2442	Ant1	2441.94	14.106	2434.887	2448.993	20	Pass
NVNT	b	2442	Ant2	2441.96	14.146	2434.887	2449.033	20	Pass
NVNT	b	2472	Ant1	2471.96	14.226	2464.847	2479.073	20	Pass
NVNT	b	2472	Ant2	2471.94	14.186	2464.847	2479.033	20	Pass
NVNT	g	2412	Ant1	2411.98	16.424	2403.768	2420.192	20	Pass
NVNT	g	2412	Ant2	2411.98	16.424	2403.768	2420.192	20	Pass
NVNT	g	2442	Ant1	2441.98	16.424	2433.768	2450.192	20	Pass
NVNT	g	2442	Ant2	2441.98	16.424	2433.768	2450.192	20	Pass
NVNT	g	2472	Ant1	2471.98	16.424	2463.768	2480.192	20	Pass
NVNT	g	2472	Ant2	2471.98	16.424	2463.768	2480.192	20	Pass
NVNT	n20	2412	Ant1	2412	17.582	2403.209	2420.791	20	Pass
NVNT	n20	2412	Ant2	2411.96	17.582	2403.169	2420.751	20	Pass
NVNT	n20	2442	Ant1	2442	17.582	2433.209	2450.791	20	Pass
NVNT	n20	2442	Ant2	2442	17.582	2433.209	2450.791	20	Pass
NVNT	n20	2472	Ant1	2472	17.582	2463.209	2480.791	20	Pass
NVNT	n20	2472	Ant2	2471.96	17.582	2463.169	2480.751	20	Pass
NVNT	n40	2422	Ant1	2421.96	36.044	2403.938	2439.982	40	Pass
NVNT	n40	2422	Ant2	2421.96	36.044	2403.938	2439.982	40	Pass
NVNT	n40	2442	Ant1	2441.92	35.964	2423.938	2459.902	40	Pass
NVNT	n40	2442	Ant2	2441.92	35.964	2423.938	2459.902	40	Pass
NVNT	n40	2462	Ant1	2461.92	35.964	2443.938	2479.902	40	Pass
NVNT	n40	2462	Ant2	2461.92	35.964	2443.938	2479.902	40	Pass

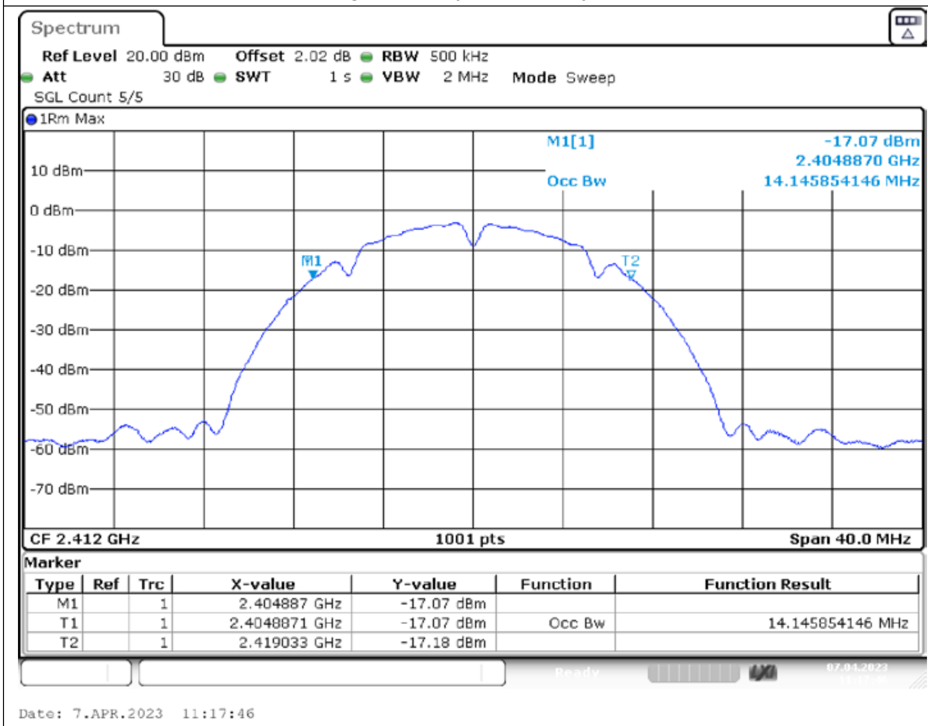
All the modulation modes were tested, the data of the worst mode are described in the following table.

Test Graphs

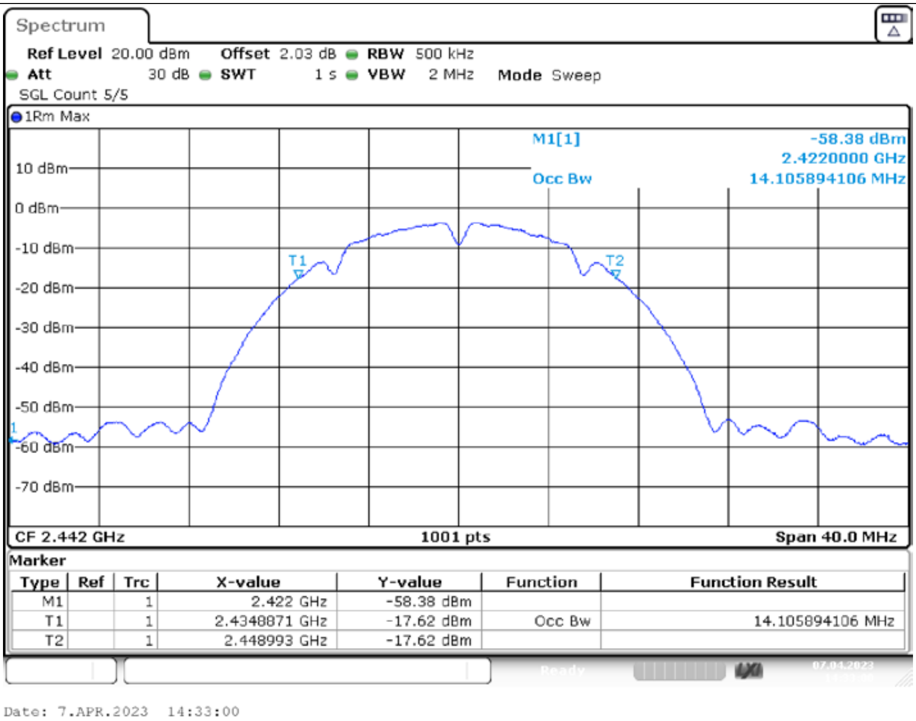
OBW NVNT b 2412MHz Ant1



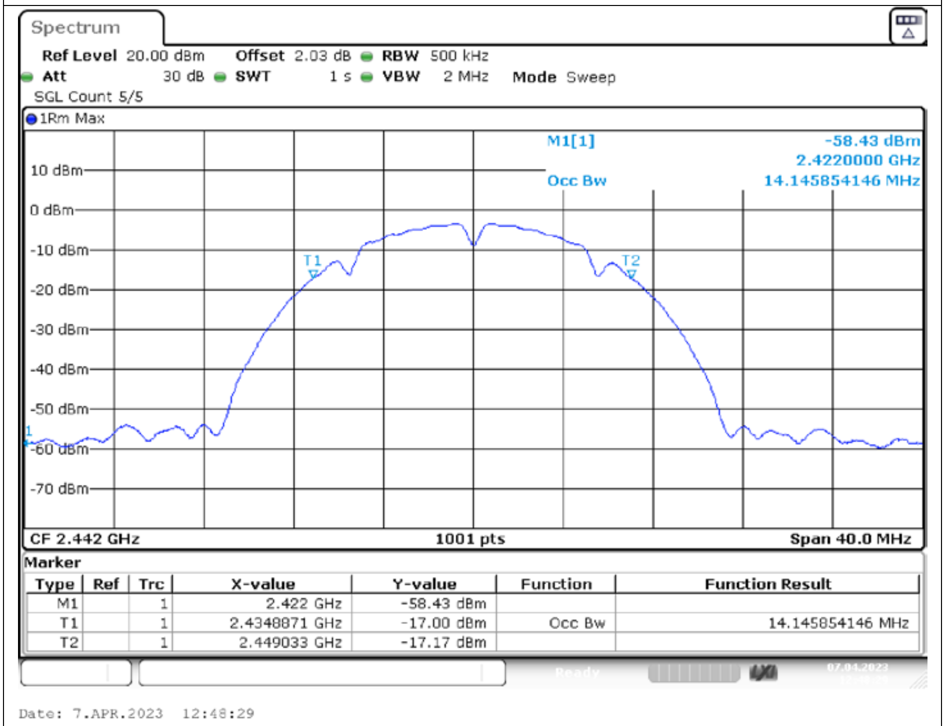
OBW NVNT b 2412MHz Ant2



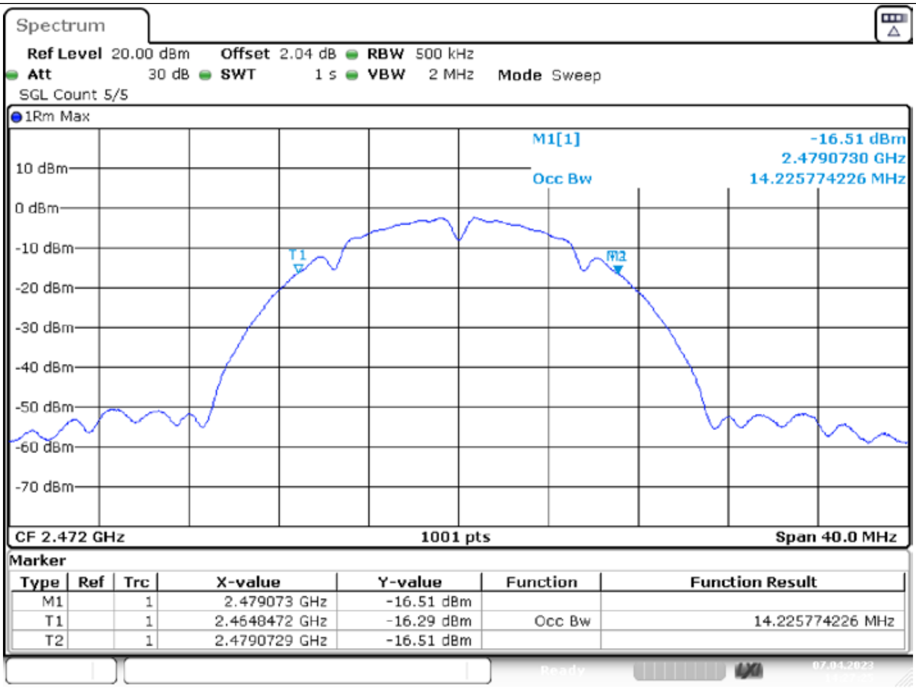
OBW NVNT b 2442MHz Ant1



OBW NVNT b 2442MHz Ant2

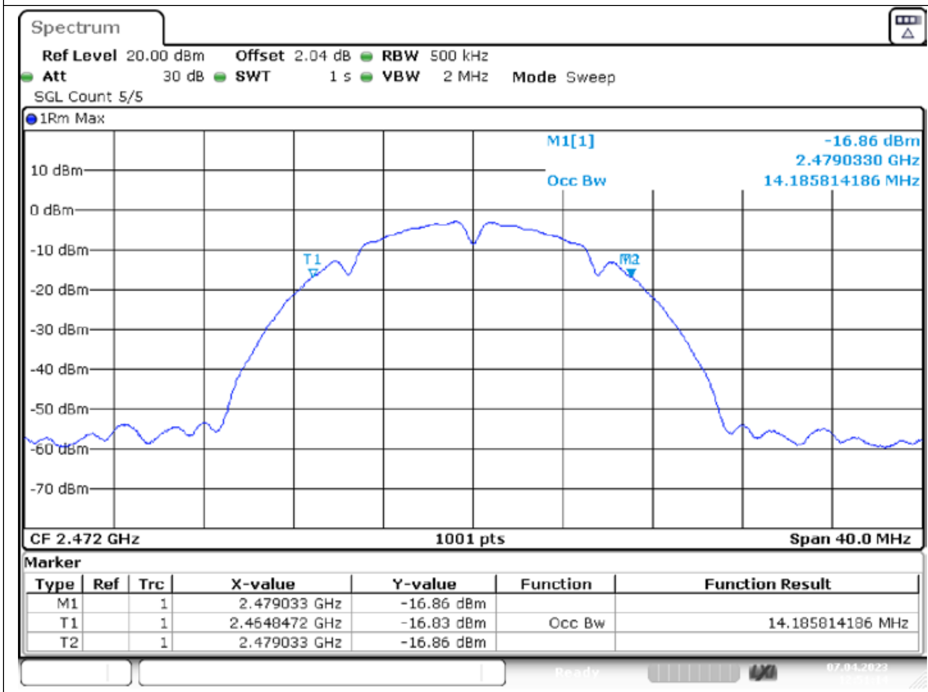


OBW NVNT b 2472MHz Ant1



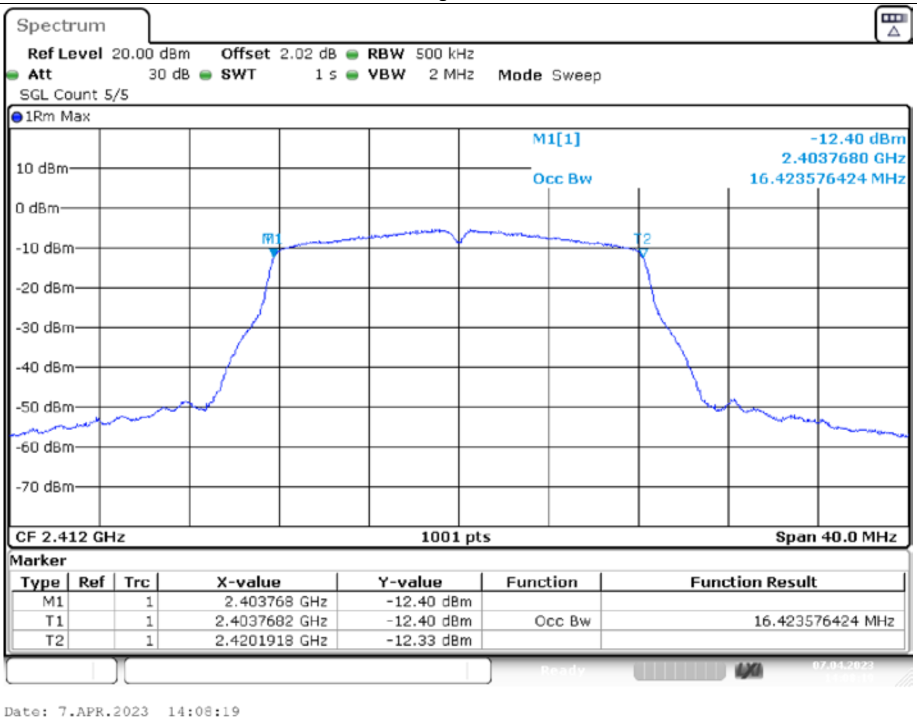
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.479073 GHz	-16.51 dBm		
T1		1	2.4648472 GHz	-16.29 dBm	Occ Bw	14.225774226 MHz
T2		1	2.4790729 GHz	-16.51 dBm		

OBW NVNT b 2472MHz Ant2

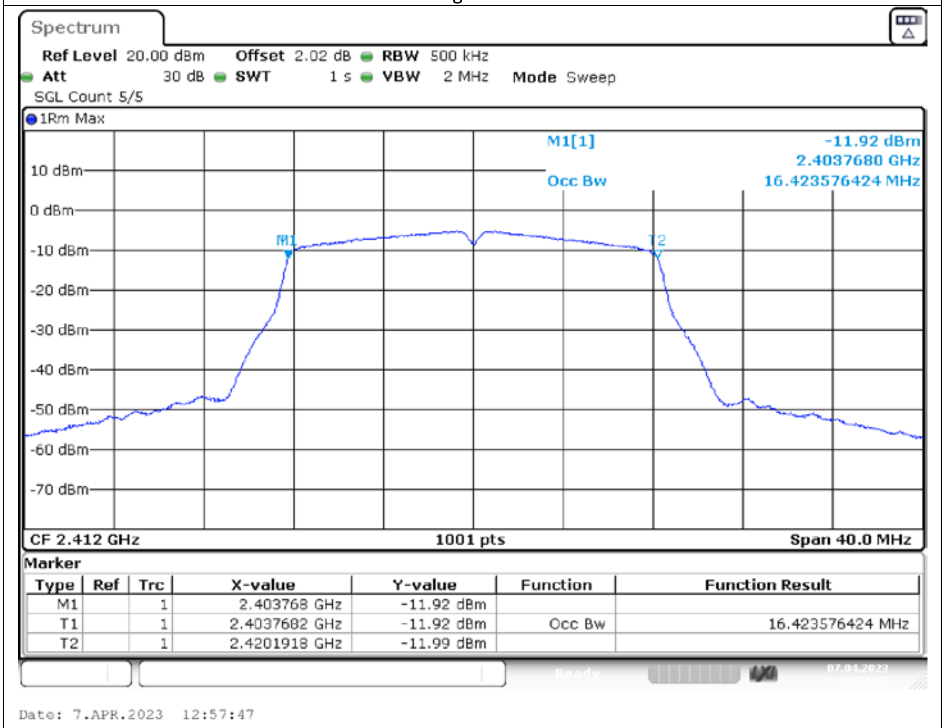


Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.479033 GHz	-16.86 dBm		
T1		1	2.4648472 GHz	-16.83 dBm	Occ Bw	14.185814186 MHz
T2		1	2.479033 GHz	-16.86 dBm		

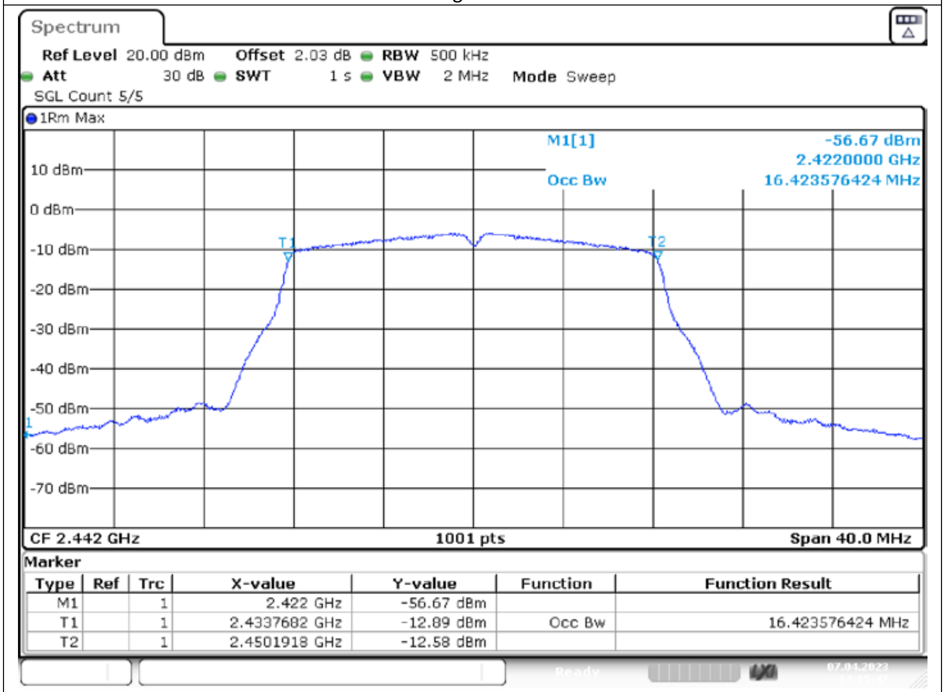
OBW NVNT g 2412MHz Ant1



OBW NVNT g 2412MHz Ant2

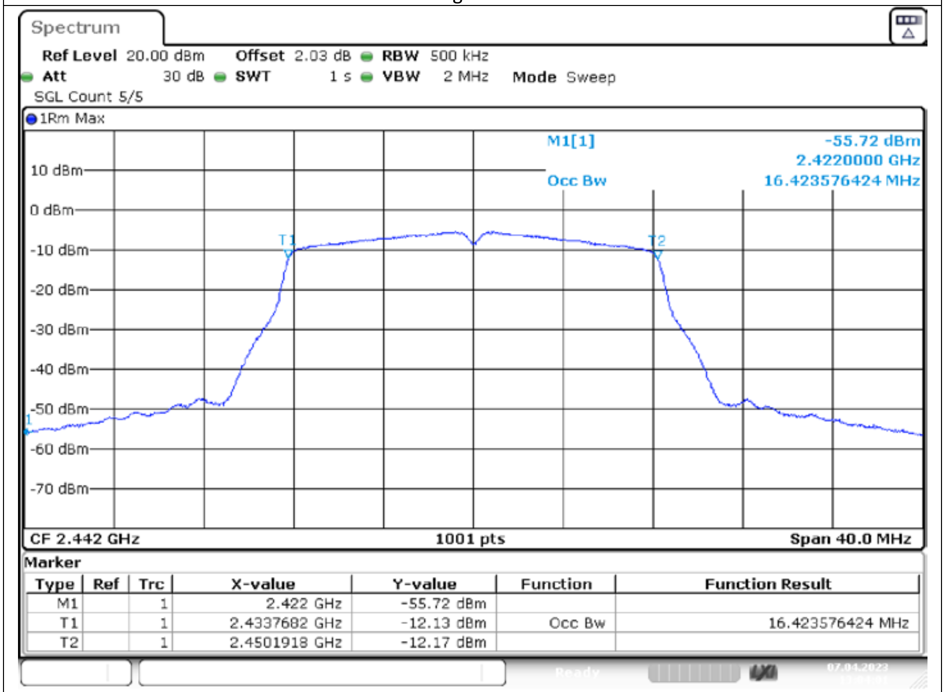


OBW NVNT g 2442MHz Ant1



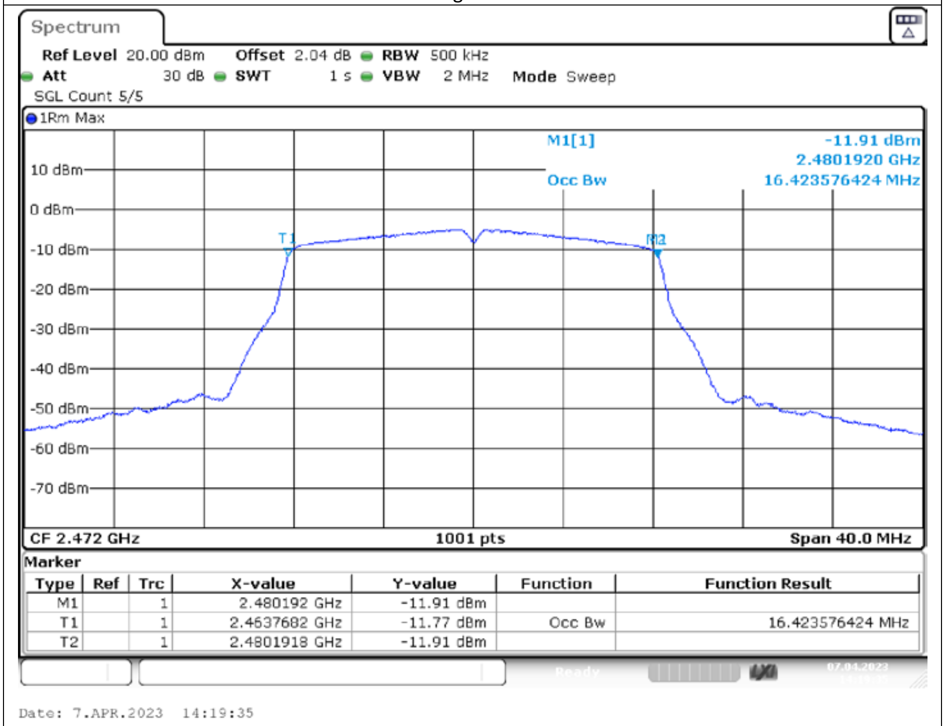
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.422 GHz	-56.67 dBm		
T1		1	2.4337682 GHz	-12.89 dBm	Occ Bw	16.423576424 MHz
T2		1	2.4501918 GHz	-12.58 dBm		

OBW NVNT g 2442MHz Ant2

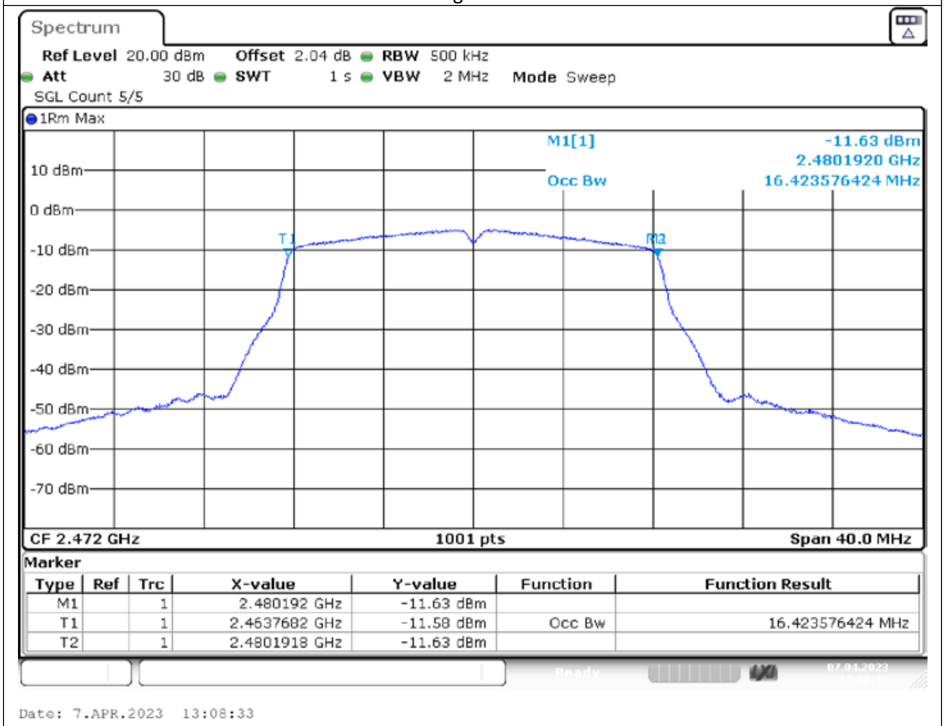


Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.422 GHz	-55.72 dBm		
T1		1	2.4337682 GHz	-12.13 dBm	Occ Bw	16.423576424 MHz
T2		1	2.4501918 GHz	-12.17 dBm		

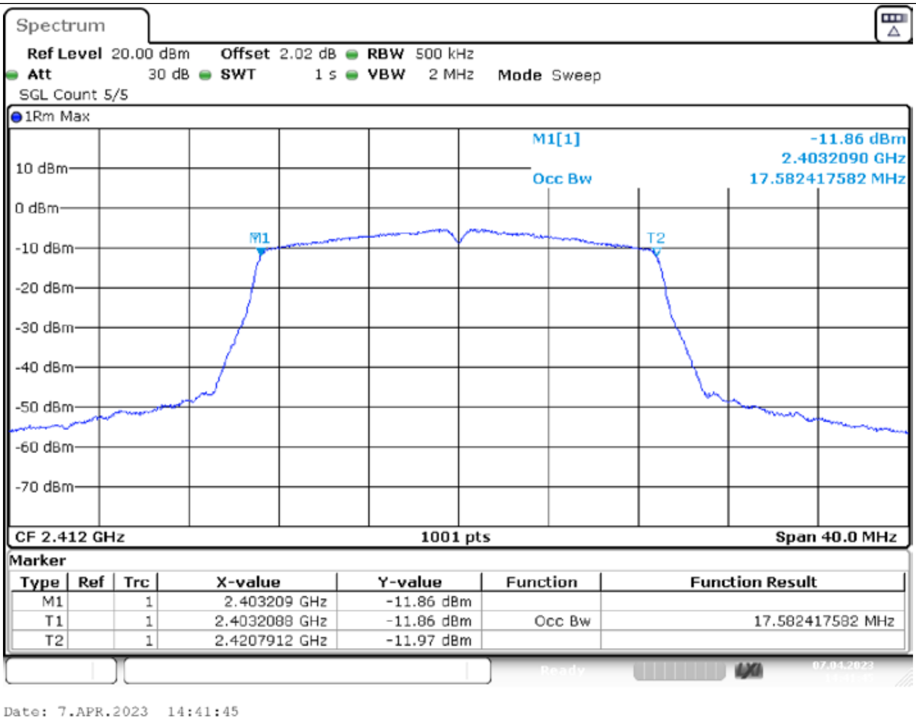
OBW NVNT g 2472MHz Ant1



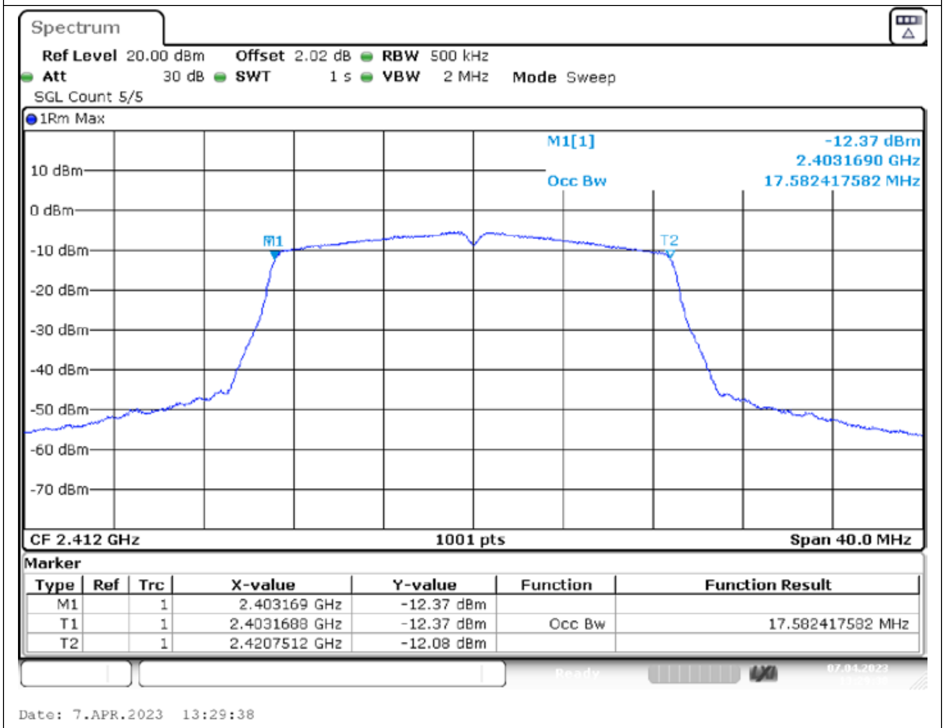
OBW NVNT g 2472MHz Ant2



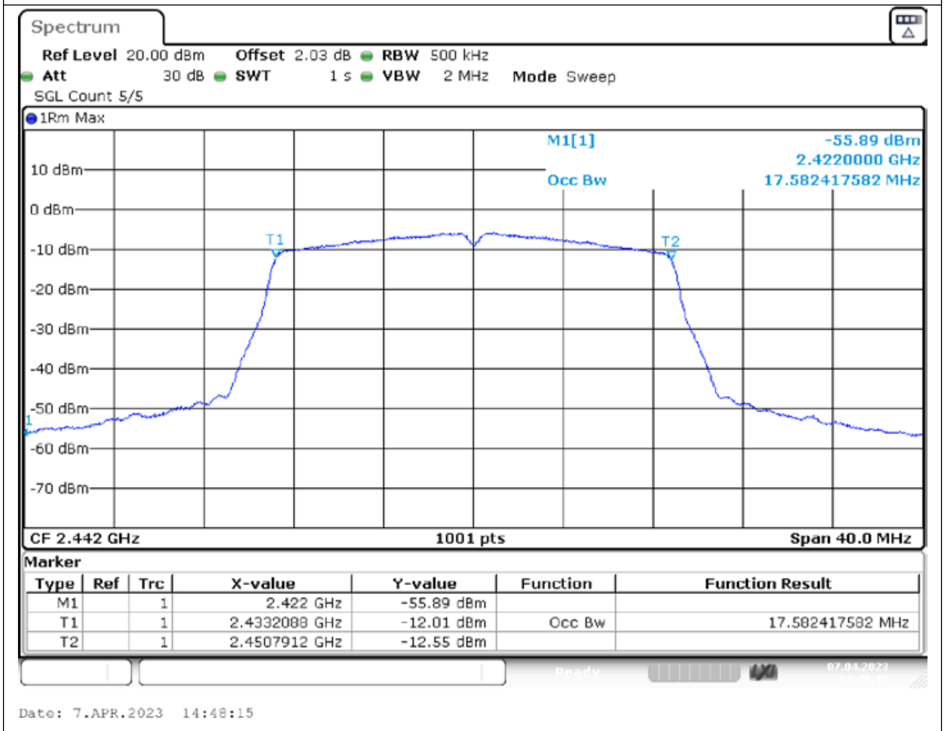
OBW NVNT n20 2412MHz Ant1



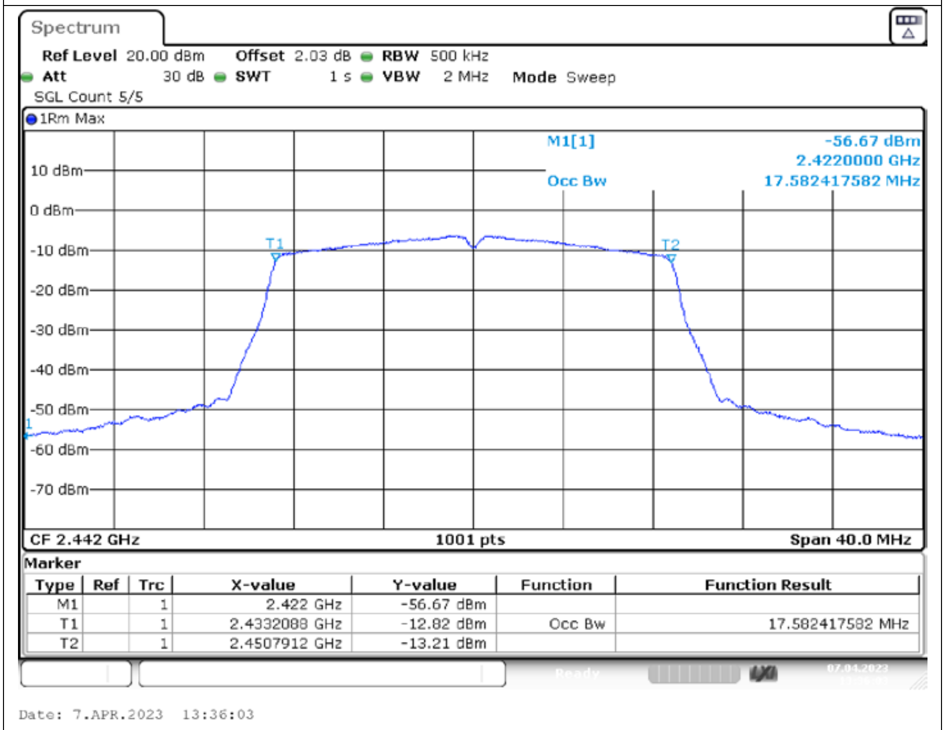
OBW NVNT n20 2412MHz Ant2



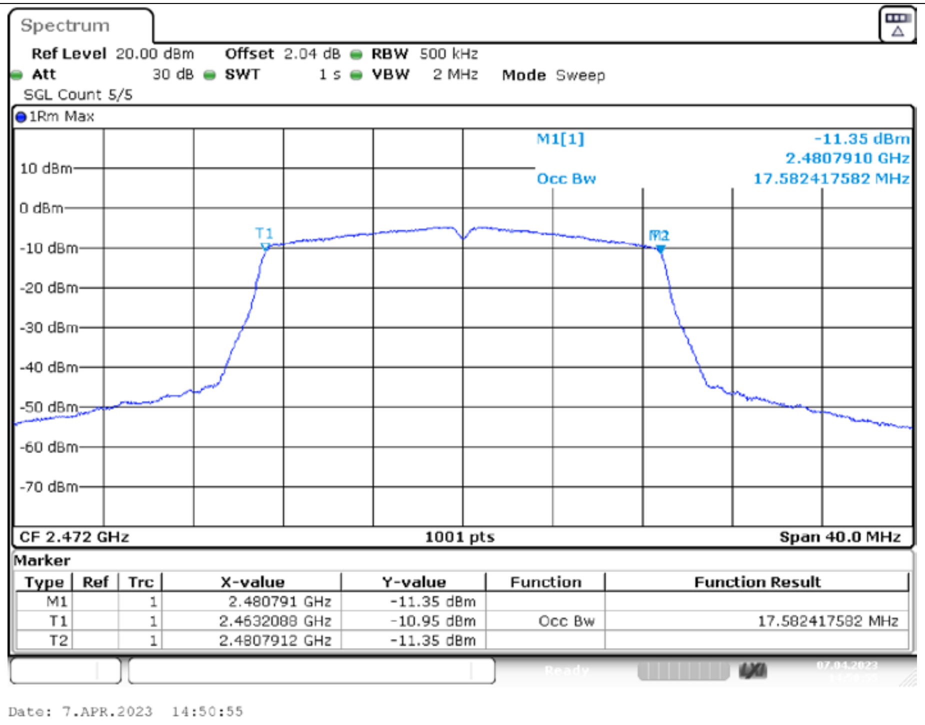
OBW NVNT n20 2442MHz Ant1



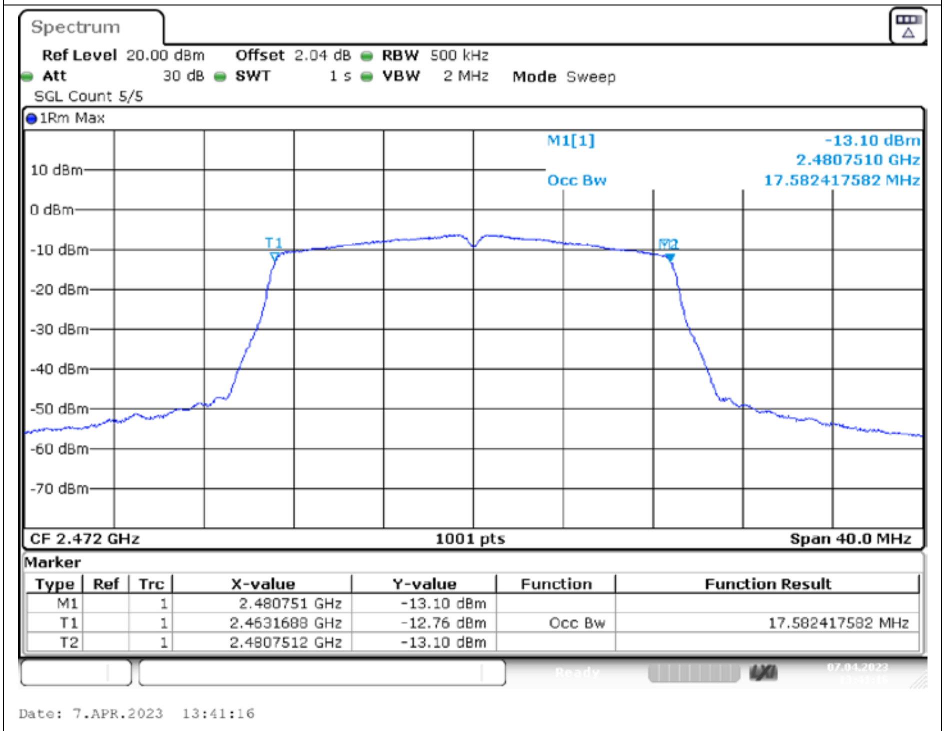
OBW NVNT n20 2442MHz Ant2



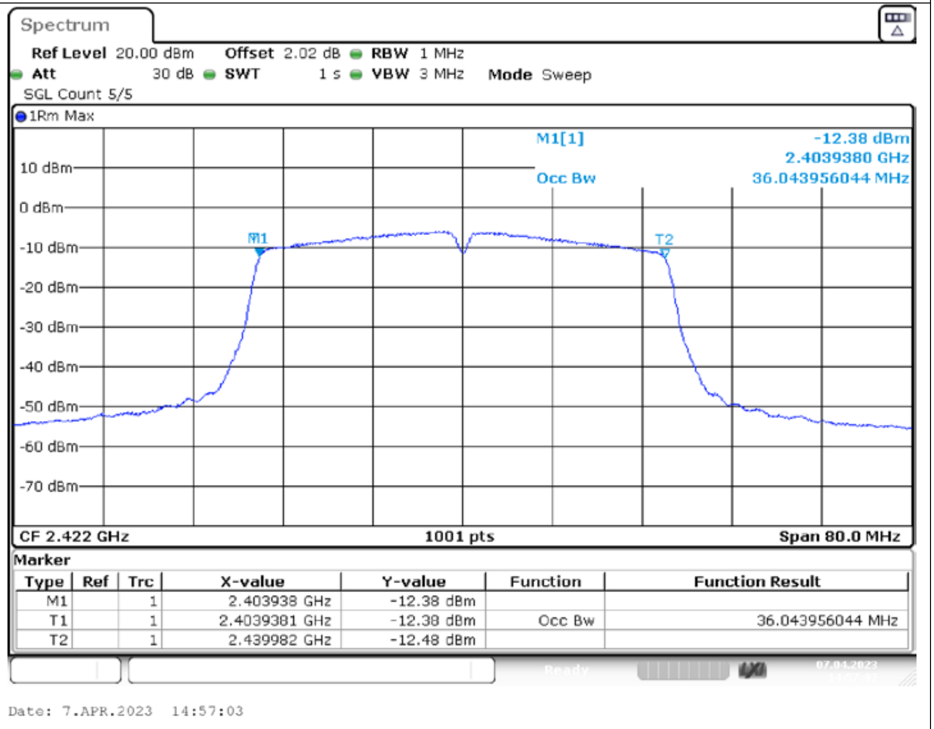
OBW NVNT n20 2472MHz Ant1



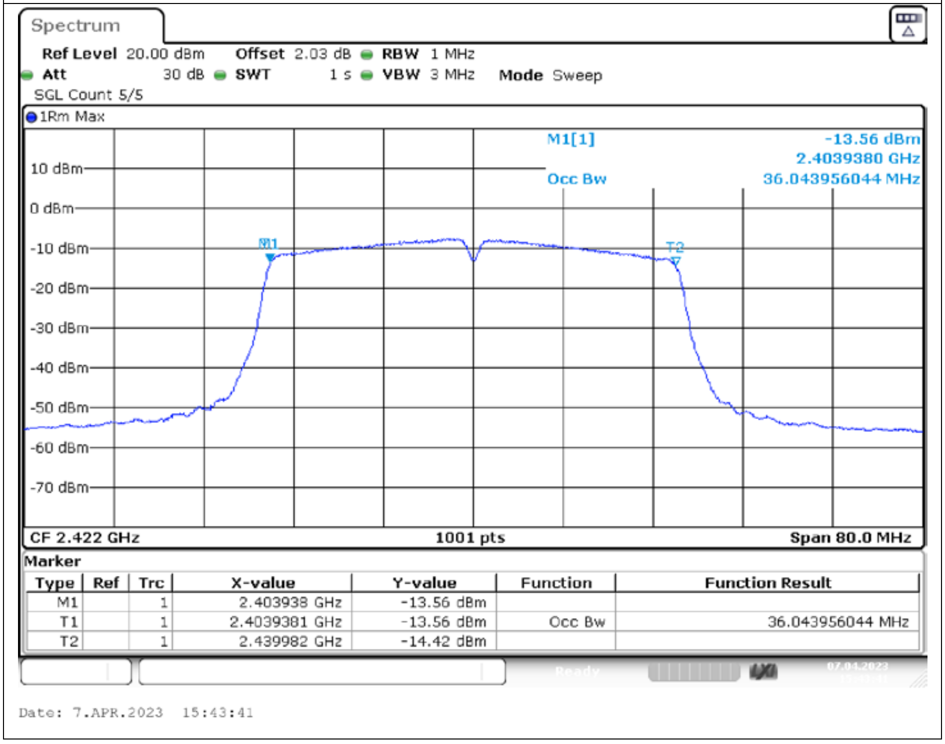
OBW NVNT n20 2472MHz Ant2



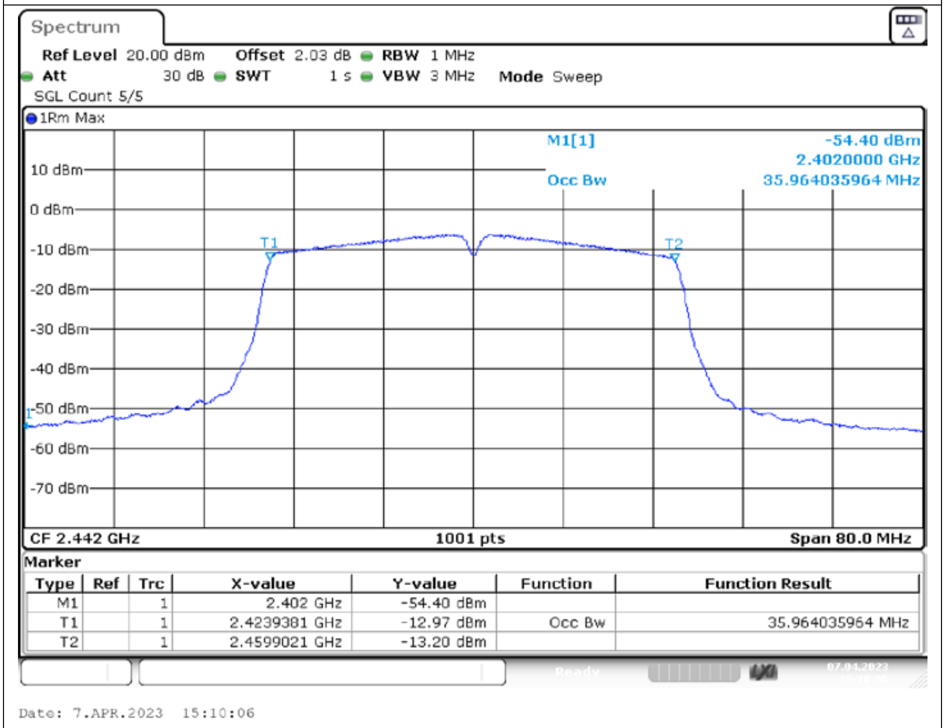
OBW NVNT n40 2422MHz Ant1



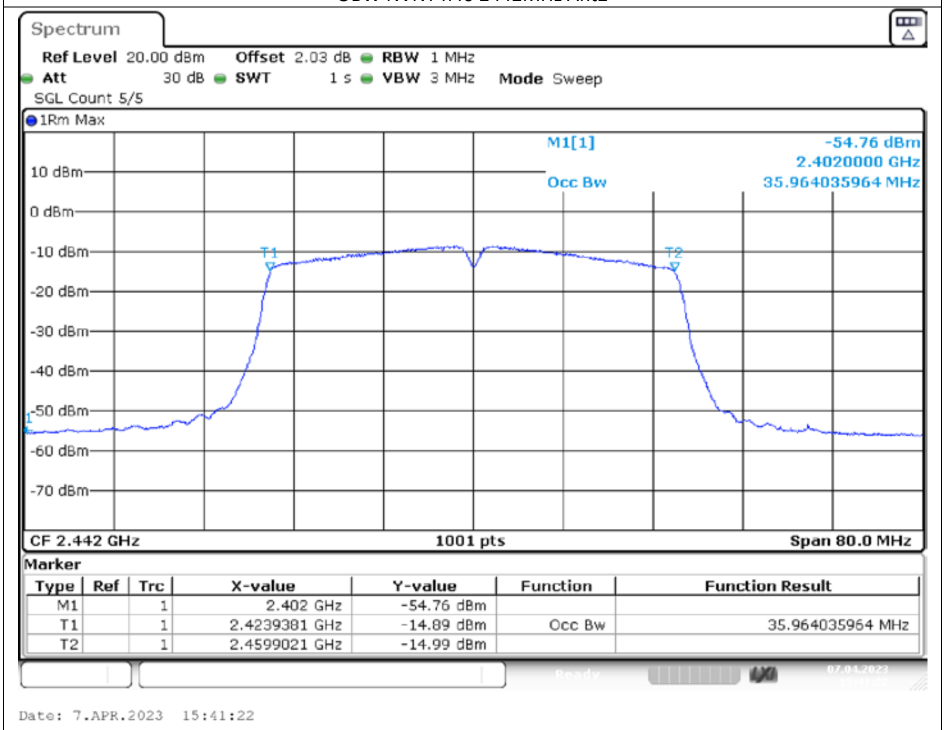
OBW NVNT n40 2422MHz Ant2



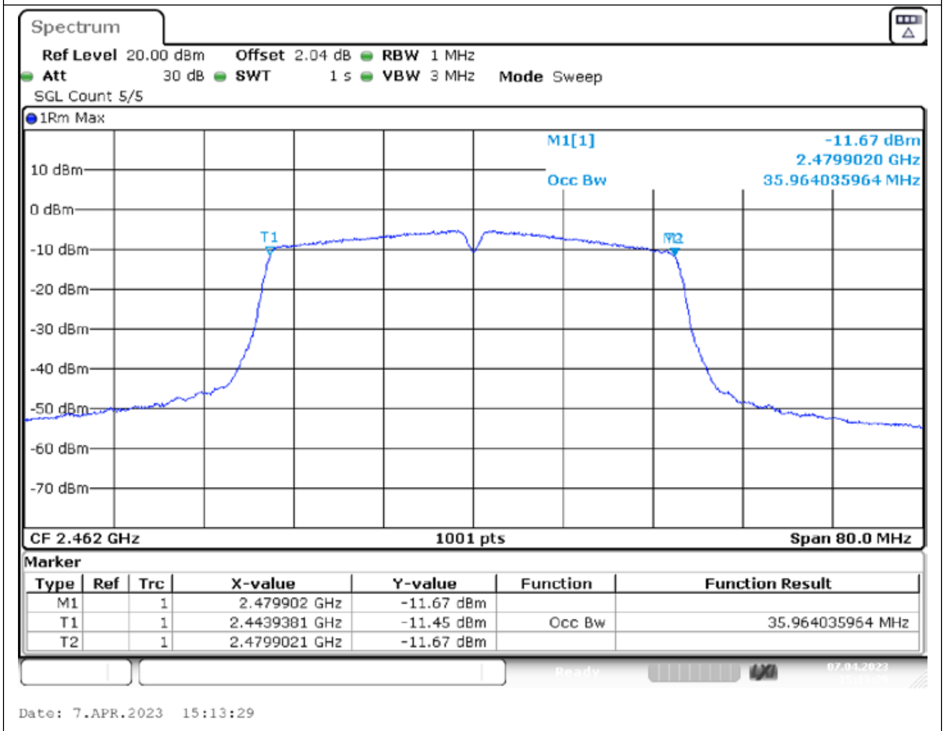
OBW NVNT n40 2442MHz Ant1



OBW NVNT n40 2442MHz Ant2



OBW NVNT n40 2462MHz Ant1



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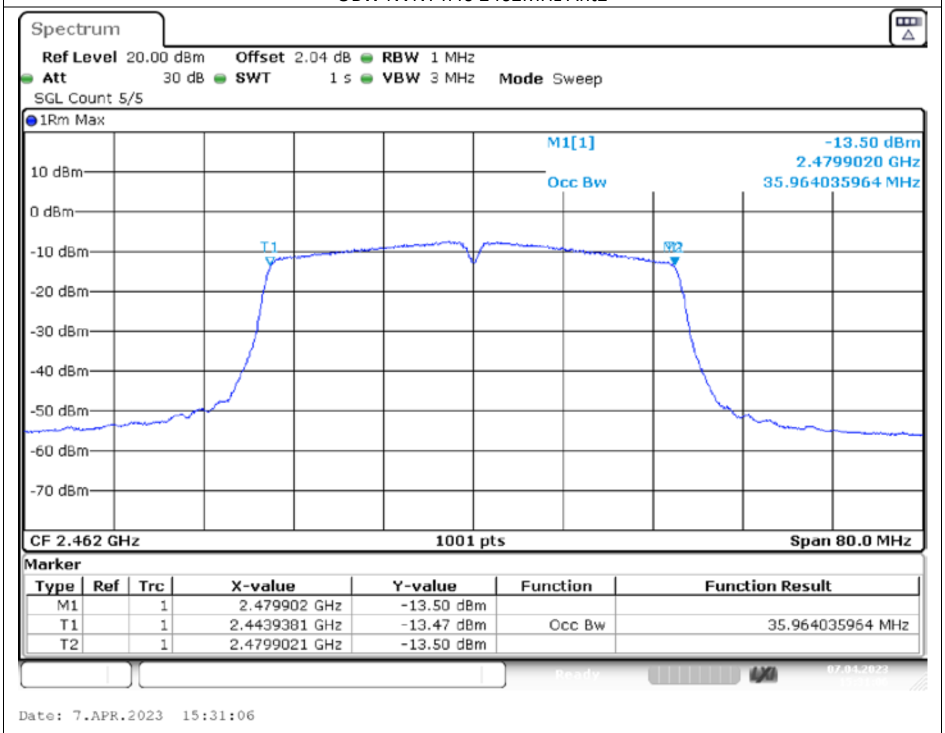


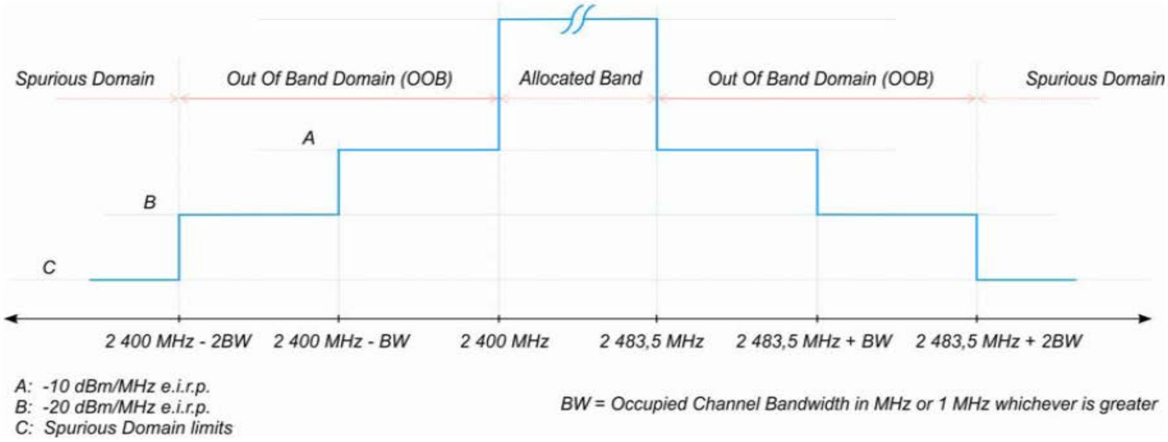
8.4TRANSMITTER UNWANTED EMISSION IN THE OUT-OF BAND

8.4.1 Applicable standard

ETSI EN 300 328 clause 4.3.1.9, clause 4.3.2.8

8.4.2 Conformance Limit

The transmitter unwanted emissions in the out-of-band domain but outside the allocated band, shall not exceed the limits of the mask given in below figure.



8.4.3 Test Configuration

The measurements for emission in the out-of band shall be performed at both normal environmental conditions and at the extremes of the operating temperature range.

Radiated measurements shall only be used for integral antenna equipment that does not have a temporary antenna connector(s) provided.

Conducted measurements shall be used for antenna equipment provided a temporary antenna connector(s).

8.4.4 Test Procedure

1. Please refer to ETSI EN 300 328 (V2.2.2) clause 5.4.8.1 for the test conditions.
2. Please refer to ETSI EN 300 328 (V2.2.2) clause 5.4.8.2 for the measurement method.

■ Conducted measurement

The applicable mask is defined by the measurement results from the tests performed under clause 5.4.7 (Occupied Channel Bandwidth).

The Out-of-band emissions within the different horizontal segments of the mask provided in figure 1 and figure 3 shall be measured using the procedure in step 1 to step 6 below. This method assumes the spectrum analyser is equipped with the Time Domain Power option.

Step 1:

• Connect the UUT to the spectrum analyser and use the following settings:
- Centre Frequency: 2 484 MHz
- Span: 0 Hz
- Resolution BW: 1 MHz
- Filter mode: Channel filter
- Video BW: 3 MHz
- Detector Mode: RMS
- Trace Mode: Max Hold
- Sweep Mode: Continuous
- Sweep Points: Sweep Time [s] / (1 μs) or 5 000 whichever is greater
- Trigger Mode: Video trigger; in case video triggering is not possible, an external trigger source may be used
- Sweep Time: > 120 % of the duration of the longest burst detected during the measurement of the

RF Output Power

Step 2 (segment 2 483,5 MHz to 2 483,5 MHz + BW):

- Adjust the trigger level to select the transmissions with the highest power level.
- For frequency hopping equipment operating in a normal hopping mode, the different hops will result in signal bursts with different power levels. In this case the burst with the highest power level shall be selected.
- Set a window (start and stop lines) to match with the start and end of the burst and in which the RMS power shall be measured using the Time Domain Power function.
- Select RMS power to be measured within the selected window and note the result which is the RMS power within this 1 MHz segment (2 483,5 MHz to 2 484,5 MHz). Compare this value with the applicable limit provided by the mask.
- Increase the centre frequency in steps of 1 MHz and repeat this measurement for every 1 MHz segment within the range 2 483,5 MHz to 2 483,5 MHz + BW. The centre frequency of the last 1 MHz segment shall be set to 2 483,5 MHz + BW - 0,5 MHz (which means this may partly overlap with the previous 1 MHz segment).

Step 3 (segment 2 483,5 MHz + BW to 2 483,5 MHz + 2BW):

- Change the centre frequency of the analyser to 2 484 MHz + BW and perform the measurement for the first 1 MHz segment within range 2 483,5 MHz + BW to 2 483,5 MHz + 2BW. Increase the centre frequency in 1 MHz steps and repeat the measurements to cover this whole range. The centre frequency of the last 1 MHz segment shall be set to 2 483,5 MHz + 2 BW - 0,5 MHz (which means this may partly overlap with the previous 1 MHz segment).

Step 4 (segment 2 400 MHz - BW to 2 400 MHz):

- Change the centre frequency of the analyser to 2 399,5 MHz and perform the measurement for the first 1 MHz segment within range 2 400 MHz - BW to 2 400 MHz Reduce the centre frequency in 1 MHz steps and repeat the measurements to cover this whole range. The centre frequency of the last 1 MHz segment shall be set to 2 400 MHz - BW + 0,5 MHz (which means this may partly overlap with the previous 1 MHz segment).

Step 5 (segment 2 400 MHz - 2BW to 2 400 MHz - BW):

- Change the centre frequency of the analyser to 2 399,5 MHz - BW and perform the measurement for the first 1 MHz segment within range 2 400 MHz - 2BW to 2 400 MHz - BW. Reduce the centre frequency in 1 MHz steps and repeat the measurements to cover this whole range. The centre frequency of the last 1 MHz segment shall be set to 2 400 MHz - 2BW + 0,5 MHz (which means this may partly overlap with the previous 1 MHz segment).

Step 6:

- In case of conducted measurements on equipment with a single transmit chain, the declared antenna assembly gain "G" in dBi shall be added to the results for each of the 1 MHz segments and compared with the limits provided by the mask given in figure 1 or figure 3. If more than one antenna assembly is intended for this power setting, the antenna with the highest gain shall be considered.
- In case of conducted measurements on smart antenna systems (equipment with multiple transmit chains), the measurements need to be repeated for each of the active transmit chains. The declared antenna assembly gain "G" in dBi for a single antenna shall be added to these results. If more than one antenna assembly is intended for this power setting, the antenna with the highest gain shall be considered. Comparison with the applicable limits shall be done using any of the options given below:

- Option 1: the results for each of the transmit chains for the corresponding 1 MHz segments shall be added. The additional beamforming gain "Y" in dB shall be added as well and the resulting values compared with the limits provided by the mask given in figure 1 or figure 3.
- Option 2: the limits provided by the mask given in figure 1 or figure 3 shall be reduced by 10 × log10(Ach) and the additional beamforming gain "Y" in dB. The results for each of the transmit chains shall be individually compared with these reduced limits.
  NOTE: Ach refers to the number of active transmit chains.

It shall be recorded whether the equipment complies with the mask provided in figure 1 or figure 3.

■ Radiated measurement

The test set up as described in annex B and the applicable measurement procedures described in annex C shall be used. Alternatively a test fixture may be used.

The test procedure is as described under clause 5.4.8.2.1.

8.4.5 Test results

Pass

All the modulation modes were tested, the data of the worst mode are described in the following table

Condition	Mode	Frequency (MHz)	Antenna	OOB Frequency (MHz)	Level (dBm/MHz)	Limit (dBm/MHz)	Verdict
NVNT	b	2412	Ant1	2399.5	-48.7	-10	Pass
NVNT	b	2412	Ant1	2398.5	-48.06	-10	Pass
NVNT	b	2412	Ant1	2397.5	-49.57	-10	Pass
NVNT	b	2412	Ant1	2396.5	-45.69	-10	Pass
NVNT	b	2412	Ant1	2395.5	-50.2	-10	Pass
NVNT	b	2412	Ant1	2394.5	-51.34	-10	Pass
NVNT	b	2412	Ant1	2393.5	-52.48	-10	Pass
NVNT	b	2412	Ant1	2392.5	-53.22	-10	Pass
NVNT	b	2412	Ant1	2391.5	-54.84	-10	Pass
NVNT	b	2412	Ant1	2390.5	-56.16	-10	Pass
NVNT	b	2412	Ant1	2389.5	-55.76	-10	Pass
NVNT	b	2412	Ant1	2388.5	-56.82	-10	Pass
NVNT	b	2412	Ant1	2387.5	-56.17	-10	Pass
NVNT	b	2412	Ant1	2386.5	-56.46	-10	Pass
NVNT	b	2412	Ant1	2386.314	-56.42	-10	Pass
NVNT	b	2412	Ant1	2385.314	-56.62	-20	Pass
NVNT	b	2412	Ant1	2384.314	-56.67	-20	Pass
NVNT	b	2412	Ant1	2383.314	-55.96	-20	Pass
NVNT	b	2412	Ant1	2382.314	-56.02	-20	Pass
NVNT	b	2412	Ant1	2381.314	-56.45	-20	Pass
NVNT	b	2412	Ant1	2380.314	-56.74	-20	Pass
NVNT	b	2412	Ant1	2379.314	-56.27	-20	Pass
NVNT	b	2412	Ant1	2378.314	-55.64	-20	Pass
NVNT	b	2412	Ant1	2377.314	-56.19	-20	Pass
NVNT	b	2412	Ant1	2376.314	-56.63	-20	Pass
NVNT	b	2412	Ant1	2375.314	-55.85	-20	Pass
NVNT	b	2412	Ant1	2374.314	-56.66	-20	Pass
NVNT	b	2412	Ant1	2373.314	-56.95	-20	Pass
NVNT	b	2412	Ant1	2372.314	-56.04	-20	Pass
NVNT	b	2412	Ant1	2372.128	-56.21	-20	Pass
NVNT	b	2412	Ant2	2399.5	-49.08	-10	Pass
NVNT	b	2412	Ant2	2398.5	-48.81	-10	Pass
NVNT	b	2412	Ant2	2397.5	-51.23	-10	Pass
NVNT	b	2412	Ant2	2396.5	-48.18	-10	Pass
NVNT	b	2412	Ant2	2395.5	-51.91	-10	Pass
NVNT	b	2412	Ant2	2394.5	-52.66	-10	Pass
NVNT	b	2412	Ant2	2393.5	-53.92	-10	Pass
NVNT	b	2412	Ant2	2392.5	-52.13	-10	Pass
NVNT	b	2412	Ant2	2391.5	-54.77	-10	Pass
NVNT	b	2412	Ant2	2390.5	-56.28	-10	Pass
NVNT	b	2412	Ant2	2389.5	-57.39	-10	Pass
NVNT	b	2412	Ant2	2388.5	-57.29	-10	Pass
NVNT	b	2412	Ant2	2387.5	-57.02	-10	Pass
NVNT	b	2412	Ant2	2386.5	-57.16	-10	Pass
NVNT	b	2412	Ant2	2386.354	-57.02	-10	Pass
NVNT	b	2412	Ant2	2385.354	-55.18	-20	Pass
NVNT	b	2412	Ant2	2384.354	-56.89	-20	Pass
NVNT	b	2412	Ant2	2383.354	-56.13	-20	Pass
NVNT	b	2412	Ant2	2382.354	-56.92	-20	Pass
NVNT	b	2412	Ant2	2381.354	-56.56	-20	Pass
NVNT	b	2412	Ant2	2380.354	-56.02	-20	Pass
NVNT	b	2412	Ant2	2379.354	-56.52	-20	Pass
NVNT	b	2412	Ant2	2378.354	-57.42	-20	Pass
NVNT	b	2412	Ant2	2377.354	-57.19	-20	Pass
NVNT	b	2412	Ant2	2376.354	-57.05	-20	Pass
NVNT	b	2412	Ant2	2375.354	-56.03	-20	Pass
NVNT	b	2412	Ant2	2374.354	-56.08	-20	Pass
NVNT	b	2412	Ant2	2373.354	-56.35	-20	Pass
NVNT	b	2412	Ant2	2372.354	-57.31	-20	Pass
NVNT	b	2412	Ant2	2372.208	-57.5	-20	Pass
NVNT	b	2472	Ant1	2484	-46.63	-10	Pass
NVNT	b	2472	Ant1	2485	-46.67	-10	Pass
NVNT	b	2472	Ant1	2486	-47.28	-10	Pass
NVNT	b	2472	Ant1	2487	-45.57	-10	Pass

NVNT	b	2472	Ant1	2488	-47.7	-10	Pass
NVNT	b	2472	Ant1	2489	-48.62	-10	Pass
NVNT	b	2472	Ant1	2490	-53.18	-10	Pass
NVNT	b	2472	Ant1	2491	-50.96	-10	Pass
NVNT	b	2472	Ant1	2492	-55.29	-10	Pass
NVNT	b	2472	Ant1	2493	-56.15	-10	Pass
NVNT	b	2472	Ant1	2494	-56.26	-10	Pass
NVNT	b	2472	Ant1	2495	-55.87	-10	Pass
NVNT	b	2472	Ant1	2496	-57.55	-10	Pass
NVNT	b	2472	Ant1	2497	-57.71	-10	Pass
NVNT	b	2472	Ant1	2497.226	-57.81	-10	Pass
NVNT	b	2472	Ant1	2498.226	-57.71	-20	Pass
NVNT	b	2472	Ant1	2499.226	-57.45	-20	Pass
NVNT	b	2472	Ant1	2500.226	-57.95	-20	Pass
NVNT	b	2472	Ant1	2501.226	-57.77	-20	Pass
NVNT	b	2472	Ant1	2502.226	-58.27	-20	Pass
NVNT	b	2472	Ant1	2503.226	-57.97	-20	Pass
NVNT	b	2472	Ant1	2504.226	-58.09	-20	Pass
NVNT	b	2472	Ant1	2505.226	-57.56	-20	Pass
NVNT	b	2472	Ant1	2506.226	-58.18	-20	Pass
NVNT	b	2472	Ant1	2507.226	-57.7	-20	Pass
NVNT	b	2472	Ant1	2508.226	-55.66	-20	Pass
NVNT	b	2472	Ant1	2509.226	-57.28	-20	Pass
NVNT	b	2472	Ant1	2510.226	-56.79	-20	Pass
NVNT	b	2472	Ant1	2511.226	-58.58	-20	Pass
NVNT	b	2472	Ant1	2511.452	-58.49	-20	Pass
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NVNT	b	2472	Ant2	2485	-50.29	-10	Pass
NVNT	b	2472	Ant2	2486	-52.1	-10	Pass
NVNT	b	2472	Ant2	2487	-51.12	-10	Pass
NVNT	b	2472	Ant2	2488	-50.27	-10	Pass
NVNT	b	2472	Ant2	2489	-52.05	-10	Pass
NVNT	b	2472	Ant2	2490	-55.66	-10	Pass
NVNT	b	2472	Ant2	2491	-52.88	-10	Pass
NVNT	b	2472	Ant2	2492	-53.15	-10	Pass
NVNT	b	2472	Ant2	2493	-54.52	-10	Pass
NVNT	b	2472	Ant2	2494	-56.51	-10	Pass
NVNT	b	2472	Ant2	2495	-56.52	-10	Pass
NVNT	b	2472	Ant2	2496	-56.99	-10	Pass
NVNT	b	2472	Ant2	2497	-57.17	-10	Pass
NVNT	b	2472	Ant2	2497.186	-57.29	-10	Pass
NVNT	b	2472	Ant2	2498.186	-57.63	-20	Pass
NVNT	b	2472	Ant2	2499.186	-56.61	-20	Pass
NVNT	b	2472	Ant2	2500.186	-57.11	-20	Pass
NVNT	b	2472	Ant2	2501.186	-56.61	-20	Pass
NVNT	b	2472	Ant2	2502.186	-56.95	-20	Pass
NVNT	b	2472	Ant2	2503.186	-56.79	-20	Pass
NVNT	b	2472	Ant2	2504.186	-57.66	-20	Pass
NVNT	b	2472	Ant2	2505.186	-58.01	-20	Pass
NVNT	b	2472	Ant2	2506.186	-57.41	-20	Pass
NVNT	b	2472	Ant2	2507.186	-57.45	-20	Pass
NVNT	b	2472	Ant2	2508.186	-57.42	-20	Pass
NVNT	b	2472	Ant2	2509.186	-57.92	-20	Pass
NVNT	b	2472	Ant2	2510.186	-57.95	-20	Pass
NVNT	b	2472	Ant2	2511.186	-57.14	-20	Pass
NVNT	b	2472	Ant2	2511.372	-56.98	-20	Pass
NVNT	g	2412	Ant1	2399.5	-36.88	-10	Pass
NVNT	g	2412	Ant1	2398.5	-39.3	-10	Pass
NVNT	g	2412	Ant1	2397.5	-39.17	-10	Pass
NVNT	g	2412	Ant1	2396.5	-41.97	-10	Pass
NVNT	g	2412	Ant1	2395.5	-41.2	-10	Pass
NVNT	g	2412	Ant1	2394.5	-44.45	-10	Pass
NVNT	g	2412	Ant1	2393.5	-46.04	-10	Pass
NVNT	g	2412	Ant1	2392.5	-47.17	-10	Pass
NVNT	g	2412	Ant1	2391.5	-48.51	-10	Pass
NVNT	g	2412	Ant1	2390.5	-49.3	-10	Pass
NVNT	g	2412	Ant1	2389.5	-49.29	-10	Pass
NVNT	g	2412	Ant1	2388.5	-49.54	-10	Pass
NVNT	g	2412	Ant1	2387.5	-49.68	-10	Pass

NVNT	g	2412	Ant1	2386.5	-49.76	-10	Pass
NVNT	g	2412	Ant1	2385.5	-49.7	-10	Pass
NVNT	g	2412	Ant1	2384.5	-49.87	-10	Pass
NVNT	g	2412	Ant1	2384.076	-50	-10	Pass
NVNT	g	2412	Ant1	2383.076	-49.89	-20	Pass
NVNT	g	2412	Ant1	2382.076	-50.07	-20	Pass
NVNT	g	2412	Ant1	2381.076	-50	-20	Pass
NVNT	g	2412	Ant1	2380.076	-49.89	-20	Pass
NVNT	g	2412	Ant1	2379.076	-50.03	-20	Pass
NVNT	g	2412	Ant1	2378.076	-50.14	-20	Pass
NVNT	g	2412	Ant1	2377.076	-50.2	-20	Pass
NVNT	g	2412	Ant1	2376.076	-50.31	-20	Pass
NVNT	g	2412	Ant1	2375.076	-50.34	-20	Pass
NVNT	g	2412	Ant1	2374.076	-50.17	-20	Pass
NVNT	g	2412	Ant1	2373.076	-50.45	-20	Pass
NVNT	g	2412	Ant1	2372.076	-50.47	-20	Pass
NVNT	g	2412	Ant1	2371.076	-50.69	-20	Pass
NVNT	g	2412	Ant1	2370.076	-50.72	-20	Pass
NVNT	g	2412	Ant1	2369.076	-50.74	-20	Pass
NVNT	g	2412	Ant1	2368.076	-50.69	-20	Pass
NVNT	g	2412	Ant1	2367.652	-50.76	-20	Pass
NVNT	g	2412	Ant2	2399.5	-33.8	-10	Pass
NVNT	g	2412	Ant2	2398.5	-35.97	-10	Pass
NVNT	g	2412	Ant2	2397.5	-36.36	-10	Pass
NVNT	g	2412	Ant2	2396.5	-39.41	-10	Pass
NVNT	g	2412	Ant2	2395.5	-38.57	-10	Pass
NVNT	g	2412	Ant2	2394.5	-41.67	-10	Pass
NVNT	g	2412	Ant2	2393.5	-43.63	-10	Pass
NVNT	g	2412	Ant2	2392.5	-45.46	-10	Pass
NVNT	g	2412	Ant2	2391.5	-47.48	-10	Pass
NVNT	g	2412	Ant2	2390.5	-48.37	-10	Pass
NVNT	g	2412	Ant2	2389.5	-48.62	-10	Pass
NVNT	g	2412	Ant2	2388.5	-49.26	-10	Pass
NVNT	g	2412	Ant2	2387.5	-49.54	-10	Pass
NVNT	g	2412	Ant2	2386.5	-49.46	-10	Pass
NVNT	g	2412	Ant2	2385.5	-49.41	-10	Pass
NVNT	g	2412	Ant2	2384.5	-49.58	-10	Pass
NVNT	g	2412	Ant2	2384.076	-49.88	-10	Pass
NVNT	g	2412	Ant2	2383.076	-49.98	-20	Pass
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NVNT	g	2412	Ant2	2381.076	-49.91	-20	Pass
NVNT	g	2412	Ant2	2380.076	-50.04	-20	Pass
NVNT	g	2412	Ant2	2379.076	-49.83	-20	Pass
NVNT	g	2412	Ant2	2378.076	-49.84	-20	Pass
NVNT	g	2412	Ant2	2377.076	-50.09	-20	Pass
NVNT	g	2412	Ant2	2376.076	-50.05	-20	Pass
NVNT	g	2412	Ant2	2375.076	-50.07	-20	Pass
NVNT	g	2412	Ant2	2374.076	-49.87	-20	Pass
NVNT	g	2412	Ant2	2373.076	-50.2	-20	Pass
NVNT	g	2412	Ant2	2372.076	-50.22	-20	Pass
NVNT	g	2412	Ant2	2371.076	-50.31	-20	Pass
NVNT	g	2412	Ant2	2370.076	-50.48	-20	Pass
NVNT	g	2412	Ant2	2369.076	-50.64	-20	Pass
NVNT	g	2412	Ant2	2368.076	-50.58	-20	Pass
NVNT	g	2412	Ant2	2367.652	-50.79	-20	Pass
NVNT	g	2472	Ant1	2484	-34.05	-10	Pass
NVNT	g	2472	Ant1	2485	-36.05	-10	Pass
NVNT	g	2472	Ant1	2486	-38.43	-10	Pass
NVNT	g	2472	Ant1	2487	-39.2	-10	Pass
NVNT	g	2472	Ant1	2488	-40.12	-10	Pass
NVNT	g	2472	Ant1	2489	-41.59	-10	Pass
NVNT	g	2472	Ant1	2490	-43.36	-10	Pass
NVNT	g	2472	Ant1	2491	-44.97	-10	Pass
NVNT	g	2472	Ant1	2492	-46.44	-10	Pass
NVNT	g	2472	Ant1	2493	-47.86	-10	Pass
NVNT	g	2472	Ant1	2494	-48.08	-10	Pass
NVNT	g	2472	Ant1	2495	-48.32	-10	Pass
NVNT	g	2472	Ant1	2496	-48.78	-10	Pass
NVNT	g	2472	Ant1	2497	-48.7	-10	Pass

NVNT	g	2472	Ant1	2498	-48.96	-10	Pass
NVNT	g	2472	Ant1	2499	-48.87	-10	Pass
NVNT	g	2472	Ant1	2499.424	-48.98	-10	Pass
NVNT	g	2472	Ant1	2500.424	-49.15	-20	Pass
NVNT	g	2472	Ant1	2501.424	-49.11	-20	Pass
NVNT	g	2472	Ant1	2502.424	-49.23	-20	Pass
NVNT	g	2472	Ant1	2503.424	-49.41	-20	Pass
NVNT	g	2472	Ant1	2504.424	-49.3	-20	Pass
NVNT	g	2472	Ant1	2505.424	-49.48	-20	Pass
NVNT	g	2472	Ant1	2506.424	-49.42	-20	Pass
NVNT	g	2472	Ant1	2507.424	-49.64	-20	Pass
NVNT	g	2472	Ant1	2508.424	-49.75	-20	Pass
NVNT	g	2472	Ant1	2509.424	-49.58	-20	Pass
NVNT	g	2472	Ant1	2510.424	-49.67	-20	Pass
NVNT	g	2472	Ant1	2511.424	-49.96	-20	Pass
NVNT	g	2472	Ant1	2512.424	-49.83	-20	Pass
NVNT	g	2472	Ant1	2513.424	-49.84	-20	Pass
NVNT	g	2472	Ant1	2514.424	-50.06	-20	Pass
NVNT	g	2472	Ant1	2515.424	-50.06	-20	Pass
NVNT	g	2472	Ant1	2515.848	-50.07	-20	Pass
NVNT	g	2472	Ant2	2484	-34.03	-10	Pass
NVNT	g	2472	Ant2	2485	-35.9	-10	Pass
NVNT	g	2472	Ant2	2486	-37.96	-10	Pass
NVNT	g	2472	Ant2	2487	-38.8	-10	Pass
NVNT	g	2472	Ant2	2488	-39.74	-10	Pass
NVNT	g	2472	Ant2	2489	-40.71	-10	Pass
NVNT	g	2472	Ant2	2490	-43.21	-10	Pass
NVNT	g	2472	Ant2	2491	-45.17	-10	Pass
NVNT	g	2472	Ant2	2492	-46.93	-10	Pass
NVNT	g	2472	Ant2	2493	-48.01	-10	Pass
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NVNT	g	2472	Ant2	2495	-49.13	-10	Pass
NVNT	g	2472	Ant2	2496	-49.8	-10	Pass
NVNT	g	2472	Ant2	2497	-49.9	-10	Pass
NVNT	g	2472	Ant2	2498	-49.85	-10	Pass
NVNT	g	2472	Ant2	2499	-50.12	-10	Pass
NVNT	g	2472	Ant2	2499.424	-49.92	-10	Pass
NVNT	g	2472	Ant2	2500.424	-50.13	-20	Pass
NVNT	g	2472	Ant2	2501.424	-50.32	-20	Pass
NVNT	g	2472	Ant2	2502.424	-50.33	-20	Pass
NVNT	g	2472	Ant2	2503.424	-50.37	-20	Pass
NVNT	g	2472	Ant2	2504.424	-50.48	-20	Pass
NVNT	g	2472	Ant2	2505.424	-50.59	-20	Pass
NVNT	g	2472	Ant2	2506.424	-50.64	-20	Pass
NVNT	g	2472	Ant2	2507.424	-50.81	-20	Pass
NVNT	g	2472	Ant2	2508.424	-50.79	-20	Pass
NVNT	g	2472	Ant2	2509.424	-51.04	-20	Pass
NVNT	g	2472	Ant2	2510.424	-50.95	-20	Pass
NVNT	g	2472	Ant2	2511.424	-50.92	-20	Pass
NVNT	g	2472	Ant2	2512.424	-51.06	-20	Pass
NVNT	g	2472	Ant2	2513.424	-51.31	-20	Pass
NVNT	g	2472	Ant2	2514.424	-51.33	-20	Pass
NVNT	g	2472	Ant2	2515.424	-51.34	-20	Pass
NVNT	g	2472	Ant2	2515.848	-51.42	-20	Pass
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NVNT	n20	2412	Ant1	2398.5	-37.63	-10	Pass
NVNT	n20	2412	Ant1	2397.5	-39.29	-10	Pass
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NVNT	n20	2412	Ant1	2387.5	-48.87	-10	Pass
NVNT	n20	2412	Ant1	2386.5	-49.01	-10	Pass
NVNT	n20	2412	Ant1	2385.5	-49.03	-10	Pass

NVNT	n20	2412	Ant1	2384.5	-49.01	-10	Pass
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NVNT	n20	2412	Ant1	2381.918	-49.33	-20	Pass
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NVNT	n20	2412	Ant1	2379.918	-49.45	-20	Pass
NVNT	n20	2412	Ant1	2378.918	-49.52	-20	Pass
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NVNT	n20	2412	Ant1	2376.918	-49.59	-20	Pass
NVNT	n20	2412	Ant1	2375.918	-49.64	-20	Pass
NVNT	n20	2412	Ant1	2374.918	-49.83	-20	Pass
NVNT	n20	2412	Ant1	2373.918	-49.95	-20	Pass
NVNT	n20	2412	Ant1	2372.918	-49.9	-20	Pass
NVNT	n20	2412	Ant1	2371.918	-49.98	-20	Pass
NVNT	n20	2412	Ant1	2370.918	-49.99	-20	Pass
NVNT	n20	2412	Ant1	2369.918	-50.21	-20	Pass
NVNT	n20	2412	Ant1	2368.918	-50.3	-20	Pass
NVNT	n20	2412	Ant1	2367.918	-50.43	-20	Pass
NVNT	n20	2412	Ant1	2366.918	-50.61	-20	Pass
NVNT	n20	2412	Ant1	2365.918	-50.49	-20	Pass
NVNT	n20	2412	Ant1	2365.336	-50.63	-20	Pass
NVNT	n20	2412	Ant2	2399.5	-34.69	-10	Pass
NVNT	n20	2412	Ant2	2398.5	-36.25	-10	Pass
NVNT	n20	2412	Ant2	2397.5	-37.82	-10	Pass
NVNT	n20	2412	Ant2	2396.5	-37.31	-10	Pass
NVNT	n20	2412	Ant2	2395.5	-38.29	-10	Pass
NVNT	n20	2412	Ant2	2394.5	-42.43	-10	Pass
NVNT	n20	2412	Ant2	2393.5	-42.47	-10	Pass
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NVNT	n20	2412	Ant2	2385.5	-49.62	-10	Pass
NVNT	n20	2412	Ant2	2384.5	-49.77	-10	Pass
NVNT	n20	2412	Ant2	2383.5	-49.85	-10	Pass
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NVNT	n20	2412	Ant2	2376.918	-50.02	-20	Pass
NVNT	n20	2412	Ant2	2375.918	-50.08	-20	Pass
NVNT	n20	2412	Ant2	2374.918	-50.01	-20	Pass
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NVNT	n20	2412	Ant2	2369.918	-50.38	-20	Pass
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NVNT	n20	2412	Ant2	2365.336	-50.88	-20	Pass
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NVNT	n20	2472	Ant1	2486	-34.24	-10	Pass
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NVNT	n20	2472	Ant1	2489	-38.82	-10	Pass
NVNT	n20	2472	Ant1	2490	-41.15	-10	Pass
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NVNT	n20	2472	Ant1	2502.582	-49.26	-20	Pass
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NVNT	n20	2472	Ant1	2507.582	-49.52	-20	Pass
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NVNT	n20	2472	Ant1	2515.582	-50.11	-20	Pass
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NVNT	n20	2472	Ant1	2517.582	-50.22	-20	Pass
NVNT	n20	2472	Ant1	2518.164	-50.23	-20	Pass
NVNT	n20	2472	Ant2	2484	-35.75	-10	Pass
NVNT	n20	2472	Ant2	2485	-38.13	-10	Pass
NVNT	n20	2472	Ant2	2486	-38.13	-10	Pass
NVNT	n20	2472	Ant2	2487	-40.04	-10	Pass
NVNT	n20	2472	Ant2	2488	-40.88	-10	Pass
NVNT	n20	2472	Ant2	2489	-42.39	-10	Pass
NVNT	n20	2472	Ant2	2490	-44.18	-10	Pass
NVNT	n20	2472	Ant2	2491	-45.03	-10	Pass
NVNT	n20	2472	Ant2	2492	-46.38	-10	Pass
NVNT	n20	2472	Ant2	2493	-48.09	-10	Pass
NVNT	n20	2472	Ant2	2494	-48.93	-10	Pass
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NVNT	n20	2472	Ant2	2499	-50.1	-10	Pass
NVNT	n20	2472	Ant2	2500	-50.17	-10	Pass
NVNT	n20	2472	Ant2	2500.582	-50.24	-10	Pass
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NVNT	n20	2472	Ant2	2503.582	-50.58	-20	Pass
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NVNT	n20	2472	Ant2	2509.582	-50.83	-20	Pass
NVNT	n20	2472	Ant2	2510.582	-50.92	-20	Pass
NVNT	n20	2472	Ant2	2511.582	-51.11	-20	Pass
NVNT	n20	2472	Ant2	2512.582	-51.14	-20	Pass
NVNT	n20	2472	Ant2	2513.582	-51.19	-20	Pass
NVNT	n20	2472	Ant2	2514.582	-51.27	-20	Pass
NVNT	n20	2472	Ant2	2515.582	-51.18	-20	Pass
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NVNT	n20	2472	Ant2	2517.582	-51.56	-20	Pass
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NVNT	n40	2422	Ant1	2399.5	-38.86	-10	Pass
NVNT	n40	2422	Ant1	2398.5	-40.6	-10	Pass
NVNT	n40	2422	Ant1	2397.5	-39.97	-10	Pass
NVNT	n40	2422	Ant1	2396.5	-41.88	-10	Pass
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NVNT	n40	2422	Ant1	2394.5	-43.07	-10	Pass
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NVNT	n40	2422	Ant1	2391.5	-44.2	-10	Pass

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NVNT	n40	2422	Ant1	2379.5	-49.22	-10	Pass
NVNT	n40	2422	Ant1	2378.5	-48.99	-10	Pass
NVNT	n40	2422	Ant1	2377.5	-49.27	-10	Pass
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NVNT	n40	2422	Ant1	2375.5	-49.6	-10	Pass
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NVNT	n40	2422	Ant1	2361.456	-51.21	-20	Pass
NVNT	n40	2422	Ant1	2360.456	-51.4	-20	Pass
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NVNT	n40	2422	Ant1	2351.456	-51.77	-20	Pass
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NVNT	n40	2422	Ant1	2347.456	-51.96	-20	Pass
NVNT	n40	2422	Ant1	2346.456	-52.19	-20	Pass
NVNT	n40	2422	Ant1	2345.456	-52.19	-20	Pass
NVNT	n40	2422	Ant1	2344.456	-52.33	-20	Pass
NVNT	n40	2422	Ant1	2343.456	-52.36	-20	Pass
NVNT	n40	2422	Ant1	2342.456	-52.44	-20	Pass
NVNT	n40	2422	Ant1	2341.456	-52.47	-20	Pass
NVNT	n40	2422	Ant1	2340.456	-52.81	-20	Pass
NVNT	n40	2422	Ant1	2339.456	-52.86	-20	Pass
NVNT	n40	2422	Ant1	2338.456	-52.83	-20	Pass
NVNT	n40	2422	Ant1	2337.456	-52.95	-20	Pass
NVNT	n40	2422	Ant1	2336.456	-53.03	-20	Pass
NVNT	n40	2422	Ant1	2335.456	-53.27	-20	Pass
NVNT	n40	2422	Ant1	2334.456	-53.34	-20	Pass
NVNT	n40	2422	Ant1	2333.456	-53.46	-20	Pass
NVNT	n40	2422	Ant1	2332.456	-53.5	-20	Pass
NVNT	n40	2422	Ant1	2331.456	-53.65	-20	Pass
NVNT	n40	2422	Ant1	2330.456	-53.55	-20	Pass
NVNT	n40	2422	Ant1	2329.456	-53.75	-20	Pass
NVNT	n40	2422	Ant1	2328.456	-53.81	-20	Pass
NVNT	n40	2422	Ant1	2328.412	-53.81	-20	Pass
NVNT	n40	2422	Ant2	2399.5	-40.91	-10	Pass
NVNT	n40	2422	Ant2	2398.5	-42.91	-10	Pass
NVNT	n40	2422	Ant2	2397.5	-41.92	-10	Pass
NVNT	n40	2422	Ant2	2396.5	-44.29	-10	Pass

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NVNT	n40	2422	Ant2	2394.5	-45.57	-10	Pass
NVNT	n40	2422	Ant2	2393.5	-45.27	-10	Pass
NVNT	n40	2422	Ant2	2392.5	-46.21	-10	Pass
NVNT	n40	2422	Ant2	2391.5	-46.33	-10	Pass
NVNT	n40	2422	Ant2	2390.5	-46.51	-10	Pass
NVNT	n40	2422	Ant2	2389.5	-46.46	-10	Pass
NVNT	n40	2422	Ant2	2388.5	-47.98	-10	Pass
NVNT	n40	2422	Ant2	2387.5	-48	-10	Pass
NVNT	n40	2422	Ant2	2386.5	-48.03	-10	Pass
NVNT	n40	2422	Ant2	2385.5	-47.66	-10	Pass
NVNT	n40	2422	Ant2	2384.5	-49.28	-10	Pass
NVNT	n40	2422	Ant2	2383.5	-49.06	-10	Pass
NVNT	n40	2422	Ant2	2382.5	-49.65	-10	Pass
NVNT	n40	2422	Ant2	2381.5	-49.58	-10	Pass
NVNT	n40	2422	Ant2	2380.5	-49.92	-10	Pass
NVNT	n40	2422	Ant2	2379.5	-50.19	-10	Pass
NVNT	n40	2422	Ant2	2378.5	-50	-10	Pass
NVNT	n40	2422	Ant2	2377.5	-50.1	-10	Pass
NVNT	n40	2422	Ant2	2376.5	-50.36	-10	Pass
NVNT	n40	2422	Ant2	2375.5	-50.36	-10	Pass
NVNT	n40	2422	Ant2	2374.5	-50.25	-10	Pass
NVNT	n40	2422	Ant2	2373.5	-50.52	-10	Pass
NVNT	n40	2422	Ant2	2372.5	-50.61	-10	Pass
NVNT	n40	2422	Ant2	2371.5	-50.77	-10	Pass
NVNT	n40	2422	Ant2	2370.5	-50.85	-10	Pass
NVNT	n40	2422	Ant2	2369.5	-50.96	-10	Pass
NVNT	n40	2422	Ant2	2368.5	-51.05	-10	Pass
NVNT	n40	2422	Ant2	2367.5	-51.11	-10	Pass
NVNT	n40	2422	Ant2	2366.5	-51.31	-10	Pass
NVNT	n40	2422	Ant2	2365.5	-51.36	-10	Pass
NVNT	n40	2422	Ant2	2364.5	-51.47	-10	Pass
NVNT	n40	2422	Ant2	2364.456	-51.48	-10	Pass
NVNT	n40	2422	Ant2	2363.456	-51.51	-20	Pass
NVNT	n40	2422	Ant2	2362.456	-51.66	-20	Pass
NVNT	n40	2422	Ant2	2361.456	-51.72	-20	Pass
NVNT	n40	2422	Ant2	2360.456	-51.92	-20	Pass
NVNT	n40	2422	Ant2	2359.456	-51.98	-20	Pass
NVNT	n40	2422	Ant2	2358.456	-51.9	-20	Pass
NVNT	n40	2422	Ant2	2357.456	-51.88	-20	Pass
NVNT	n40	2422	Ant2	2356.456	-52.05	-20	Pass
NVNT	n40	2422	Ant2	2355.456	-52.12	-20	Pass
NVNT	n40	2422	Ant2	2354.456	-52.07	-20	Pass
NVNT	n40	2422	Ant2	2353.456	-52.09	-20	Pass
NVNT	n40	2422	Ant2	2352.456	-52.11	-20	Pass
NVNT	n40	2422	Ant2	2351.456	-52.25	-20	Pass
NVNT	n40	2422	Ant2	2350.456	-52.32	-20	Pass
NVNT	n40	2422	Ant2	2349.456	-52.33	-20	Pass
NVNT	n40	2422	Ant2	2348.456	-52.33	-20	Pass
NVNT	n40	2422	Ant2	2347.456	-52.34	-20	Pass
NVNT	n40	2422	Ant2	2346.456	-52.52	-20	Pass
NVNT	n40	2422	Ant2	2345.456	-52.62	-20	Pass
NVNT	n40	2422	Ant2	2344.456	-52.72	-20	Pass
NVNT	n40	2422	Ant2	2343.456	-52.85	-20	Pass
NVNT	n40	2422	Ant2	2342.456	-52.83	-20	Pass
NVNT	n40	2422	Ant2	2341.456	-52.95	-20	Pass
NVNT	n40	2422	Ant2	2340.456	-52.99	-20	Pass
NVNT	n40	2422	Ant2	2339.456	-53.14	-20	Pass
NVNT	n40	2422	Ant2	2338.456	-53.22	-20	Pass
NVNT	n40	2422	Ant2	2337.456	-53.15	-20	Pass
NVNT	n40	2422	Ant2	2336.456	-53.48	-20	Pass
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NVNT	n40	2422	Ant2	2334.456	-53.73	-20	Pass
NVNT	n40	2422	Ant2	2333.456	-53.76	-20	Pass
NVNT	n40	2422	Ant2	2332.456	-53.68	-20	Pass
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NVNT	n40	2462	Ant2	2487	-44.65	-10	Pass
NVNT	n40	2462	Ant2	2488	-45.26	-10	Pass
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NVNT	n40	2462	Ant2	2492	-47.6	-10	Pass
NVNT	n40	2462	Ant2	2493	-49.2	-10	Pass
NVNT	n40	2462	Ant2	2494	-48.73	-10	Pass
NVNT	n40	2462	Ant2	2495	-49.61	-10	Pass
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NVNT	n40	2462	Ant2	2511	-53.68	-10	Pass
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NVNT	n40	2462	Ant2	2514	-53.93	-10	Pass
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NVNT	n40	2462	Ant2	2518	-54.33	-10	Pass
NVNT	n40	2462	Ant2	2518.964	-54.33	-10	Pass
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NVNT	n40	2462	Ant2	2528.964	-55.05	-20	Pass
NVNT	n40	2462	Ant2	2529.964	-55.14	-20	Pass
NVNT	n40	2462	Ant2	2530.964	-55.22	-20	Pass
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NVNT	n40	2462	Ant2	2536.964	-55.65	-20	Pass
NVNT	n40	2462	Ant2	2537.964	-55.67	-20	Pass
NVNT	n40	2462	Ant2	2538.964	-55.77	-20	Pass
NVNT	n40	2462	Ant2	2539.964	-55.89	-20	Pass
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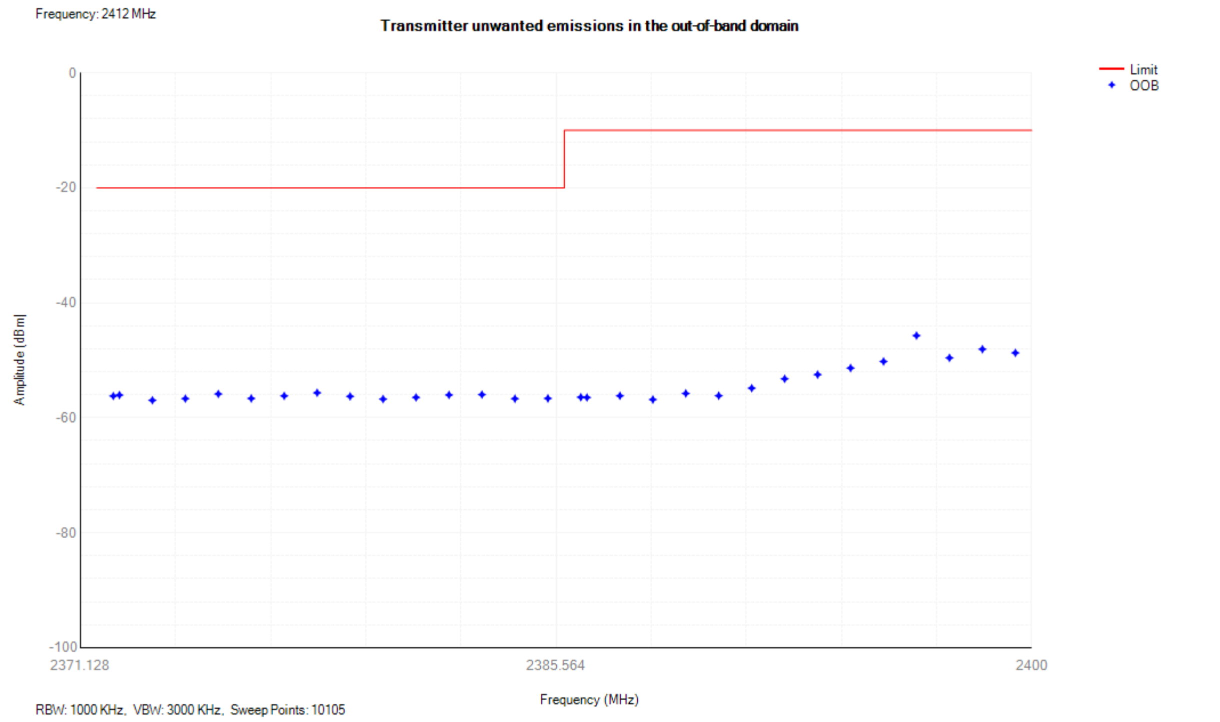
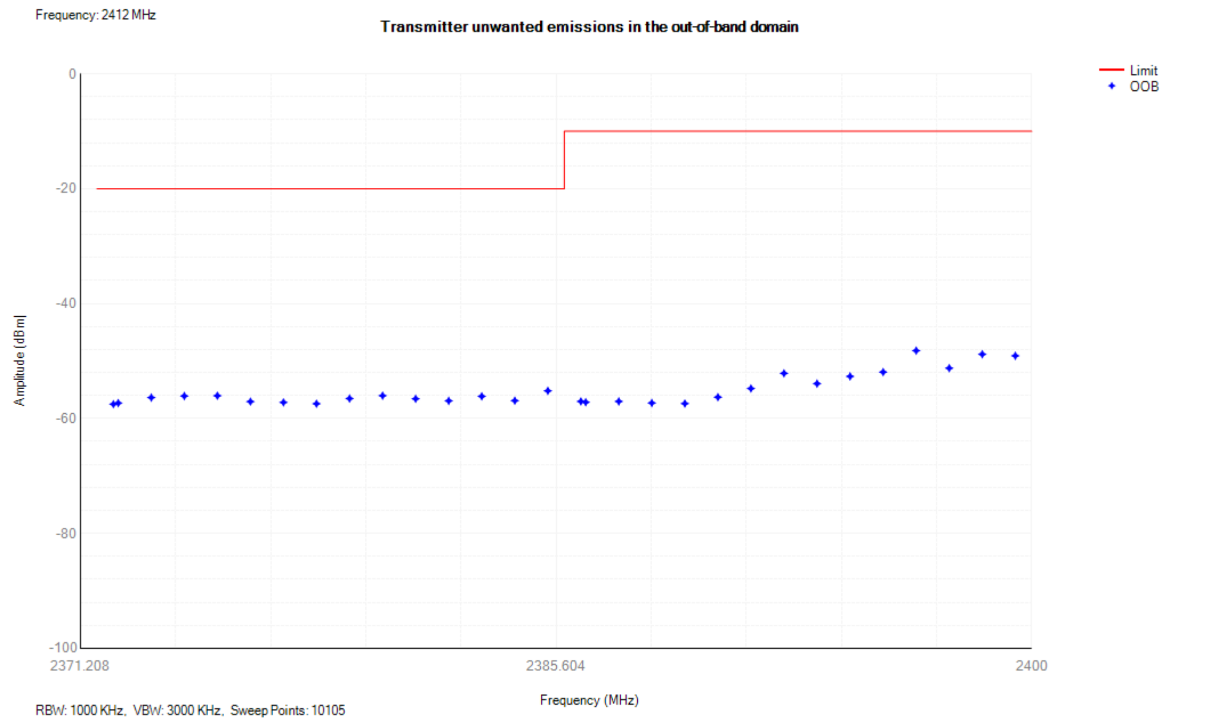
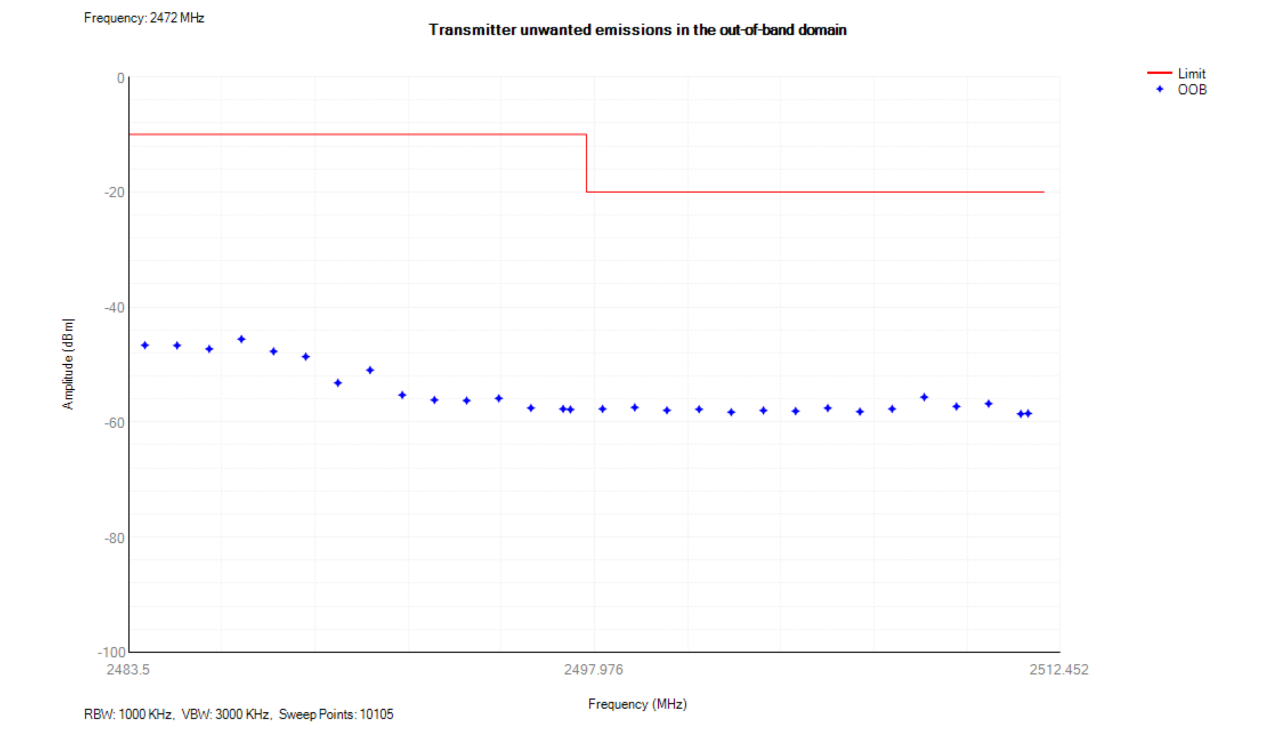
NVNT	n40	2462	Ant2	2542.964	-56.08	-20	Pass
NVNT	n40	2462	Ant2	2543.964	-56.1	-20	Pass
NVNT	n40	2462	Ant2	2544.964	-56.21	-20	Pass
NVNT	n40	2462	Ant2	2545.964	-56.24	-20	Pass
NVNT	n40	2462	Ant2	2546.964	-56.22	-20	Pass
NVNT	n40	2462	Ant2	2547.964	-56.35	-20	Pass

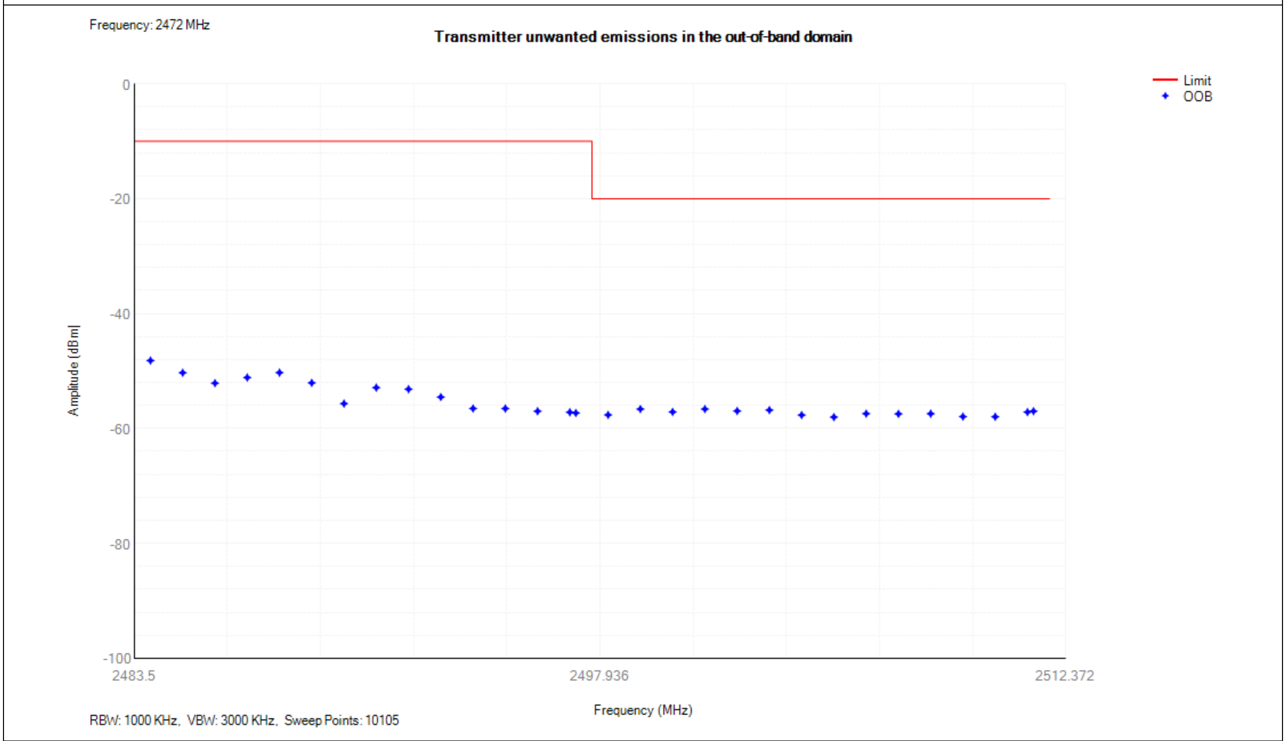
NVNT	n40	2462	Ant2	2548.964	-56.44	-20	Pass
NVNT	n40	2462	Ant2	2549.964	-56.43	-20	Pass
NVNT	n40	2462	Ant2	2550.964	-56.52	-20	Pass
NVNT	n40	2462	Ant2	2551.964	-56.6	-20	Pass
NVNT	n40	2462	Ant2	2552.964	-56.59	-20	Pass
NVNT	n40	2462	Ant2	2553.964	-56.65	-20	Pass
NVNT	n40	2462	Ant2	2554.928	-56.72	-20	Pass

Test Graphs
Tx. Emissions OOB NVNT b 2412MHz Ant1

Tx. Emissions OOB NVNT b 2412MHz Ant2


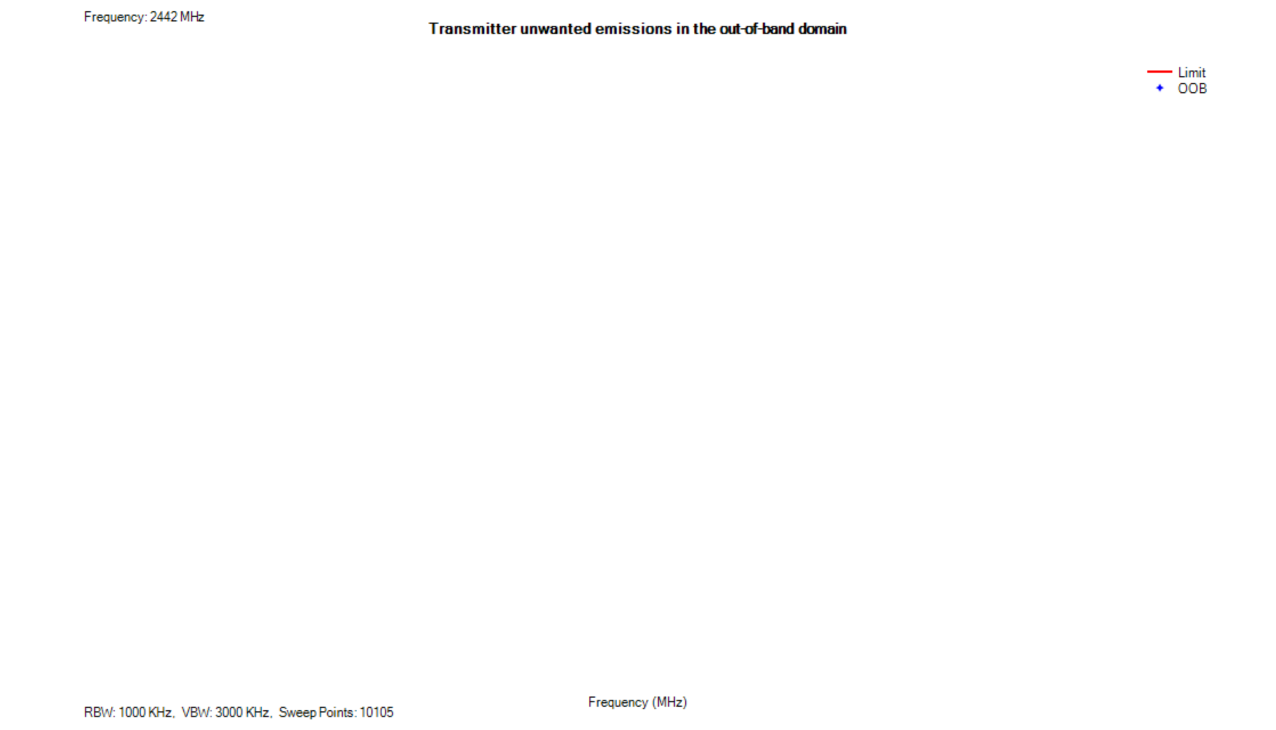
Tx. Emissions OOB NVNT b 2472MHz Ant1



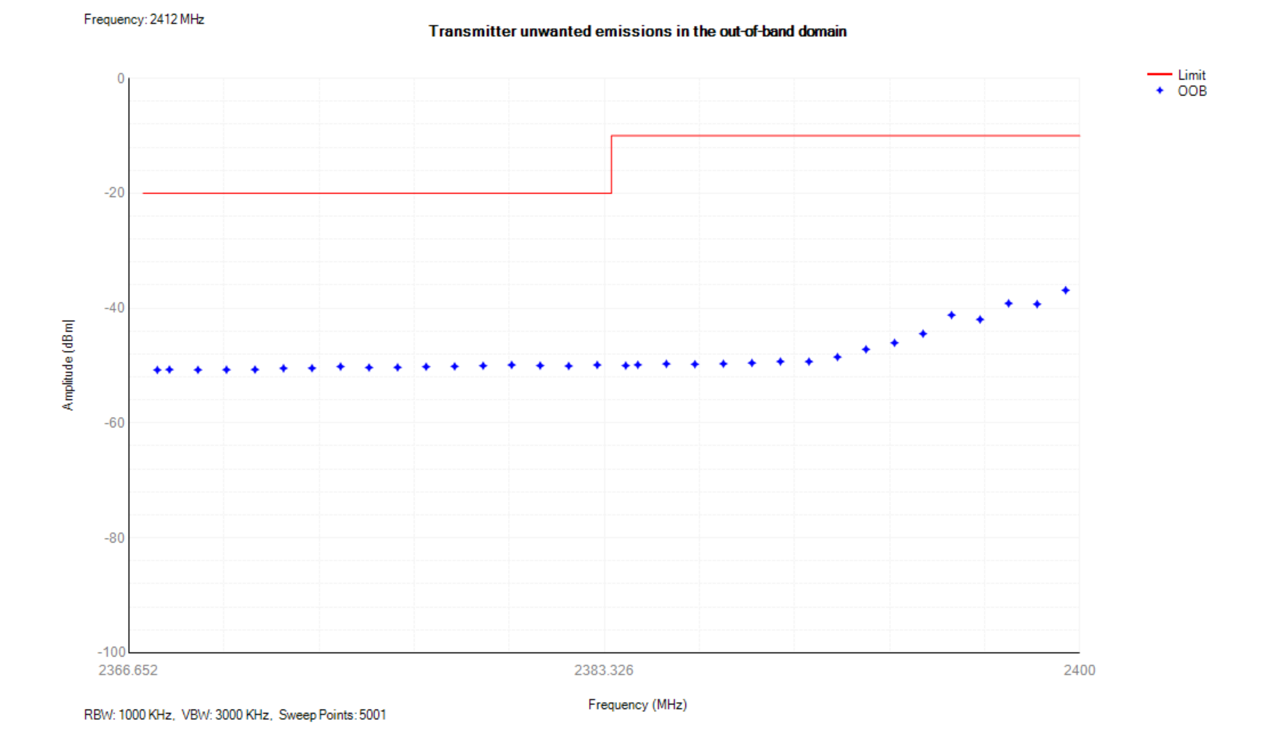
Tx. Emissions OOB NVNT b 2472MHz Ant2



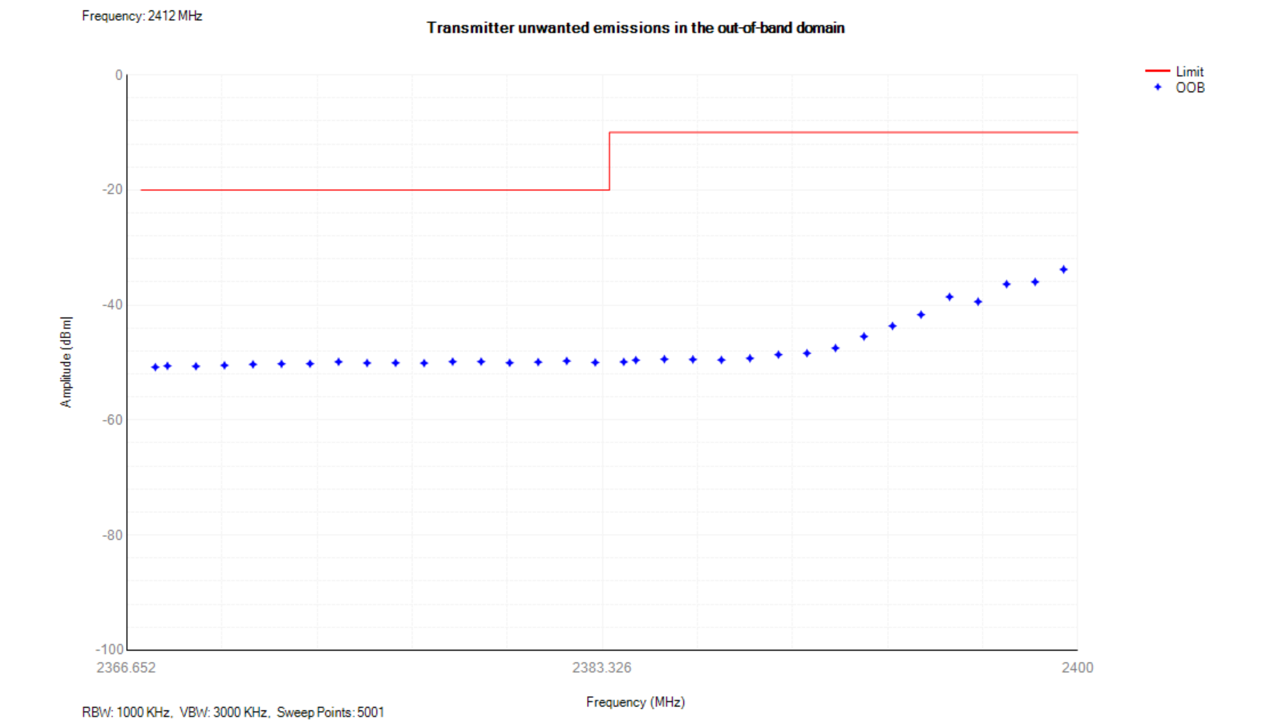
Tx. Emissions OOB NVNT b 2442MHz Ant2



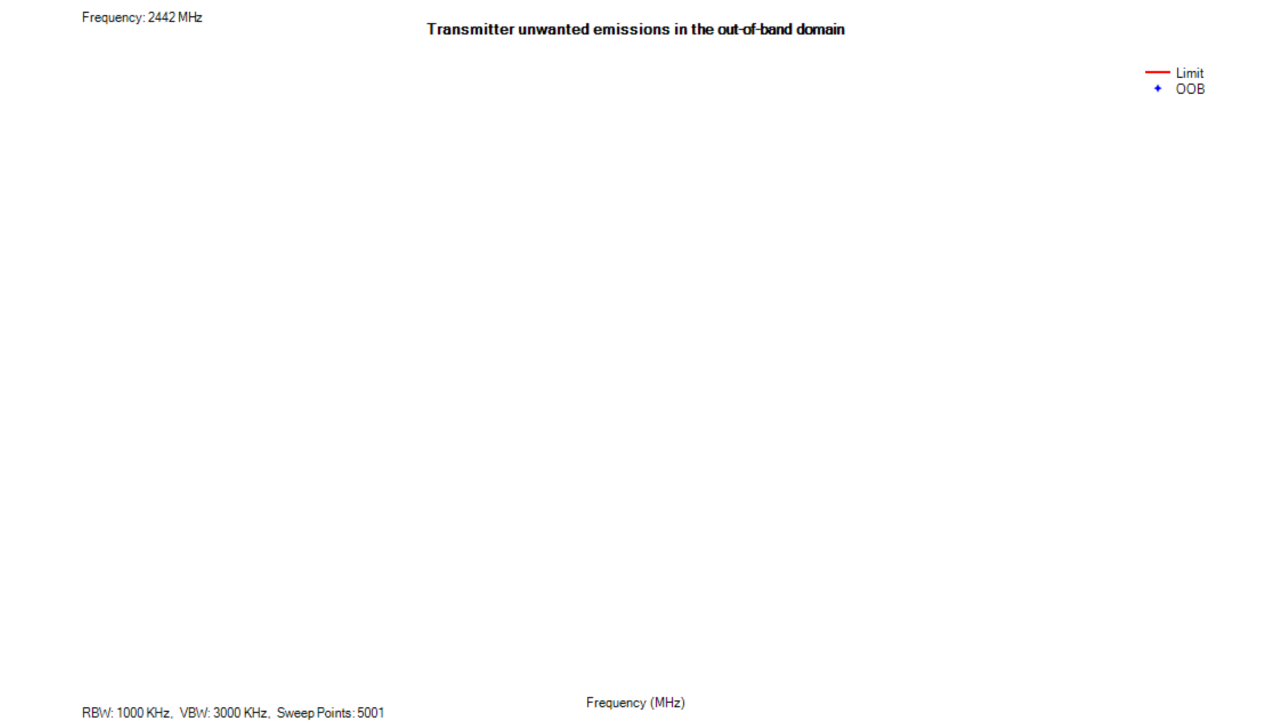
Tx. Emissions OOB NVNT g 2412MHz Ant1



Tx. Emissions OOB NVNT g 2412MHz Ant2



Tx. Emissions OOB NVNT g 2442MHz Ant1



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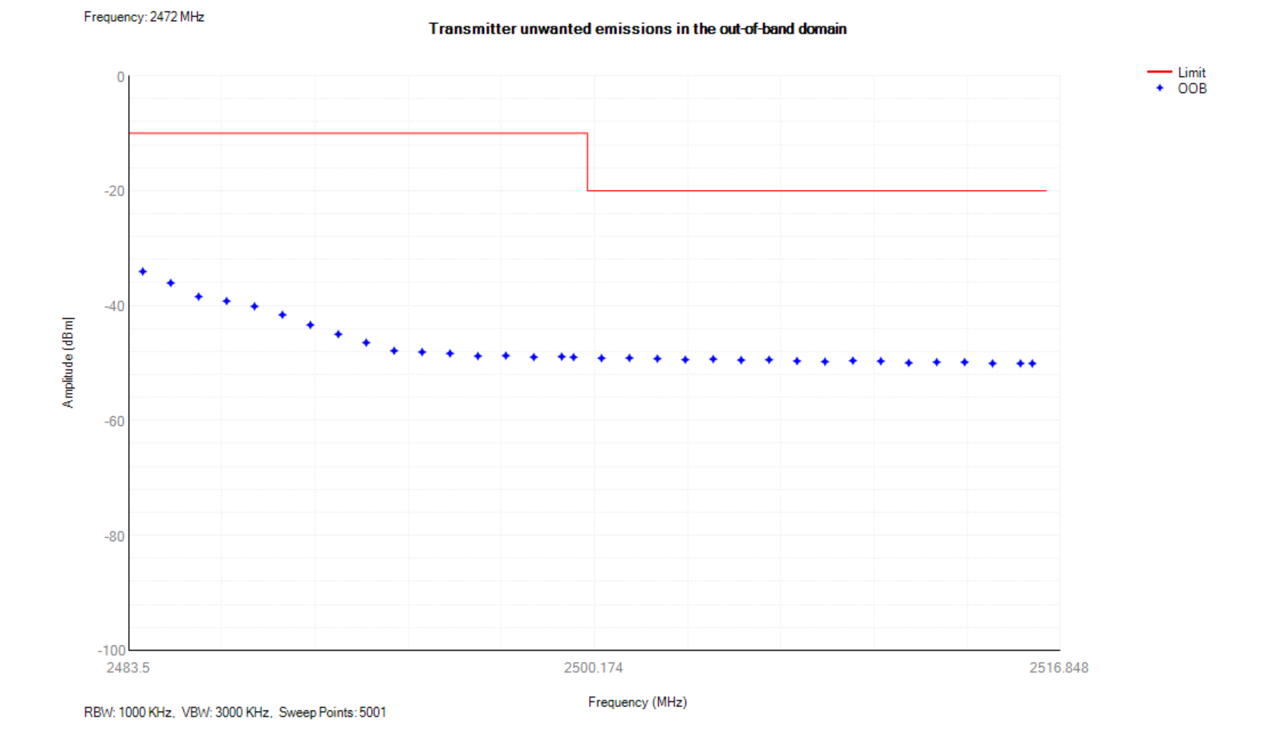

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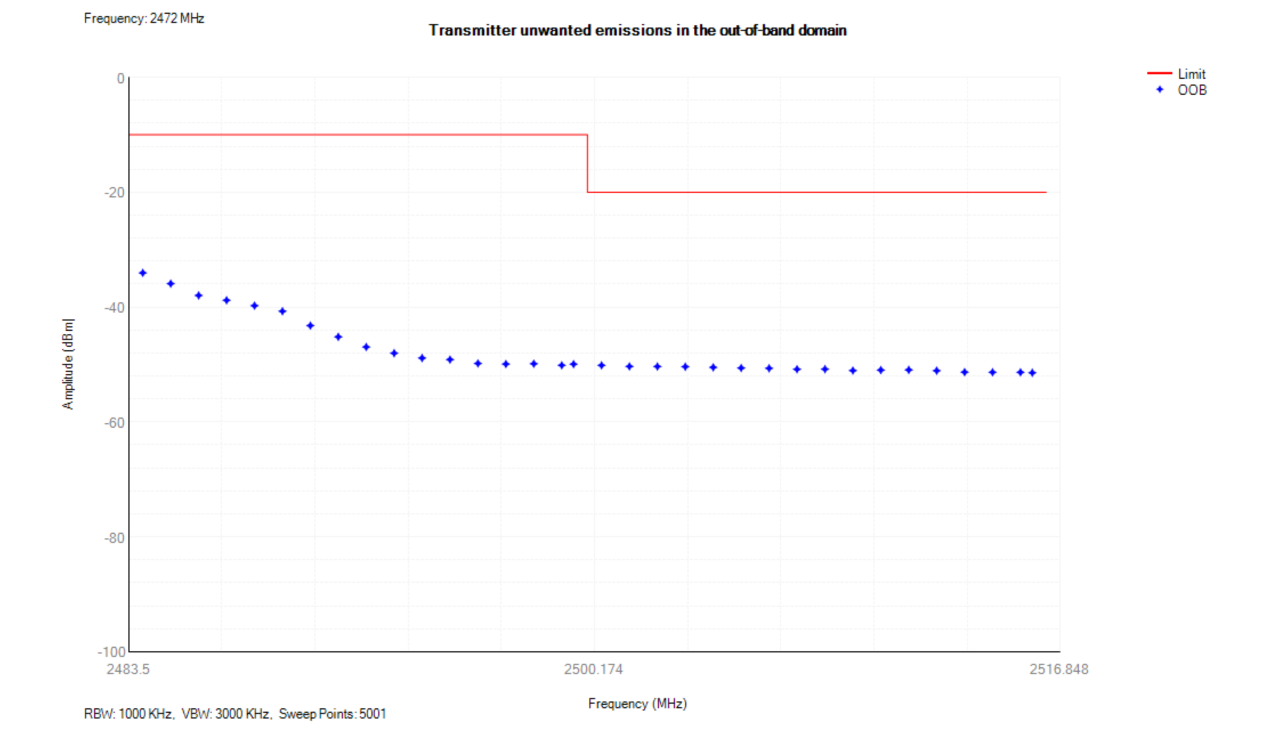
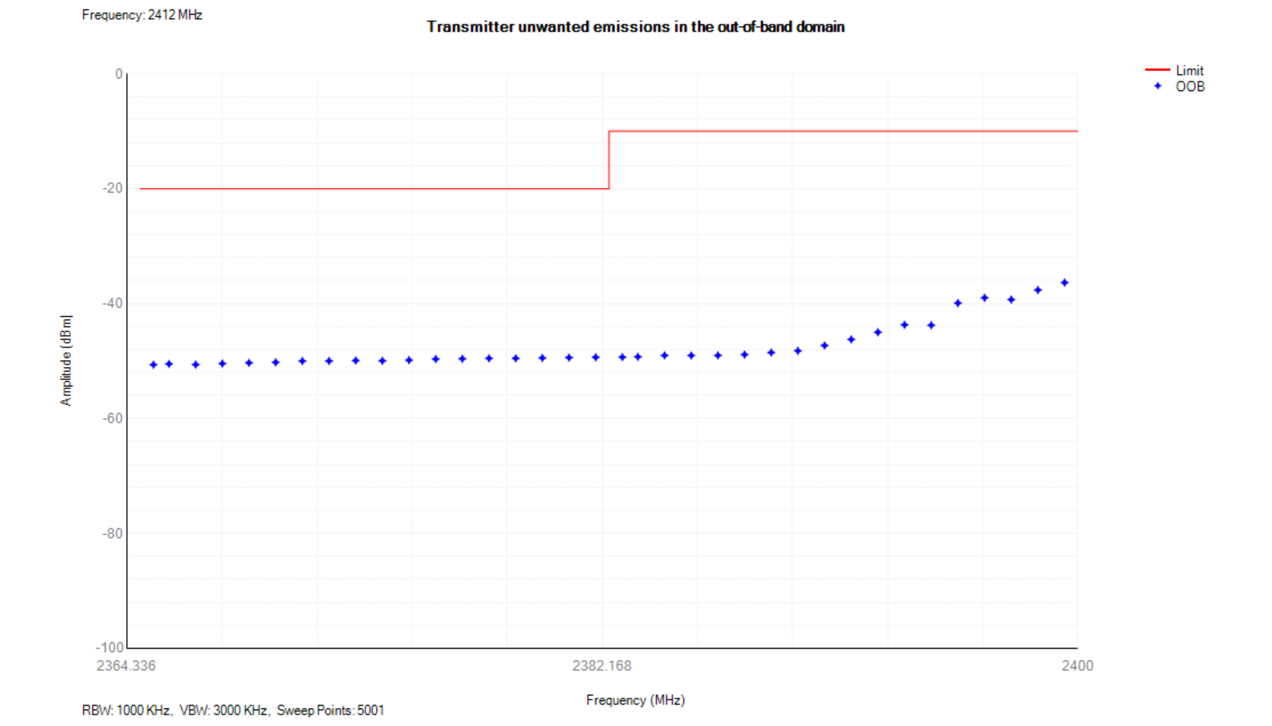
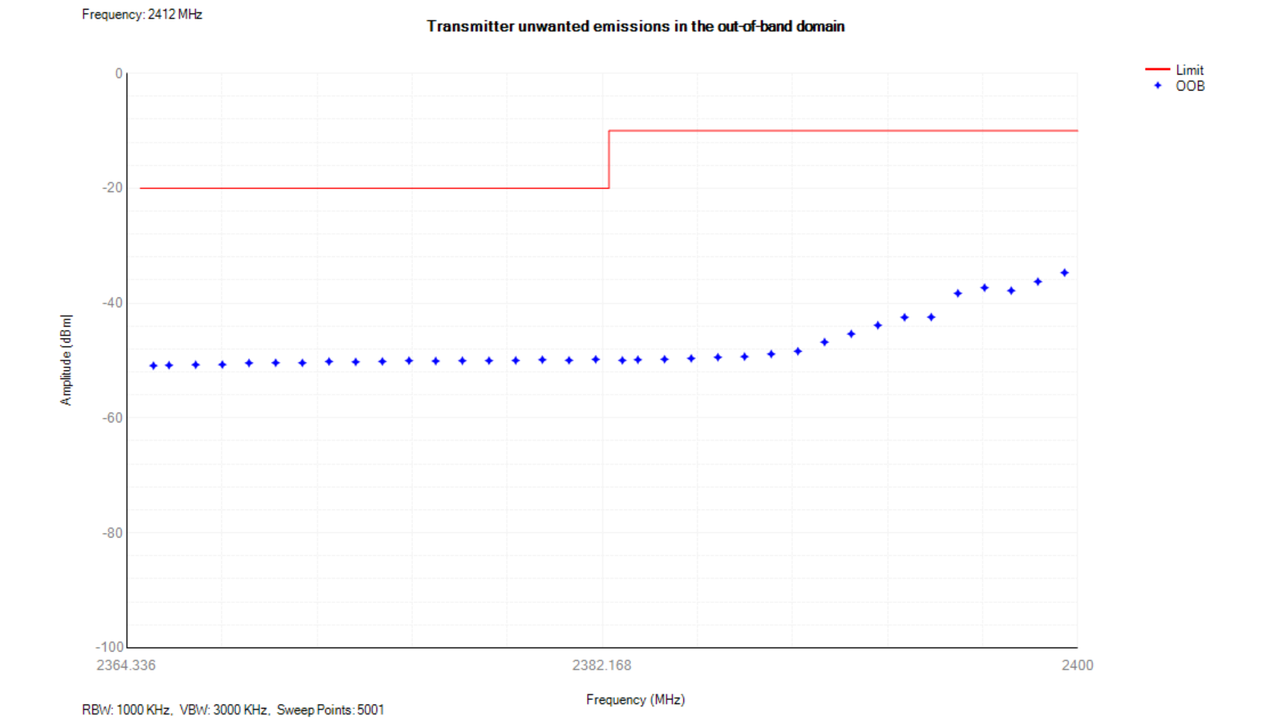


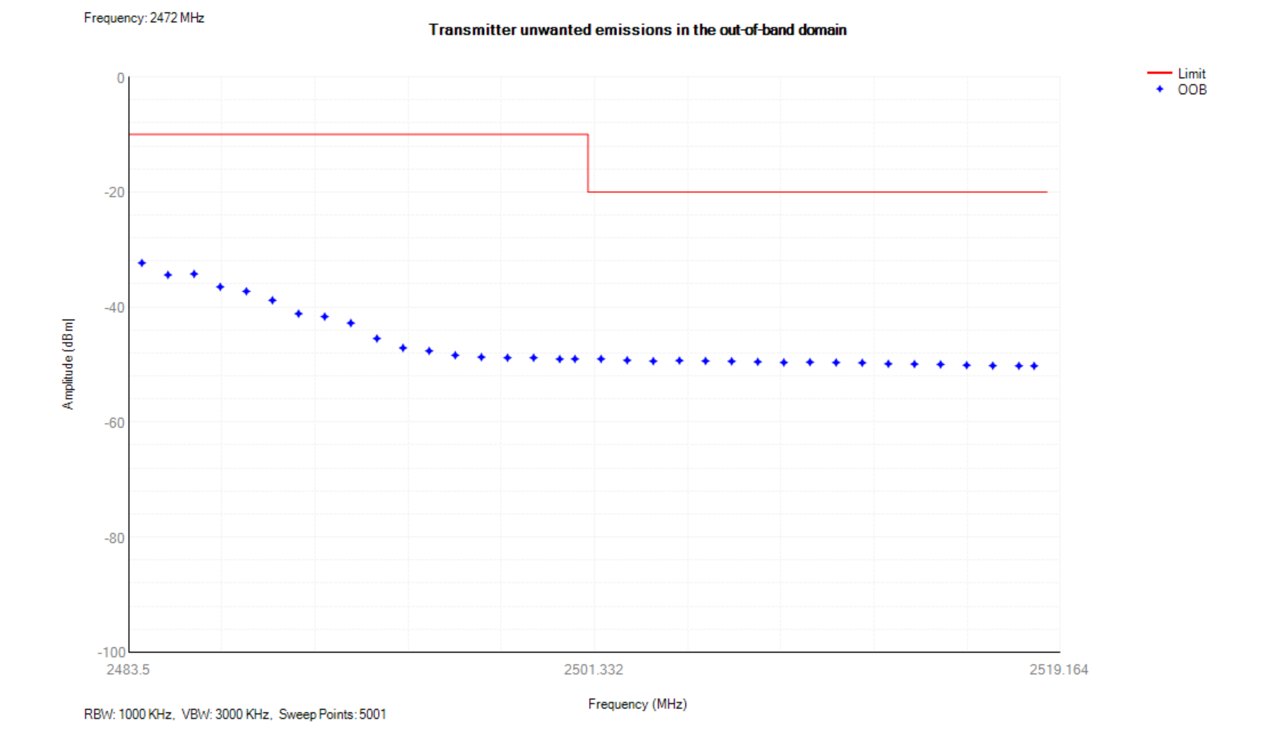
Tx. Emissions OOB NVNT n20 2412MHz Ant1



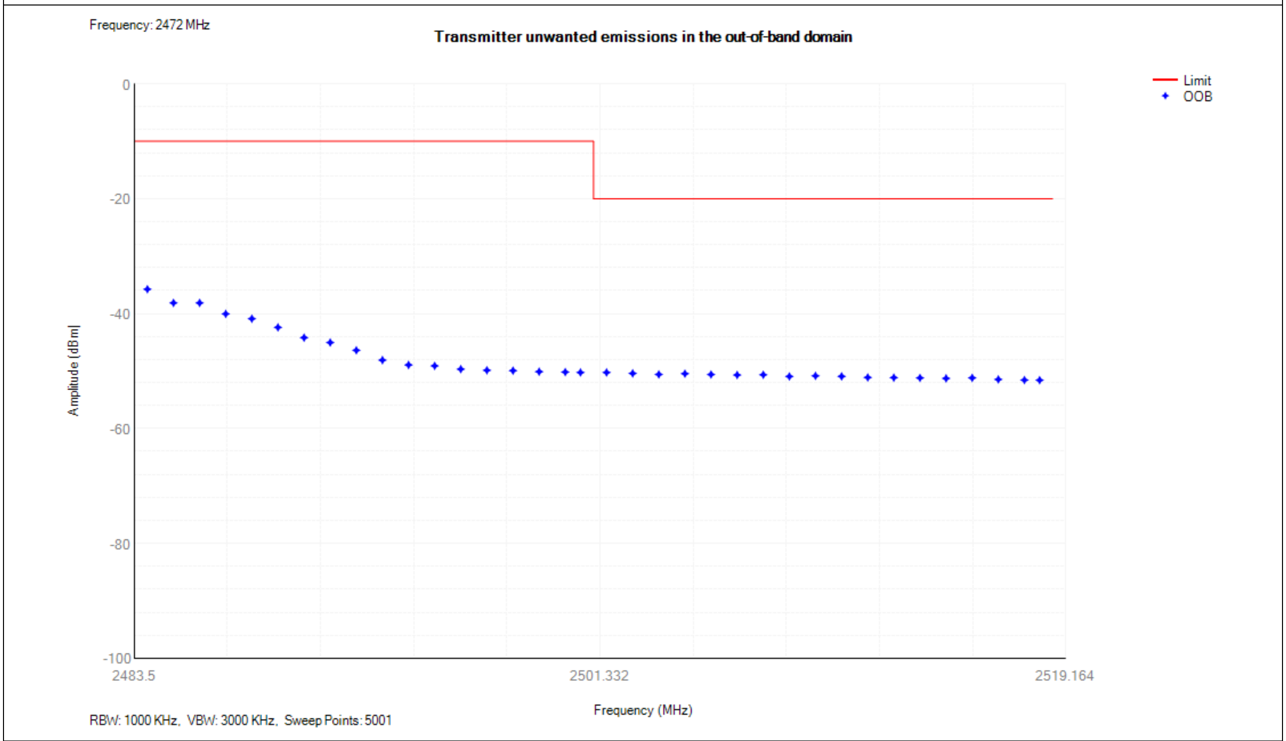
Tx. Emissions OOB NVNT n20 2412MHz Ant2



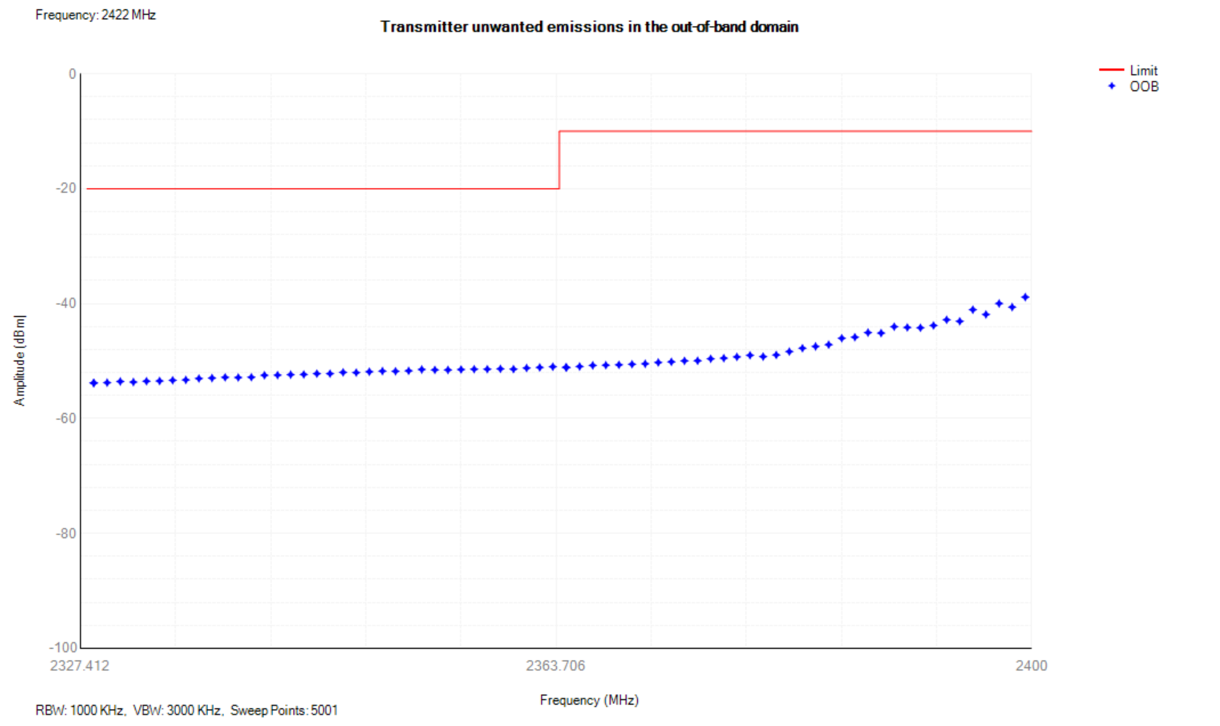
Tx. Emissions OOB NVNT n20 2472MHz Ant1



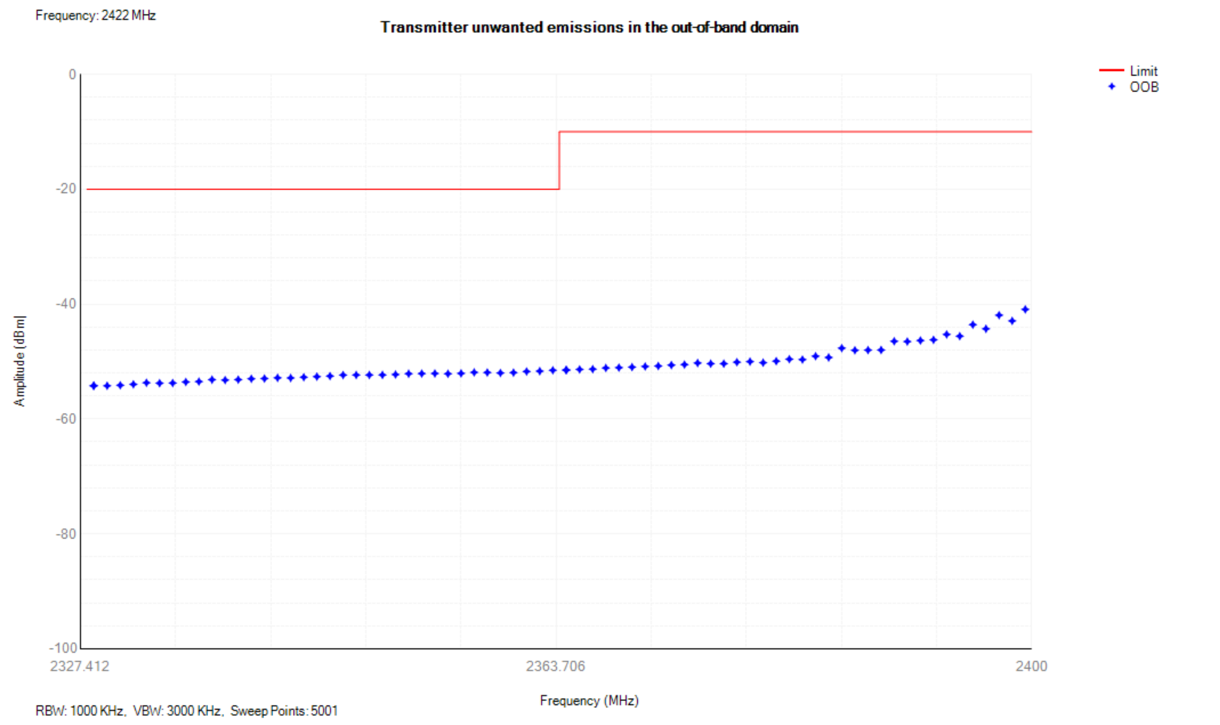
Tx. Emissions OOB NVNT n20 2472MHz Ant2



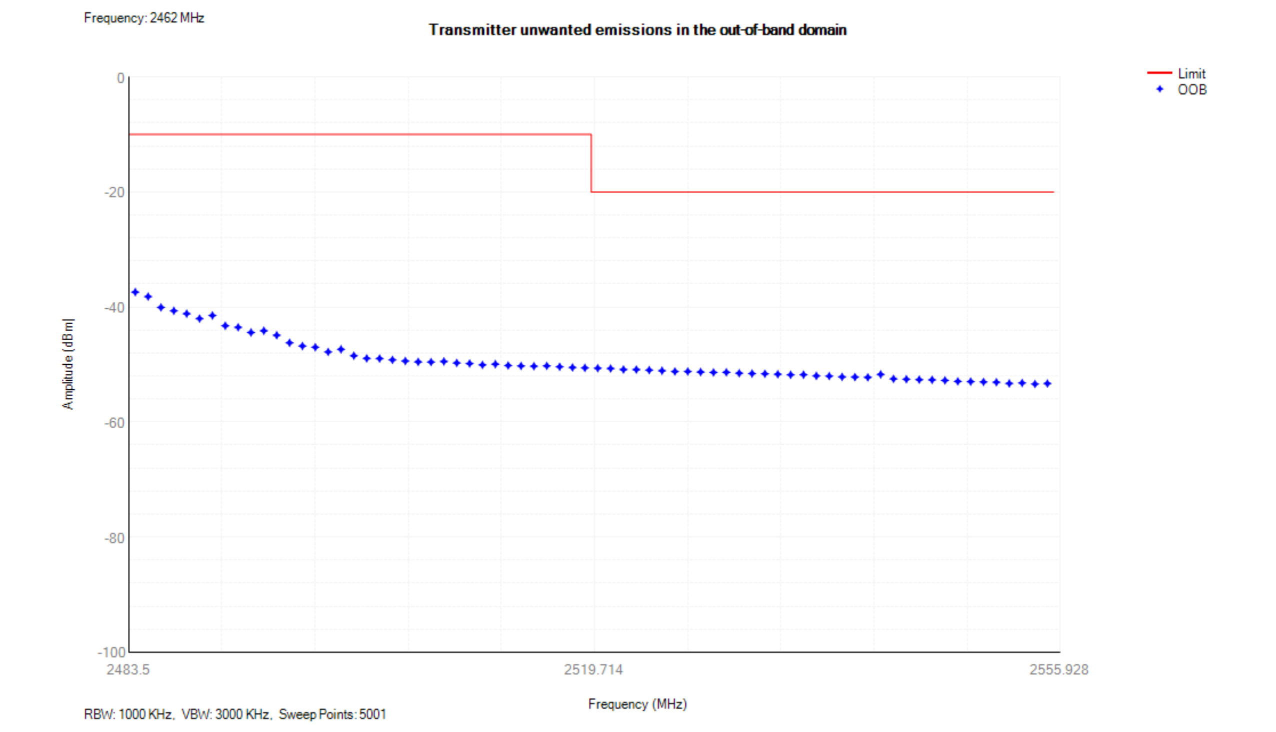
Tx. Emissions OOB NVNT n40 2422MHz Ant1



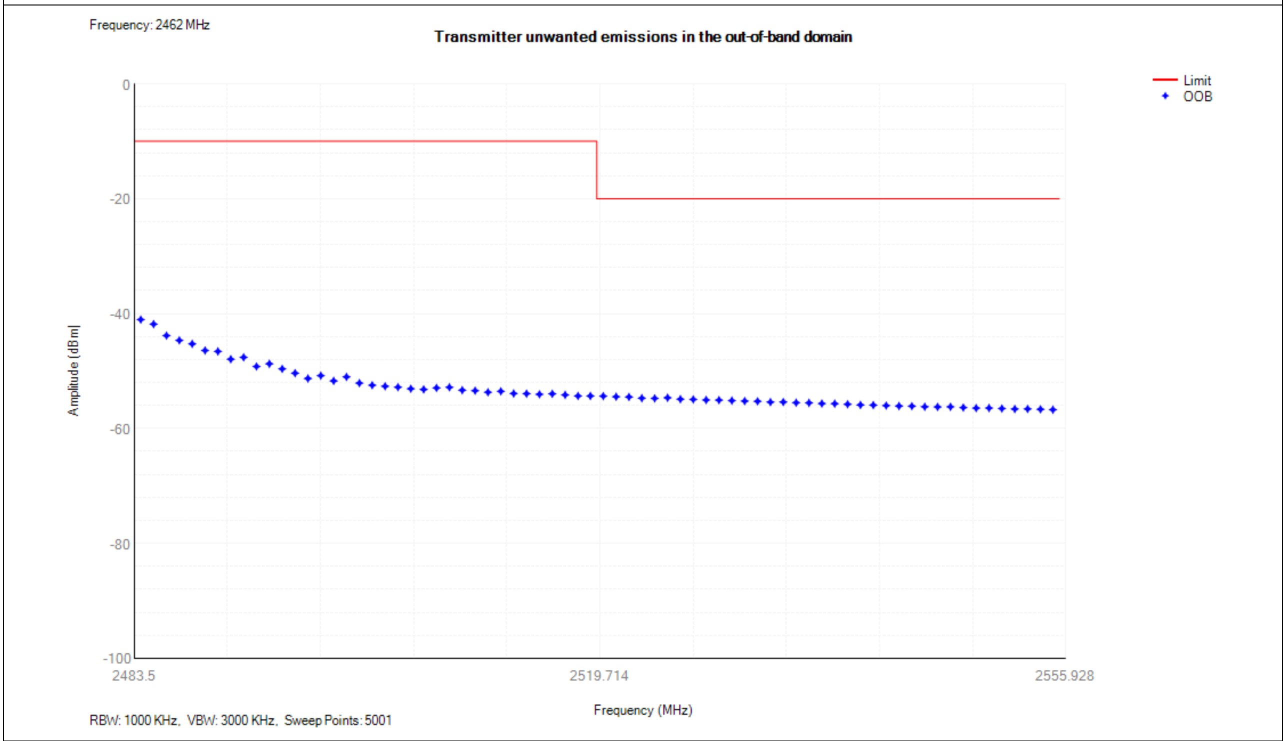
Tx. Emissions OOB NVNT n40 2422MHz Ant2



Tx. Emissions OOB NVNT n40 2462MHz Ant1



Tx. Emissions OOB NVNT n40 2462MHz Ant2



8.5 TRANSMITTER UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN

8.5.1 Applicable standard

ETSI EN 300 328 clause 4.3.1.10, clause 4.3.2.9

8.5.2 Conformance Limit

The transmitter unwanted emissions in the spurious domain shall not exceed the values given in below.
In case of equipment with antenna connectors, these limits apply to emissions at the antenna port (conducted).
For emissions radiated by the cabinet or emissions radiated by integral antenna equipment (without antenna connectors), these limits are e.r.p. for emissions up to 1 GHz and e.i.r.p. for emissions above 1 GHz.

Frequency Range	Maximum power	bandwidth
30 MHz to 47 MHz	-36dBm	100kHz
47 MHz to 74 MHz	-54dBm	100kHz
74 MHz to 87.5 MHz	-36dBm	100kHz
87.5MHz to118 MHz	-54dBm	100kHz
118 MHz to174MHz	-36dBm	100kHz
174MHz to 230MHz	-54dBm	100kHz
230 MHz to 470 MHz	-36dBm	100kHz
470 MHz to 862 MHz	-54dBm	100kHz
862 MHz to1 GHz	-36dBm	100kHz
1GHz to12.75 GHz	-30dBm	1MHz

8.5.3 Test Configuration

The measurements for emissions in the spurious domain shall only be performed at normal test conditions.

Radiated measurements shall be used for equipment.

Conducted measurements shall be used for equipment.

8.5.4 Test Procedure

1. Please refer to ETSI EN 300 328 (V2.2.2) clause 5.4.9.1 for the test conditions.
2. Please refer to ETSI EN 300 328 (V2.2.2) clause 5.4.9.2 for the measurement methods.

■ Conducted measurement
● Introduction
The spectrum in the spurious domain (see figure 1 or figure 3) shall be searched for emissions that exceed the limit values given in table 4 or table 12 or that come to within 6 dB below these limits. Each occurrence shall be recorded.
The measurement procedure contains 2 parts.
● Pre-scan
The test procedure below shall be used to identify potential unwanted emissions of the UUT.
Step 1:
The sensitivity of the measurement set-up should be such that the noise floor is at least 12 dB below the limits given in table 4 or table 12.
Step 2:
The emissions over the range 30 MHz to 1 000 MHz shall be identified.
Spectrum analyser settings:

• Resolution bandwidth: 100 kHz
Video bandwidth: 300 kHz
• Filter type: 3 dB (Gaussian)
• Detector mode: Peak
• Trace Mode: Max Hold
• Sweep Points: ≥ 19 400; For spectrum analysers not supporting this high number of sweep points, the frequency band may need to be segmented.
• Sweep time: For non continuous transmissions (duty cycle less than 100 %), the sweep time shall be sufficiently long, such that for each 100 kHz frequency step, the measurement time is greater than two transmissions of the UUT, on any channel.
For Frequency Hopping equipment operating in a normal operating (hopping not disabled) mode, the sweep time shall be further increased to capture multiple transmissions on any of the hopping frequencies.
The above sweep time setting may result in long measuring times in case of frequency hopping equipment. To avoid such long measuring times, an FFT analyser could be used.

Allow the trace to stabilize. Any emissions identified during the sweeps above and that fall within the 6 dB range below the applicable limit or above, shall be individually measured using the procedure in clause 5.4.9.2.1.3 and compared to the limits given in table 4 or table 12.

Step 3:
The emissions over the range 1 GHz to 12,75 GHz shall be identified.
Spectrum analyser settings:
• Resolution bandwidth: 1 MHz
• Video bandwidth: 3 MHz
• Filter type: 3 dB (Gaussian)
• Detector mode: Peak
• Trace Mode: Max Hold
• Sweep Points: ≥ 23 500; For spectrum analysers not supporting this high number of sweep points, the frequency band may need to be segmented.
• Sweep time: For non continuous transmissions (duty cycle less than 100 %), the sweep time shall be sufficiently long, such that for each 1 MHz frequency step, the measurement time is greater than two transmissions of the UUT, on any channel.
For Frequency Hopping equipment operating in a normal operating (hopping not disabled) mode, the sweep time shall be further increased to capture multiple transmissions on any of the hopping frequencies.
The above sweep time setting may result in long measuring times in case of frequency hopping equipment. To avoid such long measuring times, an FFT analyser could be used.

Allow the trace to stabilize. Any emissions identified during the sweeps above that fall within the 6 dB range below the applicable limit or above, shall be individually measured using the procedure in clause 5.4.9.2.1.3 and compared to the limits given in table 4 or table 12.
Frequency Hopping equipment may generate a block (or several blocks) of spurious emissions anywhere within the spurious domain. If this is the case, only the highest peak of each block of emissions shall be measured using the procedure in clause 5.4.9.2.1.3.
Step 4:
• In case of conducted measurements on smart antenna systems (equipment with multiple transmit chains), step 2 and step 3 need to be repeated for each of the active transmit chains (Ach).The limits used to identify emissions during this pre-scan need to be reduced with 10 × log10 (Ach) (number of active transmit chains).

● Measurement of the emissions identified during the pre-scan

The procedure in step 1 to step 4 below shall be used to accurately measure the individual unwanted emissions identified during the pre-scan measurements above. This method assumes the spectrum analyser has a Time Domain Power function.
Step 1:
The level of the emissions shall be measured using the following spectrum analyser settings:
• Measurement Mode: Time Domain Power
• Centre Frequency: Frequency of the emission identified during the pre-scan
• Resolution Bandwidth: 100 kHz (< 1 GHz) / 1 MHz (> 1 GHz)
• Video Bandwidth: 300 kHz (< 1 GHz) / 3 MHz (> 1 GHz)
• Frequency Span: Zero Span
• Sweep mode: Single Sweep
• Sweep time: > 120 % of the duration of the longest burst detected during the measurement of the

RF Output Power

• Sweep points: Sweep time [μs] / (1 μs) with a maximum of 30 000
• Trigger: Video (burst signals) or Manual (continuous signals)
• Detector: RMS

Step 2:

• Set a window where the start and stop indicators match the start and end of the burst with the highest level and record the value of the power measured within this window. If the spurious emission to be measured is a continuous transmission, the measurement window shall be set to match the start and stop times of the sweep.

Step 3:

In case of conducted measurements on smart antenna systems (equipment with multiple transmit chains), step 2 needs to be repeated for each of the active transmit chains (Ach).

Sum the measured power (within the observed window) for each of the active transmit chains.

Step 4:

The value defined in step 3 shall be compared to the limits defined in table 4 or table 12.

■ Radiated measurement

The test site as described in annex B and applicable measurement procedures as described in annex C shall be used.

The test procedure is further as described under clause 5.4.9.2.1.

8.5.5 Test Results

Worst test data of test mode(802.11b)，We have pre-tested the horizontal and vertical data, the worst polarity please refer to the following data

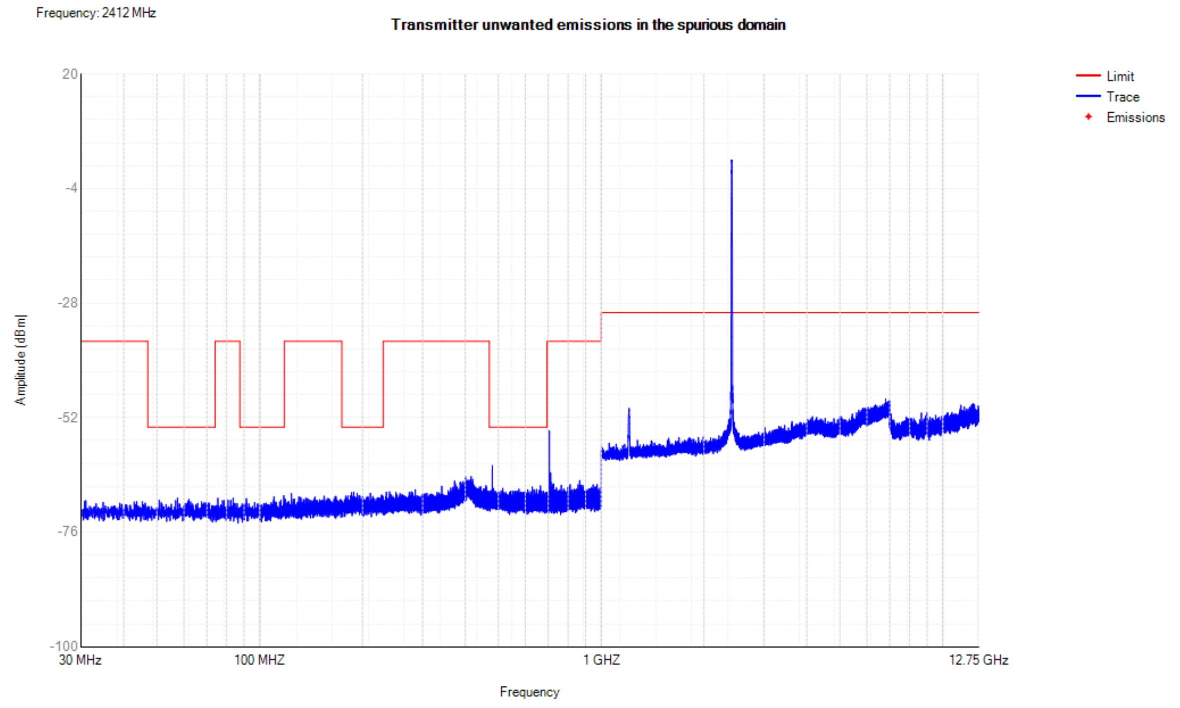
Condition	Mode	Frequency (MHz)	Antenna	Range (MHz)	Spur Freq (MHz)	Peak (dBm)	RMS (dBm)	Limit (dBm)	Verdict
NVNT	b	2412	Ant1	30 -47	30.95	-69.35	NA	-36	Pass
NVNT	b	2412	Ant1	47 -74	57.45	-68.84	NA	-54	Pass
NVNT	b	2412	Ant1	74 -87.5	83.60	-68.84	NA	-36	Pass
NVNT	b	2412	Ant1	87.5 -118	117.60	-68.32	NA	-54	Pass
NVNT	b	2412	Ant1	118 -174	123.80	-67.88	NA	-36	Pass
NVNT	b	2412	Ant1	174 -230	188.60	-67.57	NA	-54	Pass
NVNT	b	2412	Ant1	230 -470	400.15	-64.30	NA	-36	Pass
NVNT	b	2412	Ant1	470 -694	480.00	-62.04	NA	-54	Pass
NVNT	b	2412	Ant1	694 -1000	705.30	-54.74	NA	-36	Pass
NVNT	b	2412	Ant1	1000 -2360	1206.50	-50.04	NA	-30	Pass
NVNT	b	2412	Ant1	2523.5 -12750	6806.00	-48.05	NA	-30	Pass
NVNT	b	2412	Ant2	30 -47	30.25	-69.23	NA	-36	Pass
NVNT	b	2412	Ant2	47 -74	59.30	-68.60	NA	-54	Pass
NVNT	b	2412	Ant2	74 -87.5	80.35	-69.16	NA	-36	Pass
NVNT	b	2412	Ant2	87.5 -118	92.30	-68.79	NA	-54	Pass
NVNT	b	2412	Ant2	118 -174	151.90	-68.05	NA	-36	Pass
NVNT	b	2412	Ant2	174 -230	212.90	-68.07	NA	-54	Pass
NVNT	b	2412	Ant2	230 -470	251.00	-66.11	NA	-36	Pass
NVNT	b	2412	Ant2	470 -694	479.95	-60.06	NA	-54	Pass
NVNT	b	2412	Ant2	694 -1000	956.00	-66.36	NA	-36	Pass
NVNT	b	2412	Ant2	1000 -2360	1206.00	-47.91	NA	-30	Pass
NVNT	b	2412	Ant2	2523.5 -12750	6990.00	-48.73	NA	-30	Pass
NVNT	b	2442	Ant1	30 -47	33.10	-69.52	NA	-36	Pass
NVNT	b	2442	Ant1	47 -74	73.75	-68.45	NA	-54	Pass
NVNT	b	2442	Ant1	74 -87.5	81.20	-69.05	NA	-36	Pass
NVNT	b	2442	Ant1	87.5 -118	109.65	-67.91	NA	-54	Pass
NVNT	b	2442	Ant1	118 -174	168.25	-67.38	NA	-36	Pass
NVNT	b	2442	Ant1	174 -230	215.45	-67.31	NA	-54	Pass
NVNT	b	2442	Ant1	230 -470	400.00	-64.18	NA	-36	Pass
NVNT	b	2442	Ant1	470 -694	480.00	-62.19	NA	-54	Pass
NVNT	b	2442	Ant1	694 -1000	722.10	-54.26	NA	-36	Pass
NVNT	b	2442	Ant1	1000 -2360	1221.00	-49.94	NA	-30	Pass
NVNT	b	2442	Ant1	2523.5 -12750	6983.50	-48.04	NA	-30	Pass
NVNT	b	2442	Ant2	30 -47	32.15	-69.72	NA	-36	Pass
NVNT	b	2442	Ant2	47 -74	71.20	-69.08	NA	-54	Pass
NVNT	b	2442	Ant2	74 -87.5	79.90	-68.29	NA	-36	Pass
NVNT	b	2442	Ant2	87.5 -118	106.15	-68.97	NA	-54	Pass
NVNT	b	2442	Ant2	118 -174	173.45	-67.89	NA	-36	Pass
NVNT	b	2442	Ant2	174 -230	210.00	-67.57	NA	-54	Pass
NVNT	b	2442	Ant2	230 -470	416.55	-66.08	NA	-36	Pass
NVNT	b	2442	Ant2	470 -694	480.00	-59.87	-61.34	-54	Pass
NVNT	b	2442	Ant2	694 -1000	912.25	-66.00	NA	-36	Pass
NVNT	b	2442	Ant2	1000 -2360	1220.50	-47.74	NA	-30	Pass
NVNT	b	2442	Ant2	2523.5 -12750	6991.50	-48.32	NA	-30	Pass
NVNT	b	2472	Ant1	30 -47	40.85	-68.39	NA	-36	Pass
NVNT	b	2472	Ant1	47 -74	72.85	-68.57	NA	-54	Pass
NVNT	b	2472	Ant1	74 -87.5	78.05	-68.96	NA	-36	Pass
NVNT	b	2472	Ant1	87.5 -118	100.55	-68.69	NA	-54	Pass
NVNT	b	2472	Ant1	118 -174	149.35	-68.14	NA	-36	Pass
NVNT	b	2472	Ant1	174 -230	221.80	-67.15	NA	-54	Pass
NVNT	b	2472	Ant1	230 -470	400.05	-64.27	NA	-36	Pass
NVNT	b	2472	Ant1	470 -694	480.00	-63.97	NA	-54	Pass
NVNT	b	2472	Ant1	694 -1000	910.20	-65.64	NA	-36	Pass
NVNT	b	2472	Ant1	1000 -2360	1236.00	-47.67	NA	-30	Pass
NVNT	b	2472	Ant1	2523.5 -12750	6992.00	-47.48	NA	-30	Pass
NVNT	b	2472	Ant2	30 -47	44.00	-69.00	NA	-36	Pass
NVNT	b	2472	Ant2	47 -74	50.80	-69.46	NA	-54	Pass
NVNT	b	2472	Ant2	74 -87.5	86.40	-68.42	NA	-36	Pass
NVNT	b	2472	Ant2	87.5 -118	96.70	-68.45	NA	-54	Pass
NVNT	b	2472	Ant2	118 -174	172.30	-68.20	NA	-36	Pass
NVNT	b	2472	Ant2	174 -230	229.50	-66.62	NA	-54	Pass
NVNT	b	2472	Ant2	230 -470	287.40	-65.93	NA	-36	Pass
NVNT	b	2472	Ant2	470 -694	480.00	-59.26	-60.62	-54	Pass

NVNT	b	2472	Ant2	694 -1000	871.30	-65.39	NA	-36	Pass
NVNT	b	2472	Ant2	1000 -2360	1236.00	-46.07	NA	-30	Pass
NVNT	b	2472	Ant2	2523.5 -12750	6999.00	-48.14	NA	-30	Pass
NVNT	g	2412	Ant1	30 -47	46.10	-69.14	NA	-36	Pass
NVNT	g	2412	Ant1	47 -74	50.35	-69.09	NA	-54	Pass
NVNT	g	2412	Ant1	74 -87.5	80.35	-69.04	NA	-36	Pass
NVNT	g	2412	Ant1	87.5 -118	110.30	-68.89	NA	-54	Pass
NVNT	g	2412	Ant1	118 -174	143.95	-68.23	NA	-36	Pass
NVNT	g	2412	Ant1	174 -230	194.55	-67.01	NA	-54	Pass
NVNT	g	2412	Ant1	230 -470	410.55	-64.22	NA	-36	Pass
NVNT	g	2412	Ant1	470 -694	480.00	-60.52	NA	-54	Pass
NVNT	g	2412	Ant1	694 -1000	864.65	-65.46	NA	-36	Pass
NVNT	g	2412	Ant1	1000 -2360	1204.00	-48.23	NA	-30	Pass
NVNT	g	2412	Ant1	2523.5 -12750	6736.00	-47.95	NA	-30	Pass
NVNT	g	2412	Ant2	30 -47	43.55	-68.36	NA	-36	Pass
NVNT	g	2412	Ant2	47 -74	69.45	-68.79	NA	-54	Pass
NVNT	g	2412	Ant2	74 -87.5	82.00	-69.72	NA	-36	Pass
NVNT	g	2412	Ant2	87.5 -118	113.95	-68.82	NA	-54	Pass
NVNT	g	2412	Ant2	118 -174	173.20	-68.04	NA	-36	Pass
NVNT	g	2412	Ant2	174 -230	180.10	-66.89	NA	-54	Pass
NVNT	g	2412	Ant2	230 -470	451.70	-66.26	NA	-36	Pass
NVNT	g	2412	Ant2	470 -694	480.00	-57.97	-59.13	-54	Pass
NVNT	g	2412	Ant2	694 -1000	833.25	-65.66	NA	-36	Pass
NVNT	g	2412	Ant2	1000 -2360	1204.00	-47.26	NA	-30	Pass
NVNT	g	2412	Ant2	2523.5 -12750	6608.50	-48.07	NA	-30	Pass
NVNT	g	2442	Ant1	30 -47	33.55	-68.22	NA	-36	Pass
NVNT	g	2442	Ant1	47 -74	47.05	-68.86	NA	-54	Pass
NVNT	g	2442	Ant1	74 -87.5	81.35	-69.52	NA	-36	Pass
NVNT	g	2442	Ant1	87.5 -118	90.55	-68.12	NA	-54	Pass
NVNT	g	2442	Ant1	118 -174	135.25	-67.39	NA	-36	Pass
NVNT	g	2442	Ant1	174 -230	180.90	-67.62	NA	-54	Pass
NVNT	g	2442	Ant1	230 -470	417.85	-64.64	NA	-36	Pass
NVNT	g	2442	Ant1	470 -694	480.00	-60.94	NA	-54	Pass
NVNT	g	2442	Ant1	694 -1000	935.80	-65.62	NA	-36	Pass
NVNT	g	2442	Ant1	1000 -2360	1218.50	-47.95	NA	-30	Pass
NVNT	g	2442	Ant1	2523.5 -12750	6812.00	-48.48	NA	-30	Pass
NVNT	g	2442	Ant2	30 -47	30.05	-68.62	NA	-36	Pass
NVNT	g	2442	Ant2	47 -74	70.30	-69.36	NA	-54	Pass
NVNT	g	2442	Ant2	74 -87.5	78.60	-69.30	NA	-36	Pass
NVNT	g	2442	Ant2	87.5 -118	103.35	-68.63	NA	-54	Pass
NVNT	g	2442	Ant2	118 -174	160.65	-68.12	NA	-36	Pass
NVNT	g	2442	Ant2	174 -230	214.35	-66.89	NA	-54	Pass
NVNT	g	2442	Ant2	230 -470	461.10	-65.59	NA	-36	Pass
NVNT	g	2442	Ant2	470 -694	480.00	-57.71	-59.21	-54	Pass
NVNT	g	2442	Ant2	694 -1000	891.80	-66.05	NA	-36	Pass
NVNT	g	2442	Ant2	1000 -2360	1221.00	-48.08	NA	-30	Pass
NVNT	g	2442	Ant2	2523.5 -12750	6999.50	-48.00	NA	-30	Pass
NVNT	g	2472	Ant1	30 -47	44.20	-69.53	NA	-36	Pass
NVNT	g	2472	Ant1	47 -74	61.85	-69.40	NA	-54	Pass
NVNT	g	2472	Ant1	74 -87.5	84.50	-69.53	NA	-36	Pass
NVNT	g	2472	Ant1	87.5 -118	115.55	-68.77	NA	-54	Pass
NVNT	g	2472	Ant1	118 -174	166.05	-67.35	NA	-36	Pass
NVNT	g	2472	Ant1	174 -230	181.10	-67.62	NA	-54	Pass
NVNT	g	2472	Ant1	230 -470	400.00	-63.43	NA	-36	Pass
NVNT	g	2472	Ant1	470 -694	480.00	-58.12	-58.86	-54	Pass
NVNT	g	2472	Ant1	694 -1000	860.75	-65.60	NA	-36	Pass
NVNT	g	2472	Ant1	1000 -2360	1235.50	-46.88	NA	-30	Pass
NVNT	g	2472	Ant1	2523.5 -12750	6951.50	-47.11	NA	-30	Pass
NVNT	g	2472	Ant2	30 -47	32.05	-69.31	NA	-36	Pass
NVNT	g	2472	Ant2	47 -74	54.70	-69.63	NA	-54	Pass
NVNT	g	2472	Ant2	74 -87.5	79.15	-69.14	NA	-36	Pass
NVNT	g	2472	Ant2	87.5 -118	98.85	-68.68	NA	-54	Pass
NVNT	g	2472	Ant2	118 -174	120.85	-67.61	NA	-36	Pass
NVNT	g	2472	Ant2	174 -230	229.25	-67.61	NA	-54	Pass
NVNT	g	2472	Ant2	230 -470	444.50	-66.11	NA	-36	Pass
NVNT	g	2472	Ant2	470 -694	480.00	-54.05	-54.86	-54	Pass
NVNT	g	2472	Ant2	694 -1000	851.45	-65.85	NA	-36	Pass
NVNT	g	2472	Ant2	1000 -2360	1235.50	-46.58	NA	-30	Pass
NVNT	g	2472	Ant2	2523.5 -12750	6923.50	-48.06	NA	-30	Pass

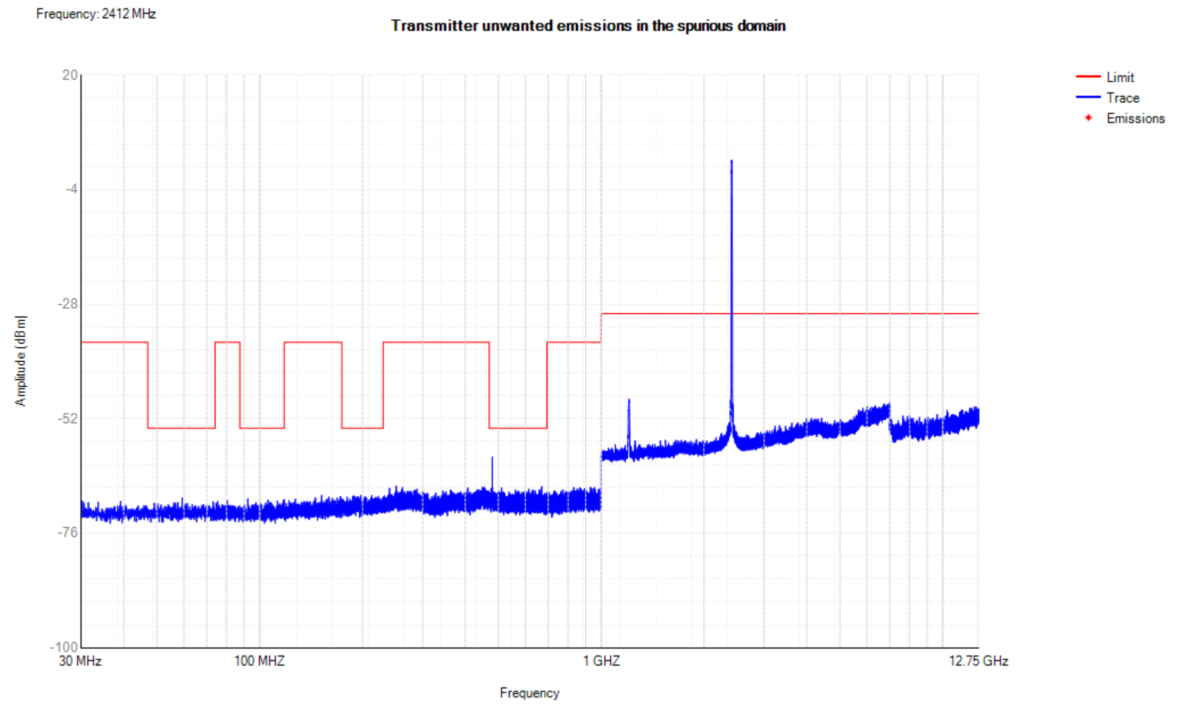
NVNT	n20	2412	Ant1	30 -47	39.95	-69.17	NA	-36	Pass
NVNT	n20	2412	Ant1	47 -74	61.70	-69.01	NA	-54	Pass
NVNT	n20	2412	Ant1	74 -87.5	75.95	-69.05	NA	-36	Pass
NVNT	n20	2412	Ant1	87.5 -118	116.70	-67.78	NA	-54	Pass
NVNT	n20	2412	Ant1	118 -174	159.90	-68.18	NA	-36	Pass
NVNT	n20	2412	Ant1	174 -230	197.60	-67.83	NA	-54	Pass
NVNT	n20	2412	Ant1	230 -470	408.40	-64.73	NA	-36	Pass
NVNT	n20	2412	Ant1	470 -694	480.00	-59.94	-62.45	-54	Pass
NVNT	n20	2412	Ant1	694 -1000	973.15	-65.50	NA	-36	Pass
NVNT	n20	2412	Ant1	1000 -2360	1204.50	-48.26	NA	-30	Pass
NVNT	n20	2412	Ant1	2523.5 -12750	6884.50	-48.38	NA	-30	Pass
NVNT	n20	2412	Ant2	30 -47	33.75	-69.49	NA	-36	Pass
NVNT	n20	2412	Ant2	47 -74	73.75	-68.97	NA	-54	Pass
NVNT	n20	2412	Ant2	74 -87.5	86.10	-68.34	NA	-36	Pass
NVNT	n20	2412	Ant2	87.5 -118	112.05	-68.19	NA	-54	Pass
NVNT	n20	2412	Ant2	118 -174	125.80	-66.88	NA	-36	Pass
NVNT	n20	2412	Ant2	174 -230	187.95	-67.53	NA	-54	Pass
NVNT	n20	2412	Ant2	230 -470	283.35	-65.84	NA	-36	Pass
NVNT	n20	2412	Ant2	470 -694	480.00	-57.50	-59.13	-54	Pass
NVNT	n20	2412	Ant2	694 -1000	877.90	-64.82	NA	-36	Pass
NVNT	n20	2412	Ant2	1000 -2360	1206.00	-47.17	NA	-30	Pass
NVNT	n20	2412	Ant2	2523.5 -12750	6911.00	-47.76	NA	-30	Pass
NVNT	n20	2442	Ant1	30 -47	34.85	-68.82	NA	-36	Pass
NVNT	n20	2442	Ant1	47 -74	73.80	-68.83	NA	-54	Pass
NVNT	n20	2442	Ant1	74 -87.5	87.35	-69.32	NA	-36	Pass
NVNT	n20	2442	Ant1	87.5 -118	92.95	-68.80	NA	-54	Pass
NVNT	n20	2442	Ant1	118 -174	163.75	-68.00	NA	-36	Pass
NVNT	n20	2442	Ant1	174 -230	177.05	-67.80	NA	-54	Pass
NVNT	n20	2442	Ant1	230 -470	392.80	-64.60	NA	-36	Pass
NVNT	n20	2442	Ant1	470 -694	480.00	-62.50	NA	-54	Pass
NVNT	n20	2442	Ant1	694 -1000	996.95	-66.01	NA	-36	Pass
NVNT	n20	2442	Ant1	1000 -2360	1219.50	-47.27	NA	-30	Pass
NVNT	n20	2442	Ant1	2523.5 -12750	6997.50	-48.45	NA	-30	Pass
NVNT	n20	2442	Ant2	30 -47	46.50	-69.45	NA	-36	Pass
NVNT	n20	2442	Ant2	47 -74	69.45	-69.34	NA	-54	Pass
NVNT	n20	2442	Ant2	74 -87.5	84.05	-69.05	NA	-36	Pass
NVNT	n20	2442	Ant2	87.5 -118	110.00	-68.56	NA	-54	Pass
NVNT	n20	2442	Ant2	118 -174	163.75	-67.79	NA	-36	Pass
NVNT	n20	2442	Ant2	174 -230	187.40	-67.16	NA	-54	Pass
NVNT	n20	2442	Ant2	230 -470	386.65	-65.89	NA	-36	Pass
NVNT	n20	2442	Ant2	470 -694	480.00	-58.06	-59.11	-54	Pass
NVNT	n20	2442	Ant2	694 -1000	871.00	-65.79	NA	-36	Pass
NVNT	n20	2442	Ant2	1000 -2360	1220.00	-47.48	NA	-30	Pass
NVNT	n20	2442	Ant2	2523.5 -12750	6990.00	-48.36	NA	-30	Pass
NVNT	n20	2472	Ant1	30 -47	43.40	-68.87	NA	-36	Pass
NVNT	n20	2472	Ant1	47 -74	71.45	-68.79	NA	-54	Pass
NVNT	n20	2472	Ant1	74 -87.5	87.45	-69.21	NA	-36	Pass
NVNT	n20	2472	Ant1	87.5 -118	117.20	-68.32	NA	-54	Pass
NVNT	n20	2472	Ant1	118 -174	153.65	-68.07	NA	-36	Pass
NVNT	n20	2472	Ant1	174 -230	194.15	-67.14	NA	-54	Pass
NVNT	n20	2472	Ant1	230 -470	399.95	-64.49	NA	-36	Pass
NVNT	n20	2472	Ant1	470 -694	480.00	-57.52	-58.71	-54	Pass
NVNT	n20	2472	Ant1	694 -1000	878.75	-65.83	NA	-36	Pass
NVNT	n20	2472	Ant1	1000 -2360	1235.50	-45.94	NA	-30	Pass
NVNT	n20	2472	Ant1	2523.5 -12750	2529.50	-47.79	NA	-30	Pass
NVNT	n20	2472	Ant2	30 -47	46.35	-69.48	NA	-36	Pass
NVNT	n20	2472	Ant2	47 -74	53.35	-69.16	NA	-54	Pass
NVNT	n20	2472	Ant2	74 -87.5	78.00	-68.52	NA	-36	Pass
NVNT	n20	2472	Ant2	87.5 -118	88.95	-68.37	NA	-54	Pass
NVNT	n20	2472	Ant2	118 -174	152.80	-67.93	NA	-36	Pass
NVNT	n20	2472	Ant2	174 -230	183.95	-66.69	NA	-54	Pass
NVNT	n20	2472	Ant2	230 -470	440.10	-66.28	NA	-36	Pass
NVNT	n20	2472	Ant2	470 -694	480.00	-54.10	-54.89	-54	Pass
NVNT	n20	2472	Ant2	694 -1000	867.20	-65.52	NA	-36	Pass
NVNT	n20	2472	Ant2	1000 -2360	1235.50	-45.66	NA	-30	Pass
NVNT	n20	2472	Ant2	2523.5 -12750	6983.00	-47.48	NA	-30	Pass
NVNT	n40	2422	Ant1	30 -47	30.65	-66.71	NA	-36	Pass
NVNT	n40	2422	Ant1	47 -74	47.10	-68.78	NA	-54	Pass
NVNT	n40	2422	Ant1	74 -87.5	80.70	-69.49	NA	-36	Pass

NVNT	n40	2422	Ant1	87.5 -118	108.10	-68.82	NA	-54	Pass
NVNT	n40	2422	Ant1	118 -174	121.70	-68.60	NA	-36	Pass
NVNT	n40	2422	Ant1	174 -230	214.85	-67.60	NA	-54	Pass
NVNT	n40	2422	Ant1	230 -470	400.00	-63.53	NA	-36	Pass
NVNT	n40	2422	Ant1	470 -694	480.00	-61.25	NA	-54	Pass
NVNT	n40	2422	Ant1	694 -1000	869.55	-66.23	NA	-36	Pass
NVNT	n40	2422	Ant1	1000 -2320	1209.50	-50.36	NA	-30	Pass
NVNT	n40	2422	Ant1	2563.5 -12750	6829.00	-47.65	NA	-30	Pass
NVNT	n40	2422	Ant2	30 -47	30.60	-66.63	NA	-36	Pass
NVNT	n40	2422	Ant2	47 -74	57.05	-68.75	NA	-54	Pass
NVNT	n40	2422	Ant2	74 -87.5	82.80	-69.28	NA	-36	Pass
NVNT	n40	2422	Ant2	87.5 -118	116.70	-68.52	NA	-54	Pass
NVNT	n40	2422	Ant2	118 -174	140.85	-67.42	NA	-36	Pass
NVNT	n40	2422	Ant2	174 -230	224.25	-67.10	NA	-54	Pass
NVNT	n40	2422	Ant2	230 -470	451.10	-65.19	NA	-36	Pass
NVNT	n40	2422	Ant2	470 -694	480.00	-56.36	-57.47	-54	Pass
NVNT	n40	2422	Ant2	694 -1000	722.25	-56.04	NA	-36	Pass
NVNT	n40	2422	Ant2	1000 -2320	1214.50	-50.61	NA	-30	Pass
NVNT	n40	2422	Ant2	2563.5 -12750	6837.50	-47.59	NA	-30	Pass
NVNT	n40	2442	Ant1	30 -47	32.50	-65.41	NA	-36	Pass
NVNT	n40	2442	Ant1	47 -74	68.60	-69.31	NA	-54	Pass
NVNT	n40	2442	Ant1	74 -87.5	86.75	-69.39	NA	-36	Pass
NVNT	n40	2442	Ant1	87.5 -118	108.30	-68.73	NA	-54	Pass
NVNT	n40	2442	Ant1	118 -174	170.20	-67.49	NA	-36	Pass
NVNT	n40	2442	Ant1	174 -230	182.95	-67.38	NA	-54	Pass
NVNT	n40	2442	Ant1	230 -470	399.95	-64.16	NA	-36	Pass
NVNT	n40	2442	Ant1	470 -694	480.00	-61.59	NA	-54	Pass
NVNT	n40	2442	Ant1	694 -1000	991.85	-65.49	NA	-36	Pass
NVNT	n40	2442	Ant1	1000 -2320	1218.50	-49.26	NA	-30	Pass
NVNT	n40	2442	Ant1	2563.5 -12750	6879.00	-47.74	NA	-30	Pass
NVNT	n40	2442	Ant2	30 -47	30.20	-67.12	NA	-36	Pass
NVNT	n40	2442	Ant2	47 -74	73.65	-69.06	NA	-54	Pass
NVNT	n40	2442	Ant2	74 -87.5	79.00	-69.30	NA	-36	Pass
NVNT	n40	2442	Ant2	87.5 -118	87.75	-67.86	NA	-54	Pass
NVNT	n40	2442	Ant2	118 -174	164.45	-67.83	NA	-36	Pass
NVNT	n40	2442	Ant2	174 -230	222.35	-67.60	NA	-54	Pass
NVNT	n40	2442	Ant2	230 -470	446.85	-65.97	NA	-36	Pass
NVNT	n40	2442	Ant2	470 -694	480.00	-55.02	-55.71	-54	Pass
NVNT	n40	2442	Ant2	694 -1000	999.20	-65.74	NA	-36	Pass
NVNT	n40	2442	Ant2	1000 -2320	1223.00	-50.43	NA	-30	Pass
NVNT	n40	2442	Ant2	2563.5 -12750	6969.00	-48.01	NA	-30	Pass
NVNT	n40	2462	Ant1	30 -47	30.25	-65.28	NA	-36	Pass
NVNT	n40	2462	Ant1	47 -74	55.25	-68.24	NA	-54	Pass
NVNT	n40	2462	Ant1	74 -87.5	75.60	-68.64	NA	-36	Pass
NVNT	n40	2462	Ant1	87.5 -118	98.90	-68.77	NA	-54	Pass
NVNT	n40	2462	Ant1	118 -174	134.70	-67.49	NA	-36	Pass
NVNT	n40	2462	Ant1	174 -230	178.50	-67.46	NA	-54	Pass
NVNT	n40	2462	Ant1	230 -470	401.35	-63.54	NA	-36	Pass
NVNT	n40	2462	Ant1	470 -694	480.00	-56.41	-57.47	-54	Pass
NVNT	n40	2462	Ant1	694 -1000	891.40	-66.03	NA	-36	Pass
NVNT	n40	2462	Ant1	1000 -2320	1231.00	-47.91	NA	-30	Pass
NVNT	n40	2462	Ant1	2563.5 -12750	6848.50	-47.74	NA	-30	Pass
NVNT	n40	2462	Ant2	30 -47	30.65	-65.88	NA	-36	Pass
NVNT	n40	2462	Ant2	47 -74	70.40	-68.50	NA	-54	Pass
NVNT	n40	2462	Ant2	74 -87.5	74.85	-68.58	NA	-36	Pass
NVNT	n40	2462	Ant2	87.5 -118	116.95	-69.46	NA	-54	Pass
NVNT	n40	2462	Ant2	118 -174	144.60	-67.53	NA	-36	Pass
NVNT	n40	2462	Ant2	174 -230	224.45	-66.57	NA	-54	Pass
NVNT	n40	2462	Ant2	230 -470	445.40	-65.31	NA	-36	Pass
NVNT	n40	2462	Ant2	470 -694	480.00	-56.12	-57.18	-54	Pass
NVNT	n40	2462	Ant2	694 -1000	856.90	-65.68	NA	-36	Pass
NVNT	n40	2462	Ant2	1000 -2320	1233.50	-49.64	NA	-30	Pass
NVNT	n40	2462	Ant2	2563.5 -12750	6951.00	-47.68	NA	-30	Pass

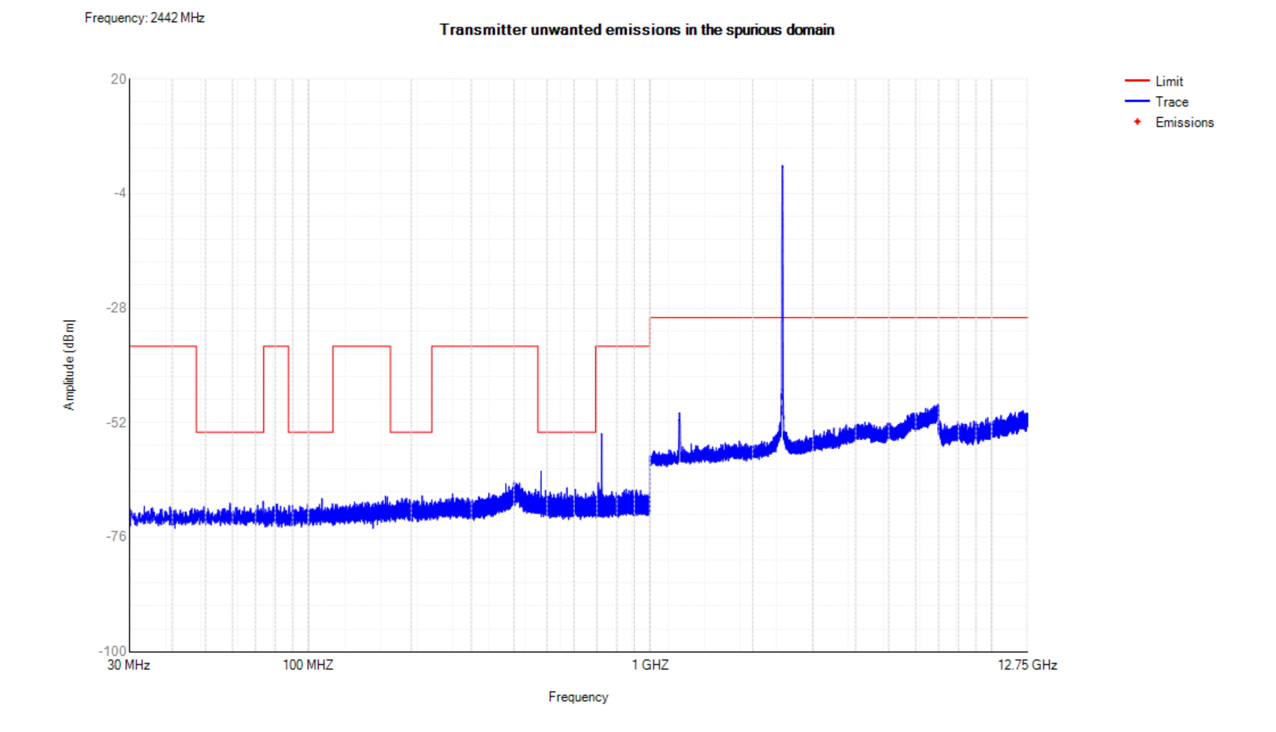
Test Graphs
Tx. Spurious NVNT b 2412MHz Ant1



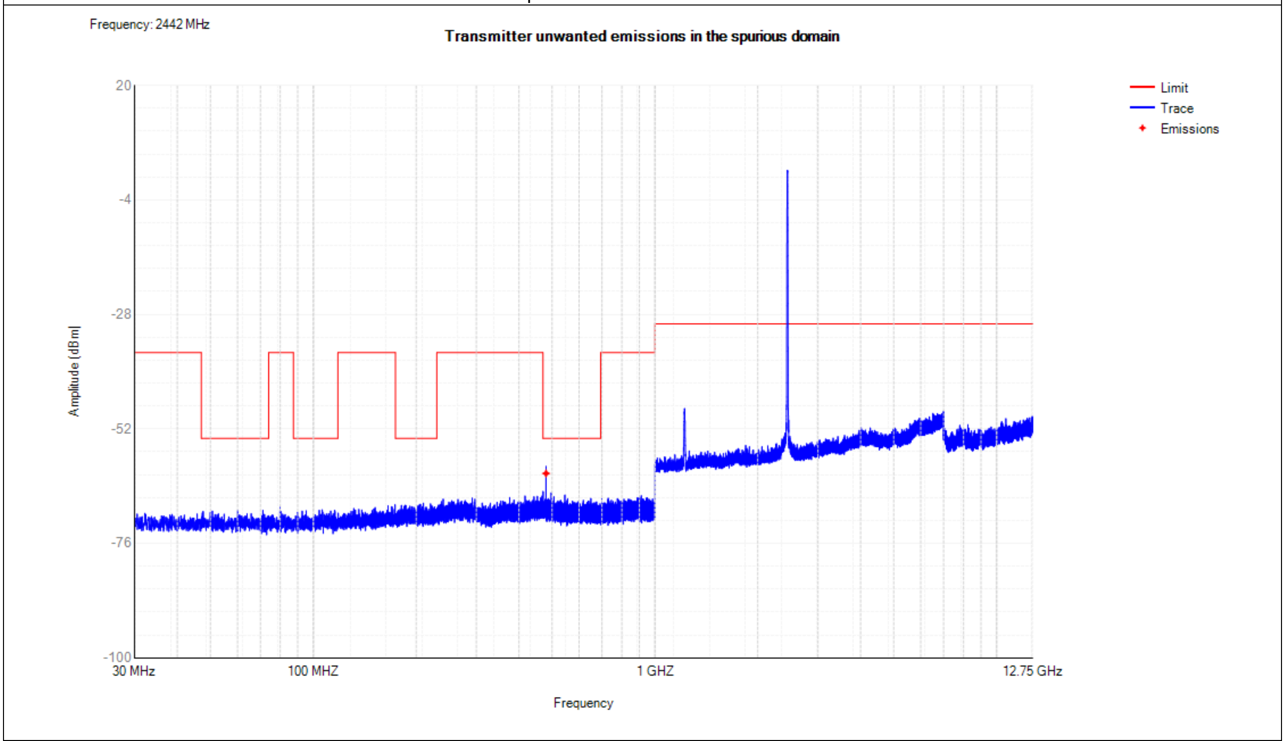
Tx. Spurious NVNT b 2412MHz Ant2



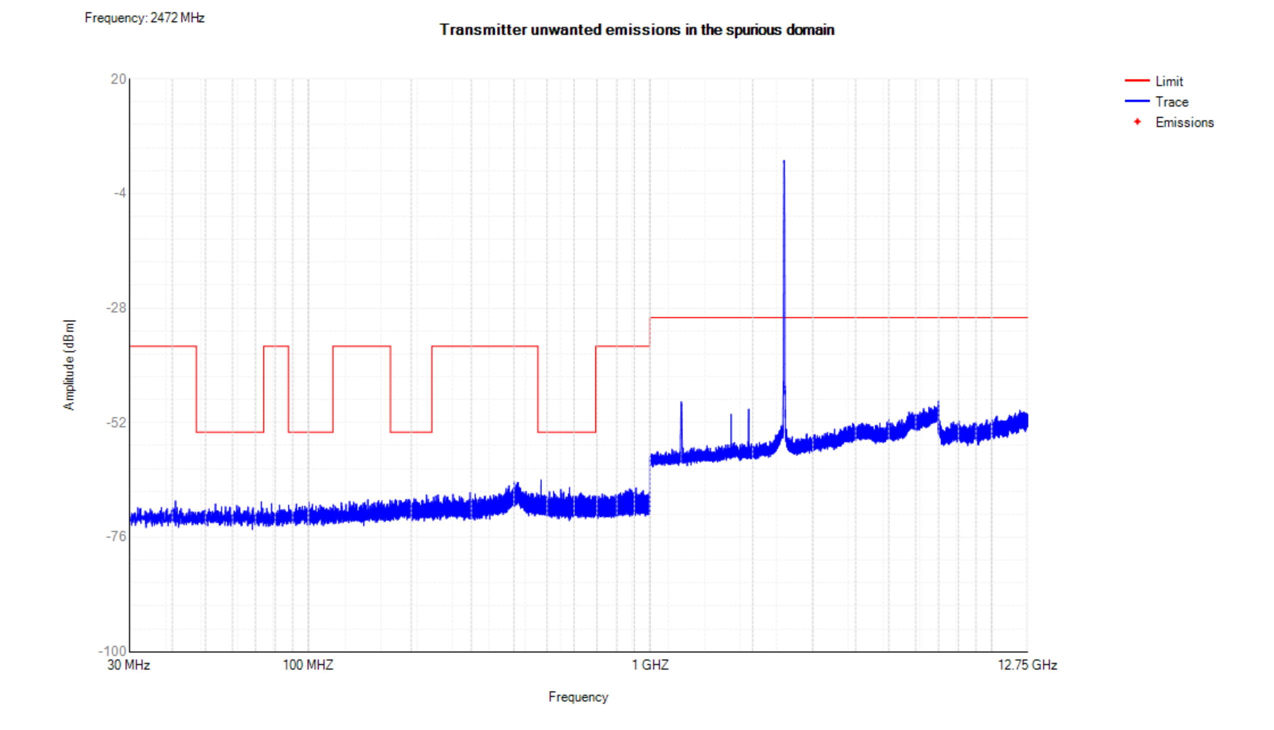
Tx. Spurious NVNT b 2442MHz Ant1



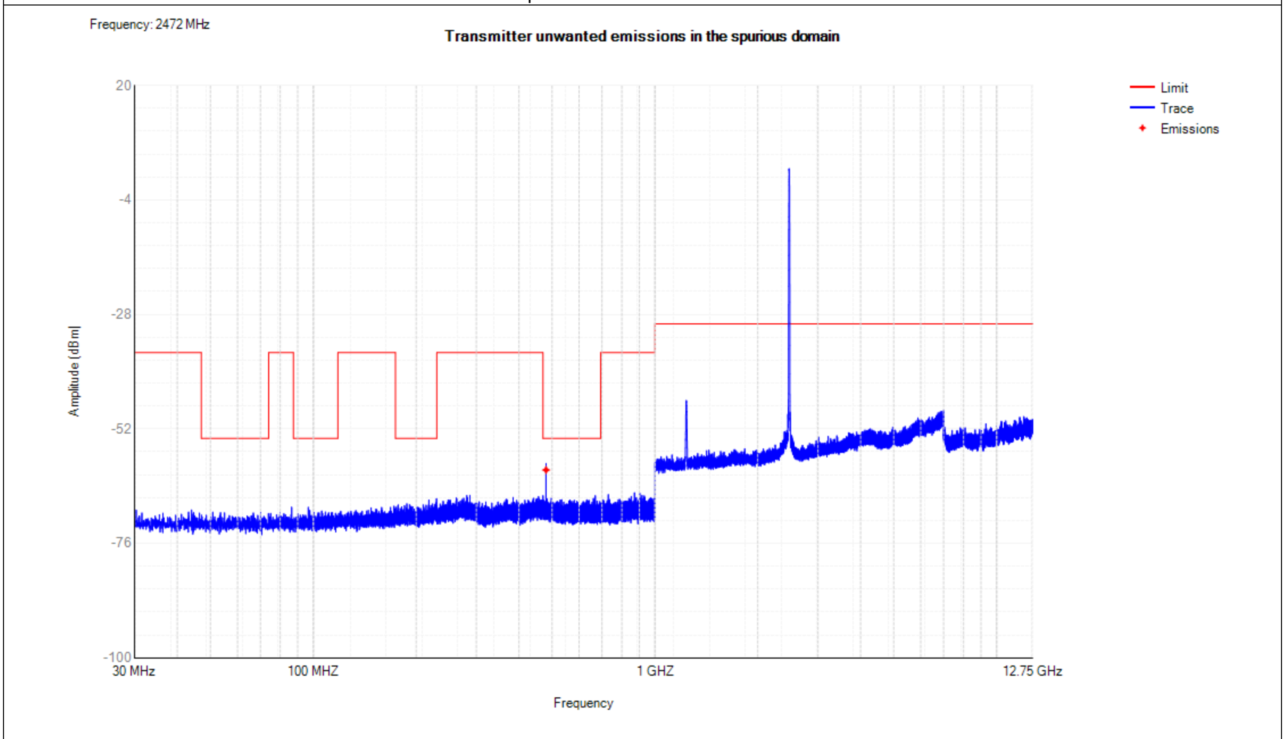
Tx. Spurious NVNT b 2442MHz Ant2



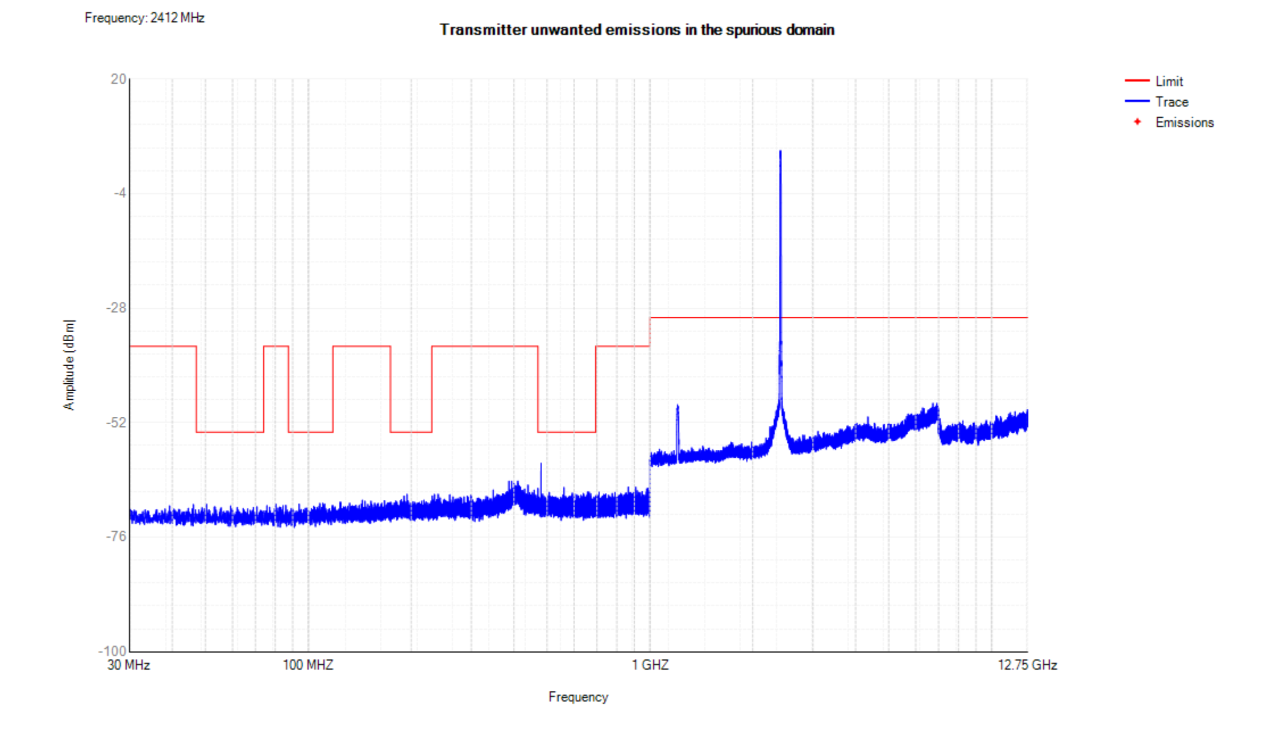
Tx. Spurious NVNT b 2472MHz Ant1



Tx. Spurious NVNT b 2472MHz Ant2



Tx. Spurious NVNT g 2412MHz Ant1



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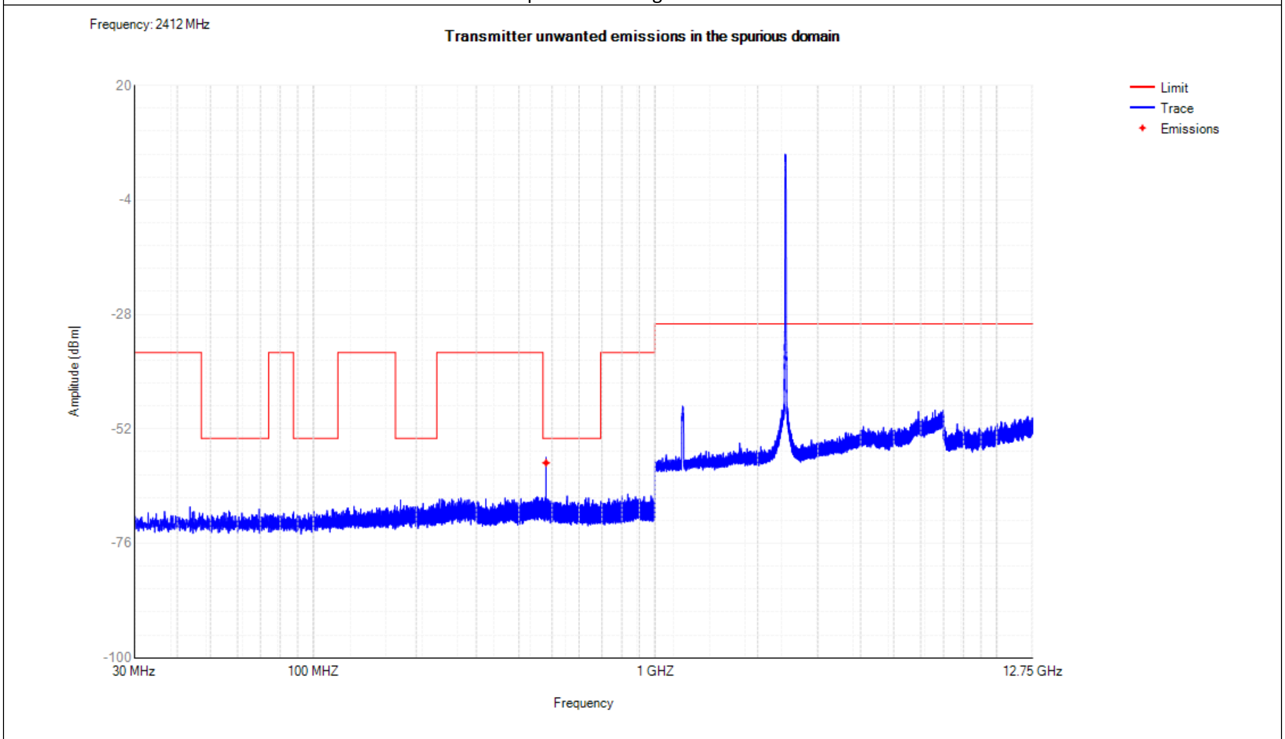
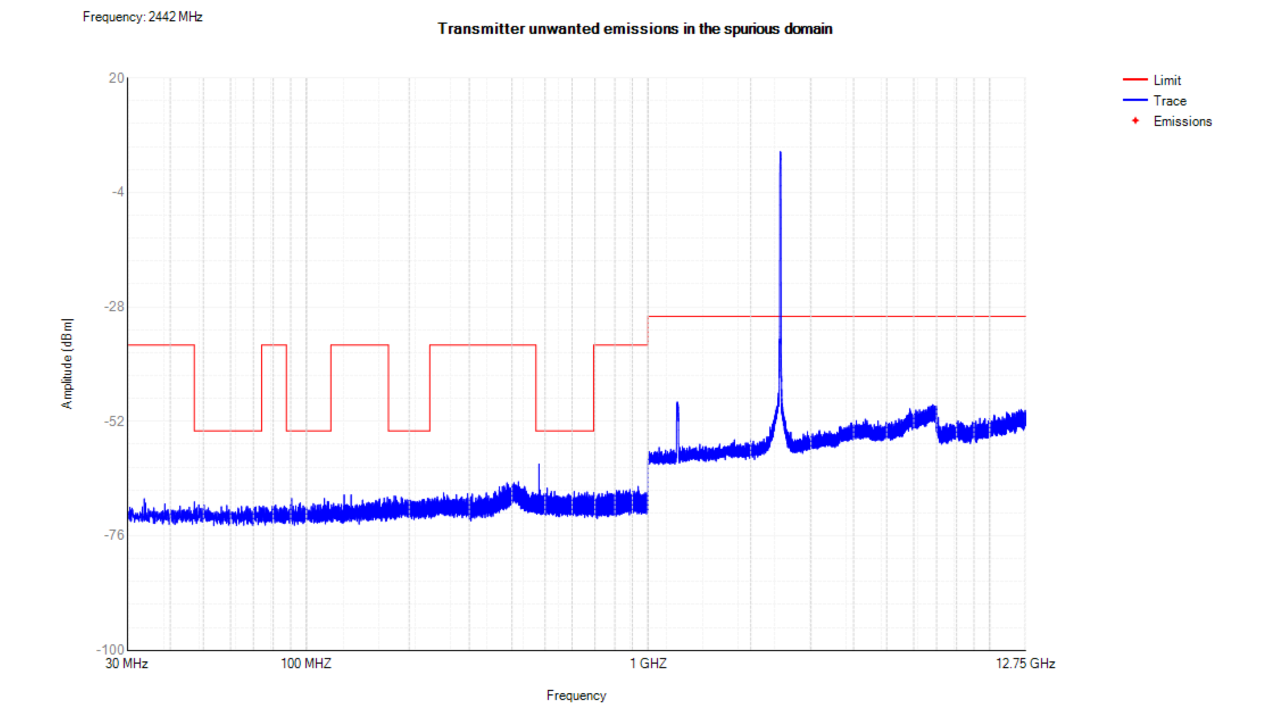
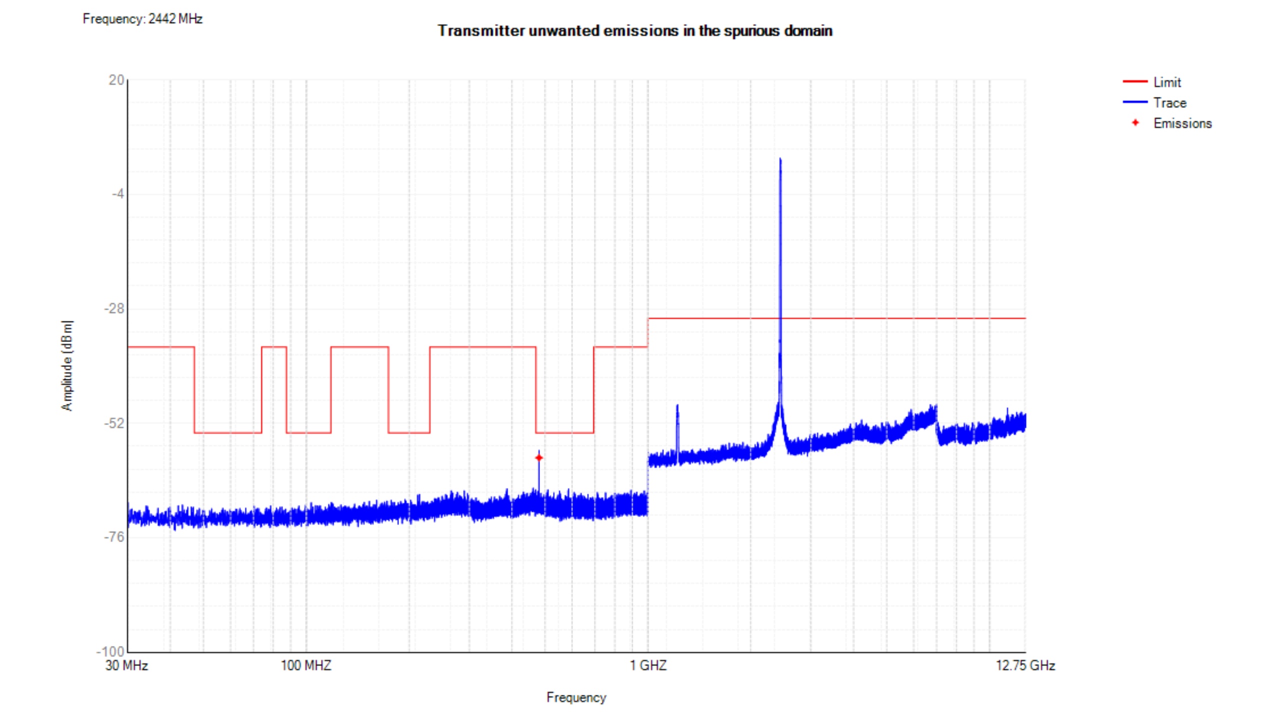


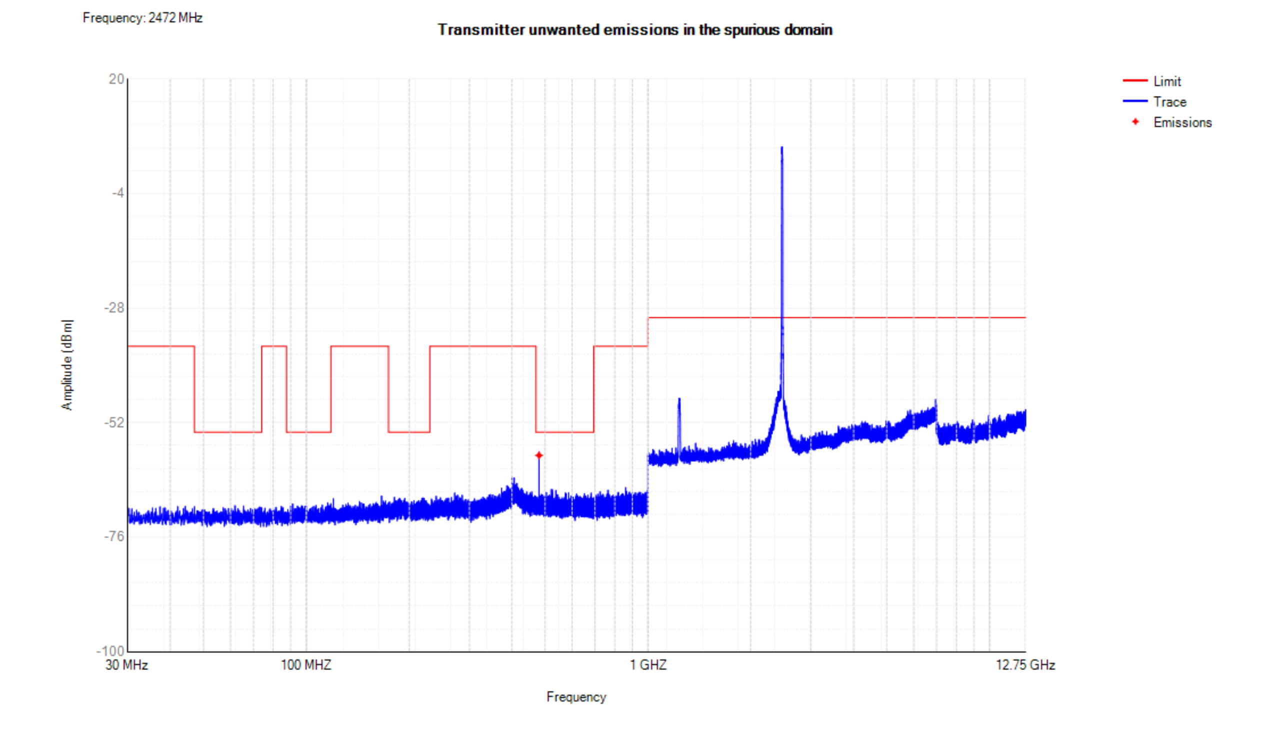
Tx. Spurious NVNT g 2442MHz Ant1



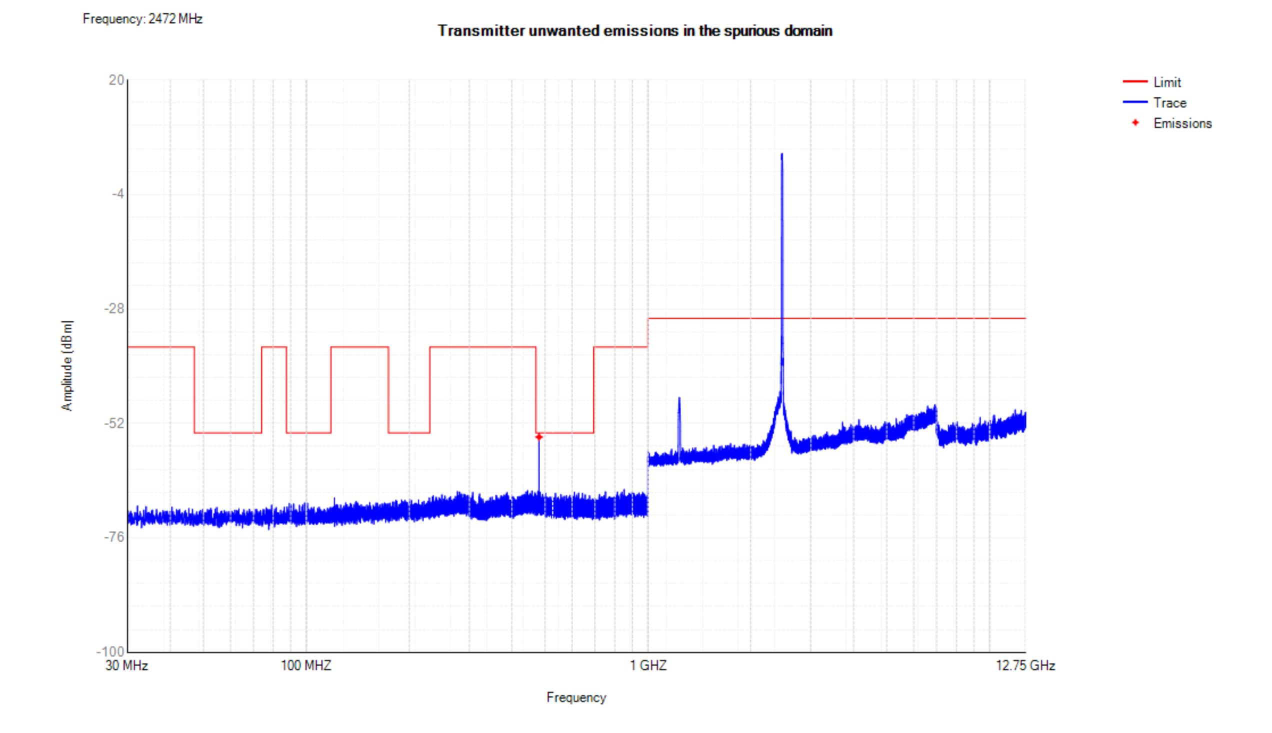
Tx. Spurious NVNT g 2442MHz Ant2



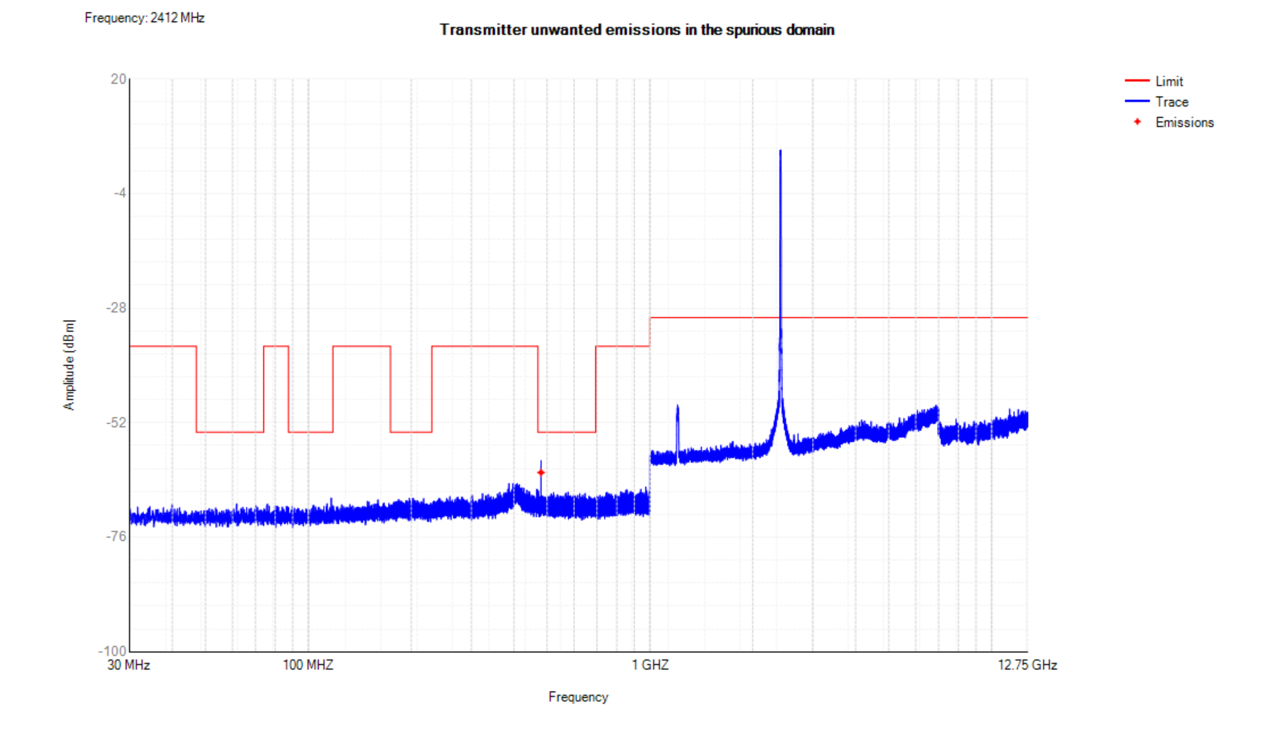
Tx. Spurious NVNT g 2472MHz Ant1



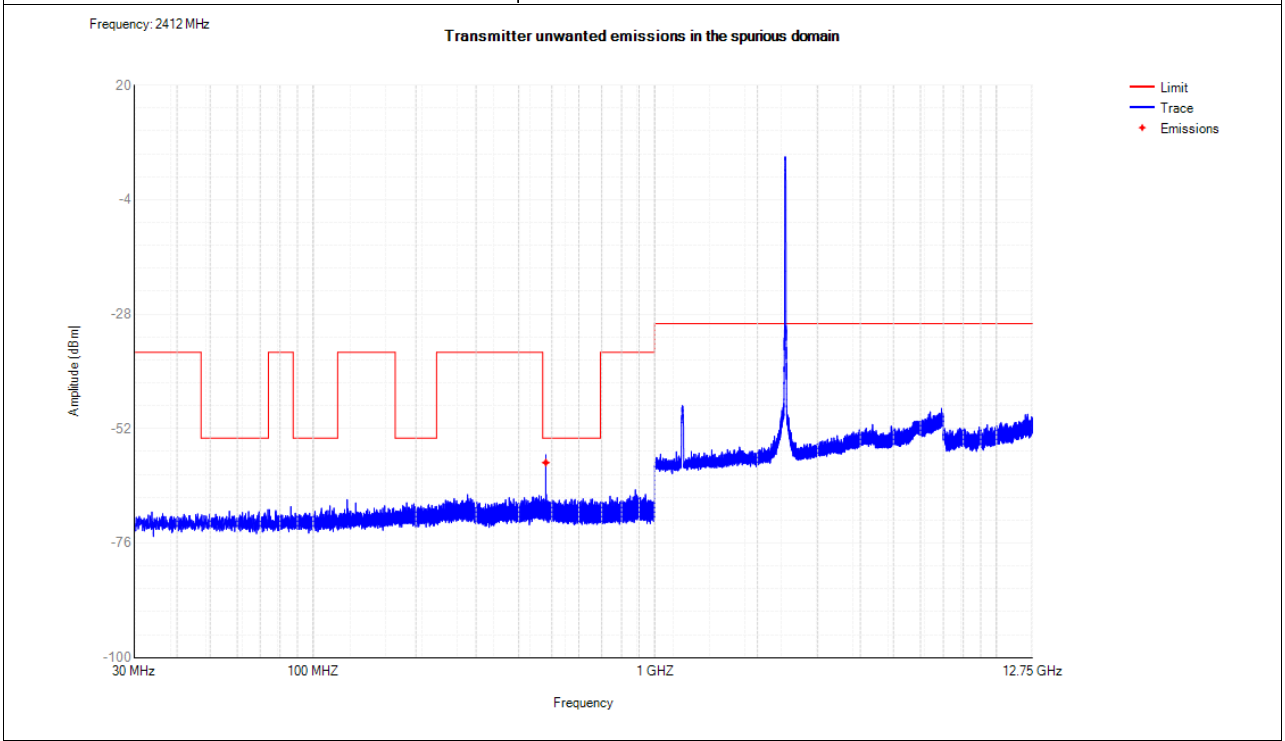
Tx. Spurious NVNT g 2472MHz Ant2



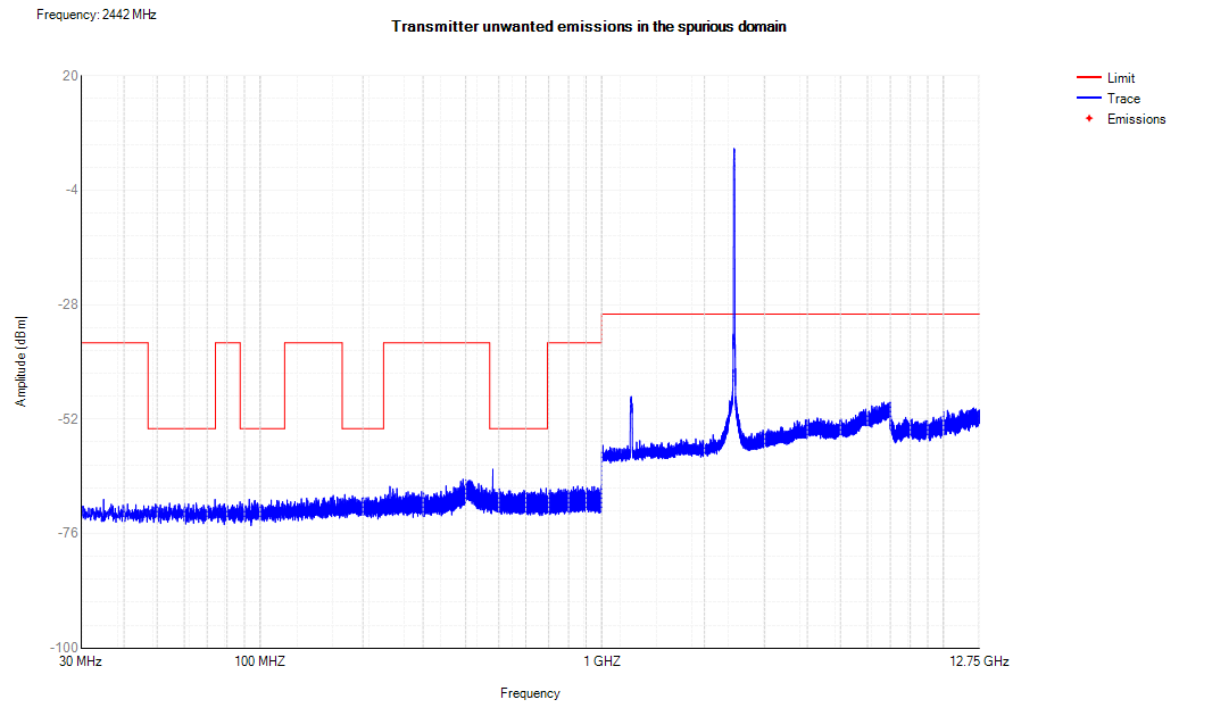
Tx. Spurious NVNT n20 2412MHz Ant1



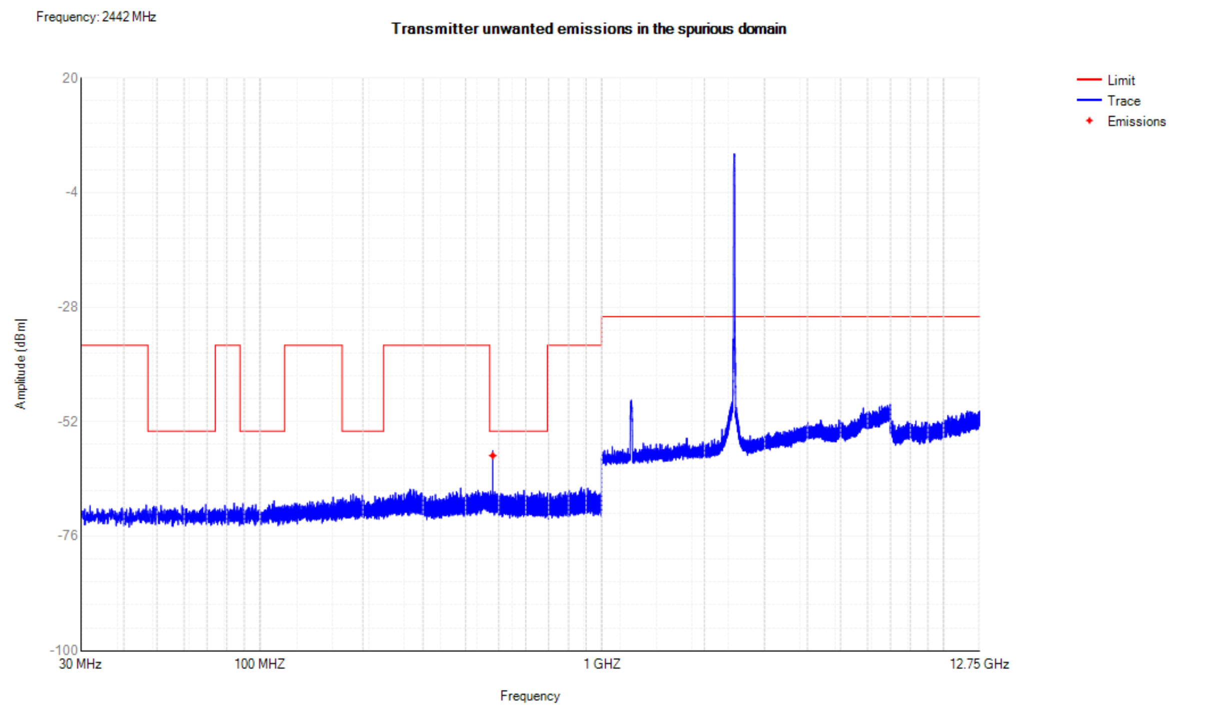
Tx. Spurious NVNT n20 2412MHz Ant2



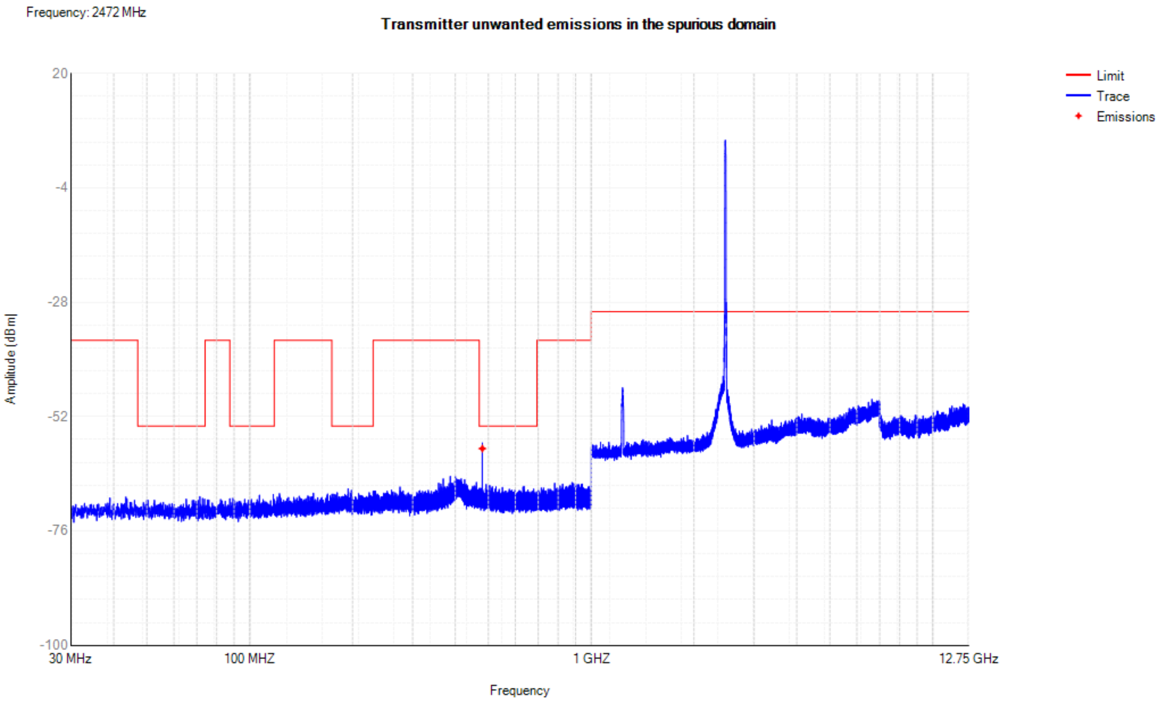
Tx. Spurious NVNT n20 2442MHz Ant1



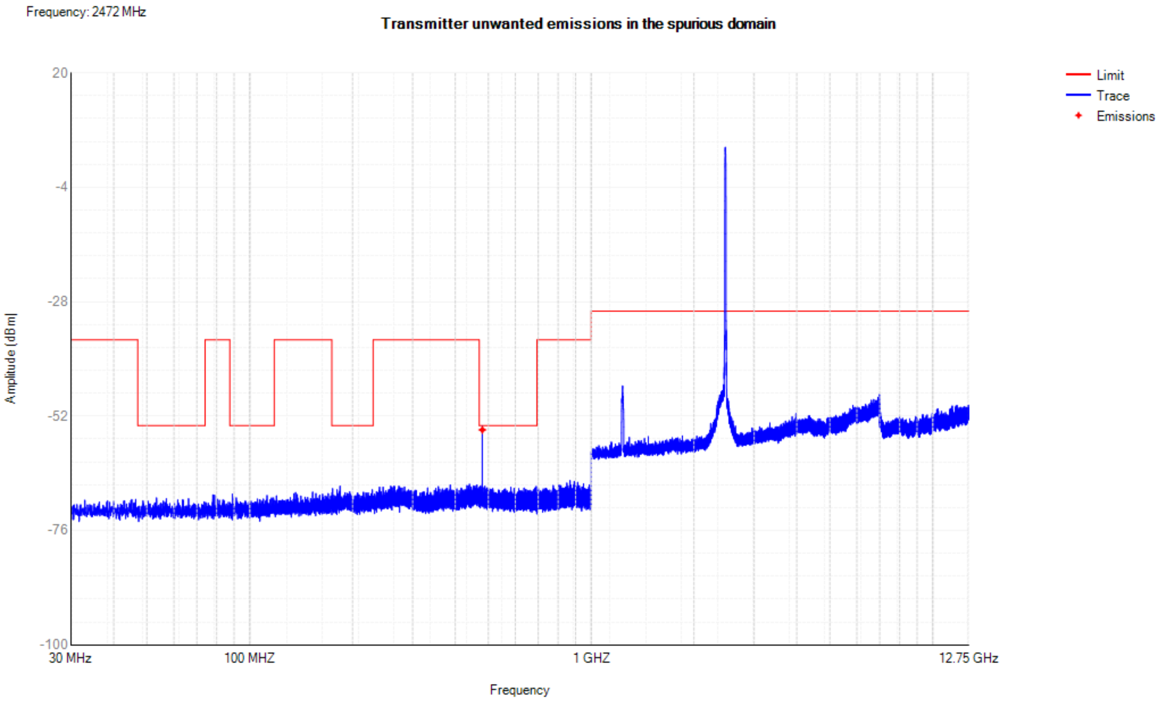
Tx. Spurious NVNT n20 2442MHz Ant2



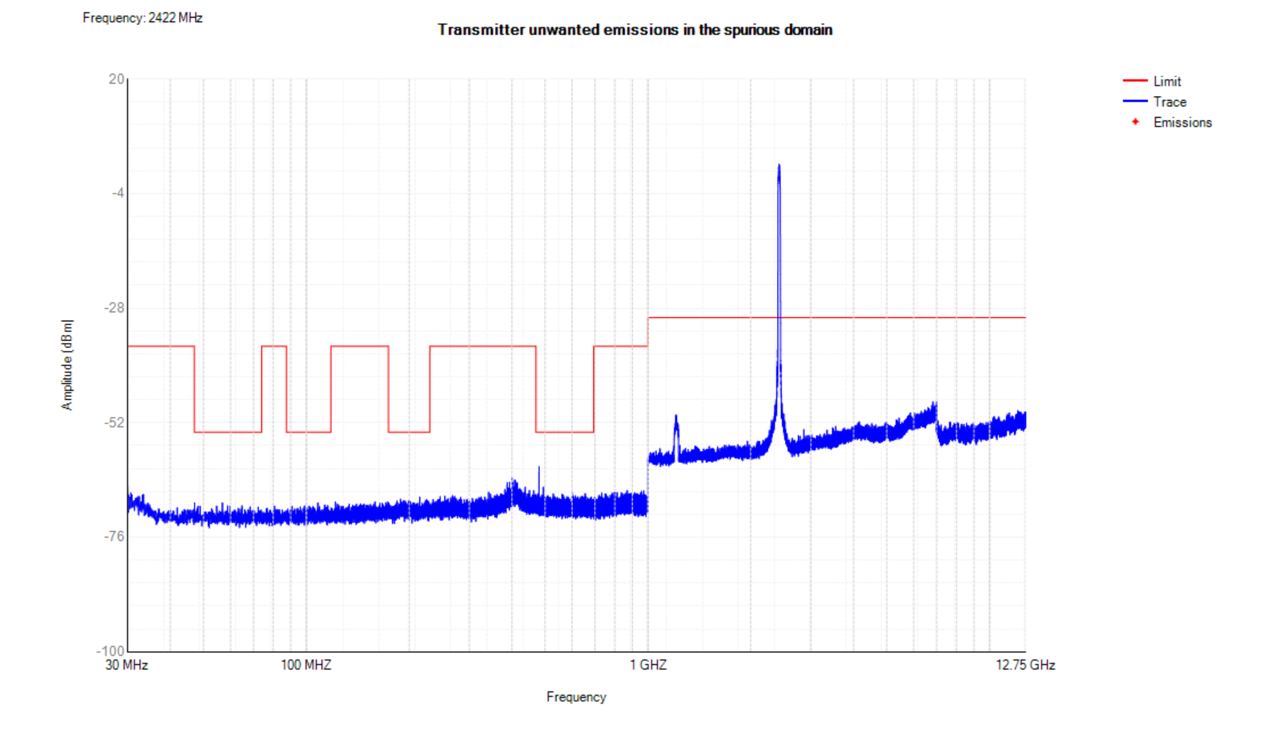
Tx. Spurious NVNT n20 2472MHz Ant1



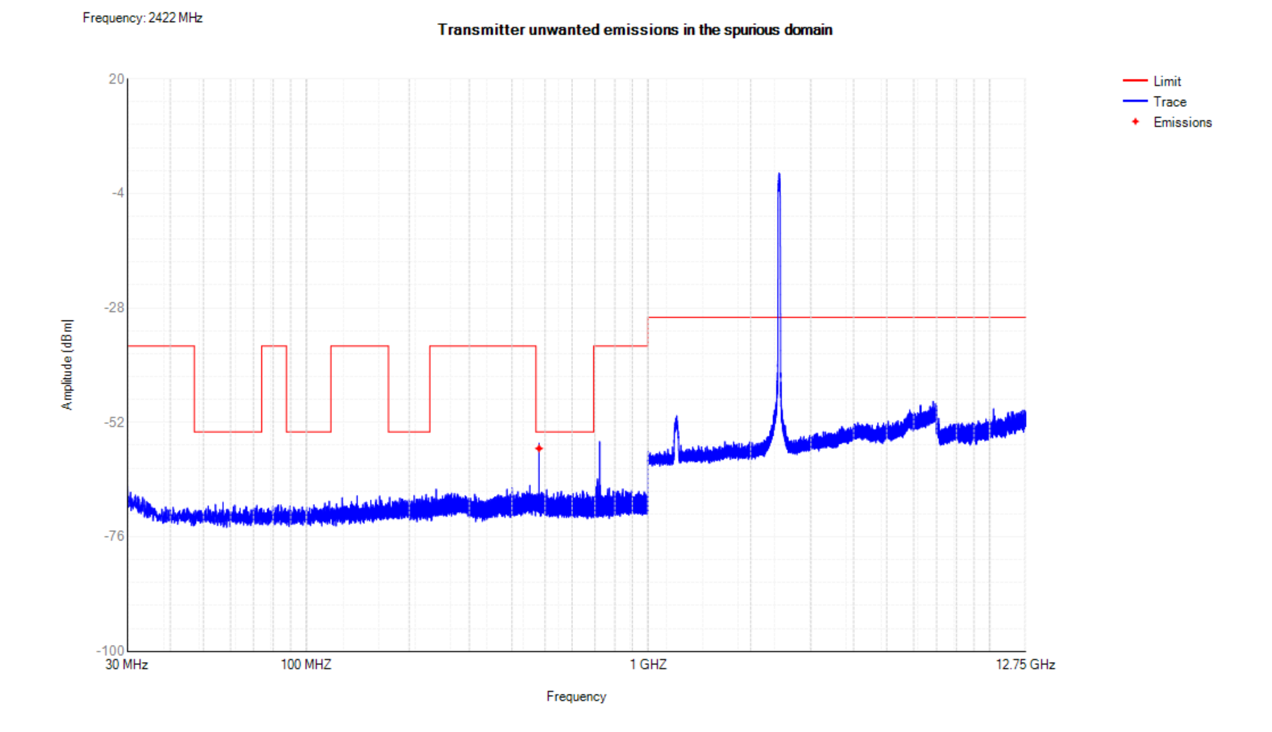
Tx. Spurious NVNT n20 2472MHz Ant2



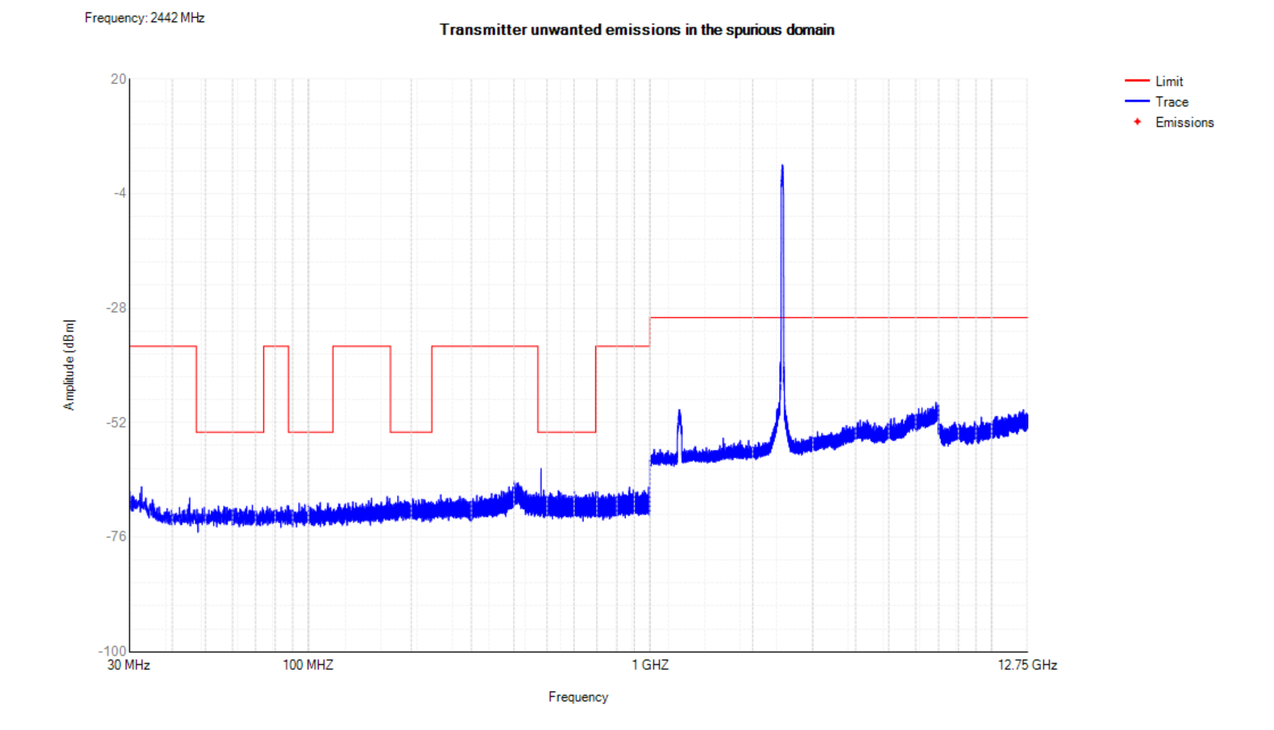
Tx. Spurious NVNT n40 2422MHz Ant1



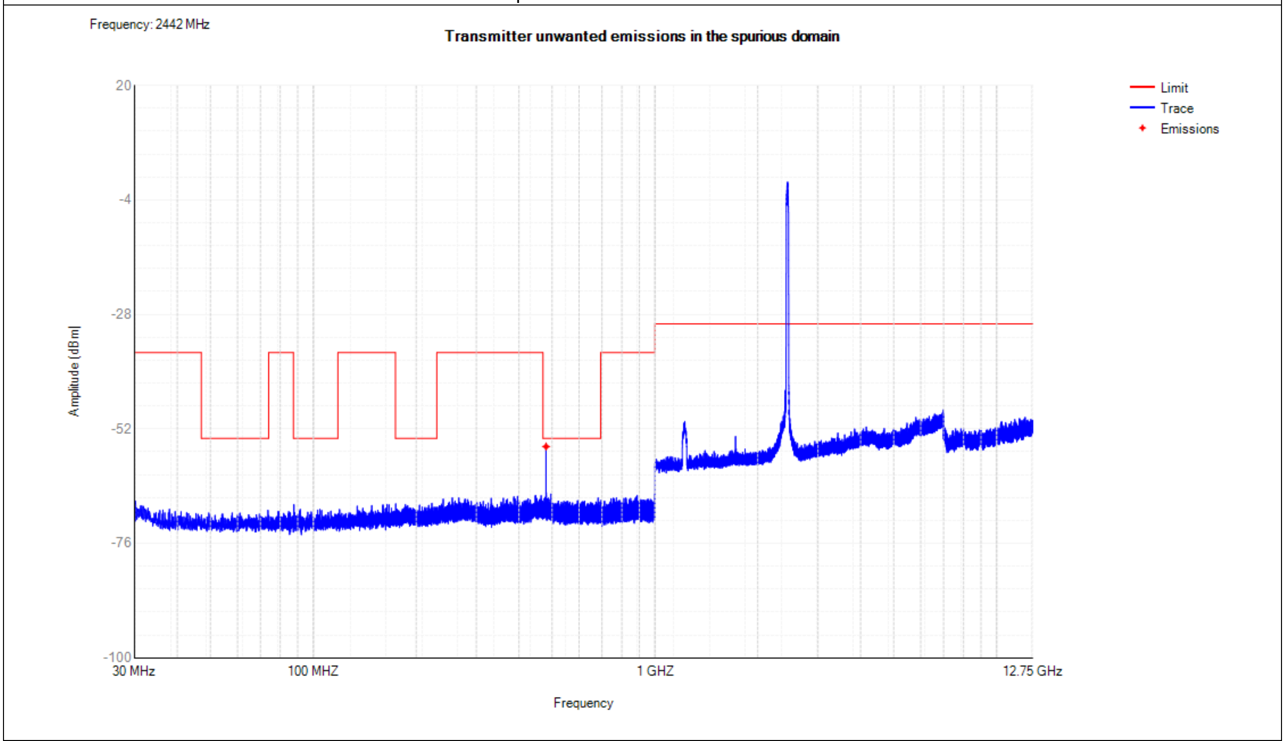
Tx. Spurious NVNT n40 2422MHz Ant2



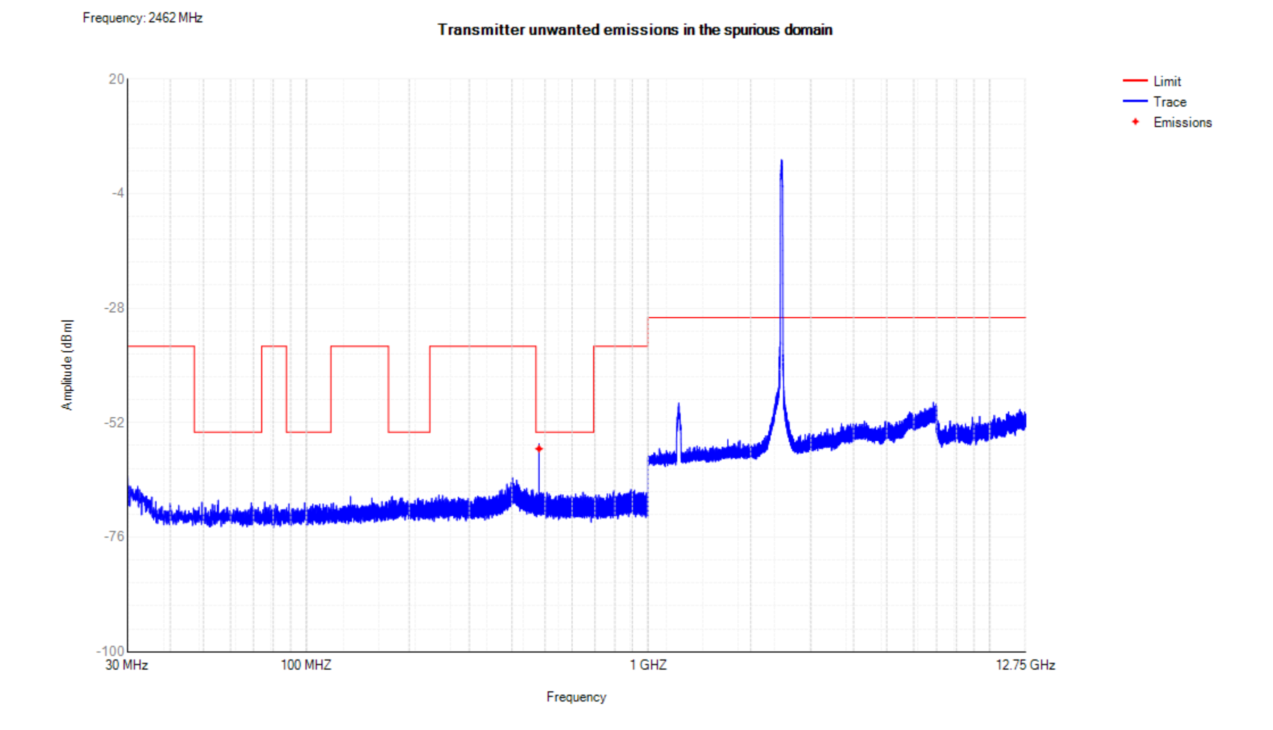
Tx. Spurious NVNT n40 2442MHz Ant1



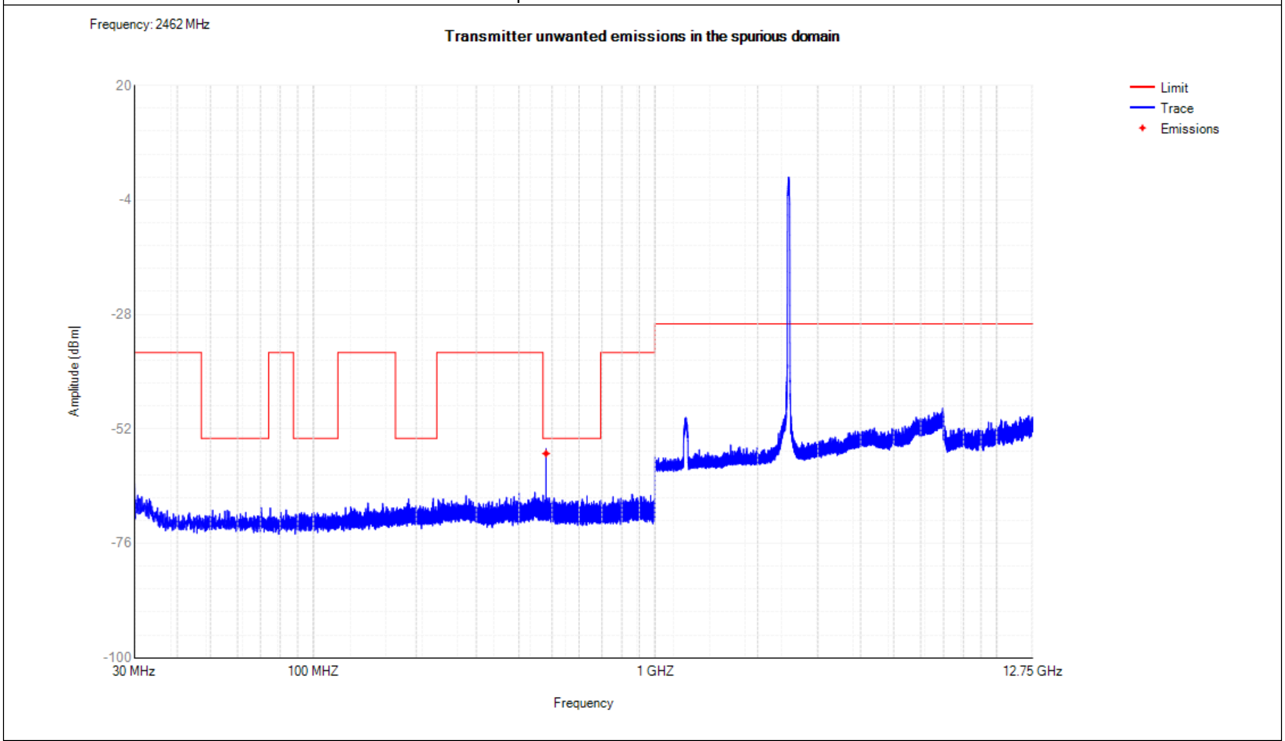
Tx. Spurious NVNT n40 2442MHz Ant2



Tx. Spurious NVNT n40 2462MHz Ant1



Tx. Spurious NVNT n40 2462MHz Ant2



Notes: 1. Negative sign (-) in the margin column signify levels below the limit.
2. The test frequency range is 30MHz to 12.75GHz.
3. Other emissions found were at least 10 dB below the limit.
4. Measurement Uncertainty: ±5.0dB.
5. Correction value was combined in the calculated result.

8.6 RECEIVER SPURIOUS EMISSIONS

8.6.1 Applicable standard

ETSI EN 300 328 clause 4.3.1.11, clause 4.3.2.10

8.6.2 Conformance Limit

The spurious emissions of the receiver shall not exceed the values given in below.

In case of equipment with antenna connectors, these limits apply to emissions at the antenna port (conducted). For emissions radiated by the cabinet or emissions radiated by integral antenna equipment (without antenna connectors), these limits are e.r.p. for emissions up to 1 GHz and e.i.r.p. for emissions above 1 GHz.

Frequency Range	Maximum power	Measurement Width
30 MHz to 1 GHz	-57 dBm	100kHz
1 GHz to 12.75 GHz	-47 dBm	1MHz

8.6.3 Test Configuration

The measurements for emissions in the spurious domain shall only be performed at normal test conditions.

The measurements for emissions in the spurious domain shall only be performed at normal test conditions.

Radiated measurements shall be used for equipment.

Conducted measurements shall be used for equipment.

8.6.4 Test Procedure

1. Please refer to ETSI EN 300 328 (V2.2.2) clause 5.4.11.1 for the test conditions.
2. Please refer to ETSI EN 300 328 (V2.2.2) clause 5.4.11.2 for the measurement methods.

■ Conducted measurement

● Introduction

The spectrum in the spurious domain (see figure 1 or figure 3) shall be searched for emissions that exceed the limit values given in table 4 or table 12 or that come to within 6 dB below these limits. Each occurrence shall be recorded.

The measurement procedure contains 2 parts.

● Pre-scan

The test procedure below shall be used to identify potential unwanted emissions of the UUT.

Step 1:

The sensitivity of the measurement set-up should be such that the noise floor is at least 12 dB below the limits given in table 4 or table 12.

Step 2:

The emissions over the range 30 MHz to 1 000 MHz shall be identified.

Spectrum analyser settings:

• Resolution bandwidth: 100 kHz

Video bandwidth: 300 kHz

• Filter type: 3 dB (Gaussian)

• Detector mode: Peak

• Trace Mode: Max Hold

• Sweep Points: ≥ 19 400; For spectrum analysers not supporting this high number of sweep points, the frequency band may need to be segmented.

• Sweep time: For non continuous transmissions (duty cycle less than 100 %), the sweep time shall be

sufficiently long, such that for each 100 kHz frequency step, the measurement time is greater than two transmissions of the UUT, on any channel.
For Frequency Hopping equipment operating in a normal operating (hopping not disabled) mode, the sweep time shall be further increased to capture multiple transmissions on any of the hopping frequencies.
The above sweep time setting may result in long measuring times in case of frequency hopping equipment. To avoid such long measuring times, an FFT analyser could be used.

Allow the trace to stabilize. Any emissions identified during the sweeps above and that fall within the 6 dB range below the applicable limit or above, shall be individually measured using the procedure in clause 5.4.9.2.1.3 and compared to the limits given in table 4 or table 12.

Step 3:

The emissions over the range 1 GHz to 12,75 GHz shall be identified.

Spectrum analyser settings:

• Resolution bandwidth: 1 MHz
• Video bandwidth: 3 MHz
• Filter type: 3 dB (Gaussian)
• Detector mode: Peak
• Trace Mode: Max Hold
• Sweep Points: ≥ 23 500; For spectrum analysers not supporting this high number of sweep points, the frequency band may need to be segmented.
• Sweep time: For non continuous transmissions (duty cycle less than 100 %), the sweep time shall be sufficiently long, such that for each 1 MHz frequency step, the measurement time is greater than two transmissions of the UUT, on any channel.
For Frequency Hopping equipment operating in a normal operating (hopping not disabled) mode, the sweep time shall be further increased to capture multiple transmissions on any of the hopping frequencies.
The above sweep time setting may result in long measuring times in case of frequency hopping equipment. To avoid such long measuring times, an FFT analyser could be used.

Allow the trace to stabilize. Any emissions identified during the sweeps above that fall within the 6 dB range below the applicable limit or above, shall be individually measured using the procedure in clause 5.4.9.2.1.3 and compared to the limits given in table 4 or table 12.

Frequency Hopping equipment may generate a block (or several blocks) of spurious emissions anywhere within the spurious domain. If this is the case, only the highest peak of each block of emissions shall be measured using the procedure in clause 5.4.9.2.1.3.

Step 4:

• In case of conducted measurements on smart antenna systems (equipment with multiple transmit chains), step 2 and step 3 need to be repeated for each of the active transmit chains (Ach).The limits used to identify emissions during this pre-scan need to be reduced with 10 × log10 (Ach) (number of active transmit chains).

● Measurement of the emissions identified during the pre-scan

The procedure in step 1 to step 4 below shall be used to accurately measure the individual unwanted emissions identified during the pre-scan measurements above. This method assumes the spectrum analyser has a Time Domain Power function.

Step 1:

The level of the emissions shall be measured using the following spectrum analyser settings:

• Measurement Mode: Time Domain Power
• Centre Frequency: Frequency of the emission identified during the pre-scan
• Resolution Bandwidth: 100 kHz (< 1 GHz) / 1 MHz (> 1 GHz)
• Video Bandwidth: 300 kHz (< 1 GHz) / 3 MHz (> 1 GHz)
• Frequency Span: Zero Span
• Sweep mode: Single Sweep
• Sweep time: > 120 % of the duration of the longest burst detected during the measurement of the RF Output Power
• Sweep points: Sweep time [µs] / (1 µs) with a maximum of 30 000
• Trigger: Video (burst signals) or Manual (continuous signals)
• Detector: RMS

Step 2:

• Set a window where the start and stop indicators match the start and end of the burst with the highest level and record the value of the power measured within this window. If the spurious emission to be measured is a continuous transmission, the measurement window shall be set to match the start and stop

times of the sweep.
Step 3:
In case of conducted measurements on smart antenna systems (equipment with multiple transmit chains), step 2 needs to be repeated for each of the active transmit chains (Ach).
Sum the measured power (within the observed window) for each of the active transmit chains.
Step 4:
The value defined in step 3 shall be compared to the limits defined in table 4 or table 12.

- Radiated measurement

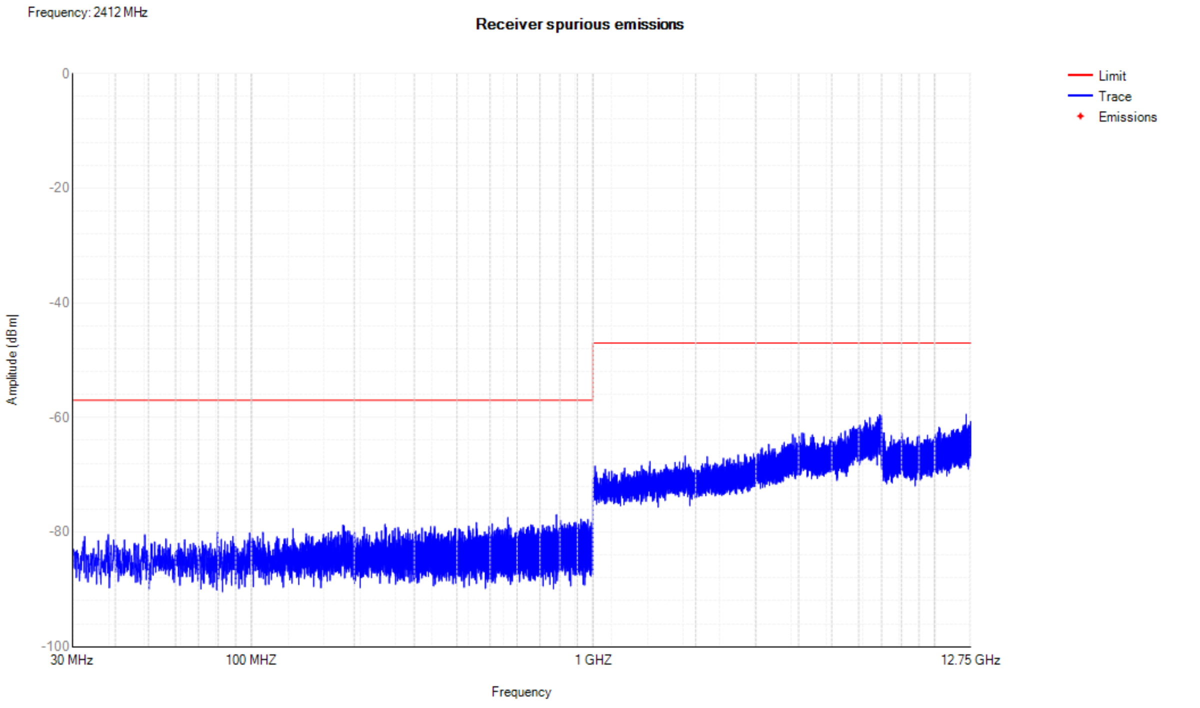
The test site as described in annex B and applicable measurement procedures as described in annex C shall be used.
The test procedure is further as described under clause 5.4.9.2.1.

8.6.5 Test Results

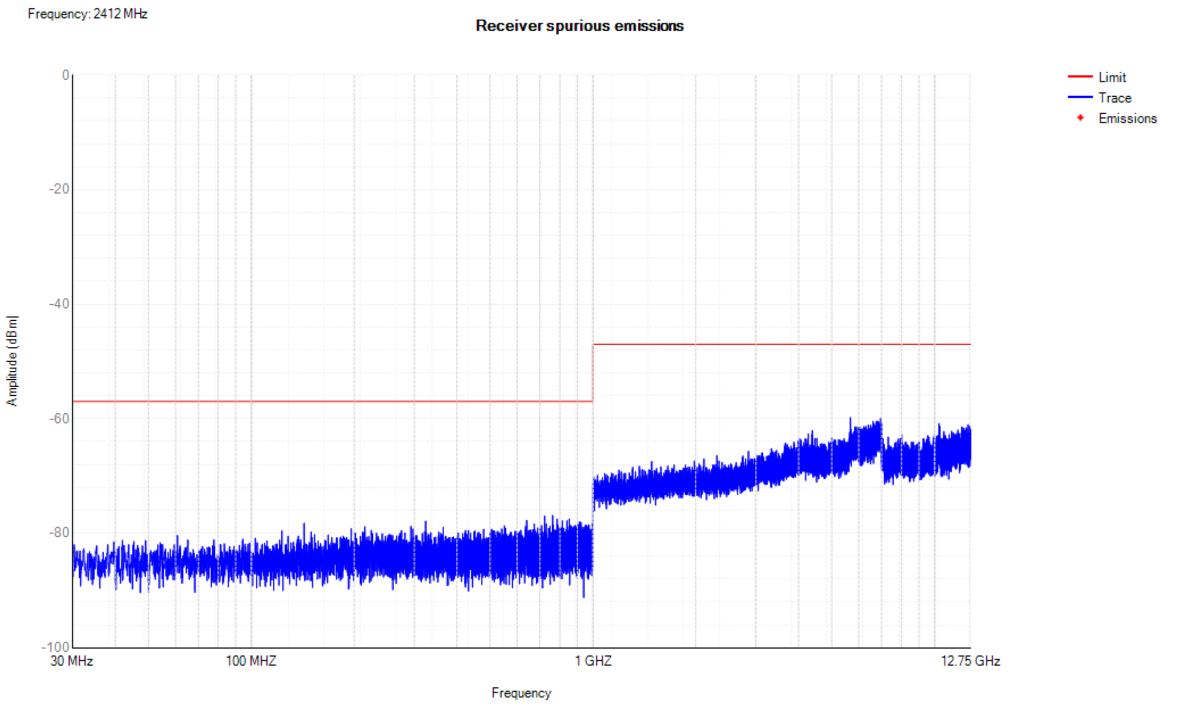
All the modulation modes were tested, the data of the worst mode are described in the following page.

Condition	Mode	Frequency (MHz)	Antenna	Range (MHz)	Spur Freq (MHz)	Peak (dBm)	RMS (dBm)	Limit (dBm)	Verdict
NVNT	b	2412	Ant1	30 -1000	781.9	-76.96	NA	-57	Pass
NVNT	b	2412	Ant1	1000 -12750	12378	-59.44	NA	-47	Pass
NVNT	b	2412	Ant2	30 -1000	762.25	-76.89	NA	-57	Pass
NVNT	b	2412	Ant2	1000 -12750	5670.5	-59.81	NA	-47	Pass
NVNT	b	2442	Ant1	30 -1000	997.45	-76.77	NA	-57	Pass
NVNT	b	2442	Ant1	1000 -12750	6951.5	-59.74	NA	-47	Pass
NVNT	b	2442	Ant2	30 -1000	430.5	-76.97	NA	-57	Pass
NVNT	b	2442	Ant2	1000 -12750	6980.5	-59.86	NA	-47	Pass
NVNT	b	2472	Ant1	30 -1000	868.3	-76.92	NA	-57	Pass
NVNT	b	2472	Ant1	1000 -12750	6923	-59.25	NA	-47	Pass
NVNT	b	2472	Ant2	30 -1000	728.75	-75.28	NA	-57	Pass
NVNT	b	2472	Ant2	1000 -12750	6972.5	-59.13	NA	-47	Pass
NVNT	g	2412	Ant1	30 -1000	971.6	-76.62	NA	-57	Pass
NVNT	g	2412	Ant1	1000 -12750	6793	-59.37	NA	-47	Pass
NVNT	g	2412	Ant2	30 -1000	947.6	-76.59	NA	-57	Pass
NVNT	g	2412	Ant2	1000 -12750	6633.5	-59.42	NA	-47	Pass
NVNT	g	2442	Ant1	30 -1000	831.9	-77.14	NA	-57	Pass
NVNT	g	2442	Ant1	1000 -12750	6601.5	-59.72	NA	-47	Pass
NVNT	g	2442	Ant2	30 -1000	914.45	-76.69	NA	-57	Pass
NVNT	g	2442	Ant2	1000 -12750	6857	-59.01	NA	-47	Pass
NVNT	g	2472	Ant1	30 -1000	734.8	-76.86	NA	-57	Pass
NVNT	g	2472	Ant1	1000 -12750	6948.5	-58.87	NA	-47	Pass
NVNT	g	2472	Ant2	30 -1000	722.3	-71.92	NA	-57	Pass
NVNT	g	2472	Ant2	1000 -12750	6984.5	-58.94	NA	-47	Pass
NVNT	n20	2412	Ant1	30 -1000	994.7	-76.16	NA	-57	Pass
NVNT	n20	2412	Ant1	1000 -12750	6978.5	-58.79	NA	-47	Pass
NVNT	n20	2412	Ant2	30 -1000	926.35	-77.28	NA	-57	Pass
NVNT	n20	2412	Ant2	1000 -12750	6923.5	-59.29	NA	-47	Pass
NVNT	n20	2442	Ant1	30 -1000	895.8	-76.86	NA	-57	Pass
NVNT	n20	2442	Ant1	1000 -12750	6635.5	-59.42	NA	-47	Pass
NVNT	n20	2442	Ant2	30 -1000	977.1	-77.56	NA	-57	Pass
NVNT	n20	2442	Ant2	1000 -12750	6993	-58.91	NA	-47	Pass
NVNT	n20	2472	Ant1	30 -1000	806.3	-76.86	NA	-57	Pass
NVNT	n20	2472	Ant1	1000 -12750	6979	-59.86	NA	-47	Pass
NVNT	n20	2472	Ant2	30 -1000	755.1	-77.66	NA	-57	Pass
NVNT	n20	2472	Ant2	1000 -12750	6921.5	-59.64	NA	-47	Pass
NVNT	n40	2422	Ant1	30 -1000	825.8	-77.09	NA	-57	Pass
NVNT	n40	2422	Ant1	1000 -12750	6987.5	-59.40	NA	-47	Pass
NVNT	n40	2422	Ant2	30 -1000	722.2	-74.53	NA	-57	Pass
NVNT	n40	2422	Ant2	1000 -12750	6983.5	-58.93	NA	-47	Pass
NVNT	n40	2442	Ant1	30 -1000	890.1	-77.75	NA	-57	Pass
NVNT	n40	2442	Ant1	1000 -12750	6988.5	-58.45	NA	-47	Pass
NVNT	n40	2442	Ant2	30 -1000	851.55	-75.73	NA	-57	Pass
NVNT	n40	2442	Ant2	1000 -12750	6795.5	-59.89	NA	-47	Pass
NVNT	n40	2462	Ant1	30 -1000	900	-77.71	NA	-57	Pass
NVNT	n40	2462	Ant1	1000 -12750	6656.5	-59.19	NA	-47	Pass
NVNT	n40	2462	Ant2	30 -1000	320	-75.83	NA	-57	Pass
NVNT	n40	2462	Ant2	1000 -12750	6909.5	-59.19	NA	-47	Pass

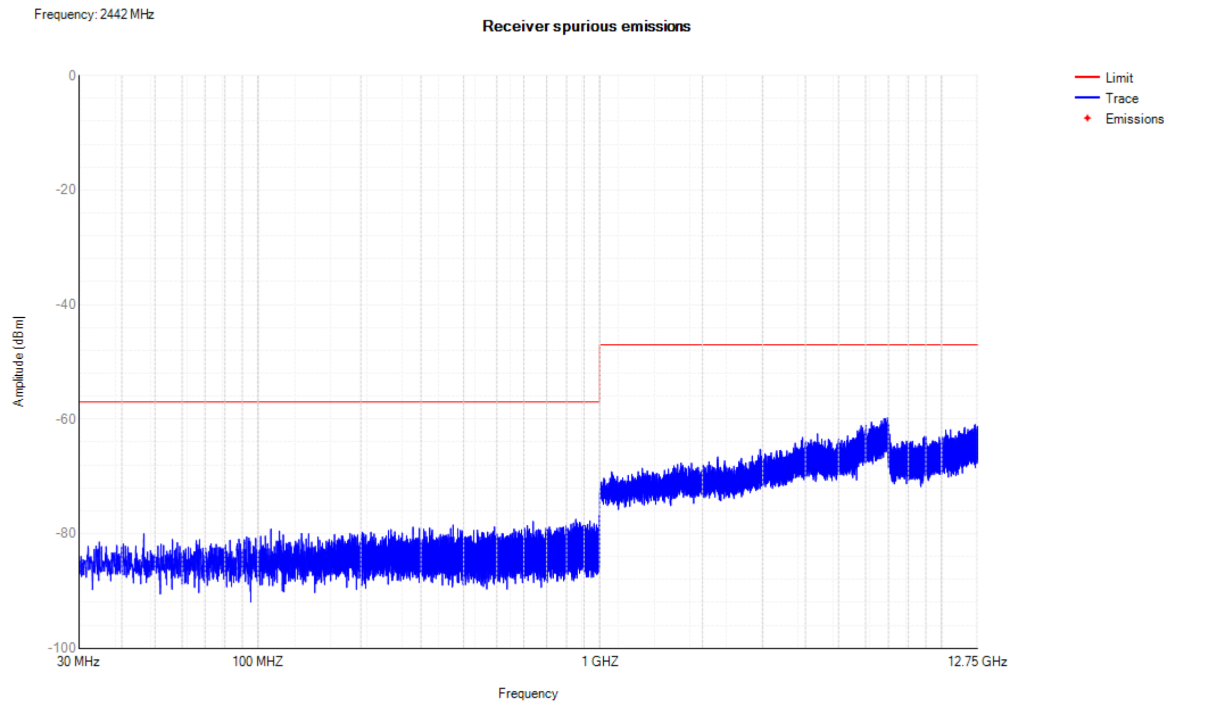
Test Graphs
Rx. Spurious NVNT b 2412MHz Ant1



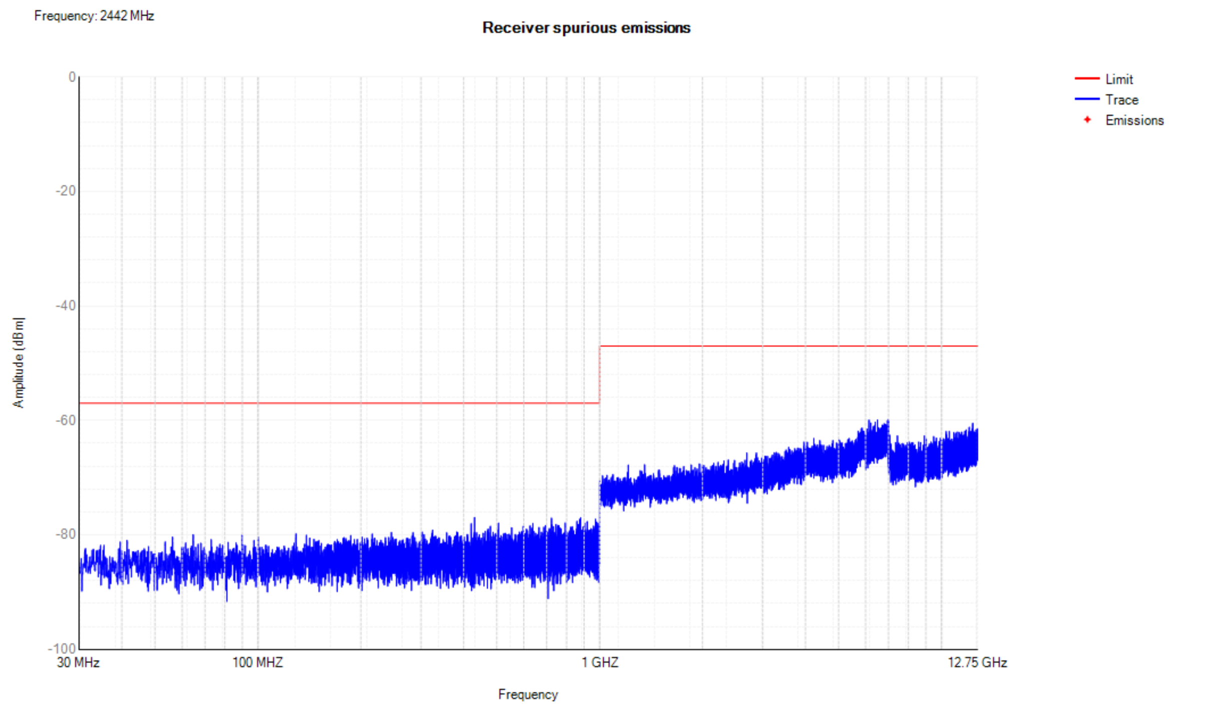
Rx. Spurious NVNT b 2412MHz Ant2



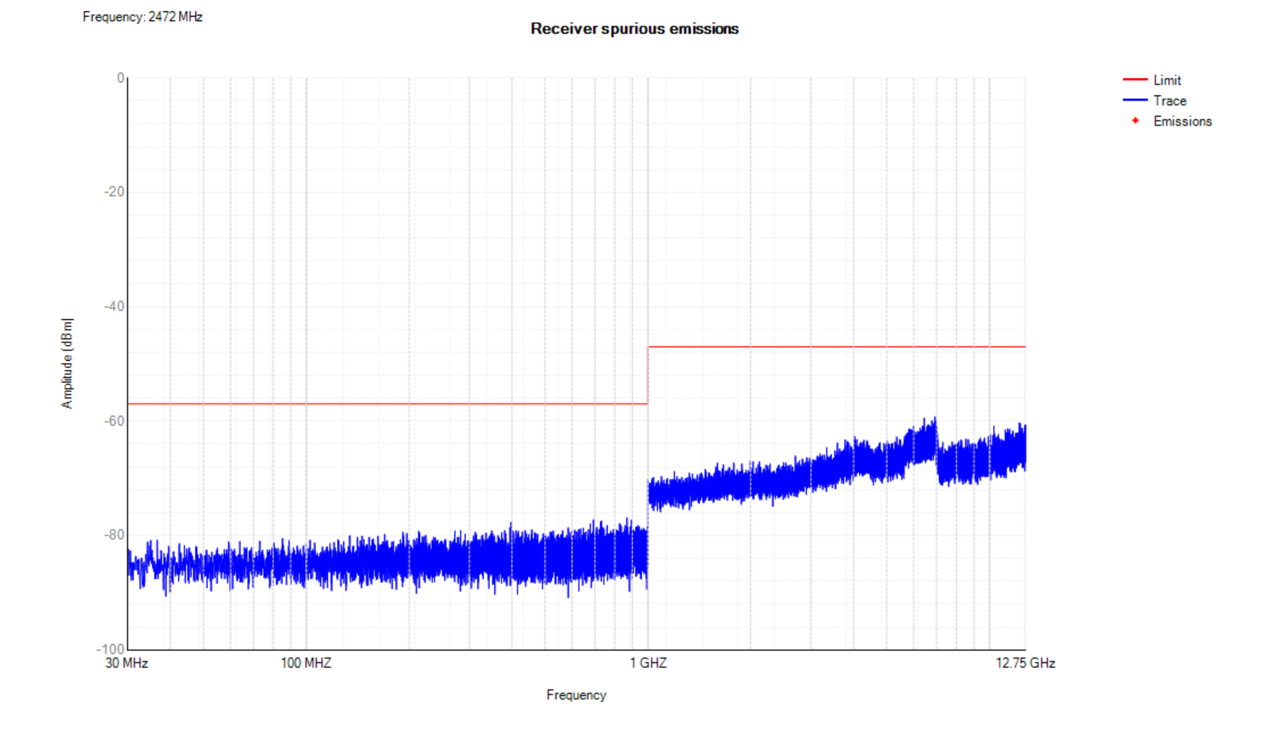
Rx. Spurious NVNT b 2442MHz Ant1



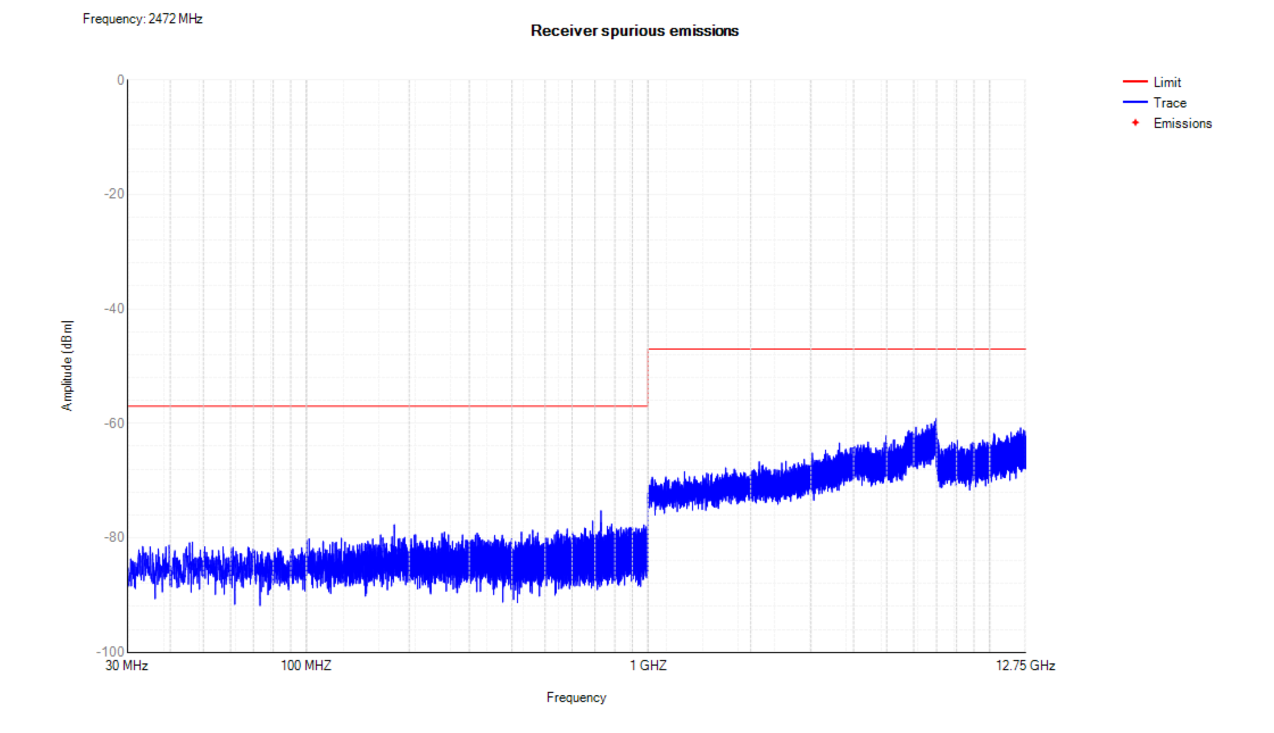
Rx. Spurious NVNT b 2442MHz Ant2



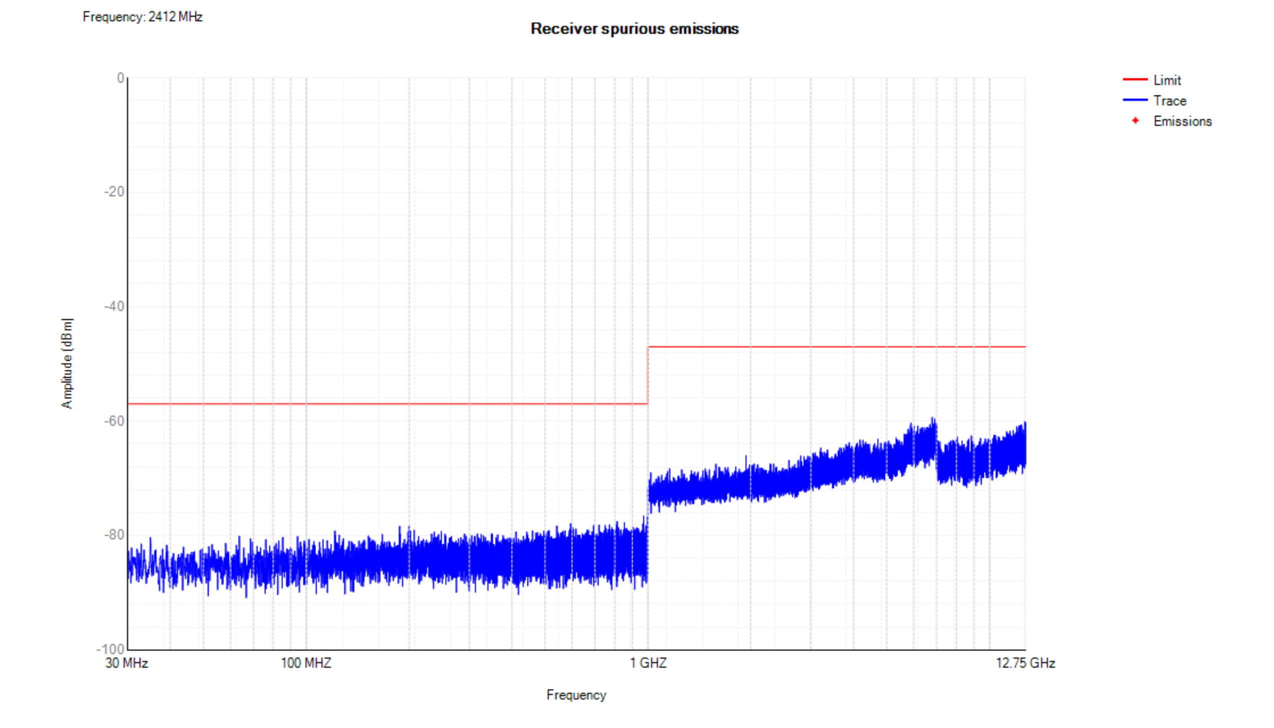
Rx. Spurious NVNT b 2472MHz Ant1



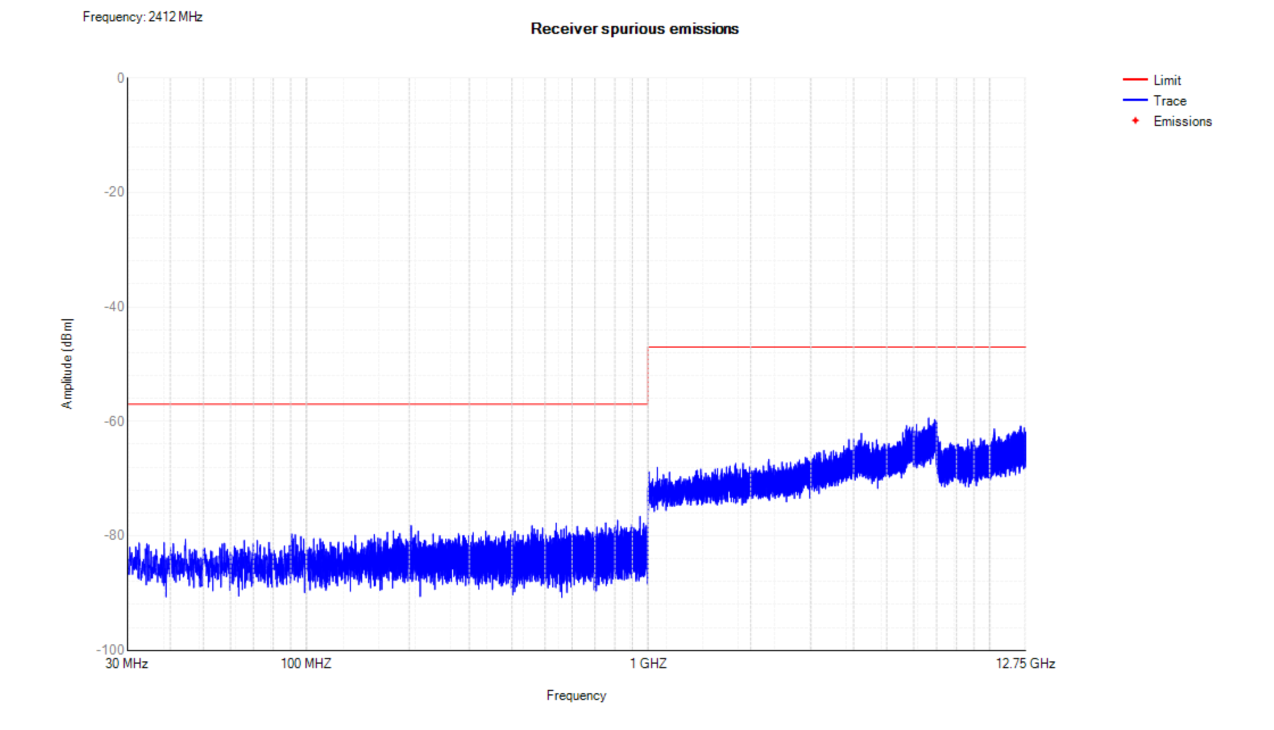
Rx. Spurious NVNT b 2472MHz Ant2



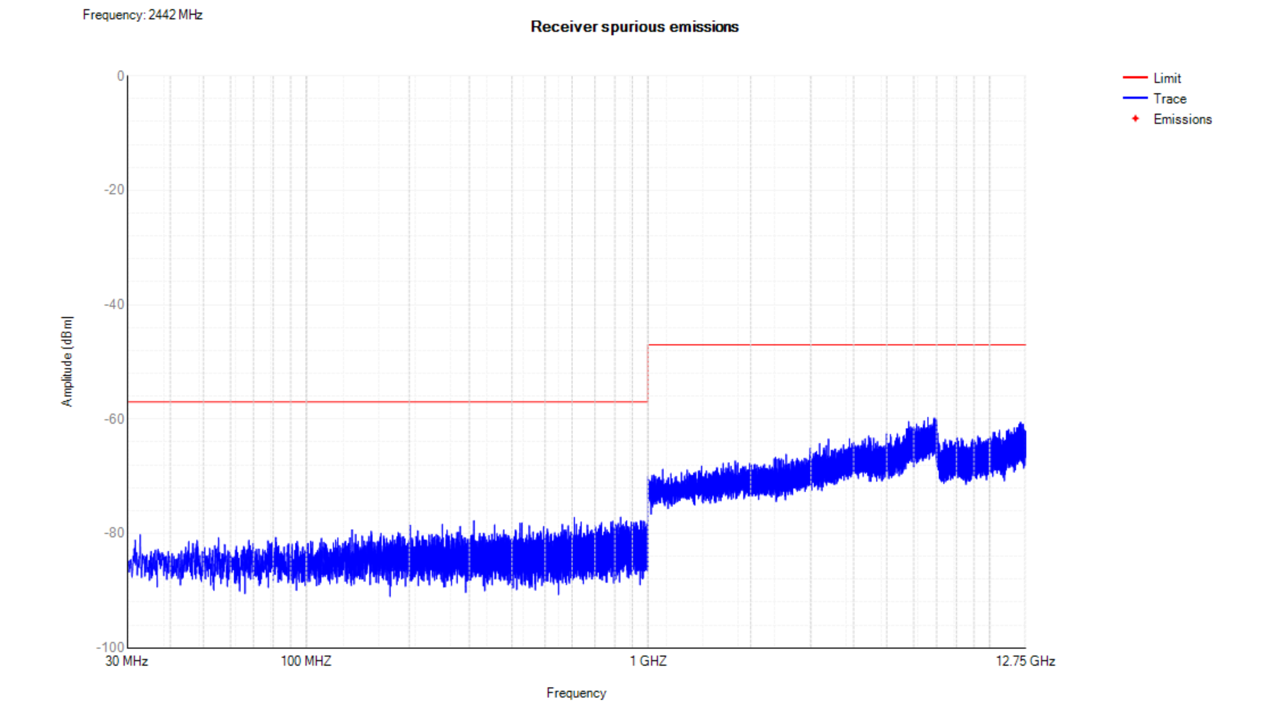
Rx. Spurious NVNT g 2412MHz Ant1



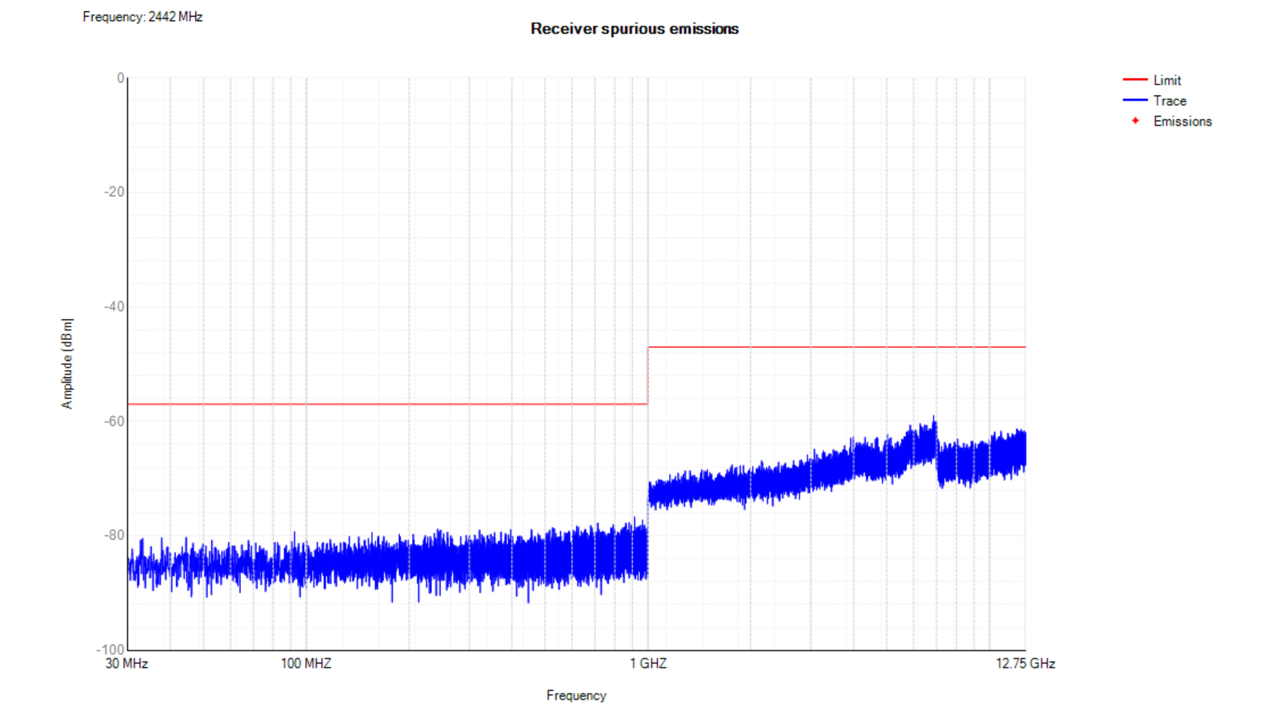
Rx. Spurious NVNT g 2412MHz Ant2



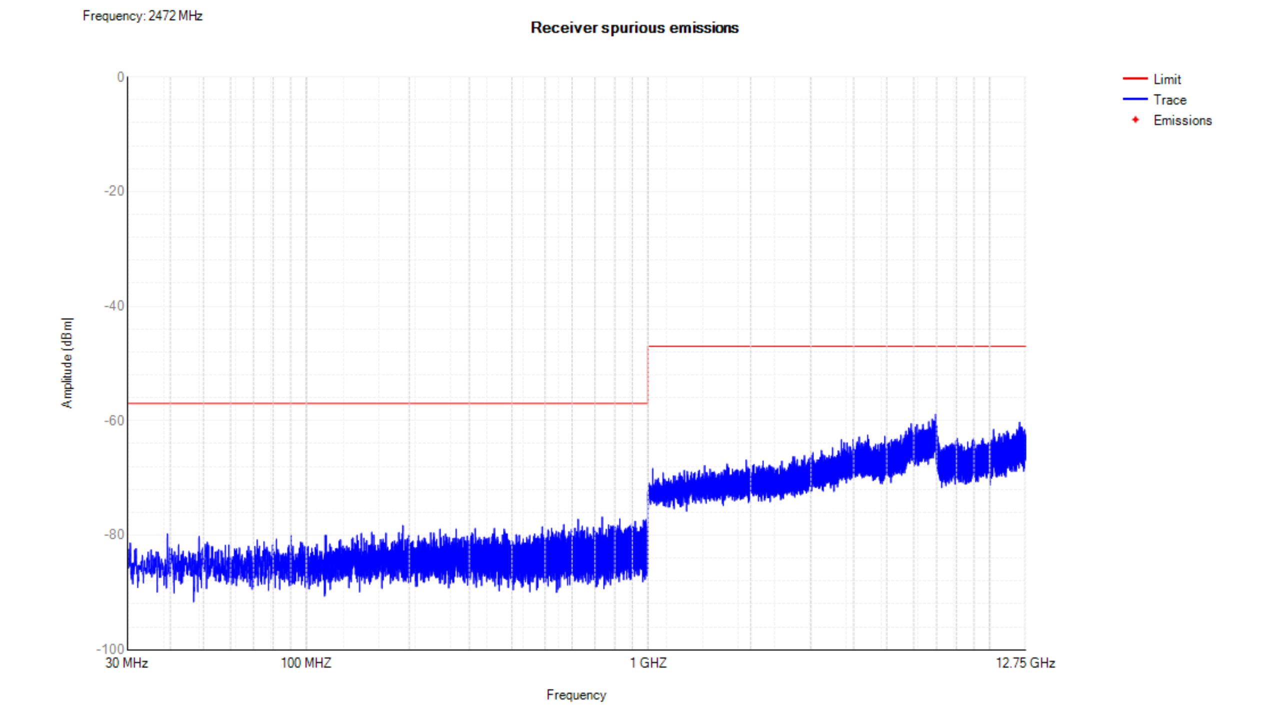
Rx. Spurious NVNT g 2442MHz Ant1



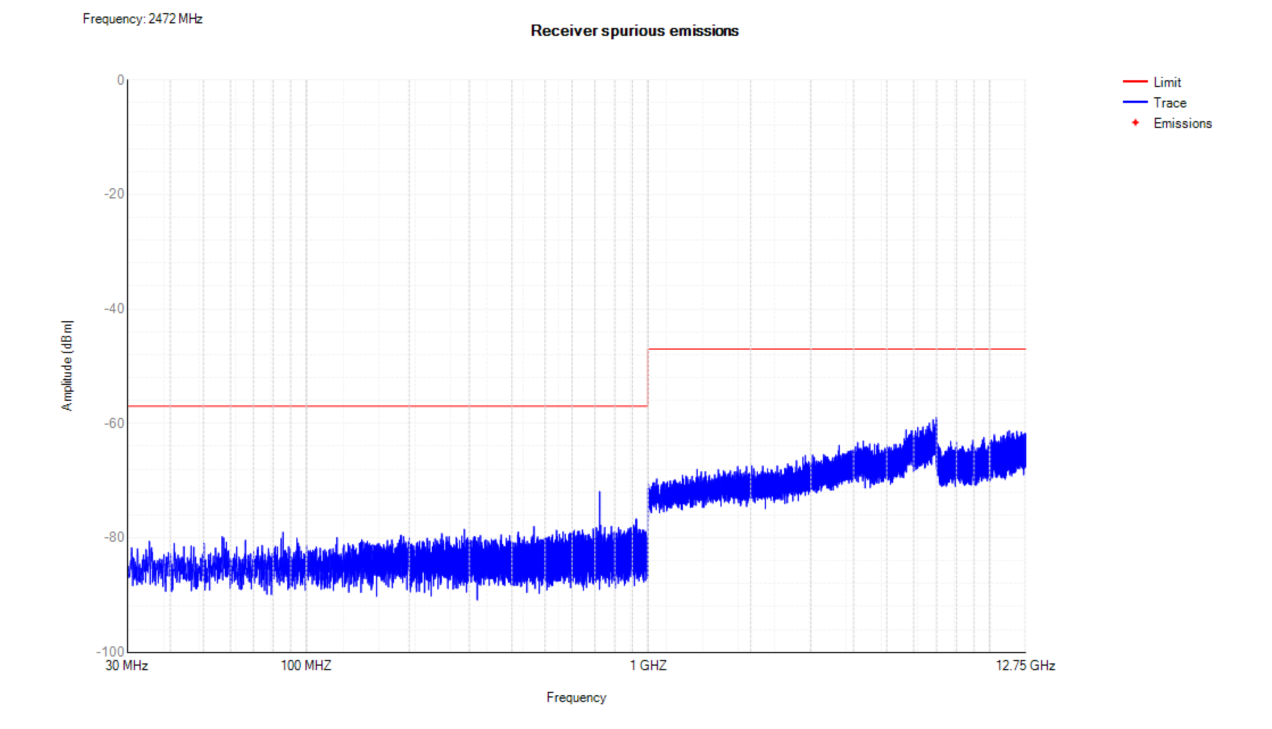
Rx. Spurious NVNT g 2442MHz Ant2



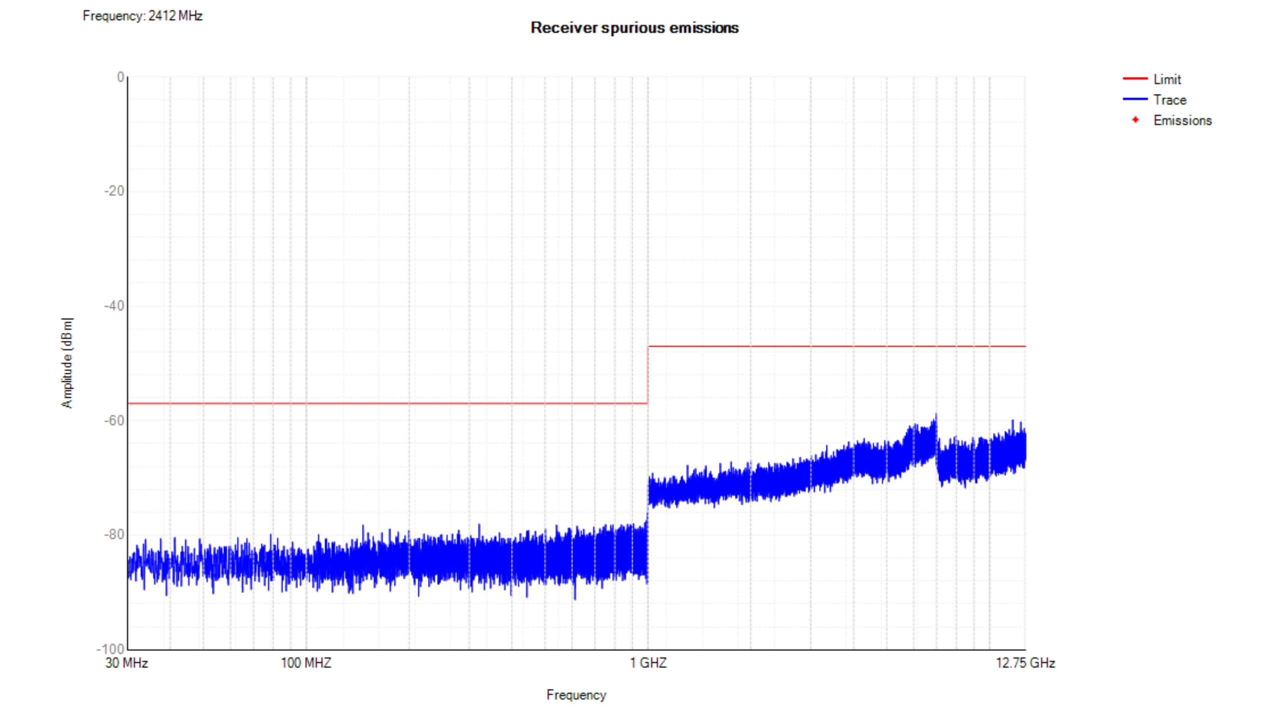
Rx. Spurious NVNT g 2472MHz Ant1



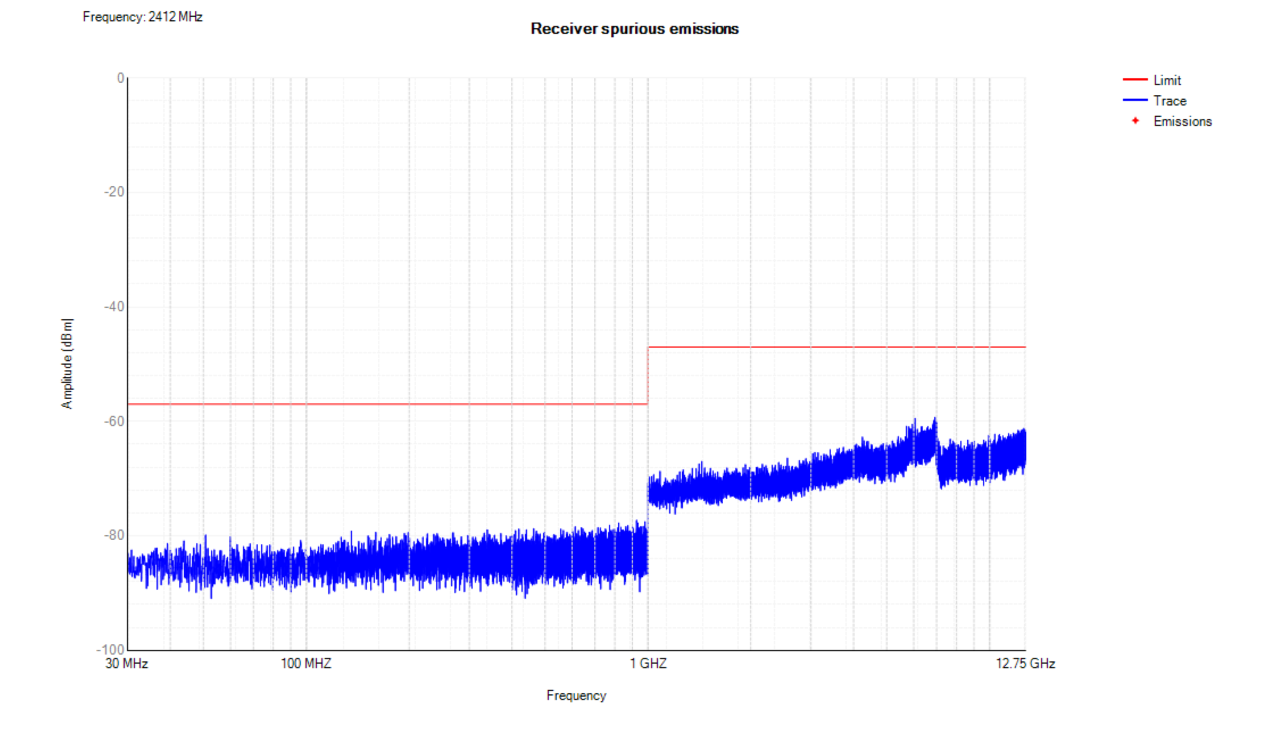
Rx. Spurious NVNT g 2472MHz Ant2



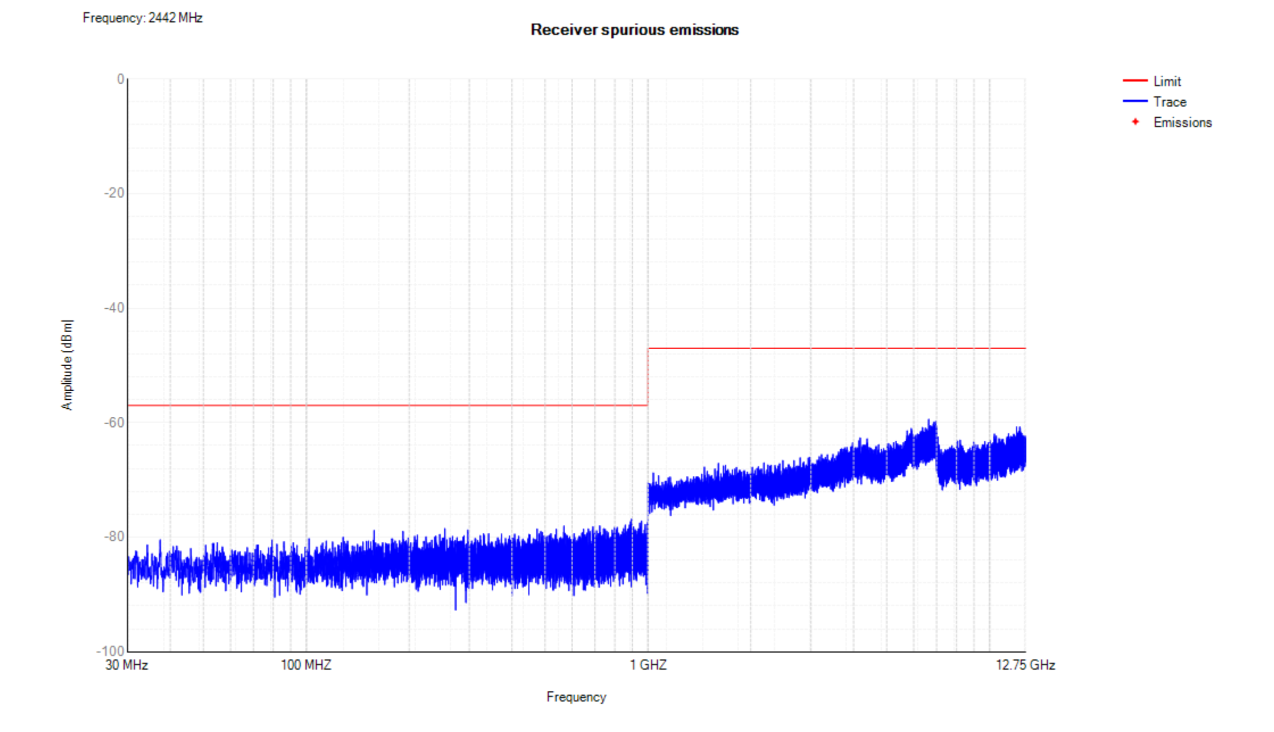
Rx. Spurious NVNT n20 2412MHz Ant1



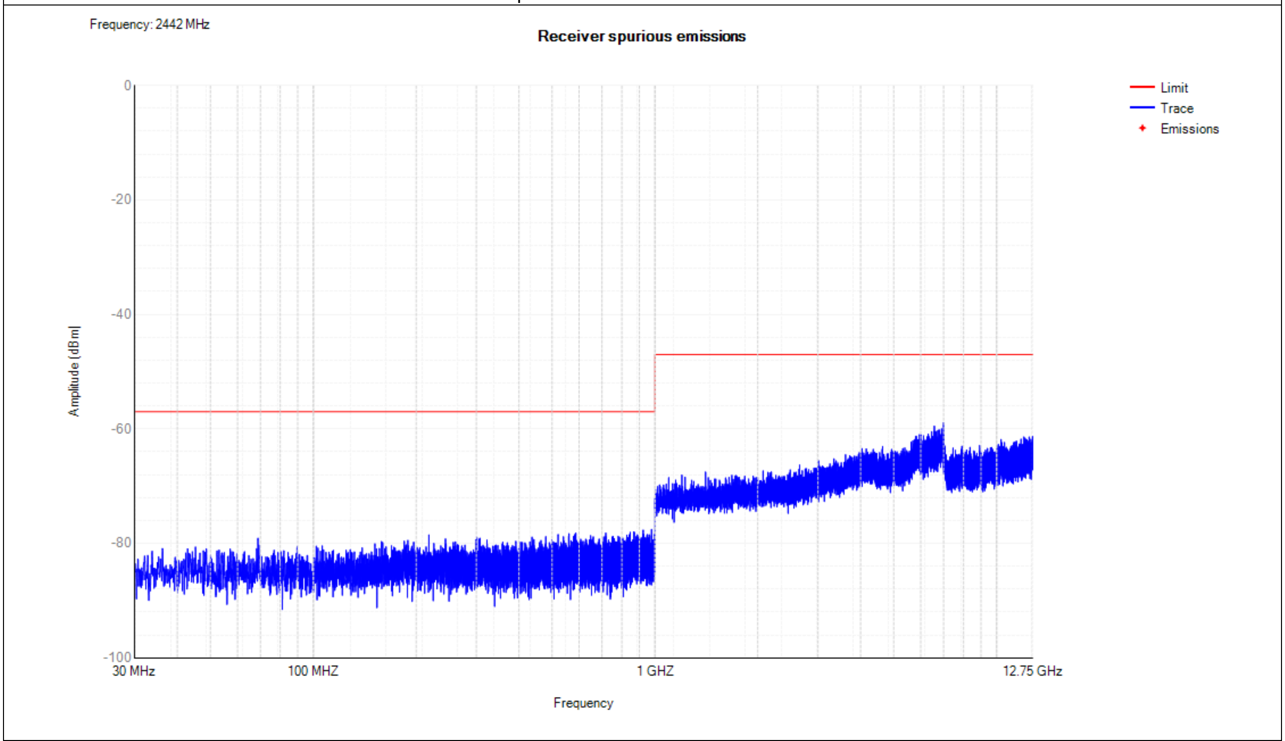
Rx. Spurious NVNT n20 2412MHz Ant2



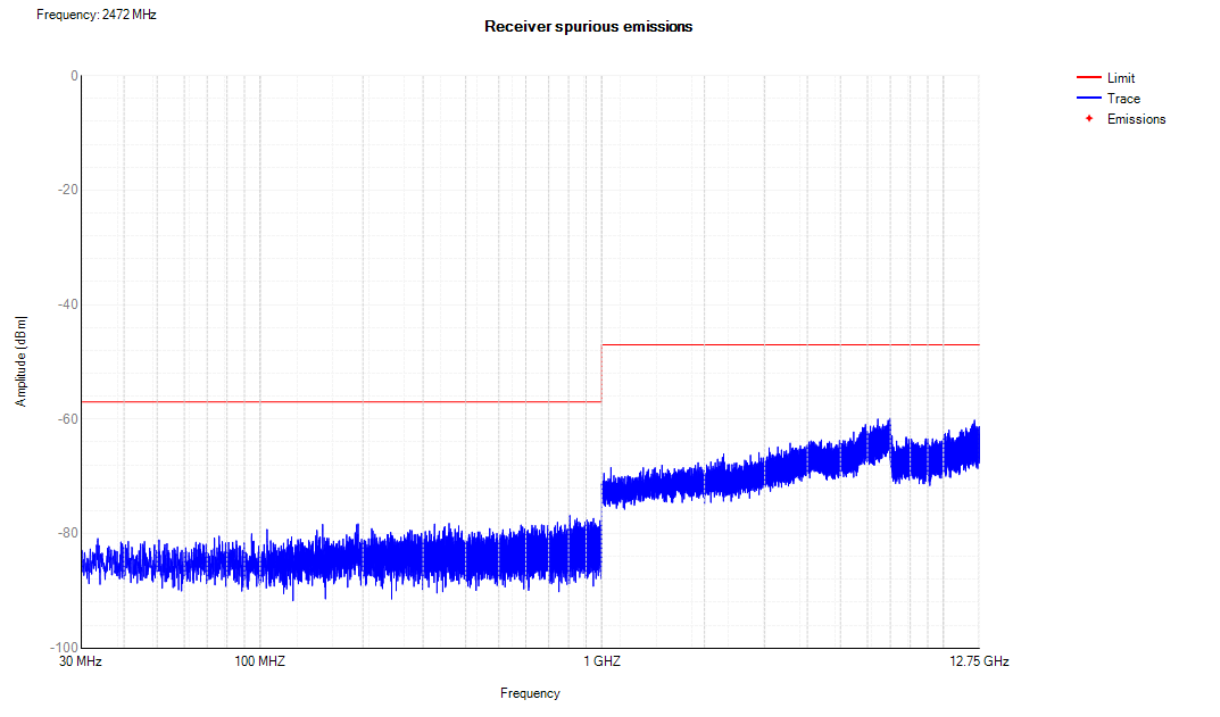
Rx. Spurious NVNT n20 2442MHz Ant1



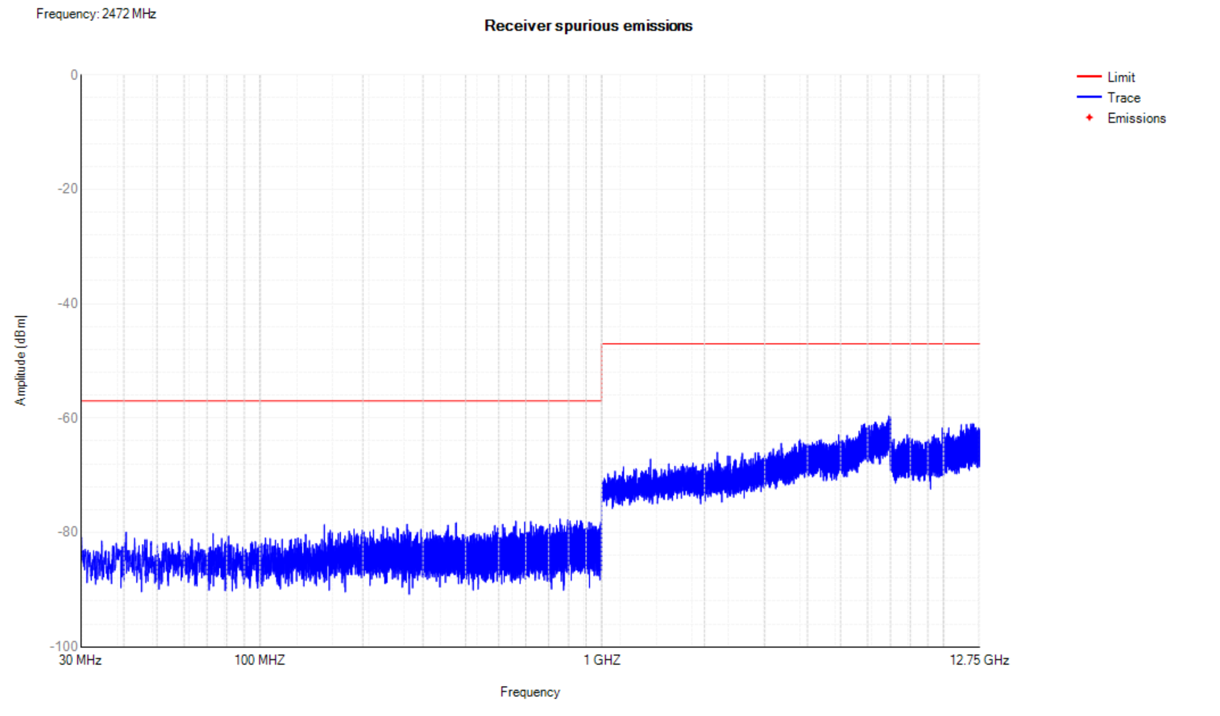
Rx. Spurious NVNT n20 2442MHz Ant2



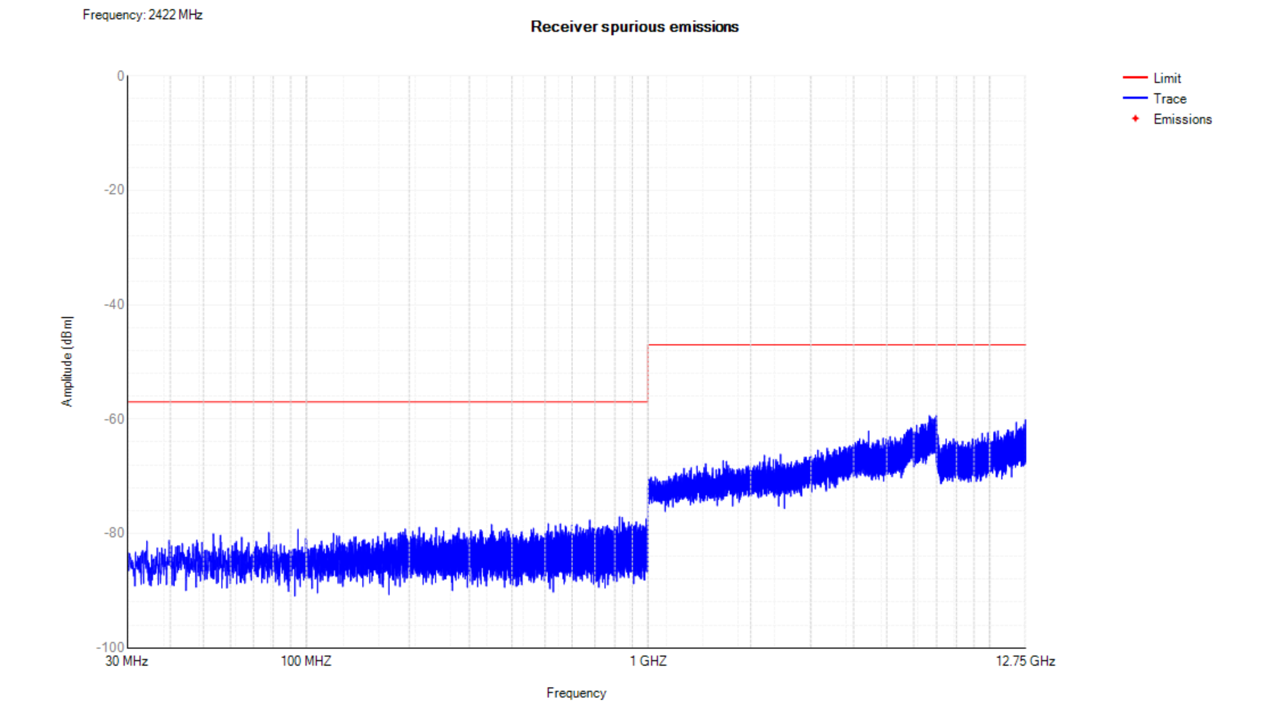
Rx. Spurious NVNT n20 2472MHz Ant1



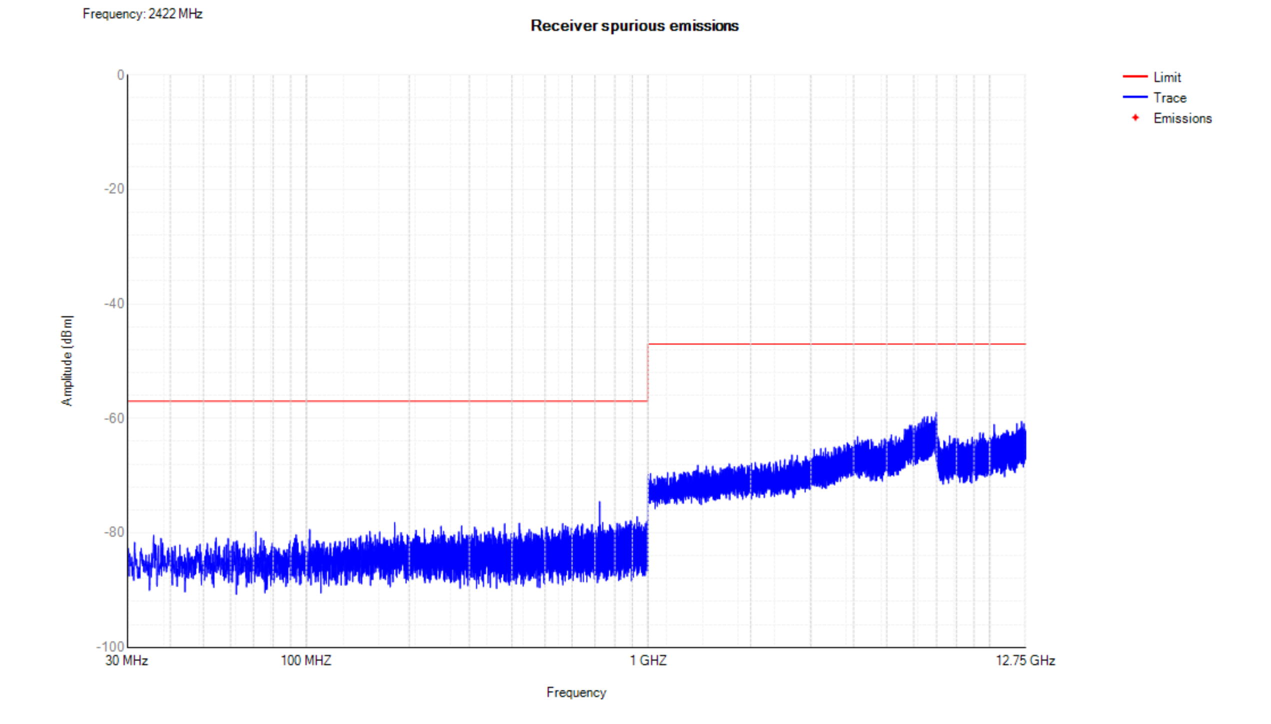
Rx. Spurious NVNT n20 2472MHz Ant2



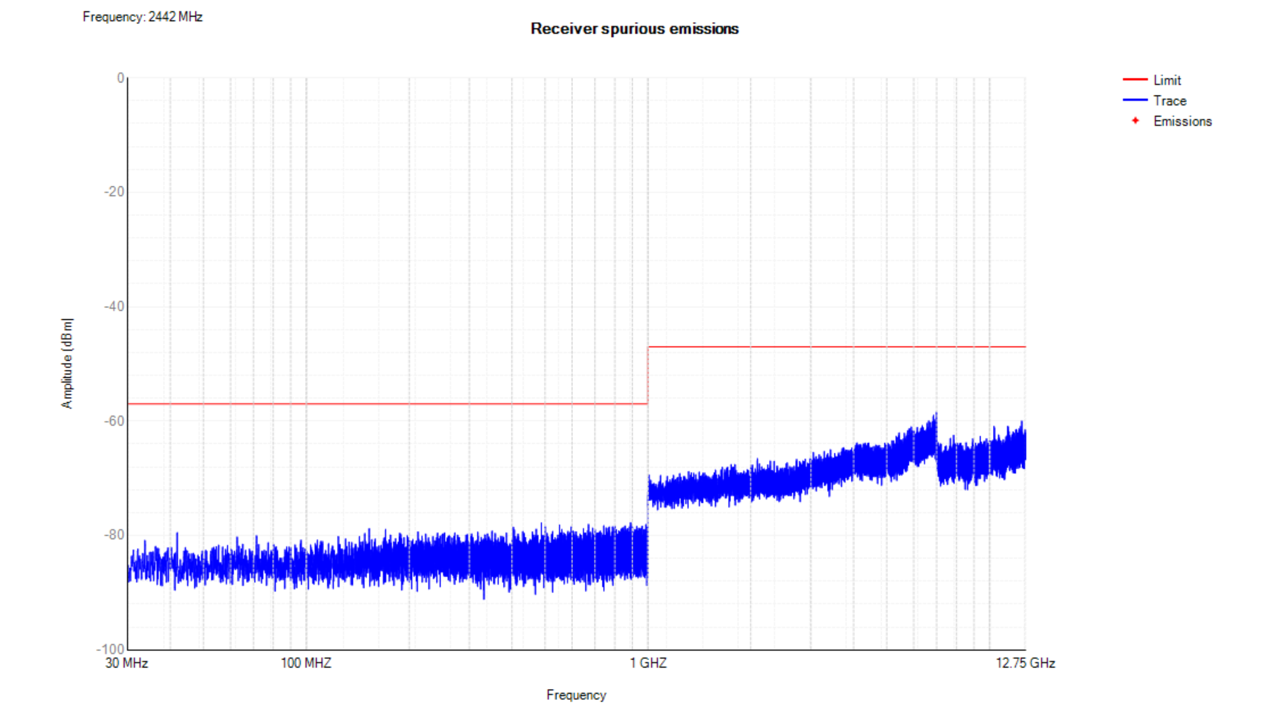
Rx. Spurious NVNT n40 2422MHz Ant1



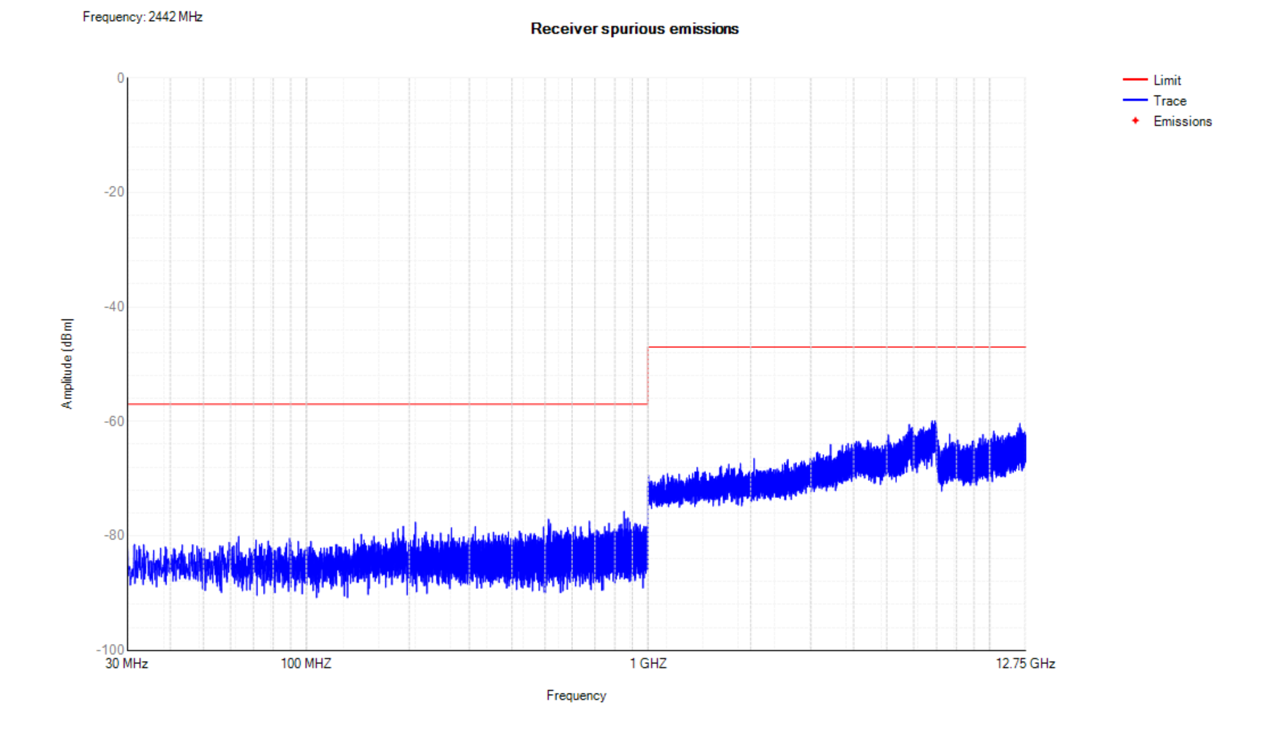
Rx. Spurious NVNT n40 2422MHz Ant2

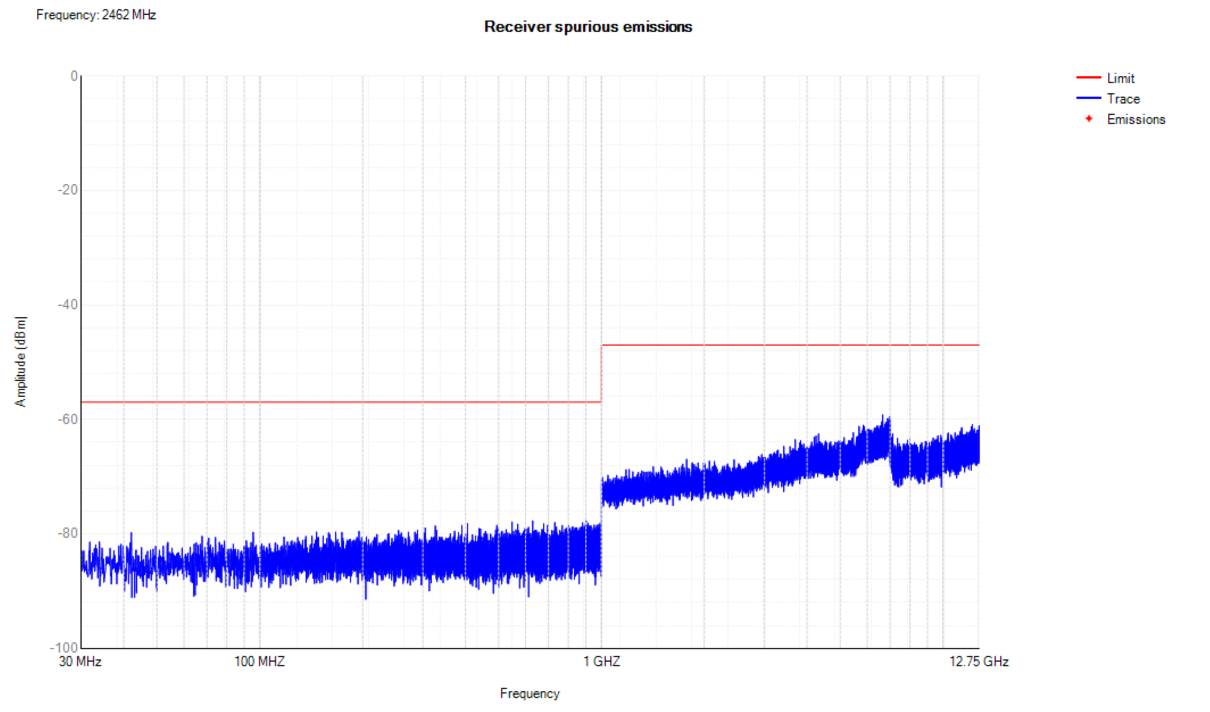
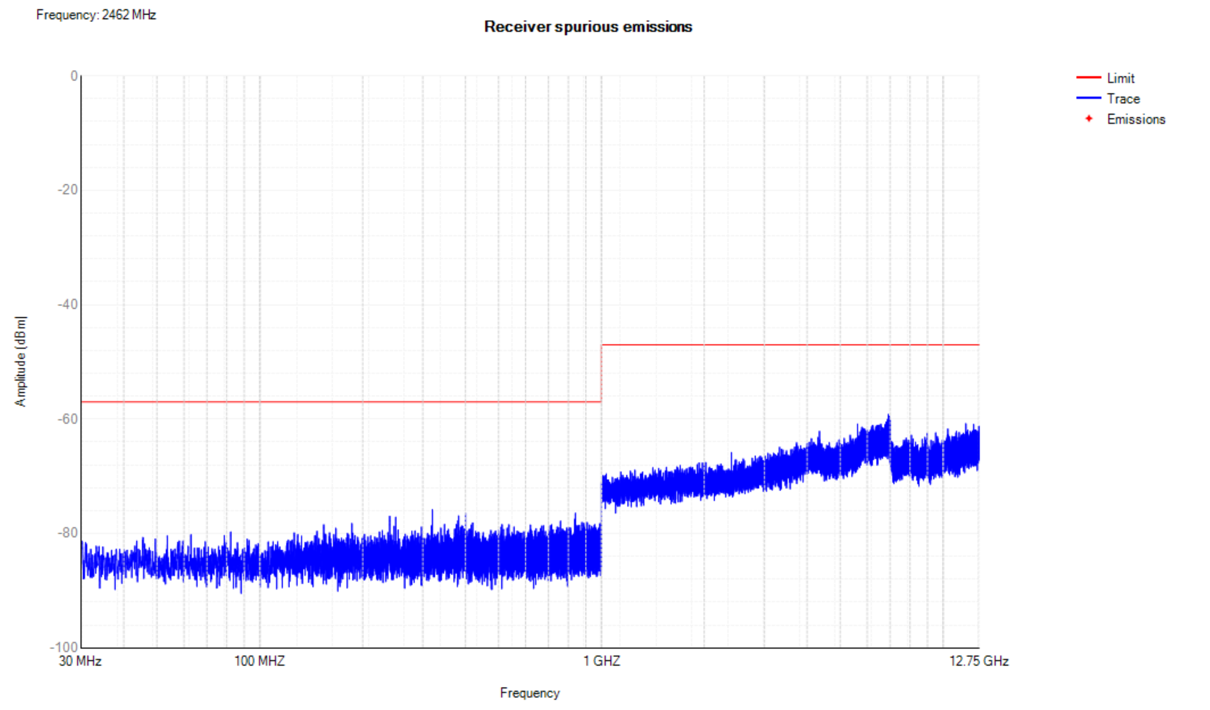


Rx. Spurious NVNT n40 2442MHz Ant1



Rx. Spurious NVNT n40 2442MHz Ant2



Rx. Spurious NVNT n40 2462MHz Ant1

Rx. Spurious NVNT n40 2462MHz Ant2


Notes:
1. Negative sign (-) in the margin column signify levels below the limit.
2. The test frequency range is 30MHz to 12.75GHz.
3. Other emissions found were at least 10 dB below the limit.
4. Measurement Uncertainty: ±5.0dB.
5. Correction value was combined in the calculated result.

8.7 ADAPTIVITY

8.7.1 Applicable standard

ETSI EN 300 328 clause 4.3.2.6

8.7.2 Conformance Limit

Only for adaptive equipment and RF output power >=10dBm(EIRP)

■ Adaptive Frequency Hopping equipment using LBT based DAA shall comply with the following minimum set of requirements:

1) At the start of every dwell time, before transmission on a hopping frequency, the equipment shall perform a Clear Channel Assessment (CCA) check using energy detect. The CCA observation time shall be not less than 0,2 % of the Channel Occupancy Time with a minimum of 18 µs. If the equipment finds the hopping frequency to be clear, it may transmit immediately.

2) If it is determined that a signal is present with a level above the detection threshold defined in step 5 the hopping frequency shall be marked as 'unavailable'. Then the equipment may jump to the next frequency in the hopping scheme even before the end of the dwell time, but in that case the 'unavailable' channel cannot be considered as being 'occupied' and shall be disregarded with respect to the requirement of the minimum number of hopping frequencies as defined in clause 4.3.1.4.3.2. Alternatively, the equipment can remain on the frequency during the remainder of the dwell time. However, if the equipment remains on the frequency with the intention to transmit, it shall perform an Extended CCA check in which the (unavailable) channel is observed for a random duration between the value defined for the CCA observation time in step 1 and 5 % of the Channel Occupancy Time defined in step 3. If the Extended CCA check has determined the frequency to be no longer occupied, the hopping frequency becomes available again. If the Extended CCA time has determined the channel still to be occupied, it shall perform new Extended CCA checks until the channel is no longer occupied.

3) The total time during which an equipment has transmissions on a given hopping frequency without re-evaluating the availability of that frequency is defined as the Channel Occupancy Time.
The Channel Occupancy Time for a given hopping frequency, which starts immediately after a successful CCA, shall be less than 60 ms followed by an Idle Period of minimum 5 % of the Channel Occupancy Time with a minimum of 100 µs.
After the Idle Period has expired, the procedure as in step 1 shall be repeated before having new transmissions on this hopping frequency during the same dwell time.
EXAMPLE: An equipment with a dwell time of 400 ms can have 6 transmission sequences of 60 ms each, separated with an Idle Period of 3 ms. Each transmission sequence was preceded with a successful CCA check of 120 µs.
For LBT based adaptive frequency hopping equipment with a dwell time < 60 ms, the maximum Channel Occupancy Time is limited by the dwell time.

4) 'Unavailable' channels may be removed from or may remain in the hopping sequence, but in any case:
- apart from Short Control Signalling Transmissions referred to in clause 4.3.1.7.4, there shall be no transmissions on 'unavailable' channels;
- a minimum of N hopping frequencies as defined in clause 4.3.1.4.3.2 shall always be maintained.

5) The detection threshold shall be proportional to the transmit power of the transmitter: for a 20 dBm e.i.r.p. transmitter the detection threshold level (TL) shall be equal to or less than -70 dBm/MHz at the input to the receiver assuming a 0 dBi (receive) antenna assembly. This threshold level (TL) may be corrected for the (receive) antenna assembly gain (G); however, beamforming gain (Y) shall not be taken into account. For power levels less than 20 dBm e.i.r.p., the detection threshold level may be relaxed to:
TL = -70 dBm/MHz + 10 × log10 (100 mW / Pout) (Pout in mW e.i.r.p.)

6) The equipment shall comply with the requirements defined in step 1 to step 4 of the present clause in the presence of an unwanted CW signal as defined in table 2.

Unwanted Signal parameters

Wanted signal mean power from companion device	Unwanted signal frequency (MHz)	Unwanted CW signal power (dBm)
sufficient to maintain the link (see note 2)	2 395 or 2 488,5 (see note 1)	-35 (see note 3)
NOTE 1: The highest frequency shall be used for testing operating channels within the range 2 400 MHz to 2 442 MHz, while the lowest frequency shall be used for testing operating channels within the range 2 442 MHz to 2 483,5 MHz. See clause 5.4.6.1. NOTE 2: A typical value which can be used in most cases is -50 dBm/MHz. NOTE 3: The level specified is the level in front of the UUT antenna. In case of conducted measurements, this level has to be corrected by the actual antenna assembly gain.		

● Short control signaling transmissions

If implemented, Short Control Signalling Transmissions shall have a maximum TxOn / (TxOn + TxOff) ratio of 10 % within any observation period of 50 ms or within an observation period equal to the dwell time, whichever is less.

■ For LBT based Detect and avoid equipment shall comply with the following requirement

Load Based Equipment may implement an LBT based spectrum sharing mechanism based on the Clear Channel

Assessment (CCA) mode using energy detect as described in IEEE 802.11™-2012 [i.3], clause 9, clause 10, clause 16, clause 17, clause 19 and clause 20, or in IEEE 802.15.4™-2011 [i.4], clause 4, clause 5 and clause 8 providing the equipment complies with the conformance requirements referred to in clause 4.3.2.6.3.4. Load Based Equipment not using any of the mechanisms referenced above shall comply with the following minimum set of requirements:

1) Before a transmission or a burst of transmissions, the equipment shall perform a Clear Channel Assessment (CCA) check using energy detect. The equipment shall observe the operating channel for the duration of the CCA observation time which shall be not less than 18 μs. The channel shall be considered occupied if the energy level in the channel exceeds the threshold given in step 5 below. If the equipment finds the channel to be clear, it may transmit immediately.

2) If the equipment finds the channel occupied, it shall not transmit on this channel (see also the next paragraph). The equipment shall perform an Extended CCA check in which the channel is observed for a random duration in the range between 18 μs and at least 160 μs. If the extended CCA check has determined the channel to be no longer occupied, the equipment may resume transmissions on this channel. If the Extended CCA time has determined the channel still to be occupied, it shall perform new Extended CCA checks until the channel is no longer occupied.

NOTE: The Idle Period in between transmissions is considered to be the CCA or the Extended CCA check as there are no transmissions during this period. The equipment is allowed to switch to a non-adaptive mode and to continue transmissions on this channel providing it complies with the requirements applicable to non-adaptive equipment. Alternatively, the equipment is also allowed to continue Short Control Signalling Transmissions on this channel providing it complies with the requirements given in clause 4.3.2.6.4.

3) The total time that an equipment makes use of a RF channel is defined as the Channel Occupancy Time. This Channel Occupancy Time shall be less than 13 ms, after which the device shall perform a new CCA as described in step 1 above.

4) The equipment, upon correct reception of a packet which was intended for this equipment can skip CCA and immediately (see also next paragraph) proceed with the transmission of management and control frames (e.g. ACK and Block ACK frames are allowed but data frames are not allowed). A consecutive sequence of transmissions by the equipment without a new CCA shall not exceed the maximum channel occupancy time as defined in step 3 above.

For the purpose of multi-cast, the ACK transmissions (associated with the same data packet) of the individual devices are allowed to take place in a sequence.

5) The energy detection threshold for the CCA shall be proportional to the transmit power of the transmitter: for a 20 dBm e.i.r.p. transmitter the CCA threshold level (TL) shall be equal to or less than -70 dBm/MHz at the input to the receiver assuming a 0 dBi (receive) antenna assembly. This threshold level (TL) may be corrected for the (receive) antenna assembly gain (G); however, beamforming gain (Y) shall not be taken into account. For power levels less than 20 dBm e.i.r.p., the CCA threshold level may be relaxed to:

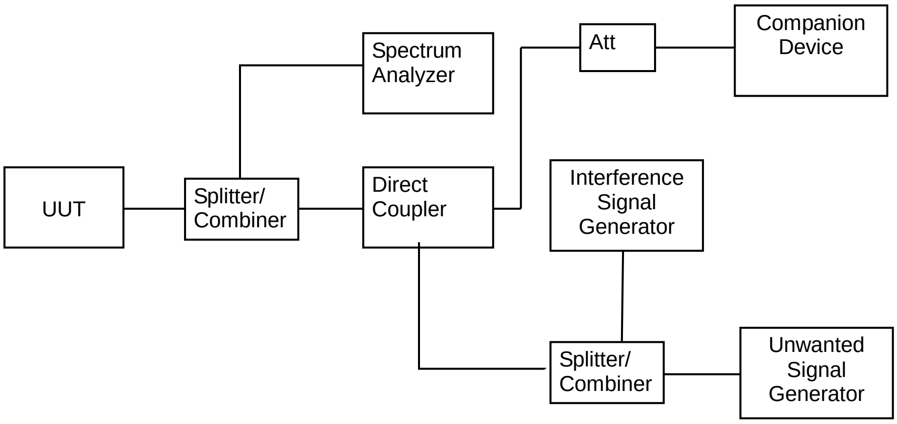
TL = -70 dBm/MHz + 10 × log10 (100 mW / Pout) (Pout in mW e.i.r.p.)
6) The equipment shall comply with the requirements defined in step 1 to step 4 of the present clause in the presence of an unwanted CW signal as defined in below.

Unwanted Signal parameters

Wanted signal mean power from companion device	Unwanted signal frequency (MHz)	Unwanted signal power (dBm)
sufficient to maintain the link (see note 2)	2 395 or 2 488,5 (see note 1)	-35 (see note 3)
NOTE 1: The highest frequency shall be used for testing operating channels within the range 2 400 MHz to 2 442 MHz, while the lowest frequency shall be used for testing operating channels within the range 2 442 MHz to 2 483,5 MHz. See clause 5.4.6.1. NOTE 2: A typical value which can be used in most cases is -50 dBm/MHz. NOTE 3: The level specified is the level in front of the UUT antenna. In case of conducted measurements, this level has to be corrected by the actual antenna assembly gain.		

■ Short control signaling transmissions
If implemented, Short Control Signalling Transmissions of adaptive equipment using wide band modulations other than FHSS shall have a maximum TxOn / (TxOn + TxOff) ratio of 10 % within any observation period of 50 ms.

8.7.3 Test Configuration



8.7.4 Test Procedure

1. Please refer to ETSI EN 300 328 (V2.2.2) clause 5.4.6.1 for the test conditions.
2. Please refer to ETSI EN 300 328 (V2.2.2) clause 5.4.6.2 for the measurement method.

■ Conducted measurement
Adaptive Frequency Hopping equipment using DAA
●Step 1 to step 7 below define the procedure to verify the efficiency of the DAA based adaptive mechanisms for frequency hopping equipment. These mechanisms are described in clause 4.3.1.7. For systems using multiple receive chains only one chain (antenna port) need to be tested. All other receiver inputs shall be terminated.
Step 1:
• The UUT shall connect to a companion device during the test. The interference signal generator, the unwanted signal generator, the spectrum analyser, the UUT and the companion device are connected using a set-up equivalent to the example given by figure 5, although the interference and unwanted signal generators do not generate any signals at this point in time. The spectrum analyser is used to monitor the transmissions of both the UUT and the companion device and it should be possible to distinguish between either transmission. In addition, the spectrum analyser is used to monitor the transmissions of the UUT in response to the interfering and the unwanted signals.
• For the hopping frequency to be tested, adjust the received signal level (wanted signal from the

companion device) at the UUT to the value defined in table 2 and table 3 (clause 4).
Testing of Unidirectional equipment does not require a link to be established with a companion device.

- The analyser shall be set as follows:

- RBW: use next available RBW setting below the measured Occupied Channel Bandwidth
- Filter type: Channel Filter
- VBW: ≥ RBW
- Detector Mode: RMS
- Centre Frequency: Equal to the hopping frequency to be tested
- Span: 0 Hz
- Sweep time: > Channel Occupancy Time of the UUT. If the Channel Occupancy Time is non-contiguous (non-LBT based equipment), the sweep time shall be sufficient to cover the period over which the Channel Occupancy Time is spread out
- Trace Mode: Clear/Write
- Trigger Mode: Video

Step 2:

- Configure the UUT for normal transmissions with a sufficiently high payload resulting in a minimum transmitter activity ratio (TxOn / (TxOn + TxOff)) of 0,3. Where this is not possible, the UUT shall be configured to the maximum payload possible.
- Using the procedure defined in clause 5.4.6.2.1.5, it shall be verified that, for equipment with a dwell time greater than the maximum allowable Channel Occupancy Time, the UUT complies with the maximum Channel Occupancy Time and minimum Idle Period defined in clause 4.3.1.7.2.2 or clause 4.3.1.7.3.2. When measuring the Idle Period of the UUT, it shall not include the transmission time of the companion device.

Step 3: Adding the interference signal

- An interference signal as defined in clause B.7 is injected centred on the hopping frequency being tested. The power spectral density level (at the input of the UUT) of this interference signal shall be equal to the detection threshold defined in clause 4.3.1.7.2.2 or clause 4.3.1.7.3.2.

Step 4: Verification of reaction to the interference signal

- The spectrum analyser shall be used to monitor the transmissions of the UUT on the selected hopping frequency with the interfering signal injected. This may require the spectrum analyser sweep to be triggered by the start of the interfering signal.
- Using the procedure defined in clause 5.4.6.2.1.5, it shall be verified that:

i) The UUT shall stop transmissions on the hopping frequency being tested.
The UUT is assumed to stop transmissions on this hopping frequency within a period equal to the maximum Channel Occupancy Time defined in clause 4.3.1.7.2.2 or clause 4.3.1.7.3.2. As stated in clause 4.3.1.7.3.2, step 3, the Channel Occupancy Time for non-LBT based frequency hopping equipment may be non-contiguous.

ii) For LBT based frequency hopping equipment, apart from Short Control Signalling Transmissions (see iii) below), there shall be no subsequent transmissions on this hopping frequency, as long as the interference signal remains present.
For non-LBT based frequency hopping equipment, apart from Short Control Signalling Transmissions (see iii) below), there shall be no subsequent transmissions on this hopping frequency for a (silent) period defined in clause 4.3.1.7.3.2, step 2. After that, the UUT may have normal transmissions again for the duration of a single Channel Occupancy Time period (which may be non-contiguous). Because the interference signal is still present, another silent period as defined in clause 4.3.1.7.3.2, step 2 needs to be included. This sequence is repeated as long as the interfering signal is present.
In case of overlapping channels, transmissions in adjacent channels may generate transmission bursts on the channel being investigated; however, they have a lower amplitude as on-channel transmissions. Care should be taken to only evaluate the on-channel transmissions. The Time Domain Power Option of the analyser may be used to measure the RMS power of the individual bursts to distinguish on-channel transmissions from transmissions on adjacent channels. In some cases, the RBW may need to be reduced.
To verify that the UUT is not resuming normal transmissions as long as the interference signal is present, the monitoring time may need to be 60 s or more. If transmissions are detected during this period, the settings of the analyser may need to be adjusted to allow an accurate assessment to verify the transmissions comply with the limits for Short Control Signalling Transmissions.

iii) The UUT may continue to have Short Control Signalling Transmissions on the hopping frequency being tested while the interference signal is present. These transmissions shall comply with the limits defined in clause 4.3.1.7.4.2. The verification of the Short Control Signalling transmissions may require the analyser settings to be changed (e.g. sweep time).

iv) Alternatively, the equipment may switch to a non-adaptive mode.
Step 5: Adding the unwanted signal
• With the interfering signal present, a 100 % duty cycle CW signal is inserted as the unwanted signal. The frequency and the level are provided in table 2 of clause 4.3.1.7.2.2, step 6 or table 3 of clause 4.3.1.7.3.2,
step 6.
• The spectrum analyser shall be used to monitor the transmissions of the UUT on the selected hopping frequency. This may require the spectrum analyser sweep to be triggered by the start of the unwanted signal.
• Using the procedure defined in clause 5.4.6.2.1.5, it shall be verified that:
i) The UUT shall not resume normal transmissions on the hopping frequency being tested as long as both the interference and unwanted signals remain present.
To verify that the UUT is not resuming normal transmissions as long as the interference and unwanted signals are present, the monitoring time may need to be 60 s or more. If transmissions are detected during this period, the settings of the analyser may need to be adjusted to allow an accurate assessment to verify the transmissions comply with the limits for Short Control Signalling Transmissions.
ii) The UUT may continue to have Short Control Signalling Transmissions on the hopping frequency being tested while the interference and unwanted signals are present. These transmissions shall comply with the limits defined in clause 4.3.1.7.4.2.
The verification of the Short Control Signalling transmissions may require the analyser settings to be changed (e.g. sweep time).
Step 6: Removing the interference and unwanted signal
• On removal of the interference and unwanted signal, the UUT is allowed to re-include any channel previously marked as unavailable; however, for non-LBT based equipment, it shall be verified that this shall only be done after the period defined in clause 4.3.1.7.3.2, step 2.
Step 7:
• Step 2 to step 6 shall be repeated for each of the hopping frequencies to be tested.

LBT based adaptive equipment using modulations other than FHSS
Step 1 to step 7 below define the procedure to verify the efficiency of the LBT based adaptive mechanism of equipment using wide band modulations other than FHSS. This method can be applied on Load Based Equipment and Frame Based Equipment.
Step 1:
• The UUT shall connect to a companion device during the test. The interference signal generator, the unwanted signal generator, the spectrum analyser, the UUT and the companion device are connected using a set-up equivalent to the example given by figure 5 although the interference and unwanted signal generator do not generate any signals at this point in time. The spectrum analyser is used to monitor the transmissions of both the UUT and the companion device and it should be possible to distinguish between either transmission. In addition, the spectrum analyser is used to monitor the transmissions of the UUT in response to the interfering and the unwanted signals.
• Adjust the received signal level (wanted signal from the companion device) at the UUT to the value defined in table 10 (clause 4.3.2.6.3.2.2) for Frame Based Equipment or in table 11 (clause 4.3.2.6.3.2.3) for Load Based Equipment.
Testing of Unidirectional equipment does not require a link to be established with a companion device.
• The analyser shall be set as follows:
- RBW: ⩾ Occupied Channel Bandwidth (if the analyser does not support this setting, the highest available setting shall be used)
- VBW: 3 × RBW (if the analyser does not support this setting, the highest available setting shall be used)
- Detector Mode: RMS
- Centre Frequency: Equal to the centre frequency of the operating channel
- Span: 0 Hz
- Sweep time: > maximum Channel Occupancy Time
- Trace Mode: Clear Write
- Trigger Mode: Video
Step 2:
• Configure the UUT for normal transmissions with a sufficiently high payload resulting in a minimum transmitter activity ratio (TxOn / (TxOn + TxOff)) of 0,3. Where this is not possible, the UUT shall be configured to the maximum payload possible.
• For Frame Based Equipment, using the procedure defined in clause 5.4.6.2.1.5, it shall be verified that

the UUT complies with the maximum Channel Occupancy Time and minimum Idle Period defined in clause 4.3.2.6.3.2.2, step 3. When measuring the Idle Period of the UUT, it shall not include the transmission time of the companion device.

- For Load Based equipment, using the procedure defined in clause 5.4.6.2.1.5, it shall be verified that the UUT complies with the maximum Channel Occupancy Time and minimum Idle Period defined in clause 4.3.2.6.3.2.3, step 2 and step 3. When measuring the Idle Period of the UUT, it shall not include the transmission time of the companion device.
  For the purpose of testing Load Based Equipment referred to in the first paragraph of clause 4.3.2.6.3.2.3 (IEEE 802.11™ [i.3] or IEEE 802.15.4™ [i.4] equipment), the limits to be applied for the minimum Idle Period and the maximum Channel Occupancy Time are the same as defined for other types of Load Based Equipment (see clause 4.3.2.6.3.2.3, step 2 and step 3). The Idle Period is considered to be equal to the CCA or Extended CCA time defined in clause 4.3.2.6.3.2.3, step 1 and step 2.

Step 3: Adding the interference signal

- An interference signal as defined in clause B.7 is injected on the current operating channel of the UUT. The power spectral density level (at the input of the UUT) of this interference signal shall be equal to the detection threshold defined in clause 4.3.2.6.3.2.2, step 5 (frame based equipment) or clause 4.3.2.6.3.2.3, step 5 (load based equipment).

Step 4: Verification of reaction to the interference signal

- The spectrum analyser shall be used to monitor the transmissions of the UUT on the selected operating channel with the interfering signal injected. This may require the spectrum analyser sweep to be triggered by the start of the interfering signal.
- Using the procedure defined in clause 5.4.6.2.1.5, it shall be verified that:
  i) The UUT shall stop transmissions on the current operating channel.
  The UUT is assumed to stop transmissions within a period equal to the maximum Channel Occupancy Time defined in clause 4.3.2.6.3.2.2 (frame based equipment) or clause 4.3.2.6.3.2.3 (load based equipment).
  ii) Apart from Short Control Signalling Transmissions, there shall be no subsequent transmissions while the interfering signal is present.
  To verify that the UUT is not resuming normal transmissions as long as the interference signal is present, the monitoring time may need to be 60 s or more.
  iii) The UUT may continue to have Short Control Signalling Transmissions on the operating channel while the interfering signal is present. These transmissions shall comply with the limits defined in clause 4.3.2.6.4.2.
  The verification of the Short Control Signalling transmissions may require the analyser settings to be changed (e.g. sweep time).
  iv) Alternatively, the equipment may switch to a non-adaptive mode.

Step 5: Adding the unwanted signal

- With the interfering signal present, a 100 % duty cycle CW signal is inserted as the unwanted signal. The frequency and the level are provided in table 10 (clause 4.3.2.6.3.2.2) for Frame Based Equipment or in table 11 (clause 4.3.2.6.3.2.3) for Load Based Equipment.
- The spectrum analyser shall be used to monitor the transmissions of the UUT on the selected operating channel. This may require the spectrum analyser sweep to be triggered by the start of the unwanted signal.
- Using the procedure defined in clause 5.4.6.2.1.5, it shall be verified that:
  i) The UUT shall not resume normal transmissions on the current operating channel as long as both the interference and unwanted signals remain present.
  To verify that the UUT is not resuming normal transmissions as long as the interference and unwanted signals are present, the monitoring time may need to be 60 s or more.
  ii) The UUT may continue to have Short Control Signalling Transmissions on the operating channel while the interfering and unwanted signals are present. These transmissions shall comply with the limits defined in clause 4.3.2.6.4.2.
  The verification of the Short Control Signalling transmissions may require the analyser settings to be changed (e.g. sweep time).

Step 6: Removing the interference and unwanted signal

- On removal of the interference and unwanted signals the UUT is allowed to start transmissions again on this channel; however, this is not a requirement and, therefore, does not require testing.

Step 7:

- Step 2 to step 6 shall be repeated for each of the frequencies to be tested.

■Radiated measurements

When performing radiated measurements on equipment with dedicated antennas, measurements shall be

repeated for each alternative dedicated antenna.
A test site as described in annex B and applicable measurement procedures as described in annex C shall be used. The test procedure is further as described under clause 5.4.6.2.1.

8.7.5 Test Results

N/A.

8.8 RECEIVER BLOCKING

8.8.1 Applicable standard

ETSI EN 300 328 clause 4.3.1.12, clause 4.3.2.11

8.8.2 Conformance Limit

The minimum performance criterion shall be a PER less than or equal to 10 %. The manufacturer may declare alternative performance criteria as long as that is appropriate for the intended use of the equipment (see clause 5.4.1.t)).

■ General

While maintaining the minimum performance criteria as defined in clause, the blocking levels at specified frequency offsets shall be equal to or greater than the limits defined for the applicable receiver category provided in below.

●Receiver Category 1

Receiver Blocking parameters for Receiver Category 1 equipment

<table>
<tr><th>Wanted signal mean power from companion device (dBm)</th><th>Blocking signal frequency (MHz)</th><th>Blocking signal power (dBm) (see note 4)</th><th>Type of blocking signal</th></tr>
<tr><td>(-133 dBm + 10 × log10(OCBW)) or -68 dBm whichever is less (see note 2)</td><td>2 380
2 503,5</td><td rowspan="2">-34</td><td rowspan="2">CW</td></tr>
<tr><td>(-139 dBm + 10 × log10(OCBW)) or -74 dBm whichever is less (see note 3)</td><td>2 300
2 330
2 360
2 524
2 484
2 674</td></tr>
<tr><td colspan="4">NOTE 1: OCBW is in Hz.
NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to Pmin + 26 dB where Pmin is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.
NOTE 3: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to Pmin + 20 dB where Pmin is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.
NOTE 4: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.</td></tr>
</table>

●Receiver Category 2

Receiver Blocking parameters receiver category 2 equipment

<table>
<tr><th>Wanted signal mean power from companion device (dBm)</th><th>Blocking signal frequency (MHz)</th><th>Blocking signal power (dBm) (see note 3)</th><th>Type of blocking signal</th></tr>
<tr><td>(-139 dBm + 10 × log10(OCBW) + 10 dB) or (-74 dBm + 10 dB) whichever is less (see note 2)</td><td>2 380
2 504
2 300
2 584</td><td>-34</td><td>CW</td></tr>
<tr><td colspan="4">NOTE 1: OCBW is in Hz.
NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to Pmin + 26 dB where Pmin is the minimum level of wanted signal required to meet the minimum</td></tr>
</table>

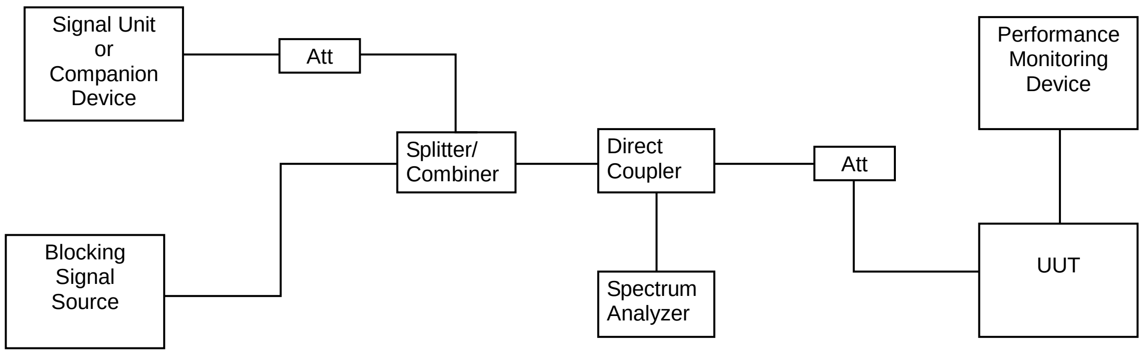
performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.
NOTE 3: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.

●Receiver Category 3
Receiver Blocking parameters receiver category 3 equipment

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 3)	Type of blocking signal
(-139 dBm + 10 × log10(OCBW) + 20 dB) or (-74 dBm + 20 dB) whichever is less (see note 2)	2 380 2 504 2 300 2 584	-34	CW

NOTE 1: OCBW is in Hz.
NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to Pmin + 30 dB where Pmin is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.
NOTE 3: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.

8.8.3 Test Configuration



8.8.4 Test Procedure

1. Please refer to ETSI EN 300 328 (V2.2.2) clause 5.4.11.1 for the test conditions.
2. Please refer to ETSI EN 300 328 (V2.2.2) clause 5.4.11.2 for the measurement method.

■ Conducted measurement

Adaptive Frequency Hopping equipment using DAA
Step 1:
• For non-frequency hopping equipment, the UUT shall be set to the lowest operating channel.
Step 2:
• The blocking signal generator is set to the first frequency as defined in the appropriate table corresponding to the receiver category and type of equipment.
Step 3:
• With the blocking signal generator switched off, a communication link is established between the UUT and the associated companion device using the test setup shown in figure 6. The attenuation of the variable attenuator shall be increased in 1 dB steps to a value at which the minimum performance criteria as specified in clause 4.3.1.12.3 or clause 4.3.2.11.3 is still met. The resulting level for the wanted signal at the input of the UUT is Pmin.
• This signal level (Pmin) is increased by the value provided in the table corresponding to the receiver

category and type of equipment.

Step 4:

• The blocking signal at the UUT is set to the level provided in the table corresponding to the receiver category and type of equipment. It shall be verified and recorded in the test report that the performance criteria as specified in clause 4.3.1.12.3 or clause 4.3.2.11.3 is met.

Step 5:

• Repeat step 4 for each remaining combination of frequency and level for the blocking signal as provided in the table corresponding to the receiver category and type of equipment.

Step 6:

• For non-frequency hopping equipment, repeat step 2 to step 5 with the UUT operating at the highest operating channel.

■ Radiated measurements

When performing radiated measurements on equipment with dedicated antennas, measurements shall be repeated for each alternative dedicated antenna.

A test site as described in annex B and applicable measurement procedures as described in annex C shall be used.

The test procedure is further as described under clause 5.4.11.2.1.

The level of the blocking signal at the UUT referred to in step 4 is assumed to be the level in front of the UUT antenna(s). The UUT shall be positioned with its main beam pointing towards the antenna radiating the blocking signal. The position recorded in clause 5.4.2.2.2 can be used.

8.8.5 Test Results

Receiver category

Wifi 2.4G		
☐	Receiver category 1	Adaptive equipment with a maximum RF output power greater than 10 dBm e.i.r.p. shall be considered as receiver category 1 equipment.
☒	Receiver category 2	Non-adaptive equipment with a Medium Utilization (MU) factor greater than 1 % and less than or equal to 10 % or adaptive equipment with a maximum RF output power of 10 dBm e.i.r.p. shall be considered as receiver category 2 equipment.
☐	Receiver category 3	Non-adaptive equipment with a maximum Medium Utilization (MU) factor of 1 % or adaptive equipment with a maximum RF output power of 0 dBm e.i.r.p. shall be considered as receiver category 3 equipment.
☐	Other Receiver category	Maximum RF Output Power less than 10 dBm e.i.r.p. No need to test Receiver Blocking

All of the modes were tested the data of the worst mode are recorded in the following pages.

Wifi 2.4G ANT1:					
Operation Mode:	☒802.11b		☐802.11g	☐802.11n(HT20)	☐802.11n(HT40)
Temperature:	24ºC		Test Date:	April 07, 2023	
Test Frequency:	☒2412MHz		☐2472MHz		
Humidity:	53 % RH		Tested by:	Fan	
Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm)	Type of blocking signal	PER(%)	Result
-54	2 380	-34	CW	0.5%	PASS
	2 504			0.7%	PASS
	2 300			0.1%	PASS
	2 584			2.2%	PASS
☐Pout<=10dBm OCBW:13MHz NOTE: N/A means not applicable					

Wifi 2.4G ANT1:					
Operation Mode:	☒802.11b		☐802.11g	☐802.11n(HT20)	☐802.11n(HT40)
Temperature:	24ºC		Test Date:	April 07, 2023	
Test Frequency:	☐2412MHz		☒2472MHz		
Humidity:	53 % RH		Tested by:	Fan	
Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm)	Type of blocking signal	PER(%)	Result
-54	2 380	-34	CW	1.1%	PASS
	2 504			1.2%	PASS
	2 300			0.9%	PASS
	2 584			2.3%	PASS
☐Pout<=10dBm OCBW:13MHz NOTE: N/A means not applicable					

9 APPENDIX PHOTOGRAPHS OF EUT

Please refer to the report :E01A23030814E00201.

END OF REPORT