



ITL Co., Ltd.

No.8, JinQianLing street 5, Huangjiang Town, Dongguan, Guangdong, China.

Telephone: +86-769-39001678
Fax: +86-20-62824387
Email: itl@i-testlab.com

Telephone: +86-769-39001678
Fax: +86-20-62824387
Email: itl@i-testlab.com

FCC Test Report

Applicant: ZHENGZHOU DI YUN WANG LUO KE JI YOU XIAN GONG SI

Address of Applicant: No.2602,26th Floor, Block B, Dongfang Building No.198-19, Songshan South Road, Erqi District, Zhengzhou, Henan, China

Manufacturer: ZHENGZHOU DI YUN WANG LUO KE JI YOU XIAN GONG SI

Address of Manufacturer: No.2602,26th Floor, Block B, Dongfang Building No.198-19, Songshan South Road, Erqi District, Zhengzhou, Henan, China

Equipment Under Test (EUT):

Product: Power supply

Model No.: HOSL03B, TLA-120-12W-1; HOSL04C, TLA-200-12W-1; HOSL05D, TLA-300-12WA2-1

Brand Name: ***clewenwils***

FCC ID: 2A4G9-001

Standards: 47 CFR Part 15, Subpart C

Date of Test: 2022-02-22 to 2022-03-18

Date of Issue: 2022-03-19

Report No. : D220222008-01

Test Result : **PASS***

Damon

Tested By:

(Damon Deng)

Reviewed By:

Chivas

(Chivas Zeng)

Approved By:

Victor

(Victor Meng)



* In the configuration tested, the EUT complied with the standards specified above.

1 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
D220222008-01	Rev.01	Initial report	2022-03-19

2 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15, Subpart C Section 15.203/15.247 (c)	ANSI C63.10 2013	PASS
AC Power Line Conducted Emission	47 CFR Part 15, Subpart C Section 15.207	ANSI C63.10 2013	PASS
Conducted Peak Output Power	47 CFR Part 15, Subpart C Section 15.247 (b)(3)	KDB558074 D01 V04	PASS
6dB Occupied Bandwidth	47 CFR Part 15, Subpart C Section 15.247 (a)(2)	KDB558074 D01 V04	PASS
Power Spectral Density	47 CFR Part 15, Subpart C Section 15.247 (e)	KDB558074 D01 V04	PASS
Band-edge for RF Conducted Emissions	47 CFR Part 15, Subpart C Section 15.247(d)	KDB558074 D01 V04	PASS
RF Conducted Spurious Emissions	47 CFR Part 15, Subpart C Section 15.247(d)	KDB558074 D01 V04	PASS
Radiated Spurious Emissions	47 CFR Part 15, Subpart C Section 15.205/15.209	ANSI C63.10 2013	PASS
Restricted bands around fundamental frequency (Radiated Emission)	47 CFR Part 15, Subpart C Section 15.205/15.209	ANSI C63.10 2013	PASS

3 Contents

	Page
1 VERSION	2
2 TEST SUMMARY	3
3 CONTENTS	4
4 GENERAL INFORMATION	5
4.1 CLIENT INFORMATION	5
4.2 GENERAL DESCRIPTION OF EUT	5
4.3 TEST ENVIRONMENT AND MODE	7
4.4 DESCRIPTION OF SUPPORT UNITS	7
4.5 TEST LOCATION	7
4.6 TEST FACILITY.....	8
4.7 STATEMENT OF THE MEASUREMENT UNCERTAINTY	8
4.8 DEVIATION FROM STANDARDS.....	8
4.9 ABNORMALITIES FROM STANDARD CONDITIONS.....	8
4.10 OTHER INFORMATION REQUESTED BY THE CUSTOMER	8
4.11 EQUIPMENT LIST	9
5 TEST RESULTS AND MEASUREMENT DATA	10
5.1 ANTENNA REQUIREMENT	10
5.2 CONDUCTED EMISSIONS.....	11
5.3 CONDUCTED PEAK OUTPUT POWER.....	15
MAXIMUM CONDUCTED OUTPUT POWER.....	16
5.4 6dB OCCUPY BANDWIDTH.....	21
6DB BANDWIDTH.....	22
5.5 POWER SPECTRAL DENSITY.....	28
MAXIMUM POWER SPECTRAL DENSITY LEVEL.....	29
5.6 BAND-EDGE FOR RF CONDUCTED EMISSIONS	35
BAND EDGE.....	36
5.7 RF CONDUCTED SPURIOUS EMISSIONS	43
5.8 RADIATED SPURIOUS EMISSIONS.....	54
5.8.1 Radiated emission below 1GHz.....	57
5.8.2 Transmitter emission above 1GHz.....	59
5.9 RESTRICTED BANDS AROUND FUNDAMENTAL FREQUENCY	61
6 PHOTOGRAPHS - EUT TEST SETUP.....	66
6.1 RADIATED SPURIOUS EMISSION	66
6.2 CONDUCTED EMISSION.....	67
7 PHOTOGRAPHS - EUT CONSTRUCTIONAL DETAILS.....	68

4 General Information

4.1 Client Information

Applicant:	ZHENGZHOU DI YUN WANG LUO KE JI YOU XIAN GONG SI
Address of Applicant:	No.2602,26 th Floor, Block B, Dongfang Building No.198-19, Songshan South Road, Erqi District, Zhengzhou, Henan, China
Manufacturer:	ZHENGZHOU DI YUN WANG LUO KE JI YOU XIAN GONG SI
Address of Manufacturer:	No.2602,26 th Floor, Block B, Dongfang Building No.198-19, Songshan South Road, Erqi District, Zhengzhou, Henan, China
Factory:	TDC Power Products Co., Ltd.
Factory of Manufacturer:	Dong Hang 3rd Industrial District, Dong Hang, Dong Guan City, Guang Dong Province, China

4.2 General Description of EUT

Product Name:	Power supply
Model No.:	HOSL03B, TLA-120-12W-1; HOSL04C, TLA-200-12W-1; HOSL05D, TLA-300-12WA2-1
Trade Mark:	<i>cljewenwils</i>
Hardware version:	V1.0
Software version:	V1.0
Operation Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz
Channel Numbers:	IEEE 802.11b/g, IEEE 802.11n HT20: 11 Channels
Channel Separation:	5MHz
Type of Modulation:	IEEE for 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE for 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE for 802.11n(HT20): OFDM (64QAM, 16QAM, QPSK, BPSK)
Sample Type:	Stationary equipment
Test Software of EUT:	RF test tool (manufacturer declare)
Antenna Type and Gain:	Type: External antenna with ipex connector Gain:3.0dBi
Power Supply:	Input: AC120V/60Hz 1.2A AC120V/60Hz 2A AC120V/60Hz 3A Output: 12Vac 120W max 12Vac 200W max 12Vac 300W max or 14Vac 300W Max

Operation Frequency each of channel(802.11b/g/n HT20)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412MHz	4	2427MHz	7	2442MHz	10	2457MHz
2	2417MHz	5	2432MHz	8	2447MHz	11	2462MHz
3	2422MHz	6	2437MHz	9	2452MHz		

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

For 802.11b/g/n (HT20):

Channel	Frequency
The Lowest channel	2412MHz
The Middle channel	2437MHz
The Highest channel	2462MHz

The output power setting of EUT is set in the factory and followed the max. peak level in below.

802.11b	18dBm \pm 1.5dB
802.11g	18dBm \pm 1.5dB
802.11n(HT20)	18dBm \pm 1.5dB

Note:

1. Software (RF test tool) provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.
2. The rechargeable battery is fully-charged batter.

4.3 Test Environment and Mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	52 % RH
Atmospheric Pressure:	1008 mbar
Test mode:	
Transmitting mode:	Keep the EUT in transmitting mode with all kind of modulation and all kind of data rate.
Operated Mode for Worst Duty Cycle:	
Test Signal Duty Cycle(x)	Average correction factor(dB)
100% - IEEE802.11b	0
100% - IEEE802.11g	0
100% - IEEE802.11n (HT20)	0

4.4 Description of Support Units

The EUT has been tested with associated equipment below.

Description	Manufacturer	Model No.	Remark	FCC certification
Notebook	Lenovo	Lenovo ideapad 100-14IBY	Provide by lab	DOC
AC/DC Adapter	Lenovo	PA-1450-55LN	Provide by lab	DOC

4.5 Test Location

All tests were performed at:

ITL Co., Ltd.,

No.8, JinQianLing street 5, Huangjiang Town, Dongguan, Guangdong, China

Tel: 0086-769-39001678, Fax: 0086-20-62824387

No tests were sub-contracted:

4.6 Test Facility

- CNAS(Lab code: L9342)
- Designation Number: CN5035
- Test Firm Registration Number: 239076
- NVLAP LAB CODE 600199-0

4.7 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate.

The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities.

The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the **Shenzhen Tongce Testing Lab** quality system acc. to DIN EN ISO/IEC 17025.

Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for **TCT** laboratory is reported:

Test	Range	Uncertainty	Notes
Radiated Emission	Below 1GHz	$\pm 3.92\text{dB}$	(1)
Radiated Emission	Above 1GHz	$\pm 4.28\text{dB}$	(1)
Conducted Disturbance	0.15~30MHz	$\pm 2.56\text{dB}$	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

4.8 Deviation from Standards

None.

4.9 Abnormalities from Standard Conditions

None.

4.10 Other Information Requested by the Customer

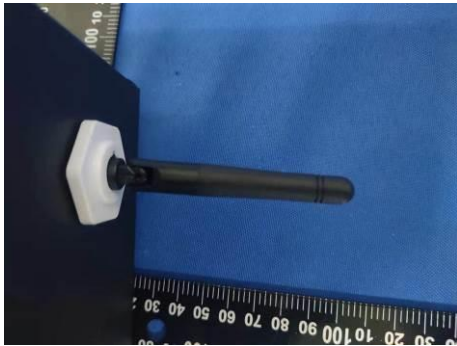
None.

4.11 Equipment List

No.	Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due
DGITL-301	Semi-Anechoic chamber	ETS•Lindgren	9*6*6	CT000874-1181	2020.08.03	2022.08.03
DGITL-307	EMI test receiver	SCHWARZBECK	ESVS10	833616 /003	2021.05.11	2022.05.11
DGITL-376	Wideband Radio Communication Tester	SCHWARZBECK	CMW500	LR114195	2021.05.11	2022.05.11
DGITL-349	MXG Vector Signal Generator	Agilent Technologies	N5182A	MY47071034	2021.05.11	2022.05.11
DGITL-306	Spectrum Analyzer	Agilent Technologies	N9010A	MY54200334	2021.05.11	2022.05.11
DGITL-352	Pre Amplifier	MInl-CIrcuits	ZFC-1000HX	SN292801110	2021.05.11	2022.05.11
DGITL-375	Spectrum Analyzer	SCHWARZBECK	FSV40-N	6625-01-588-5515	2021.05.11	2022.05.11
DGITL-309	Horn Antenna	ETS Lindgren	3117	SN00152265	2021.05.11	2022.05.11
DGITL-308	Bilog Antenna	ETS• Lindgren	3142E	156975	2020.06.20	2022.06.20
DGITL-350	Wideband Amplifier Super Ultra	MInl-CIrcuits	ZVA-183X-S+	SN986401426	2021.05.11	2022.05.11
DGITL-365	Broad-band Horn Antenna	SCHWARZBECK	9170	795	2020.07.04	2022.07.04
DGITL-371	Pre Amplifier	teramicrowave	TALA-0040G35	18081001	2021.05.11	2022.05.10
DGITL-363	Active Loop Antenna	SCHWARZBECK	FMZB 1519B	062	2020.07.04	2022.07.03

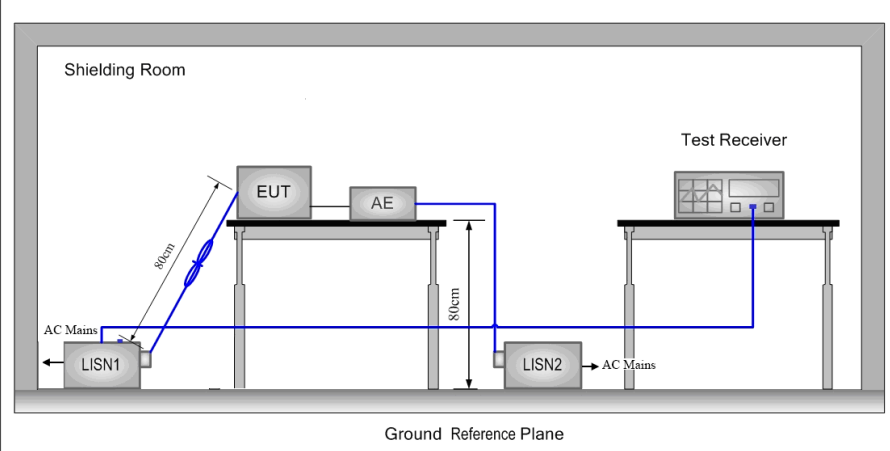
5 Test results and Measurement Data

5.1 Antenna Requirement

Standard requirement:	47 CFR Part 15C Section 15.203 /247(c)
<p>15.203 requirement:</p> <p>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.</p> <p>15.247(b) (4) requirement:</p> <p>The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.</p>	
EUT Antenna:	
The antenna is External antenna with ipex connector. The best case gain of the antenna is 3.0dBi.	

5.2 Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.207		
Test Method:	ANSI C63.10: 2013		
Test Frequency Range:	150kHz to 30MHz		
Limit:	Frequency range (MHz)	Limit (dBuV)	
		Quasi-peak	Average
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	5-30	60	50
* Decreases with the logarithm of the frequency.			
Test Procedure:	<ol style="list-style-type: none"> 1) The mains terminal disturbance voltage test was conducted in a shielded room. 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded. 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2. 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement. 		

Test Setup:	
Exploratory Test Mode:	<p>Transmitting with all kind of modulations, data rates at lowest, middle and highest channel.</p> <p>Charge + Transmitting mode.</p> <p>Mode a: Connect the AC-DC adaptor with the charging hole on unit.</p> <p>Mode b: Connect the unit return to the charging station under transmitting mode.</p>
Final Test Mode:	<p>Through Pre-scan, find the 1Mbps of rate of 802.11b at lowest channel is the worst case.</p> <p>Charge + Transmitting mode.</p> <p>Mode b: Connect the unit return to the charging station under transmitting mode.</p> <p>Only the worst case is recorded in the report.</p>
Instruments Used:	Refer to section 5.10 for details
Test Voltage:	AC120V/60Hz
Test Results:	Pass

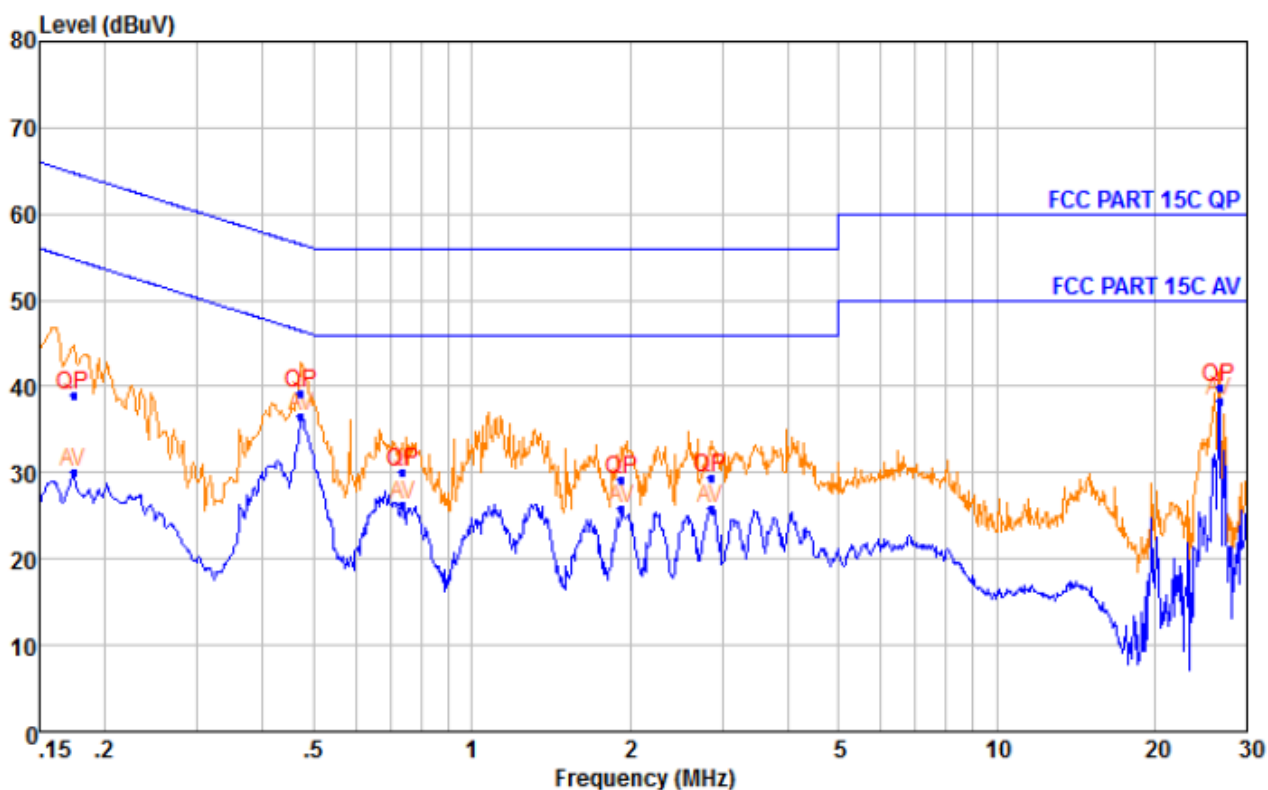
Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

Model No.:HOSL05D

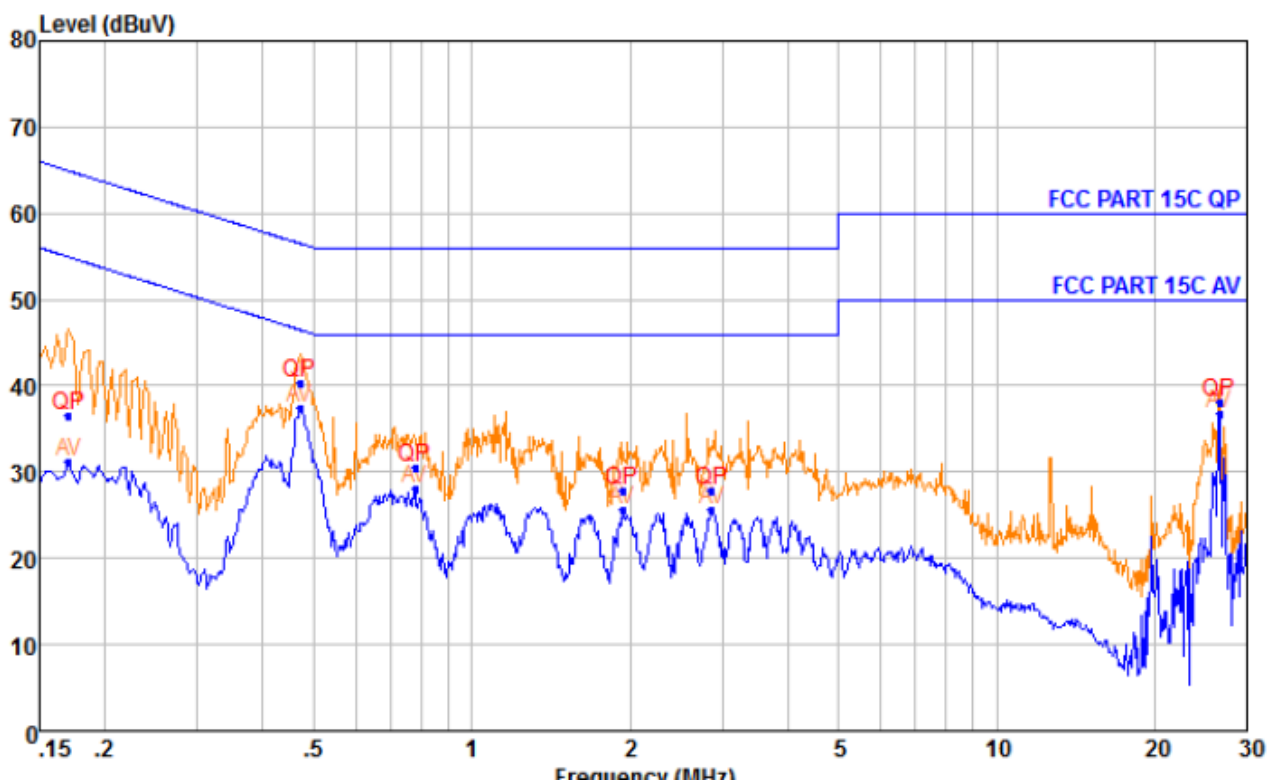
Live Line:



NO.	Freq MHz	Reading dBuV	LISN Factor dB	Cable Loss dB	Measured dBuV	Limit Line dBuV	Over Limit dB	Remark
1	0.174	19.65	10.31	0.02	29.98	54.77	-24.79	Average
2	0.174	28.65	10.31	0.02	38.98	64.77	-25.79	QP
3	0.474	26.04	10.37	0.03	36.44	46.45	-10.01	Average
4	0.474	28.86	10.37	0.03	39.26	56.45	-17.19	QP
5	0.739	16.03	10.33	0.04	26.40	46.00	-19.60	Average
6	0.739	19.79	10.33	0.04	30.16	56.00	-25.84	QP
7	1.928	15.30	10.42	0.07	25.79	46.00	-20.21	Average
8	1.928	18.61	10.42	0.07	29.10	56.00	-26.90	QP
9	2.854	15.27	10.41	0.08	25.76	46.00	-20.24	Average
10	2.854	18.97	10.41	0.08	29.46	56.00	-26.54	QP
11	26.558	27.27	10.84	0.22	38.33	50.00	-11.67	Average
12	26.558	28.81	10.84	0.22	39.87	60.00	-20.13	QP

1: Measured=Reading + LISN Factor + Cable Loss

Neutral Line:



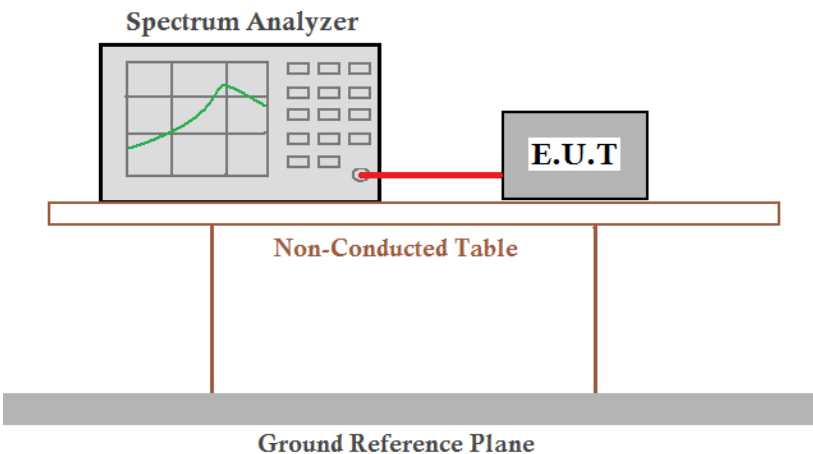
NO.	Freq MHz	Reading dBuV	LISN Factor dB	Cable Loss dB	Measured dBuV	Limit Line dBuV	Over Limit dB	Remark
1	0.170	20.60	10.48	0.02	31.10	54.94	-23.84	Average
2	0.170	25.93	10.48	0.02	36.43	64.94	-28.51	QP
3	0.471	26.97	10.52	0.03	37.52	46.49	-8.97	Average
4	0.471	29.72	10.52	0.03	40.27	56.49	-16.22	QP
5	0.779	17.40	10.62	0.04	28.06	46.00	-17.94	Average
6	0.779	19.98	10.62	0.04	30.64	56.00	-25.36	QP
7	1.939	14.92	10.62	0.07	25.61	46.00	-20.39	Average
8	1.939	17.17	10.62	0.07	27.86	56.00	-28.14	QP
9	2.869	15.00	10.60	0.08	25.68	46.00	-20.32	Average
10	2.869	17.07	10.60	0.08	27.75	56.00	-28.25	QP
11	26.558	25.60	10.97	0.22	36.79	50.00	-13.21	Average
12	26.558	26.83	10.97	0.22	38.02	60.00	-21.98	QP

1: Measured = Reading + LISN Factor + Cable Loss

Notes:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level = Receiver Reading + LISN Factor + Cable Loss.

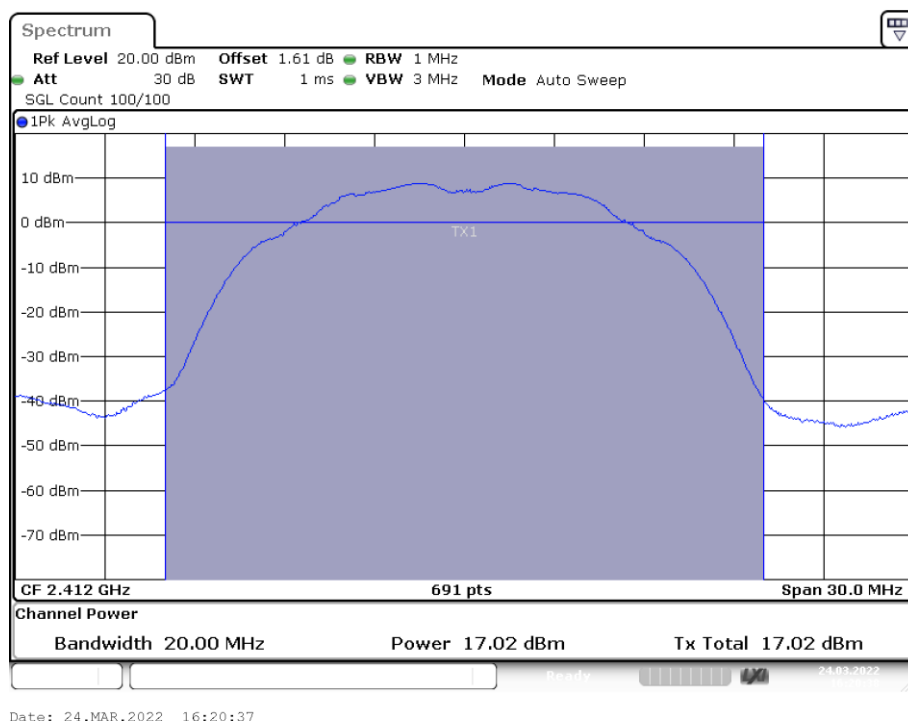
5.3 Conducted Peak Output Power

Test Requirement:	47 CFR Part 15C Section 15.247 (b)(3)
Test Method:	KDB558074 D01 V04
Test Setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer, shown with a green trace on its screen, is connected to an E.U.T. (Equipment Under Test) box by a red cable. Both the Spectrum Analyzer and the E.U.T. are positioned on a table labeled 'Non-Conducted Table'. This table is supported by two vertical legs. Below the table, a horizontal grey bar represents the 'Ground Reference Plane'.</p>
Test Instruments:	Refer to section 5.10 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g ; 6.5Mbps of rate is the worst case of 802.11n(HT20) Only the worst case is recorded in the report.
Limit:	30dBm
Test Results:	Pass

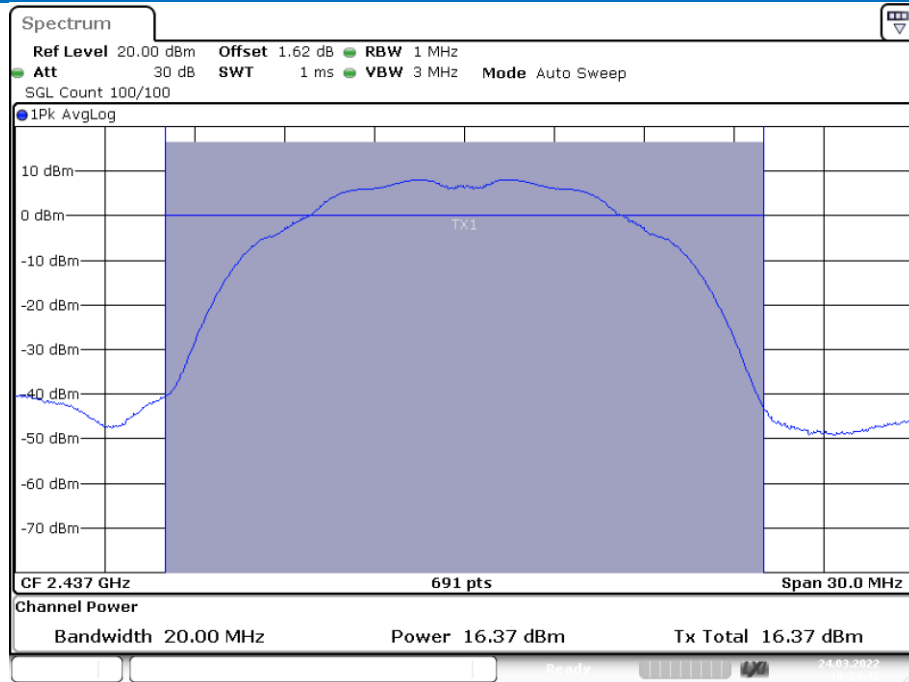
Maximum Conducted Output Power

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Duty Factor (dB)	Total Power (dBm)	Limit (dBm)	Verdict
NVNT	b	2412	Ant1	17.02	0	17.02	30	Pass
NVNT	b	2437	Ant1	16.37	0	16.37	30	Pass
NVNT	b	2462	Ant1	16.38	0	16.38	30	Pass
NVNT	g	2412	Ant1	16.21	0	16.21	30	Pass
NVNT	g	2437	Ant1	16.30	0	16.30	30	Pass
NVNT	g	2462	Ant1	16.21	0	16.21	30	Pass
NVNT	n20	2412	Ant1	16.12	0	16.12	30	Pass
NVNT	n20	2437	Ant1	16.04	0	16.04	30	Pass
NVNT	n20	2462	Ant1	16.05	0	16.05	30	Pass

Test plot as follows:

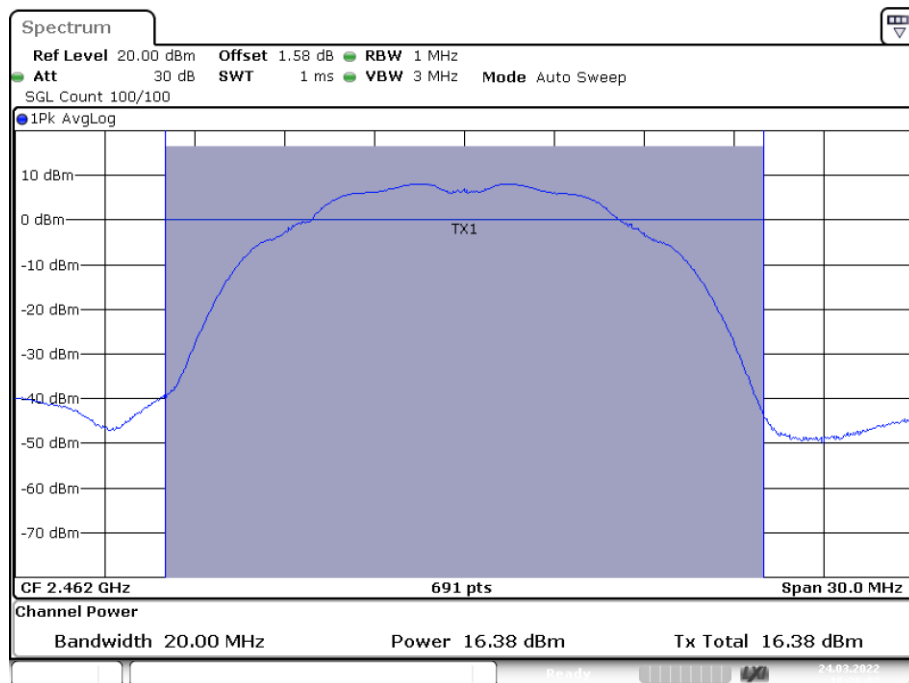


Power NVNT b 2412MHz Ant1



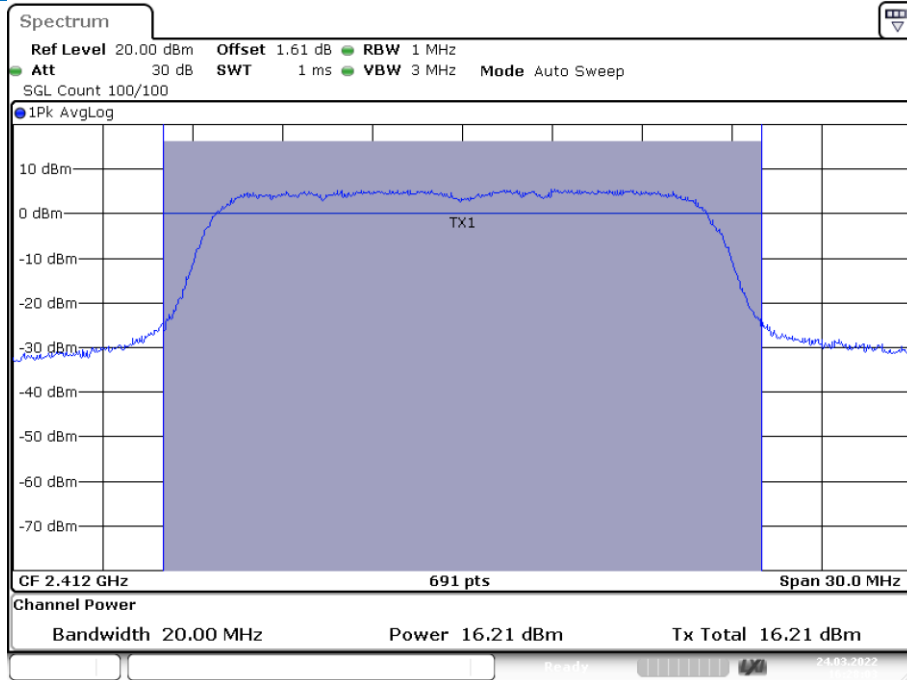
Date: 24.MAR.2022 16:24:41

Power NVNT b 2437MHz Ant1



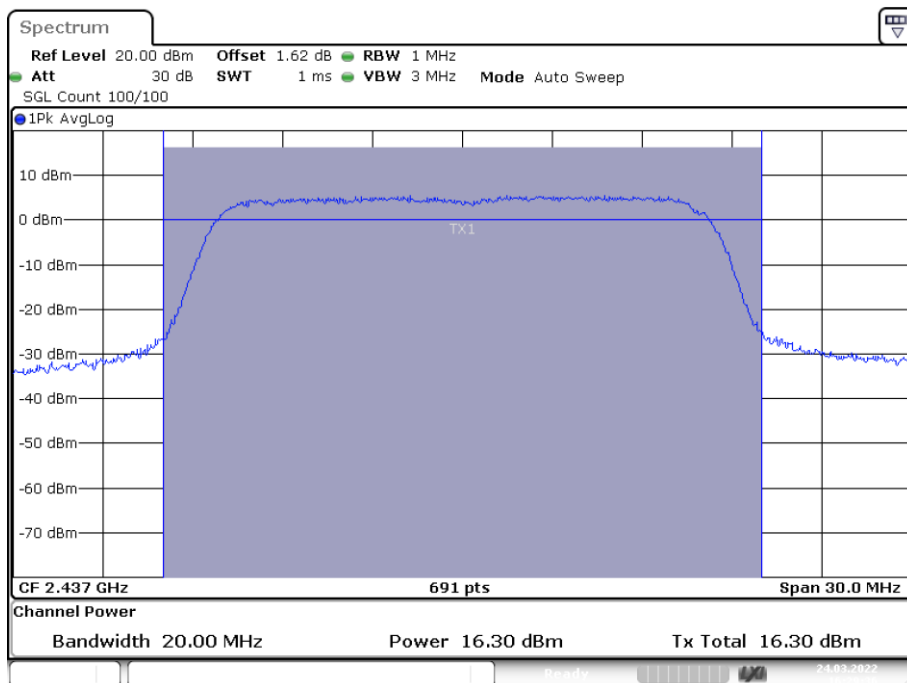
Date: 24.MAR.2022 16:26:03

Power NVNT b 2462MHz Ant1



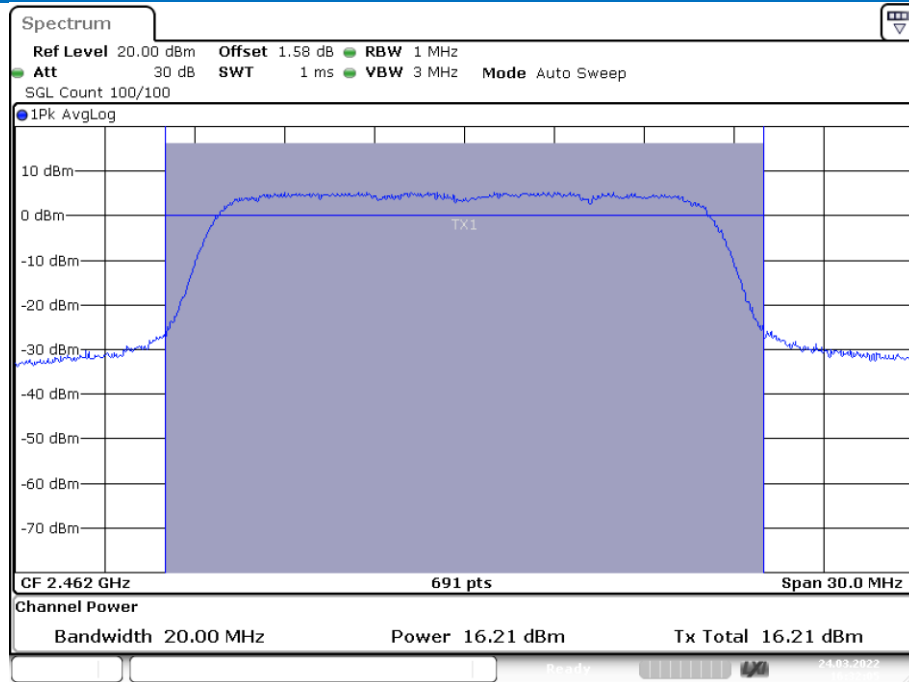
Date: 24.MAR.2022 16:28:03

Power NVNT g 2412MHz Ant1



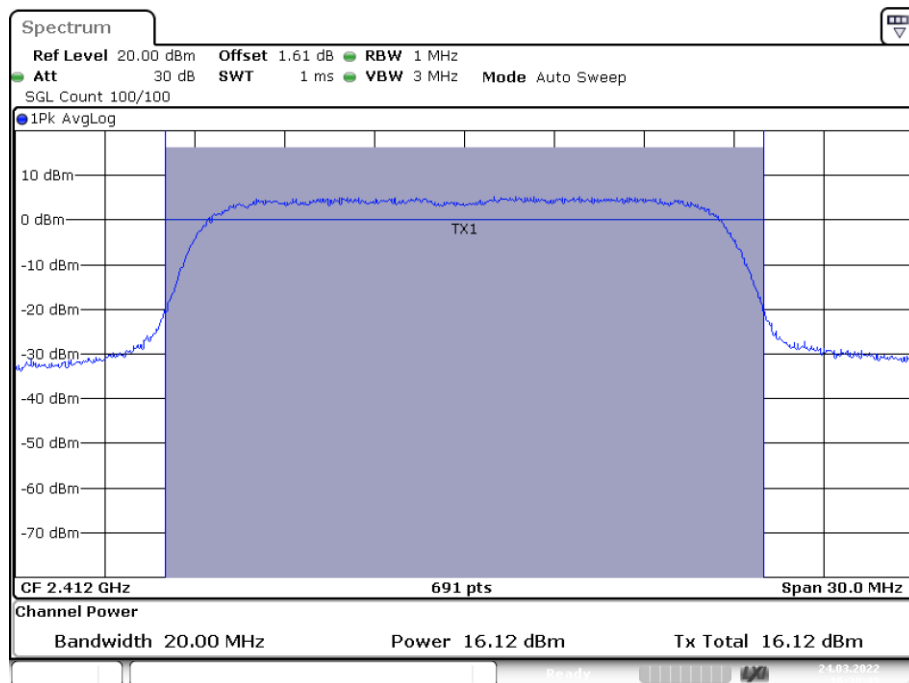
Date: 24.MAR.2022 16:29:36

Power NVNT g 2437MHz Ant1



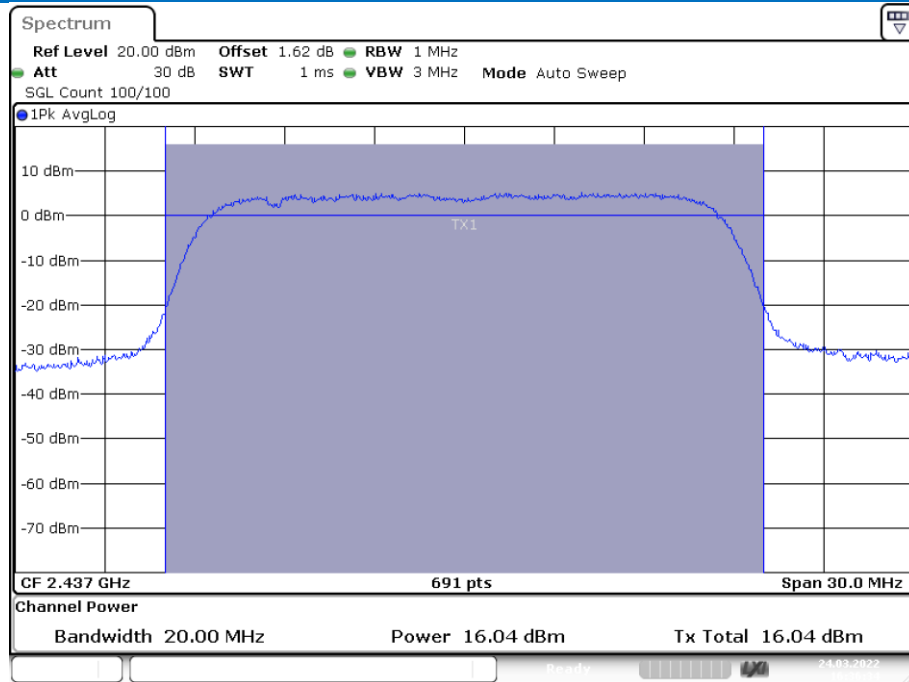
Date: 24.MAR.2022 16:32:05

Power NVNT g 2462MHz Ant1



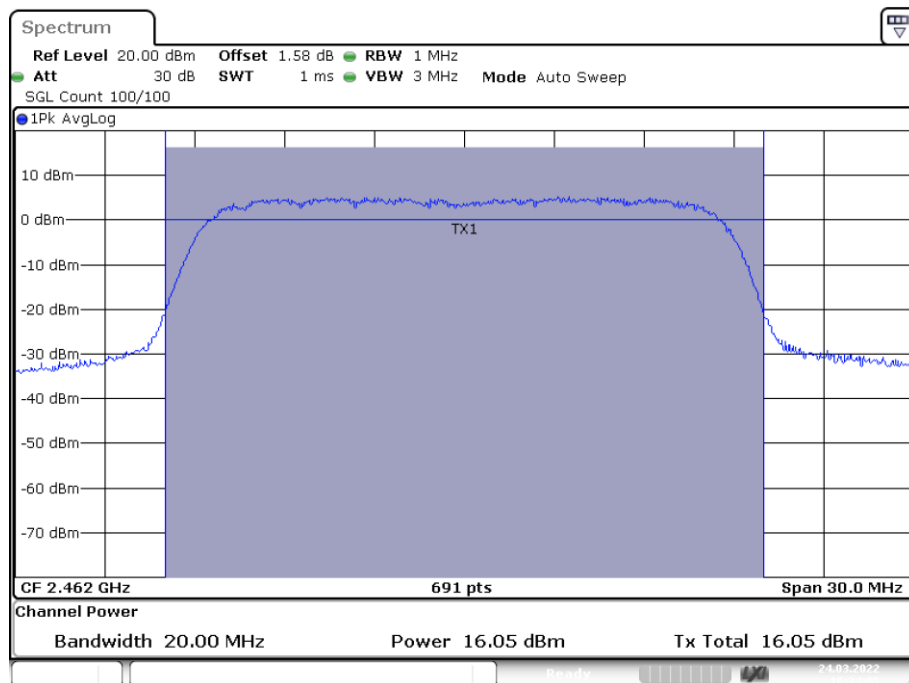
Date: 24.MAR.2022 16:38:49

Power NVNT n20 2412MHz Ant1



Date: 24.MAR.2022 16:36:34

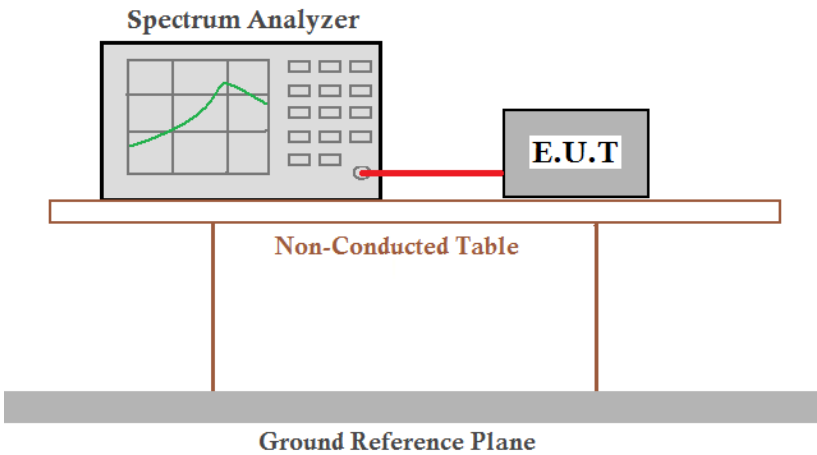
Power NVNT n20 2437MHz Ant1



Date: 24.MAR.2022 16:34:05

Power NVNT n20 2462MHz Ant1

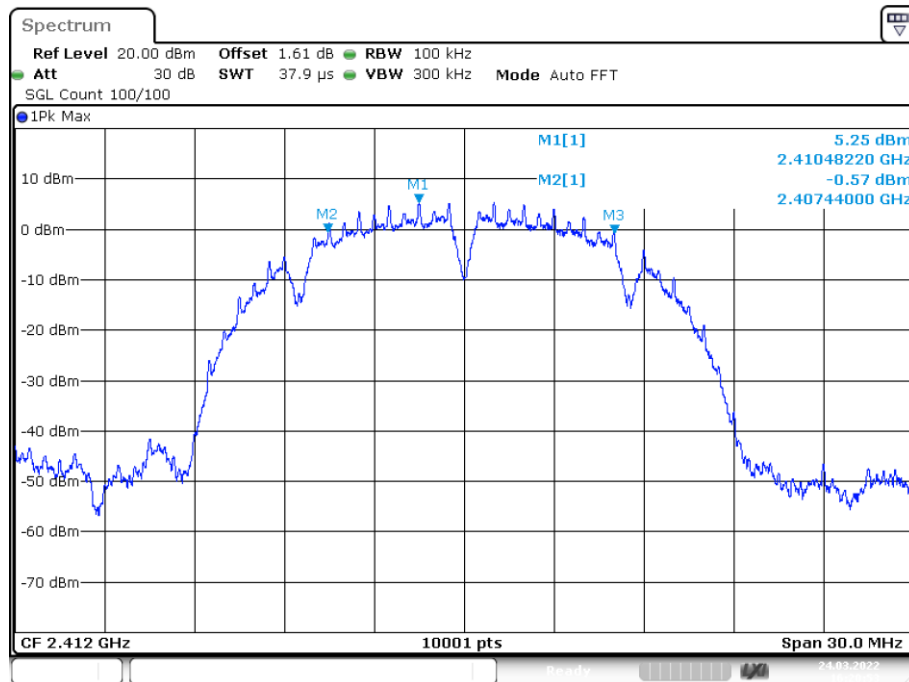
5.4 6dB Occupy Bandwidth

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(2)
Test Method:	KDB558074 D01 V04
Test Setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer, shown with a grid and a green curve, is connected to an E.U.T. (Equipment Under Test) box by a red cable. Both the Spectrum Analyzer and the E.U.T. are positioned on a 'Non-Conducted Table', which is a rectangular platform supported by two vertical legs. Below this table is a 'Ground Reference Plane', represented by a thick grey horizontal bar.</p>
Instruments Used:	Refer to section 5.10 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g ; 6.5Mbps of rate is the worst case of 802.11n(HT20) ;
Limit:	≥ 500 kHz
Test Results:	Pass

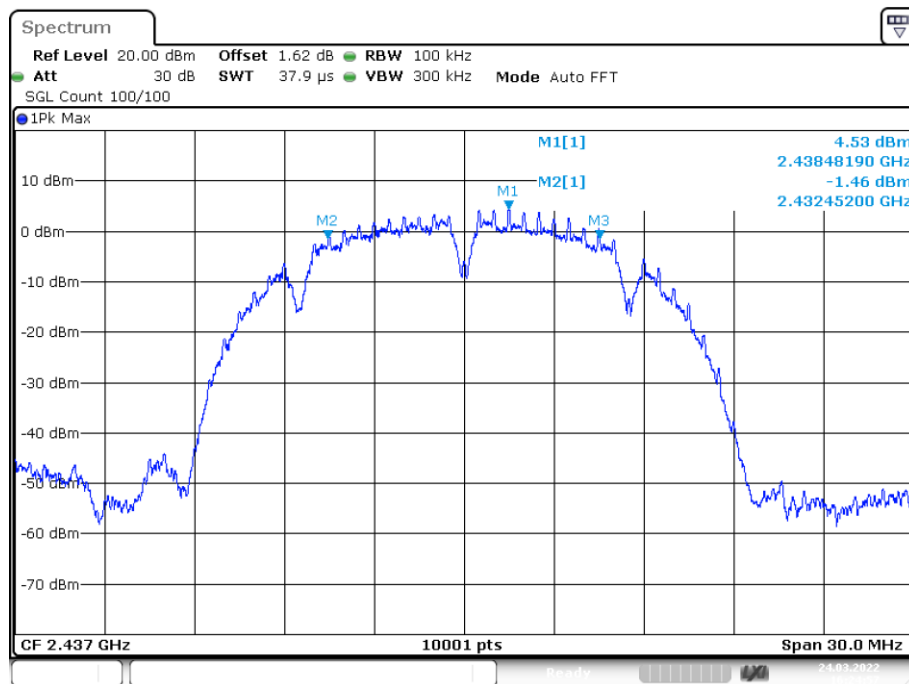
6dB Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	b	2412	Ant1	9.567	0.5	Pass
NVNT	b	2437	Ant1	9.075	0.5	Pass
NVNT	b	2462	Ant1	9.069	0.5	Pass
NVNT	g	2412	Ant1	16.353	0.5	Pass
NVNT	g	2437	Ant1	16.359	0.5	Pass
NVNT	g	2462	Ant1	16.377	0.5	Pass
NVNT	n20	2412	Ant1	17.211	0.5	Pass
NVNT	n20	2437	Ant1	17.037	0.5	Pass
NVNT	n20	2462	Ant1	17.043	0.5	Pass

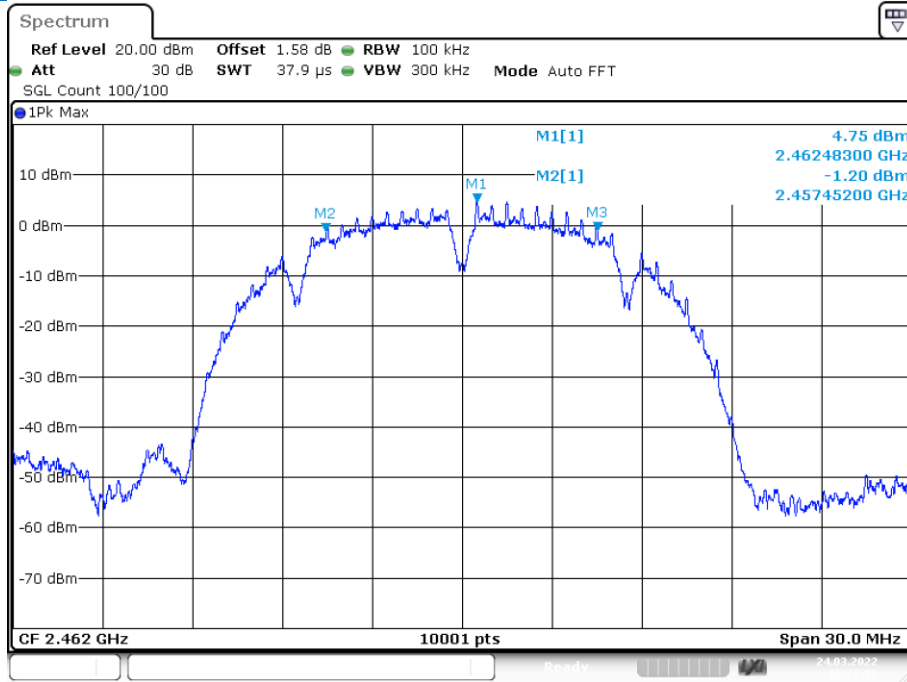
Test plot as follows:



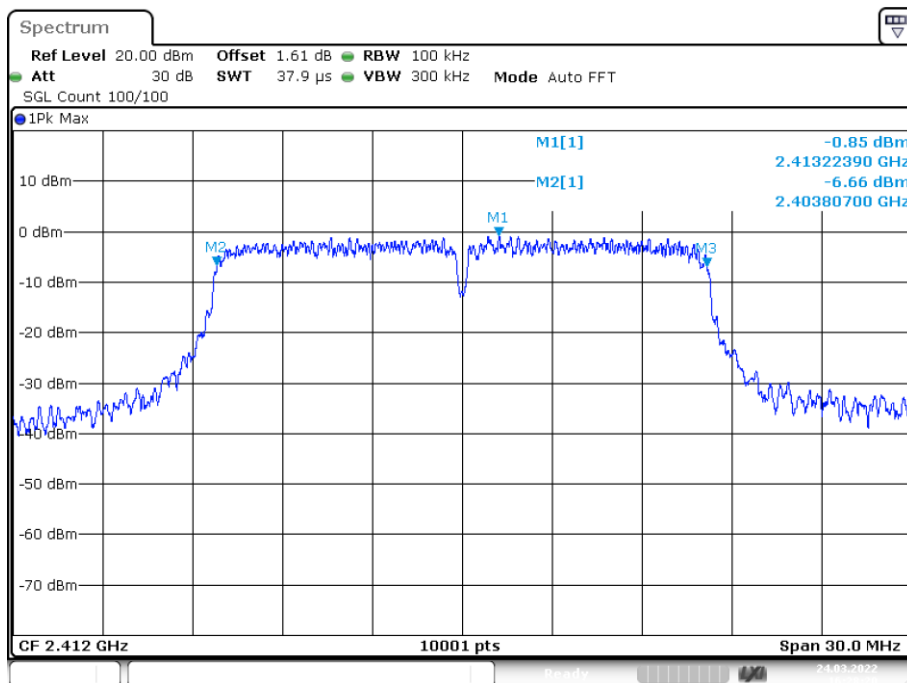
-6dB Bandwidth NVNT b 2412MHz Ant1



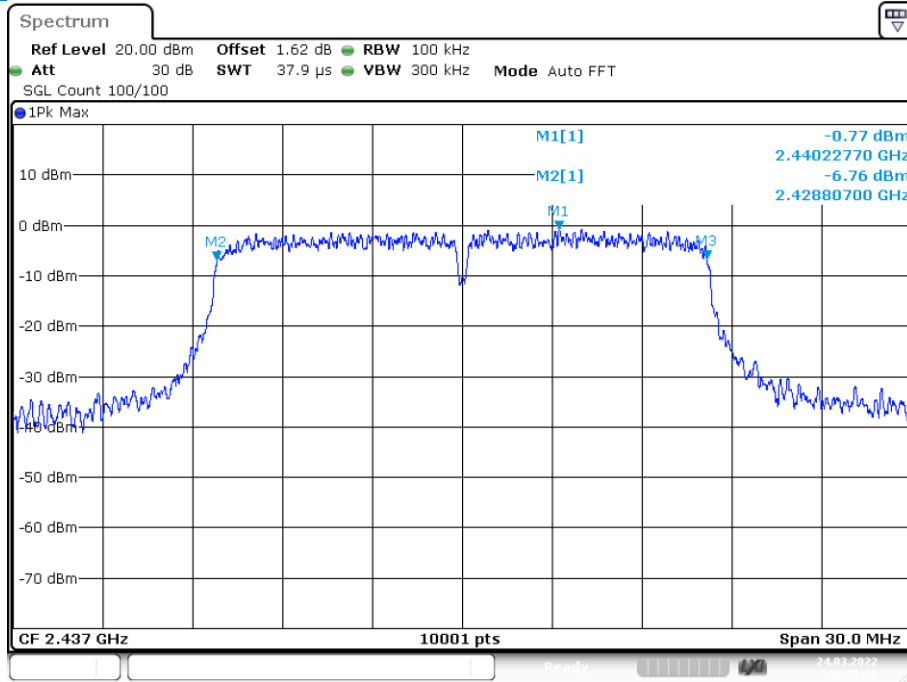
-6dB Bandwidth NVNT b 2437MHz Ant1



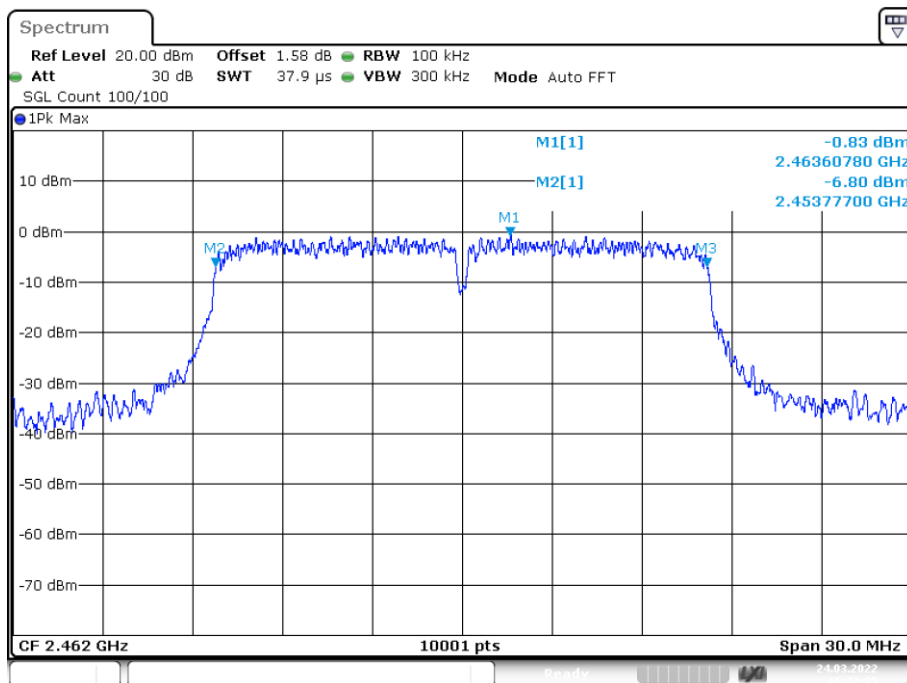
-6dB Bandwidth NVNT b 2462MHz Ant1



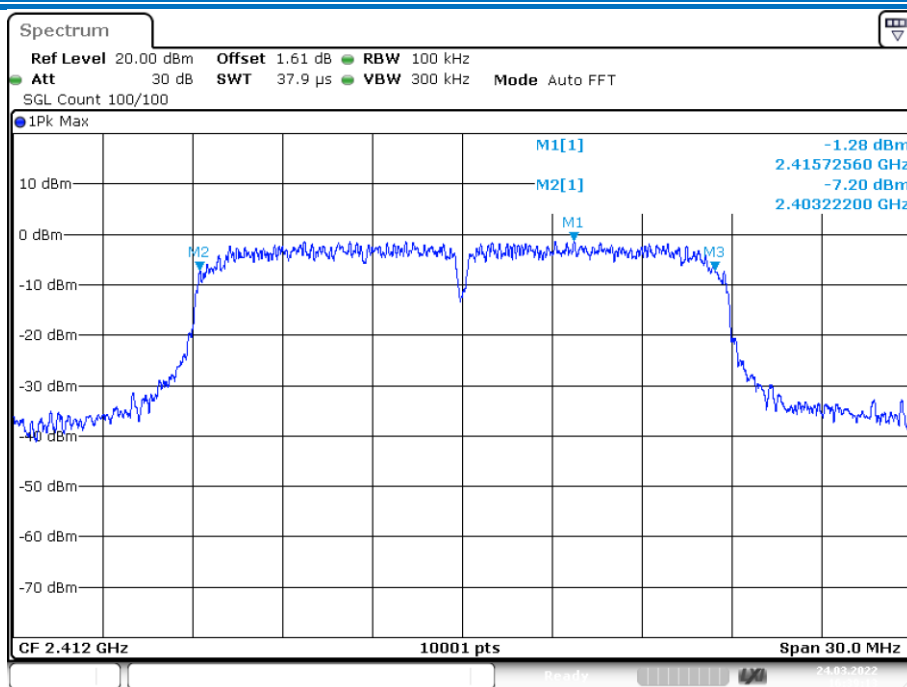
-6dB Bandwidth NVNT g 2412MHz Ant1



-6dB Bandwidth NVNT g 2437MHz Ant1

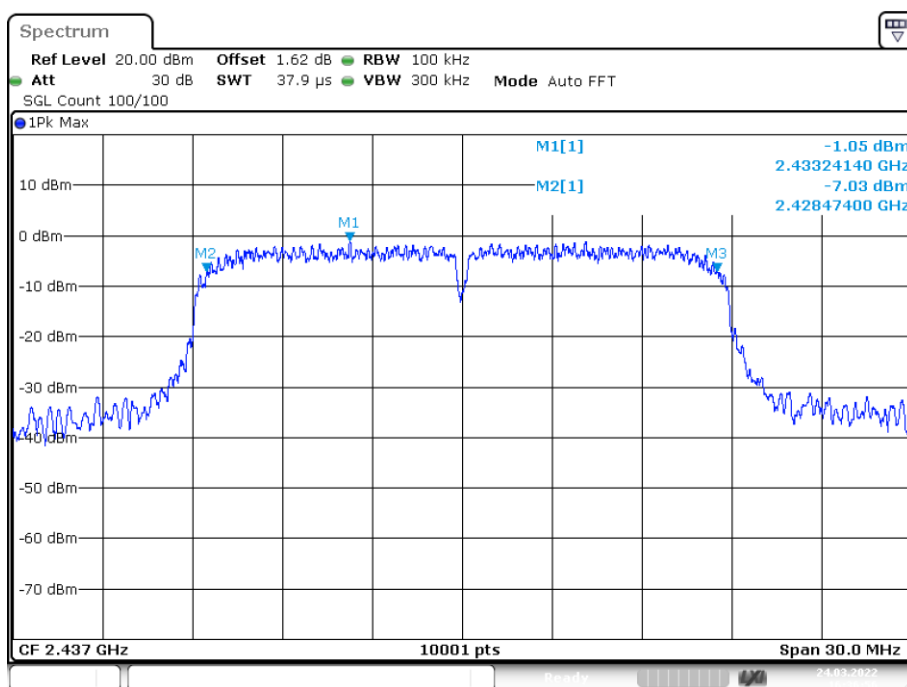


-6dB Bandwidth NVNT g 2462MHz Ant1



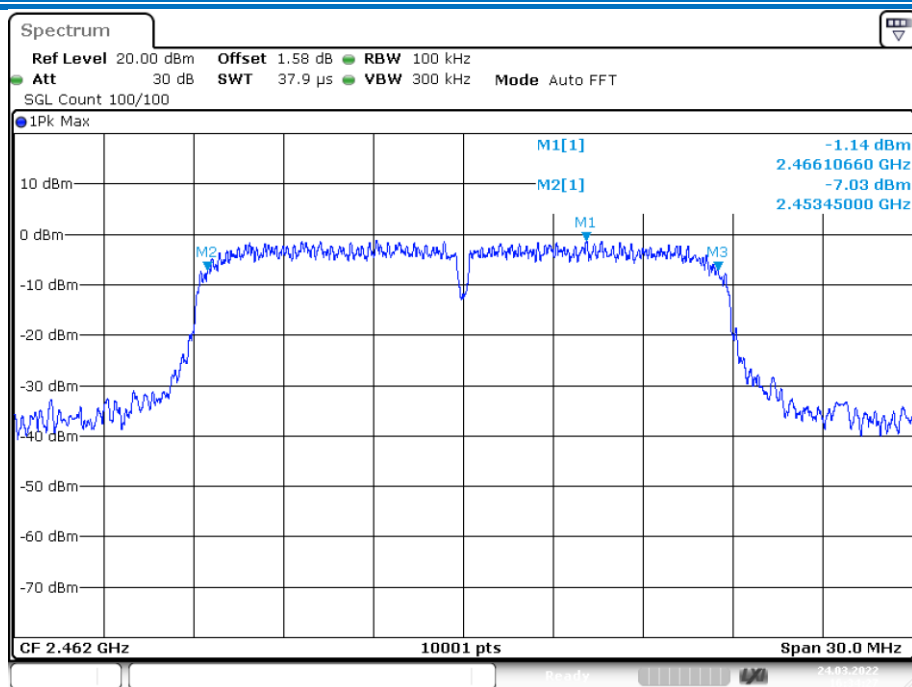
Date: 24.MAR.2022 16:39:13

-6dB Bandwidth NVNT n20 2412MHz Ant1



Date: 24.MAR.2022 16:36:56

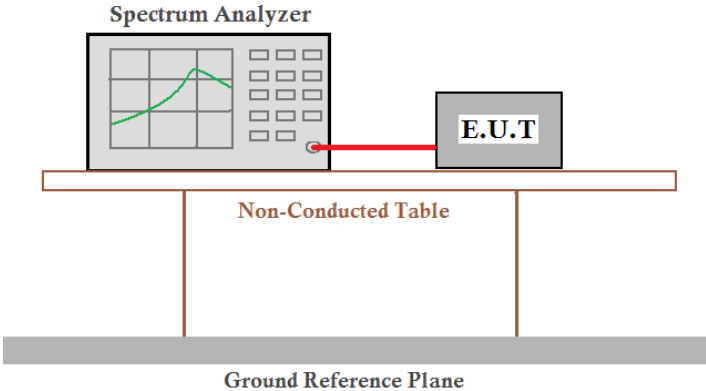
-6dB Bandwidth NVNT n20 2437MHz Ant1



Date: 24.MAR.2022 16:34:27

-6dB Bandwidth NVNT n20 2462MHz Ant1

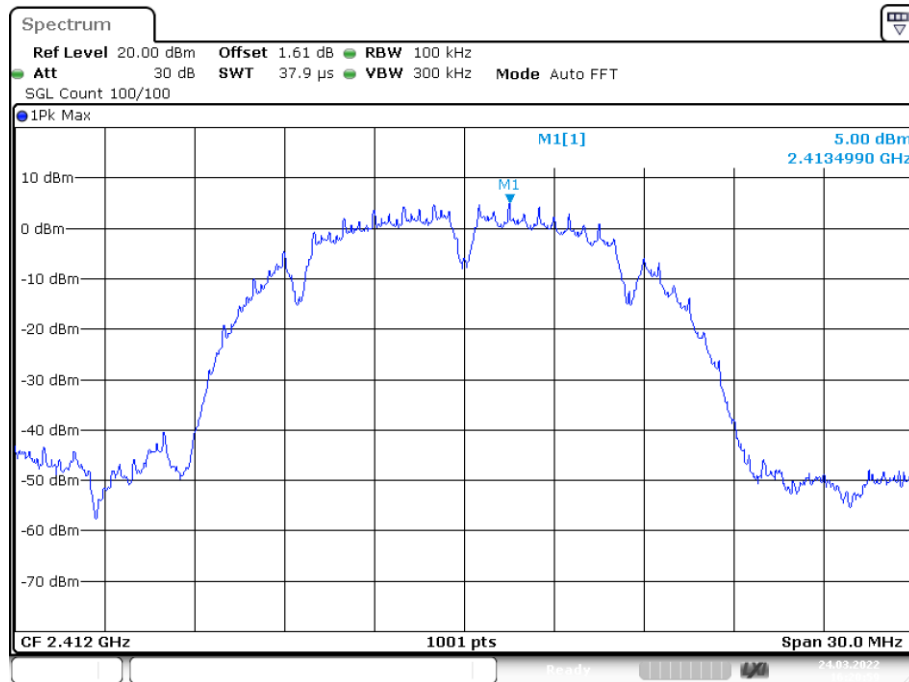
5.5 Power Spectral Density

Test Requirement:	47 CFR Part 15C Section 15.247 (e)
Test Method:	KDB558074 D01 V04
Test Setup:	 <p><i>Remark:</i> Offset the High-Frequency cable loss 1.5dB in the spectrum analyzer.</p>
Test Instruments:	Refer to section 5.10 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g ; 6.5Mbps of rate is the worst case of 802.11n(HT20) ;
Limit:	$\leq 8.00\text{dBm}/3\text{kHz}$
Test Results:	Pass

Maximum Power Spectral Density Level

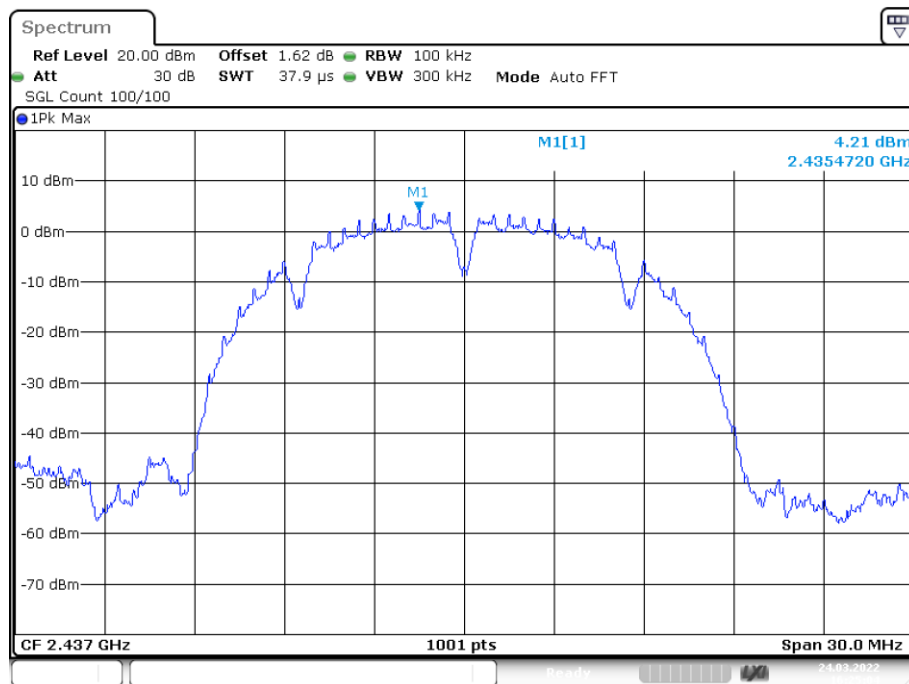
Condition	Mode	Frequency (MHz)	Antenna	Max PSD (dBm)	Limit (dBm/3KHz)	Verdict
NVNT	b	2412	Ant1	5.003	8	Pass
NVNT	b	2437	Ant1	4.207	8	Pass
NVNT	b	2462	Ant1	4.415	8	Pass
NVNT	g	2412	Ant1	-0.844	8	Pass
NVNT	g	2437	Ant1	-0.564	8	Pass
NVNT	g	2462	Ant1	-0.736	8	Pass
NVNT	n20	2412	Ant1	-1.172	8	Pass
NVNT	n20	2437	Ant1	1.982	8	Pass
NVNT	n20	2462	Ant1	-0.34	8	Pass

Test plot as follows:



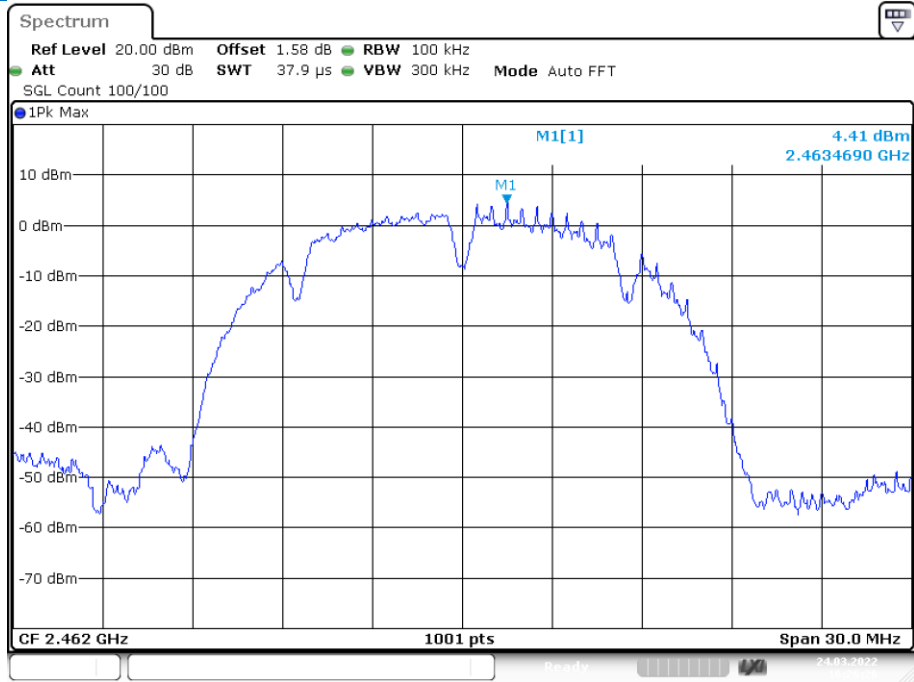
Date: 24.MAR.2022 16:20:59

PSD NVNT b 2412MHz Ant1



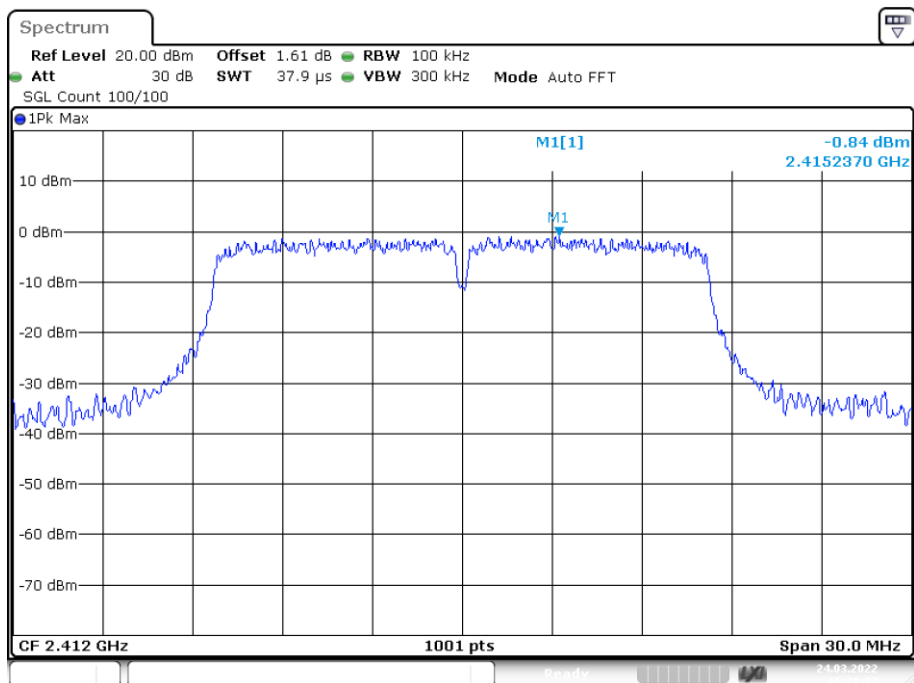
Date: 24.MAR.2022 16:25:04

PSD NVNT b 2437MHz Ant1



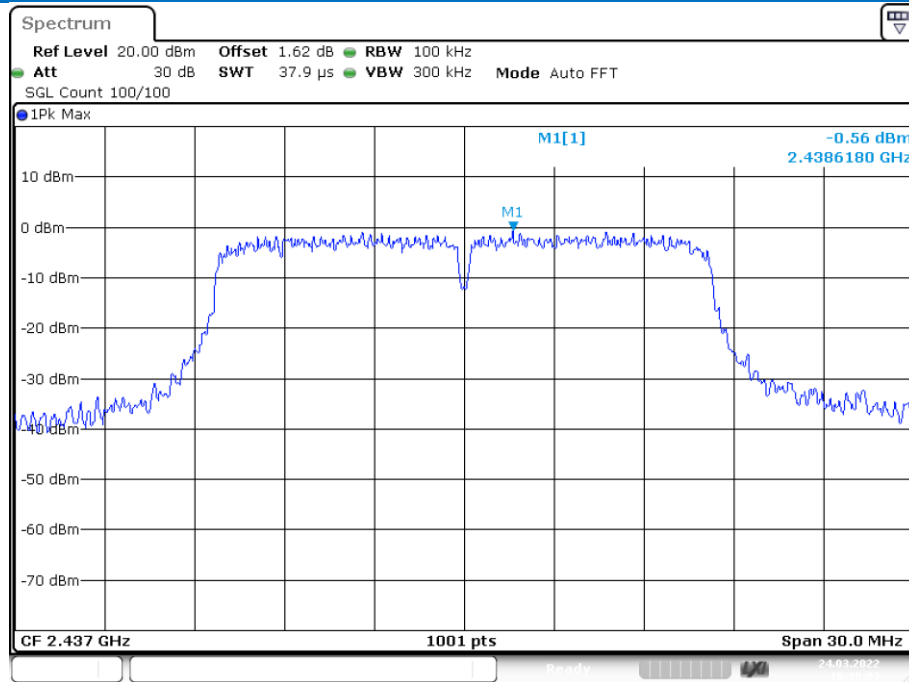
Date: 24.MAR.2022 16:26:26

PSD NVNT b 2462MHz Ant1

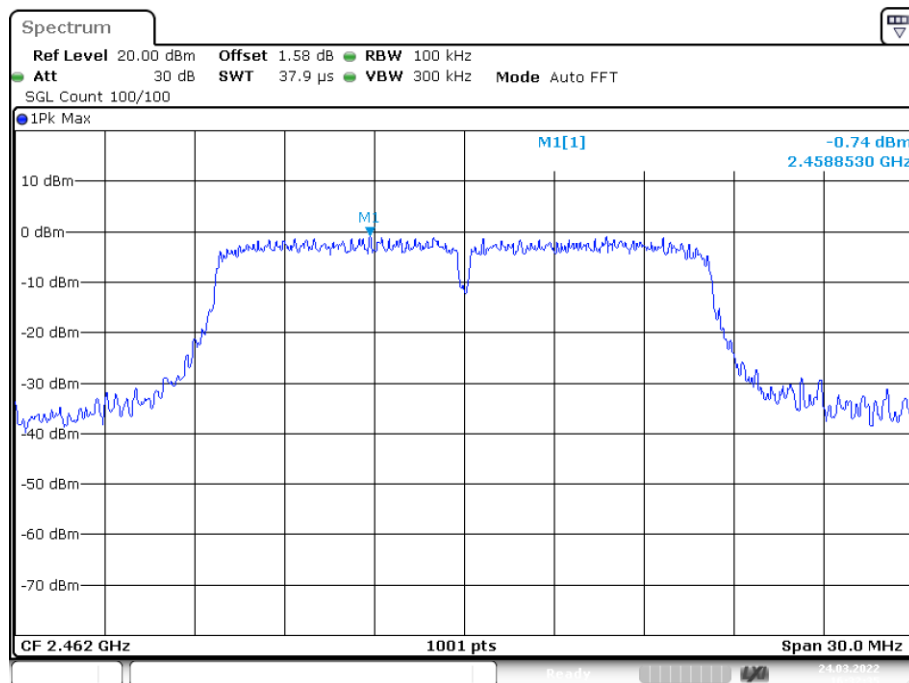


Date: 24.MAR.2022 16:28:27

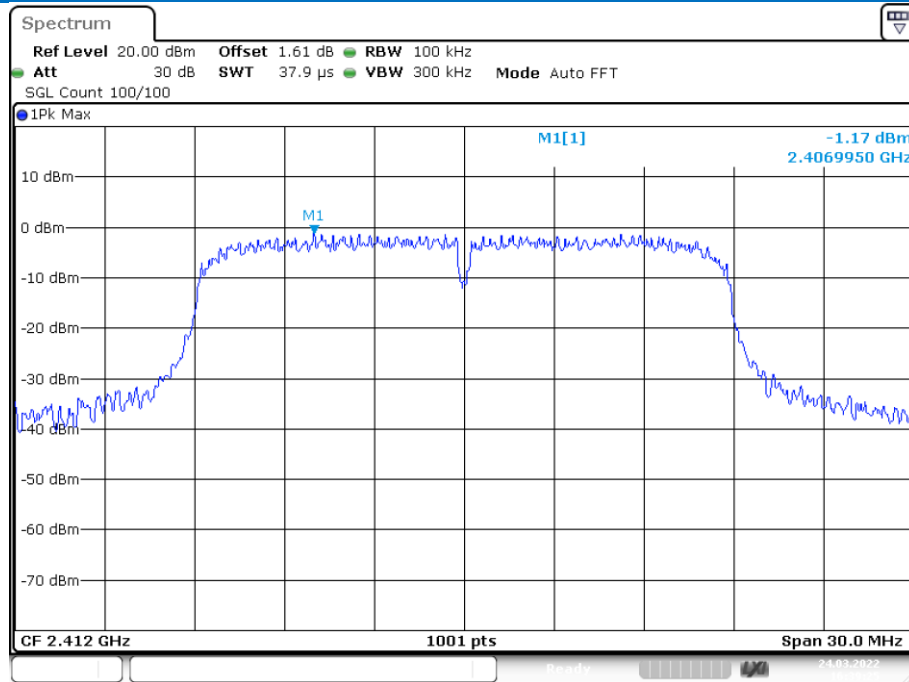
PSD NVNT g 2412MHz Ant1



PSD NVNT g 2437MHz Ant1

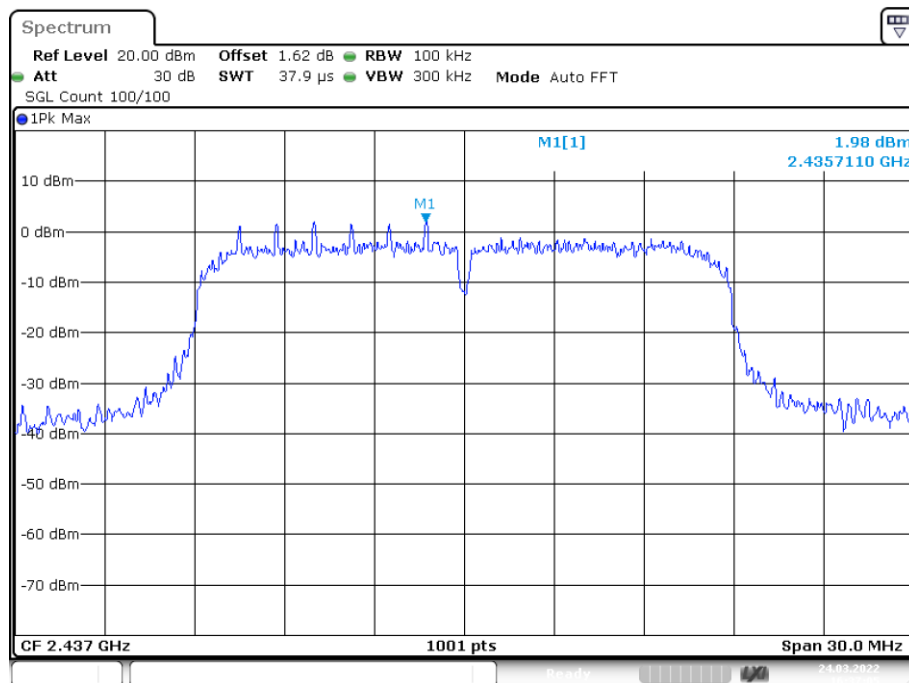


PSD NVNT g 2462MHz Ant1



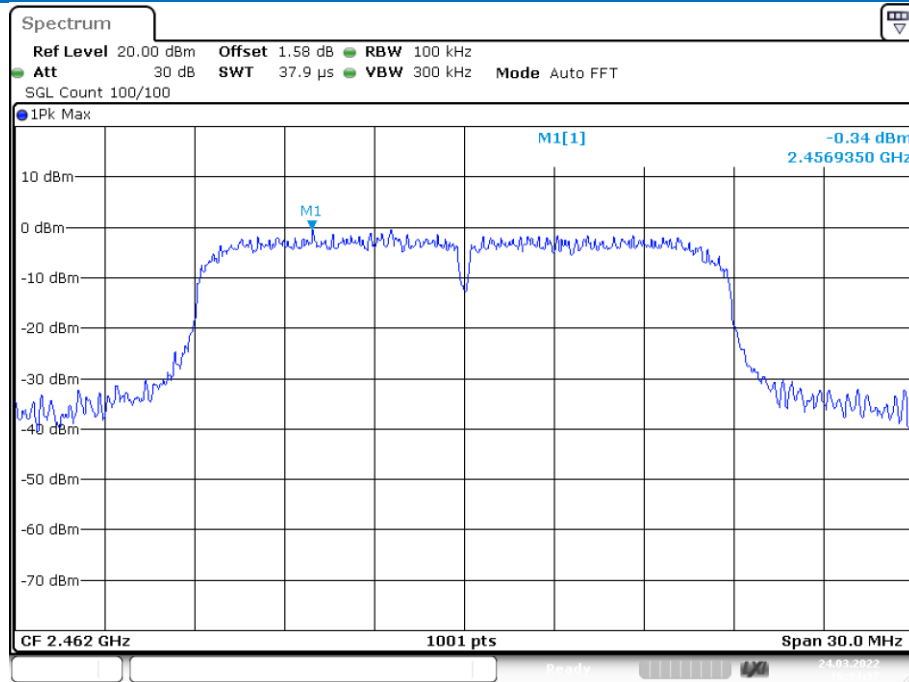
Date: 24.MAR.2022 16:39:25

PSD NVNT n20 2412MHz Ant1



Date: 24.MAR.2022 16:37:05

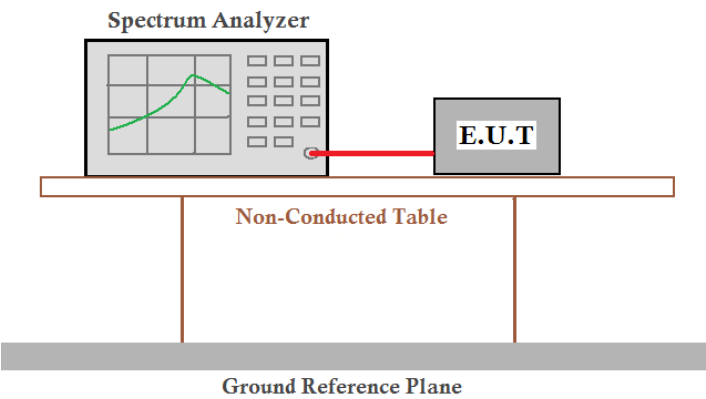
PSD NVNT n20 2437MHz Ant1



Date: 24.MAR.2022 16:34:38

PSD NVNT n20 2462MHz Ant1

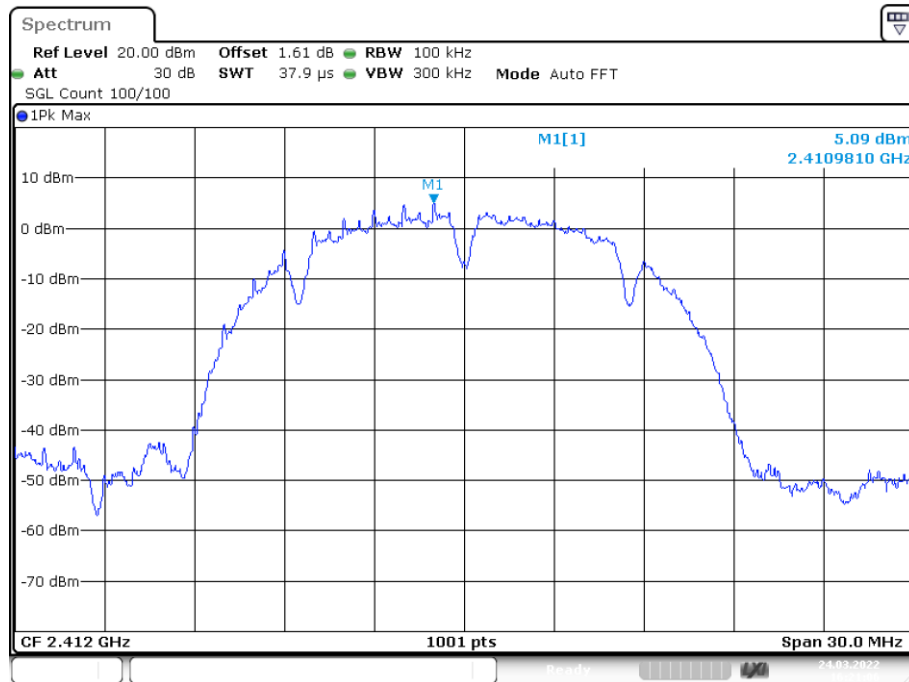
5.6 Band-edge for RF Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	KDB558074 D01 V04
Test Setup:	 <p><i>Remark:</i> Offset the High-Frequency cable loss 1.5dB in the spectrum analyzer.</p>
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g ; 6.5Mbps of rate is the worst case of 802.11n(HT20) ;
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass

Band Edge

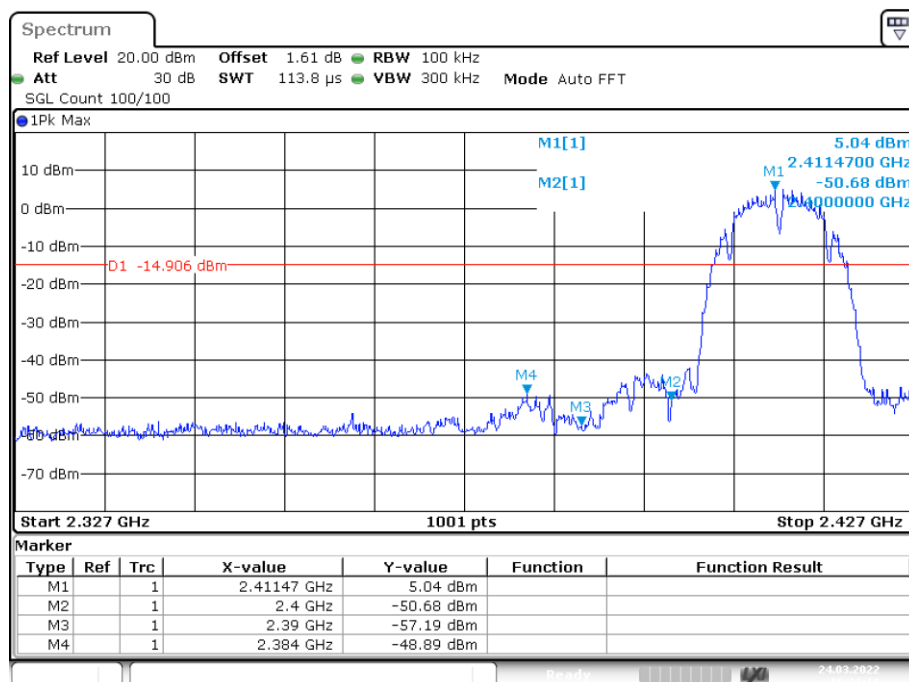
Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	b	2412	Ant1	-53.98	-20	Pass
NVNT	b	2462	Ant1	-56.62	-20	Pass
NVNT	g	2412	Ant1	-41.57	-20	Pass
NVNT	g	2462	Ant1	-42.43	-20	Pass
NVNT	n20	2412	Ant1	-41.39	-20	Pass
NVNT	n20	2462	Ant1	-38.35	-20	Pass

Test plot as follows:



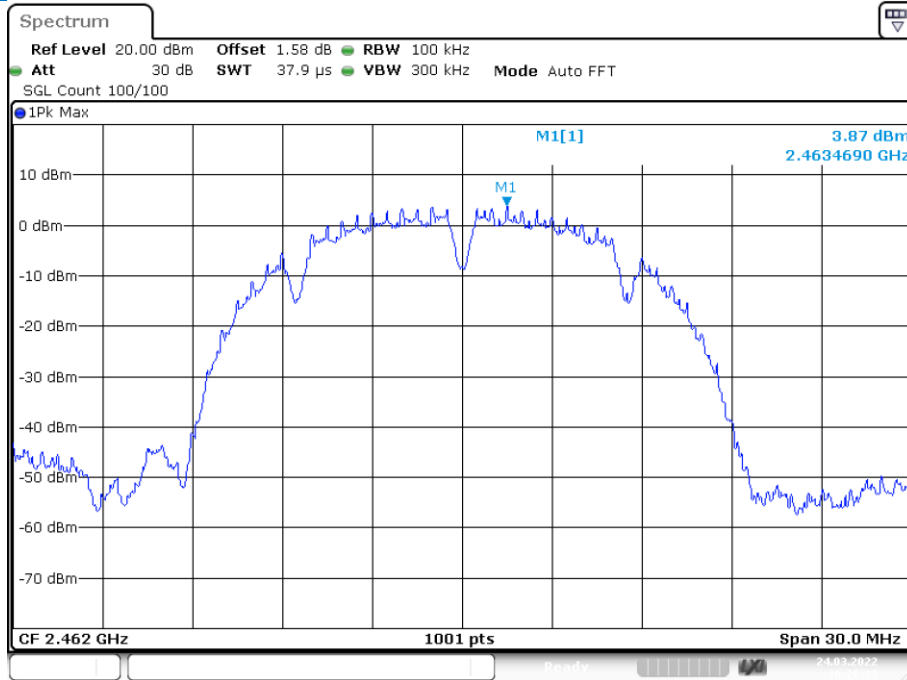
Date: 24.MAR.2022 16:21:05

Band Edge NVNT b 2412MHz Ant1 Ref



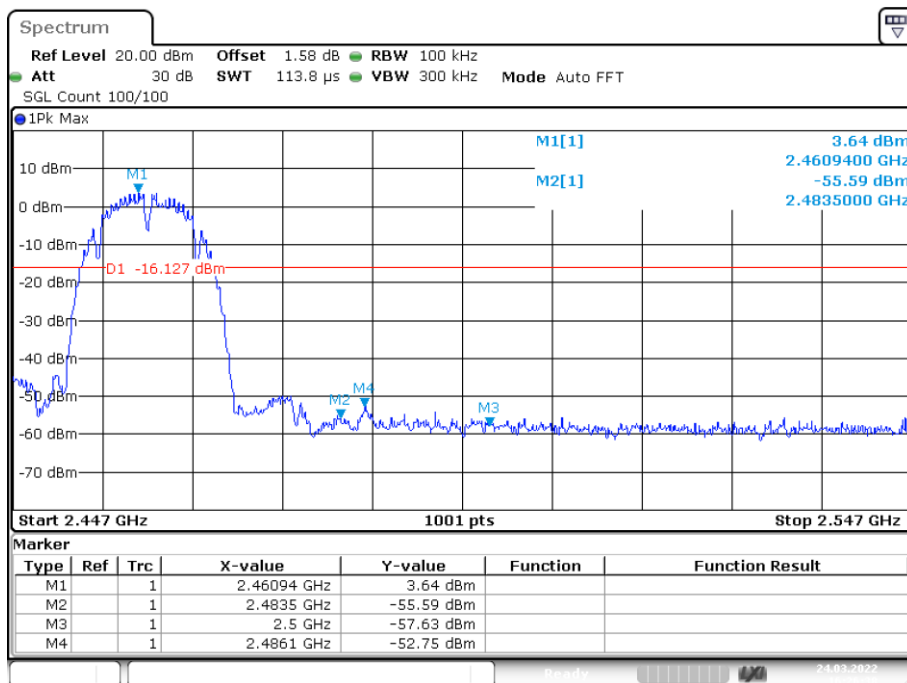
Date: 24.MAR.2022 16:21:11

Band Edge NVNT b 2412MHz Ant1 Emission



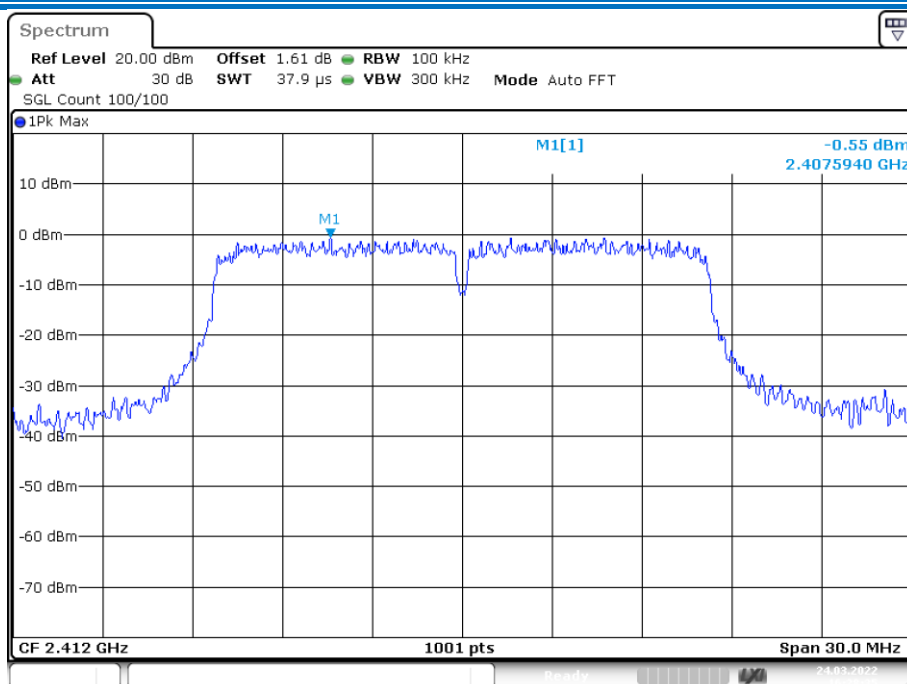
Date: 24.MAR.2022 16:26:33

Band Edge NVNT b 2462MHz Ant1 Ref



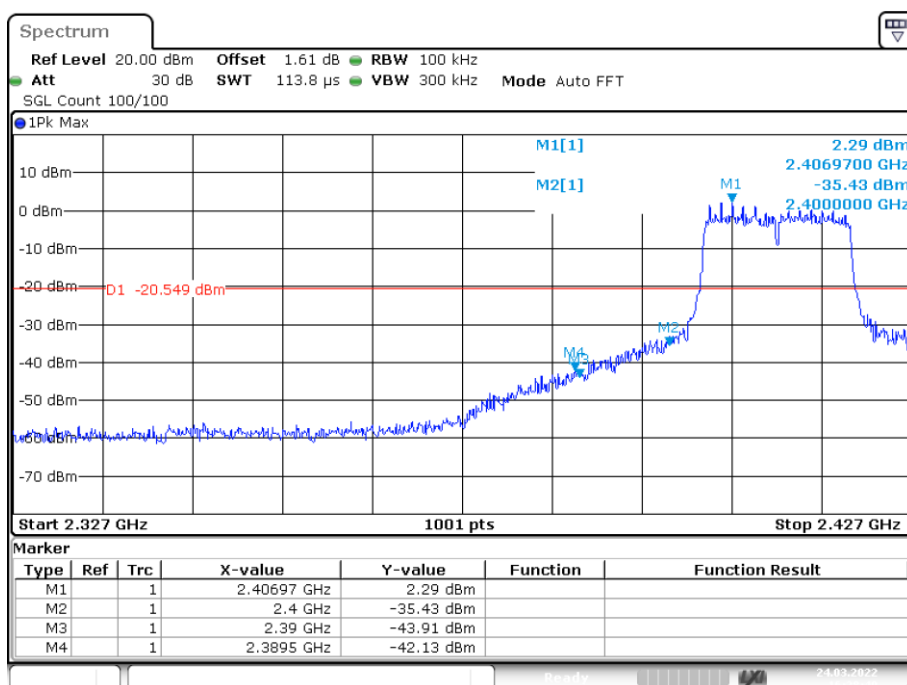
Date: 24.MAR.2022 16:26:38

Band Edge NVNT b 2462MHz Ant1 Emission



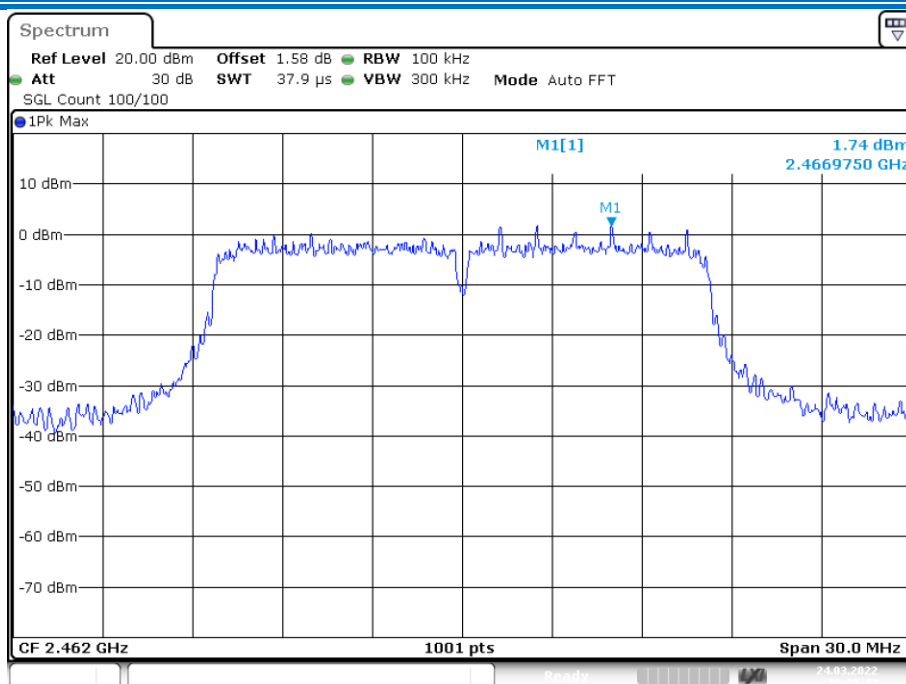
Date: 24.MAR.2022 16:28:34

Band Edge NVNT g 2412MHz Ant1 Ref



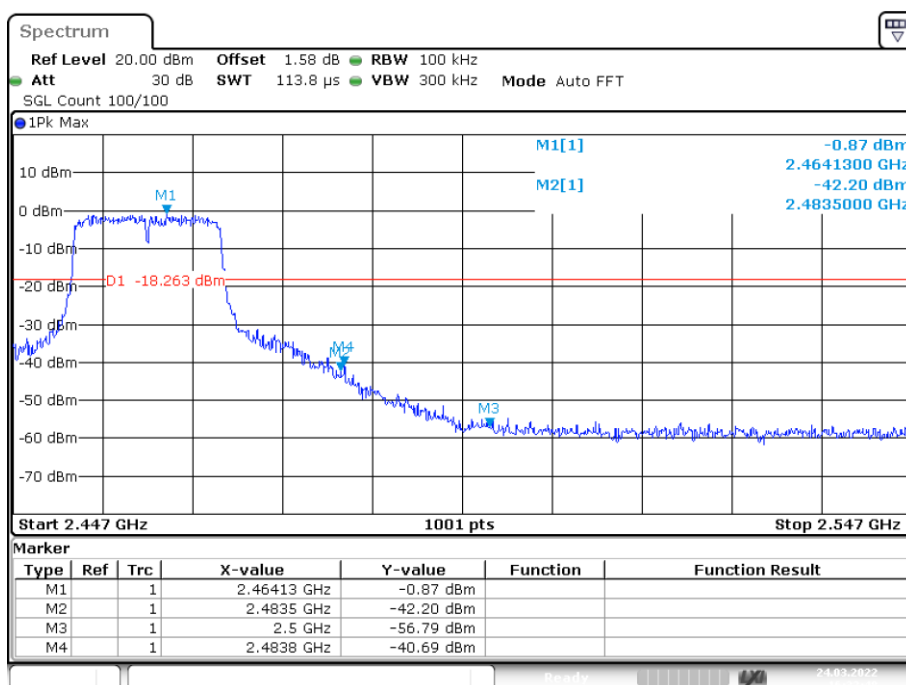
Date: 24.MAR.2022 16:28:39

Band Edge NVNT g 2412MHz Ant1 Emission



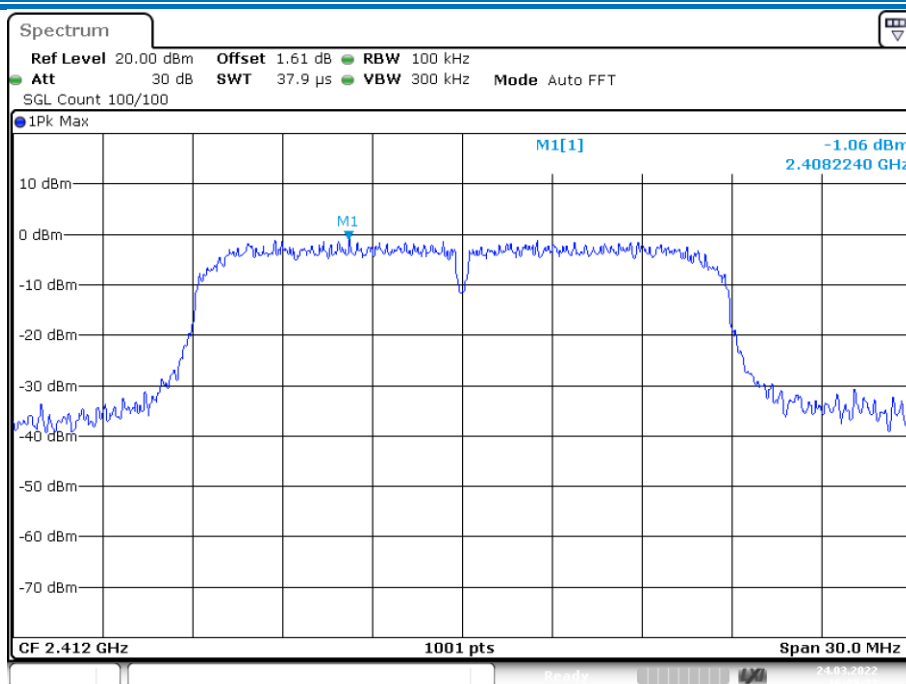
Date: 24.MAR.2022 16:32:42

Band Edge NVNT g 2462MHz Ant1 Ref



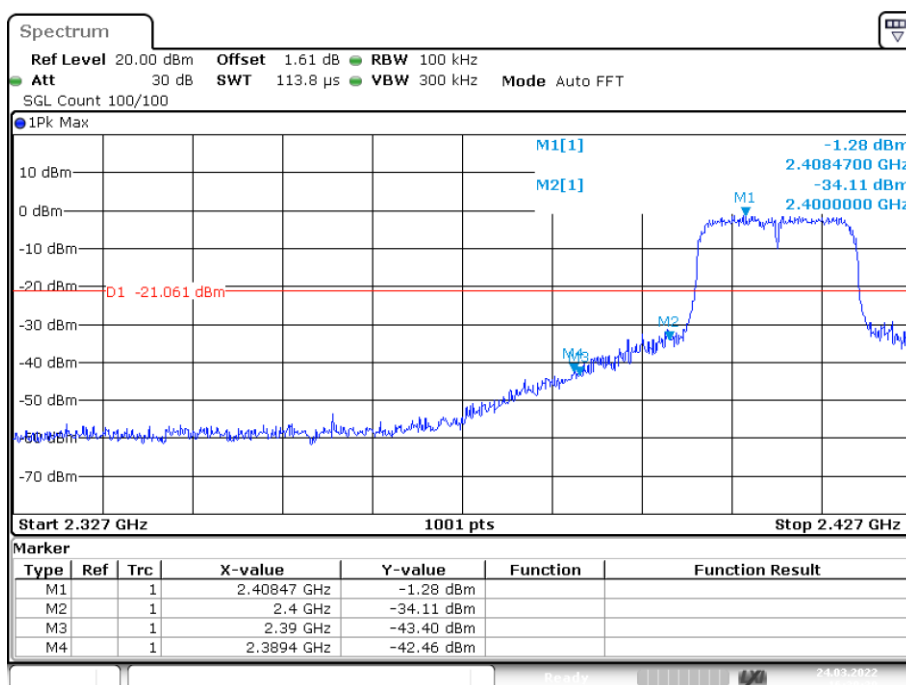
Date: 24.MAR.2022 16:32:47

Band Edge NVNT g 2462MHz Ant1 Emission



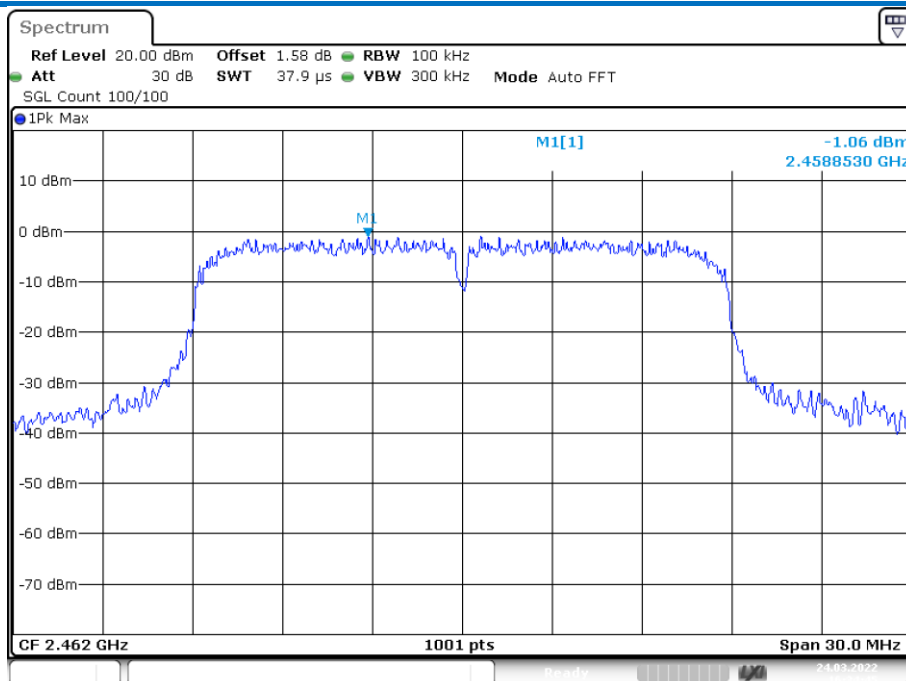
Date: 24.MAR.2022 16:39:34

Band Edge NVNT n20 2412MHz Ant1 Ref



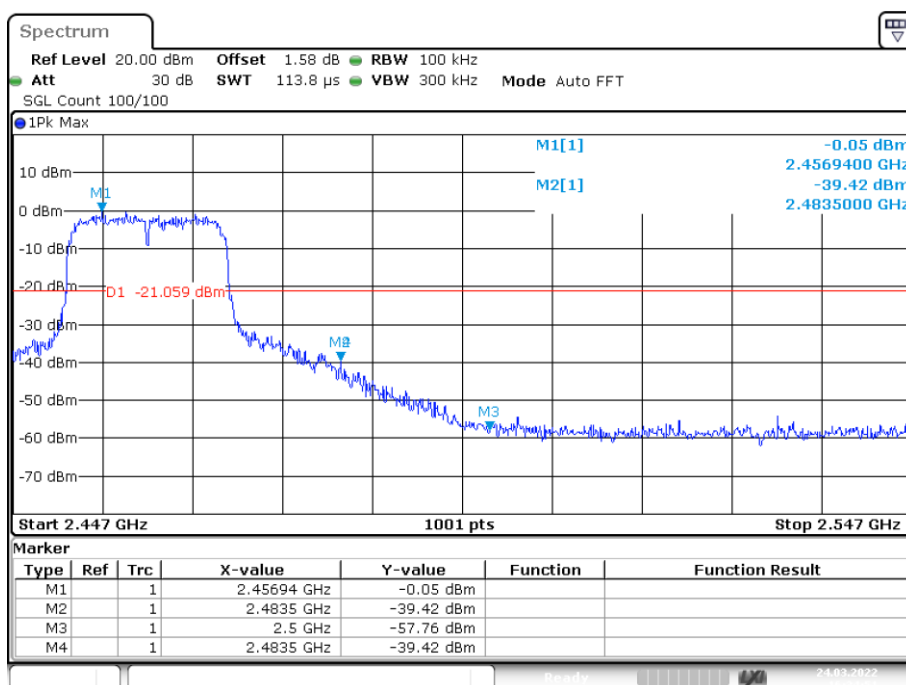
Date: 24.MAR.2022 16:39:39

Band Edge NVNT n20 2412MHz Ant1 Emission



Date: 24.MAR.2022 16:34:46

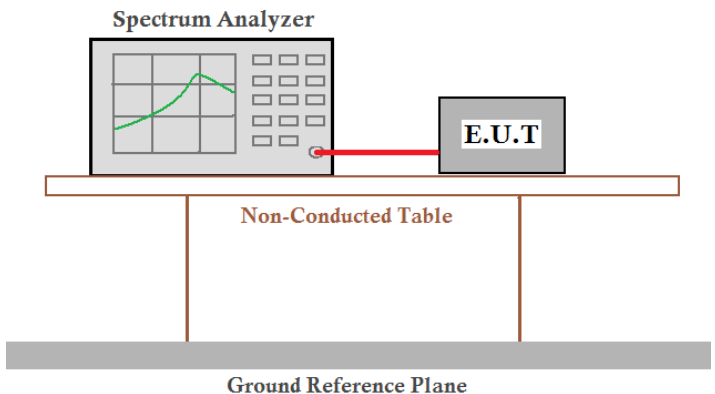
Band Edge NVNT n20 2462MHz Ant1 Ref



Date: 24.MAR.2022 16:34:51

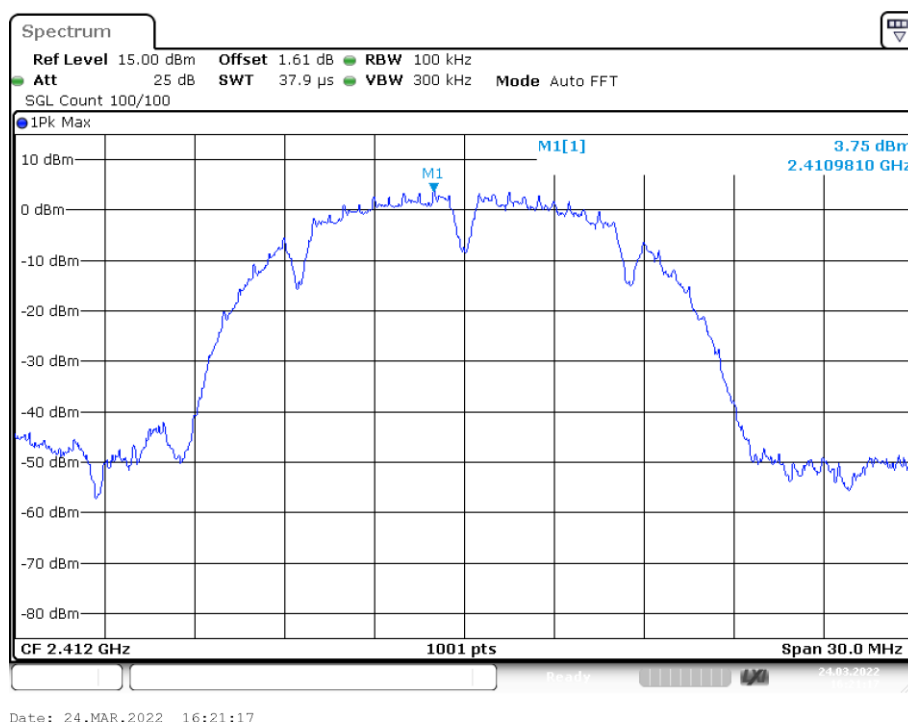
Band Edge NVNT n20 2462MHz Ant1 Emission

5.7 RF Conducted Spurious Emissions

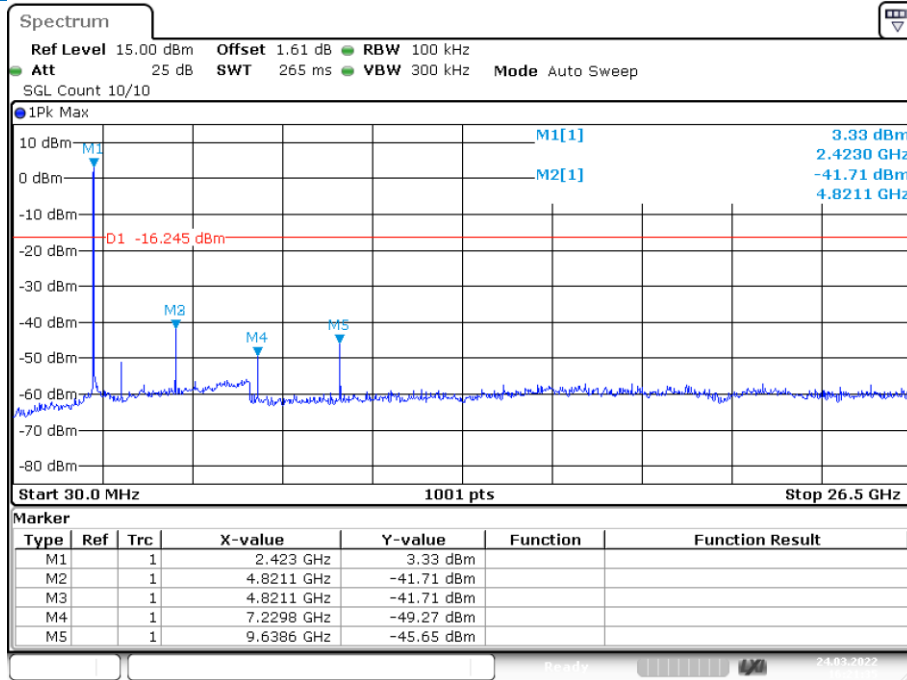
Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	KDB558074 D01 V04
Test Setup:	 <p><i>Remark:</i> Offset the High-Frequency cable loss 1.5dB in the spectrum analyzer.</p>
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g ; 6.5Mbps of rate is the worst case of 802.11n(HT20) ;
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass

Test plot as follows:

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	b	2412	Ant1	-45.46	-20	Pass
NVNT	b	2437	Ant1	-45.51	-20	Pass
NVNT	b	2462	Ant1	-48.73	-20	Pass
NVNT	g	2412	Ant1	-50.49	-20	Pass
NVNT	g	2437	Ant1	-48.5	-20	Pass
NVNT	g	2462	Ant1	-48.28	-20	Pass
NVNT	n20	2412	Ant1	-49.58	-20	Pass
NVNT	n20	2437	Ant1	-51.29	-20	Pass
NVNT	n20	2462	Ant1	-48.57	-20	Pass

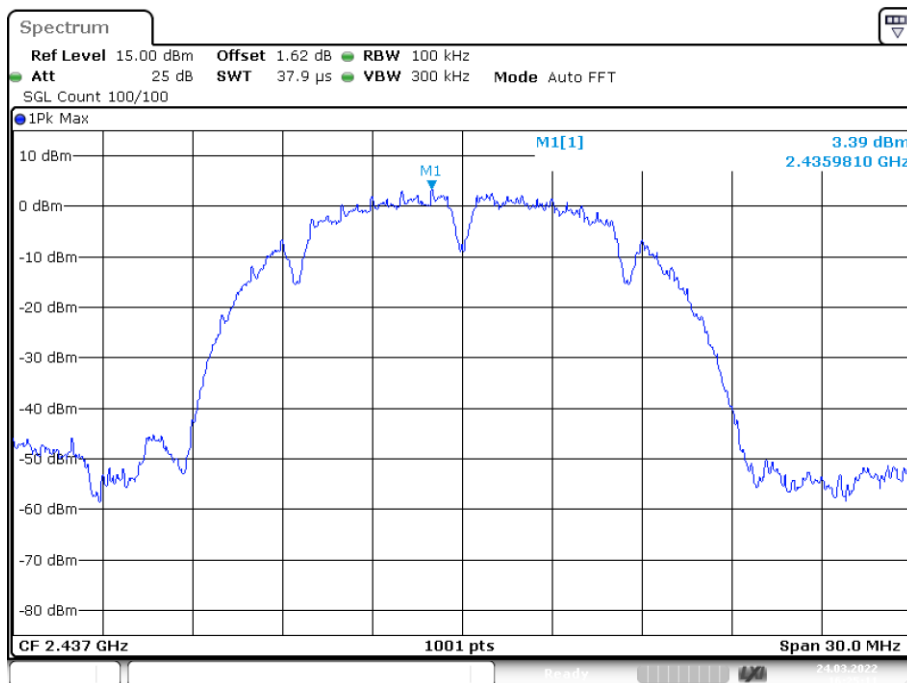


Tx. Spurious NVNT b 2412MHz Ant1 Ref



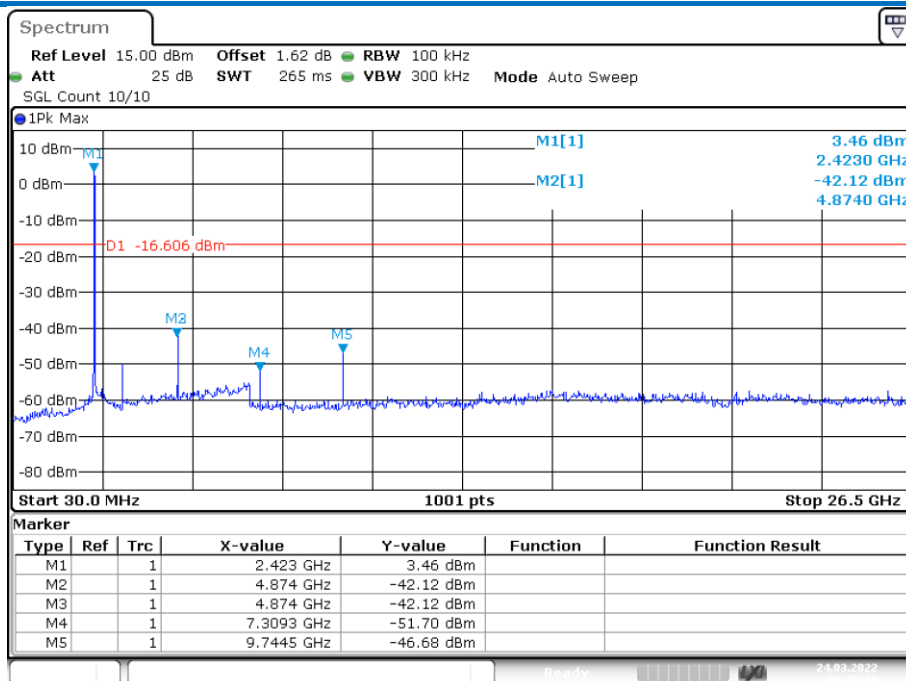
Date: 24.MAR.2022 16:21:35

Tx. Spurious NVNT b 2412MHz Ant1 Emission



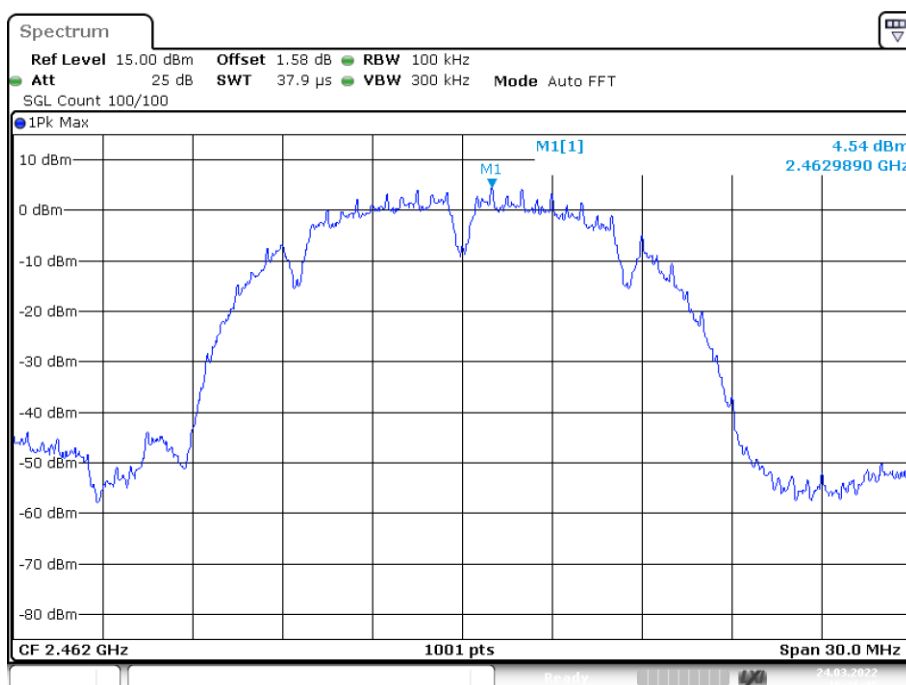
Date: 24.MAR.2022 16:25:11

Tx. Spurious NVNT b 2437MHz Ant1 Ref



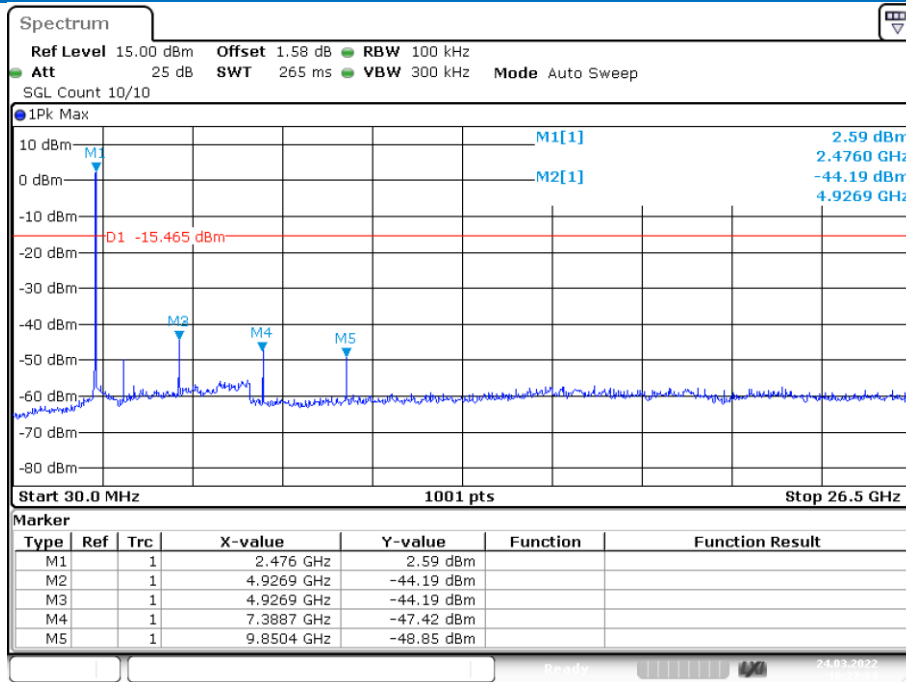
Date: 24.MAR.2022 16:25:29

Tx. Spurious NVNT b 2437MHz Ant1 Emission



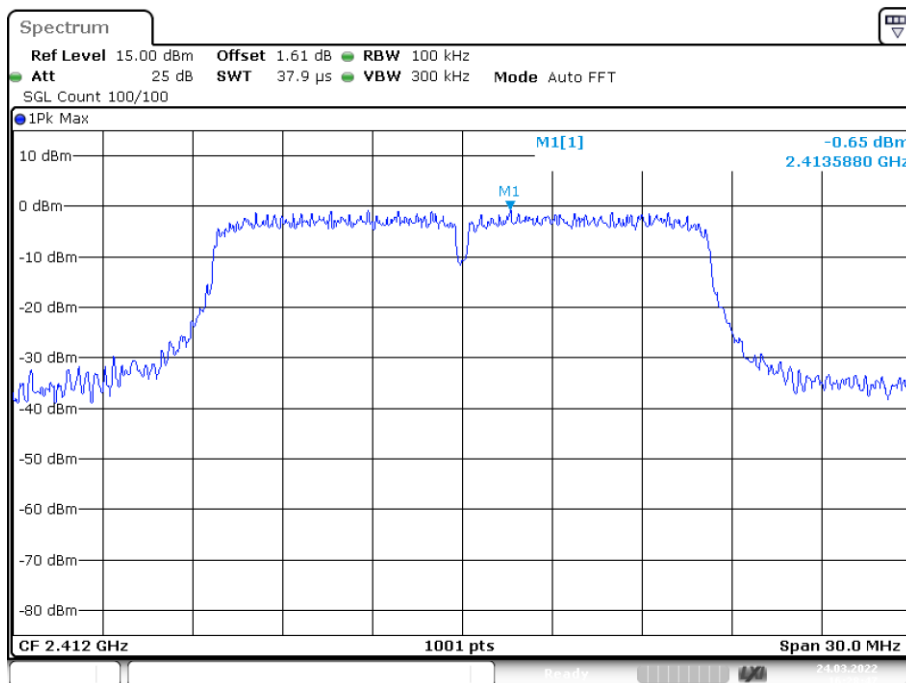
Date: 24.MAR.2022 16:26:45

Tx. Spurious NVNT b 2462MHz Ant1 Ref



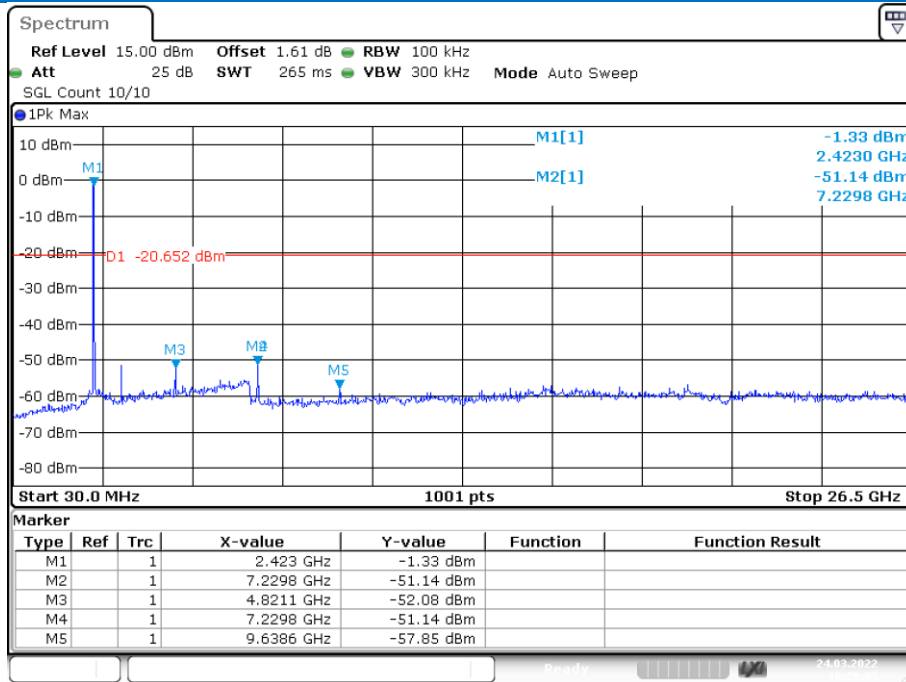
Date: 24.MAR.2022 16:27:03

Tx. Spurious NVNT b 2462MHz Ant1 Emission



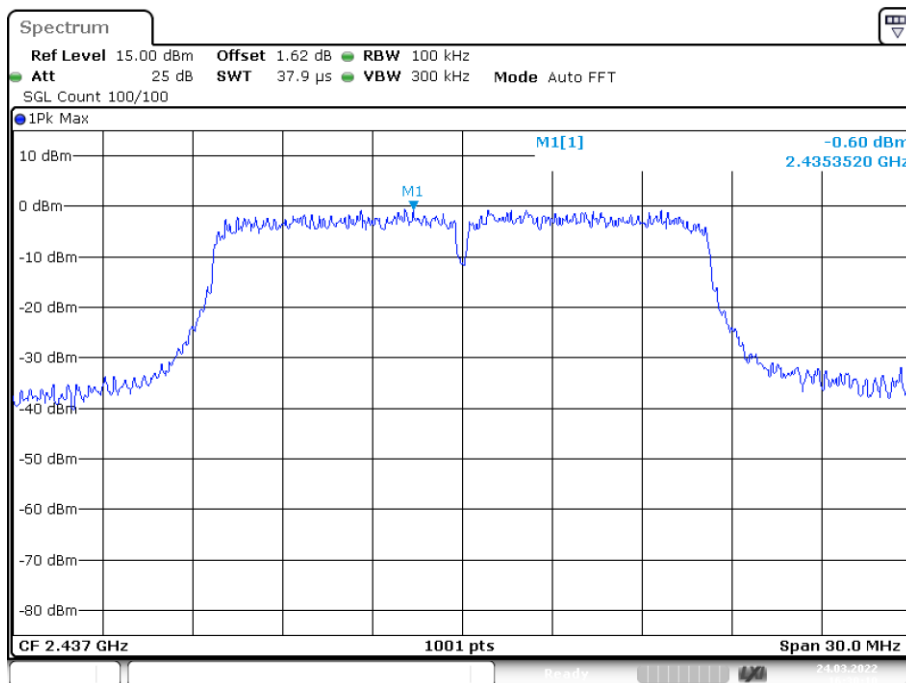
Date: 24.MAR.2022 16:28:47

Tx. Spurious NVNT g 2412MHz Ant1 Ref



Date: 24.MAR.2022 16:29:05

Tx. Spurious NVNT g 2412MHz Ant1 Emission



Date: 24.MAR.2022 16:30:10

Tx. Spurious NVNT g 2437MHz Ant1 Ref