

FCC AND ISED CERTIFICATION TEST REPORT

Report No.: DDT-B23020801-2E03

Applicant	:	Beijing Orion Star Technology Co., Ltd.
Address	:	Room A-2570, 2nd Floor, No. 30, Shixing Street, Shijingshan District, Beijing China
Equipment under Test	:	AI Delivery Robot
Model No.	:	OS-R-DR02
Trade Mark	:	ORIONSTAR
FCC ID	:	2A3BD-OSRDR02
IC	:	27780-OSRDR02
Manufacturer	:	Beijing Orion Star Technology Co., Ltd.
Address	:	Room A-2570, 2nd Floor, No. 30, Shixing Street, Shijingshan District, Beijing China

Issued By: Tianjin Dongdian Testing Service Co., Ltd.

Address: Building D-1, No. 19, Weisi Road, Microelectronics Industrial Park Development Area, Tianjin, China.

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REPORT

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Test Report Declare

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Test Standard Used: FCC Rules and Regulations Part 15 Subpart C, RSS-247 Issue 2 February 2017.

Test procedure used: ANSI C63.10:2020, RSS-Gen Issue 5, Apr. 2018, KDB 558074 D01 15.247 Meas Guidance v05r02

We Declare:

The equipment described above is tested by Tianjin Dongdian Testing Service Co., Ltd and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and Tianjin Dongdian Testing Service Co., Ltd is assumed of full responsibility for the accuracy and completeness of these tests.

After test and evaluation, our opinion is that the equipment provided for test compliance with the requirement of the above FCC&ISED standards.

Report No:	DDT-B23020801-2E02		
Date of Receipt:	Jan. 18, 2023	Date of Test:	Jan. 18, 2023 ~ Mar.03, 2023

Prepared By:

Sunny Zhang

Sunny Zhang/Engineer

Approved By:

Leon Li

Leon Li/RF Manager

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Tianjin Dongdian Testing Service Co., Ltd.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

Revision History

Rev.	Revisions	Issue Date	Revised By
---	Initial issue	Mar. 03, 2023	

1. Summary of Test Results

The EUT have been tested according to the applicable standards as referenced below.		
Description of Test Item	Standard	Verdict
6dB Bandwidth and 99% Bandwidth	FCC 15.247 (a) (2) RSS-247 Clause 5.2 (a)	Pass
Maximum Conducted Output Power	FCC 15.247 (b) (3) RSS-247 Clause 5.4 (e)	Pass
Power Spectral Density	FCC 15.247 (e) RSS-247 Clause 5.2 (b)	Pass
Band-edge and Spurious Emissions (Conducted)	FCC 15.247 (d) RSS-247 Clause 5.5	Pass
Radiated Spurious Emissions	FCC 15.247 (d) FCC 15.209 FCC 15.205 RSS-247 Clause 5.5 RSS-GEN Clause 8.9	Pass
Radiated Band Edge Compliance	FCC 15.247 (d) FCC 15.209 FCC 15.205 RSS-247 Clause 5.5 RSS-GEN Clause 8.9	Pass
Power Line Conducted Emission	FCC 15.207 RSS-GEN Clause 8.8	Pass
Antenna Requirement	FCC 15.203 RSS-GEN Clause 6.8	Pass

2. General Test Information

2.1. Description of EUT

EUT* Name	: AI Delivery Robot
Model Number	: OS-R-DR02
EUT Function Description	: Please reference user manual of this device
Power supply	: DC 25.55V by Polymer Li-ion built-in battery : AC 100-240V~50/60Hz by ac/dc adapter for charge
Radio Technology	: IEEE 802.11b/g/n
Operation Frequency	: IEEE 802.11b: 2412MHz-2462MHz : IEEE 802.11g: 2412MHz-2462MHz : IEEE 802.11n HT20: 2412MHz-2462MHz : IEEE 802.11n HT40: 2422MHz-2452MHz
Modulation	: IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) : IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) : IEEE 802.11n HT20, HT40: OFDM (64QAM, 16QAM, QPSK, BPSK)
Transmitter Rate	: IEEE 802.11b: 1, 2, 5.5, 11 Mbps : IEEE 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps : IEEE 802.11n HT20, HT40: MCS0~MCS7
Antenna Type	: Antenna 1: Dedicated FPC antenna, maximum PK gain: 3.77 dBi : Antenna 2: Dedicated FPC antenna, maximum PK gain: 3.68 dBi
Serial Number	: N/A

Note1: EUT is the ab. of equipment under test.

Note2: This EUT supports MIMO in IEEE 802.11n mode, and antenna gains are not equal, Directional gain was calculated by using the formulas applicable to equal gain antennas with GANT set equal to the gain of the antenna having the highest gain.

So Directional gain = GANT+ Array Gain, where Array Gain is as follows:

For power measurements, Array Gain = 0 dB ($NANT \leq 4$), so the Directional gain=3.77.

Channel information					
CH	Frequency (MHz)	CH	Frequency (MHz)	CH	Frequency (MHz)
1	2412	5	2432	9	2452
2	2417	6	2437	10	2457
3	2422	7	2442	11	2462
4	2427	8	2447	/	/

2.2. Accessories of EUT

Description of Accessories	Manufacturer	Model number	Description	Remark
AC/DC ADAPTER	FOSHAN SHUNDE GUANYUDA POWER SUPPLY CO., LTD	GM262-3200780 -1F	INPUT:100-240V~50/60Hz 3.5A, OUTPUT:32V-7.8A	GVE

2.3. Assistant equipment used for test

Assistant equipment	Manufacturer	Model number	EMC Compliance	SN
Notebook	Lenovo Beijing Co. Ltd.	ThinkPad	FCC/CE	TP00067A

2.4. Block diagram of EUT configuration for test

EUT

Run the special test software “QRCT.exe” provided by manufacturer to control EUT work in Continuous Tx mode, and select test channel, wireless mode and data rate.

Tested mode, channel, setting Tx power and rand data rate information					
Mode	Setting Tx Power		Data rate (Mbps) (See Note)	Channel	Frequency (MHz)
	ANT1	ANT2			
IEEE 802.11b	14	14	1	LCH: CH1	2412
	14	14	1	MCH: CH6	2437
	14	14	1	HCH: CH11	2462
IEEE 802.11g	13	13	6	LCH: CH1	2412
	13	13	6	MCH: CH6	2437
	13	13	6	HCH: CH11	2462
IEEE 802.11n HT20	10	10	MCS 0	LCH: CH1	2412
	10	10	MCS 0	MCH: CH6	2437
	10	10	MCS 0	HCH: CH11	2462
IEEE 802.11n HT40	10	10	MCS 0	LCH: CH3	2422
	10	10	MCS 0	MCH: CH6	2437
	10	10	MCS 0	HCH: CH9	2452

Note: According exploratory test, EUT will have maximum output power in those data rate, so those data rate were used for all test.

2.5. Deviations of test standard

No Deviation

2.6. Test environment conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature range:	21-28℃
Humidity range:	20-75%
Pressure range:	86-106kPa

2.7. Test laboratory

Tianjin Dongdian Testing Service Co., Ltd.

Address: Building D-1, No. 19, Weisi Road, Microelectronics Industrial Park Development Area, Tianjin, China.

Tel: +86-22-58038033, <http://www.ddttest.com>, Email: ddt@dgddt.com

NVLAP (National Voluntary Laboratory Accreditation Program) CODE: 500036-0

CNAS (China National Accreditation Service for Conformity Assessment) CODE: L13402

FCC Designation Number: CN5004; FCC Test Firm Registration Number: 368676

ISED (Innovation, Science and Economic Development Canada) Company Number: 27768

Conformity Assessment Body Identifier: CN0125

VCCI Facility Registration Number: C-20089, T-20093, R-20125, G-20122

2.8. Measurement uncertainty

Test Item	Uncertainty
Bandwidth	0.14%
Peak Output Power (Conducted) (Spectrum Analyzer)	0.12 dB ($10 \text{ MHz} \leq f < 3.6 \text{ GHz}$);
	0.32 dB ($3.6 \text{ GHz} \leq f < 8 \text{ GHz}$)
Peak Output Power (Conducted) (Power Sensor)	0.51 dB
Power Spectral Density	0.12 dB ($10 \text{ MHz} \leq f < 3.6 \text{ GHz}$);
	0.32 dB ($3.6 \text{ GHz} \leq f < 8 \text{ GHz}$)
Frequencies Stability	6.7×10^{-8} (Antenna couple method)
	3.4×10^{-8} (Conducted method)
Conducted Spurious Emissions	0.12 dB ($10 \text{ MHz} \leq f < 3.6 \text{ GHz}$);
	0.32 dB ($3.6 \text{ GHz} \leq f < 8 \text{ GHz}$)
	0.52 dB ($8 \text{ GHz} \leq f < 22 \text{ GHz}$)
Uncertainty for Radio Frequency (RBW < 20 kHz)	3×10^{-7}
Temperature	$\pm 2^{\circ}\text{C}$
Humidity	$\pm 1\%$
Uncertainty for Radiation Emission Test (30 MHz - 1 GHz)	2.72 dB (Antenna Polarize: V)
	2.72 dB (Antenna Polarize: H)
Uncertainty for Radiation Emission Test (1 GHz - 40 GHz)	2.74 dB (1 - 6 GHz)
	2.72 dB (6 GHz - 18 GHz)
	3.54 dB (18 GHz - 26 GHz)
	4.30 dB (26 GHz - 40 GHz)
Uncertainty for Power Line Conduction Emission Test	3.40 dB (150 kHz - 30 MHz)

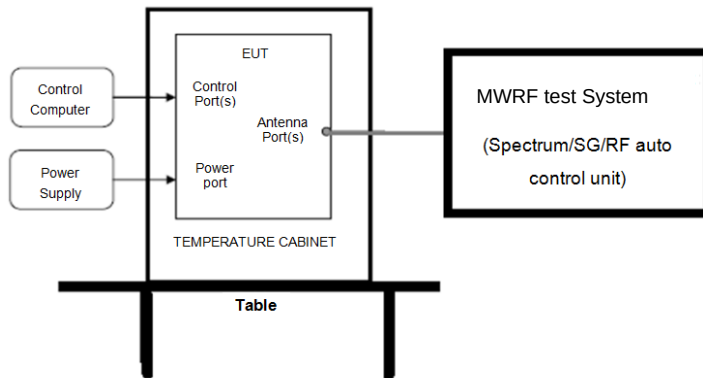
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3. Equipment Used During Test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
RF Connected Test (MWRFTest system)					
Microwave Signal Generator	R&S	SMF100A	101396	2022/05/26	1 Year
MXG Vector Signal Generator	Keysight	N5182A	MY50143288	2022/03/07	1 Year
EMI Test Receiver	R&S	ESU26	100243	2022/03/03	1 Year
Wideband Radio Communication Tester	R&S	CMW500	158800	2022/06/11	1 Year
Power Sensor	KEYSIGHT	U2021XA	MY59150007	2022/03/23	1 Year
DC Power Supply	inSTEK	PSP-2010	EN122317	2023/02/12	1 Year
Test Software	MWRFTest	MTS8310	V03	N/A	N/A
Radiated Emission -10m EMI Chamber					
Broadband Horn Antenna	TESEQ	BHA 9118	31754	2022/10/12	1 Year
Broad Band Horn Antenna	Schwarzbeck	BBHA 9170	790	2022/05/06	1 Year
Active Loop Antenna	R&S	HFH2-Z2	100269	2022/07/11	1 Year
Low noise amplifier	MITEQ	TPA0118-36	0914	2023/02/16	1 Year
EMI Test Receiver	R&S	ESCI	101024	2022/03/03	1 Year
EMI Test Receiver	R&S	ESCI	101030	2022/03/29	1 Year
EMI Test Receiver	R&S	ESU26	100244	2022/03/03	1 Year
Bilog Antenna	TESEQ	CBL6112D	29068	2022/10/10	2 Year
Bilog Antenna	TESEQ	CBL6112D	29069	2022/10/10	2 Year
Amplifier	Sonoma	310N	300913	2023/02/15	1 Year
Amplifier	Sonoma	310N	300914	2023/02/15	1 Year
Ant Mast	Innco	MA4000	N/A	N/A	N/A
Ant Mast	Innco	MA4000	N/A	N/A	N/A
Mast Controller	Innco	CO2000	N/A	N/A	N/A
Mast Controller	Innco	CO2000	N/A	N/A	N/A
RF Selector 4CH	TOYO	NS4904N	Selector1	N/A	N/A
RF Selector 4CH	TOYO	NS4904N	Selector2	N/A	N/A
Test software	TOYO	EP5/RSE	Ver 1.9.1	N/A	N/A
Test software	Audix	E3	V 6.11111b	N/A	N/A
Power Line Conducted Emissions Test					
Test Receiver	R&S	ESCI	101397	2022/03/03	1 Year
LISN	R&S	ENV216	101122	2022/03/31	1 Year
Test software	TOYO	EP5/CE	V 5.4.40	N/A	N/A

4. 6dB Bandwidth and 99% Bandwidth

4.1. Block diagram of test setup



4.2. Limits

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

4.3. Test procedure

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

(2) 99% Bandwidth set the spectrum analyzer as follows:

RBW:	1% to 5% of the OBW
VBW:	Three times the RBW
Detector Mode:	Peak
Sweep time:	auto
Trace mode	Max hold

(3) 6dB Bandwidth set the spectrum analyzer as follows:

RBW:	100 kHz
VBW:	300 kHz
Detector Mode:	Peak
Sweep time:	auto
Trace mode	Max hold

(4) Allow the trace to stabilize, measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

4.4. Test result

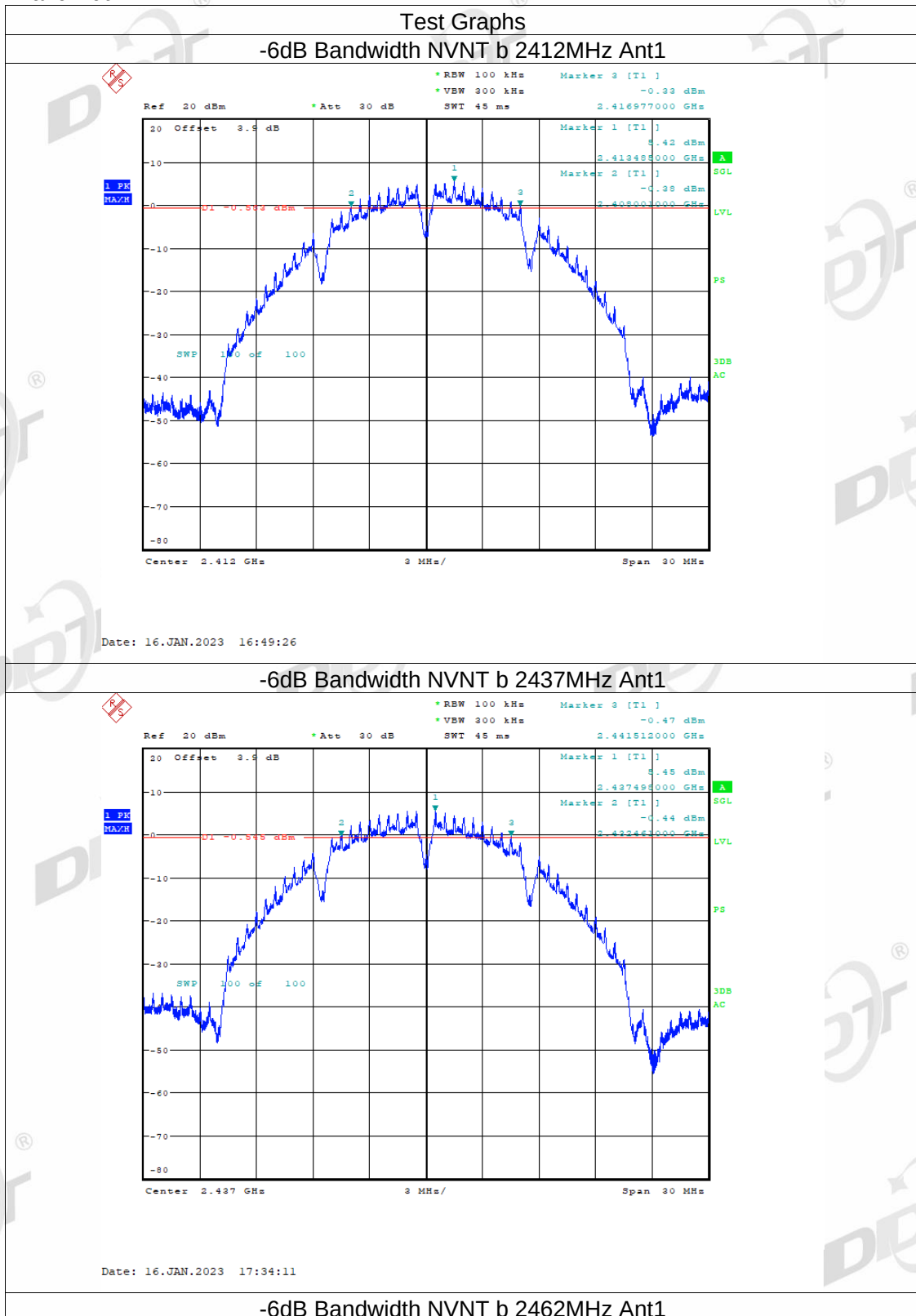
Test Mode	Test Channel	Ant	6dB Bandwidth (MHz)	Limit (MHz)	Verdict
b	2412	Ant1	8.976	≥ 0.5	Pass
b	2437	Ant1	9.051	≥ 0.5	Pass
b	2462	Ant1	8.064	≥ 0.5	Pass
b	2412	Ant2	8.547	≥ 0.5	Pass
b	2437	Ant2	8.526	≥ 0.5	Pass
b	2462	Ant2	9.000	≥ 0.5	Pass
g	2412	Ant1	15.675	≥ 0.5	Pass
g	2437	Ant1	16.323	≥ 0.5	Pass
g	2462	Ant1	15.711	≥ 0.5	Pass
g	2412	Ant2	16.332	≥ 0.5	Pass
g	2437	Ant2	16.356	≥ 0.5	Pass
g	2462	Ant2	16.320	≥ 0.5	Pass
n20	2412	Ant1	16.323	≥ 0.5	Pass
n20	2412	Ant2	17.562	≥ 0.5	Pass
n20	2437	Ant1	17.547	≥ 0.5	Pass
n20	2437	Ant2	17.571	≥ 0.5	Pass
n20	2462	Ant1	16.317	≥ 0.5	Pass
n20	2462	Ant2	17.283	≥ 0.5	Pass
n40	2422	Ant1	35.076	≥ 0.5	Pass
n40	2422	Ant2	36.030	≥ 0.5	Pass
n40	2437	Ant1	36.066	≥ 0.5	Pass
n40	2437	Ant2	36.312	≥ 0.5	Pass
n40	2452	Ant1	35.652	≥ 0.5	Pass
n40	2452	Ant2	35.670	≥ 0.5	Pass

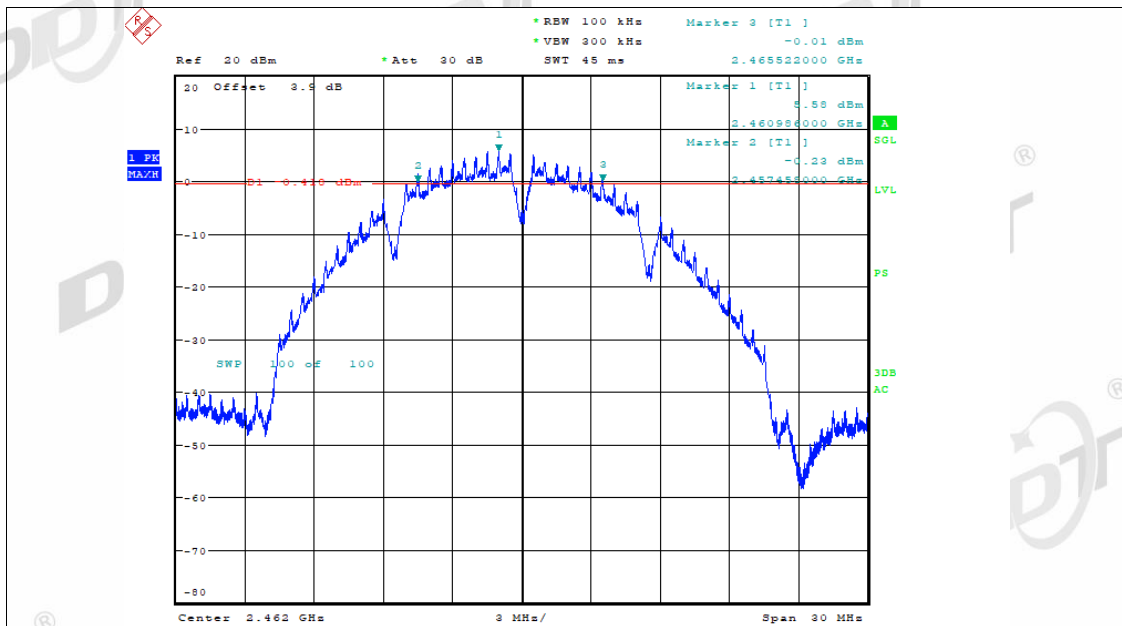
Test Mode	Test Channel	Ant	99% OBW (MHz)	Limit (MHz)	Verdict
b	2412	Ant1	13.884	---	Pass
b	2437	Ant1	14.211	---	Pass
b	2462	Ant1	13.800	---	Pass
b	2412	Ant2	13.797	---	Pass
b	2437	Ant2	14.013	---	Pass
b	2462	Ant2	13.809	---	Pass
g	2412	Ant1	16.716	---	Pass
g	2437	Ant1	16.839	---	Pass
g	2462	Ant1	16.662	---	Pass

g	2412	Ant2	16.554	---	Pass
g	2437	Ant2	16.629	---	Pass
g	2462	Ant2	16.629	---	Pass
n20	2412	Ant1	17.886	---	Pass
n20	2412	Ant2	17.790	---	Pass
n20	2437	Ant1	18.000	---	Pass
n20	2437	Ant2	17.895	---	Pass
n20	2462	Ant1	17.835	---	Pass
n20	2462	Ant2	17.880	---	Pass
n40	2422	Ant1	36.258	---	Pass
n40	2422	Ant2	36.474	---	Pass
n40	2437	Ant1	36.804	---	Pass
n40	2437	Ant2	36.624	---	Pass
n40	2452	Ant1	36.444	---	Pass
n40	2452	Ant2	36.396	---	Pass

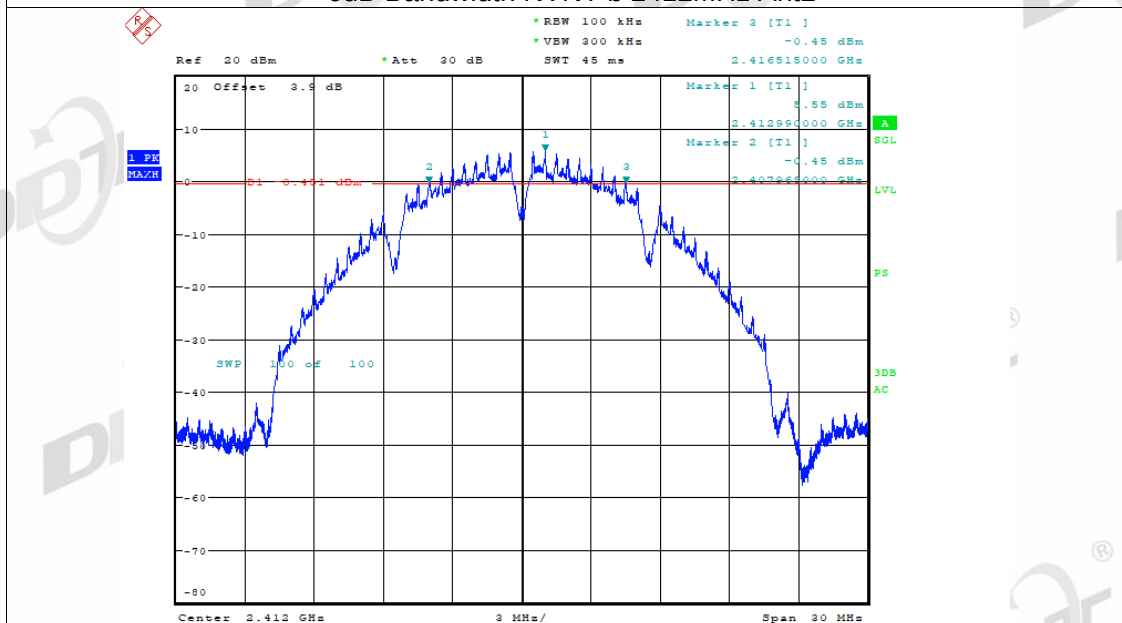
4.5. original test data

6dB Bandwidth:



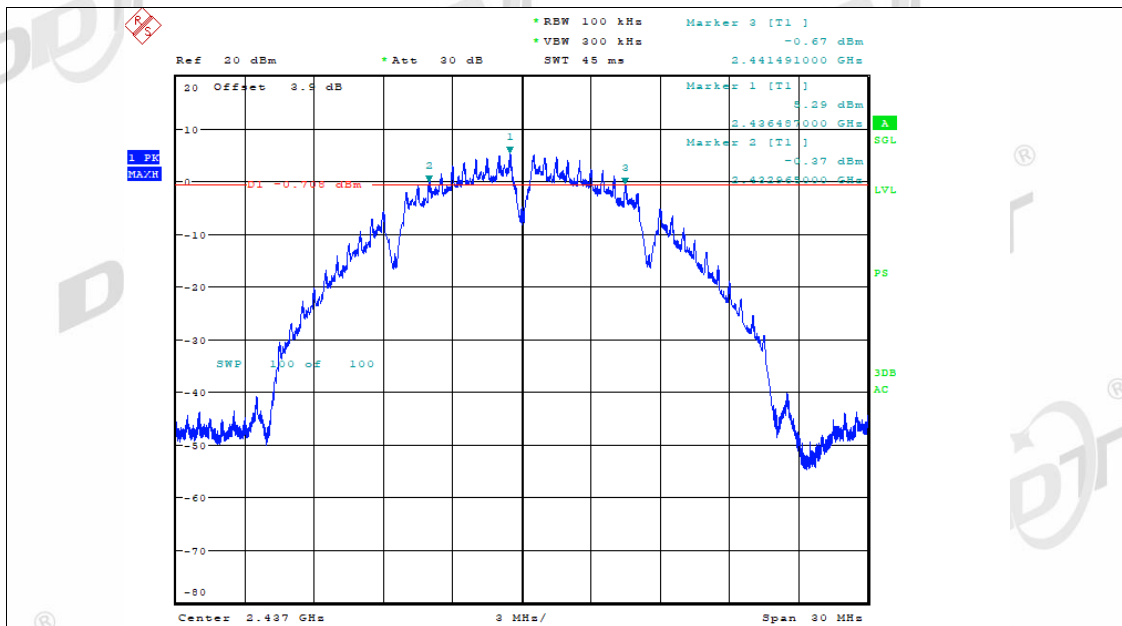


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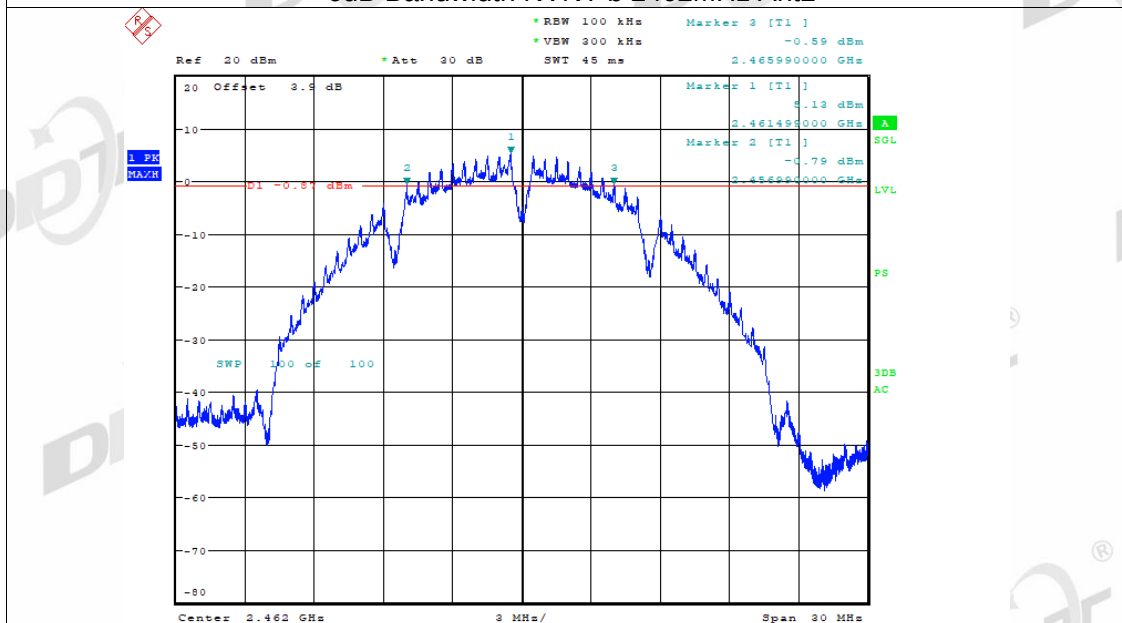
-6dB Bandwidth NVNT b 2412MHz Ant2

Date: 16.JAN.2023 16:53:03

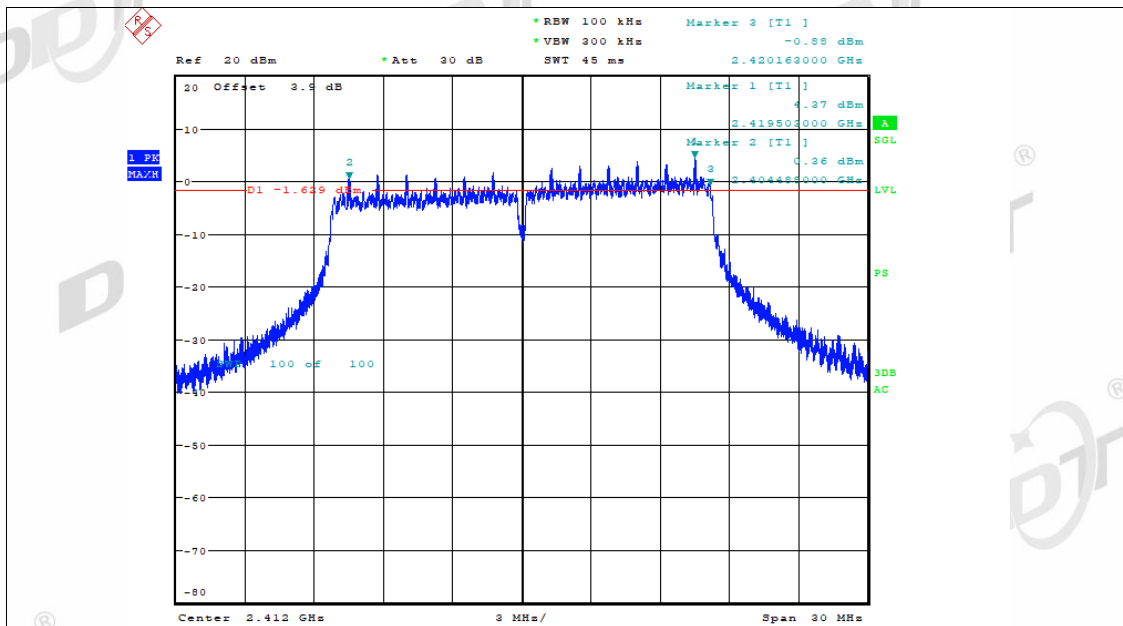
-6dB Bandwidth NVNT b 2437MHz Ant2



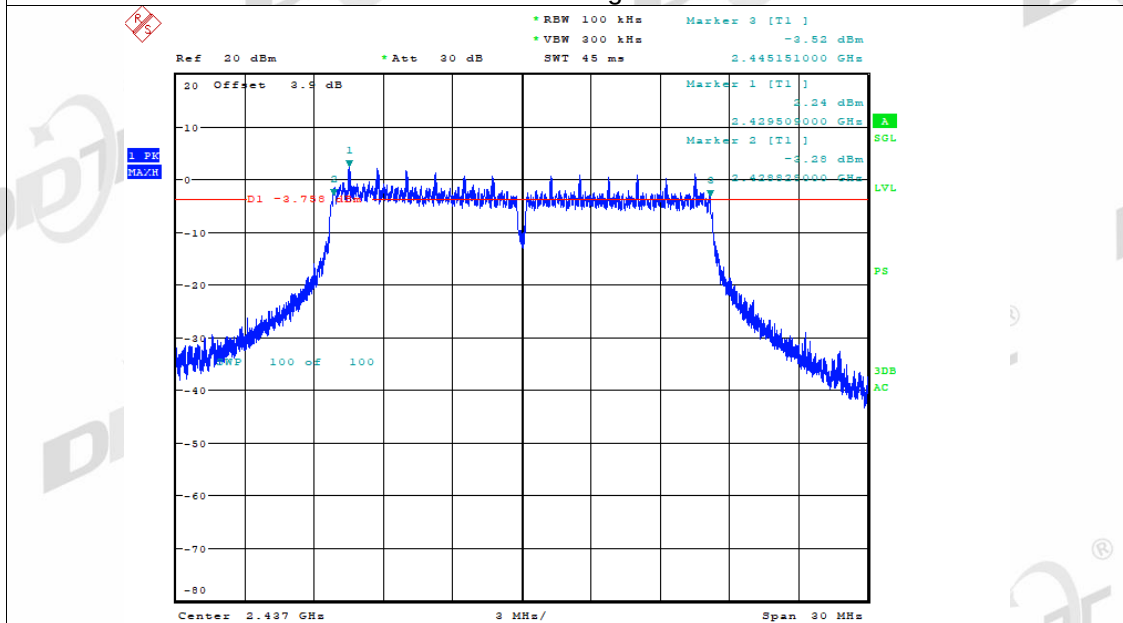
-6dB Bandwidth NVNT b 2462MHz Ant2



-6dB Bandwidth NVNT g 2412MHz Ant1

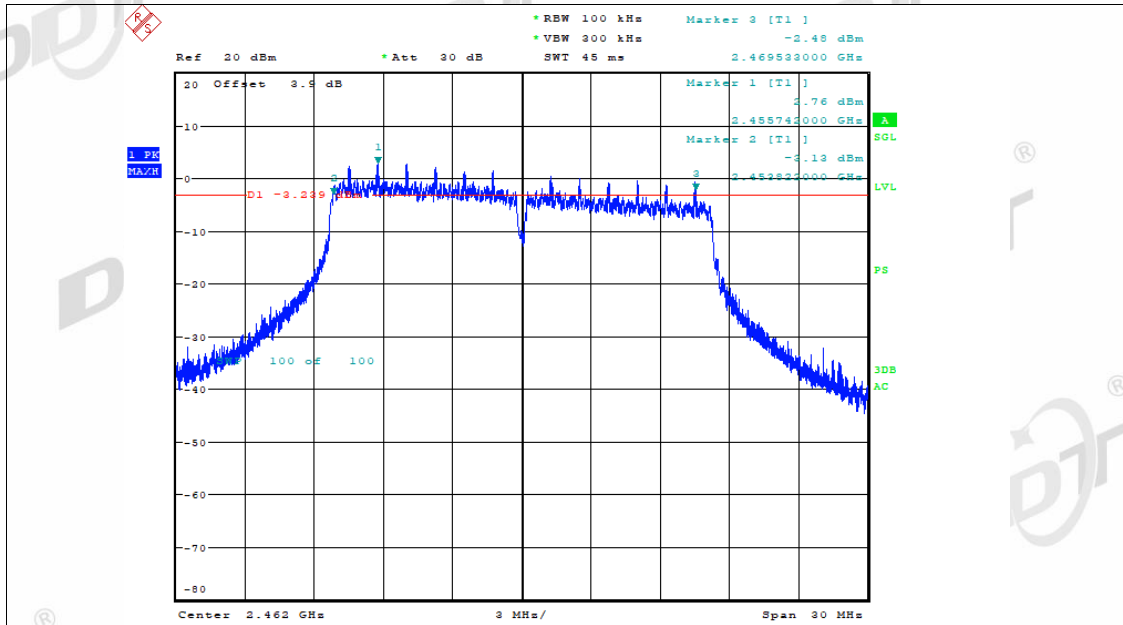


Date: 17.JAN.2023 08:47:52

-6dB Bandwidth NVNT g 2437MHz Ant1

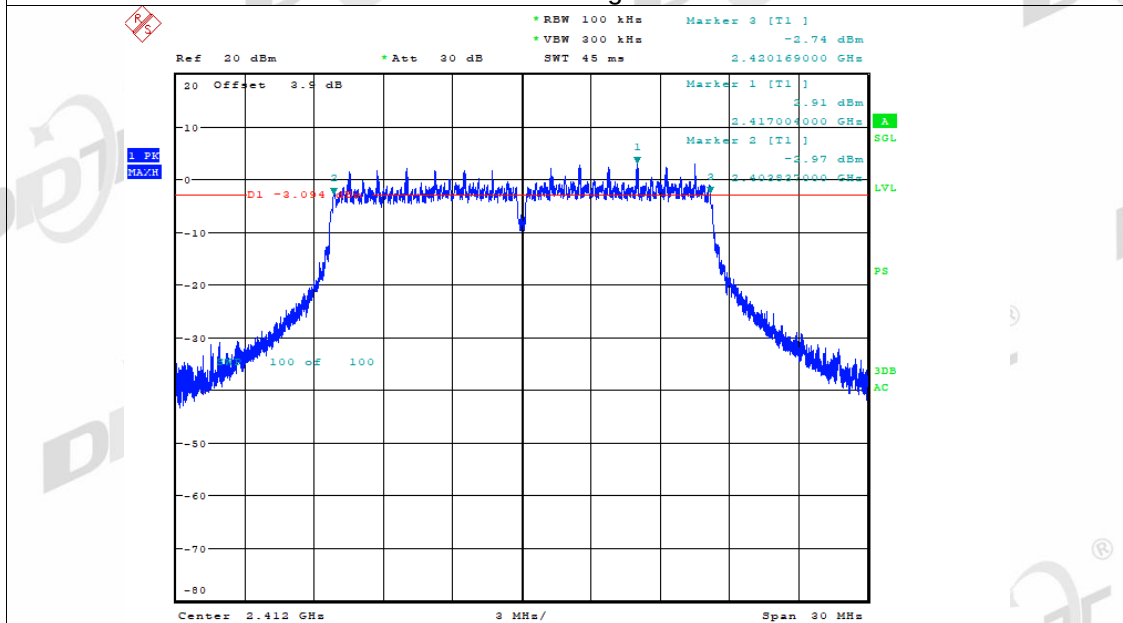
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-6dB Bandwidth NVNT g 2462MHz Ant1



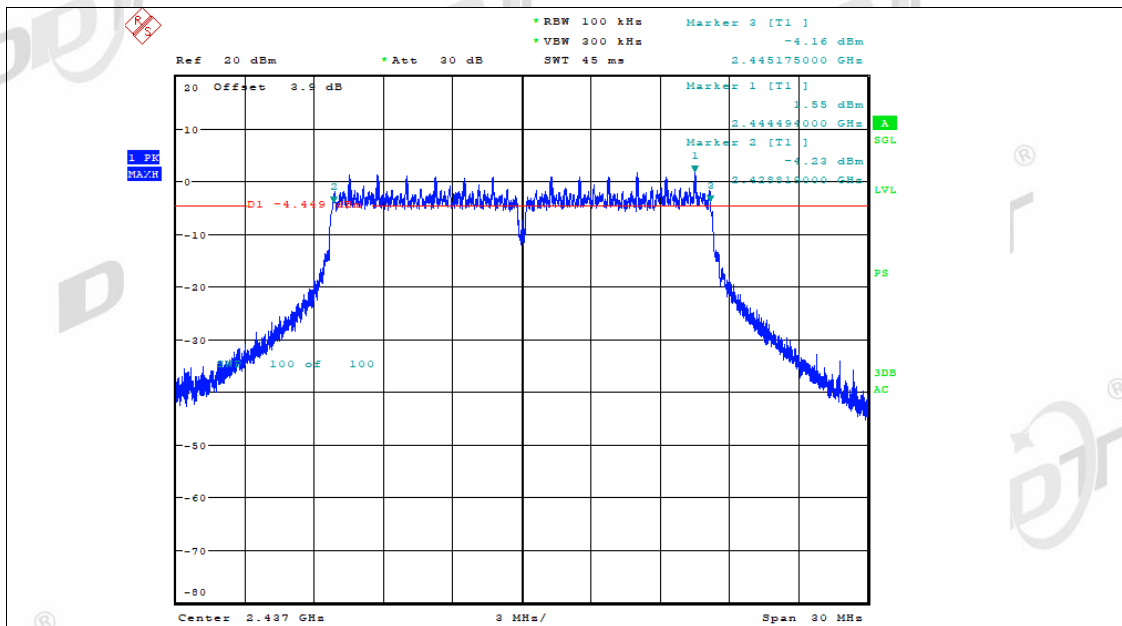
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-6dB Bandwidth NVNT g 2412MHz Ant2



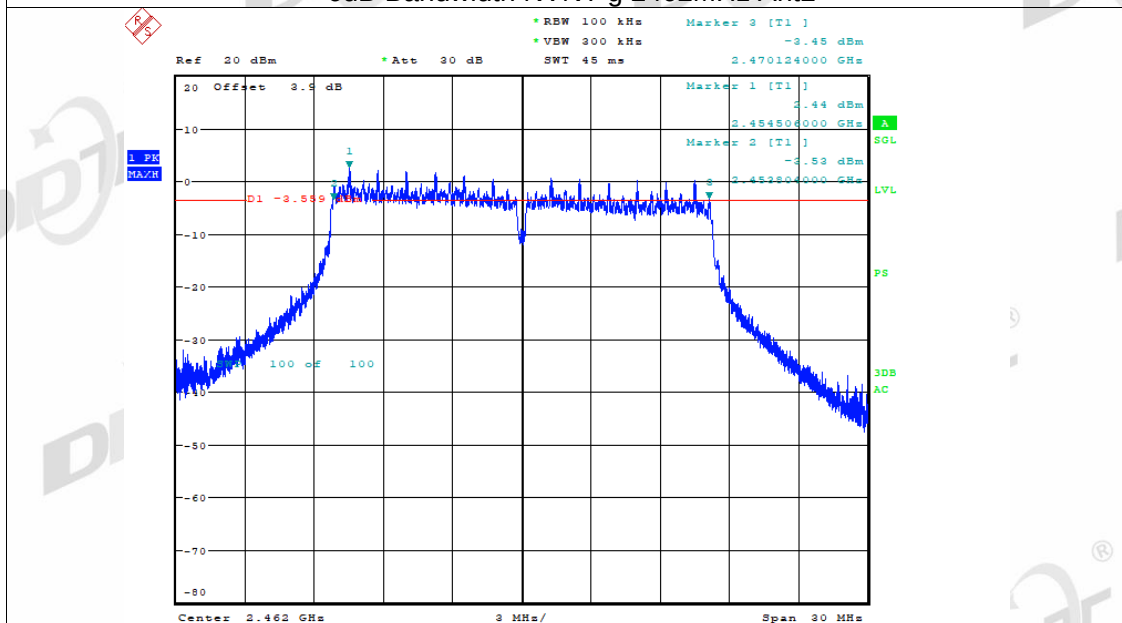
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-6dB Bandwidth NVNT g 2437MHz Ant2



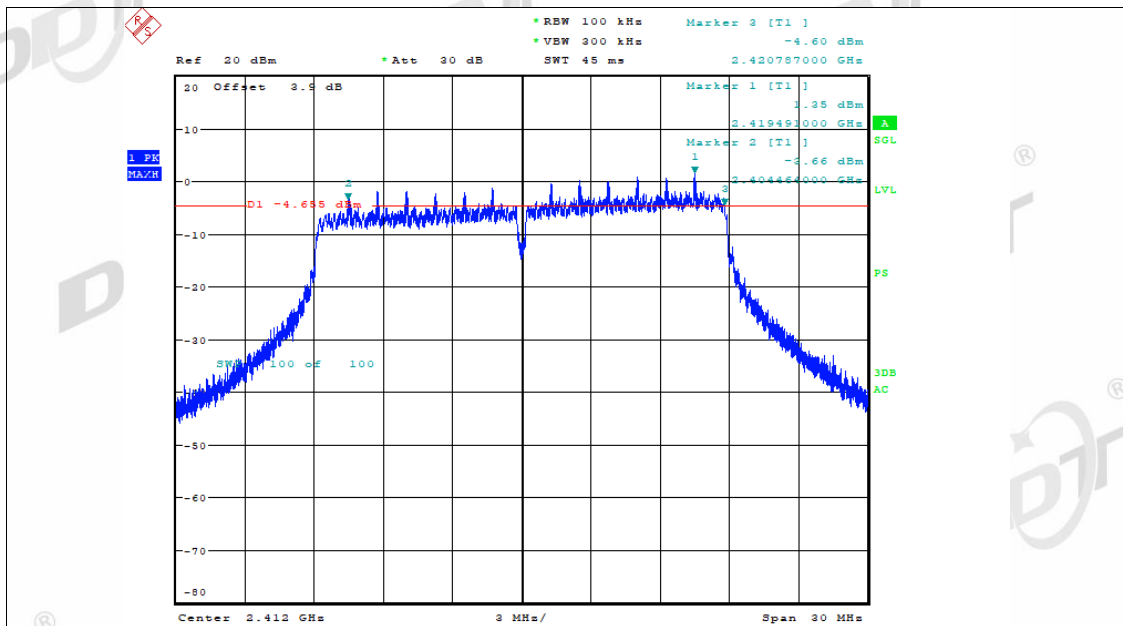
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-6dB Bandwidth NVNT g 2462MHz Ant2

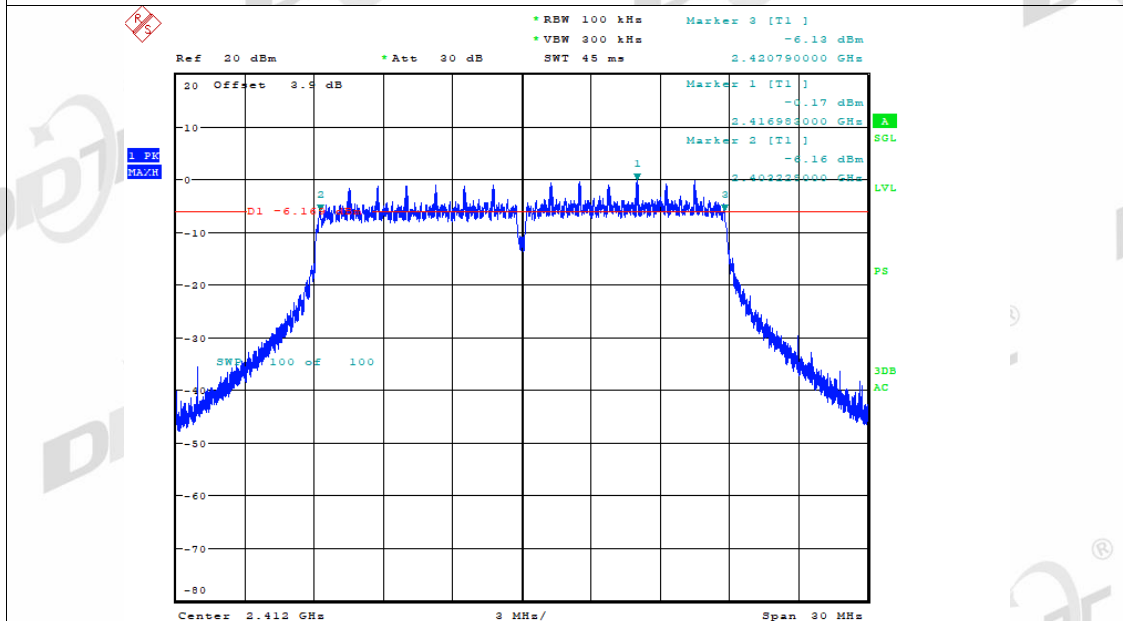


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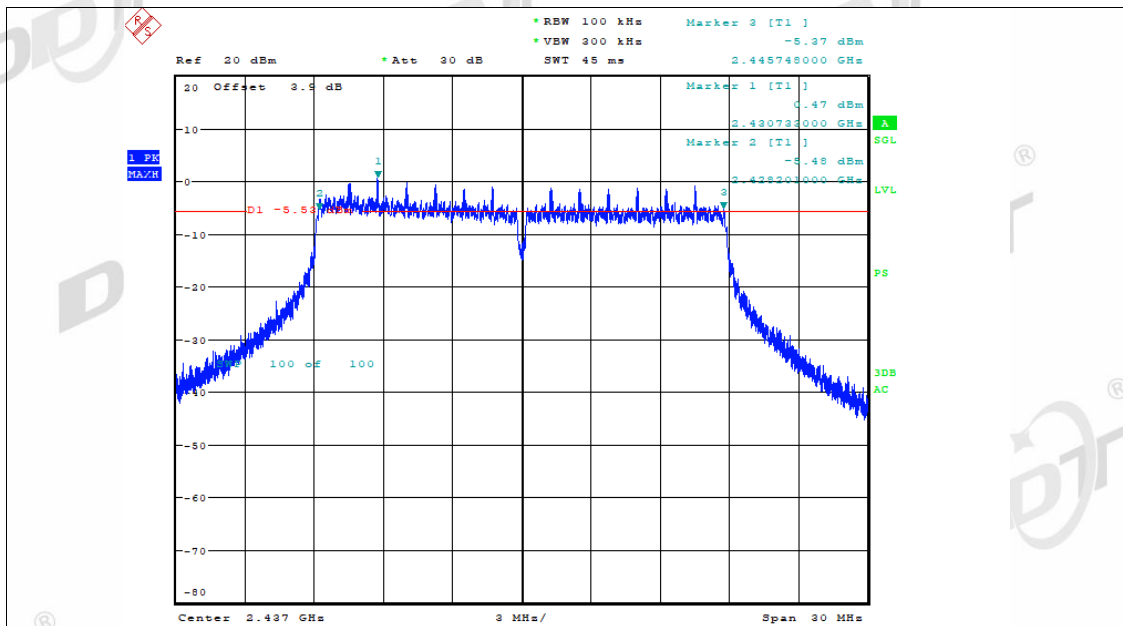
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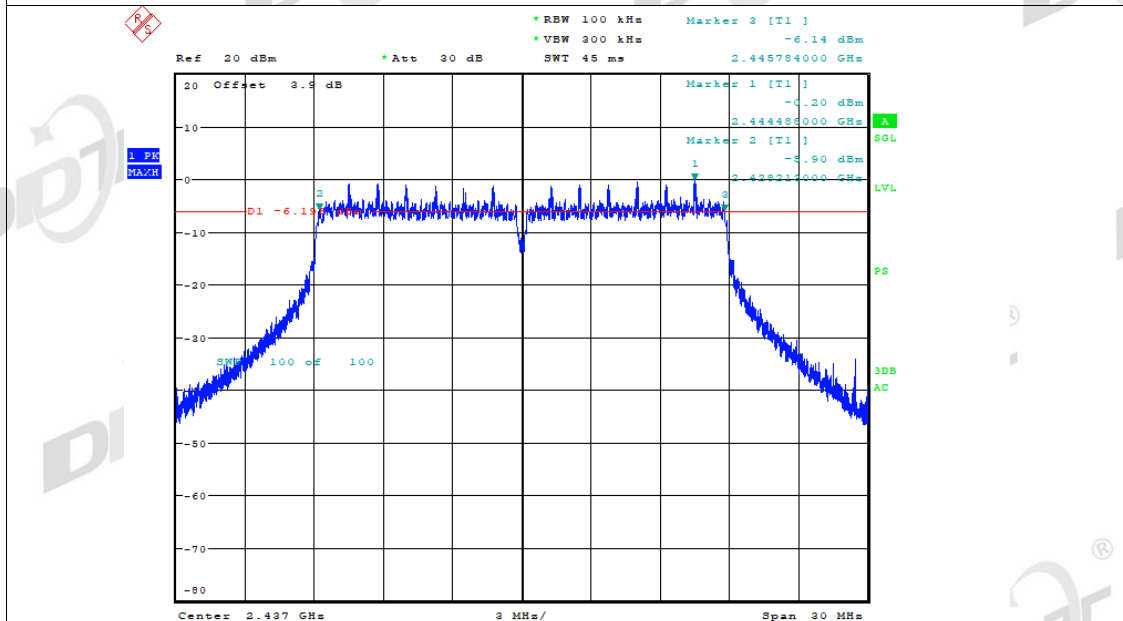
-6dB Bandwidth NVNT n20 2412MHz Ant2



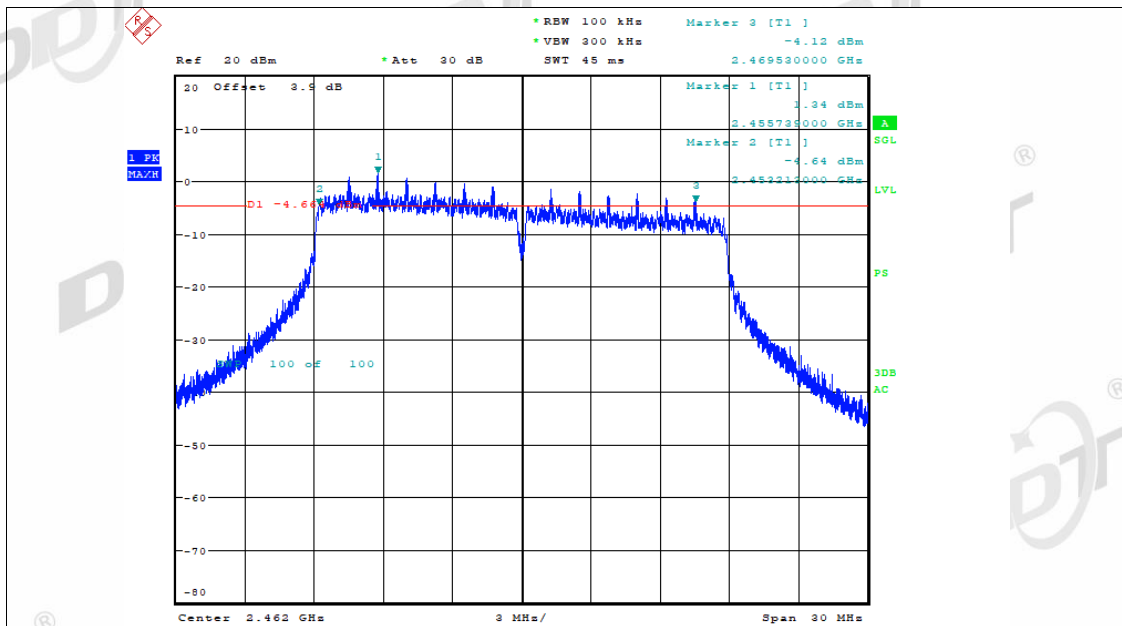
-6dB Bandwidth NVNT n20 2437MHz Ant1



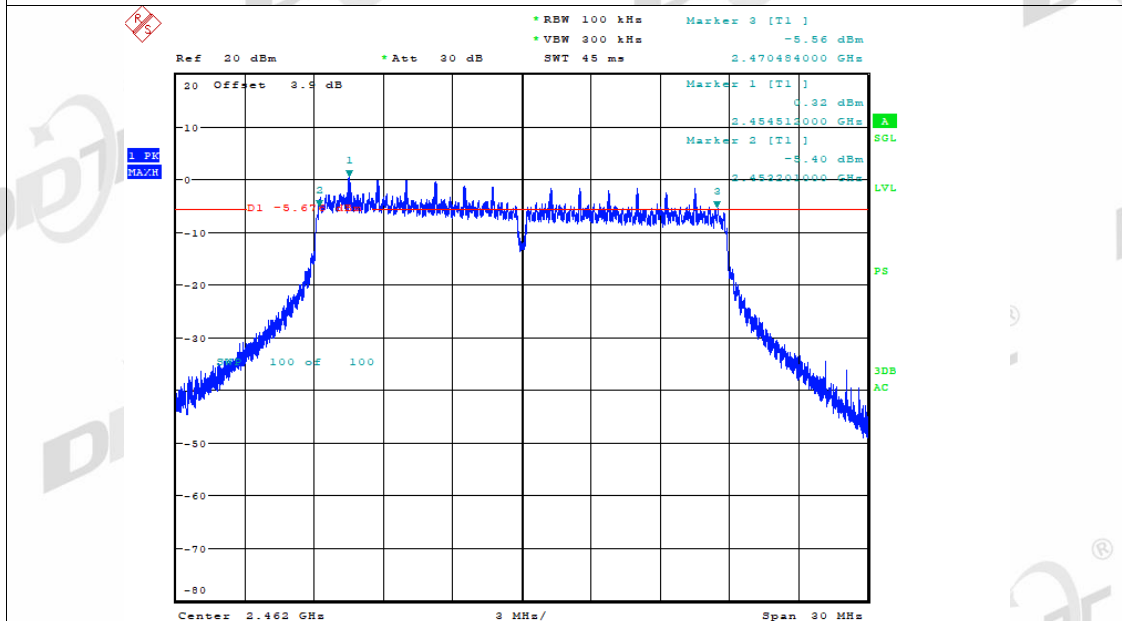
-6dB Bandwidth NVNT n20 2437MHz Ant2



-6dB Bandwidth NVNT n20 2462MHz Ant1

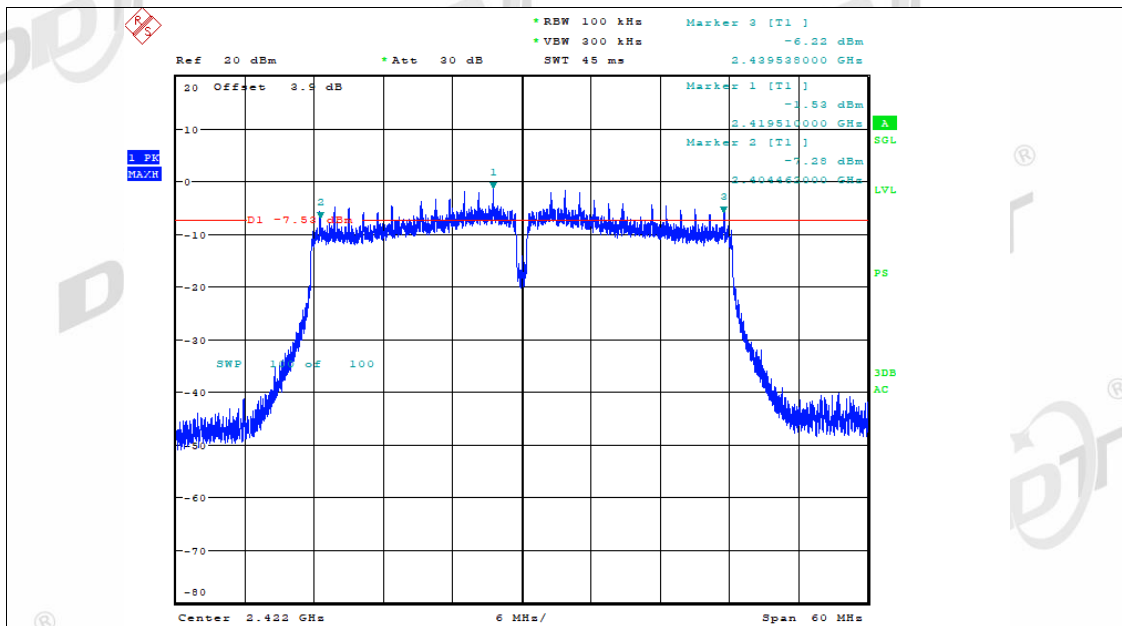


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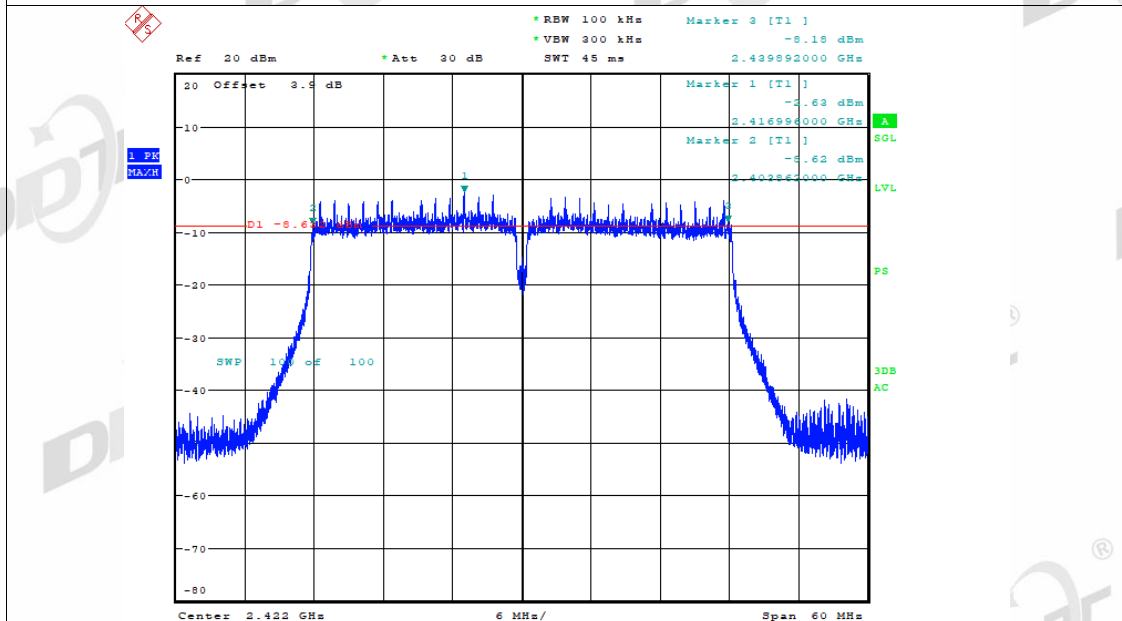
-6dB Bandwidth NVNT n20 2462MHz Ant2

Date: 17.JAN.2023 09:48:21

-6dB Bandwidth NVNT n40 2422MHz Ant1

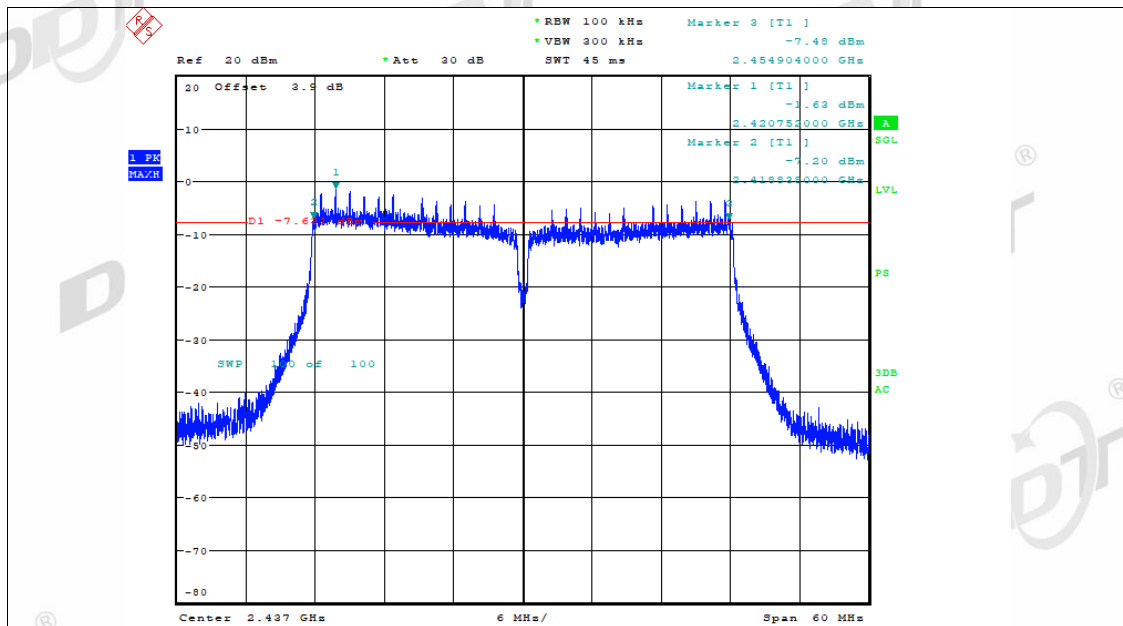


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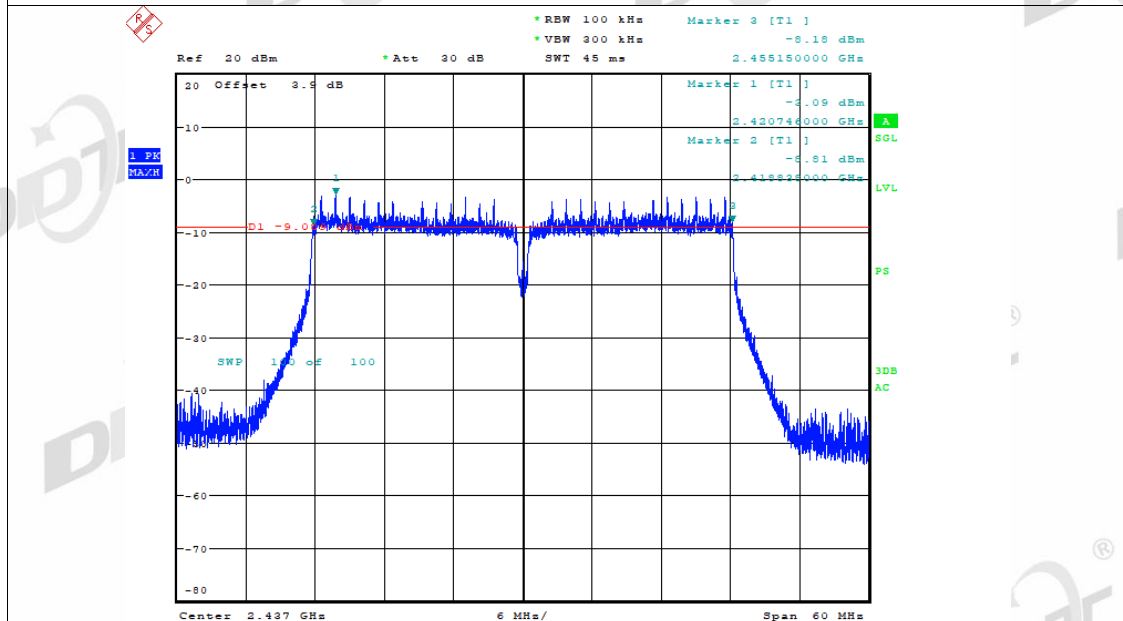
-6dB Bandwidth NVNT n40 2422MHz Ant2

Date: 17.JAN.2023 09:58:17

-6dB Bandwidth NVNT n40 2437MHz Ant1

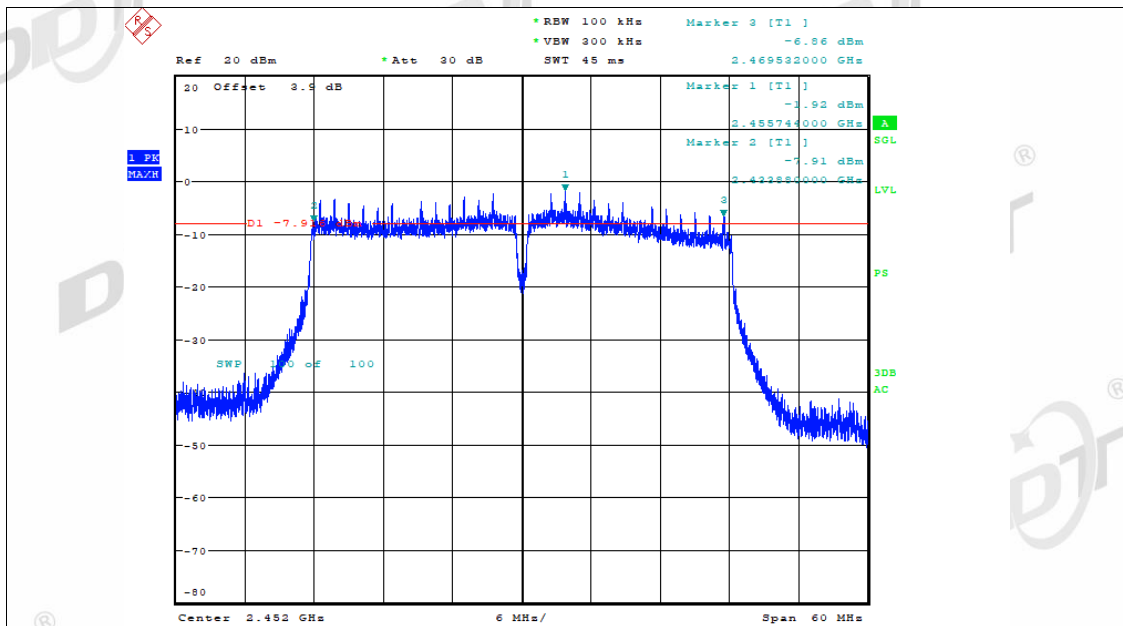


Date: 17.JAN.2023 10:09:17

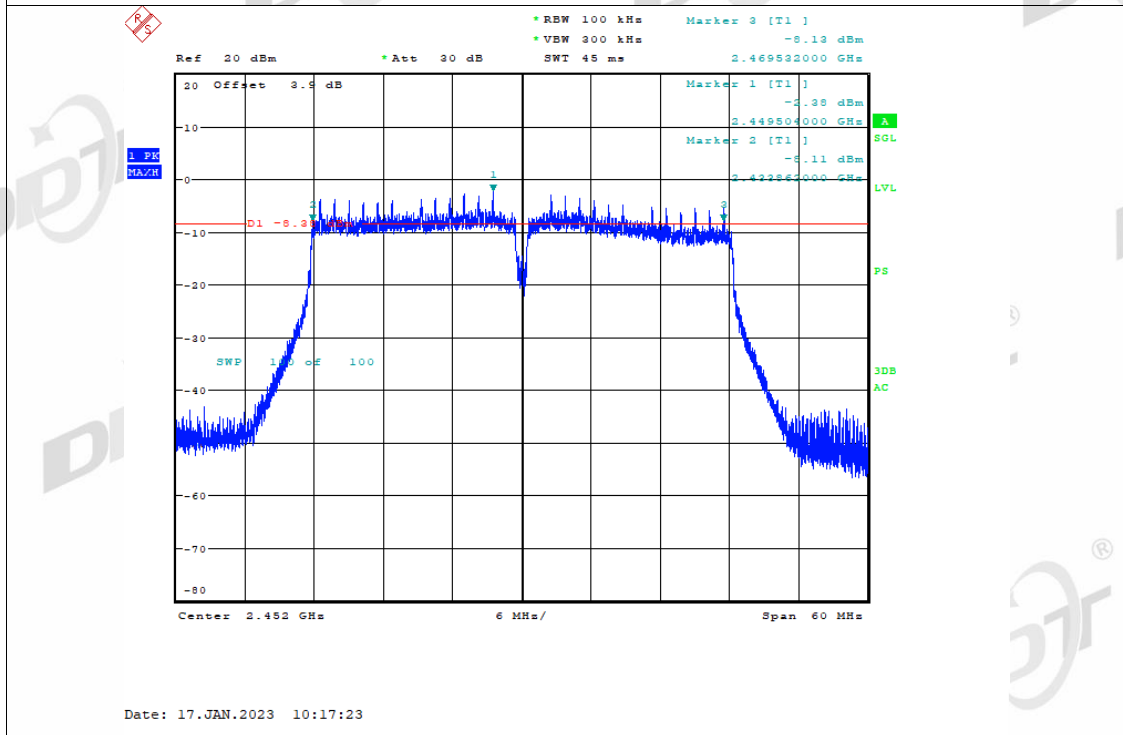
-6dB Bandwidth NVNT n40 2437MHz Ant2

Date: 17.JAN.2023 10:09:36

-6dB Bandwidth NVNT n40 2452MHz Ant1

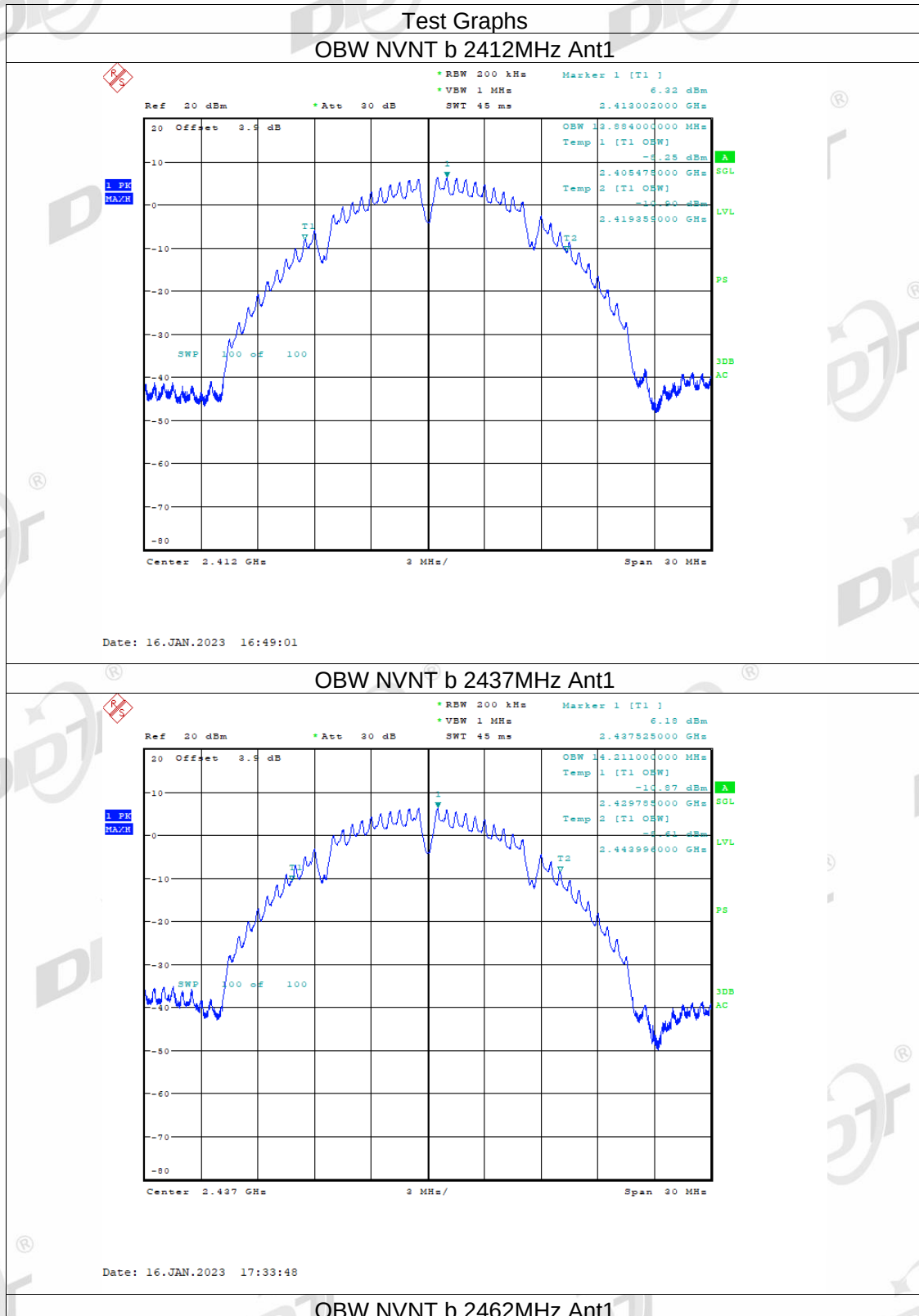


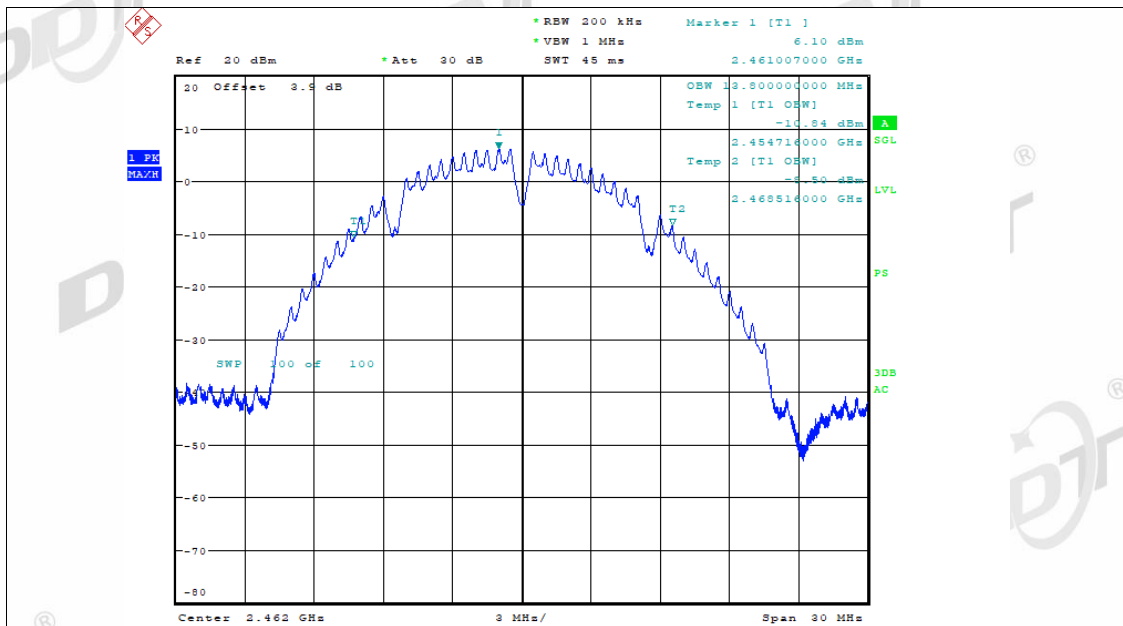
Date: 17.JAN.2023 10:17:04

-6dB Bandwidth NVNT n40 2452MHz Ant2

Date: 17.JAN.2023 10:17:23

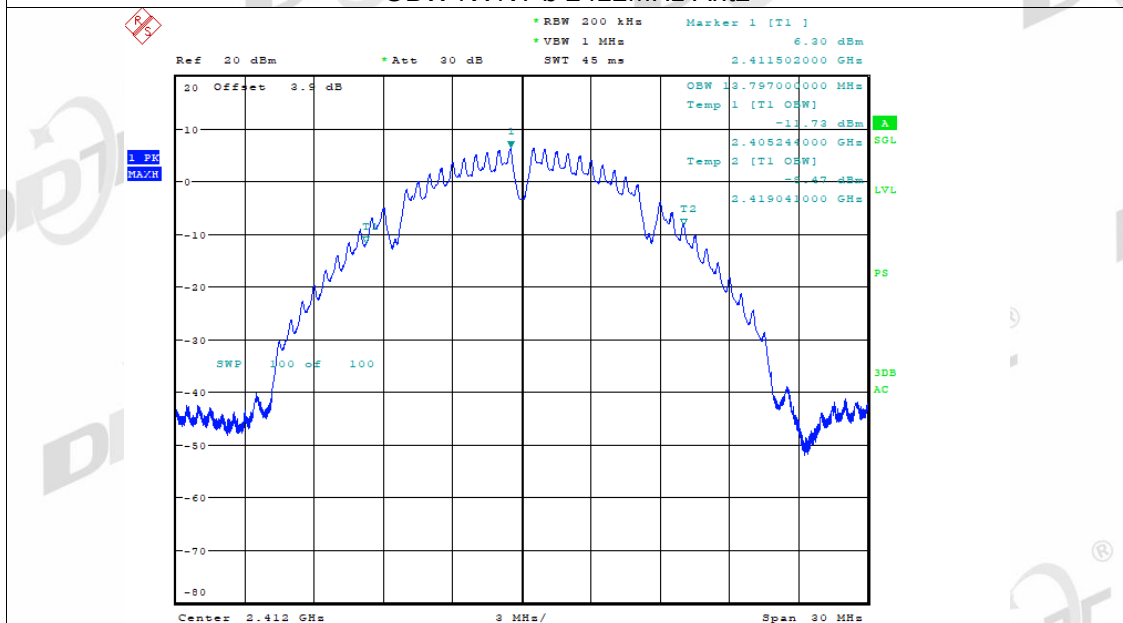
99% Bandwidth





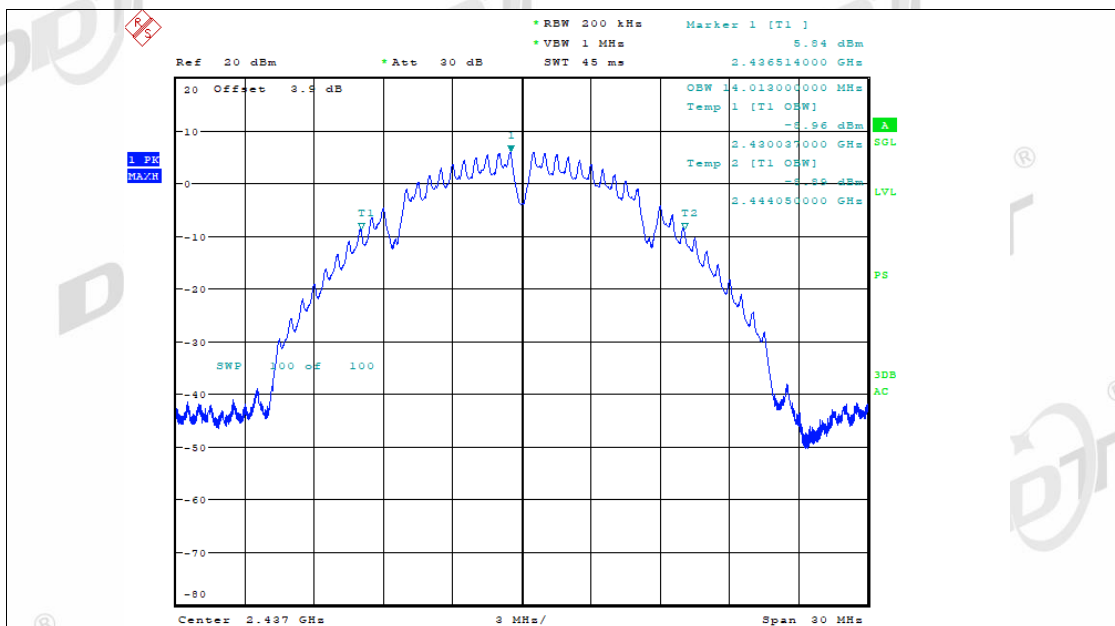
Date: 16.JAN.2023 17:41:31

OBW NVNT b 2412MHz Ant2



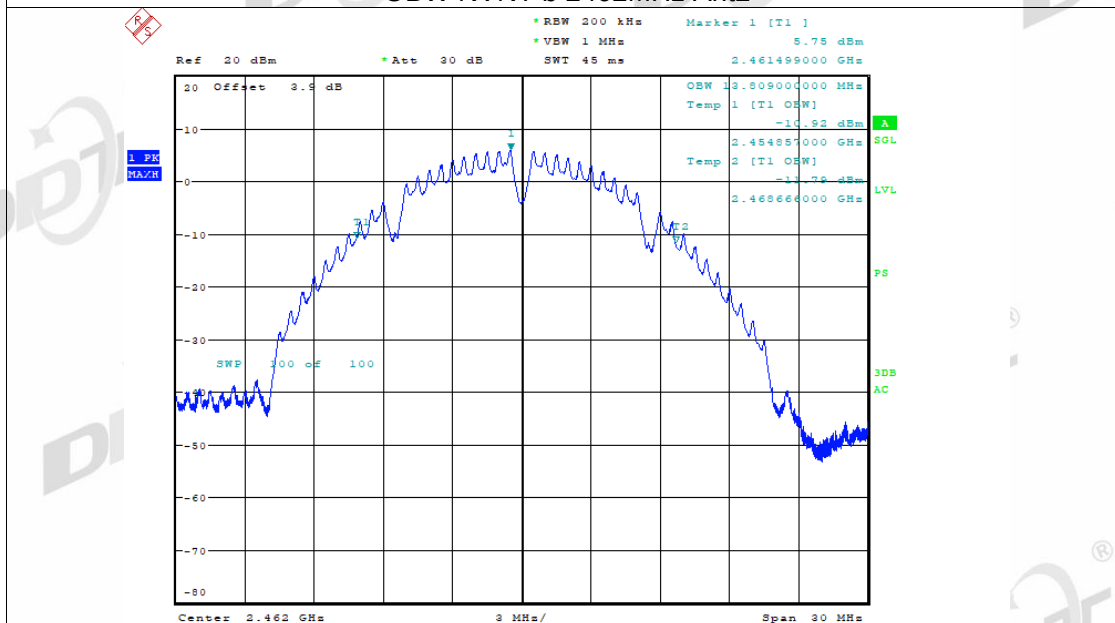
Date: 16.JAN.2023 16:52:38

OBW NVNT b 2437MHz Ant2



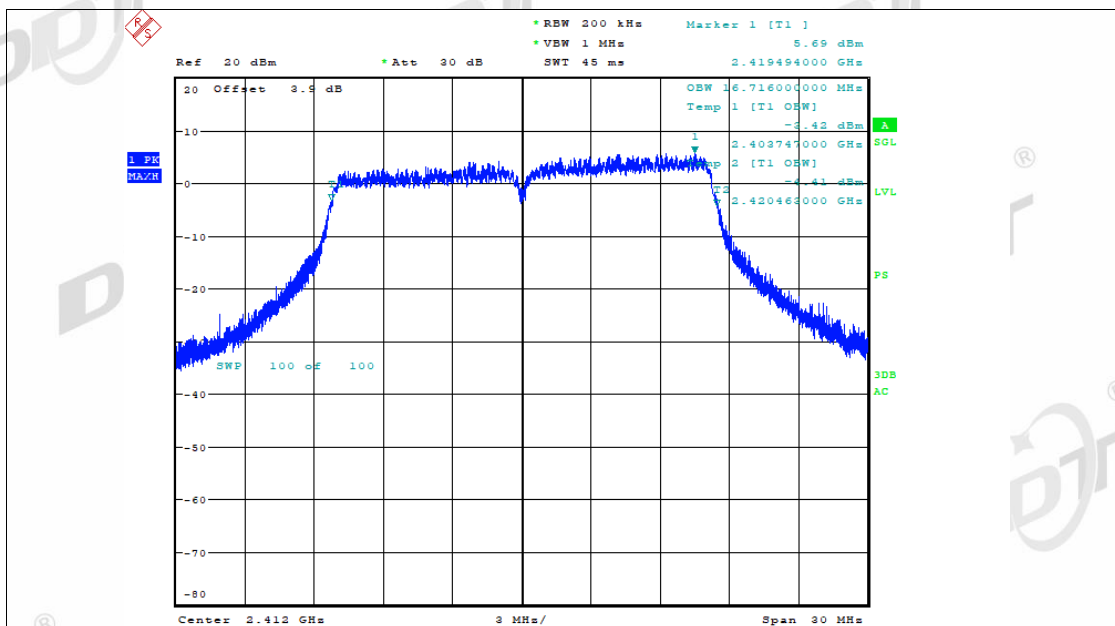
Date: 16.JAN.2023 17:37:41

OBW NVNT b 2462MHz Ant2



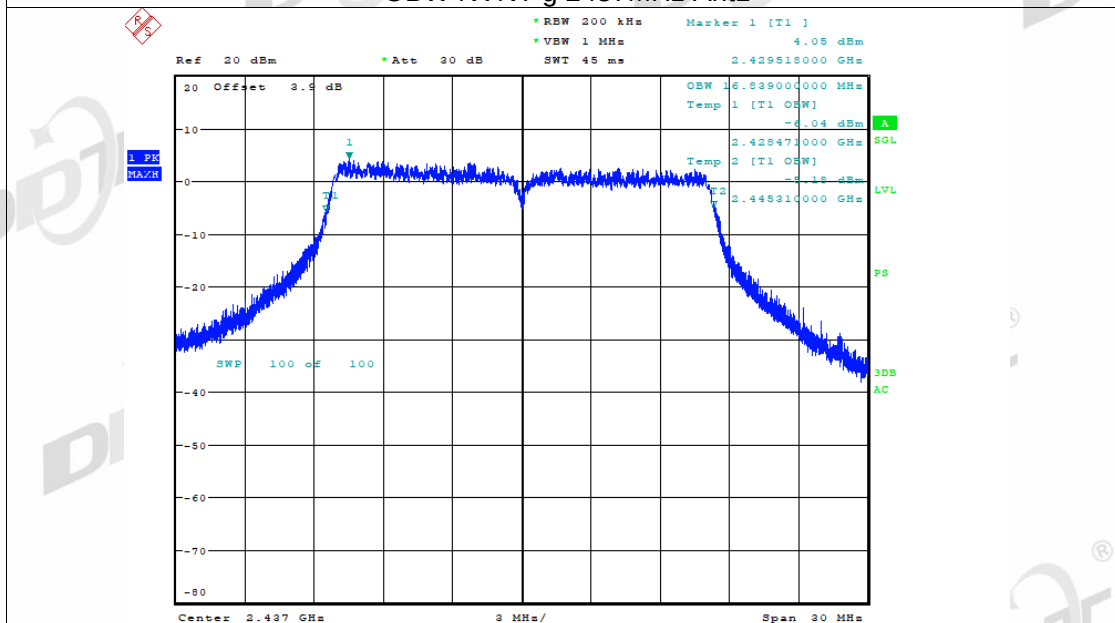
Date: 16.JAN.2023 17:45:14

OBW NVNT g 2412MHz Ant1



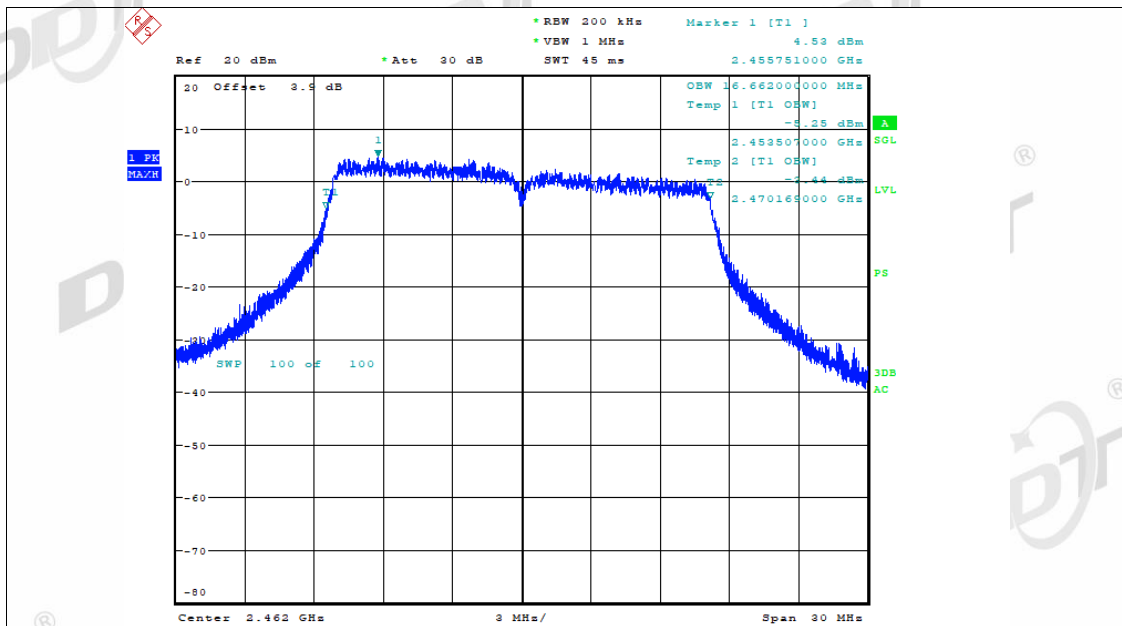
Date: 17.JAN.2023 08:47:27

OBW NVNT g 2437MHz Ant1



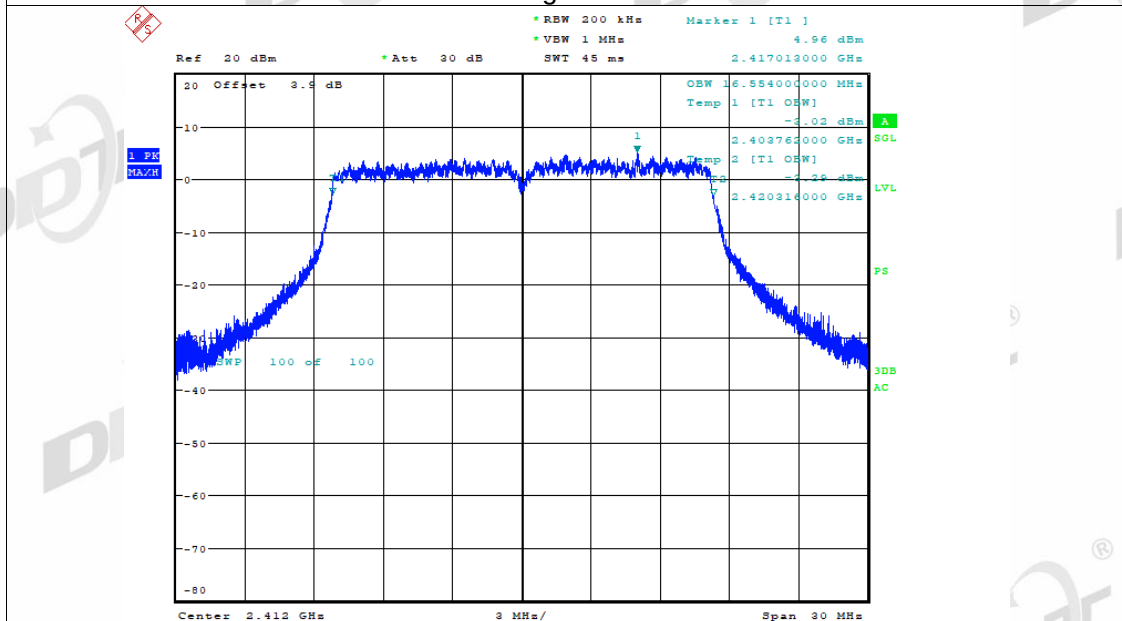
Date: 17.JAN.2023 08:58:30

OBW NVNT g 2462MHz Ant1



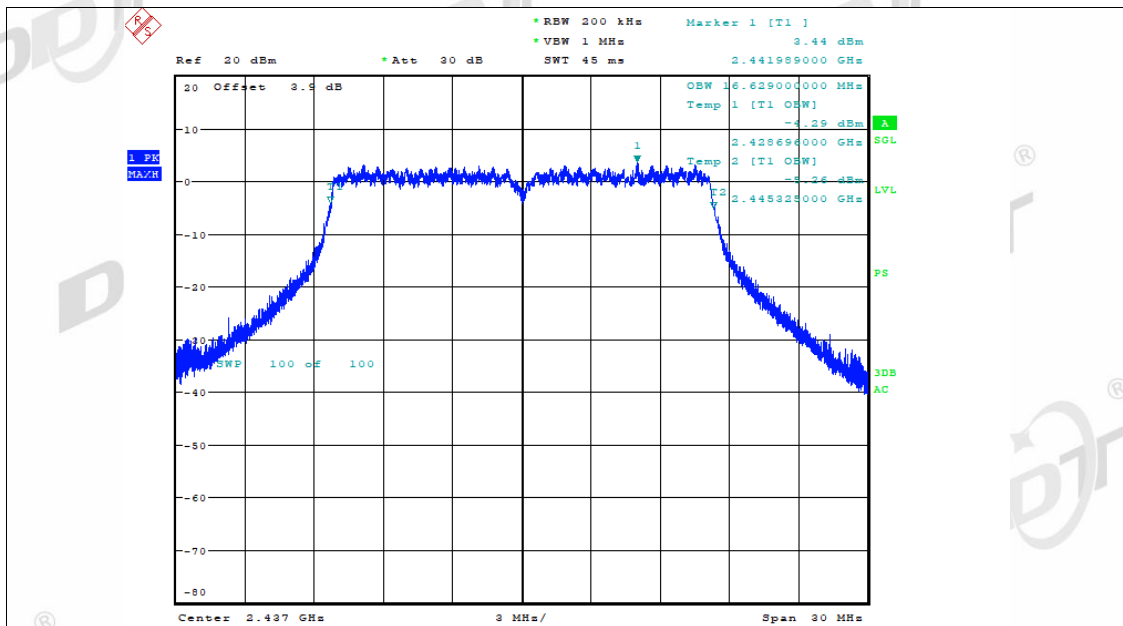
Date: 17.JAN.2023 09:11:02

OBW NVNT g 2412MHz Ant2



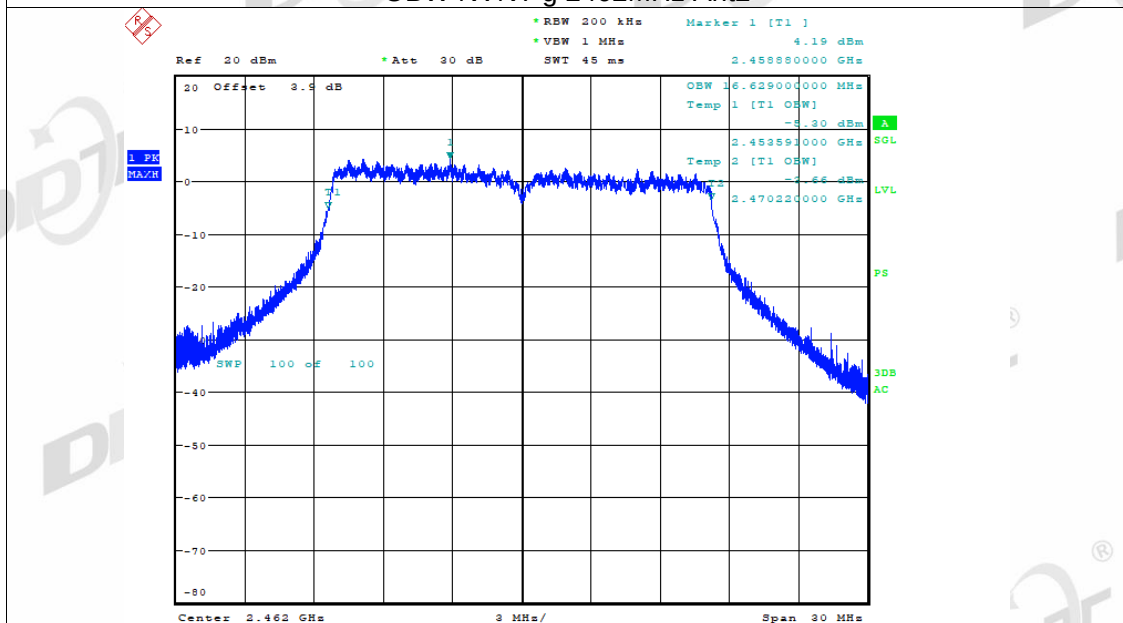
Date: 17.JAN.2023 08:52:12

OBW NVNT g 2437MHz Ant2



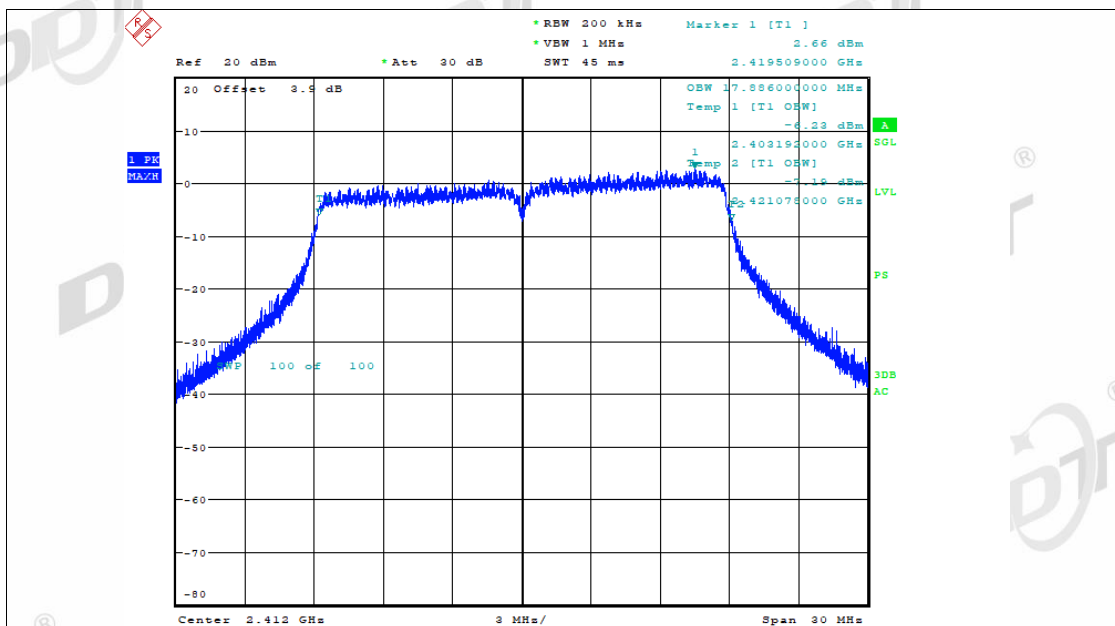
Date: 17.JAN.2023 09:07:09

OBW NVNT g 2462MHz Ant2



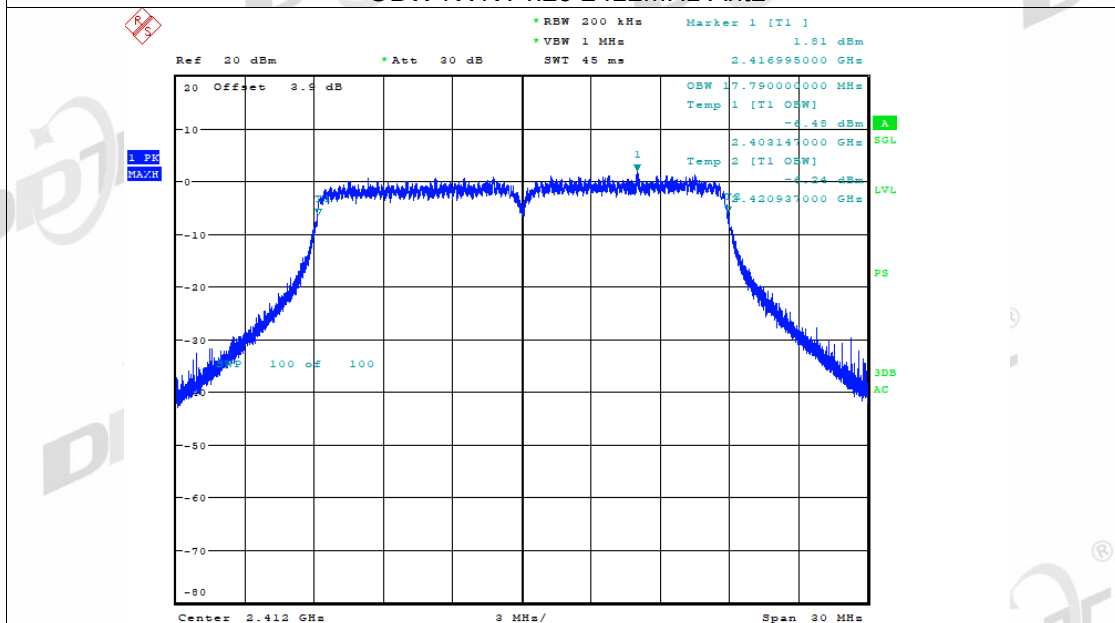
Date: 17.JAN.2023 09:14:46

OBW NVNT n20 2412MHz Ant1



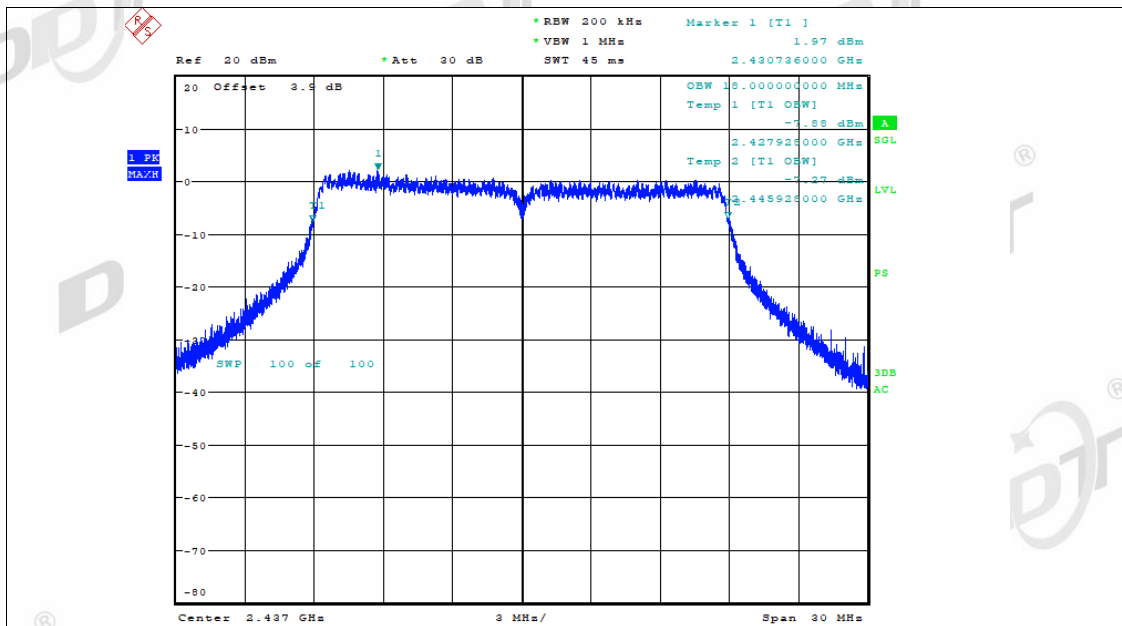
Date: 17.JAN.2023 09:23:55

OBW NVNT n20 2412MHz Ant2



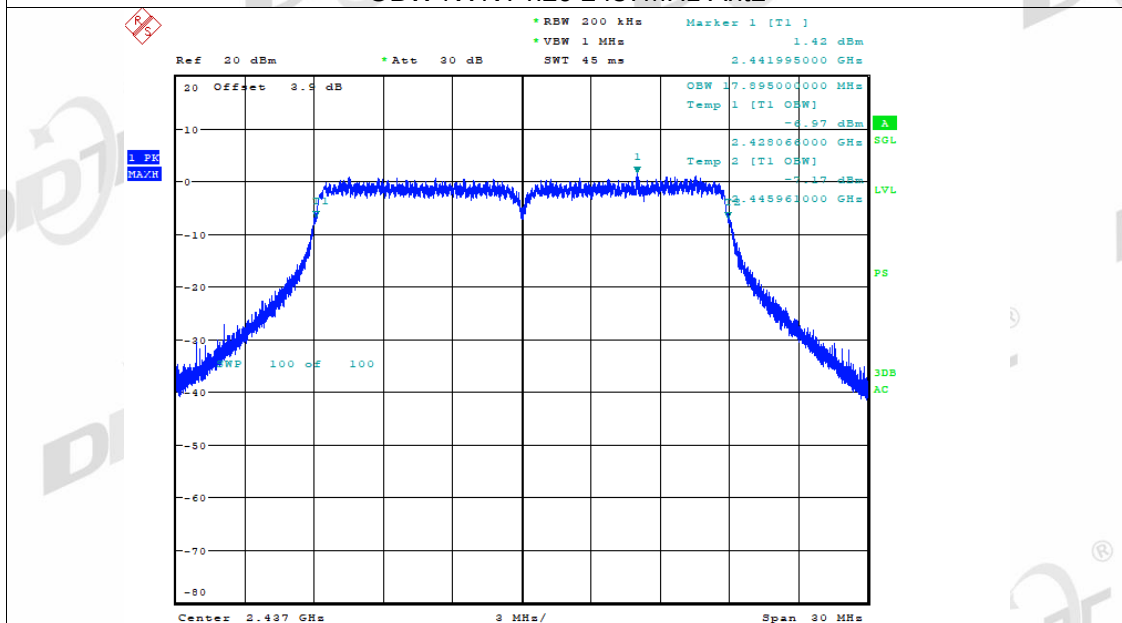
Date: 17.JAN.2023 09:24:17

OBW NVNT n20 2437MHz Ant1



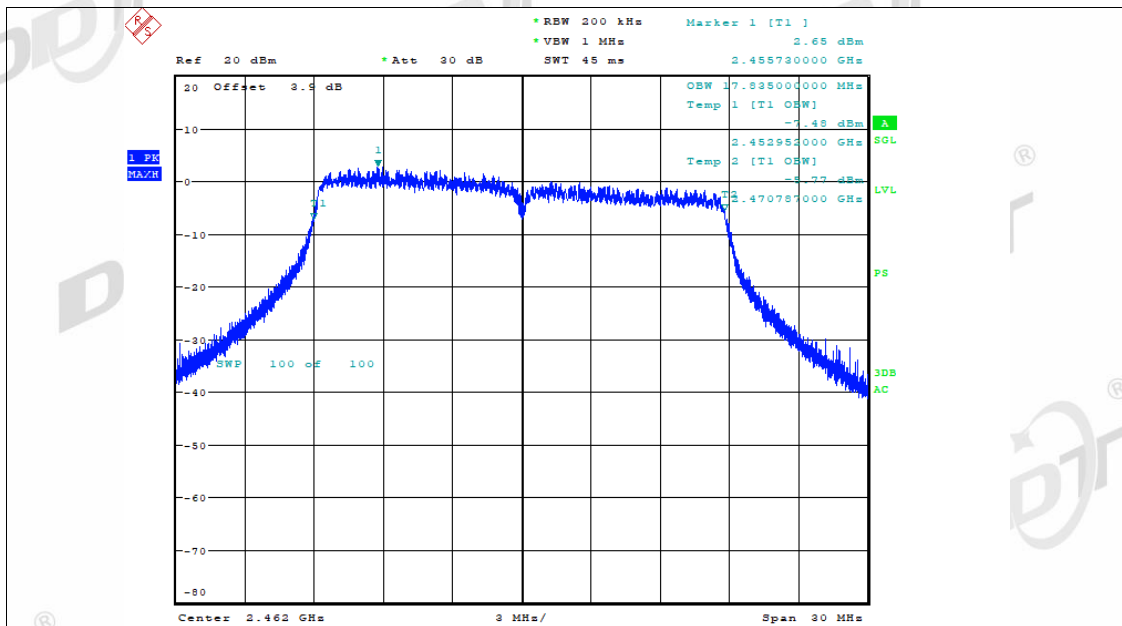
Date: 17.JAN.2023 09:31:07

OBW NVNT n20 2437MHz Ant2



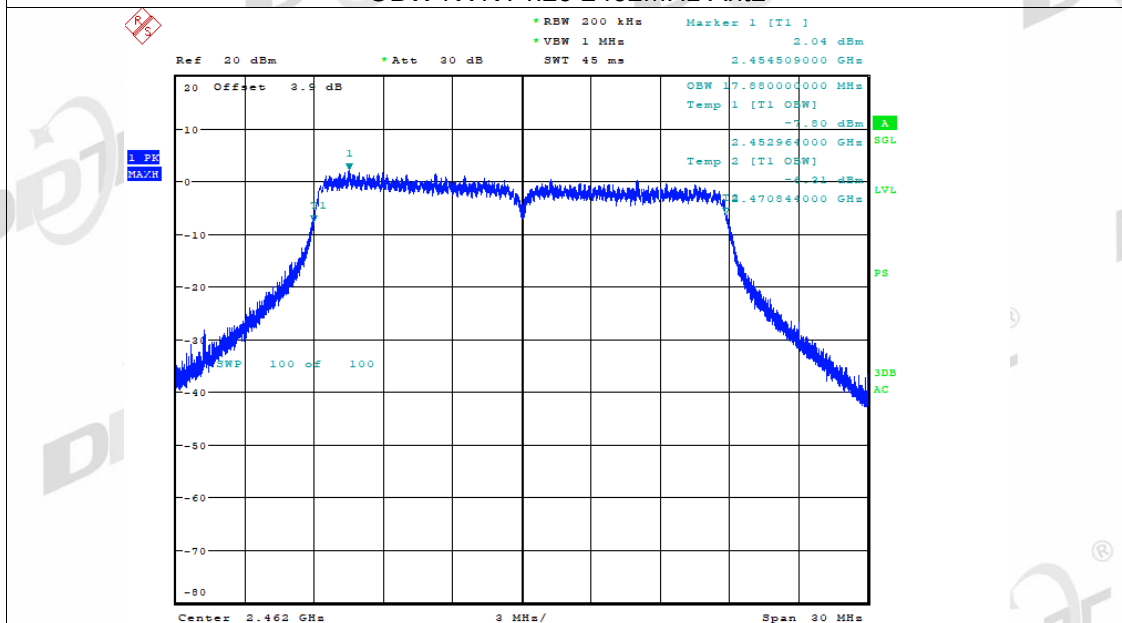
Date: 17.JAN.2023 09:31:27

OBW NVNT n20 2462MHz Ant1



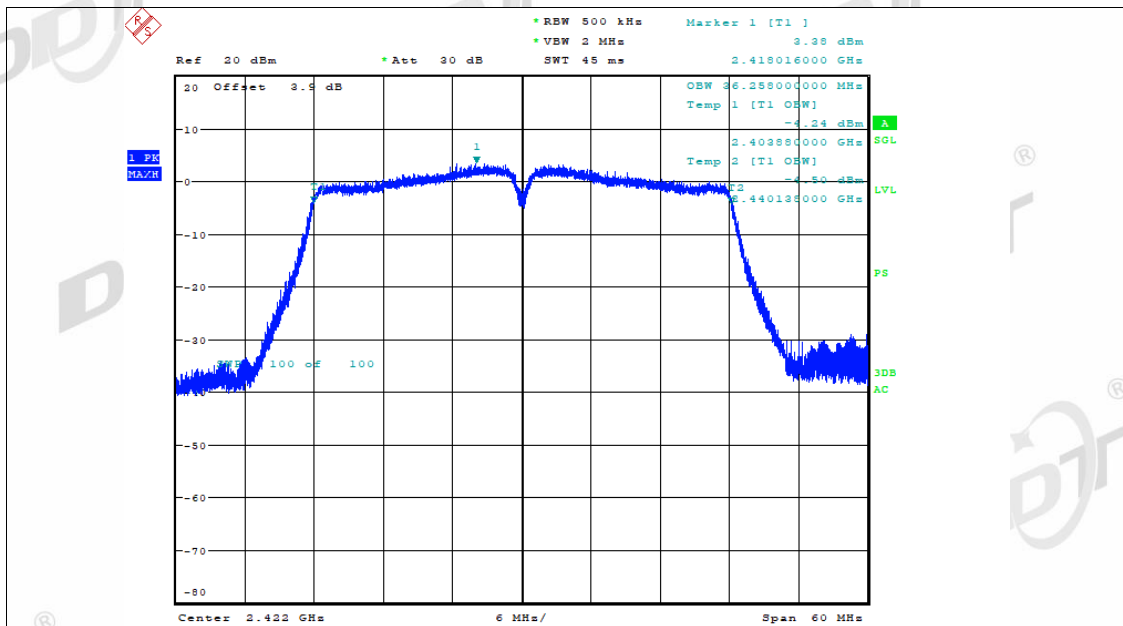
Date: 17.JAN.2023 09:47:11

OBW NVNT n20 2462MHz Ant2



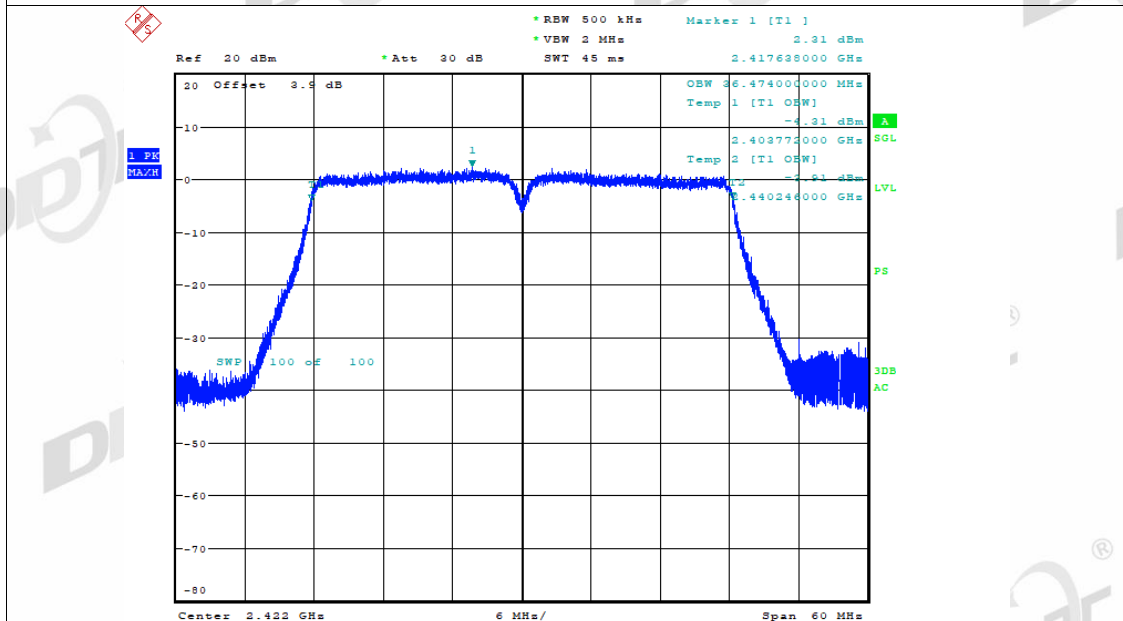
Date: 17.JAN.2023 09:47:33

OBW NVNT n40 2422MHz Ant1



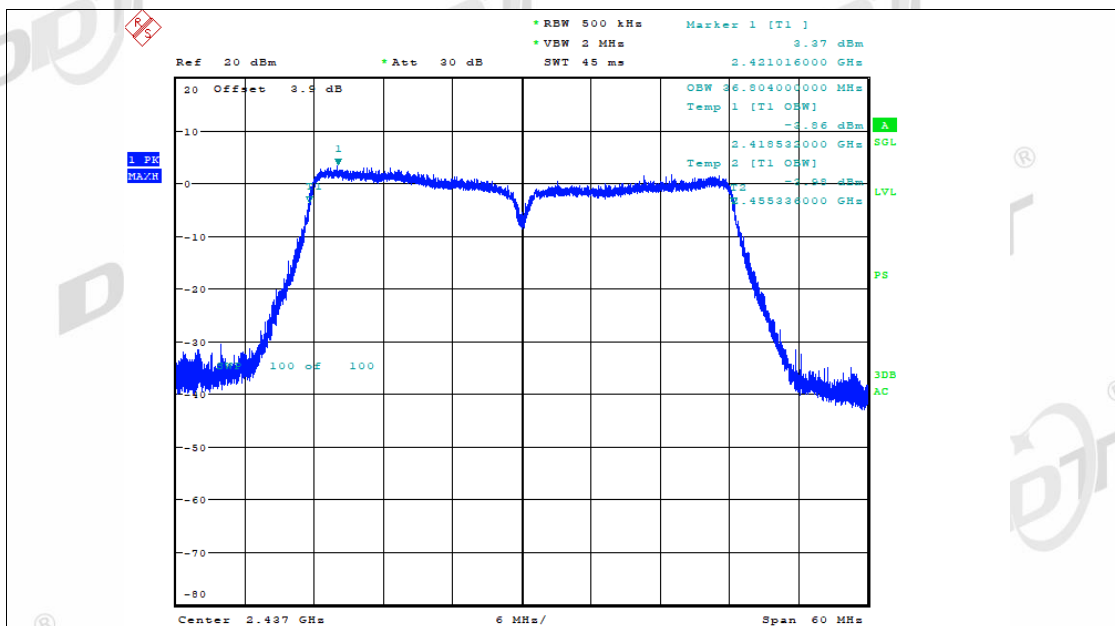
Date: 17.JAN.2023 09:57:16

OBW NVNT n40 2422MHz Ant2



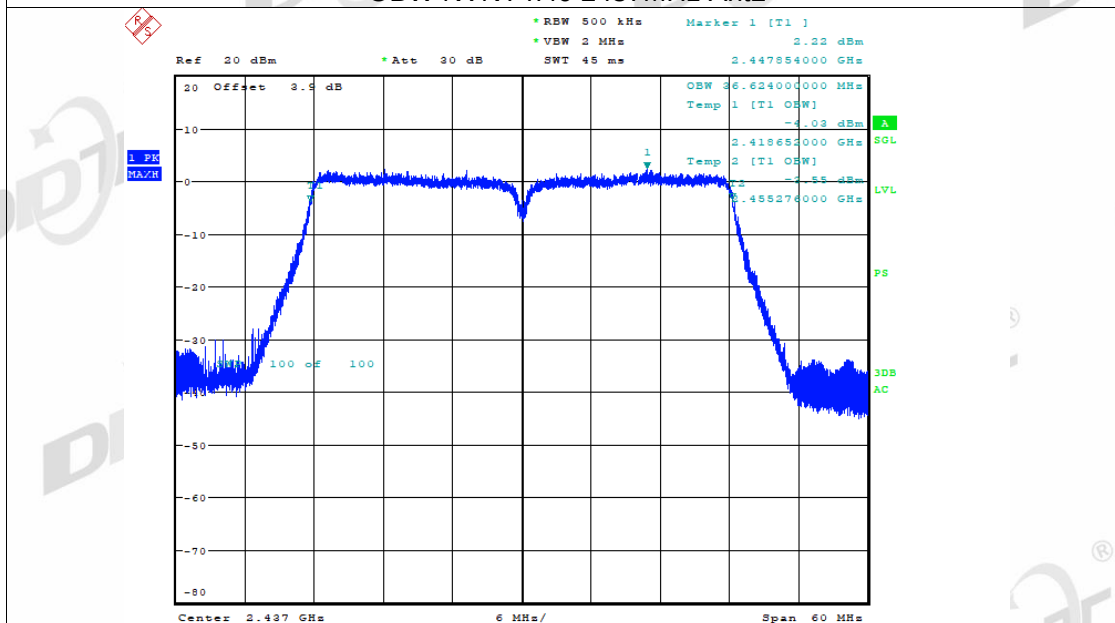
Date: 17.JAN.2023 09:57:35

OBW NVNT n40 2437MHz Ant1



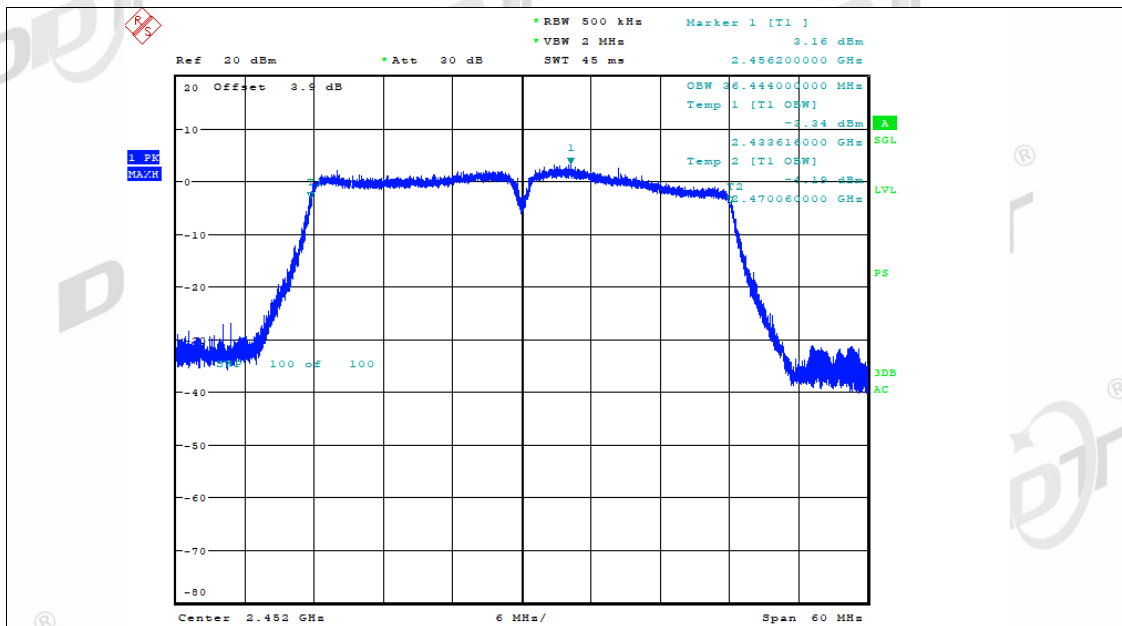
Date: 17.JAN.2023 10:08:33

OBW NVNT n40 2437MHz Ant2



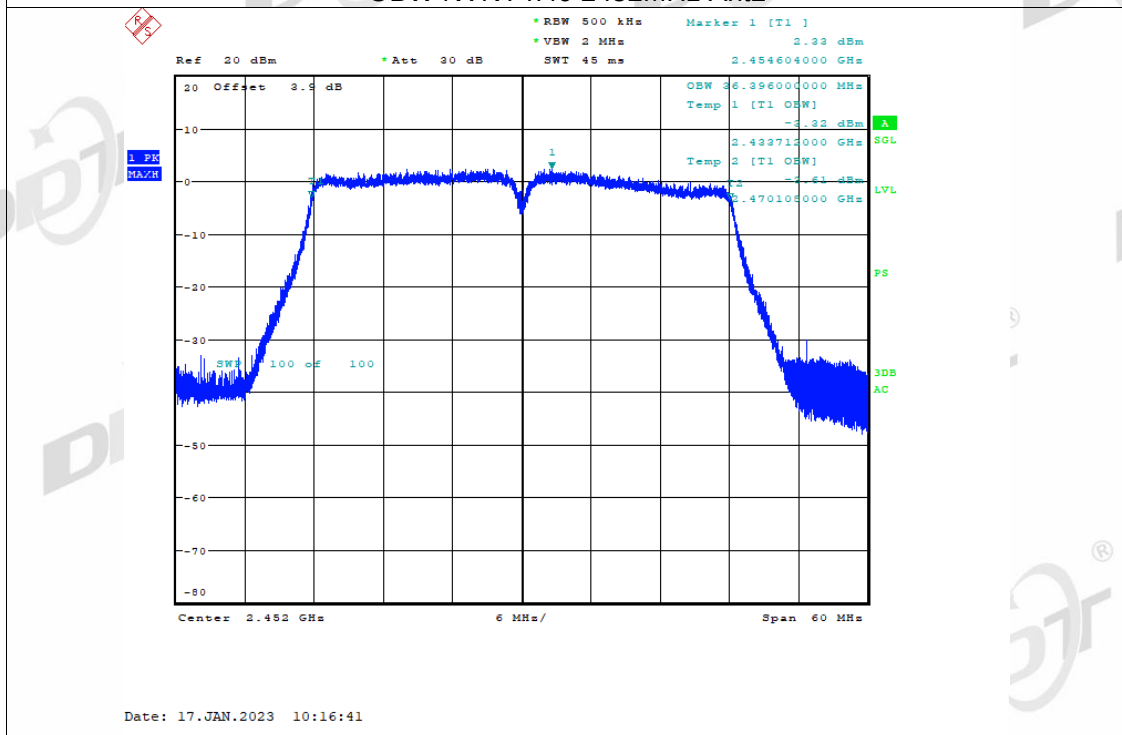
Date: 17.JAN.2023 10:08:53

OBW NVNT n40 2452MHz Ant1



Date: 17.JAN.2023 10:16:21

OBW NVNT n40 2452MHz Ant2



Date: 17.JAN.2023 10:16:41

5. Maximum PK Conducted Output Power

5.1. Block diagram of test setup

Same as section 4.1

5.2. Limits

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. 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 as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

5.3. Test procedure

Connect each EUT's antenna output to power sensor by RF cable and attenuator
Measure the Maximum output power of antenna port by power sensor.

5.4. Test result

Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)	Verdict
11B	2412	Ant1	16.42	30	20.19	36	Pass
11B	2437	Ant1	16.26	30	20.03	36	Pass
11B	2462	Ant1	15.95	30	19.72	36	Pass
11B	2412	Ant2	14.82	30	18.50	36	Pass
11B	2437	Ant2	14.73	30	18.41	36	Pass
11B	2462	Ant2	14.48	30	18.16	36	Pass
11G	2412	Ant1	22.13	30	25.90	36	Pass
11G	2437	Ant1	22.43	30	26.20	36	Pass
11G	2462	Ant1	22.43	30	26.20	36	Pass
11G	2412	Ant2	20.98	30	24.66	36	Pass
11G	2437	Ant2	21.54	30	25.22	36	Pass
11G	2462	Ant2	21.11	30	24.79	36	Pass
11N20	2412	Ant1	20.22	30	23.99	36	Pass
11N20	2412	Ant2	18.69	30	22.37	36	Pass
11N20	2412	Sum	22.53	30	26.30	36	Pass
11N20	2437	Ant1	20.12	30	23.89	36	Pass
11N20	2437	Ant2	19.15	30	22.83	36	Pass
11N20	2437	Sum	22.67	30	26.44	36	Pass
11N20	2462	Ant1	20.08	30	23.85	36	Pass
11N20	2462	Ant2	18.81	30	22.49	36	Pass
11N20	2462	Sum	22.50	30	26.27	36	Pass
11N40	2422	Ant1	20.64	30	24.41	36	Pass
11N40	2422	Ant2	19.22	30	22.90	36	Pass
11N40	2422	Sum	23.00	30	26.77	36	Pass
11N40	2437	Ant1	20.28	30	24.05	36	Pass
11N40	2437	Ant2	19.99	30	23.67	36	Pass
11N40	2437	Sum	23.15	30	26.92	36	Pass
11N40	2452	Ant1	20.87	30	24.64	36	Pass
11N40	2452	Ant2	19.78	30	23.46	36	Pass
11N40	2452	Sum	23.37	30	27.14	36	Pass

6. Power Spectral Density

6.1. Block diagram of test setup

Same as section 4.1

6.2. Limits

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

6.3. Test procedure

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

(2) Set the spectrum analyzer as follows:

Center frequency	DTS Channel center frequency
RBW:	$3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$
VBW:	$\geq 3\text{RBW}$
Span	1.5 times the DTS bandwidth
Detector Mode:	peak
Sweep time:	auto
Trace mode	Max hold

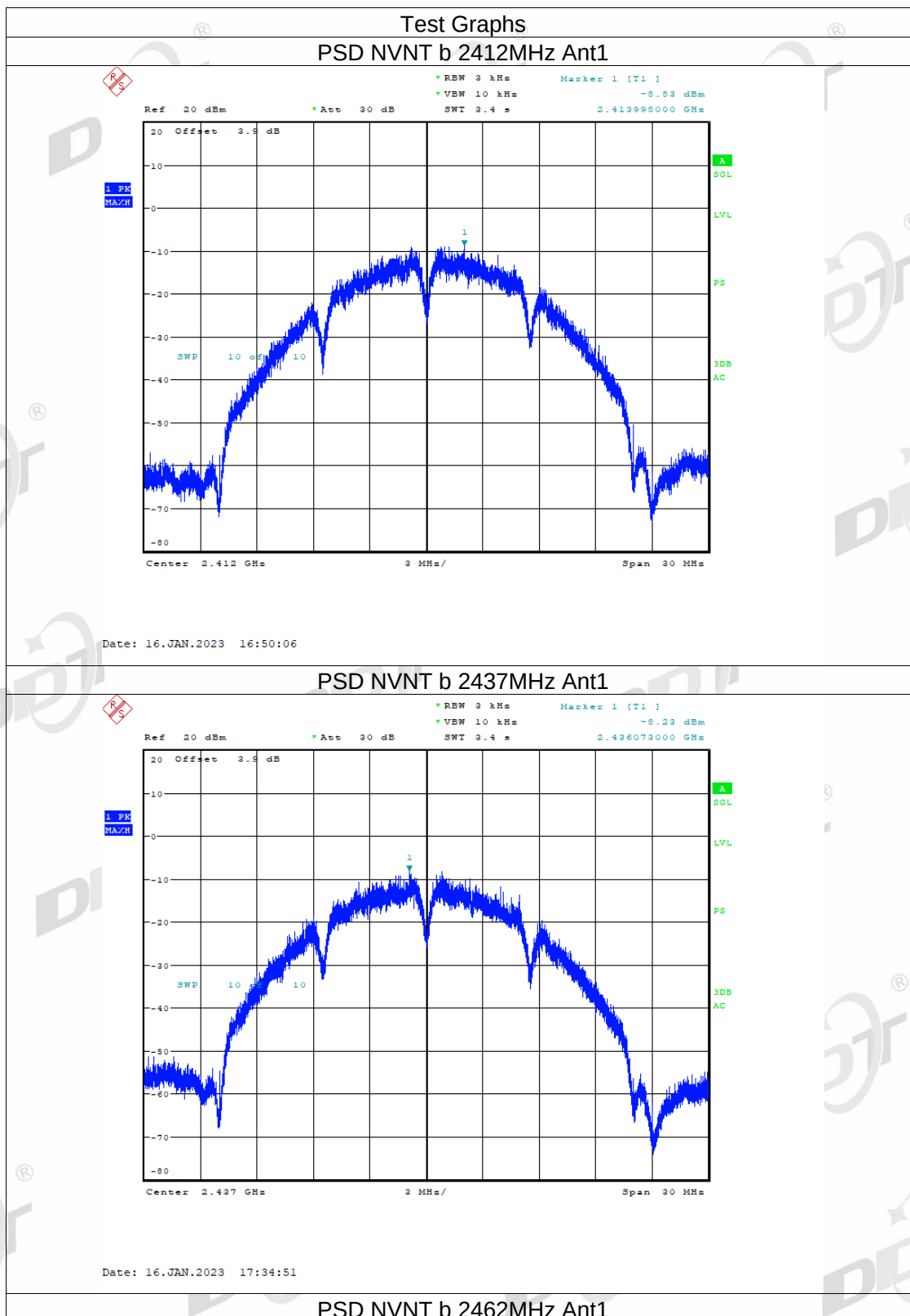
(3) Allow the trace to stabilize, use the peak marker function to determine the maximum amplitude level within the RBW.

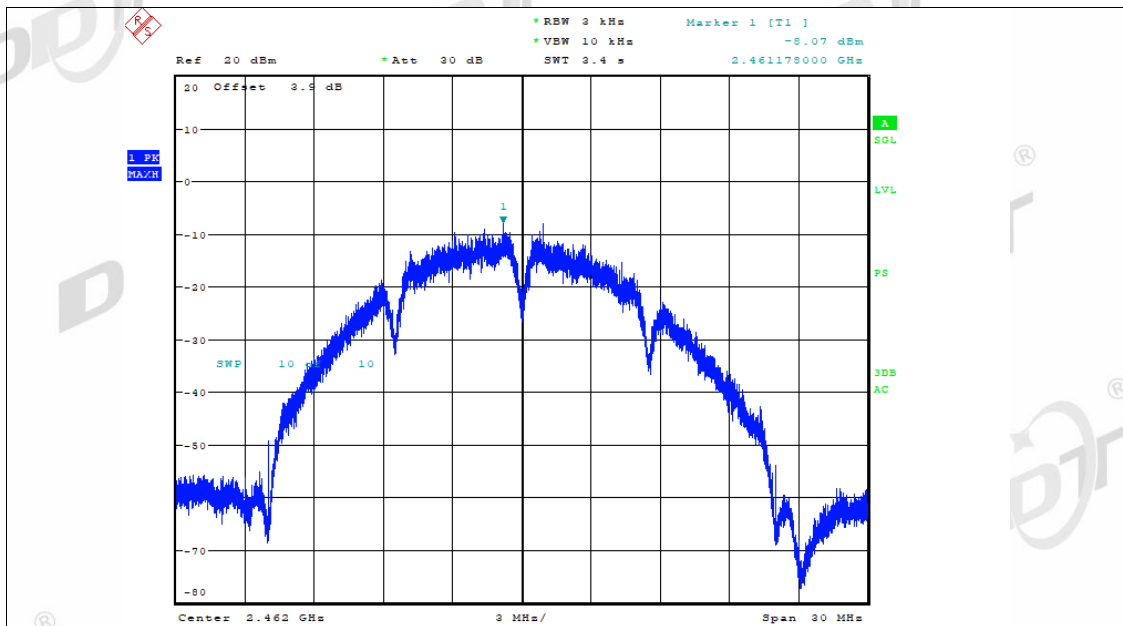
(4) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

6.4. Test result

Test Mode	Test Channel	Antenna	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
11B	2412	Ant1	-8.83	8.00	Pass
11B	2437	Ant1	-8.23	8.00	Pass
11B	2462	Ant1	-8.07	8.00	Pass
11B	2412	Ant2	-8.13	8.00	Pass
11B	2437	Ant2	-8.72	8.00	Pass
11B	2462	Ant2	-9.44	8.00	Pass
11G	2412	Ant1	-10.01	8.00	Pass
11G	2437	Ant1	-11.89	8.00	Pass
11G	2462	Ant1	-10.73	8.00	Pass
11G	2412	Ant2	-11.86	8.00	Pass
11G	2437	Ant2	-12.09	8.00	Pass
11G	2462	Ant2	-12.81	8.00	Pass
11N20	2412	Ant1	-13.89	8.00	Pass
11N20	2412	Ant2	-14.88	8.00	Pass
11N20	2412	Sum	-11.35	8.00	Pass
11N20	2437	Ant1	-14.27	8.00	Pass
11N20	2437	Ant2	-14.16	8.00	Pass
11N20	2437	Sum	-11.20	8.00	Pass
11N20	2462	Ant1	-13.41	8.00	Pass
11N20	2462	Ant2	-14.22	8.00	Pass
11N20	2462	Sum	-10.79	8.00	Pass
11N40	2422	Ant1	-15.98	8.00	Pass
11N40	2422	Ant2	-16.92	8.00	Pass
11N40	2422	Sum	-13.41	8.00	Pass
11N40	2437	Ant1	-15.93	8.00	Pass
11N40	2437	Ant2	-16.88	8.00	Pass
11N40	2437	Sum	-13.37	8.00	Pass
11N40	2452	Ant1	-16.02	8.00	Pass
11N40	2452	Ant2	-17.52	8.00	Pass
11N40	2452	Sum	-13.70	8.00	Pass

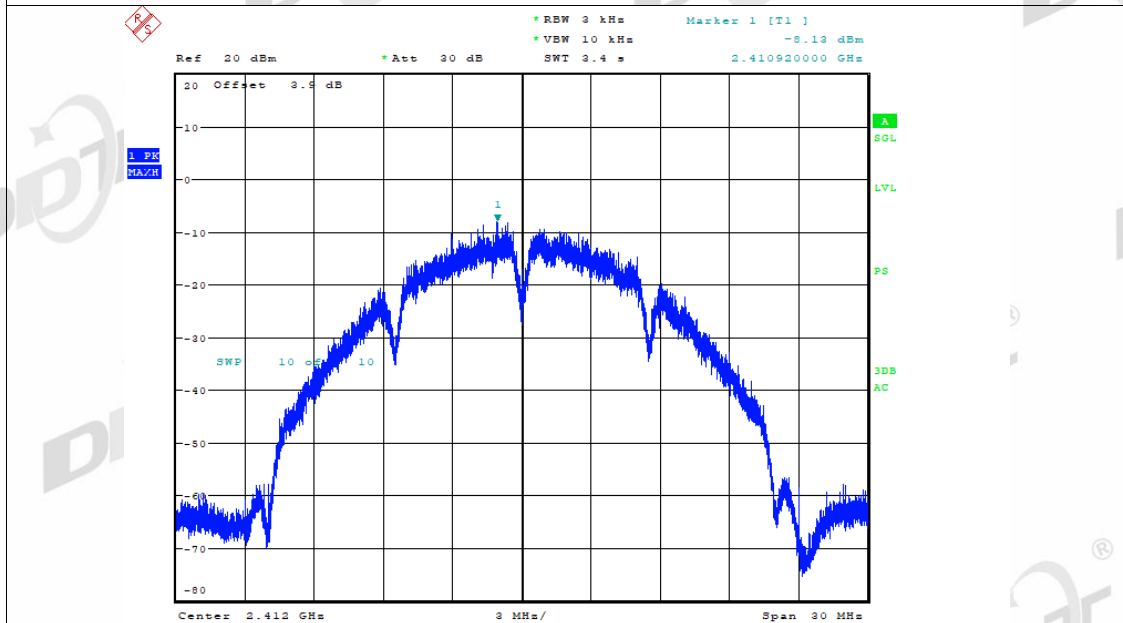
6.5. original test data





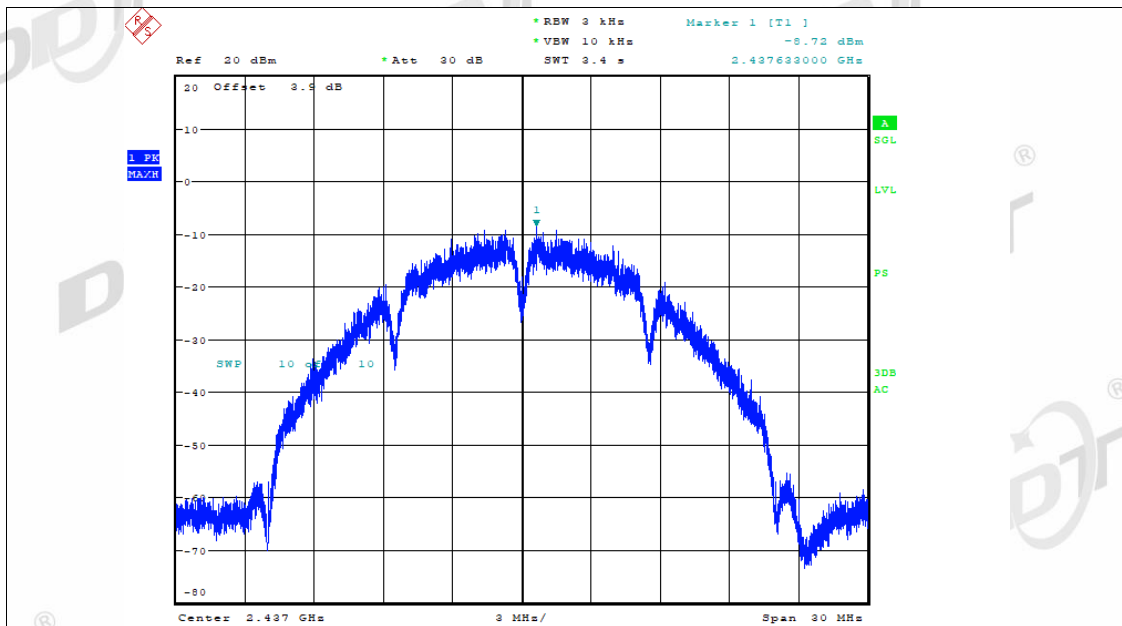
Date: 16.JAN.2023 17:42:38

PSD NVNT b 2412MHz Ant2

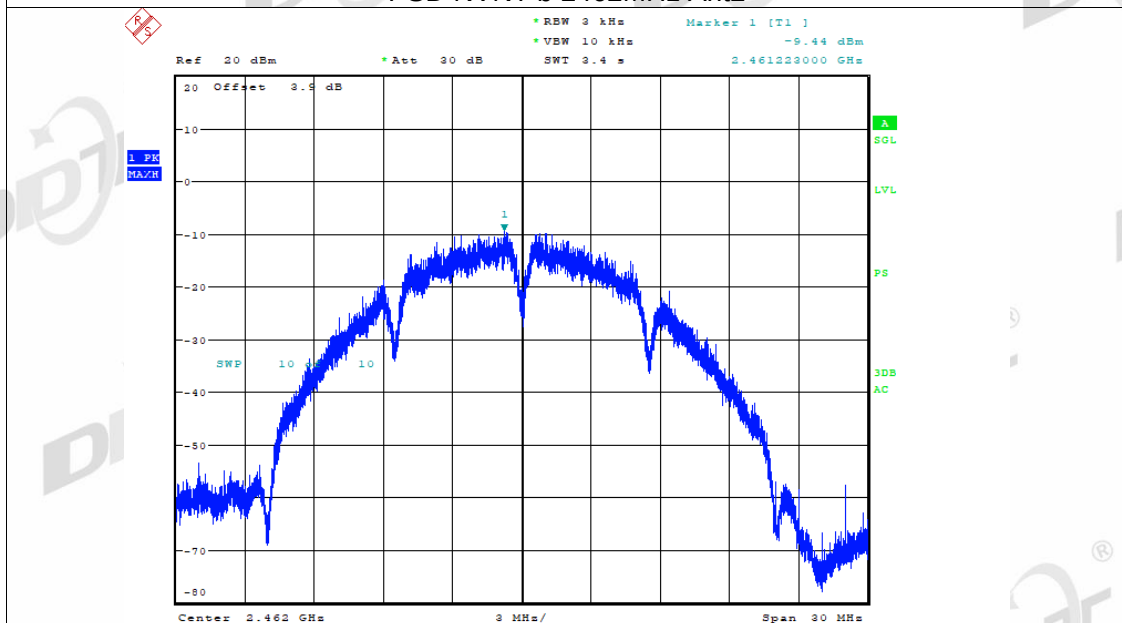


Date: 16.JAN.2023 16:53:43

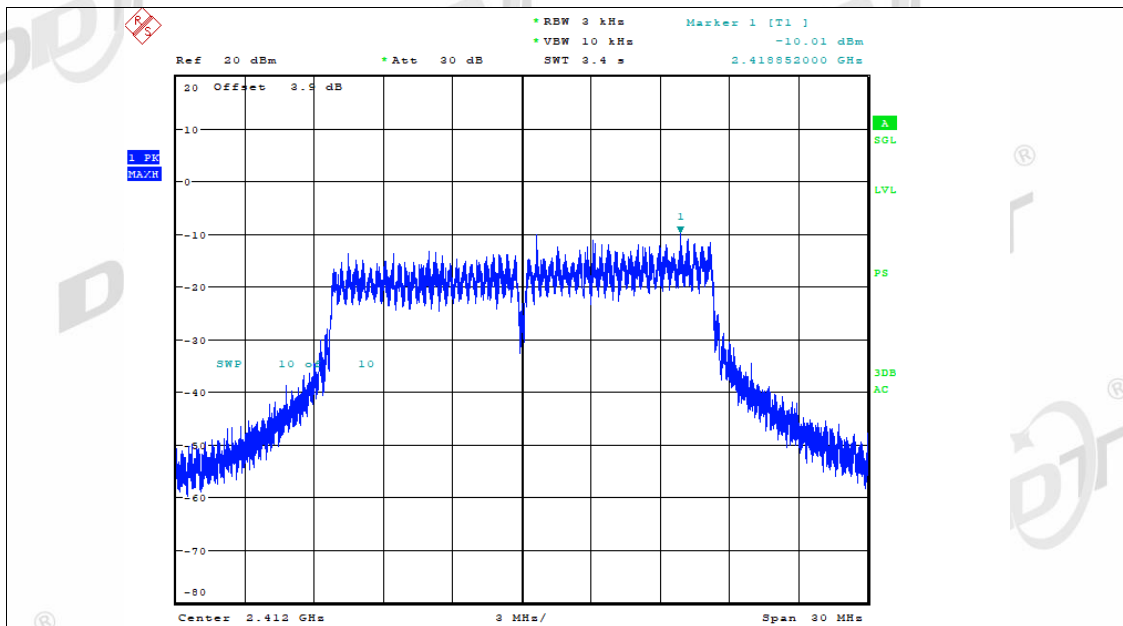
PSD NVNT b 2437MHz Ant2



PSD NVNT b 2462MHz Ant2

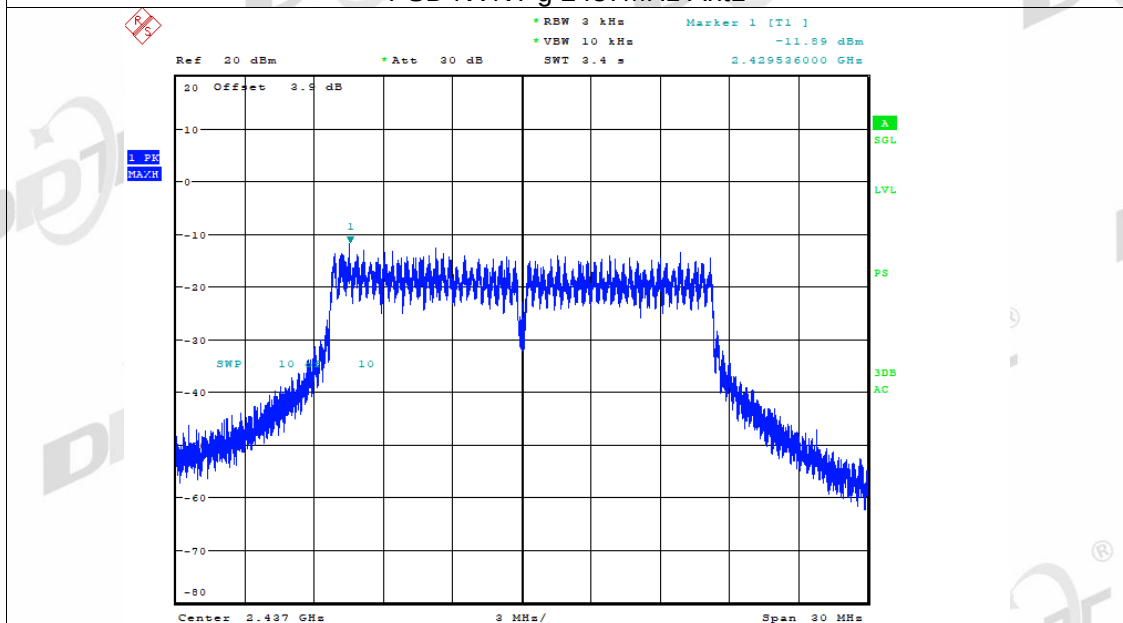


PSD NVNT g 2412MHz Ant1



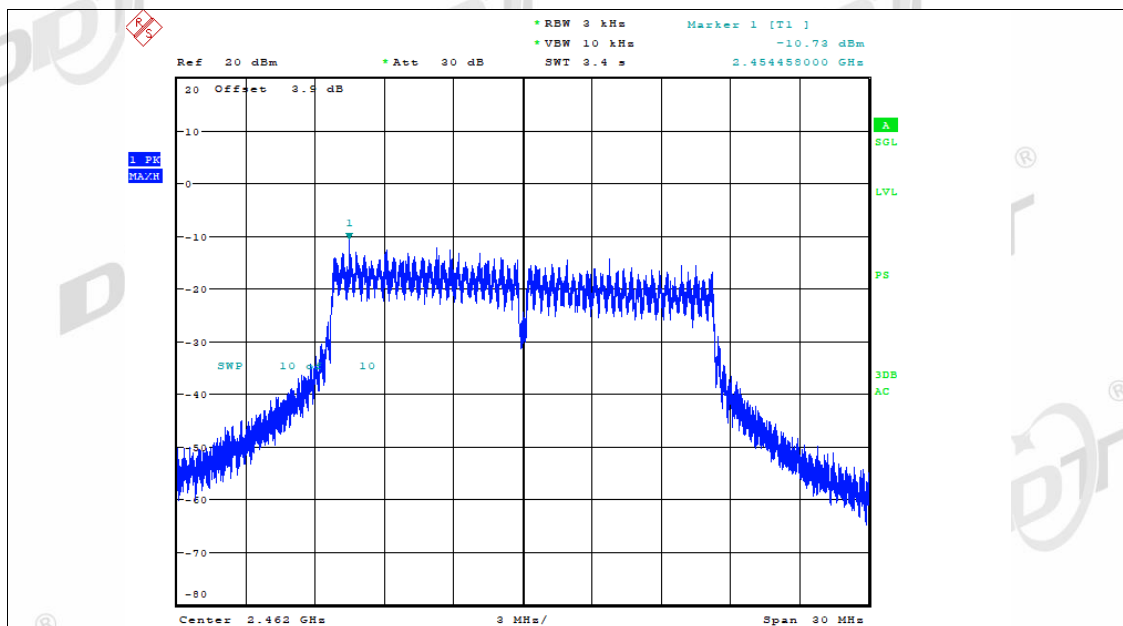
Date: 17.JAN.2023 08:48:32

PSD NVNT g 2437MHz Ant1



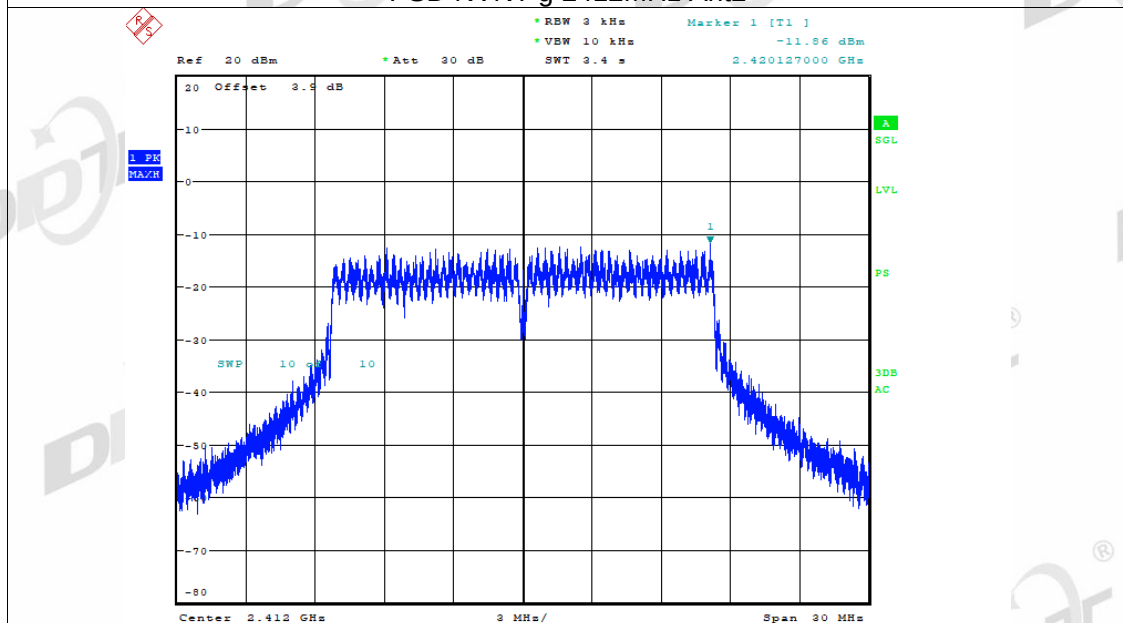
Date: 17.JAN.2023 08:59:33

PSD NVNT g 2462MHz Ant1



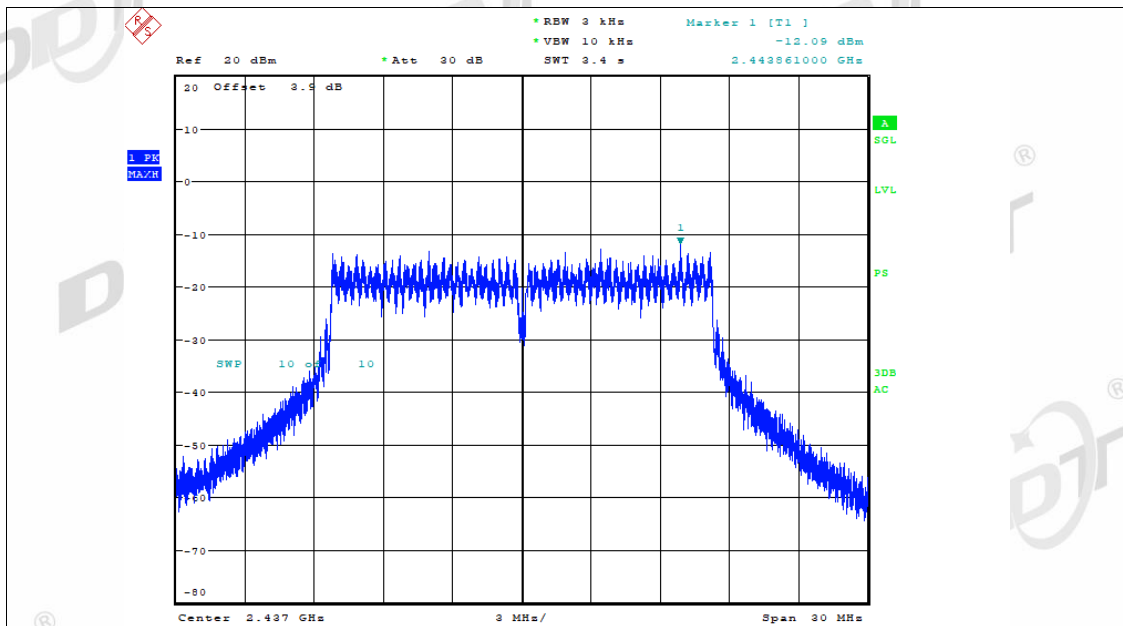
Date: 17.JAN.2023 09:12:08

PSD NVNT g 2412MHz Ant2



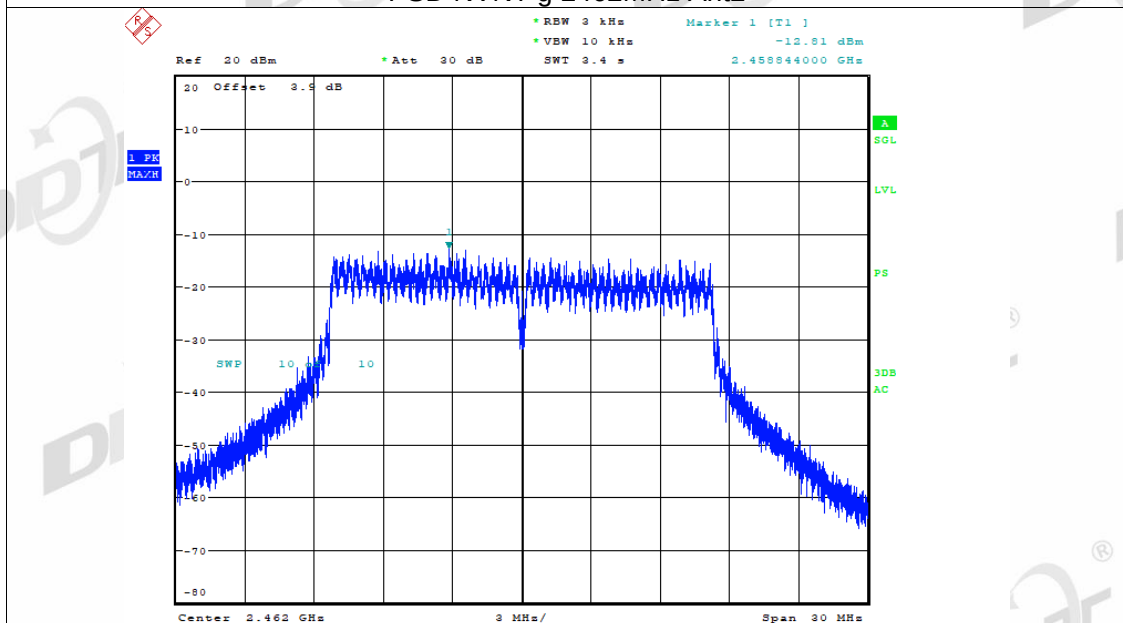
Date: 17.JAN.2023 08:53:18

PSD NVNT g 2437MHz Ant2



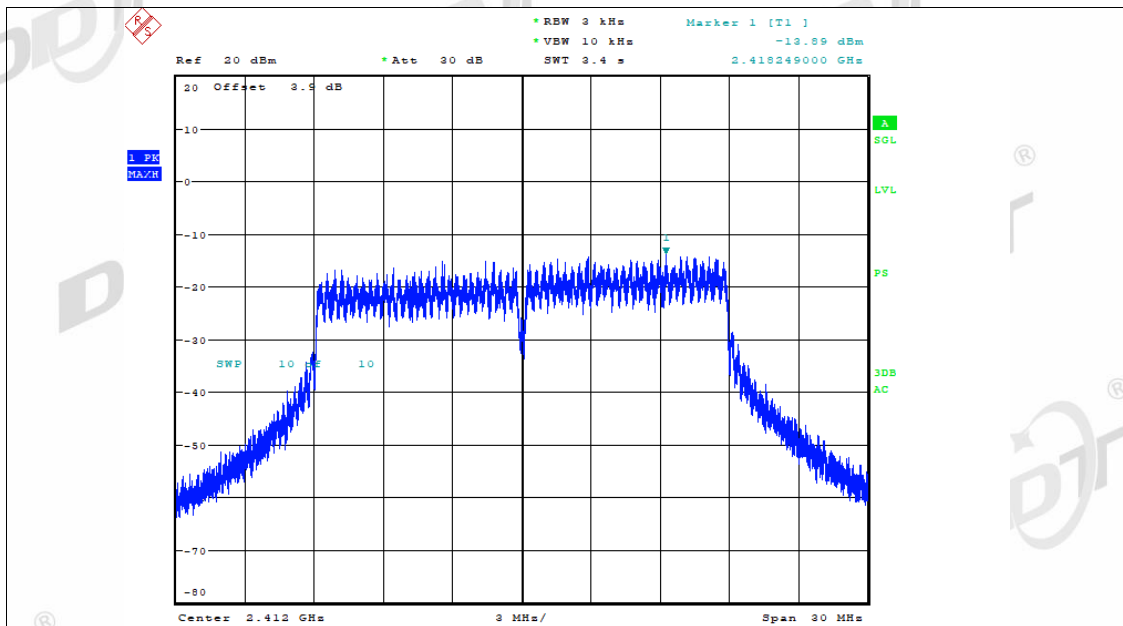
Date: 17.JAN.2023 09:08:15

PSD NVNT g 2462MHz Ant2



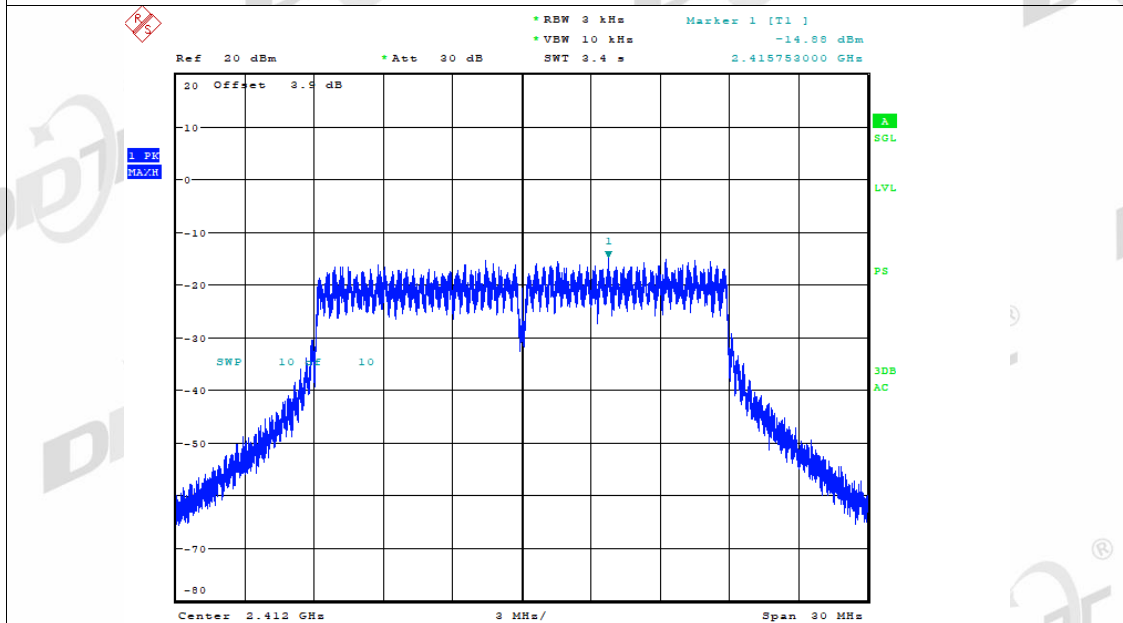
Date: 17.JAN.2023 09:15:55

PSD NVNT n20 2412MHz Ant1



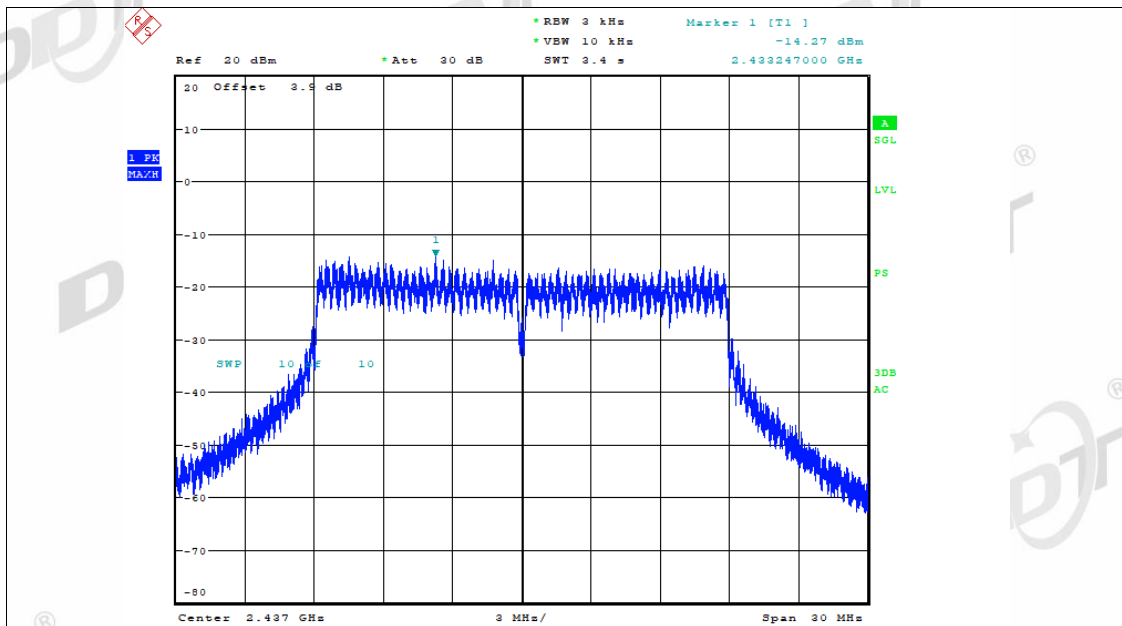
Date: 17.JAN.2023 09:25:46

PSD NVNT n20 2412MHz Ant2

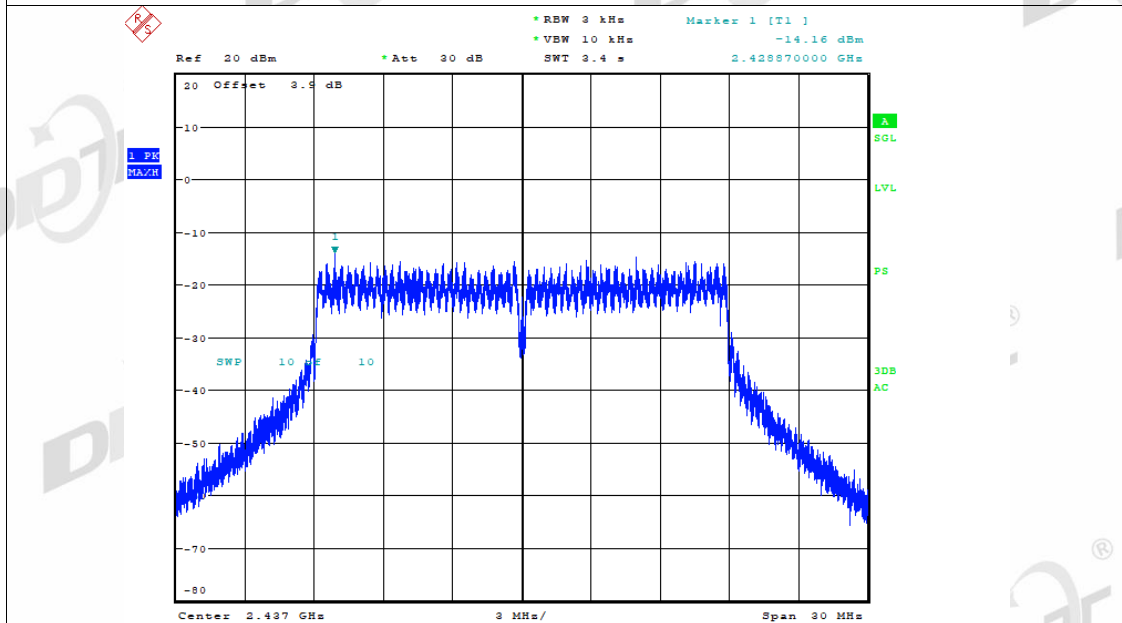


Date: 17.JAN.2023 09:26:23

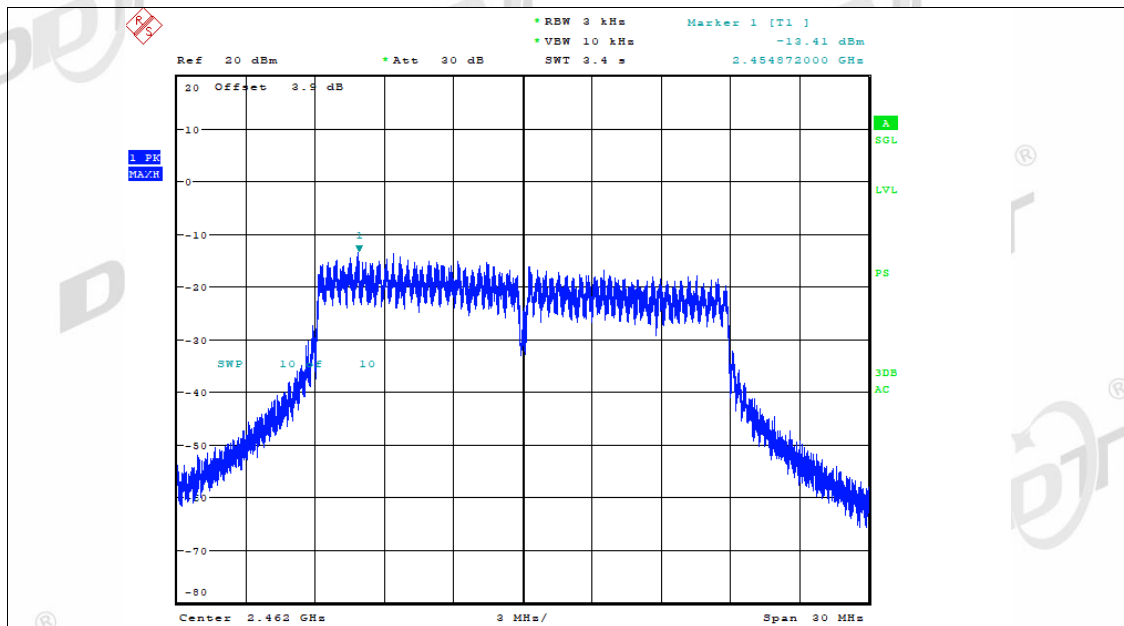
PSD NVNT n20 2437MHz Ant1



PSD NVNT n20 2437MHz Ant2

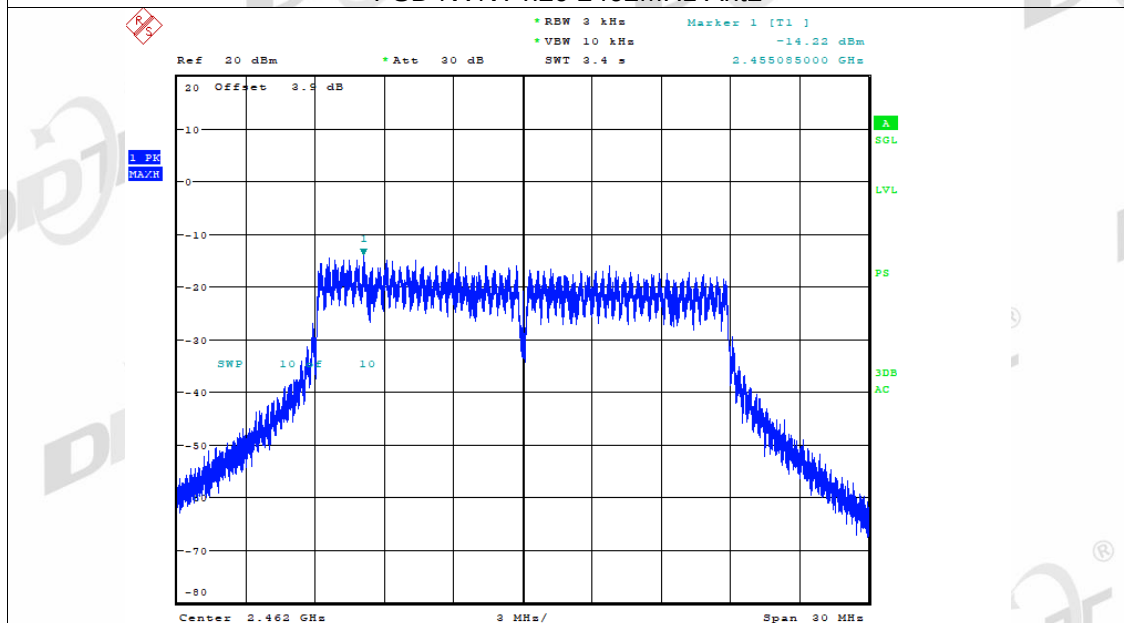


PSD NVNT n20 2462MHz Ant1



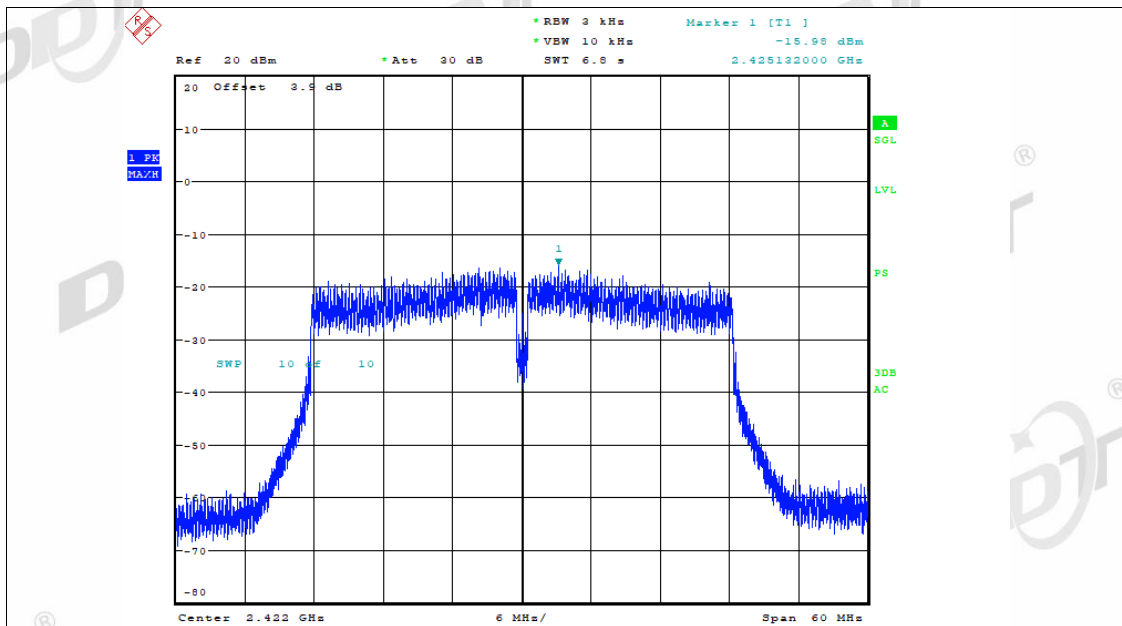
Date: 17.JAN.2023 09:49:03

PSD NVNT n20 2462MHz Ant2



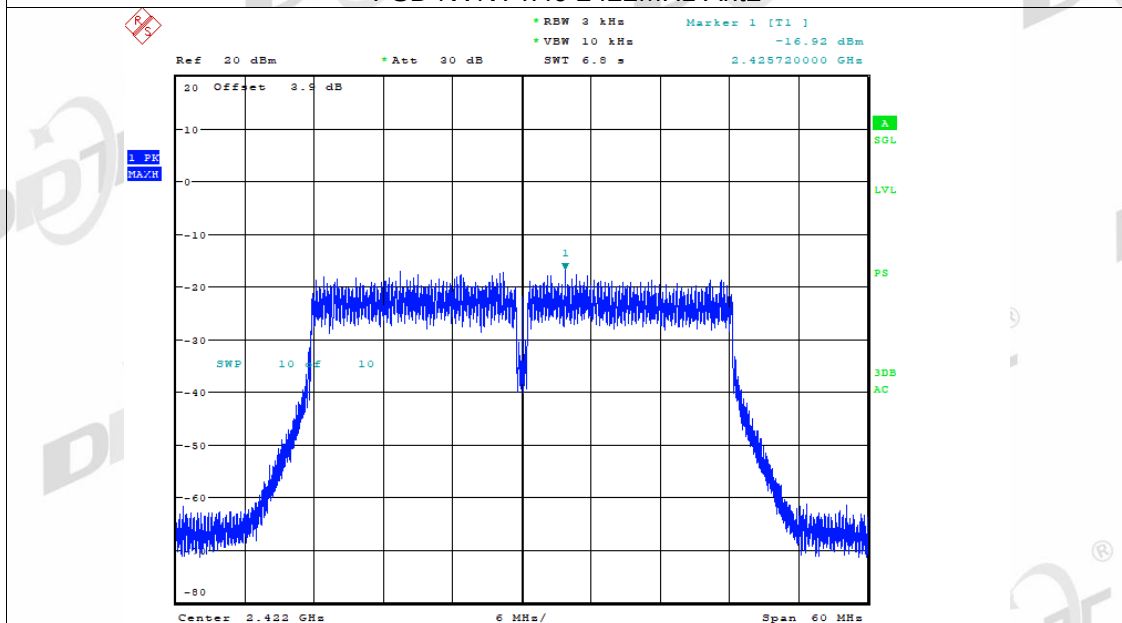
Date: 17.JAN.2023 09:49:40

PSD NVNT n40 2422MHz Ant1



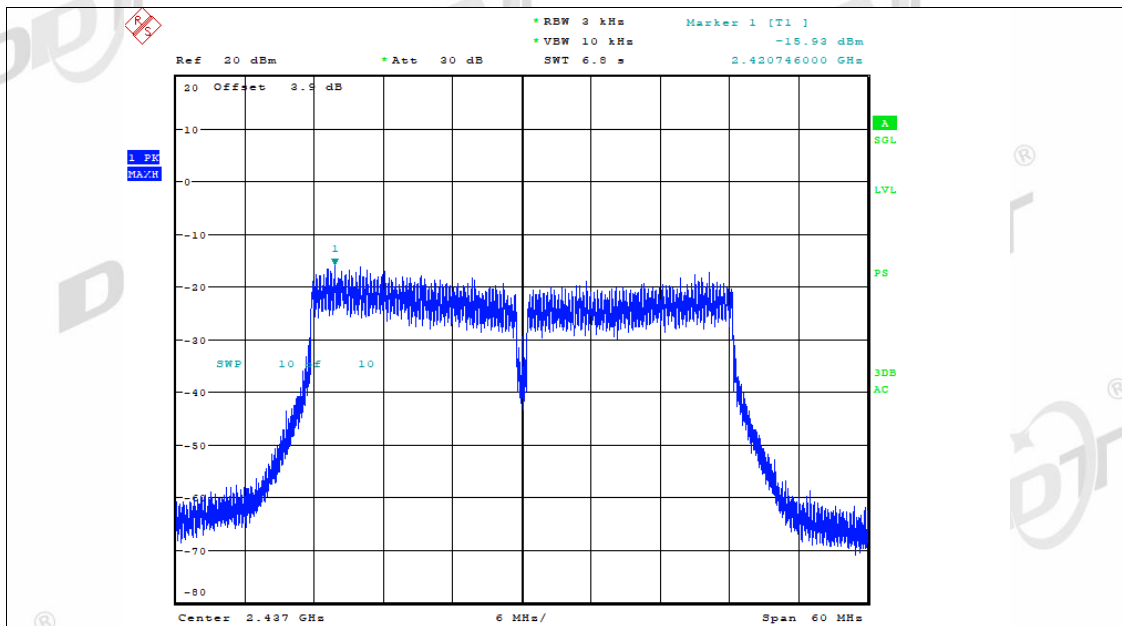
Date: 17.JAN.2023 09:59:30

PSD NVNT n40 2422MHz Ant2



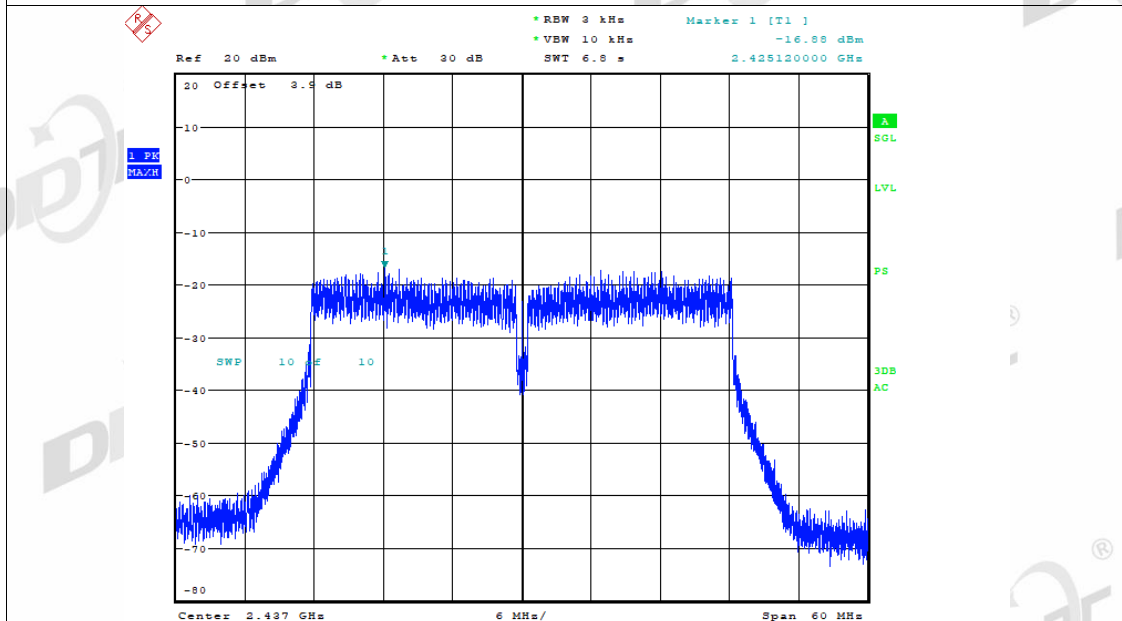
Date: 17.JAN.2023 10:00:41

PSD NVNT n40 2437MHz Ant1



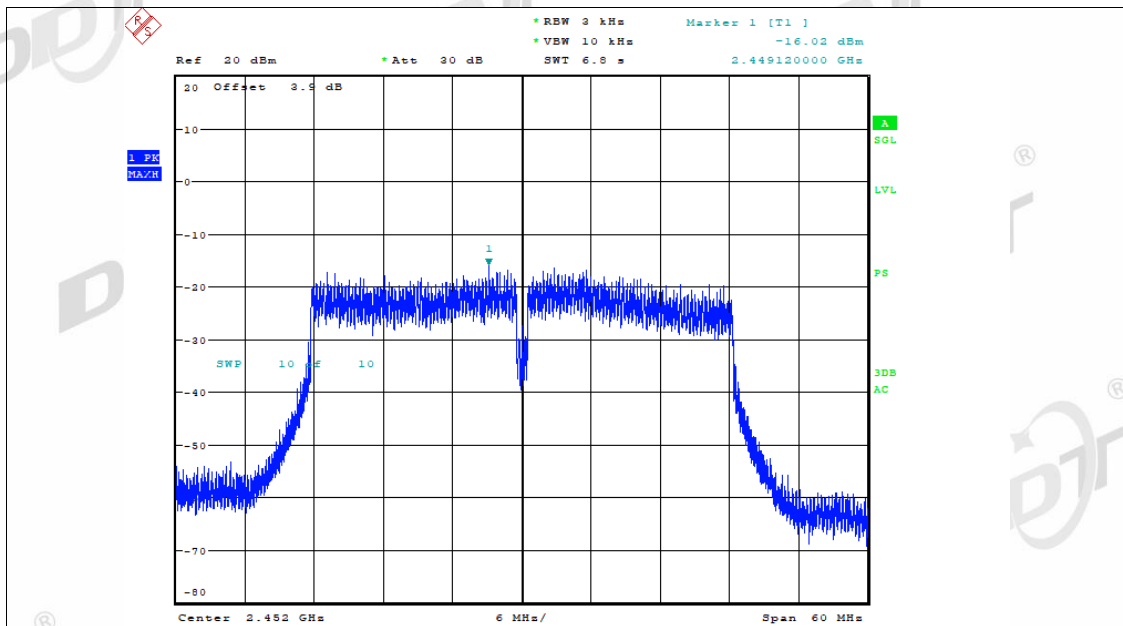
Date: 17.JAN.2023 10:10:50

PSD NVNT n40 2437MHz Ant2



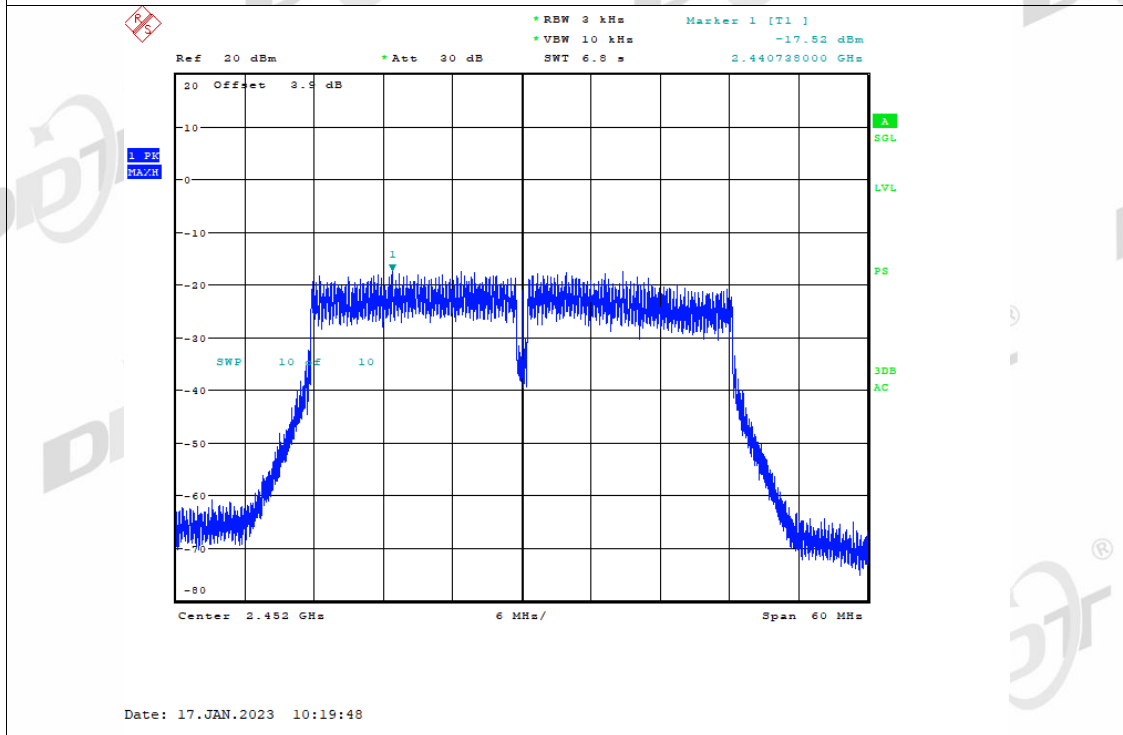
Date: 17.JAN.2023 10:12:00

PSD NVNT n40 2452MHz Ant1



Date: 17.JAN.2023 10:18:37

PSD NVNT n40 2452MHz Ant2



Date: 17.JAN.2023 10:19:48

7. Band Edge Compliance (Conducted Method)

7.1. Block diagram of test setup

Same as section 4.1

7.2. Limits

In any 100 kHz bandwidth outside the frequency bands 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.

7.3. Test procedure

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

(2) Establish a reference level by using the following procedure:

Center frequency	DTS Channel center frequency
RBW:	100 kHz
VBW:	300 kHz
Span	1.5 times the DTS bandwidth
Detector Mode:	Peak
Sweep time:	auto
Trace mode	Max hold

(3) Allow the trace to stabilize, use the peak marker function to determine the maximum peak power level to establish the reference level.

(4) Set the spectrum analyzer as follows:

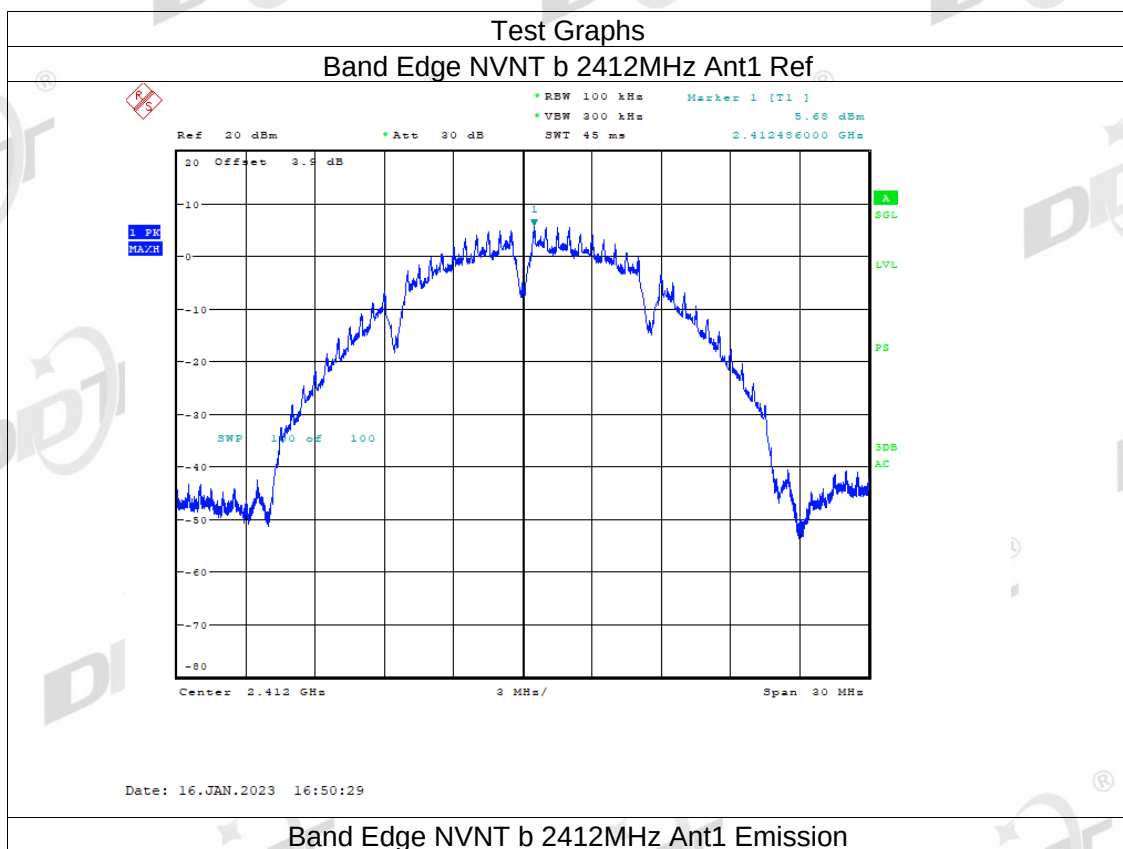
RBW:	100 kHz
VBW:	300 kHz
Span	Encompass frequency range to be measured
Number of measurement points	$\geq \text{span}/\text{RBW}$
Detector Mode:	Peak
Sweep time:	auto
Trace mode	Max hold

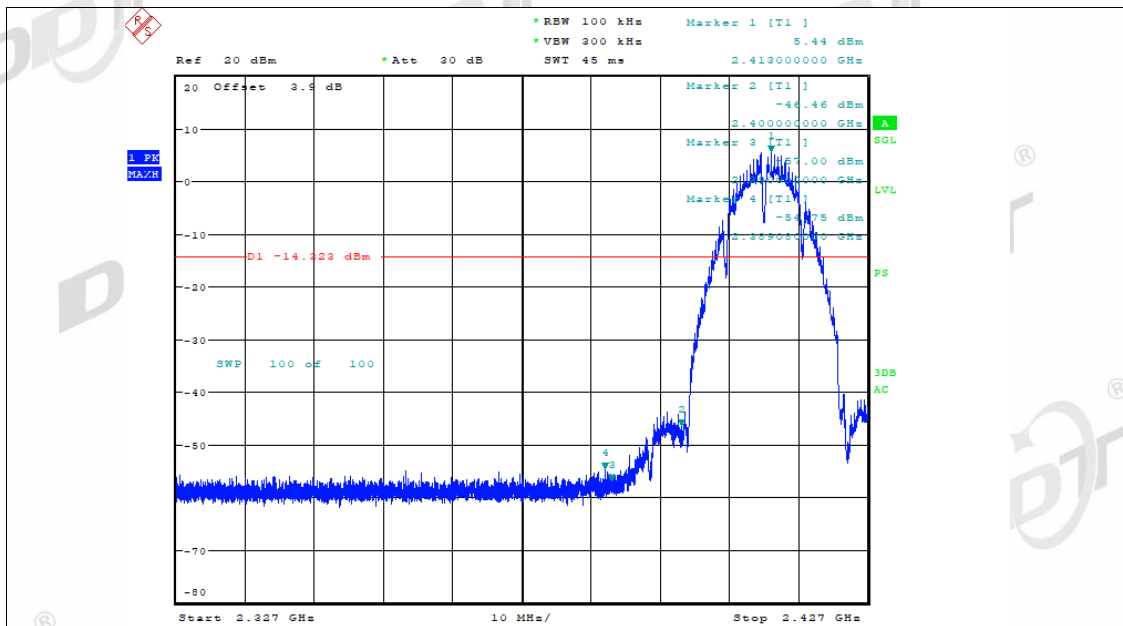
(5) Allow the trace to stabilize, use the peak marker function to determine the maximum amplitude of all unwanted emissions outside of the authorized frequency band

7.4. Test result

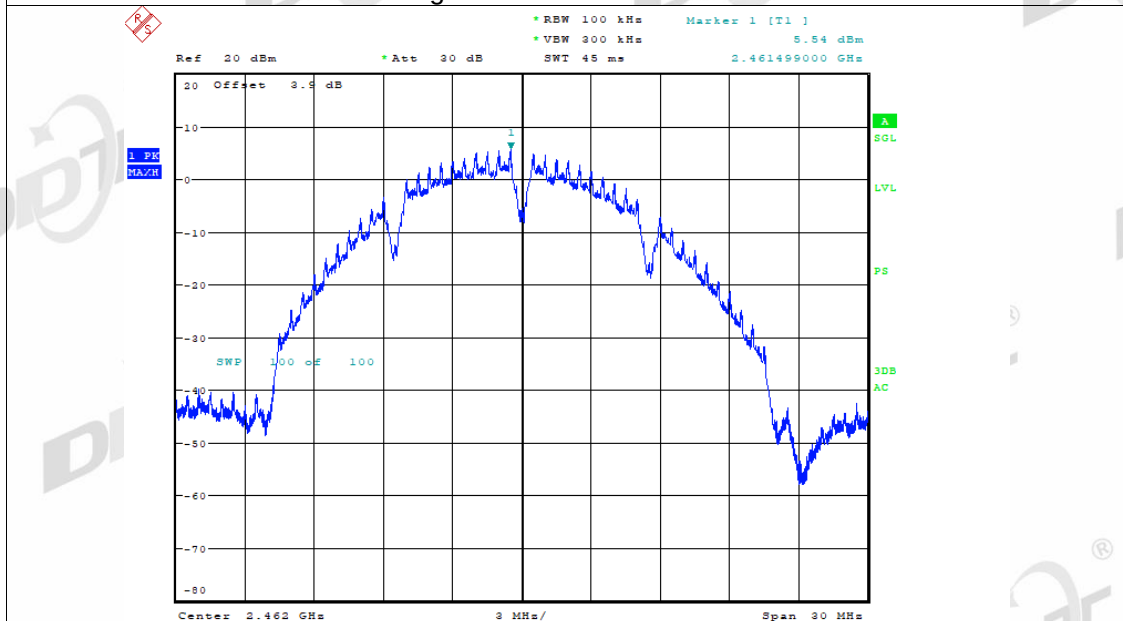
EUT Set Mode	CH or Frequency	Ant1 Result (dBm)	EUT Set Mode	CH or Frequency	Ant1 Result (dBm)
11b	CH1	Pass	11n HT 20	CH1	Pass
	CH11	Pass		CH11	Pass
11g	CH1	Pass	11n HT 40	CH3	Pass
	CH11	Pass		CH9	Pass

7.5. original test data

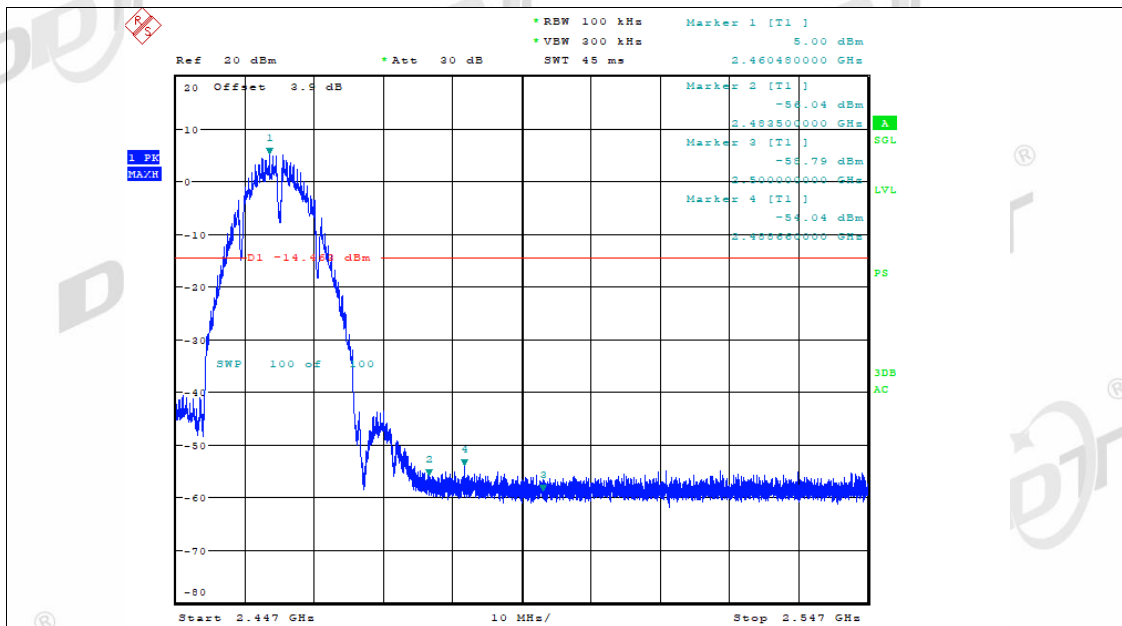




Band Edge NVNT b 2462MHz Ant1 Ref

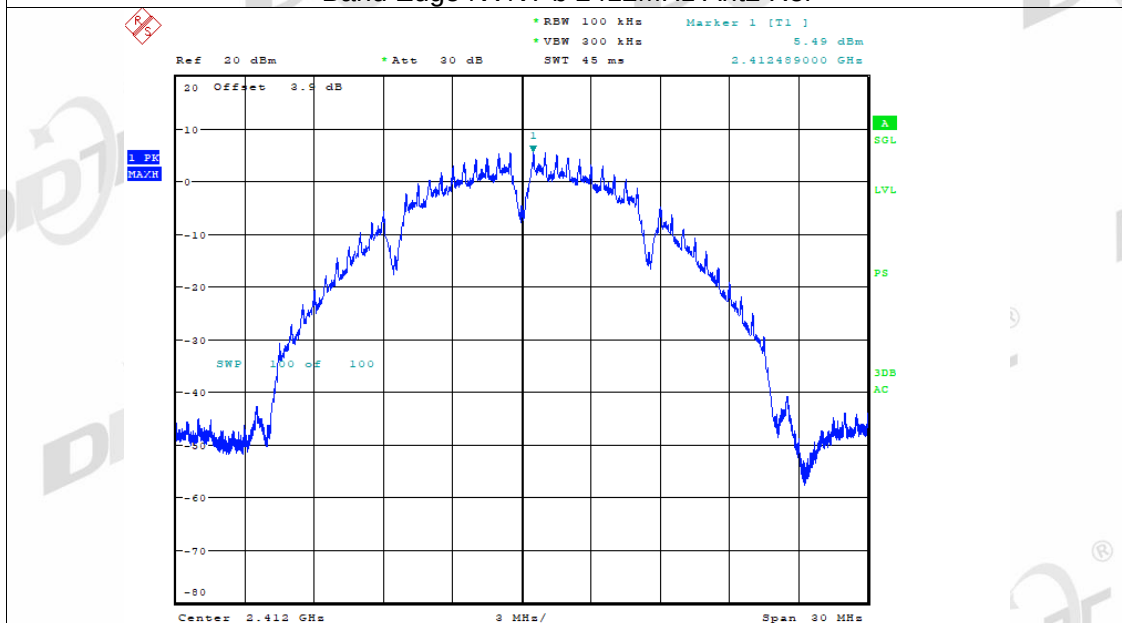


Band Edge NVNT b 2462MHz Ant1 Emission



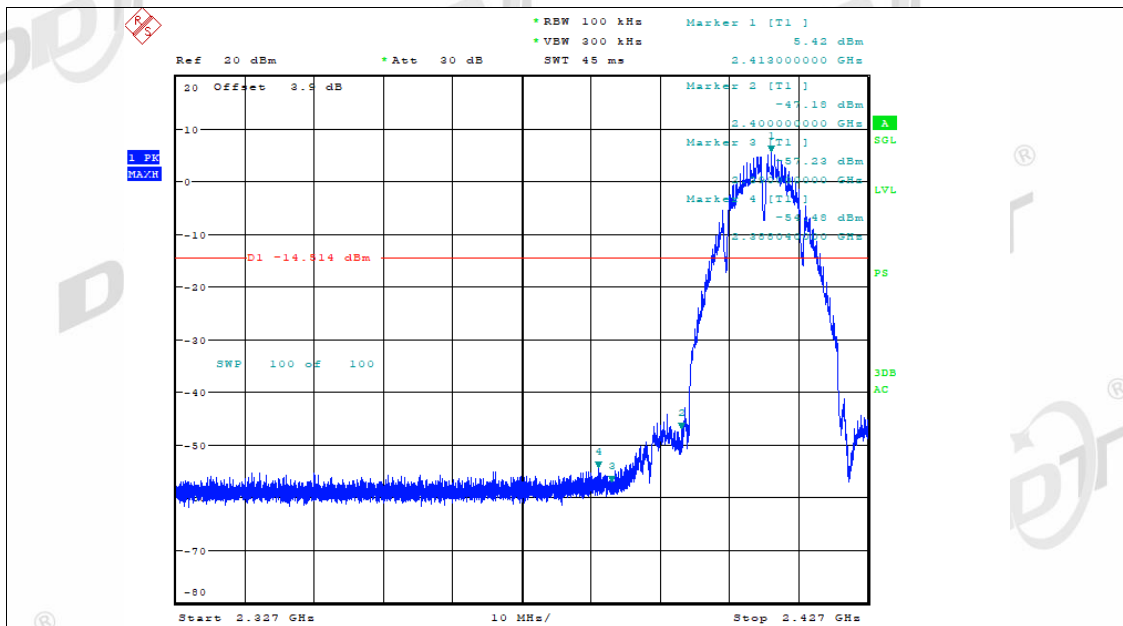
Date: 16.JAN.2023 17:43:22

Band Edge NVNT b 2412MHz Ant2 Ref



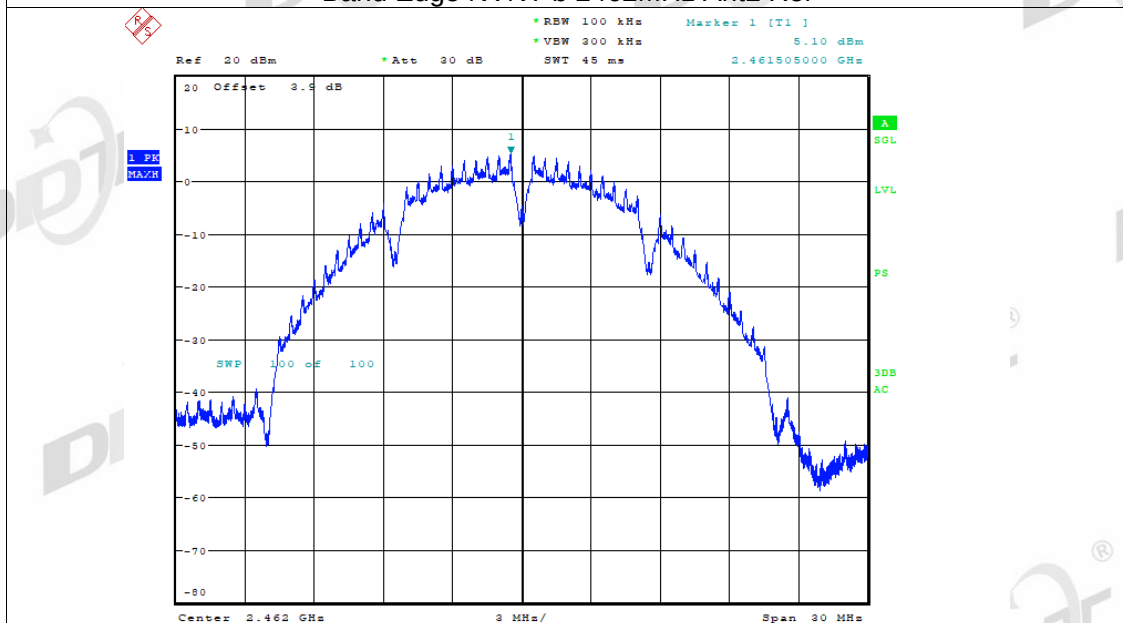
Date: 16.JAN.2023 16:54:07

Band Edge NVNT b 2412MHz Ant2 Emission



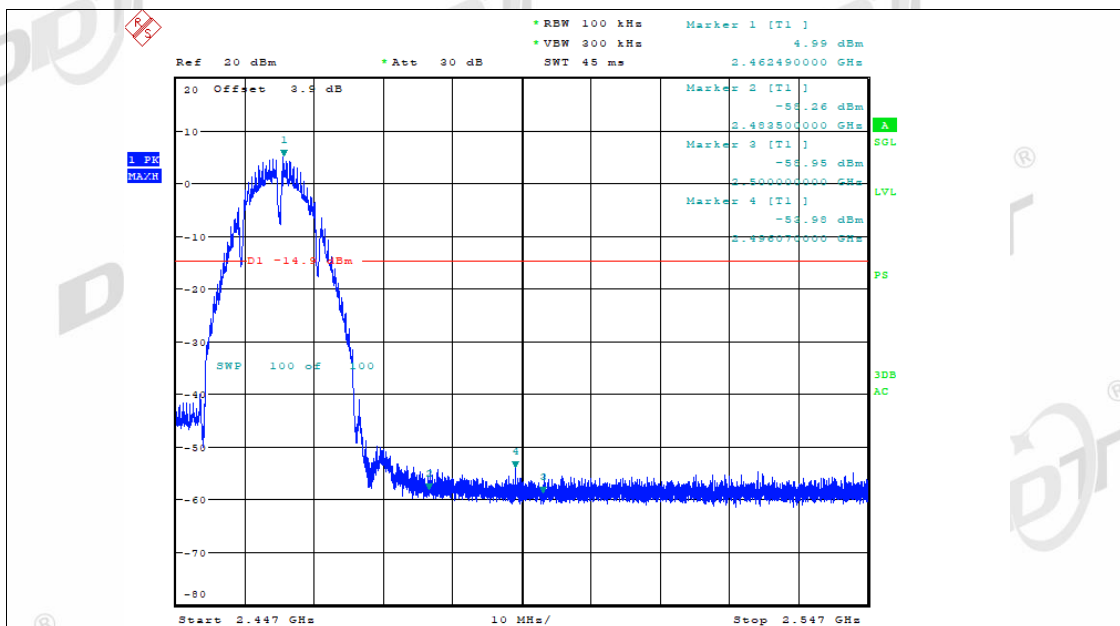
Date: 16.JAN.2023 16:54:26

Band Edge NVNT b 2462MHz Ant2 Ref



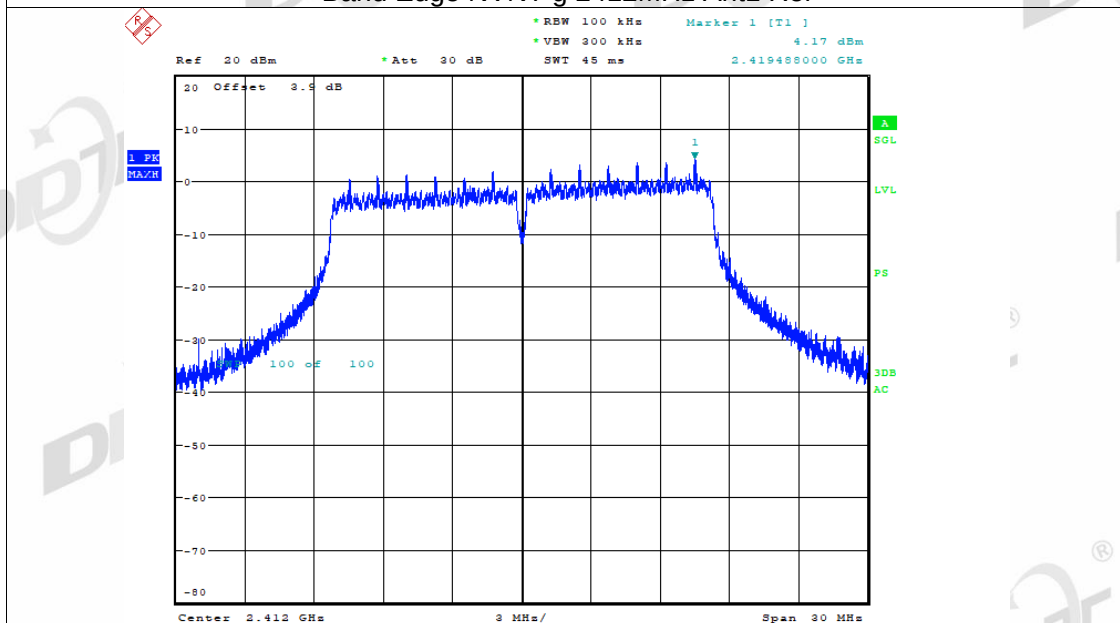
Date: 16.JAN.2023 17:46:49

Band Edge NVNT b 2462MHz Ant2 Emission



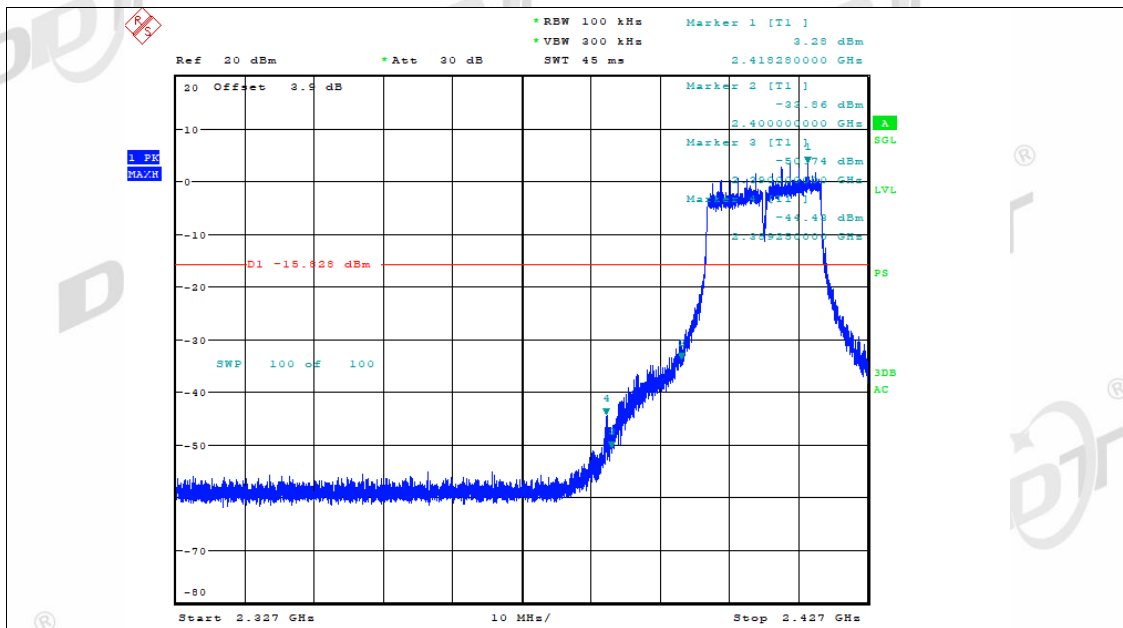
Date: 16.JAN.2023 17:47:08

Band Edge NVNT g 2412MHz Ant1 Ref



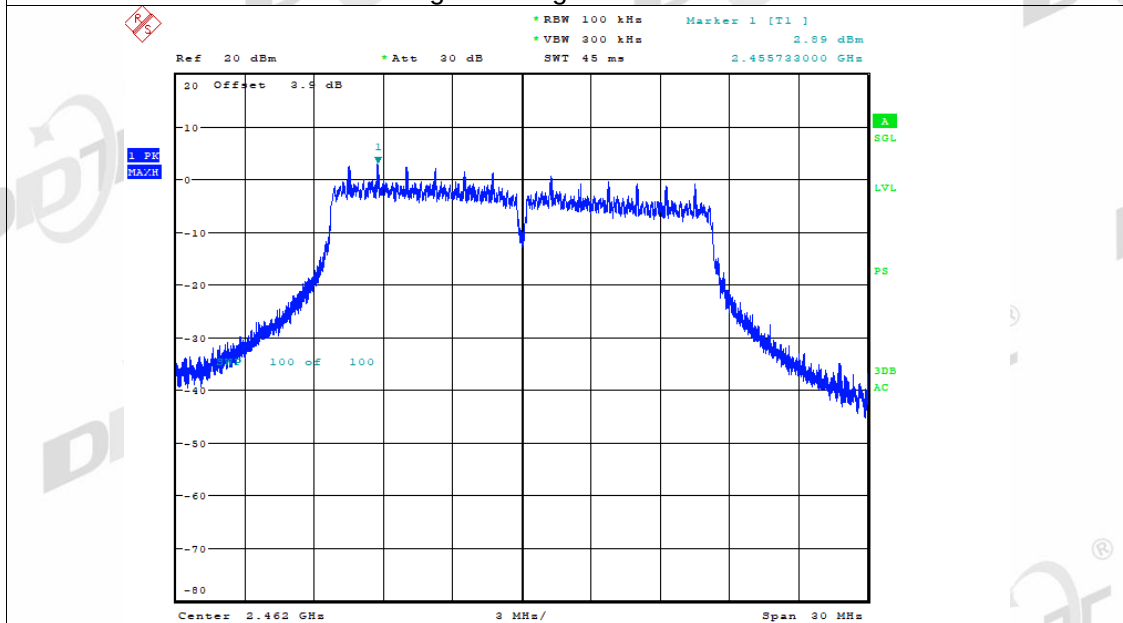
Date: 17.JAN.2023 08:48:55

Band Edge NVNT g 2412MHz Ant1 Emission



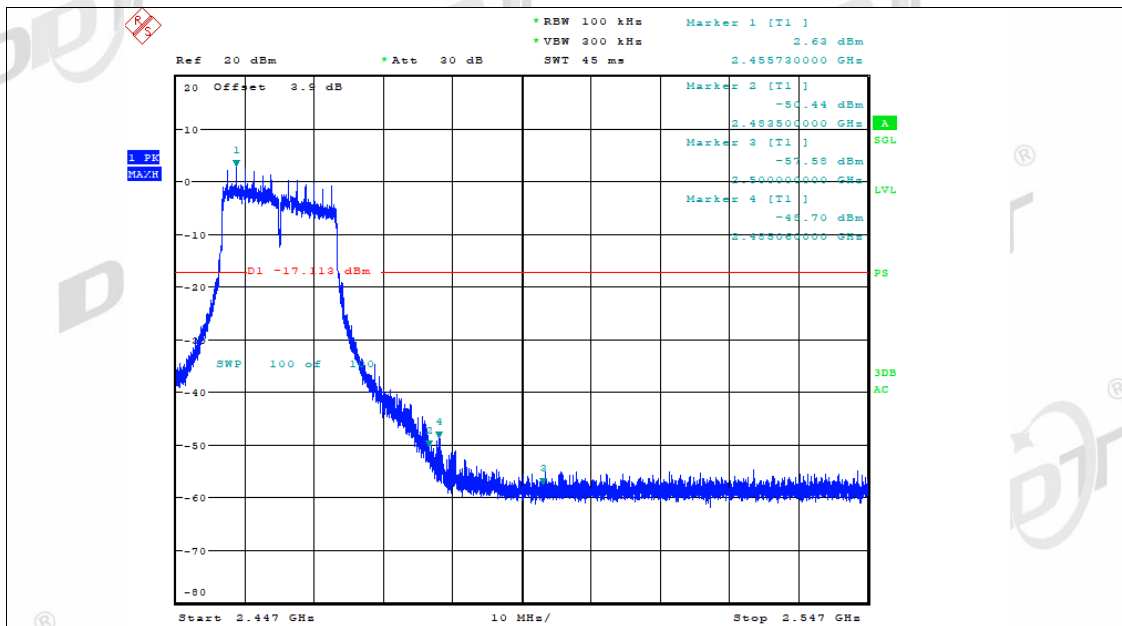
Date: 17.JAN.2023 08:49:15

Band Edge NVNT g 2462MHz Ant1 Ref



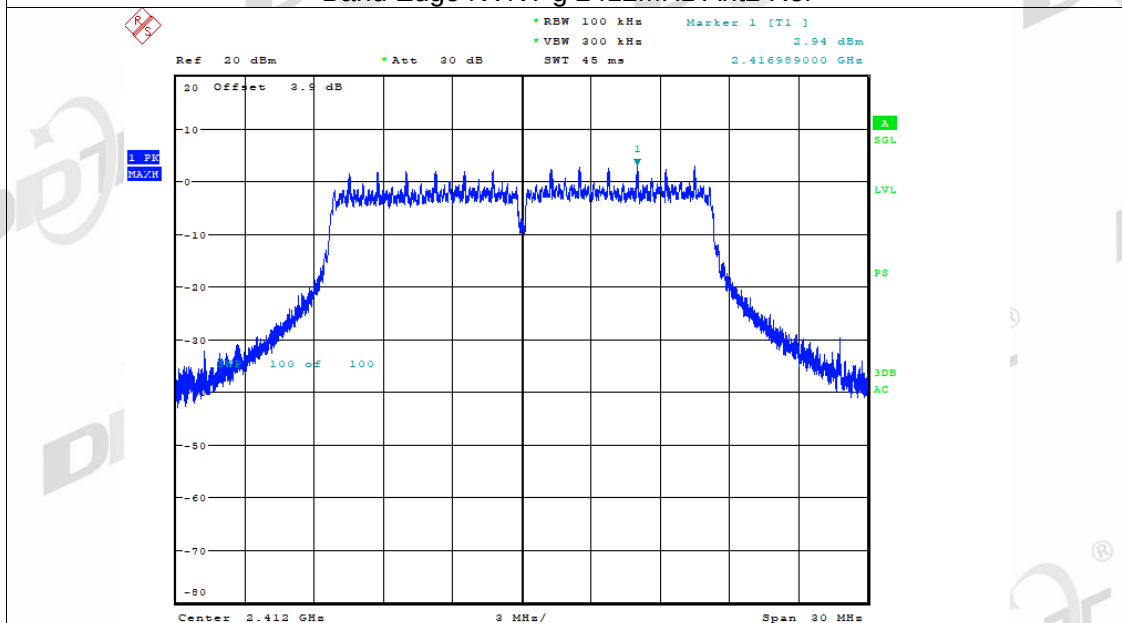
Date: 17.JAN.2023 09:12:33

Band Edge NVNT g 2462MHz Ant1 Emission



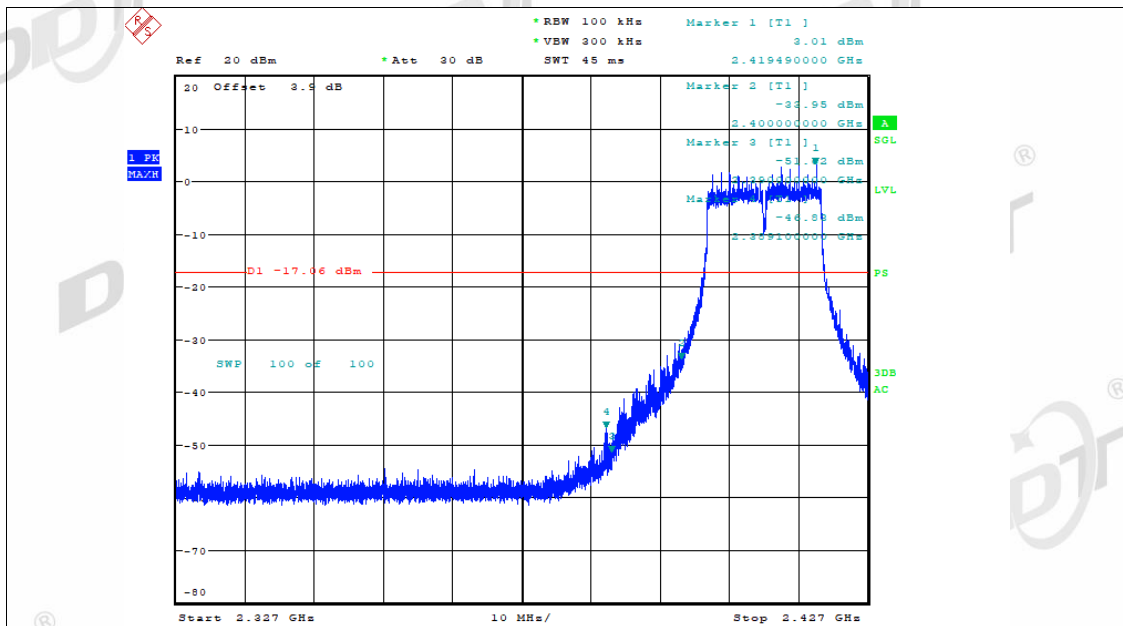
Date: 17.JAN.2023 09:12:52

Band Edge NVNT g 2412MHz Ant2 Ref



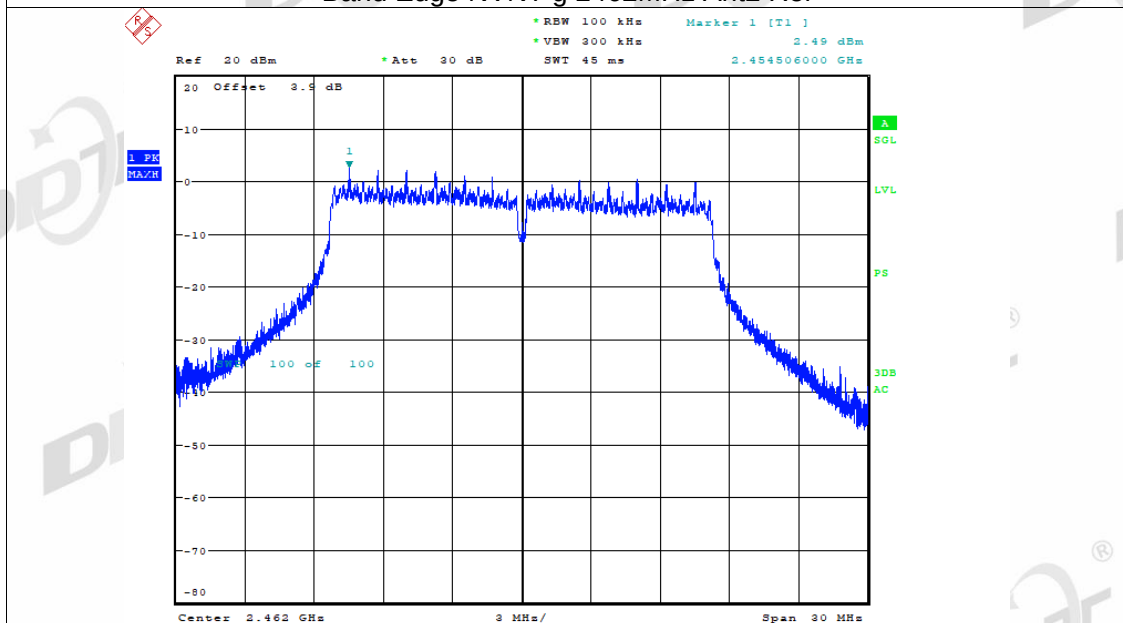
Date: 17.JAN.2023 08:53:42

Band Edge NVNT g 2412MHz Ant2 Emission



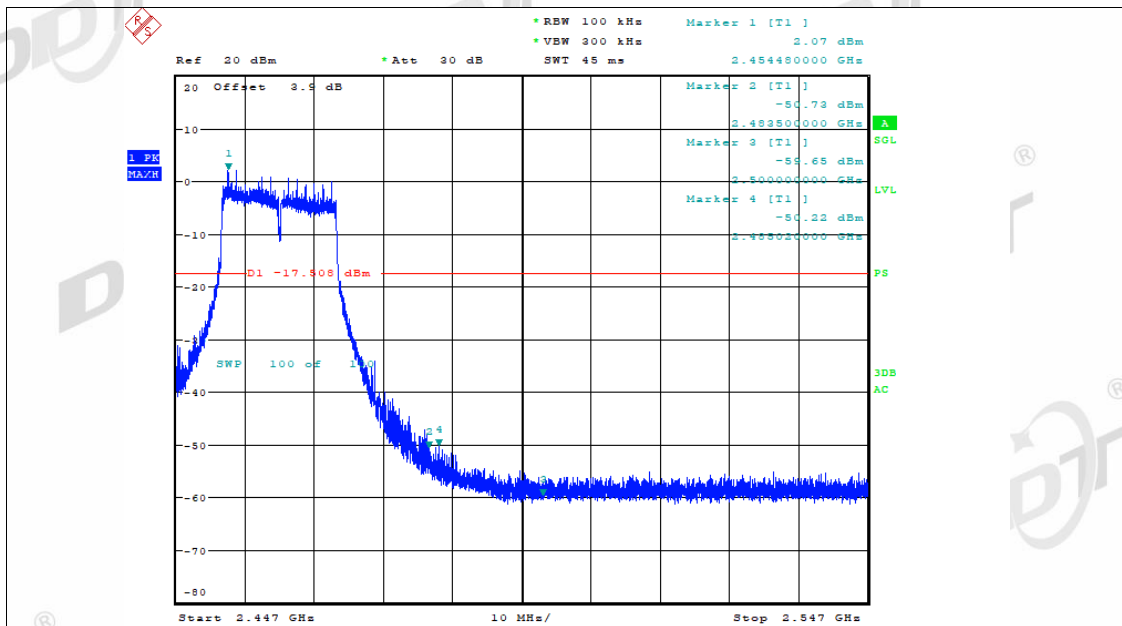
Date: 17.JAN.2023 08:54:01

Band Edge NVNT g 2462MHz Ant2 Ref



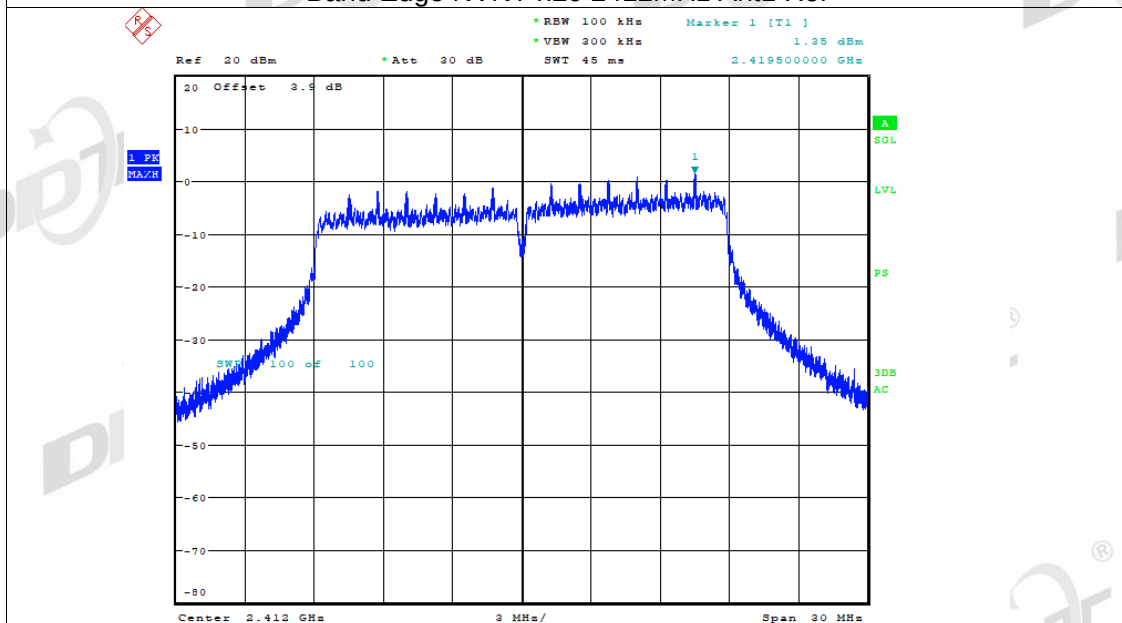
Date: 17.JAN.2023 09:16:21

Band Edge NVNT g 2462MHz Ant2 Emission



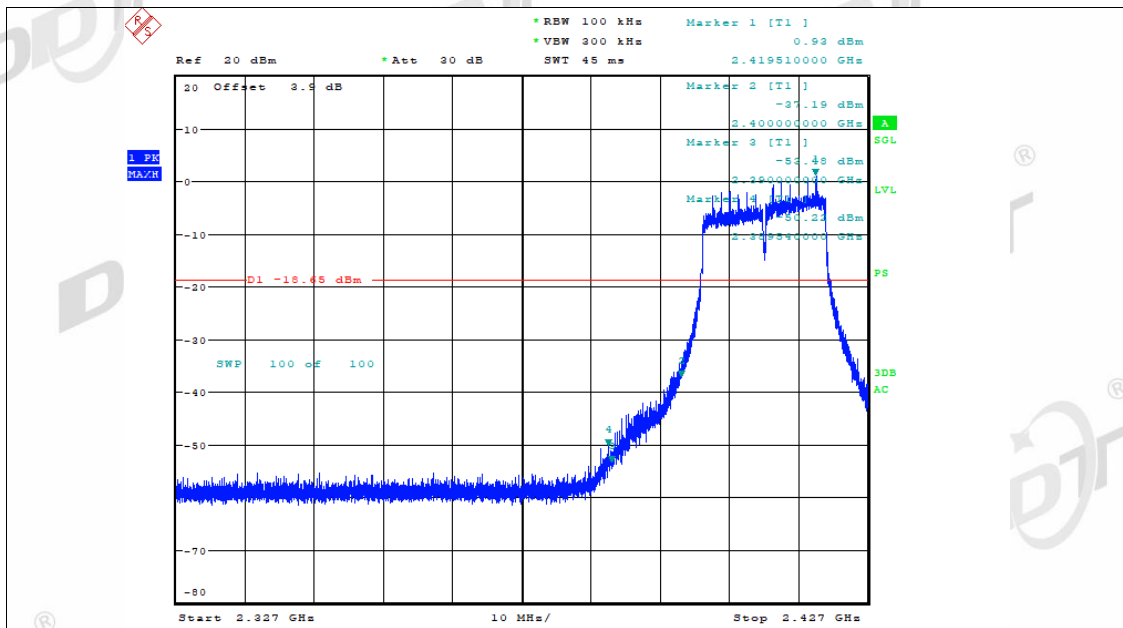
Date: 17.JAN.2023 09:16:40

Band Edge NVNT n20 2412MHz Ant1 Ref



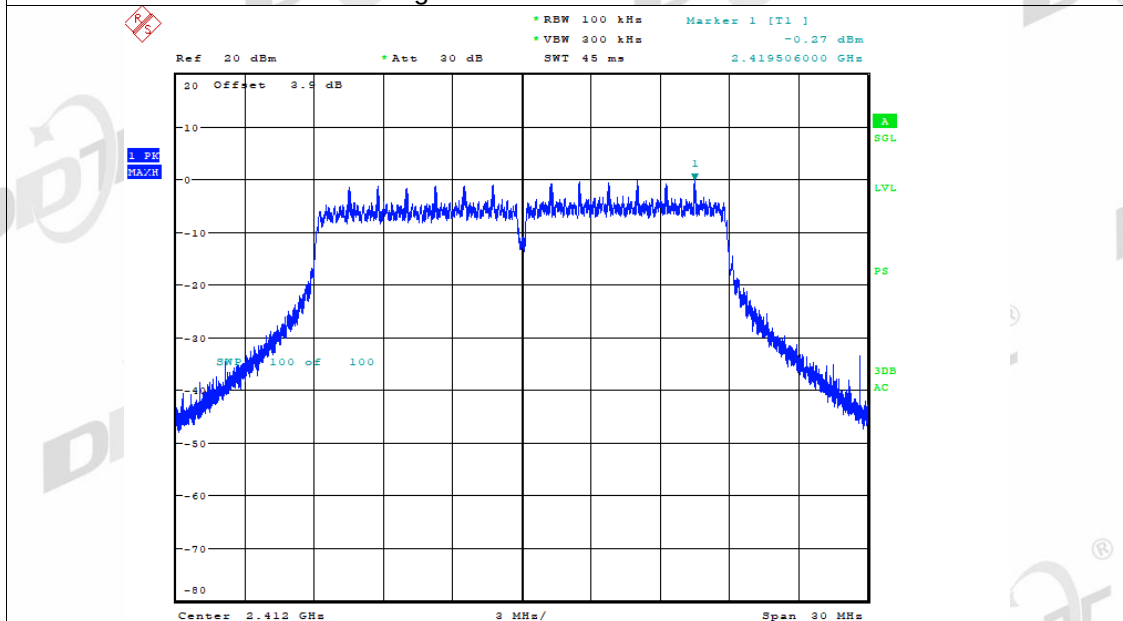
Date: 17.JAN.2023 09:26:48

Band Edge NVNT n20 2412MHz Ant1 Emission



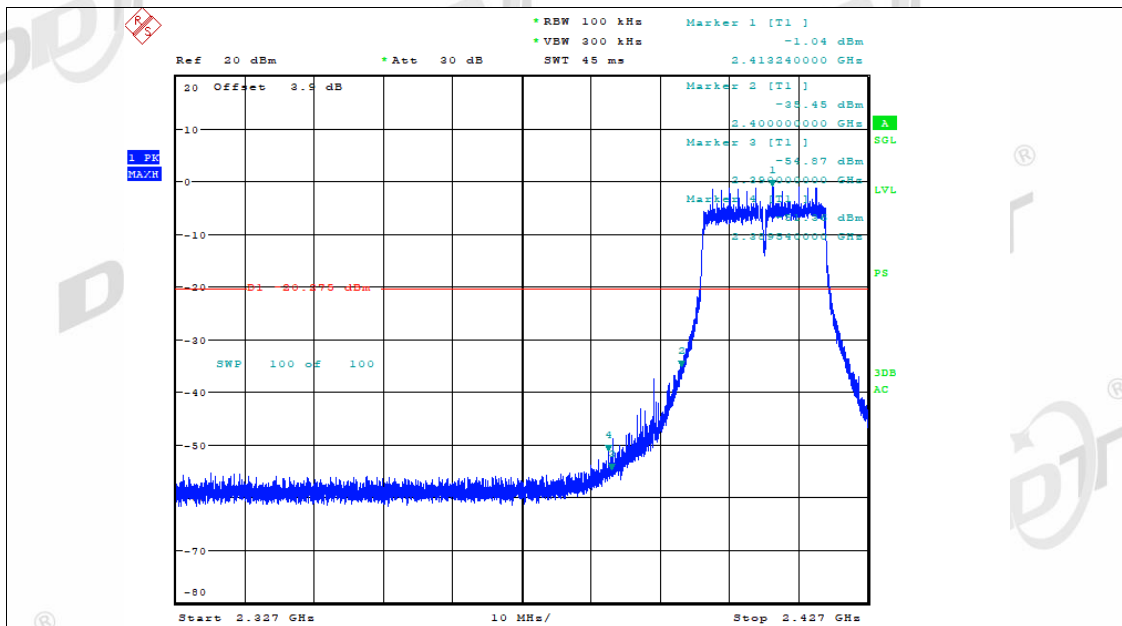
Date: 17.JAN.2023 09:27:07

Band Edge NVNT n20 2412MHz Ant2 Ref



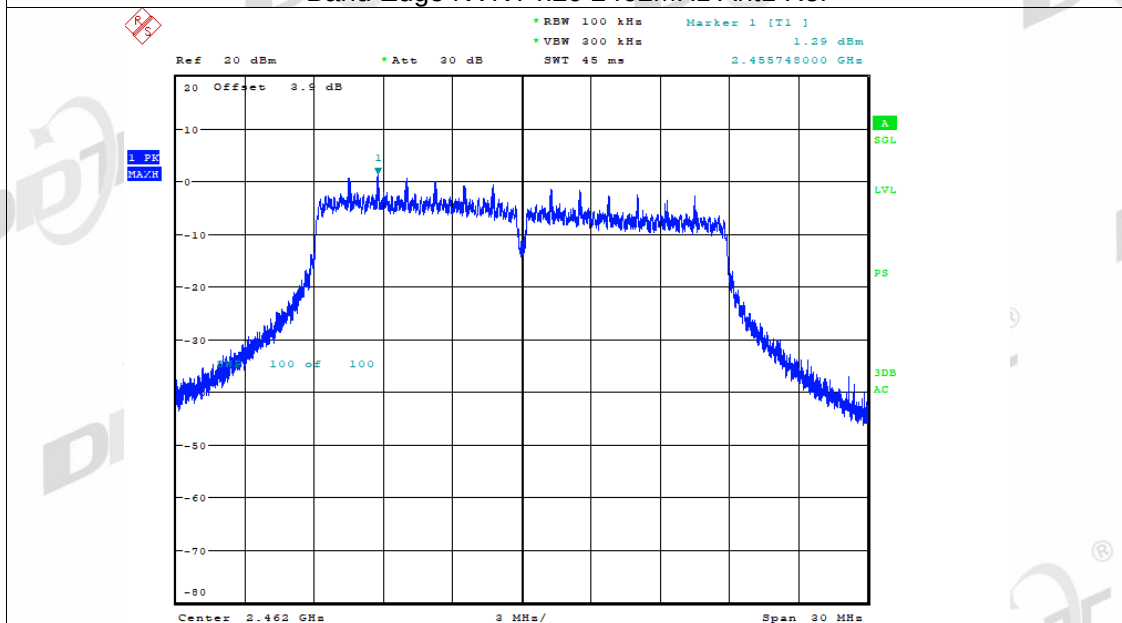
Date: 17.JAN.2023 09:27:27

Band Edge NVNT n20 2412MHz Ant2 Emission



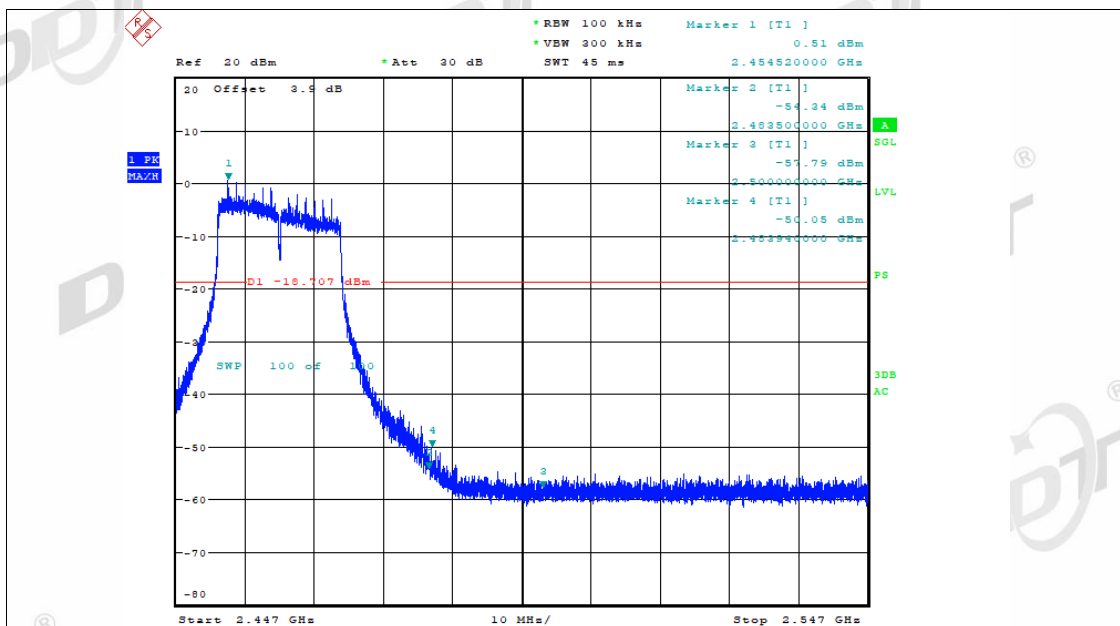
Date: 17.JAN.2023 09:27:46

Band Edge NVNT n20 2462MHz Ant1 Ref



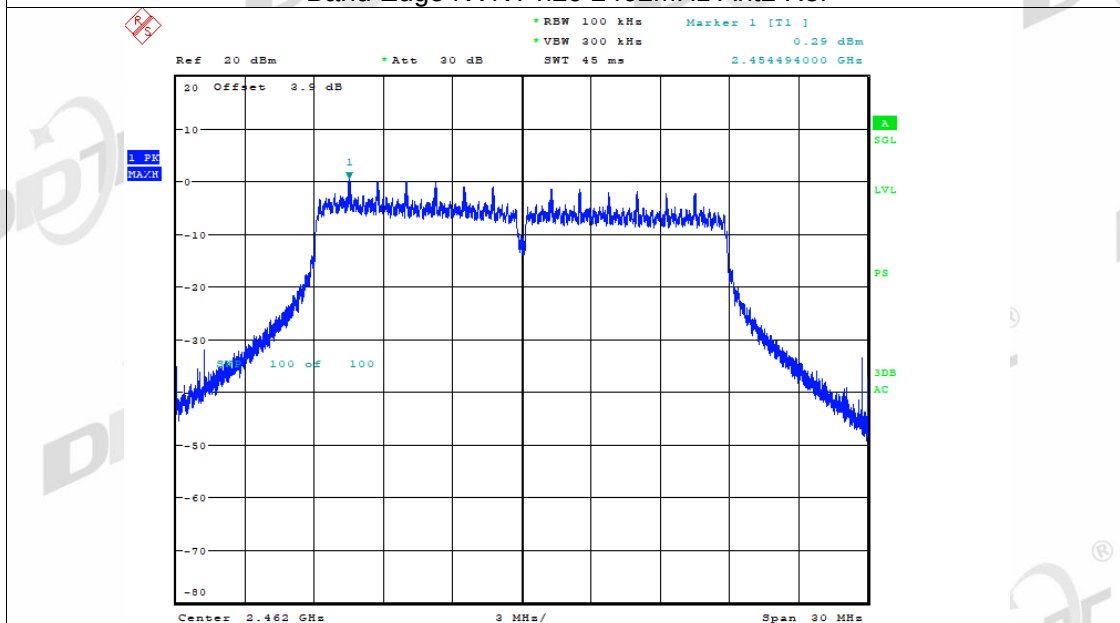
Date: 17.JAN.2023 09:50:06

Band Edge NVNT n20 2462MHz Ant1 Emission



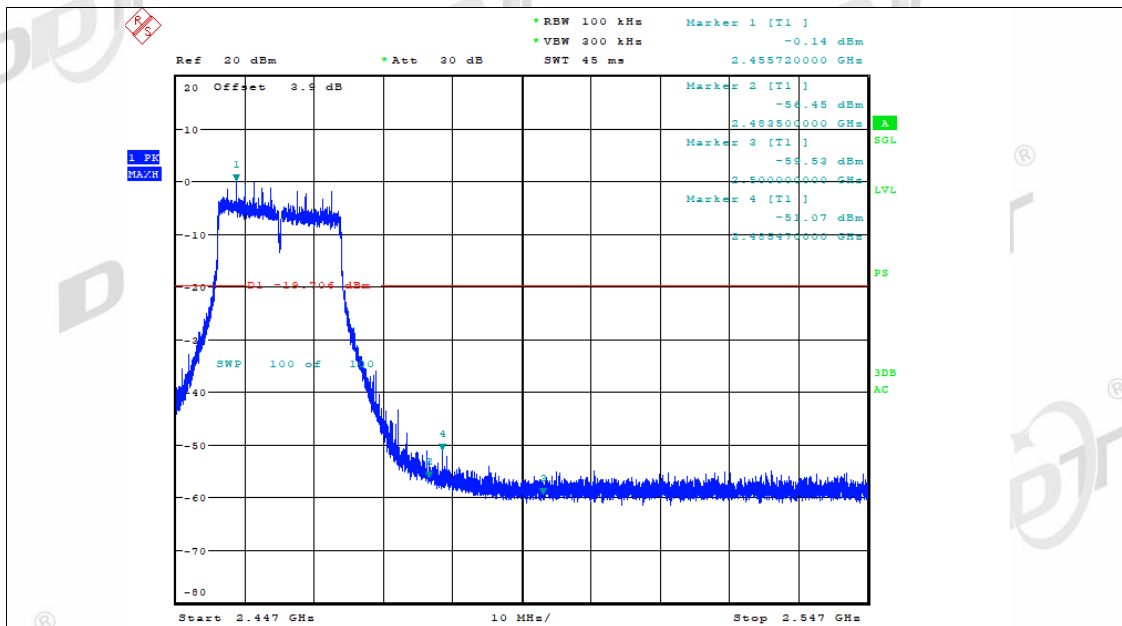
Date: 17.JAN.2023 09:50:24

Band Edge NVNT n20 2462MHz Ant2 Ref



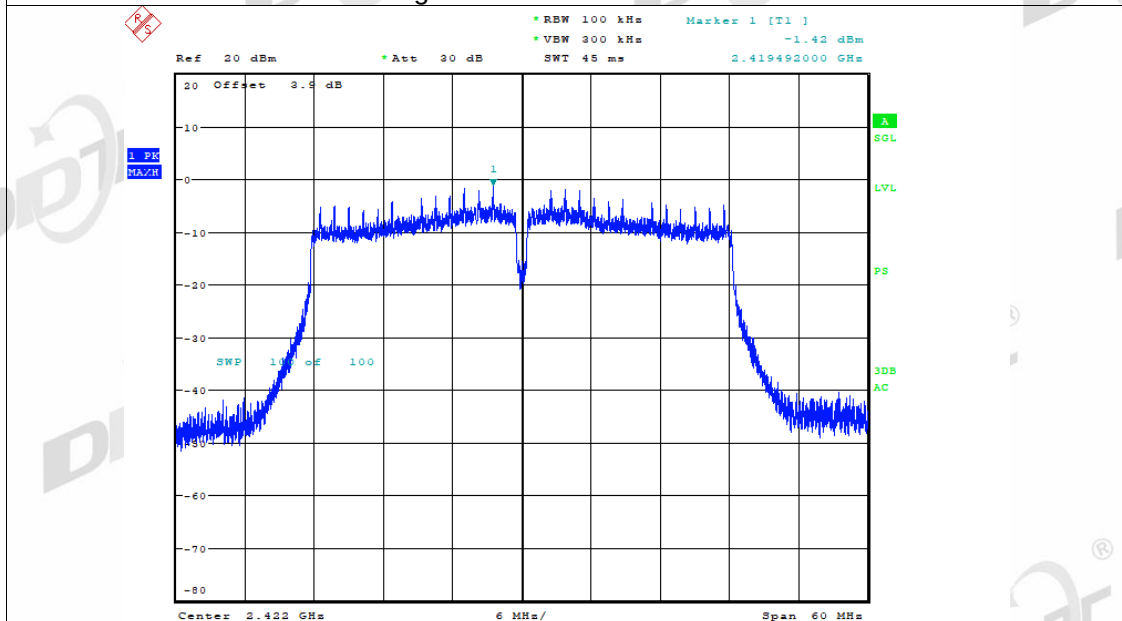
Date: 17.JAN.2023 09:50:45

Band Edge NVNT n20 2462MHz Ant2 Emission



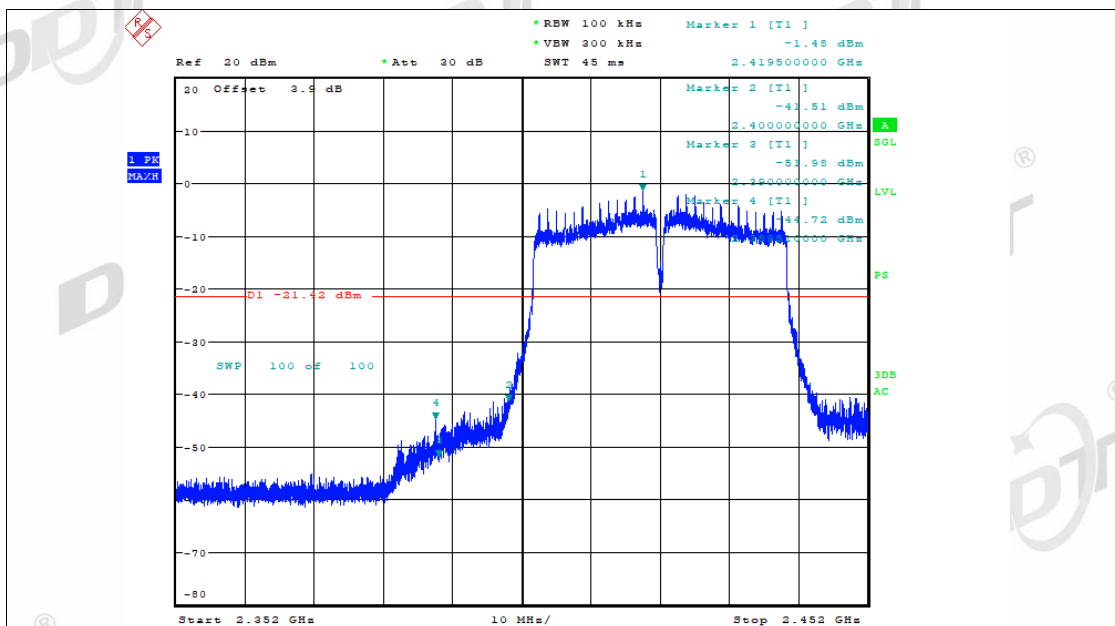
Date: 17.JAN.2023 09:51:03

Band Edge NVNT n40 2422MHz Ant1 Ref



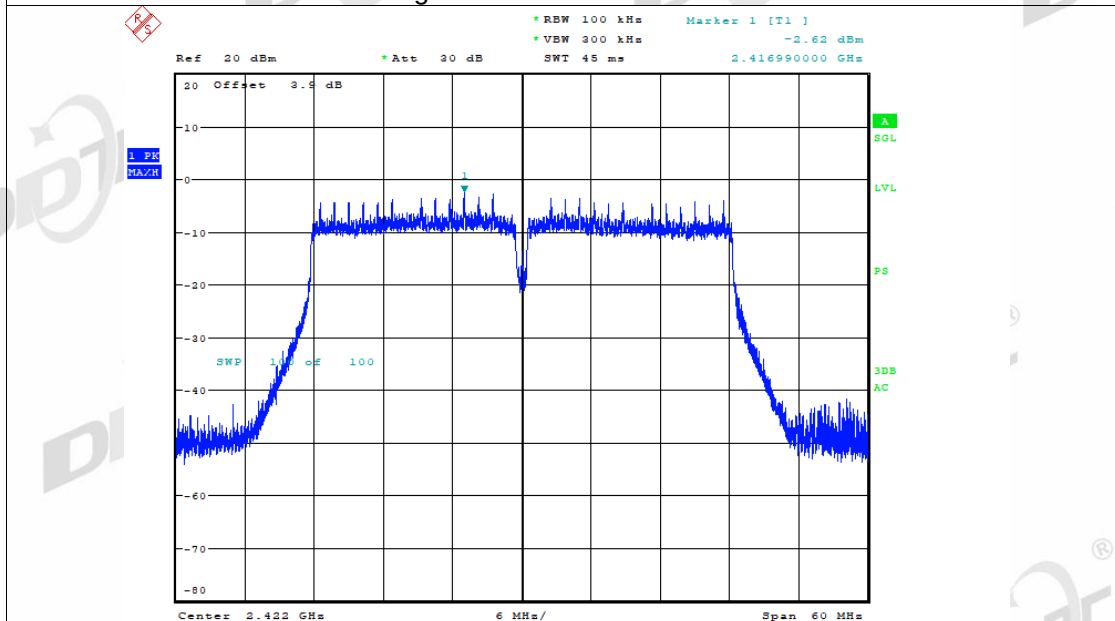
Date: 17.JAN.2023 10:01:02

Band Edge NVNT n40 2422MHz Ant1 Emission



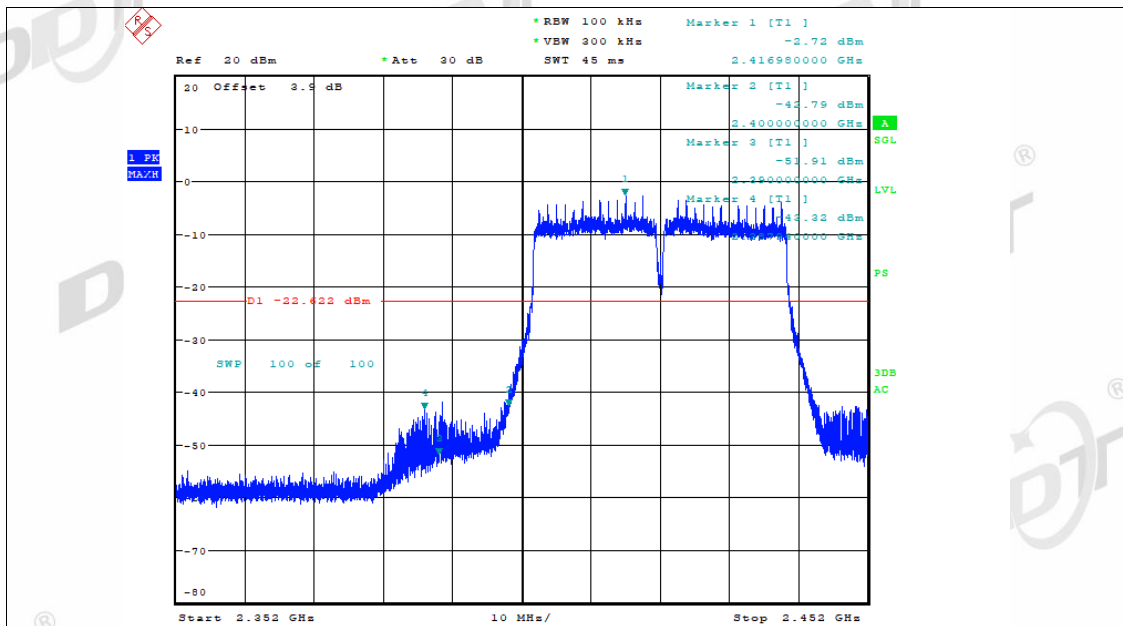
Date: 17.JAN.2023 10:01:21

Band Edge NVNT n40 2422MHz Ant2 Ref



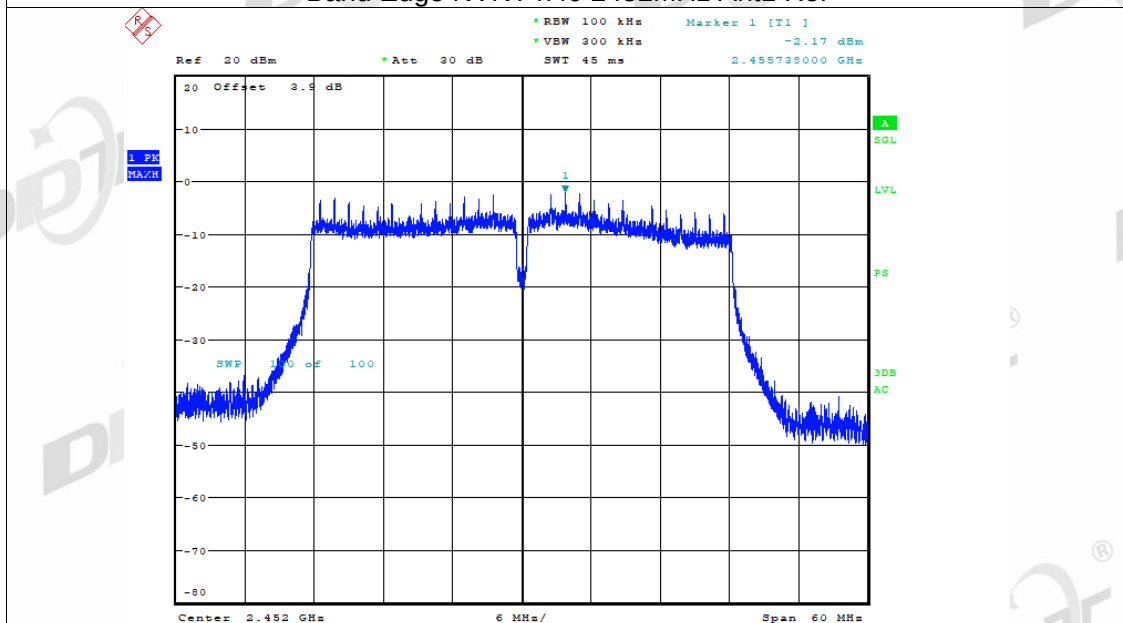
Date: 17.JAN.2023 10:01:39

Band Edge NVNT n40 2422MHz Ant2 Emission



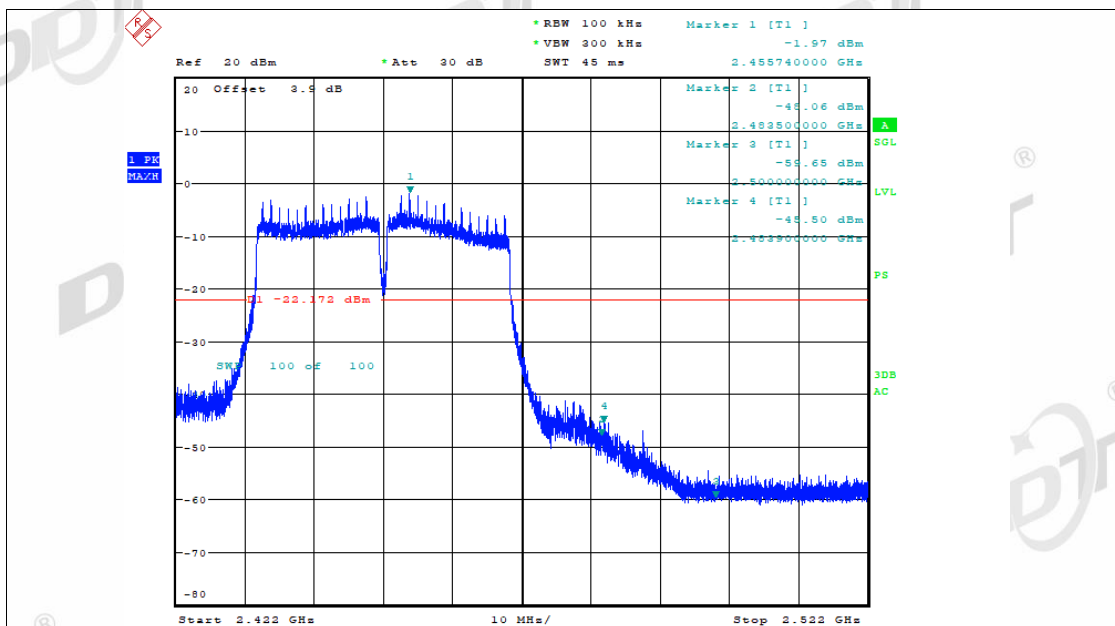
Date: 17.JAN.2023 10:01:58

Band Edge NVNT n40 2452MHz Ant1 Ref



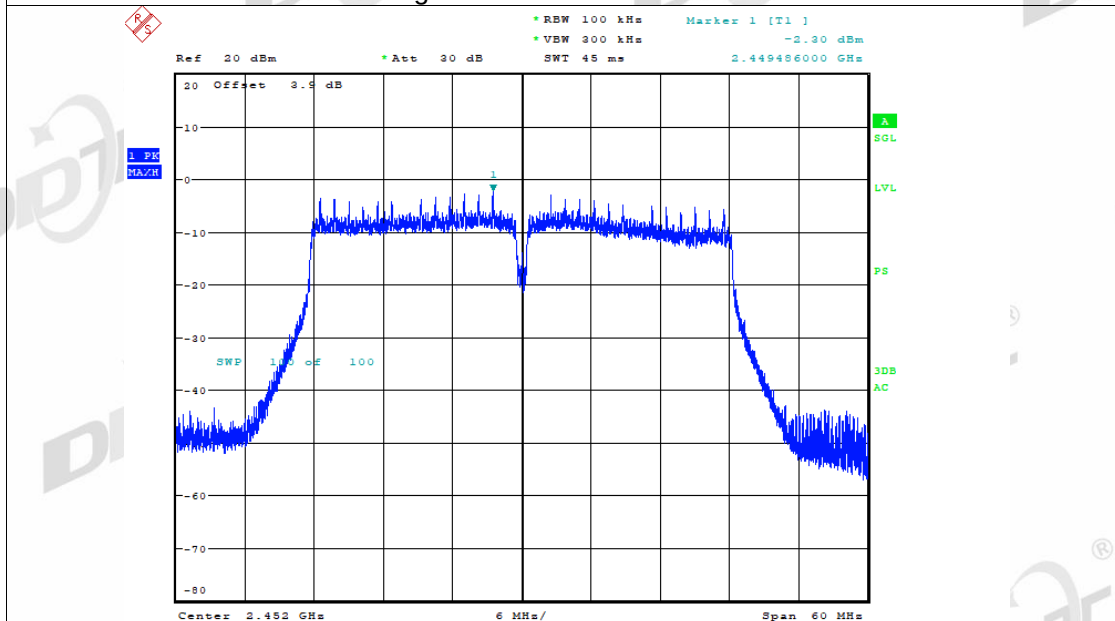
Date: 17.JAN.2023 10:20:10

Band Edge NVNT n40 2452MHz Ant1 Emission



Date: 17.JAN.2023 10:20:28

Band Edge NVNT n40 2452MHz Ant2 Ref



Date: 17.JAN.2023 10:20:47

Band Edge NVNT n40 2452MHz Ant2 Emission

