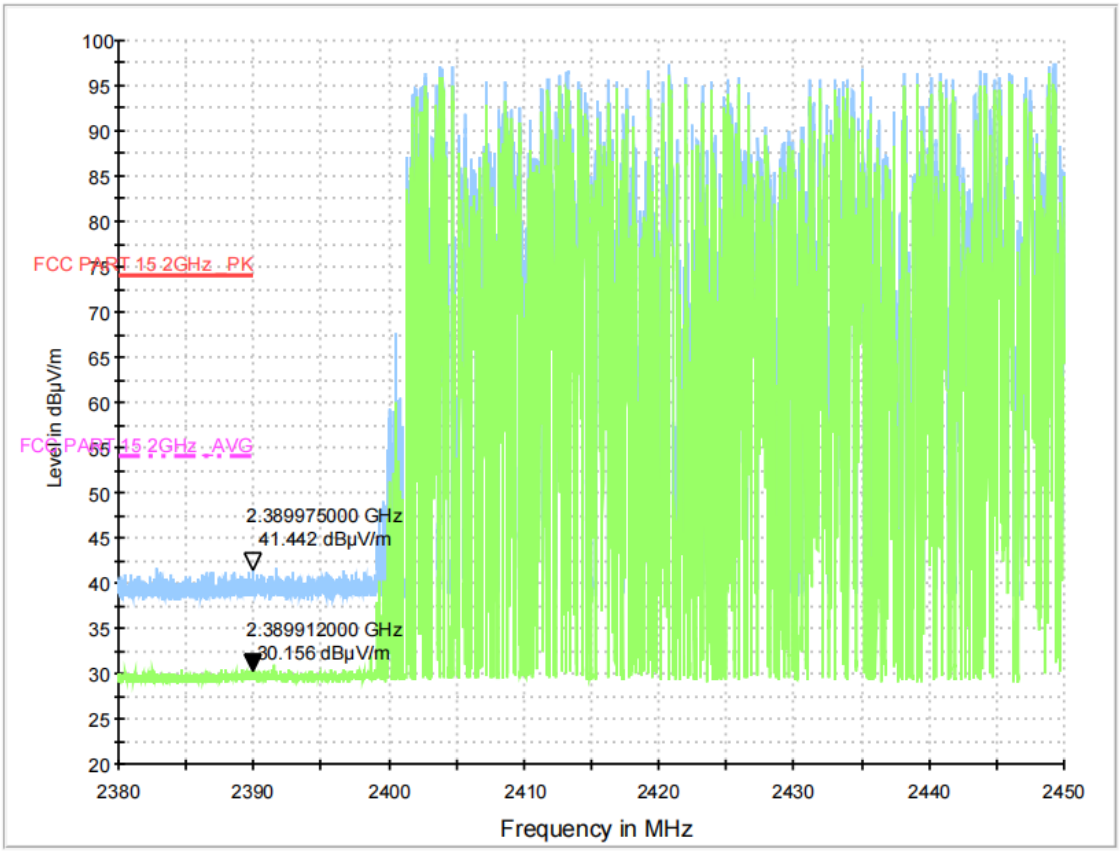
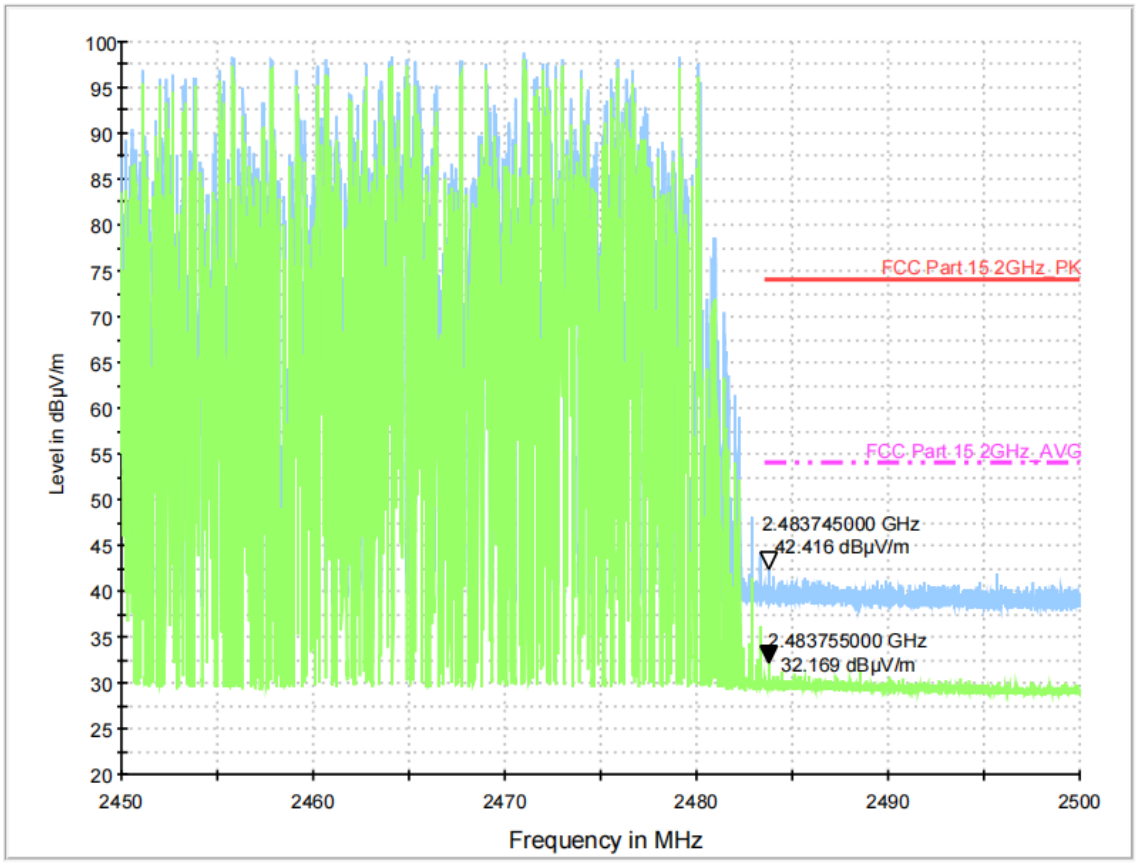
TM6 / Polarization: Horizontal, Vertical / Band: 2.4G / BW: 1 / CH: L



TM6 / Polarization: Horizontal, Vertical / Band: 2.4G / BW: 1 / CH: H



6.9 Emissions in restricted frequency bands (below 1GHz)

Test Requirement:	In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).`
Test Method:	Radiated emissions tests
Test Limit:	

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100 **	3
88-216	150 **	3
216-960	200 **	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.

Procedure:	ANSI C63.10-2013 section 6.6.4

6.9.1 E.U.T. Operation:

Operating Environment:	
Temperature:	24.9 °C
Humidity:	49.4 %
Atmospheric Pressure:	1010 mbar

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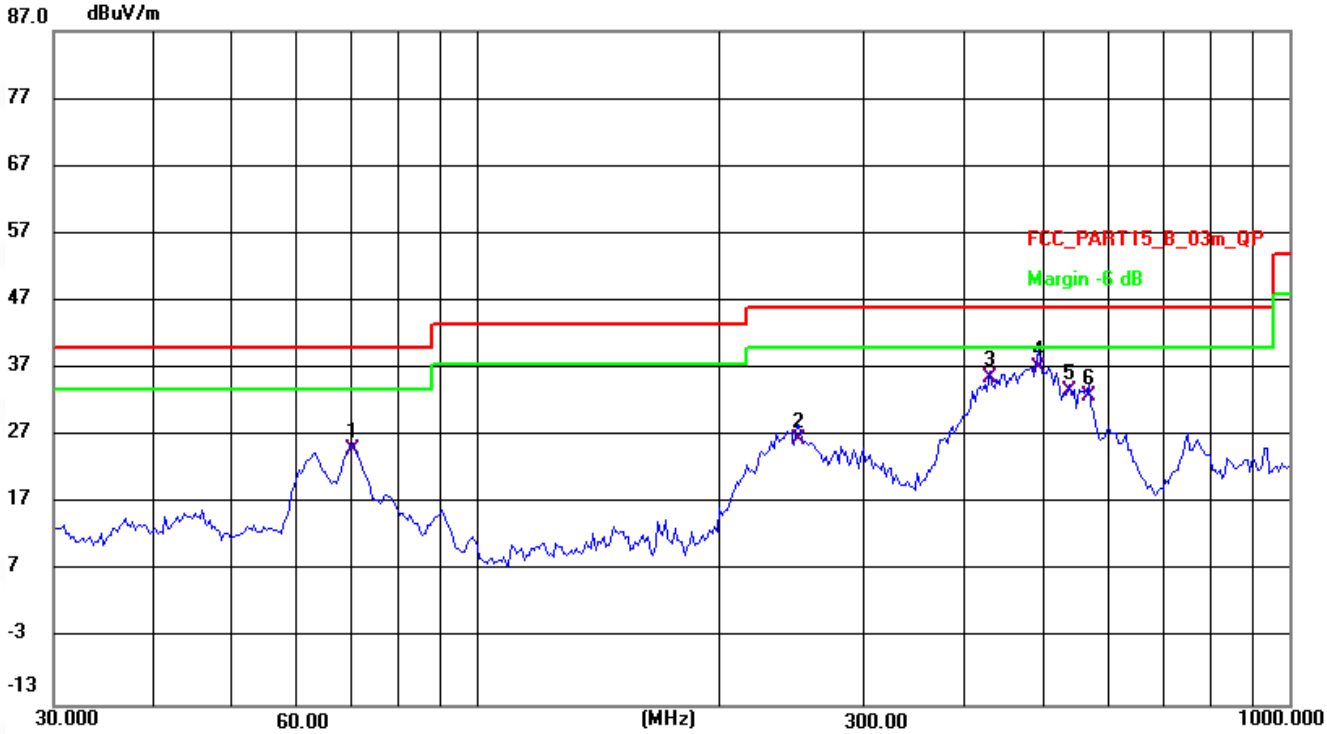
6.9.2 Test Data:

Note: All the mode have been tested, and only the worst case of GFSK mode are in the report
TM1 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)	Remark
1	70.2096	47.13	-22.12	25.01	40.00	-14.99	QP	199	348	
2	248.7319	50.44	-23.90	26.54	46.00	-19.46	QP	199	107	
3	427.2920	54.17	-18.60	35.57	46.00	-10.43	QP	100	271	
4 *	491.7700	54.26	-17.25	37.01	46.00	-8.99	QP	100	271	
5	535.0377	49.90	-16.32	33.58	46.00	-12.42	QP	199	261	
6	565.9776	48.24	-15.23	33.01	46.00	-12.99	QP	199	261	

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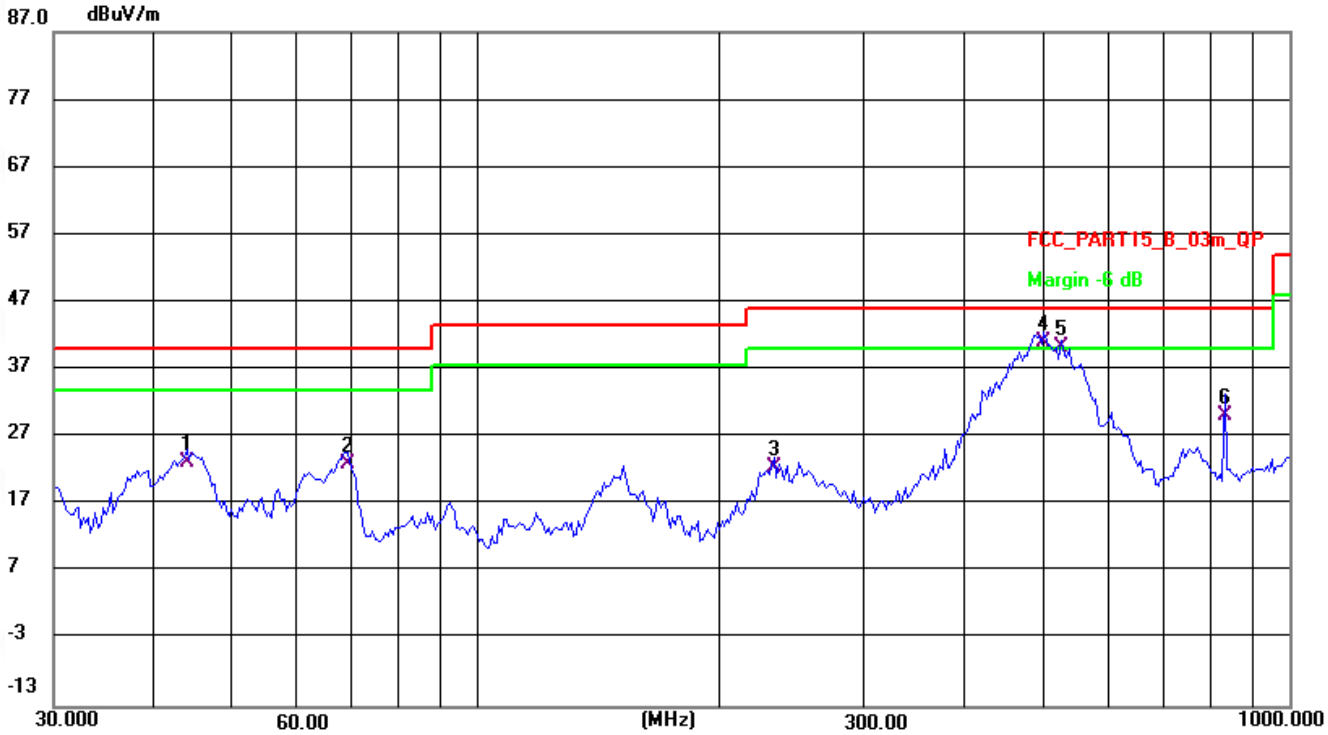
TM1 / Polarization: Vertical / Band: 2.4G / BW: 1 / CH: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)	Remark
1	43.8452	42.69	-19.44	23.25	40.00	-16.75	QP	100	119	
2	69.2297	44.95	-21.94	23.01	40.00	-16.99	QP	100	141	
3	231.8531	47.70	-25.12	22.58	46.00	-23.42	QP	100	12	
4 *	498.7303	58.16	-17.11	41.05	46.00	-4.95	QP	199	348	
5 !	523.8763	56.89	-16.64	40.25	46.00	-5.75	QP	100	358	
6	833.0127	40.03	-9.89	30.14	46.00	-15.86	QP	100	98	

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6.10 Emissions in restricted frequency bands (above 1GHz)

Test Requirement:	In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).`
Test Method:	Radiated emissions tests
Test Limit:	

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100 **	3
88-216	150 **	3
216-960	200 **	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.

Procedure:	ANSI C63.10-2013 section 6.6.4

6.10.1 E.U.T. Operation:

Operating Environment:	
Temperature:	24.9 °C
Humidity:	49.4 %
Atmospheric Pressure:	1010 mbar

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6.10.2 Test Data:

From 1G-25GHz
(All modes have been tested, only show the worst mode data(

TM1 / Polarization: Horizontal, Vertical / Band: 2.4G / BW: 1

Test Mode: GFSK TX Low									
Freq (MHz)	Read Level (dBuV/m)	Polar (H/V)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4804	48.01	V	33.93	10.18	34.26	57.86	74	-16.14	PK
4804	36.28	V	33.93	10.18	34.26	46.13	54	-7.87	AV
7206	/	/	/	/	/	/	/	/	/
9608	/	/	/	/	/	/	/	/	/
4804	46.89	H	33.93	10.18	34.26	56.74	74	-17.262	PK
4804	36.59	H	33.93	10.18	34.26	46.44	54	-7.56	AV
7206	/	/	/	/	/	/	/	/	/
9608	/	/	/	/	/	/	/	/	/
Test Mode: GFSK TX Mid									
4882	49.08	V	33.95	10.20	34.26	58.97	74	-15.05	PK
4882	35.86	V	33.95	10.20	34.26	45.75	54	-8.25	AV
7323	/	/	/	/	/	/	/	/	/
9764	/	/	/	/	/	/	/	/	/
4882	48.80	H	33.95	10.20	34.26	58.69	74	-15.31	PK
4882	34.27	H	33.95	10.20	34.26	44.16	54	-9.84	AV
7323	/	/	/	/	/	/	/	/	/
9764	/	/	/	/	/	/	/	/	/
Test Mode: GFSK TX High									
4960	49.52	V	33.98	10.22	34.25	59.47	74	-14.53	PK
4960	36.28	V	33.98	10.22	34.25	46.23	54	-7.77	AV
7440	/	/	/	/	/	/	/	/	/
9920	/	/	/	/	/	/	/	/	/
4960	48.96	H	33.98	10.22	34.25	58.91	74	-15.09	PK
4960	37.35	H	33.98	10.22	34.25	47.3	54	-6.7	AV
7440	/	/	/	/	/	/	/	/	/
9920	/	/	/	/	/	/	/	/	/

Note:
1, Result = Read level + Antenna factor + cable loss-Amp factor
2, All the other emissions not reported were too low to read and deemed to comply with FCC limit

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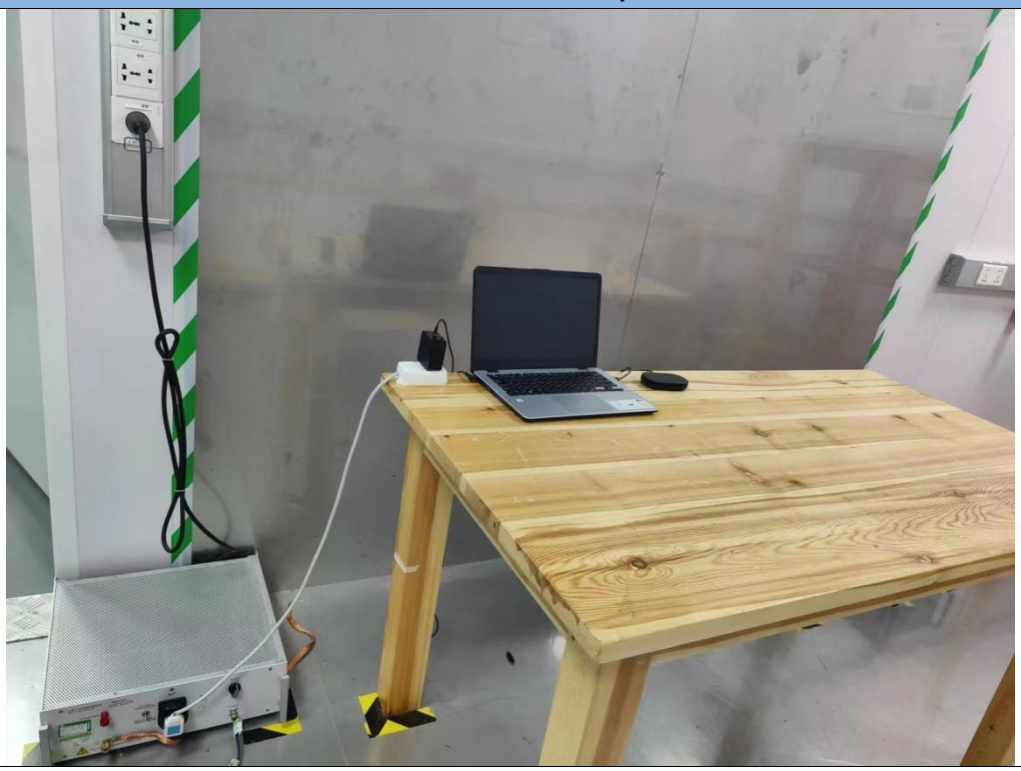
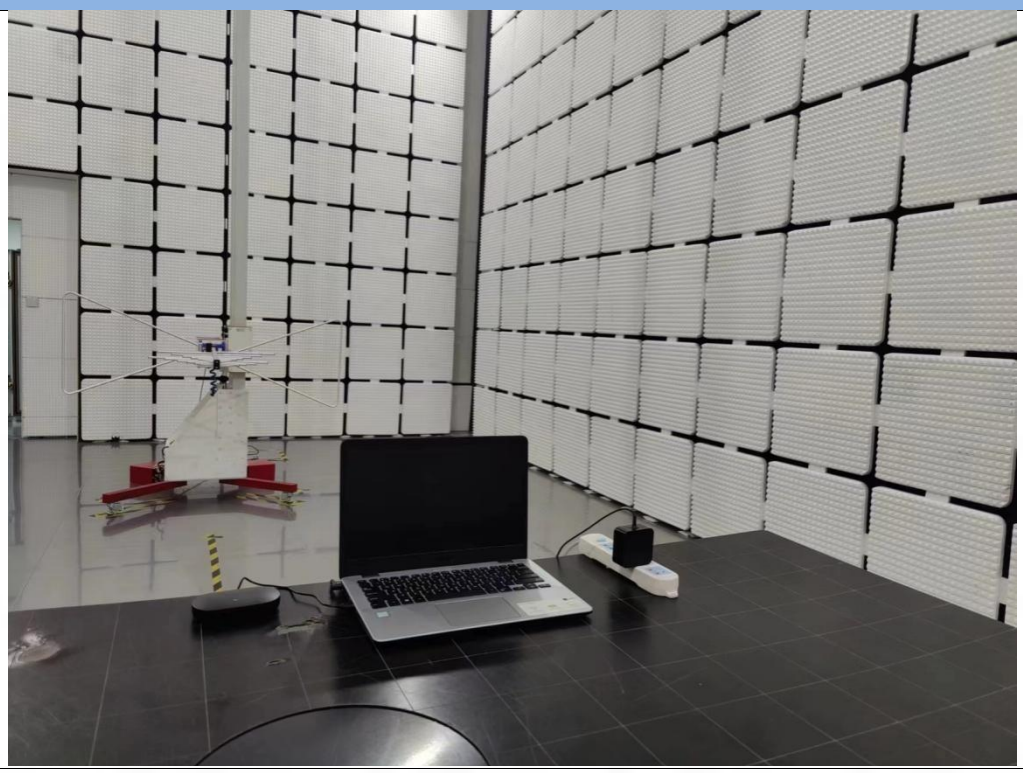
7 Test Setup Photos

Conducted Emission at AC power line


Band edge emissions (Radiated)
Emissions in restricted frequency bands (above 1GHz)

Emissions in restricted frequency bands (below 1GHz)



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Appendix

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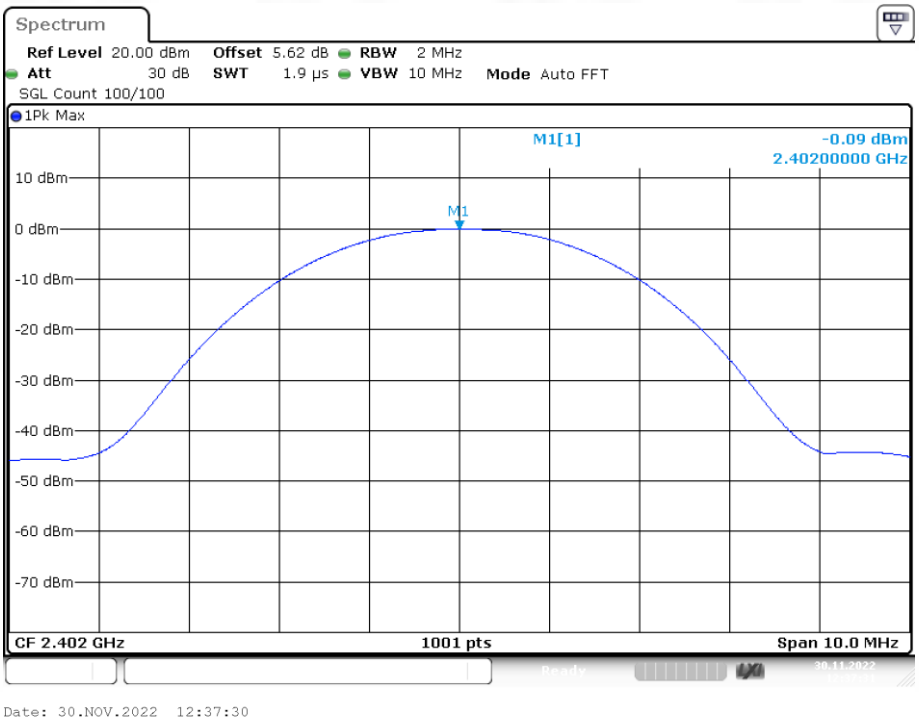
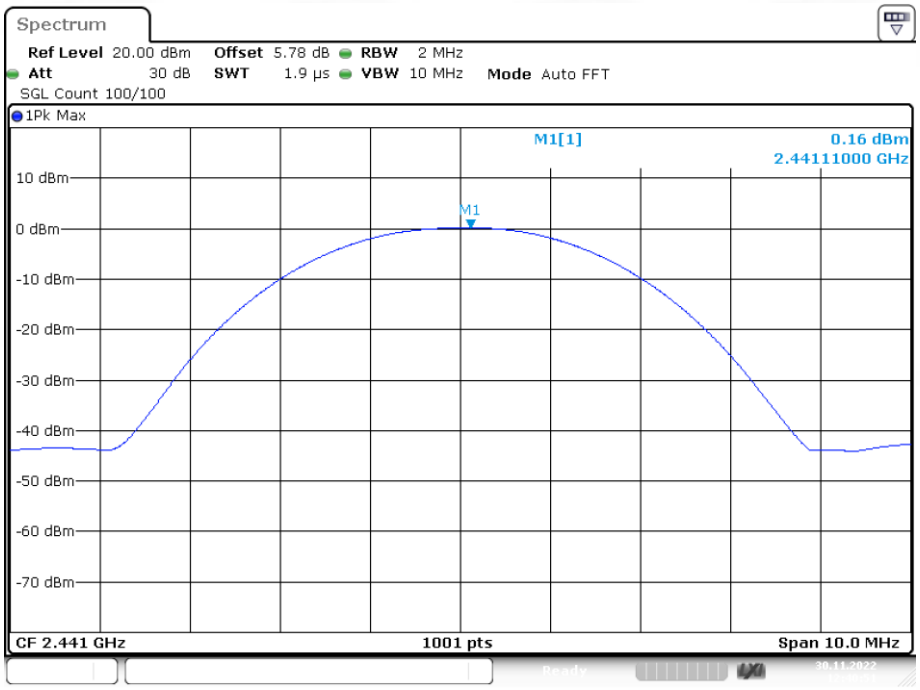
Maximum Conducted Output Power

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Duty Factor (dB)	Total Power (dBm)	Limit (dBm)	Verdict
NVNT	1-DH1	2402	Ant1	-0.091	0	-0.091	21	Pass
NVNT	1-DH1	2441	Ant1	0.16	0	0.16	21	Pass
NVNT	1-DH1	2480	Ant1	-0.593	0	-0.593	21	Pass
NVNT	1-DH3	2441	Ant1	0.101	0	0.101	21	Pass
NVNT	1-DH5	2441	Ant1	0.294	0	0.294	21	Pass
NVNT	2-DH1	2402	Ant1	-0.501	0	-0.501	21	Pass
NVNT	2-DH1	2441	Ant1	0.072	0	0.072	21	Pass
NVNT	2-DH1	2480	Ant1	-0.812	0	-0.812	21	Pass
NVNT	2-DH3	2441	Ant1	-0.323	0	-0.323	21	Pass
NVNT	2-DH5	2441	Ant1	-0.192	0	-0.192	21	Pass
NVNT	3-DH1	2402	Ant1	-0.452	0	-0.452	21	Pass
NVNT	3-DH1	2441	Ant1	-0.158	0	-0.158	21	Pass
NVNT	3-DH1	2480	Ant1	-0.862	0	-0.862	21	Pass
NVNT	3-DH3	2441	Ant1	0.459	0	0.459	21	Pass
NVNT	3-DH5	2441	Ant1	0.106	0	0.106	21	Pass

Power NVNT 1-DH1 2402MHz Ant1



Power NVNT 1-DH1 2441MHz Ant1



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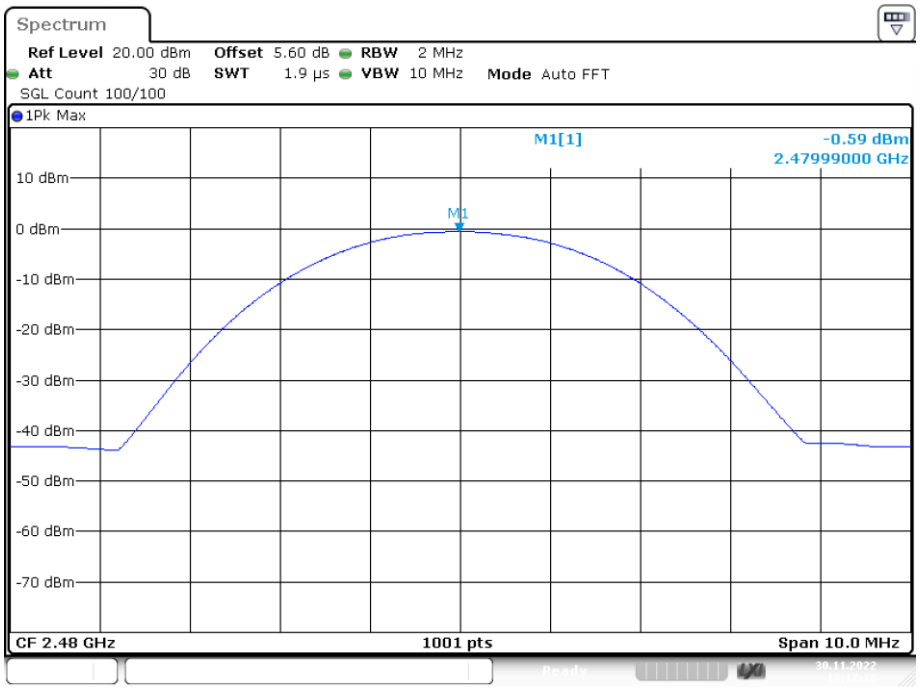
Power NVNT 1-DH1 2480MHz Ant1



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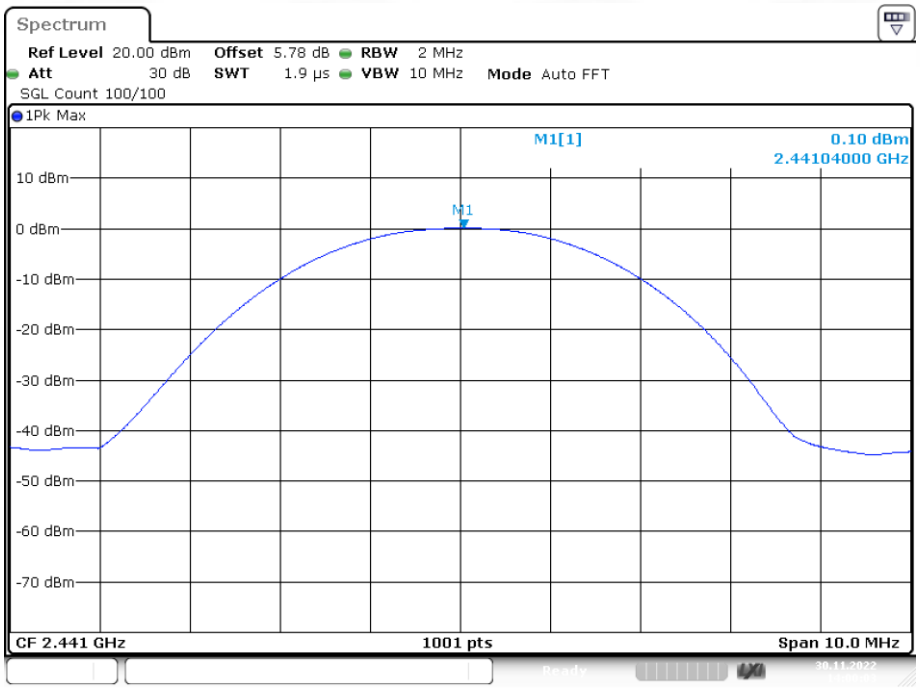
Power NVNT 1-DH3 2441MHz Ant1



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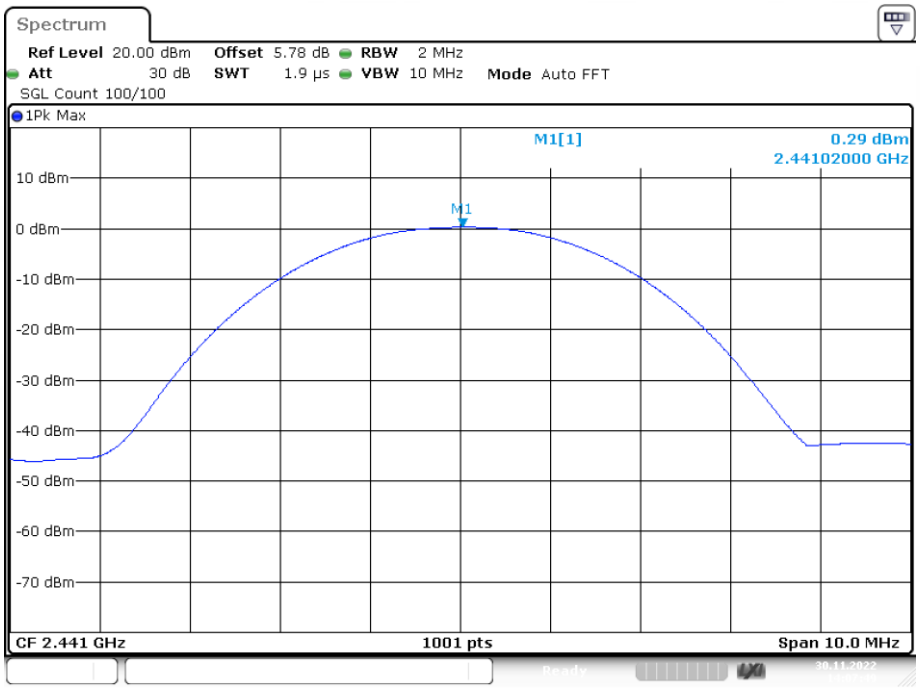
Power NVNT 1-DH5 2441MHz Ant1



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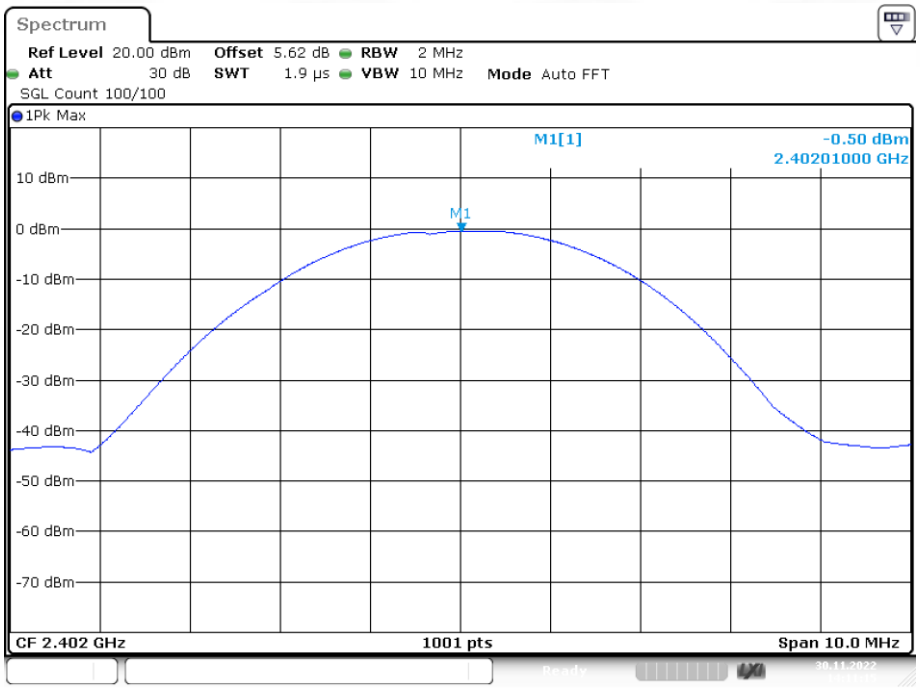
Power NVNT 2-DH1 2402MHz Ant1



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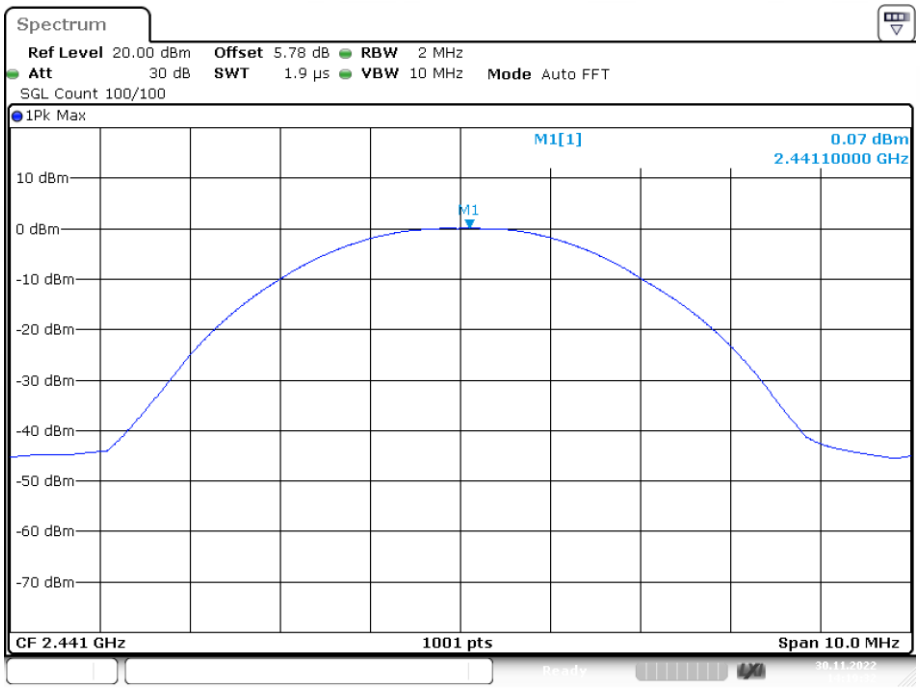
Power NVNT 2-DH1 2441MHz Ant1



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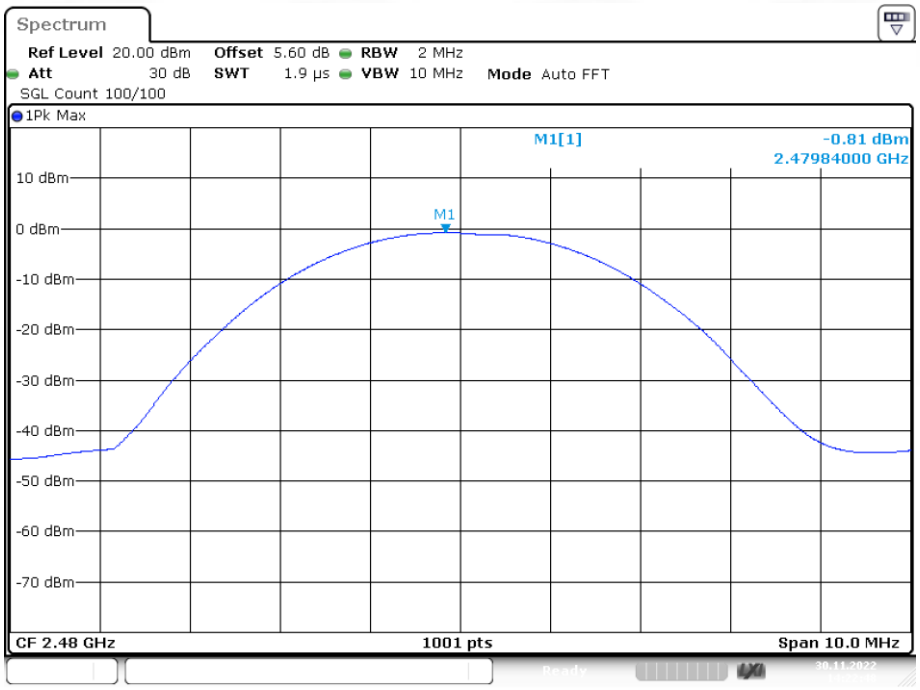
Power NVNT 2-DH1 2480MHz Ant1



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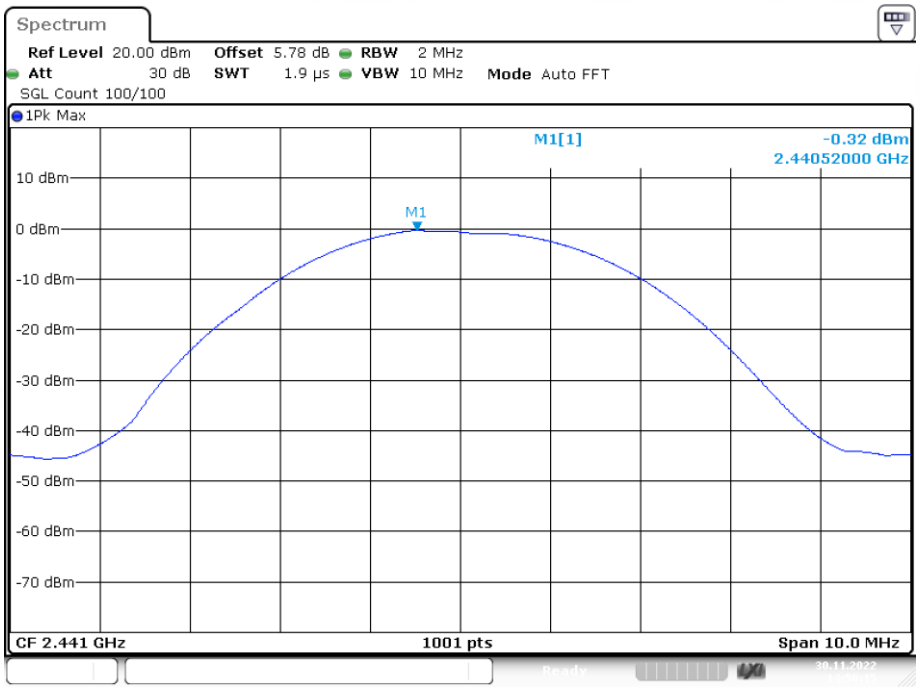
Power NVNT 2-DH3 2441MHz Ant1



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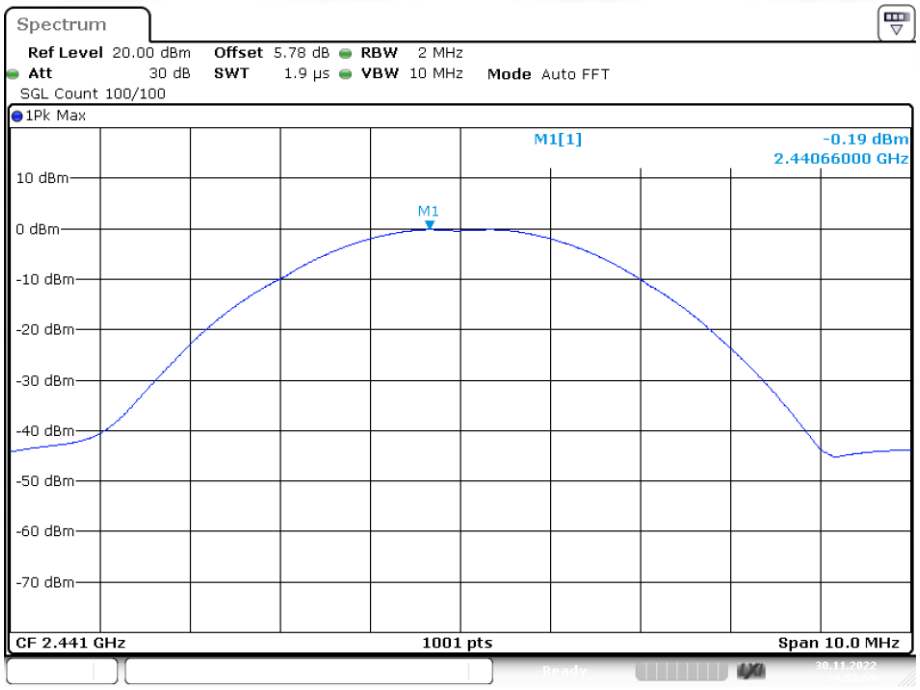
Power NVNT 2-DH5 2441MHz Ant1



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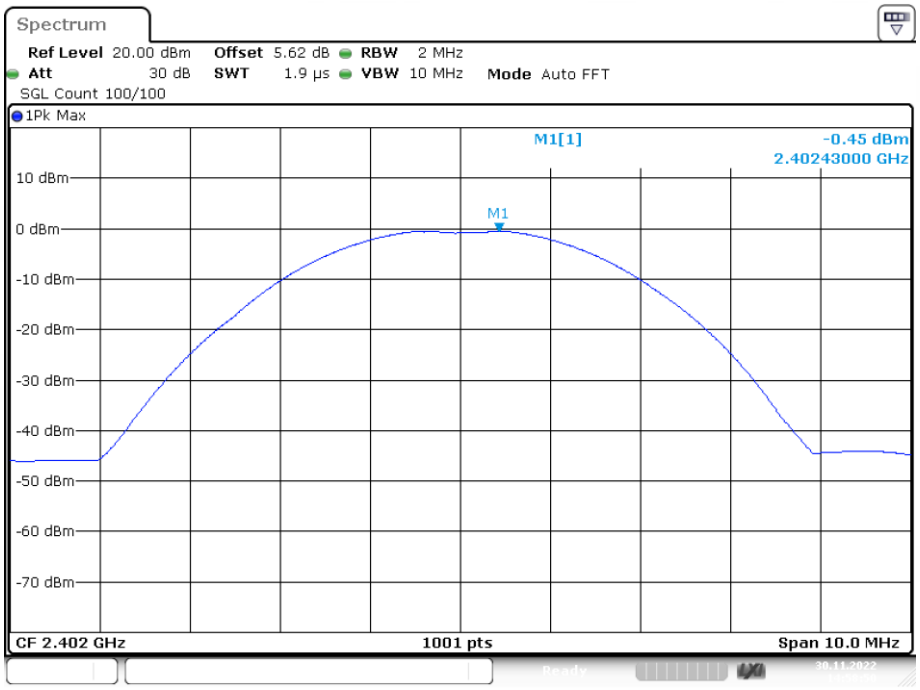
Power NVNT 3-DH1 2402MHz Ant1



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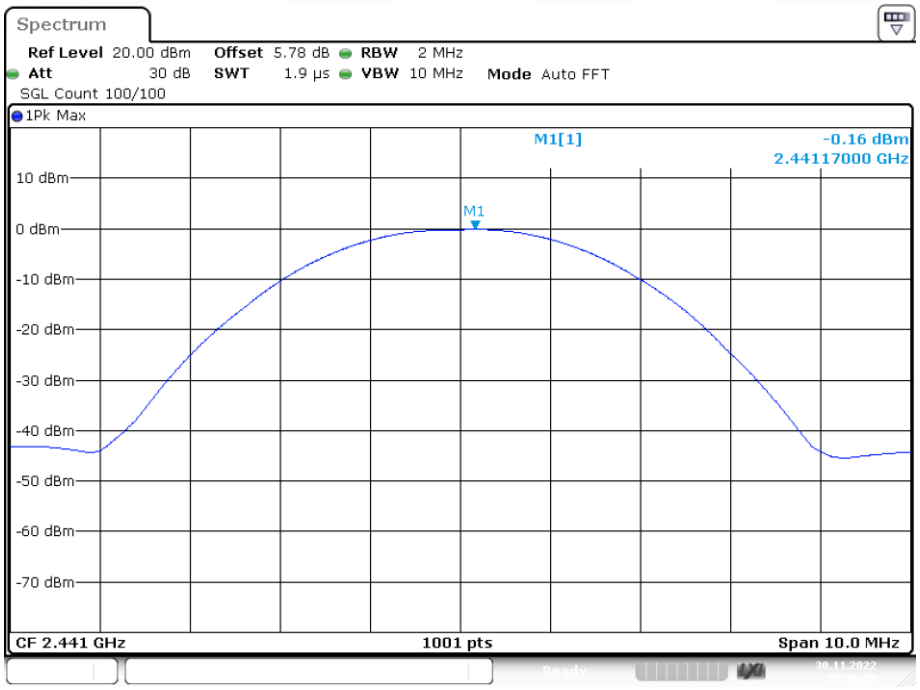
Power NVNT 3-DH1 2441MHz Ant1



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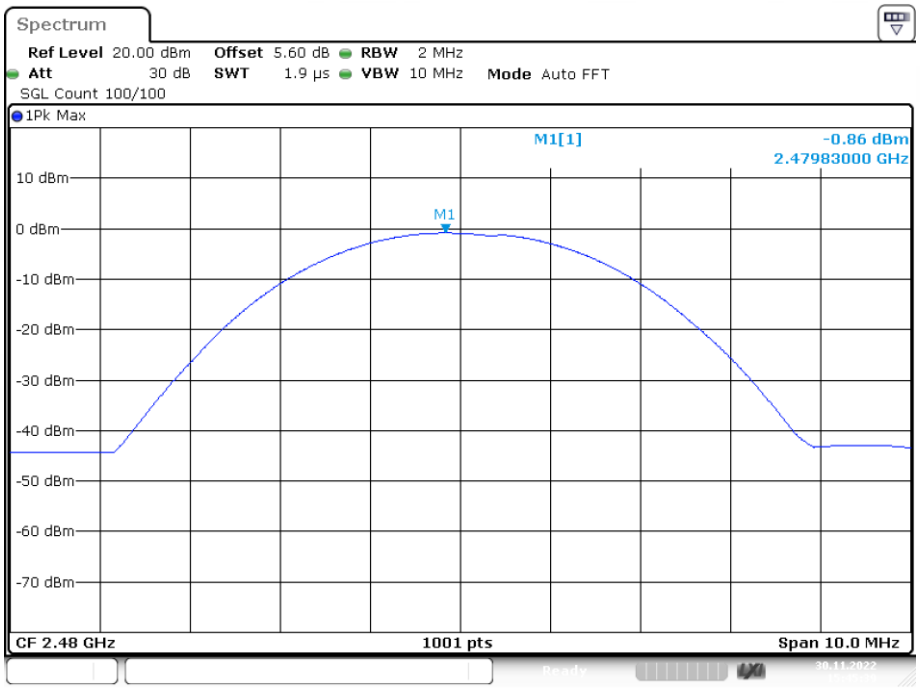
Power NVNT 3-DH1 2480MHz Ant1



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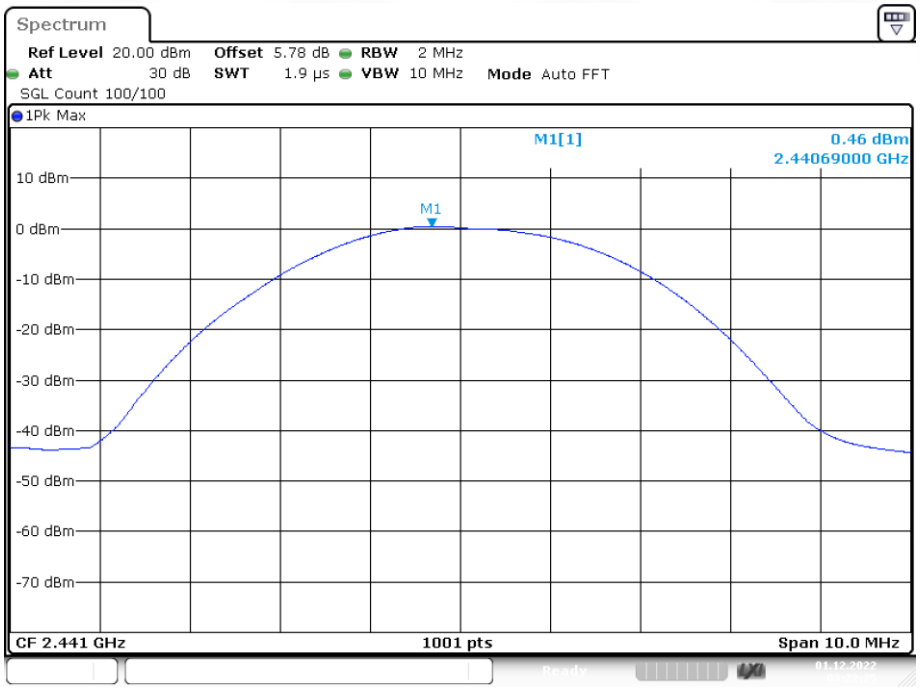
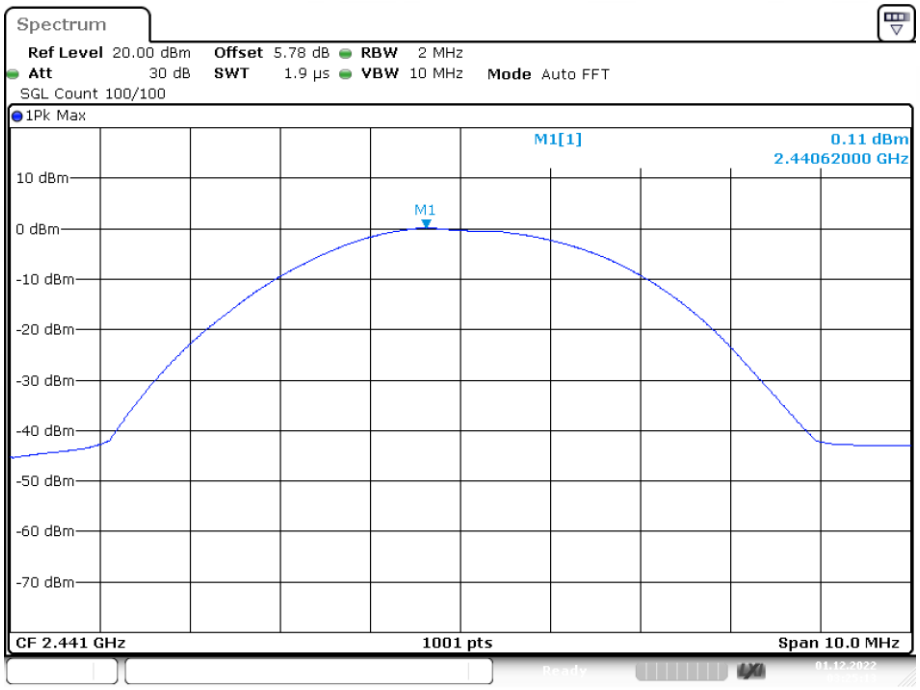
Power NVNT 3-DH3 2441MHz Ant1



Date: 1.DEC.2022 03:22:24

Power NVNT 3-DH5 2441MHz Ant1



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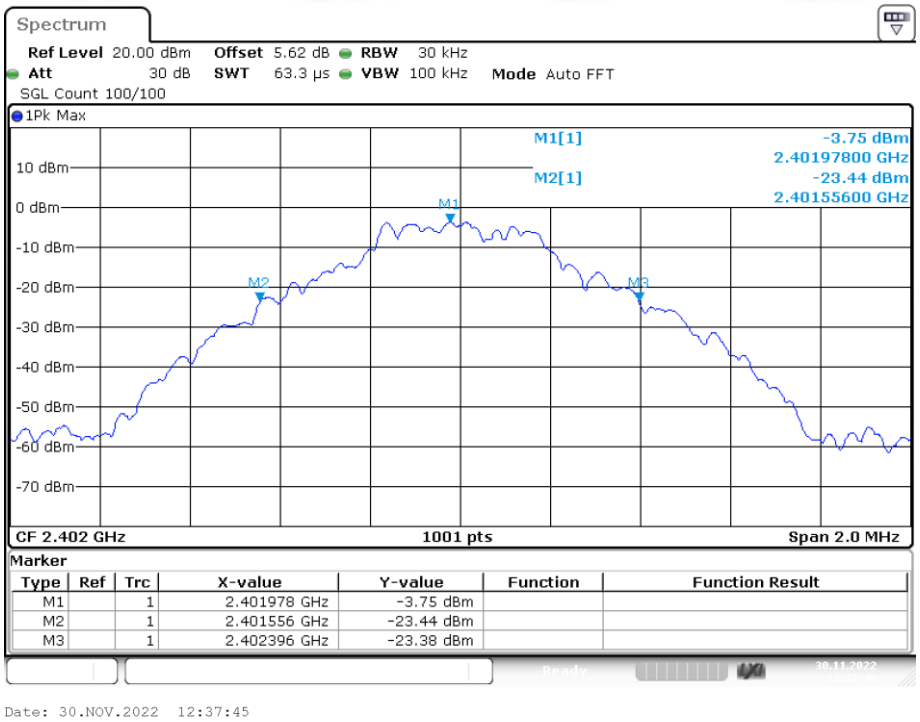
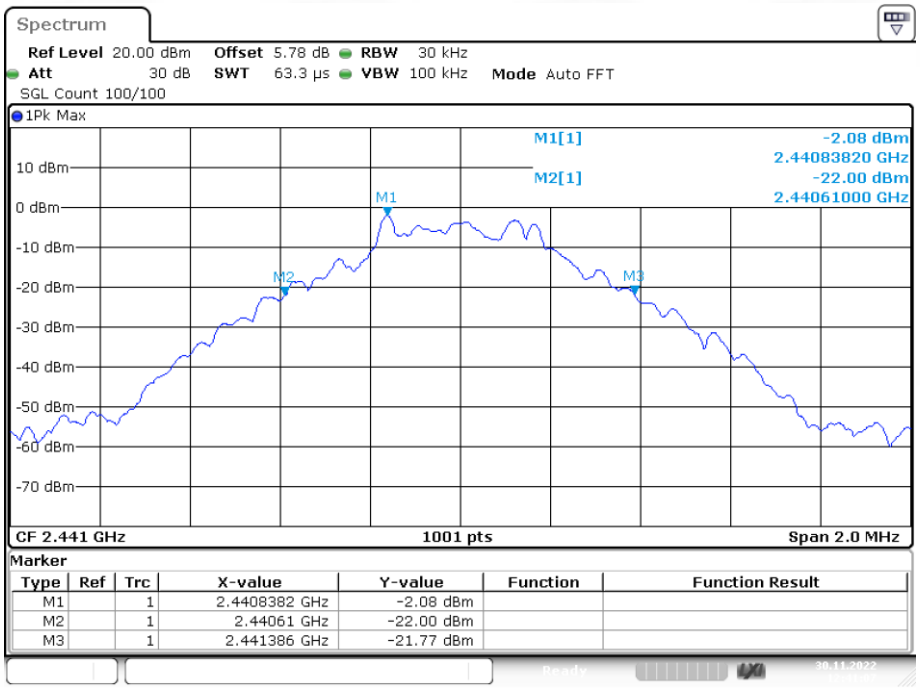
-20dB Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	-20 dB Bandwidth (MHz)	Limit -20 dB Bandwidth (MHz)	Verdict
NVNT	1-DH1	2402	Ant1	0.84	0	Pass
NVNT	1-DH1	2441	Ant1	0.776	0	Pass
NVNT	1-DH1	2480	Ant1	0.8	0	Pass
NVNT	2-DH1	2402	Ant1	1.216	0	Pass
NVNT	2-DH1	2441	Ant1	1.23	0	Pass
NVNT	2-DH1	2480	Ant1	1.238	0	Pass
NVNT	3-DH1	2402	Ant1	1.208	0	Pass
NVNT	3-DH1	2441	Ant1	1.208	0	Pass
NVNT	3-DH1	2480	Ant1	1.208	0	Pass

-20dB Bandwidth NVNT 1-DH1 2402MHz Ant1

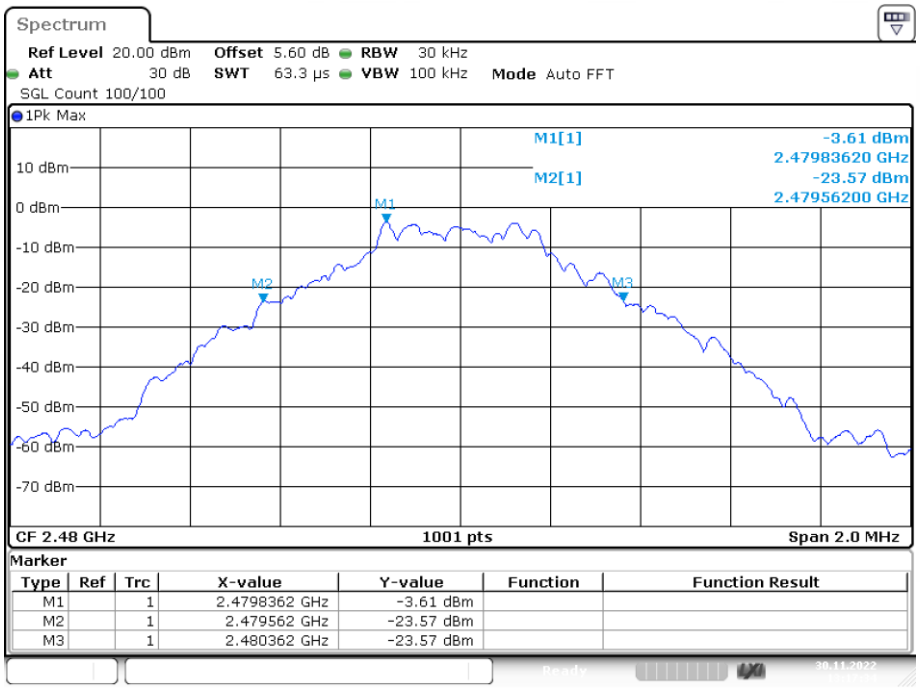


-20dB Bandwidth NVNT 1-DH1 2441MHz Ant1



Date: 30.NOV.2022 12:41:06

-20dB Bandwidth NVNT 1-DH1 2480MHz Ant1



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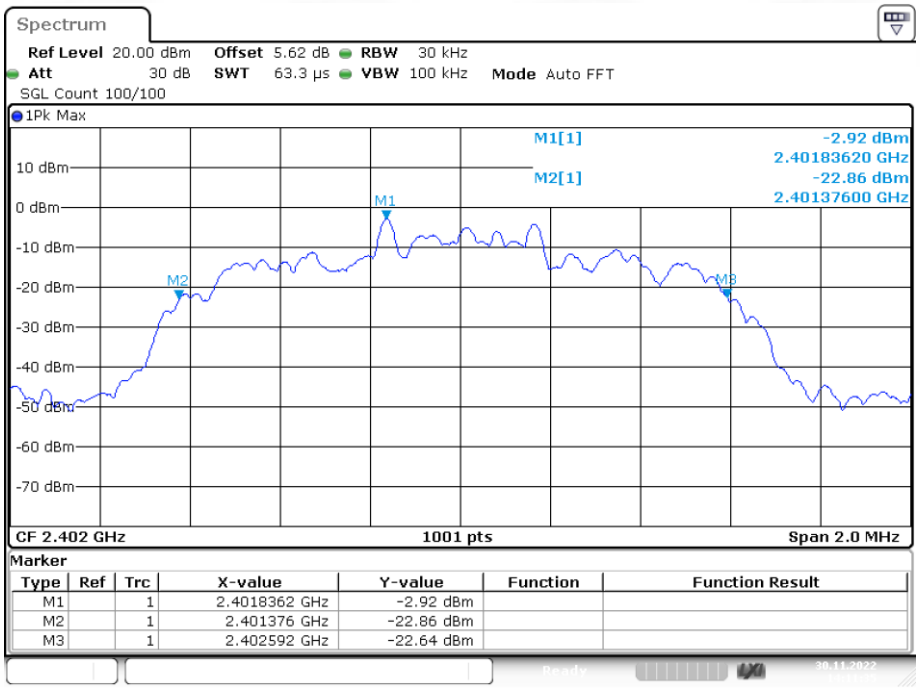
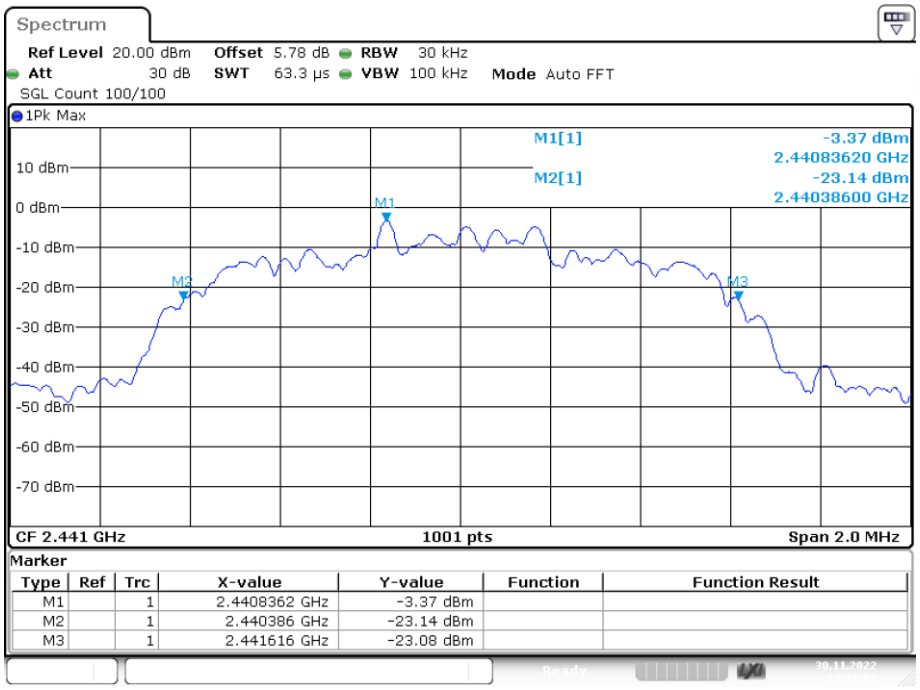
-20dB Bandwidth NVNT 2-DH1 2402MHz Ant1



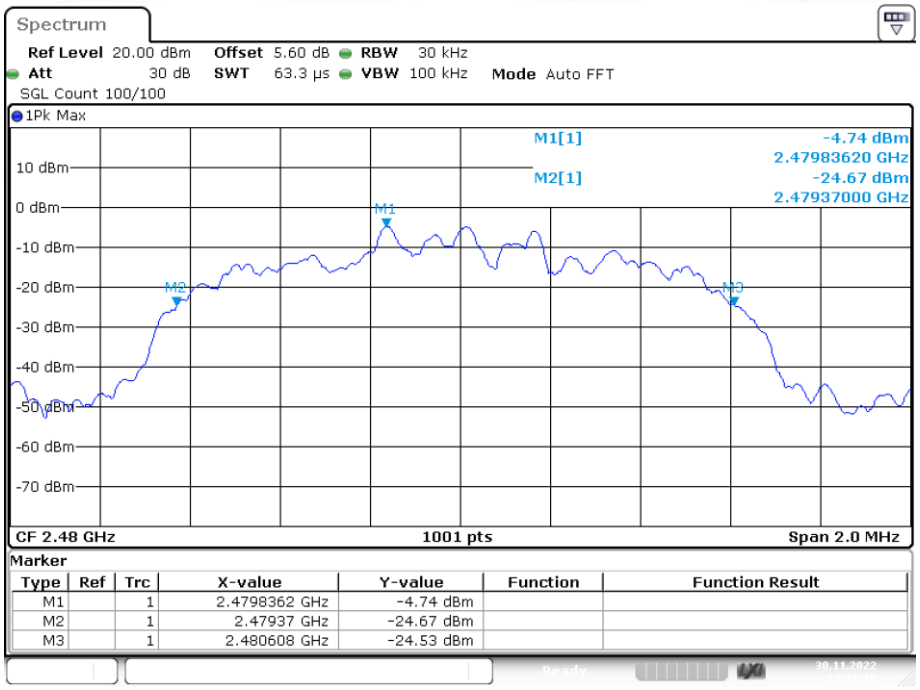
Date: 30.NOV.2022 14:11:35

-20dB Bandwidth NVNT 2-DH1 2441MHz Ant1



Date: 30.NOV.2022 14:19:53

-20dB Bandwidth NVNT 2-DH1 2480MHz Ant1

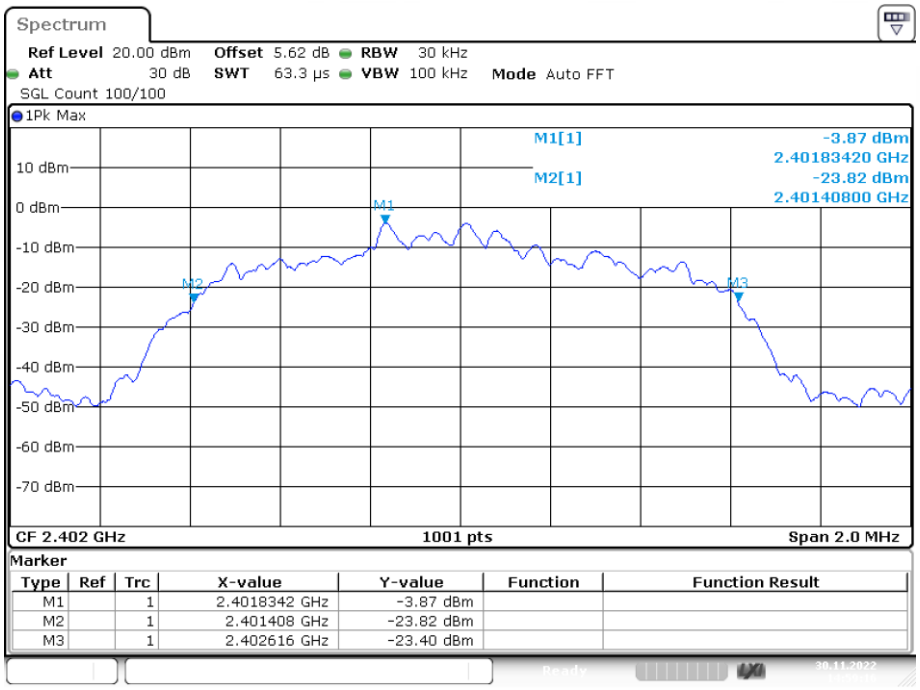


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.4798362 GHz	-4.74 dBm		
M2		1	2.47937 GHz	-24.67 dBm		
M3		1	2.480608 GHz	-24.53 dBm		

Date: 30.NOV.2022 14:23:09

-20dB Bandwidth NVNT 3-DH1 2402MHz Ant1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.4018342 GHz	-3.87 dBm		
M2		1	2.401408 GHz	-23.82 dBm		
M3		1	2.402616 GHz	-23.40 dBm		

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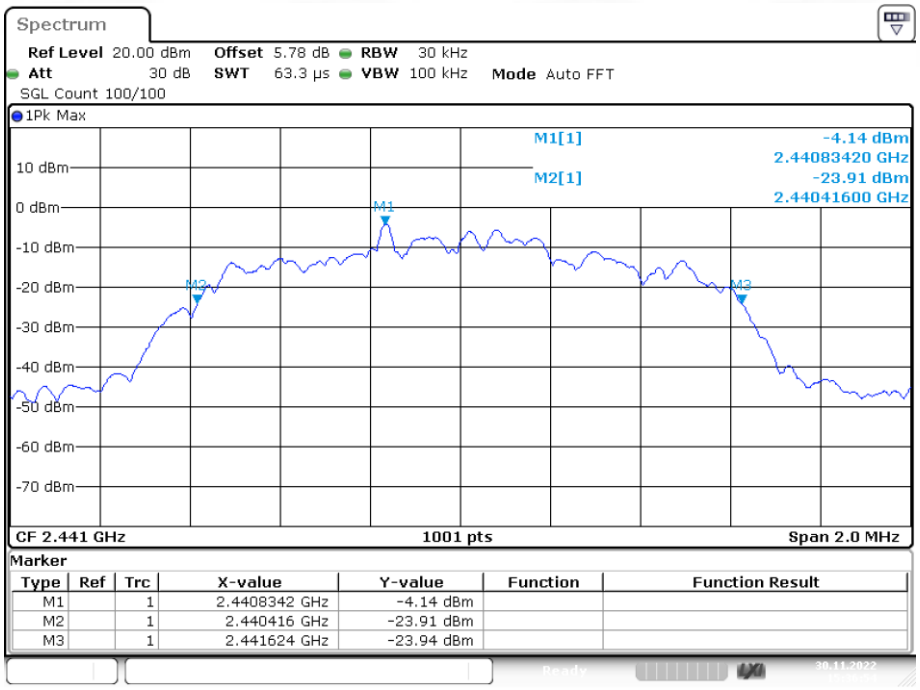
-20dB Bandwidth NVNT 3-DH1 2441MHz Ant1



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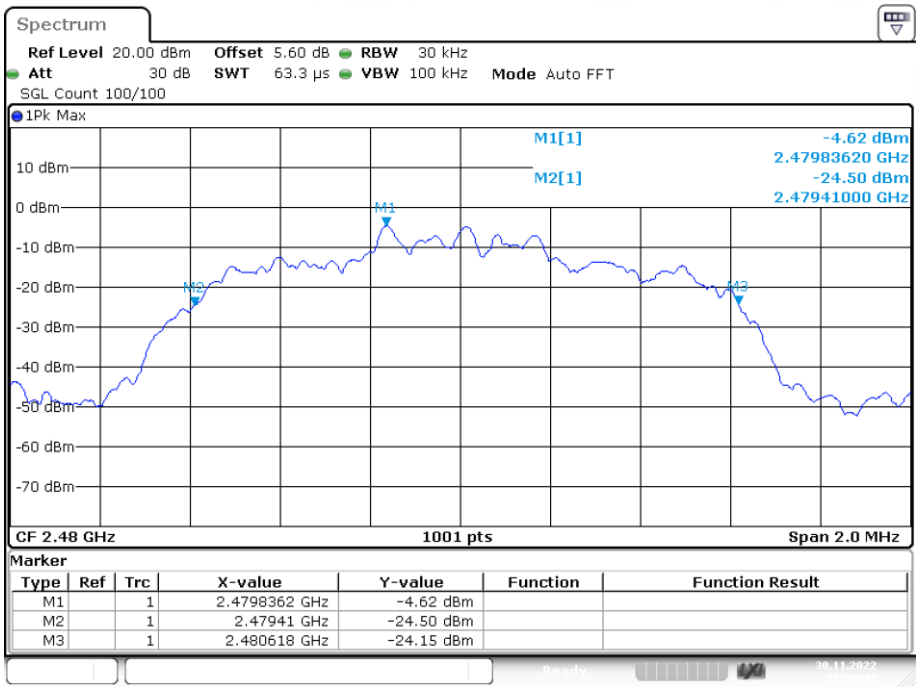
-20dB Bandwidth NVNT 3-DH1 2480MHz Ant1

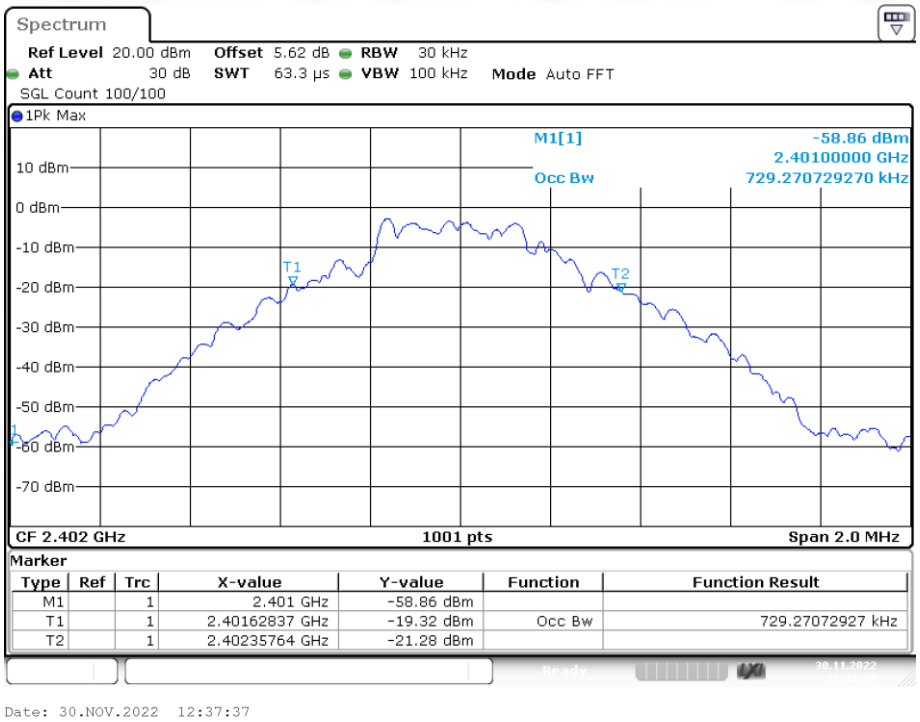


Date: 30.NOV.2022 15:39:42

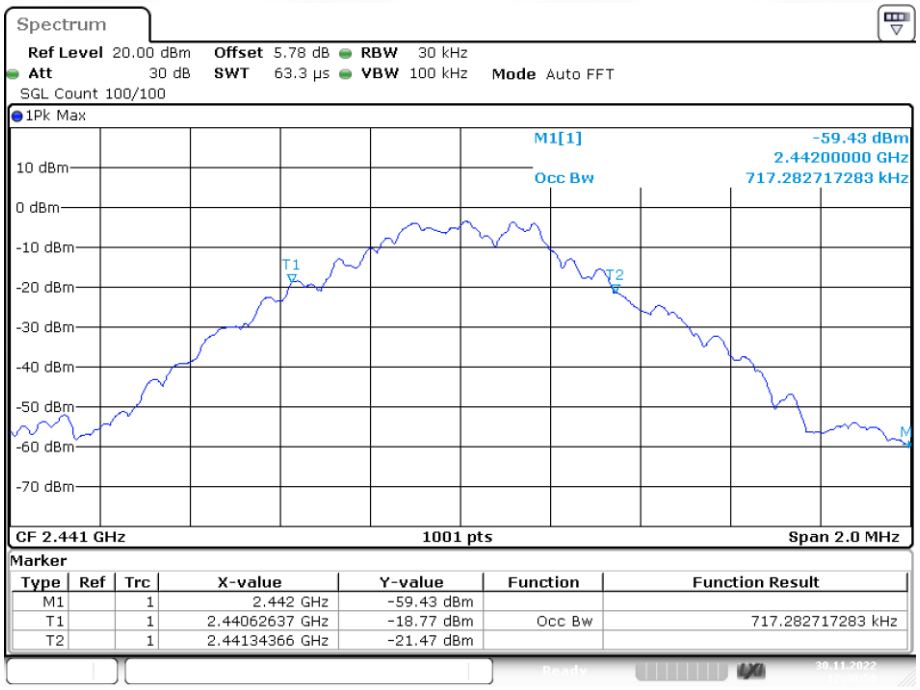
Occupied Channel Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
NVNT	1-DH1	2402	Ant1	0.729
NVNT	1-DH1	2441	Ant1	0.717
NVNT	1-DH1	2480	Ant1	0.737
NVNT	2-DH1	2402	Ant1	1.129
NVNT	2-DH1	2441	Ant1	1.157
NVNT	2-DH1	2480	Ant1	1.145
NVNT	3-DH1	2402	Ant1	1.141
NVNT	3-DH1	2441	Ant1	1.123
NVNT	3-DH1	2480	Ant1	1.137

OBW NVNT 1-DH1 2402MHz Ant1

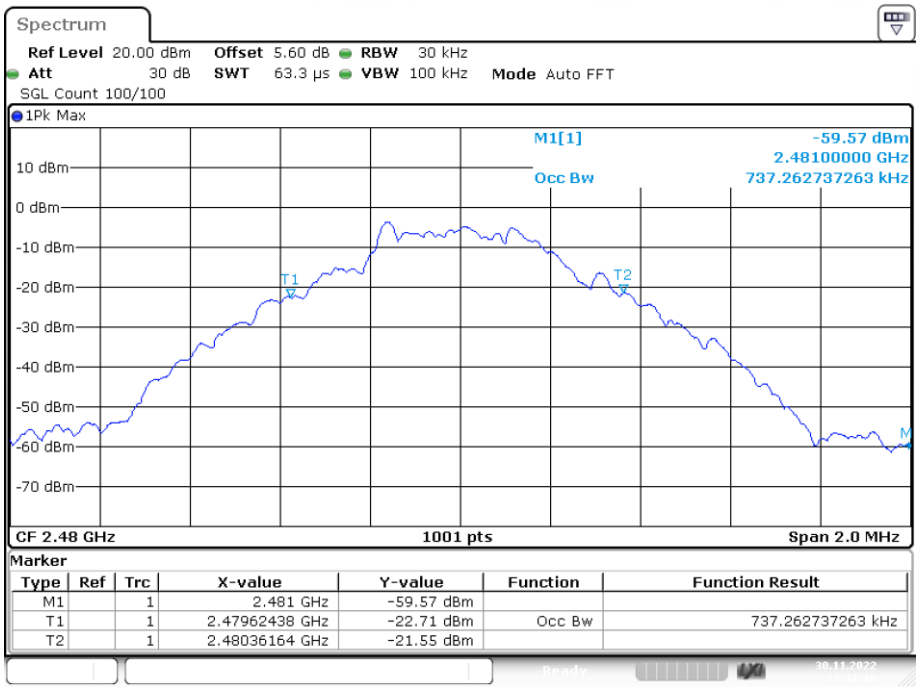


OBW NVNT 1-DH1 2441MHz Ant1



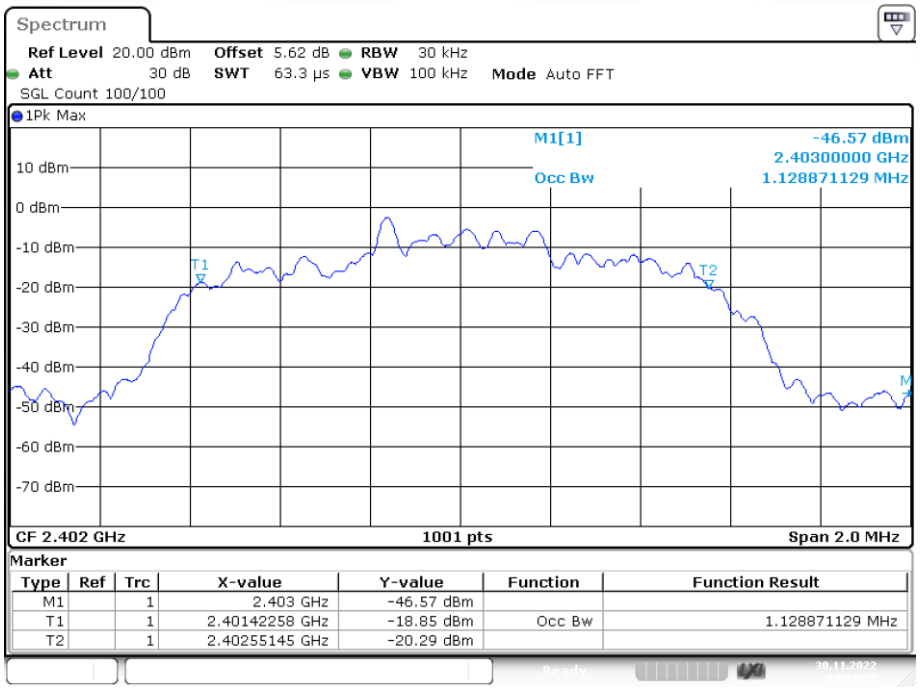
Date: 30.NOV.2022 12:40:58

OBW NVNT 1-DH1 2480MHz Ant1



Date: 30.NOV.2022 13:17:26

OBW NVNT 2-DH1 2402MHz Ant1

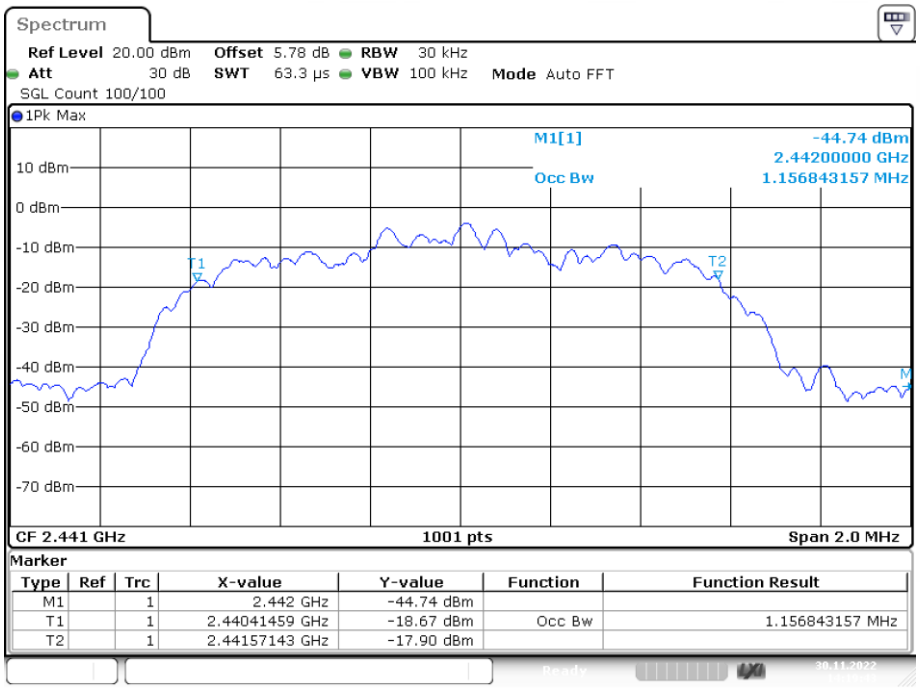


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.403 GHz	-46.57 dBm		
T1		1	2.40142258 GHz	-18.85 dBm	Occ Bw	1.128871129 MHz
T2		1	2.40255145 GHz	-20.29 dBm		

Date: 30.NOV.2022 14:11:25

OBW NVNT 2-DH1 2441MHz Ant1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.442 GHz	-44.74 dBm		
T1		1	2.44041459 GHz	-18.67 dBm	Occ Bw	1.156843157 MHz
T2		1	2.44157143 GHz	-17.90 dBm		

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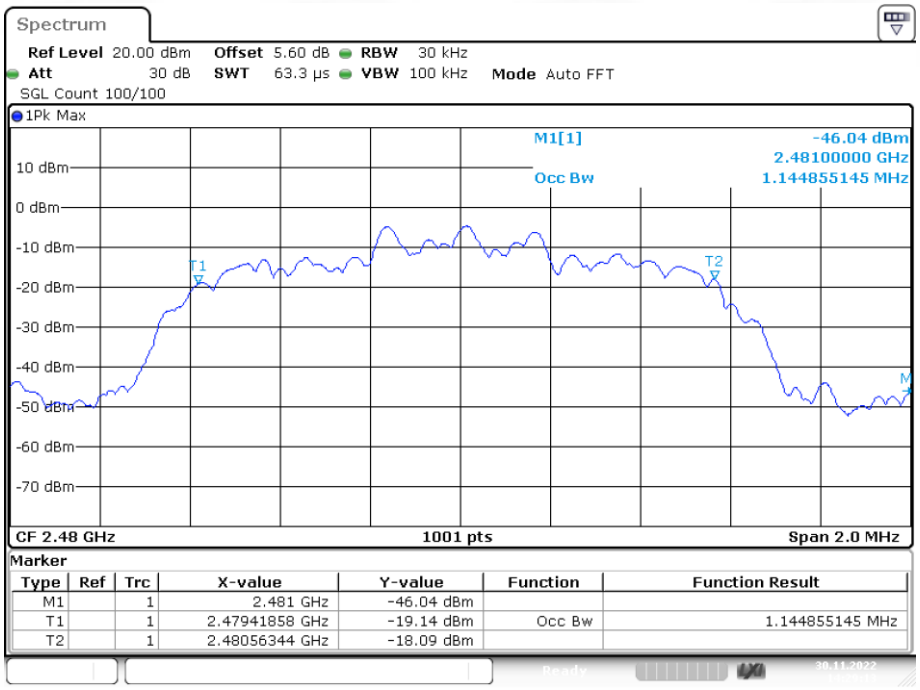
OBW NVNT 2-DH1 2480MHz Ant1



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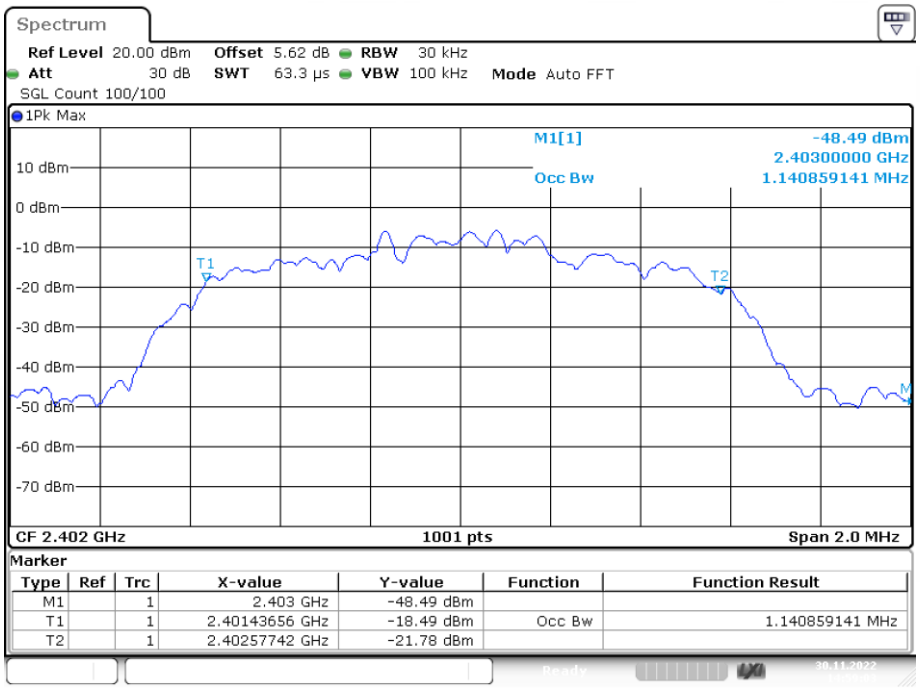
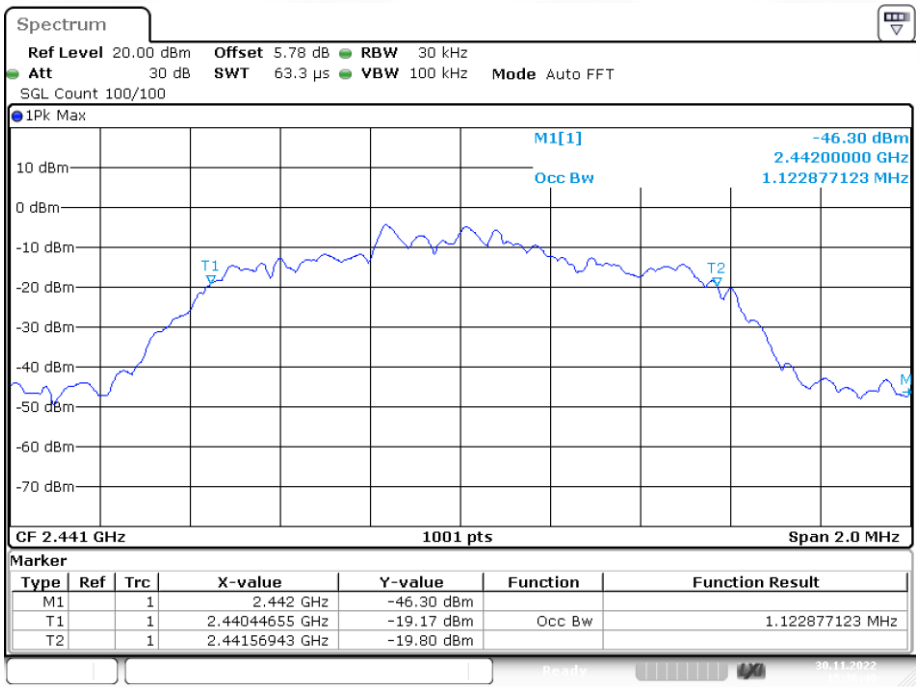
OBW NVNT 3-DH1 2402MHz Ant1



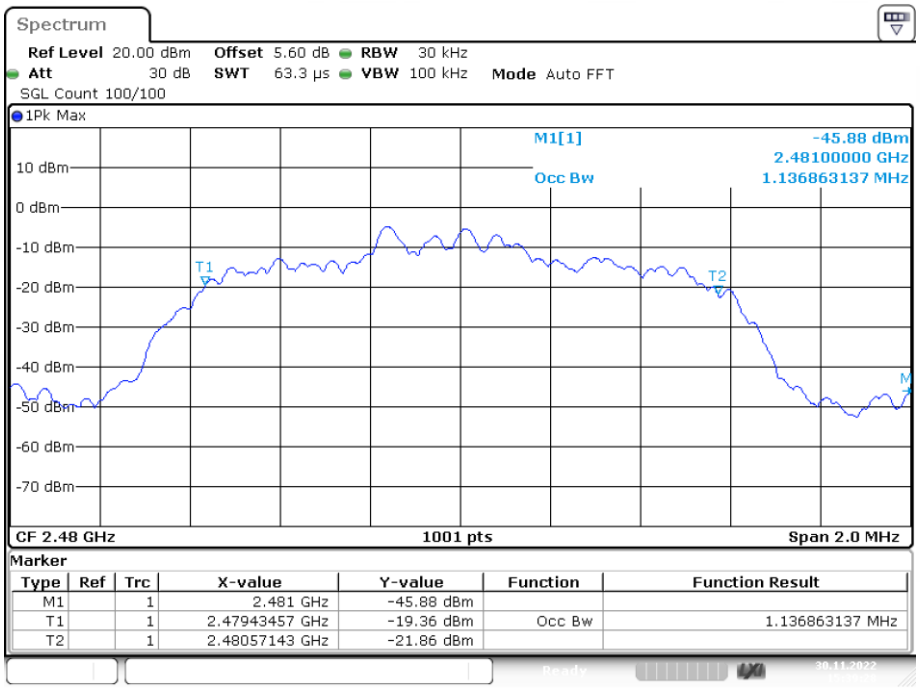
Date: 30.NOV.2022 14:59:02

OBW NVNT 3-DH1 2441MHz Ant1



Date: 30.NOV.2022 15:36:40

OBW NVNT 3-DH1 2480MHz Ant1

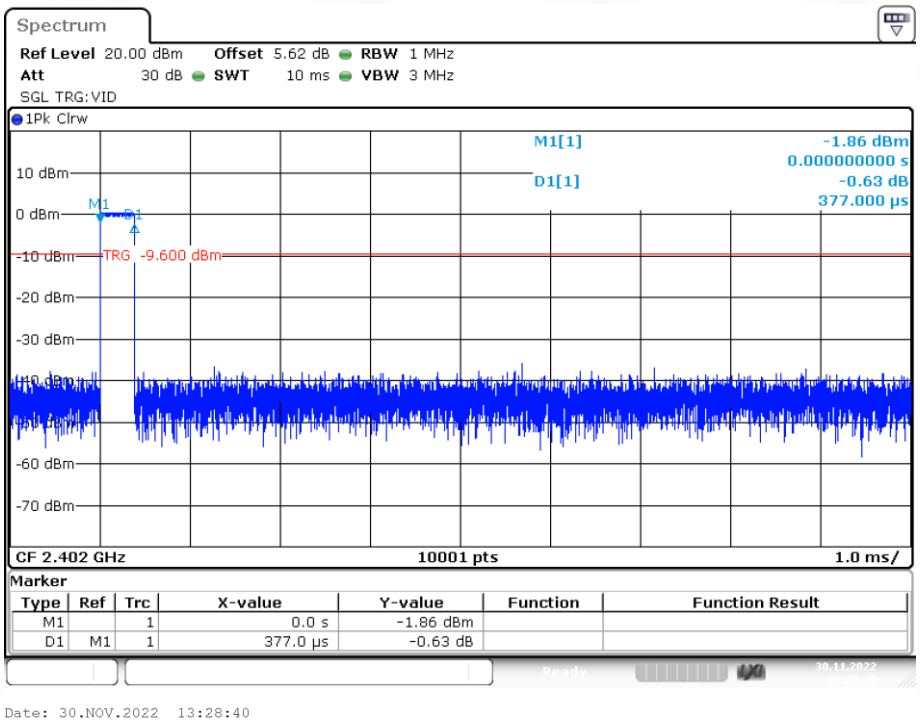


Date: 30.NOV.2022 15:39:28

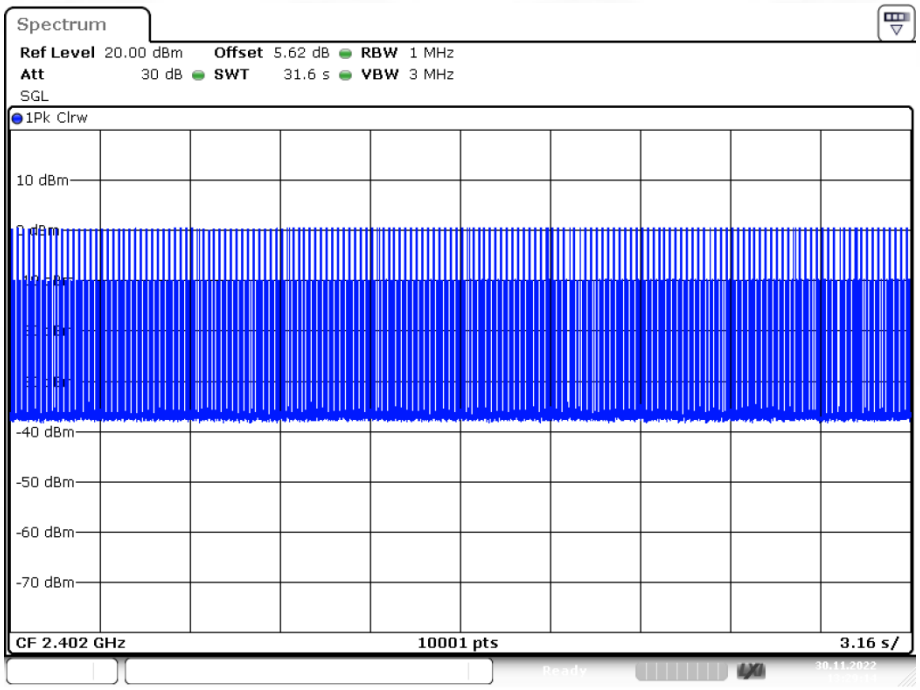
Dwell Time

Condition	Mode	Frequency (MHz)	Antenna	Pulse Time (ms)	Total Dwell Time (ms)	Burst Count	Period Time (ms)	Limit (ms)	Verdict
NVNT	1-DH1	2402	Ant1	0.377	119.509	317	31600	400	Pass
NVNT	1-DH1	2441	Ant1	0.378	119.826	317	31600	400	Pass
NVNT	1-DH1	2480	Ant1	0.378	118.692	314	31600	400	Pass
NVNT	1-DH3	2441	Ant1	1.632	256.224	157	31600	400	Pass
NVNT	1-DH5	2441	Ant1	2.881	290.981	101	31600	400	Pass
NVNT	2-DH1	2402	Ant1	0.38	120.46	317	31600	400	Pass
NVNT	2-DH1	2441	Ant1	0.38	118.56	312	31600	400	Pass
NVNT	2-DH1	2480	Ant1	0.384	121.344	316	31600	400	Pass
NVNT	2-DH3	2441	Ant1	1.637	255.372	156	31600	400	Pass
NVNT	2-DH5	2441	Ant1	2.88	296.64	103	31600	400	Pass
NVNT	3-DH1	2402	Ant1	0.386	123.134	319	31600	400	Pass
NVNT	3-DH1	2441	Ant1	0.386	122.362	317	31600	400	Pass
NVNT	3-DH1	2480	Ant1	0.386	122.362	317	31600	400	Pass
NVNT	3-DH3	2441	Ant1	1.635	253.425	155	31600	400	Pass
NVNT	3-DH5	2441	Ant1	2.887	291.587	101	31600	400	Pass

Dwell NVNT 1-DH1 2402MHz Ant1 One Burst



Dwell NVNT 1-DH1 2402MHz Ant1 Accumulated



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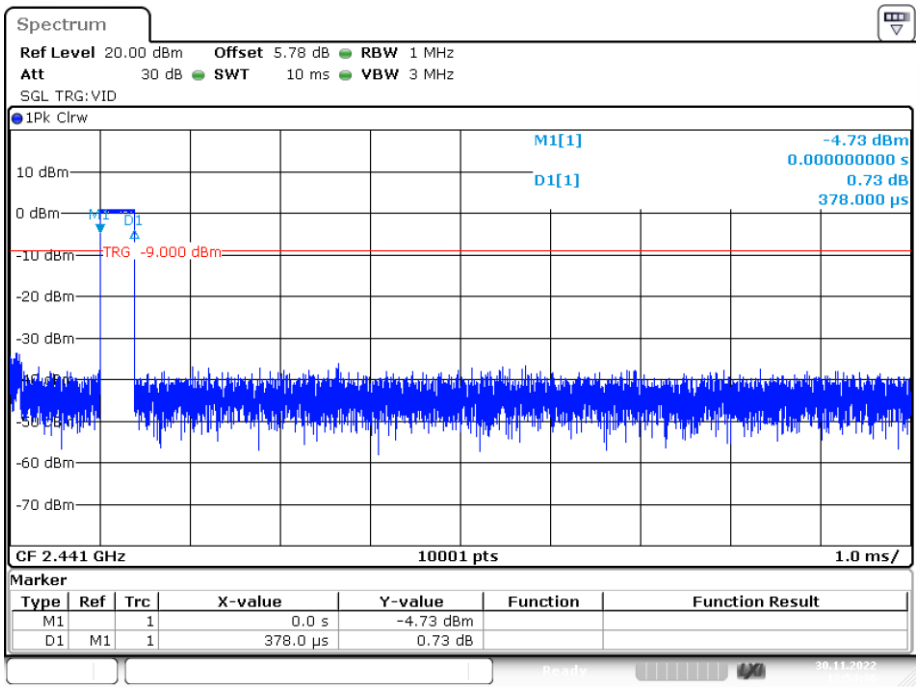
Dwell NVNT 1-DH1 2441MHz Ant1 One Burst



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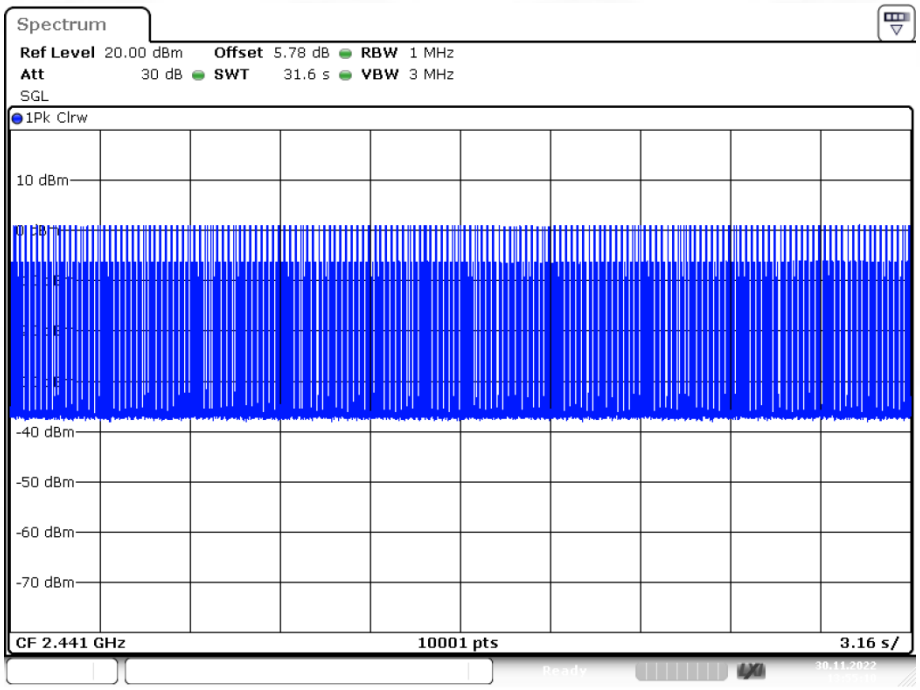
Dwell NVNT 1-DH1 2441MHz Ant1 Accumulated



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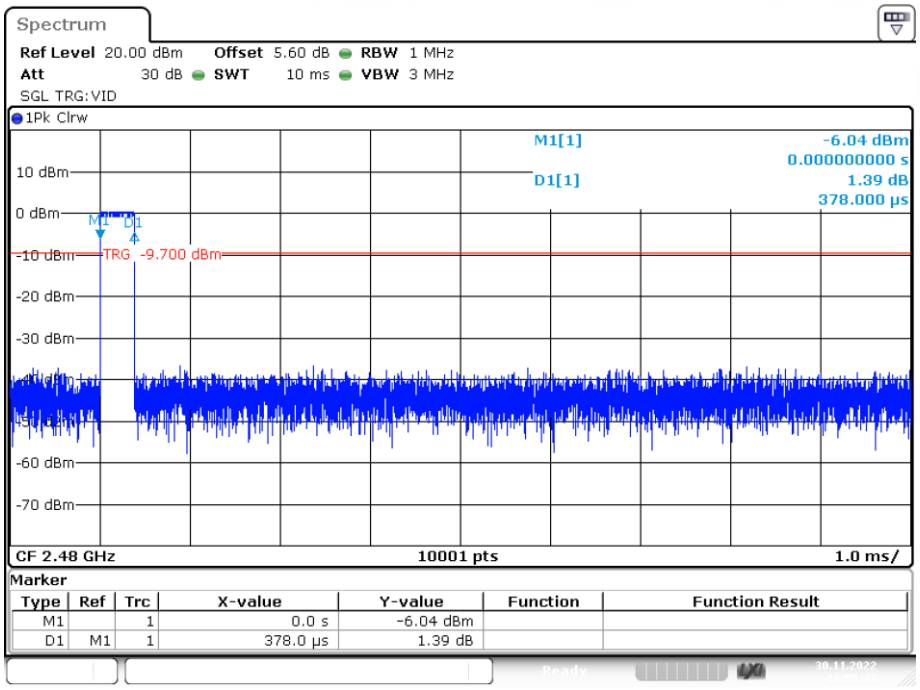
Dwell NVNT 1-DH1 2480MHz Ant1 One Burst



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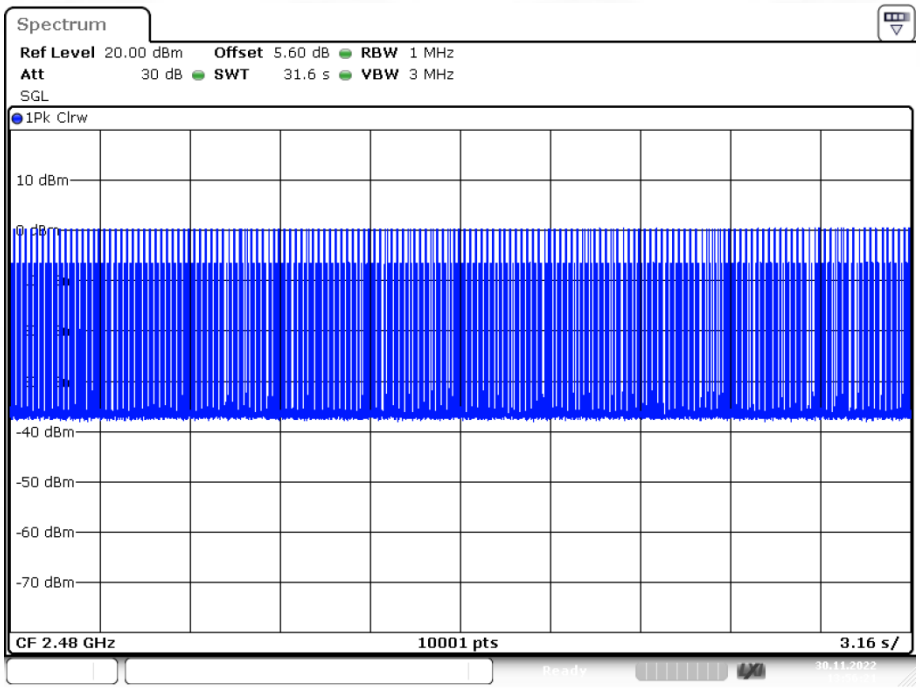

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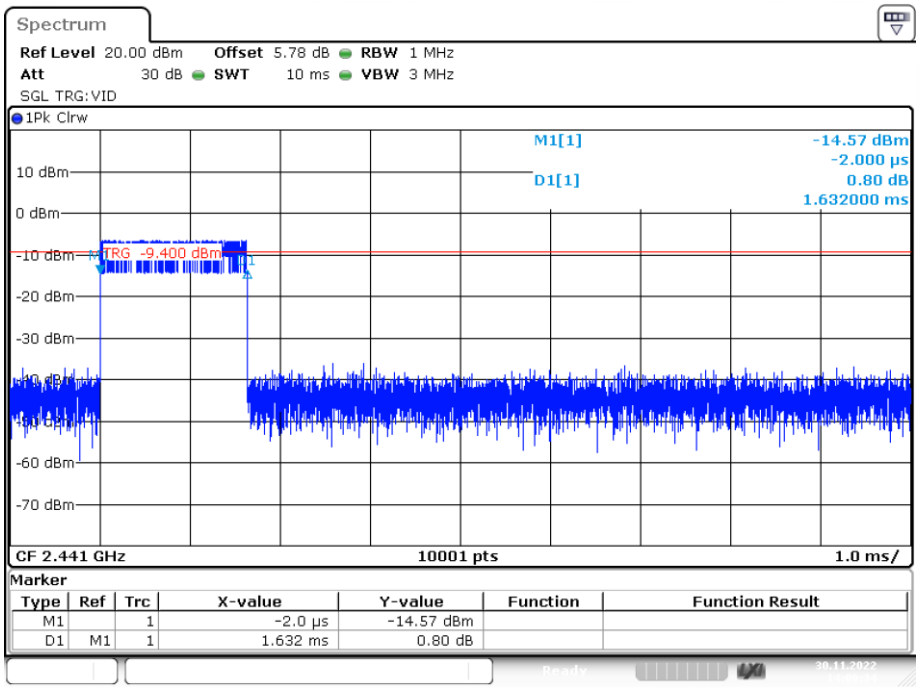
Dwell NVNT 1-DH3 2441MHz Ant1 One Burst



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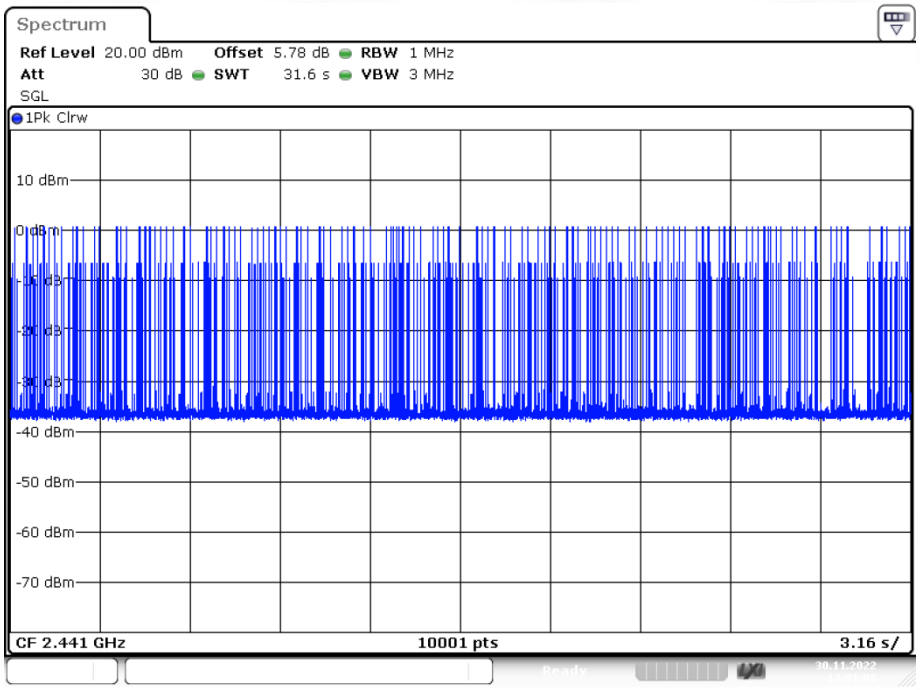
Dwell NVNT 1-DH3 2441MHz Ant1 Accumulated



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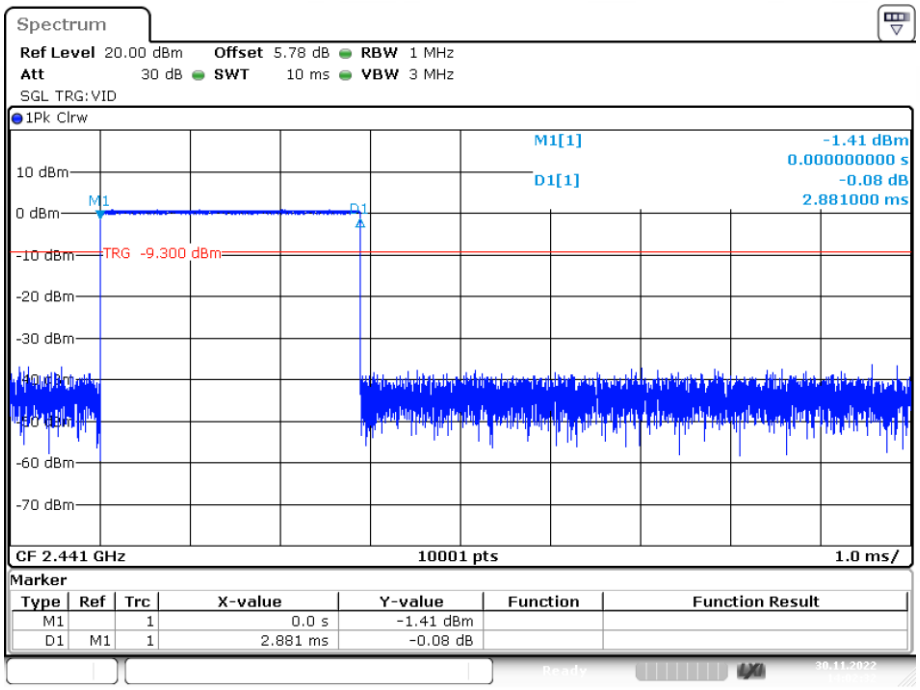
Dwell NVNT 1-DH5 2441MHz Ant1 One Burst



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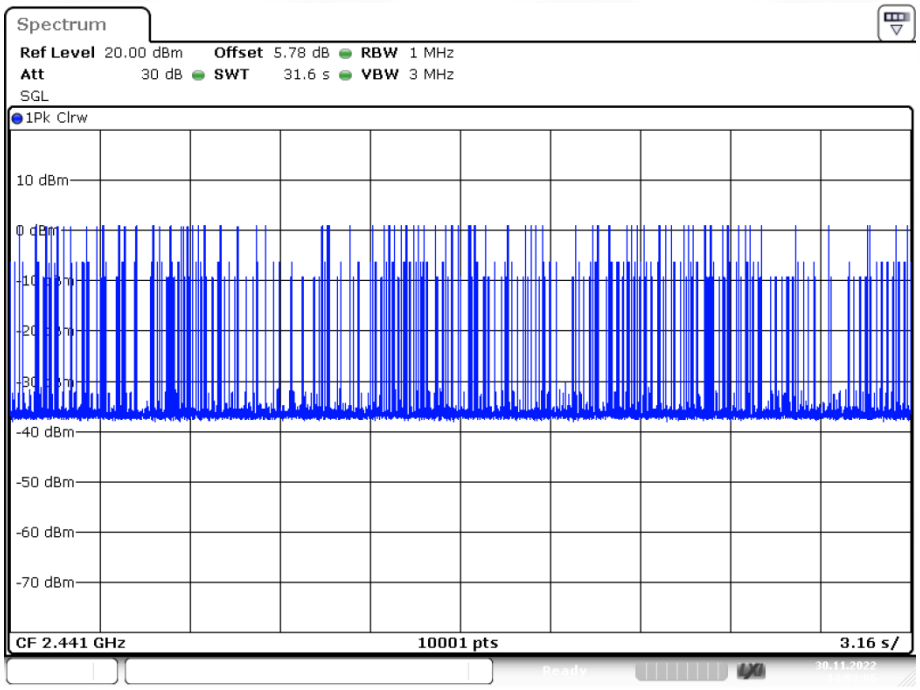

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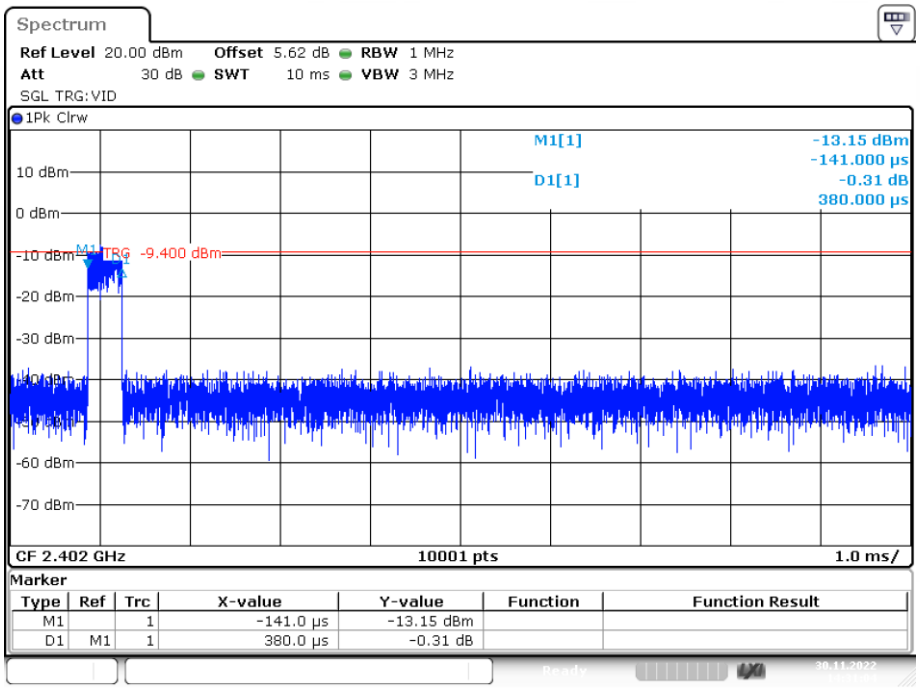
Dwell NVNT 2-DH1 2402MHz Ant1 One Burst



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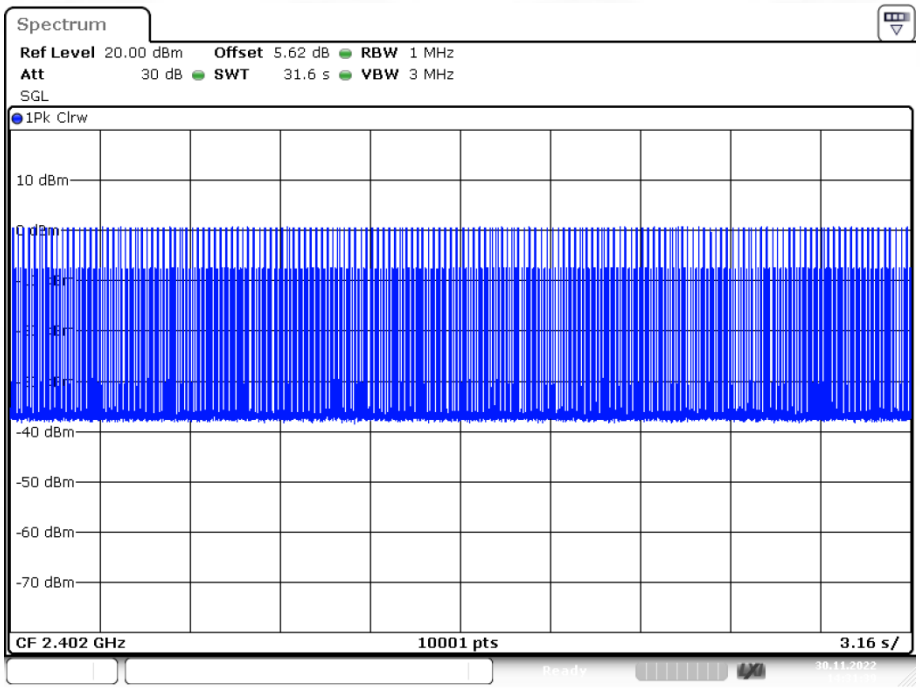
Dwell NVNT 2-DH1 2402MHz Ant1 Accumulated



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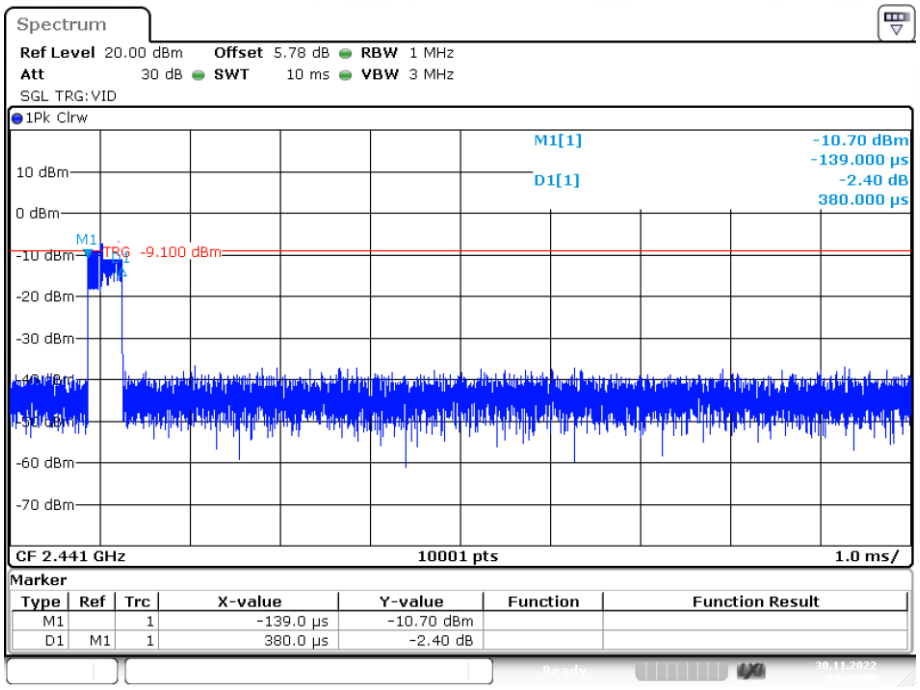
Dwell NVNT 2-DH1 2441MHz Ant1 One Burst



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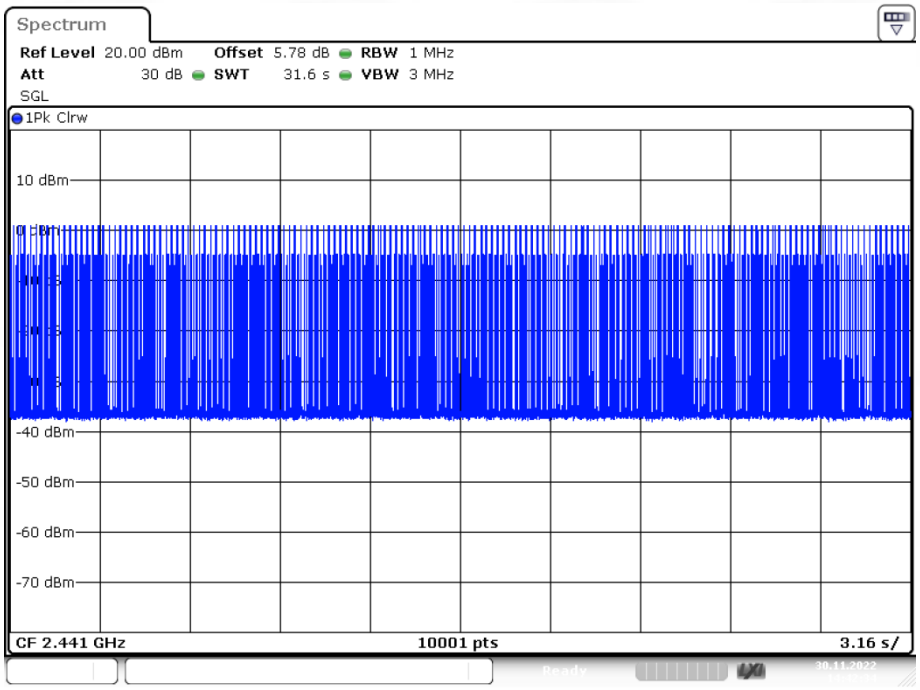
Dwell NVNT 2-DH1 2441MHz Ant1 Accumulated



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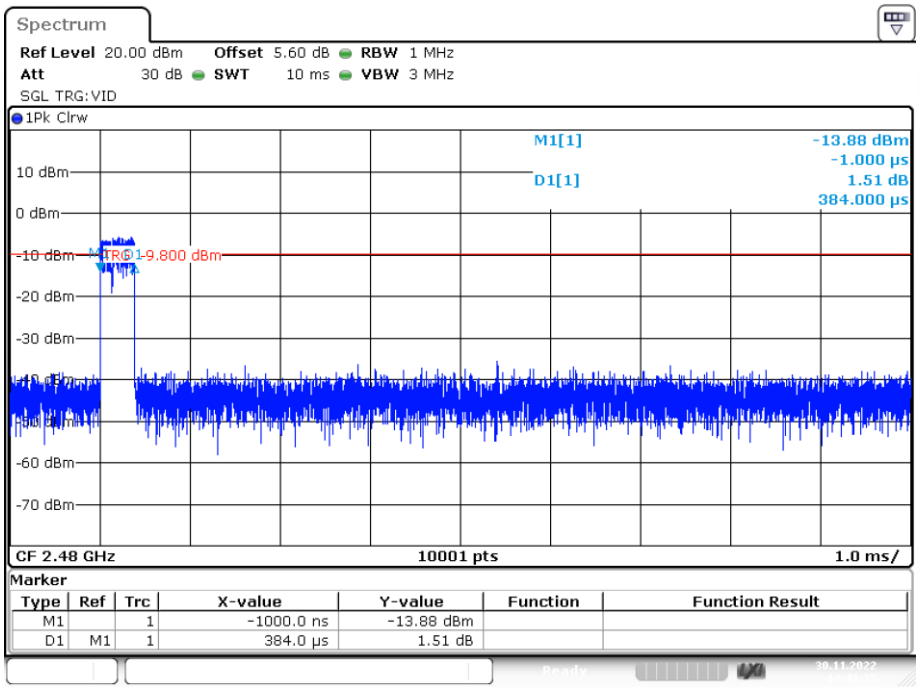
Dwell NVNT 2-DH1 2480MHz Ant1 One Burst



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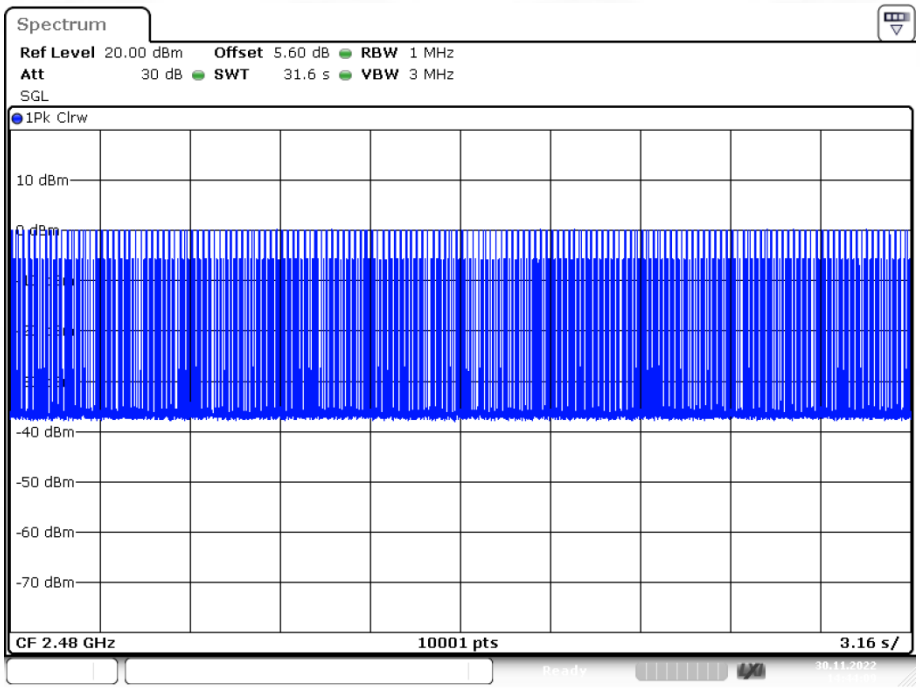

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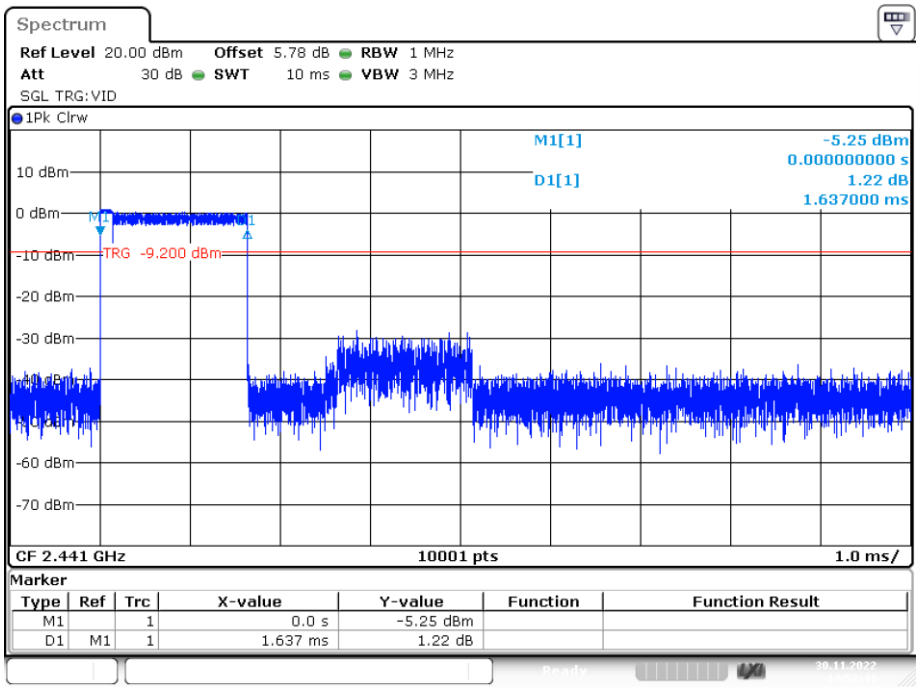
Dwell NVNT 2-DH3 2441MHz Ant1 One Burst



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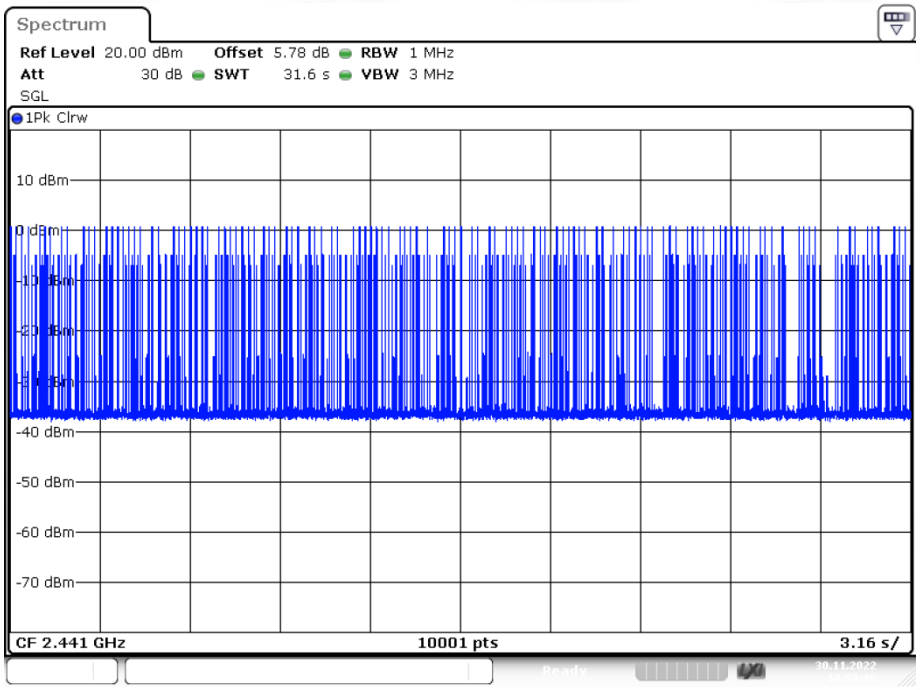

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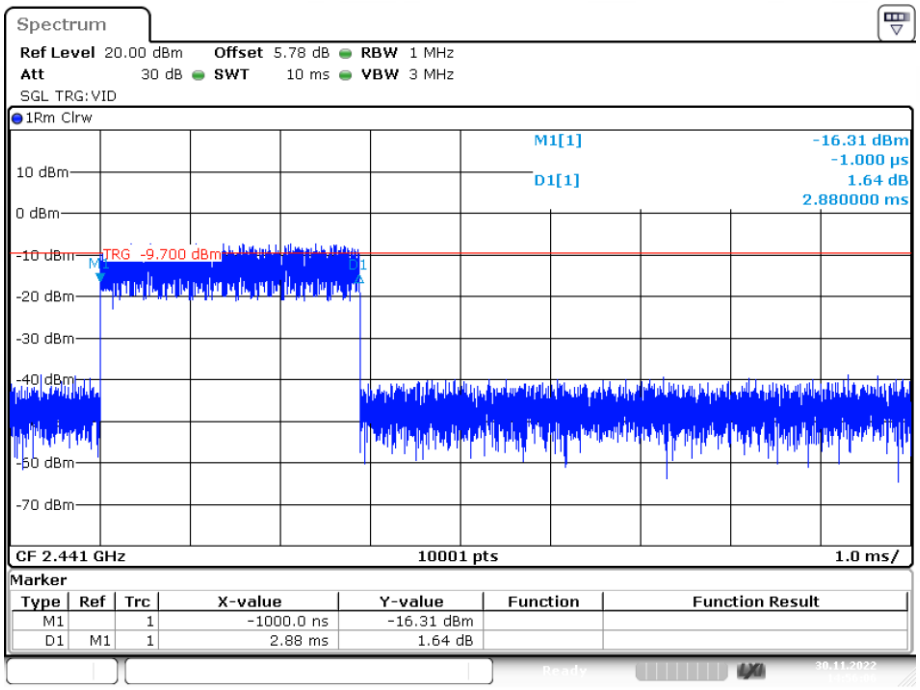
Dwell NVNT 2-DH5 2441MHz Ant1 One Burst



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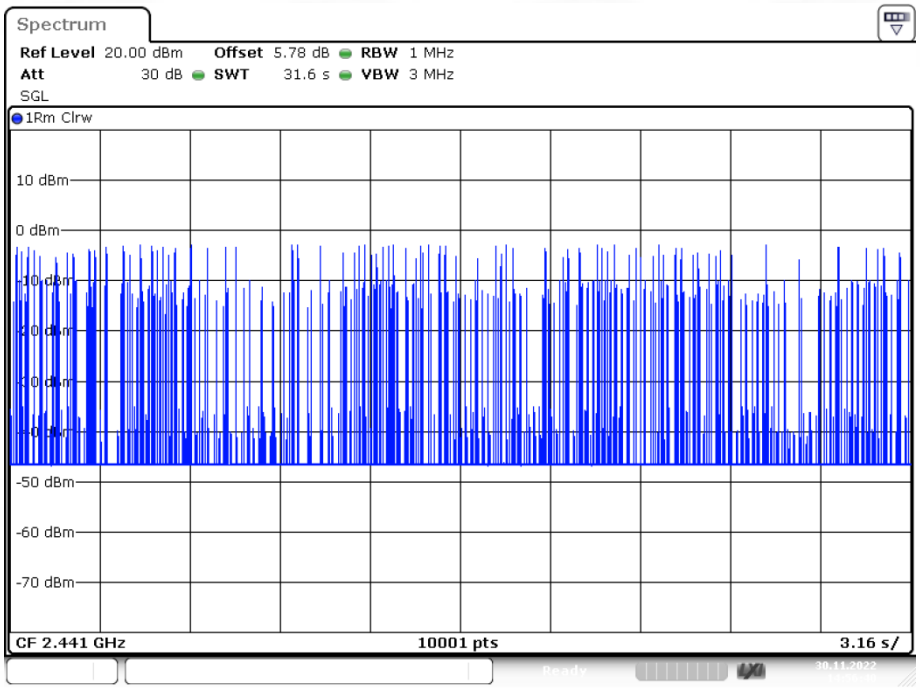
Dwell NVNT 2-DH5 2441MHz Ant1 Accumulated



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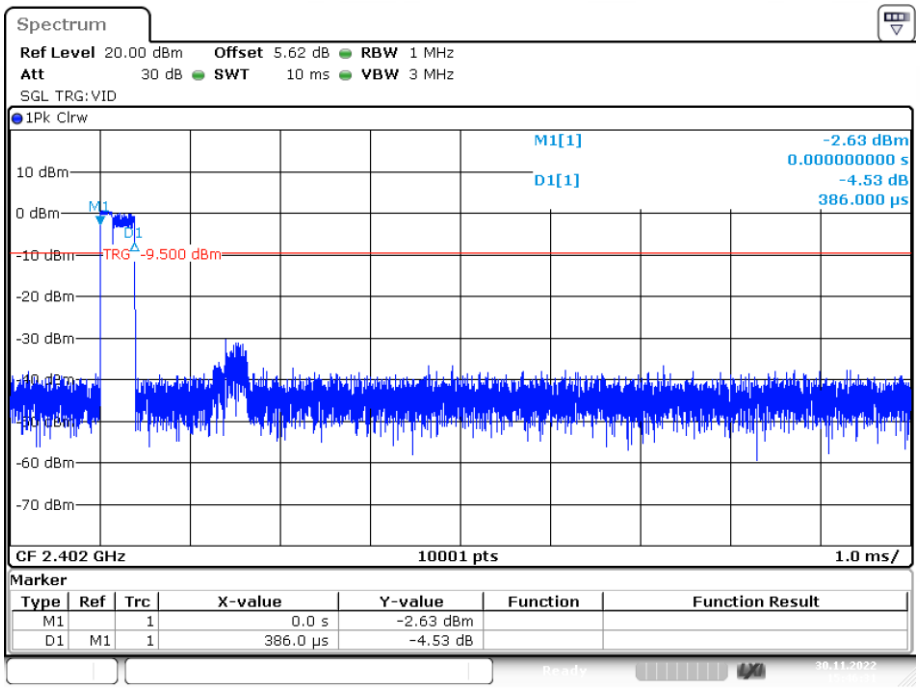
Dwell NVNT 3-DH1 2402MHz Ant1 One Burst



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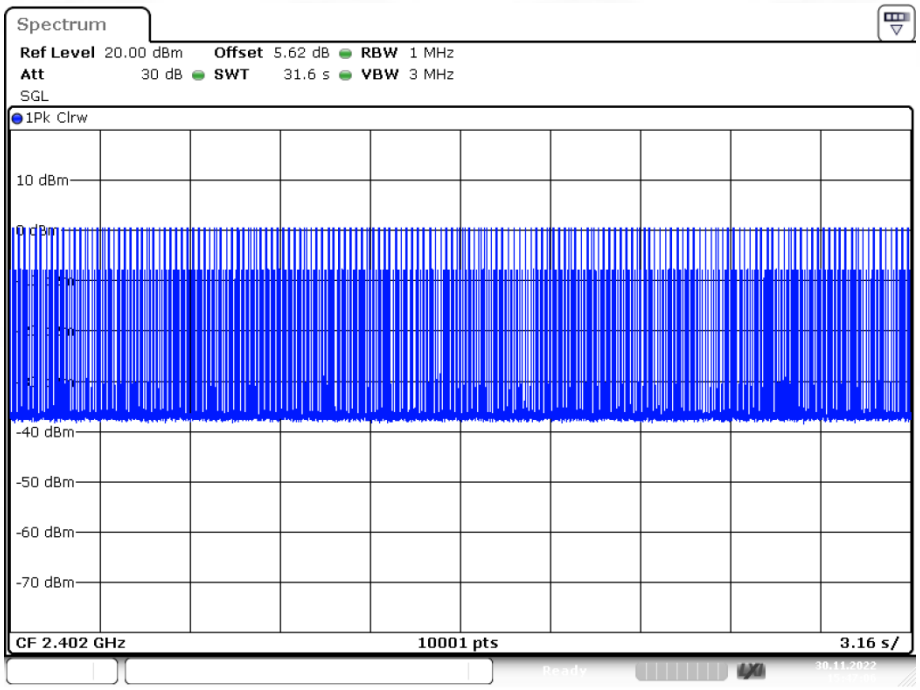
Dwell NVNT 3-DH1 2402MHz Ant1 Accumulated



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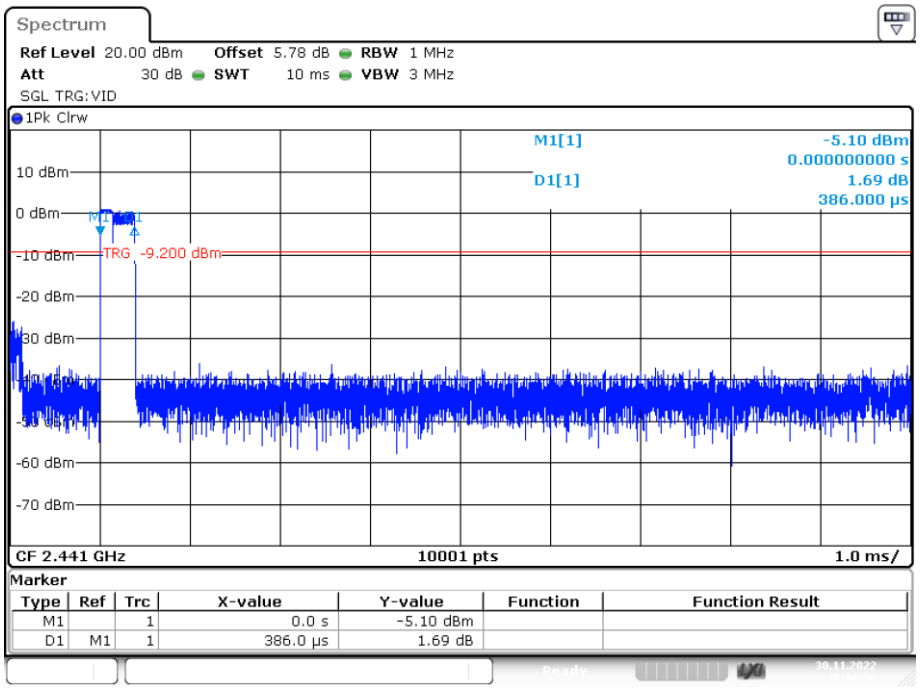
Dwell NVNT 3-DH1 2441MHz Ant1 One Burst



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