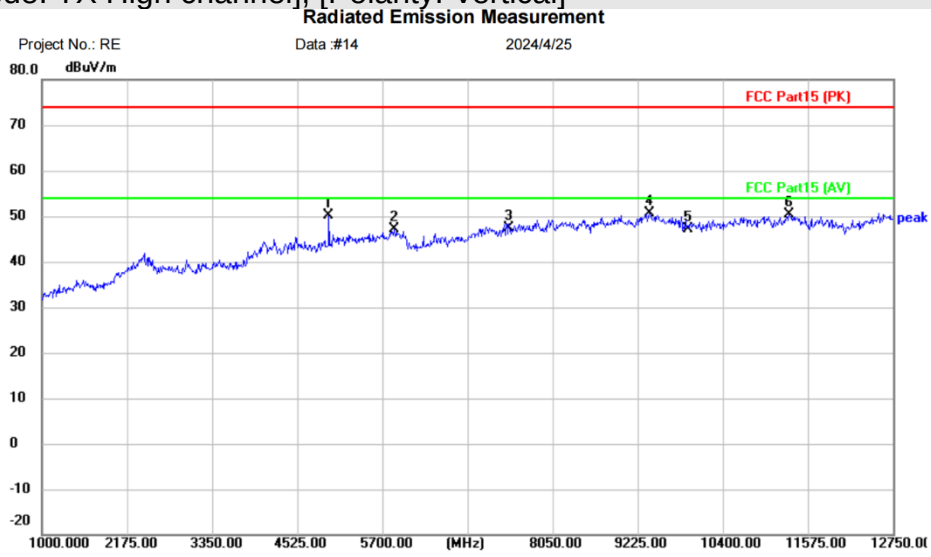
[Test mode: TX High channel]; [Polarity: Vertical]



Site
Limit: FCC Part15 (PK)
EUT: TLSR8208EDG56D
M/N: TLSR8208EDG56D
Mode: BLE 1M TX 2480
Note:

Polarization: ***Vertical***
Power:

Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4959.750	43.50	6.60	50.10	74.00	-23.90	peak	
2		5864.500	38.66	8.48	47.14	74.00	-26.86	peak	
3		7440.000	37.66	9.64	47.30	74.00	-26.70	peak	
4	*	9389.500	38.04	12.59	50.63	74.00	-23.37	peak	
5		9920.000	35.01	12.14	47.15	74.00	-26.85	peak	
6		11316.50	37.73	12.69	50.42	74.00	-23.58	peak	

*:Maximum data x:Over limit !:over margin 〈Reference Only

Receiver: ESR_1 Spectrum Analyzer: FSP40

Test Result: Pass

6.9 Radiated emissions which fall in the restricted bands

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.10.5
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX

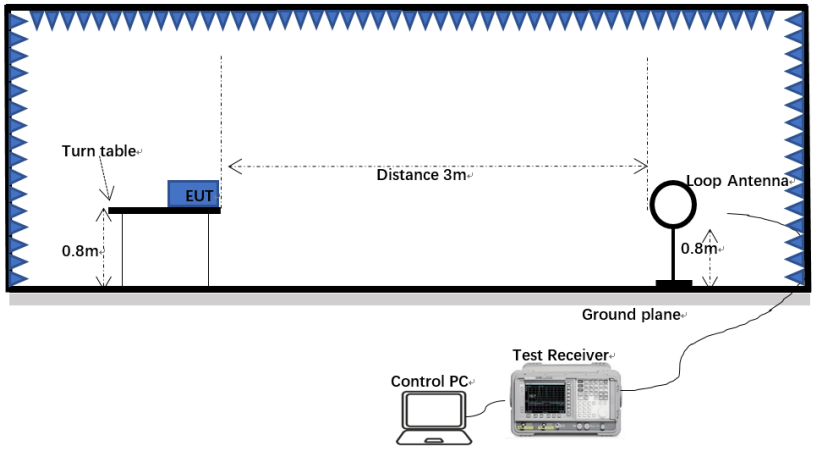
6.9.1 Limit

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
Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.		

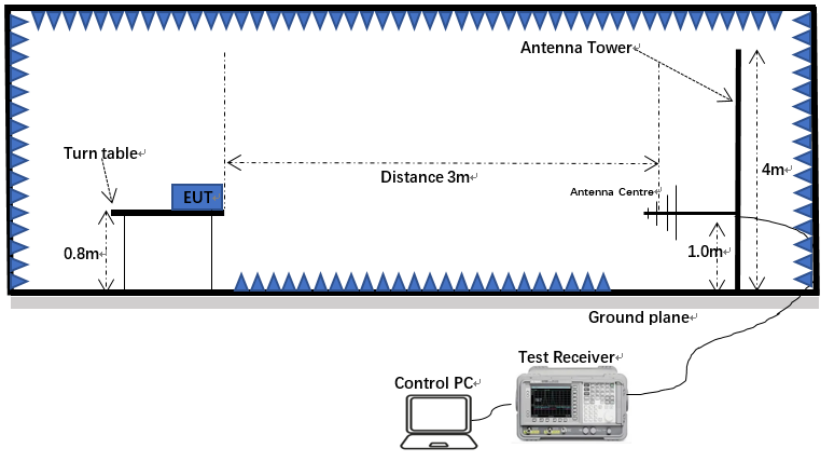
BlueAsia

6.9.2 Test setup

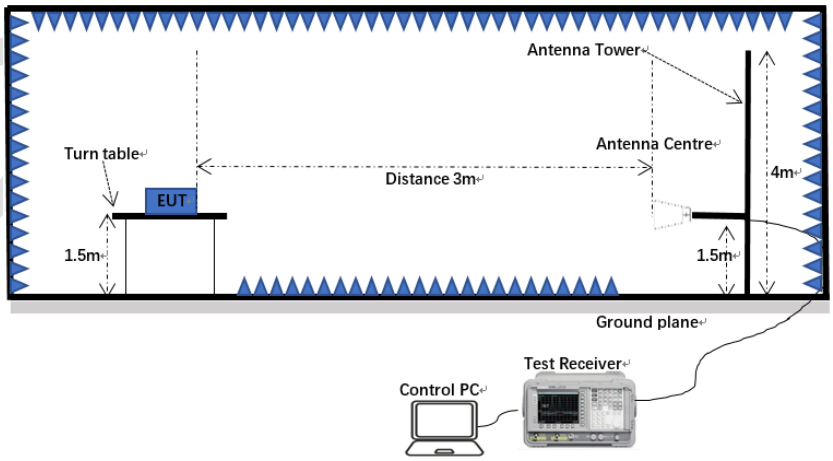
Below 1GHz：



30MHz-1GHz：



Above 1GHz：



6.9.3 Procedure

a) For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b) For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c) The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d) The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

e) For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

f) The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

g) If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

h) Test the EUT in the lowest channel, the middle channel, the highest channel.

i) The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

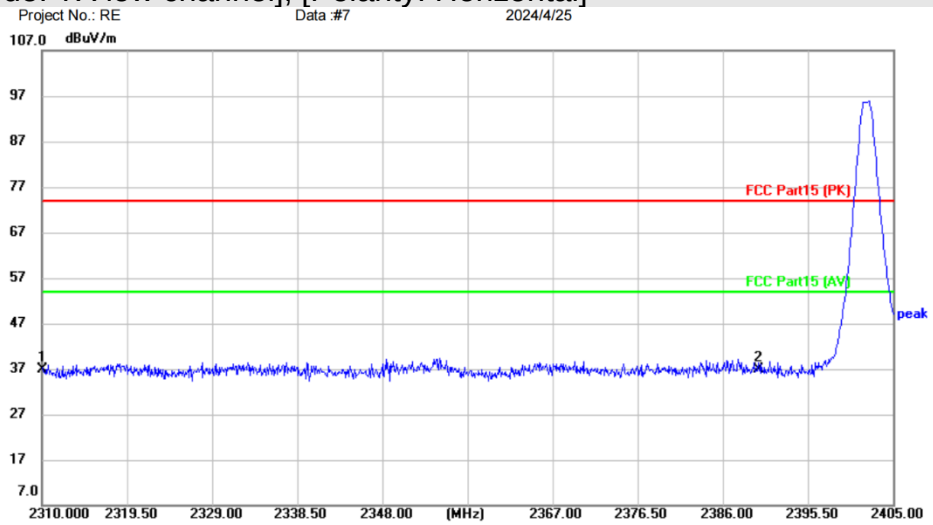
j) Repeat above procedures until all frequencies measured was complete.

Note 1: Level (dBuV) = Reading (dBuV) + Factor (dB/m)
Note 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

6.9.4 Test data

Remark: During the test, pre-scan the BLE1M/BLE2M mode, and found the BLE1M mode which it is worse case.

[Test mode: TX low channel]; [Polarity: Horizontal]



Site
Limit: FCC Part15 (PK)
EUT: TLSR8208EDG56D
M/N: TLSR8208EDG56D
Mode: BLE 1M TX 2402
Note:

Polarization: ***Horizontal***
Power:

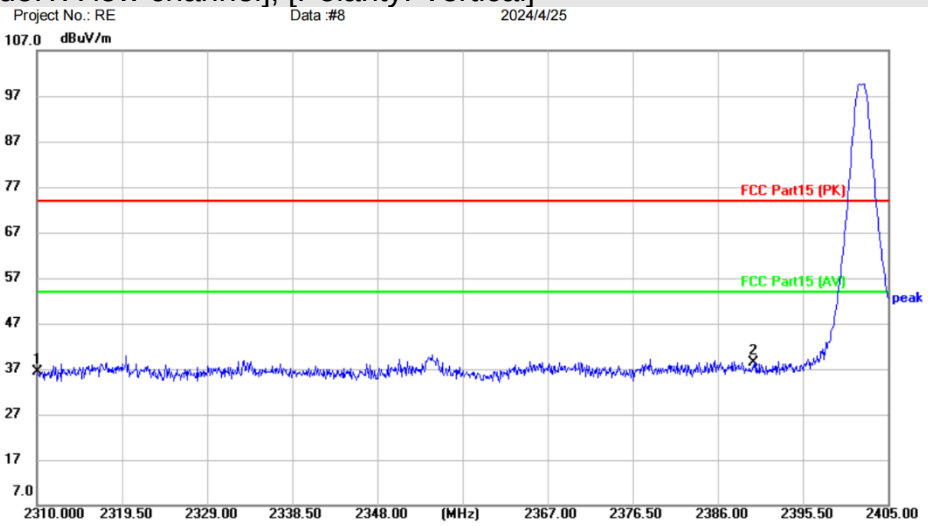
Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	2310.000	39.77	-2.89	36.88	74.00	-37.12	peak	
2		2390.000	39.57	-2.70	36.87	74.00	-37.13	peak	

*:Maximum data x:Over limit !:over margin 〈Reference Only

Test Result: Pass

[Test mode:TX low channel]; [Polarity: Vertical]



Site
Limit: FCC Part15 (PK)
EUT: TLSR8208EDG56D
M/N: TLSR8208EDG56D
Mode: BLE 1M TX 2402
Note:

Polarization: ***Vertical***
Power:

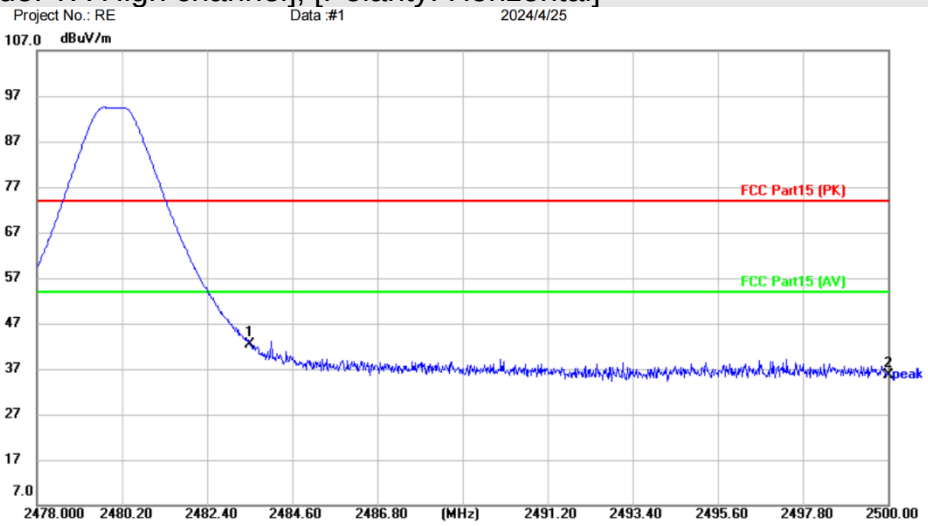
Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2310.000	39.26	-2.89	36.37	74.00	-37.63	peak	
2	*	2390.000	41.13	-2.70	38.43	74.00	-35.57	peak	

*:Maximum data x:Over limit !:over margin 〈Reference Only

Test Result: Pass

[Test mode: TX High channel]; [Polarity: Horizontal]



Site
Limit: FCC Part15 (PK)
EUT: TLSR8208EDG56D
M/N: TLSR8208EDG56D
Mode: BLE 1M TX 2480
Note:

Polarization: ***Horizontal***
Power:

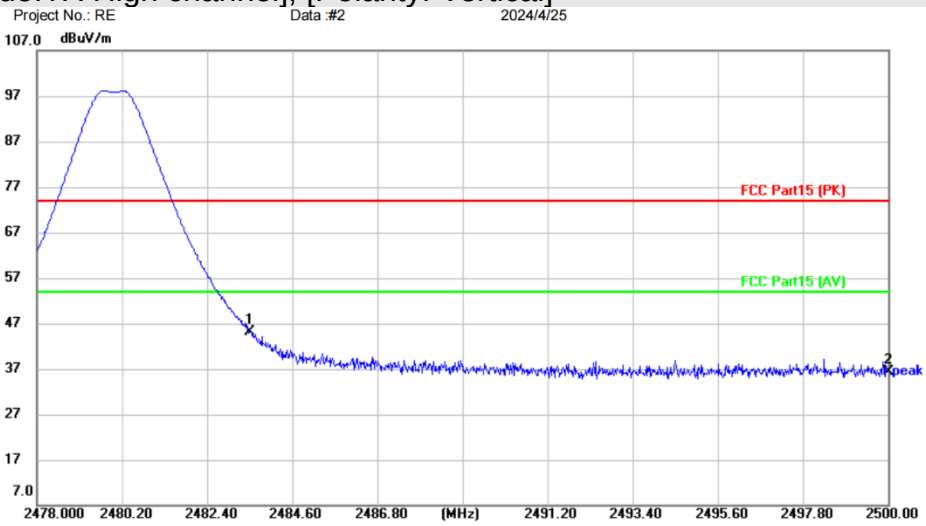
Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	2483.500	45.32	-2.91	42.41	74.00	-31.59	peak	
2		2500.000	38.66	-3.00	35.66	74.00	-38.34	peak	

*:Maximum data x:Over limit !:over margin 〈Reference Only

Test Result: Pass

[Test mode:TX High channel]; [Polarity: Vertical]



Site
Limit: FCC Part15 (PK)
EUT: TLSR8208EDG56D
M/N: TLSR8208EDG56D
Mode: BLE 1M TX 2480
Note:

Polarization: ***Vertical***
Power:

Temperature: (C)
Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	2483.500	47.93	-2.91	45.02	74.00	-28.98	peak	
2		2500.000	39.38	-3.00	36.38	74.00	-37.62	peak	

*:Maximum data x:Over limit !:over margin 〈Reference Only

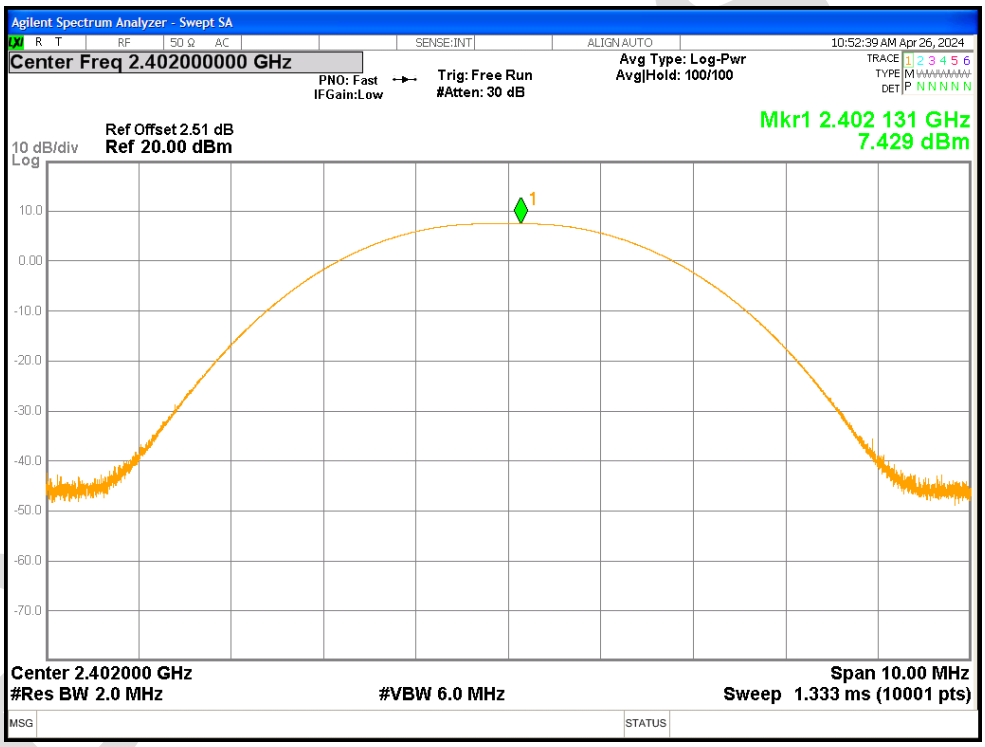
Test Result: Pass

7 Appendix A

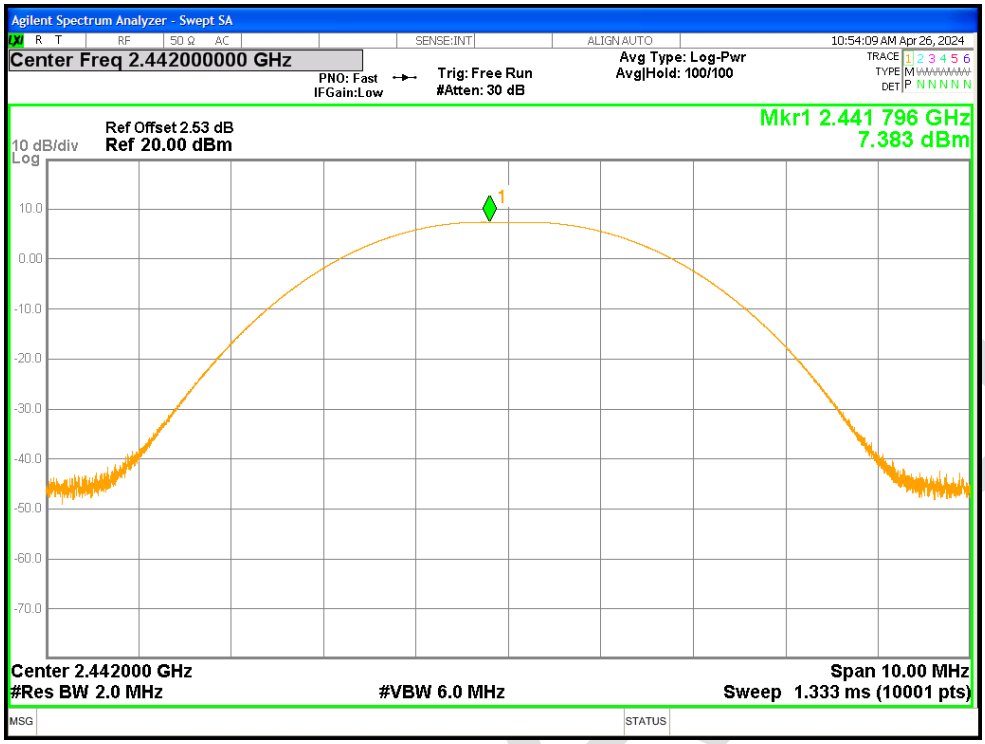
Maximum Conducted Output Power

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	BLE 1M	2402	Ant1	7.429	30	Pass
NVNT	BLE 1M	2442	Ant1	7.383	30	Pass
NVNT	BLE 1M	2480	Ant1	6.4	30	Pass
NVNT	BLE 2M	2402	Ant1	7.376	30	Pass
NVNT	BLE 2M	2442	Ant1	7.333	30	Pass
NVNT	BLE 2M	2480	Ant1	6.37	30	Pass

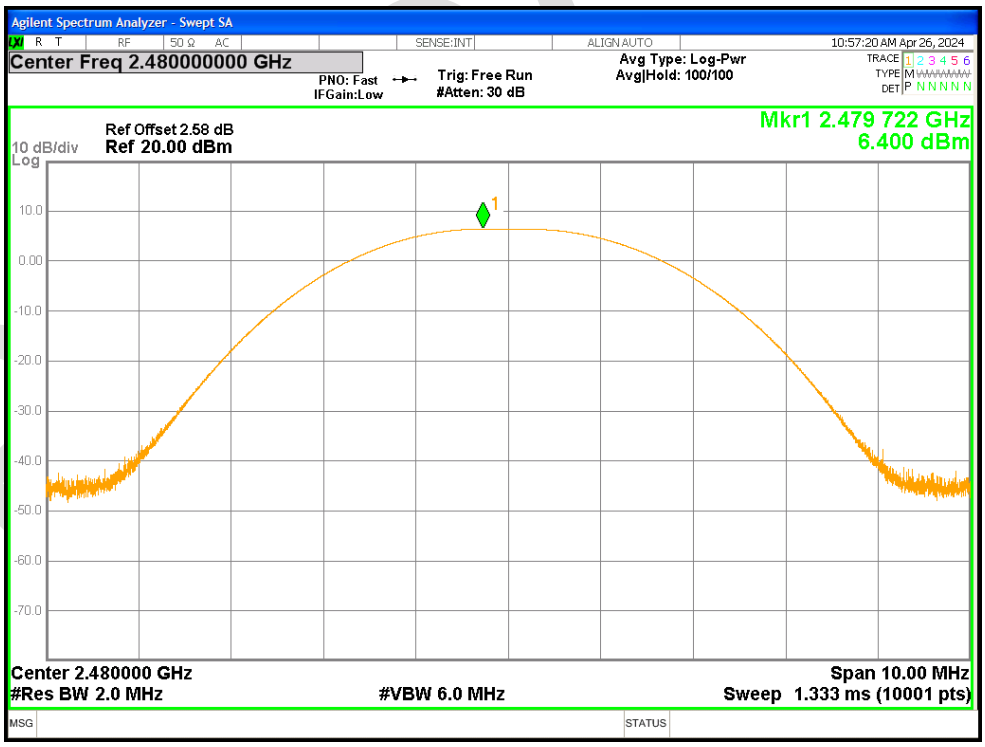
Power NVNT BLE 1M 2402MHz Ant1



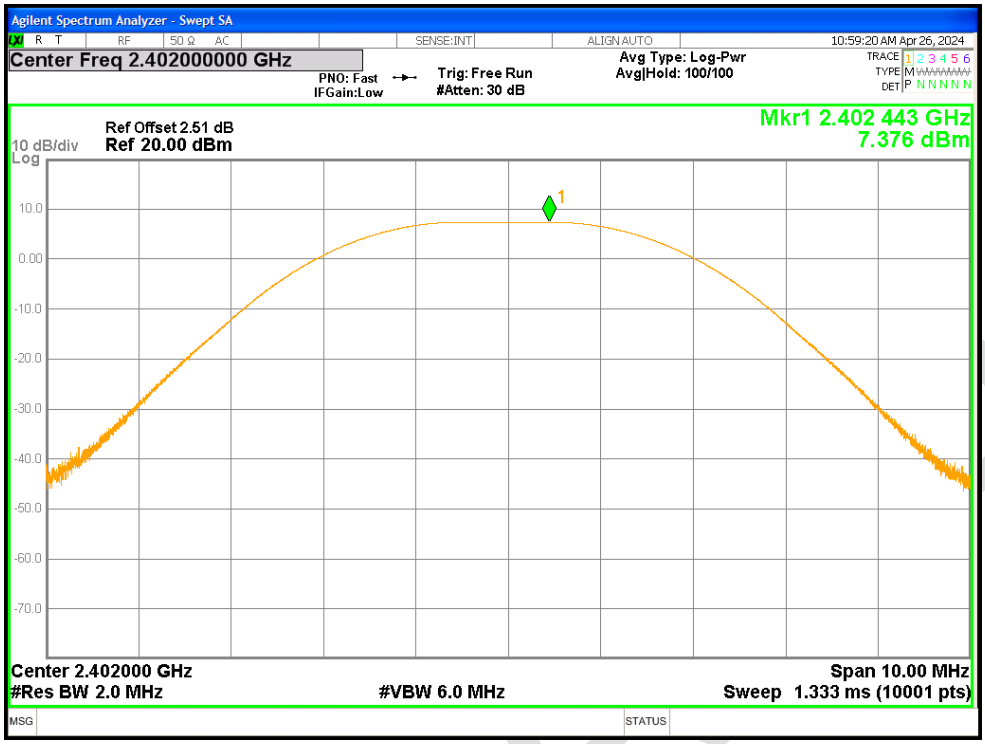
Power NVNT BLE 1M 2442MHz Ant1



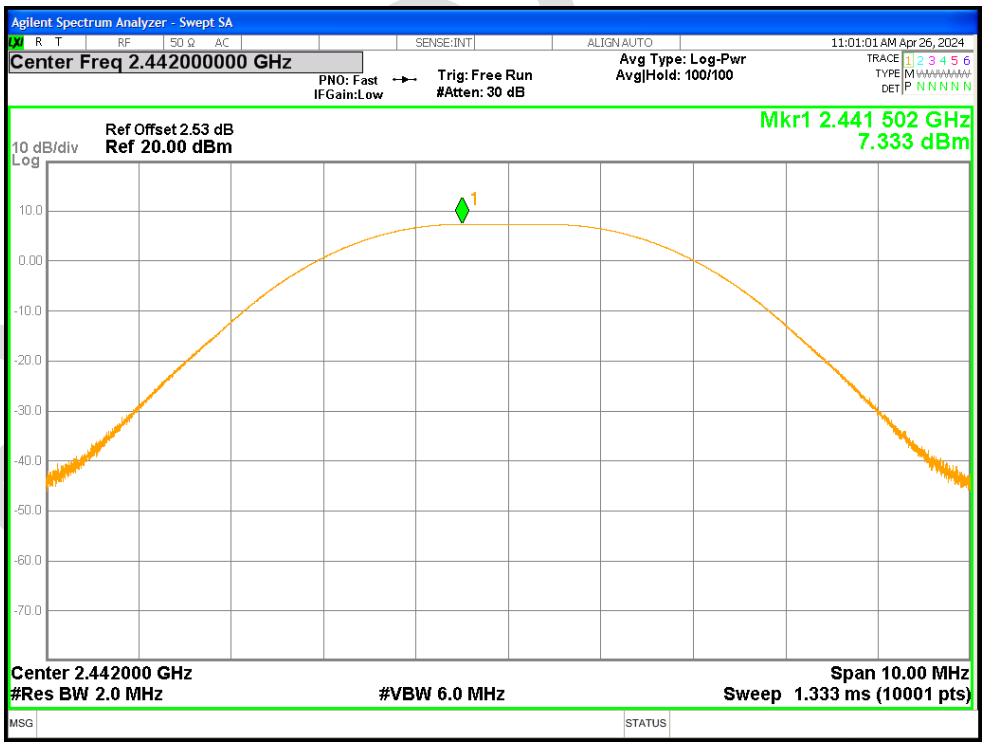
Power NVNT BLE 1M 2480MHz Ant1



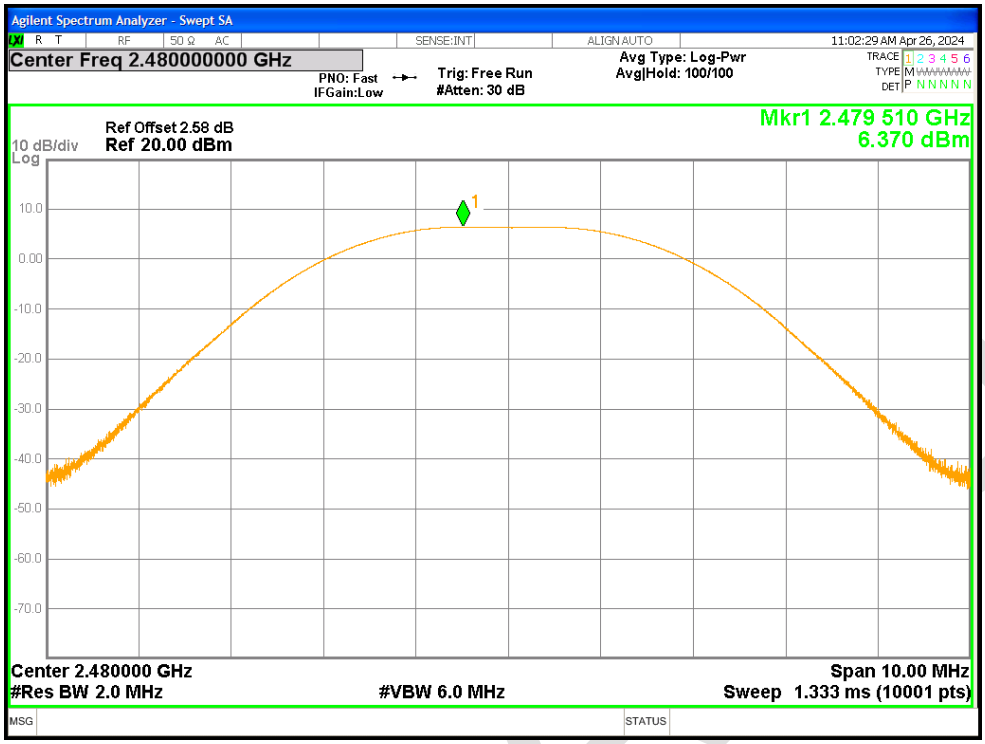
Power NVNT BLE 2M 2402MHz Ant1



Power NVNT BLE 2M 2442MHz Ant1



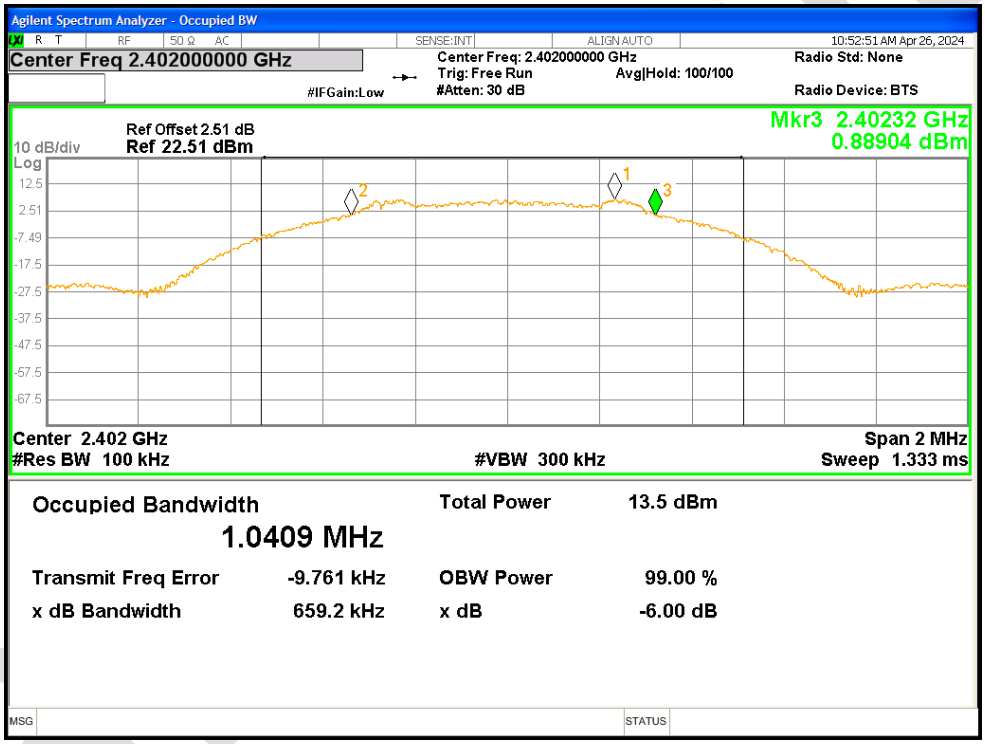
Power NVNT BLE 2M 2480MHz Ant1


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 100/100
11:02:29 AM Apr 26, 2024
Ref Offset 2.58 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.479 510 GHz
6.370 dBm
Center 2.480000 GHz
#Res BW 2.0 MHz
#VBW 6.0 MHz
Span 10.00 MHz
Sweep 1.333 ms (10001 pts)

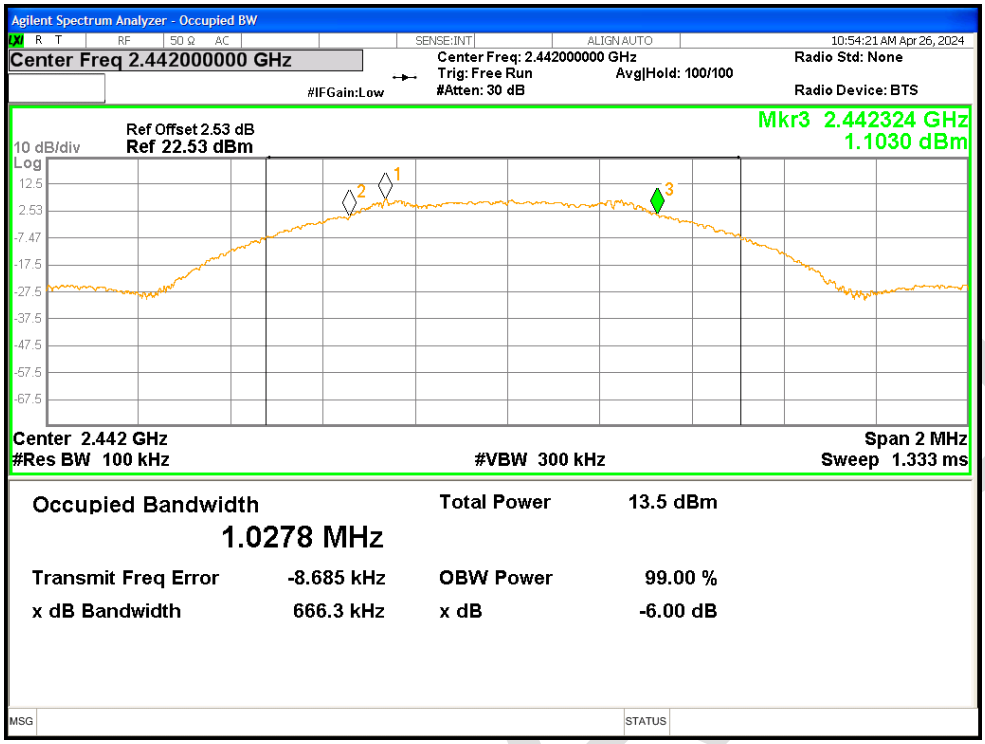
-6dB Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	BLE 1M	2402	Ant1	0.659	0.5	Pass
NVNT	BLE 1M	2442	Ant1	0.666	0.5	Pass
NVNT	BLE 1M	2480	Ant1	0.677	0.5	Pass
NVNT	BLE 2M	2402	Ant1	1.35	0.5	Pass
NVNT	BLE 2M	2442	Ant1	1.351	0.5	Pass
NVNT	BLE 2M	2480	Ant1	1.254	0.5	Pass

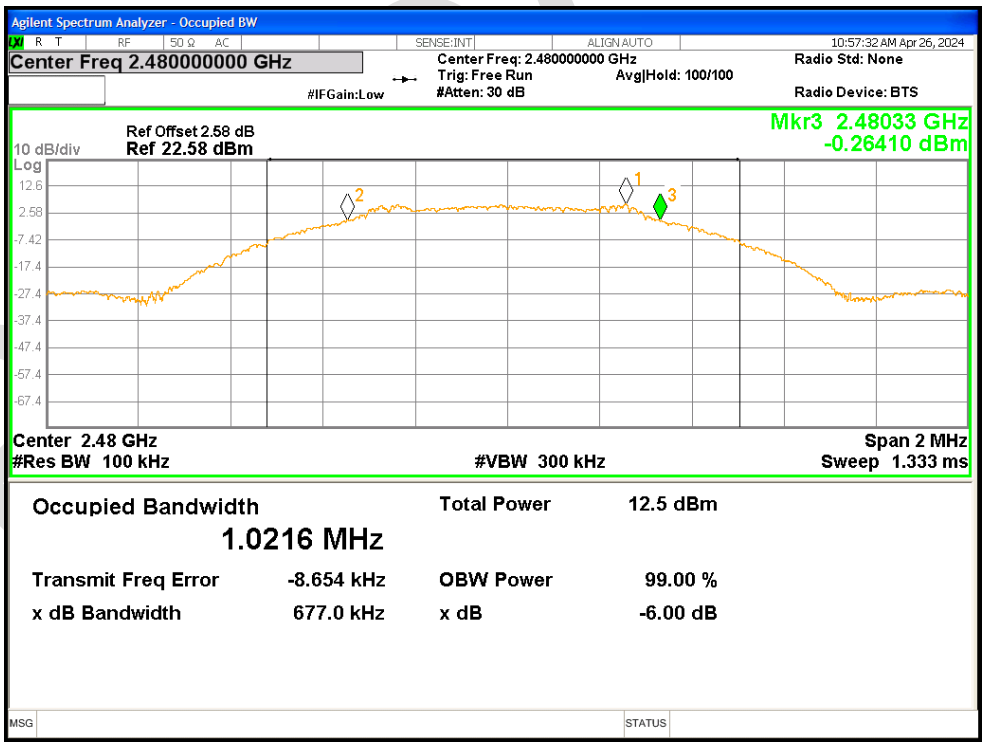
-6dB Bandwidth NVNT BLE 1M 2402MHz Ant1



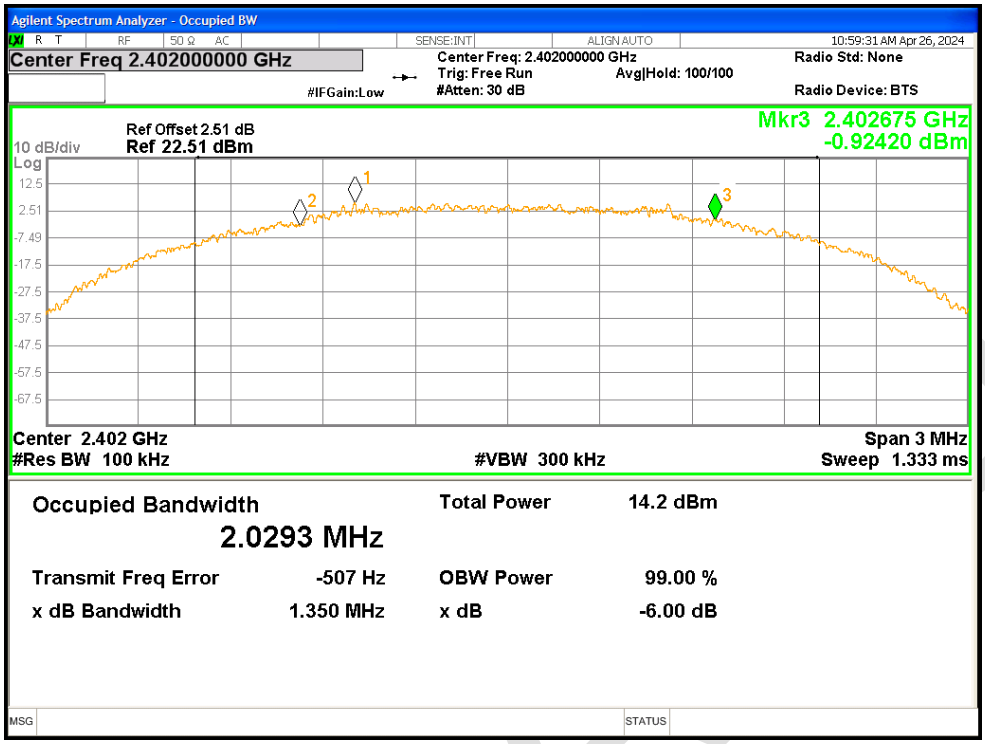
-6dB Bandwidth NVNT BLE 1M 2442MHz Ant1



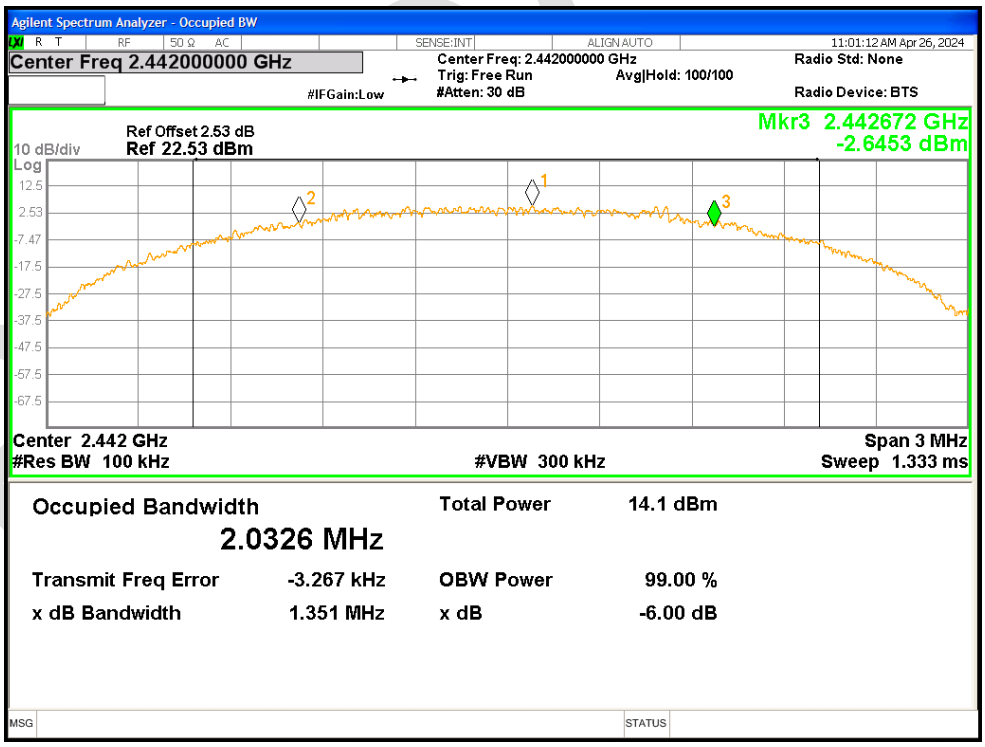
-6dB Bandwidth NVNT BLE 1M 2480MHz Ant1



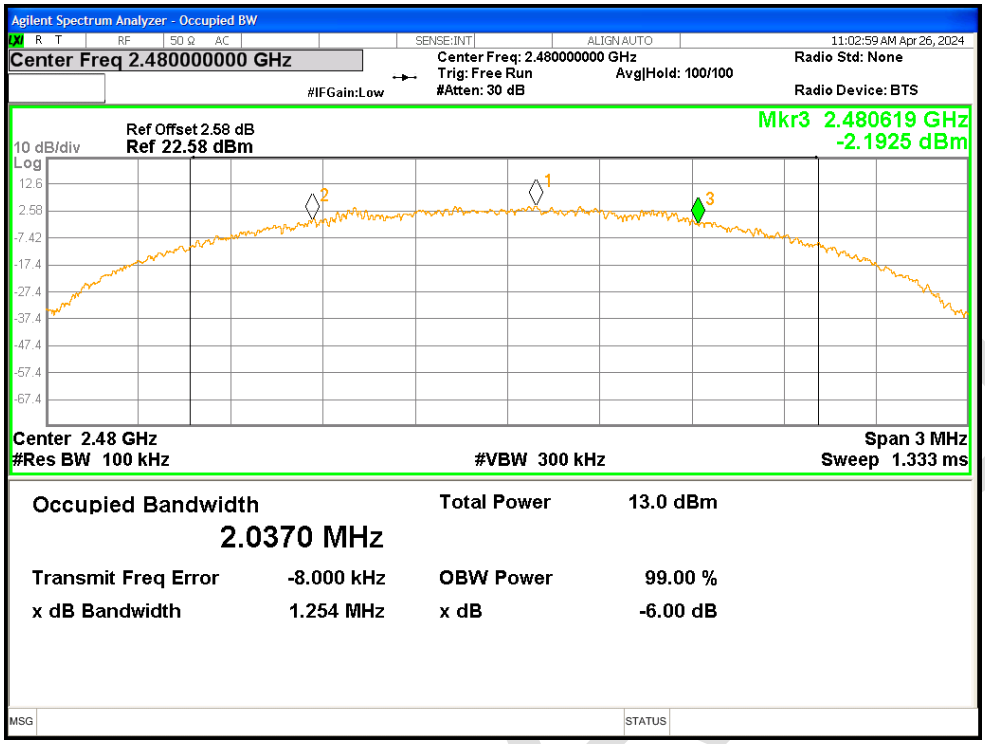
-6dB Bandwidth NVNT BLE 2M 2402MHz Ant1



-6dB Bandwidth NVNT BLE 2M 2442MHz Ant1



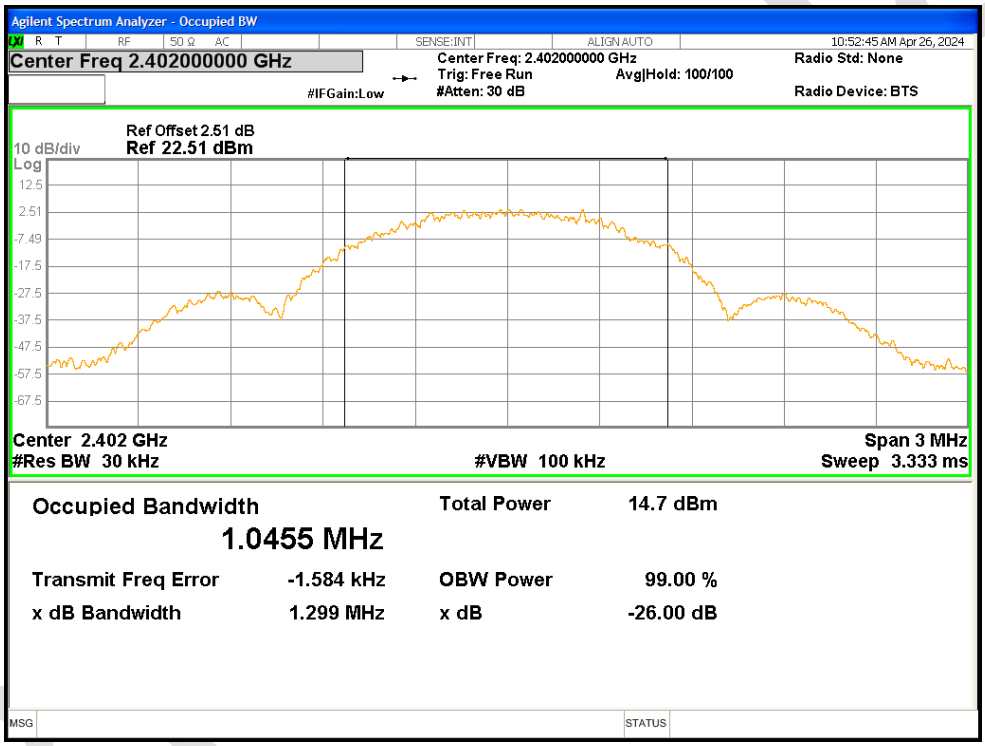
-6dB Bandwidth NVNT BLE 2M 2480MHz Ant1


Agilent Spectrum Analyzer - Occupied BW
Center Freq 2.480000000 GHz
Center Freq: 2.480000000 GHz
Trig: Free Run
#Atten: 30 dB
Avg|Hold: 100/100
Radio Std: None
Radio Device: BTS
11:02:59 AM Apr 26, 2024
Mkr3 2.480619 GHz
-2.1925 dBm
Ref Offset 2.58 dB
10 dB/div
Ref 22.58 dBm
Log
Center 2.48 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 3 MHz
Sweep 1.333 ms
Occupied Bandwidth
2.0370 MHz
Total Power 13.0 dBm
Transmit Freq Error -8.000 kHz
OBW Power 99.00 %
x dB Bandwidth 1.254 MHz
x dB -6.00 dB

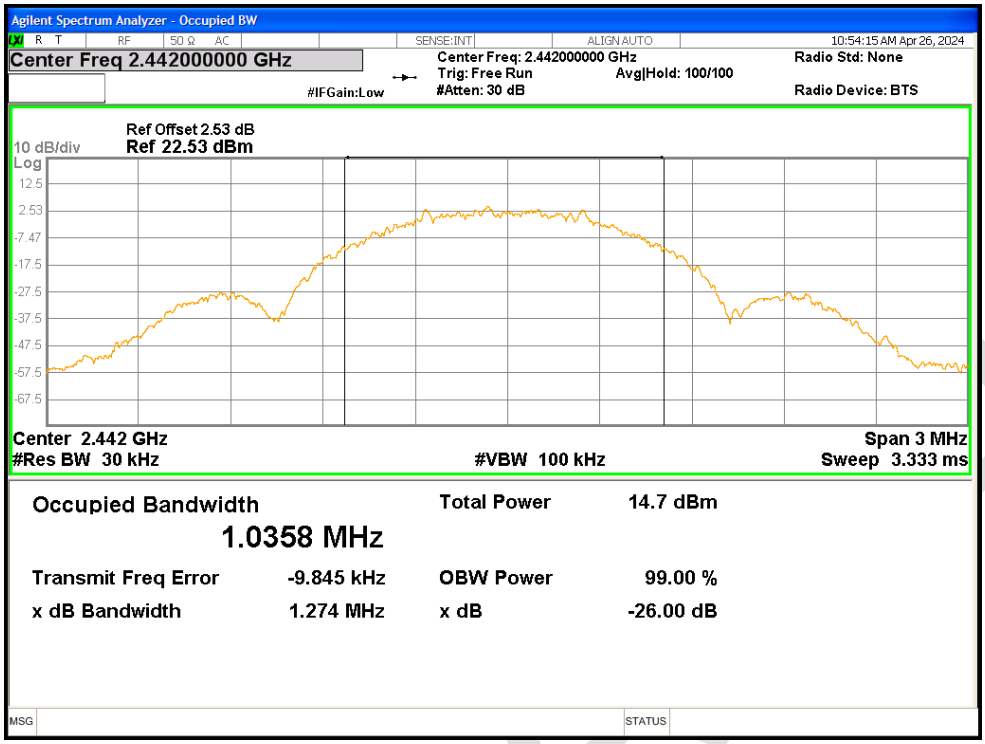
Occupied Channel Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
NVNT	BLE 1M	2402	Ant1	1.0455
NVNT	BLE 1M	2442	Ant1	1.0358
NVNT	BLE 1M	2480	Ant1	1.0230
NVNT	BLE 2M	2402	Ant1	2.0407
NVNT	BLE 2M	2442	Ant1	2.0101
NVNT	BLE 2M	2480	Ant1	2.0646

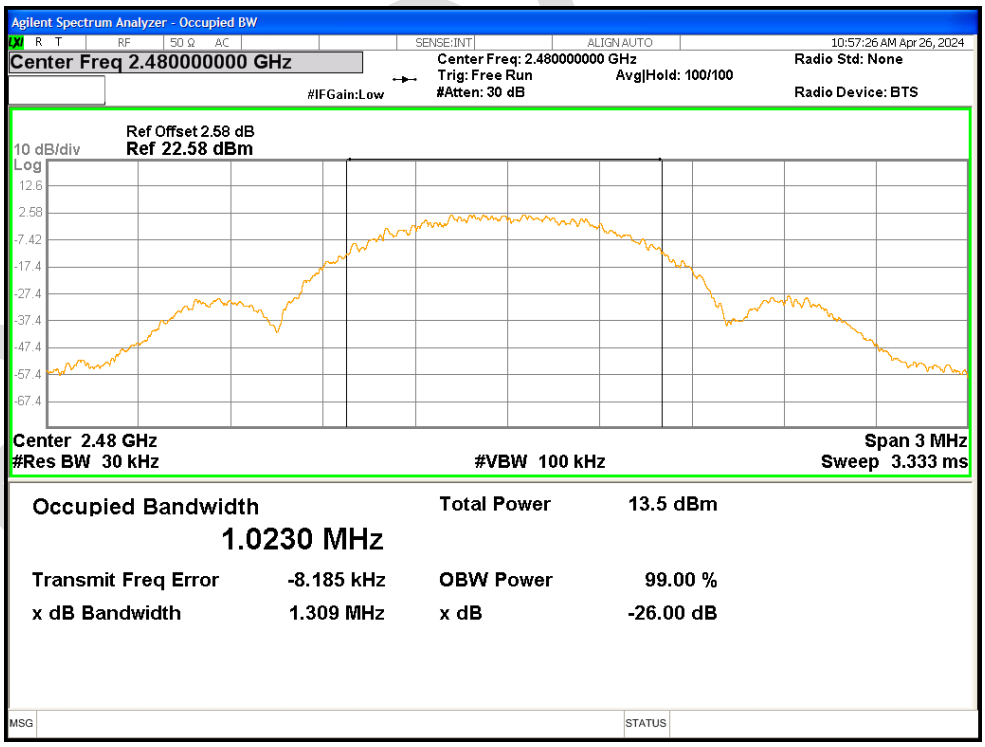
OBW NVNT BLE 1M 2402MHz Ant1



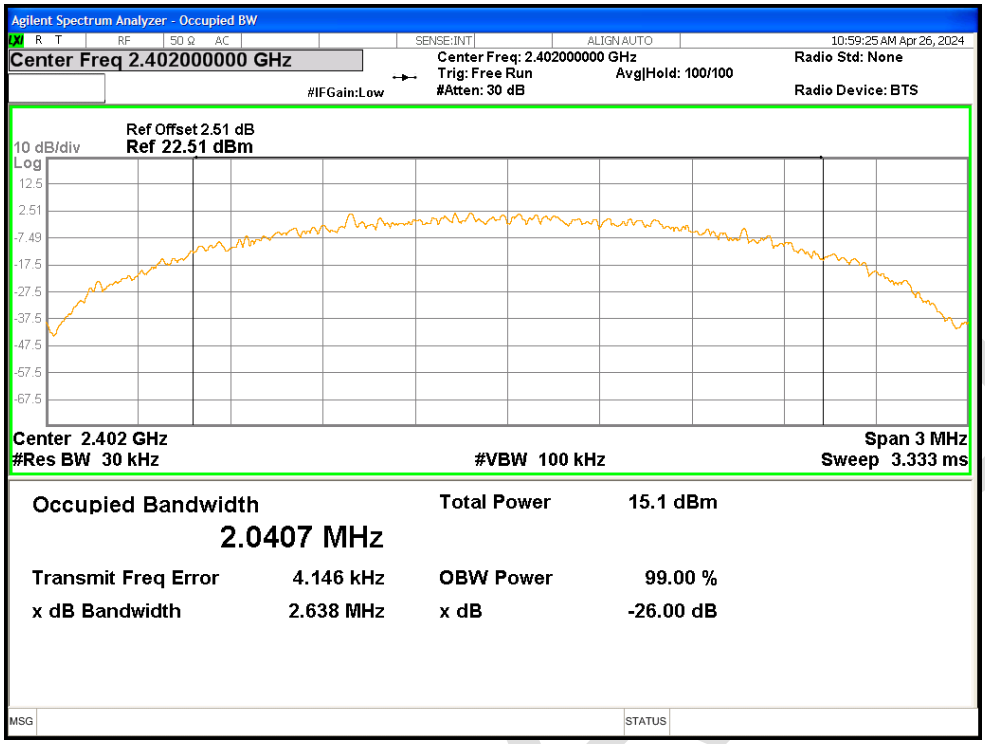
OBW NVNT BLE 1M 2442MHz Ant1



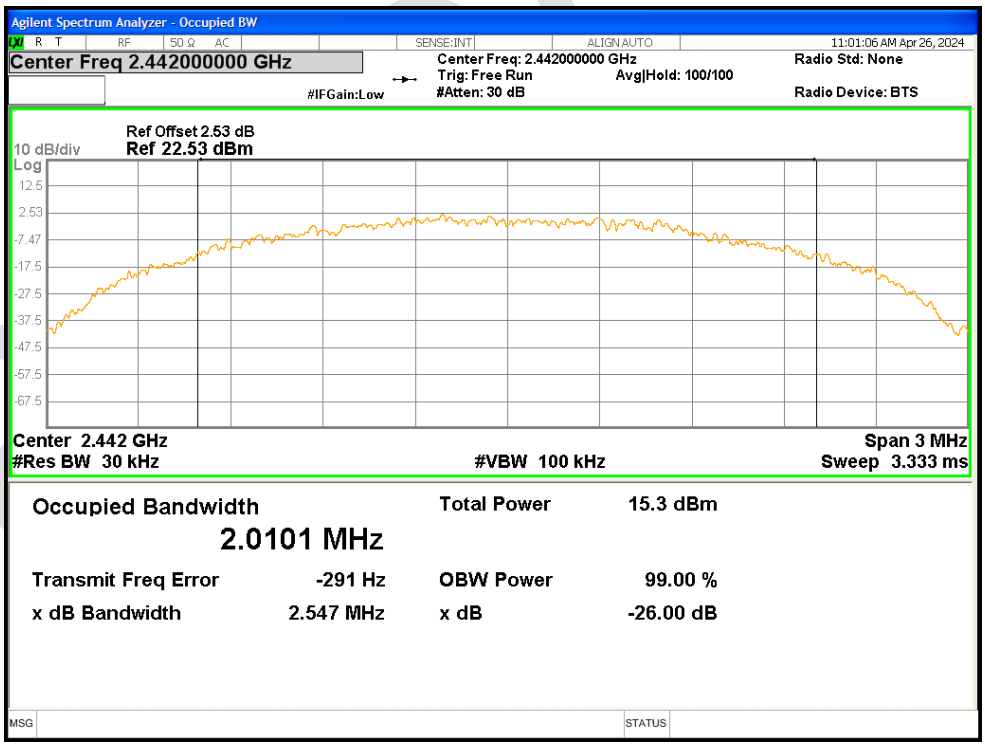
OBW NVNT BLE 1M 2480MHz Ant1



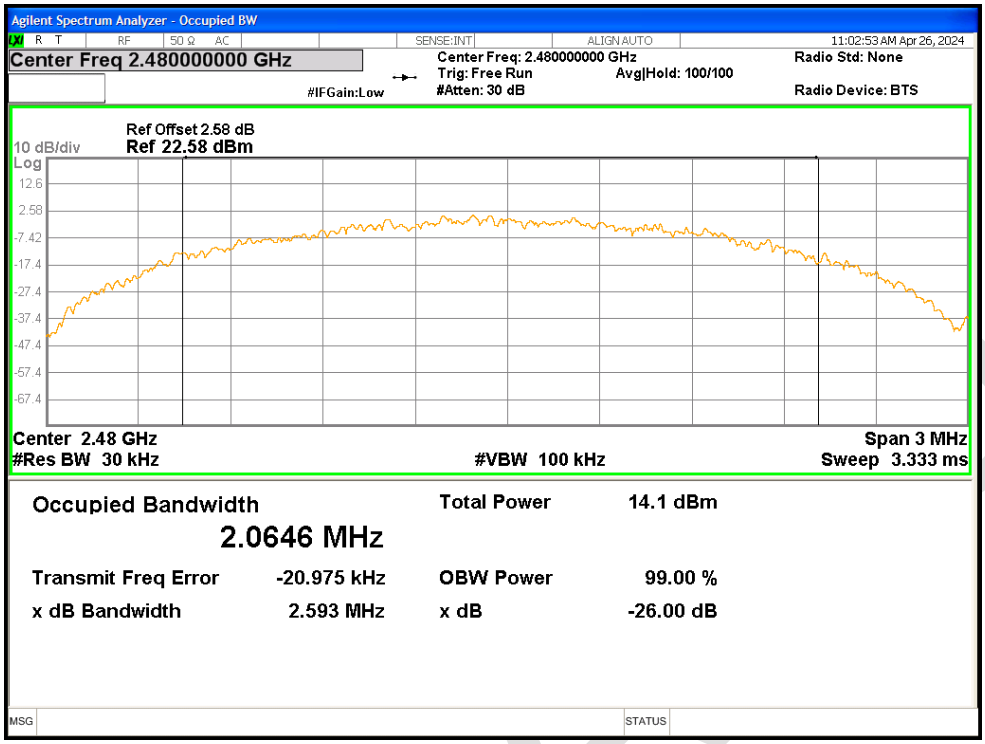
OBW NVNT BLE 2M 2402MHz Ant1



OBW NVNT BLE 2M 2442MHz Ant1



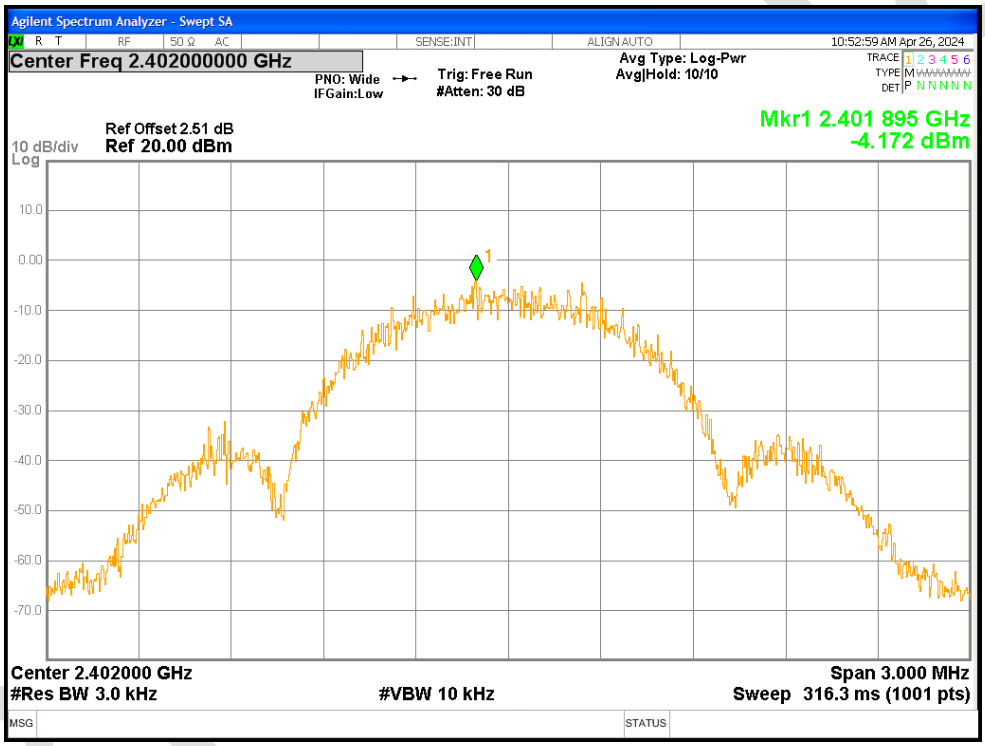
OBW NVNT BLE 2M 2480MHz Ant1


Agilent Spectrum Analyzer - Occupied BW
Center Freq 2.480000000 GHz
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold: 100/100
#Atten: 30 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
11:02:53 AM Apr 26, 2024
Ref Offset 2.58 dB
10 dB/div
Ref 22.58 dBm
Log
12.6
2.58
-7.42
-17.4
-27.4
-37.4
-47.4
-57.4
-67.4
Center 2.48 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 3 MHz
Sweep 3.333 ms
Occupied Bandwidth
2.0646 MHz
Total Power 14.1 dBm
Transmit Freq Error -20.975 kHz
OBW Power 99.00 %
x dB Bandwidth 2.593 MHz
x dB -26.00 dB
MSG
STATUS

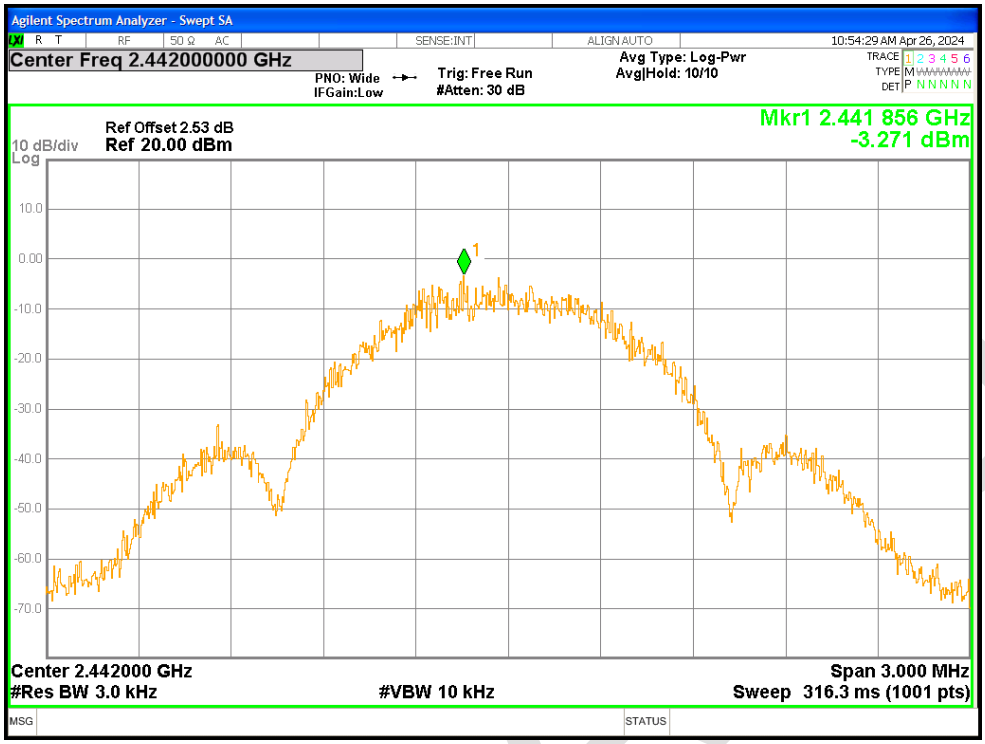
Maximum Power Spectral Density Level

Condition	Mode	Frequency (MHz)	Antenna	Max PSD (dBm)	Limit (dBm)	Verdict
NVNT	BLE 1M	2402	Ant1	-4.172	8	Pass
NVNT	BLE 1M	2442	Ant1	-3.271	8	Pass
NVNT	BLE 1M	2480	Ant1	-4.909	8	Pass
NVNT	BLE 2M	2402	Ant1	-6.455	8	Pass
NVNT	BLE 2M	2442	Ant1	-5.025	8	Pass
NVNT	BLE 2M	2480	Ant1	-7.94	8	Pass

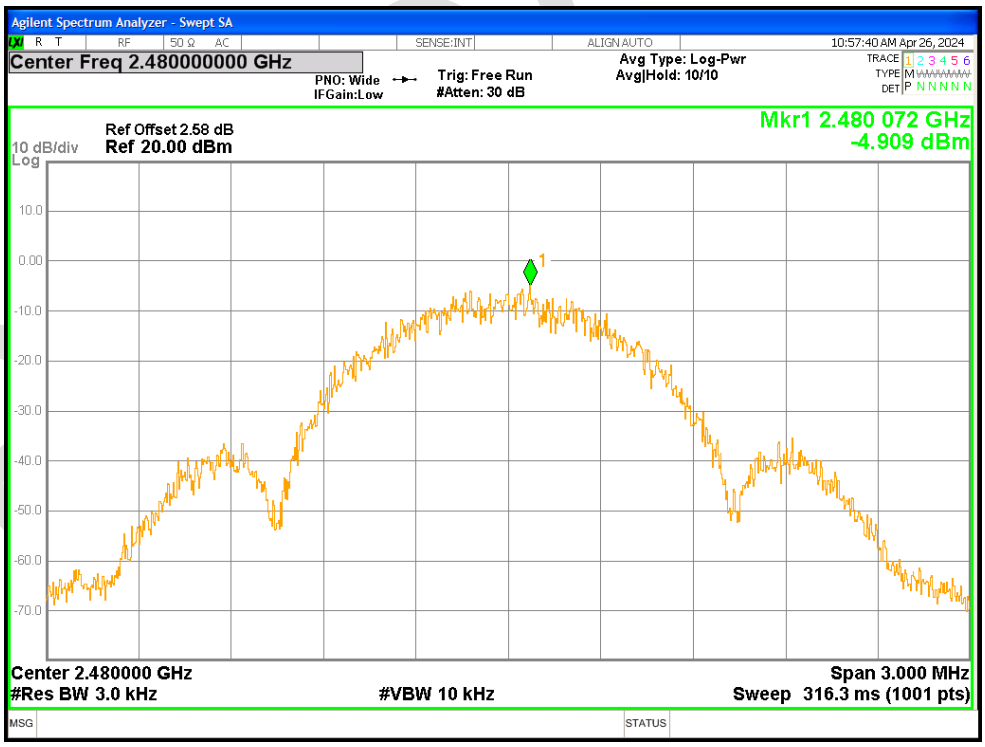
PSD NVNT BLE 1M 2402MHz Ant1



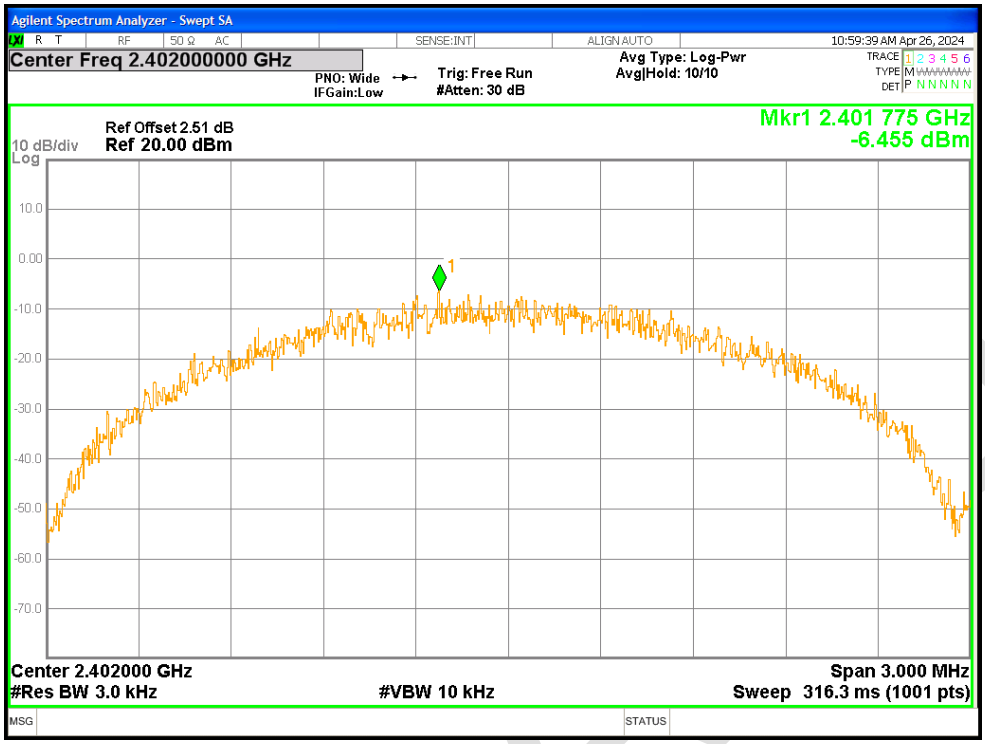
PSD NVNT BLE 1M 2442MHz Ant1



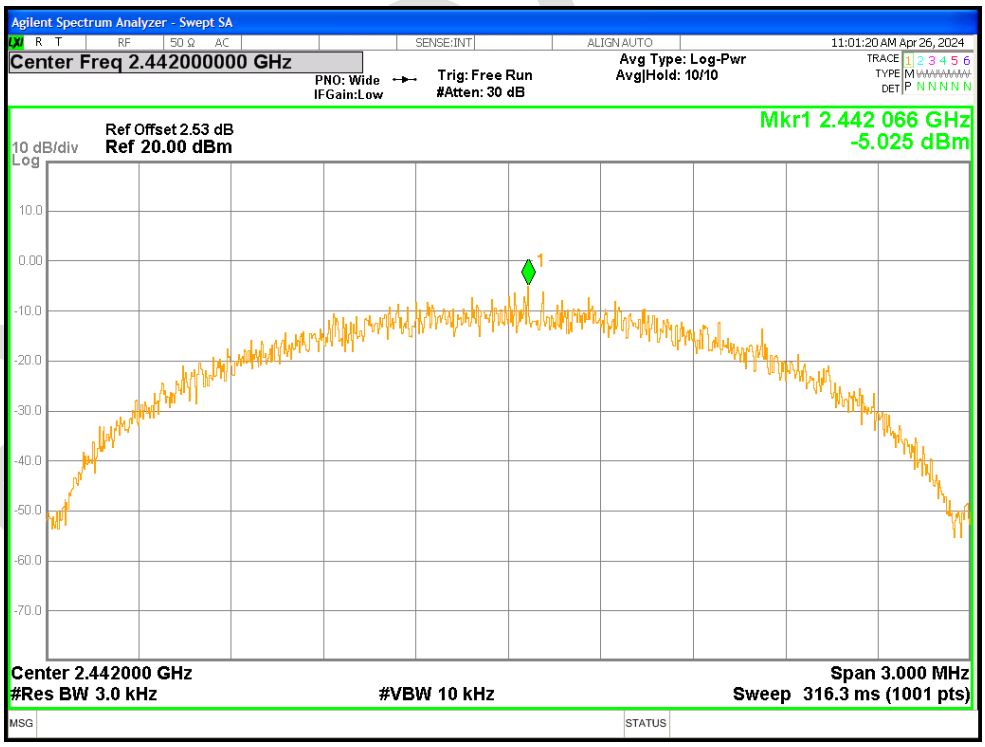
PSD NVNT BLE 1M 2480MHz Ant1



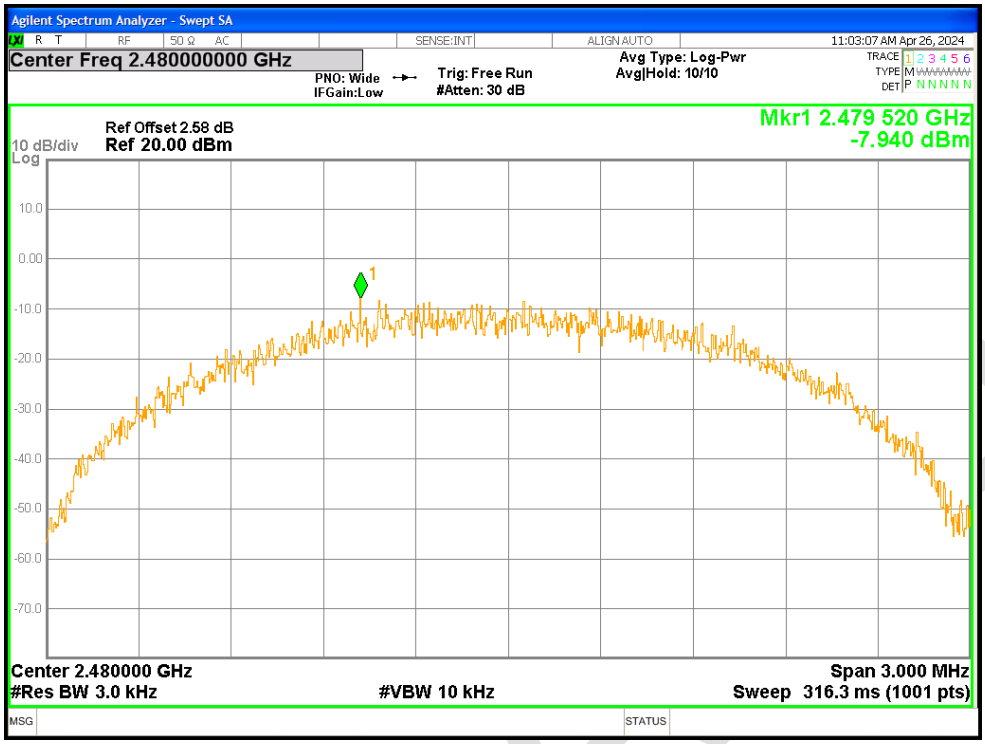
PSD NVNT BLE 2M 2402MHz Ant1



PSD NVNT BLE 2M 2442MHz Ant1



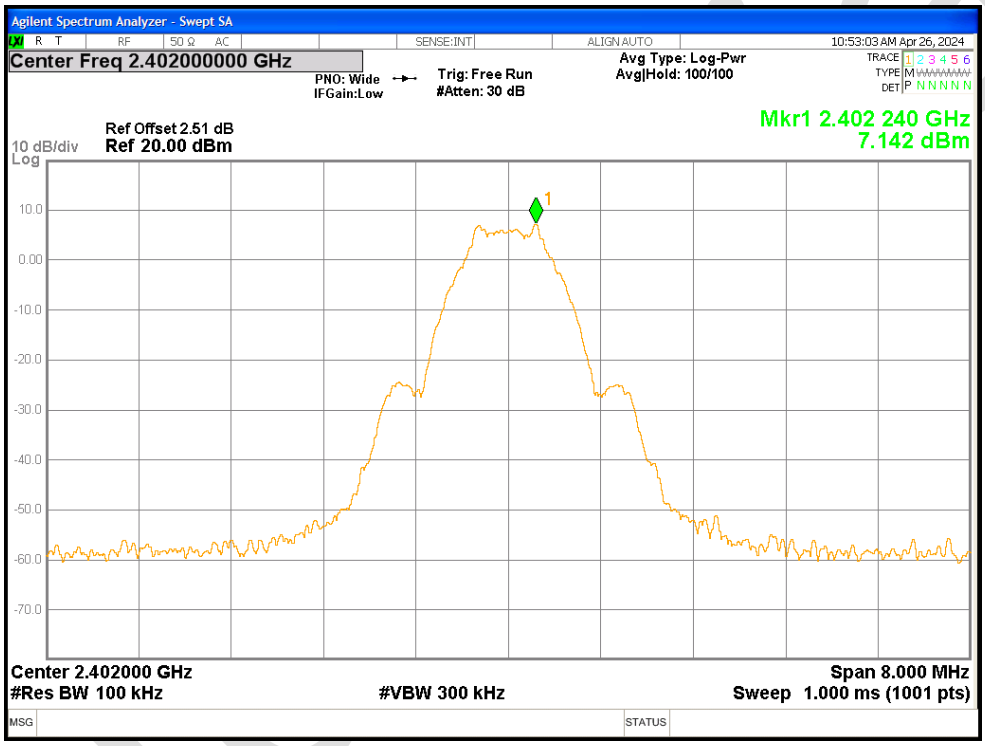
PSD NVNT BLE 2M 2480MHz Ant1


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 10/10
11:03:07 AM Apr 26, 2024
Ref Offset 2.58 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.479 520 GHz
-7.940 dBm
Center 2.480000 GHz
#Res BW 3.0 kHz
#VBW 10 kHz
Span 3.000 MHz
Sweep 316.3 ms (1001 pts)

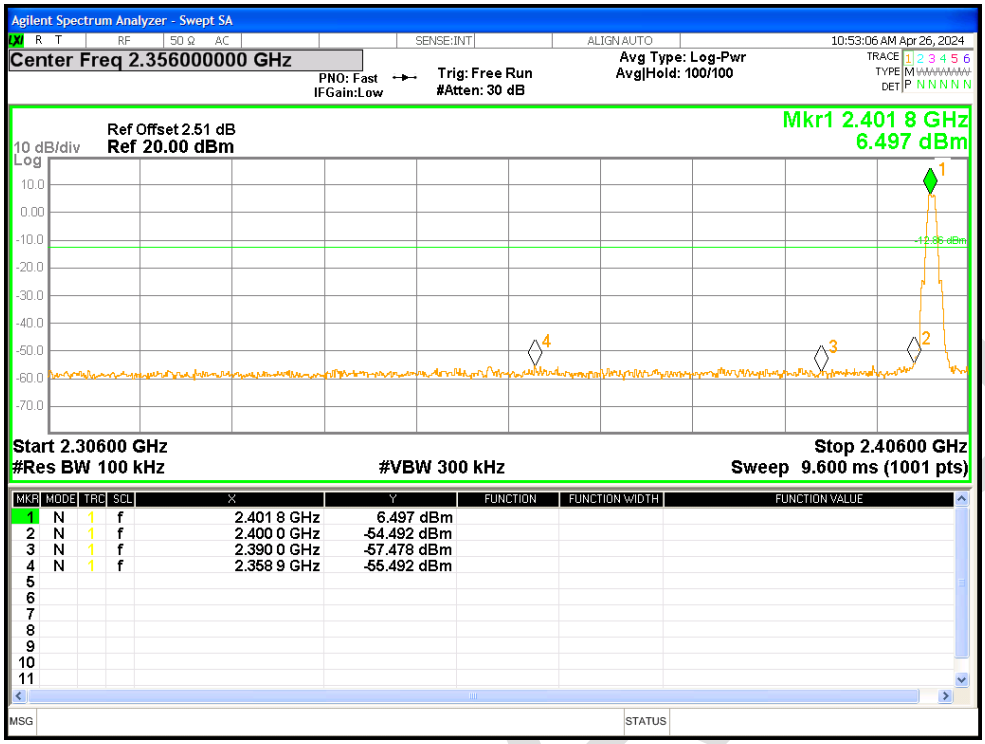
Band Edge

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE 1M	2402	Ant1	-62.63	-20	Pass
NVNT	BLE 1M	2480	Ant1	-60.58	-20	Pass
NVNT	BLE 2M	2402	Ant1	-61.72	-20	Pass
NVNT	BLE 2M	2480	Ant1	-59.37	-20	Pass

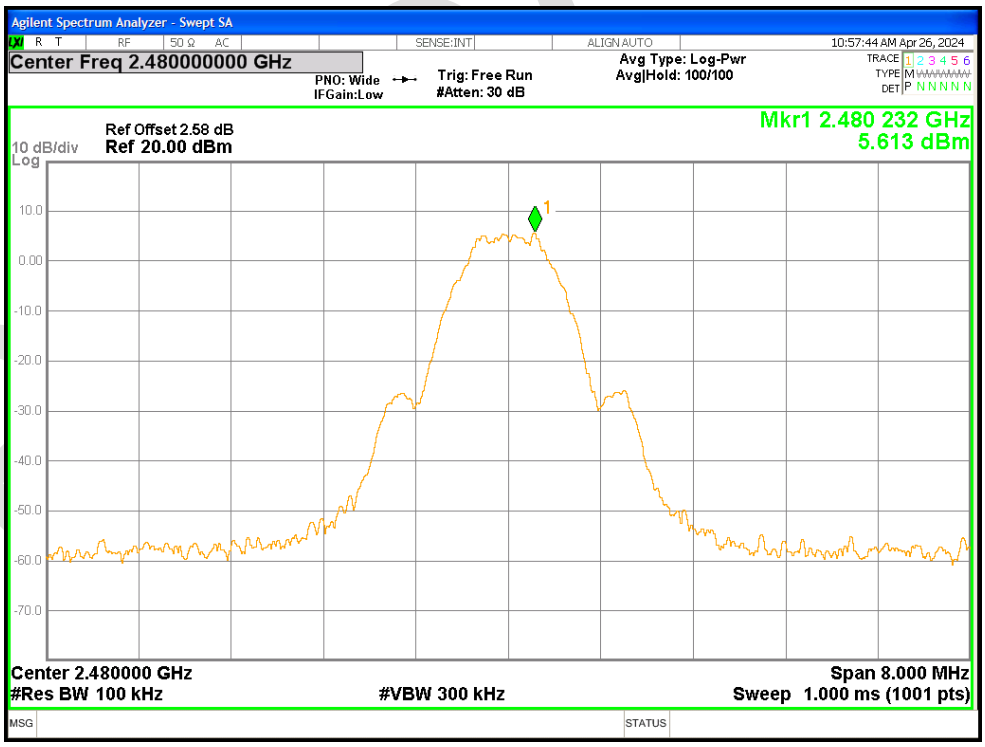
Band Edge NVNT BLE 1M 2402MHz Ant1 Ref



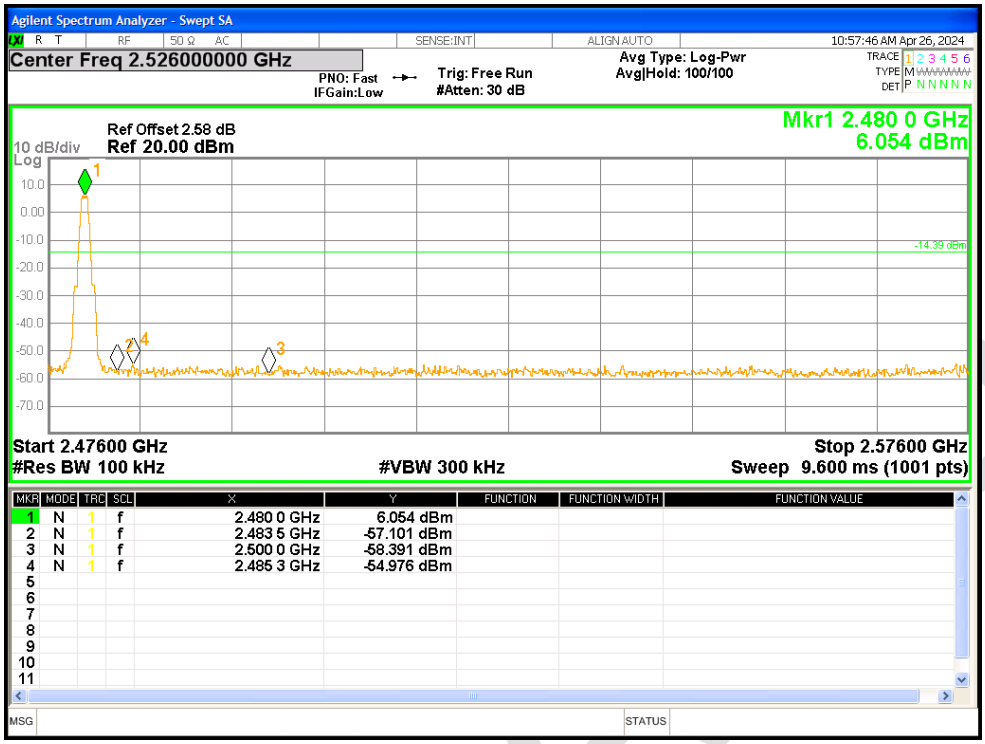
Band Edge NVNT BLE 1M 2402MHz Ant1 Emission



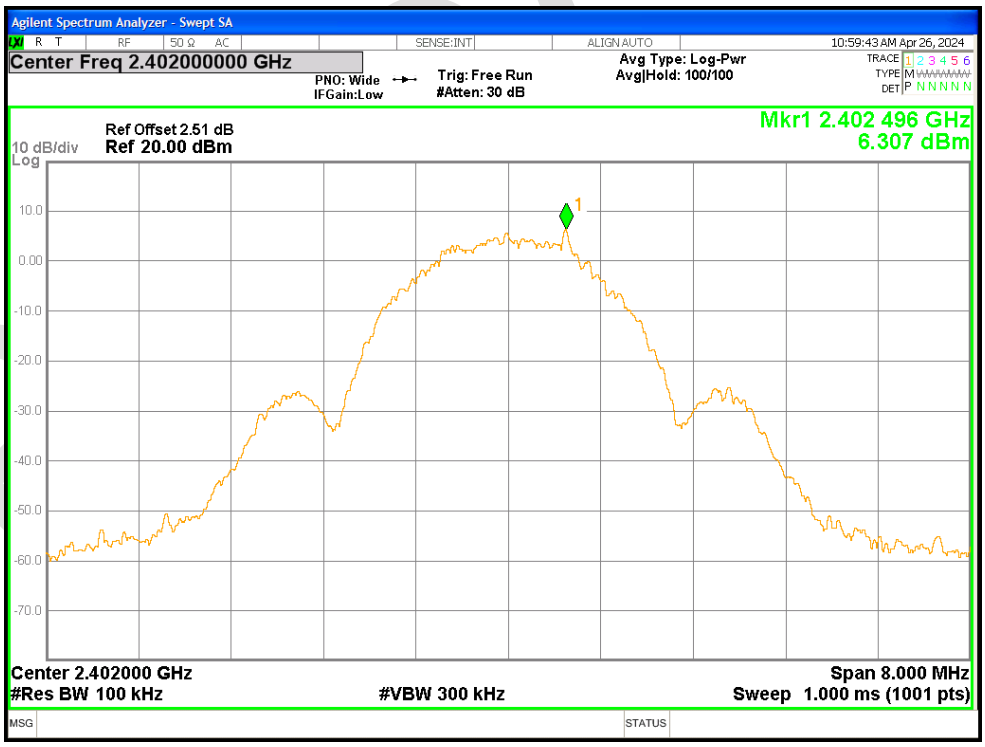
Band Edge NVNT BLE 1M 2480MHz Ant1 Ref



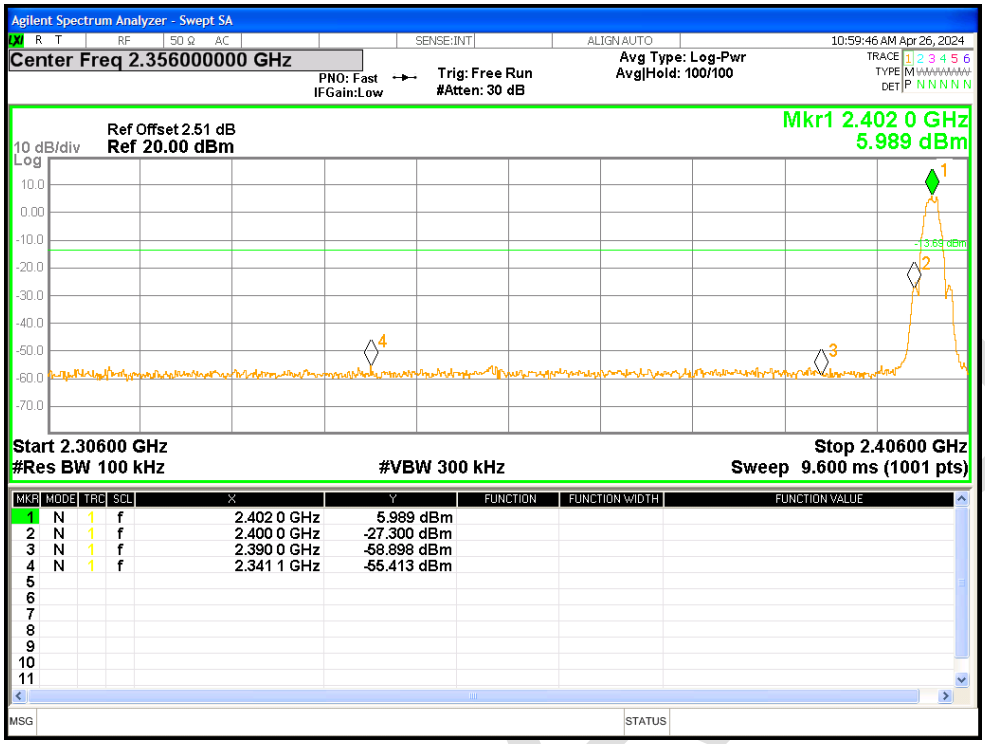
Band Edge NVNT BLE 1M 2480MHz Ant1 Emission



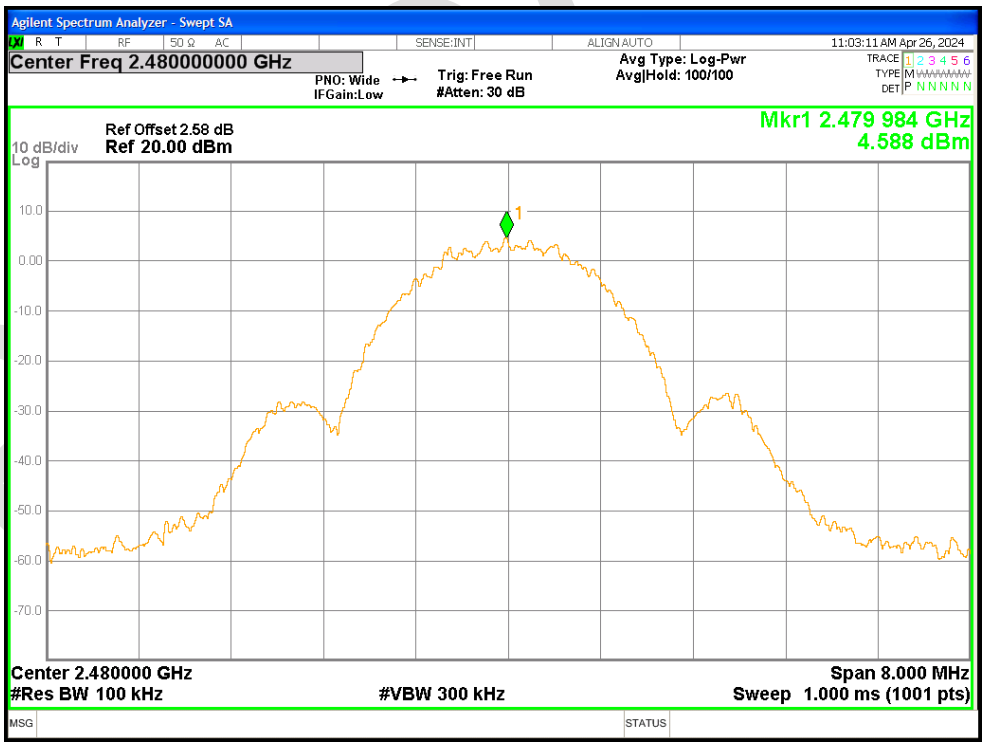
Band Edge NVNT BLE 2M 2402MHz Ant1 Ref



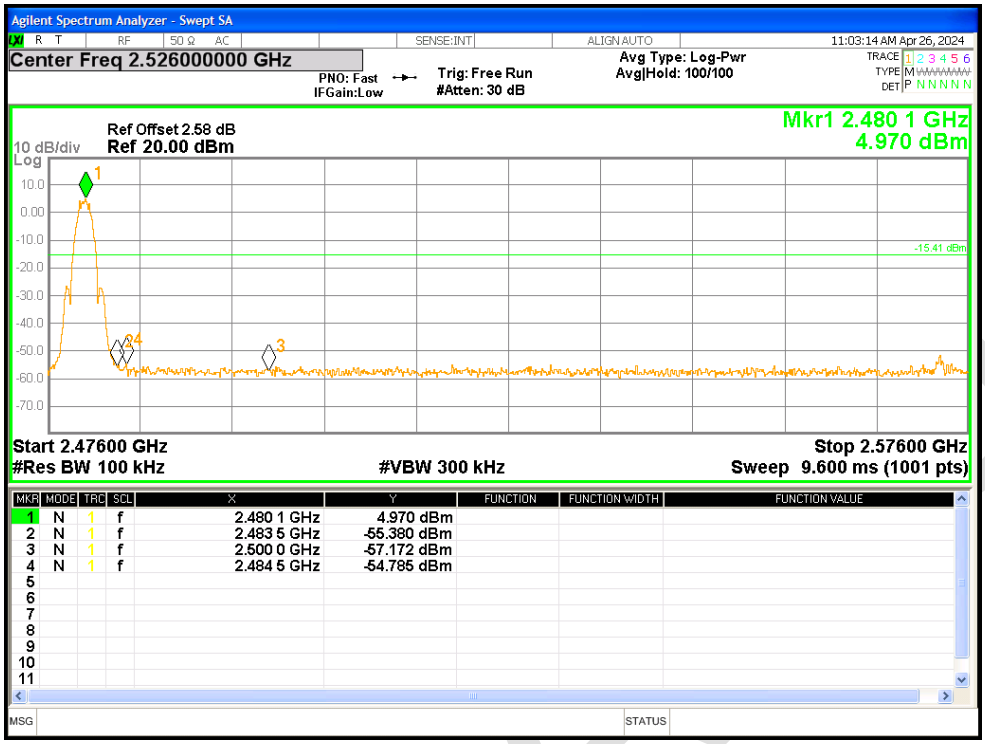
Band Edge NVNT BLE 2M 2402MHz Ant1 Emission



Band Edge NVNT BLE 2M 2480MHz Ant1 Ref



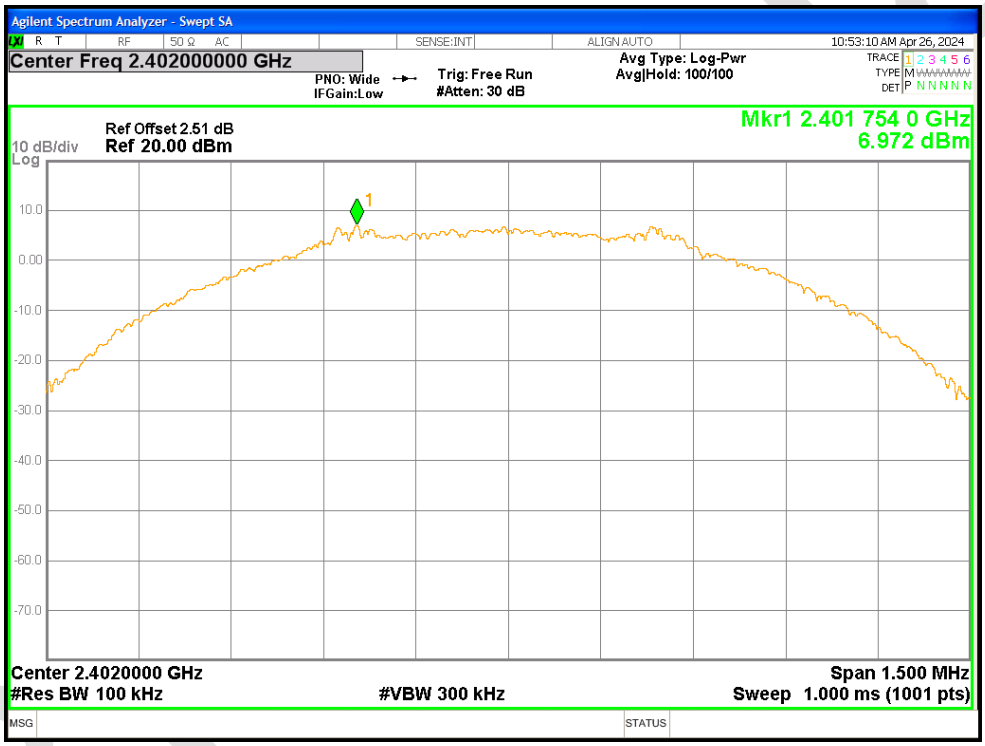
Band Edge NVNT BLE 2M 2480MHz Ant1 Emission


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.526000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 100/100
11:03:14 AM Apr 26, 2024
Ref Offset 2.58 dB
10 dB/div
Ref 20.00 dBm
Mkr1 2.480 1 GHz
4.970 dBm
-15.41 dBm
Start 2.47600 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.57600 GHz
Sweep 9.600 ms (1001 pts)
1 N 1 f 2.480 1 GHz 4.970 dBm
2 N 1 f 2.483 5 GHz -55.380 dBm
3 N 1 f 2.500 0 GHz -57.172 dBm
4 N 1 f 2.484 5 GHz -54.785 dBm

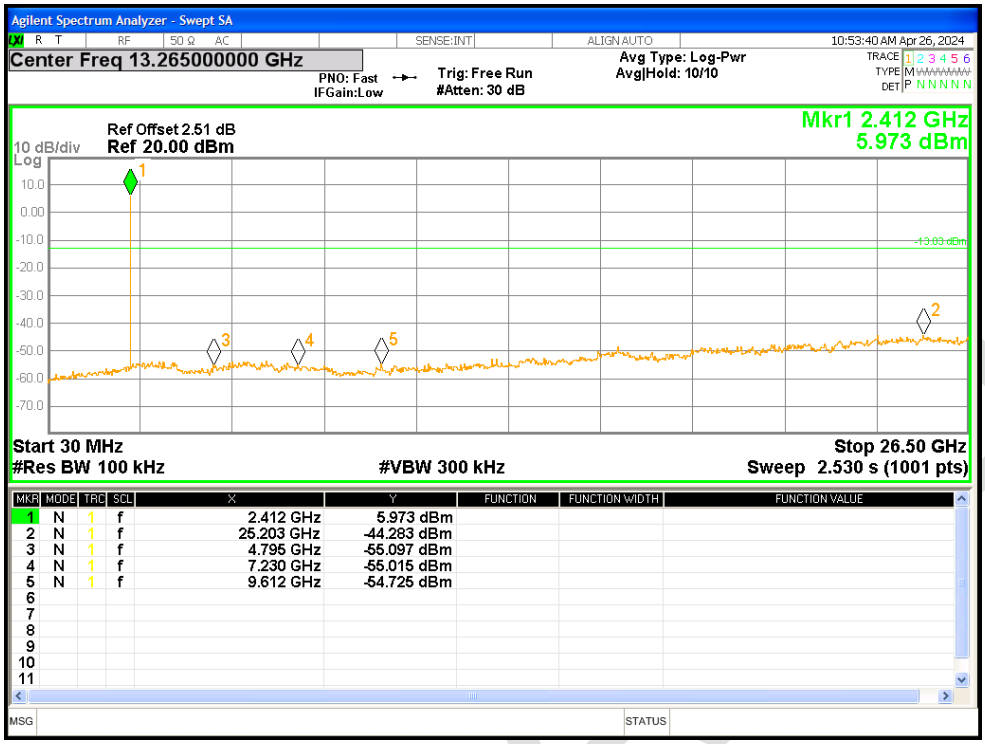
Conducted RF Spurious Emission

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE 1M	2402	Ant1	-51.25	-20	Pass
NVNT	BLE 1M	2442	Ant1	-51.07	-20	Pass
NVNT	BLE 1M	2480	Ant1	-49.85	-20	Pass
NVNT	BLE 2M	2402	Ant1	-49.39	-20	Pass
NVNT	BLE 2M	2442	Ant1	-49.54	-20	Pass
NVNT	BLE 2M	2480	Ant1	-47.94	-20	Pass

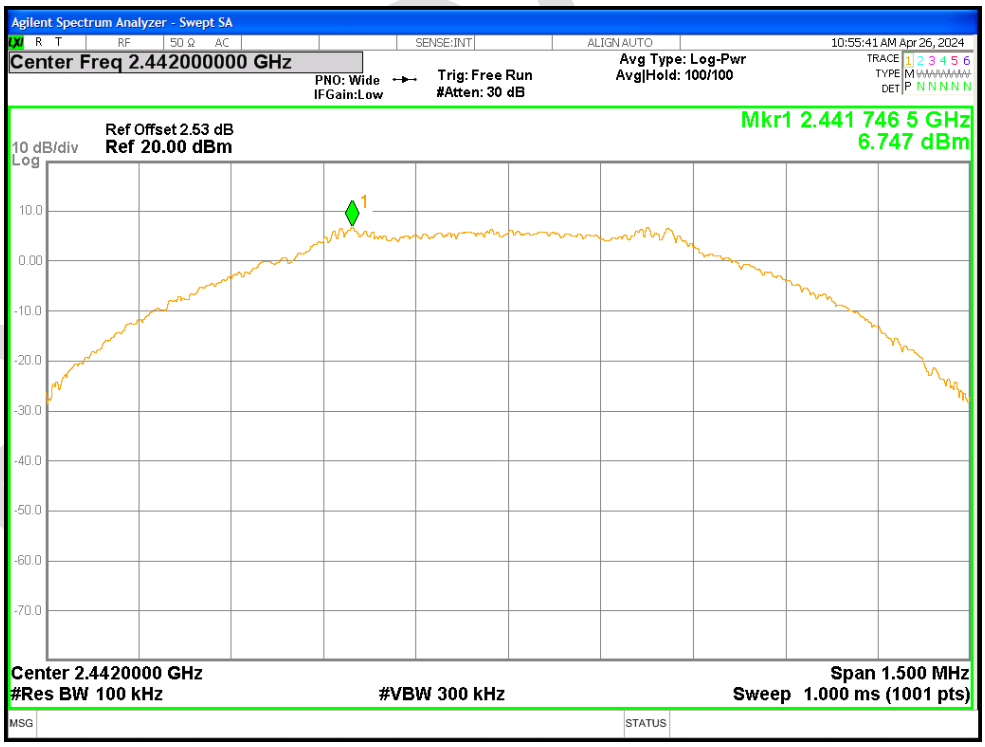
Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Ref



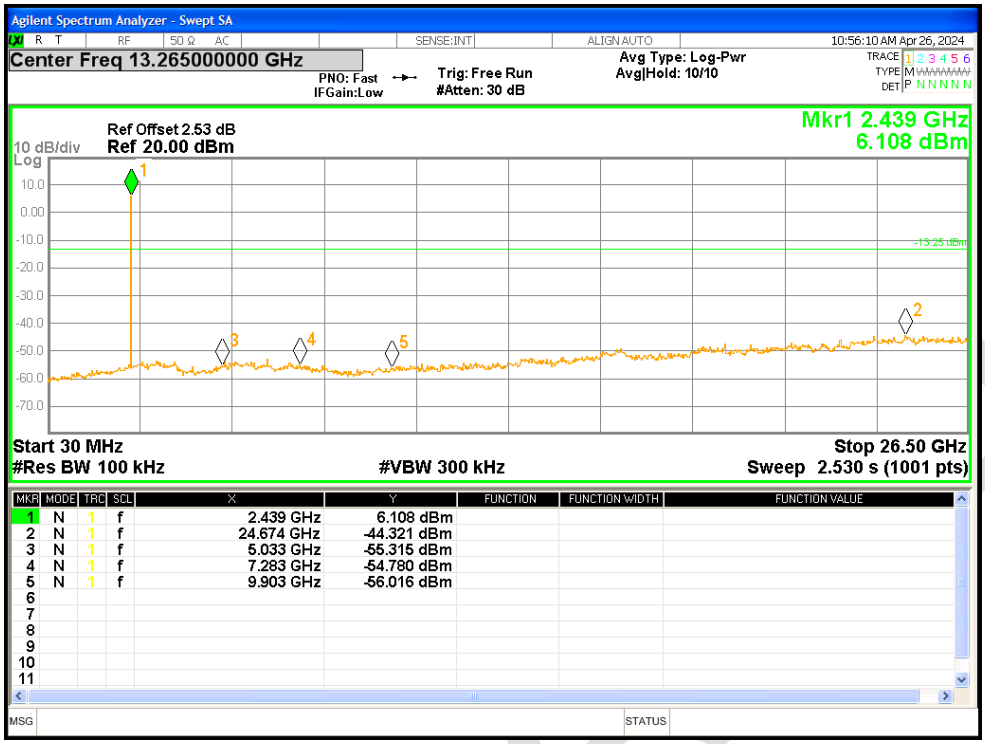
Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Emission



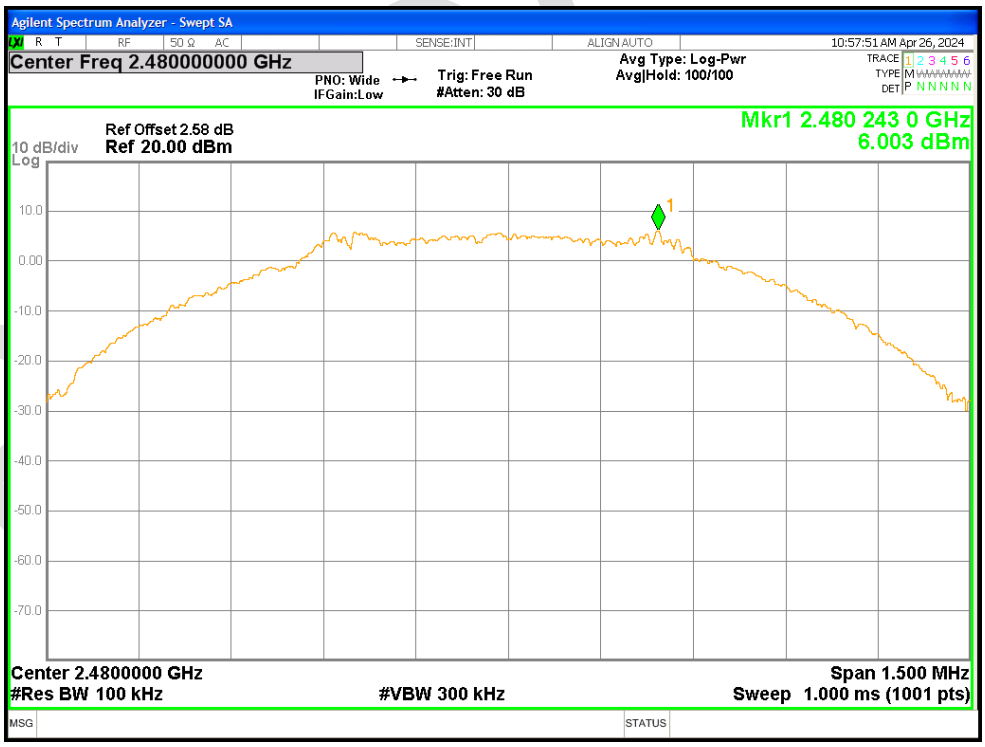
Tx. Spurious NVNT BLE 1M 2442MHz Ant1 Ref



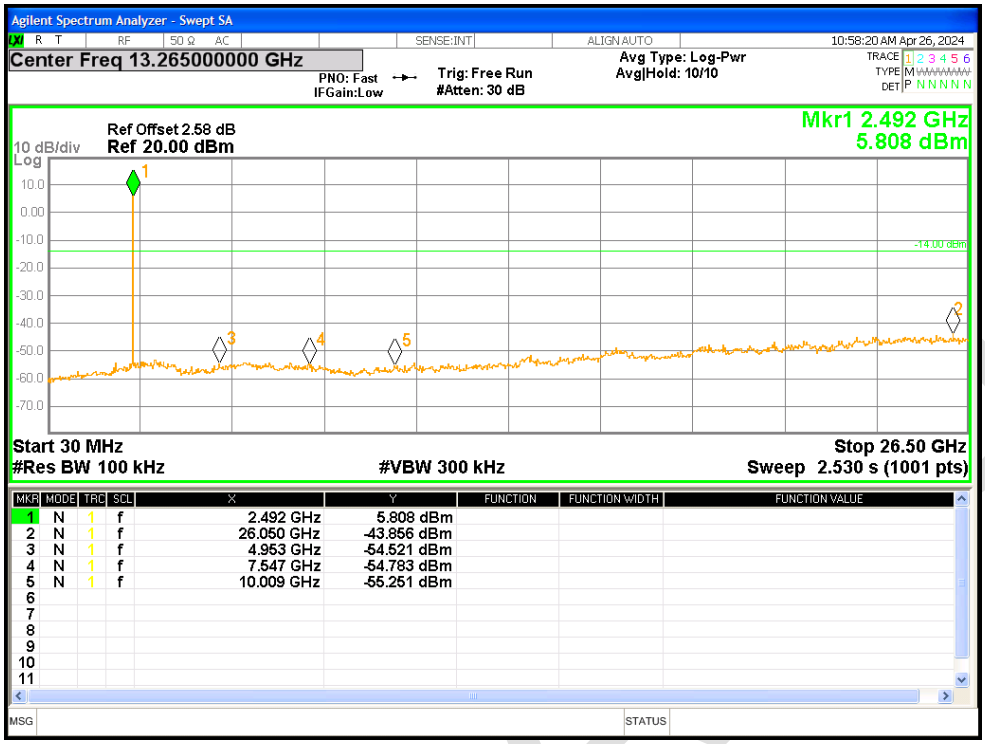
Tx. Spurious NVNT BLE 1M 2442MHz Ant1 Emission



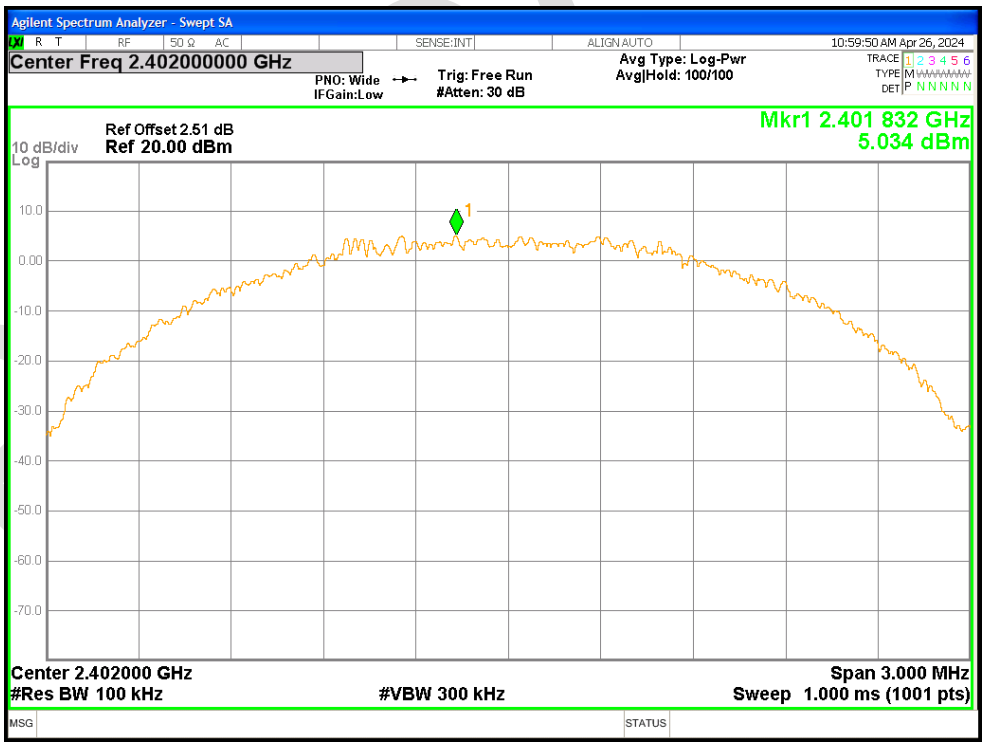
Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Ref



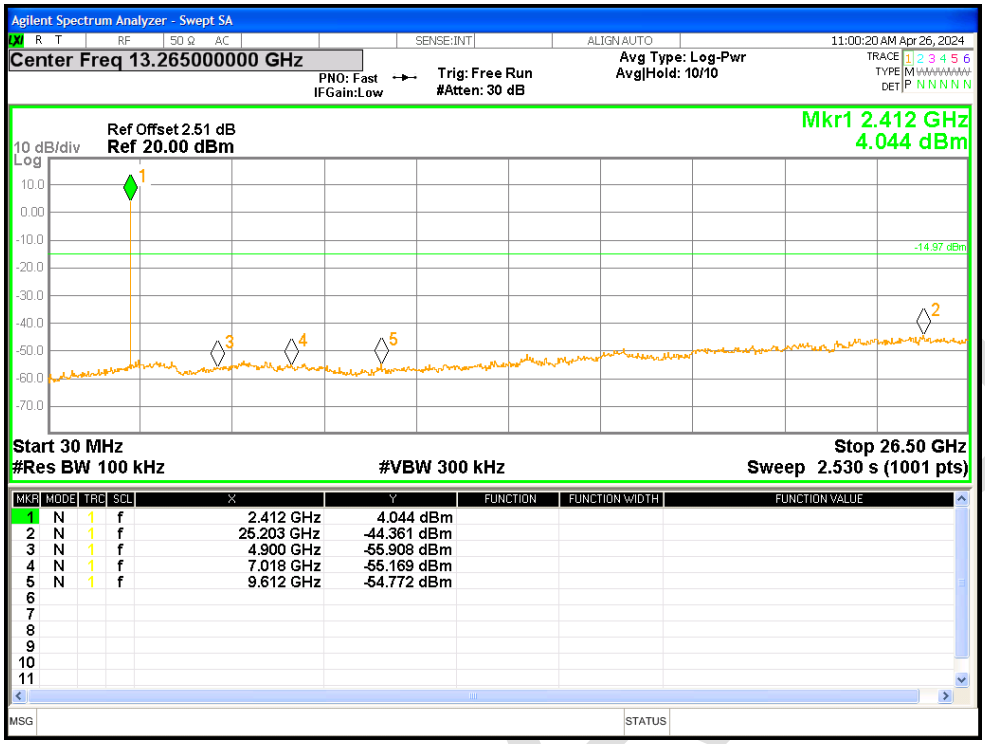
Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Emission



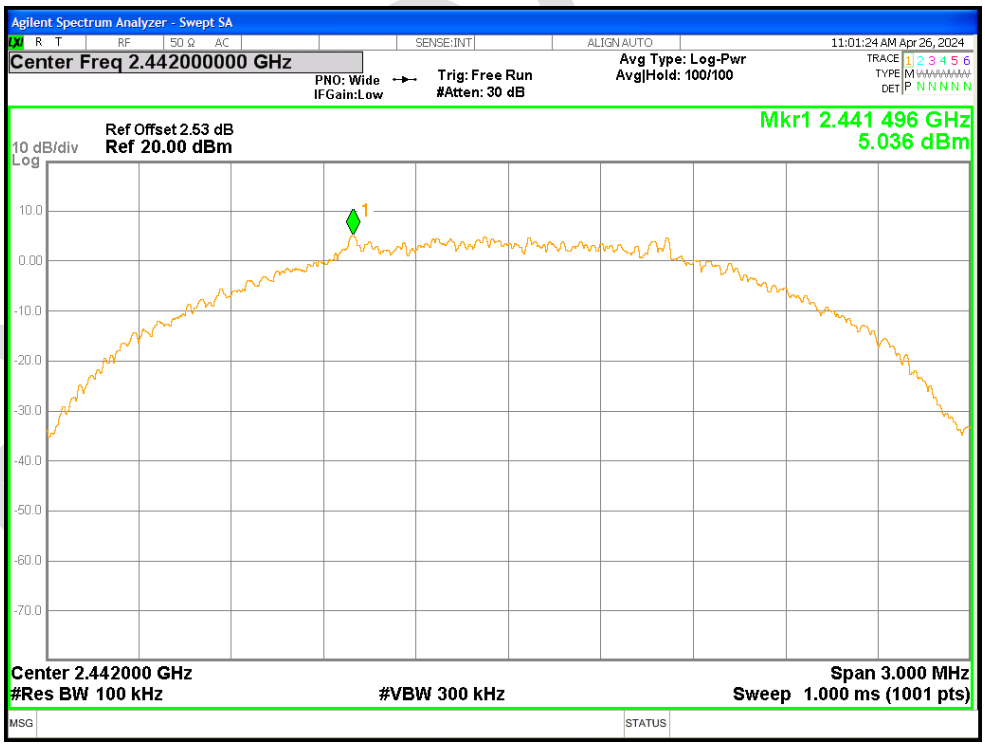
Tx. Spurious NVNT BLE 2M 2402MHz Ant1 Ref



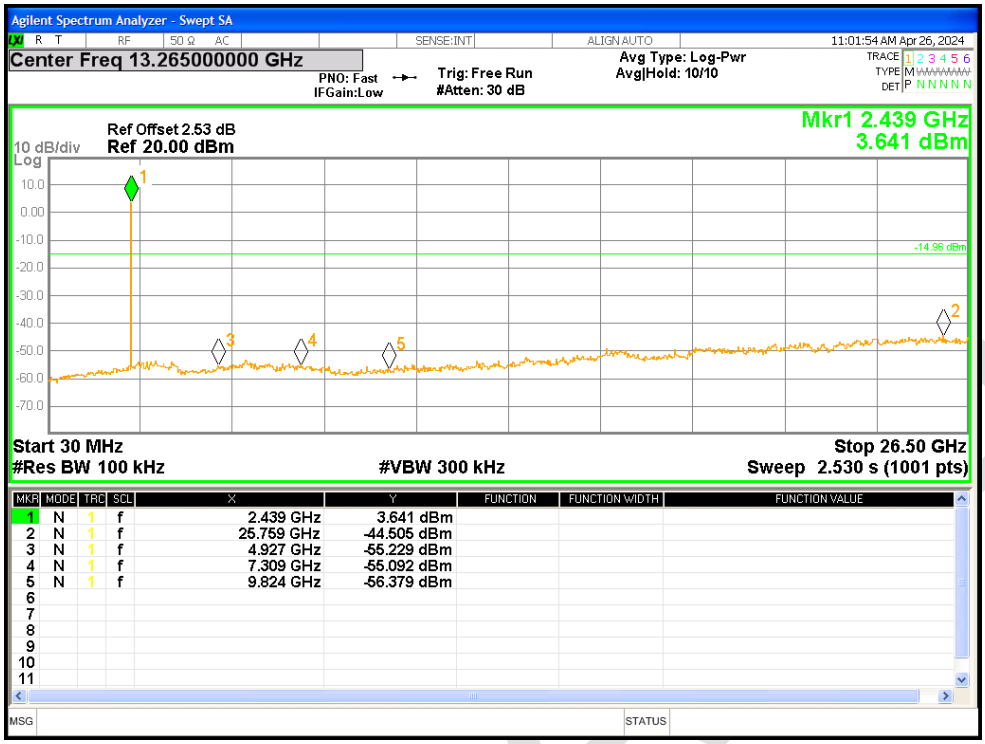
Tx. Spurious NVNT BLE 2M 2402MHz Ant1 Emission



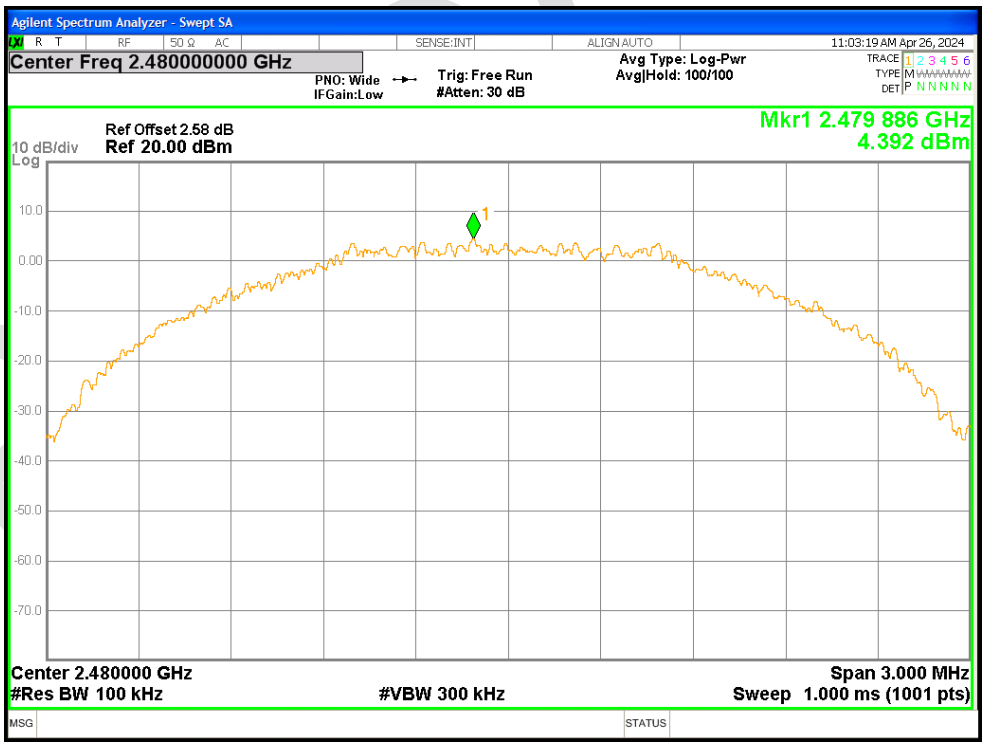
Tx. Spurious NVNT BLE 2M 2442MHz Ant1 Ref



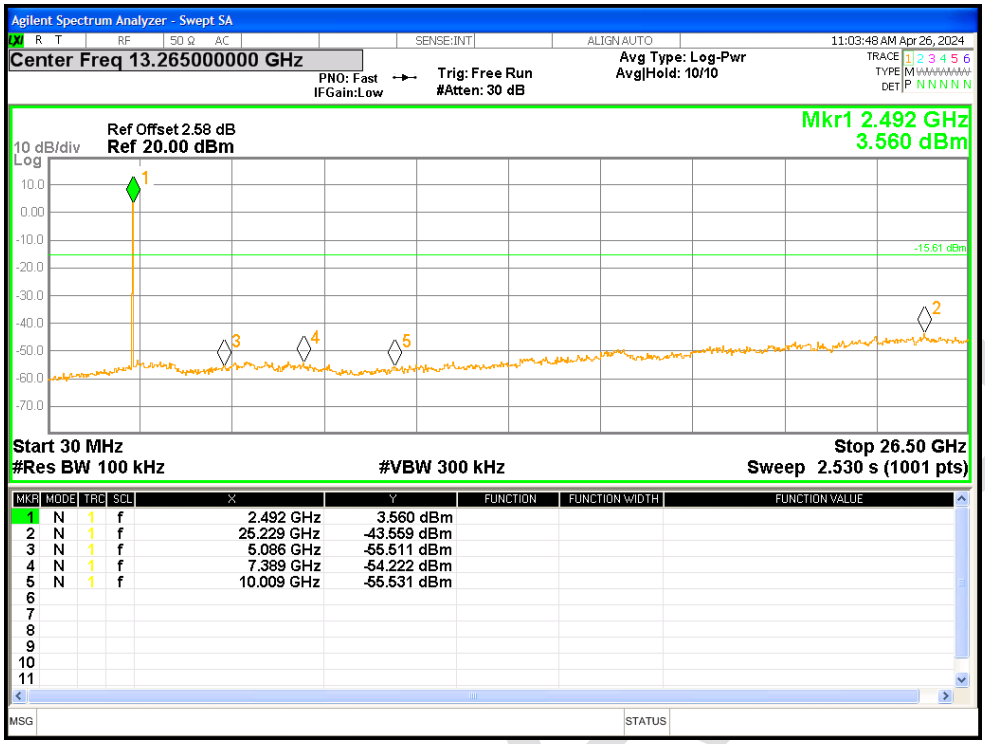
Tx. Spurious NVNT BLE 2M 2442MHz Ant1 Emission



Tx. Spurious NVNT BLE 2M 2480MHz Ant1 Ref



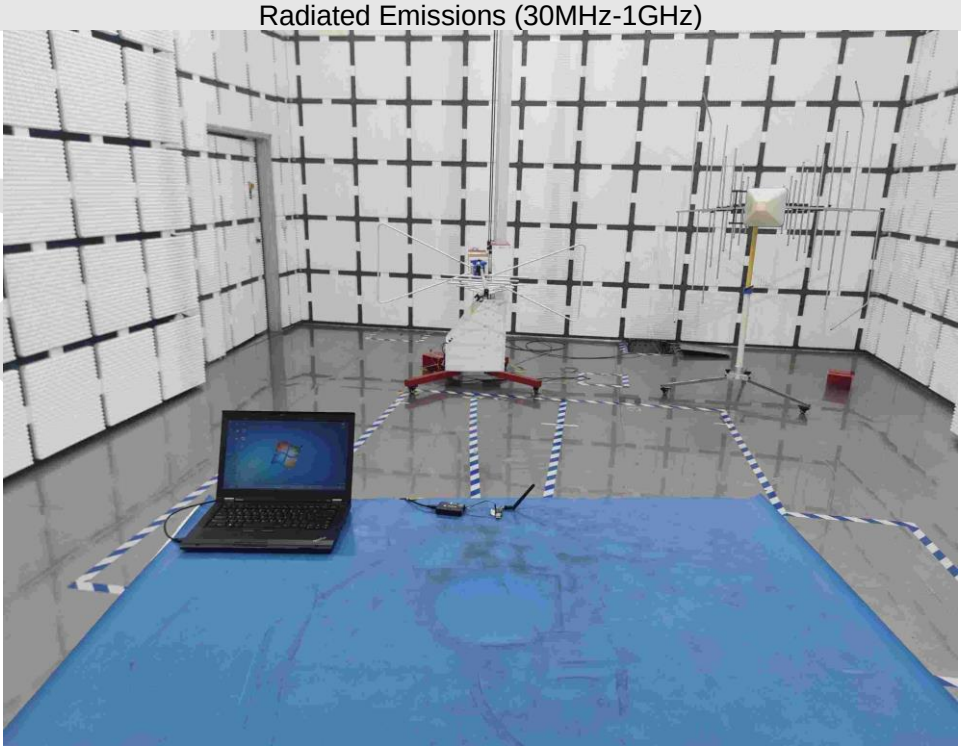
Tx. Spurious NVNT BLE 2M 2480MHz Ant1 Emission


Agilent Spectrum Analyzer - Swept SA
Center Freq 13.265000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 10/10
11:03:48 AM Apr 26, 2024
Ref Offset 2.58 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.492 GHz
3.560 dBm
-15.61 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.50 GHz
Sweep 2.530 s (1001 pts)
MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE
1 N 1 f 2.492 GHz 3.560 dBm
2 N 1 f 25.229 GHz -43.559 dBm
3 N 1 f 5.086 GHz -55.511 dBm
4 N 1 f 7.389 GHz -54.222 dBm
5 N 1 f 10.009 GHz -55.531 dBm
MSG
STATUS

Appendix B: photographs of test setup

Conducted emissions at AC power line (150kHz-30MHz)

Radiated Emissions (30MHz-1GHz)



Radiated Emissions (above 1GHz)

BlueAsia

Appendix C: photographs of EUT

Reference to the test report no. BLA-EMC-202404-A4701

----END OF REPORT----

The test report is effective only with both signature and specialized stamp, the result(s) shown in this report refer only to the sample(s) tested. Without written approval of BlueAsia, this report can't be reproduced except in full.

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