

TEST REPORT

Product Name : MOBILE DIGITAL VIDEO RECORDER
Brand Mark : NavAtlas
Model No. : NA82M
Extension Model : NA81MDVR
FCC ID : 2AFXA-NA82M
Report Number : BLA-EMC-202112-A9602
Date of Sample Receipt : 2021/12/21
Date of Test : 2021/12/21 to 2021/12/30
Date of Issue : 2022/1/4
Test Standard : 47 CFR Part 15, Subpart C 15.247
Test Result : Pass

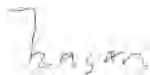
Prepared for:

FengShun Peiying Electro-Acoustic Co., Ltd
2nd Floor, Block F, Hongwei Industrial Area, No.6 Liuxian 2 Road,
Baocheng 70 Area, Bao'an, Shenzhen City,
Guangdong Province, P.R. China

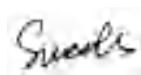
Prepared by:

BlueAsia of Technical Services(Shenzhen) Co., Ltd.
Building C, No. 107, Shihuan Road, Shiyuan Sub-District, Baoan District,
Shenzhen, Guangdong Province, China
TEL: +86-755-23059481

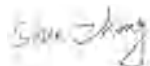
Compiled by:



Review by:



Approved by:



Date:

2022/1/4



REPORT REVISE RECORD

Version No.	Date	Description
00	2022/1/4	Original

BlueAsia

TABLE OF CONTENTS

1	TEST SUMMARY.....	5
2	GENERAL INFORMATION.....	6
3	GENERAL DESCRIPTION OF E.U.T.....	6
4	TEST ENVIRONMENT.....	7
5	TEST MODE.....	7
6	MEASUREMENT UNCERTAINTY.....	7
7	DESCRIPTION OF SUPPORT UNIT.....	8
8	LABORATORY LOCATION.....	8
9	TEST INSTRUMENTS LIST.....	9
1	ANTENNA REQUIREMENT.....	13
1.1	CONCLUSION.....	13
2	CONDUCTED SPURIOUS EMISSIONS.....	14
2.1	LIMITS.....	14
2.2	BLOCK DIAGRAM OF TEST SETUP.....	14
2.3	TEST DATA.....	15
3	CONDUCTED PEAK OUTPUT POWER.....	16
3.1	LIMITS.....	16
3.2	BLOCK DIAGRAM OF TEST SETUP.....	16
3.3	TEST DATA.....	17
4	CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ).....	错误！未定义书签。
4.1	LIMITS.....	错误！未定义书签。
4.2	BLOCK DIAGRAM OF TEST SETUP.....	错误！未定义书签。
4.3	PROCEDURE.....	错误！未定义书签。
4.4	TEST DATA.....	错误！未定义书签。
5	RADIATED SPURIOUS EMISSIONS.....	18
5.1	LIMITS.....	18
5.2	BLOCK DIAGRAM OF TEST SETUP.....	19
5.3	PROCEDURE.....	19
5.4	TEST DATA.....	21

6	RADIATED EMISSIONS WHICH FALL IN THE RESTRICTED BANDS.....	29
6.1	LIMITS.....	29
6.2	BLOCK DIAGRAM OF TEST SETUP.....	30
6.3	PROCEDURE.....	30
6.4	TEST DATA.....	32
7	CONDUCTED BAND EDGES MEASUREMENT.....	36
7.1	LIMITS.....	36
7.2	BLOCK DIAGRAM OF TEST SETUP.....	36
7.3	TEST DATA.....	37
8	DWELL TIME.....	38
8.1	LIMITS.....	38
8.2	BLOCK DIAGRAM OF TEST SETUP.....	38
8.3	TEST DATA.....	39
9	HOPPING CHANNEL NUMBER.....	40
9.1	LIMITS.....	40
9.2	BLOCK DIAGRAM OF TEST SETUP.....	40
9.3	TEST DATA.....	40
10	CARRIER FREQUENCIES SEPARATION.....	41
10.1	LIMITS.....	41
10.2	BLOCK DIAGRAM OF TEST SETUP.....	41
10.3	TEST DATA.....	41
11	20DB BANDWIDTH.....	42
11.1	BLOCK DIAGRAM OF TEST SETUP.....	42
11.2	TEST DATA.....	42
10	APPENDIX.....	43
	APPENDIX A: PHOTOGRAPHS OF TEST SETUP.....	90

1 TEST SUMMARY

Test item	Test Requirement	Test Method	Class/Severity	Result
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(c)	Pass
Conducted Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.6 & Section 11.11	47 CFR Part 15, Subpart C 15.247(d)	Pass
Conducted Peak Output Power	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.5	47 CFR Part 15, Subpart C 15.247(b)(3)	Pass
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	N/A
Radiated Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.4,6.5,6.6	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	Pass
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	Pass
Conducted Band Edges Measurement	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.8 & Section 11.13.3.2	47 CFR Part 15, Subpart C 15.247(d)	Pass
Dwell Time	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.4	47 CFR Part 15, Subpart C 15.247a(1)(iii)	Pass
Hopping Channel Number	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.3	47 CFR Part 15, Subpart C 15.247a(1)(iii)	Pass
Carrier Frequencies Separation	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.2	47 CFR Part 15, Subpart C 15.247a(1)	Pass
20dB Bandwidth	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.7	47 CFR Part 15, Subpart C 15.247(a)(1)	Pass

Remark:

N/A: Not Applicable

2 GENERAL INFORMATION

Applicant	FengShun Peiying Electro-Acoustic Co., Ltd
Address	2nd Floor, Block F, Hongwei Industrial Area, No.6 Liuxian 2 Road, Baocheng 70 Area, Bao'an, Shenzhen City, Guangdong Province, P.R. China
Manufacturer	FengShun Peiying Electro-Acoustic Co., Ltd
Address	No.8, Fengda Road, Tangkeng Town Industrial Area, Fengshun County, Meizhou City, Guangdong Province, P.R. China
Factory	FengShun Peiying Electro-Acoustic Co., Ltd
Address	No.8, Fengda Road, Tangkeng Town Industrial Area, Fengshun County, Meizhou City, Guangdong Province, P.R. China
Product Name	MOBILE DIGITAL VIDEO RECORDER
Test Model No.	NA82M

3 GENERAL DESCRIPTION OF E.U.T.

Hardware Version	V09
Software Version	Android 4.4
Operation Frequency:	2402MHz-2480MHz
Modulation Type:	GFSK, pi/4DQPSK, 8DPSK
Channel Spacing:	1MHz
Number of Channels:	79
Antenna Type:	Internal Antenna
Antenna Gain:	2.0dBi (provided by applicant)

4 TEST ENVIRONMENT

Environment	Temperature	Voltage
Normal	25°C	DC12V

5 TEST MODE

TEST MODE	TEST MODE DESCRIPTION
Transmitting mode	Keep the EUT in continuously transmitting mode with modulation. (hopping and non hopping mode all have been tested, non hopping mode is worse case for RE)
Remark: Full battery is used during all test except ac conducted emission, DH1,DH3, DH5 all have been tested, during the test, GFSK, Pi/4QPSK, 8-DPSK modulation were all pre-scanned Only the 8-DPSK of the worst mode would be recorded in this report.	

6 MEASUREMENT UNCERTAINTY

Parameter	Expanded Uncertainty (Confidence of 95%)
Radiated Emission(9kHz-30MHz)	±4.34dB
Radiated Emission(30Mz-1000MHz)	±4.24dB
Radiated Emission(1GHz-18GHz)	±4.68dB
AC Power Line Conducted Emission(150kHz-30MHz)	±3.45dB

Parameter	Expanded Uncertainty (Confidence of 95%)
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±1.5 dB
Power Spectral Density, conducted	±3.0 dB
Unwanted Emissions, conducted	±3.0 dB
Temperature	±3 °C
Supply voltages	±3 %
Time	±5 %
Radiated Emission (30MHz ~ 1000MHz)	±4.35 dB
Radiated Emission (1GHz ~ 18GHz)	±4.44 dB

7 DESCRIPTION OF SUPPORT UNIT

Device Type	Manufacturer	Model Name	Serial No.	Remark
PC	HASEE	K610D	N/A	N/A

8 LABORATORY LOCATION

All tests were performed at:
BlueAsia of Technical Services(Shenzhen) Co., Ltd.
Building C, No. 107, Shihuan Road, Shiyuan Sub-District, Baoan District, Shenzhen, Guangdong Province, China
Telephone: TEL: +86-755-28682673 FAX: +86-755-28682673
No tests were sub-contracted.

9 TEST INSTRUMENTS LIST

Test Equipment Of Conducted Spurious Emissions					
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Spectrum	R&S	FSP40	100817	24/9/2021	23/9/2022
Spectrum	Agilent	N9020A	MY49100060	24/9/2021	23/9/2022
Signal Generator	Agilent	N5182A	MY49060650	24/9/2021	23/9/2022
Signal Generator	Agilent	E8257D	MY44320250	24/9/2021	23/9/2022

Test Equipment Of Conducted Peak Output Power					
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Spectrum	R&S	FSP40	100817	24/9/2021	23/9/2022
Spectrum	Agilent	N9020A	MY49100060	24/9/2021	23/9/2022
Signal Generator	Agilent	N5182A	MY49060650	24/9/2021	23/9/2022
Signal Generator	Agilent	E8257D	MY44320250	24/9/2021	23/9/2022

Test Equipment Of Radiated Spurious Emissions					
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Chamber	SKET	966	N/A	10/11/2020	9/11/2023
Spectrum	R&S	FSP40	100817	24/9/2021	23/9/2022
Receiver	R&S	ESR7	101199	24/9/2021	23/9/2022
broadband Antenna	Schwarzbeck	VULB9168	00836 P:00227	26/9/2020	25/9/2022
Horn Antenna	Schwarzbeck	9120D	01892 P:00331	26/9/2020	25/9/2022

Amplifier	SKET	LNPA-0118-45	N/A	24/9/2021	23/9/2022
EMI software	EZ	EZ-EMC	N/A	N/A	N/A
Loop antenna	SCHNARZBECK	FMZB1519B	00102	26/9/2020	25/9/2022

Test Equipment Of Radiated Emissions which fall in the restricted bands

Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Chamber	SKET	966	N/A	10/11/2020	9/11/2023
Spectrum	R&S	FSP40	100817	24/9/2021	23/9/2022
Receiver	R&S	ESR7	101199	24/9/2021	23/9/2022
broadband Antenna	Schwarzbeck	VULB9168	00836 P:00227	26/9/2020	25/9/2022
Horn Antenna	Schwarzbeck	9120D	01892 P:00331	26/9/2020	25/9/2022
Amplifier	SKET	LNPA-0118-45	N/A	24/9/2021	23/9/2022
EMI software	EZ	EZ-EMC	N/A	N/A	N/A
Loop antenna	SCHNARZBECK	FMZB1519B	00102	26/9/2020	25/9/2022

Test Equipment Of Conducted Band Edges Measurement

Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Spectrum	R&S	FSP40	100817	24/9/2021	23/9/2022
Spectrum	Agilent	N9020A	MY49100060	24/9/2021	23/9/2022
Signal Generator	Agilent	N5182A	MY49060650	24/9/2021	23/9/2022
Signal Generator	Agilent	E8257D	MY44320250	24/9/2021	23/9/2022

Test Equipment Of Dwell Time

Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
-----------	--------------	-------	-----	----------	---------

Spectrum	R&S	FSP40	100817	24/9/2021	23/9/2022
Spectrum	Agilent	N9020A	MY49100060	24/9/2021	23/9/2022
Signal Generator	Agilent	N5182A	MY49060650	24/9/2021	23/9/2022
Signal Generator	Agilent	E8257D	MY44320250	24/9/2021	23/9/2022

Test Equipment Of Hopping Channel Number

Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Spectrum	R&S	FSP40	100817	24/9/2021	23/9/2022
Spectrum	Agilent	N9020A	MY49100060	24/9/2021	23/9/2022
Signal Generator	Agilent	N5182A	MY49060650	24/9/2021	23/9/2022
Signal Generator	Agilent	E8257D	MY44320250	24/9/2021	23/9/2022

Test Equipment Of Carrier Frequencies Separation

Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Spectrum	R&S	FSP40	100817	24/9/2021	23/9/2022
Spectrum	Agilent	N9020A	MY49100060	24/9/2021	23/9/2022
Signal Generator	Agilent	N5182A	MY49060650	24/9/2021	23/9/2022
Signal Generator	Agilent	E8257D	MY44320250	24/9/2021	23/9/2022

Test Equipment Of 20dB Bandwidth

Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Spectrum	R&S	FSP40	100817	24/9/2021	23/9/2022
Spectrum	Agilent	N9020A	MY49100060	24/9/2021	23/9/2022
Signal Generator	Agilent	N5182A	MY49060650	24/9/2021	23/9/2022

Signal Generator	Agilent	E8257D	MY44320250	24/9/2021	23/9/2022
------------------	---------	--------	------------	-----------	-----------

BlueAsia

10 ANTENNA REQUIREMENT

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	N/A

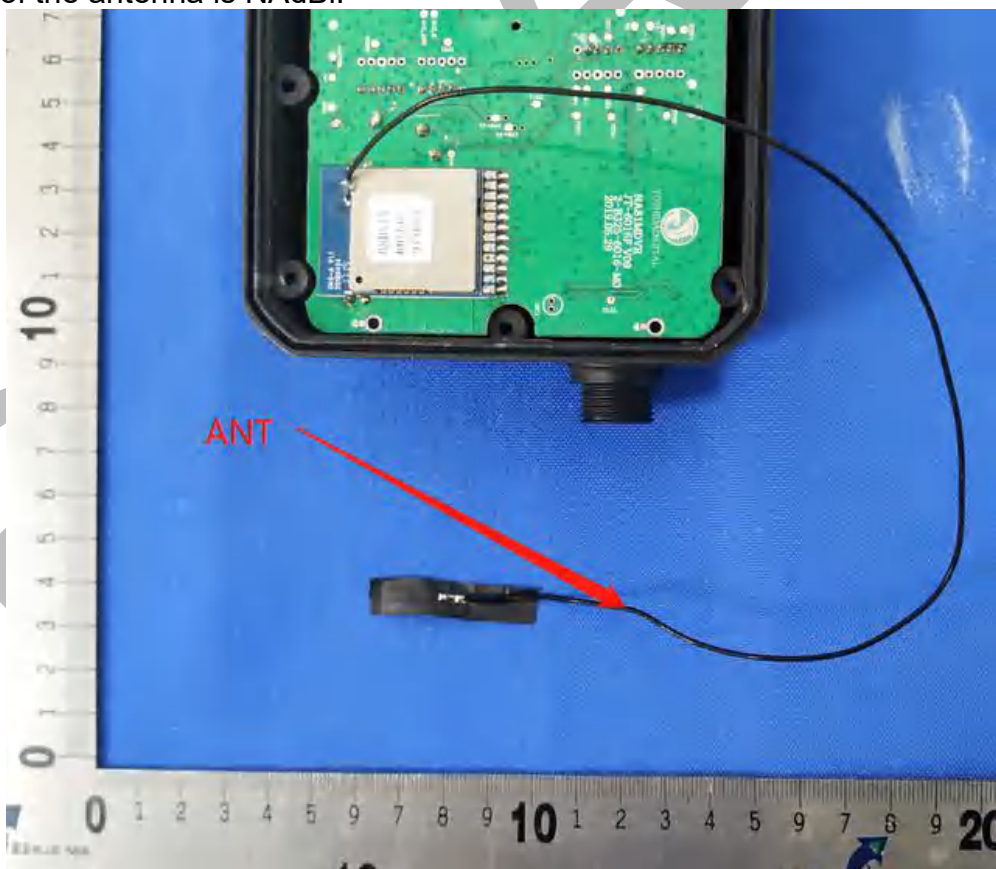
10.1 CONCLUSION

Standard Requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit permanently attached antenna or of an so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is NAdBi.



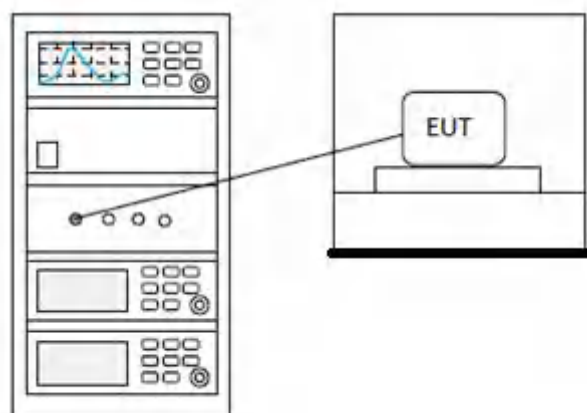
11 CONDUCTED SPURIOUS EMISSIONS

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.6 & Section 11.11
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Sven
Temperature	25°C
Humidity	52%

11.1 LIMITS

Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. 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)).
---------------	--

11.2 BLOCK DIAGRAM OF TEST SETUP



11.3 TEST DATA

Pass: Please Refer To Appendix: For Details

BlueAsia

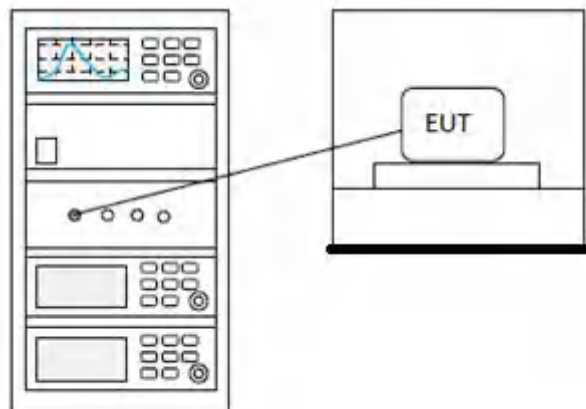
12 CONDUCTED PEAK OUTPUT POWER

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.5
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Sven
Temperature	25°C
Humidity	52%

12.1 LIMITS

Frequency range(MHz)	Output power of the intentional radiator(watt)
902-928	1 for ≥ 50 hopping channels
	0.25 for $25 \leq \text{hopping channels} < 50$
	1 for digital modulation
2400-2483.5	1 for ≥ 75 non-overlapping hopping channels
	0.125 for all other frequency hopping systems
	1 for digital modulation
5725-5850	1 for frequency hopping systems and digital modulation

12.2 BLOCK DIAGRAM OF TEST SETUP



12.3 TEST DATA

Pass: Please Refer To Appendix: For Details
--

BlueAsia

13 RADIATED SPURIOUS EMISSIONS

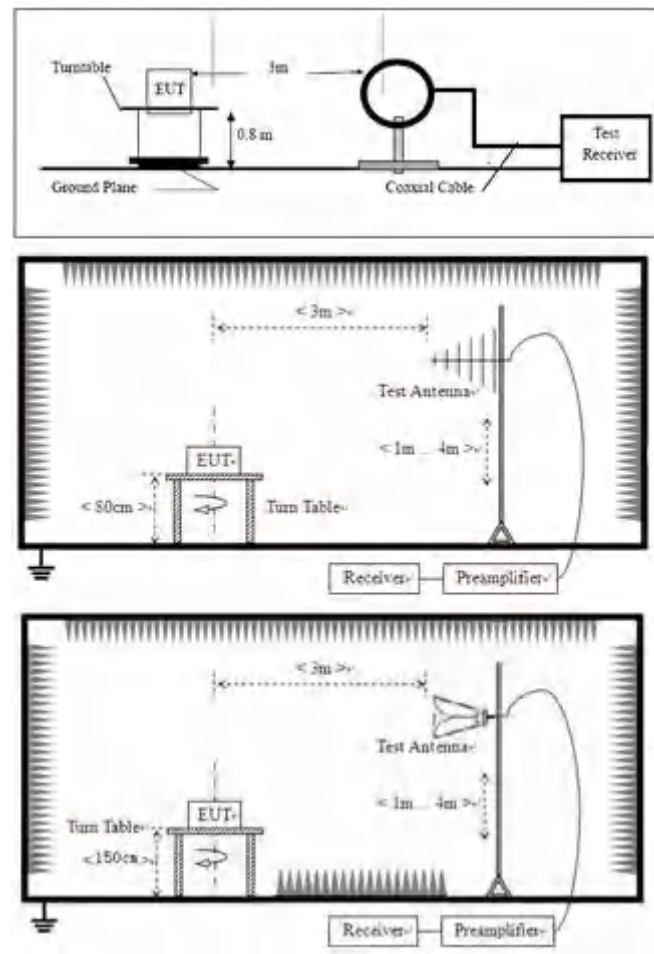
Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.4,6.5,6.6
Test Mode (Pre-Scan)	TX;TX middle channel;TX Low channel;TX high channel
Test Mode (Final Test)	TX;TX middle channel;TX Low channel;TX high channel
Tester	Sven
Temperature	25℃
Humidity	52%

13.1 LIMITS

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.

13.2 BLOCK DIAGRAM OF TEST SETUP



13.3 PROCEDURE

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

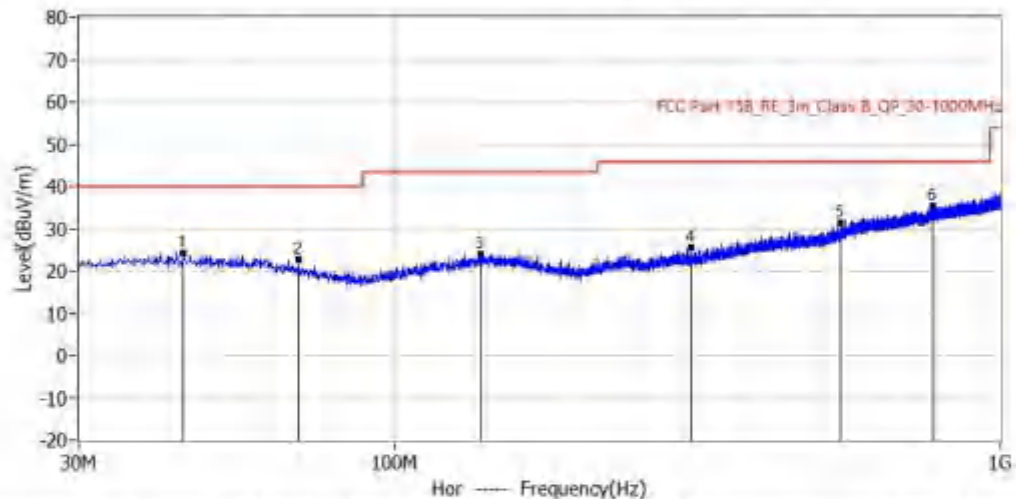
Remark:

- 1) For emission below 1GHz, through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.
- 2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
Final Test Level = Receiver Reading + Antenna Factor + Cable Factor - Preamplifier Factor
- 3) Scan from 9kHz to 25GHz, the disturbance above 12.75GHz and below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported. fundamental frequency is blocked by filter, and only spurious emission is shown.
- 4) 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.

13.4 TEST DATA

[TestMode: TX]; [Polarity: Horizontal]

Test Lab: BlueAsia EMC Lab (RE #1)	Project: BLA-EMC-202112-A96
EUT: MOBILE DIGITAL VIDEO RECORDER	Test Engineer: York
M/N: NA82M	Temperature:
S/N:	Humidity:
Test Mode: TX mode	Test Voltage:
Note:	Test Data: 2021-12-23 17:34:02

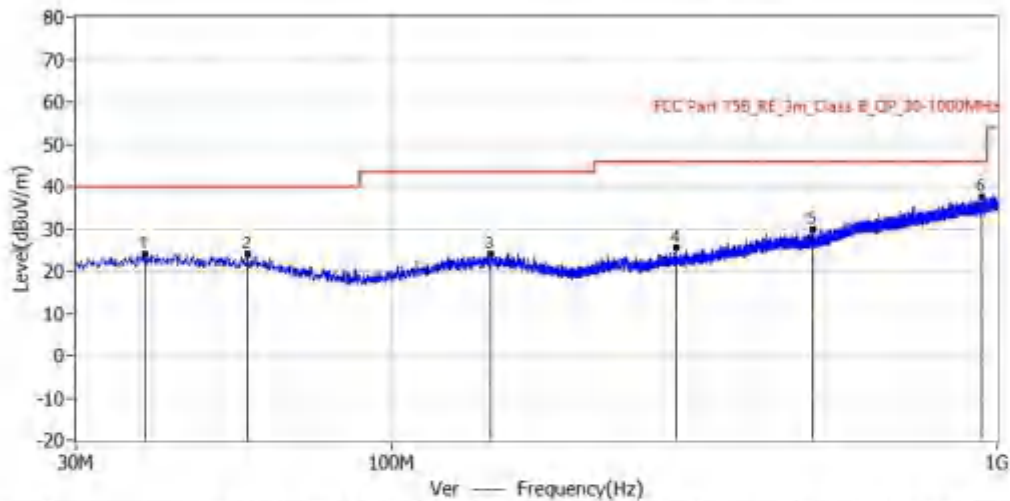


No.	Frequency	Limit dBuV/m	Level dBuV/m	Delta dB	Reading dBuV	Factor dB/m	Detector	Polar	Height cm	Angle deg
1*	44.671MHz	40.0	24.3	-15.7	0.3	24.0	QP	Hor	100.0	0.0
2*	69.043MHz	40.0	22.7	-17.3	1.1	21.6	QP	Hor	100.0	290.0
3*	138.034MHz	43.5	24.0	-19.5	0.4	23.6	QP	Hor	100.0	0.0
4*	308.390MHz	46.0	25.5	-20.5	1.2	24.3	QP	Hor	100.0	0.0
5*	544.343MHz	46.0	31.3	-14.7	1.6	29.7	QP	Hor	100.0	0.0
6*	774.233MHz	46.0	35.5	-10.5	1.9	33.6	QP	Hor	100.0	125.0

Test Result: Pass

[TestMode: TX]; [Polarity: Vertical]

Test Lab: BlueAsia EMC Lab (RE #1)	Project: BLA-EMC-202112-A96
EUT: MOBILE DIGITAL VIDEO RECORDER	Test Engineer: York
M/N: NA82M	Temperature:
S/N:	Humidity:
Test Mode: TX mode	Test Voltage:
Note:	Test Data: 2021-12-23 17:36:23



No.	Frequency	Limit dBuV/m	Level dBuV/m	Delta dB	Reading dBuV	Factor dB/m	Detector	Polar	Height cm	Angle deg
1*	38.973MHz	40.0	23.9	-16.1	-0.1	24.0	QP	Ver	100.0	76.0
2*	57.524MHz	40.0	24.1	-15.9	0.5	23.6	QP	Ver	100.0	8.0
3*	145.188MHz	43.5	23.9	-19.6	0.3	23.6	QP	Ver	100.0	164.0
4*	294.204MHz	46.0	25.4	-20.6	1.5	23.9	QP	Ver	100.0	192.0
5*	494.630MHz	46.0	30.0	-16.0	1.6	28.4	QP	Ver	100.0	32.0
6*	944.710MHz	46.0	37.5	-8.5	2.0	35.5	QP	Ver	100.0	164.0

Test Result: Pass

[TestMode: TX Low channel]; [Polarity: Horizontal]



Test Result: Pass

[TestMode: TX Low channel]; [Polarity: Vertical]



Test Result: Pass

[TestMode: TX middle channel]; [Polarity: Horizontal]



Test Result: Pass

[TestMode: TX middle channel]; [Polarity: Vertical]



Test Result: Pass

[TestMode: TX high channel]; [Polarity: Horizontal]



Test Result: Pass

[TestMode: TX high channel]; [Polarity: Vertical]



Test Result: Pass

14 RADIATED EMISSIONS WHICH FALL IN THE RESTRICTED BANDS

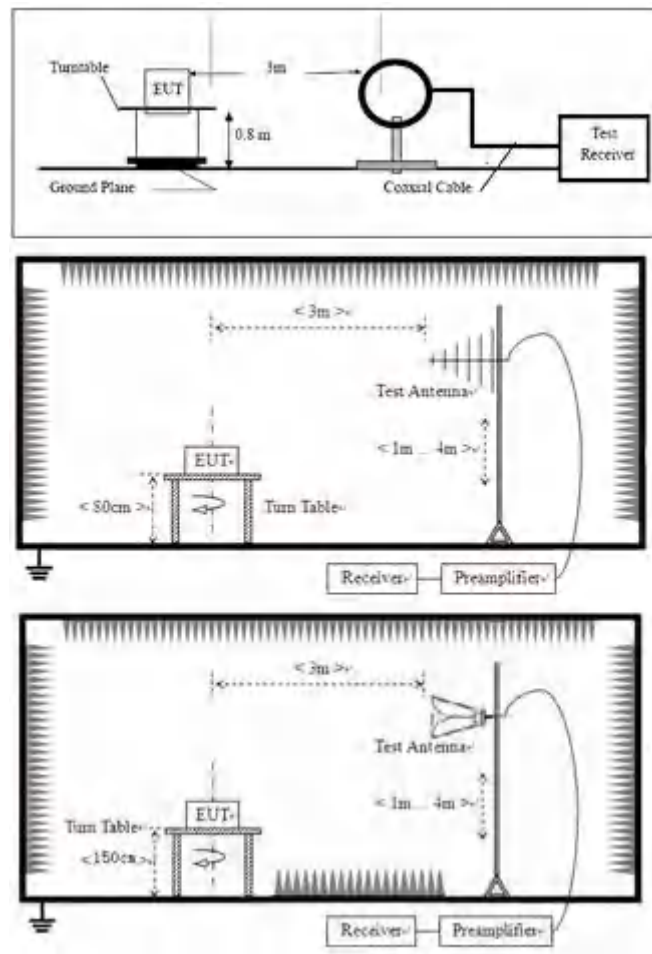
Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.10.5
Test Mode (Pre-Scan)	TX;TX Low channel;TX high channel
Test Mode (Final Test)	TX;TX Low channel;TX high channel
Tester	Sven
Temperature	25℃
Humidity	52%

14.1 LIMITS

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.

14.2 BLOCK DIAGRAM OF TEST SETUP



14.3 PROCEDURE

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

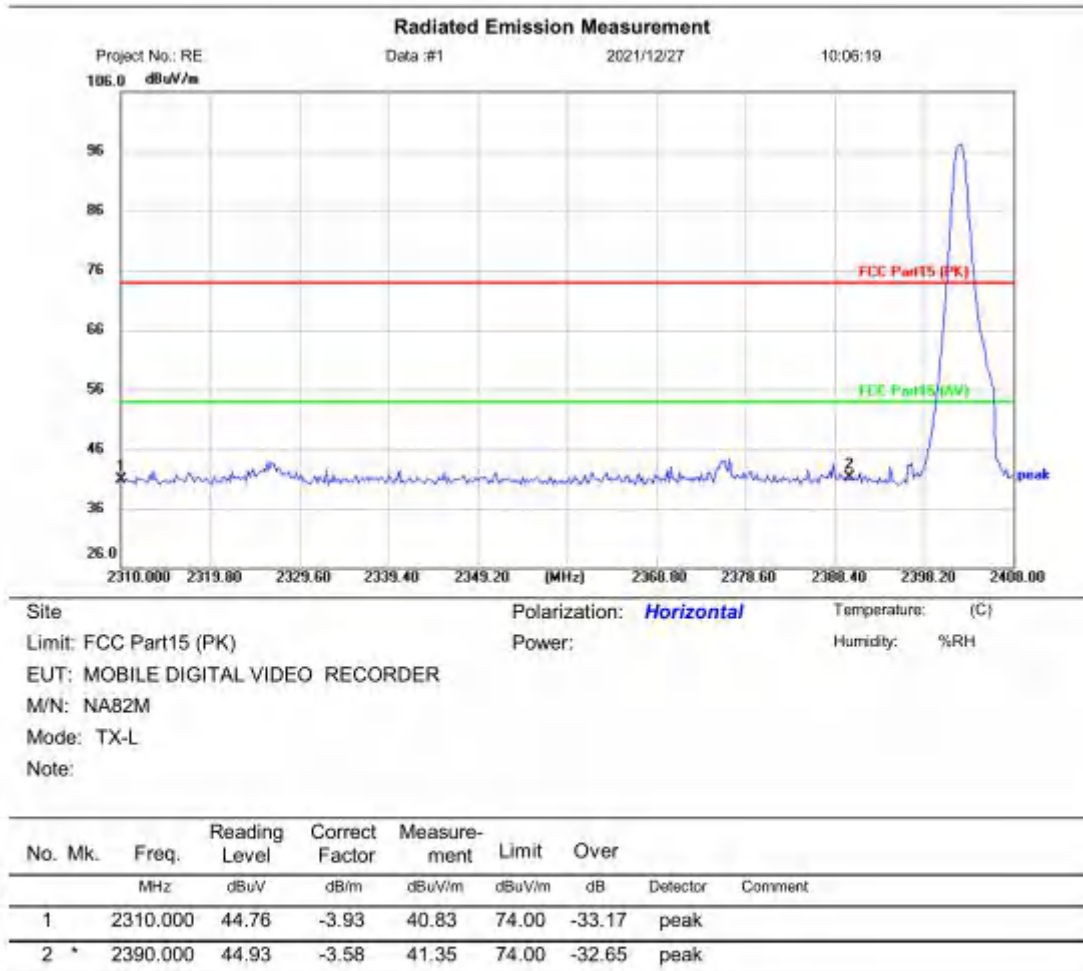
Remark 1: $\text{Level} = \text{Read Level} + \text{Cable Loss} + \text{Antenna Factor} - \text{Preamplifier Factor}$

Remark 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.

BlueAsia

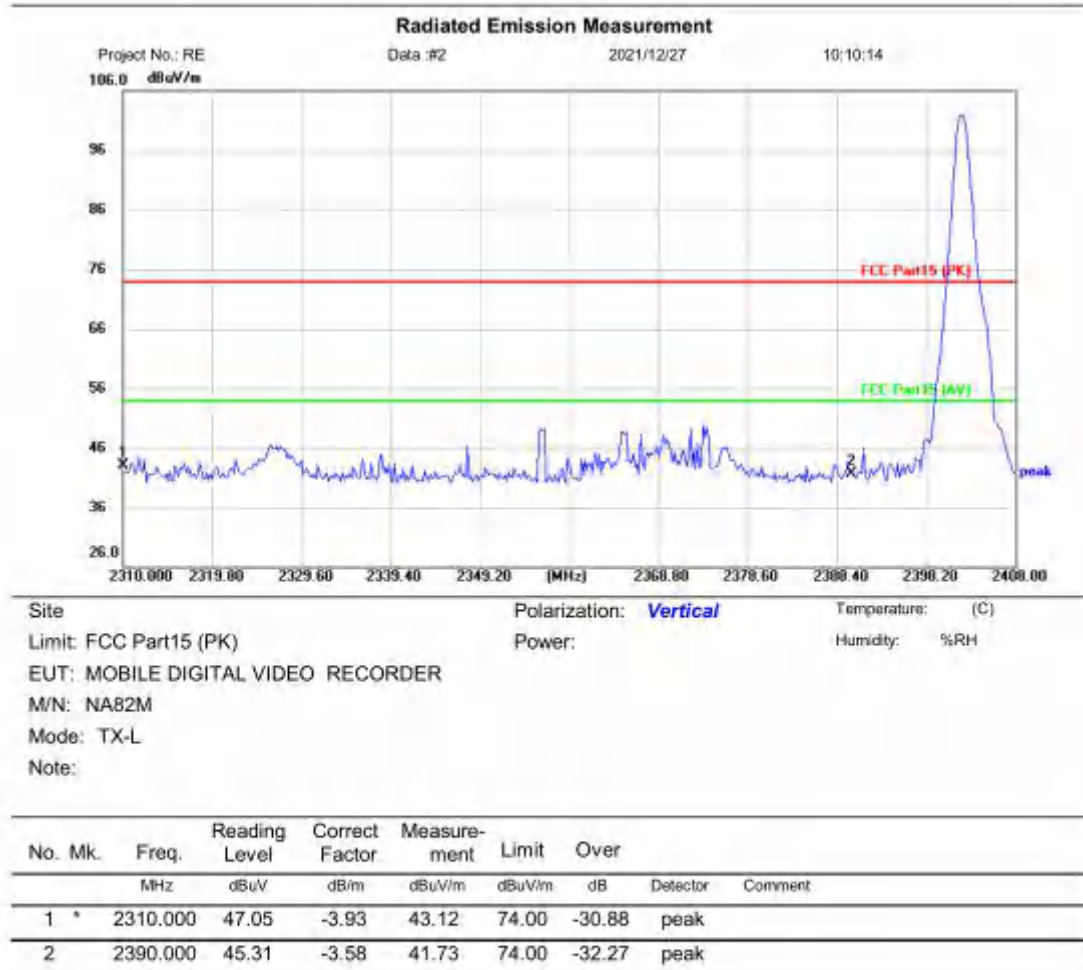
14.4 TEST DATA

[TestMode: TX Low channel]; [Polarity: Horizontal]



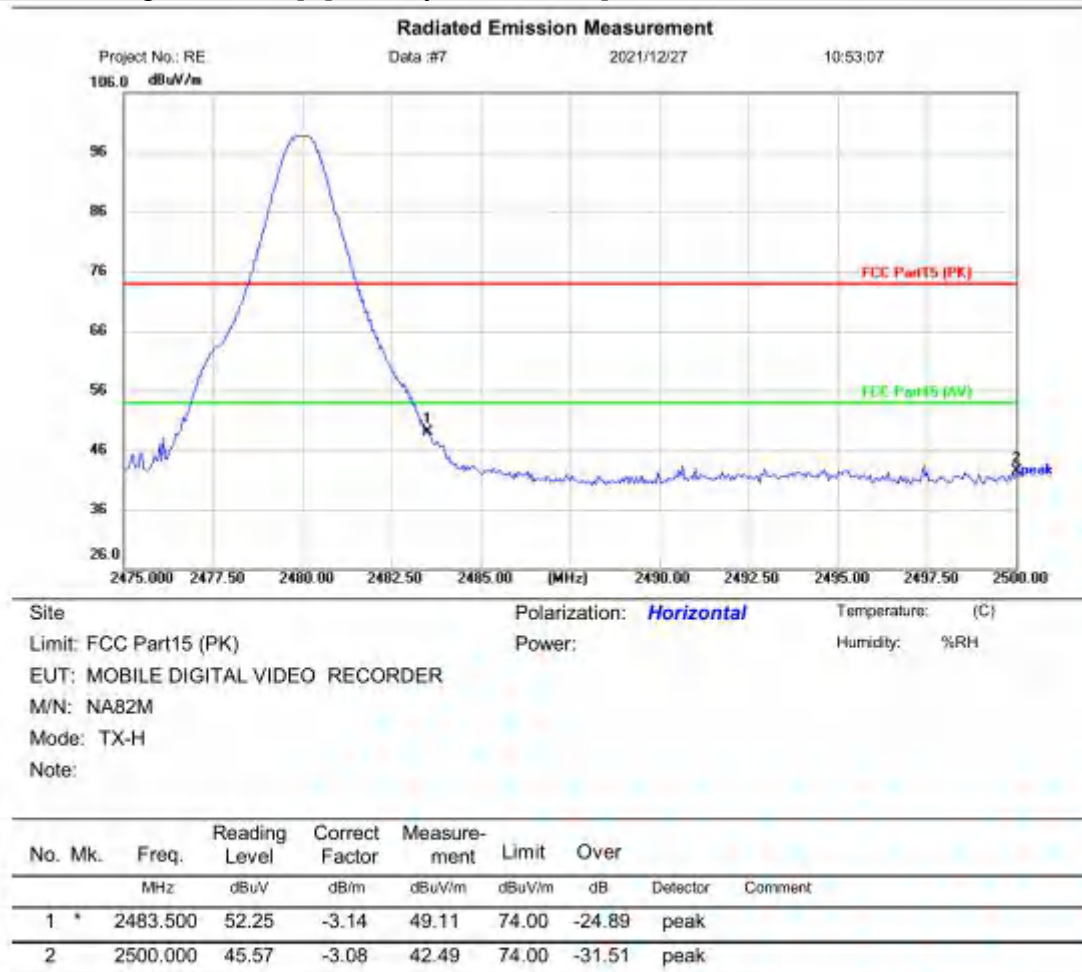
Test Result: Pass

[TestMode: TX Low channel]; [Polarity: Vertical]



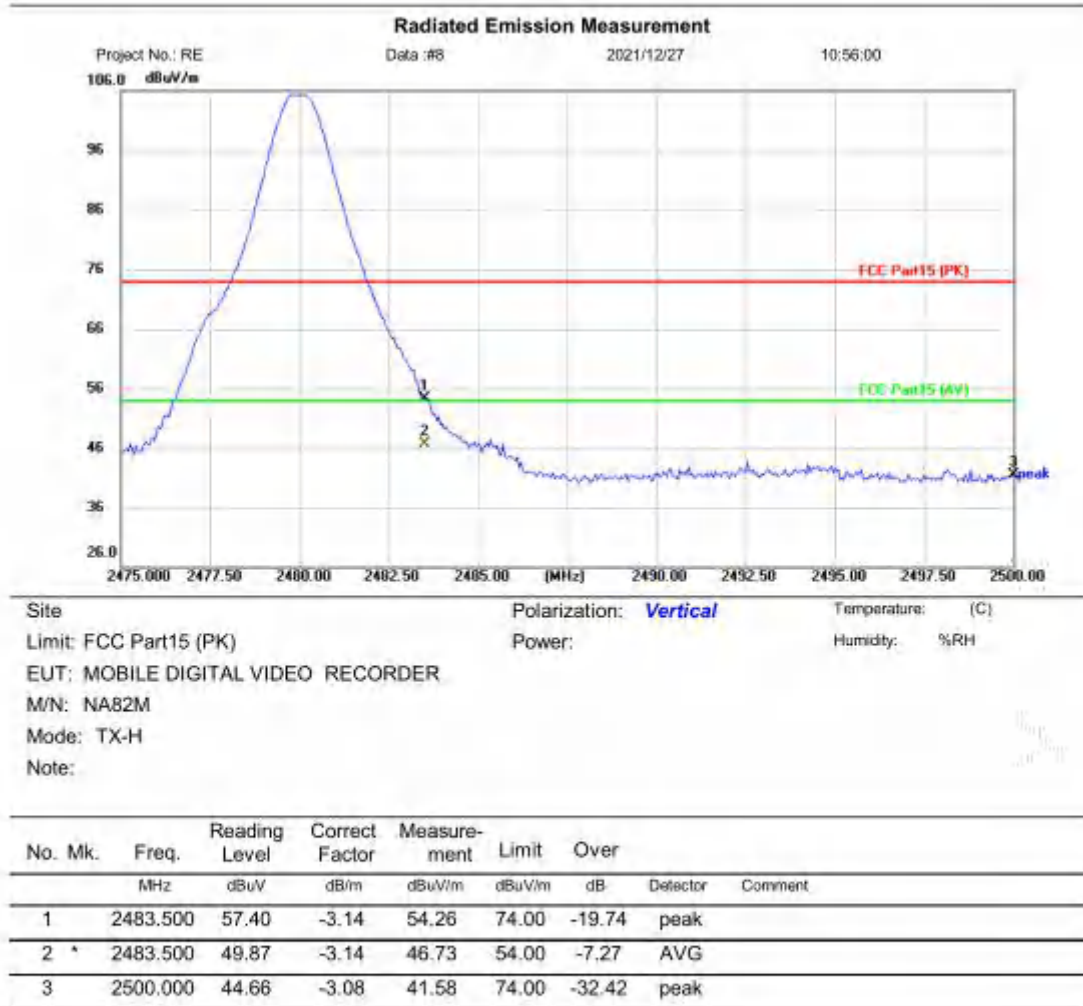
Test Result: Pass

[TestMode: TX high channel]; [Polarity: Horizontal]



Test Result: Pass

[TestMode: TX high channel]; [Polarity: Vertical]



Test Result: Pass

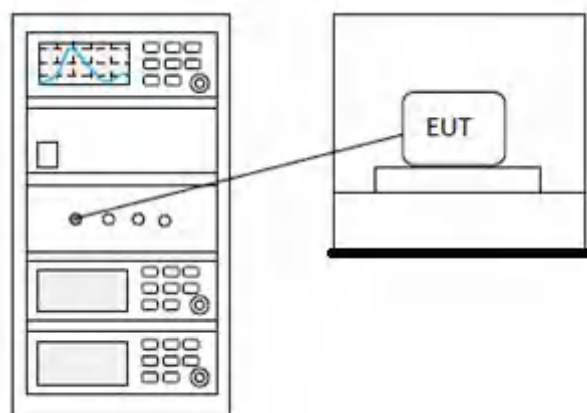
15 CONDUCTED BAND EDGES MEASUREMENT

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.8 & Section 11.13.3.2
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Sven
Temperature	25°C
Humidity	52%

15.1 LIMITS

Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. 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)).
---------------	--

15.2 BLOCK DIAGRAM OF TEST SETUP



15.3 TEST DATA**Pass: Please Refer To Appendix: For Details**

BlueAsia

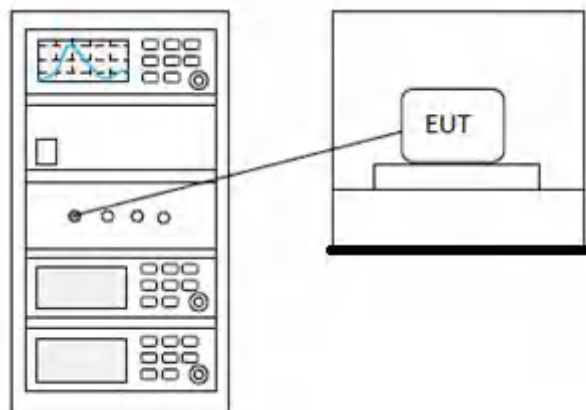
16 DWELL TIME

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.4
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Sven
Temperature	25°C
Humidity	52%

16.1 LIMITS

Frequency(MHz)	Limit
902-928	0.4S within a 20S period(20dB bandwidth<250kHz)
	0.4S within a 10S period(20dB bandwidth≥250kHz)
2400-2483.5	0.4S within a period of 0.4S multiplied by the number of hopping channels
5725-5850	0.4S within a 30S period

16.2 BLOCK DIAGRAM OF TEST SETUP



16.3 TEST DATA**Pass: Please Refer To Appendix: For Details**

BlueAsia

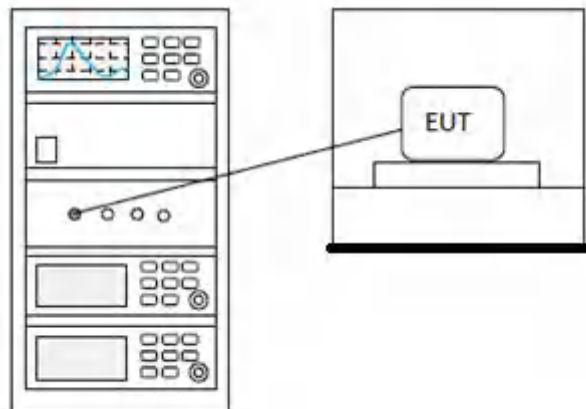
17 HOPPING CHANNEL NUMBER

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.3
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Sven
Temperature	25°C
Humidity	52%

17.1 LIMITS

Frequency range(MHz)	Number of hopping channels (minimum)
902-928	50 for 20dB bandwidth <250kHz
	25 for 20dB bandwidth ≥250kHz
2400-2483.5	15
5725-5850	75

17.2 BLOCK DIAGRAM OF TEST SETUP



17.3 TEST DATA

Pass: Please Refer To Appendix: For Details

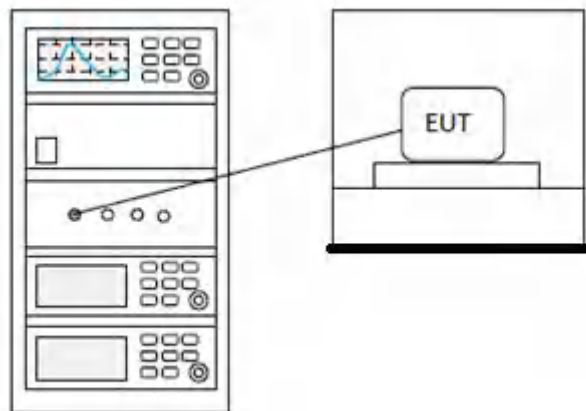
18 CARRIER FREQUENCIES SEPARATION

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.2
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Sven
Temperature	25°C
Humidity	52%

18.1 LIMITS

Limit:	2/3 of the 20dB bandwidth base on the transmission power is less than 0.125W
---------------	--

18.2 BLOCK DIAGRAM OF TEST SETUP



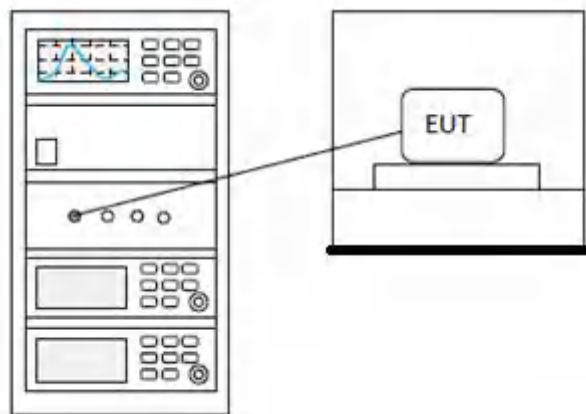
18.3 TEST DATA

Pass: Please Refer To Appendix: For Details
--

19 20DB BANDWIDTH

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.7
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Sven
Temperature	25°C
Humidity	52%

19.1 BLOCK DIAGRAM OF TEST SETUP



19.2 TEST DATA

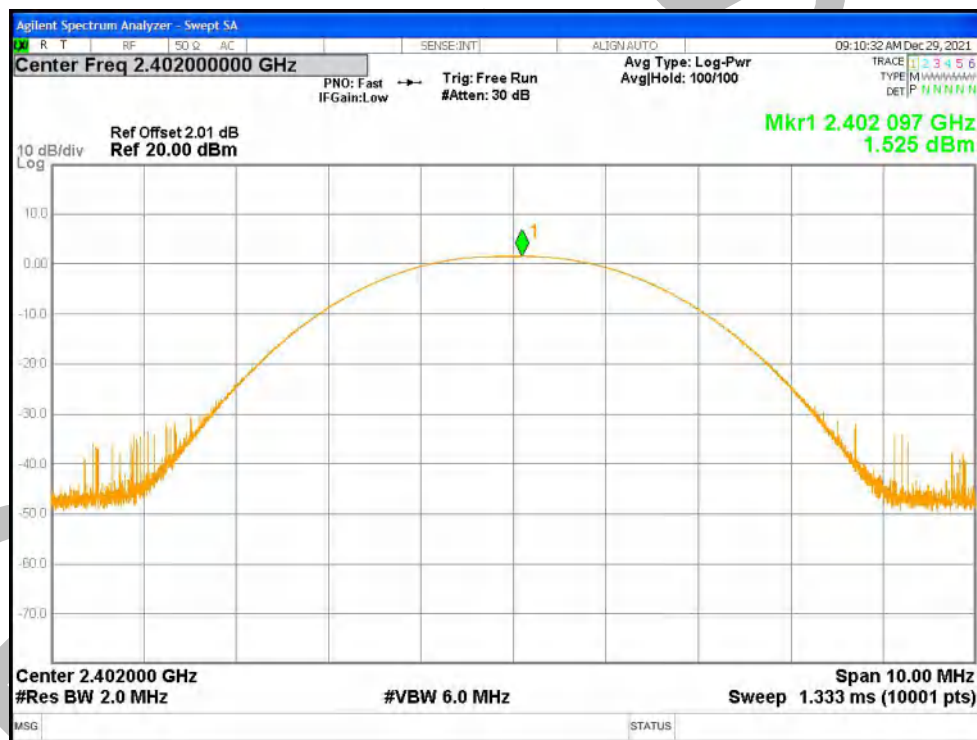
Pass: Please Refer To Appendix: For Details

20 APPENDIX

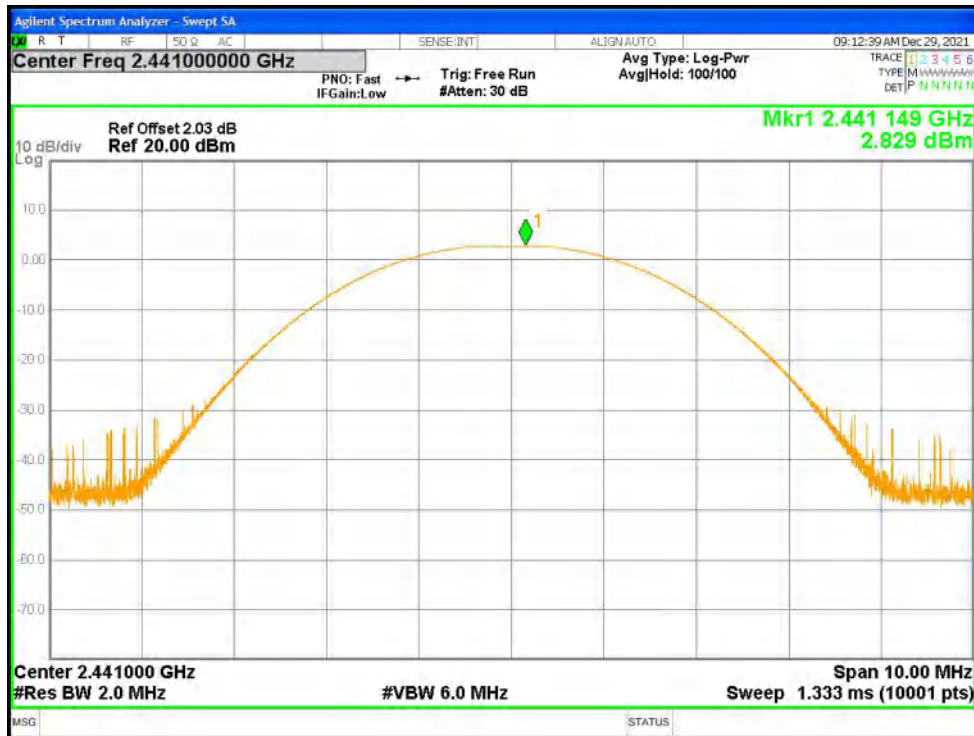
20.1 MAXIMUM CONDUCTED OUTPUT POWER

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Total Power (dBm)	Limit (dBm)	Verdict
NVNT	1-DH1	2402	Ant1	1.525	1.525	21	Pass
NVNT	1-DH1	2441	Ant1	2.829	2.829	21	Pass
NVNT	1-DH1	2480	Ant1	1.602	1.602	21	Pass
NVNT	2-DH1	2402	Ant1	-0.553	-0.553	21	Pass
NVNT	2-DH1	2441	Ant1	0.725	0.725	21	Pass
NVNT	2-DH1	2480	Ant1	-0.575	-0.575	21	Pass
NVNT	3-DH1	2402	Ant1	-0.048	-0.048	21	Pass
NVNT	3-DH1	2441	Ant1	1.27	1.27	21	Pass
NVNT	3-DH1	2480	Ant1	-0.025	-0.025	21	Pass

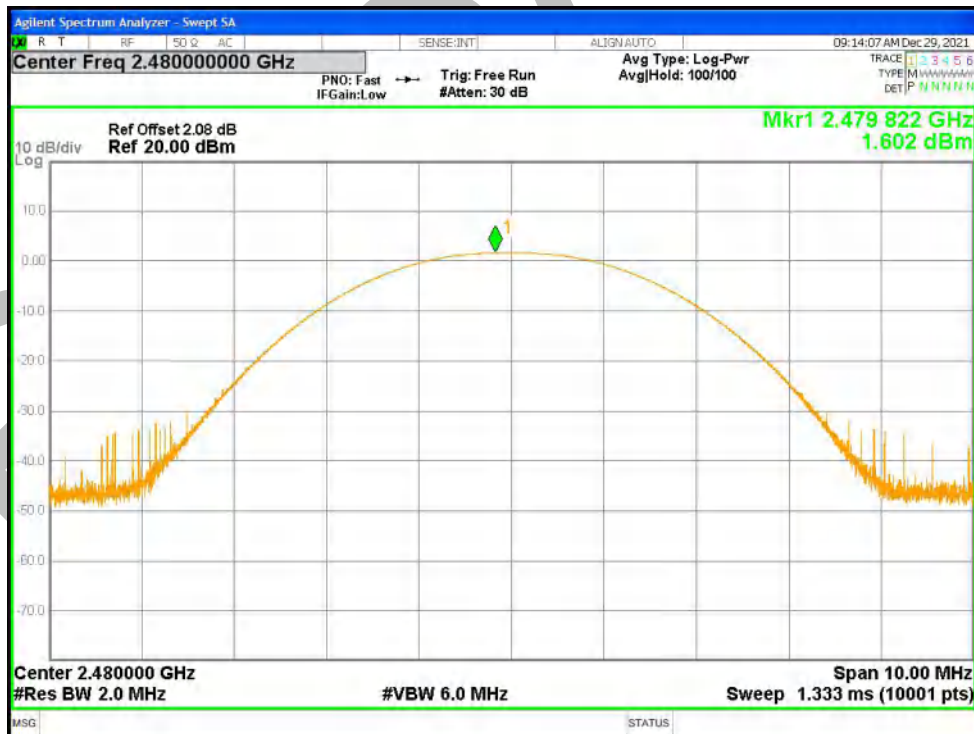
Power NVNT 1-DH1 2402MHz Ant1



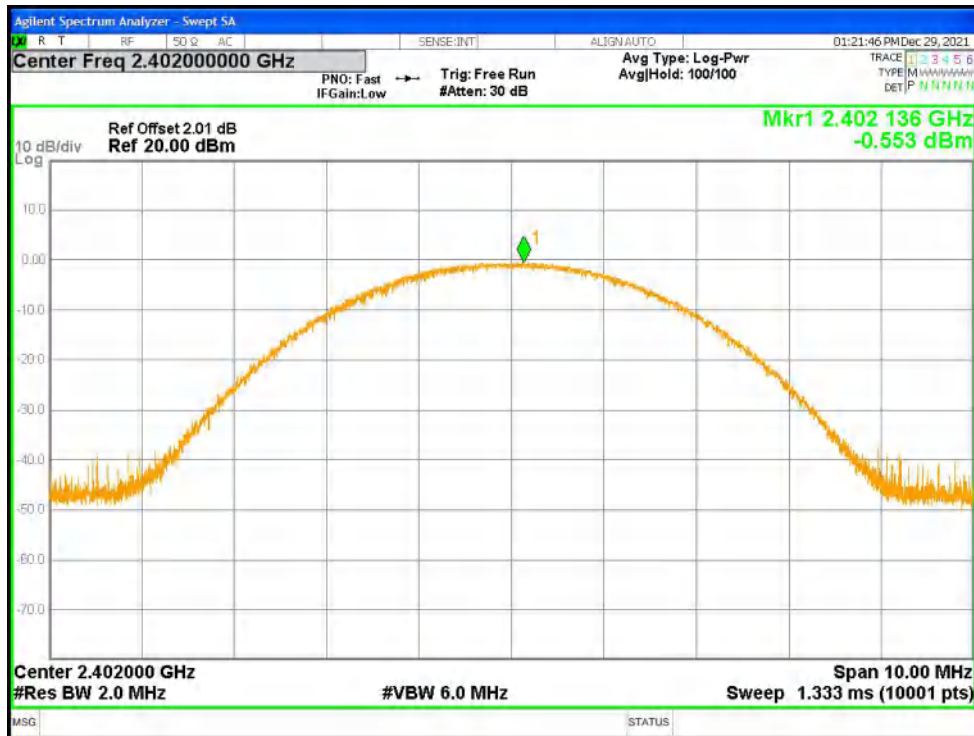
Power NVNT 1-DH1 2441MHz Ant1



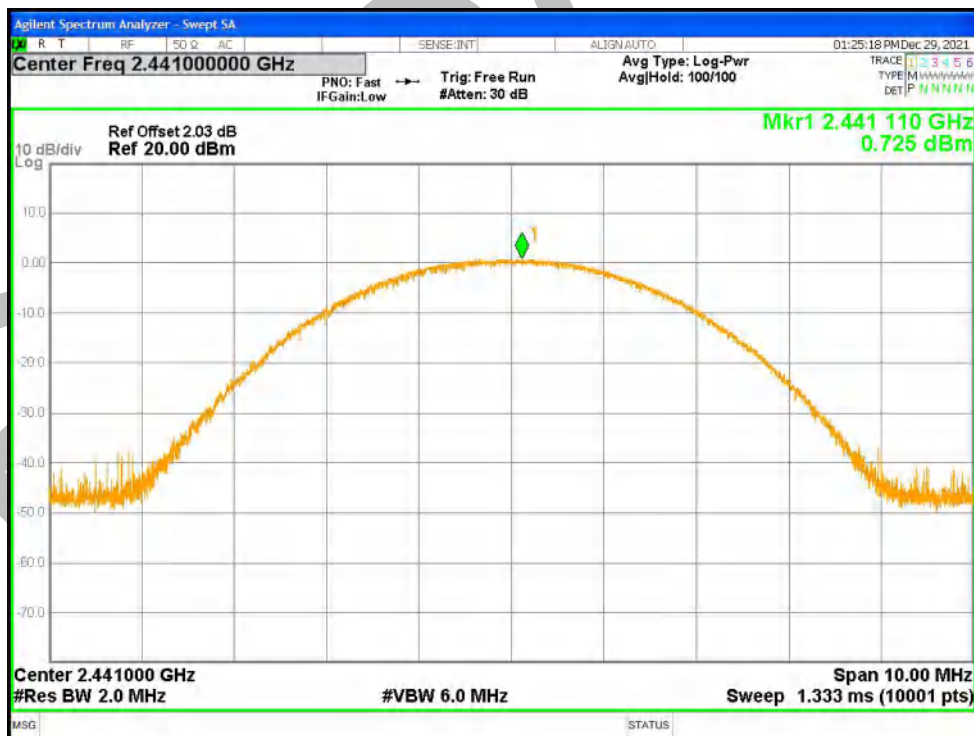
Power NVNT 1-DH1 2480MHz Ant1



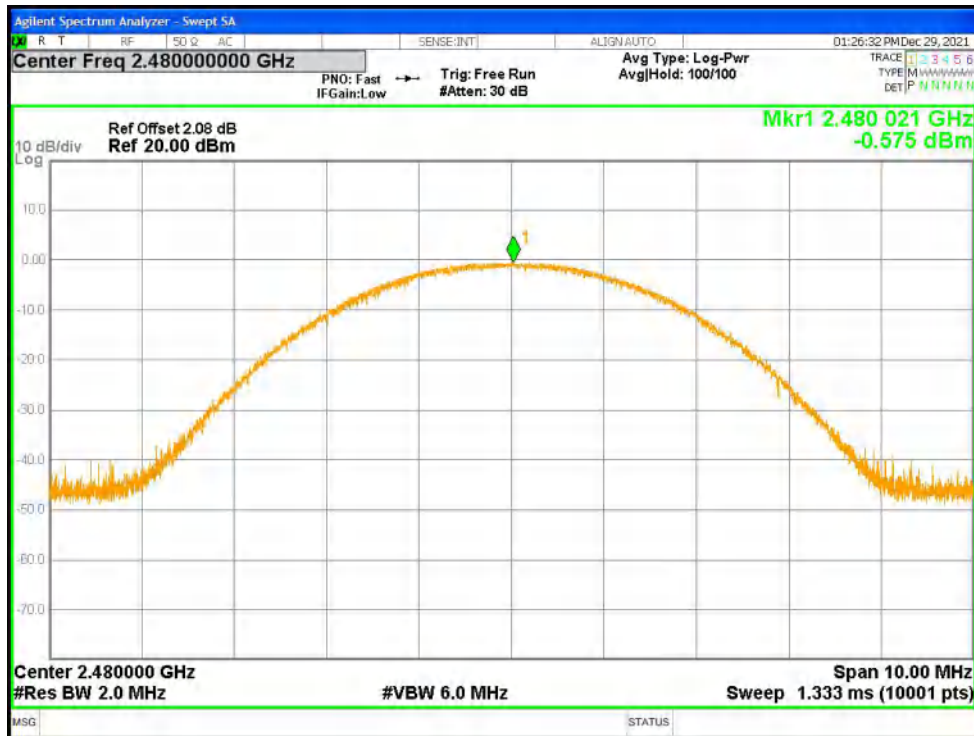
Power NVNT 2-DH1 2402MHz Ant1



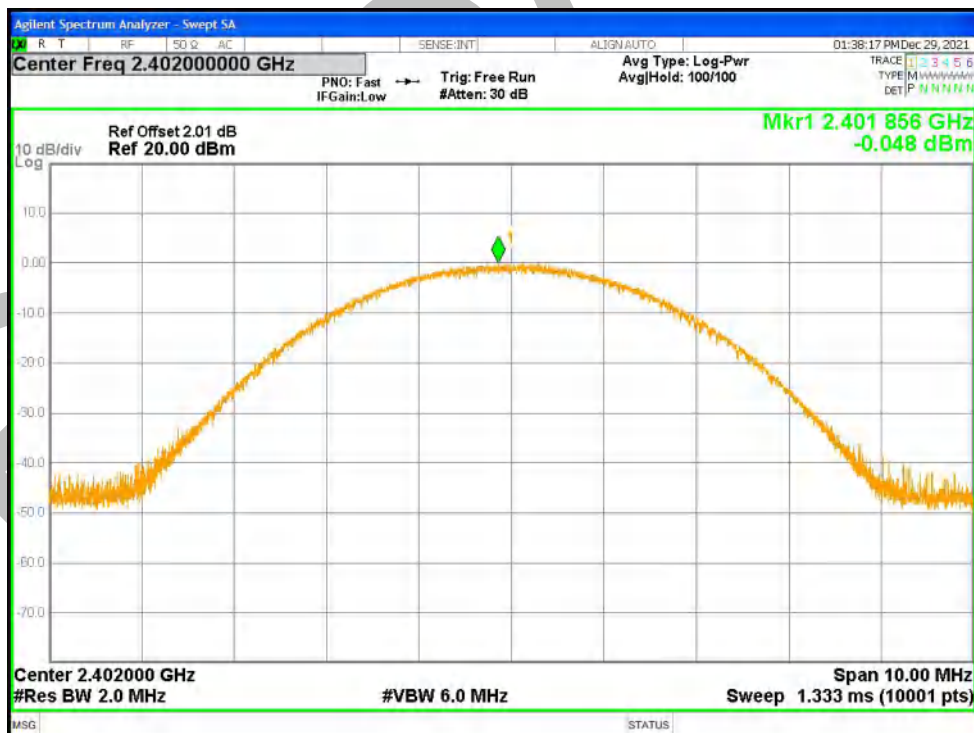
Power NVNT 2-DH1 2441MHz Ant1



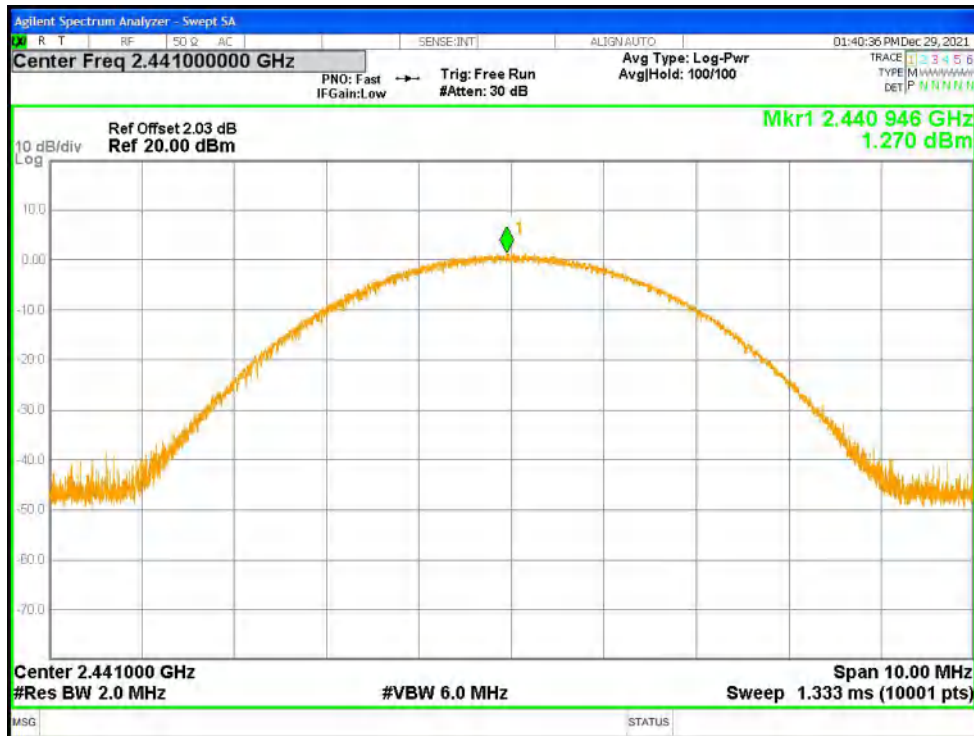
Power NVNT 2-DH1 2480MHz Ant1



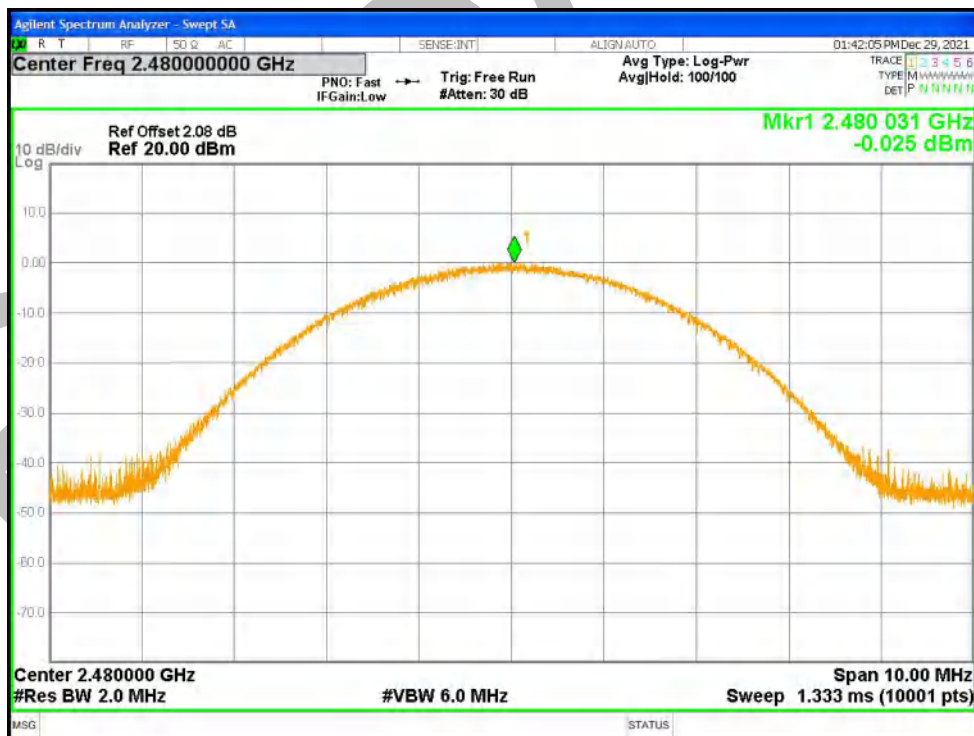
Power NVNT 3-DH1 2402MHz Ant1



Power NVNT 3-DH1 2441MHz Ant1



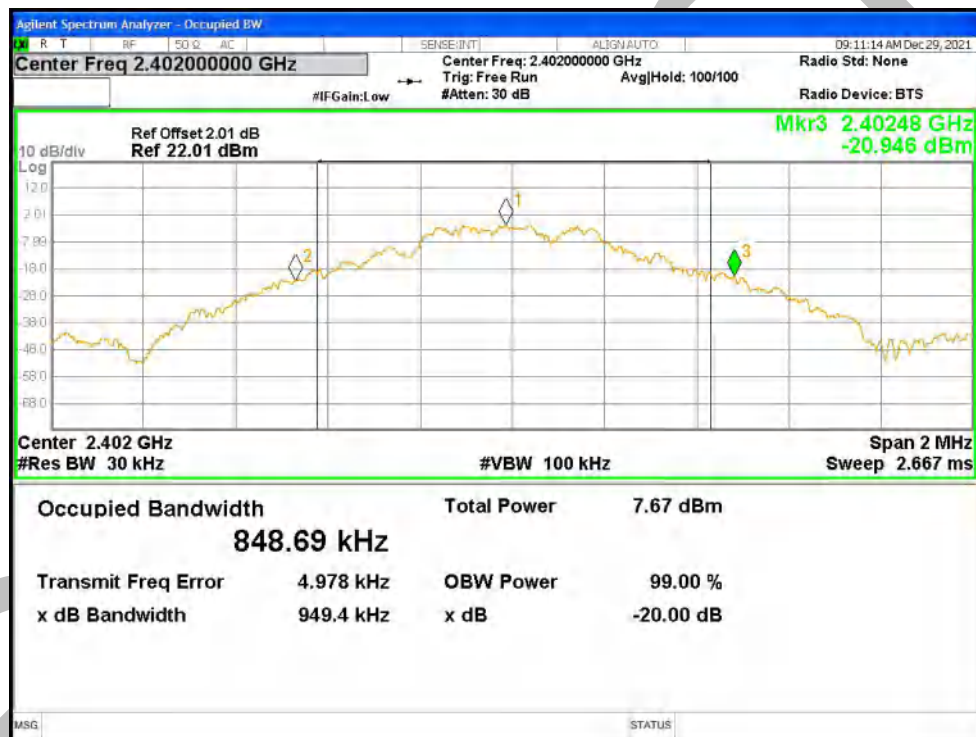
Power NVNT 3-DH1 2480MHz Ant1



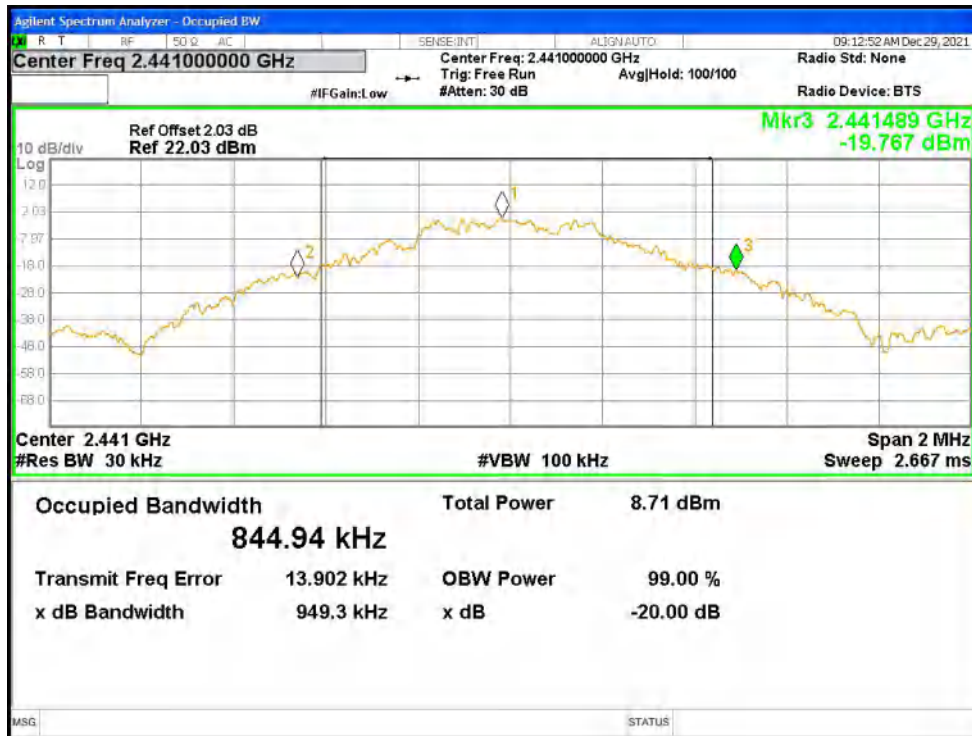
20.2 -20DB BANDWIDTH

Condition	Mode	Frequency (MHz)	Antenna	-20 dB Bandwidth (MHz)	Limit -20 dB Bandwidth (MHz)	Verdict
NVNT	1-DH1	2402	Ant1	0.949	0	Pass
NVNT	1-DH1	2441	Ant1	0.949	0	Pass
NVNT	1-DH1	2480	Ant1	0.945	0	Pass
NVNT	2-DH1	2402	Ant1	1.339	0	Pass
NVNT	2-DH1	2441	Ant1	1.342	0	Pass
NVNT	2-DH1	2480	Ant1	1.319	0	Pass
NVNT	3-DH1	2402	Ant1	1.296	0	Pass
NVNT	3-DH1	2441	Ant1	1.293	0	Pass
NVNT	3-DH1	2480	Ant1	1.295	0	Pass

-20dB Bandwidth NVNT 1-DH1 2402MHz Ant1



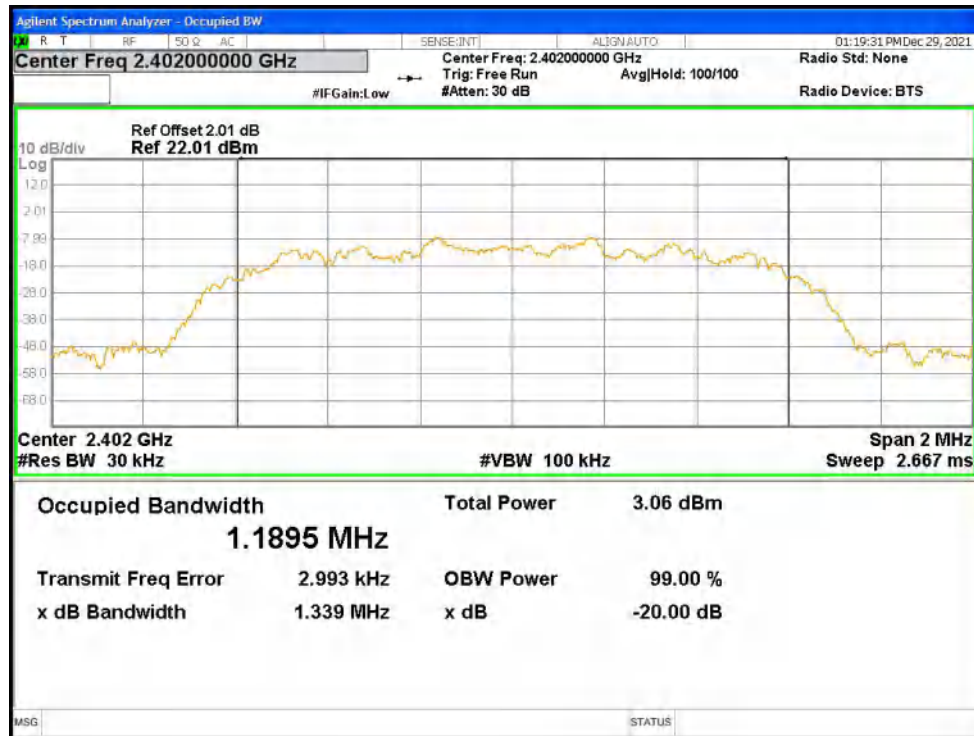
-20dB Bandwidth NVNT 1-DH1 2441MHz Ant1



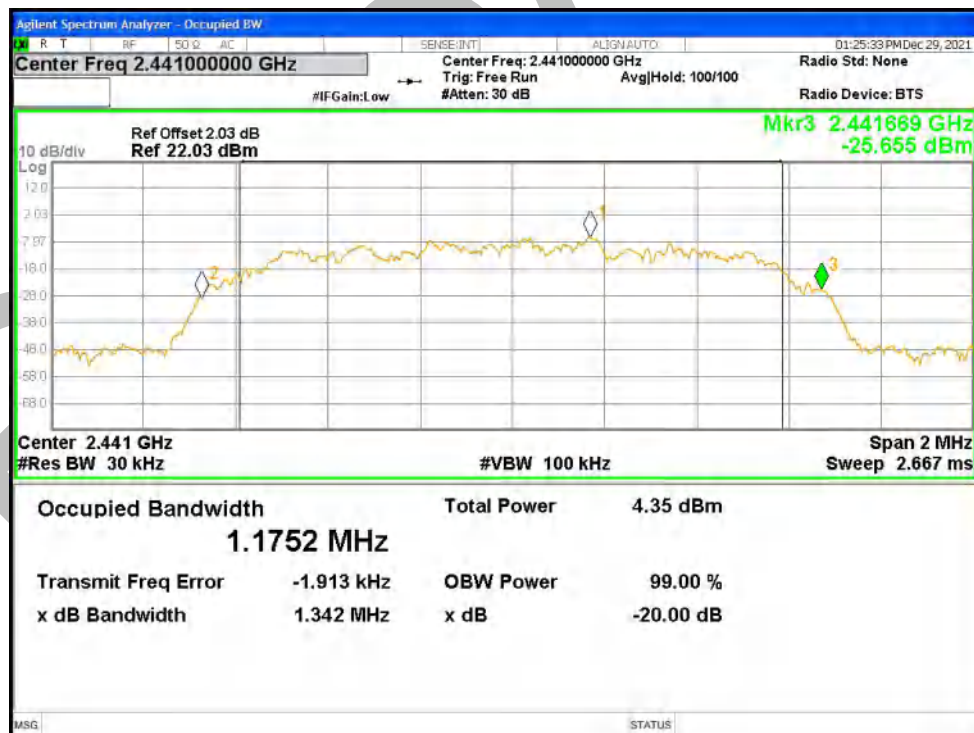
-20dB Bandwidth NVNT 1-DH1 2480MHz Ant1



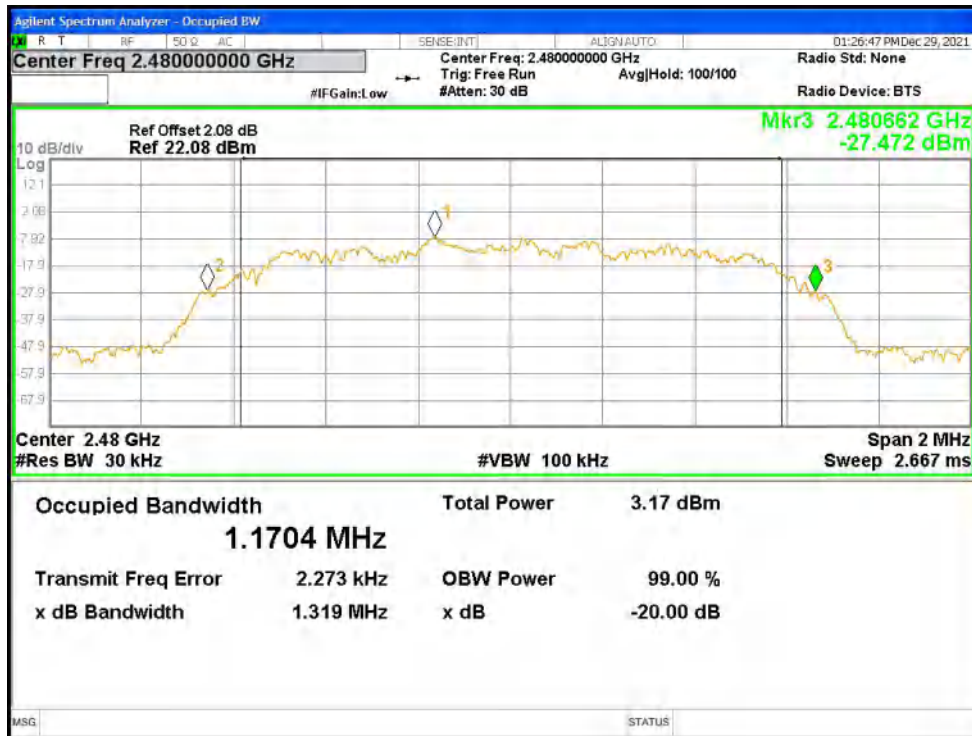
-20dB Bandwidth NVNT 2-DH1 2402MHz Ant1



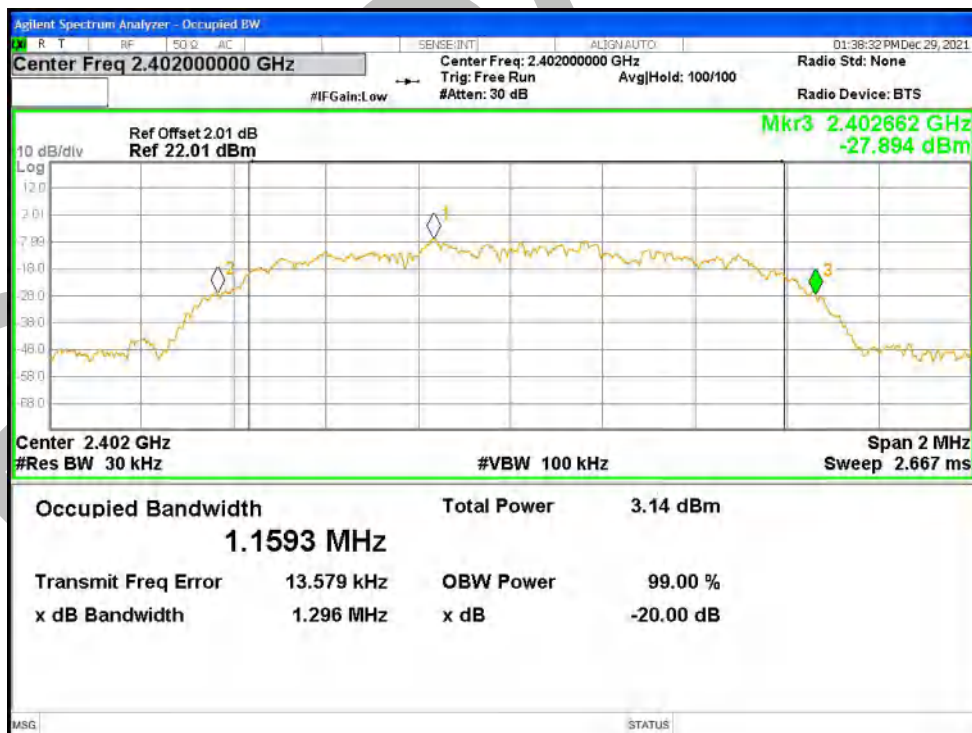
-20dB Bandwidth NVNT 2-DH1 2441MHz Ant1



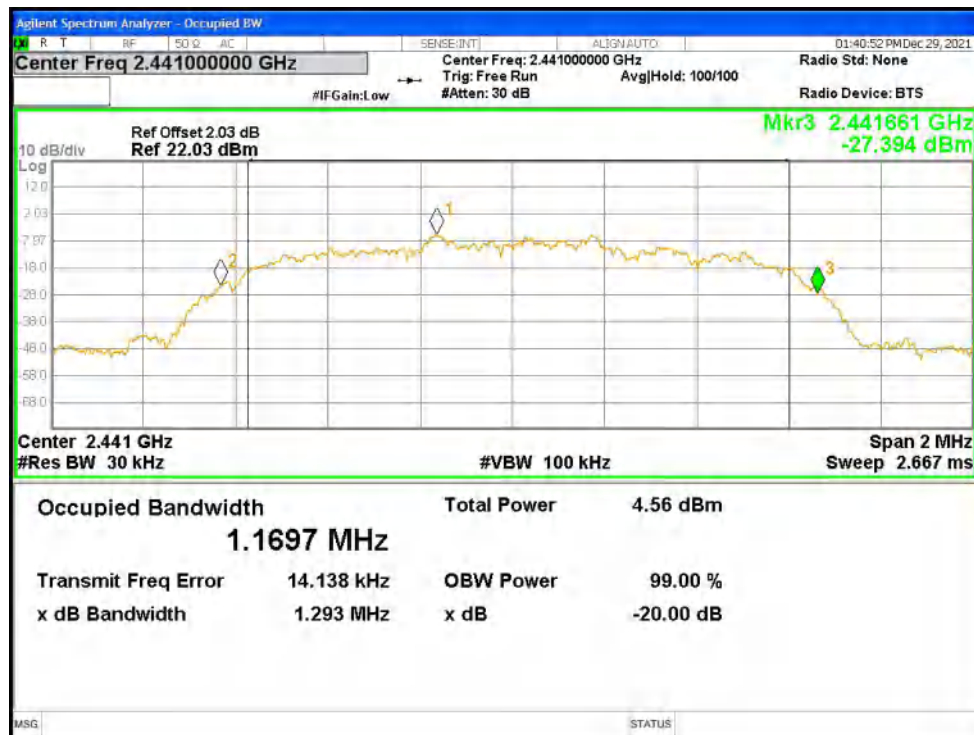
-20dB Bandwidth NVNT 2-DH1 2480MHz Ant1



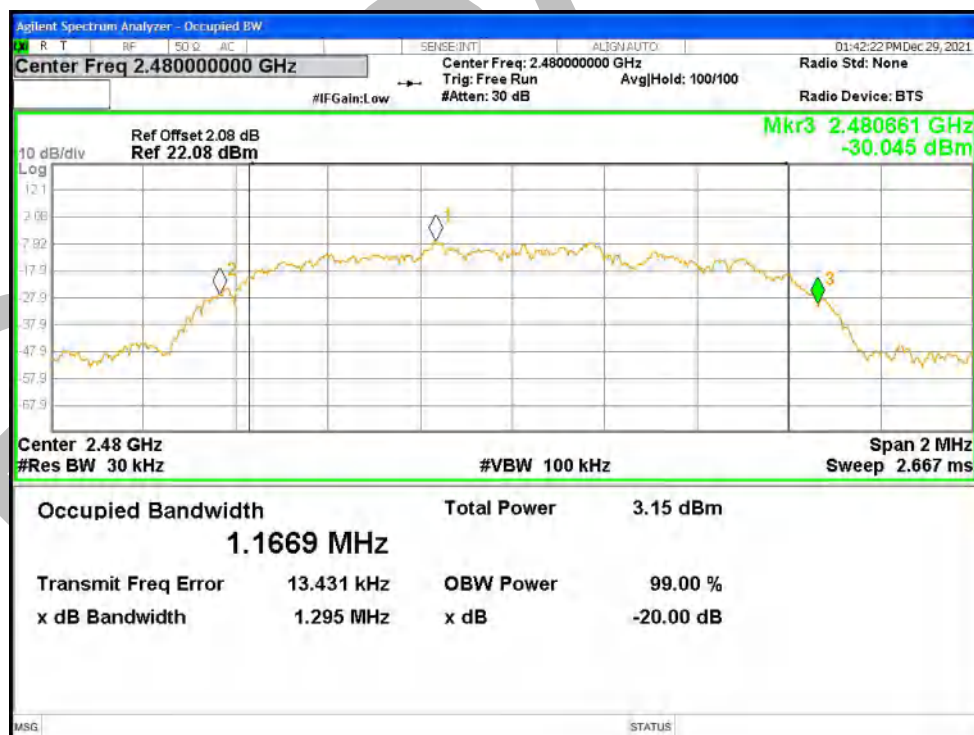
-20dB Bandwidth NVNT 3-DH1 2402MHz Ant1



-20dB Bandwidth NVNT 3-DH1 2441MHz Ant1



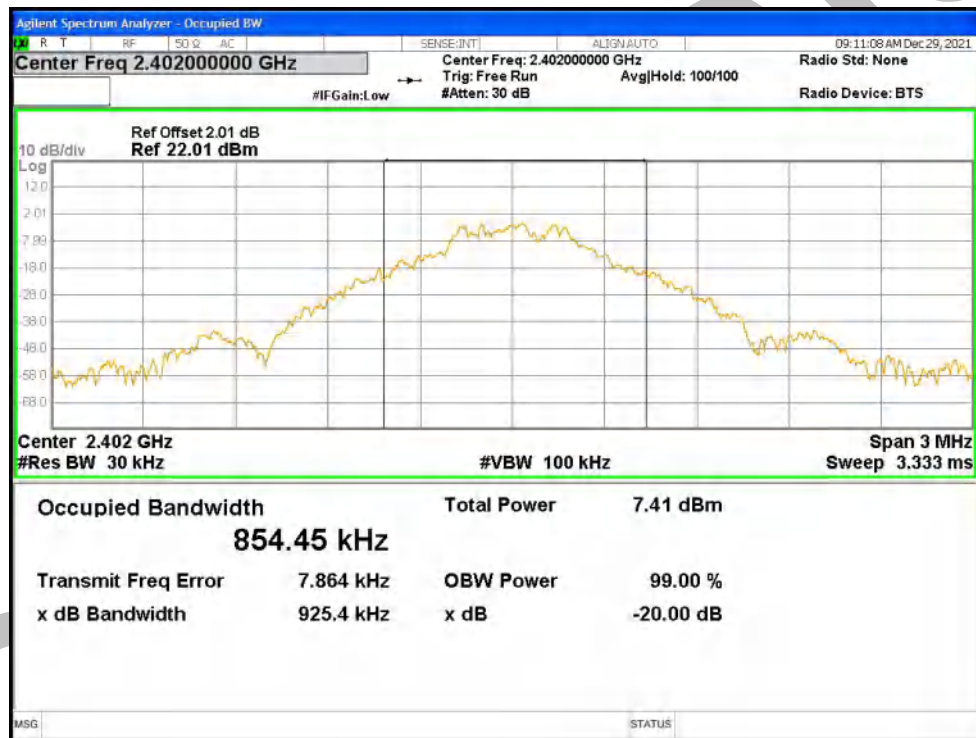
-20dB Bandwidth NVNT 3-DH1 2480MHz Ant1



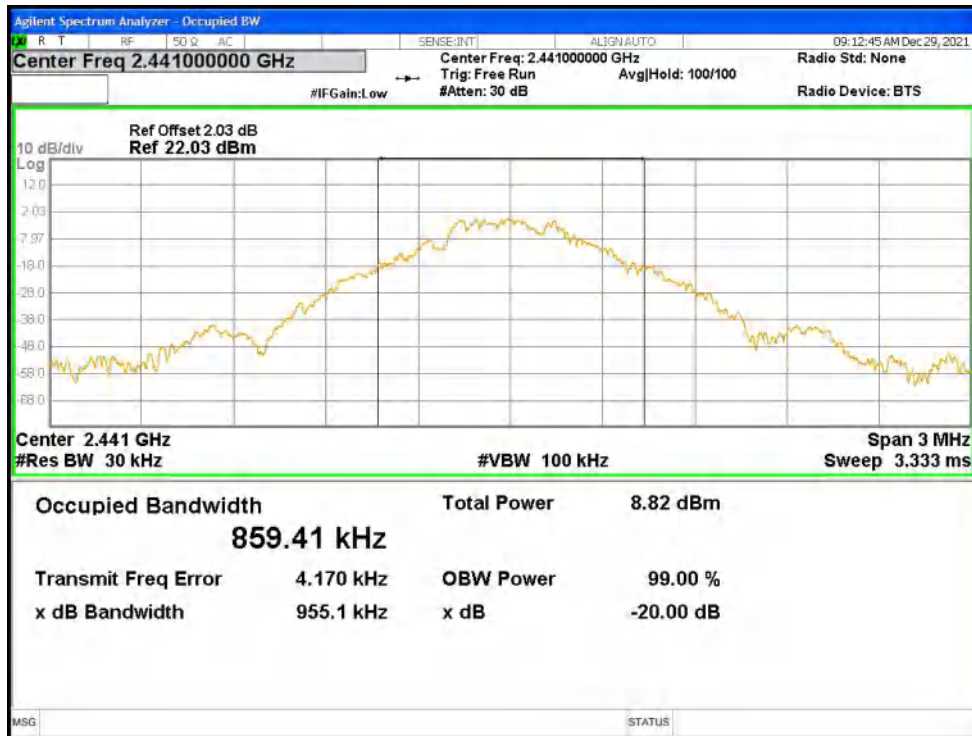
20.3 OCCUPIED CHANNEL BANDWIDTH

Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
NVNT	1-DH1	2402	Ant1	0.8544479412
NVNT	1-DH1	2441	Ant1	0.8594089869
NVNT	1-DH1	2480	Ant1	0.8732674728
NVNT	2-DH1	2402	Ant1	1.191003282
NVNT	2-DH1	2441	Ant1	1.181691959
NVNT	2-DH1	2480	Ant1	1.183209916
NVNT	3-DH1	2402	Ant1	1.155108419
NVNT	3-DH1	2441	Ant1	1.164405671
NVNT	3-DH1	2480	Ant1	1.167331591

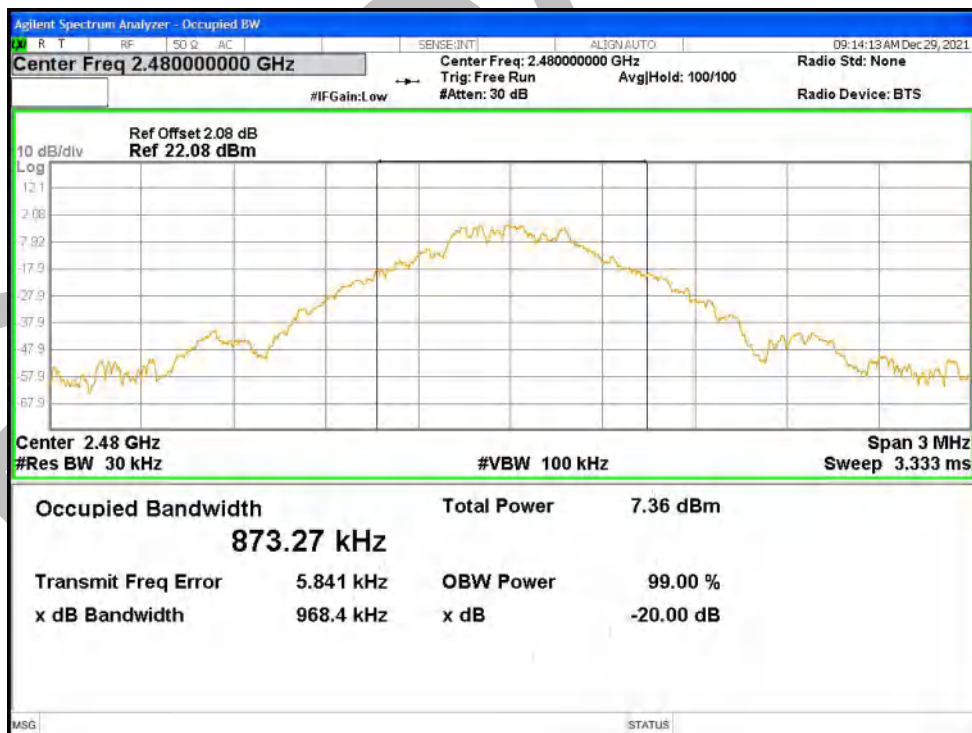
OBW NVNT 1-DH1 2402MHz Ant1



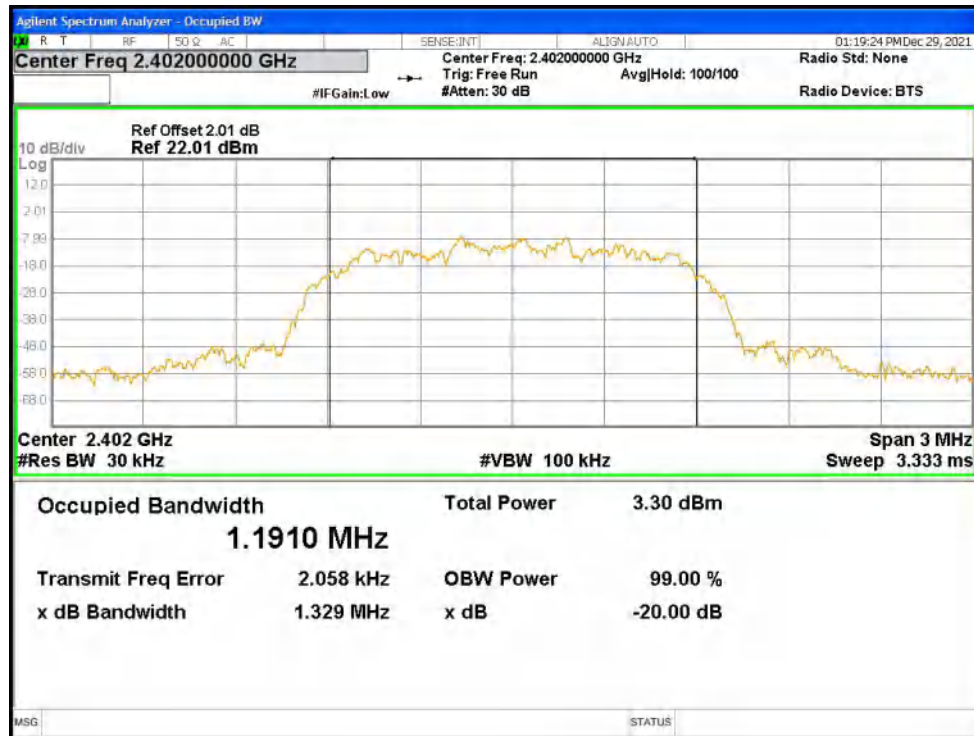
OBW NVNT 1-DH1 2441MHz Ant1



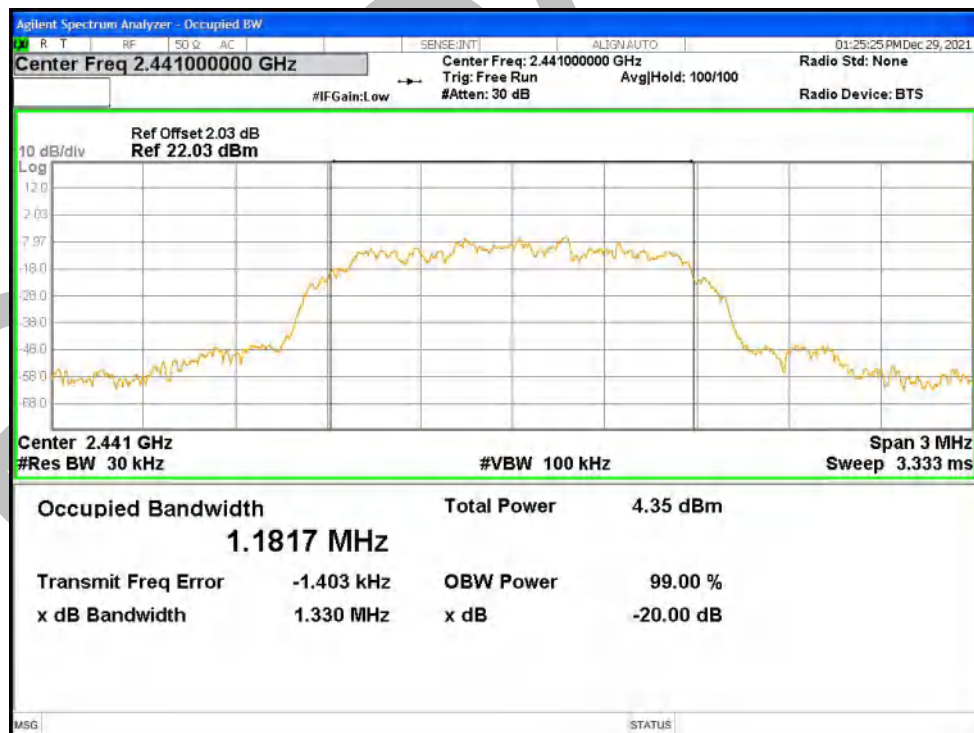
OBW NVNT 1-DH1 2480MHz Ant1



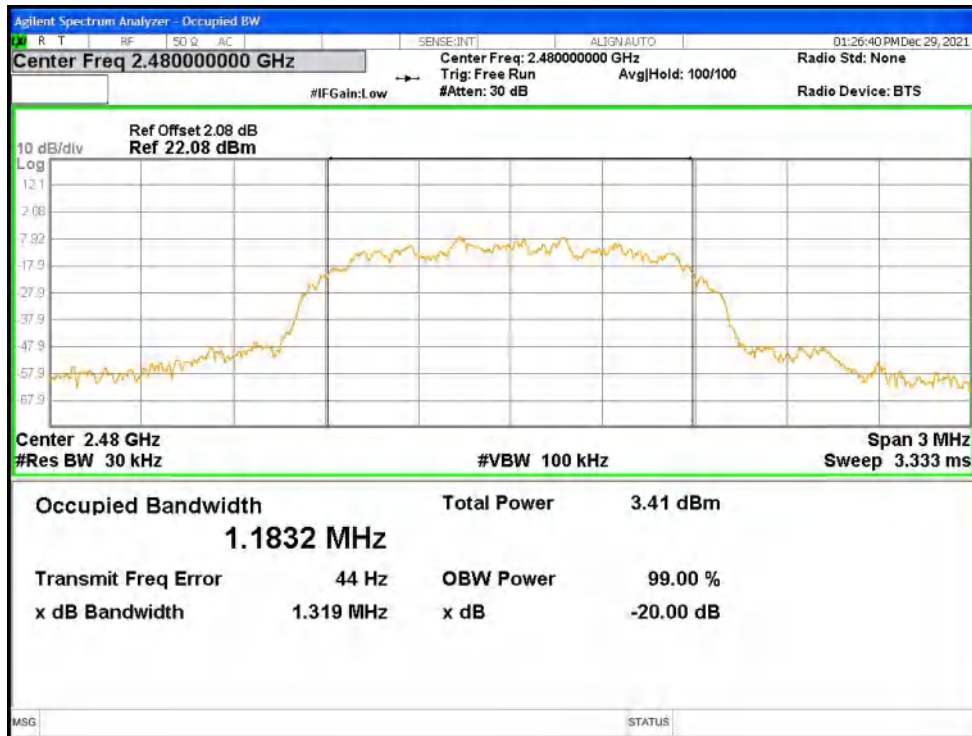
OBW NVNT 2-DH1 2402MHz Ant1



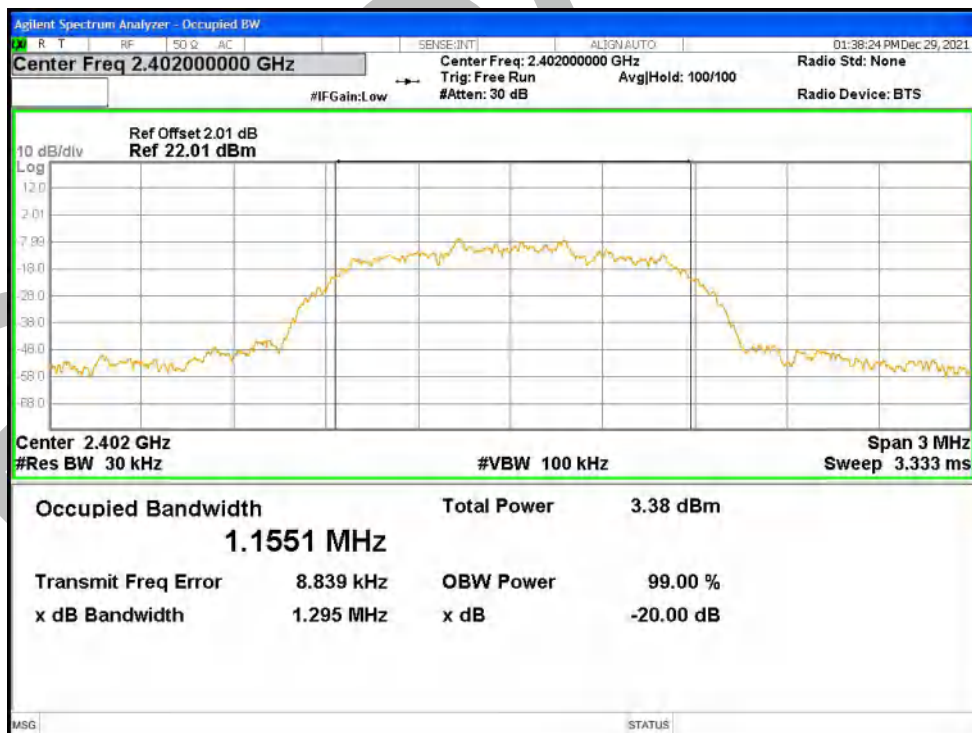
OBW NVNT 2-DH1 2441MHz Ant1



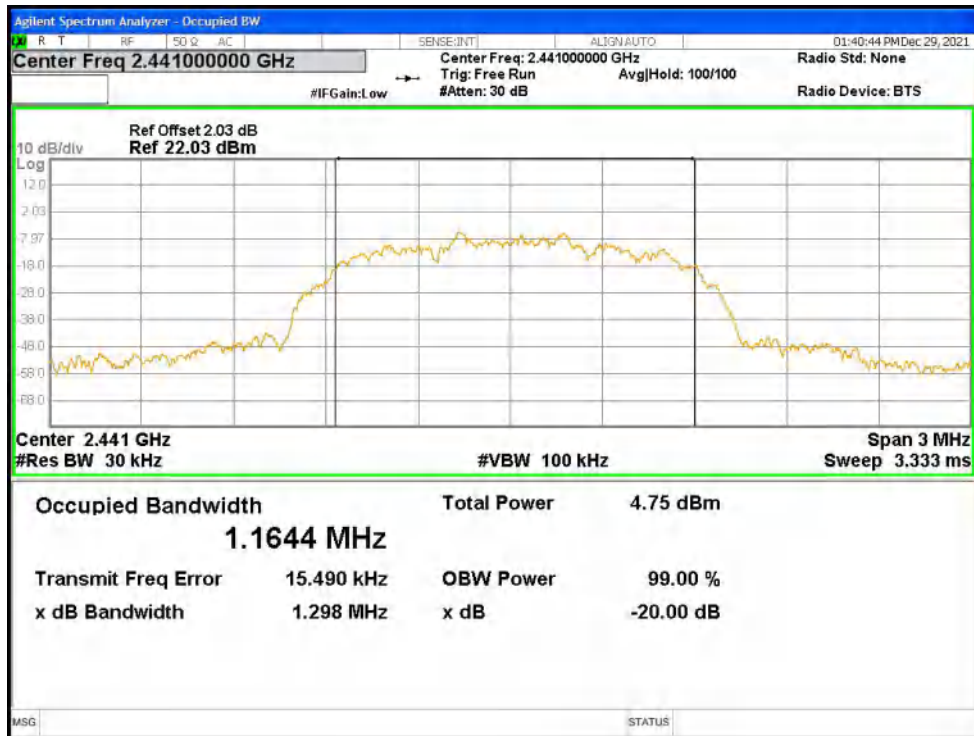
OBW NVNT 2-DH1 2480MHz Ant1



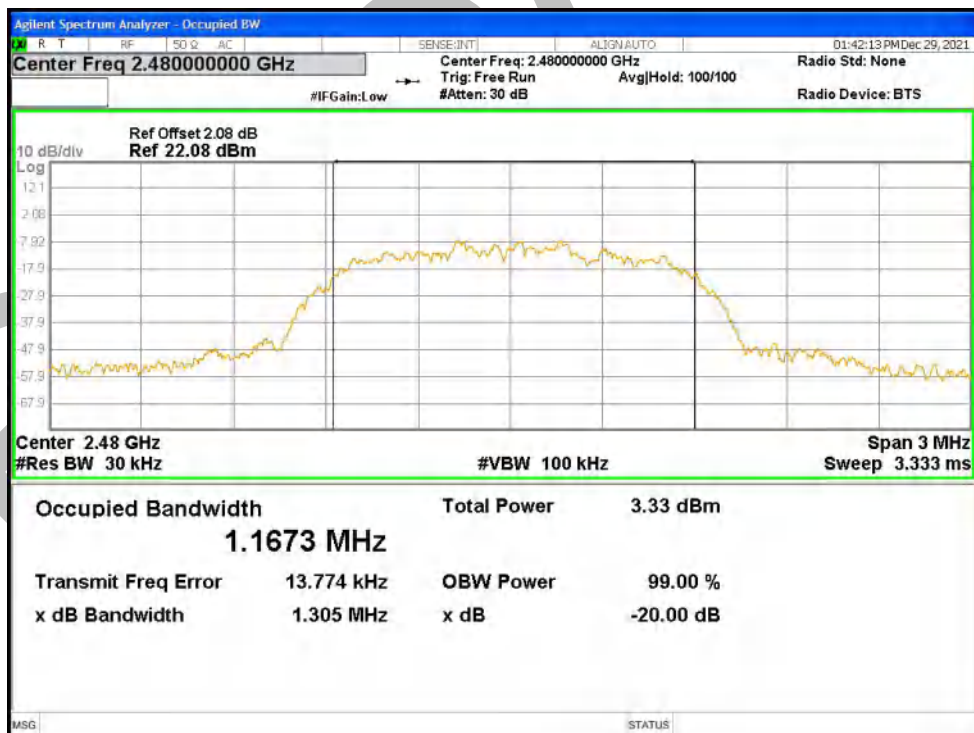
OBW NVNT 3-DH1 2402MHz Ant1



OBW NVNT 3-DH1 2441MHz Ant1



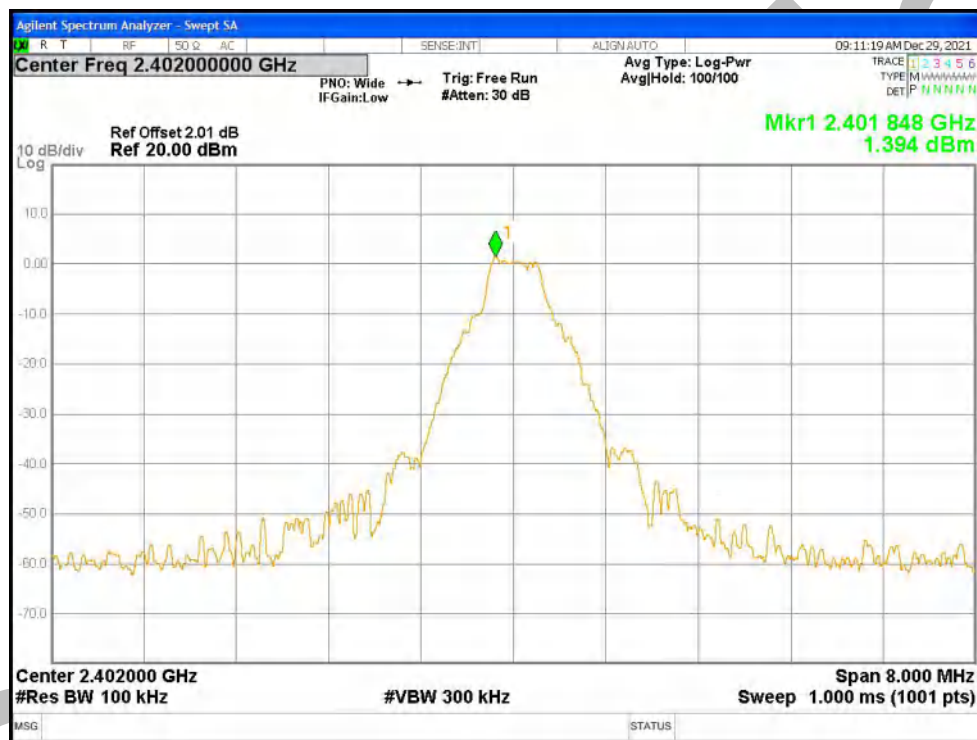
OBW NVNT 3-DH1 2480MHz Ant1



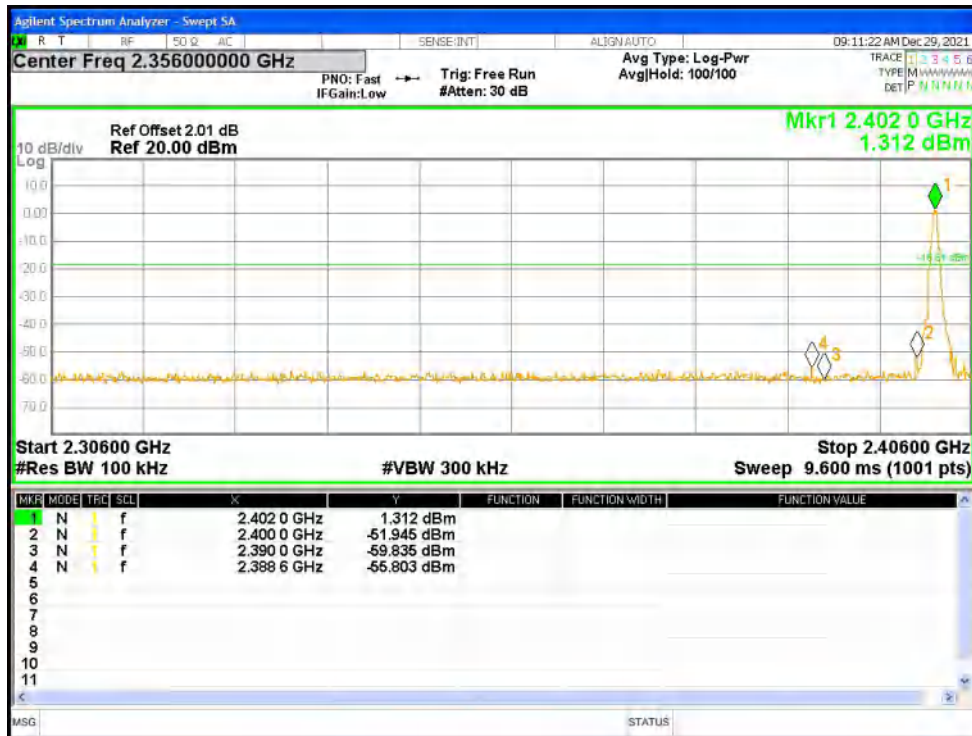
20.4 BAND EDGE

Condition	Mode	Frequency (MHz)	Antenna	Hopping Mode	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	1-DH1	2402	Ant1	No-Hopping	-57.19	-20	Pass
NVNT	1-DH1	2480	Ant1	No-Hopping	-57.45	-20	Pass
NVNT	2-DH1	2402	Ant1	No-Hopping	-51.32	-20	Pass
NVNT	2-DH1	2480	Ant1	No-Hopping	-52.82	-20	Pass
NVNT	3-DH1	2402	Ant1	No-Hopping	-52.84	-20	Pass
NVNT	3-DH1	2480	Ant1	No-Hopping	-51.14	-20	Pass

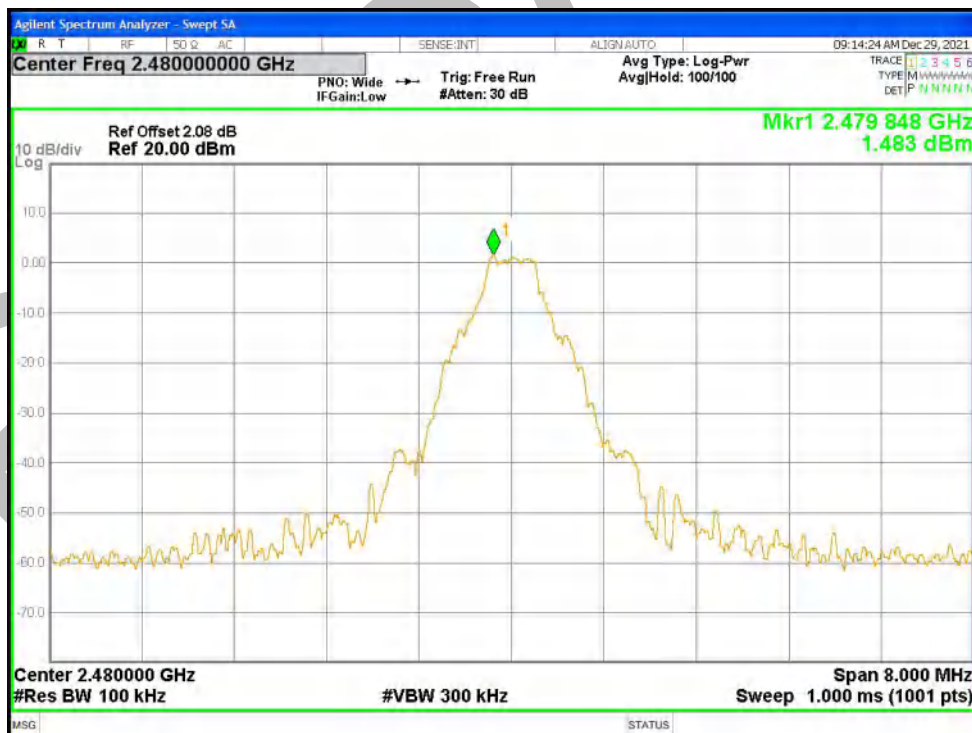
Band Edge NVNT 1-DH1 2402MHz Ant1 No-Hopping Ref



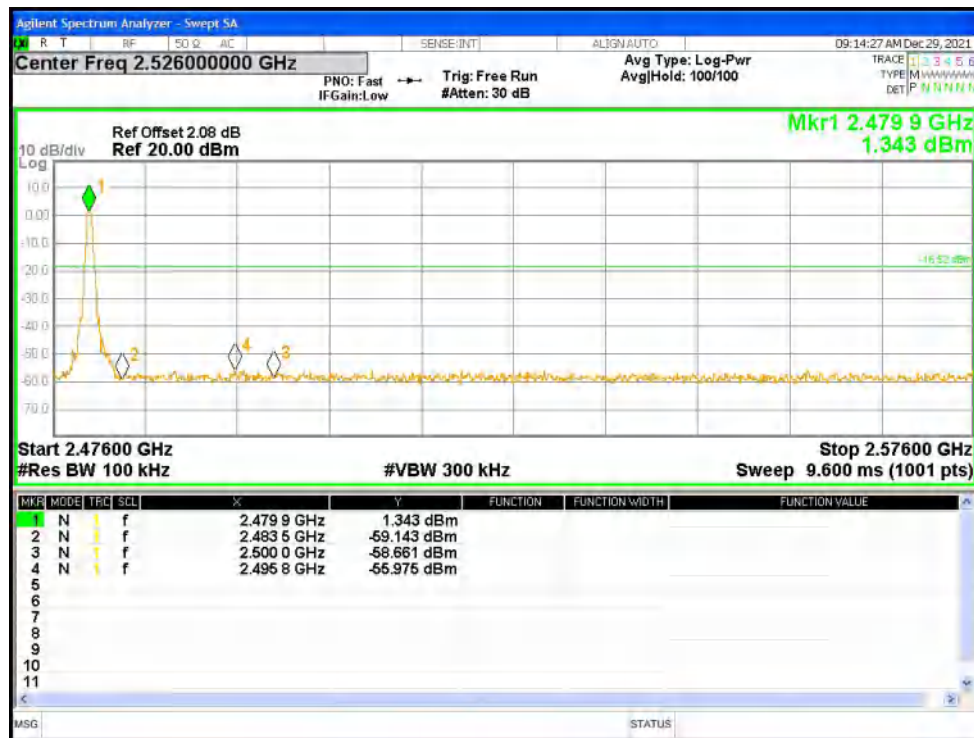
Band Edge NVNT 1-DH1 2402MHz Ant1 No-Hopping Emission



Band Edge NVNT 1-DH1 2480MHz Ant1 No-Hopping Ref



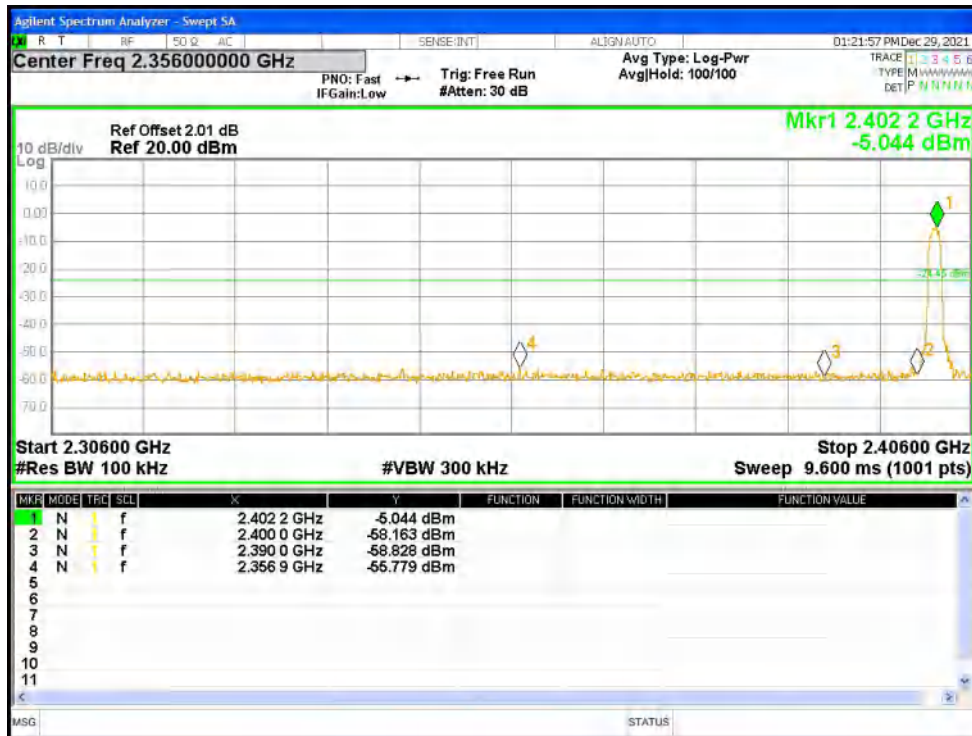
Band Edge NVNT 1-DH1 2480MHz Ant1 No-Hopping Emission



Band Edge NVNT 2-DH1 2402MHz Ant1 No-Hopping Ref



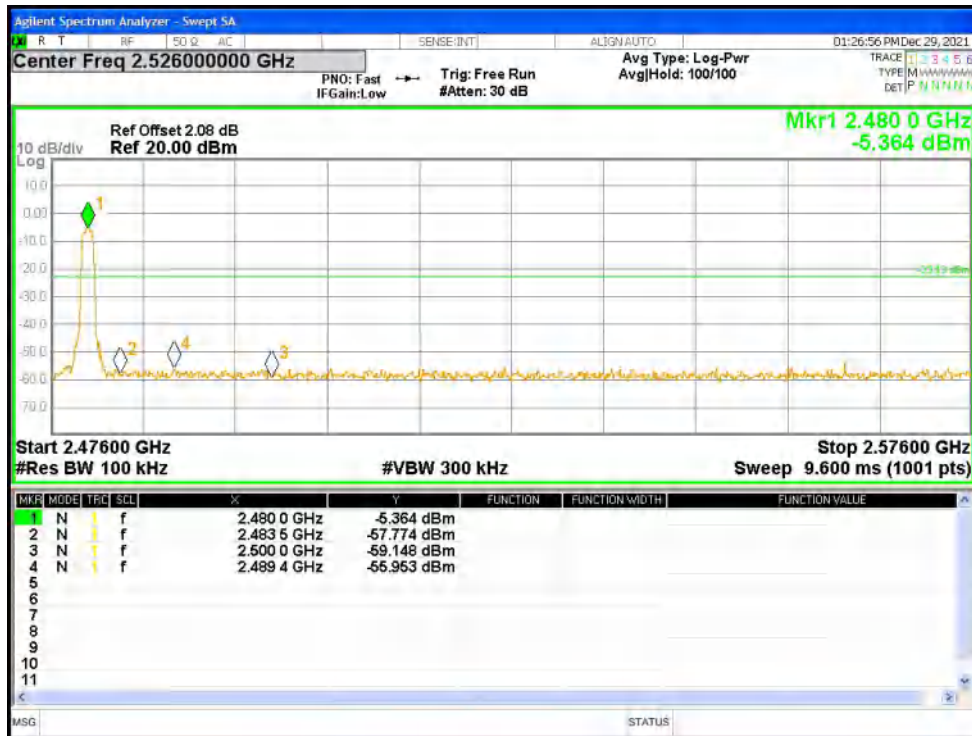
Band Edge NVNT 2-DH1 2402MHz Ant1 No-Hopping Emission



Band Edge NVNT 2-DH1 2480MHz Ant1 No-Hopping Ref



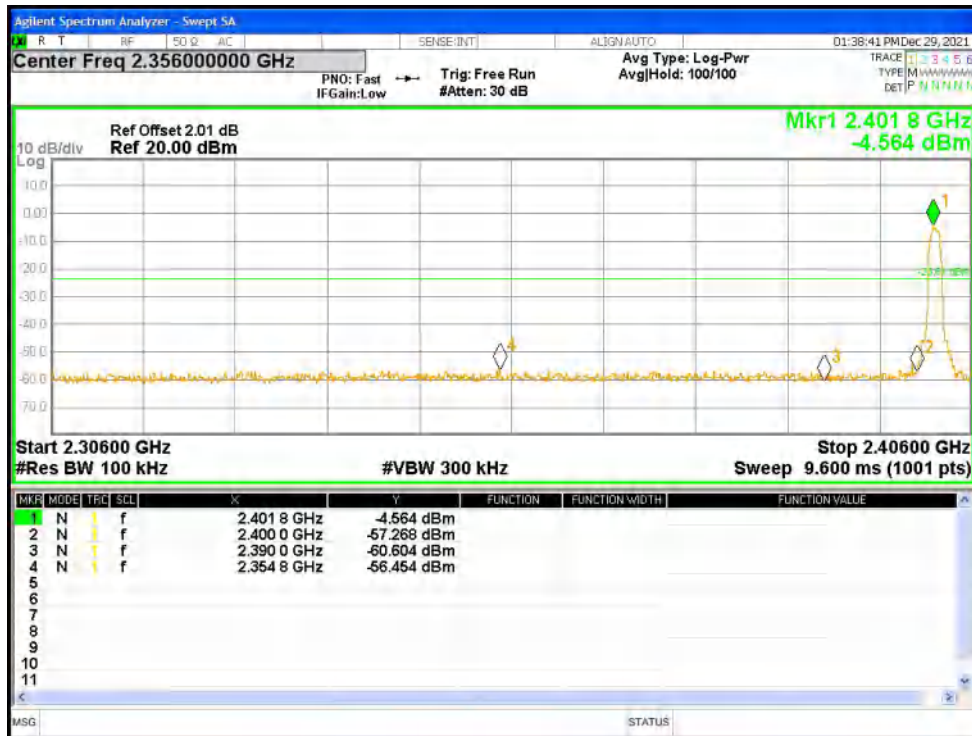
Band Edge NVNT 2-DH1 2480MHz Ant1 No-Hopping Emission



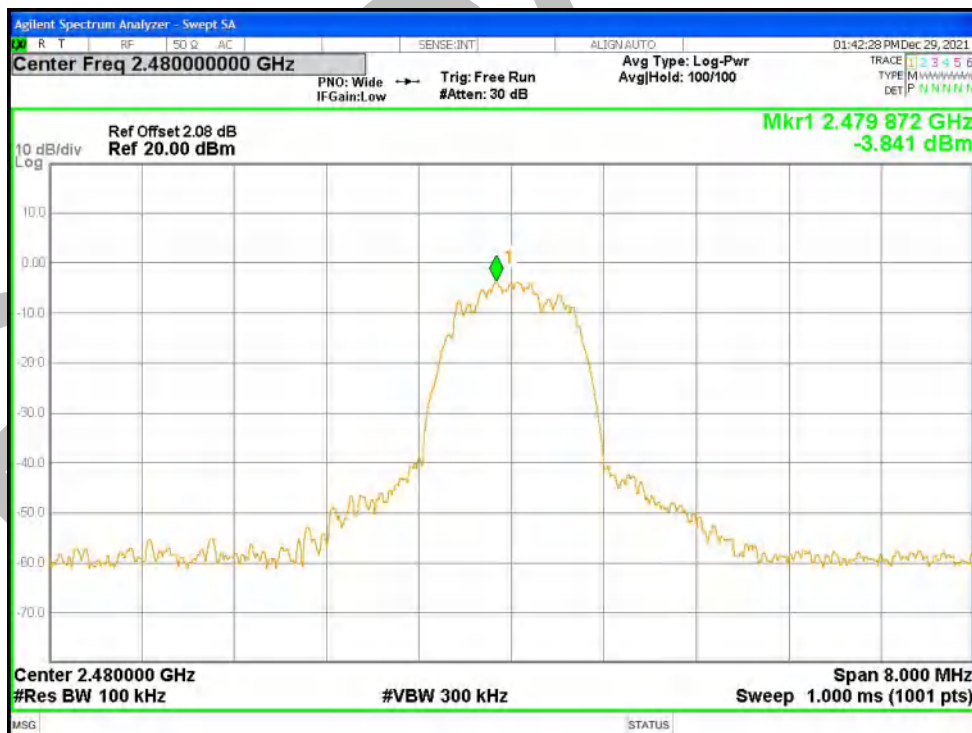
Band Edge NVNT 3-DH1 2402MHz Ant1 No-Hopping Ref



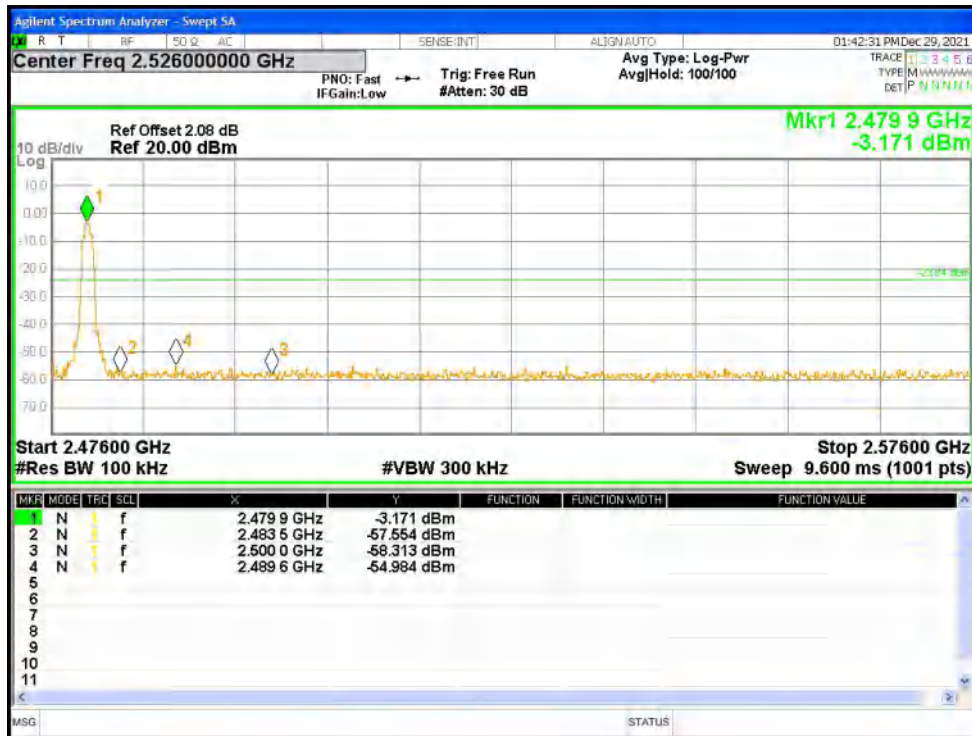
Band Edge NVNT 3-DH1 2402MHz Ant1 No-Hopping Emission



Band Edge NVNT 3-DH1 2480MHz Ant1 No-Hopping Ref



Band Edge NVNT 3-DH1 2480MHz Ant1 No-Hopping Emission



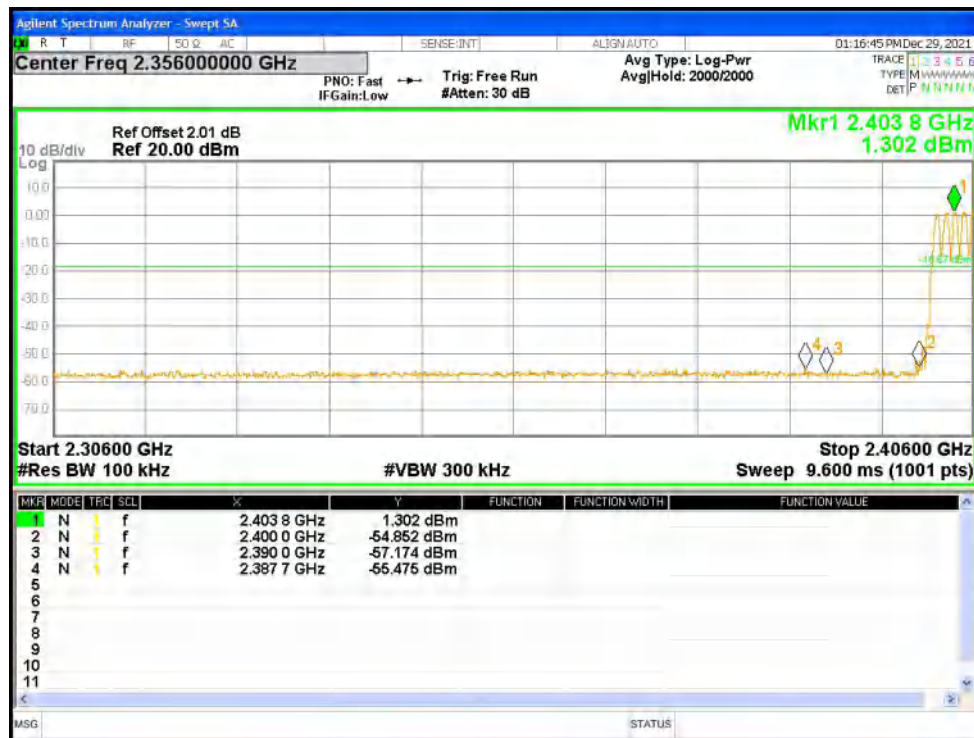
20.5 BAND EDGE(HOPPING)

Condition	Mode	Frequency (MHz)	Antenna	Hopping Mode	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	1-DH1	2402	Ant1	Hopping	-56.8	-20	Pass
NVNT	1-DH1	2480	Ant1	Hopping	-56.45	-20	Pass
NVNT	2-DH1	2402	Ant1	Hopping	-52.03	-20	Pass
NVNT	2-DH1	2480	Ant1	Hopping	-50.88	-20	Pass
NVNT	3-DH1	2402	Ant1	Hopping	-51.23	-20	Pass
NVNT	3-DH1	2480	Ant1	Hopping	-50.72	-20	Pass

Band Edge(Hopping) NVNT 1-DH1 2402MHz Ant1 Hopping Ref



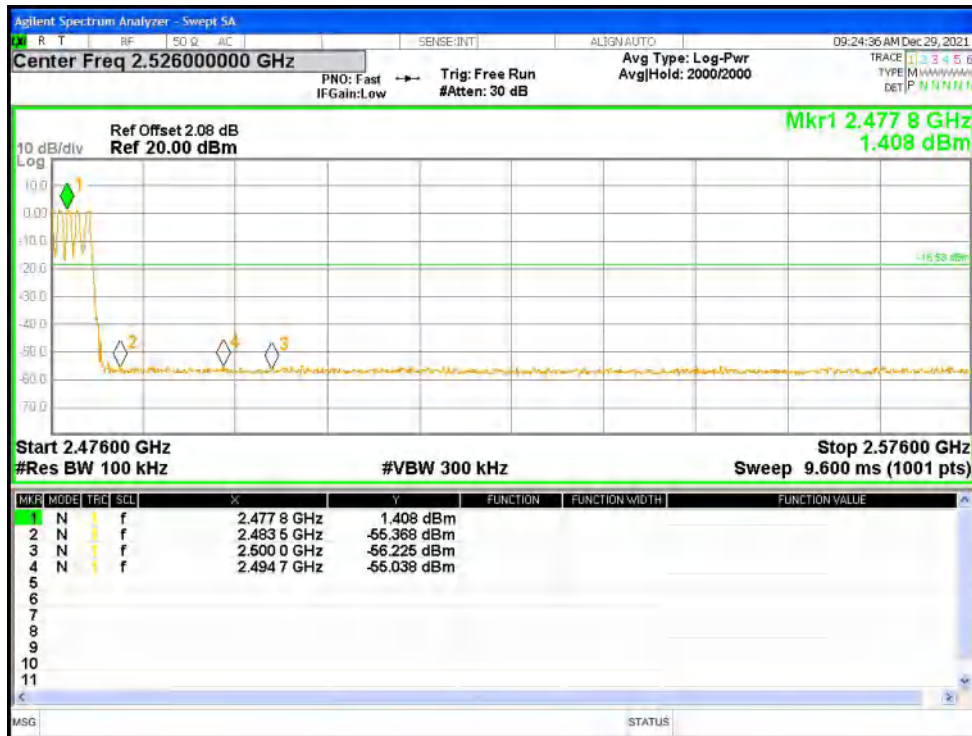
Band Edge(Hopping) NVNT 1-DH1 2402MHz Ant1 Hopping Emission



Band Edge(Hopping) NVNT 1-DH1 2480MHz Ant1 Hopping Ref



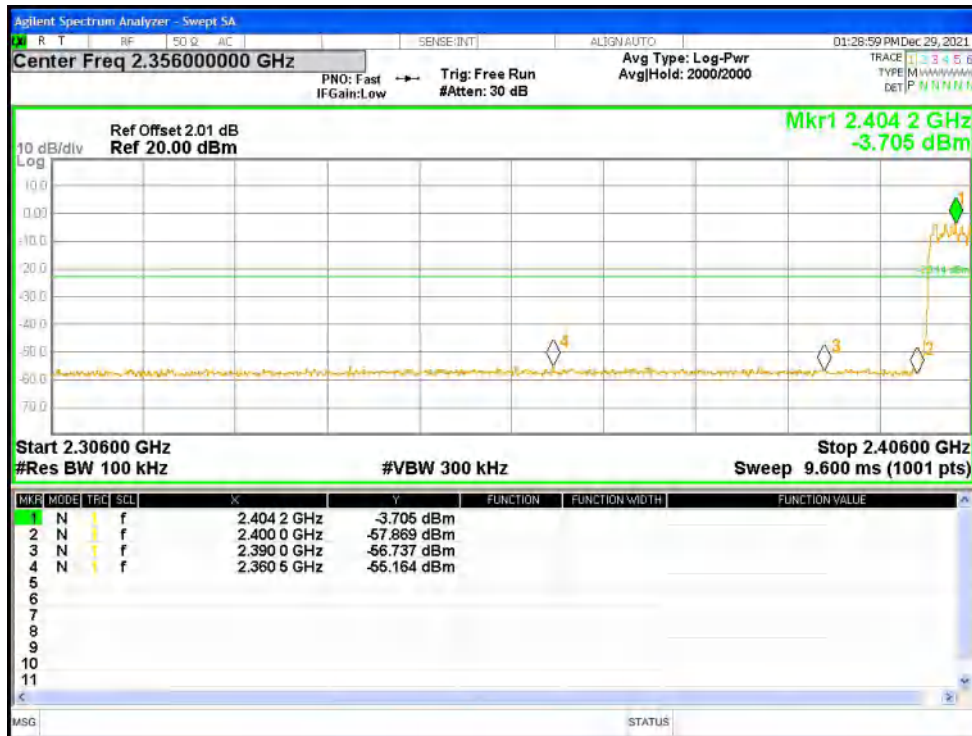
Band Edge(Hopping) NVNT 1-DH1 2480MHz Ant1 Hopping Emission



Band Edge(Hopping) NVNT 2-DH1 2402MHz Ant1 Hopping Ref



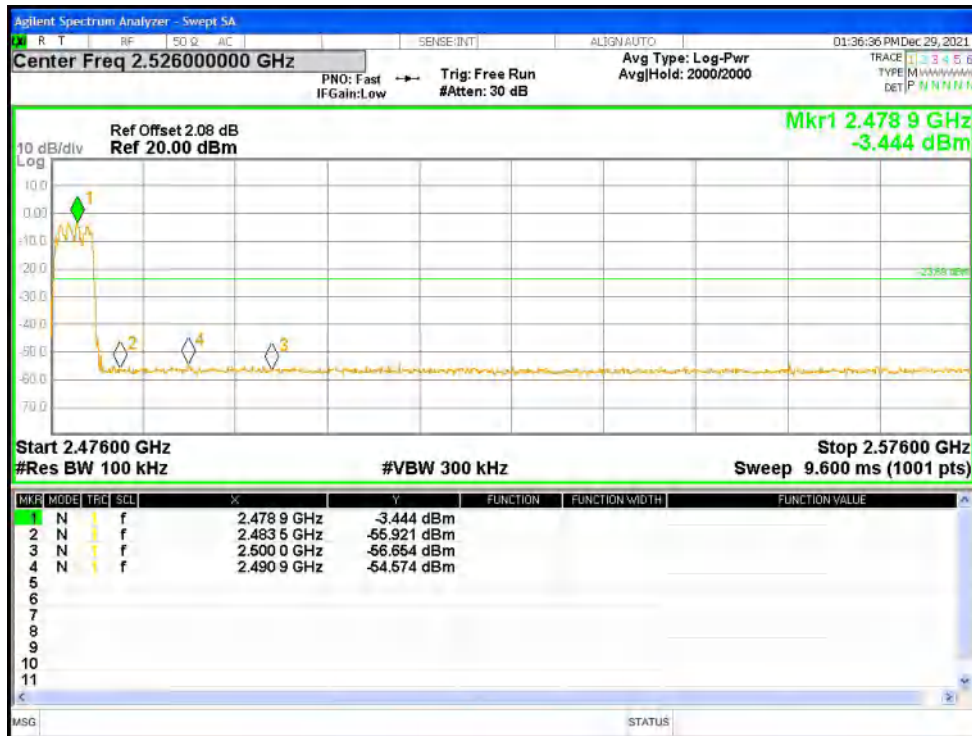
Band Edge(Hopping) NVNT 2-DH1 2402MHz Ant1 Hopping Emission



Band Edge(Hopping) NVNT 2-DH1 2480MHz Ant1 Hopping Ref



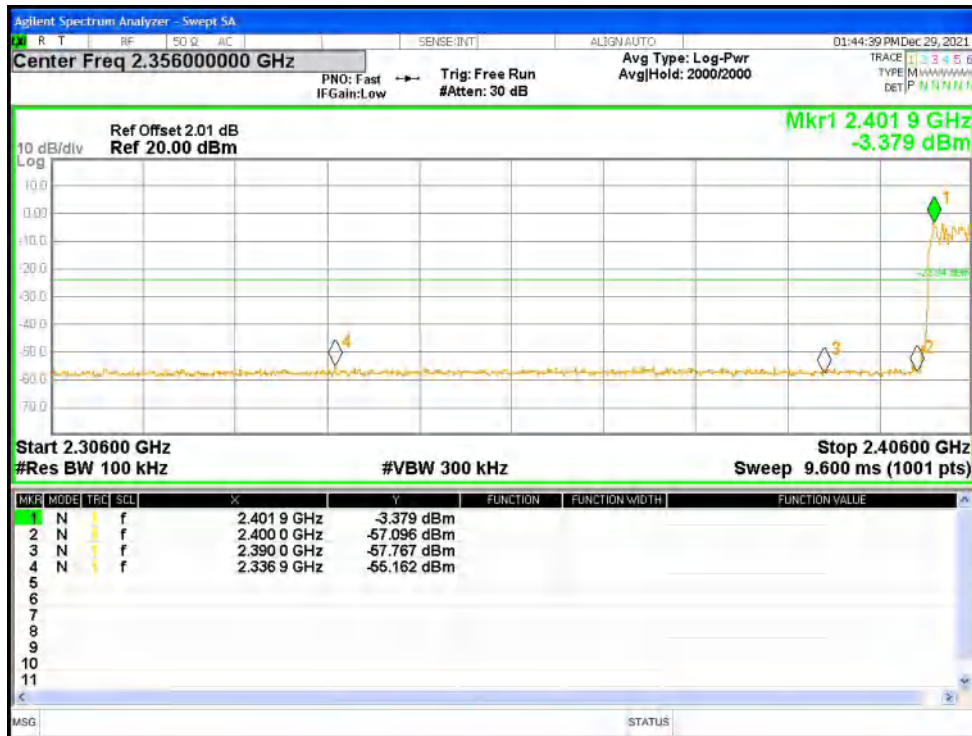
Band Edge(Hopping) NVNT 2-DH1 2480MHz Ant1 Hopping Emission



Band Edge(Hopping) NVNT 3-DH1 2402MHz Ant1 Hopping Ref



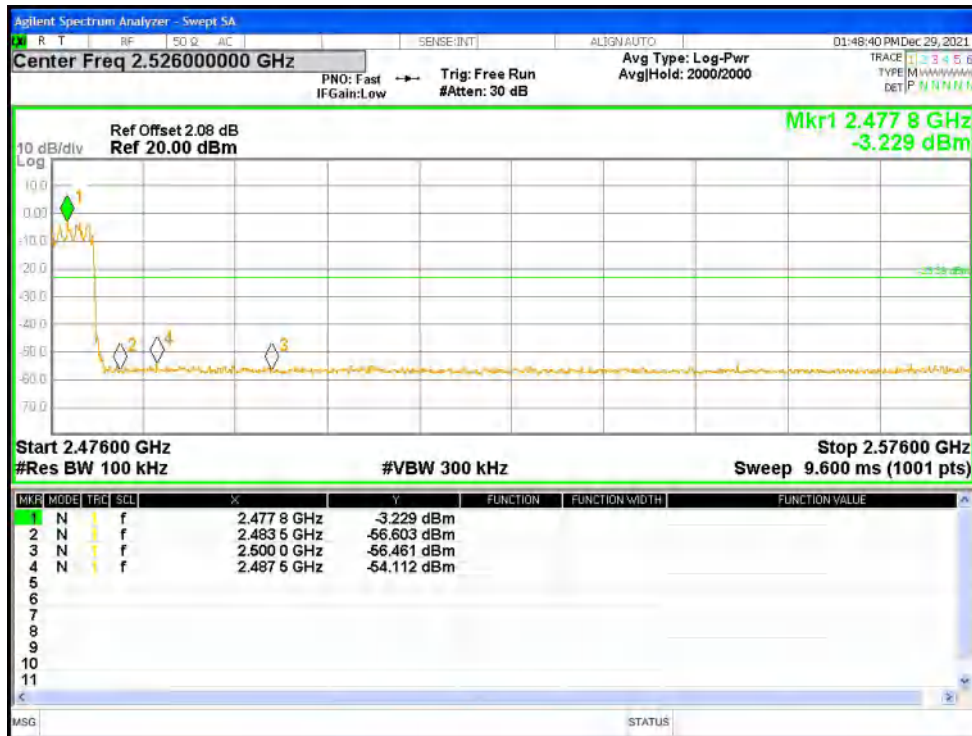
Band Edge(Hopping) NVNT 3-DH1 2402MHz Ant1 Hopping Emission



Band Edge(Hopping) NVNT 3-DH1 2480MHz Ant1 Hopping Ref



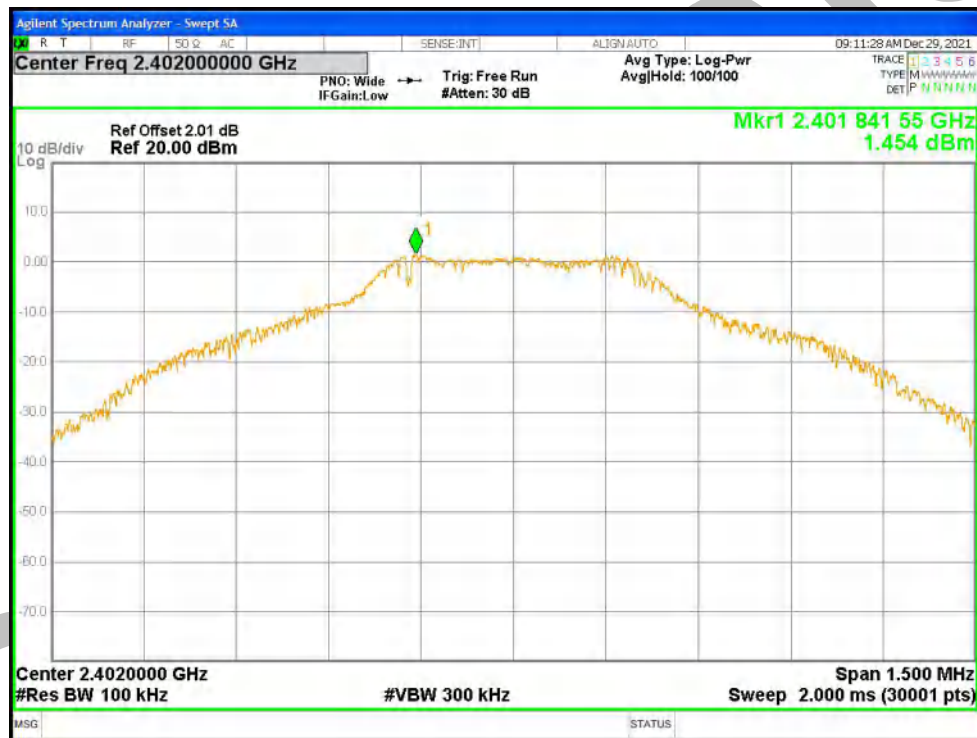
Band Edge(Hopping) NVNT 3-DH1 2480MHz Ant1 Hopping Emission



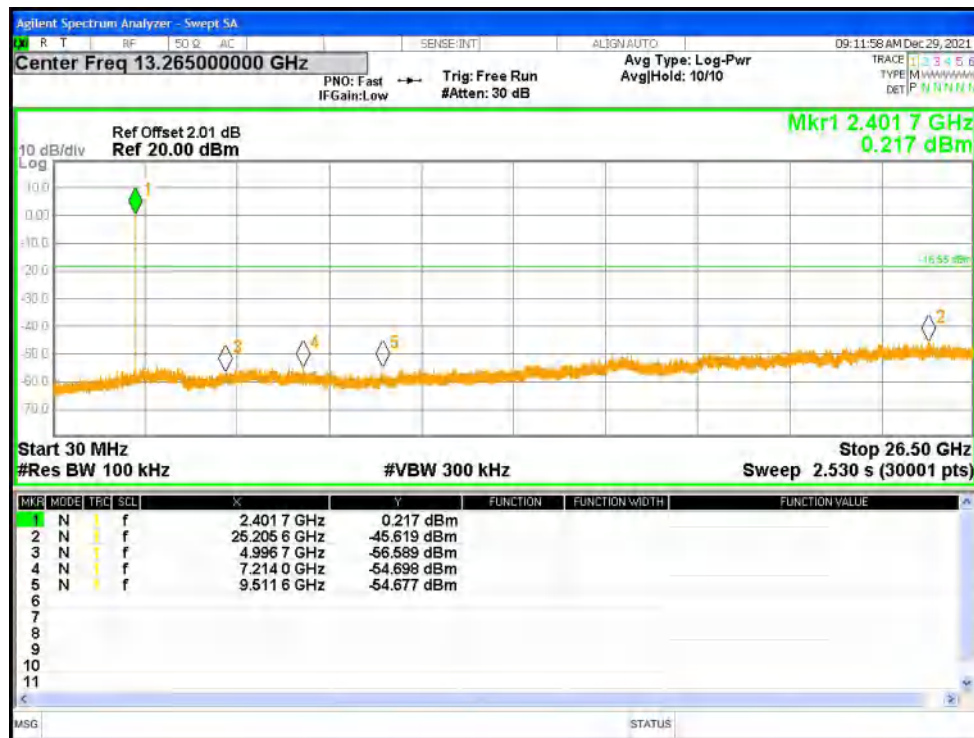
20.6 CONDUCTED RF SPURIOUS EMISSION

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	1-DH1	2402	Ant1	-47.06	-20	Pass
NVNT	1-DH1	2441	Ant1	-48.96	-20	Pass
NVNT	1-DH1	2480	Ant1	-47.1	-20	Pass
NVNT	2-DH1	2402	Ant1	-42.16	-20	Pass
NVNT	2-DH1	2441	Ant1	-43.64	-20	Pass
NVNT	2-DH1	2480	Ant1	-42.42	-20	Pass
NVNT	3-DH1	2402	Ant1	-42.83	-20	Pass
NVNT	3-DH1	2441	Ant1	-43.28	-20	Pass
NVNT	3-DH1	2480	Ant1	-42.43	-20	Pass

Tx. Spurious NVNT 1-DH1 2402MHz Ant1 Ref



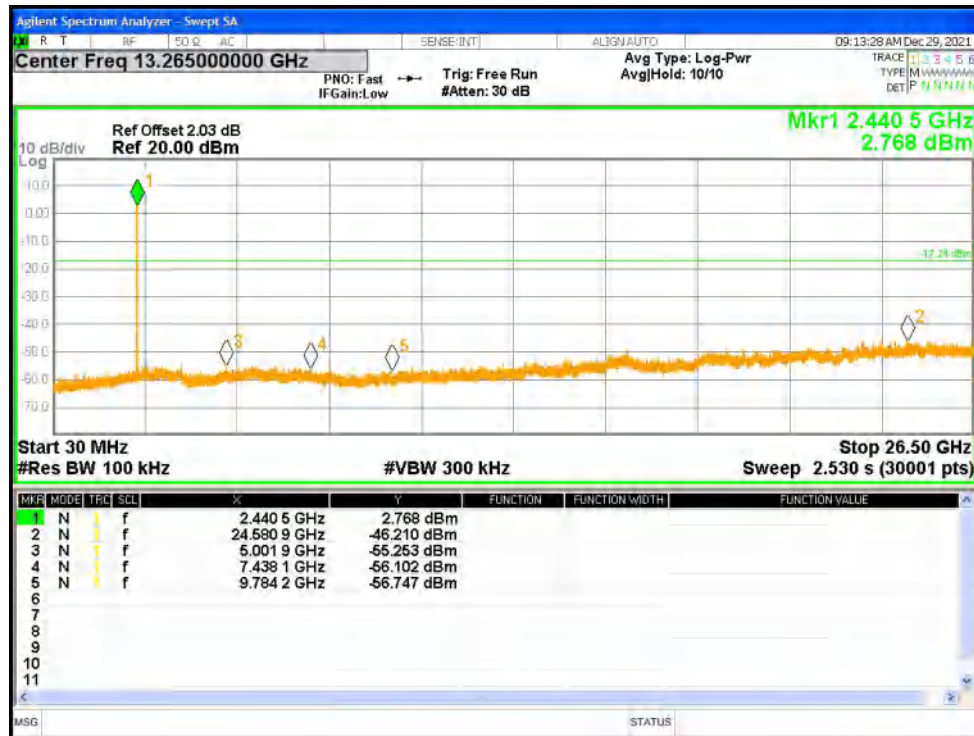
Tx. Spurious NVNT 1-DH1 2402MHz Ant1 Emission



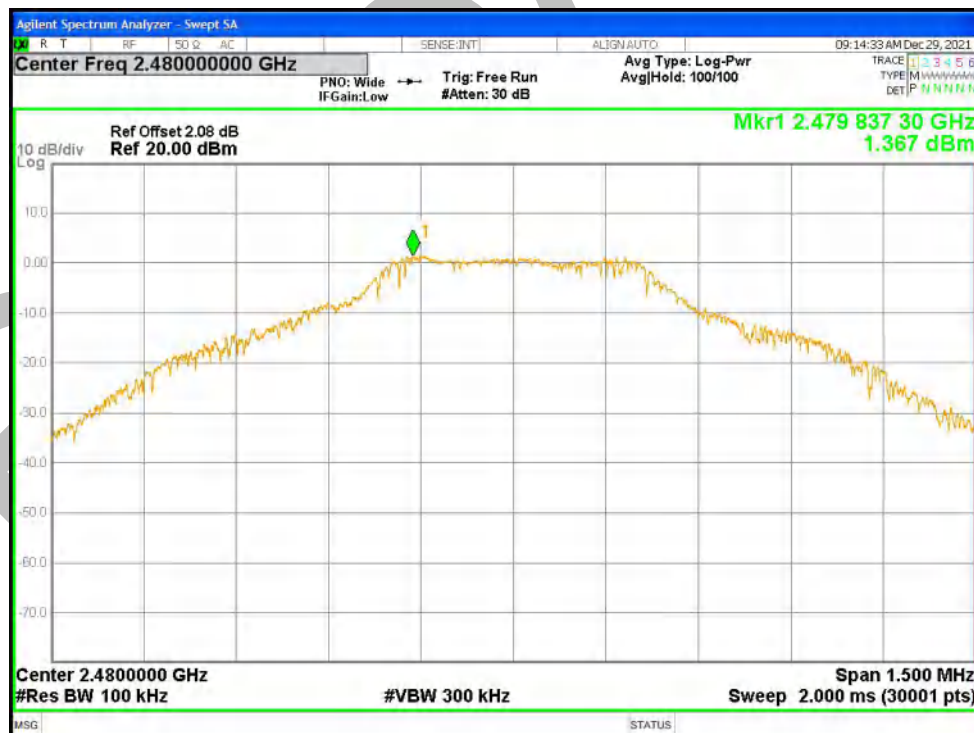
Tx. Spurious NVNT 1-DH1 2441MHz Ant1 Ref



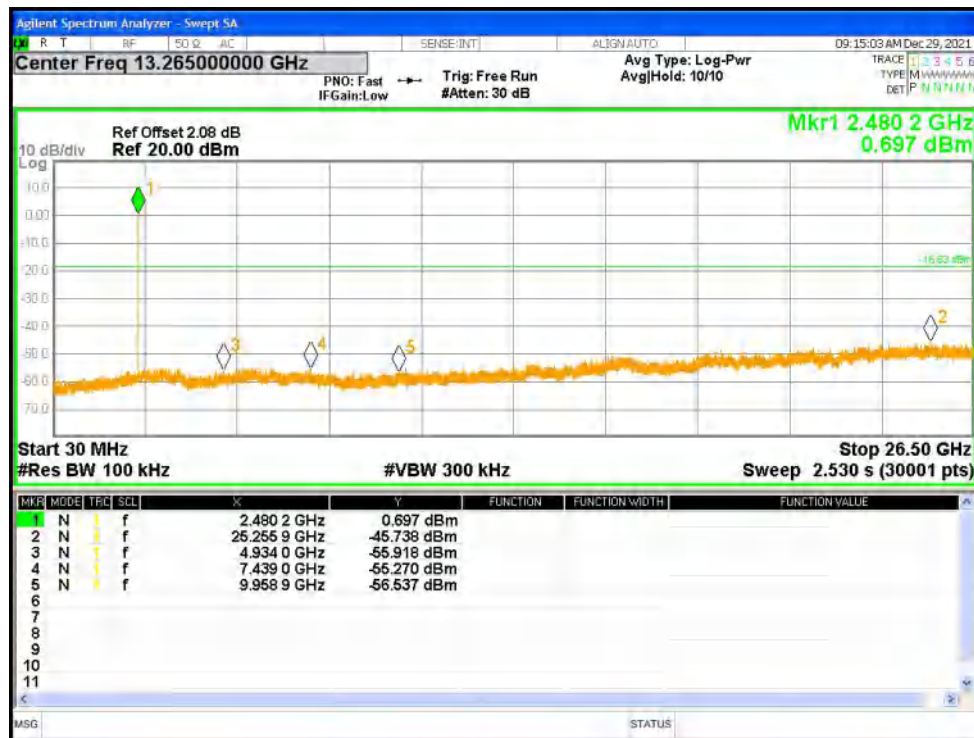
Tx. Spurious NVNT 1-DH1 2441MHz Ant1 Emission



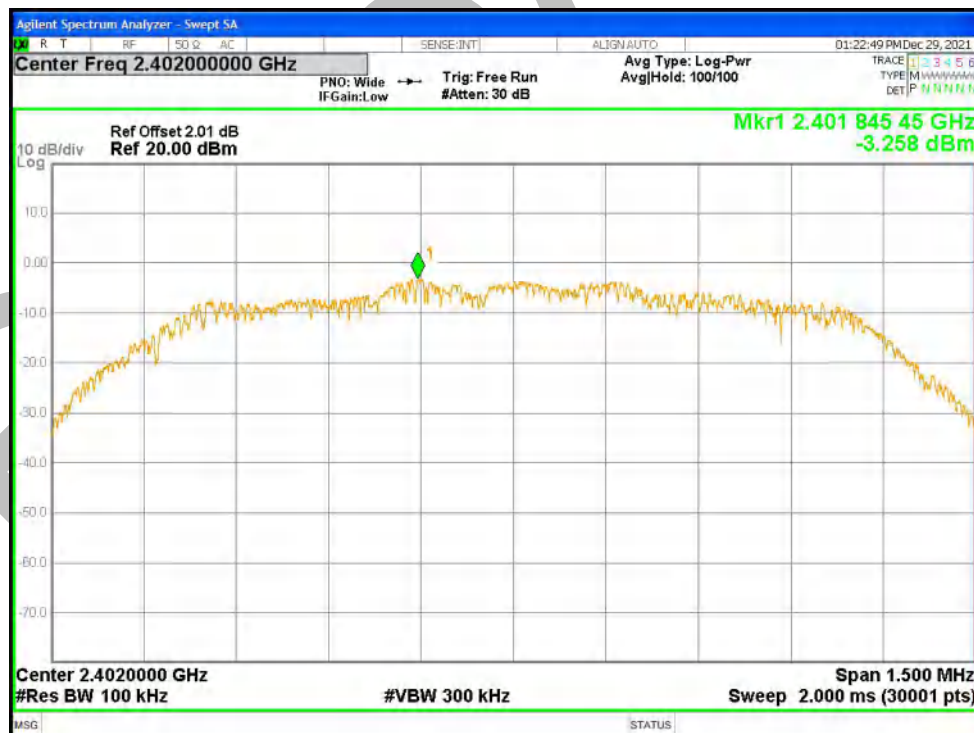
Tx. Spurious NVNT 1-DH1 2480MHz Ant1 Ref



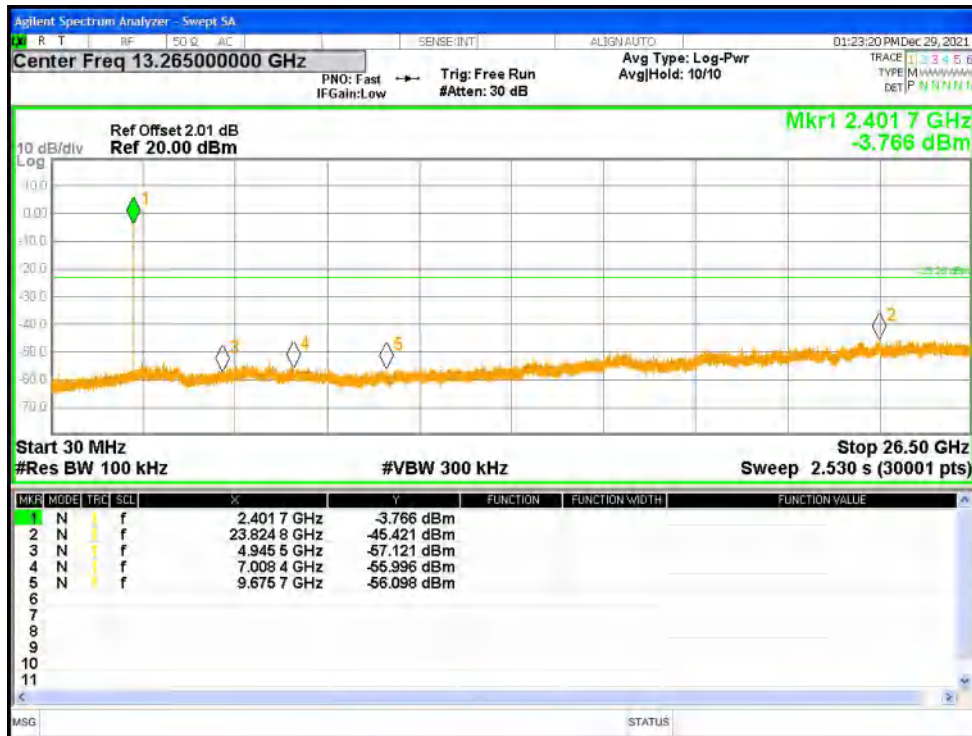
Tx. Spurious NVNT 1-DH1 2480MHz Ant1 Emission



Tx. Spurious NVNT 2-DH1 2402MHz Ant1 Ref



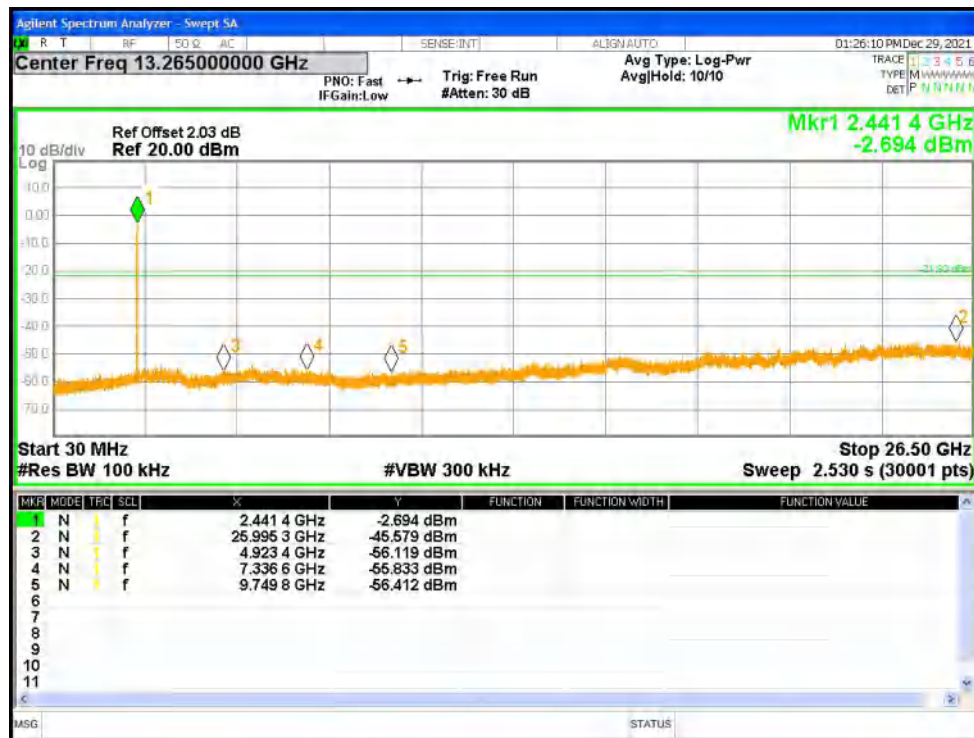
Tx. Spurious NVNT 2-DH1 2402MHz Ant1 Emission



Tx. Spurious NVNT 2-DH1 2441MHz Ant1 Ref



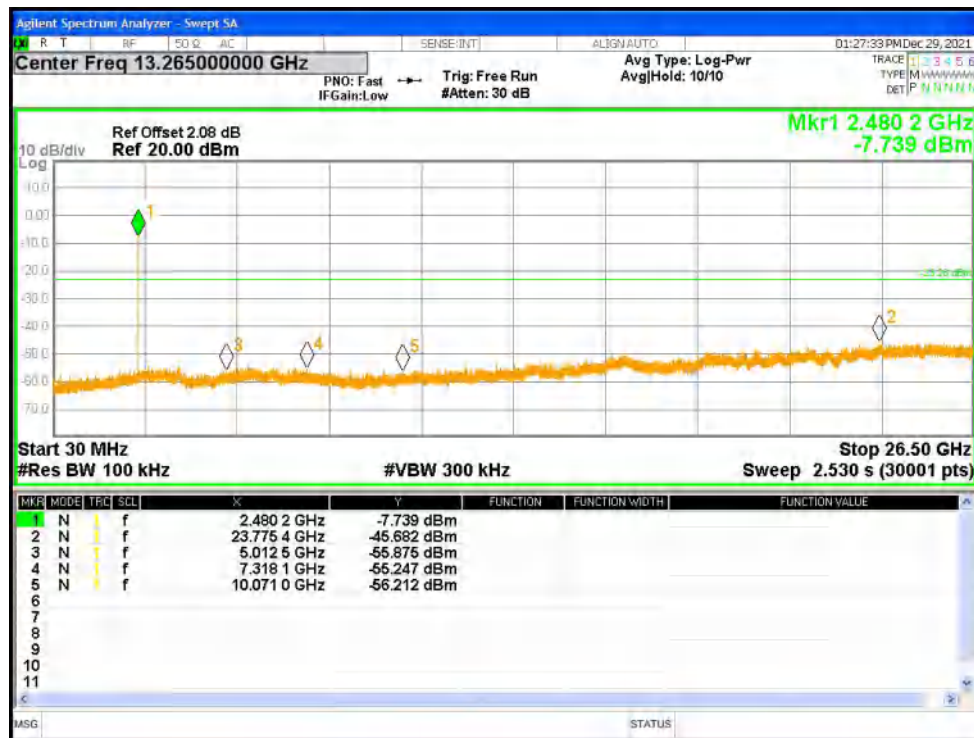
Tx. Spurious NVNT 2-DH1 2441MHz Ant1 Emission



Tx. Spurious NVNT 2-DH1 2480MHz Ant1 Ref



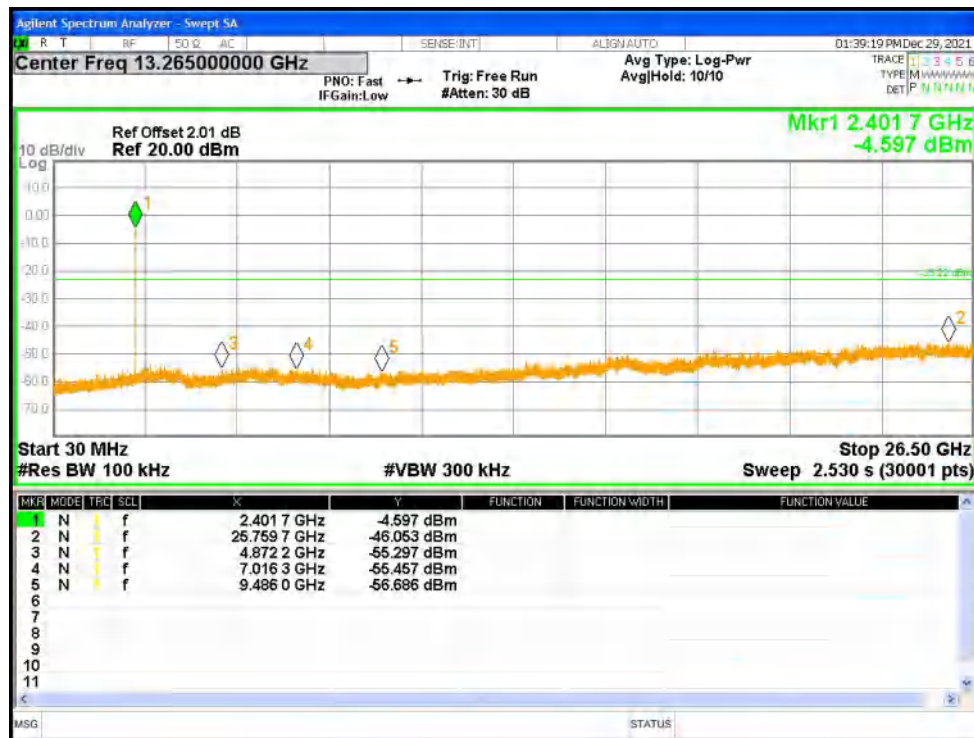
Tx. Spurious NVNT 2-DH1 2480MHz Ant1 Emission



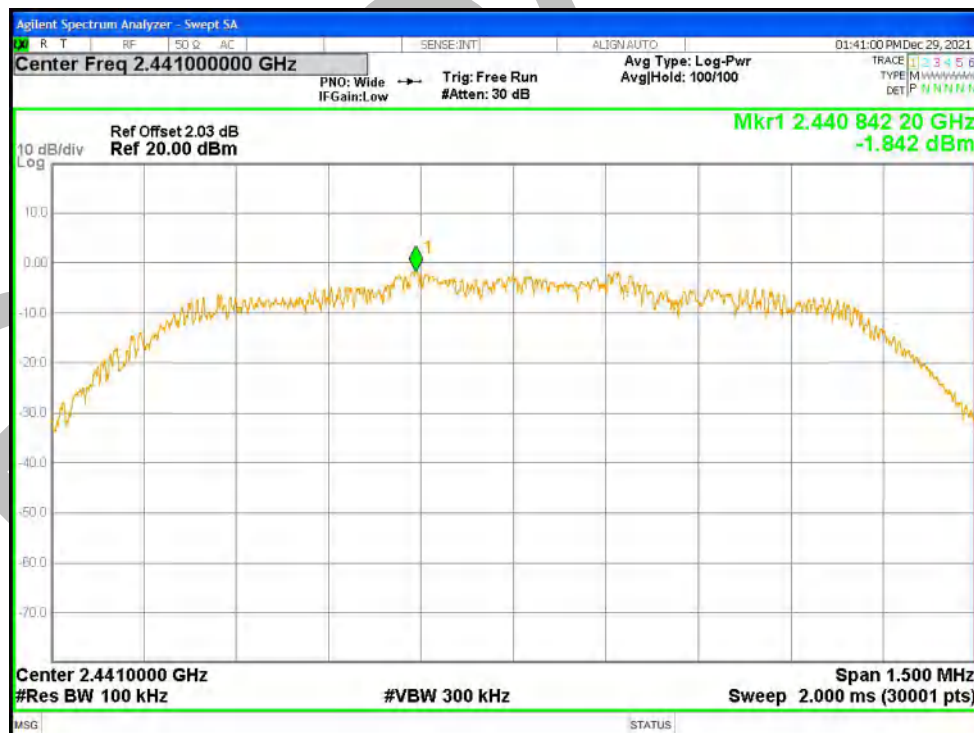
Tx. Spurious NVNT 3-DH1 2402MHz Ant1 Ref



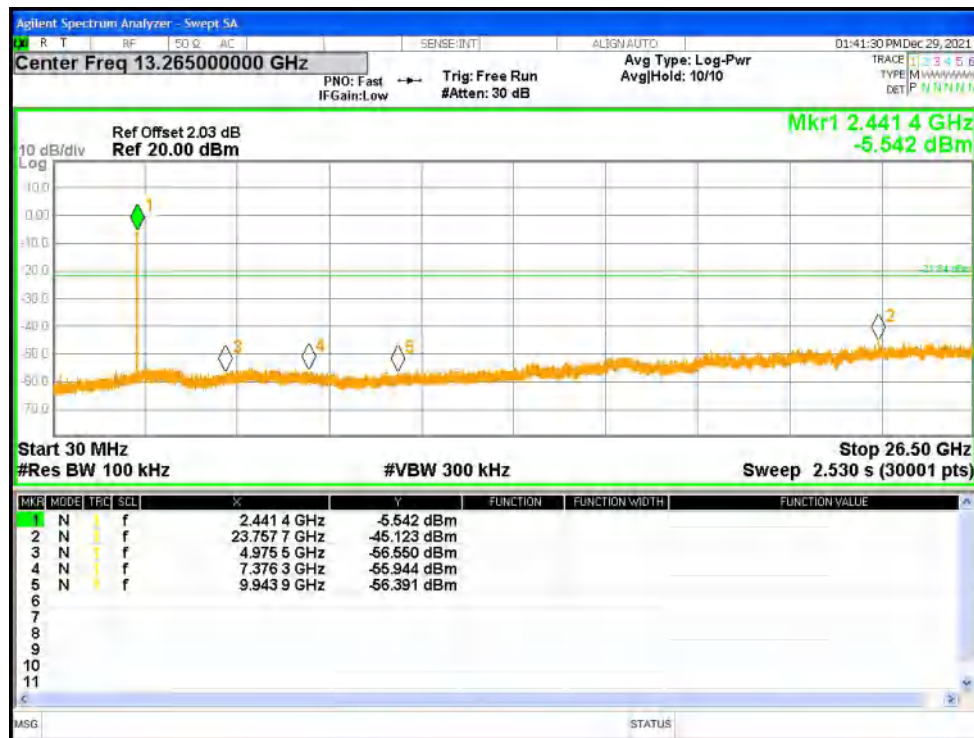
Tx. Spurious NVNT 3-DH1 2402MHz Ant1 Emission



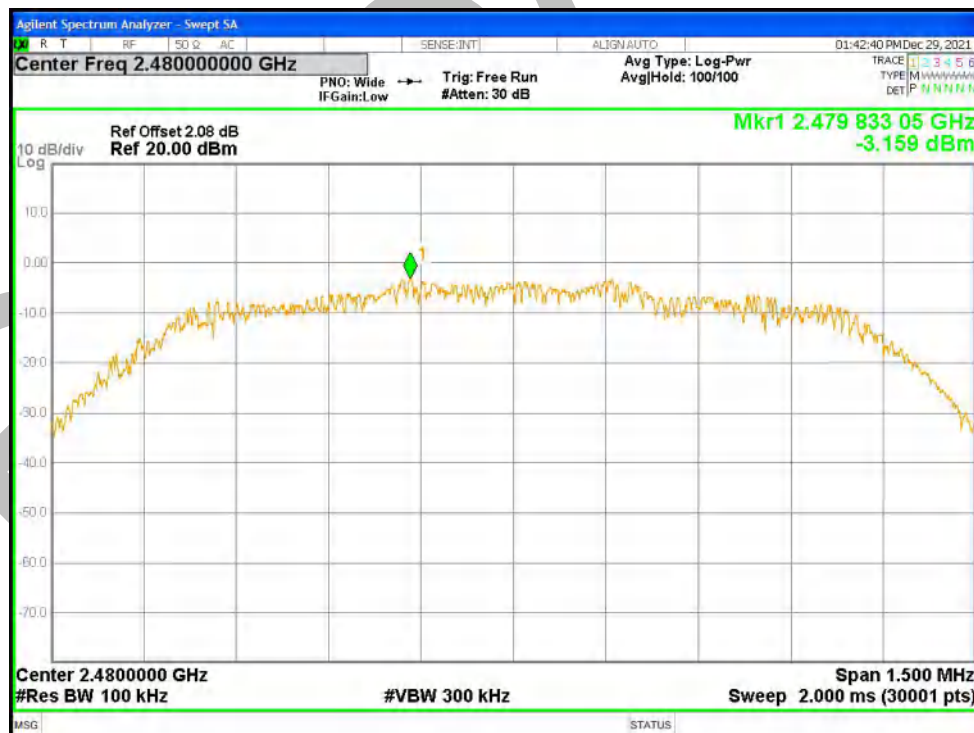
Tx. Spurious NVNT 3-DH1 2441MHz Ant1 Ref



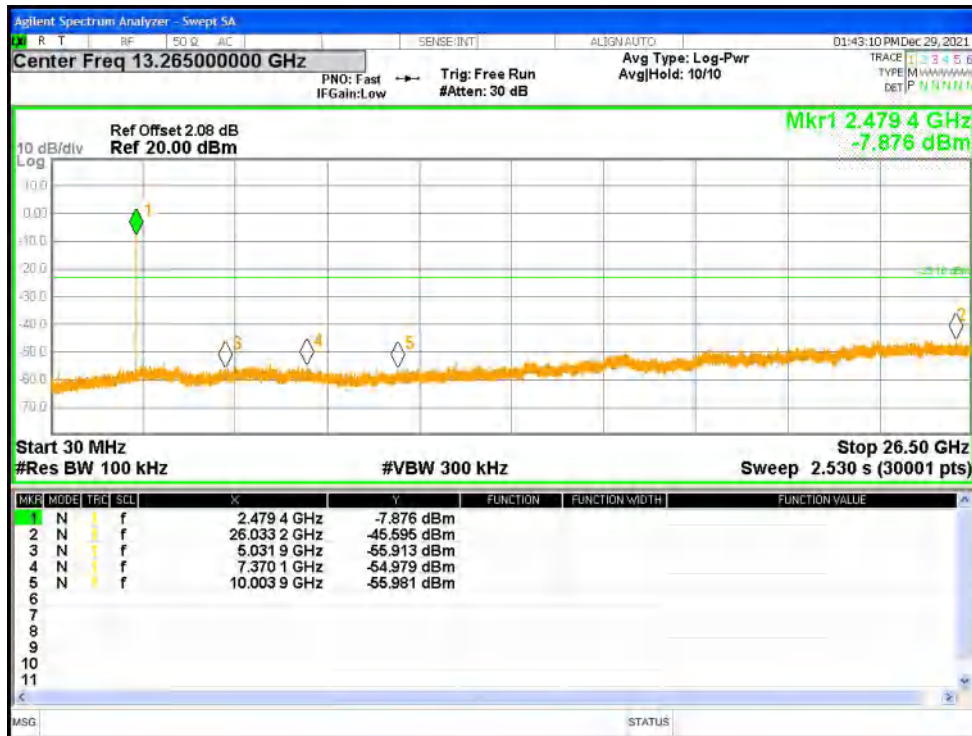
Tx. Spurious NVNT 3-DH1 2441MHz Ant1 Emission



Tx. Spurious NVNT 3-DH1 2480MHz Ant1 Ref



Tx. Spurious NVNT 3-DH1 2480MHz Ant1 Emission



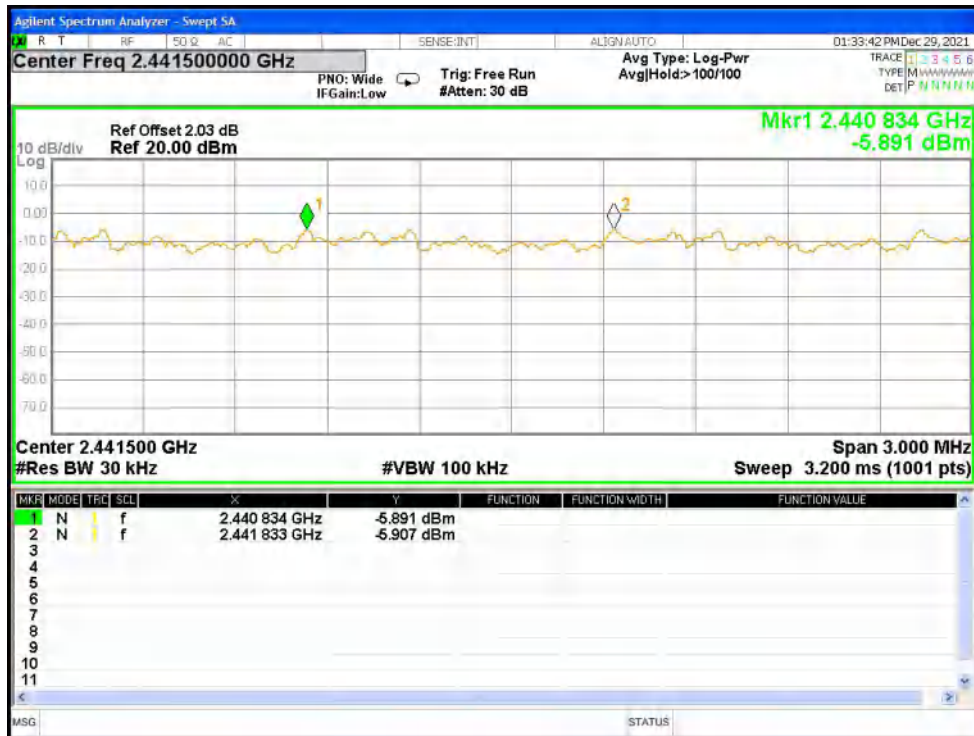
20.7 CARRIER FREQUENCIES SEPARATION

Condition	Mode	Antenna	Hopping Freq1 (MHz)	Hopping Freq2 (MHz)	HFS (MHz)	Limit (MHz)	Verdict
NVNT	1-DH1	Ant1	2441.0215	2442.0205	0.999	0.949	Pass
NVNT	2-DH1	Ant1	2440.834	2441.833	0.999	0.895	Pass
NVNT	3-DH1	Ant1	2441.071	2442.01	0.939	0.862	Pass

CFS NVNT 1-DH1 2441MHz Ant1



CFS NVNT 2-DH1 2441MHz Ant1



CFS NVNT 3-DH1 2441MHz Ant1



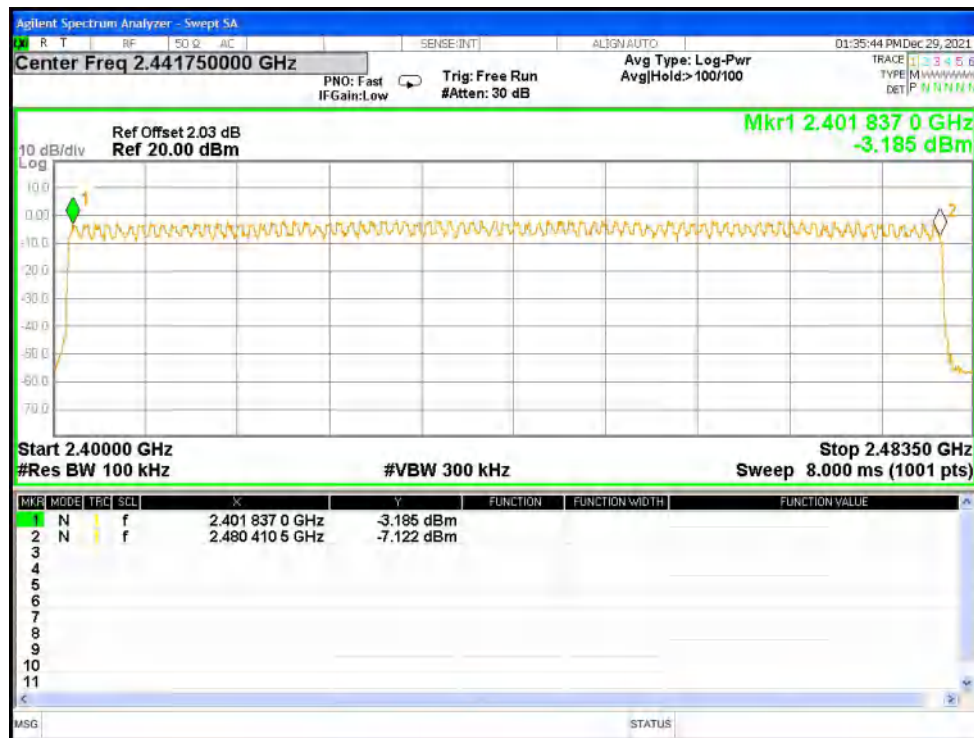
20.8 NUMBER OF HOPPING CHANNEL

Condition	Mode	Antenna	Hopping Number	Limit	Verdict
NVNT	1-DH1	Ant1	79	15	Pass
NVNT	2-DH1	Ant1	79	15	Pass
NVNT	3-DH1	Ant1	79	15	Pass

Hopping No. NVNT 1-DH1 2441MHz Ant1



Hopping No. NVNT 2-DH1 2441MHz Ant1



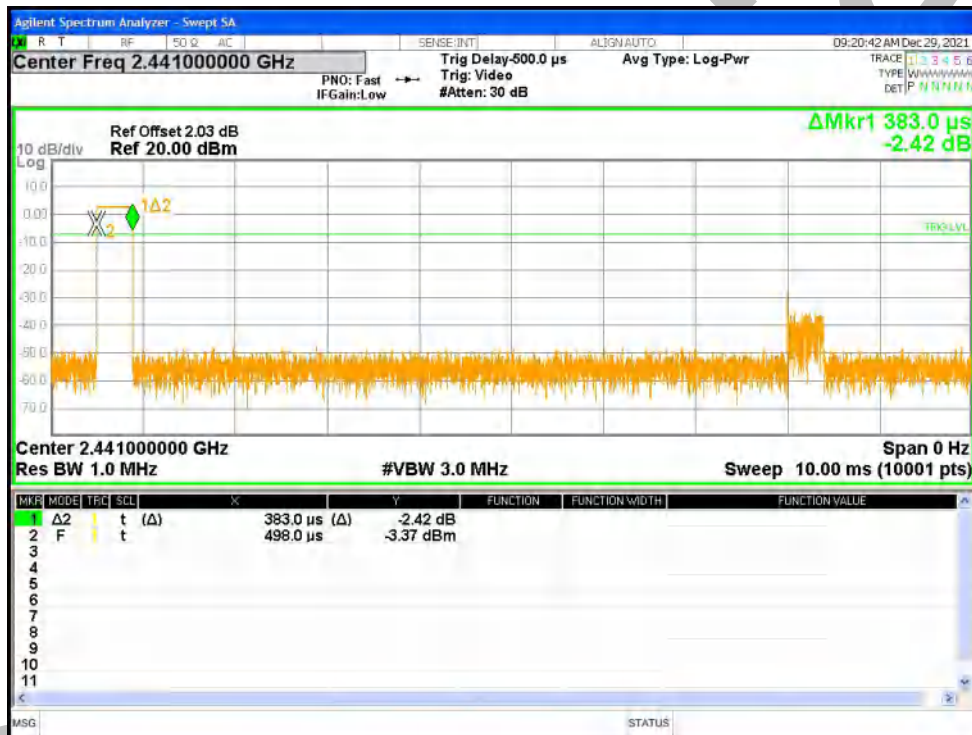
Hopping No. NVNT 3-DH1 2441MHz Ant1



20.9 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	2441	Ant1	0.383	121.794	318	31600	400	Pass
NVNT	1-DH3	2441	Ant1	1.638	257.166	157	31600	400	Pass
NVNT	1-DH5	2441	Ant1	2.886	291.486	101	31600	400	Pass

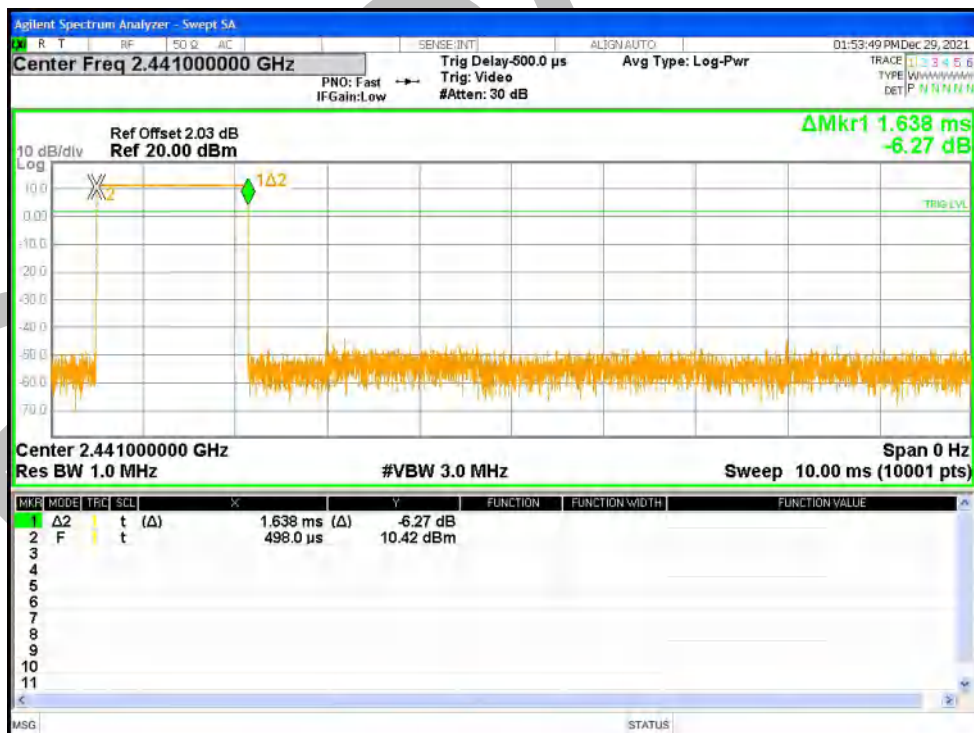
Dwell NVNT 1-DH1 2441MHz Ant1 One Burst



Dwell NVNT 1-DH1 2441MHz Ant1 Accumulated



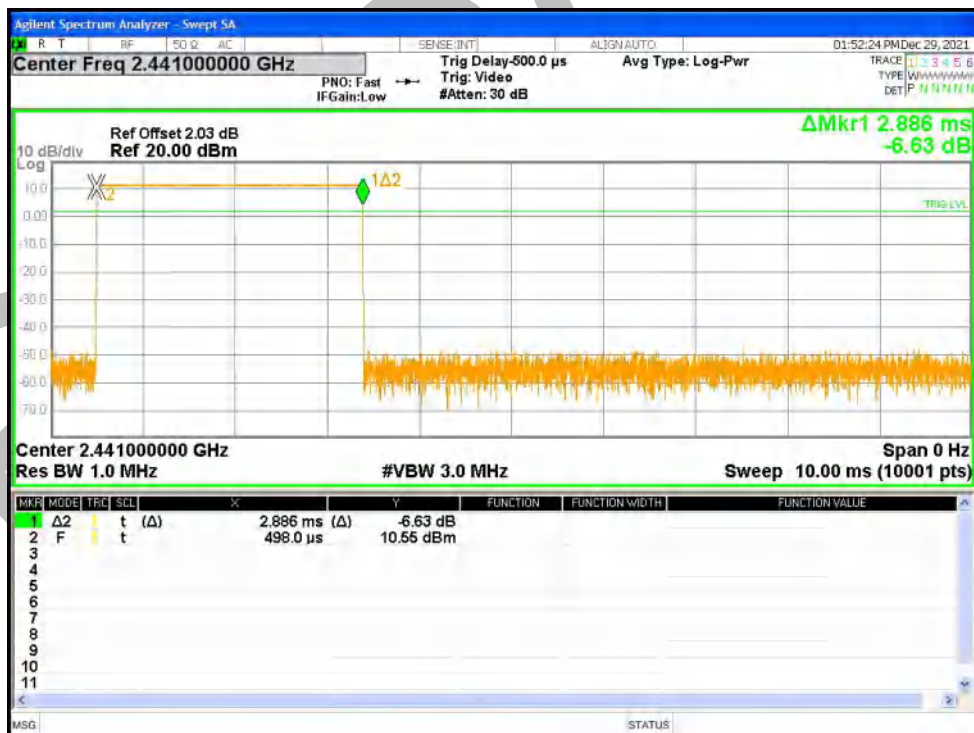
Dwell NVNT 1-DH3 2441MHz Ant1 One Burst



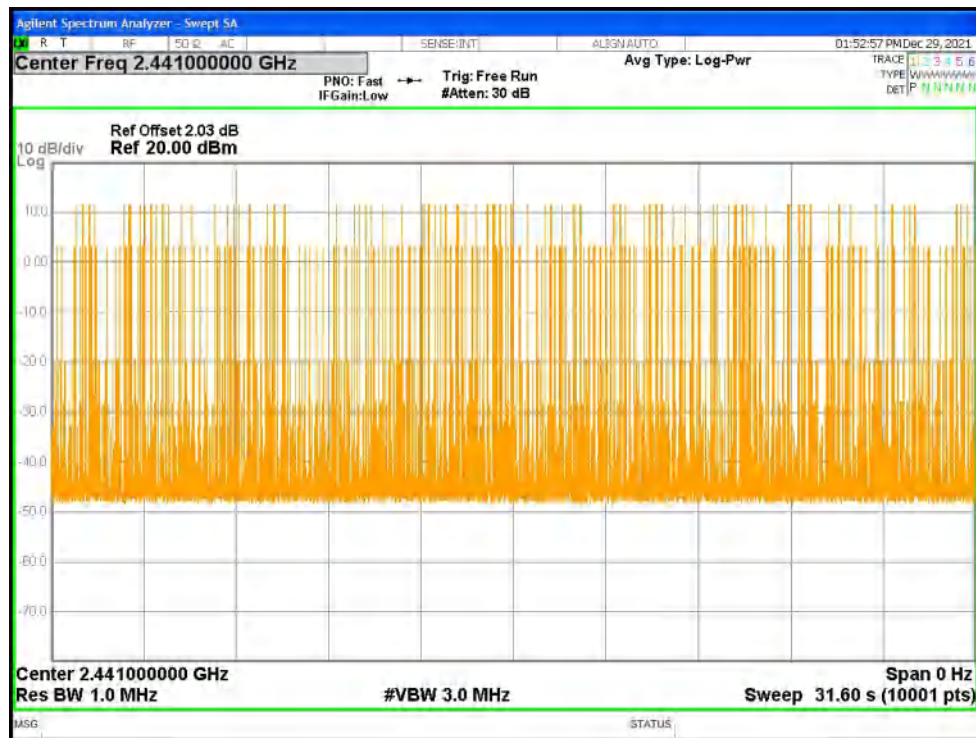
Dwell NVNT 1-DH3 2441MHz Ant1 Accumulated



Dwell NVNT 1-DH5 2441MHz Ant1 One Burst

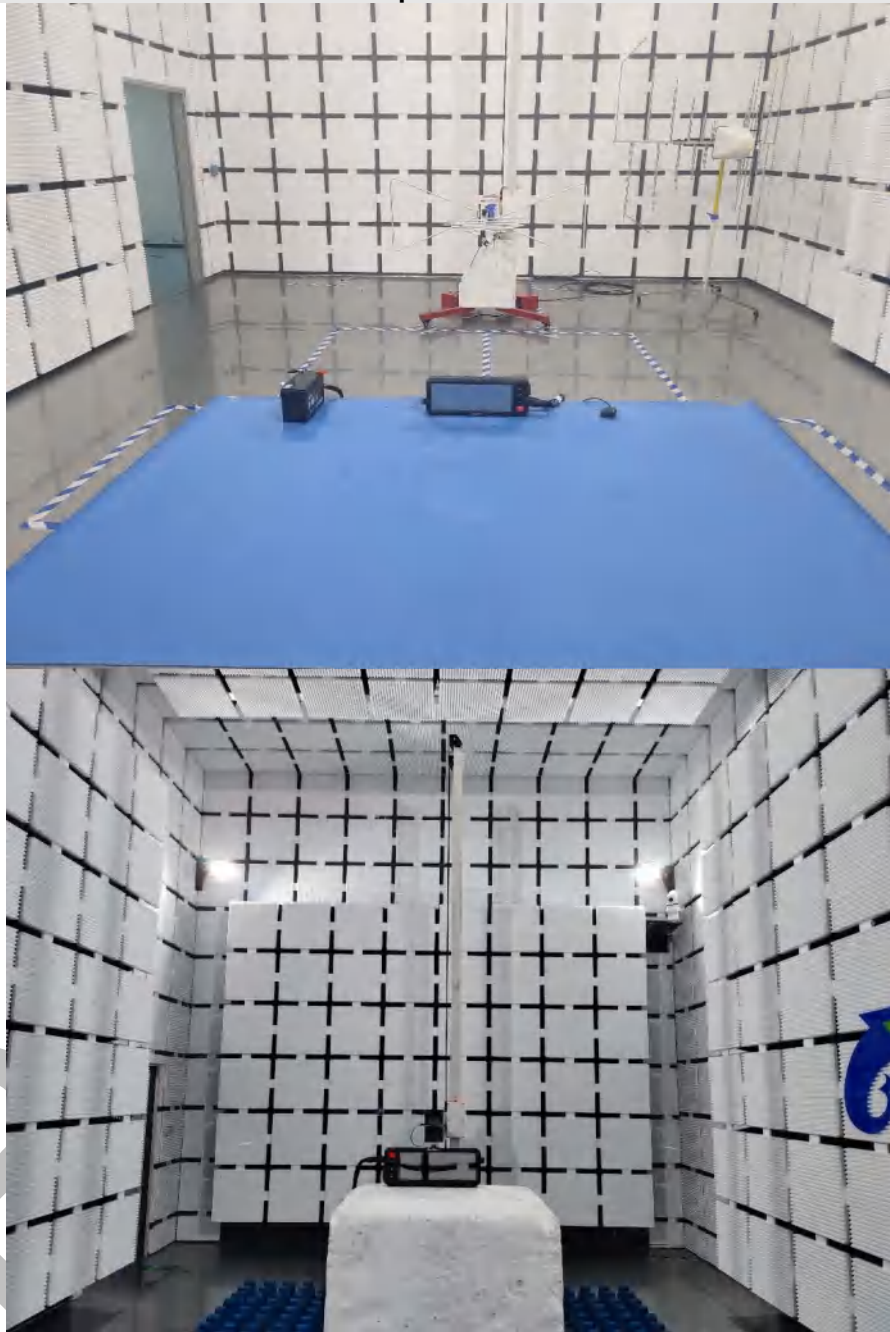


Dwell NVNT 1-DH5 2441MHz Ant1 Accumulated



APPENDIX A: PHOTOGRAPHS OF TEST SETUP

Radiated Spurious Emissions



APPENDIX B: PHOTOGRAPHS OF EUT

(Reference to the test report No. BLA-EMC-202112-A9601)

----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.