

TEST REPORT

Application No.: BTEK231124008AE
Applicant: SHENZHEN ECARE ELECTRONICS CO., LTD
Address of Applicant: B201/B401/B501/B601, Hua Li Industrial Building, 404 Yu An Road, Bao An, Shenzhen, Guang Dong, China
Manufacturer: SHENZHEN ECARE ELECTRONICS CO., LTD
Address of Manufacturer: B201/B401/B501/B601, Hua Li Industrial Building, 404 Yu An Road, Bao An, Shenzhen, Guang Dong, China
Factory: SHENZHEN ECARE ELECTRONICS CO., LTD
Address of Factory: B201/B401/B501/B601, Hua Li Industrial Building, 404 Yu An Road, Bao An, Shenzhen, Guang Dong, China
Equipment Under Test (EUT):
EUT Name: Bluetooth module
Model No.: TP901, TP901W, I01, TP902, TP902W, I02, P900, P900W, TP903, TP903W, I03, TP904, TP904W, I04
Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
Trade Mark: N/A
Standard(s): 47 CFR Part 15, Subpart C 15.247
Date of Receipt: 2023-11-24
Date of Test: 2023-11-24 to 2023-12-08
Date of Issue: 2023-12-08

Test Result:	Pass*
---------------------	--------------

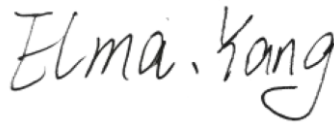

* In the configuration tested, the EUT complied with the standards specified above.



Damon Su
EMC Laboratory Manager



Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2023-12-08		Original

Authorized for issue by:				
				
		<hr/> Elma Yang/Project Engineer		
				
		<hr/> Carl Yang/Reviewer		



2 Test Summary

Radio Spectrum Technical Requirement				
Item	Standard	Method	Requirement	Result
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)	Pass

Radio Spectrum Matter Part				
Item	Standard	Method	Requirement	Result
Conducted Peak Output Power	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.9.1.3	47 CFR Part 15, Subpart C 15.247(b)(3)	Pass
Minimum 6dB Bandwidth		ANSI C63.10 (2013) Section 11.8.1	47 CFR Part 15, Subpart C 15.247a(2)	Pass
Power Spectrum Density		ANSI C63.10 (2013) Section 11.10.2	47 CFR Part 15, Subpart C 15.247(e)	Pass
Conducted Band Edges Measurement		ANSI C63.10 (2013) Section 11.13.3.2	47 CFR Part 15, Subpart C 15.247(d)	Pass
Conducted Spurious Emissions		ANSI C63.10 (2013) Section 11.11	47 CFR Part 15, Subpart C 15.247(d)	Pass
Radiated Emissions which fall in the restricted bands		ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Radiated Spurious Emissions (Below 1GHz)		ANSI C63.10 (2013) Section 6.4,6.5,6.6	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Radiated Spurious Emissions (Above 1GHz)		ANSI C63.10 (2013) Section 6.4,6.5,6.6	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass

Note:

Model No.: TP901, TP901W, I01, TP902, TP902W, I02, P900, P900W, TP903, TP903W, I03, TP904, TP904W, I04.

The module is same, and the only different is antenna

The model number of ANT1 is TP901, TP901W, I01, TP902, TP902W, I02, P900, P900W
ANT2 is TP903, TP903W, I03, TP904, TP904W, I04.



3 Contents

	Page
1 Cover Page	1
2 Test Summary	3
3 Contents	4
4 General Information	6
4.1 Details of E.U.T.	6
4.2 Description of Support Units	6
4.3 Measurement Uncertainty	6
4.4 Test Location	7
4.5 Deviation from Standards	7
4.6 Abnormalities from Standard Conditions	7
5 Equipment List	8
6 Radio Spectrum Technical Requirement	11
6.1 Antenna Requirement	11
6.1.1 Test Requirement:	11
6.1.2 Conclusion	11
7 Radio Spectrum Matter Test Results	12
7.1 Conducted Peak Output Power	12
7.1.1 E.U.T. Operation	12
7.1.2 Test Mode Description	12
7.1.3 Test Setup Diagram	12
7.1.4 Measurement Procedure and Data	12
7.2 Minimum 6dB Bandwidth	13
7.2.1 E.U.T. Operation	13
7.2.2 Test Mode Description	13
7.2.3 Test Setup Diagram	13
7.2.4 Measurement Procedure and Data	13
7.3 Power Spectrum Density	14
7.3.1 E.U.T. Operation	14
7.3.2 Test Mode Description	14
7.3.3 Test Setup Diagram	14
7.3.4 Measurement Procedure and Data	14
7.4 Conducted Band Edges Measurement	15
7.4.1 E.U.T. Operation	15
7.4.2 Test Mode Description	15
7.4.3 Test Setup Diagram	15
7.4.4 Measurement Procedure and Data	15
7.5 Conducted Spurious Emissions	16
7.5.1 E.U.T. Operation	16
7.5.2 Test Mode Description	16
7.5.3 Test Setup Diagram	16
7.5.4 Measurement Procedure and Data	16
7.6 Radiated Emissions which fall in the restricted bands	17
7.6.1 E.U.T. Operation	17
7.6.2 Test Mode Description	17
7.6.3 Test Setup Diagram	17
7.6.4 Measurement Procedure and Data	18
7.7 Radiated Spurious Emissions (Below 1GHz)	21
7.7.1 E.U.T. Operation	21



7.7.2 Test Mode Description	21
7.7.3 Test Setup Diagram.....	21
7.7.4 Measurement Procedure and Data	22
7.8 Radiated Spurious Emissions (Above 1GHz).....	27
7.8.1 E.U.T. Operation	27
7.8.2 Test Mode Description	27
7.8.3 Test Setup Diagram.....	28
7.8.4 Measurement Procedure and Data	29
8 Test Setup Photo	37
9 EUT Constructional Details (EUT Photos)	37
10 Appendix	38



4 General Information

4.1 Details of E.U.T.

Power supply:	DC 3.3V
Frequency Range:	2402MHz to 2480MHz
Bluetooth Version:	V5.0
This test report is for BLE mode, For ANT1, ANT2	
Modulation Type:	GFSK
Channel Spacing:	2MHz
Date Rate:	1Mbps
Number of Channels:	40
Sample Type:	Portable device
Antenna Type:	PIFA Antenna
Antenna Gain:	ANT1:3 dBi ANT2:3 dBi
Hardware Version	N/A
Software and Firmware Version	N/A
Sample No.:	BTEK231124008AE-01
Remark: The information in this section is provided by the applicant or manufacturer, BANTEK is not liable to the accuracy, suitability, reliability or/and integrity of the information.	

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
/	/	/	/

4.3 Measurement Uncertainty

Test Item	Measurement Uncertainty
Conducted Peak Output Power	$\pm 0.76\text{dB}$
Minimum 6dB Bandwidth	$\pm 3\%$
Power Spectrum Density	$\pm 2.9\text{dB}$
Conducted Band Edges Measurement	$\pm 0.8\text{dB}$
Conducted Spurious Emissions	$\pm 0.8\text{dB}$
Radiated Emissions which fall in the restricted bands	$\pm 5.1\text{dB}$ (1GHz-6GHz); $\pm 5.2\text{dB}$ (above 6GHz)
Radiated Spurious Emissions (Below 1GHz)	$\pm 5.1\text{dB}$
Radiated Spurious Emissions (Above 1GHz)	$\pm 5.1\text{dB}$ (1GHz-6GHz); $\pm 5.2\text{dB}$ (above 6GHz)



4.4 Test Location

All tests were performed at:

Shenzhen BANTEK Testing Co., Ltd.

A5&A6, Building B1&B2, No.45 Gangtou Road, Bogang Community, Shajing Street, Bao'an District, Shenzhen, Guangdong, China 518104

Tel: +86 0755-2334 4200 Fax: +86 0755-2334 4200

FCC Registration Number: 264293

Designation Number: CN1356

No tests were sub-contracted.

4.5 Deviation from Standards

None

4.6 Abnormalities from Standard Conditions

None



5 Equipment List

Conducted Peak Output Power					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Power Meter (U2021XA_Ch2)	Agilent Technologies	U2021XA_Ch2	SEM009-02	2023-06-12	2024-06-11
6dB Attenuator	HP	8491A	EMC2062	2023-06-12	2024-06-11
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS-EMC	0.8M	EMC2136	2023-06-12	2024-06-11

Minimum 6dB Bandwidth					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EXA Signal Analyzer(10Hz-44GHz)	Agilent Technologies	N9010A	EMC2138	2023-06-12	2024-06-11
6dB Attenuator	HP	8491A	EMC2062	2023-06-12	2024-06-11
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS-EMC	0.8M	EMC2136	2023-06-12	2024-06-11

Power Spectrum Density					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EXA Signal Analyzer(10Hz-44GHz)	Agilent Technologies	N9010A	EMC2138	2023-06-12	2024-06-11
6dB Attenuator	HP	8491A	EMC2062	2023-06-12	2024-06-11
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS-EMC	0.8M	EMC2136	2023-06-12	2024-06-11



Conducted Band Edges Measurement					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EXA Signal Analyzer(10Hz-44GHz)	Agilent Technologies	N9010A	EMC2138	2023-06-12	2024-06-11
6dB Attenuator	HP	8491A	EMC2062	2023-06-12	2024-06-11
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS-EMC	0.8M	EMC2136	2023-06-12	2024-06-11

Conducted Spurious Emissions					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EXA Signal Analyzer(10Hz-44GHz)	Agilent Technologies	N9010A	EMC2138	2023-06-12	2024-06-11
6dB Attenuator	HP	8491A	EMC2062	2023-06-12	2024-06-11
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS-EMC	0.8M	EMC2136	2023-06-12	2024-06-11

Radiated Emissions which fall in the restricted bands					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EMI Test Receiver(20Hz-26.5GHz)	Rohde & Schwarz	ESIB26	EMC0522	2023-06-12	2024-06-11
Chamber cable(Above 1GHz)	Scoflex	KMKM-8.0m	EMC0545	2023-06-12	2024-06-11
Horn Antenna(1GHz-18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	EMC2026	2022-06-15	2025-06-14
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2023-06-12	2024-06-11
2.4GHz Filter	Micro-Tronics	BRM 50702	EMC2069	2023-06-12	2024-06-11
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2022-03-03	2025-03-02
MXE EMI Receiver(10Hz-8.4GHz)	Keysight	N9038A	EMC2139	2023-06-12	2024-06-11
EXA Signal Analyzer(10Hz-44GHz)	Keysight	N9010A	EMC2138	2023-06-12	2024-06-11
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A
Notch Filter (5150-5880)	Mico-Tronics	BRM50716	EMC2168	2023-06-12	2024-06-11
Horn Antenna(14-40GHz)	SCHWARZBECK	BBHA 9170	EMC2041	2022-06-15	2025-06-14
Microwave Broadband Preamplifier (18-40GHz)	SCHWARZBECK	BBV 9721	EMC2172	2023-06-12	2024-06-11



Radiated Spurious Emissions Below 1GHz					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Chamber cable	HangTianXing	N/A	EMC0542	2023-06-12	2024-06-11
Trilog Broadband Antenna(25MHz-1GHz)-Lab	SCHWARZBECK MESS-ELEKTRONIK	VULB 9168	SEM003-18	2022-06-15	2025-06-14
Amplifier(9kHz-1.3GHz)	HP	8447F	EMC2065	2023-06-12	2024-06-11
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2022-03-03	2025-03-02
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A
EXA Signal Analyzer(10Hz-44GHz)	Keysight	N9010A	EMC2138	2023-06-12	2024-06-11

Radiated Spurious Emissions (Above 1GHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EMI Test Receiver(20Hz-26.5GHz)	Rohde & Schwarz	ESIB26	EMC0522	2023-06-12	2024-06-11
Chamber cable(Above 1GHz)	Scoflex	KMKM-8.0m	EMC0545	2023-06-12	2024-06-11
Horn Antenna(1GHz-18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	EMC2026	2022-06-15	2025-06-14
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2023-06-12	2024-06-11
2.4GHz Filter	Micro-Tronics	BRM 50702	EMC2069	2023-06-12	2024-06-11
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2022-03-03	2025-03-02
MXE EMI Receiver(10Hz-8.4GHz)	Keysight	N9038A	EMC2139	2023-06-12	2024-06-11
EXA Signal Analyzer(10Hz-44GHz)	Keysight	N9010A	EMC2138	2023-06-12	2024-06-11
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A
Notch Filter (5150-5880)	Mico-Tronics	BRM50716	EMC2168	2023-06-12	2024-06-11
Horn Antenna(14-40GHz)	SCHWARZBECK	BBHA 9170	EMC2041	2022-06-15	2025-06-14
Microwave Broadband Preamplifier (18-40GHz)	SCHWARZBECK	BBV 9721	EMC2172	2023-06-12	2024-06-11

General used equipment					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
DMM	Fluke	73	EMC0006	2023-06-12	2024-06-11
DMM	Fluke	73	EMC0007	2023-06-12	2024-06-11



6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)

6.1.2 Conclusion

Standard Requirement:

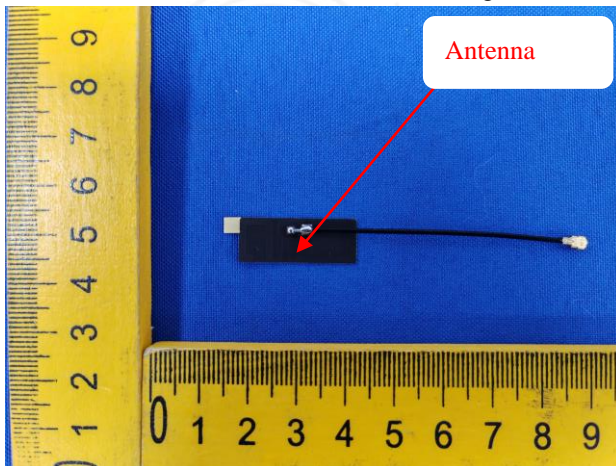
Testing shall be performed using the highest gain antenna of each combination of licence-exempt transmitter and antenna type, with the transmitter output power set at the maximum level. When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna manufacturer.

15.247(b) (4) requirement:

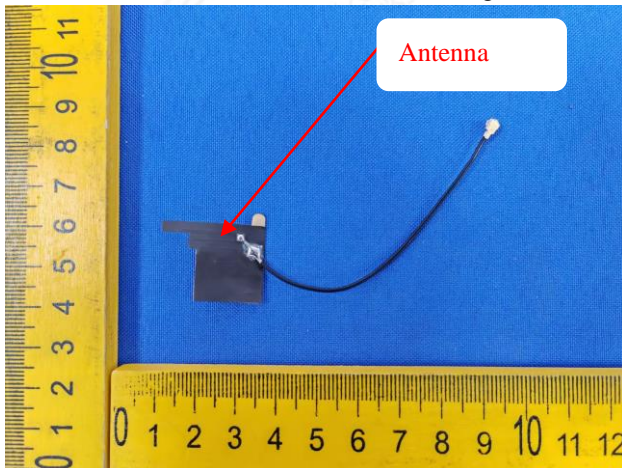
The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna:

The antenna is a PIFA ANT1. The best case gain of the antenna is 3 dBi.



The antenna is a PIFA ANT2. The best case gain of the antenna is 3 dBi.



7 Radio Spectrum Matter Test Results

7.1 Conducted Peak Output Power

Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(3)

Test Method: ANSI C63.10 (2013) Section 11.9.1.3

Limit:

Frequency range(MHz)	Output power of the intentional radiator(watt)
902-928	1 for ≥ 50 hopping channels
	0.25 for $25 \leq$ 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

7.1.1 E.U.T. Operation

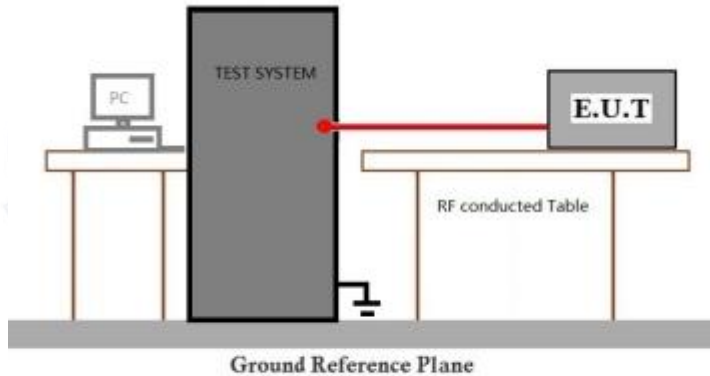
Operating Environment:

Temperature: 20.5 °C Humidity: 50.0 % RH Pressure: Atmospheric 1010 mbar

7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation.

7.1.3 Test Setup Diagram



7.1.4 Measurement Procedure and Data

cable loss=0.9dB

Please Refer to Appendix for Details



7.2 Minimum 6dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.247a(2)
 Test Method: ANSI C63.10 (2013) Section 11.8.1
 Limit: ≥ 500 kHz

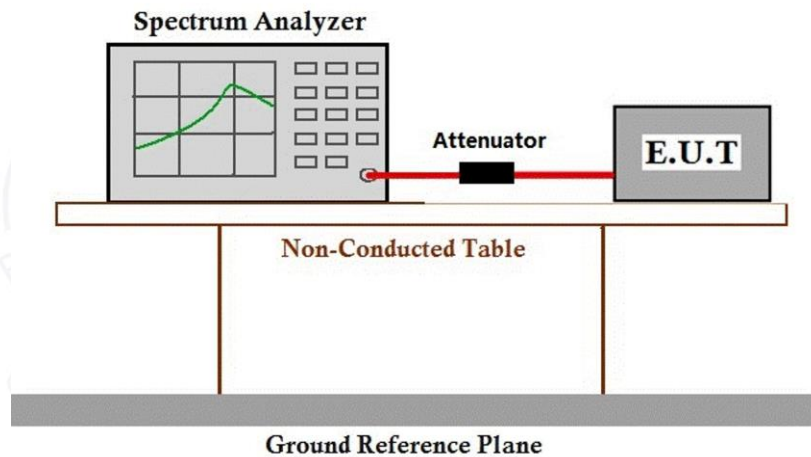
7.2.1 E.U.T. Operation

Operating Environment:
 Temperature: 20.5 °C Humidity: 50.0 % RH Atmospheric Pressure: 1010 mbar

7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation.

7.2.3 Test Setup Diagram



7.2.4 Measurement Procedure and Data

cable loss=0.83dB

Please Refer to Appendix for Details



7.3 Power Spectrum Density

Test Requirement 47 CFR Part 15, Subpart C 15.247(e)

Test Method: ANSI C63.10 (2013) Section 11.10.2

Limit:

≤8dBm in any 3 kHz band during any time interval of continuous transmission

7.3.1 E.U.T. Operation

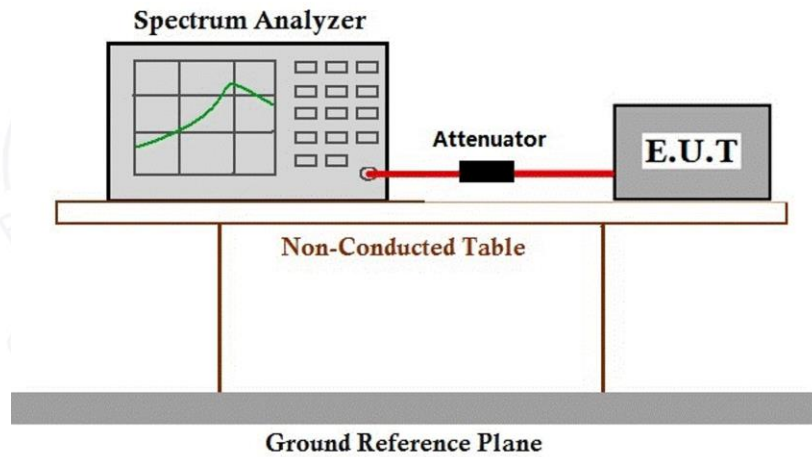
Operating Environment:

Temperature: 20.5 °C Humidity: 50.0 % RH Atmospheric Pressure: 1010 mbar

7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation.

7.3.3 Test Setup Diagram



7.3.4 Measurement Procedure and Data

cable loss=0.83dB

Please Refer to Appendix for Details



7.4 Conducted Band Edges Measurement

Test Requirement 47 CFR Part 15, Subpart C 15.247(d)
 Test Method: ANSI C63.10 (2013) Section 11.13.3.2
 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)).

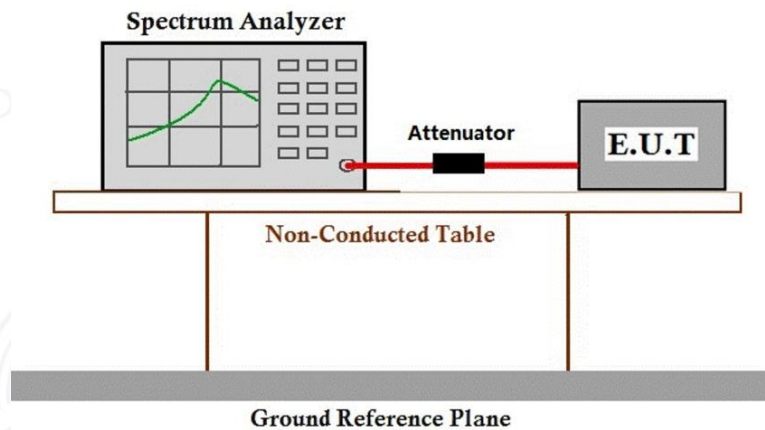
7.4.1 E.U.T. Operation

Operating Environment:
 Temperature: 20.5 °C Humidity: 50.0 % RH Atmospheric Pressure: 1010 mbar

7.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation.

7.4.3 Test Setup Diagram



7.4.4 Measurement Procedure and Data

cable loss=0.83dB

Please Refer to Appendix for Details



7.5 Conducted Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.247(d)

Test Method: ANSI C63.10 (2013) Section 11.11

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)).

7.5.1 E.U.T. Operation

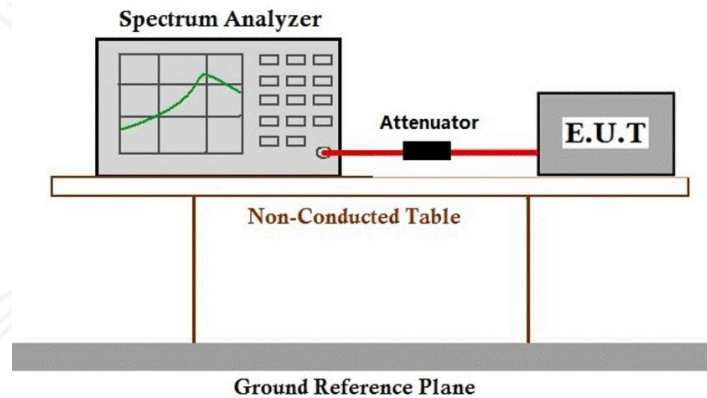
Operating Environment:

Temperature: 20.5 °C Humidity: 50.0 % RH Atmospheric Pressure: 1010 mbar

7.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation.

7.5.3 Test Setup Diagram



7.5.4 Measurement Procedure and Data

cable loss=0.83dB

Please Refer to Appendix for Details



7.6 Radiated Emissions which fall in the restricted bands

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2013) Section 6.10.5

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.

7.6.1 E.U.T. Operation

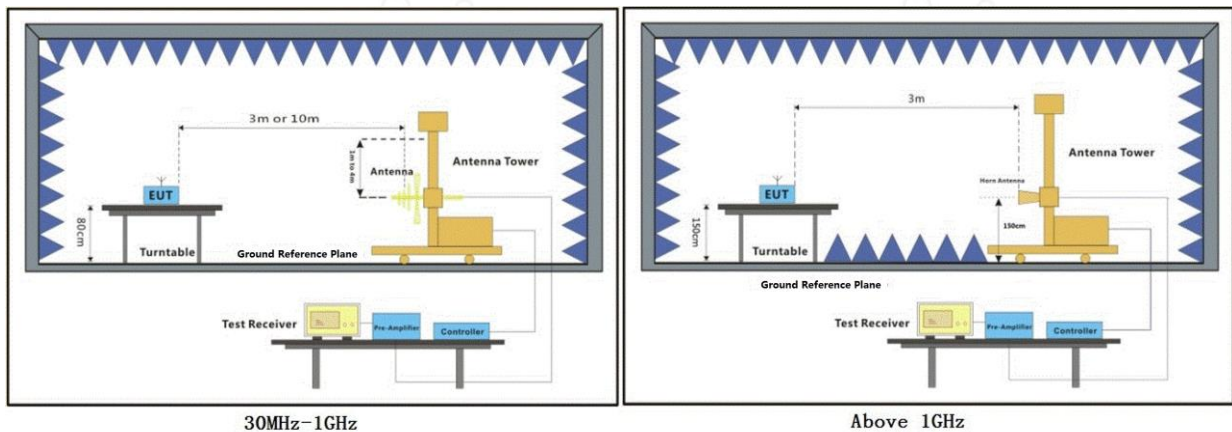
Operating Environment:

Temperature: 21.4 °C Humidity: 54.3 % RH Atmospheric Pressure: 1010 mbar

7.6.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation.

7.6.3 Test Setup Diagram



7.6.4 Measurement Procedure and Data

- 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 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: $\text{Level} = \text{Read Level} + \text{Cable Loss} + \text{Antenna Factor} - \text{Preamp Factor}$

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.



Note: Level = Reading level + Factor

All mode had been tested, only the worst 1M mode is in the report.

For ANT 1

Test Mode: 01; Polarity: Horizontal; Modulation: GFSK; Channel: Low

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2310.000	68.08	-30.59	37.49	74.00	-36.51	peak	P
2	2390.000	69.80	-30.49	39.31	74.00	-34.69	peak	P
3	2400.000	77.86	-30.48	47.38	74.00	-26.62	peak	P

Test Mode: 01; Polarity: Vertical; Modulation: GFSK; Channel: Low

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2310.000	67.93	-30.59	37.34	74.00	-36.66	peak	P
2	2390.000	69.00	-30.49	38.51	74.00	-35.49	peak	P
3	2400.000	78.93	-30.48	48.45	74.00	-25.55	peak	P

Test Mode: 01; Polarity: Horizontal; Modulation: GFSK; Channel: High

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2483.500	79.32	-30.39	48.93	74.00	-25.07	peak	P
2	2500.000	70.58	-30.37	40.21	74.00	-33.79	peak	P

Test Mode: 01; Polarity: Vertical; Modulation: GFSK; Channel: High

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2483.500	79.13	-30.39	48.74	74.00	-25.26	peak	P
2	2500.000	71.94	-30.37	41.57	74.00	-32.43	peak	P



For ANT 2

All mode had been tested, only the worst 1M mode is in the report.

Test Mode: 01; Polarity: Horizontal; Modulation: GFSK; Channel: Low

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2310.000	68.48	-30.59	37.89	74.00	-36.11	peak	P
2	2390.000	70.06	-30.49	39.57	74.00	-34.43	peak	P
3	2400.000	78.61	-30.48	48.13	74.00	-25.87	peak	P

Test Mode: 01; Polarity: Vertical; Modulation: GFSK; Channel: Low

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2310.000	68.74	-30.59	38.15	74.00	-35.85	peak	P
2	2390.000	69.39	-30.49	38.90	74.00	-35.10	peak	P
3	2400.000	77.67	-30.48	47.19	74.00	-26.81	peak	P

Test Mode: 01; Polarity: Horizontal; Modulation: GFSK; Channel: High

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2483.500	80.18	-30.39	49.79	74.00	-24.21	peak	P
2	2500.000	71.07	-30.37	40.70	74.00	-33.30	peak	P

Test Mode: 01; Polarity: Vertical; Modulation: GFSK; Channel: High

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2483.500	80.86	-30.39	50.47	74.00	-23.53	peak	P
2	2500.000	71.82	-30.37	41.45	74.00	-32.55	peak	P



7.7 Radiated Spurious Emissions (Below 1GHz)

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2013) Section 6.4,6.5,6.6

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.

7.7.1 E.U.T. Operation

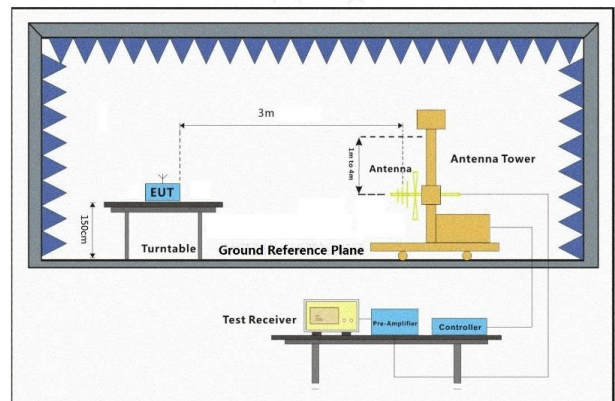
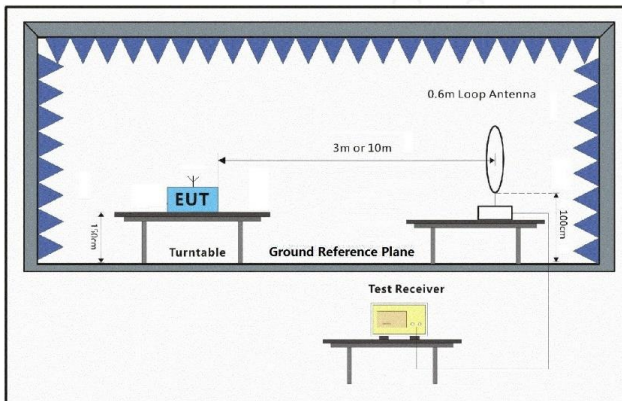
Operating Environment:

Temperature: 25.5 °C Humidity: 68.6 % RH Atmospheric Pressure: 1010 mbar

7.7.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation.

7.7.3 Test Setup Diagram



7.7.4 Measurement Procedure and Data

- 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. 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.
- c. 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.
- d. 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.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. 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.
- g. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- h. 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.
- i. Repeat above procedures until all frequencies measured was complete.

Remark:

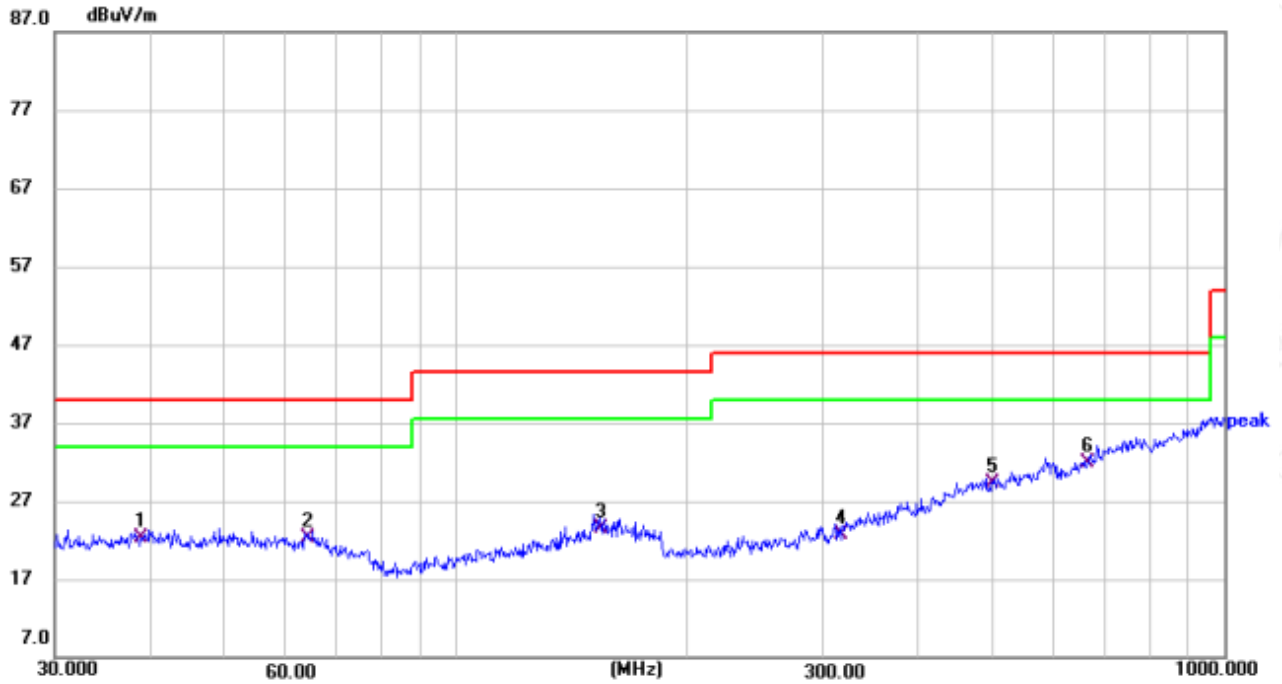
- 1) Through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.
- 2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
Final Test Level = Reading Level + Factor
- 3) Scan from 9kHz to 1 GHz, the disturbance 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.



For ANT 1

All mode had been tested, only the worst 1M mode is in the report.

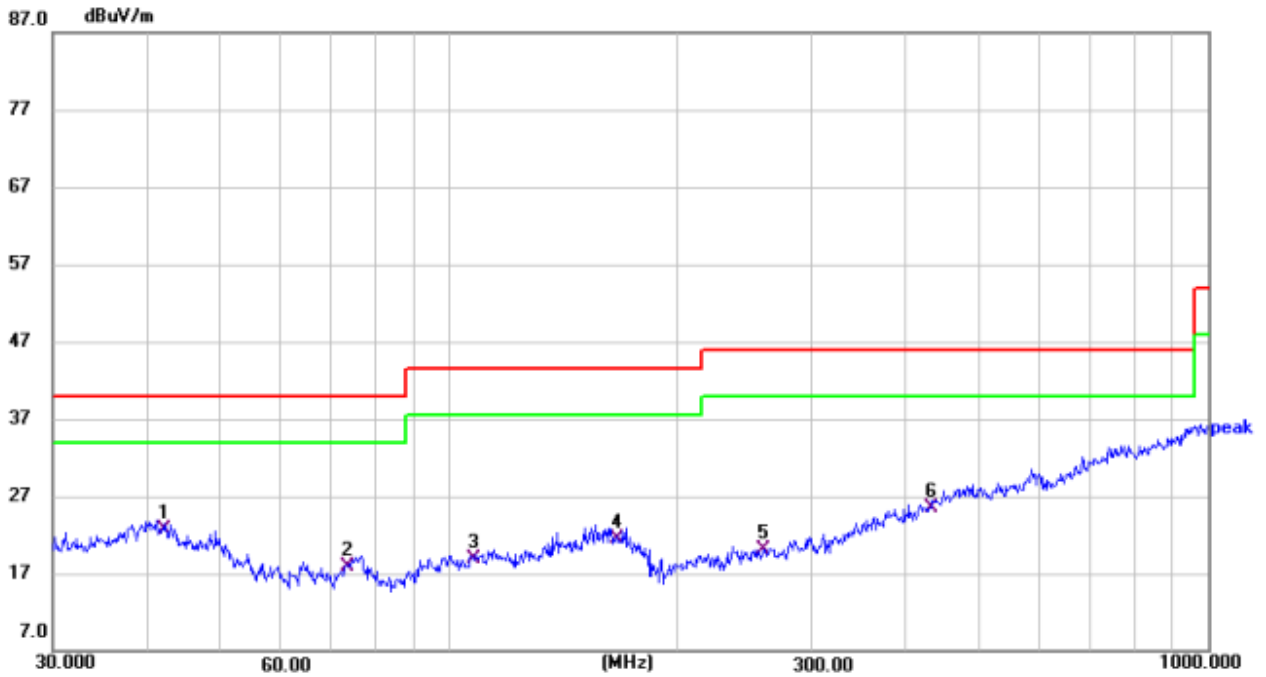
Test Mode: 00; Polarity: Horizontal; Modulation: GFSK; Channel: High



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	38.8878	39.34	-17.01	22.33	40.00	-17.67	QP
2	63.9827	41.12	-18.87	22.25	40.00	-17.75	QP
3	154.2785	40.59	-17.05	23.54	43.50	-19.96	QP
4	317.7010	39.85	-17.06	22.79	46.00	-23.21	QP
5	499.4246	43.13	-13.79	29.34	46.00	-16.66	QP
6 *	663.4728	42.35	-10.49	31.86	46.00	-14.14	QP



Test Mode: 00; Polarity: Vertical; Modulation: GFSK; Channel: High



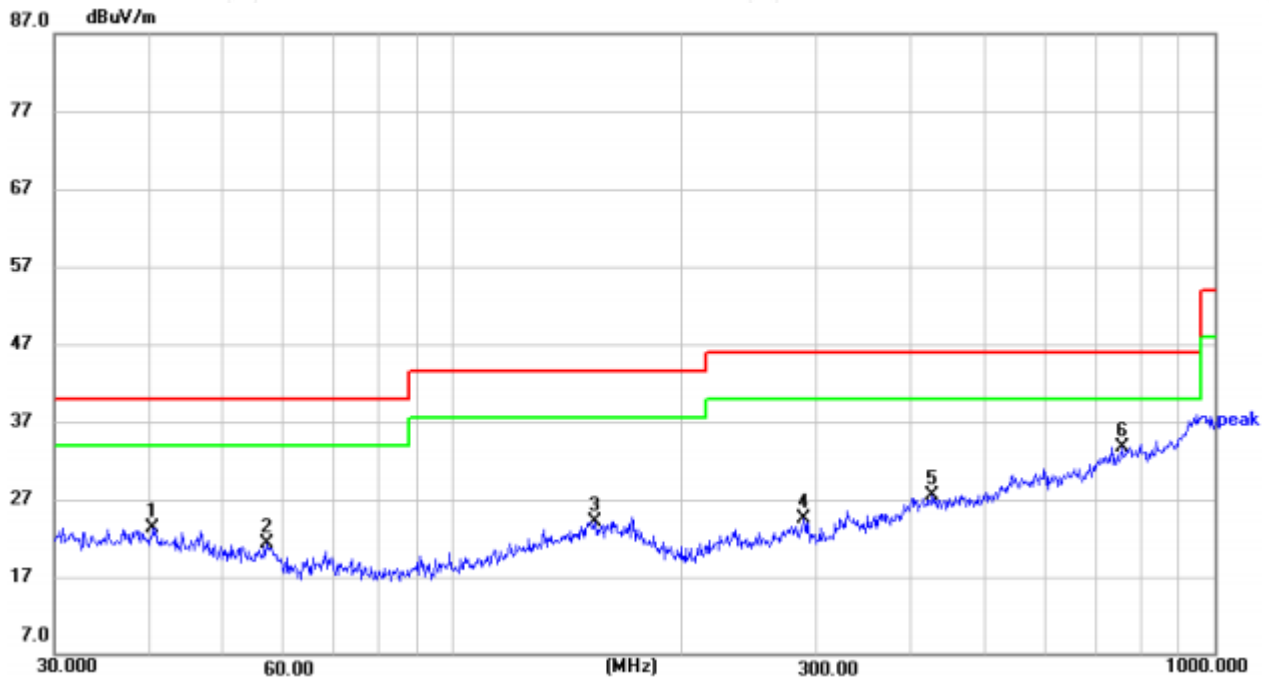
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	42.0065	39.95	-17.18	22.77	40.00	-17.23	QP
2	73.3593	38.65	-20.72	17.93	40.00	-22.07	QP
3	107.5100	38.92	-20.09	18.83	43.50	-24.67	QP
4	166.0680	39.42	-17.86	21.56	43.50	-21.94	QP
5	259.2336	38.97	-18.88	20.09	46.00	-25.91	QP
6	431.0314	40.16	-14.60	25.56	46.00	-20.44	QP



For ANT2

All mode had been tested, only the worst 1M mode is in the report.

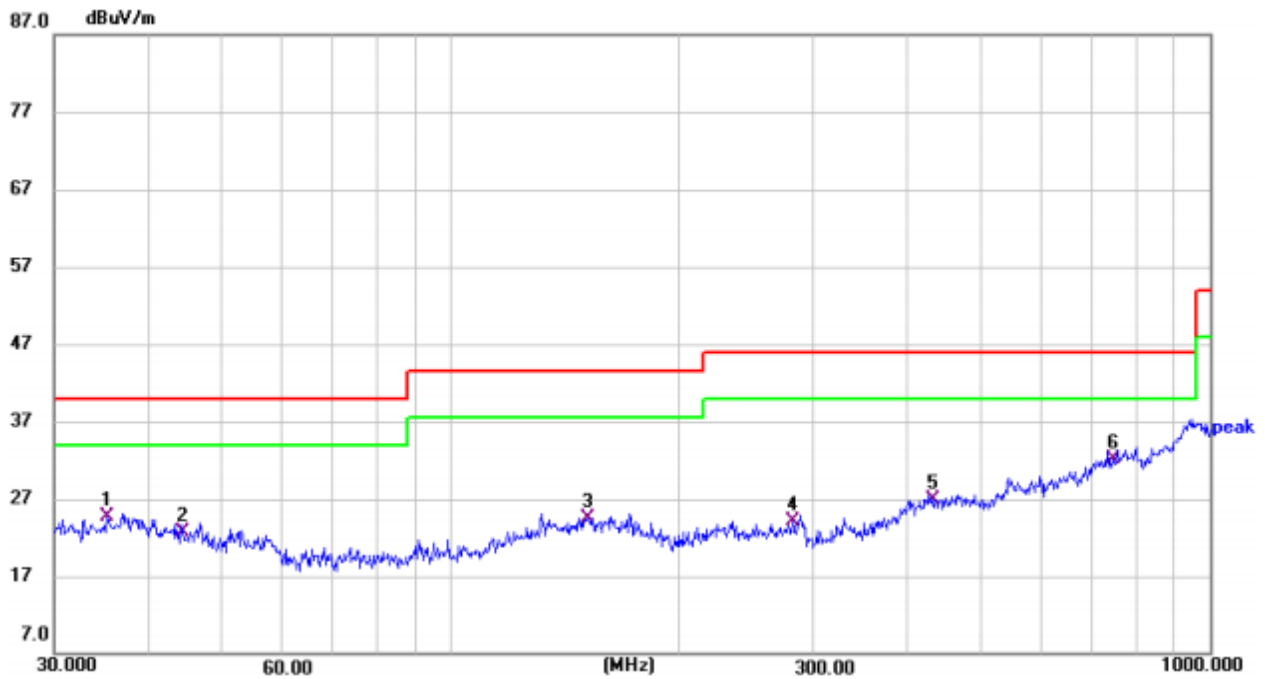
Test Mode: 00; Polarity: Horizontal; Modulation: GFSK; Channel: High



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	40.4170	40.35	-16.97	23.38	40.00	-16.62	peak
2	56.9911	39.37	-18.04	21.33	40.00	-18.67	peak
3	153.7384	41.10	-17.02	24.08	43.50	-19.42	peak
4	289.0020	42.48	-18.05	24.43	46.00	-21.57	peak
5	426.5210	42.20	-14.68	27.52	46.00	-18.48	peak
6 *	755.3872	42.56	-8.76	33.80	46.00	-12.20	peak



Test Mode: 00; Polarity: Vertical; Modulation: GFSK; Channel: High



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	35.2511	42.23	-17.57	24.66	40.00	-15.34	QP
2	44.2751	40.54	-17.86	22.68	40.00	-17.32	QP
3	151.5971	41.36	-16.85	24.51	43.50	-18.99	QP
4	281.9945	42.22	-18.17	24.05	46.00	-21.95	QP
5	431.0314	41.59	-14.60	26.99	46.00	-19.01	QP
6 *	747.4823	41.05	-8.91	32.14	46.00	-13.86	QP

Note:

- 1) Pre-scan all modes and recorded the worst case results in this report (High Channel).
- 2) Emission level (dBuV/m) = 20 log Emission level (uV/m).
- 3) Level= Reading+ Factor, Margin= Level- Limit, Factor= Antenna Factor Cable Loss-Preamp Factor



7.8 Radiated Spurious Emissions (Above 1GHz)

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2013) Section 6.4,6.5,6.6

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.

7.8.1 E.U.T. Operation

Operating Environment:

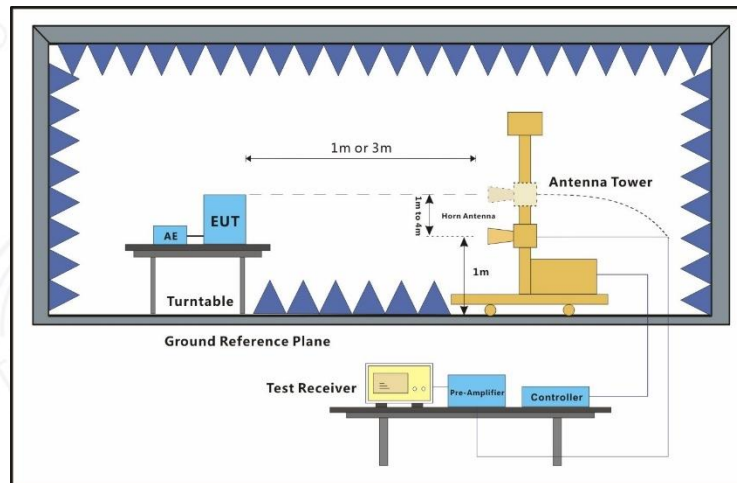
Temperature: 21.4 °C Humidity: 54.3 % RH Atmospheric Pressure: 1010 mbar

7.8.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation.



7.8.3 Test Setup Diagram



7.8.4 Measurement Procedure and Data

- a. 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.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. 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.
- d. 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 and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. 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.
- g. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- h. 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.
- i. Repeat above procedures until all frequencies measured was complete.

Remark:

1) 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 = Level= Reading Level + Factor

2) Scan from 1GHz to 25GHz, the disturbance above 18GHz 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.

3) 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.



For ANT1

TM00 / Polarization: Horizontal / Modulation: 1M/ CH: L

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2914.309	70.02	-28.75	41.26	74.00	-32.74	peak	P
2	4276.210	68.60	-28.02	40.59	74.00	-33.41	peak	P
3	6086.294	65.69	-26.11	39.59	74.00	-34.41	peak	P
4	8645.832	69.16	-24.43	44.73	74.00	-29.27	peak	P
5	11047.488	68.16	-23.58	44.58	74.00	-29.42	peak	P
6	14217.152	70.19	-20.61	49.58	74.00	-24.42	peak	P

TM00 / Polarization: Horizontal / Modulation: 1M/ CH: L

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2972.348	66.85	-30.34	36.51	74.00	-37.49	peak	P
2	4313.316	68.38	-27.95	40.42	74.00	-33.58	peak	P
3	6353.163	68.14	-26.30	41.84	74.00	-32.16	peak	P
4	8575.334	68.89	-24.51	44.38	74.00	-29.62	peak	P
5	11286.354	67.93	-23.82	44.10	74.00	-29.90	peak	P
6	14956.097	71.18	-20.60	50.58	74.00	-23.42	peak	P

TM00 / Polarization: Horizontal / Modulation: 1M/ CH: M

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2914.701	69.97	-30.02	39.95	74.00	-34.05	peak	P
2	4276.241	67.58	-28.83	38.76	74.00	-35.24	peak	P
3	6084.539	64.48	-25.86	38.62	74.00	-35.38	peak	P
4	8646.080	70.00	-24.33	45.66	74.00	-28.34	peak	P
5	11046.711	68.76	-22.47	46.29	74.00	-27.71	peak	P
6	14217.500	70.01	-21.56	48.45	74.00	-25.55	peak	P

TM00 / Polarization: Horizontal / Modulation: 1M/ CH: M

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2972.369	67.00	-30.18	36.82	74.00	-37.18	peak	P
2	4313.579	69.11	-27.96	41.15	74.00	-32.85	peak	P
3	6352.743	67.28	-25.91	41.37	74.00	-32.63	peak	P
4	8576.567	70.39	-25.63	44.76	74.00	-29.24	peak	P
5	11286.856	68.39	-24.01	44.38	74.00	-29.62	peak	P
6	14956.172	71.49	-19.84	51.64	74.00	-22.36	peak	P



TM00 / Polarization: Horizontal / Modulation: 1M/ CH: H

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2914.844	70.02	-30.52	39.50	74.00	-34.50	peak	P
2	4277.210	69.02	-28.21	40.81	74.00	-33.19	peak	P
3	6084.836	65.41	-26.13	39.28	74.00	-34.72	peak	P
4	8645.210	69.34	-24.40	44.94	74.00	-29.06	peak	P
5	11047.881	68.17	-23.37	44.80	74.00	-29.20	peak	P
6	14218.734	71.49	-22.01	49.48	74.00	-24.52	peak	P

TM00 / Polarization: Horizontal / Modulation: 1M/ CH: H

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2973.014	67.39	-28.73	38.66	74.00	-35.34	peak	P
2	4313.217	67.85	-28.29	39.56	74.00	-34.44	peak	P
3	6352.891	67.01	-25.59	41.42	74.00	-32.58	peak	P
4	8575.698	69.59	-24.96	44.63	74.00	-29.37	peak	P
5	11287.132	68.33	-22.88	45.45	74.00	-28.55	peak	P
6	14955.550	71.96	-21.19	50.77	74.00	-23.23	peak	P

TM00 / Polarization: Horizontal / Modulation: 2M/ CH: L

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2914.978	69.95	-30.29	39.67	74.00	-34.33	peak	P
2	4277.842	67.58	-28.98	38.60	74.00	-35.40	peak	P
3	6085.850	64.78	-25.71	39.07	74.00	-34.93	peak	P
4	8644.990	69.63	-25.53	44.09	74.00	-29.91	peak	P
5	11047.661	68.27	-22.59	45.68	74.00	-28.32	peak	P
6	14217.828	69.82	-21.43	48.38	74.00	-25.62	peak	P

TM00 / Polarization: Horizontal / Modulation: 2M/ CH: L

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2973.184	66.73	-30.08	36.65	74.00	-37.35	peak	P
2	4314.085	68.52	-29.90	38.62	74.00	-35.38	peak	P
3	6352.703	67.18	-25.28	41.90	74.00	-32.10	peak	P
4	8576.955	69.88	-26.01	43.87	74.00	-30.13	peak	P
5	11285.422	67.84	-23.13	44.71	74.00	-29.29	peak	P
6	14954.887	71.37	-20.74	50.63	74.00	-23.37	peak	P



TM00 / Polarization: Horizontal / Modulation: 2M/ CH: M

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2914.392	69.01	-30.01	39.00	74.00	-35.00	peak	P
2	4276.153	68.70	-29.07	39.64	74.00	-34.36	peak	P
3	6085.211	64.72	-26.18	38.55	74.00	-35.45	peak	P
4	8646.323	70.32	-24.71	45.61	74.00	-28.39	peak	P
5	11046.367	68.77	-23.76	45.01	74.00	-28.99	peak	P
6	14217.521	71.25	-20.28	50.97	74.00	-23.03	peak	P

TM00 / Polarization: Horizontal / Modulation: 2M/ CH: M

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2973.687	67.10	-30.24	36.86	74.00	-37.14	peak	P
2	4312.595	68.17	-28.78	39.39	74.00	-34.61	peak	P
3	6353.304	66.85	-25.80	41.05	74.00	-32.95	peak	P
4	8576.971	70.45	-25.61	44.84	74.00	-29.16	peak	P
5	11285.977	68.62	-23.41	45.21	74.00	-28.79	peak	P
6	14954.799	71.37	-20.71	50.67	74.00	-23.33	peak	P

TM00 / Polarization: Horizontal / Modulation: 2M/ CH: H

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2915.376	68.85	-30.08	38.77	74.00	-35.23	peak	P
2	4276.752	68.25	-29.47	38.78	74.00	-35.22	peak	P
3	6084.724	65.85	-25.38	40.46	74.00	-33.54	peak	P
4	8646.409	70.61	-25.89	44.72	74.00	-29.28	peak	P
5	11047.157	67.22	-23.75	43.47	74.00	-30.53	peak	P
6	14218.394	71.31	-21.74	49.58	74.00	-24.42	peak	P

TM00 / Polarization: Horizontal / Modulation: 2M/ CH: H

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2973.715	66.40	-28.96	37.43	74.00	-36.57	peak	P
2	4313.358	68.96	-29.73	39.22	74.00	-34.78	peak	P
3	6354.128	66.58	-26.03	40.55	74.00	-33.45	peak	P
4	8576.793	70.62	-25.31	45.31	74.00	-28.69	peak	P
5	11285.892	68.89	-22.42	46.47	74.00	-27.53	peak	P
6	14956.430	71.83	-20.05	51.78	74.00	-22.22	peak	P



For ANT2

TM00 / Polarization: Horizontal / Modulation: 1M/ CH: L

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2915.245	69.51	-29.52	40.00	74.00	-34.00	peak	P
2	4276.908	67.70	-28.97	38.72	74.00	-35.28	peak	P
3	6086.025	64.33	-24.53	39.80	74.00	-34.20	peak	P
4	8646.114	69.08	-25.60	43.47	74.00	-30.53	peak	P
5	11046.397	68.50	-22.50	46.00	74.00	-28.00	peak	P
6	14218.781	70.76	-20.44	50.32	74.00	-23.68	peak	P

TM00 / Polarization: Horizontal / Modulation: 1M/ CH: L

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2972.778	66.07	-30.03	36.03	74.00	-37.97	peak	P
2	4312.123	69.41	-28.74	40.67	74.00	-33.33	peak	P
3	6353.602	68.12	-25.57	42.55	74.00	-31.45	peak	P
4	8575.350	70.73	-24.63	46.10	74.00	-27.90	peak	P
5	11285.174	67.31	-24.02	43.29	74.00	-30.71	peak	P
6	14955.589	71.58	-20.61	50.97	74.00	-23.03	peak	P

TM00 / Polarization: Horizontal / Modulation: 1M/ CH: M

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2915.248	69.82	-28.81	41.02	74.00	-32.98	peak	P
2	4278.066	67.97	-28.43	39.53	74.00	-34.47	peak	P
3	6085.810	64.35	-25.99	38.36	74.00	-35.64	peak	P
4	8645.917	69.54	-25.62	43.92	74.00	-30.08	peak	P
5	11046.850	68.63	-24.23	44.40	74.00	-29.60	peak	P
6	14217.859	71.76	-20.45	51.30	74.00	-22.70	peak	P

TM00 / Polarization: Horizontal / Modulation: 1M/ CH: M

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2972.742	67.86	-29.03	38.82	74.00	-35.18	peak	P
2	4312.889	69.79	-29.30	40.49	74.00	-33.51	peak	P
3	6353.444	68.03	-25.09	42.94	74.00	-31.06	peak	P
4	8577.091	69.85	-25.18	44.67	74.00	-29.33	peak	P
5	11285.219	68.52	-23.59	44.93	74.00	-29.07	peak	P
6	14955.521	70.65	-19.89	50.76	74.00	-23.24	peak	P



TM00 / Polarization: Horizontal / Modulation: 1M/ CH: H

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2914.846	69.81	-29.75	40.06	74.00	-33.94	peak	P
2	4276.657	67.91	-29.05	38.86	74.00	-35.14	peak	P
3	6085.304	65.75	-26.25	39.51	74.00	-34.49	peak	P
4	8645.042	69.03	-25.07	43.96	74.00	-30.04	peak	P
5	11047.428	67.78	-23.15	44.62	74.00	-29.38	peak	P
6	14219.035	70.77	-21.16	49.62	74.00	-24.38	peak	P

TM00 / Polarization: Horizontal / Modulation: 1M/ CH: H

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2973.422	66.67	-28.69	37.99	74.00	-36.01	peak	P
2	4313.804	68.75	-29.53	39.22	74.00	-34.78	peak	P
3	6353.136	67.57	-25.10	42.47	74.00	-31.53	peak	P
4	8575.621	68.82	-25.61	43.20	74.00	-30.80	peak	P
5	11286.101	68.89	-23.39	45.50	74.00	-28.50	peak	P
6	14956.604	70.29	-19.32	50.98	74.00	-23.02	peak	P

TM00 / Polarization: Horizontal / Modulation: 2M/ CH: L

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2914.604	70.04	-29.31	40.73	74.00	-33.27	peak	P
2	4276.662	67.76	-28.39	39.37	74.00	-34.63	peak	P
3	6085.926	65.45	-24.90	40.55	74.00	-33.45	peak	P
4	8645.755	70.64	-24.33	46.31	74.00	-27.69	peak	P
5	11048.192	67.81	-23.59	44.22	74.00	-29.78	peak	P
6	14217.482	71.01	-20.36	50.66	74.00	-23.34	peak	P

TM00 / Polarization: Horizontal / Modulation: 2M/ CH: L

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2973.076	66.62	-28.95	37.67	74.00	-36.33	peak	P
2	4313.355	69.69	-29.62	40.07	74.00	-33.93	peak	P
3	6354.052	68.24	-25.53	42.72	74.00	-31.28	peak	P
4	8576.610	69.45	-24.83	44.62	74.00	-29.38	peak	P
5	11287.037	68.74	-24.23	44.50	74.00	-29.50	peak	P
6	14956.222	71.98	-21.25	50.73	74.00	-23.27	peak	P



TM00 / Polarization: Horizontal / Modulation: 2M/ CH: M

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2913.855	68.82	-30.27	38.55	74.00	-35.45	peak	P
2	4277.834	68.51	-28.87	39.64	74.00	-34.36	peak	P
3	6084.880	64.53	-25.98	38.55	74.00	-35.45	peak	P
4	8646.401	69.93	-25.58	44.35	74.00	-29.65	peak	P
5	11047.309	67.44	-22.70	44.73	74.00	-29.27	peak	P
6	14217.192	71.33	-21.53	49.80	74.00	-24.20	peak	P

TM00 / Polarization: Horizontal / Modulation: 2M/ CH: M

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2973.304	67.96	-29.80	38.16	74.00	-35.84	peak	P
2	4312.834	68.87	-29.65	39.22	74.00	-34.78	peak	P
3	6352.602	67.45	-24.58	42.87	74.00	-31.13	peak	P
4	8576.479	68.97	-26.09	42.88	74.00	-31.12	peak	P
5	11286.904	68.59	-24.18	44.41	74.00	-29.59	peak	P
6	14956.319	71.95	-21.11	50.84	74.00	-23.16	peak	P

TM00 / Polarization: Horizontal / Modulation: 2M/ CH: H

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2914.297	69.94	-30.39	39.55	74.00	-34.45	peak	P
2	4277.056	69.05	-29.27	39.78	74.00	-34.22	peak	P
3	6085.760	65.20	-25.95	39.25	74.00	-34.75	peak	P
4	8646.811	70.35	-25.63	44.71	74.00	-29.29	peak	P
5	11047.786	67.37	-22.77	44.60	74.00	-29.40	peak	P
6	14218.987	71.31	-20.46	50.85	74.00	-23.15	peak	P



TM00 / Polarization: Horizontal / Modulation: 2M/ CH: H

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2974.186	66.16	-29.28	36.88	74.00	-37.12	peak	P
2	4312.134	69.31	-27.98	41.33	74.00	-32.67	peak	P
3	6353.372	67.32	-25.12	42.20	74.00	-31.80	peak	P
4	8576.050	70.06	-24.33	45.73	74.00	-28.27	peak	P
5	11286.008	68.66	-23.73	44.93	74.00	-29.07	peak	P
6	14955.207	71.35	-19.58	51.77	74.00	-22.23	peak	P

Notes:

- 1).Measuring frequencies from 9 KHz~10th harmonic(ex.26GHz),at least have 20dB margin found between lowest internal used/generated frequency to 30 MHz.
- 2).Radiated emissions measured in frequency range from 9 KHz~10th harmonic (ex.26GHz)were made with an instrument using Peak detector mode.
- 3).18-25GHz at least have 20dB margin.No recording in the test report.
- 4) Level=Reading +Factor
Factor= Antenna Factor+ Cable Loss-Preamp Factor



8 Test Setup Photo

Refer to Appendix – Test Setup Photos.

9 EUT Constructional Details (EUT Photos)

Refer to Appendix EUT Photos

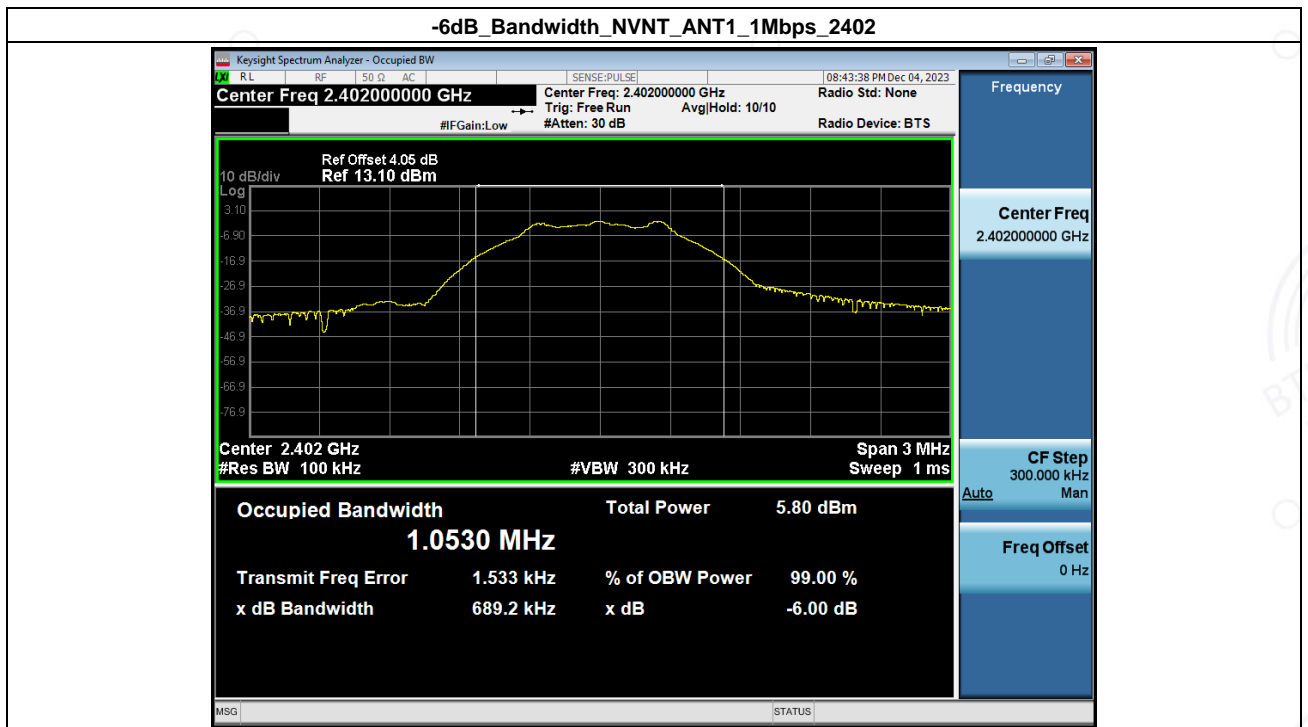


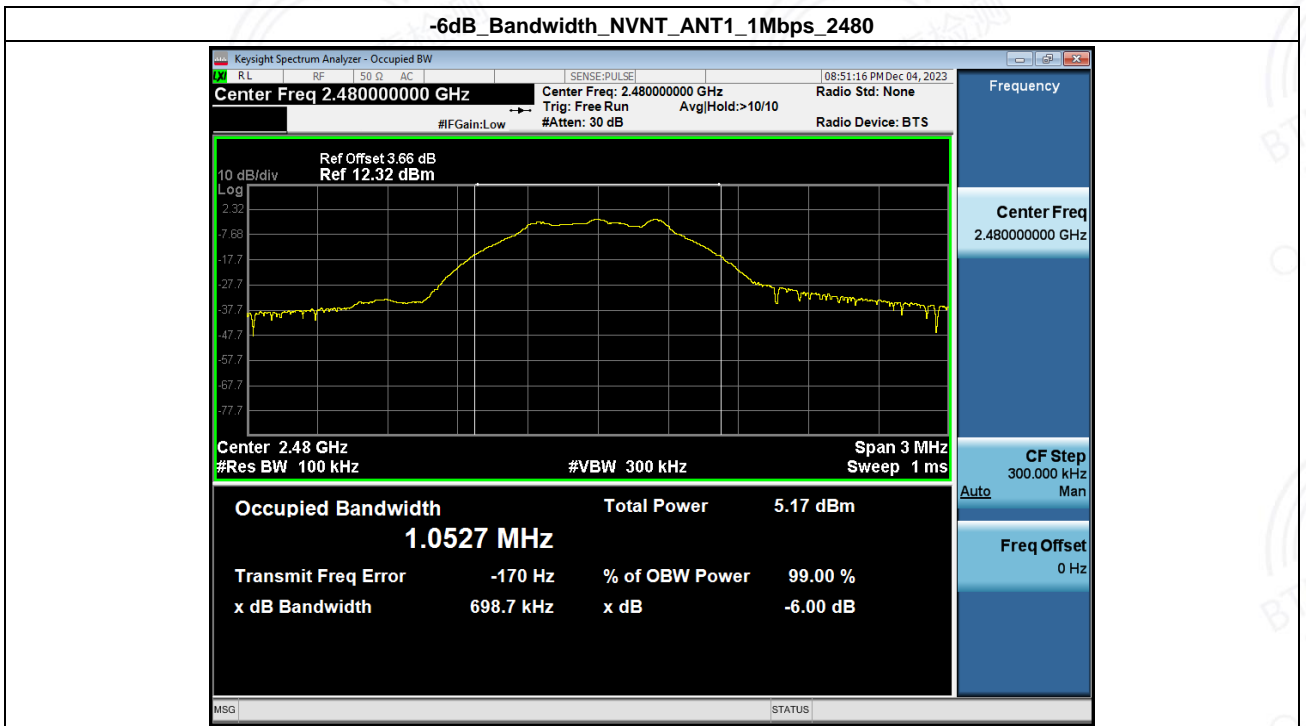
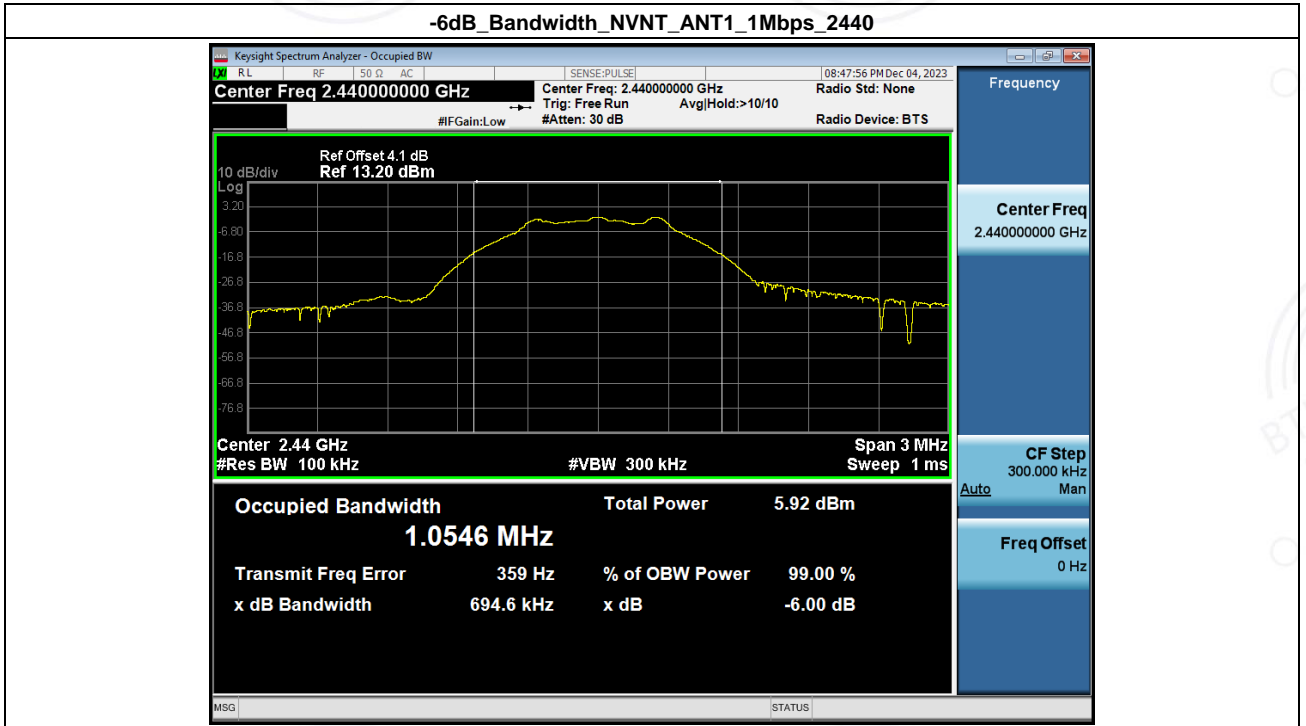
10 Appendix

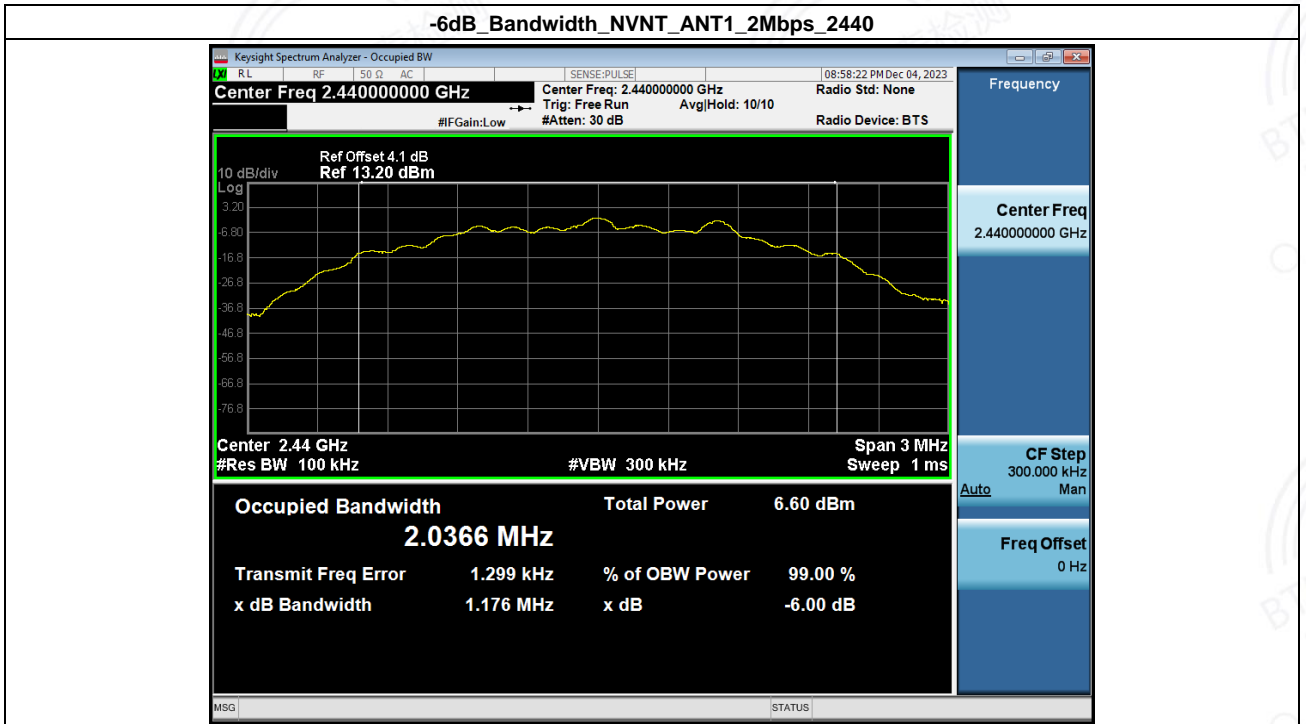
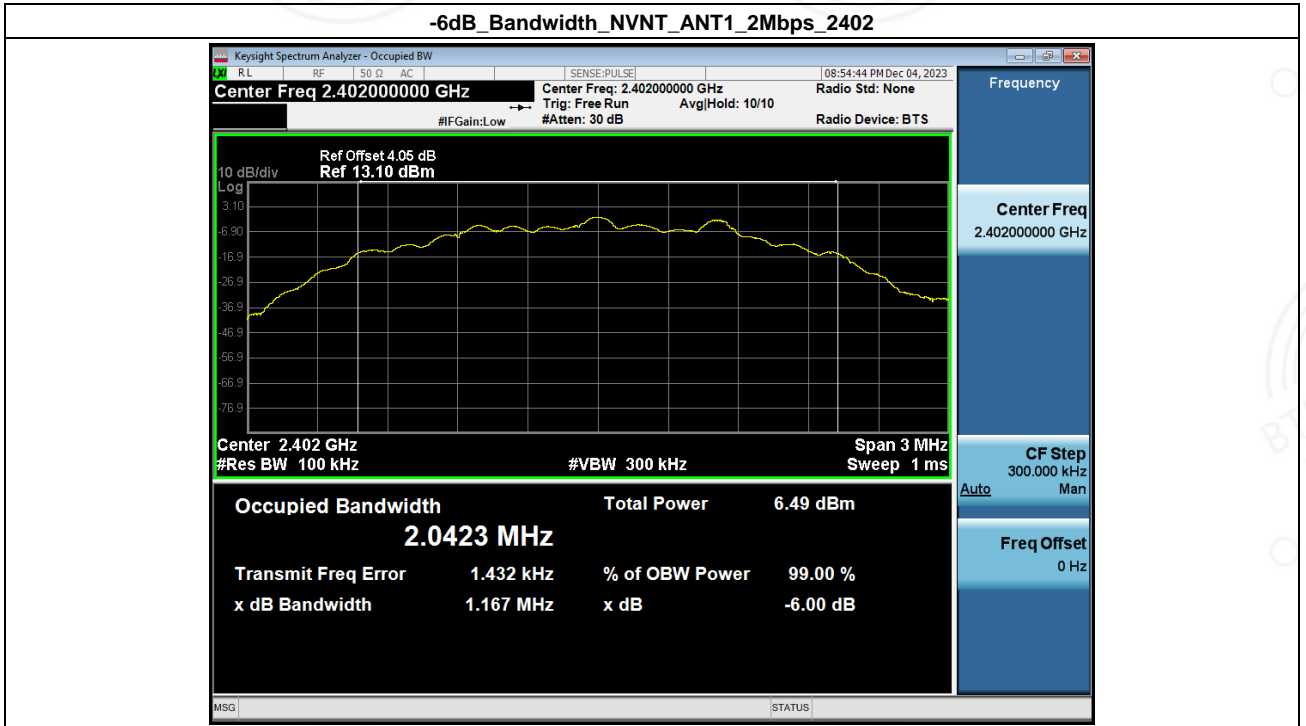
Cable loss=0.83 dB

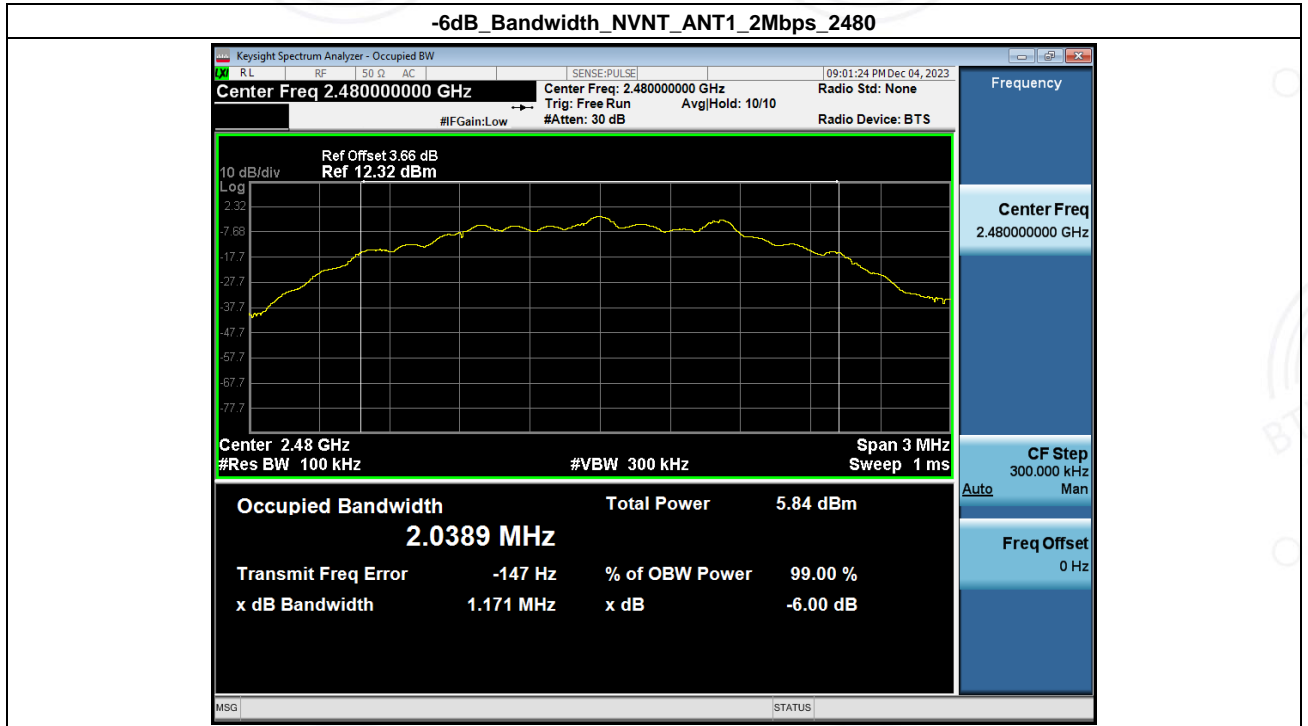
1. -6dB Bandwidth

Condition	Antenna	Rate	Frequency (MHz)	-6dB BW(kHz)	limit(kHz)	Result
NVNT	ANT1	1Mbps	2402	689.25	500	Pass
NVNT	ANT1	1Mbps	2440.00	694.63	500	Pass
NVNT	ANT1	1Mbps	2480	698.69	500	Pass
NVNT	ANT1	2Mbps	2402	1167.10	500	Pass
NVNT	ANT1	2Mbps	2440.00	1175.71	500	Pass
NVNT	ANT1	2Mbps	2480	1170.67	500	Pass



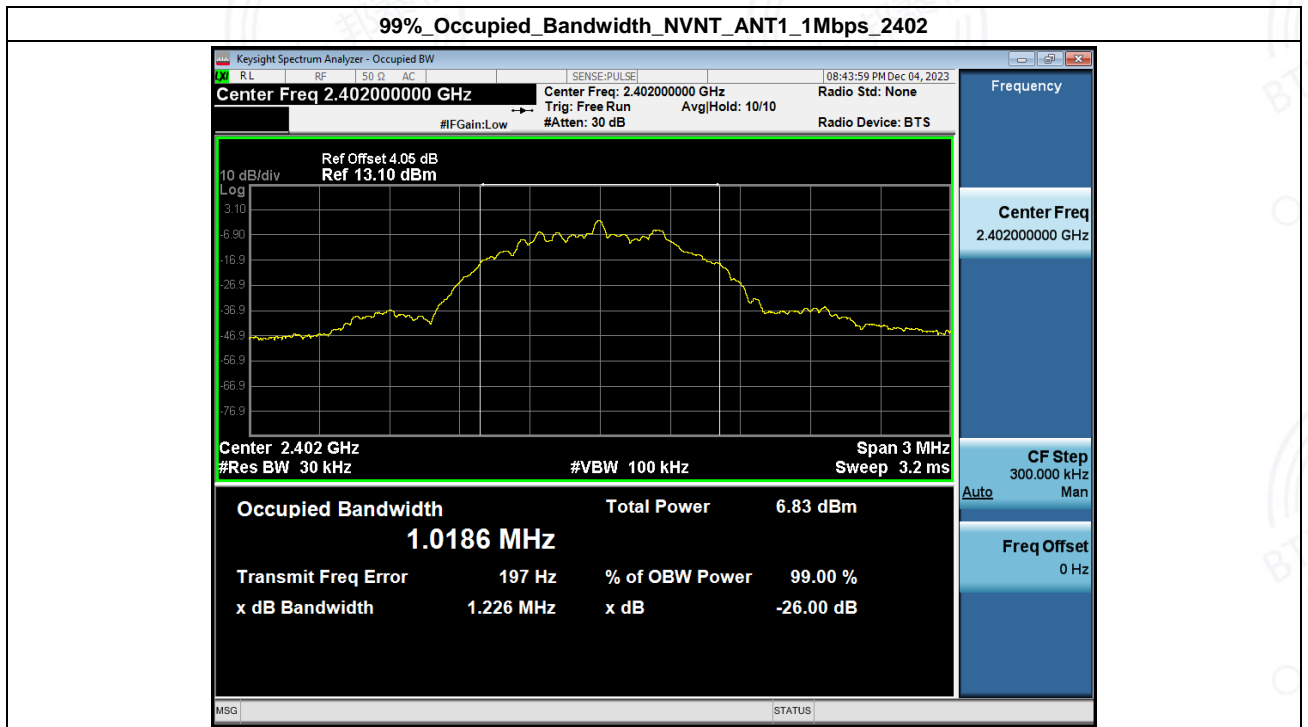


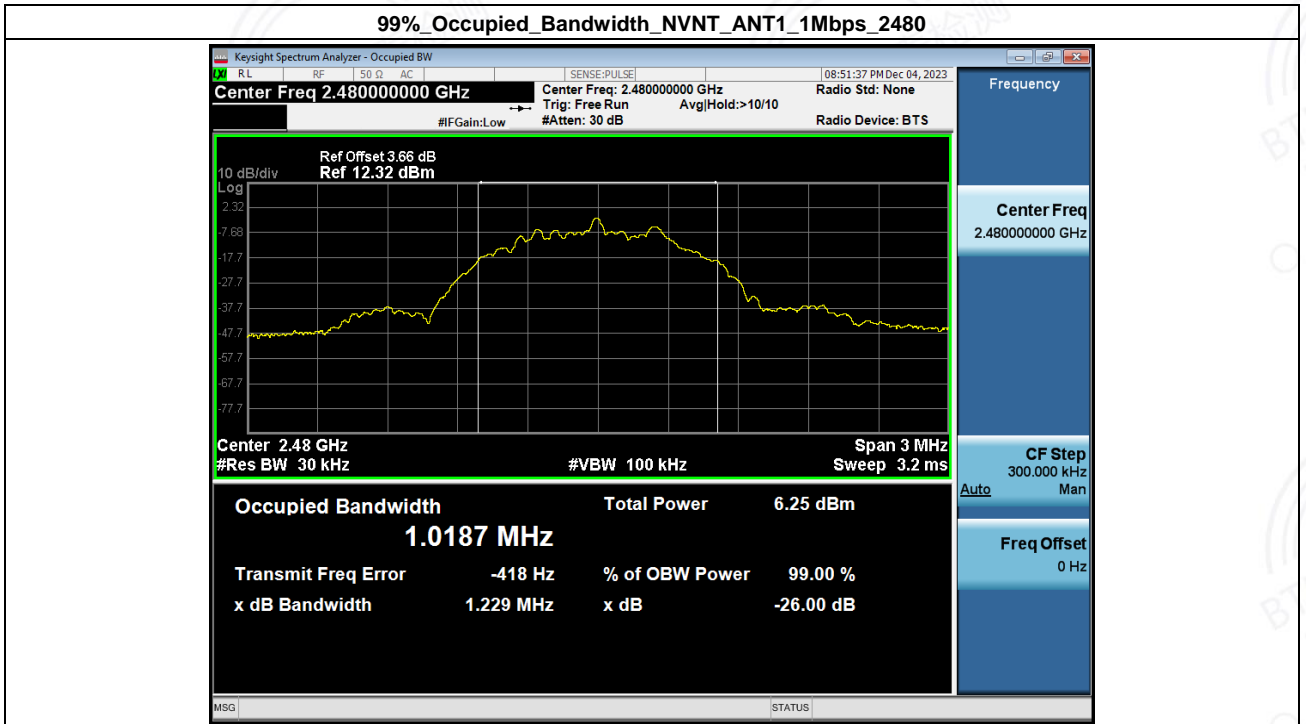
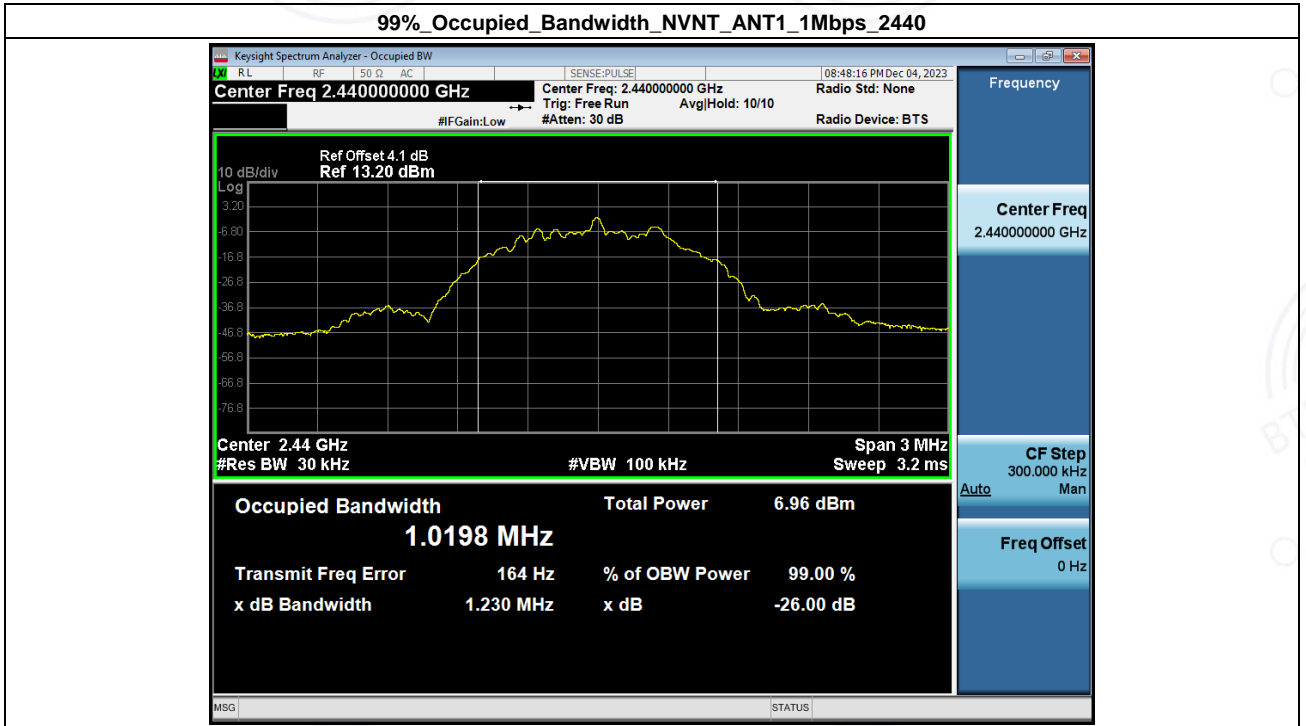


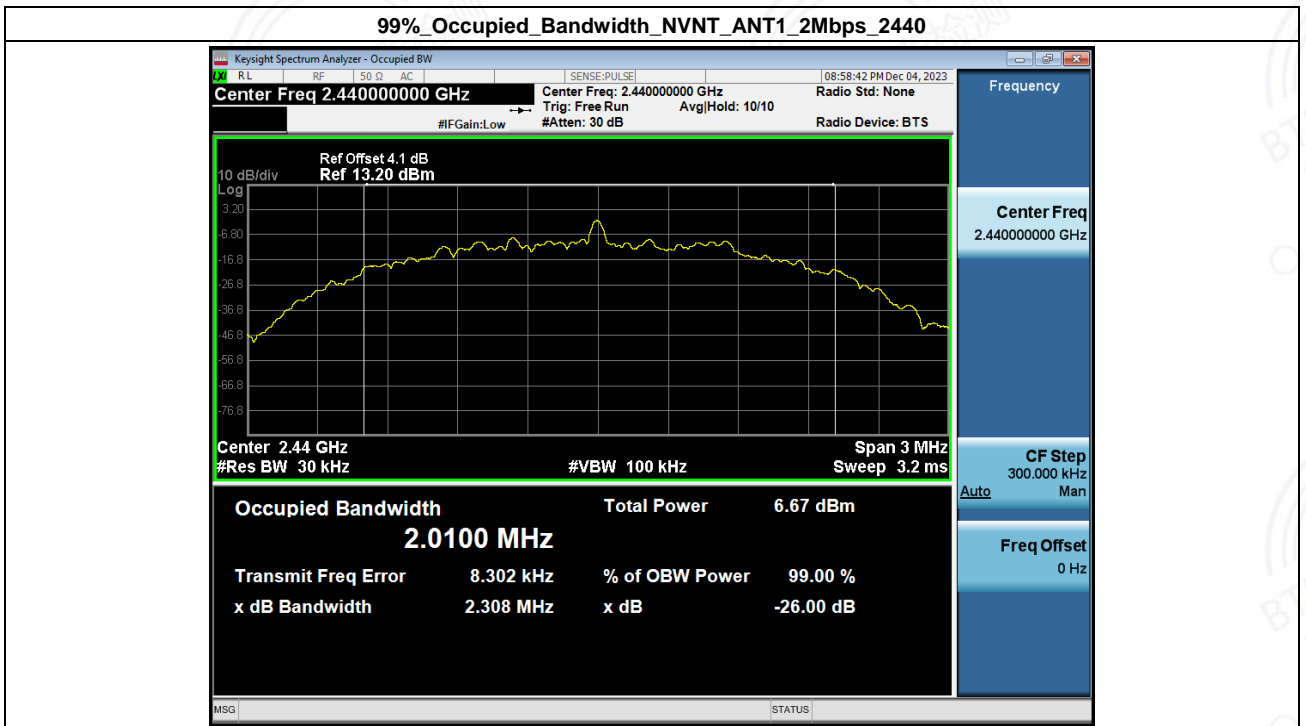
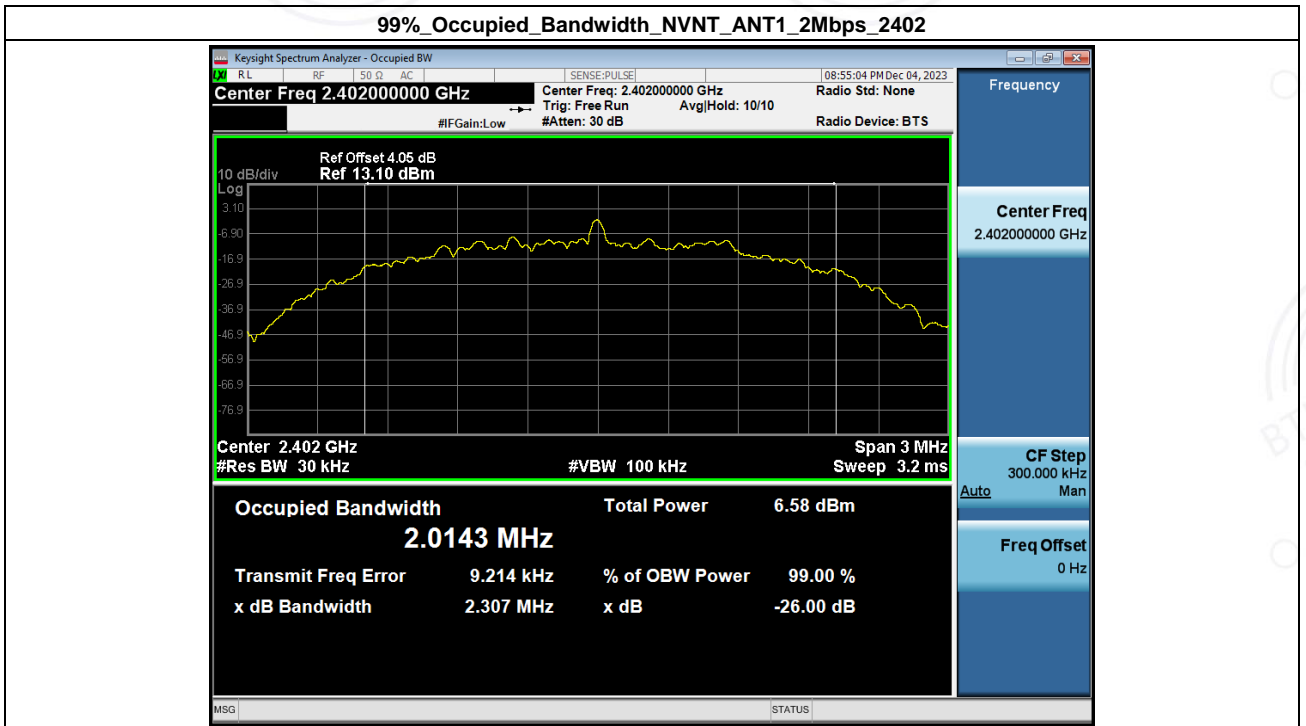


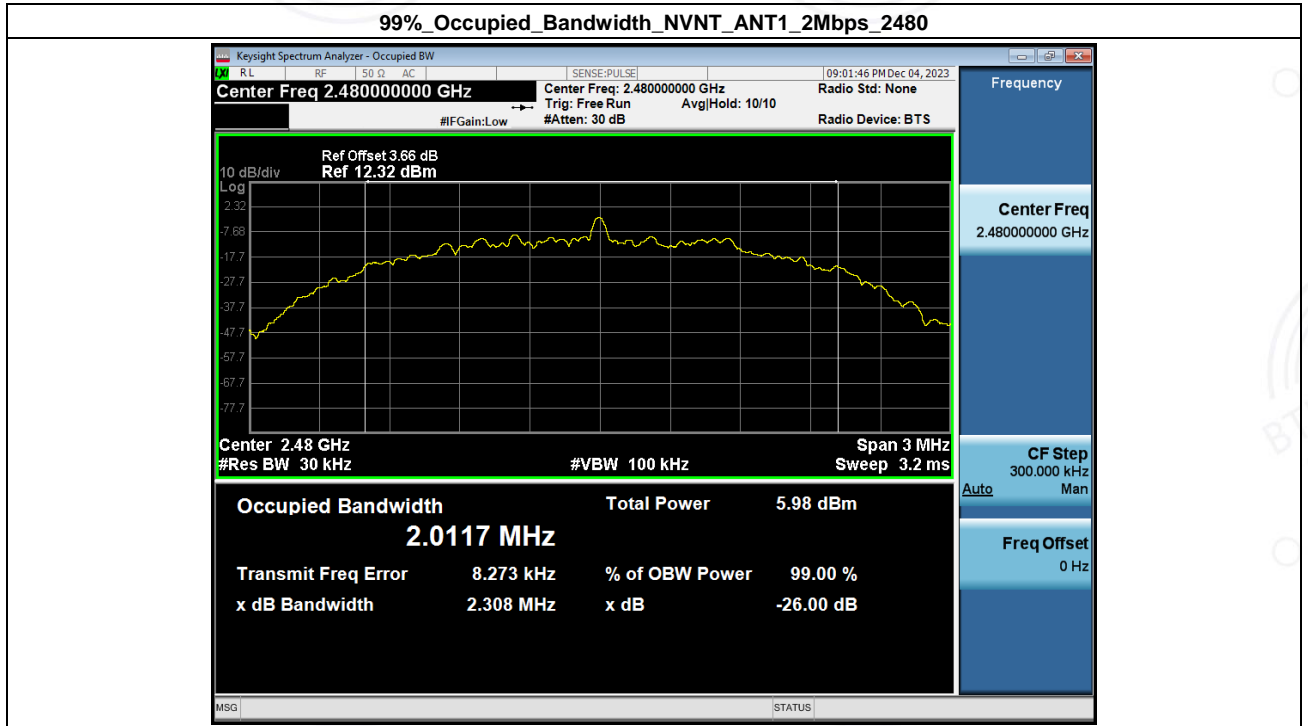
2. 99% Occupied Bandwidth

Condition	Antenna	Rate	Frequency (MHz)	99% BW (MHz)
NVNT	ANT1	1Mbps	2402	1.019
NVNT	ANT1	1Mbps	2440.00	1.020
NVNT	ANT1	1Mbps	2480	1.019
NVNT	ANT1	2Mbps	2402	2.014
NVNT	ANT1	2Mbps	2440.00	2.010
NVNT	ANT1	2Mbps	2480	2.012



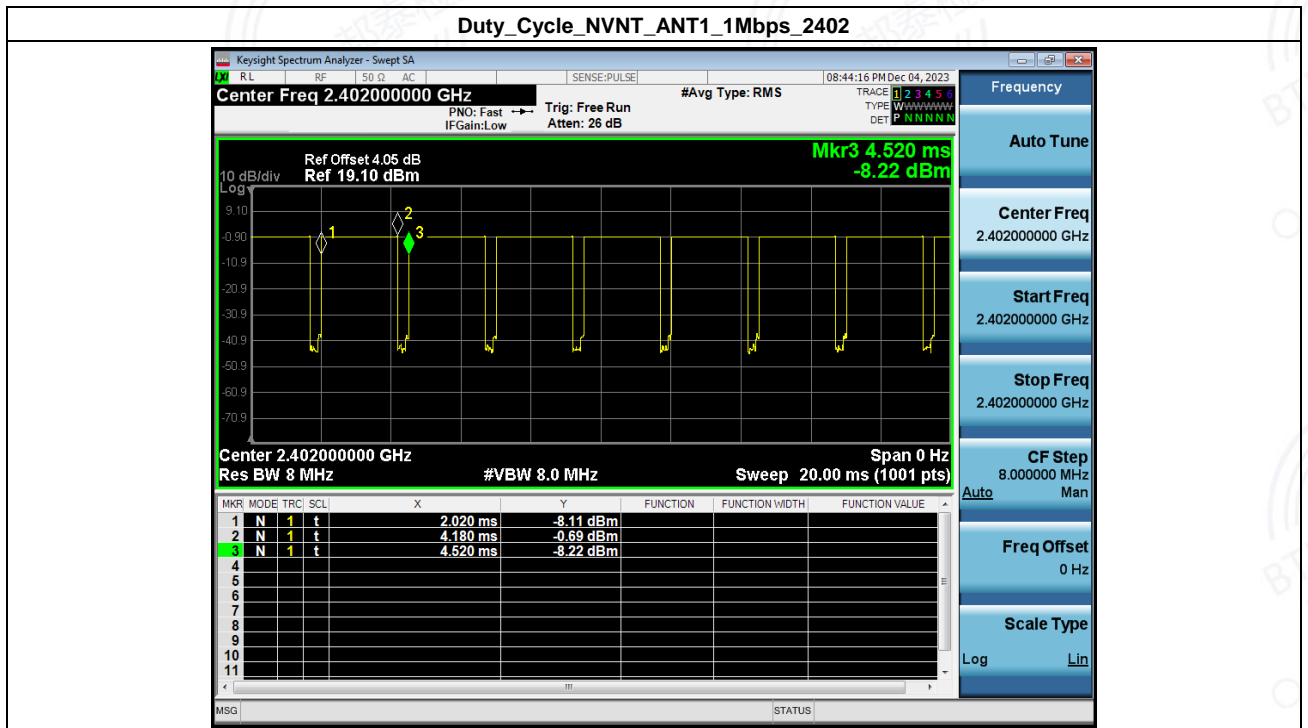


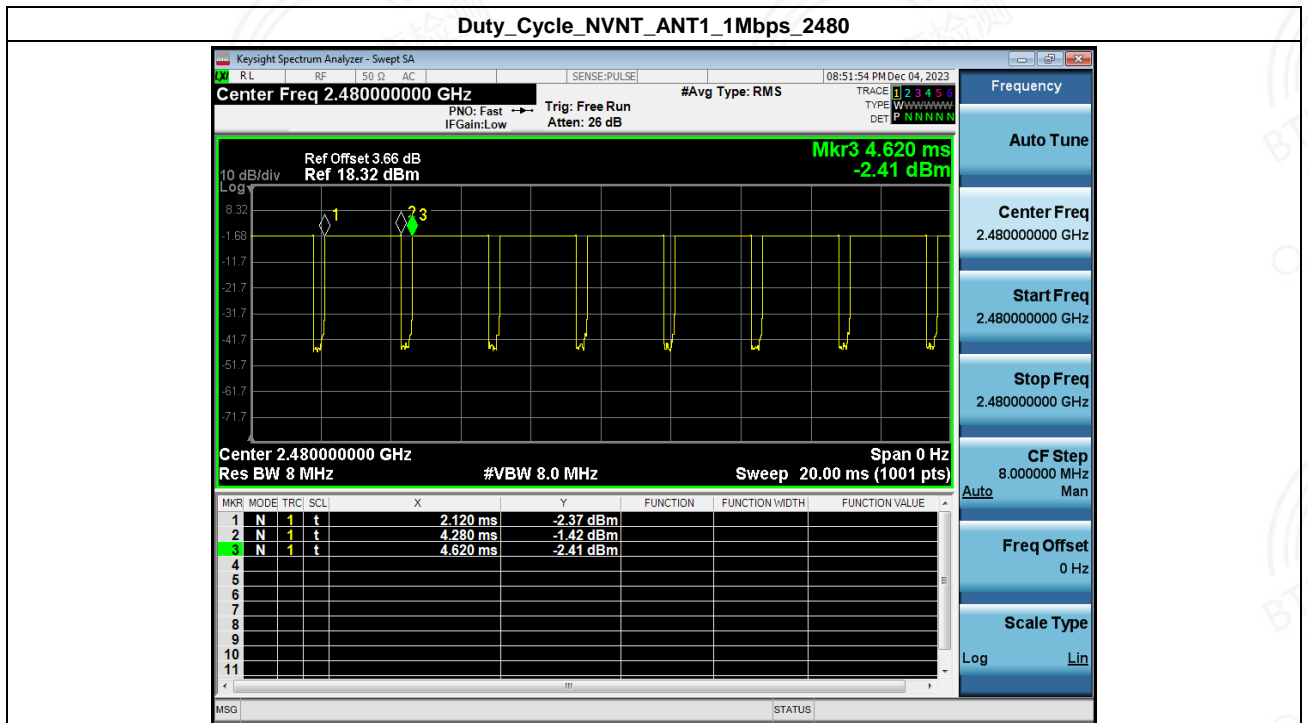
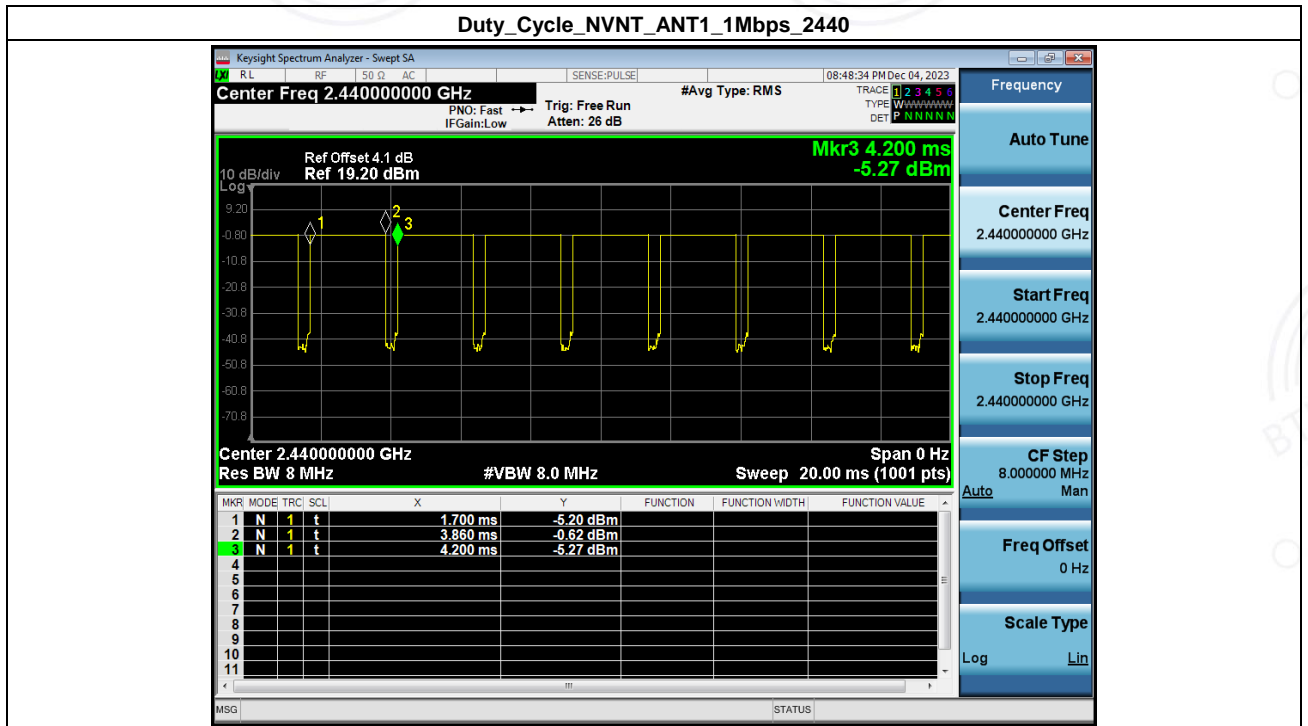


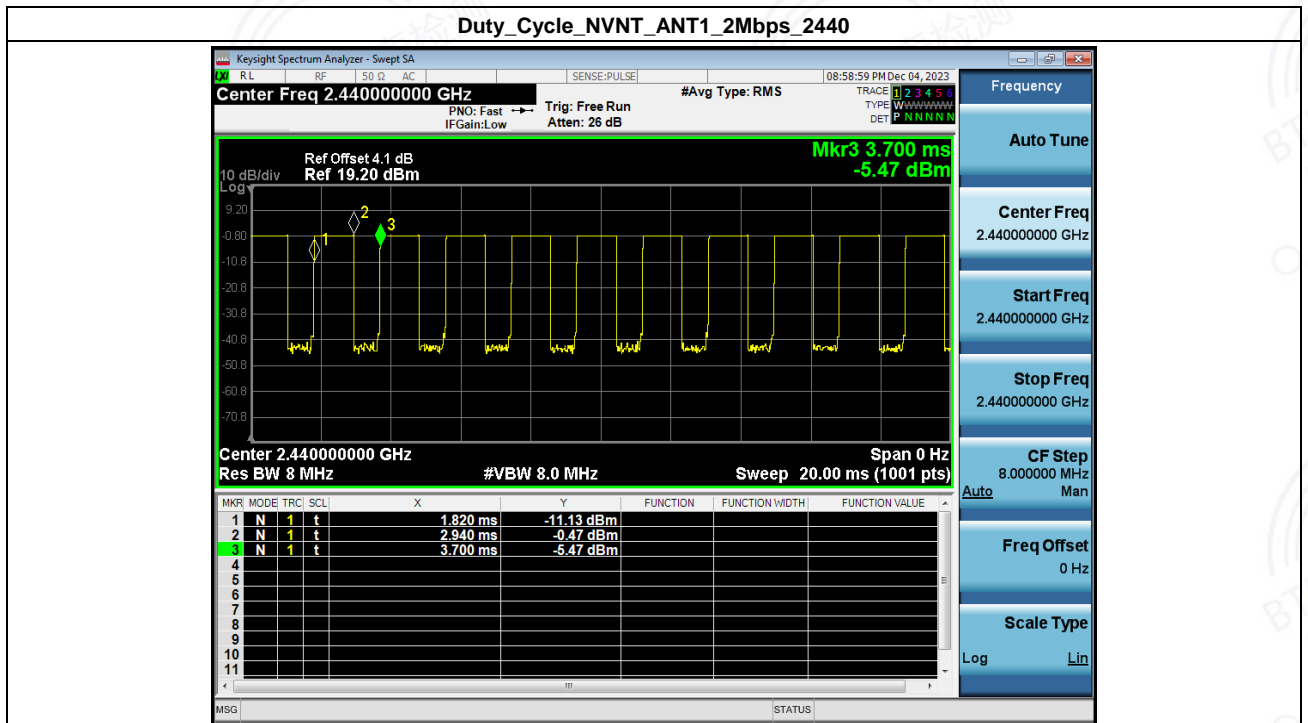
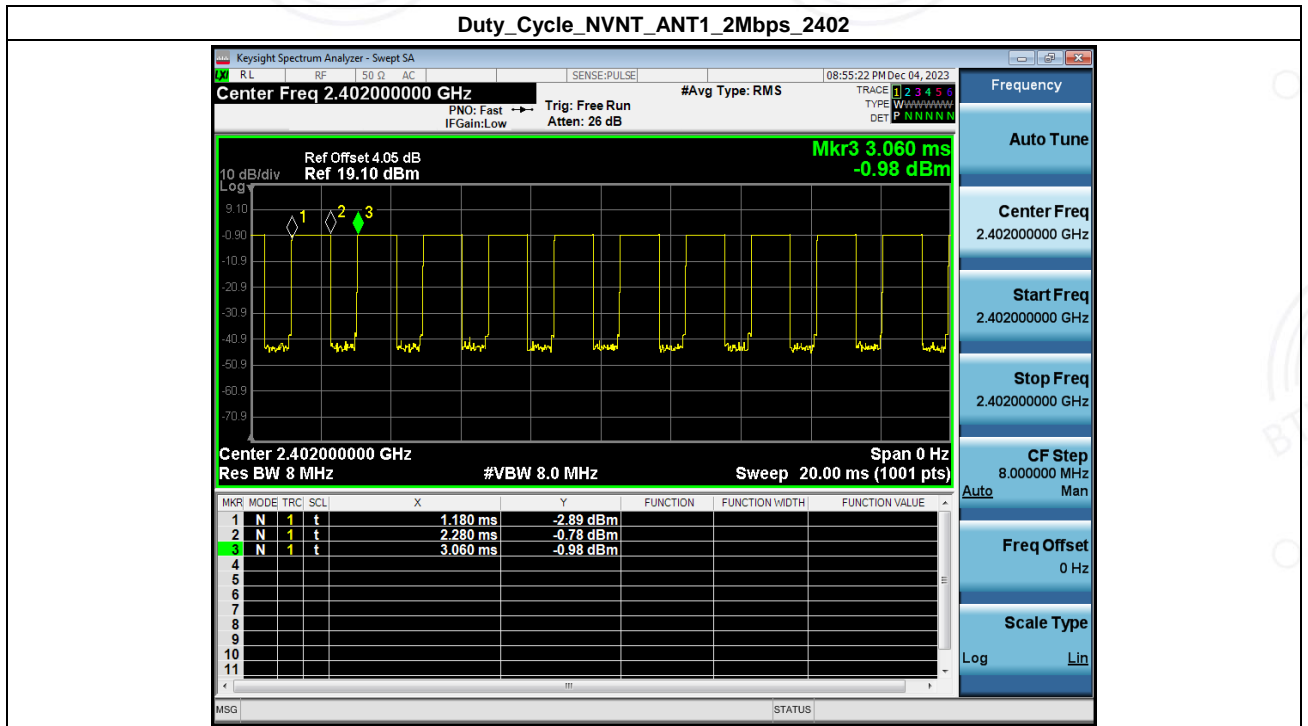


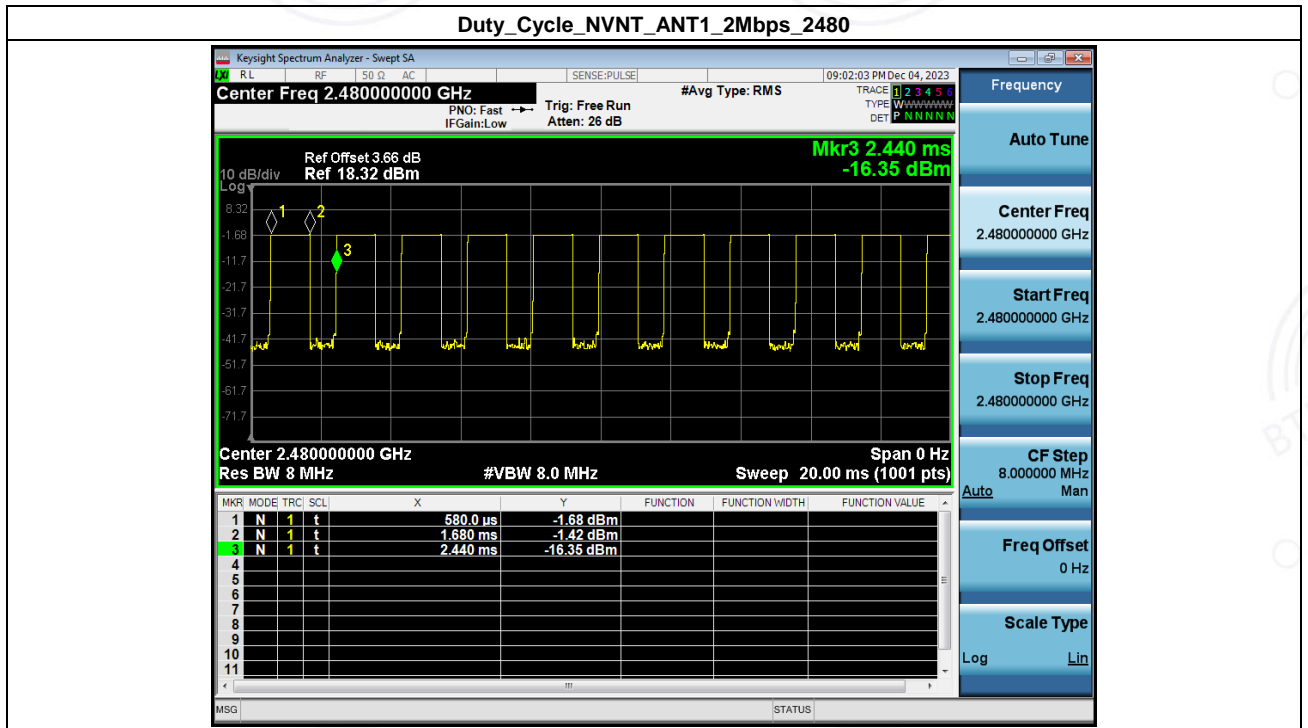
3. Duty Cycle

Condition	Antenna	Rate	Frequency (MHz)	Dutycycle(%)	Duty_factor
NVNT	ANT1	1Mbps	2402	87.20	0.59
NVNT	ANT1	1Mbps	2440.00	87.20	0.59
NVNT	ANT1	1Mbps	2480	87.20	0.59
NVNT	ANT1	2Mbps	2402	59.57	2.25
NVNT	ANT1	2Mbps	2440.00	60.64	2.17
NVNT	ANT1	2Mbps	2480	59.14	2.28



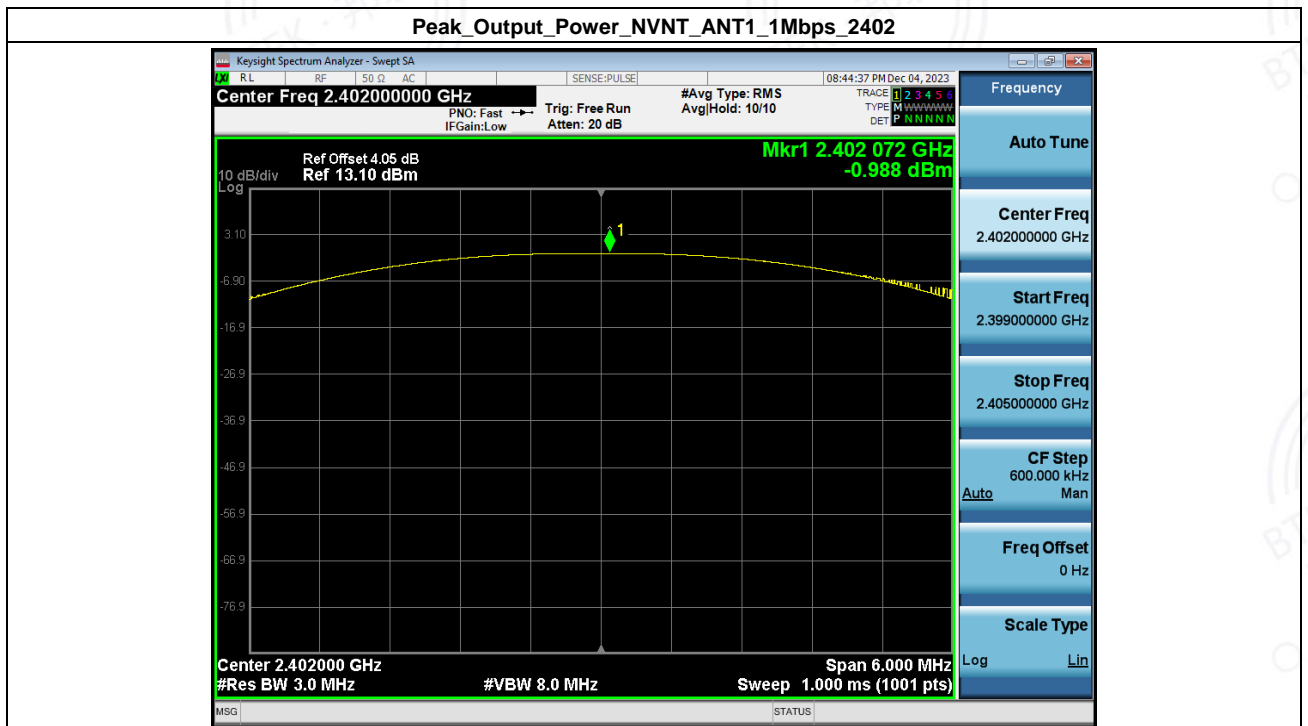


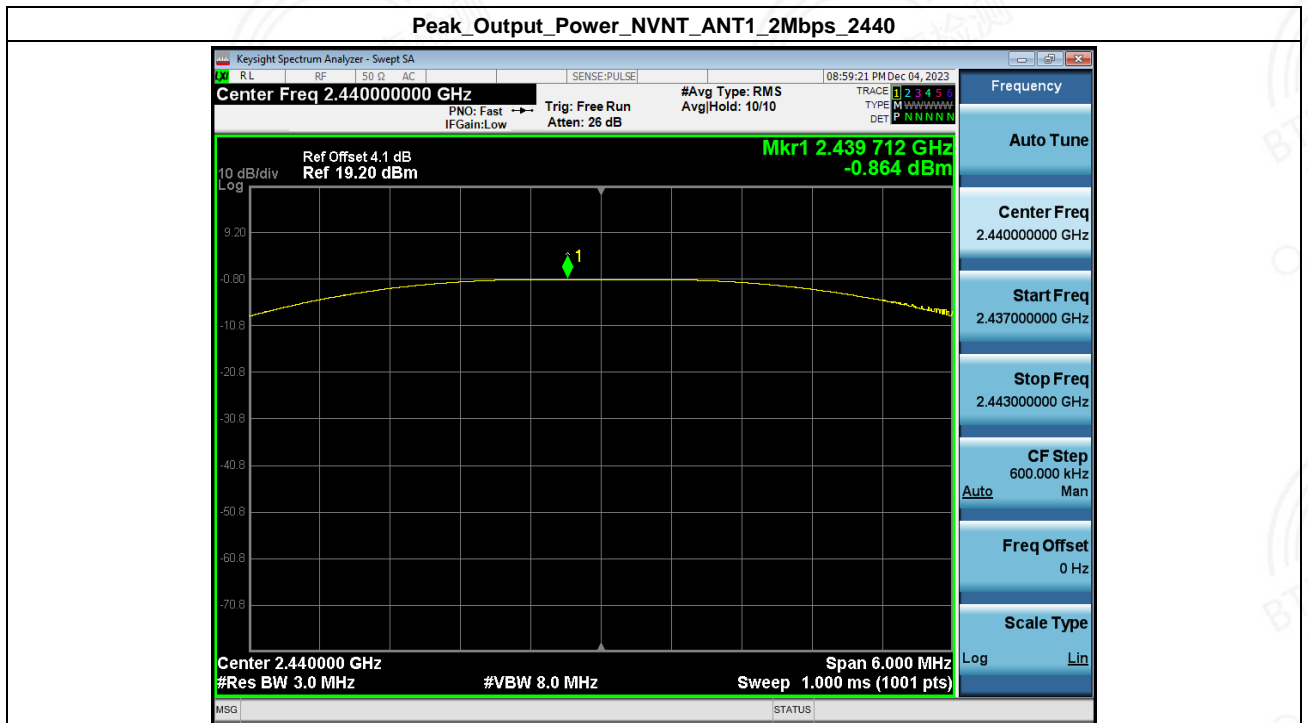
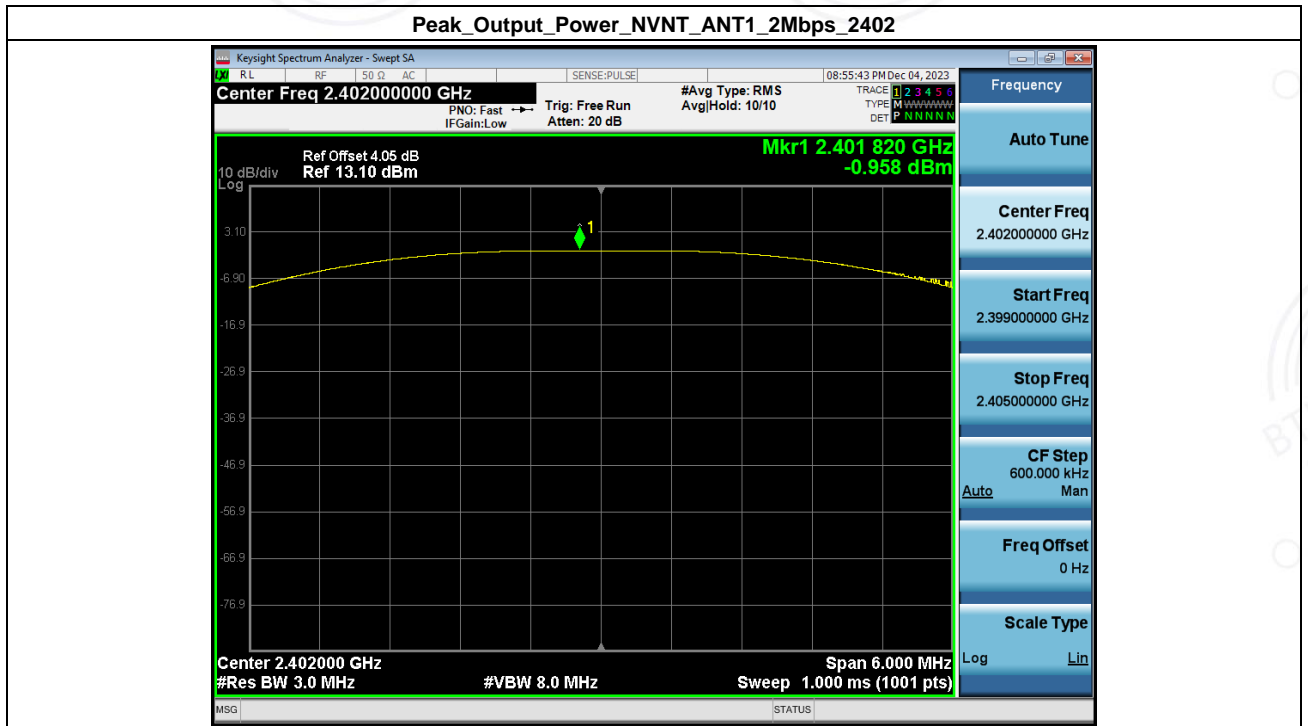


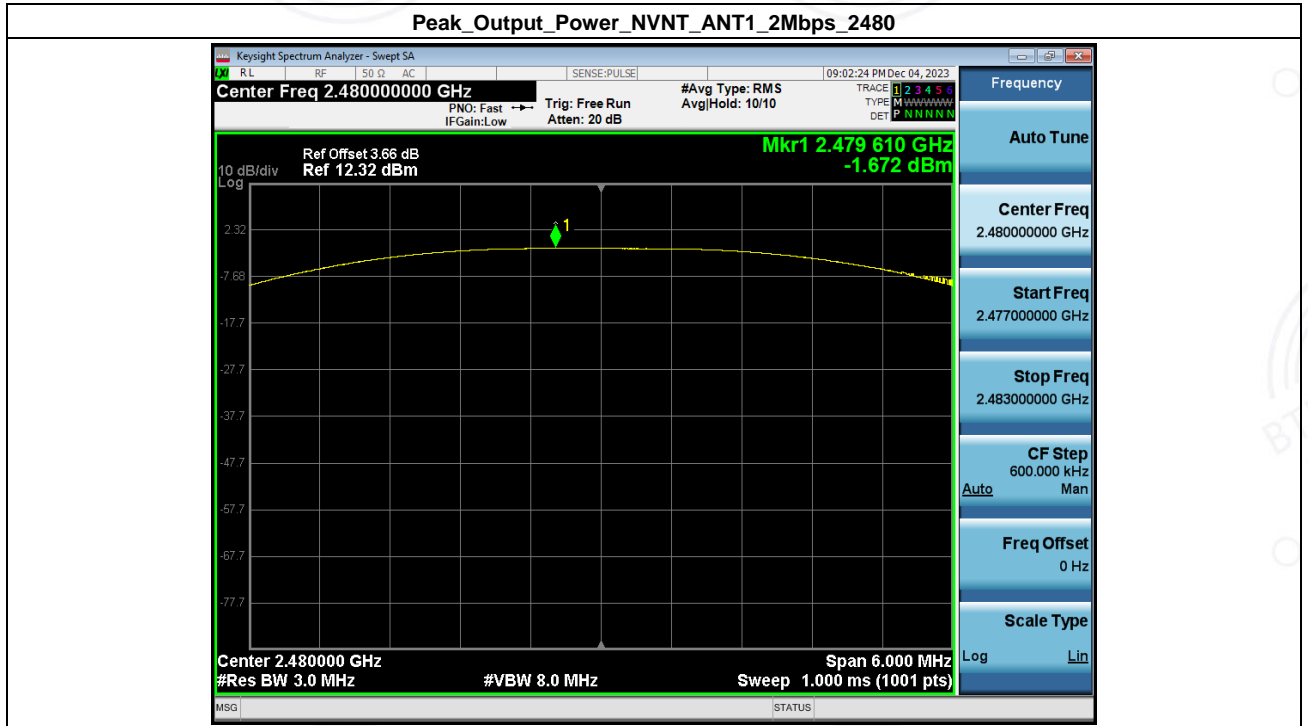


4. Peak Output Power

Condition	Antenna	Rate	Frequency (MHz)	Max. Conducted Power(dBm)	Max. Conducted Power(mW)	Limit(mW)	Result
NVNT	ANT1	1Mbps	2402	-0.99	0.80	1000	Pass
NVNT	ANT1	1Mbps	2440.00	-0.90	0.81	1000	Pass
NVNT	ANT1	1Mbps	2480	-1.70	0.68	1000	Pass
NVNT	ANT1	2Mbps	2402	-0.96	0.80	1000	Pass
NVNT	ANT1	2Mbps	2440.00	-0.86	0.82	1000	Pass
NVNT	ANT1	2Mbps	2480	-1.67	0.68	1000	Pass

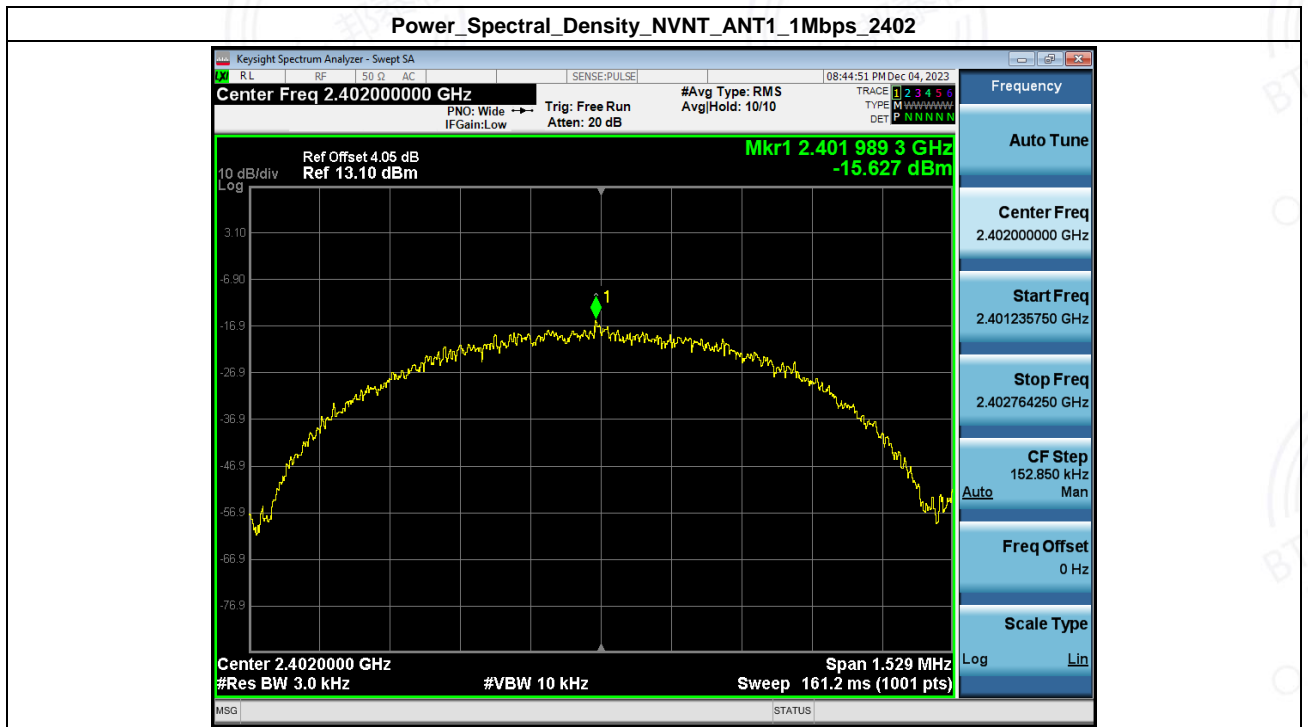


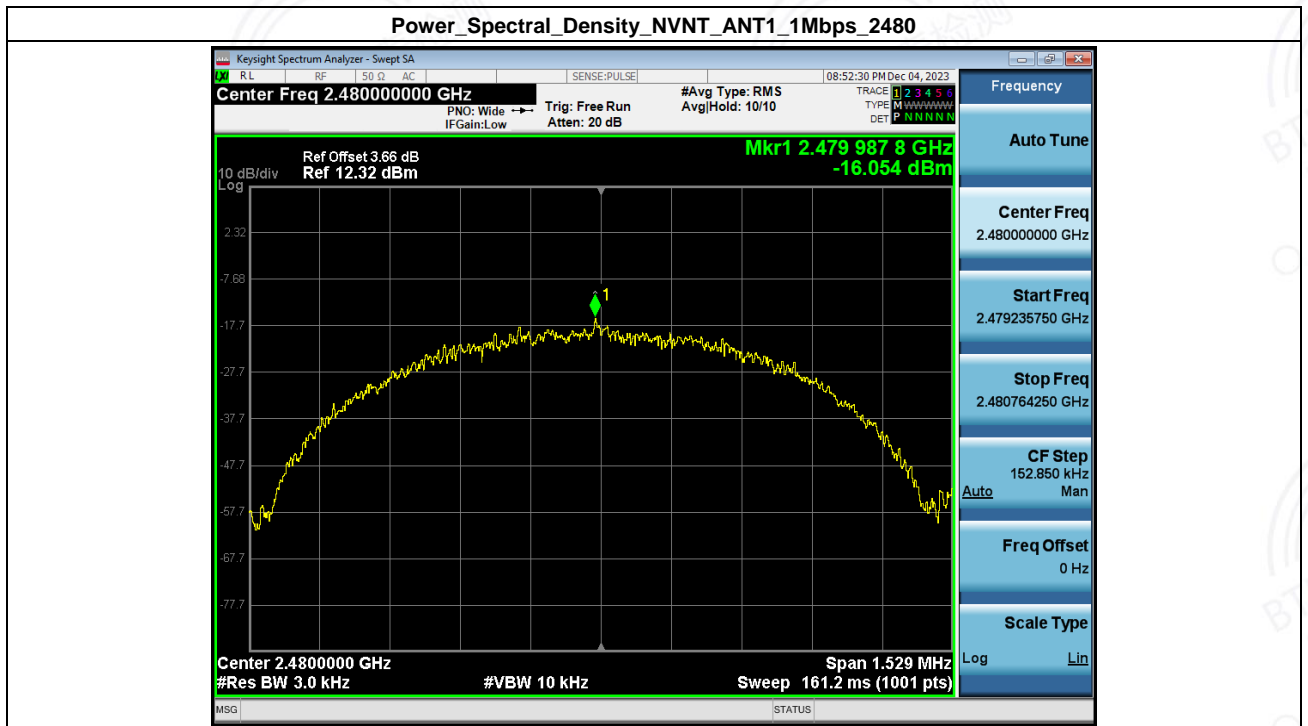
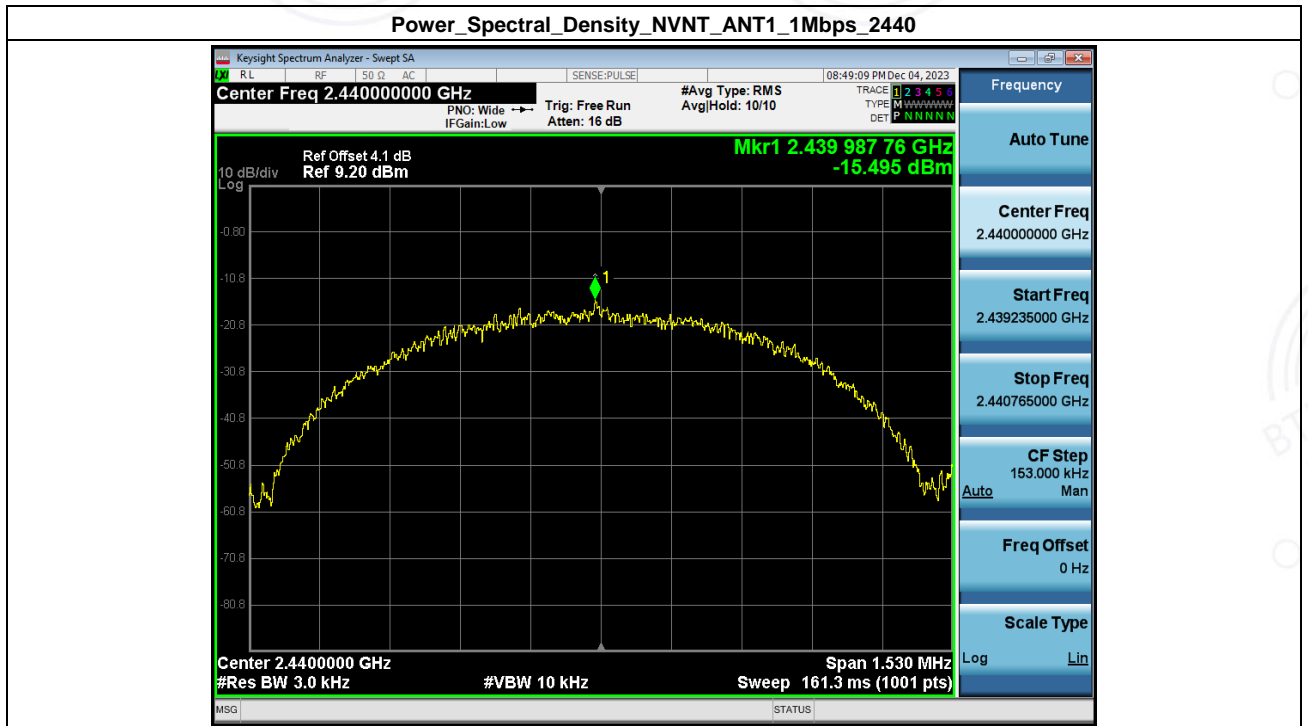


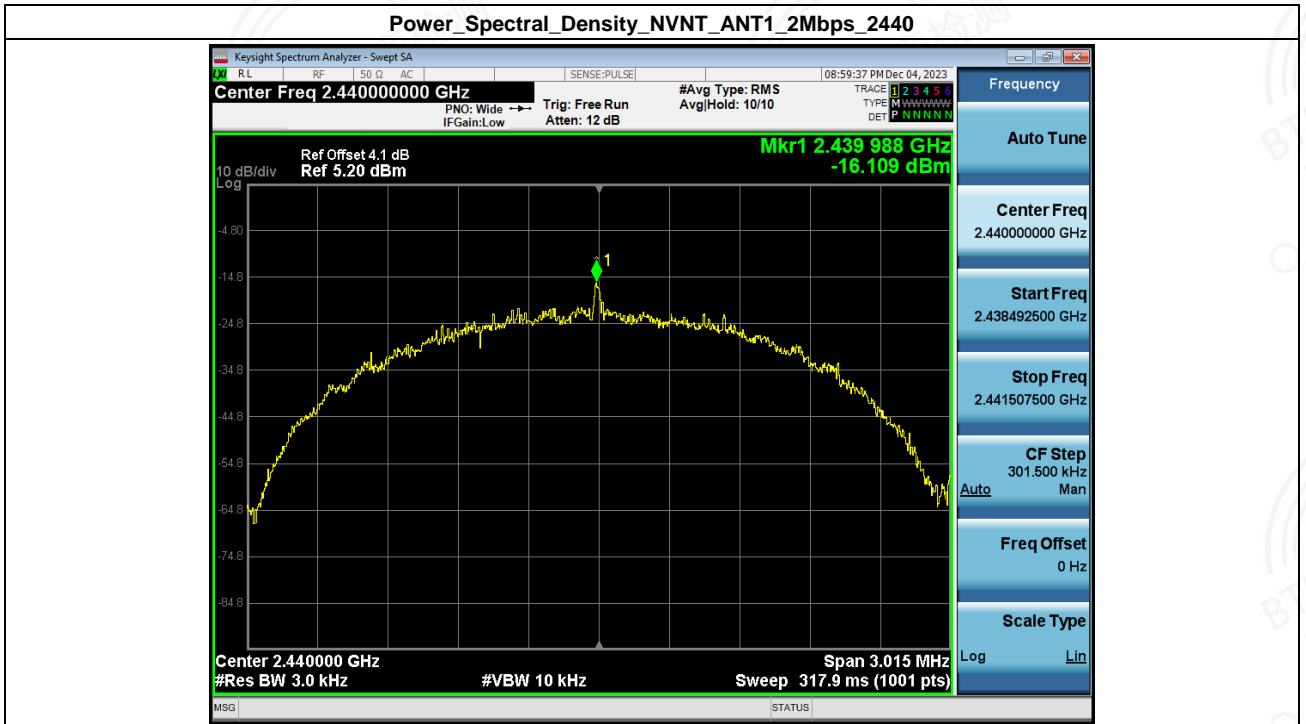
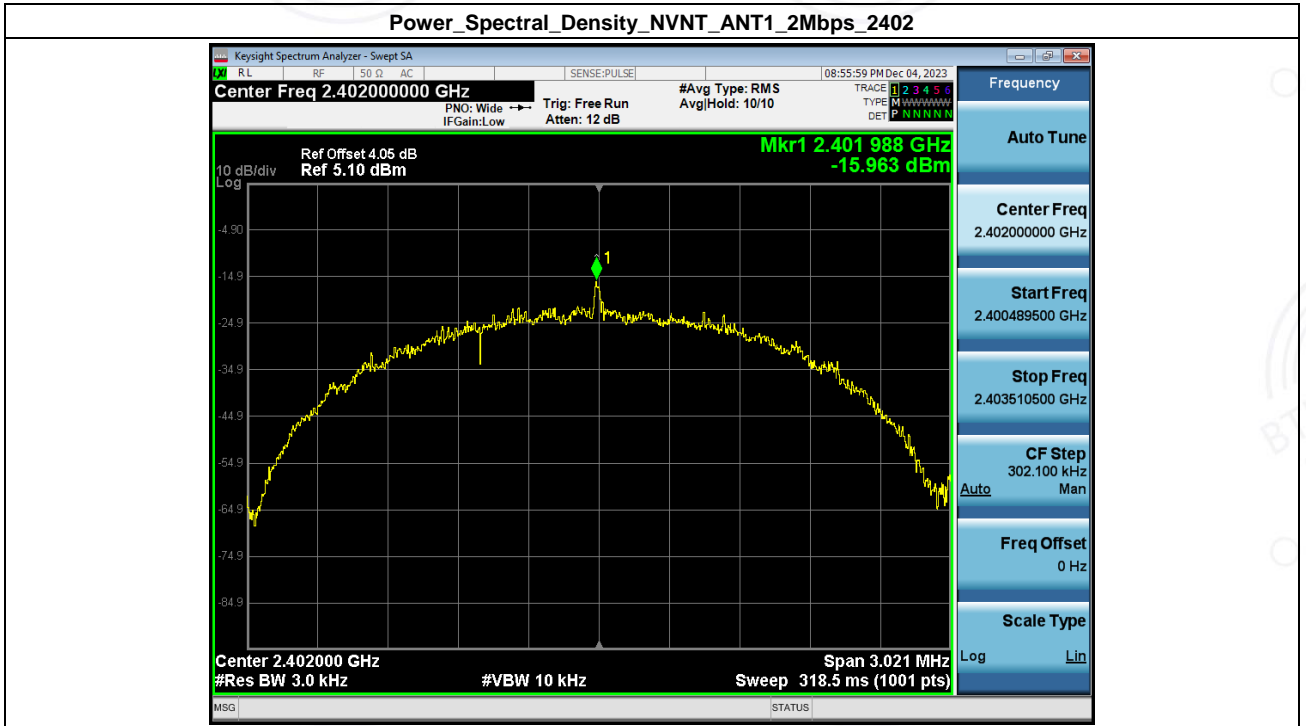


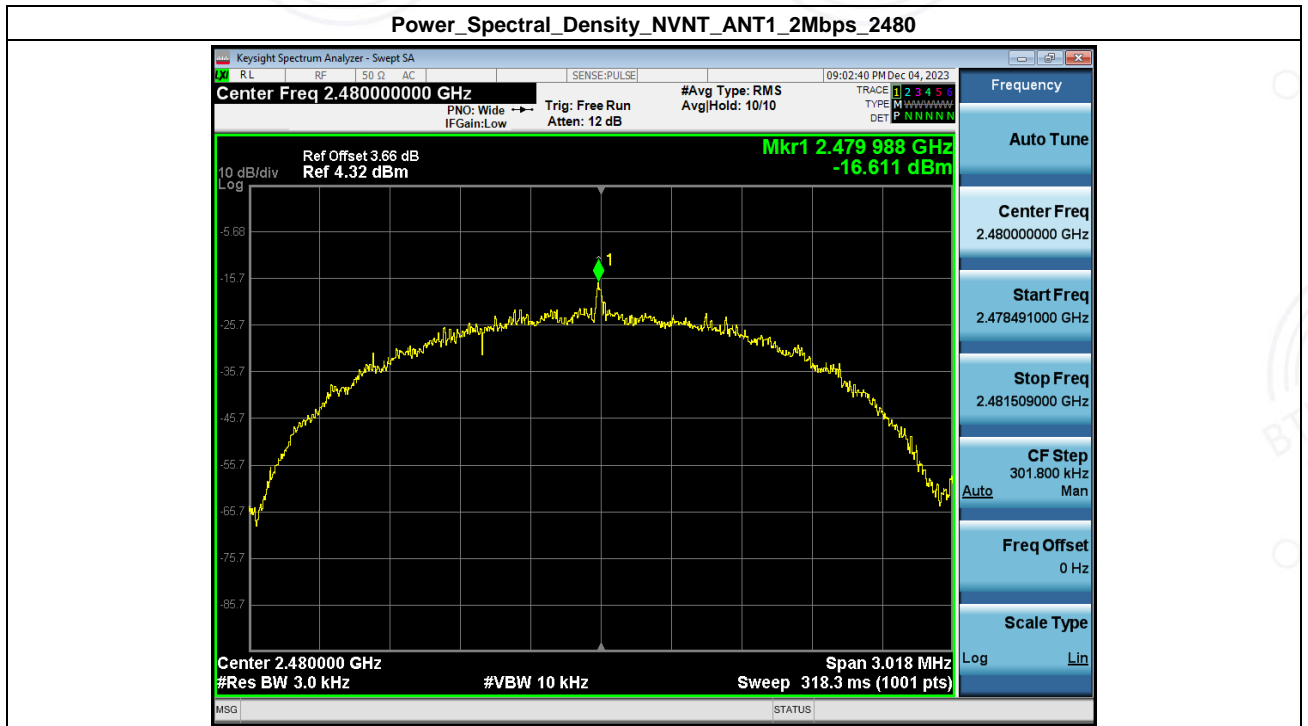
5. Power Spectral Density

Condition	Antenna	Rate	Frequency (MHz)	Power Spectral Density(dBm)	Limit(dBm/3kHz)	Result
NVNT	ANT1	1Mbps	2402	-15.63	8	Pass
NVNT	ANT1	1Mbps	2440.00	-15.49	8	Pass
NVNT	ANT1	1Mbps	2480	-16.05	8	Pass
NVNT	ANT1	2Mbps	2402	-15.96	8	Pass
NVNT	ANT1	2Mbps	2440.00	-16.11	8	Pass
NVNT	ANT1	2Mbps	2480	-16.61	8	Pass



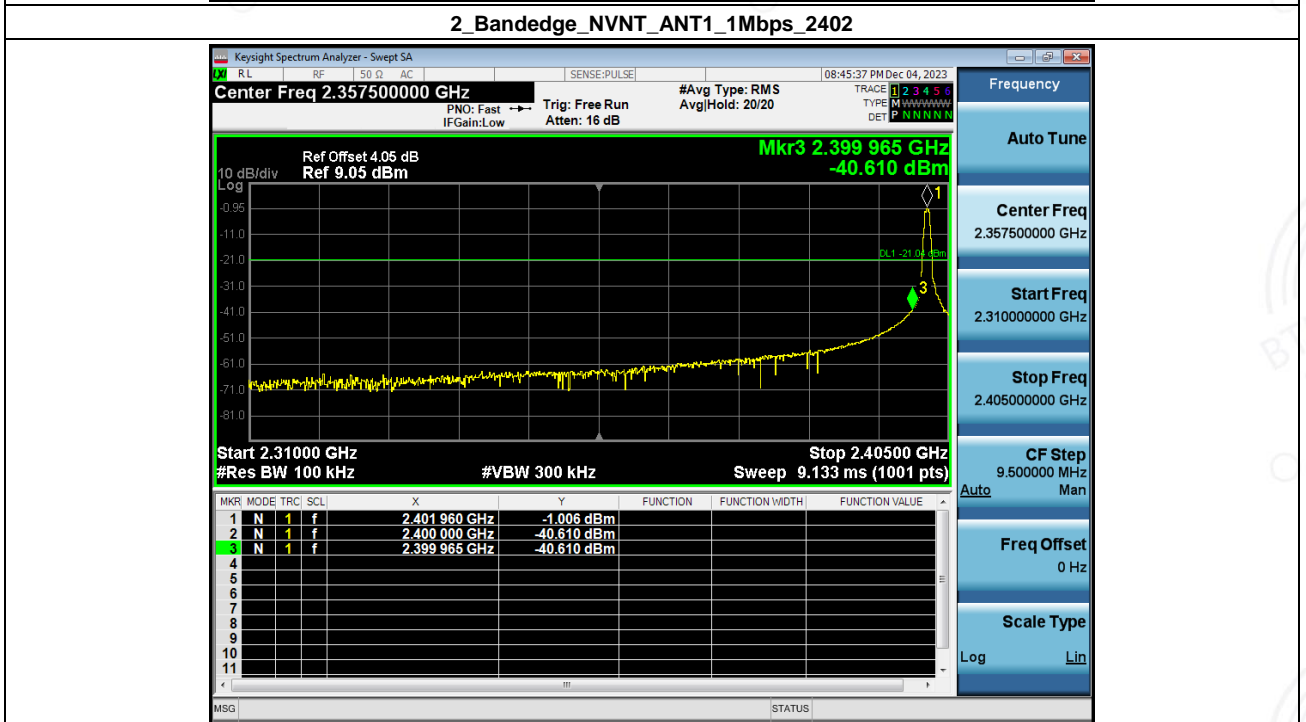
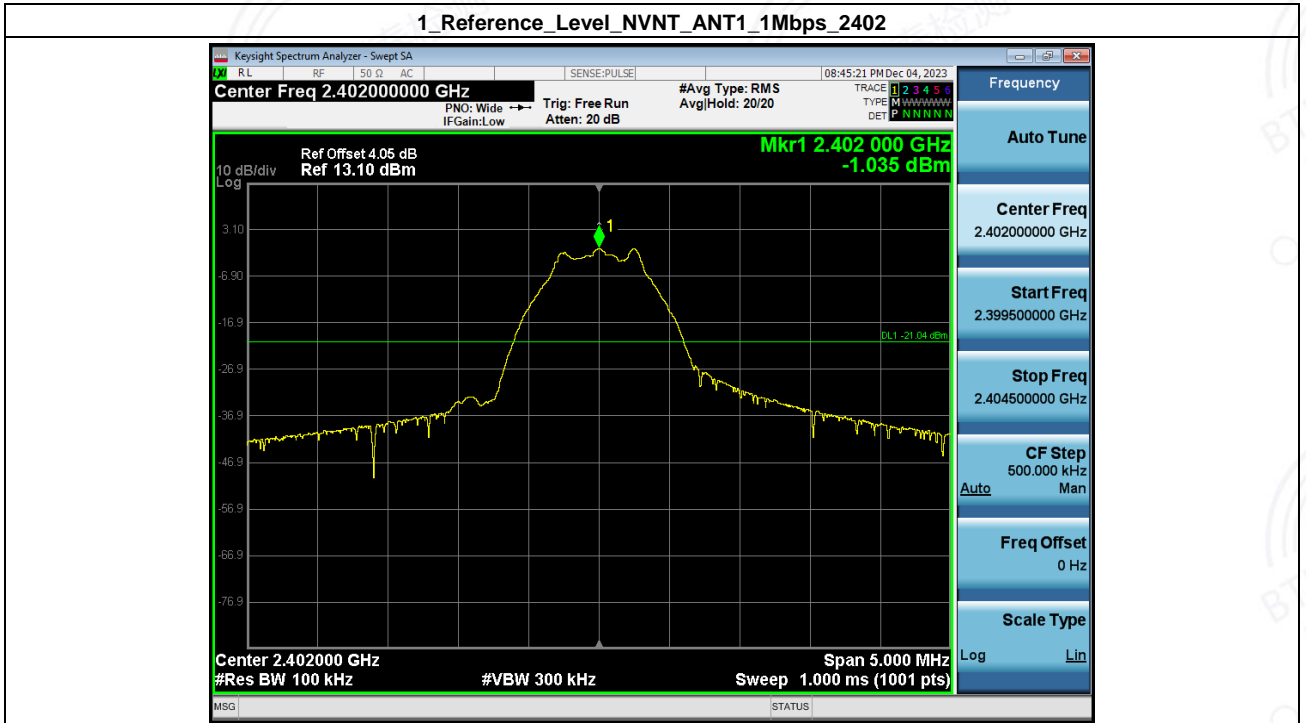






6. Bandedge

Condition	Antenna	Rate	TX_Frequency (MHz)	Max. Mark Frequency (MHz)	Spurious level(dBm)	limit(dBm)	Result
NVNT	ANT1	1Mbps	2402	2399.965	-40.610	-21.035	Pass
NVNT	ANT1	1Mbps	2480	2483.525	-44.412	-21.750	Pass
NVNT	ANT1	2Mbps	2402	2399.965	-34.487	-21.015	Pass
NVNT	ANT1	2Mbps	2480	2483.525	-43.811	-21.739	Pass



1_Reference_Level_NVNT_ANT1_1Mbps_2480



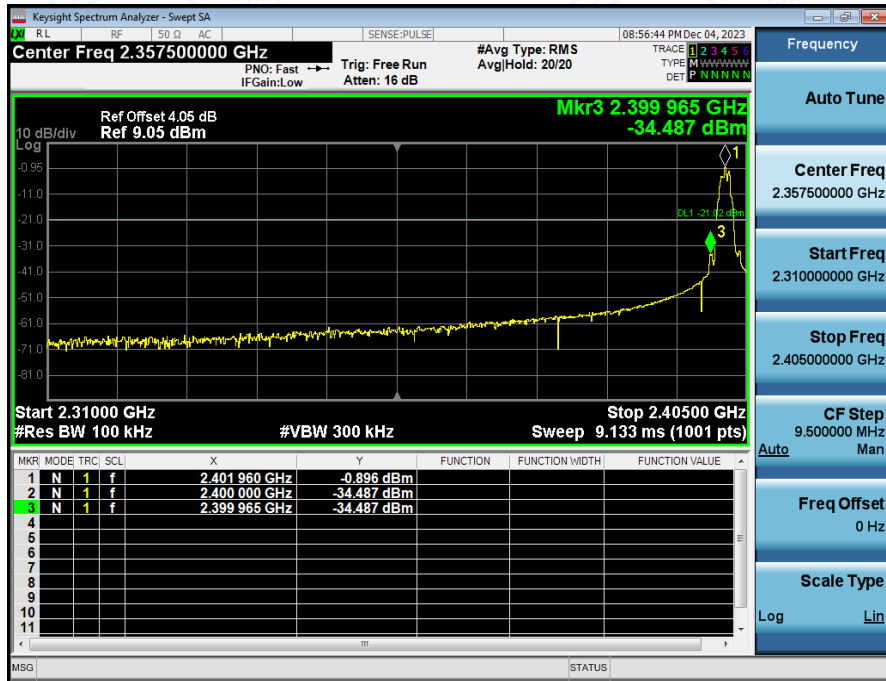
2_Bandedge_NVNT_ANT1_1Mbps_2480

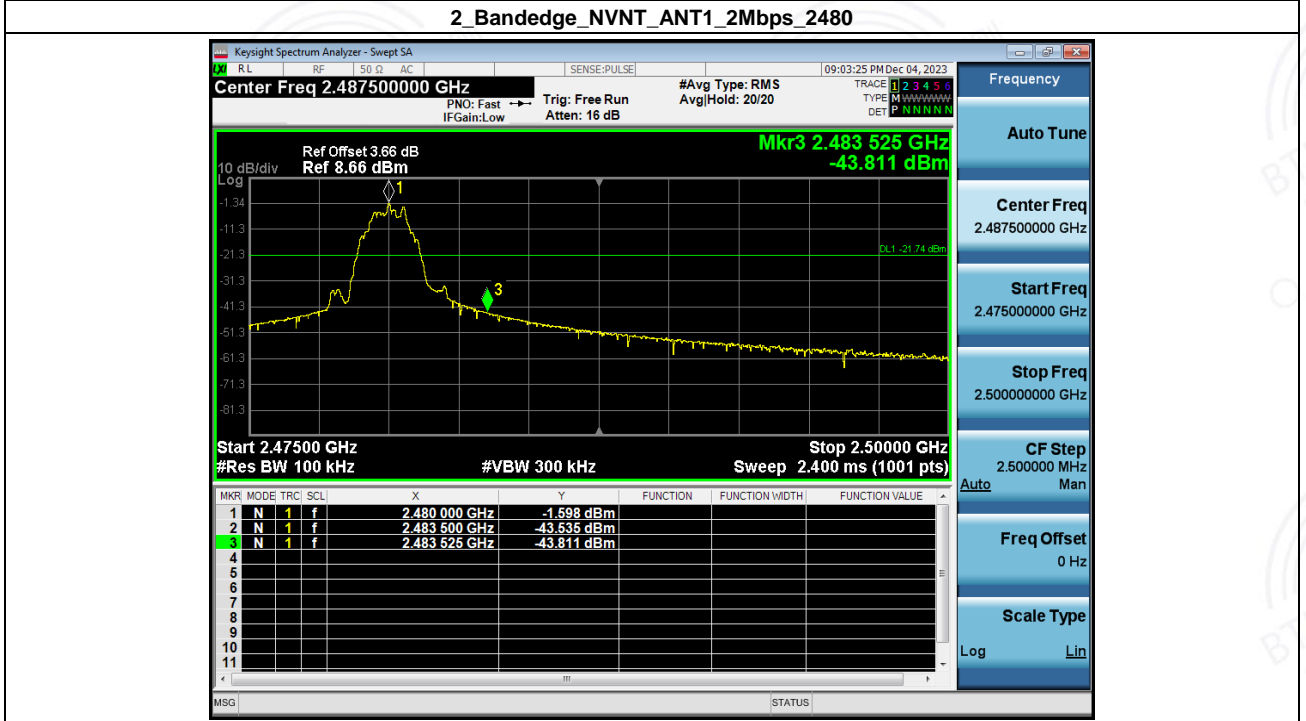
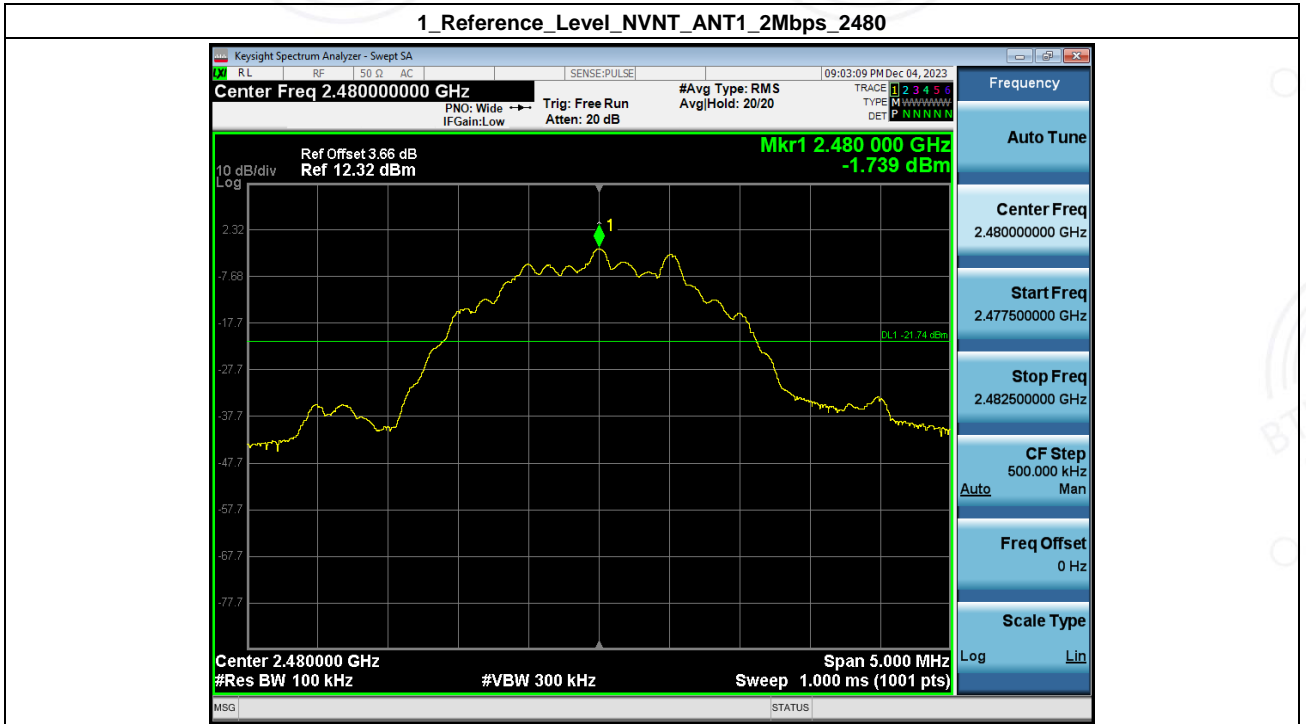


1 Reference_Level_NVNT_ANT1_2Mbps_2402



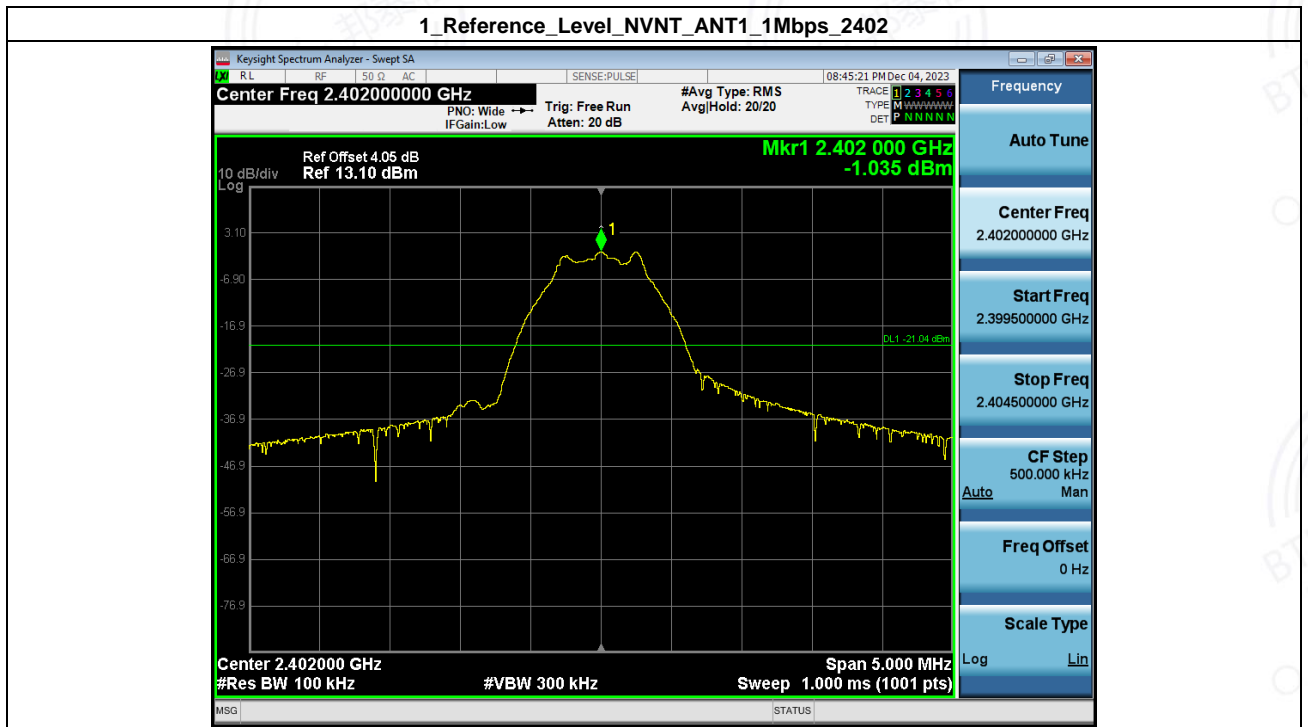
2 Bandedge_NVNT_ANT1_2Mbps_2402

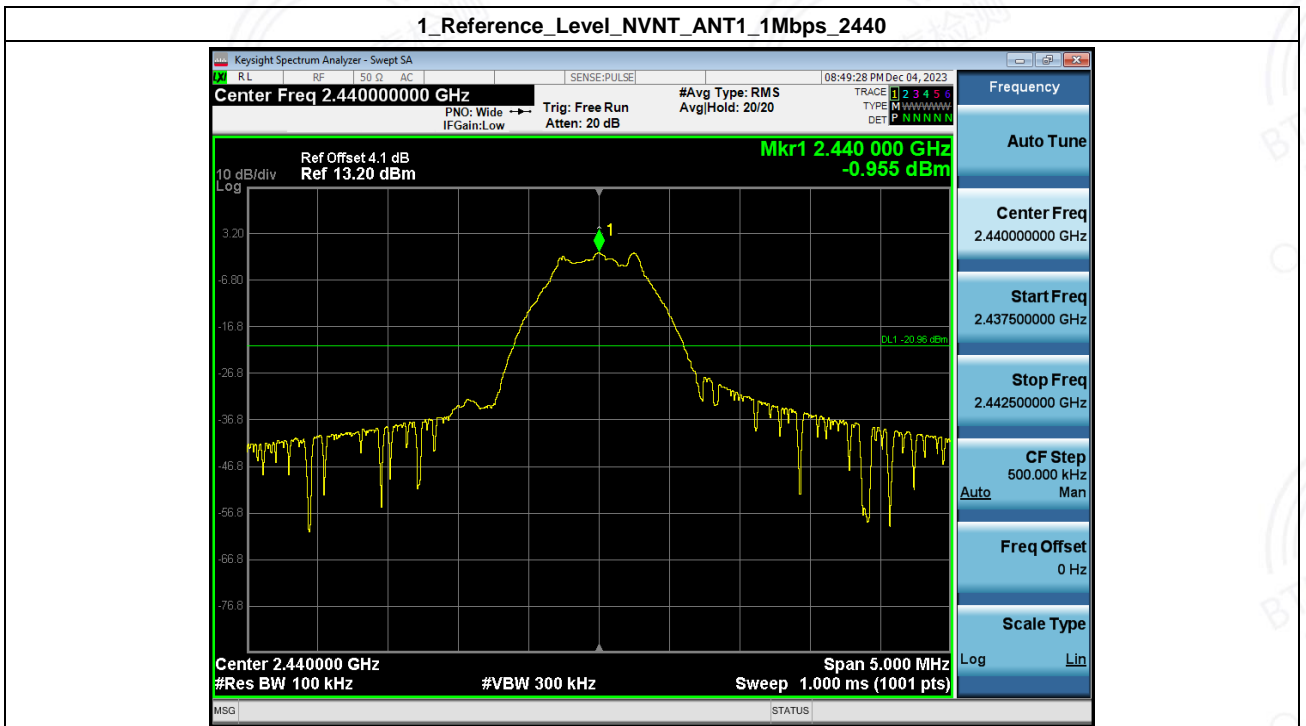
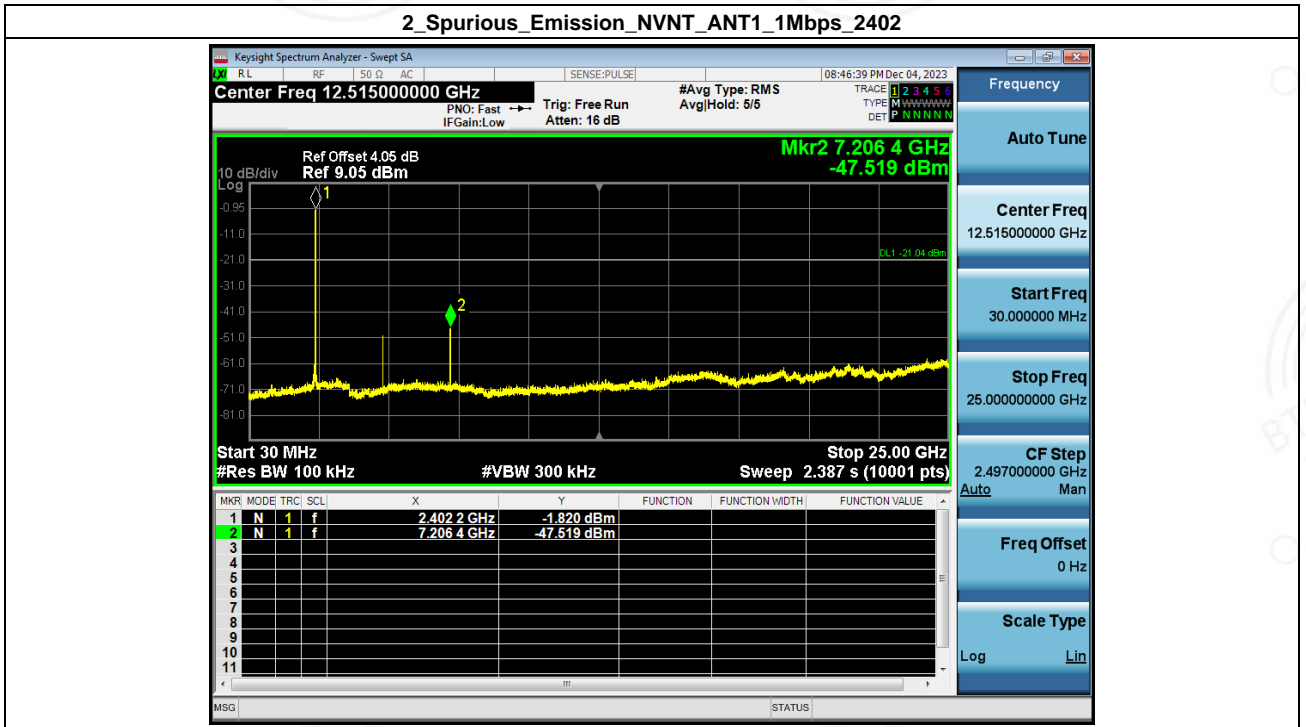


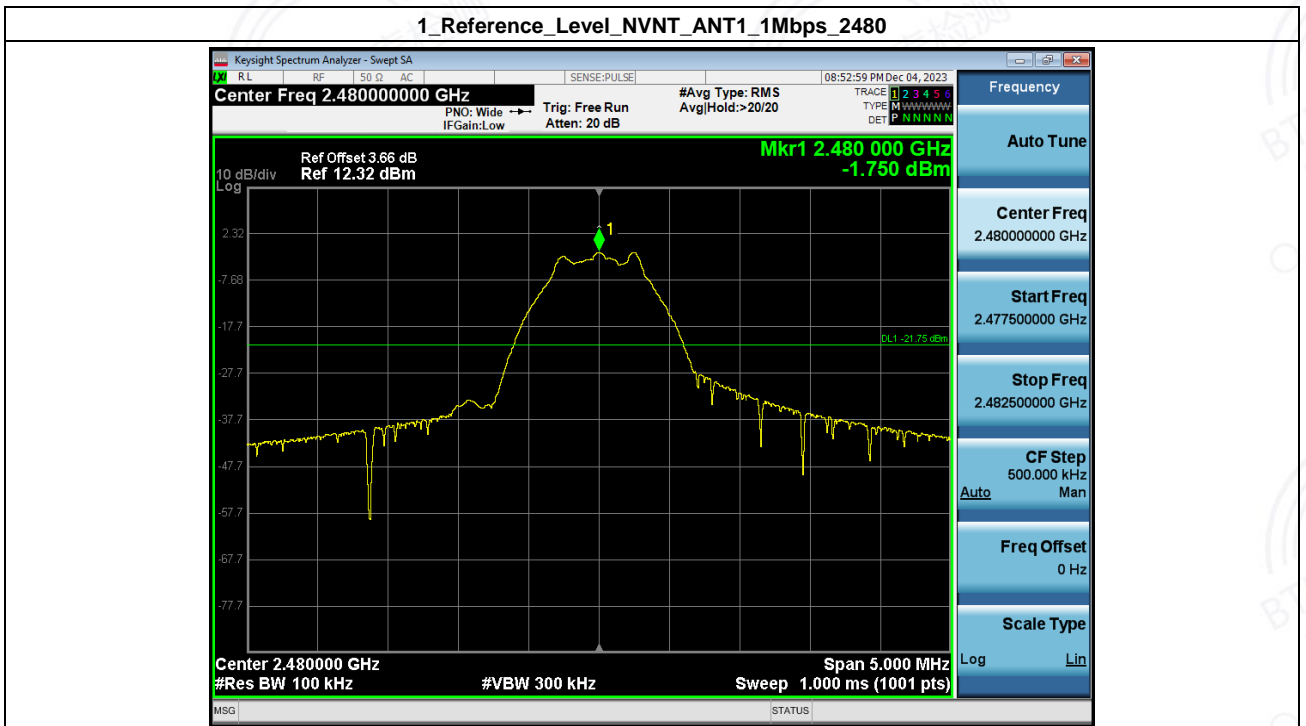
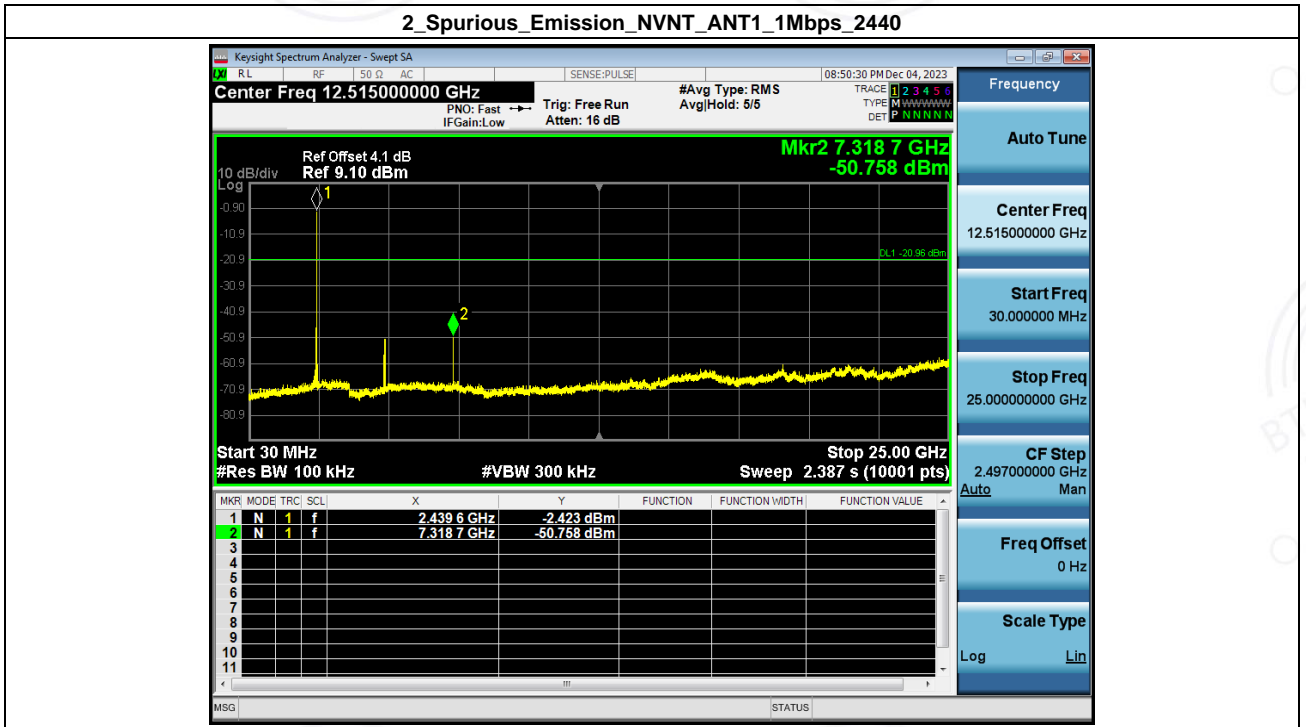


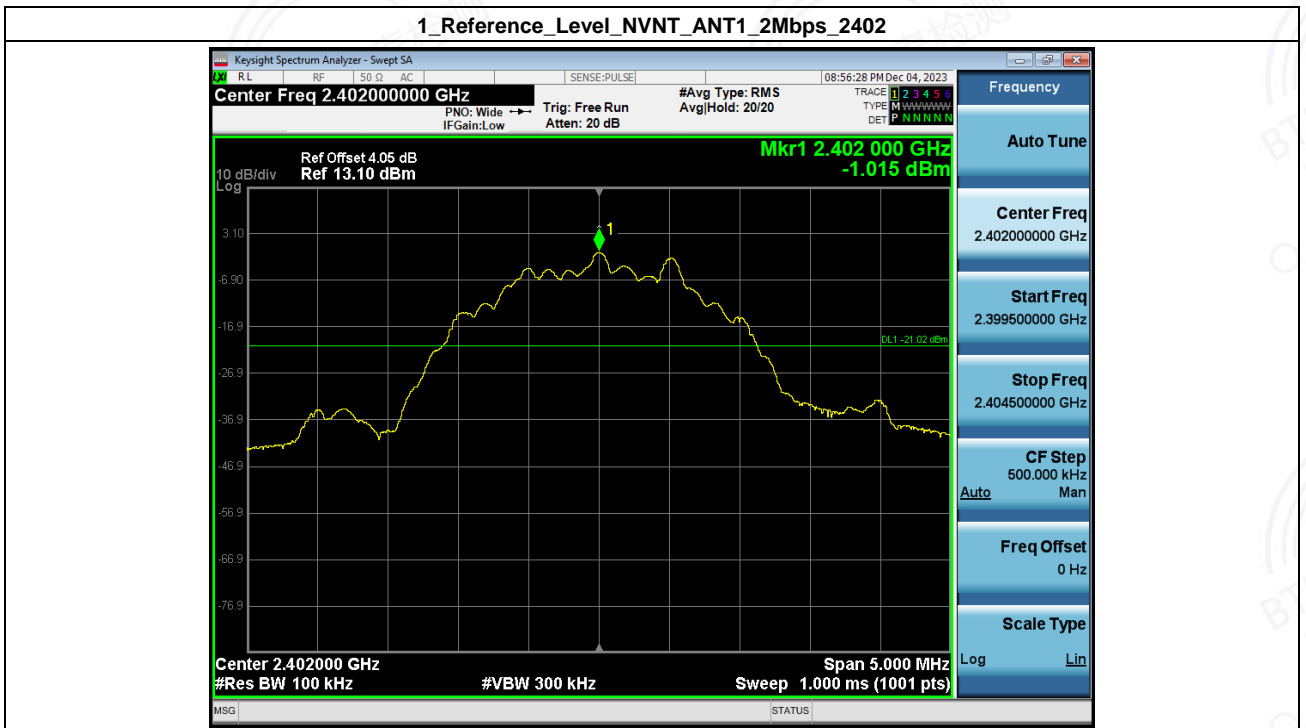
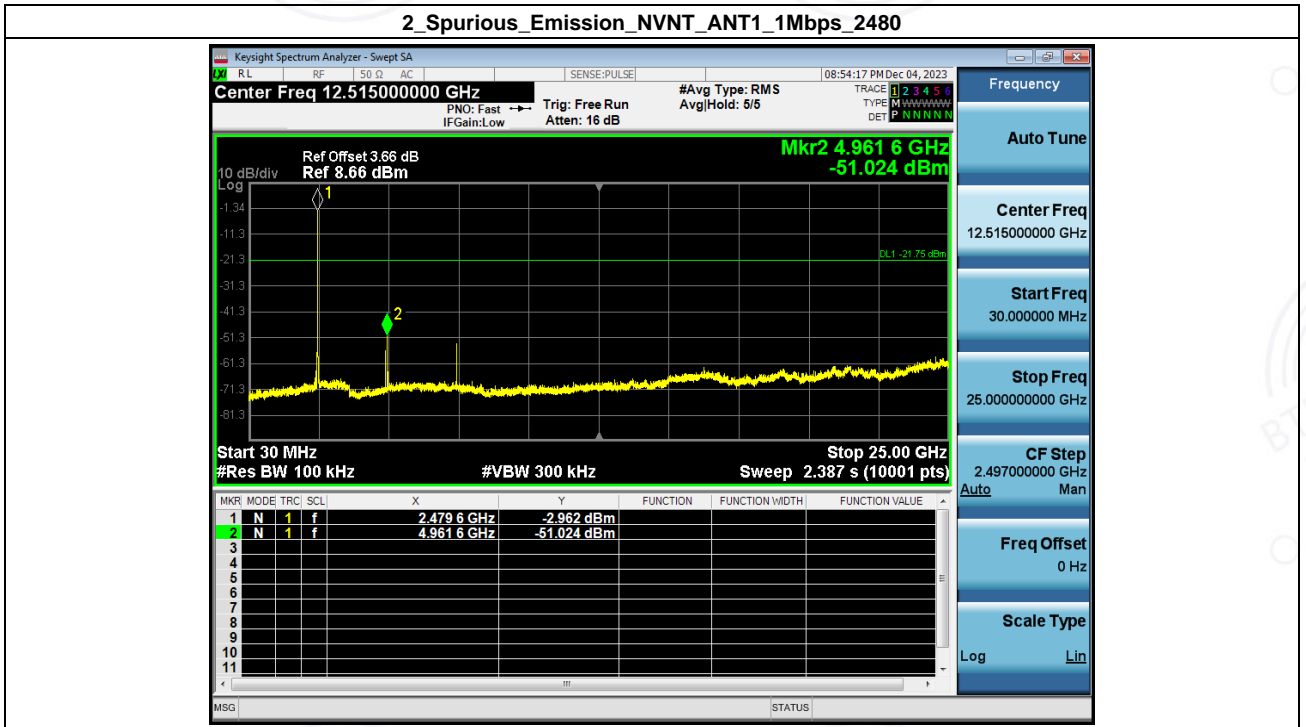
7. Spurious Emission

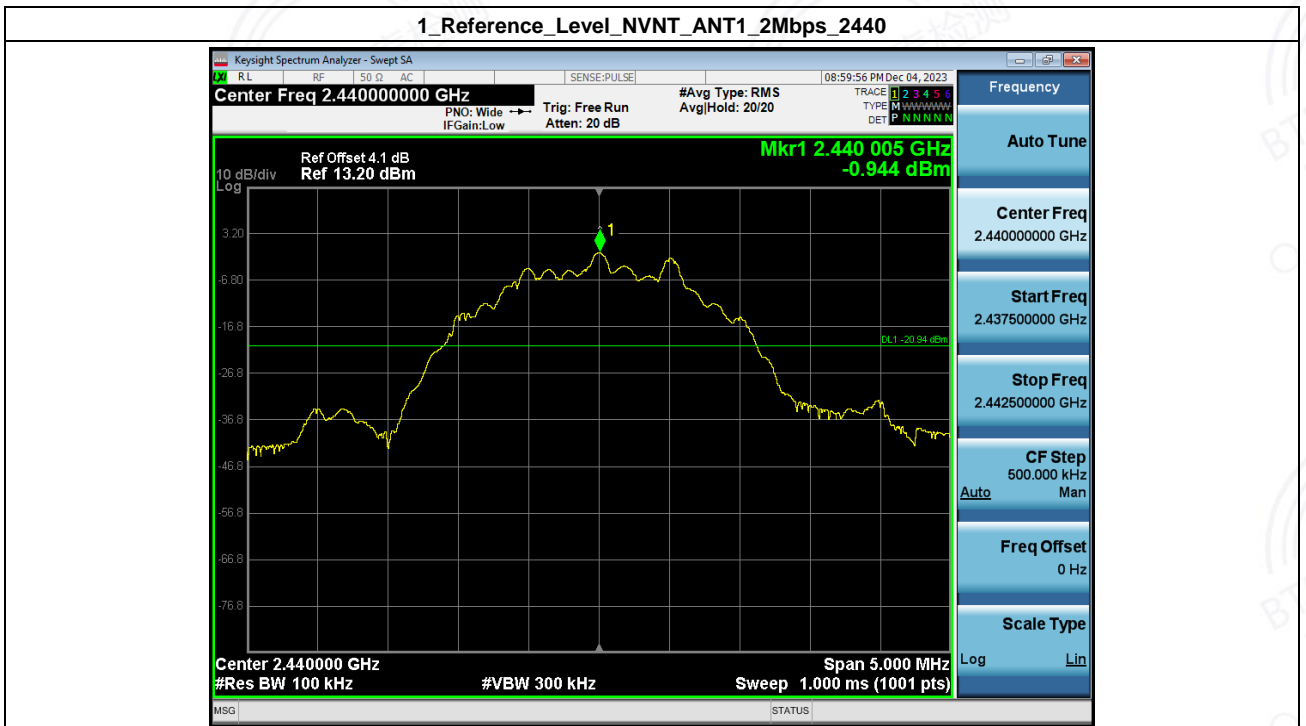
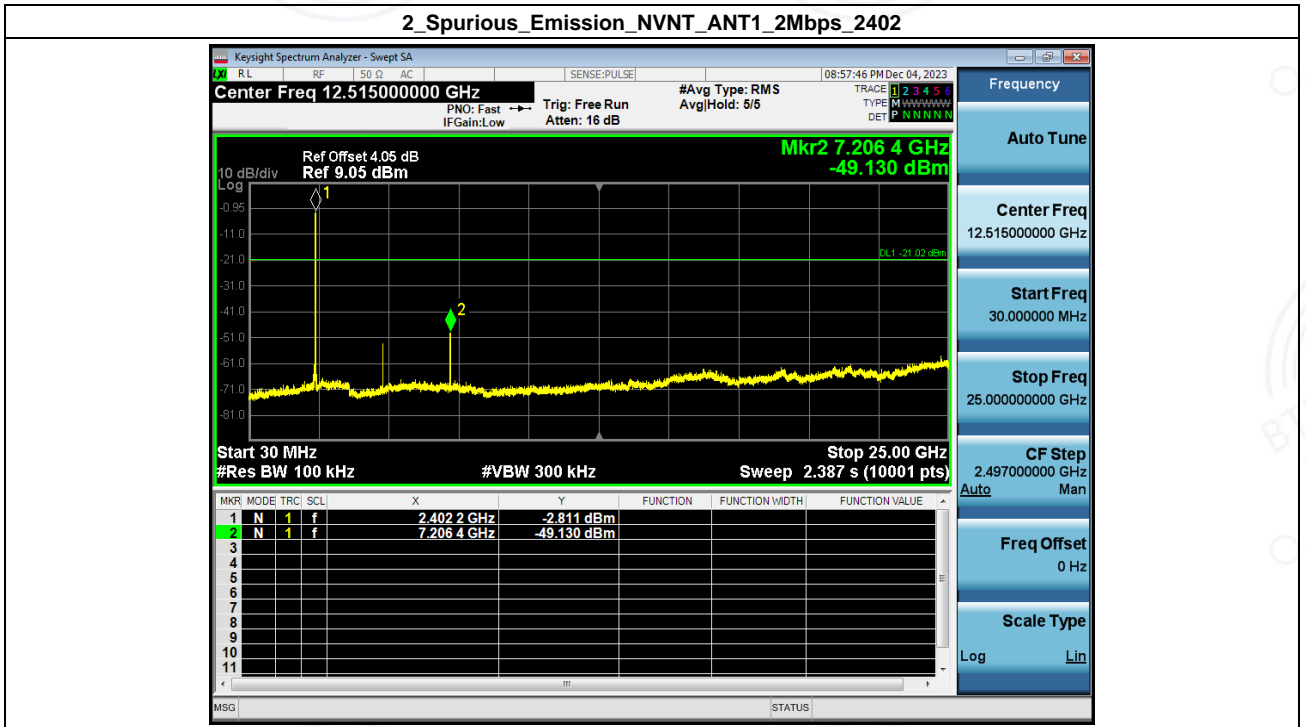
Condition	Antenna	Rate	TX_Frequency(MHz)	Spurious MAX.Value(dBm)	Limit	Result
NVNT	ANT1	1Mbps	2402	-47.519	-21.035	Pass
NVNT	ANT1	1Mbps	2440.00	-50.758	-20.955	Pass
NVNT	ANT1	1Mbps	2480	-51.024	-21.750	Pass
NVNT	ANT1	2Mbps	2402	-49.130	-21.015	Pass
NVNT	ANT1	2Mbps	2440.00	-51.317	-20.944	Pass
NVNT	ANT1	2Mbps	2480	-48.916	-21.739	Pass

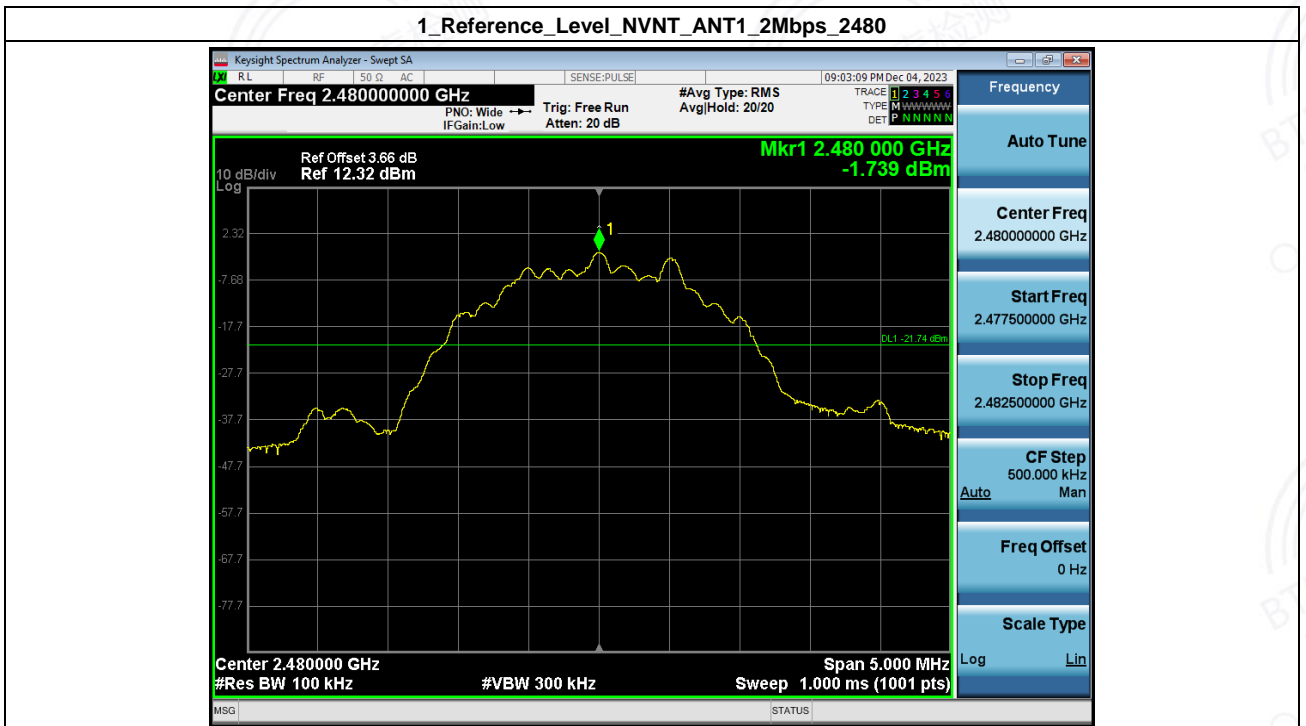
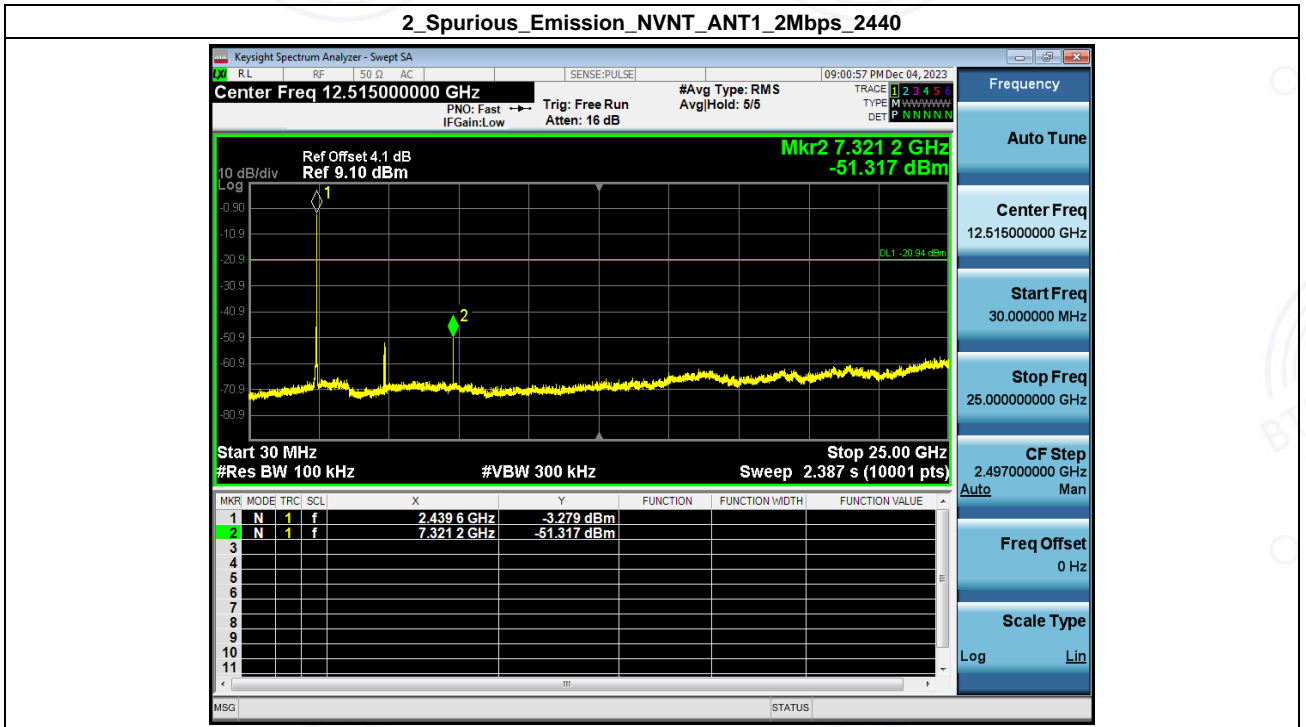


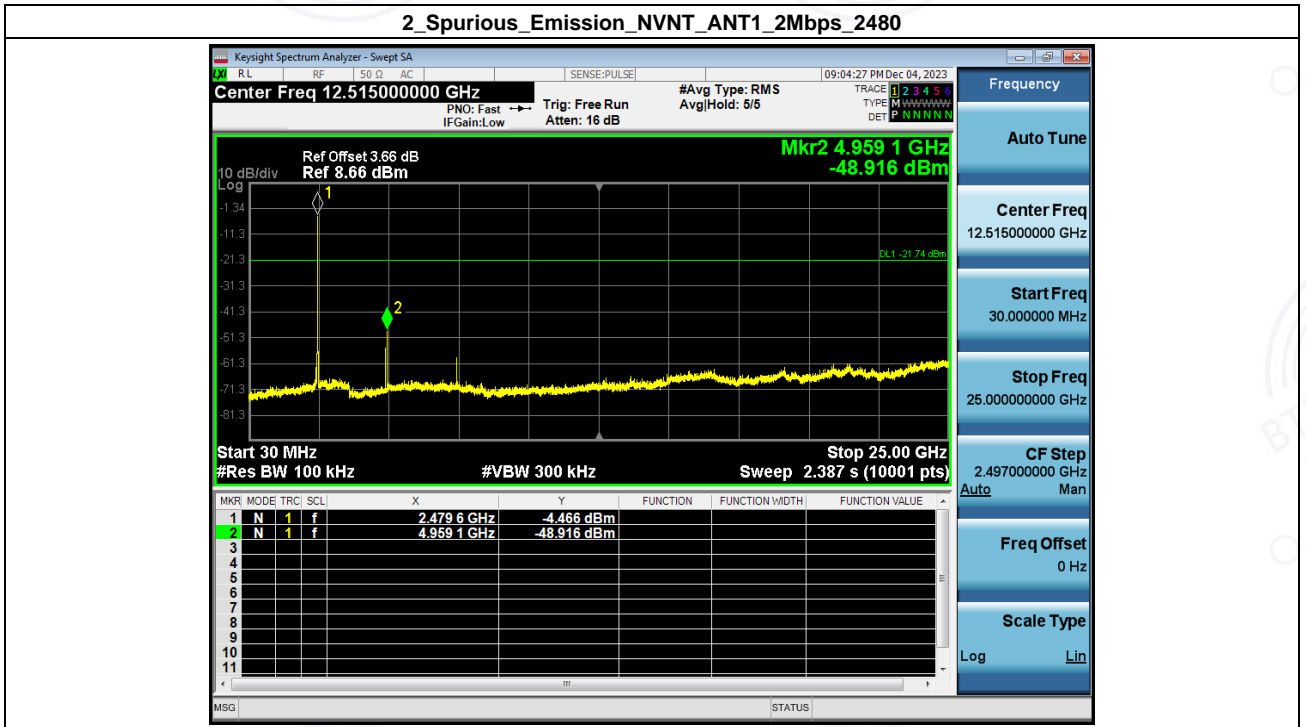












- End of the Report -

