



TEST REPORT

Application No.: BTEK231109008AE
Applicant: Shenzhen Sincodynamic Technology Co.,Ltd
Address of Applicant: No.1 Changguang Industrial Park, No.40 Aoxin Road, Baoan Community, Y uanshan St., Henggang, Shenzhen, 518115 China
Manufacturer: Shenzhen Sincodynamic Technology Co.,Ltd
Address of Manufacturer: No.1 Changguang Industrial Park, No.40 Aoxin Road, Baoan Community, Y uanshan St., Henggang, Shenzhen, 518115 China
Factory: Shenzhen Sincodynamic Technology Co.,Ltd
Address of Factory: No.1 Changguang Industrial Park, No.40 Aoxin Road, Baoan Community, Y uanshan St., Henggang, Shenzhen, 518115 China
Equipment Under Test (EUT):
EUT Name: Wireless headphone
Model No.: 4SO050A--RSP20, B6-BT, B8-BT, 4SO050A--OL
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: 2023-11-20
Date of Test: 2023-11-20 to 2023-12-06
Date of Issue: 2023-12-06

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		2023-12-06		Original

Authorized for issue by:				
		Elma. Yang		
		Elma Yang /Project Engineer		
		Carl. Yang		
		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
Other requirements Frequency Hopping Spread Spectrum System Hopping Sequence		N/A	47 CFR Part 15, Subpart C 15.247(a)(1),(g),(h)	Pass

Radio Spectrum Matter Part				
Item	Standard	Method	Requirement	Result
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
Conducted Peak Output Power		ANSI C63.10 (2013) Section 7.8.5	47 CFR Part 15, Subpart C 15.247(b)(1)	Pass
20dB Bandwidth		ANSI C63.10 (2013) Section 7.8.7	47 CFR Part 15, Subpart C 15.247(a)(1)	Pass
Carrier Frequencies Separation		ANSI C63.10 (2013) Section 7.8.2	47 CFR Part 15, Subpart C 15.247a(1)	Pass
Hopping Channel Number		ANSI C63.10 (2013) Section 7.8.3	47 CFR Part 15, Subpart C 15.247a(1)(iii)	Pass
Dwell Time		ANSI C63.10 (2013) Section 7.8.4	47 CFR Part 15, Subpart C 15.247a(1)(iii)	Pass
Conducted Band Edges Measurement		ANSI C63.10 (2013) Section 7.8.6	47 CFR Part 15, Subpart C 15.247(d)	Pass
Conducted Spurious Emissions		ANSI C63.10 (2013) Section 7.8.8	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:

The EUT can't work with Bluetooth while charging, So Conducted Emissions at AC Power Line (150kHz-30MHz) is not applicable.

E.U.T./EUT means Equipment Under Test.

Pass means the test result passed the test standard requirement, please find the detailed decision rule in the report relative section.

Model No.:4SO050A--RSP20, B6-BT, B8-BT, 4SO050A--OL

Only the model 4SO050A--RSP20 was tested. According to the declaration from the applicant, the electrical circuit design, layout, components used, internal wiring and functions of other models are identical for the above models, with only difference on Model No.



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	10
6.1 Antenna Requirement	10
6.1.1 Test Requirement:	10
6.1.2 Conclusion	10
6.2 Other requirements Frequency Hopping Spread Spectrum System Hopping Sequence	11
6.2.1 Test Requirement:	11
6.2.2 Conclusion	12
7 Radio Spectrum Matter Test Results	14
7.1 Conducted Peak Output Power	16
7.1.1 E.U.T. Operation	16
7.1.2 Test Mode Description	16
7.1.3 Test Setup Diagram	16
7.1.4 Measurement Procedure and Data	16
7.2 20dB Bandwidth	17
7.2.1 E.U.T. Operation	17
7.2.2 Test Mode Description	17
7.2.3 Test Setup Diagram	17
7.2.4 Measurement Procedure and Data	17
7.3 Carrier Frequencies Separation	18
7.3.1 E.U.T. Operation	18
7.3.2 Test Mode Description	18
7.3.3 Test Setup Diagram	18
7.3.4 Measurement Procedure and Data	18
7.4 Hopping Channel Number	19
7.4.1 E.U.T. Operation	19
7.4.2 Test Mode Description	19
7.4.3 Test Setup Diagram	19
7.4.4 Measurement Procedure and Data	19
7.5 Dwell Time	20
7.5.1 E.U.T. Operation	20
7.5.2 Test Mode Description	20
7.5.3 Test Setup Diagram	20
7.5.4 Measurement Procedure and Data	20
7.6 Conducted Band Edges Measurement	21
7.6.1 E.U.T. Operation	21
7.6.2 Test Mode Description	21
7.6.3 Test Setup Diagram	21



7.6.4	Measurement Procedure and Data	21
7.7	Conducted Spurious Emissions	22
7.7.1	E.U.T. Operation	22
7.7.2	Test Mode Description	22
7.7.3	Test Setup Diagram	22
7.7.4	Measurement Procedure and Data	22
7.8	Radiated Emissions which fall in the restricted bands	23
7.8.1	E.U.T. Operation	23
7.8.2	Test Mode Description	23
7.8.3	Test Setup Diagram	24
7.8.4	Measurement Procedure and Data	24
7.9	Radiated Spurious Emissions (Below 1GHz)	26
7.9.1	E.U.T. Operation	26
7.9.2	Test Mode Description	26
7.9.3	Test Setup Diagram	27
7.9.4	Measurement Procedure and Data	27
7.10	Radiated Spurious Emissions (Above 1GHz)	30
7.10.1	E.U.T. Operation	30
7.10.2	Test Mode Description	30
7.10.3	Test Setup Diagram	31
7.10.4	Measurement Procedure and Data	31
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 3.7V by battery(200mAh) and recharged by Type-C port.
Cable(s):	/
Frequency Range:	2402MHz to 2480MHz
Bluetooth Version:	V5.3
This test report is for classic mode.	
Spectrum Spread Technology:	Frequency Hopping Spread Spectrum(FHSS)
Hopping Channel Type:	Adaptive Frequency Hopping systems
Modulation Type:	GFSK, $\pi/4$ DQPSK, 8DPSK
Number of Channels:	79
Channel Spacing:	1MHz
Sample Type:	Portable device
Antenna Type:	PCB Antenna
Antenna Gain:	-0.58 dBi
Hardware Version	JD-B8-AB5656B2-V1.1
Software and Firmware Version	V1.1
Sample No.:	BTEK231109008AE-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 Emissions at AC Power Line (150kHz-30MHz)	$\pm 3.12\text{dB}$
Conducted Peak Output Power	$\pm 0.76\text{dB}$
20dB Bandwidth	$\pm 3\%$
Carrier Frequencies Separation	$\pm 7.3 \times 10^{-8}$
Hopping Channel Number	$\pm 7.3 \times 10^{-8}$
Dwell Time	$\pm 0.4\%$
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 Gangtuo Road, Bogang Community, Shajing Street, Bao'an District, Shenzhen, Guangdong, China 518104

Tel:0755-2334 4200 Fax: 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 Emissions at AC Power Line (150kHz-30MHz)					
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Shielding Room	YIHENG ENECTRONIC	9*5*3.3	YH-BT-220304-04	2022-03-03	2025-03-02
EMI Test Receiver	Rohde&Schwarz	ESCI	101021	2023-06-12	2024-06-11
Measurement Software	Fara	EZ EMC Ver. FA-03A2	N/A	N/A	N/A
LISN	Rohde&Schwarz	ENV216	101472	2023-06-12	2024-06-11
LISN	Schwarzbeck	NSLK 8128	05127	2023-06-12	2024-06-11

RF Conducted					
Equipment	Manufacturer	Model No	Serial No	Cal Date	Cal Due Date
Shielding Room	YIHENG ENECTRONIC	5.5*3.1*3	YH-BT-220304-03	2022-03-03	2025-03-02
EXA Signal Analyzer	KEYSIGHT	N9020A	MY54230486	2023-06-12	2024-06-11
DC Power Supply	E3632A	E3642A	KR75304416	2023-06-12	2024-06-11
Attenuator	RswTech	SMA-JK-6dB	N/A	2023-06-12	2024-06-11
Attenuator	RswTech	SMA-JK-3dB	N/A	2023-06-12	2024-06-11
RF Control Unit	Techy	TR1029-1	N/A	2023-06-12	2024-06-11
RF Sensor Unit	Techy	TR1029-2	N/A	2023-06-12	2024-06-11
WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW 500	141258	2023-06-12	2024-06-11
MXG Vector Signal Generator	Agilent	N5182A	US46240522	2023-06-12	2024-06-11
Programmable Temperature&Humidity Chamber	GRT	GR-HWX1000	GR22051001	2023-06-12	2024-06-11
Measurement Software	TACHOY	RF TestSoft	N/A	N/A	N/A

RSE					
Equipment	Manufacturer	Model No	Serial No	Cal Date	Cal Due Date
3m Semi-Anechoic Chamber	YIHENG ENECTRONIC	966	YH-BT-220304-01	2022-03-03	2025-03-02
EMI Test Receiver	Rohde&Schwarz	ESCI	100694	2023-06-12	2024-06-11
TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	01324	2022-06-15	2025-06-14
Pre-Amplifier	Schwarzbeck	BBV 9745	#180	2023-06-12	2024-06-11
Measurement Software	Fara	EZ EMC Ver. FA-03A2	N/A	2023-06-12	2024-06-11
EXA Signal Analyzer	Keysight	N9020A	MY54440290	2023-06-12	2024-06-11
Horn Antenna	Schwarzbeck	BBHA 9120D	02695	2022-06-15	2025-06-14
Pre-Amplifier	Tonscend	TAP0118045	AP20K806109	2023-06-12	2024-06-11
Horn Antenna	SCHWARZBECK	BBHA9170	1157	2022-06-15	2025-06-14



Low Noise Pre-amplifier	SKET	LNPA-1840G-50	SK2022032902	2023-06-12	2024-06-11
Signal analyzer	ROHDE&SCHWARZ	FSQ40	100010	2023-06-12	2024-06-11
Loop Antenna	ETS	6502	00201177	2022-06-15	2025-06-14

General used equipment					
Equipment	Manufacturer	Model No	Serial No	Cal Date	Cal Due Date
Humidity/Temperature/Barometric Pressure Indicator	KUMAR	F132	N/A	2023-06-12	2024-06-11
Humidity/Temperature/Barometric Pressure Indicator	KUMAR	F132	N/A	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:

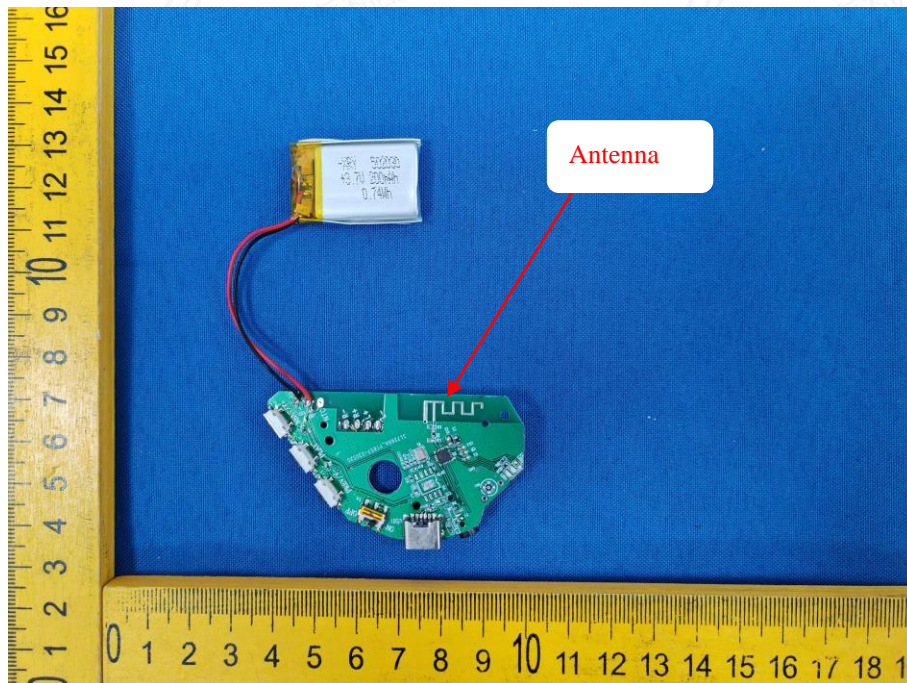
Testing shall be performed using the highest gain antenna of each combination of licence-exempt transmitter and antenna type, with the transmitter output power set at the maximum level. When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's 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 integrated on the Chip in PCB and no consideration of replacement. The best case gain of the antenna is -0.58dBi.



6.2 Other requirements Frequency Hopping Spread Spectrum System Hopping Sequence

6.2.1 Test Requirement:

47 CFR Part 15, Subpart C 15.247(a)(1),(g),(h)

Limit:

Standard Requirement:

The system shall hop to channel frequencies that are selected at the system hopping rate from a Pseudorandom ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

Frequency hopping spread spectrum systems are not required to employ all available hopping channels during each transmission. However, the system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this section should the transmitter be presented with a continuous data (or information) stream. In addition, a system employing short transmission bursts must comply with the definition of a frequency hopping system and must distribute its transmissions over the minimum number of hopping channels specified in this section.

The incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hopsets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

Compliance for section 15.247(a)(1):

According to Technical Specification, the pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONES; i.e. the shift register is initialized with nine ones.

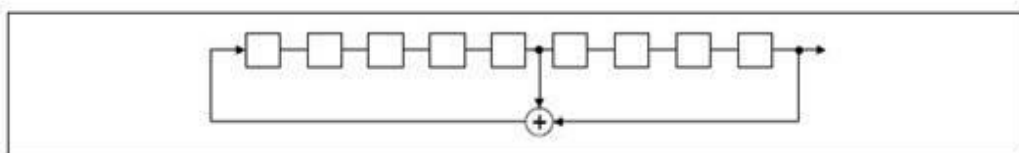
> Number of shift register stages: 9

> Length of pseudo-random sequence: $2^9 - 1 = 511$ bits

> Longest sequence of zeros: 8 (non-inverted signal)

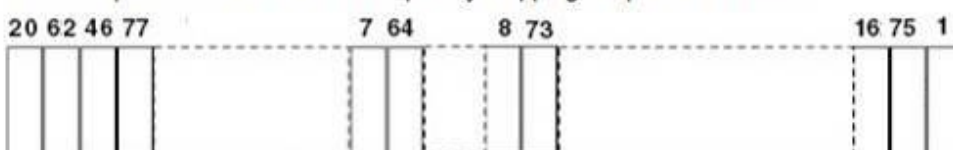
Linear Feedback Shift Register for Generation of the PRBS sequence

An example of Pseudorandom Frequency Hopping Sequence as follow:



Linear Feedback Shift Register for Generation of the PRBS sequence

An example of Pseudorandom Frequency Hopping Sequence as follow:



Each frequency used equally on the average by each transmitter.

According to Technical Specification, the receivers are designed to have input and IF bandwidths that



match the hopping channel bandwidths of any transmitters and shift frequencies in synchronization with the transmitted signals.

Compliance for section 15.247(g):

According to Technical Specification, the system transmits the packet with the pseudorandom hopping frequency with a continuous data and the short burst transmission from the Bluetooth system is also transmitted under the frequency hopping system with the pseudorandom hopping frequency system.

Compliance for section 15.247(h):

According to Technical specification, the system incorporates with an adaptive system to detect other user within the spectrum band so that it individually and independently to avoid hopping on the occupied channels.

The system is designed not have the ability to coordinated with other FHSS System in an effort to avoid the simultaneous occupancy of individual hopping frequencies by multiple transmitter.

6.2.2 Conclusion

Standard Requirement:

The system shall hop to channel frequencies that are selected at the system hopping rate from a Pseudorandom ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter.

The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

Frequency hopping spread spectrum systems are not required to employ all available hopping channels during each transmission. However, the system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this section should the transmitter be presented with a continuous data (or information) stream. In addition, a system employing short transmission bursts must comply with the definition of a frequency hopping system and must distribute its transmissions over the minimum number of hopping channels specified in this section.

The incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hopsets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

Compliance for section 15.247(a)(1):

According to Technical Specification, the pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONES; i.e. the shift register is initialized with nine ones.

> Number of shift register stages: 9

> Length of pseudo-random sequence: $2^9 - 1 = 511$ bits

> Longest sequence of zeros: 8 (non-inverted signal)

Linear Feedback Shift Register for Generation of the PRBS sequence

Each frequency used equally on the average by each transmitter.

According to Technical Specification, the receivers are designed to have input and IF bandwidths that match the hopping channel bandwidths of any transmitters and shift frequencies in synchronization with the transmitted signals.

Compliance for section 15.247(g):

According to Technical Specification, the system transmits the packet with the pseudorandom hopping frequency with a continuous data and the short burst transmission from the Bluetooth system is also transmitted under the frequency hopping system with the pseudorandom hopping frequency system.

Compliance for section 15.247(h):

According to Technical specification, the system incorporates with an adaptive system to detect other user



within the spectrum band so that it individually and independently to avoid hopping on the occupied channels. The system is designed not have the ability to coordinated with other FHSS System in an effort to avoid the simultaneous occupancy of individual hopping frequencies by multiple transmitter.



7 Radio Spectrum Matter Test Results

7.1 Conducted Emissions at AC Power Line (150kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.207

Test Method: ANSI C63.10 (2013) Section 6.2

Limit:

Frequency of emission(MHz)	Conducted limit(dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
*Decreases with the logarithm of the frequency.		
Detector: Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz		

7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 22.2 °C

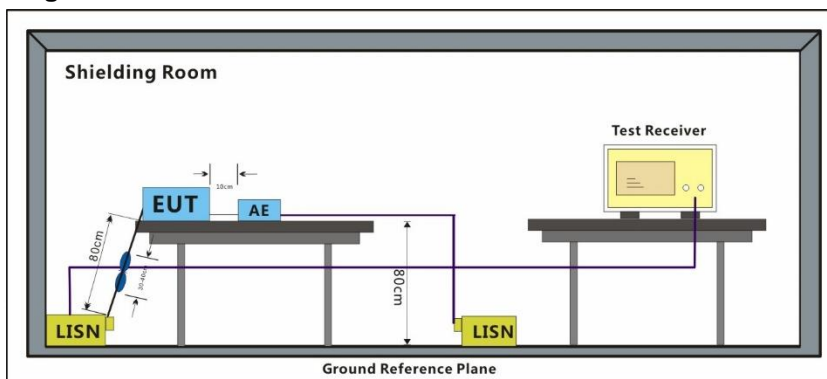
Humidity: 60.5 % RH

Atmospheric Pressure: 1010 mbar

7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.1.3 Test Setup Diagram



7.1.4 Measurement Procedure and Data

- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
 - 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a $50\Omega/50\mu\text{H} + 50\Omega$ linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
 - 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane.
 - 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
 - 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.
- Remark: $\text{LISN} = \text{Read Level} + \text{Cable Loss} + \text{LISN Factor}$

Not applicable



7.2 Conducted Peak Output Power

Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(1)

Test Method: ANSI C63.10 (2013) Section 7.8.5

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

7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 20.6 °C

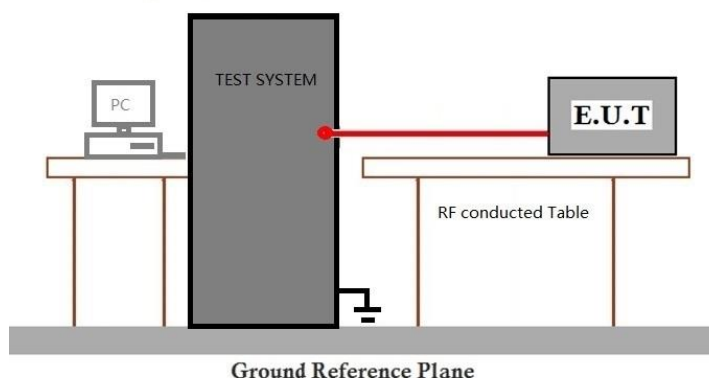
Humidity: 50.5 % RH

Atmospheric Pressure: 1010 mbar

7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

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 20dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.247(a)(1)
Test Method: ANSI C63.10 (2013) Section 7.8.7

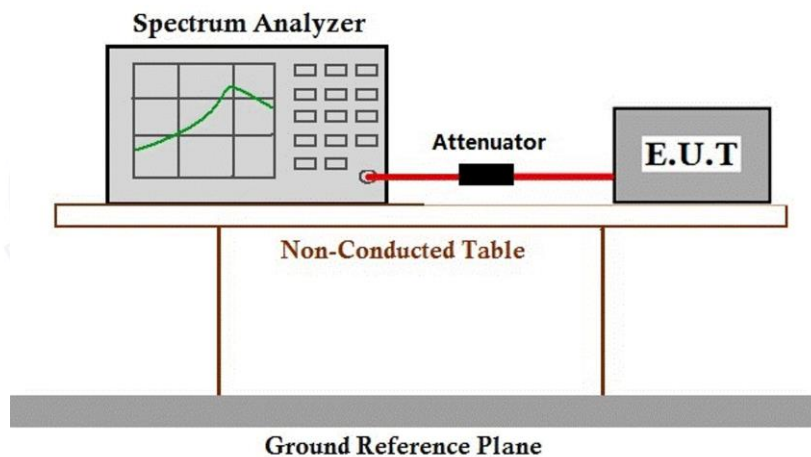
7.3.1 E.U.T. Operation

Operating Environment:
Temperature: 20.6 °C Humidity: 50.5 % RH Atmospheric Pressure: 1010 mbar

7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

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 Carrier Frequencies Separation

Test Requirement 47 CFR Part 15, Subpart C 15.247a(1)

Test Method: ANSI C63.10 (2013) Section 7.8.2

Limit:

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

7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 20.6 °C

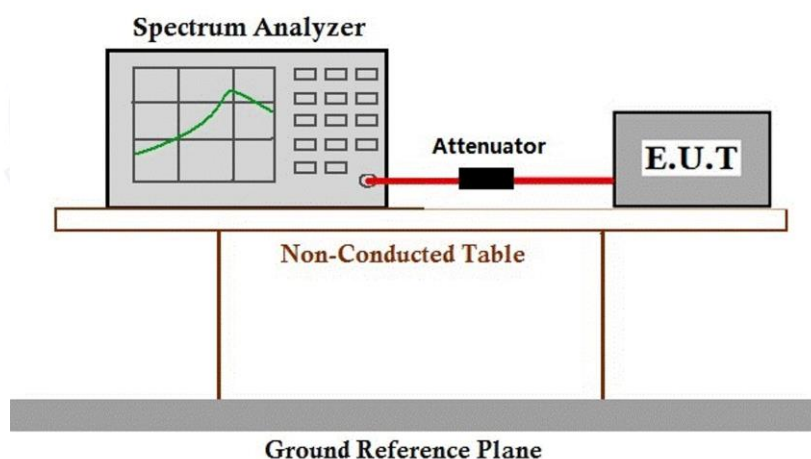
Humidity: 50.5 % RH

Atmospheric Pressure: 1010 mbar

7.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

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 Hopping Channel Number

Test Requirement 47 CFR Part 15, Subpart C 15.247a(1)(iii)

Test Method: ANSI C63.10 (2013) Section 7.8.3

Limit:

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

7.5.1 E.U.T. Operation

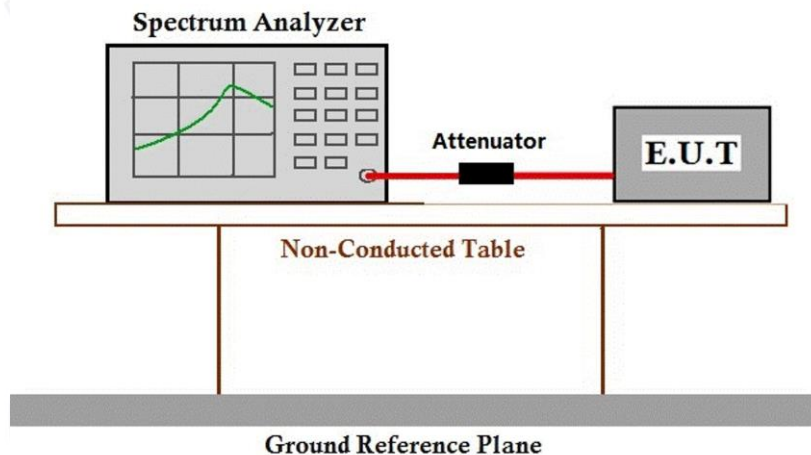
Operating Environment:

Temperature: 20.6 °C Humidity: 50.5 % RH Atmospheric Pressure: 1010 mbar

7.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	TX_Hop mode_Keep the EUT in frequency hopping mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

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 Dwell Time

Test Requirement 47 CFR Part 15, Subpart C 15.247a(1)(iii)

Test Method: ANSI C63.10 (2013) Section 7.8.4

Limit:

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

7.6.1 E.U.T. Operation

Operating Environment:

Temperature: 20.6 °C

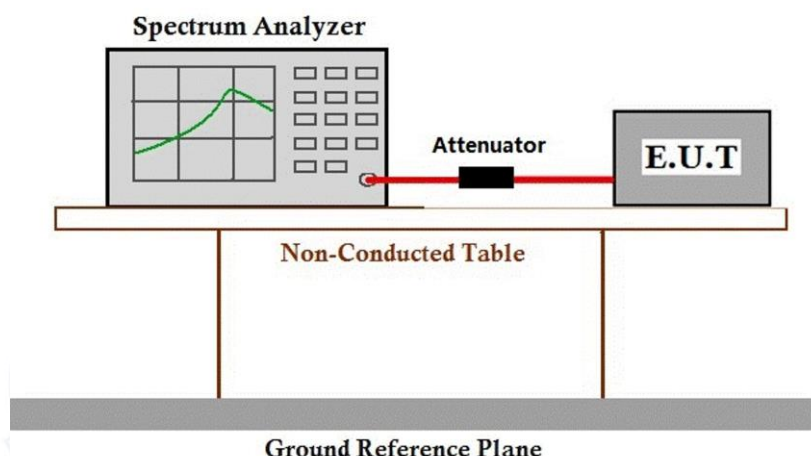
Humidity: 50.5 % RH

Atmospheric Pressure: 1010 mbar

7.6.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	TX_Hop mode_Keep the EUT in frequency hopping mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.6.3 Test Setup Diagram



7.6.4 Measurement Procedure and Data

cable loss=0.83dB

Please Refer to Appendix for Details



7.7 Conducted Band Edges Measurement

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

Test Method: ANSI C63.10 (2013) Section 7.8.6

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)).

7.7.1 E.U.T. Operation

Operating Environment:

Temperature: 20.6 °C

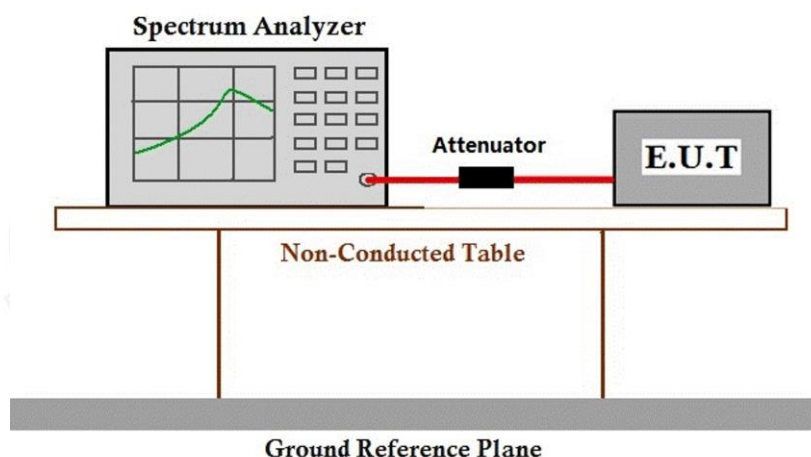
Humidity: 50.5 % RH

Atmospheric Pressure: 1010 mbar

7.7.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.
Final test	02	TX_Hop mode_Keep the EUT in frequency hopping mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.7.3 Test Setup Diagram



7.7.4 Measurement Procedure and Data

cable loss=0.83dB

Please Refer to Appendix for Details



7.8 Conducted Spurious Emissions

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

Test Method: ANSI C63.10 (2013) Section 7.8.8

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)).

7.8.1 E.U.T. Operation

Operating Environment:

Temperature: 20.6 °C

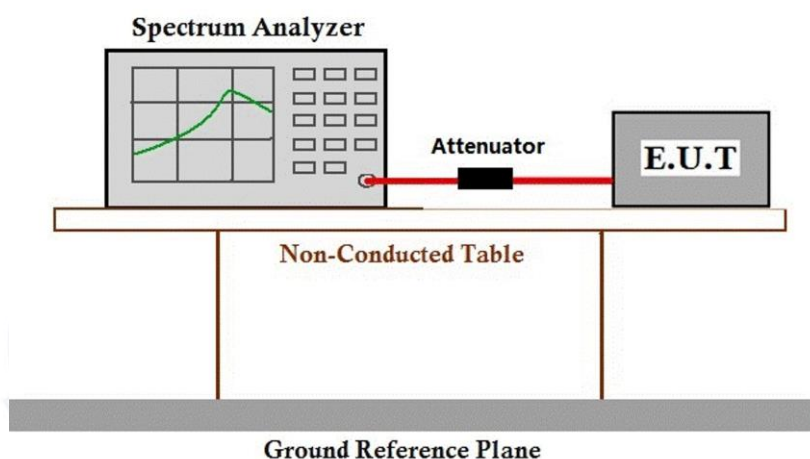
Humidity: 50.5 % RH

Atmospheric Pressure: 1010 mbar

7.8.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.8.3 Test Setup Diagram



7.8.4 Measurement Procedure and Data

cable loss=0.83dB

Please Refer to Appendix for Details



7.9 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.

7.9.1 E.U.T. Operation

Operating Environment:

Temperature: 21.4 °C

Humidity: 54.3 % RH

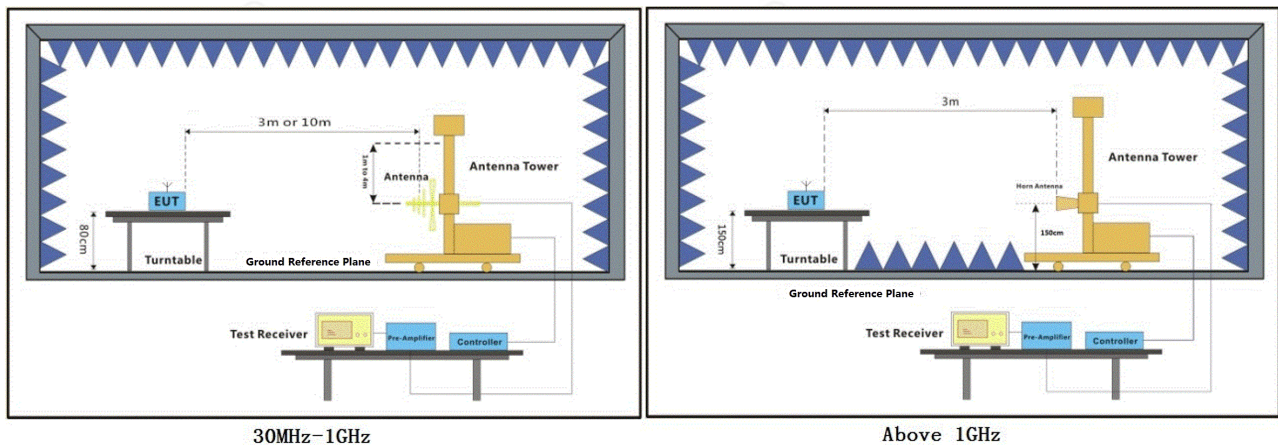
Atmospheric Pressure: 1010 mbar

7.9.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.



7.9.3 Test Setup Diagram



7.9.4 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: Level= Reading Level + 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

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	67.54	-30.59	36.95	74.00	-37.05	peak	P
2	2390.000	70.07	-30.49	39.58	74.00	-34.42	peak	P
3	2400.000	79.19	-30.48	48.71	74.00	-25.29	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	68.98	-30.59	38.39	74.00	-35.61	peak	P
2	2390.000	69.99	-30.49	39.50	74.00	-34.50	peak	P
3	2400.000	79.28	-30.48	48.80	74.00	-25.20	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	80.51	-30.39	50.12	74.00	-23.88	peak	P
2	2500.000	71.89	-30.37	41.52	74.00	-32.48	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	79.43	-30.39	49.04	74.00	-24.96	peak	P
2	2500.000	70.92	-30.37	40.55	74.00	-33.45	peak	P



7.10 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.

7.10.1 E.U.T. Operation

Operating Environment:

Temperature: 25.5 °C

Humidity: 68.6 % RH

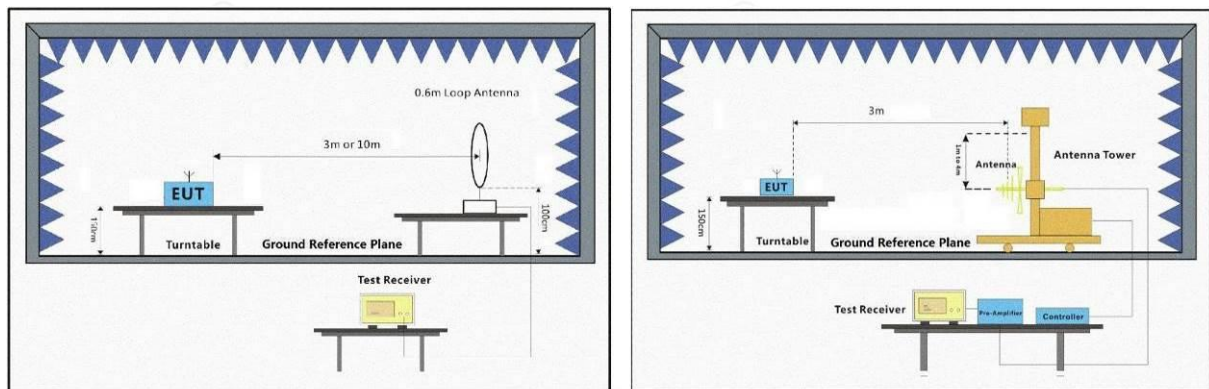
Atmospheric Pressure: 1010 mbar

7.10.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.



7.10.3 Test Setup Diagram



7.10.4 Measurement Procedure and Data

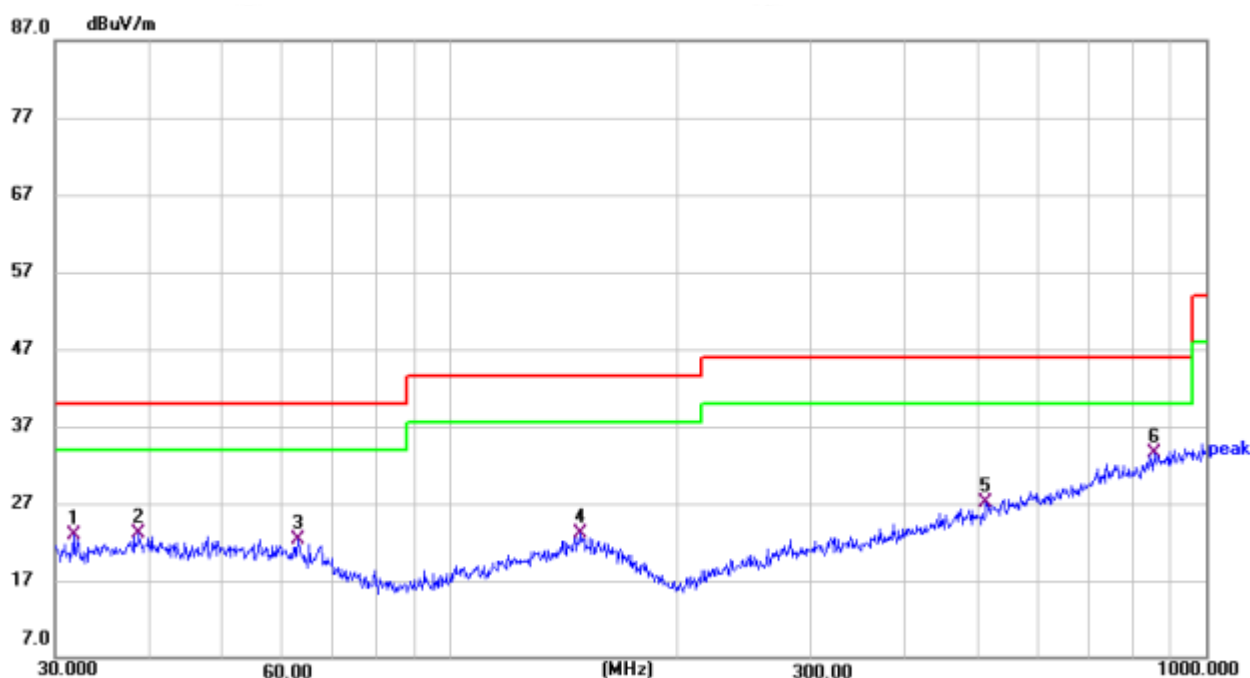
- For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 or 10 meters from the interference-receiving antenna, which 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.
- Test the EUT in the lowest channel, the middle channel, the Highest channel.
- 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.
- Repeat above procedures until all frequencies measured was complete.

Remark:

- Through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.
- 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
- 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.



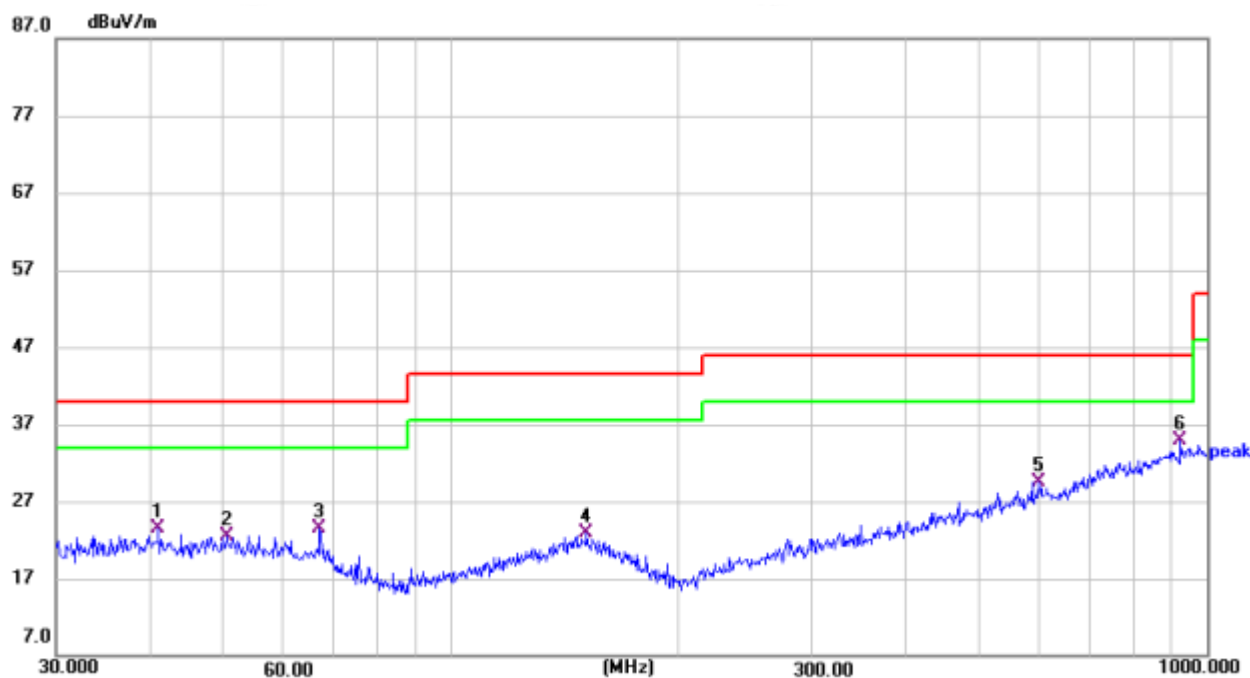
Test Mode: 01; Polarity: Horizontal; Modulation: GFSK; Channel: High



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	31.7312	40.74	-17.87	22.87	40.00	-17.13	QP	300	209	P	
2	38.7517	40.22	-17.02	23.20	40.00	-16.80	QP	200	119	P	
3	62.8707	40.88	-18.53	22.35	40.00	-17.65	QP	100	220	P	
4	148.9624	40.01	-16.86	23.15	43.50	-20.35	QP	100	221	P	
5	511.8352	40.45	-13.34	27.11	46.00	-18.89	QP	100	321	P	
6 *	854.0247	41.91	-8.32	33.59	46.00	-12.41	QP	100	201	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	Height (cm)	Azimuth (deg.)	P/F	Remark
1	40.9880	40.54	-17.08	23.46	40.00	-16.54	QP	200	112	P	
2	50.4090	40.10	-17.57	22.53	40.00	-17.47	QP	100	119	P	
3	66.9670	42.70	-19.27	23.43	40.00	-16.57	QP	100	111	P	
4	151.0665	39.79	-16.85	22.94	43.50	-20.56	QP	100	123	P	
5	599.3212	41.14	-11.59	29.55	46.00	-16.45	QP	100	332	P	
6 *	922.5157	42.57	-7.60	34.97	46.00	-11.03	QP	100	225	P	



7.11 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.

7.11.1 E.U.T. Operation

Operating Environment:

Temperature: 21.4 °C

Humidity: 54.3 % RH

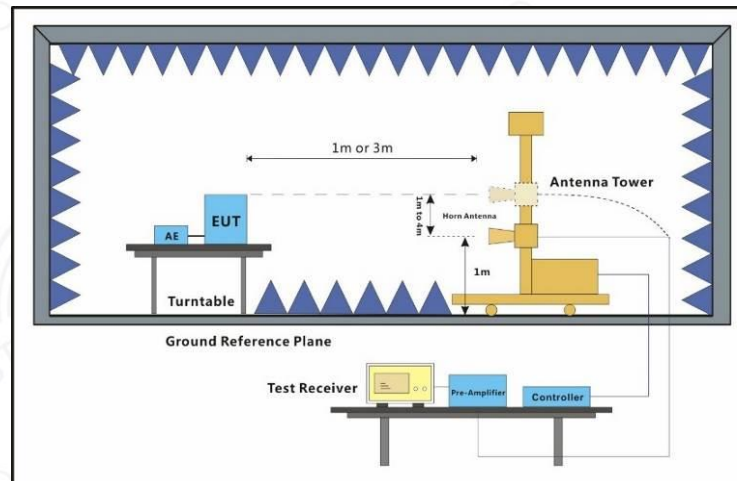
Atmospheric Pressure: 1010 mbar

7.11.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.



7.11.3 Test Setup Diagram



7.11.4 Measurement Procedure and Data

- 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 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 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.
- Test the EUT in the lowest channel, the middle channel, the Highest channel.
- 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.
- 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 = Receiver Reading + Antenna Factor + Cable Factor - Preamplifier 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.



TM01 / Polarization: Horizontal / Modulation: GFSK/ CH: L

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2914.145	70.62	-29.63	40.99	74.00	-33.01	peak	P
2	4277.181	68.66	-29.38	39.28	74.00	-34.72	peak	P
3	6085.933	64.71	-24.40	40.32	74.00	-33.68	peak	P
4	8646.262	70.00	-25.75	44.25	74.00	-29.75	peak	P
5	11046.921	67.39	-23.53	43.86	74.00	-30.14	peak	P
6	14218.542	70.13	-20.66	49.47	74.00	-24.53	peak	P

TM01 / Polarization: Vertical / Modulation: GFSK/ CH: L

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2972.634	66.29	-28.70	37.58	74.00	-36.42	peak	P
2	4313.879	68.83	-29.15	39.68	74.00	-34.32	peak	P
3	6352.563	67.83	-25.97	41.86	74.00	-32.14	peak	P
4	8577.151	69.03	-24.91	44.11	74.00	-29.89	peak	P
5	11286.172	68.33	-23.95	44.38	74.00	-29.62	peak	P
6	14955.222	70.84	-19.46	51.37	74.00	-22.63	peak	P

TM01 / Polarization: Horizontal / Modulation: GFSK/ CH: M

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2914.358	69.16	-30.53	38.62	74.00	-35.38	peak	P
2	4276.386	67.87	-28.90	38.97	74.00	-35.03	peak	P
3	6085.136	65.75	-25.10	40.65	74.00	-33.35	peak	P
4	8645.360	70.31	-24.21	46.10	74.00	-27.90	peak	P
5	11048.279	67.92	-22.71	45.21	74.00	-28.79	peak	P
6	14218.849	70.99	-22.11	48.88	74.00	-25.12	peak	P

TM01 / Polarization: Vertical / Modulation: GFSK/ CH: M

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2973.584	67.40	-30.37	37.02	74.00	-36.98	peak	P
2	4313.132	69.05	-29.06	39.99	74.00	-34.01	peak	P
3	6353.951	66.72	-25.60	41.12	74.00	-32.88	peak	P
4	8577.103	69.91	-25.82	44.09	74.00	-29.91	peak	P
5	11286.978	68.43	-23.87	44.56	74.00	-29.44	peak	P
6	14955.452	71.87	-21.12	50.75	74.00	-23.25	peak	P



TM01 / Polarization: Horizontal / Modulation: GFSK/ CH: H

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2913.976	69.49	-29.11	40.37	74.00	-33.63	peak	P
2	4277.773	68.39	-29.82	38.57	74.00	-35.43	peak	P
3	6085.926	64.02	-26.00	38.02	74.00	-35.98	peak	P
4	8645.352	68.87	-24.14	44.73	74.00	-29.27	peak	P
5	11048.236	68.05	-22.77	45.28	74.00	-28.72	peak	P
6	14217.881	70.65	-20.80	49.84	74.00	-24.16	peak	P

TM01 / Polarization: Vertical / Modulation: GFSK/ CH: H

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2972.953	67.77	-29.16	38.60	74.00	-35.40	peak	P
2	4312.767	68.71	-29.37	39.34	74.00	-34.66	peak	P
3	6354.134	68.41	-25.53	42.88	74.00	-31.12	peak	P
4	8576.394	68.87	-25.14	43.73	74.00	-30.27	peak	P
5	11286.746	68.81	-23.41	45.40	74.00	-28.60	peak	P
6	14955.302	71.87	-20.85	51.02	74.00	-22.98	peak	P

TM01 / Polarization: Horizontal / Modulation: $\pi/4$ DQPSK / CH: L

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2914.526	70.02	-28.68	41.34	74.00	-32.66	peak	P
2	4277.198	68.45	-29.10	39.35	74.00	-34.65	peak	P
3	6086.225	65.50	-25.02	40.48	74.00	-33.52	peak	P
4	8645.274	69.72	-24.77	44.95	74.00	-29.05	peak	P
5	11047.191	68.87	-23.33	45.54	74.00	-28.46	peak	P
6	14218.106	70.63	-20.54	50.10	74.00	-23.90	peak	P

TM01 / Polarization: Horizontal / Modulation: $\pi/4$ DQPSK / CH: L

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2974.164	67.60	-29.83	37.77	74.00	-36.23	peak	P
2	4313.193	67.87	-29.57	38.31	74.00	-35.69	peak	P
3	6352.879	68.01	-26.22	41.80	74.00	-32.20	peak	P
4	8575.360	69.86	-25.33	44.53	74.00	-29.47	peak	P
5	11285.266	68.32	-23.39	44.93	74.00	-29.07	peak	P
6	14956.723	70.89	-20.00	50.89	74.00	-23.11	peak	P



TM01 / Polarization: Horizontal / Modulation: $\pi/4$ DQPSK / CH: M

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2915.268	70.13	-30.58	39.56	74.00	-34.44	peak	P
2	4277.636	68.54	-29.14	39.40	74.00	-34.60	peak	P
3	6085.748	64.13	-24.53	39.60	74.00	-34.40	peak	P
4	8645.320	69.21	-25.20	44.01	74.00	-29.99	peak	P
5	11047.316	67.94	-24.32	43.62	74.00	-30.38	peak	P
6	14218.771	69.91	-20.29	49.63	74.00	-24.37	peak	P

TM01 / Polarization: Vertical / Modulation: $\pi/4$ DQPSK / CH: M

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2973.320	66.23	-30.19	36.04	74.00	-37.96	peak	P
2	4312.296	69.37	-29.60	39.78	74.00	-34.22	peak	P
3	6353.073	67.02	-26.38	40.64	74.00	-33.36	peak	P
4	8576.975	70.32	-24.89	45.44	74.00	-28.56	peak	P
5	11286.470	67.29	-22.51	44.78	74.00	-29.22	peak	P
6	14956.329	71.66	-20.90	50.76	74.00	-23.24	peak	P

TM01 / Polarization: Horizontal / Modulation: $\pi/4$ DQPSK / CH: H

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2914.185	70.36	-28.90	41.45	74.00	-32.55	peak	P
2	4277.068	67.71	-29.39	38.32	74.00	-35.68	peak	P
3	6086.057	65.12	-25.33	39.79	74.00	-34.21	peak	P
4	8646.802	70.51	-24.95	45.56	74.00	-28.44	peak	P
5	11047.256	67.26	-23.99	43.27	74.00	-30.73	peak	P
6	14217.926	70.49	-21.54	48.95	74.00	-25.05	peak	P

TM01 / Polarization: Vertical / Modulation: $\pi/4$ DQPSK / CH: H

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2973.985	67.57	-28.67	38.90	74.00	-35.10	peak	P
2	4313.365	67.93	-29.60	38.33	74.00	-35.67	peak	P
3	6353.932	67.35	-26.28	41.07	74.00	-32.93	peak	P
4	8575.938	69.10	-25.67	43.43	74.00	-30.57	peak	P
5	11286.113	67.21	-23.65	43.56	74.00	-30.44	peak	P
6	14955.410	71.48	-20.93	50.55	74.00	-23.45	peak	P



TM01 / Polarization: Horizontal / Modulation: 8DPSK / CH: L

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2914.540	69.12	-30.19	38.93	74.00	-35.07	peak	P
2	4276.828	67.79	-28.76	39.03	74.00	-34.97	peak	P
3	6086.297	65.11	-25.83	39.28	74.00	-34.72	peak	P
4	8645.493	70.34	-24.58	45.75	74.00	-28.25	peak	P
5	11047.847	68.16	-23.28	44.88	74.00	-29.12	peak	P
6	14218.883	70.63	-20.14	50.49	74.00	-23.51	peak	P

TM01 / Polarization: Horizontal / Modulation: 8DPSK / CH: L

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2973.041	66.46	-29.16	37.30	74.00	-36.70	peak	P
2	4312.121	68.21	-28.49	39.72	74.00	-34.28	peak	P
3	6353.339	66.80	-25.27	41.52	74.00	-32.48	peak	P
4	8575.541	69.40	-24.25	45.15	74.00	-28.85	peak	P
5	11286.827	68.37	-23.42	44.95	74.00	-29.05	peak	P
6	14956.522	70.68	-20.33	50.35	74.00	-23.65	peak	P

TM01 / Polarization: Horizontal / Modulation: 8DPSK / CH: M

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2913.880	70.37	-29.71	40.66	74.00	-33.34	peak	P
2	4278.028	68.77	-28.87	39.89	74.00	-34.11	peak	P
3	6084.512	65.10	-25.88	39.22	74.00	-34.78	peak	P
4	8645.321	70.77	-25.74	45.02	74.00	-28.98	peak	P
5	11047.249	66.95	-22.81	44.14	74.00	-29.86	peak	P
6	14217.429	70.55	-21.35	49.20	74.00	-24.80	peak	P

TM01 / Polarization: Vertical / Modulation: 8DPSK / CH: M

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2973.502	67.08	-30.56	36.51	74.00	-37.49	peak	P
2	4313.286	68.09	-29.57	38.52	74.00	-35.48	peak	P
3	6353.458	67.61	-24.60	43.01	74.00	-30.99	peak	P
4	8576.956	69.52	-25.07	44.45	74.00	-29.55	peak	P
5	11286.832	67.81	-22.59	45.22	74.00	-28.78	peak	P
6	14955.167	71.78	-20.22	51.56	74.00	-22.44	peak	P



TM01 / Polarization: Horizontal / Modulation: 8DPSK / CH: H

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2914.317	70.09	-29.09	41.00	74.00	-33.00	peak	P
2	4278.045	67.86	-29.81	38.04	74.00	-35.96	peak	P
3	6085.716	65.50	-25.03	40.47	74.00	-33.53	peak	P
4	8645.755	69.41	-25.61	43.80	74.00	-30.20	peak	P
5	11046.439	68.21	-22.79	45.42	74.00	-28.58	peak	P
6	14218.853	70.45	-21.99	48.46	74.00	-25.54	peak	P

TM01 / Polarization: Vertical / Modulation: 8DPSK / CH: H

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2973.752	67.74	-30.34	37.40	74.00	-36.60	peak	P
2	4313.606	68.93	-28.46	40.48	74.00	-33.52	peak	P
3	6352.416	67.53	-24.95	42.58	74.00	-31.42	peak	P
4	8575.381	70.73	-25.03	45.71	74.00	-28.29	peak	P
5	11285.234	67.84	-24.10	43.75	74.00	-30.25	peak	P
6	14956.225	70.51	-19.68	50.83	74.00	-23.17	peak	P



8 Test Setup Photo

Refer to Appendix – Test Setup Photos.

9 EUT Constructional Details (EUT Photos)

Refer to Appendix - External and Internal Appendix EUT Photos

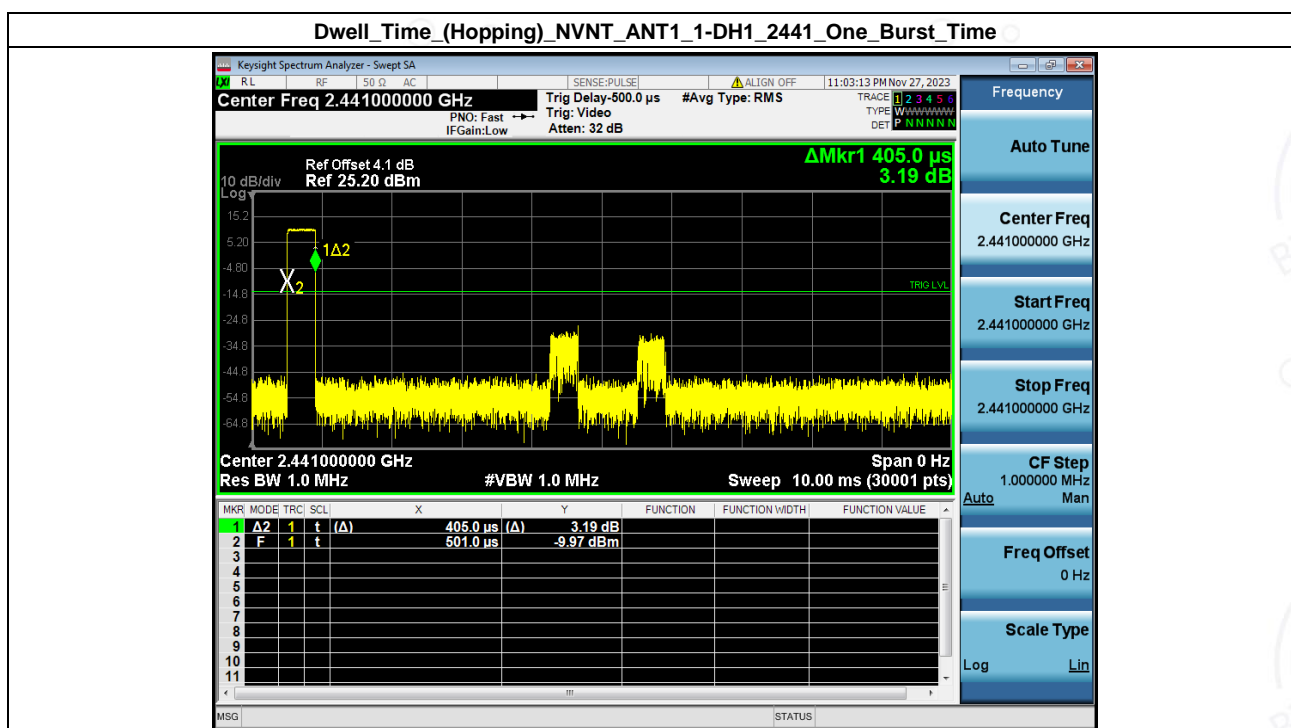


10 Appendix

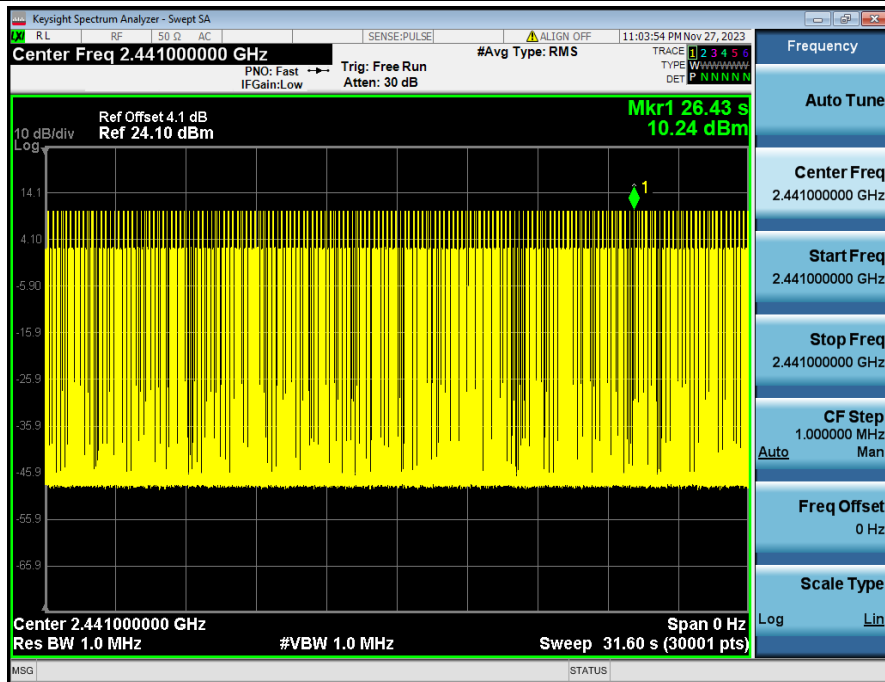
Cable loss=0.83 dB

1. Dwell Time (Hopping)

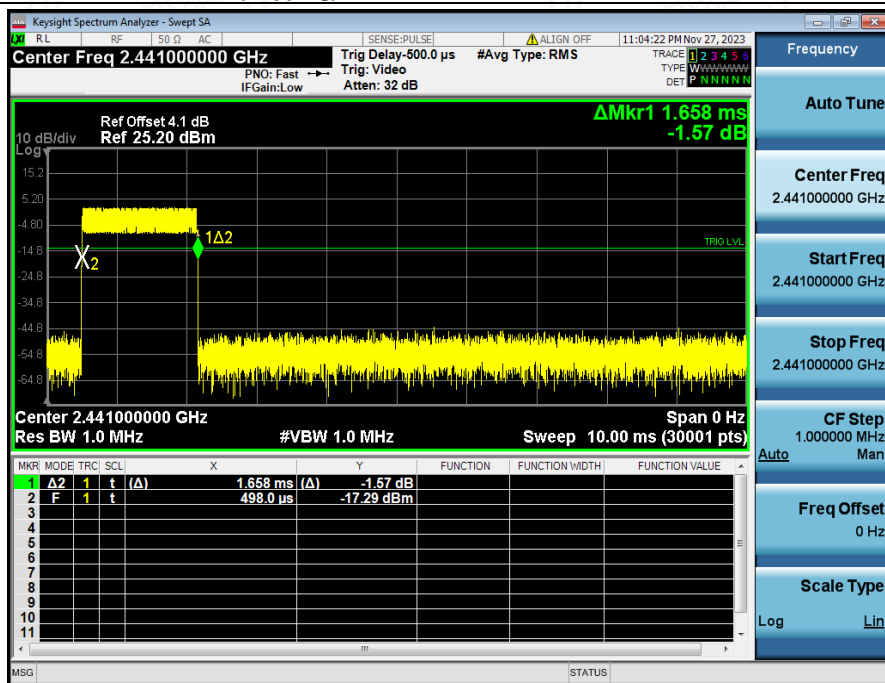
Condition	Antenna	Packet Type	Pulse Time(ms)	Hops	Dwell Time(ms)	Limit(s)	Result
NVNT	ANT1	1-DH1	0.405	320.00	129.600	0.40	Pass
NVNT	ANT1	1-DH3	1.658	158.00	261.964	0.40	Pass
NVNT	ANT1	1-DH5	2.909	108.00	314.172	0.40	Pass
NVNT	ANT1	2-DH1	0.412	320.00	131.840	0.40	Pass
NVNT	ANT1	2-DH3	1.664	158.00	262.912	0.40	Pass
NVNT	ANT1	2-DH5	2.911	104.00	302.744	0.40	Pass
NVNT	ANT1	3-DH1	0.413	320.00	132.160	0.40	Pass
NVNT	ANT1	3-DH3	0.001	160.00	0.160	0.40	Pass
NVNT	ANT1	3-DH5	2.918	113.00	329.734	0.40	Pass



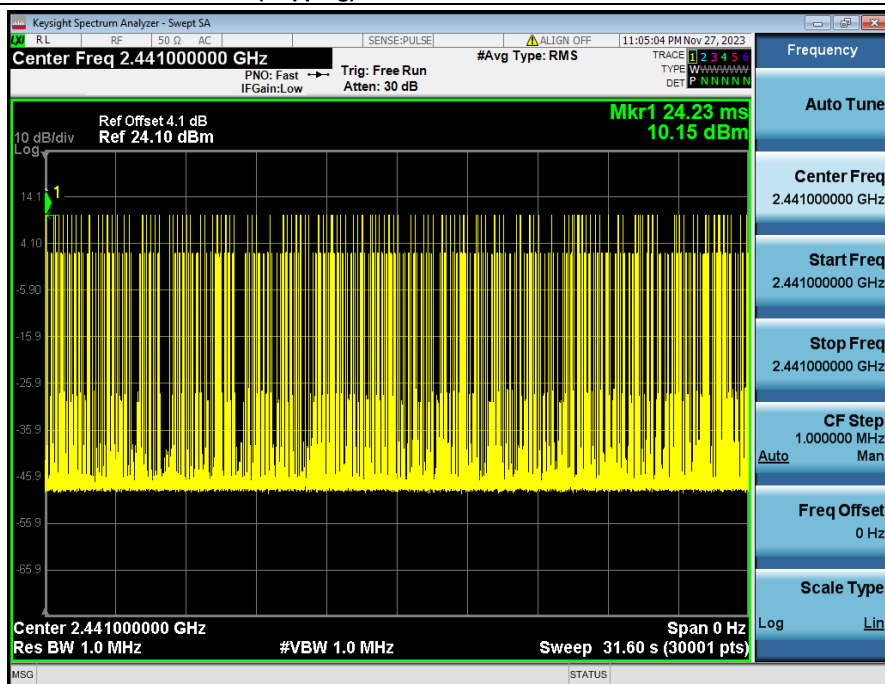
Dwell_Time_(Hopping)_NVNT_ANT1_1-DH1_2441_Accumulated



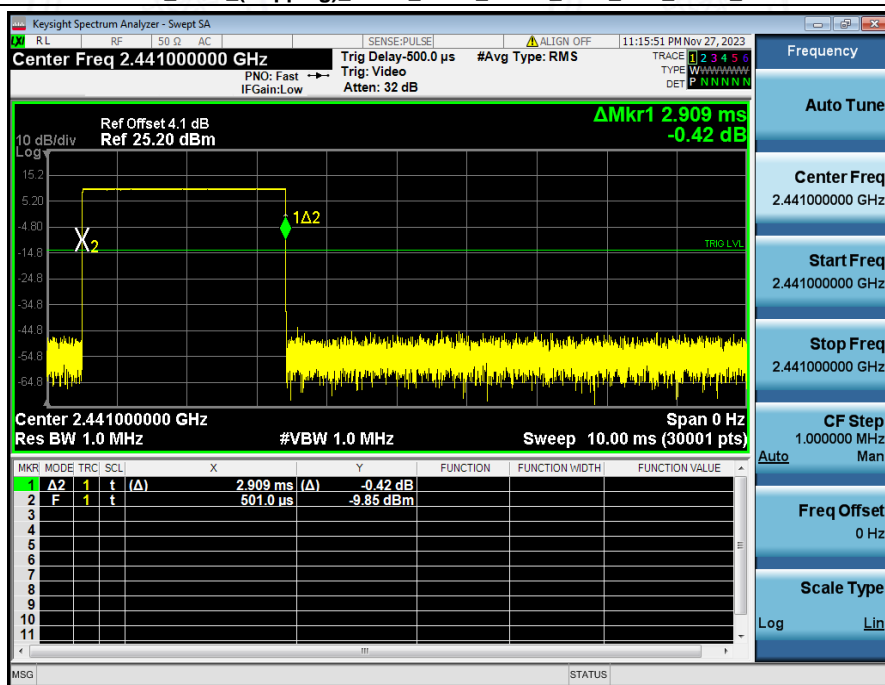
Dwell_Time_(Hopping)_NVNT_ANT1_1-DH3_2441_One_Burst_Time



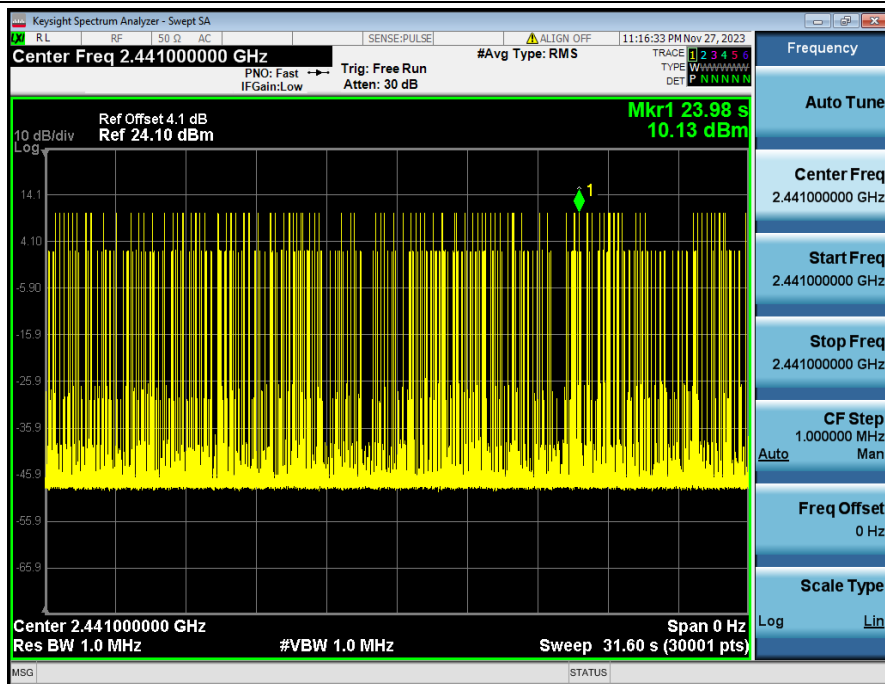
Dwell_Time_(Hopping)_NVNT_ANT1_1-DH3_2441_Accumulated



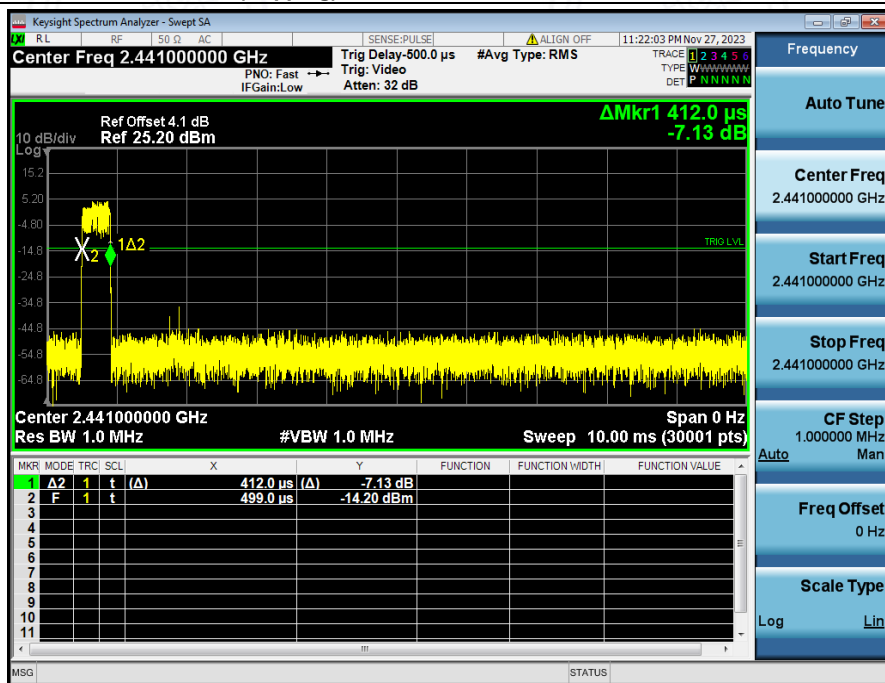
Dwell_Time_(Hopping)_NVNT_ANT1_1-DH5_2441_One_Burst_Time



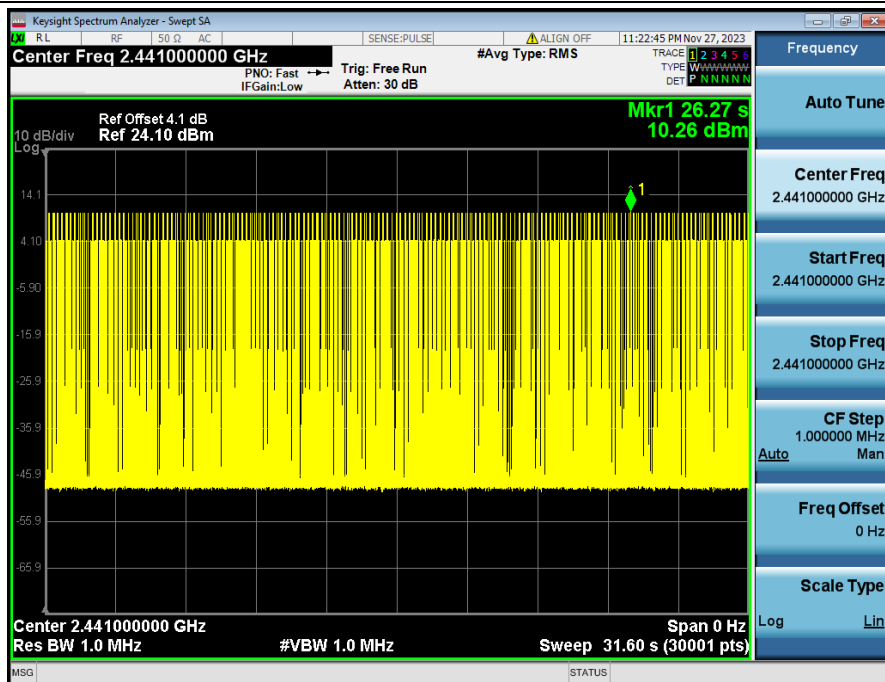
Dwell_Time_(Hopping)_NVNT_ANT1_1-DH5_2441_Accumulated



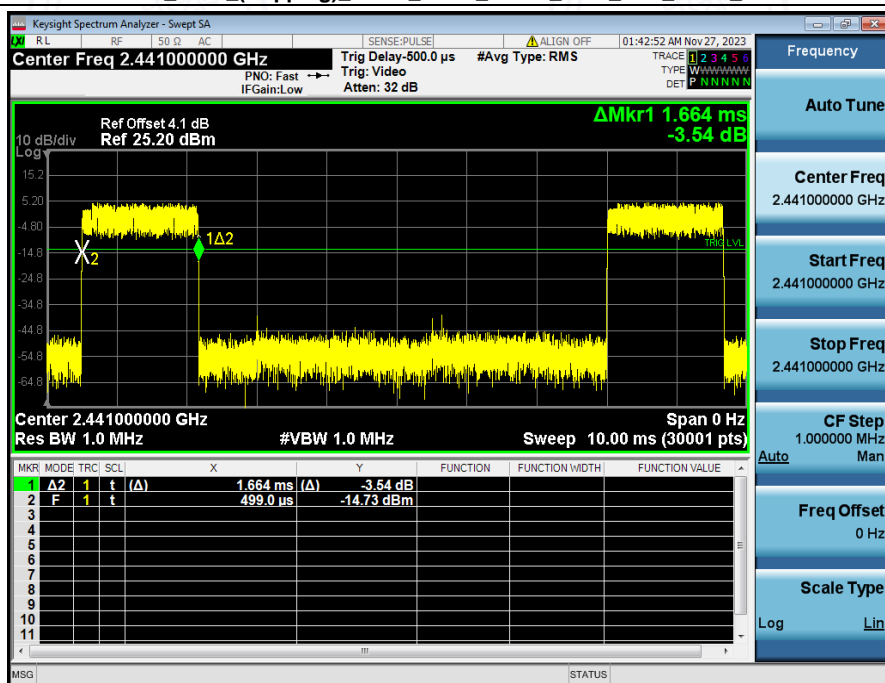
Dwell_Time_(Hopping)_NVNT_ANT1_2-DH1_2441_One_Burst_Time



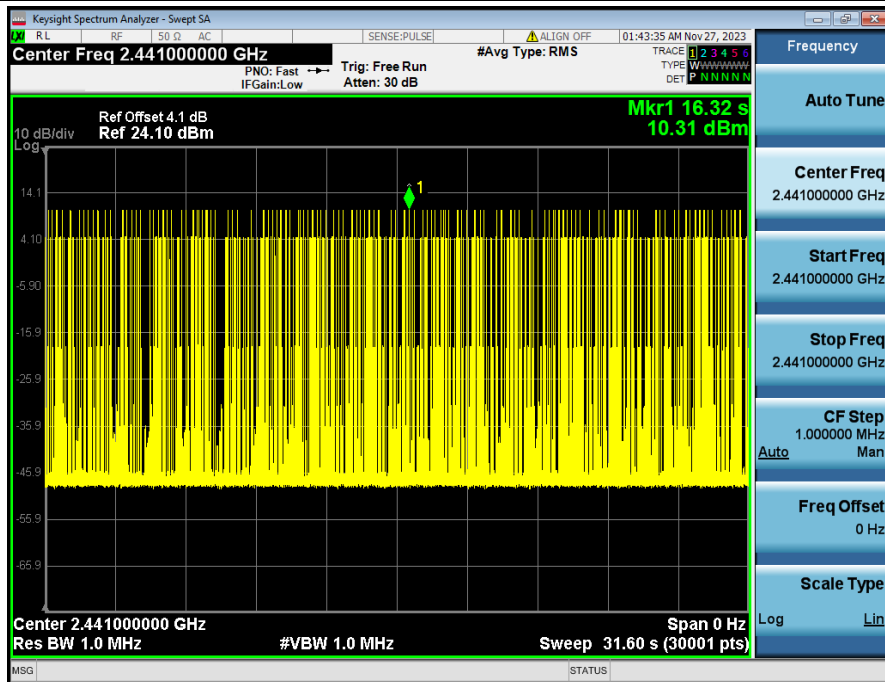
Dwell_Time_(Hopping)_NVNT_ANT1_2-DH1_2441_Accumulated



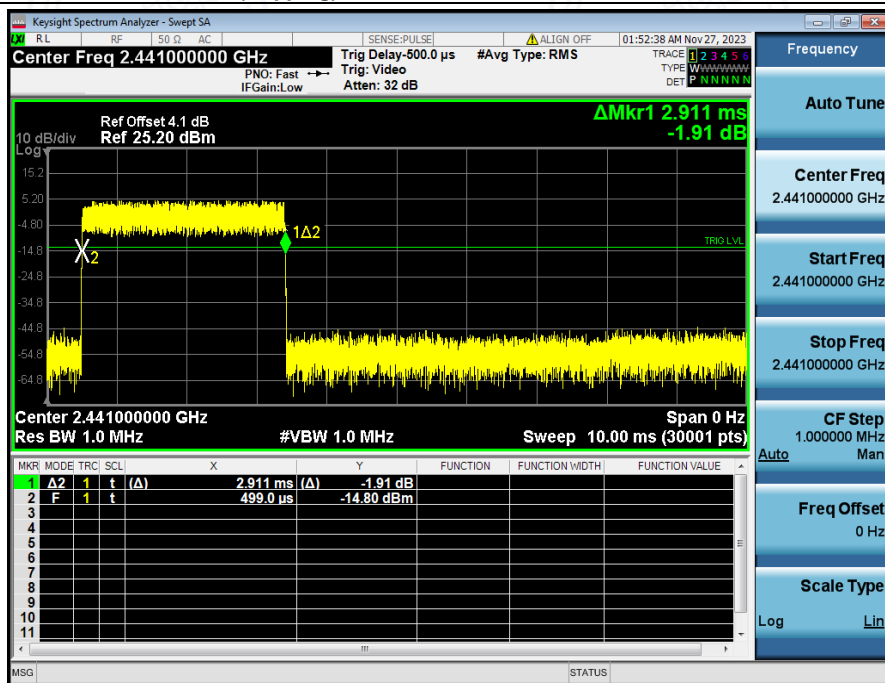
Dwell_Time_(Hopping)_NVNT_ANT1_2-DH3_2441_One_Burst_Time



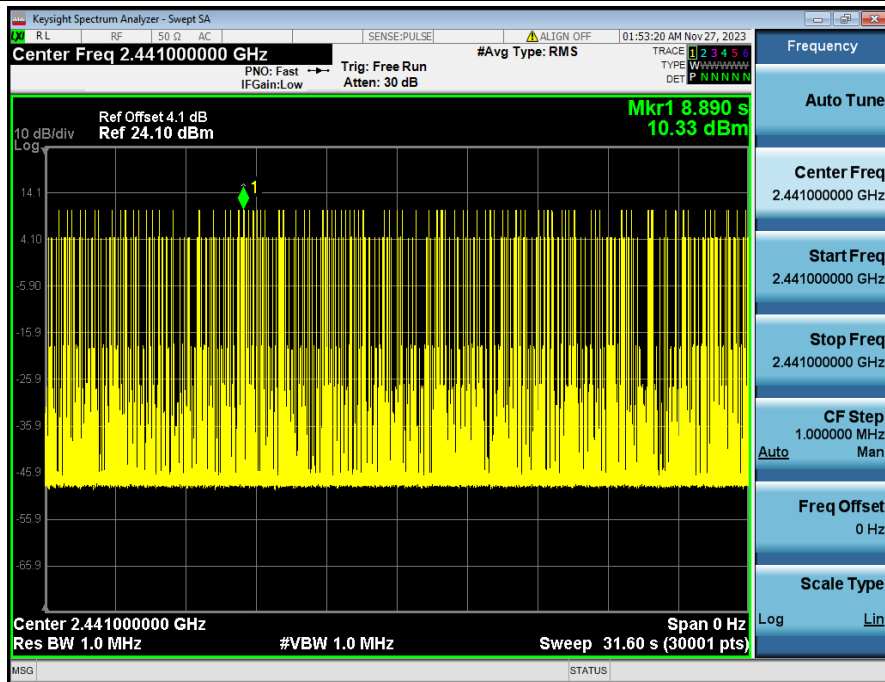
Dwell_Time_(Hopping)_NVNT_ANT1_2-DH3_2441_Accumulated



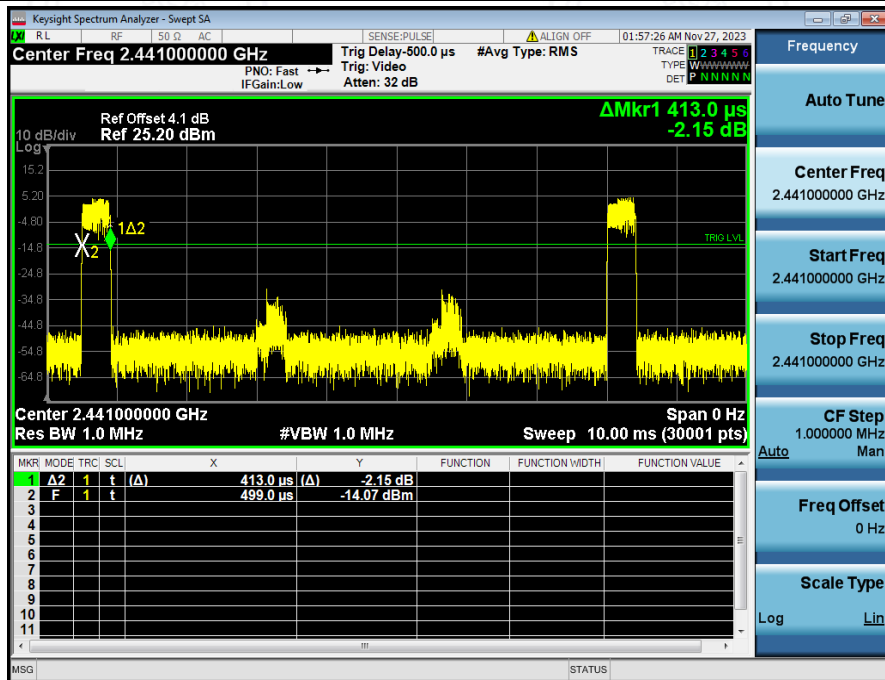
Dwell_Time_(Hopping)_NVNT_ANT1_2-DH5_2441_One_Burst_Time



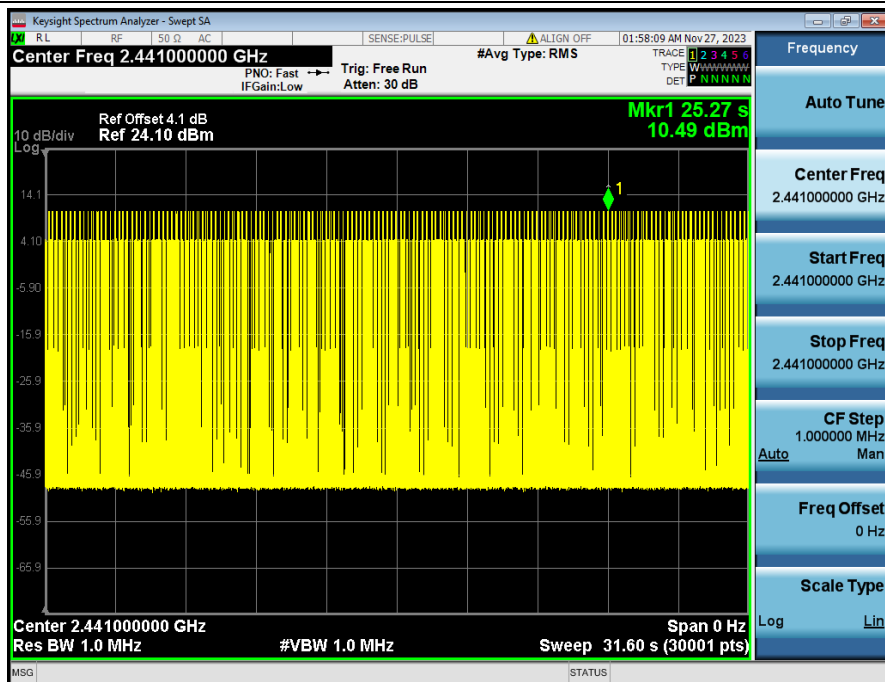
Dwell_Time_(Hopping)_NVNT_ANT1_2-DH5_2441_Accumulated



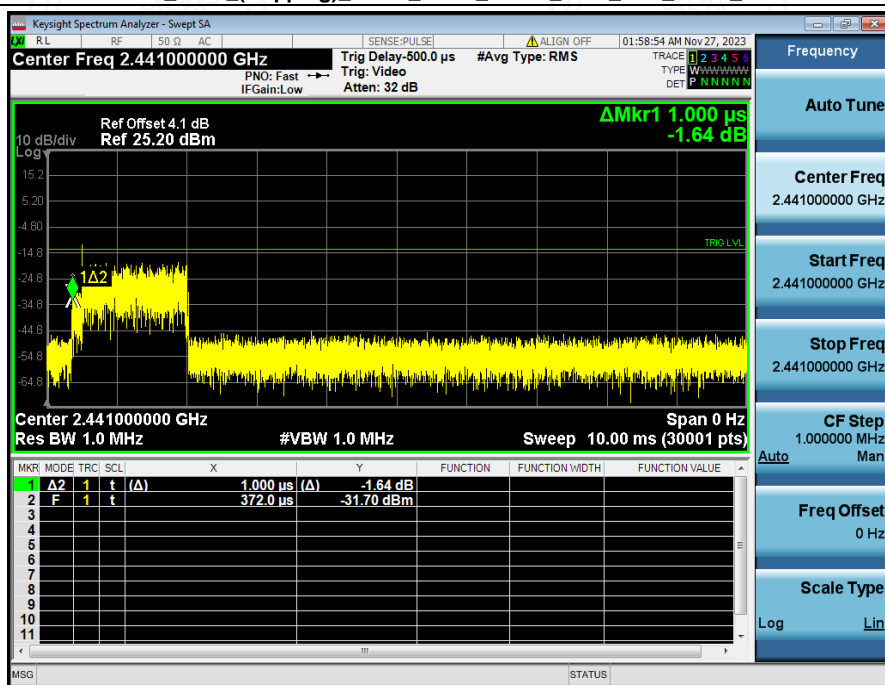
Dwell_Time_(Hopping)_NVNT_ANT1_3-DH1_2441_One_Burst_Time



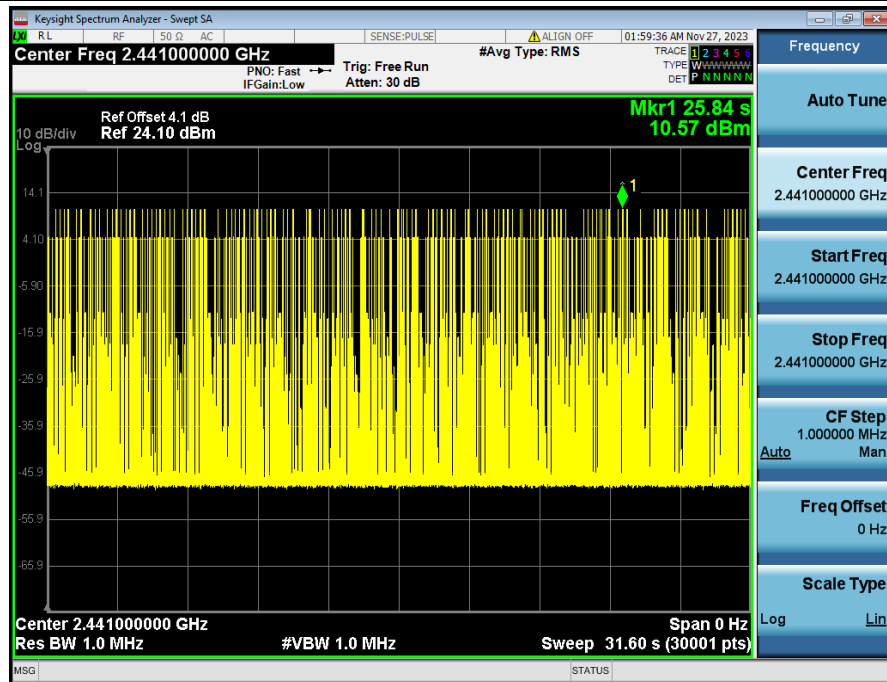
Dwell_Time_(Hopping)_NVNT_ANT1_3-DH1_2441_Accumulated



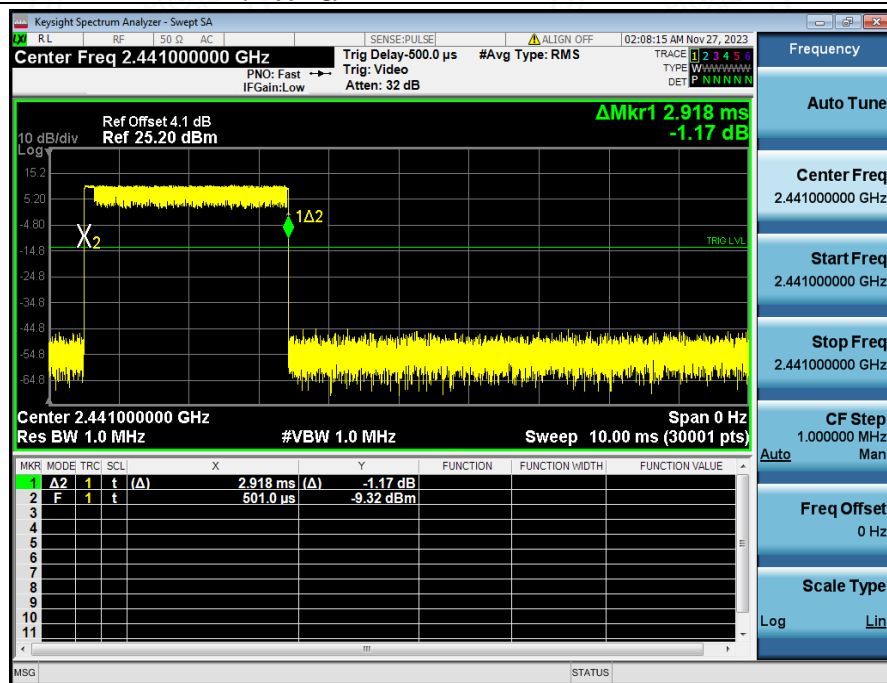
Dwell_Time_(Hopping)_NVNT_ANT1_3-DH3_2441_One_Burst_Time



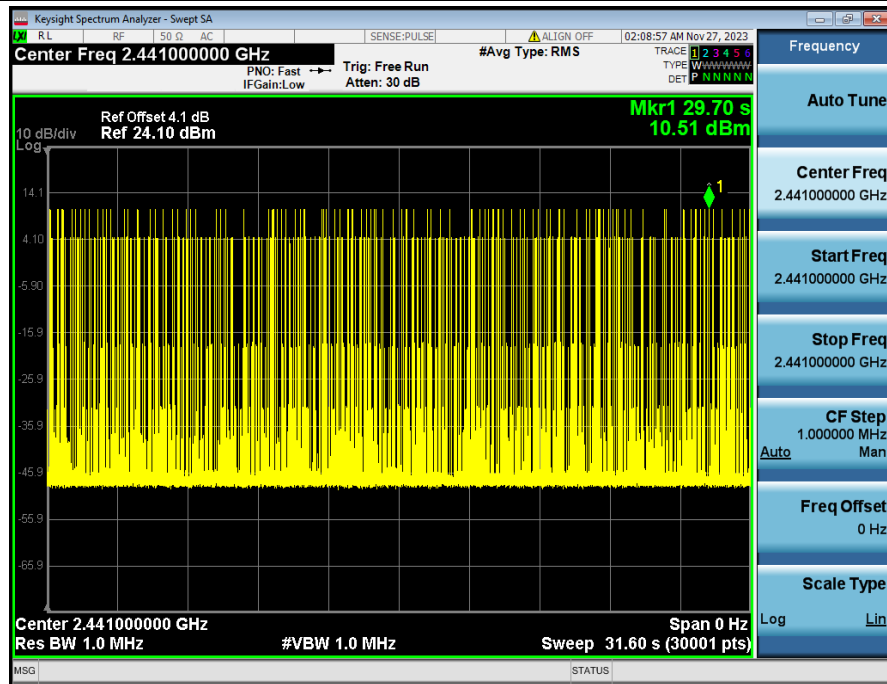
Dwell_Time_(Hopping)_NVNT_ANT1_3-DH3_2441_Accumulated



Dwell_Time_(Hopping)_NVNT_ANT1_3-DH5_2441_One_Burst_Time

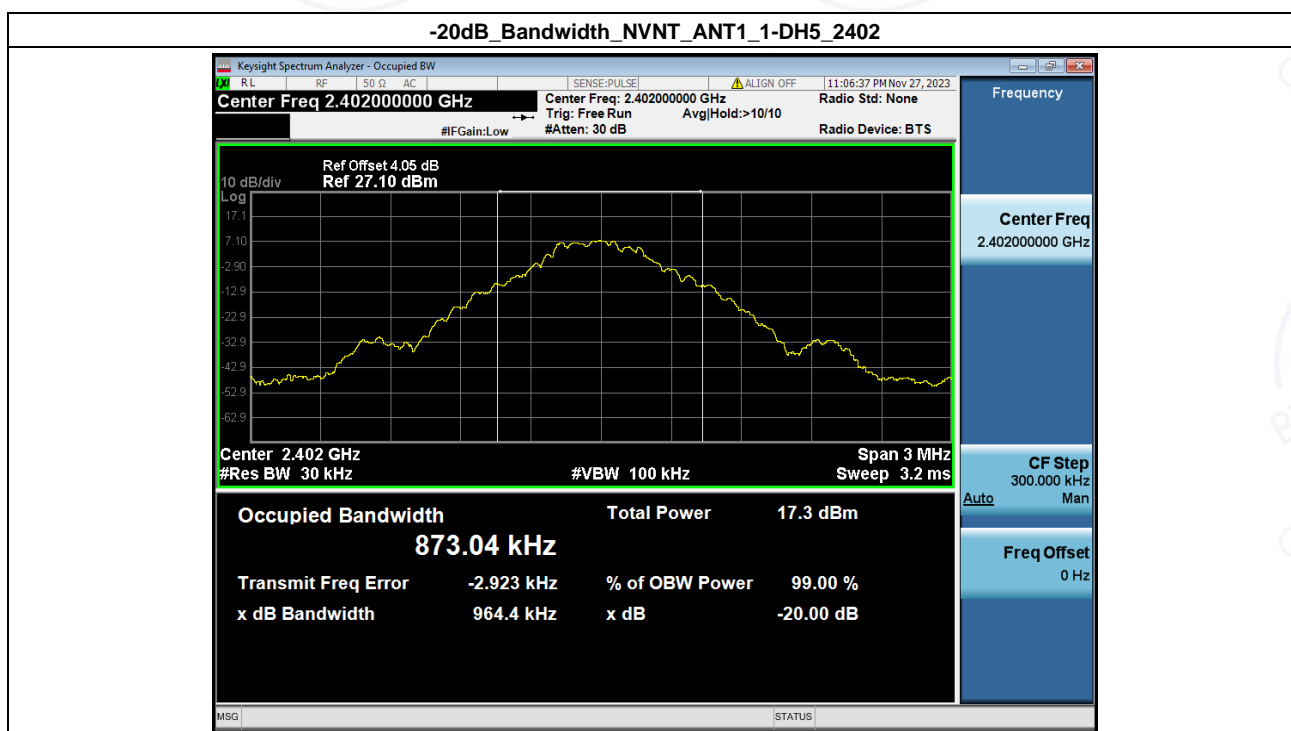


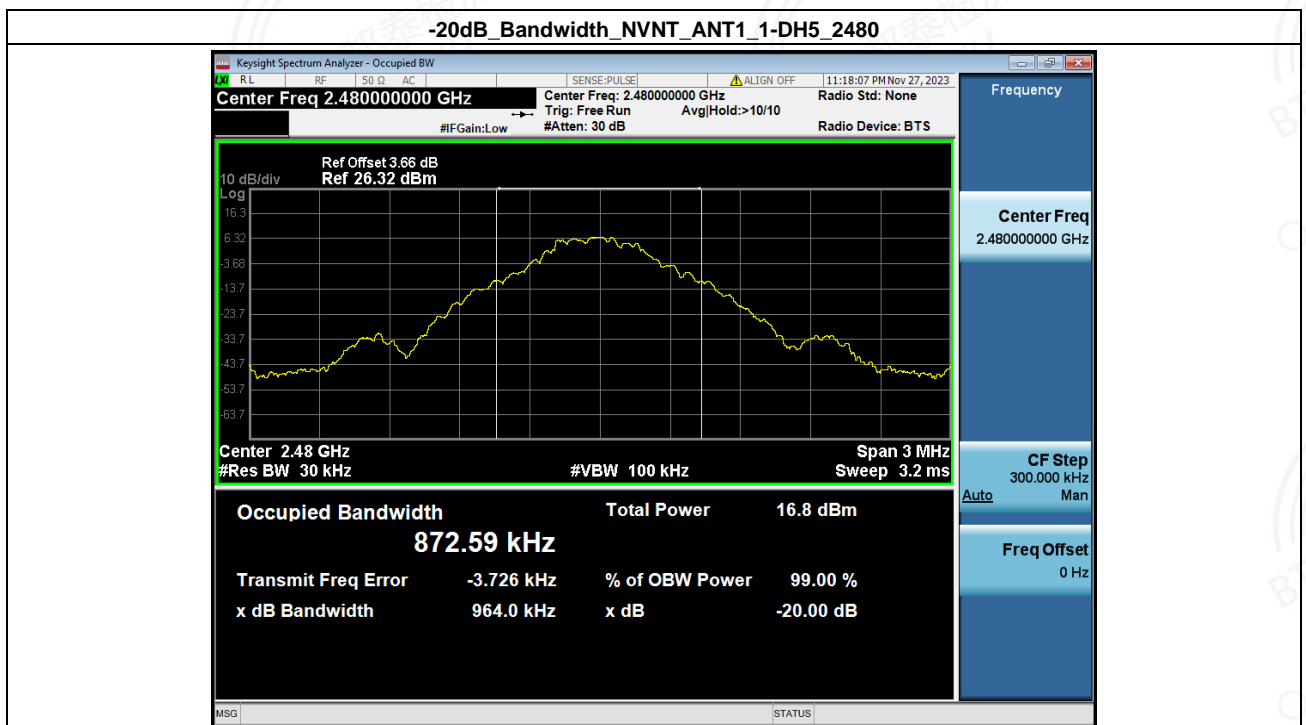
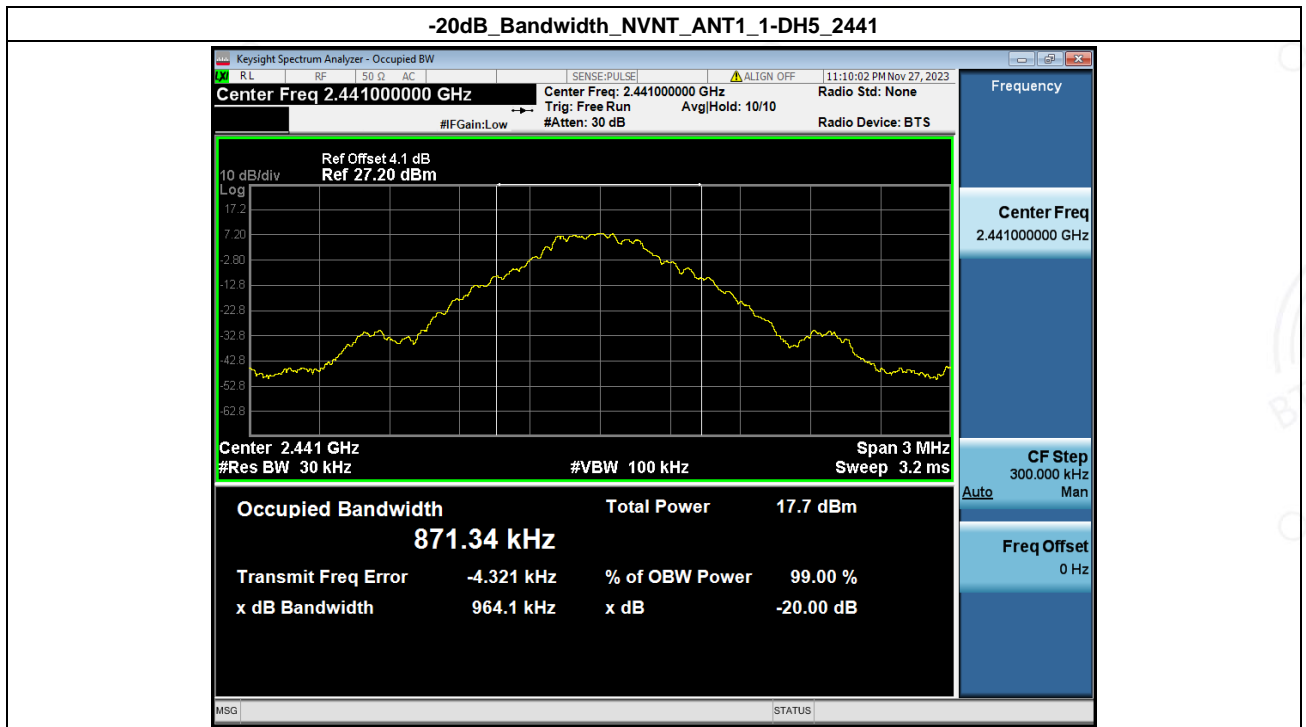
Dwell_Time_(Hopping)_NVNT_ANT1_3-DH5_2441_Accumulated

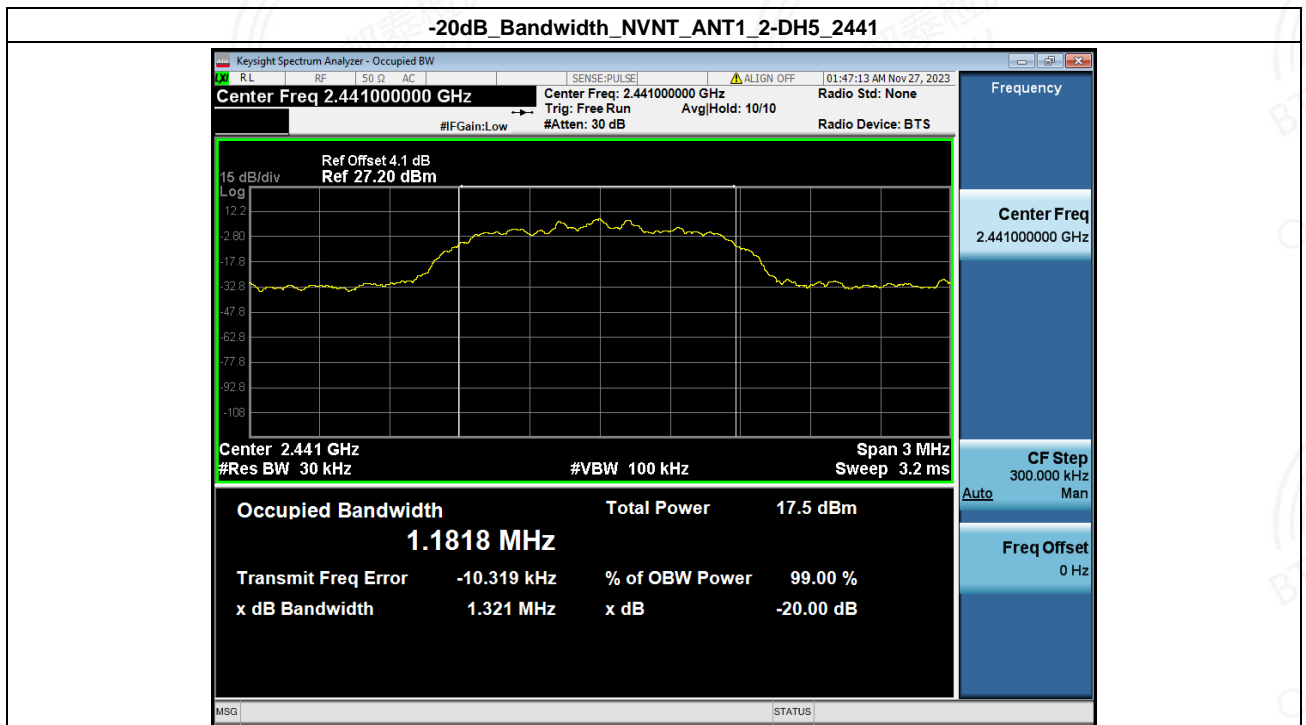
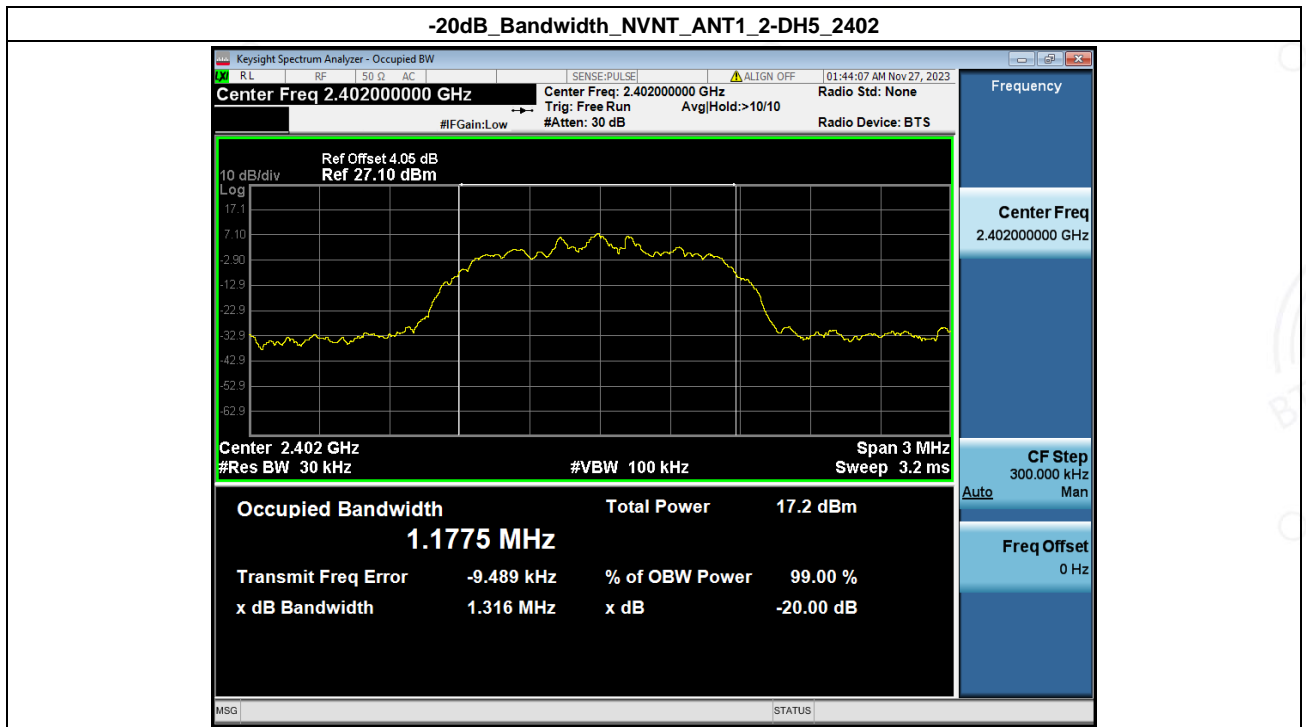


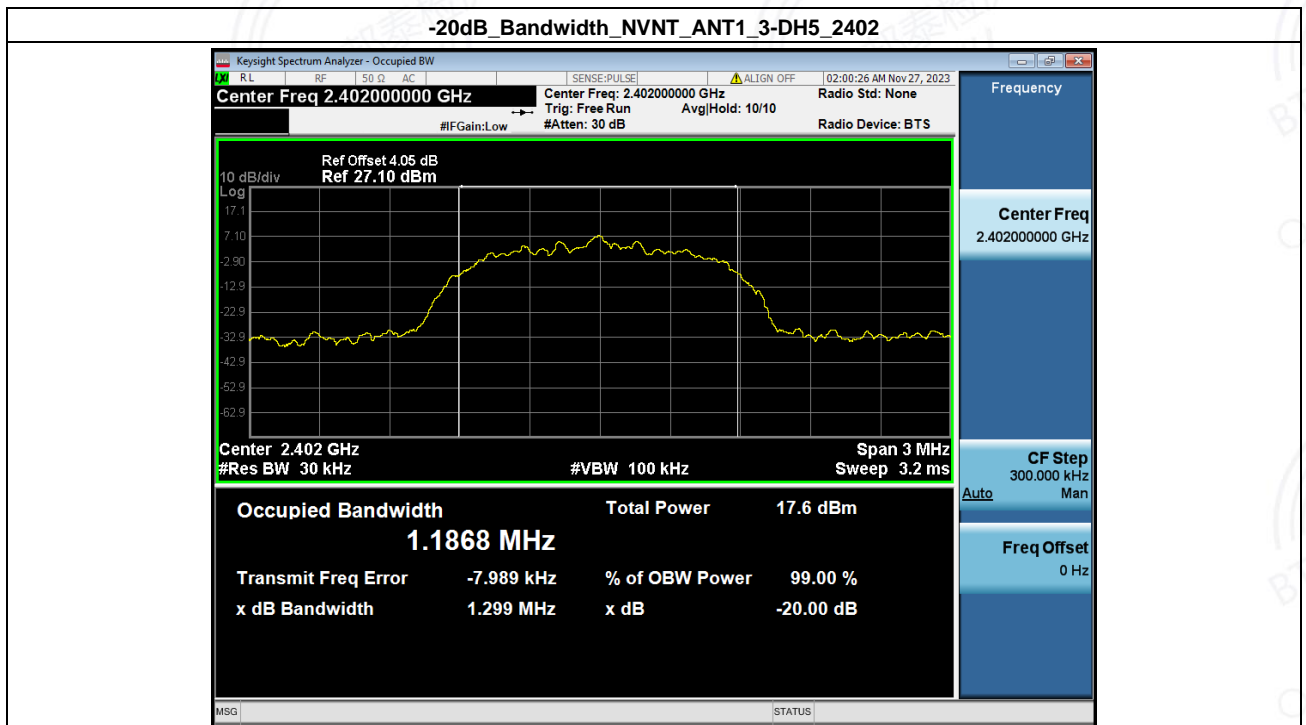
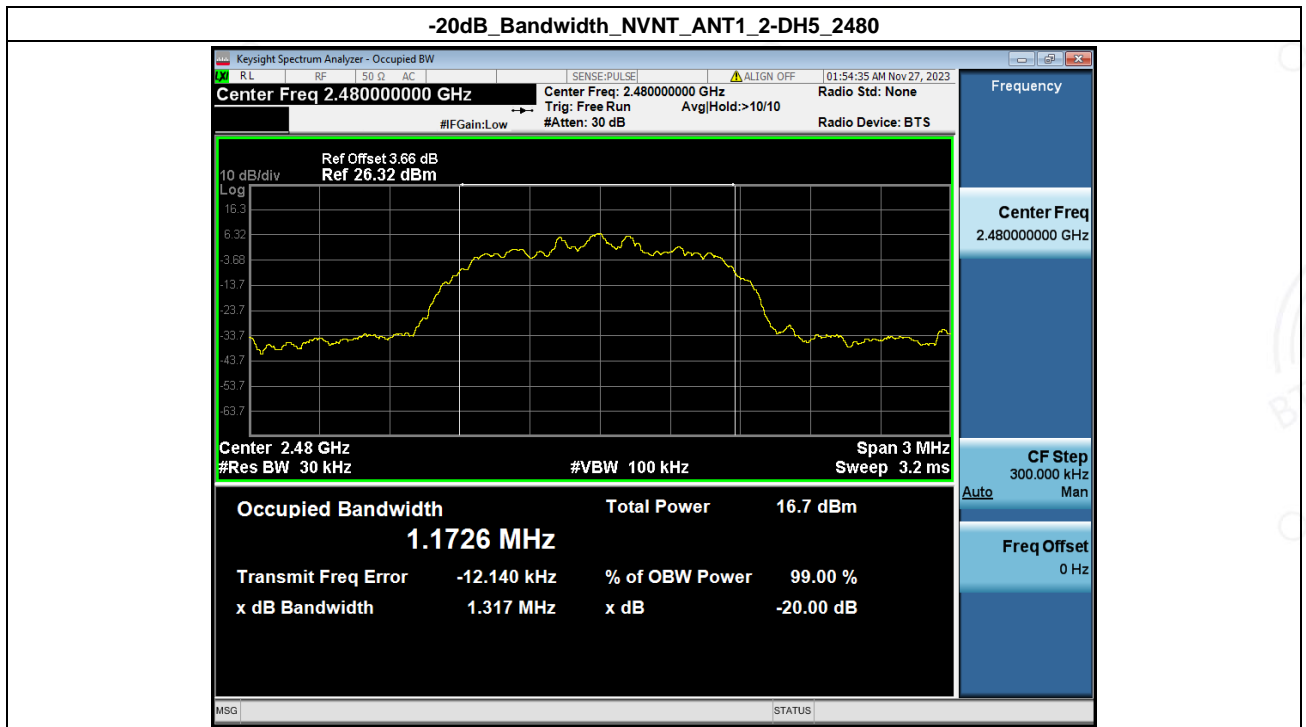
2. -20dB Bandwidth

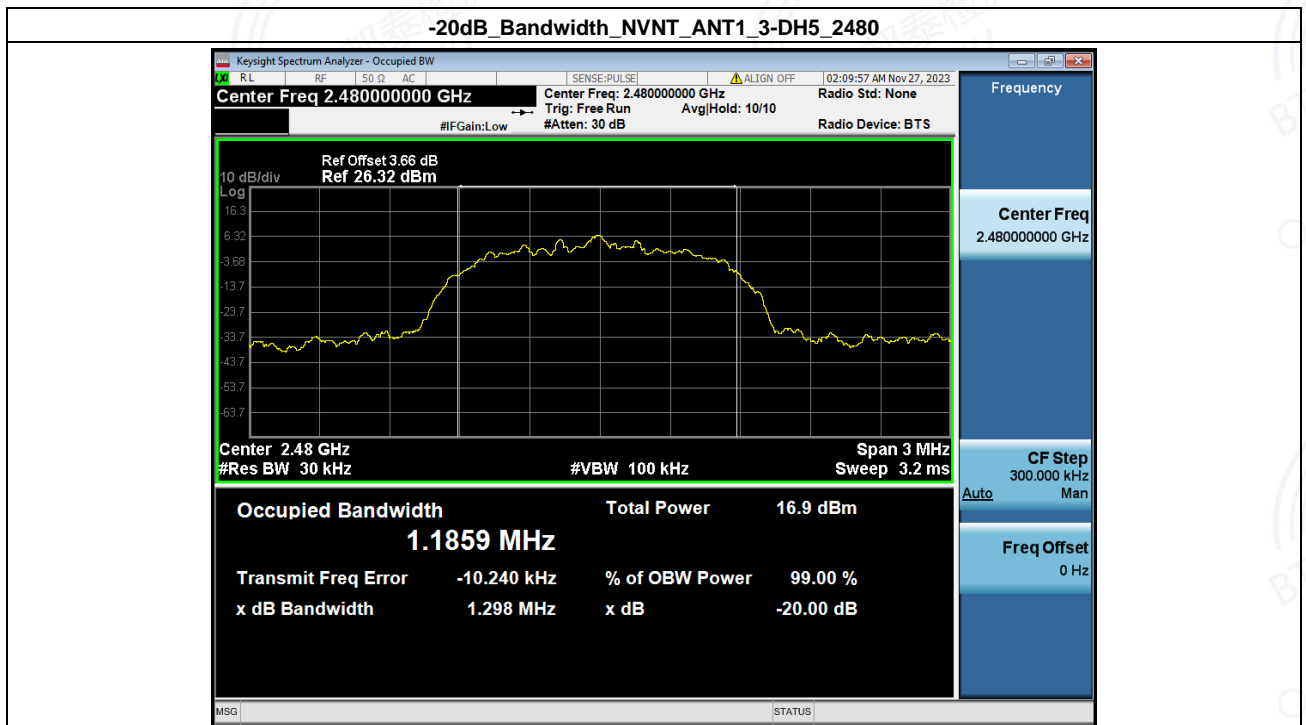
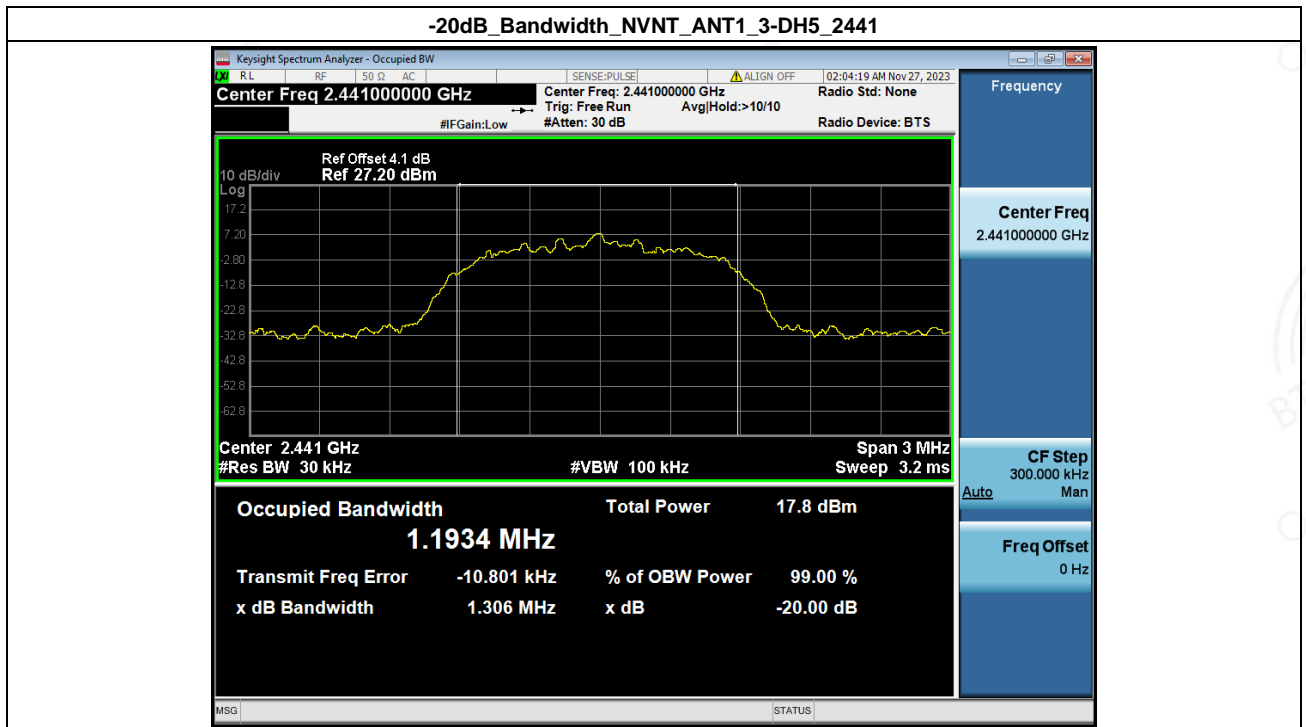
Condition	Antenna	Modulation	Frequency (MHz)	-20dB BW(MHz)	if larger than CFS
NVNT	ANT1	1-DH5	2402.00	0.964	No
NVNT	ANT1	1-DH5	2441.00	0.964	No
NVNT	ANT1	1-DH5	2480.00	0.964	No
NVNT	ANT1	2-DH5	2402.00	1.316	Yes
NVNT	ANT1	2-DH5	2441.00	1.321	Yes
NVNT	ANT1	2-DH5	2480.00	1.317	Yes
NVNT	ANT1	3-DH5	2402.00	1.299	Yes
NVNT	ANT1	3-DH5	2441.00	1.306	Yes
NVNT	ANT1	3-DH5	2480.00	1.298	Yes





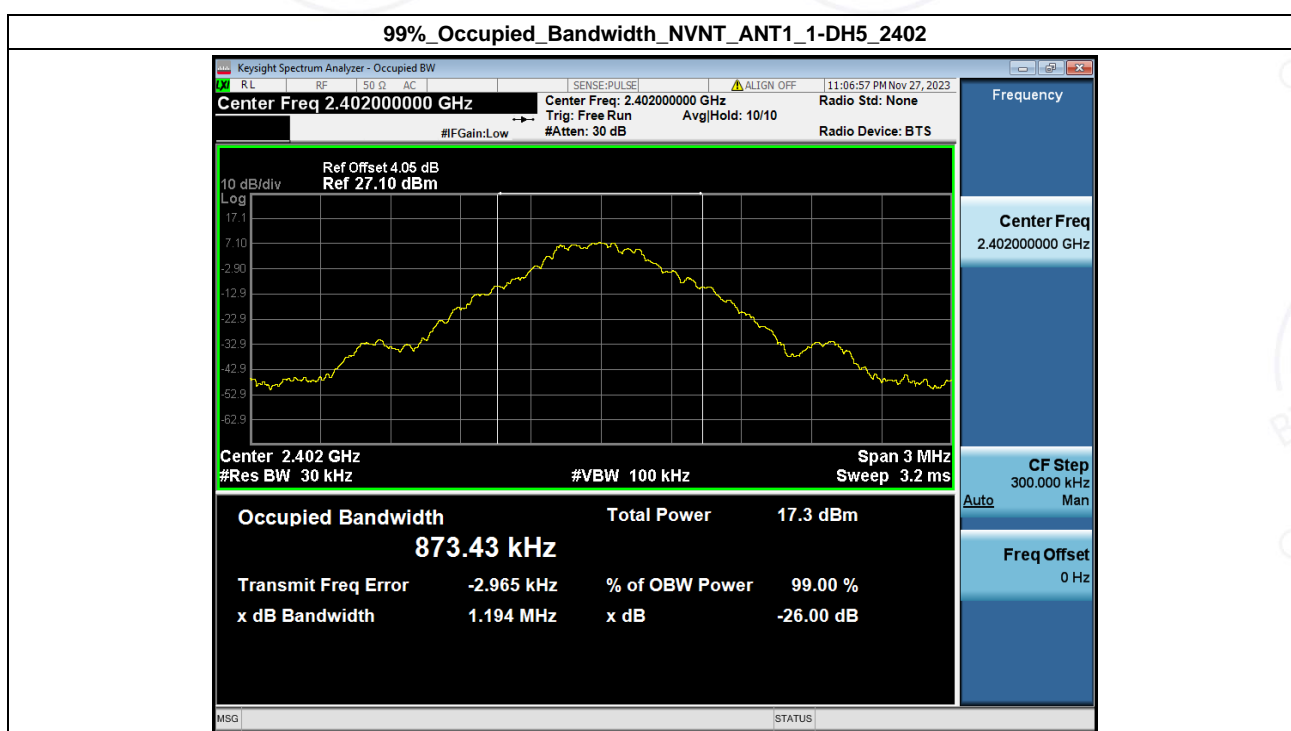


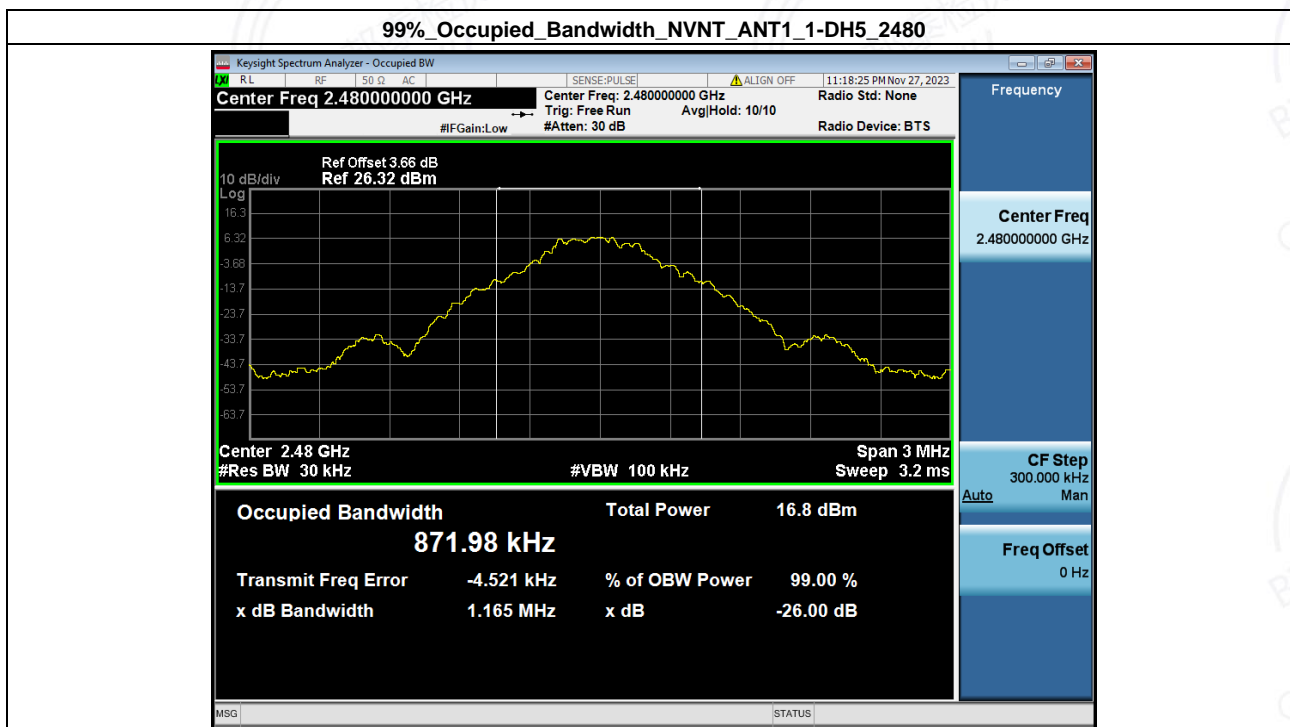
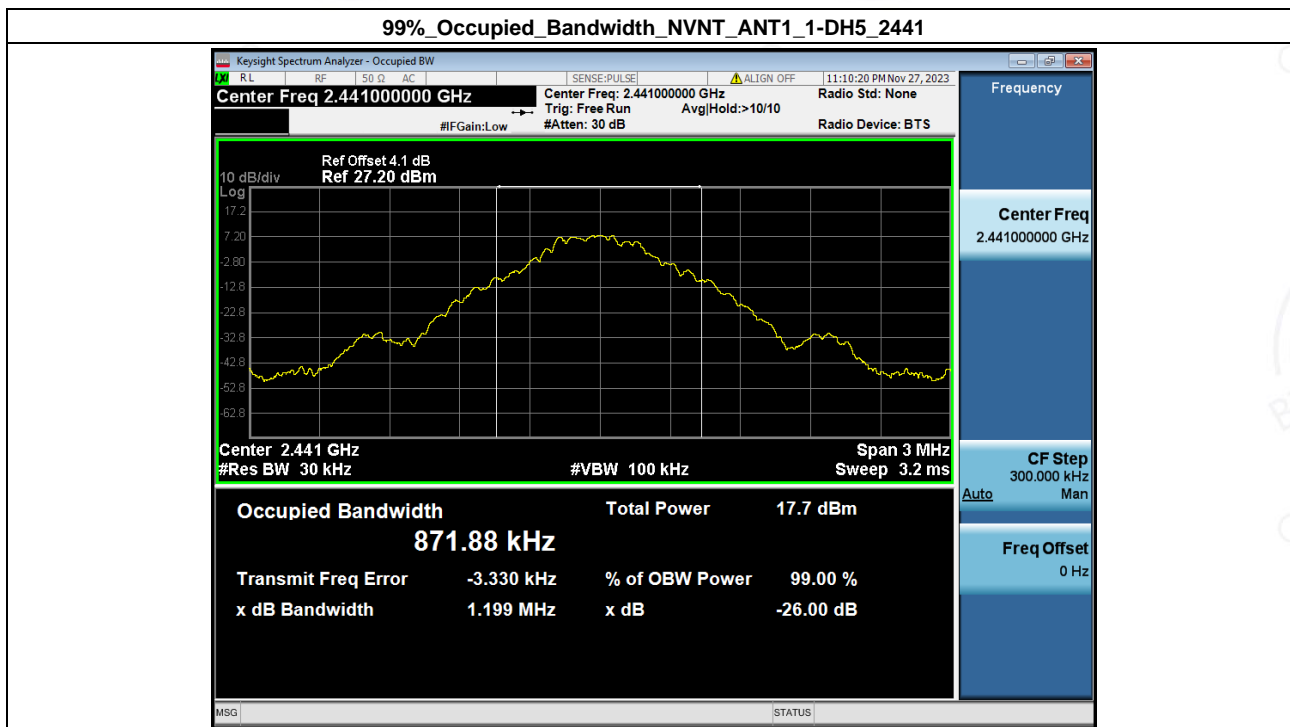


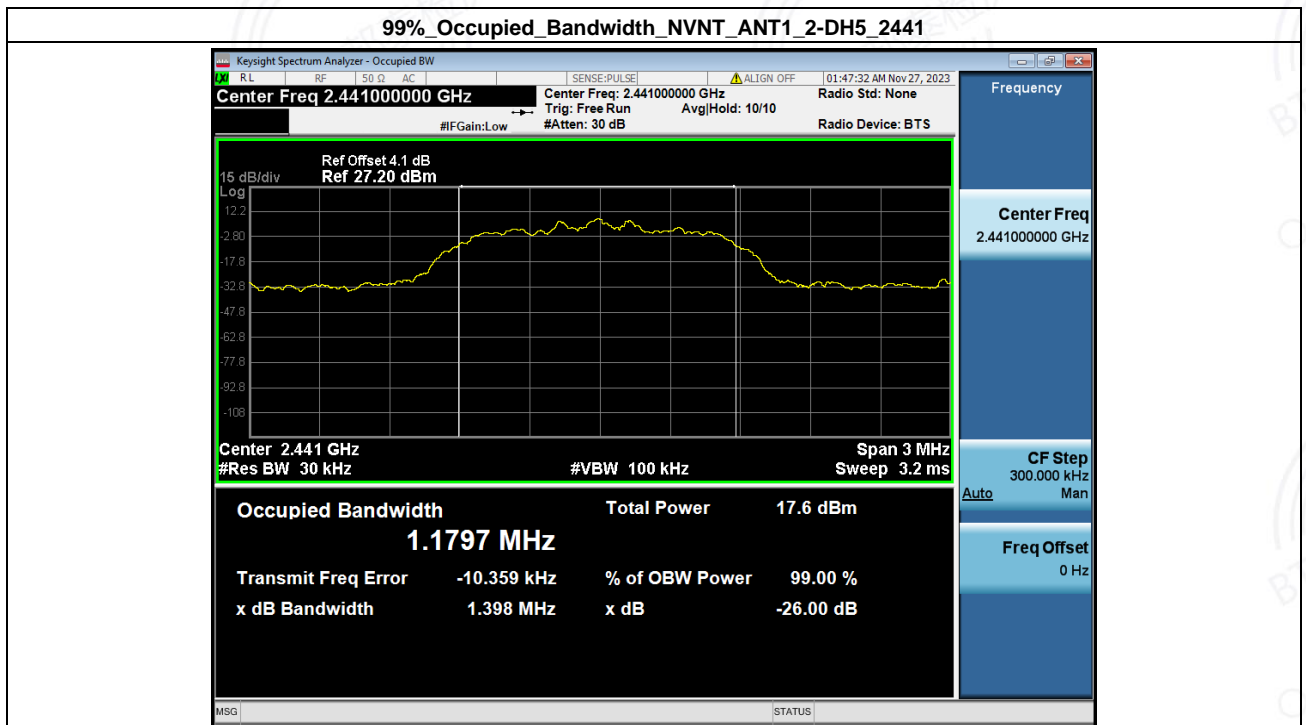
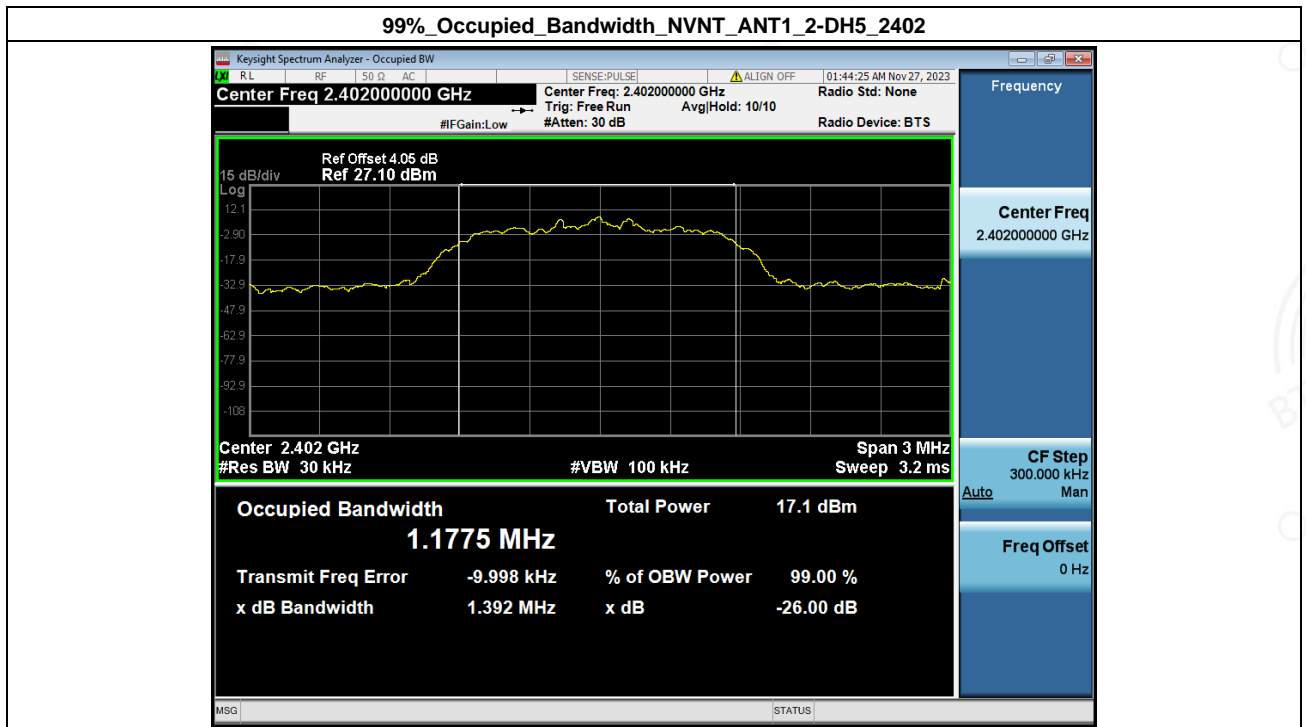


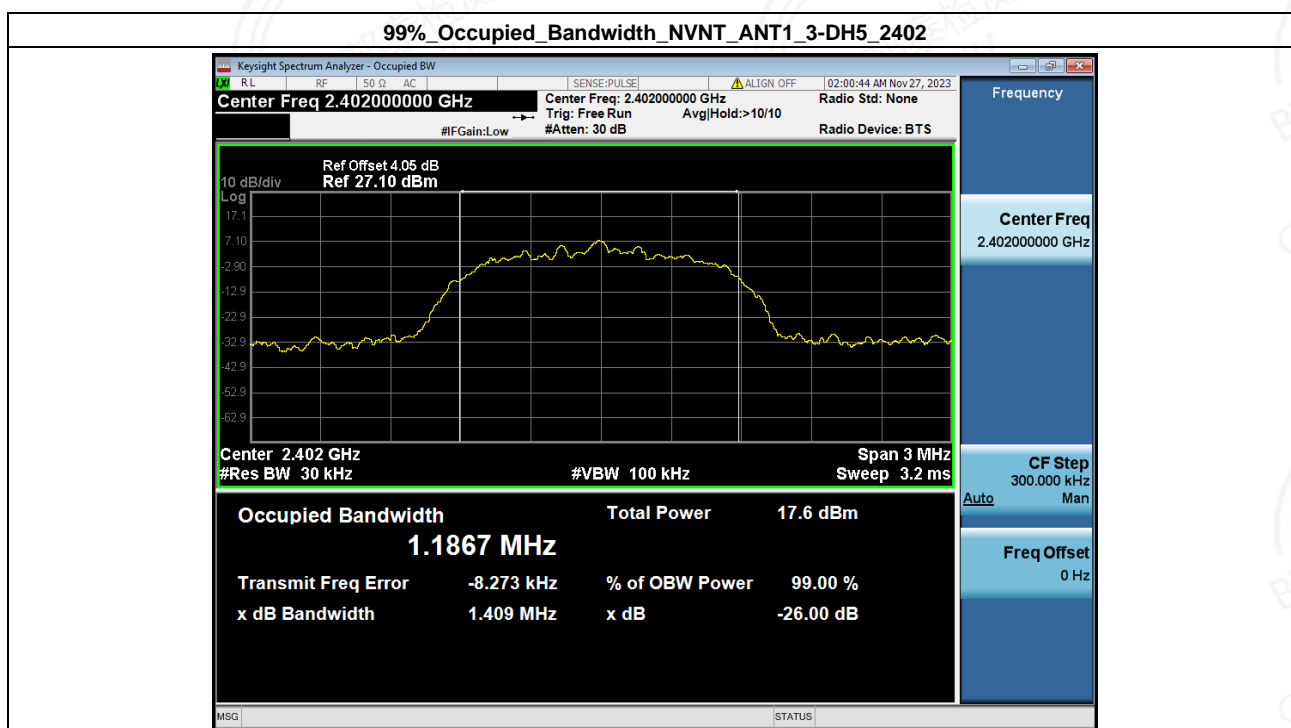
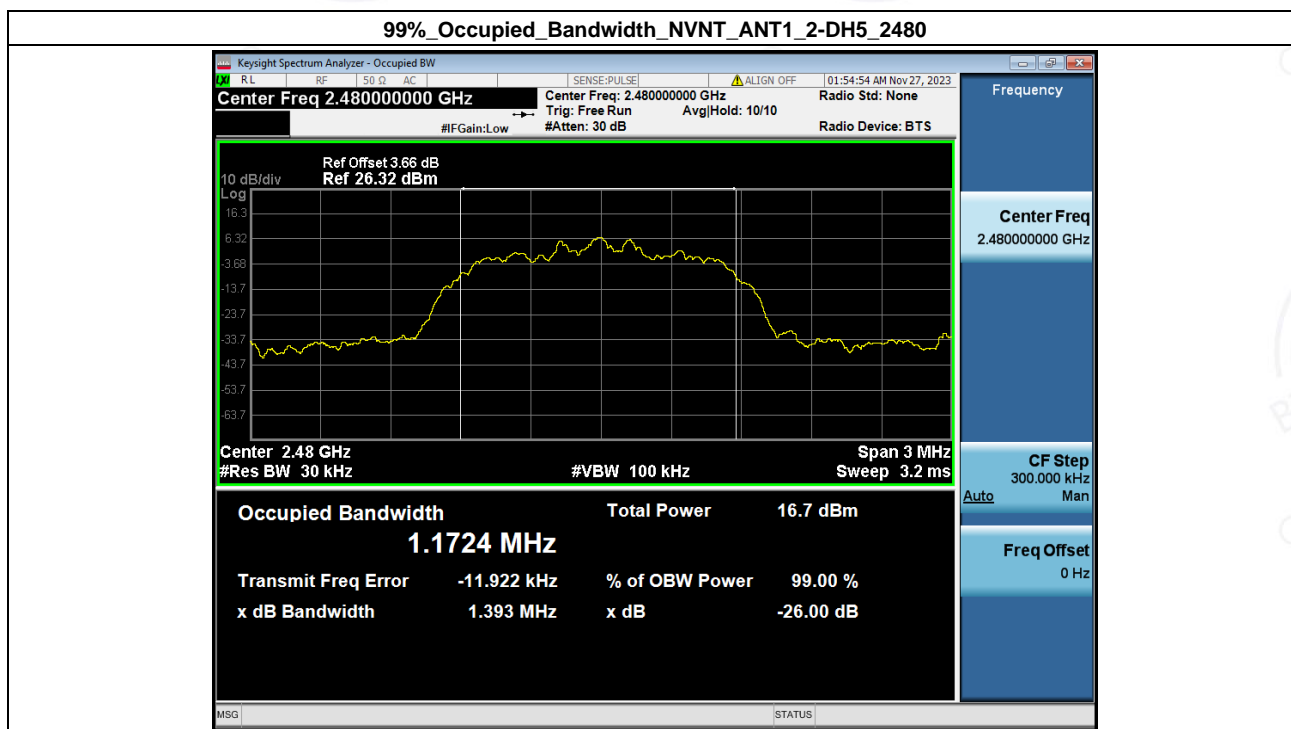
3. 99% Occupied Bandwidth

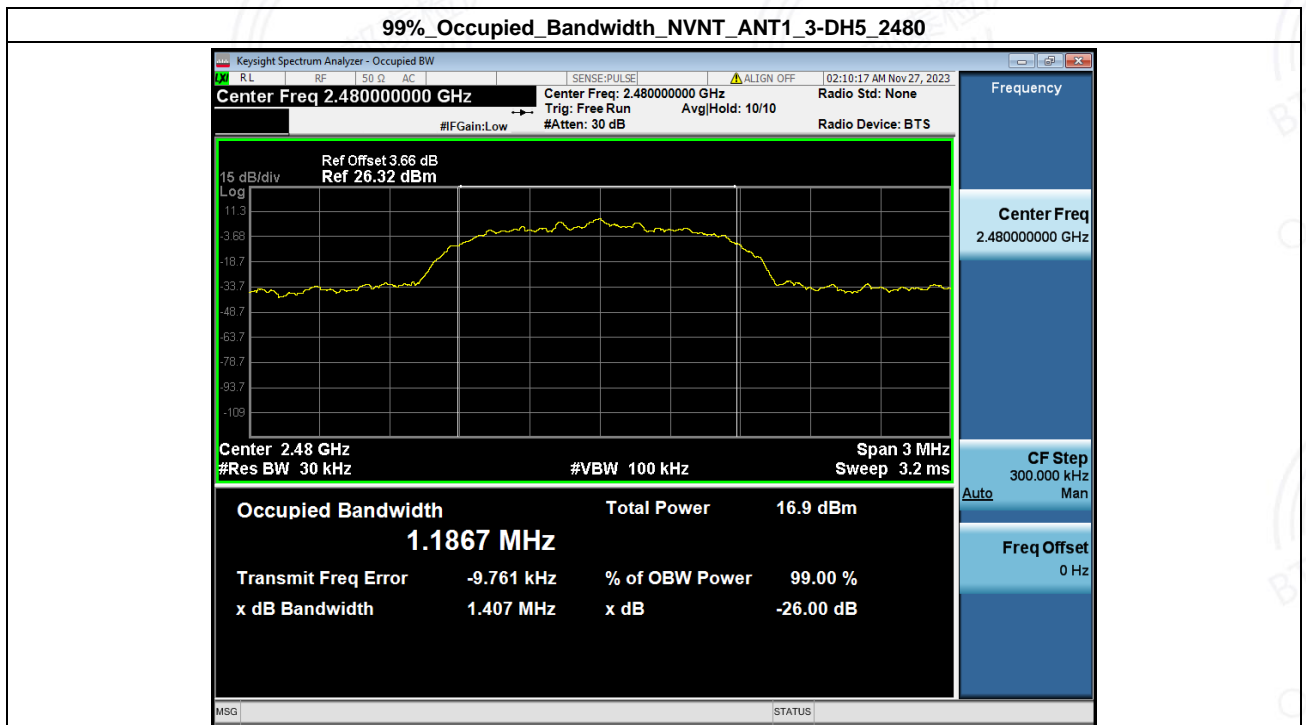
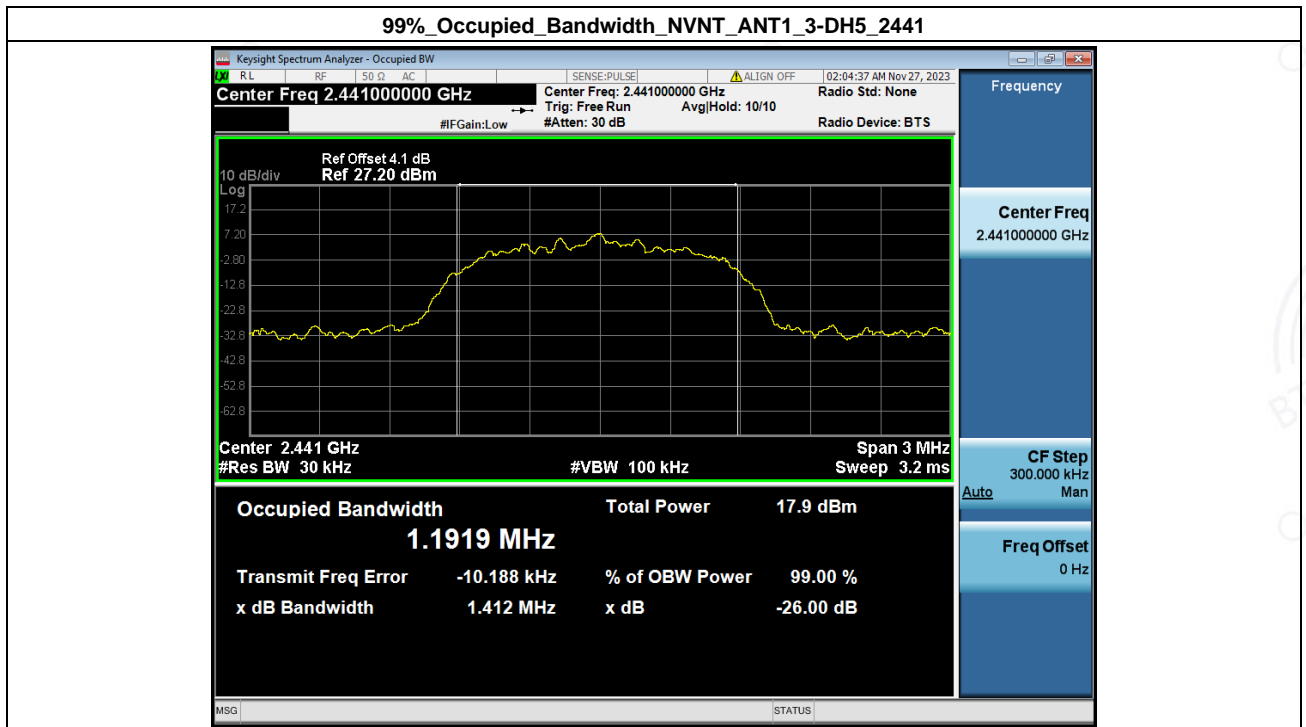
Condition	Antenna	Modulation	Frequency (MHz)	99% BW (MHz)
NVNT	ANT1	1-DH5	2402.00	0.873
NVNT	ANT1	1-DH5	2441.00	0.872
NVNT	ANT1	1-DH5	2480.00	0.872
NVNT	ANT1	2-DH5	2402.00	1.177
NVNT	ANT1	2-DH5	2441.00	1.180
NVNT	ANT1	2-DH5	2480.00	1.172
NVNT	ANT1	3-DH5	2402.00	1.187
NVNT	ANT1	3-DH5	2441.00	1.192
NVNT	ANT1	3-DH5	2480.00	1.187











4. Peak Output Power

Condition	Antenna	Modulation	Frequency (MHz)	Max. Conducted Power(dBm)	Max. Conducted Power(mW)	Limit(mW)	Result
NVNT	ANT1	1-DH5	2402.00	1.15	1.30	1000	Pass
NVNT	ANT1	1-DH5	2441.00	1.56	1.43	1000	Pass
NVNT	ANT1	1-DH5	2480.00	0.14	1.03	1000	Pass
NVNT	ANT1	2-DH5	2402.00	-1.33	0.74	125	Pass
NVNT	ANT1	2-DH5	2441.00	-0.84	0.82	125	Pass
NVNT	ANT1	2-DH5	2480.00	-0.79	0.83	125	Pass
NVNT	ANT1	3-DH5	2402.00	-0.86	0.82	125	Pass
NVNT	ANT1	3-DH5	2441.00	-0.37	0.92	125	Pass
NVNT	ANT1	3-DH5	2480.00	-0.31	0.93	125	Pass

