

**Compliance Certification Services (Kunshan) Inc. Shenzhen Branch**

SZCCS-TRF-01 Rev. A/0 Aug01,2022

Report No.: FYCR230100001502

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**TEST REPORT**

**Application No.:** FYCR2301000015AT  
**Applicant:** Thales Avionics, Inc.  
**Address of Applicant:** 51 Discovery, Irvine, California, USA.  
**Manufacturer:** Thales Avionics, Inc.  
**Address of Manufacturer:** 51 Discovery, Irvine, California, USA.  
**Factory:** Wingtech Information Technology Co., LTD  
**Address of Factory:** NO.11 South Changjiang Road, Xinwu District, WUXI, 214028 CHINA

**Equipment Under Test (EUT):**

**EUT Name:** SVDU-G6 11.6 IN-ARM OPTIQ; SVDU-G6 11.6 SEATBACK OPTIQ;  
SVDU-G6 13.3 IN-ARM OPTIQ; SVDU-G6 13.3 SEATBACK OPTIQ

**Model No.:** Please refer to section 2. ♣

♣ Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.

**FCC ID:** 2AGGY18751113

**Standard(s) :** 47 CFR Part 15, Subpart C 15.247

**Date of Receipt:** 2023-01-10

**Date of Test:** 2023-02-27 to 2023-04-06

**Date of Issue:** 2023-04-10

<b>Test Result:</b>	Pass*
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\* In the configuration tested, the EUT complied with the standards specified above.



Winkey Wang  
EMC Technical Manager



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**Revision Record**

<b>Version</b>	<b>Chapter</b>	<b>Date</b>	<b>Modifier</b>	<b>Remark</b>
01		2023-04-10		Original

**Authorized for issue by:**

	 _____ <b>Tree Zhan/Project Engineer</b>		
	 _____ <b>Winkey Wang/Reviewer</b>		

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## 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 Peak Output Power	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.5	47 CFR Part 15, Subpart C 15.247(b)(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	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Radiated Spurious Emissions Above 1GHz		ANSI C63.10 (2013) Section 6.6	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass

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**Remark:**

Model No.: SVDU-G6 11.6 IN-ARM OPTIQ: 187530-101, 187530-102, 187530-201, 187530-202, 187530-301, 187530-302, 187530-401, 187530-402.

SVDU-G6 11.6 SEATBACK OPTIQ: 187531-101, 187531-102, 187531-201, 187531-202, 187531-301, 187531-302, 187531-401, 187531-402, 187531-801, 187531-802.

SVDU-G6 13.3 IN-ARM OPTIQ: 187500-101, 187500-102, 187500-201, 187500-202, 187500-301, 187500-302, 187500-401, 187500-402, 187500-312.

SVDU-G6 13.3 SEATBACK OPTIQ: 187501-101, 187501-102, 187501-201, 187501-202, 187501-301, 187501-302, 187501-401, 187501-402, 187501-312, 187501-801, 187501-802.

Model Differences-Both models are identical except for model No. and below details

Model No.	Storage Size	Camera	LCD Panel
187531-101	128GB	Without	RE116QUM-A5A
187531-102	512GB	Without	RE116QUM-A5A
187531-201	128GB	Without	RE116QUM-A5A
187531-202	512GB	Without	RE116QUM-A5A
187531-401	128GB	Support	RE116QUM-A50
187531-402	512GB	Support	RE116QUM-A50
187531-301	128GB	Support	RE116QUM-A50
187531-302	512GB	Support	RE116QUM-A50
187531-801	128GB	Without	RE116QUM-A5A
187531-802	512GB	Support	RE116QUM-A50
187530-101	128GB	Without	RE116QUM-A5A
187530-102	512GB	Without	RE116QUM-A5A
187530-201	128GB	Without	RE116QUM-A5A
187530-202	512GB	Without	RE116QUM-A5A
187530-401	128GB	Support	RE116QUM-A50
187530-402	512GB	Support	RE116QUM-A50
187530-301	128GB	Support	RE116QUM-A50
187530-302	512GB	Support	RE116QUM-A50

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Model No.	Storage Size	Camera	LCD Panel
187501-101	128GB	Without	RE133QUM-A5A
187501-102	512GB	Without	RE133QUM-A5A
187501-201	128GB	Without	RE133QUM-A5A
187501-202	512GB	Without	RE133QUM-A5A
187501-401	128GB	Support	RE133QUM-A50
187501-402	512GB	Support	RE133QUM-A50
187501-301	128GB	Support	RE133QUM-A50
187501-302	512GB	Support	RE133QUM-A50
187501-312	512GB	Support	RE133QUM-A50
187501-801	128GB	Without	RE133QUM-A5A
187501-802	512GB	Support	RE133QUM-A50
187500-101	128GB	Without	RE133QUM-A5A
187500-102	512GB	Without	RE133QUM-A5A
187500-201	128GB	Without	RE133QUM-A5A
187500-202	512GB	Without	RE133QUM-A5A
187500-401	128GB	Support	RE133QUM-A50
187500-402	512GB	Support	RE133QUM-A50
187500-301	128GB	Support	RE133QUM-A50
187500-302	512GB	Support	RE133QUM-A50
187500-312	512GB	Support	RE133QUM-A50

The model 187500-402 was tested fully, and the models 187530-402 were performed the Transmitter unwanted emissions in the spurious domain for discrepancy.



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## 4 General Information

### 4.1 Details of E.U.T.

Power supply:	Powered by DC 28V
Operation Frequency:	2402MHz to 2480MHz
Modulation Type:	GFSK, pi/4DQPSK, 8DPSK
Number of Channels:	79
Channel Spacing:	1MHz
Spectrum Spread Technology:	Frequency Hopping Spread Spectrum(FHSS)
Bluetooth Version:	V5.0 Dual mode
Antenna Type:	Integral Antenna
Antenna Gain:	Antenna 1: 3.6dBi

Remark: The information in this section is provided by the applicant or manufacturer, CCS 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.
DC power supply	ZHAOXIN	PS-3005D	REF.No.SEA27B01
RF cable	SGS	N/A (cable loss: 0.5dBi)	SEL00438

### 4.3 Measurement Uncertainty

Test Item	Measurement Uncertainty
Conducted Peak Output Power	± 0.8dB
20dB Bandwidth	± 0.3%
Carrier Frequencies Separation	± 0.3%
Hopping Channel Number	± 0.3%
Dwell Time	± 0.3%
Conducted Band Edges Measurement	± 2.7dB
Conducted Spurious Emissions	± 2.7dB
Radiated Emissions which fall in the restricted bands	± 4.4dB (Above 1GHz)
Radiated Spurious Emissions Below 1GHz	± 3.1dB (Below 1GHz)
Radiated Spurious Emissions Above 1GHz	± 4.4dB (Above 1GHz)

Remark:

The  $U_{lab}$  (lab Uncertainty) is less than  $U_{cispr/ETSI}$  (CISPR/ETSI Uncertainty), so the test results

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

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### 4.4 Test Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc. Shenzhen branch.

Fuyong lab. Xinlong TechnoPark, Fengtang Road, Fuyong Subdistrict, Bao'an, Shenzhen, China

Tel: +86 755 8866 3988 Fax: +86 755 2671 0594

No tests were sub-contracted.

### 4.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **A2LA (Certificate No. 6606.01)**

Compliance Certification Services (Kunshan) Inc. Shenzhen branch is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 6606.01.

- **FCC –Designation Number: CN1322**

Compliance Certification Services (Kunshan) Inc. Shenzhen branch has been recognized as an accredited testing laboratory.

Designation Number: CN1322. Test Firm Registration Number: 718073

- **Innovation, Science and Economic Development Canada**

Compliance Certification Services (Kunshan) Inc. Shenzhen branch has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0129.

IC#: 28189.

### 4.6 Deviation from Standards

None

### 4.7 Abnormalities from Standard Conditions

None

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## 5 Equipment List

Conducted Peak Output Power					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Power Sensor	Erika Fiedler	U2021XA	SEM009-15	2022/7/12	2023/7/11
Power Sensor	Erika Fiedler	U2021XA	SEM009-16	2022/7/12	2023/7/11
Attenuator	Huber+Suhner	6620_SMA-50-1	SEM021-09	2022/7/12	2023/7/11
Coaxial Cable	CCS	N/A	SEM037-01	2022/5/16	2023/5/15
Measurement Software	TST PASS	TST PASS V2.0	N/A	N/A	N/A

20dB Bandwidth					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
MXA Signal Analyzer	KEYSIGHT	N9020A	SEM004-25	2022/5/30	2023/5/29
Attenuator	Huber+Suhner	6620_SMA-50-1	SEM021-09	2022/7/12	2023/7/11
Coaxial Cable	CCS	N/A	SEM037-01	2022/5/16	2023/5/15
Measurement Software	TST PASS	TST PASS V2.0	N/A	N/A	N/A

Carrier Frequencies Separation					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
MXA Signal Analyzer	KEYSIGHT	N9020A	SEM004-25	2022/5/30	2023/5/29
Attenuator	Huber+Suhner	6620_SMA-50-1	SEM021-09	2022/7/12	2023/7/11
Coaxial Cable	CCS	N/A	SEM037-01	2022/5/16	2023/5/15
Measurement Software	TST PASS	TST PASS V2.0	N/A	N/A	N/A

Hopping Channel Number					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
MXA Signal Analyzer	KEYSIGHT	N9020A	SEM004-25	2022/5/30	2023/5/29
Attenuator	Huber+Suhner	6620_SMA-50-1	SEM021-09	2022/7/12	2023/7/11
Coaxial Cable	CCS	N/A	SEM037-01	2022/5/16	2023/5/15
Measurement Software	TST PASS	TST PASS V2.0	N/A	N/A	N/A

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Dwell Time					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
MXA Signal Analyzer	KEYSIGHT	N9020A	SEM004-25	2022/5/30	2023/5/29
Attenuator	Huber+Suhner	6620_SMA-50-1	SEM021-09	2022/7/12	2023/7/11
Coaxial Cable	CCS	N/A	SEM037-01	2022/5/16	2023/5/15
Measurement Software	TST PASS	TST PASS V2.0	N/A	N/A	N/A

Conducted Band Edges Measurement					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
MXA Signal Analyzer	KEYSIGHT	N9020A	SEM004-25	2022/5/30	2023/5/29
Attenuator	Huber+Suhner	6620_SMA-50-1	SEM021-09	2022/7/12	2023/7/11
Coaxial Cable	CCS	N/A	SEM037-01	2022/5/16	2023/5/15
Measurement Software	TST PASS	TST PASS V2.0	N/A	N/A	N/A

Conducted Spurious Emissions					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
MXA Signal Analyzer	KEYSIGHT	N9020A	SEM004-25	2022/5/30	2023/5/29
Attenuator	Huber+Suhner	6620_SMA-50-1	SEM021-09	2022/7/12	2023/7/11
Coaxial Cable	CCS	N/A	SEM037-01	2022/5/16	2023/5/15
Measurement Software	TST PASS	TST PASS V2.0	N/A	N/A	N/A

Radiated Emissions which fall in the restricted bands					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
3m Anechoic Chamber	CRT	N/A	SEM001-13	2021/7/13	2024/7/12
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9120D	SEM003-32	2021/9/26	2024/9/25
MXA Signal Analyzer	KEYSIGHT	N9020A	SEM004-23	2022/4/24	2023/4/23
Coaxial Cable	CCS	N/A	SEM035-02	2022/5/16	2023/5/15
Pre-amplifier	TST PASS	LNA04080G30	SEM005-27	2022/4/15	2023/4/14
Pre-amplifier	TST PASS	LNA10180G45	SEM005-28	2022/4/15	2023/4/14
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A

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## Radiated Spurious Emissions Below 1GHz

Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
3m Anechoic Chamber	CRT	N/A	SEM001-13	2021/7/13	2024/7/12
Trilog-Broadband Antenna	Schwarzbeck	VULB9168	SEM003-33	2021/9/25	2024/9/24
Loop Antenna	ETS-LINDGREN	6502	SEM003-36	2021/9/26	2024/9/25
MXE EMI receiver	Agilent	N9038A	SEM004-05	2022/7/12	2023/7/11
Pre-amplifier	HP	8447D	SEM005-02	2022/7/12	2023/7/11
Coaxial Cable	CCS	N/A	SEM035-01	2022/5/16	2023/5/15
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A

## Radiated Spurious Emissions Above 1GHz

Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
3m Anechoic Chamber	CRT	N/A	SEM001-13	2021/7/13	2024/7/12
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9120D	SEM003-32	2021/9/26	2024/9/25
MXA Signal Analyzer	KEYSIGHT	N9020A	SEM004-23	2022/4/24	2023/4/23
Coaxial Cable	CCS	N/A	SEM035-02	2022/5/16	2023/5/15
Pre-amplifier	TST PASS	LNA04080G30	SEM005-27	2022/4/15	2023/4/14
Pre-amplifier	TST PASS	LNA10180G45	SEM005-28	2022/4/15	2023/4/14
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A

## General used equipment

Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Humidity/ Temperature Indicator	Mingle	TH607	SEM002-22	2022/7/12	2023/7/11
Humidity/ Temperature Indicator	Mingle	TH607	SEM002-23	2022/7/12	2023/7/11
Barometer	DUMAI	DYM3	SEM002-24	2022/7/12	2023/7/11

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## 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:

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

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 main PCB and no consideration of replacement. The best case gain of the antenna is 3.6dBi.

Antenna location: Refer to internal photo.

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## 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)

### 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

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

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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 coordinate with other FHSS System in an effort to avoid the simultaneous occupancy of individual hopping frequencies by multiple transmitter.

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## 7 Radio Spectrum Matter Test Results

### 7.1 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 $\geq 50$ hopping channels
	0.25 for $25 \leq$ hopping channels $< 50$
	1 for digital modulation
2400-2483.5	1 for $\geq 75$ 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: 23.7 °C      Humidity: 45.6 % RH      Atmospheric Pressure: 1020 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.

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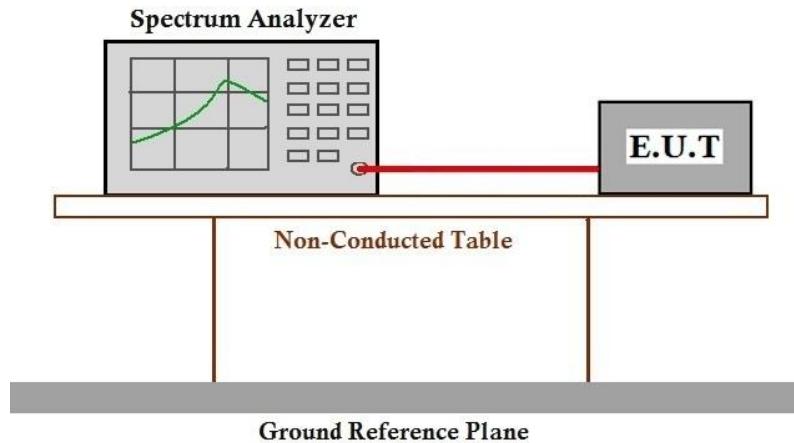


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**7.1.3 Test Setup Diagram****7.1.4 Measurement Procedure and Data**

Note: Since the verify power the same operating range bandwidth and smaller power can be covered by the higher power.

Please Refer to Appendix for Details

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## 7.2 20dB Bandwidth

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

Test Method: ANSI C63.10 (2013) Section 7.8.7

### 7.2.1 E.U.T. Operation

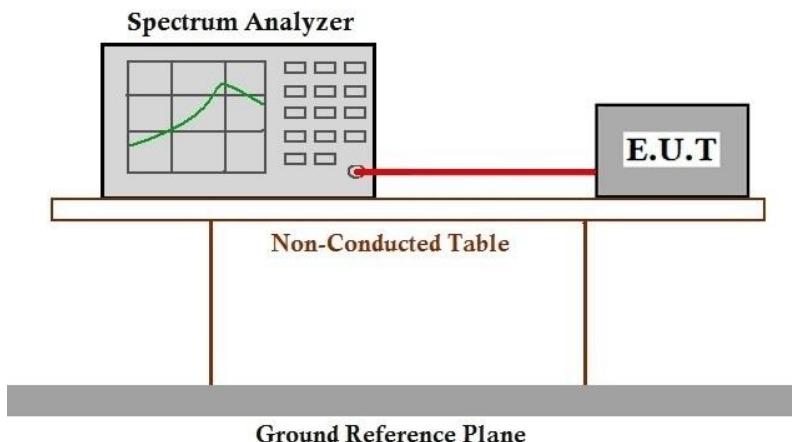
Operating Environment:

Temperature: 23.7 °C      Humidity: 45.6 % RH      Atmospheric Pressure: 1020 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

Please Refer to Appendix for Details



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### 7.3 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:

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

#### 7.3.1 E.U.T. Operation

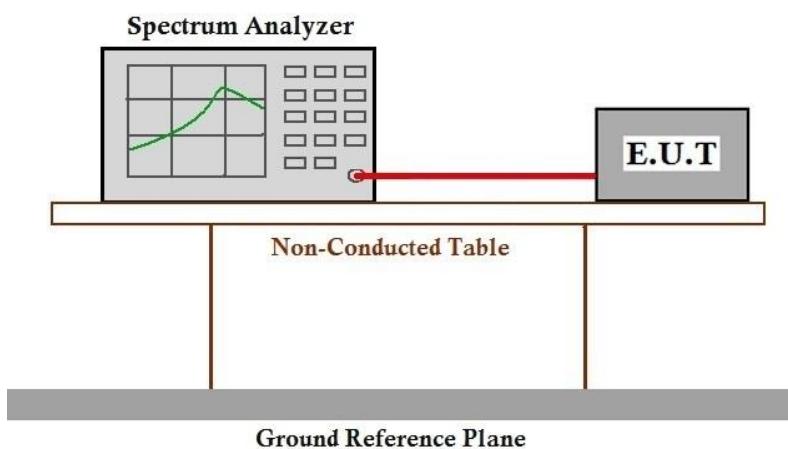
Operating Environment:

Temperature: 23.7 °C      Humidity: 45.6 % RH      Atmospheric Pressure: 1020 mbar

#### 7.3.2 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.

#### 7.3.3 Test Setup Diagram



#### 7.3.4 Measurement Procedure and Data

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## 7.4 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

### 7.4.1 E.U.T. Operation

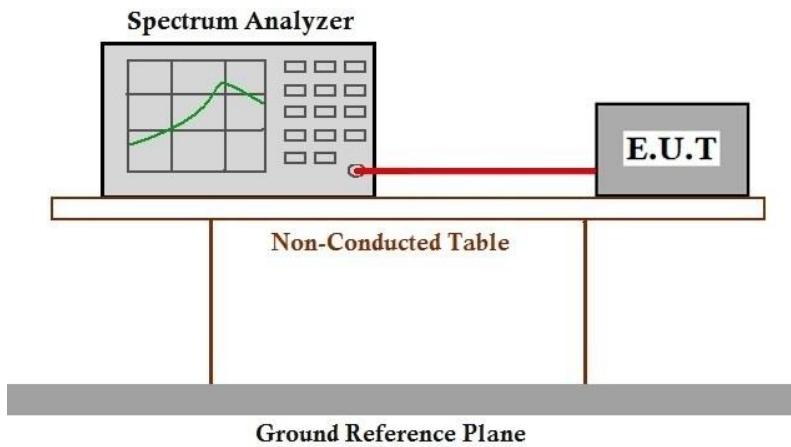
Operating Environment:

Temperature: 23.7 °C      Humidity: 45.6 % RH      Atmospheric Pressure: 1020 mbar

### 7.4.2 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.

### 7.4.3 Test Setup Diagram



### 7.4.4 Measurement Procedure and Data

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## 7.5 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

### 7.5.1 E.U.T. Operation

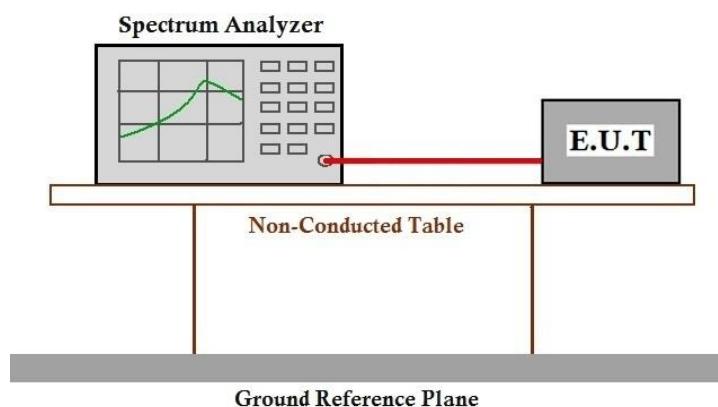
Operating Environment:

Temperature: 23.7 °C Humidity: 45.6 % RH Atmospheric Pressure: 1020 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

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## 7.6 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)).

### 7.6.1 E.U.T. Operation

Operating Environment:

Temperature: 23.7 °C      Humidity: 45.6 % RH      Atmospheric Pressure: 1020 mbar

### 7.6.2 Test Mode Description

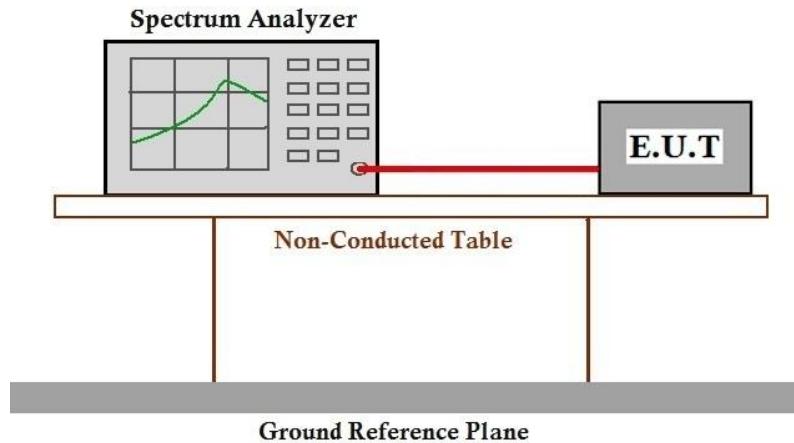
Pre-scan / Final test	Mode Code	Description
Final test	01	TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.
Final test	02	TX_Hop mode_Keep the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



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**7.6.3 Test Setup Diagram****7.6.4 Measurement Procedure and Data**

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## 7.7 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)).

### 7.7.1 E.U.T. Operation

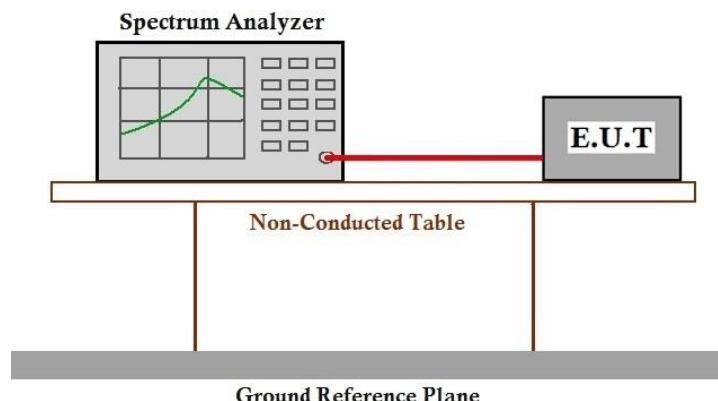
Operating Environment:

Temperature: 23.7 °C      Humidity: 45.6 % RH      Atmospheric Pressure: 1020 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.

### 7.7.3 Test Setup Diagram



### 7.7.4 Measurement Procedure and Data

Please Refer to Appendix for Details



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**7.8 Radiated Emissions which fall in the restricted bands**

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

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

Measurement Distance: 3m

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: 20.9 °C      Humidity: 54.1 % RH      Atmospheric Pressure: 1020 mbar

**7.8.2 Test Mode Description**

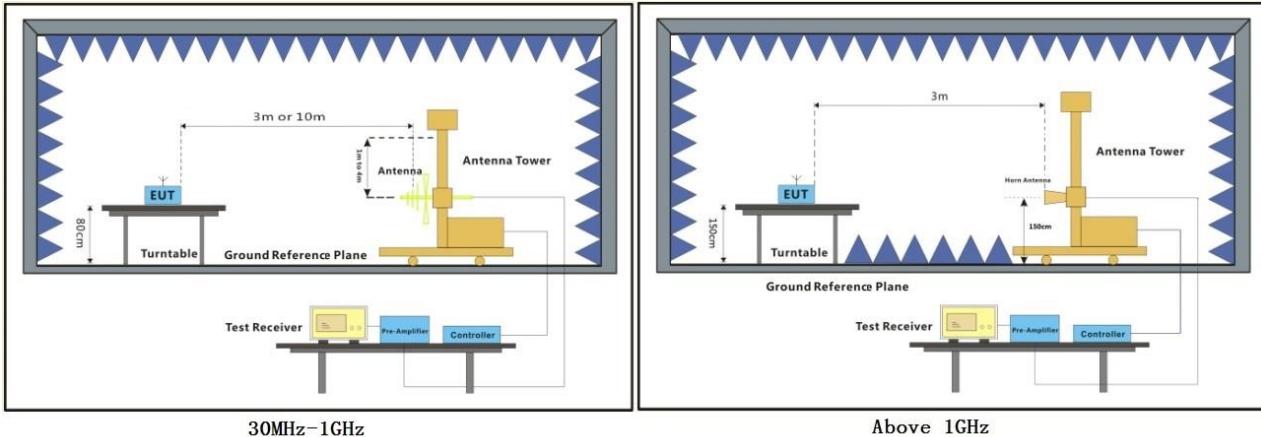
Pre-scan / Final test	Mode Code	Description
Final test	01	TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

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**7.8.3 Test Setup Diagram****7.8.4 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.
- For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- 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: Level= Read Level+ Cable Loss+ Antenna Factor- 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.



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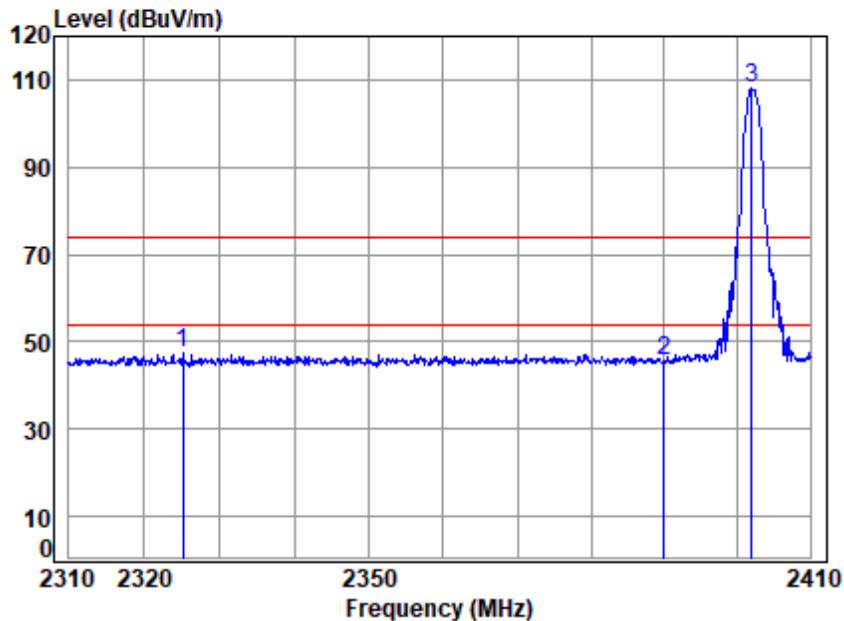
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Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:Low



Site : chamber  
Condition: 3m HORIZONTAL  
Job No : 00015AT/00016AT  
Mode : 2402 Band edge  
Note : BT

		Cable Freq	Ant Loss	Preamp Factor	Read Level	Limit Level	Line dBuV/m	Over Line dBuV/m	Over Limit dB	Remark
		MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2325.125	5.01	27.01	32.50	47.81	47.33	74.00	-26.67	peak	
2	2390.000	5.05	27.16	32.50	45.95	45.66	74.00	-28.34	peak	
3	2402.000	5.06	27.18	32.50	108.18	107.92	74.00	33.92	peak	

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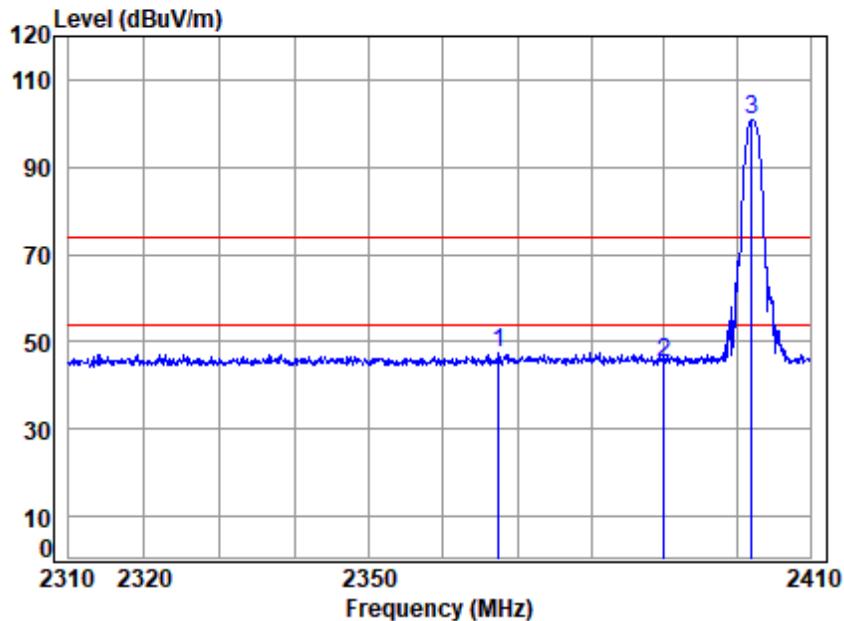
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Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:Low



Site : chamber  
Condition: 3m VERTICAL  
Job No : 00015AT/00016AT  
Mode : 2402 Band edge  
Note : BT

		Cable Freq	Ant Loss	Preamp Factor	Read Level	Limit Level	Line dBuV/m	Over Limit	Remark
		MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2367.483	5.04	27.11	32.50	47.77	47.42	74.00	-26.58	peak
2	2390.000	5.05	27.16	32.50	45.51	45.22	74.00	-28.78	peak
3	2402.000	5.06	27.18	32.50	101.10	100.84	74.00	26.84	peak

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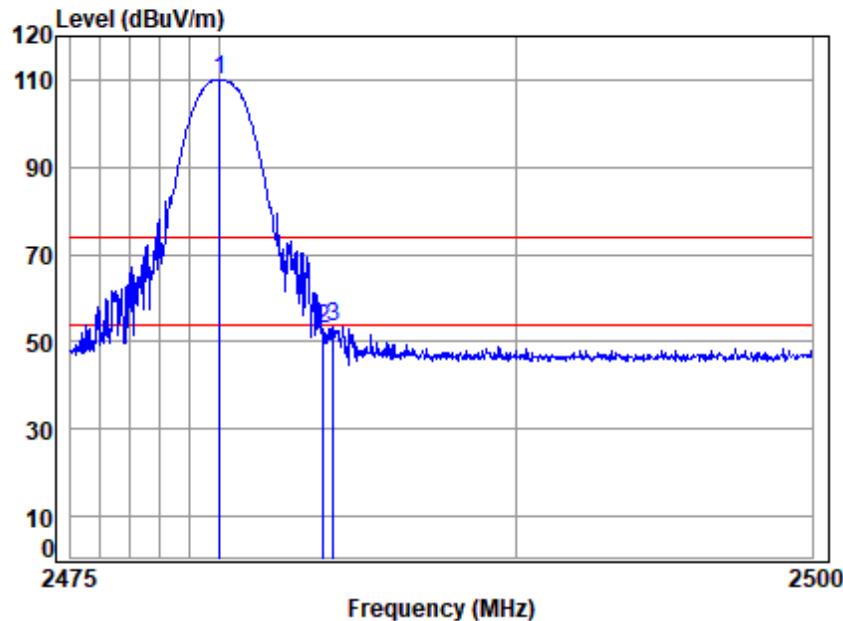
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Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:High



Site : chamber  
Condition: 3m HORIZONTAL  
Job No : 00015AT/00016AT  
Mode : 2480 Band edge  
Note : BT

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Limit Line	Over Limit Remark	
							dB	dB
1 2480.000	5.12	27.36	32.50	110.04	110.02	74.00	36.02	peak
2 2483.500	5.12	27.36	32.50	52.79	52.77	74.00	-21.23	peak
3 2483.821	5.12	27.37	32.50	53.34	53.33	74.00	-20.67	Peak

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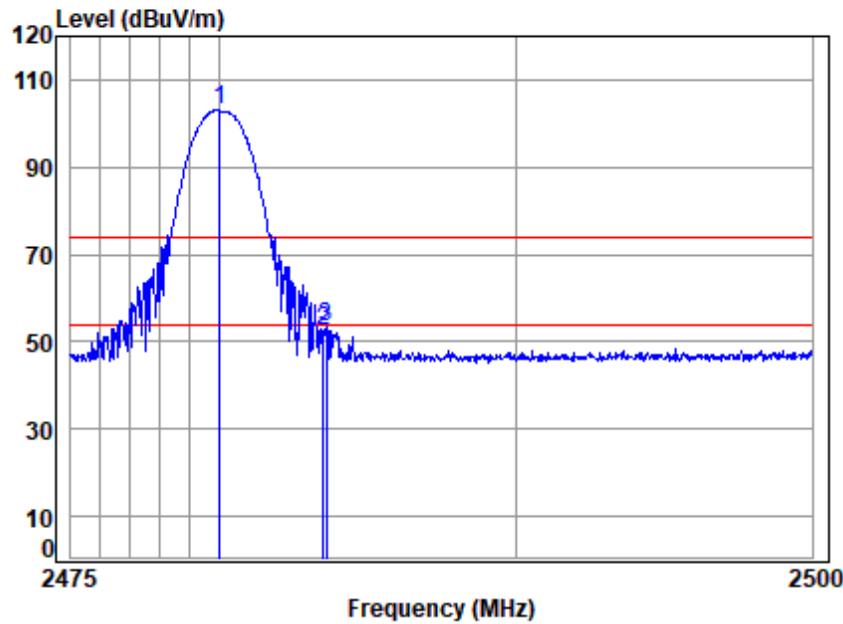
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Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:High



Site : chamber  
Condition: 3m VERTICAL  
Job No : 00015AT/00016AT  
Mode : 2480 Band edge  
Note : BT

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Line Limit	Over Limit	Remark
	MHz	dB	dB/m		dB	dBuV	dBuV/m	dBuV/m	
1	2480.000	5.12	27.36	32.50	102.99	102.97	74.00	28.97	peak
2	2483.500	5.12	27.36	32.50	52.59	52.57	74.00	-21.43	peak
3	2483.597	5.12	27.36	32.50	53.62	53.60	74.00	-20.40	Peak



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**7.9 Radiated Spurious Emissions Below 1GHz**

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

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

Measurement Distance: 3m

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
960-1000	500	3

**7.9.1 E.U.T. Operation**

Operating Environment:

Temperature: 21.0 °C      Humidity: 53.9 % RH      Atmospheric Pressure: 1020 mbar

**7.9.2 Test Mode Description**

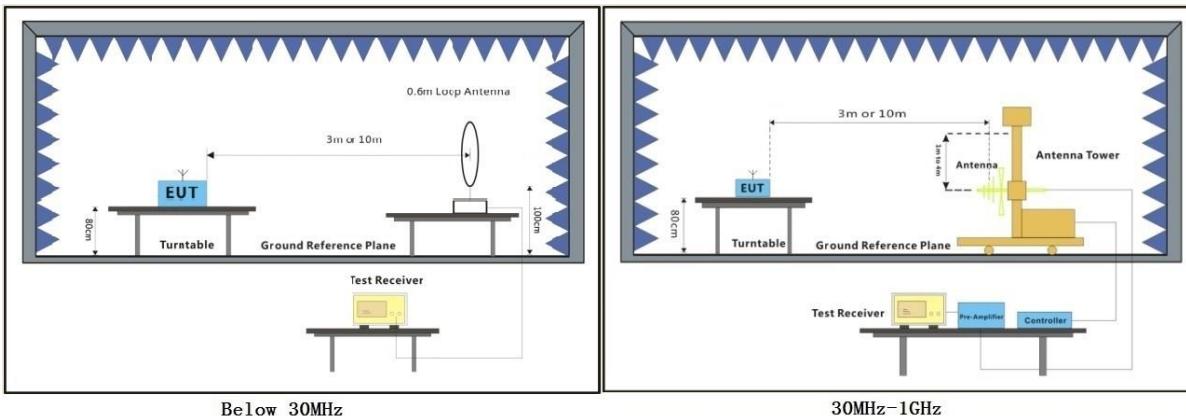
Pre-scan / Final test	Mode Code	Description
Final test	01	TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

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**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. 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 quasi-peak 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. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor
2. Scan from 9kHz to 30MHz, 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.
3. The disturbance below 1GHz was very low and the harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.



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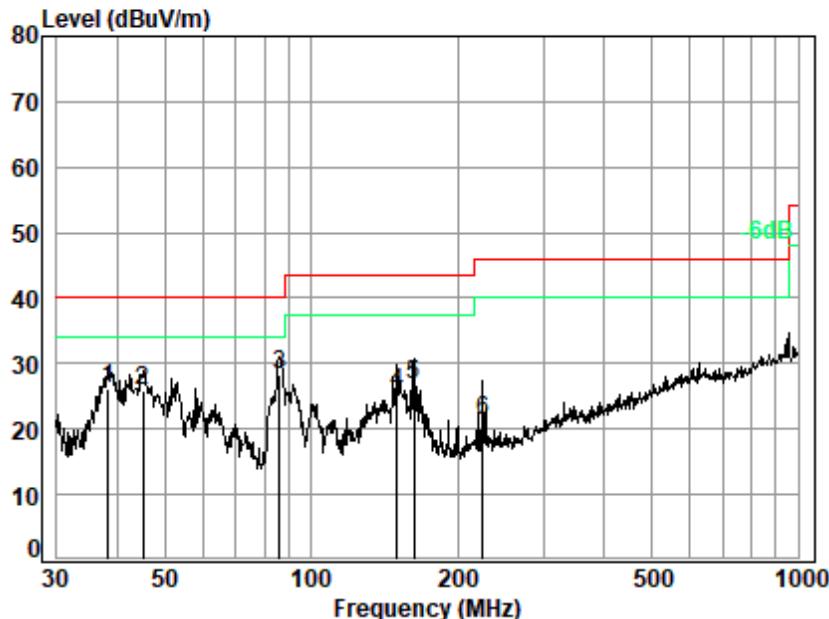
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13.3 inch

Test Mode: 01; Polarity: Horizontal



Site : chamber

Condition: 3m HORIZONTAL

Job No : 00015AT

Mode : 01

Freq	Cable	Ant	Preamp	Read	Limit	Over	Over	Remark
	Loss	Factor	Factor	Level				
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	38.346	0.20	16.34	25.88	35.49	26.15	40.00	-13.85 QP
2	45.217	0.23	17.29	25.87	34.18	25.83	40.00	-14.17 QP
3	85.898	0.60	13.77	25.81	39.59	28.15	40.00	-11.85 QP
4	150.011	0.91	17.43	25.54	32.90	25.70	43.50	-17.80 QP
5	162.611	0.83	17.17	25.49	34.31	26.82	43.50	-16.68 QP
6	225.308	0.78	15.97	25.28	29.91	21.38	46.00	-24.62 QP

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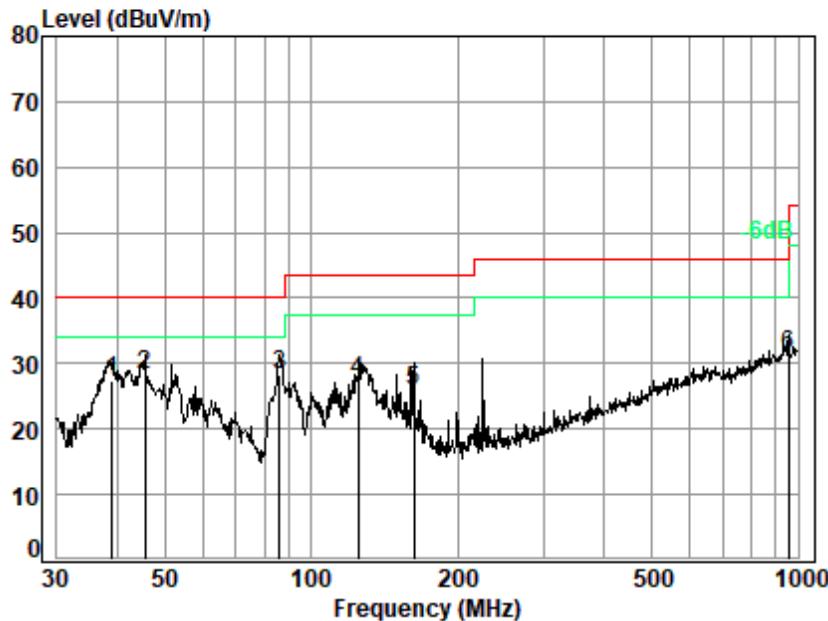
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Test Mode: 01; Polarity: Vertical



Site : chamber

Condition: 3m VERTICAL

Job No : 00015AT

Mode : 01

Freq	Cable	Ant	Preamp	Read	Limit	Over	Remark	
	Loss	Factor	Factor	Level	Level	Line		
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	39.024	0.20	16.49	25.88	36.43	27.24	40.00	-12.76 QP
2	45.535	0.23	17.28	25.87	36.57	28.21	40.00	-11.79 QP
3	86.200	0.61	13.72	25.81	39.67	28.19	40.00	-11.81 QP
4	125.007	0.98	16.22	25.66	35.99	27.53	43.50	-15.97 QP
5	162.611	0.83	17.17	25.49	33.46	25.97	43.50	-17.53 QP
6	955.438	2.26	29.35	26.30	26.12	31.43	46.00	-14.57 QP

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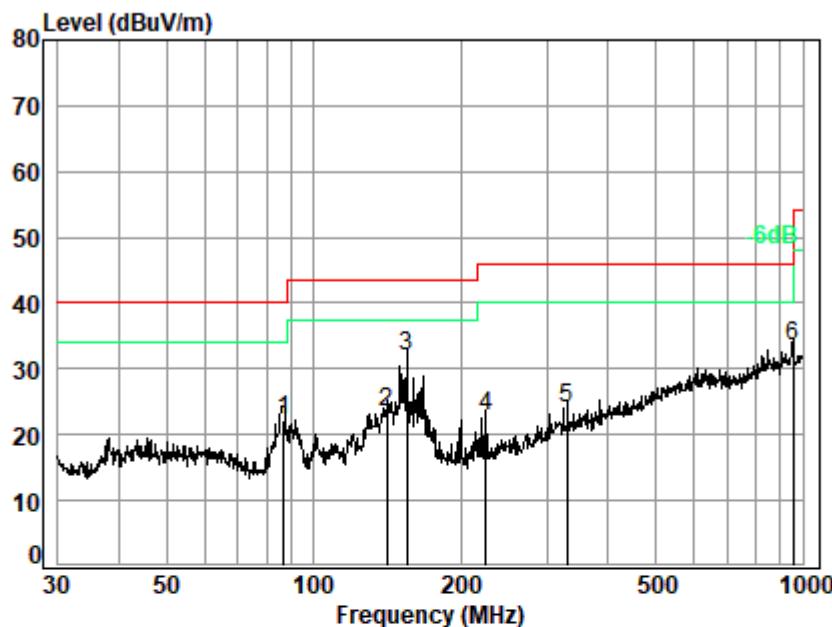
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11.6inch

Test Mode: 01; Polarity: Horizontal



Site : chamber  
Condition: 3m HORIZONTAL  
Job No : 00015AT  
Mode :

Freq	Cable	Ant	Preamp	Read	Limit	Over	Remark	
	Loss	Factor	Factor	Level	Level	Line		
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	86.807	0.62	13.65	25.81	33.80	22.26	40.00	-17.74 QP
2	141.330	0.96	17.55	25.58	30.45	23.38	43.50	-20.12 QP
3	154.821	0.88	17.34	25.52	39.30	32.00	43.50	-11.50 QP
4	225.308	0.78	15.97	25.28	31.19	22.66	46.00	-23.34 QP
5	330.195	1.33	19.51	25.13	28.47	24.18	46.00	-21.82 QP
6	955.438	2.26	29.35	26.30	28.26	33.57	46.00	-12.43 QP

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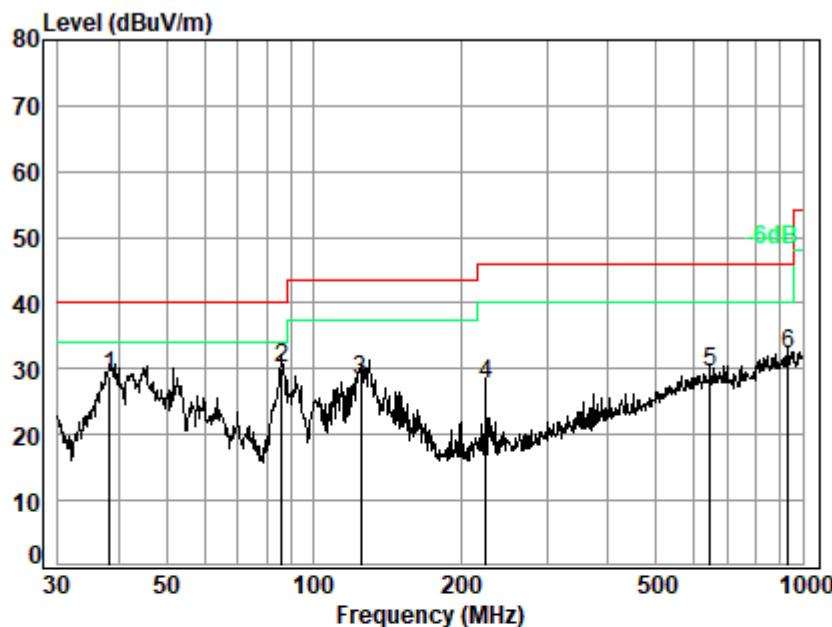
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Test Mode: 01; Polarity: Vertical



Site : chamber  
Condition: 3m VERTICAL  
Job No : 00015AT  
Mode :

Freq	Cable	Ant	Preamp	Read	Limit	Over	Remark
	MHz	Loss	Factor	Level	Level	Line	
1	38.346	0.20	16.34	25.88	38.11	28.77	40.00 -11.23 QP
2	85.898	0.60	13.77	25.81	41.54	30.10	40.00 -9.90 QP
3	124.569	0.98	16.19	25.66	36.92	28.43	43.50 -15.07 QP
4	225.308	0.78	15.97	25.28	36.21	27.68	46.00 -18.32 QP
5	647.386	2.11	25.13	25.67	27.98	29.55	46.00 -16.45 QP
6	935.546	2.23	29.26	26.35	27.11	32.25	46.00 -13.75 QP

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**7.10 Radiated Spurious Emissions Above 1GHz**

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

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

Measurement Distance: 3m

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
Above 1000	500	3

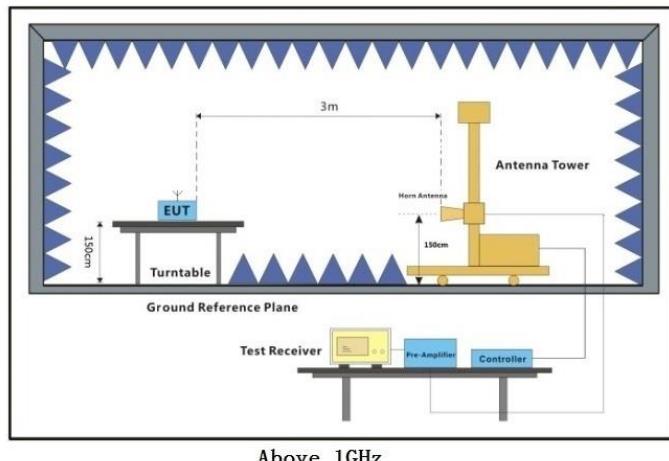
**7.10.1 E.U.T. Operation**

Operating Environment:

Temperature: 22.2 °C      Humidity: 54.3 % RH      Atmospheric Pressure: 1020 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**

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**7.10.4 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 (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 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. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp 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. As shown in this section, 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.



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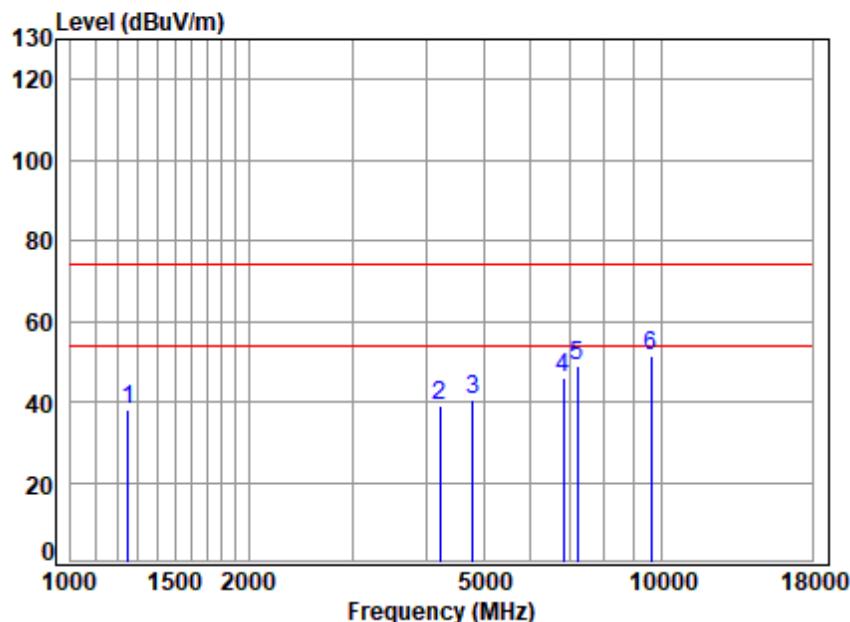
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Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:Low



Site : chamber

Condition: 3m HORIZONTAL

Job No : 00015AT/00016AT

Mode : 2402 TX RSE

Note : BT

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark	
								MHz	dB
								dB	dB/m
1	1249.269	3.26	24.27	52.69	63.42	38.26	74.00	-35.74	peak
2	4218.186	7.48	29.82	52.87	54.74	39.17	74.00	-34.83	peak
3	4804.000	7.98	30.94	53.05	54.67	40.54	74.00	-33.46	peak
4	6815.551	8.01	35.37	53.38	56.02	46.02	74.00	-27.98	peak
5	7206.000	8.29	36.05	53.52	57.88	48.70	74.00	-25.30	peak
6	9608.000	11.41	37.53	53.58	56.20	51.56	74.00	-22.44	peak

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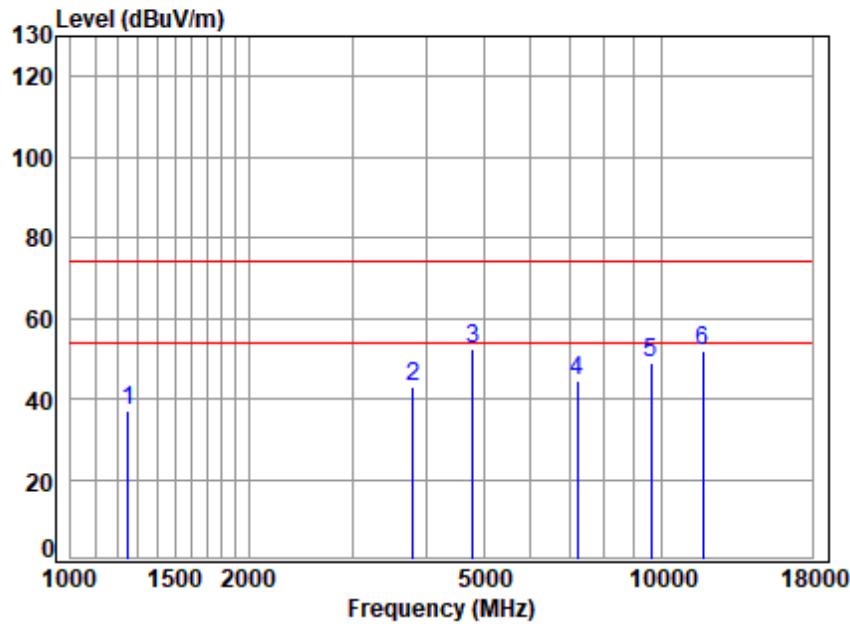
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Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:Low



Site : chamber  
Condition: 3m VERTICAL  
Job No : 00015AT/00016AT  
Mode : 2402 TX RSE  
Note : BT

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Line Limit	Over Limit	Remark	
								MHz	dB
1 1249.269	3.26	24.27	52.69	62.36	37.20	74.00	-36.80	peak	
2 3801.333	7.30	29.19	52.85	59.18	42.82	74.00	-31.18	peak	
3 4804.000	7.98	30.94	53.05	66.46	52.33	74.00	-21.67	peak	
4 7206.000	8.29	36.05	53.52	53.78	44.60	74.00	-29.40	peak	
5 9608.000	11.41	37.53	53.58	53.56	48.92	74.00	-25.08	peak	
6 11769.210	11.60	39.76	53.91	54.69	52.14	74.00	-21.86	Peak	

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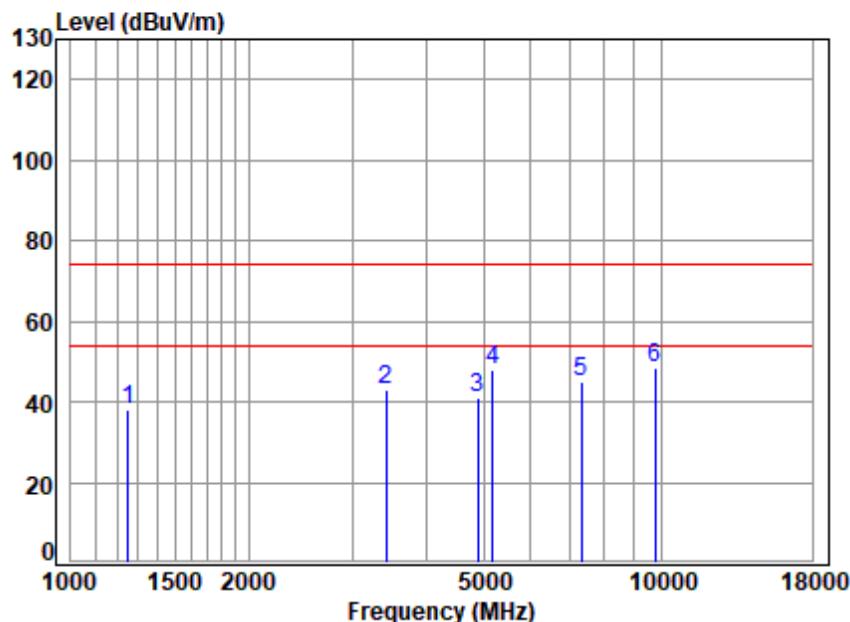
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Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:middle



Site : chamber

Condition: 3m HORIZONTAL

Job No : 00015AT/00016AT

Mode : 2441 TX RSE

Note : BT

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit		Over Line Limit	Remark	
					dB	dB/m	dB	dBuV	dBuV/m
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dBuV/m	dB	
1 1249.269	3.26	24.27	52.69	63.34	38.18	74.00	-35.82	peak	
2 3415.787	6.79	28.68	52.96	60.28	42.79	74.00	-31.21	peak	
3 4882.000	8.11	31.13	53.07	55.10	41.27	74.00	-32.73	peak	
4 5179.049	8.29	31.84	53.04	61.07	48.16	74.00	-25.84	peak	
5 7323.000	8.35	36.19	53.53	54.18	45.19	74.00	-28.81	peak	
6 9764.000	11.29	37.88	53.43	52.57	48.31	74.00	-25.69	peak	

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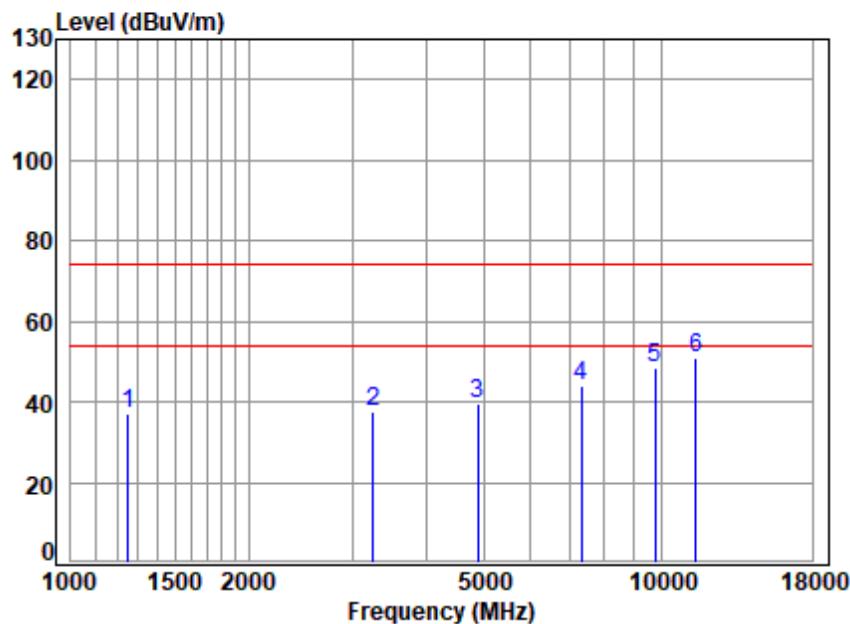
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Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:middle



Site : chamber  
Condition: 3m VERTICAL  
Job No : 00015AT/00016AT  
Mode : 2441 TX RSE  
Note : BT

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Line Limit	Over Limit	Remark	
								MHz	dB
1 1249.269	3.26	24.27	52.69	62.43	37.27	74.00	-36.73	peak	
2 3252.005	6.38	28.65	53.02	55.34	37.35	74.00	-36.65	Peak	
3 4882.000	8.11	31.13	53.07	53.57	39.74	74.00	-34.26	peak	
4 7323.000	8.35	36.19	53.53	52.94	43.95	74.00	-30.05	peak	
5 9764.000	11.29	37.88	53.43	52.79	48.53	74.00	-25.47	peak	
6 11433.910	11.57	39.69	53.78	53.68	51.16	74.00	-22.84	Peak	

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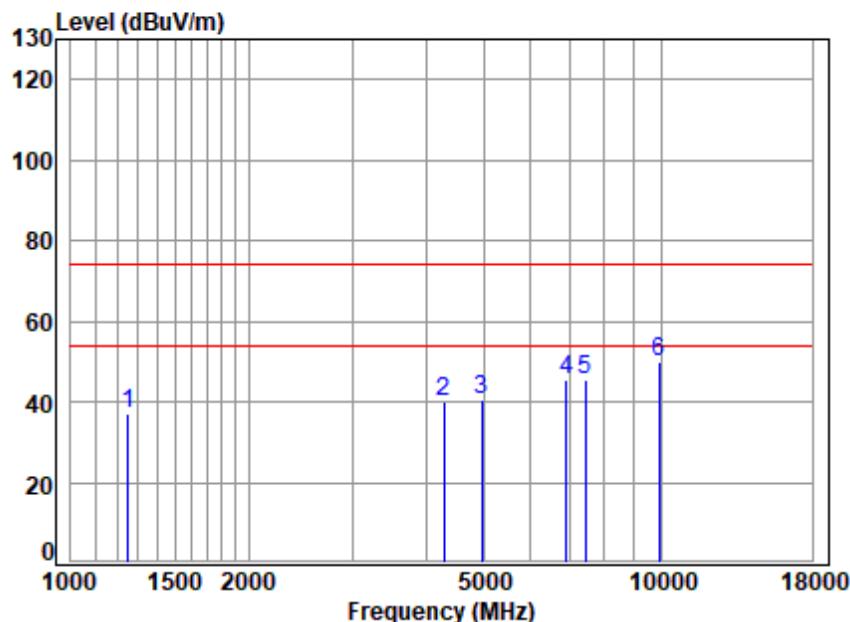
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Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:High



Site : chamber  
Condition: 3m HORIZONTAL  
Job No : 00015AT/00016AT  
Mode : 2480 TX RSE  
Note : BT

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit		Over Limit	Remark	
					dB	dB/m	dB	dBuV	dBuV/m
MHz									
1	1249.269	3.26	24.27	52.69	62.20	37.04	74.00	-36.96	peak
2	4291.977	7.48	29.92	52.89	55.46	39.97	74.00	-34.03	peak
3	4960.000	8.24	31.31	53.09	53.94	40.40	74.00	-33.60	peak
4	6894.806	8.09	35.55	53.43	55.09	45.30	74.00	-28.70	peak
5	7440.000	8.40	36.33	53.55	54.25	45.43	74.00	-28.57	peak
6	9920.000	11.18	38.22	53.28	53.69	49.81	74.00	-24.19	peak

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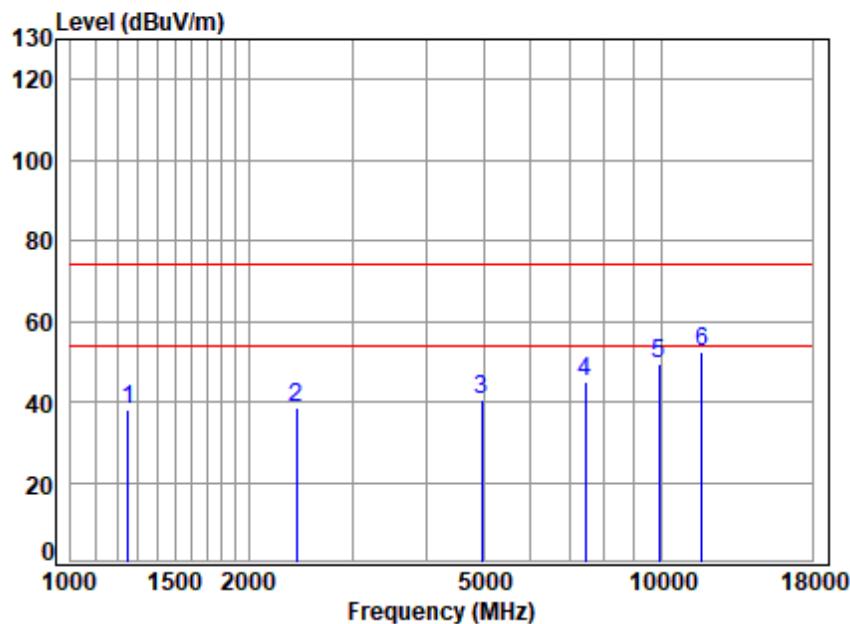
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Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:High



Site : chamber  
Condition: 3m VERTICAL  
Job No : 00015AT/00016AT  
Mode : 2480 TX RSE  
Note : BT

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Line Limit	Over	Remark	
								MHz	dB
1 1249.269	3.26	24.27	52.69	63.33	38.17	74.00	-35.83	peak	
2 2407.703	5.07	27.20	53.10	59.38	38.55	74.00	-35.45	Peak	
3 4960.000	8.24	31.31	53.09	54.00	40.46	74.00	-33.54	peak	
4 7440.000	8.40	36.33	53.55	53.87	45.05	74.00	-28.95	peak	
5 9920.000	11.18	38.22	53.28	53.07	49.19	74.00	-24.81	peak	
6 11701.380	11.60	39.74	53.88	54.92	52.38	74.00	-21.62	Peak	

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## 8 Test Setup Photo

Refer to Appendix - Test Setup Photo for FYCR2301000015AT

## 9 EUT Constructional Details (EUT Photos)

Refer to Appendix – External and Internal Photos for FYCR2301000015AT.



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## 10 Appendix

### 1. Bandwidth

#### 1.1 OBW

##### 1.1.1 Test Result

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	99% Occupied Bandwidth (MHz)	Verdict
					Result	
GFSK	SISO	2402	DH5	1	0.848	Pass
		2441	DH5	1	0.847	Pass
		2480	DH5	1	0.845	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.188	Pass
		2441	2DH5	1	1.173	Pass
		2480	2DH5	1	1.189	Pass
8DPSK	SISO	2402	3DH5	1	1.195	Pass
		2441	3DH5	1	1.179	Pass
		2480	3DH5	1	1.197	Pass

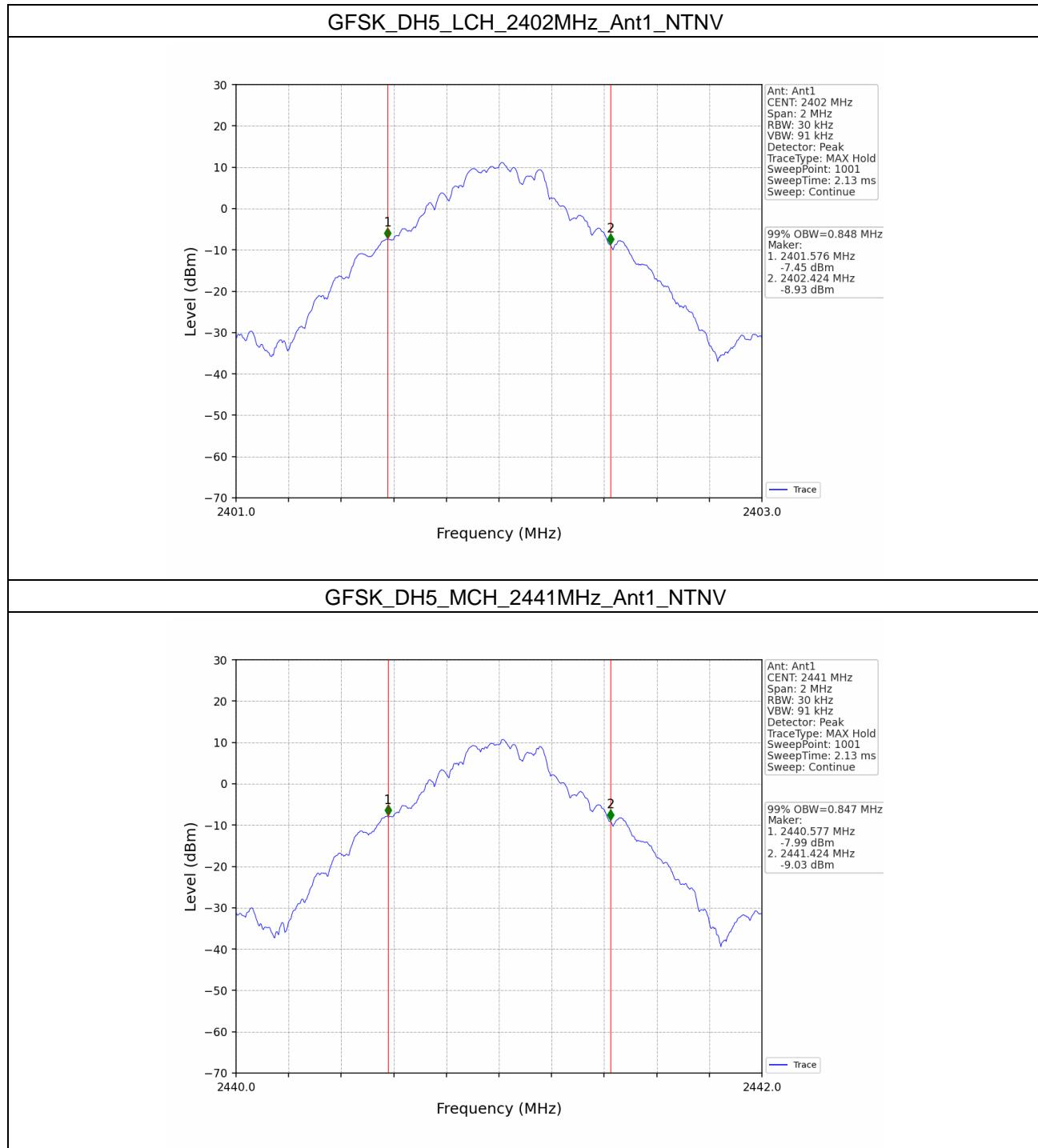
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**1.1.2 Test Graph**

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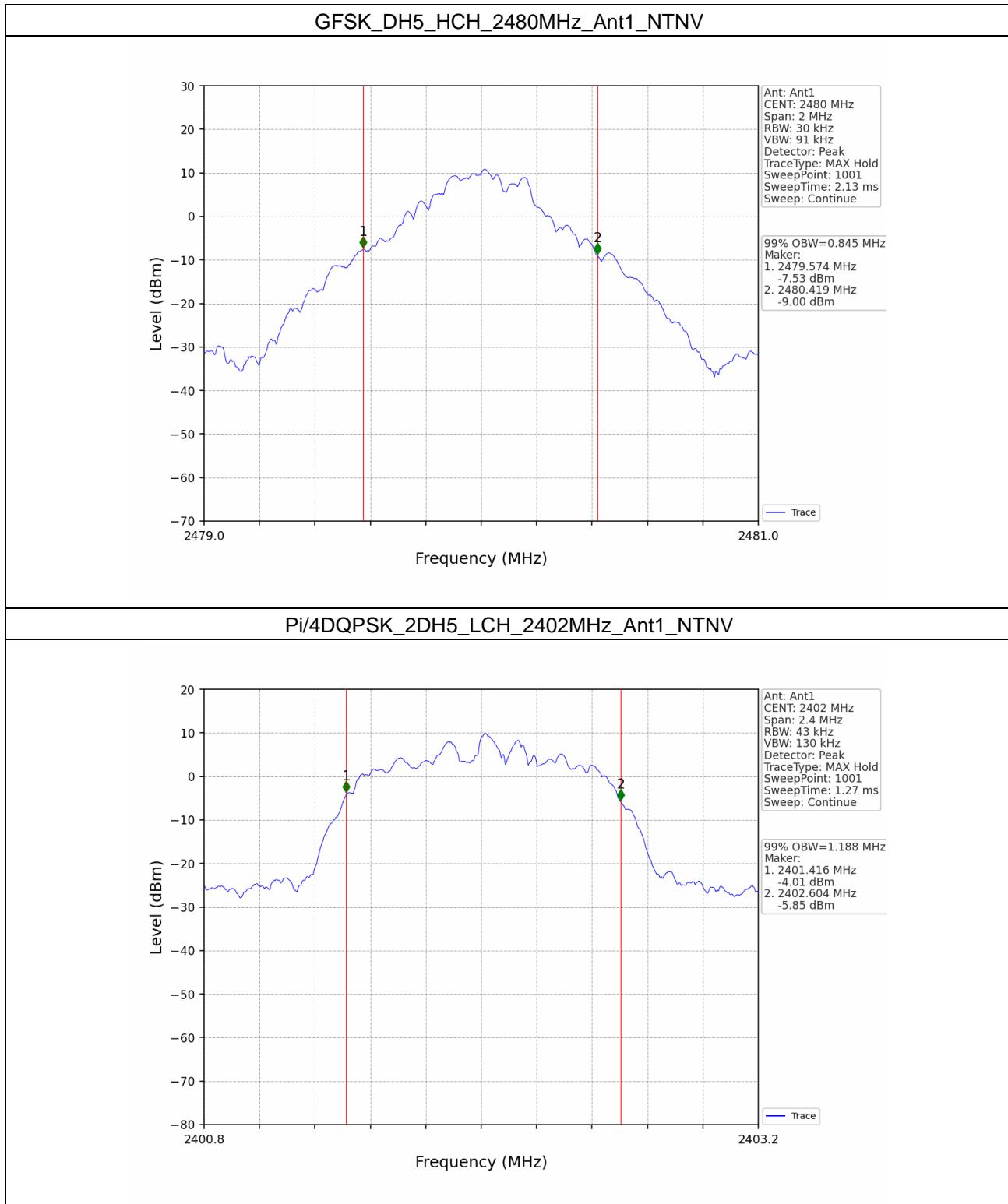
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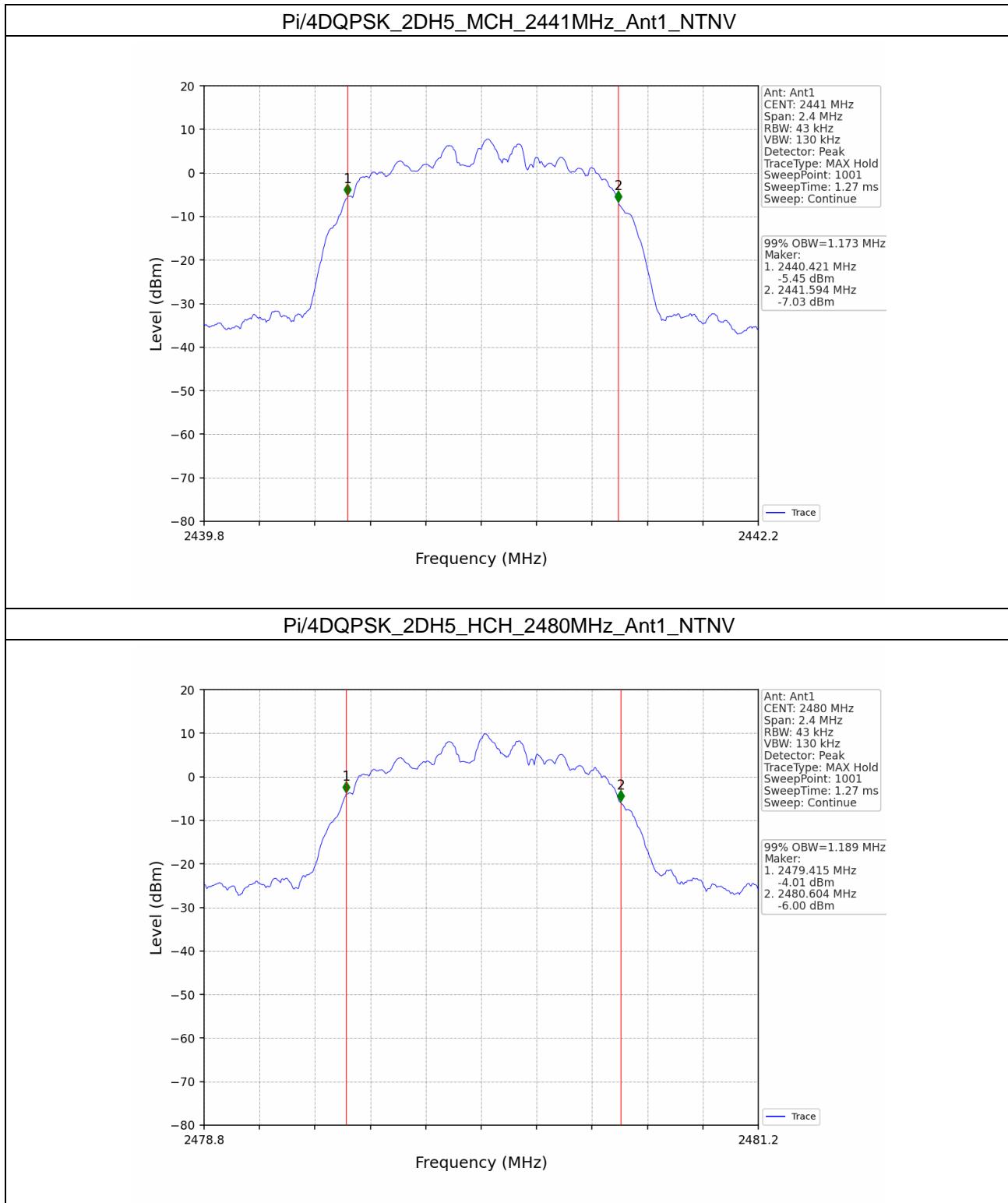
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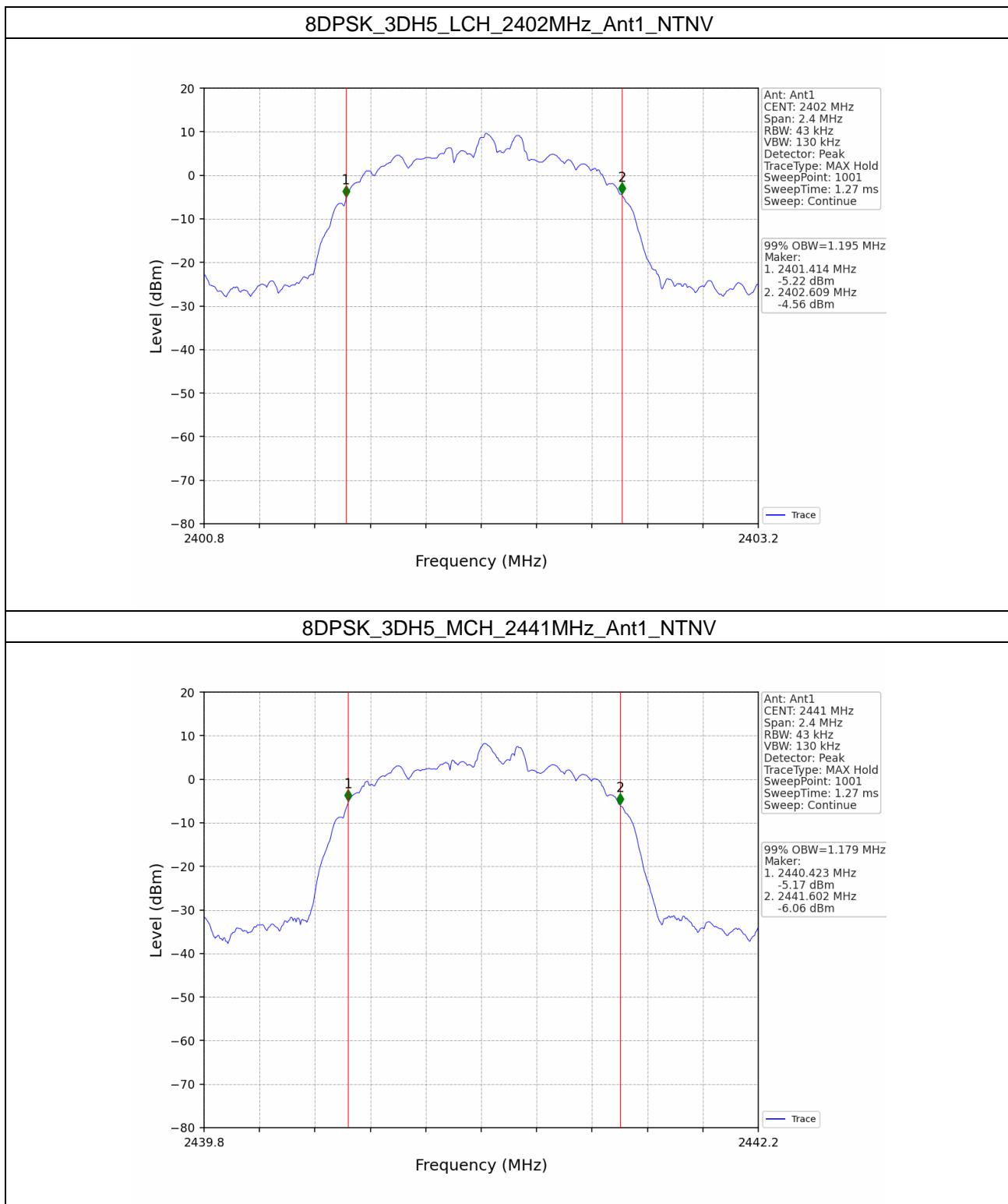
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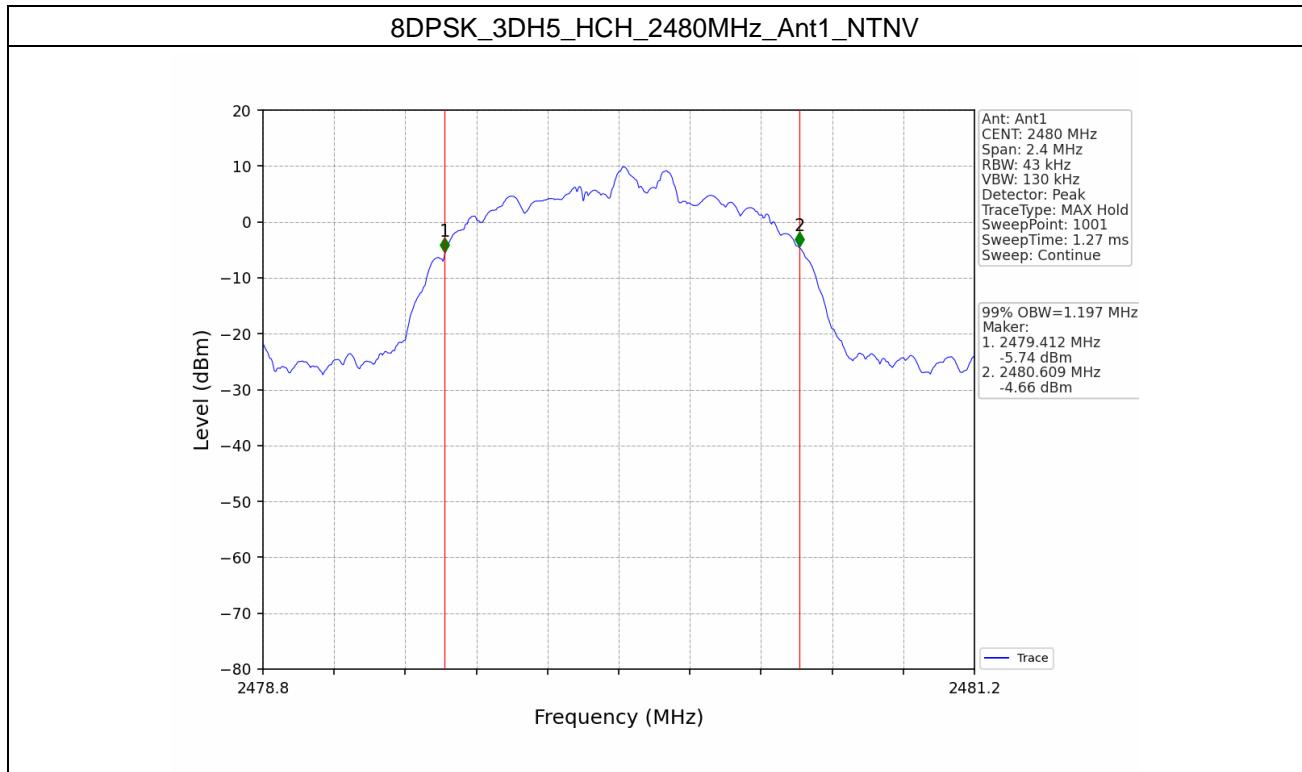
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**1.2 20dB BW****1.2.1 Test Result**

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	20dB Bandwidth (MHz)	Verdict
					Result	
GFSK	SISO	2402	DH5	1	0.934	Pass
		2441	DH5	1	0.938	Pass
		2480	DH5	1	0.936	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.311	Pass
		2441	2DH5	1	1.297	Pass
		2480	2DH5	1	1.312	Pass
8DPSK	SISO	2402	3DH5	1	1.317	Pass
		2441	3DH5	1	1.312	Pass
		2480	3DH5	1	1.316	Pass

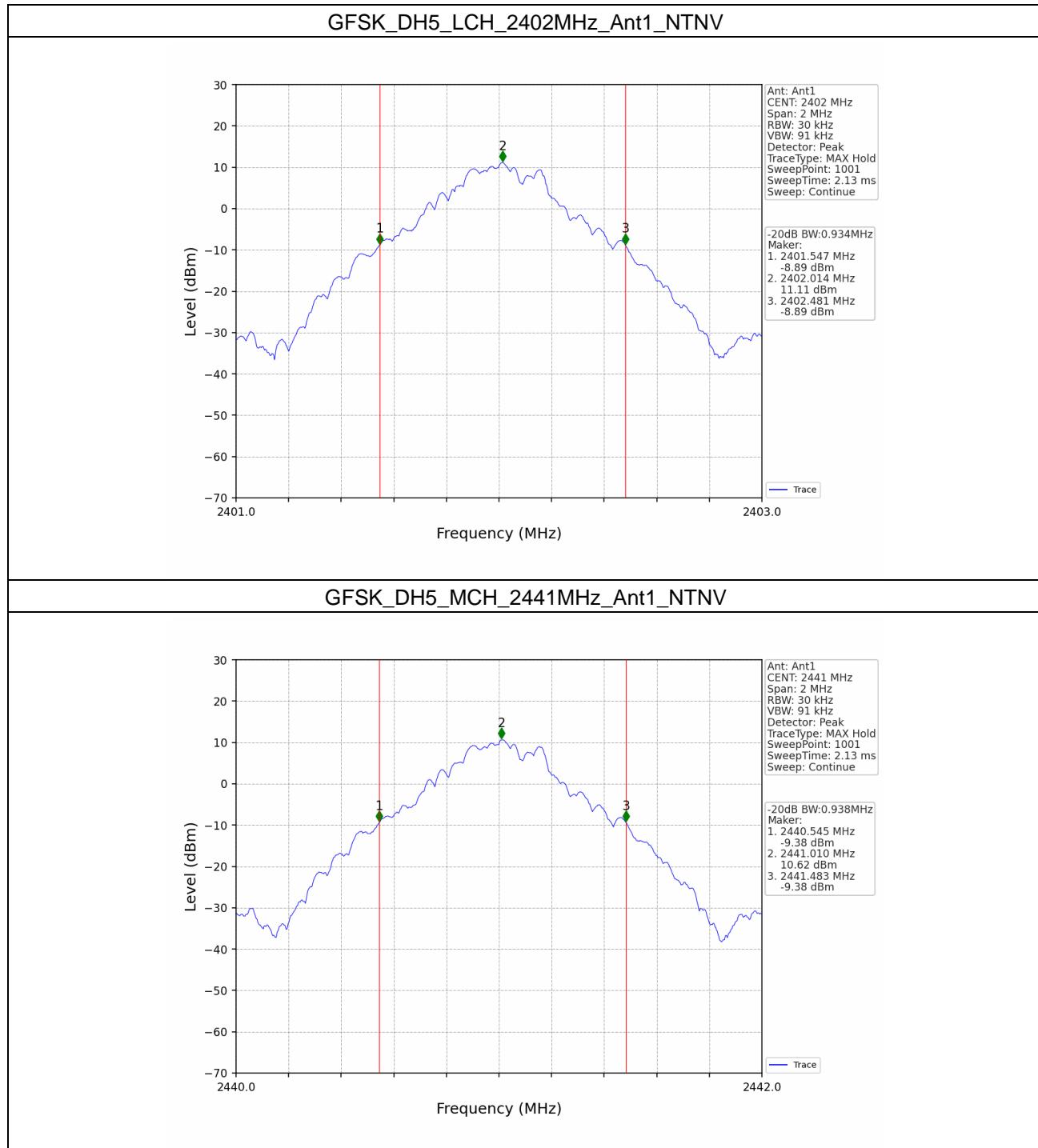
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**1.2.2 Test Graph**

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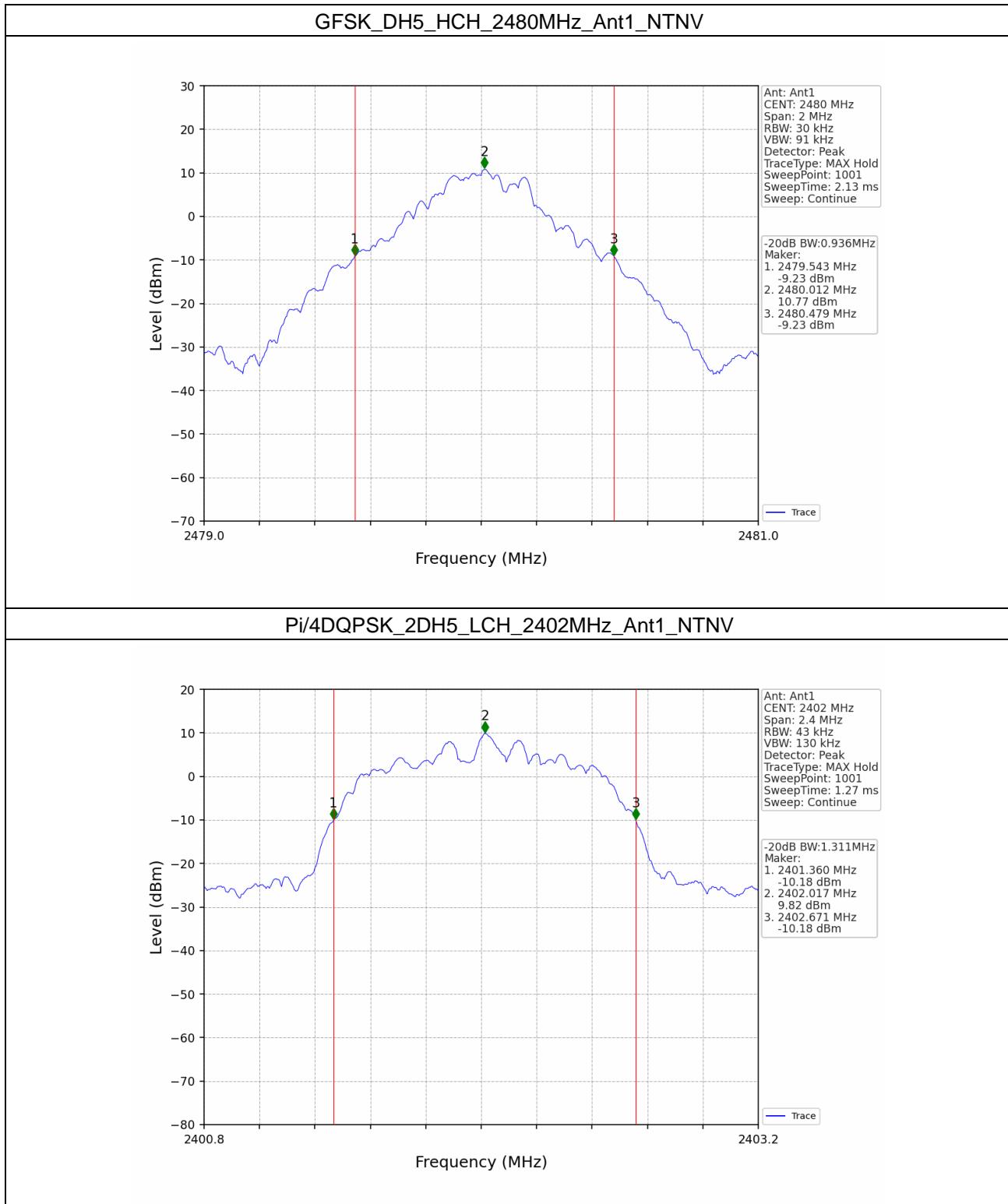
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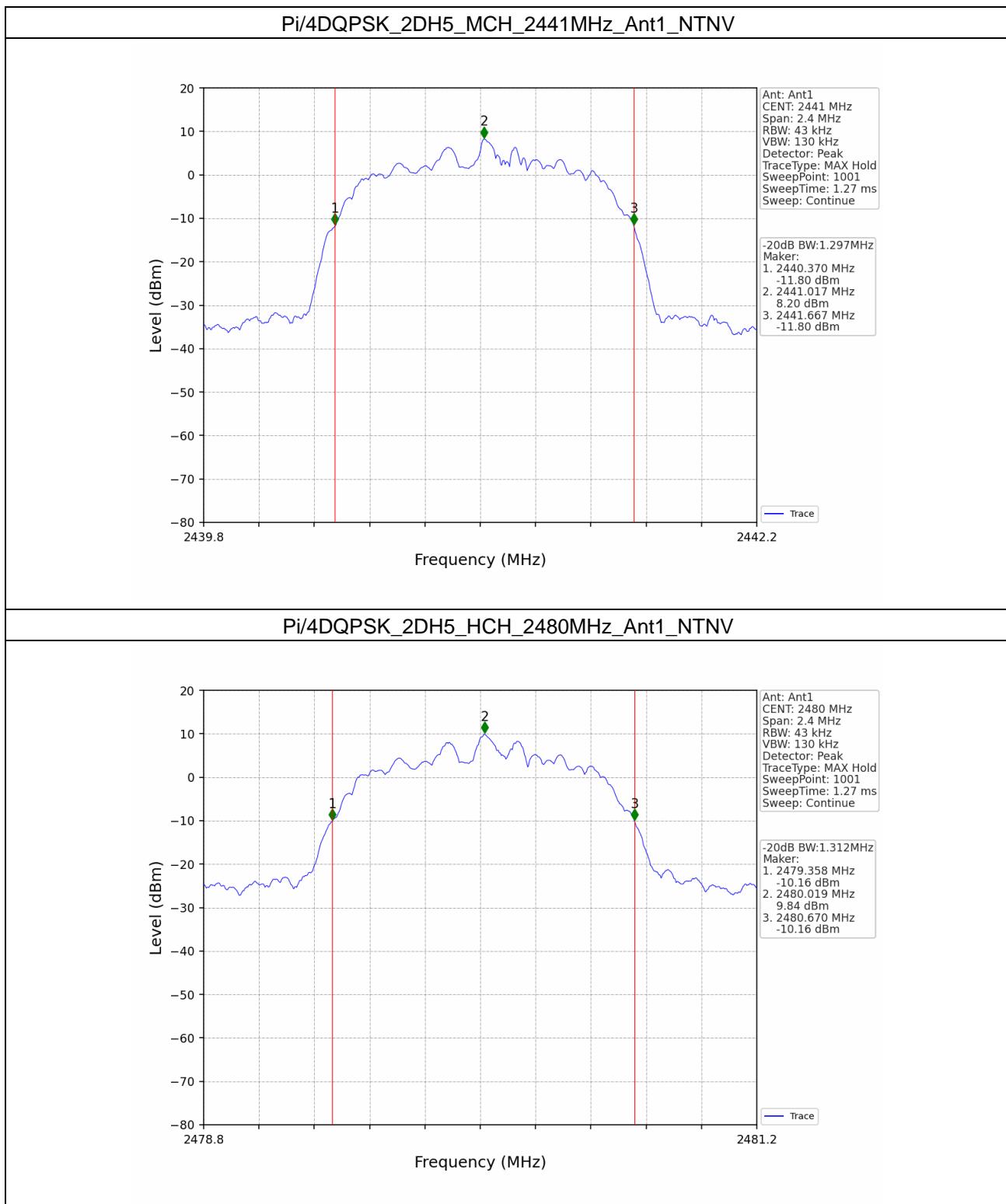
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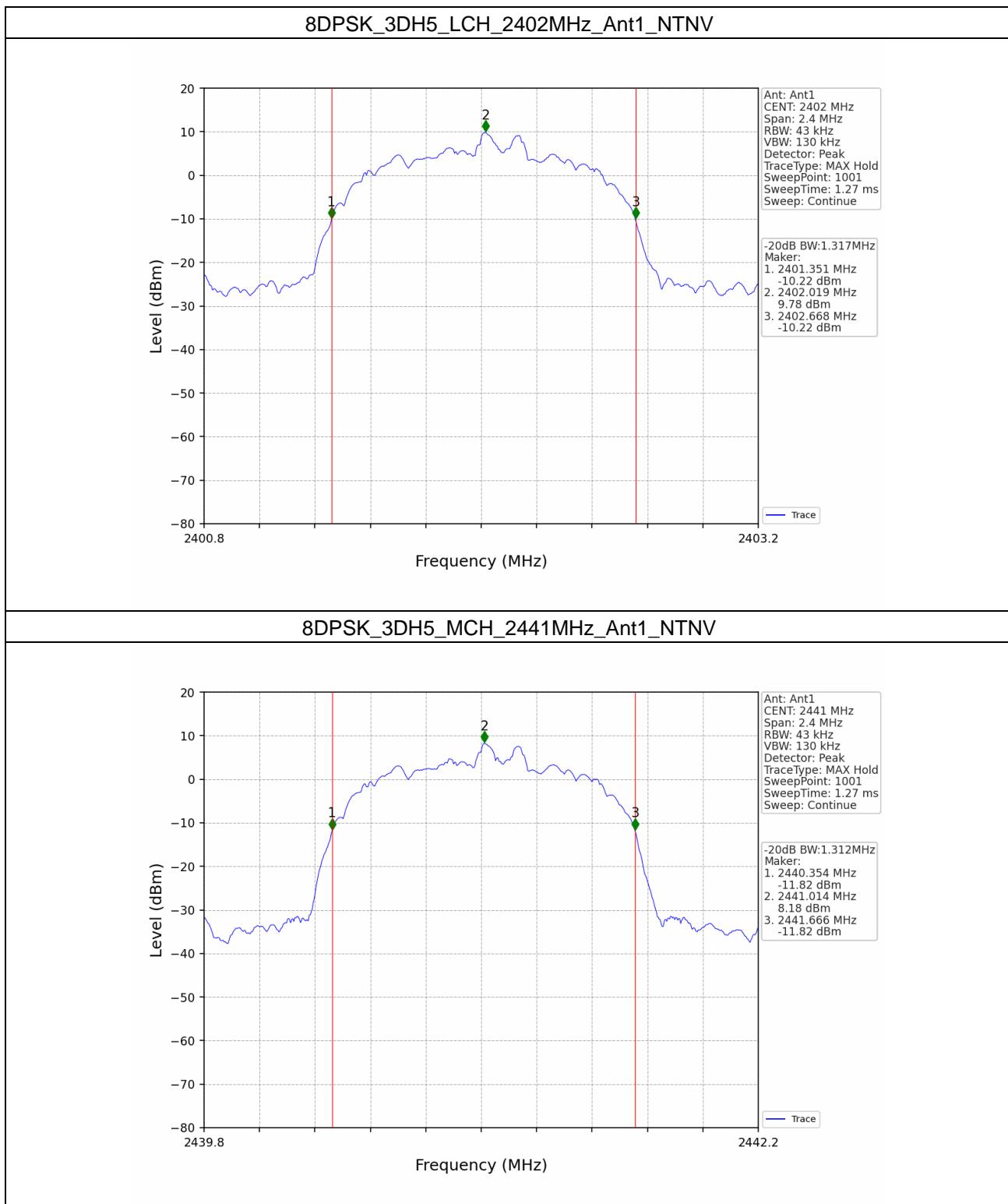
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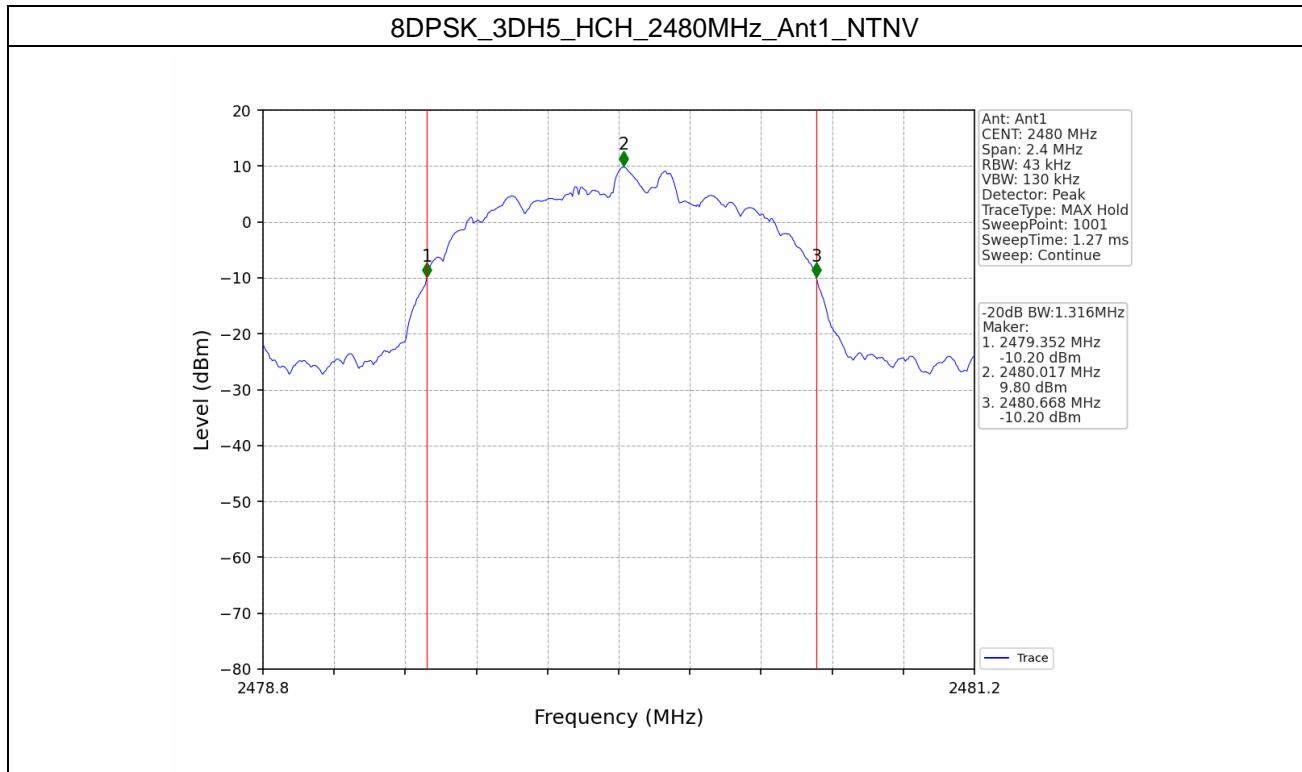
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## 2. Maximum Conducted Output Power

### 2.1 Power

#### 2.1.1 Test Result

Mode	TX Type	Frequency (MHz)	Packet Type	Maximum Peak Conducted Output Power (dBm)		Verdict
				ANT1	Limit	
GFSK	SISO	2402	DH5	12.65	<=30	Pass
		2441	DH5	12.32	<=30	Pass
		2480	DH5	12.30	<=30	Pass
Pi/4DQPSK	SISO	2402	2DH5	11.91	<=20.97	Pass
		2441	2DH5	10.93	<=20.97	Pass
		2480	2DH5	11.86	<=20.97	Pass
8DPSK	SISO	2402	3DH5	12.04	<=20.97	Pass
		2441	3DH5	11.17	<=20.97	Pass
		2480	3DH5	11.95	<=20.97	Pass

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### 3. Carrier Frequency Separation

#### 3.1 Ant1

##### 3.1.1 Test Result

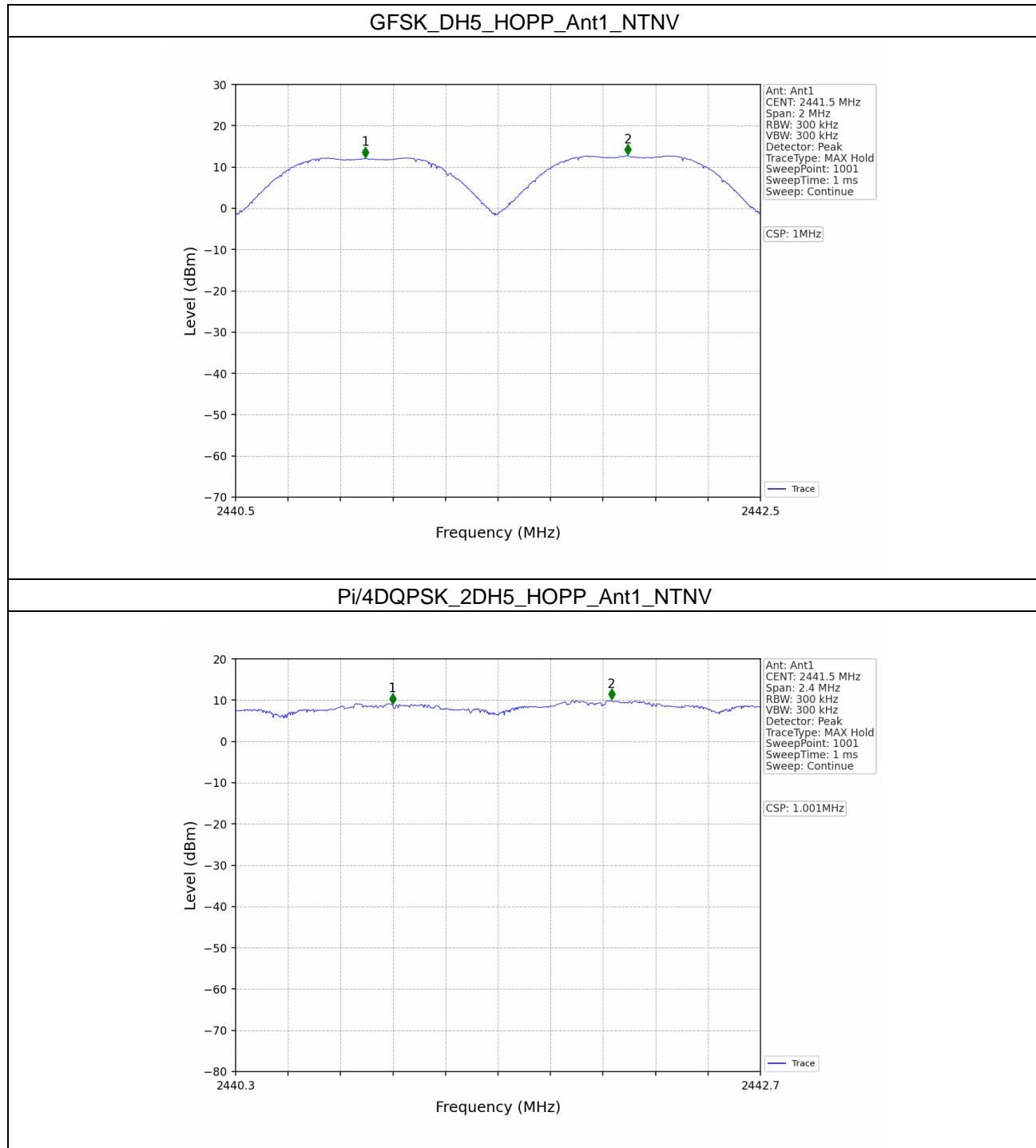
Ant1							
Mode	TX Type	Frequency (MHz)	Packet Type	Channel Separation (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	Verdict
GFSK	SISO	HOPP	DH5	1.000	0.938	>=0.938	Pass
Pi/4DQPSK	SISO	HOPP	2DH5	1.001	1.312	>=0.875	Pass
8DPSK	SISO	HOPP	3DH5	1.001	1.317	>=0.878	Pass



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**3.1.2 Test Graph**

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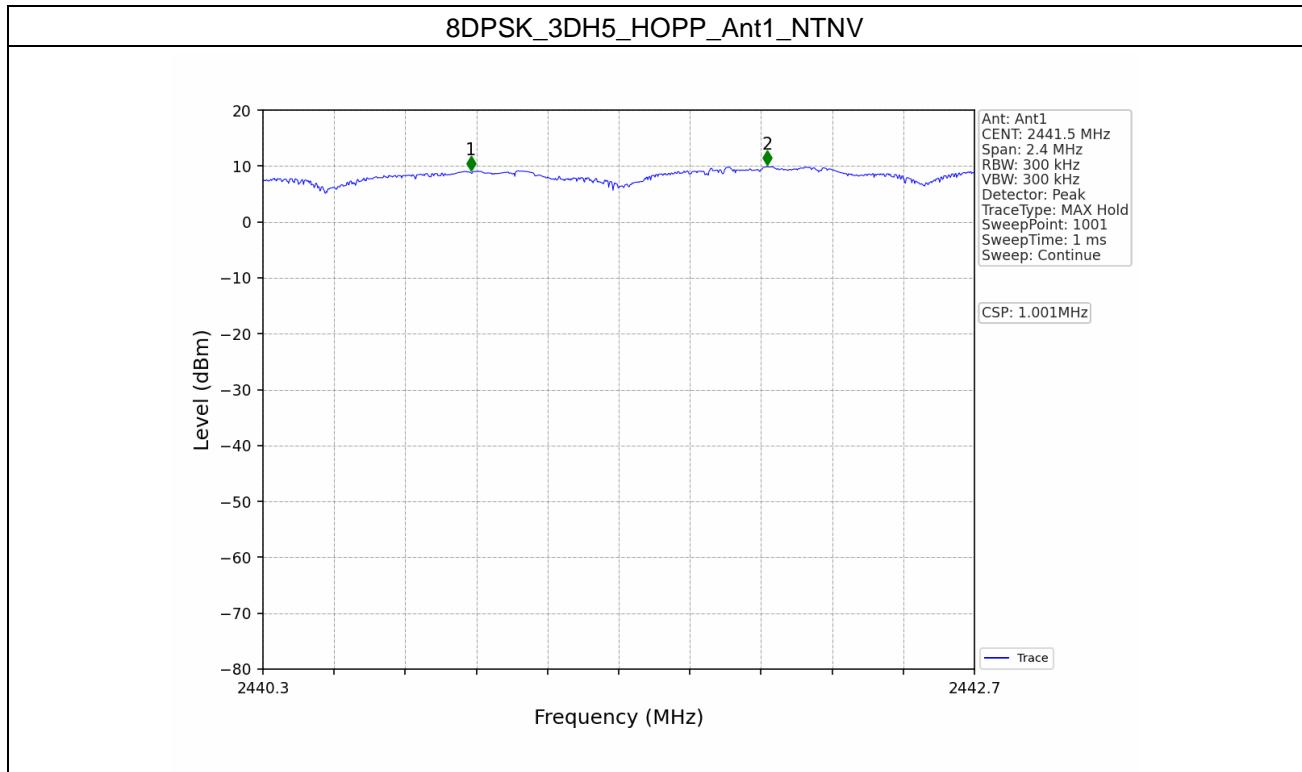
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## 4. Number of Hopping Frequencies

### 4.1 HoppNum

#### 4.1.1 Test Result

Mode	TX Type	Frequency (MHz)	Packet Type	Num of Hopping Frequencies		Verdict
				ANT1	Limit	
GFSK	SISO	HOPP	DH5	79	>=15	Pass
Pi/4DQPSK	SISO	HOPP	2DH5	79	>=15	Pass
8DPSK	SISO	HOPP	3DH5	79	>=15	Pass

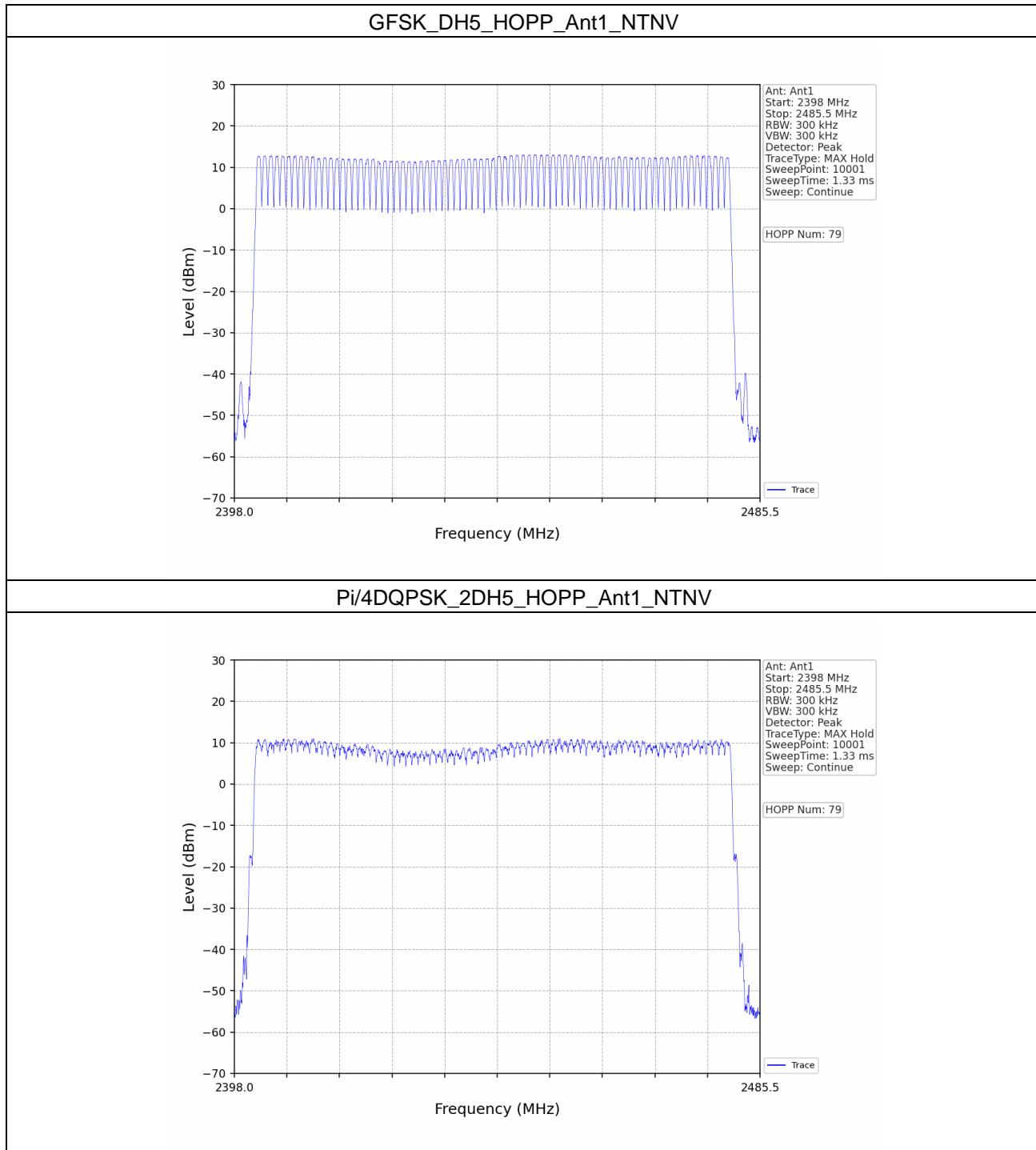


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**4.1.2 Test Graph**

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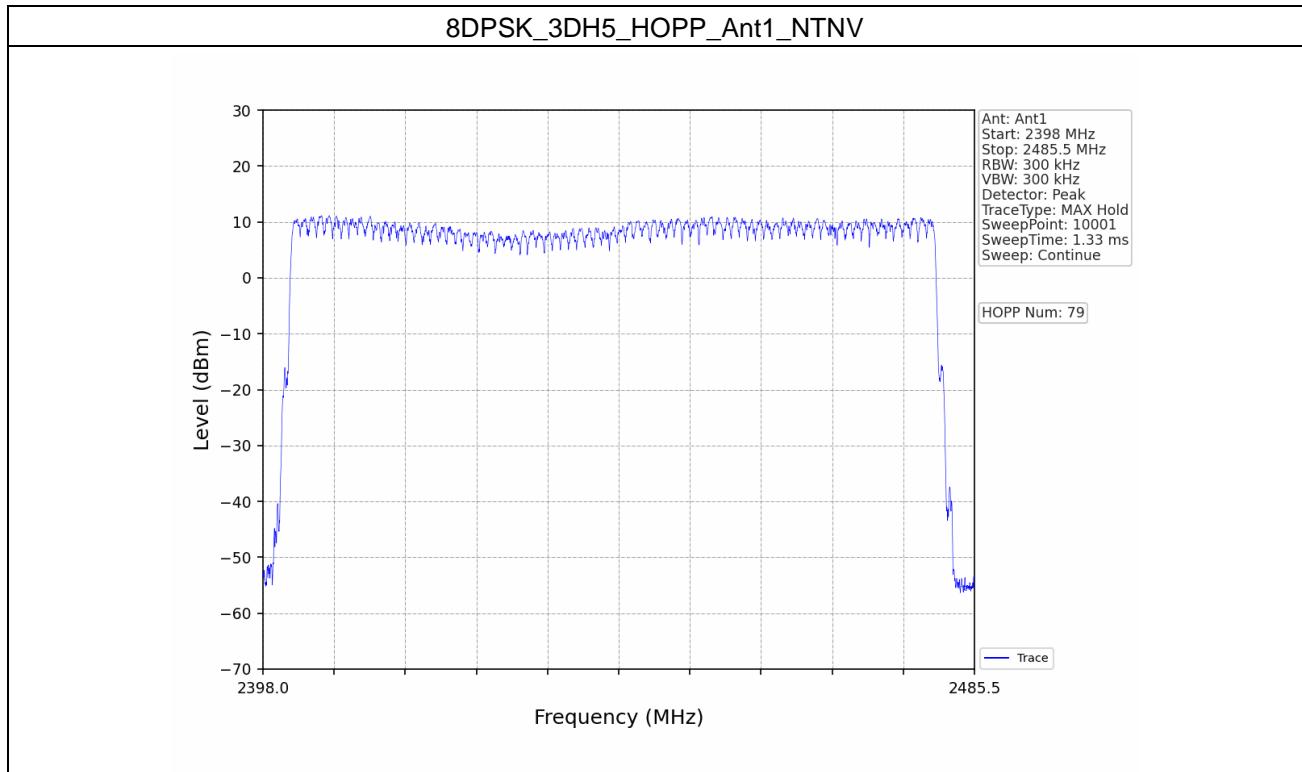
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## 5. Time of Occupancy (Dwell Time)

### 5.1 Ant1

#### 5.1.1 Test Result

Ant1									
Mode	TX Type	Frequency (MHz)	Packet Type	Duration of Single Pulse (ms)	Observation Period (s)	Num of Pulse in Observation Period	Dwell Time (ms)	Limit (ms)	Verdict
GFSK	SISO	HOPP	DH1	0.386	31.600	320	123.520	<=400	Pass
			DH3	1.648	31.600	159	262.032	<=400	Pass
			DH5	2.910	31.600	105	305.550	<=400	Pass
Pi/4DQPSK	SISO	HOPP	2DH1	0.412	31.600	320	131.840	<=400	Pass
			2DH3	1.664	31.600	172	286.208	<=400	Pass
			2DH5	2.908	31.600	111	322.788	<=400	Pass
8DPSK	SISO	HOPP	3DH1	0.390	31.600	320	124.800	<=400	Pass
			3DH3	1.662	31.600	162	269.244	<=400	Pass
			3DH5	2.894	31.600	107	309.658	<=400	Pass

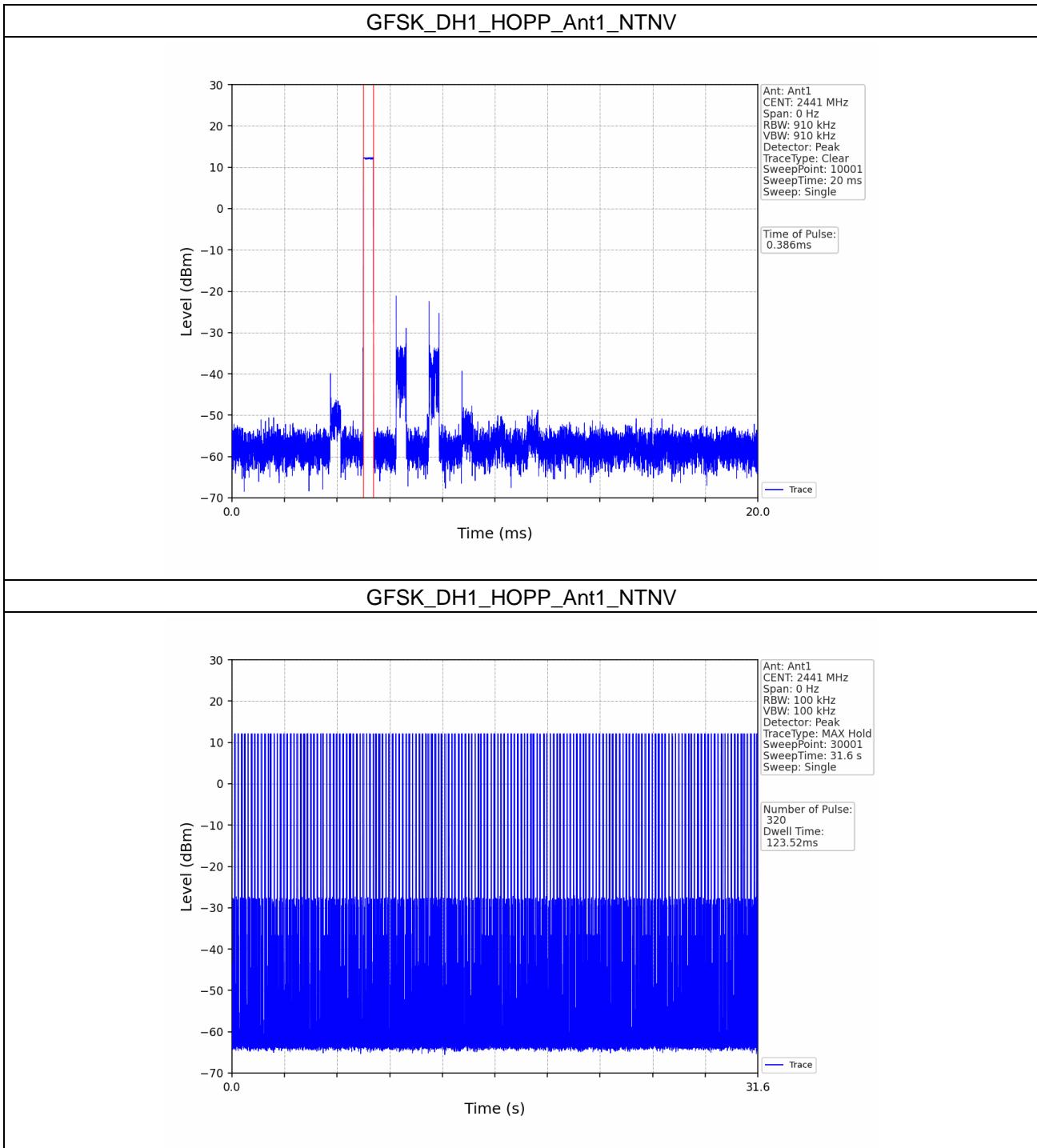
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**5.1.2 Test Graph**

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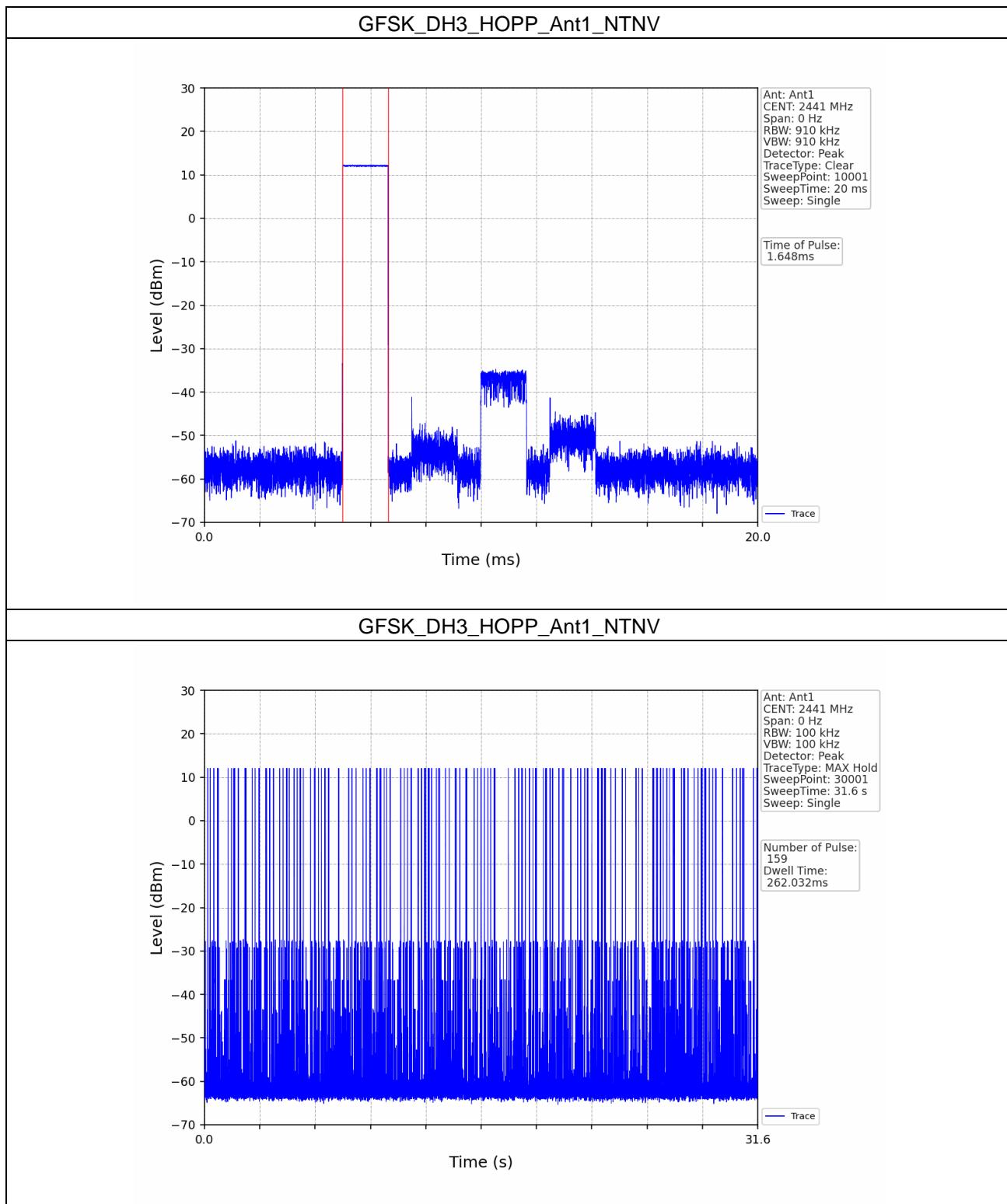
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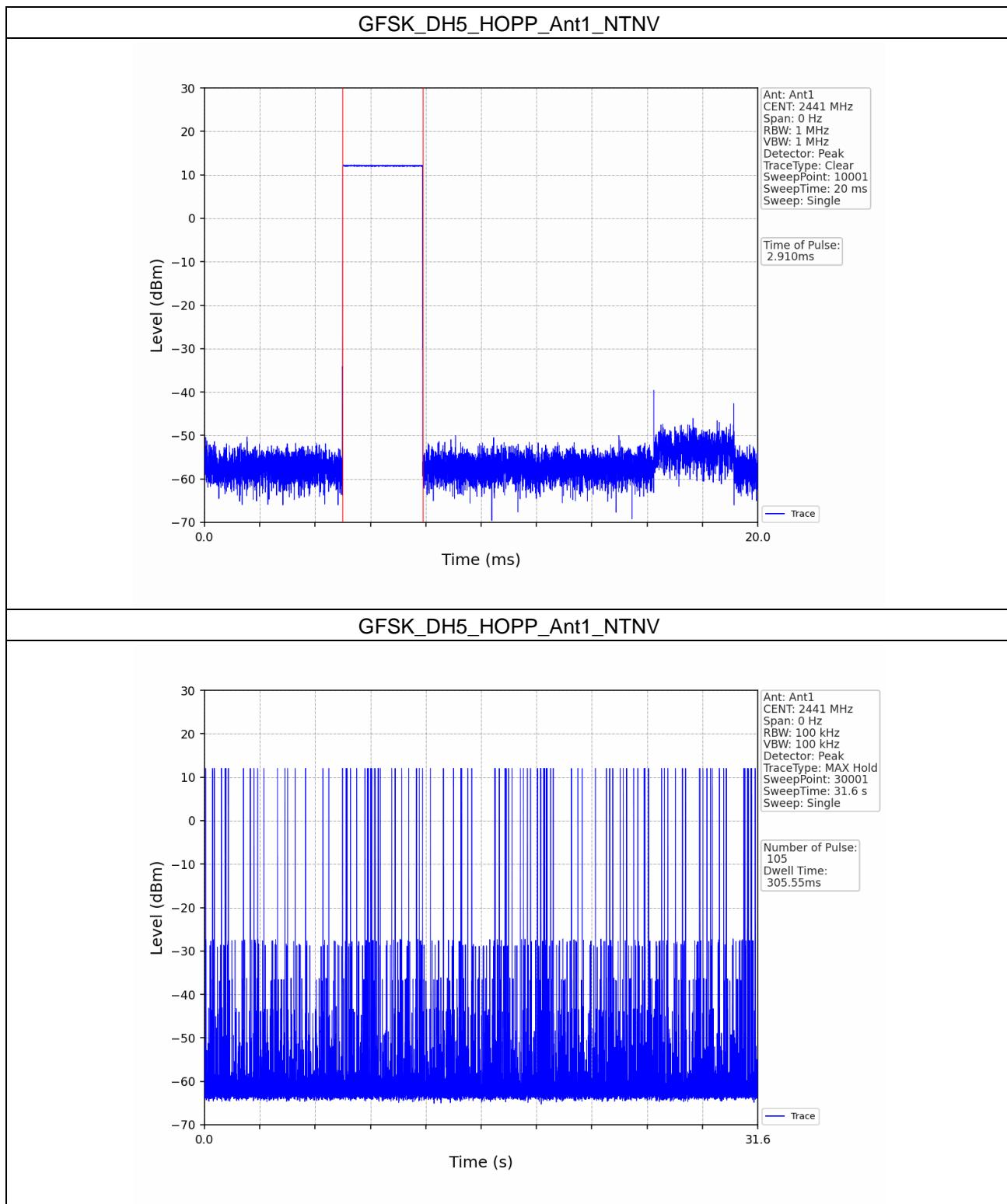
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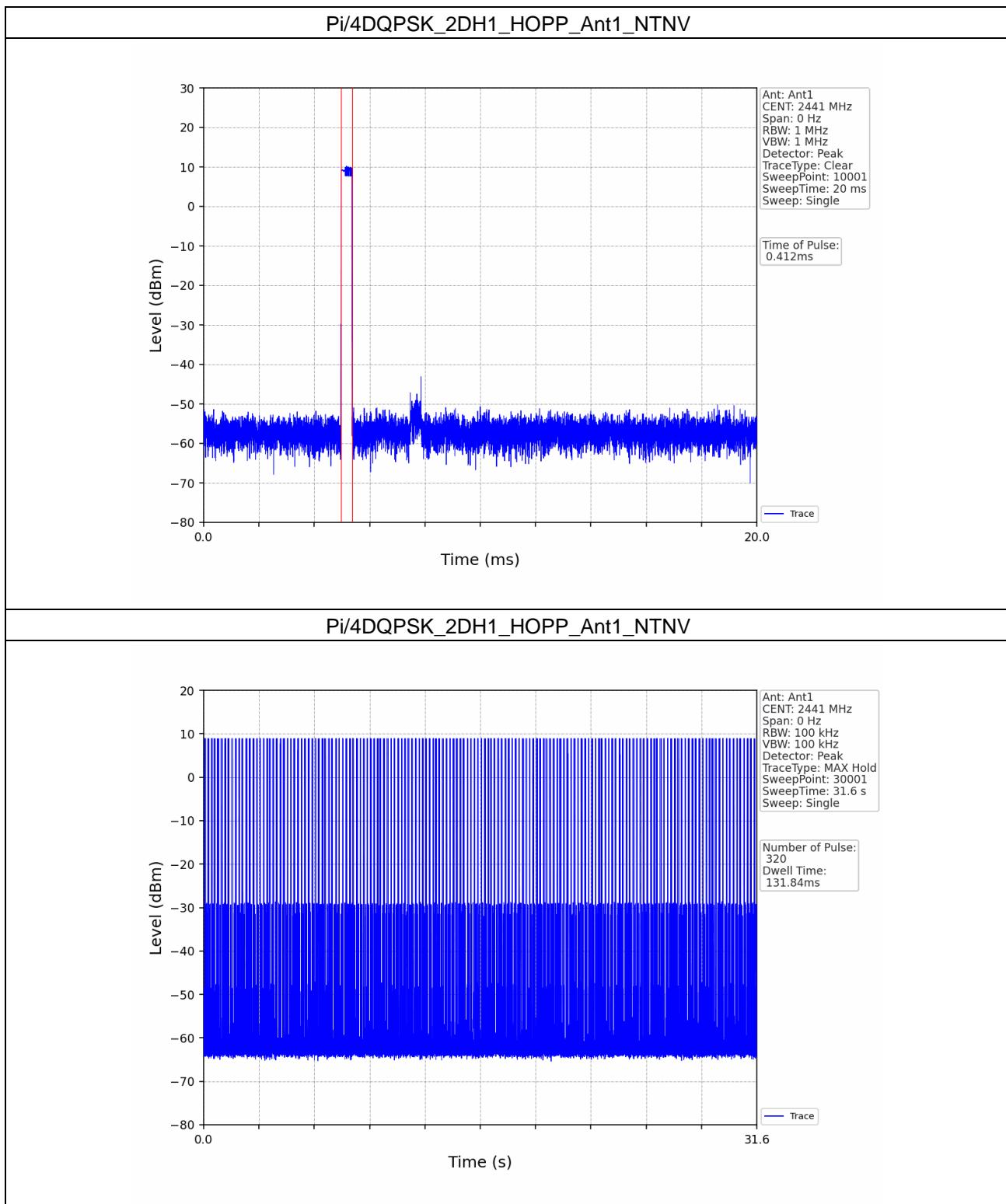
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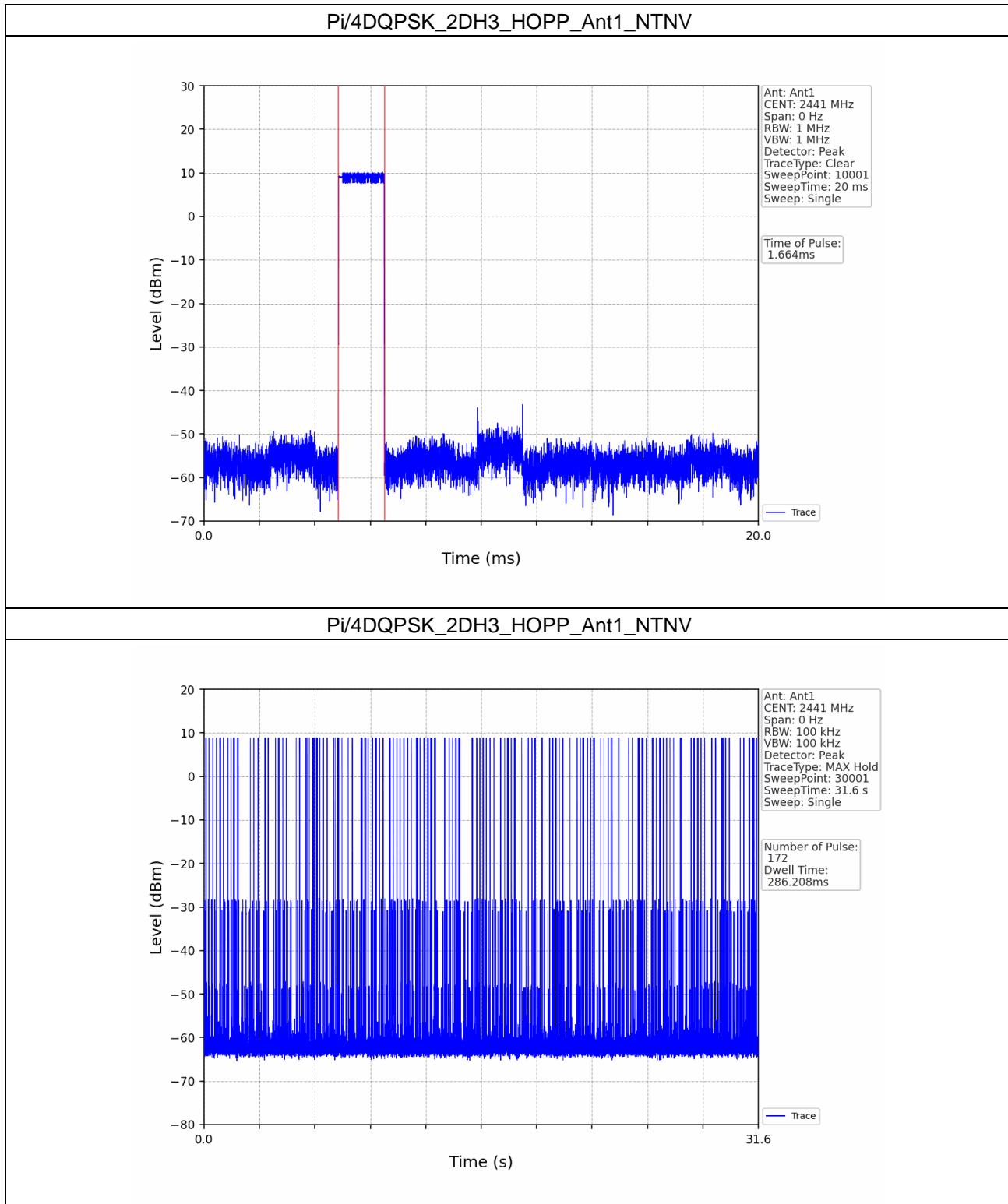
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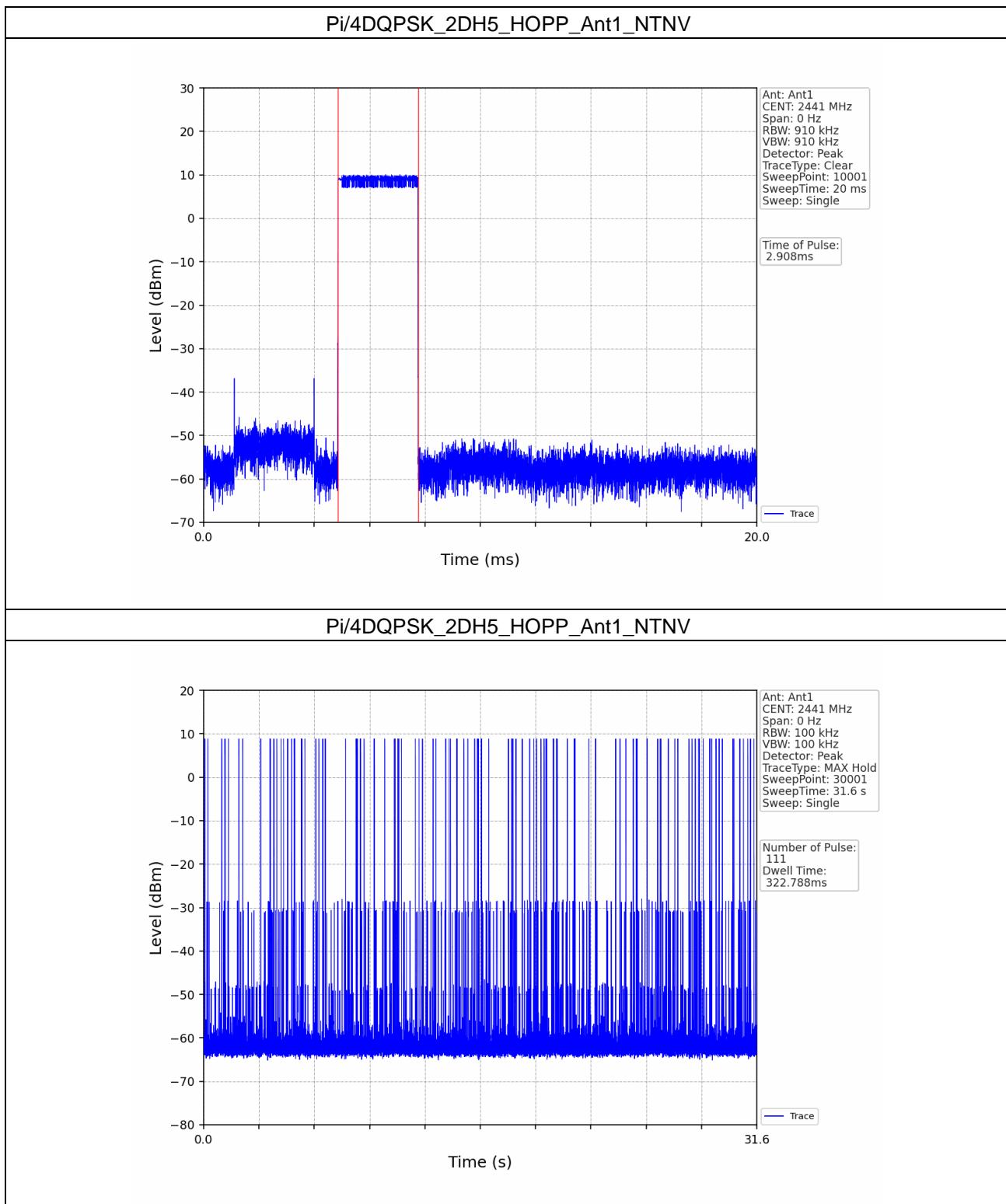
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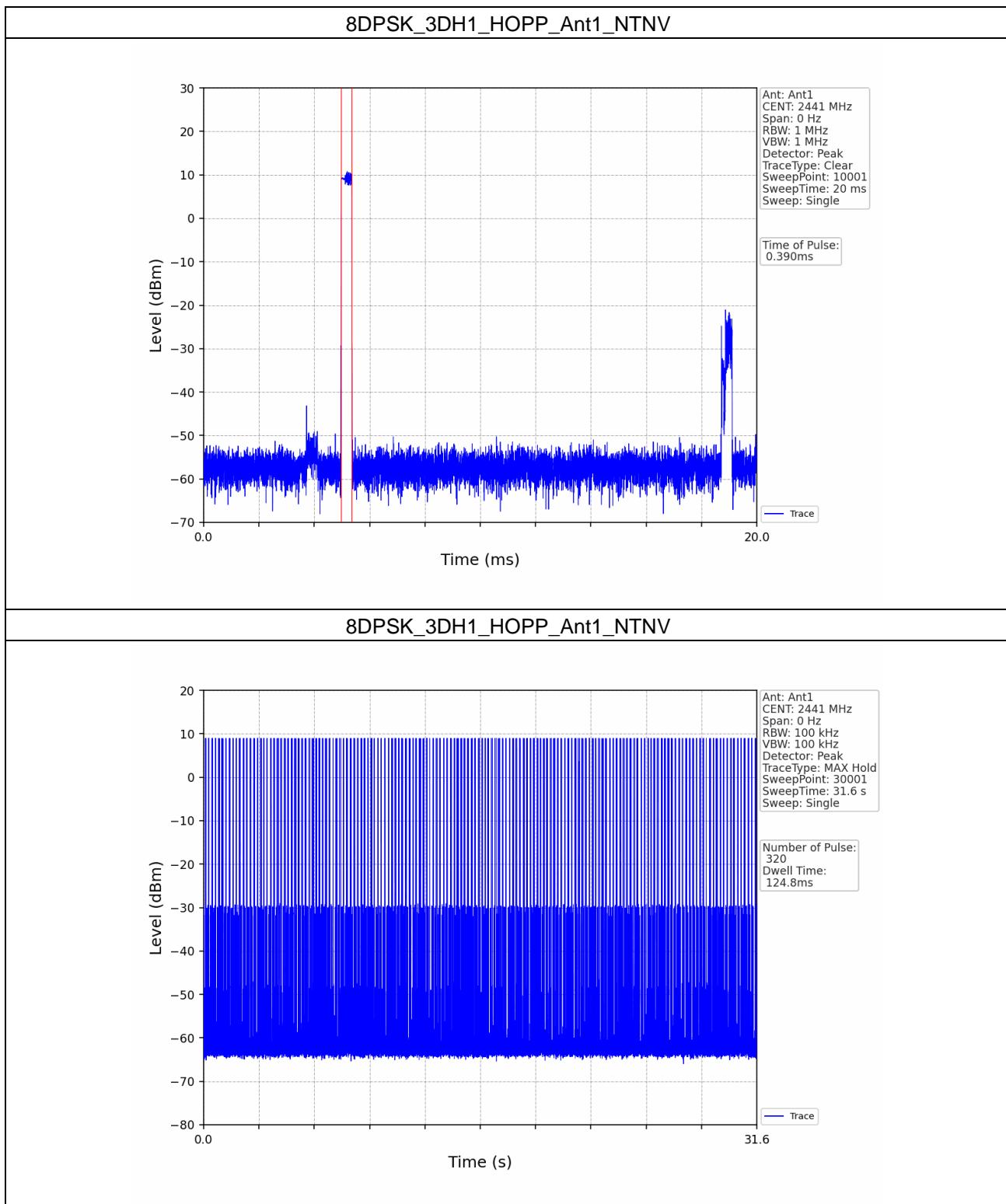
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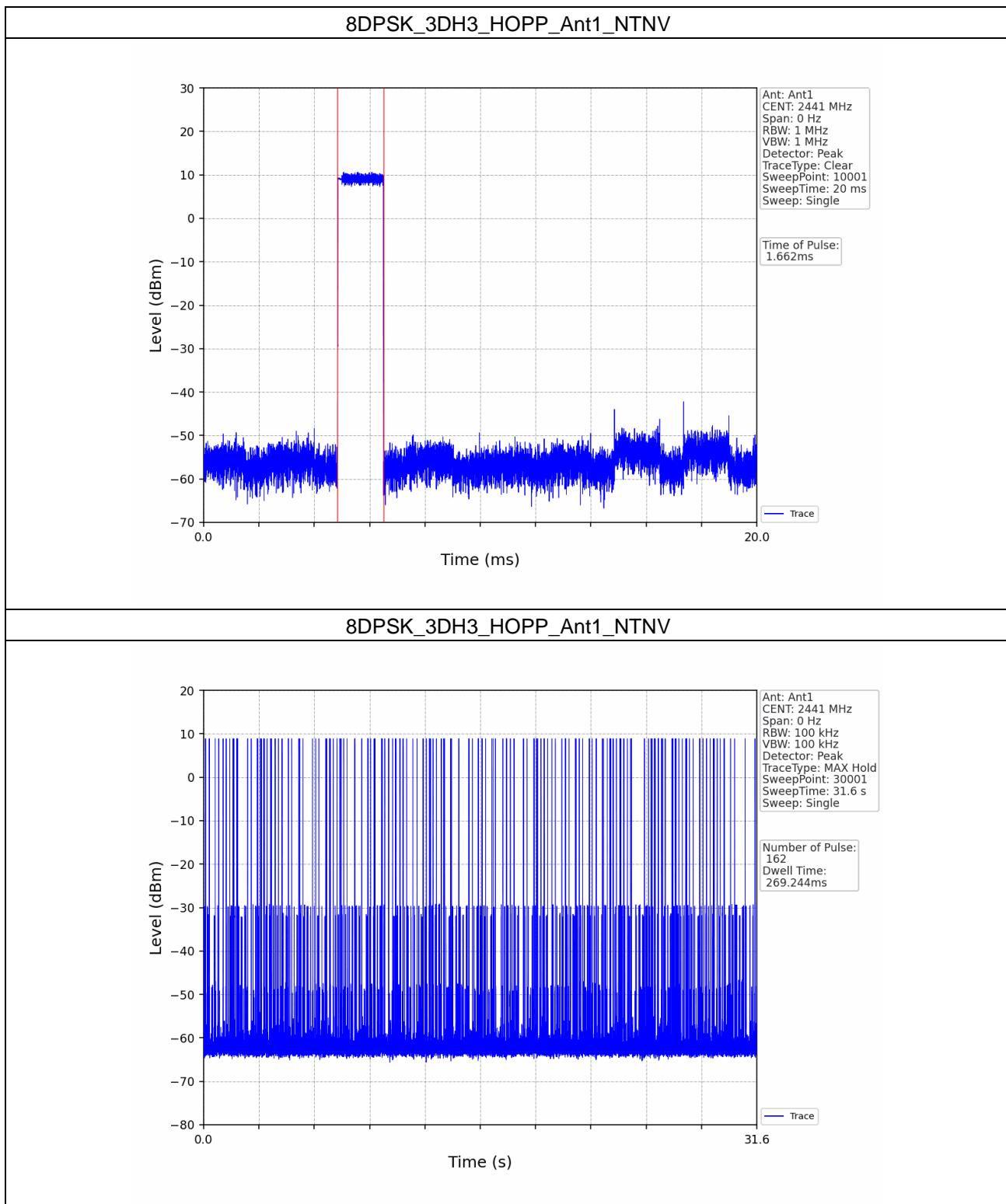
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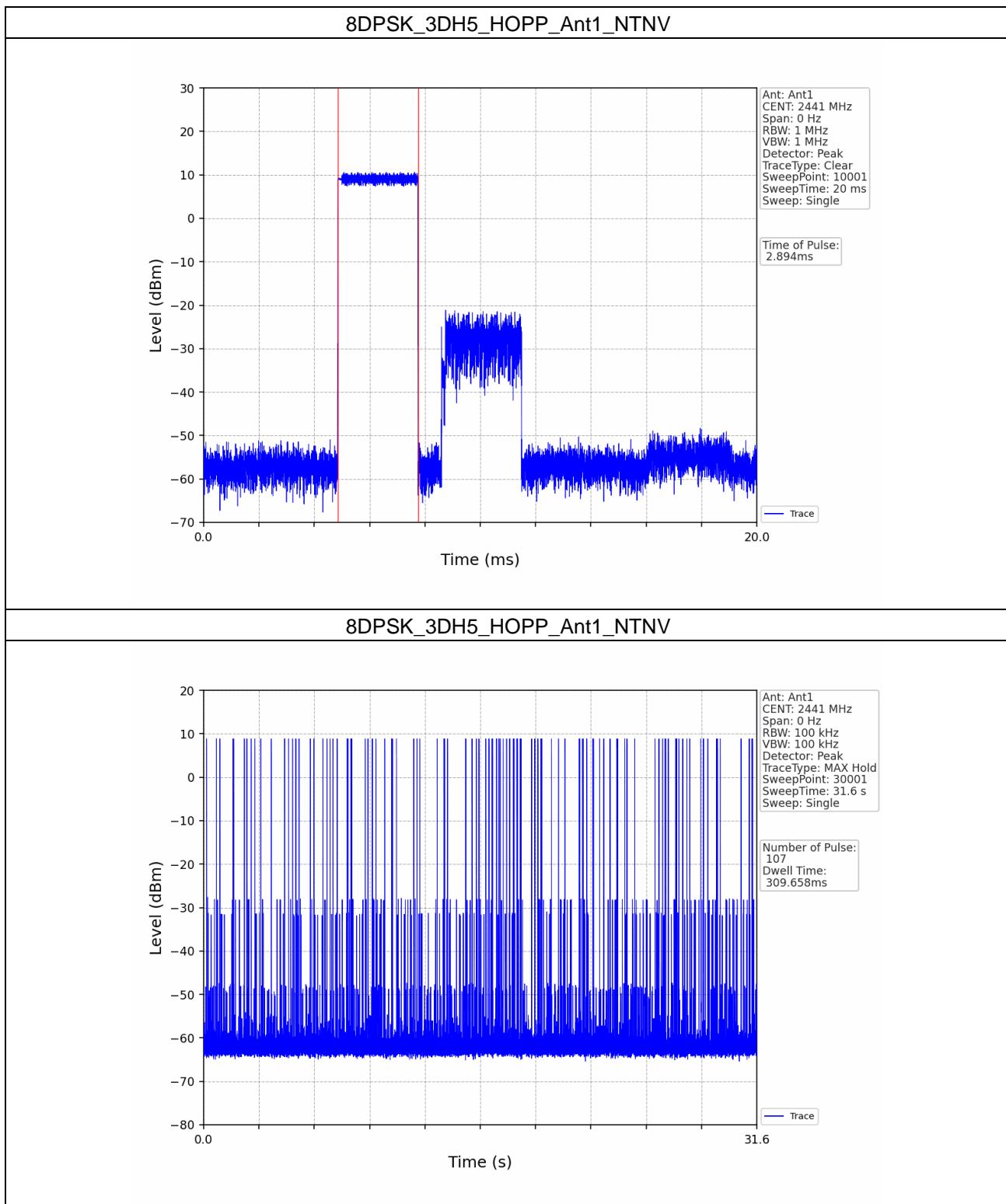
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## 6. Unwanted Emissions In Non-restricted Frequency Bands

### 6.1 Ref

#### 6.1.1 Test Result

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)
GFSK	SISO	2402	DH5	1	<b>12.52</b>
		2441	DH5	1	12.15
		2480	DH5	1	12.16
Pi/4DQPSK	SISO	2402	2DH5	1	10.64
		2441	2DH5	1	9.03
		2480	2DH5	1	<b>10.70</b>
8DPSK	SISO	2402	3DH5	1	<b>10.68</b>
		2441	3DH5	1	9.03
		2480	3DH5	1	10.66

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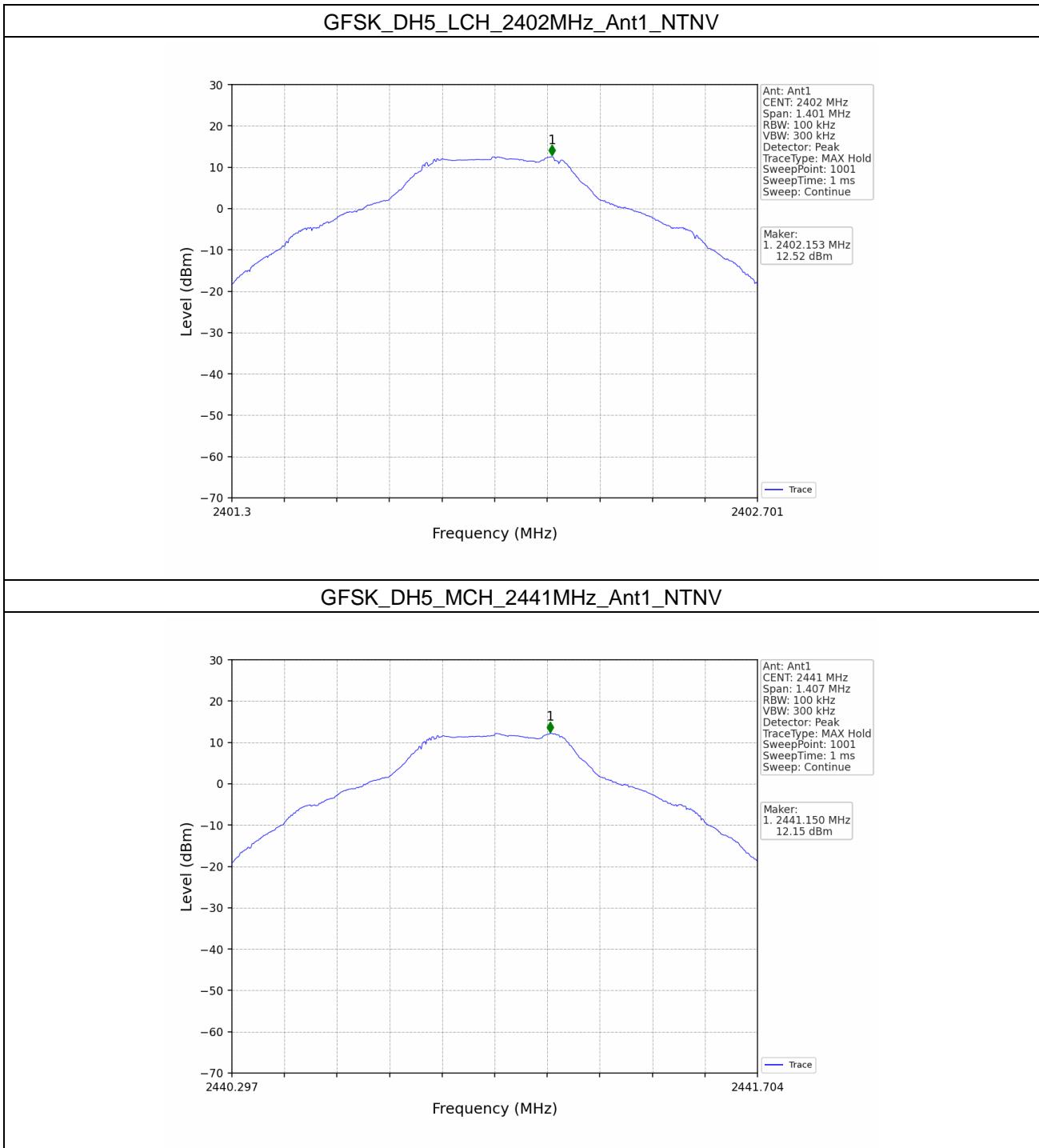


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**6.1.2 Test Graph**

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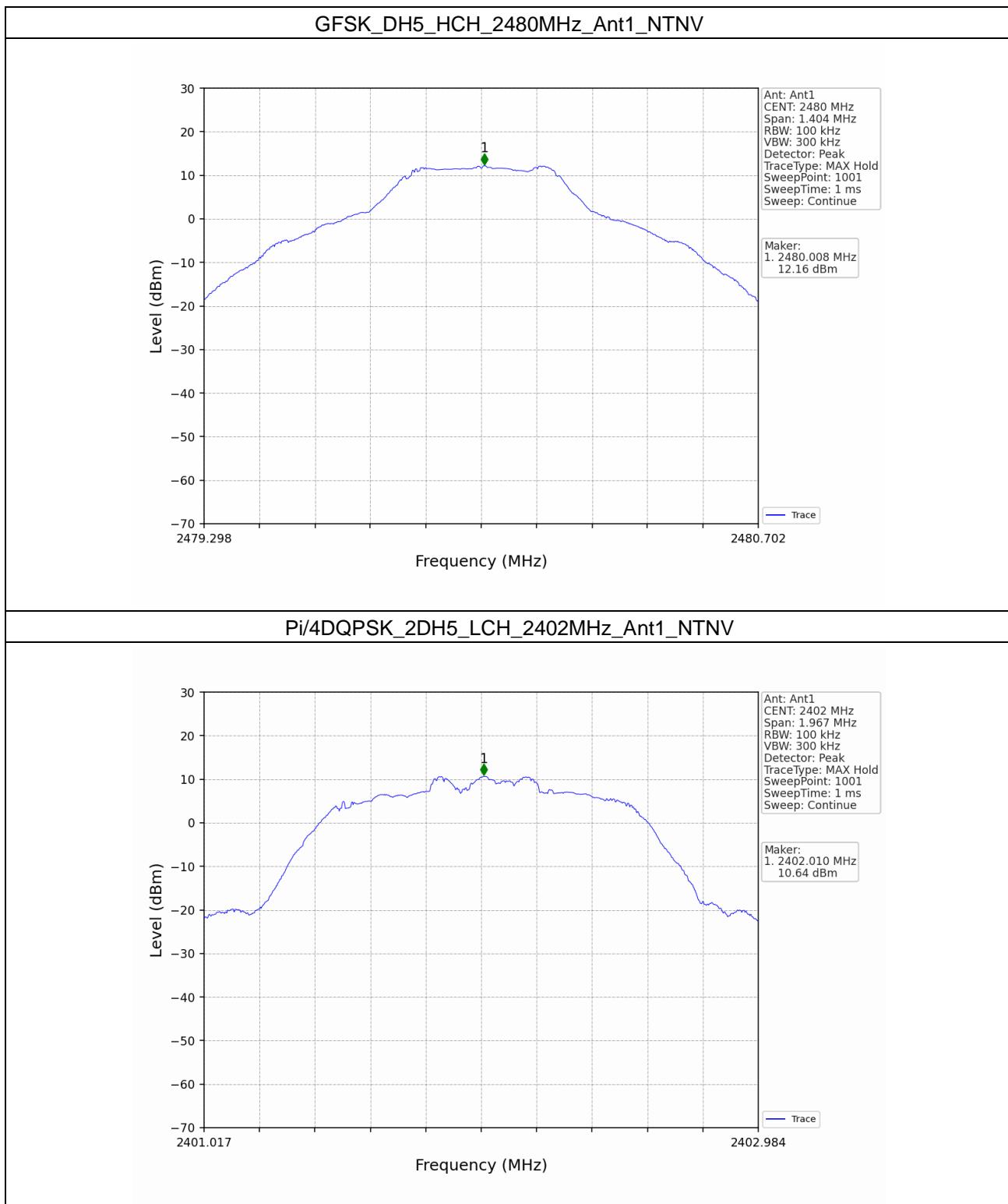
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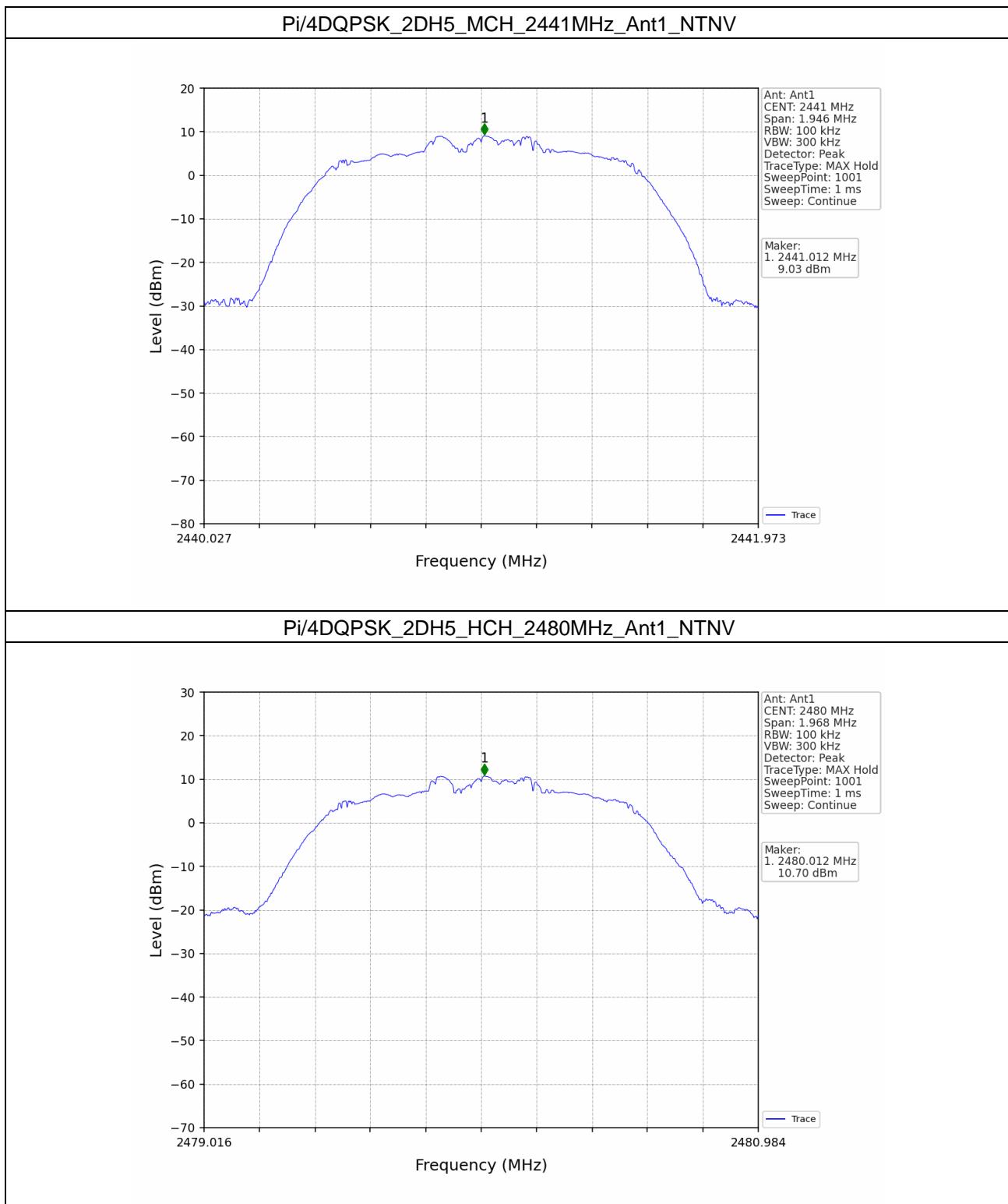
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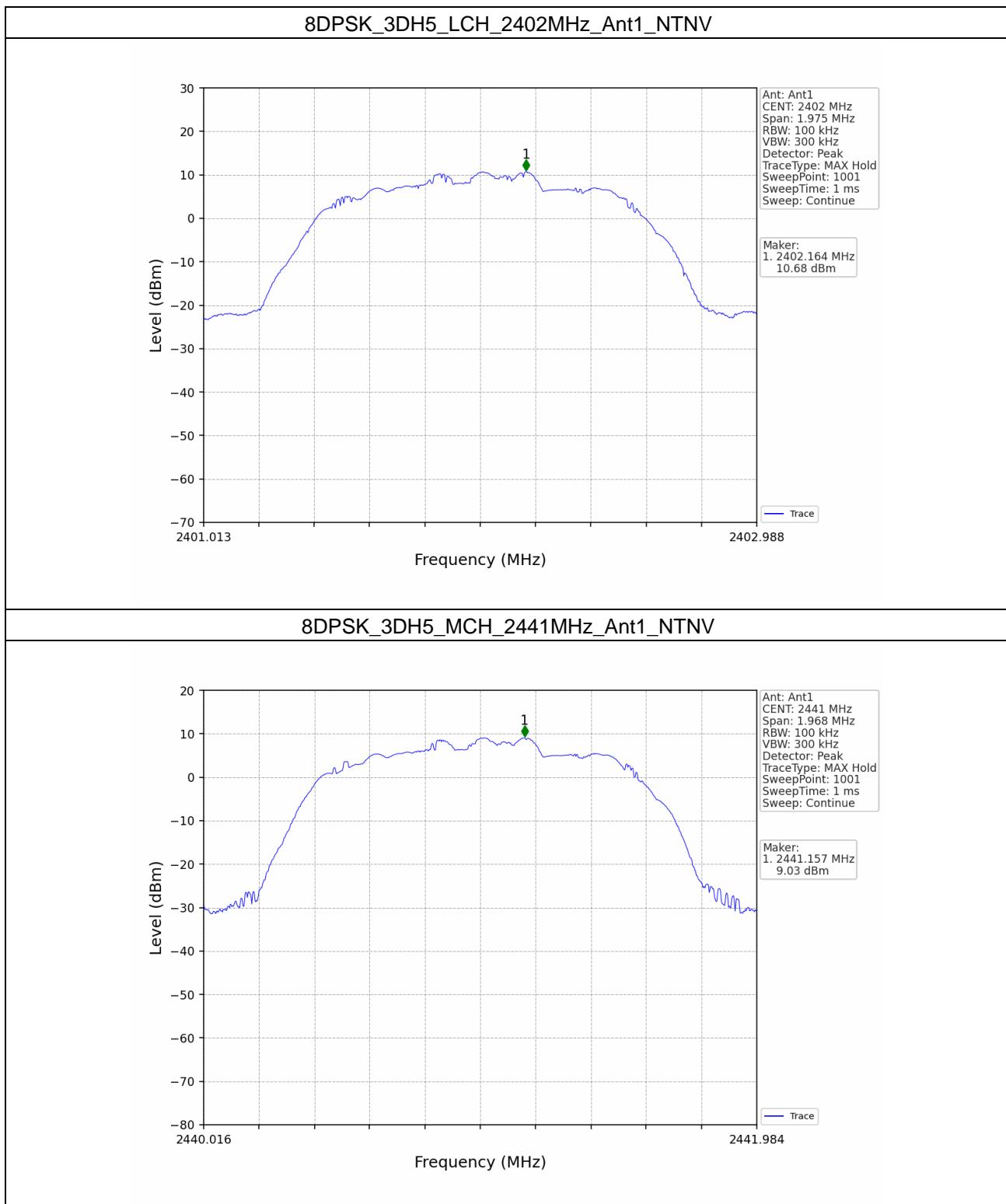
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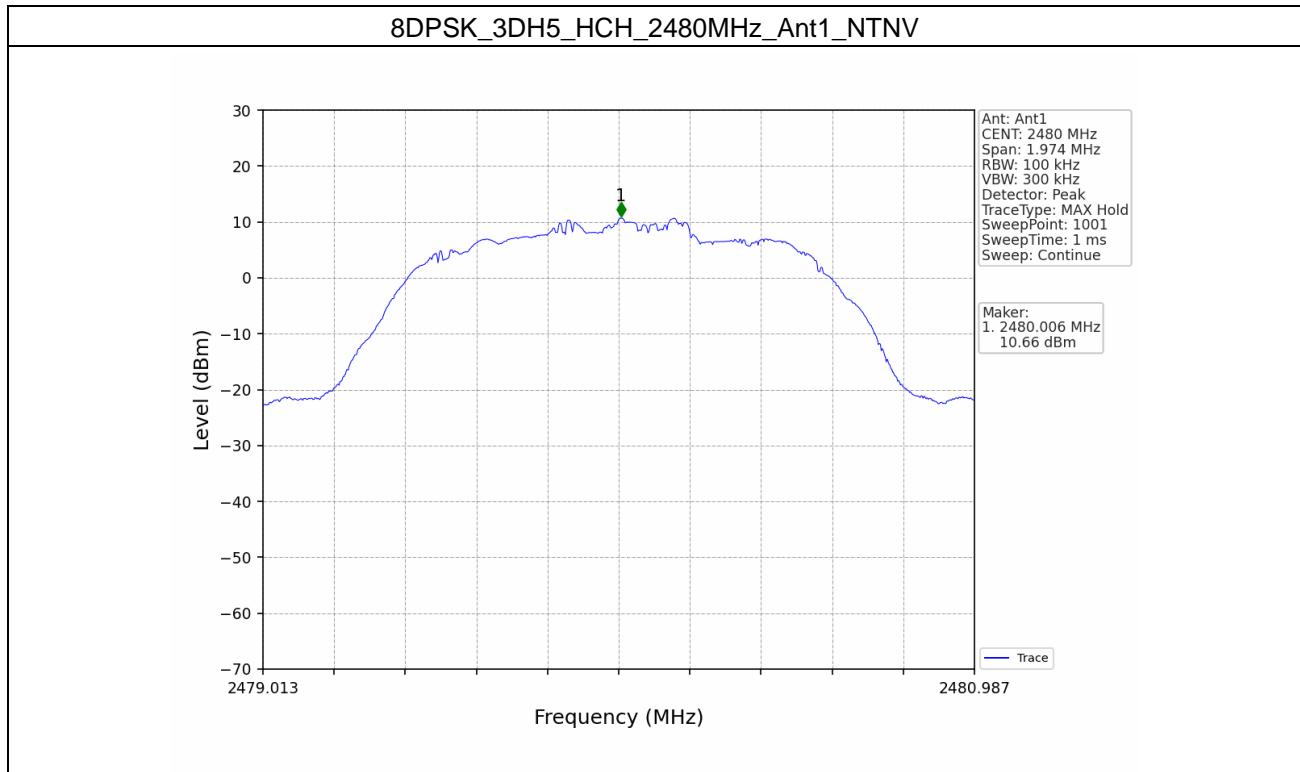
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## 6.2 CSE

## 6.2.1 Test Result

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
GFSK	SISO	2402	DH5	1	12.52	-7.48	Pass
		2441	DH5	1	12.52	-7.48	Pass
		2480	DH5	1	12.52	-7.48	Pass
		HOPP	DH5	1	12.52	-7.48	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	10.70	-9.30	Pass
		2441	2DH5	1	10.70	-9.30	Pass
		2480	2DH5	1	10.70	-9.30	Pass
		HOPP	2DH5	1	10.70	-9.30	Pass
8DPSK	SISO	2402	3DH5	1	10.68	-9.32	Pass
		2441	3DH5	1	10.68	-9.32	Pass
		2480	3DH5	1	10.68	-9.32	Pass
		HOPP	3DH5	1	10.68	-9.32	Pass

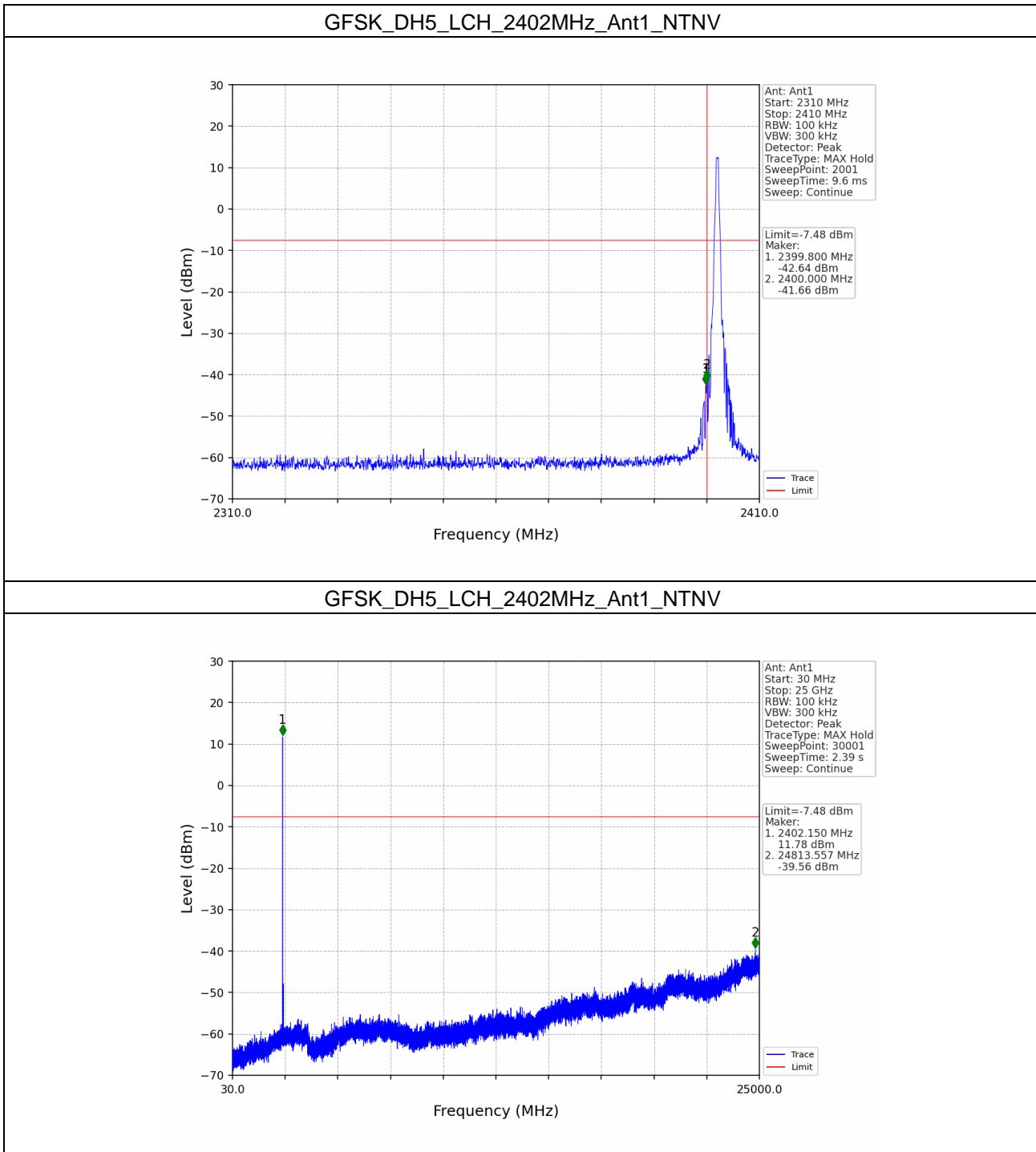
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**6.2.2 Test Graph**

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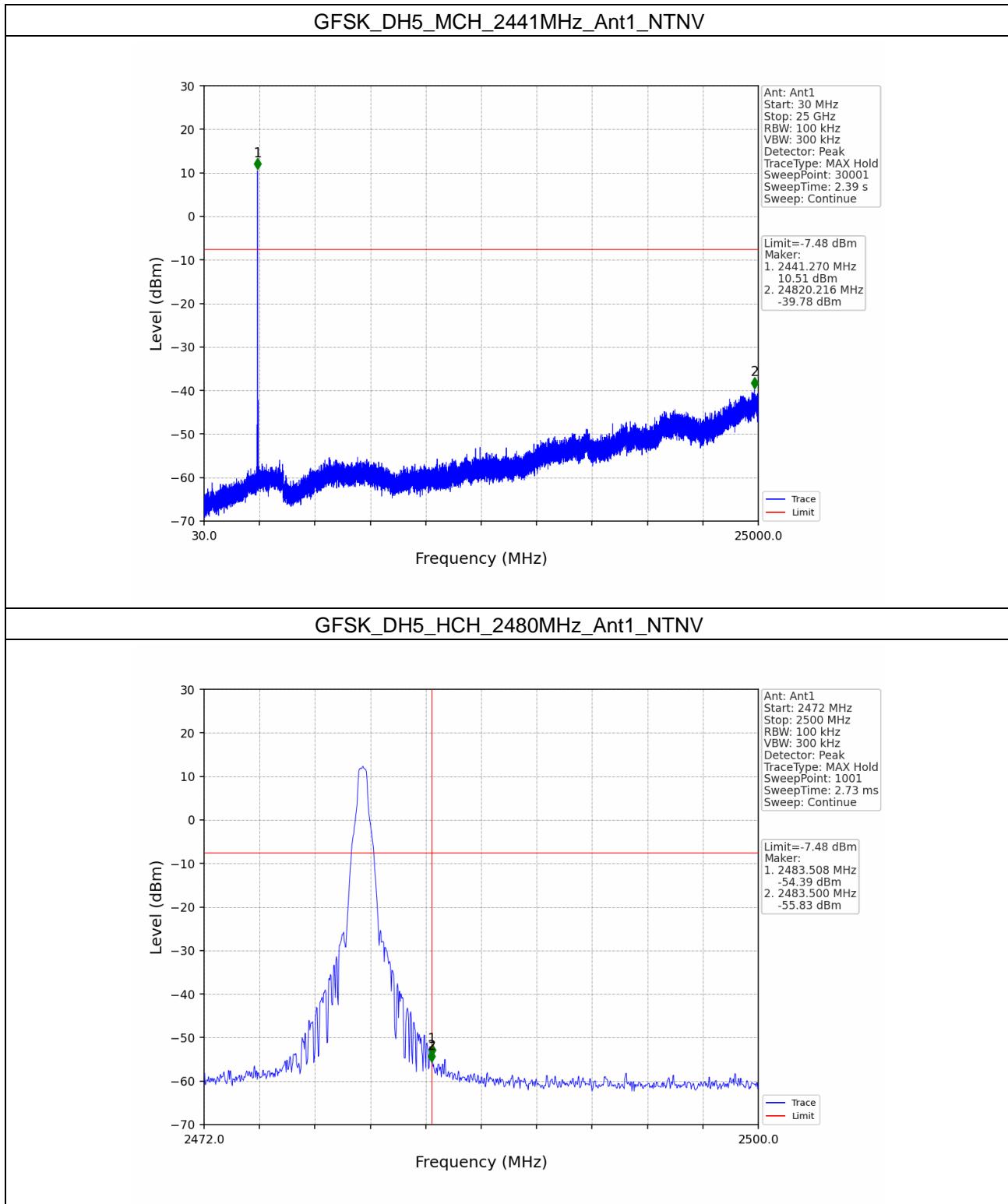
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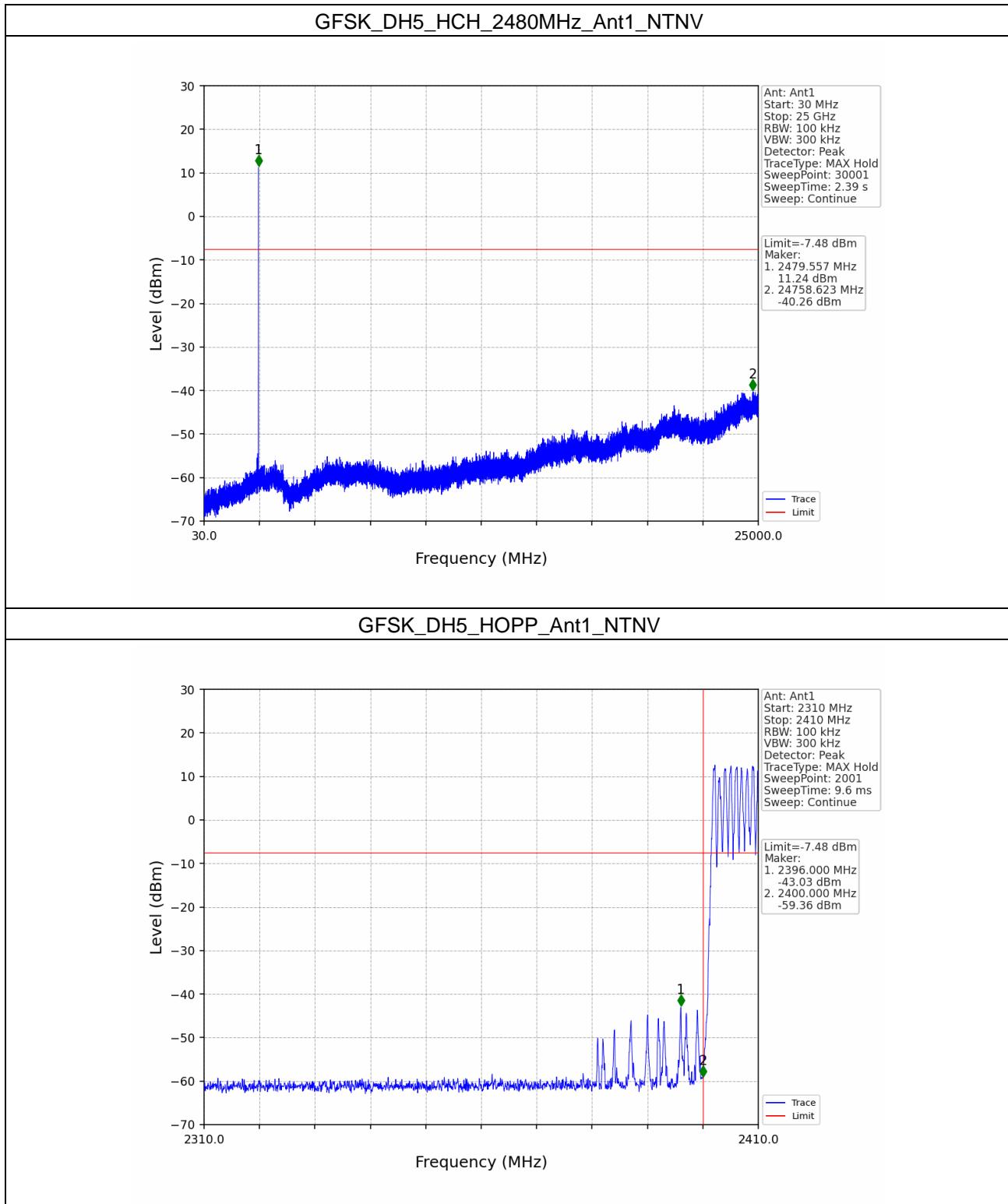
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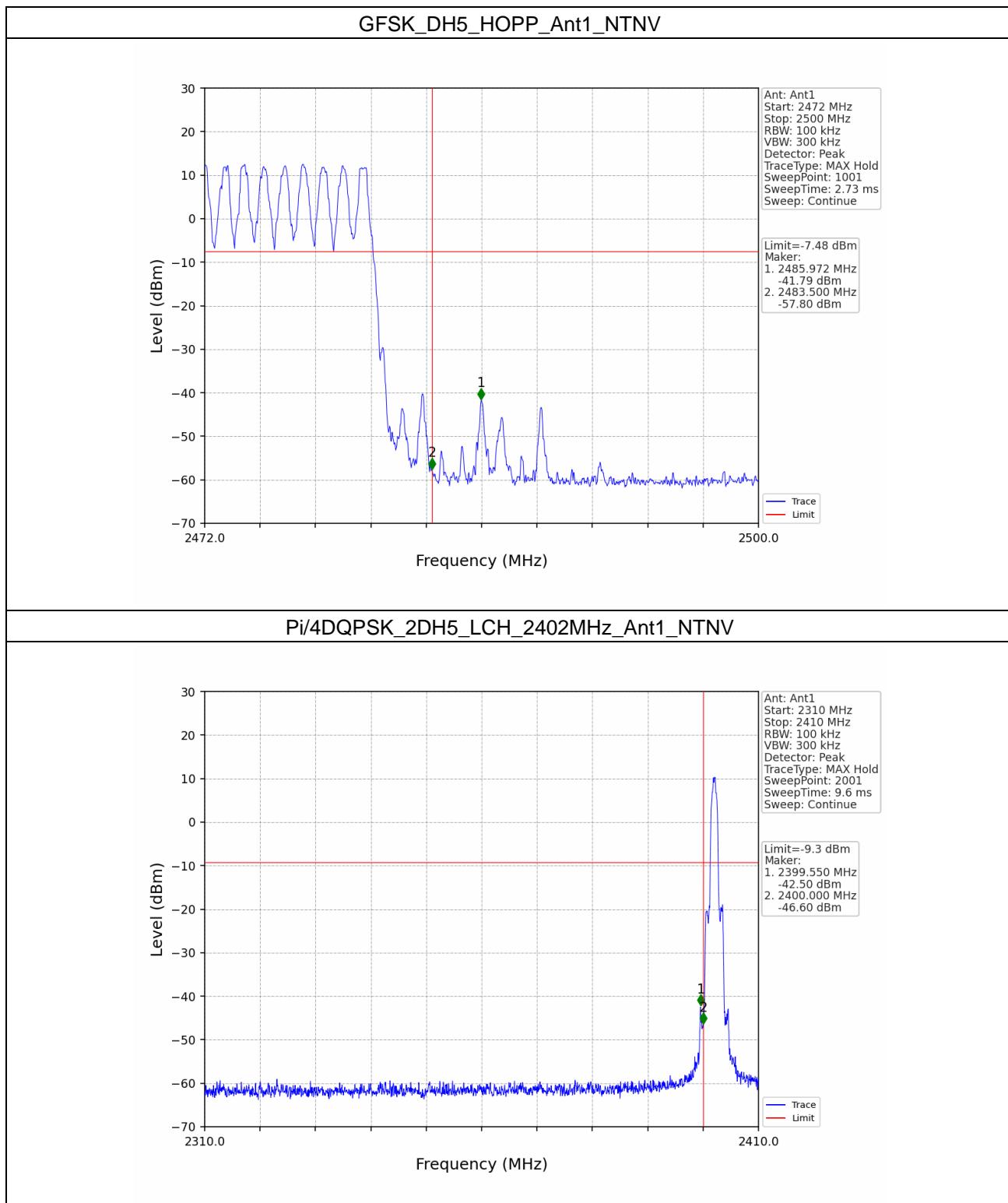
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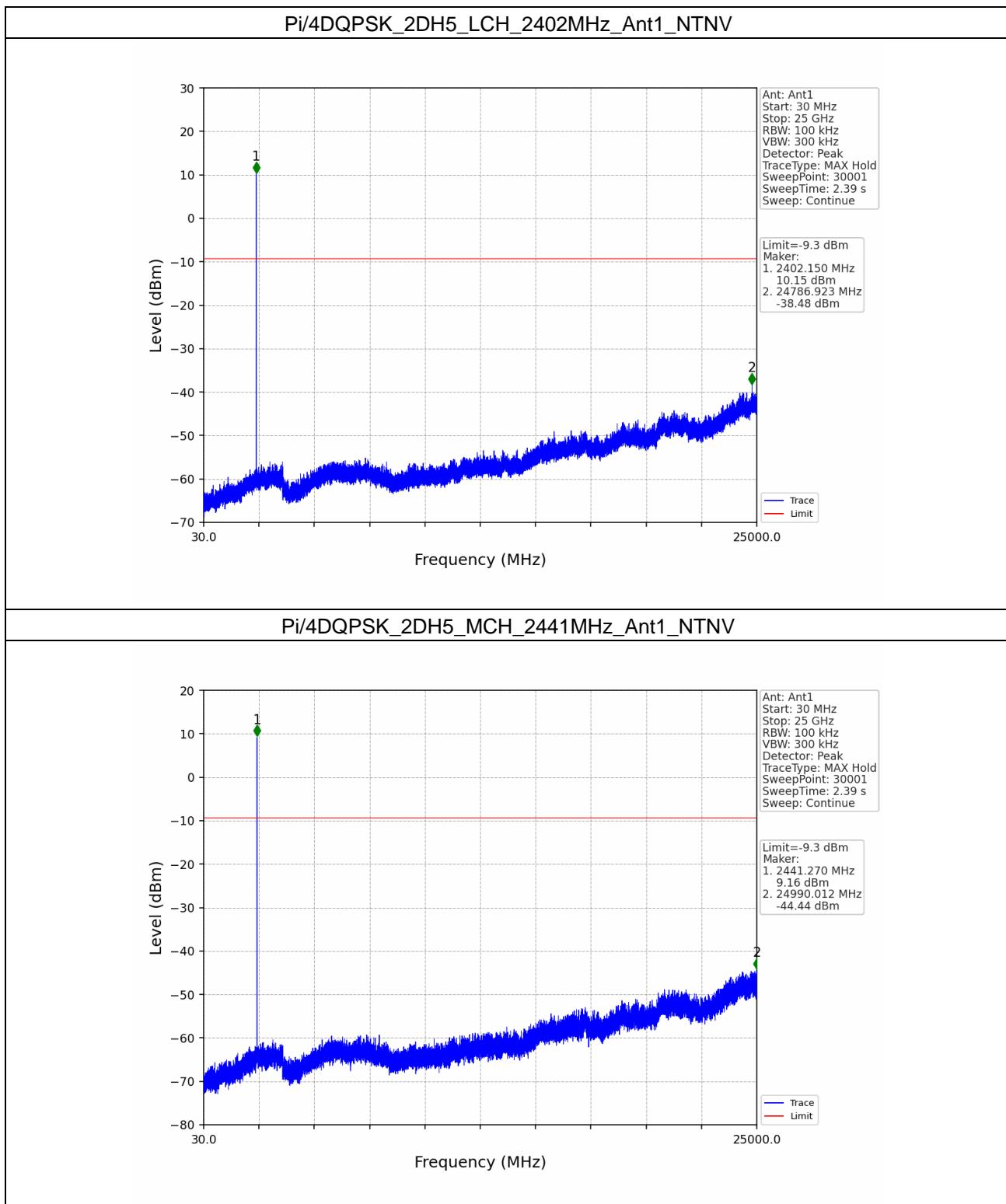
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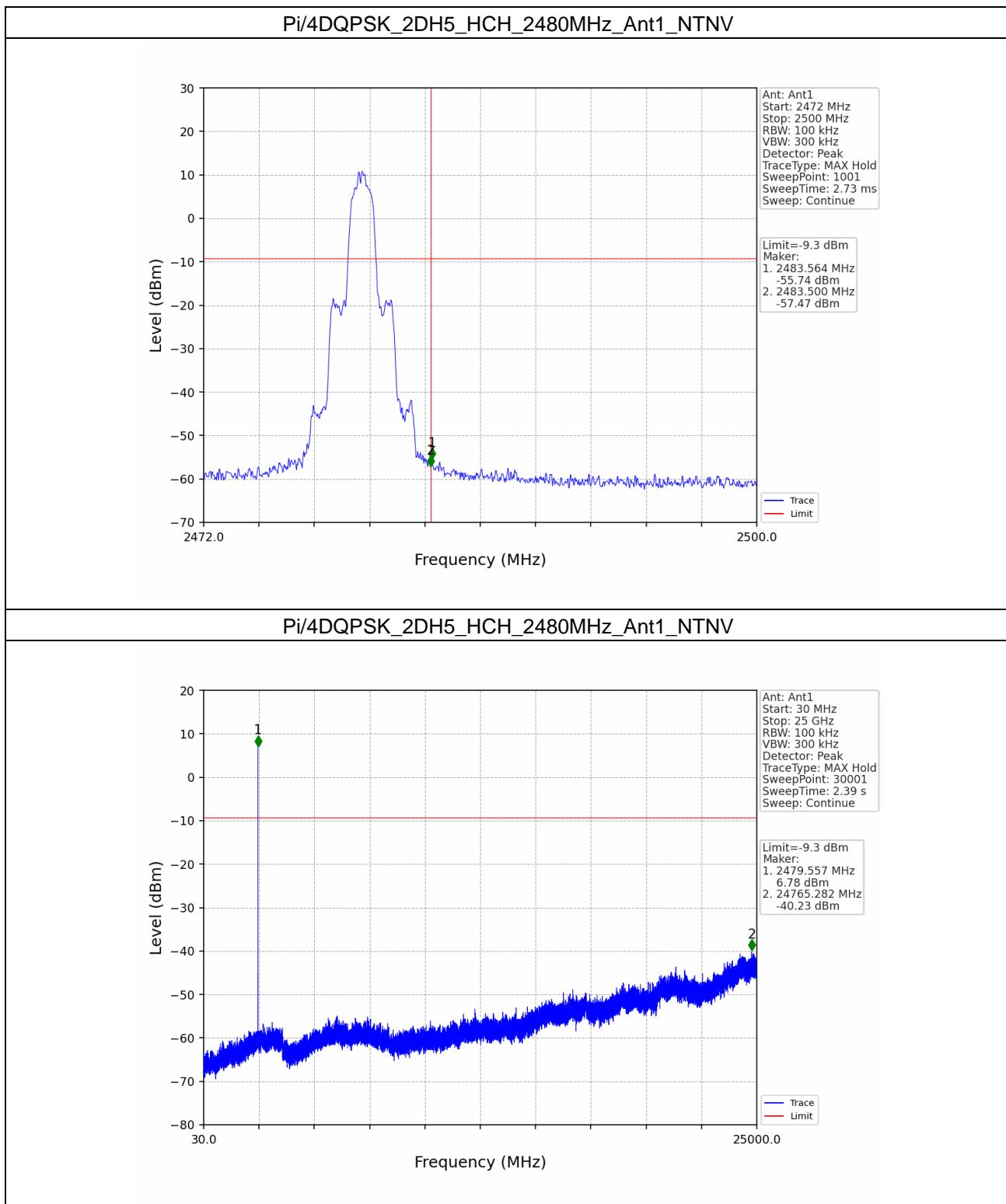
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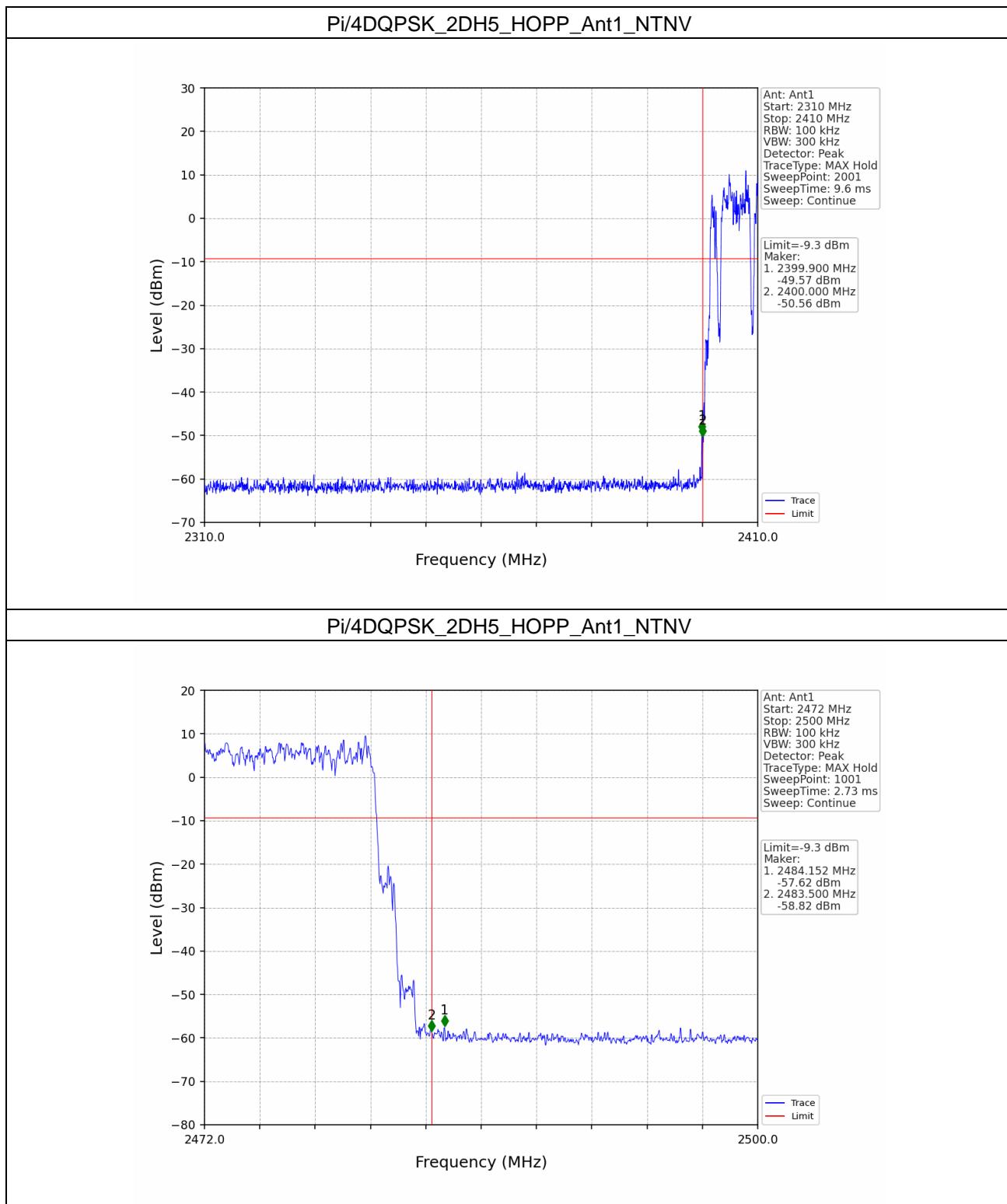
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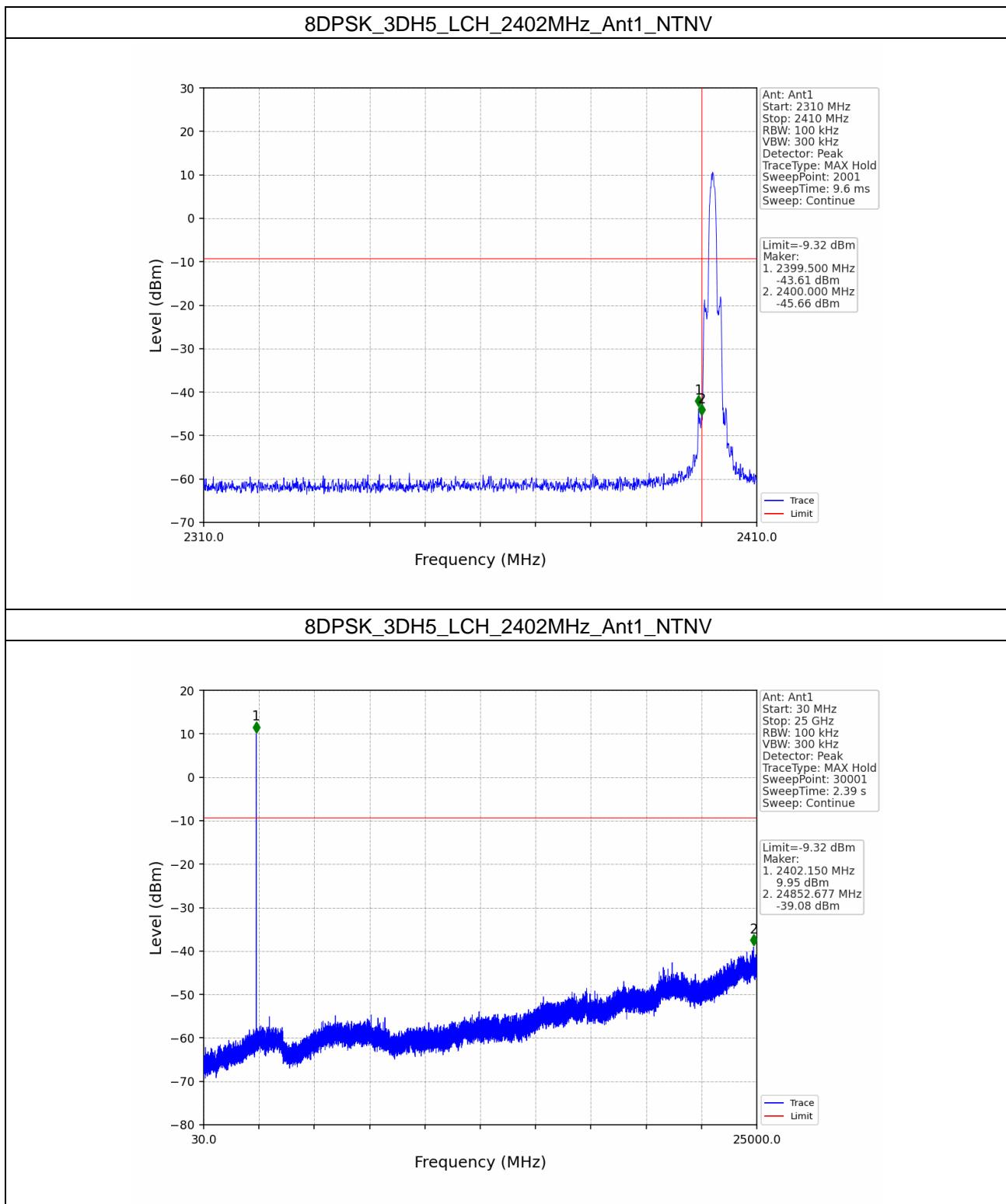
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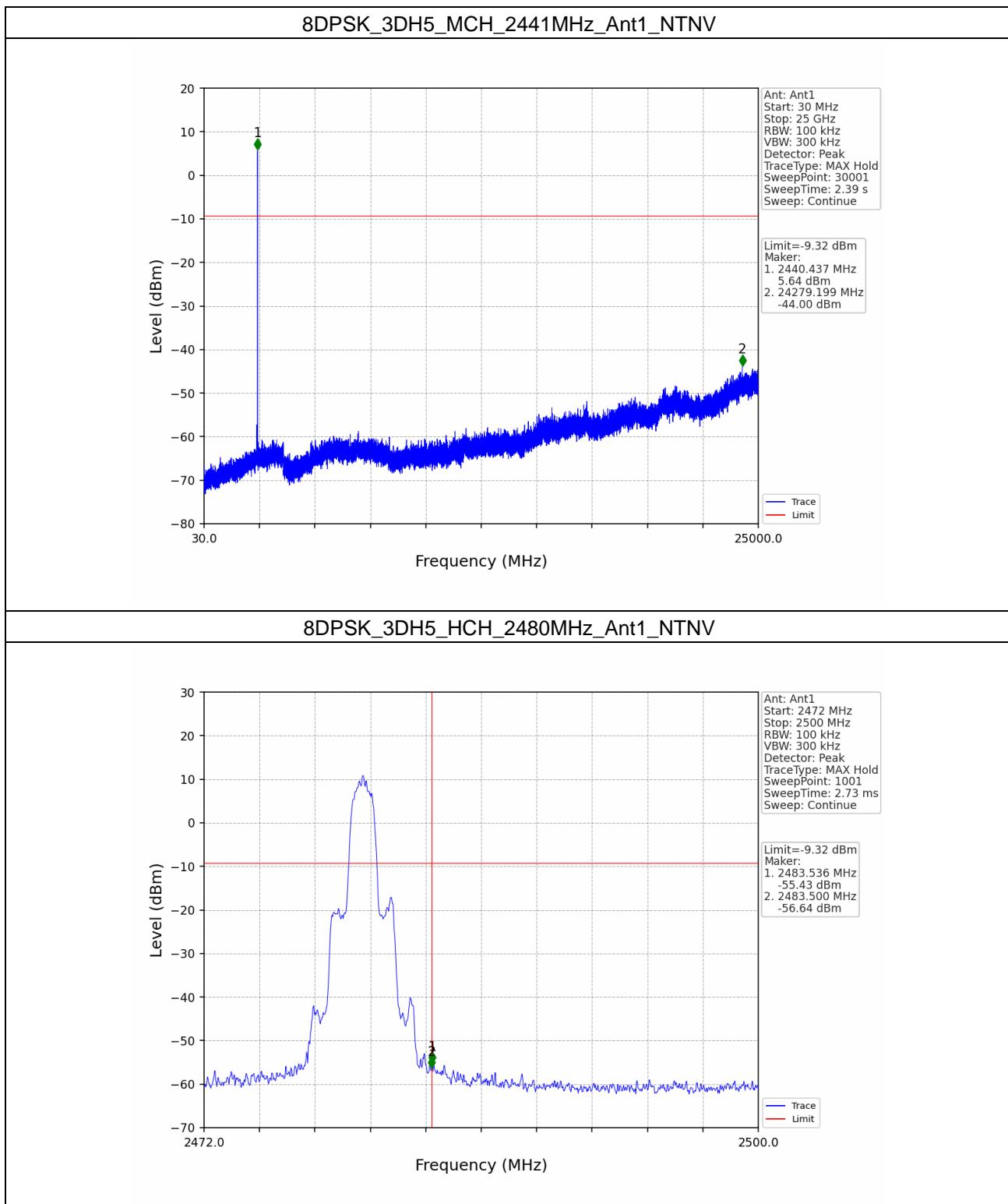
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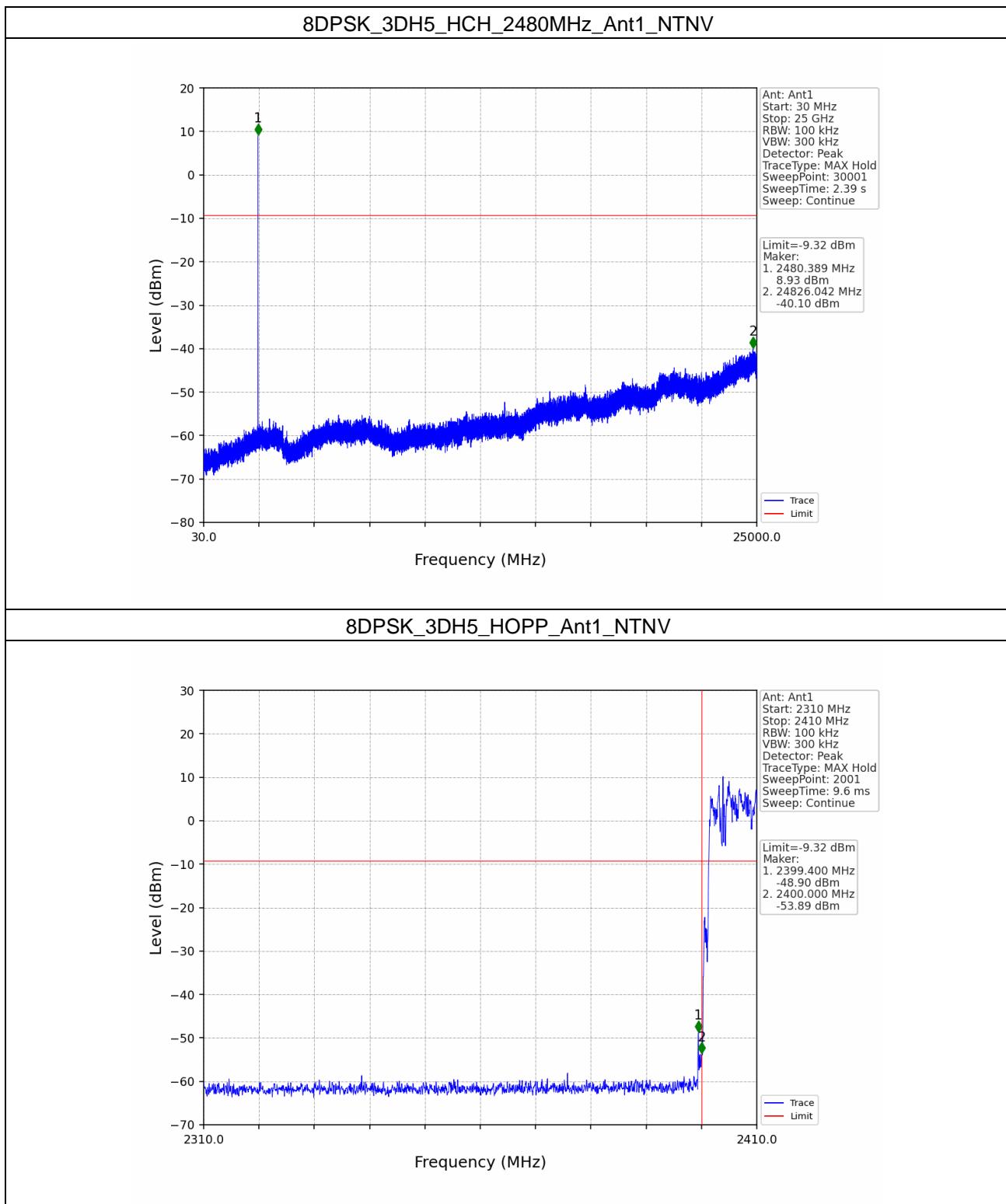
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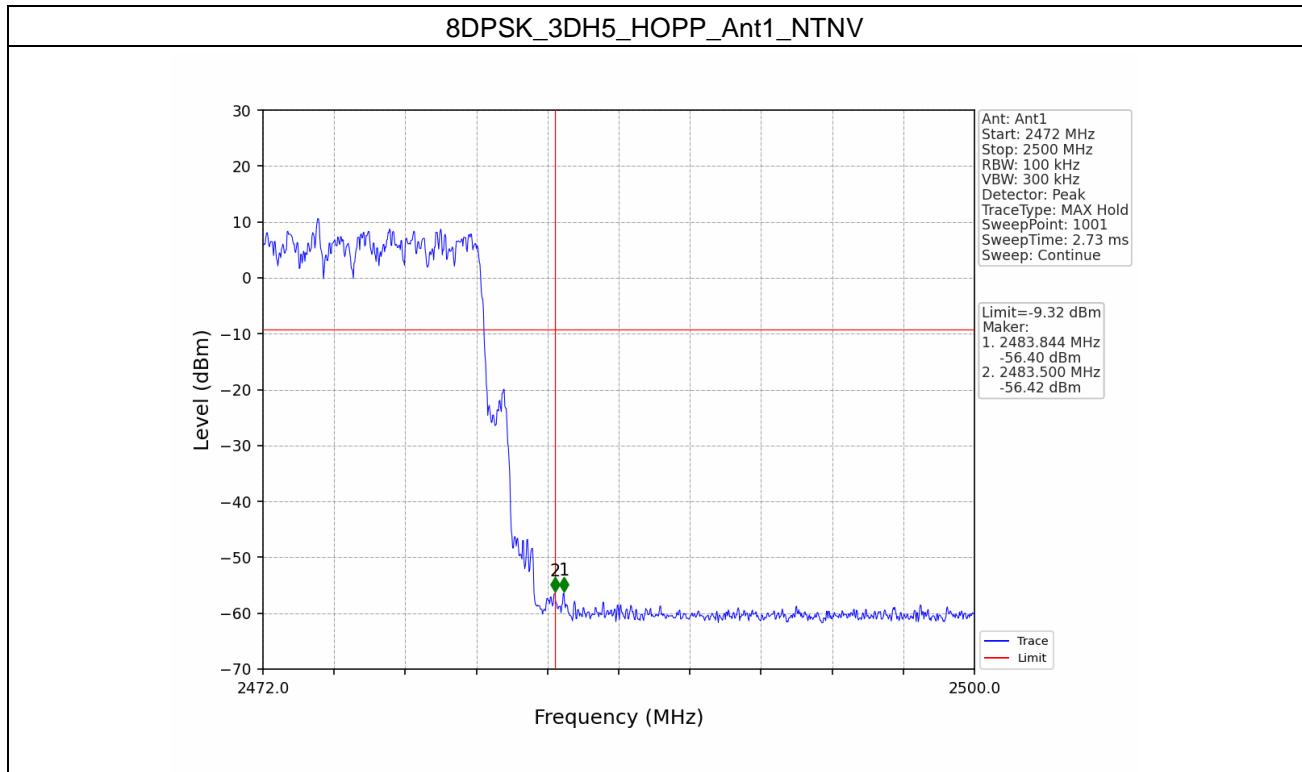


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