

SZEMC-TRF-01 Rev. A/1 Report No.: SZCR241100433602

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# TEST REPORT

**Application No.:** SZCR2411004336AT

Applicant: Fujian Newland Payment Technology Co.,Ltd.

**Address of Applicant:** No. B602, Building #1, Haixia Jingmao Plaza, Fuzhou Bonded Area 350015,

Fujian, China

Manufacturer: Fujian Newland Payment Technology Co.,Ltd.

Address of Manufacturer: No. B602, Building #1, Haixia Jingmao Plaza, Fuzhou Bonded Area 350015,

Fujian, China

**Equipment Under Test (EUT):** 

**EUT Description: POS Terminal** 

Model No.: N950S Trade Mark: Newland

FCC ID: 2AM6U-NA950SU

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

**Date of Receipt:** 2024-11-20

2024-11-26 to 2024-12-03 Date of Test:

Date of Issue: 2024-12-12

Test Result: Pass\*

Keny Xu **EMC Laboratory Manager** 

Ceny. Ku



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<sup>\*</sup> In the configuration tested, the EUT complied with the standards specified above.



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	Revision Record					
Version	Chapter	Date	Modifier	Remark		
01		2024-12-12		Original		

Authorized for issue by:		
	Dorjan. Huang	
	Donjon Huang/Project Engineer	
	Exic Fu	
	Eric Fu/Reviewer	



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#### **Test Summary** 2

Item	Standard	Method	Requirement	Result
Antenna Requirement		N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)	Pass
Other requirements Frequency Hopping Spread Spectrum System Hopping Sequence	47 CFR Part 15, Subpart C 15.247	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)		ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	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		
Conducted Peak Output Power	47 CFR Part 15,	ANSI C63.10 (2013) Section 7.8.5	47 CFR Part 15, Subpart C 15.247(b)(1)	Pass		
20dB Bandwidth	Subpart C 15.247	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		



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### **General Information**

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

EUT Description:	POS Terminal		
Model No.:	N950S		
Trade Mark:	Newland		
Hardware Version:	V1.0		
Software Version:	NDroid 6		
Power Supply:	DC 7.2V from internal rechargeable battery		
Operation Frequency:	2400MHz~2483.5MHz fc = 2402 MHz + N * 1 MHz, where: -fc = "Operating Frequency" in MHz, -N = "Channel Number" with the range from 0 to 78.		
Bluetooth version:	Bluetooth V5.0		
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)		
Modulation Type:	GFSK, π/4DQPSK, 8DPSK		
Number of Channel:	79		
Hopping Channel Type:	Adaptive Frequency Hopping systems		
Antenna Type:	☐ External, ⊠ Integrated		
	1.16dBi		
Antenna Gain:	Note:		
7 unomia Gain.	The antenna gain are derived from the gain information report provided by the manufacturer.		
RF Cable:	2000MHz ~ 3000MHz (1.1dB)		
Remark: As above information is provisuitability, reliability or/and in	ded and confirmed by the applicant. SGS is not liable to the accuracy, tegrity of the information		



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### 4.2 Environment Parameter

Environment Parameter		1020 mbar Selected Values During Tests		
Relative Humidity		31.1-62.2 % RH Ambient		
Value		Temperature(°C)	Voltage(V)	
NTNV		20~25	7.2	
LTLV		-10	6.2	
LTHV		-10	8.4	
HTLV		50	6.2	
HTHV		50	8.4	
Note:				
NV:Normal Voltage	LV:Low Extreme Test Vo	ltage HV:High E	xtreme Test Voltage	

NT:Normal Temperature LT:Low Extreme Test Temperature HT:High Extreme Test Temperature

### 4.3 Measurement Uncertainty

Test Item	Measurement Uncertainty
Conducted Emissions at AC Power Line (150kHz-30MHz)	± 3.1dB
Radiated Emissions which fall in the restricted bands	± 6.0dB (Below 1GHz);± 4.6dB (Above 1GHz)
Radiated Spurious Emissions Below 1GHz	± 6.0dB for 3m; ± 5.0dB for 10m
Radiated Spurious Emissions Above 1GHz	± 4.6dB (1-18GHz);± 4.8dB (18- 40GHz)
Conducted Peak Output Power	± 0.75dB
20dB Bandwidth	± 3%
Carrier Frequencies Separation	± 7.25 x 10-8
Hopping Channel Number	± 7.25 x 10-8
Dwell Time	± 0.37%
Conducted Band Edges Measurement	± 0.75dB
Conducted Spurious Emissions	± 0.75dB

### Remark:

The U<sub>lab</sub> (lab Uncertainty) is less than U<sub>cispr/ETSI</sub> (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:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Nanshan District, Shenzhen, Guangdong, China. 518057.

Tel: +86 755 2601 2053 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. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

### VCCI (Member No. 1937)

The 3m Fully-anechoic chamber for above 1GHz. 10m Semi-anechoic chamber for below 1GHz. Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen EMC laboratory have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

### • FCC -Designation Number: CN1336

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1336. Test Firm Registration Number: 787754.

### Innovation, Science and Economic Development Canada

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

### 4.6 Deviation from Standards

None

#### 4.7 Abnormalities from Standard Conditions

None



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#### 5 **Equipment List**

Conducted Emissions at AC Power Line (150kHz-30MHz)						
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date	
Shielding Room	ZhongYu Electron	GB-88	SEM001-06	2022-05-14	2025-05-13	
EMI Test Receiver	Rohde&Schwarz	ESR	SZ-WRG-M-047	2024-01-30	2025-01-29	
Measurement Software	AUDIX	e3 V8.2014- 6-27a	N/A	N/A	N/A	
Coaxial Cable	SGS	N/A	SEM024-01	2024-07-06	2025-07-05	
LISN	Rohde&Schwarz	ENV216	SEM007-01	2024-08-15	2025-08-14	
LISN	ETS-LINDGREN	3816/2	SEM007-02	2024-03-14	2025-03-13	

Radiated Emissions which fall in the restricted bands						
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date	
3m Fully-Anechoic Chamber	AUDIX	N/A	SEM001-02	2024-05-11	2027-05-10	
Signal Analyzer	Rohde & Schwarz	FSV40	SEM008-04	2024-03-15	2025-03-14	
Horn Antenna	Rohde&Schwarz	HF907	SEM003-07	2023-07-23	2025-07-22	
Microwave system amplifier	Agilent	83017A	SEM005-25	2024-09-14	2025-09-13	
Measurement Software	AUDIX	e3 V8.2014-6- 27	N/A	N/A	N/A	
Coaxial Cable	SGS	N/A	SEM026-01	2024-07-06	2025-07-05	
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	SEM003-15	2024-08-10	2025-08-09	
Pre-Amplifier	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2024-03-15	2025-03-14	

Radiated Spurious Emissions Below 1GHz											
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date						
Loop Antenna	ETS-Lindgren	6502	SEM003-08	2023-11-20	2025-11-19						
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2023-06-19	2026-06-18						
MXE EMI Receiver	Agilent Technologies	N9038A	SEM004-15	2024-08-14	2025-08-13						
BiConiLog Antenna	ETS-LINDGREN	3142C	SEM003-01	2023-09-16	2025-09-15						
Pre-Amplifier	Agilent Technologies	8447D	SEM005-01	2024-03-14	2025-03-13						
Measurement Software	AUDIX	e3 V8.2014-6- 27	N/A	N/A	N/A						
Coaxial Cable	SGS	N/A	SEM025-01	2024-07-06	2025-07-05						



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Radiated Spurious Emissions Above 1GHz										
Radiated Spurious Emis	ssions Above 1GHz	1			1					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date					
3m Fully-Anechoic Chamber	AUDIX	N/A	N/A SEM001-02		2027-05-10					
Signal Analyzer	Rohde & Schwarz	FSV40	SEM008-04	2024-03-15	2025-03-14					
Horn Antenna	Rohde&Schwarz	HF907	SEM003-07	2023-07-23	2025-07-22					
Microwave system amplifier	Agilent	83017A	SEM005-25	2024-09-14	2025-09-13					
Measurement Software	AUDIX	e3 V8.2014-6- 27	N/A	N/A	N/A					
Coaxial Cable	SGS	N/A	SEM026-01	2024-07-06	2025-07-05					
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	SEM003-15	2024-08-10	2025-08-09					
Pre-Amplifier	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2024-03-15	2025-03-14					

RF Conducted Test					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Power Sensor	TST PASS	TSPS2023R	SEM009-26	2024-03-27	2025-03-26
Power Sensor	KEYSIGHT	U2021XA	SEM009-16	2024-03-14	2025-03-13
DC Power Supply	Chroma	62012P-80-60	SEM011-11	2024-08-14	2025-08-13
MXA Signal Analyzer	KEYSIGHT	N9020A	N9020A SEM004-19		2025-03-13
Measurement Software	TST PASS	TST PASS V2.0	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-01	2024-07-06	2025-07-05
Attenuator	Huber+Suhner	6620_SMA-50- 1	SEM021-09	2024-03-27	2025-03-26

General used equipmen	t				
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Humidity/ Temperature Indicator	deli	8838	SEM002-32	2024-07-24	2025-07-23
Humidity/ Temperature Indicator	deli	8838	SEM002-33	2024-07-24	2025-07-23
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2024-03-18	2025-03-17



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# 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

15.203 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.

#### **EUT Antenna:**

The antenna is an Integrated Antenna, and the connection port is fixed with glue, and the antenna cannot be replaced.

The best-case gain of the antenna is 1.16dBi.\*

#### \*Note:

The antenna gain are derived from the gain information report provided by the manufacturer.

As above information is provided and confirmed by the applicant. SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.



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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: 29 -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 frequency system.

Compliance for section 15.247(h):



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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.



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#### **Radio Spectrum Matter Test Results** 7

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

47 CFR Part 15, Subpart C 15.207 Test Requirement Test Method: ANSI C63.10 (2013) Section 6.2

Limit:

Fraguency of emission/MU-)	Conducted limit(dBµV)							
Frequency of emission(MHz)	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	Detector: Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz							

### 7.1.1 E.U.T. Operation

Operating Environment:

22.5 °C Humidity: 44.5 % RH Atmospheric Pressure: 1020 mbar Temperature:

7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Charge + TX_non-Hop mode_Keep the EUT in charging and 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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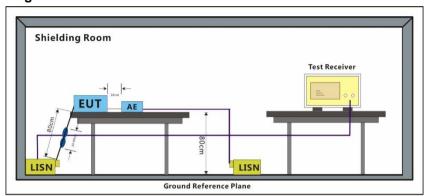
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#### 7.1.3 Test Setup Diagram



#### 7.1.4 Measurement Procedure and Data

- 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 50ohm/50uH + 5ohm 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: Level=Read Level+ Cable Loss+ LISN Factor



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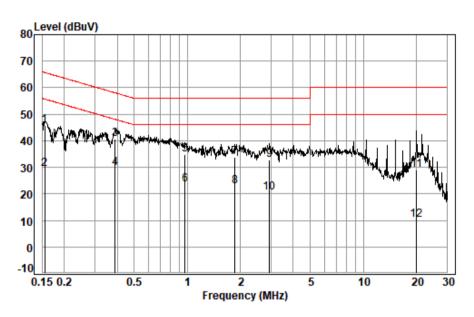


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Test Mode: 00; Line: Live line



: Shielding Room

Condition: Line Job No. : 04336AT

Test mode: 00

	Freq		Cable Freq Loss		Read Level	Level	Limit Line	Over Limit	Remark
	•	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1		0.1548	0.06	10.19	35.45	45.70	65.74	-20.04	QP
2		0.1548	0.06	10.19	18.95	29.20	55.74	-26.54	Average
3	*	0.3893	0.07	9.69	30.96	40.72	58.08	-17.36	QP
4	*	0.3893	0.07	9.69	20.06	29.82	48.08	-18.26	Average
5		0.9735	0.09	9.59	25.05	34.73	56.00	-21.27	QP
6		0.9735	0.09	9.59	13.83	23.51	46.00	-22.49	Average
7		1.8680	0.10	9.58	24.20	33.88	56.00	-22.12	QP
8		1.8680	0.10	9.58	13.28	22.96	46.00	-23.04	Average
9		2.9307	0.11	9.65	23.17	32.93	56.00	-23.07	QP
10		2.9307	0.11	9.65	10.82	20.58	46.00	-25.42	Average
11		20.0559	0.30	10.17	18.61	29.08	60.00	-30.92	QP
12		20.0559	0.30	10.17	-0.22	10.25	50.00	-39.75	Average



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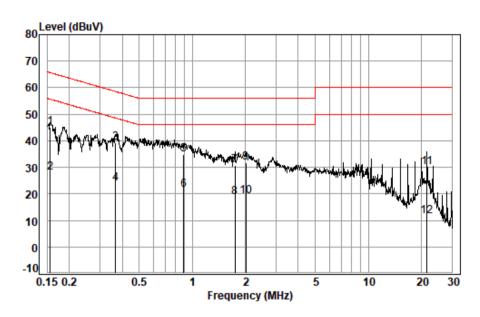


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Test Mode: 00; Line: Neutral Line



: Shielding Room

Condition: Neutral Job No. : 04336AT

Test mode: 00

	Freq		Cable Freq Loss		Read Level	Level	Limit Line	Over Limit	Remark
		MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1		0.1557	0.06	10.14	34.92	45.12	65.69	-20.57	QP
2		0.1557	0.06	10.14	17.63	27.83	55.69	-27.86	Average
3	*	0.3673	0.07	9.75	29.50	39.32	58.56	-19.24	QP
4		0.3673	0.07	9.75	13.94	23.76	48.56	-24.80	Average
5		0.8944	0.09	9.57	25.06	34.72	56.00	-21.28	QP
6	*	0.8944	0.09	9.57	11.70	21.36	46.00	-24.64	Average
7		1.7529	0.10	9.55	21.21	30.86	56.00	-25.14	QP
8		1.7529	0.10	9.55	9.19	18.84	46.00	-27.16	Average
9		2.0225	0.10	9.55	22.17	31.82	56.00	-24.18	QP
10		2.0225	0.10	9.55	9.48	19.13	46.00	-26.87	Average
11		21.6002	0.31	10.25	19.59	30.15	60.00	-29.85	QP
12		21.6002	0.31	10.25	1.16	11.72	50.00	-38.28	Average



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### 7.2 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

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.

### 7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 22.4 °C Humidity: 62.2 % RH Atmospheric Pressure: 1020 mbar

#### 7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Pre-scan	00	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	01	Charge + TX_non-Hop mode_Keep the EUT in charging and 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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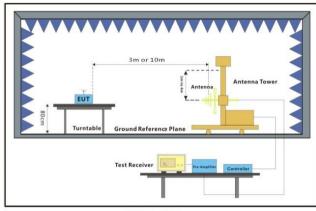


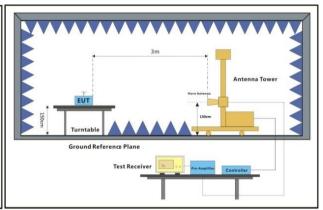
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### 7.2.3 Test Setup Diagram





30MHz-1GHz Above 1GHz



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#### 7.2.4 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 middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- i. 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.
- Remark 3: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for Peak detection (PK) and Average detection (AV) at frequency above 1GHz.

Remark 4:For fundamental and harmonic signal measurement, the resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ≥1/T (Duty cycle<98%) or 10Hz (Duty cycle≥98%) for Average detection (AV) at frequency above 1GHz.



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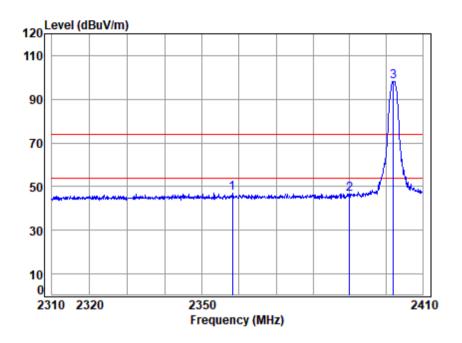


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Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:Low



Site : chamber

Condition: 3m HORIZONTAL : 04336AT\04337AT Mode : 2402 Band edge

: BT

	Freq			Preamp Factor					Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2358.171	15.79	29.10	32.80	34.80	46.89	74.00	-27.11	peak
2	2390.000	15.81	29.10	32.78	34.24	46.37	74.00	-27.63	peak
3	p 2402.000	15.82	29.09	32.77	86.18	98.32	74.00	24.32	peak



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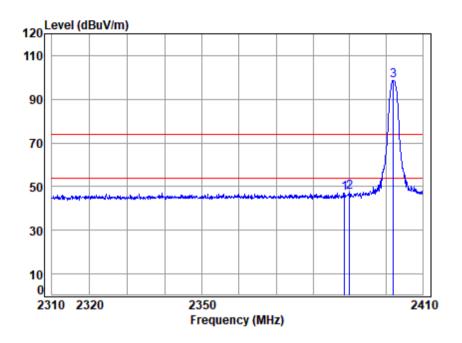


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Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:Low



Site : chamber

Condition: 3m VERTICAL

: 04336AT\04337AT Mode : 2402 Band edge

: BT

	Freq			Preamp Factor					Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2388.647	15.81	29.10	32.78	35.07	47.20	74.00	-26.80	peak
	2390.000								
3 p	2402.000	15.82	29.09	32.77	86.47	98.61	74.00	24.61	peak



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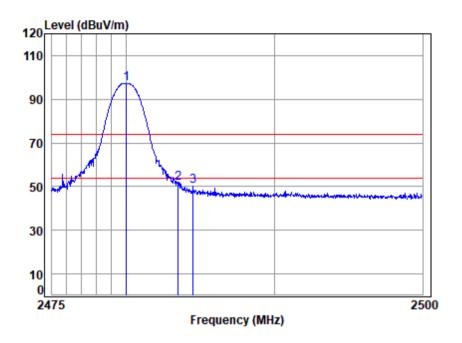


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Test Mode: 01; Polarity: Horizontal; Modulation: GFSK; Channel: High



Site : chamber

Condition: 3m HORIZONTAL : 04336AT\04337AT Mode : 2480 Band edge

: BT

	Freq			Preamp Factor					Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 p	2480.000	15.86	28.90	32.73	85.24	97.27	74.00	23.27	peak
2	2483.500	15.86	28.90	32.73	39.32	51.35	74.00	-22.65	peak
3	2484.495	15.86	28.90	32.73	38.25	50.28	74.00	-23.72	peak



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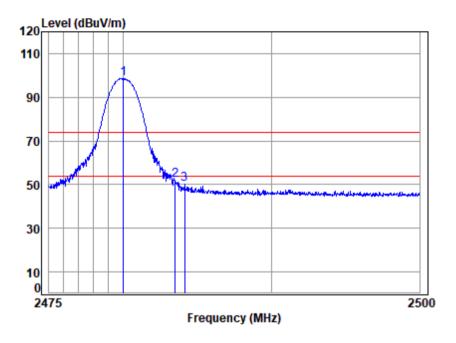


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Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:High



Site : chamber

Condition: 3m VERTICAL

: 04336AT\04337AT Mode : 2480 Band edge

: BT

	Freq			Preamp Factor					Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 p	2480.000	15.86	28.90	32.73	86.50	98.53	74.00	24.53	peak
2	2483.500	15.86	28.90	32.73	39.79	51.82	74.00	-22.18	peak
3	2484.121	15.86	28.90	32.73	38.05	50.08	74.00	-23.92	peak



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### 7.3 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

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

### 7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 20.2 °C Humidity: 45.2 % RH Atmospheric Pressure: 1020 mbar

### 7.3.2 Test Mode Description

7.5.2 TCSt IV		
Pre-scan / Final test	Mode Code	Description
Final test	00	Charge + TX_non-Hop mode_Keep the EUT in charging and 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.
Pre-scan	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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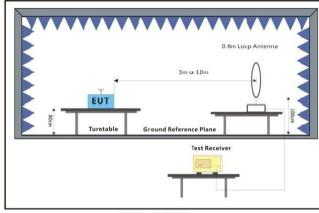
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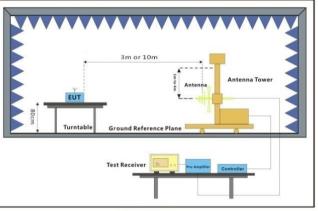


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#### 7.3.3 Test Setup Diagram





Below 30MHz

30MHz-1GHz

#### 7.3.4 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.



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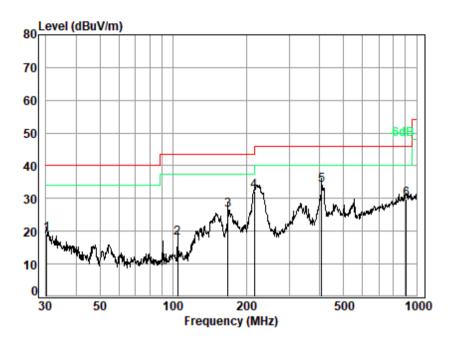


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Test Mode: 00; Polarity: Horizontal



Site : chamber

Condition: 3m HORIZONTAL

Job No. : 04336AT

Test Mode: 00

		Ant	Cable	Preamp	Read		Limit	0ver	
	Freq	Factor	Loss	Factor	Level	Level	Line	Limit	Remark
_									
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB	
1	30.211	21.10	0.64	27.79	25.23	19.18	40.00	-20.82	QP
2	104.170	12.22	1.21	27.57	32.00	17.86	43.50	-25.64	QP
3	167.824	13.17	1.56	27.31	39.10	26.52	43.50	-16.98	QP
4	216.024	14.87	1.80	27.10	42.75	32.32	46.00	-13.68	QP
5 q	407.515	20.52	2.58	27.19	38.18	34.09	46.00	-11.91	QP
6	906.482	27.87	4.11	26.72	24.43	29.69	46.00	-16.31	OP



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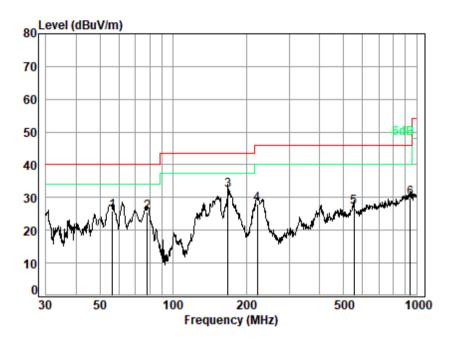


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Test Mode: 00; Polarity: Vertical



Site : chamber

Condition: 3m VERTICAL

Job No. : 04336AT

Test Mode: 00

		Ant	Cable	Preamp	Read		Limit	0ver	
	Freq	Factor	Loss	Factor	Level	Level	Line	Limit	Remark
-	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB	
1	56.395	11.81	0.89	27.72	40.90	25.88	40.00	-14.12	QP
2	78.413	10.40	1.05	27.65	41.65	25.45	40.00	-14.55	QP
3 q	167.824	13.17	1.56	27.31	44.70	32.12	43.50	-11.38	QP
4	221.392	15.31	1.82	27.08	38.04	28.09	46.00	-17.91	QP
5	552.883	23.71	3.06	27.78	28.07	27.06	46.00	-18.94	QP
6	942.131	28.19	4.20	26.46	23.90	29.83	46.00	-16.17	OP



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### 7.4 Radiated Spurious Emissions Above 1GHz

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

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

Measurement Distance: 3m

### Limit:

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

### 7.4.1 E.U.T. Operation

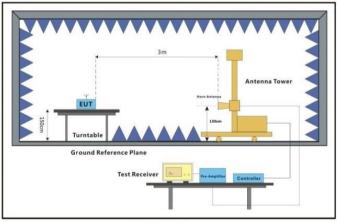
Operating Environment:

22.4 °C Atmospheric Pressure: 1020 mbar Temperature: Humidity: 61.7 % RH

### 7.4.2 Test Mode Description

7.4.2 103t N		
Pre-scan / Final test	Mode Code	Description
Pre-scan	00	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	01	Charge + TX_non-Hop mode_Keep the EUT in charging and 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



Above 1GHz



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#### 7.4.4 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.
- 4: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for Peak detection (PK) and Average detection (AV) at frequency above 1GHz.
- 5:For fundamental and harmonic signal measurement, the resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ≥1/T (Duty cycle<98%) or 10Hz (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1GHz.



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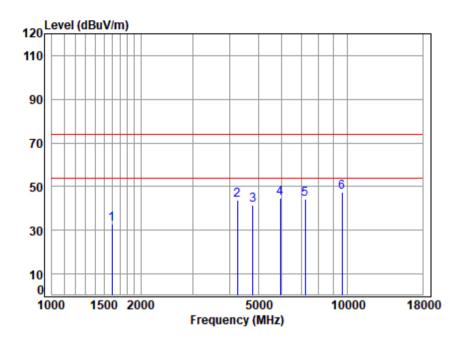


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Test Mode: 01; Polarity: Horizontal; Modulation: GFSK; Channel:Low



Site : chamber

Condition: 3m HORIZONTAL : 04336AT\04337AT Mode : 2402 TX RSE

: BT

		Cable	Ant	Preamp	Read		Limit	0ver	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	d Bu V/m	dB	
1	1597.181	4.78	26.81	54.80	55.98	32.77	74.00	-41.23	peak
2	4242.641	8.21	33.80	54.27	56.02	43.76	74.00	-30.24	peak
3	4804.000	8.00	34.32	54.22	53.55	41.65	74.00	-32.35	peak
4	5932.638	9.49	34.67	53.17	53.61	44.60	74.00	-29.40	peak
5	7206.000	9.32	35.70	53.18	52.59	44.43	74.00	-29.57	peak
6	p 9608.000	11.41	37.42	53.35	51.99	47.47	74.00	-26.53	peak



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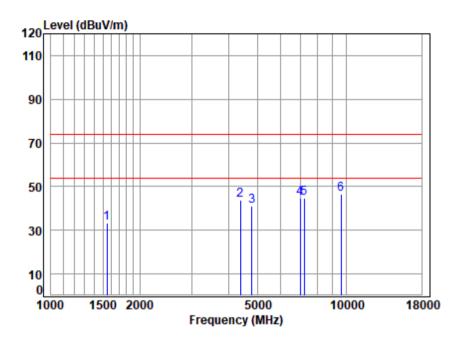


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Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:Low



Site : chamber

Condition: 3m VERTICAL

: 04336AT\04337AT

Mode : 2402 TX RSE

: BT

		Cable	Ant	Preamp	Read		Limit	0ver	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1547.199	4.67	26.99	54.79	56.49	33.36	74.00	-40.64	peak
2	4392.376	8.00	34.74	54.26	55.25	43.73	74.00	-30.27	peak
3	4804.000	8.00	34.32	54.22	53.07	41.17	74.00	-32.83	peak
4	6974.982	9.51	35.75	53.20	52.57	44.63	74.00	-29.37	peak
5	7206.000	9.32	35.70	53.18	52.83	44.67	74.00	-29.33	peak
6	p 9608.000	11.41	37.42	53.35	51.10	46.58	74.00	-27.42	peak



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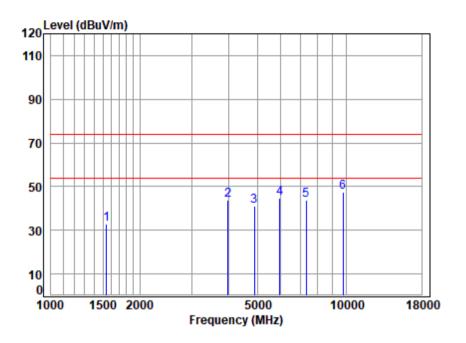


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Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:middle



Site : chamber

Condition: 3m HORIZONTAL : 04336AT\04337AT

Mode : 2441 TX RSE

: BT

	Freq			Preamp Factor					Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1542.733	4.66	26.97	54.79	55.91	32.75	74.00	-41.25	peak
2	3981.257	8.50	33.19	54.31	56.25	43.63	74.00	-30.37	peak
3	4882.000	8.03	34.63	54.21	52.67	41.12	74.00	-32.88	peak
4	5949.811	9.50	34.70	53.15	53.56	44.61	74.00	-29.39	peak
5	7323.000	9.20	35.70	53.17	51.96	43.69	74.00	-30.31	peak
6 p	9764.000	11.32	37.37	53.29	52.06	47.46	74.00	-26.54	peak



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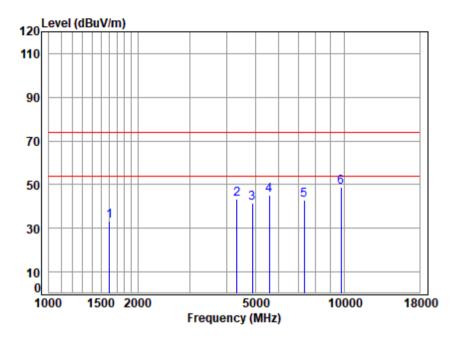


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Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:middle



Site : chamber

Condition: 3m VERTICAL

: 04336AT\04337AT

Mode : 2441 TX RSE

: BT

		Cable	Ant	Preamp	Read		Limit	0ver	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1601.804	4.79	26.78	54.80	56.33	33.10	74.00	-40.90	peak
2	4329.354	8.09	34.23	54.26	55.28	43.34	74.00	-30.66	peak
3	4882.000	8.03	34.63	54.21	53.02	41.47	74.00	-32.53	peak
4	5583.251	9.34	34.70	53.53	54.74	45.25	74.00	-28.75	peak
5	7323.000	9.20	35.70	53.17	51.02	42.75	74.00	-31.25	peak
6	p 9764.000	11.32	37.37	53.29	53.30	48.70	74.00	-25.30	peak



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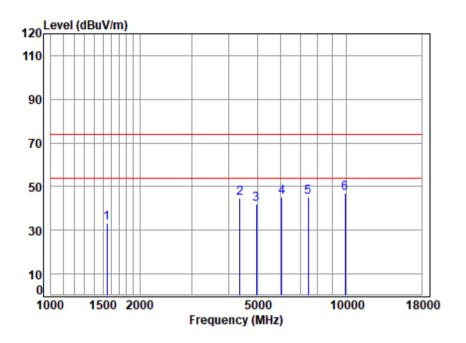


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Test Mode: 01; Polarity: Horizontal; Modulation: GFSK; Channel: High



Site : chamber

Condition: 3m HORIZONTAL : 04336AT\04337AT

Mode : 2480 TX RSE

: BT

	Freq			Preamp Factor					Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1547.199	4.67	26.99	54.79	56.37	33.24	74.00	-40.76	peak
2	4367.058	8.04	34.54	54.26	56.27	44.59	74.00	-29.41	peak
3	4960.000	8.06	34.56	54.20	53.41	41.83	74.00	-32.17	peak
4	6053.894	9.48	35.01	53.11	53.57	44.95	74.00	-29.05	peak
5	7440.000	9.09	35.96	53.15	53.06	44.96	74.00	-29.04	peak
6	p 9920.000	11.23	37.30	53.23	51.75	47.05	74.00	-26.95	peak



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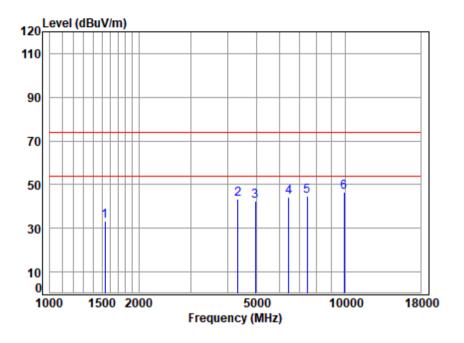


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Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:High



Site : chamber

Condition: 3m VERTICAL

: 04336AT\04337AT

Mode : 2480 TX RSE

: BT

		Cable	Ant	Preamp	Read		Limit	0ver	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1538.281	4.65	26.95	54.79	56.49	33.30	74.00	-40.70	peak
2	4329.354	8.09	34.23	54.26	55.08	43.14	74.00	-30.86	peak
3	4960.000	8.06	34.56	54.20	53.86	42.28	74.00	-31.72	peak
4	6451.353	9.18	35.50	53.15	52.79	44.32	74.00	-29.68	peak
5	7440.000	9.09	35.96	53.15	52.74	44.64	74.00	-29.36	peak
6	p 9920.000	11.23	37.30	53.23	51.21	46.51	74.00	-27.49	peak



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### 7.5 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)
	1 for ≥50 hopping channels
902-928	0.25 for 25≤ hopping channels <50
	1 for digital modulation
	1 for ≥75 non-overlapping hopping channels
2400-2483.5	0.125 for all other frequency hopping systems
	1 for digital modulation
5725-5850	1 for frequency hopping systems and digital modulation

### 7.5.1 E.U.T. Operation

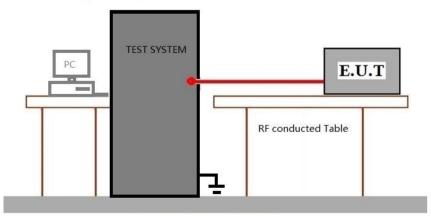
Operating Environment:

Temperature: 24.6 °C Humidity: 31.1 % RH Atmospheric Pressure: 1020 mbar

### 7.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	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.

#### 7.5.3 Test Setup Diagram



Ground Reference Plane



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#### 7.5.4 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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#### 7.6 20dB Bandwidth

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

#### 7.6.1 E.U.T. Operation

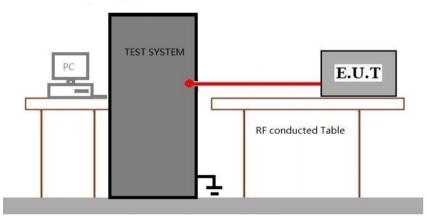
Operating Environment:

24.6 °C Humidity: 31.1 % RH Atmospheric Pressure: 1020 mbar Temperature:

7.6.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	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.

#### 7.6.3 Test Setup Diagram



Ground Reference Plane

#### 7.6.4 Measurement Procedure and Data

Please Refer to Appendix for Details



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### 7.7 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.

### 7.7.1 E.U.T. Operation

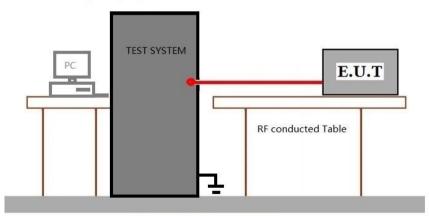
Operating Environment:

Atmospheric Pressure: 1020 mbar Temperature: 24.6 °C Humidity: 31.1 % RH

### 7.7.2 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.

### 7.7.3 Test Setup Diagram



Ground Reference Plane

#### 7.7.4 Measurement Procedure and Data

Please Refer to Appendix for Details



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### 7.8 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)
202 202	50 for 20dB bandwidth <250kHz
902-928	25 for 20dB bandwidth ≥250kHz
2400-2483.5	15
5725-5850	75

#### 7.8.1 E.U.T. Operation

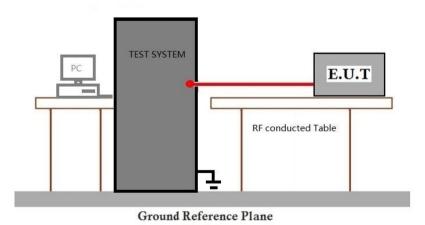
Operating Environment:

Temperature: 24.6 °C Humidity: 31.1 % RH Atmospheric Pressure: 1020 mbar

#### 7.8.2 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.

#### 7.8.3 Test Setup Diagram



### 7.8.4 Measurement Procedure and Data

Please Refer to Appendix for Details



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### 7.9 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
002.029	0.4S within a 20S period(20dB bandwidth<250kHz)
902-928	0.4S within a 10S period(20dB bandwidth≥250kHz)
2400 2402 5	0.4S within a period of 0.4S multiplied by the number
2400-2483.5	of hopping channels
5725-5850	0.4S within a 30S period

### 7.9.1 E.U.T. Operation

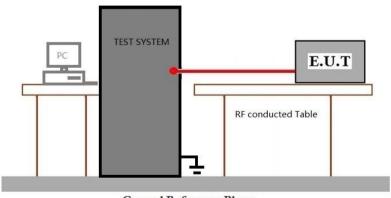
Operating Environment:

Temperature: 24.6 °C Humidity: 31.1 % RH Atmospheric Pressure: 1020 mbar

7.9.2 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.

### 7.9.3 Test Setup Diagram



Ground Reference Plane

#### 7.9.4 Measurement Procedure and Data

### Please Refer to Appendix for Details



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### 7.10 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).

### 7.10.1 E.U.T. Operation

Operating Environment:

Temperature: 24.6 °C Humidity: 31.1 % RH Atmospheric Pressure: 1020 mbar

#### 7.10.2 Test Mode Description

7110.2 1000	7.10.2 Test mode bescription						
Pre-scan / Final test	Mode Code	Description					
Final test	00	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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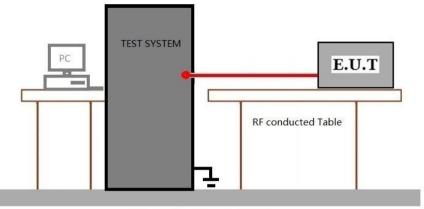


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#### 7.10.3 Test Setup Diagram



Ground Reference Plane

#### 7.10.4 Measurement Procedure and Data

Please Refer to Appendix for Details



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### 7.11 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).

### 7.11.1 E.U.T. Operation

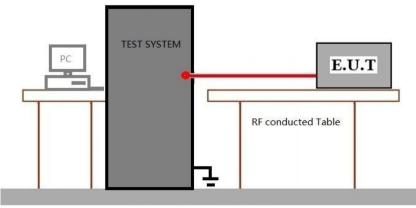
Operating Environment:

Temperature: 24.6 °C Humidity: 31.1 % RH Atmospheric Pressure: 1020 mbar

7.11.2 Test Mode Description

1.11.2 1630	7.11.2 Test Mode Description						
Pre-scan / Final test	Mode Code	Description					
Final test	00	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



Ground Reference Plane



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#### 7.11.4 Measurement Procedure and Data

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#### **Test Setup Photo** 8

Please refer to SZCR2411004336 Appendix\_Setup Photo.

#### **EUT Constructional Details (EUT Photos)** 9

Please refer to SZCR2411004336 Appendix\_External Photo and Internal Photo.



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# 10 Appendix

1. Duty Cycle

1.1 Test Result

1.1.1 Ant1

	Ant1								
Mode	TX Type	Frequency (MHz)	Packet Type	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)	
		2402	DH5	2.887	3.749	77.01	1.13	0.01	
GFSK	SISO	2441	DH5	2.909	3.749	77.59	1.10	0.05	
		2480	DH5	2.899	3.751	77.29	1.12	0.03	
	SISO	2402	2DH5	2.912	3.751	77.63	1.10	0.03	
Pi/4DQPSK		2441	2DH5	2.909	3.749	77.59	1.10	0.03	
		2480	2DH5	2.910	3.750	77.60	1.10	0.06	
		2402	3DH5	2.914	3.750	77.71	1.10	0.03	
8DPSK	SISO	2441	3DH5	2.913	3.752	77.64	1.10	0.06	
		2480	3DH5	2.912	3.749	77.67	1.10	0.03	



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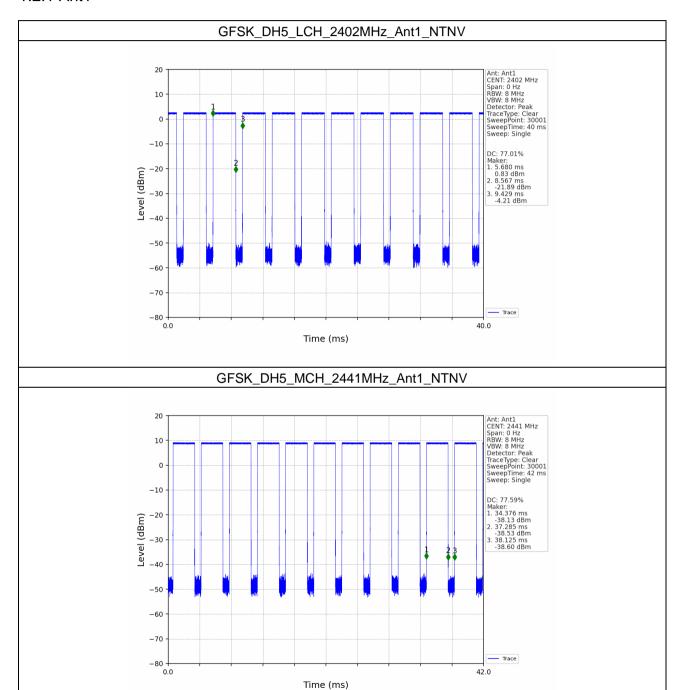
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## 1.2 Test Graph

#### 1.2.1 Ant1





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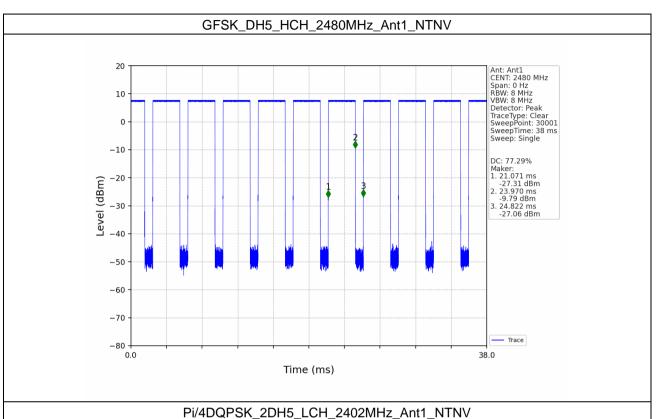
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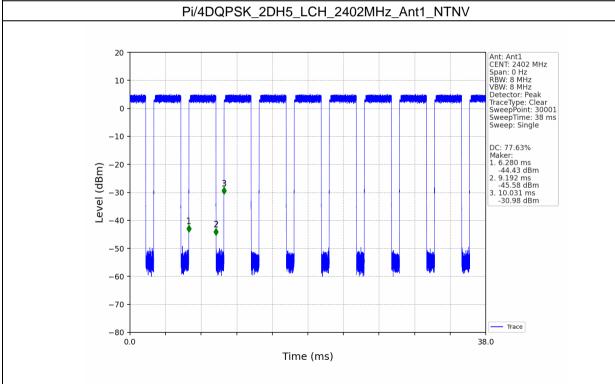


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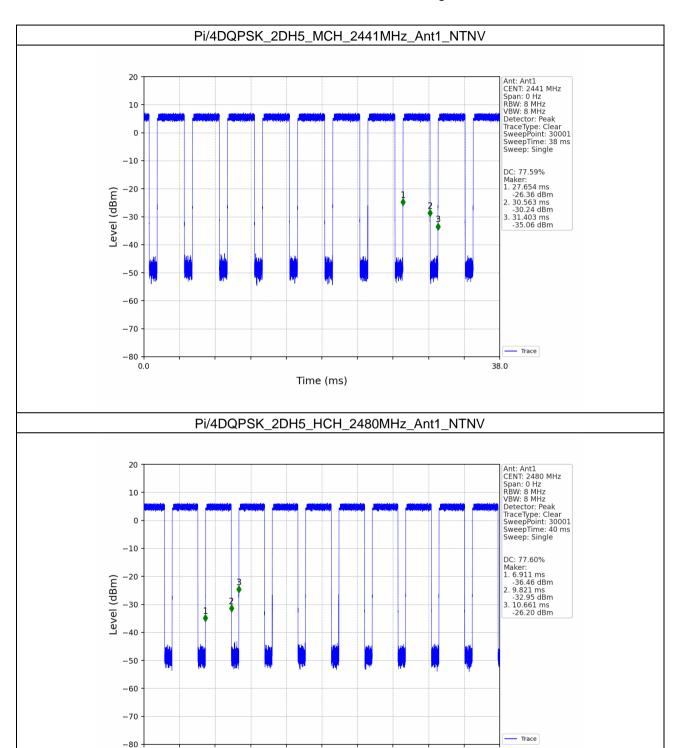
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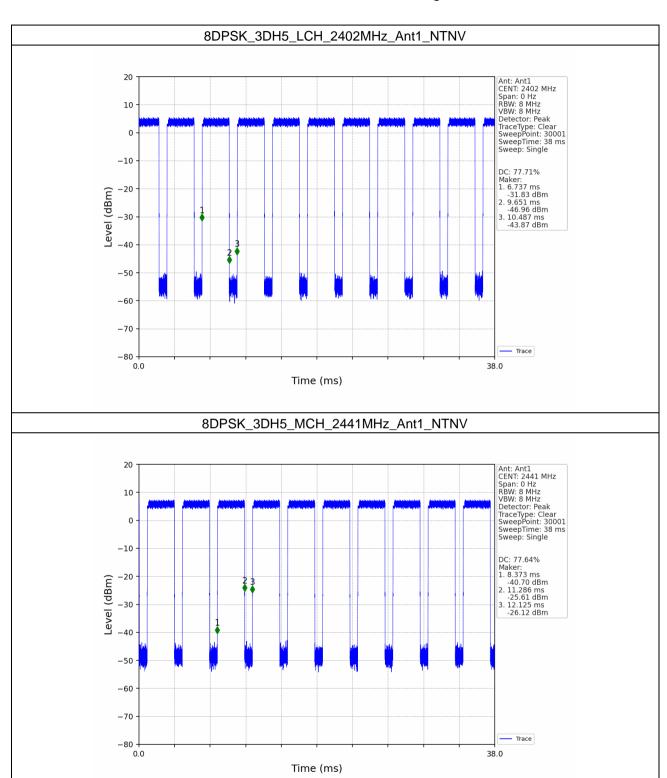
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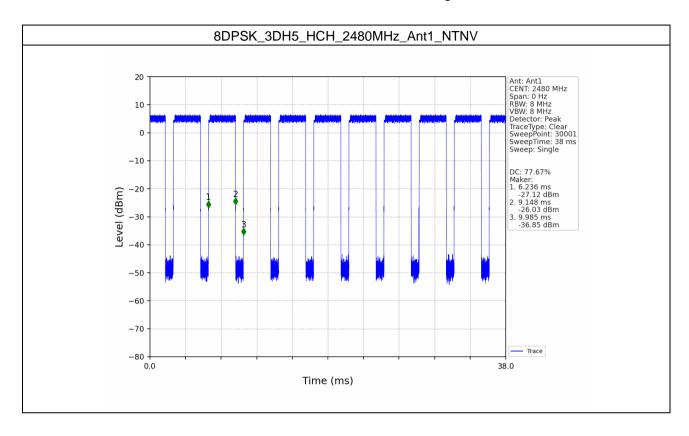
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### 2. Bandwidth

### 2.1 Test Result

#### 2.1.1 OBW

Mode	TX	Frequency	Packet	ANT	99% Occupied Bandwidth (MHz)		Verdict
Mode	Type	(MHz)	Туре		Result	Limit	verdict
		2402	DH5	1	0.858	/	Pass
GFSK	SISO	2441	DH5	1	0.863	/	Pass
		2480	DH5	1	0.863	/	Pass
	SISO	2402	2DH5	1	1.174	/	Pass
Pi/4DQPSK		2441	2DH5	1	1.175	/	Pass
		2480	2DH5	1	1.178	/	Pass
		2402	3DH5	1	1.179	/	Pass
8DPSK	SISO	2441	3DH5	1	1.179	/	Pass
		2480	3DH5	1	1.183	/	Pass

### 2.1.2 20dB BW

Mode	TX Type	Frequency		ANT	20dB Band	Verdict						
		(MHz)			Result	Limit	verdict					
GFSK	SISO	2402	DH5	1	0.941	/	Pass					
		2441	DH5	1	0.945	/	Pass					
		2480	DH5	1	0.943	/	Pass					
Pi/4DQPSK	SISO	2402	2DH5	1	1.291	/	Pass					
		2441	2DH5	1	1.290	/	Pass					
		2480	2DH5	1	1.288	/	Pass					
8DPSK	SISO						2402	3DH5	1	1.300	/	Pass
		2441	3DH5	1	1.300	/	Pass					
		2480	3DH5	1	1.301	/	Pass					



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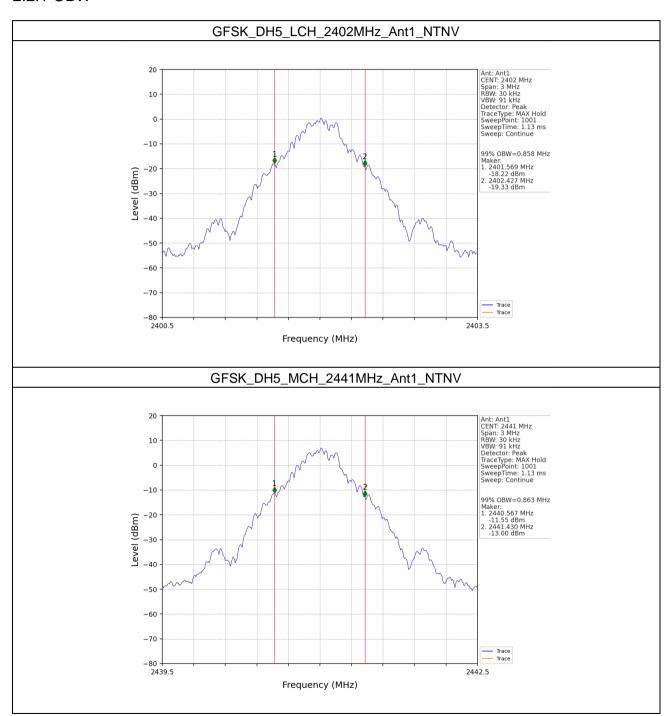
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## 2.2 Test Graph

### 2.2.1 OBW





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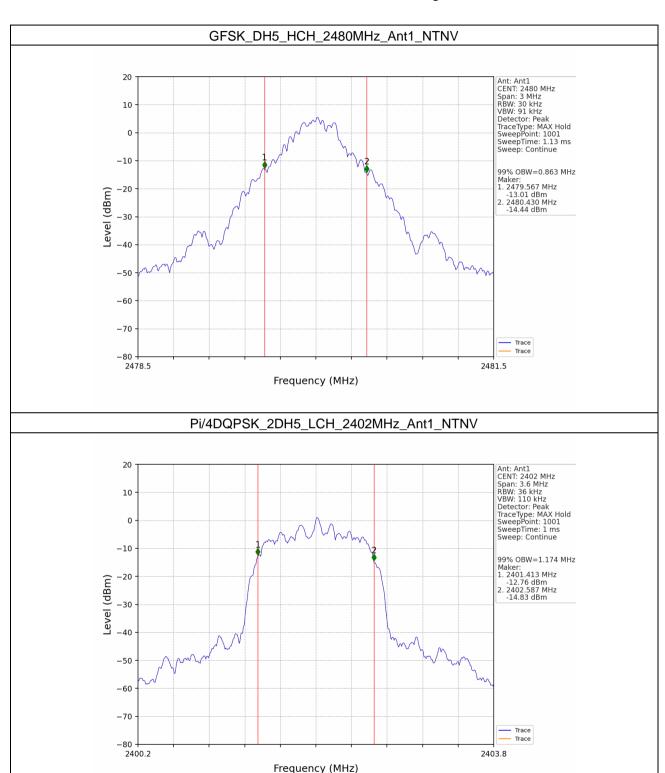
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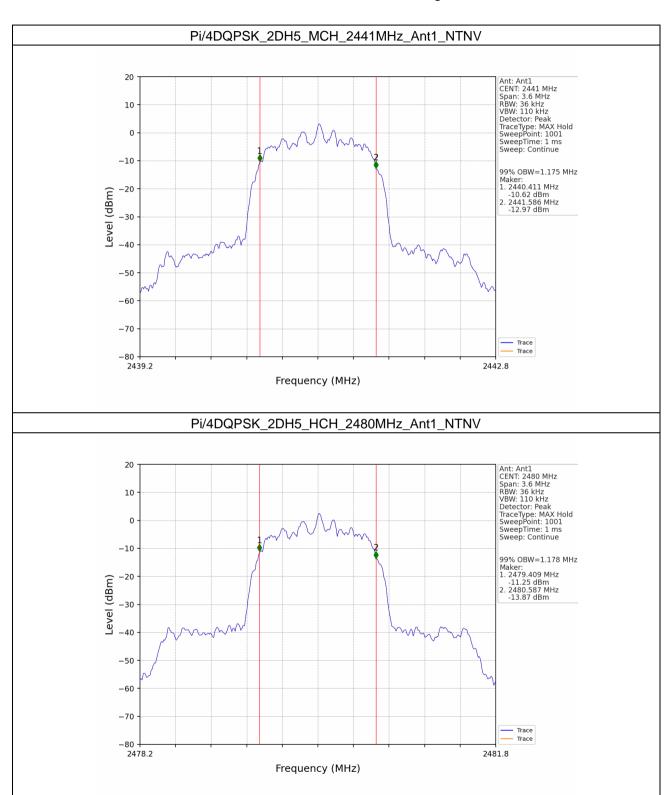
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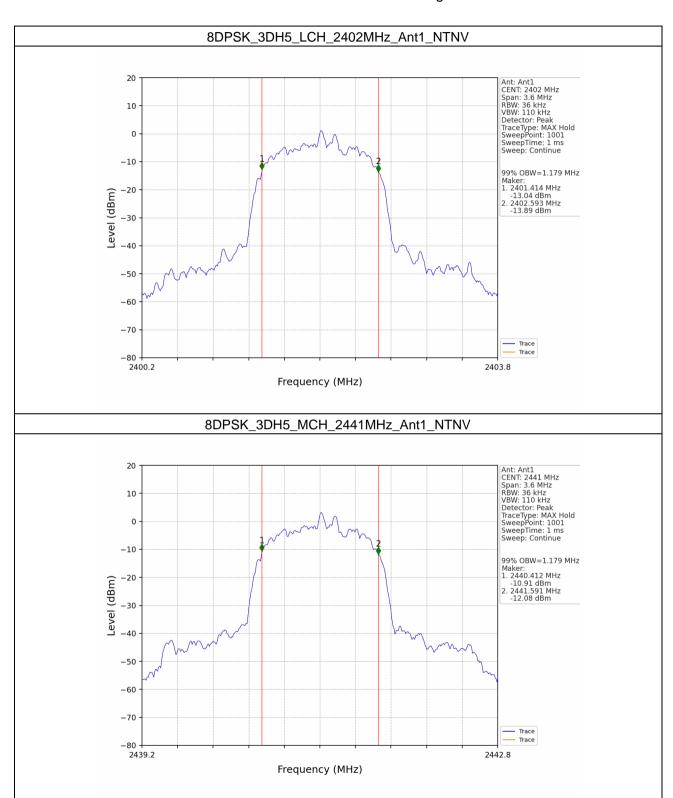
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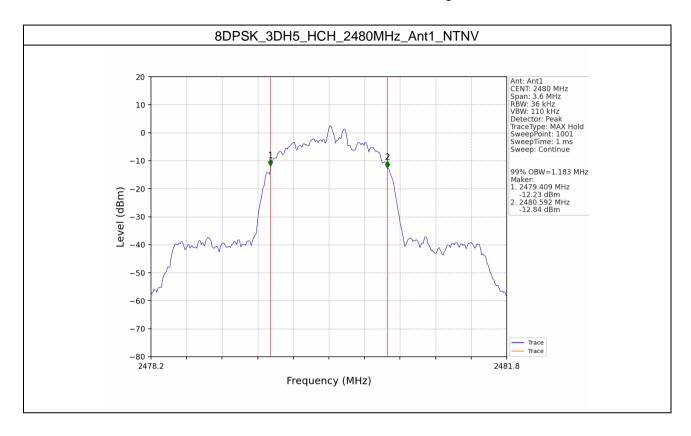
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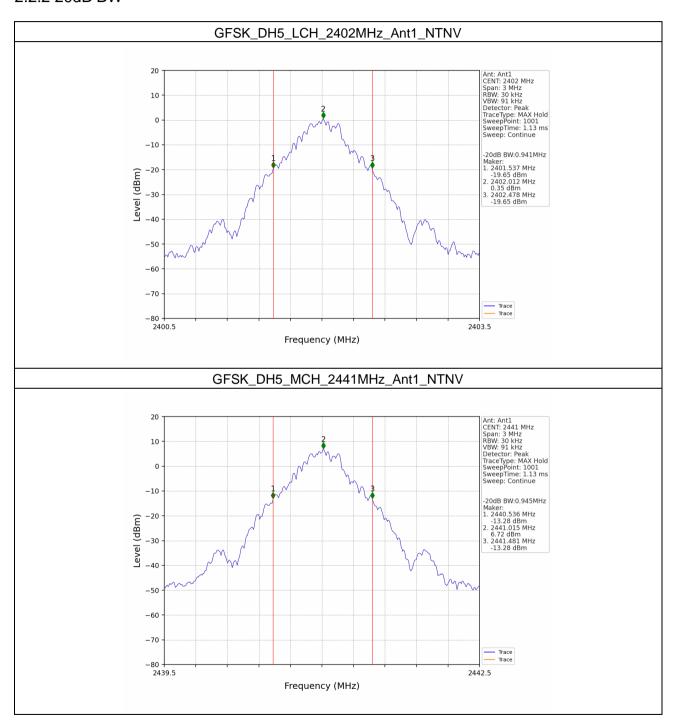


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#### 2.2.2 20dB BW





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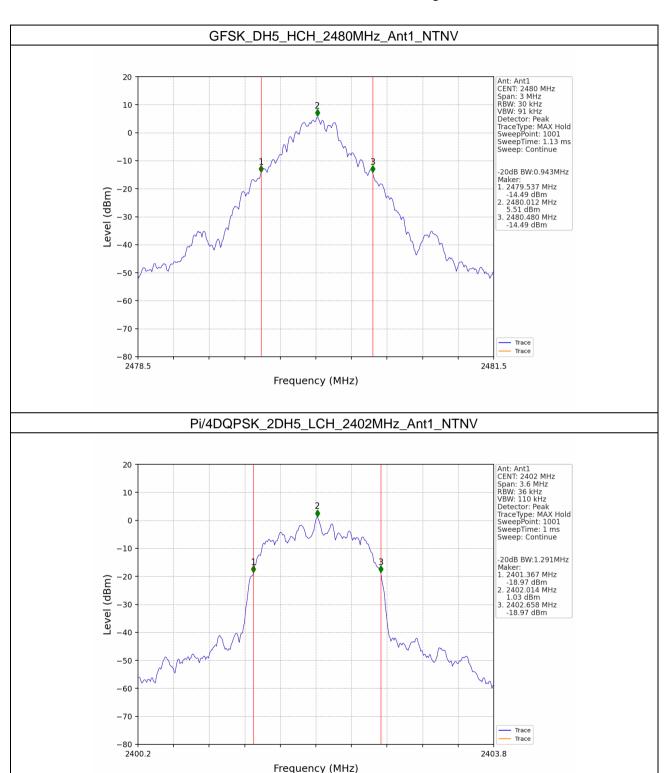
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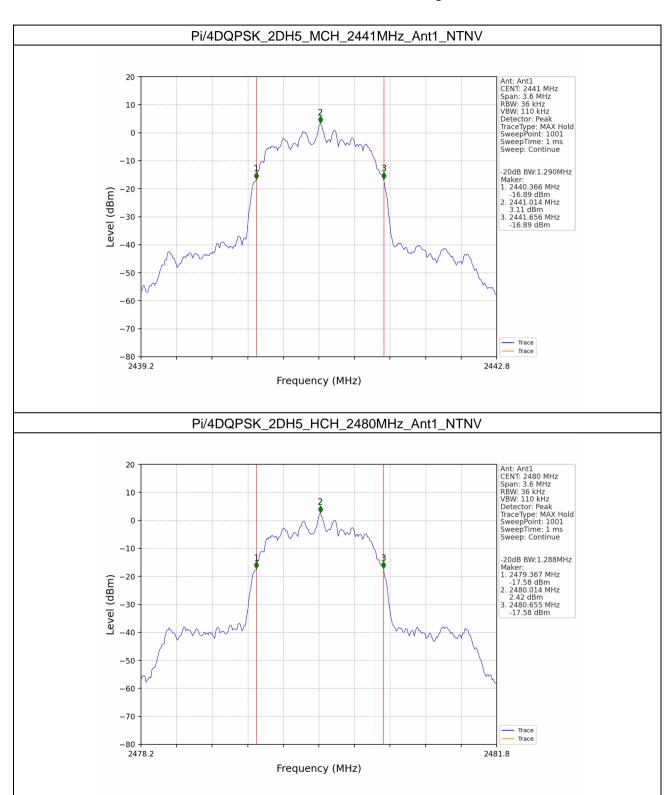
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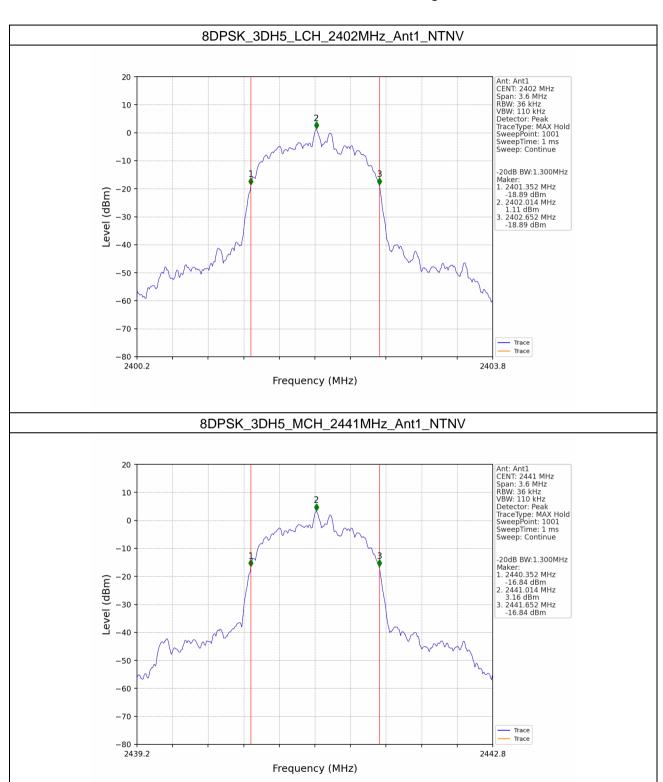
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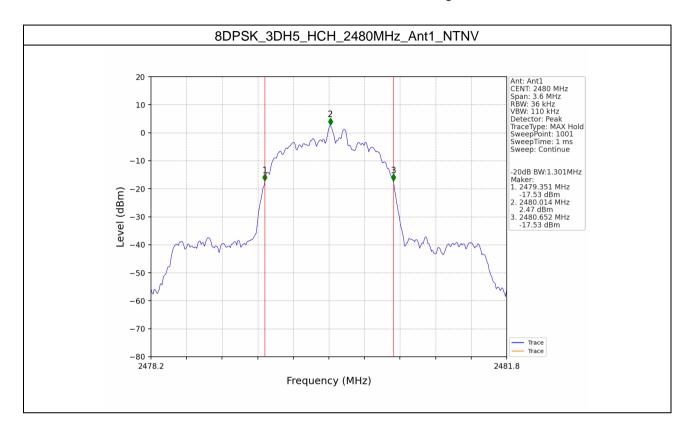
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## 3. Maximum Conducted Output Power

### 3.1 Test Result

#### 3.1.1 Power

Mode	TX Type	Frequency (MHz)	Packet Type	Maximum Peak Cond (dE	Verdict	
				ANT1	Limit	
GFSK	SISO	2402	DH5	7.37	<=30	Pass
		2441	DH5	9.00	<=30	Pass
		2480	DH5	7.58	<=30	Pass
Pi/4DQPSK	SISO	2402	2DH5	4.96	<=20.97	Pass
		2441	2DH5	6.96	<=20.97	Pass
		2480	2DH5	6.07	<=20.97	Pass
8DPSK	SISO	2402	3DH5	5.38	<=20.97	Pass
		2441	3DH5	7.28	<=20.97	Pass
		2480	3DH5	6.37	<=20.97	Pass

# 4. Carrier Frequency Separation

### 4.1 Test Result

### 4.1.1 Ant1

Ant1									
Mode	TX Type	Frequency (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	Verdict				
GFSK	SISO	HOPP	DH5	0.972	0.945	>=0.945	Pass		
Pi/4DQPSK	SISO	HOPP	2DH5	0.994	1.291	>=0.861	Pass		
8DPSK	SISO	HOPP	3DH5	1.001	1.301	>=0.867	Pass		



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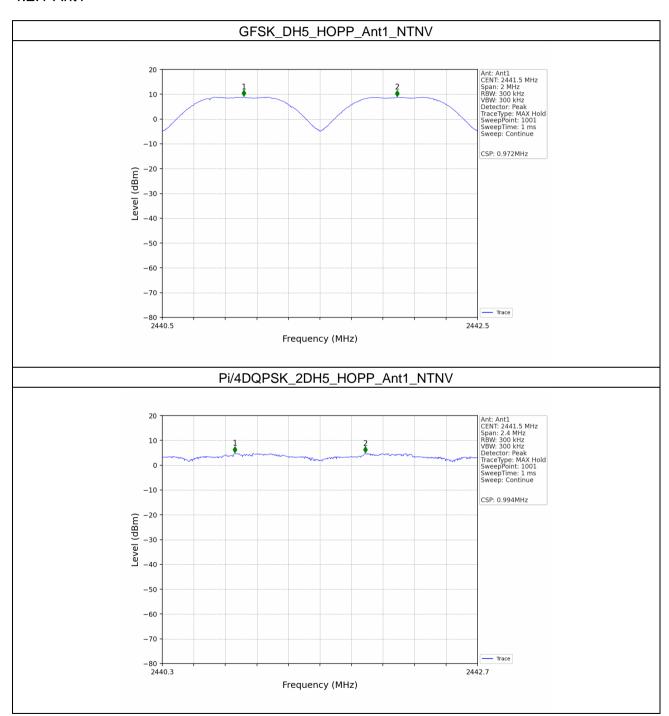
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### 4.2 Test Graph

### 4.2.1 Ant1





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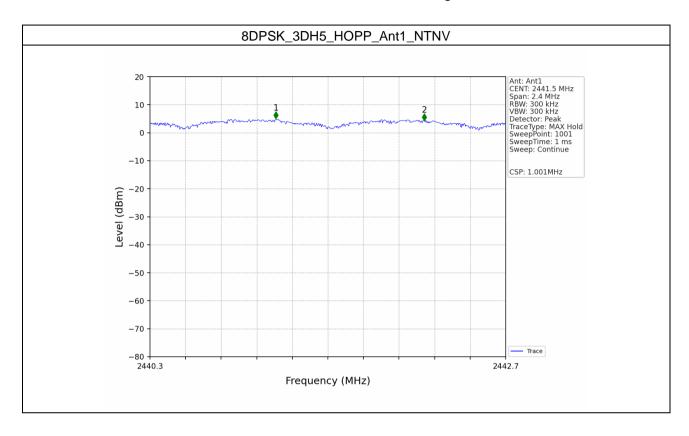
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# 5. Number of Hopping Frequencies

5.1 Test Result

### 5.1.1 HoppNum

Mode	TX	Frequency	Packet Type	Num of Hoppir	Vardiet	
	Туре	(MHz)		ANT1	Limit	Verdict
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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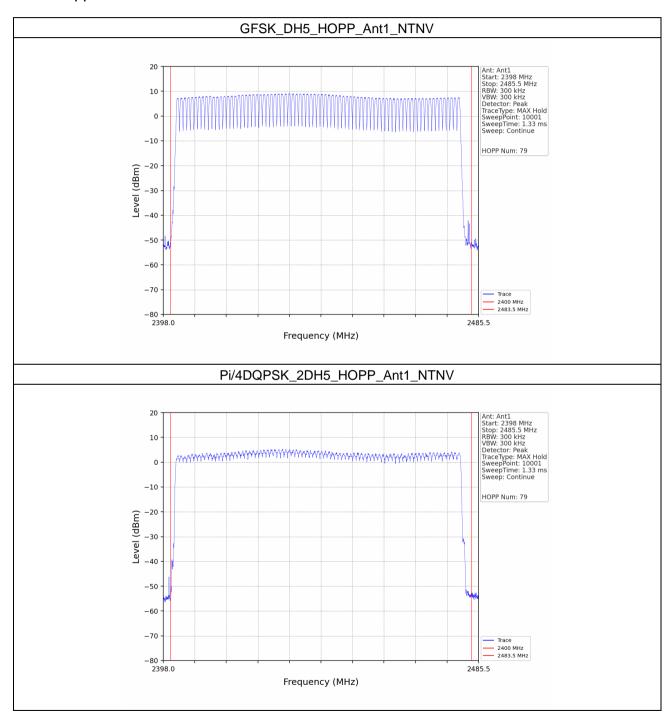
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### 5.2 Test Graph

### 5.2.1 HoppNum





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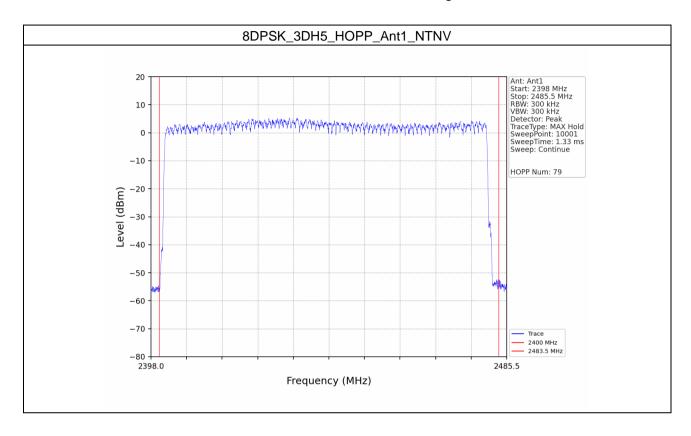
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# 6. Time of Occupancy (Dwell Time)

6.1 Test Result

#### 6.1.1 Ant1

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 SI			DH1	0.386	31.600	317	122.362	<=400	Pass
	SISO	HOPP	DH3	1.640	31.600	160	262.400	<=400	Pass
			DH5	2.902	31.600	106	307.612	<=400	Pass
Pi/4DQPSK		ISO HOPP	2DH1	0.404	31.600	316	127.664	<=400	Pass
	SISO		2DH3	1.644	31.600	148	243.312	<=400	Pass
			2DH5	2.912	31.600	99	288.288	<=400	Pass
8DPSK		HOPP	3DH1	0.392	31.600	311	121.912	<=400	Pass
	SISO		3DH3	1.664	31.600	151	251.264	<=400	Pass
			3DH5	2.916	31.600	92	268.272	<=400	Pass



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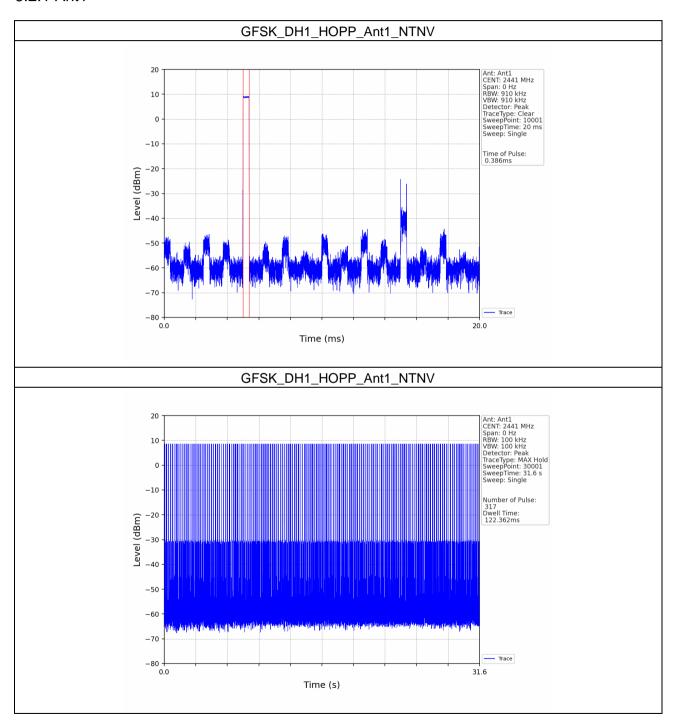
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## 6.2 Test Graph

### 6.2.1 Ant1





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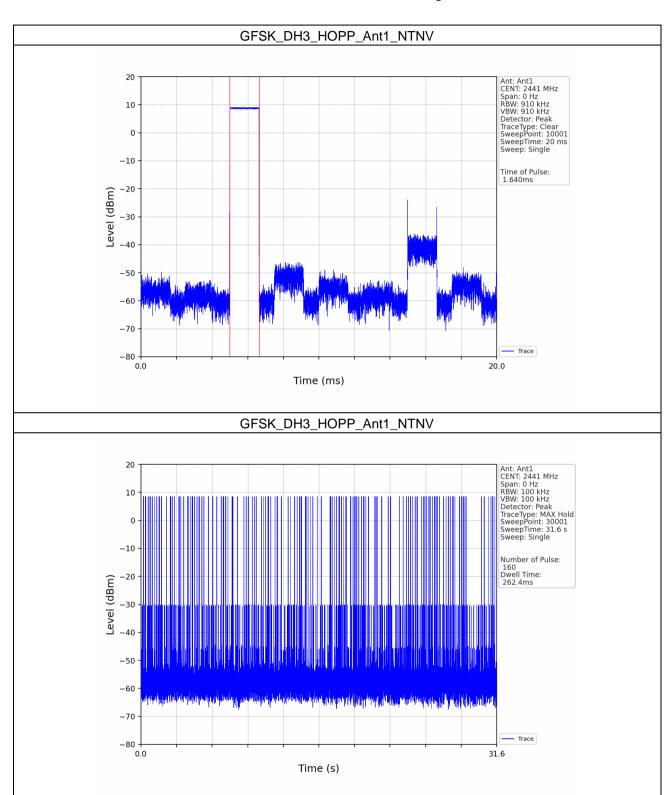
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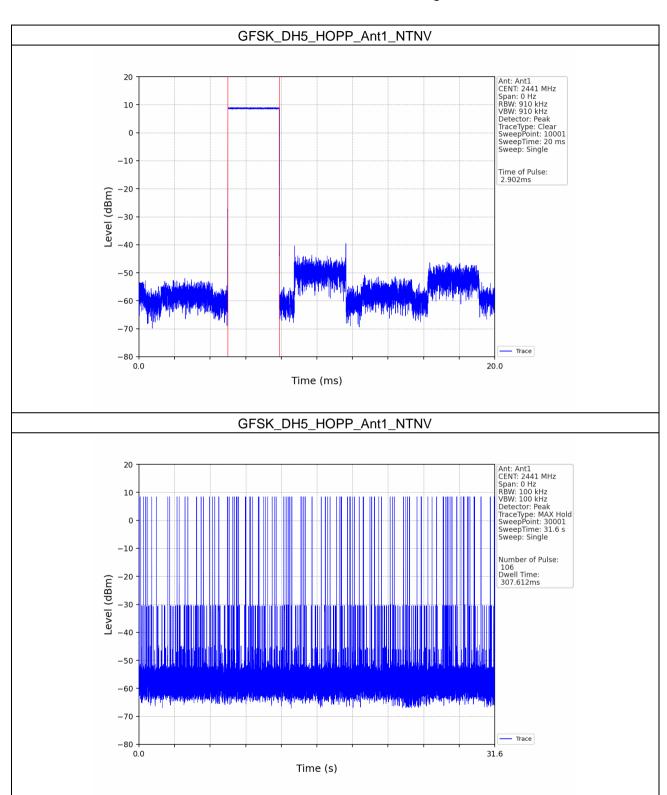
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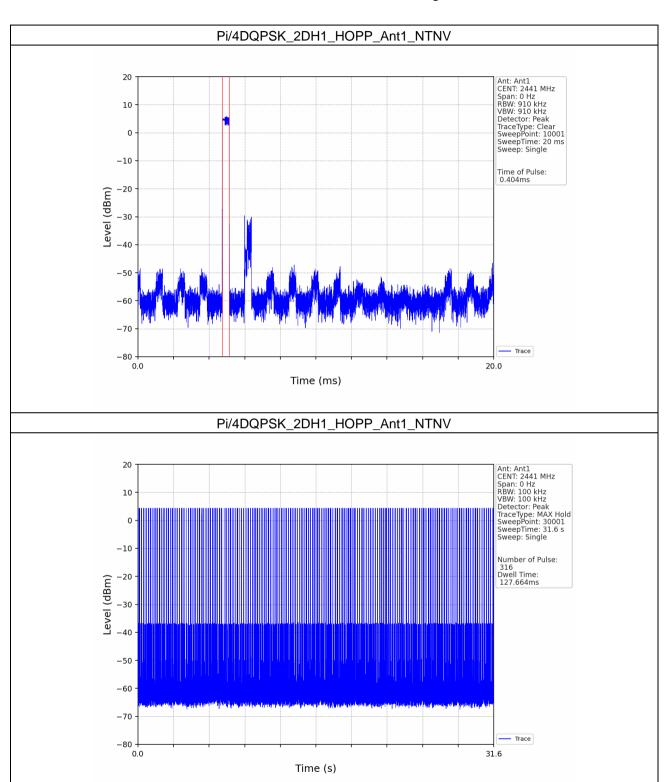
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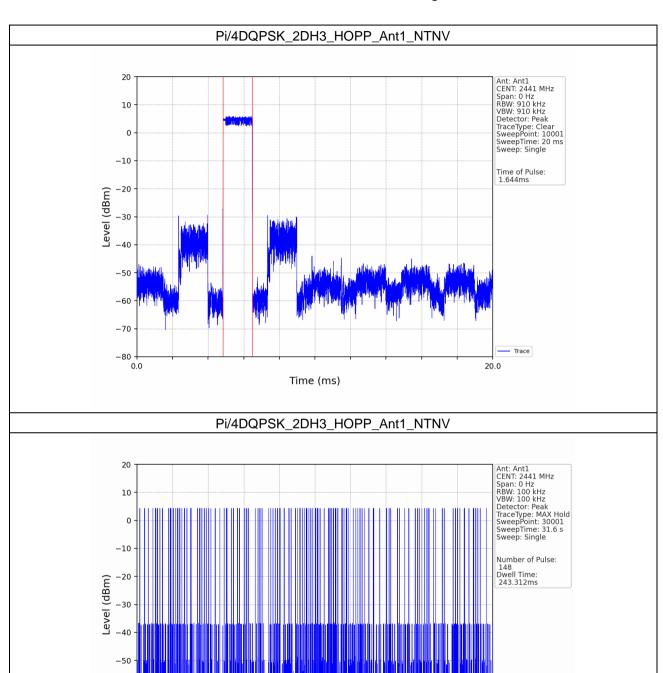
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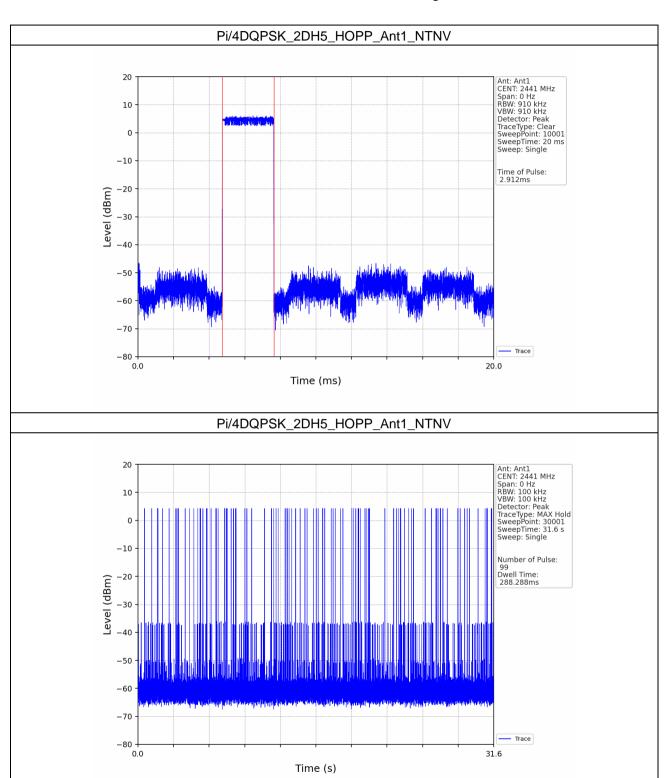
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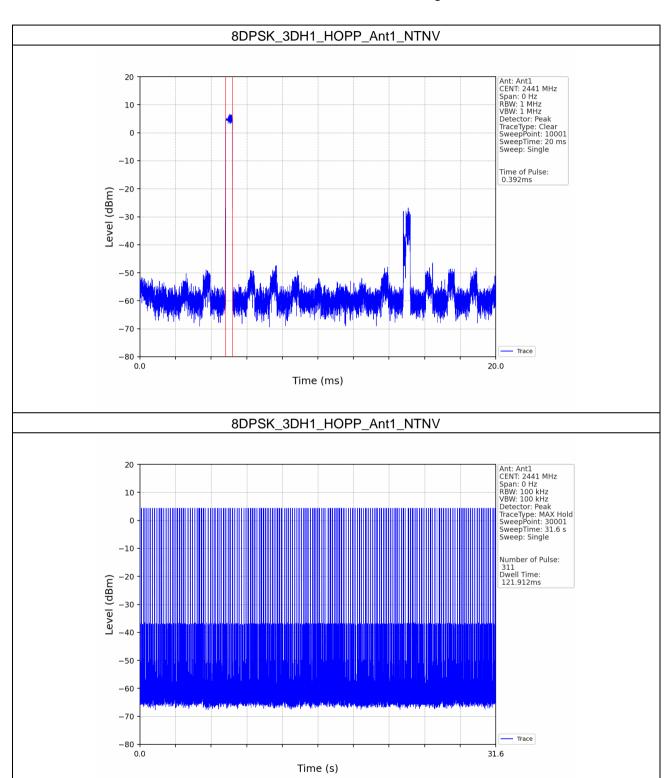
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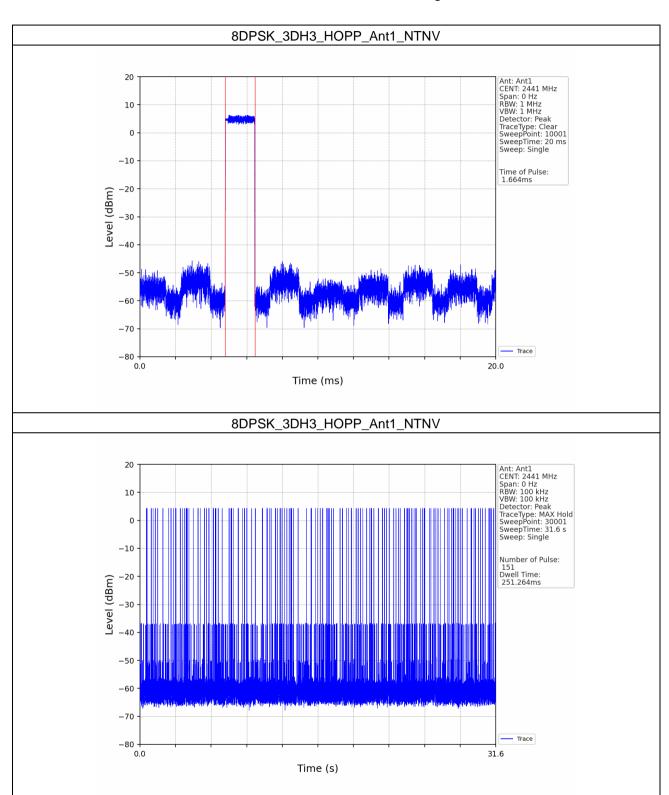
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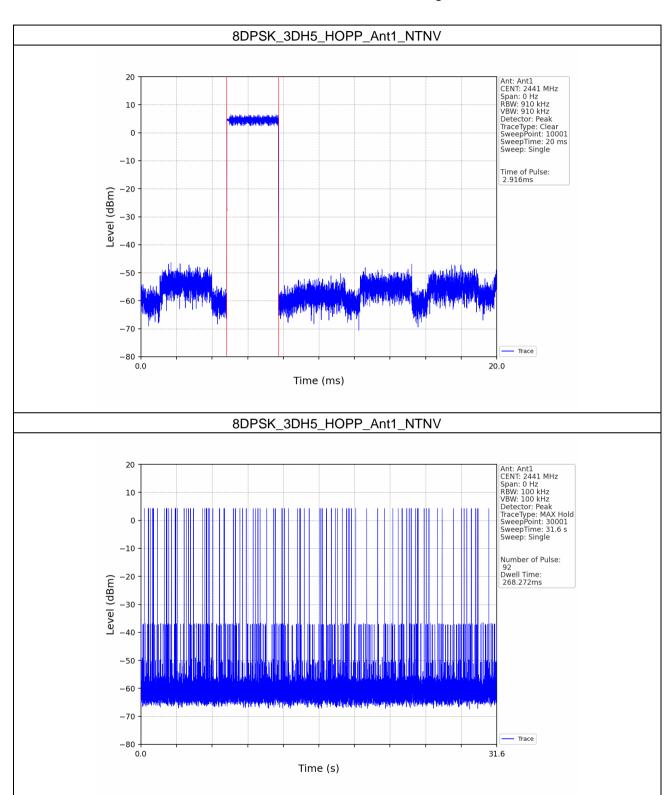
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#### 7. Unwanted Emissions In Non-restricted Frequency Bands

#### 7.1 Test Result

#### 7.1.1 Ref

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)	
GFSK	SISO	2402	DH5	1	7.04	
		2441	DH5	1	8.64	
		2480	DH5	1	7.28	
Pi/4DQPSK	SISO	2402	2DH5	1	2.38	
		2441	2DH5	1	4.47	
		2480	2DH5	1	3.84	
8DPSK	SISO	2402	3DH5	1	2.36	
		2441	3DH5	1	4.51	
		2480	3DH5	1	3.81	

#### 7.1.2 CSE

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
GFSK	SISO	2402	DH5	1	8.64	-11.36	Pass
		2441	DH5	1	8.64	-11.36	Pass
		2480	DH5	1	8.64	-11.36	Pass
		HOPP	DH5	1	8.64	-11.36	Pass
					8.64	-11.36	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	4.47	-15.53	Pass
		2441	2DH5	1	4.47	-15.53	Pass
		2480	2DH5	1	4.47	-15.53	Pass
		HOPP	2DH5	1	4.47	-15.53	Pass
					4.47	-15.53	Pass
8DPSK	SISO	2402	3DH5	1	4.51	-15.49	Pass
		2441	3DH5	1	4.51	-15.49	Pass
		2480	3DH5	1	4.51	-15.49	Pass
		HOPP	3DH5	1	4.51	-15.49	Pass
					4.51	-15.49	Pass



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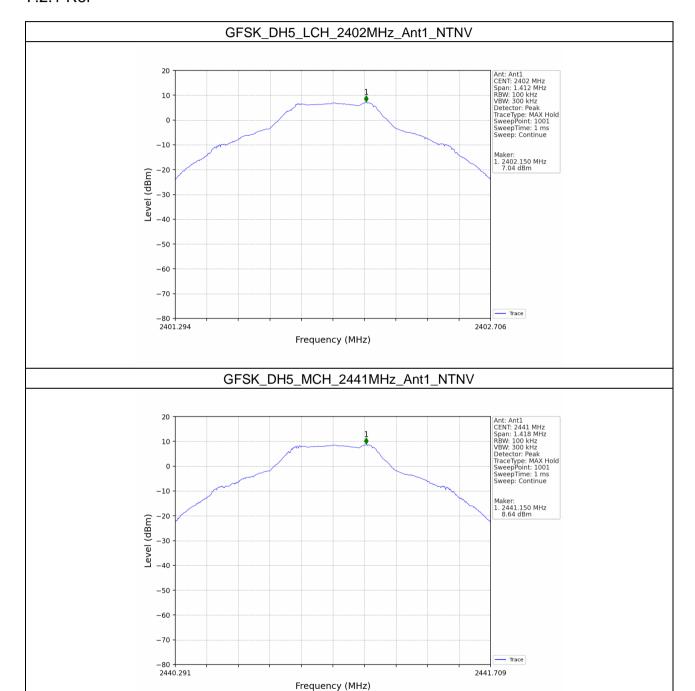
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#### 7.2 Test Graph

#### 7.2.1 Ref





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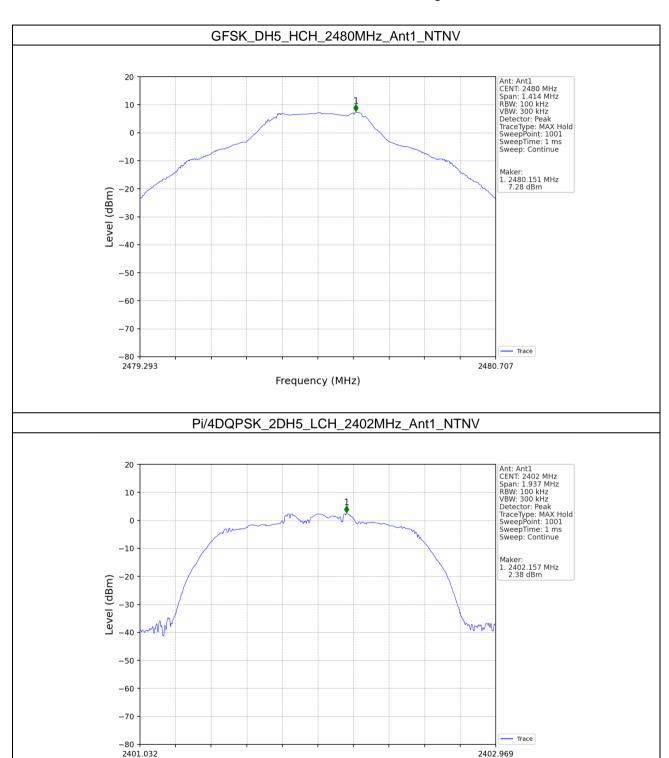
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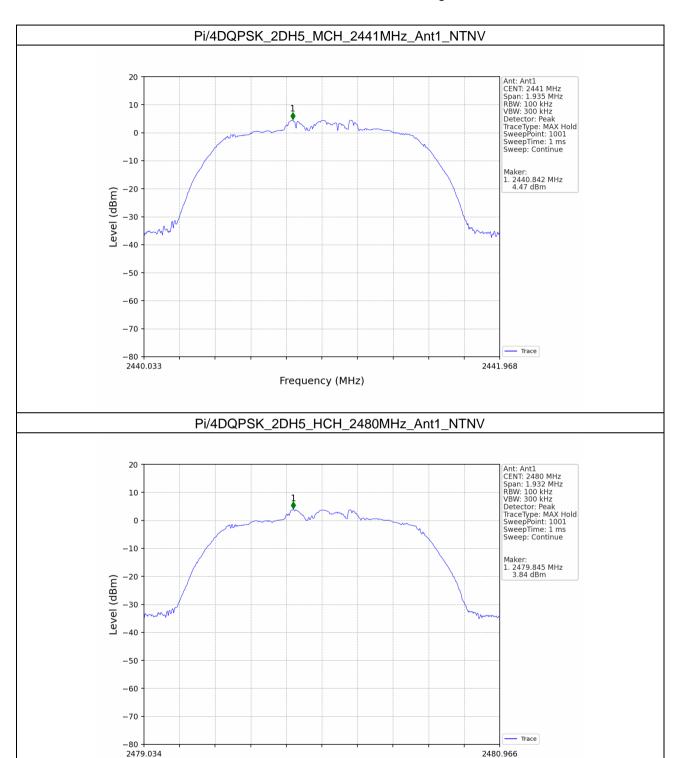
Frequency (MHz)



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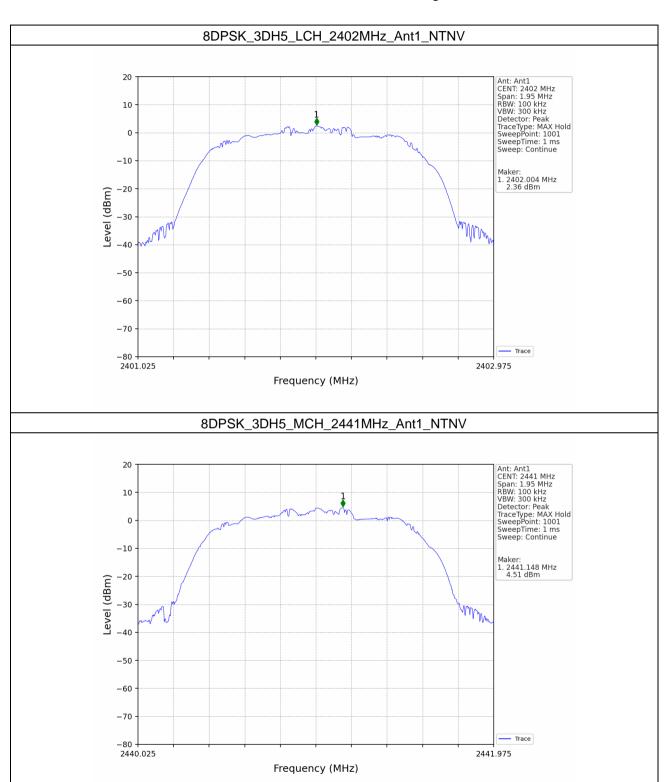
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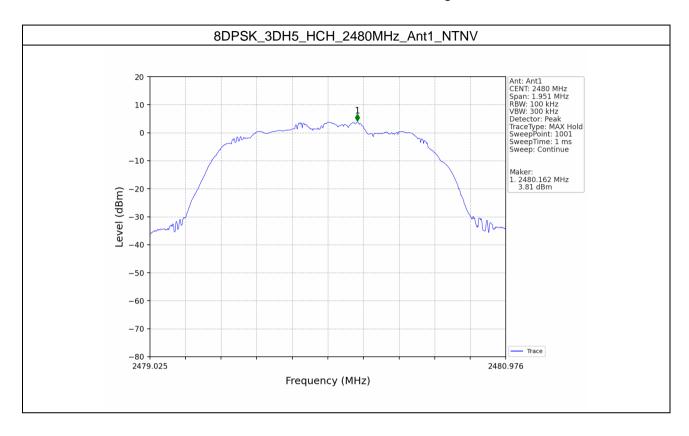
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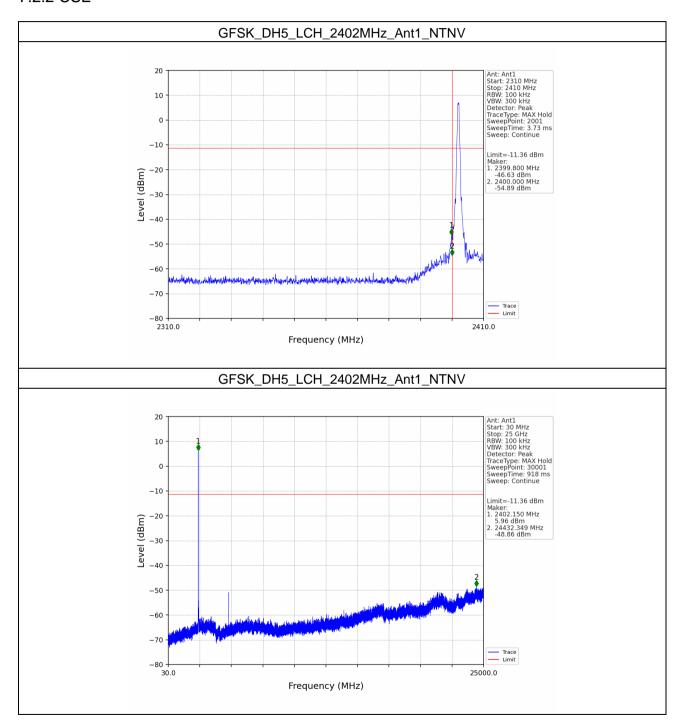


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#### 7.2.2 CSF





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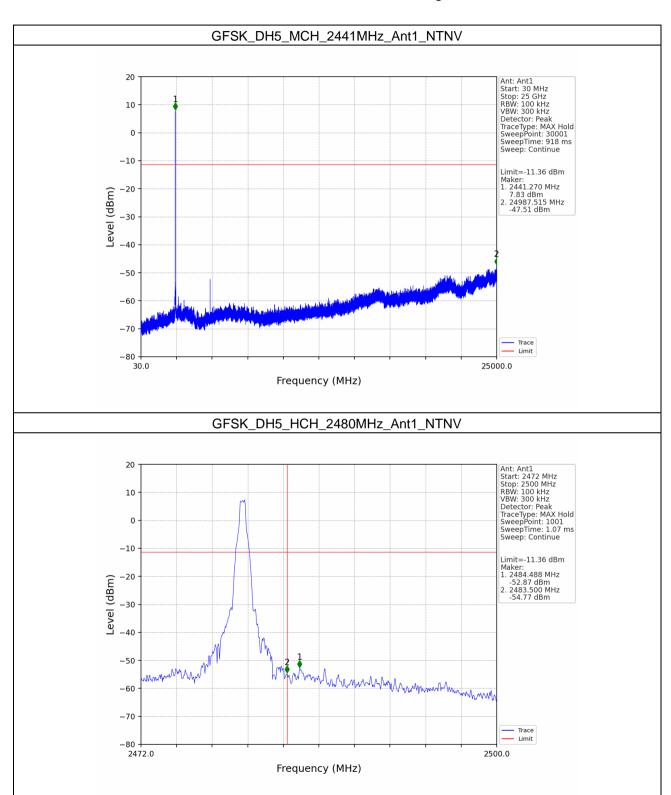
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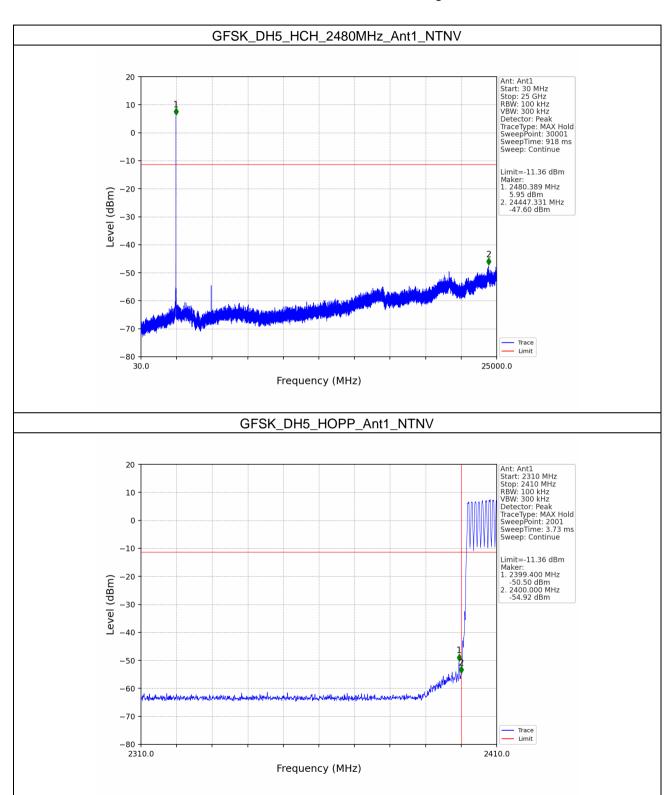
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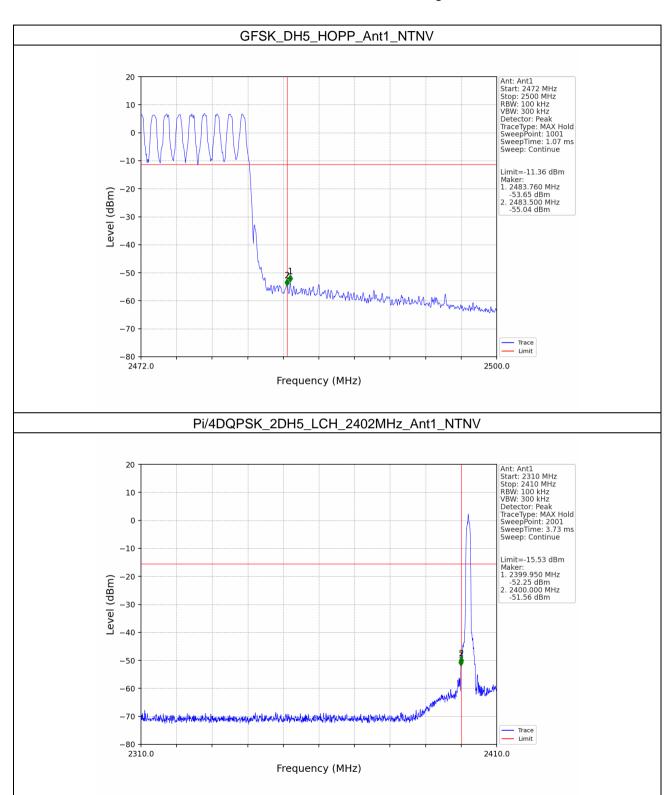
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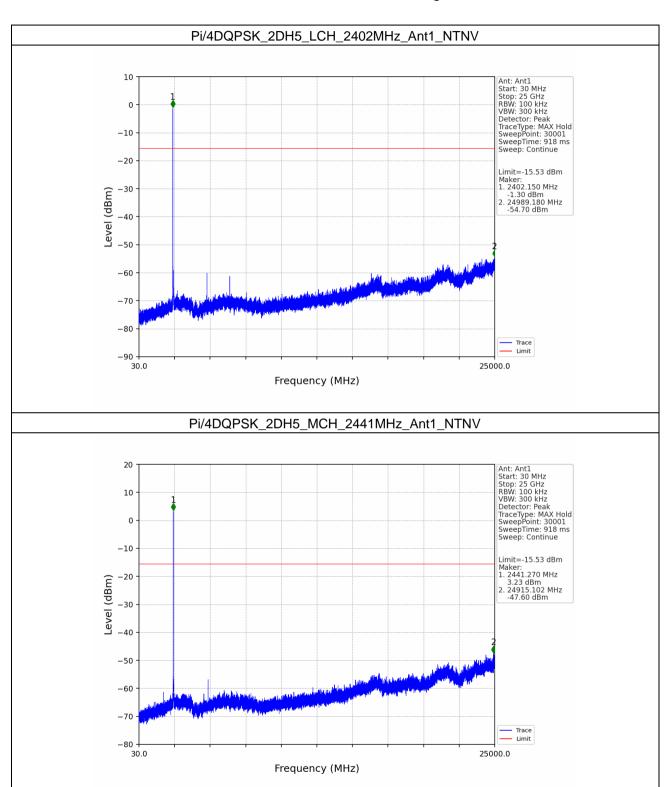
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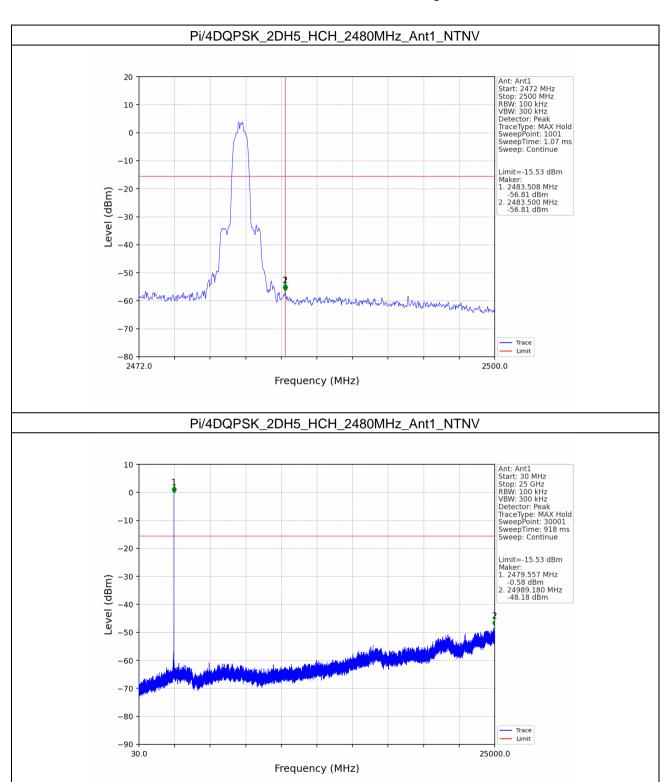
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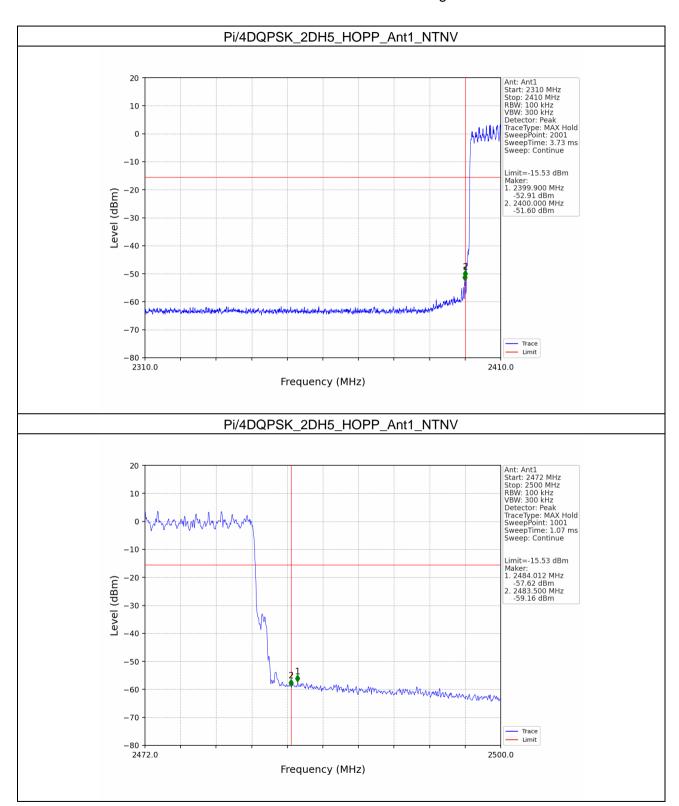
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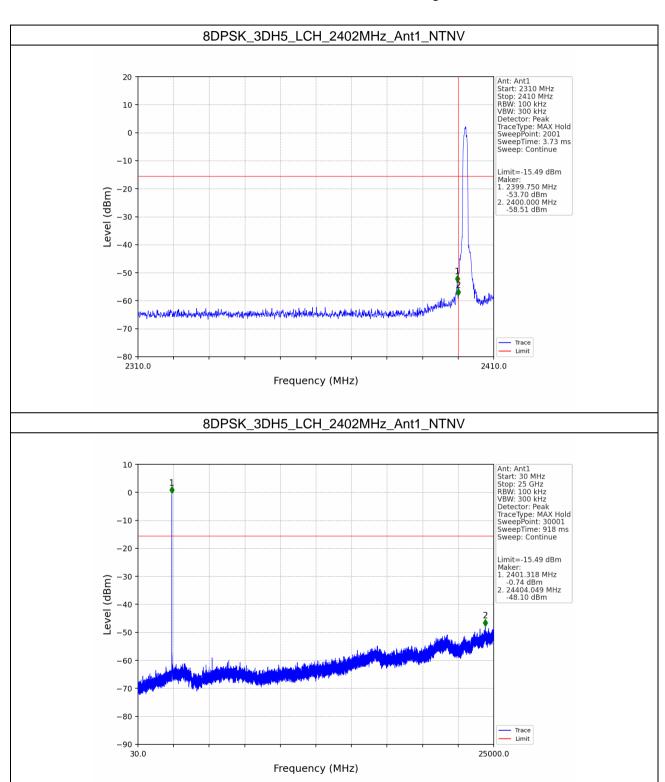
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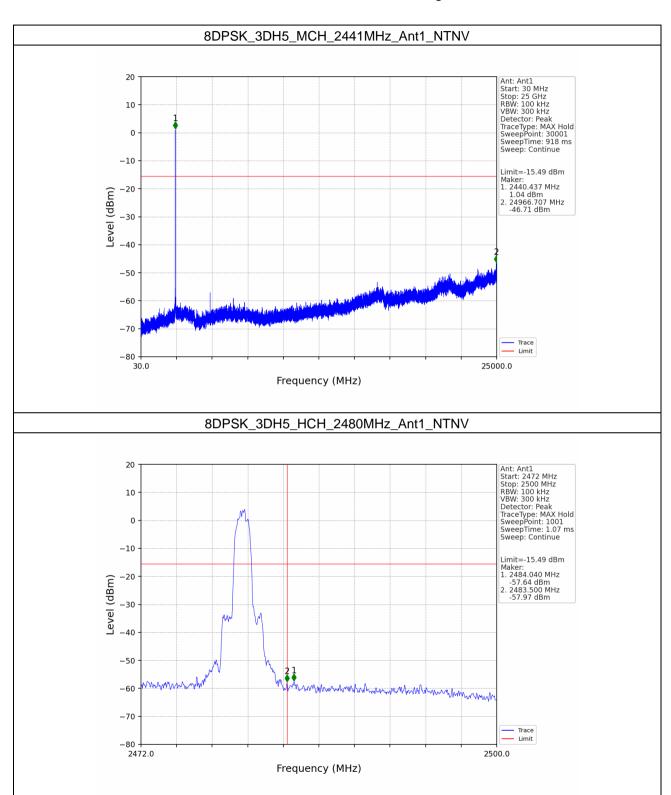
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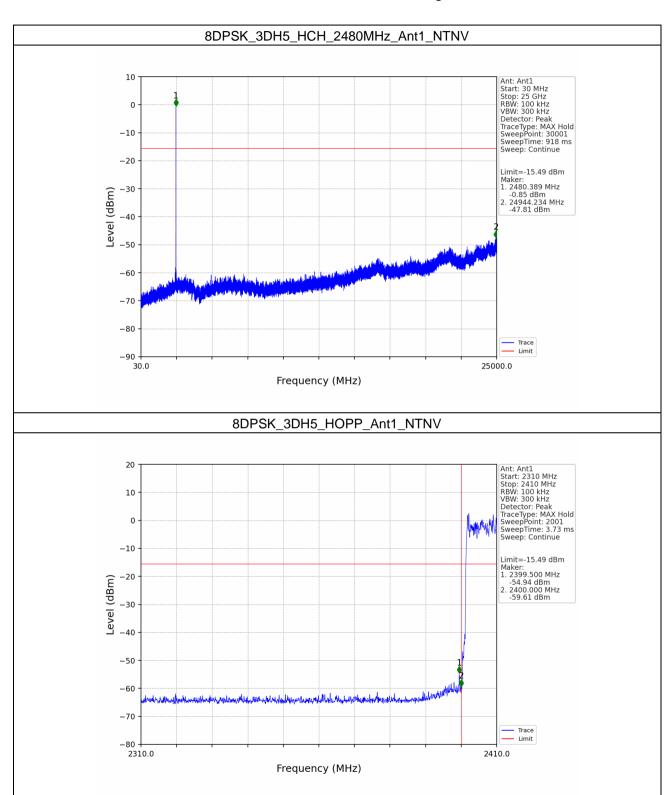
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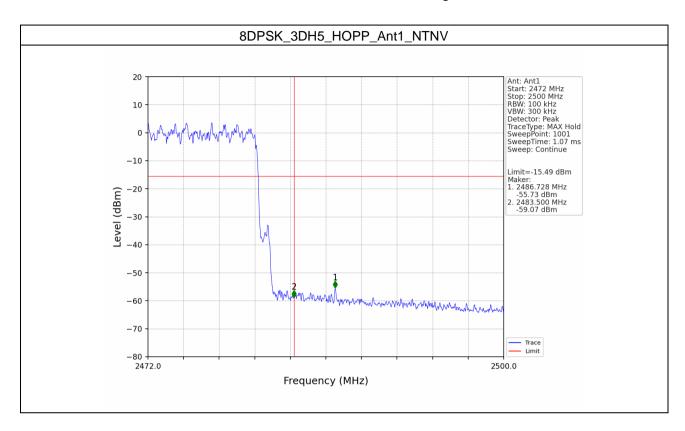
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