

### **RF Test Report**

### For

### **Applicant name:**

Address:

EUT name:

Brand name:

Model number:

Series model number:

N/A

### Shenzhen KingAnDa Technology Development Co., Ltd. East Block NO. 2, Shangxue Industrial Zone, Bantian Street, Longgang District, Shenzhen, China Bluetooth headset YYK YYK-Q71

### **Issued By**

<b>Company Name:</b> Address:	<b>BTF Testing Lab (Shenzhen) Co., Ltd.</b> F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China
Report Number: Test Standards:	BTF240830R00201 47 CFR Part 15.247
Test Conclusion:	Pass
FCC ID:	2AOZMYYK-Q71
Date of sample receipt:	2024-08-30
Test date:	2024-08-31 to 2024-09-05
Date of issue:	2024-09-06
Test by:	Ssxx.guo
Prepared by:	Ssxx.guo/ Tester Chris Liu/Project engineer Chris Liu/Project engineer

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### Test Report Number: BTF240830R00201

Revision History			
Version	Issue Date	Revisions Content	
R_V0	2024-09-06	Original	-

Note: Once the revision has been made, then previous versions reports are invalid.



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### 1 Introduction

### 1.1 Identification of Testing Laboratory

Company Name:	BTF Testing Lab (Shenzhen) Co., Ltd.
Address:	F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China
Phone Number:	+86-0755-23146130
Fax Number:	+86-0755-23146130

### 1.2 Identification of the Responsible Testing Location

Company Name:	BTF Testing Lab (Shenzhen) Co., Ltd.
Address:	F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China
Phone Number:	+86-0755-23146130
Fax Number:	+86-0755-23146130
FCC Registration Number:	518915
Designation Number:	CN1330

### 1.3 Announcement

(1) The test report reference to the report template version v0.

(2) The test report is invalid if not marked with the signatures of the persons responsible for preparing, reviewing and approving the test report.

(3) The test report is invalid if there is any evidence and/or falsification.

(4) This document may not be altered or revised in any way unless done so by BTF and all revisions are duly noted in the revisions section.

(5) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.

(6) The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.



### 2 **Product Information**

### 2.1 Application Information

Company name:	Shenzhen KingAnDa Technology Development Co., Ltd.
Address:	East Block NO. 2, Shangxue Industrial Zone, Bantian Street, Longgang District, Shenzhen, China

### 2.2 Manufacturer Information

Company name:	Shenzhen KingAnDa Technology Development Co., Ltd.
Address:	East Block NO. 2, Shangxue Industrial Zone, Bantian Street, Longgang District, Shenzhen, China

### 2.3 Factory Information

Company name:	Shenzhen KingAnDa Technology Development Co., Ltd.	
Address:	East Block NO. 2, Shangxue Industrial Zone, Bantian Street,	
, lucioco.	Longgang District, Shenzhen, China	

### 2.4 General Description of Equipment under Test (EUT)

EUT name	Bluetooth headset
Under test model name	YYK-Q71
Series model name	N/A
Description of model name differentiation	N/A
Hardware version	N/A
Software version	N/A
Power supply:	Input: 5.0V from USB or 3.7V from battery
AC adapter:	N/A

### 2.5 Technical Information

Operation Frequency:	2402MHz to 2480MHz
Number of Channels:	79
Modulation Type:	GFSK, π/4 DQPSK, 8DPSK
Antenna Type:	L&R:Internal Ant
Antenna Gain <sup>#</sup> :	L&R:2.78dBi
Note:	

#: The antenna gain provided by the applicant, and the laboratory will not be responsible for the accumulated calculation results which covers the information provided by the applicant.
 Bluetooth Version: 5.0



#### 3 **Summary of Test Results**

#### 3.1 **Test Standards**

The tests were performed according to following standards:

47 CFR Part 15.247: Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

### 3.2 Uncertainty of Test

Measurement Uncertainty
±2.64dB
±69kHz
±0.87dB
±0.95dB
1-6GHz: ±3.94dB
6-18GHz: ±4.16dB
±4.12dB

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

### 3.3 Summary of Test Result

Item	Standard	Requirement	Result
Antenna requirement	47 CFR Part 15.247	47 CFR 15.203	Pass
Conducted Emission at AC power line	47 CFR Part 15.247	47 CFR 15.207(a)	N/A
Occupied Bandwidth	47 CFR Part 15.247	47 CFR 15.215(c)	Pass
Maximum Conducted Output Power	47 CFR Part 15.247	47 CFR 15.247(b)(1)	Pass
Channel Separation	47 CFR Part 15.247	47 CFR 15.247(a)(1)	Pass
Number of Hopping Frequencies	47 CFR Part 15.247	47 CFR 15.247(a)(1)(iii)	Pass
Dwell Time	47 CFR Part 15.247	47 CFR 15.247(a)(1)(iii)	Pass
Emissions in non-restricted frequency bands	47 CFR Part 15.247	47 CFR 15.247(d), 15.209, 15.205	Pass
Band edge emissions (Radiated)	47 CFR Part 15.247	47 CFR 15.247(d), 15.209, 15.205	Pass
Emissions in frequency bands (below 1GHz)	47 CFR Part 15.247	47 CFR 15.247(d), 15.209, 15.205	Pass
Emissions in frequency bands (above 1GHz)	47 CFR Part 15.247	47 CFR 15.247(d), 15.209, 15.205	Pass

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### 4 Test Configuration

### 4.1 Test Equipment List

Conducted Emission at AC power line					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Pulse Limiter	SCHWARZBECK	VTSD 9561-F	00953	2023-11-16	2024-11-15
Coaxial Switcher	SCHWARZBECK	CX210	CX210	2023-11-16	2024-11-15
V-LISN	SCHWARZBECK	NSLK 8127	01073	2023-11-16	2024-11-15
LISN	AFJ	LS16/110VAC	16010020076	2023-11-16	2024-11-15
EMI Receiver	ROHDE&SCHWA RZ	ESCI3	101422	2023-11-15	2024-11-14

Occupied Bandwidth Maximum Conducted Output Power Channel Separation Number of Hopping Frequencies Dwell Time Emissions in non-restricted frequency bands					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
RFTest software	/	V1.00	/	/	/
RF Control Unit	Techy	TR1029-1	/	2023-11-16	2024-11-15
RF Sensor Unit	Techy	TR1029-2	/	2023-11-16	2024-11-15
Programmable constant temperature and humidity box	ZZCKONG	ZZ-K02A	20210928007	2023-11-16	2024-11-15
Adjustable Direct Current Regulated Power Supply	Dongguan Tongmen Electronic Technology Co., LTD	etm-6050c	20211026123	2023-11-16	2024-11-15
WIDEBAND RADIO COMMNUNICATION TESTER	Rohde & Schwarz	CMW500	161997	2023-11-16	2024-11-15
MXA Signal Analyzer	KEYSIGHT	N9020A	MY50410020	2023-11-16	2024-11-15



Band edge emissions	Band edge emissions (Radiated)				
	Emissions in frequency bands (below 1GHz)				
Emissions in frequency bands (above 1GHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Coaxial cable Multiflex 141	Schwarzbeck	N/SMA 0.5m	517386	2023-11-16	2024-11-15
Preamplifier	SCHWARZBECK	BBV9744	00246	2023-11-16	2024-11-15
RE Cable	REBES Talent	UF1-SMASMAM-1 0m	21101566	2023-11-16	2024-11-15
RE Cable	REBES Talent	UF2-NMNM-10m	21101570	2023-11-16	2024-11-15
RE Cable	REBES Talent	UF1-SMASMAM-1 m	21101568	2023-11-16	2024-11-15
RE Cable	REBES Talent	UF2-NMNM-1m	21101576	2023-11-16	2024-11-15
RE Cable	REBES Talent	UF2-NMNM-2.5m	21101573	2023-11-16	2024-11-15
POSITIONAL CONTROLLER	SKET	PCI-GPIB	1	2023-11-16	2024-11-15
Horn Antenna	SCHWARZBECK	BBHA9170	01157	2023-11-13	2024-11-12
EMI TEST RECEIVER	ROHDE&SCHWA RZ	ESCI7	101032	2023-11-16	2024-11-15
SIGNAL ANALYZER	ROHDE&SCHWA RZ	FSQ40	100010	2023-11-16	2024-11-15
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	2023-11-16	2024-11-15
Broadband Preamplilifier	SCHWARZBECK	BBV9718D	00008	2023-11-16	2024-11-15
Horn Antenna	SCHWARZBECK	BBHA9120D	2597	2023-11-16	2024-11-15
EZ_EMC	Frad	FA-03A2 RE+	/	2023-11-16	2024-11-15
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	2023-11-16	2024-11-15
Log periodic antenna	SCHWARZBECK	VULB 9168	01328	2023-11-13	2024-11-12



### 4.2 Test Auxiliary Equipment

The EUT was tested as an independent device.

### 4.3 Test Modes

No.	Test Modes	Description
TM1	TX-GFSK	Keep the EUT in continuously transmitting mode (non-hopping) with
	(Non-Hopping)	GFSK modulation.
TM2	TX-Pi/4DQPSK	Keep the EUT in continuously transmitting mode (non-hopping) with
	(Non-Hopping)	Pi/4DQPSK modulation.
TM3	TX-8DPSK	Keep the EUT in continuously transmitting mode (non-hopping) with
1 1013	(Non-Hopping)	8DPSK modulation.
TM4	TX-GFSK (Hopping)	Keep the EUT in continuously transmitting mode (hopping) with GFSK modulation,.
TNAS	TX-Pi/4DQPSK	Keep the EUT in continuously transmitting mode (hopping) with
TM5	(Hopping)	Pi/4DQPSK modulation.
TM6	TX-8DPSK (Hopping)	Keep the EUT in continuously transmitting mode (hopping) with 8DPSK modulation.



### 5 Evaluation Results (Evaluation)

### 5.1 Antenna requirement

Test Requirement:	Refer to 47 CFR Part 15.203, 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 shall be considered sufficient to comply with the provisions of this section.

### 5.1.1 Conclusion:





### 6 Radio Spectrum Matter Test Results (RF)

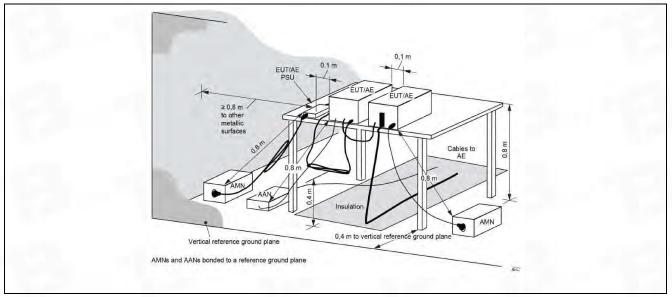
### 6.1 Conducted Emission at AC power line

Test Requirement:	Refer to 47 CFR 15.207(a), Except as shown in paragraphs (b)and (c)of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 $\mu$ H/50 ohms line impedance stabilization network (LISN).		
Test Method:	ANSI C63.10-2013 section 6.2		
	Frequency of emission (MHz)	Conducted limit (dBµV)	
		Quasi-peak	Average
Test Limit:	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	5-30	60	50
	*Decreases with the logarithm of t	he frequency.	
Procedure:	Refer to ANSI C63.10-2013 section 6.2, standard test method for ac power-line conducted emissions from unlicensed wireless devices		

### 6.1.1 E.U.T. Operation:

Operating Environment:			
Temperature:	23 °C		
Humidity:	45.4 %		
Atmospheric Pressure:	1010 mbar		

### 6.1.2 Test Setup Diagram:





Test Report Number: BTF240830R00201

### 6.1.3 Test Data:

Not Applicable. Note:When the EUT is charging, the Bluetooth can't work.



### 6.2 Occupied Bandwidth

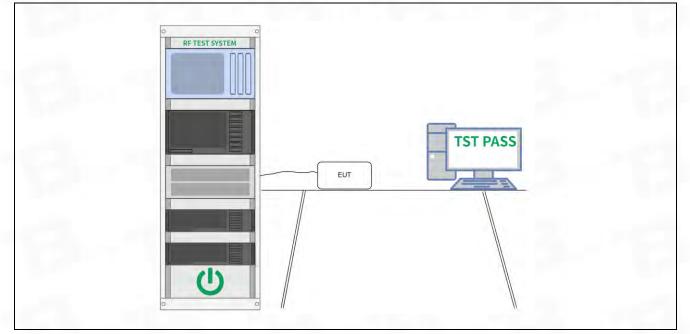
Test Requirement:	47 CFR 15.215(c)
	ANSI C63.10-2013, section 7.8.7, For occupied bandwidth measurements, use the
Test Method:	procedure in 6.9.2.
	KDB 558074 D01 15.247 Meas Guidance v05r02
Test Limit:	Refer to 47 CFR 15.215(c), intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.
	a) The spectrum analyzer center frequency is set to the nominal EUT channel
	<ul> <li>center frequency. The span range for the EMI receiver or spectrum analyzer shall be between two times and five times the OBW.</li> <li>b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW,</li> </ul>
	unless otherwise specified by the applicable requirement.
	c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the
	<ul><li>reference level. Specific guidance is given in 4.1.5.2.</li><li>d) Steps a) through c) might require iteration to adjust within the specified tolerances.</li></ul>
	e) The dynamic range of the instrument at the selected RBW shall be more than 10 dB below the target "-xx dB down" requirement; that is, if the requirement calls for measuring the -20 dB OBW, the instrument noise floor at the selected RBW shall be at least 30 dB below the
Procedure:	<ul> <li>reference value.</li> <li>f) Set detection mode to peak and trace mode to max hold.</li> <li>g) Determine the reference value: Set the EUT to transmit an unmodulated carrier or modulated signal, as applicable. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value).</li> </ul>
	<ul> <li>h) Determine the "-xx dB down amplitude" using [(reference value) - xx].</li> <li>Alternatively, this calculation may be made by using the marker-delta function of</li> </ul>
	the instrument. i) If the reference value is determined by an unmodulated carrier, then turn the EUT modulation ON, and either clear the evicting trace or start a new trace on the
	modulation ON, and either clear the existing trace or start a new trace on the spectrum analyzer and allow the new trace to stabilize. Otherwise, the trace from step g) shall be used for step j).
	j) Place two markers, one at the lowest frequency and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the "-xx dB down amplitude" determined in step h). If a marker is below this "-xx dB down amplitude" value, then it shall be as close as possible to
	this value. The occupied bandwidth is the frequency difference between the two markers. Alternatively, set a marker at the lowest frequency of the envelope of the spectral display, such that the marker is at or slightly below the "-xx dB down
	amplitude" determined in step h). Reset the marker-delta function and move the marker to the other side of the emission until the delta marker amplitude is at the same level as the reference marker amplitude. The marker-delta frequency reading at this point is the specified emission bandwidth.
	<ul> <li>k) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).</li> </ul>



### 6.2.1 E.U.T. Operation:

Operating Environment:		
Temperature:	22.9 °C	
Humidity:	49.6 %	
Atmospheric Pressure:	1010 mbar	

### 6.2.2 Test Setup Diagram:



### 6.2.3 Test Data:

Please Refer to Appendix for Details.



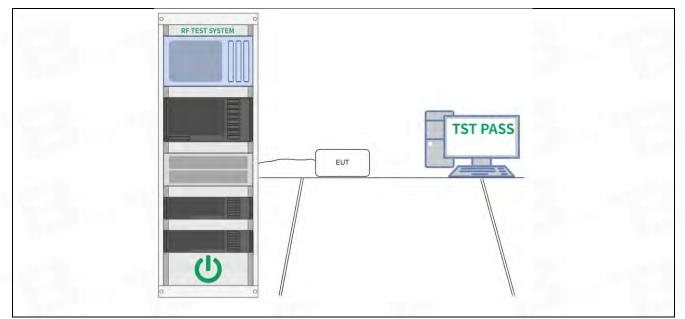
### 6.3 Maximum Conducted Output Power

Test Requirement:	47 CFR 15.247(b)(1)
Test Method:	ANSI C63.10-2013, section 7.8.5
	KDB 558074 D01 15.247 Meas Guidance v05r02
Test Limit:	Refer to 47 CFR 15.247(b)(1), For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.
Procedure:	<ul> <li>This is an RF-conducted test to evaluate maximum peak output power. Use a direct connection between the antenna port of the unlicensed wireless device and the spectrum analyzer, through suitable attenuation. The hopping shall be disabled for this test: <ul> <li>a) Use the following spectrum analyzer settings:</li> <li>1) Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel.</li> <li>2) RBW &gt; 20 dB bandwidth of the emission being measured.</li> <li>3) VBW &gt;= RBW.</li> <li>4) Sweep: Auto.</li> <li>5) Detector function: Peak.</li> <li>6) Trace: Max hold.</li> <li>b) Allow trace to stabilize.</li> <li>c) Use the marker-to-peak function to set the marker to the peak of the emission.</li> <li>d) The indicated level is the peak output power, after any corrections for external attenuators and cables.</li> <li>e) A plot of the test results and setup description shall be included in the test report. NOTE—A peak responding power meter may be used, where the power meter and sensor system video bandwidth is greater than the occupied bandwidth of the unlicensed wireless device, rather than a spectrum analyzer.</li> </ul> </li> </ul>

### 6.3.1 E.U.T. Operation:

Operating Environment:	
Temperature:	22.9 °C
Humidity:	49.6 %
Atmospheric Pressure:	1010 mbar
6.3.2 Test Setup Diagram:	





# **6.3.3 Test Data:** Please Refer to Appendix for Details.



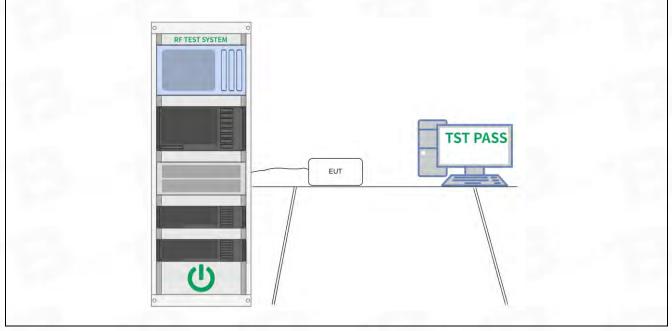
### 6.4 Channel Separation

Test Requirement:	47 CFR 15.247(a)(1)					
Test Method:	ANSI C63.10-2013, section 7.8.2					
	KDB 558074 D01 15.247 Meas Guidance v05r02					
Test Limit:	Refer to 47 CFR 15.247(a)(1), 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 bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.					
Procedure:	The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings: a) Span: Wide enough to capture the peaks of two adjacent channels. b) RBW: Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel. c) Video (or average) bandwidth (VBW) ≥ RBW. d) Sweep: Auto. e) Detector function: Peak. f) Trace: Max hold. g) Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. Compliance of an EUT with the appropriate regulatory limit shall be determined. A plot of the data shall be included in the test report.					

### 6.4.1 E.U.T. Operation:

Operating Environment:	
Temperature:	22.9 °C
Humidity:	49.6 %
Atmospheric Pressure:	1010 mbar

### 6.4.2 Test Setup Diagram:



### 6.4.3 Test Data:

Please Refer to Appendix for Details.

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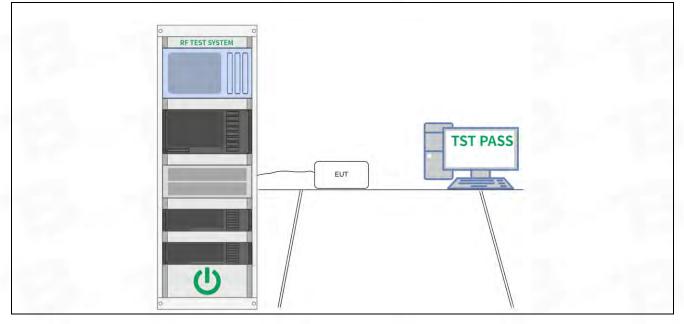
### 6.5 Number of Hopping Frequencies

Test Requirement:	47 CFR 15.247(a)(1)(iii)
Test Method:	ANSI C63.10-2013, section 7.8.3
	KDB 558074 D01 15.247 Meas Guidance v05r02
Test Limit:	Refer to 47 CFR 15.247(a)(1)(iii), Fequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.
Procedure:	<ul> <li>The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:</li> <li>a) Span: The frequency band of operation. Depending on the number of channels the device supports, it may be necessary to divide the frequency range of operation across multiple spans, to allow the individual channels to be clearly seen.</li> <li>b) RBW: To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.</li> <li>c) VBW ≥ RBW.</li> <li>d) Sweep: Auto.</li> <li>e) Detector function: Peak.</li> <li>f) Trace: Max hold.</li> <li>g) Allow the trace to stabilize.</li> <li>It might prove necessary to break the span up into subranges to show clearly all of the hopping frequencies. Compliance of an EUT with the appropriate regulatory limit shall be determined for the number of hopping channels. A plot of the data shall be included in the test report.</li> </ul>
651 EUT Operation:	

### 6.5.1 E.U.T. Operation:

Operating Environment:	
Temperature:	22.9 °C
Humidity:	49.6 %
Atmospheric Pressure:	1010 mbar

### 6.5.2 Test Setup Diagram:



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**6.5.3 Test Data:** Please Refer to Appendix for Details.



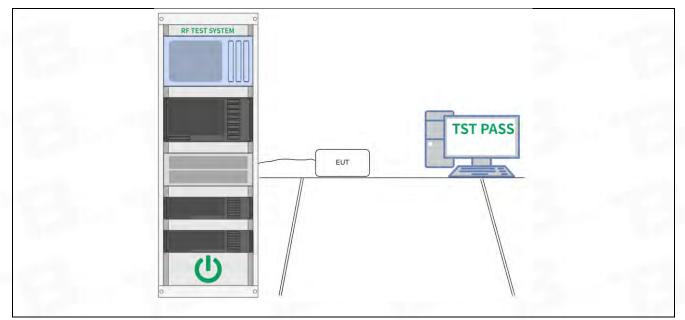
### 6.6 Dwell Time

Test Method:       ANSI C63.10-2013, section 7.8.4 KDB 558074 D01 15.247 Meas Guidance v05r02         Test Limit:       Refer to 47 CFR 15.247 (a)(1)(iii), Fequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.         The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:       a) Span. Zero span, centered on a hopping channel.         b) RBW shall be <= channel spacing and where possible RBW should be set >> 1 / T, where T is the expected dwell time per channel.       c) Sweep: As necessary to capture the entire dwell time per hopping channel; where possible use a video trigger and trigger delay so that the transmitted signal starts a little to the right of the start of the plot. The trigger level might need slight adjustment to prevent triggering when the system hops on an adjacent channel; a second plot might be needed with a longer sweep time to show two successive hops on a channel.         d) Detector function: Peak.       e) Trace: Max hold.         Use the marker-delta function to determine the transmit time per hop. If this value varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation in transmit time.         Repeat the measurement using a longer sweep time to determine the number of hops or the period specified in the requirements, using the following equation:         (Number of	Test Requirement:	47 CFR 15.247(a)(1)(iii)
Procedure:       Refer to 47 CFR 15.247 (a)(1)(iii). Fequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.         The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:       a) Span: Zero span, centered on a hopping channel.         b) RBW shall be <= channel spacing and where possible RBW should be set >> 1 / T, where T is the expected dwell time per channel.       c) Sweep: As necessary to capture the entire dwell time per hopping channel; where possible use a video trigger and trigger delay so that the transmitted signal starts a little to the right of the start of the plot. The trigger level might need slight adjustment to prevent triggering when the system hops on an adjacen channel; a second plot might be needed with a longer sweep time to show two successive hops on a channel.         d) Detector function: Peak.       e) Trace: Max hold.         use the marker-delta function to determine the transmit time per hop. If this value varies with different modes of operation (data rate, modulation format, number of hopping equation: (Number of hops in the period specified in the requirements) = (number of hops in the period specified in the requirements) = (number of hops in the period specified in the requirements / analyzer sweep time)         If the total number of hops in the period specified in the requirements / analyzer sweep time)       multiplied by the number of hopping channels, etc.), then repeat this test for each va	Test Method:	
Test Limit:       MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.         The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings: <ul> <li>a) Span: Zero span, centered on a hopping channel.</li> <li>b) RBW shall be &lt;= channel spacing and where possible RBW should be set &gt;&gt; 1 / T, where T is the expected dwell time per channel.</li> <li>c) Sweep: As necessary to capture the entire dwell time per hopping channel; where possible use a video trigger and trigger delay so that the transmitted signal starts a little to the right of the start of the plot. The trigger level might need slight adjustment to prevent triggering when the system hops on an adjacent channel; a second plot might be needed with a longer sweep time to show two successive hops on a channel.</li> <li>d) Detector function: Peak.</li> <li>e) Trace: Max hold.</li> <li>Use the marker-della function to determine the transmit time per hop. If this value varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation in transmit time.</li> </ul> Procedure:     Repeat the measurement using a longer sweep time to determine the number of hops over the sweep time shall be equal to, or less than, the period specified in the requirements, using the following equation:                          (Number of hops in the period specified in the requirements) = (number of hops in the period specified in the requirements / analyzer sweep time)	rest method.	
<ul> <li>analyzer settings: <ul> <li>a) Span: Zero span, centered on a hopping channel.</li> <li>b) RBW shall be &lt;= channel spacing and where possible RBW should be set &gt;&gt; 1 / T, where T is the expected dwell time per channel.</li> <li>c) Sweep: As necessary to capture the entire dwell time per hopping channel; where possible use a video trigger and trigger delay so that the transmitted signal starts a little to the right of the start of the plot. The trigger level might need slight adjustment to prevent triggering when the system hops on an adjacent channel; a second plot might be needed with a longer sweep time to show two successive hops on a channel.</li> <li>d) Detector function: Peak.</li> <li>e) Trace: Max hold.</li> <li>Use the marker-delta function to determine the transmit time per hop. If this value varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation in transmit time.</li> <li>Repeat the measurement using a longer sweep time to determine the number of hops over the period specified in the requirements. The sweep time shall be equal to, or less than, the period specified in the requirements, using the following equation: <ul> <li>(Number of hops in the period specified in the requirements, using the following equation:</li> <li>(Number of hops on spectrum analyzer) × (period specified in the requirements. If the number of hops in a specific time varies with different modes of operation data rate, modulation format, number of hops in a specific time varies with different modes specified in the requirements.</li> </ul> </li> </ul></li></ul>	Test Limit:	MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency
	Procedure:	analyzer settings: a) Span: Zero span, centered on a hopping channel. b) RBW shall be <= channel spacing and where possible RBW should be set >> 1 / T, where T is the expected dwell time per channel. c) Sweep: As necessary to capture the entire dwell time per hopping channel; where possible use a video trigger and trigger delay so that the transmitted signal starts a little to the right of the start of the plot. The trigger level might need slight adjustment to prevent triggering when the system hops on an adjacent channel; a second plot might be needed with a longer sweep time to show two successive hops on a channel. d) Detector function: Peak. e) Trace: Max hold. Use the marker-delta function to determine the transmit time per hop. If this value varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation in transmit time. Repeat the measurement using a longer sweep time to determine the number of hops over the period specified in the requirements. Determine the number of hops over the sweep time and calculate the total number of hops in the period specified in the requirements, using the following equation: (Number of hops in the period specified in the requirements) = (number of hops on spectrum analyzer) × (period specified in the requirements / analyzer sweep time) The average time of occupancy is calculated from the transmit time per hop multiplied by the number of hops in the period specified in the requirements. If the number of hops in a specific time varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation.

### 6.6.1 E.U.T. Operation:

Operating Environment:				
Temperature:	22.9 °C			
Humidity:	49.6 %			
Atmospheric Pressure:	1010 mbar			
6.6.2 Test Setup Diagram:				





# **6.6.3 Test Data:** Please Refer to Appendix for Details.



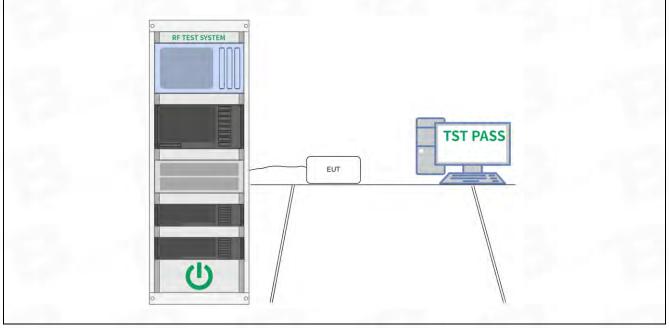
### 6.7 Emissions in non-restricted frequency bands

Test Requirement:	47 CFR 15.247(d), 15.209, 15.205				
Test Method:	ANSI C63.10-2013 section 7.8.8				
Test Method.	KDB 558074 D01 15.247 Meas Guidance v05r02				
Test Limit:	Refer to 47 CFR 15.247(d), 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.				
Procedure:	Conducted spurious emissions shall be measured for the transmit frequency, per 5.5 and 5.6, and at the maximum transmit powers. Connect the primary antenna port through an attenuator to the spectrum analyzer input; in the results, account for all losses between the unlicensed wireless device output and the spectrum analyzer. The instrument shall span 30 MHz to 10 times the operating frequency in GHz, with a resolution bandwidth of 100 kHz, video bandwidth of 300 kHz, and a coupled sweep time with a peak detector. The band 30 MHz to the highest frequency may be split into smaller spans, as long as the entire spectrum is covered.				

### 6.7.1 E.U.T. Operation:

Operating Environment:	
Temperature:	22.9 °C
Humidity:	49.6 %
Atmospheric Pressure:	1010 mbar

### 6.7.2 Test Setup Diagram:



### 6.7.3 Test Data:

Please Refer to Appendix for Details.

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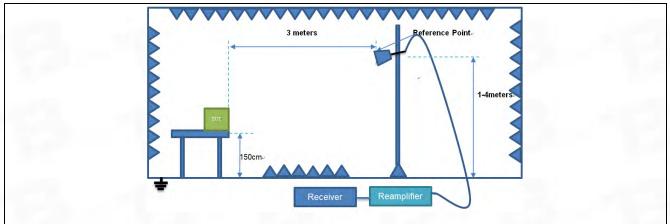
### 6.8 Band edge emissions (Radiated)

Test Requirement:	Refer to 47 CFR 15.247(d), In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated					
		in § 15.209(a)(see § 15.205(c))	).`			
Test Method:	ANSI C63.10-2013 section					
	KDB 558074 D01 15.247					
	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			
Test Limit:	Above 960	500	3			
	<ul> <li>** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.</li> <li>In the emission table above, the tighter limit applies at the band edges.</li> <li>The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.</li> </ul>					
Procedure:		ANSI C63.10-2013 section 6.10.5.2				
681 EILT Operation:						

### 6.8.1 E.U.T. Operation:

Operating Environment:	
Temperature:	23.1 °C
Humidity:	52.4 %
Atmospheric Pressure:	1010 mbar

### 6.8.2 Test Setup Diagram:





### 6.8.3 Test Data:

### Note:

All modes are tested, and only the worst mode GFSK is showed in the report The peak value is less than the AV limit 54dBuV/m, and the AV value is not evaluated L:

TM1 / Polari	TM1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 1 / CH: L							
No.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	
1	2310.00	87.81	-43.68	44.13	74.00	-29.87	peak	
2	2390.00	87.24	-43.64	43.60	74.00	-30.40	peak	
3	2400.00	88.38	-43.61	44.77	74.00	-29.23	peak	

TM1 / Polari	TM1 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 1 / CH: L							
No.Frequency (MHz)Reading Level(dBuV)Factor (dB)Level (dB)Limit (dBuV/m)Margin (dB)Detector								
1	2310.00	88.13	-43.68	44.45	74.00	-29.55	peak	
2	2390.00	87.56	-43.64	43.92	74.00	-30.08	peak	
3	2400.00	88.70	-43.61	45.09	74.00	-28.91	peak	

TM1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 1 / CH: H											
No.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector				
1	2483.50	88.94	-43.58	45.36	74.00	-28.64	peak				
2	2500.00	87.37	-43.58	43.79	74.00	-30.21	peak				

TM1 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 1 / CH: H										
No.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector			
1	2483.50	88.76	-43.58	45.18	74.00	-28.82	peak			
2	2500.00	86.98	-43.58	43.40	74.00	-30.60	peak			



### R:

TM1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 1 / CH: L											
No.Frequency (MHz)Reading Level(dBuV)Factor (dB)Level (dBuV/m)Limit (dBuV/m)Margin (dB)							Detector				
1	2310.00	88.38	-43.68	44.70	74.00	-29.30	peak				
2	2390.00	87.81	-43.64	44.17	74.00	-29.83	peak				
3	2400.00	88.95	-43.61	45.34	74.00	-28.66	peak				

TM1 / Polari	TM1 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 1 / CH: L											
No.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector					
1	2310.00	88.70	-43.68	45.02	74.00	-28.98	peak					
2	2390.00	88.13	-43.64	44.49	74.00	-29.51	peak					
3	2400.00	89.27	-43.61	45.66	74.00	-28.34	peak					

TM1 / Polari	TM1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 1 / CH: H											
No.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector					
1	2483.50	89.51	-43.58	45.93	74.00	-28.07	peak					
2	2500.00	87.94	-43.58	44.36	74.00	-29.64	peak					

TM1 / Polari	TM1 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 1 / CH: H										
No.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector				
1	2483.50	89.33	-43.58	45.75	74.00	-28.25	peak				
2	2500.00	87.55	-43.58	43.97	74.00	-30.03	peak				



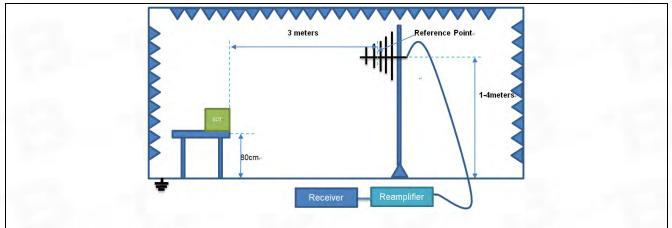
### 6.9 Emissions in frequency bands (below 1GHz)

	Refer to 47 CFR 15.247	(d), In addition, radiated emission	ons which fall in the			
Test Requirement:		ned in § 15.205(a), must also co in § 15.209(a)(see § 15.205(c))				
Test Method:	ANSI C63.10-2013 secti					
	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			
Test Limit:	Above 960	500	3			
	<ul> <li>** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.</li> <li>In the emission table above, the tighter limit applies at the band edges. The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands</li> </ul>					
Procedure:	ANSI C63.10-2013 secti	ents employing an average det on 6 6 4				
691 EUT Operation:	7.101 000.10 2010 3000					

### 6.9.1 E.U.T. Operation:

Operating Environment:	
Temperature:	23.1 °C
Humidity:	52.4 %
Atmospheric Pressure:	1010 mbar

### 6.9.2 Test Setup Diagram:

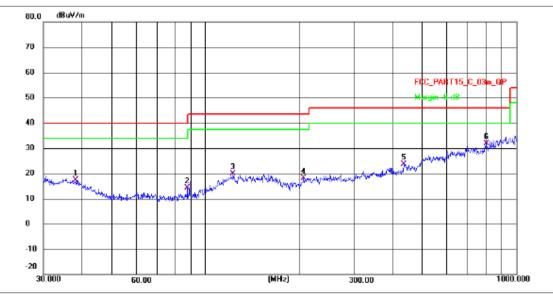




### 6.9.3 Test Data:

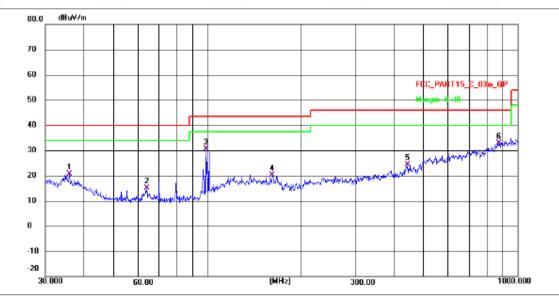
Note: All modes are tested, and only the worst mode GFSK is showed in the report L:

TM1 / Polarization: Horizontal / Band: 2400-2483.5 MHz



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	38.2791	27.13	-9.64	17.49	40.00	-22.51	QP	Р
2	87.4177	37.02	-22.66	14.36	40.00	-25.64	QP	P
3	122.6188	42.03	-22.25	19.78	43.50	-23.72	QP	P
4	207.1226	39.70	-21.47	18.23	43.50	-25.27	QP	P
5	434.8268	43.10	-19.54	23.56	46.00	-22.44	QP	Р
6 *	800.3817	49.62	-17.86	31.76	46.00	-14.24	QP	Р

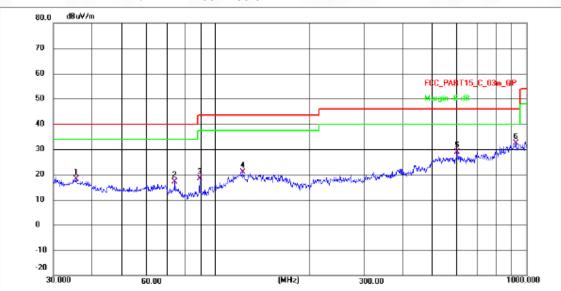




#### TM1 / Polarization: Vertical / Band: 2400-2483.5 MHz

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	35.9376	30.40	-9.66	20.74	40.00	-19.26	QP	Р
2	63.8707	24.58	-9.42	15.16	40.00	-24.84	QP	P
3 *	99.3538	44.39	-13.69	30.70	43.50	-12.80	QP	P
4	162.8959	34.44	-14.33	20.11	43.50	-23.39	QP	P
5	442.5177	36.87	-12.54	24.33	46.00	-21.67	QP	P
6	872.1832	49.53	-16.67	32.86	46.00	-13.14	QP	P

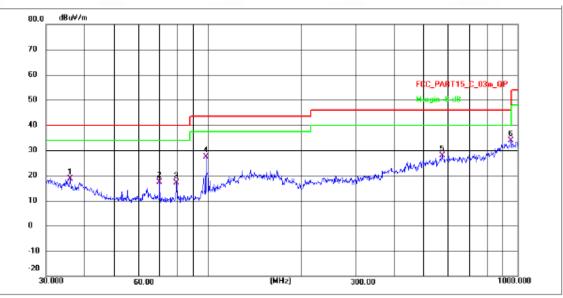




### R: TM1 / Polarization: Horizontal / Band: 2400-2483.5 MHz

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	35.5615	27.91	-9.67	18.24	40.00	-21.76	QP	Р
2	74.0052	26.41	-9.33	17.08	40.00	-22.92	QP	P
3	89.1200	41.08	-22.64	18.44	43.50	-25.06	QP	P
4	122.6187	43.03	-22.25	20.78	43.50	-22.72	QP	P
5	601.4265	47.11	-18.34	28.77	46.00	-17.23	QP	P
6 *	927.3808	48.36	-16.04	32.32	46.00	-13.68	QP	P





TM1 / Polarization: Vertical / Band: 2400-2483.5 MHz

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	35.9376	28.40	-9.66	18.74	40.00	-21.26	QP	P
2	69.9675	26.68	-9.36	17.32	40.00	-22.68	QP	P
3	79.3816	26.35	-9.27	17.08	40.00	-22.92	QP	P
4	98.6594	49.87	-22.49	27.38	43.50	-16.12	QP	P
5	571.6113	46.48	-18.53	27.95	46.00	-18.05	QP	P
6 *	955.4380	49.74	-15.87	33.87	46.00	-12.13	QP	P



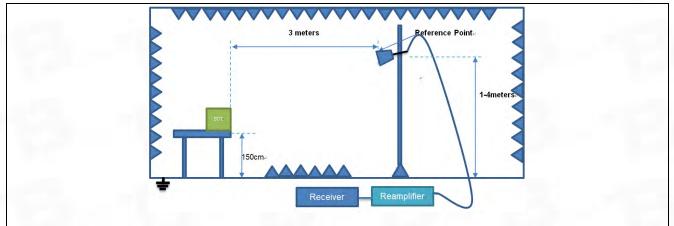
### 6.10 Emissions in frequency bands (above 1GHz)

	In addition, radiated emi	ssions which fall in the restricted	d bands, as defined in §						
Test Requirement:		mply with the radiated emission	limits specified in §						
		15.209(a)(see § 15.205(c)).`							
Test Method:	ANSI C63.10-2013 section 6.6.4								
rest metriod.	KDB 558074 D01 15.24	KDB 558074 D01 15.247 Meas Guidance v05r02							
	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						
Test Limit:	Above 960	Above 960 500 3							
	radiators operating under 54-72 MHz, 76-88 MHz, these frequency bands i 15.231 and 15.241. In the emission table about The emission limits show employing a CISPR qua 110–490 kHz and above	paragraph (g), fundamental em er this section shall not be locate 174-216 MHz or 470-806 MHz. s permitted under other sections ove, the tighter limit applies at th wn in the above table are based si-peak detector except for the f e 1000 MHz. Radiated emission tents employing an average det	ed in the frequency bands However, operation within s of this part, e.g., §§ he band edges. on measurements frequency bands 9–90 kHz, limits in these three bands						
Procedure:	ANSI C63.10-2013 secti	on 6.6.4							
6 10 1 E U T Operation	<u>.</u>								

### 6.10.1 E.U.T. Operation:

Operating Environment:	
Temperature:	23.1 °C
Humidity:	52.4 %
Atmospheric Pressure:	1010 mbar

### 6.10.2Test Setup Diagram:





### 6.10.3Test Data:

Note:

All modes are tested, and only the worst mode GFSK is showed in the report L:

TM1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 1 / CH: L									
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector		
1	4804.000	94.24	-48.83	45.41	74.00	-28.59	peak		
2	7206.000	88.25	-46.88	41.37	74.00	-32.63	peak		
3	9608.000	90.25	-45.51	44.74	74.00	-29.26	peak		

TM1 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 1 / CH: L									
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector		
1	4804.000	94.59	-48.83	45.76	74.00	-28.24	peak		
2	7206.000	88.50	-46.88	41.62	74.00	-32.38	peak		
3	9608.000	90.93	-45.51	45.42	74.00	-28.58	peak		

TM1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 1 / CH: M									
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector		
1	4882.000	93.68	-48.83	44.85	74.00	-29.15	peak		
2	7323.000	87.69	-46.88	40.81	74.00	-33.19	peak		
3	9764.000	89.69	-45.51	44.18	74.00	-29.82	peak		

TM1 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 1 / CH: M									
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector		
1	4882.000	94.03	-48.83	45.20	74.00	-28.80	peak		
2	7323.000	87.94	-46.88	41.06	74.00	-32.94	peak		
3	9764.000	90.37	-45.51	44.86	74.00	-29.14	peak		

TM1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 1 / CH: H									
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector		
1	4960.000	94.70	-48.71	45.99	74.00	-28.01	peak		
2	7440.000	88.71	-46.76	41.95	74.00	-32.05	peak		
3	9920.000	90.71	-45.39	45.32	74.00	-28.68	peak		

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	4960.000	94.99	-48.71	46.28	74.00	-27.72	peak
2	7440.000	88.90	-46.76	42.14	74.00	-31.86	peak
3	9920.000	91.33	-45.39	45.94	74.00	-28.06	peak

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R:

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	4804.000	94.82	-48.83	45.99	74.00	-28.01	peak
2	7206.000	87.14	-46.88	40.26	74.00	-33.74	peak
3	9608.000	89.25	-45.51	43.74	74.00	-30.26	peak

TM1 / Polariz	zation: vertical	/ Band: 2400-	-2483.5 MHZ	/ BW: 1 / CH:	L		
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	4804.000	95.17	-48.83	46.34	74.00	-27.66	peak
2	7206.000	87.39	-46.88	40.51	74.00	-33.49	peak
3	9608.000	89.93	-45.51	44.42	74.00	-29.58	peak

TM1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 1 / CH: M									
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector		
1	4882.000	94.26	-48.83	45.43	74.00	-28.57	peak		
2	7323.000	86.58	-46.88	39.70	74.00	-34.30	peak		
3	9764.000	88.69	-45.51	43.18	74.00	-30.82	peak		

ſ	TM1 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 1 / CH: M							
	No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
	1	4882.000	94.61	-48.83	45.78	74.00	-28.22	peak
	2	7323.000	86.83	-46.88	39.95	74.00	-34.05	peak
	3	9764.000	89.37	-45.51	43.86	74.00	-30.14	peak

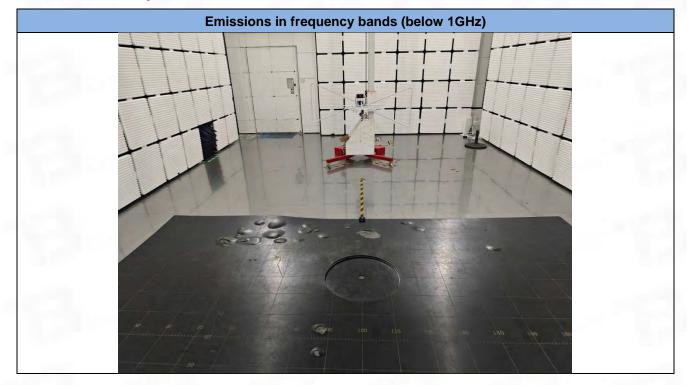
TM1 / Polari	TM1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 1 / CH: H							
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	
1	4960.000	95.28	-48.71	46.57	74.00	-27.43	peak	
2	7440.000	87.60	-46.76	40.84	74.00	-33.16	peak	
3	9920.000	89.71	-45.39	44.32	74.00	-29.68	peak	

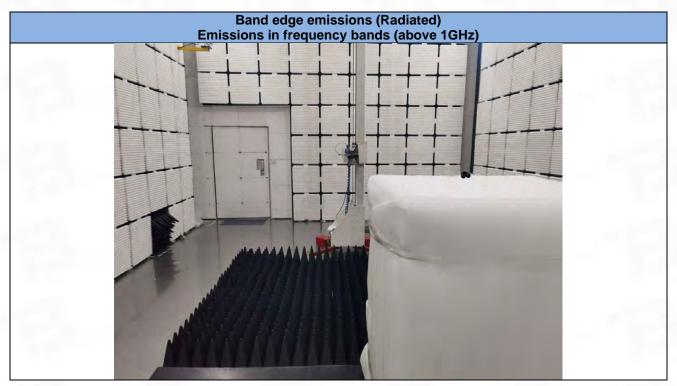
TM1 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 1 / CH: H								
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	
1	4960.000	95.57	-48.71	46.86	74.00	-27.14	peak	
2	7440.000	87.79	-46.76	41.03	74.00	-32.97	peak	
3	9920 000	90.33	-45 39	44 94	74 00	-29.06	peak	

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### 7 Test Setup Photos







Test Report Number: BTF240830R00201

# Appendix

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# L:

# 1. Bandwidth

## 1.1 Test Result

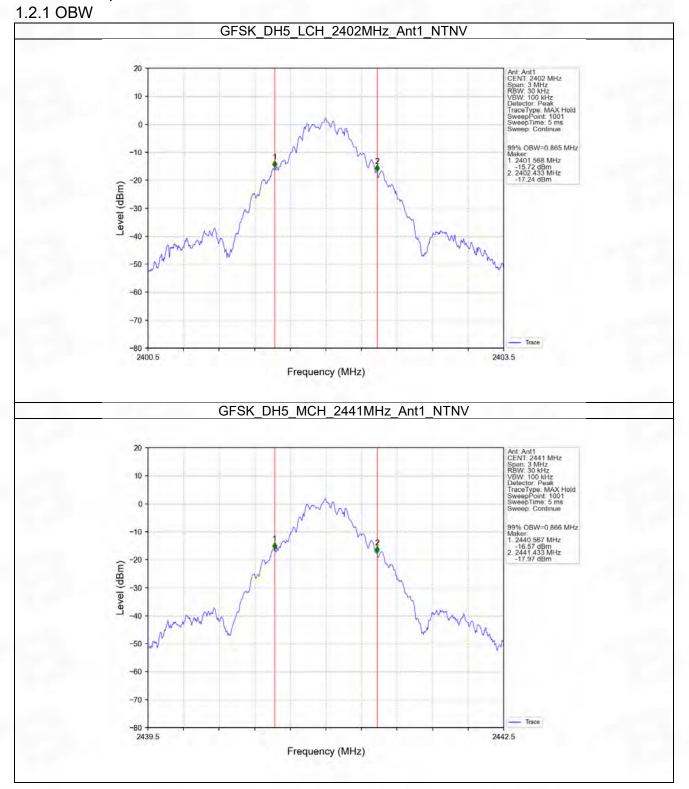
#### 1.1.1 OBW

Mode	ТΧ	Frequency	Packet	ANT	99% Occupied Bandwidth (MHz)		Verdict
Mode	Туре	(MHz)	Туре	ANT	Result	Limit	verdict
		2402	DH5	1	0.865	/	Pass
GFSK	SISO	2441	DH5	1	0.866	/	Pass
		2480	DH5	1	0.870	/	Pass
		2402	2DH5	1	1.163	/	Pass
Pi/4DQPSK	SISO	2441	2DH5	1	1.160	/	Pass
		2480	2DH5	1	1.163	/	Pass
Contraction of the	1000	2402	3DH5	1	1.177	/	Pass
8DPSK	SISO	2441	3DH5	1	1.177	/	Pass
		2480	3DH5	1	1.176	/	Pass

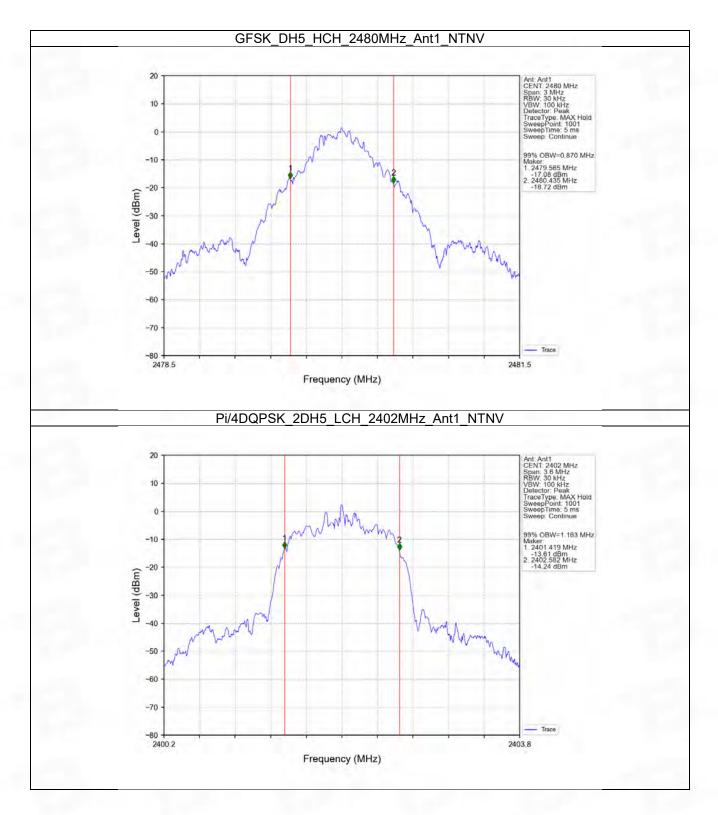
#### 1.1.2 20dB BW

Mode	ΤX	Frequency	Packet	ANT	20dB Bandwidth (MHz)		Verdict
wode	Туре	(MHz)	Туре	ANT	Result	Limit	verdict
		2402	DH5	1	0.950	/	Pass
GFSK	SISO	2441	DH5	1	0.953	/	Pass
		2480	DH5	1	0.953	/	Pass
	SISO	2402	2DH5	1	1.260	/	Pass
Pi/4DQPSK		2441	2DH5	1	1.257	/	Pass
1000		2480	2DH5	1	1.255	/	Pass
		2402	3DH5	1	1.298	/	Pass
8DPSK	SISO	2441	3DH5	1	1.283	/	Pass
		2480	3DH5	1	1.292	/	Pass

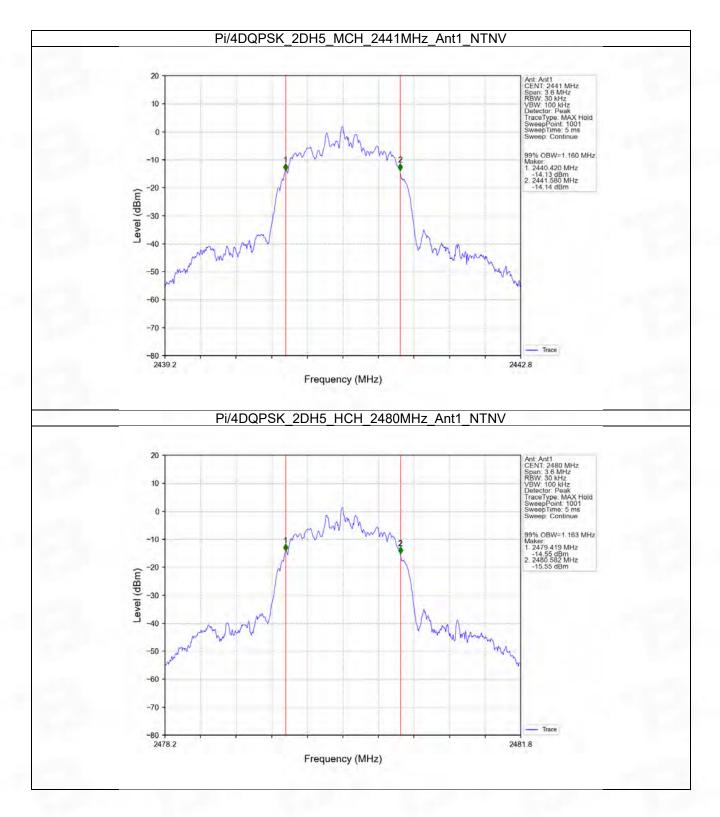




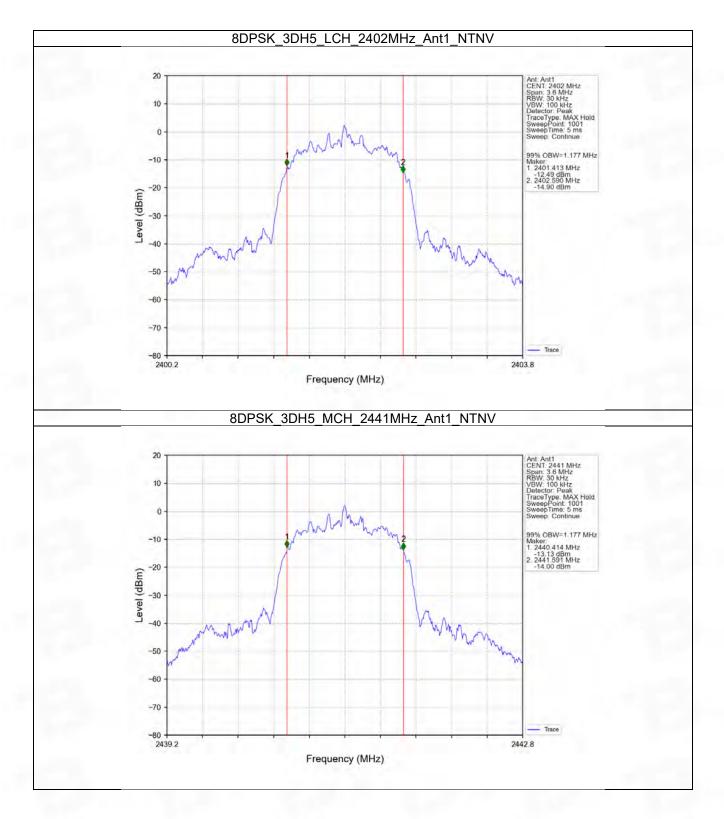




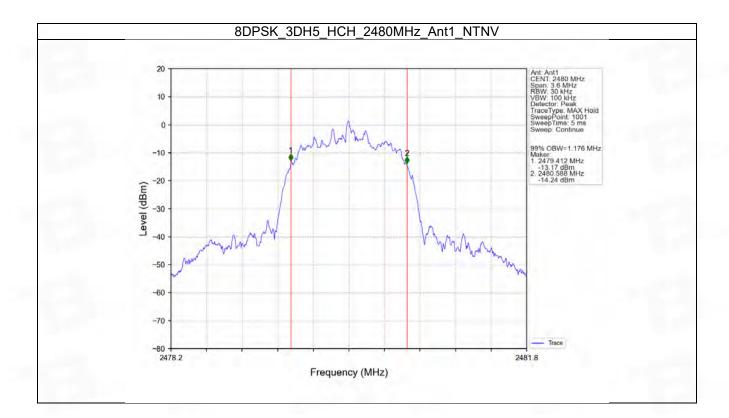






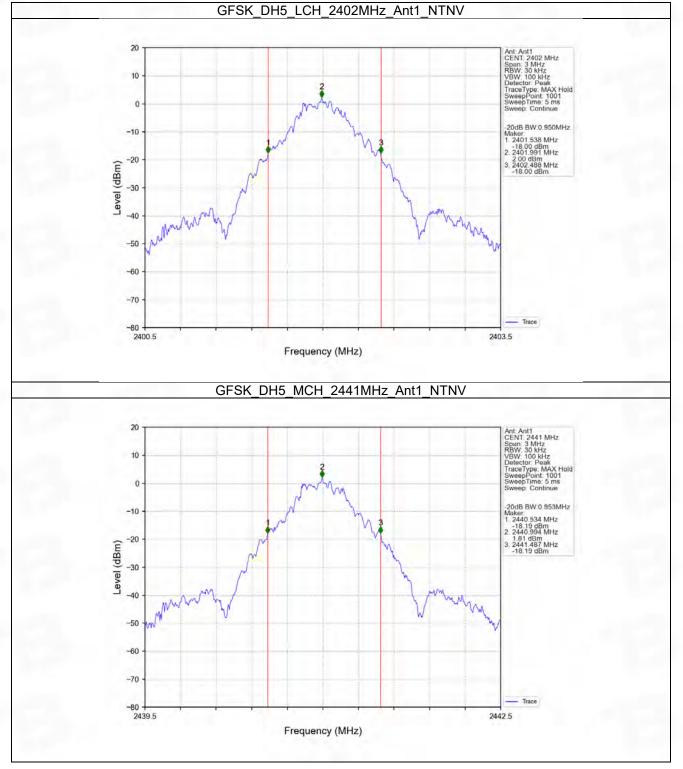




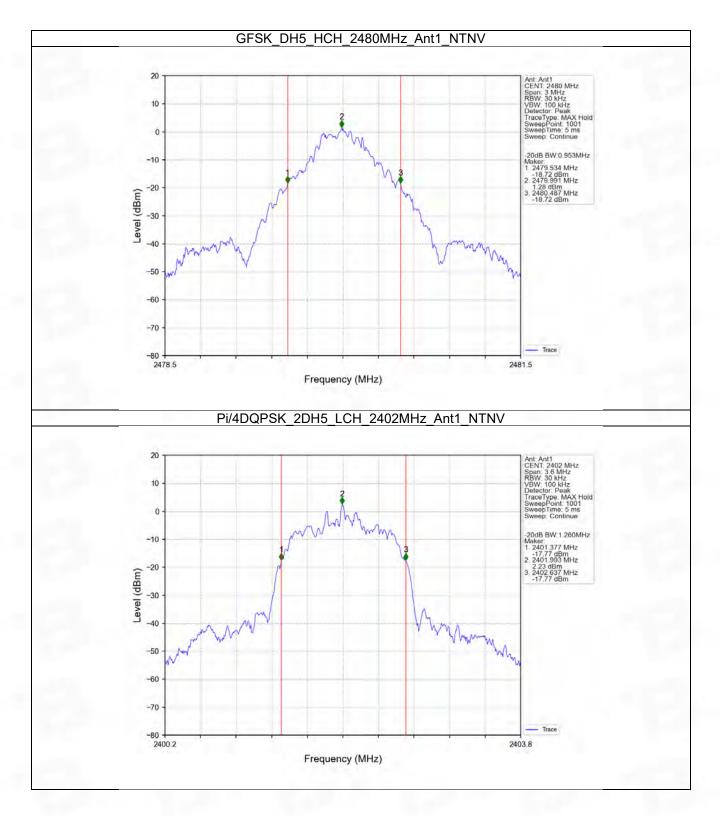




#### 1.2.2 20dB BW

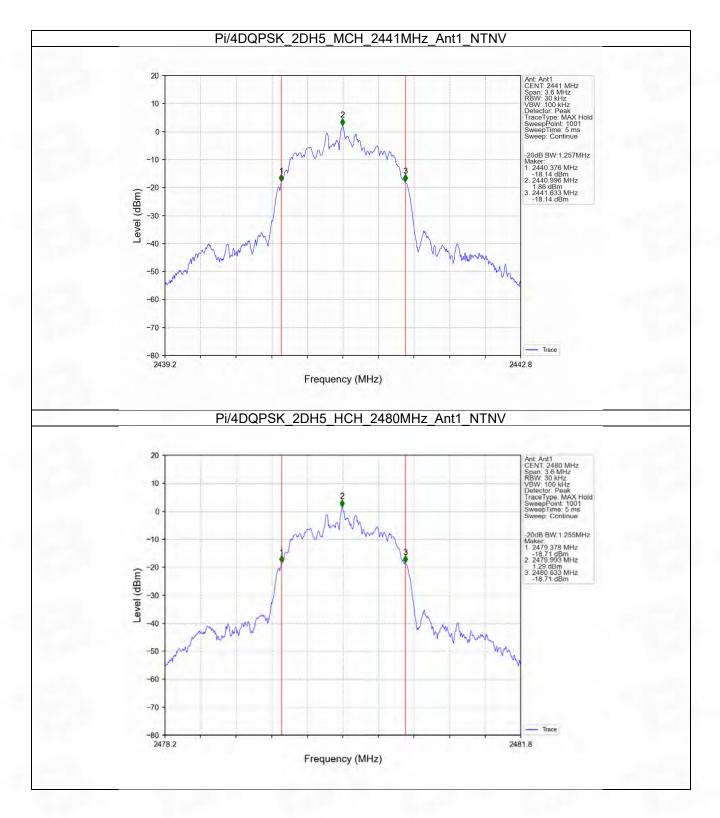






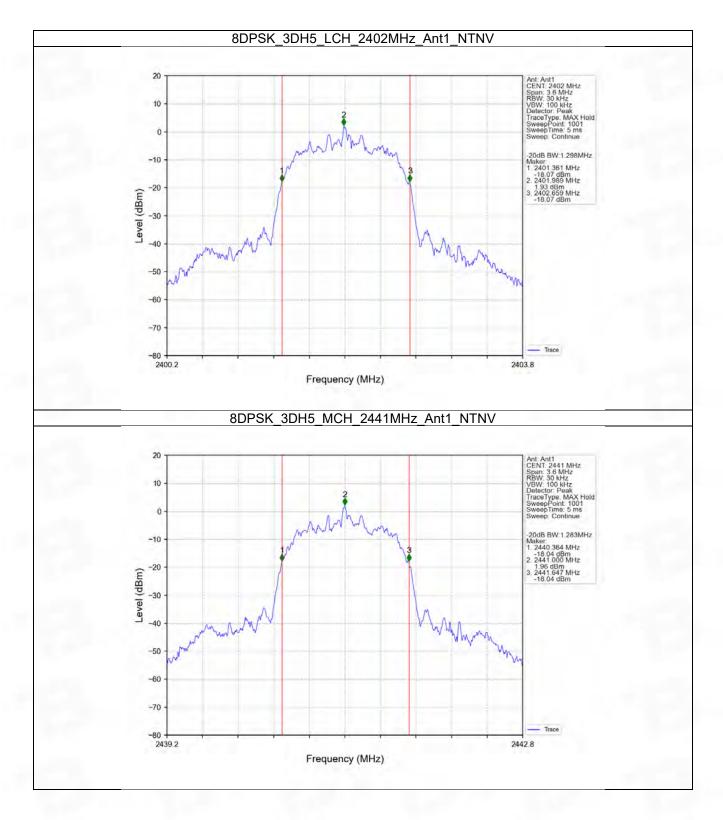
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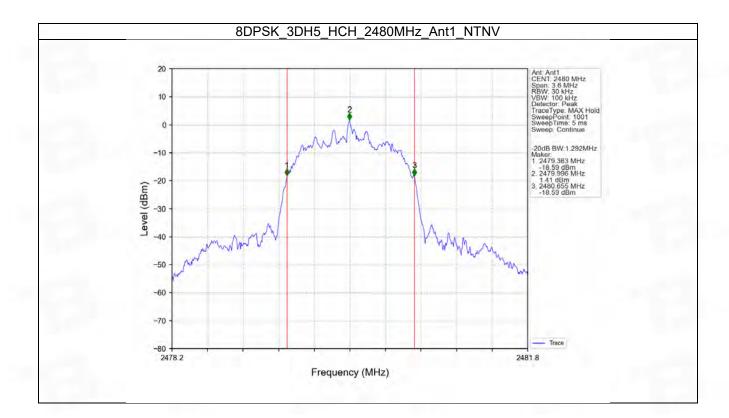


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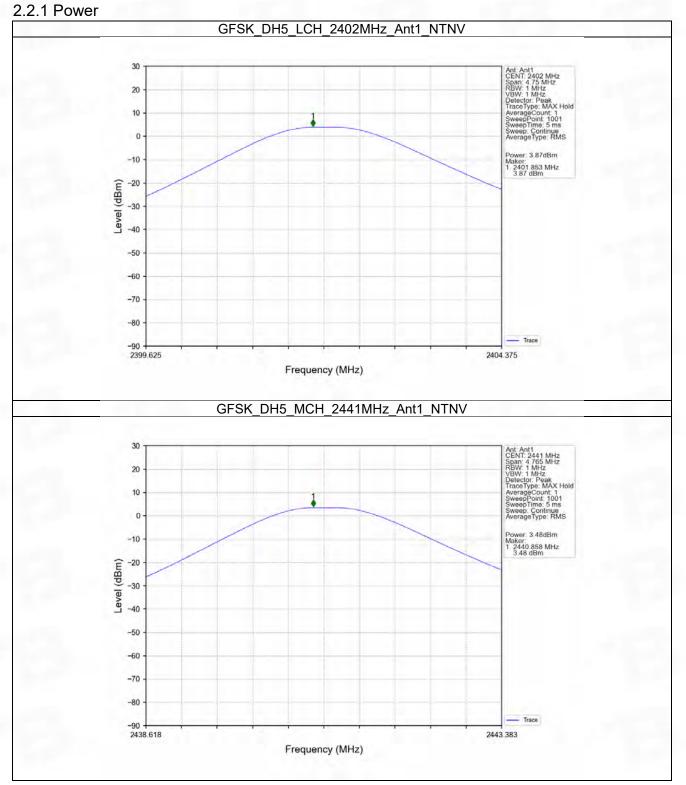
## 2. Maximum Conducted Output Power

## 2.1 Test Result

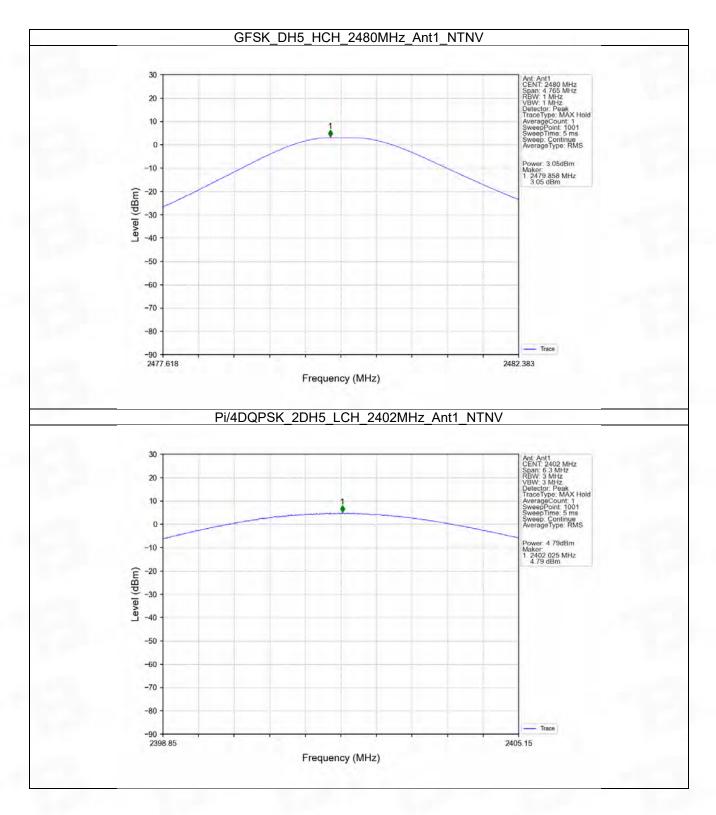
### 2.1.1 Power

Mode	TX	Frequency (MHz)	Packet	Maximum Peak Cond (dB	Verdict	
	Туре		Туре	ANT1	Limit	
GFSK SISO		2402	DH5	3.87	<=30	Pass
	SISO	2441	DH5	3.48	<=30	Pass
		2480	DH5	3.05	<=30	Pass
		2402	2DH5	4.79	<=20.97	Pass
Pi/4DQPSK	SISO	2441	2DH5	4.43	<=20.97	Pass
		2480	2DH5	3.86	<=20.97	Pass
		2402	3DH5	5.23	<=20.97	Pass
8DPSK	SISO	2441	3DH5	4.84	<=20.97	Pass
		2480	3DH5	4.28	<=20.97	Pass
Note1: Antenn	ia Gain: An	t1: 2.78dBi;				1.0

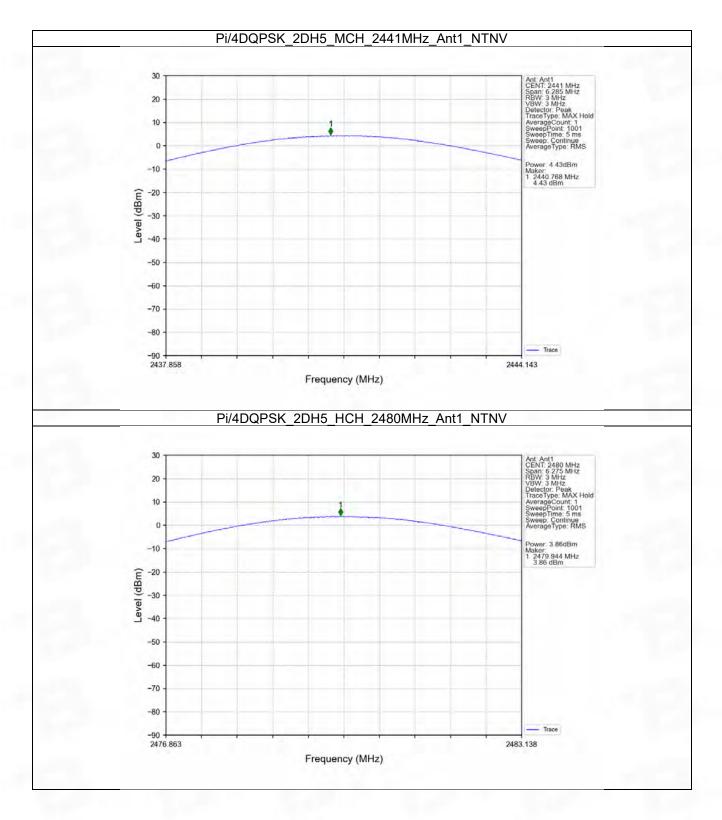






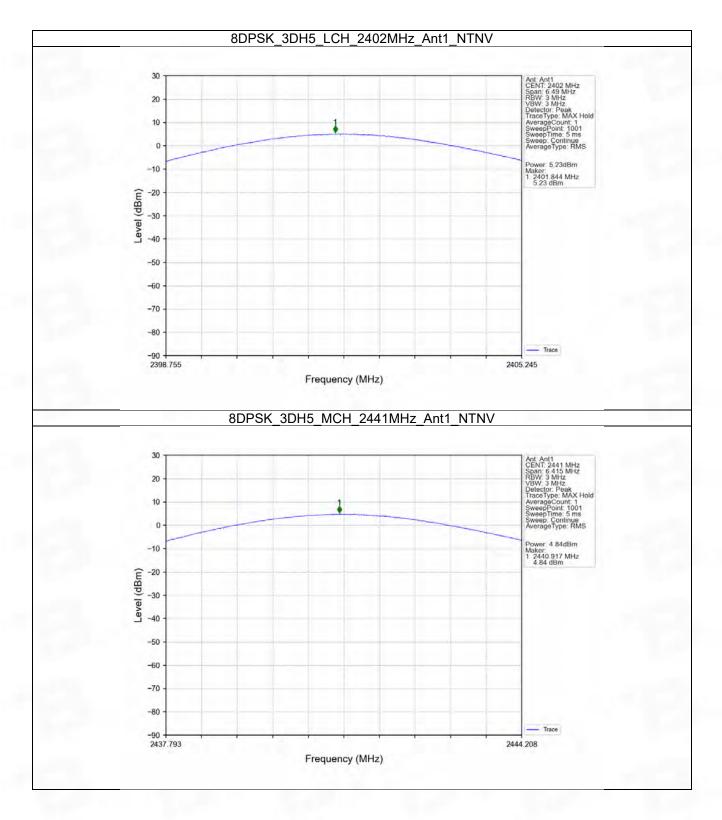






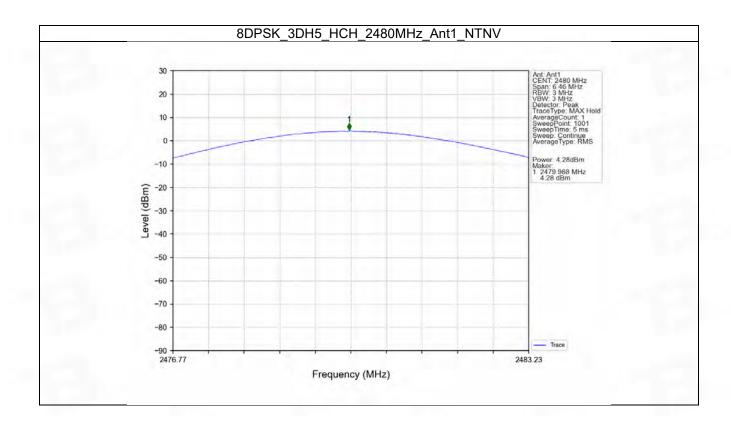
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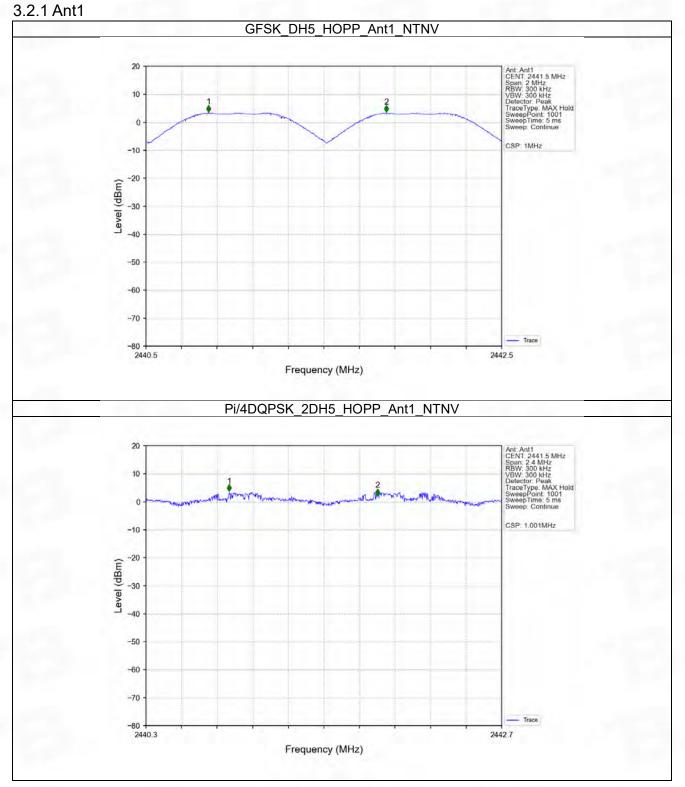
# 3. Carrier Frequency Separation

## 3.1 Test Result

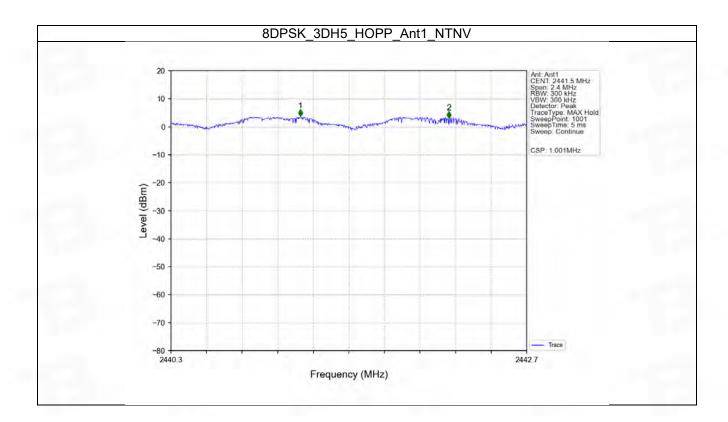
#### 3.1.1 Ant1

	Ant1									
Mode	ΤX	Frequency	Packet	Channel Separation	20dB Bandwidth	Limit	Verdict			
Mode	Туре	(MHz)	Туре	(MHz)	(MHz)	(MHz)	verdict			
GFSK	SISO	HOPP	DH5	1.000	0.953	>=0.953	Pass			
Pi/4DQPSK	SISO	HOPP	2DH5	1.001	1.260	>=0.84	Pass			
8DPSK	SISO	HOPP	3DH5	1.001	1.298	>=0.865	Pass			











# 4. Number of Hopping Frequencies

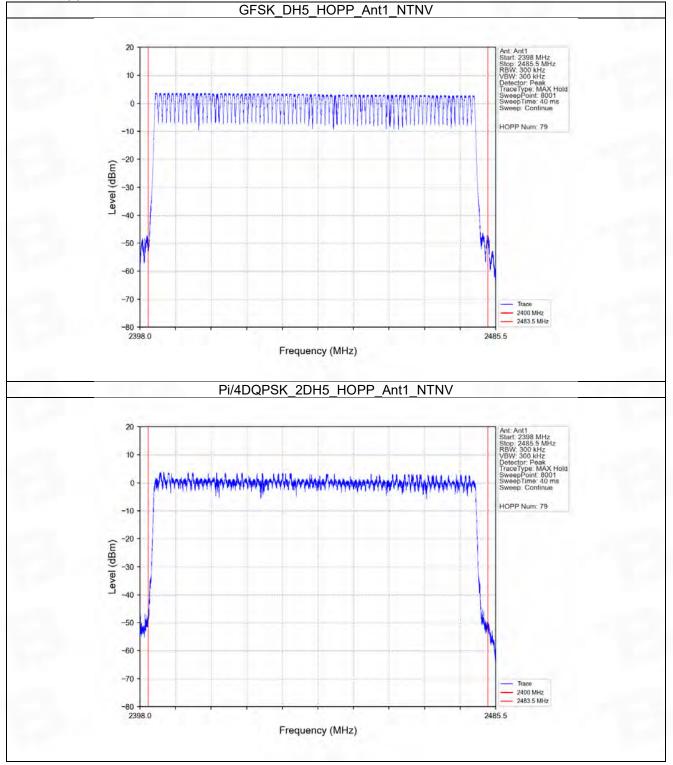
## 4.1 Test Result

### 4.1.1 HoppNum

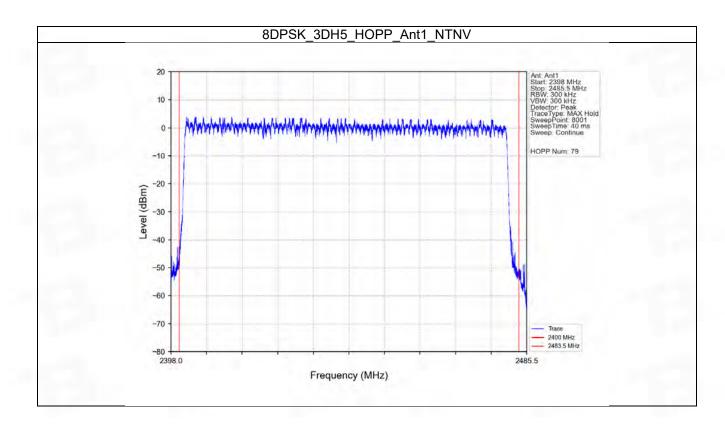
Mode	TX	Frequency	Packet	Num of Hoppir	ng Frequencies	Verdict
Mode	Туре	(MHz)	Туре	ANT1	Limit	verdici
GFSK	SISO	HOPP	DH5	79	>=15	Pass
Pi/4DQPSK	SISO	HOPP	2DH5	79	>=15	Pass
8DPSK	SISO	HOPP	3DH5	79	>=15	Pass



4.2.1 HoppNum









# 5. Time of Occupancy (Dwell Time)

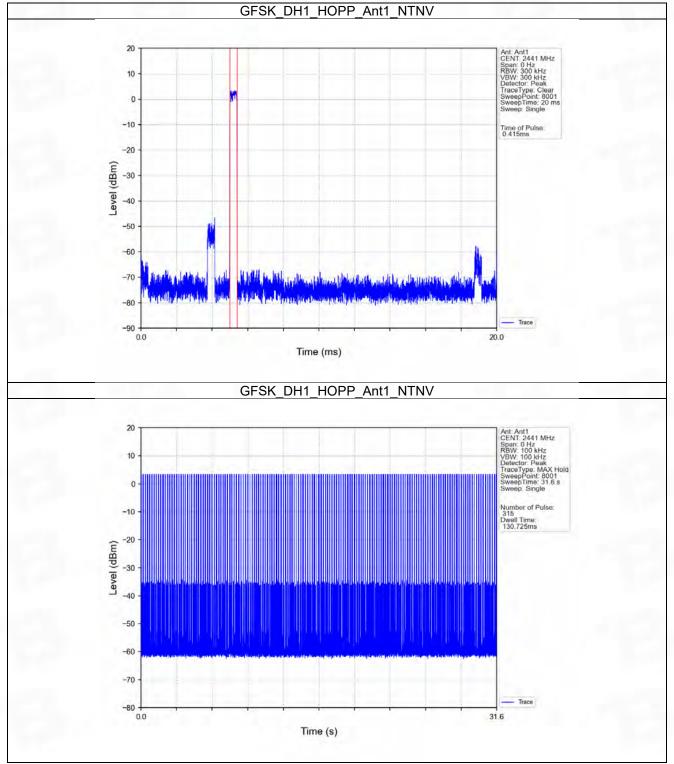
## 5.1 Test Result

#### 5.1.1 Ant1

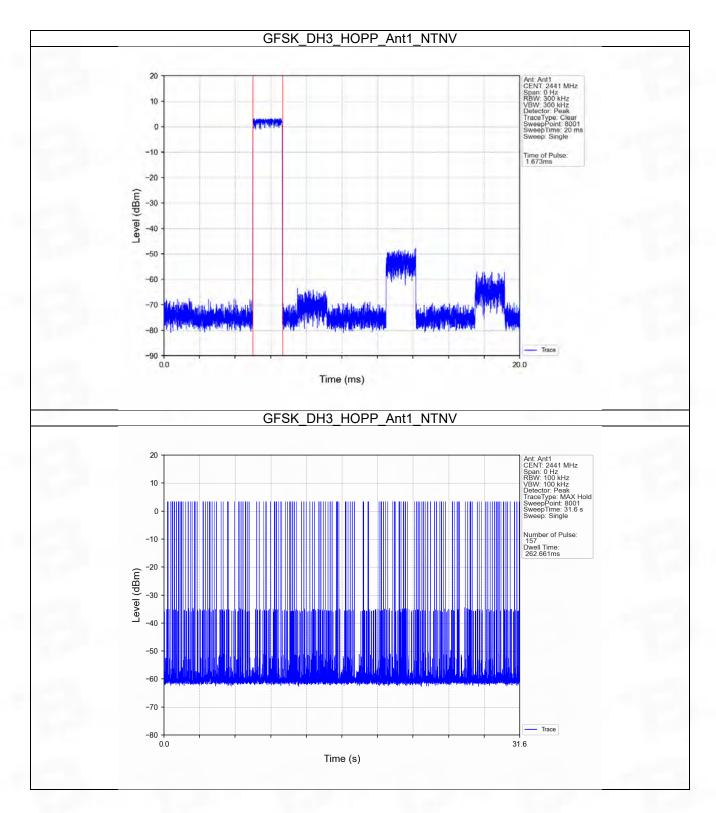
	Ant1										
Mode	ТХ Туре	Frequency (MHz)	Packet Type	Duration of Single Pulse (ms)	Observation Period (s)	Num of Pulse in Observation Period	Dwell Time (ms)	Limit (ms)	Verdict		
			DH1	0.415	31.600	315	130.725	<=400	Pass		
GFSK	GFSK SISO HOPP	HOPP	DH3	1.673	31.600	157	262.661	<=400	Pass		
			DH5	2.923	31.600	111	324.453	<=400	Pass		
		HOPP	2DH1	0.428	31.600	317	135.676	<=400	Pass		
Pi/4DQPSK	SISO		2DH3	1.673	31.600	157	262.661	<=400	Pass		
			2DH5	2.918	31.600	103	300.554	<=400	Pass		
			3DH1	0.420	31.600	314	131.880	<=400	Pass		
8DPSK	8DPSK SISO	HOPP	3DH3	1.675	31.600	157	262.975	<=400	Pass		
			3DH5	2.920	31.600	107	312.440	<=400	Pass		



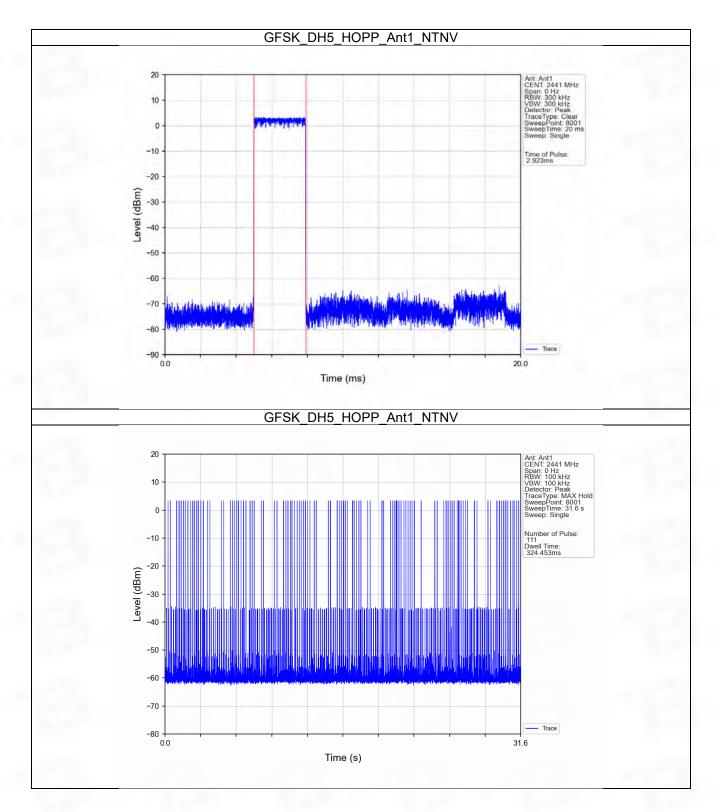
5.2.1 Ant1



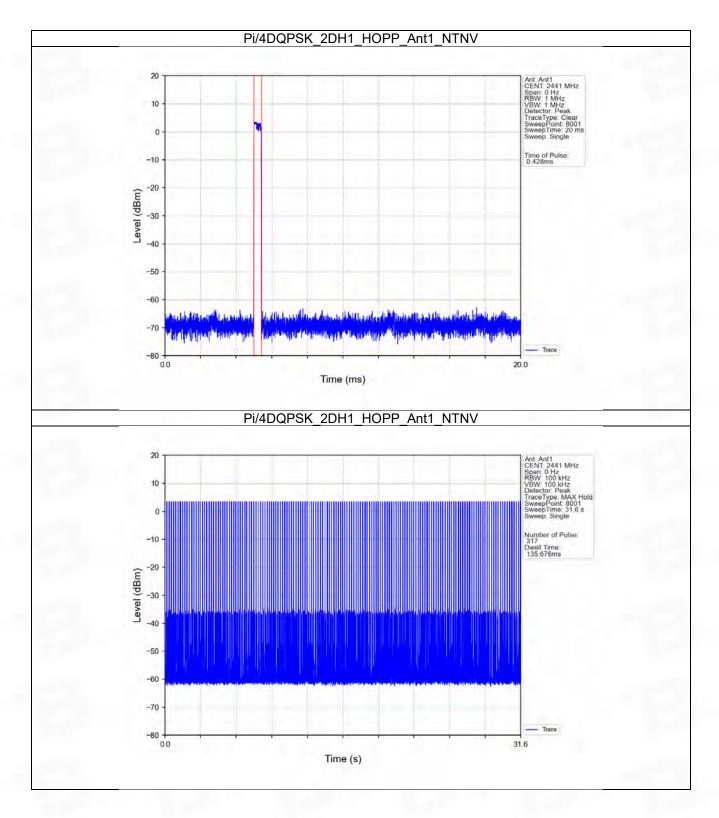






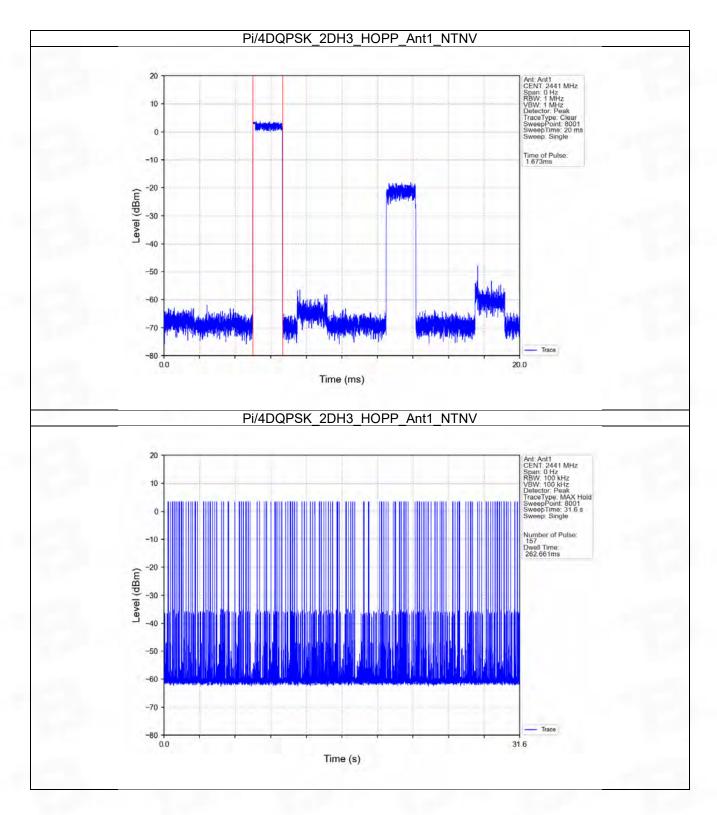




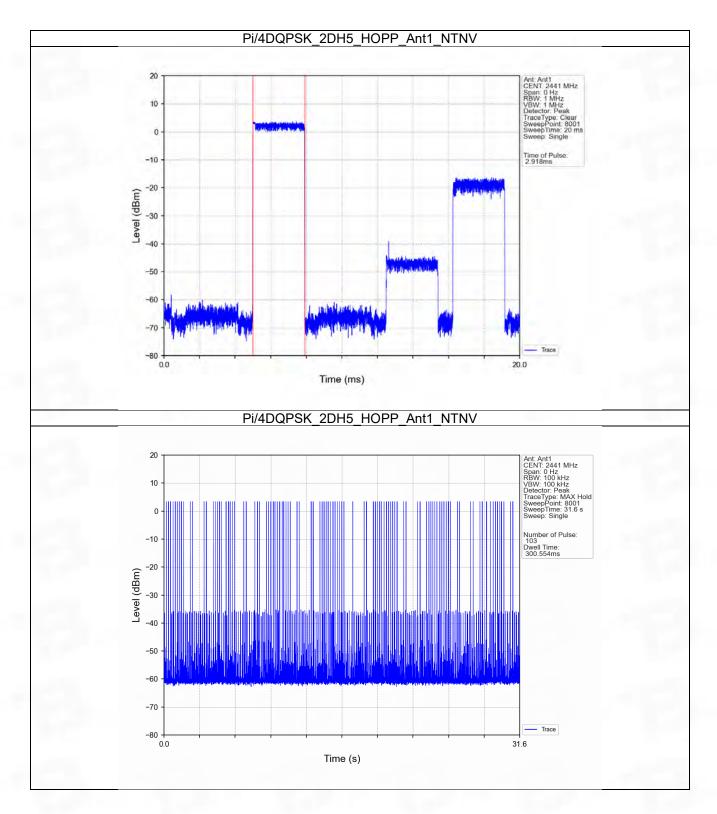


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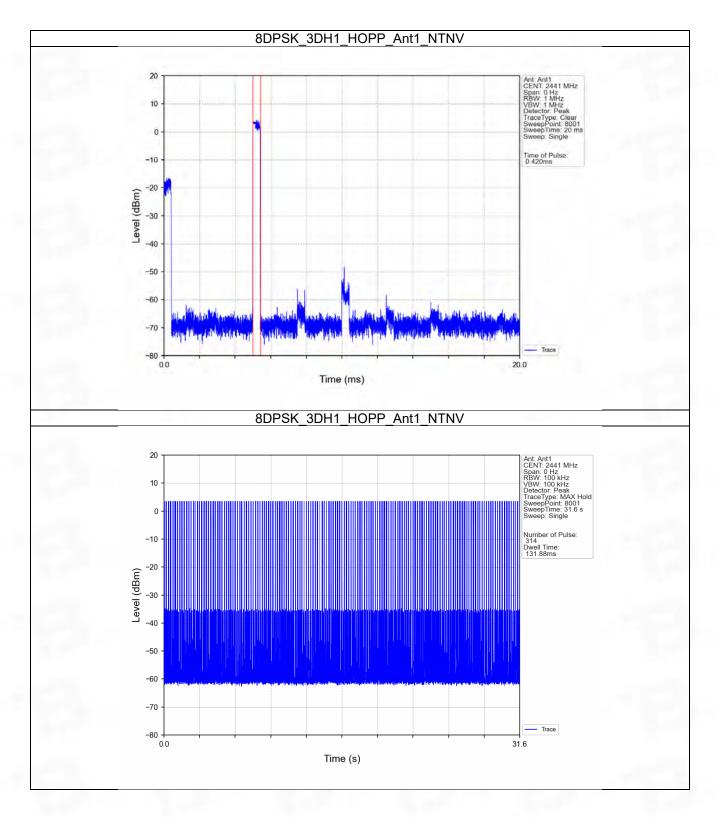




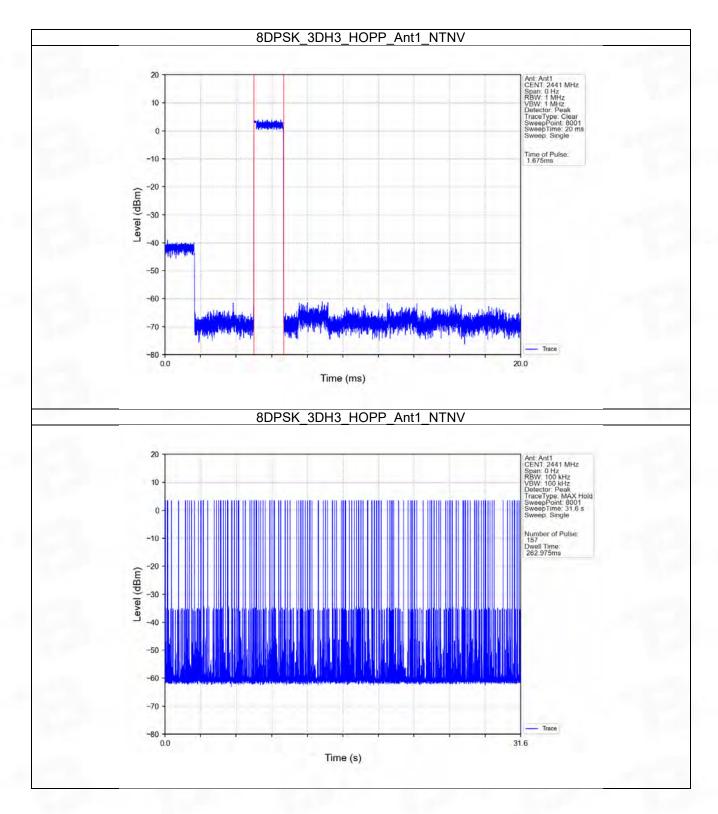


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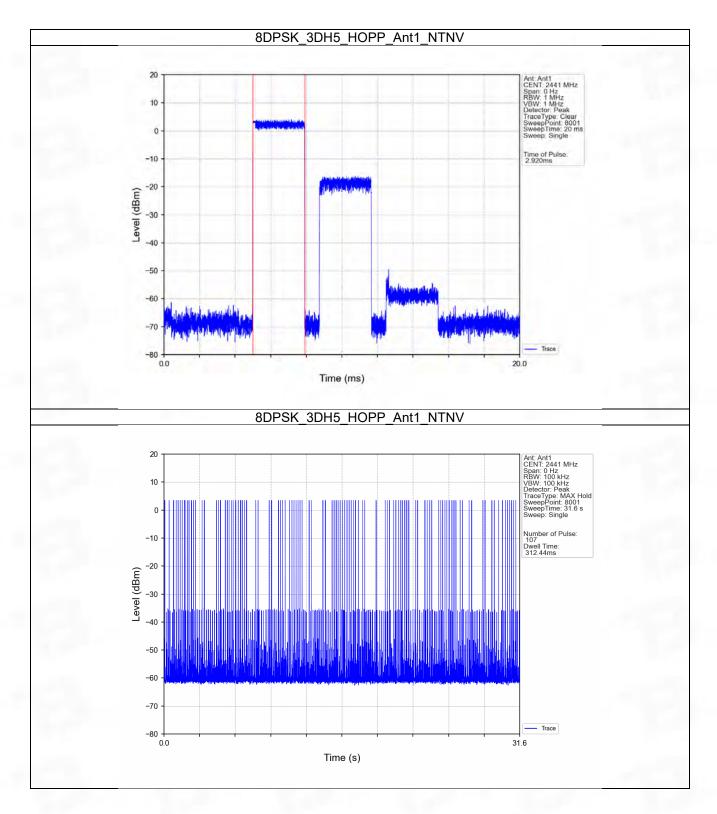






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## 6. Unwanted Emissions In Non-restricted Frequency Bands

### 6.1 Test Result

#### 6.1.1 Ref

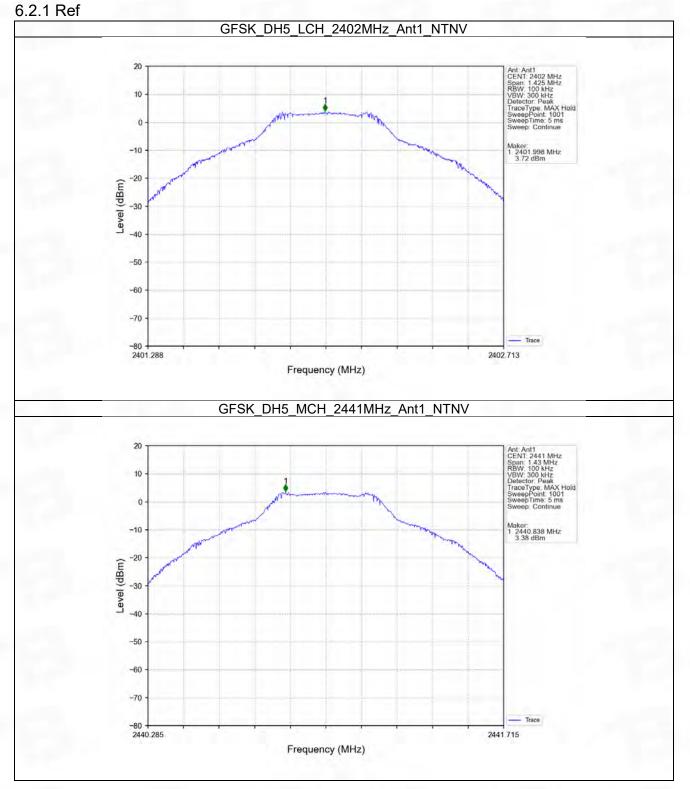
Mode	ТХ Туре	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)
		2402	DH5	1	3.72
GFSK	SISO	2441	DH5	1	3.38
		2480	DH5	1	2.97
		2402	2DH5	1	3.82
Pi/4DQPSK	SISO	2441	2DH5	1	3.43
		2480	2DH5	1	ANT         (dBm)           1         3.72           1         3.38           1         2.97           1         3.82
		2402	3DH5	1	3.85
8DPSK	SISO	2441	3DH5	1	3.49
		2480	3DH5	1	2.85

Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.

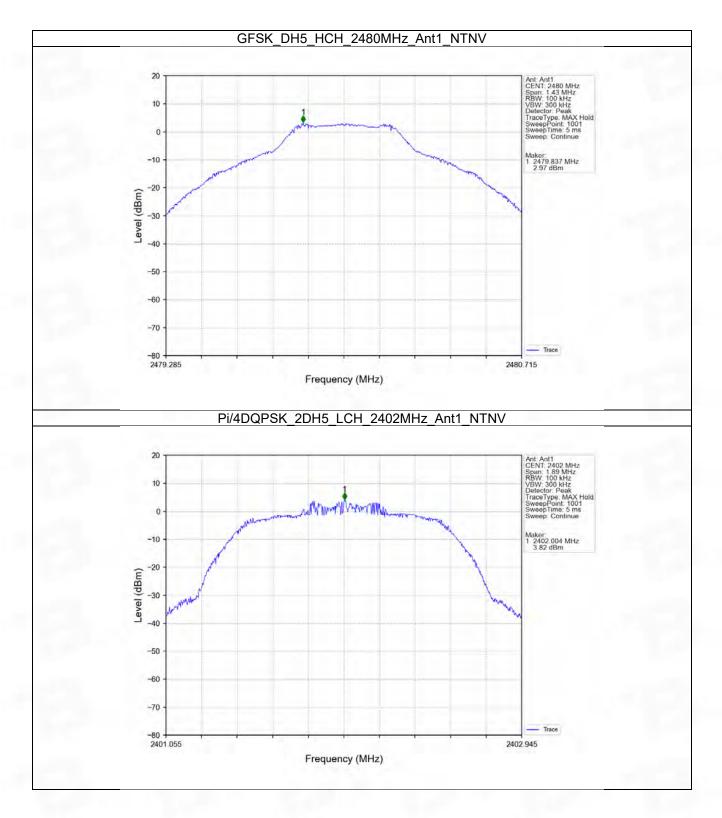
#### 6.1.2 CSE

Туре	(MHz)	Type	ANT	( ID is )		Verdict
		. , = =		(dBm)	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	
	2402	DH5	1	3.72	-16.28	Pass
	2441	DH5	1	3.72	-16.28	Pass
SISO	2480	DH5	1	3.72	-16.28	Pass
			1	3.72	-16.28	Pass
	норр	DHD	I	3.72	-16.28	Pass
SISO	2402	2DH5	1	3.82	-16.18	Pass
	2441	2DH5	1	3.82	-16.18	Pass
	2480	2DH5	1	3.82	-16.18	Pass
	HOPP	2DH5	1	3.82	-16.18	Pass
				3.82	-16.18	Pass
	2402	3DH5	1	3.85	-16.15	Pass
	2441	3DH5	1	3.85	-16.15	Pass
SISO	2480	3DH5	1	3.85	-16.15	Pass
		2045	1	3.85	-16.15	Pass
	HUPP	3005	I	3.85	-16.15	Pass
	SISO SISO	HOPP 2402 2441 SISO 2480 HOPP 2402 2441 SISO 2480 HOPP	HOPP         DH5           2402         2DH5           2441         2DH5           2480         2DH5           HOPP         2DH5           HOPP         2DH5           HOPP         2DH5           SISO         2402           AU2         3DH5           2441         3DH5           SISO         2480           AU1         3DH5           HOPP         3DH5	HOPP         DH5         1           2402         2DH5         1           2441         2DH5         1           2480         2DH5         1           HOPP         2DH5         1           HOPP         2DH5         1           HOPP         2DH5         1           2402         3DH5         1           2441         3DH5         1           SISO         2480         3DH5         1           HOPP         3DH5         1	HOPP         DH5         1         3.72           2402         2DH5         1         3.72           2402         2DH5         1         3.82           2441         2DH5         1         3.82           2441         2DH5         1         3.82           2480         2DH5         1         3.82           HOPP         2DH5         1         3.82           HOPP         2DH5         1         3.82           SISO         2402         3DH5         1         3.85           2441         3DH5         1         3.85           2480         3DH5         1         3.85           HOPP         3DH5         1         3.85           HOPP         3DH5         1         3.85	$\begin{array}{c c c c c c c c c c c c c c c c c c c $



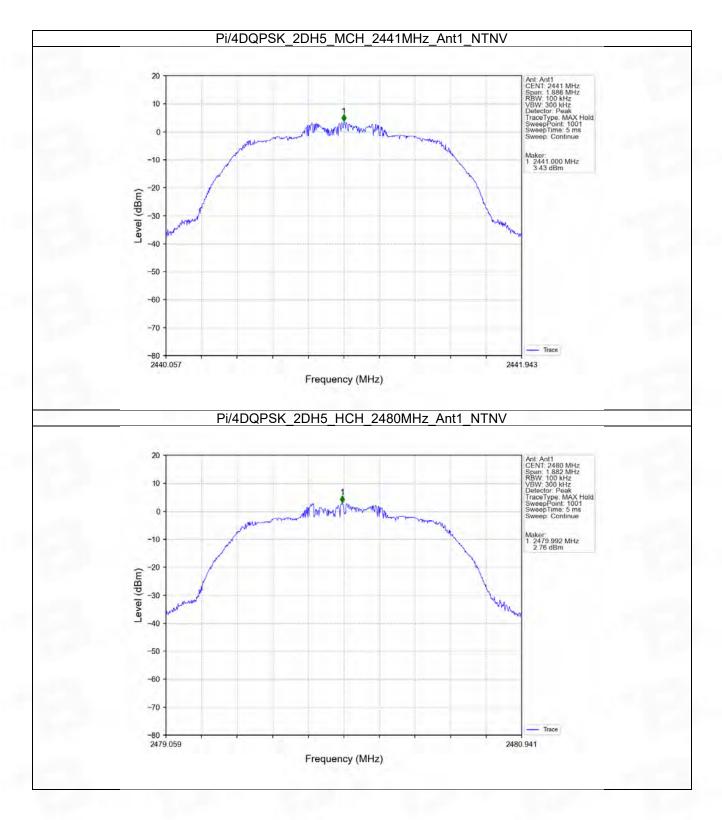






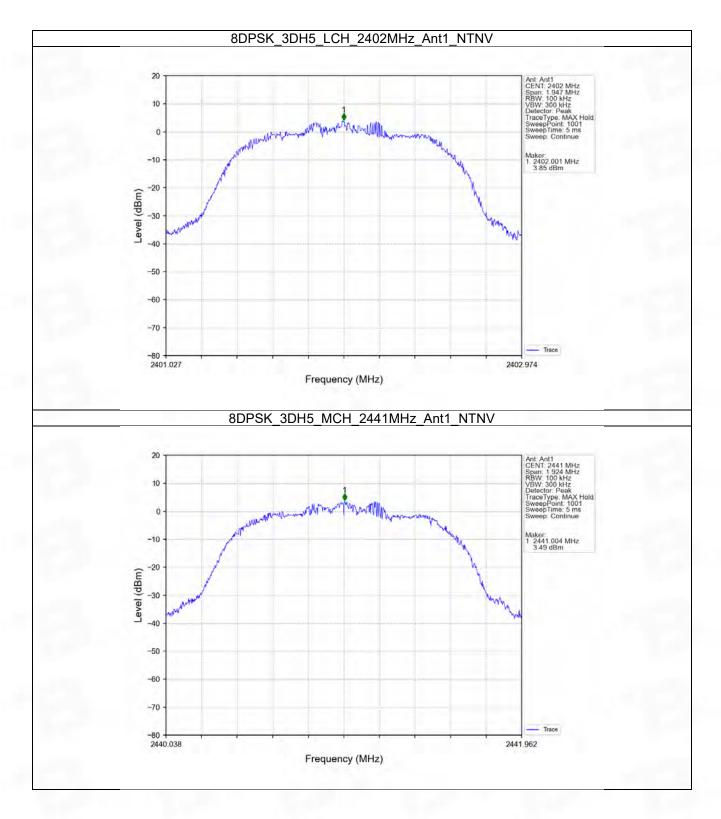
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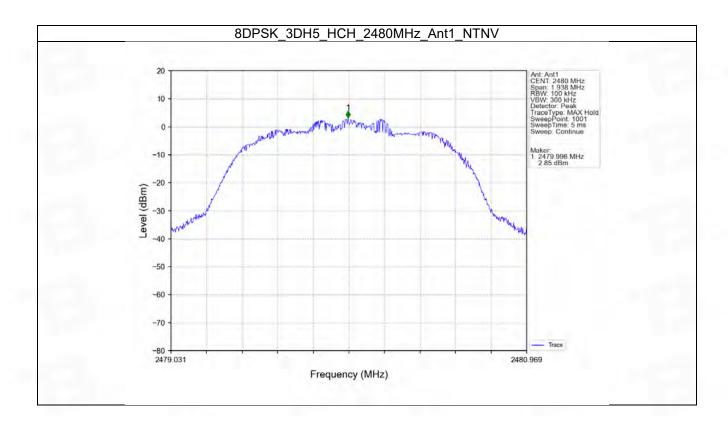


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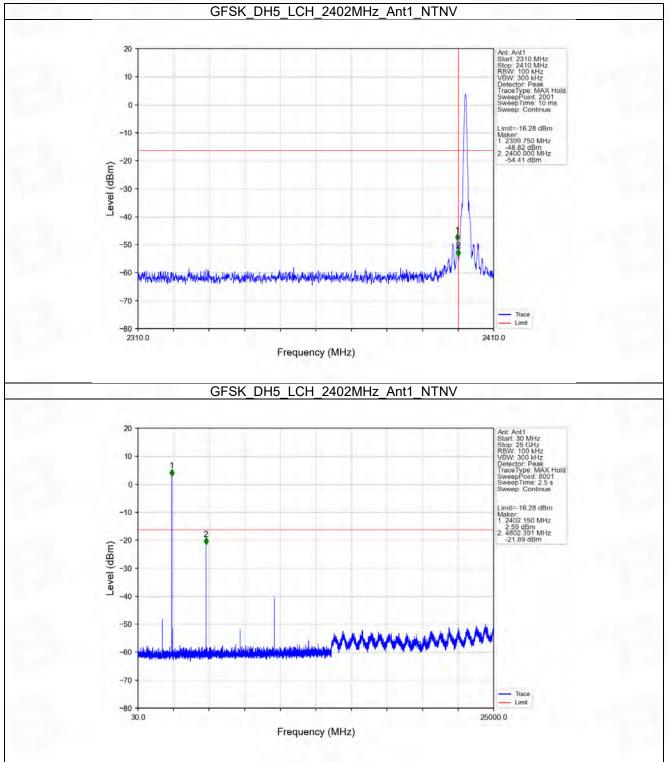




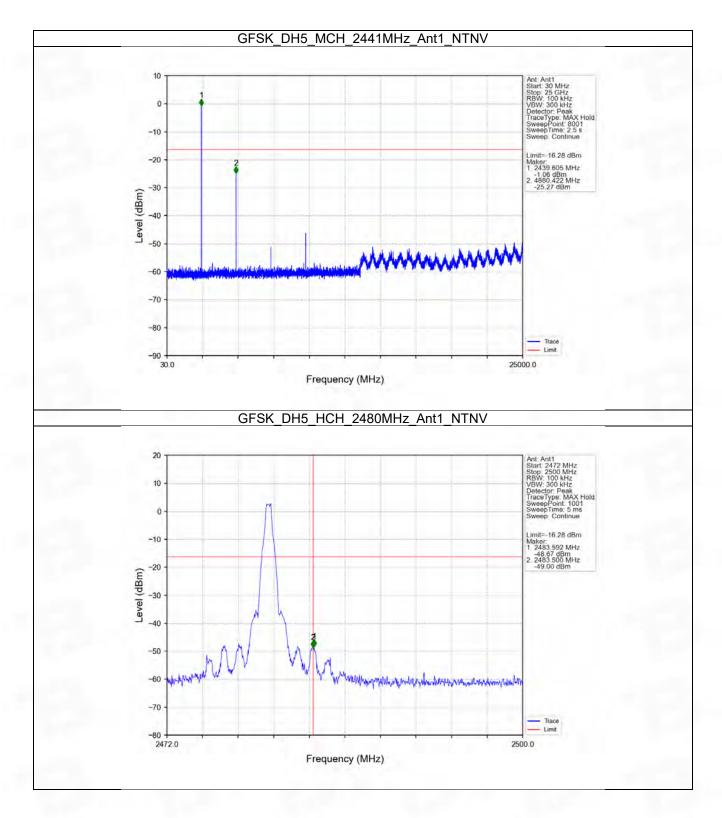




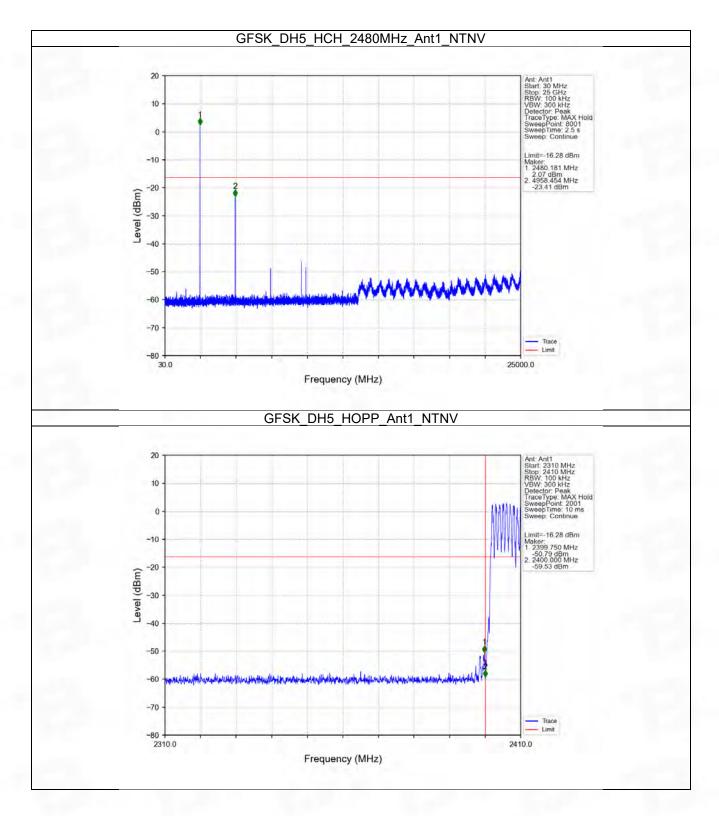
6.2.2 CSE





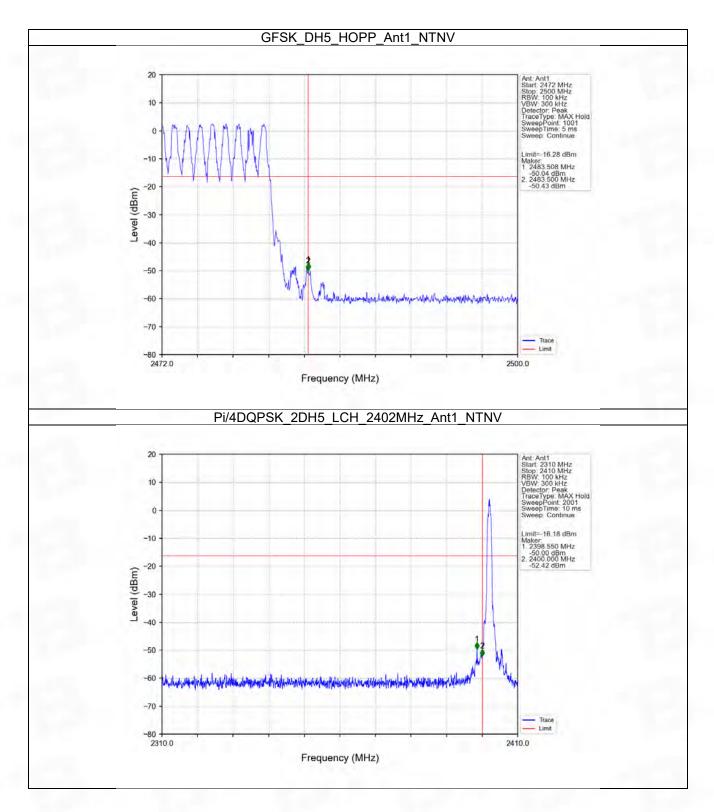




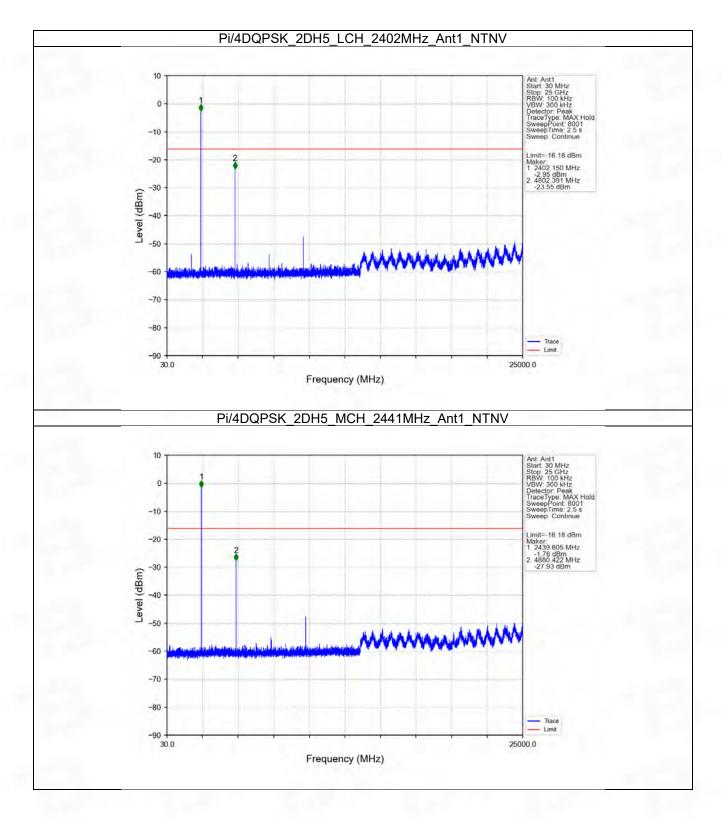


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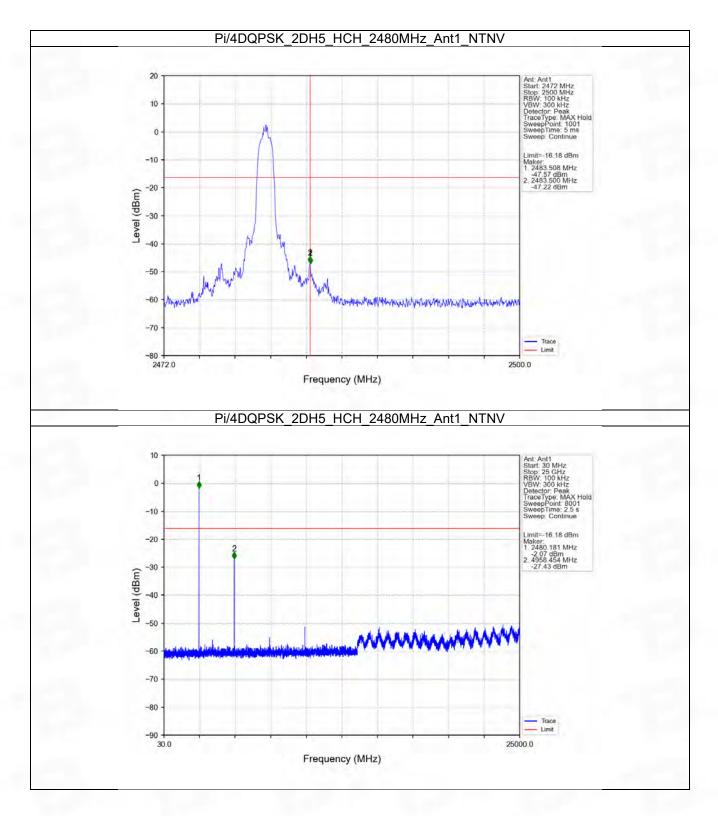






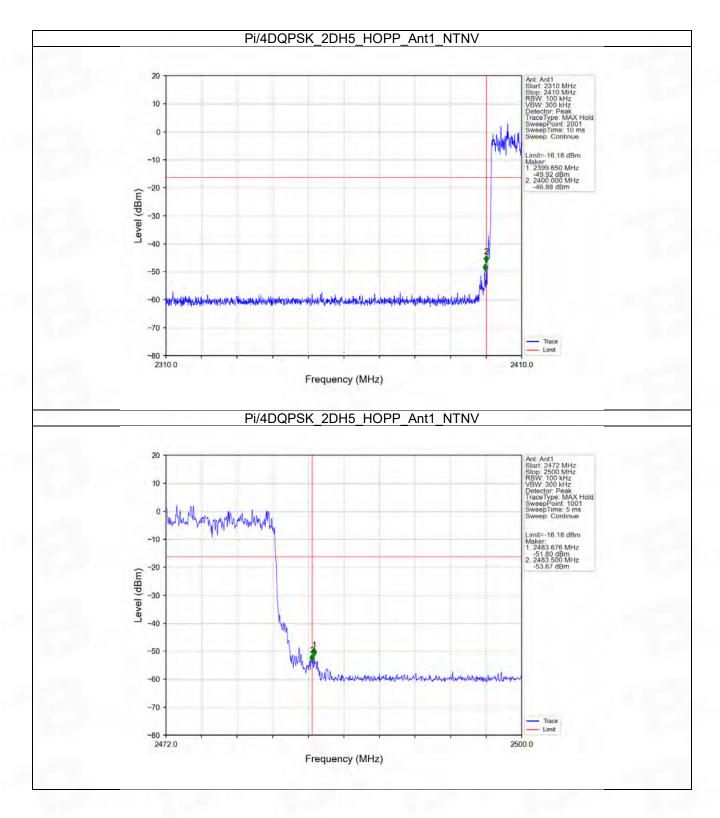
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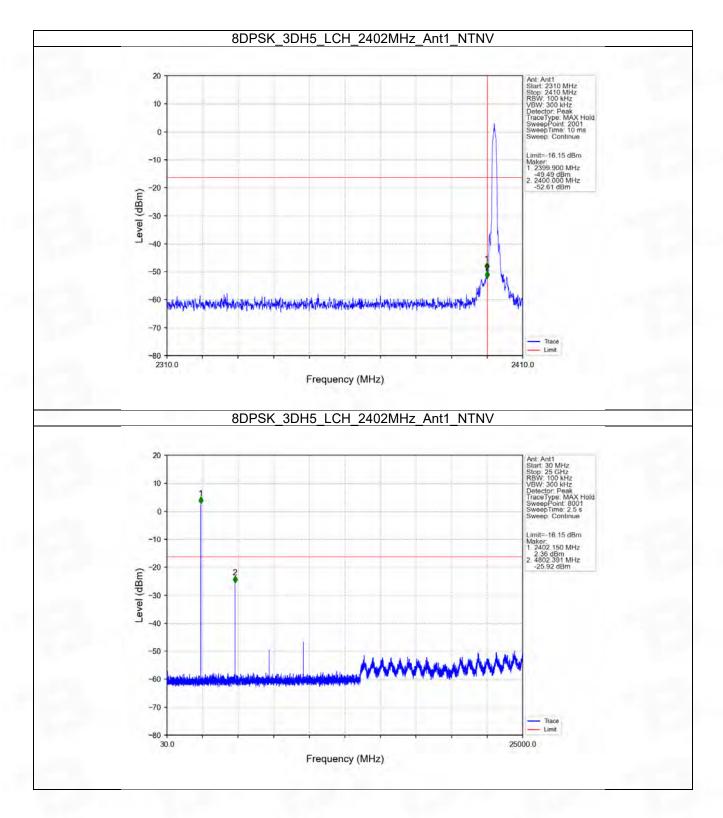


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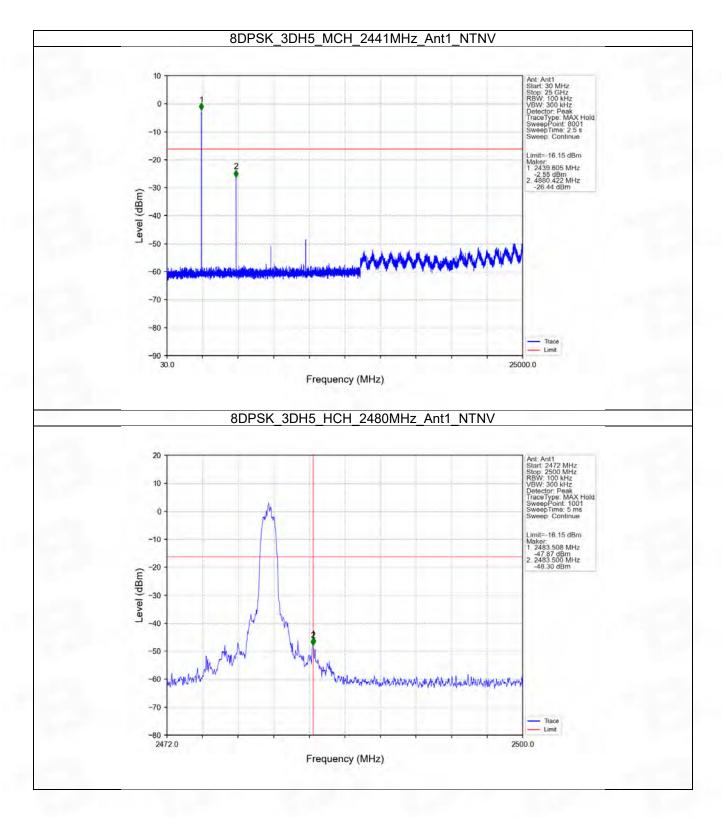






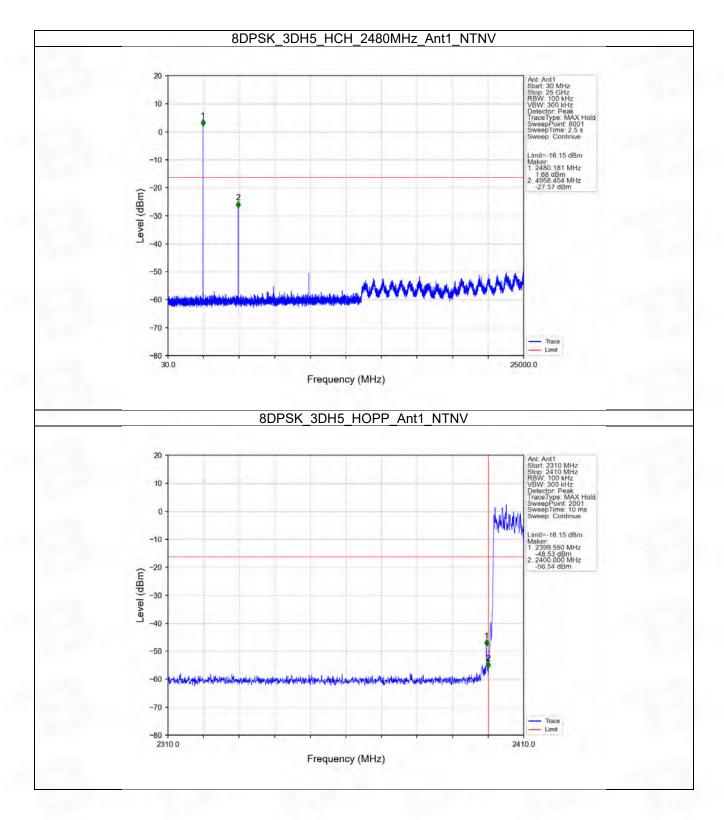
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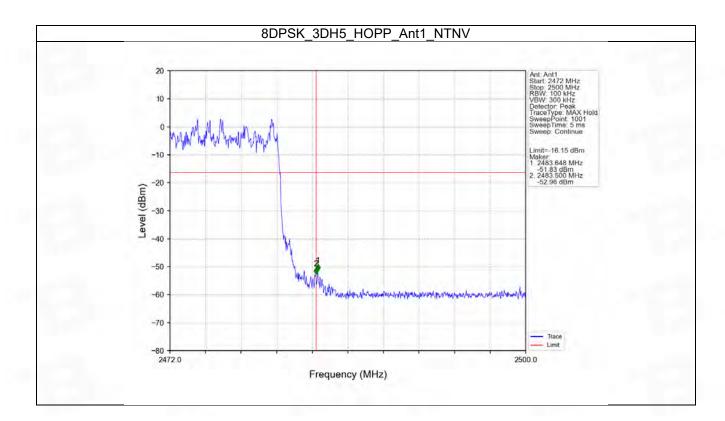
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# 7. Form731

## 7.1 Test Result

#### 7.1.1 Form731

Lower Freq (MHz)	High Freq (MHz)	MAX Power (W)	MAX Power (dBm)
2402	2480	0.0033	5.23



#### R:

## 1. Bandwidth

### 1.1 Test Result

#### 1.1.1 OBW

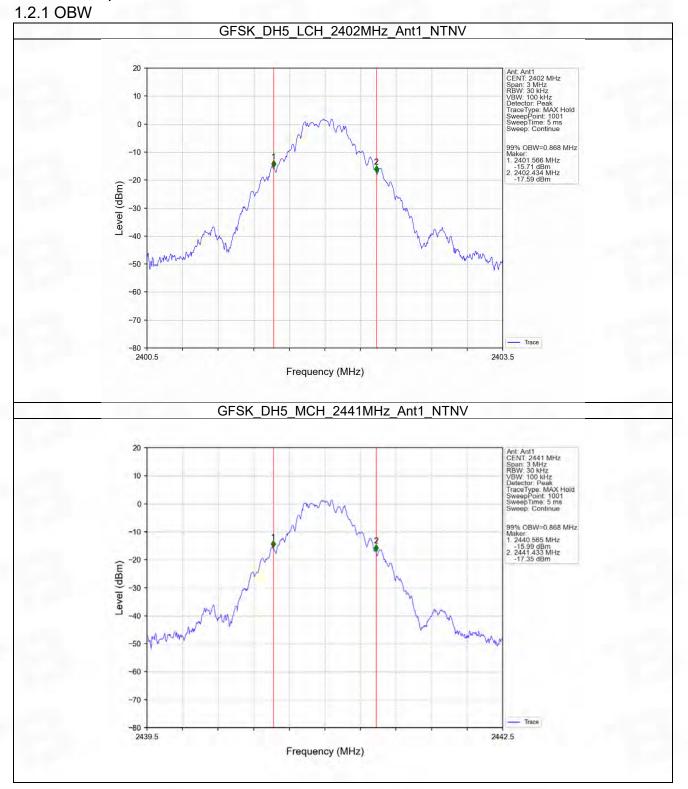
Mode TX		Frequency	Packet		99% Occupied Bandwidth (MHz)		Verdict
Type	(MHz)	Туре	Result		Limit	verdict	
		2402	DH5	1	0.868	/	Pass
GFSK SISO	2441	DH5	1	0.868	/	Pass	
		2480	DH5	1	0.866	/	Pass
Pi/4DQPSK SISO		2402	2DH5	1	1.162	/	Pass
	SISO	2441	2DH5	1	1.161	/	Pass
	2480	2DH5	1	1.160	/	Pass	
8DPSK SISO	2402	3DH5	1	1.165	/	Pass	
	SISO	2441	3DH5	1	1.165	/	Pass
		2480	3DH5	1	1.167	/	Pass

#### 1.1.2 20dB BW

Mode	ΤX	Frequency	Packet	ANT	20dB Bandwidth (MHz)		Verdict
Type	Туре	(MHz)	Туре	ANT	Result	Limit	Veruici
		2402	DH5	1	0.955	/	Pass
GFSK	SISO	2441	DH5	1	0.955	/	Pass
		2480	DH5	1	0.957	/	Pass
Pi/4DQPSK SISO		2402	2DH5	1	1.316	/	Pass
	SISO	2441	2DH5	1	1.315	/	Pass
		2480	2DH5	1	1.312	/	Pass
8DPSK S	SISO	2402	3DH5	1	1.300	/	Pass
		2441	3DH5	1	1.300	/	Pass
		2480	3DH5	1	1.300	/	Pass

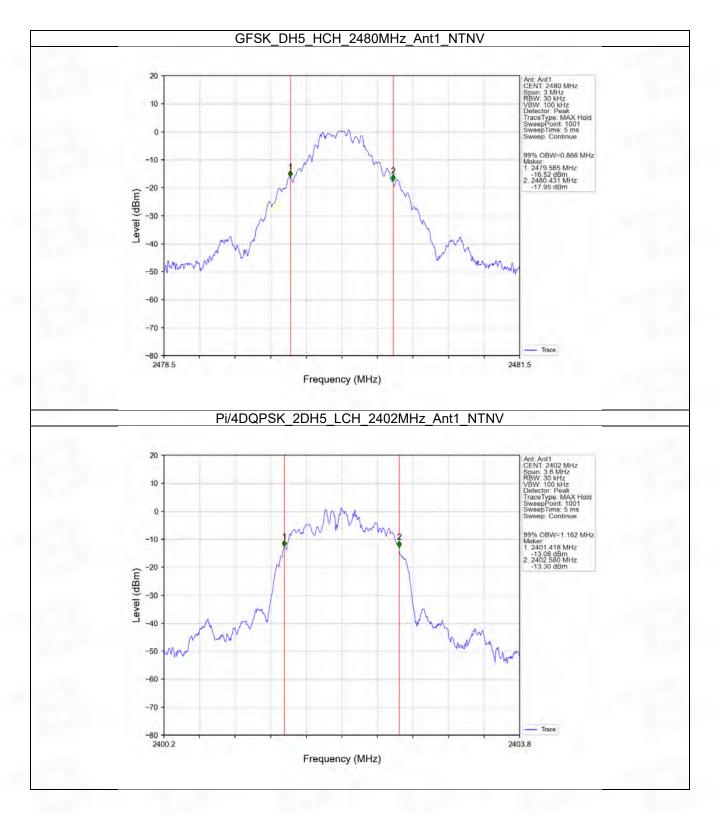


### 1.2 Test Graph

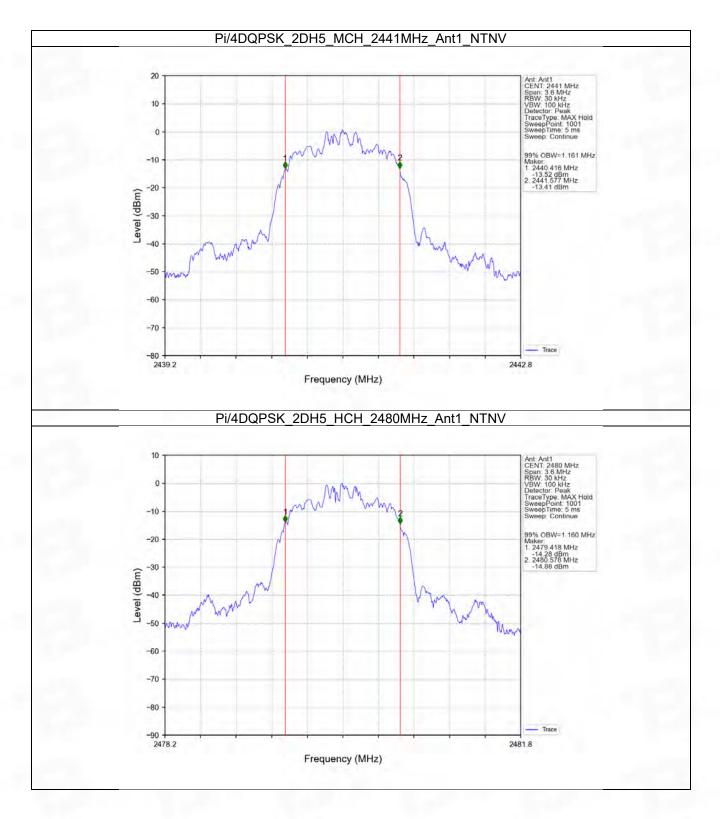


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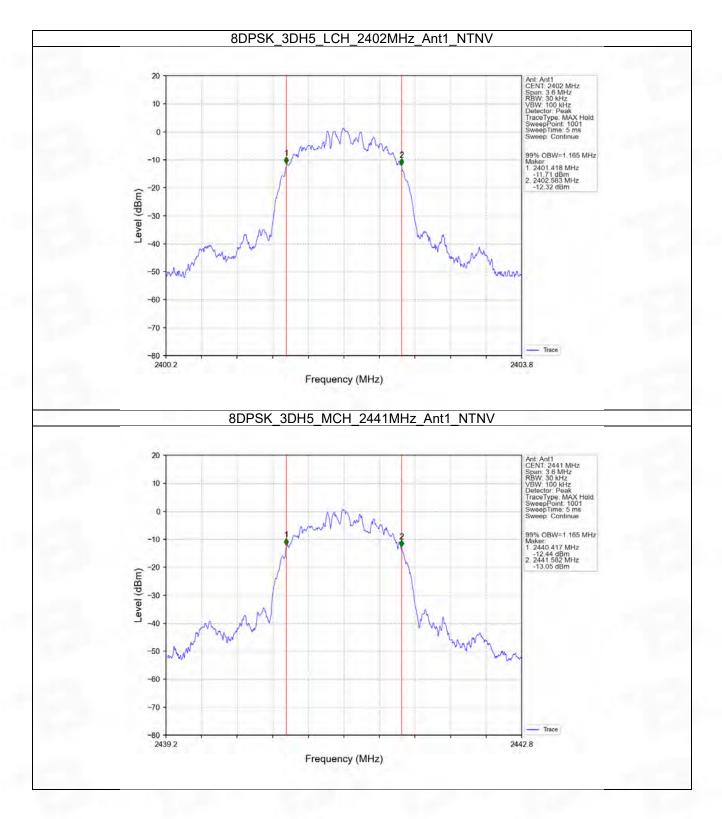






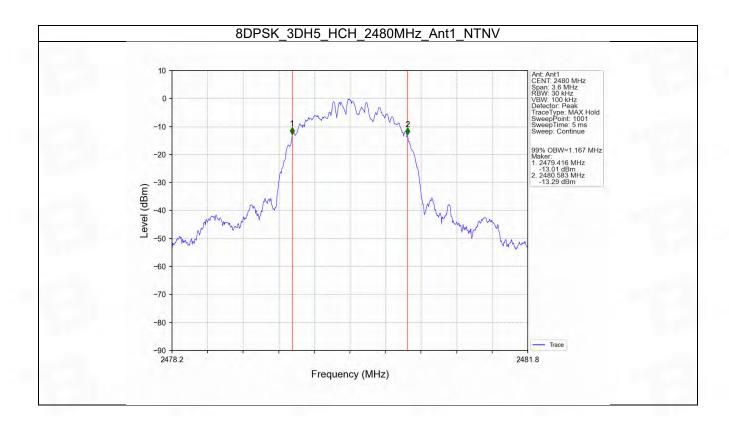






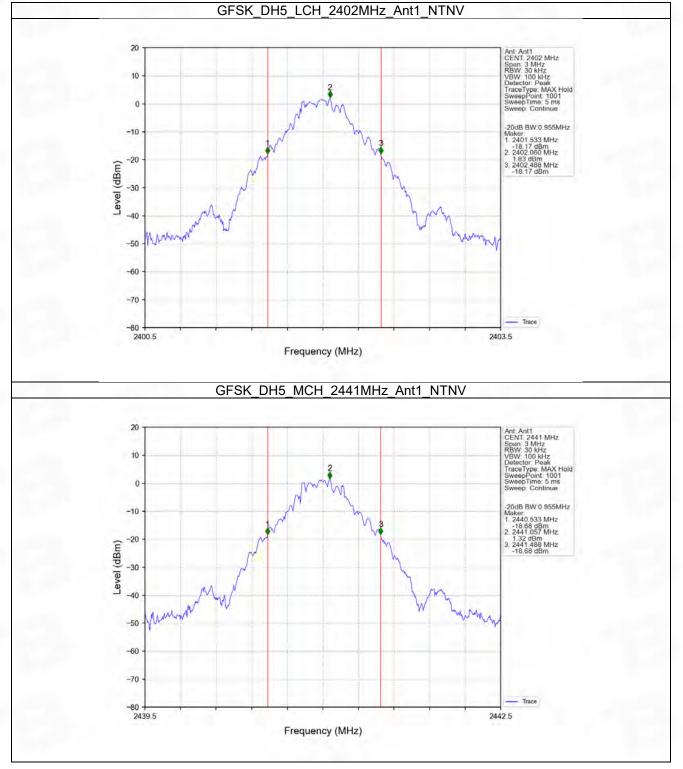
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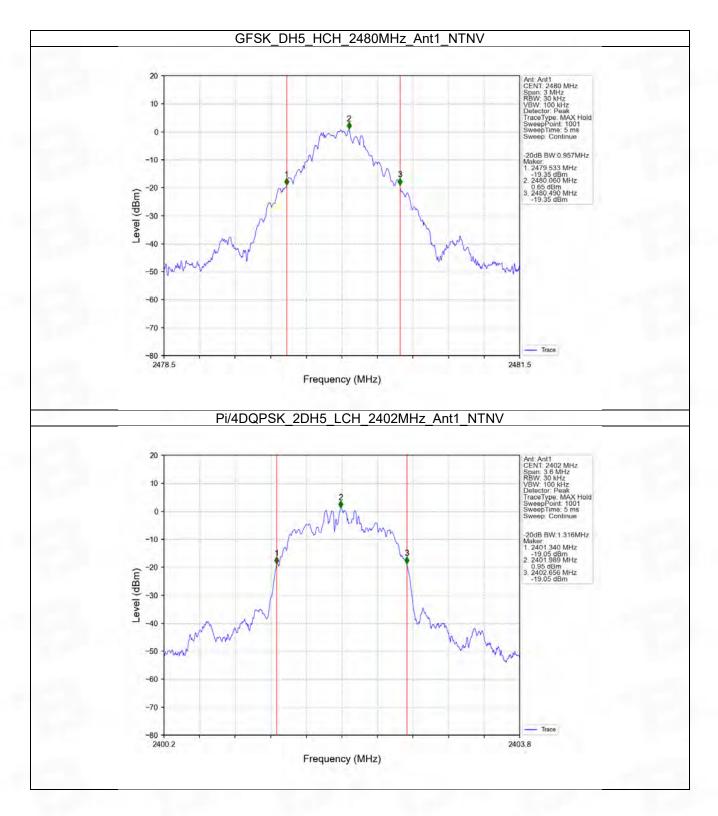




#### 1.2.2 20dB BW

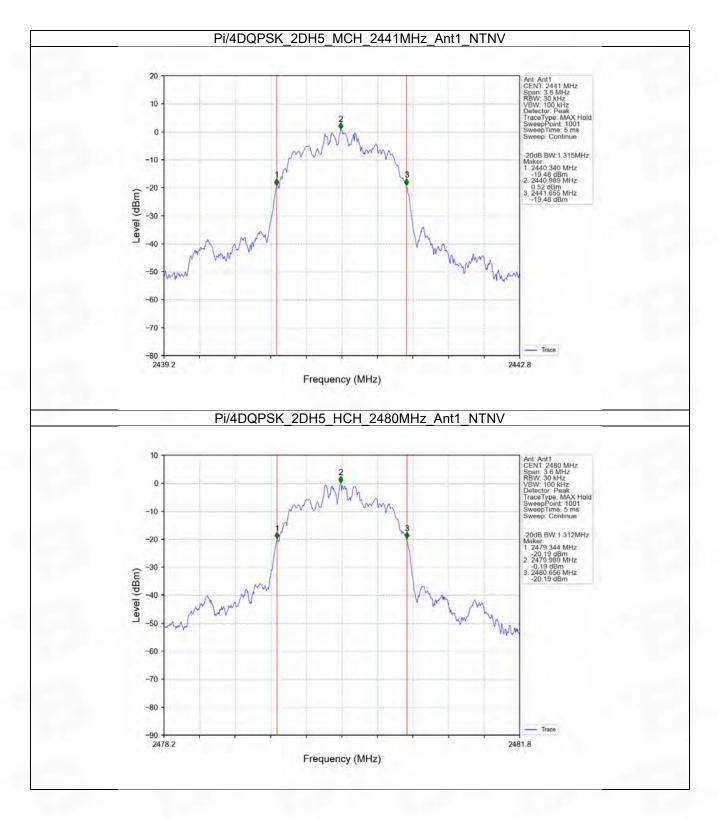






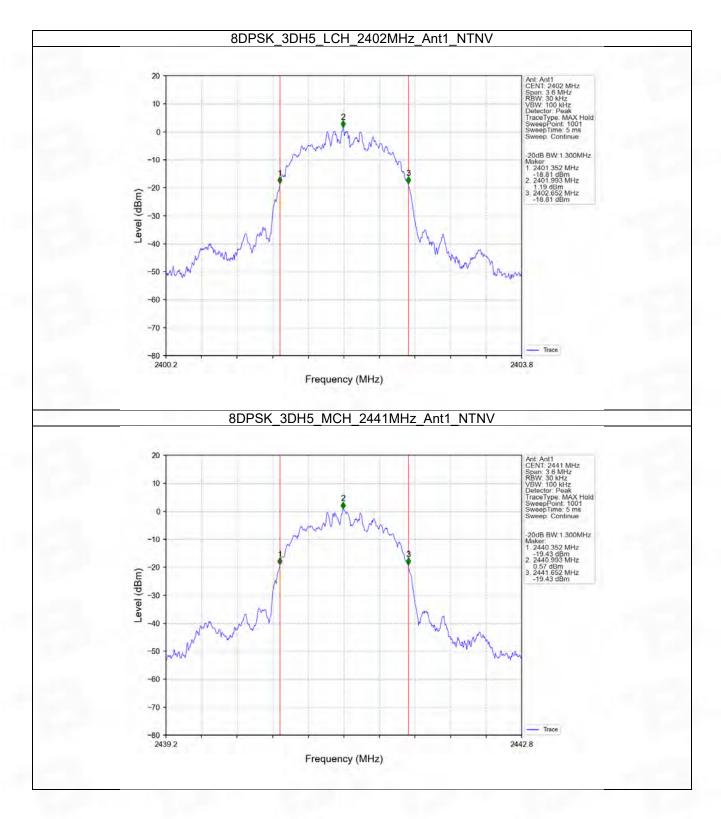
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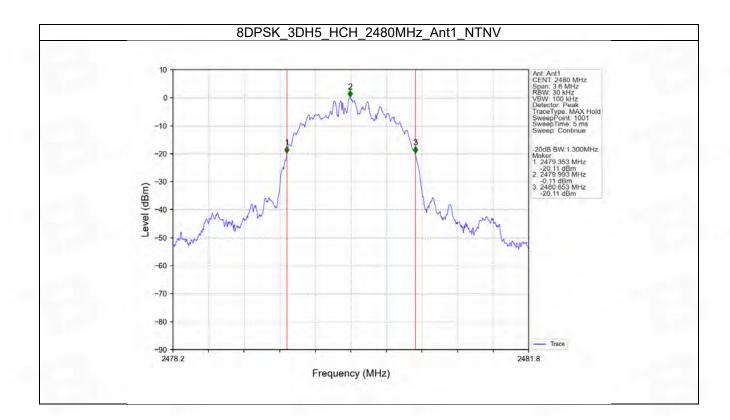


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# 2. Maximum Conducted Output Power

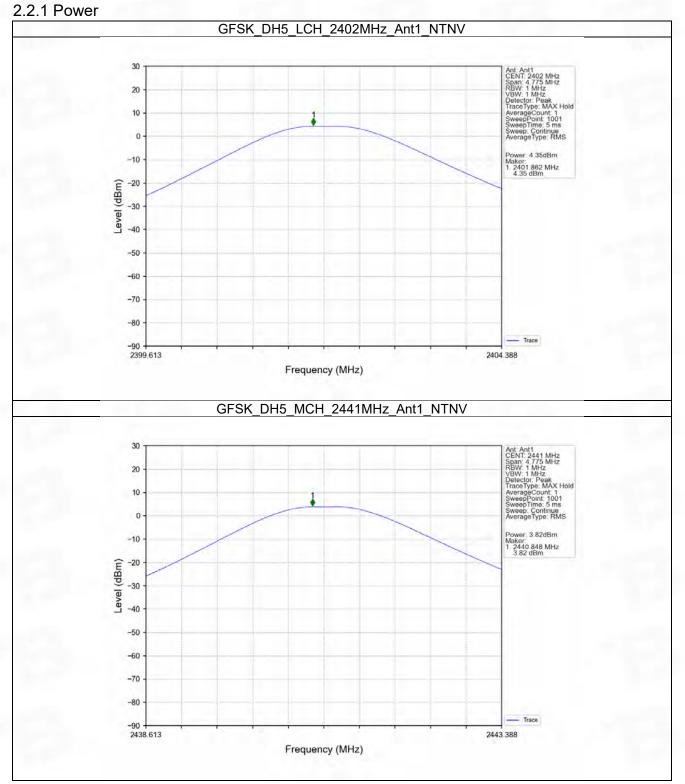
## 2.1 Test Result

### 2.1.1 Power

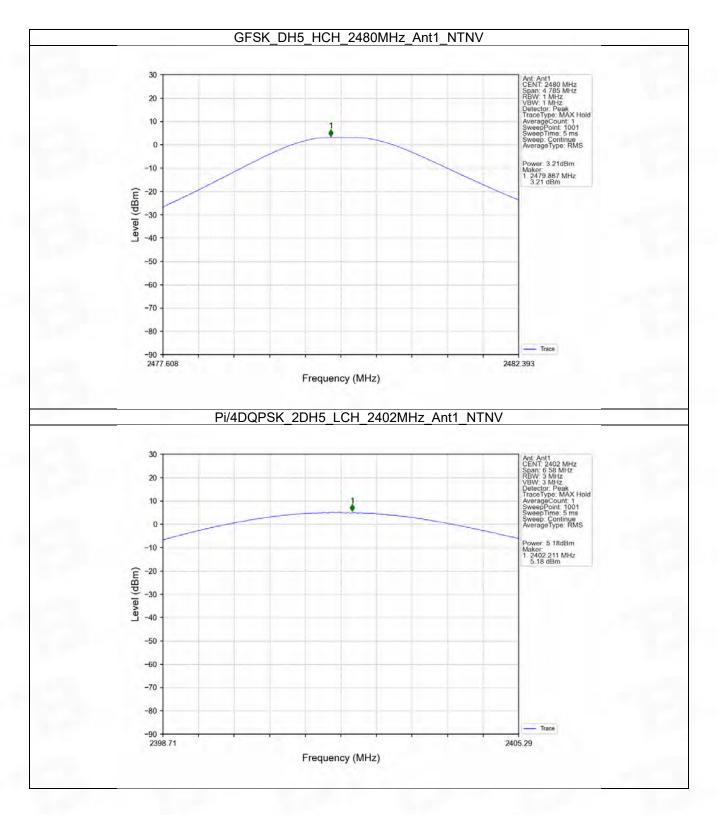
Mode TX			Packet	Maximum Peak Cond (dB	Verdict	
	Туре	(MHz)	Туре	ANT1	Limit	
		2402	DH5	4.35	<=30	Pass
GFSK	SISO	2441	DH5	3.82	<=30	Pass
		2480	DH5	3.21	<=30	Pass
Pi/4DQPSK SISO	SISO	2402	2DH5	5.18	<=20.97	Pass
		SISO	2441	2DH5	4.76	<=20.97
	2480	2DH5	4.10	<=20.97	Pass	
		2402	3DH5	5.43	<=20.97	Pass
8DPSK SISO	SISO	2441	3DH5	4.89	<=20.97	Pass
		2480	3DH5	4.27	<=20.97	Pass
Note1: Antenn	ia Gain: An	t1: 2.78dBi;				1.0



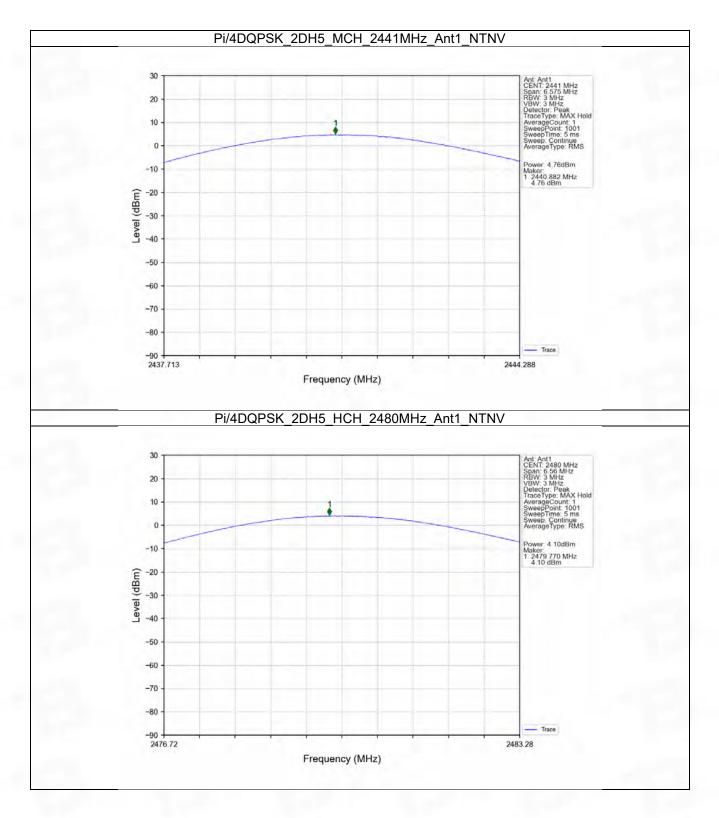
### 2.2 Test Graph





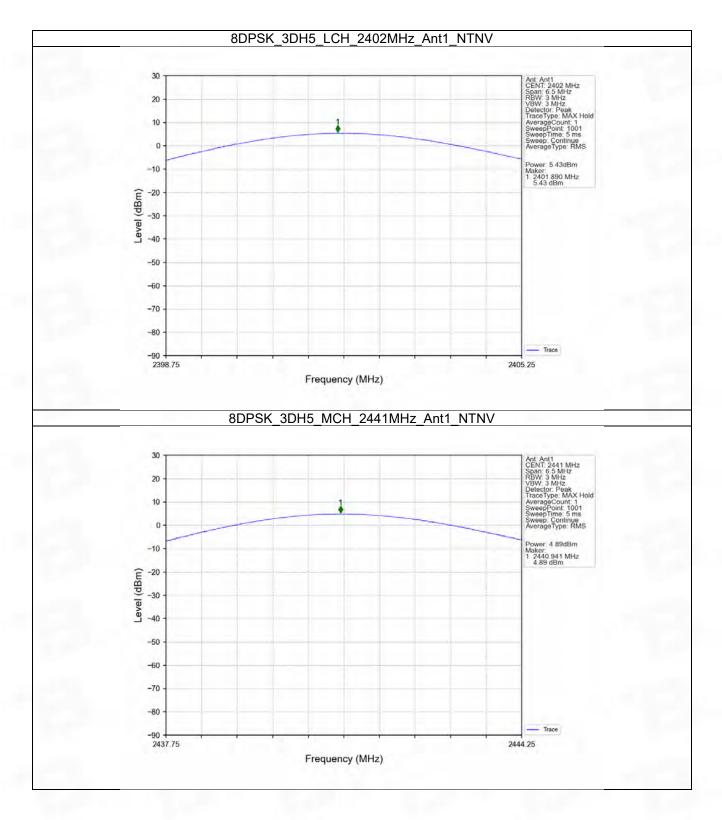




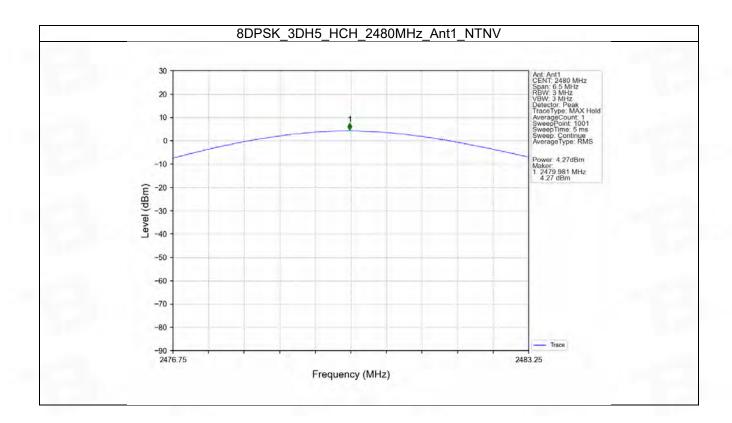


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# 3. Carrier Frequency Separation

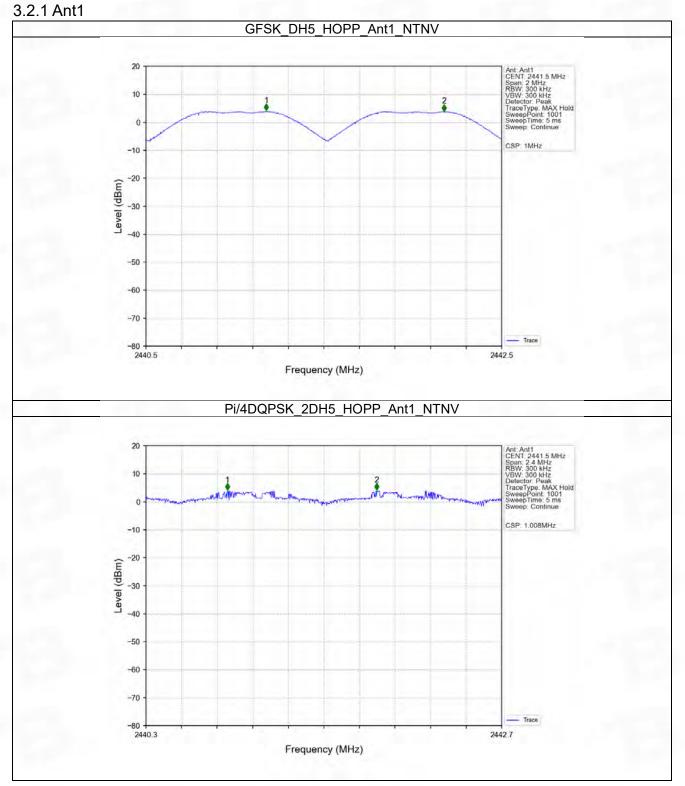
## 3.1 Test Result

#### 3.1.1 Ant1

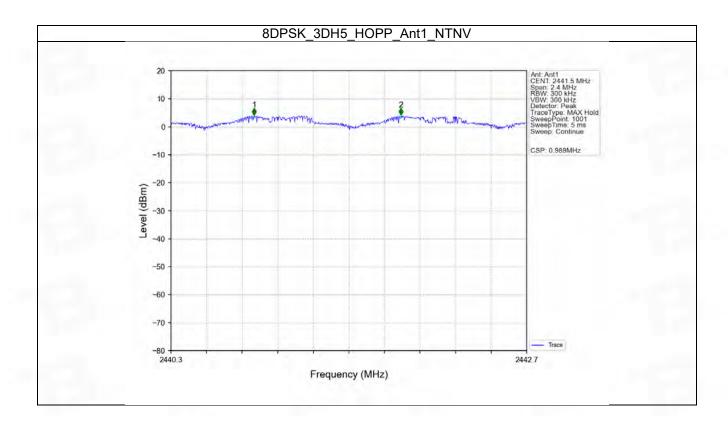
Ant1									
Mode	ΤX	Frequency	Packet	Channel Separation	20dB Bandwidth	Limit	Verdict		
Mode	Туре	(MHz)	Туре	(MHz)	(MHz)	(MHz)	verdict		
GFSK	SISO	HOPP	DH5	1.000	0.957	>=0.957	Pass		
Pi/4DQPSK	SISO	HOPP	2DH5	1.008	1.316	>=0.877	Pass		
8DPSK	SISO	HOPP	3DH5	0.989	1.300	>=0.867	Pass		



### 3.2 Test Graph









# 4. Number of Hopping Frequencies

## 4.1 Test Result

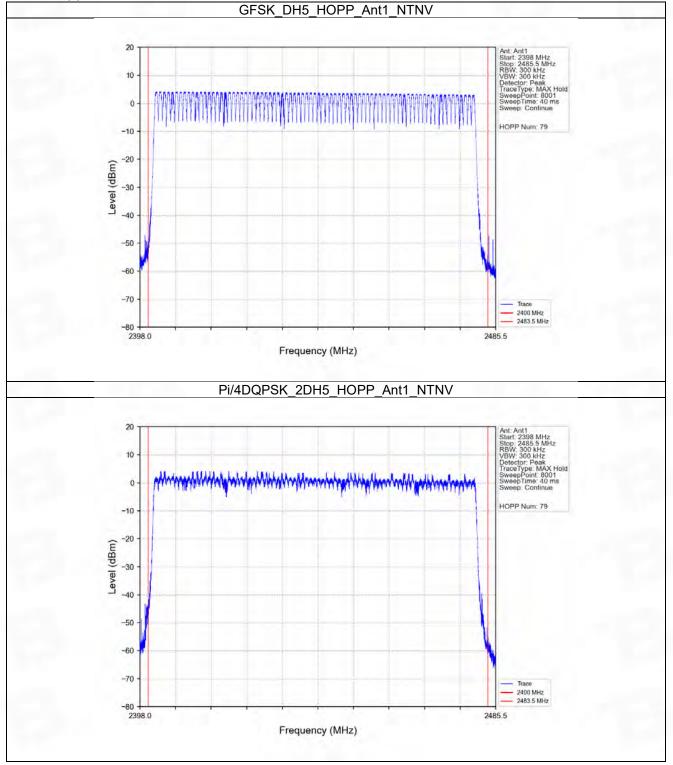
#### 4.1.1 HoppNum

ModeTX		Frequency	Frequency Packet		Num of Hopping Frequencies		
Mode	Туре	(MHz)	Туре	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	



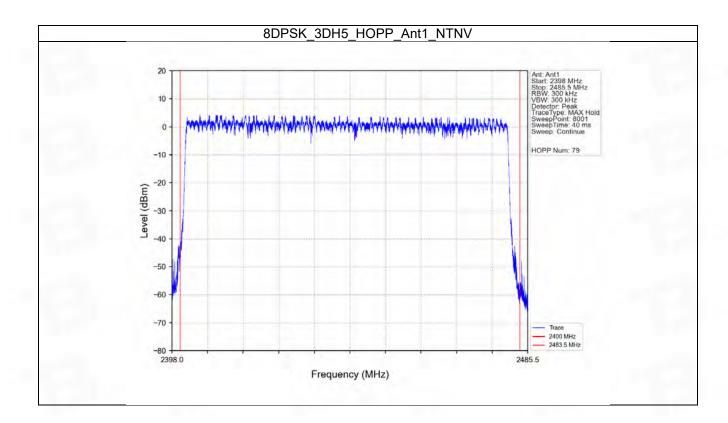
## 4.2 Test Graph

4.2.1 HoppNum



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# 5. Time of Occupancy (Dwell Time)

## 5.1 Test Result

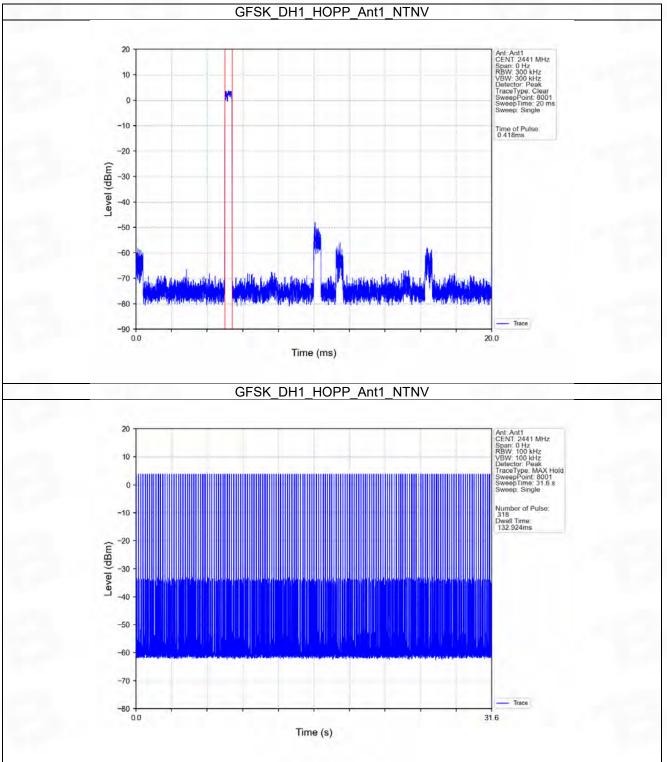
#### 5.1.1 Ant1

Ant1									
Mode	ТХ Туре	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	0.418	31.600	318	132.924	<=400	Pass
			DH3	1.673	31.600	163	272.699	<=400	Pass
			DH5	2.923	31.600	98	286.454	<=400	Warning
Pi/4DQPSK	SISO	HOPP	2DH1	0.415	31.600	317	131.555	<=400	Pass
			2DH3	1.668	31.600	162	270.216	<=400	Pass
			2DH5	2.925	31.600	108	315.900	<=400	Pass
8DPSK	SISO	ISO HOPP	3DH1	0.425	31.600	318	135.150	<=400	Pass
			3DH3	1.678	31.600	163	273.514	<=400	Pass
			3DH5	2.930	31.600	99	290.070	<=400	Pass



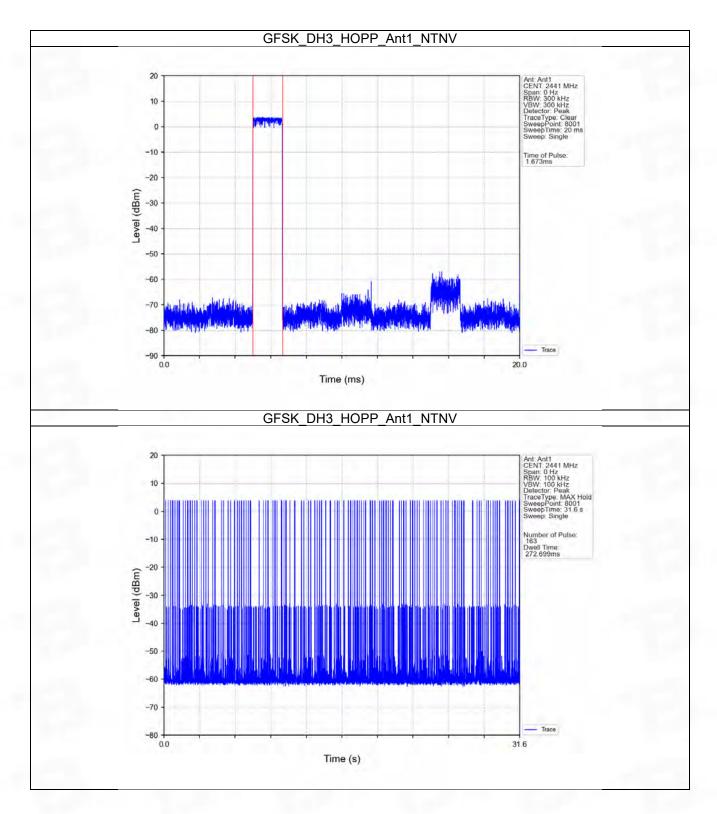
### 5.2 Test Graph



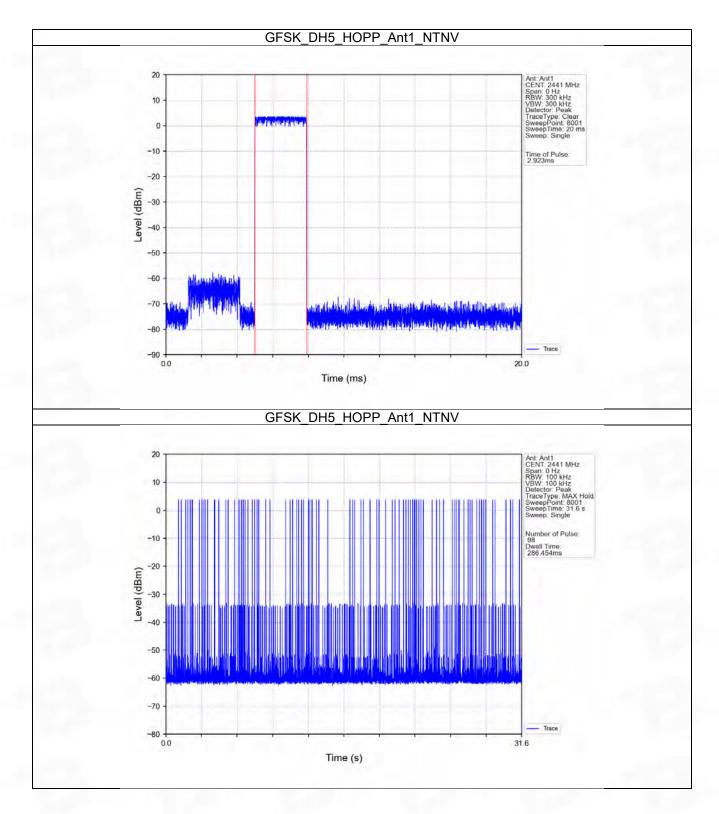


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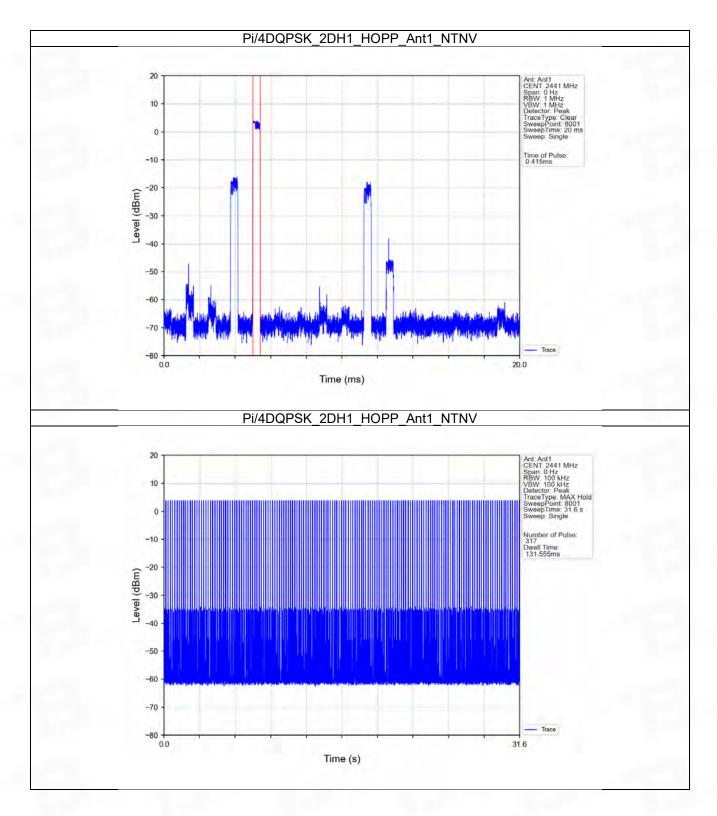




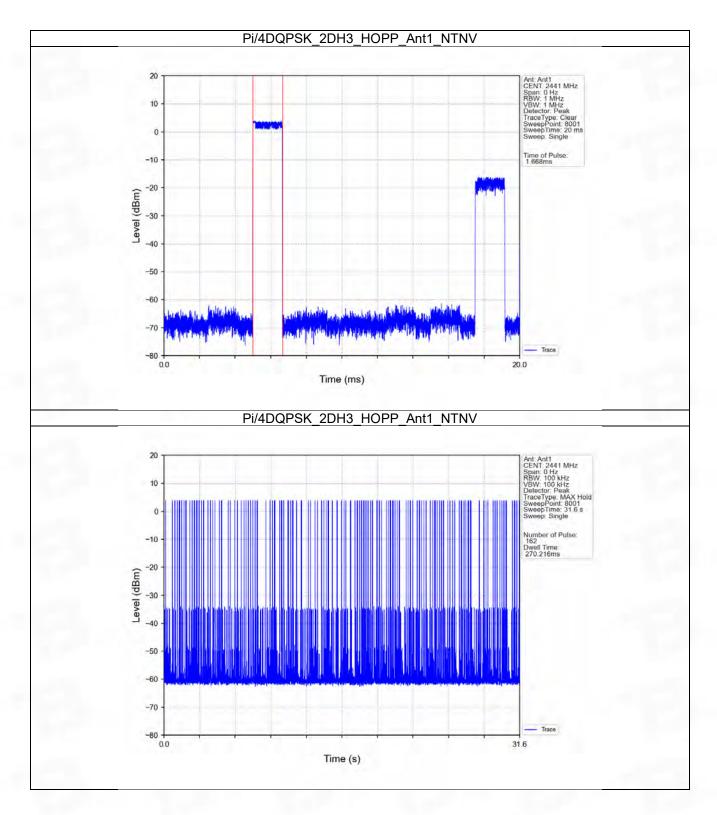


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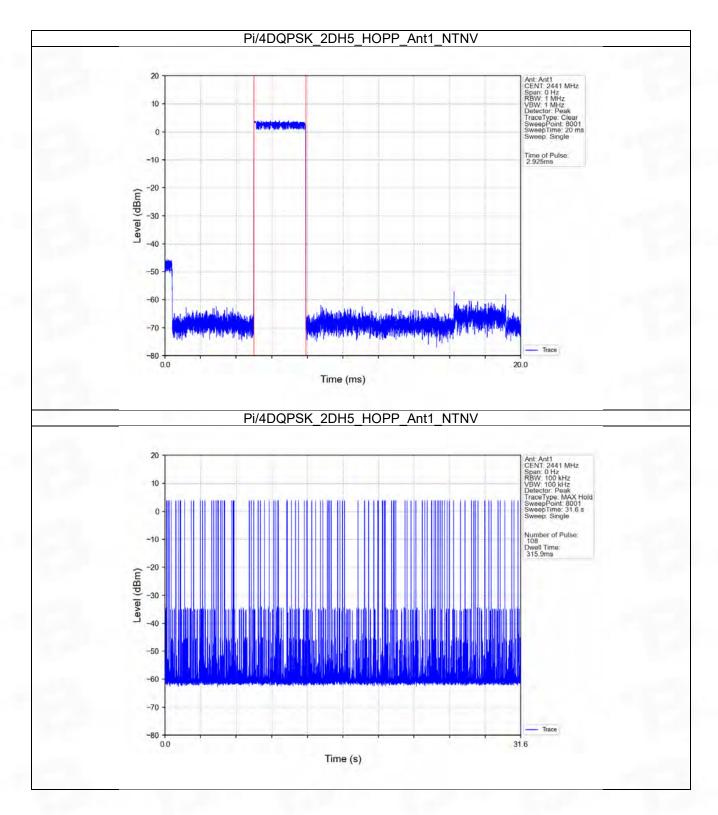




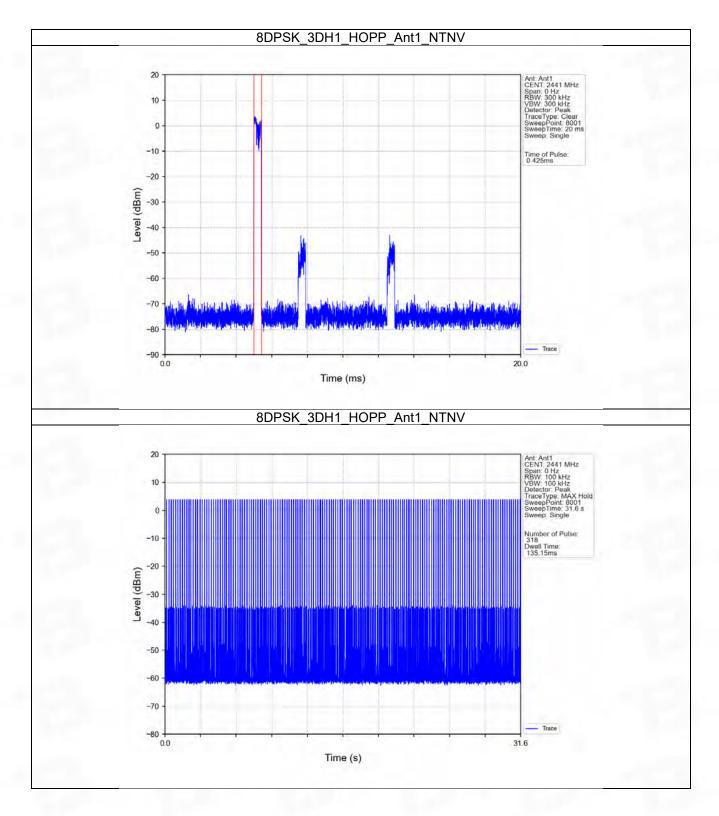




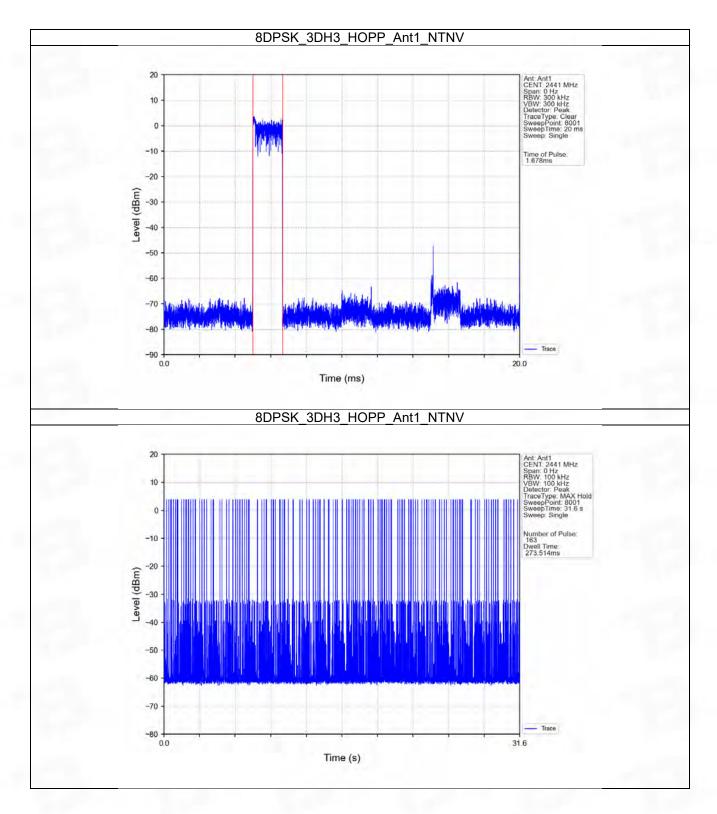




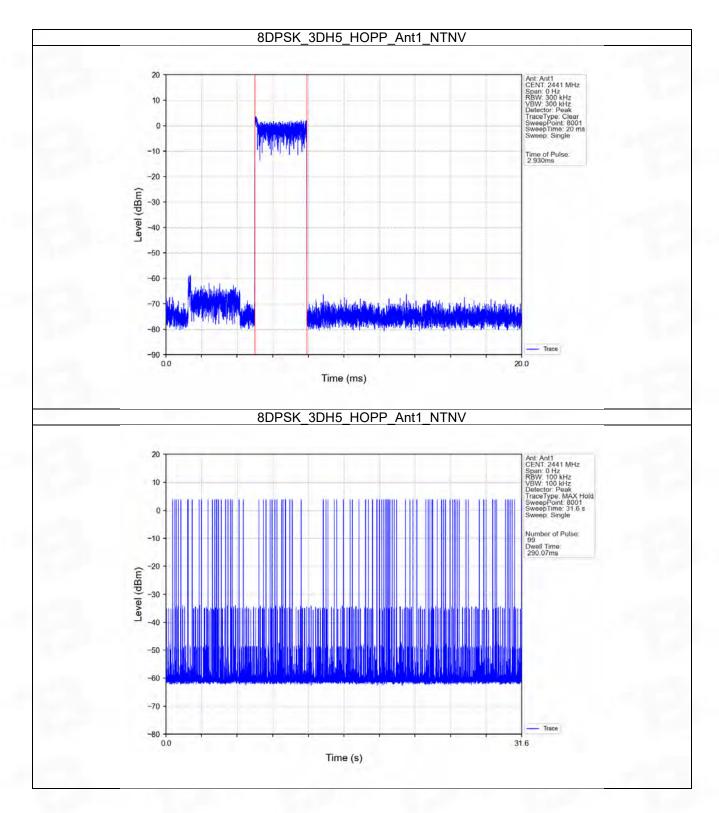














## 6. Unwanted Emissions In Non-restricted Frequency Bands

#### 6.1 Test Result

#### 6.1.1 Ref

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)	
		2402	DH5	1	4.43	
GFSK	SISO	2441	DH5 1		3.94	
		2480	DH5	1	3.26	
	SISO	2402	2DH5	1	4.21	
Pi/4DQPSK		2441	2DH5	1	3.80	
		2480	2DH5	1	3.11	
		2402	3DH5	1	4.34	
8DPSK	SISO	2441	3DH5	1	3.81	
	Concerning of	2480	3DH5	1	3.12	

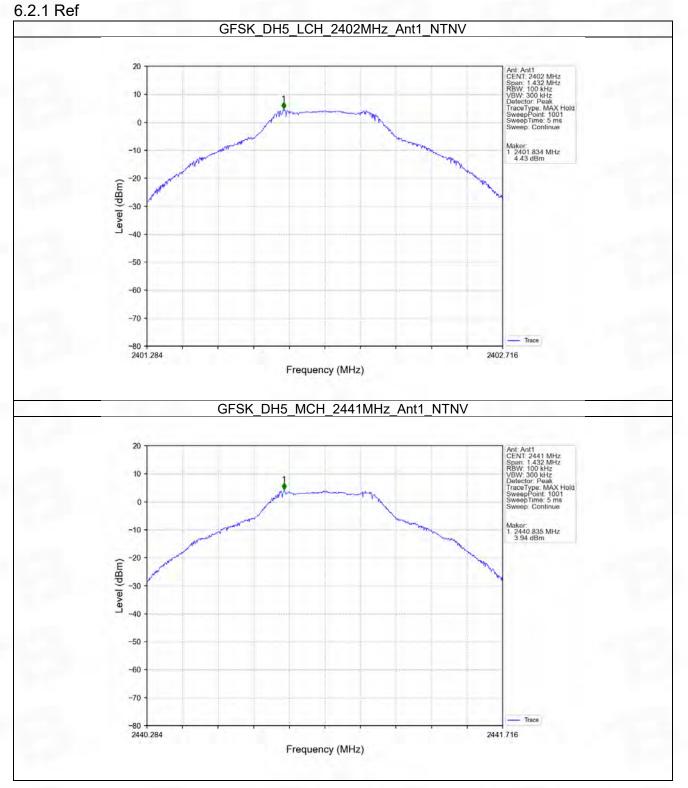
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.

#### 6.1.2 CSE

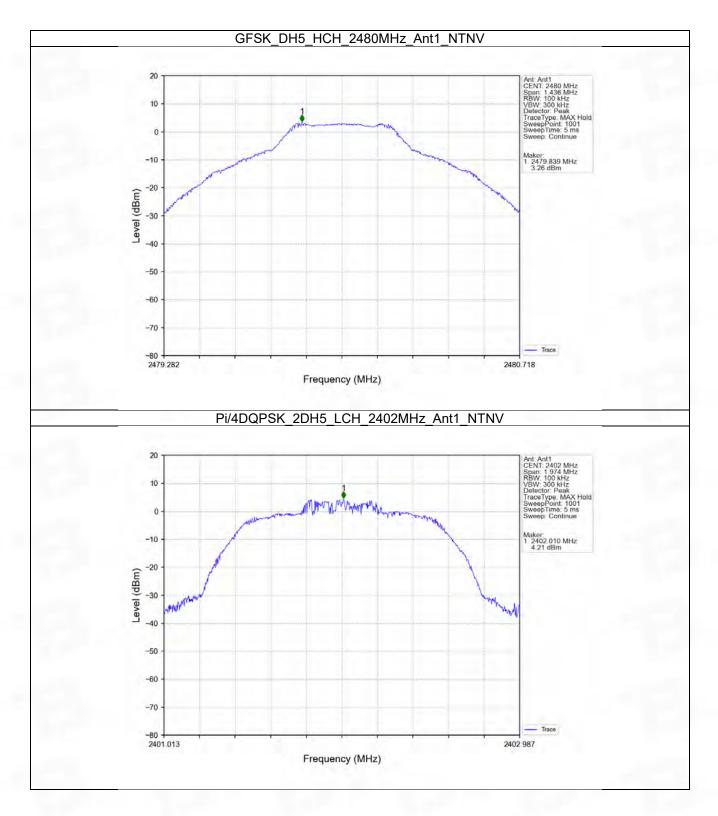
ТХ	Frequency (MHz)	Packet Type	ANT	Level of Reference	Limit	Verdict
Туре				(dBm)	(dBm)	veruiet
SISO	2402	DH5	1	4.43	-15.57	Pass
	2441	DH5	1	4.43	-15.57	Pass
	2480	DH5	1	4.43	-15.57	Pass
	HOPP	DH5	1	4.43	-15.57	Pass
				4.43	-15.57	Pass
SISO	2402	2DH5	1	4.21	-15.79	Pass
	2441	2DH5	1	4.21	-15.79	Pass
	2480	2DH5	1	4.21	-15.79	Pass
	HOPP	2DH5	1	4.21	-15.79	Pass
				4.21	-15.79	Pass
SISO	2402	3DH5	1	4.34	-15.66	Pass
	2441	3DH5	1	4.34	-15.66	Pass
	2480	3DH5	1	4.34	-15.66	Pass
	HOPP	3DH5	1	4.34	-15.66	Pass
				4.34	-15.66	Pass
	Type SISO SISO	Type         (MHz)           2402         2441           SISO         2480           HOPP         2402           SISO         2441           SISO         2402           2441         2402           2441         2441           SISO         2480           HOPP         2402           2441         2480           SISO         2402           2441         2480	Type         (MHz)         Type           2402         DH5           2441         DH5           SISO         2480         DH5           HOPP         DH5           2402         2DH5           2441         2DH5           2402         2DH5           2441         2DH5           2480         2DH5           2480         2DH5           2480         2DH5           HOPP         2DH5           HOPP         2DH5           SISO         2402         3DH5           SISO         2480         3DH5	Type         (MHz)         Type         AN1           2402         DH5         1           2402         DH5         1           2441         DH5         1           2480         DH5         1           SISO         2480         DH5         1           HOPP         DH5         1         1           SISO         2402         2DH5         1           2441         2DH5         1         1           SISO         2480         2DH5         1           HOPP         2DH5         1         1           SISO         2480         2DH5         1           SISO         2402         3DH5         1           SISO         2441         3DH5         1           SISO         2480         3DH5         1	Type         (MHz)         Type         AN I         (dBm)           2402         DH5         1         4.43           2441         DH5         1         4.43           SISO         2480         DH5         1         4.43           HOPP         DH5         1         4.43           HOPP         DH5         1         4.43           SISO         2402         2DH5         1         4.43           HOPP         DH5         1         4.43           SISO         2402         2DH5         1         4.21           2441         2DH5         1         4.21           HOPP         2DH5         1         4.21           HOPP         2DH5         1         4.21           SISO         2480         2DH5         1         4.21           HOPP         2DH5         1         4.34         4.34           SISO         2402         3DH5         1         4.34           HOPP         3DH5         1         4.34	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$



## 6.2 Test Graph

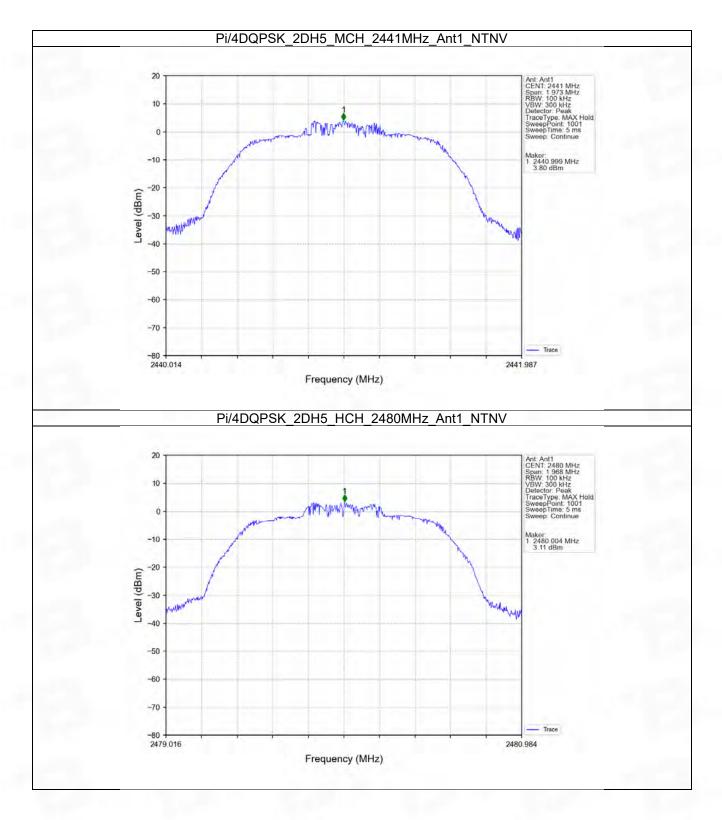




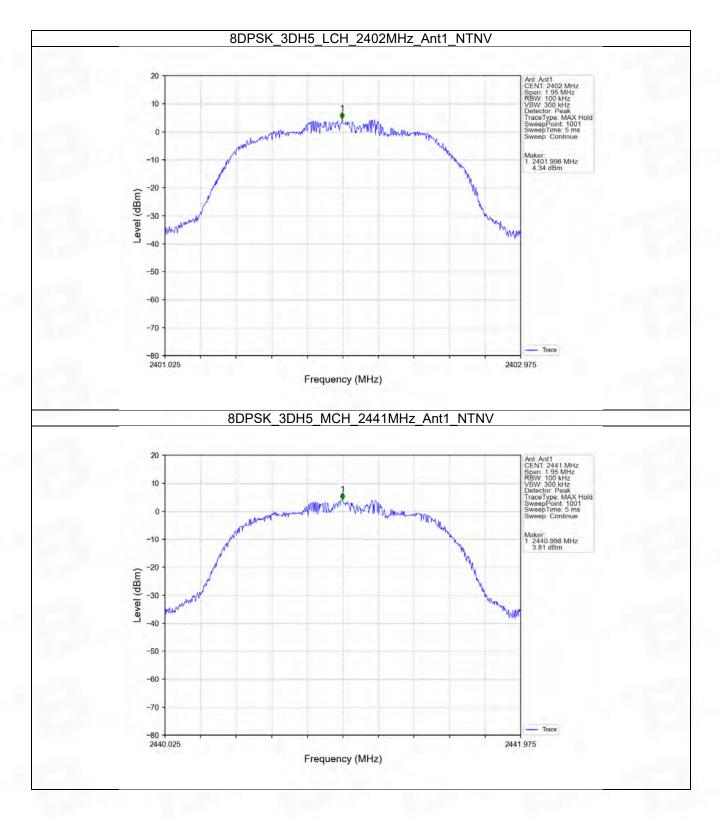


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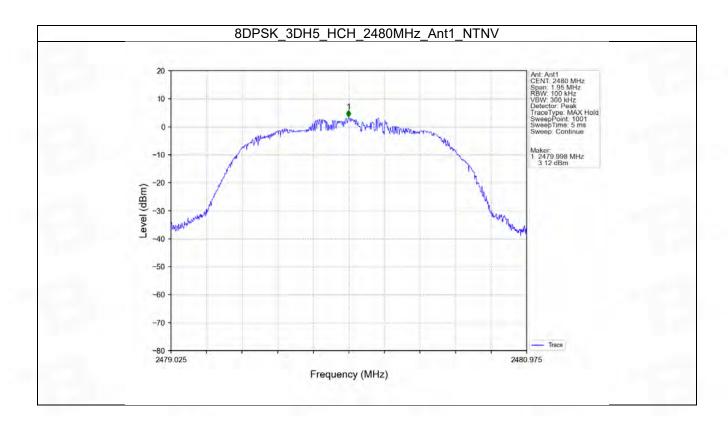






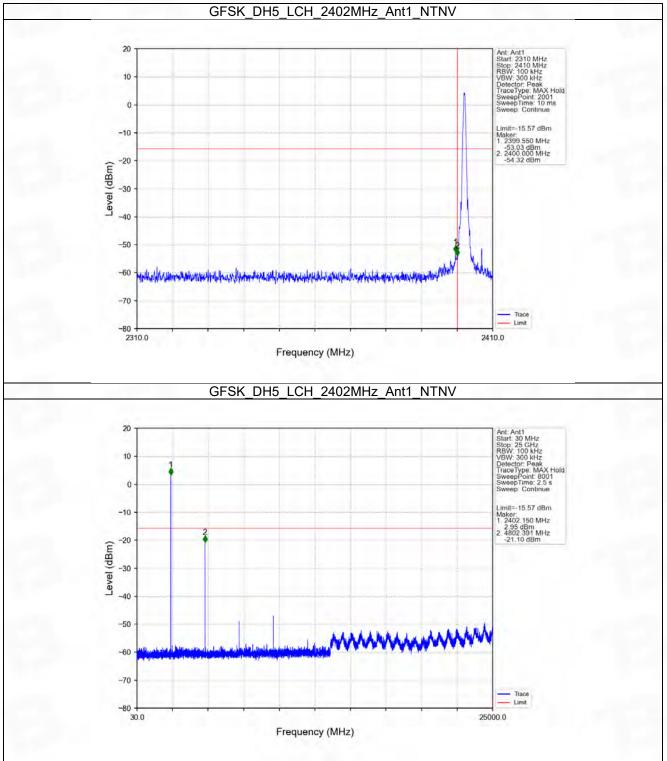
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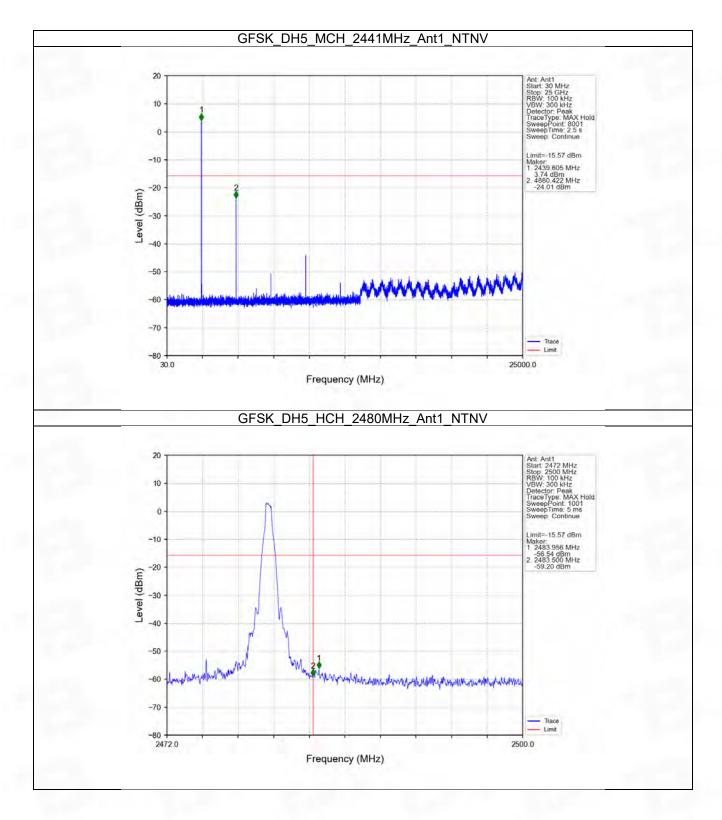




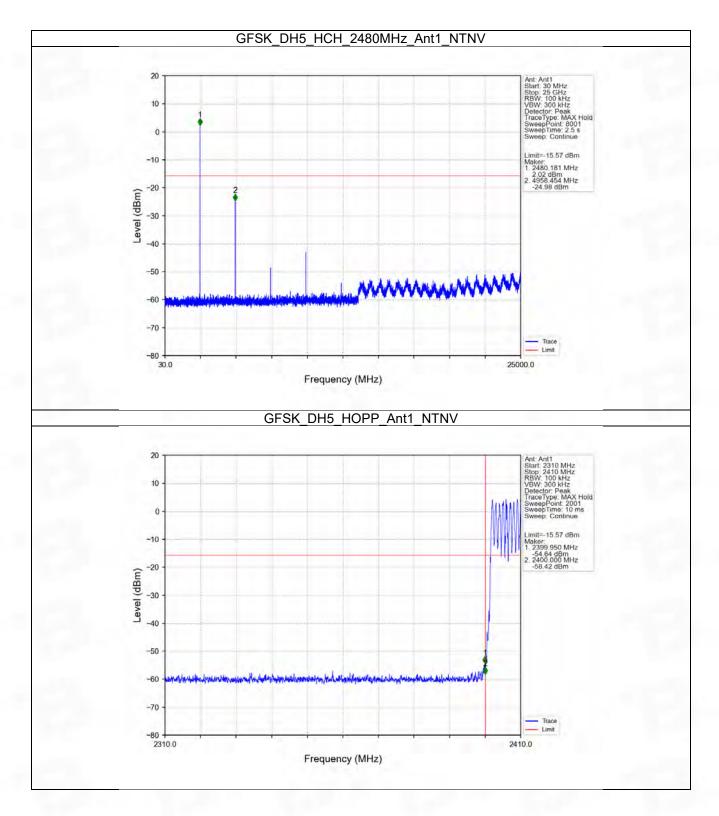
6.2.2 CSE





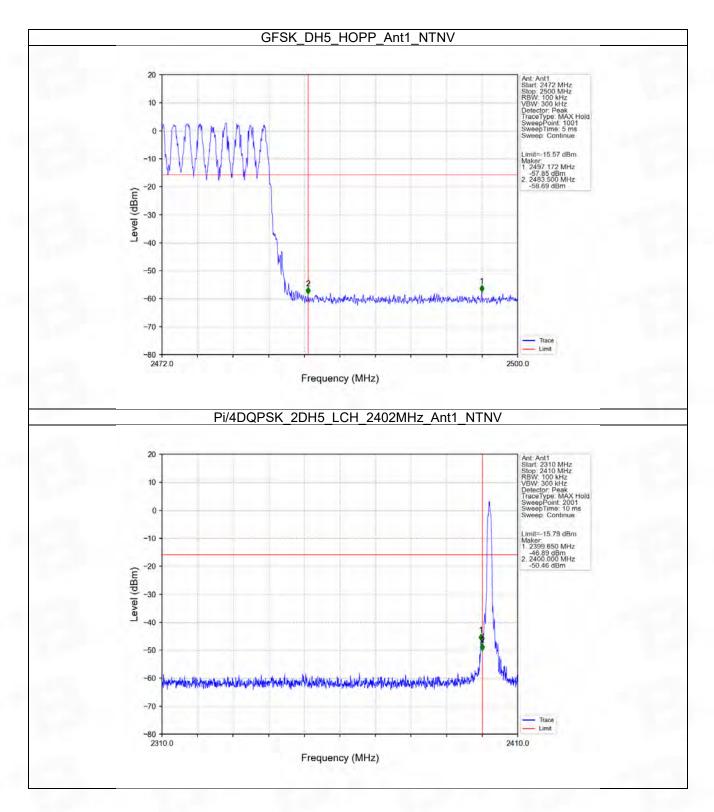




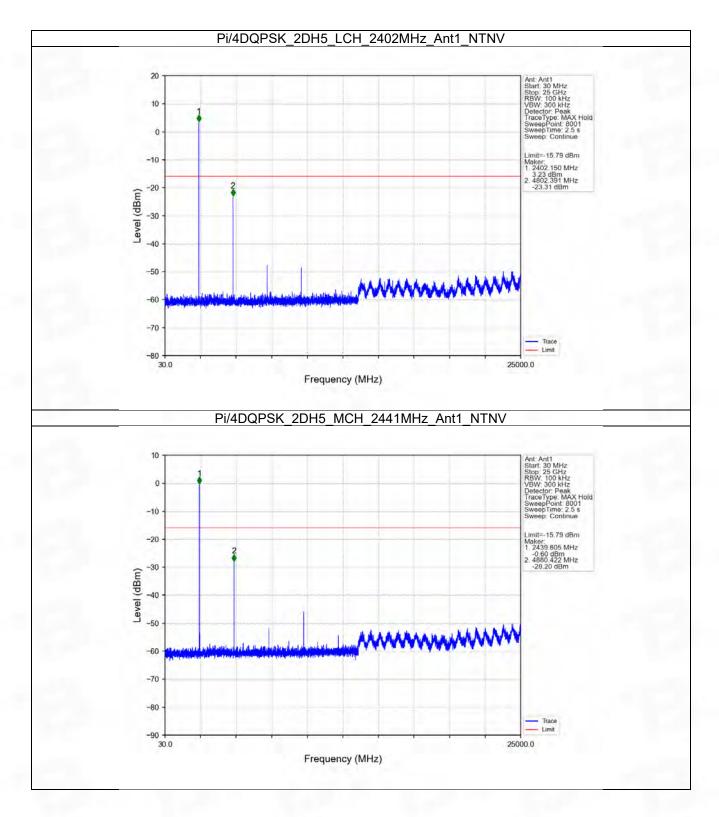


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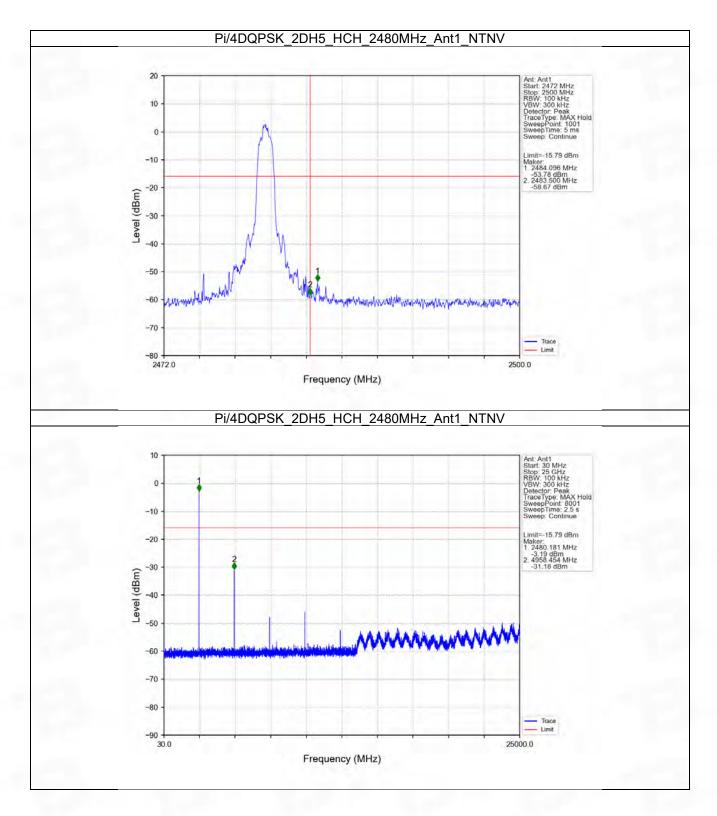




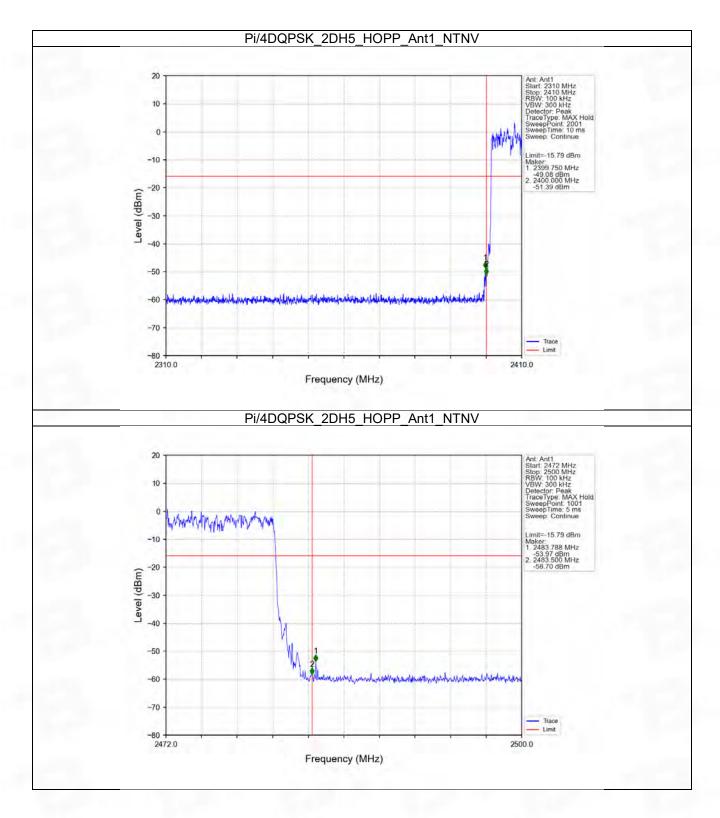


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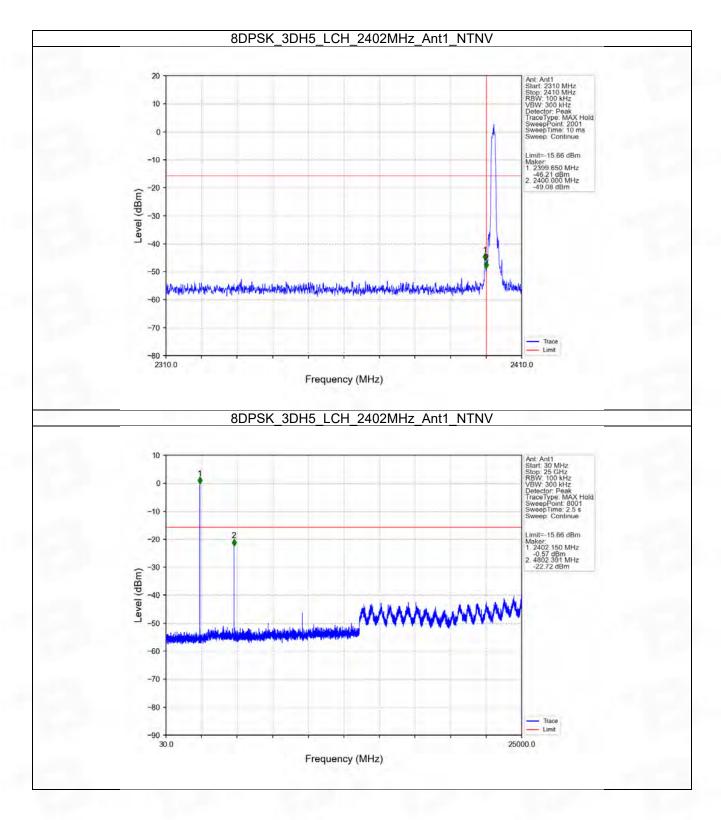




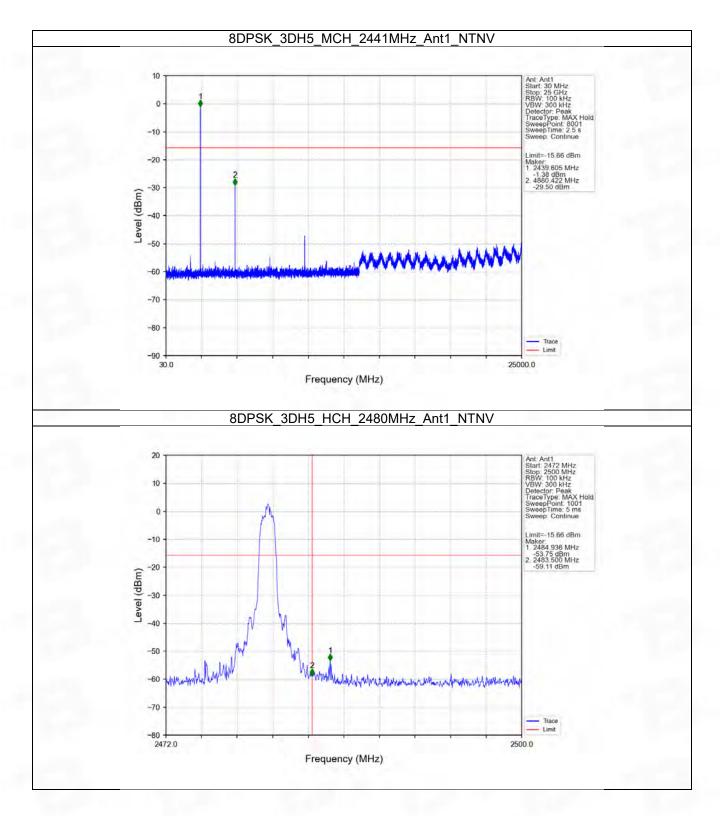






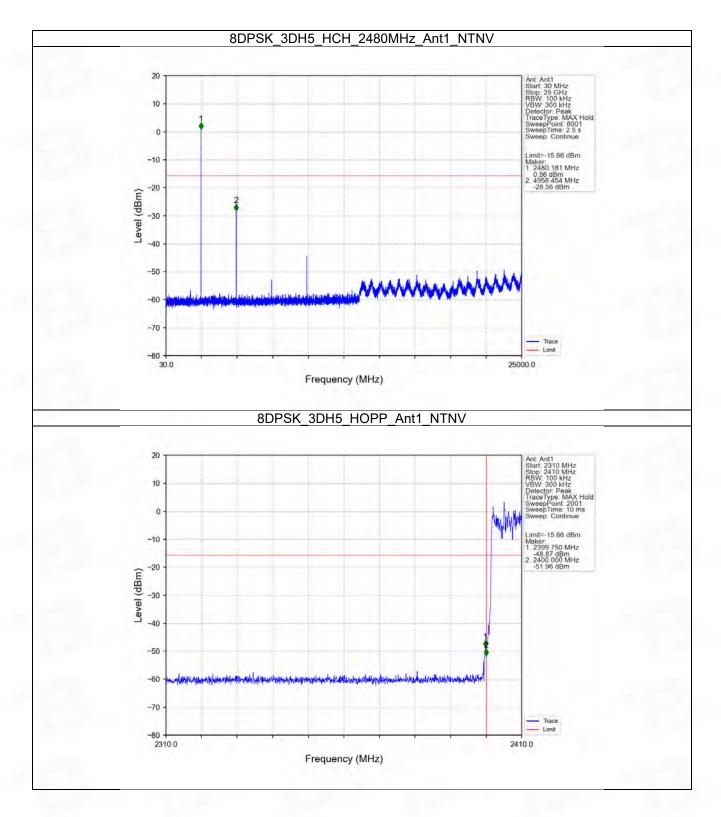






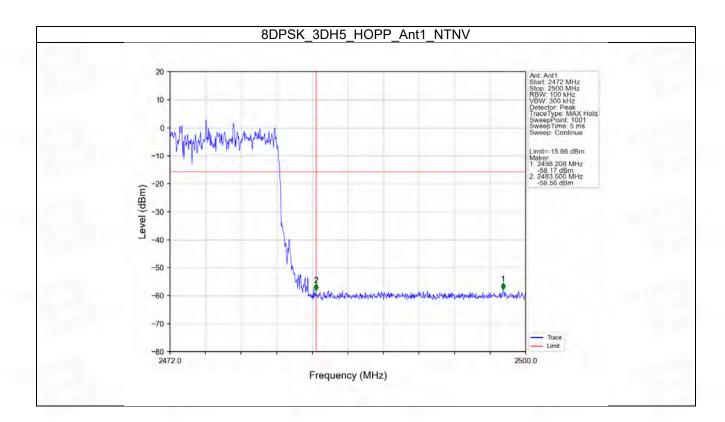
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### 7. Form731

#### 7.1 Test Result

#### 7.1.1 Form731

Lower Freq (MHz)	High Freq (MHz)	MAX Power (W)	MAX Power (dBm)
2402	2480	0.0035	5.43



#### BTF Testing Lab (Shenzhen) Co., Ltd.

F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

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