

# **RF** Test Report

## For

## **Applicant Name:**

## **TECNO MOBILE LIMITED**

Address:

EUT Name:

Brand Name:

Model Number:

FLAT N 16/F BLOCK B UNIVERSAL INDUSTRIAL CENTRE 19-25 SHAN MEI STREET FOTAN NT HONGKONG Laptop TECNO T15DA Series Model Number: Refer to section 2

## **Issued By**

## **Company Name:**

Address:

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

**Report Number:** Test Standards:

BTF230612R00602 47 CFR Part 15.247

**Test Conclusion:** FCC ID: Test Date: Date of Issue:

Pass 2ADYY-T15DA 2023-05-09 to 2023-06-01 2023-06-15

Prepared By:

Date:

Approved By:

Date:

Chris Lin (Bridgert Engineen)
Chris Liu / Project Engineer
2023-06-15 -
then *
Ryan.CJ / EMC Manager
2023-06-15

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Page 1 of 87

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#### Test Report Number: BTF230612R00602

Revision History			
Version	Issue Date	Revisions Content	
R_V0	2023-06-15	Original	

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

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## **Table of Contents**

1	INTR	INTRODUCTION			
	<ol> <li>Identification of Testing Laboratory</li></ol>				
	-	Announcement			
2		DUCT INFORMATION			
	2.1	Application Information			
	2.2 2.3	Manufacturer Information			
	2.3	General Description of Equipment under Test (EUT)	0		
	2.5	Technical Information			
3	SUM	MARY OF TEST RESULTS	8		
	3.1	Test Standards			
	3.2	Uncertainty of Test			
	3.3	Summary of Test Result	8		
4	TEST	T CONFIGURATION	9		
	4.1	Test Equipment List			
	4.2	Test Auxiliary Equipment			
	4.3	Test Modes			
5	EVA	LUATION RESULTS (EVALUATION)	15		
	5.1	Antenna requirement			
		5.1.1 Conclusion:	15		
6	RAD	IO SPECTRUM MATTER TEST RESULTS (RF)	16		
	6.1	Conducted Emission at AC power line	16		
		6.1.1 E.U.T. Operation:			
		6.1.2 Test Setup Diagram:			
		6.1.3			
	6.2	Occupied Bandwidth			
		6.2.1 E.U.T. Operation:			
		6.2.3 Test Data:			
	6.3	Maximum Conducted Output Power			
		6.3.1 E.U.T. Operation:			
		6.3.2 Test Setup Diagram:			
		6.3.3 Test Data:			
	6.4	Channel Separation			
		6.4.1 E.U.T. Operation:			
		6.4.2 Test Setup Diagram: 6.4.3 Test Data:			
	6.5	Number of Hopping Frequencies			
	0.5	6.5.1 E.U.T. Operation:			
		6.5.2 Test Setup Diagram:			
		6.5.3 Test Data:			
	6.6	Dwell Time	27		
		6.6.1 E.U.T. Operation:			
		6.6.2 Test Setup Diagram:			
		6.6.3 Test Data:			
	6.7	Emissions in non-restricted frequency bands	29		



## Test Report Number: BTF230612R00602

	6.7.1	E.U.T. Operation:	
	6.7.2	Test Setup Diagram:	
	6.7.3	Test Data:	
6.8	Band	edge emissions (Radiated)	
	6.8.1	E.U.T. Operation:	
		Test Data:	
6.9	Emiss	sions in restricted frequency bands (below 1GHz)	
	6.9.1	E.U.T. Operation:	
	6.9.2	Test Data:	
6.1	0 Emis	ssions in restricted frequency bands (above 1GHz)	36
	6.10.1	E.U.T. Operation:	
	6.10.2	2 Test Data:	
APPEND	IX		



## 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.

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(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:	TECNO MOBILE LIMITED
Address:	FLAT N 16/F BLOCK B UNIVERSAL INDUSTRIAL CENTRE 19-25 SHAN MEI STREET FOTAN NT HONGKONG

## 2.2 Manufacturer Information

Company Name:	TECNO MOBILE LIMITED
Address:	FLAT N 16/F BLOCK B UNIVERSAL INDUSTRIAL CENTRE 19-25 SHAN MEI STREET FOTAN NT HONGKONG

## 2.3 Factory Information

Company Name:	GUANGXI SHANCHAUN TECHNOLOGY CO LTD
Address:	2nd floor of building1 in zone 3、building2 in zone 3, 1st floor of building 2 in zone 4, Guangxi 3nod Smart Industrial Park, No. 3 Gaoke Road, Haicheng District, Beihai City, Guangxi Zhuang Autonomous Region

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

EUT Name:	Laptop		
Test Model Number:	T15DA		
Series Model Number:	N/A		

## 2.5 Technical Information

	Model: 165
	Rated Voltage: 11.55V
Power Supply:	Rated Capacity: 6060mAh/70Wh
	Limited Capacity: 6160mAh/71.14Wh
	Limited Charge Voltage: 13.2V
	Adapter1: DS65-1
	Input: 100-240V-50/60Hz 1.5A Max
	Output: 5.0V3.0A 9.0V3.0A 12.0V3.0A 15.0V3.0A 20.0V3.25A 65.0W
	Adapter2: DS65-3
	I Input: 100-240V-50/60Hz 1.5A Max
	Output: 5.0V3.0A 9.0V3.0A 12.0V3.0A 15.0V3.0A 20.0V3.25A 65.0W
Power Adaptor:	Adapter3: TCW-E61S-65W
Power Adaptor.	Input: 100-240V-50/60Hz 1.5A Max
	Output: DP: 5.0V3.0A 15.0W 9.0V3.0A 27.0W 12.0V3.0A 36.0W 15.0V
	3.0A 45.0W 20.0V3.25A 65.0W
	PPS: 3.3-11.0V5.0A 55.0W Max
	Adapter4: TCW-U61S-65W
	Input: 100-240V-50/60Hz 1.5A Max
	Output: DP: 5.0V==-3.0A 15.0W 9.0V==-3.0A 27.0W 12.0V==-3.0A 36.0W 15.0V
	3.0A 45.0W 20.0V3.25A 65.0W PPS: 3.3-11.0V5.0A Max
Operation Frequency:	2402MHz to 2480MHz
Number of Channels:	
Modulation Type:	GFSK, π/4 DQPSK, 8DPSK
Antenna Type:	Integral Antenna
Antenna Gain <sup>#</sup> :	3.86 dBi

#### Note:

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#: 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.

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## 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

Item	Measurement Uncertainty		
Conducted Emission (150 kHz-30 MHz)	±2.64dB		
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			

## 3.3 Summary of Test Result

the 95% confidence level using a coverage factor of k=2

Item	Standard	Requirement	Result
Antenna requirement	47 CFR Part 15.247	Part 15.203	Pass
Conducted Emission at AC power line	47 CFR Part 15.247	47 CFR 15.207(a)	Pass
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)	Pass
Band edge emissions (Radiated)	47 CFR Part 15.247	47 CFR 15.247(d)	Pass
Emissions in restricted frequency bands (below 1GHz)	47 CFR Part 15.247	47 CFR 15.247(d)	Pass
Emissions in restricted frequency bands (above 1GHz)	47 CFR Part 15.247	47 CFR 15.247(d)	Pass



#### **Test Configuration** 4

#### **Test Equipment List** 4.1

Conducted Emission at AC power line							
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date		
Pulse Limiter	SCHWARZBECK	VTSD 9561-F	00953	2022-11-24	2023-11-23		
Coaxial Switcher	SCHWARZBECK	CX210	CX210	2022-11-24	2023-11-23		
V-LISN	SCHWARZBECK	NSLK 8127	01073	2022-11-24	2023-11-23		
LISN	AFJ	LS16/110VAC	16010020076	2023-02-23	2024-02-22		
EMI Receiver	ROHDE&SCHWA RZ	ESCI3	101422	2022-11-24	2023-11-23		

Occupied Bandwidth							
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date		
RFTest software	/	V1.00	/	/	/		
RF Control Unit	Techy	TR1029-1	/	2022-11-24	2023-11-23		
RF Sensor Unit	Techy	TR1029-2	/	2022-11-24	2023-11-23		
Programmable constant temperature and humidity box	ZZCKONG	ZZ-K02A	20210928007	2022-11-24	2023-11-23		
Adjustable Direct Current Regulated Power Supply	Dongguan Tongmen Electronic Technology Co., LTD	etm-6050c	20211026123	2022-11-24	2023-11-23		
WIDEBAND RADIO COMMNUNICATION TESTER	Rohde & Schwarz	CMW500	161997	2022-11-24	2023-11-23		
MXA Signal Analyzer	KEYSIGHT	N9020A	MY50410020	2022-11-24	2023-11-23		

Maximum Conducted Output Power							
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date		
RFTest software	/	V1.00	/	/	/		
RF Control Unit	Techy	TR1029-1	/	2022-11-24	2023-11-23		
RF Sensor Unit	Techy	TR1029-2	/	2022-11-24	2023-11-23		
Programmable constant temperature and humidity box	ZZCKONG	ZZ-K02A	20210928007	2022-11-24	2023-11-23		
Adjustable Direct Current Regulated Power Supply	Dongguan Tongmen Electronic Technology Co., LTD	etm-6050c	20211026123	2022-11-24	2023-11-23		
WIDEBAND RADIO COMMNUNICATION TESTER	Rohde & Schwarz	CMW500	161997	2022-11-24	2023-11-23		
MXA Signal Analyzer	KEYSIGHT	N9020A	MY50410020	2022-11-24	2023-11-23		

Channel Separation					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
RFTest software	/	V1.00	/	/	/

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Page 9 of 87



#### Test Report Number: BTF230612R00602

RF Control Unit	Techy	TR1029-1	/	2022-11-24	2023-11-23
RF Sensor Unit	Techy	TR1029-2	/	2022-11-24	2023-11-23
Programmable constant temperature and humidity box	ZZCKONG	ZZ-K02A	20210928007	2022-11-24	2023-11-23
Adjustable Direct Current Regulated Power Supply	Dongguan Tongmen Electronic Technology Co., LTD	etm-6050c	20211026123	2022-11-24	2023-11-23
WIDEBAND RADIO COMMNUNICATION TESTER	Rohde & Schwarz	CMW500	161997	2022-11-24	2023-11-23
MXA Signal Analyzer	KEYSIGHT	N9020A	MY50410020	2022-11-24	2023-11-23

Number of Hopping Frequencies							
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date		
RFTest software	/	V1.00	/	/	/		
RF Control Unit	Techy	TR1029-1	/	2022-11-24	2023-11-23		
RF Sensor Unit	Techy	TR1029-2	/	2022-11-24	2023-11-23		
Programmable constant temperature and humidity box	ZZCKONG	ZZ-K02A	20210928007	2022-11-24	2023-11-23		
Adjustable Direct Current Regulated Power Supply	Dongguan Tongmen Electronic Technology Co., LTD	etm-6050c	20211026123	2022-11-24	2023-11-23		
WIDEBAND RADIO COMMNUNICATION TESTER	Rohde & Schwarz	CMW500	161997	2022-11-24	2023-11-23		
MXA Signal Analyzer	KEYSIGHT	N9020A	MY50410020	2022-11-24	2023-11-23		

Dwell Time					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
RFTest software	/	V1.00	/	/	/
RF Control Unit	Techy	TR1029-1	/	2022-11-24	2023-11-23
RF Sensor Unit	Techy	TR1029-2	/	2022-11-24	2023-11-23
Programmable constant temperature and humidity box	ZZCKONG	ZZ-K02A	20210928007	2022-11-24	2023-11-23
Adjustable Direct Current Regulated Power Supply	Dongguan Tongmen Electronic Technology Co., LTD	etm-6050c	20211026123	2022-11-24	2023-11-23
WIDEBAND RADIO COMMNUNICATION TESTER	Rohde & Schwarz	CMW500	161997	2022-11-24	2023-11-23
MXA Signal Analyzer	KEYSIGHT	N9020A	MY50410020	2022-11-24	2023-11-23

Emissions in non-restricted frequency bands

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Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
RFTest software	/	V1.00	/	/	/
RF Control Unit	Techy	TR1029-1	/	2022-11-24	2023-11-23
RF Sensor Unit	Techy	TR1029-2	/	2022-11-24	2023-11-23
Programmable constant temperature and humidity box	ZZCKONG	ZZ-K02A	20210928007	2022-11-24	2023-11-23
Adjustable Direct Current Regulated Power Supply	Dongguan Tongmen Electronic Technology Co., LTD	etm-6050c	20211026123	2022-11-24	2023-11-23
WIDEBAND RADIO COMMNUNICATION TESTER	Rohde & Schwarz	CMW500	161997	2022-11-24	2023-11-23
MXA Signal Analyzer	KEYSIGHT	N9020A	MY50410020	2022-11-24	2023-11-23

Band edge emissions	(Radiated)				
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Coaxial cable Multiflex 141	Schwarzbeck	N/SMA 0.5m	517386	2023-03-24	2024-03-23
Preamplifier	SCHWARZBECK	BBV9744	00246	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF1-SMASMAM-1 0m	21101566	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-10m	21101570	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF1-SMASMAM-1 m	21101568	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-1m	21101576	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-2.5m	21101573	2022-11-24	2023-11-23
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Horn Antenna	SCHWARZBECK	BBHA9170	01157	2021-11-28	2023-11-27
EMI TEST RECEIVER	ROHDE&SCHWA RZ	ESCI7	101032	2022-11-24	2023-11-23
SIGNAL ANALYZER	ROHDE&SCHWA RZ	FSQ40	100010	2022-11-24	2023-11-23
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Broadband Preamplilifier	SCHWARZBECK	BBV9718D	00008	2023-03-24	2024-03-23
Horn Antenna	SCHWARZBECK	BBHA9120D	2597	2022-05-22	2024-05-21
EZ_EMC	Frad	FA-03A2 RE+	/	/	/
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Log periodic antenna	SCHWARZBECK	VULB 9168	01328	2021-11-28	2023-11-27

Emissions in restricted frequency bands (below 1GHz)							
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date		
Coaxial cable Multiflex 141	Schwarzbeck	N/SMA 0.5m	517386	2023-03-24	2024-03-23		
Preamplifier	SCHWARZBECK	BBV9744	00246	2022-11-24	2023-11-23		

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Page 11 of 87



RE Cable	REBES Talent	UF1-SMASMAM-1 0m	21101566	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-10m	21101570	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF1-SMASMAM-1 m	21101568	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-1m	21101576	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-2.5m	21101573	2022-11-24	2023-11-23
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Horn Antenna	SCHWARZBECK	BBHA9170	01157	2021-11-28	2023-11-27
EMI TEST RECEIVER	ROHDE&SCHWA RZ	ESCI7	101032	2022-11-24	2023-11-23
SIGNAL ANALYZER	ROHDE&SCHWA RZ	FSQ40	100010	2022-11-24	2023-11-23
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Broadband Preamplilifier	SCHWARZBECK	BBV9718D	00008	2023-03-24	2024-03-23
Horn Antenna	SCHWARZBECK	BBHA9120D	2597	2022-05-22	2024-05-21
EZ_EMC	Frad	FA-03A2 RE+	/	/	/
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	1
Log periodic antenna	SCHWARZBECK	VULB 9168	01328	2021-11-28	2023-11-27

Emissions in restricted 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	2023-03-24	2024-03-23	
Preamplifier	SCHWARZBECK	BBV9744	00246	2022-11-24	2023-11-23	
RE Cable	REBES Talent	UF1-SMASMAM-1 0m	21101566	2022-11-24	2023-11-23	
RE Cable	REBES Talent	UF2-NMNM-10m	21101570	2022-11-24	2023-11-23	
RE Cable	REBES Talent	UF1-SMASMAM-1 m	21101568	2022-11-24	2023-11-23	
RE Cable	REBES Talent	UF2-NMNM-1m	21101576	2022-11-24	2023-11-23	
RE Cable	REBES Talent	UF2-NMNM-2.5m	21101573	2022-11-24	2023-11-23	
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	1	/	
Horn Antenna	SCHWARZBECK	BBHA9170	01157	2021-11-28	2023-11-27	
EMI TEST RECEIVER	ROHDE&SCHWA RZ	ESCI7	101032	2022-11-24	2023-11-23	
SIGNAL ANALYZER	ROHDE&SCHWA RZ	FSQ40	100010	2022-11-24	2023-11-23	
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/	
Broadband Preamplilifier	SCHWARZBECK	BBV9718D	00008	2023-03-24	2024-03-23	
Horn Antenna	SCHWARZBECK	BBHA9120D	2597	2022-05-22	2024-05-21	
EZ_EMC	Frad	FA-03A2 RE+	/	/	/	
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	1	/	

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Log periodic antenna S	SCHWARZBECK	VULB 9168	01328	2021-11-28	2023-11-27



## 4.2 Test Auxiliary Equipment

The EUT was tested as an independent device.

## 4.3 Test Modes

Temperature:	25.0 °C
Humidity:	56 % RH
Atmospheric Pressure:	1010 mbar
Test Mode:	
Engineering mode:	Keep the EUT in continuous transmitting by select channel and modulations with Fully-charged batter

The sample was placed 0.8m & 1.5m for the measurement below & above 1GHZ above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

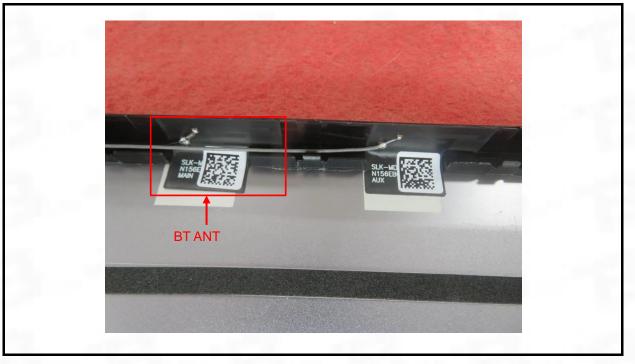


## 5 Evaluation Results (Evaluation)

## 5.1 Antenna requirement

Test Requirement:An intentional radiator shall be designed to ensure that no antenna other than that<br/>furnished by the responsible party shall be used with the device. The use of a<br/>permanently attached antenna or of an antenna that uses a unique coupling to the<br/>intentional radiator shall be considered sufficient to comply with the provisions of<br/>this section.

#### 5.1.1 Conclusion:





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

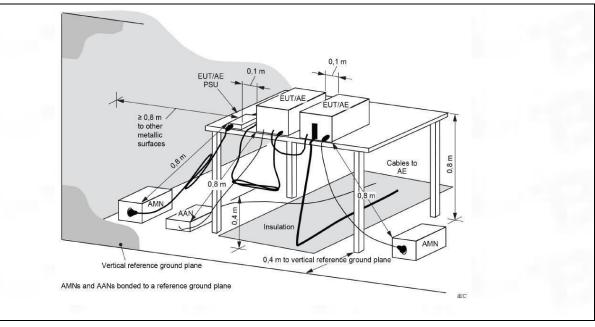
#### **Conducted Emission at AC power line** 6.1

Test Requirement:	Except as shown in paragraphs (b that is designed to be connected t frequency voltage that is conducte or frequencies, within the band 15 the following table, as measured u stabilization network (LISN).	o the public utility (AC) ed back onto the AC po 0 kHz to 30 MHz, shall	power line, the radio wer line on any frequency not exceed the limits in	
Test Method:	Refer to ANSI C63.10-2013 section 6.2, standard test method for ac power-line conducted emissions from unlicensed wireless devices			
	Frequency of emission (MHz)	Conducted limit (dBµV)		
Test Limit:		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.				

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

Operating Environment:	
Temperature:	22.4 °C
Humidity:	52.7 %
Atmospheric Pressure:	1010 mbar

#### 6.1.2 Test Setup Diagram:

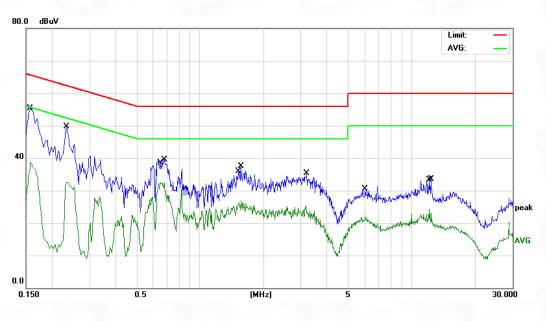


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## 6.1.3

Line: Line / Band: 2.4G / BW: 1 / CH: M



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	*	0.1580	44.92	10.41	55.33	65.56	-10.23	QP
2		0.2340	39.22	10.42	49.64	62.30	-12.66	QP
3		0.2340	22.18	10.42	32.60	52.30	-19.70	AVG
4		0.6500	22.12	10.48	32.60	46.00	-13.40	AVG
5		0.6780	29.05	10.48	39.53	56.00	-16.47	QP
6		1.5300	15.61	10.59	26.20	46.00	-19.80	AVG
7		1.5660	26.82	10.59	37.41	56.00	-18.59	QP
8		3.1580	14.89	10.67	25.56	46.00	-20.44	AVG
9		3.1940	24.58	10.67	35.25	56.00	-20.75	QP
10		6.0500	11.65	10.71	22.36	50.00	-27.64	AVG
11		12.1140	13.49	10.90	24.39	50.00	-25.61	AVG
12		12.3500	22.50	10.92	33.42	60.00	-26.58	QP

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Line: Neutral / Band: 2.4G / BW: 1 / CH: M

30.0 dBu	uV					Limit:	
						AVG:	
XX							
M.	×						
40 1	M/X	1 M					
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0.150	0.5		(MHz)	5			30.000
		Reading	Correct	Measure-		-	
No. N	Mk. Freq.	Level	Factor	ment	Limit	Over	
	MHz	dBuV	dB	dBuV	dBuV	dB	Detecto
1	0.1620	25.39	10.41	35.80	55.36	-19.56	AVG
2 '	* 0.1700	41.89	10.41	52.30	64.96	-12.66	QP
3	0.2420	19.10	10.42	29.52	52.02	-22.50	AV
4	0.2508	32.02	10.42	42.44	61.73	-19.29	QP
5	0.4940	13.46	10.47	23.93	46.10	-22.17	AVG
6	0.6620	22.86	10.48	33.34	46.00	-12.66	AVC
7	0.6820	29.83	10.48	40.31	56.00	-15.69	QP
8	1.5859	14.41	10.60	25.01	46.00	-20.99	AVG
9	2.8740	25.24	10.67	35.91	56.00	-20.09	QP
10	2.9180	15.45	10.67	26.12	46.00	-19.88	AVG
11	6.4300	18.46	10.72	29.18	60.00	-30.82	QP
12	11.0900	22.56	10.85	33.41	60.00	-26.59	QP

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## 6.2 Occupied Bandwidth

Test Requirement:	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.
Test Method:	Occupied bandwidth—relative measurement procedure
Test Limit:	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.
Procedure:	<ul> <li>a) The spectrum analyzer center frequency is set to the nominal EUT channel 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, unless otherwise specified by the applicable requirement.</li> <li>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 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> <li>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 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> <li>h) Determine the "-xx dB down amplitude" using [(reference value) - xx]. Alternatively, this calculation may be made by using the marker-delta function of the instrument.</li> <li>i) If the reference value is determined by an unmodulated carrier, then turn the EUT modulation ON, and either clear the existing trace or start a new trace from step g) shall be used for step j).</li> <li>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</li></ul>

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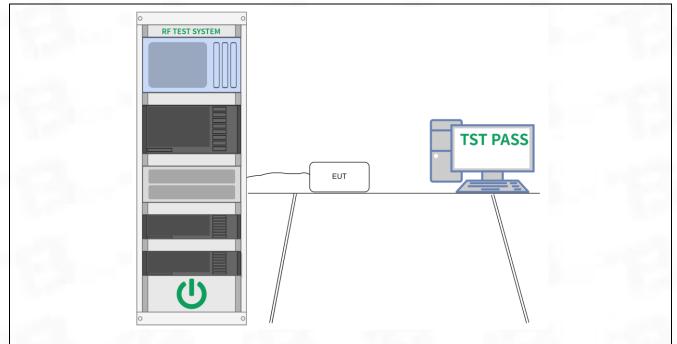


k) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly
labeled. Tabular data may be reported in addition to the plot(s).

## 6.2.1 E.U.T. Operation:

Operating Environment:	
Temperature:	25.6 °C
Humidity:	50.6 %
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

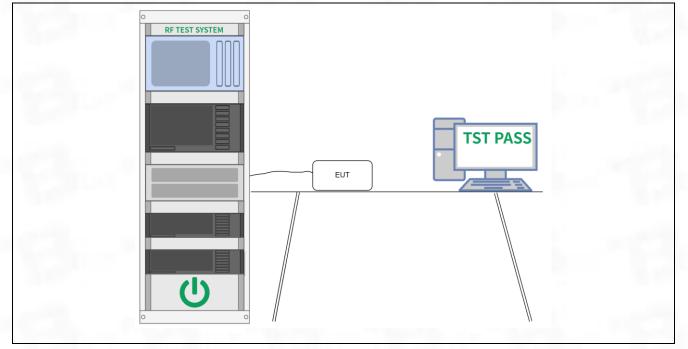
	For frequency hopping systems operating in the 2400-2483.5 MHz band employing
Test Requirement:	at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the
	2400-2483.5 MHz band: 0.125 watts.
Test Method:	Output power test procedure for frequency-hopping spread-spectrum (FHSS)
	devices
	For frequency hopping systems operating in the 2400-2483.5 MHz band employing
Test Limit:	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.
	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: a) Use the following spectrum analyzer settings:
	1) Span: Approximately five times the 20 dB bandwidth, centered on a hopping
	channel.
	2) RBW > 20 dB bandwidth of the emission being measured.
	3) VBW >= RBW.
Procedure:	4) Sweep: Auto.
	5) Detector function: Peak.
	6) Trace: Max hold. b) Allow trace to stabilize.
	c) Use the marker-to-peak function to set the marker to the peak of the emission.
	d) The indicated level is the peak output power, after any corrections for external
	attenuators and cables.
	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.

## 6.3.1 E.U.T. Operation:

Operating Environment:		
Temperature:	25.6 °C	
Humidity:	50.6 %	
Atmospheric Pressure:	1010 mbar	



### 6.3.2 Test Setup Diagram:



## 6.3.3 Test Data:

Please Refer to Appendix for Details.



#### **Channel Separation** 6.4

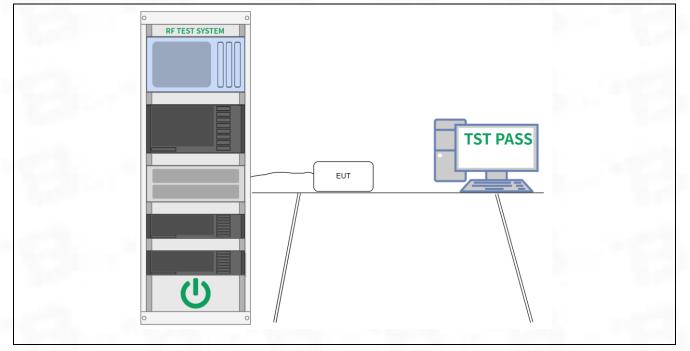
Test Requirement:	Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier 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.
Test Method:	Carrier frequency separation
Test 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.
Procedure:	<ul> <li>The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:</li> <li>a) Span: Wide enough to capture the peaks of two adjacent channels.</li> <li>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.</li> <li>c) Video (or average) bandwidth (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>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.</li> </ul>

## 6.4.1 E.U.T. Operation:

Operating Environment:	
Temperature:	25.6 °C
Humidity:	50.6 %
Atmospheric Pressure:	1010 mbar



### 6.4.2 Test Setup Diagram:



## 6.4.3 Test Data:

Please Refer to Appendix for Details.



#### **Number of Hopping Frequencies** 6.5

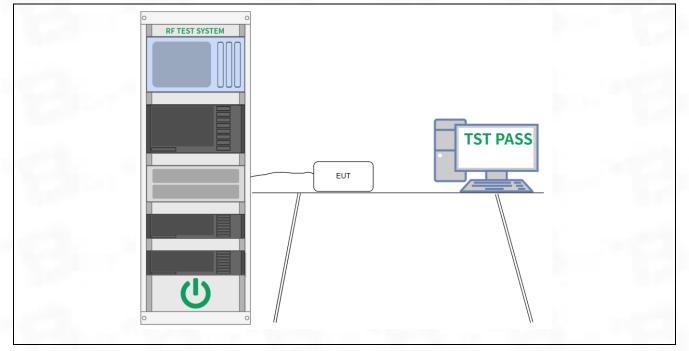
Test Requirement:	Fequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.
Test Method:	Number of hopping frequencies
Test Limit:	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:	The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings: 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. 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. c) VBW ≥ RBW. d) Sweep: Auto. e) Detector function: Peak. f) Trace: Max hold. g) Allow the trace to stabilize. 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.

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

Operating Environment:				
Temperature:	25.6 °C	A CONTRACTOR OF THE OWNER OF THE		1.00
Humidity:	50.6 %			
Atmospheric Pressure:	1010 mbar			



### 6.5.2 Test Setup Diagram:



## 6.5.3 Test Data:

Please Refer to Appendix for Details.



## 6.6 Dwell Time

Test Requirement:       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.         Test Method:       Time of occupancy (dwell time)         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.         Test Limit:       O.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels are used.         Test Limit:       O.4 seconds within a period of 0.4 seconds multiplied by the number of hopping 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 <       channels 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 at video trigger and trigger delays to that the transmitted signal starts a little to the right of the start of the plot. The trigger level might heed slight adjustment to prevent tringgering when the system hops on an adjacent channel	Test Requirement:channels. The average time of occupancy on any channel shall not be greater of 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 18 channels are used.Test Method:Time of occupancy (dwell time)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 of 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels. The average time of occupancy on any channel shall not be greater of 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 18 channels are used.Test Limit:The EUT shall have its hopping function enabled. Use the following spectrum	
Procedure:       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: <ul> <li>a) Spar. 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 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) = (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 transmit time per hop multiplied by the number of hops procedified in the requirements. If the number of hops in the period specified in the requirements. If the number of hops in the period specified</li></ul>	Test Limit:       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 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 19 channels are used.         The EUT shall have its hopping function enabled. Use the following spectrum	. The average time of occupancy on any channel shall not be greater than nds within a period of 0.4 seconds multiplied by the number of hopping employed. Frequency hopping systems may avoid or suppress sions on a particular hopping frequency provided that a minimum of 15
Procedure:       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: <ul> <li>a) Spar. 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> </ul> Procedure:     (Number of hops in the period specified in the requirements, using the following equation: <ul> <li>the every triggering when the system</li> <li>the system shall be equal to, or less than, the period specified in the requirements) =             <ul> <li>(number of hops in the period specified in</li></ul></li></ul>	Test Limit: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 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	occupancy (dwell time)
<ul> <li>Procedure:</li> <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 and calculate the total number of hops in the period specified in the requirements, using the following equation: <ul> <li>(Number of hops in the period specified in the requirements) =</li> <li>(number of hops on spectrum analyzer) × (period specified in the requirements / analyzer sweep time)</li> <li>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 hops in a specific time varies with different modes of operation (data rate, modulation format, number of hops in a 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 pin a specific time varies wit</li></ul></li></ul></li></ul>		. The average time of occupancy on any channel shall not be greater than nds within a period of 0.4 seconds multiplied by the number of hopping employed. Frequency hopping systems may avoid or suppress sions on a particular hopping frequency provided that a minimum of 15
	<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; 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 sig starts a little to the right of the start of the plot. The trigger level might need slig adjustment to prevent triggering when the system hops on an adjacent channe 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 va varies with different modes of operation (data rate, modulation format, number 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 hops over 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 number of hops in a specific time varies with different modes of operation (data rate, modulation format, number of hops in the period specified in the requirements, using the following equation:</li> </ul></li></ul>	settings: Zero span, centered on a hopping channel. shall be <= channel spacing and where possible RBW should be set >> 1 / T is the expected dwell time per channel. b: As necessary to capture the entire dwell time per hopping channel; ssible use a video trigger and trigger delay so that the transmitted signal title to the right of the start of the plot. The trigger level might need slight int to prevent triggering when the system hops on an adjacent channel; a lot might be needed with a longer sweep time to show two successive a channel. or function: Peak. Max hold. marker-delta function to determine the transmit time per hop. If this value th different modes of operation (data rate, modulation format, number of channels, etc.), then repeat this test variation in transmit time. ne measurement using a longer sweep time to determine the number of r the period specified in the requirements. The sweep time shall be equal s than, the period specified in the ents. Determine the number of hops over the sweep time and calculate number of hops in the period specified in the requirements) = of hops on spectrum analyzer) × (period specified in the requirements, using the equation: r of hops in the period specified from the transmit time per hop d by the number of hops in the period specified in the requirements. If the of hops in a specific time varies with different modes of operation (data fullation format, number of hopping channels, etc.), then repeat this test for atom. sured transmit time and time between hops shall be consistent with the

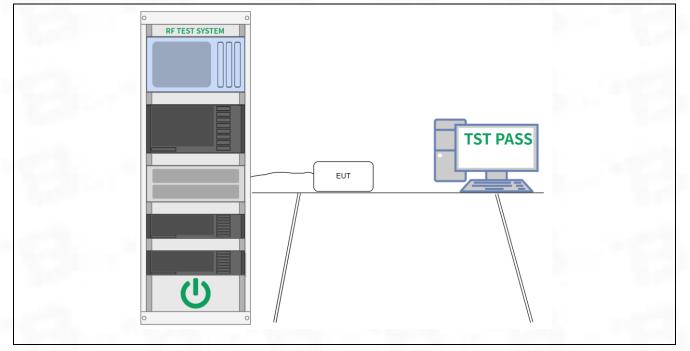
## 6.6.1 E.U.T. Operation:

Operating Environment:		
Temperature:	25.6 °C	
Humidity:	50.6 %	
Atmospheric Pressure:	1010 mbar	

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### 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

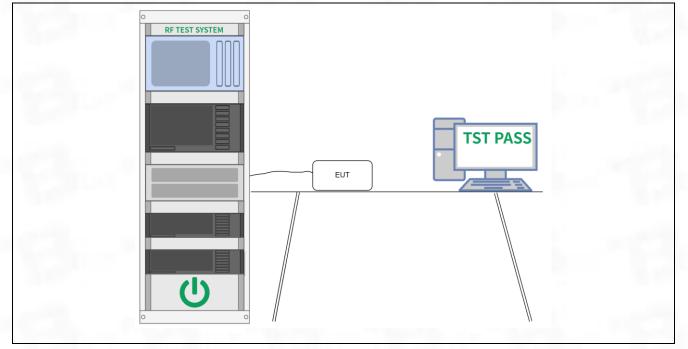
Test Requirement:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band 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.
Test Method:	Conducted spurious emissions test methodology
Test 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.
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:	25.6 °C
Humidity:	50.6 %
Atmospheric Pressure:	1010 mbar



### 6.7.2 Test Setup Diagram:



## 6.7.3 Test Data:

Please Refer to Appendix for Details.



## 6.8 Band edge emissions (Radiated)

Test Requirement:	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)).				
Test Method:	Radiated emissions test	S			
	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	1.705-30.0 30 3			
	30-88	100 **	3		
Test Limit:	88-216	150 **	3		
	216-960	200 **	3		
	Above 960	500	3		
	radiators operating unde 54-72 MHz, 76-88 MHz,	paragraph (g), fundamental em er this section shall not be locate 174-216 MHz or 470-806 MHz. s permitted under other section	ed in the frequency bands . However, operation within		
Procedure:	ANSI C63.10-2013 section 6.6.4				
6.8.1 E.U.T. Operation					

Operating Environment:	
Temperature:	24.9 °C
Humidity:	49.4 %
Atmospheric Pressure:	1010 mbar



## 6.8.2 Test Data:

#### Test result for GFSK Mode(the worst case)

Frequency	Reading	Correct Factor	Emission Level	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	H/V	
			Low Cha	nnel			
2390	64.93	-8.76	56.17	74	17.83	Н	PK
2390	54.81	-8.76	46.05	54	7.95	Н	AV
2390	59.35	-8.73	50.62	74	23.38	V	PK
2390	57.30	-8.73	48.57	54	5.43	V	AV
	High Channel						
2483.5	62.96	-8.76	54.20	74	19.80	Н	PK
2483.5	56.97	-8.76	48.21	54	5.79	Н	AV
2483.5	62.56	-8.73	53.83	74	20.17	V	PK
2483.5	56.84	-8.73	48.11	54	5.89	V	AV

Note: Freq. = Emission frequency in MHz Reading level  $(dB\mu V)$  = Receiver reading Corr. Factor (dB) = Attenuation factor + Cable loss Level  $(dB\mu V)$  = Reading level  $(dB\mu V)$  + Corr. Factor (dB)Limit  $(dB\mu V)$  = Limit stated in standard Margin (dB) = Level  $(dB\mu V)$  – Limits  $(dB\mu V)$ 



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

Test Requirement:	15.205(a), must also co	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)).				
Test Method:	Radiated emissions test	Radiated emissions tests				
	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	.705-30.0 30				
	30-88	100 **	3			
Test Limit:	88-216	150 **	3			
	216-960	200 **	3			
	Above 960	500	3			
	radiators operating unde 54-72 MHz, 76-88 MHz,	** 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.				
Procedure:	ANSI C63.10-2013 sect	ANSI C63.10-2013 section 6.6.4				
6.9.1 E.U.T. Operation	n-	and the second				

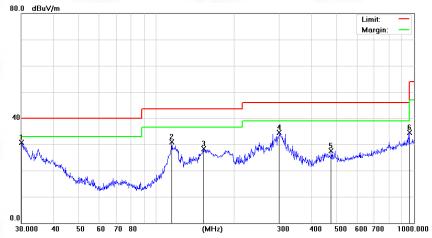
#### 6.9.1 E.U.T. Operation:

Operating Environment:		
Temperature:	24.9 °C	
Humidity:	49.4 %	
Atmospheric Pressure:	1010 mbar	



## 6.9.2 Test Data:

Note: All the mode have been tested, and only the worst case of GFSK mode are in the report Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: H

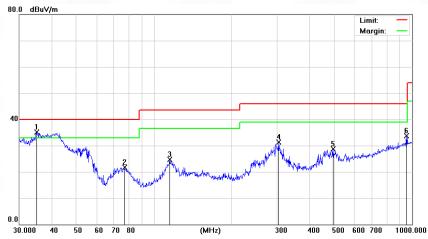


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1	*	30.1054	24.80	5.97	30.77	40.00	-9.23	QP
2		114.9169	34.20	-3.24	30.96	43.50	-12.54	QP
3		152.6641	31.13	-2.77	28.36	43.50	-15.14	QP
4		300.3672	35.99	-1.54	34.45	46.00	-11.55	QP
5		477.1694	26.50	1.06	27.56	46.00	-18.44	QP
6		958.7943	25.45	9.09	34.54	46.00	-11.46	QP

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Polarization: Vertical / Band: 2.4G / BW: 1 / CH: H

	No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
			MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
,	1	*	35.0048	31.84	3.18	35.02	40.00	-4.98	QP
	2		77.0505	29.61	-7.83	21.78	40.00	-18.22	QP
	3		114.9169	28.00	-3.24	24.76	43.50	-18.74	QP
	4		303.5437	32.78	-1.51	31.27	46.00	-14.73	QP
	5		494.1984	27.12	1.58	28.70	46.00	-17.30	QP
1	6	1	952.0937	24.82	8.98	33.80	46.00	-12.20	QP



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

Test Requirement:		issions which fall in the restricte mply with the radiated emission (c)).			
Test Method:	Radiated emissions tests				
	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		
Test Limit:	88-216	150 **	3		
	216-960	200 **	3		
	Above 960	500	3		
	** 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.				
Procedure:	ANSI C63.10-2013 sect	ANSI C63.10-2013 section 6.6.4			
6.10.1E.U.T. Operation	n:				

Operating Environment:		
Temperature:	24.9 °C	
Humidity:	49.4 %	
Atmospheric Pressure:	1010 mbar	



#### 6.10.2Test Data:

GFSK

011											
<b>-</b>		Low channel: 2402MHz									
Freq.		Ant.Pol	Emission Level(dBuV)		Limit 3m	(dBuV/m)	Over(dB)				
(MHz	.)	H/V	PK	AV	PK	AV	PK	AV			
4804		V	59.18	40.65	74	54	-14.82	-13.35			
7206	;	V	59.48	40.17	74	54	-14.52	-13.83			
4804	ł	Н	58.39	40.66	74	54	-15.61	-13.34			
7206	;	Н	58.07	39.07	74	54	-15.93	-14.93			

Free		Middle channel: 2441MHz									
Freq.	Ant.Pol	Emission Level(dBuV)		Limit 3m	(dBuV/m)	Over(dB)					
(MHz)	H/V	PK	AV	PK	AV	PK	AV				
4882	V	60.99	41.49	74	54	-13.01	-12.51				
7323	V	59.05	40.16	74	54	-14.95	-13.84				
4882	Н	59.79	40.22	74	54	-14.21	-13.78				
7323	Н	59.41	40.41	74	54	-14.59	-13.59				

Freq.	High channel: 2480MHz									
	Ant.Pol	Emission L	_evel(dBuV)	Limit 3m	(dBuV/m)	Over(dB)				
(MHz)	H/V	PK	AV	PK	AV	PK	AV			
4960	V	58.23	40.29	74	54	-15.77	-13.71			
7440	V	59.64	39.48	74	54	-14.36	-14.52			
4960	Н	59.53	39.03	74	54	-14.47	-14.97			
7440	Н	59.61	40.61	74	54	-14.39	-13.39			

#### Note:

- 1. The emission levels of other frequencies are very lower than the limit and not show in test report.
- 2. Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.
- З. Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.
- Measurements were conducted in all three modulation (GFSK, Pi/4 DQPSK, 8DPSK), and the worst case Mode (GFSK) 4. was submitted only.



# Appendix

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Page 38 of 87



# 1. Bandwidth

- 1.1 OBW
- 1.1.1 Test Result

Test channel	20dB Occupy Bandwidth (MHz)							
lest channel	GFSK	π/4-DQPSK	8DPSK	Conclusion				
Lowest	0.949	1.481	1.477	PASS				
Middle	0.952	1.495	1.494	PASS				
Highest	0.949	1.52	1.491	PASS				

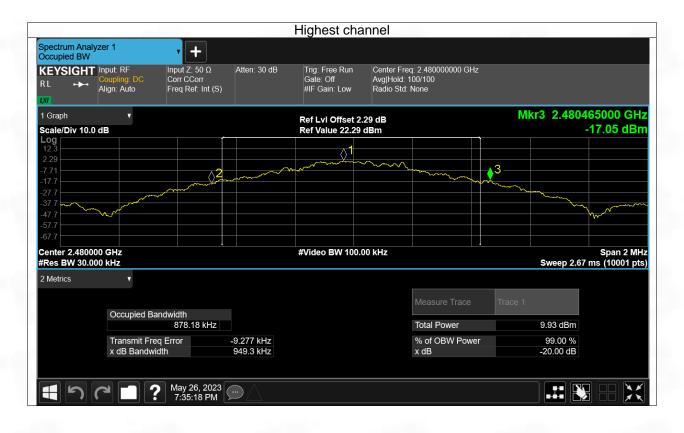


# 1.1.2 Test Graph



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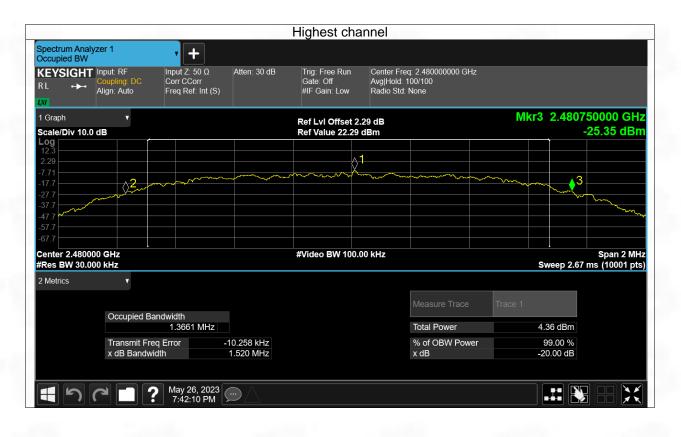


#### **Pi/4DQPSK Modulation**



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#### **8DPSK Modulation**



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# 2. Maximum Conducted Output Power

# 2.1 Power

# 2.1.1 Test Result

GFSK mode									
Test channel	Test channel         Peak Output Power (dBm)         Limit (dBm)         Result								
Lowest	0.88	20.97	PASS						
Middle	0.59	20.97	PASS						
Highest	-0.16	20.97	PASS						

Pi/4DQPSK mode									
Test channel	Test channel         Peak Output Power (dBm)         Limit (dBm)         Result								
Lowest	-3.99	20.97	PASS						
Middle	-4.27	20.97	PASS						
Highest	-4.92	20.97	PASS						

8DPSK mode							
Test channel         Peak Output Power (dBm)         Limit (dBm)         Result							
Lowest	-4.35	20.97	PASS				
Middle	-4.34	20.97	PASS				
Highest	-4.88	20.97	PASS				



# 2.1.2 Test Graph

## **GFSK Modulation**



#### Middle channel Spectrum Analyzer 1 Channel Power + Atten: 30 dB #PNO: Fast Center Freq: 2.441000000 GHz Avg|Hold: 100/100 Radio Std: None Input Z: 50 Ω Trig: Free Run KEYSIGHT Input: RF Corr CCorr Freq Ref: Int (S) Gate: Off #IF Gain: Low Align: Auto 1 Graph Ref Lvi Offset 2.22 dB Ref Value 22.22 dBm Scale/Div 10.0 dB Log Mart A. 67.8 Center 2.441000 GHz #Res BW 2.0000 MHz Span 10 MHz Sweep 1.00 ms (1001 pts) #Video BW 6.0000 MHz\* 2 Metrics Total Channel Power 0.59 dBm / 1.00 MHz -59.41 dBm/Hz Total Power Spectral Density May 26, 2023 7:32:24 PM ? ····) 12 2 ſ

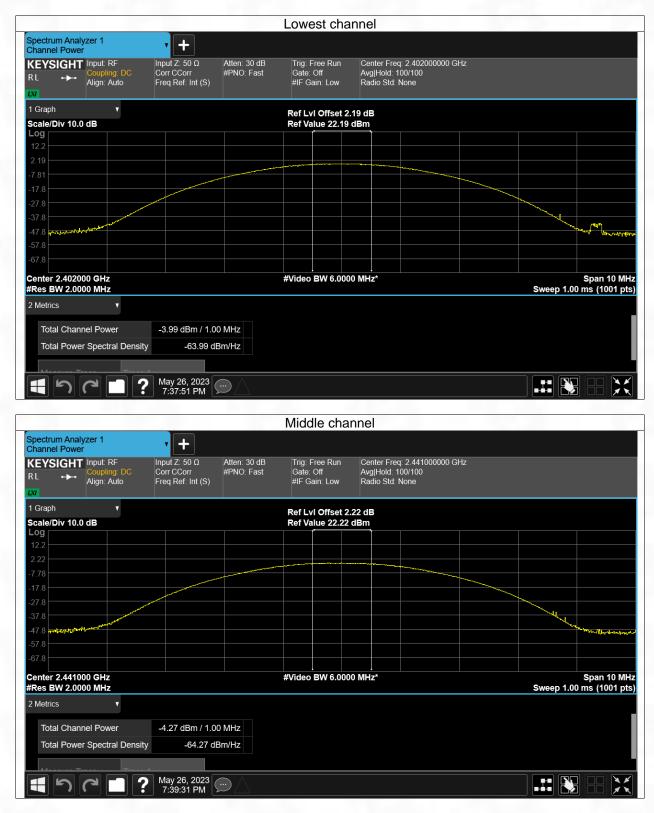
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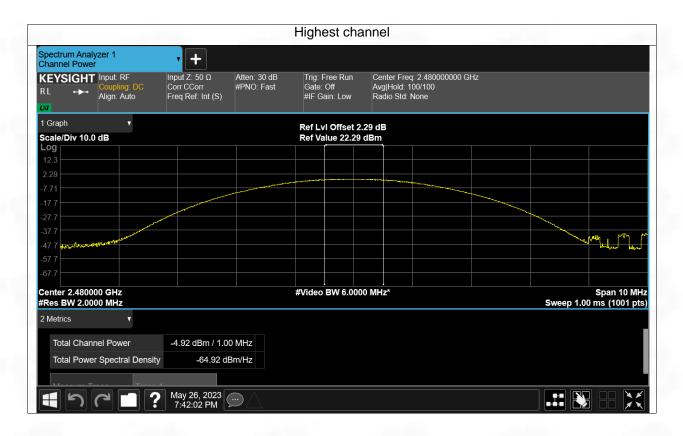


#### **Pi/4DQPSK Modulation**



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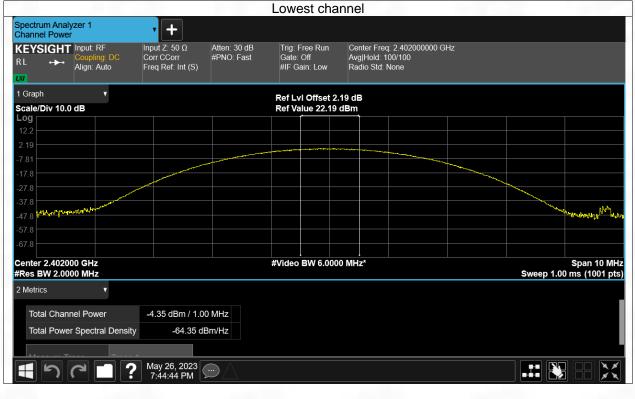


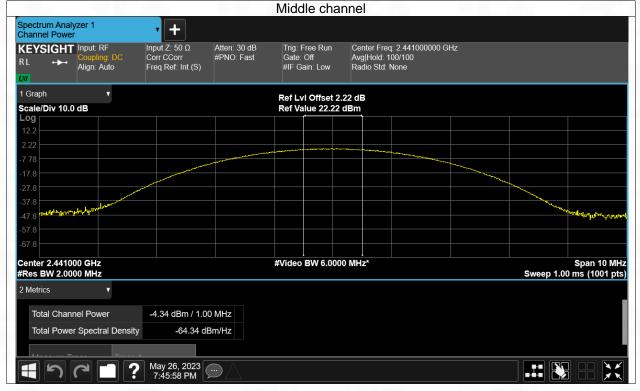


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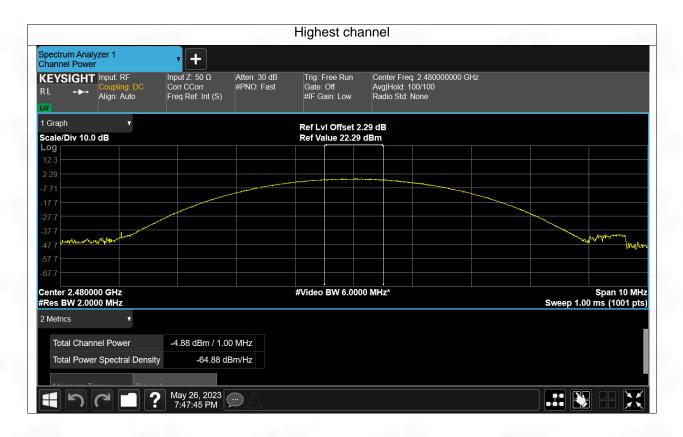
#### **8DPSK Modulation**





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# 3. Carrier Frequency Separation

# 3.1 Ant1

# 3.1.1 Test Result

	GFSK mode								
Test channel	Result								
Lowest	0.962	2/3*20dB BW	PASS						
Middle	1.002	2/3*20dB BW	PASS						
Highest	0.998	2/3*20dB BW	PASS						

Pi/4 DQPSK mode							
Test channelCarrier Frequencies Separation (MHz)Limit (MHz)Result							
Lowest	1.002	2/3*20dB BW	PASS				
Middle	0.844	2/3*20dB BW	PASS				
Highest							

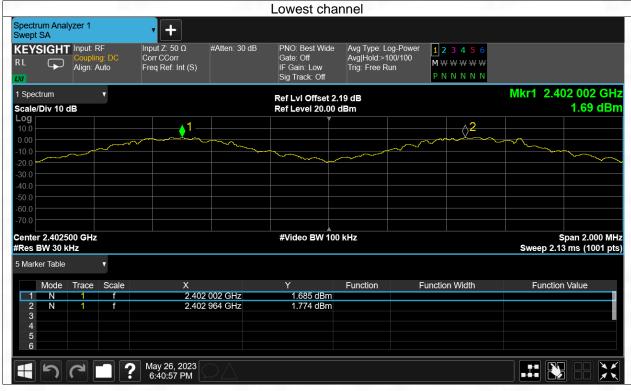
8DPSK mode							
Test channelCarrier Frequencies Separation (MHz)Limit (MHz)Result							
Lowest	1.158	2/3*20dB BW	PASS				
Middle	0.996	2/3*20dB BW	PASS				
Highest	0.998	2/3*20dB BW	PASS				

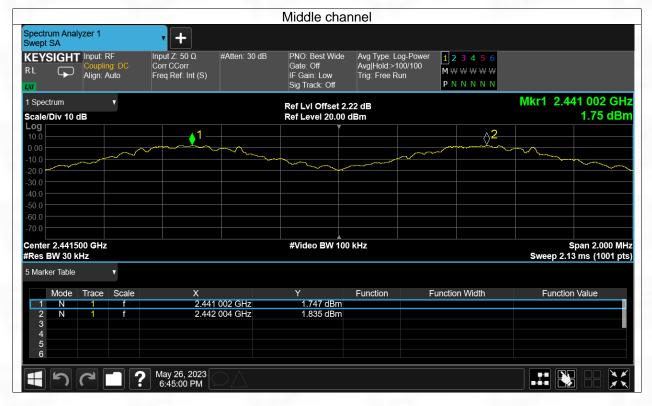
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# 3.1.2 Test Graph

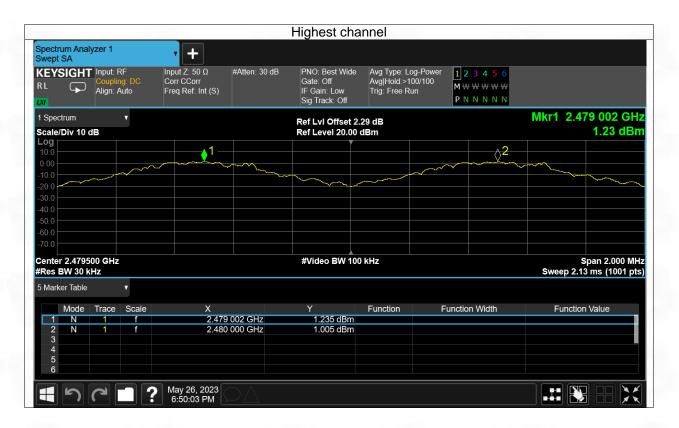
#### **GFSK Modulation**





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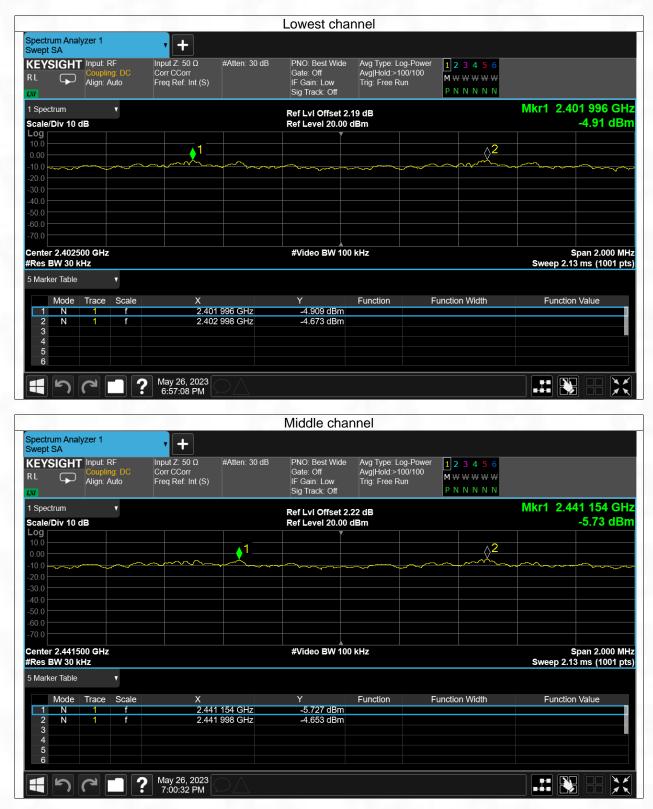




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#### **Pi/4DQPSK Modulation**



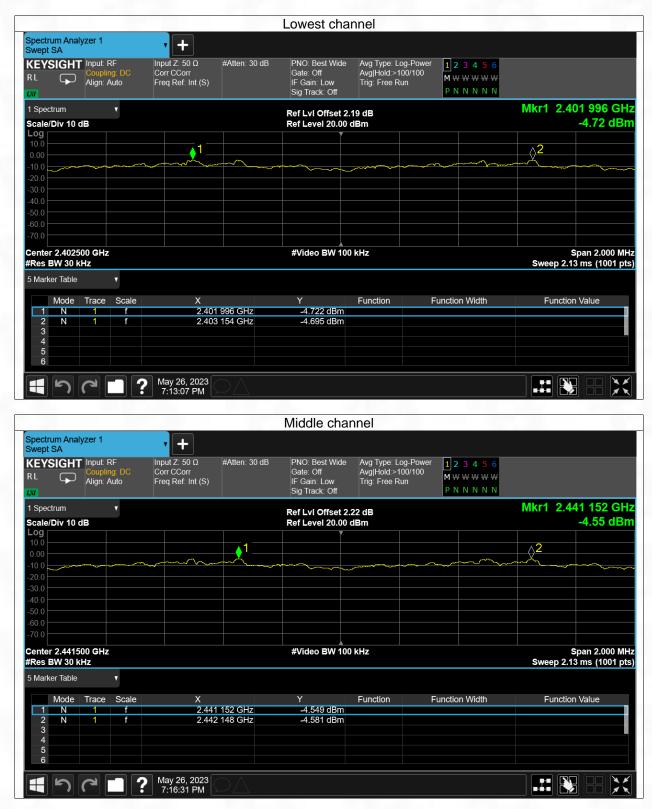
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						Highest cl	nannel				
Spectr Swept	rum Anal : SA	yzer 1		• +							
KEY: RL	SIGHT	Input: I Couplin Align: A	ng: DC	Input Ζ: 50 Ω Corr CCorr Freq Ref: Int (S)	#Atten: 30 dB	PNO: Best Wid Gate: Off IF Gain: Low Sig Track: Off	de Avg Type: I Avg Hold:> Trig: Free F	100/100 Run	<b>1</b> 2 3 4 5 6 M₩₩₩₩₩₩ P N N N N N		
	ctrum /Div 10 (	dB	•			Ref LvI Offsei Ref Level 20.0				Mkr1 2.4	479 006 GHz -5.54 dBm
Log 10.0 0.00				1					<mark>2</mark>		
-10.0 -20.0 -30.0	~~~~		~~~		*****						
-40.0 -50.0 -60.0											
-70.0 Cente	r 2.4795		!			#Video BW ?	100 kHz				Span 2.000 MHz
	BW 30 k ker Table	Hz	V							Sweep 2.	13 ms (1001 pts)
JIVIAI	Mode	Trace	Scale	х		Y	Function	Fu	nction Width	Functi	on Value
1	N	1	f		006 GHz	-5.540 dBr					
2 3	Ν	1	f	2.479	990 GHz	-5.182 dBr	n				
4 5 6											
	5	6		May 26, 2023 7:24:11 PM							



#### **8DPSK Modulation**



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					Highest ch	annel				
Spectrum A Swept SA	nalyzer 1		• +							
KEYSIGI <sup>RL</sup>	Coupl	ing: DC	Input Ζ: 50 Ω Corr CCorr Freq Ref: Int (S)	#Atten: 30 dB	PNO: Best Wide Gate: Off IF Gain: Low Sig Track: Off	e Avg Type: I Avg Hold:> Trig: Free F	100/100	1 2 3 4 5 6 M W W W W P N N N N N		
1 Spectrum Scale/Div 1	l0 dB	▼			Ref LvI Offset 2 Ref Level 20.00				Mkr1 2.4	479 156 GHz -5.11 dBm
Log 10.0 0.00				1					2	
-10.0 -20.0 -30.0										
-40.0 -50.0 -60.0										
-70.0		z			#Video BW 10	00 kHz			•	Span 2.000 MHz
#Res BW 3 5 Marker Tat		V							Sweep 2	.13 ms (1001 pts)
Mod	e Trace	Scale	Х		Y	Function	Fi	unction Width	Functi	on Value
1 N	1	f		156 GHz	-5.114 dBm					
2 N 3	1	f	2.480	154 GHz	-4.961 dBm					
4										
5										
6										
1			May 26, 2023 7:19:55 PM							

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# 4. Number of Hopping Frequencies

# 4.1 HoppNum

# 4.1.1 Test Result

Mode	Hopping channel numbers	Limit	Result
GFSK, P/4-DQPSK, 8DPSK	79	15	PASS

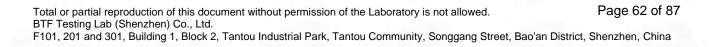


# 4.1.2 Test Graph



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						8DPS	SK				
Spectro Swept	um Anal <u>)</u> SA	yzer 1		• +							
REYS RL	SIGHT	Input: Coupli Align:	ing: DC	Input Z: 50 Ω Corr CCorr Freq Ref: Int (S)	#Atten: 30 dB	PNO: Fast Gate: Off IF Gain: Low Sig Track: Off	Avg Type: I Avg Hold:> Trig: Free F	100/100	1 2 3 4 5 6 M₩₩₩₩₩₩ PNNNNN		
	trum Div 10 c	B	•			Ref Lvi Offse Ref Level 20				Mkr1 2.401	753 5 GHz -3.60 dBm
Log 10.0 0.00	1	ላላላ	ᢧ᠋ᢩᡘ᠕ᡘᠺ᠕	ᡣ᠋ᢧᡧᡘ᠇᠆᠕ᠺ᠕ᠰᡳ᠕ᡔ		white		ᡧᡘᢦᠬᢑᡀᠽ	᠕ᠵᡘᢧᠯᡘᢈᠽ᠈ᡀᢉᡳᡘ	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	2
-10.0 -20.0 -30.0											
-40.0 -50.0	<b>[</b>										
-60.0 -70.0	10000										
	.40000 3W 100					#Video BW	300 KHZ				op 2.48350 GHz 0 ms (1001 pts)
5 Mark	er Table		•								
	Mode	Trace	Scale	Х		Y	Function	Fi	unction Width	Functio	n Value
	N	1	f		53 5 GHz 93 0 GHz	-3.597 dB					
2	Ν	1	f	2.479 9	95 0 GHZ	-2.543 dB					
4											
5 6											
	5	2		May 26, 2023 7:09:43 PM							

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# 5. Time of Occupancy (Dwell Time)

# 5.1 Ant1

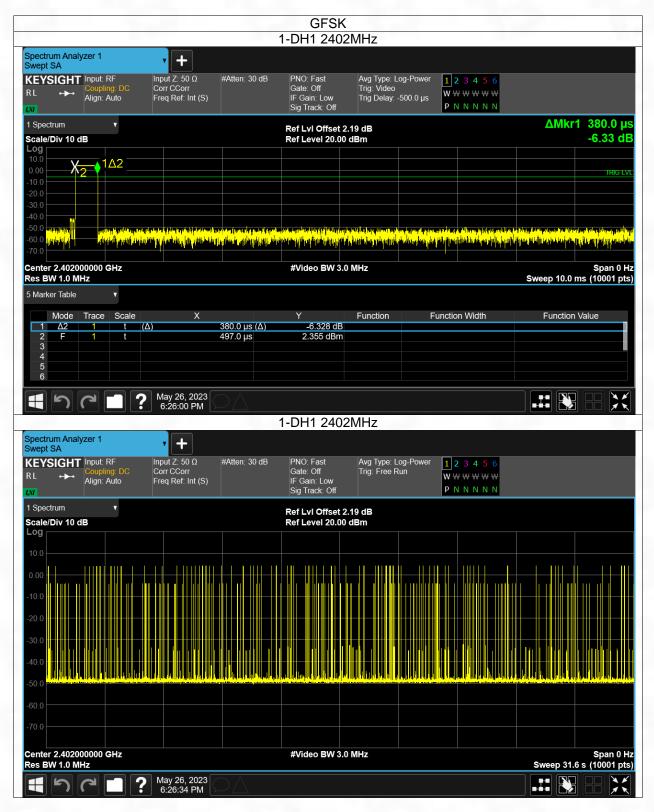
# 5.1.1 Test Result

Mode	Frequency (MHz)	Pulse Time (ms)	Total Dwell Time (ms)	Burst Count	Period Time (ms)	Limit (ms)	Verdict
1-DH1	2402	0.38	35.72	94	31600	400	Pass
1-DH1	2441	0.38	40.66	107	31600	400	Pass
1-DH1	2480	0.38	44.46	117	31600	400	Pass
1-DH3	2402	1.636	178.324	109	31600	400	Pass
1-DH3	2441	1.636	175.052	107	31600	400	Pass
1-DH3	2480	1.636	148.876	91	31600	400	Pass
1-DH5	2402	2.884	279.748	97	31600	400	Pass
1-DH5	2441	2.884	308.588	107	31600	400	Pass
1-DH5	2480	2.884	299.936	104	31600	400	Pass

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# 5.1.2 Test Graph



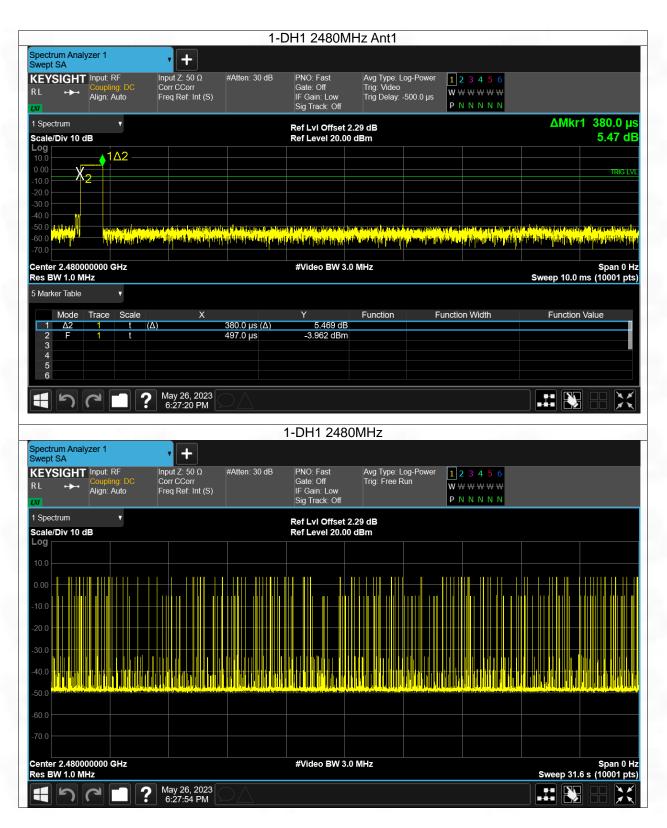
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			1	1-DH1 244	1MHz				
Spectrum Analyzer Swept SA	1	• +							
	upling: DC C	nput Ζ: 50 Ω Corr CCorr Freq Ref: Int (S)	#Atten: 30 dB	PNO: Fast Gate: Off IF Gain: Low Sig Track: Off	Avg Type: Lo Trig: Video Trig Delay: -	- -500.0 μs	L 2 3 4 5 6 V W W W W W P N N N N N		
1 Spectrum	v			Ref LvI Offset				ΔMkr	1 380.0 µs 2.35 dB
Scale/Div 10 dB				Ref Level 20.0	0 dBm				2.55 08
0.00	1Δ2								
-10.0 X 1.1 -20.0									
-30.0 -40.0									
-50.0				<mark>n han de santa de la santa Na fina de la santa de la s</mark>	i nanci schia biandit d Ingelia provinska pisati stati			r la contra contra En la contra c	<mark>delle en lighte delle serveren delle serveren delle serveren delle serveren delle serveren delle serveren delle Este delle serveren de</mark>
Center 2.44100000 Res BW 1.0 MHz	0 GHz			#Video BW 3	.0 MHz			Sweep 10.0	Span 0 Hz ms (10001 pts)
5 Marker Table	T								
Mode Trad		X		Y	Function	Fund	tion Width	Function	Value
$   \begin{bmatrix}     1 & \Delta 2 & 1 \\     2 & F & 1 \\     3 &    \end{bmatrix} $	t (Δ) t		380.0 μs (Δ) 483.0 μs	2.354 dE -10.99 dBm					
3 4 5									
6									
<b>1</b> 76	?	May 26, 2023 6:26:40 PM							
				1-DH1 244	1MHz				
			·						
Spectrum Analyzer Swept SA		<b>' +</b>							
Swept SA	ut: RF Ir Ipling: DC C	nput Z: 50 Ω Corr CCorr	#Atten: 30 dB	PNO: Fast Gate: Off	Avg Type: Lo Trig: Free Ri		L 2 3 4 5 6		
Swept SA	ut: RF Ir Ipling: DC C	nput Z: 50 Ω		PNO: Fast	Avg Type: Lo	un V	23456 V ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~		
Swept SA KEYSIGHT Inpu R L + Alig I Spectrum	ut: RF Ir Ipling: DC C	nput Z: 50 Ω Corr CCorr		PNO: Fast Gate: Off IF Gain: Low Sig Track: Off Ref LvI Offset	Avg Type: Lo Trig: Free Ri 2.22 dB	un V	v₩₩₩₩₩		
Swept SA KEYSIGHT Inpu RL Alig	ut: RF Ir upling: DC C n: Auto F	nput Z: 50 Ω Corr CCorr		PNO: Fast Gate: Off IF Gain: Low Sig Track: Off	Avg Type: Lo Trig: Free Ri 2.22 dB	un V	v₩₩₩₩₩		
Swept SA KEYSIGHT RL Inpu Cou Alig 1 Spectrum Scale/Div 10 dB	ut: RF Ir upling: DC C n: Auto F	nput Z: 50 Ω Corr CCorr		PNO: Fast Gate: Off IF Gain: Low Sig Track: Off Ref LvI Offset	Avg Type: Lo Trig: Free Ri 2.22 dB	un V	v₩₩₩₩₩		
Swept SA KEYSIGHT RL +++ Cot Alig LV 1 Spectrum Scale/Div 10 dB Log	ut: RF Ir upling: DC C n: Auto F	nput Z: 50 Ω Corr CCorr		PNO: Fast Gate: Off IF Gain: Low Sig Track: Off Ref LvI Offset	Avg Type: Lo Trig: Free Ri 2.22 dB	un V	v₩₩₩₩₩		
Swept SA KEYSIGHT Inpu RL ↔ Cou Alig 1 Spectrum Scale/Div 10 dB Log 10.0	ut: RF Ir upling: DC C n: Auto F	nput Z: 50 Ω Corr CCorr		PNO: Fast Gate: Off IF Gain: Low Sig Track: Off Ref LvI Offset	Avg Type: Lo Trig: Free Ri 2.22 dB	un V	v₩₩₩₩₩		
Swept SA KEYSIGHT RL Cot Alig DV 1 Spectrum Scale/Div 10 dB Log 10.0 0.00	ut: RF Ir upling: DC C n: Auto F	nput Z: 50 Ω Corr CCorr		PNO: Fast Gate: Off IF Gain: Low Sig Track: Off Ref LvI Offset	Avg Type: Lo Trig: Free Ri 2.22 dB	un V	v₩₩₩₩₩		
Swept SA           KEYSIGHT         Inpu           RL         →→         Aig           LV/         1         Spectrum           Scale/Div 10 dB         Og         Og           10.0         Og         Og         Og           -10.0         Og         Og         Og         Og	ut: RF Ir upling: DC C n: Auto F	nput Z: 50 Ω Corr CCorr		PNO: Fast Gate: Off IF Gain: Low Sig Track: Off Ref LvI Offset	Avg Type: Lo Trig: Free Ri 2.22 dB	un V	v₩₩₩₩₩		
Swept SA KEYSIGHT RL →→ Aig INT 1 Spectrum Scale/Div 10 dB Log 10.0 0.00 0.00 -10.0 -20.0	ut: RF Ir upling: DC C n: Auto F	nput Z: 50 Ω Corr CCorr		PNO: Fast Gate: Off IF Gain: Low Sig Track: Off Ref LvI Offset	Avg Type: Lo Trig: Free Ri 2.22 dB	un V	v₩₩₩₩₩		
Swept SA KEYSIGHT RL →→ 1 Spectrum Scale/Div 10 dB Log 10.0 -20.0 -30.0	ut: RF Ir upling: DC C n: Auto F	nput Z: 50 Ω Corr CCorr		PNO: Fast Gate: Off IF Gain: Low Sig Track: Off Ref LvI Offset	Avg Type: Lo Trig: Free Ri 2.22 dB	un V	v₩₩₩₩₩		
Swept SA           KEYSIGHT         Inpu           R L         →→         Cou           I Spectrum         Scale/Div 10 dB         Inpu           Scale/Div 10 dB         Out         Out         Out           10.0         Out         Out         Out         Out           -10.0         Out         Out         Out         Out         Out           -20.0         Out         Out	ut: RF Ir upling: DC C n: Auto F	nput Z: 50 Ω Corr CCorr		PNO: Fast Gate: Off IF Gain: Low Sig Track: Off Ref LvI Offset	Avg Type: Lo Trig: Free Ri 2.22 dB	un V	v₩₩₩₩₩		
Swept SA           KEYSIGHT         Input           RL         →→         Cot           I Spectrum         Scale/Div 10 dB         Out           Scale/Div 10 dB         Out         Out           10.0         →         Out         Out           -10.0         →         Out         Out         Out           -20.0         →         Out         Out         Out         Out           -30.0         Out         O	ut: RF Ir upling: DC C n: Auto F	nput Z: 50 Ω Corr CCorr		PNO: Fast Gate: Off IF Gain: Low Sig Track: Off Ref LvI Offset	Avg Type: Lo Trig: Free Ri 2.22 dB	un V	v₩₩₩₩₩		
Swept SA           KEYSIGHT RL         Inpu Cou Alig           1 Spectrum           Scale/Div 10 dB           Log           10.0           -0.00           -10.0           -20.0           -30.0           -40.0           -50.0           -60.0           -70.0	ut: RF Ir npling: DC C n: Auto F Value Va Value Value	nput Z: 50 Ω Corr CCorr		PNO: Fast Gate: Off IF Gain: Low Sig Track: Off Ref LvI Offset Ref Level 20.0	Avg Type: Lo Trig: Free Ri 2.22 dB 0 dBm	un V	v₩₩₩₩₩		
Swept SA           KEYSIGHT RL         Inpu Cou Alig           1 Spectrum           Scale/Div 10 dB           Log           10.0           -0.00           -10.0           -20.0           -30.0           -40.0           -50.0           -60.0	ut: RF Ir npling: DC C n: Auto F Value Va Value Value	nput Z: 50 Ω Corr CCorr		PNO: Fast Gate: Off IF Gain: Low Sig Track: Off Ref LvI Offset	Avg Type: Lo Trig: Free Ri 2.22 dB 0 dBm	un V	v₩₩₩₩₩	Sweep 31.	Span 0 Hz 6 s (10001 pts)

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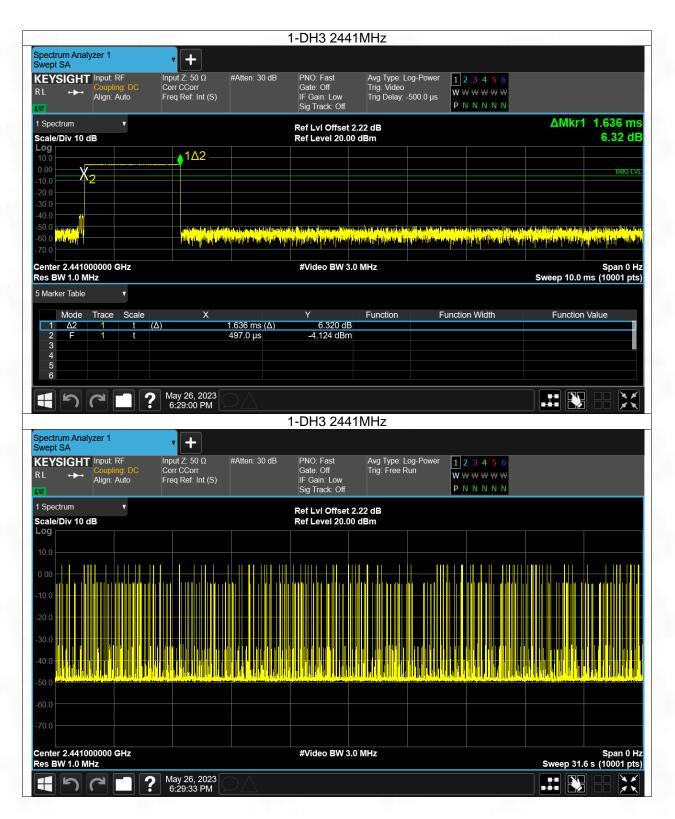




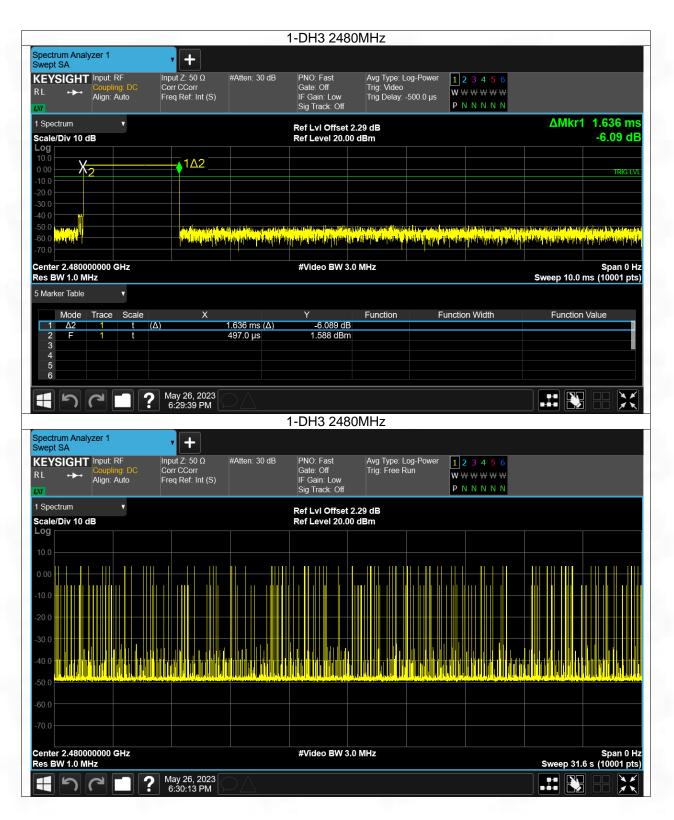




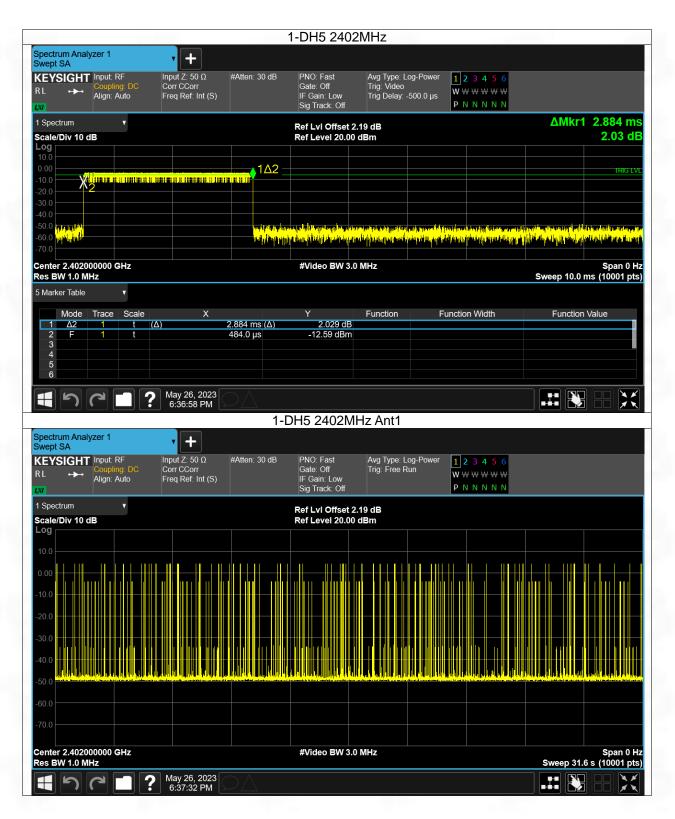




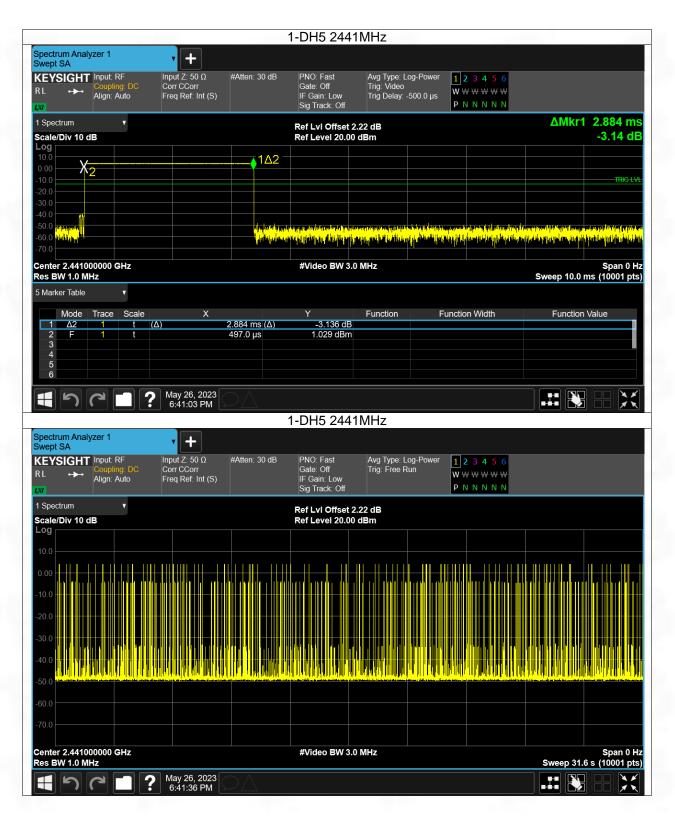


















- 6. Unwanted Emissions In Non-restricted Frequency Bands
- 6.1 CSE
- 6.1.1 Test Result(pass)

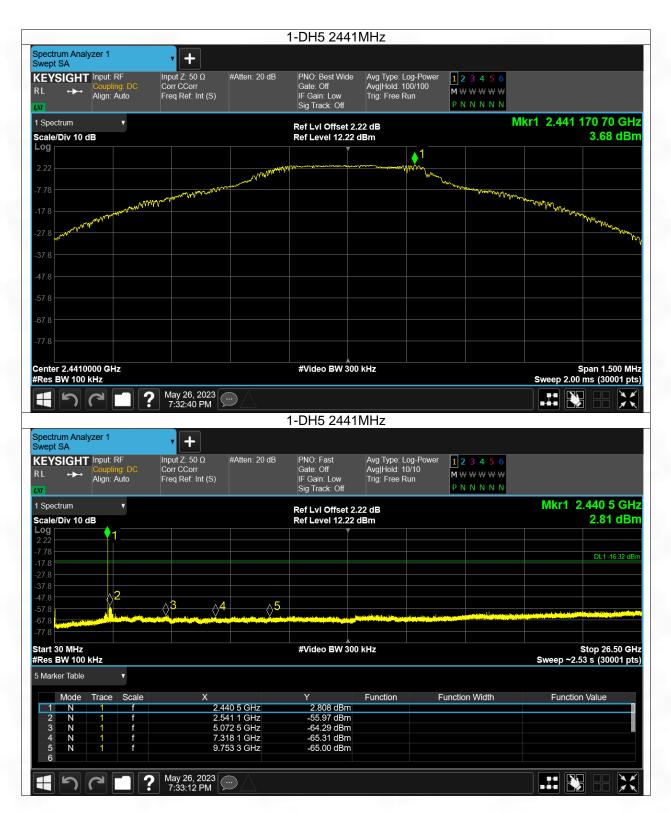


### 6.1.2 Test Graph

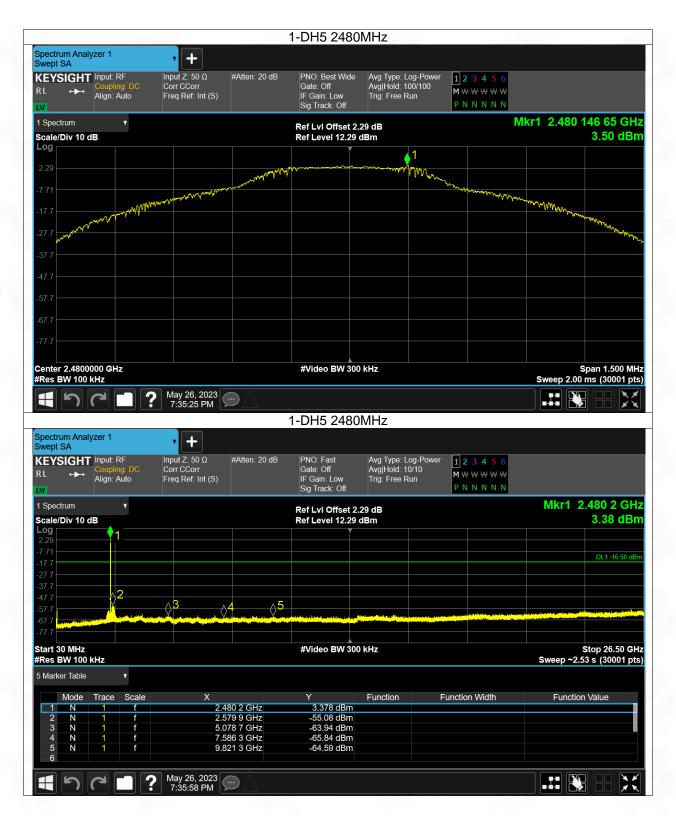


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#### Pi/4DQPSK mode



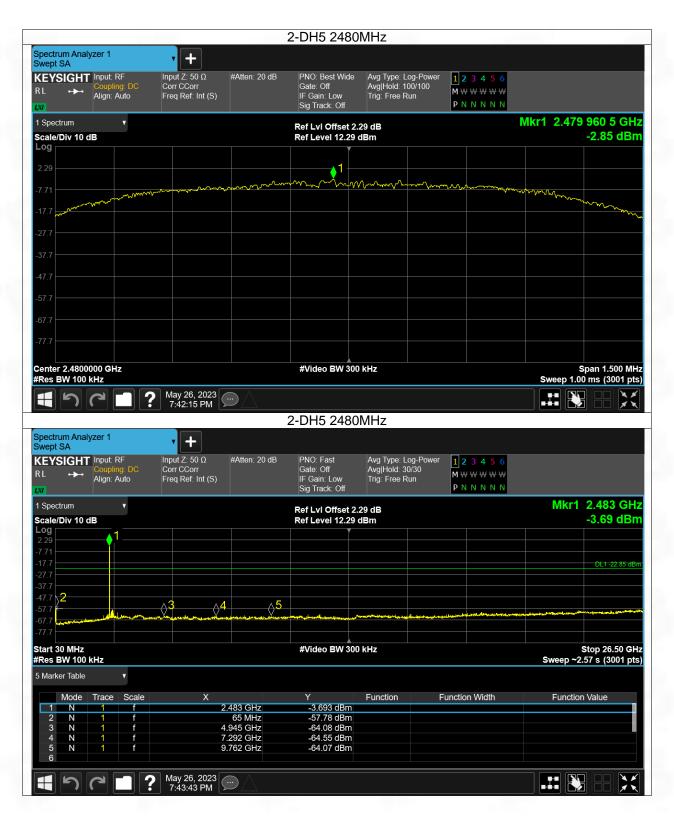
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r				2-DH5 2441	MHz				
Spectrum Anal Swept SA	lyzer 1	• +							
KEYSIGHT RL +→-• ™	Input: RF Coupling: DC Align: Auto	Input Ζ: 50 Ω Corr CCorr Freq Ref: Int (S)	#Atten: 20 dB	PNO: Best Wide Gate: Off IF Gain: Low Sig Track: Off	Avg Type: Log-Power Avg Hold: 100/100 Trig: Free Run	M ₩ ₩ ₩ ₩ ₩ P N N N N N			
1 Spectrum	v			Ref LvI Offset 2.2			Mkr1 2.440 9		
Scale/Div 10 o	dB			Ref Level 12.22 o	lBm			-1.78 dBm	
2.22				1_					
			- Marine and a second second	manner	man and a second and	and the state of t			
-7.78 -17.8	Work when have been	A CONTRACTOR OF CONTRACTOR OFO					and and the second second	Werland Jackson .	
-17.8 part								and the second	
-27.8									
-37.8									
-47.8									
-57.8									
-67.8									
-77.8									
Ocarter 2 4440				#Video BW/ 200				4 500 MU-	
Center 2.4410 #Res BW 100			#Video BW 300 kHz				Span 1.500 MHz Sweep 2.00 ms (30001 pts)		
<b>H</b> 5		May 26, 2023 7:39:45 PM							
				2-DH5 2441	MHz				
Spectrum Anal Swept SA	lyzer 1	<b>•</b> +							
KEYSIGHT RL +++	Input: RF Coupling: DC Align: Auto	Input Ζ: 50 Ω Corr CCorr Freq Ref: Int (S)	#Atten: 20 dB	PNO: Fast Gate: Off IF Gain: Low Sig Track: Off	Avg Type: Log-Power Avg Hold: 10/10 Trig: Free Run	1 2 3 4 5 6 M \vee vee vee vee vee P N N N N N			
1 Spectrum Scale/Div 10 o	₹ dB			Ref LvI Offset 2.2 Ref Level 12.22 o				441 4 GHz -5.20 dBm	
Log 2.22	1								
-7.78									
-17.8								DL1 -21.78 dBm	
-37.8									
-47.8 <mark>2</mark> -57.8			5					the instantion of the instantion	
-67.8								الكريم المحمد الم	
-11.0				#Video BW 300	kHz			top 26.50 GHz 3 s (30001 pts)	
Start 30 MHz							- Weight Designed	STATUTOR DURING	
Start 30 MHz #Res BW 100 5 Marker Table									
#Res BW 100 5 Marker Table	۷	X		Y	Function.	Eunction Width			
#Res BW 100 5 Marker Table Mode 1 N	Trace Scale		41 4 GHz	Y -5.199 dBm	Function	Function Width	Function		
#Res BW 100 5 Marker Table Mode 1 N 2 N 3 N	Trace Scale 1 f 1 f 1 f	2.4	69.7 MHz )34 6 GHz	-5.199 dBm -57.66 dBm -64.58 dBm	Function	Function Width			
#Res BW 100 5 Marker Table Mode 1 N 2 N 3 N 4 N 5 N	Trace Scale	2.4 5.0 7.2	69.7 MHz	-5.199 dBm -57.66 dBm	Function	Function Width			
#Res BW 100 5 Marker Table Mode 1 N 2 N 3 N 4 N	Trace         Scale           1         f           1         f           1         f           1         f           1         f           1         f	2.4 5.0 7.2	69.7 MHz )34 6 GHz 236 9 GHz	-5.199 dBm -57.66 dBm -64.58 dBm -65.28 dBm	Function	Function Width			

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#### 8DPSK mode

			3	3-DH5 2402	2MHz				
Spectrum Analyzer 1 Swept SA		• +							
	oling: DC C	put Z: 50 Ω prr CCorr eq Ref: Int (S)	#Atten: 20 dB	PNO: Best Wide Gate: Off IF Gain: Low Sig Track: Off	Avg Type: Log Avg Hold: 100 Trig: Free Ru	D/100 M	2 3 4 5 6 ₩₩₩₩₩ N N N N N		
1 Spectrum Scale/Div 10 dB	V			Ref LvI Offset 2 Ref Level 12.19				Mkr1 2.402	162 95 GHz -1.88 dBm
Log				Ĭ					
2.19		. 0. C. C. C. Martin	መግረጉዮስ የውጭቶምኤየትንት የስ	www.w.w.w.w.	mport	J	100 /0-00-00-000/00 J	4 Da - 4 Port -	
-7.81 -17.8	Mer Marine Marine						· · · · · · · · · · · · · · · · · · ·	My Mary Mary Mary	and the second
-17.8									
-37.8									
-47.8									
-57.8									
-67.8									
-77.8									
Center 2.4020000 G #Res BW 100 kHz	Hz			#Video BW 30	0 kHz				Span 1.500 MHz ms (30001 pts)
<b>4</b> 7 7	<b>?</b>	/ay 26, 2023 7:44:58 PM							
			3	3-DH5 2402	2MHz				
Spectrum Analyzer 1 Swept SA		• +							
	oling: DC C	put Z: 50 Ω orr CCorr eq Ref: Int (S)	#Atten: 20 dB	PNO: Fast Gate: Off IF Gain: Low Sig Track: Off	Avg Type: Log Avg Hold: 10/ Trig: Free Ru	10 M	2 3 4 5 6 ₩₩₩₩₩₩ N N N N N N		
1 Spectrum Scale/Div 10 dB	T			Ref Lvl Offset 2 Ref Level 12.19				Mkr1 2	.401 7 GHz -3.46 dBm
2.19	1								
-7.81 -17.8 -27.8									DL1 -21.89 dBm
-37.8									
-57.8	<u>}3</u>		5						
-77.8 Start 30 MHz				#Video BW 30	0 647				Stop 26.50 GHz
#Res BW 100 kHz				#11000 811 30					53 s (30001 pts)
5 Marker Table Mode Trac	e Scale	Х		Y	Function	Func	tion Width	Function	
1 N 1 2 N 1	f f	2.40	01 7 GHz 69.7 MHz	-3.463 dBm -58.19 dBm					
3 N 1 4 N 1	f f	4.60 7.10	64 0 GHz 69 0 GHz	-64.70 dBm -64.61 dBm					
5 N 1 6	f	9.43	30 4 GHz	-65.20 dBm					
452	<b>?</b>	/lay 26, 2023 7:45:32 PM							

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				3-DH5 2441	MHz				
Spectrum Analyzer ' Swept SA	1	• +							
	t: RF pling: DC n: Auto	Input Ζ: 50 Ω Corr CCorr Freq Ref: Int (S)	#Atten: 20 dB	PNO: Best Wide Gate: Off IF Gain: Low Sig Track: Off	Avg Type: Log-Power Avg Hold: 100/100 Trig: Free Run	123456 M\vmedskip V\vmedskip V PNNNNN			
1 Spectrum Scale/Div 10 dB	•			Ref LvI Offset 2. Ref Level 12.22			Mkr1 2.441 1	53 20 GHz -1.64 dBm	
Log				Rei Level 12.22	uBm			-1.04 ubm	
2.22					1				
-7.78		han war war	Ale-way may and a second s		where where where the second	๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛	n mar and an and and		
-7.78	Willy Constraints						The second secon	Marth Charles	
-27.8									
-37.8									
-47.8									
-57.8									
-67.8									
-77.8									
Center 2.4410000 G	Hz			#Video BW 300	kHz			pan 1.500 MHz	
#Res BW 100 kHz		May 26, 2023						Sweep 2.00 ms (30001 pts)	
- C	2	7:46:12 PM							
	1			3-DH5 2441	MHz				
Spectrum Analyzer 7 Swept SA		• +							
	t: RF pling: DC n: Auto	Input Ζ: 50 Ω Corr CCorr Freq Ref: Int (S)	#Atten: 20 dB	PNO: Fast Gate: Off IF Gain: Low Sig Track: Off	Avg Type: Log-Power Avg Hold: 10/10 Trig: Free Run	1 2 3 4 5 6 M₩₩₩₩₩₩ P N N N N N			
1 Spectrum Scale/Div 10 dB	•			Ref LvI Offset 2. Ref Level 12.22			Mkr1 2	.441 4 GHz -3.90 dBm	
2.22	1			ļ					
-7.78	1								
-17.8								DL1-21.64 dBm	
-17.8								<u>— DL1 -21.64 dBm</u>	
-27.8 -37.8 -47.8 <b>2</b>		A3 4						DL1-21.64 dBm	
-27.8			55					DL1-21.64 dBm	
-27.8 -37.8 -47.8 -57.8 -67.8 -77.8		<u>}</u> 3}4	5. 					Vizi ya Bayaya wa Alamba Maria I.	
-27.8 -37.8 -47.8 -57.8 -67.8		<u>}</u> 34	5-	#Video BW 300	kesside tar			DL1-21.64 dBm Stop 26.50 GHz 3 s (30001 pts)	
-27.8 -37.8 -47.8 -57.8 -67.8 -77.8 -77.8 -77.8 -77.8 -77.8 -77.8	T La constante de la constante	} <mark>3</mark> 4	<u>\$</u> 5	#Video BW 300	k Hz			Stop 26.50 GHz	
-27.8 -37.8 -47.8 -57.8 -77.8 -77.8 Start 30 MHz #Res BW 100 kHz 5 Marker Table Mode Trace		×		Y		Function Width		Stop 26.50 GHz 3 s (30001 pts)	
-27.8 -37.8 -47.8 -57.8 -67.8 -77.8 <b>Start 30 MHz</b> <b>#Res BW 100 kHz</b> 5 Marker Table Mode Trac 1 N 1 2 N 1	e Scale f f	x 2.4	41 4 GHz 59.7 MHz	Y -3.898 dBm -58.77 dBm		Function Width	Sweep ~2.5	Stop 26.50 GHz 3 s (30001 pts)	
-27.8 -37.8 -47.8 -57.8 -67.8 -77.9 -77.9	e Scale f f f f	X 2.4 5.0 7.2	41 4 GHz 69.7 MHz 69.1 GHz 73 1 GHz	Y -3.898 dBm -58.77 dBm -63.97 dBm -65.38 dBm		Function Width	Sweep ~2.5	Stop 26.50 GHz 3 s (30001 pts)	
-27.8 -37.8 -47.8 -57.8 -77.9 -77.8 -77.9	e Scale f f f	X 2.4 5.0 7.2	41 4 GHz 69.7 MHz 01 1 GHz	Y -3.898 dBm -58.77 dBm -63.97 dBm		Function Width	Sweep ~2.5	Stop 26.50 GHz 3 s (30001 pts)	

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Test Report Number: BTF230612R00602

# 6.2 Band Edge

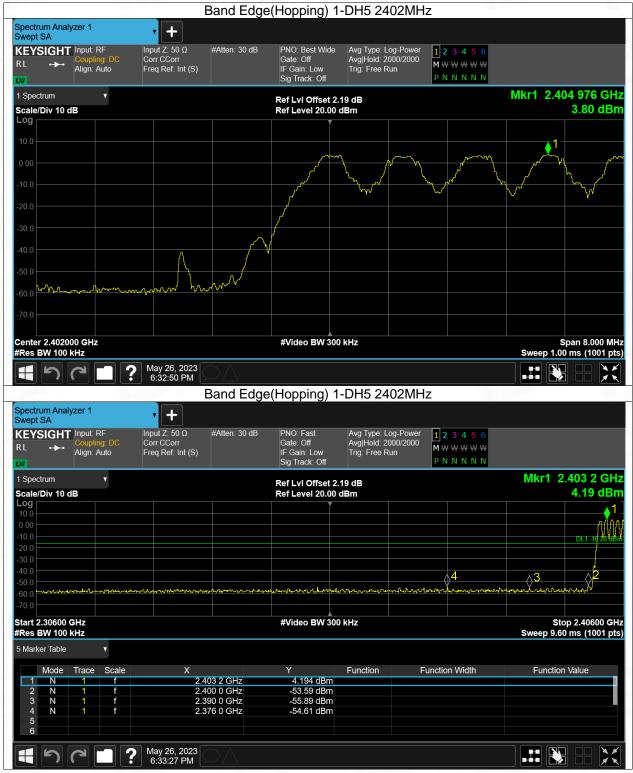
# 6.2.1 Test Result(Pass)

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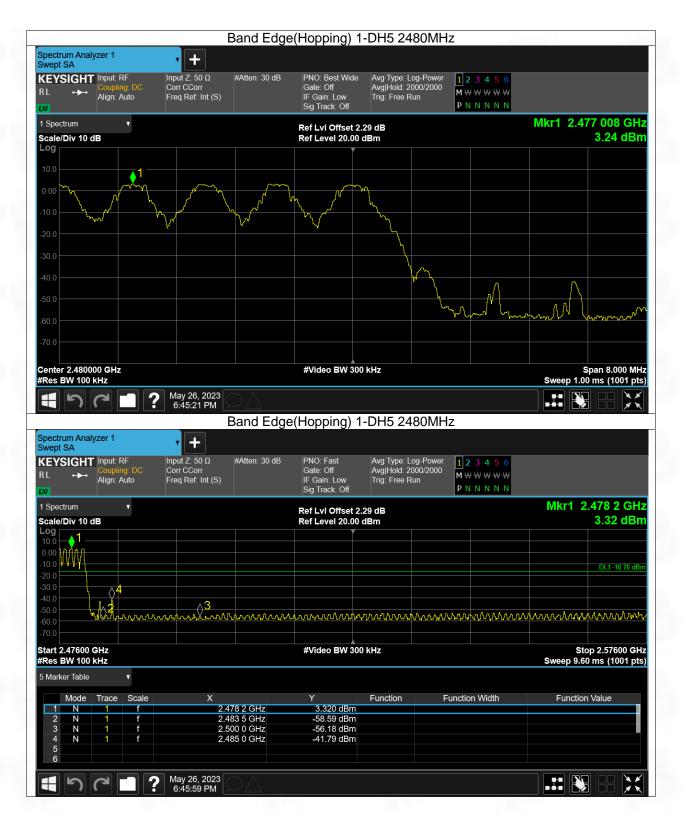
### 6.2.2 Test Graph

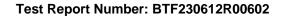
#### GFSK Modulation (the worst case)



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