TEST REPORT

Applicant	:	DLAB Scientific Co., Ltd.
Address of Applicant	:	YuAn Road 31, Airport Economic Core Zone,Shunyi District,Beijing101318,P.R.China
Product Name	:	UV Visible Spectrophotometer
Brand Name	:	N/A
Model Name	:	SP-UV1000, SCI-UV1000, SP-V1000, SCI-V1000, SP-V1100, SCI-V1100, SP-UV1100, SCI-UV1100, SP-UV3101, SCI-3101UV, SP-UV2102, SCI-2102UV, SP-UV3102, SCI-3102UV, SP-UV2101, SCI-2101UV, SP-XUV5102, SCI-5102XUV, SP-XUV5101, SCI-5101XUV
Sample Acquisition Method	:	Sent by Client
Sample No.	:	E23100070-01#02 E23100070-01#03
FCC ID	:	2BDRA-SPSCIUV
ISED Number	:	31626-SPSCIUV
Standards	:	FCC CFR47 Part 15, Subpart C RSS-Gen (Issue 5, Amd.2-Feb 2021) RSS-247 (Issue 3, August 2023)
Date of Receipt	:	2023-10-24
Date of Test	:	2023-10-27~ 2023-11-03
Date of Issue	:	2023-12-05

Remark:

This report details the results of the testing carried out on one sample, the results contained in this report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

Prepared by: Erik. Yang (Erik Yang) Reviewed by: Jennifer Zhou (Jennifer Zhou) Approved by: Echo Mu (Authorized signatory: Echo Mu)

TEST REPORT

Contents

1 General Information

1.1 Testing Laboratory

ISED CAB identifier #	CN0081
Company Name	ICAS Testing Technology Service (Shanghai) Co., Ltd.
Address	No.1298 Pingan Road, Minhang District, Shanghai, China
Telephone	0086 21-51682999
Fax	0086 21-54711112
Homepage	www.icasiso.com

1.2 Details of Application

Applicant Company Name	DLAB Scientific Co., Ltd.
Address	YuAn Road 31, Airport Economic Core Zone, Shunyi District,Beijing101318,P.R.China
Contact Person	Xiaoli Liu
Telephone	18201853137
Email	2050365105@qq.com
Manufacturer Company Name	DLAB Scientific Co., Ltd.
Address	YuAn Road 31, Airport Economic Core Zone, Shunyi District,Beijing101318,P.R.China
Factory Company Name	DLAB Scientific Co., Ltd.
Address	YuAn Road 31, Airport Economic Core Zone, Shunyi District,Beijing101318,P.R.China

1.3 Details of EUT

Product Name	UV Visible Spectrophotometer
Brand Name	N/A
Test Model Name	SP-UV1000
Series Models Name	SCI-UV1000,SP-V1000,SCI-V1000,SP-V1100,SCI-V1100,SP-UV1100,SCI-UV1100, SP-UV3101,SCI-3101UV,SP-UV2102,SCI-2102UV,SP-UV3102,SCI-3102UV, SP-UV2101,SCI-2101UV,SP-XUV5102,SCI-5102XUV, SP-XUV5101, SCI-5101XUV
Difference Description	All the same except for the model name
FCC ID	2BDRA-SPSCIUV
ISED Number	31626-SPSCIUV
HVIN	SPSCIUV
Mode of Operation	Bluetooth BR/EDR Version 5.0
Frequency Range	2402MHz ~ 2480MHz
Number of Channels	79 (at intervals of 1 MHz)
Modulation Type	GFSK, π/4-DQPSK, 8-DPSK
Max RF Output Power	0.92dBm

Antenna Type	PCB Antenna
Antenna Gain	1.97dBi
Extreme Temperature Range	+16℃~ +35℃
Test Voltage	AC 120V 60Hz
Hardware Version	V1.0
Software Version	V1.0.2
RF power setting in TEST SW	BT_Tool V1.1.2_Set Power level_Default_TX Power 7

Note:

1. The above information was declared by the manufacture.

2. For more details, please refer to the User's manual of the EUT.

Channel List

Channel	Frequency	Channel	Frequency	Channel	Frequency
0	2.402GHz	27	2.429GHz	54	2.456GHz
1	2.403GHz	28	2.430GHz	55	2.457GHz
2	2.404GHz	29	2.431GHz	56	2.458GHz
3	2.405GHz	30	2.432GHz	57	2.459GHz
4	2.406GHz	31	2.433GHz	58	2.460GHz
5	2.407GHz	32	2.434GHz	59	2.461GHz
6	2.408GHz	33	2.435GHz	60	2.462GHz
7	2.409GHz	34	2.436GHz	61	2.463GHz
8	2.410GHz	35	2.437GHz	62	2.464GHz
9	2.411GHz	36	2.438GHz	63	2.465GHz
10	2.412GHz	37	2.439GHz	64	2.466GHz
11	2.413GHz	38	2.440GHz	65	2.467GHz
12	2.414GHz	39	2.441GHz	66	2.468GHz
13	2.415GHz	40	2.442GHz	67	2.469GHz
14	2.416GHz	41	2.443GHz	68	2.470GHz
15	2.417GHz	42	2.444GHz	69	2.471GHz
16	2.418GHz	43	2.445GHz	70	2.472GHz
17	2.419GHz	44	2.446GHz	71	2.473GHz
18	2.420GHz	45	2.447GHz	72	2.474GHz
19	2.421GHz	46	2.448GHz	73	2.475GHz
20	2.422GHz	47	2.449GHz	74	2.476GHz
21	2.423GHz	48	2.450GHz	75	2.477GHz
22	2.424GHz	49	2.451GHz	76	2.478GHz
23	2.425GHz	50	2.452GHz	77	2.479GHz
24	2.426GHz	51	2.453GHz	78	2.480GHz
25	2.427GHz	52	2.454GHz		
26	2.428GHz	53	2.455GHz		

1.4 Test Methodology

47 CFR Part 15, Subpart C	Telecommunication-Radio Frequency Devices-Intentional Radiators
KDB Publication 558074 D01 v05r02	15.247 Meas Guidance.
RSS-Gen (Issue 5, Amd.2-Feb 2021)	General Requirements for Compliance of Radio Apparatus
RSS-247 (Issue 3, August 2023)	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

Note(s):

All test items were verified and recorded according to the standards and without any addition/deviation/exclusion during the test.

1.5 Test Summary

Test Item	FCC Rules	ISED Rules	Result
Antenna Requirement	FCC Part 15.247(b)(4), FCC Part 15.203	RSS-247 5.4(f), RSS-GEN 6.8	PASS
Maximum Conducted Peak Output Power and E.I.R.P	FCC Part 15.247(b)(1)	RSS-247 5.1(b)	PASS
20dB Bandwidth and 99% Bandwidth	FCC Part 15.247(a)(1)	RSS-247 5.1(a), RSS-Gen 6.7	PASS
Conducted Spurious Emission & Authorized-band band-edge	FCC Part 15.247(d)	RSS-247 5.5	PASS
Radiated Emission	FCC Part 15.247(d), 15.205, 15.209	RSS-GEN 8.9	PASS
Band Edge (Restricted-band band-edge)	FCC Part 15.247(d), 15.205, 15.209	RSS-GEN 8.10	PASS
Hopping Frequency Separation	FCC Part 15.247(a)(1)	RSS-247 5.1(b)	PASS
Number of Hopping Frequency	FCC Part 15.247(a)(1)(iii)	RSS-247 5.1(d)	PASS
Time of Occupancy	FCC Part 15.247(a)(1)(iii)	RSS-247 5.1(d)	PASS
Conducted Emission on AC Mains	FCC Part 15.207(a)	RSS-Gen 8.8	PASS

2 Test Condition

2.1 Environmental conditions

Temperature (°C)	18-25
Humidity (%RH)	40-65
Barometric Pressure (mbar)	960-1060

2.2 Equipment List

Name of Equipment	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	Keysight	N9020B	MY59260184	2023-07-27	2024-07-26
Spectrum Analyzer	Rohde & Schwarz	FSV40N	101450	2023-06-08	2024-06-07
Signal Generator	Rohde & Schwarz	SMR27	100184	2023-07-27	2024-07-26
EMI Test Receiver	Rohde & Schwarz	ESPI3	100173	2023-06-08	2024-06-07
EMI Test Receiver	Rohde & Schwarz	ESR 7	101911	2023-06-08	2024-06-07
V-network	SCHWARZBECK	NSLK 8127	8127-902	2023-06-07	2024-06-06
Attenuator	SCHWARZBECK	VTSD 9561-FN	/	2023-06-06	2024-06-05
Broadband Antenna	SCHWARZBECK	VULB9163	9163-1037	2023-03-22	2025-03-21
Horn Antenna-18G	SCHWARZBECK	BBHA9120D	9120D-1775	2023-06-13	2025-06-12
Loop Antenna	SCHWARZBECK	FMZB 1513	/	2023-06-09	2024-06-08
Horn Antenna-40G	YINGLIAN	LB-180400-KF	N/A	2023-06-18	2025-06-17
Broadband Preamplifier	SCHWARZBECK	BBV 9718	346	2023-06-08	2024-06-07
EMC chamber 9*6*6(L*W*H)	CHANGNING	966	N/A	2023-06-09	2025-06-08
Shielded Enclosure 8*5*4(L*W*H)	CHANGNING	854	N/A	2023-06-09	2025-06-08
Test Software	BL	BL410_E	Version:1.0.0.117	N/A	N/A
Test Software	BL	BL410_R	Version:2.1.1.409	N/A	N/A

2.3 Measurement Uncertainty

The uncertainty is calculated using the methods suggested in the “Guide to the Expression of Uncertainty in measurement” (GUM) published by CISPR and ANSI. The reported uncertainty of measurement y ±U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

Parameter		Uncertainty
Antenna Port Conducted Emission	< 1GHz	± 1.5 dB
	> 1GHz	± 1.5 dB
Radiated Emission	9KHz – 30MHz	± 3.42 dB
	30 MHz – 1GHz	± 5.00 dB
	> 1GHz	± 4.88 dB
Conducted Emission on AC Mains	150kHz-30MHz	± 2.68 dB
Occupied Channel Bandwidth		±5 %

3 Test Set-up and Operation Modes

3.1 Details of Test Mode

Using test software (BT_Tool V1.1.2) was control EUT work in continuous transmitting mode. Select test channel as below:

Channel	Frequency
The lowest channel (CH0)	2402MHz
The middle channel (CH39)	2441MHz
The highest channel (CH78)	2480MHz

The basic operation modes are:

A. On
   1. BR/EDR mode
      a. Transmitting
         i. Low Channel
         ii. Middle Channel
         iii. High Channel
         iv. Hopping mode
      b. Receiving
   2. Normal working with Bluetooth on

B. Standby

C. Off

3.2 Special Accessories and Auxiliary Equipment

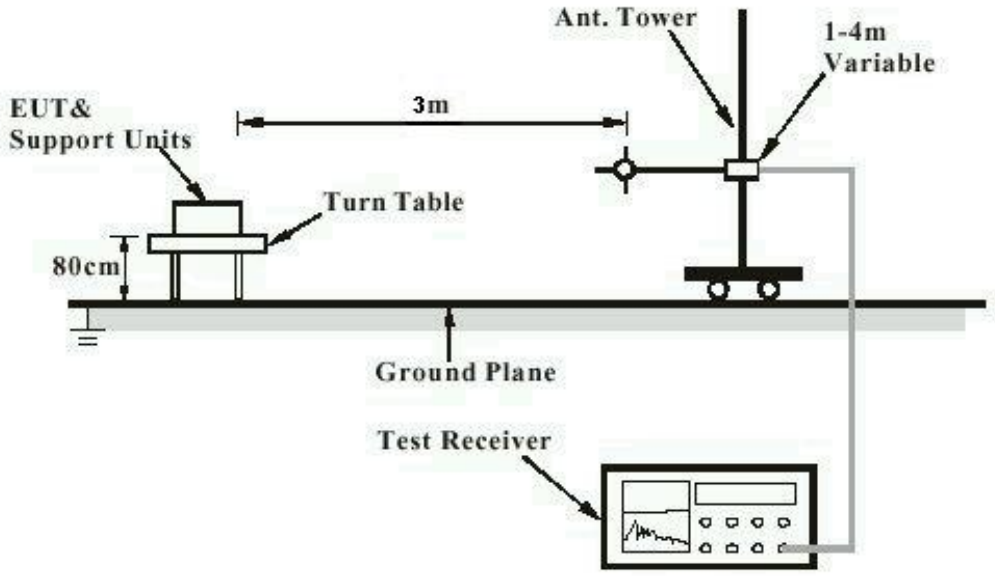
Description	Manufacturer	Model Name	Serial No.
Laptop 1	Lenovo	TP00083A	PF-0PRDGN
Laptop 2	HP	HP ZHAN 66 PRO G1	5CD7438R1J
USB Cable	N/A	N/A	1.00m Unshielded

3.3 Support Software

Description	Manufacturer	Software Name
Software	N/A	BT_Tool V1.1.2

3.4 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test



Note: Measurements above 1GHz are done with a table height of 1.5m. In addition, there is RF absorbing material on the floor of the test site for above 1GHz measurement.

Diagram of Measurement Configuration for Conduction Test

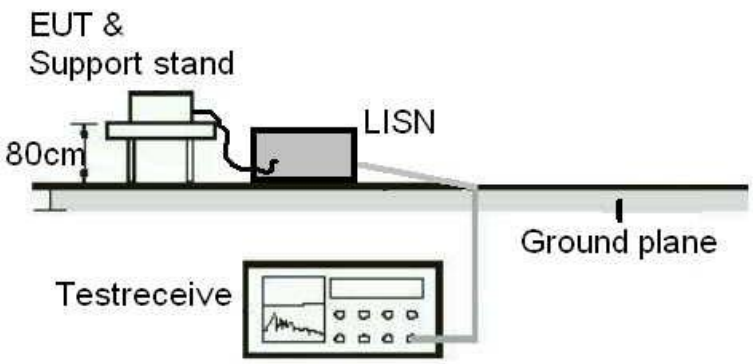
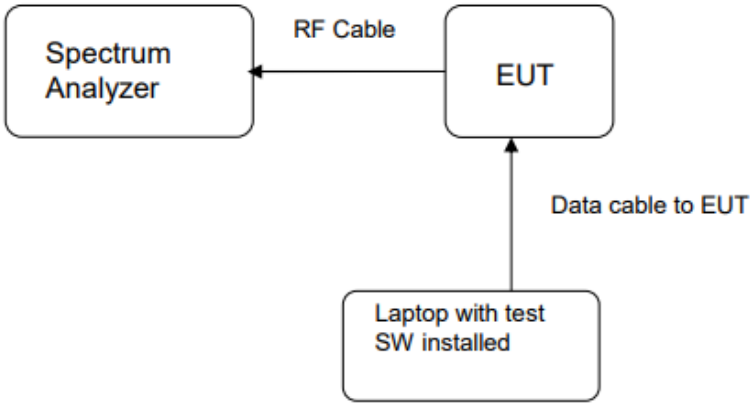


Diagram of Measurement Configuration for Transmitter Test



4 Test Results

4.1 Transmitter Requirement & Test Suites

4.1.1 Antenna Requirement

RESULT: **PASS**

Test standard	:	FCC Part 15.247(b)(4), Part 15.203 RSS-247 5.4(f), RSS-GEN 6.8
Requirement	:	An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. In addition, If transmitting antennas of directional gain greater than 6dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

According to the manufacturer declaration, the EUT has an antenna with a directional gain of 1.97dBi. The antenna is a PCB antenna with no possibility of replacement with a non-approved antenna by the end-user.

Therefore, the EUT is considered to comply with this provision.

4.1.2 Maximum Peak Output Power and E.I.R.P

RESULT: **PASS**

Test standard : FCC Part 15.247(b)(1), RSS-247 5.1(b)
Requirement : ANSI C63.10-2013, Clause 7.8.5
KDB 558074 D01 v05r02, Clause 2.2
Kind of test site : Shielded room

Test setup

Test Channel : Low/Middle/High
Operation Mode : A.1.a
Ambient temperature : 24.9°C
Relative humidity : 51%

Table 1: Maximum Peak Output Power

Test Mode	Test Channel (MHz)	Peak Output Power Measurement Result		Limit (W)
		(dBm)	(mW)	
GFSK	2402	-3.65	0.43	< 1
	2441	-2.55	0.56	
	2480	-1.61	0.69	
π/4-DQPSK	2402	-1.74	0.67	< 0.125
	2441	-0.61	0.87	
	2480	0.38	1.09	
8-DPSK	2402	-1.08	0.78	< 0.125
	2441	0.01	1.00	
	2480	0.92	1.24	

Table 2: E.I.R.P

Test Mode	Test Channel (MHz)	E.I.R.P		Limit (W)
		(dBm)	(mW)	
GFSK	2402	-1.68	0.68	< 4
	2441	-0.58	0.87	
	2480	0.36	1.09	
π/4-DQPSK	2402	0.23	1.05	
	2441	1.36	1.37	
	2480	2.35	1.72	
8-DPSK	2402	0.89	1.23	
	2441	1.98	1.58	
	2480	2.89	1.95	

Note: The antenna gain is 1.97dBi

Figure 1: Maximum Peak Output Power, 2402MHz, GFSK

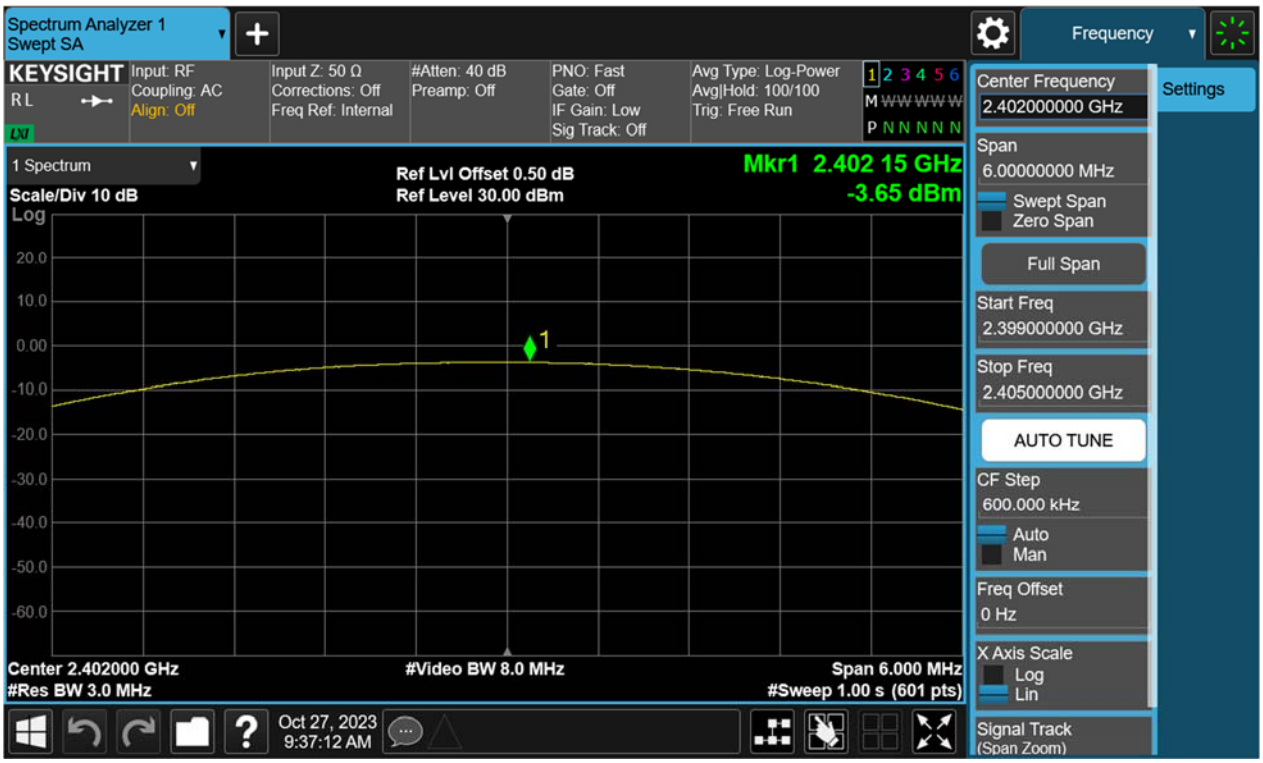


Figure 2: Maximum Peak Output Power, 2441MHz, GFSK

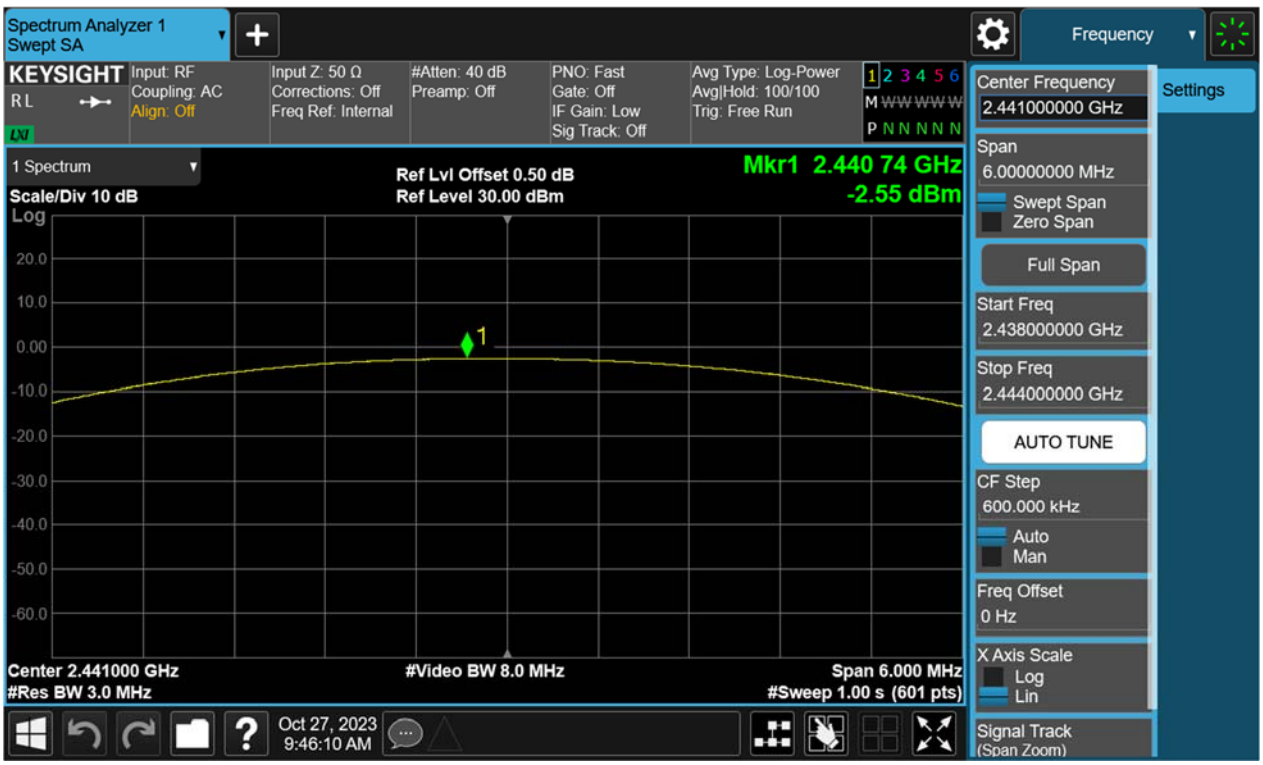


Figure 3: Maximum Peak Output Power, 2480MHz, GFSK

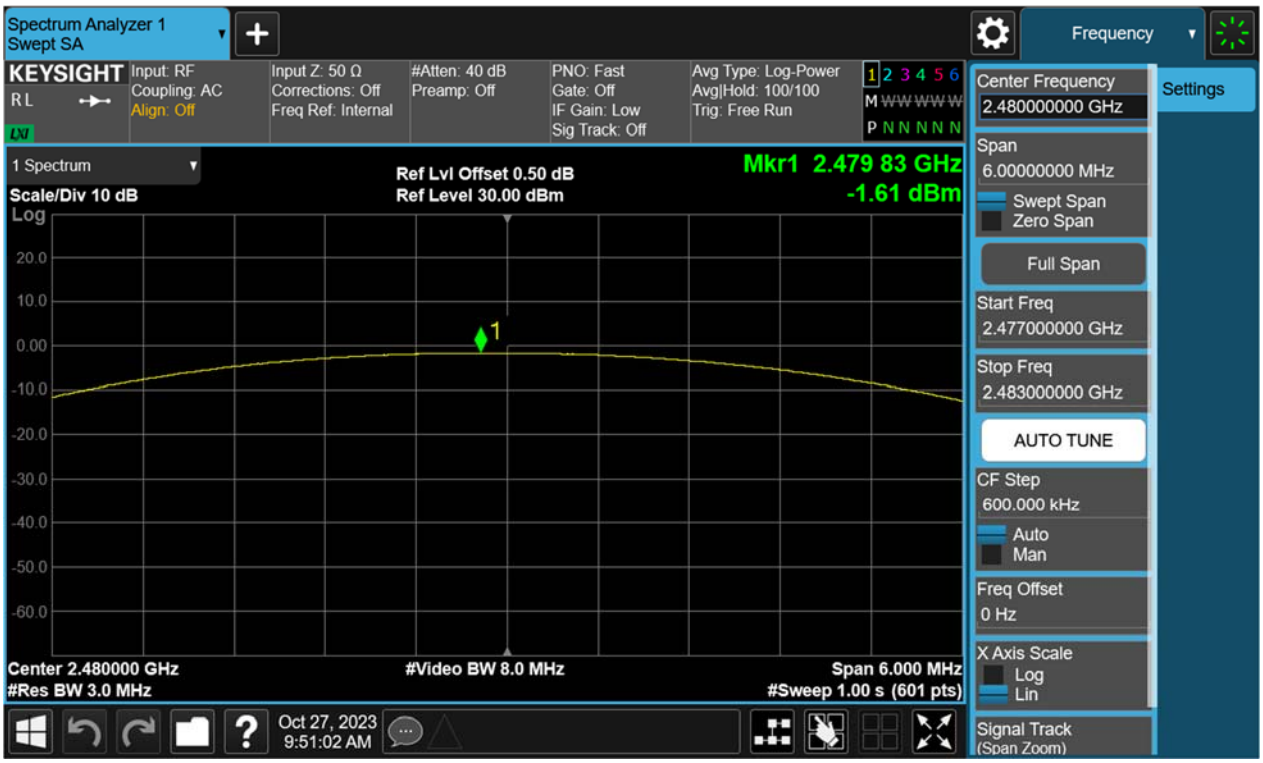


Figure 4: Maximum Peak Output Power, 2402MHz, π/4-DQPSK

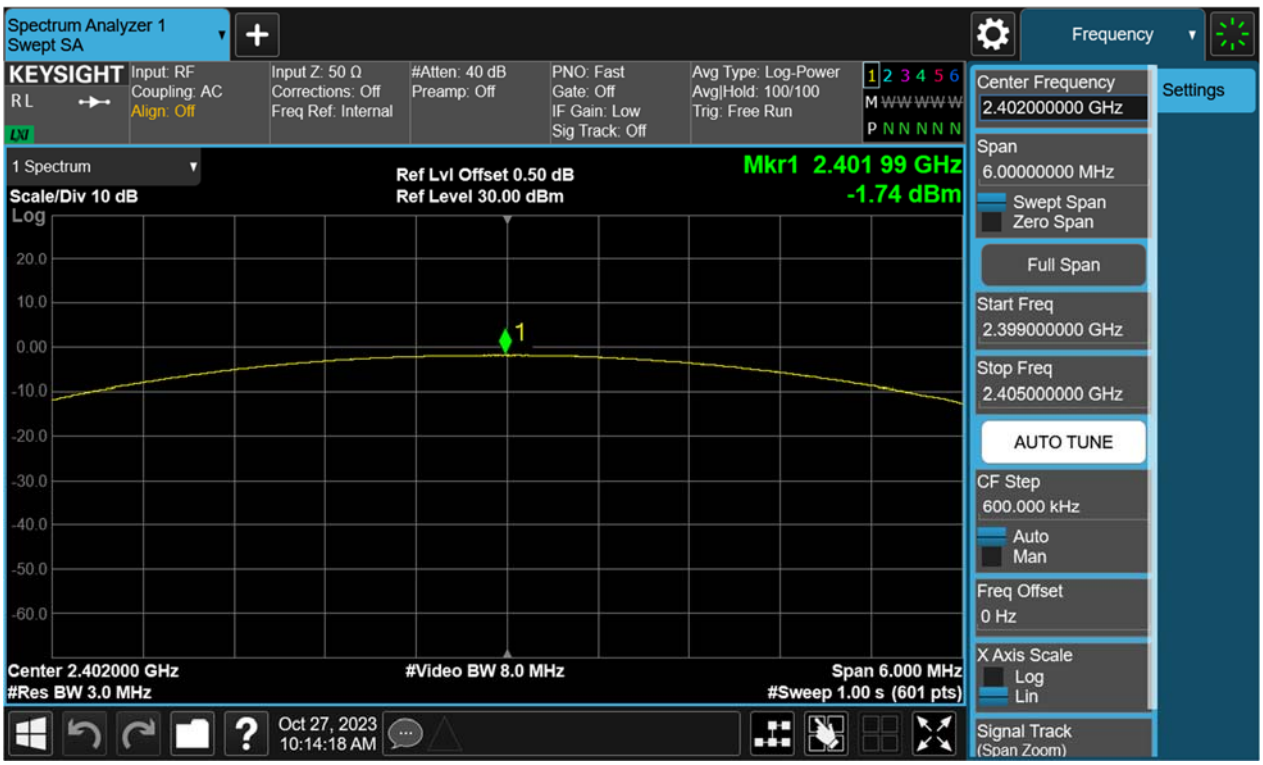


Figure 5: Maximum Peak Output Power, 2441MHz, π/4-DQPSK

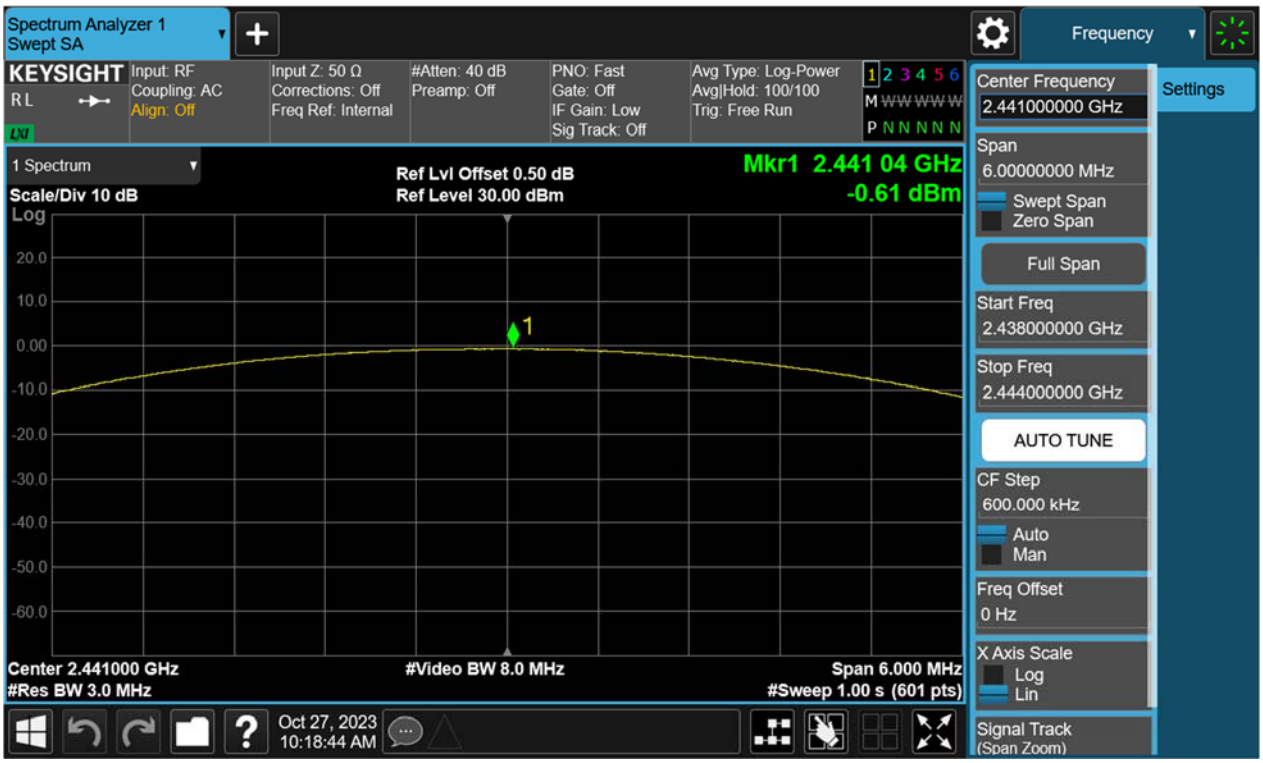


Figure 6: Maximum Peak Output Power, 2480MHz, π/4-DQPSK

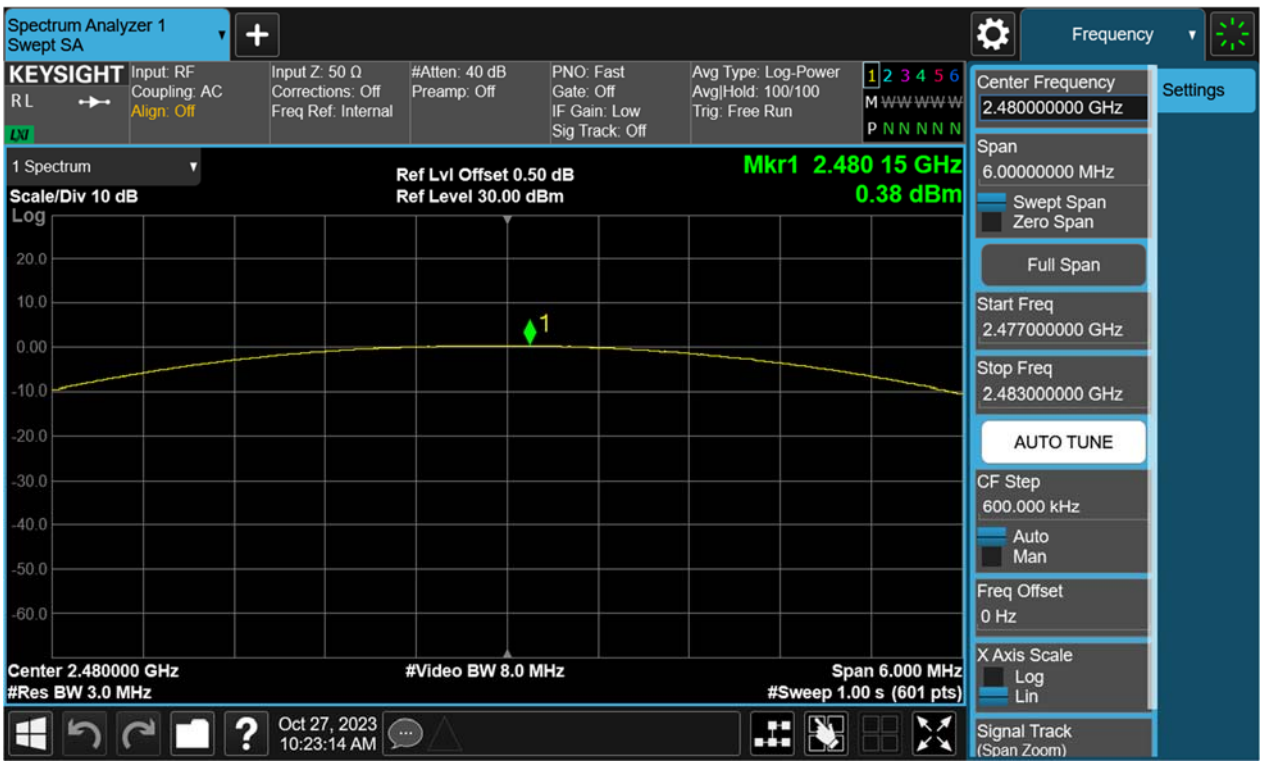


Figure 7: Maximum Peak Output Power, 2402MHz, 8-DPSK

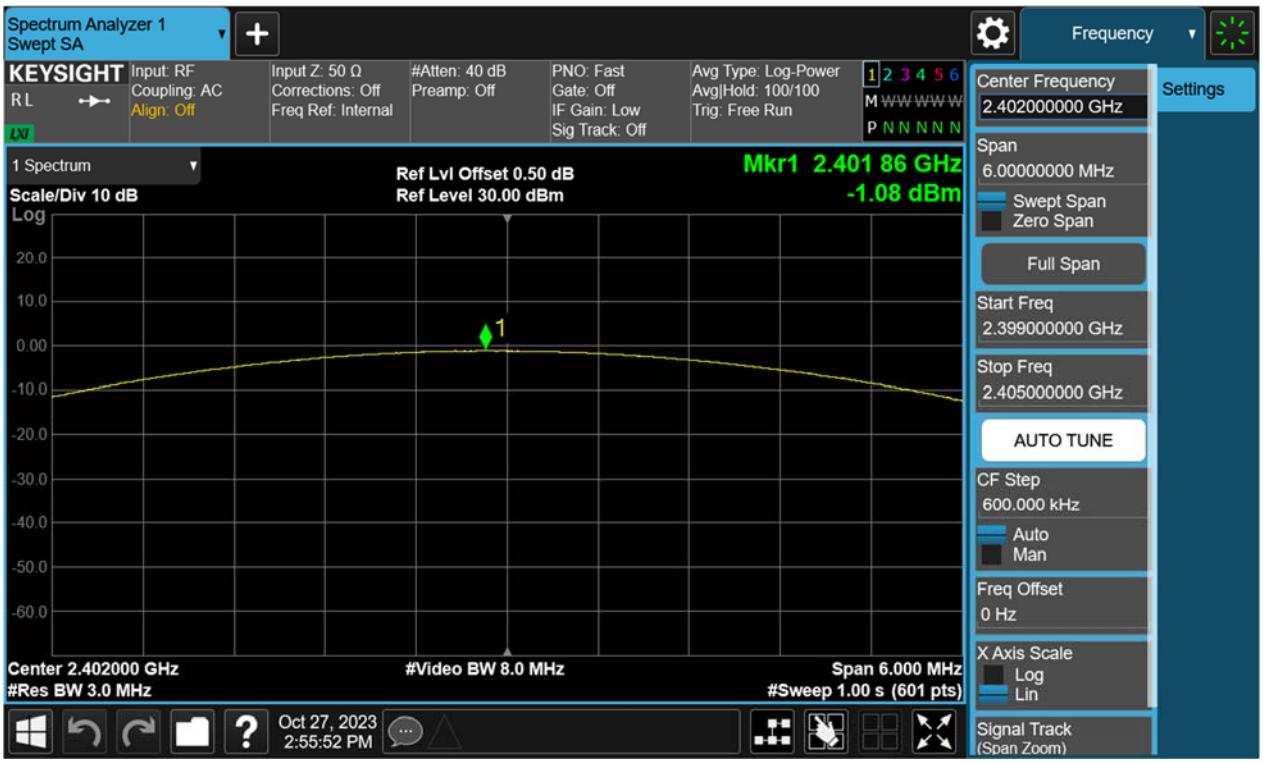


Figure 8: Maximum Peak Output Power, 2441MHz, 8-DPSK

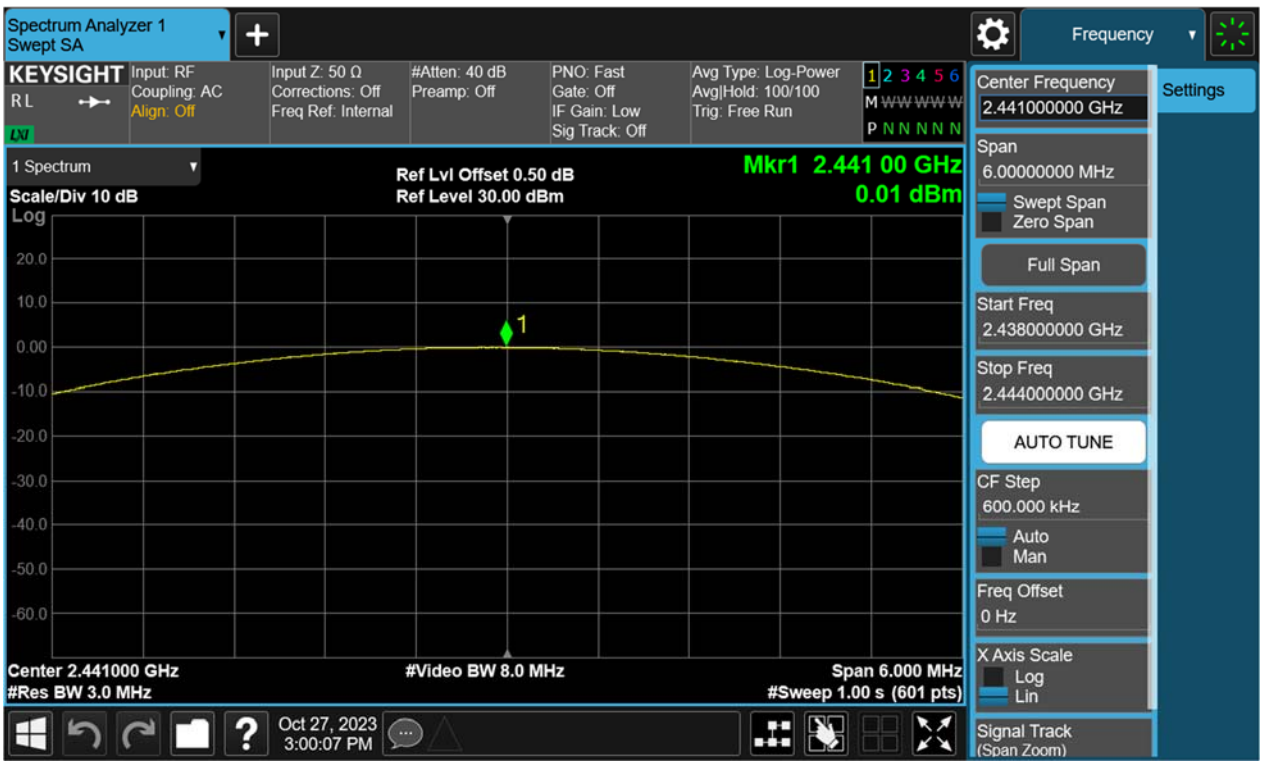


Figure 9: Maximum Peak Output Power, 2480MHz, 8-DPSK

4.1.3 20dB Bandwidth and 99% Bandwidth

RESULT: **PASS**

Test standard : FCC Part 15.247(a)(1)
RSS-247 5.1(a), RSS-Gen 6.7
Requirement : ANSI C63.10-2013, Clause 7.8.7
KDB 558074 D01 v05r02, Clause 2.2
Kind of test site : Shielded room

Test setup

Test Channel : Low/Middle/High
Operation Mode : A.1.a
Ambient temperature : 24.9°C
Relative humidity : 51%

Table 3: 20dB Bandwidth and 99% Bandwidth

Test Mode	Test Channel (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
GFSK	2402	0.9556	0.8471
	2441	0.9542	0.8400
	2480	0.9530	0.8414
π/4-DQPSK	2402	1.3190	1.1647
	2441	1.3180	1.1638
	2480	1.3130	1.1625
8-DPSK	2402	1.3050	1.1676
	2441	1.3040	1.1670
	2480	1.3080	1.1670

Figure 10: 20dB Bandwidth and 99% Bandwidth, 2402MHz, GFSK

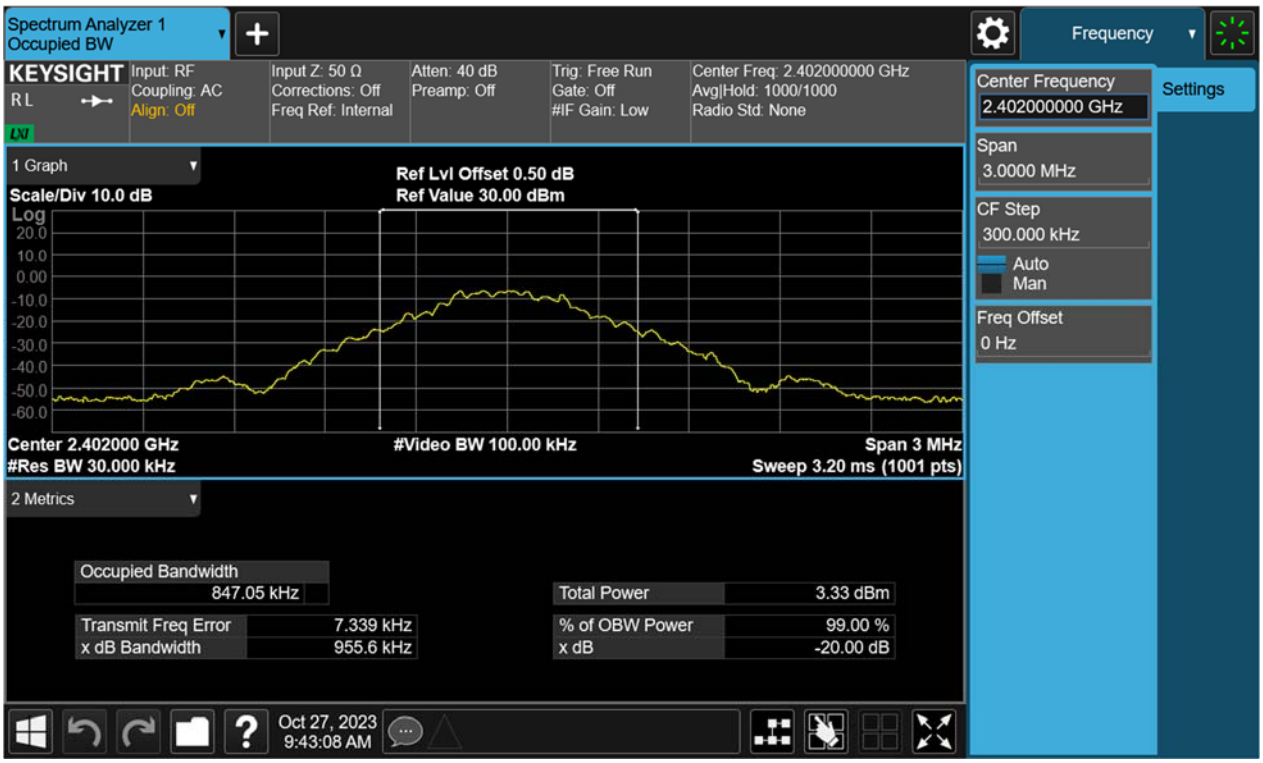


Figure 11: 20dB Bandwidth and 99% Bandwidth, 2441MHz, GFSK

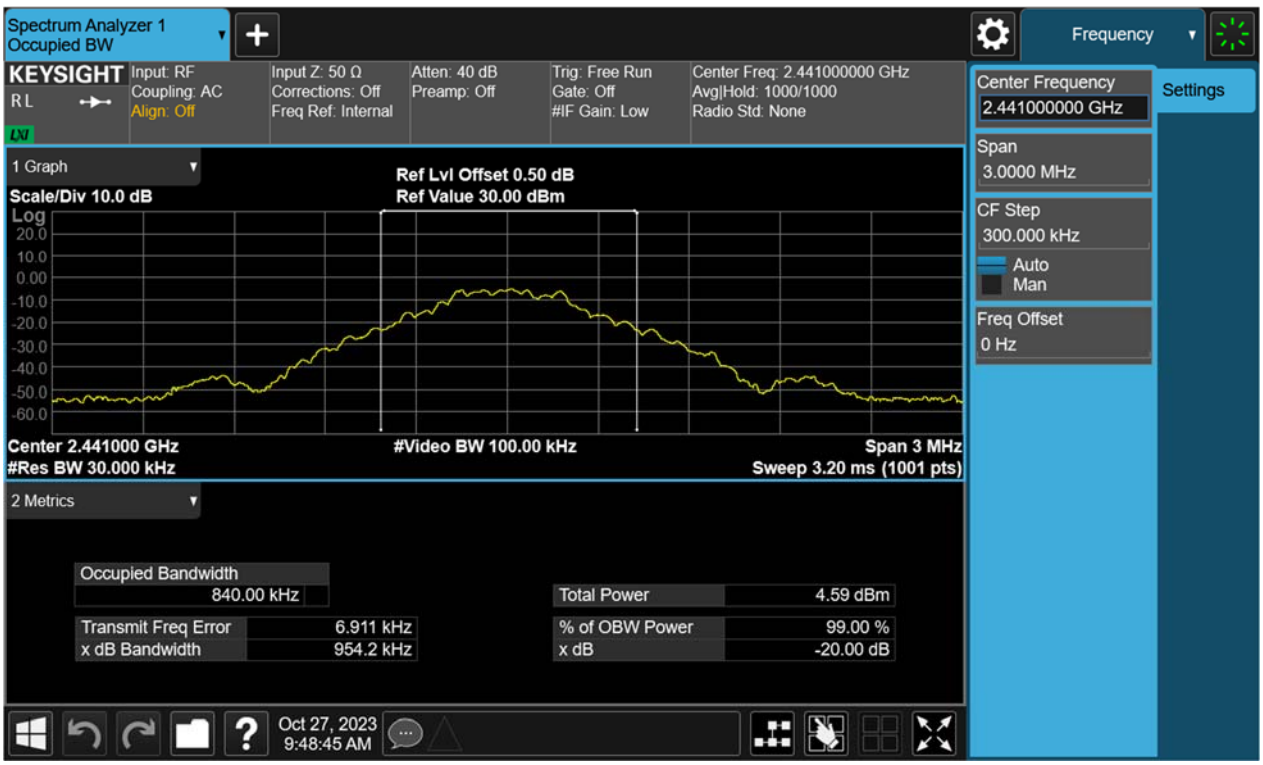


Figure 12: 20dB Bandwidth and 99% Bandwidth, 2480MHz, GFSK

Figure 13: 20dB Bandwidth and 99% Bandwidth, 2402MHz, π/4-DQPSK

Figure 14: 20dB Bandwidth and 99% Bandwidth, 2441MHz, π/4-DQPSK

Figure 15: 20dB Bandwidth and 99% Bandwidth, 2480MHz, π/4-DQPSK

Figure 16: 20dB Bandwidth and 99% Bandwidth, 2402MHz, 8-DPSK

Figure 17: 20dB Bandwidth and 99% Bandwidth, 2441MHz, 8-DPSK

Figure 18: 20dB Bandwidth and 99% Bandwidth, 2480MHz, 8-DPSK

4.1.4 Conducted Spurious Emission & Authorized-band band-edge

RESULT: **PASS**

Test standard	:	FCC Part 15.247(d), RSS-247 5.5
Requirement	:	ANSI C63.10-2013, Clause 7.8.8
Kind of test site	:	Shielded room

Test setup

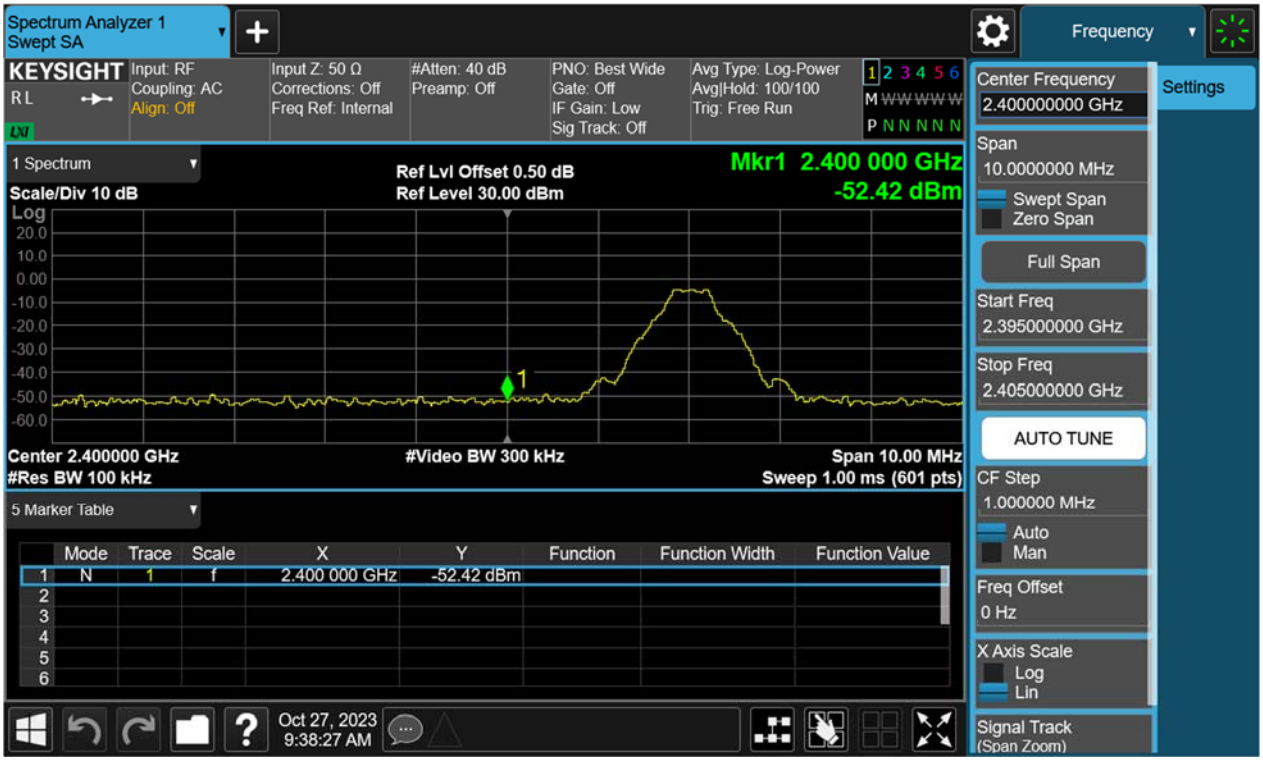
Test Channel	:	Low/Middle/High for spurious, Low/High for Band Edge
Operation Mode	:	A.1.a
Ambient temperature	:	24.9°C
Relative humidity	:	51%

For details refer to following test plot.

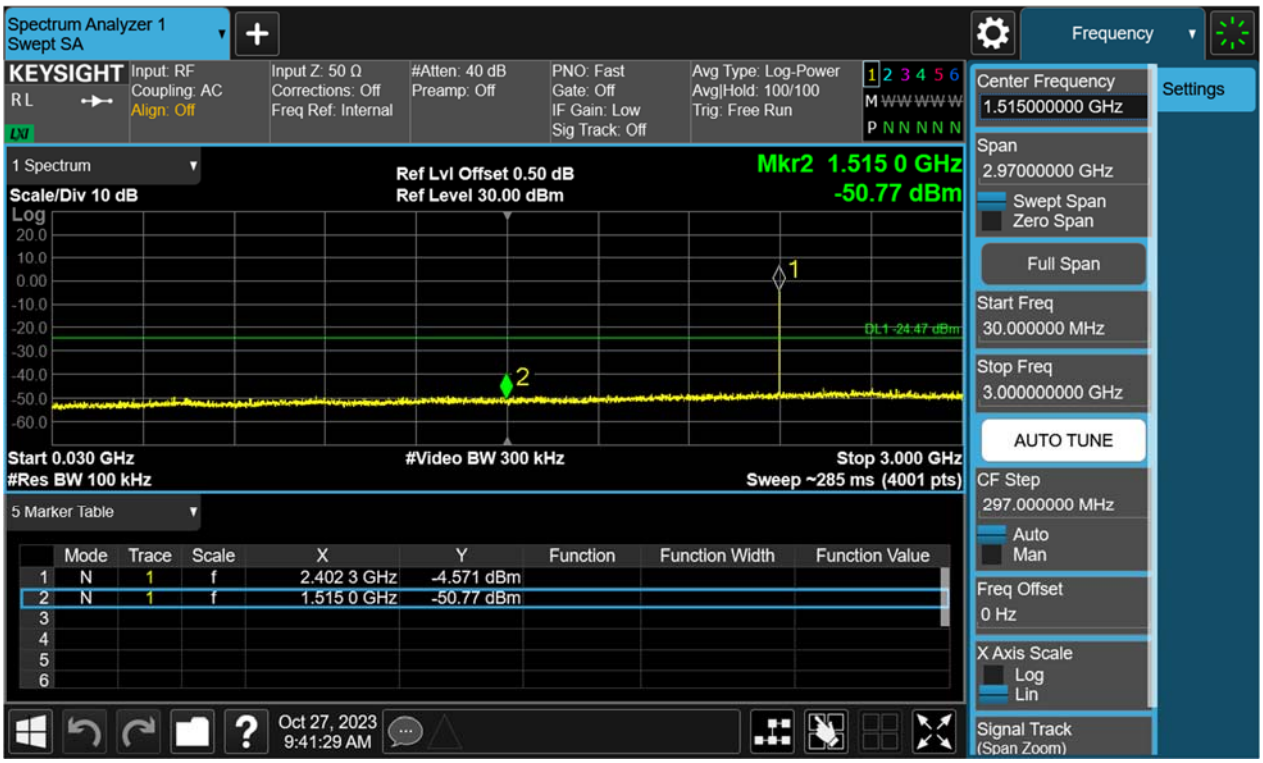
Figure 19: Conducted Spurious Emission & Authorized-band band-edge, 2402MHz, GFSK

Carrier Level

Band Edge



Conducted spurious emissions 30MHz-25GHz



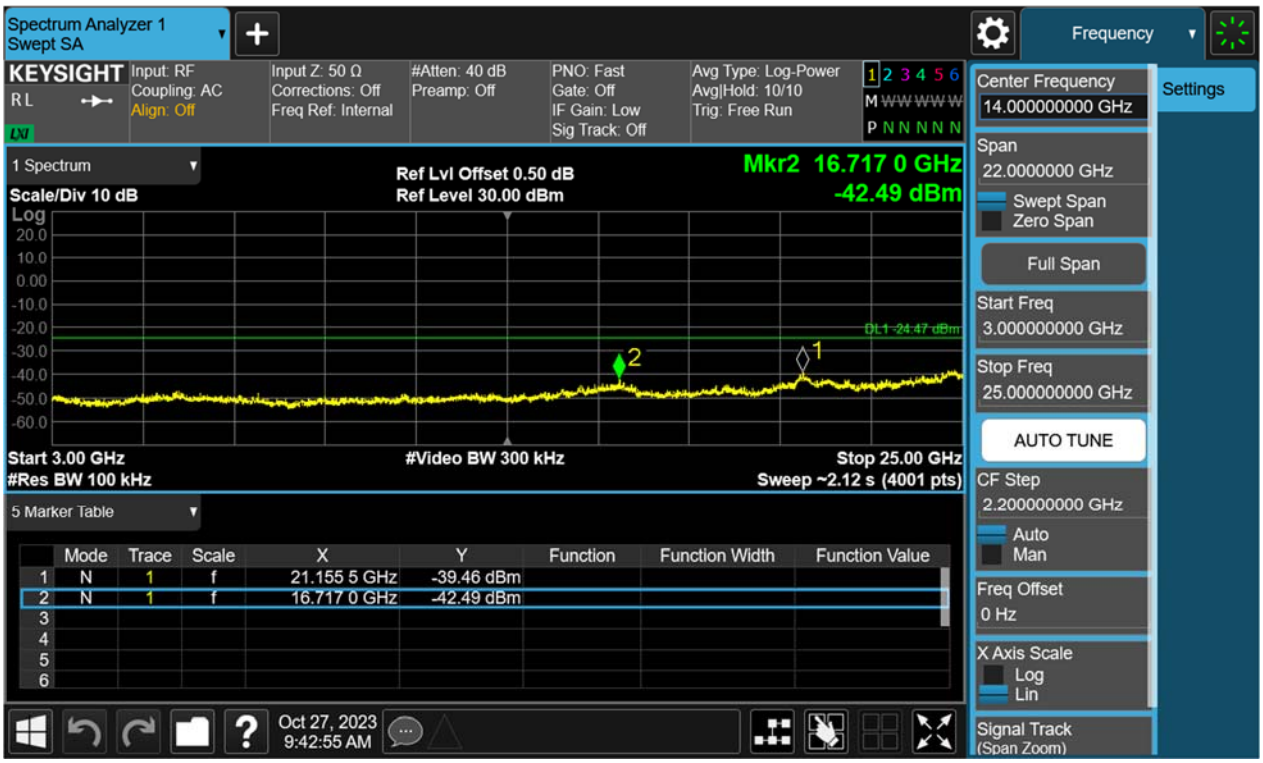
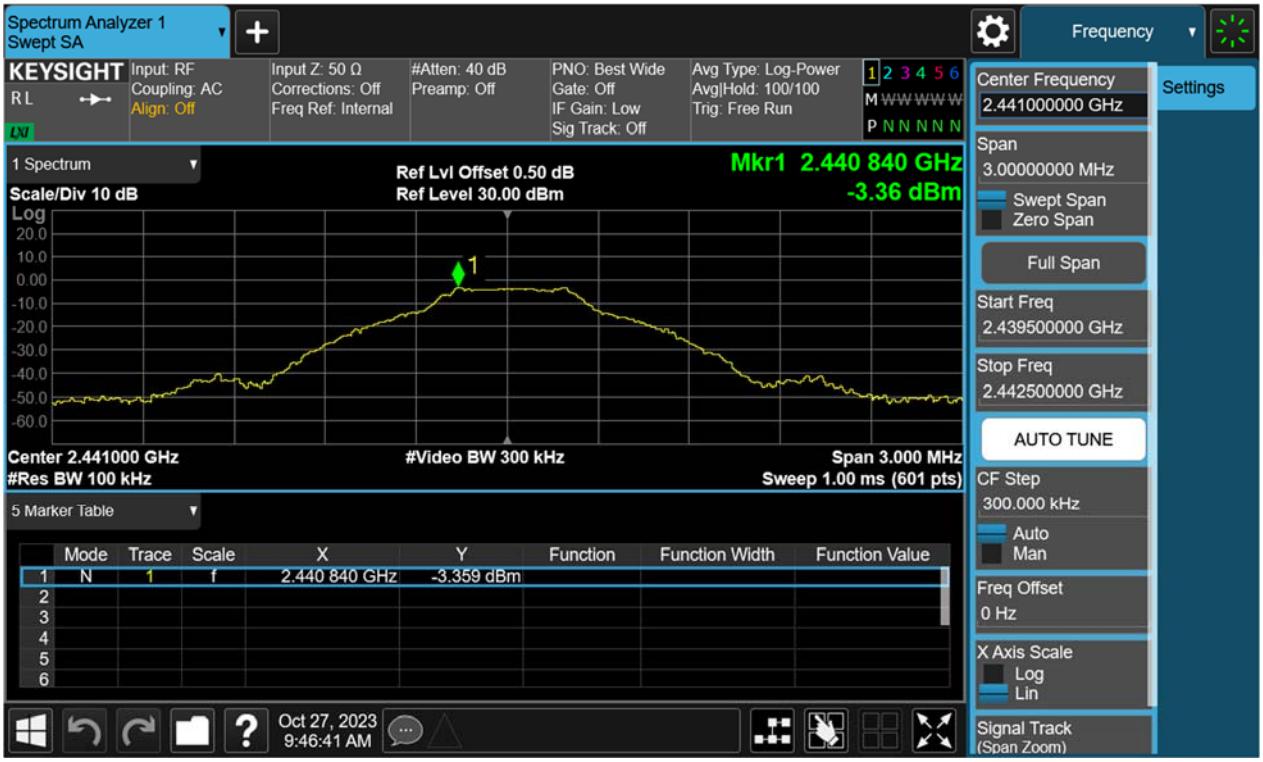


Figure 20: Conducted Spurious Emission & Authorized-band band-edge, 2441MHz, GFSK Carrier Level



Conducted spurious emissions 30MHz-25GHz

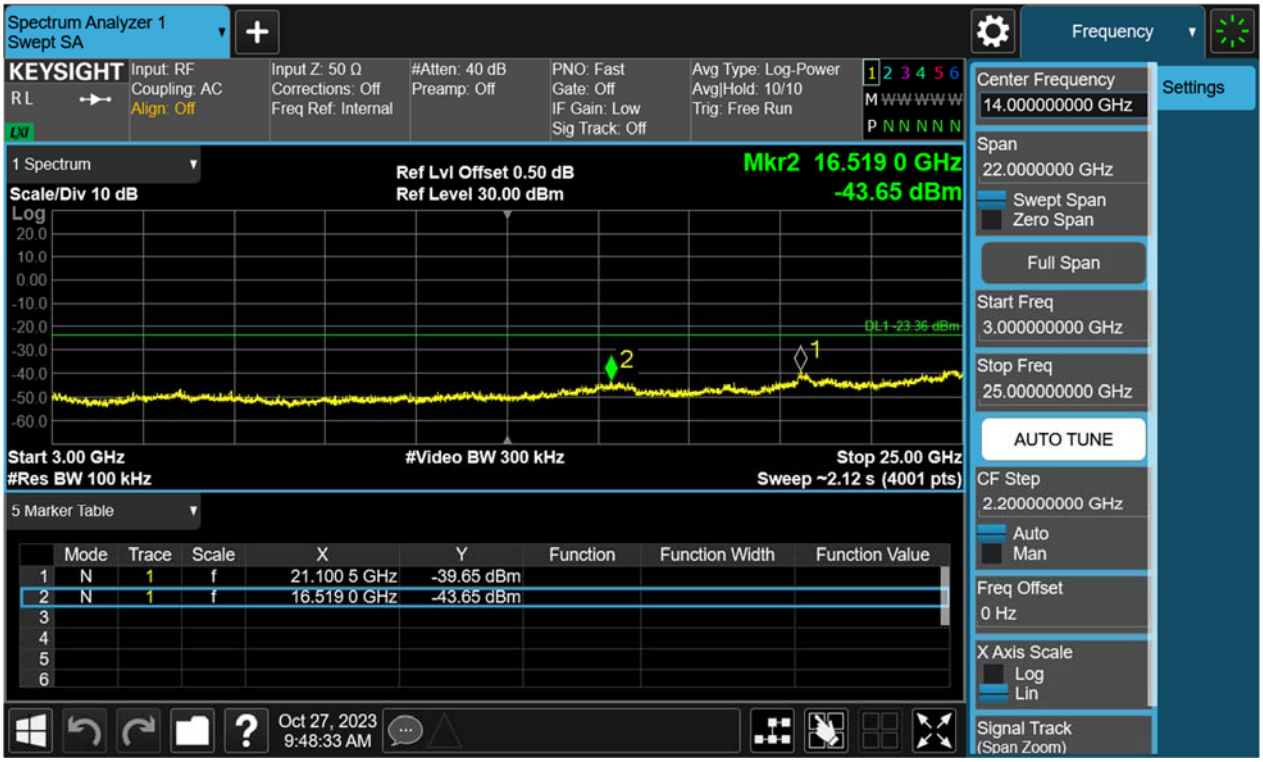


Figure 21: Conducted Spurious Emission & Authorized-band band-edge, 2480MHz, GFSK Carrier Level

Band Edge

Conducted spurious emissions 30MHz-25GHz

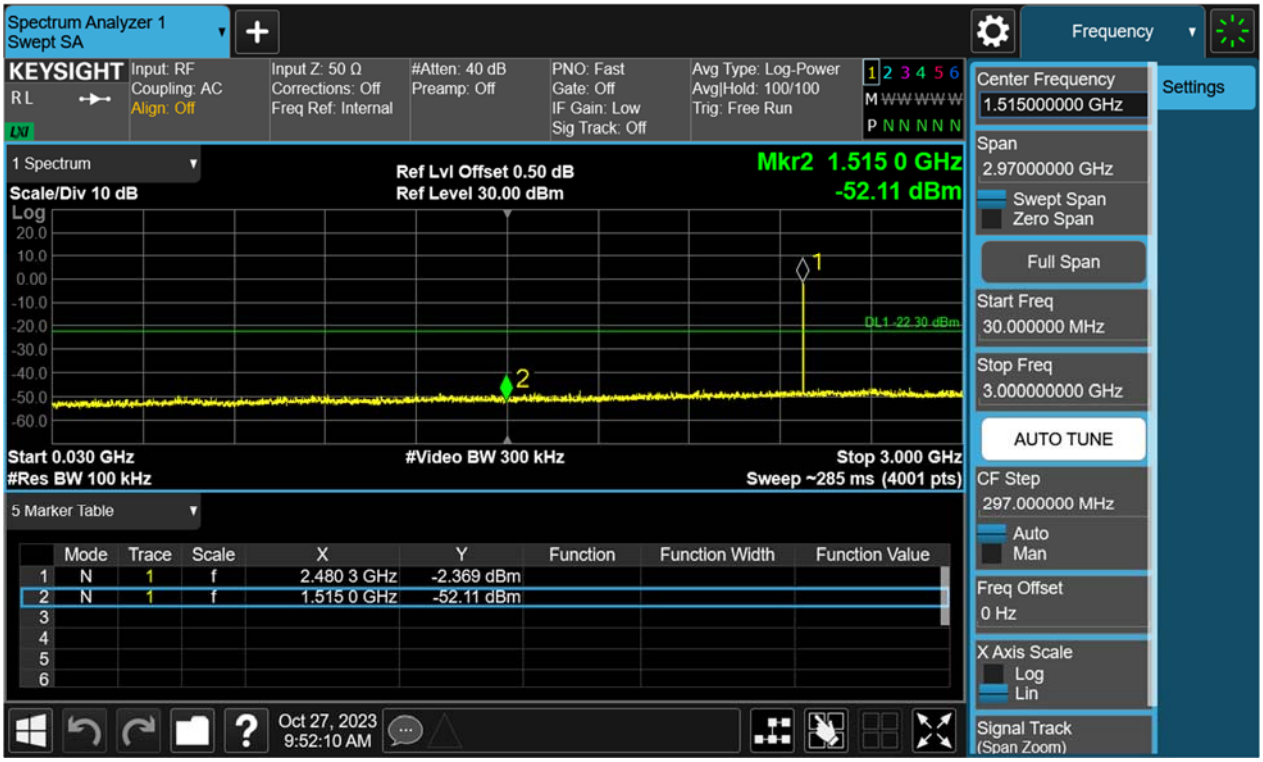
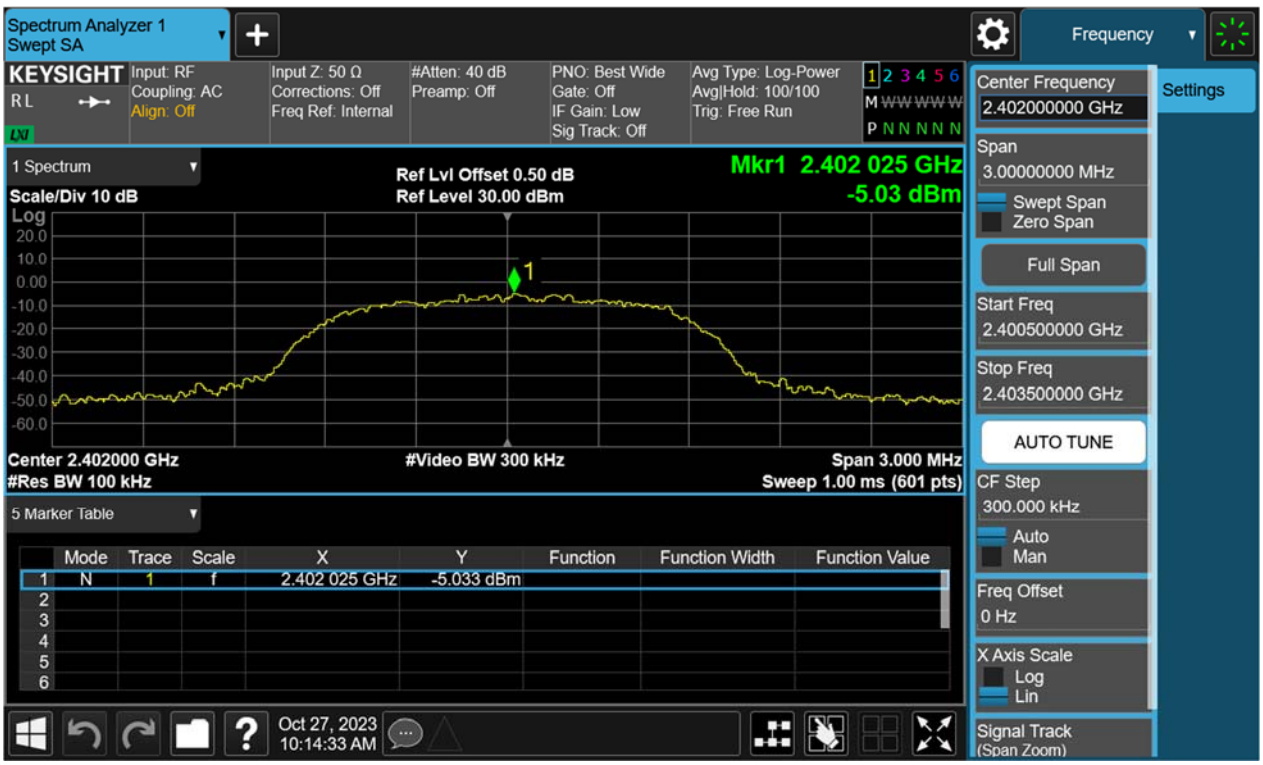
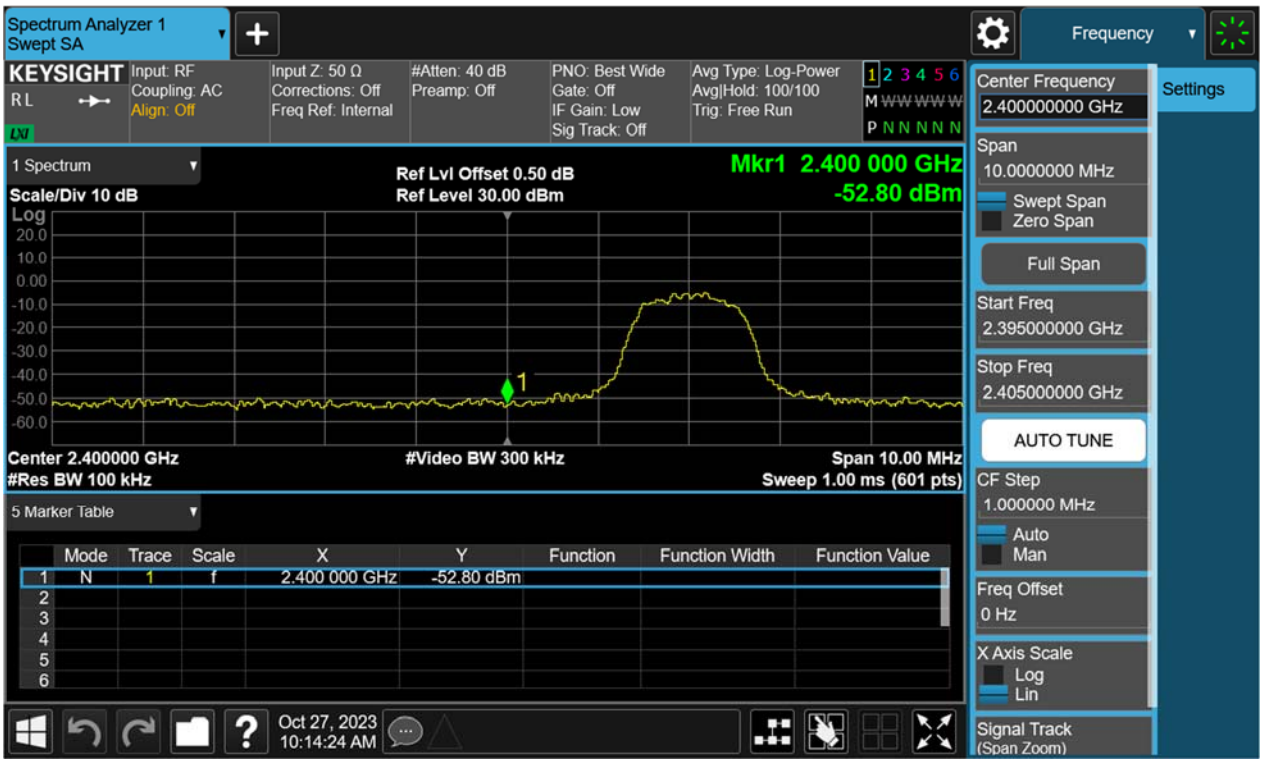


Figure 22: Conducted Spurious Emission & Authorized-band band-edge, 2402MHz, π/4-DQPSK Carrier Level



Band Edge



Conducted spurious emissions 30MHz-25GHz

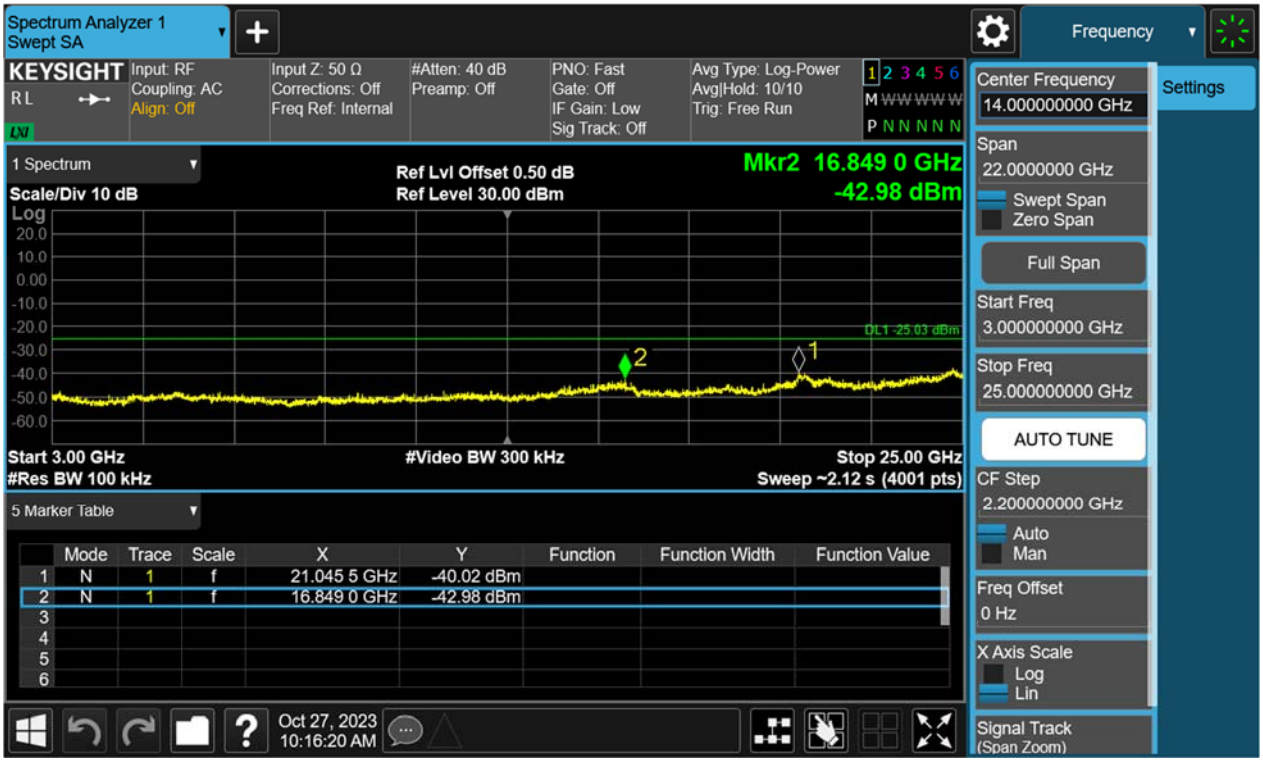
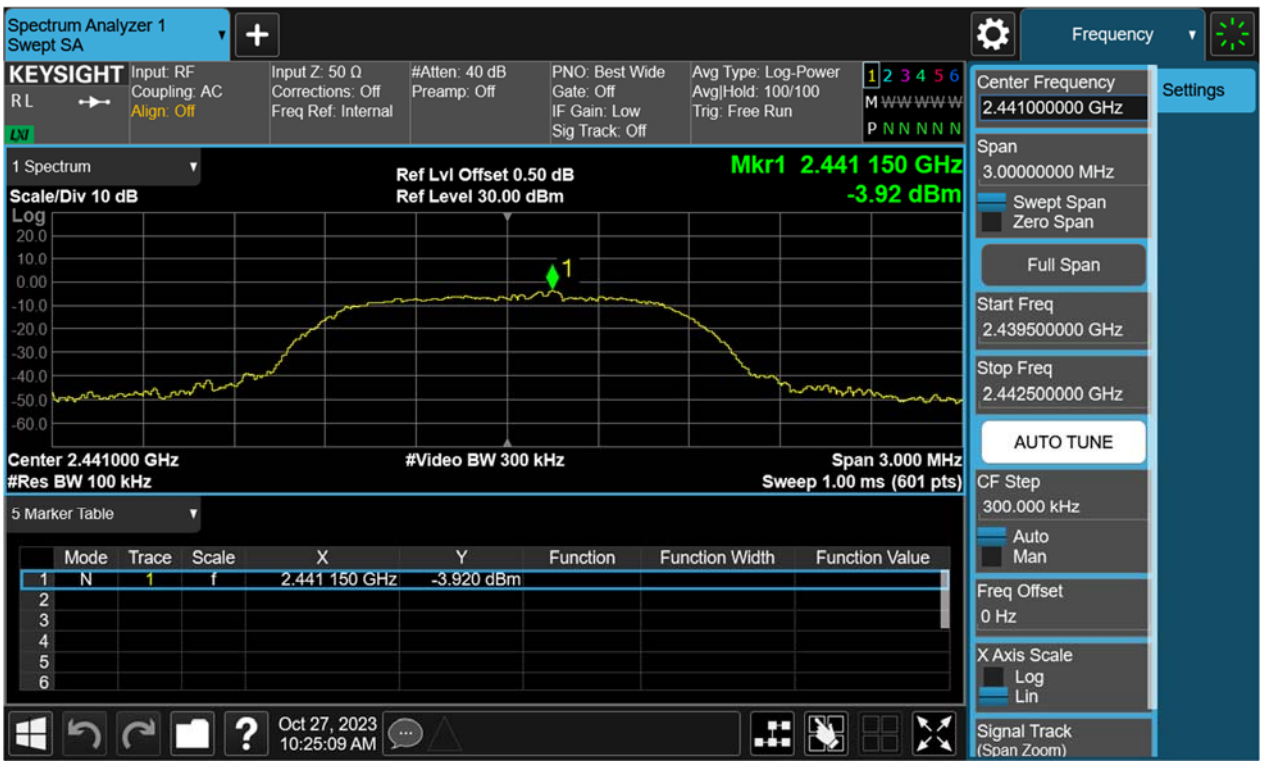


Figure 23: Conducted Spurious Emission & Authorized-band band-edge, 2441MHz, π/4-DQPSK Carrier Level



Conducted spurious emissions 30MHz-25GHz

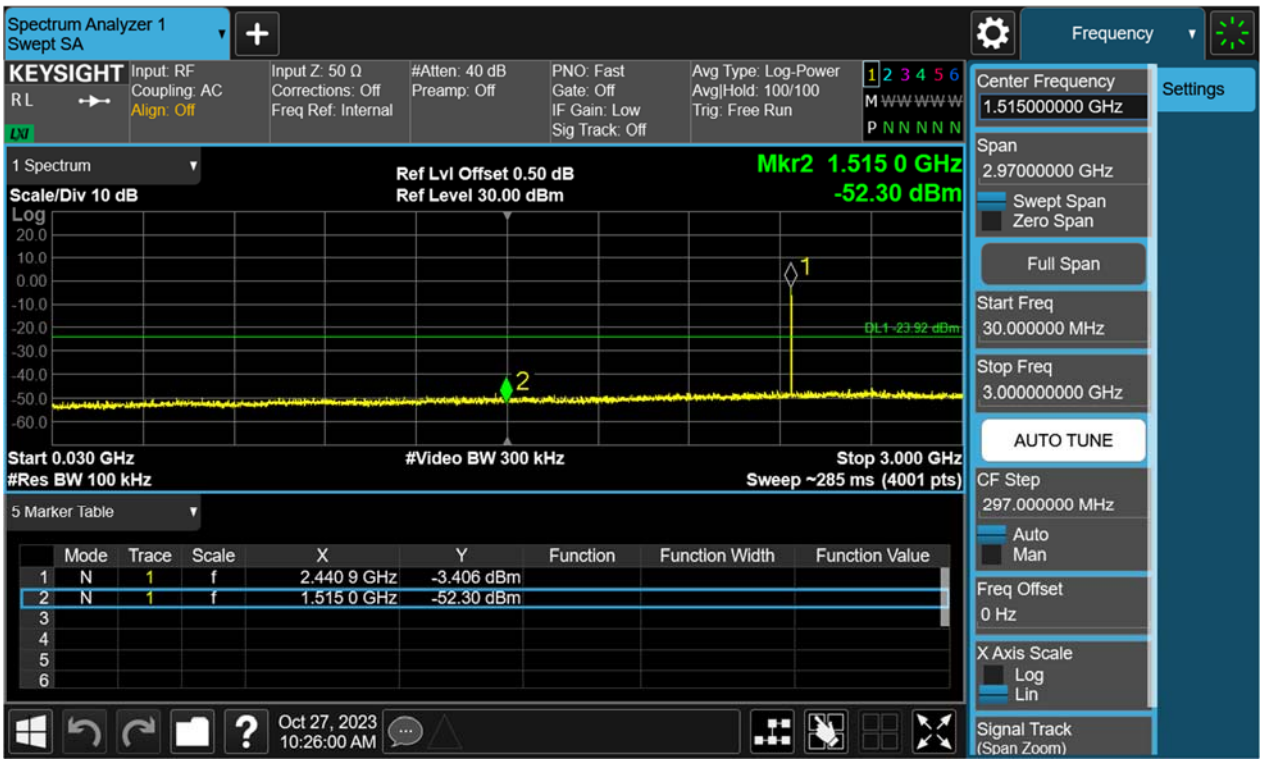


Figure 24: Conducted Spurious Emission & Authorized-band band-edge, 2480MHz, π/4-DQPSK Carrier Level

Band Edge

Conducted spurious emissions 30MHz-25GHz