TEST REPORT

Applicant	:	Home Tech Innovation, Inc
Address of Applicant	:	1035 Cambridge St, Suite 11A, Cambridge, MA 02141
Product Name	:	Suvie Kitchen Robot
Brand Name	:	Suvie
Model No.	:	SV301
Sample No.	:	E22060090-01#01 E22060090-02#01
FCC ID	:	2AT2K-SV301
Standard	:	FCC CFR47 Part 15, Subpart C
Date of Receipt	:	2022-07-11
Date of Test	:	2022-07-11 ~ 2022-07-27
Date of Issue	:	2022-07-29

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: Guoyou Chi (Authorized signatory: Guoyou Chi)

Contents

1 General Information

1.1 Testing Laboratory

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	Home Tech Innovation, Inc
Address	1035 Cambridge St, Suite 11A, Cambridge, MA 02141
Contact Person	Kevin Incorvia
Telephone	+1 617 800 5336
Email	kincorvia@suvie.com
Manufacturer Company Name	Home Tech Innovation, Inc
Address	1035 Cambridge St, Suite 11A, Cambridge, MA 02141

1.3 Details of EUT

Product Name	Suvie Kitchen Robot
Brand Name	Suvie
Test Model No.	SV301
FCC ID	2AT2K-SV301
Mode of Operation	Bluetooth BR/EDR
Frequency Range	2400MHz ~ 2483.5MHz
Number of Channels	79 (at intervals of 1 MHz)
Modulation Type	GFSK, π/4-DQPSK, 8-DPSK
Antenna Type	PCB Antenna
Antenna Gain	3.42dBi
Test Voltage	AC 120V 60Hz 1400W
Hardware version	SV301_1.0.2
Software version	fw
Test SW Version	BL410_R; BL410_E
RF power setting in TEST_SW	EspRFTestTool_v2.8

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.
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	Requirement	Result
Antenna Requirement	FCC Part 15.247(b)(4), 15.203	FCC Part 15.247(b)(4), 15.203	PASS
Maximum Peak Output Power	FCC Part 15.247(b)(1)	ANSI C63.10-2013, Clause 7.8.5 KDB 558074 D01 v05r02, Clause 2.2	PASS
20dB Bandwidth	FCC Part 15.247(a)(1)	ANSI C63.10-2013, Clause 7.8.7 KDB 558074 D01 v05r02, Clause 2.2	PASS
Conducted Spurious Emission & Authorized-band band-edge	FCC Part 15.247(d)	ANSI C63.10-2013, Clause 7.8.8	PASS
Radiated Spurious Emission	FCC Part 15.247(d), 15.205, 15.209	ANSI C63.10-2013, Clause 7.8.8	PASS
Band Edge (Restricted-band band-edge)	FCC Part 15.247(d), 15.205, 15.209	ANSI C63.10-2013, Clause 7.8.6	PASS
Hopping Frequency Separation	FCC Part 15.247(a)(1)	ANSI C63.10-2013, Clause 7.8.2 KDB 558074 D01 v05r02, Clause 2.2	PASS
Number of Hopping Frequency	FCC Part 15.247(a)(1)(iii)	ANSI C63.10-2013, Clause 7.8.3 KDB 558074 D01 v05r02, Clause 2.2	PASS
Time of Occupancy	FCC Part 15.247(a)(1)(iii)	ANSI C63.10-2013, Clause 7.8.4 KDB 558074 D01 v05r02, Clause 2.2	PASS
Conducted Emission on AC Mains	FCC Part 15.207(a)	ANSI C63.10-2013, Clause 6.2	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 Date
Spectrum Analyzer	Keysight	N9020B	MY59260184	2021-08-17	2022-08-16
Spectrum Analyzer	Rohde & Schwarz	FSV40N	101450	2022-06-09	2023-06-08
EMI Test Receiver	Rohde & Schwarz	ESPI3	100173	2022-06-09	2023-06-08
EMI Test Receiver	Rohde & Schwarz	ESR 7	101911	2022-06-09	2023-06-08
V-network	SCHWARZBECK	NSLK 8127	8127-902	2022-06-09	2023-06-08
Wideband Radio Communication Tester	Rohde & Schwarz	CMW 500	100687	2021-08-13	2022-08-12
Broadband Antenna	SCHWARZBECK	VULB9163	9163-1037	2021-06-08	2023-06-07
Horn Antenna-18G	SCHWARZBECK	BBHA9120D	9120D-1775	2021-06-08	2023-06-07
Loop Antenna	SCHWARZBECK	FMZB 1513	N/A	2020-11-23	2022-11-22
Horn Antenna-40G	YINGLIAN	LB-180400-KF	N/A	2021-06-12	2023-06-11
EMC chamber 9*6*6（L*W*H)	CHANGNING	966	N/A	2020-06-09	2023-06-08
Shielded Enclosure 8*5*4（L*W*H)	CHANGNING	854	N/A	2020-06-09	2023-06-08
Test Software	BL	BL410_E	N/A	N/A	N/A
Test Software	BL	BL410_R	N/A	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	Frequency	Uncertainty
Antenna Port Conducted Emission	< 1GHz	± 1.5 dB
	> 1GHz	± 1.5 dB
Radiated Emission	30 MHz – 1 GHz	± 3.42 dB
	> 1GHz	± 4.20 dB
Conducted Emission on AC Mains	9 kHz to 30 MHz	± 1.71 dB
Occupied Channel Bandwidth		±5 %

3 Test Set-up and Operation Modes

3.1 Details of Test Mode

Using test software (EspRFTestTool_v2.8) was control EUT work in continuous transmitter and receiver 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

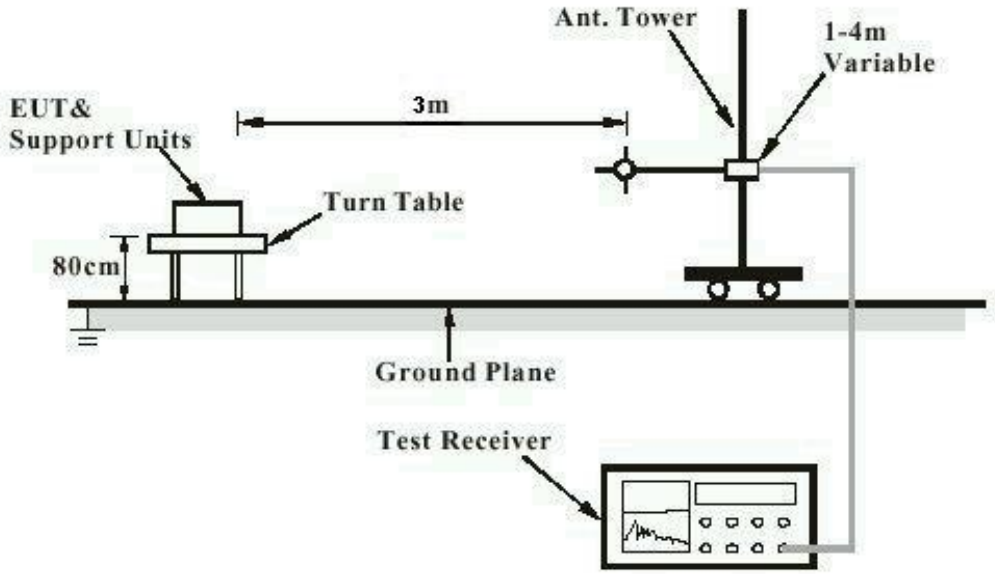
Description	Manufacturer	Model No.	Serial No.
PC	HP	HP ZHAN 66 Pro G1	N/A
USB Cable	N/A	N/A	1.00m Unshielded

3.3 Support Software

Description	Manufacturer	Software Name
Software	N/A	EspRFTestTool_v2.8

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

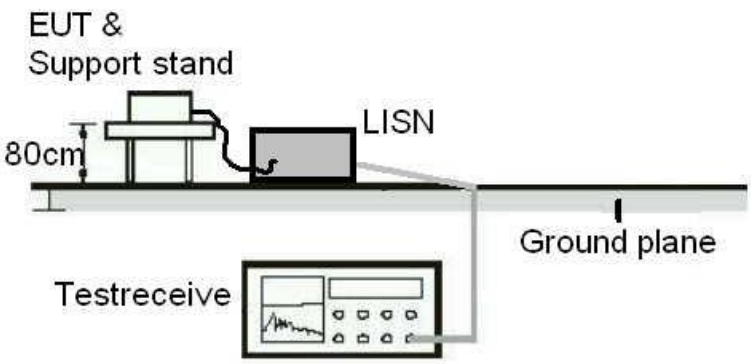
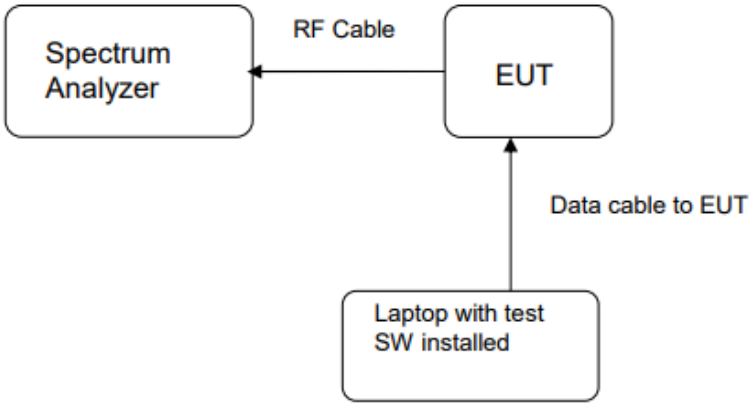


Diagram of Measurement Configuration for Transmitter Test



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
Requirement	:	The use of approved antennas only with directional gains that do not exceed 6dBi

According to the manufacturer declaration, the EUT has an antenna with a directional gain of 3.42dBi. The antenna is 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

RESULT: **PASS**

Test standard : FCC Part 15.247(b)(1)

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	0.33	1.08	< 1
	2441	0.68	1.17	
	2480	0.11	1.03	
π/4-DQPSK	2402	2.70	1.86	< 0.125
	2441	3.02	2.00	
	2480	2.53	1.79	
8-DPSK	2402	3.08	2.03	< 0.125
	2441	3.52	2.25	
	2480	3.03	2.01	

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

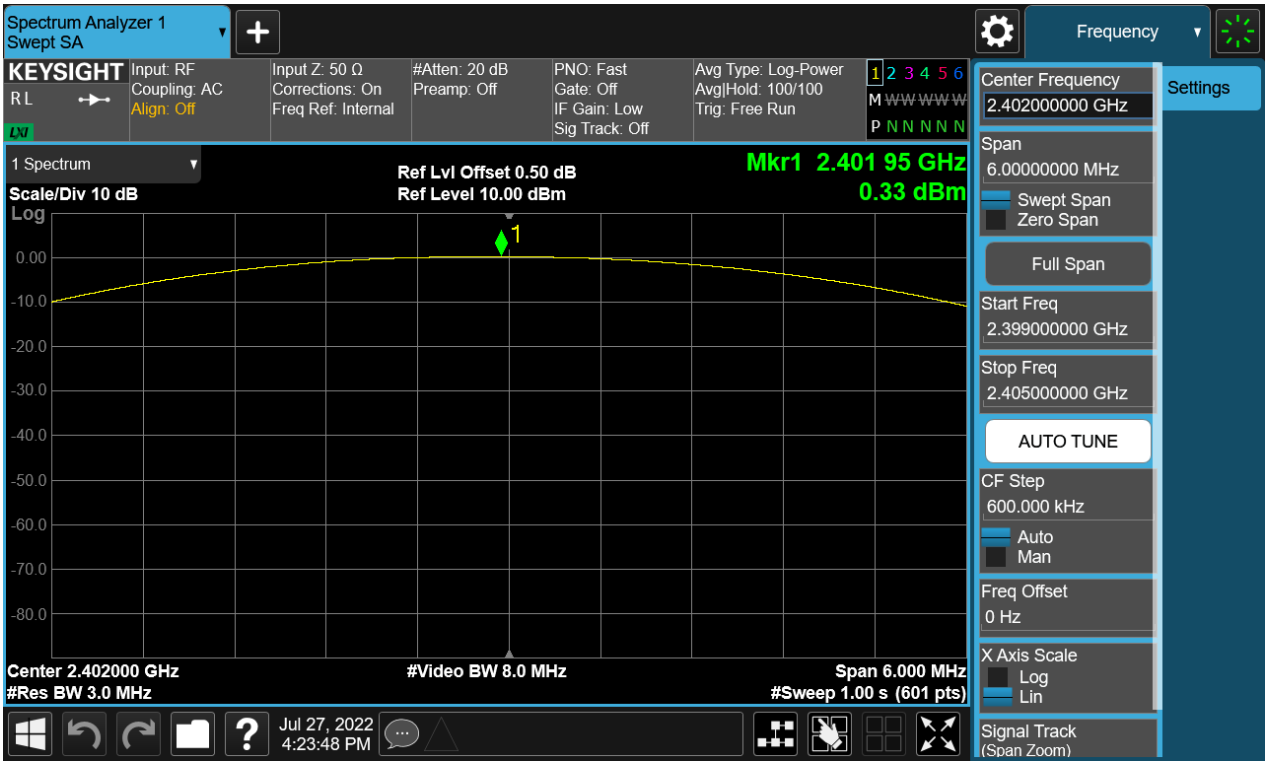


Figure 2: Maximum Peak Output Power, 2441MHz, GFSK

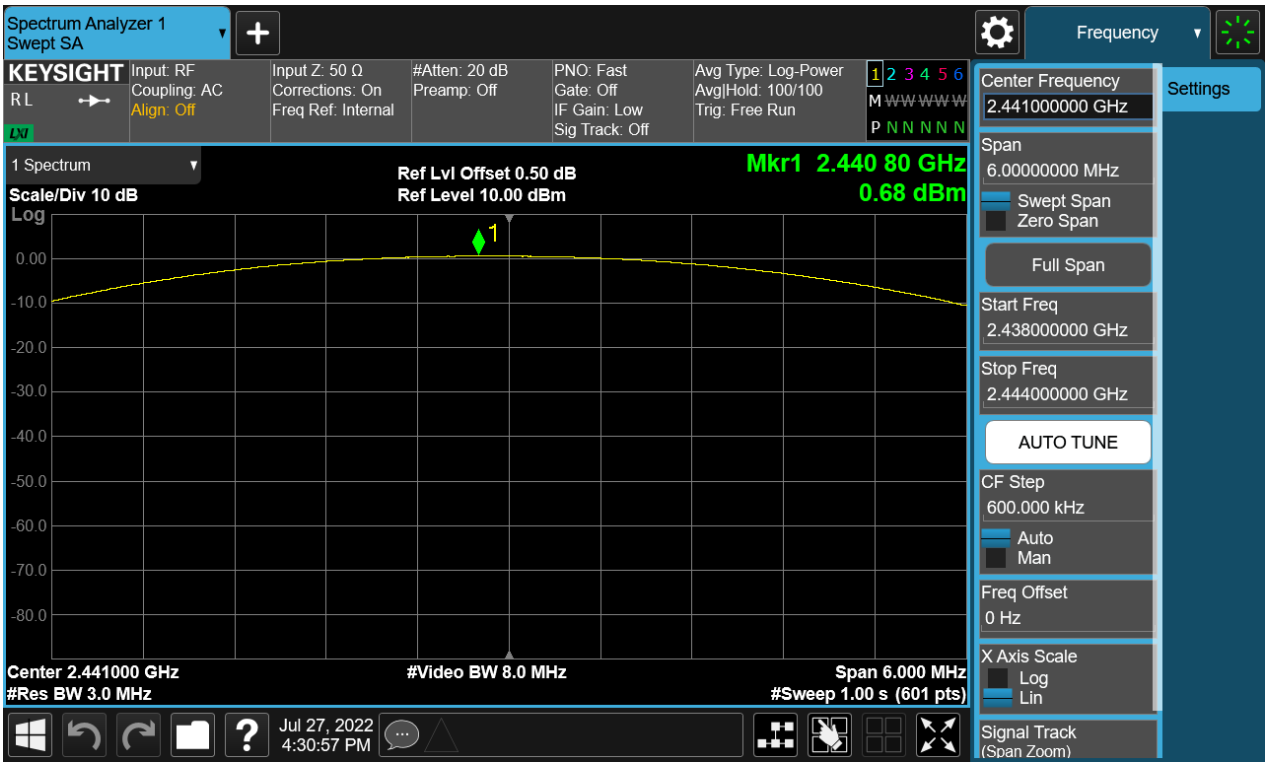


Figure 3: Maximum Peak Output Power, 2480MHz, GFSK

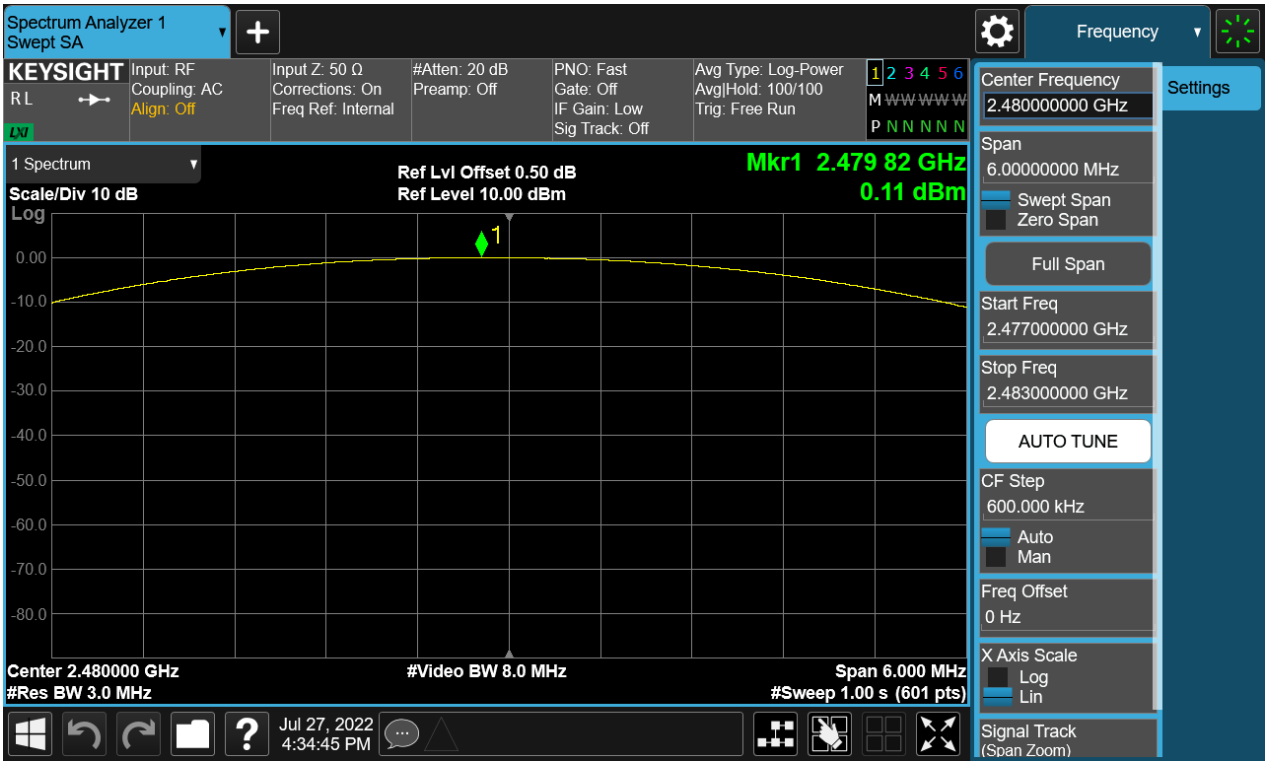


Figure 4: Maximum Peak Output Power, 2402MHz, π/4-DQPSK

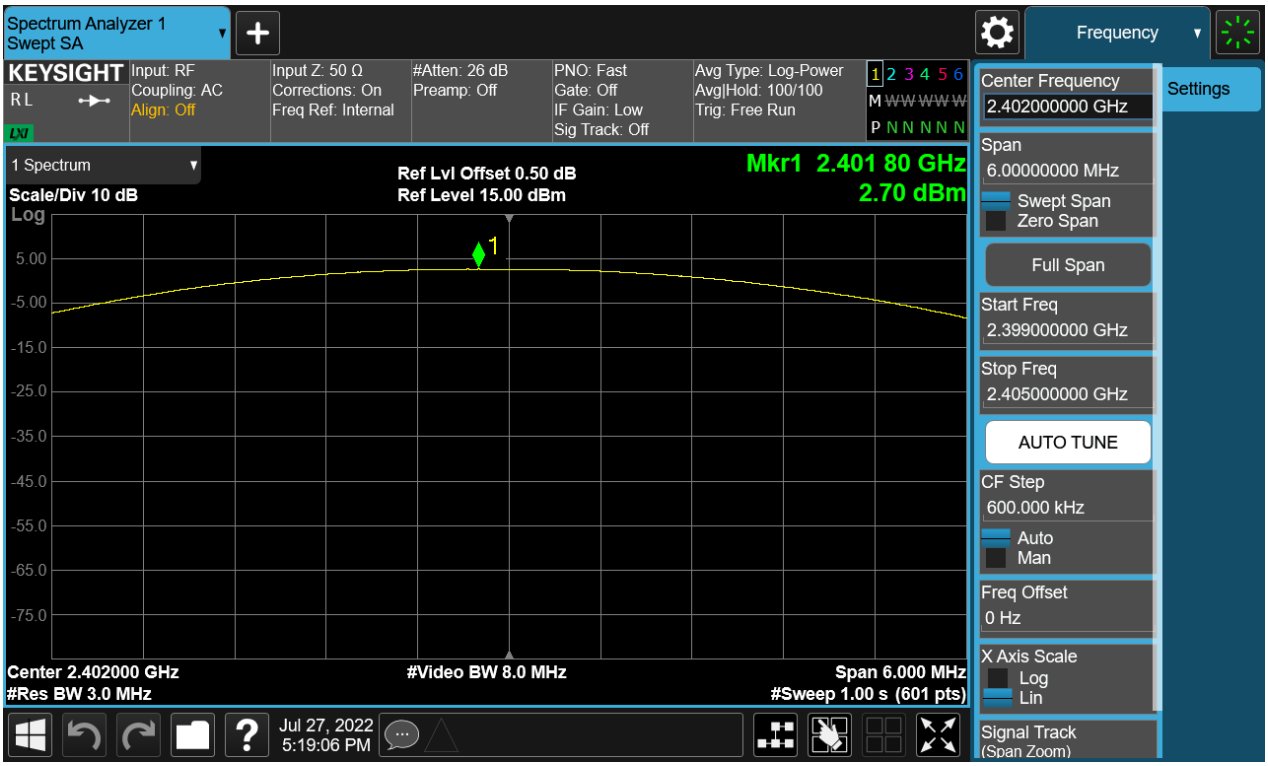


Figure 5: Maximum Peak Output Power, 2441MHz, π/4-DQPSK

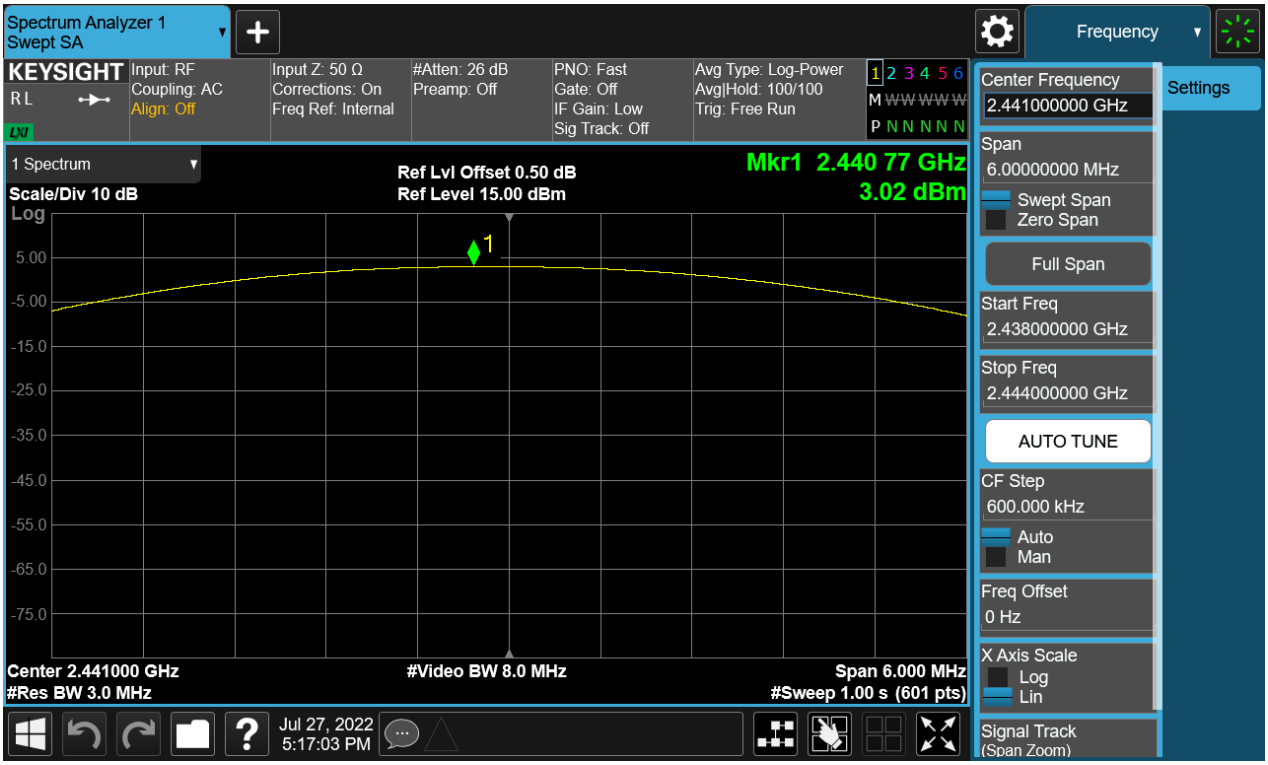


Figure 6: Maximum Peak Output Power, 2480MHz, π/4-DQPSK

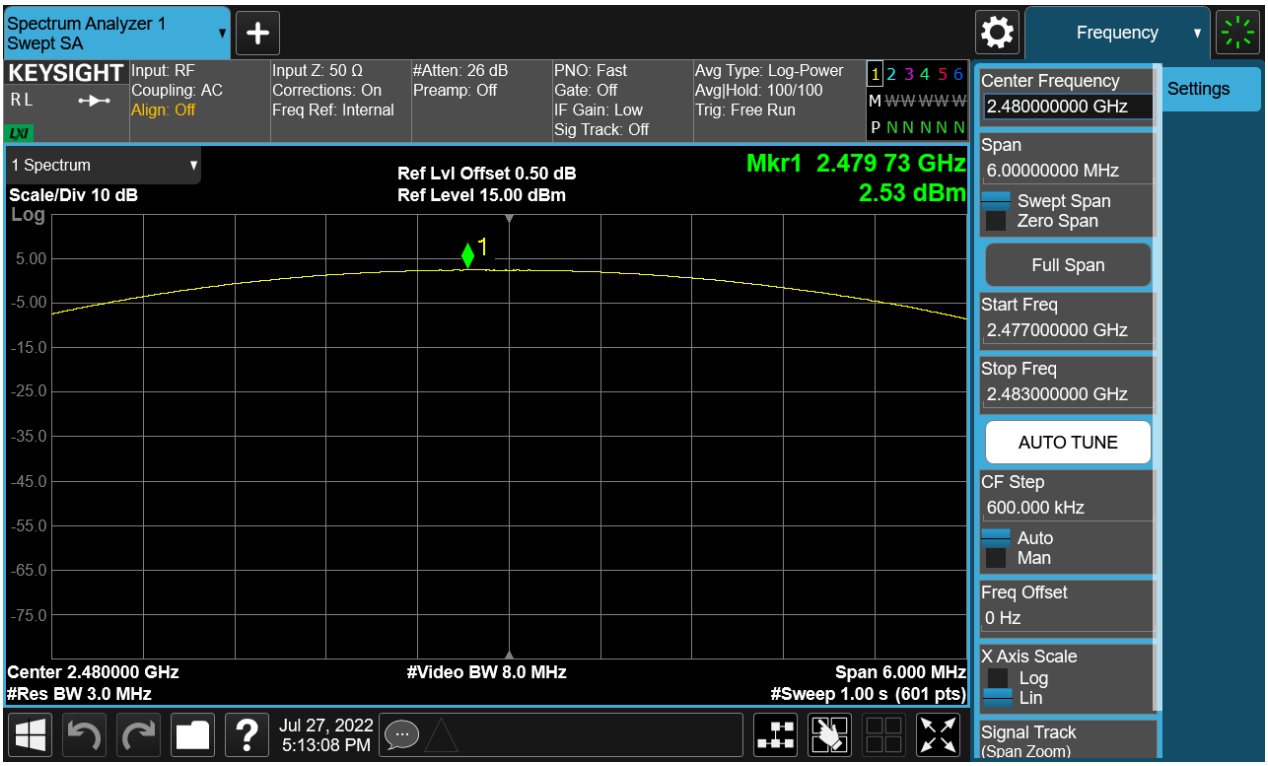


Figure 7: Maximum Peak Output Power, 2402MHz, 8-DPSK

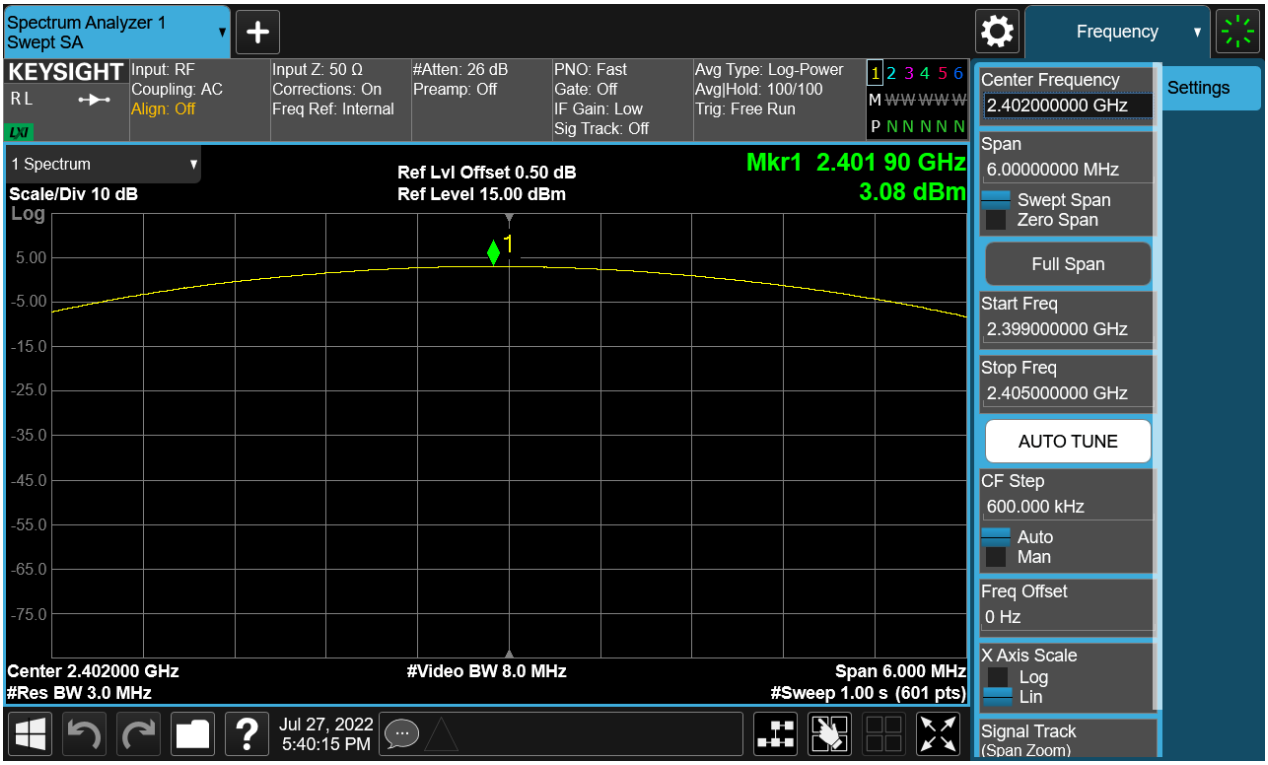


Figure 8: Maximum Peak Output Power, 2441MHz, 8-DPSK

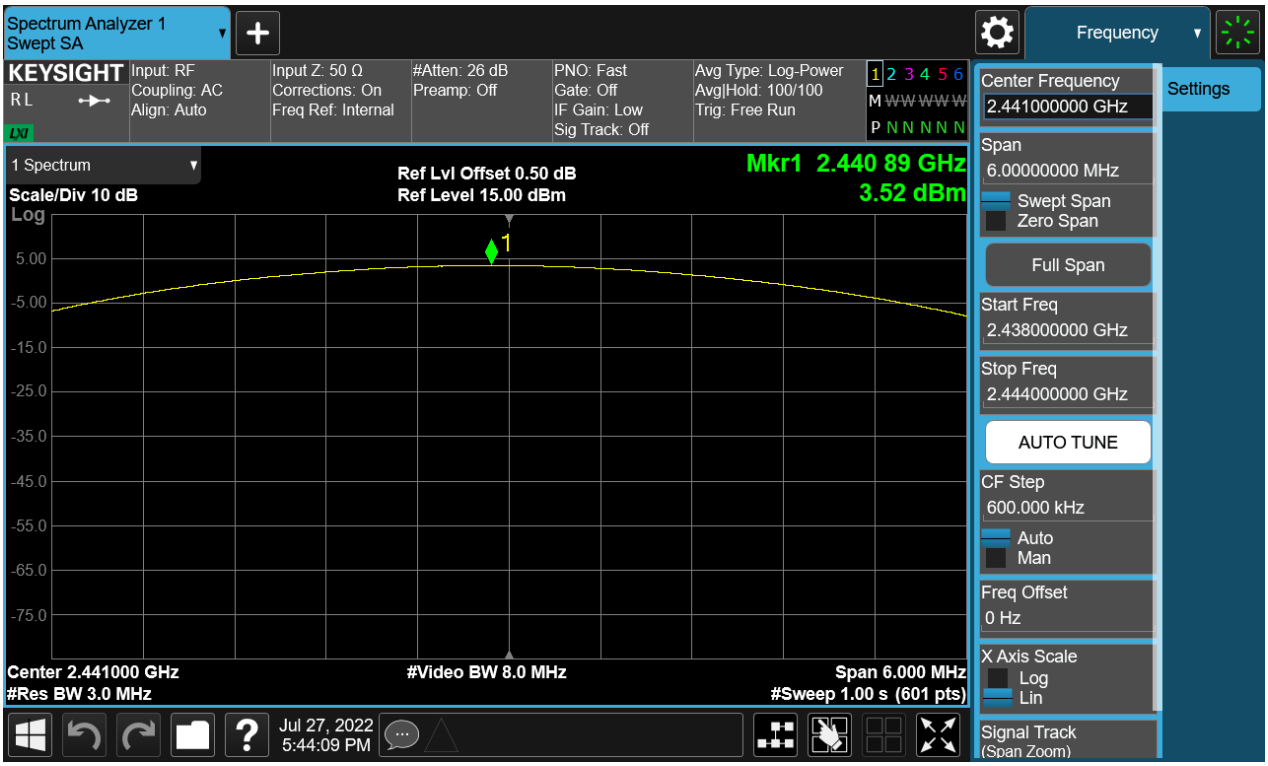
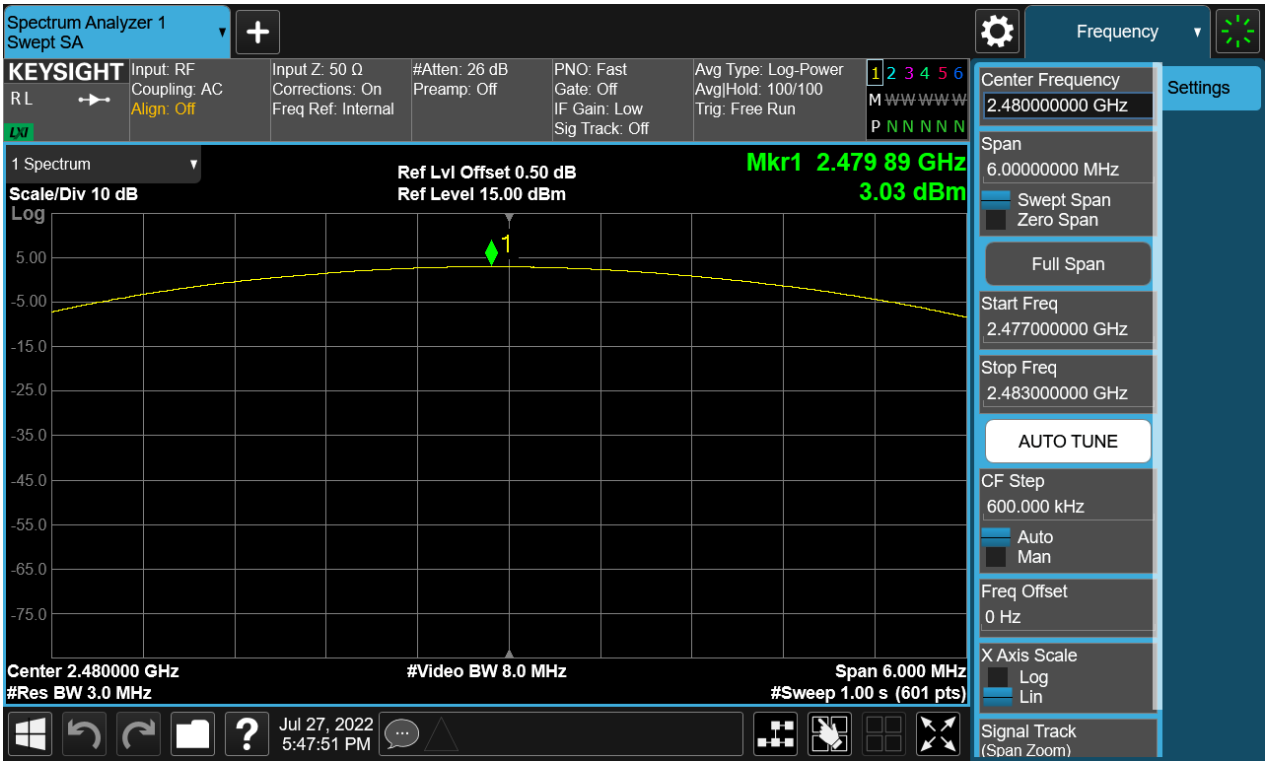


Figure 9: Maximum Peak Output Power, 2480MHz, 8-DPSK



4.1.3 20dB Bandwidth

RESULT: **PASS**

Test standard : FCC Part 15.247(a)(1)

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 2: 20dB Bandwidth

Test Mode	Test Channel (MHz)	20dB Bandwidth (MHz)
GFSK	2402	0.9421
	2441	0.9347
	2480	0.9374
π/4-DQPSK	2402	1.3140
	2441	1.3210
	2480	1.3250
8-DPSK	2402	1.2990
	2441	1.3040
	2480	1.3060

Figure 10: 20dB Bandwidth, 2402MHz, GFSK

Figure 11: 20dB Bandwidth, 2441MHz, GFSK

Figure 12: 20dB Bandwidth, 2480MHz, GFSK

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

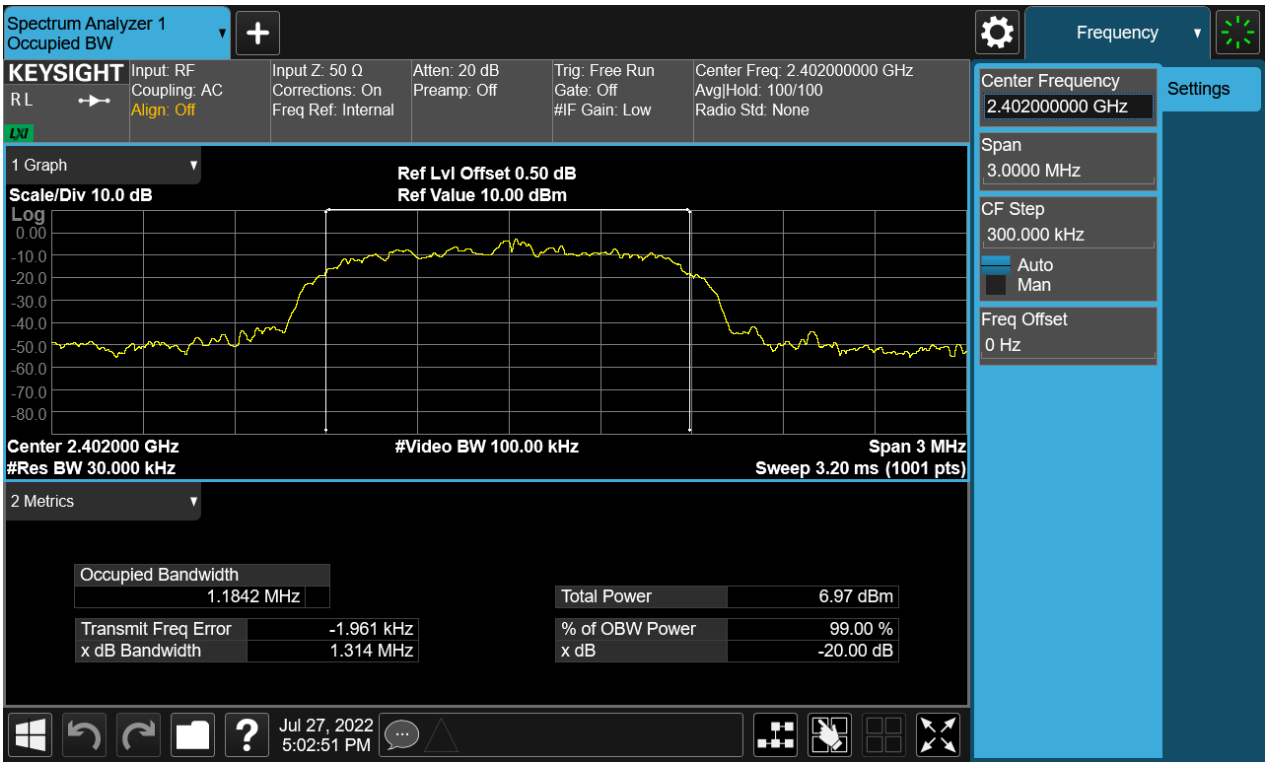


Figure 14: 20dB Bandwidth, 2441MHz, π/4-DQPSK

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

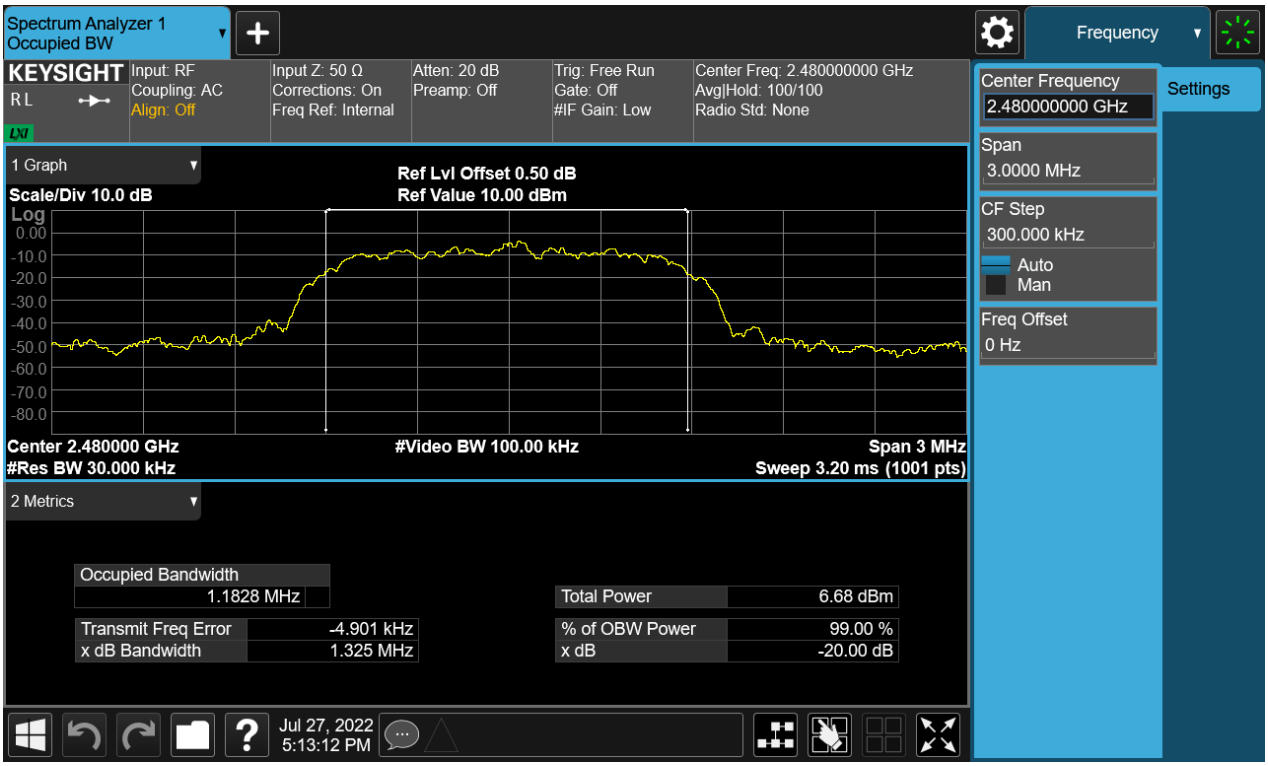


Figure 16: 20dB Bandwidth, 2402MHz, 8-DPSK

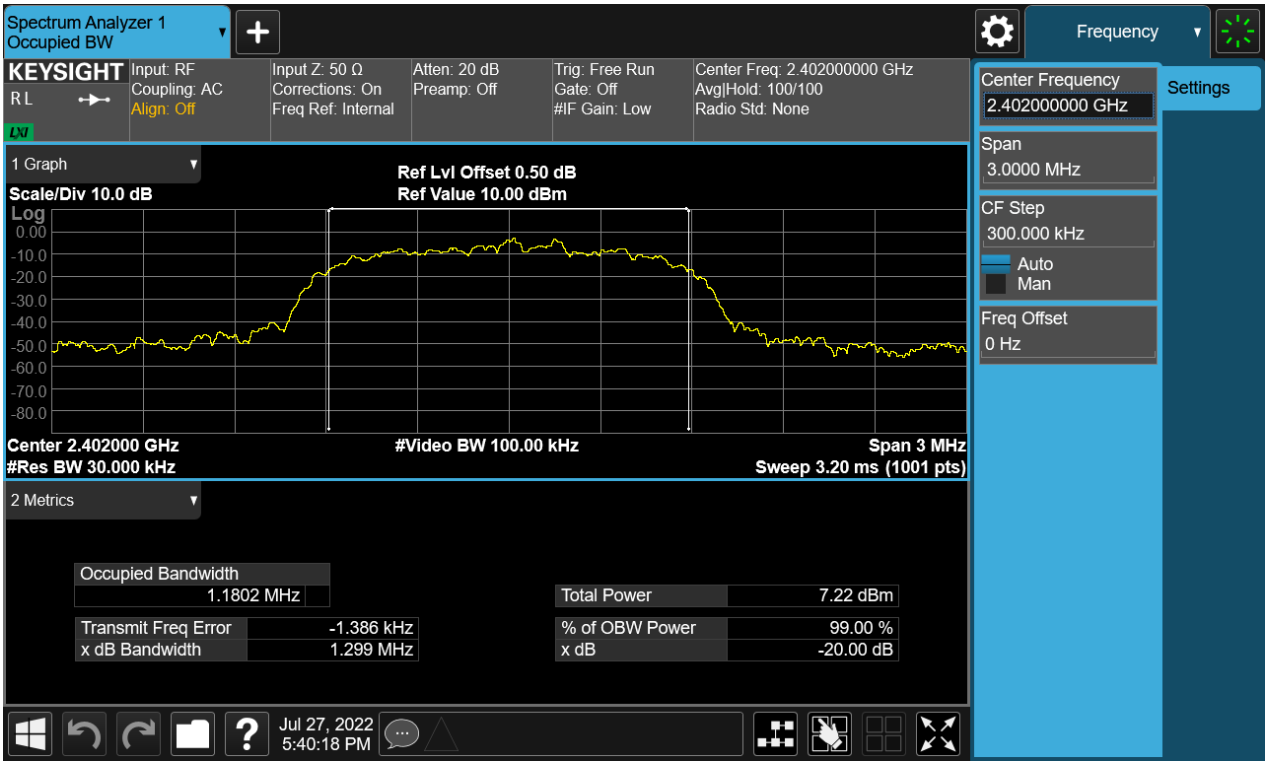


Figure 17: 20dB Bandwidth, 2441MHz, 8-DPSK

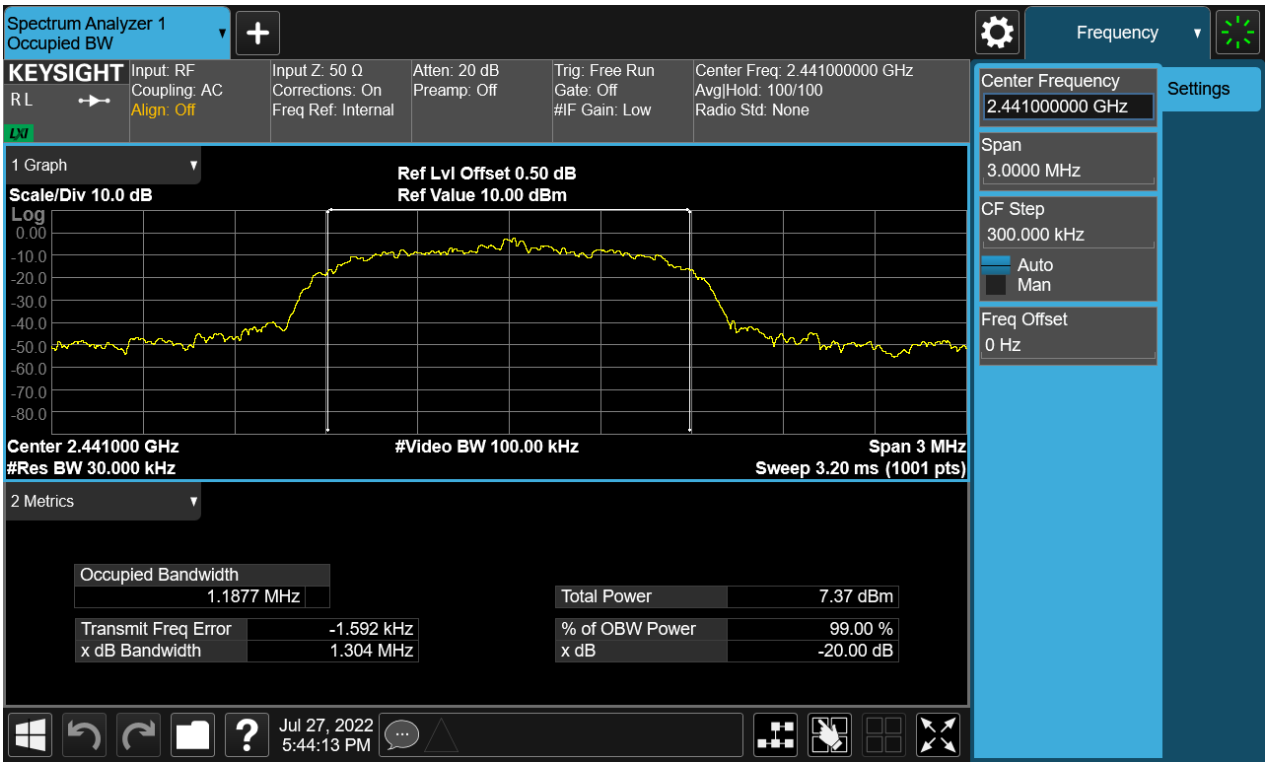


Figure 18: 20dB Bandwidth, 2480MHz, 8-DPSK

4.1.4 Conducted Spurious Emission & Authorized-band band-edge

RESULT: **PASS**

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

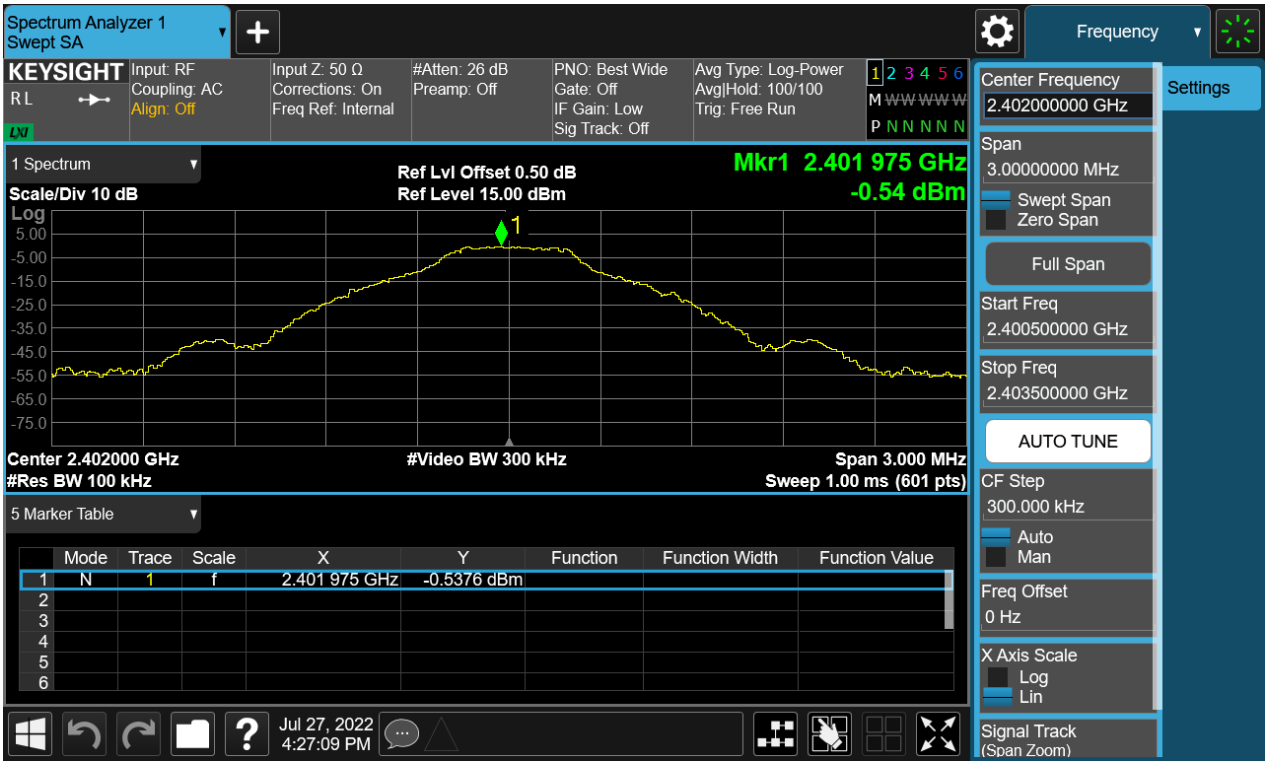
Test setup

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%

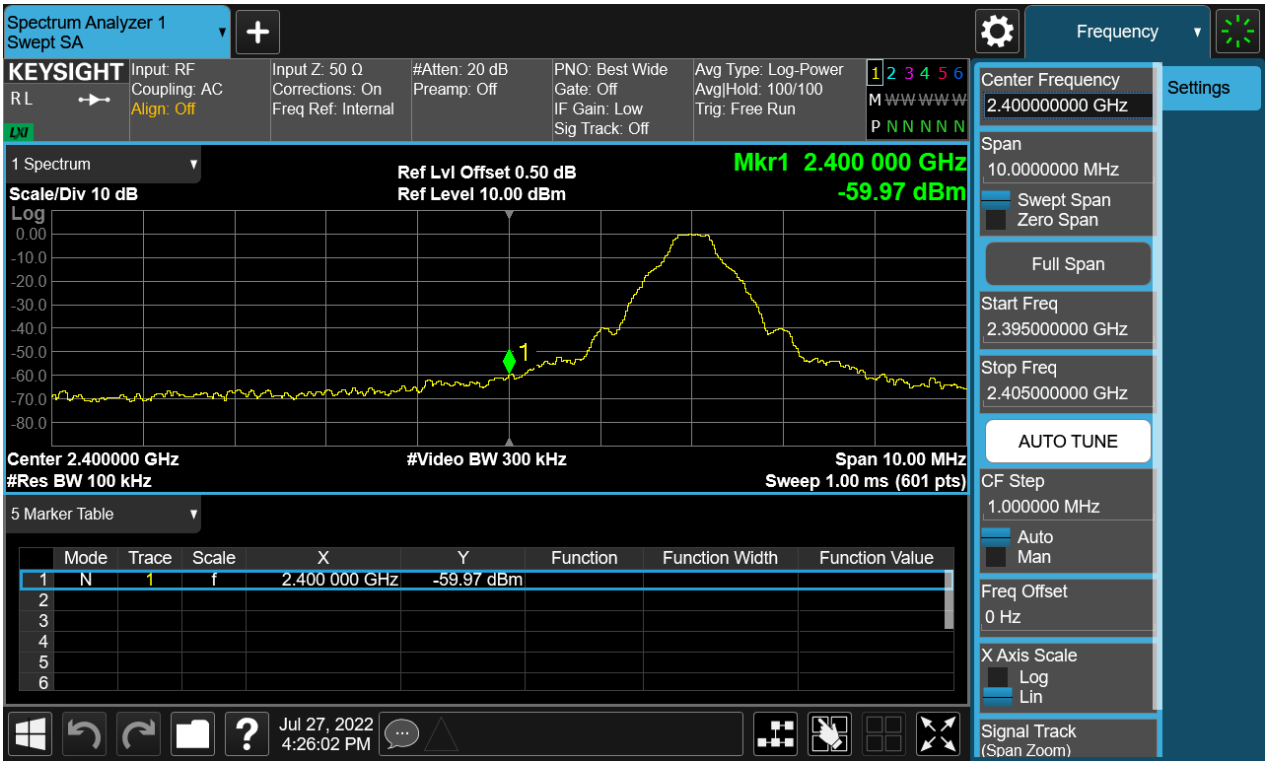
For details refer to following test plot.

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

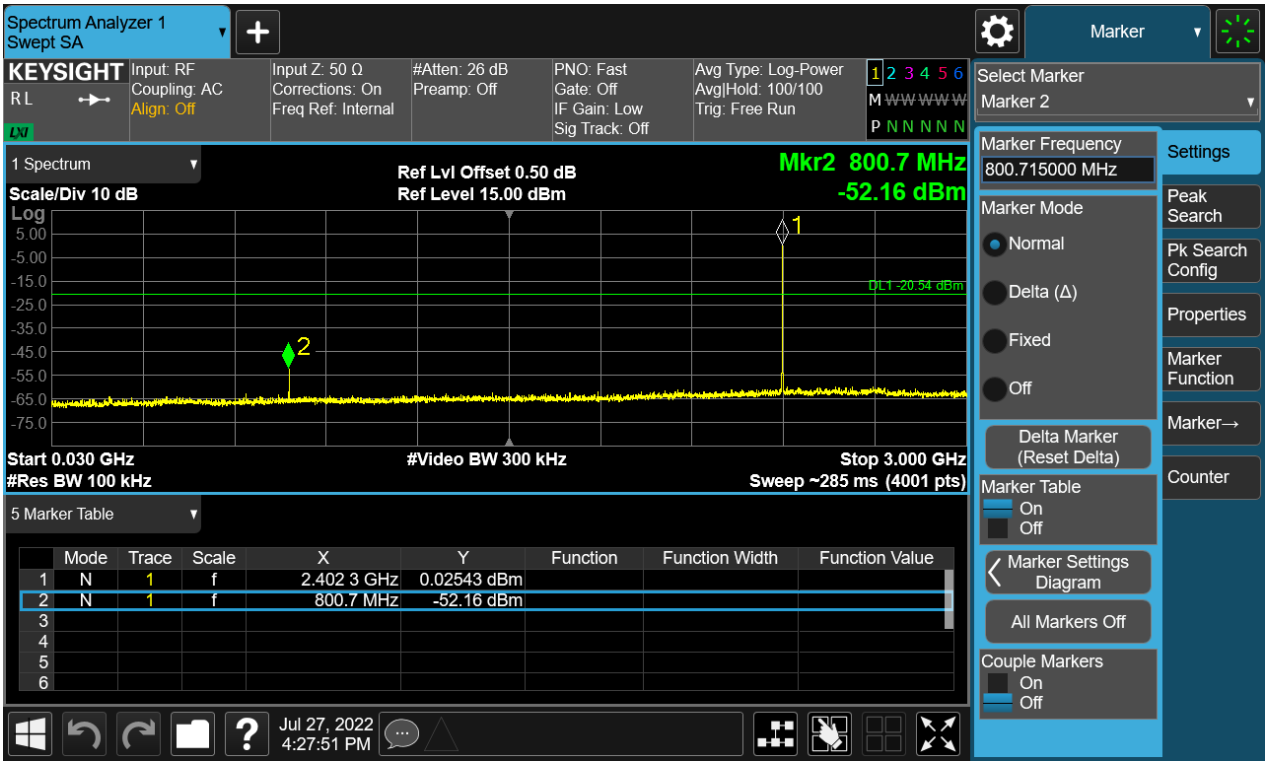
Carrier Level



Band Edge



Conducted spurious emissions 30MHz-25GHz



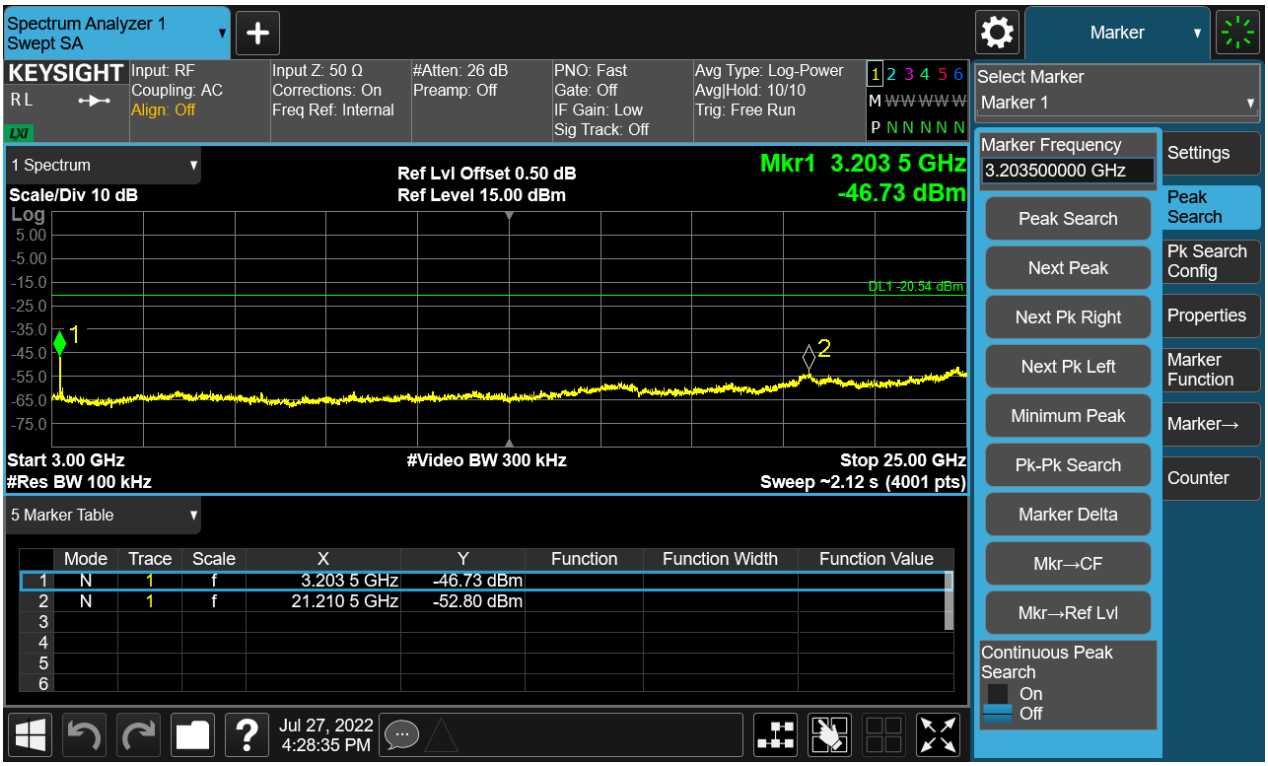
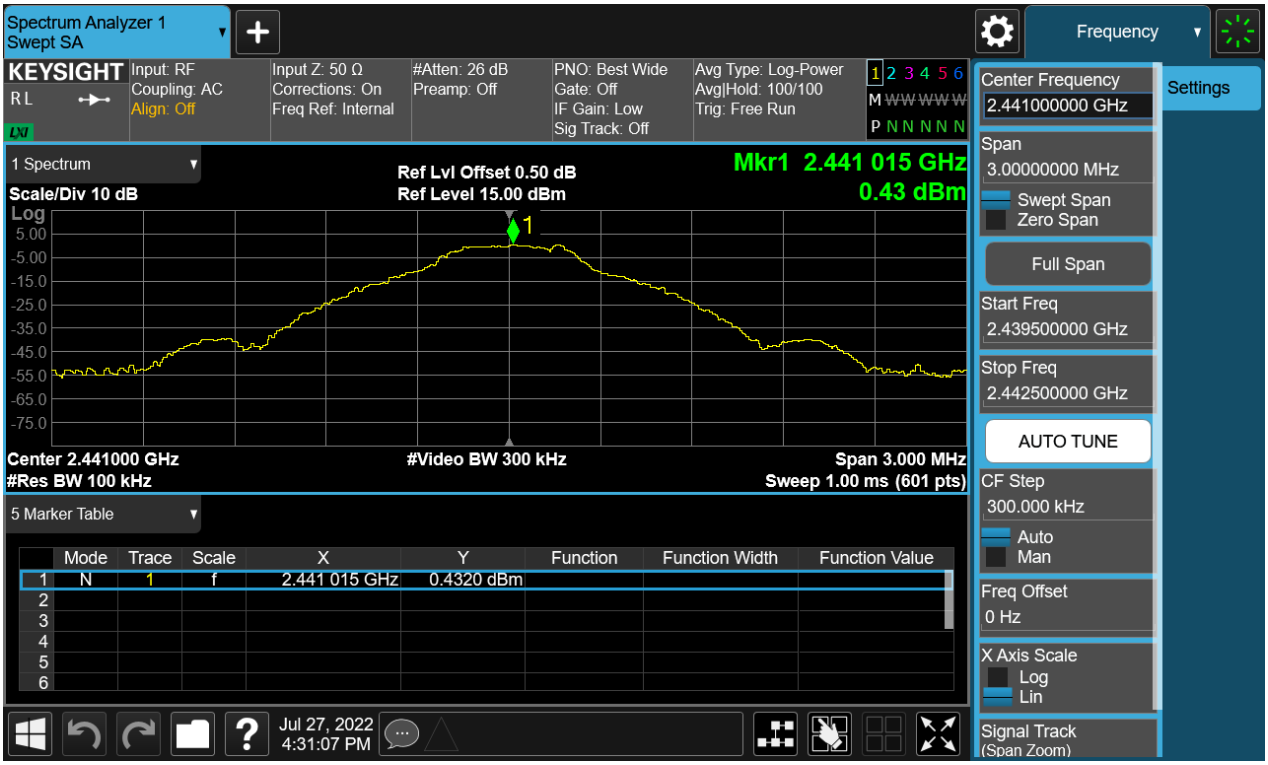
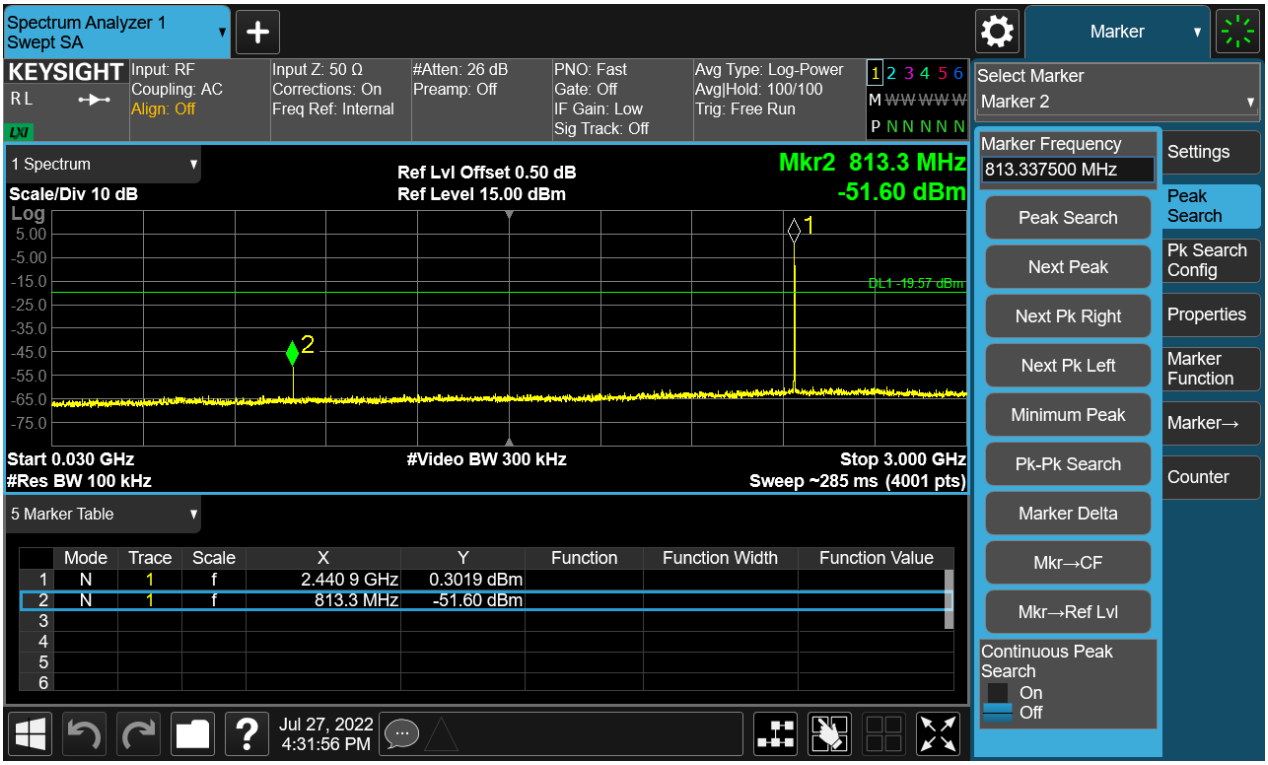


Figure 20: Conducted Spurious Emission & Authorized-band band-edge, 2441MHz, GFSK Carrier Level



Conducted spurious emissions 30MHz-25GHz



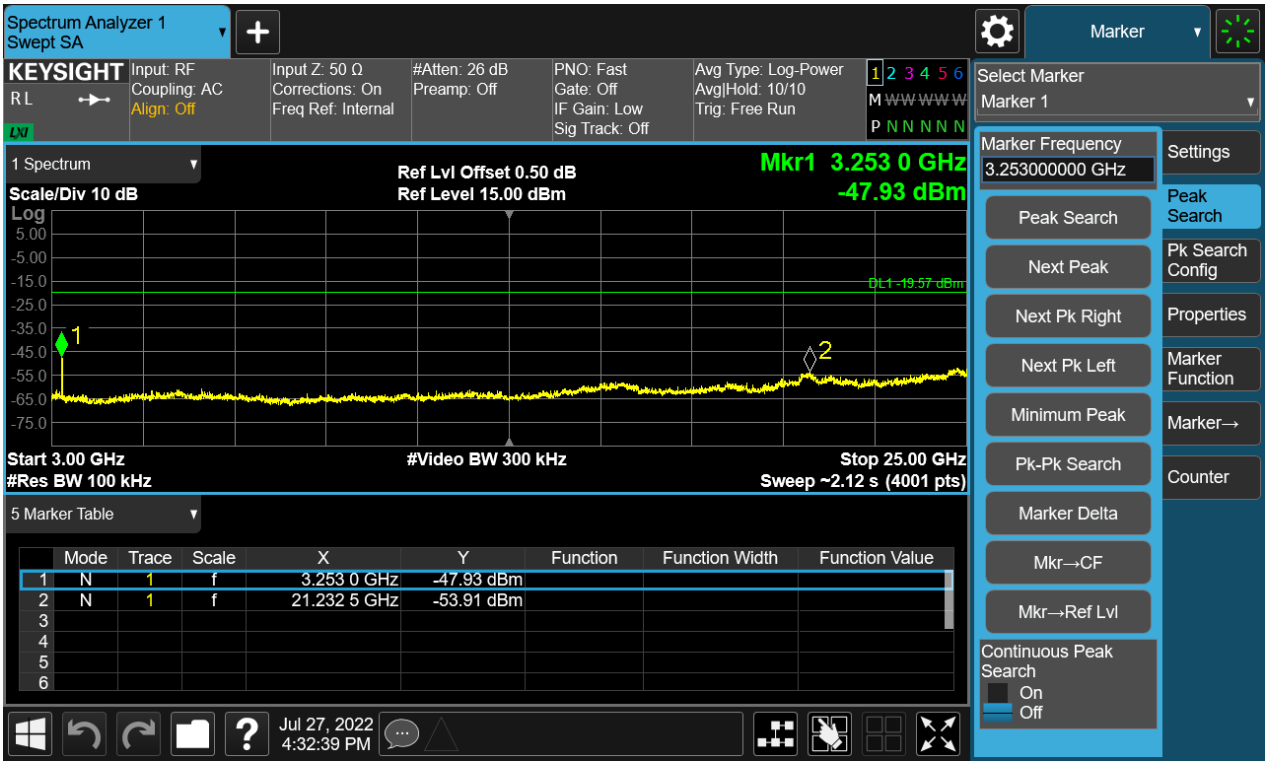
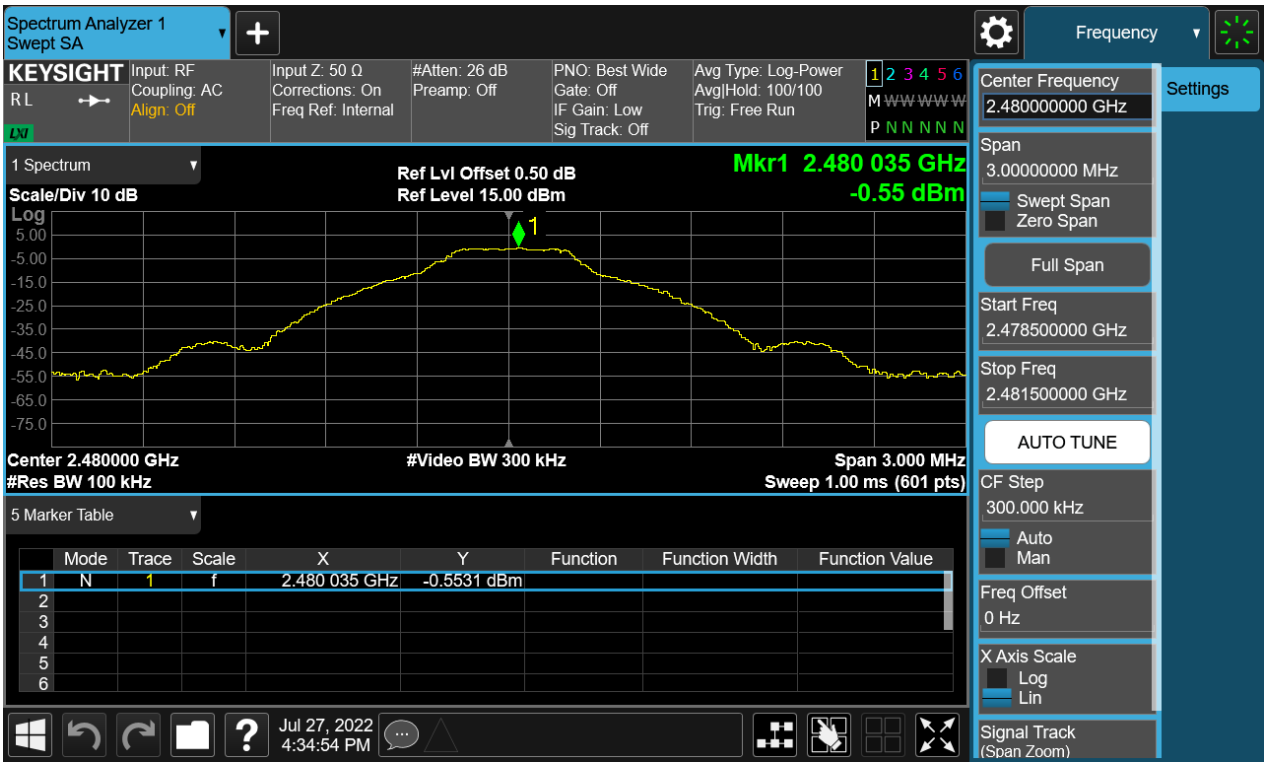
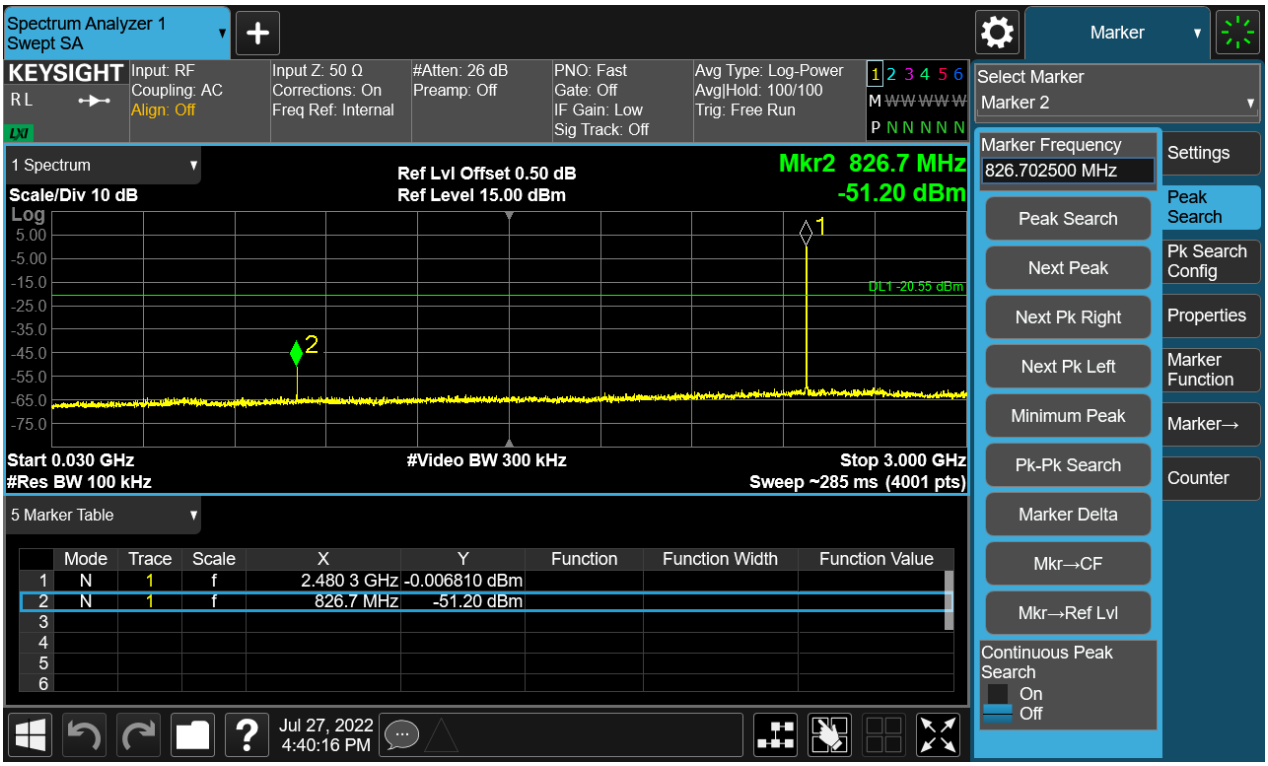


Figure 21: Conducted Spurious Emission & Authorized-band band-edge, 2480MHz, GFSK Carrier Level



Band Edge

Conducted spurious emissions 30MHz-25GHz



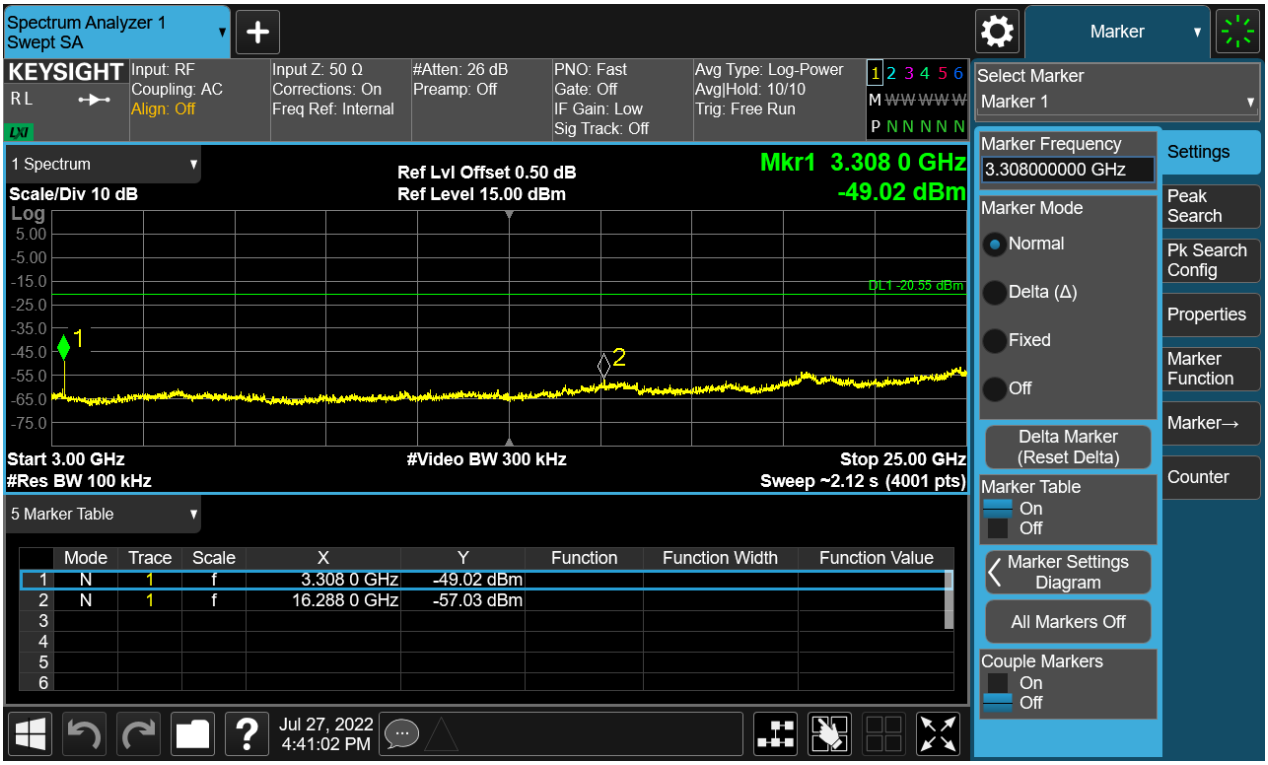
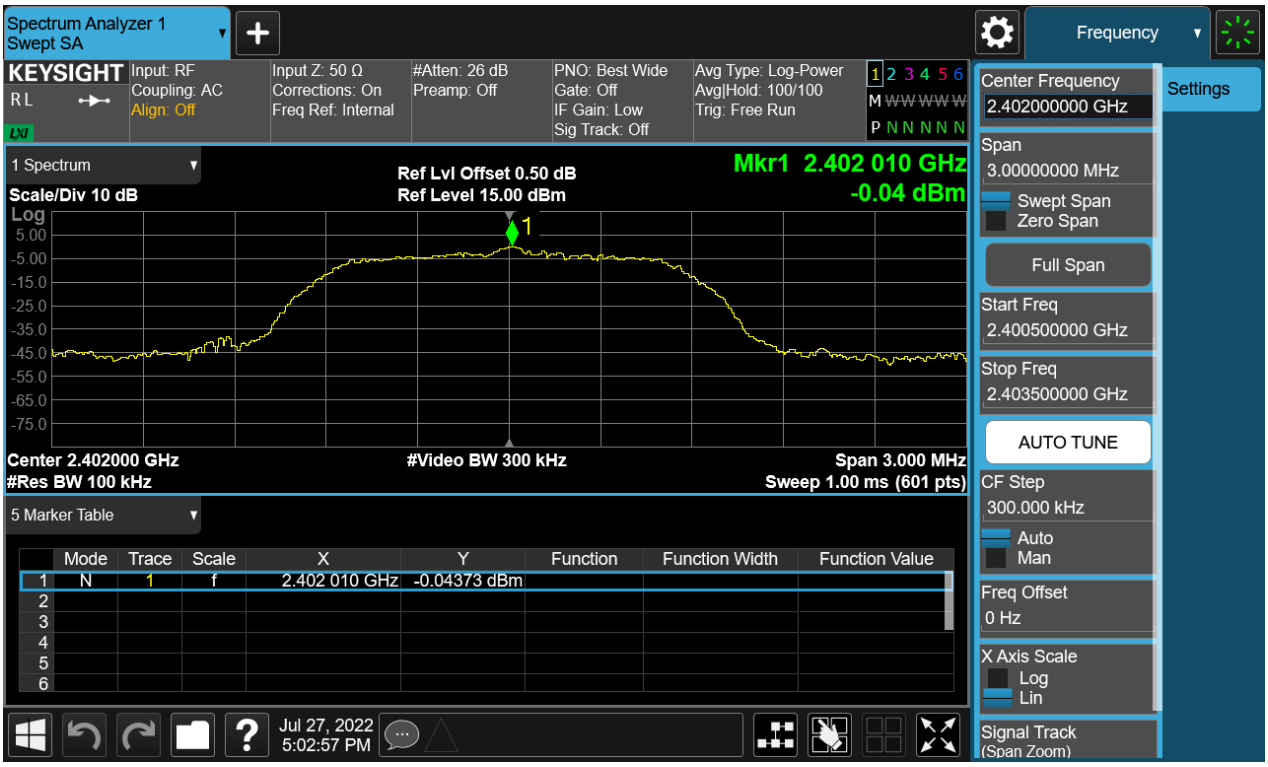
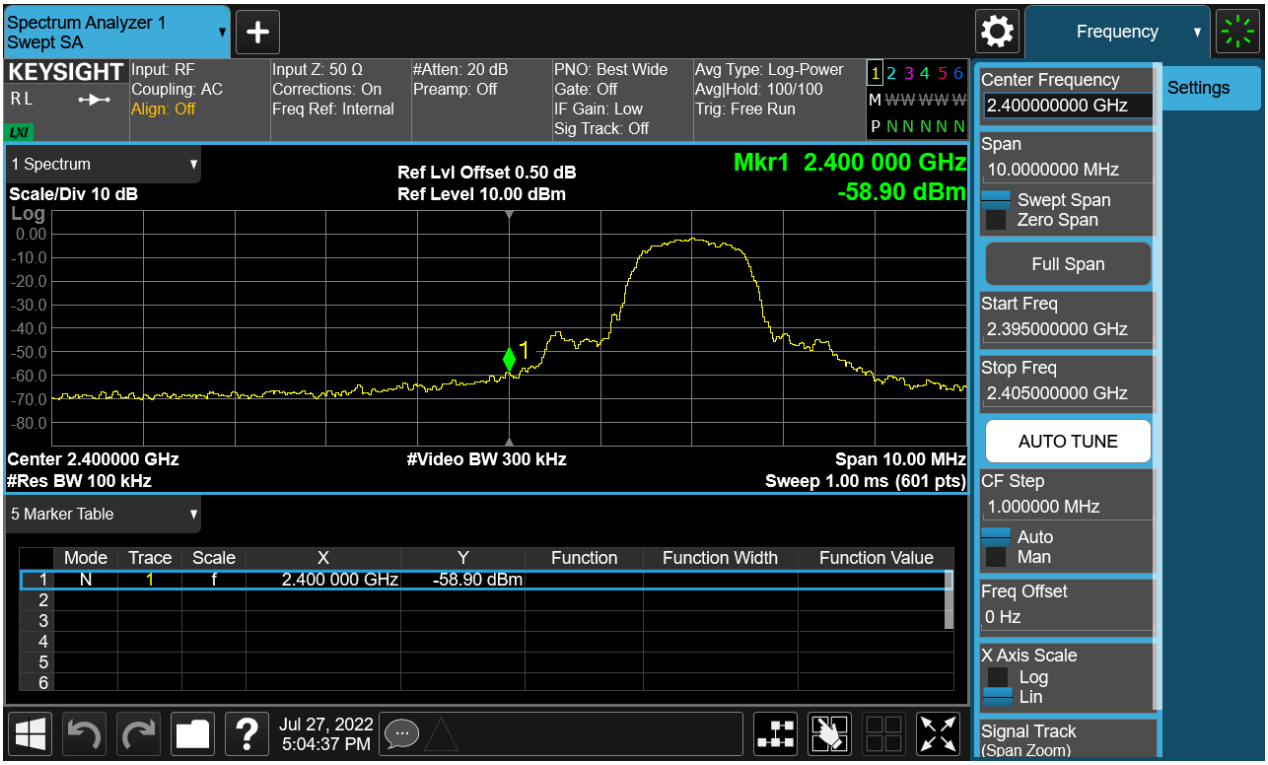


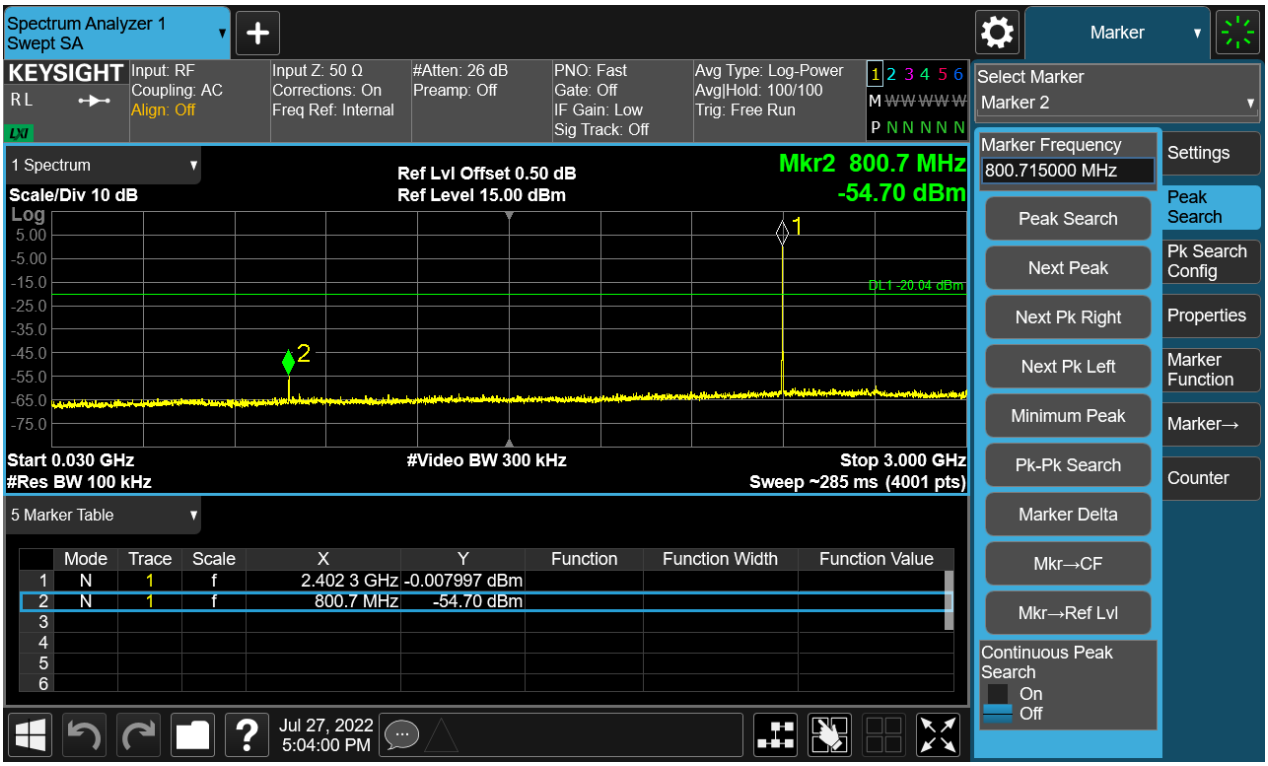
Figure 22: Conducted Spurious Emission & Authorized-band band-edge, 2402MHz, π/4-DQPSK Carrier Level



Band Edge



Conducted spurious emissions 30MHz-25GHz



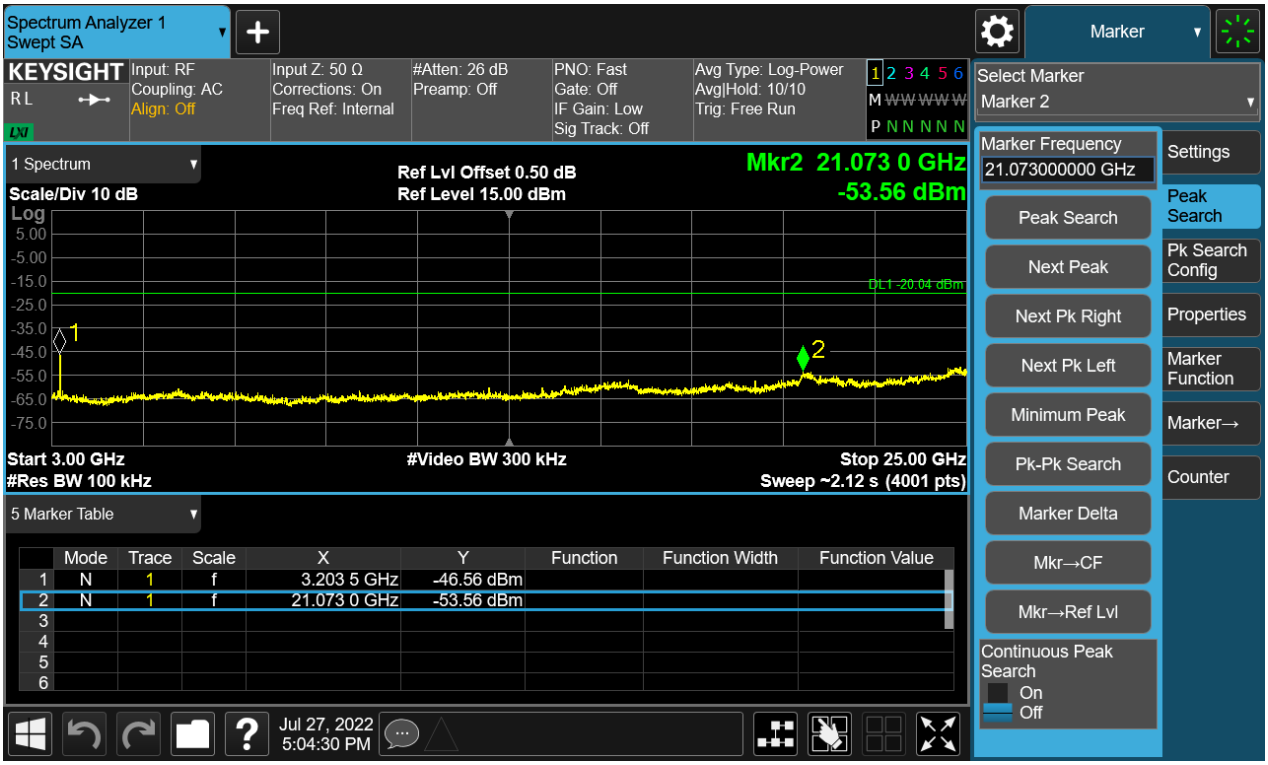
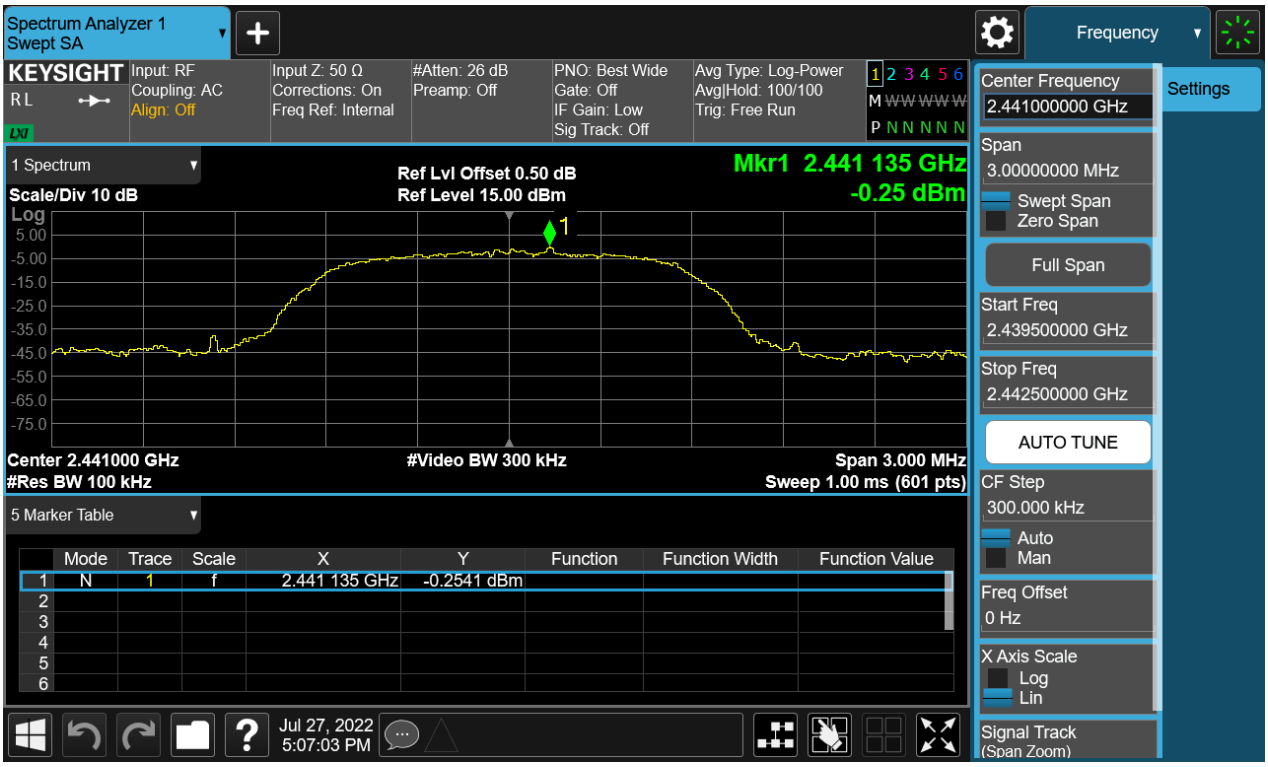
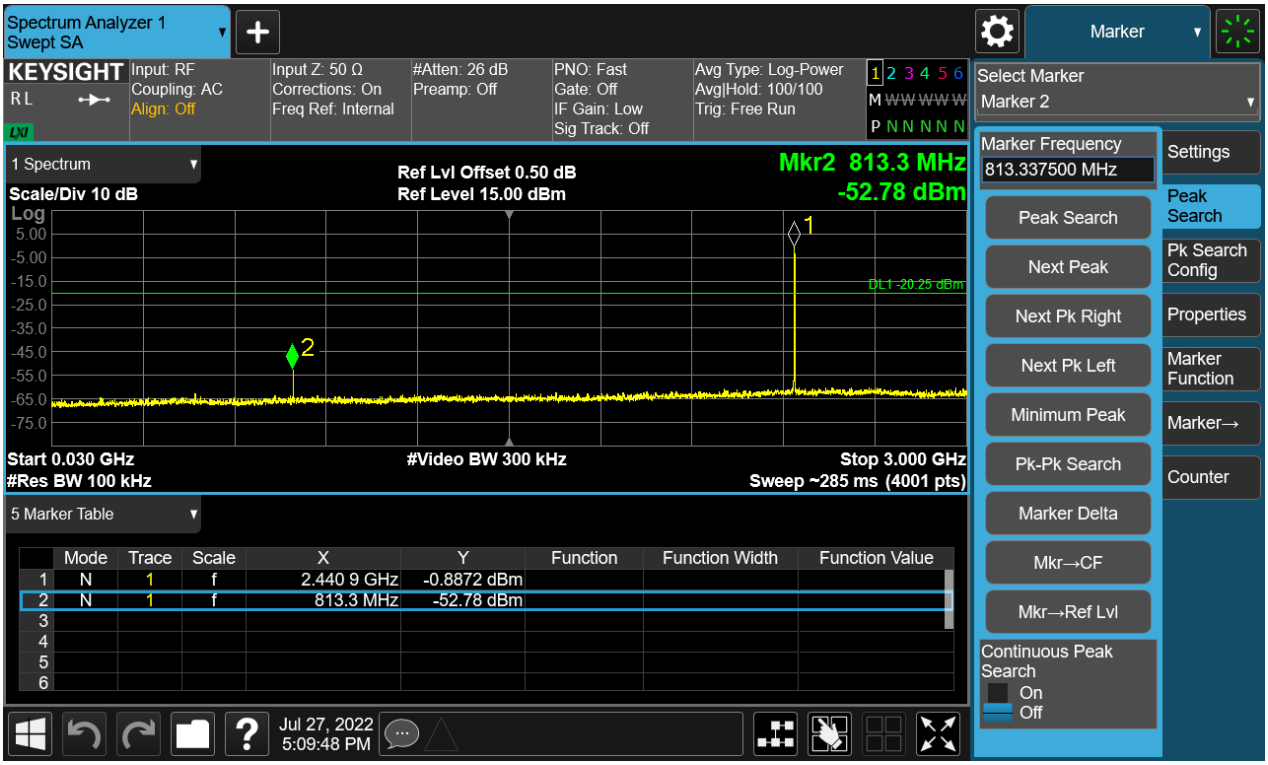


Figure 23: Conducted Spurious Emission & Authorized-band band-edge, 2441MHz, π/4-DQPSK Carrier Level



Conducted spurious emissions 30MHz-25GHz



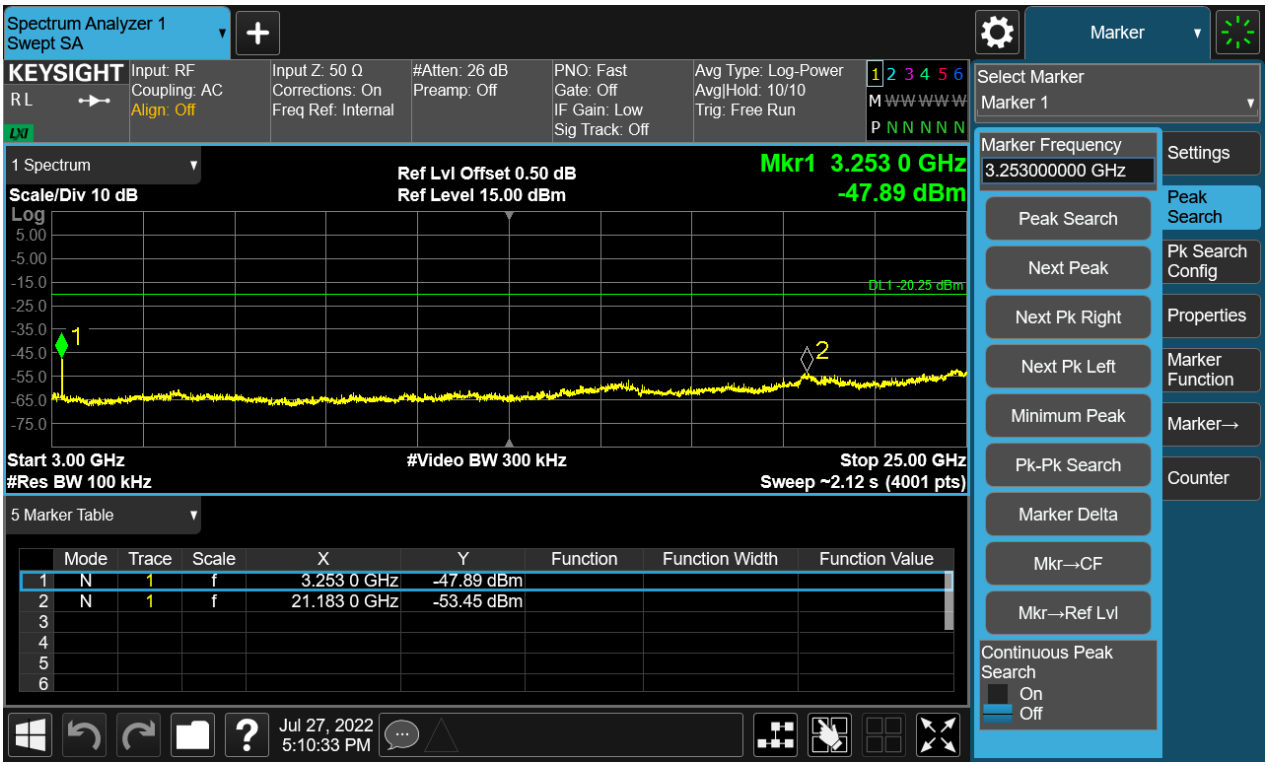
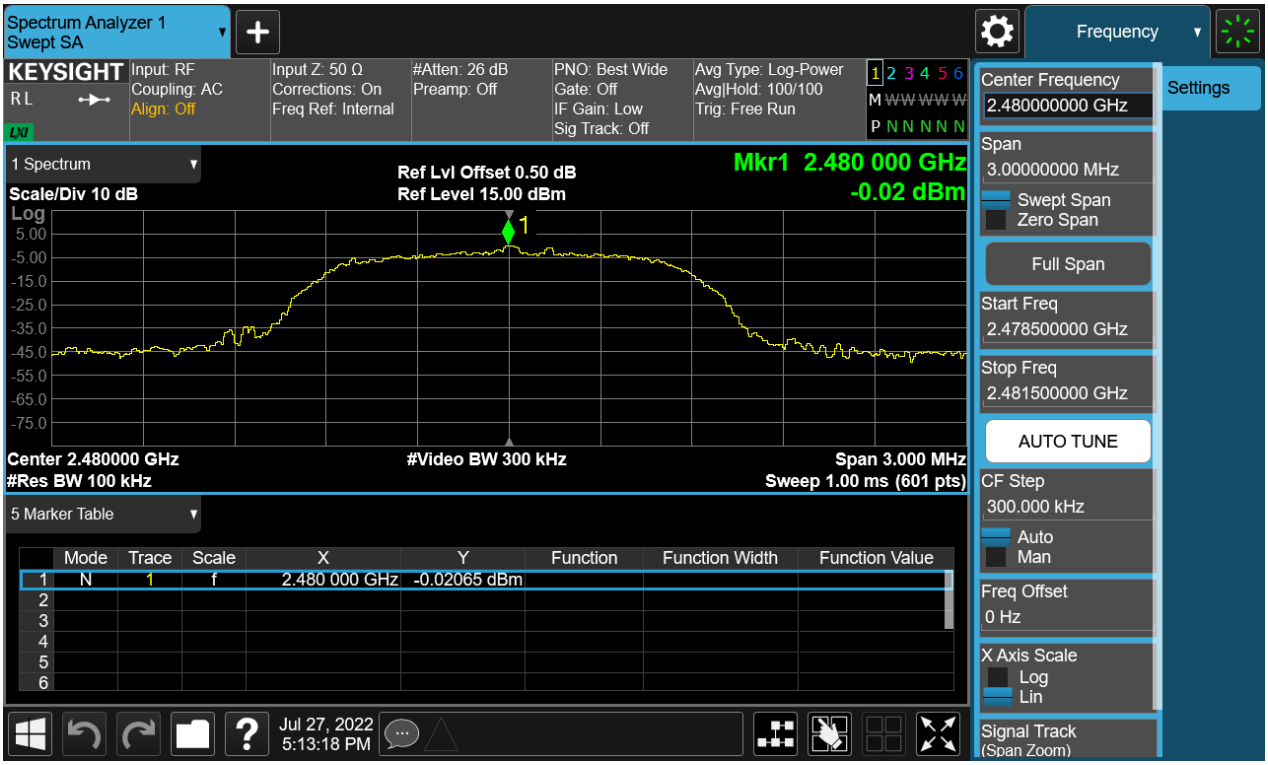


Figure 24: Conducted Spurious Emission & Authorized-band band-edge, 2480MHz, π/4-DQPSK Carrier Level



Band Edge

Conducted spurious emissions 30MHz-25GHz