

TEST REPORT

Report No.: SHE23060106-02CE

Date: 2023-12-08

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Applicant : SIMCom Wireless Solutions Limited
Address of Applicant : SIMCom Headquarters Building, Building 3, No.289
Linhong Road, Changning District, Shanghai, China

Product Name : LTE Wireless Data Module
Brand Name : SIMCom
Model Name : SIM8918NA
Sample Acquisition Method : Sent by Client
Sample No. : E23060106-02#03

FCC ID : 2AJYU-8XRA002
ISED Number : 23761-8XRA002

Standards : FCC CFR47 Part 15, Subpart C
RSS-Gen (Issue 5, Amd.2-Feb 2021)
RSS-247 (Issue 3, August 2023)

Date of Receipt : 2023-09-06
Date of Test : 2023-09-06~ 2023-12-07
Date of Issue : 2023-12-08

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)

Reviewed by:



(Jennifer Zhou)

Approved by:



(Authorized signatory: Echo Mu)

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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	SIMCom Wireless Solutions Limited
Address	SIMCom Headquarters Building, Building 3, No.289 Linhong Road, Changning District, Shanghai,China
Contact Person	Yongsheng Li
Telephone	+86 21 3252 3134
Email	yongsheng.li@simcom.com
Manufacturer Company Name	SIMCom Wireless Solutions Limited
Address	SIMCom Headquarters Building, Building 3, No.289 Linhong Road, Changning District, Shanghai,China
Factory Company Name	SIMCom Wireless Solutions Limited
Address	SIMCom Headquarters Building, Building 3, No.289 Linhong Road, Changning District, Shanghai,China

1.3 Details of EUT

Product Name	LTE Wireless Data Module
Brand Name	SIMCom
Test Model Name	SIM8918NA
FCC ID	2AJYU-8XRA001
ISED Number	23761-8XRA002
Mode of Operation	Bluetooth BR/EDR Version 4.2
Frequency Range	2400MHz ~ 2483.5MHz
Number of Channels	79 (at intervals of 1 MHz)
Modulation Type	GFSK, $\pi/4$ -DQPSK, 8-DPSK
Max RF Output Power	10.51dBm
Antenna Type	External Antenna
Antenna Gain	4.01dBi
Extreme Temperature Range	-35°C ~ +75°C
Test Voltage	DC 3.9V

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Hardware Version	8XR000-SIM8918_V1.03
Software Version	SIM8918B01V01
RF power setting in TEST_SW	QRCT_Power level setting_ GFSK_ setting 9 QRCT_Power level setting_ $\pi/4$ -DQPSK _ setting 8 QRCT_Power level setting_ 8DPSK _ setting 8

Note:

1. The above information was declared by the manufacture.
2. For more details, please refer to the User's manual of the EUT.

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.

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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

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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	N/A	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	2024-06-08
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

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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 $y \pm U$, where expanded 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 %
Maximum Conducted Output Power and E.I.R.P		± 0.64 dB

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3 Test Set-up and Operation Modes

3.1 Details of Test Mode

Using test software (QRCT Version 4.0.00166.0) 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	Lenovo	TP00083A	N/A
SWITCHING POWER SUPPLY	N/A	P-050B-050200EU	N/A
EVB Debug Board 1	N/A	Smart Module-EVB_V1.03	N/A
EVB Debug Board 2	N/A	8918-TE_V1.02	N/A
USB Cable	N/A	N/A	1.00m Unshielded

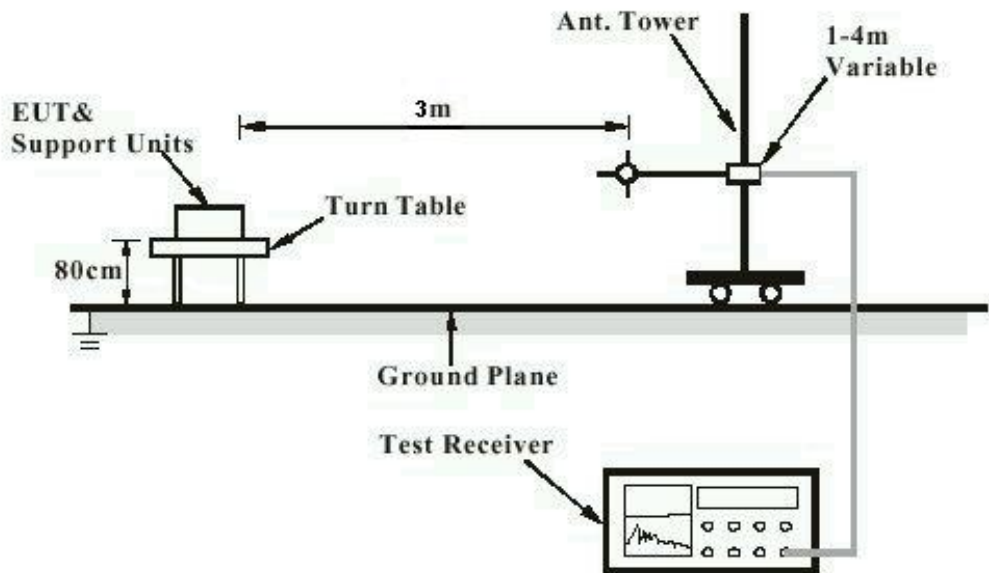
3.3 Support Software

Description	Manufacturer	Software Name
Software	Qualcomm	QRCT Version 4.0.00166.0

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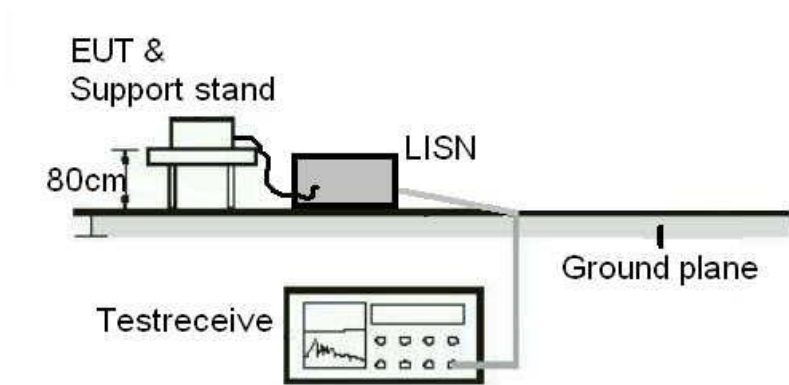
3.4 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test



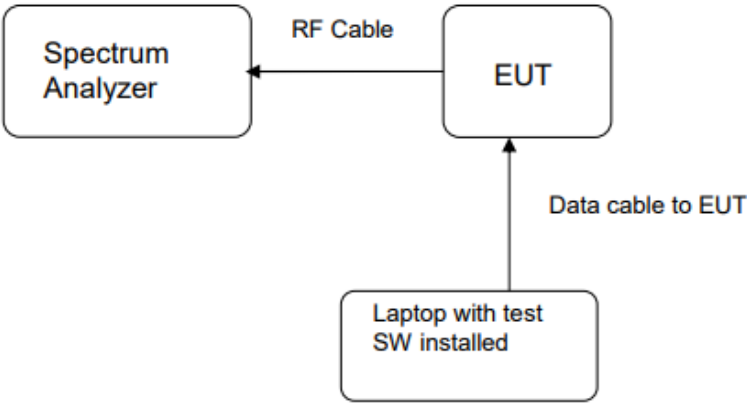
Note: Measurements above 1GHz are done with a table height of 1.5m. In addition, there is RF absorbing material on the floor of the test site for above 1GHz measurement.

Diagram of Measurement Configuration for Conduction Test



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Diagram of Measurement Configuration for Transmitter Test



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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 : 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 4.01dBi. The antenna is an external antenna with no possibility of replacement with a non-approved antenna by the end-user.

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.

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

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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	9.95	9.89	< 1
	2441	10.51	11.25	
	2480	9.96	9.91	
$\pi/4$ -DQPSK	2402	6.35	4.32	< 0.125
	2441	7.17	5.21	
	2480	6.86	4.85	
8-DPSK	2402	6.51	4.48	< 0.125
	2441	7.35	5.43	
	2480	7.70	5.89	

Table 2: E.I.R.P

Test Mode	Test Channel (MHz)	E.I.R.P		Limit (W)
		(dBm)	(mW)	
GFSK	2402	13.96	24.89	< 4
	2441	14.52	28.31	
	2480	13.97	24.95	
$\pi/4$ -DQPSK	2402	10.36	10.86	
	2441	11.18	13.12	
	2480	10.87	12.22	
8-DPSK	2402	10.52	11.27	
	2441	11.36	13.68	
	2480	11.71	14.83	

Note: The antenna gain is 4.01dBi

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



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



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



Figure 4: Maximum Peak Output Power, 2402MHz, $\pi/4$ -DQPSK



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Figure 5: Maximum Peak Output Power, 2441MHz, $\pi/4$ -DQPSK



Figure 6: Maximum Peak Output Power, 2480MHz, $\pi/4$ -DQPSK



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



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



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



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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

: 21.3°C

Relative humidity

: 42%

Table 3: 20dB Bandwidth and 99% Bandwidth

Test Mode	Test Channel (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
GFSK	2402	0.9479	0.8566
	2441	0.9446	0.8641
	2480	0.9378	0.8587
π /4-DQPSK	2402	1.2810	1.1752
	2441	1.2820	1.1783
	2480	1.2810	1.1758
8-DPSK	2402	1.2930	1.1778
	2441	1.2930	1.1825
	2480	1.2920	1.1808

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



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



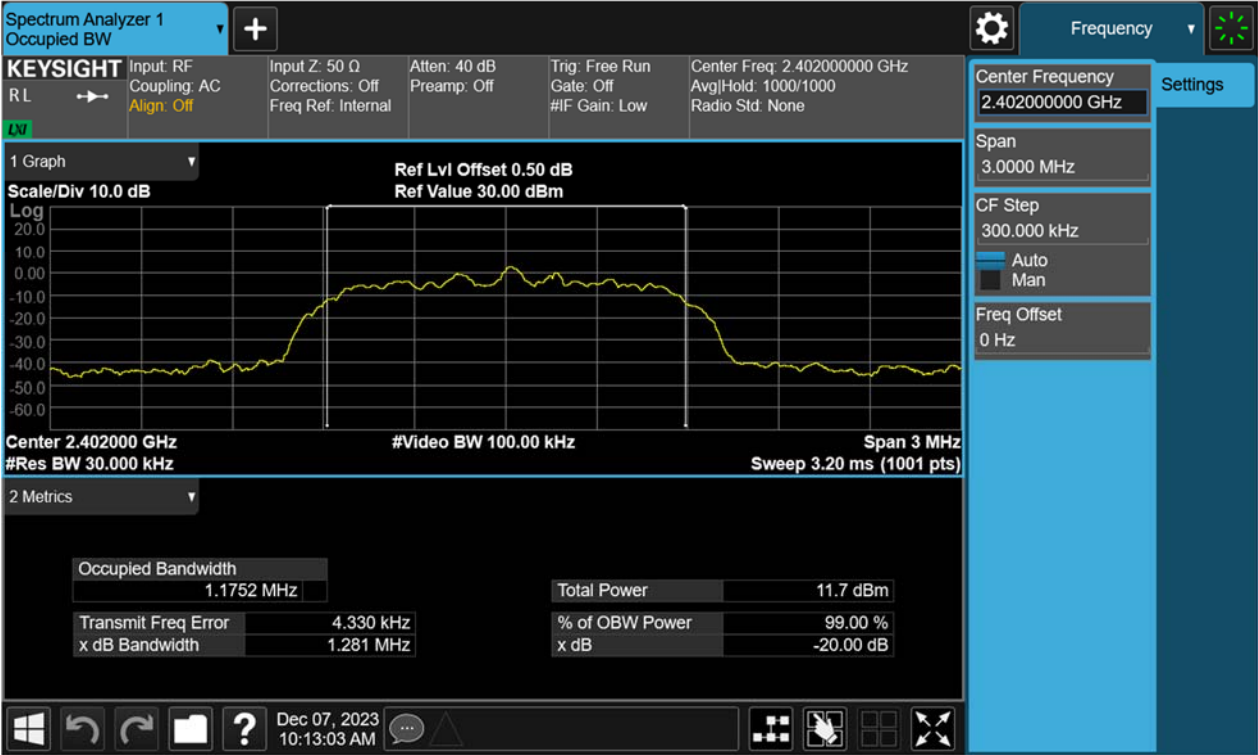
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Figure 12: 20dB Bandwidth and 99% Bandwidth, 2480MHz, GFSK



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



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

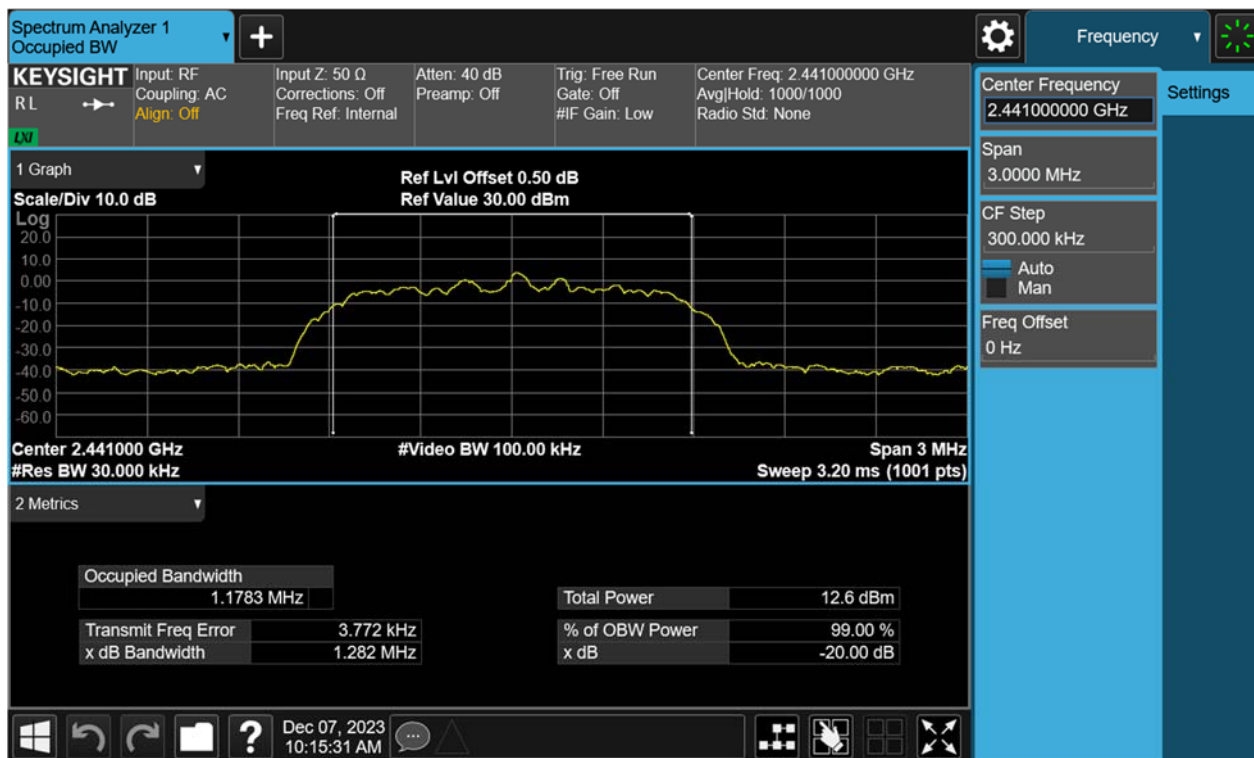


Figure 15: 20dB Bandwidth and 99% Bandwidth, 2480MHz, $\pi/4$ -DQPSK



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

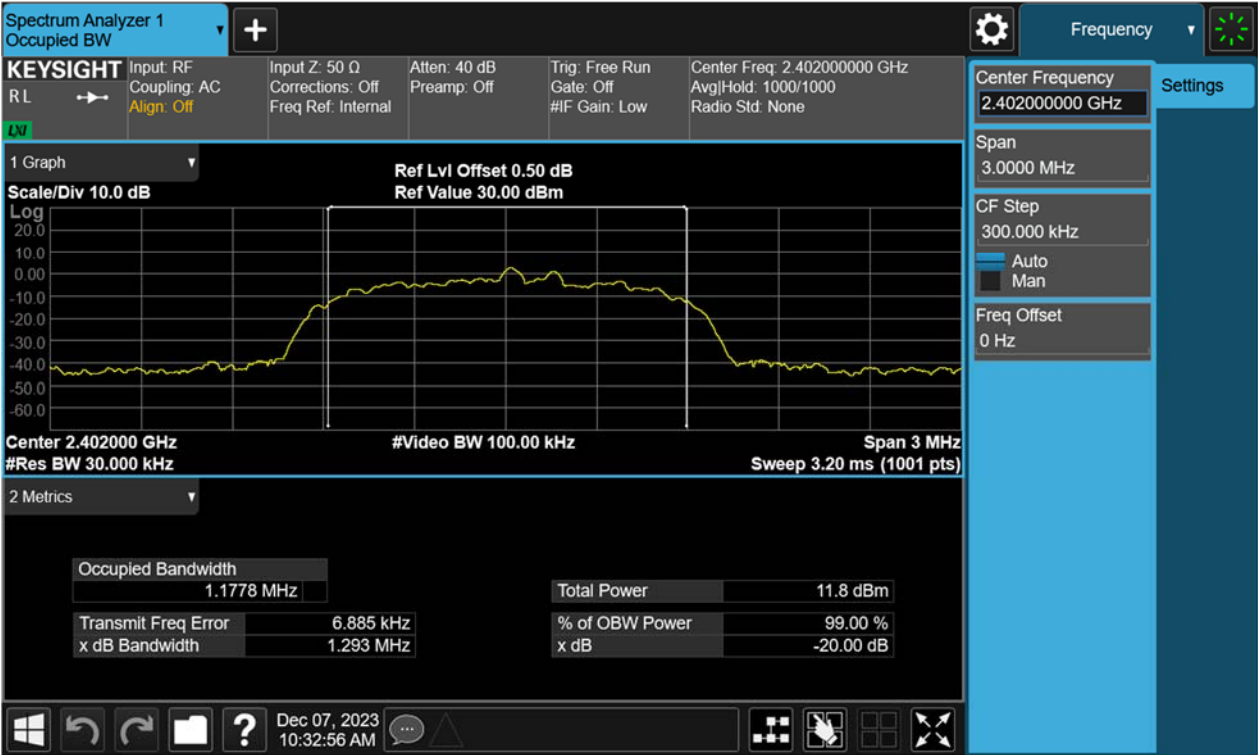
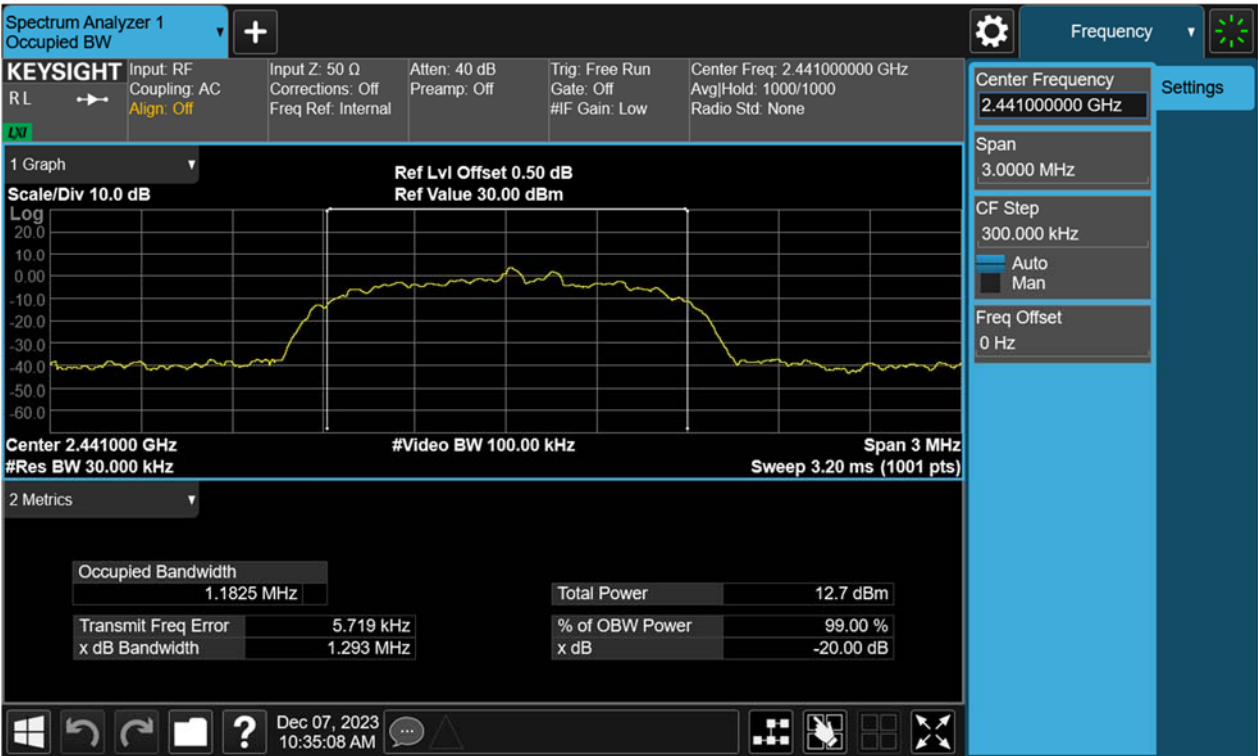


Figure 17: 20dB Bandwidth and 99% Bandwidth, 2441MHz, 8-DPSK



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



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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	: 21.3°C
Relative humidity	: 42%

For details refer to following test plot.

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



Band Edge



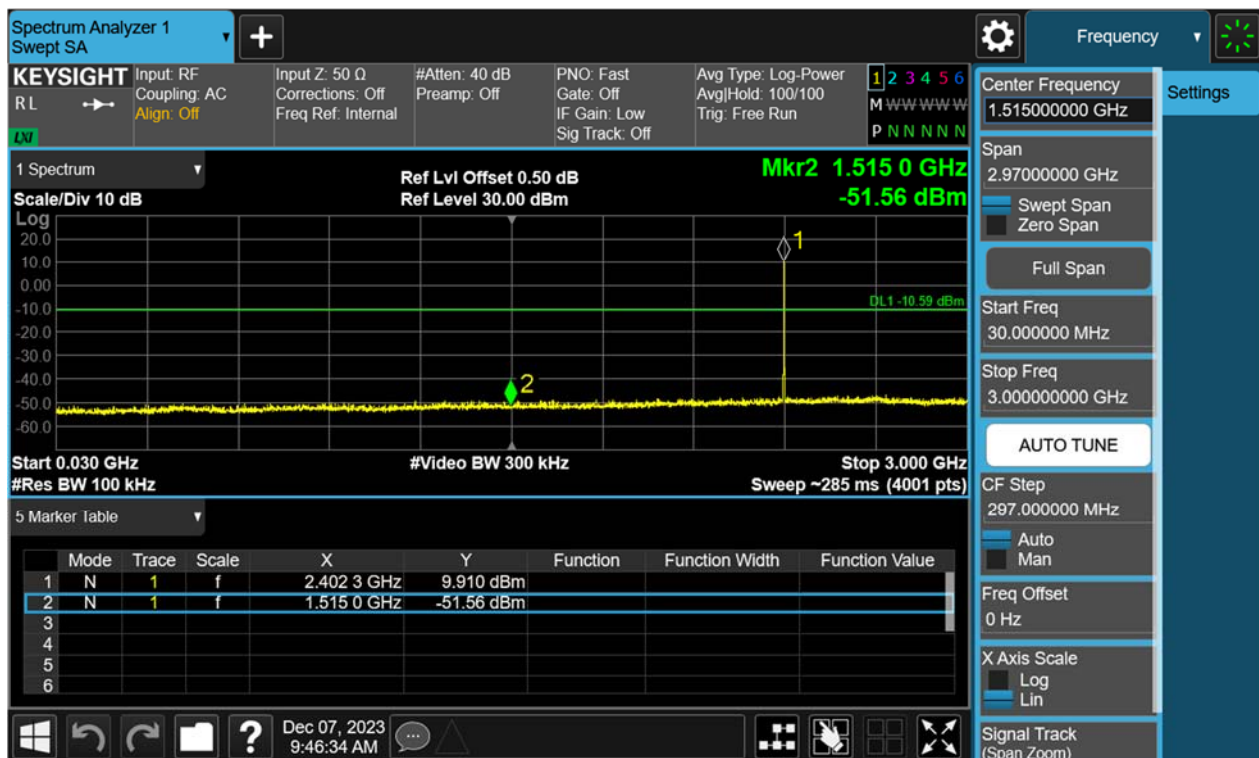
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Conducted spurious emissions 30MHz-25GHz



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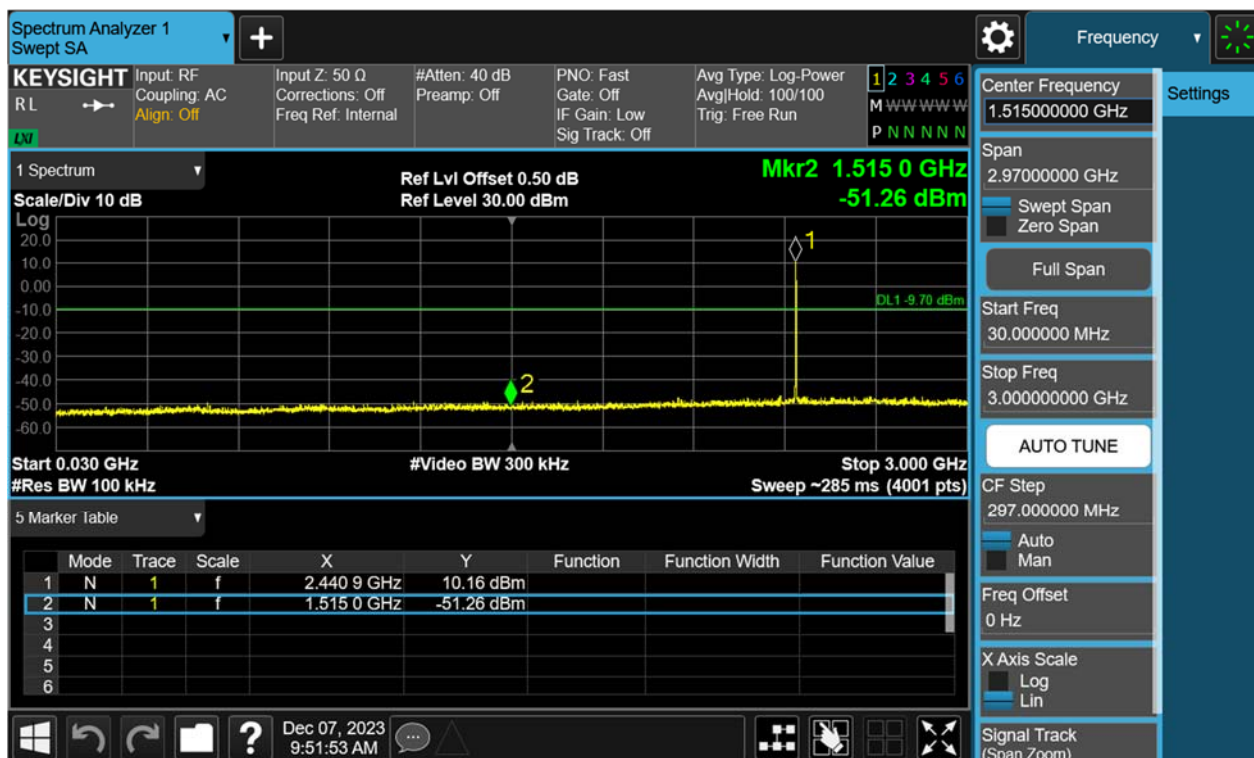
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Figure 20: Conducted Spurious Emission & Authorized-band band-edge, 2441MHz, GFSK Carrier Level



Conducted spurious emissions 30MHz-25GHz



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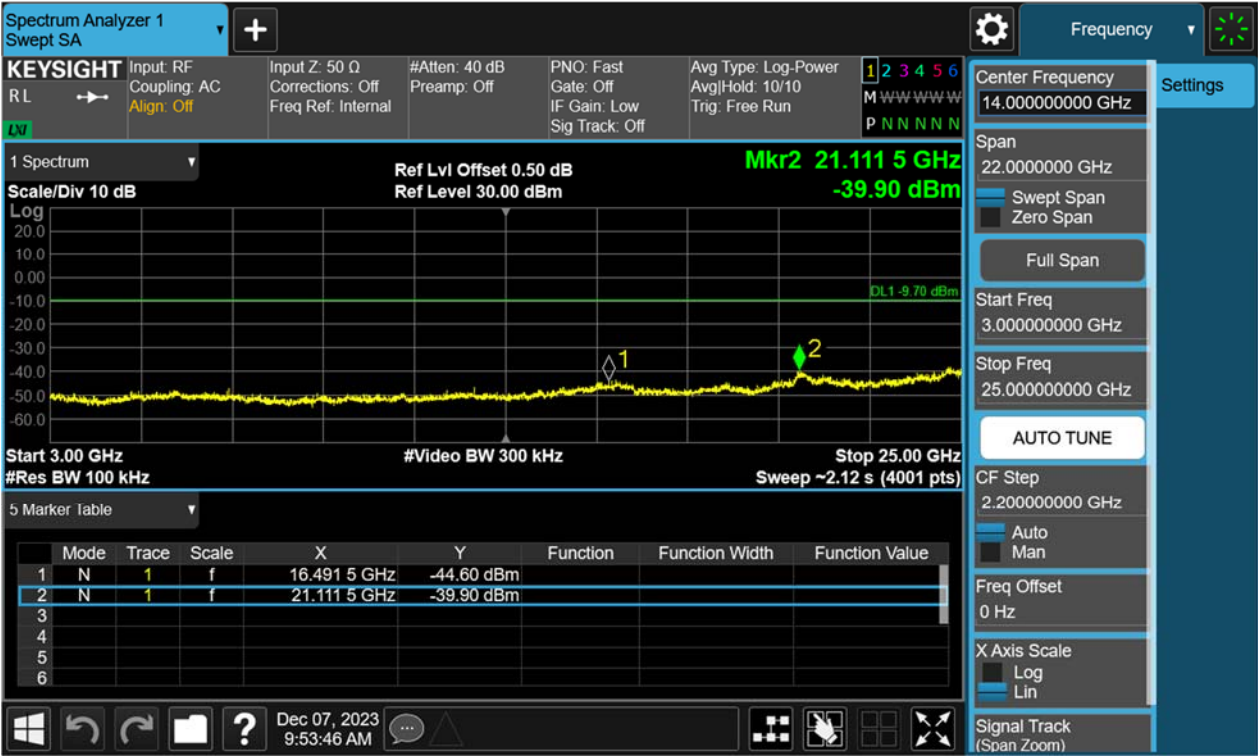


Figure 21: Conducted Spurious Emission & Authorized-band band-edge, 2480MHz, GFSK Carrier Level



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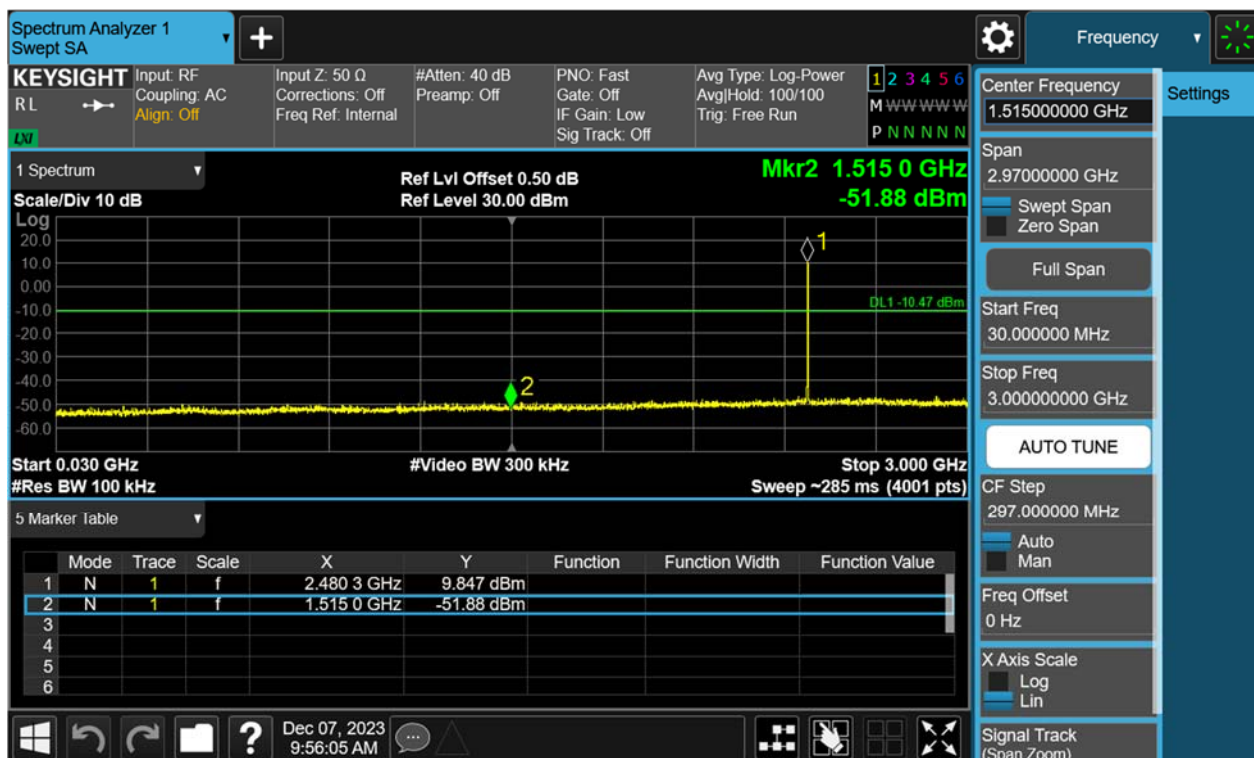
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Band Edge



Conducted spurious emissions 30MHz-25GHz



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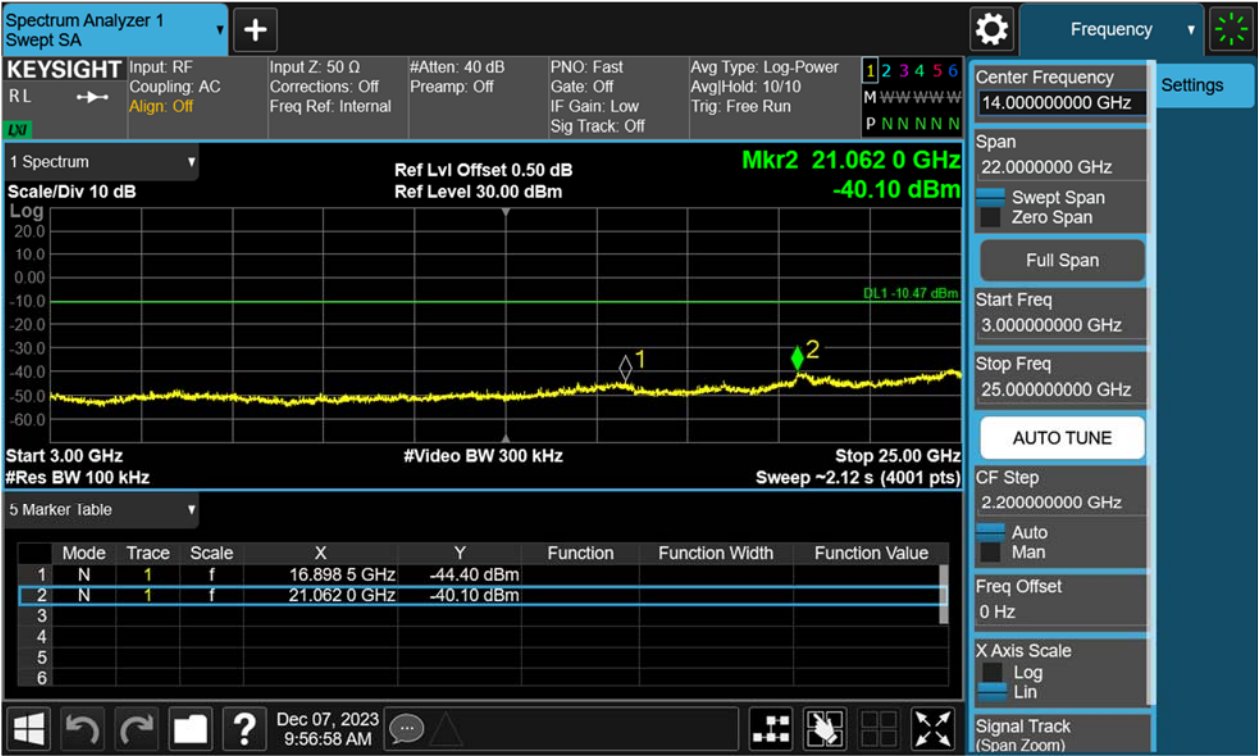
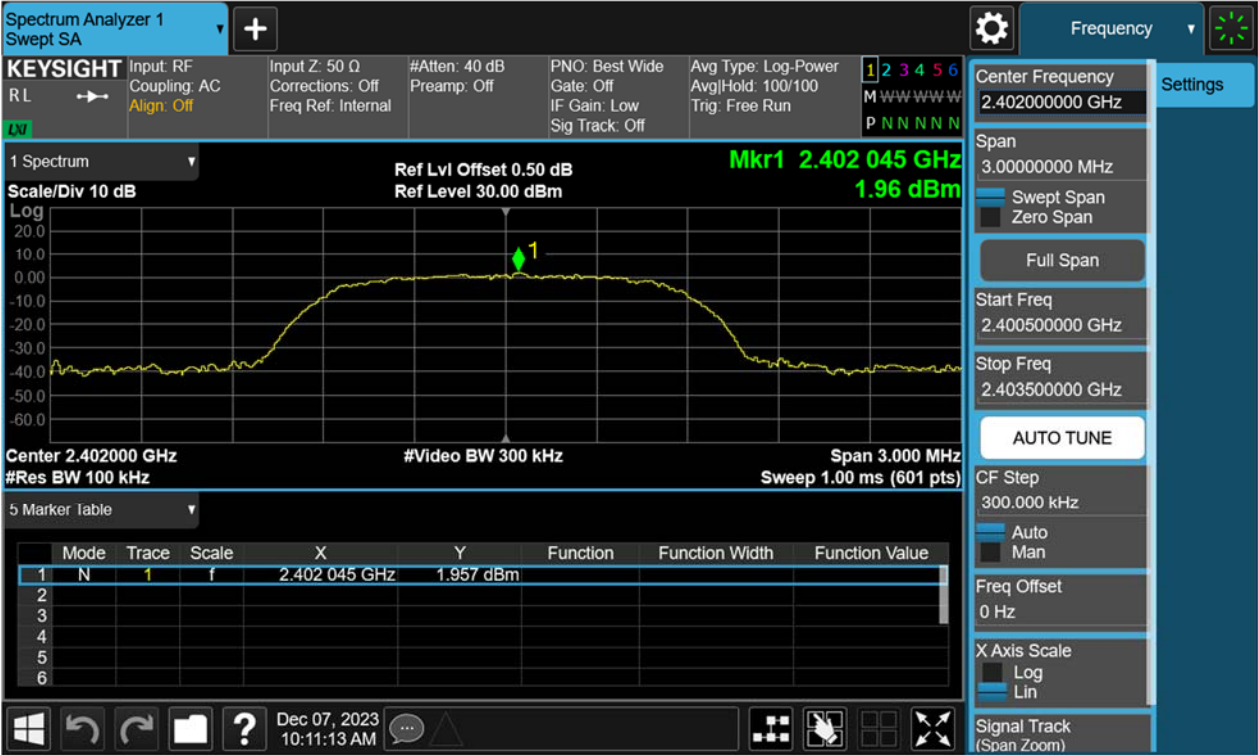


Figure 22: Conducted Spurious Emission & Authorized-band band-edge, 2402MHz, $\pi/4$ -DQPSK Carrier Level



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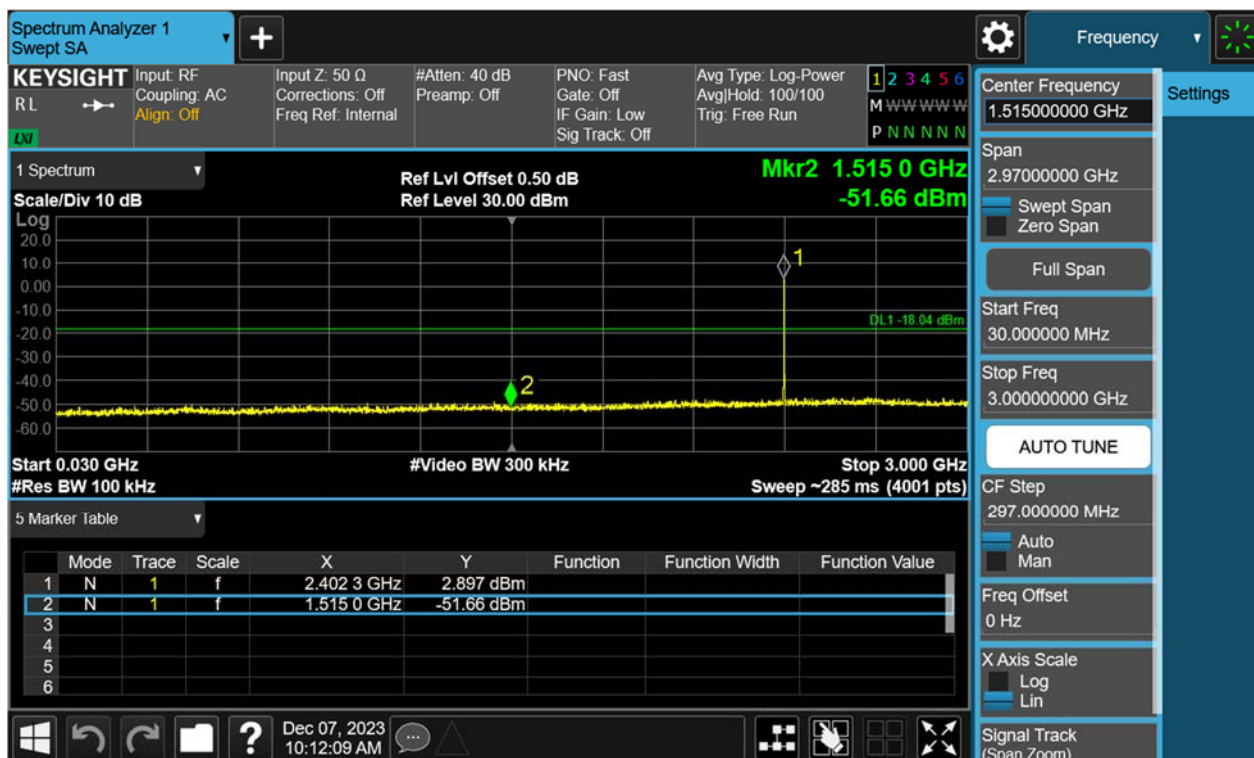
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Band Edge



Conducted spurious emissions 30MHz-25GHz



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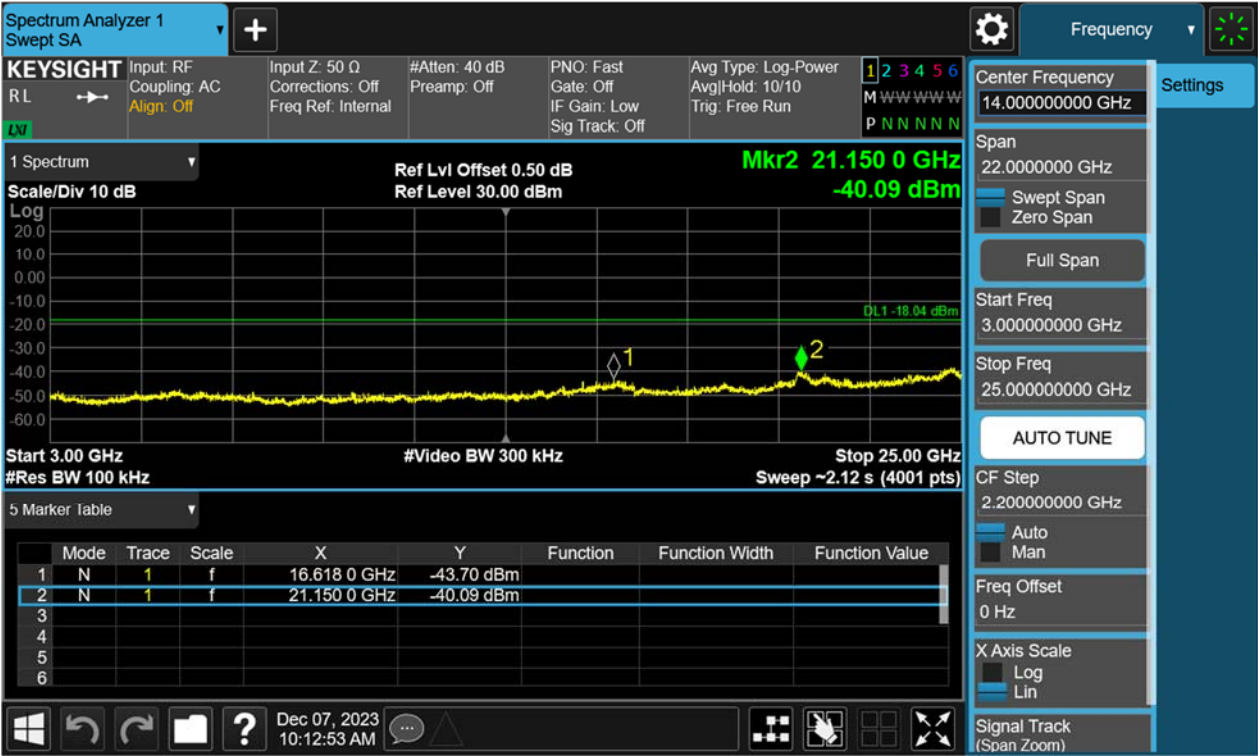
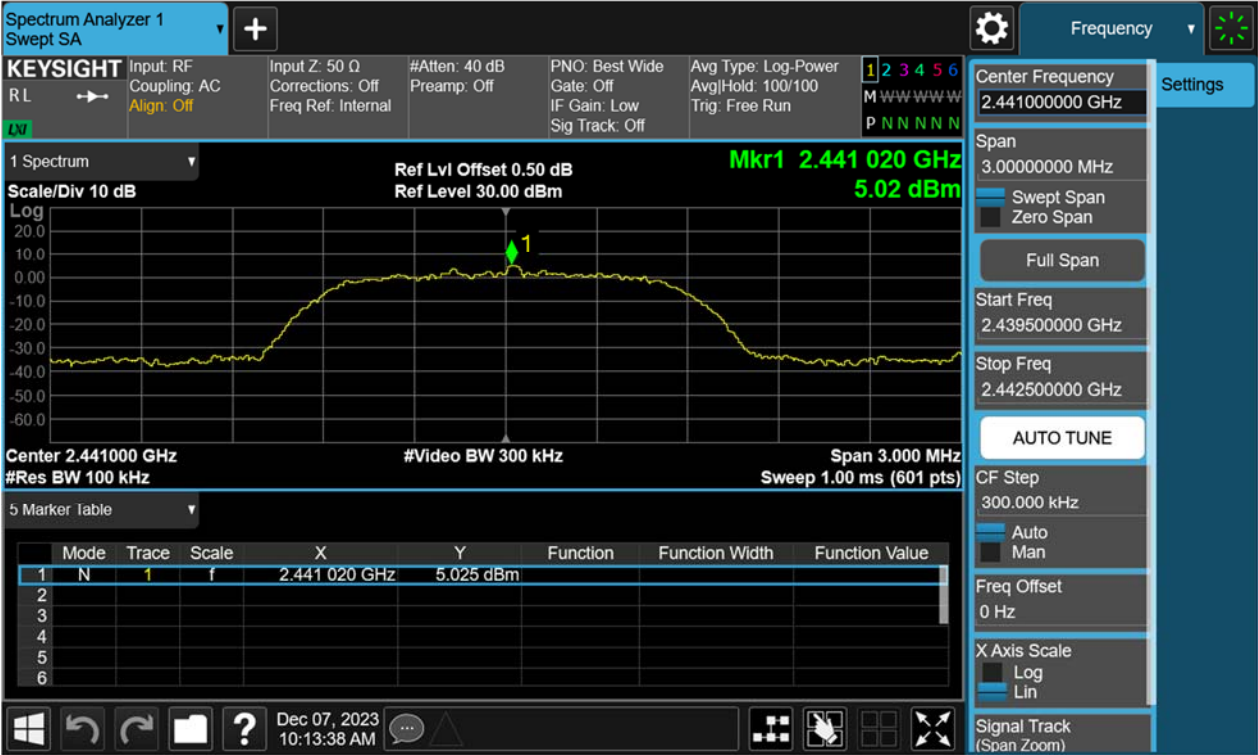


Figure 23: Conducted Spurious Emission & Authorized-band band-edge, 2441MHz, $\pi/4$ -DQPSK Carrier Level



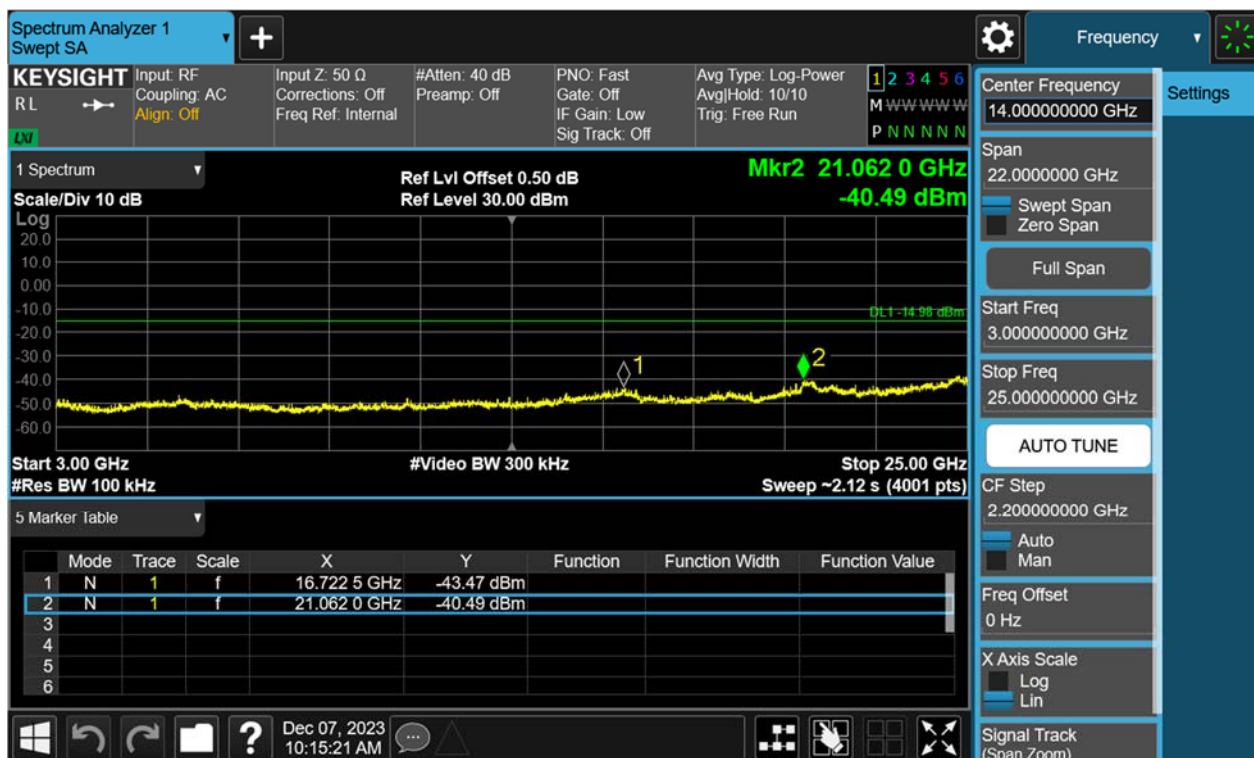
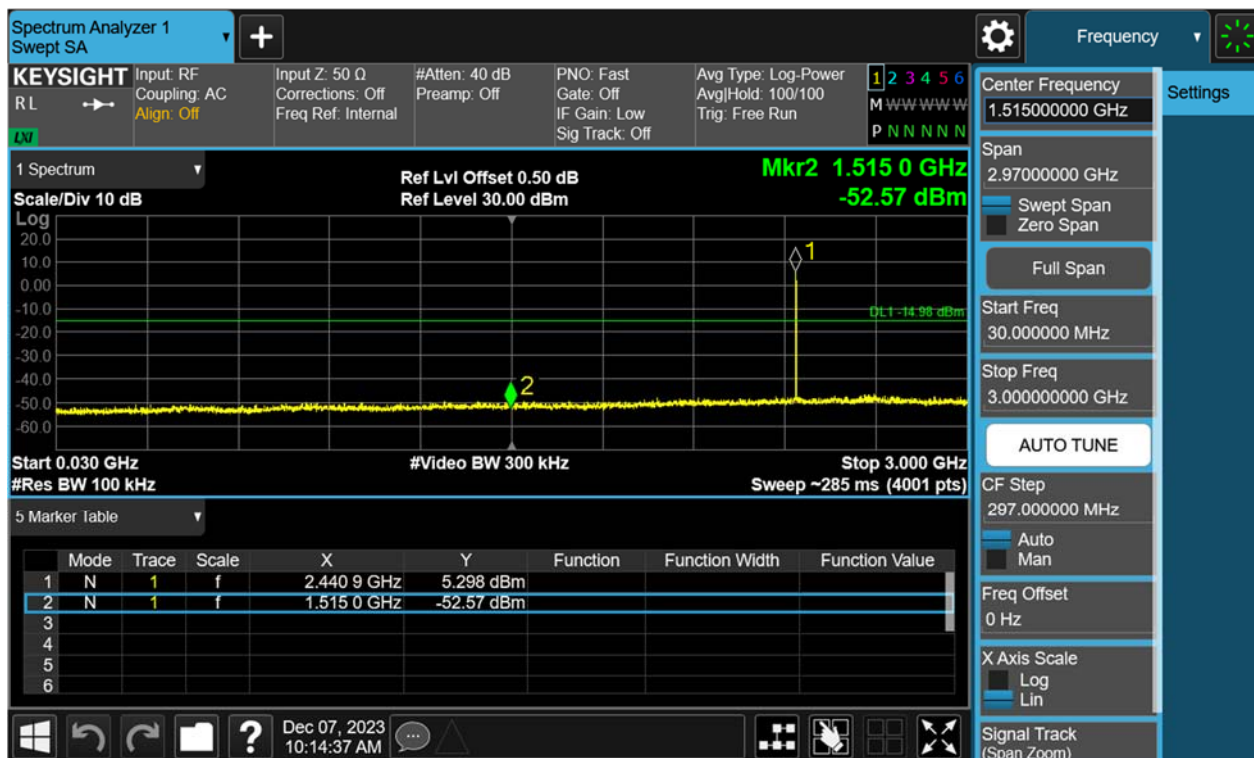
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Conducted spurious emissions 30MHz-25GHz



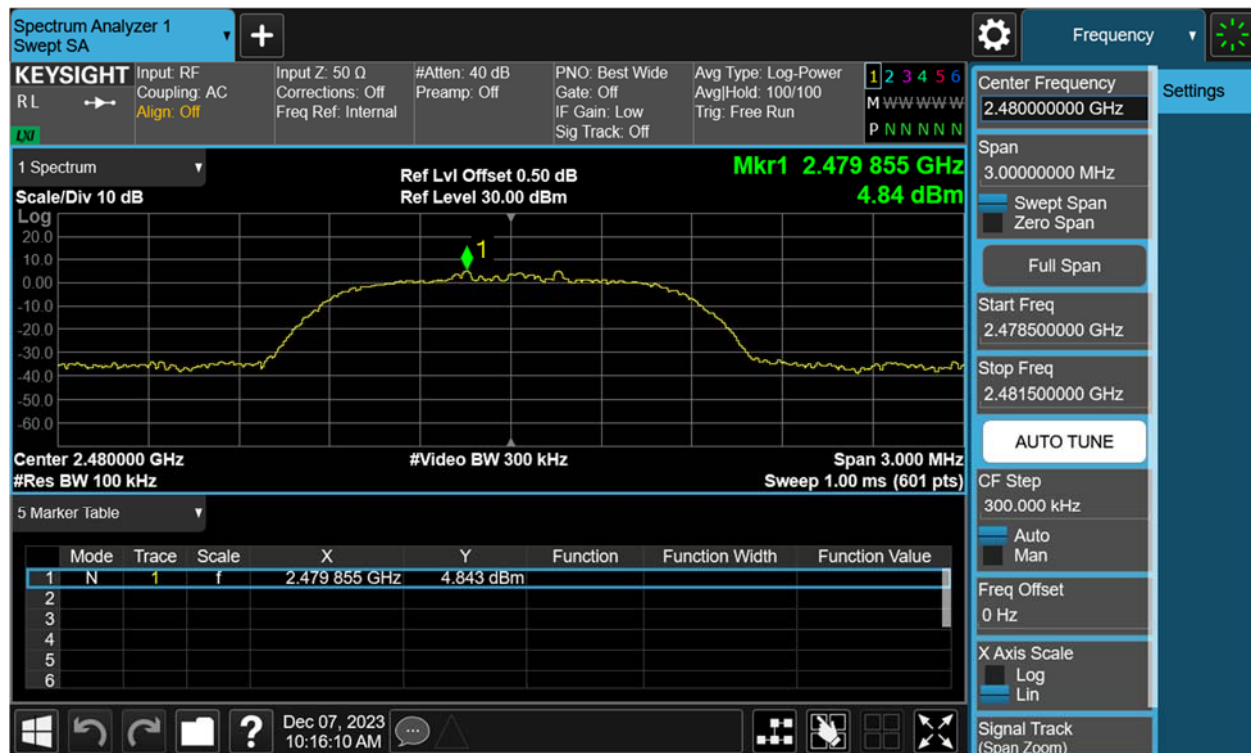
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Figure 24: Conducted Spurious Emission & Authorized-band band-edge, 2480MHz, $\pi/4$ -DQPSK Carrier Level



Band Edge



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Conducted spurious emissions 30MHz-25GHz

