DEKRA Testing and Certification, S.A.U.
Parque Tecnológico de Andalucía,
c/ Severo Ochoa nº 2 · 29590 Campanillas · Málaga · España
C.I.F. A29 507 456

DEKRA

ENAC ENSAYOS Nº 51/LE147

Test report No:
NIE: 57478RRF.005

Test Report

USA FCC Part 15.247, 15.209
CANADA RSS-247, RSS-Gen

Radio Frequency Devices. Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz.
Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices.
General Requirements and Information for the Certification of Radio Apparatus.

(*) Identification of item tested	Secure Smartphone.
(*) Trademark	Bittium.
(*) Model and /or type reference	Tough Mobile 2.
Other identification of the product	HW version: 0302. SW version: 40.1. FCC ID: V27SD-61. IC: 3282B-SD61.
(*) Features	LTE • 3GPP Rel12 • FDD/TDD Cat13/5, • DL 400Mbit/s, • UL 75 Mbit/s UMTS/HSPA • 3GPP rel8, HSPA+, • DL 42 Mbit/s, • UL 5.76 Mbit/s GSM/GPRS/EDGE Complementary Radios • Wi-Fi 802.11 a/b/g/n/ac (2.4 and 5 GHz), 2 x 2 MIMO • BT 5.0 • NFC
Applicant	BITTIUM WIRELESS OY Ritaharjuntie 1, 90590 Oulu, Finland
Test method requested, standard	USA FCC Part 15.247 10-1-18 Edition: Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz. USA FCC Part 15.209 10-1-18 Edition: Radiated emission limits; general requirements. CANADA RSS-247 Issue 2 (February 2017). CANADA RSS-Gen Issue 5 (April 2018).

	Guidance for Performing Compliance Measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid Systems Devices Operating Under Section 15.247 of the FCC Rules. 558074 D01 Meas Guidance v05r02 dated April 2, 2019. Guidance for Emission Testing of Transmitters with Multiple Outputs in the Same Band 662911 D01 Multiple Transmitter Output v02r01 dated 10/31/2013 ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.
Summary	IN COMPLIANCE
Approved by (name / position & signature)	J. Carlos Luque RF Lab. Supervisor 74841983Y JOSE CARLOS LUQUE (C:A29507456) Firmado digitalmente por 74841983Y JOSE CARLOS LUQUE (C:A29507456) Fecha: 2019.09.10 16:18:53 +02'00'
Date of issue	2019-09-10
Report template No	FDT08_22 (*) "Data provided by the client"

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Competences and guarantees

DEKRA Testing and Certification is a testing laboratory accredited by the National Accreditation Body (ENAC - Entidad Nacional de Acreditación), to perform the tests indicated in the Certificate No. 51/LE 147.

DEKRA Testing and Certification is a FCC-recognized accredited testing laboratory with appropriate scope of accreditation that include testing performed in this test report.

DEKRA Testing and Certification is an ISED-recognized accredited testing laboratory with appropriate scope of accreditation that include testing performed in this test report.

In order to assure the traceability to other national and international laboratories, DEKRA Testing and Certification has a calibration and maintenance program for its measurement equipment.

DEKRA Testing and Certification guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at DEKRA Testing and Certification at the time of performance of the test.

DEKRA Testing and Certification is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

General conditions

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA Testing and Certification S.A.U.
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Uncertainty

Uncertainty (factor k=2) was calculated according to the DEKRA Testing and Certification S.A.U. internal document PODT000.

Data provided by the client

The following data has been provided by the client:

1. Information relating to the description of the sample ("Identification of the item tested", "Trademark", "Model and/or type reference tested").

2. The sample of Tough Mobile 2 consists of a Secure Smartphone targeted for professional use where High Security is required.

DEKRA Testing and Certification S.A.U. declines any responsibility with respect to the information provided by the client and that may affect the validity of results.

Usage of samples

Samples undergoing test have been selected by: The client.

- Sample S/01 is composed of the following elements:

Control Nº	Description	Model	Serial Nº	Date of reception
57478C/016	Mobile Phone	Tough Mobile 2	KM184000311	2018/10/25

Sample S/01 has undergone the following test(s): All CONDUCTED tests indicated in appendixes A, B and C.

- Sample S/02 is composed of the following elements:

Control Nº	Description	Model	Serial Nº	Date of Reception
57478C/032	Mobile Phone	Tough Mobile 2	--	2018/11/26
57478C/033	USB Cable	--	--	2018/11/26
57478C/034	AC/DC Adaptor	--	--	2018/11/26
57478C/039	Headphones	--	--	2018/11/26

Sample S/02 has undergone the following test(s): All RADIATED tests indicated in appendixes A, B and C.

Test sample description

Ports..... :	Port name and description	Cable			
		Specified max length [m]	Attached during test	Shielded	Coupled to patient(3)
	Not provided data.		☐	☐	☐
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐
Supplementary information to the ports..... :					

Rated power supply.....:	Voltage and Frequency	Reference poles				
		L1	L2	L3	N	PE

	☐	AC:	☐	☐	☐	☐	☐
	☐	AC:	☐	☐	☐	☐	☐
	☐	DC:					
	☐	DC:					
Rated Power .....:	Not provided data.						
Clock frequencies .....:	Not provided data.						
Other parameters.....:	FCC ID: V27SD-61 IC: 3282B-SD61						
Software version .....:	40.1						
Hardware version.....:	0302						
Dimensions in cm (W x H x D)....:	Not provided data.						
Mounting position.....:	☐	Table top equipment					
	☐	Wall/Ceiling mounted equipment					
	☐	Floor standing equipment					
	☒	Hand-held equipment					
	☐	Other:					
Modules/parts .....:	Module/parts of test item			Type		Manufacturer	
	Not provided data.						
Accessories (not part of the test item).....:	Description			Type		Manufacturer	
	Not provided data.						

Documents as provided by the applicant.....:	Description	File name	Issue date
	Not provided data.		

Identification of the client

BITTIUM WIRELESS OY
Ritaharjuntie 1, 90590 Oulu, Finland

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2018-11-26
Date (finish)	2019-06-05

Document history

Report number	Date	Description
57478RRF.005	2019-09-10	First release

Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 20 % Max. = 75 %

In the semianechoic chamber, the following limits were not exceeded during the test.

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 20 % Max. = 75 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

In the chamber for conducted measurements, the following limits were not exceeded during the test:

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 20 % Max. = 35 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

Remarks and comments

The tests have been performed by the technical personnel: José Carlos Luque, José Alberto Aranda, Miguel Ángel Torres, Jaime Barranquero Gómez, Nicolás Salguero Camarena, Francisco José Alcaide, José Manuel Jiménez González, Ignacio Cabra, Verónica García Capilla and Juan Carlos Fuentes.

Used instrumentation:

Conducted Measurements:

		Last Calibration	Due Calibration
1.	Signal and Spectrum Analyzer ROHDE AND SCHWARZ FSV 40	2018/02	2020/02
2.	Vector Signal Generator 100 KHz-6GHz ROHDE AND SCHWARZ SMU200A	2018/10	2020/10
3.	Signal Generator 9 KHz-6 GHz, ROHDE AND SCHWARZ SMB100A	2017/07	2019/07
4.	Open Switch and Control Platform ROHDE & SCHWARZ OSP-B157W8	2018/05	2020/05
5.	Signal and Spectrum Analyzer ROHDE AND SCHWARZ FSV 40	2017/07	2019/07
6.	Extension for Open Switch Unit up to 40 GHz	2018/06	2020/06
7.	DC Power Supply 40V/40A Rohde & Schwarz NGPE40	2018/02	2021/02
8.	Spectrum Analyzer ROHDE AND SCHWARZ FSW50	2018/02	2020/02
9.	DC Power Supply, GW INSTEK GPS-3030D	N.A.	N.A.
10.	DC Power Supply AGILENT TECHNOLOGIES, N5770A	N.A.	N.A.
11.	Multimeter FLUKE 179	2018/06	2019/06
12.	Bluetooth Signalling unit ANRITSU MT8852B	N.A.	N.A.
13.	Wideband Power Sensor ROHDE AND SCHWARZ Z-81	2017/06	2019/06

Radiated Measurements:

		Last Calibration	Due Calibration
1.	Semianechoic Absorber Lined Chamber ETS LINDGREN FACT 3 200 STP	N.A.	N.A.
2.	Shielded Room ETS LINDGREN S101	N.A.	N.A.
3.	EMI Test Receiver 7 GHz ROHDE AND SCHWARZ ESR7	2018/10	2020/10
4.	RF Pre-amplifier, 38 dB, 30 MHz-6 GHz BONN ELEKTRONIK BLNA 0360-01N	2018/07	2019/07
5.	Biconical/Log Antenna 30 MHz - 6 GHz ETS LINDGREN 3142E	2017/04	2020/04
6.	Spectrum Analyzer ROHDE AND SCHWARZ FSW50	2018/02	2020/02
7.	RF Pre-amplifier G>30dB, 1-18GHz BONN ELEKTRONIK BLMA 0118-3A	2019/04	2020/04
8.	Broadband Horn antenna 1-18 GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9120 D	2016/11	2019/11
9.	Broadband Horn antenna 18 - 40 GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9170	2018/07	2021/07
10.	EMI Test Receiver 7 GHz ROHDE AND SCHWARZ ESR7	2017/08	2019/08
11.	RF Pre-amplifier 40 dB, 10 MHz - 6 GHz BONN ELEKTRONIK BLNA 0160-01N	2019/04	2020/04
12.	Biconical/Log Antenna 30 MHz - 6 GHz ETS LINDGREN 3142E	2018/07	2021/07
13.	Signal and Spectrum Analyzer ROHDE AND SCHWARZ FSV 40	2018/02	2020/02
14.	RF Pre-amplifier, G>48dB, 18-40GHz NARDA JS44-18004000-33-8P	2018/02	2020/02
15.	Broadband Horn antenna 1-18 GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9120 D	2018/01	2021/01
16.	RF Pre-amplifier 40 dB, 10 MHz - 6 GHz BONN ELEKTRONIK BLNA 0160-01N	2019/02	2020/08
17.	Biconical/Log Antenna 30MHz - 6GHz ETS LINDGREN 3142E	2017/09	2020/09

Testing verdicts

Not applicable:	N/A
Pass:	P
Fail:	F
Not measured:	N/M

Summary

1. Bluetooth EDR

FCC PART 15 PARAGRAPH / RSS-247			
Requirement – Test case		**Verdict**	**Remark**
Section 15.247 Subclause (a) (1) / RSS-247 5.1. (b)	20 dB Bandwidth and Carrier frequency separation	P	
Section 15.247 Subclause (a)(1)(iii) / RSS-247 Clause 5.1 (d)	Number of hopping channels	P	
Section 15.247 Subclause (a)(1)(iii) / RSS-247 Clause 5.1 (d)	Time of occupancy (Dwell Time)	P	
Section 15.247 Subclause (b) / RSS-247 5.4. (b)	Maximum peak output power and antenna gain	P	
Section 15.247 Subclause (d) / RSS-247 5.5.	Band-edge emissions compliance (Transmitter)	P	
Section 15.247 Subclause (d) / RSS-247 5.5	Emission limitations conducted (Transmitter)	P	
Section 15.247 Subclause (d) / RSS-247 5.5.	Emission limitations radiated (Transmitter)	P	
Supplementary information and remarks: None.			

2. Bluetooth Low Energy

FCC PART 15 PARAGRAPH / RSS-247			
Requirement – Test case		**Verdict**	**Remark**
Section 15.247 Subclause (a) (2) / RSS-247 5.2. (a)	6 dB Bandwidth	P	
Section 15.247 Subclause (b) / RSS-247 5.4. (d)	Maximum output power and antenna gain	P	
Section 15.247 Subclause (d) / RSS-247 5.5	Emission limitations conducted (Transmitter)	P	
Section 15.247 Subclause (d) / RSS-247 5.5.	Band-edge emissions compliance (Transmitter)	P	
Section 15.247 Subclause (e) / RSS-247 5.2. (b)	Power spectral density	P	
Section 15.247 Subclause (d) / RSS-247 5.5.	Emission limitations radiated (Transmitter)	P	
Supplementary information and remarks: None.			

3. Wi-Fi bgn2040 2x2

FCC PART 15 PARAGRAPH / RSS-247			
Requirement – Test case		**Verdict**	**Remark**
Section 15.247 Subclause (a) (2) / RSS-247 5.2. (a)	6 dB Bandwidth	P	
Section 15.247 Subclause (b) / RSS-247 5.4. (d)	Maximum output power and antenna gain	P	
Section 15.247 Subclause (d) / RSS-247 5.5	Emission limitations conducted (Transmitter)	P	
Section 15.247 Subclause (d) / RSS-247 5.5.	Band-edge emissions compliance (Transmitter)	P	
Section 15.247 Subclause (e) / RSS-247 5.2. (b)	Power spectral density	P	
Section 15.247 Subclause (d) / RSS-247 5.5.	Emission limitations radiated (Transmitter)	P	
Supplementary information and remarks: None.			

Appendix A: Test results. Bluetooth EDR (GFSK, Pi/4 DQPSK, 8DPSK)

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TEST CONDITIONS

POWER SUPPLY (V):

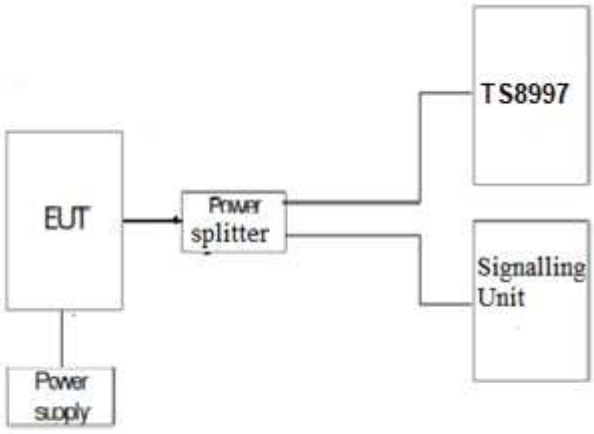
V nonimal:	3.8 Vdc
Type of Power Supply:	DC voltage from external power supply.
Type of Antenna:	Monopole with parasitic resonator.
Maximum Declared Antenna Gain:	-3 dBi

TEST FREQUENCIES:

Low Channel:	2402 MHz
Middle Channel:	2441 MHz
High Channel:	2480 MHz

CONDUCTED MEASUREMENTS

The equipment under test was set up in a shielded room and it is connected to a Bluetooth signalling unit (Bluetooth test set) and to the Test System TS8997 using a 6 dB power splitter. The reading in the spectrum analyzer is corrected taking into account the power splitter loss.



The DC supply voltage is applied using an external calibrated power supply with a multimeter.

RADIATED MEASUREMENTS

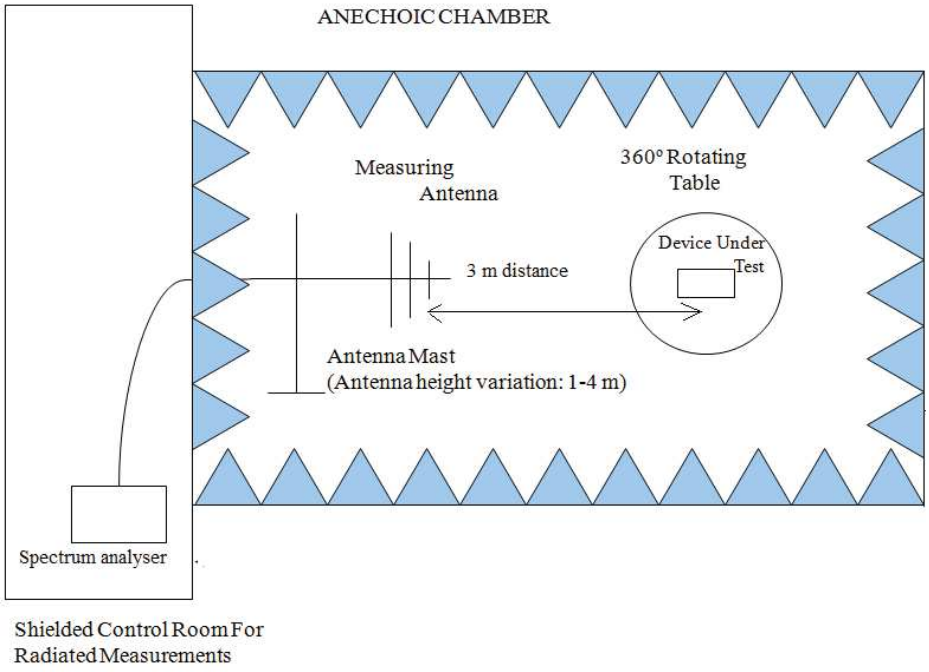
All radiated tests were performed in a semi-anechoic chamber. The measurement antenna (Bilog antenna for the range between 30 MHz to 1000 MHz) is situated at a distance of 3 m and at a distance of 1m for the frequency range 1 GHz-26 GHz (1 GHz-18 GHz Double ridge horn antenna and 18 GHz-40 GHz horn antenna).

For radiated emissions in the range 1 GHz-26 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

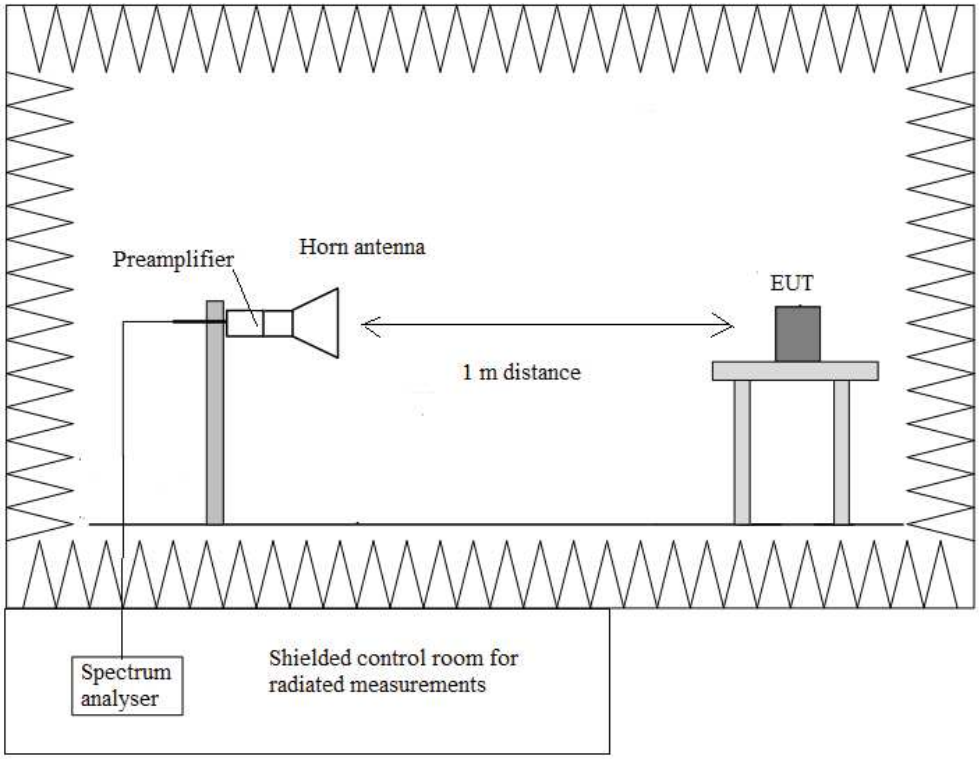
The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360º and the antenna height (Bilog antenna and Double ridge horn antenna) was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

Radiated measurements setup from 30 MHz to 1 GHz:



Radiated measurements setup f > 1 GHz:



FCC Section 15.247 Subclause (a) (1) / RSS-247 Clause 5.1. (b) 20 dB Bandwidth and Carrier frequency separation.

SPECIFICATION:

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.

RESULTS:

- **GFSK**

	Low Channel 2402 MHz	Middle Channel 2441 MHz	High Channel 2480 MHz
20 dB Spectrum Bandwidth (kHz)	925	925	925
99% Bandwidth (kHz)	835	835	835
Measurement uncertainty (kHz)	<±5.0		

- **Pi/4 DQPSK**

	Low Channel 2402 MHz	Middle Channel 2441 MHz	High Channel 2480 MHz
20 dB Spectrum Bandwidth (kHz)	1320	1320	1320
99% Bandwidth (kHz)	1190	1180	1190
Measurement uncertainty (kHz)	<±5.0		

- **8DPSK**

	Low Channel 2402 MHz	Middle Channel 2441 MHz	High Channel 2480 MHz
20 dB Spectrum Bandwidth (kHz)	1300	1280	1280
99% Bandwidth (kHz)	1210	1180	1210
Measurement uncertainty (kHz)	<±5.0		

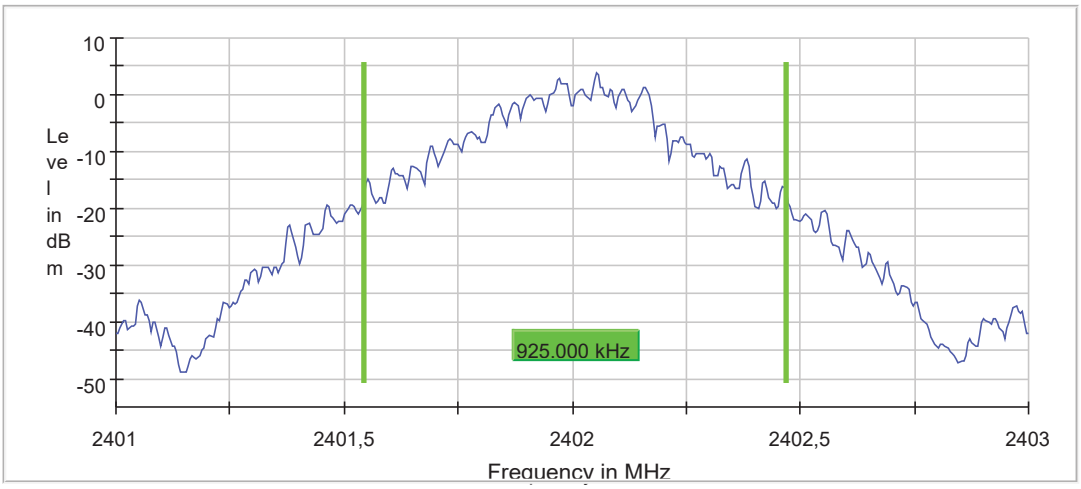
Verdict: PASS

- **GFSK – Bandwidths**

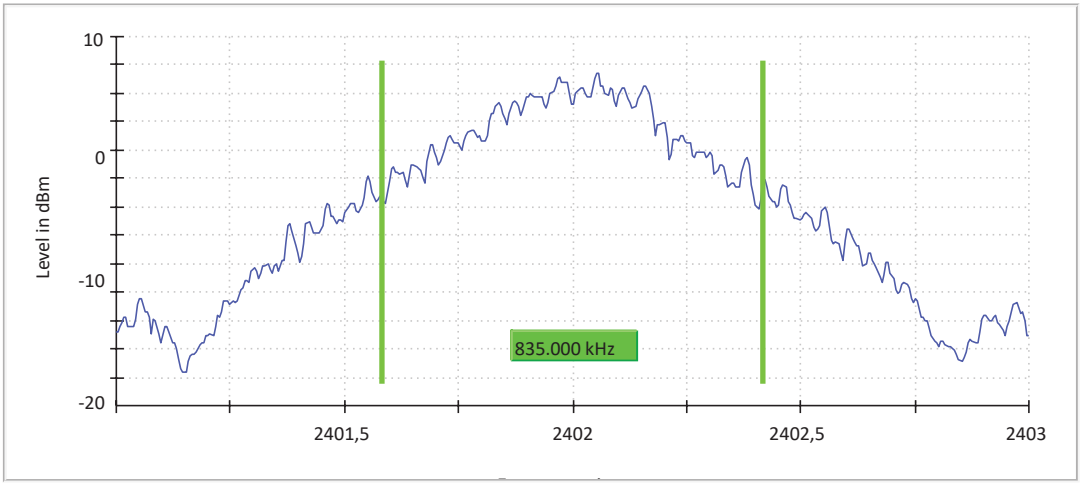
- Low Channel:

Setting	Instrument Value
Start Frequency	2.40100 GHz
Stop Frequency	2.40300 GHz
Span	2.000 MHz
RBW	10.000 kHz
VBW	30.000 kHz
Reference Level	0.000 dBm
Attenuation	20.000 dB
Detector	MaxPeak
Trace Mode	Max Hold

20 dB Bandwidth



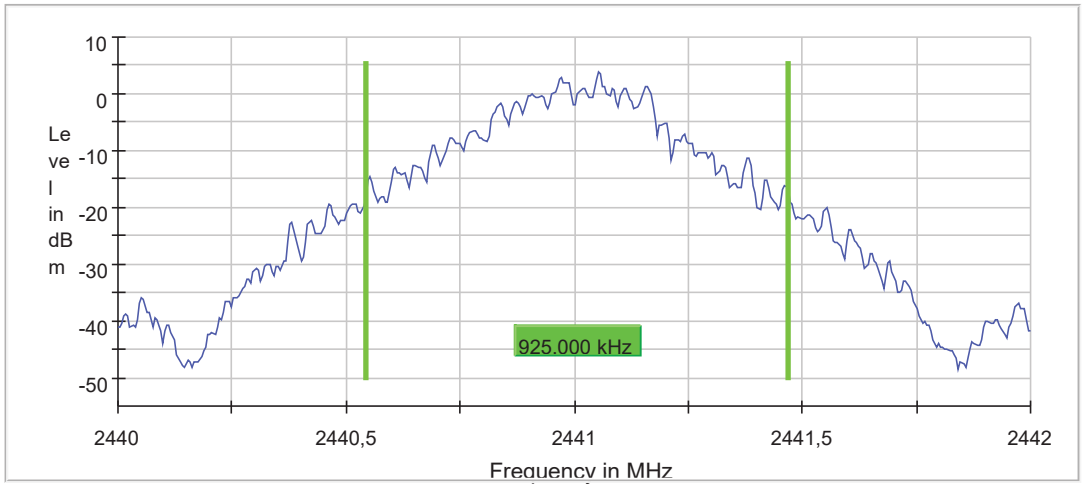
99% Bandwidth



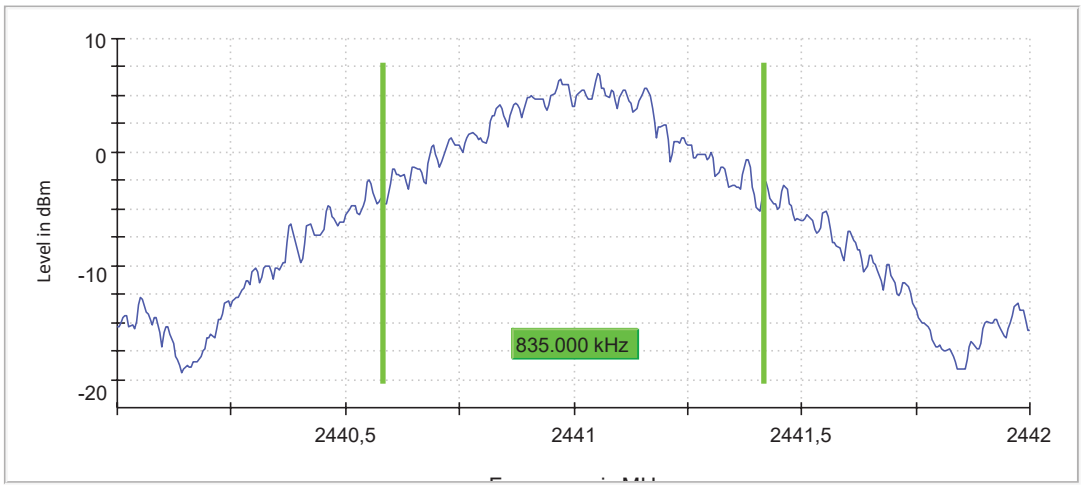
- Middle Channel:

Setting	Instrument Value
Start Frequency	2.44000 GHz
Stop Frequency	2.44200 GHz
Span	2.000 MHz
RBW	10.000 kHz
VBW	30.000 kHz
Reference Level	0.000 dBm
Attenuation	20.000 dB
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold

20 dB Bandwidth



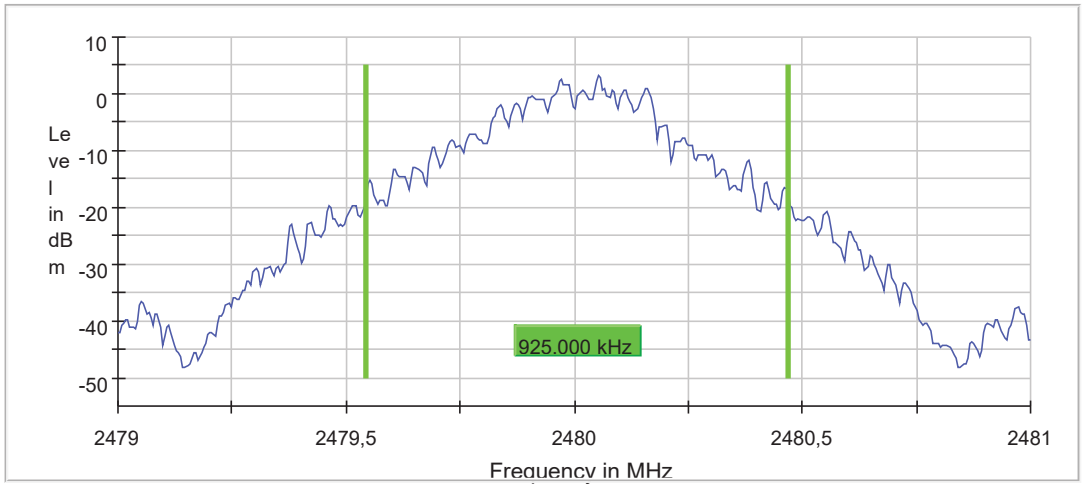
99% Bandwidth



- High Channel:

Setting	Instrument Value
Start Frequency	2.47900 GHz
Stop Frequency	2.48100 GHz
Span	2.000 MHz
RBW	10.000 kHz
VBW	30.000 kHz
Reference Level	0.000 dBm
Attenuation	20.000 dB
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold

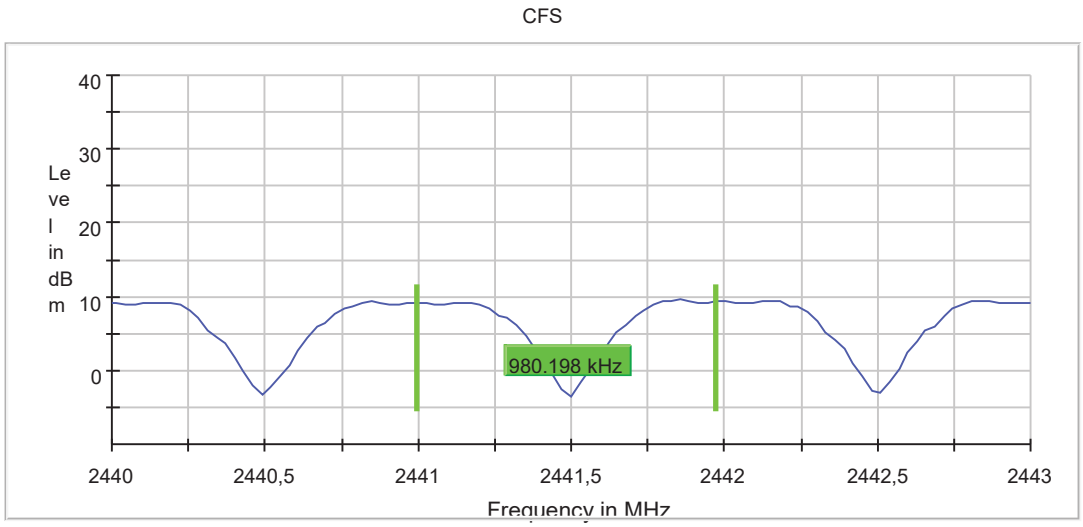
20 dB Bandwidth



99% Bandwidth

Carrier frequency separation - GFSK

Setting	Instrument Value
Start Frequency	2.44000 GHz
Stop Frequency	2.44300 GHz
Span	3.000 MHz
RBW	300.000 kHz
VBW	300.000 kHz
Reference Level	0.000 dBm
Attenuation	20.000 dB
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold



The hopping channel carrier frequencies are separated by a minimum of the 20 dB bandwidth of the hopping channel.

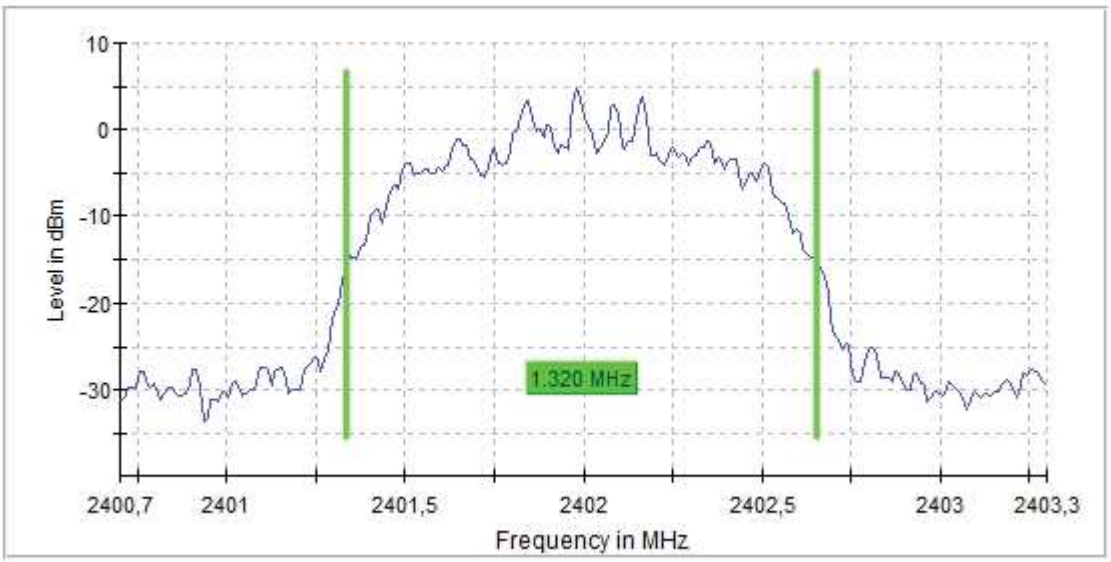
Verdict: PASS

- **Pi/4 DQPSK – Bandwidths**

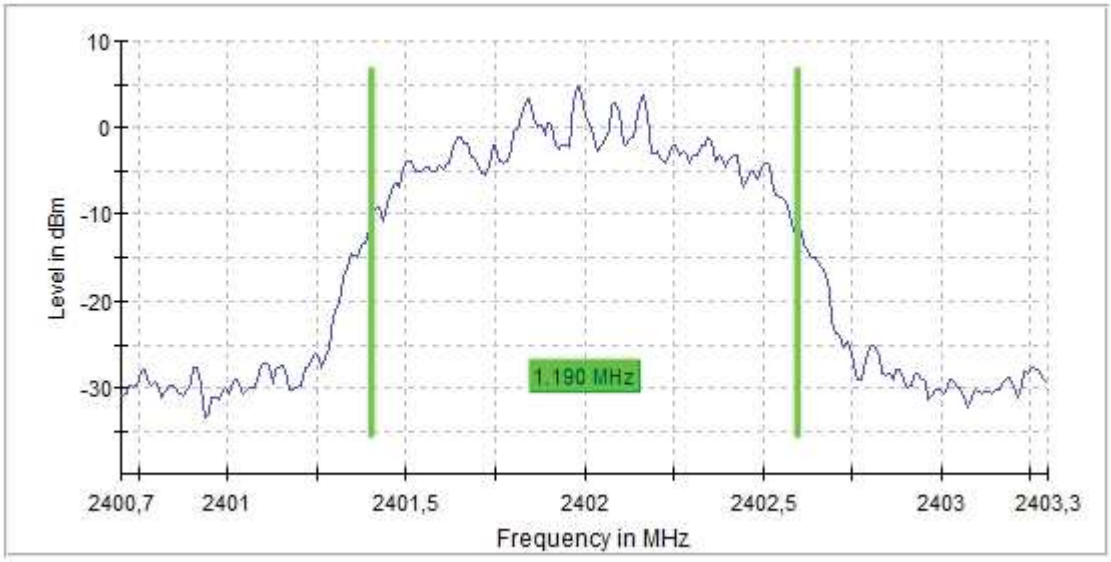
- Low Channel:

Setting	Instrument Value
Start Frequency	2.40070 GHz
Stop Frequency	2.40330 GHz
Span	2.600 MHz
RBW	20.000 kHz
VBW	100.000 kHz
Reference Level	0.000 dBm
Attenuation	20.000 dB
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold

20 dB Bandwidth



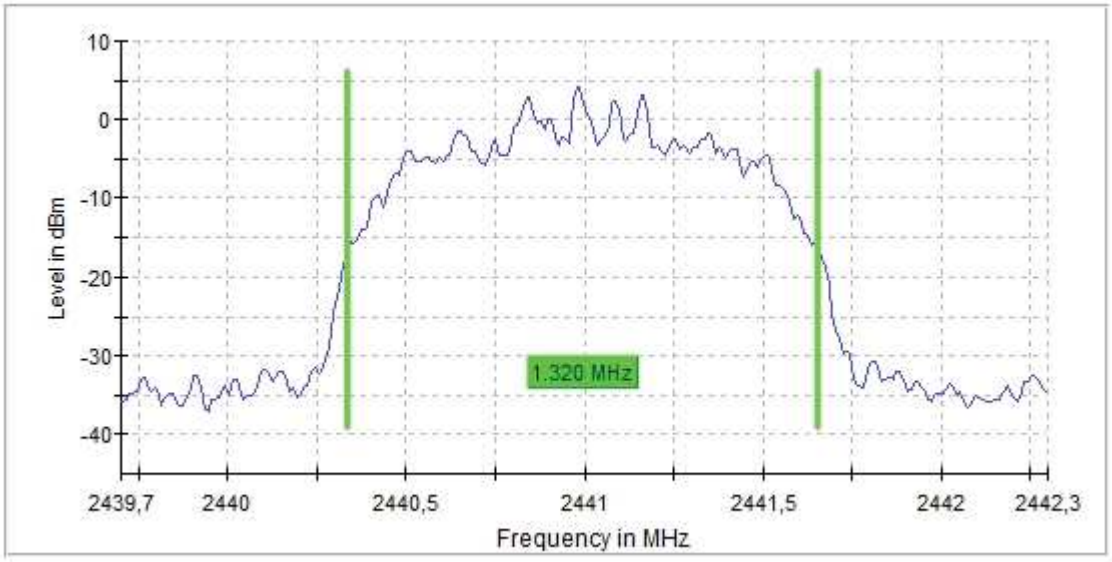
99% Bandwidth



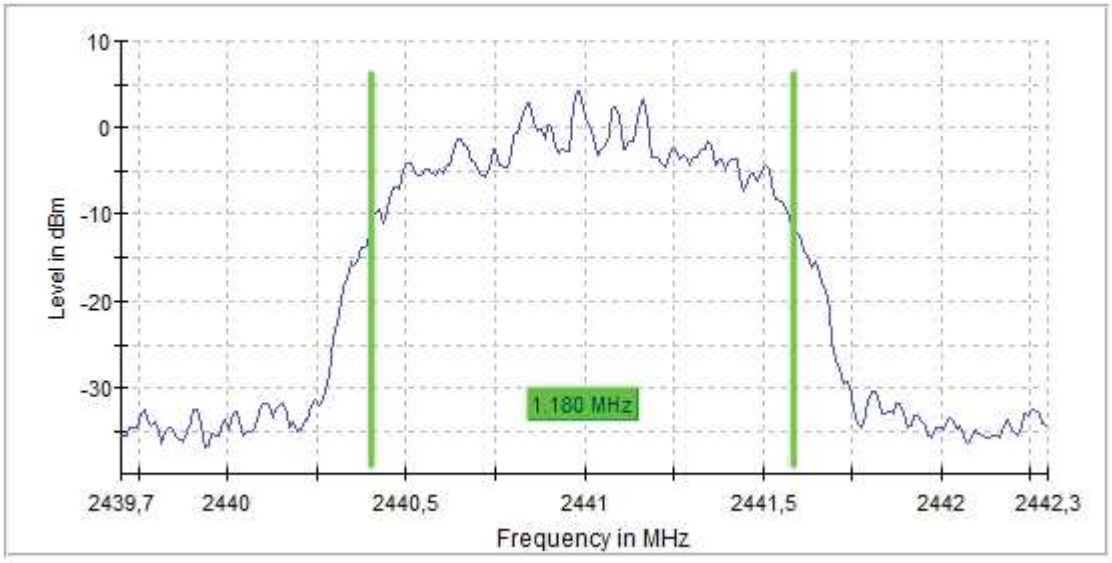
- Middle Channel:

Setting	Instrument Value
Start Frequency	2.40070 GHz
Stop Frequency	2.40330 GHz
Span	2.600 MHz
RBW	20.000 kHz
VBW	100.000 kHz
Reference Level	0.000 dBm
Attenuation	20.000 dB
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold

20 dB Bandwidth



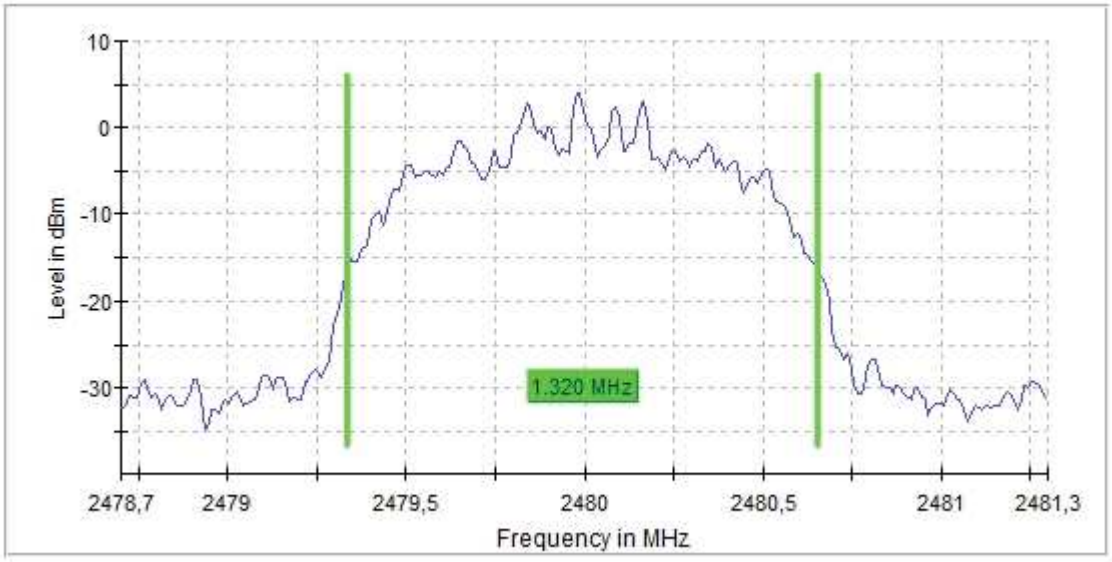
99% Bandwidth



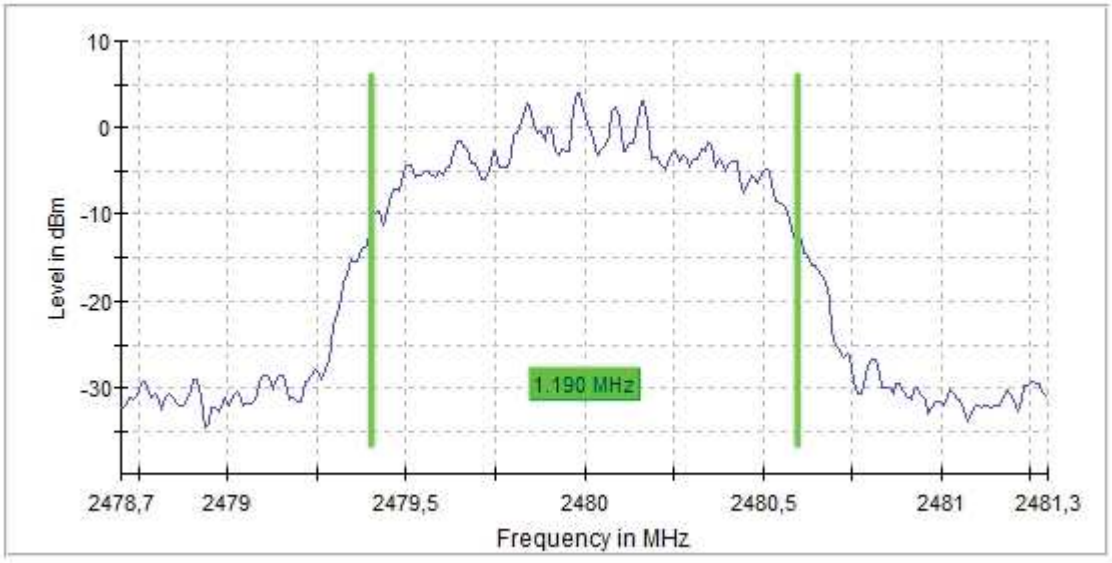
- High Channel:

Setting	Instrument Value
Start Frequency	2.40070 GHz
Stop Frequency	2.40330 GHz
Span	2.600 MHz
RBW	20.000 kHz
VBW	100.000 kHz
Reference Level	0.000 dBm
Attenuation	20.000 dB
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold

20 dB Bandwidth

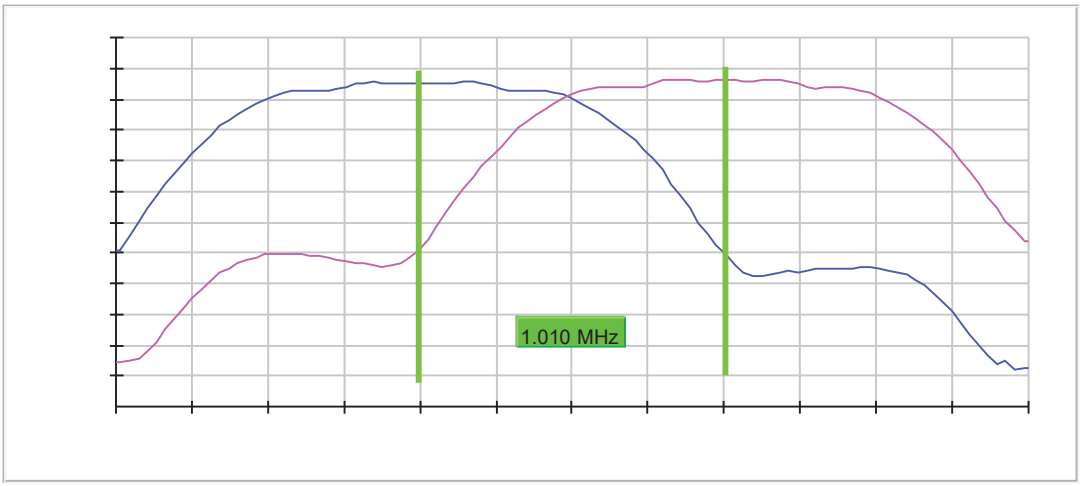


99% Bandwidth



Carrier frequency separation - Pi/4 DQPSK

Setting	Instrument Value
Start Frequency	2.44000 GHz
Stop Frequency	2.44300 GHz
Span	3.000 MHz
RBW	300.000 kHz
VBW	300.000 kHz
Reference Level	0.000 dBm
Attenuation	20.000 dB
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold



The hopping channel carrier frequencies are separated by a minimum of the 20 dB bandwidth of the hopping channel.

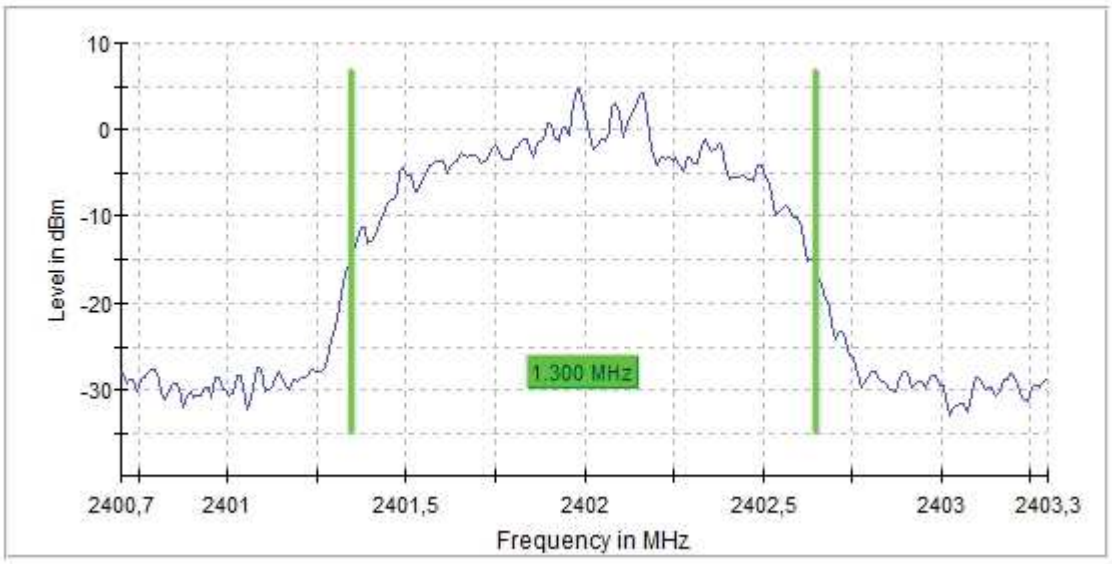
Verdict: PASS

- **8DPSK – Bandwidths**

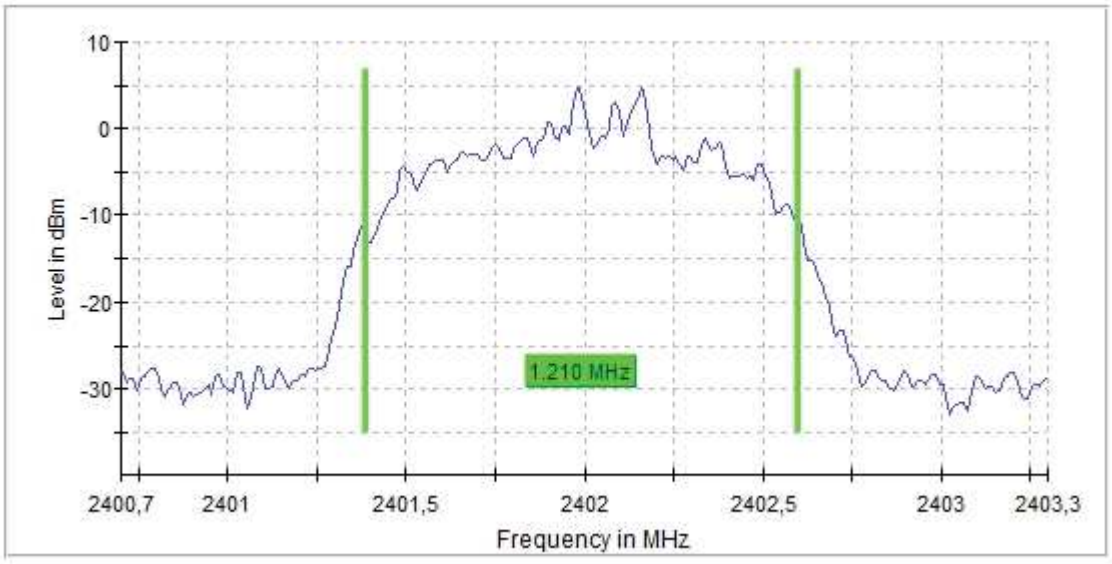
- Low Channel:

Setting	Instrument Value
Start Frequency	2.40070 GHz
Stop Frequency	2.40330 GHz
Span	2.600 MHz
RBW	20.000 kHz
VBW	100.000 kHz
Reference Level	0.000 dBm
Attenuation	20.000 dB
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold

20 dB Bandwidth



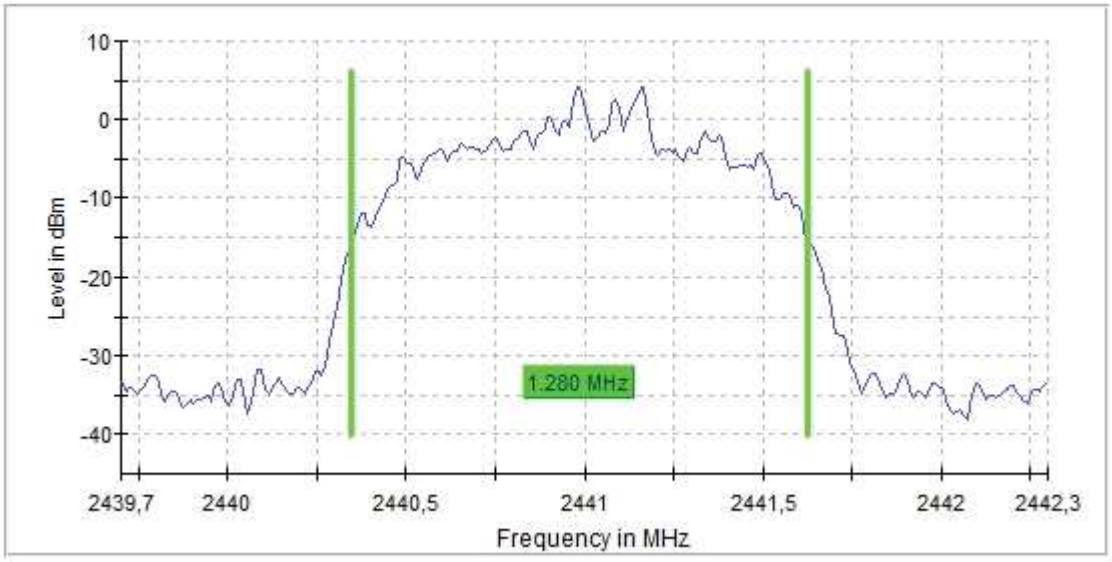
99% Bandwidth



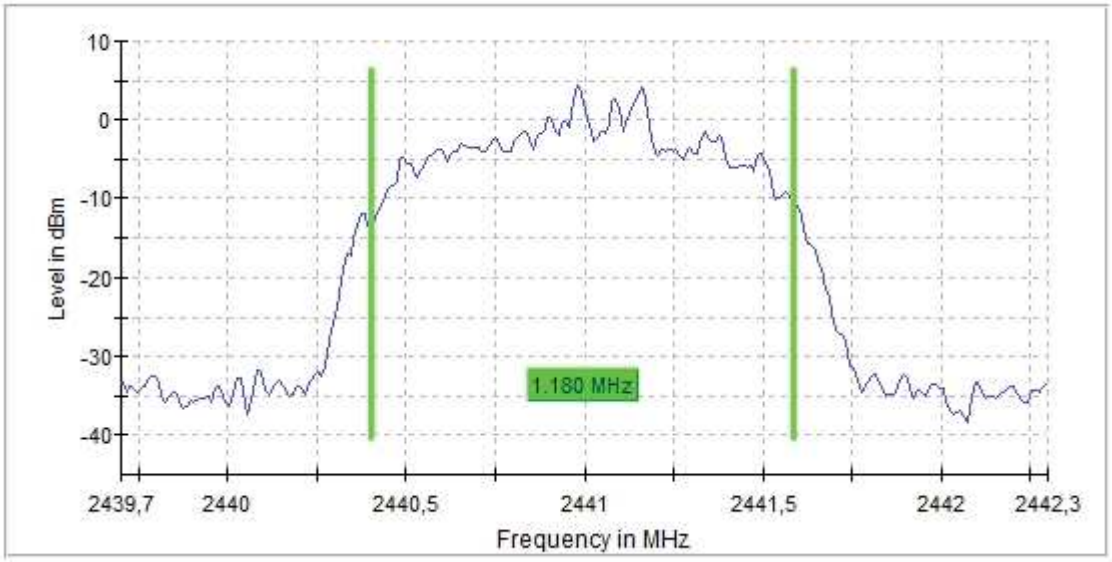
- Middle Channel:

Setting	Instrument Value
Start Frequency	2.40070 GHz
Stop Frequency	2.40330 GHz
Span	2.600 MHz
RBW	20.000 kHz
VBW	100.000 kHz
Reference Level	0.000 dBm
Attenuation	20.000 dB
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold

20 dB Bandwidth



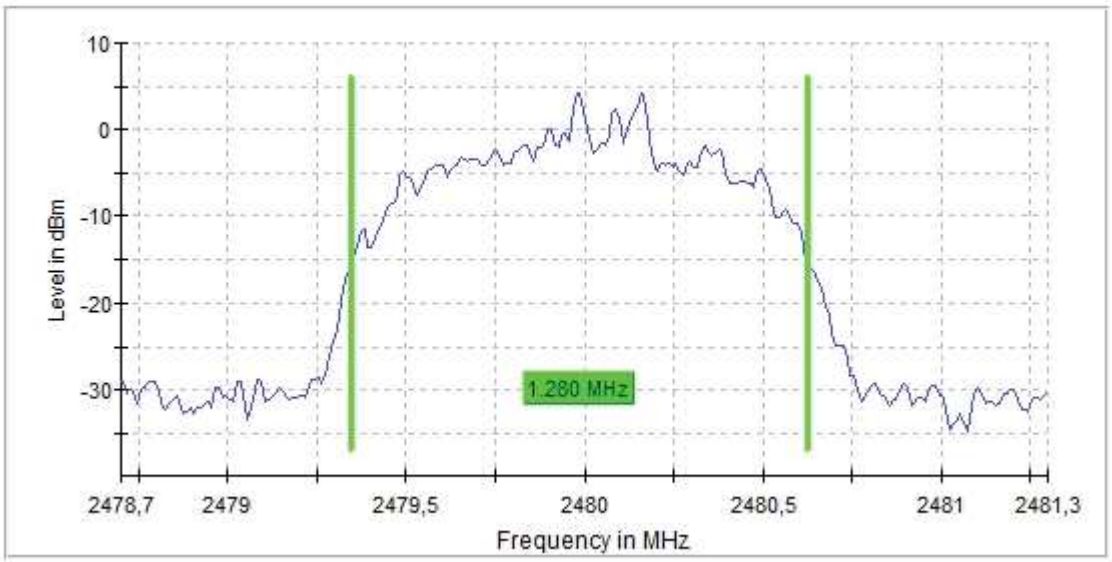
99% Bandwidth



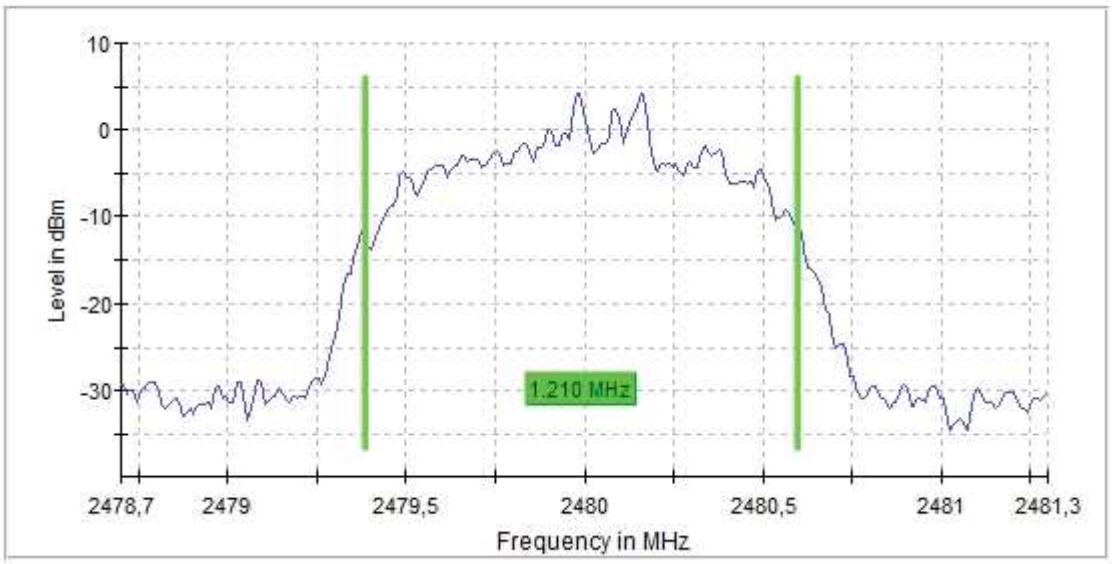
- High Channel:

Setting	Instrument Value
Start Frequency	2.40070 GHz
Stop Frequency	2.40330 GHz
Span	2.600 MHz
RBW	20.000 kHz
VBW	100.000 kHz
Reference Level	0.000 dBm
Attenuation	20.000 dB
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold

20 dB Bandwidth

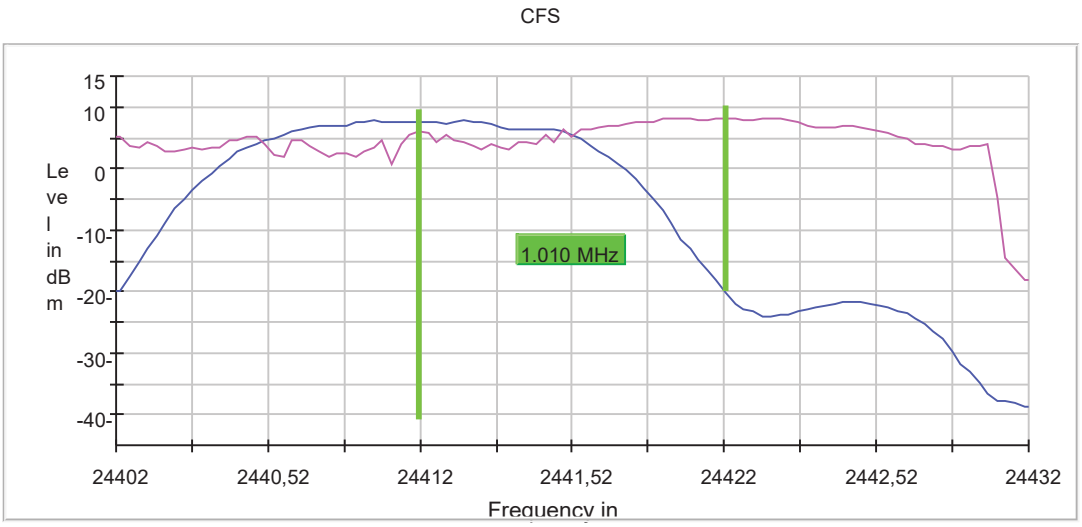


99% Bandwidth



Carrier frequency separation - 8DPSK

Setting	Instrument Value
Start Frequency	2.44000 GHz
Stop Frequency	2.44300 GHz
Span	3.000 MHz
RBW	300.000 kHz
VBW	300.000 kHz
Reference Level	0.000 dBm
Attenuation	20.000 dB
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold



The hopping channel carrier frequencies are separated by a minimum of the 20 dB bandwidth of the hopping channel.

Verdict: PASS

FCC Section 15.247 Subclause (a)(1)(iii) / RSS-247 Clause 5.1 (d) Number of hopping channels.

SPECIFICATION:

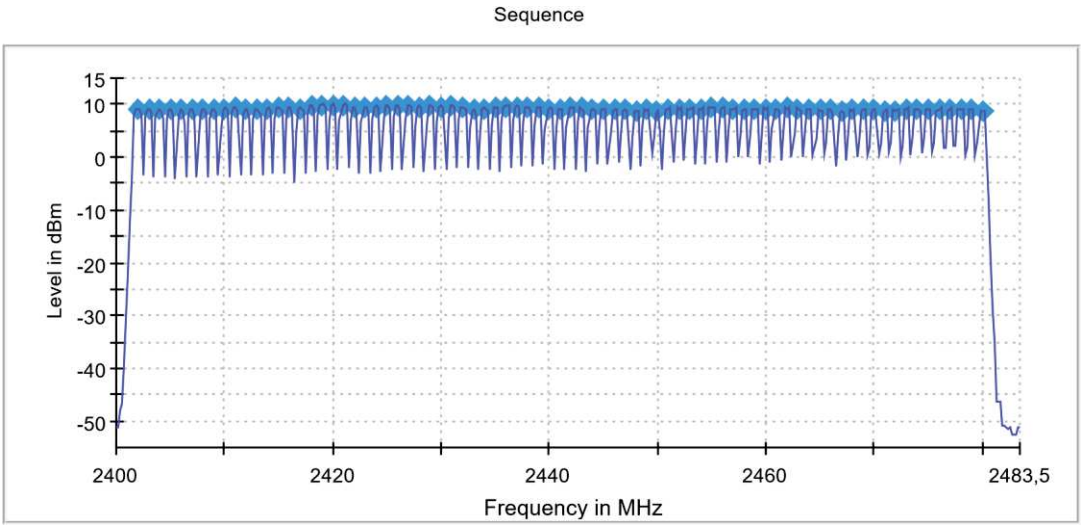
Frequency hopping system in the 2400-2483.5 MHz band shall use at least 15 channels.

RESULTS:

The number of hopping channels is 79 for all three modes.

- **GFSK – Number of hopping channels**

Setting	Instrument Value
Start Frequency	2.40000 GHz
Stop Frequency	2.48350 GHz
Span	83.500 MHz
RBW	200.000 KHz
VBW	200.000 KHz
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold

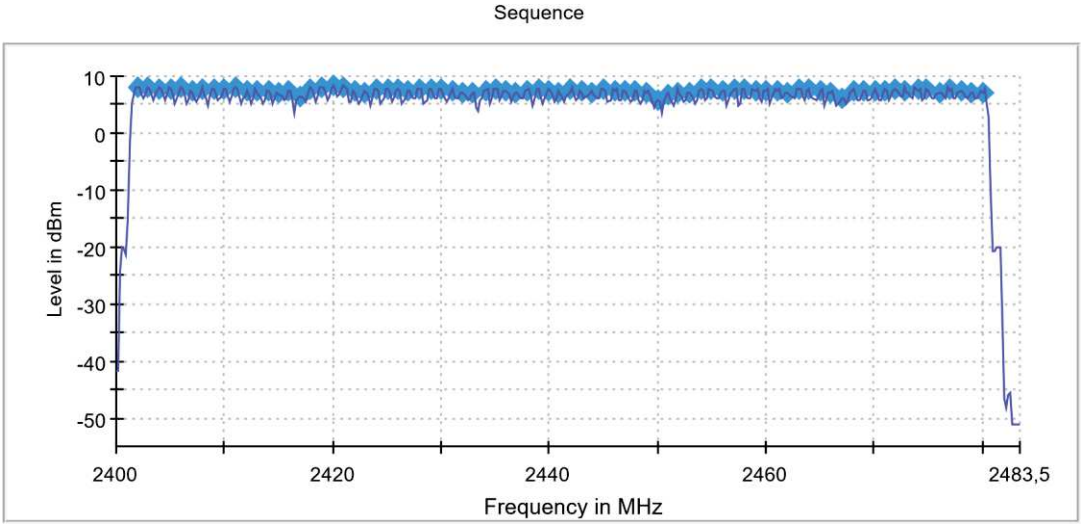


Total number of hopping channels 79

Verdict: PASS

- **Pi/4 DQPSK – Number of hopping channels**

Setting	Instrument Value
Start Frequency	2.40000 GHz
Stop Frequency	2.48350 GHz
Span	83.500 MHz
RBW	200.000 KHz
VBW	200.000 KHz
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold

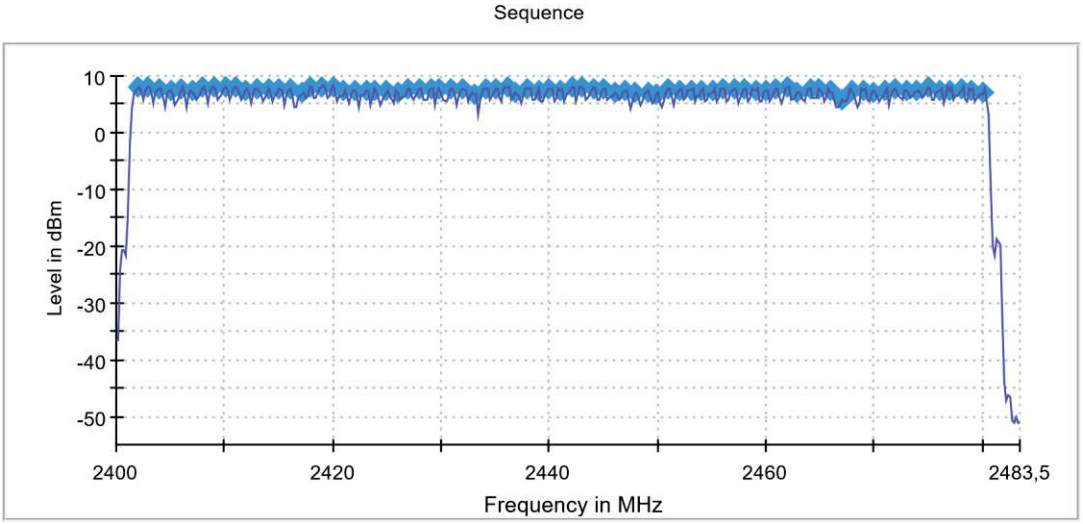


Total number of hopping channels 79

Verdict: PASS

- **8DPSK – Number of hopping channels**

Setting	Instrument Value
Start Frequency	2.40000 GHz
Stop Frequency	2.48350 GHz
Span	83.500 MHz
RBW	200.000 KHz
VBW	200.000 KHz
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold



Total number of hopping channels 79

Verdict: PASS

FCC Section 15.247 Subclause (a)(1)(iii) / RSS-247 Clause 5.1 (d) Time of occupancy (Dwell Time).

SPECIFICATION:

The average time of occupancy on any channel shall not be greater than 0.4 seconds (400 ms) within a period of 0.4 seconds multiplied by the number of hopping channels employed = 0.4 x 79= 31.6 seconds.

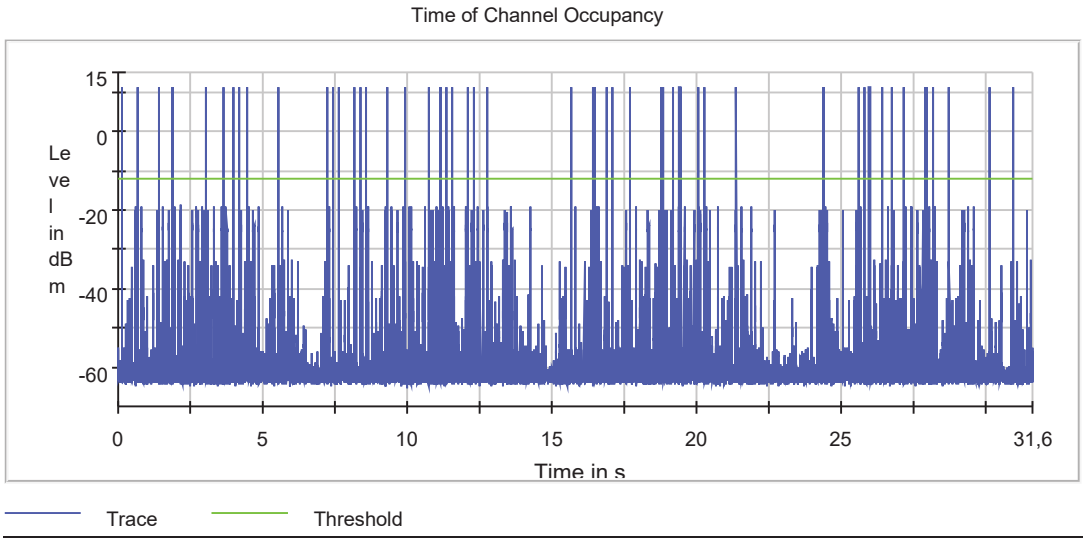
RESULTS:

- **GFSK (packet type DH5) – Time of Occupancy (Dwell Time)**
  - Transmit Time per Hop:

Min (ms)	Max (ms)	Limit Max for Max (ms)	Limit Min for Max (ms)	Mean (ms)
2.890	2.900	400.000	0.000	2.896

  - Time of Occupancy:

DUT Frequency (MHz)	Sweeptime	Number of Hops	Average time of occupancy (ms)	Threshold (dBm)	Result
2441.000000	31.600 s	54	159.300	-12.0	PASS



Measurement uncertainty (%)	<±0.01

Verdict: PASS

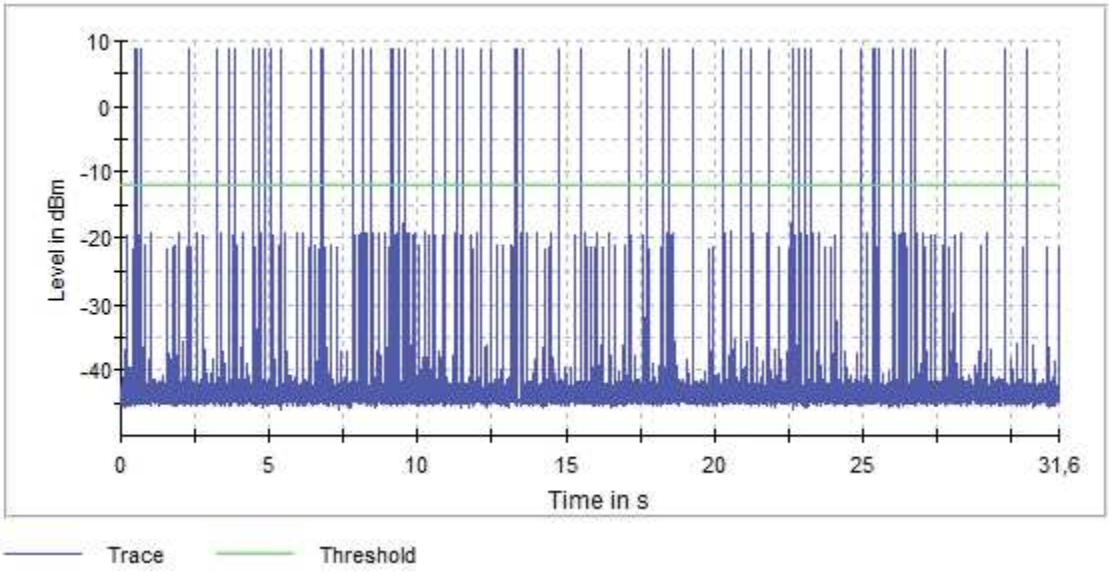
- **Pi/4 DQPSK (packet type 2DH5) – Time of Occupancy (Dwell Time)**

  - Transmit Time per Hop:

Min (ms)	Max (ms)	Limit Max for Max (ms)	Limit Min for Max (ms)	Mean (ms)
2.890	2.900	400.000	0.000	2.898

  - Time of Occupancy:

DUT Frequency (MHz)	Sweeptime	Number of Hops	Average time of occupancy (ms)	Threshold (dBm)	Result
2441.000000	31.600 s	60	176.750	-12.0	PASS



Measurement uncertainty (%)	<±0.01

Verdict: PASS

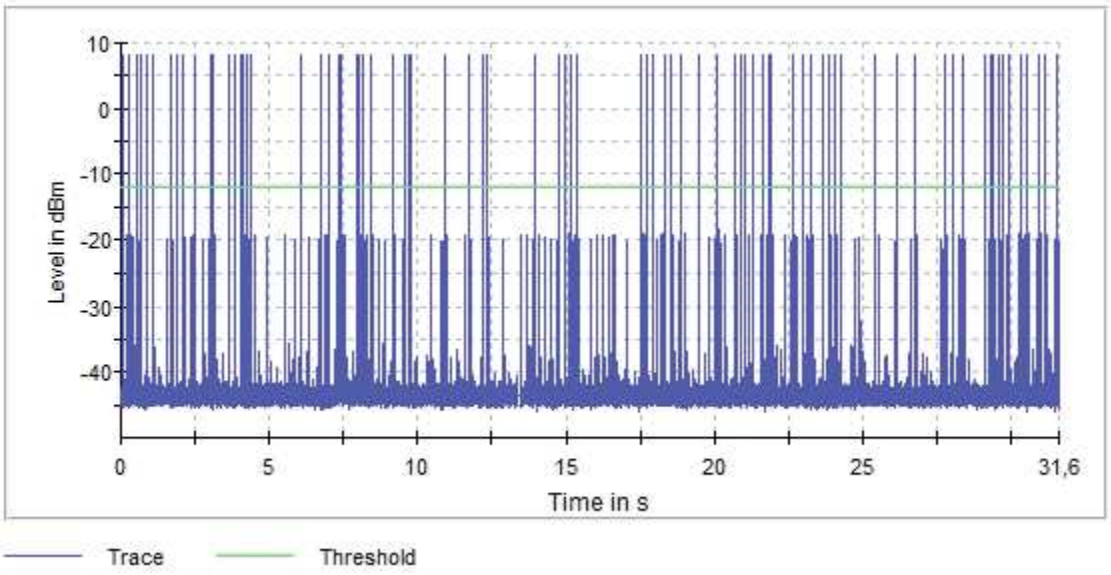
- **8DPSK (packet type 3DH5) – Time of Occupancy (Dwell Time)**

  - Transmit Time per Hop:

Min (ms)	Max (ms)	Limit Max for Max (ms)	Limit Min for Max (ms)	Mean (ms)
2.900	2.910	400.000	0.000	2.901

  - Time of Occupancy:

DUT Frequency (MHz)	Sweeptime	Number of Hops	Average time of occupancy (ms)	Threshold (dBm)	Result
2441.000000	31.600 s	81	237.910	-12.0	PASS



Measurement uncertainty (%)	<±0.01

Verdict: PASS

FCC Section 15.247 Subclause (b) / RSS-247 Clause 5.4 (b) Maximum peak output power and antenna gain

SPECIFICATION:

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 hopping channels: 1 watt (30 dBm). The e.i.r.p. shall not exceed 4 W (RSS-247).

RESULTS:

The EIRP power (dBm) is calculated by adding the maximum declared antenna gain to the measured conducted power.

Maximum Declared Antenna Gain: -3 dBi.

The maximum directional gain of the antenna is less than 6 dBi and therefore the maximum output power is not required to be reduced from the stated values

- **GFSK** (1 Mbps)

Peak Conducted Output Power	Low Channel 2402 MHz	Middle Channel 2441 MHz	High Channel 2480 MHz
Maximum Conducted Power (dBm)	+12.4	+12.4	+12.0
Maximum EIRP Power (dBm)	+9.4	+9.4	+9.0
Measurement uncertainty (dB)	<±0.78		

- **Pi/4 DQPSK** (2 Mbps)

Peak Conducted Output Power	Low Channel 2402 MHz	Middle Channel 2441 MHz	High Channel 2480 MHz
Maximum Conducted Power (dBm)	+12.2	+12.0	+11.8
Maximum EIRP Power (dBm)	+9.2	+9.0	+8.8
Measurement uncertainty (dB)	<±0.78		

- **8DPSK** (3 Mbps)

Peak Conducted Output Power	Low Channel 2402 MHz	Middle Channel 2441 MHz	High Channel 2480 MHz
Maximum Conducted Power (dBm)	+12.3	+12.2	+12.0
Maximum EIRP Power (dBm)	+9.3	+9.2	+9.0
Measurement uncertainty (dB)	<±0.78		

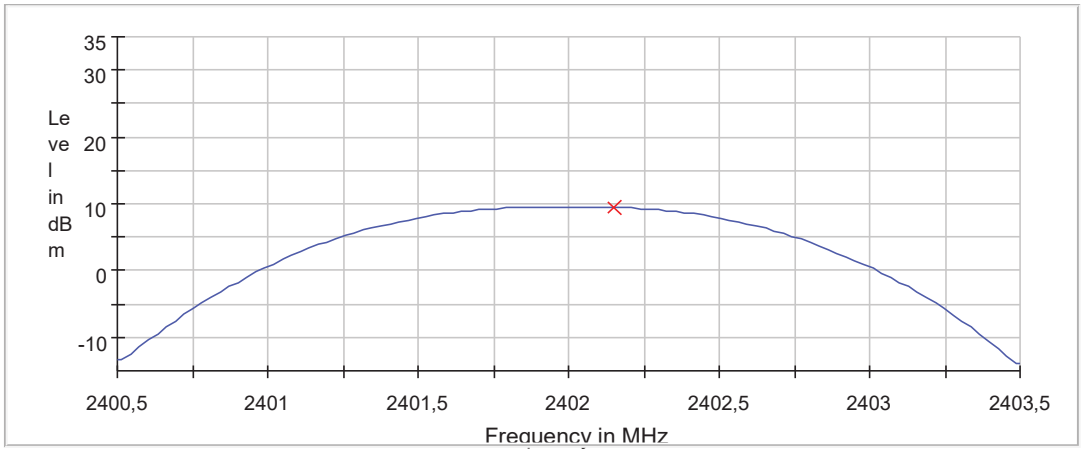
Verdict: PASS

- **GFSK – Peak Output Power**

- Low Channel:

Setting	Instrument Value
Start Frequency	2.40050 GHz
Stop Frequency	2.40350 GHz
Span	3.000 MHz
RBW	1.000 MHz
VBW	3.000 MHz
Reference Level	10.000 dBm
Attenuation	30.000 dB
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold

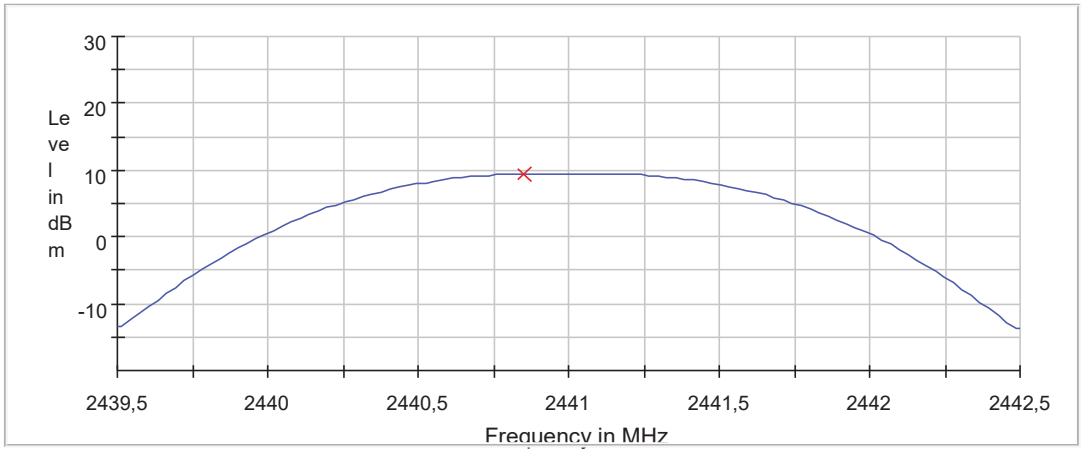
Peak Power



- Middle Channel:

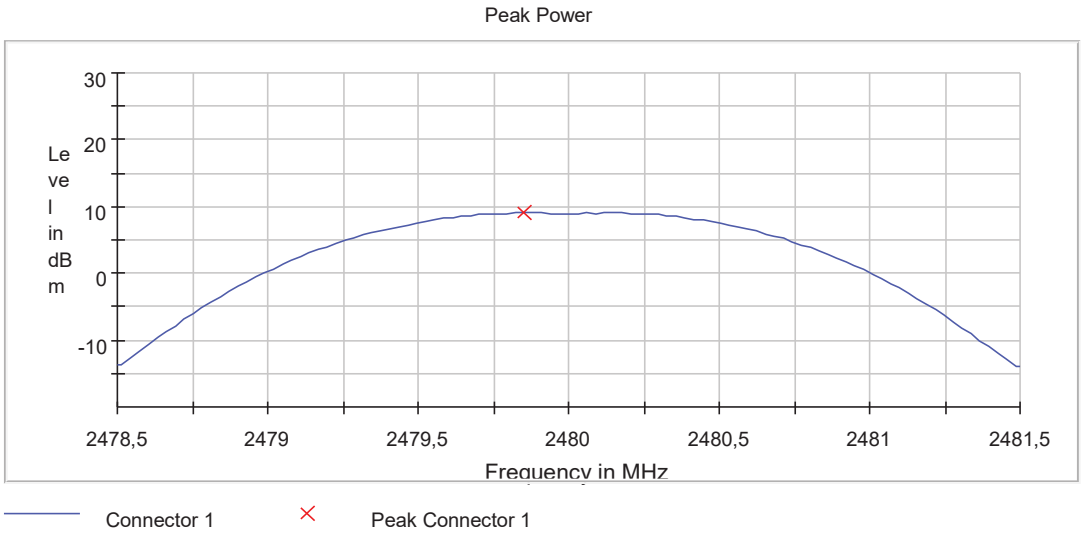
Setting	Instrument Value
Start Frequency	2.40050 GHz
Stop Frequency	2.40350 GHz
Span	3.000 MHz
RBW	1.000 MHz
VBW	3.000 MHz
Reference Level	10.000 dBm
Attenuation	30.000 dB
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold

Peak Power



- High Channel:

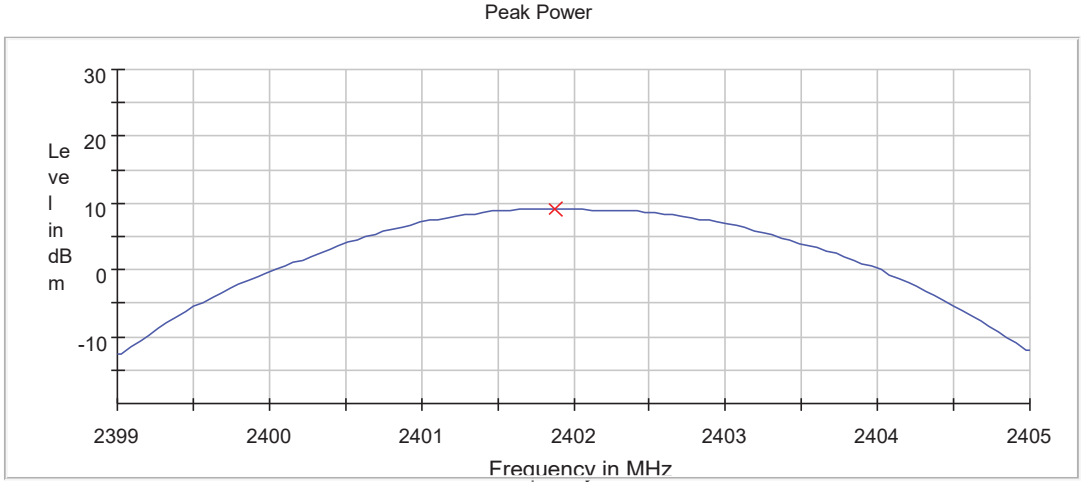
Setting	Instrument Value
Start Frequency	2.40050 GHz
Stop Frequency	2.40350 GHz
Span	3.000 MHz
RBW	1.000 MHz
VBW	3.000 MHz
Reference Level	10.000 dBm
Attenuation	30.000 dB
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold



- **Pi/4 DQPSK – Peak Output Power**

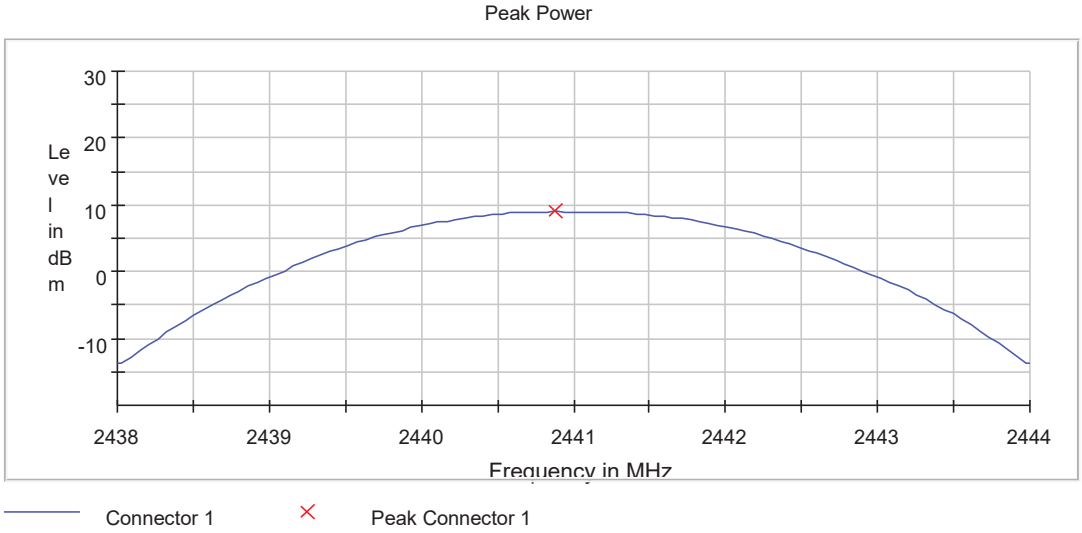
- Low Channel:

Setting	Instrument Value
Start Frequency	2.40050 GHz
Stop Frequency	2.40350 GHz
Span	3.000 MHz
RBW	1.000 MHz
VBW	3.000 MHz
Reference Level	10.000 dBm
Attenuation	30.000 dB
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold



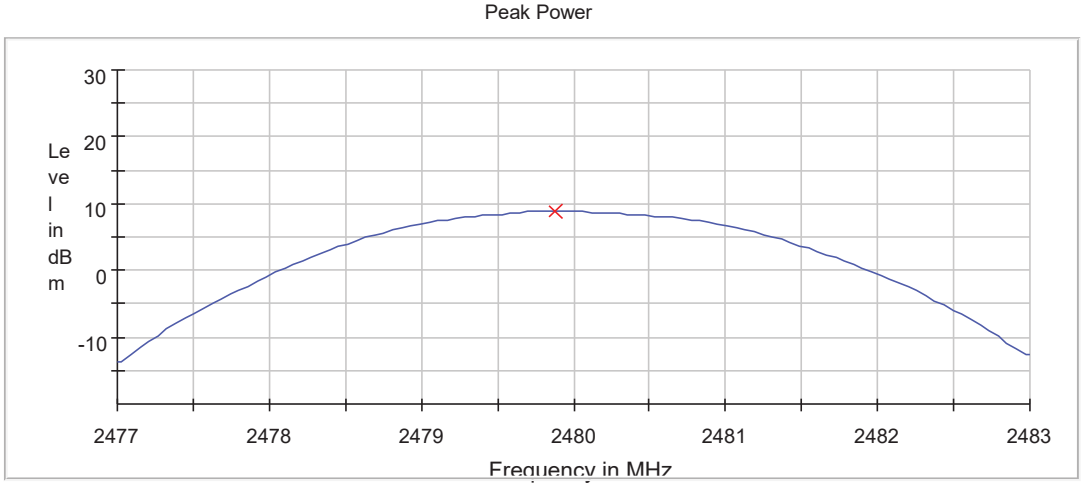
- Middle Channel:

Setting	Instrument Value
Start Frequency	2.40050 GHz
Stop Frequency	2.40350 GHz
Span	3.000 MHz
RBW	1.000 MHz
VBW	3.000 MHz
Reference Level	10.000 dBm
Attenuation	30.000 dB
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold



- High Channel:

Setting	Instrument Value
Start Frequency	2.40050 GHz
Stop Frequency	2.40350 GHz
Span	3.000 MHz
RBW	1.000 MHz
VBW	3.000 MHz
Reference Level	10.000 dBm
Attenuation	30.000 dB
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold

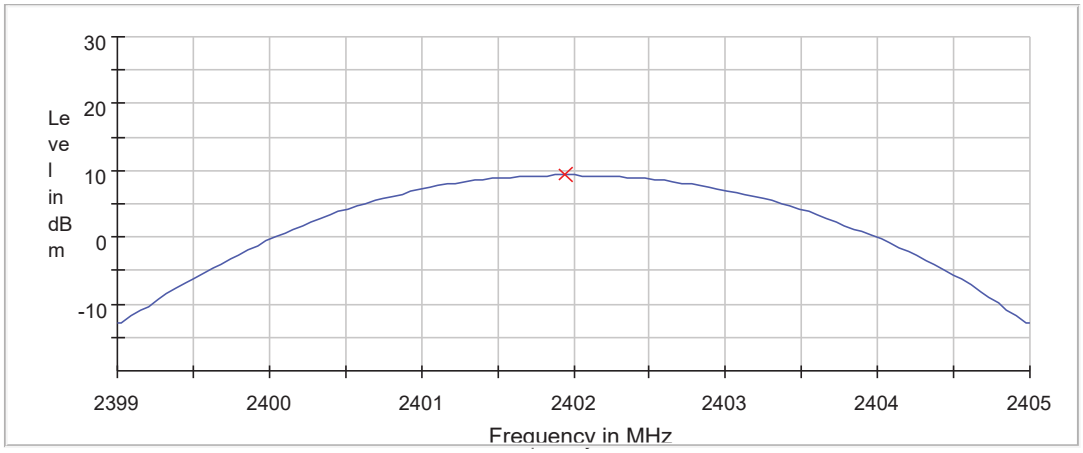


- **8DPSK – Peak Output Power**

- Low Channel:

Setting	Instrument Value
Start Frequency	2.40050 GHz
Stop Frequency	2.40350 GHz
Span	3.000 MHz
RBW	1.000 MHz
VBW	3.000 MHz
Reference Level	10.000 dBm
Attenuation	30.000 dB
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold

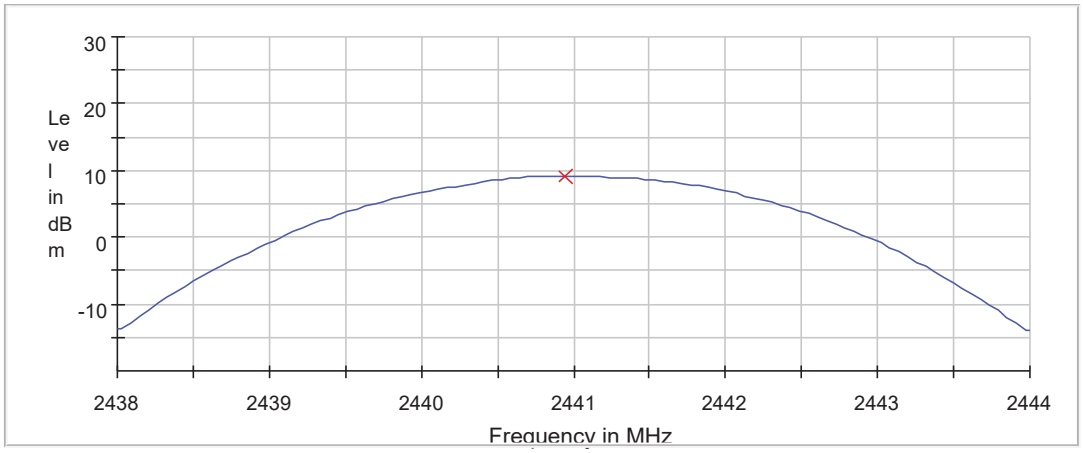
Peak Power



- Middle Channel:

Setting	Instrument Value
Start Frequency	2.40050 GHz
Stop Frequency	2.40350 GHz
Span	3.000 MHz
RBW	1.000 MHz
VBW	3.000 MHz
Reference Level	10.000 dBm
Attenuation	30.000 dB
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold

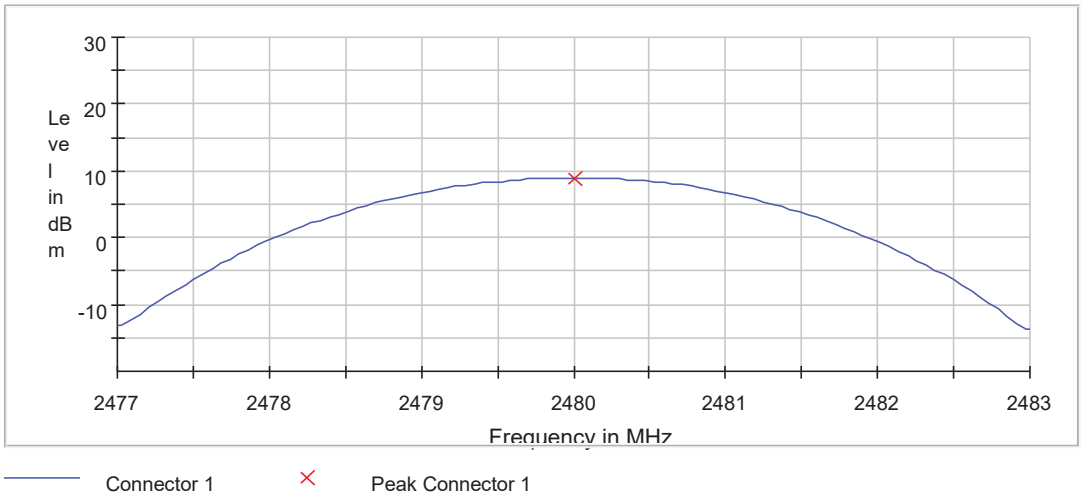
Peak Power



- High Channel:

Setting	Instrument Value
Start Frequency	2.40050 GHz
Stop Frequency	2.40350 GHz
Span	3.000 MHz
RBW	1.000 MHz
VBW	3.000 MHz
Reference Level	10.000 dBm
Attenuation	30.000 dB
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold

Peak Power



FCC Section 15.247 Subclause (d) / RSS-247 Clause 5.5. Emission limitations conducted (Transmitter)

SPECIFICATION:

In any 100 kHz bandwidths outside the frequency band in which the 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, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

RESULTS:

- **GFSK:**

	Low Channel 2402 MHz	Middle Channel 2440 MHz	High Channel 2480 MHz
Reference Level Measurement (dBm)	7.0	6.5	6.3
Measurement uncertainty (dB)	<±0.78		

- Low Channel:

No spurious peaks found at less than 20 dB below the limit.

- Middle Channel:

No spurious peaks found at less than 20 dB below the limit.

- High Channel:

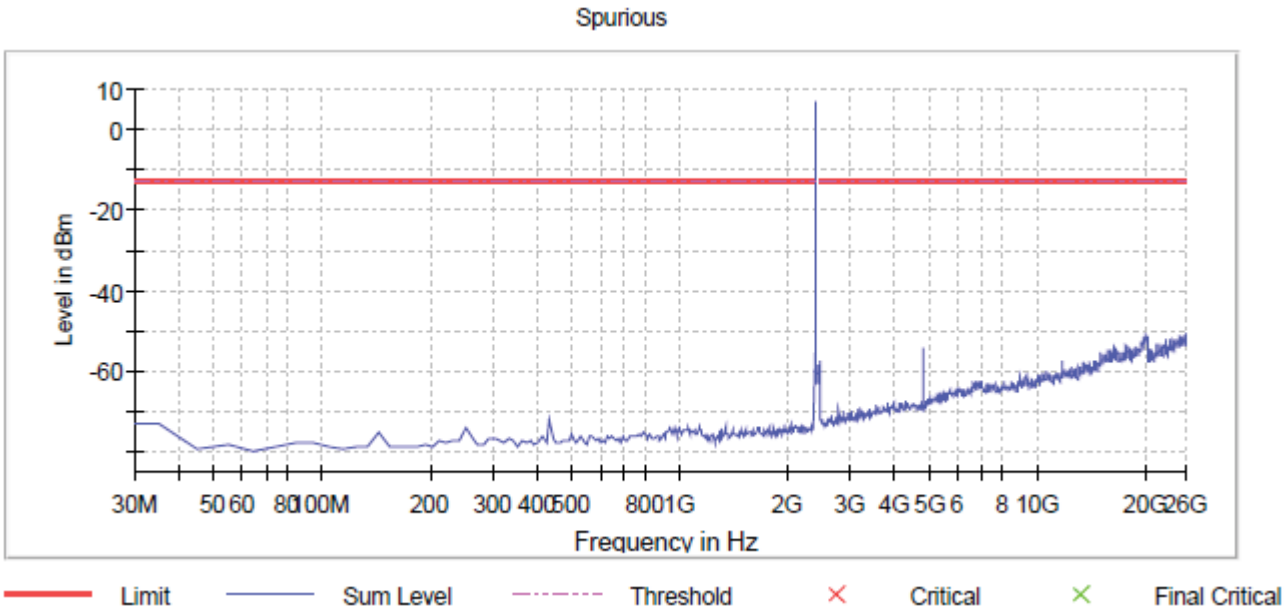
No spurious peaks found at less than 20 dB below the limit.

Measurement uncertainty (dB)	<±2.03

Verdict: PASS

- Low Channel:

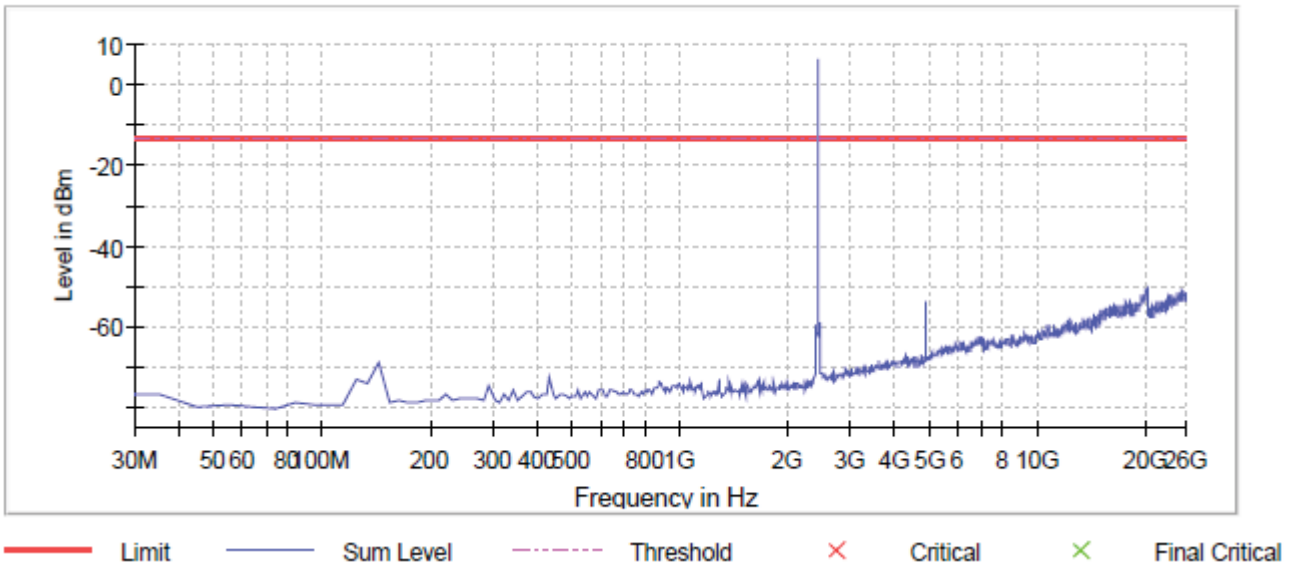
Setting	Instrument Value
Start Frequency	30 MHz
Stop Frequency	26 GHz
RBW	100.000 KHz
VBW	300.000 KHz
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold



The peak shown in the plot above the limit is the carrier frequency.

- Middle Channel:

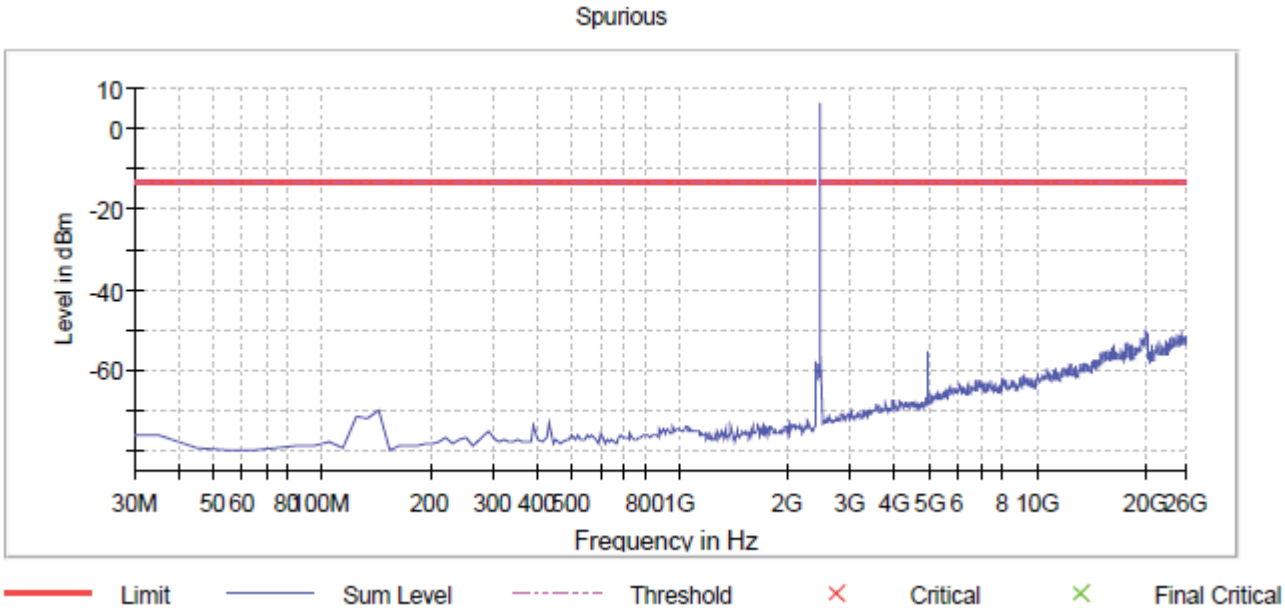
Setting	Instrument Value
Start Frequency	30 MHz
Stop Frequency	26 GHz
RBW	100.000 KHz
VBW	300.000 KHz
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold



The peak shown in the plot above the limit is the carrier frequency.

- High Channel:

Setting	Instrument Value
Start Frequency	30 MHz
Stop Frequency	26 GHz
RBW	100.000 KHz
VBW	300.000 KHz
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold



The peak shown in the plot above the limit is the carrier frequency.

- **Pi/4 DQPSK:**

	Low Channel 2402 MHz	Middle Channel 2440 MHz	High Channel 2480 MHz
Reference Level Measurement (dBm)	6.3	3.1	2.6
Measurement uncertainty (dB)	<±0.78		

- Low Channel:

No spurious peaks found at less than 20 dB below the limit.

- Middle Channel:

No spurious peaks found at less than 20 dB below the limit.

- High Channel:

No spurious peaks found at less than 20 dB below the limit.

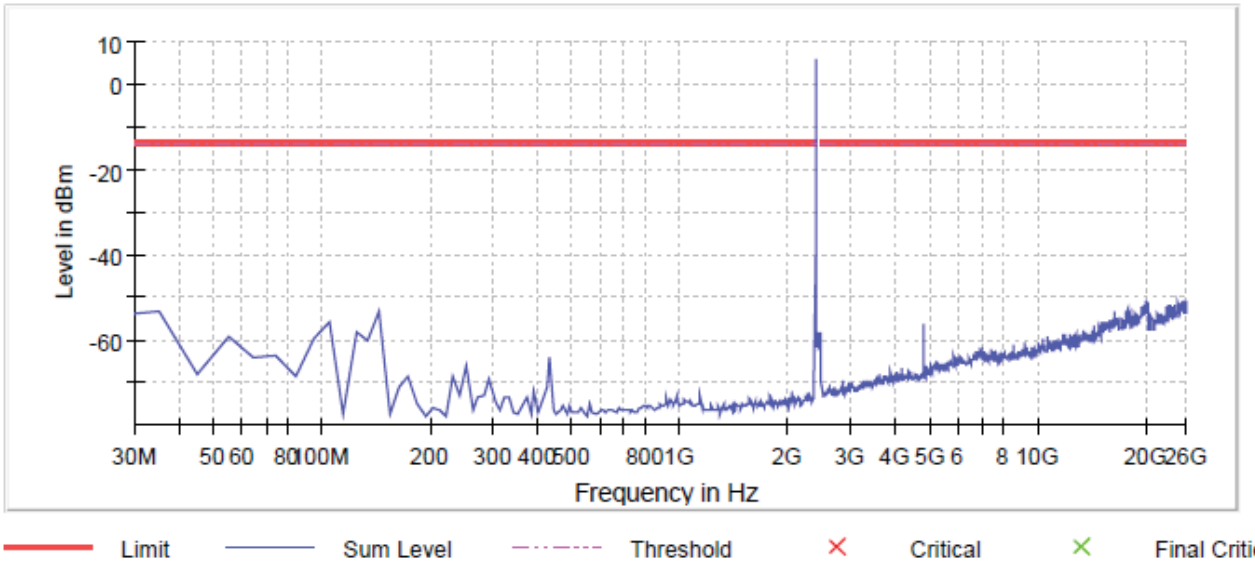
Measurement uncertainty (dB)	<±2.03

Verdict: PASS

- Low Channel:

Setting	Instrument Value
Start Frequency	30 MHz
Stop Frequency	26 GHz
RBW	100.000 KHz
VBW	300.000 KHz
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold

Spurious

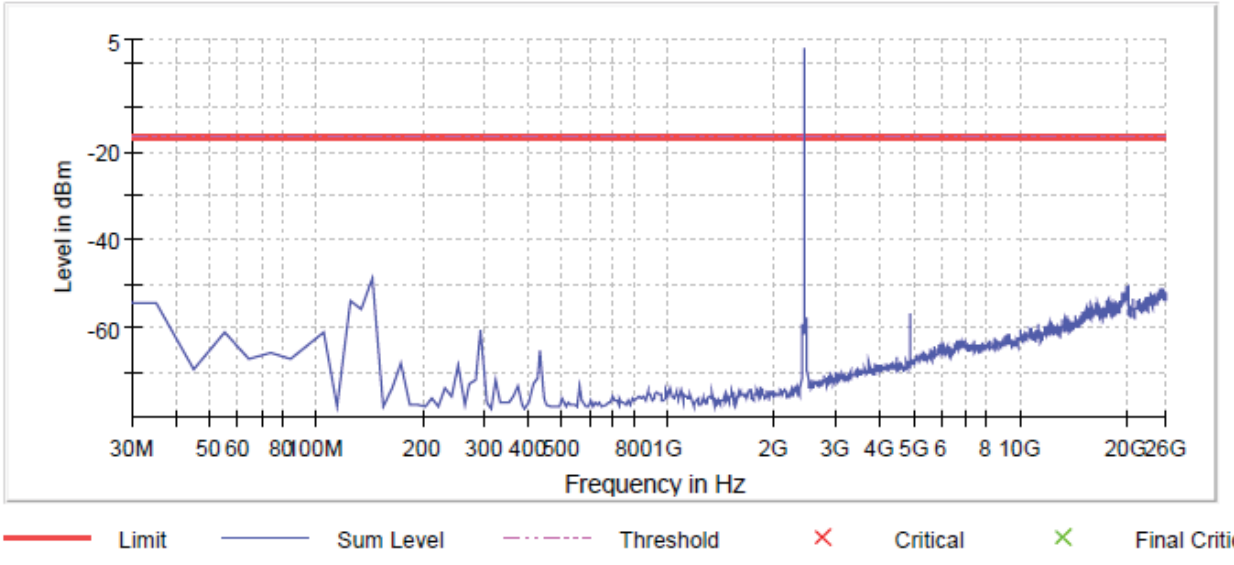


The peak shown in the plot above the limit is the carrier frequency.

- Middle Channel:

Setting	Instrument Value
Start Frequency	30 MHz
Stop Frequency	26 GHz
RBW	100.000 KHz
VBW	300.000 KHz
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold

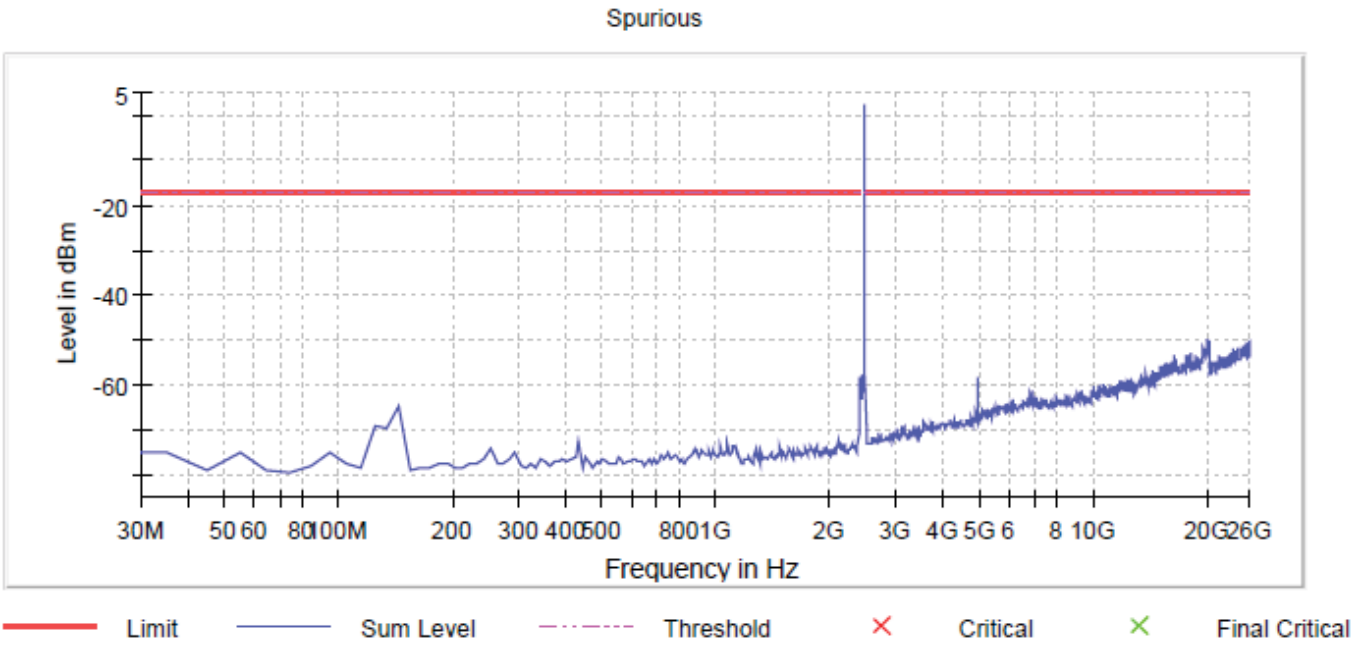
Spurious



The peak shown in the plot above the limit is the carrier frequency.

- High Channel:

Setting	Instrument Value
Start Frequency	30 MHz
Stop Frequency	26 GHz
RBW	100.000 KHz
VBW	300.000 KHz
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold



The peak shown in the plot above the limit is the carrier frequency.

- **8DPSK:**

	Low Channel 2402 MHz	Middle Channel 2440 MHz	High Channel 2480 MHz
Reference Level Measurement (dBm)	2.9	5.4	3.9
Measurement uncertainty (dB)	<±0.78		

- Low Channel:

No spurious peaks found at less than 20 dB below the limit.

- Middle Channel:

No spurious peaks found at less than 20 dB below the limit.

- High Channel:

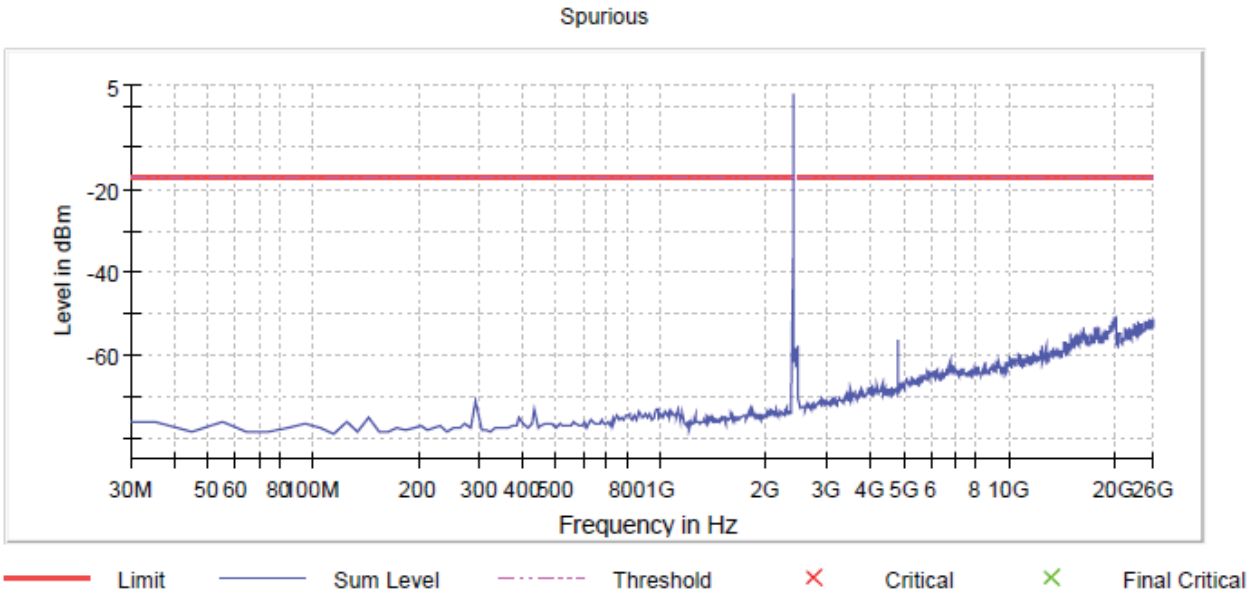
No spurious peaks found at less than 20 dB below the limit.

Measurement uncertainty (dB)	<±2.03

Verdict: PASS

- Low Channel:

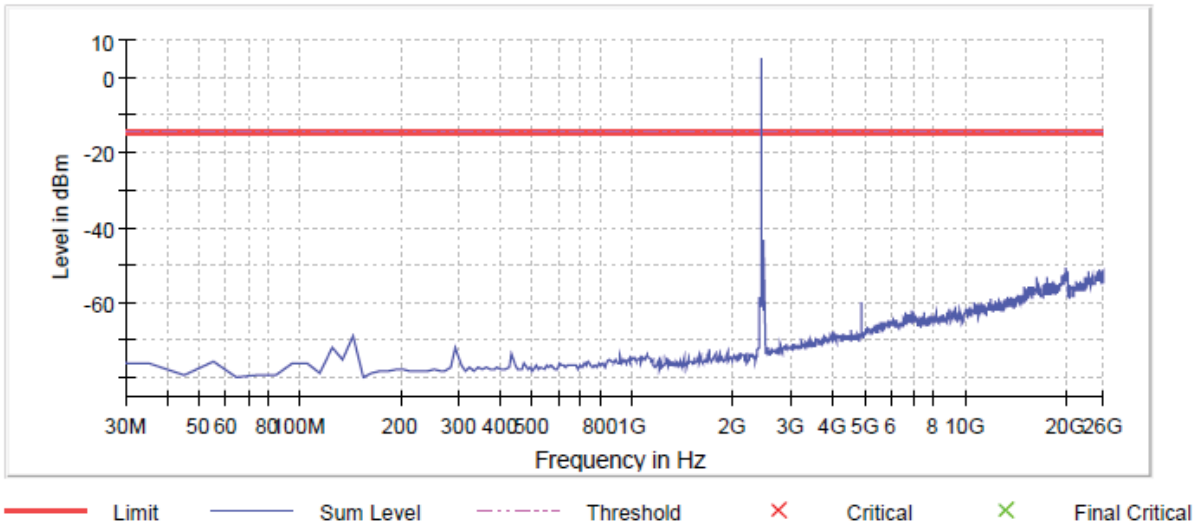
Setting	Instrument Value
Start Frequency	30 MHz
Stop Frequency	26 GHz
RBW	100.000 KHz
VBW	300.000 KHz
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold



The peak shown in the plot above the limit is the carrier frequency.

- Middle Channel:

Setting	Instrument Value
Start Frequency	30 MHz
Stop Frequency	26 GHz
RBW	100.000 KHz
VBW	300.000 KHz
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold

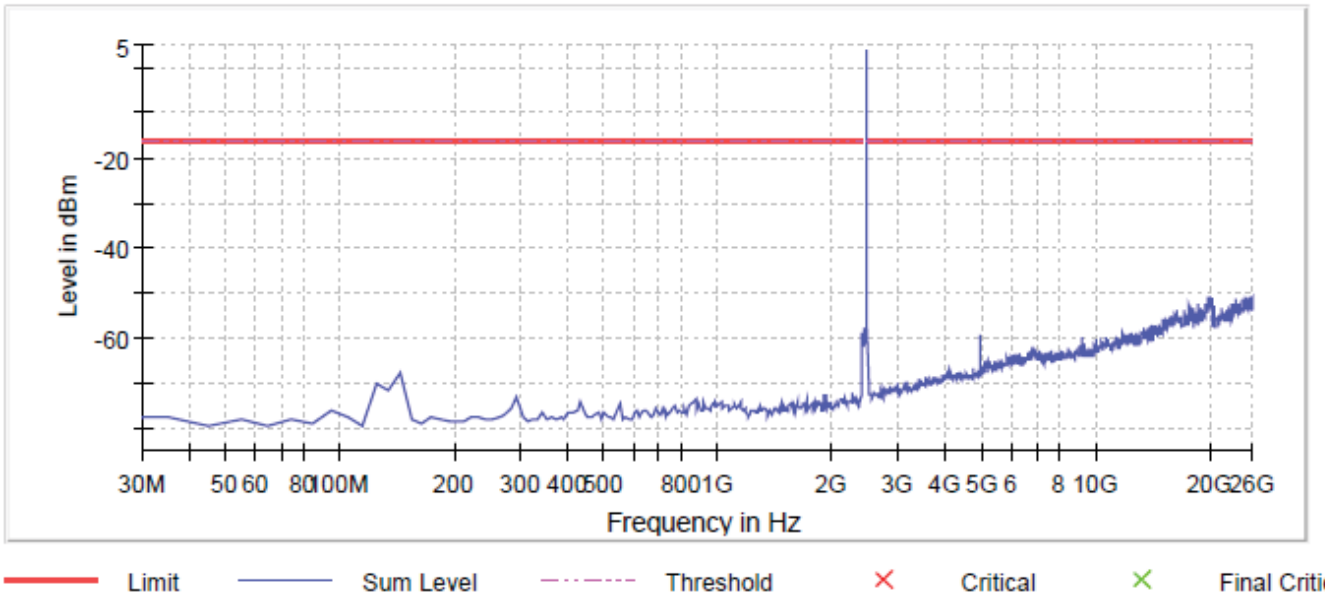


The peak shown in the plot above the limit is the carrier frequency.

- High Channel:

Setting	Instrument Value
Start Frequency	30 MHz
Stop Frequency	26 GHz
RBW	100.000 KHz
VBW	300.000 KHz
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold

Spurious



The peak shown in the plot above the limit is the carrier frequency.

FCC Section 15.247 Subclause (d) / RSS-247 Clause 5.5. Band-edge emissions compliance (Transmitter) (conducted)

SPECIFICATION:

Emissions outside the frequency band in which the intentional radiator is operating shall be at least 20 dB below the highest level of the desired power.

RESULTS:

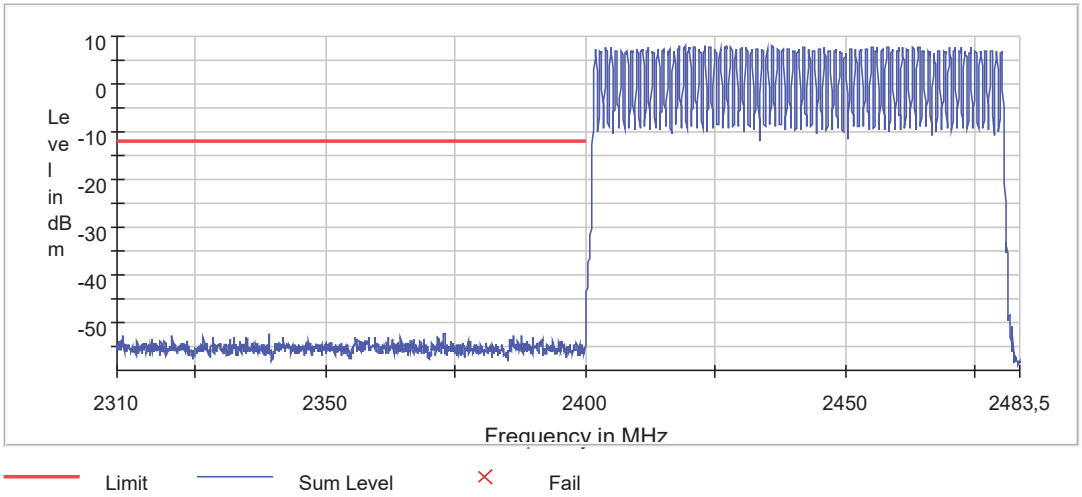
Radiated measurements were used to show compliance with the limits in the restricted bands 2.31-2.39 GHz and 2.4835-2.5 GHz.

Measurement uncertainty (dB)	<±1.56

- **GFSK – Band-edge emissions compliance**
  - HOPPING ON:
    - Low Frequency Section 2402 MHz:

Setting	Instrument Value
Start Frequency	2.31000 GHz
Stop Frequency	2.48350 GHz
RBW	100.000 KHz
VBW	300.000 KHz
Reference Level	10.000 dBm
Attenuation	30.000 dB
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold

Band Edge

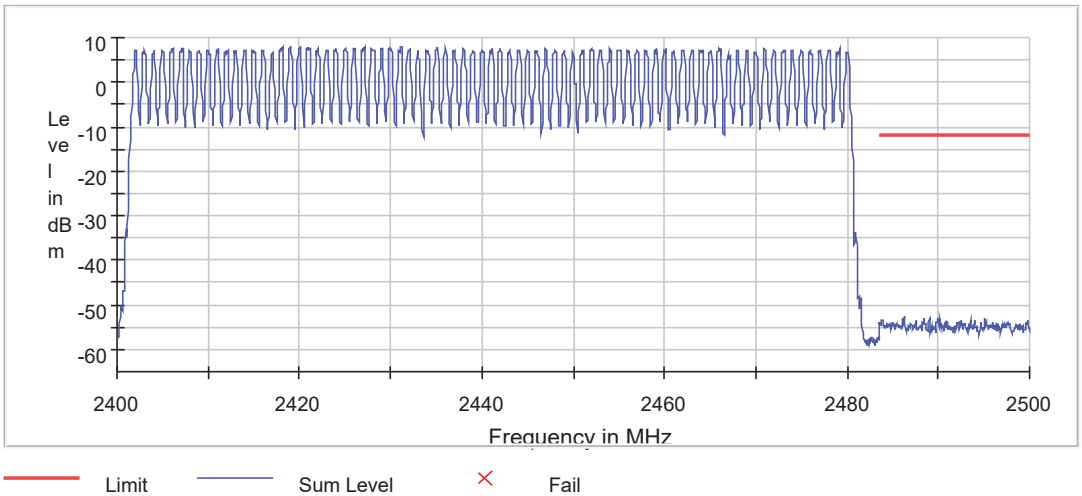


Verdict: PASS

- High Frequency Section 2480 MHz:

Setting	Instrument Value
Start Frequency	2.40000 GHz
Stop Frequency	2.50000 GHz
RBW	100.000 KHz
VBW	300.000 KHz
Reference Level	10.000 dBm
Attenuation	30.000 dB
Detector	MaxPeak
Filter	3 dB

Band Edge



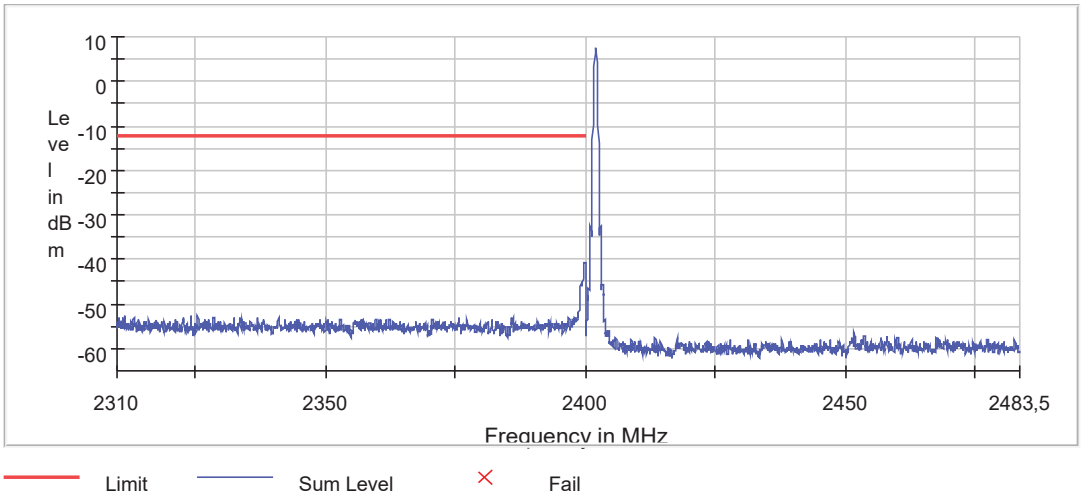
Verdict: PASS

❖ HOPPING OFF:

- Low Frequency Section 2402 MHz:

Setting	Instrument Value
Start Frequency	2.31000 GHz
Stop Frequency	2.48350 GHz
RBW	100.000 KHz
VBW	300.000 KHz
Reference Level	10.000 dBm
Attenuation	30.000 dB
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold

Band Edge

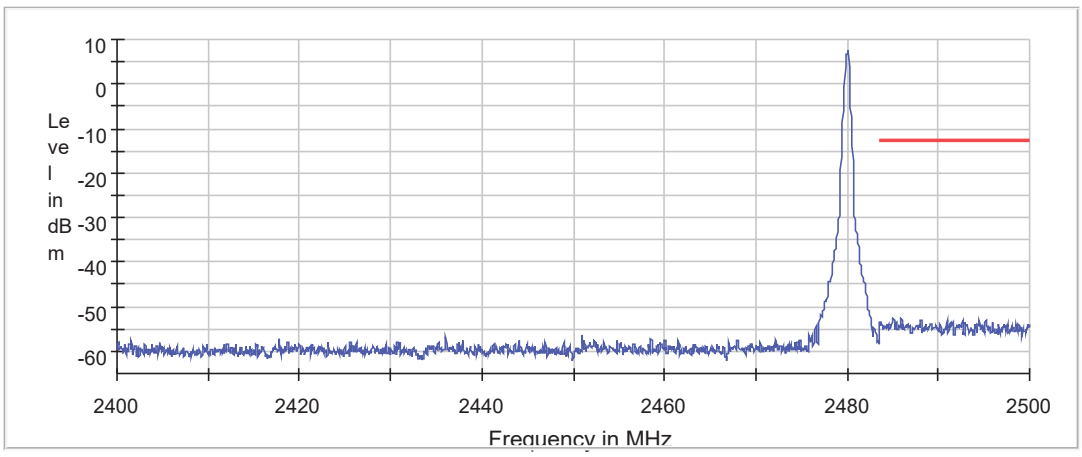


Verdict: PASS

- High Frequency Section 2480 MHz:

Setting	Instrument Value
Start Frequency	2.40000 GHz
Stop Frequency	2.50000 GHz
RBW	100.000 KHz
VBW	300.000 KHz
Reference Level	10.000 dBm
Attenuation	30.000 dB
Detector	MaxPeak
Filter	3 dB

Band Edge

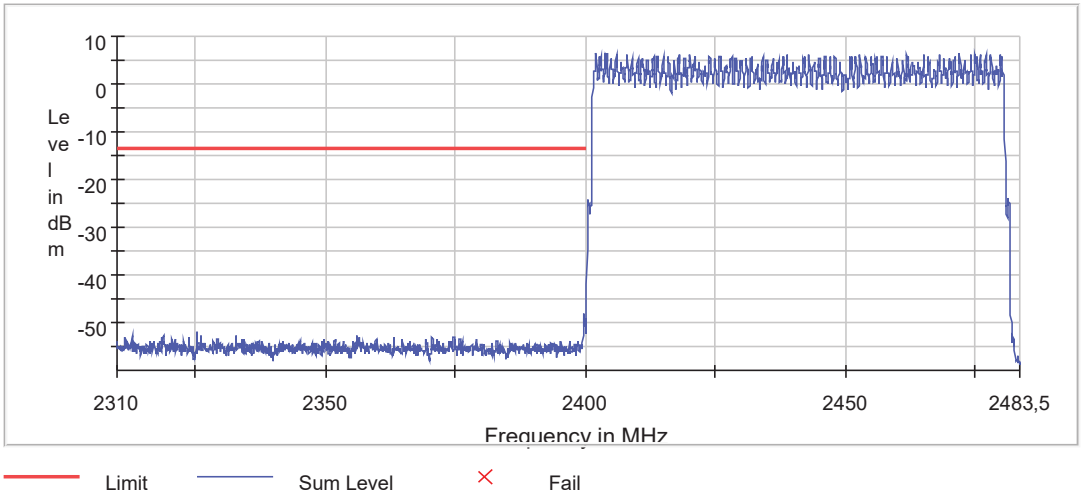


Verdict: PASS

- **Pi/4 DQPSK – Band-edge emissions compliance**
  - HOPPING ON:
    - Low Frequency Section 2402 MHz:

Setting	Instrument Value
Start Frequency	2.31000 GHz
Stop Frequency	2.48350 GHz
RBW	100.000 KHz
VBW	300.000 KHz
Reference Level	10.000 dBm
Attenuation	30.000 dB
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold

Band Edge

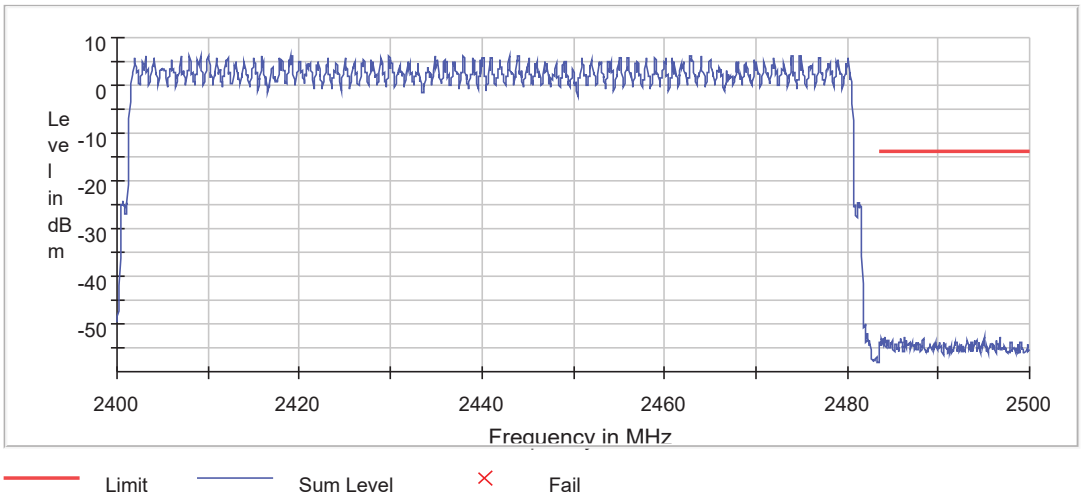


Verdict: PASS

- High Frequency Section 2480 MHz:

Setting	Instrument Value
Start Frequency	2.40000 GHz
Stop Frequency	2.50000 GHz
RBW	100.000 KHz
VBW	300.000 KHz
Reference Level	10.000 dBm
Attenuation	30.000 dB
Detector	MaxPeak
Filter	3 dB

Band Edge



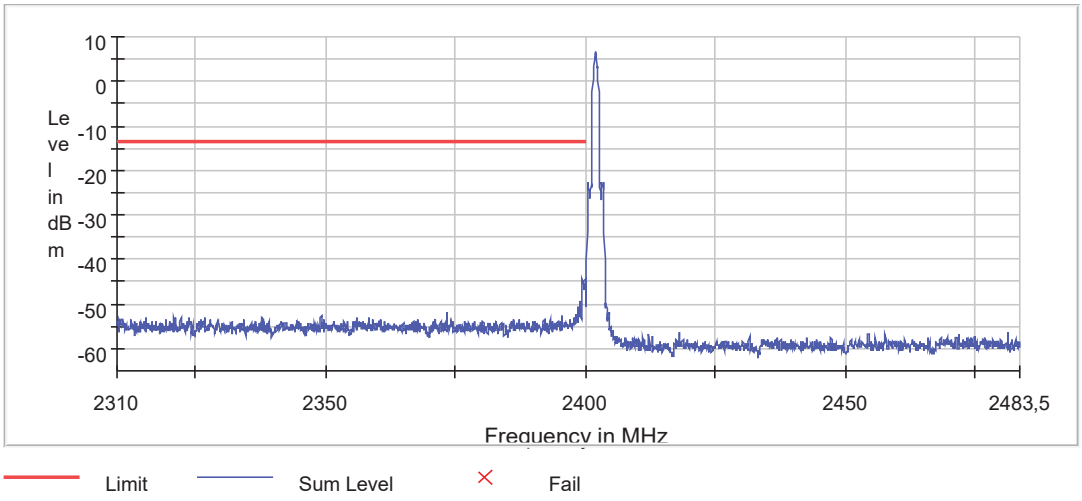
Verdict: PASS

❖ HOPPING OFF:

- Low Frequency Section 2402 MHz:

Setting	Instrument Value
Start Frequency	2.31000 GHz
Stop Frequency	2.48350 GHz
RBW	100.000 KHz
VBW	300.000 KHz
Reference Level	10.000 dBm
Attenuation	30.000 dB
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold

Band Edge

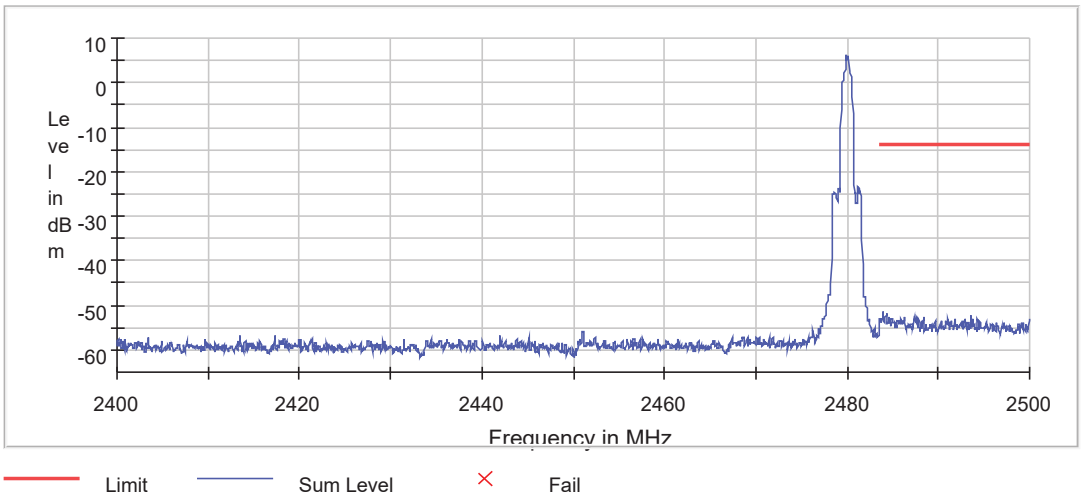


Verdict: PASS

- High Frequency Section 2480 MHz:

Setting	Instrument Value
Start Frequency	2.40000 GHz
Stop Frequency	2.50000 GHz
RBW	100.000 KHz
VBW	300.000 KHz
Reference Level	10.000 dBm
Attenuation	30.000 dB
Detector	MaxPeak
Filter	3 dB

Band Edge



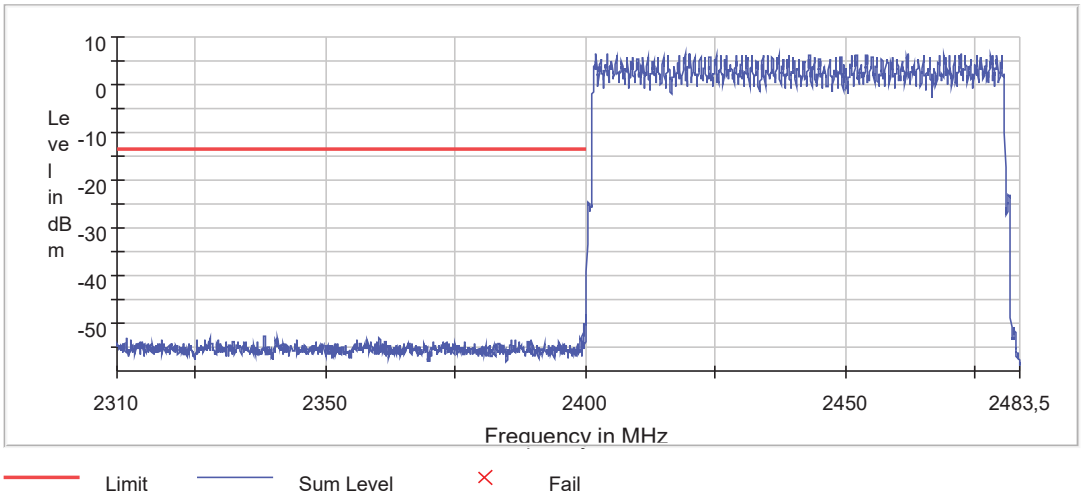
Verdict: PASS

- **8DPSK – Band-edge emissions compliance**

  - HOPPING ON:
    - Low Frequency Section 2402 MHz:

Setting	Instrument Value
Start Frequency	2.31000 GHz
Stop Frequency	2.48350 GHz
RBW	100.000 KHz
VBW	300.000 KHz
Reference Level	10.000 dBm
Attenuation	30.000 dB
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold

Band Edge

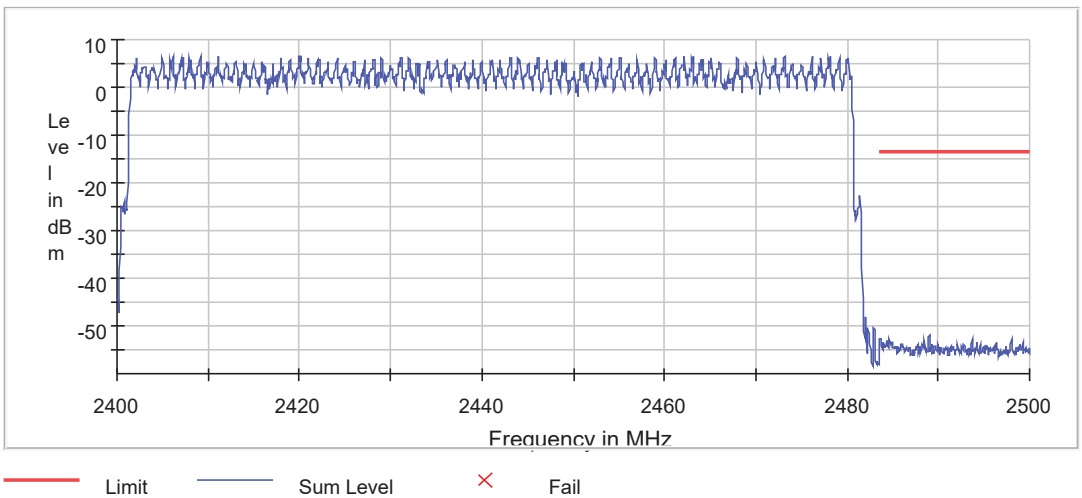


Verdict: PASS

- High Frequency Section 2480 MHz:

Setting	Instrument Value
Start Frequency	2.40000 GHz
Stop Frequency	2.50000 GHz
RBW	100.000 KHz
VBW	300.000 KHz
Reference Level	10.000 dBm
Attenuation	30.000 dB
Detector	MaxPeak
Filter	3 dB

Band Edge



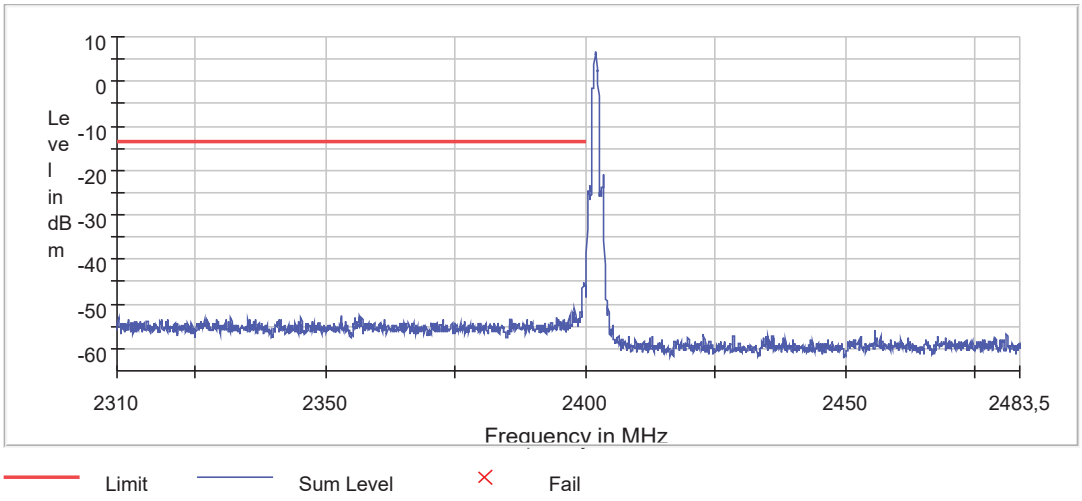
Verdict: PASS

❖ HOPPING OFF:

- Low Frequency Section 2402 MHz:

Setting	Instrument Value
Start Frequency	2.31000 GHz
Stop Frequency	2.48350 GHz
RBW	100.000 KHz
VBW	300.000 KHz
Reference Level	10.000 dBm
Attenuation	30.000 dB
Detector	MaxPeak
Filter	3 dB
Trace Mode	Max Hold

Band Edge

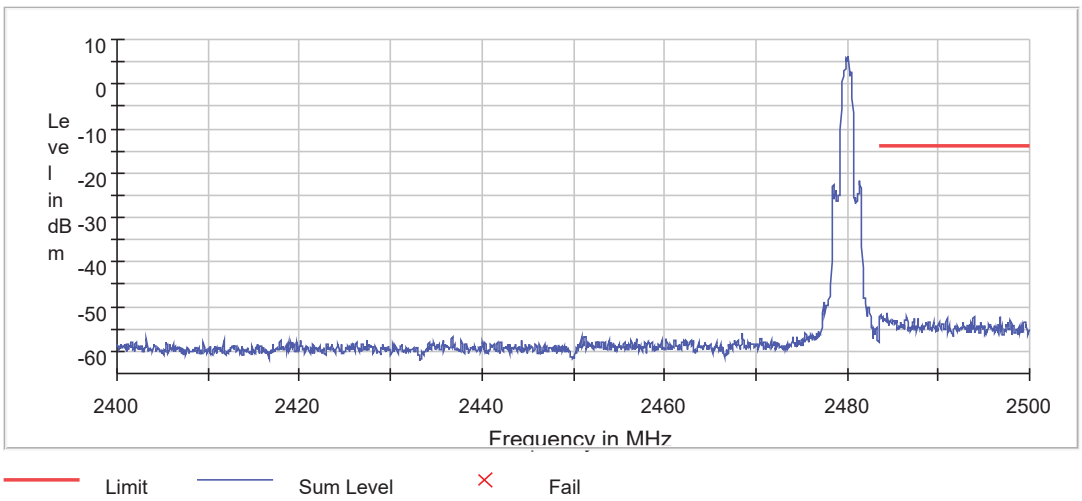


Verdict: PASS

- High Frequency Section 2480 MHz:

Setting	Instrument Value
Start Frequency	2.40000 GHz
Stop Frequency	2.50000 GHz
RBW	100.000 KHz
VBW	300.000 KHz
Reference Level	10.000 dBm
Attenuation	30.000 dB
Detector	MaxPeak
Filter	3 dB

Band Edge



Verdict: PASS

FCC Section 15.247 Subclause (d) / RSS-247 Clause 5.5. Emission limitations radiated (Transmitter)

SPECIFICATION:

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)/RSS-Gen):

Frequency Range (MHz)	Field strength (µV/m)	Field strength (dBµV/m)	Measurement distance (m)
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	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
960 - 25000	500	54	3

The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function.

RSS-247. Attenuation below the general field strength limits specified in RSS-Gen is not required.

RESULTS:

The situation and orientation was varied to find the maximum radiated emission. It was also rotated 360º and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

All tests were performed in a semi-anechoic chamber at a distance of 3 m for the frequency range 30 MHz-1000 MHz and at distance of 1m for the frequency range 1 GHz-25 GHz.

The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

Frequency range 30 MHz - 1 GHz:

The spurious frequencies do not depend neither on the operating channel nor the modulation.

Spurious frequencies found at less than 20 dB of the limit:

Spurious frequency (MHz)	Detector	Emission Level (dBµV/m)	Polarization	Measurement Uncertainty (dB)
65.066	Quasi peak	21.2	V	<± 3.81
124.785	Quasi peak	25.5	V	<± 3.81

GFSK

Frequency range 1 - 26 GHz:

The results in the next tables show the maximum measured levels in the 1-26 GHz range including the restricted bands 2.31-2.39 GHz and 2.4835-2.5 GHz.

Spurious signals with peak levels above the average limit (54 dBµV/m at 3 m) are measured with average detector for checking compliance with the average limit.

- LOW CHANNEL. Spurious signals closest to the limit:

No spurious frequencies found at less than 20 dB of the limit.

- MIDDLE CHANNEL. Spurious signals closest to the limit:

No spurious frequencies found at less than 20 dB of the limit.

- HIGH CHANNEL. Spurious signals closest to the limit:

Spurious frequency (MHz)	Detector	Emission Level (dBµV/m)	Polarization	Measurement Uncertainty (dB)
2.4835	Peak	53.86	V	<± 2.78

Verdict: PASS

- **Pi/4 DQPSK**

Frequency range 1 - 26 GHz:

The results in the next tables show the maximum measured levels in the 1-26 GHz range including the restricted bands 2.31-2.39 GHz and 2.4835-2.5 GHz.

Spurious signals with peak levels above the average limit (54 dBµV/m at 3 m) are measured with average detector for checking compliance with the average limit.

- LOW CHANNEL. Spurious signals closest to the limit:

No spurious frequencies found at less than 20 dB of the limit.

- MIDDLE CHANNEL. Spurious signals closest to the limit:

Spurious frequency (MHz)	Detector	Emission Level (dBµV/m)	Polarization	Measurement Uncertainty (dB)
10.53146	Peak	51.21	V	<± 4.72

- HIGH CHANNEL. Spurious signals closest to the limit:

Spurious frequency (MHz)	Detector	Emission Level (dBµV/m)	Polarization	Measurement Uncertainty (dB)
1.766436	Peak	46.12	V	<± 2.78
2.48353	Peak	51.06	V	<± 2.78
10.53144	Peak	51.3	H	<± 4.72

Verdict: PASS

- **8DPSK**

Frequency range 1 - 26 GHz:

The results in the next tables show the maximum measured levels in the 1-26 GHz range including the restricted bands 2.31-2.39 GHz and 2.4835-2.5 GHz.

Spurious signals with peak levels above the average limit (54 dBµV/m at 3 m) are measured with average detector for checking compliance with the average limit.

- LOW CHANNEL. Spurious signals closest to the limit:

Spurious frequency (MHz)	Detector	Emission Level (dBµV/m)	Polarization	Measurement Uncertainty (dB)
4.8039	Peak	42.08	V	<± 4.72
13.22682	Peak	53.89	H	<± 4.72

- MIDDLE CHANNEL. Spurious signals closest to the limit:

No spurious frequencies found at less than 20 dB of the limit.

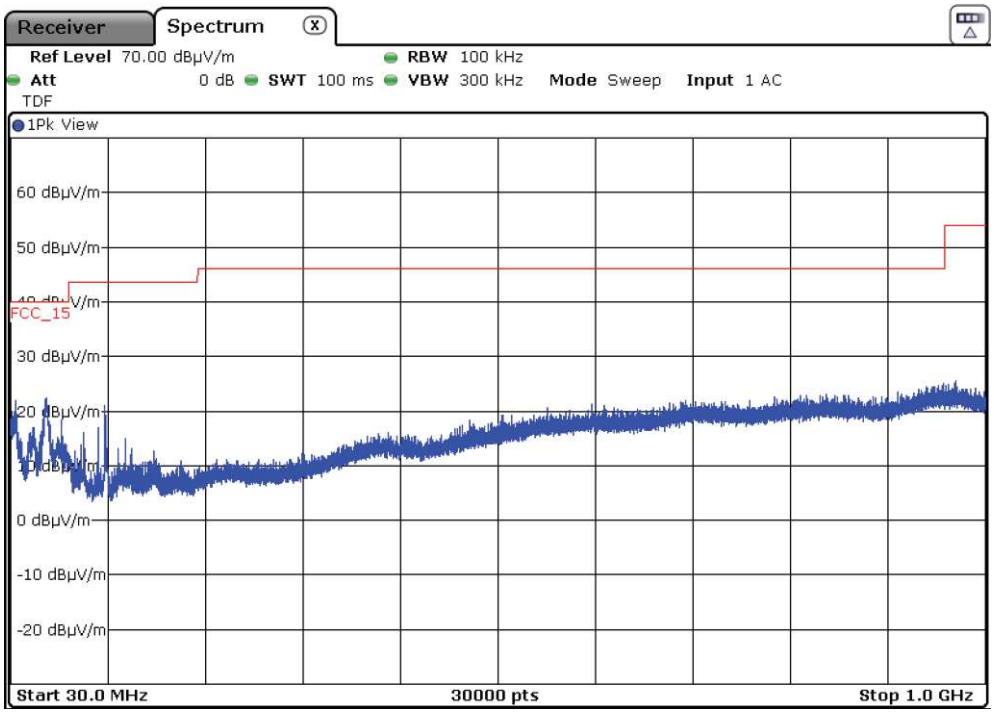
- HIGH CHANNEL. Spurious signals closest to the limit:

Spurious frequency (MHz)	Detector	Emission Level (dBµV/m)	Polarization	Measurement Uncertainty (dB)
2.48352	Peak	54.26	V	<± 2.78
	Average	39.92		

Verdict: PASS

FREQUENCY RANGE 30 MHz - 1 GHz:

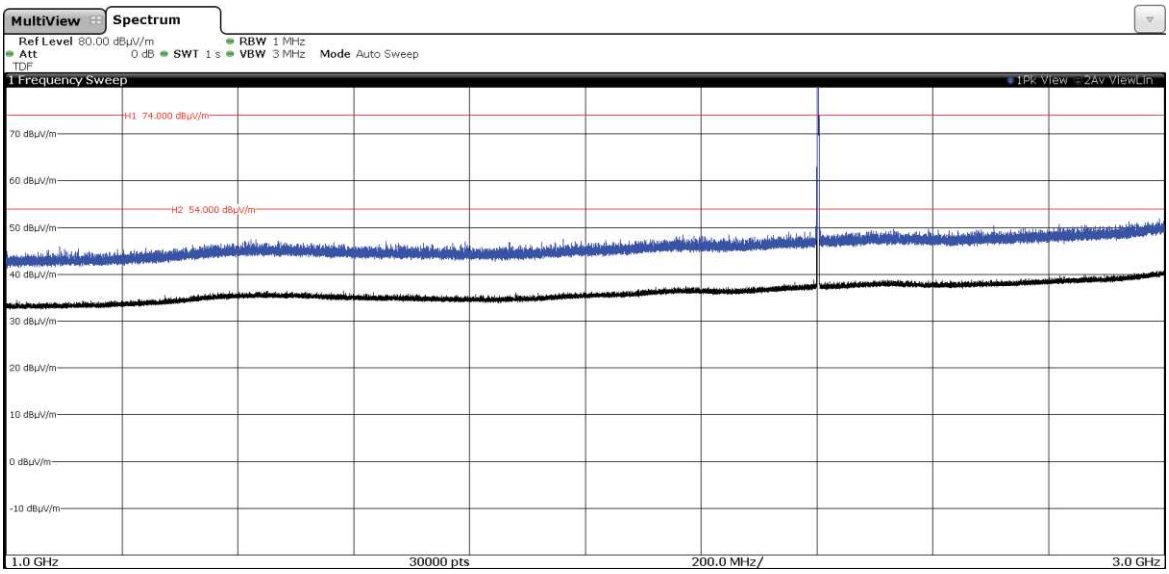
The spurious signals detected do not depend on either the operating channel or the modulation mode.



FREQUENCY RANGE 1 - 3 GHz:

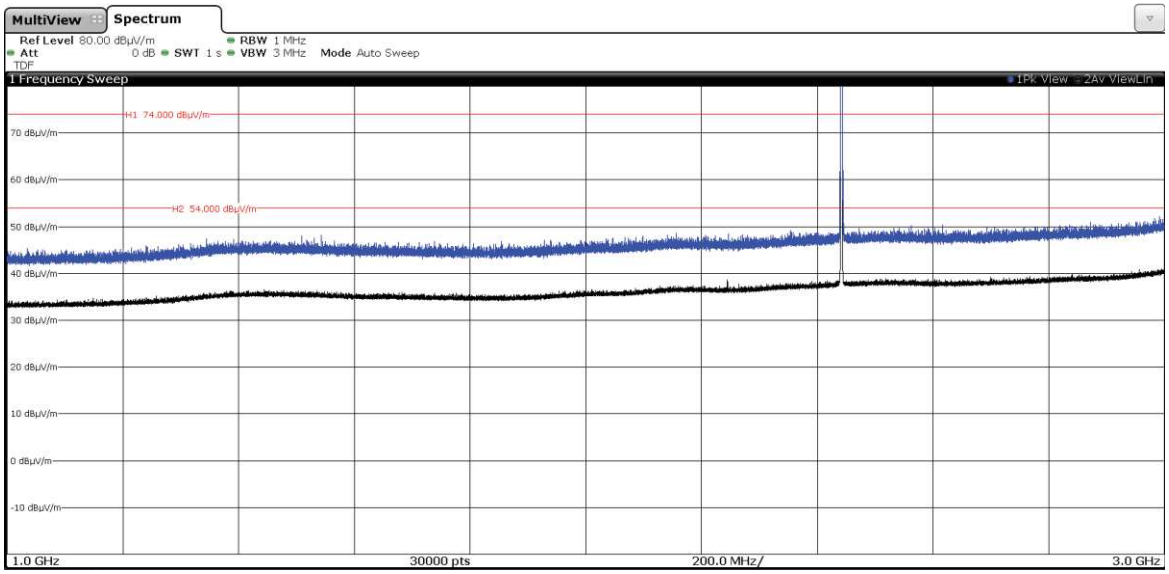
- **GFSK**

- Low Channel:



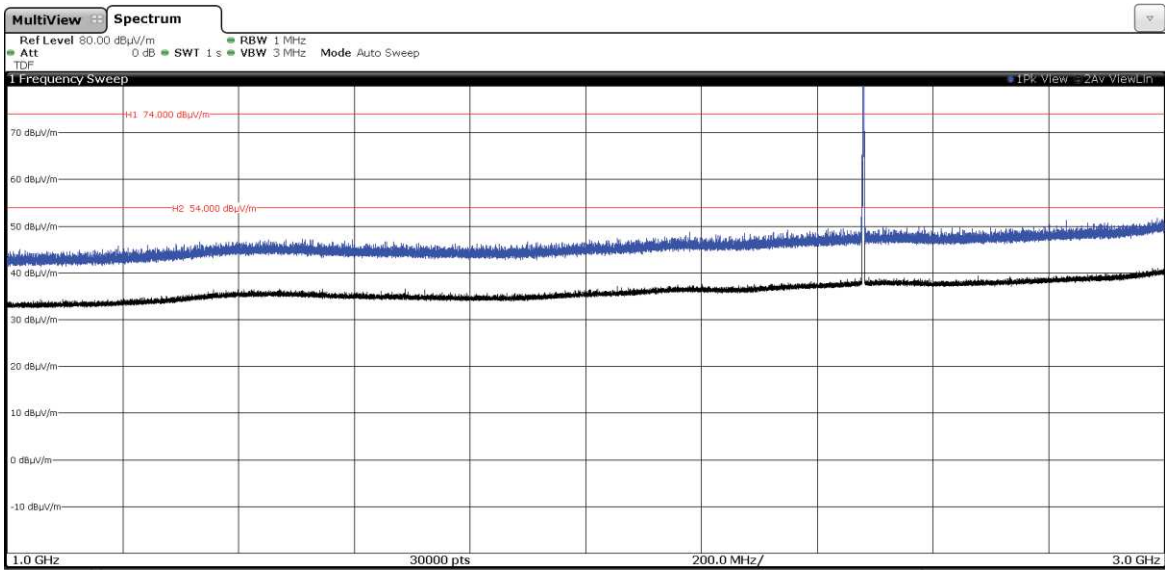
The peak above the limit is the carrier frequency.

- Middle Channel:



The peak above the limit is the carrier frequency.

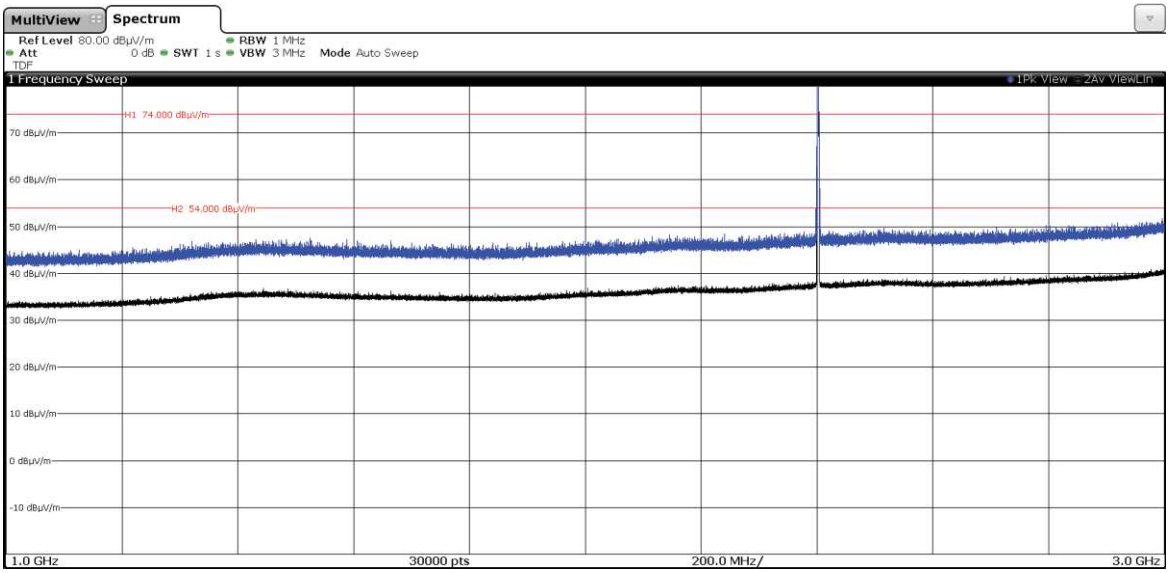
- High Channel:



The peak above the limit is the carrier frequency.

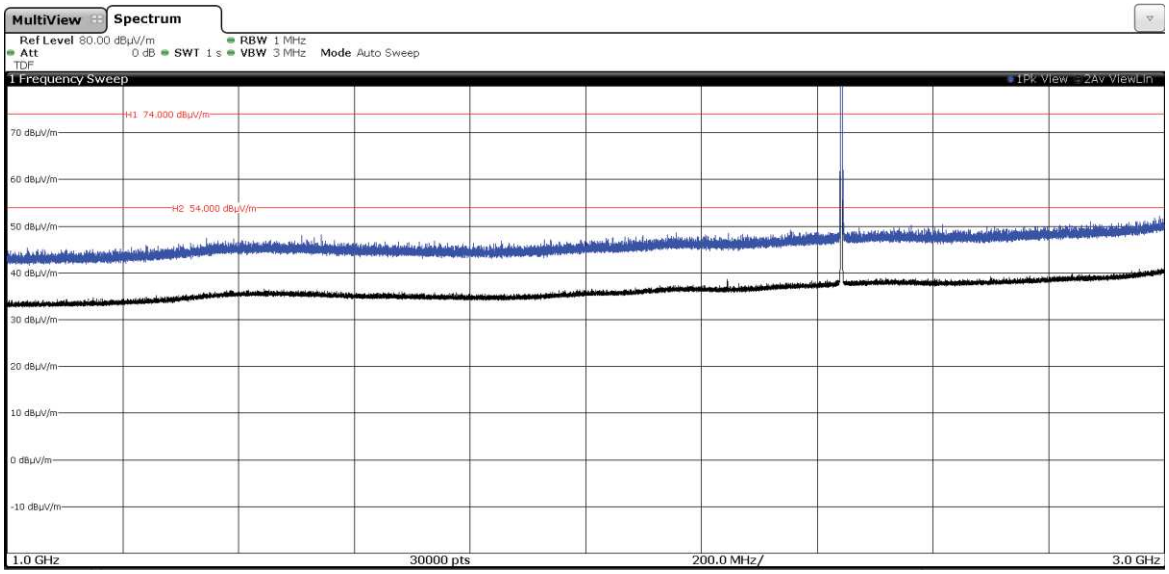
- **Pi/4 DQPSK**

- Low Channel:



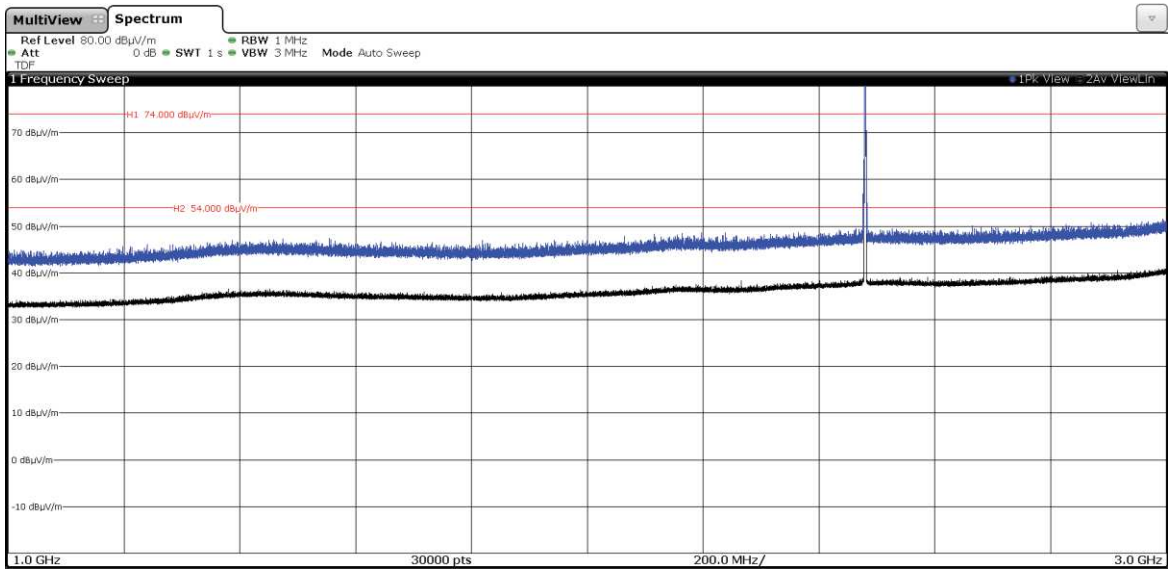
The peak above the limit is the carrier frequency.

- Middle Channel:



The peak above the limit is the carrier frequency.

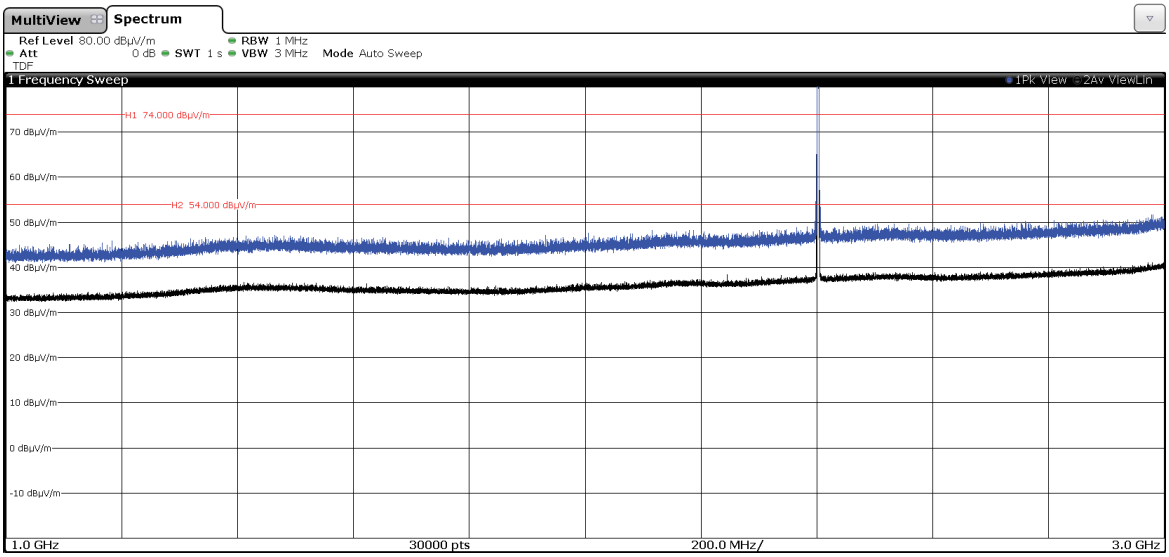
- High Channel:



The peak above the limit is the carrier frequency.

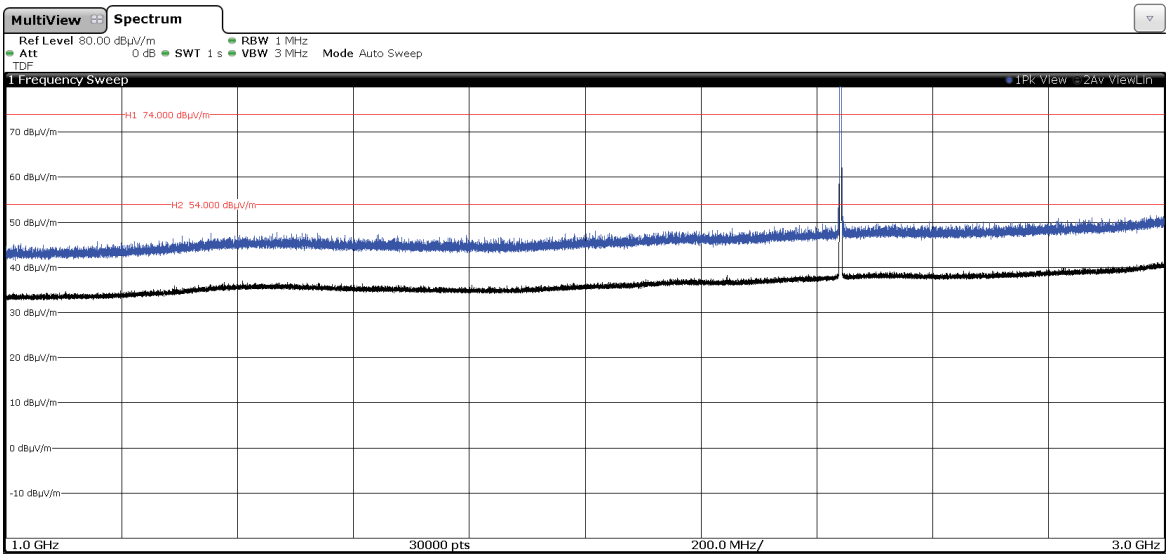
- **8DPSK**

- Low Channel:



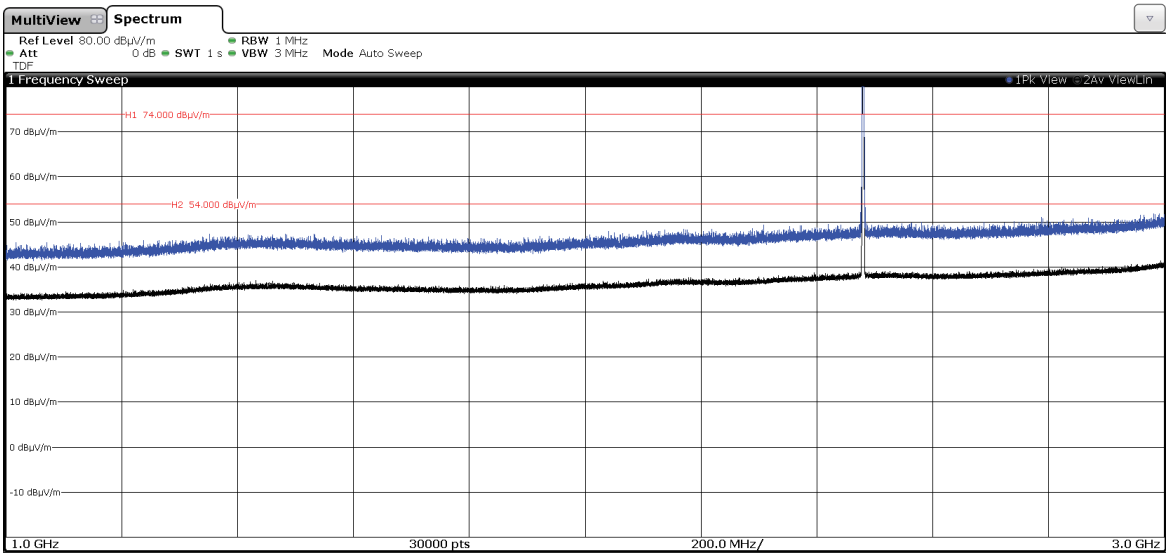
The peak above the limit is the carrier frequency.

- Middle Channel:



The peak above the limit is the carrier frequency.

- High Channel:

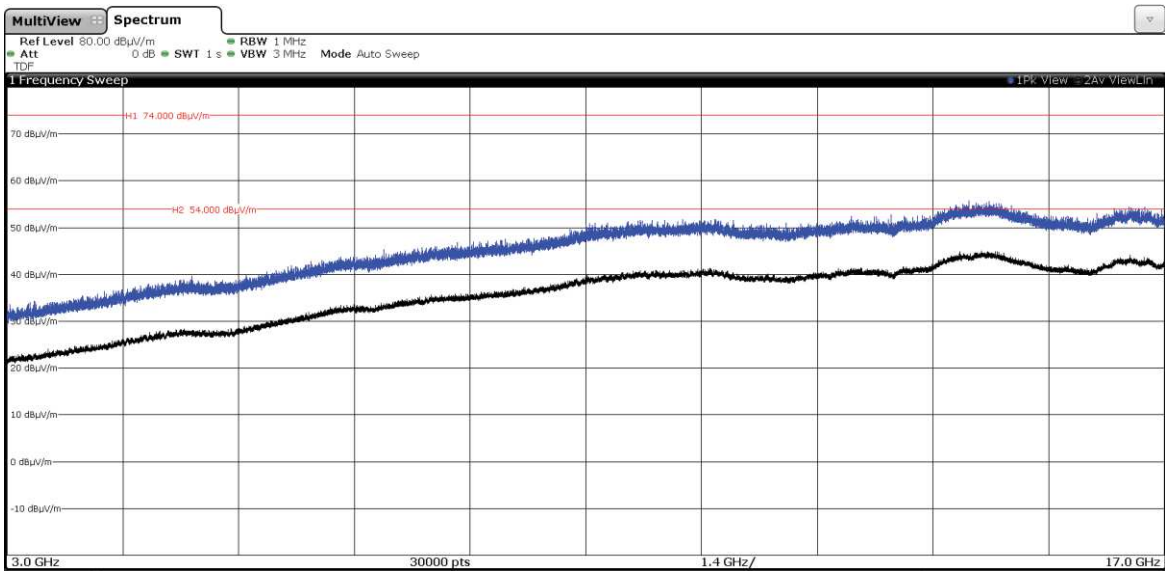


The peak above the limit is the carrier frequency.

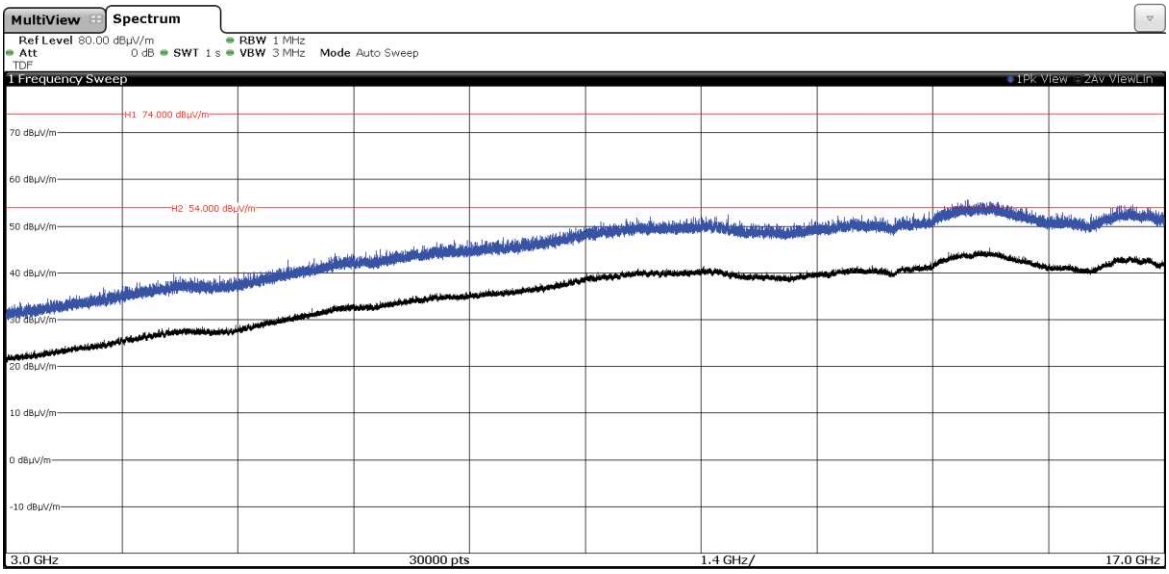
FREQUENCY RANGE 3 - 17 GHz:

- **GFSK**

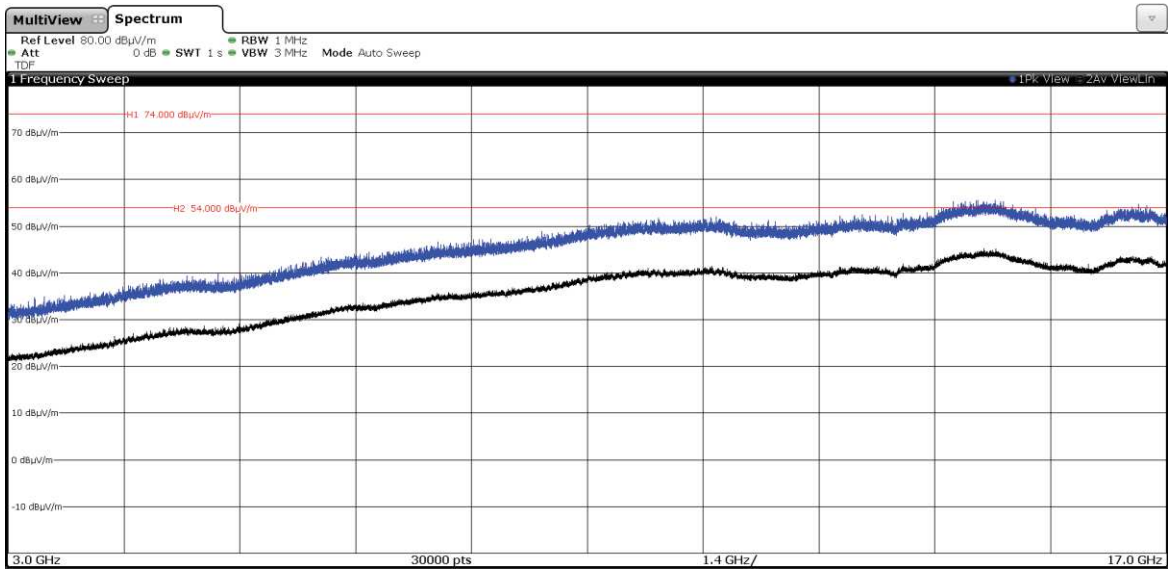
- Low Channel:



- Middle Channel:

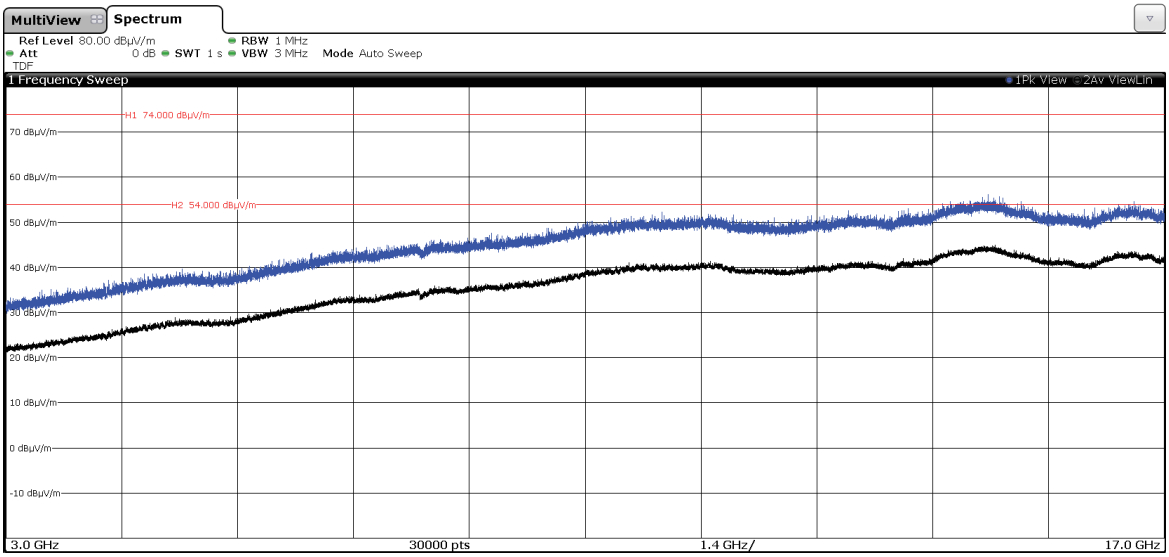


- High Channel:

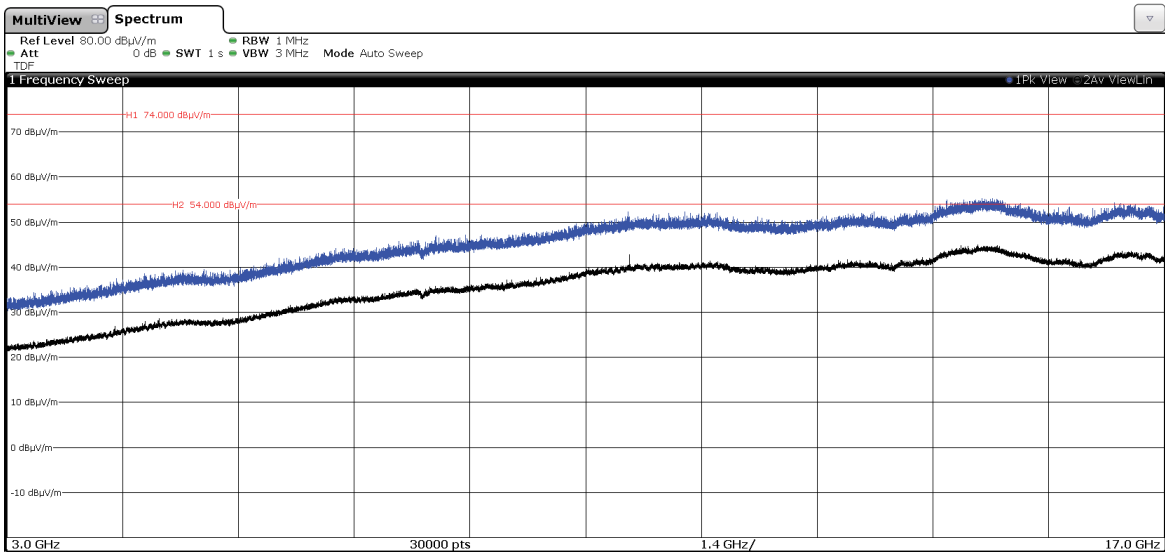


- **Pi/4 DQPSK**

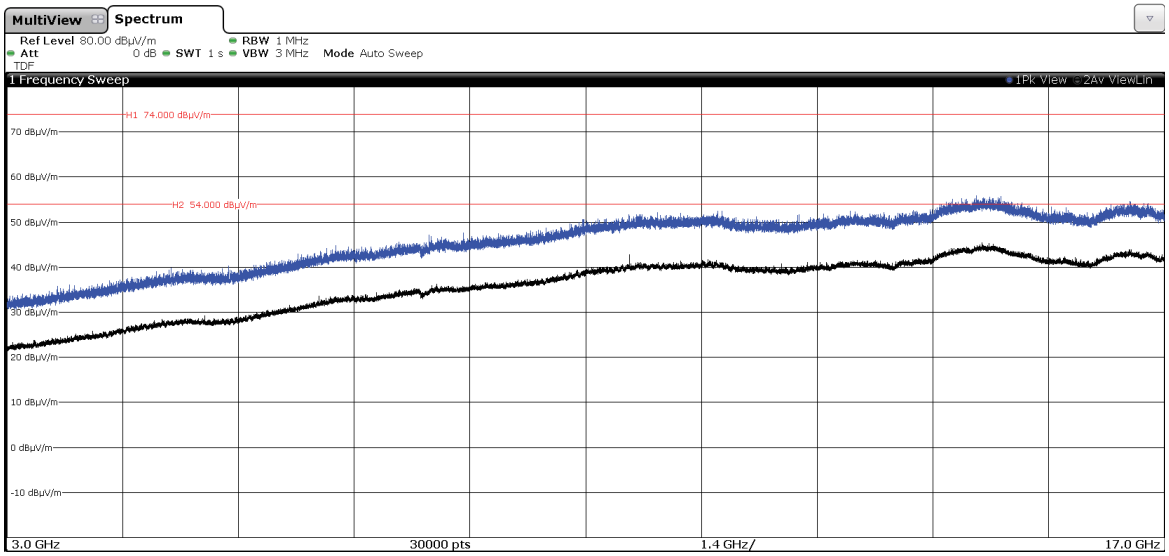
- Low Channel:



- Middle Channel:

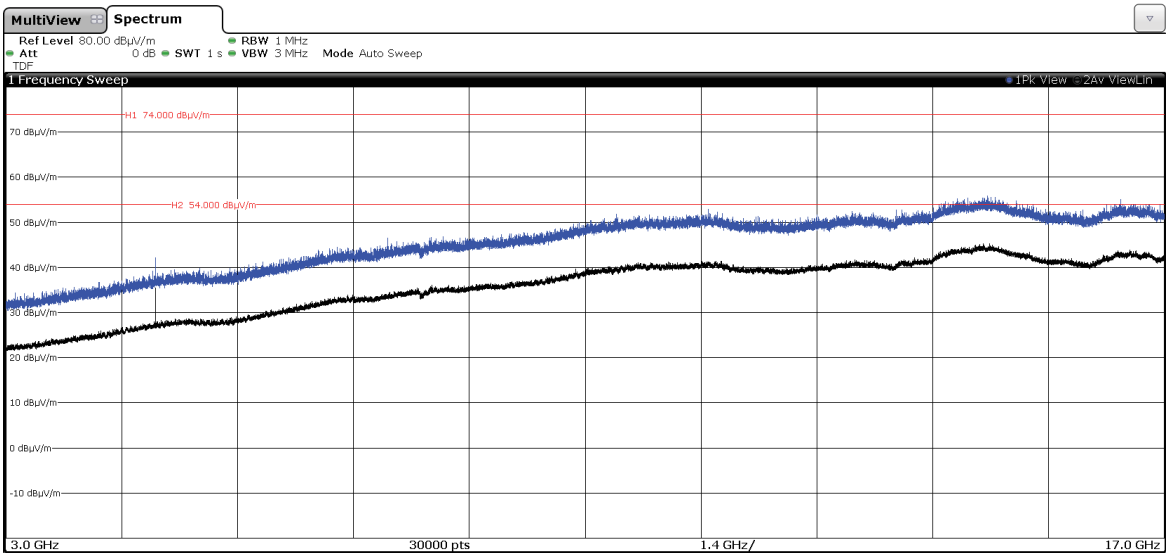


- High Channel:

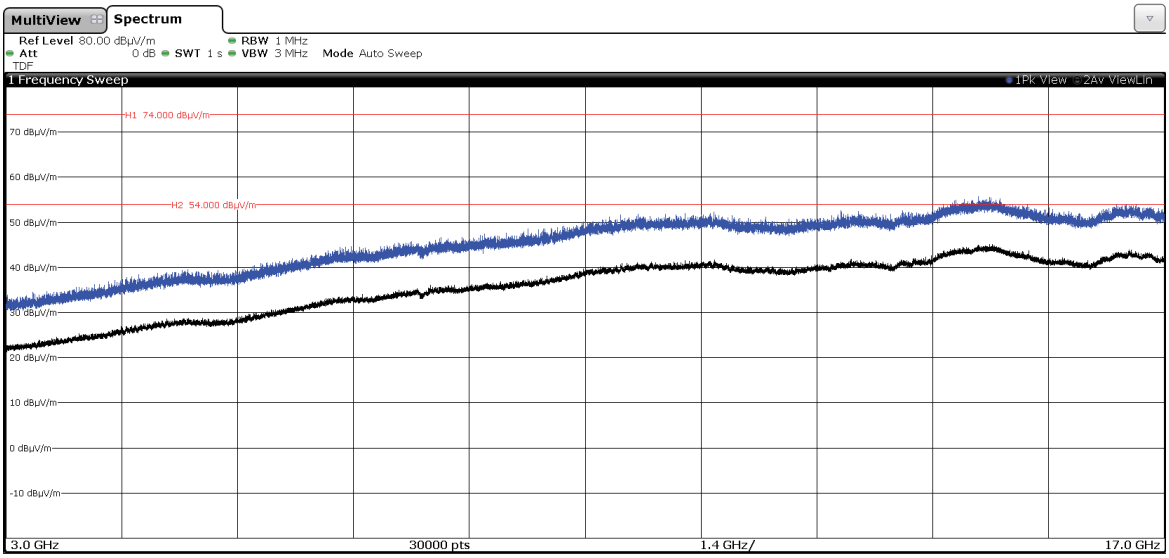


- **8DPSK**

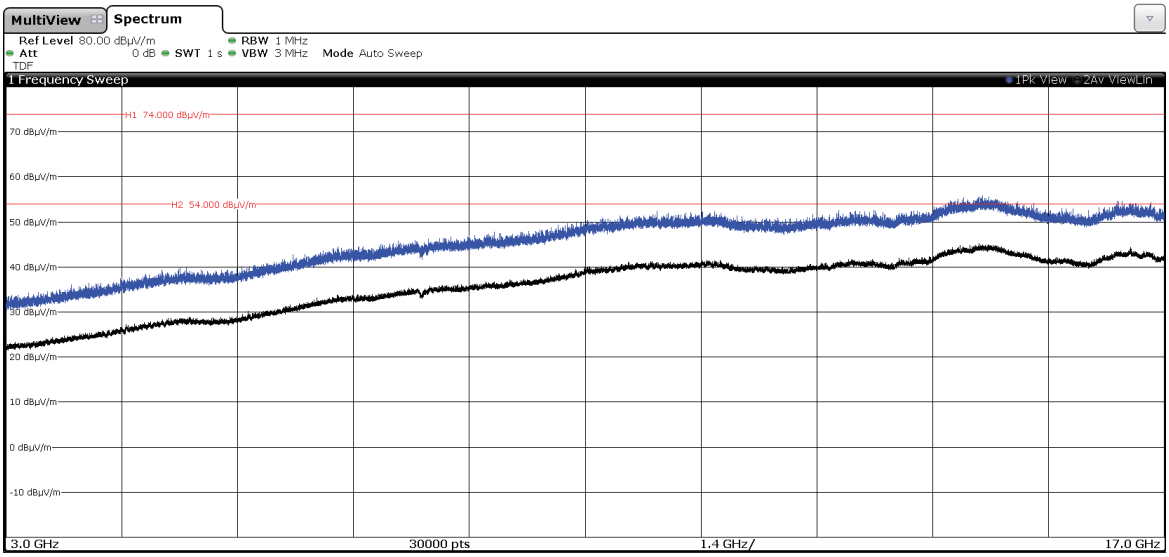
- Low Channel:



- Middle Channel:

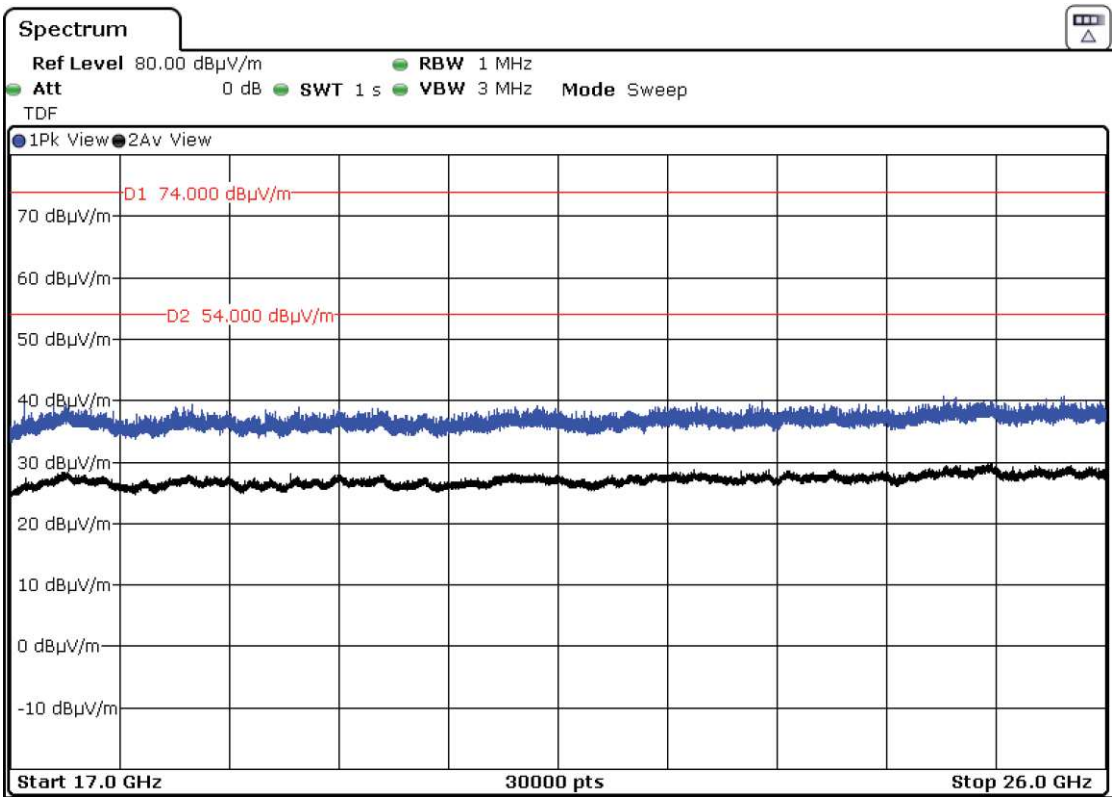


- High Channel:



FREQUENCY RANGE 17 - 26 GHz:

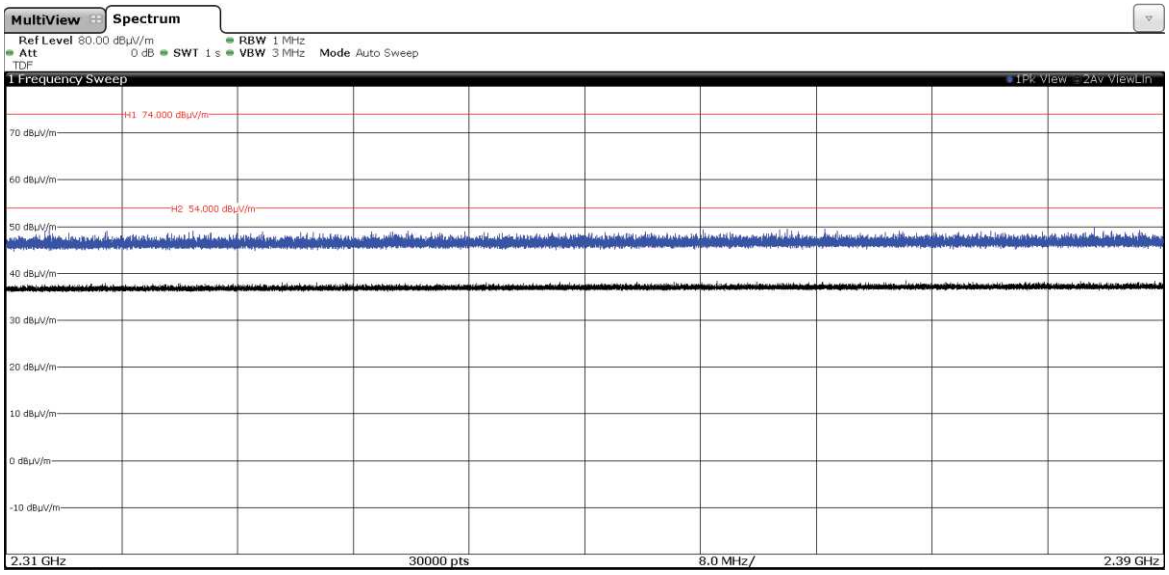
The spurious signals detected do not depend on either the operating channel or the modulation mode.



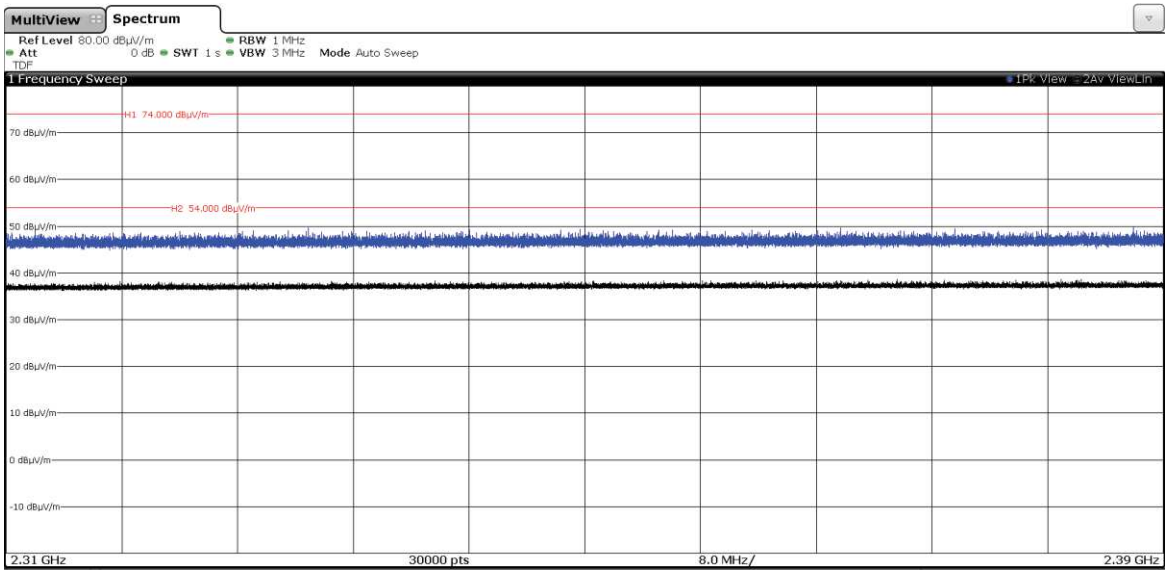
FREQUENCY RANGE 2.31-2.39 GHz:

- Low Channel:

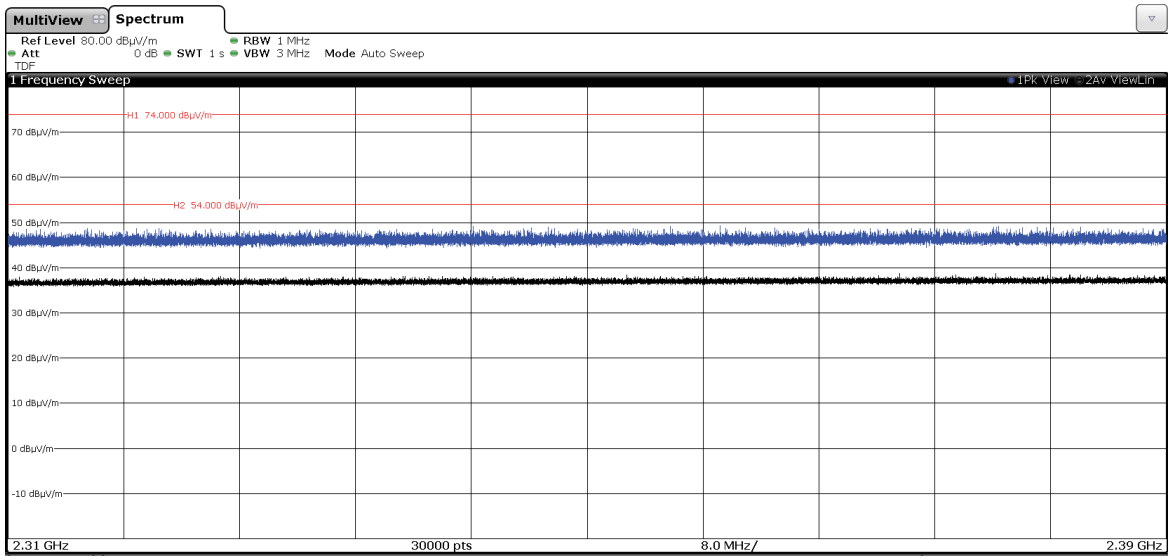
- **GFSK**



- **Pi/4 DQPSK**

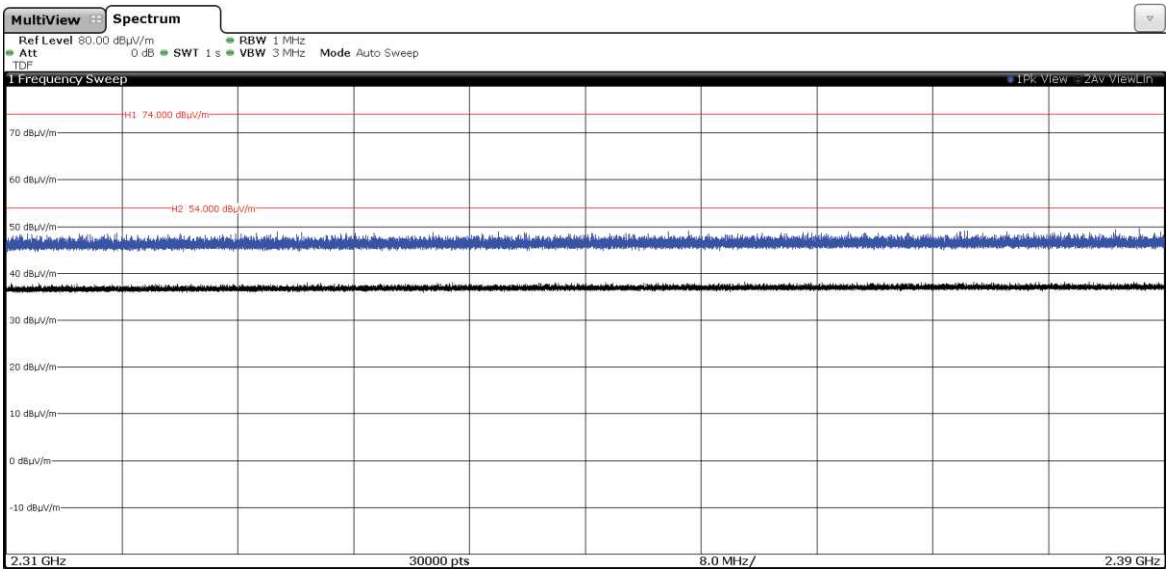


- **8DPSK**

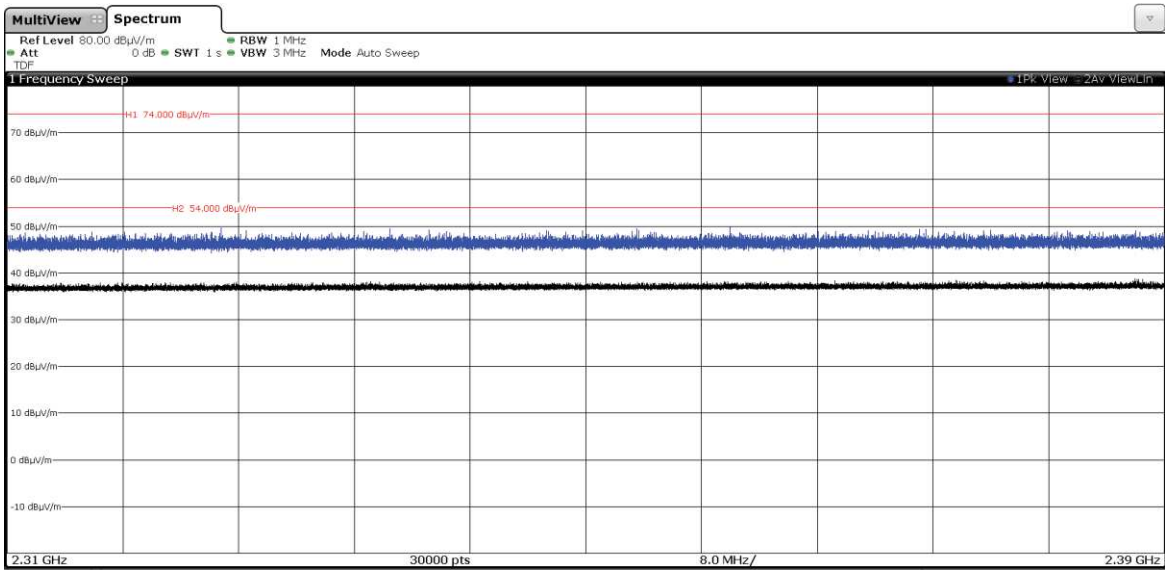

MultiView
Spectrum
Ref Level 80.00 dBµV/m
RBW 1 MHz
Att 0 dB SWT 1 s VBW 3 MHz Mode Auto Sweep
TDF
1 Frequency Sweep
1Pk View 2Av ViewLin
H1 74.000 dBµV/m
H2 54.000 dBµV/m
70 dBµV/m
60 dBµV/m
50 dBµV/m
40 dBµV/m
30 dBµV/m
20 dBµV/m
10 dBµV/m
0 dBµV/m
-10 dBµV/m
2.31 GHz
30000 pts
8.0 MHz/
2.39 GHz

- Middle Channel:

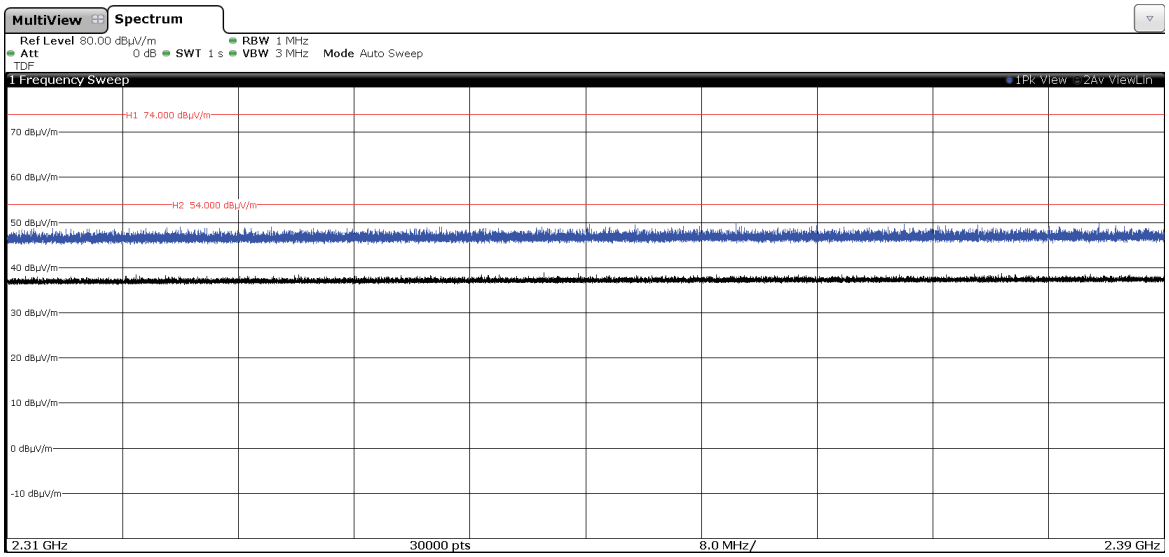
- **GFSK**



- **Pi/4 DQPSK**

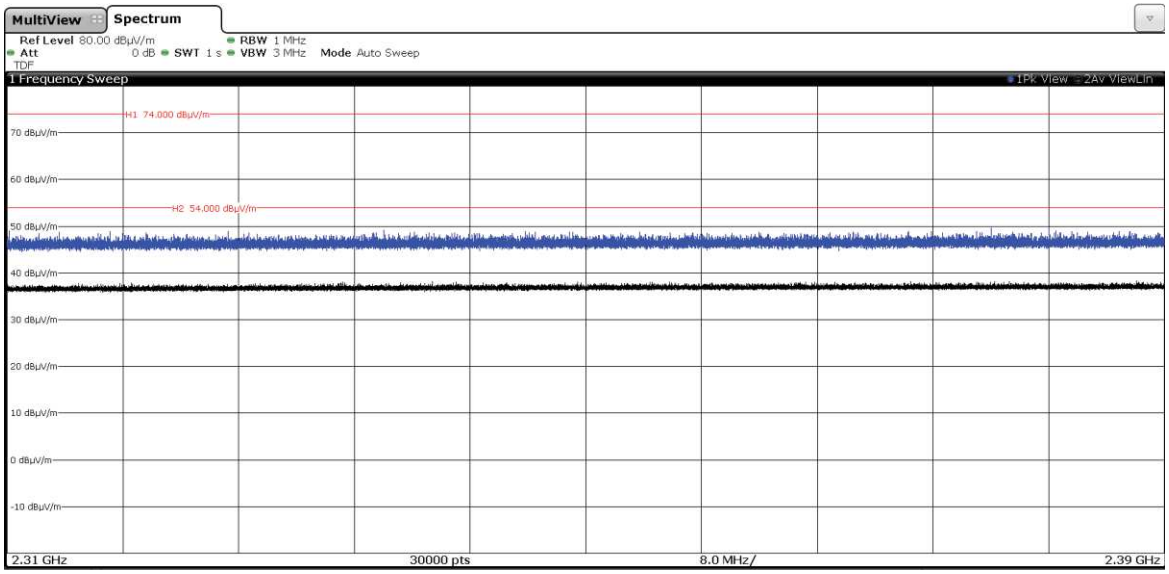


- **8DPSK**

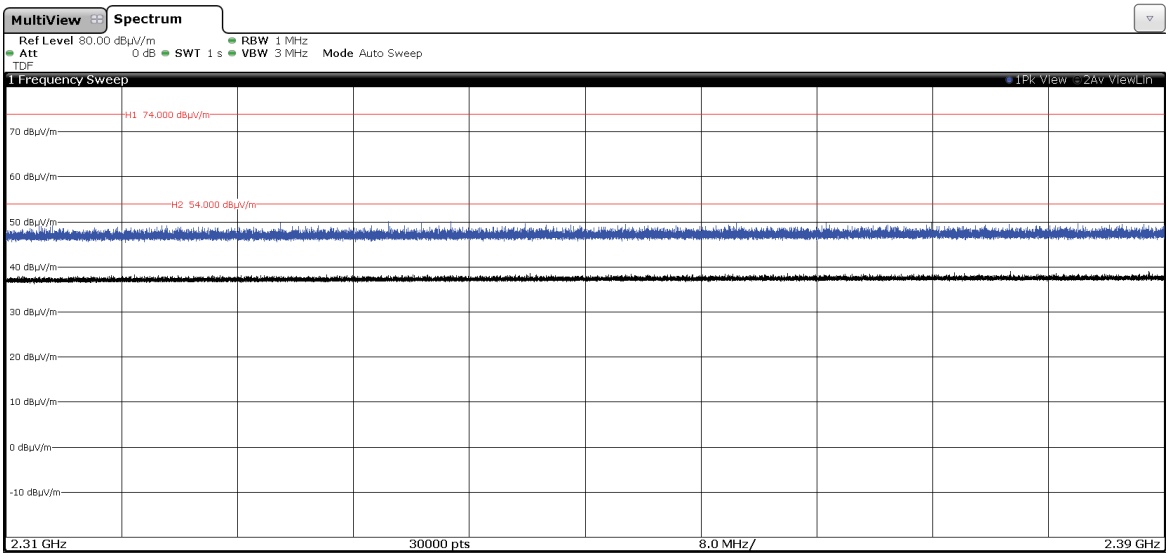

MultiView
Spectrum
Ref Level 80.00 dBµV/m
RBW 1 MHz
Att 0 dB SWT 1 s VBW 3 MHz Mode Auto Sweep
TDF
1 Frequency Sweep
1Pk View 2Av ViewLin
H1 74.000 dBµV/m
H2 54.000 dBµV/m
70 dBµV/m
60 dBµV/m
50 dBµV/m
40 dBµV/m
30 dBµV/m
20 dBµV/m
10 dBµV/m
0 dBµV/m
-10 dBµV/m
2.31 GHz
30000 pts
8.0 MHz/
2.39 GHz

- High Channel:

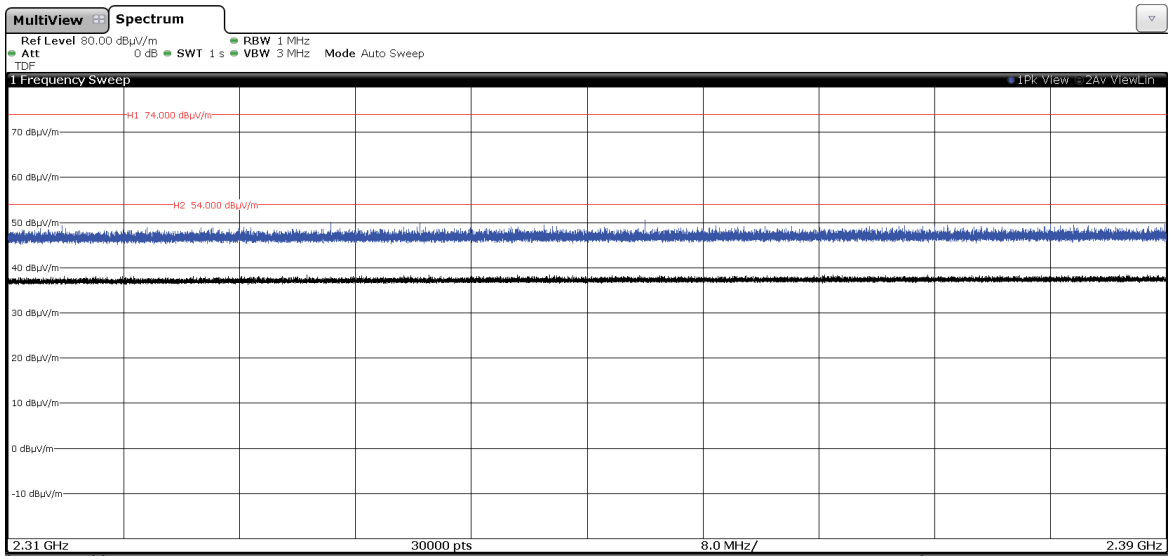
- **GFSK**



- **Pi/4 DQPSK**



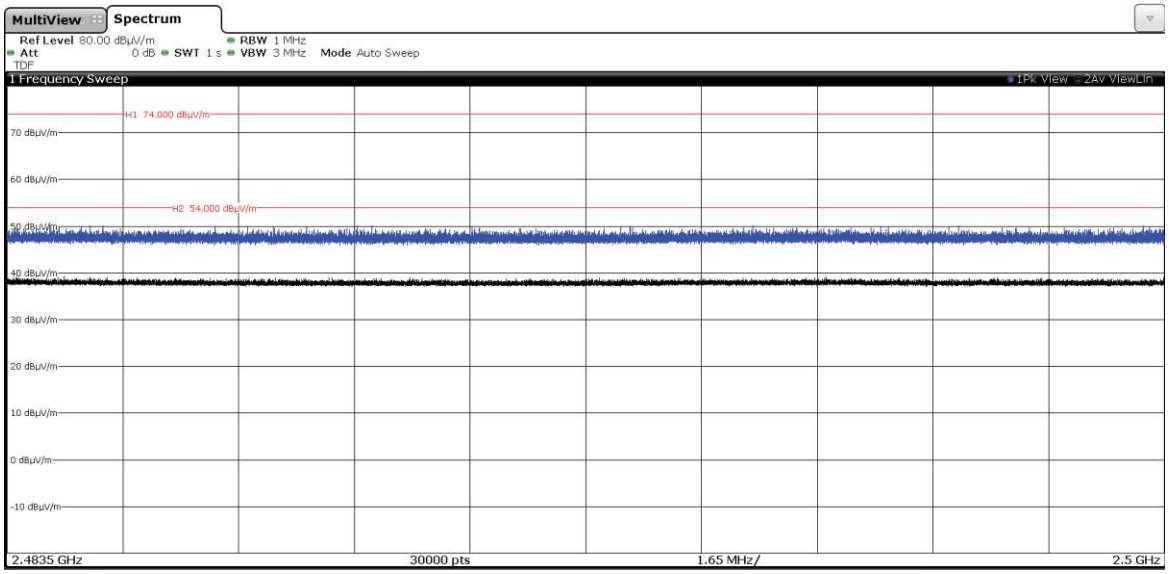
- **8DPSK**


MultiView
Spectrum
Ref Level 80.00 dBµV/m
RBW 1 MHz
Att 0 dB SWT 1 s VBW 3 MHz Mode Auto Sweep
TDF
1 Frequency Sweep
1Pk View 2Av ViewLin
H1 74.000 dBµV/m
H2 54.000 dBµV/m
70 dBµV/m
60 dBµV/m
50 dBµV/m
40 dBµV/m
30 dBµV/m
20 dBµV/m
10 dBµV/m
0 dBµV/m
-10 dBµV/m
2.31 GHz
30000 pts
8.0 MHz/
2.39 GHz

FREQUENCY RANGE 2.4835-2.5 GHz:

- Low Channel:

- **GFSK**



- **Pi/4 DQPSK**