



Test report No:  
 NIE: 60327RRF.002

## 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	A Bluetooth dongle designed for pairing with a mobile phone to have audio communication in a hearing protection system
(*) Trademark	INVISIO®
(*) Model and /or type reference	BD
Other identification of the product	HW version: 1 SW version: 1 FCC ID: 2AUGTASM17582 IC: 25405-ASM17582
(*) Features	Classic Bluetooth
Applicant	INVISIO COMMUNICATIONS A/S Stamholmen 157, 2650 Hvidovre, Denmark
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. ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Rafael López EMC Consumer & RF Lab. Manager
Date of issue	2019-10-18
Report template No	FDT08_22 (* "Data provided by the client")

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## Competences and guarantees

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DEKRA Testing and Certification S.A.U. 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 S.A.U. has a calibration and maintenance program for its measurement equipment.

DEKRA Testing and Certification S.A.U. 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 S.A.U. at the time of performance of the test.

DEKRA Testing and Certification S.A.U. 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.

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## General conditions

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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.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA Testing and Certification S.A.U. and the Accreditation Bodies.

## Uncertainty

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

## Data provided by the client

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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 the BD INV is a product family, which consists of Bluetooth dongle designed for pairing with a mobile phone to have audio communication in a hearing protection system.

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 result.

## Usage of samples

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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
60327/014	Bluetooth Dongle	BD	--	2019/06/05

Sample S/01 has undergone the following test(s): All RADIATED tests indicated in Appendix A.

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

Control Nº	Description	Model	Serial Nº	Date of reception
60327/008	Bluetooth Dongle	BD	--	2019/06/05

Sample S/02 has undergone the following test(s): All CONDUCTED tests indicated in Appendix A.

## Test sample description

Ports..... :	Port name and description	Cable					
		Specified max length [m]	Attached during test	Shielded	Coupled to patient <sup>(3)</sup>		
	ODU connector	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
	Radio connector	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Supplementary information to the ports..... :	The cables are soldered on the Bluetooth Dongle.						
Rated power supply .....	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	<input type="checkbox"/>	AC:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	AC:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input checked="" type="checkbox"/>	DC: 3.6-12V					
<input type="checkbox"/>	DC:						
Rated Power .....	72 mW						
Clock frequencies .....	26 MHz						
Other parameters..... :	-						
Software version .....	-						
Hardware version..... :	-						
Dimensions in cm (W x H x D)..... :	5x1.5x1.5 cm						
Mounting position..... :	<input type="checkbox"/>	Table top equipment					
	<input type="checkbox"/>	Wall/Ceiling mounted equipment					
	<input type="checkbox"/>	Floor standing equipment					
	<input type="checkbox"/>	Hand-held equipment					
	<input checked="" type="checkbox"/>	Other: personal carried					

Modules/parts .....	Module/parts of test item	Type	Manufacturer
	60327-013	BD INVxxxxx	INVISIO
	60327-012	BD INVxxxxx	INVISIO
	.....		
Accessories (not part of the test item) .....	Description	Type	Manufacturer
	Battery compartment	PS30	INVISIO
Documents as provided by the applicant.....	Description	File name	Issue date

## Identification of the client

INVISIO COMMUNICATIONS A/S  
 Stamholmen 157, 2650 Hvidovre, Denmark

## Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2019-06-11
Date (finish)	2019-06-24

## Document history

Report number	Date	Description
60327RRF.002	2019-10-18	First release

## Environmental conditions

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

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

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

Temperature	Min. = 15 °C Max. = 35 °C
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 °C Max. = 35 °C
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 Manuel Jiménez, José Gabriel Pendón, Jaime Barranquero, Cristina Calle and Miguel Ángel Torres.

Used instrumentation:

### Conducted Measurements:

	Last Calibration	Due Calibration
1. Bluetooth Test Set ANRITSU MT8852B	N.A.	N.A.
2. Signal and Spectrum Analyzer ROHDE AND SCHWARZ FSV40	2018/02	2020/02
3. DC Power Supply 40V/40A Rohde & Schwarz NGPE40	2018/02	2021/02

### Radiated Measurements:

	Last Calibration	Due Calibration
1. Semianechoic Absorber Lined Chamber ETS LINDGREN FACT 3 200 STP	N.A.	N.A.
2. EMI Test Receiver 7 GHz ROHDE AND SCHWARZ ESR7	2018/10	2020/10
3. RF Pre-amplifier 40 dB, 10 MHz - 6 GHz BONN ELEKTRONIK BLNA 0160-01N	2019/02	2020/08
4. Biconical/Log Antenna 30MHz - 6GHz ETS LINDGREN 3142E	2017/09	2020/09
5. Signal and Spectrum Analyzer ROHDE AND SCHWARZ FSV40	2018/02	2020/02
6. RF Pre-amplifier G>30dB, 1-18GHz BONN ELEKTRONIK BLMA 0118-3A	2019/04	2020/04
7. Broadband Horn antenna 1-18 GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9120 D	2018/01	2021/01
8. Wideband Radio Communication Tester ROHDE AND SCHWARZ CMW500	2019/02	2020/02
9. Bluetooth Test Set ANRITSU MT8852B	N.A.	N.A.



## 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 radiated (Transmitter)	P	
<u>Supplementary information and remarks:</u> None.			

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

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## TEST CONDITIONS

### POWER SUPPLY (V):

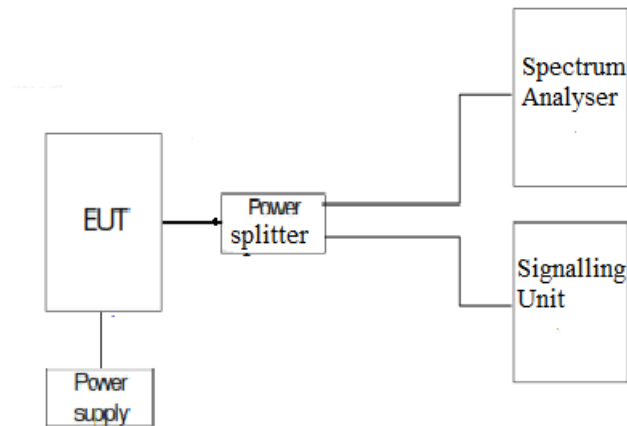
V nominal: 3.6 - 12 Vdc  
Type of Power Supply: Internal battery.  
Type of Antenna: Internal (Folded monopole).  
Maximum Declared Antenna Gain: -5 dBi to -7 dBi (includes a saw filter with -2 dBi)

### 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 spectrum analyzer 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).

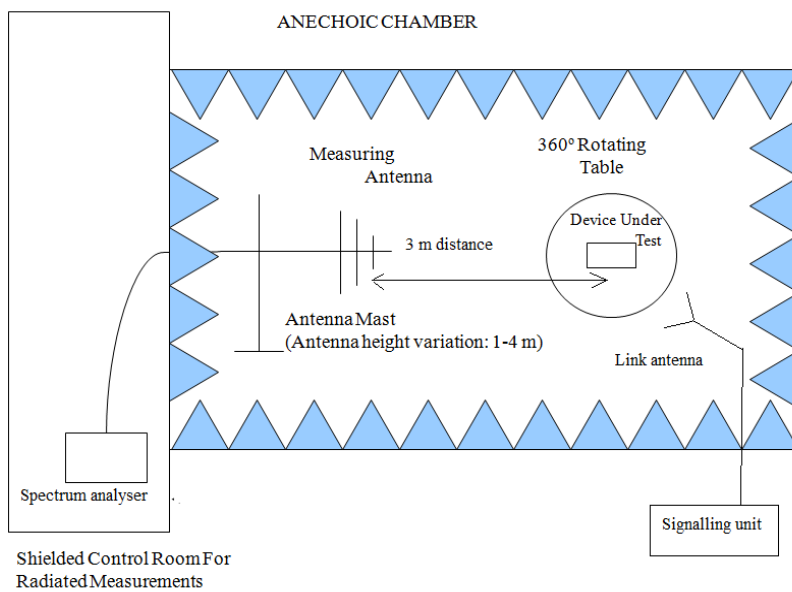
For radiated emissions in the range 1 GHz-26 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

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 360° and the antenna height (Bilog antenna and Double ridge horn antenna) was varied from 1 to 4 meters to find the maximum radiated emission.

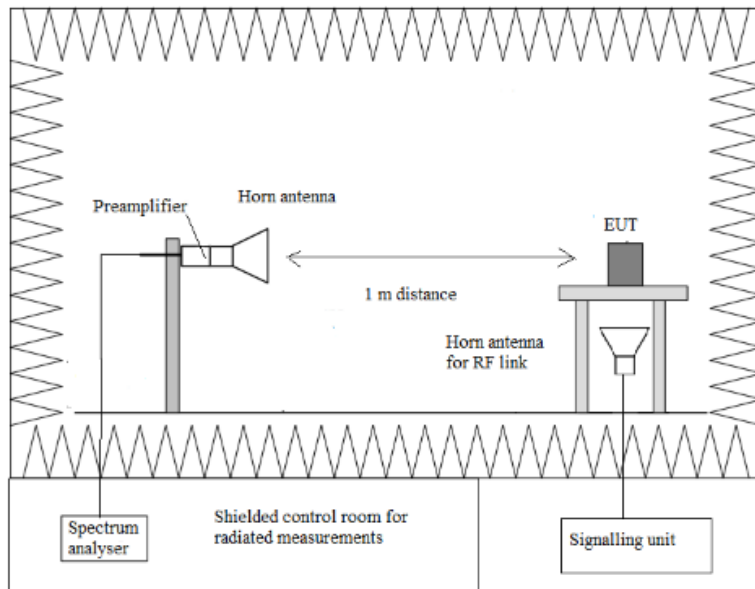
Measurements were made in both horizontal and vertical planes of polarization.

An additional horn antenna is used to control the equipment under test with the Bluetooth signalling unit (Bluetooth test set).

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)	948.3	908.6	899.8
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)	1245.5	1262.8	1277.5
Measurement uncertainty (kHz)	<±5.0		

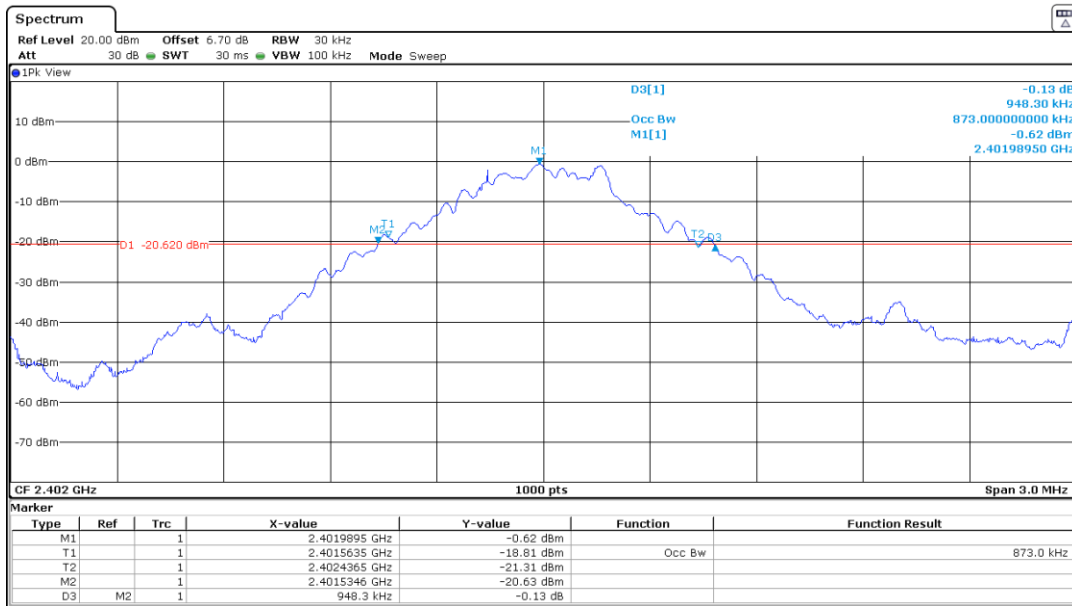
- 8DPSK**

	Low Channel 2402 MHz	Middle Channel 2441 MHz	High Channel 2480 MHz
20 dB Spectrum Bandwidth (kHz)	1274.5	1264.3	1266.9
Measurement uncertainty (kHz)	<±5.0		

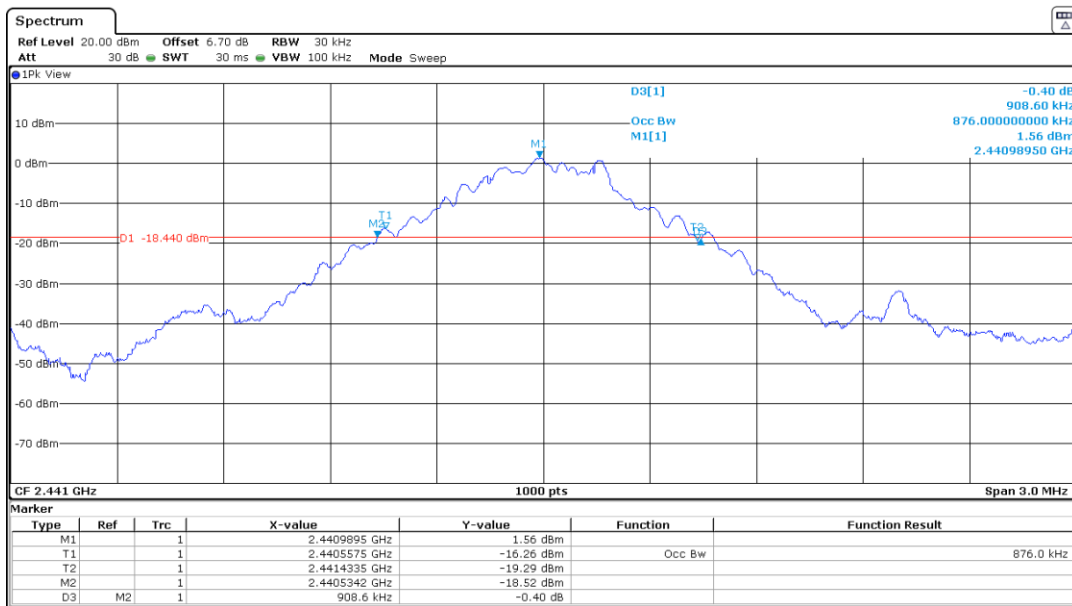
Verdict: PASS

- **GFSK – Bandwidths**

- Low Channel:

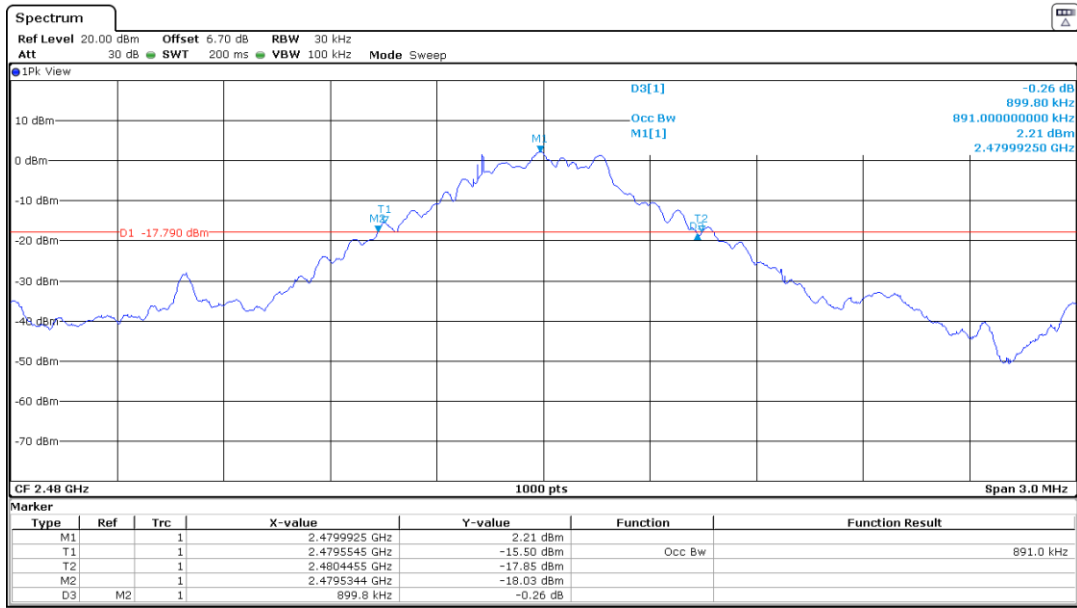


- Middle Channel:



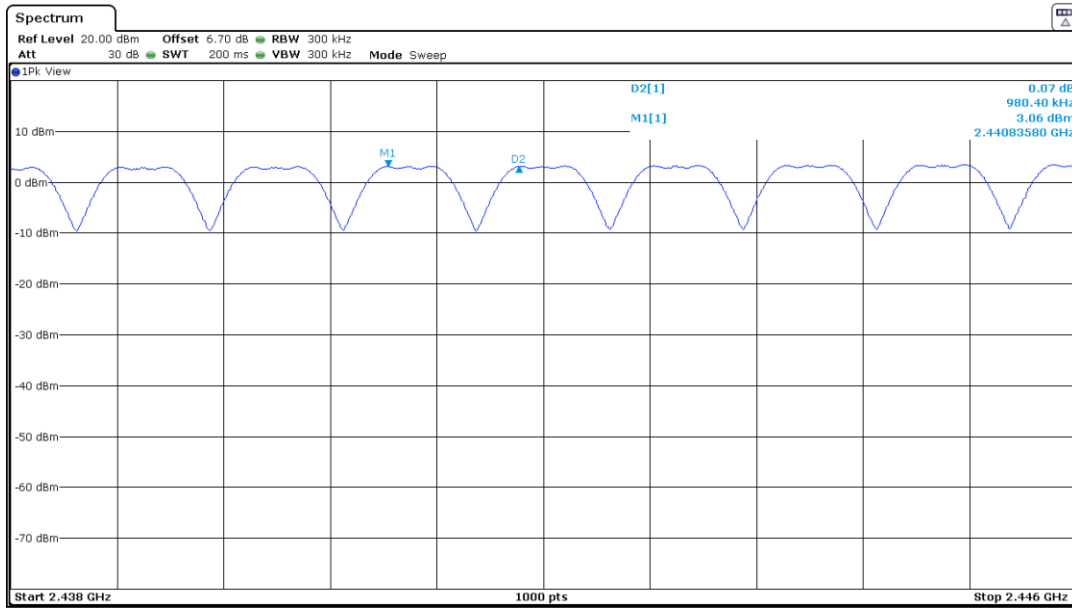


- High Channel:



### Carrier frequency separation - GFSK

Carrier frequency separation: 980.4 kHz

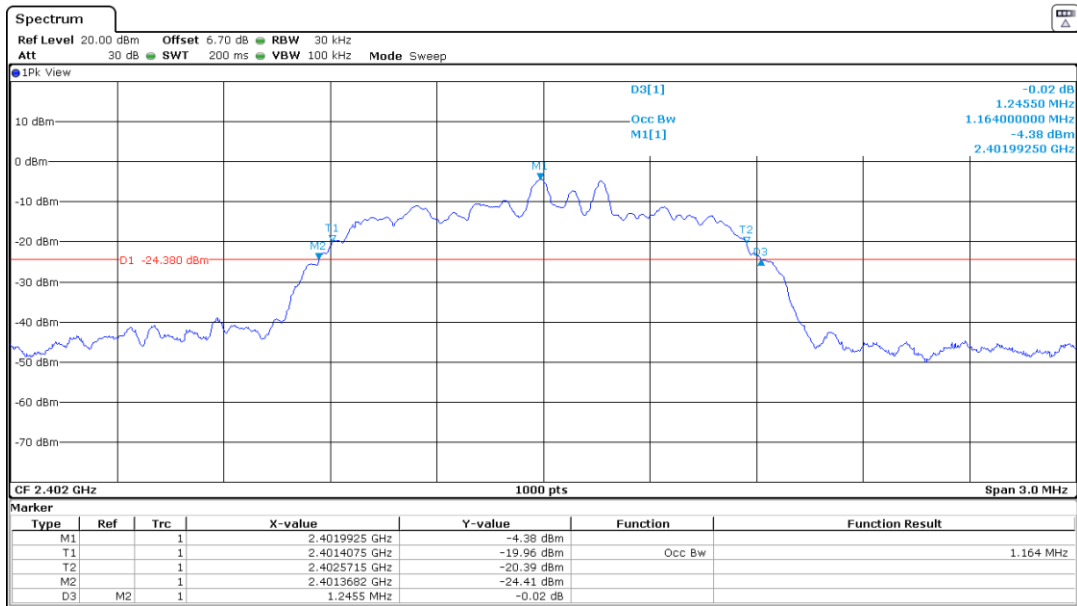


The hopping channel carrier frequencies are separated by a minimum two-thirds of the 20 dB bandwidth of the hopping channel.

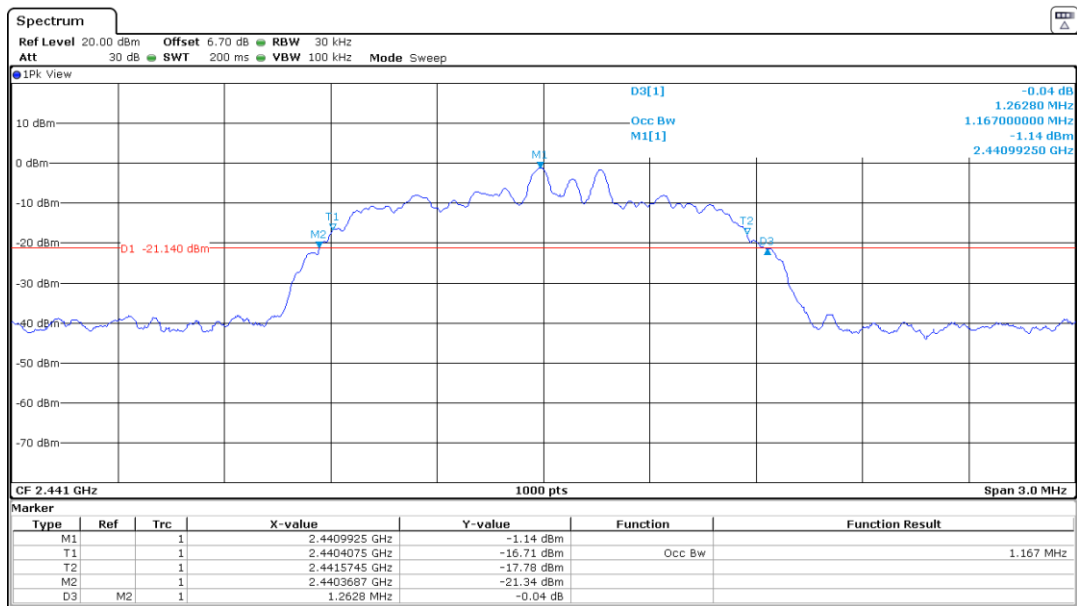
Verdict: PASS

- Pi/4 DQPSK – Bandwidths

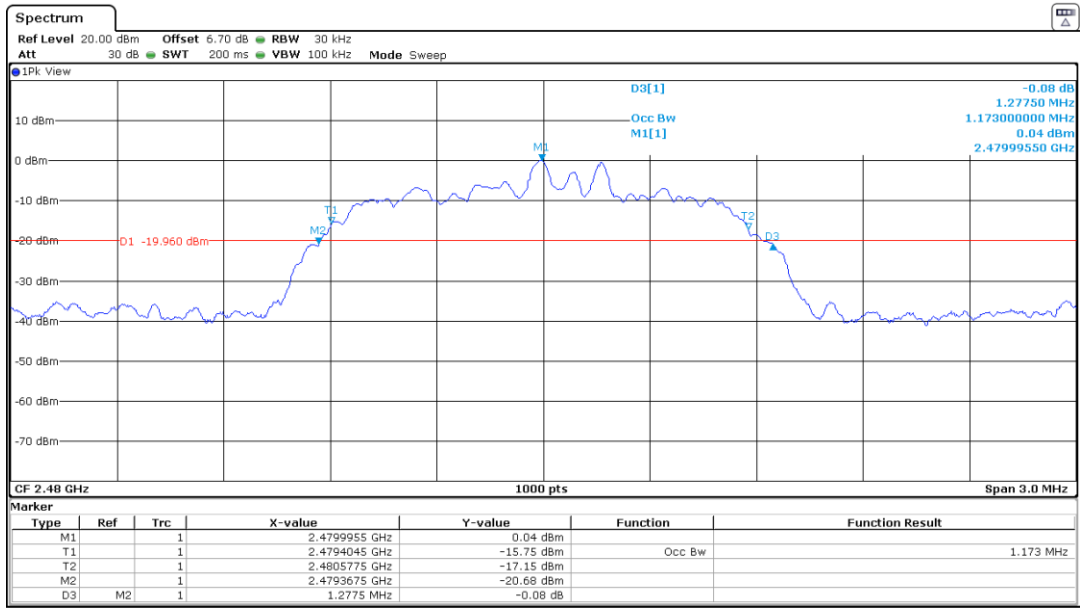
- Low Channel:



- Middle Channel:

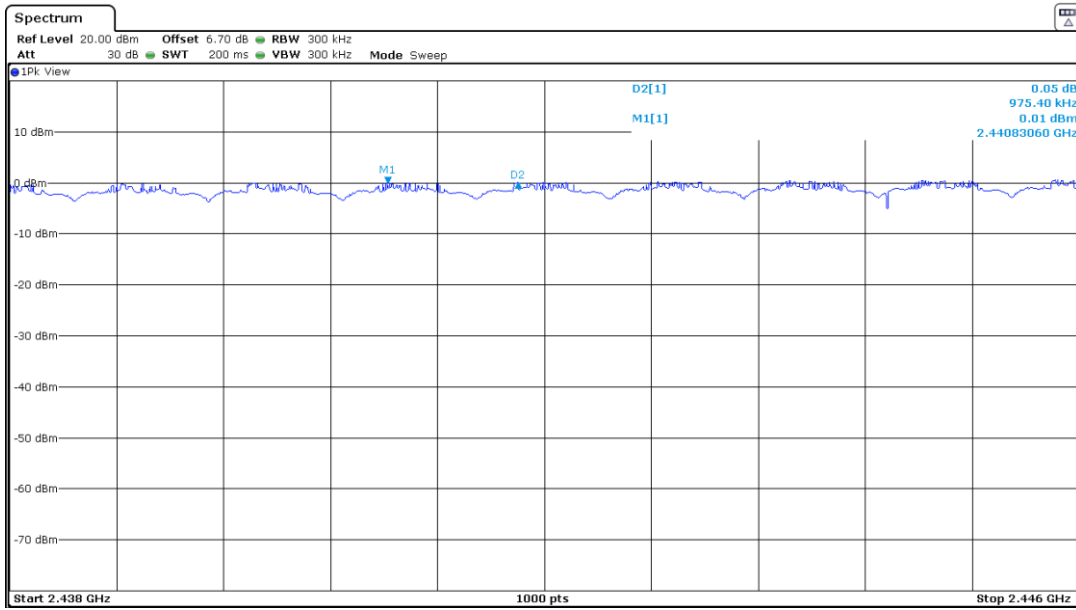


- High Channel:



### Carrier frequency separation - Pi/4 DQPSK

Carrier frequency separation: 975.4 kHz

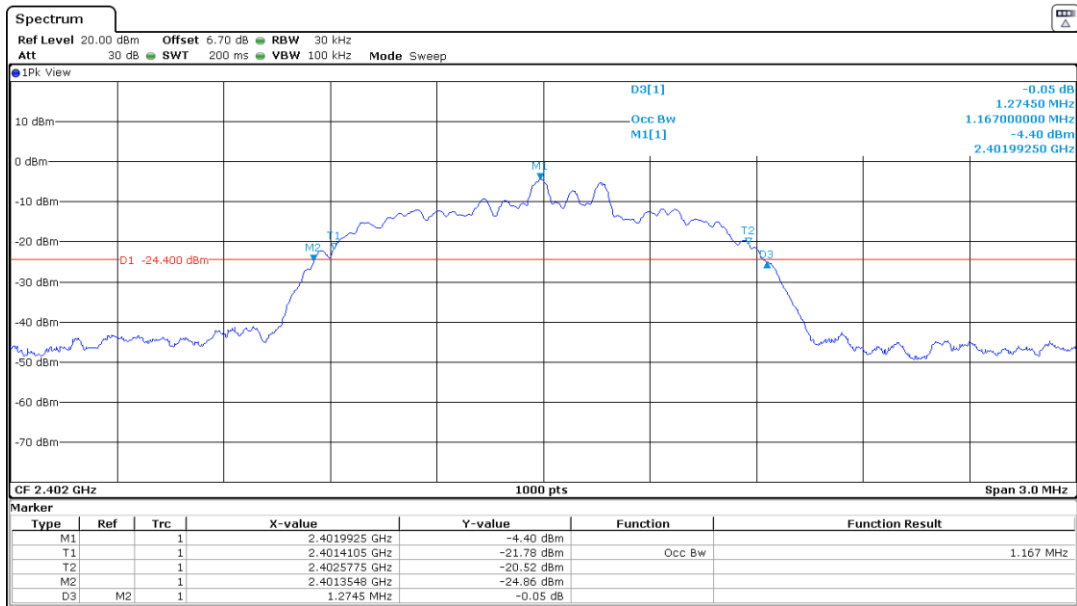


The hopping channel carrier frequencies are separated by a minimum two-thirds of the 20 dB bandwidth of the hopping channel.

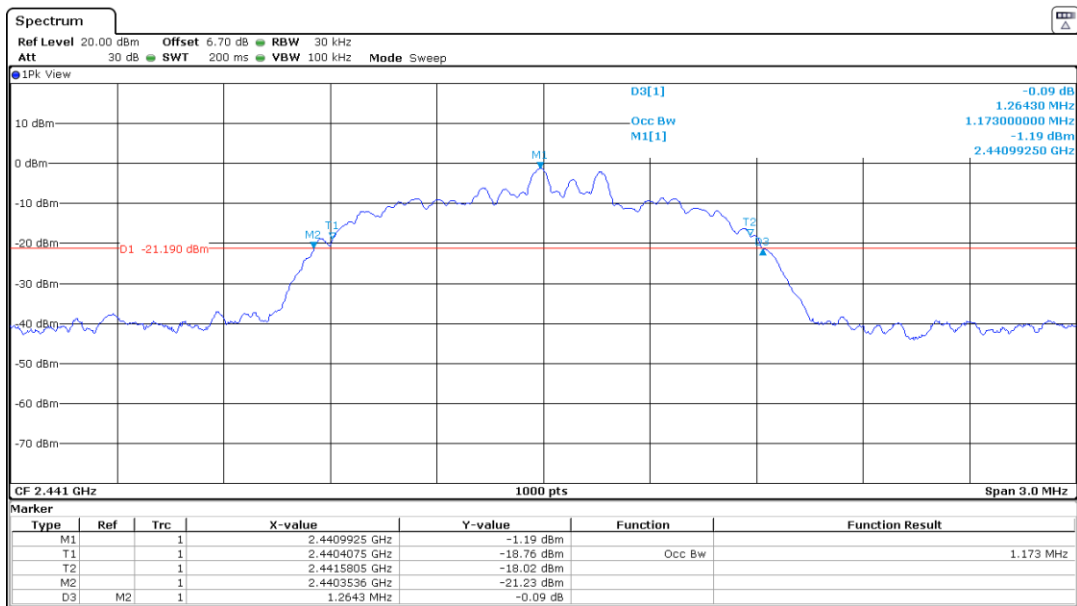
Verdict: PASS

- **8DPSK – Bandwidths**

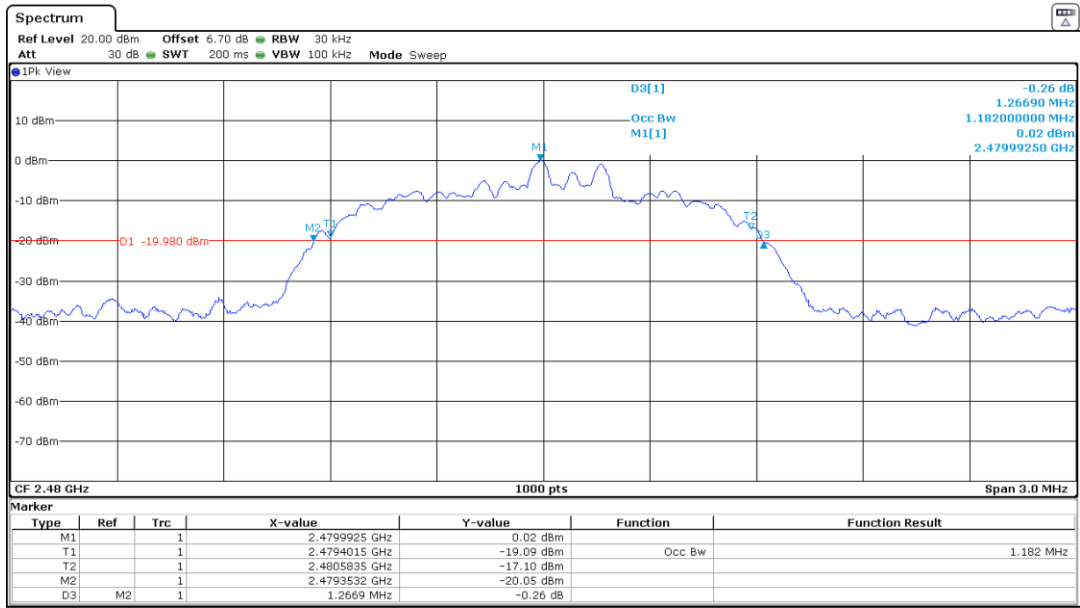
- Low Channel:



- Middle Channel:

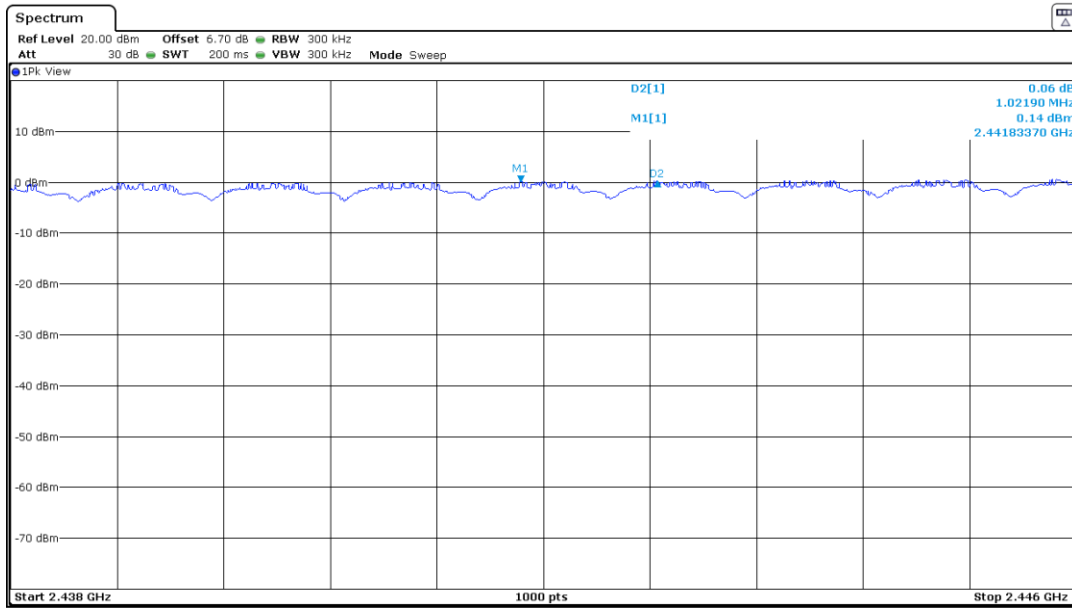


- High Channel:



### Carrier frequency separation - 8DPSK

Carrier frequency separation: 1021.9 kHz



The hopping channel carrier frequencies are separated by a minimum two-thirds 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.

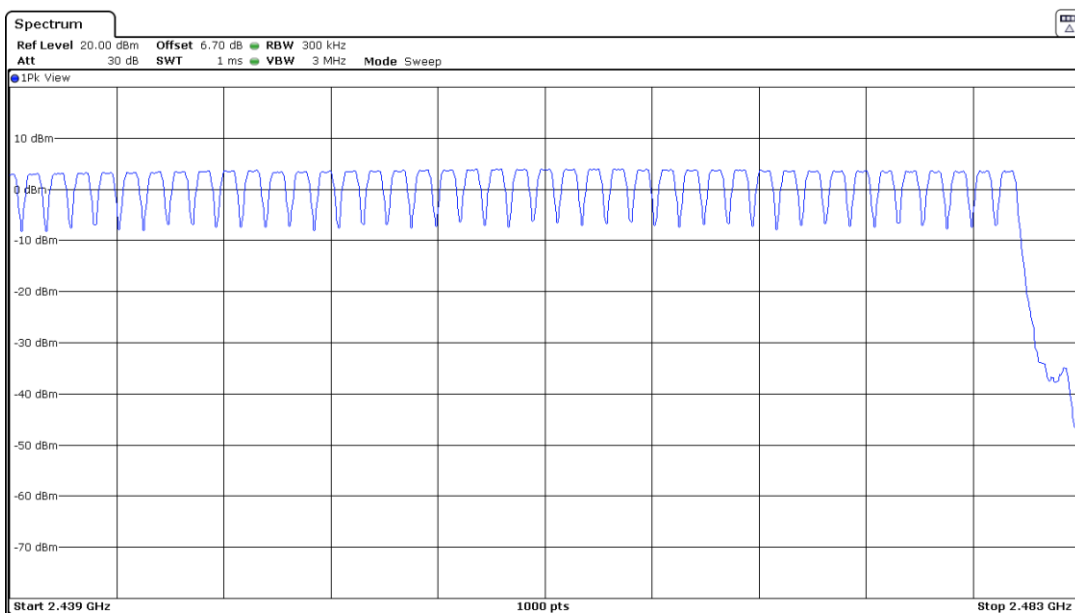
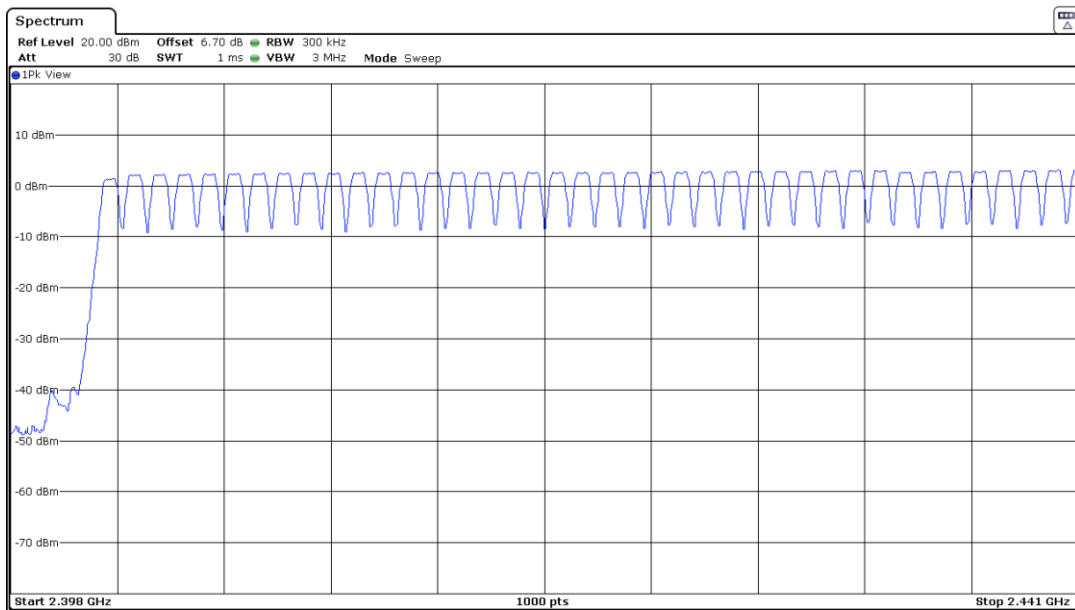
### SPECIFICATION:

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.

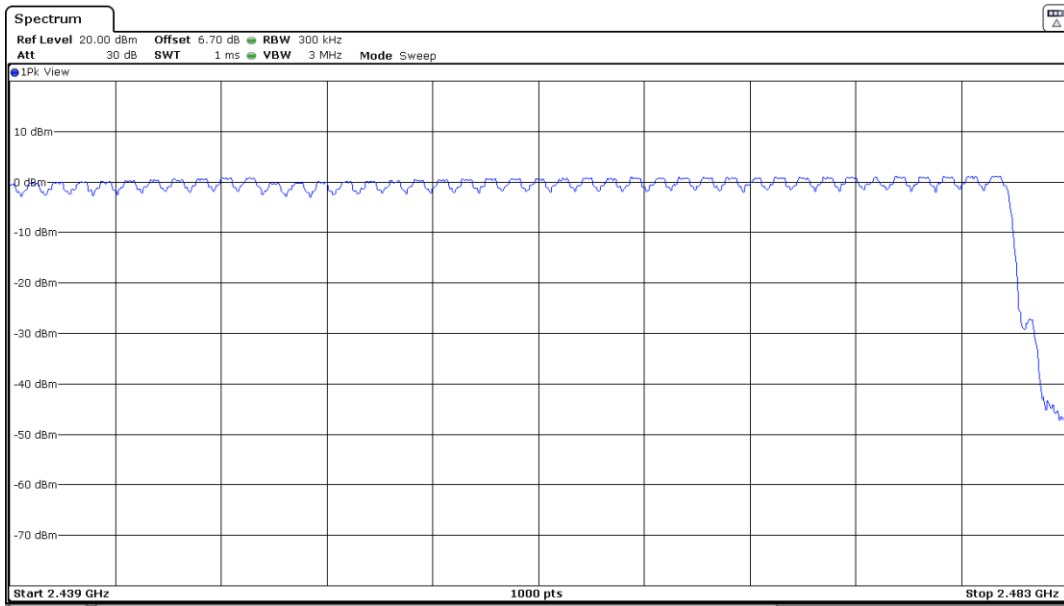
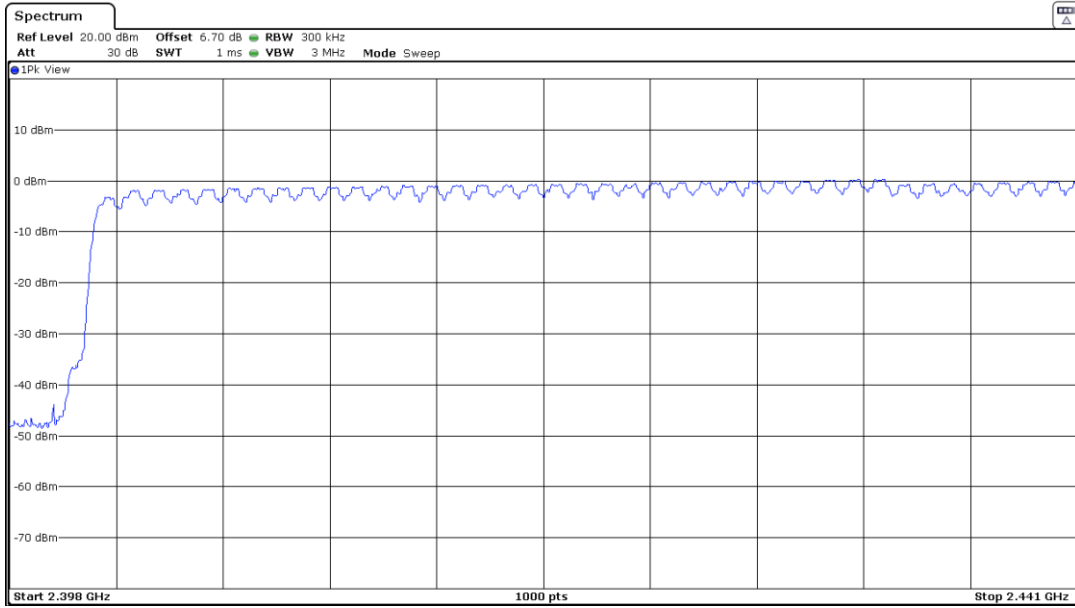
- **GFSK – Number of hopping channels**



**Total number of hopping channels      79**

Verdict: PASS

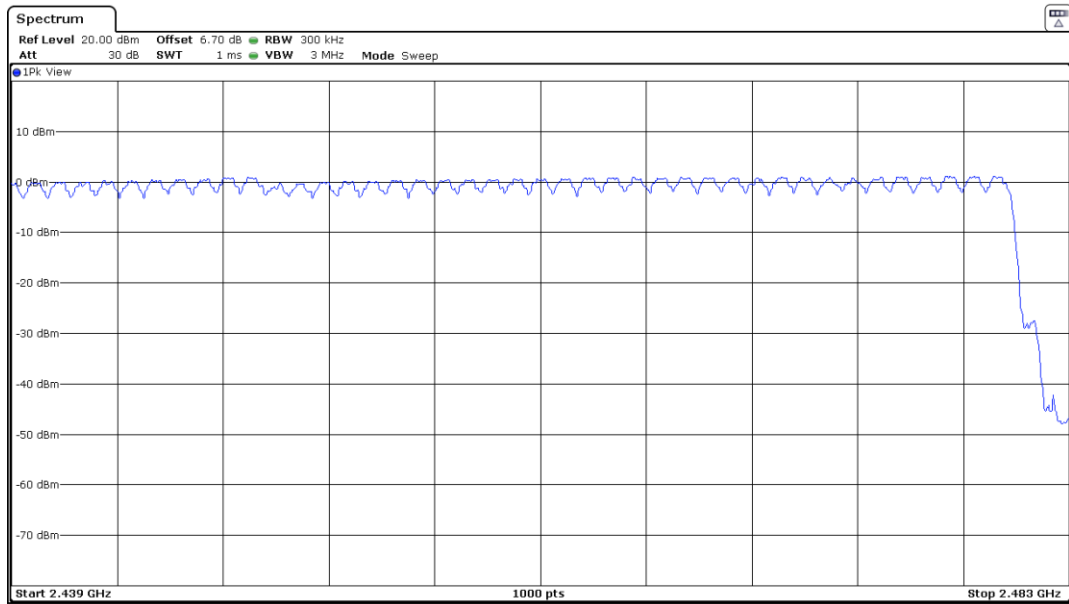
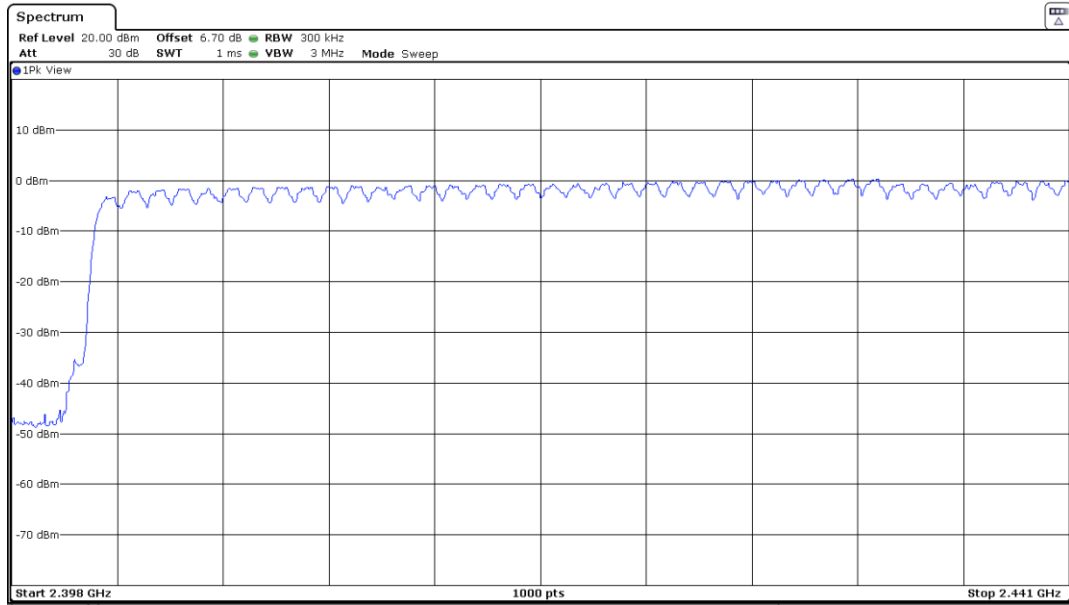
- Pi/4 DQPSK – Number of hopping channels
- 



Total number of hopping channels 79

Verdict: PASS

- 8DPSK – Number of hopping channels



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:

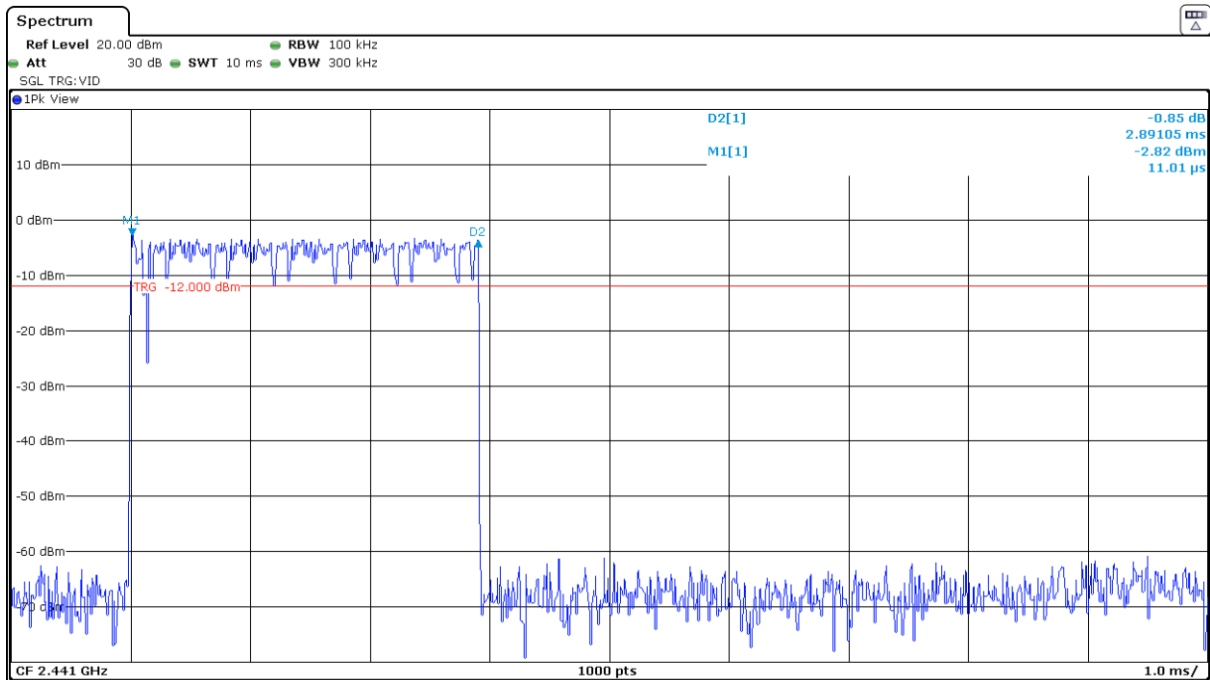
The average time of occupancy on any channel shall not be greater than 0.4 seconds (400 ms) within a period of 0.4 seconds multiplied by the number of hopping channels employed =  $0.4 \times 79 = 31.6$  seconds.

### RESULTS:

- **GFSK (packet type DH5) – Time of Occupancy (Dwell Time)**

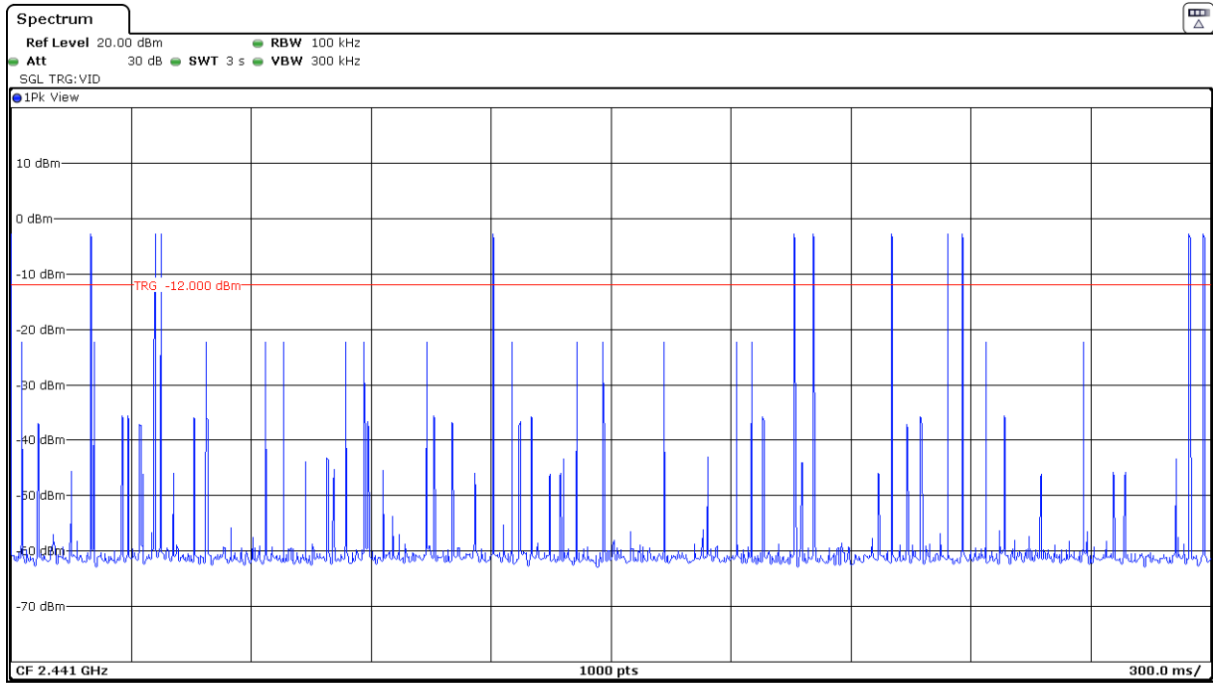
- Transmit Time per Hop:

2.89105 ms



Time of Occupancy:

Nº of hops on spectrum analyzer	11
Nº of hops over the period	115.8666667
Average Time of Occupancy	334.9763267 ms



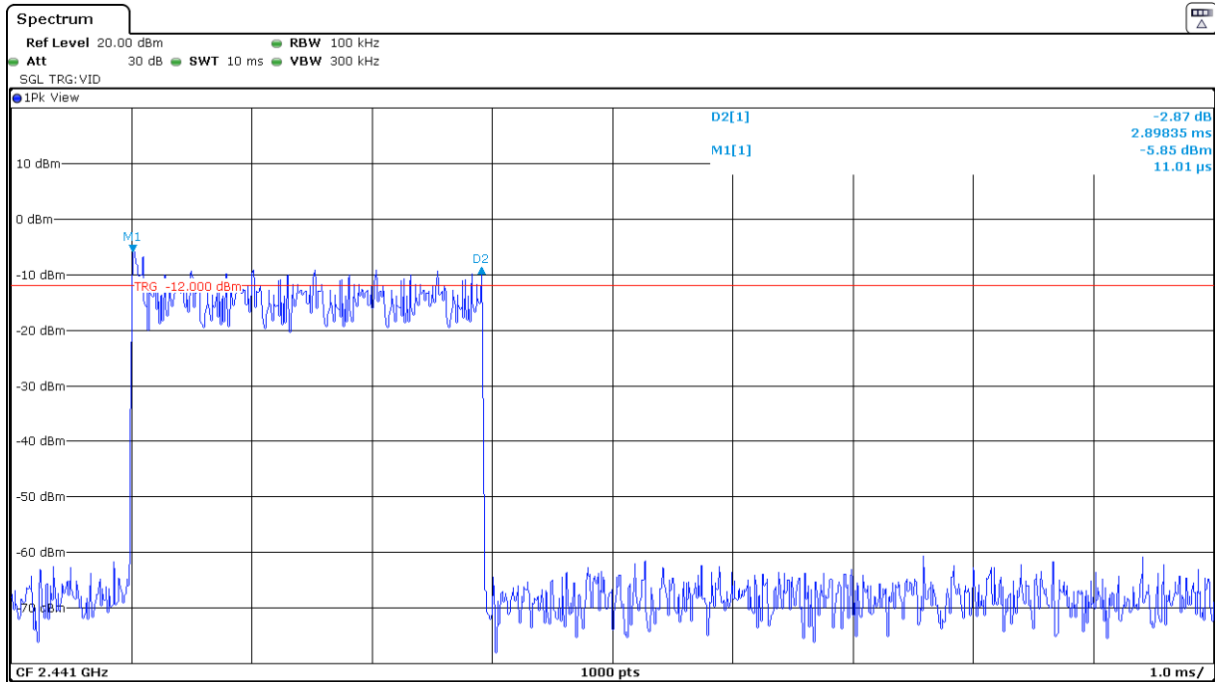
Measurement uncertainty (%)	<±0.01
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Verdict: PASS

• **PI/4 DQPSK (packet type 2DH5) – Time of Occupancy (Dwell Time)**

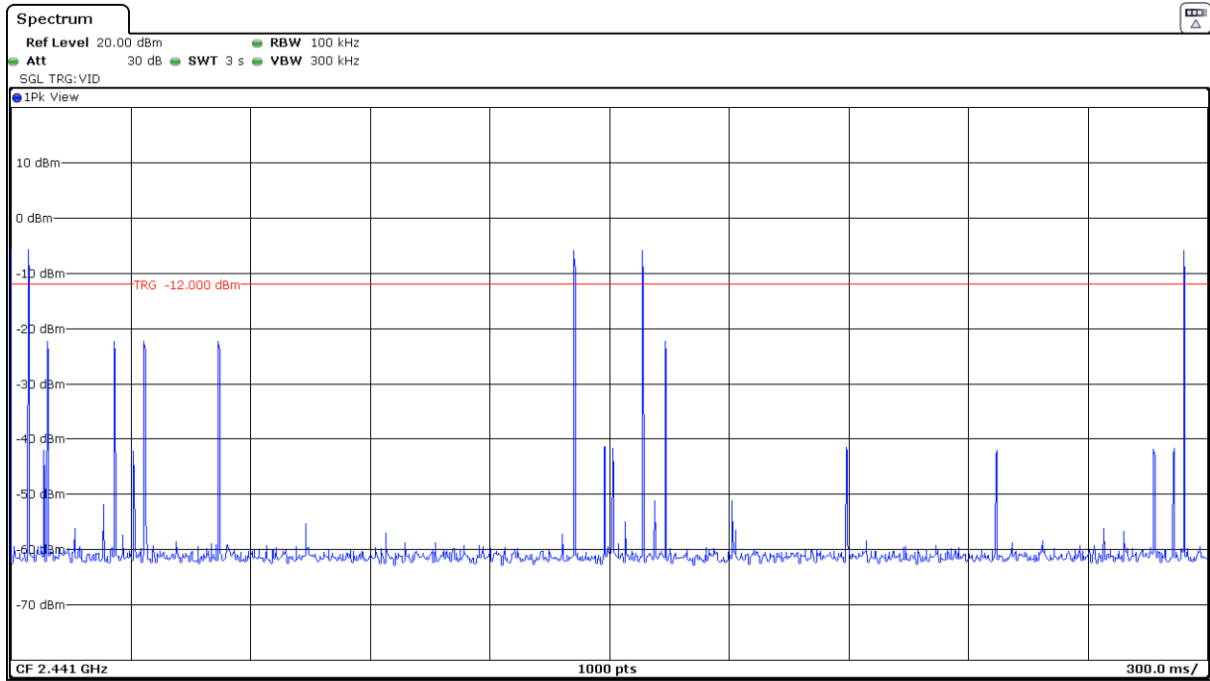
- Transmit Time per Hop:

2.898 ms



Time of Occupancy:

Nº of hops on spectrum analyzer	4
Nº of hops over the period	42.13333333
Average Time of Occupancy	122.1024 ms



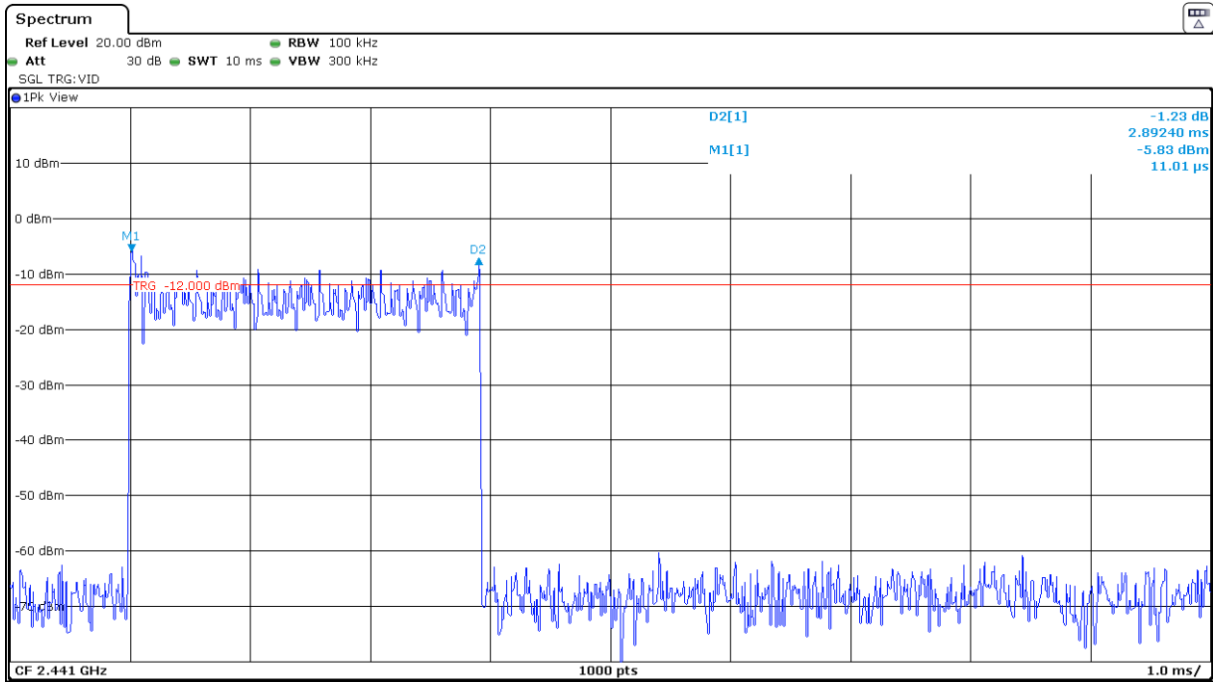
Measurement uncertainty (%)	<±0.01
-----------------------------	--------

Verdict: PASS

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

- Transmit Time per Hop:

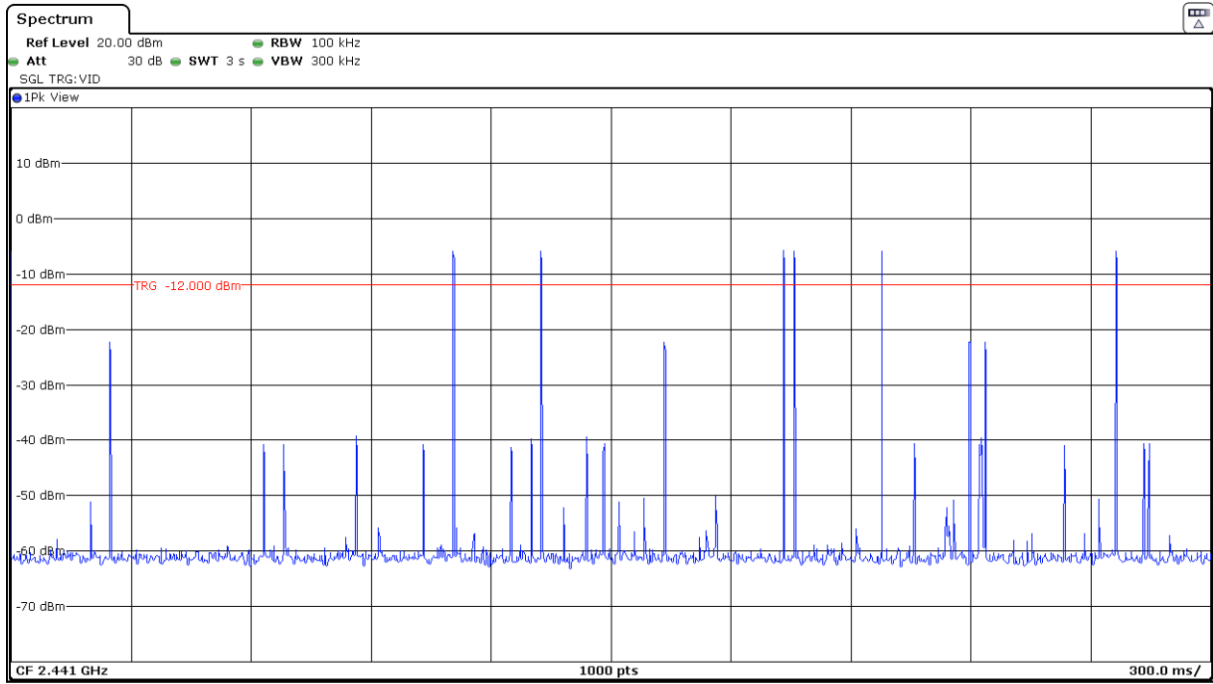
2.892 ms





Time of Occupancy:

Nº of hops on spectrum analyzer	6
Nº of hops over the period	63.2
Average Time of Occupancy	182.7744 ms



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: -5 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)	1.69	3.41	3.79
Maximum EIRP Power (dBm)	-3.31	-1.59	-1.21
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)	-1.68	1.39	2.32
Maximum EIRP Power (dBm)	-6.68	-3.61	-2.68
Measurement uncertainty (dB)	<±0.78		

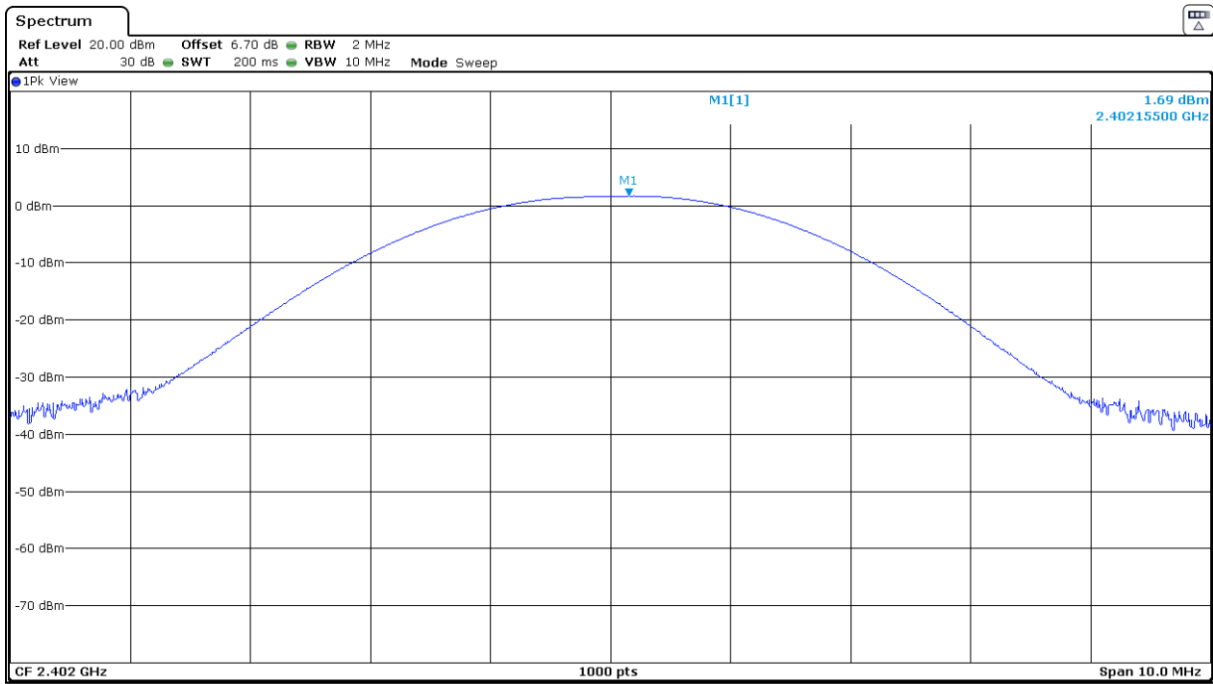
- **8DPSK (3 Mbps)**

Peak Conducted Output Power	Low Channel 2402 MHz	Middle Channel 2441 MHz	High Channel 2480 MHz
Maximum Conducted Power (dBm)	-1.2	1.78	2.59
Maximum EIRP Power (dBm)	-6.2	-3.22	-2.41
Measurement uncertainty (dB)	<±0.78		

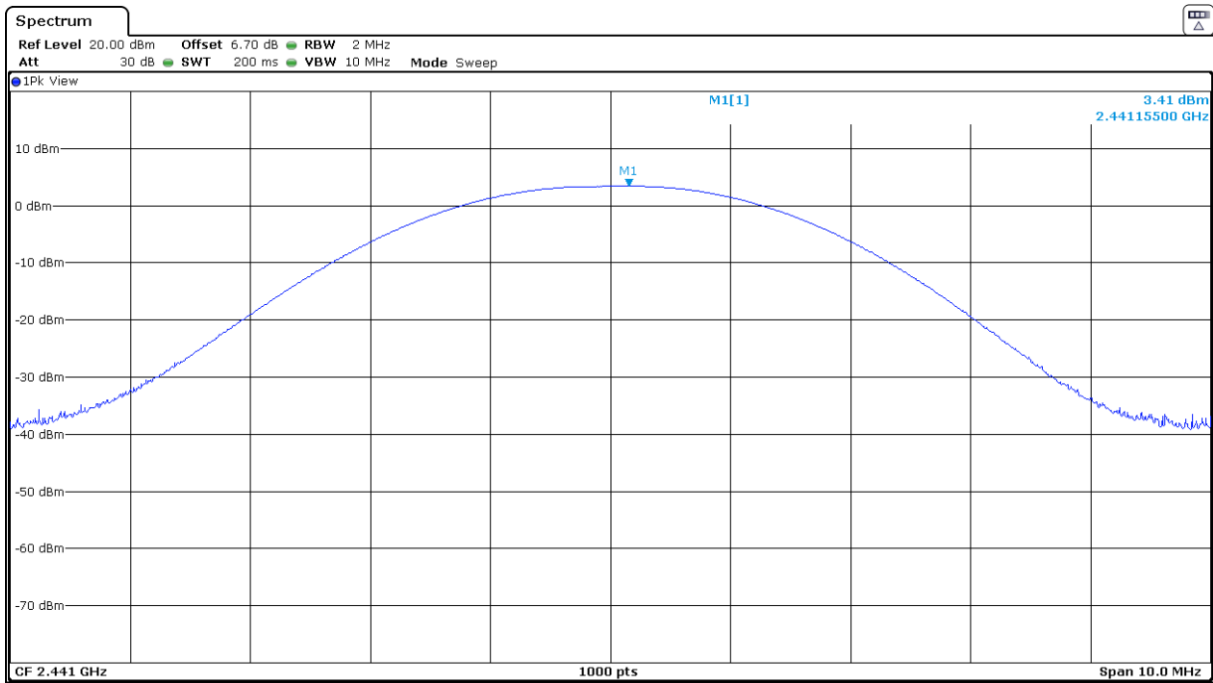
Verdict: PASS

- GFSK – Peak Output Power

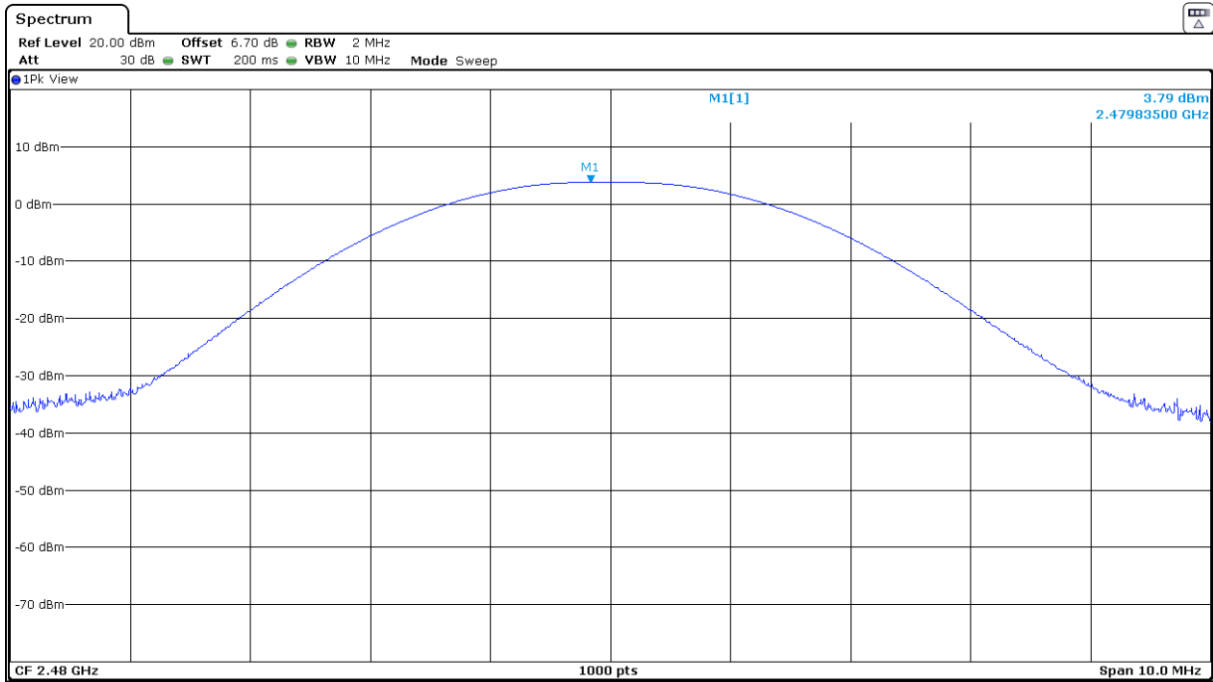
- Low Channel:



- Middle Channel:

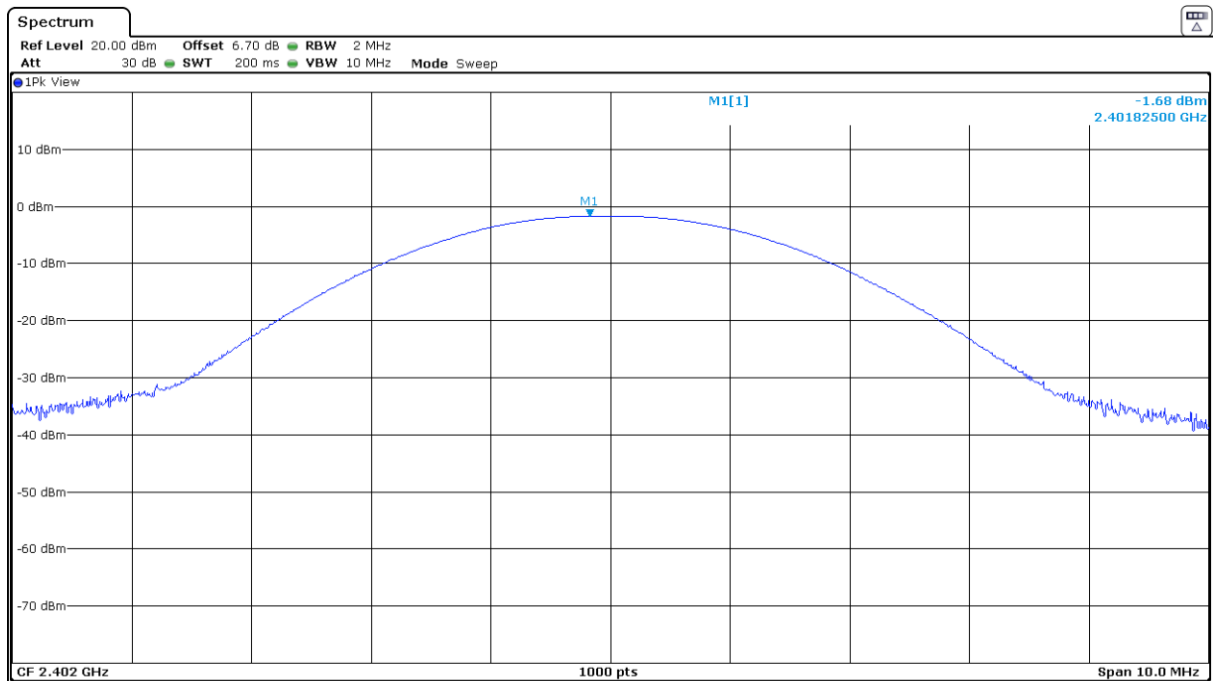


- High Channel:

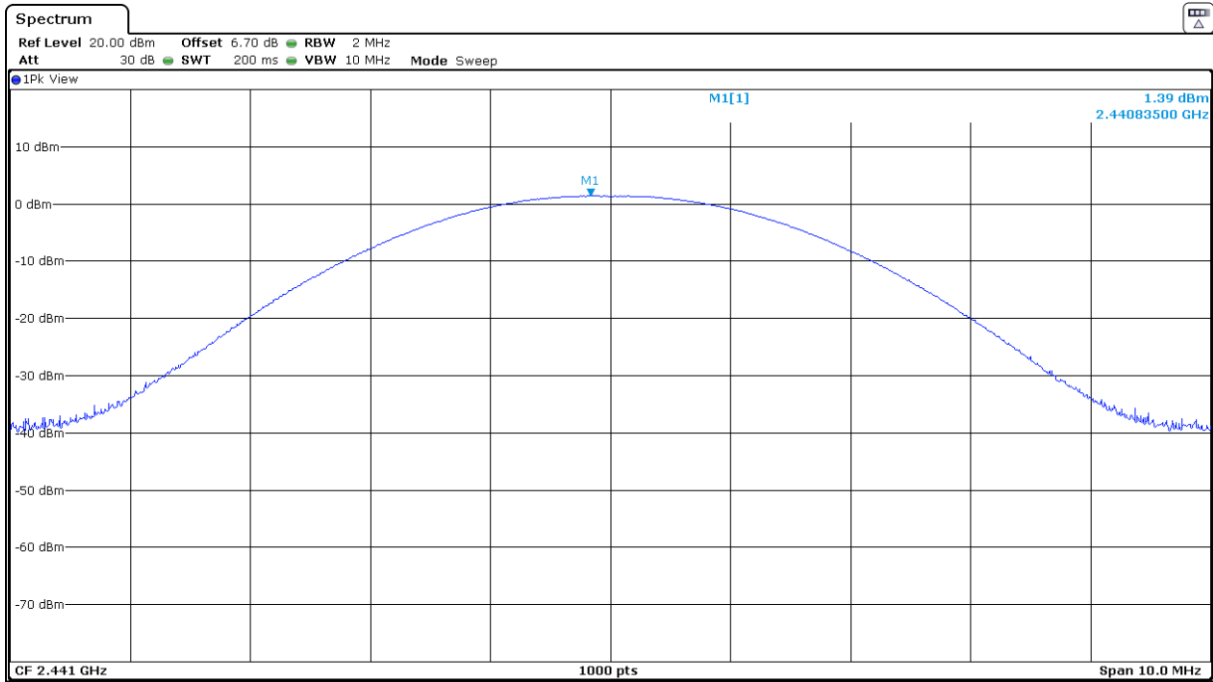


• Pi/4 DQPSK – Peak Output Power

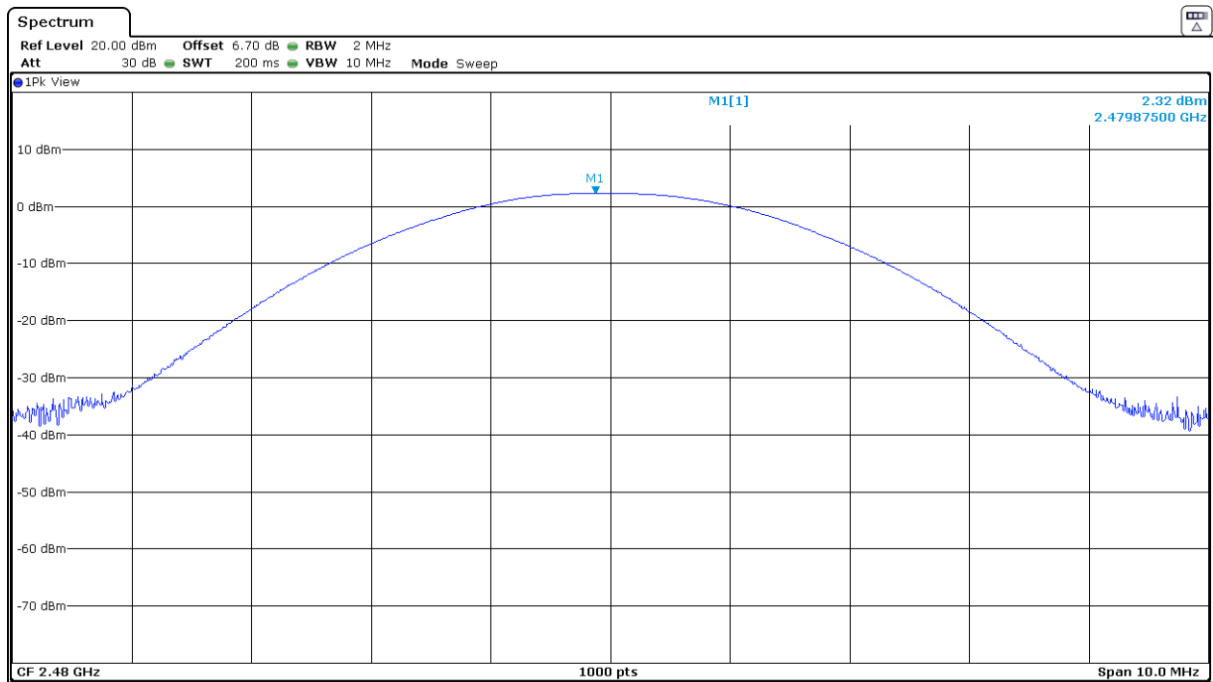
- Low Channel:



- Middle Channel:

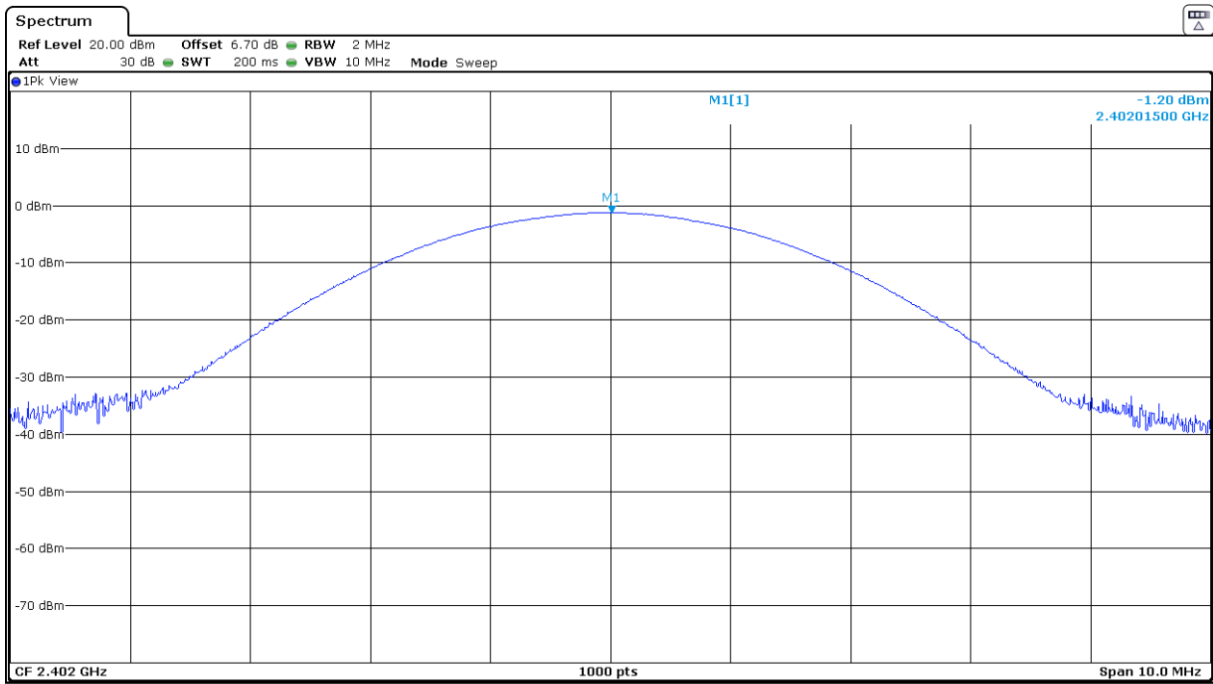


- High Channel:

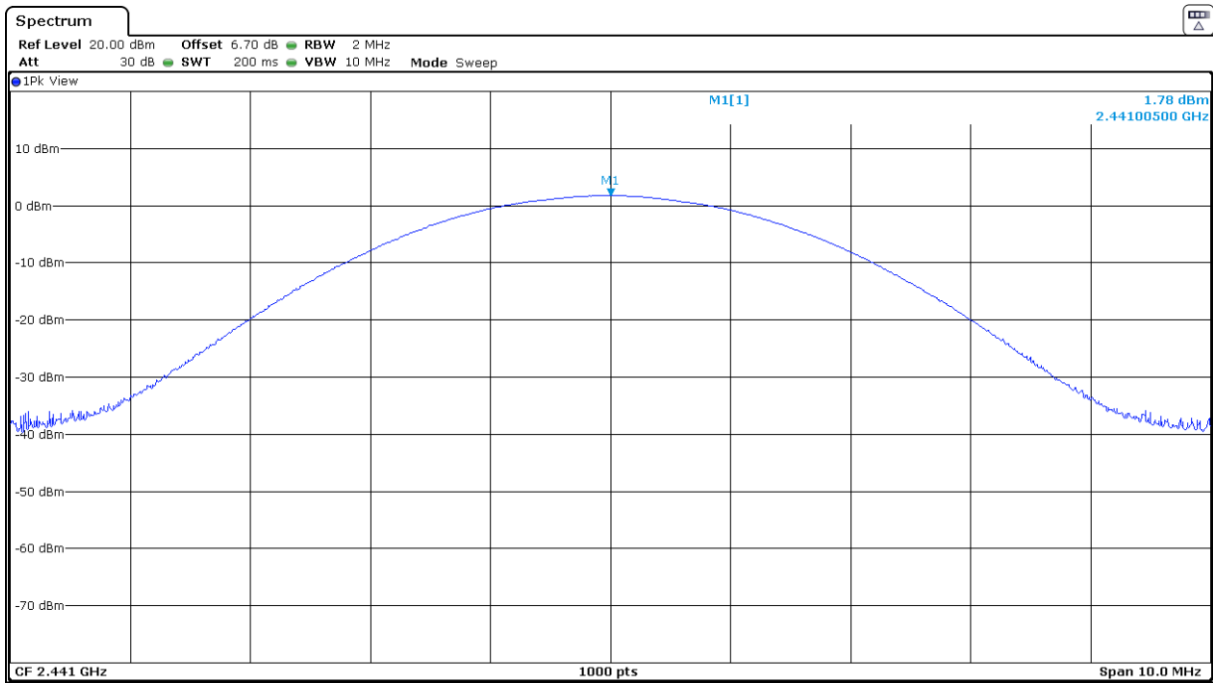


• 8DPSK – Peak Output Power

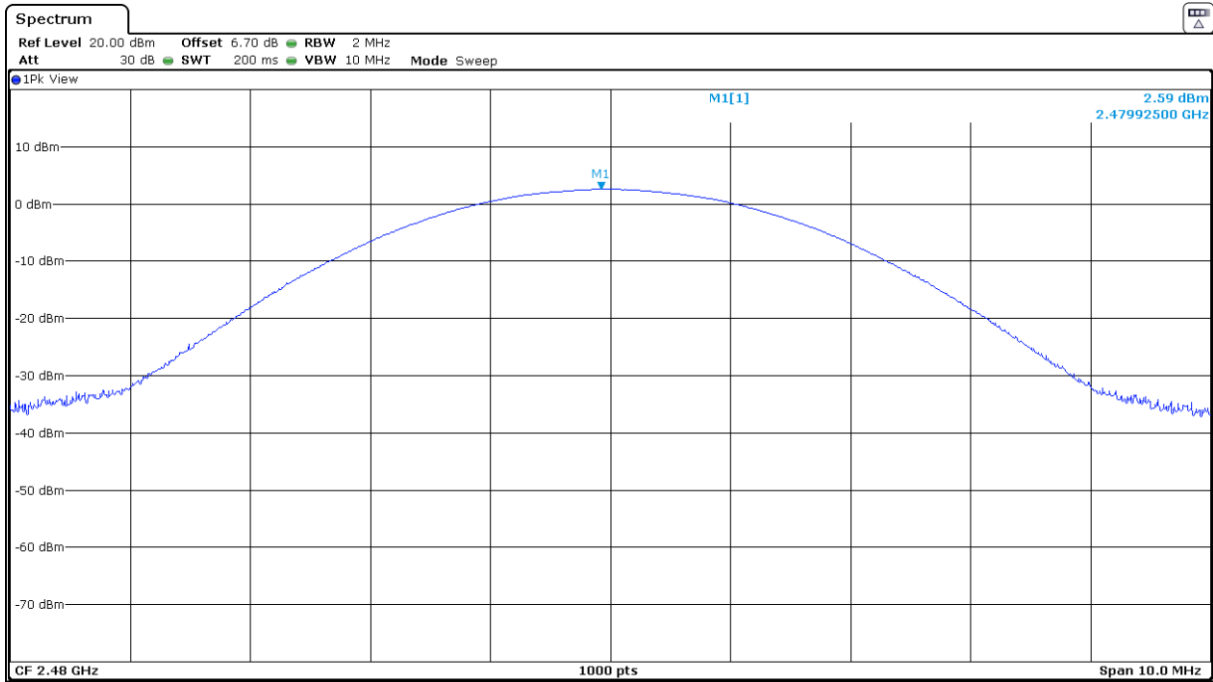
- Low Channel:



- Middle Channel:



- High Channel:



## 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.

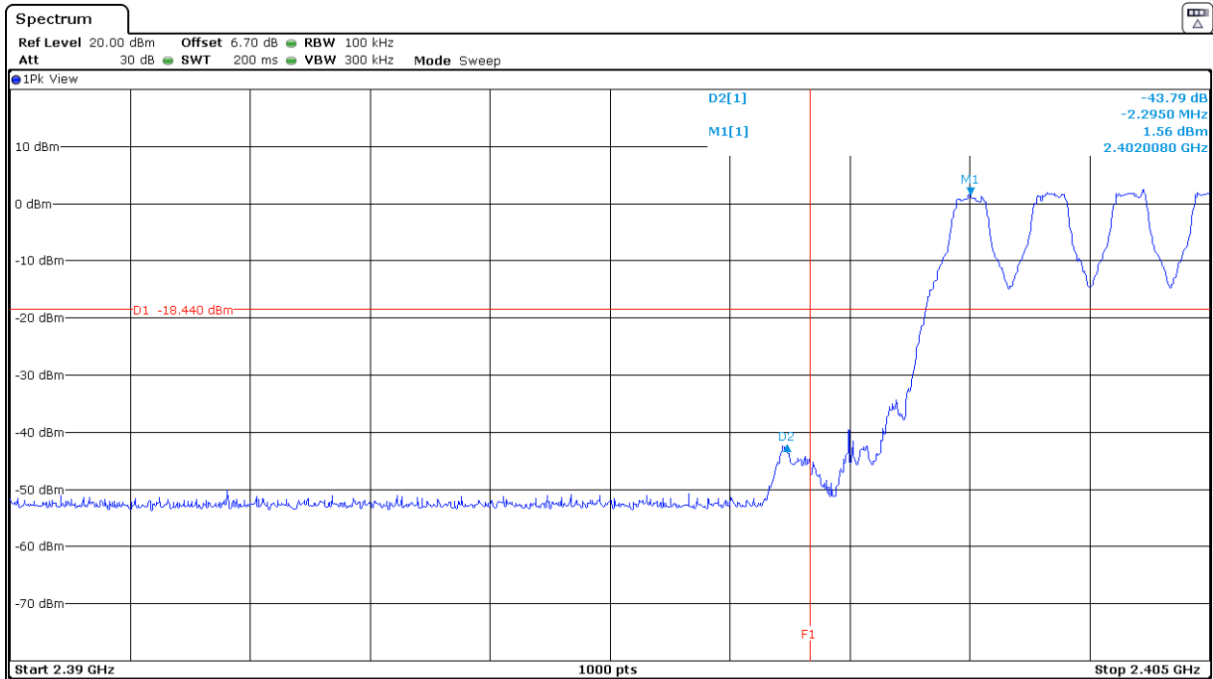
Measurement uncertainty (dB)	<+2.03
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- **GFSK – Band-edge emissions compliance**

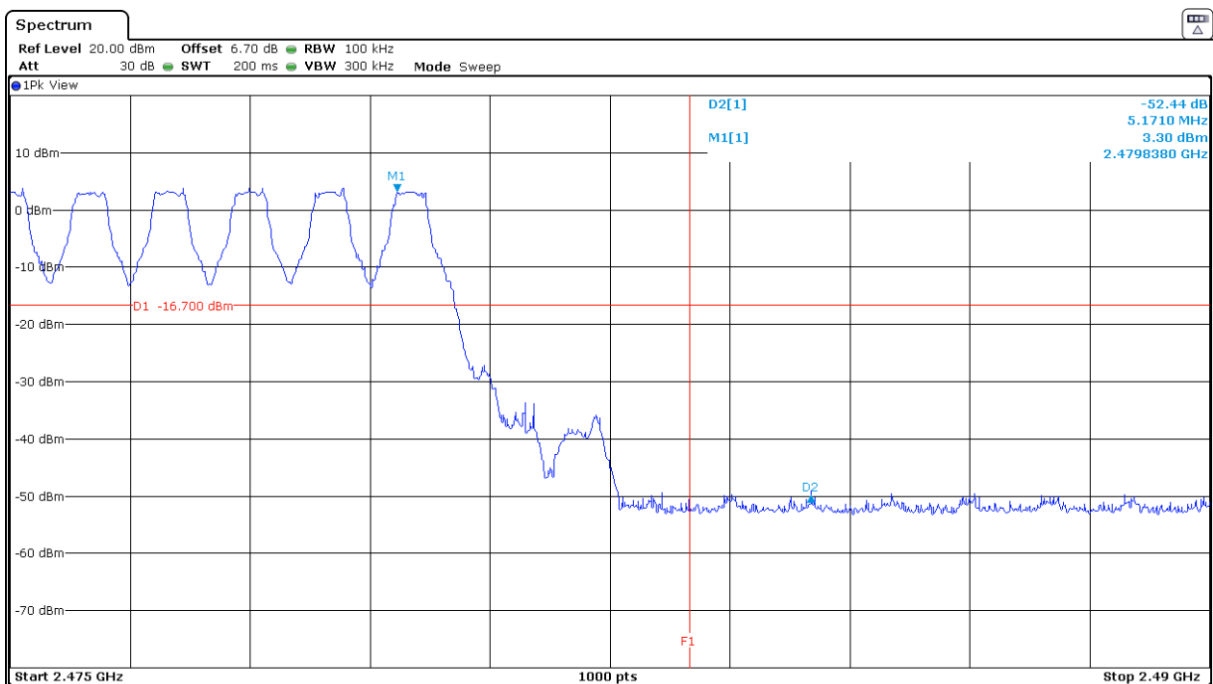
- ❖ **HOPPING ON:**

- **Low Frequency Section 2402 MHz:**



Verdict: PASS

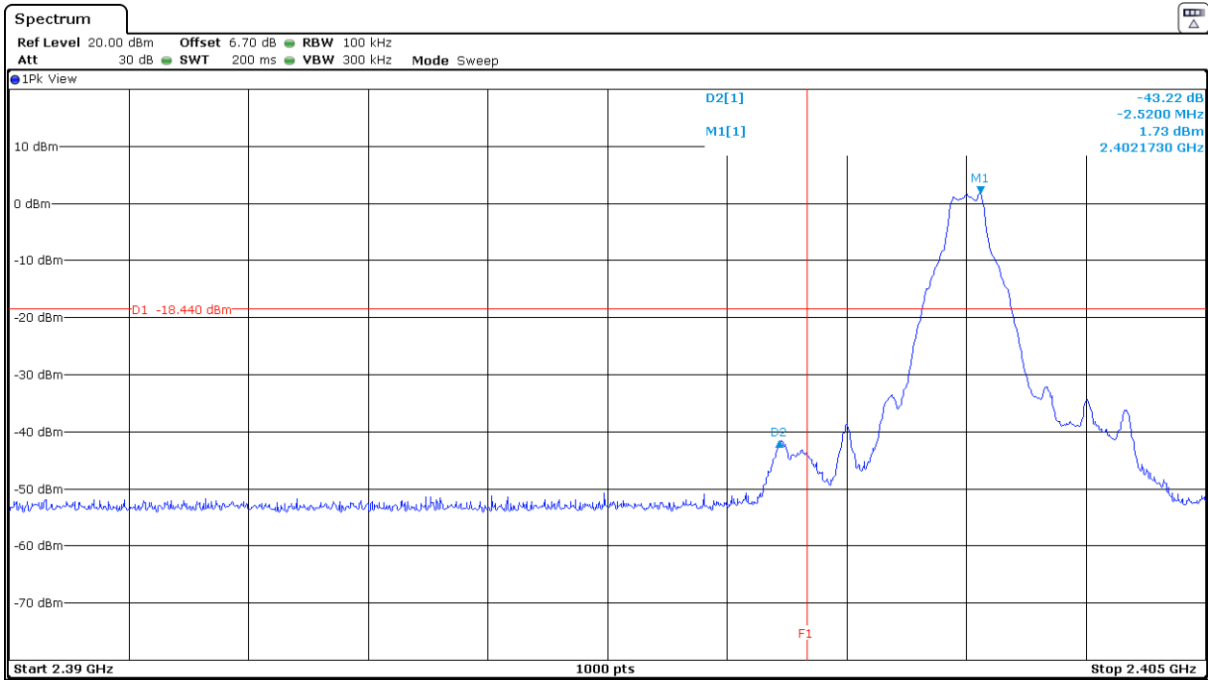
- **High Frequency Section 2480 MHz:**



Verdict: PASS

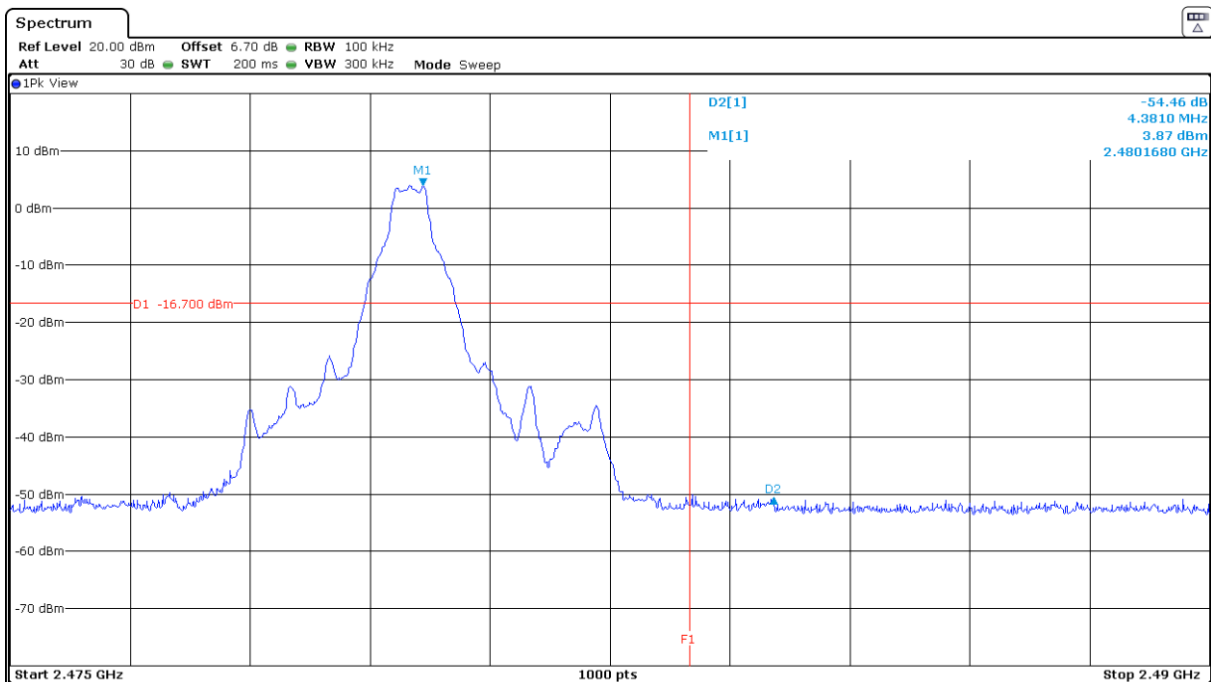
❖ HOPPING OFF:

- Low Frequency Section 2402 MHz:



Verdict: PASS

- High Frequency Section 2480 MHz:

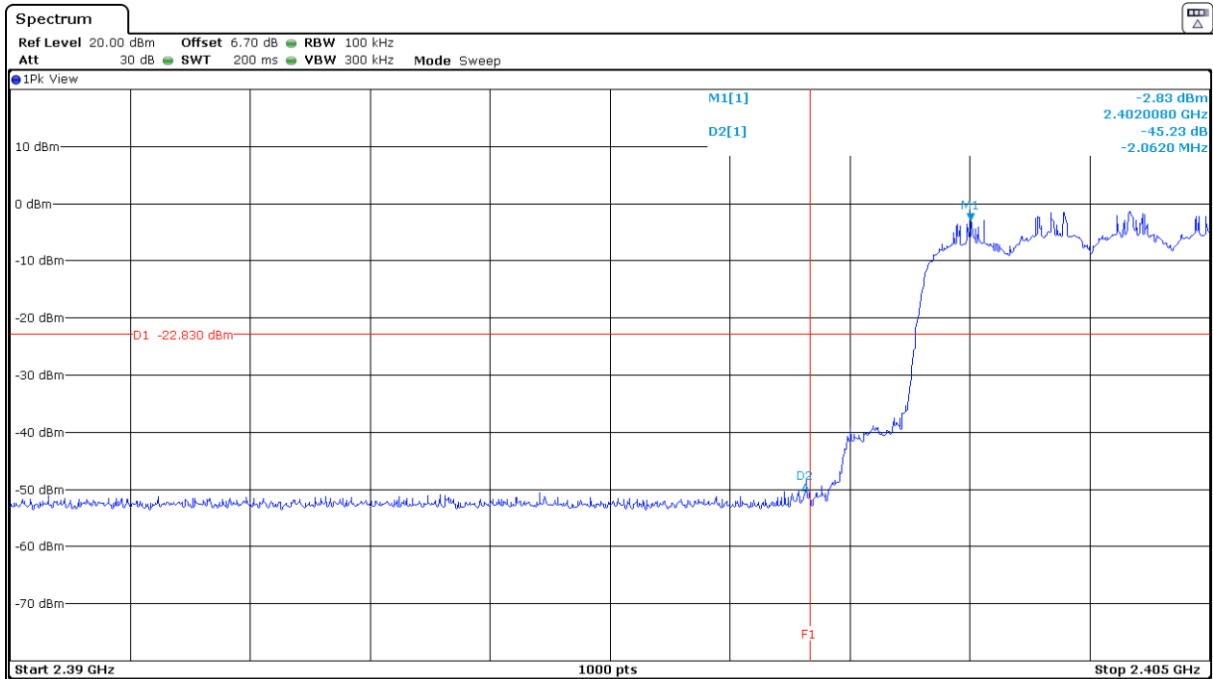


Verdict: PASS

• **PI/4 DQPSK – Band-edge emissions compliance**

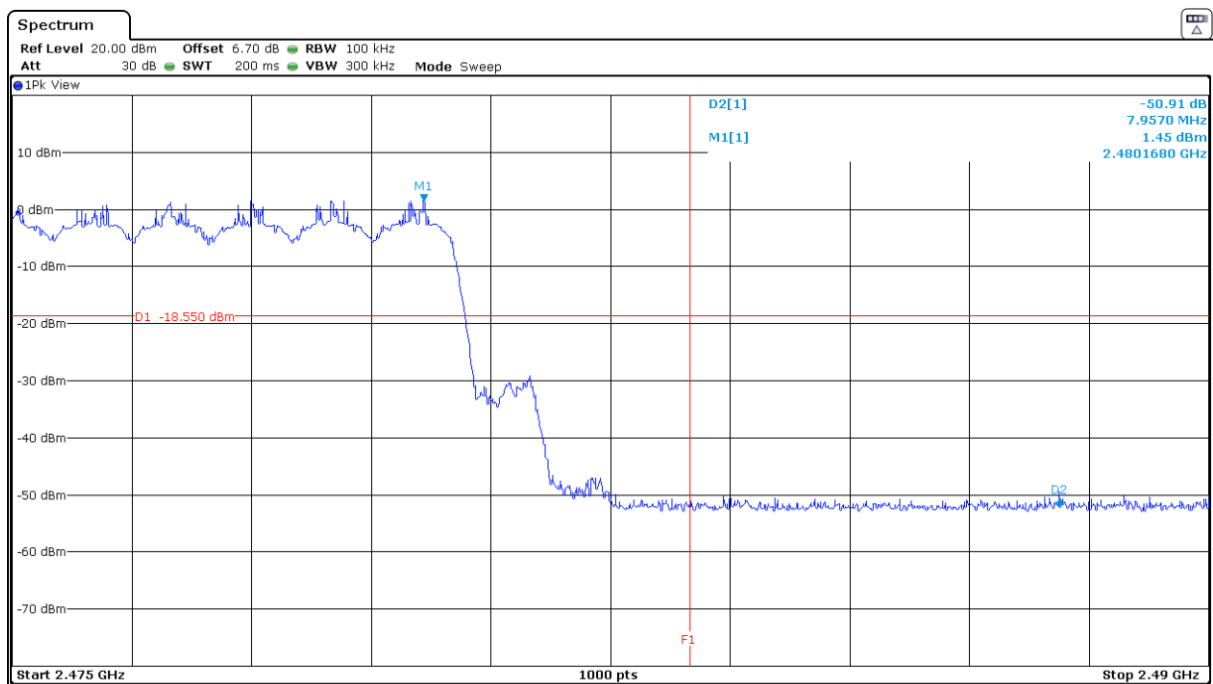
❖ **HOPPING ON:**

- **Low Frequency Section 2402 MHz:**



Verdict: PASS

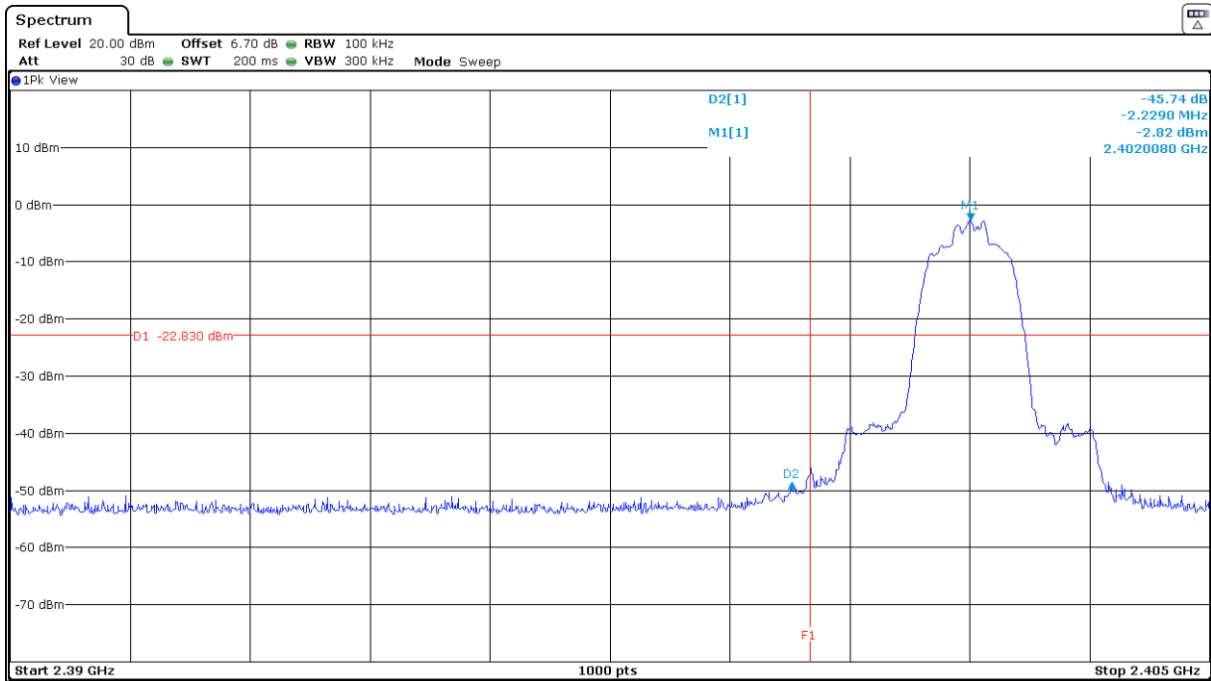
- **High Frequency Section 2480 MHz:**



Verdict: PASS

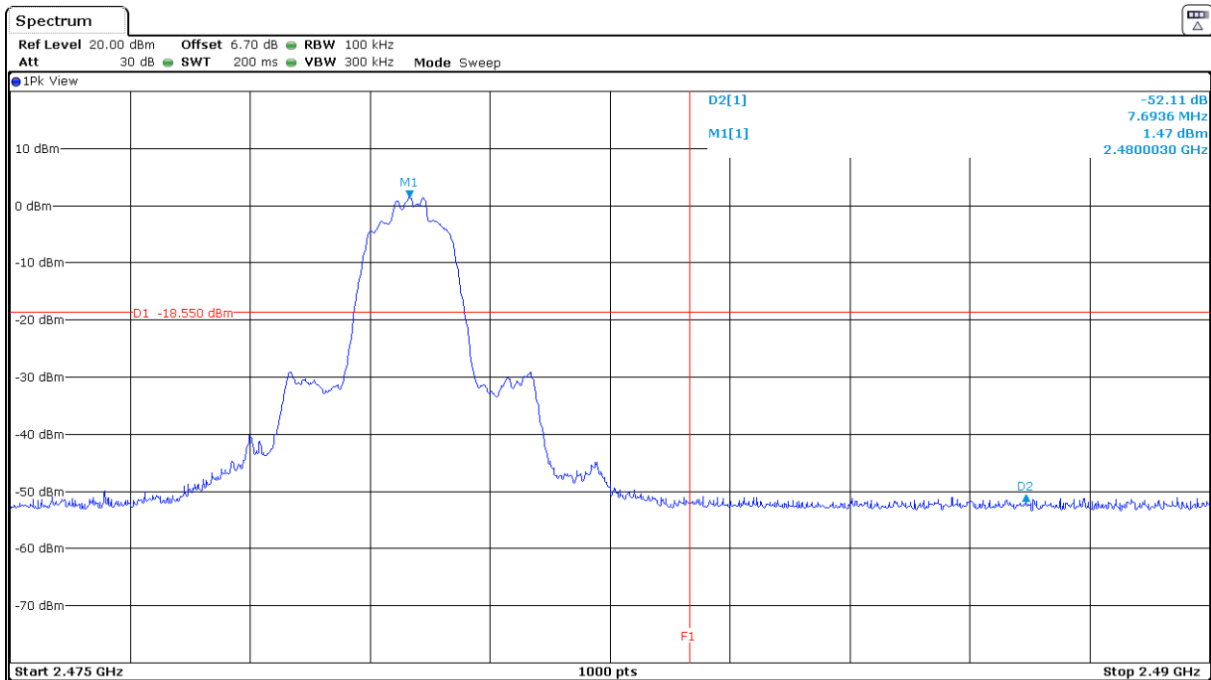
❖ HOPPING OFF:

- Low Frequency Section 2402 MHz:



Verdict: PASS

- High Frequency Section 2480 MHz:

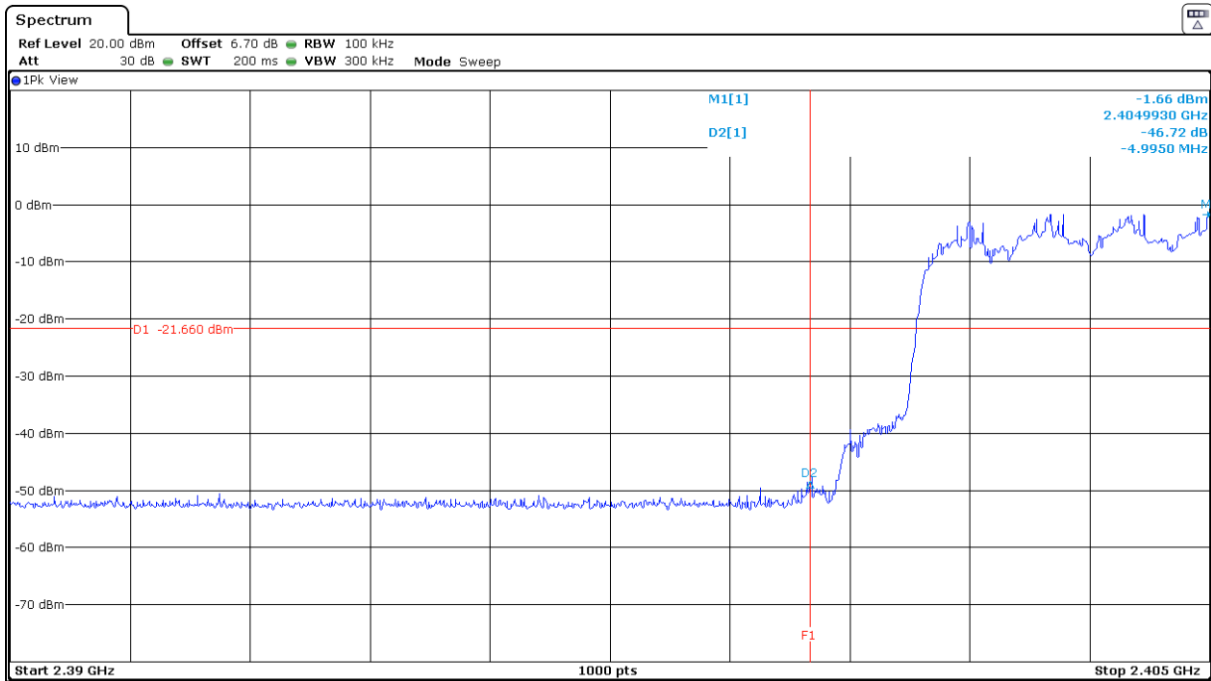


Verdict: PASS

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

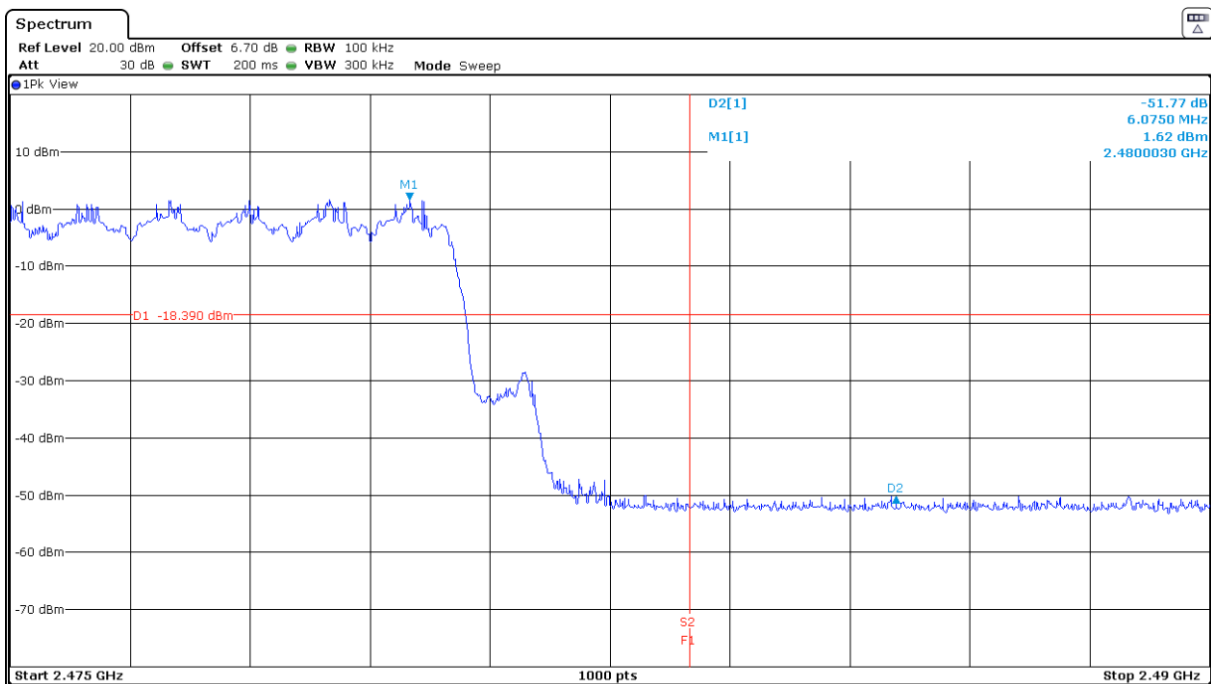
❖ **HOPPING ON:**

- **Low Frequency Section 2402 MHz:**



Verdict: PASS

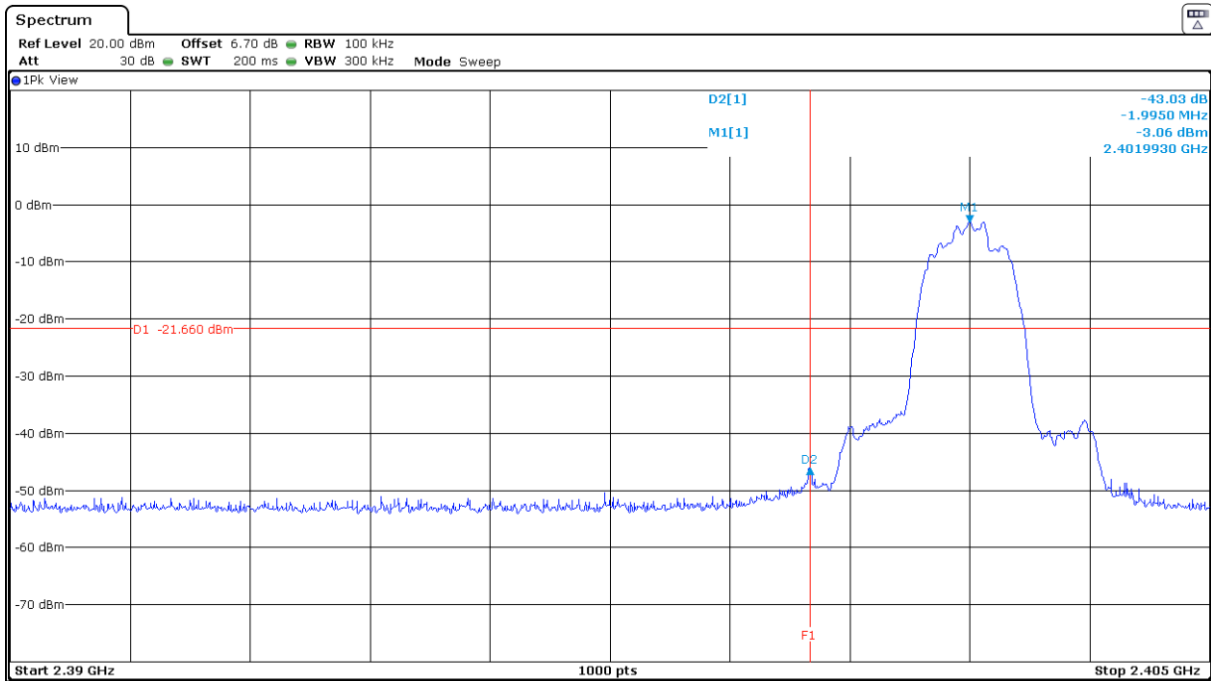
- **High Frequency Section 2480 MHz:**



Verdict: PASS

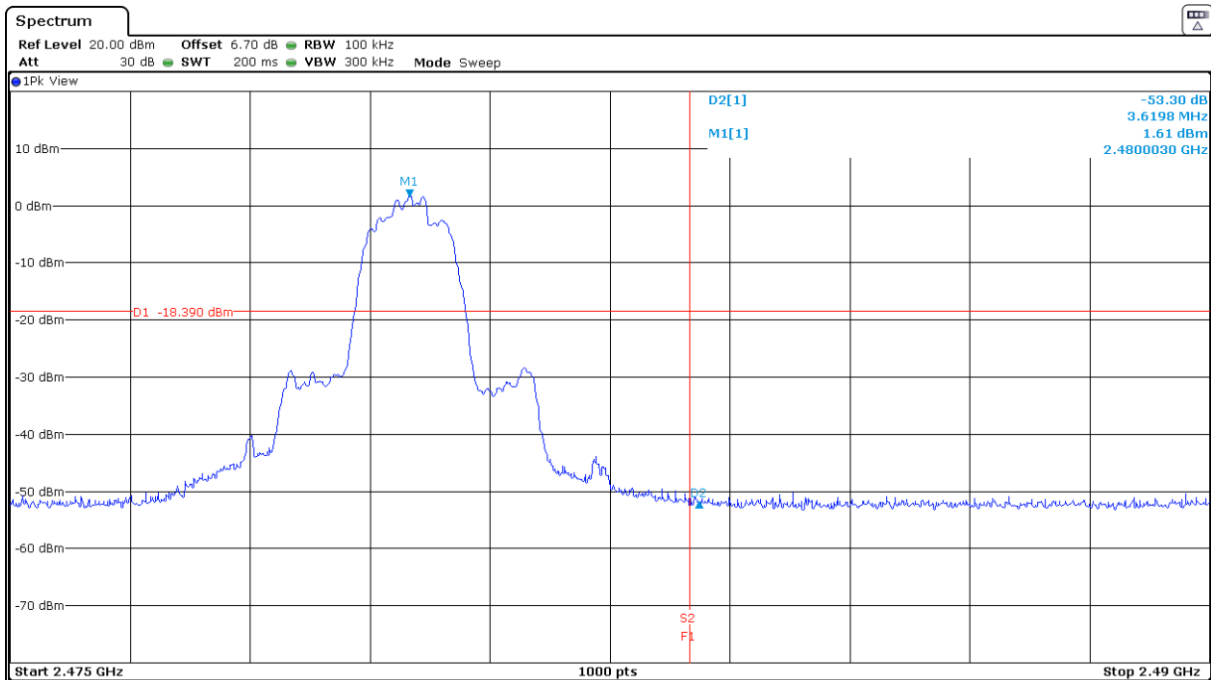
❖ HOPPING OFF:

- Low Frequency Section 2402 MHz:



Verdict: PASS

- High Frequency Section 2480 MHz:



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 ( $\mu\text{V}/\text{m}$ )	Field strength ( $\text{dB}\mu\text{V}/\text{m}$ )	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 360° 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 emissions below 1 GHz do not depend neither on the operating channel nor the modulation mode selected in the EUT.

No spurious frequencies operating (radiated) detected at less than 20 dB below limit.

### 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 frequencies with peak levels above the average limit (54 dB $\mu$ V/m at 3 m) are measured with average detector for checking compliance with the average limit.

- **Modulation: GFSK (DH5)**

- Low Channel (2402 MHz). Spurious frequencies operating (radiated) detected at less than 20 dB below limit:

Spurious frequency (GHz)	Detector	Emission Level (dB $\mu$ V/m)	Polarization	Measurement Uncertainty (dB)
2.497985	Peak	54.76	H	< $\pm$ 3.70
	Average	49.00		< $\pm$ 3.70
2.530167	Peak	54.86	H	< $\pm$ 3.70
	Average	51.83		< $\pm$ 3.70
2.562033	Peak	52.51	H	< $\pm$ 3.70
4.803900	Peak	39.78	V	< $\pm$ 3.70
7.205830	Peak	50.71	H	< $\pm$ 3.70

- Middle Channel (2441 MHz). Spurious frequencies operating (radiated) detected at less than 20 dB below limit:

Spurious frequency (GHz)	Detector	Emission Level (dB $\mu$ V/m)	Polarization	Measurement Uncertainty (dB)
2.311991	Peak	50.49	H	< $\pm$ 3.70
2.343996	Peak	51.57	H	< $\pm$ 3.70
2.375872	Peak	50.76	H	< $\pm$ 3.70
2.504033	Peak	51.39	H	< $\pm$ 3.70
2.535900	Peak	53.80	H	< $\pm$ 3.70
2.567833	Peak	53.10	H	< $\pm$ 3.70
4.881830	Peak	39.43	V	< $\pm$ 3.70
7.323430	Peak	50.92	H	< $\pm$ 3.70



- High Channel (2480 MHz). Spurious frequencies operating (radiated) detected at less than 20 dB below limit:

Spurious frequency (GHz)	Detector	Emission Level (dB $\mu$ V/m)	Polarization	Measurement Uncertainty (dB)
2.351999	Peak	51.8	H	< $\pm$ 3.70
2.384169	Peak	52.13	H	< $\pm$ 3.70
2.576033	Peak	51.57	H	< $\pm$ 3.70
2.608203	Peak	51.40	V	< $\pm$ 3.70
4.960230	Peak	37.24	V	< $\pm$ 3.70
7.439630	Peak	51.52	H	< $\pm$ 3.70

Verdict: PASS

• **Modulation PI/4-DQPSK (2DH5)**

- Low Channel (2402 MHz). Spurious frequencies operating (radiated) detected at less than 20 dB below limit:

Spurious frequency (GHz)	Detector	Emission Level (dB $\mu$ V/m)	Polarization	Measurement Uncertainty (dB)
2.497893	Peak	54.79	H	< $\pm$ 3.70
	Average	49.27		< $\pm$ 3.70
2.498082	Peak	51.71	H	< $\pm$ 3.70
2.53030	Peak	54.57	H	< $\pm$ 3.70
	Average	48.82		< $\pm$ 3.70
2.562113	Peak	51.74	H	< $\pm$ 3.70
4.803900	Peak	35.02	V	< $\pm$ 3.70
7.205480	Peak	42.42	H	< $\pm$ 3.70

- Middle Channel (2441 MHz). Spurious frequencies operating (radiated) detected at less than 20 dB below limit:

Spurious frequency (GHz)	Detector	Emission Level (dB $\mu$ V/m)	Polarization	Measurement Uncertainty (dB)
2.504767	Peak	52.14	H	< $\pm$ 3.70
2.536967	Peak	52.43	H	< $\pm$ 3.70
2.568967	Peak	51.78	H	< $\pm$ 3.70
4.88234	Peak	35.53	V	< $\pm$ 3.70
7.32283	Peak	43.35	H	< $\pm$ 3.70

- High Channel (2480 MHz). Spurious frequencies operating (radiated) detected at less than 20 dB below limit:

Spurious frequency (GHz)	Detector	Emission Level (dB $\mu$ V/m)	Polarization	Measurement Uncertainty (dB)
2.383775	Peak	49.51	H	< $\pm$ 3.70
2.576167	Peak	50.29	H	< $\pm$ 3.70
2.607500	Peak	51.38	H	< $\pm$ 3.70
4.959860	Peak	36.36	V	< $\pm$ 3.70
7.439570	Peak	42.80	H	< $\pm$ 3.70

Verdict: PASS

• **Modulation: 8-DPSK (3DH5)**

- Low Channel (2402 MHz). Spurious frequencies operating (radiated) detected at less than 20 dB below limit:

Spurious frequency (GHz)	Detector	Emission Level (dB $\mu$ V/m)	Polarization	Measurement Uncertainty (dB)
2.497994	Peak	54.87	H	< $\pm$ 3.70
	Average	49.74		< $\pm$ 3.70
2.529900	Peak	55.41	H	< $\pm$ 3.70
	Average	52.35		< $\pm$ 3.70
2.562192	Peak	50.07	H	< $\pm$ 3.70
4.804530	Peak	34.86	V	< $\pm$ 3.70

- Middle Channel (2441 MHz). Spurious frequencies operating (radiated) detected at less than 20 dB below limit:

Spurious frequency (GHz)	Detector	Emission Level (dB $\mu$ V/m)	Polarization	Measurement Uncertainty (dB)
2.505193	Peak	51.64	H	< $\pm$ 3.70
2.5367	Peak	53.40	H	< $\pm$ 3.70
2.569033	Peak	52.52	H	< $\pm$ 3.70
4.88183	Peak	37.16	V	< $\pm$ 3.70
7.3225	Peak	43.80	H	< $\pm$ 3.70

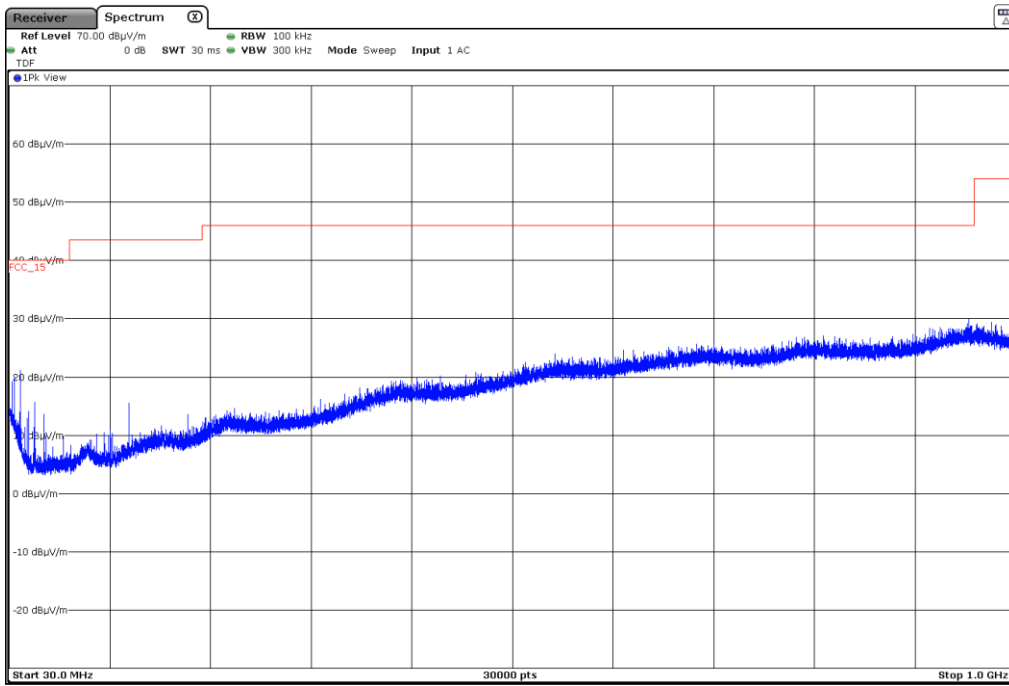
- High Channel (2480 MHz). Spurious frequencies operating (radiated) detected at less than 20 dB below limit:

Spurious frequency (GHz)	Detector	Emission Level (dB $\mu$ V/m)	Polarization	Measurement Uncertainty (dB)
2.383732	Peak	50.39	H	< $\pm$ 3.70
2.576167	Peak	51.38	H	< $\pm$ 3.70
2.607900	Peak	51.46	H	< $\pm$ 3.70
4.960430	Peak	36.63	V	< $\pm$ 3.70
7.440570	Peak	42.01	H	< $\pm$ 3.70

Verdict: PASS

### FREQUENCY RANGE 30 MHz - 1 GHz:

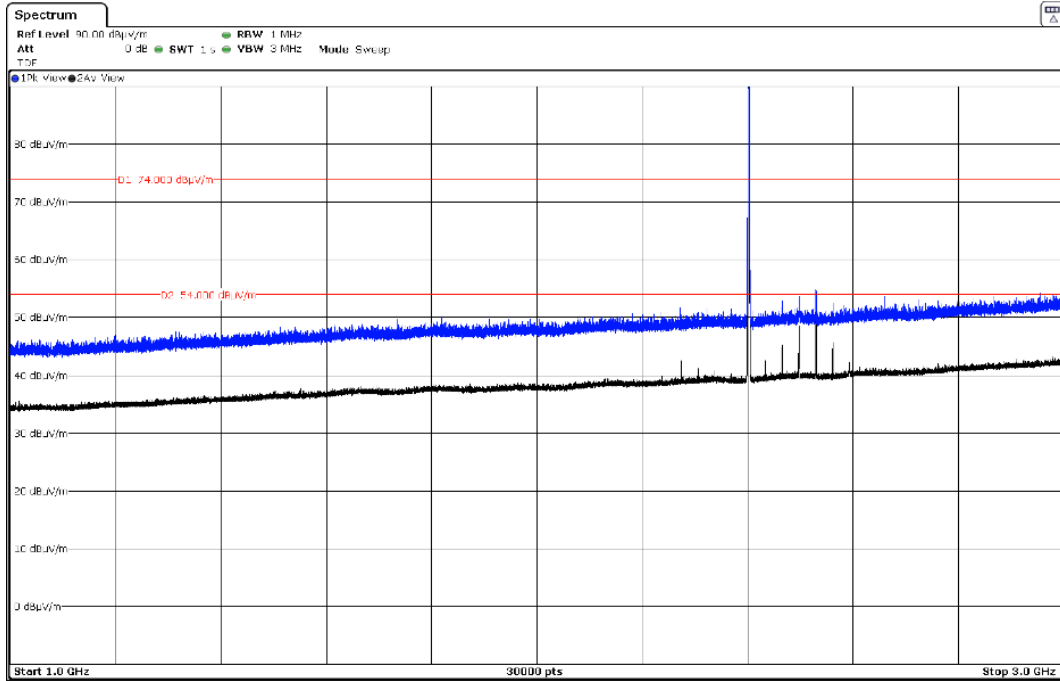
This plot is valid for the Low, Middle and High Channels and all modulation modes.



### FREQUENCY RANGE 1 - 3 GHz:

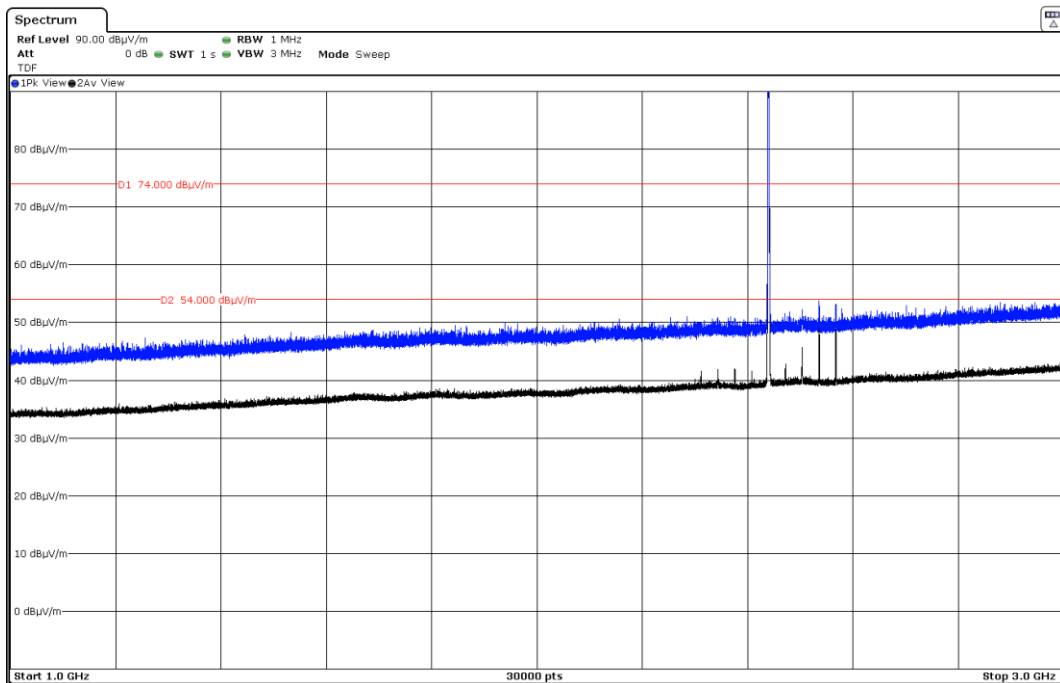
- **Modulation: GFSK (DH5)**

- Low Channel (2402 MHz):



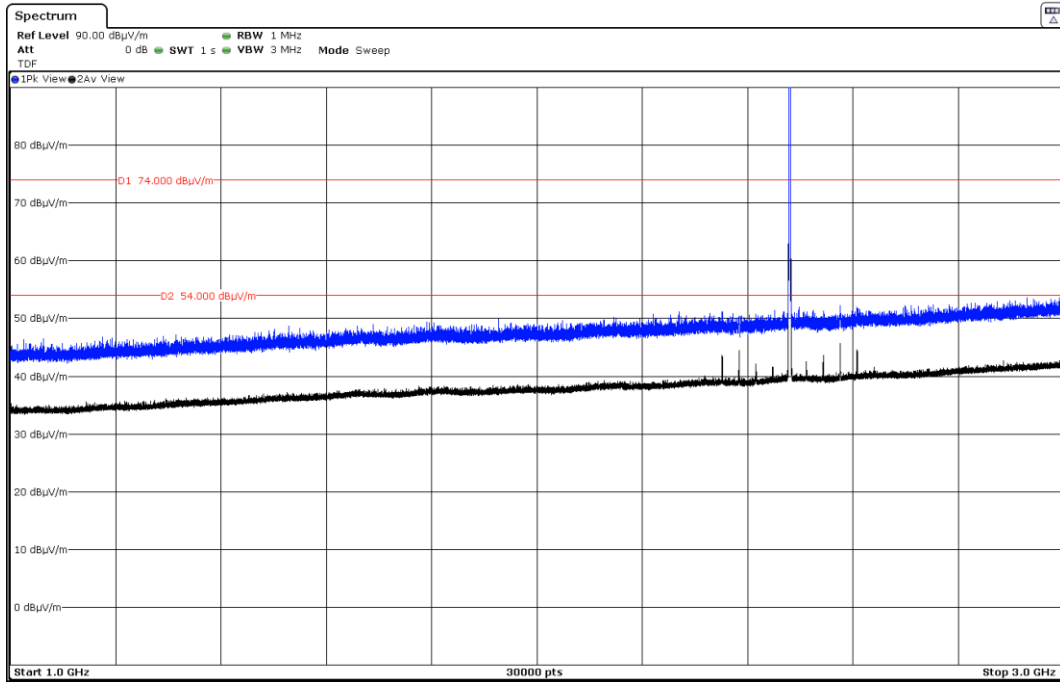
The peak above the limit is the carrier frequency.

- Middle Channel (2441 MHz):



The peak above the limit is the carrier frequency.

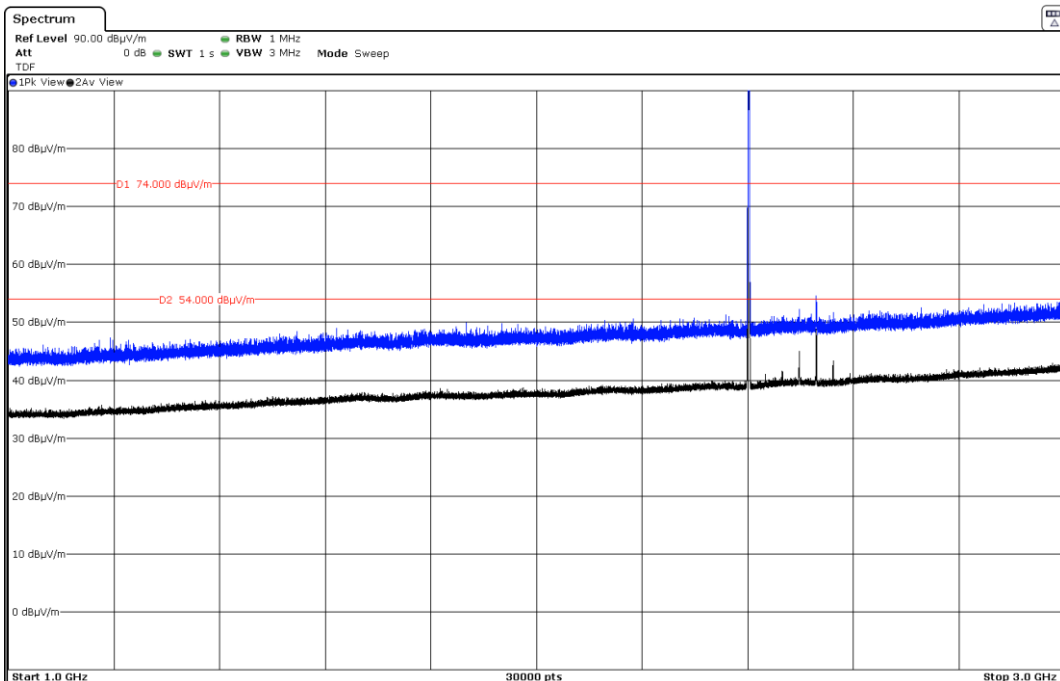
- High Channel (2480 MHz):



The peak above the limit is the carrier frequency.

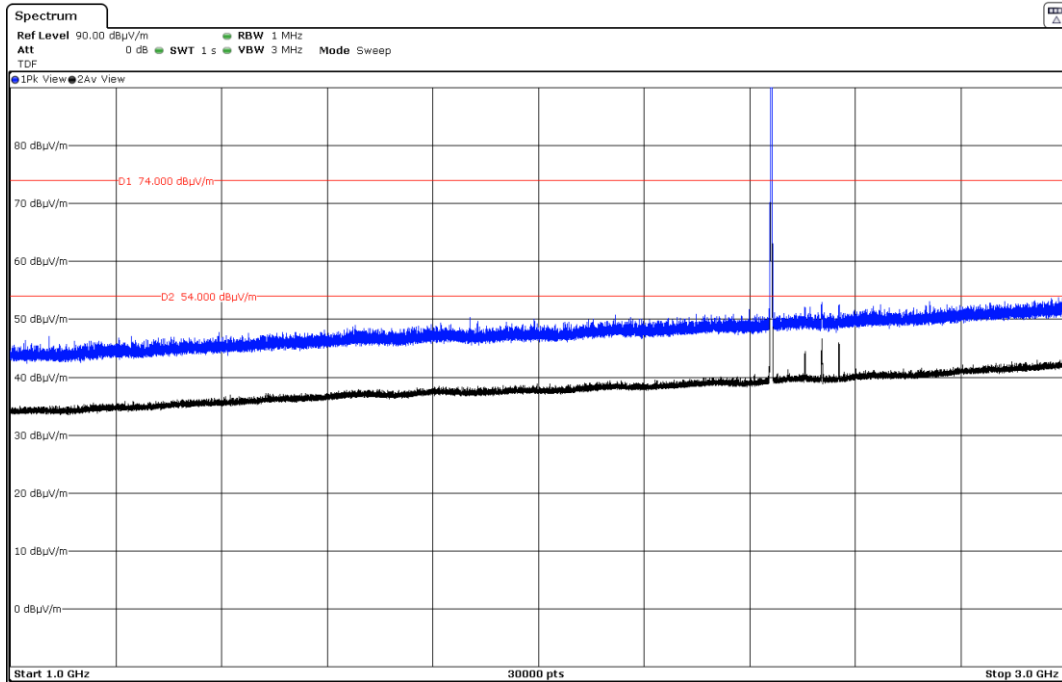
• Modulation: PI/4-DQPSK (2DH5)

- Low Channel (2402 MHz):



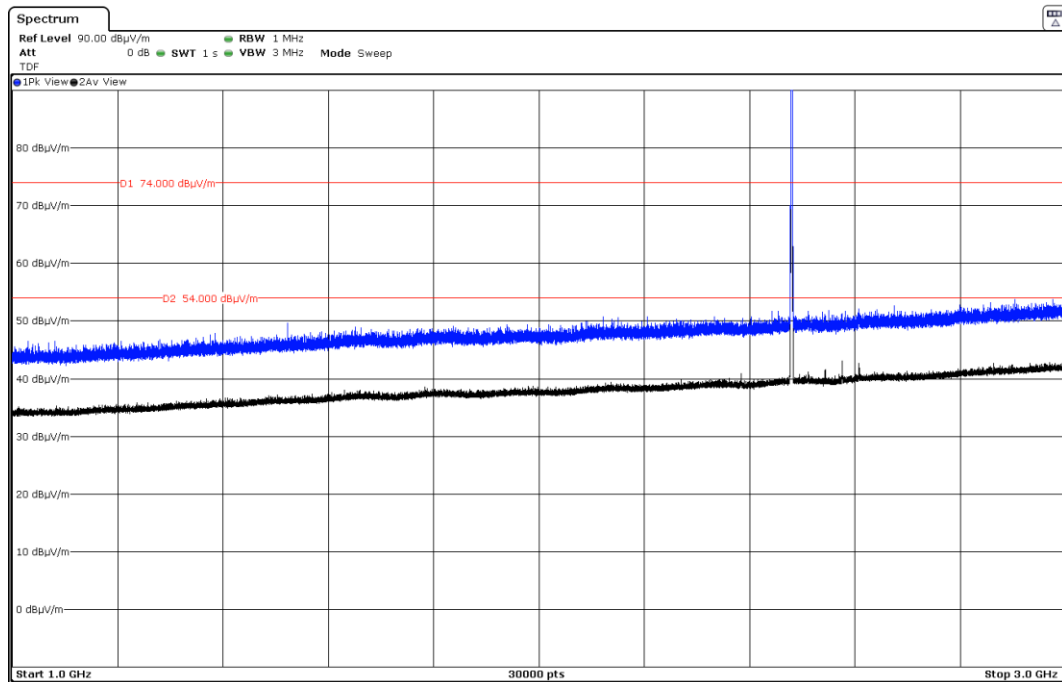
The peak above the limit is the carrier frequency.

- Middle Channel (2441 MHz):



The peak above the limit is the carrier frequency.

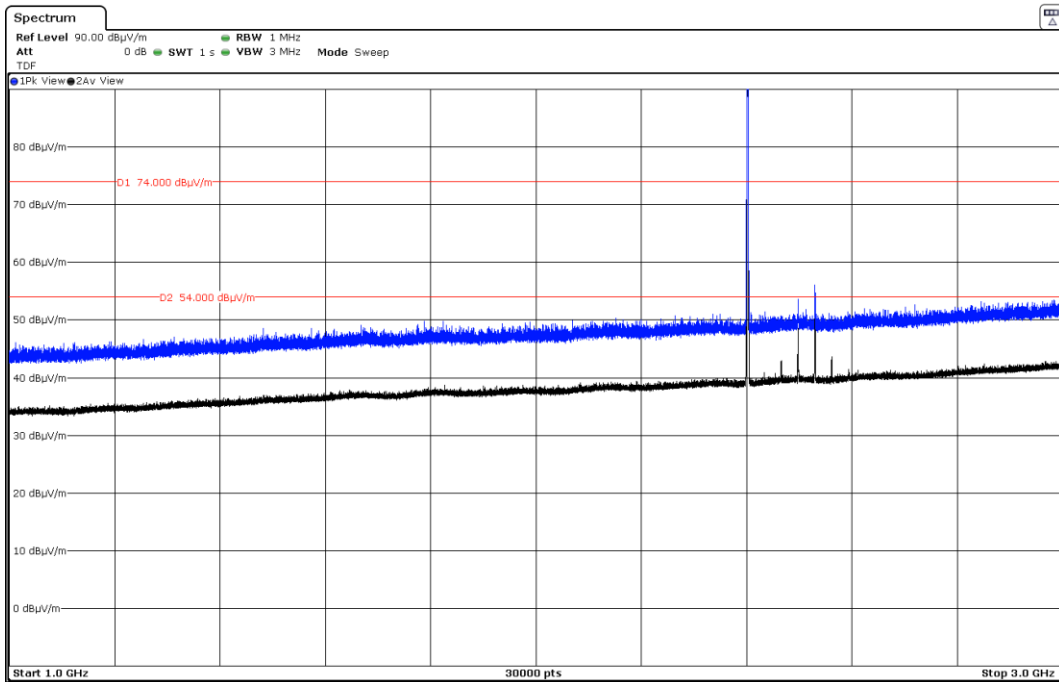
- High Channel (2480 MHz):



The peak above the limit is the carrier frequency.

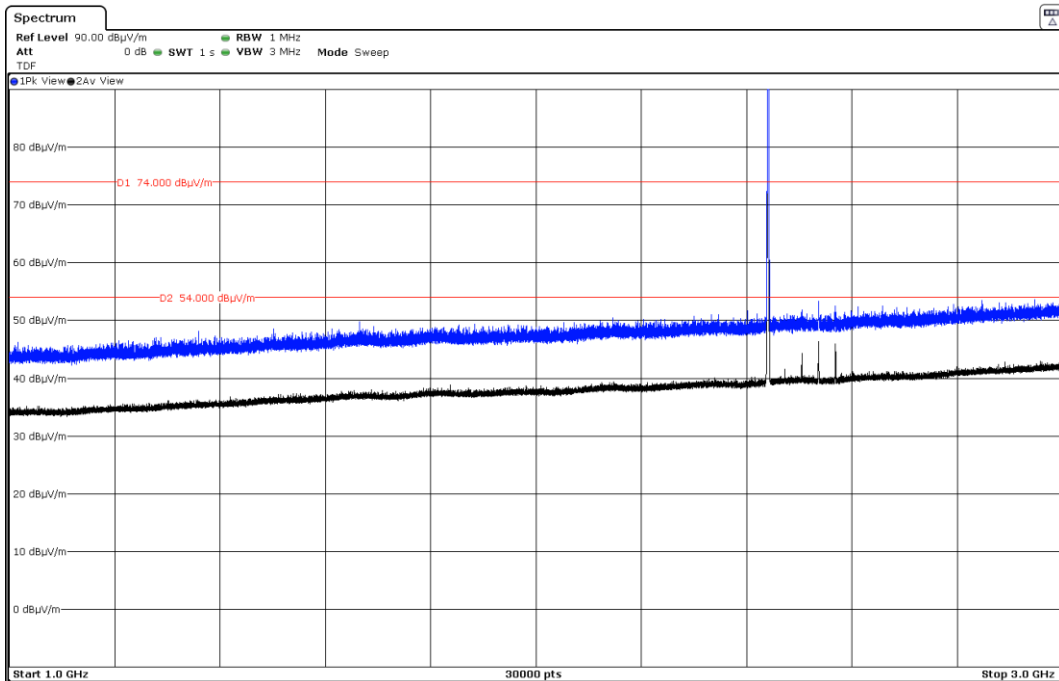
- **Modulation: 8-DPSK (3DH5)**

- Low Channel (2402 MHz):



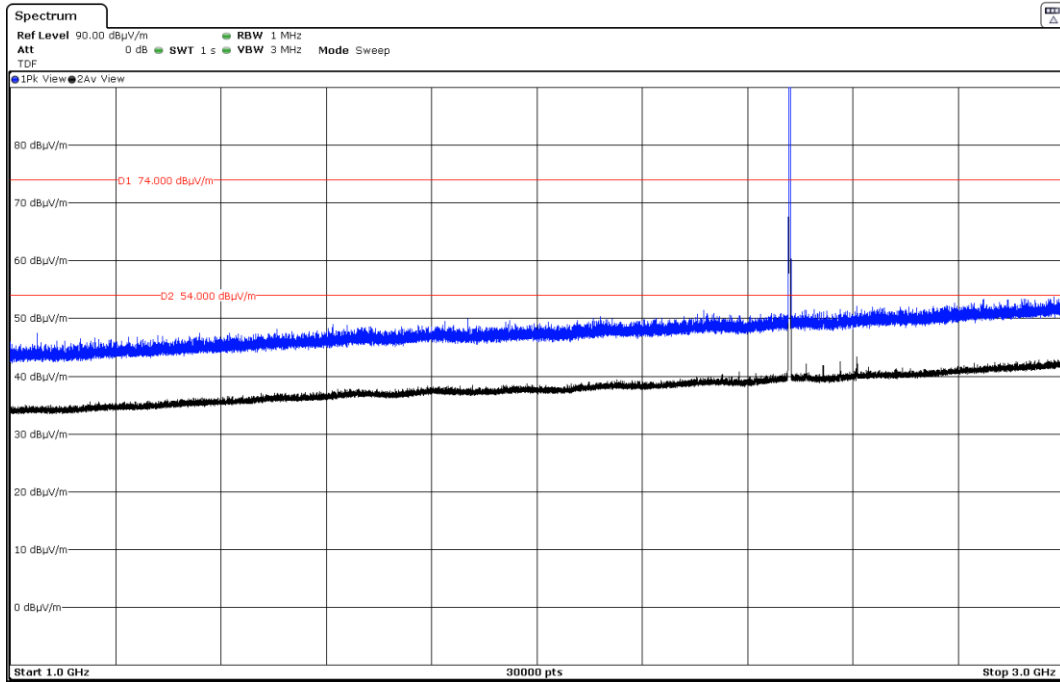
The peak above the limit is the carrier frequency.

- Middle Channel (2441 MHz):



The peak above the limit is the carrier frequency.

- High Channel (2480 MHz):



The peak above the limit is the carrier frequency.

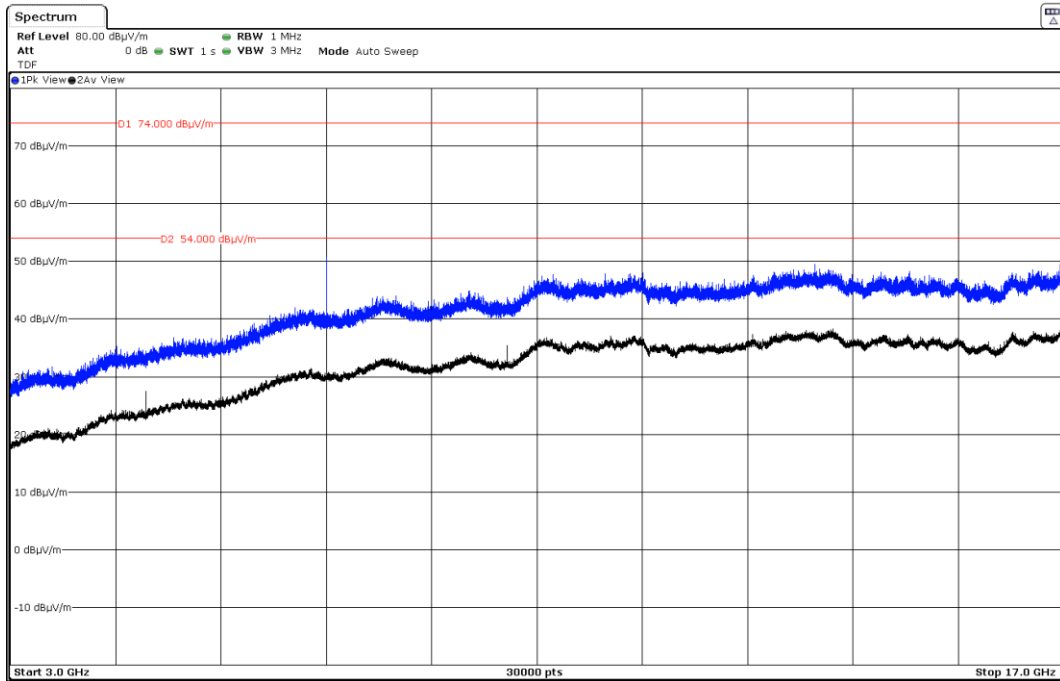


**FREQUENCY RANGE 3 - 17 GHz:**

- **Modulation: GFSK (DH5)**

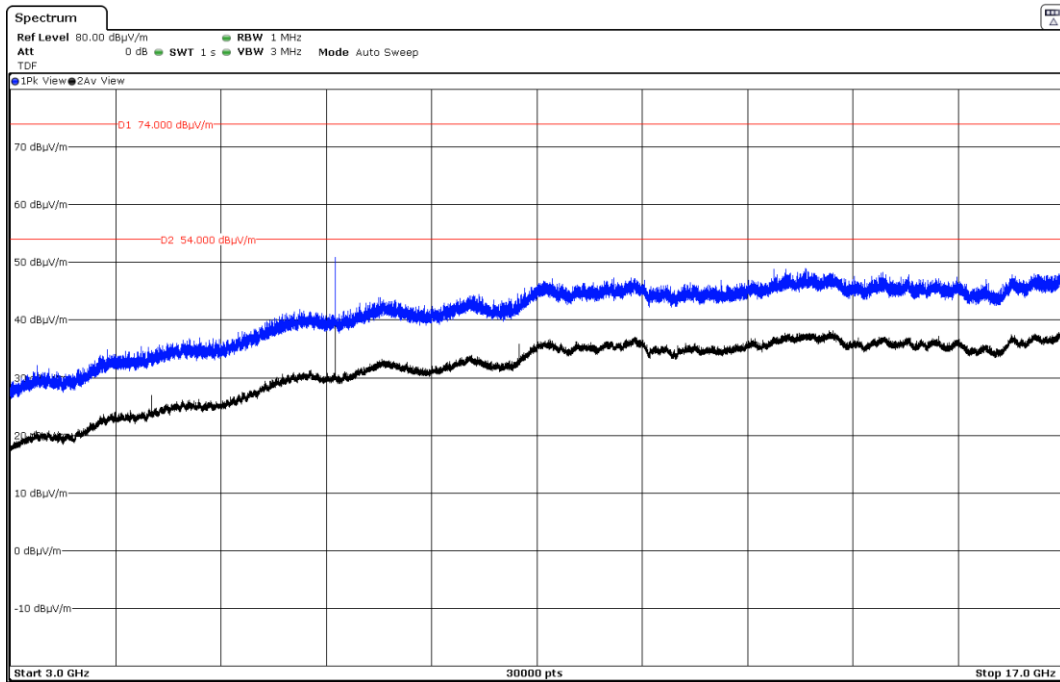
- Low Channel (2402 MHz):

9



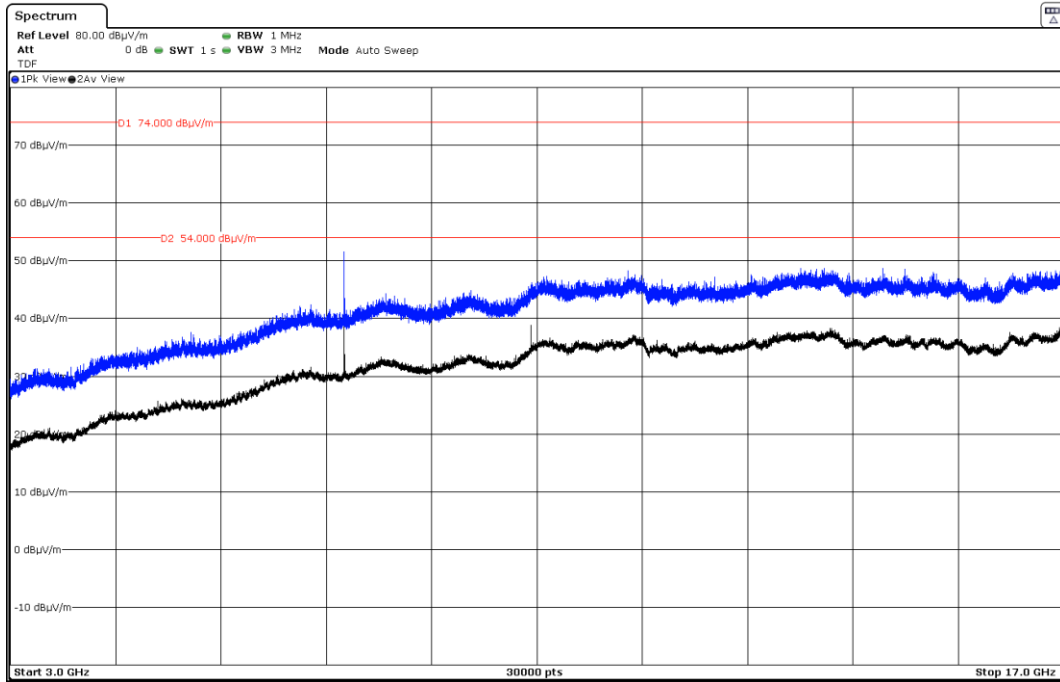
The peak above the limit is the carrier frequency.

- Middle Channel (2441 MHz):



The peak above the limit is the carrier frequency.

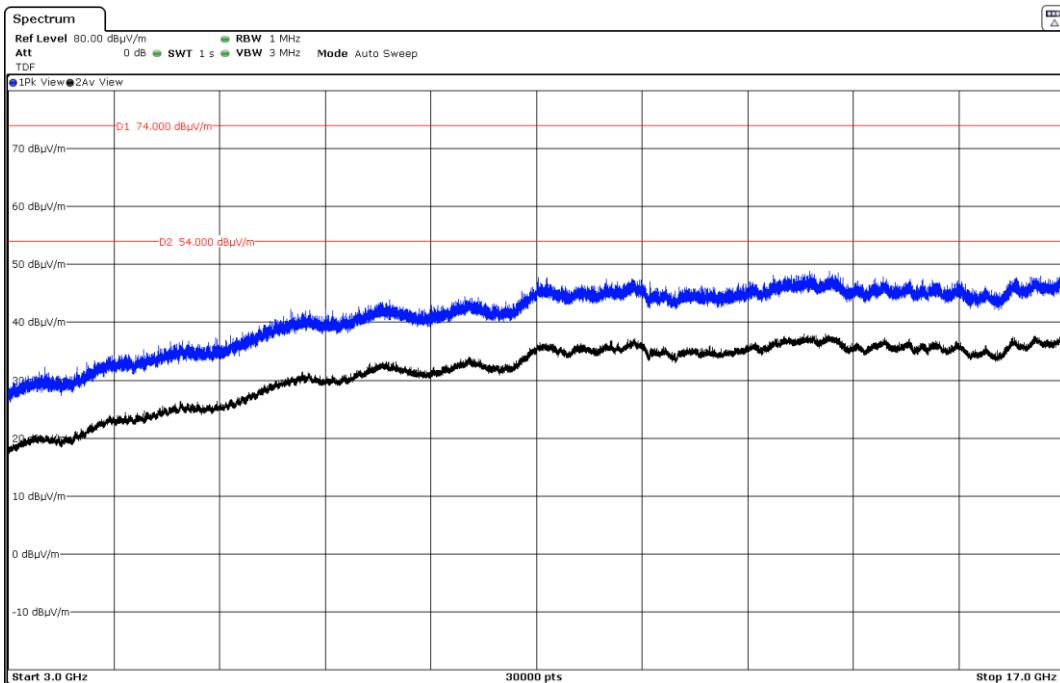
- High Channel (2480 MHz):



The peak above the limit is the carrier frequency.

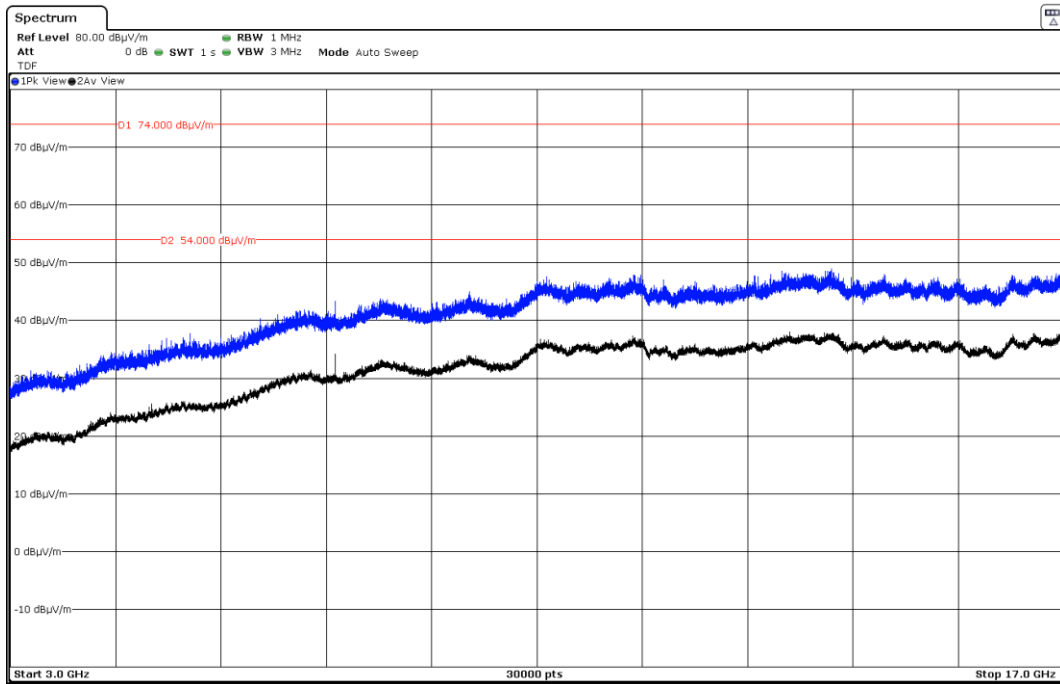
- Modulation: PI/4-DQPSK (2DH5)

- Low Channel (2402 MHz):



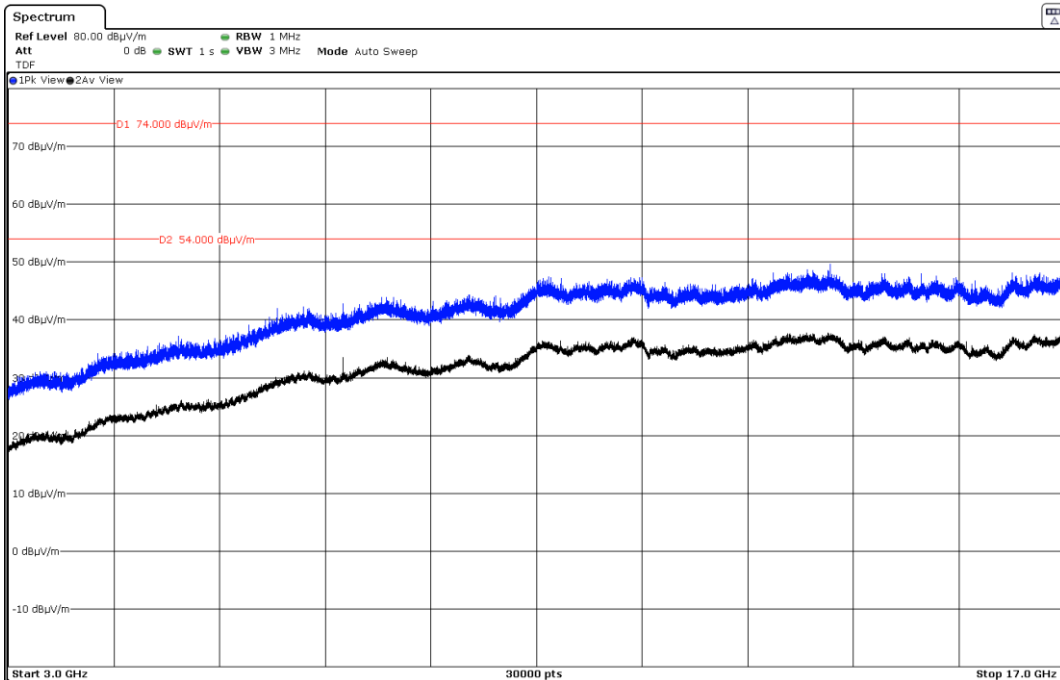
The peak above the limit is the carrier frequency.

- Middle Channel (2441 MHz):



The peak above the limit is the carrier frequency.

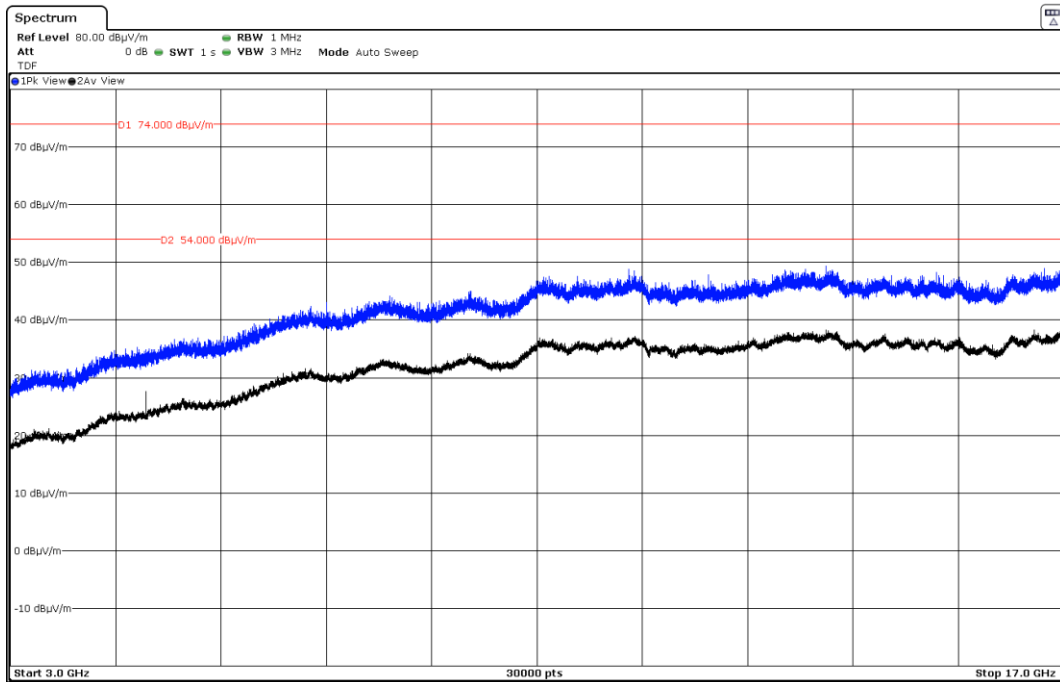
- High Channel (2480 MHz):



The peak above the limit is the carrier frequency.

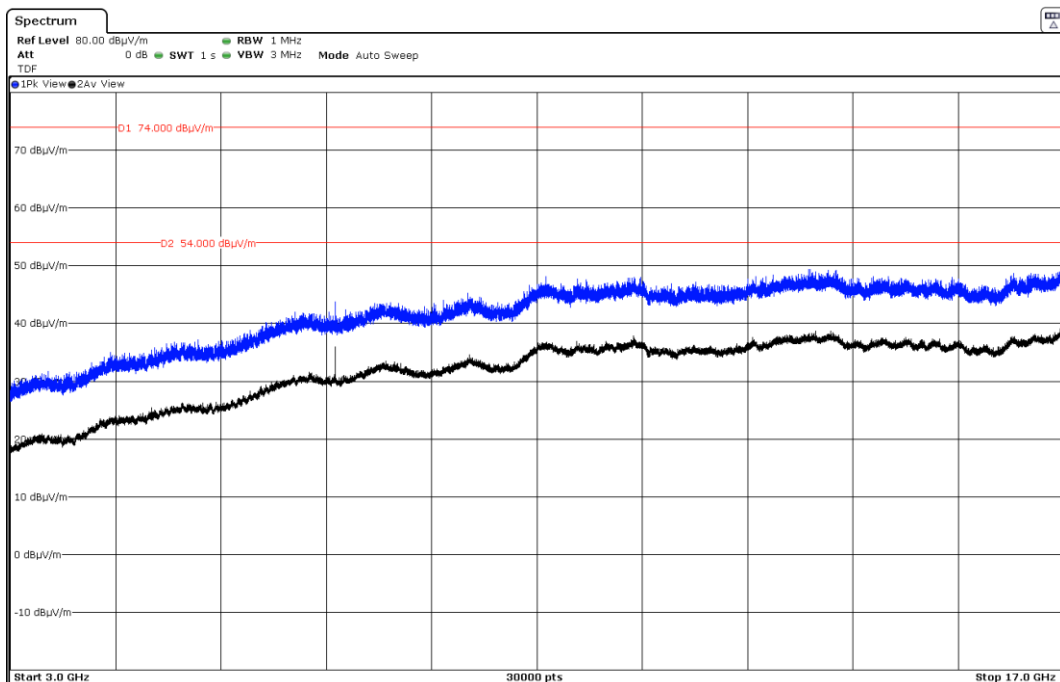
- **Modulation: 8-DPSK (3DH5)**

- Low Channel (2402 MHz):



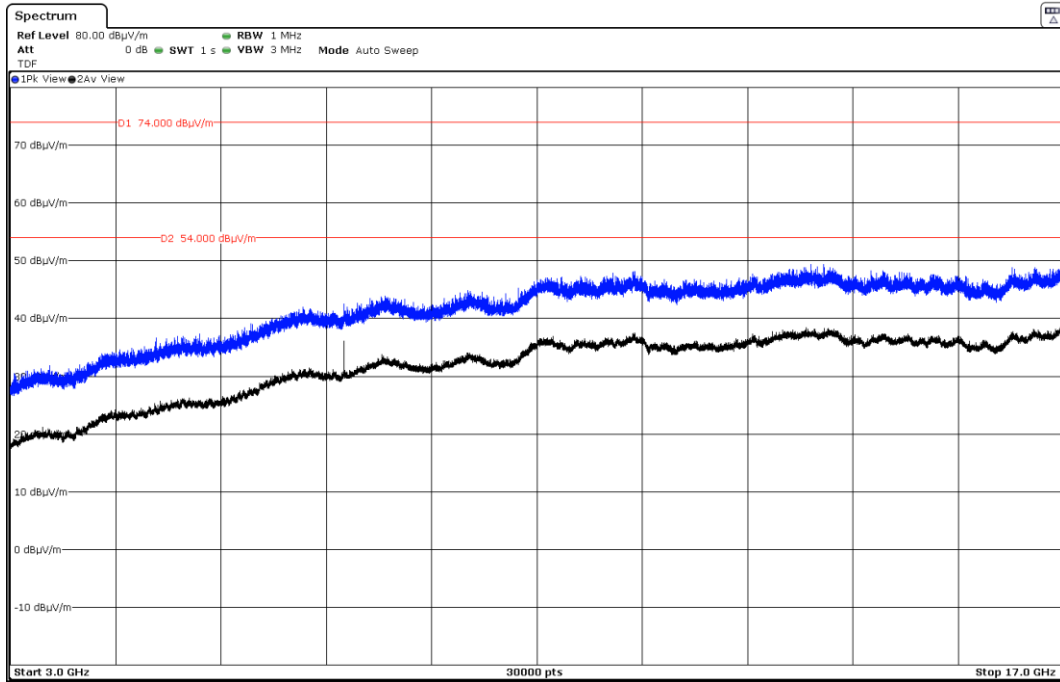
The peak above the limit is the carrier frequency.

- Middle Channel (2441 MHz):



The peak above the limit is the carrier frequency.

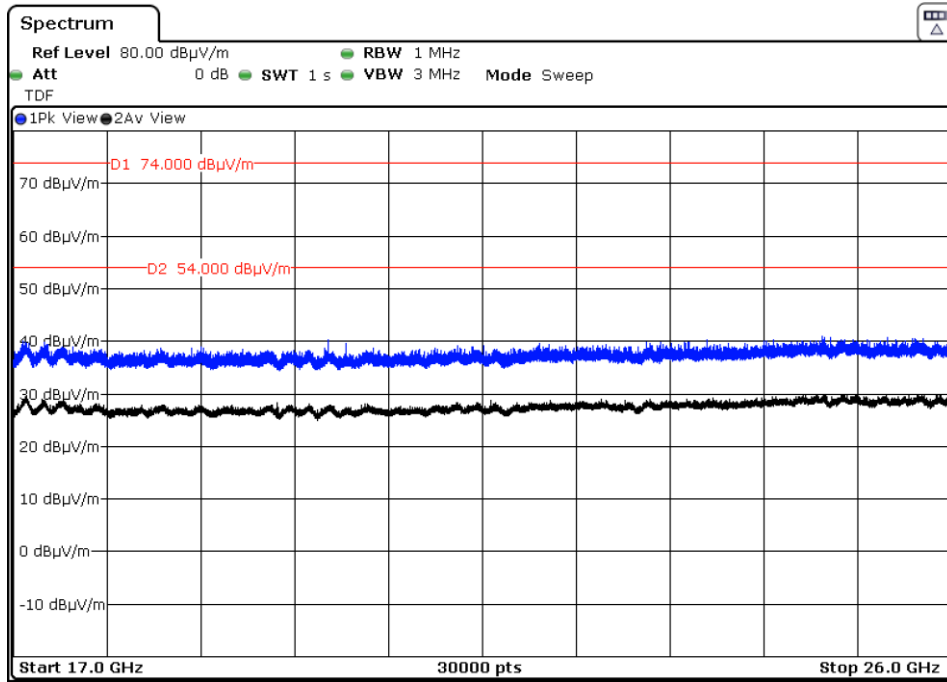
- High Channel (2480 MHz):



The peak above the limit is the carrier frequency.

### FREQUENCY RANGE 17 - 26 GHz:

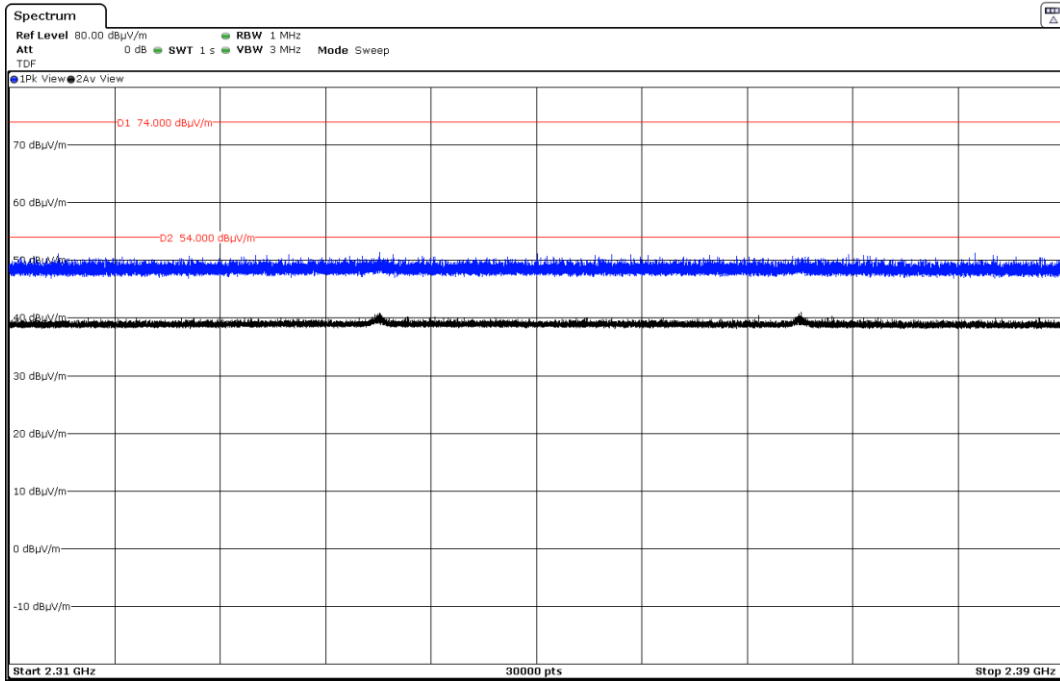
This plot is valid for the Low, Middle and High Channels and all modulation modes.



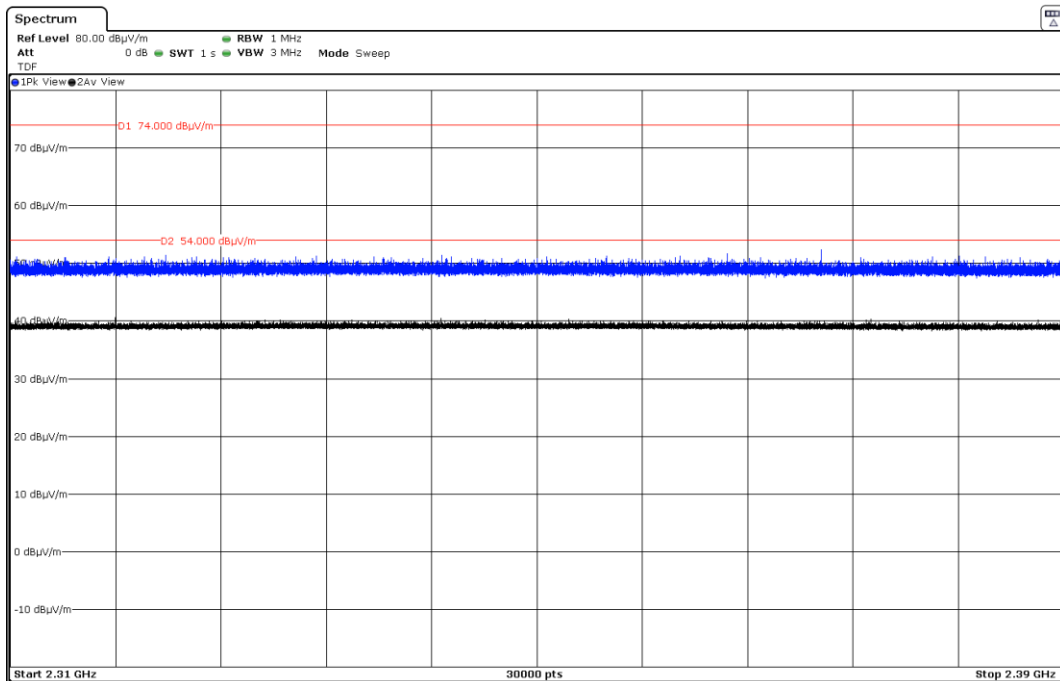
### FREQUENCY RANGE 2.31-2.39 GHz (Restricted Band 1):

- Low Channel (2402 MHz):

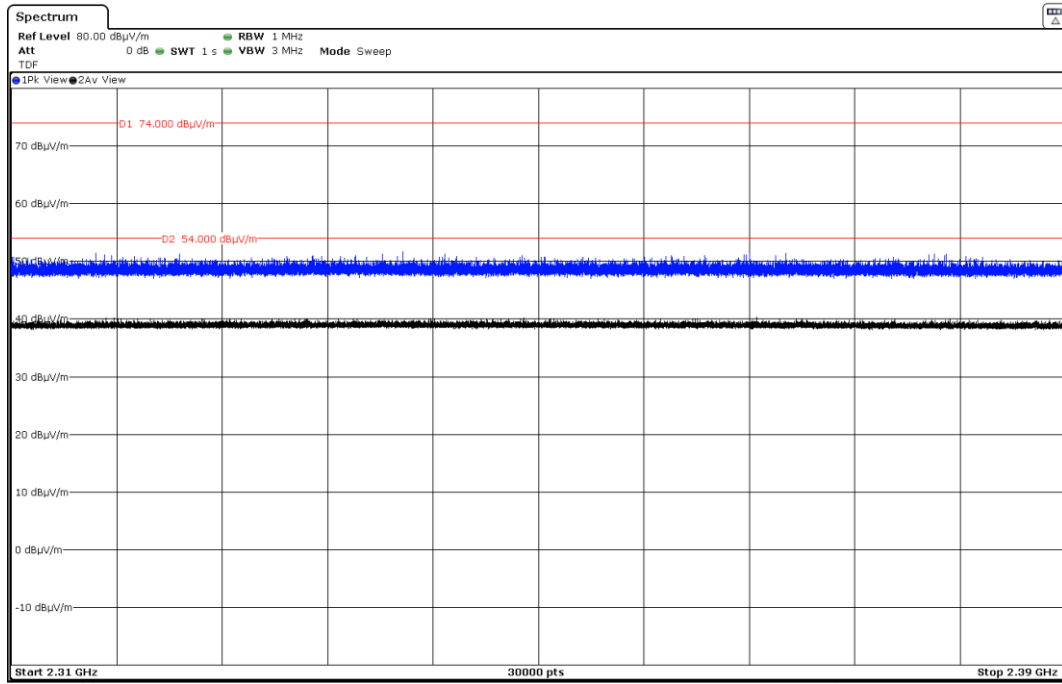
- Modulation: GFSK (DH5)



- Modulation: PI/4-DQPSK (2DH5)

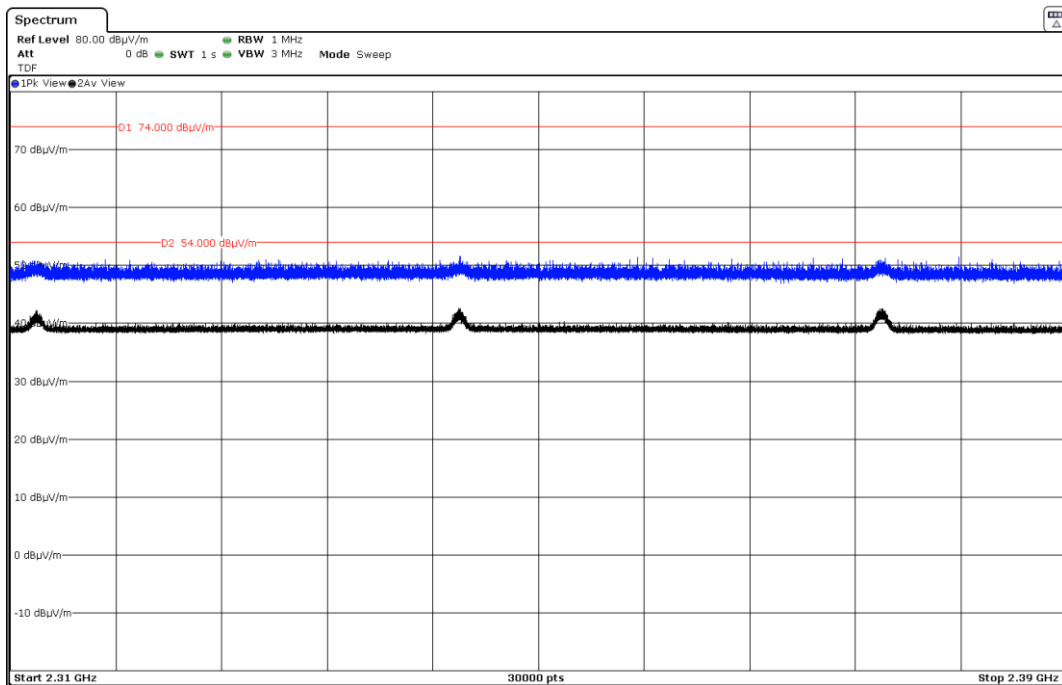


- **Modulation: 8-DPSK (3DH5)**



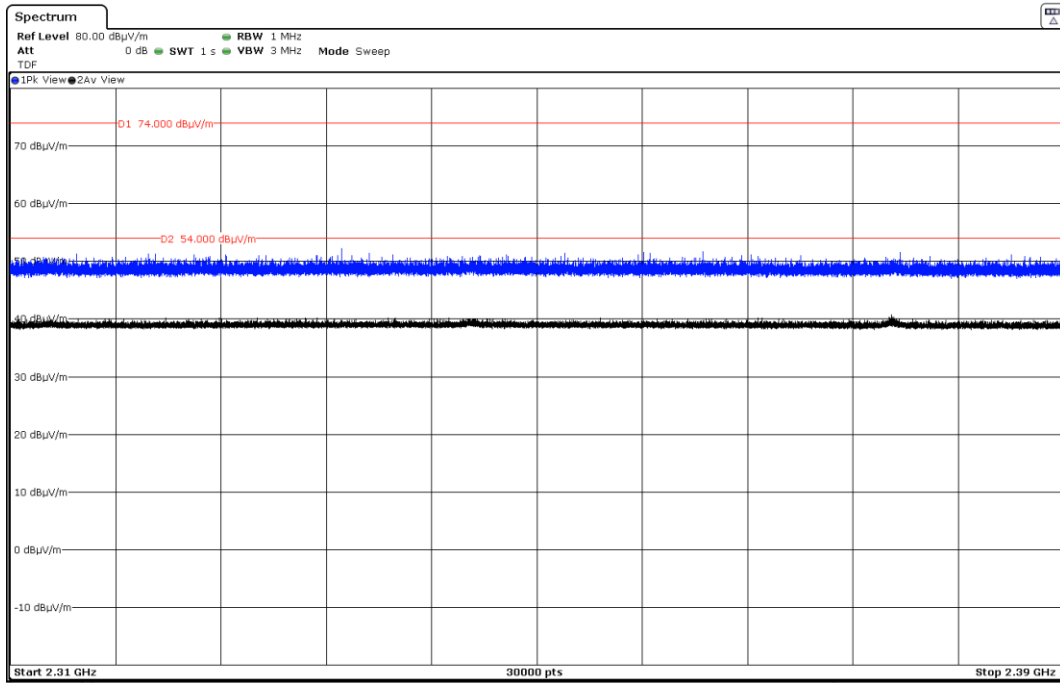
- Middle Channel (2441 MHz):

- **Modulation: GFSK (DH5)**

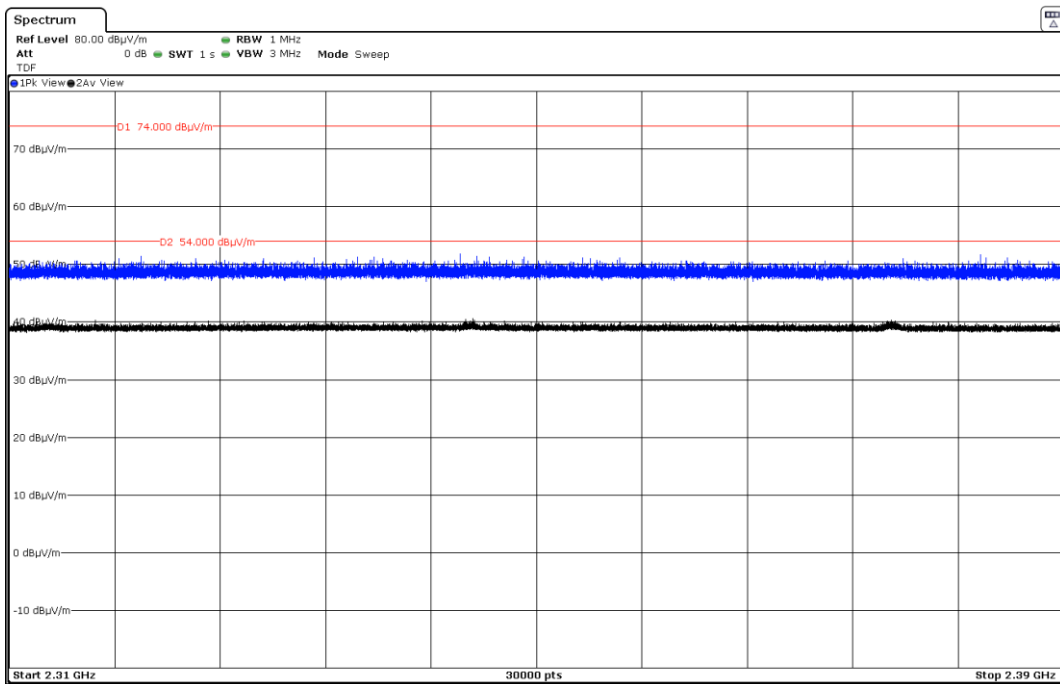




- **Modulation: PI/4-DQPSK (2DH5)**

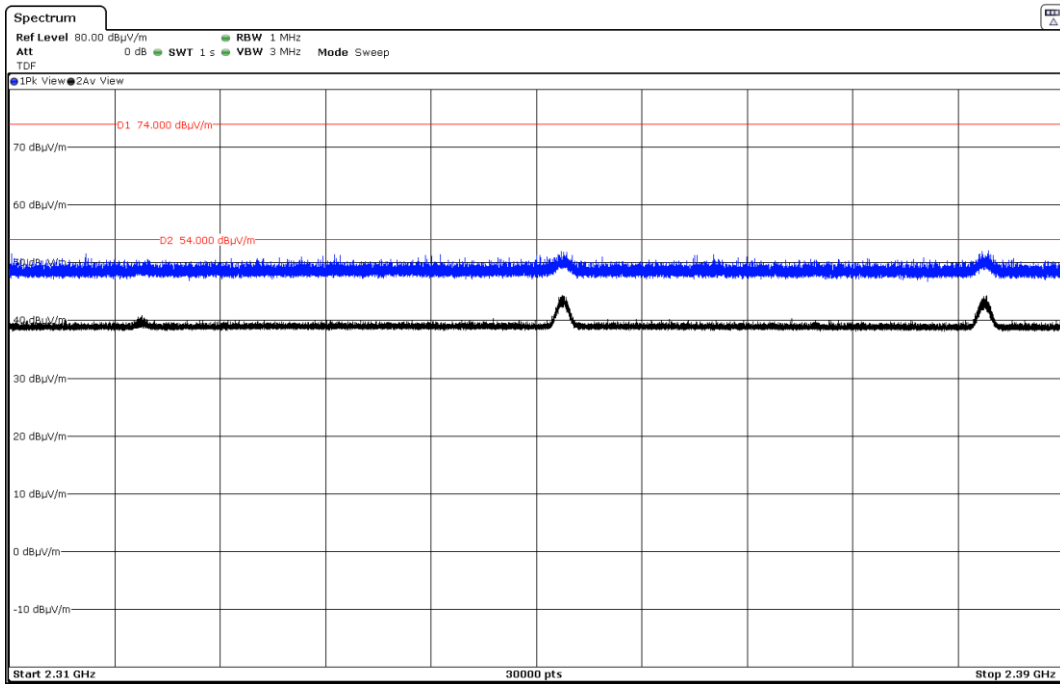


- **Modulation: 8-DPSK (3DH5)**

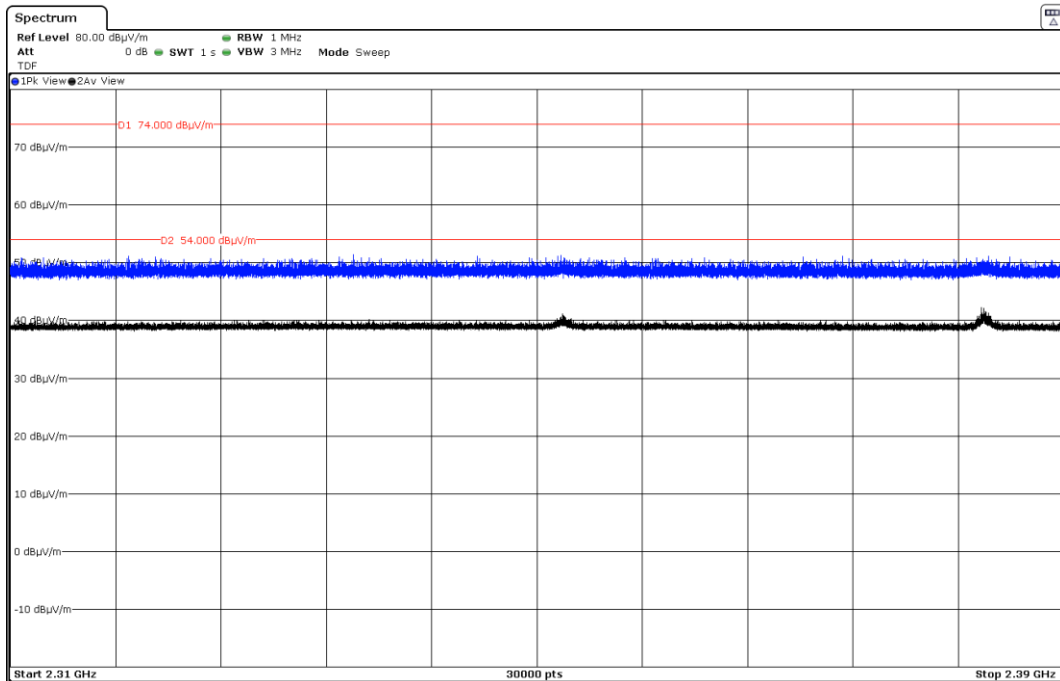


- High Channel (2480 MHz):

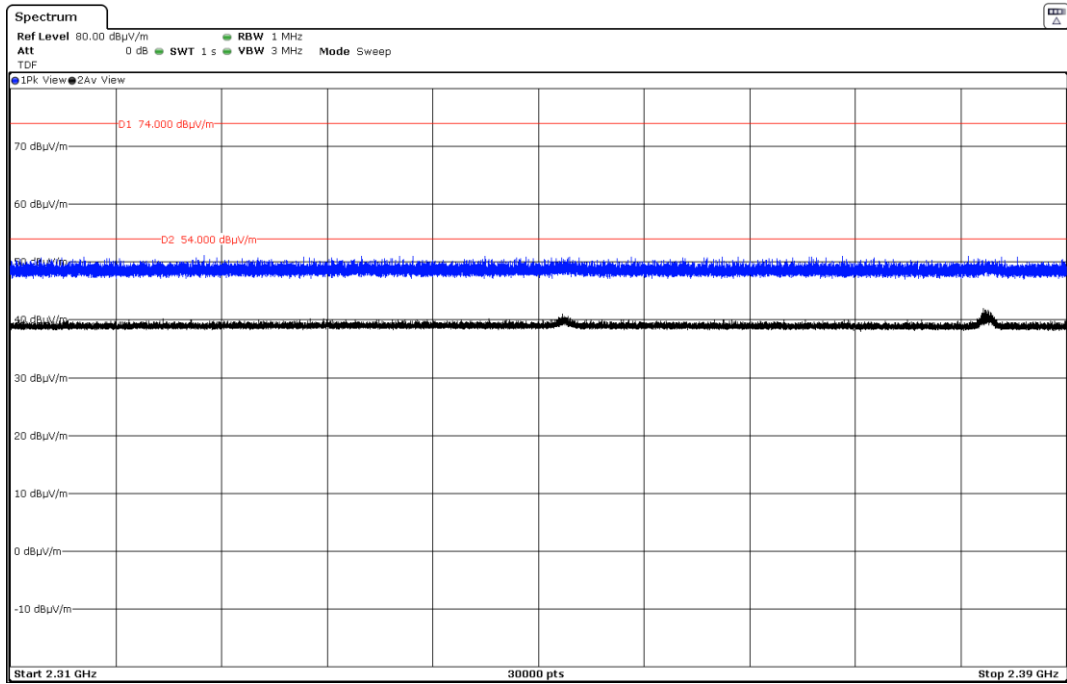
- Modulation: GFSK (DH5)



- Modulation: PI/4-DQPSK (2DH5)



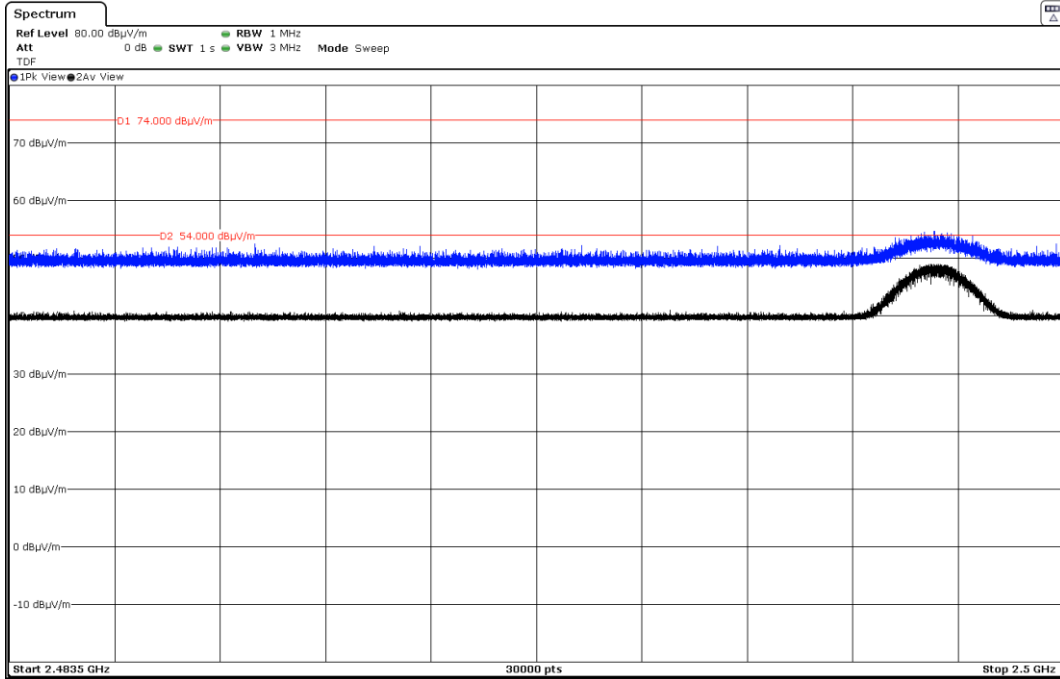
- **Modulation: 8-DPSK (3DH5)**



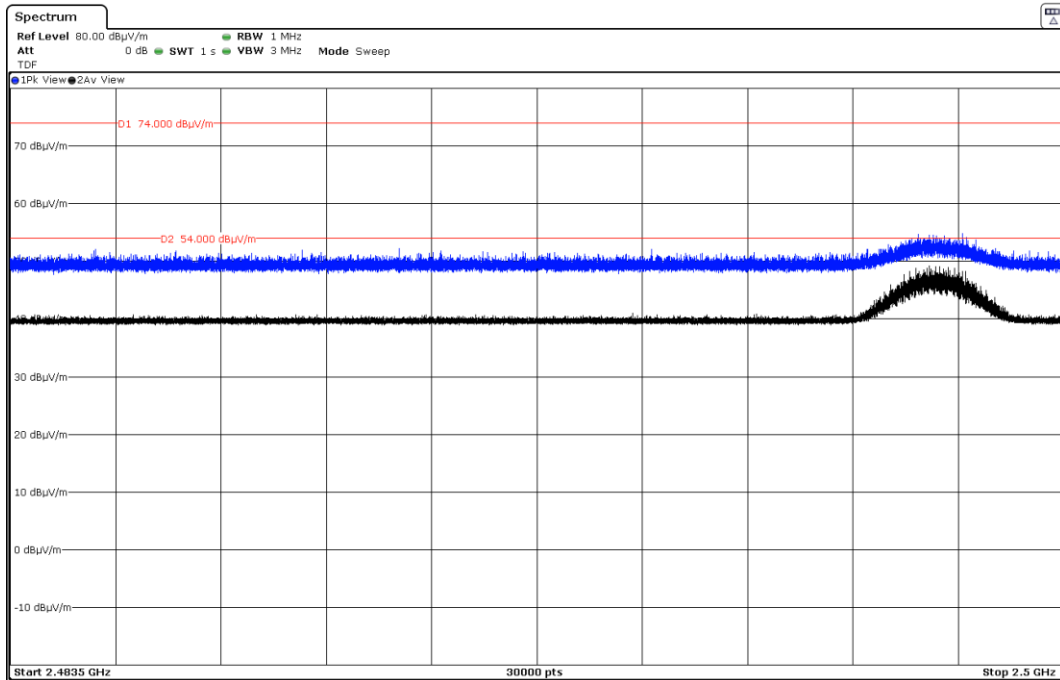
### FREQUENCY RANGE 2.4835-2.5 GHz (Restricted Band 2):

- Low Channel (2402 MHz):

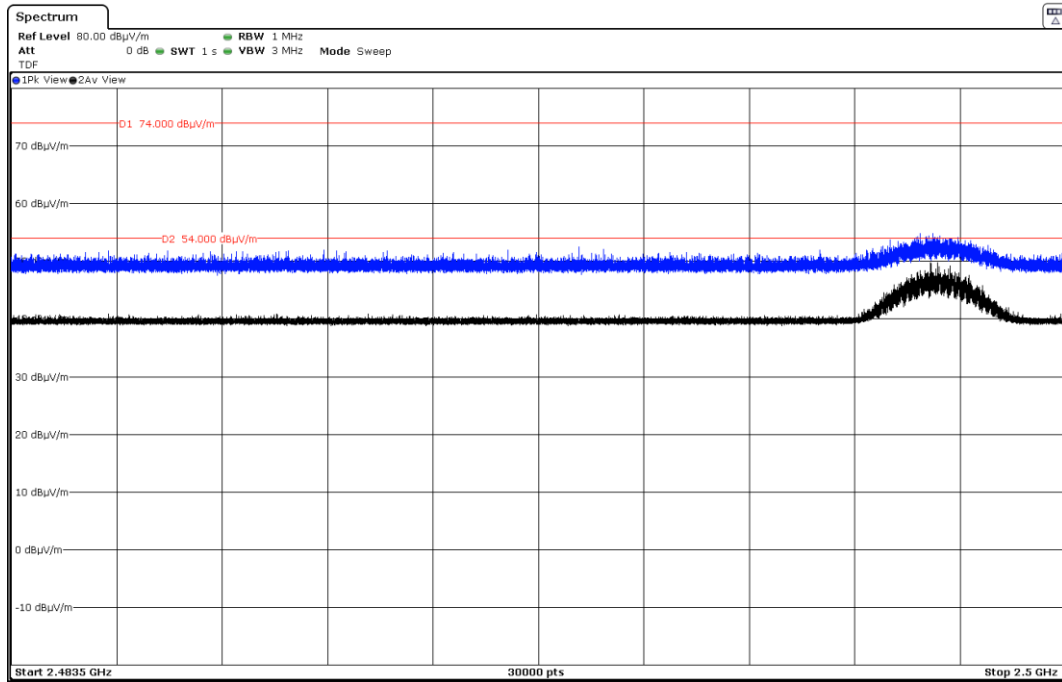
- Modulation: GFSK (DH5)



- Modulation: PI/4-DQPSK (2DH5)

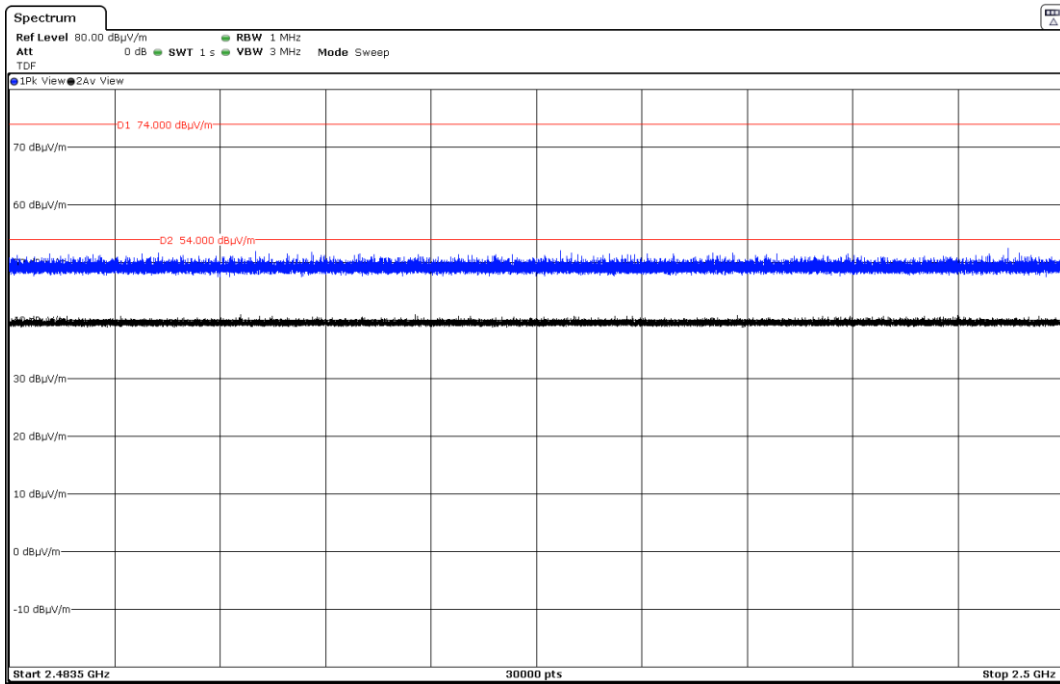


- Modulation: 8-DPSK (3DH5)

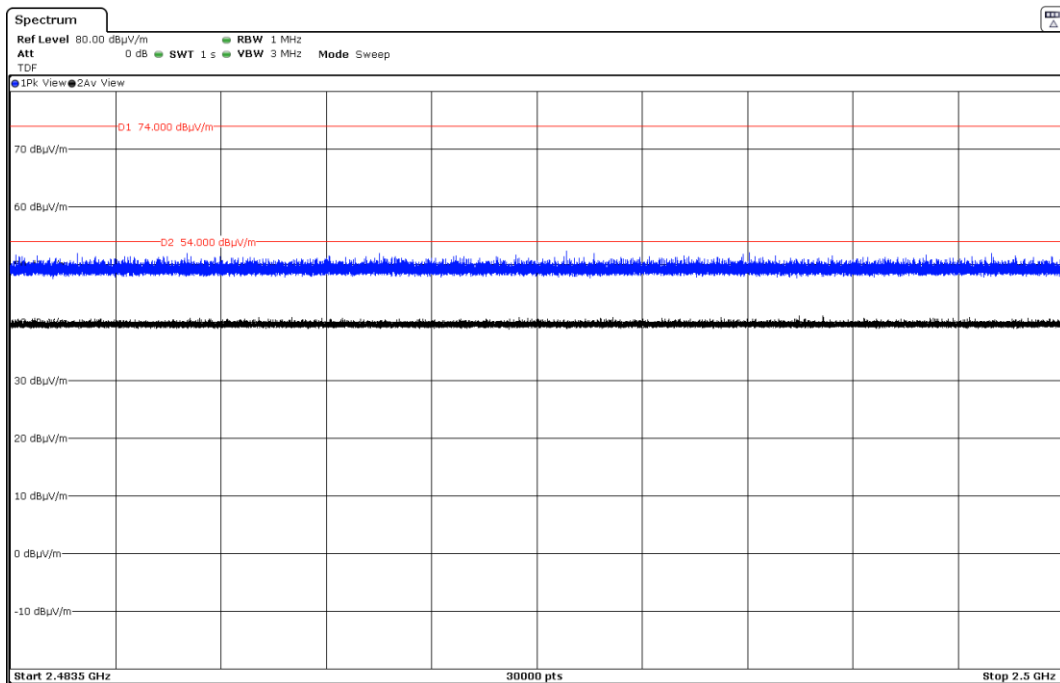


- Middle Channel (2441 MHz):

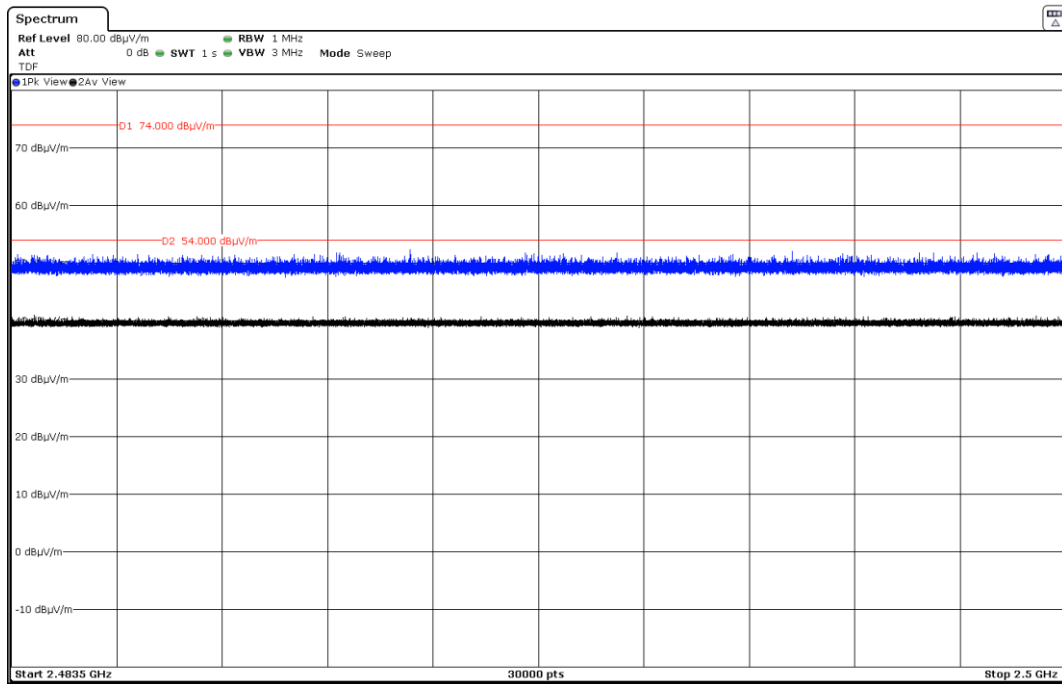
- **Modulation: GFSK (DH5)**



- **Modulation: PI/4-DQPSK (2DH5)**

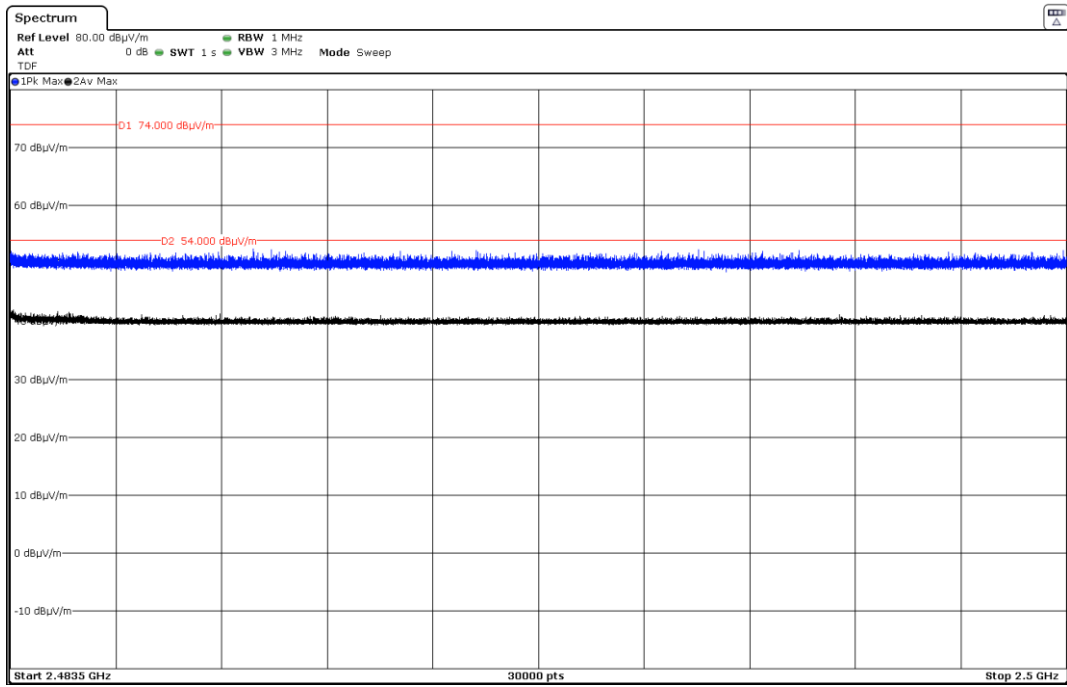


- Modulation: 8-DPSK (3DH5)

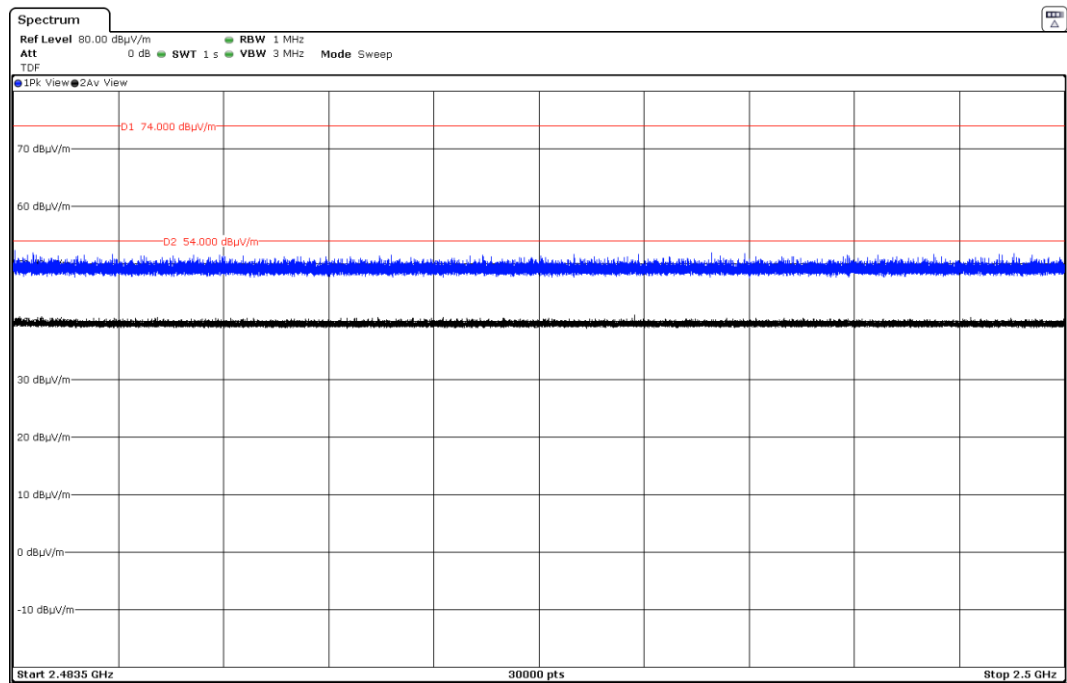


- High Channel (2480 MHz):

- Modulation: GFSK (DH5)



- Modulation: PI/4-DQPSK (2DH5)





- Modulation: 8-DPSK (3DH5)

