



FCC LISTED, REGISTRATION
 NUMBER: 720267

ISED LISTED REGISTRATION
 NUMBER 4621A-2

Informe de ensayo nº:
 Test report No:

NIE: 54022RRF.007A1

Test report (Modification 1)

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.

Identificación del objeto ensayado.....: Identification of item tested	Automotive infotainment System
Marca Trademark	Mercedes-Benz
Modelo y/o referencia tipo Model and /or type reference	NTG6 HIGH
Other identification of the product	FCC ID: T8GNTG6H / IC: 6434A-NTG6H
Final HW version	D5
Final SW version	E22.4.2
Características Features	FM, AM, DAB, USB, HDD, Bluetooth, WLAN, GNSS.
Solicitante Applicant	HARMAN BECKER AUTOMOTIVE SYSTEMS GMBH BECKER-GOERING-STR. 16; 76307 KARLSBAD GERMANY
Método de ensayo solicitado, norma.....: Test method requested, standard	USA FCC Part 15.247 10-1-16 Edition: Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz. USA FCC Part 15.209 10-1-16 Edition: Radiated emission limits; general requirements. CANADA RSS-247 Issue 2 (February 2017). CANADA RSS-Gen Issue 4 (November 2014). Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 558074 D01 DTS Meas Guidance v04 dated 05/04/2017. ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.
Resultado.....: Summary	IN COMPLIANCE
Aprobado por (nombre / cargo y firma) Approved by (name / position & signature)	Rafael López Martín LAB EMC Manager
Fecha de realización Date of issue	2017-12-27
Formato de informe No.....: Report template No	FDT11_20



Firmado digitalmente por LOPEZ MARTIN RAFAEL - 33352348W
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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 laboratory with a measurement facility in compliance with the requirements of Section 2.948 of the FCC rules and has been added to the list of facilities whose measurements data will be accepted in conjunction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Registration Number: 720267.

DEKRA Testing and Certification is a laboratory with a measurement site in compliance with the requirements of RSS 212, Issue 1 (Provisional) and has been added to the list of filed sites of the Canadian Certification and Engineering Bureau. Reference File Number: ISED 4621A-2.

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.

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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.
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Uncertainty

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

Usage of samples

Samples undergoing test have been selected by: **the client**

Sample S/01 is composed of the following elements:

Control N°	Description	Model	Serial N°	Date of reception
54022/020	Automotive infotainment System	NTG6 HIGH	A 167 900 04 03	2017-09-26
54022/049	CAN Box	NTG6 HMI-CAN	H0034755	2017-09-26
54022/053	Harness	---	---	2017-09-26
54022/050	Double Ethernet cable	---	---	2017-09-26
54022/043	Tel/GPS/VIP antenna	---	---	2017-09-26
54022/021	Dual BT/WLAN antenna	---	---	2017-09-26
54022/022	BT/WLAN antenna	---	---	2017-09-26
54022/038	BT/WLAN antenna	---	---	2017-09-26

1. Sample S/01 has undergone following test(s).

All radiated tests indicated in appendixes A and B.

Sample S/02 is composed of the following elements:

Control N°	Description	Model	Serial N°	Date of reception
54022/020	Automotive infotainment System	NTG6 HIGH	A 167 900 04 03	2017-09-26
54022/049	CAN Box	NTG6 HMI-CAN	H0034755	2017-09-26
54022/053	Harness	---	---	2017-09-26
54022/050	Double Ethernet cable	---	---	2017-09-26

1. Sample S/02 has undergone following test(s).

All conducted tests indicated in appendixes A and B.

Test sample description

The test sample (AIO) consists of an automotive head unit to be installed in cars with the following features: FM, AM, DAB, TX, USB, HDD, Bluetooth, WLAN and GNSS.

Identification of the client

HARMAN BECKER AUTOMOTIVE SYSTEMS GMBH
BECKER-GOERING-STR. 16; 76307 KARLSBAD GERMANY

Testing period

The performed test started on 2017-09-27 and finished on 2017-10-10.

The tests have been performed at DEKRA Testing and Certification.

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 %
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 1 Ω

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
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 1 Ω
Normal site attenuation (NSA)	< ±4 dB at 10 m distance between item under test and receiver antenna, (30 MHz to 1000 MHz)
Field homogeneity	More than 75% of illuminated surface is between 0 and 6 dB (26 MHz to 1000 MHz).

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. = 75 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 1 Ω

Modifications to the reference test report

It was introduced the following modifications in respect to the test report number 54022RRF.007 related with the same samples, in the next clauses and sub-clauses:

Clauses / Sub-clauses	Modification	Justification
Appendix A/ Section 15.247 Subclause (d) - RSS-247 5.5 Test.	Added the sentence with the chips that can be working at the same time.	TCB request
Appendix B/ Section 15.247 Subclause (d) - RSS-247 5.5 Test.	Added the sentence with the chips that can be working at the same time.	TCB request
Appendix B/ Section 15.247 Subclause (d) - RSS-247 5.5 Test.	The sentence to determine the worst case was modified to clarify how it was chosen the worst case of radiated spurious emission.	TCB request

This modification test report cancels and replaces the test report 54022RRF.007.

Remarks and comments

- 1; The tests have been performed by the technical personnel: Pedro Parada, Carlos Alberto Contreras, Carolina Postigo.
2: Used instrumentation:

Conducted Measurements

	Last Cal. date	Cal. due date
1. Spectrum analyser Agilent E4440A	2017/10	2019/10
2. DC power supply R&S NGPE 40/40	2014/11	2017/11
3. RF Bluetooth Test Set Anritsu MT8852B	N.A.	N.A.

Radiated Measurements

	Last Cal. date	Cal. due date
1. Semianechoic Absorber Lined Chamber ETS FACT3 200STP	N.A.	N.A.
2. BiconicalLog antenna ETS LINDGREN 3142E	2017/07	2020/04
3. Multi Device Controller EMCO 2090	N.A.	N.A.
4. Double-ridge Guide Horn antenna 1-18 GHz SCHWARZBECK BBHA 9120 D	2016/11	2019/11
5. Broadband Horn antenna 18-40 GHz SCHWARZBECK BBHA 9170	2017/03	2020/03
6. EMI Test Receiver R&S ESU 40	2016/03	2018/03
7. Spectrum analyser Rohde & Schwarz FSW50	2015/12	2017/12
8. RF pre-amplifier 20 MHz- 6 GHz BLNA 0360-01N BONN ELEKTRONIK	2017/07	2018/07
9. RF pre-amplifier 1-18 GHz Bonn Elektronik BLMA 0118-1M	2016/02	2018/02
10. RF pre-amplifier 18-40 GHz BONN ELEKTRONIK BLMA 1840-1M	2015/12	2017/12
11. RF Bluetooth Test Set Anritsu MT8852B	N.A.	N.A.

Testing verdicts

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

1. - BT EDR

FCC PART 15 PARAGRAPH		VERDICT			
		NA	P	F	NM
FCC 15.247 Subclause (a) (1) / RSS-247 Clause 5.1 (b)	20 dB Bandwidth and Carrier frequency separation		P		
FCC 15.247 Subclause (a)(1)(iii) / RSS-247 Clause 5.1 (d)	Number of hopping channels		P		
FCC 15.247 Subclause (a)(1)(iii) / RSS-247 Clause 5.1 (d)	Time of occupancy (Dwell Time)		P		
FCC 15.247 Subclause (b) / RSS-247 Clause 5.4 (b)	Maximum peak output power and antenna gain		P		
FCC 15.247 Subclause (d) / RSS-247 Clause 5.5.	Band-edge compliance of conducted emissions (Transmitter)		P		
FCC 15.247 Subclause (d) / RSS-247 Clause 5.5	Emission limitations conducted (Transmitter)		P		
FCC 15.247 Subclause (d) / RSS-247 Clause 5.5	Emission limitations radiated (Transmitter)		P		

2. WiFi 2.4 GHz (802.11b/g/n20/n40).

FCC PART 15 PARAGRAPH		VERDICT			
		NA	P	F	NM
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		

Appendix A – Test result (Bluetooth EDR)

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TEST CONDITIONS

Power supply (V):

$$V_{\text{nominal}} = 12.6 \text{ Vdc}$$

Type of power supply = External power supply (Battery).

Type of antenna: External antenna.

Declared Gain for antenna RF port 3 (maximum) = +0.7 dBi. (Antenna gain plus antenna cable loss)

TEST FREQUENCIES:

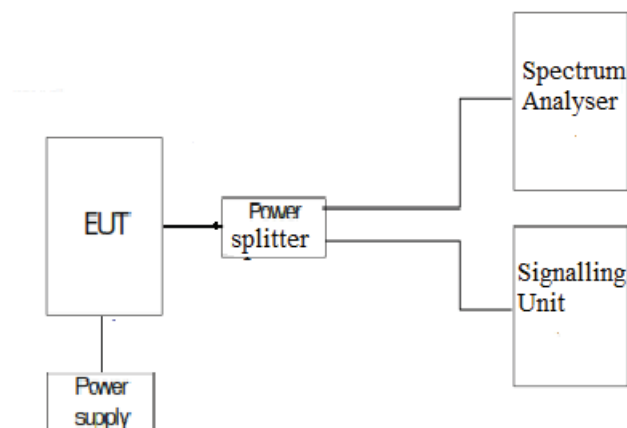
Lowest channel: 2402 MHz

Middle channel: 2441 MHz

Highest 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.

RADIATED MEASUREMENTS

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna is situated at a distance of 3 m for the frequency range 30 MHz-1000 MHz (30 MHz-1000 MHz Bilog antenna) and at a distance of 1m for the frequency range 1 GHz-25 GHz (1 GHz-18 GHz Double ridge horn antenna and 18 GHz-40 GHz horn antenna).

For radiated emissions in the range 1 GHz-25 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.

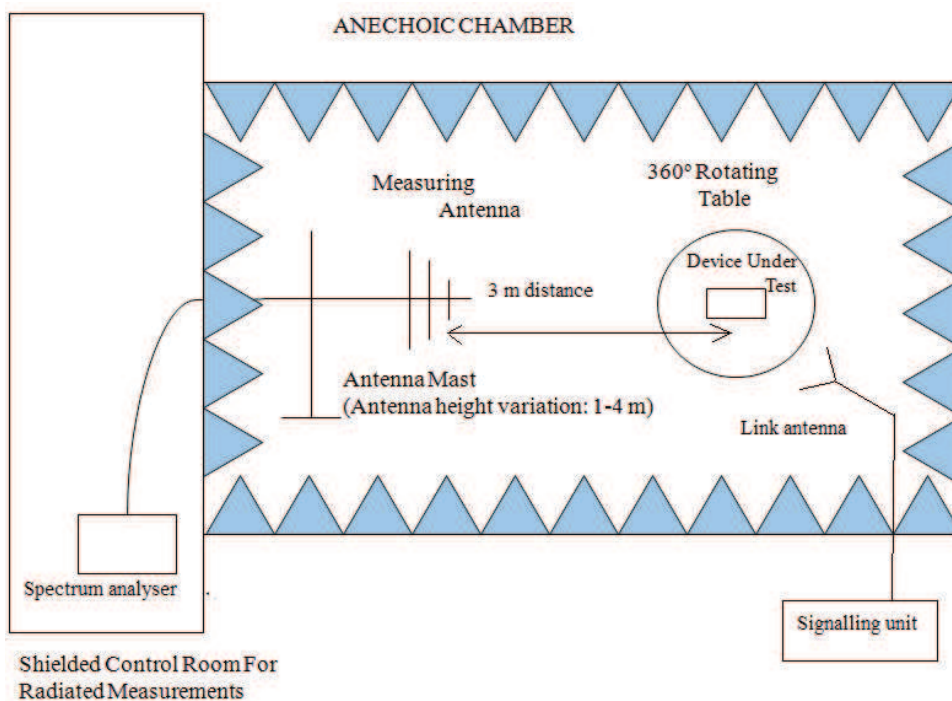
The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission.

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

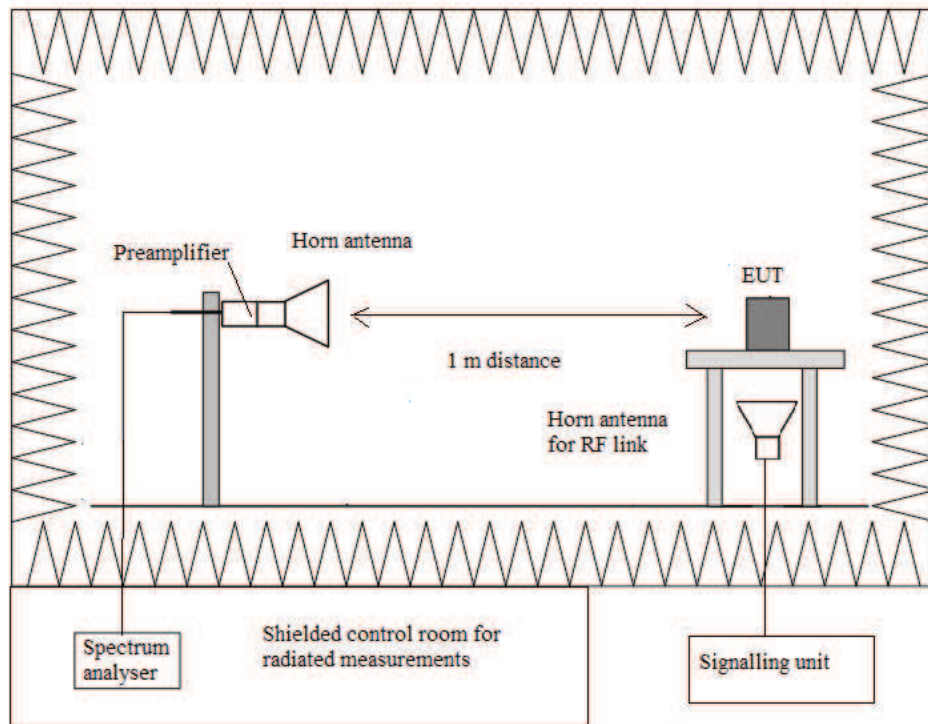
Measurements were made in both horizontal and vertical planes of polarization.

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

Radiated measurements setup $f < 1$ 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

(See next plots)

Modulation: GFSK

	Lowest frequency 2402 MHz	Middle frequency 2441 MHz	Highest frequency 2480 MHz
20 dB Spectrum bandwidth (kHz)	941.179	942.879	941.186
Measurement uncertainty (kHz)	<±5.00		

Modulation: Π/4-DQPSK (2Mbps)

	Lowest frequency 2402 MHz	Middle frequency 2441 MHz	Highest frequency 2480 MHz
20 dB Spectrum bandwidth (kHz)	1359	1194	1359
Measurement uncertainty (kHz)	<±5.00		

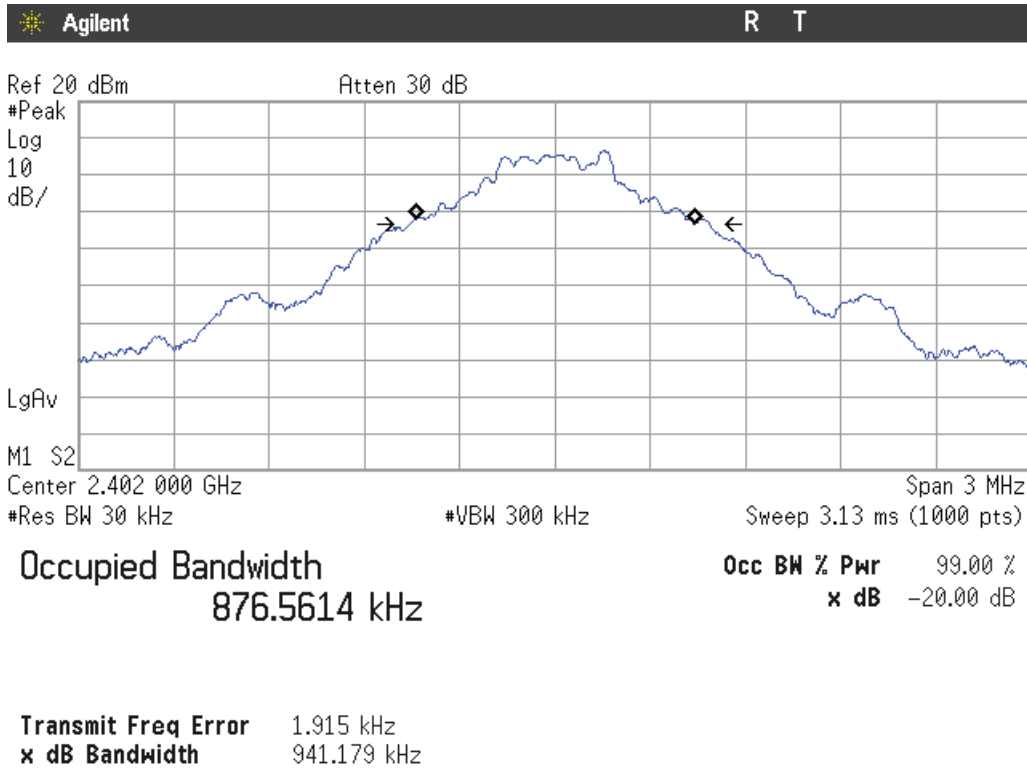
Modulation: 8-DPSK (3Mbps)

	Lowest frequency 2402 MHz	Middle frequency 2441 MHz	Highest frequency 2480 MHz
20 dB Spectrum bandwidth (kHz)	1317	1318	1320
Measurement uncertainty (kHz)	<±5.00		

Modulation: GFSK

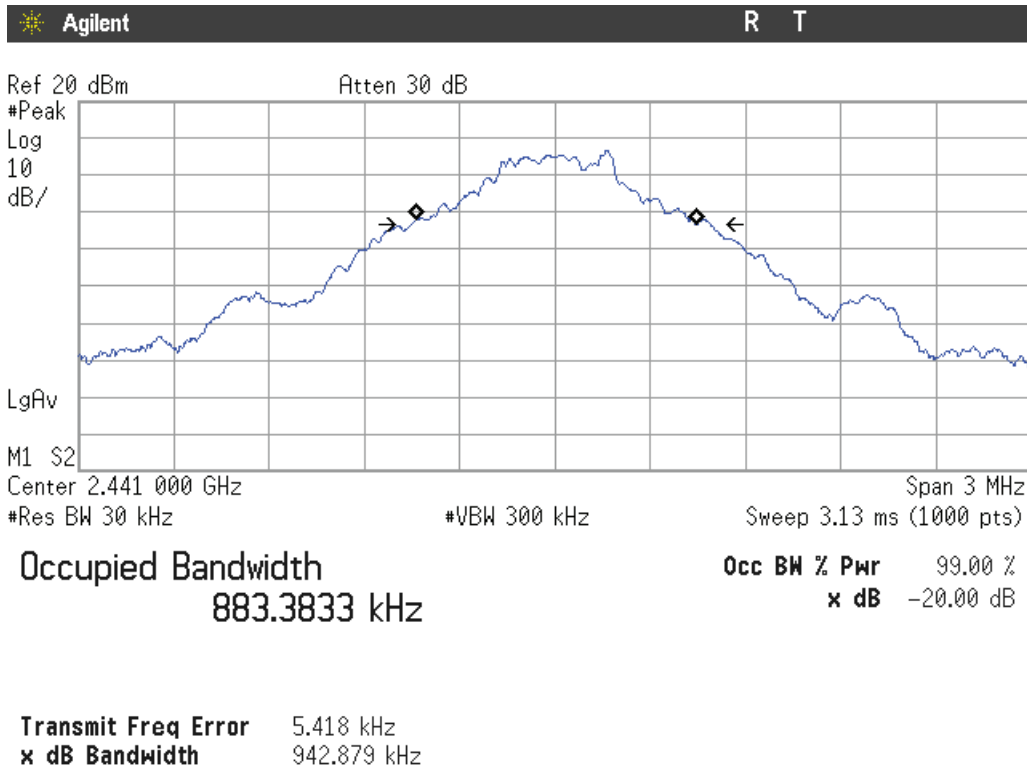
20 dB BANDWIDTH.

Lowest Channel: 2402 MHz.



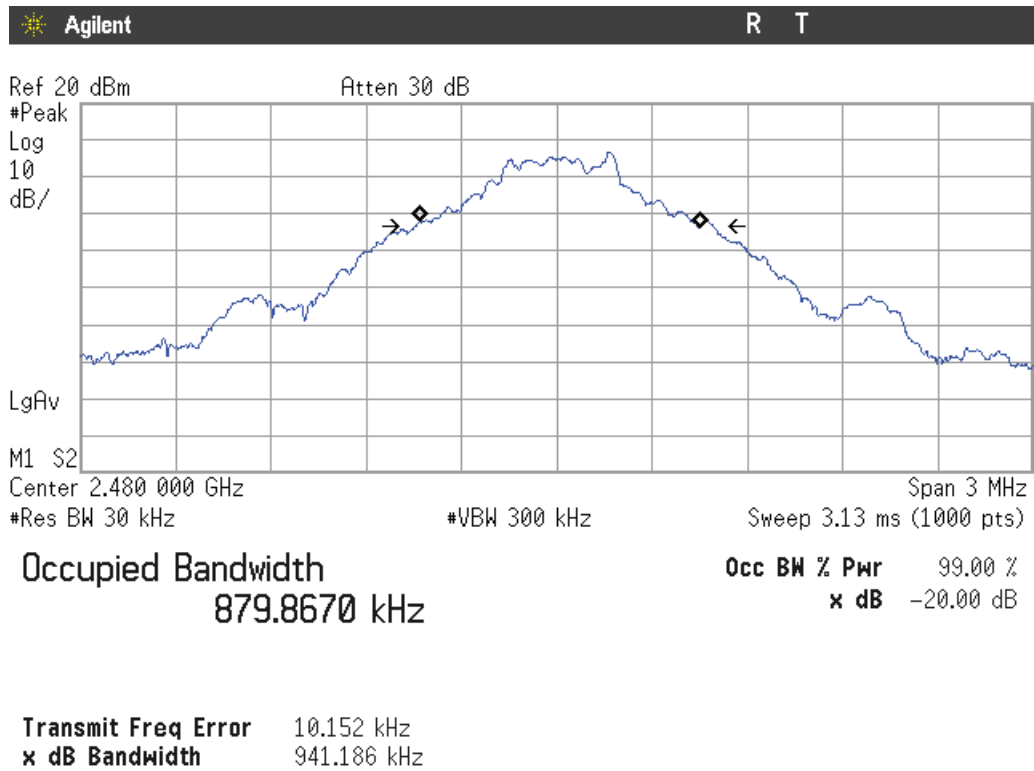
20 dB BANDWIDTH

Middle Channel: 2441 MHz.

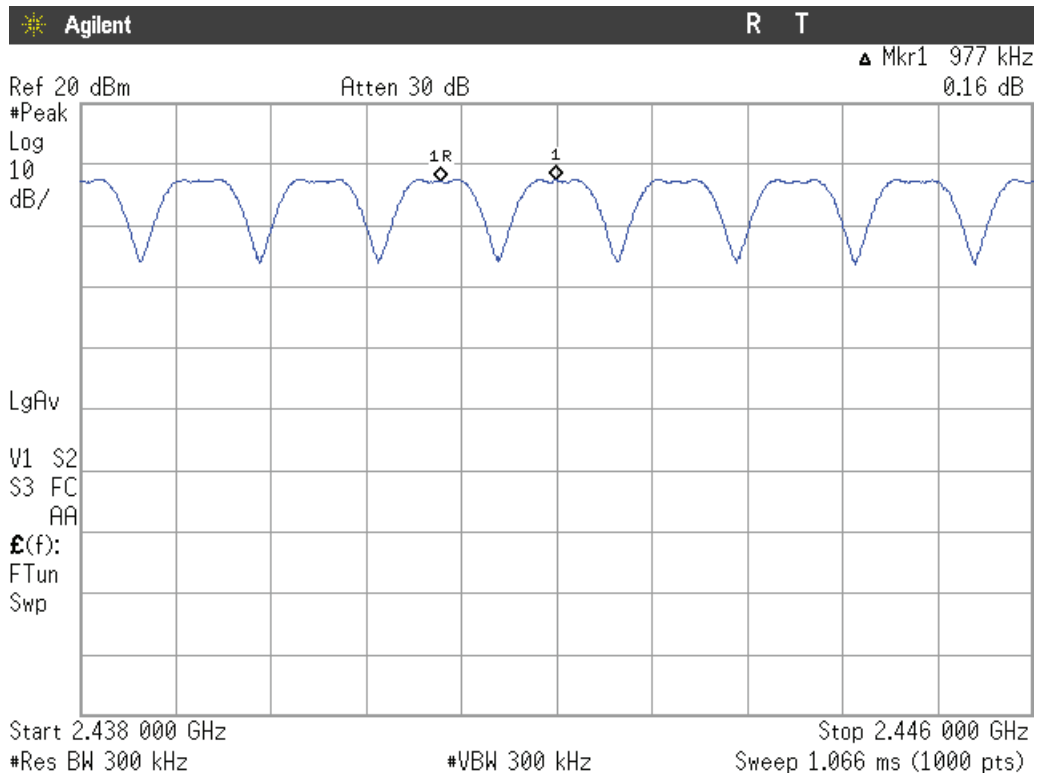


20 dB BANDWIDTH

Highest Channel: 2480 MHz.



Carrier frequency separation



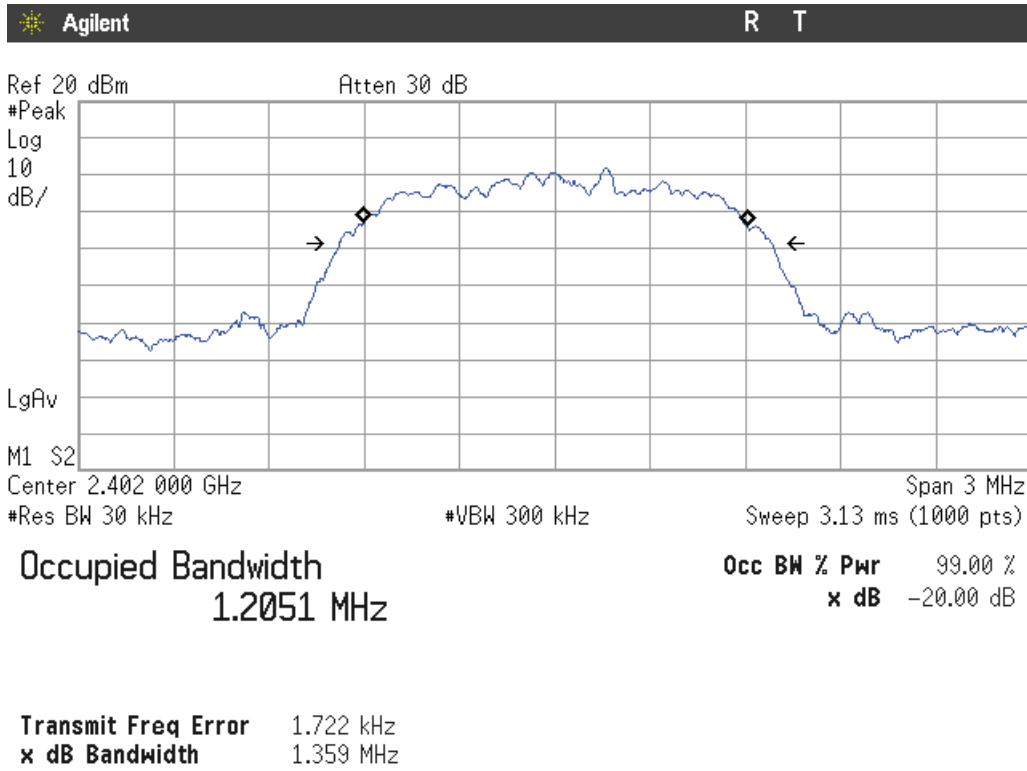
The hopping channel carrier frequencies are separated by a minimum of the two-thirds of the 20 dB bandwidth of the hopping channel.

Verdict: PASS

Modulation: Π/4-DQPSK

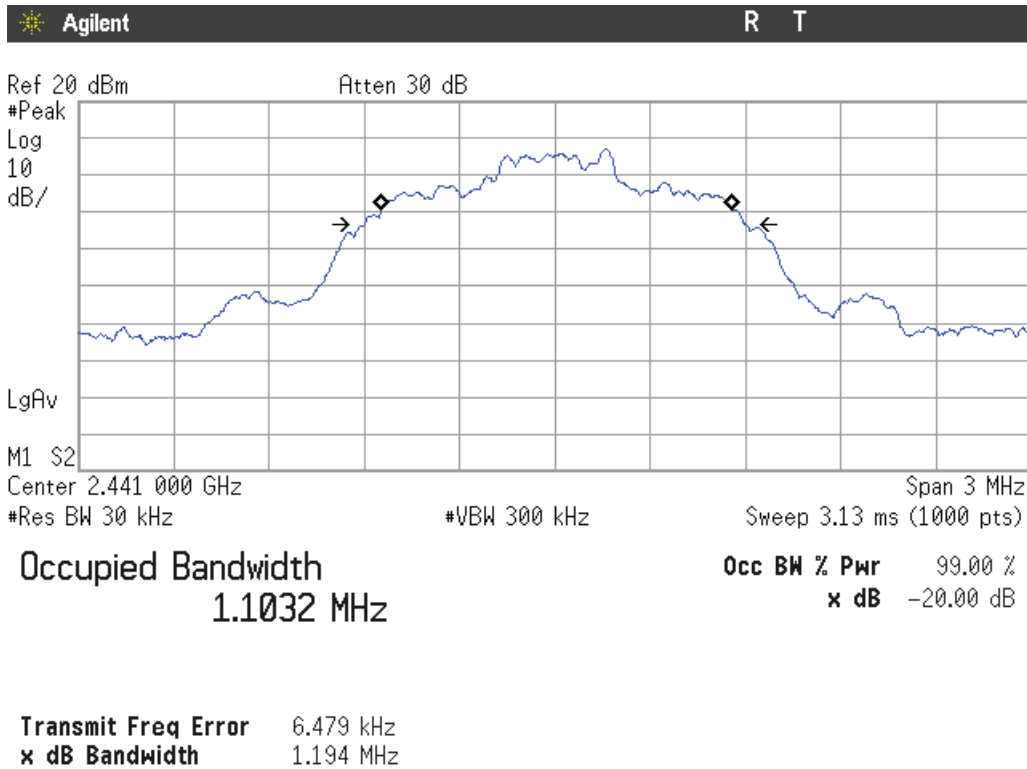
20 dB BANDWIDTH.

Lowest Channel: 2402 MHz.



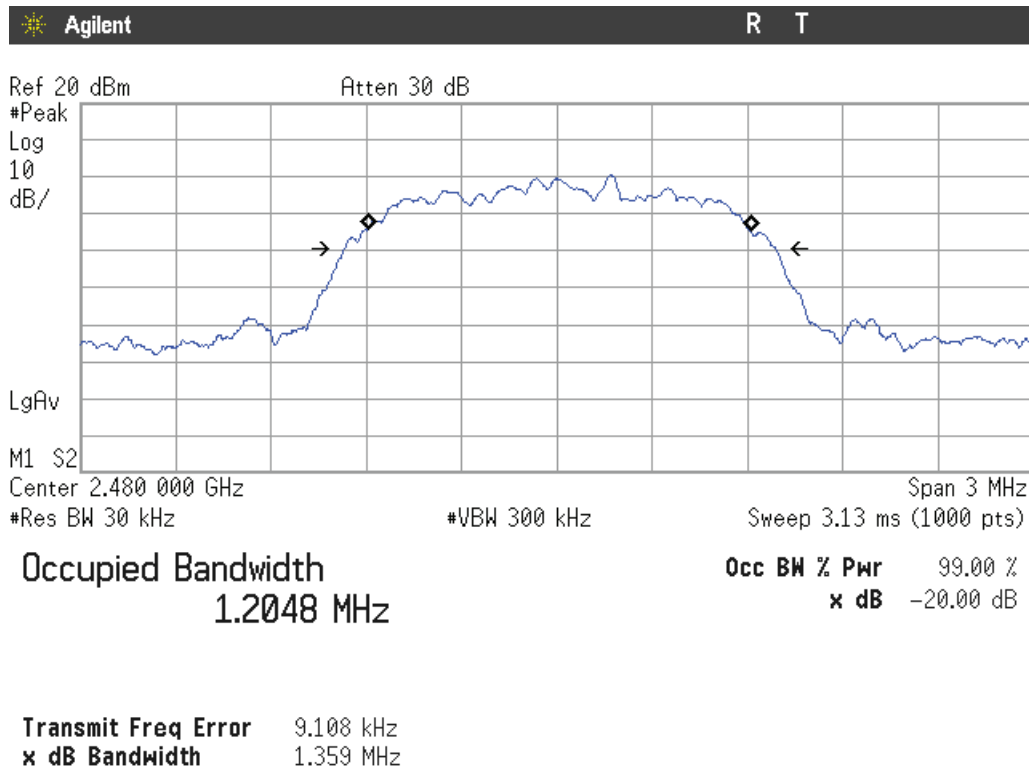
20 dB BANDWIDTH

Middle Channel: 2441 MHz.

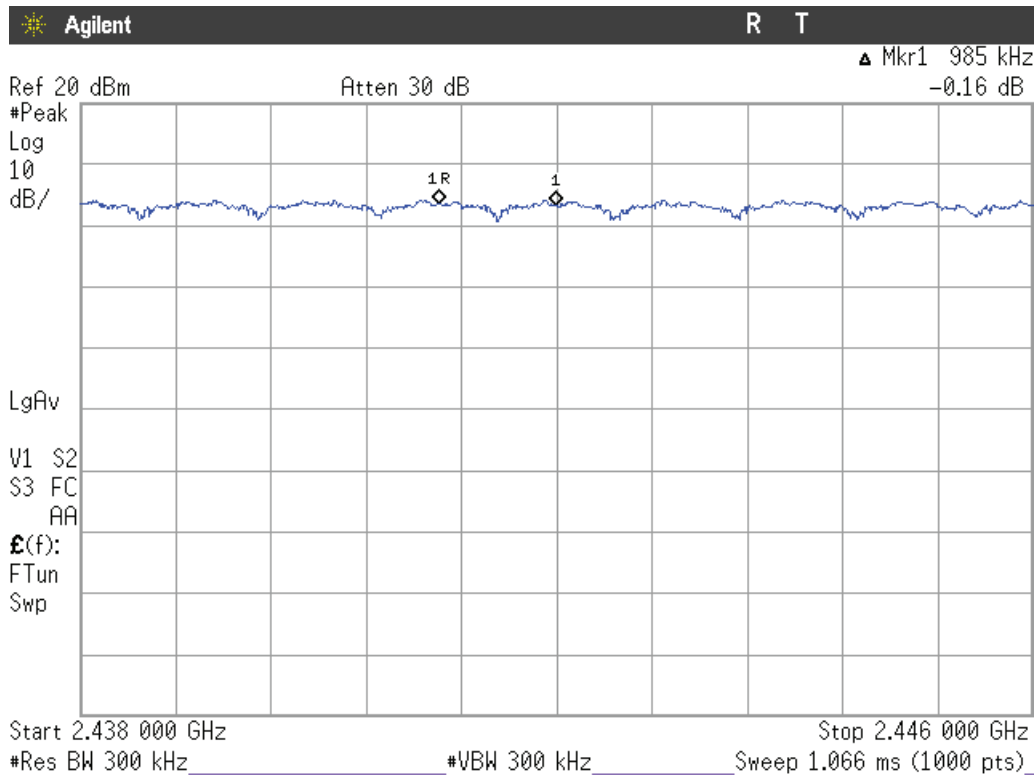


20 dB BANDWIDTH

Highest Channel: 2480 MHz.



Carrier frequency separation



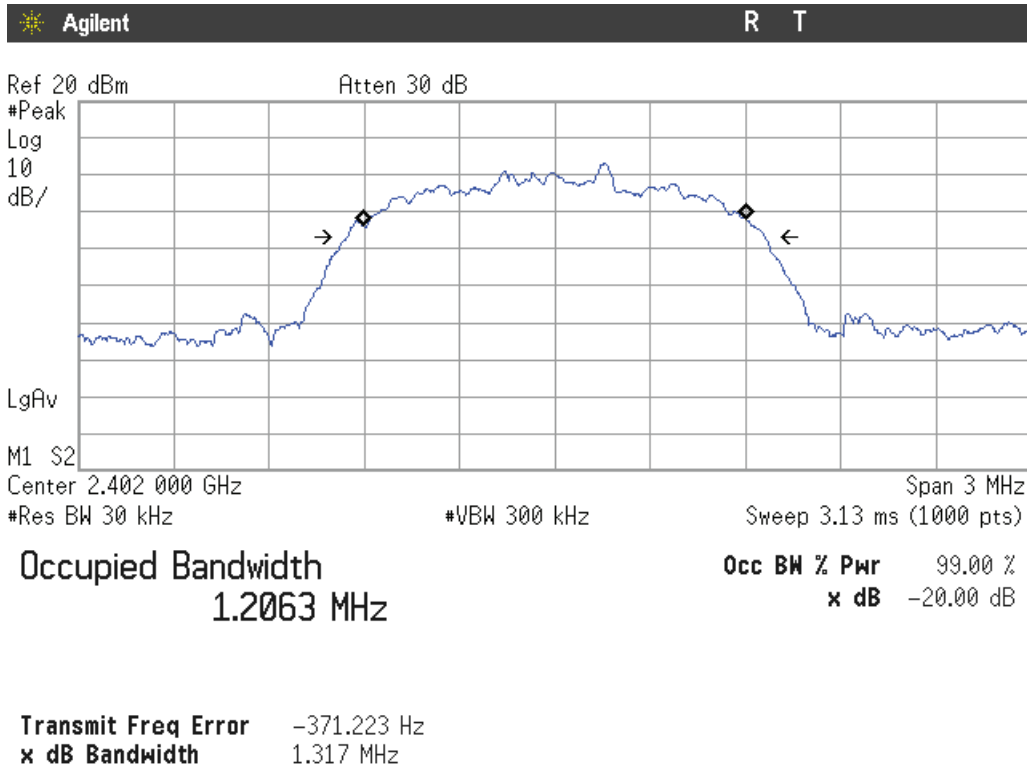
The hopping channel carrier frequencies are separated by a minimum of the two-thirds of the 20 dB bandwidth of the hopping channel

Verdict: PASS

Modulation: 8-DPSK

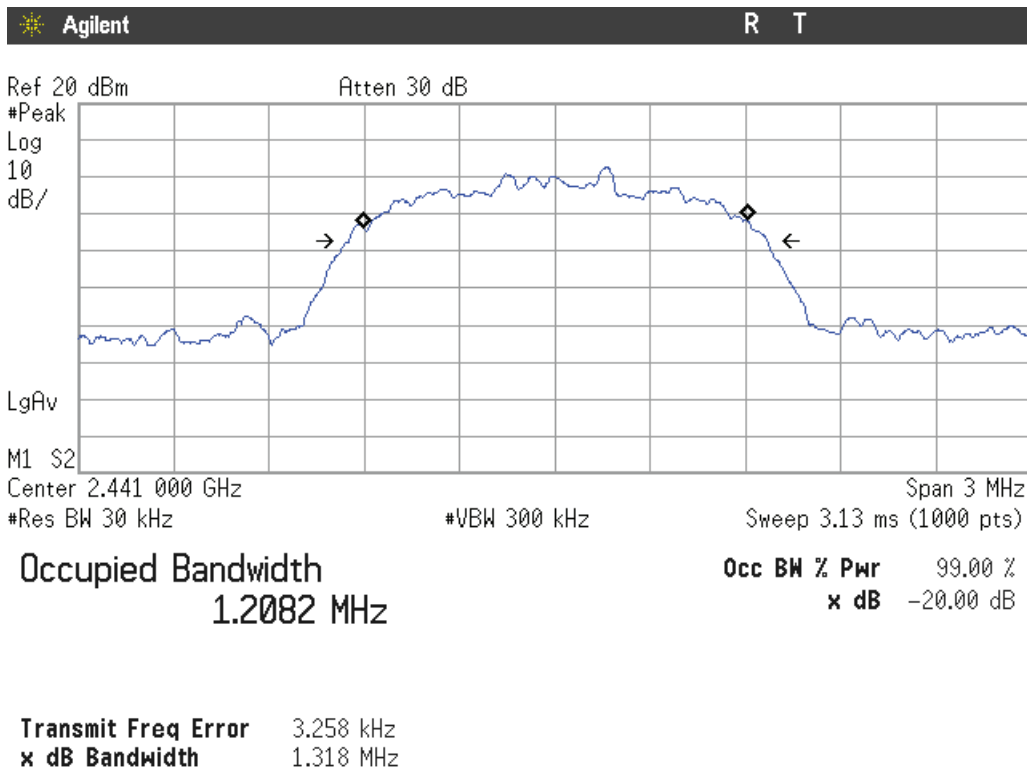
20 dB BANDWIDTH

Lowest Channel: 2402 MHz.



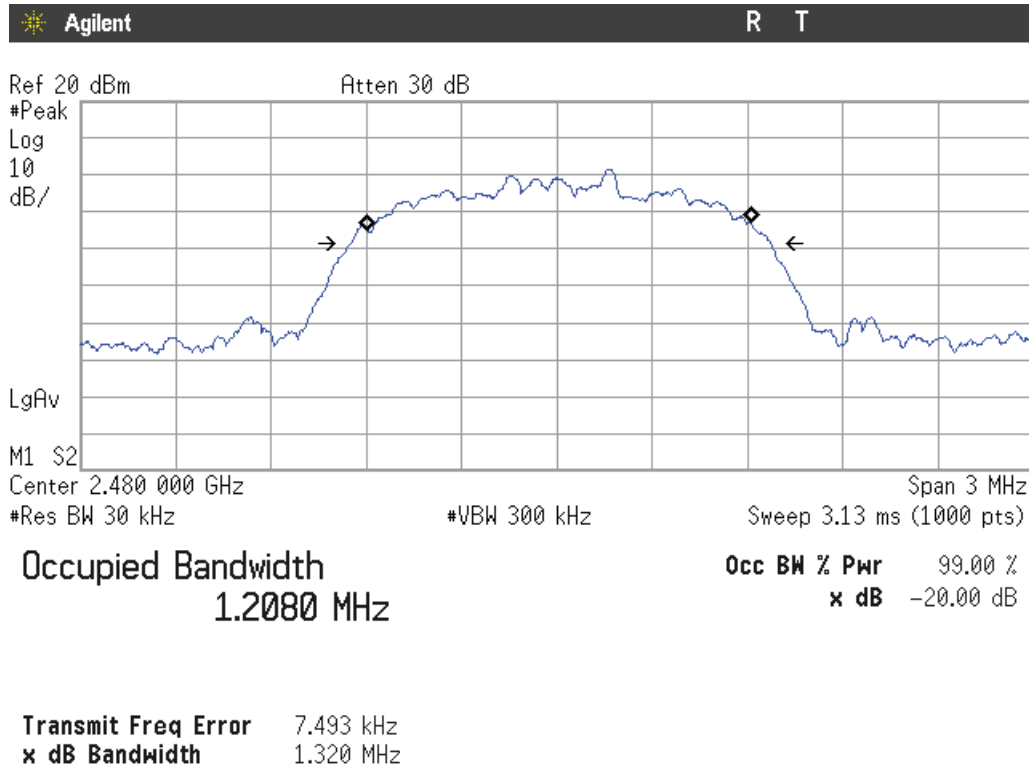
20 dB BANDWIDTH

Middle Channel: 2441 MHz.

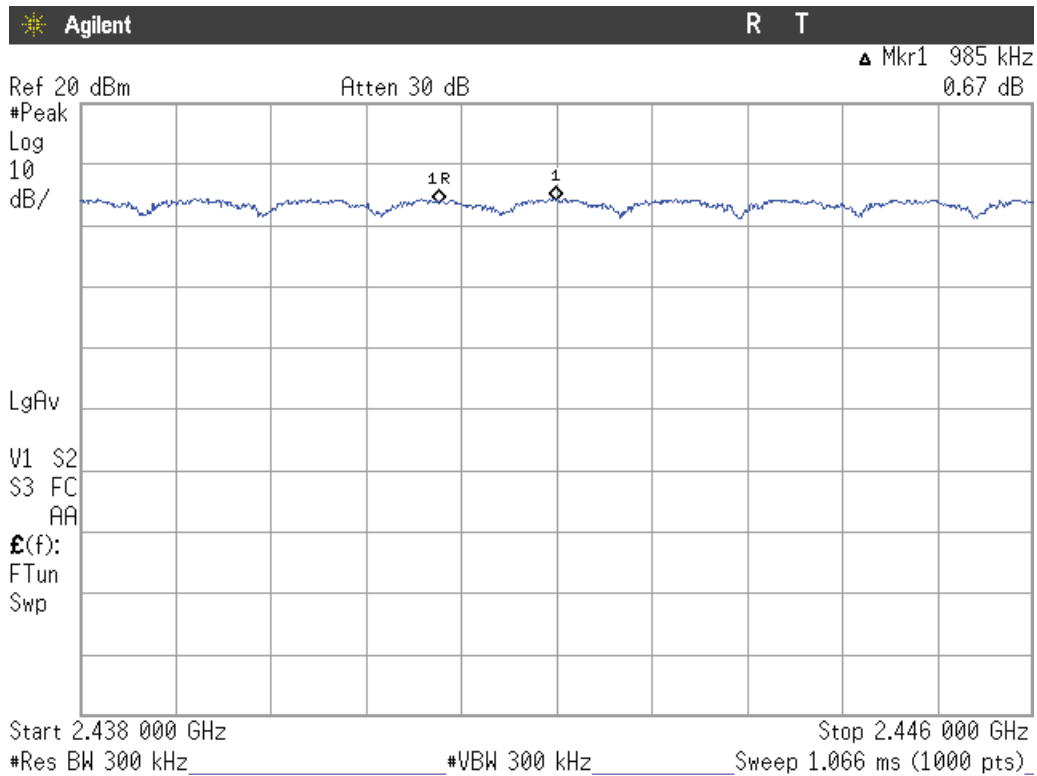


20 dB BANDWIDTH

Highest Channel: 2480 MHz.



Carrier frequency separation



The hopping channel carrier frequencies are separated by a minimum of the 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

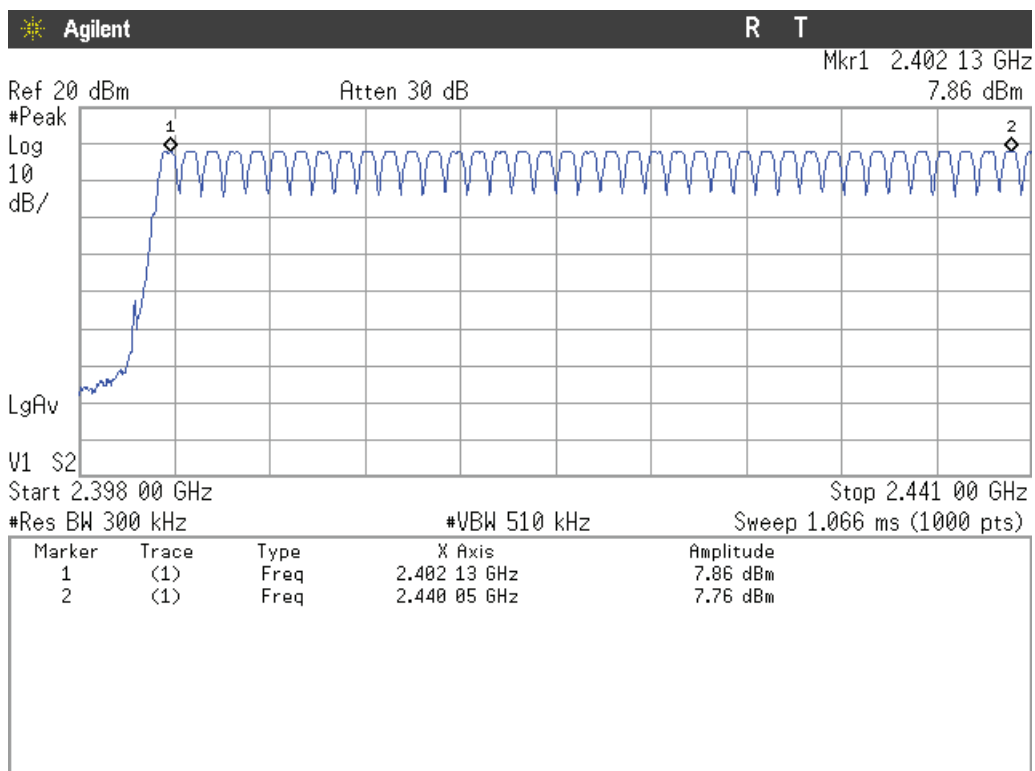
SPECIFICATION

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

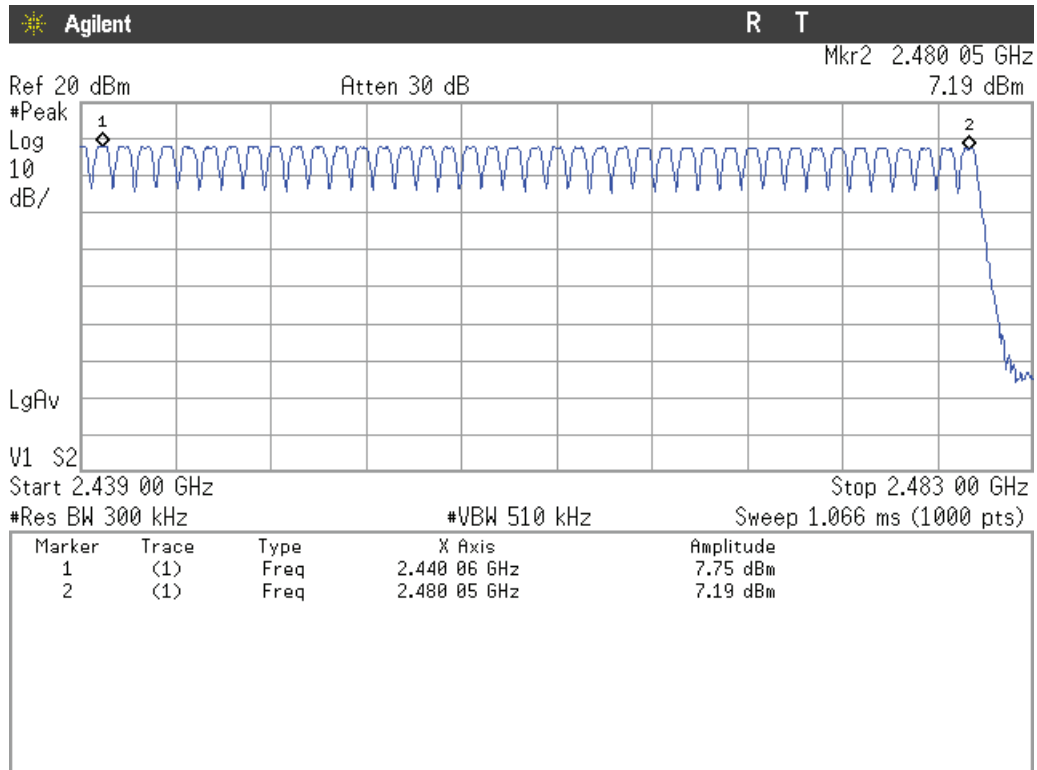
RESULTS

The number of hopping channels is 79 for all three modes (see next plots).

Modulation: GFSK



Number of hopping frequencies: 39

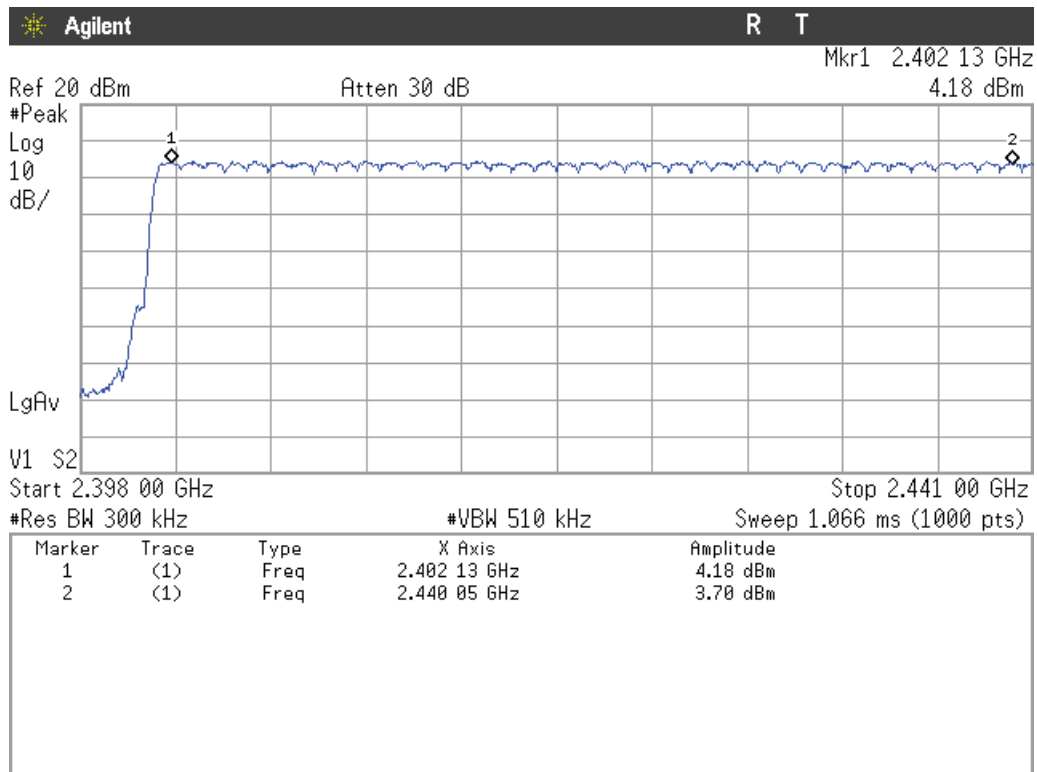


Number of hopping frequencies: 40

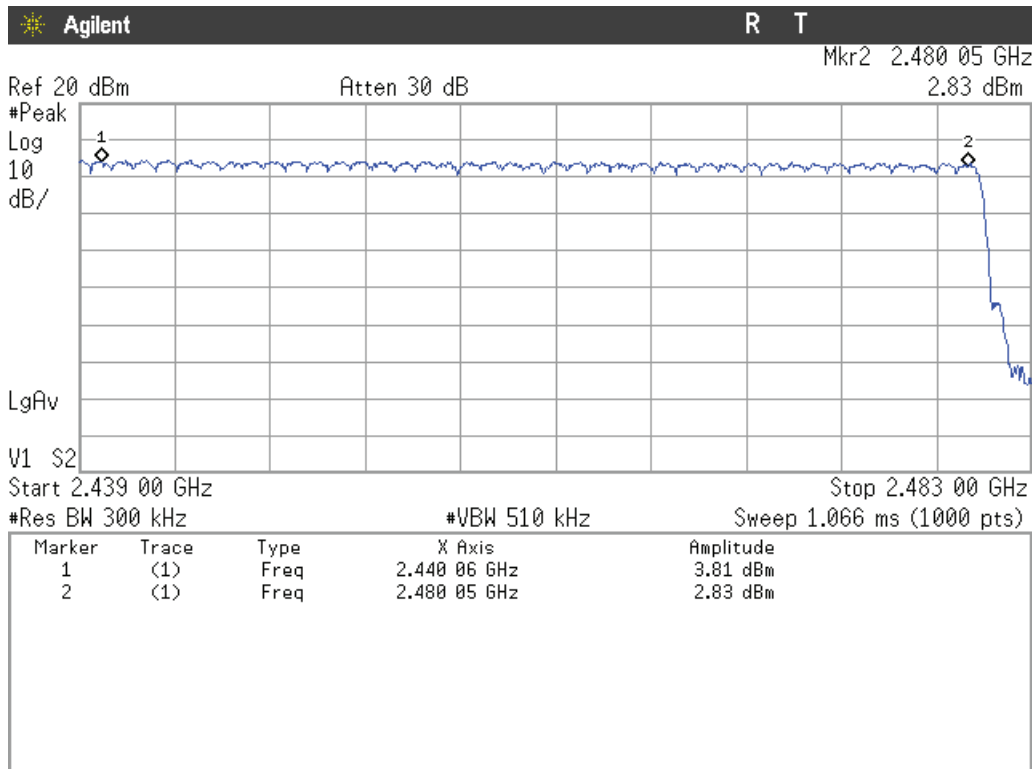
Total number of hopping frequencies: 79

Verdict: PASS

Modulation: $\Pi/4$ -DQPSK



Number of hopping frequencies: 39

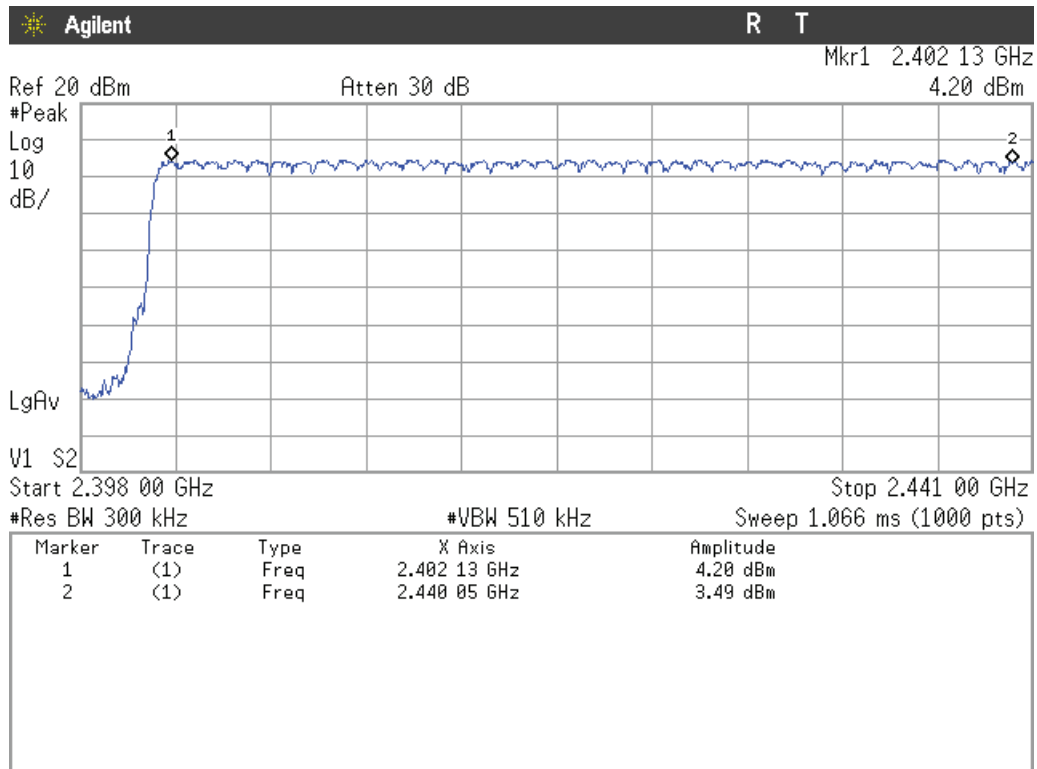


Number of hopping frequencies: 40

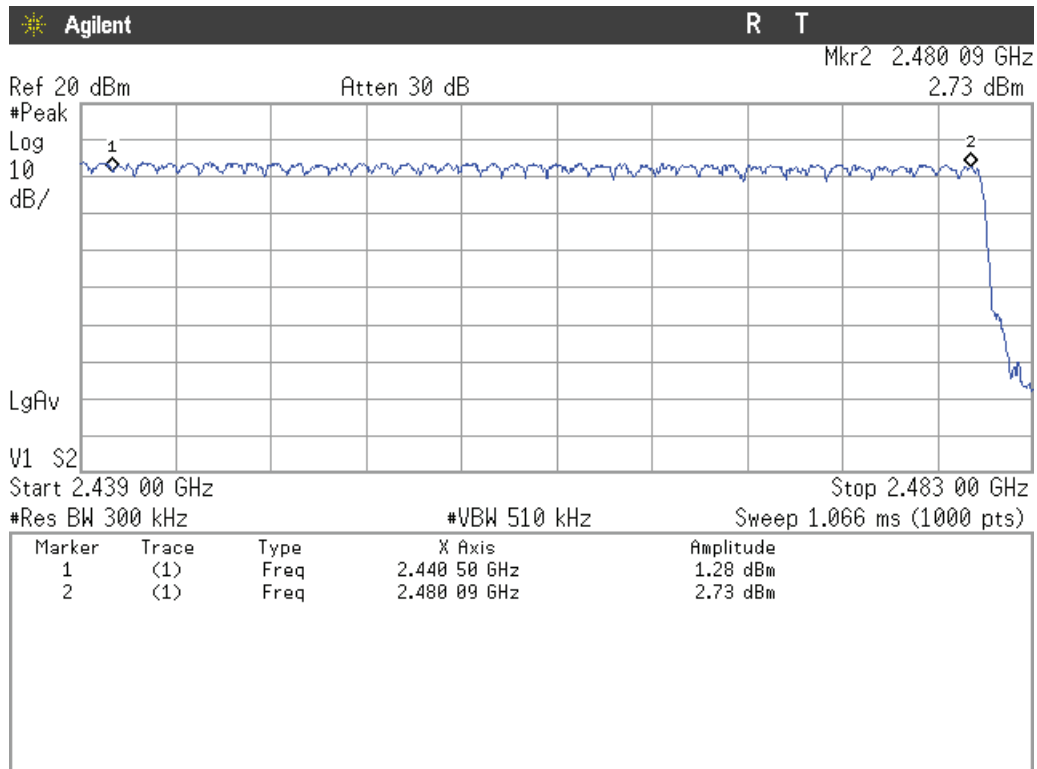
Total number of hopping frequencies: 79

Verdict: PASS

Modulation: 8-DPSK



Number of hopping frequencies: 39



Number of hopping frequencies: 40

Total number of hopping frequencies: 79

Verdict: PASS

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

SPECIFICATION

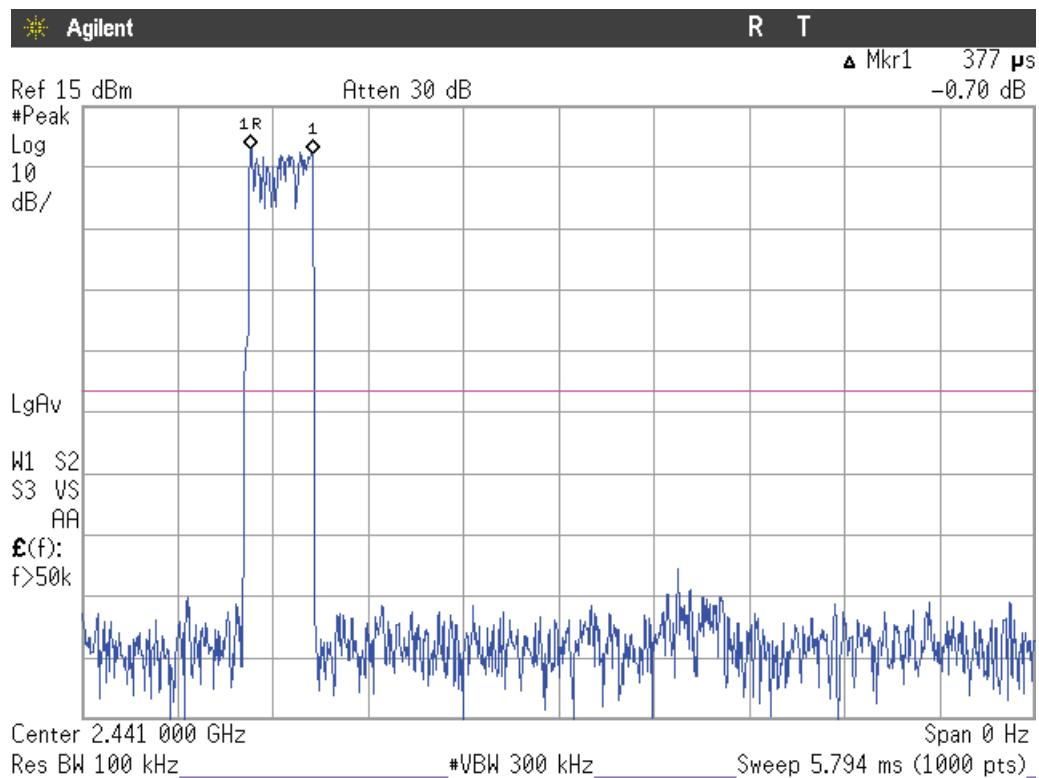
The average time of occupancy on any channel shall not be greater than 0.4 seconds (400 ms) within a period of 0.4 seconds multiplied by the number of hopping channels employed = $0.4 \times 79 = 31.6$ seconds.

RESULTS

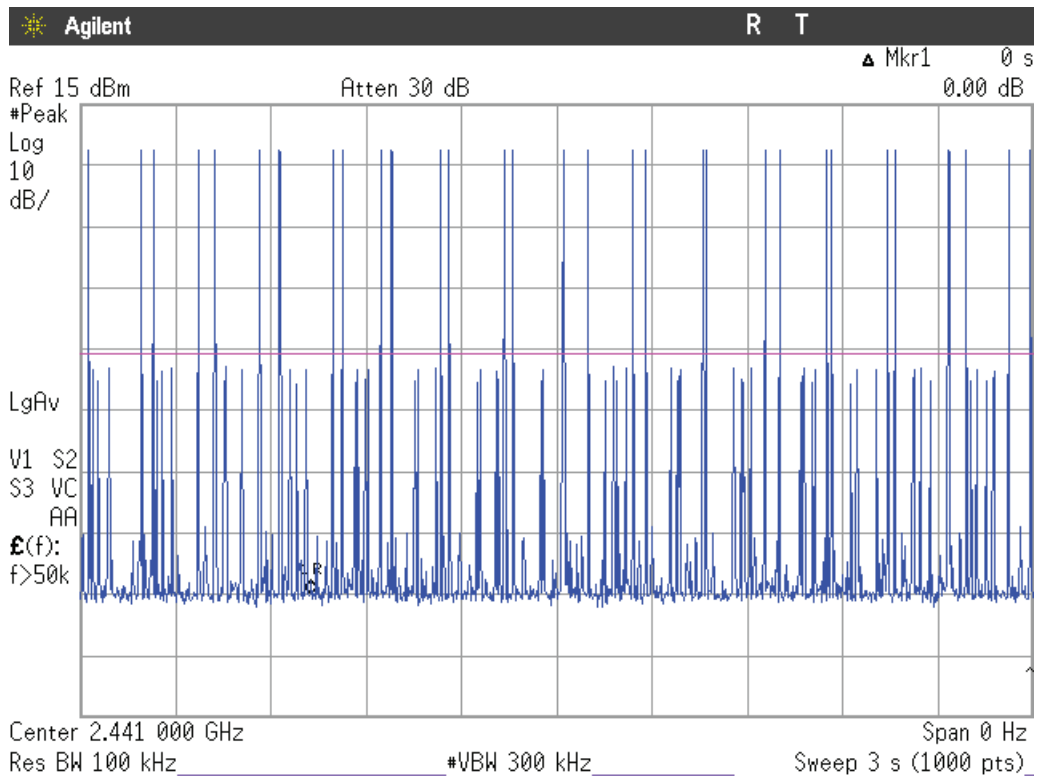
Modulation: GFSK

1. TIME OF OCCUPANCY (DWEIL TIME) FOR PACKET TYPE DH1.

- Tx- time per hop = 377 μ s (see next plot).



- Number of hops over a period of 3 seconds = 31 (see next plot).



Number of hops in the period specified in the requirements = (31 hops) x (31.6 s / 3 s) = 326.5 hops.

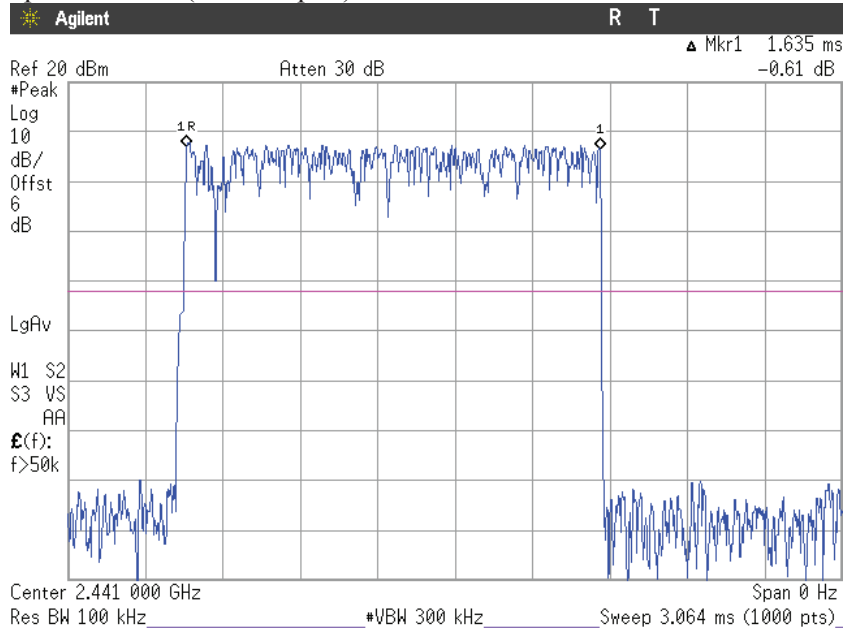
Averaging time of occupancy = 377 μs x 326.5 hops = 123.10 ms per 31.6 seconds.

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

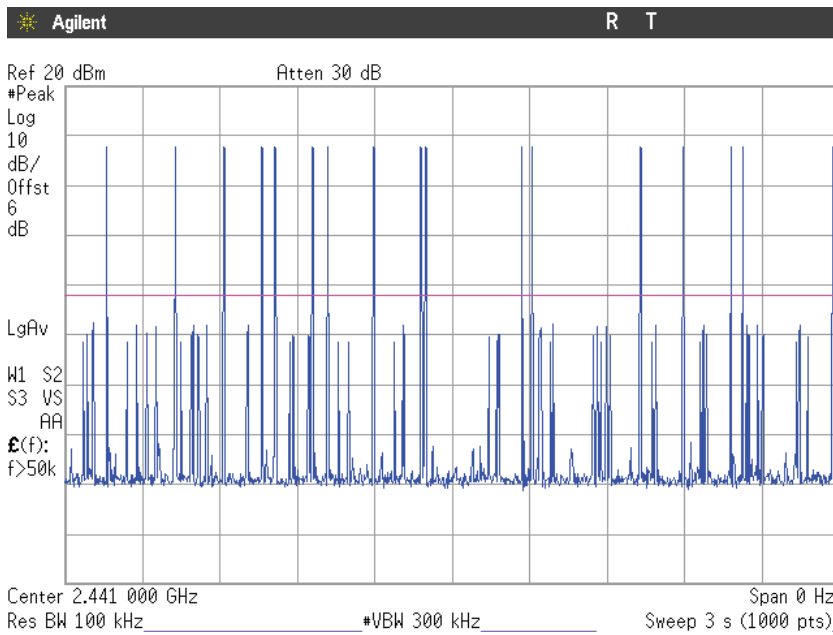
Verdict: PASS

2. TIME OF OCCUPANCY (DWELL TIME) FOR PACKET TYPE DH3.

- Tx- time per hop = 1.635 ms (see next plot).



- Number of hops over a period of 3 seconds = 17 (see next plot).



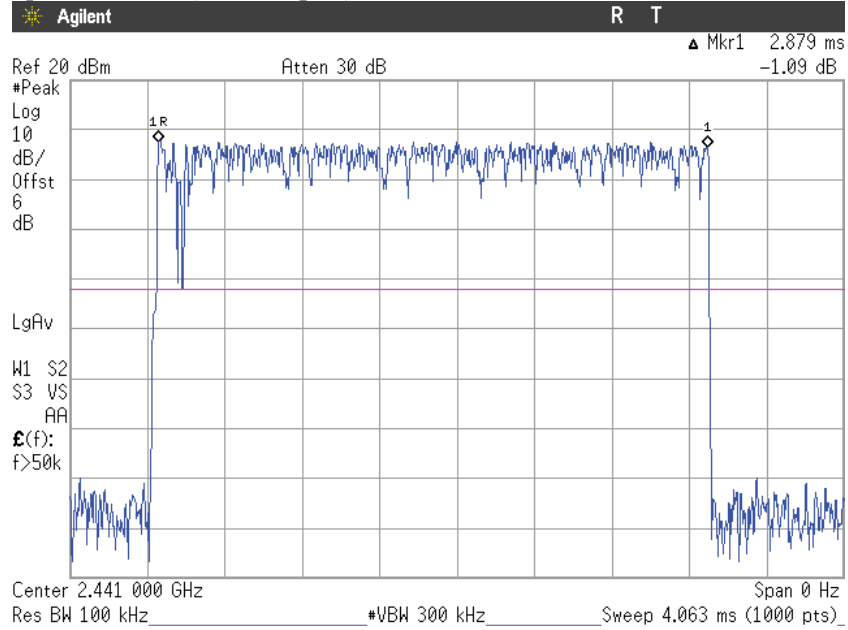
Number of hops in the period specified in the requirements = (17 hops) x (31.6 s / 3 s) = 179.06 hops.
 Averaging time of occupancy = 1.635 ms x 179.06 hops = 292.774 ms per 31.6 seconds.

Measurement uncertainty (%)	<±0.01
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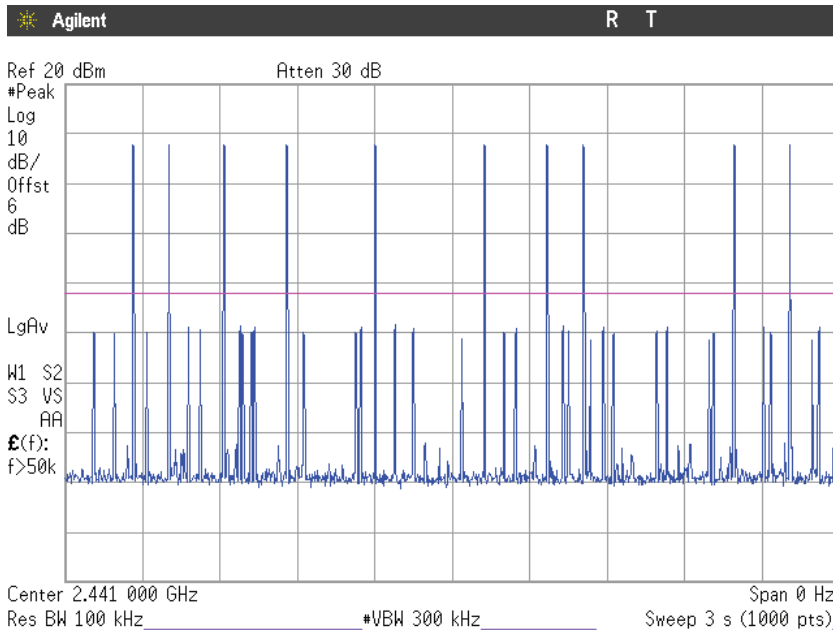
Verdict: PASS

3. TIME OF OCCUPANCY (DWELL TIME) FOR PACKET TYPE DH5.

- Tx- time per hop = 2.879 ms (see next plot).



- Number of hops over a period of 3 seconds = 10 (see next plot).



Number of hops in the period specified in the requirements = (10 hops) x (31.6 s / 3 s) = 105.33 hops.
 Averaging time of occupancy = 2.879 ms x 105.33 hops = 303.25 ms per 31.6 seconds.

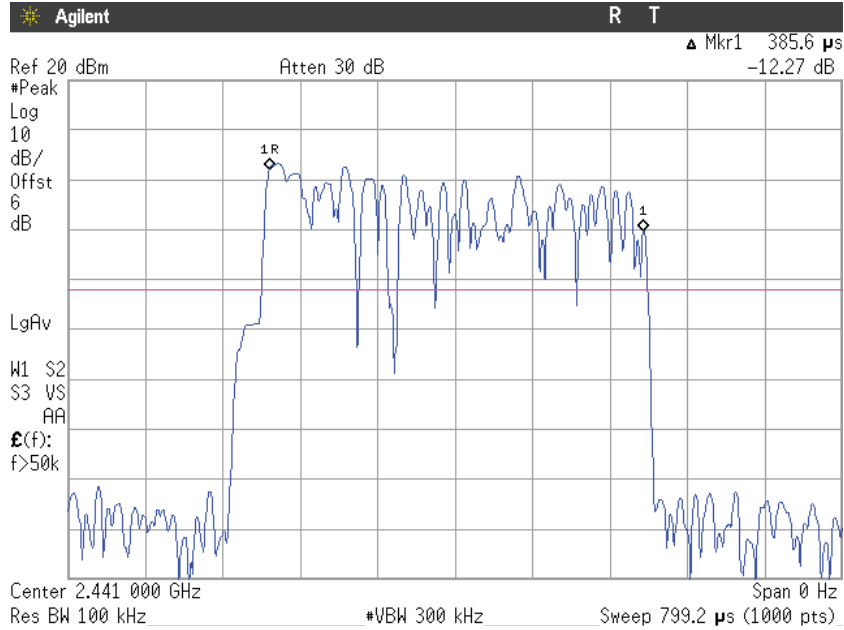
Measurement uncertainty (%)	<±0.01
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Verdict: PASS

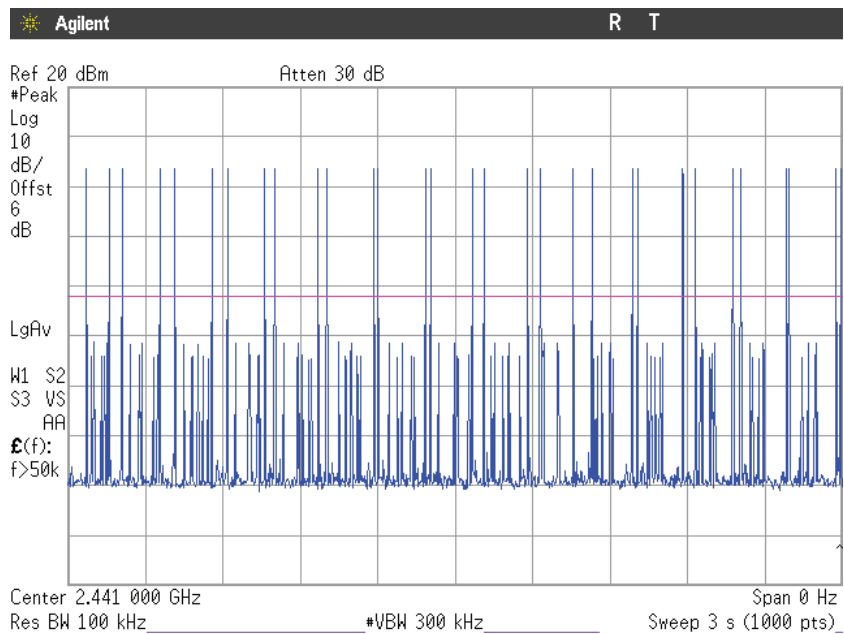
Modulation: $\Pi/4$ -DQPSK

1. TIME OF OCCUPANCY (DWELL TIME) FOR PACKET TYPE DH1.

- Tx- time per hop = 385.60 μ s (see next plot).



- Number of hops over a period of 3 second = 30 (see next plot).



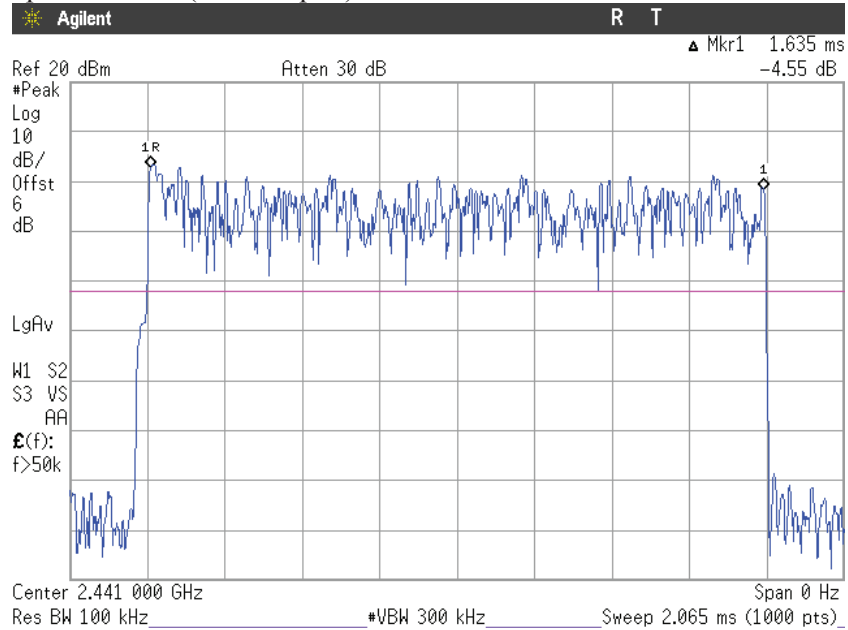
Number of hops in the period specified in the requirements = (30 hops) x (31.6 s / 3 s) = 316 hops.
 Averaging time of occupancy = 385.6 μ s x 316 hops = 121.85 ms per 31.6 seconds.

Measurement uncertainty (%)	< \pm 0.01
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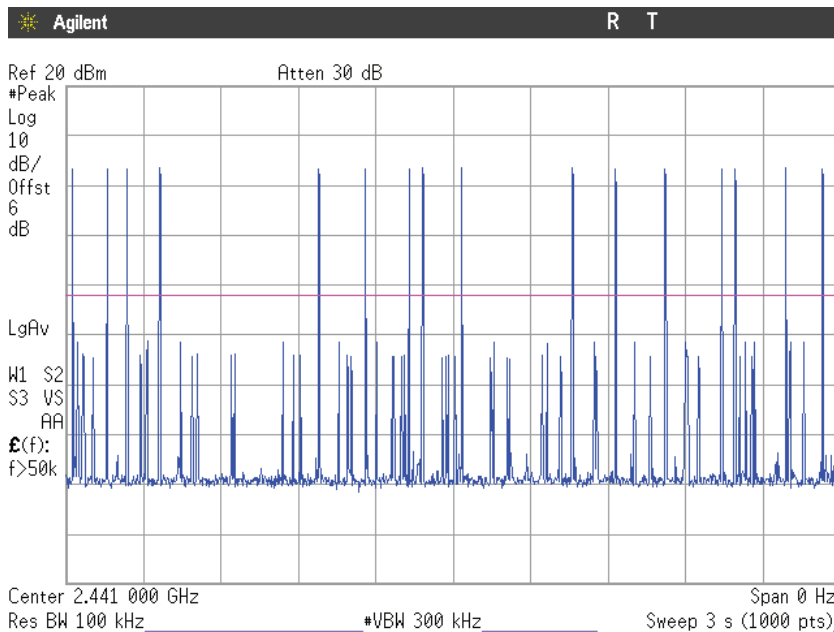
Verdict: PASS

2. TIME OF OCCUPANCY (DWELL TIME) FOR PACKET TYPE DH3.

- Tx- time per hop = 1.635 ms (see next plot).



- Number of hops over a period of 3 seconds = 17 (see next plot).



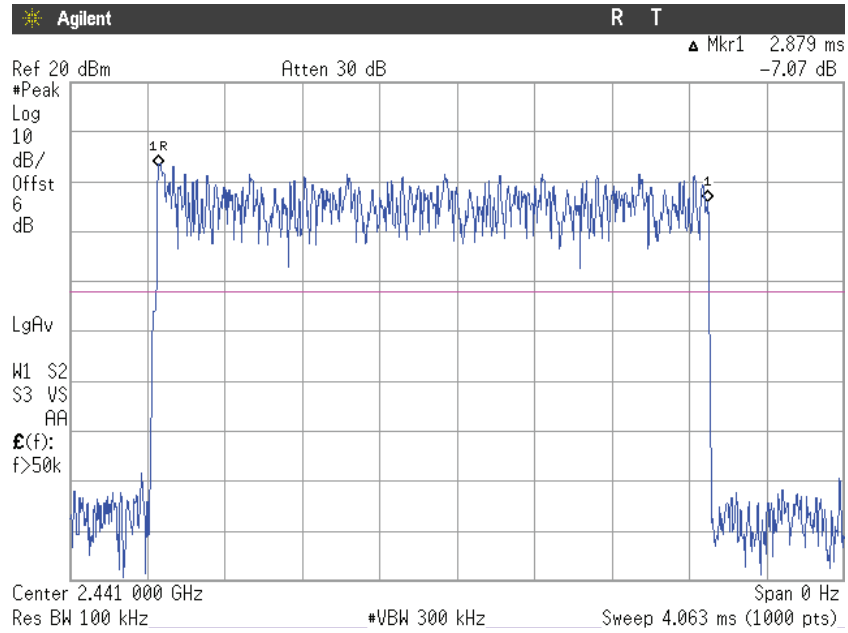
Number of hops in the period specified in the requirements = (17 hops) x (31.6 s / 3 s) = 179.06 hops.
 Averaging time of occupancy = 1.635 ms x 179.06 hops = 292.77 ms per 31.6 seconds.

Measurement uncertainty (%)	<±0.01
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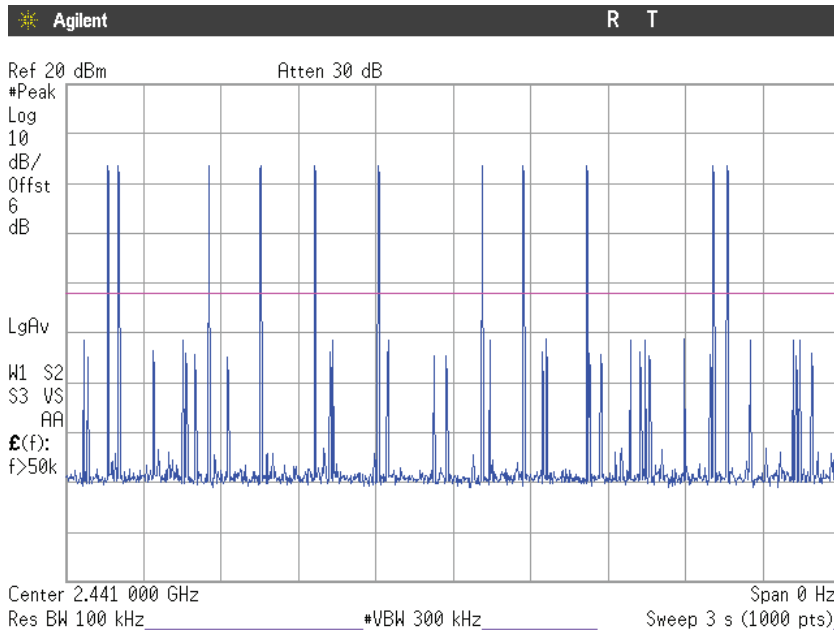
Verdict: PASS

3. TIME OF OCCUPANCY (DWELL TIME) FOR PACKET TYPE DH5.

- Tx- time per hop = 2.879 ms (see next plot).



- Number of hops over a period of 3 seconds = 11 (see next plot).



Number of hops in the period specified in the requirements = (11hops) x (31.6 s / 3 s) = 115.86 hops.
 Averaging time of occupancy = 2.879 ms x 115.86 hops = 335.58 ms per 31.6 seconds.

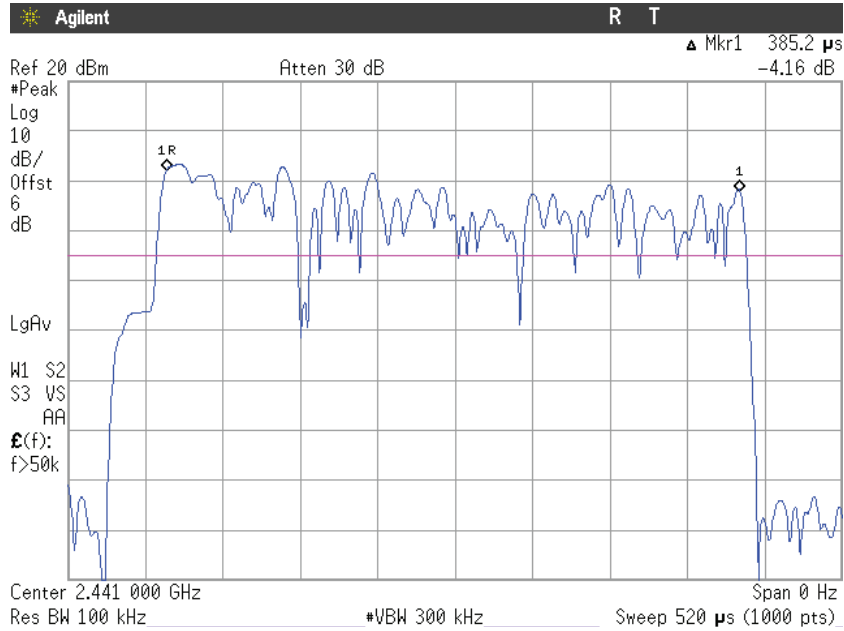
Measurement uncertainty (%)	<±0.01
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Verdict: PASS

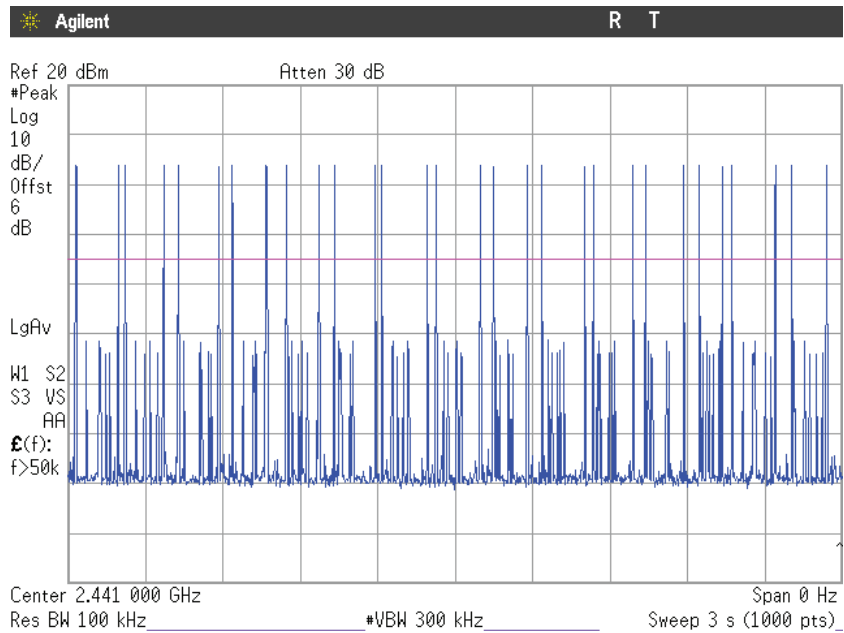
Modulation: 8-DPSK

1. TIME OF OCCUPANCY (DWELL TIME) FOR PACKET TYPE DH1.

- Tx- time per hop = 385.20 μs (see next plot).



- Number of hops over a period of 3 second = 30 (see next plot).



Number of hops in the period specified in the requirements = (30 hops) x (31.6 s / 3 s) = 316 hops.

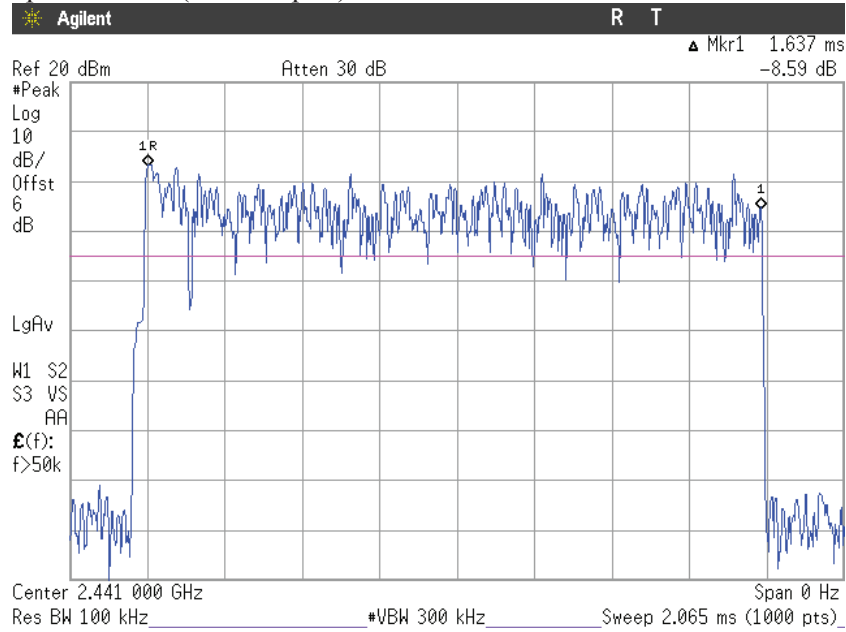
Averaging time of occupancy = 385.2 μs x 316 hops = 121.72 ms per 31.6 seconds.

Measurement uncertainty (%)	<±0.01
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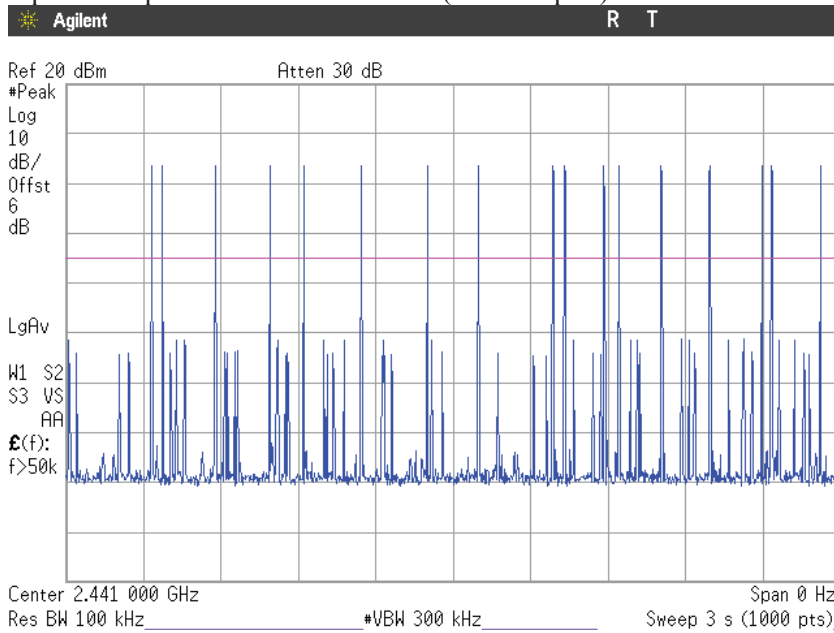
Verdict: PASS

2. TIME OF OCCUPANCY (DWELL TIME) FOR PACKET TYPE DH3.

- Tx- time per hop = 1637. ms (see next plot).



- Number of hops over a period of 3 seconds = 17 (see next plot).



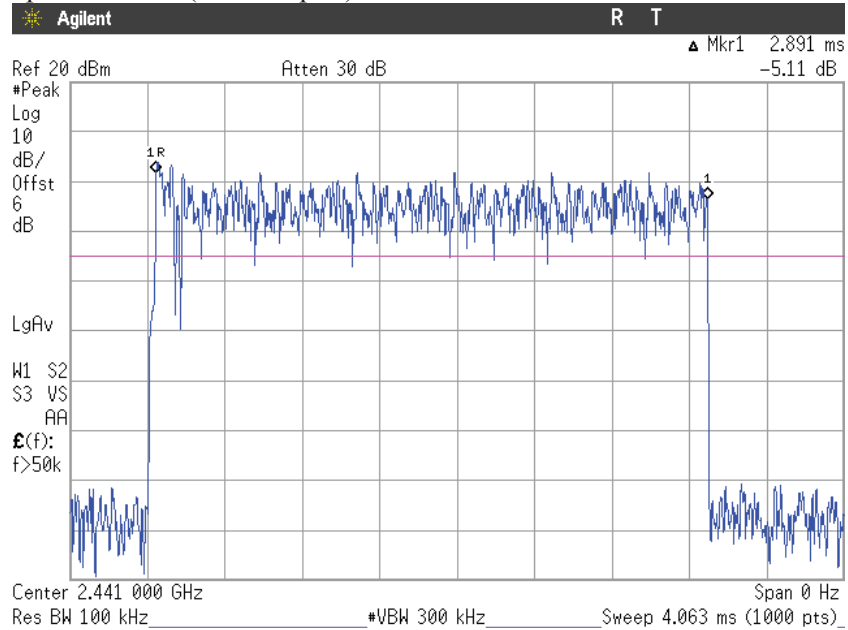
Number of hops in the period specified in the requirements = (17 hops) x (31.6 s / 3 s) = 179.06 hops.
 Averaging time of occupancy = 1.637 ms x 179.06 hops = 293.13 ms per 31.6 seconds.

Measurement uncertainty (%)	<±0.01
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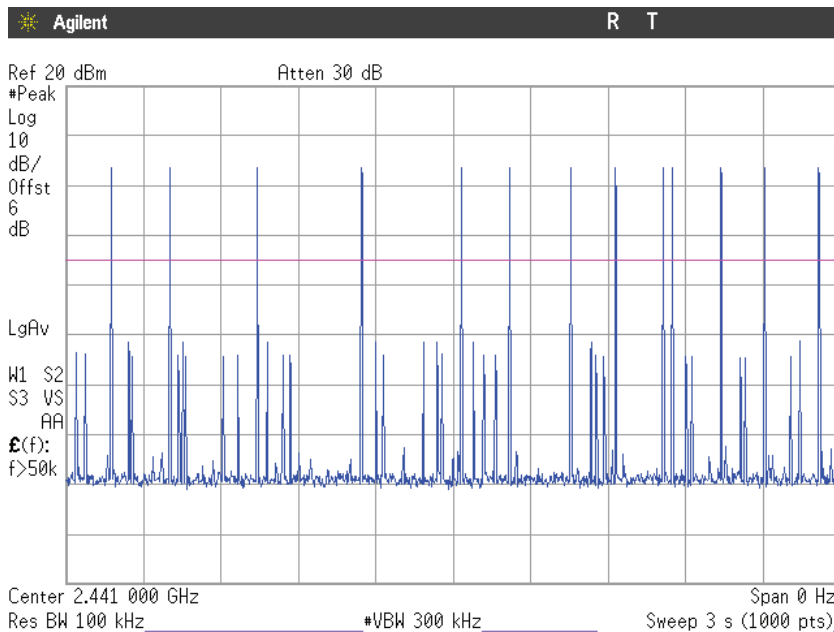
Verdict: PASS

3. TIME OF OCCUPANCY (DWELL TIME) FOR PACKET TYPE DH5.

- Tx- time per hop = 2.891 ms (see next plot).



- Number of hops over a period of 3 seconds = 13 (see next plot).



Number of hops in the period specified in the requirements = (13 hops) x (31.6 s / 3 s) =136.93 hops.
 Averaging time of occupancy =2.891. ms x 136.93 hops = 395.87 ms per 31.6 seconds.

Measurement uncertainty (%)	<±0.01
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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).

MAXIMUM OUTPUT POWER. See next plots.

Declared Gain for antenna RF port 3 (maximum) = 0.7 dBi. (Antenna gain plus antenna cable loss)

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

Modulation: GFSK

	Lowest frequency 2402 MHz	Middle frequency 2441 MHz	Highest frequency 2480 MHz
Maximum peak power (dBm)	7.92	7.64	7.02
Maximum EIRP power (dBm)	8.62	8.34	7.72
Measurement uncertainty (dB)	<±0.78		

Modulation: Π/4-DQPSK (2Mbps)

	Lowest frequency 2402 MHz	Middle frequency 2441 MHz	Highest frequency 2480 MHz
Maximum peak power (dBm)	6.49	6.44	5.37
Maximum EIRP power (dBm)	7.19	7.14	6.07
Measurement uncertainty (dB)	<±0.78		

Modulation: 8-DPSK (3Mbps)

	Lowest frequency 2402 MHz	Middle frequency 2441 MHz	Highest frequency 2480 MHz
Maximum peak power (dBm)	7.13	6.70	5.62
Maximum EIRP power (dBm)	7.83	7.40	6.32
Measurement uncertainty (dB)	<±0.78		

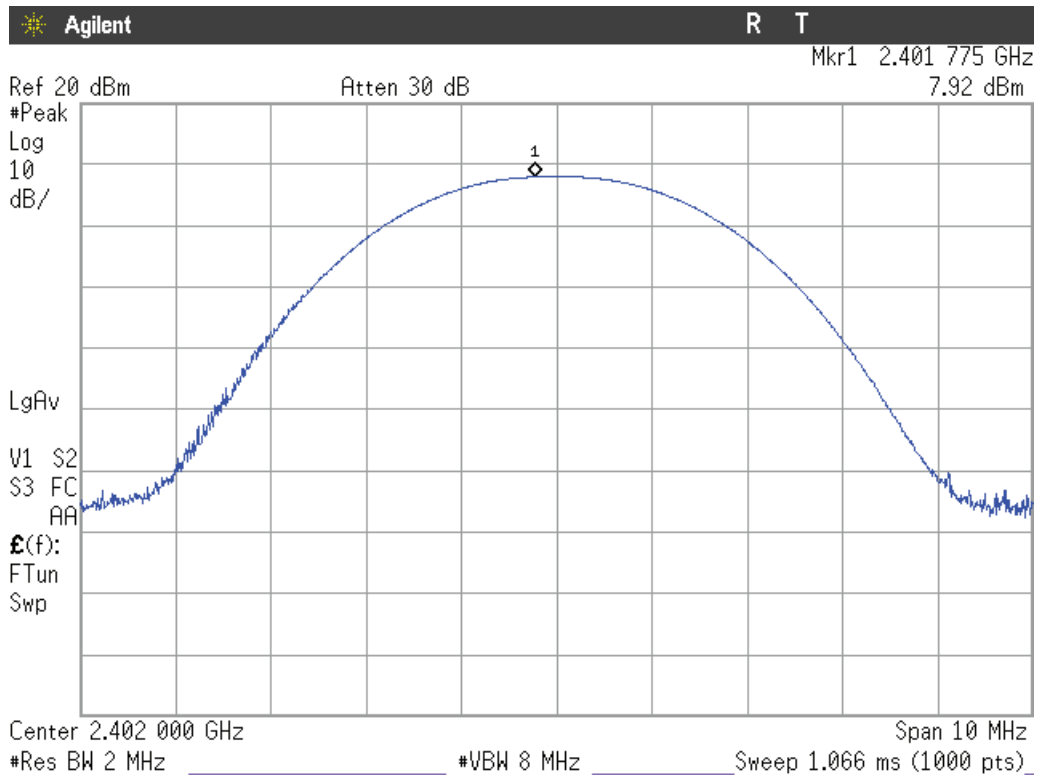
The maximum directional gain of the antenna is less than 6 dBi and therefore the maximum output power is not required to be reduced from the stated values.

Verdict: PASS

PEAK OUTPUT POWER (CONDUCTED).

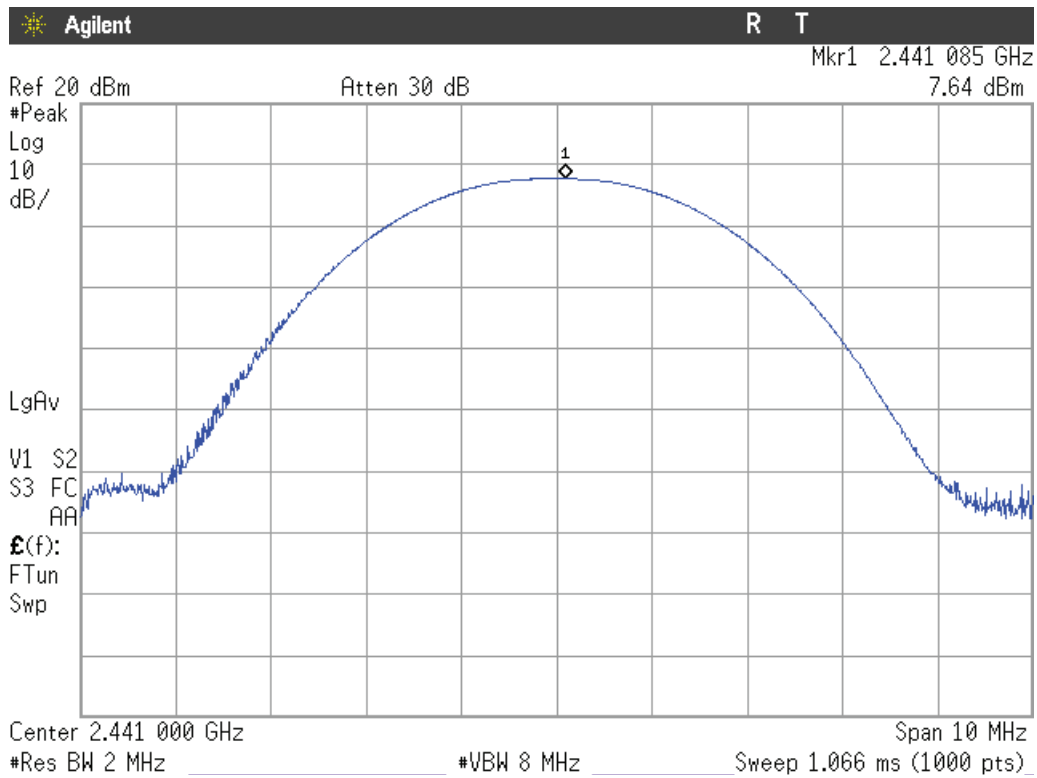
Modulation: GFSK

Lowest Channel: 2402 MHz.



Modulation: GFSK

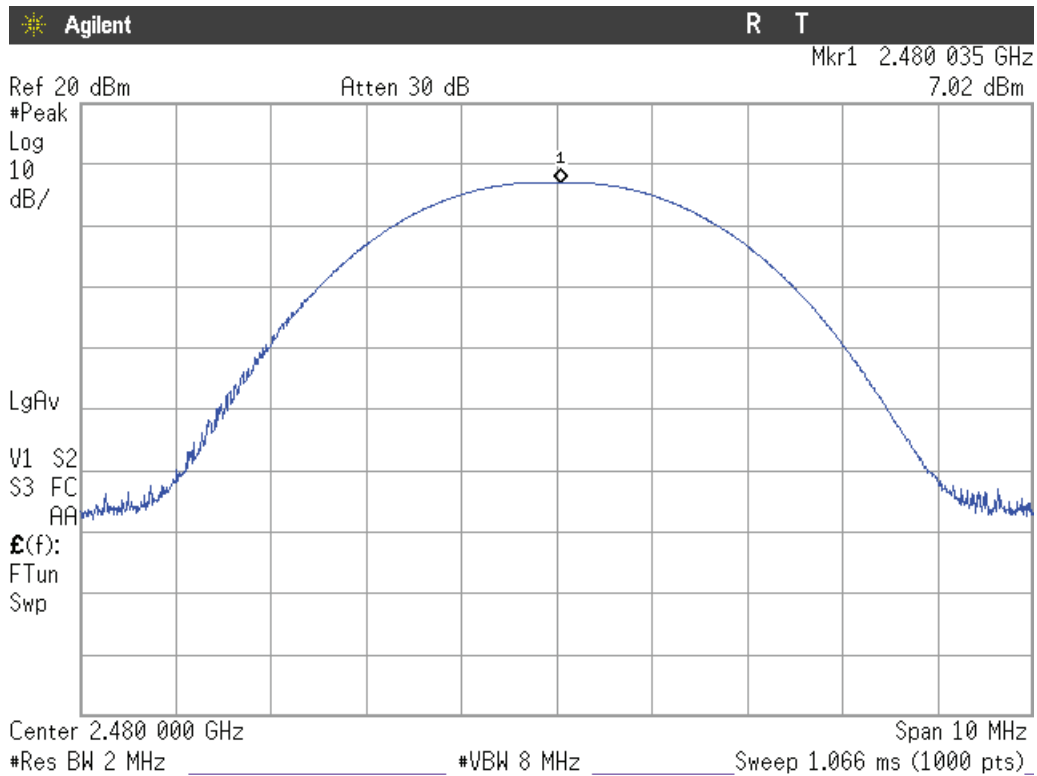
Middle Channel: 2441 MHz.



PEAK OUTPUT POWER (CONDUCTED).

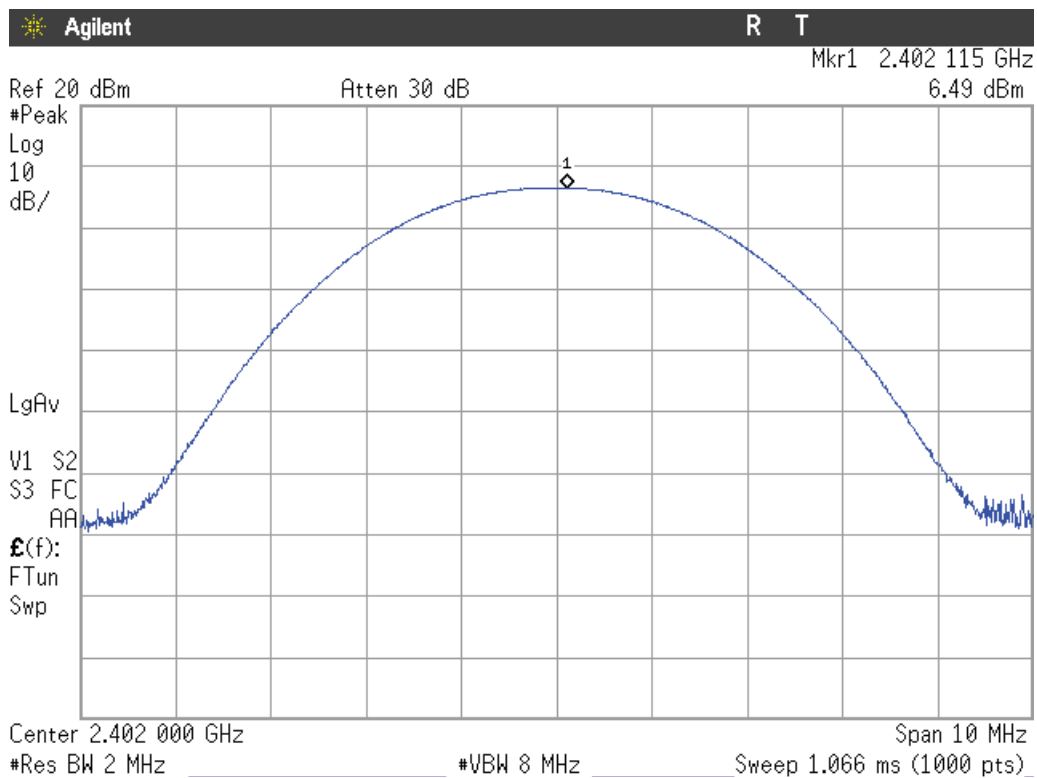
Modulation: GFSK

Highest Channel: 2480 MHz.



Modulation: $\Pi/4$ -DQPSK

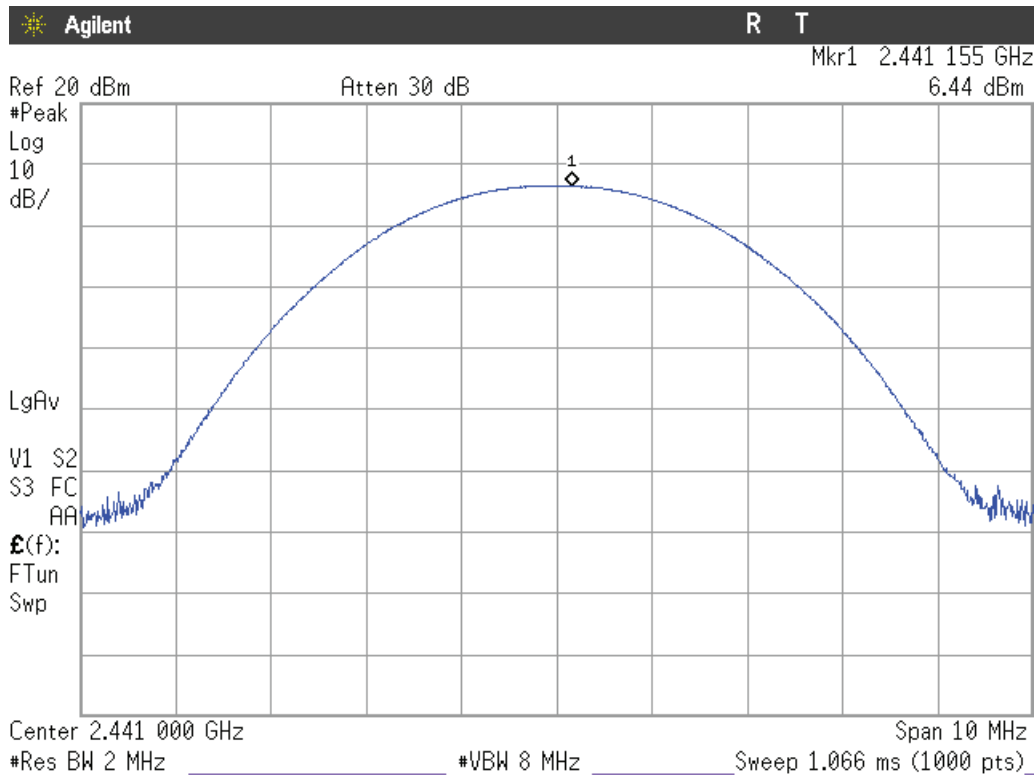
Lowest Channel: 2402 MHz



PEAK OUTPUT POWER (CONDUCTED)

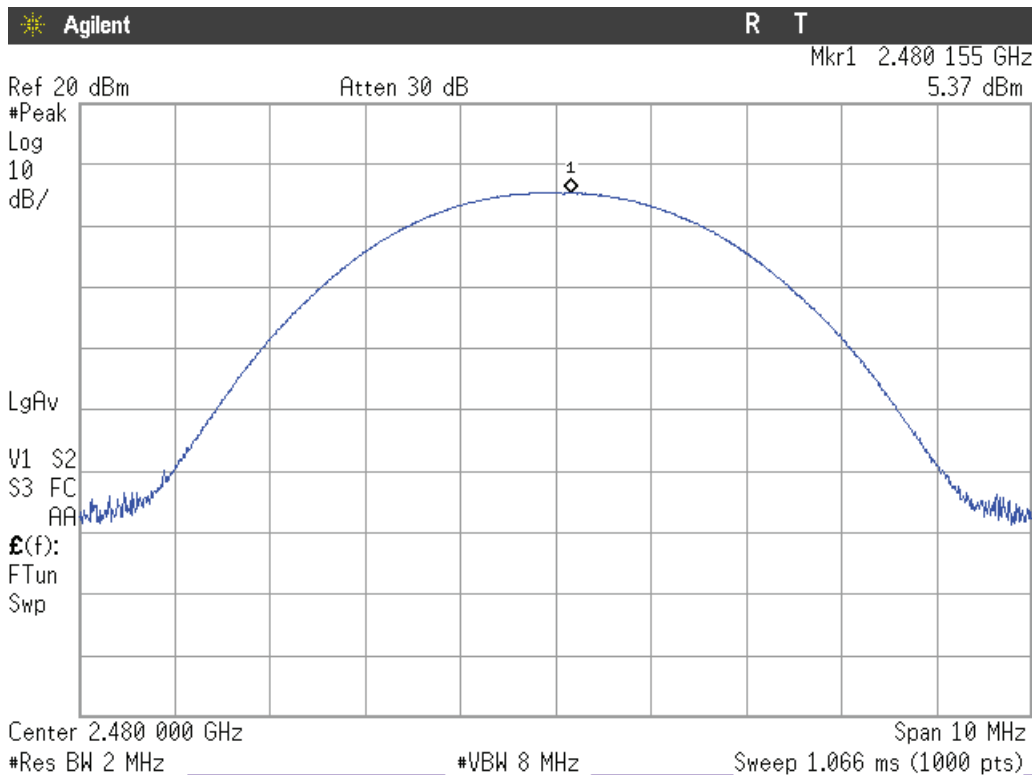
Modulation: $\Pi/4$ -DQPSK

Middle Channel: 2441 MHz.



Modulation: $\Pi/4$ -DQPSK

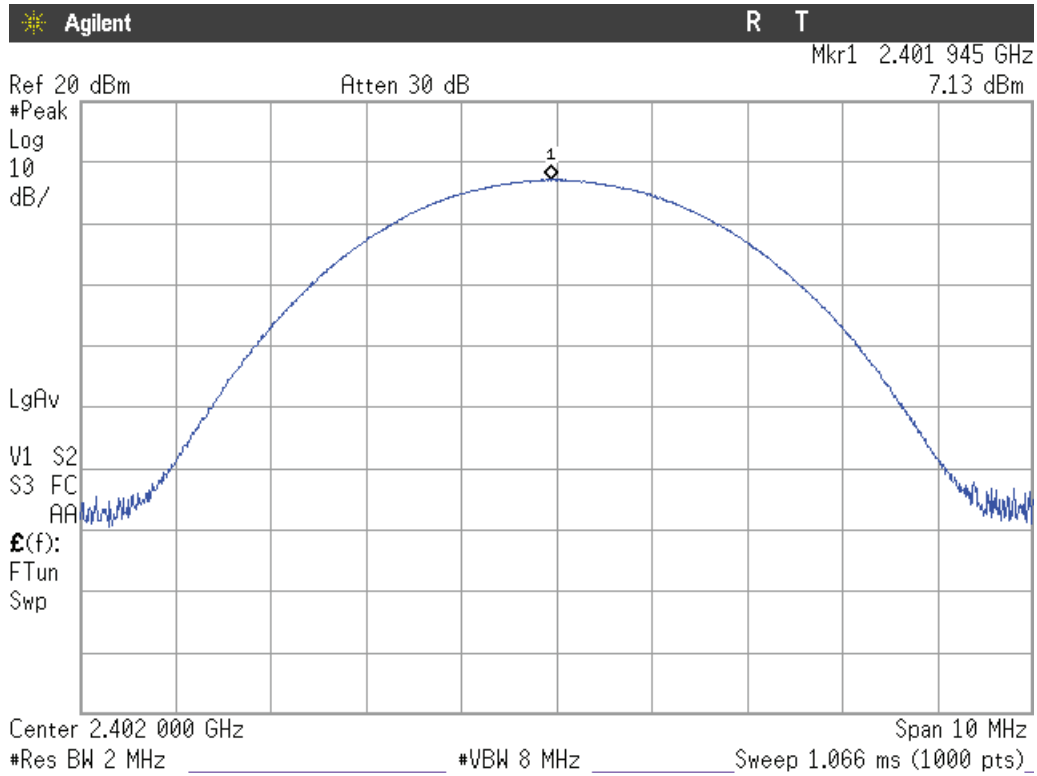
Highest Channel: 2480 MHz.



PEAK OUTPUT POWER (CONDUCTED).

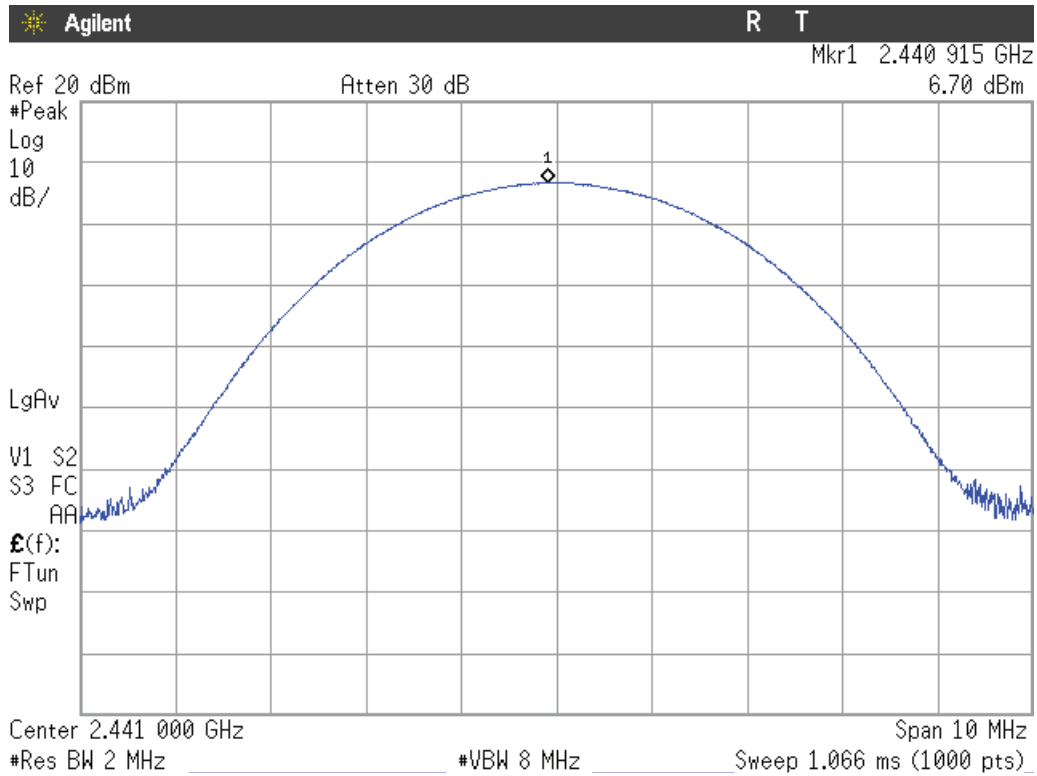
Modulation: 8-DPSK

Lowest Channel: 2402 MHz



Modulation: 8-DPSK

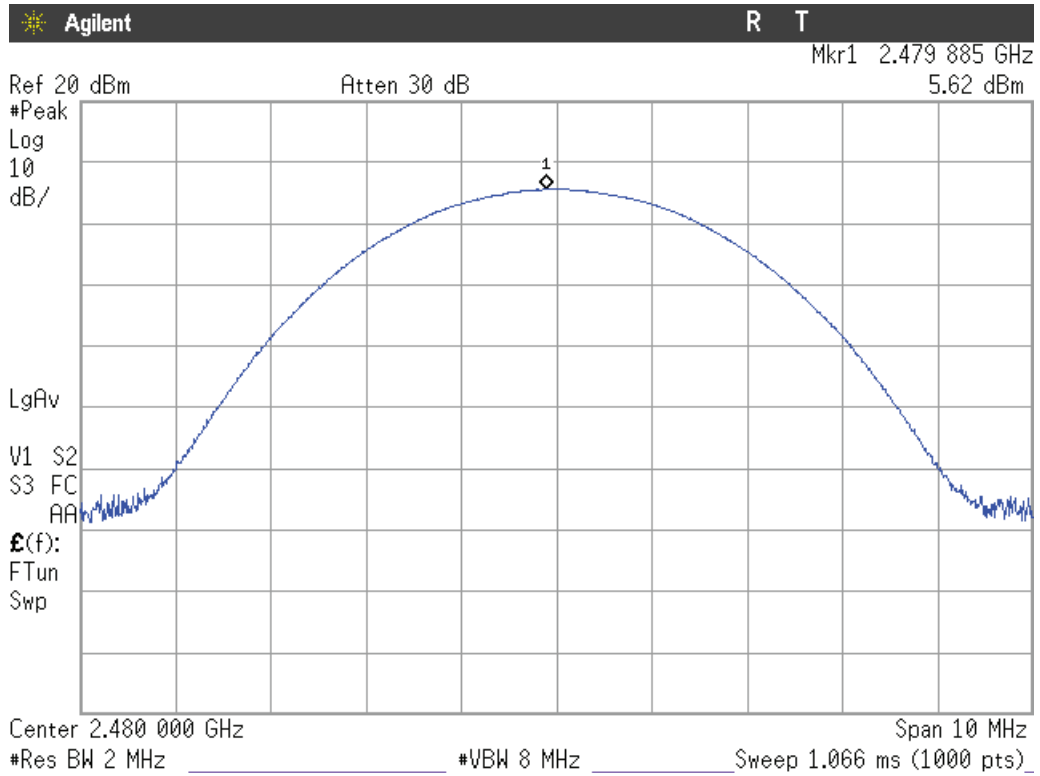
Middle Channel: 2441 MHz



PEAK OUTPUT POWER (CONDUCTED).

Modulation: 8-DPSK

Highest Channel: 2480 MHz.



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

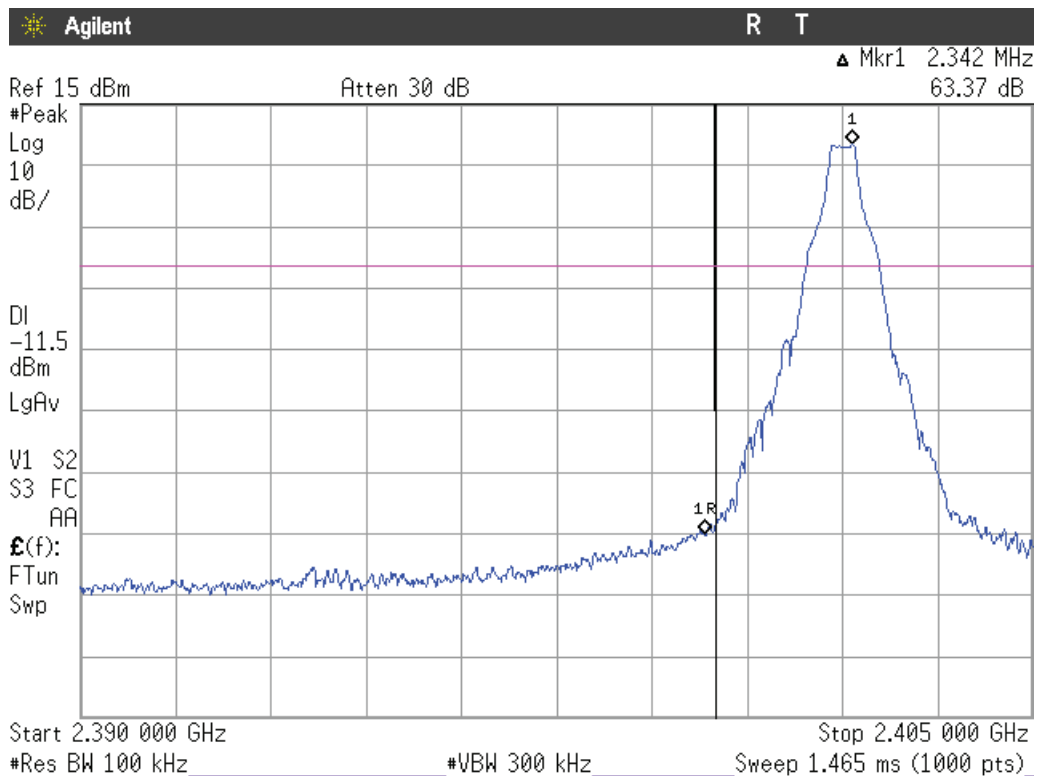
SPECIFICATION

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

RESULTS:

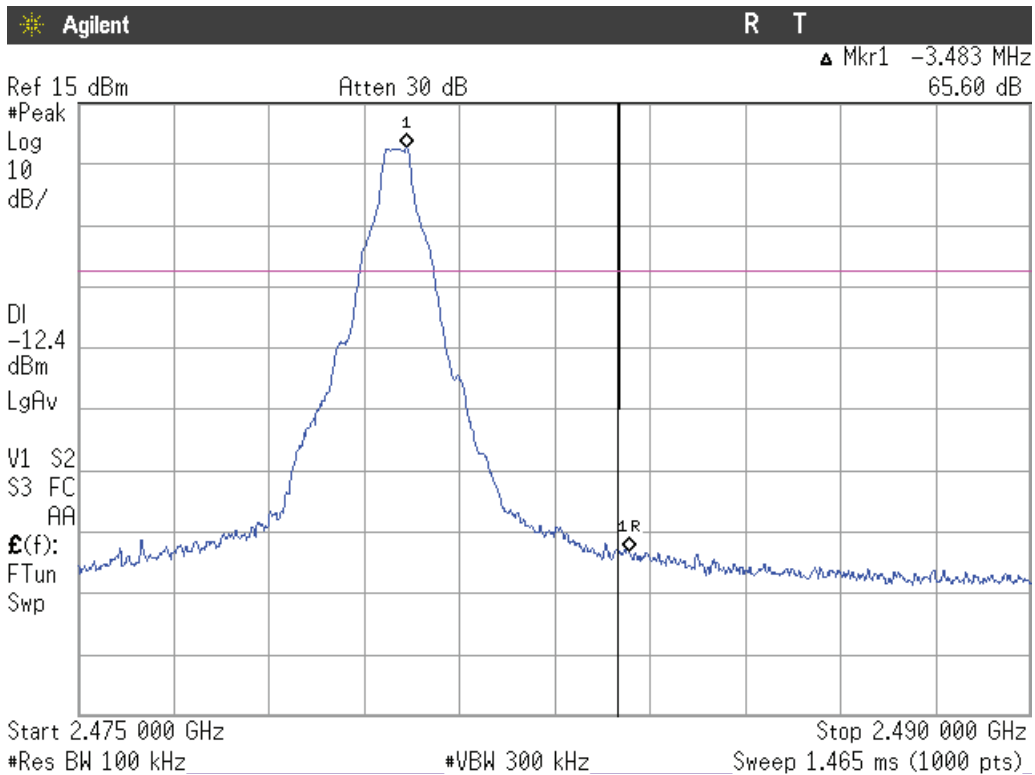
Modulation: GFSK

1. LOW FREQUENCY SECTION 2402 MHz (HOPPING OFF). See next plot.



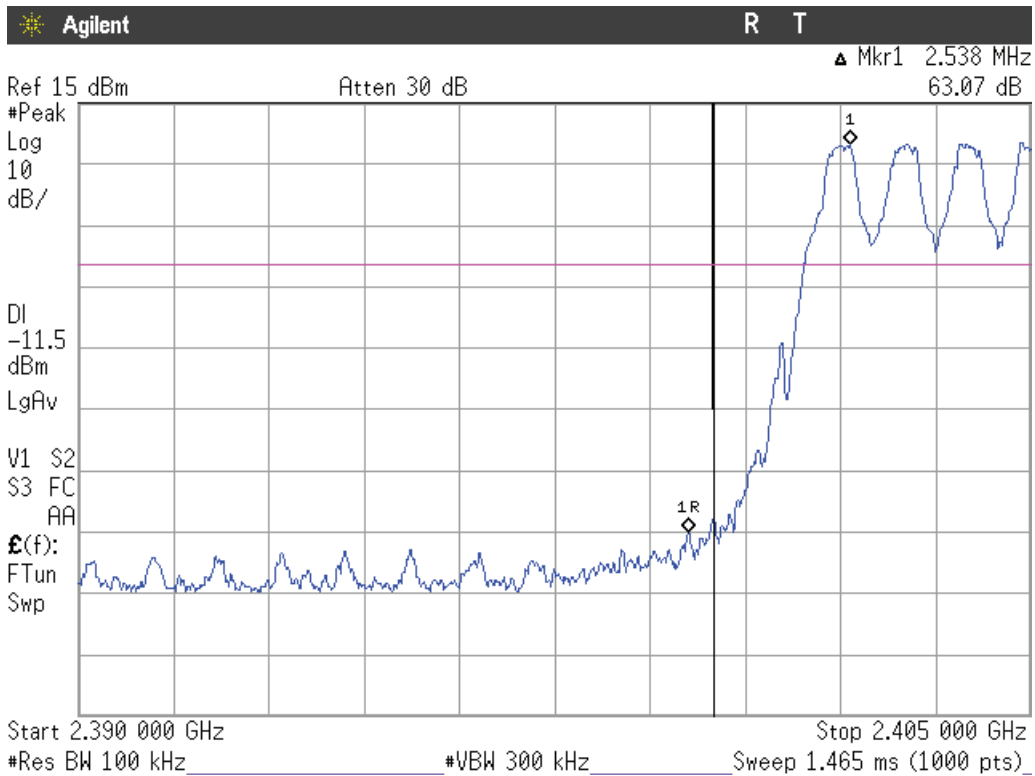
Verdict: PASS

2. HIGH FREQUENCY SECTION 2480 MHz (HOPPING OFF). See next plot.



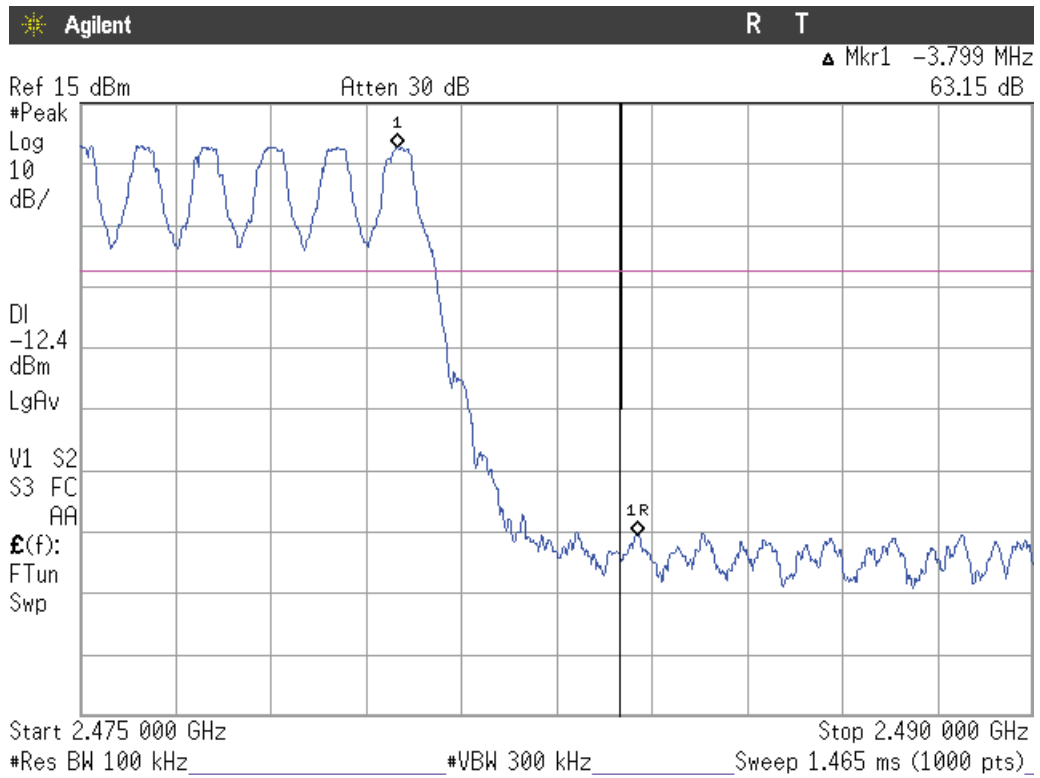
Verdict: PASS

3. LOW FREQUENCY SECTION (HOPPING ON). See next plot.



Verdict: PASS

4. HIGH FREQUENCY SECTION (HOPPING ON). See next plot.

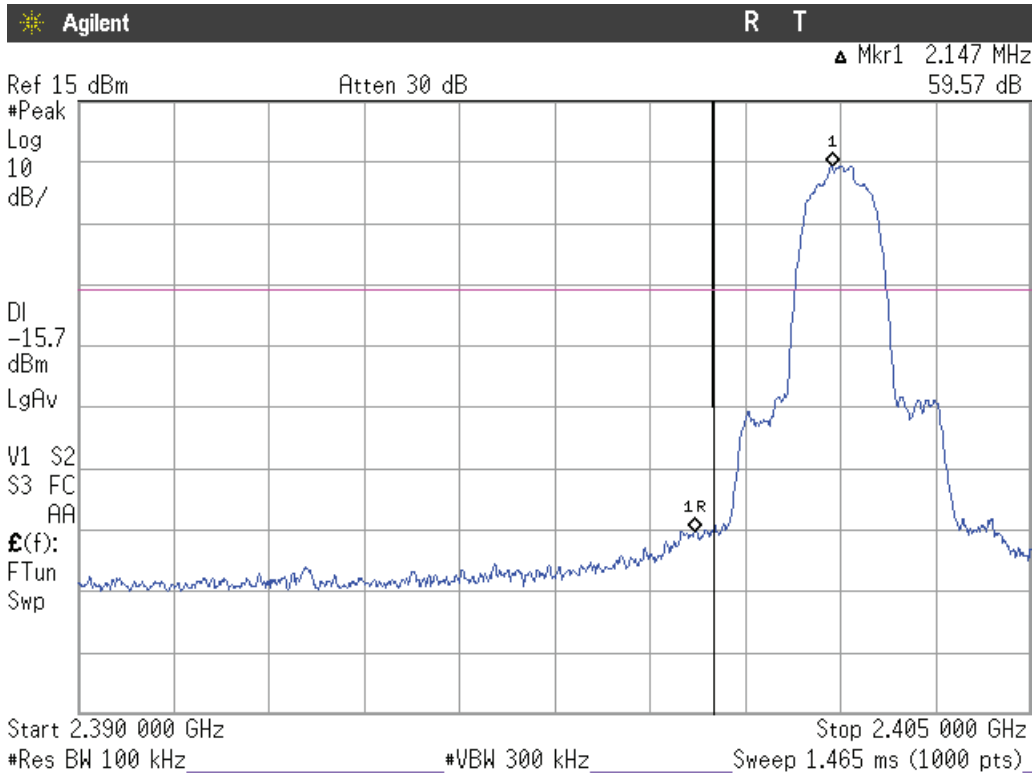


Verdict: PASS

Measurement uncertainty (dB)	<±2.03
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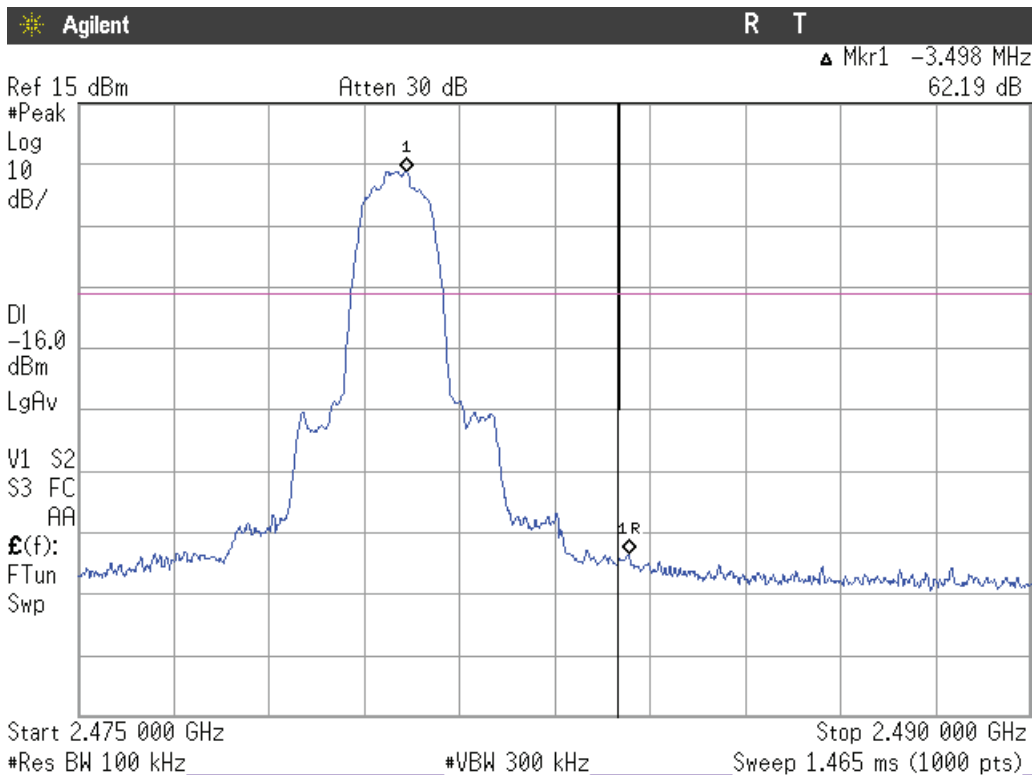
Modulation: $\Pi/4$ -DQPSK

1. LOW FREQUENCY SECTION 2402 MHz (HOPPING OFF). See next plot.



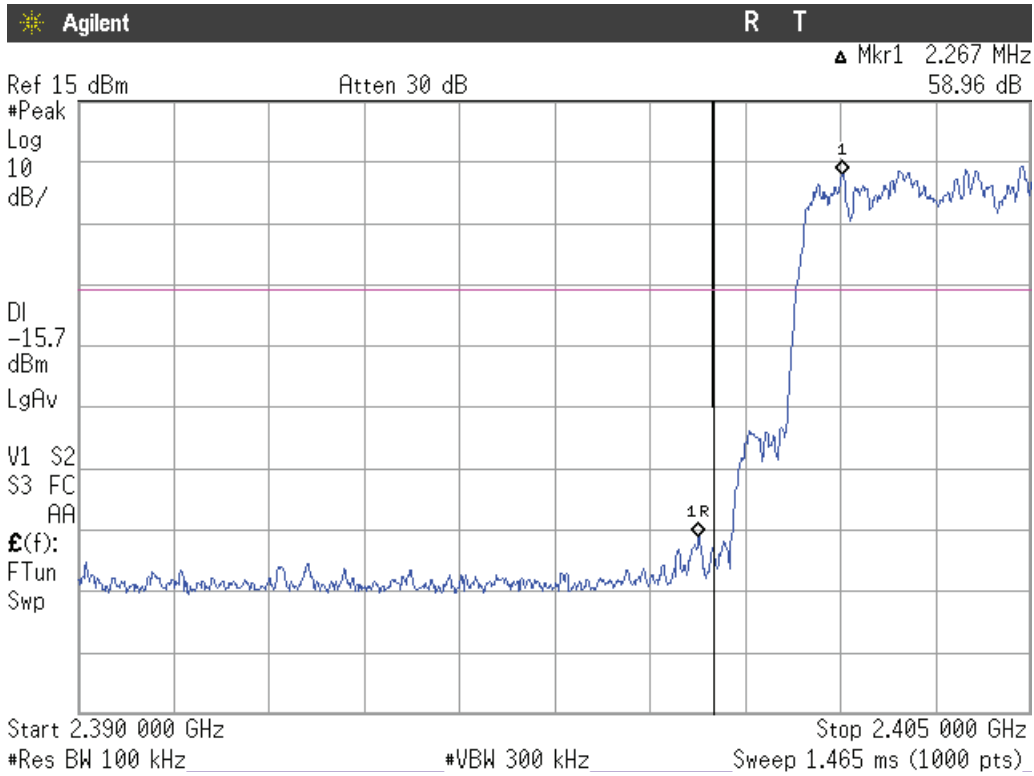
Verdict: PASS

2. HIGH FREQUENCY SECTION 2480 MHz (HOPPING OFF). See next plot.



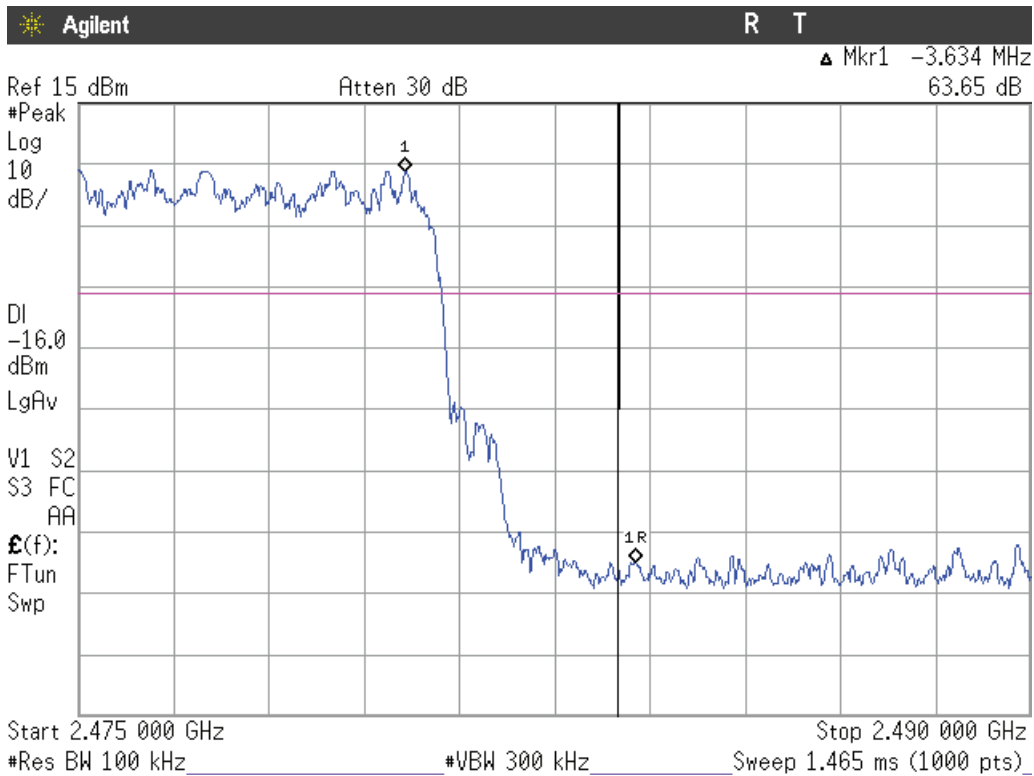
Verdict: PASS

3. LOW FREQUENCY SECTION (HOPPING ON). See next plot.



Verdict: PASS

4. HIGH FREQUENCY SECTION (HOPPING ON). See next plot.

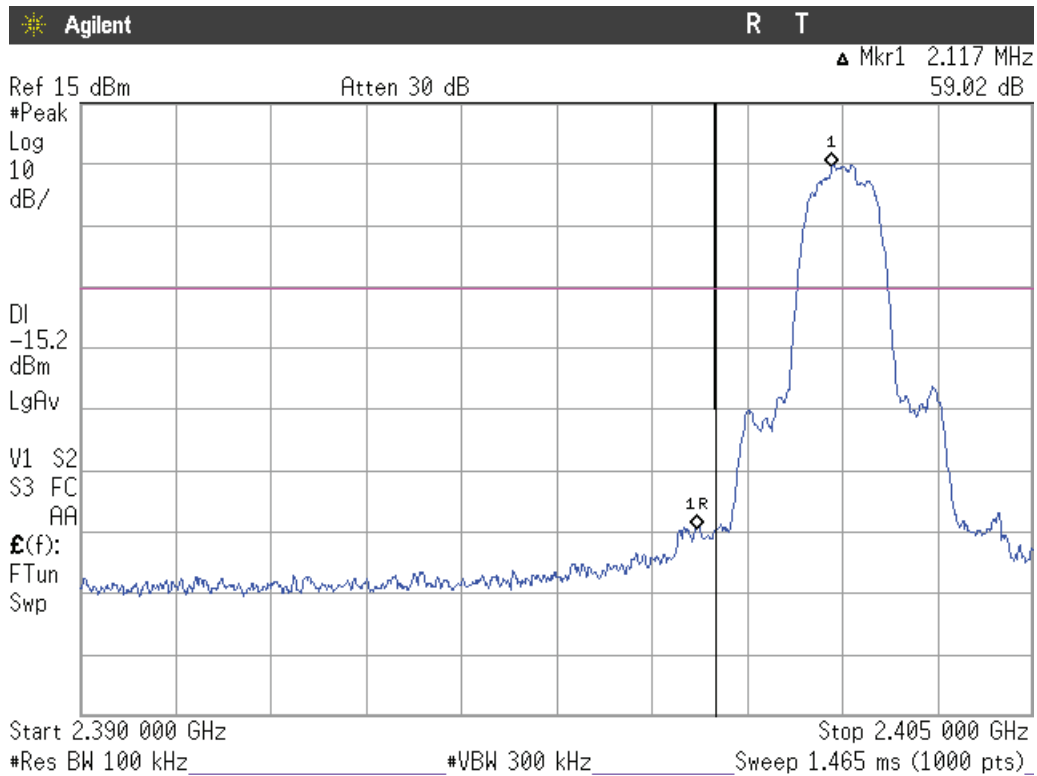


Verdict: PASS

Measurement uncertainty (dB)	<±2.03
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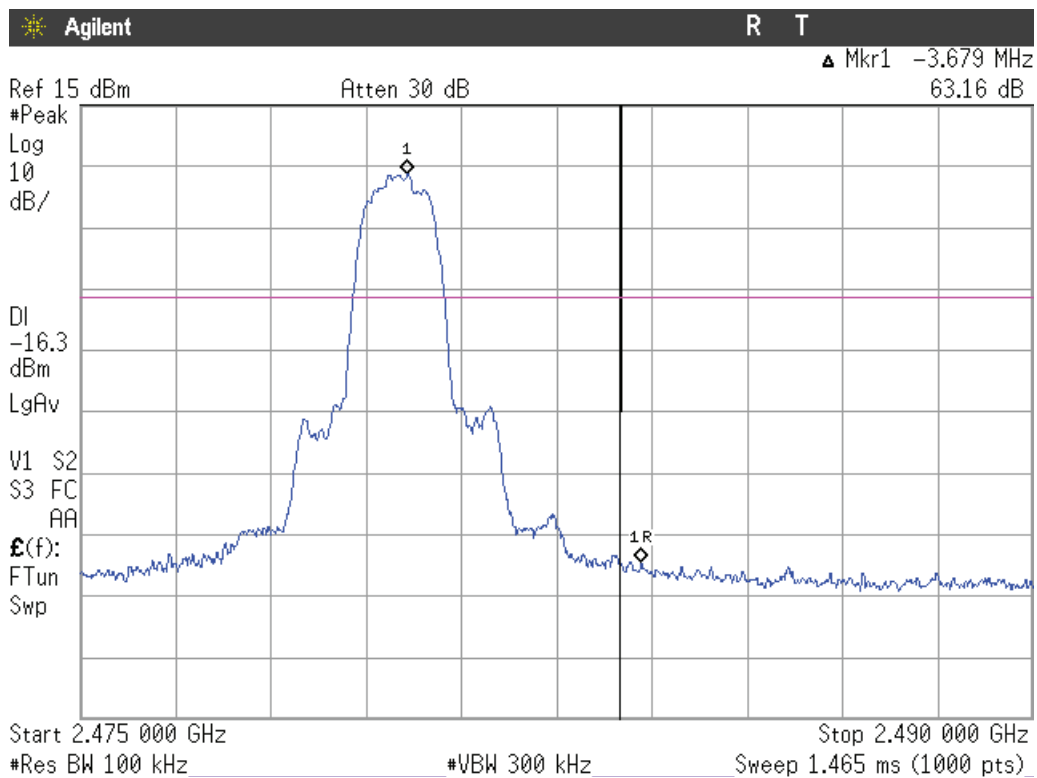
Modulation: 8-DPSK

1. LOW FREQUENCY SECTION 2402 MHz (HOPPING OFF). See next plot.



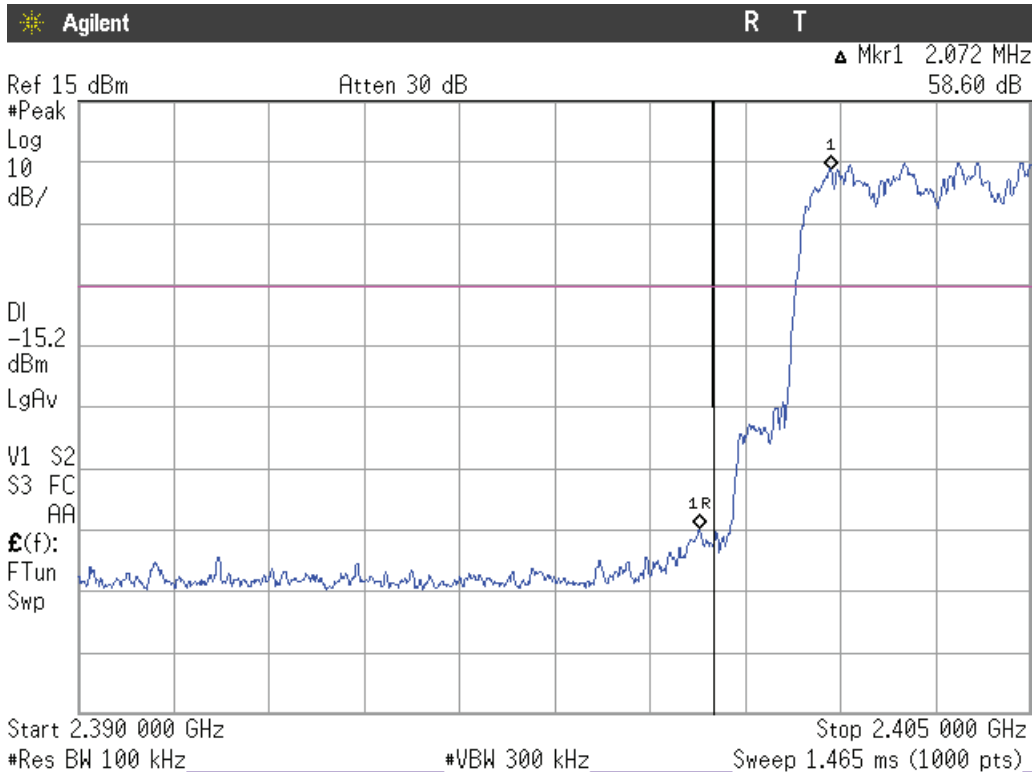
Verdict: PASS

2. HIGH FREQUENCY SECTION 2480 MHz (HOPPING OFF). See next plot.



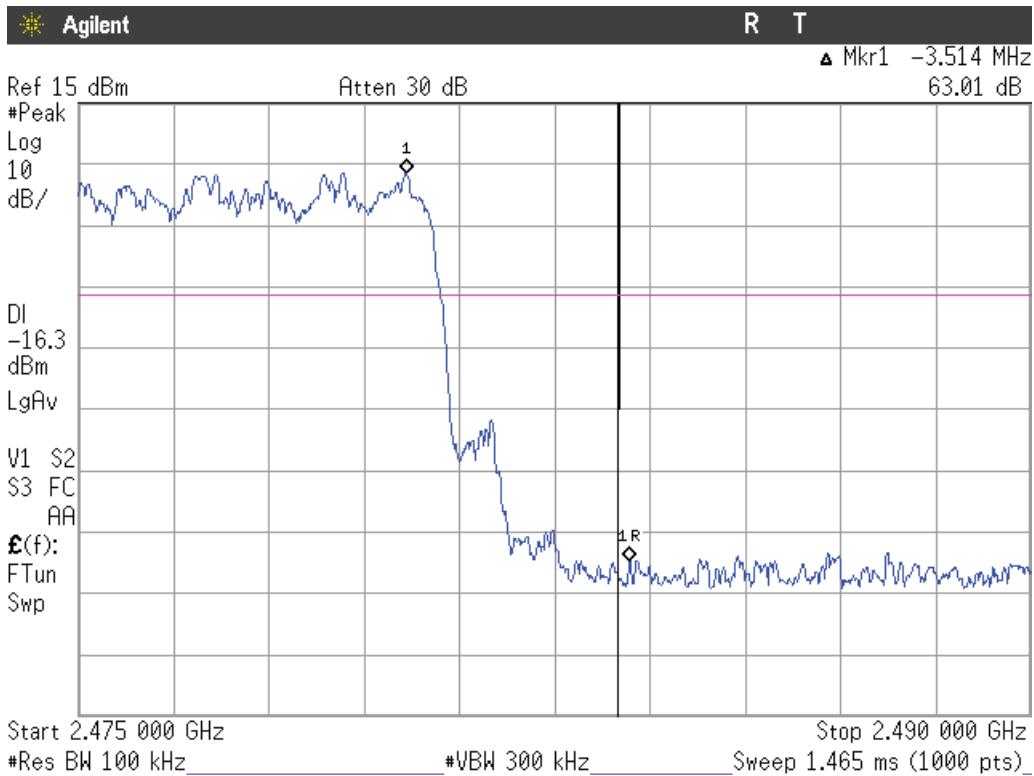
Verdict: PASS

3. LOW FREQUENCY SECTION (HOPPING ON). See next plot.



Verdict: PASS

4. HIGH FREQUENCY SECTION (HOPPING ON). See next plot.



Verdict: PASS

Measurement uncertainty (dB)	<±2.03
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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 20dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

RESULTS:

Modulation: GFSK

1. LOW CHANNEL (2402 MHz).
All peaks are more than 20 dB below the limit.
2. MIDDLE CHANNEL (2441 MHz)
All peaks are more than 20 dB below the limit.
3. HIGH CHANNEL (2480 MHz)
All peaks are more than 20 dB below the limit.

Modulation: $\Pi/4$ -DQPSK

1. LOW CHANNEL (2402 MHz).
All peaks are more than 20 dB below the limit.
2. MIDDLE CHANNEL (2441 MHz)
All peaks are more than 20 dB below the limit.
3. HIGH CHANNEL (2480 MHz)
All peaks are more than 20 dB below the limit.

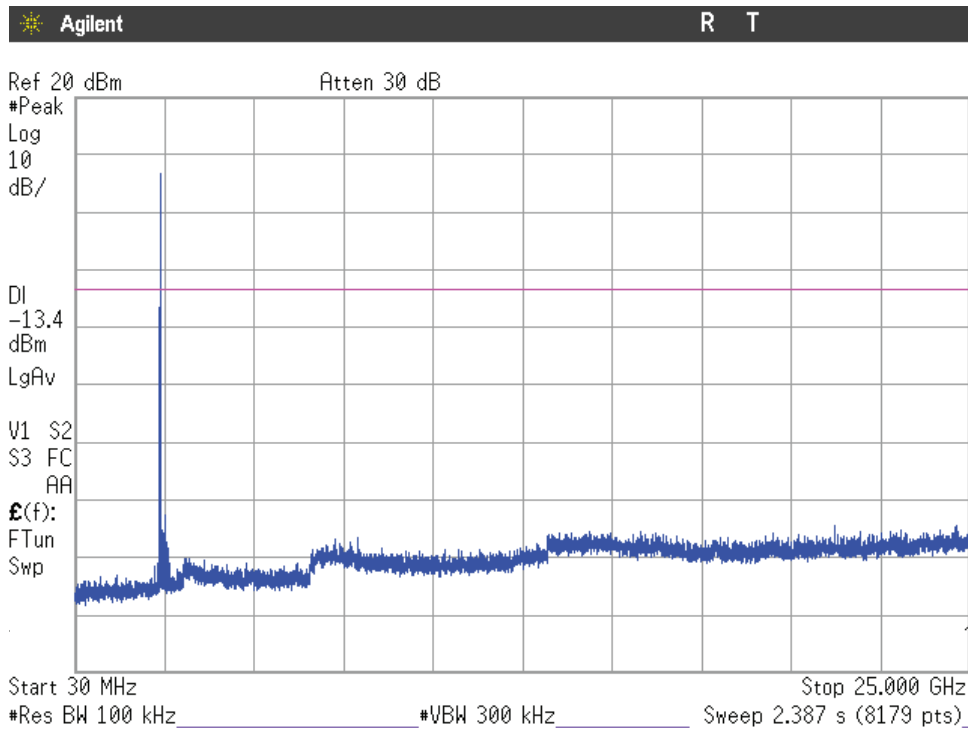
Modulation: 8-DPSK

1. LOW CHANNEL (2402 MHz).
All peaks are more than 20 dB below the limit.
2. MIDDLE CHANNEL (2441 MHz)
All peaks are more than 20 dB below the limit.
3. HIGH CHANNEL (2480 MHz)
All peaks are more than 20 dB below the limit.

Verdict: PASS

Modulation: GFSK

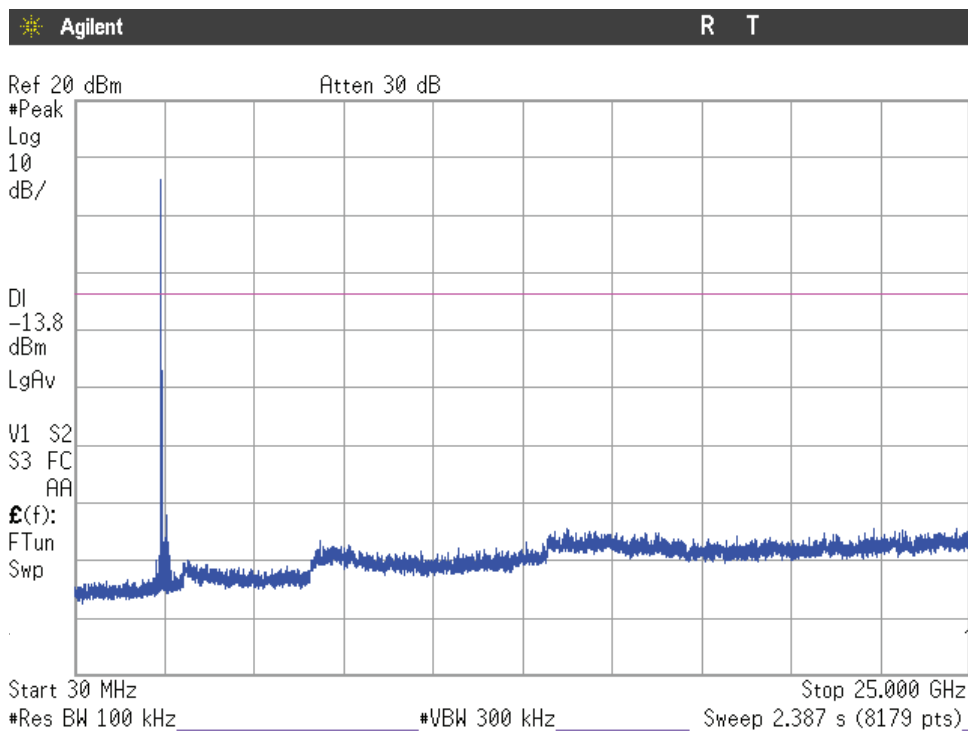
1. LOWEST CHANNEL (2402 MHz): 30 MHz-25 GHz (see next plot).



Note: The peak above the limit is the carrier frequency.

Verdict: PASS

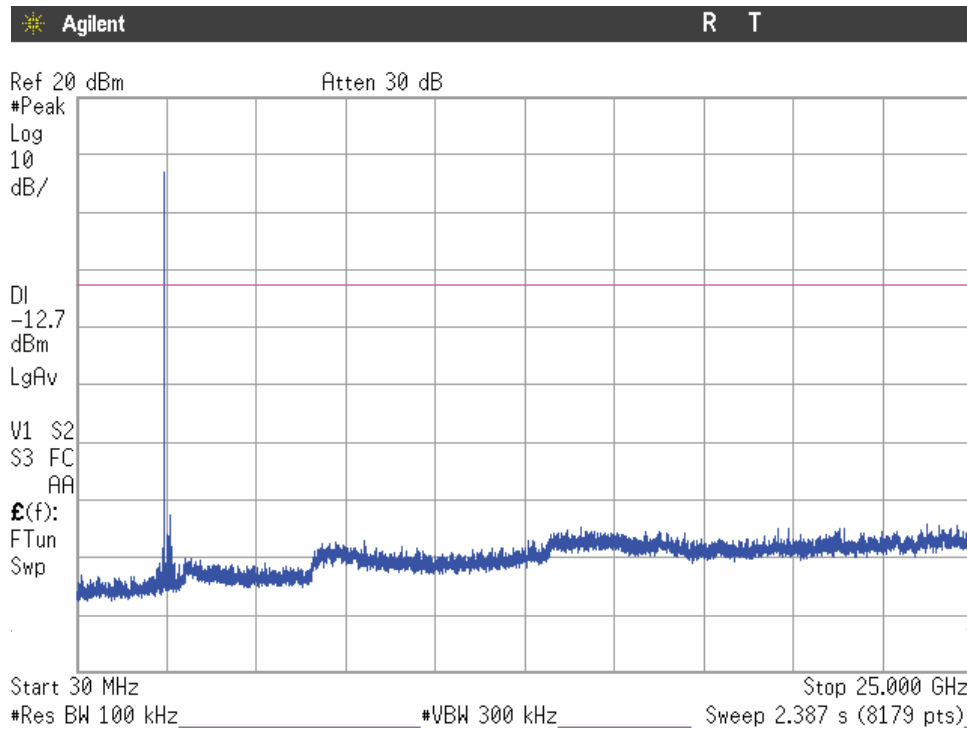
2. MIDDLE CHANNEL (2441 MHz): 30 MHz-25 GHz (see next plot).



Note: The peak above the limits is the carrier frequency.

Verdict: PASS

3. HIGH CHANNEL (2480 MHz): 30 MHz-25 GHz (see next plot).



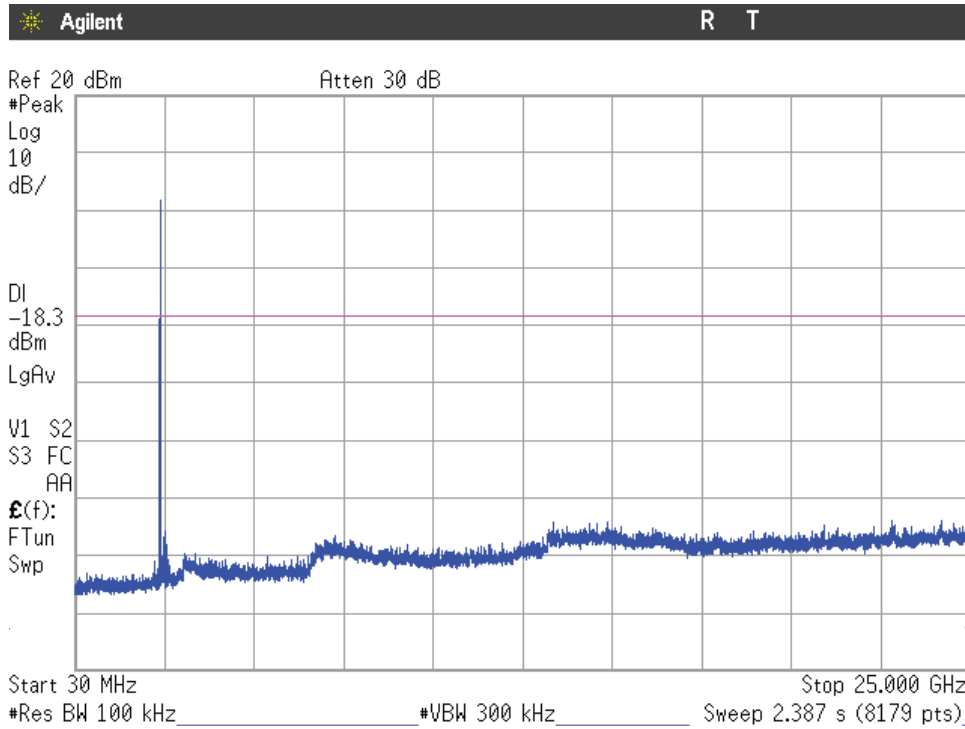
Note: The peak above the limits is the carrier frequency.

Verdict: PASS

Measurement uncertainty (dB)	<±2.03
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Modulation: $\Pi/4$ -DQPSK

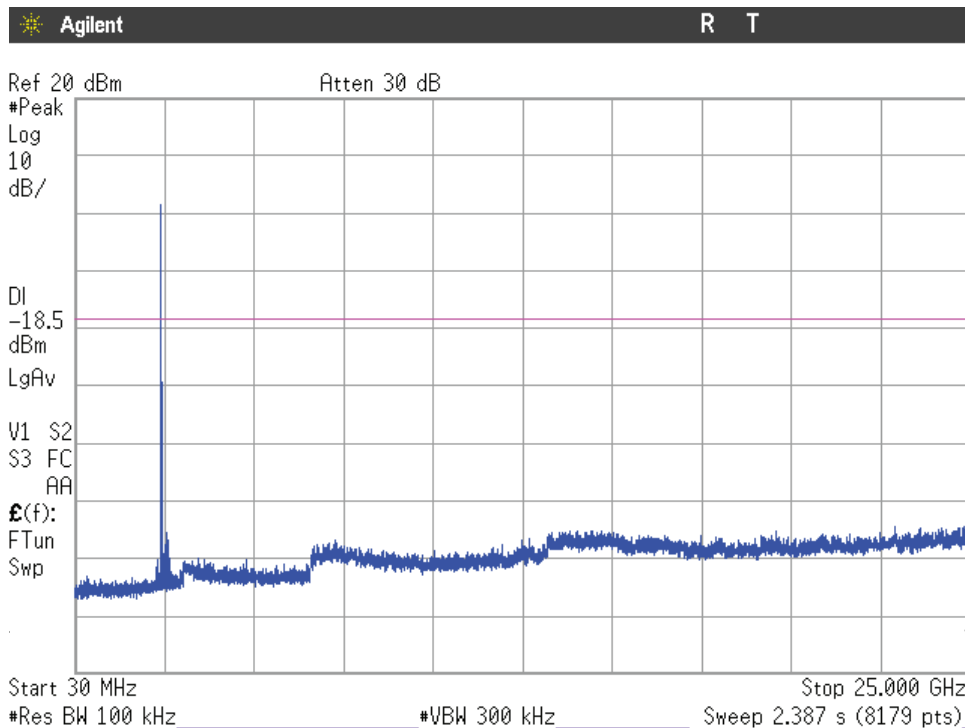
1. LOWEST CHANNEL (2402 MHz): 30 MHz-25 GHz (see next plot).



Note: The peak above the limits is the carrier frequency.

Verdict: PASS

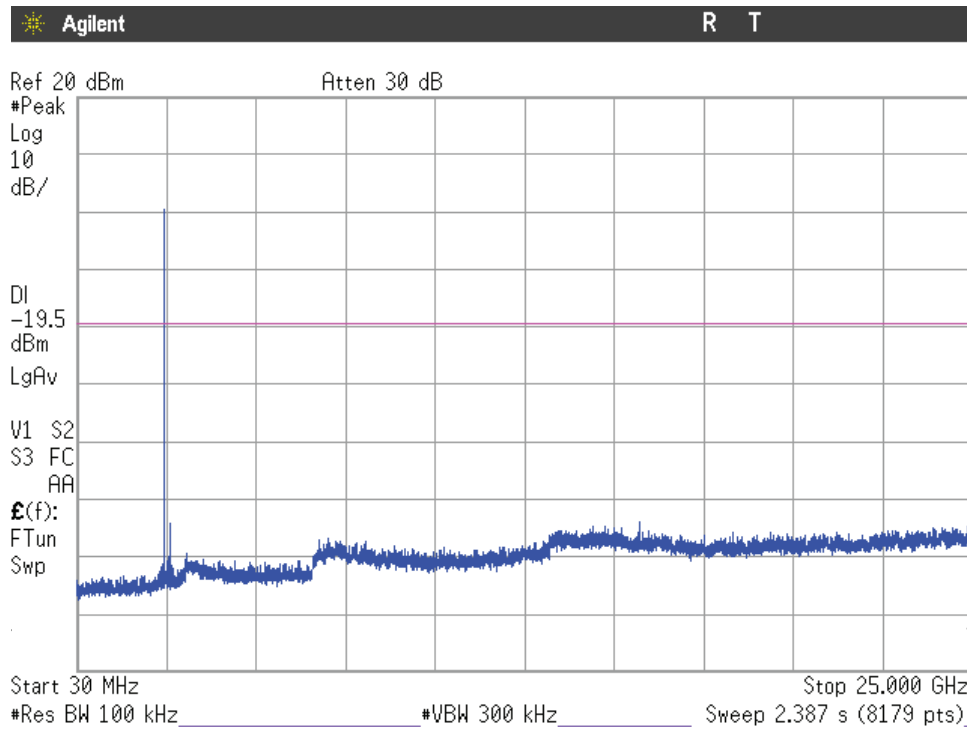
2. MIDDLE CHANNEL (2441 MHz): 30 MHz-25 GHz (see next plot).



Note: The peaks above the limits are the carrier frequencies.

Verdict: PASS

3. HIGH CHANNEL (2480 MHz): 30 MHz-25 GHz (see next plot).



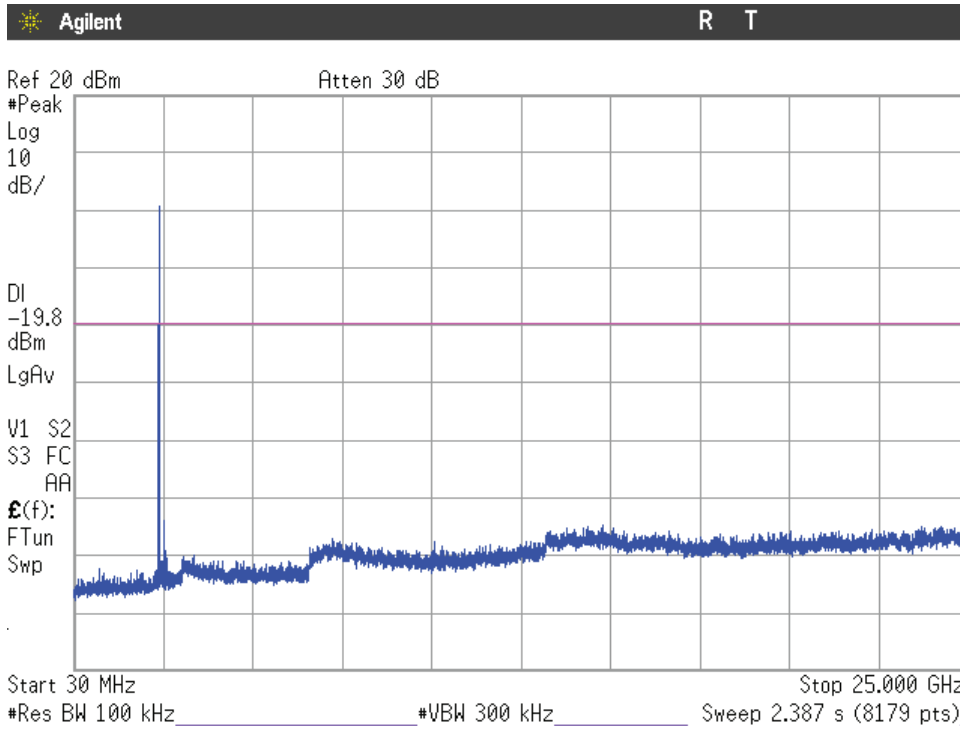
Note: The peak above the limit is the carrier frequency.

Verdict: PASS

Measurement uncertainty (dB)	<±2.03
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Modulation: 8-DPSK

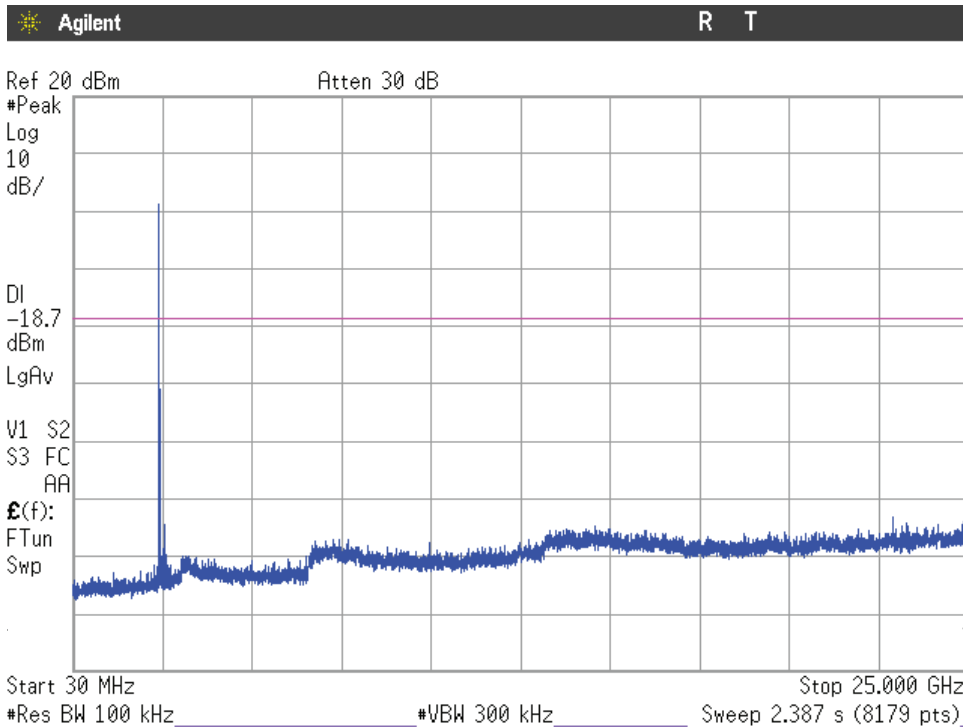
1. LOWEST CHANNEL (2402 MHz): 30 MHz-25 GHz (see next plot).



Note: The peak above the limits is the carrier frequency.

Verdict: PASS

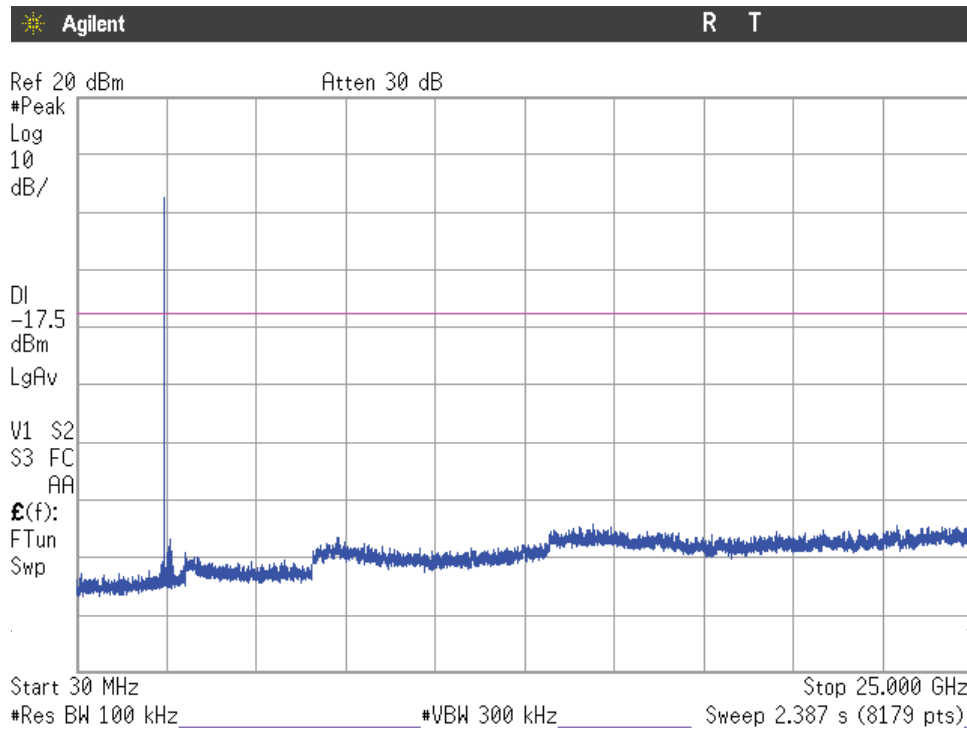
2. MIDDLE CHANNEL (2441 MHz): 30 MHz-25 GHz (see next plot).



Note: The peaks above the limit are the carrier frequencies.

Verdict: PASS

3. HIGH CHANNEL (2480 MHz): 30 MHz-25 GHz (see next plot).



Note: The peak above the limit is the carrier frequency.

Verdict: PASS

Measurement uncertainty (dB)	<±2.03
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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 ($\mu\text{V/m}$)	Field strength ($\text{dB}\mu\text{V/m}$)	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.

These are the chips that can be working at the same time (BT +WLAN1.MAC1 (2.4) + WLAN1.MAC0 (5G) + WLAN0. MAC1&0).

The test was performed with the equipment transmitting first with only the 2.4 GHz BT-EDR (WLAN 1) radio and repeated with the the worst simultaneous transmission case: WiFi 2.4GHz (WLAN1 CORE1), SiSo WiFi 5 GHz (WLAN1 CORE0) and MiMo WiFi 5 GHz (WLAN0 CORE0+CORE1) radios transmitting simultaneously to check the impact of the co-location of the other radio interfaces. The results and plots below show the worst results obtained.

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-1000 MHz.

Note: The spurious emissions below 1 GHz do not depend on either the operating channel or the modulation mode selected in the EUT.

Spurious levels operating (radiated) closest to limit.

Spurious frequency (MHz)	Polarization	Detector	Emission Level (dB μ V/m)	Measurement Uncertainty (dB)
31.358	V	Quasi-Peak	32.12	± 3.88
87.860	V	Quasi-Peak	26.45	± 3.88
786.454	V	Quasi-Peak	30.89	± 3.88
884.764	V	Quasi-Peak	29.12	± 3.88
983.073	H	Quasi-Peak	28.45	± 3.88

Frequency range 1 GHz-25 GHz

The results in the next tables show the maximum measured levels in the 1-25 GHz range including the restricted bands 2.31-2.39 GHz and 2.4835-2.5 GHz (see next plots).

Modulation: GFSK

1. CHANNEL: LOWEST (2402 MHz).

Spurious frequency (GHz)	Polarization	Detector	Emission Level (dB μ V/m)	Measurement Uncertainty (dB)
5.37475	V	Peak	44.33	± 4.87

2. CHANNEL: MIDDLE (2441 MHz).

Spurious frequency (GHz)	Polarization	Detector	Emission Level (dB μ V/m)	Measurement Uncertainty (dB)
5.37425	V	Peak	44.98	± 4.87

3. CHANNEL: HIGHEST (2480 MHz).

Spurious frequency (GHz)	Polarization	Detector	Emission Level (dB μ V/m)	Measurement Uncertainty (dB)
5.37425	V	Peak	44.79	± 4.87

Verdict: PASS

Modulation: $\Pi/4$ -DQPSK

1. CHANNEL: LOWEST (2402 MHz).

Spurious frequency (GHz)	Polarization	Detector	Emission Level (dB μ V/m)	Measurement Uncertainty (dB)
5.37475	V	Peak	44.23	± 4.87

2. CHANNEL: MIDDLE (2441 MHz).

Spurious frequency (GHz)	Polarization	Detector	Emission Level (dB μ V/m)	Measurement Uncertainty (dB)
5.37425	V	Peak	44.33	± 4.87

3. CHANNEL: HIGHEST (2480 MHz).

Spurious frequency (GHz)	Polarization	Detector	Emission Level (dB μ V/m)	Measurement Uncertainty (dB)
5.37475	V	Peak	44.23	± 4.87

Verdict: PASS

Modulation: 8-DPSK

1. CHANNEL: LOWEST (2402 MHz).

Spurious frequency (GHz)	Polarization	Detector	Emission Level (dB μ V/m)	Measurement Uncertainty (dB)
5.37475	V	Peak	44.21	± 4.87

2. CHANNEL: MIDDLE (2441 MHz).

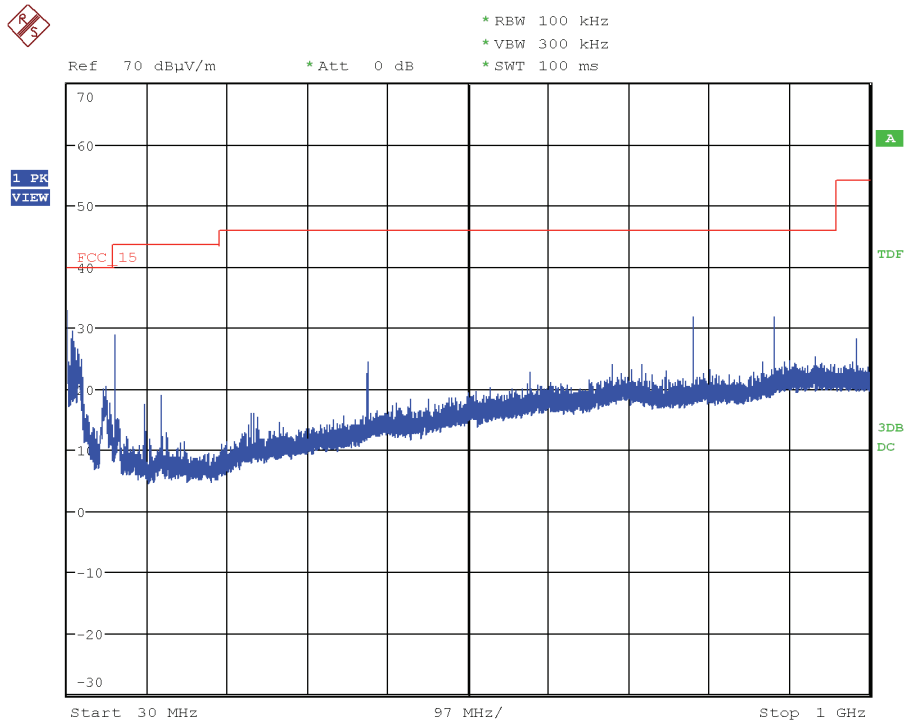
Spurious frequency (GHz)	Polarization	Detector	Emission Level (dB μ V/m)	Measurement Uncertainty (dB)
5.37475	V	Peak	44.68	± 4.87

3. CHANNEL: HIGHEST (2480 MHz).

Spurious frequency (GHz)	Polarization	Detector	Emission Level (dB μ V/m)	Measurement Uncertainty (dB)
5.37475	V	Peak	44.13	± 4.87

Verdict: PASS

FREQUENCY RANGE 30 MHz-1000 MHz.

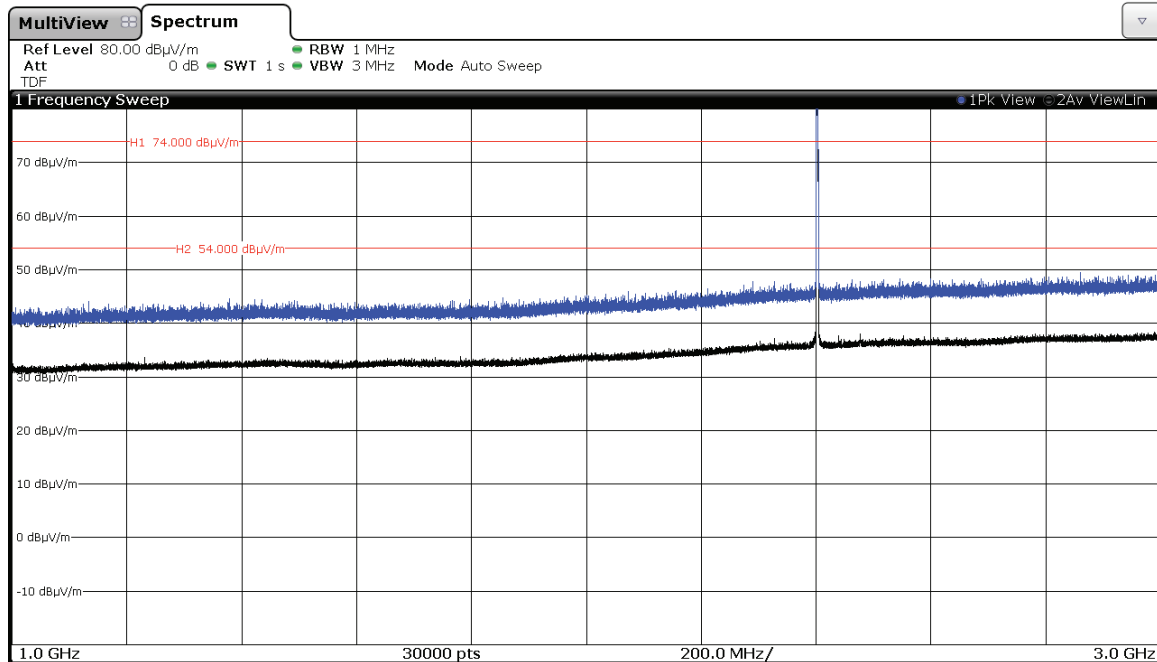


(This plot is valid for all three channels and all modulation modes).

FREQUENCY RANGE 1 GHz to 3 GHz.

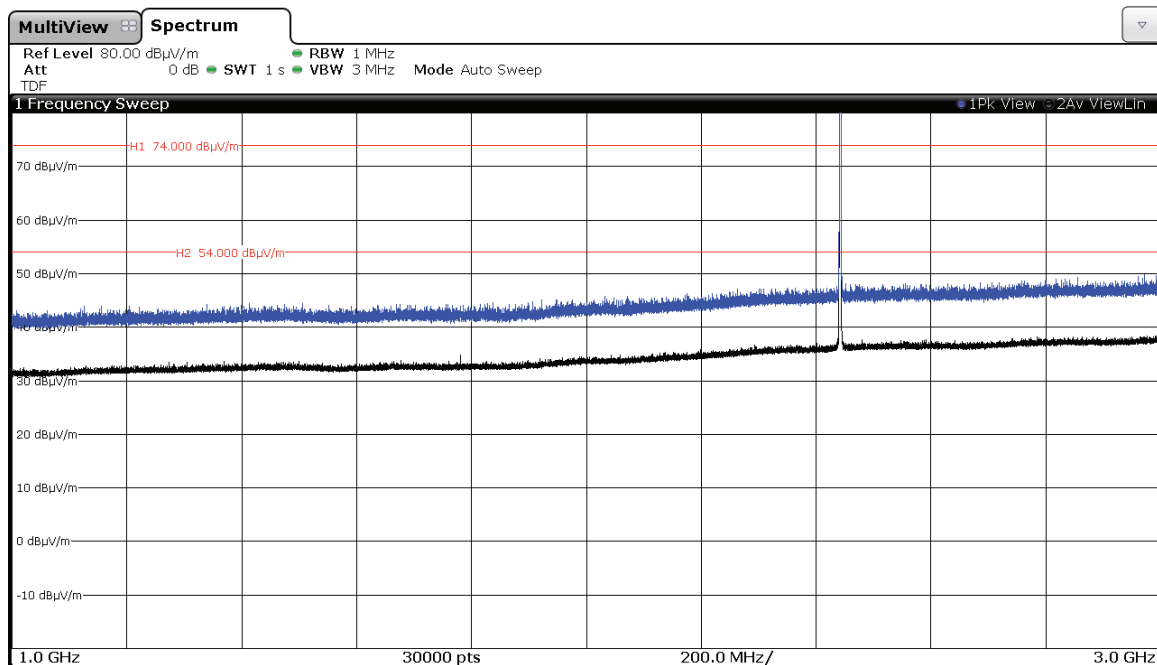
Modulation: GFSK

CHANNEL: Lowest (2402 MHz).



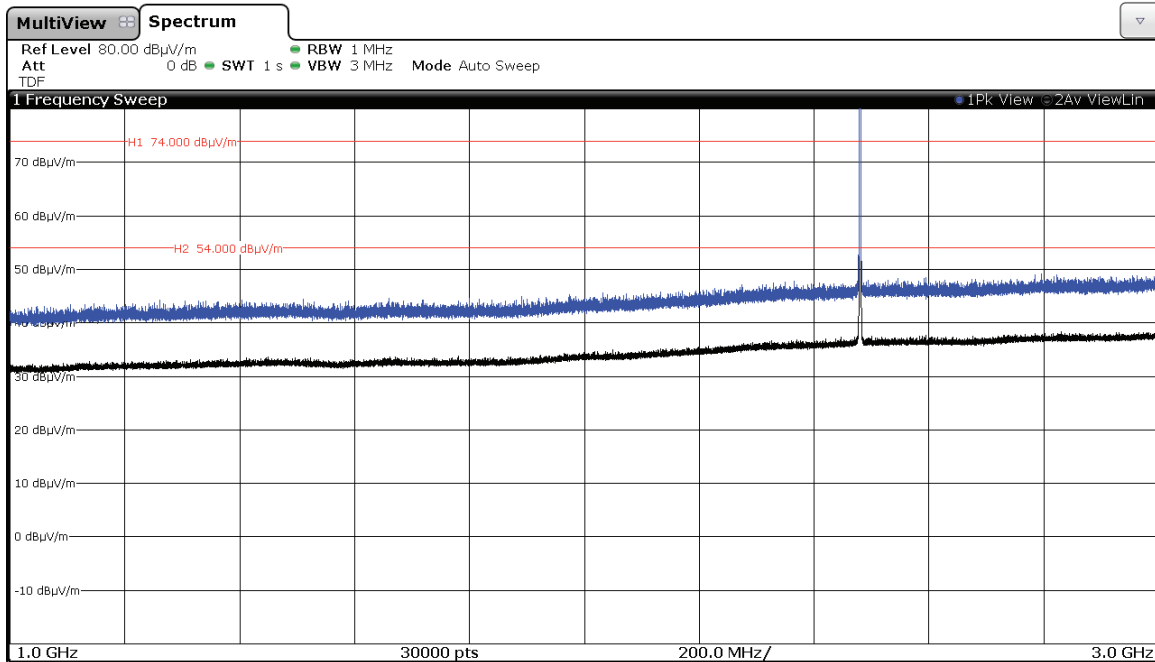
Note: The peak shown in the plot above the limits is the carrier frequency.

CHANNEL: Middle (2441 MHz).



Note: The peak shown in the plot above the limits is the carrier frequency.

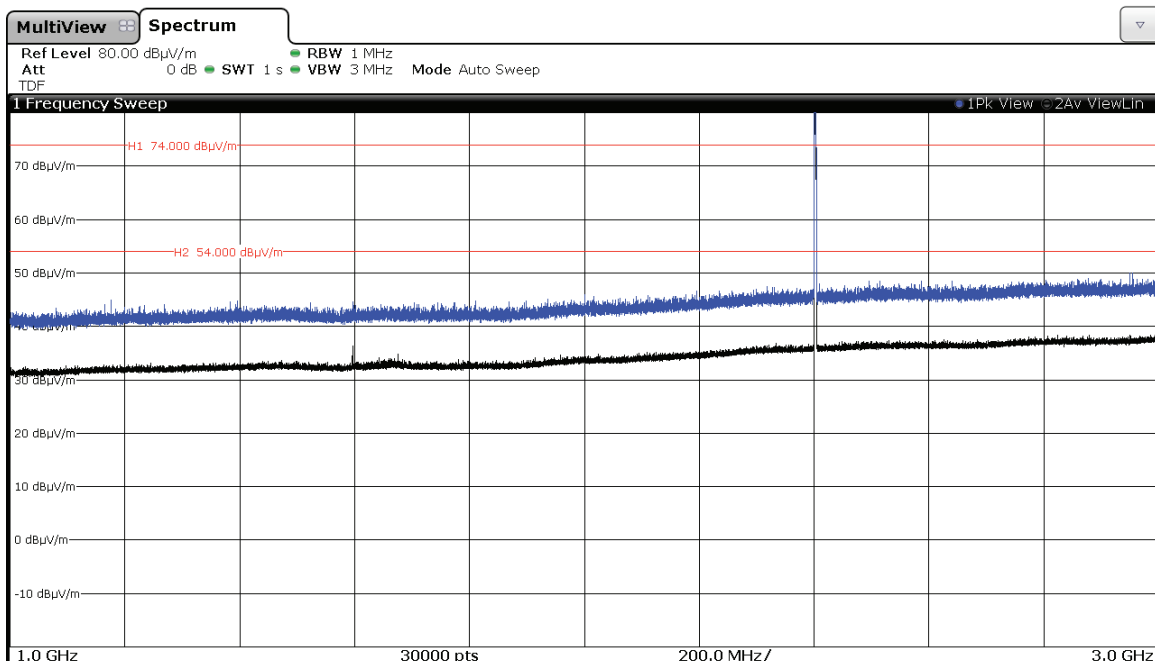
CHANNEL: Highest (2480 MHz).



Note: The peak shown in the plot above the limits is the carrier frequency.

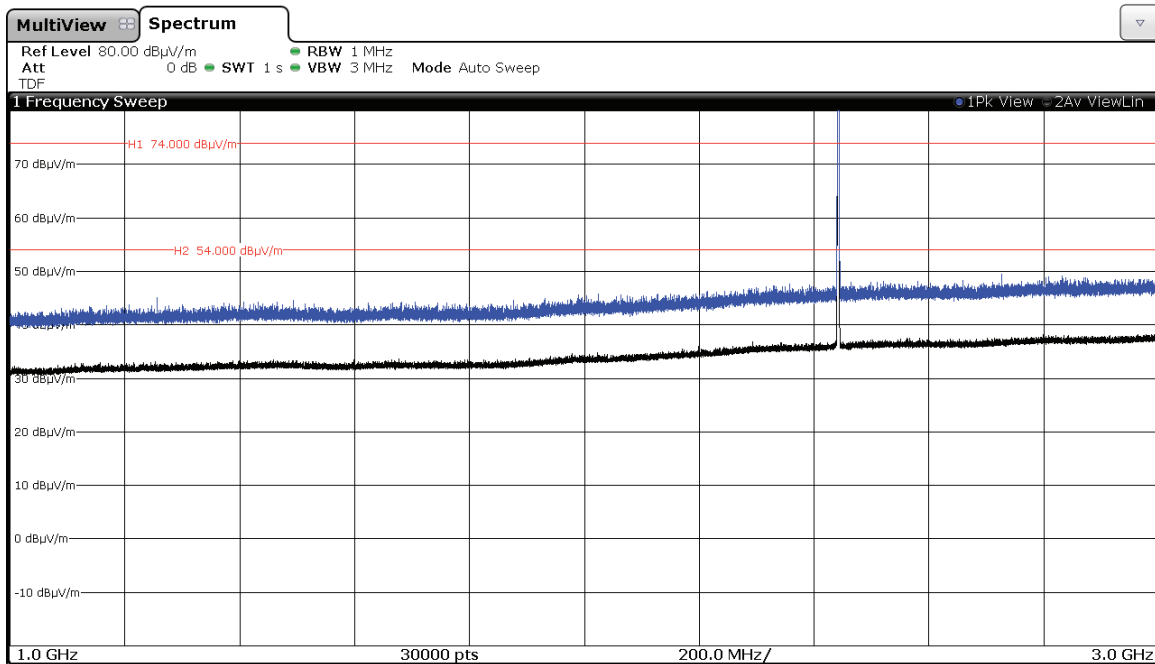
Modulation: $\Pi/4$ -DQPSK

CHANNEL: Lowest (2402 MHz).



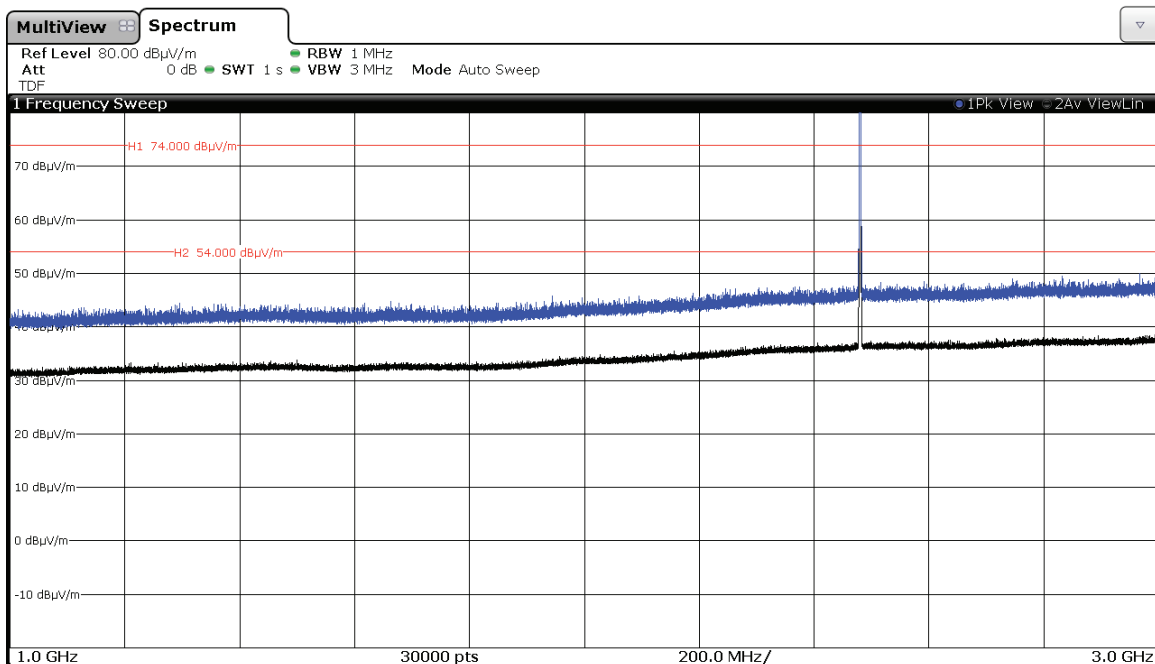
Note: The peak shown in the plot above the limits is the carrier frequency.

CHANNEL: Middle (2441 MHz).



Note: The peak shown in the plot above the limits is the carrier frequency.

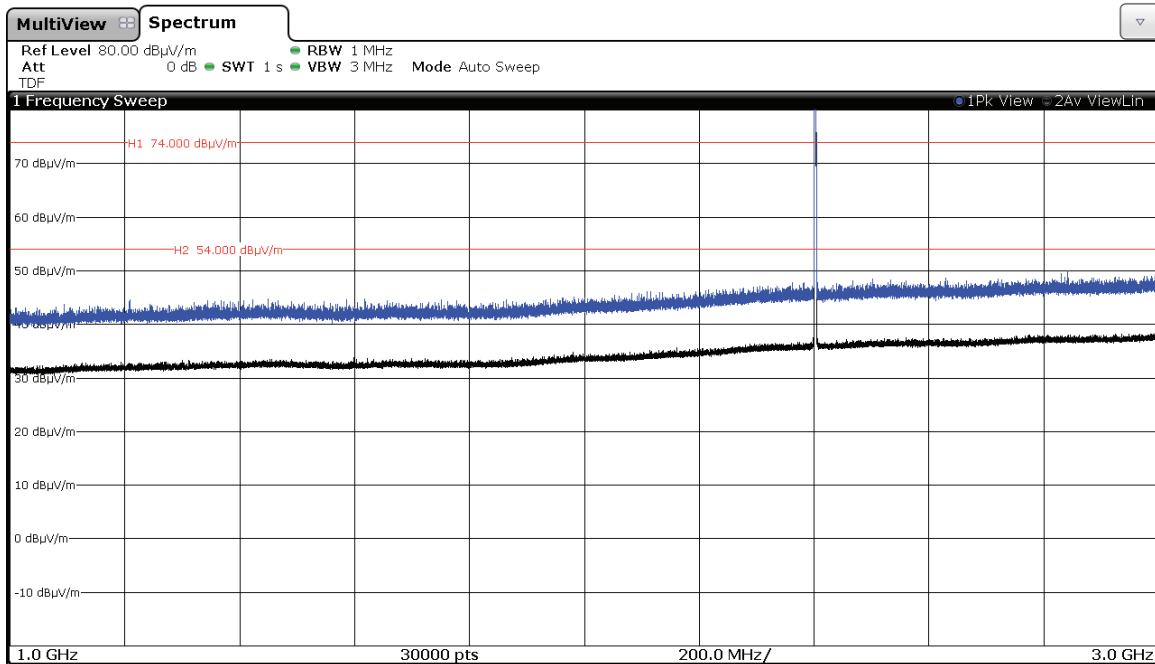
CHANNEL: Highest (2480 MHz).



Note: The peak shown in the plot above the limits is the carrier frequency.

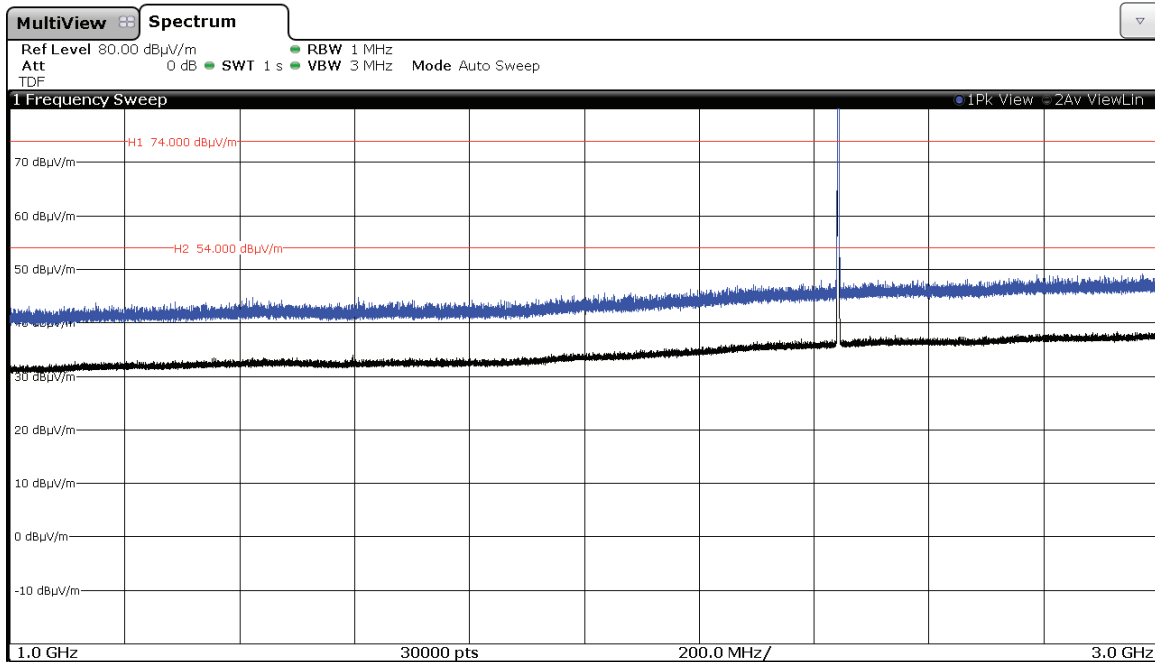
Modulation: 8-DPSK

CHANNEL: Lowest (2402 MHz).



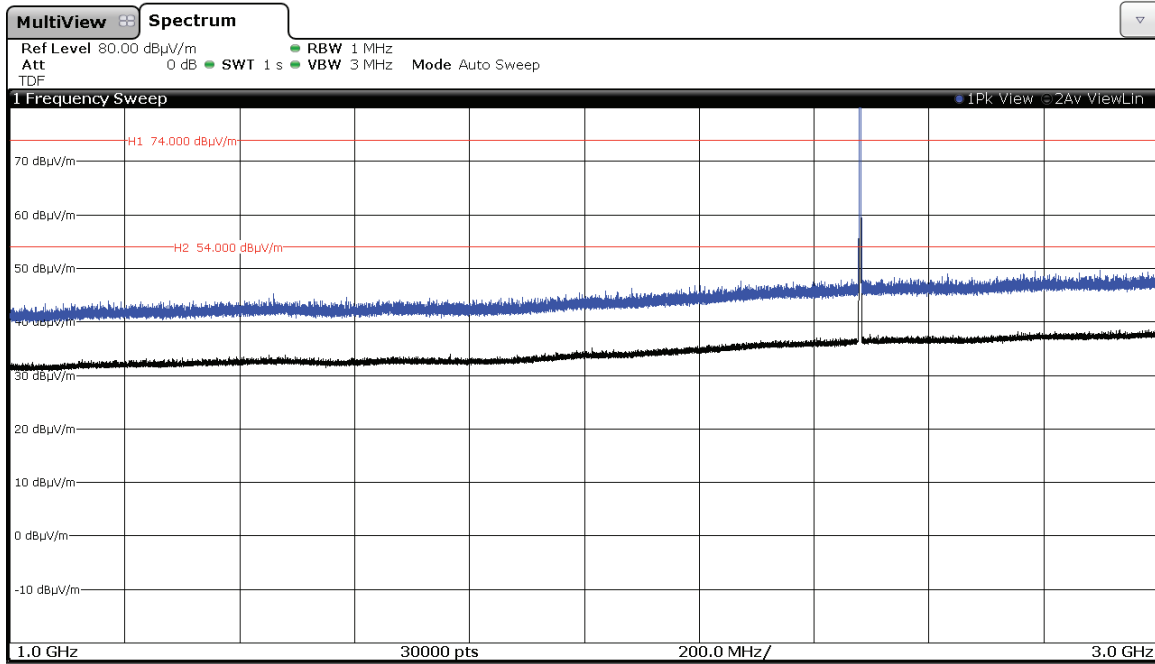
Note: The peak shown in the plot above the limits is the carrier frequency.

CHANNEL: Middle (2441 MHz).



Note: The peak shown in the plot above the limits is the carrier frequency.

CHANNEL: Highest (2480 MHz).

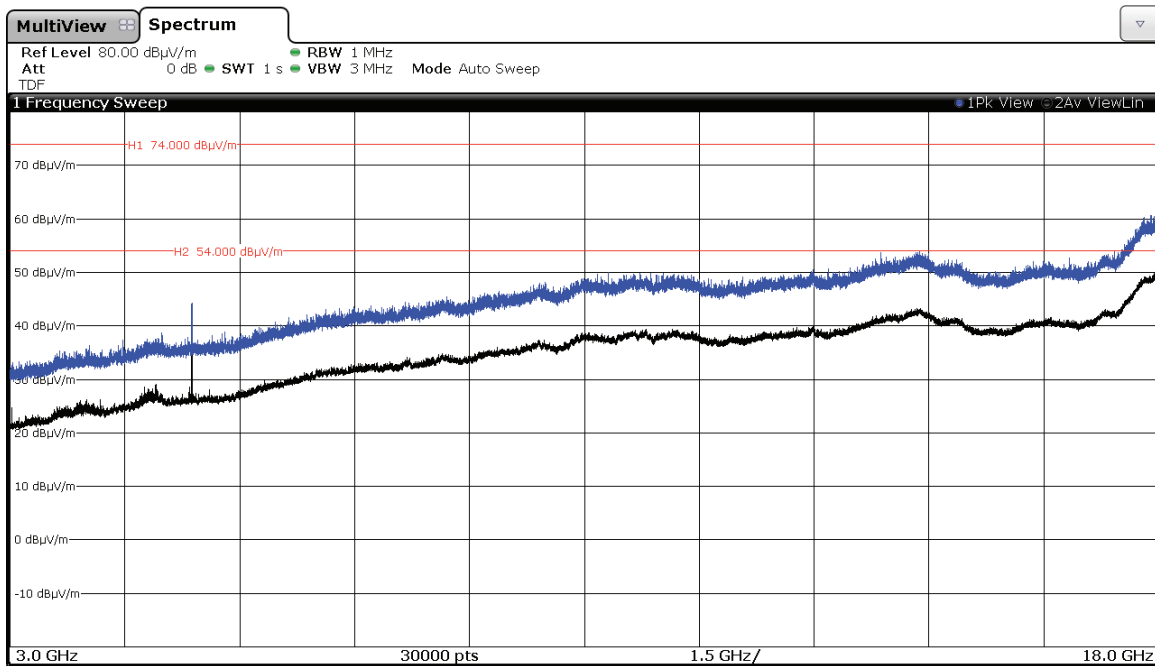


Note: The peak shown in the plot above the limits is the carrier frequency.

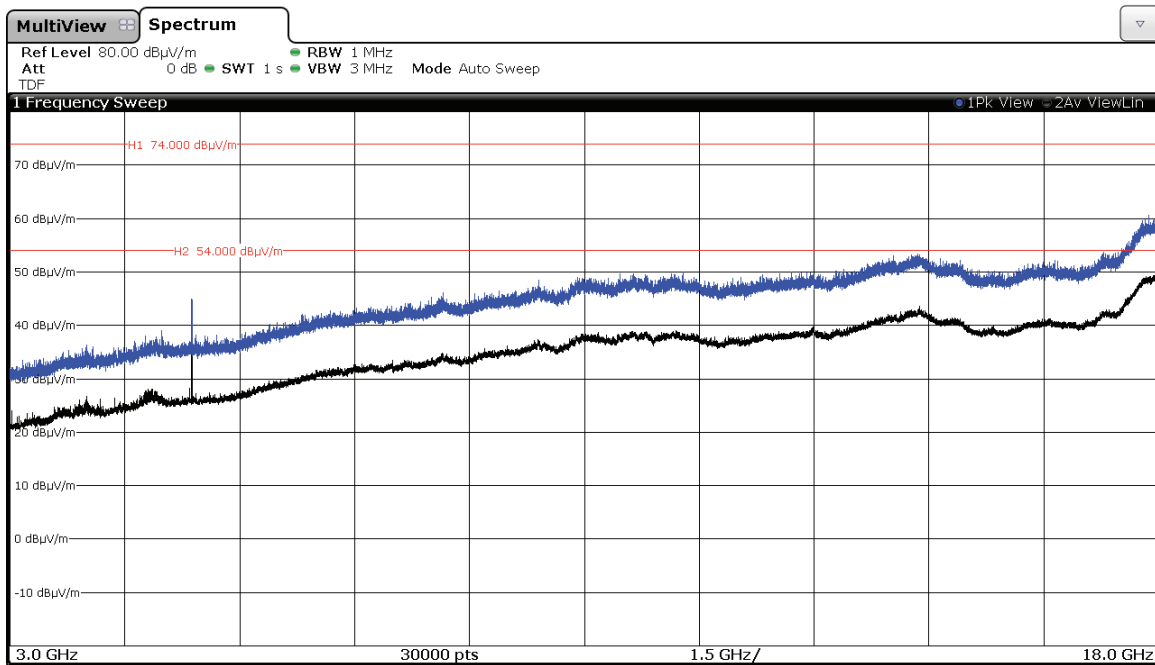
FREQUENCY RANGE 3 GHz to 18 GHz.

Modulation: GFSK

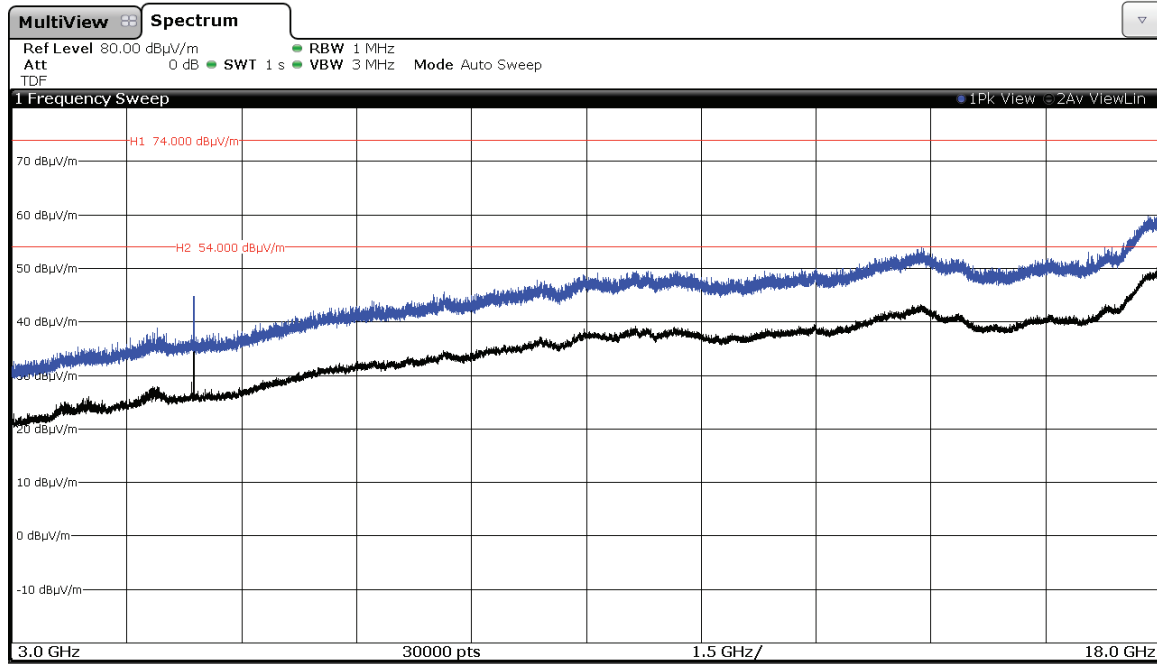
CHANNEL: Lowest (2402 MHz).



CHANNEL: Middle (2441 MHz).

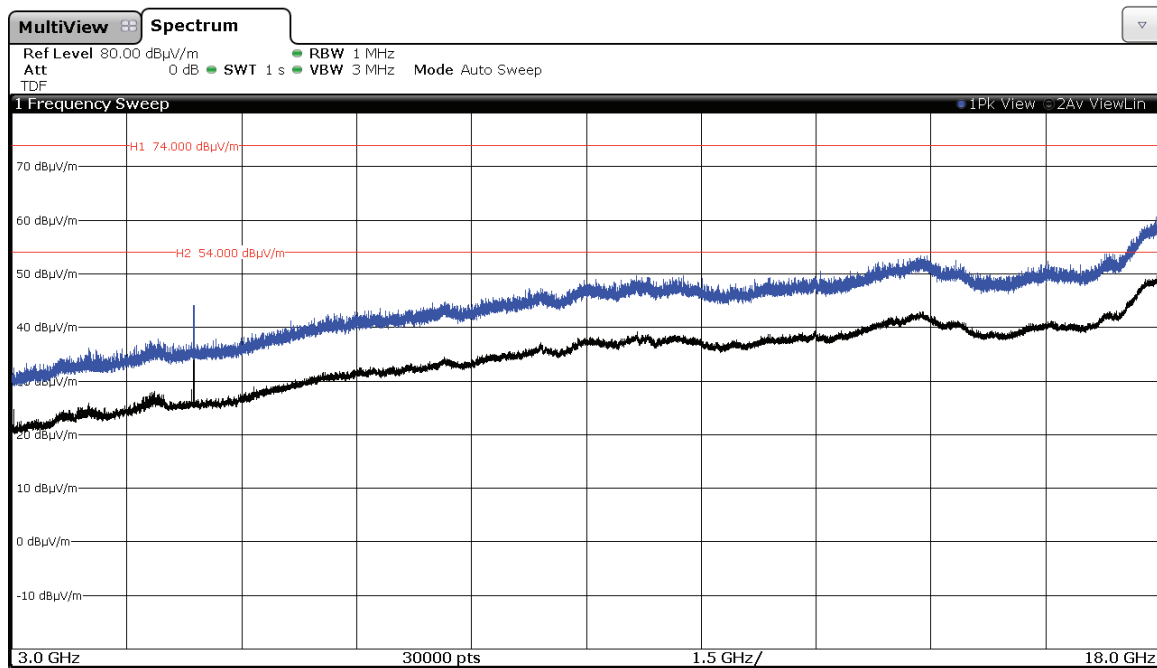


CHANNEL: Highest (2480 MHz).

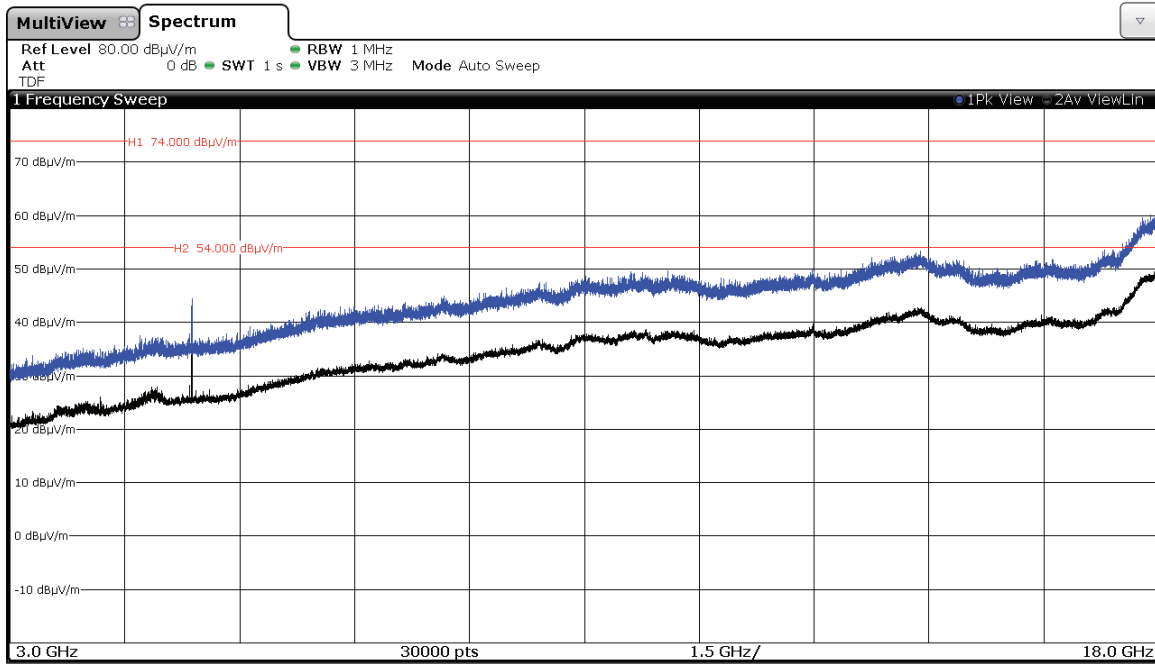


Modulation: $\Pi/4$ -DQPSK

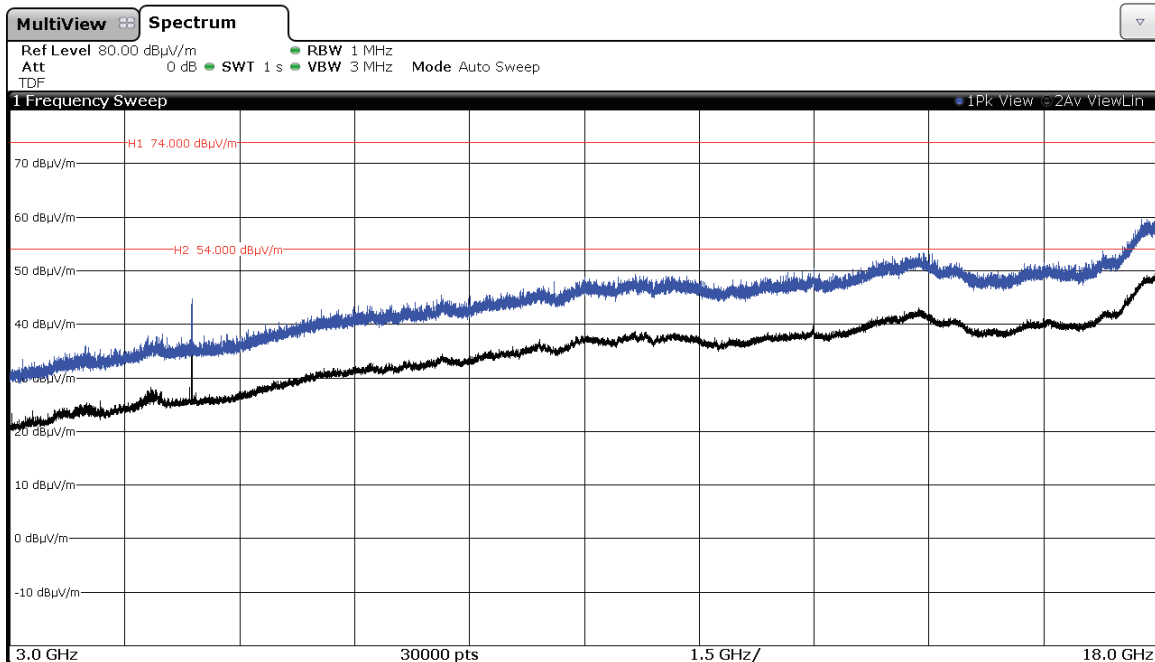
CHANNEL: Lowest (2402 MHz).



CHANNEL: Middle (2441 MHz).

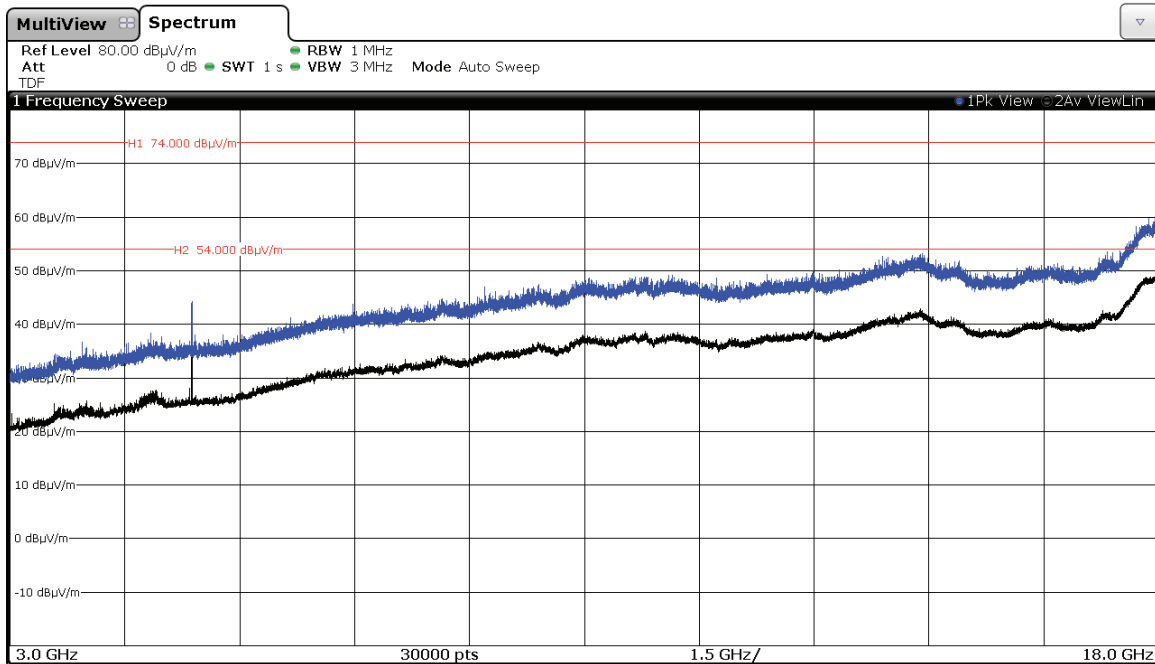


CHANNEL: Highest (2480 MHz).

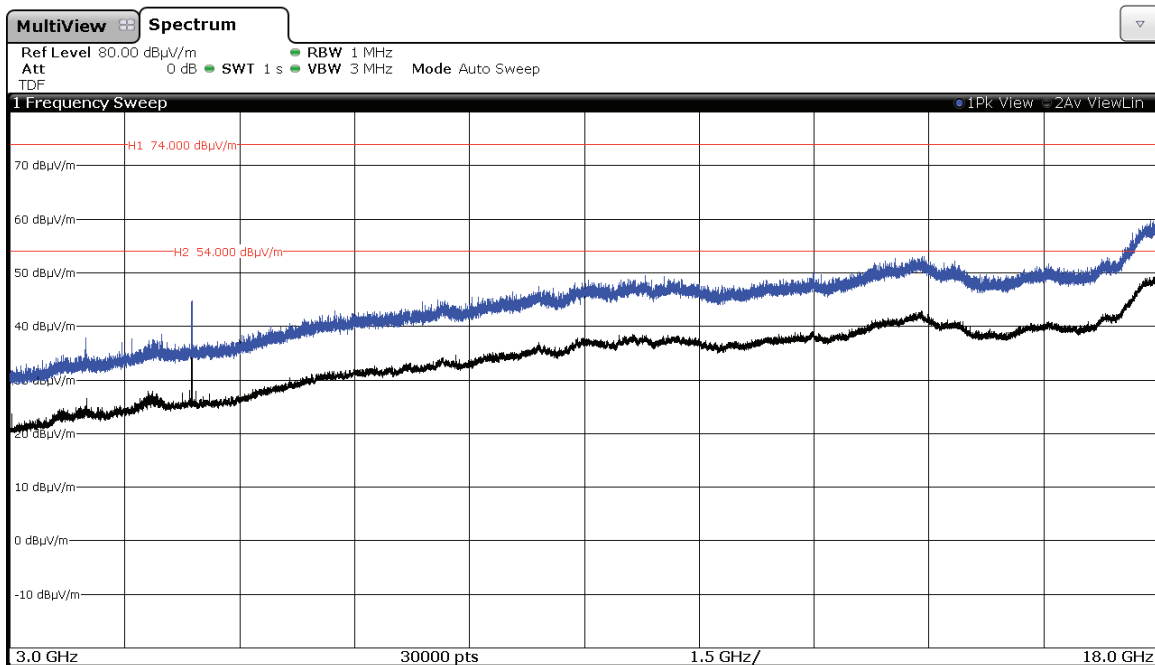


Modulation: 8-DPSK

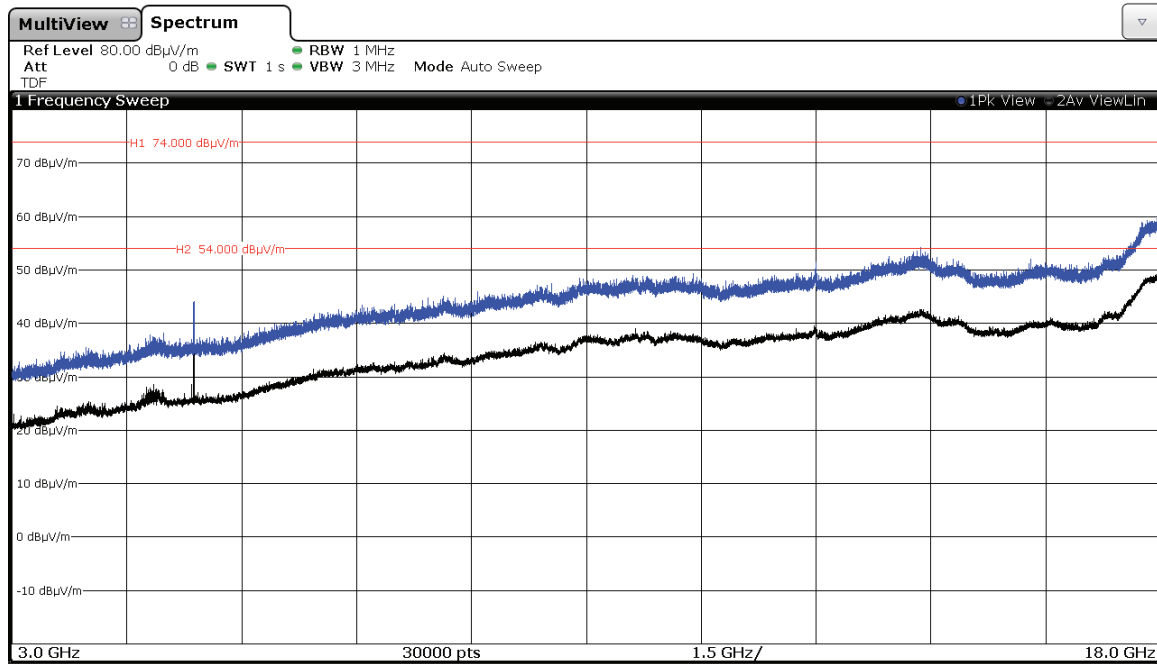
CHANNEL: Lowest (2402 MHz).



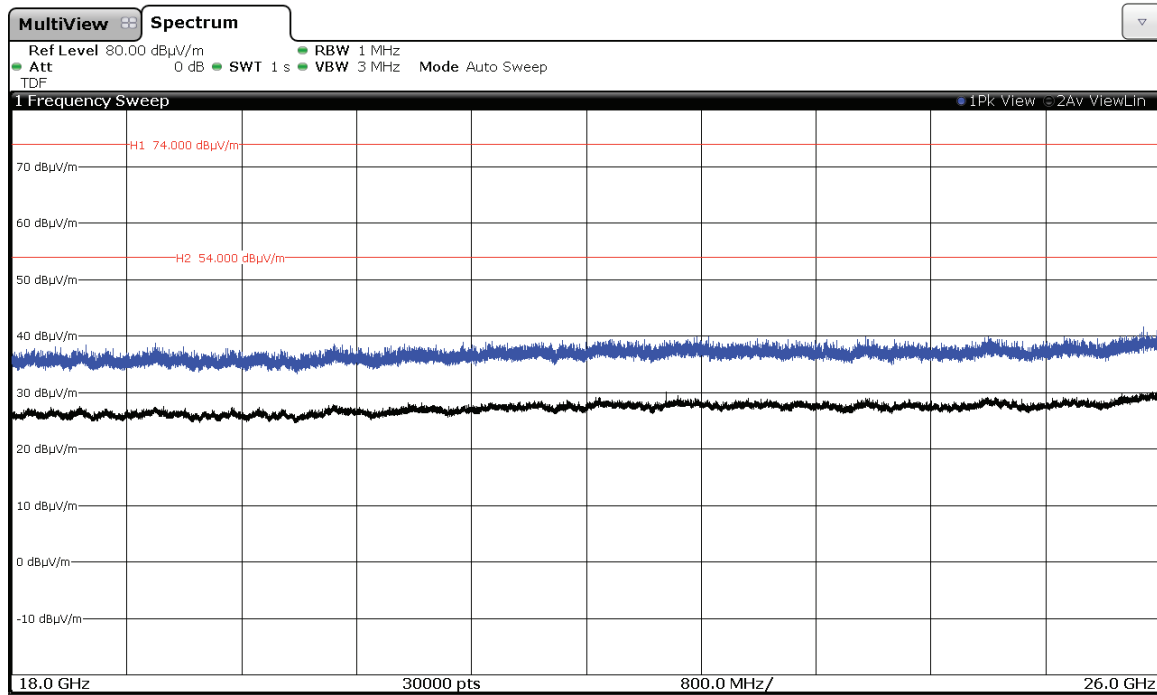
CHANNEL: Middle (2441 MHz).



CHANNEL: Highest (2480 MHz).



FREQUENCY RANGE 18 GHz to 26 GHz.

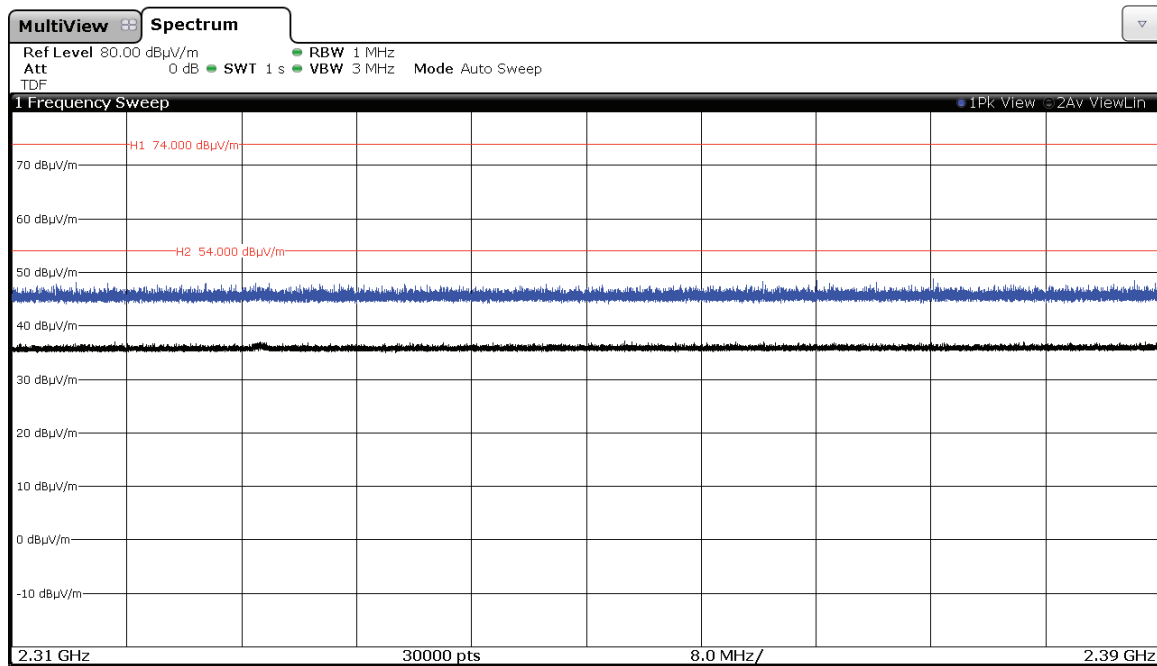


(This plot is valid for all three channels and all modulation modes).

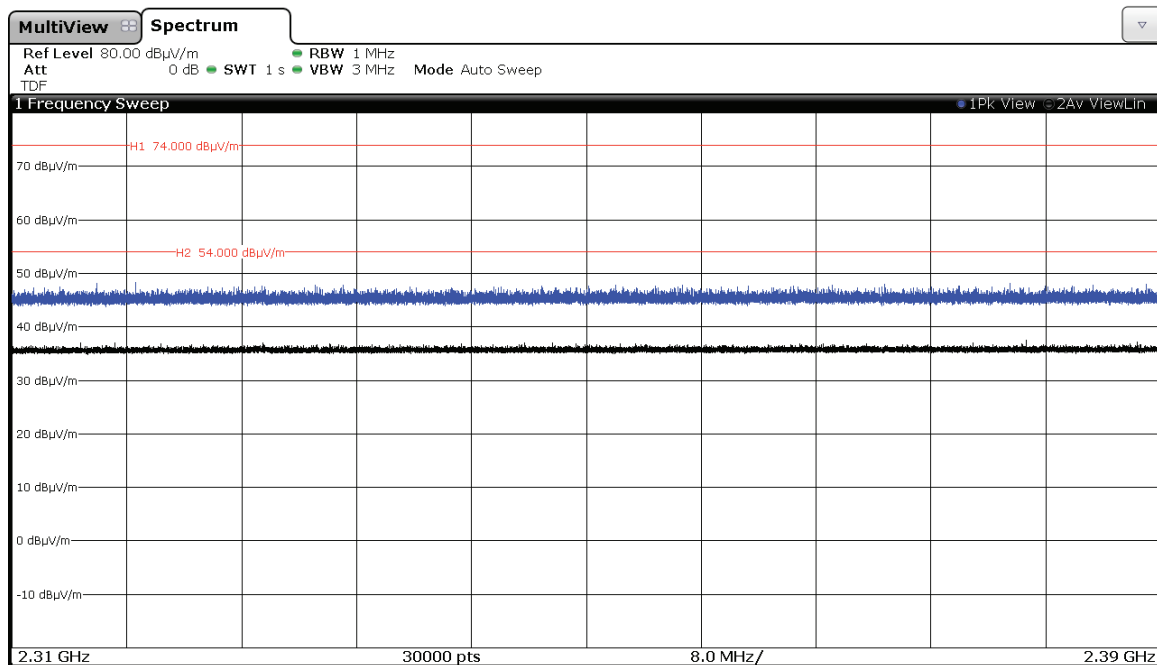
FREQUENCY RANGE 2.31 GHz to 2.39 GHz. (RESTRICTED BAND)

CHANNEL: Lowest

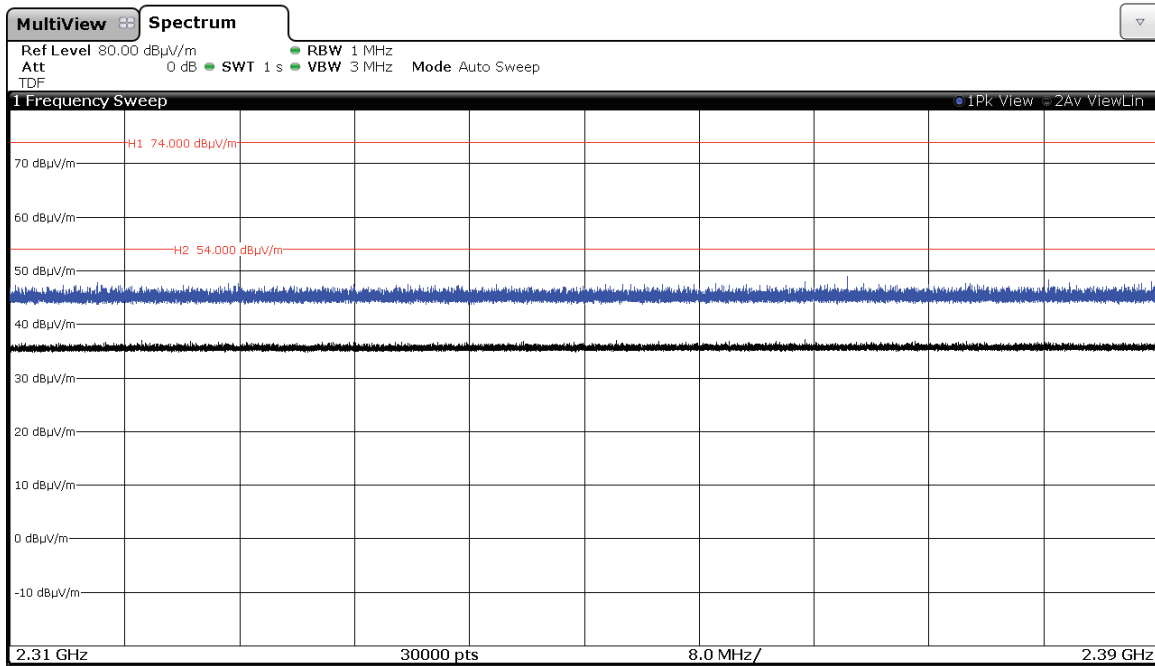
Modulation: GFSK



Modulation: Π/4-DQPSK

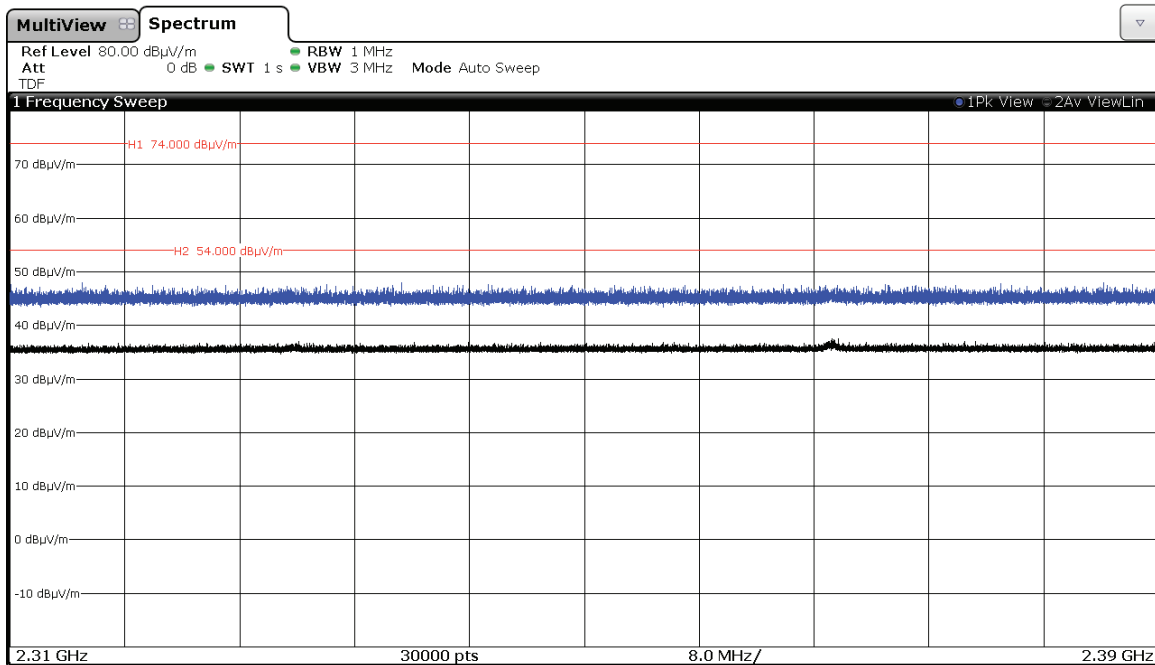


Modulation: 8-DPSK

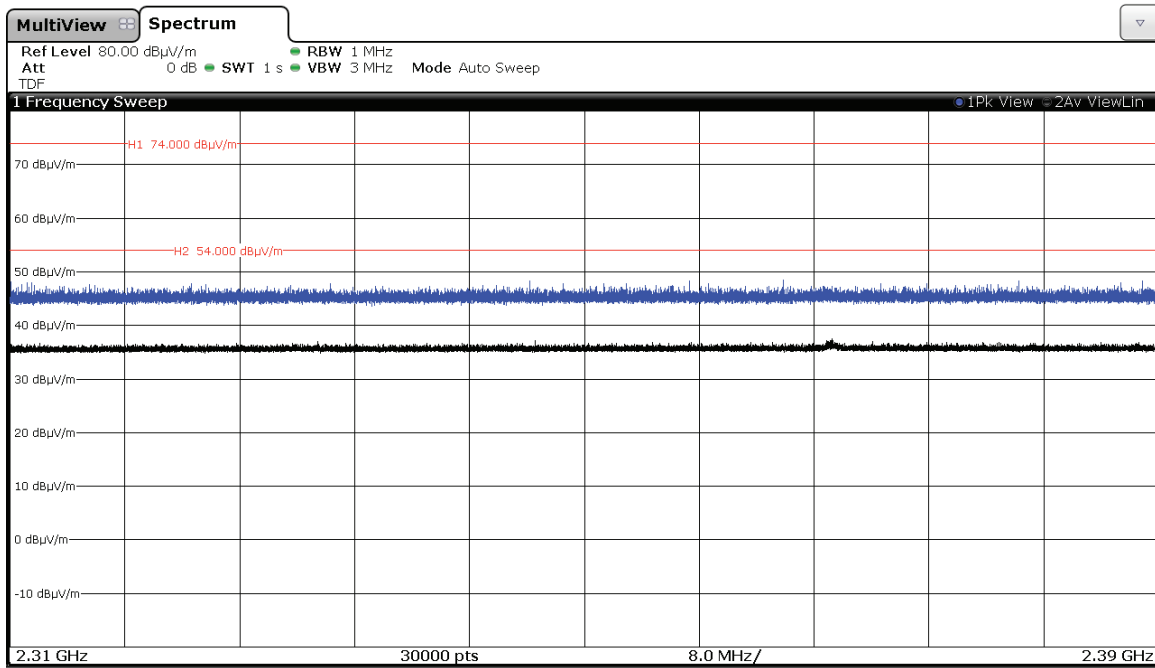


CHANNEL: Middle

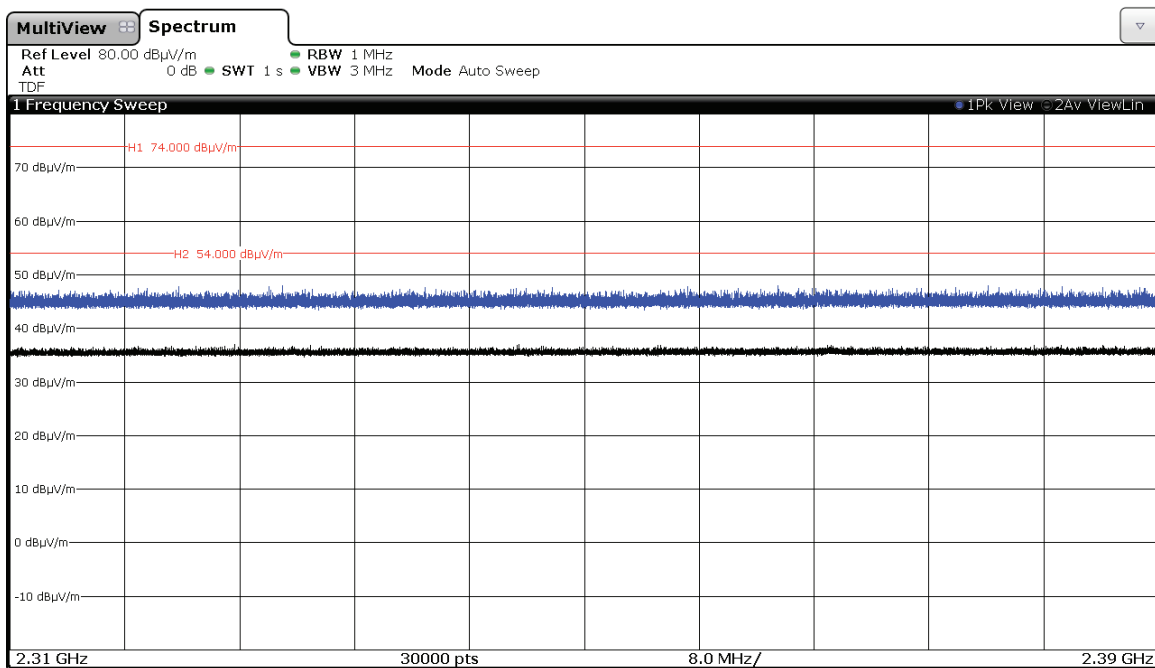
Modulation: GFSK



Modulation: $\Pi/4$ -DQPSK

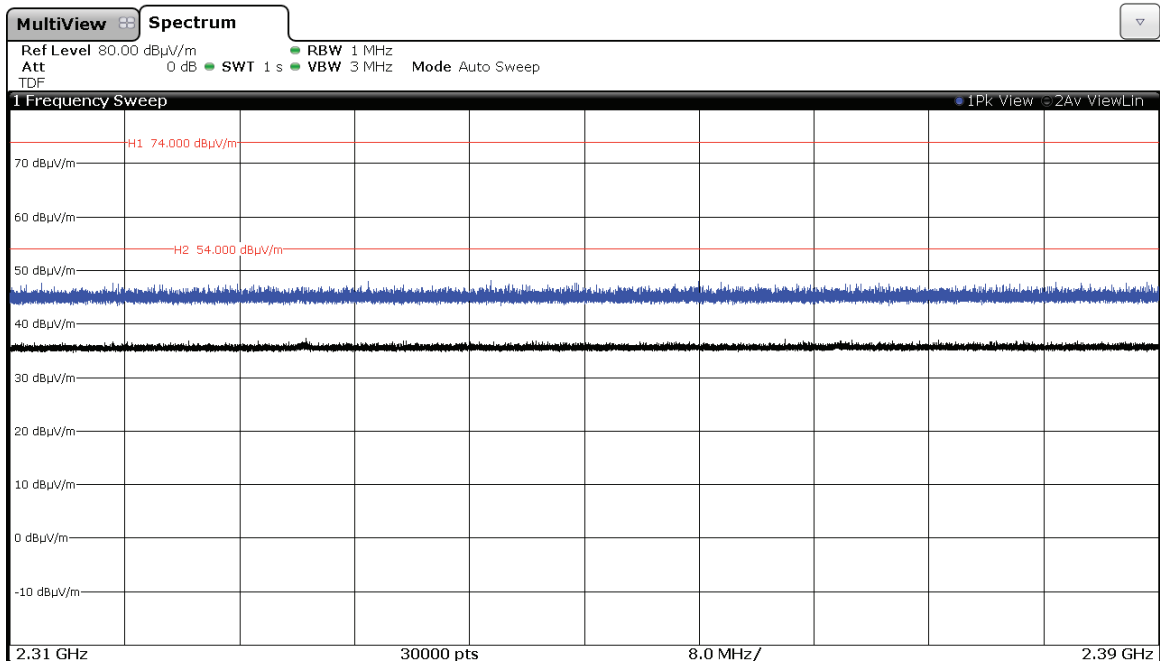


Modulation: 8-DPSK

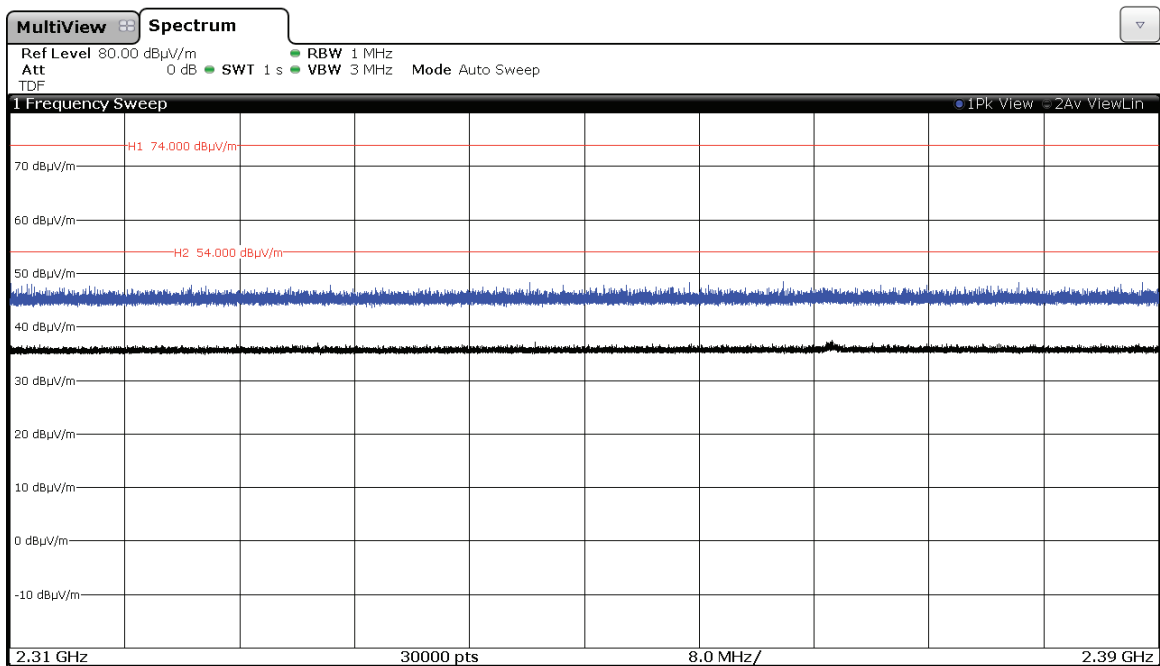


CHANNEL: Highest

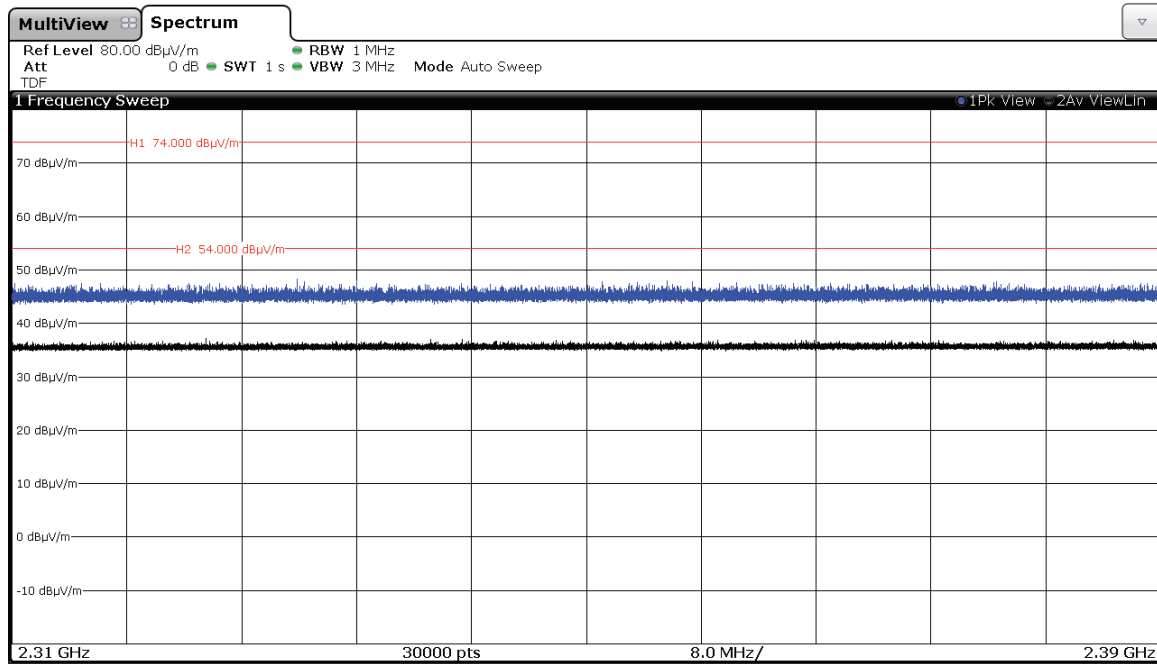
Modulation: GFSK



Modulation: $\Pi/4$ -DQPSK



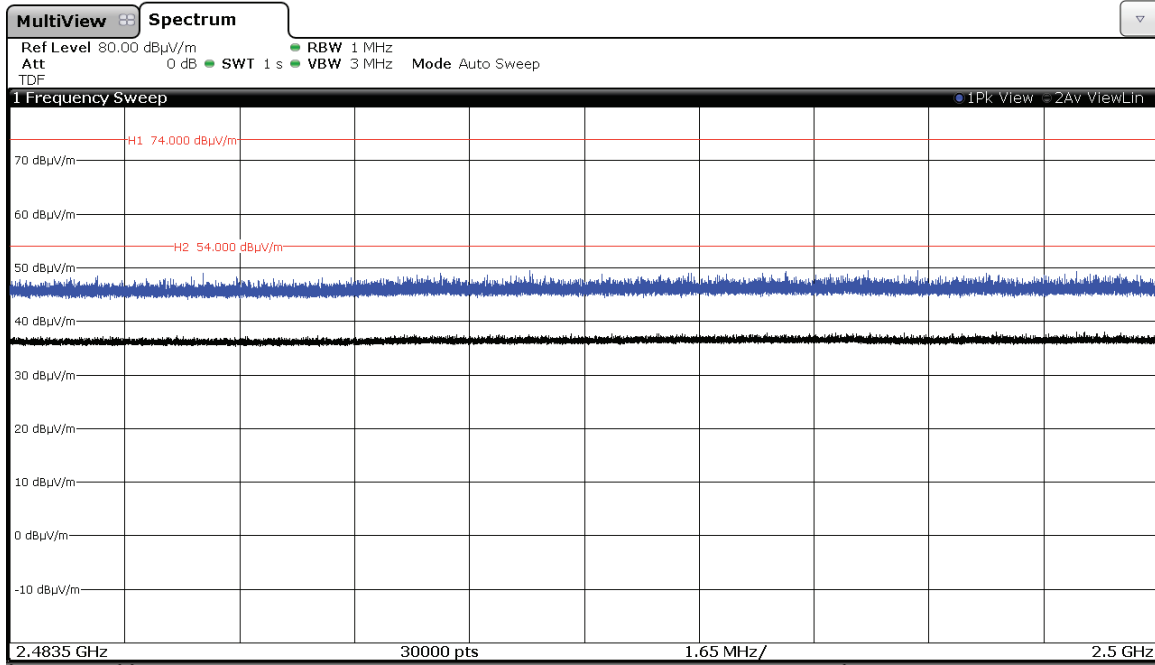
Modulation: 8-DPSK



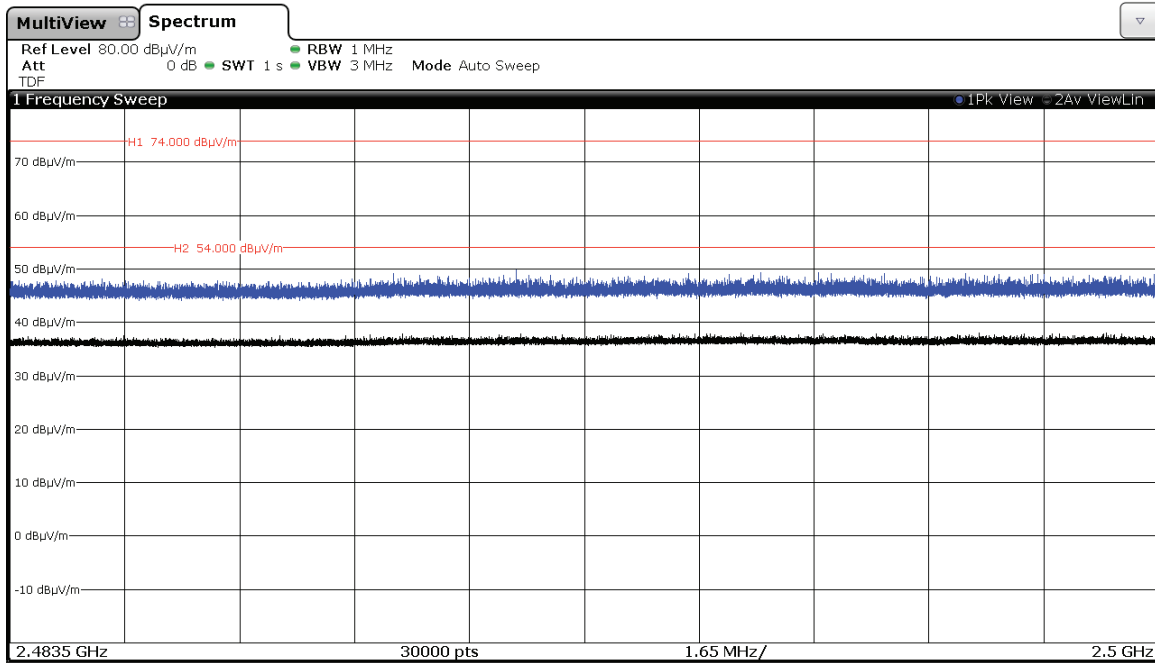
FREQUENCY RANGE 2.4835 GHz to 2.5 GHz. (RESTRICTED BAND)

CHANNEL: Lowest

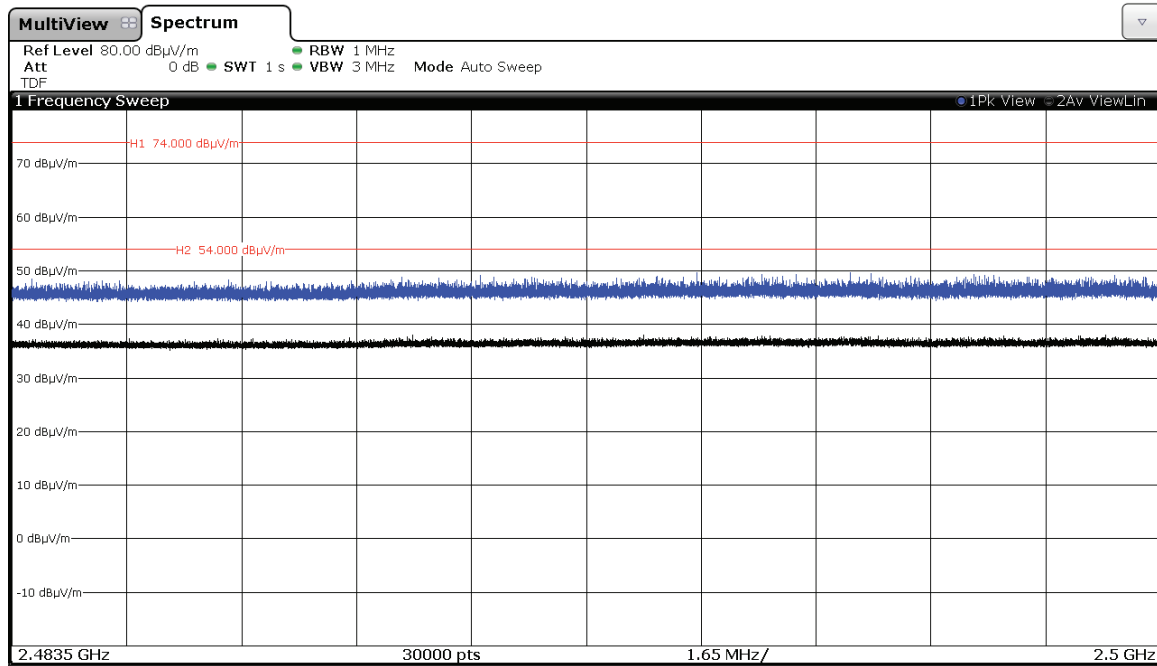
Modulation: GFSK



Modulation: $\Pi/4$ -DQPSK

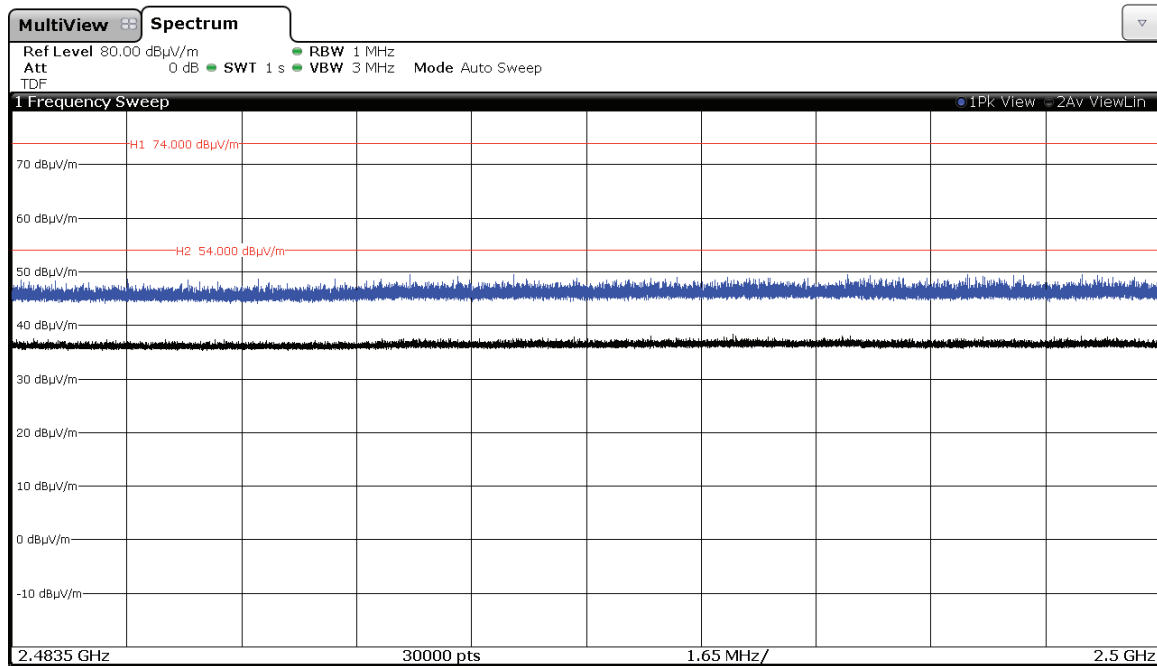


Modulation: 8-DPSK

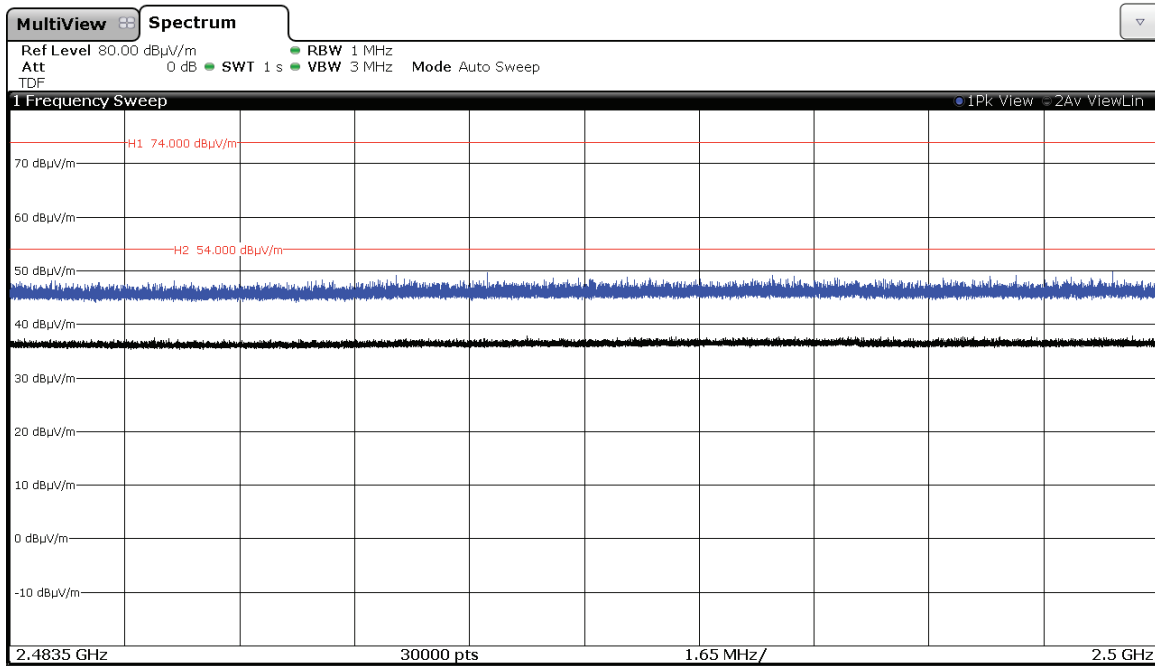


CHANNEL: Middle

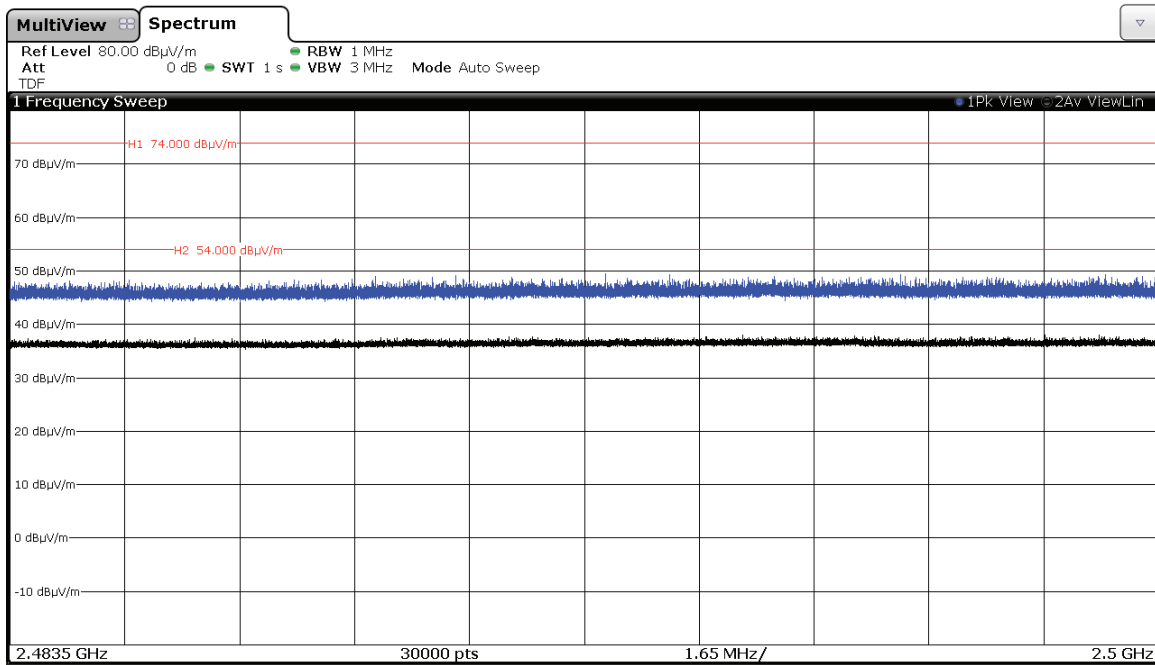
Modulation: GFSK



Modulation: $\Pi/4$ -DQPSK

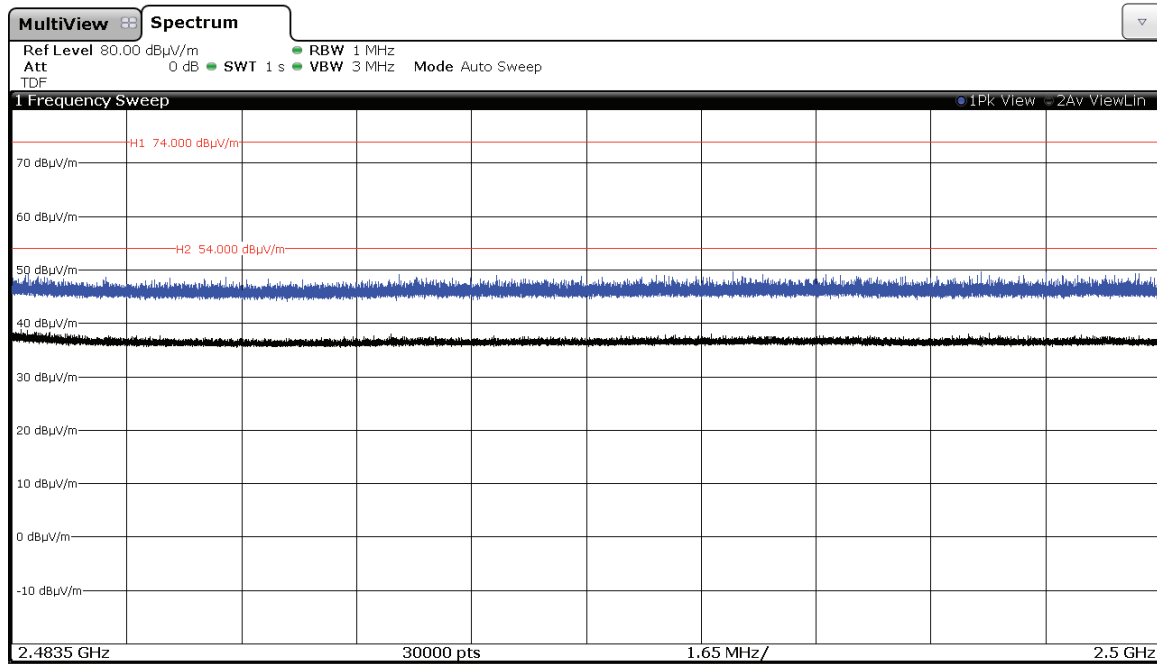


Modulation: 8-DPSK

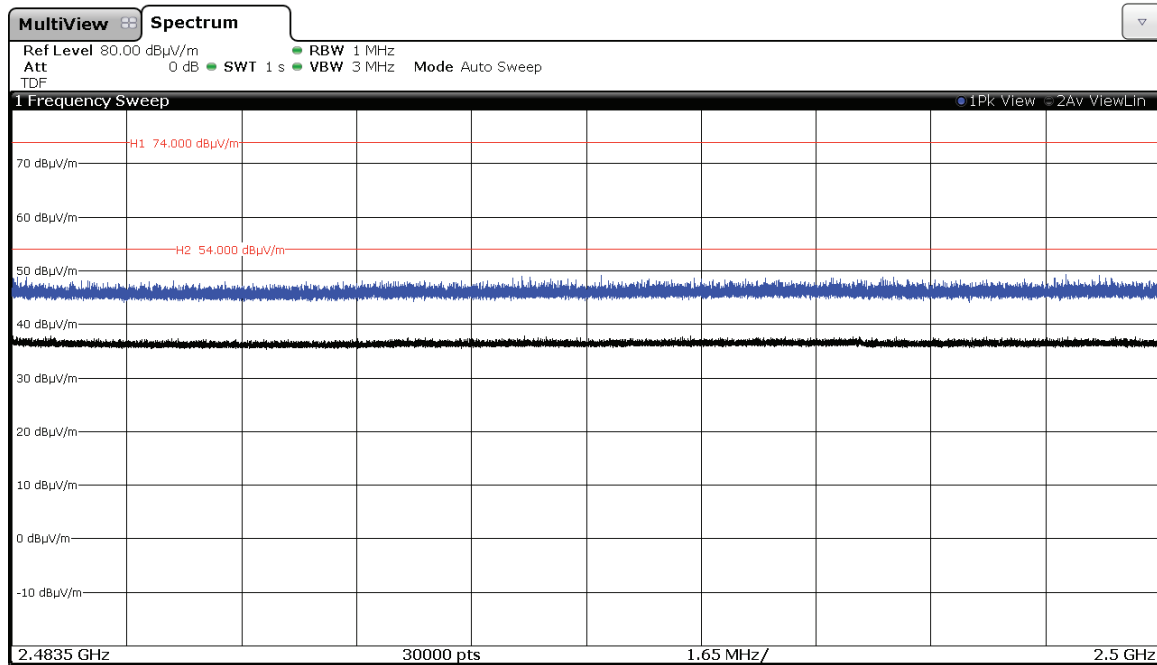


CHANNEL: Highest

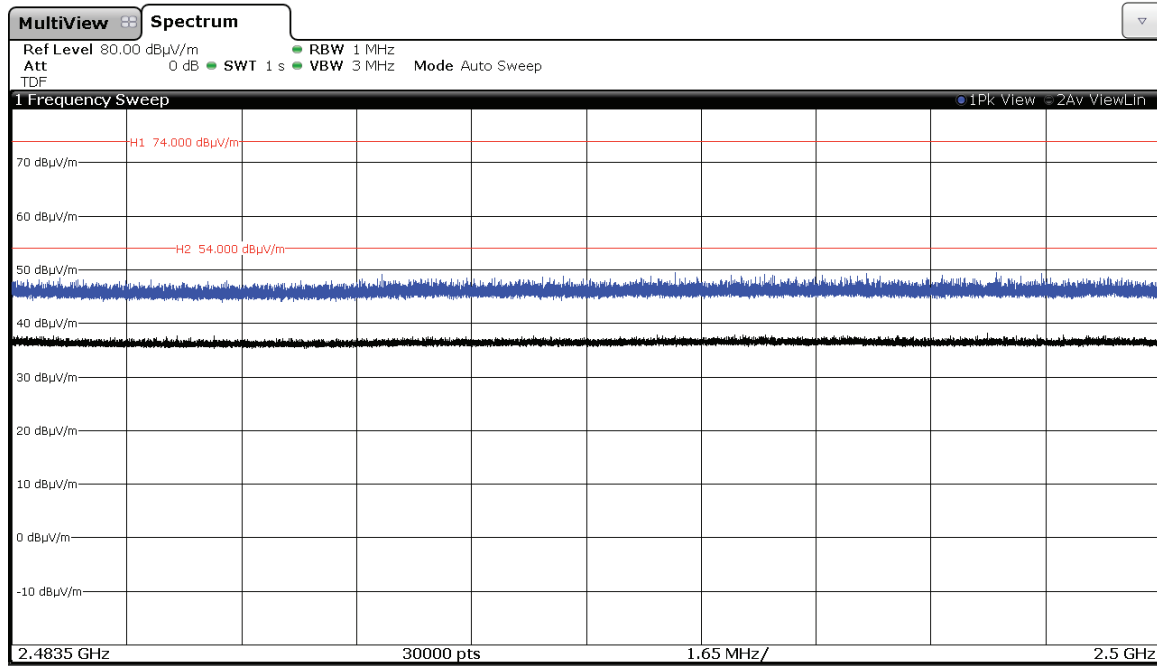
Modulation: GFSK



Modulation: $\pi/4$ -DQPSK



Modulation: 8-DPSK



Appendix B – Test result “WiFi 2.4 GHz (802.11b/g/n20/n40)”

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TEST CONDITIONS

Power supply (V):

$V_{\text{nominal}} = 12.6 \text{ Vdc}$

Type of power supply = External power supply (Battery).

Type of antenna: External antenna.

Declared Gain for antenna RF port 1 (maximum): +2.2 dBi. (Antenna gain plus antenna cable loss).

Declared Gain for antenna External RF port 2 (maximum): +2.2 dBi. (Antenna gain plus antenna cable loss).

Declared Gain for antenna RF port 4 (maximum): +1.6 dBi. (Antenna gain plus antenna cable loss)

TEST FREQUENCIES:

For WiFi 802.11b/g/n20:

Lowest channel (1): 2412 MHz

Middle channel (6): 2437 MHz

Highest channel (11): 2462 MHz

For WiFi 802.11n40:

Lowest channel (3): 2422 MHz

Middle channel (6): 2437 MHz

Highest channel (9): 2452 MHz

The test set-up was made in accordance to the general provisions of FCC DTS Measurement 558074 D01 DTS Meas Guidance v04 dated 04/05/2017.

The sample was used to configure the EUT to continuously transmit at a specified output power in all channels with different modes and modulation schemes.

It was necessary to change between CORE 0 with antenna 1, CORE 0 with antenna 2 and CORE 1 with antenna 4.

WIFI FCC:

```
tx_test.sh -a wlan0 stop
```

B

```
tx_test.sh -a wlan0 1 1 -d x -r 1 20
```

```
tx_test.sh -a wlan0 6 1 -d x -r 1 20
```

```
tx_test.sh -a wlan0 11 1 -d x -r 1 20
```

G

```
tx_test.sh -a wlan0 1 1 -d x -r 6 20
```

```
tx_test.sh -a wlan0 6 1 -d x -r 6 20
```

```
tx_test.sh -a wlan0 11 1 -d x -r 6 20
```

N20

```
tx_test.sh -a wlan0 1 1 -d x -h 0 20
```

```
tx_test.sh -a wlan0 6 1 -d x -h 0 20
```

```
tx_test.sh -a wlan0 11 1 -d x -h 0 20
```

N40

```
tx_test.sh -a wlan0 5 1 -d x -h 0 40
```

```
tx_test.sh -a wlan0 8 1 -d x -h 0 40
```

```
tx_test.sh -a wlan0 11 1 -d x -h 0 40
```

The field strength at the band edges was evaluated for each mode for the channel under test.

During transmitter test the EUT was being controlled by the SW tool to operate in a continuous transmit mode on the test channel as required and in each of the different modulation modes.

The data rates of 1Mb/s for 802.11b, 6.5Mb/s for 802.11g, MSC0 for 802.11n20, MSC0 for 802.11n40 were selected based on preliminary testing that identified those rates corresponding to the worst cases for output power and band edge levels at restricted bands.

CONDUCTED MEASUREMENTS

The equipment under test was set up in a shielded room and it is directly connected to the spectrum analyzer.



RADIATED MEASUREMENTS

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna is situated at a distance of 3 m for the frequency range 30 MHz-1000 MHz (30 MHz-1000 MHz Bilog antenna) and at a distance of 1m for the frequency range 1 GHz-25 GHz (1 GHz-18 GHz Double ridge horn antenna and 18 GHz-40 GHz horn antenna).

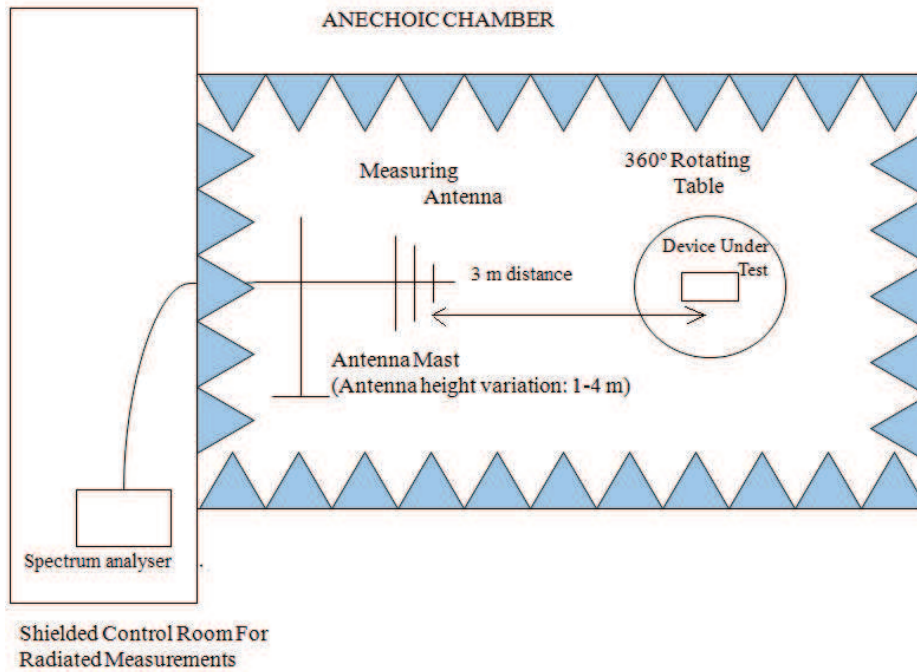
For radiated emissions in the range 1 GHz-25 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

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.

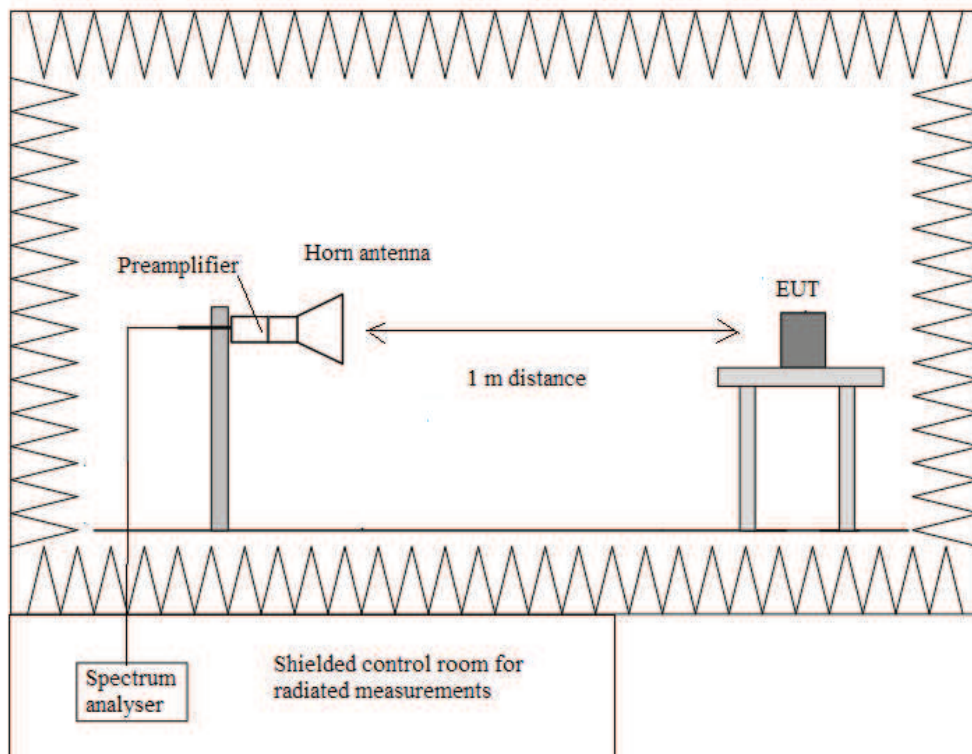
It was also rotated 360° and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

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

Radiated measurements setup $f < 1$ GHz



Radiated measurements setup $f > 1$ GHz



Occupied Bandwidth

RESULTS

(see next plots)

CORE 0 – Antenna RF External port 2: Mode B

	Lowest frequency 2412 MHz	Middle frequency 2437 MHz	Highest frequency 2462 MHz
99% bandwidth (MHz)	8.131	8.165	8.119
-26 dBc bandwidth (MHz)	10.325	10.346	10.311
Measurement uncertainty (kHz)	<±50		

Mode G

	Lowest frequency 2412 MHz	Middle frequency 2437 MHz	Highest frequency 2462 MHz
99% bandwidth (MHz)	16.786	16.823	16.774
-26 dBc bandwidth (MHz)	21.132	21.279	21.027
Measurement uncertainty (kHz)	<±50		

Mode N20

	Lowest frequency 2412 MHz	Middle frequency 2437 MHz	Highest frequency 2462 MHz
99% bandwidth (MHz)	17.835	17.875	17.909
-26 dBc bandwidth (MHz)	21.494	21.590	21.654
Measurement uncertainty (kHz)	<±50		

Mode N40

	Lowest frequency 2422 MHz	Middle frequency 2437 MHz	Highest frequency 2452 MHz
99% bandwidth (MHz)	35.937	35.957	36.008
-26 dBc bandwidth (MHz)	39.219	39.448	39.377
Measurement uncertainty (kHz)	<±100		

CORE 1 – Antenna RF port 4:
Mode B

	Lowest frequency 2412 MHz	Middle frequency 2437 MHz	Highest frequency 2462 MHz
99% bandwidth (MHz)	12.688	13.034	12.898
-26 dBc bandwidth (MHz)	17.204	17.690	17.630
Measurement uncertainty (kHz)	<±50		

Mode G

	Lowest frequency 2412 MHz	Middle frequency 2437 MHz	Highest frequency 2462 MHz
99% bandwidth (MHz)	16.867	16.880	16.830
-26 dBc bandwidth (MHz)	21.217	21.215	21.253
Measurement uncertainty (kHz)	<±50		

Mode N20

	Lowest frequency 2412 MHz	Middle frequency 2437 MHz	Highest frequency 2462 MHz
99% bandwidth (MHz)	17.851	17.929	17.938
-26 dBc bandwidth (MHz)	21.436	21.527	21.433
Measurement uncertainty (kHz)	<±50		

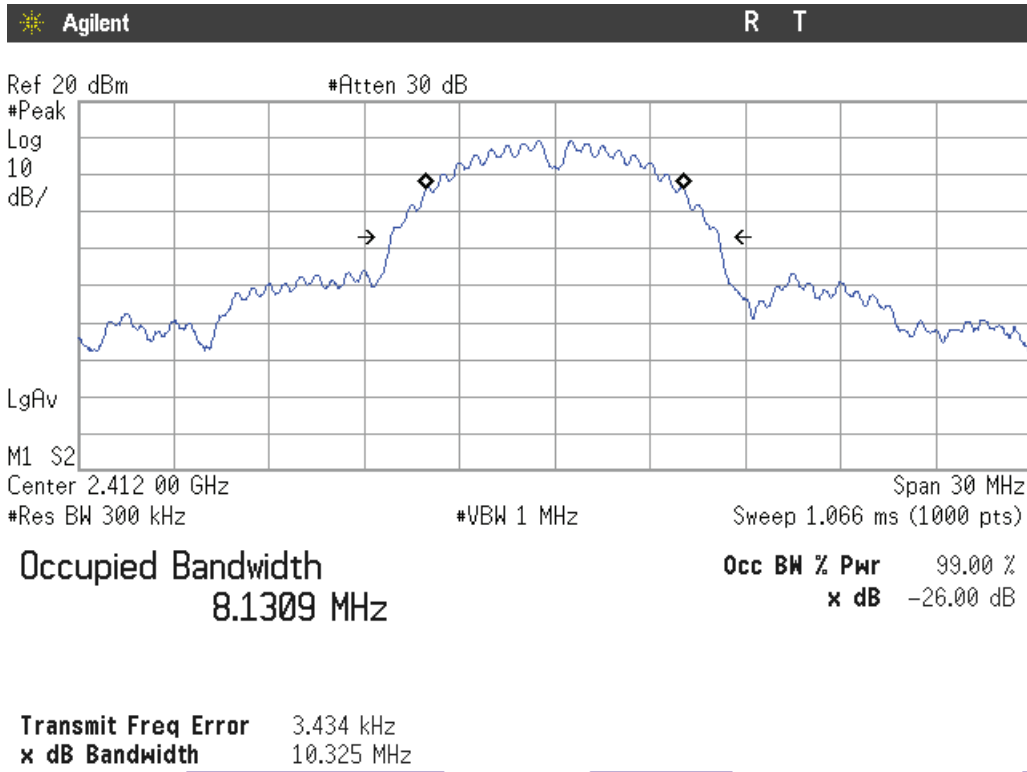
Mode N40

	Lowest frequency 2422 MHz	Middle frequency 2437 MHz	Highest frequency 2452 MHz
99% bandwidth (MHz)	35.972	35.957	35.967
-26 dBc bandwidth (MHz)	39.593	39.329	39.300
Measurement uncertainty (kHz)	<±100		

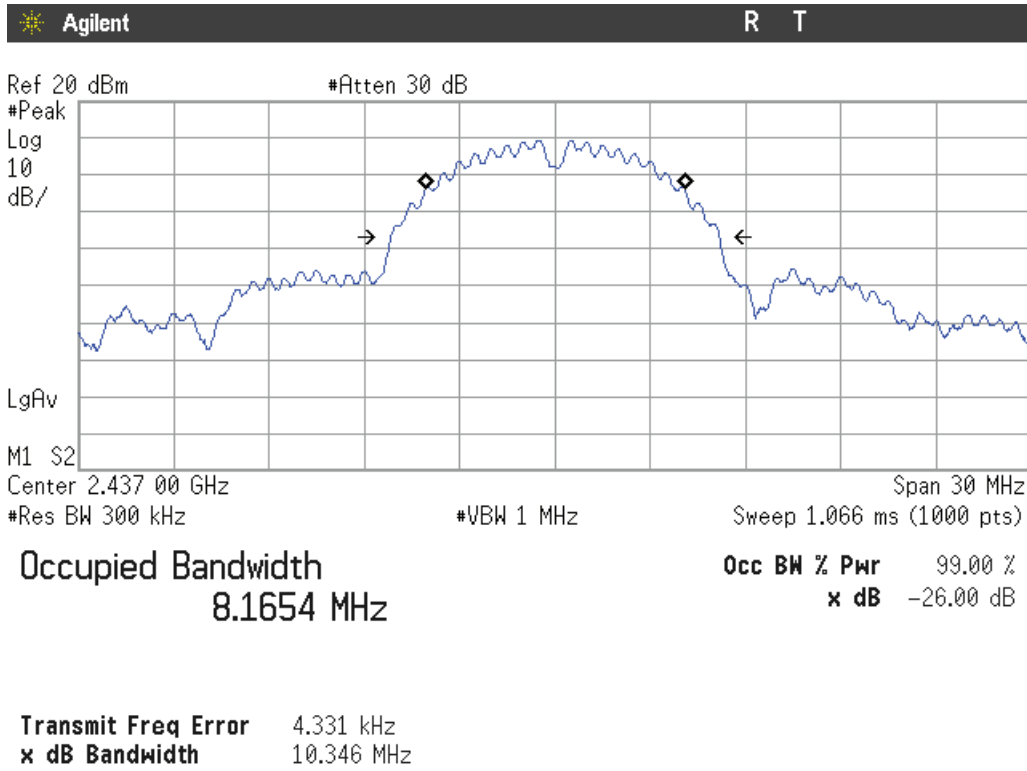
CORE 0 – Antenna RF External port 2:

Mode B

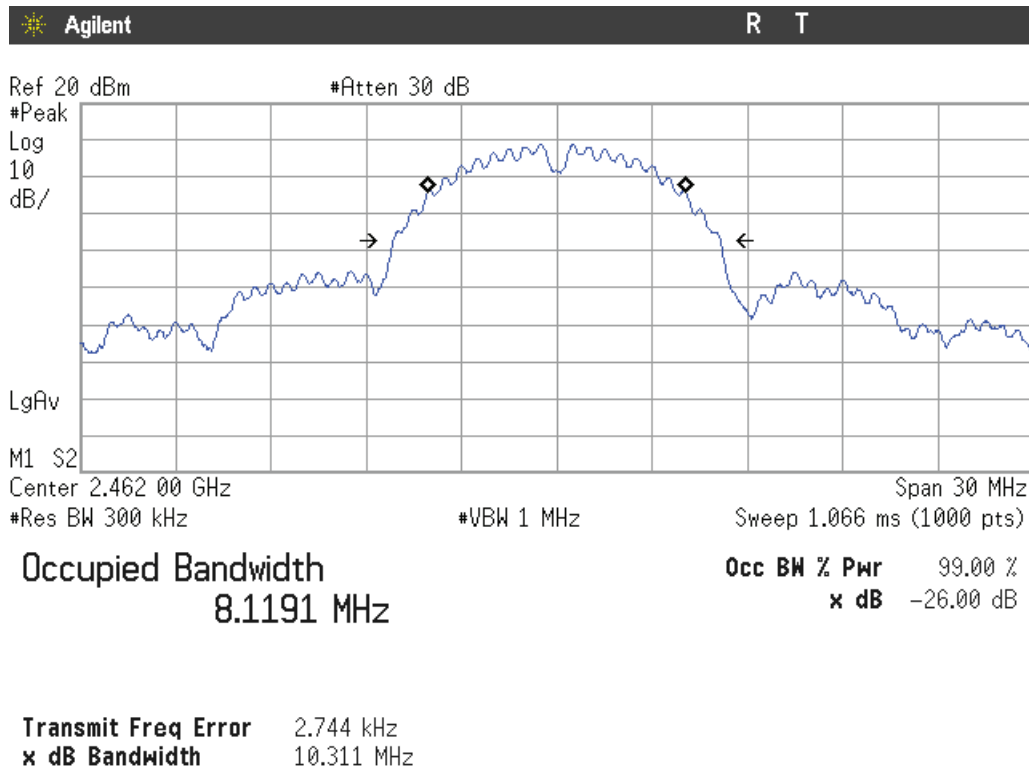
Lowest Channel



Middle Channel

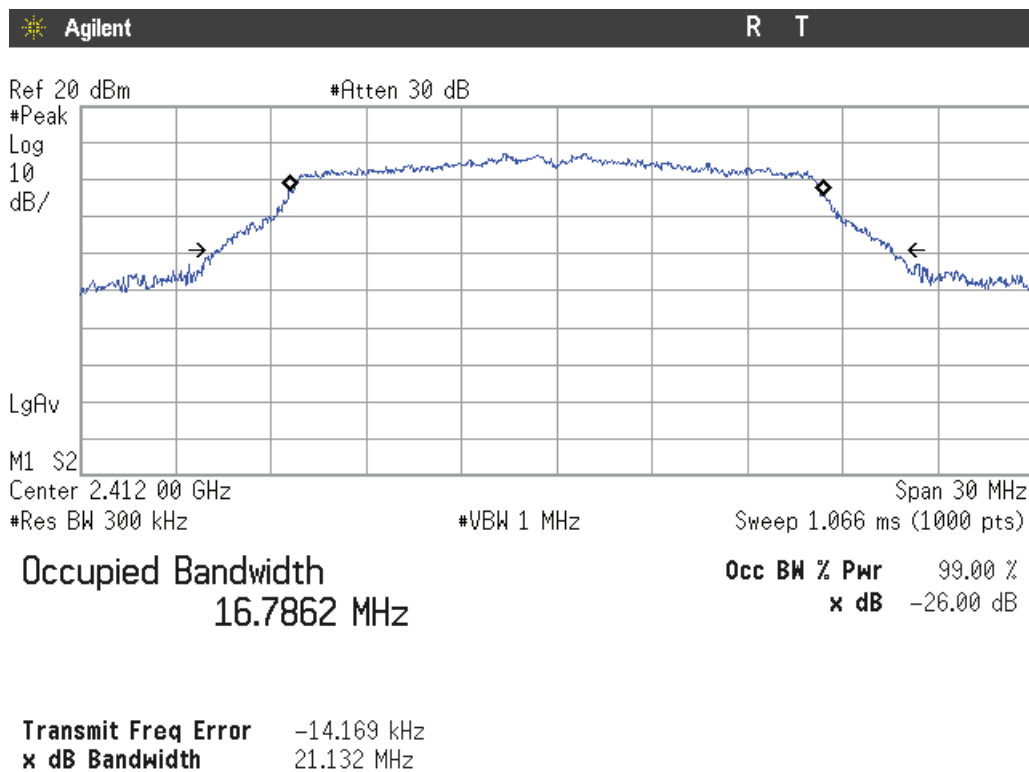


Highest channel

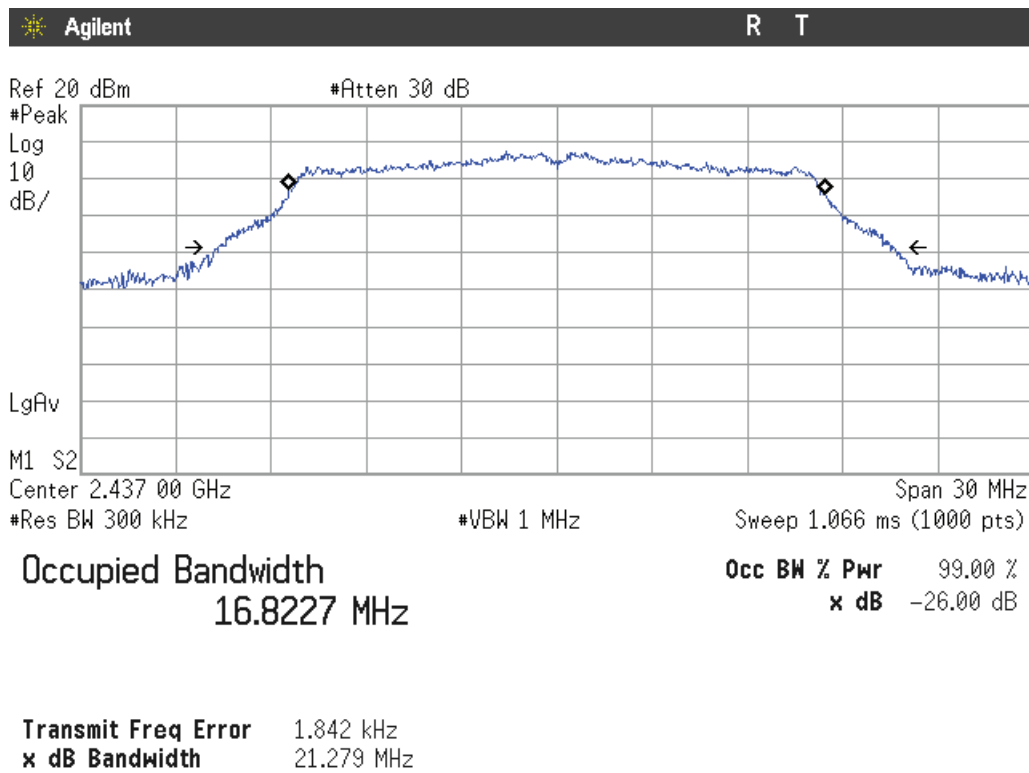


Mode G

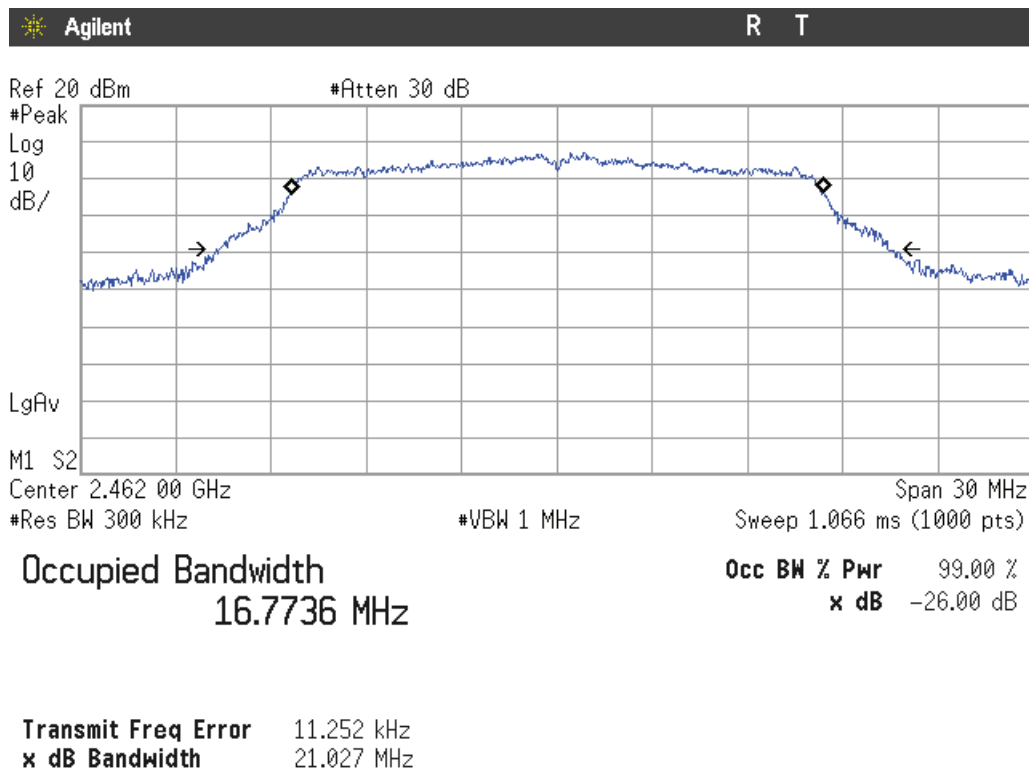
Lowest Channel



Middle Channel

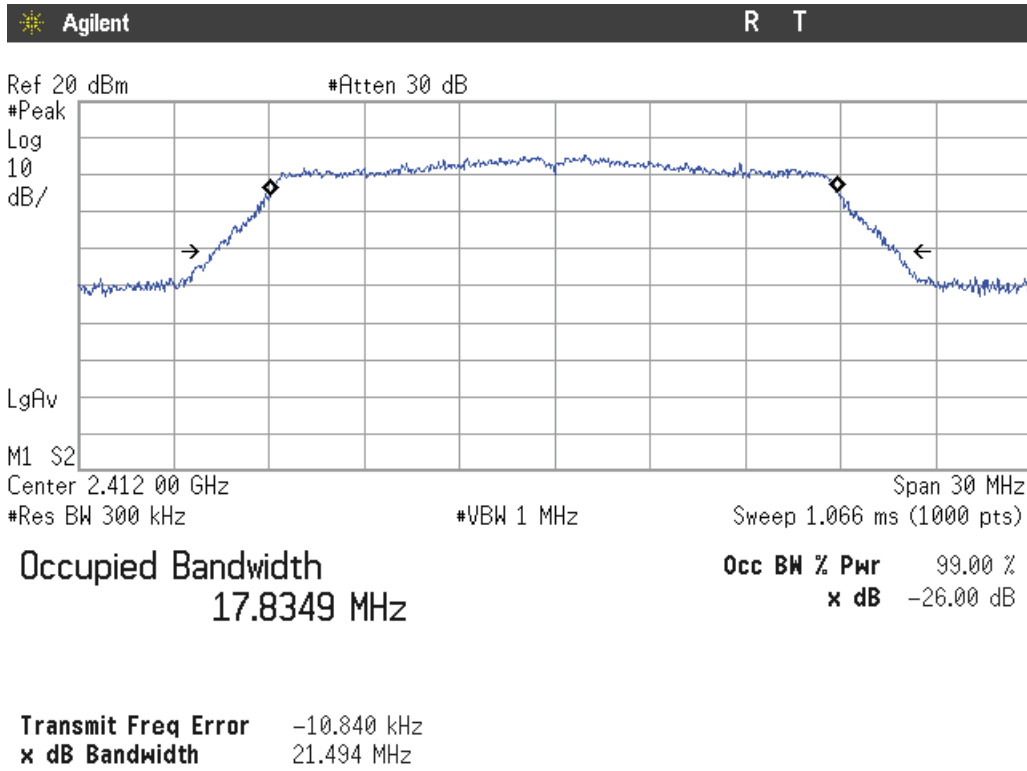


Highest channel

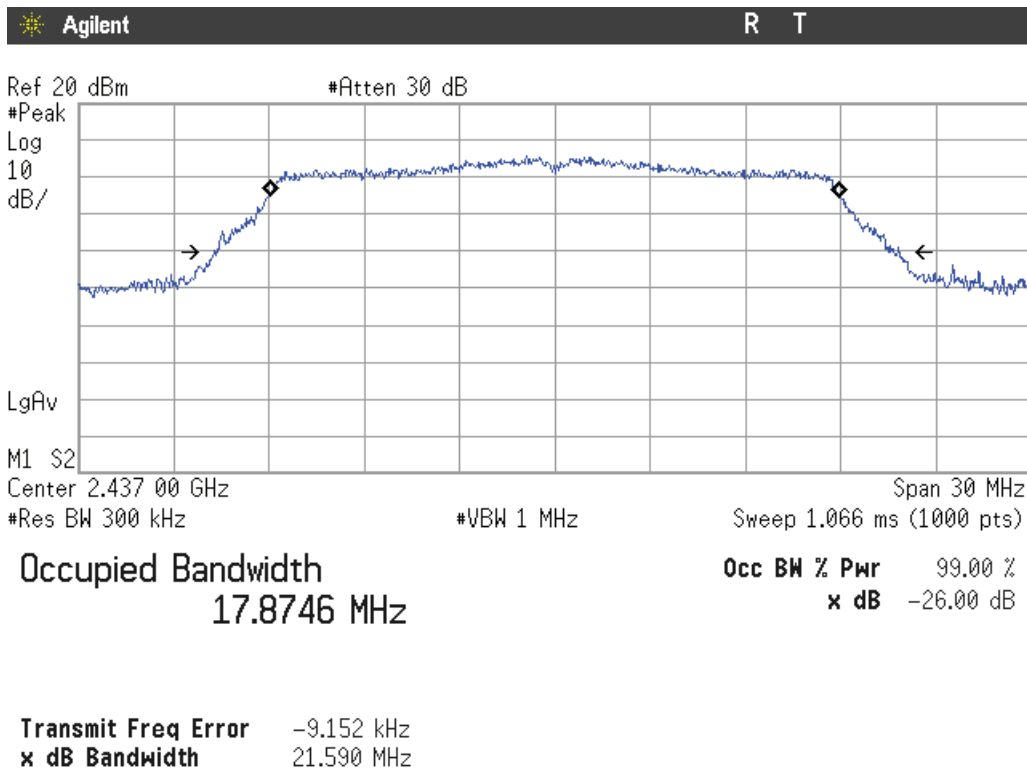


Mode N20

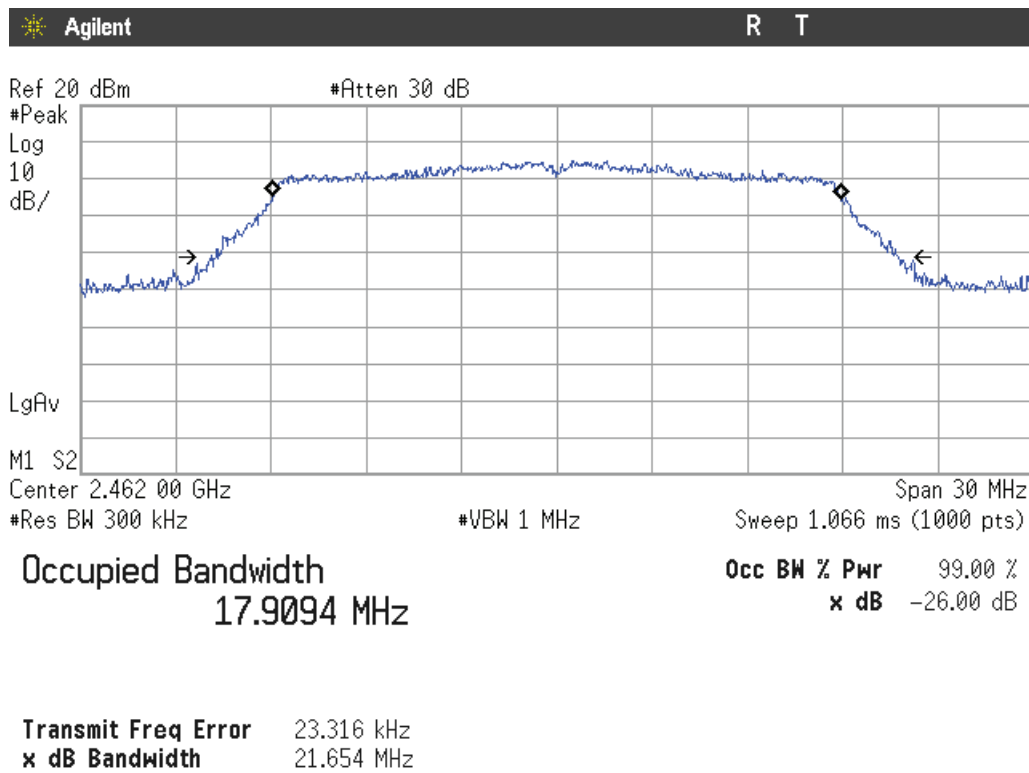
Lowest Channel



Middle Channel

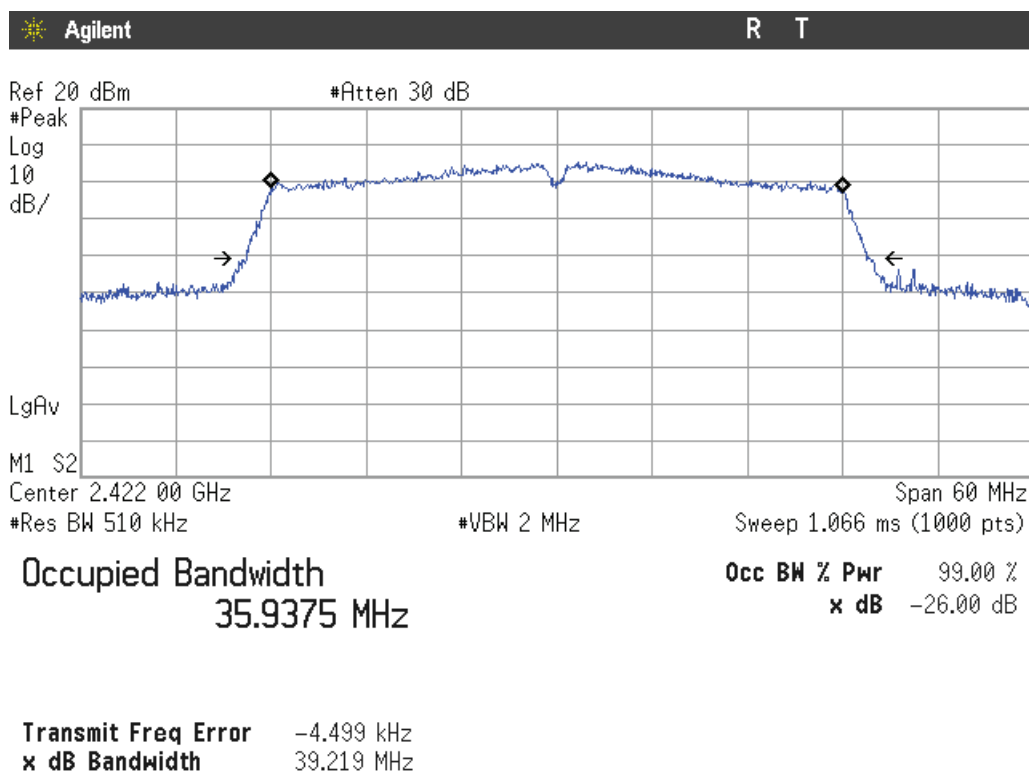


Highest channel

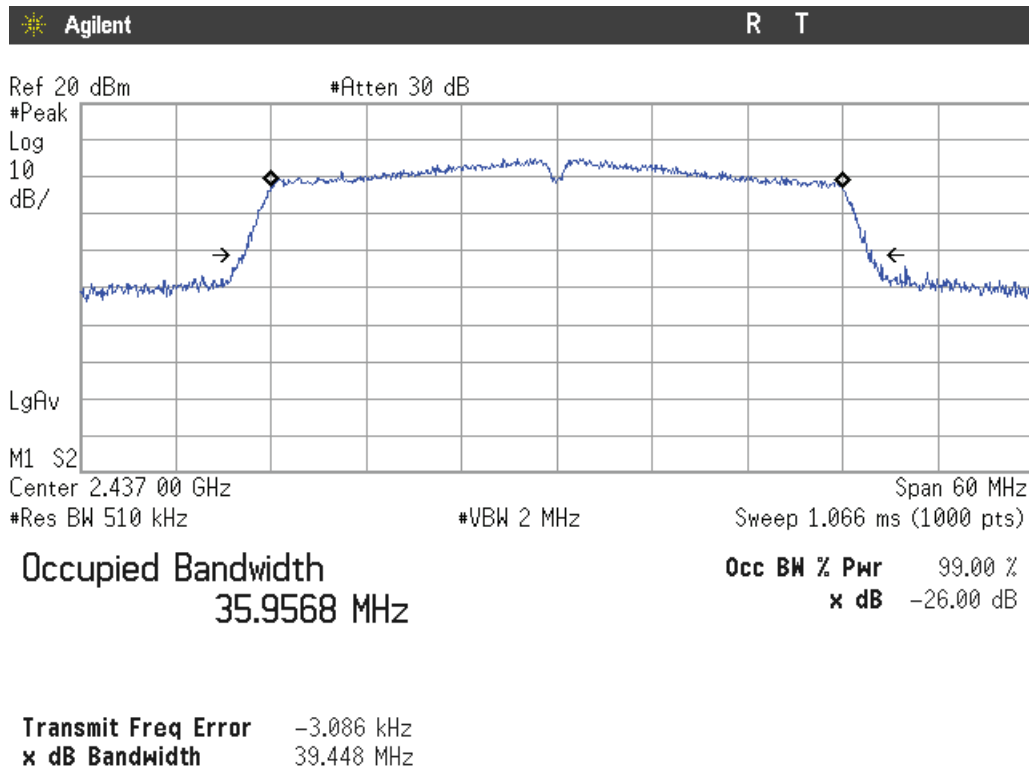


Mode N40

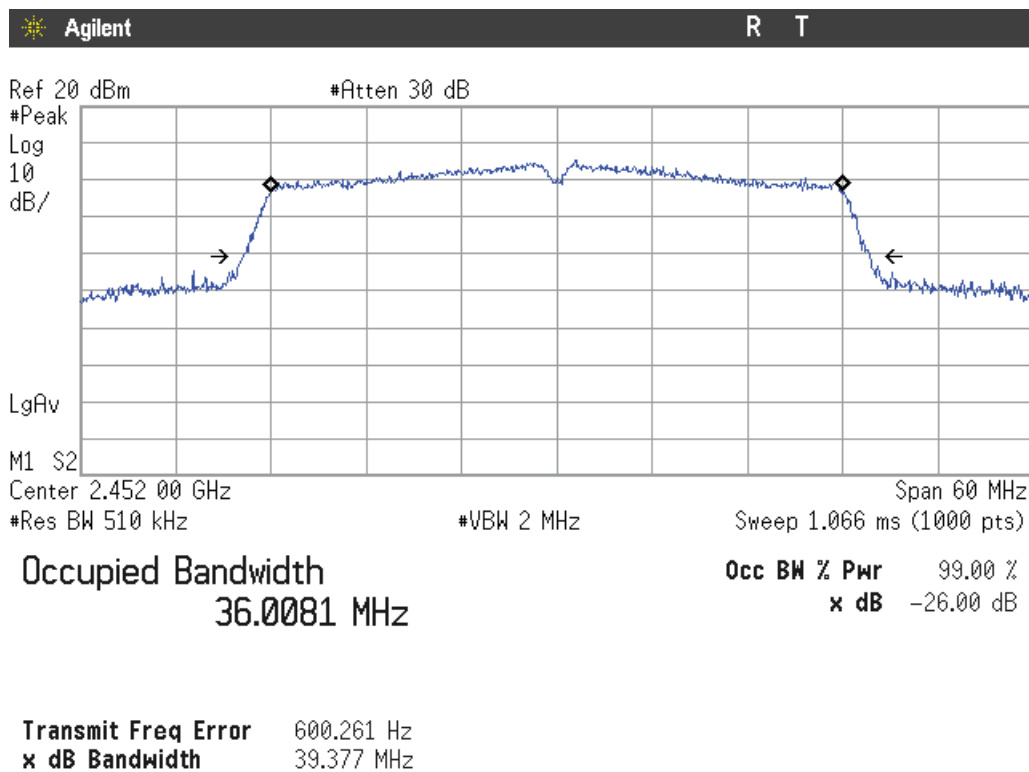
Lowest Channel



Middle Channel



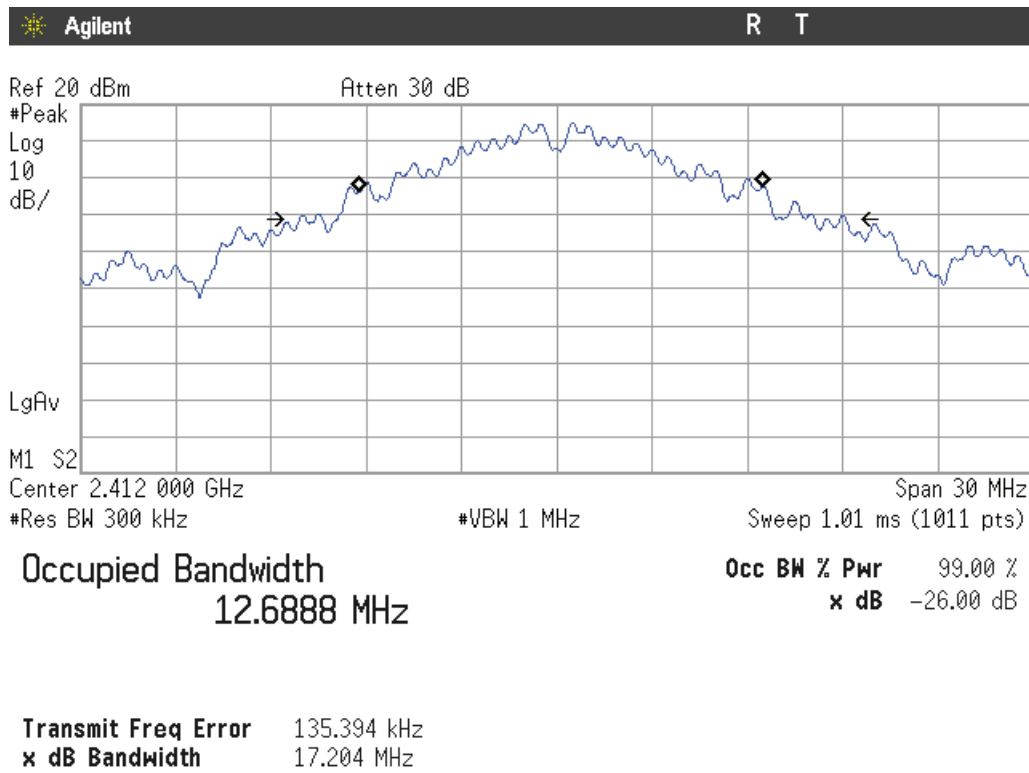
Highest channel



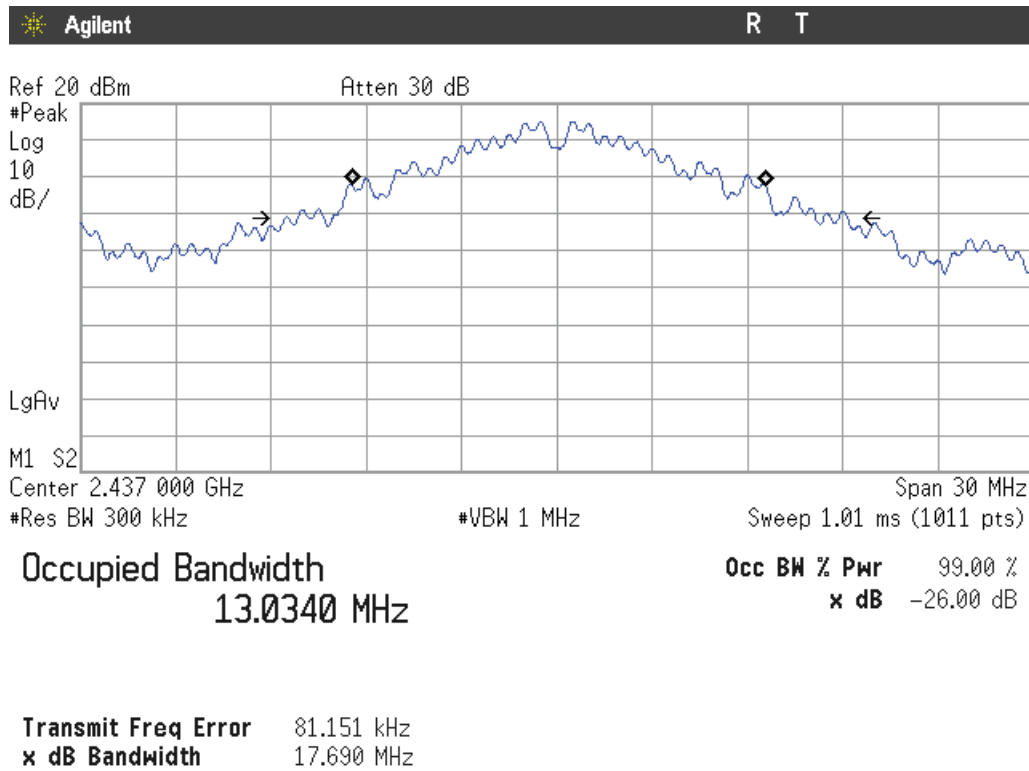
CORE 1 – Antenna RF port 4:

Mode B

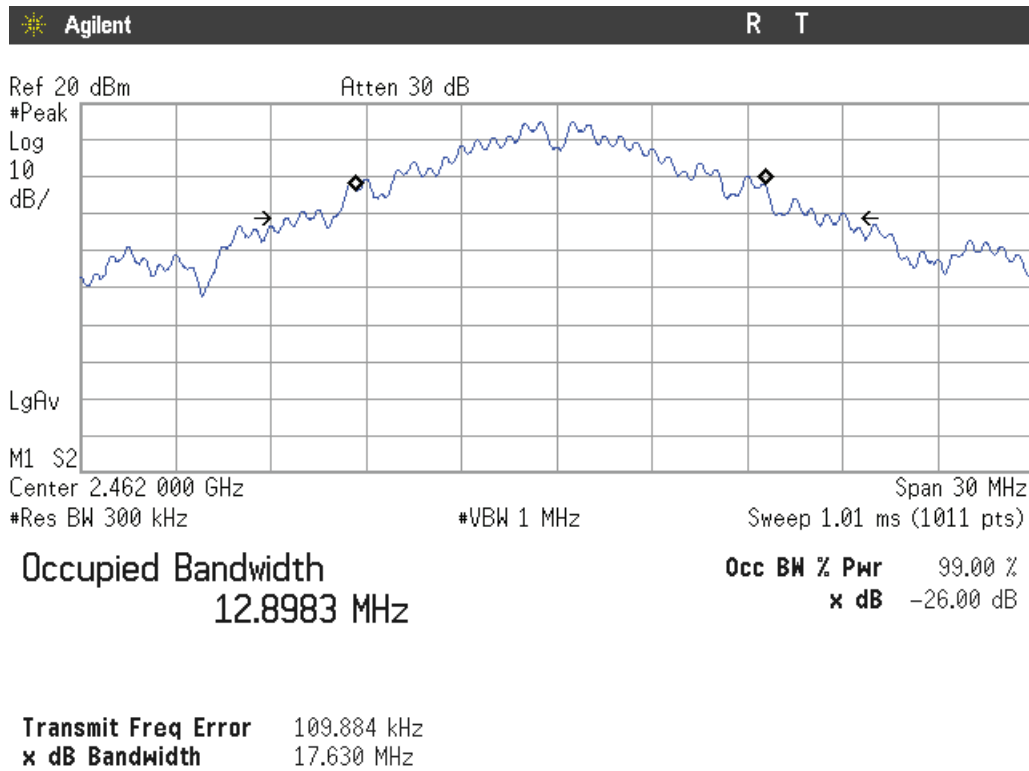
Lowest Channel



Middle Channel

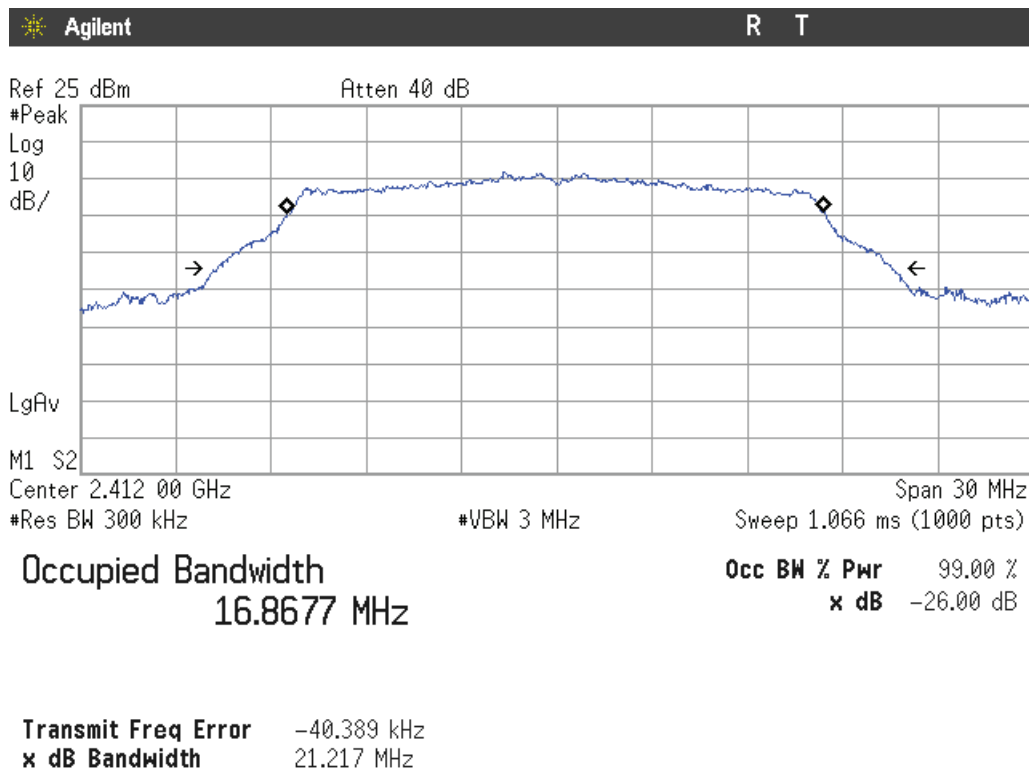


Highest channel

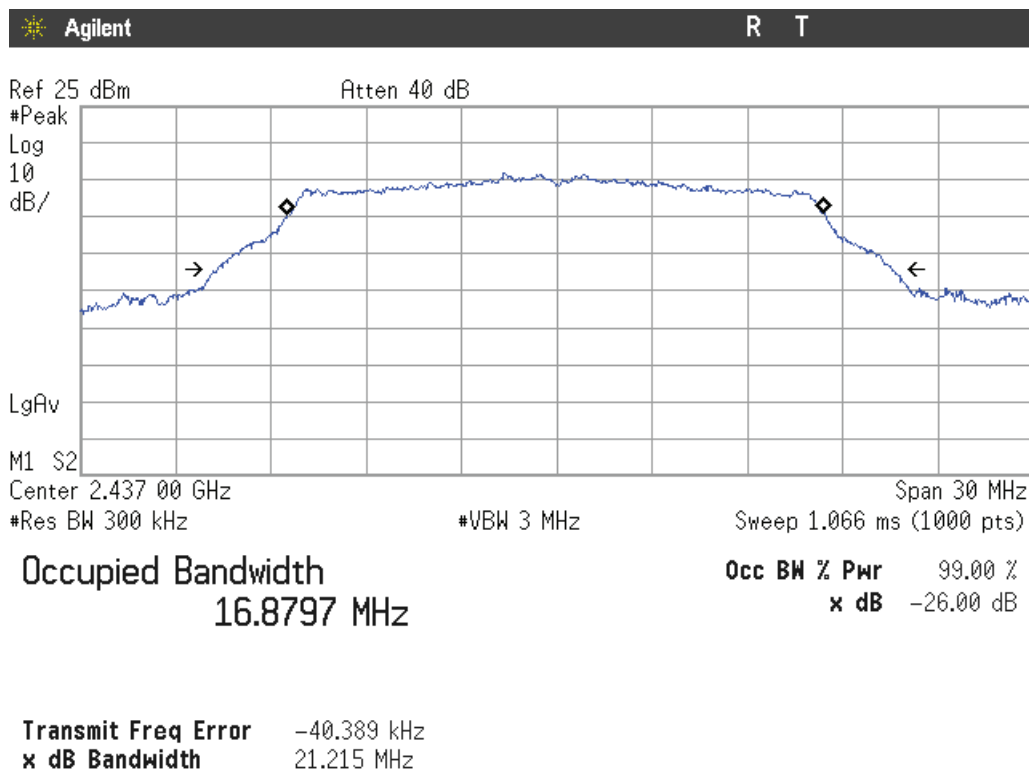


Mode G

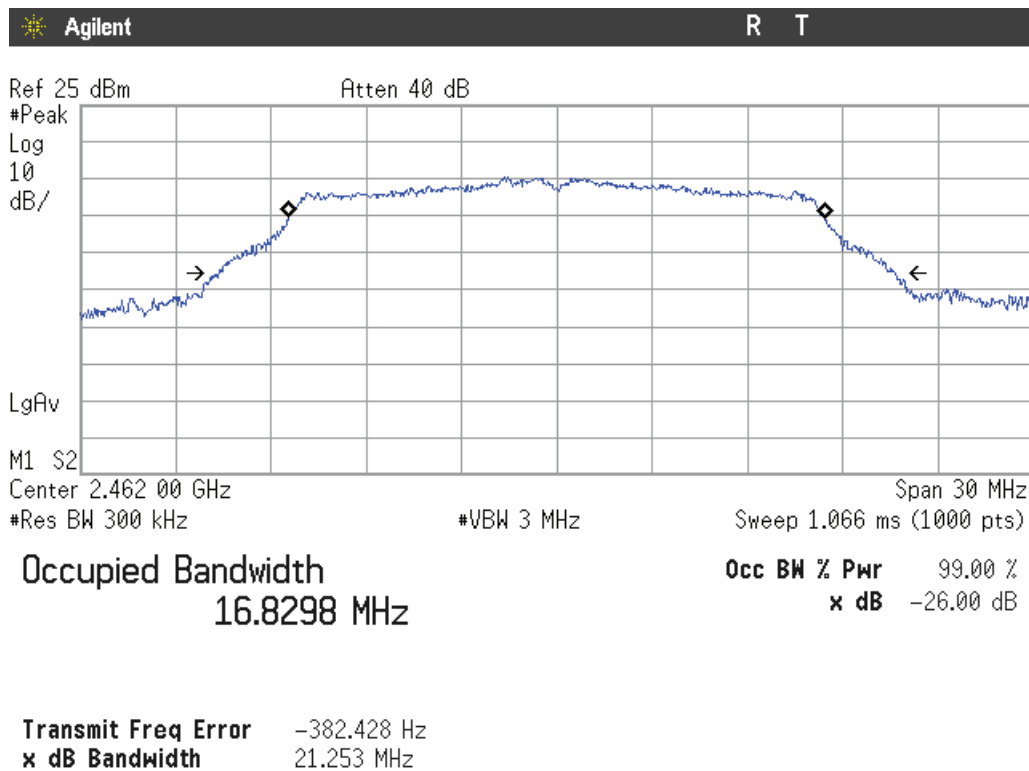
Lowest Channel



Middle Channel

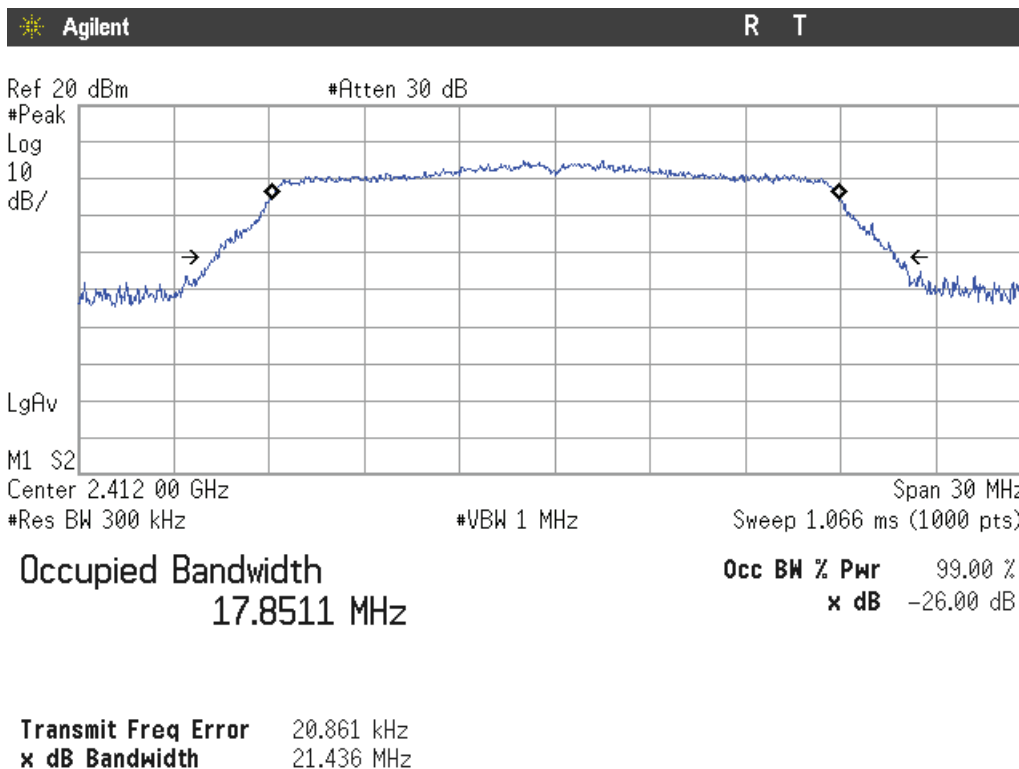


Highest channel

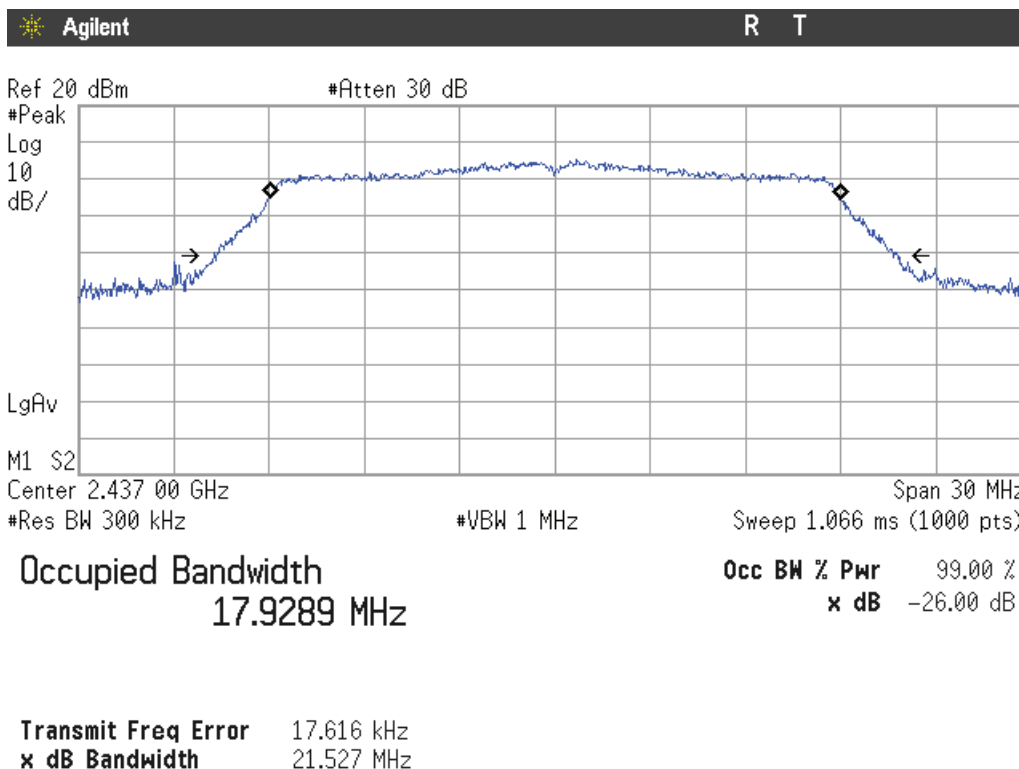


Mode N20

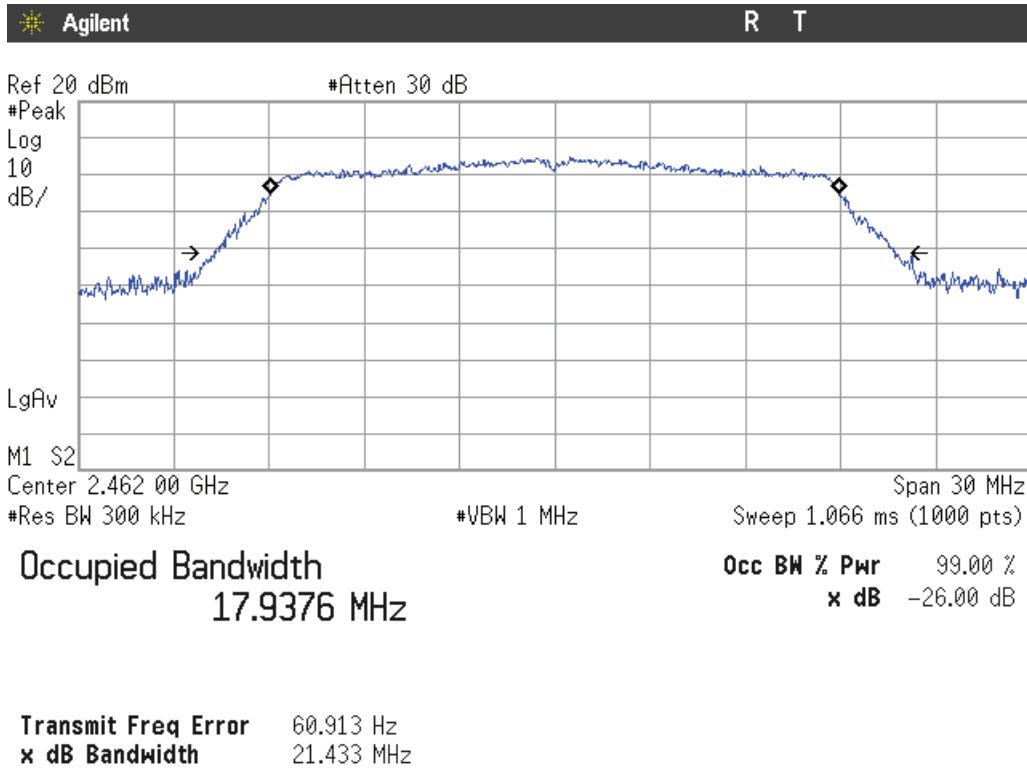
Lowest Channel



Middle Channel

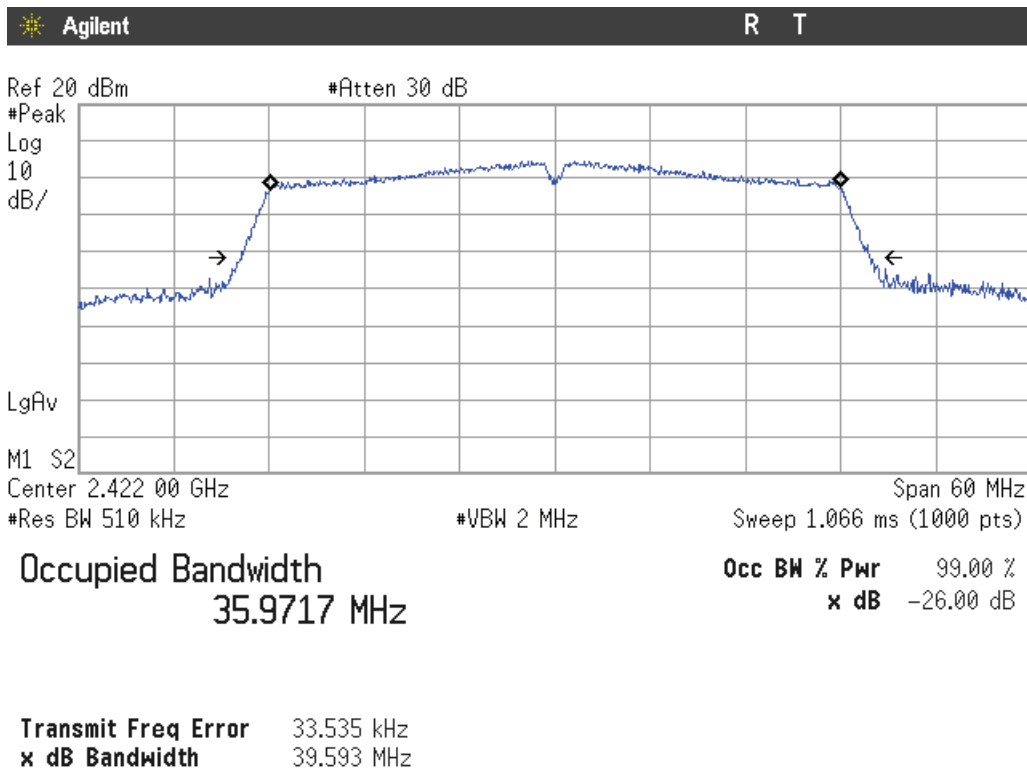


Highest channel

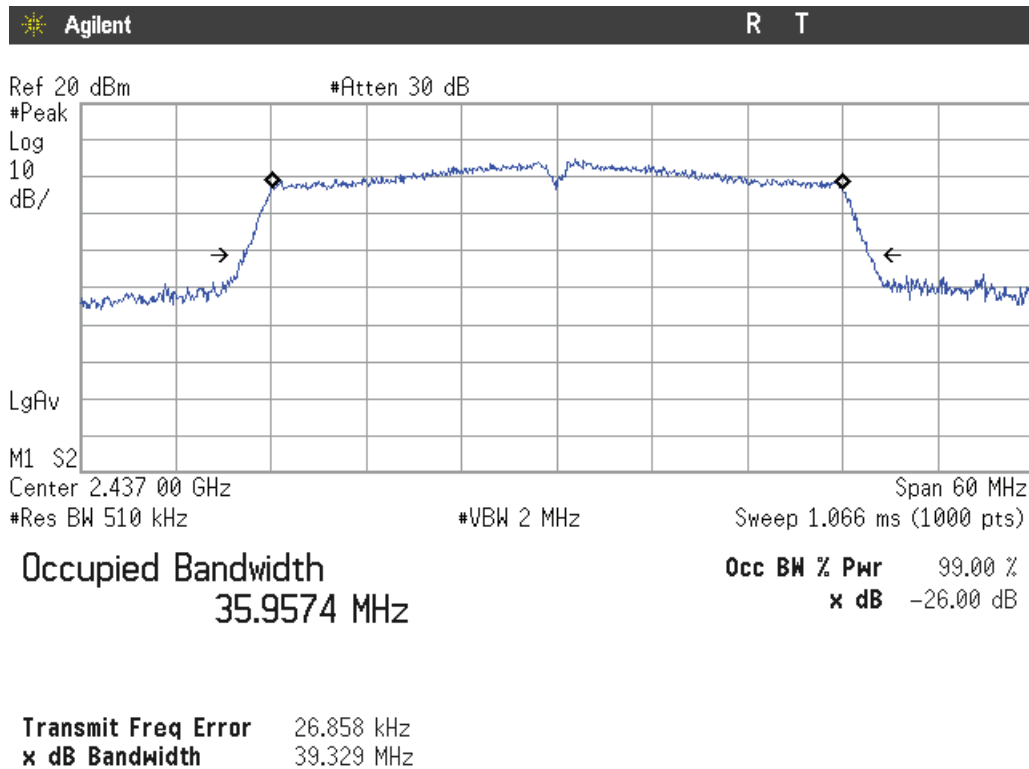


Mode N40

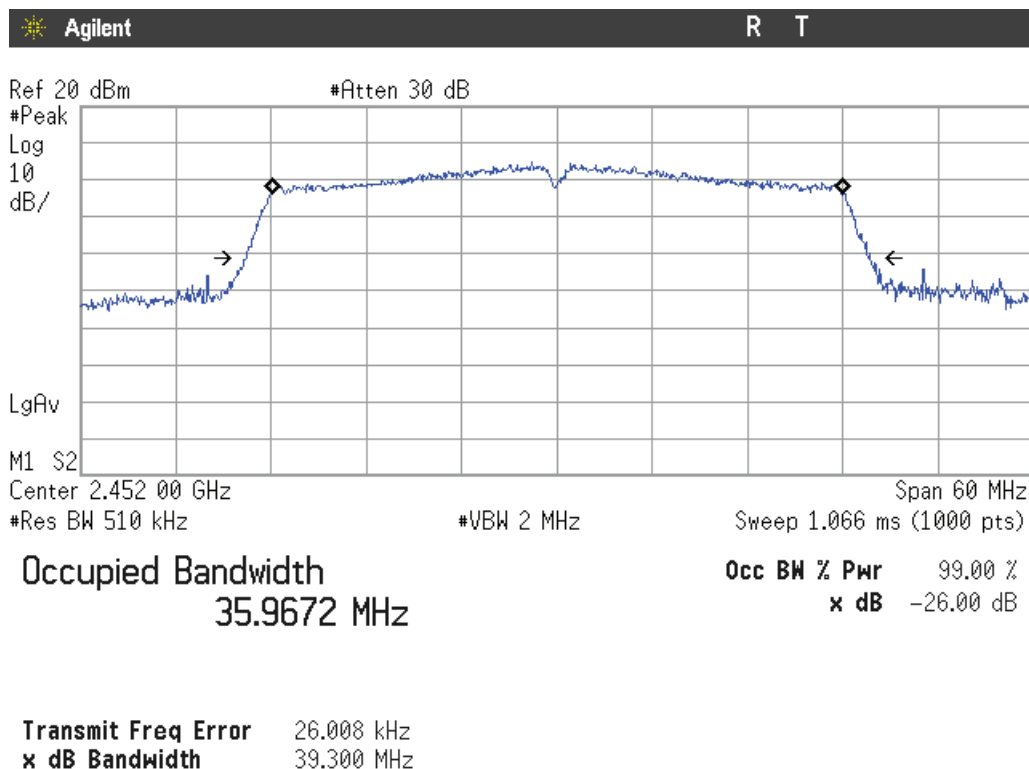
Lowest Channel



Middle Channel



Highest channel



Section 15.247 Subclause (a) (2) / RSS-247 5.2. (1). 6 dB Bandwidth

SPECIFICATION

The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

6 dB Bandwidth (see next plots).

CORE 0 – Antenna RF External port 2:

Mode B

	Lowest frequency 2412 MHz	Middle frequency 2437 MHz	Highest frequency 2462 MHz
6 dB Spectrum bandwidth (MHz)	5.626	5.445	5.626
Measurement uncertainty (kHz)	<±65.0		

Mode G

	Lowest frequency 2412 MHz	Middle frequency 2437 MHz	Highest frequency 2462 MHz
6 dB Spectrum bandwidth (MHz)	16.316	16.276	16.276
Measurement uncertainty (kHz)	<±65.0		

Mode N20

	Lowest frequency 2412 MHz	Middle frequency 2437 MHz	Highest frequency 2462 MHz
6 dB Spectrum bandwidth (MHz)	17.558	17.578	17.578
Measurement uncertainty (kHz)	<±65.0		

Mode N40

	Lowest frequency 2422 MHz	Middle frequency 2437 MHz	Highest frequency 2452 MHz
6 dB Spectrum bandwidth (MHz)	35.540	35.640	35.540
Measurement uncertainty (kHz)	<±155.0		

CORE 1 – Antenna RF port 4:

Mode B

	Lowest frequency 2412 MHz	Middle frequency 2437 MHz	Highest frequency 2462 MHz
6 dB Spectrum bandwidth (MHz)	6.006	5.986	6.026
Measurement uncertainty (kHz)	<±65.0		

Mode G

	Lowest frequency 2412 MHz	Middle frequency 2437 MHz	Highest frequency 2462 MHz
6 dB Spectrum bandwidth (MHz)	16.336	16.336	1.316
Measurement uncertainty (kHz)	<±65.0		

Mode N20

	Lowest frequency 2412 MHz	Middle frequency 2437 MHz	Highest frequency 2462 MHz
6 dB Spectrum bandwidth (MHz)	17.480	17.480	17.420
Measurement uncertainty (kHz)	<±95.0		

Mode N40

	Lowest frequency 2422 MHz	Middle frequency 2437 MHz	Highest frequency 2452 MHz
6 dB Spectrum bandwidth (MHz)	35.290	35.690	35.640
Measurement uncertainty (kHz)	<±155.0		

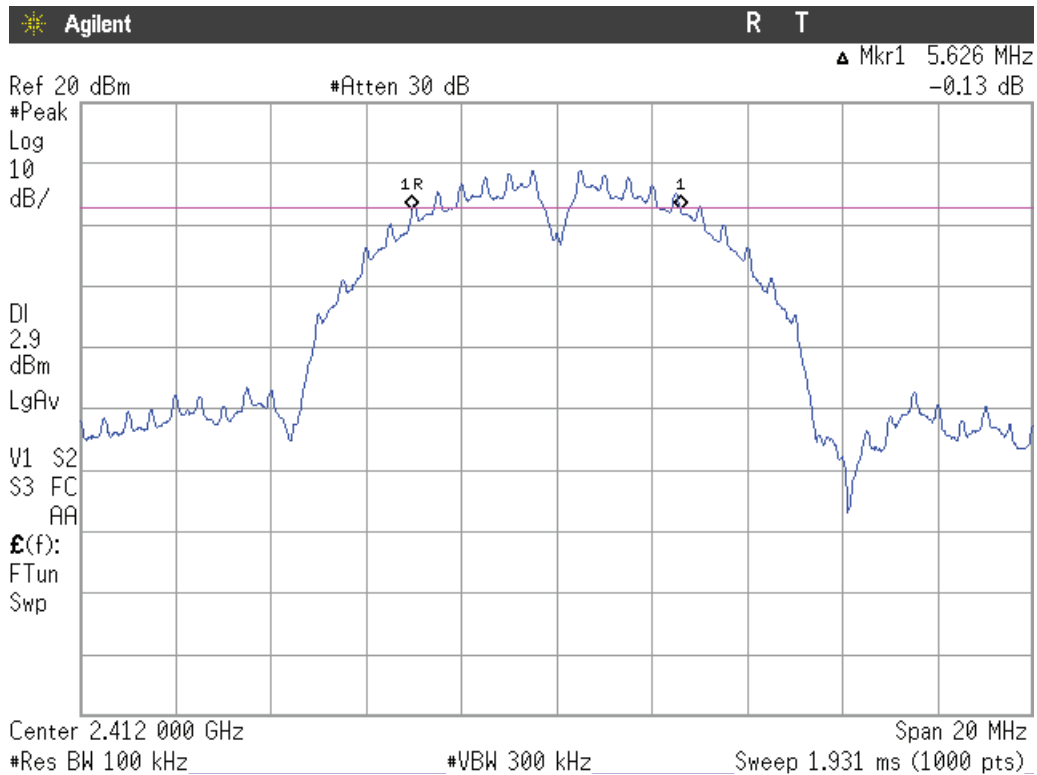
Verdict: PASS

6 dB BANDWIDTH.

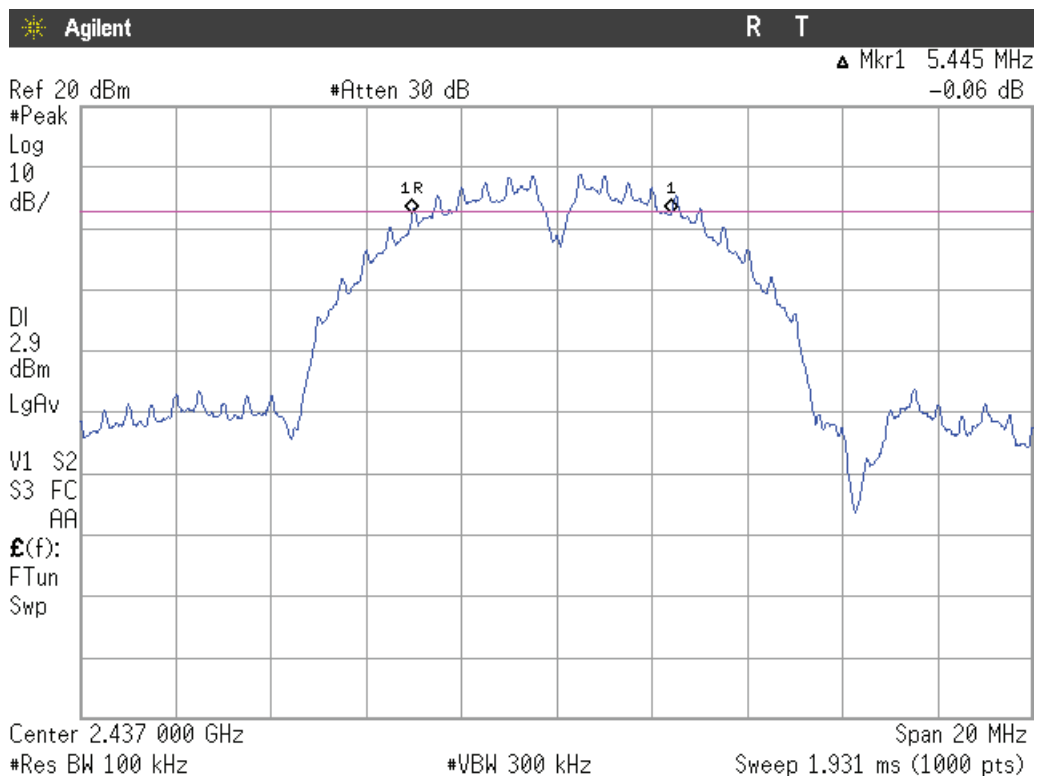
CORE 0 – Antenna RF External port 2:

Mode B

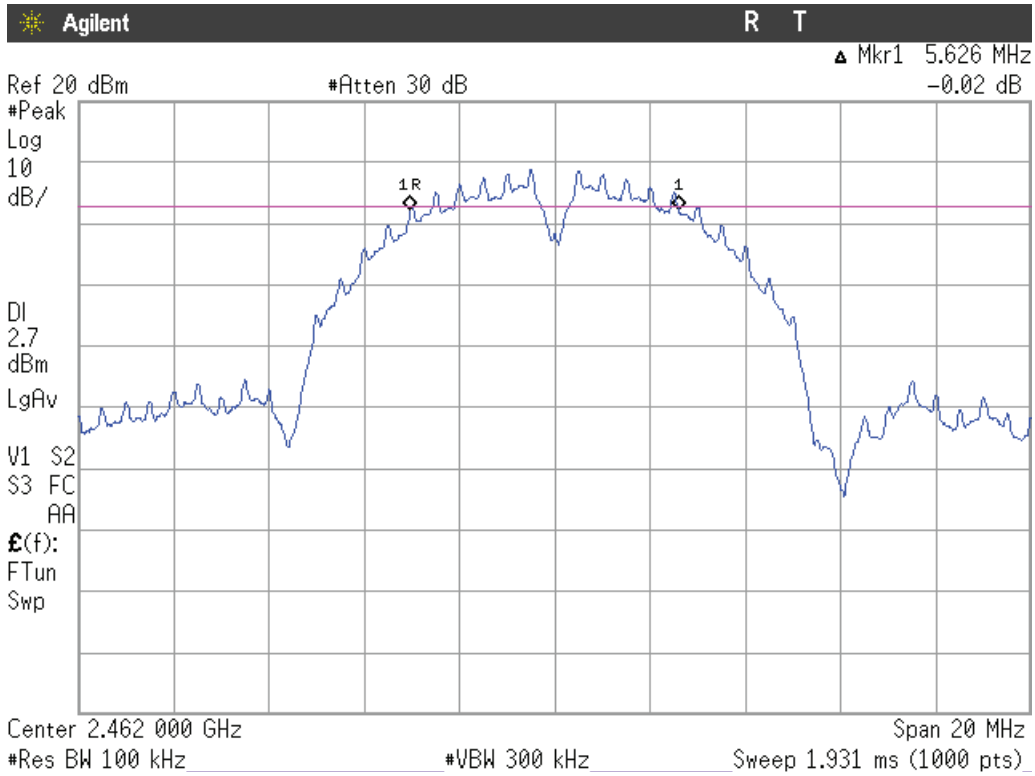
Lowest Channel



Middle Channel

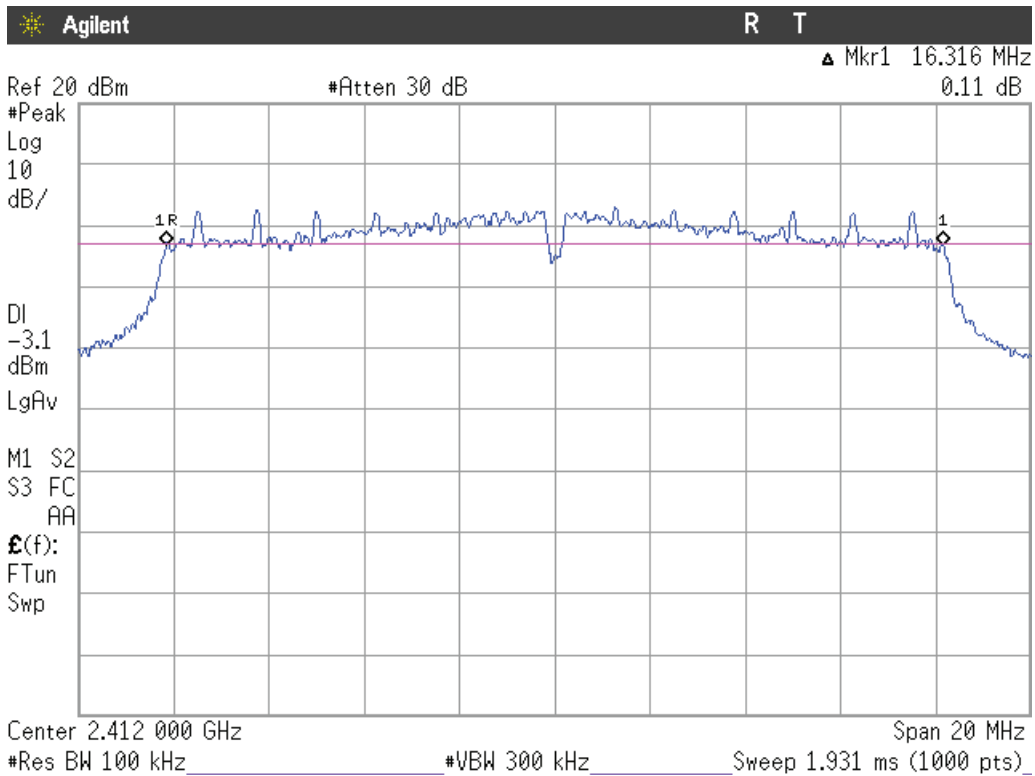


Highest channel

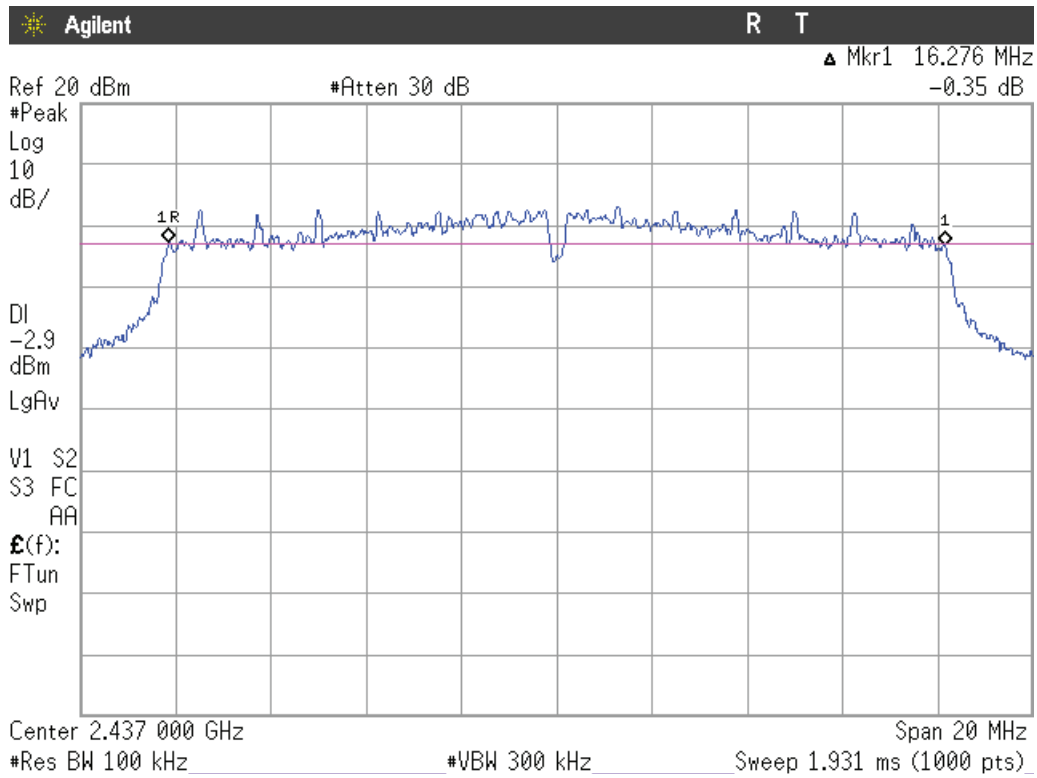


Mode G

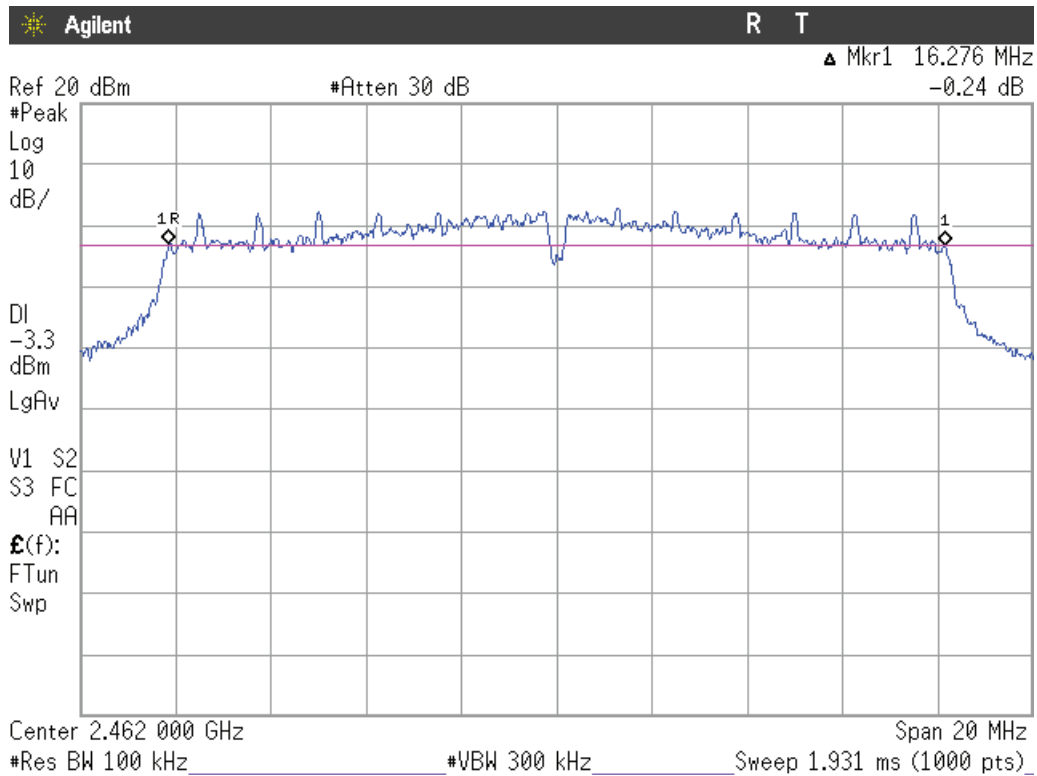
Lowest Channel



Middle Channel

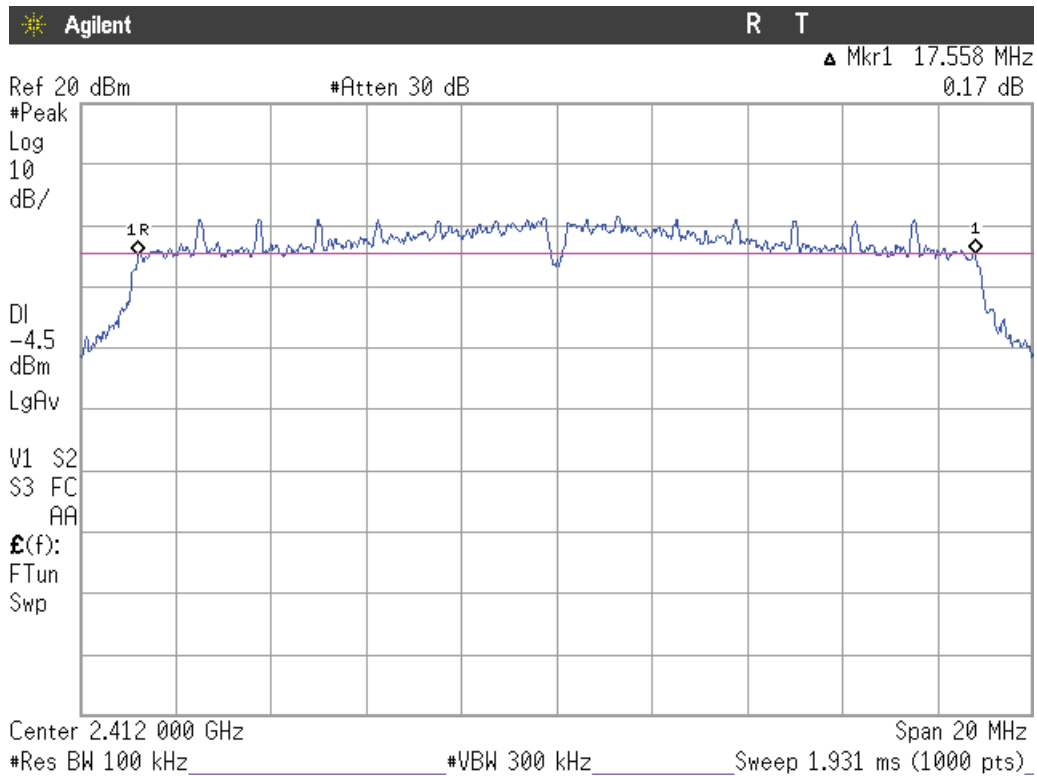


Highest channel



Mode N20

Lowest Channel



Middle Channel

