Excellence in Compliance Testing

Certification Test Report

FCC ID: VPYLB1CK982
IC: 772C-LB1CK982

FCC Rule Part: 15.247
ISED Canada Radio Standards Specification: RSS-247

ACS Report Number: 16-2033.W06.2B

Manufacturer: Murata Manufacturing Co., Ltd.
Model(s): LBEE5ZZ1CK-982

Test Begin Date: **June 02, 2016**
Test End Date: **June 10, 2016**

Report Issue Date: December 15, 2016

ANAB ACCREDITED ISO/IEC 17025 TESTING LABORATORY

FOR THE SCOPE OF ACCREDITATION UNDER CERTIFICATE NUMBER AT-1533

This report must not be used by the client to claim product certification, approval, or endorsement by ANAB, ANSI, or any agency of the Federal Government.

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1 GENERAL

1.1 Purpose

The purpose of this report is to demonstrate compliance with Part 15 Subpart C of the FCC's Code of Federal Regulations and Innovation, Science and Economic Development Canada's Radio Standards Specification RSS-247 for the tests documented herein.

1.2 Product Description

The Murata Electronics, N.A. Inc. model LBEE5ZZ1CK-982 is an IEEE 802.11a/b/g/n/ac WLAN + Bluetooth 4.0 wireless transceiver module. The test report documents the compliance of the Bluetooth radio mode of operation.

Technical Details

Mode of Operation:	Bluetooth + Enhanced Data Rate (EDR)
Frequency Range:	2402 MHz - 2480 MHz
Number of Channels:	79
Channel Separation:	1 MHz
Modulations:	GFSK, π/4-DQPSK, 8DPSK
TX Data Rates:	GFSK: 1Mbps π/4-DQPSK: 2Mbps 8DPSK: 3Mbps
Antenna Type/Gain:	PCB Trace Antenna, 0 dBi

1.3 Manufacturer Information

Murata Electronics, N.A. Inc.
2200 Lake Park Drive
Smyrna, GA. 30080

Model Number: LBEE5ZZ1CK-982

Test Sample Serial Number(s): 433900071FAC

Test Sample Condition: The samples were in good conditions with no observable physical damages.

1.4 Test Methodology and Considerations

The EUT was evaluated for RF conducted emissions for the Bluetooth + EDR mode of operation. The EUT provides a proprietary switched connector that adapts to an SMA connector for the RF conducted measurements.

Compliance to the radiated and power line conducted emissions requirements are documented in a separate test report.

Table 1.4-1: Bluetooth Radio Test configuration

Mode of Operations	Frequency (MHz)	Data Rate (kbps)
GFSK	2402	1000
	2441	1000
	2480	1000
π/4 DQPSK	2402	2000
	2441	2000
	2480	2000
8 DPSK	2402	3000
	2441	3000
	2480	3000

2 TEST FACILITIES

2.1 Location

The radiated and conducted emissions test sites are located at the following address:

Advanced Compliance Solutions, Inc.
3998 FAU Blvd, Suite 310
Boca Raton, Florida 33431
Phone: (561) 961-5585
Fax: (561) 961-5587
www.acstestlab.com

FCC Test Firm Registration #: 475089
Innovation, Science and Economic Development Canada Lab Code: 4175C

2.2 Laboratory Accreditations/Recognitions/Certifications

ACS is accredited to ISO/IEC 17025 by ANSI-ASQ National Accreditation Board under their ANAB program and has been issued certificate number AT-1533 in recognition of this accreditation. Unless otherwise specified, all test methods described within this report are covered under the ISO/IEC 17025 scope of accreditation.

2.3 Radiated & Conducted Emissions Test Site Description

2.3.1 Semi-Anechoic Chamber Test Site

The EMC radiated test facility consists of an RF-shielded enclosure. The interior dimensions of the indoor semi-anechoic chamber are approximately 48 feet (14.6 m) long by 36 feet (10.8 m) wide by 24 feet (7.3 m) high and consist of rigid, 1/8 inch (0.32 cm) steel-clad, wood core modular panels with steel framing. In the shielded enclosure, the faces of the panels are galvanized and the chamber is self-supporting. 8-foot RF absorbing cones are installed on 4 walls and the ceiling. The steel-clad ground plane is covered with vinyl flooring.

The turntable is driven by pneumatic motor, which is capable of supporting a 2000 lb. load. The turntable is flush with the chamber floor which it is connected to, around its circumference, with a continuous metallic loaded spring. An EMCO Model 1060 Multi-device controller controls the turntable position.

A pneumatic motor is used to control antenna polarizations and height relative to the ground. The height information is displayed on the control unit EMCO Model 1050.

The control room is an RF shielded enclosure attached to the semi-anechoic chamber with two bulkhead panels for connecting RF, and control cables. The dimension of the room is 7.3 m x 4.9 m x 3 m high and the entrance doors of both control and conducted rooms are 3 feet (0.91 m) by 7 feet (2.13 m).

A diagram of the Semi-Anechoic Chamber Test Site is shown in Figure 2.3.1-1 below:

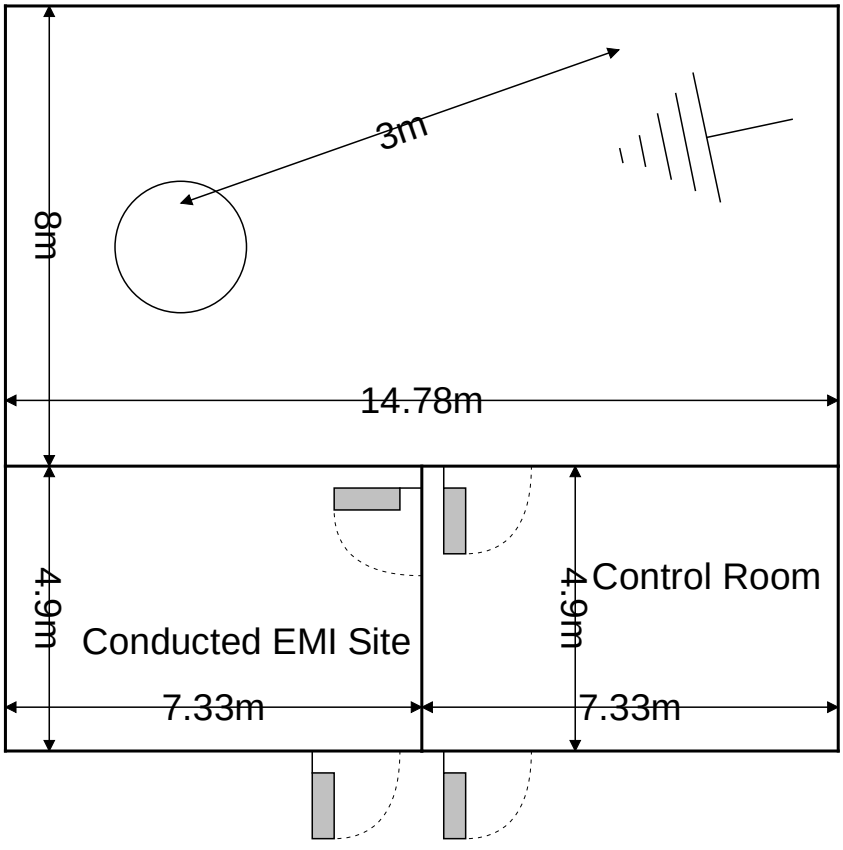


Figure 2.3.1-1: Semi-Anechoic Chamber Test Site

2.3.2 Conducted Emissions Test Site Description

The dimensions of the shielded conducted room are 7.3 x 4.9 x 3 m^3. The power line conducted emission site includes two LISNs: a Solar Model 8028-50 50 Ω/50 µH and an EMCO Model 3825/2R, which are installed as shown in the figure below. For evaluations requiring 230 V, 50 Hz AC input, a Polarad LISN (S/N 879341/048) is used in conjunction with a California Instruments signal generator Model 2001RP-OP1.

A diagram of the room is shown below in figure 2.3.2-1:

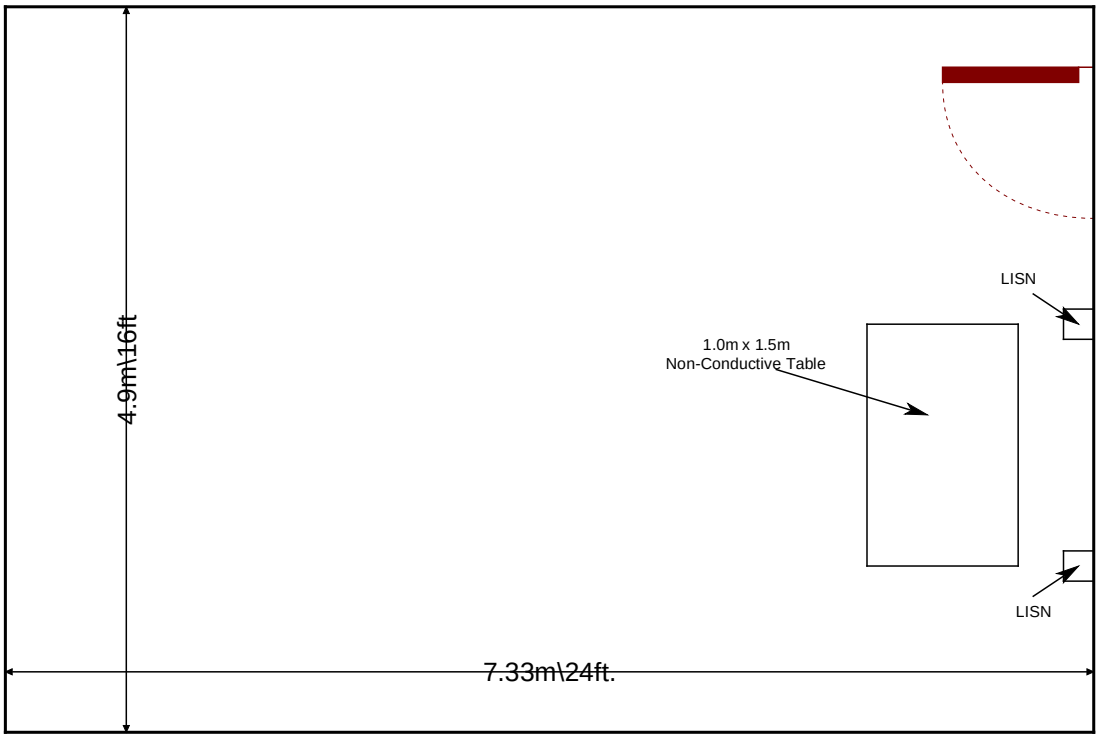


Figure 2.3.2-1: AC Mains Conducted EMI Site

3 APPLICABLE STANDARD REFERENCES

The following standards were used:

- ANSI C63.4-2014: Method of Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the 9 kHz to 40 GHz.
- ANSI C63.10-2013: American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
- US Code of Federal Regulations (CFR): Title 47, Part 2, Subpart J: Equipment Authorization Procedures, 2016.
- US Code of Federal Regulations (CFR): Title 47, Part 15, Subpart C: Radio Frequency Devices, Intentional Radiators, 2016
- Innovation, Science and Economic Development Canada Radio Standards Specification: RSS-247 — Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices, Issue 1, May 2015.
- Innovation, Science and Economic Development Canada Radio Standards Specification: RSS-GEN – General Requirements for Compliance of Radio Apparatus, Issue 4, November 2014.

4 LIST OF TEST EQUIPMENT

The calibration interval of test equipment is annually or the manufacturer's recommendations. Where the calibration interval deviates from the annual cycle based on the instrument manufacturer's recommendations, it shall be stated below.

Table 4-1: Test Equipment List

AssetID	Manufacturer	Model #	Equipment Type	Serial #	Last Calibration Date	Calibration Due Date
283	Rohde & Schwarz	FSP40	Spectrum Analyzers	1000033	7/1/2015	7/1/2016
2111	Aeroflex Inmet	40AH2W-20	Attenuator	2111	7/22/2015	7/22/2016
RE578	MPJA	HY5003	Power Supplies	3700278	NCR	NCR

Note: NCR=No Calibration Required

5 SUPPORT EQUIPMENT

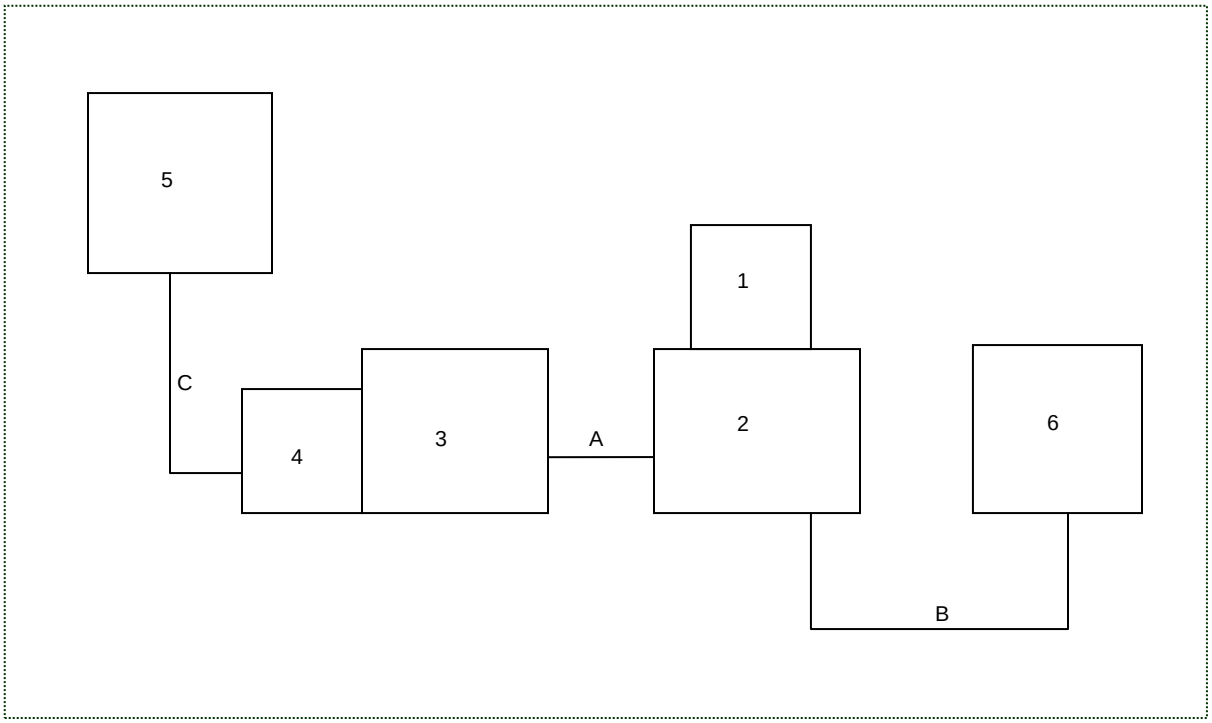
Table 5-1: EUT and Support Equipment Description

Item #	Type Device	Manufacturer	Model/Part #	Serial #
1	EUT	Murata Electronics North America, Inc..	LBEE5ZZ1CK-982	433900071FAC
2	SDIO Interface Board	Murata Electronics North America, Inc..	N/A	ACS#8
3	BT Communication Interface Board	Murata Electronics North America, Inc..	P2ML1188 UART3	ACS#3
4	USB to RS232 adapter	Parallax	28031	N/A
5	Laptop Computer	Toshiba	TECTEA M9	87026986H
6	Power Supply	MPJA	HY5003	003700278

Table 5-2: Cable Description

Cable #	Cable Type	Length	Shield	Termination
A	Ribbon Cable	0.1 m	No	SDIO Interface board to BT communication Interface Board
B	Twisted Pair	1.22 m	No	SDIO Interface Board to Power Supply
C	USB	1.15 m	No	USB to Serial Adapter to Laptop

6 EQUIPMENT UNDER TEST SETUP BLOCK DIAGRAM



7 SUMMARY OF TESTS

Along with the tabular data shown below, plots were taken of all signals deemed important enough to document.

7.1 Antenna Requirement – FCC: Section 15.203

The EUT used a printed antenna on the transceiver module. The antenna is not detachable, thus meeting the requirements of FCC Section 15.203.

7.2 Peak Output Power - FCC Section 15.247(b)(1); ISED Canada: RSS-247 5.4(2)

7.2.1 Measurement Procedure (Conducted Method)

The RF output port of the EUT was directly connected to the input of the spectrum analyzer through suitable attenuation.

7.2.2 Measurement Results

Results are shown below:

Table 7.2.2-1 RF Output Power (GFSK)

Frequency (MHz)	Power (dBm)
2402	10.02
2441	10.60
2480	10.75

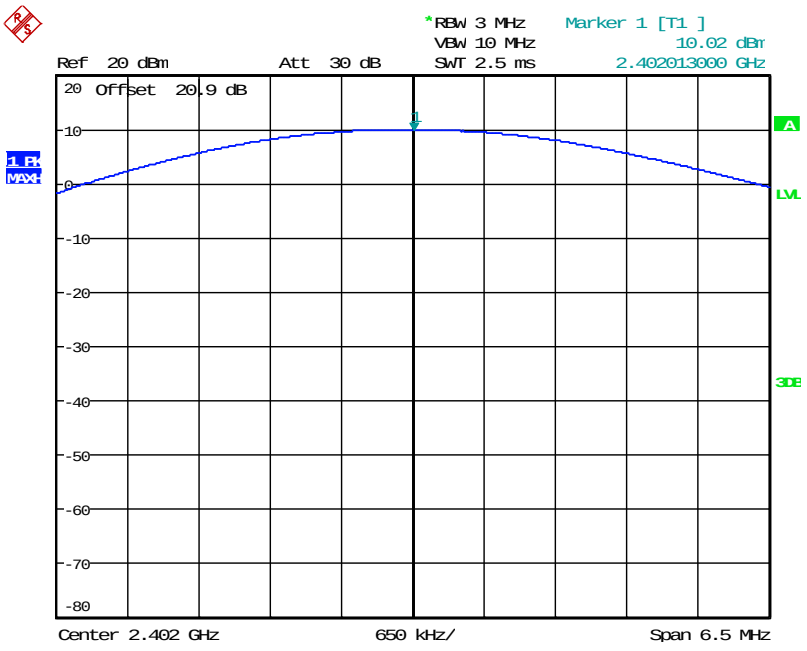


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Figure 7.2.2-1: RF Output Power (GFSK) - Low Channel

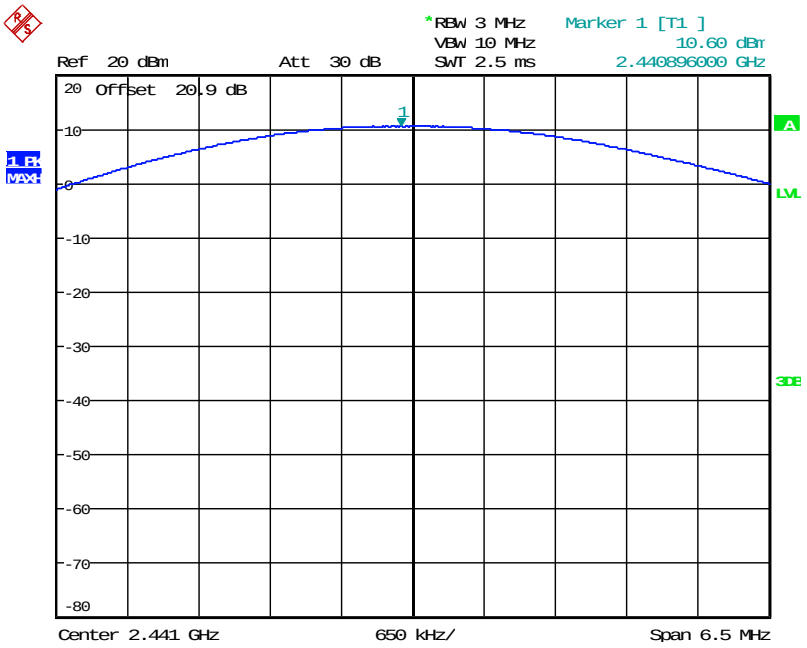

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Figure 7.2.2-2: RF Output Power (GFSK) - Middle Channel

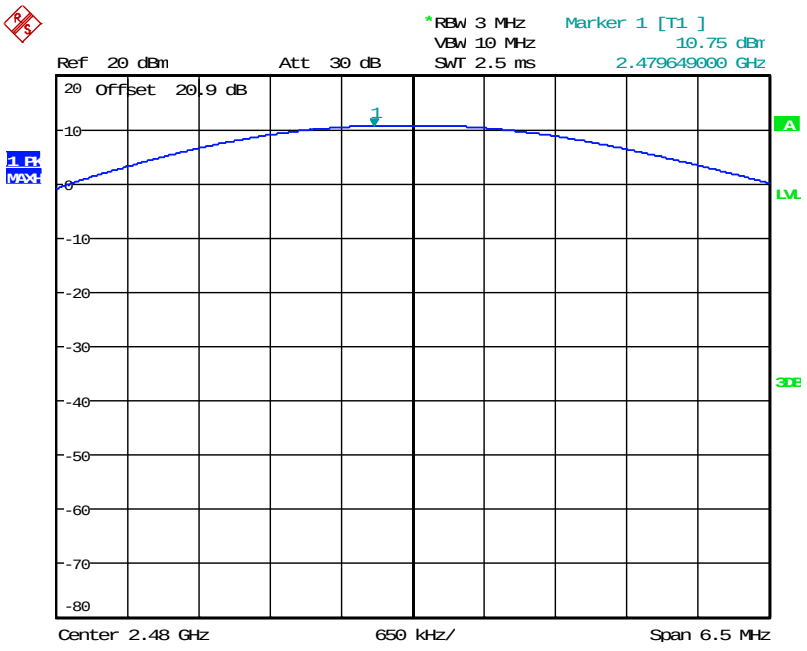

Figure 7.2.2-3: RF Output Power (GFSK) - High Channel

Table 7.2.2-2: RF Output Power (π/4 DQPSK)

Frequency (MHz)	Power (dBm)
2402	8.67
2441	9.28
2480	9.53

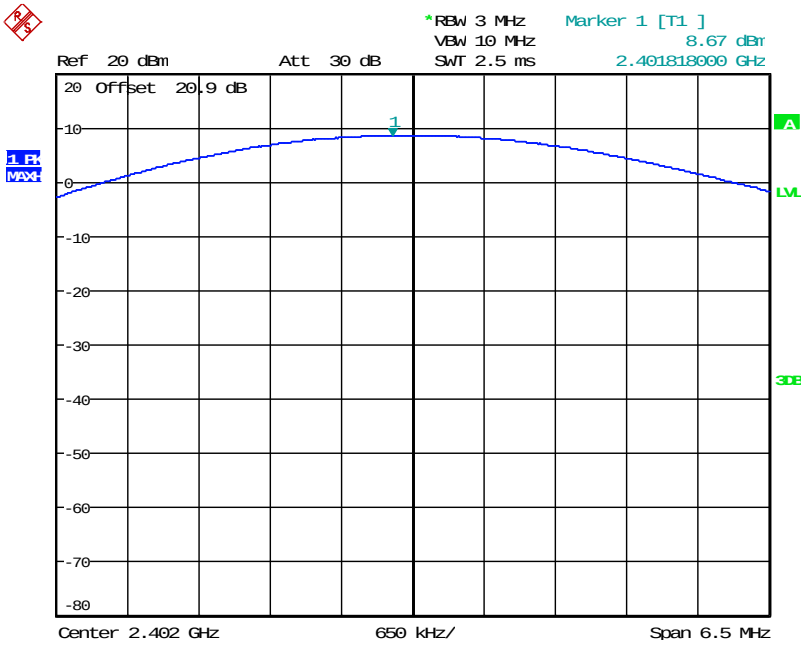

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Figure 7.2.2-4: RF Output Power (π/4 DQPSK) - Low Channel

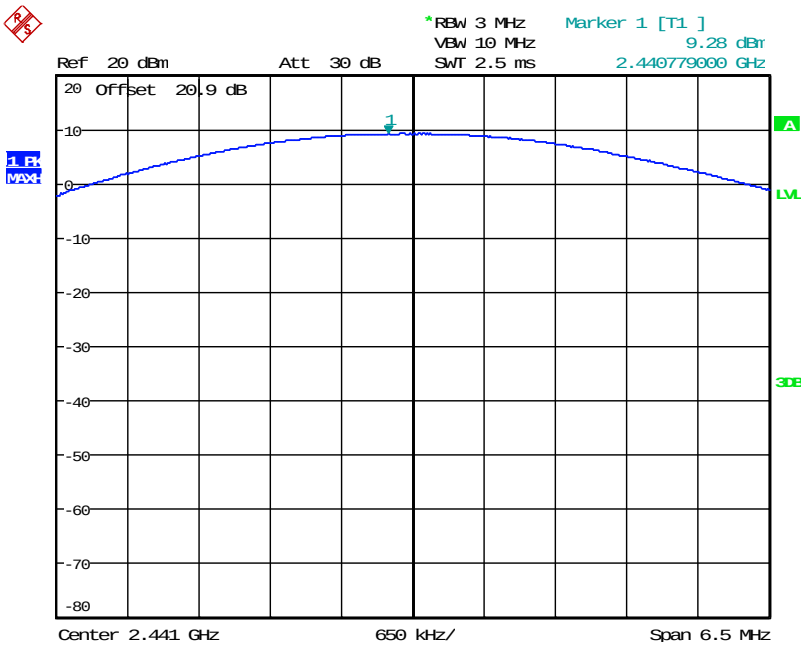

Figure 7.2.2-5: RF Output Power (π/4 DQPSK) - Middle Channel

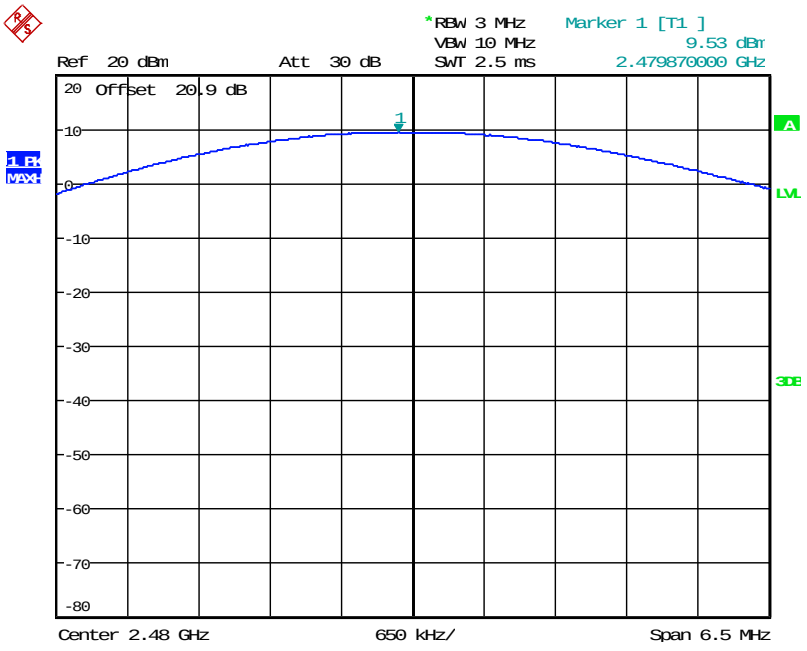

Figure 7.2.2-6: RF Output Power (π/4 DQPSK) - High Channel

Table 7.2.2-3: RF Output Power (8DPSK)

Frequency (MHz)	Power (dBm)
2402	9.10
2441	9.80
2480	10.11

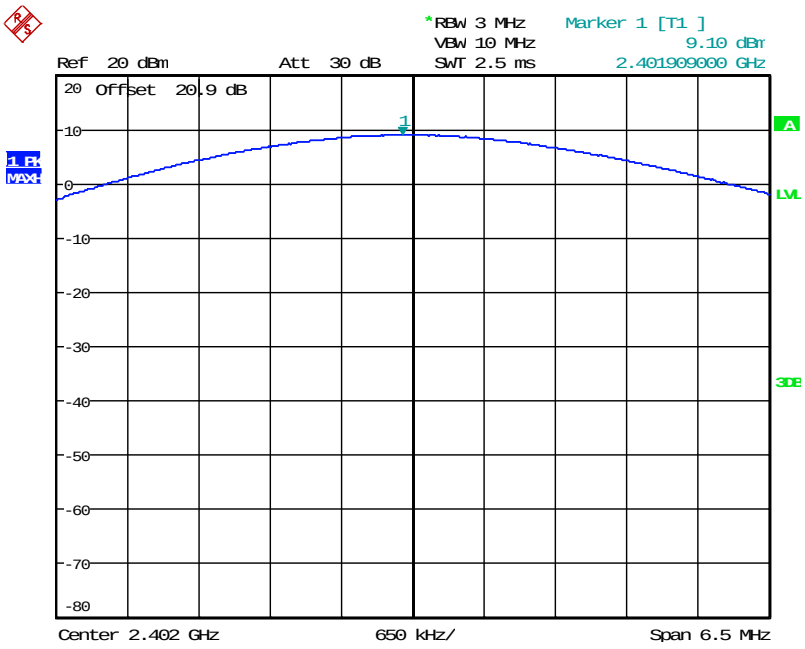

Figure 7.2.2-7: RF Output Power (8DPSK) - Low Channel

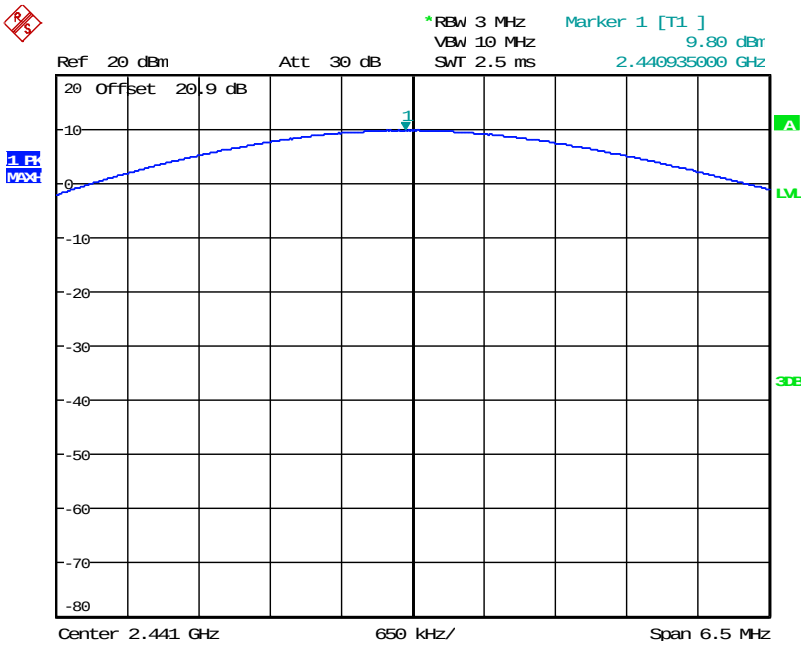

Figure 7.2.2-8: RF Output Power (8DPSK) - Middle Channel

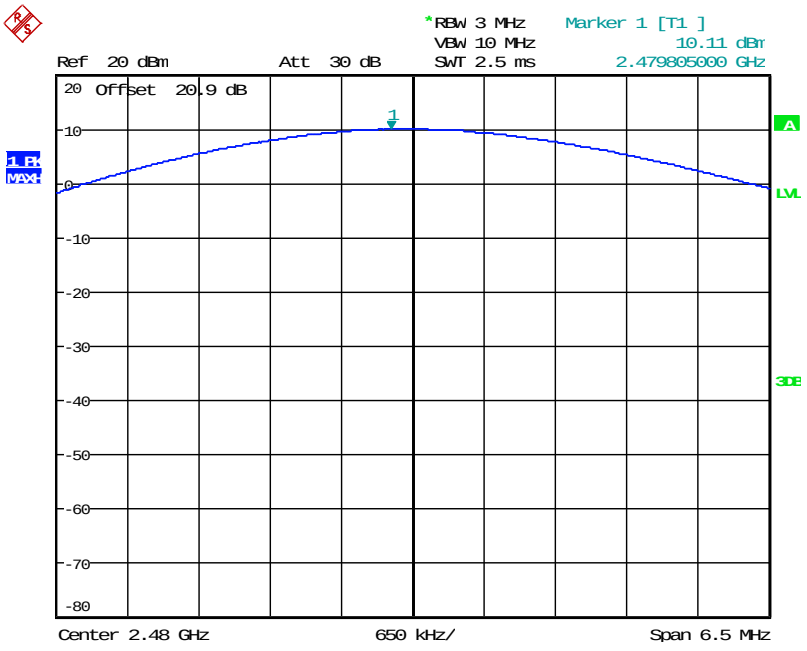

Figure 7.2.2-9: RF Output Power (8DPSK) - High Channel

7.3 Channel Usage Requirements

7.3.1 Carrier Frequency Separation – FCC: Section 15.247(a)(1); ISED Canada: RSS-247 5.1(2)

7.3.1.1 Measurement Procedure

The RF output port of the EUT was directly connected to the input of the spectrum analyzer. The span of the spectrum analyzer was set wide enough to capture two adjacent peaks and the RBW and VBW were set to approximately 30% of the channel spacing.

7.3.1.2 Measurement Results

Results are shown below:

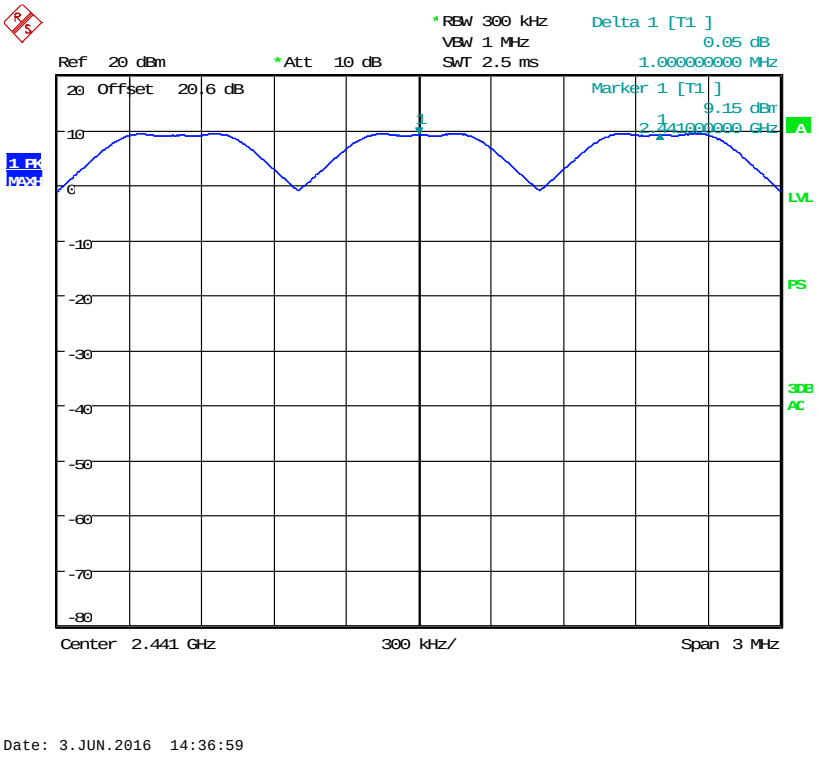

Figure 7.3.1.2-1: Carrier Frequency Separation

7.3.2 Number of Hopping Channels – FCC: Section 15.247(a)(1)(iii); ISED Canada: RSS-247 5.1(4)

7.3.2.1 Measurement Procedure

The RF output port of the EUT was directly connected to the input of the spectrum analyzer. The span of the spectrum analyzer was set wide enough to capture the number of hopping channels. The peak detector max hold function was enabled for the measurements.

7.3.2.2 Measurement Results

Results are shown below:

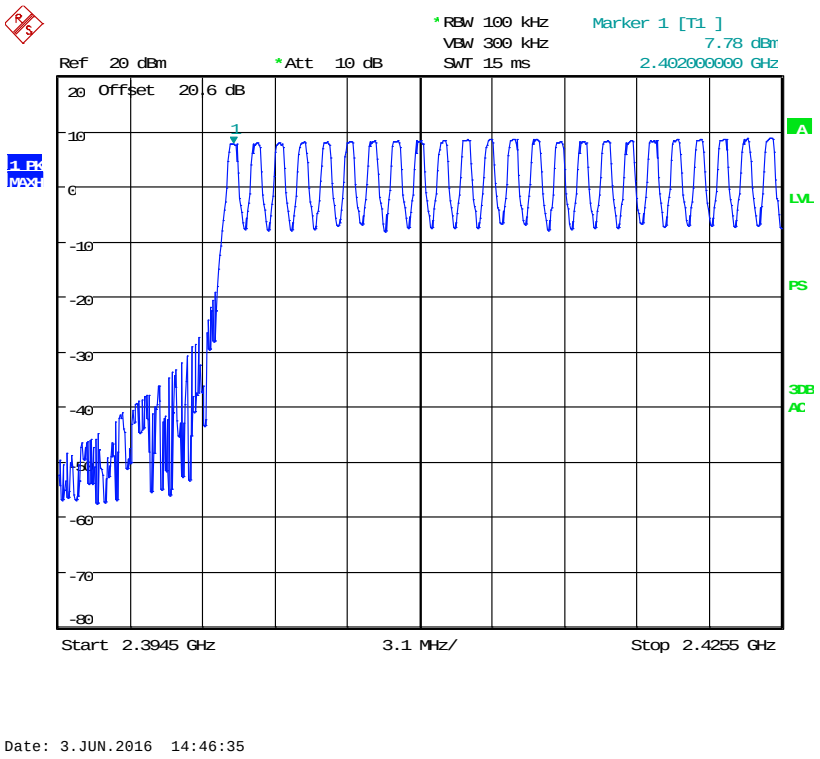

Figure 7.3.2.2-1: Number of Hopping Channels (1 – 24)

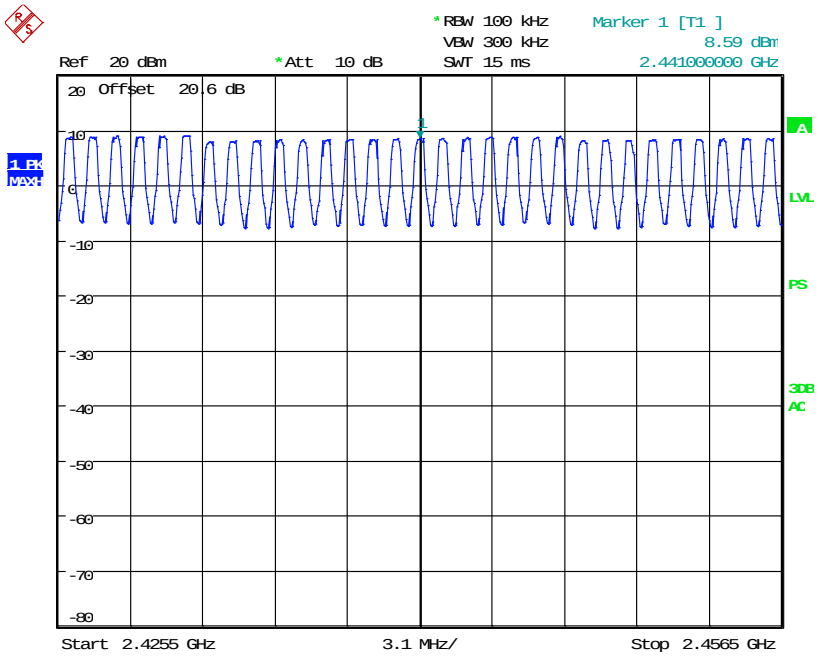

Figure 7.3.2.2-2: Number of Hopping Channels (25 – 55)

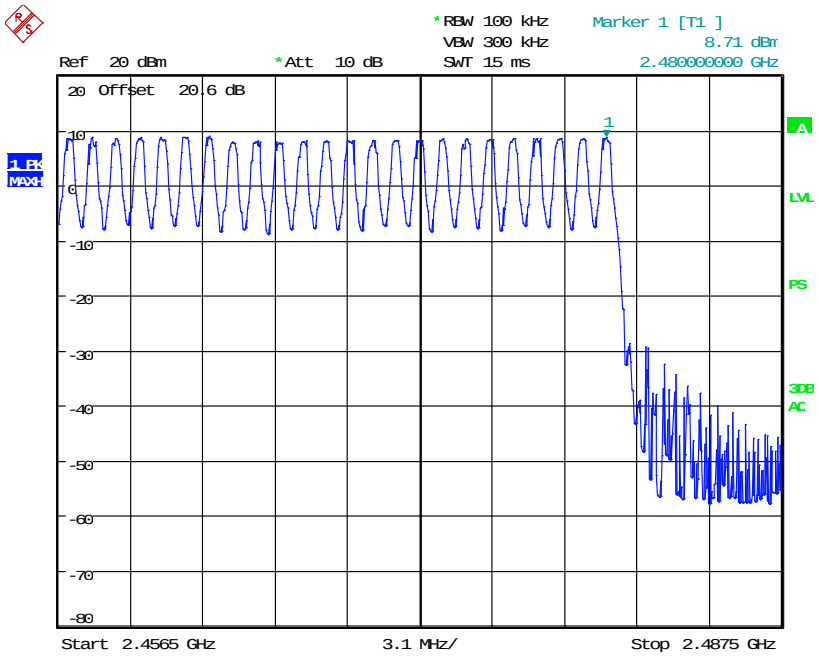

Figure 7.3.2.2-3: Number of Hopping Channels (56 – 79)

7.3.3 Channel Dwell Time – FCC: Section 15.247(a)(1)(iii); ISED Canada: RSS-247 5.1(4)

7.3.3.1 Measurement Procedure

The RF output port of the EUT was directly connected to the input of the spectrum analyzer. The span of the spectrum analyzer was set 0 Hz centered on a hopping channel. The RBW was set to less than 30% of the channel spacing and the sweep time adjusted to capture the entire dwell time per channel with peak detector max hold function.

7.3.3.2 Measurement Results

Results are shown below:

Table 7.3.3.2-1 Dwell Time on a 31.6 Second Cycle

Packet Format	Number of Hops Per Sec. (NHPS)	Number of Hops per Channel Per Sec. (NHPCPS)	Number of hops on a 31.6 s Cycle (NHPC)	Measured Dwell Times (ms)	Dwell Times on a 31.6 s Cycle	Limit (ms)	Status
DH1	800	10.13	320	0.3541667	113.33	400	PASS
DH3	400	5.06	160	1.600962	256.15	400	PASS
DH5	266.67	3.38	106.67	2.852564	304.28	400	PASS

*Notes:

NHPS = (1600 /sec)/ (NT+NR) (where NT and NR are the number of transmit and receive packets, respectively)
NHPCPS = NHPS/79
NHPC = NHPCPS * 31.6s
Dwell Time per Cycle = NHPC* Measured Dwell Time

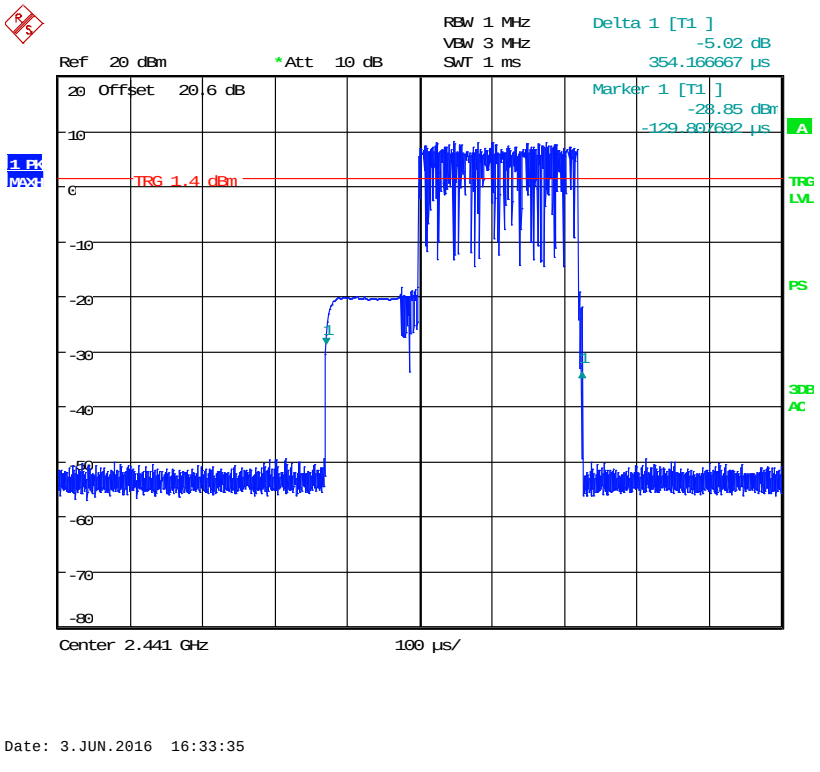

Figure 7.3.3.2-1: Channel Dwell Time – DH1

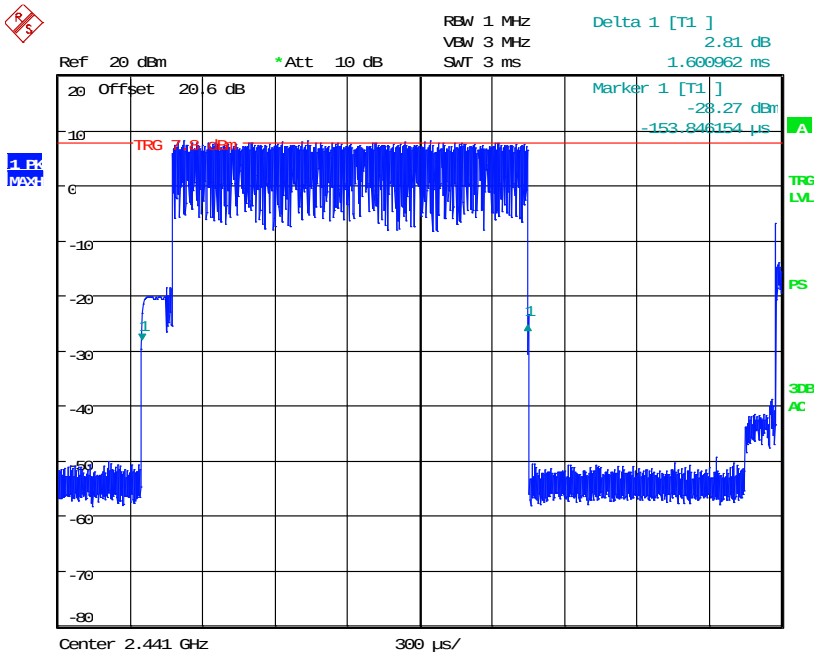

Figure 7.3.3.2-2: Channel Dwell Time – DH3

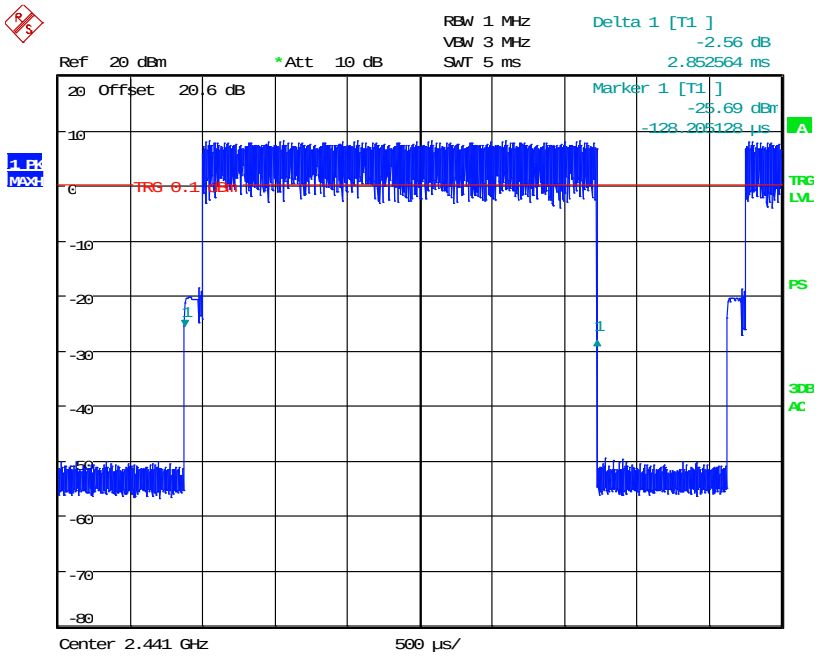

Figure 7.3.3.2-3: Channel Dwell Time – DH5

7.3.4 20dB / 99% Bandwidth - FCC: Section 15.247(a)(1)(i); ISED Canada: RSS-247 5.1(1)

7.3.4.1 Measurement Procedure

The RF output port of the EUT was directly connected to the input of the spectrum analyzer. The spectrum analyzer span was set to 2 to 5 times the estimated bandwidth of the emission. The RBW was set to 1% to 5% of the estimated emission bandwidth. The trace was set to max hold with a peak detector active. For the GFSK modulation, the Delta function of the analyzer was utilized to determine the 20 dB bandwidth of the emissions. For the 8 DPSK and Pi/4DQPSK modulations, the N dB function of the spectrum analyzer was used to measure the 20 dB bandwidth.

The 99% occupied bandwidth was measured with the spectrum analyzer span set to fully display the emission. The RBW was set to 1% to 5% of the approximated bandwidth. The occupied 99% bandwidth was measured by using the 99% bandwidth equipment function of the spectrum analyzer.

7.3.4.2 Measurement Results

Results are shown below:

Table 7.3.4.2-1: 20dB / 99% Bandwidth

Frequency [MHz]	20dB Bandwidth [kHz]	99% Bandwidth [kHz]
2402	1032.0	900.0
2441	1032.0	900.0
2480	1032.0	900.0

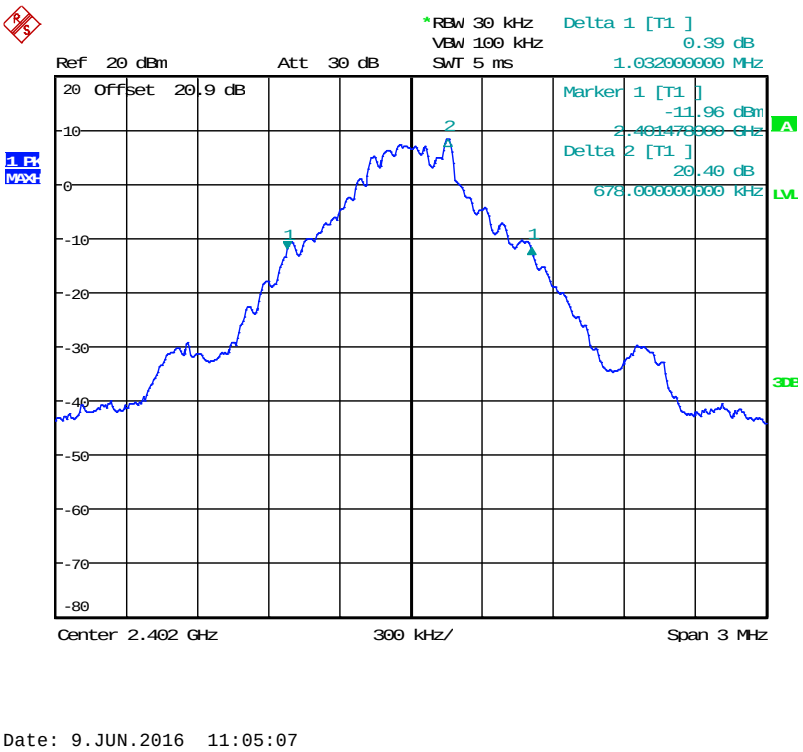

Figure 7.3.4.2-1: 20dB BW Low Channel (GFSK)

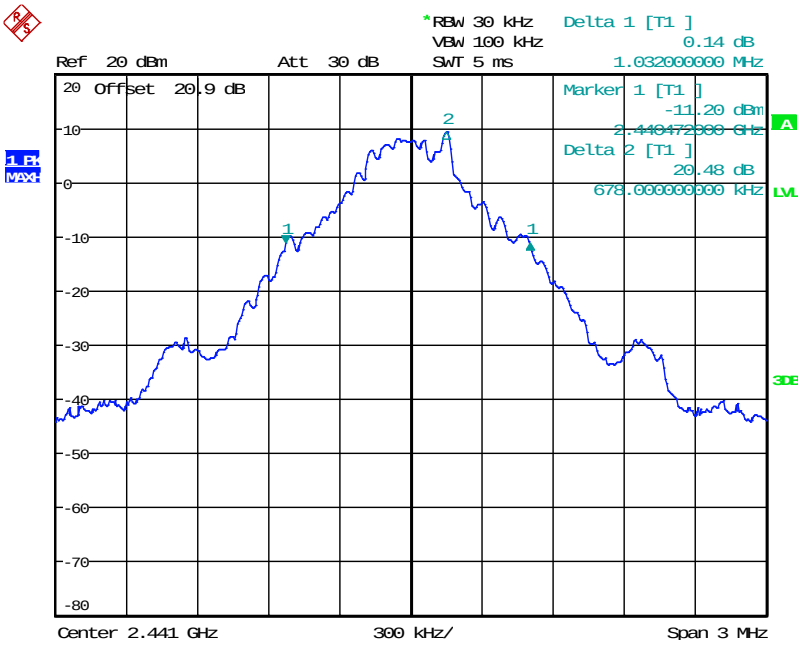

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Figure 7.3.4.2-2: 20dB BW Middle Channel (GFSK)

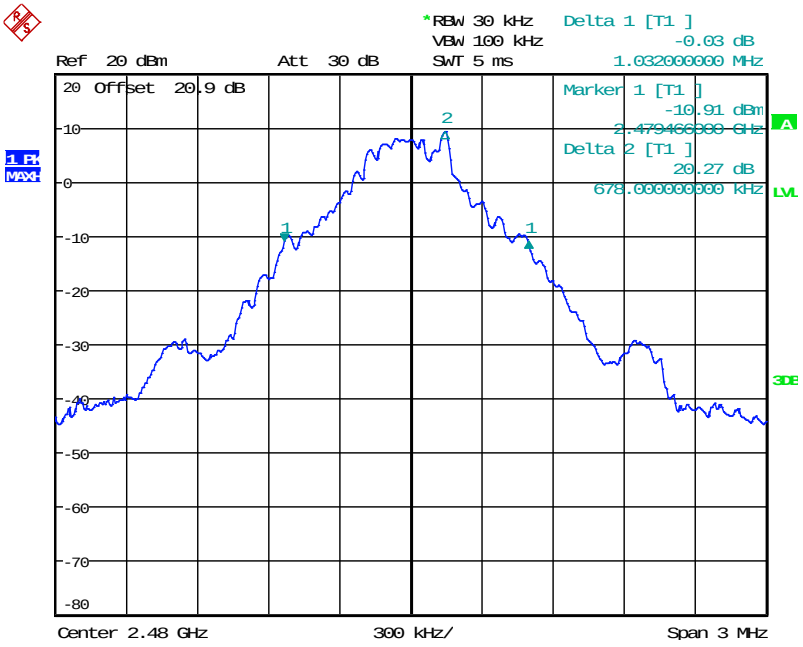

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Figure 7.3.4.2-3: 20dB BW High Channel (GFSK)

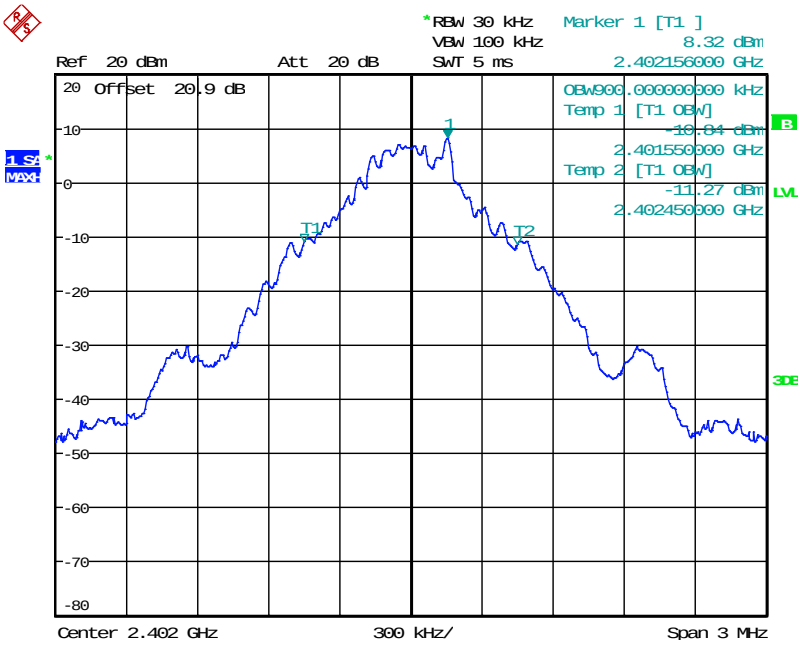

Figure 7.3.4.2-4: 99% OBW Low Channel (GFSK)

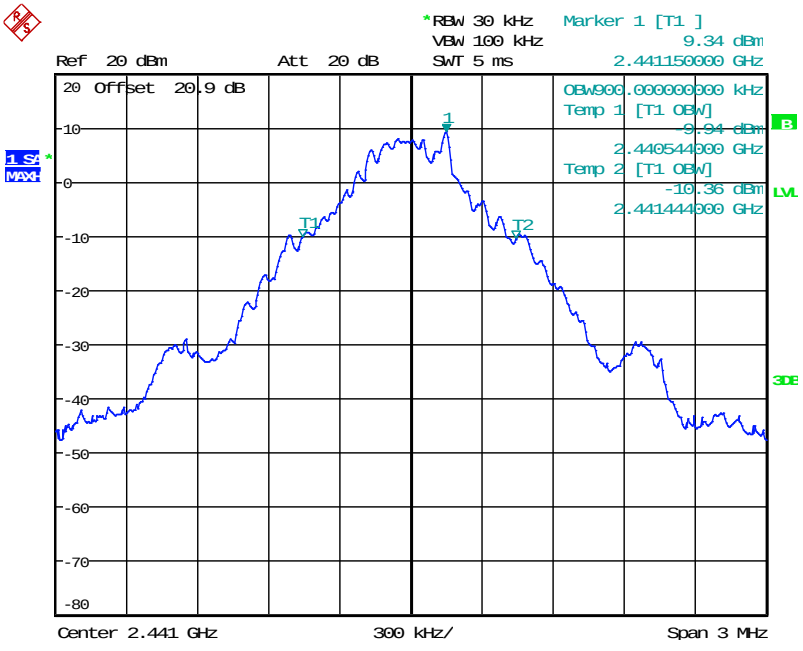

Figure 7.3.4.2-5: 99% OBW Middle Channel (GFSK)

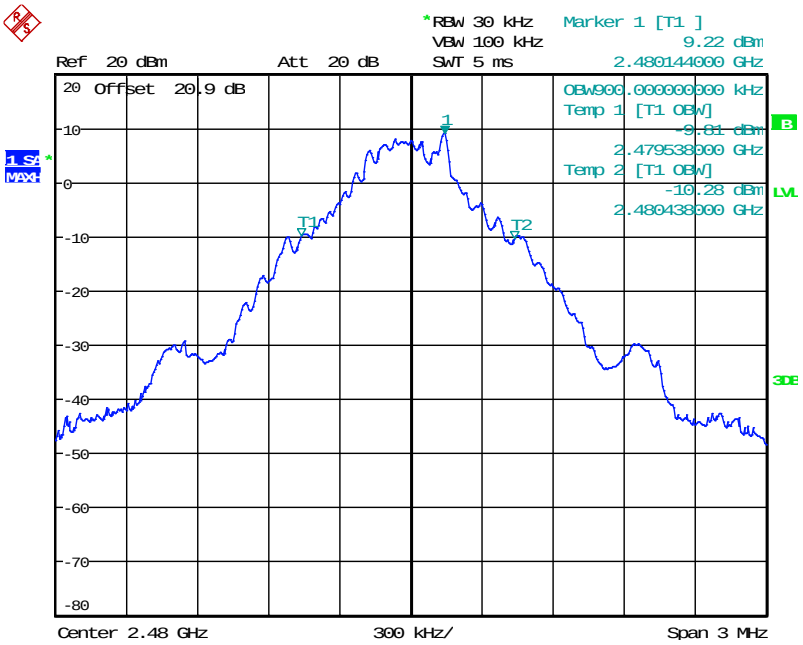

Figure 7.3.4.2-6: 99% OBW High Channel (GFSK)

Table: 7.3.4.2-2: 20dB / 99% Bandwidth (π/4 DQPSK)

Frequency [MHz]	20dB Bandwidth [kHz]	99% Bandwidth [kHz]
2402	1362.0	1206.0
2441	1368.0	1206.0
2480	1362.0	1200.0

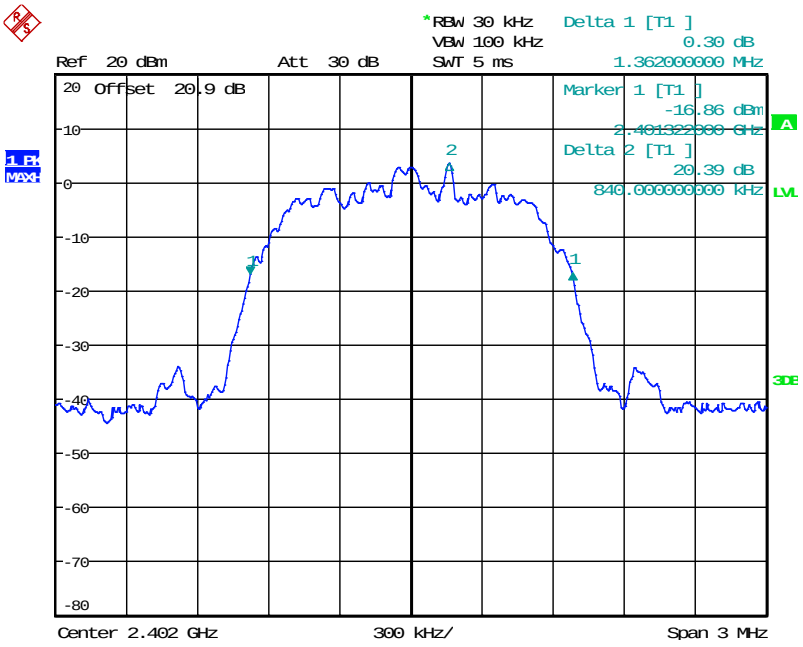

Figure 7.3.4.2-7: 20dB BW Low Channel (π/4 DQPSK)

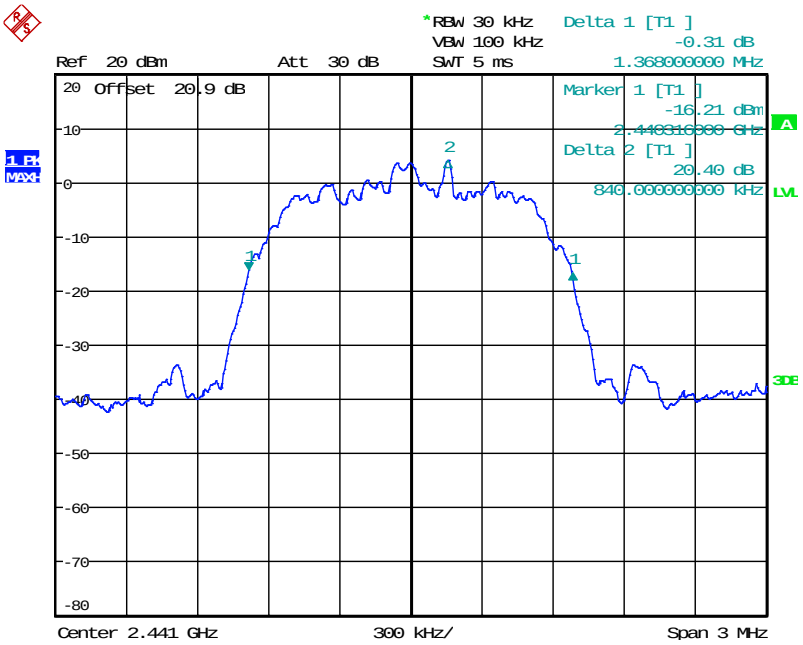

Figure 7.3.4.2-8: 20dB BW Middle Channel (π/4 DQPSK)

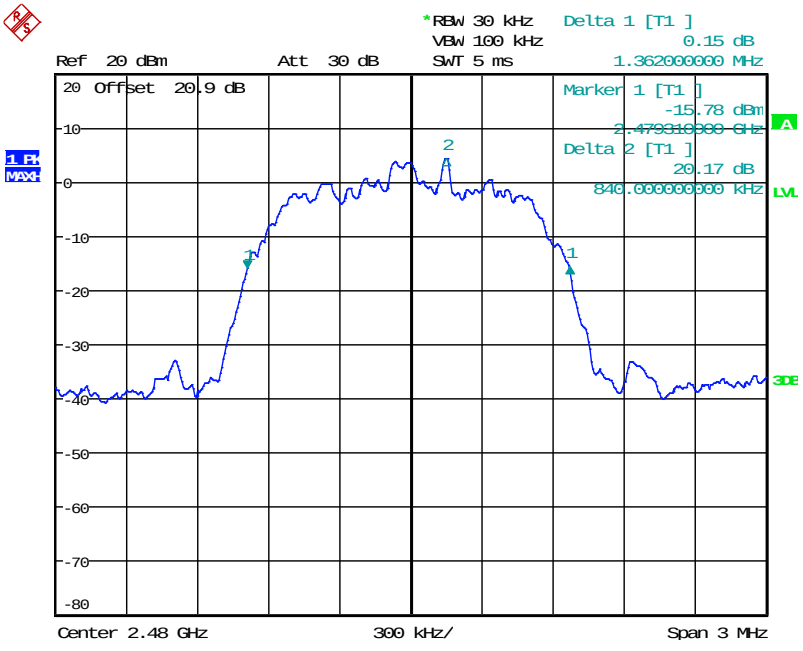

Figure 7.3.4.2-9: 20dB BW High Channel (π/4 DQPSK)

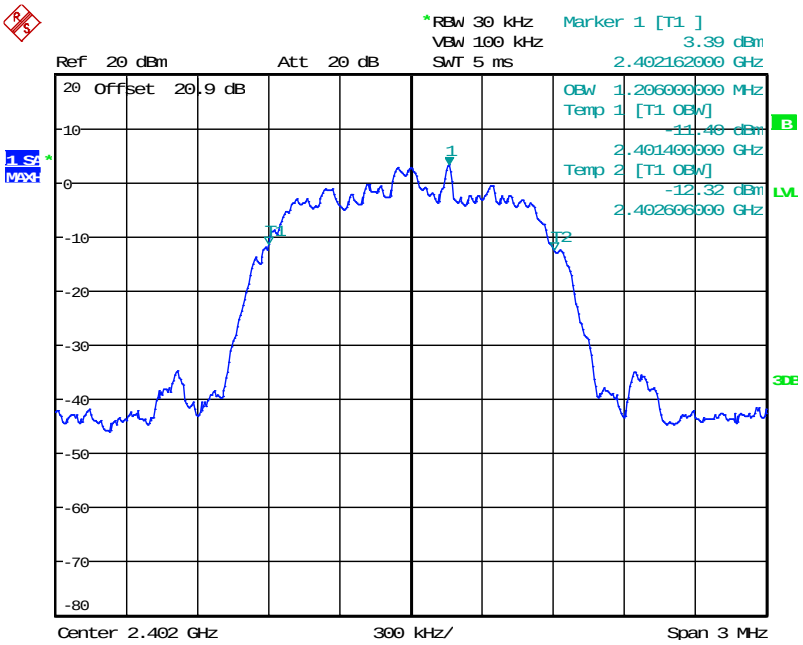

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Figure 7.3.4.2-10: 99% OBW Low Channel (π/4 DQPSK)

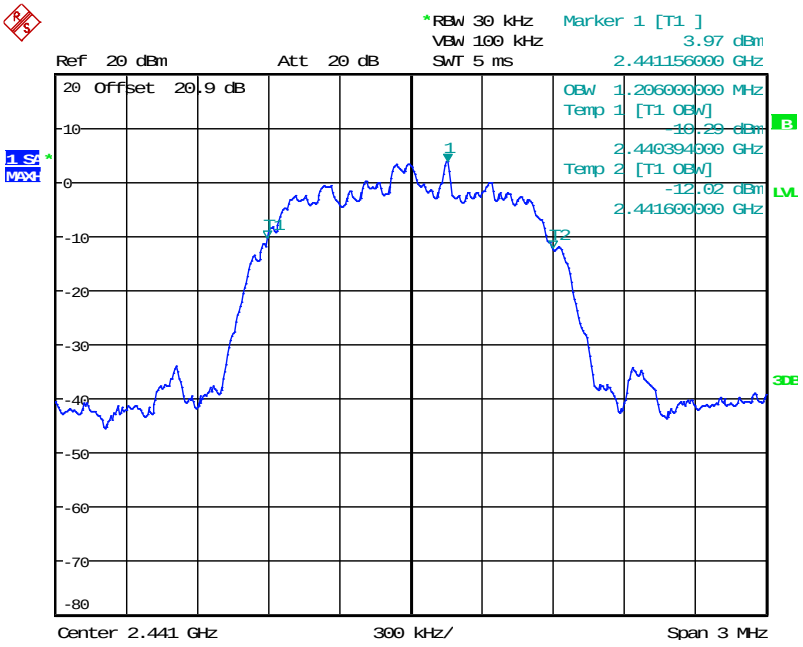

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Figure 7.3.4.2-11: 99% OBW Middle Channel (π/4 DQPSK)

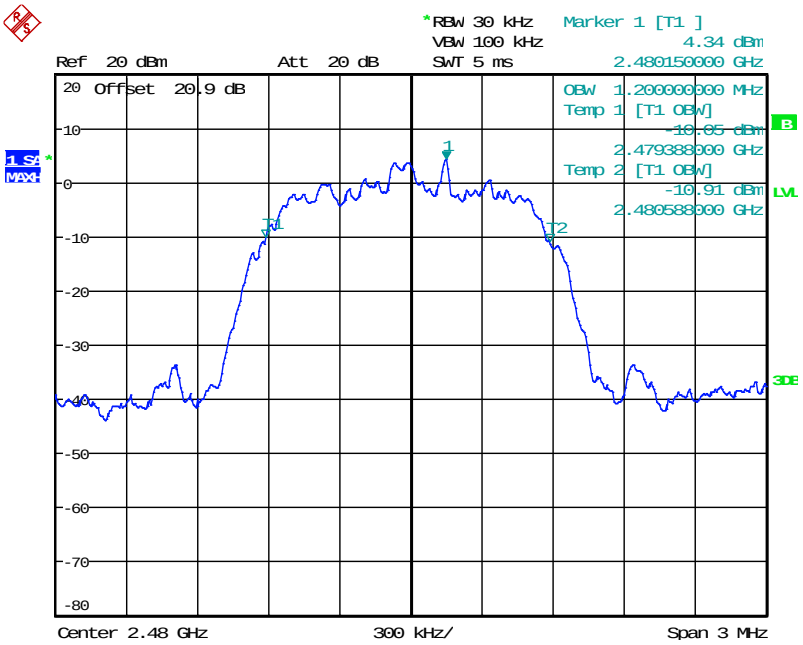

Figure 7.3.4.2-12: 99% OBW High Channel (π/4 DQPSK)

Table 7.3.4.2-3: 20dB / 99% Bandwidth (8DPSK)

Frequency [MHz]	20dB Bandwidth [kHz]	99% Bandwidth [kHz]
2402	1326.0	1206.0
2441	1326.0	1206.0
2480	1326.0	1206.0

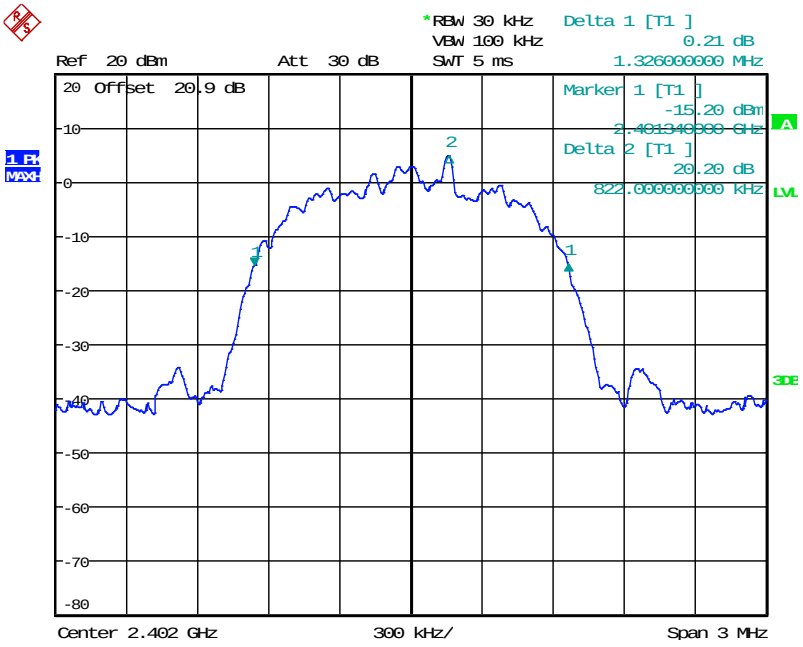

Figure 7.3.4.2-13: 20dB BW Low Channel (8DPSK)

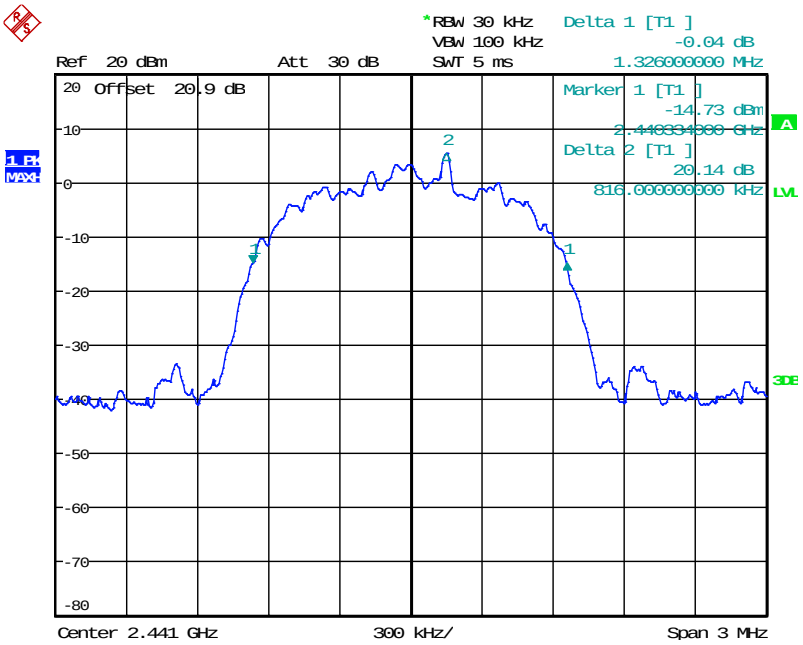

Figure 7.3.4.2-14: 20dB BW Middle Channel (8DPSK)

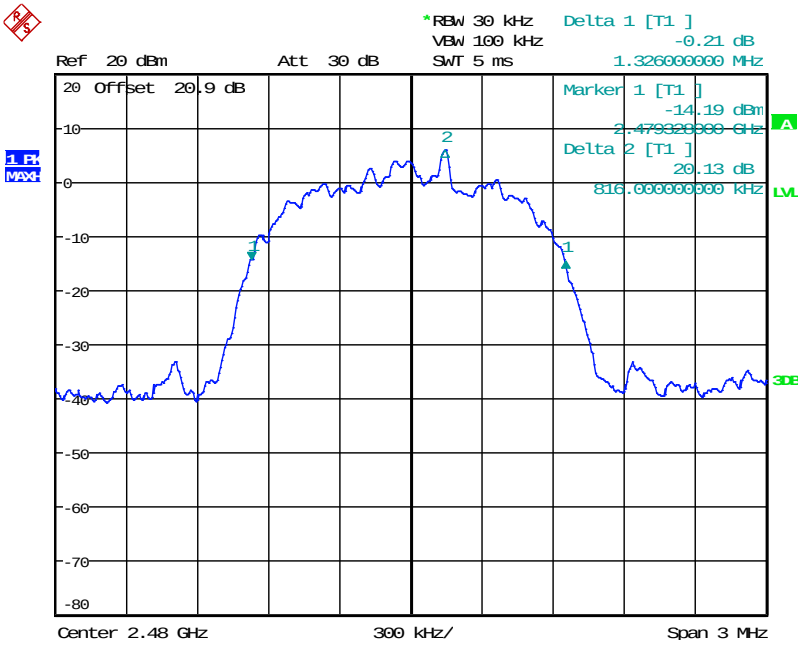

Figure 7.3.4.2-15: 20dB BW High Channel (8DPSK)

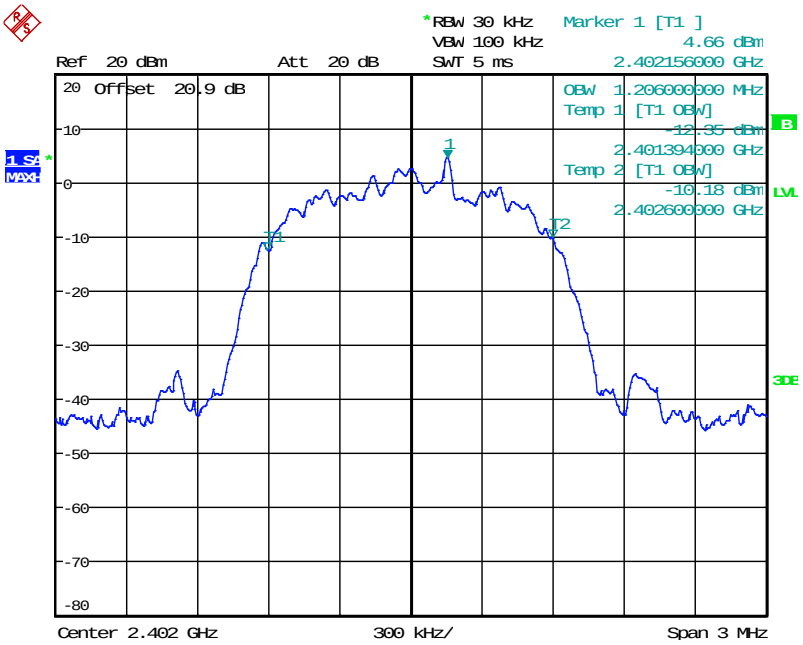

Figure 7.3.4.2-16: 99% OBW Low Channel (8DPSK)

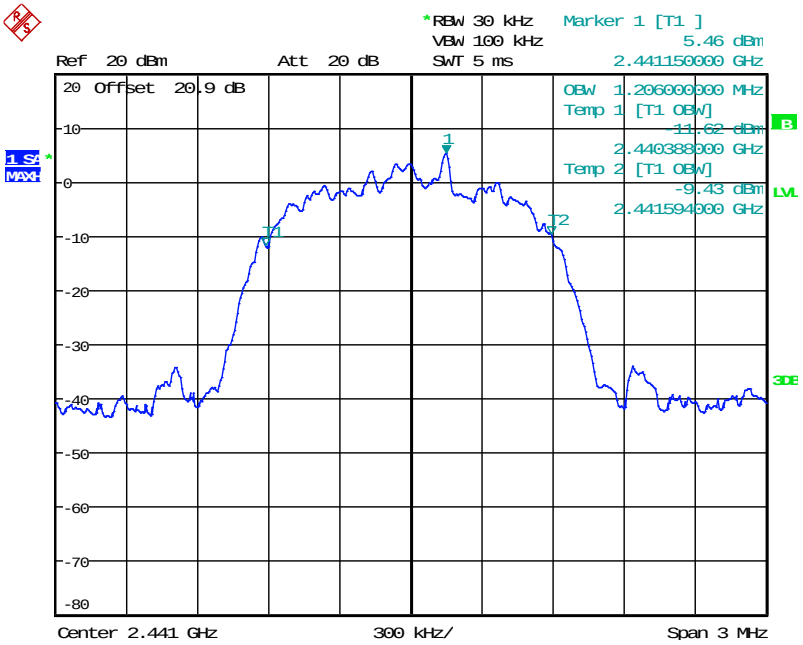

Figure 7.3.4.2-17: 99% OBW Middle Channel (8DPSK)

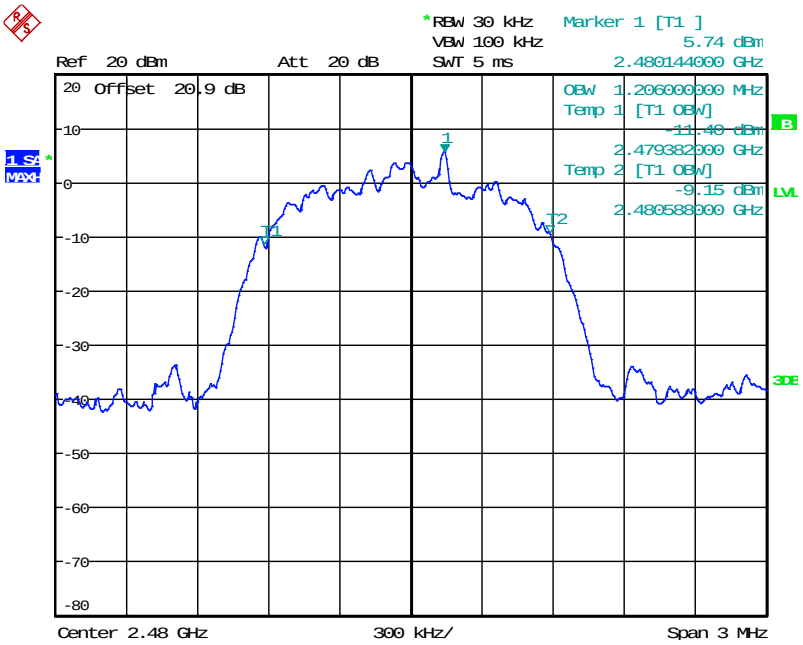

Figure 7.3.4.2-18: 99% OBW High Channel (8DPSK)

7.4 Band-Edge and Spurious Emissions

7.4.1 Band-Edge Compliance of RF Conducted Emissions - FCC Section 15.247(d); ISED Canada: RSS-247 5.5

7.4.1.1 Measurement Procedure

The RF output port of the EUT was connected to the input of the spectrum analyzer through suitable attenuation. The EUT was investigated at the lowest and highest channel available to determine band-edge compliance. For each measurement the spectrum analyzer's RBW was set to 100 kHz and the VBW was set to >= 300 kHz.

7.4.1.2 Measurement Results

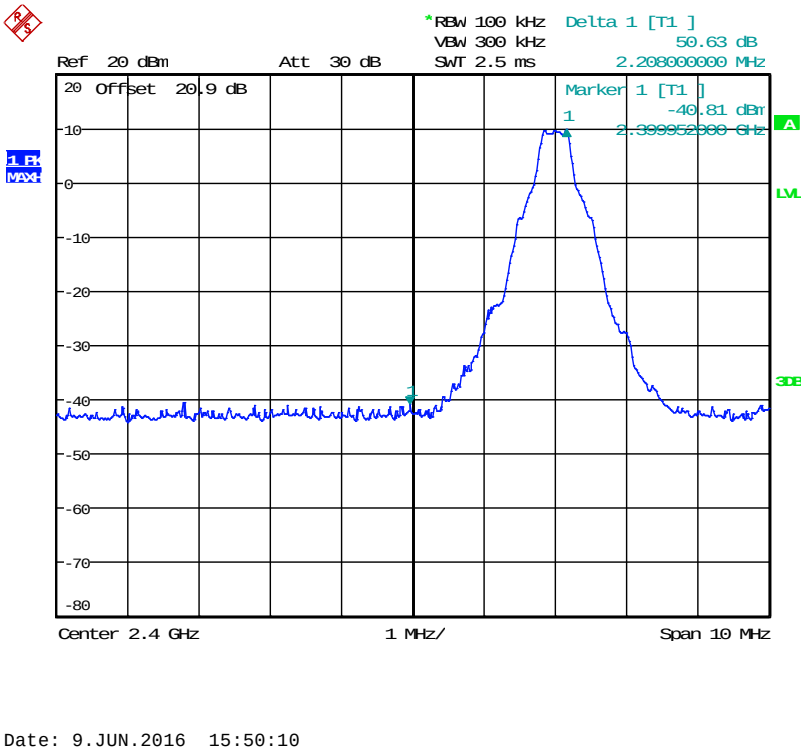

Figure 7.4.1.2-1: Lower Band-edge (GFSK)

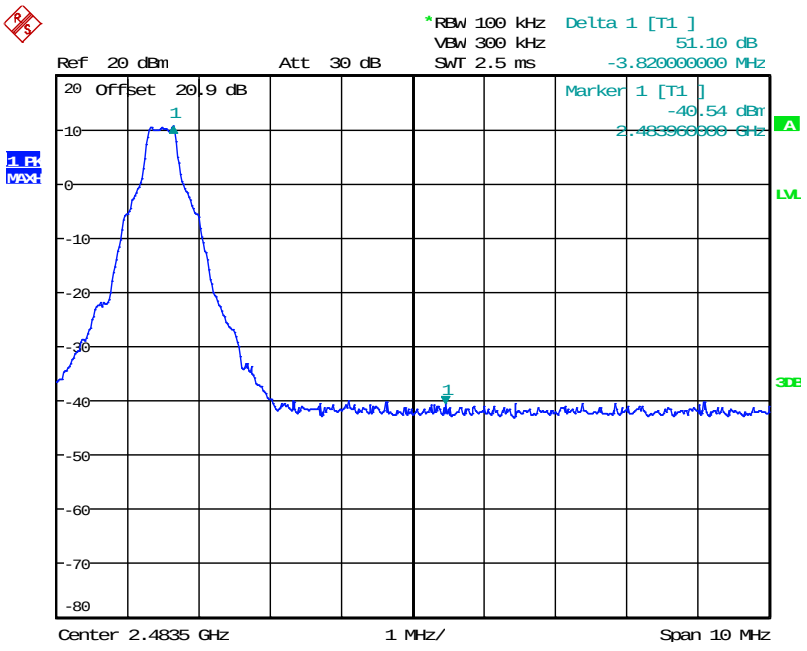

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Figure 7.4.1.2-2: Upper Band-edge (GFSK)

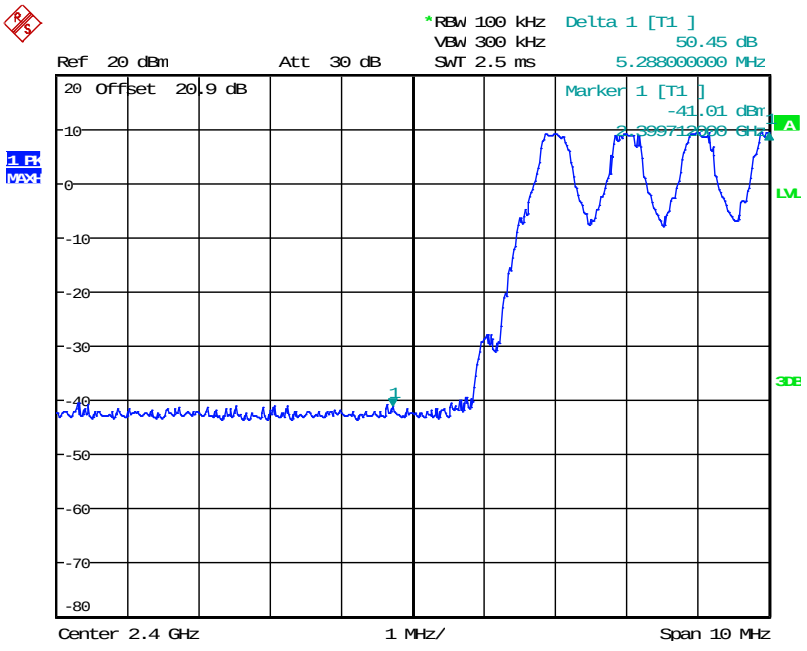

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Figure 7.4.1.2-3: Lower Band-edge – Hopping Mode (GFSK)

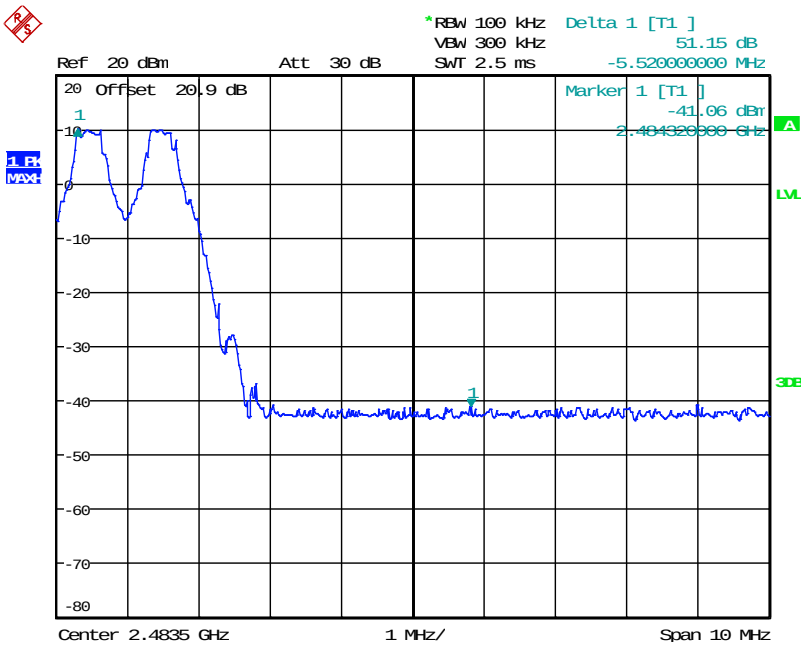

Figure 7.4.1.2-4: Upper Band-edge – Hopping Mode (GFSK)

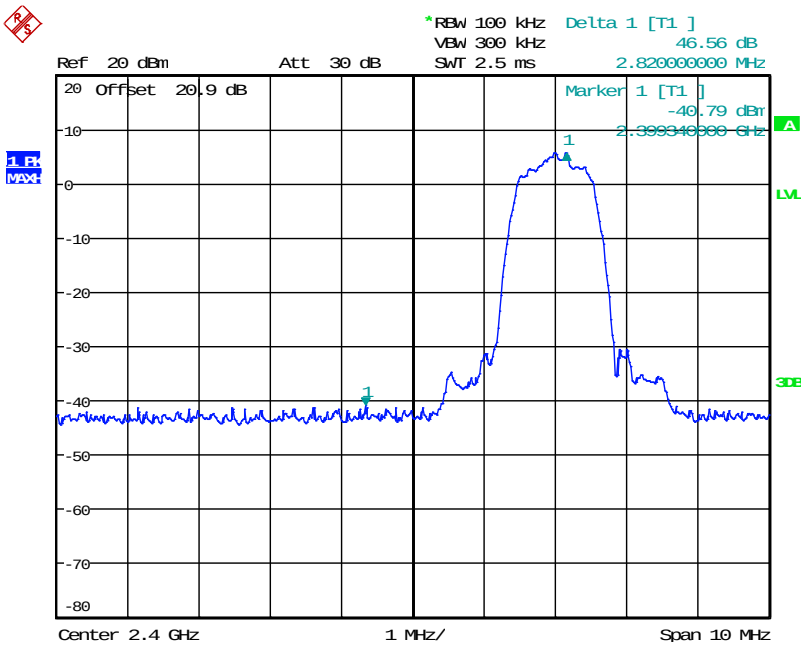

Figure 7.4.1.2-5: Lower Band-edge (π/4 DQPSK)

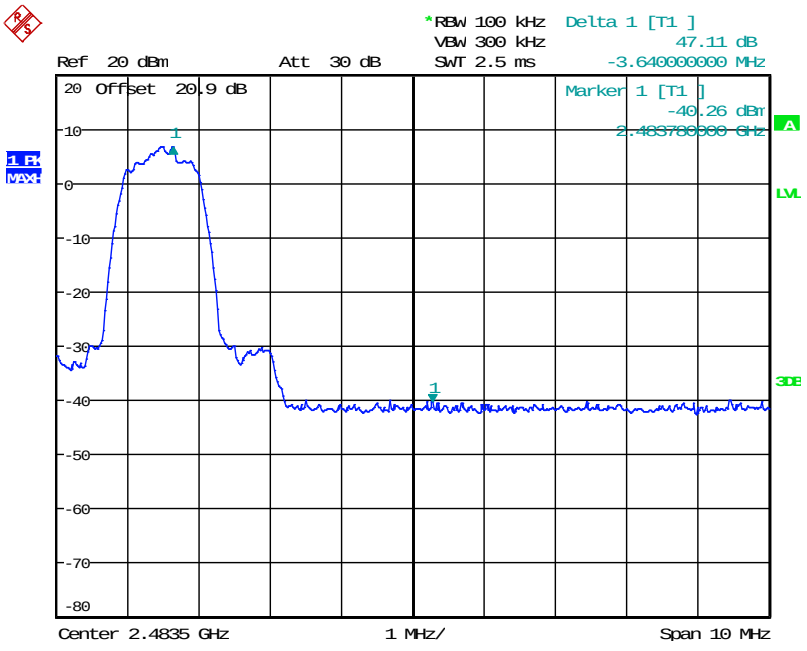

Figure 7.4.1.2-6: Upper Band-edge (π/4 DQPSK)

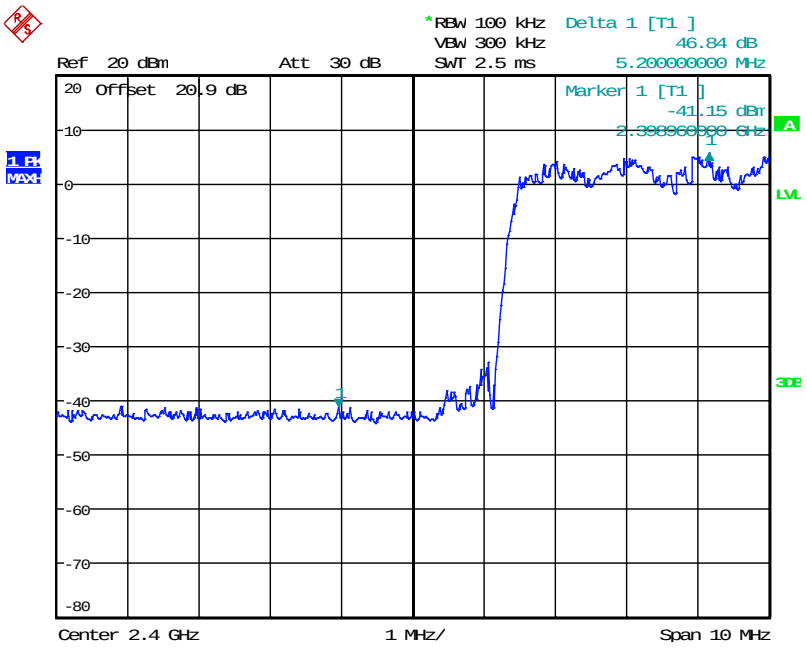

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Figure 7.4.1.2-7: Lower Band-edge – Hopping Mode (π/4 DQPSK)

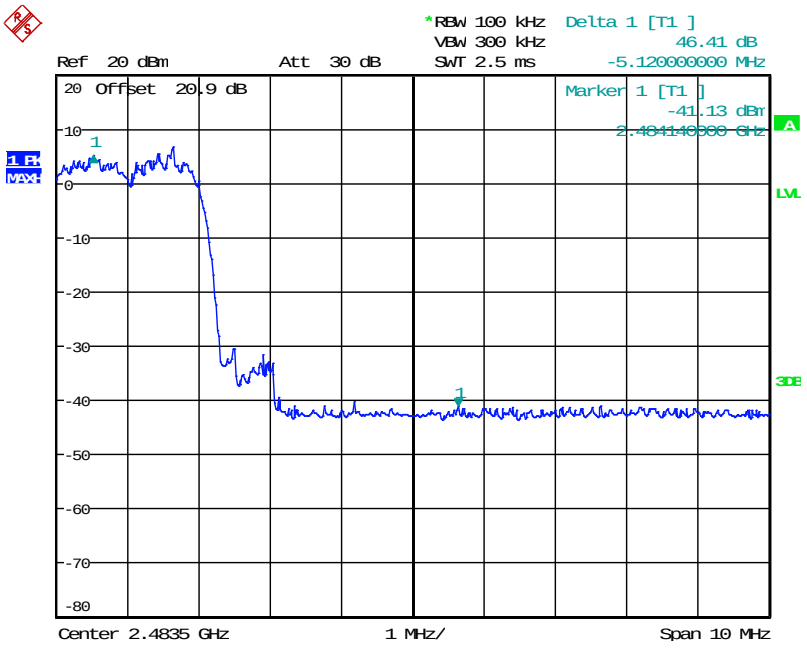

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Figure 7.4.1.2-8: Upper Band-edge – Hopping Mode (π/4 DQPSK)

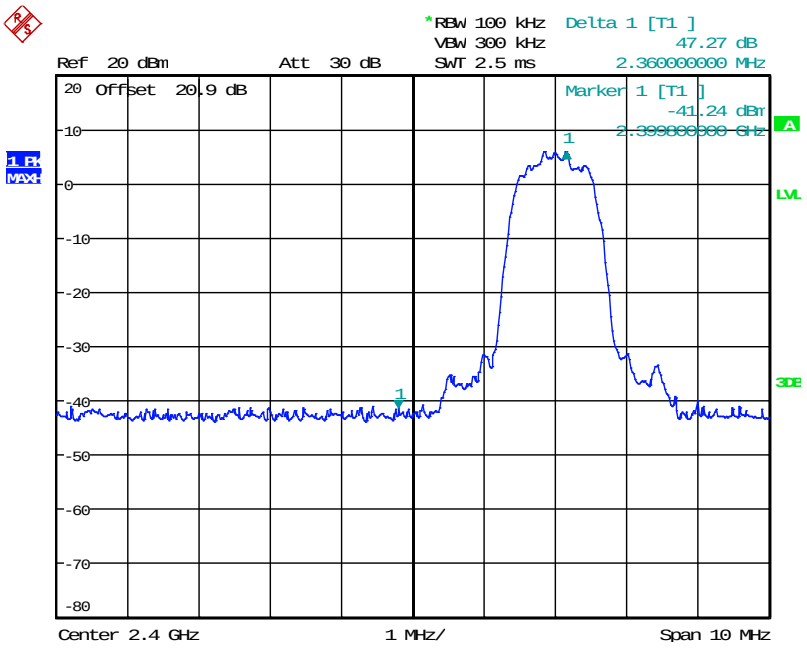


Figure 7.4.1.2-9: Lower Band-edge (8DPSK)

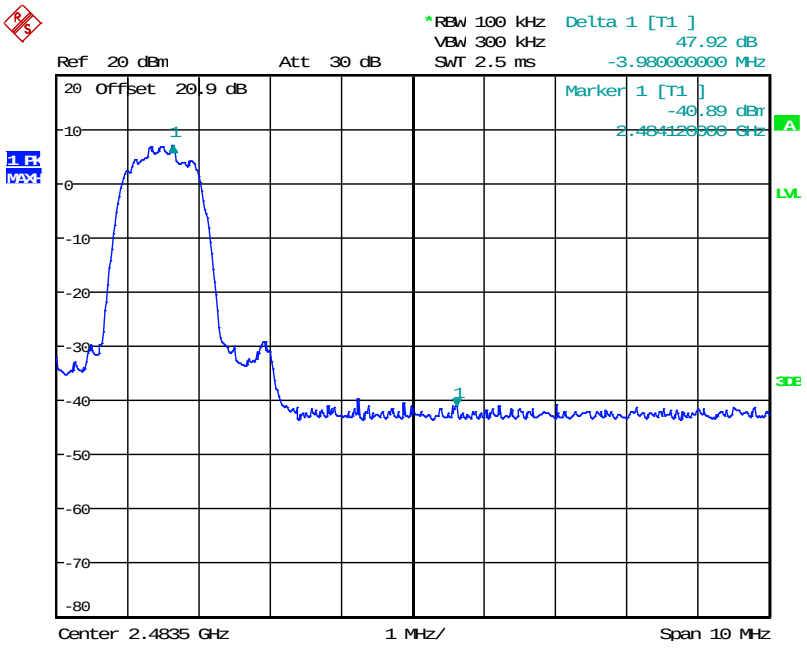
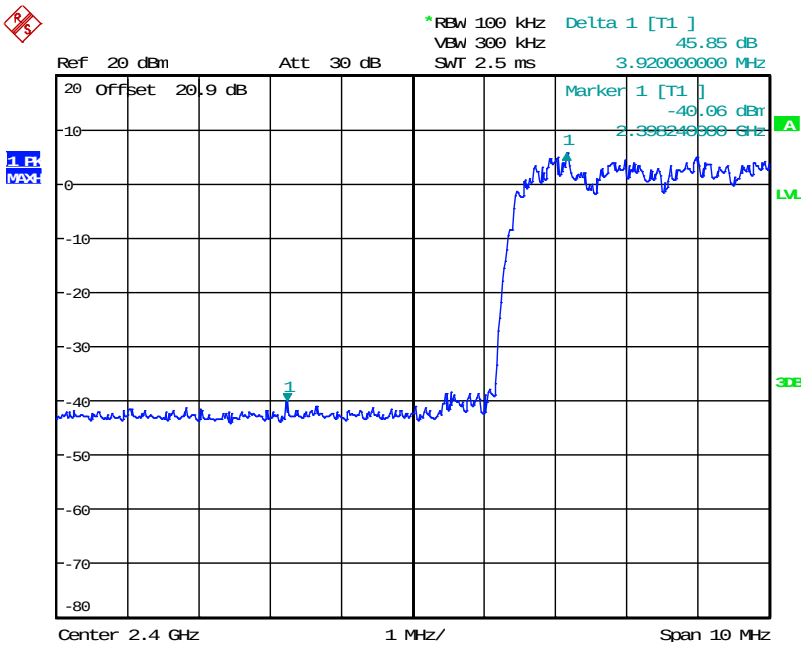
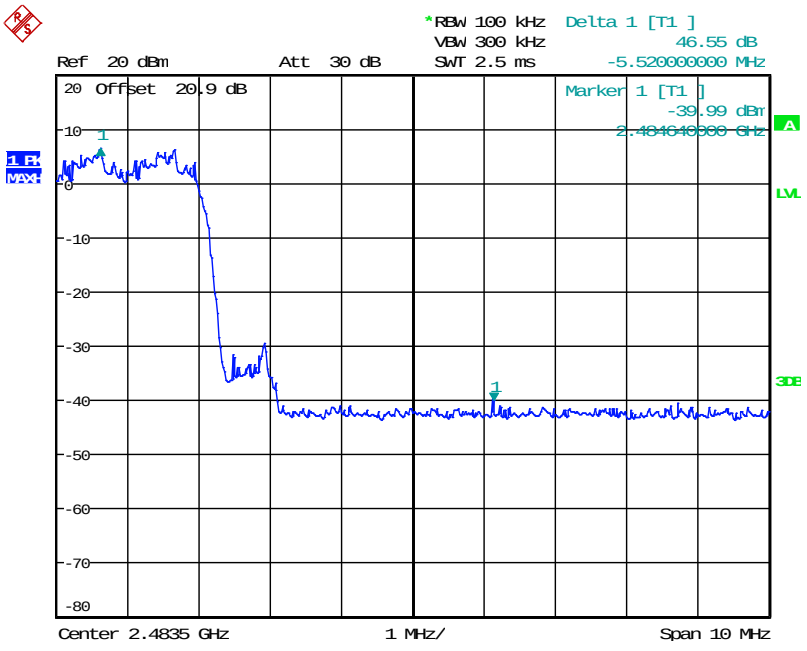


Figure 7.4.1.2-10: Upper Band-edge (8DPSK)



Date: 9.JUN.2016 16:14:13

Figure 7.4.1.2-11: Lower Band-edge – Hopping Mode (8DPSK)



Date: 9.JUN.2016 16:15:50

Figure 7.4.1.2-12: Upper Band-edge – Hopping Mode (8DPSK)

7.4.2 RF Conducted Spurious Emissions - FCC Section 15.247(d); ISED Canada: RSS-247 5.5

7.4.2.1 Measurement Procedure

The RF output port of the EUT was connected to the spectrum analyzer. The EUT was investigated for conducted spurious emissions from 30MHz to 26 GHz, 10 times the highest fundamental frequency. Measurements were made at the low, center and high channels of the EUT. For each measurement, the spectrum analyzer's RBW was set to 100 kHz. A peak detector function was used with the trace set to max hold. The levels were corrected for cable and attenuator losses.

7.4.2.2 Measurement Results

Results are shown below:

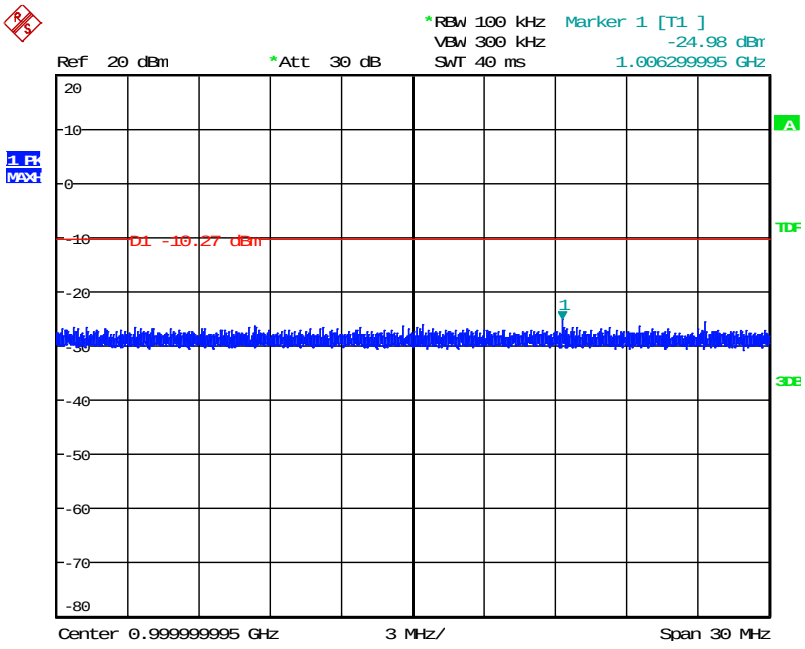
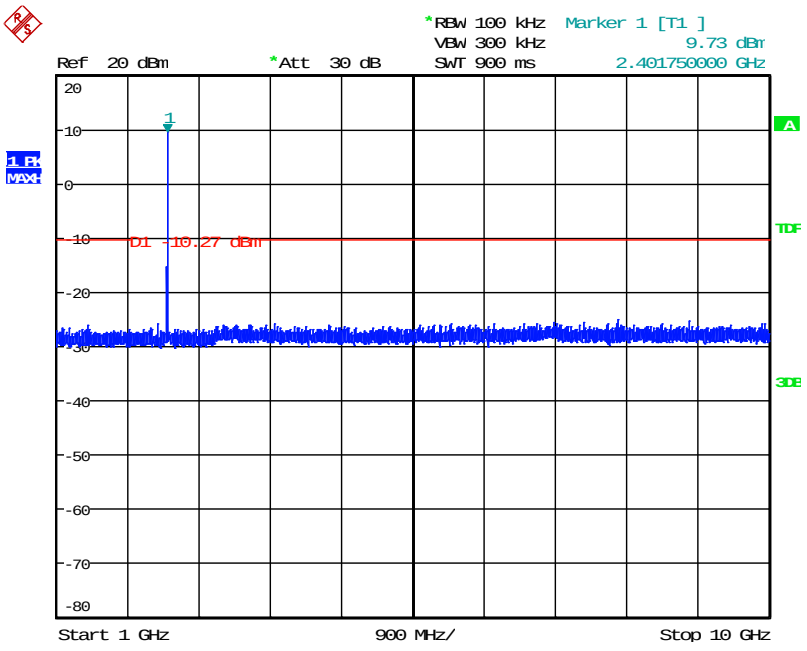
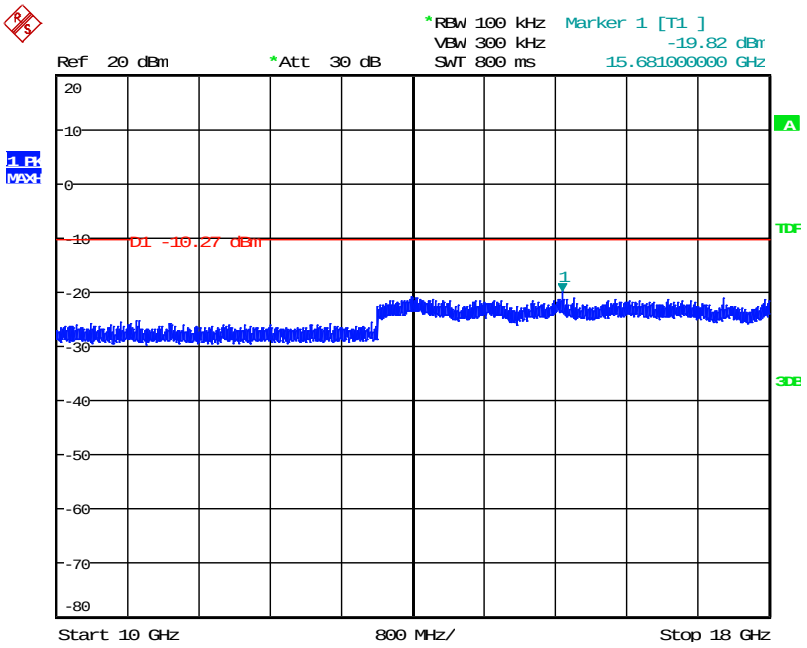


Figure 7.4.2.2-1: 30 MHz – 1 GHz – Low Channel (GFSK)



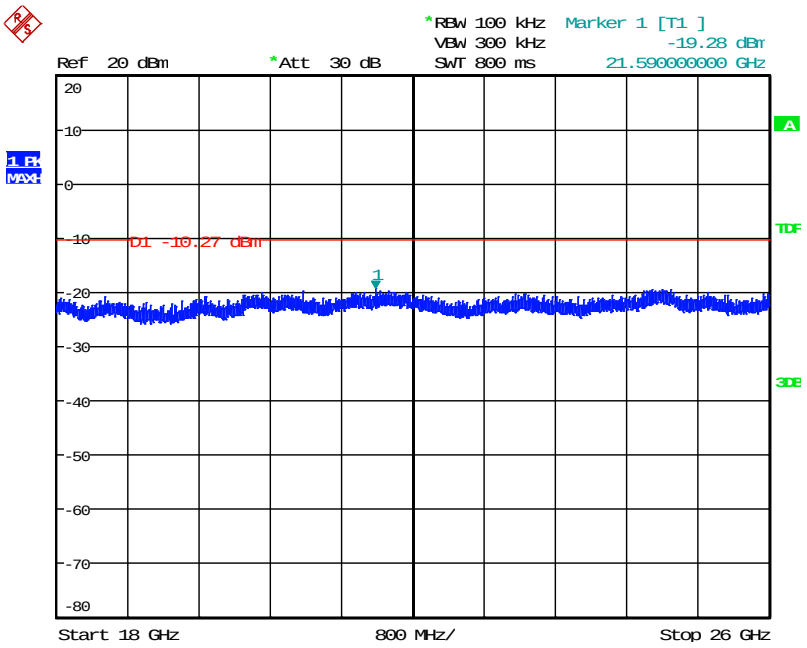
Date: 10.JUN.2016 09:34:13

Figure 7.4.2.2-2: 1 GHz –10 GHz – Low Channel (GFSK)



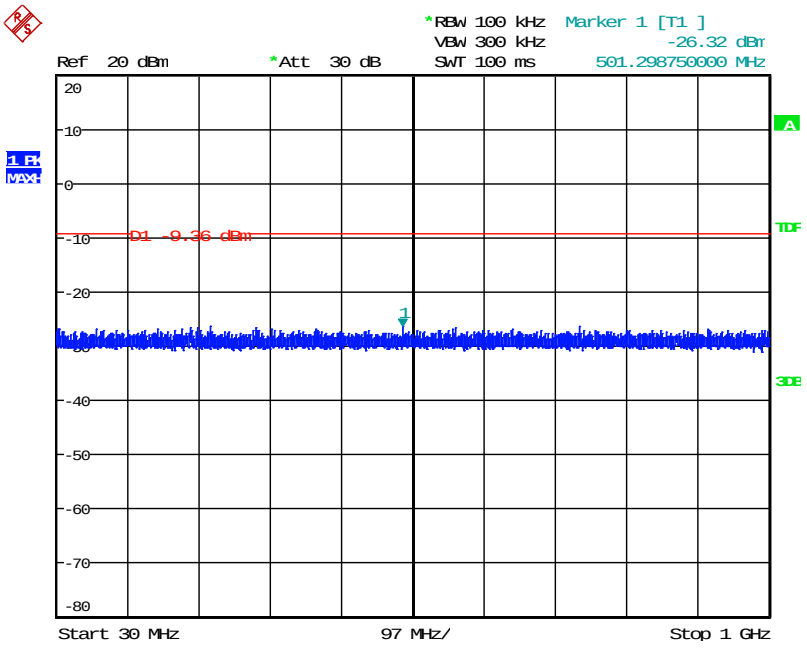
Date: 10.JUN.2016 09:38:05

Figure 7.4.2.2-3: 10 GHz –18 GHz – Low Channel (GFSK)



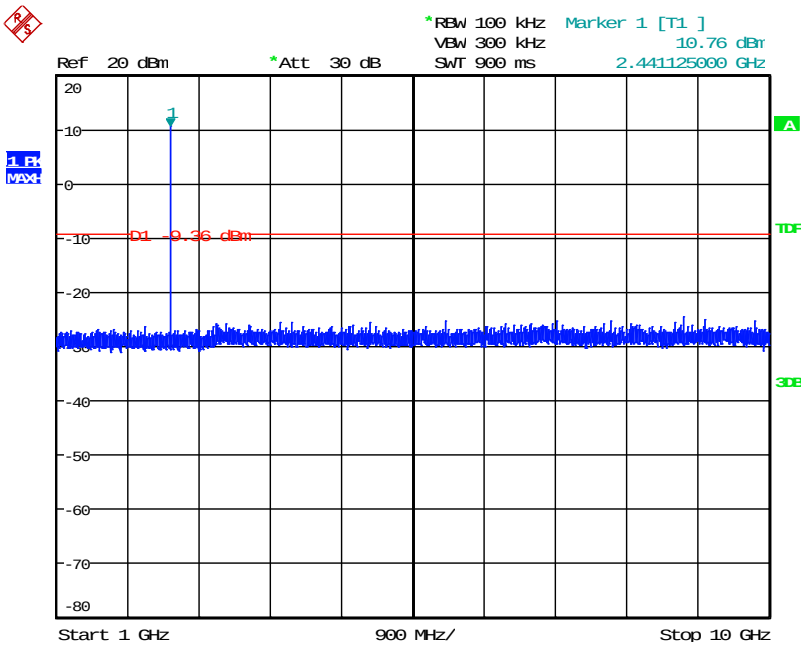
Date: 10.JUN.2016 09:42:28

Figure 7.4.2.2-4: 18 GHz –26 GHz – Low Channel (GFSK)



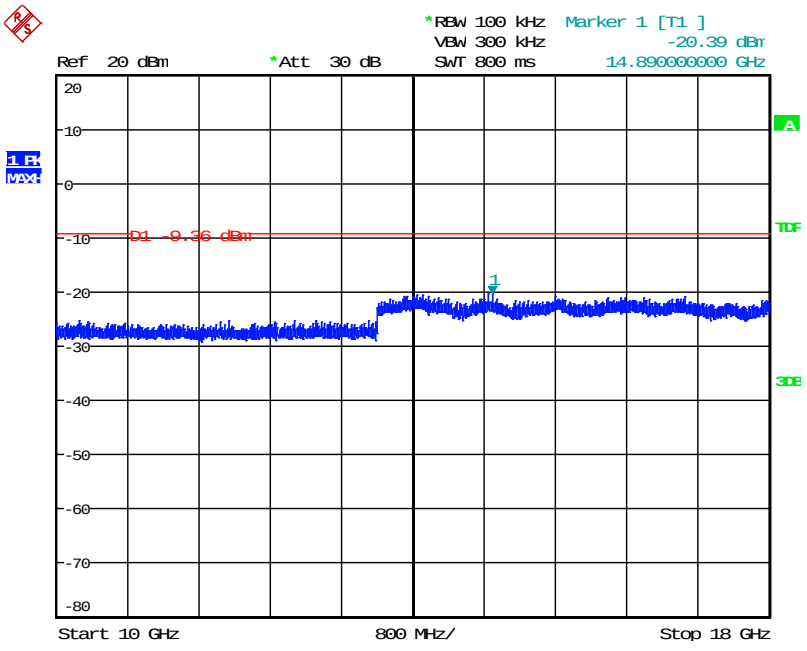
Date: 10.JUN.2016 09:51:07

Figure 7.4.2.2-5: 30 MHz – 1 GHz –Middle Channel (GFSK)



Date: 10.JUN.2016 09:48:52

Figure 7.4.2.2-6: 1 GHz –10 GHz – Middle Channel (GFSK)



Date: 10.JUN.2016 09:59:59

Figure 7.4.2.2-7: 10 GHz –18 GHz – Middle Channel (GFSK)

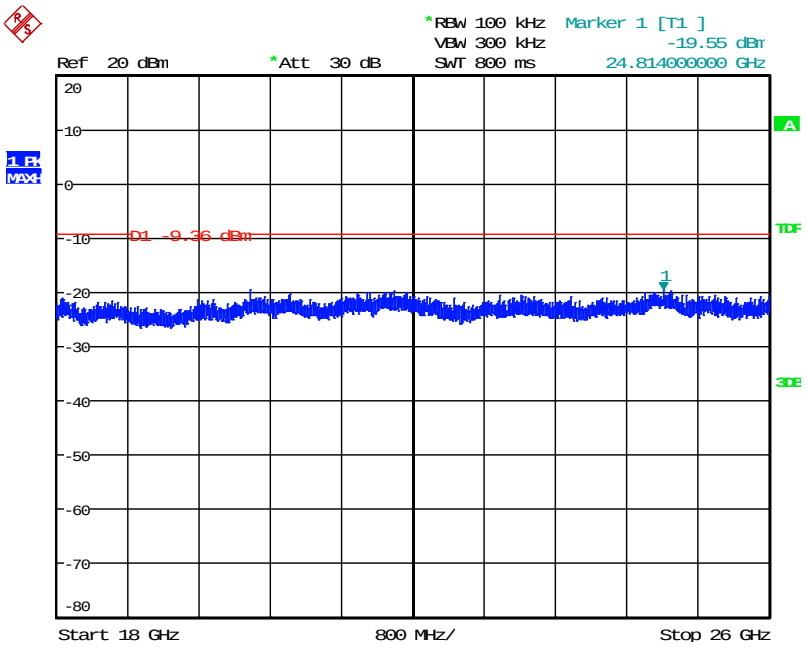


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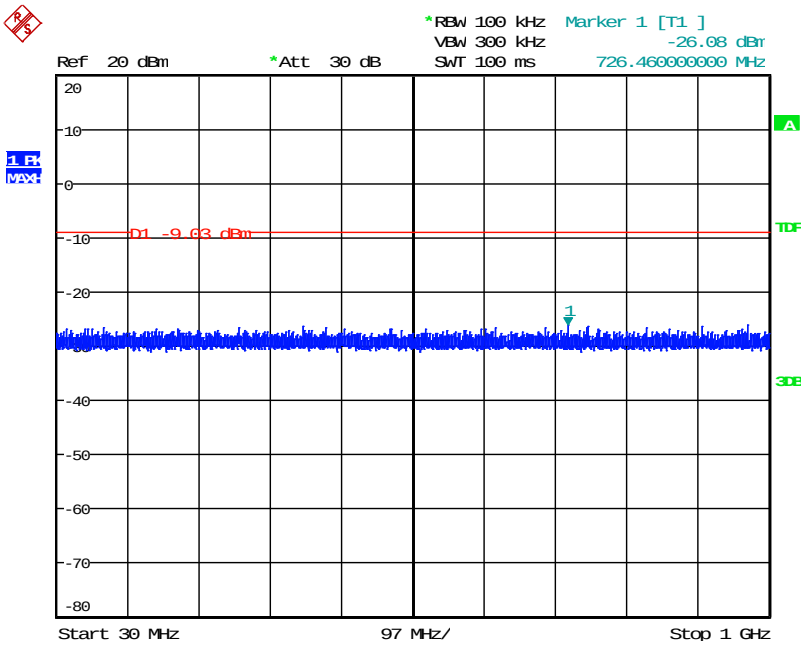
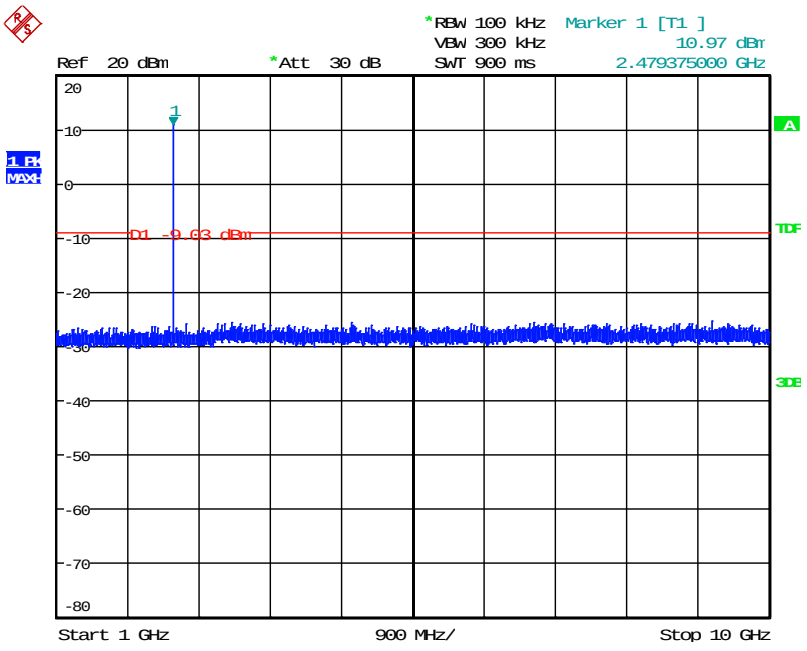
Figure 7.4.2.2-8: 18 GHz –26 GHz – Middle Channel (GFSK)



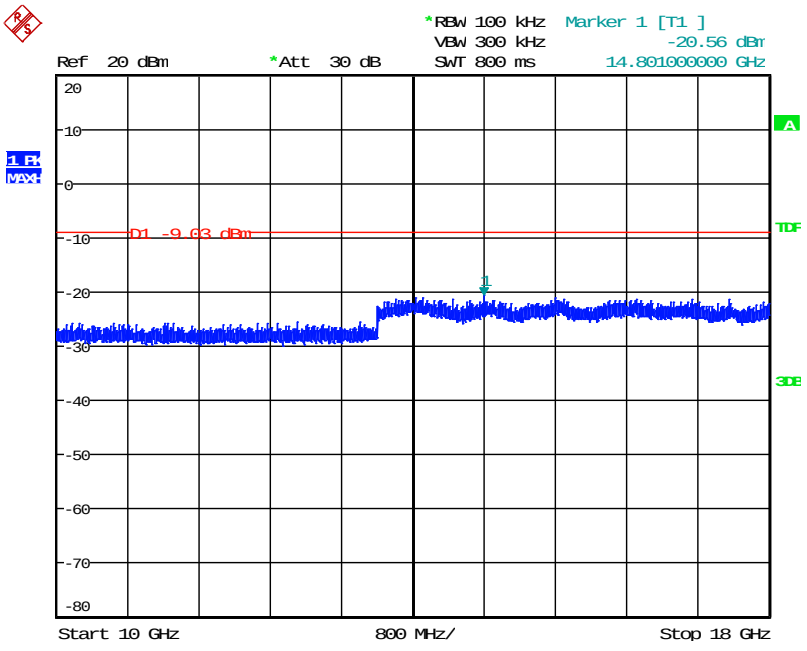
Date: 10.JUN.2016 10:08:58

Figure 7.4.2.2-9: 30 MHz – 1 GHz – High Channel (GFSK)



Date: 10.JUN.2016 10:06:57

Figure 7.4.2.2-10: 1 GHz –10 GHz –High Channel (GFSK)



Date: 10.JUN.2016 10:12:02

Figure 7.4.2.2-11: 10 GHz –18 GHz – High Channel (GFSK)

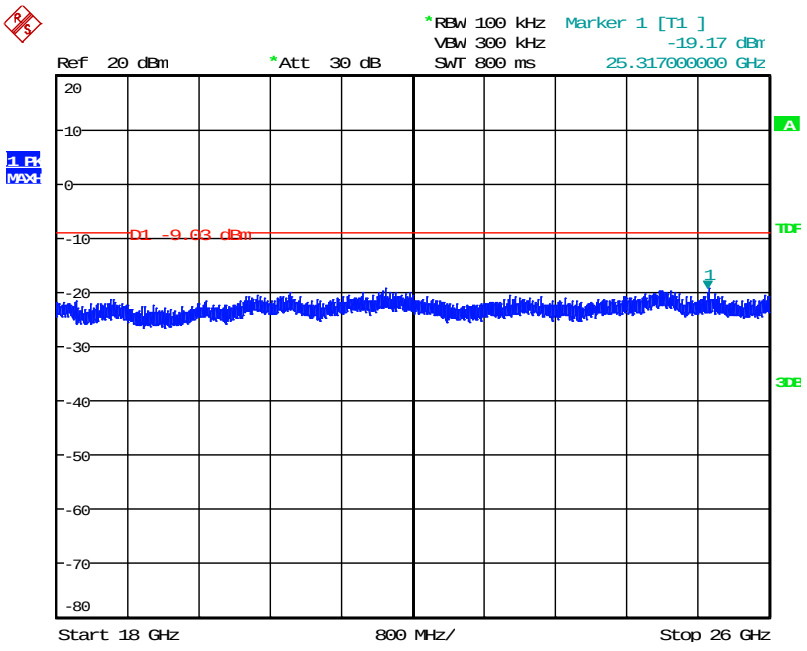


Figure 7.4.2.2-12: 18 GHz –26 GHz – High Channel (GFSK)

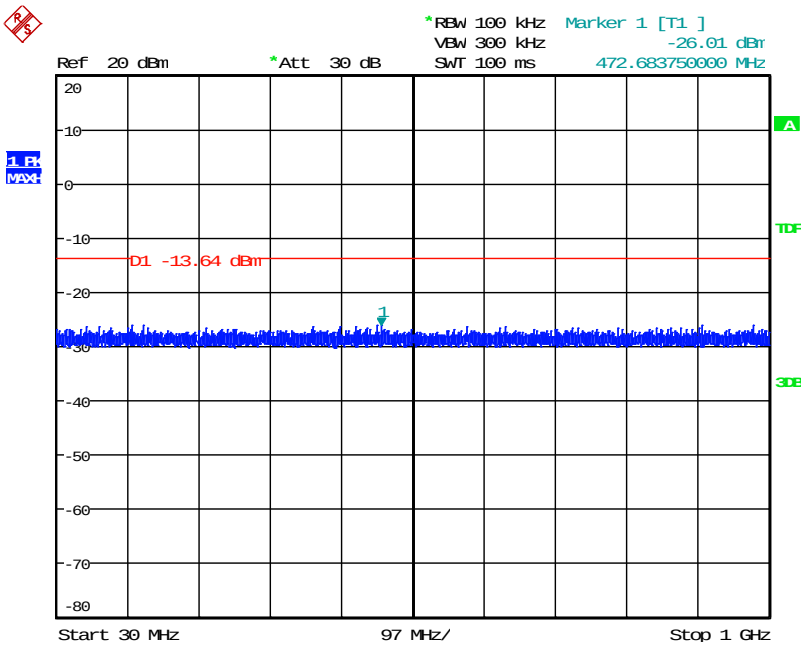


Figure 7.4.2.2-13: 30 MHz – 1 GHz – Low Channel (π/4 DQPSK)

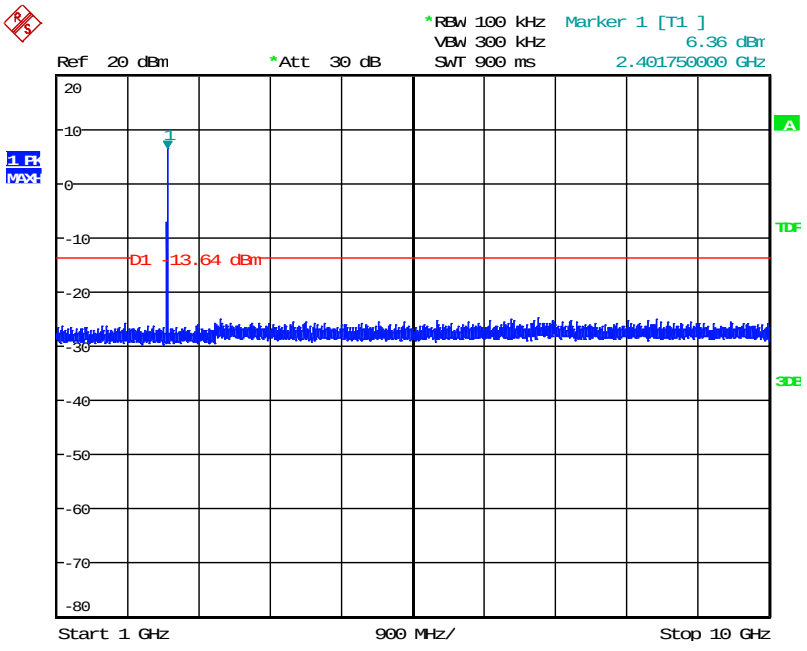


Figure 7.4.2.2-14: 1 GHz –10 GHz – Low Channel (π/4 DQPSK)

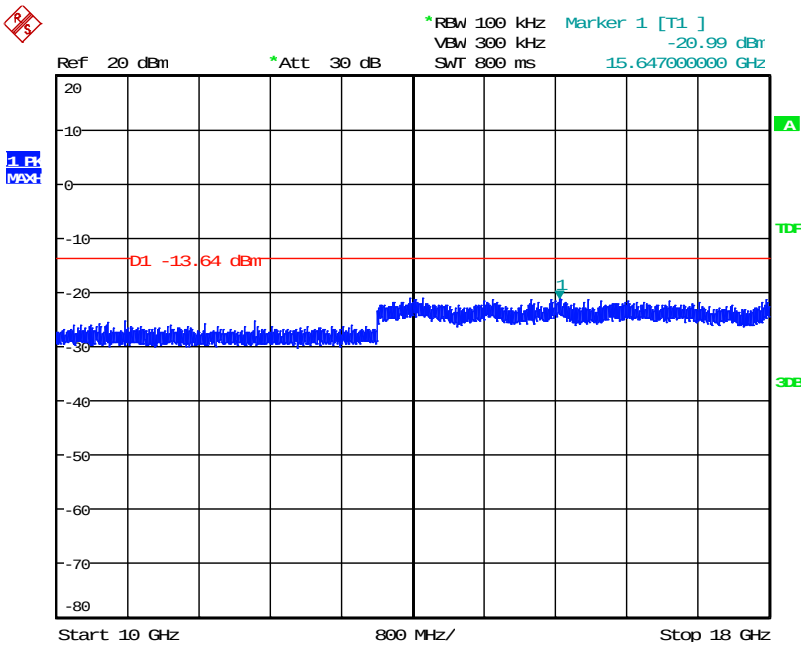


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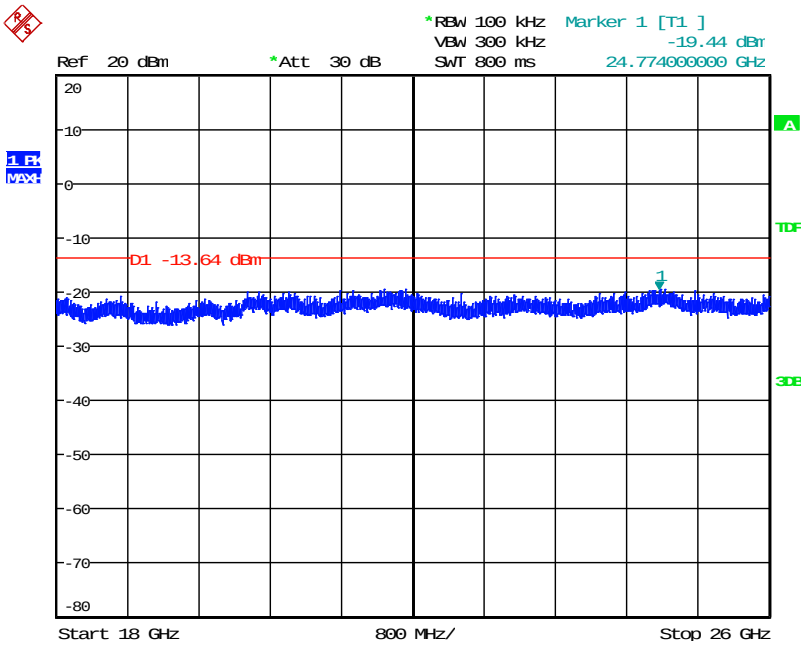
Figure 7.4.2.2-15: 10 GHz –18 GHz – Low Channel (π/4 DQPSK)



Date: 10.JUN.2016 11:06:40

Figure 7.4.2.2-16: 18 GHz –26 GHz – Low Channel (π/4 DQPSK)

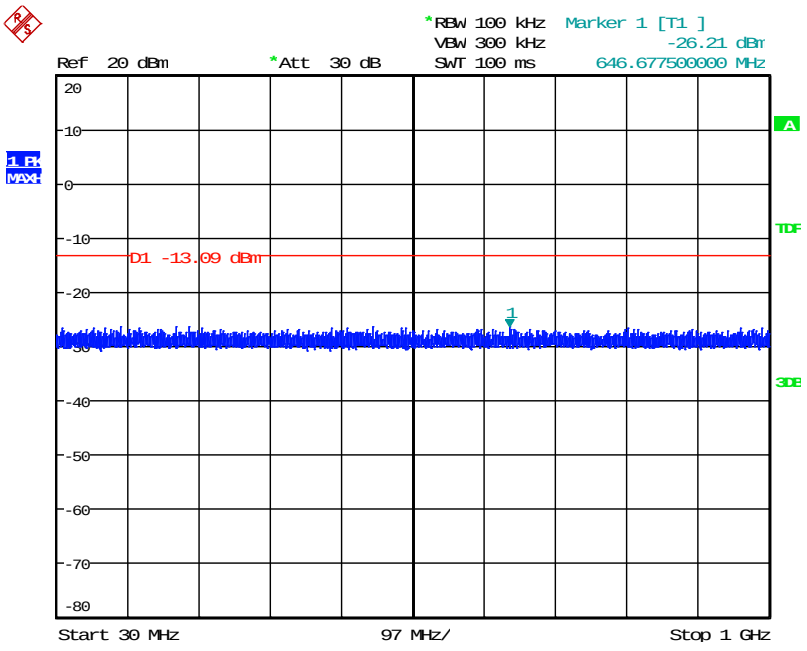


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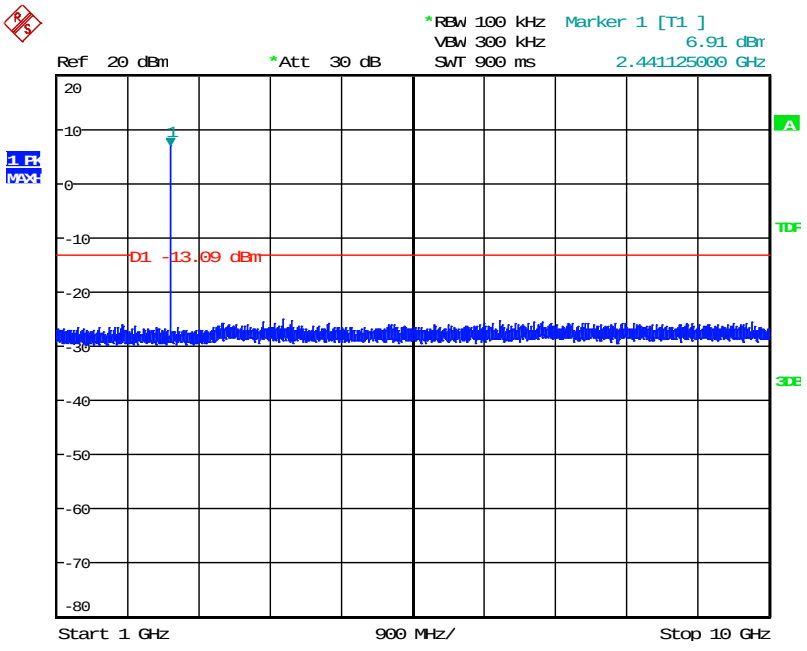
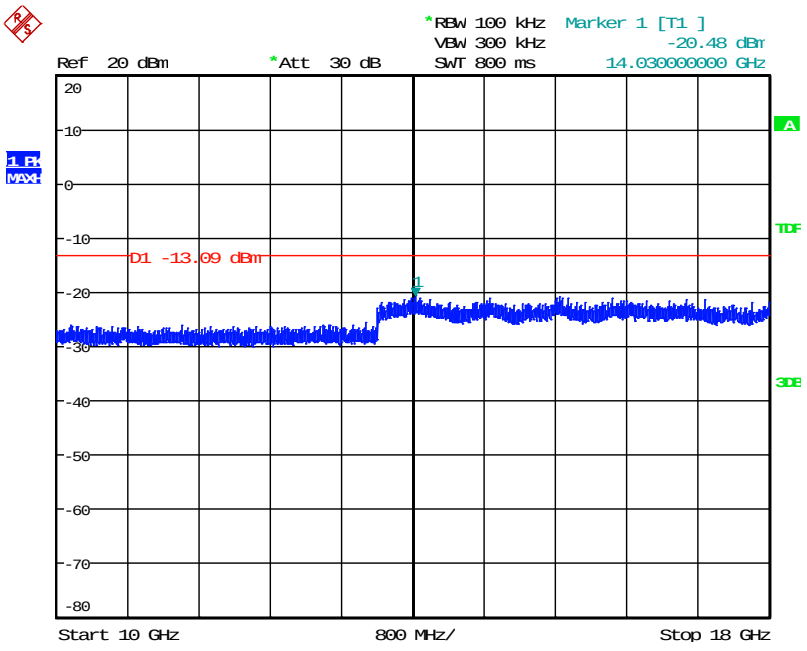
Figure 7.4.2.2-17: 30 MHz – 1 GHz –Middle Channel (π/4 DQPSK)



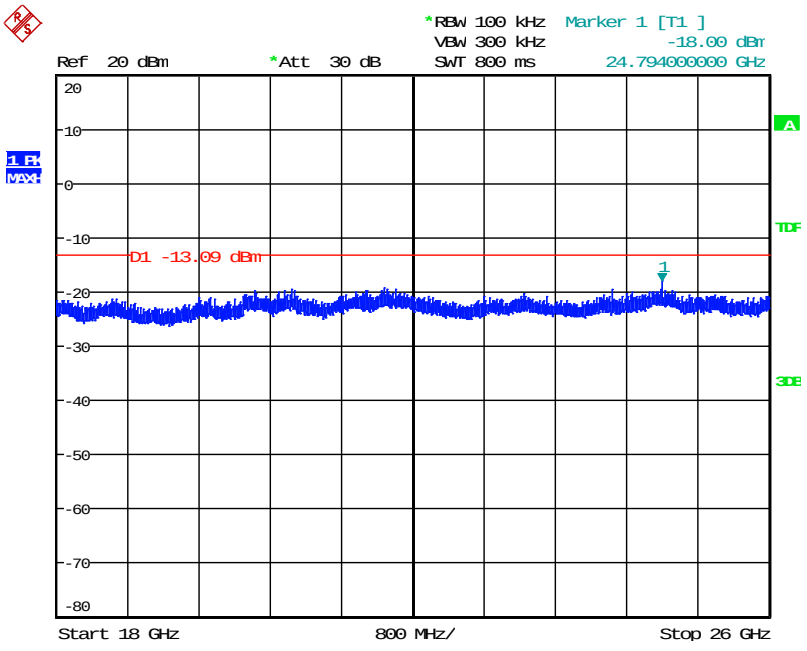
Date: 10.JUN.2016 10:36:31

Figure 7.4.2.2-18: 1 GHz –10 GHz – Middle Channel (π/4 DQPSK)



Date: 10.JUN.2016 10:38:43

Figure 7.4.2.2-19: 10 GHz –18 GHz – Middle Channel (π/4 DQPSK)



Date: 10.JUN.2016 10:41:20

Figure 7.4.2.2-20: 18 GHz –26 GHz – Middle Channel (π/4 DQPSK)

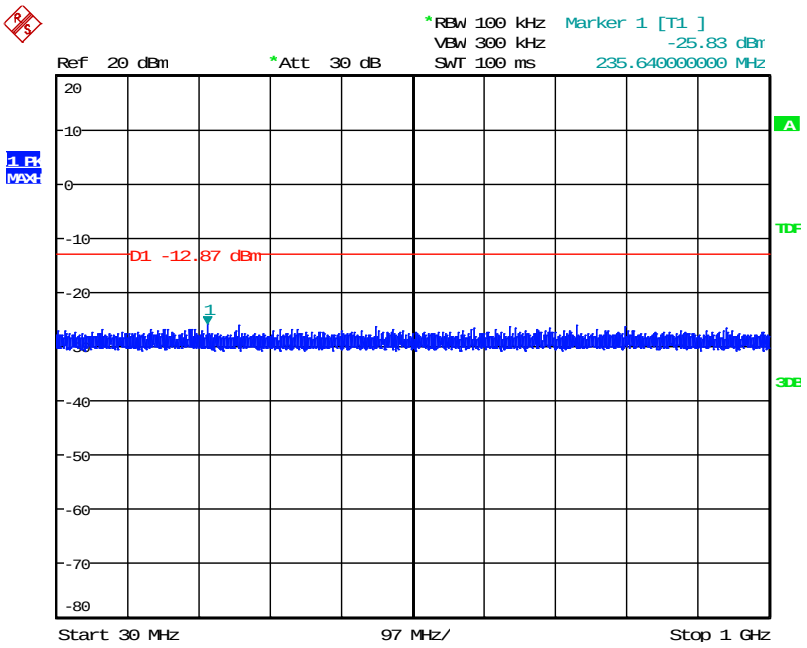


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Figure 7.4.2.2-21: 30 MHz – 1 GHz – High Channel (π/4 DQPSK)

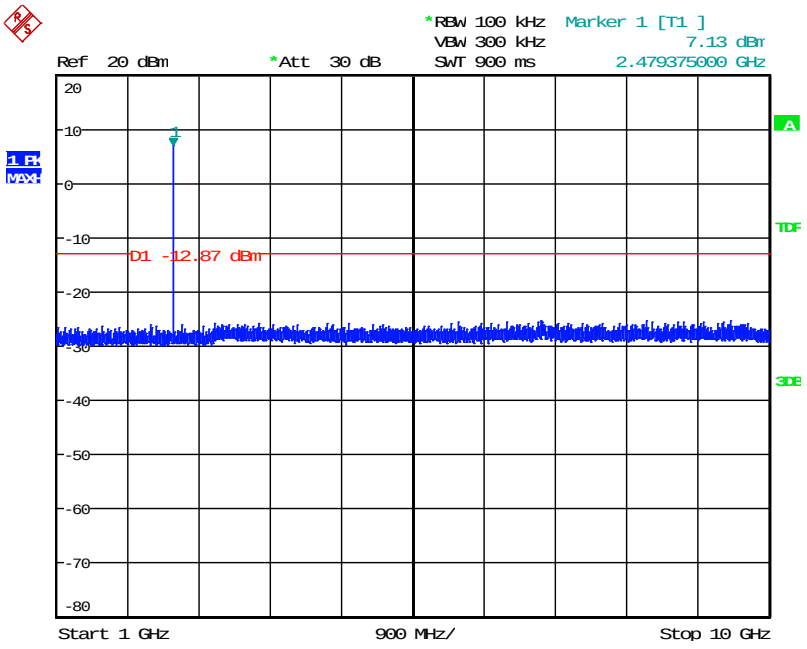

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Figure 7.4.2.2-22: 1 GHz –10 GHz –High Channel (π/4 DQPSK)

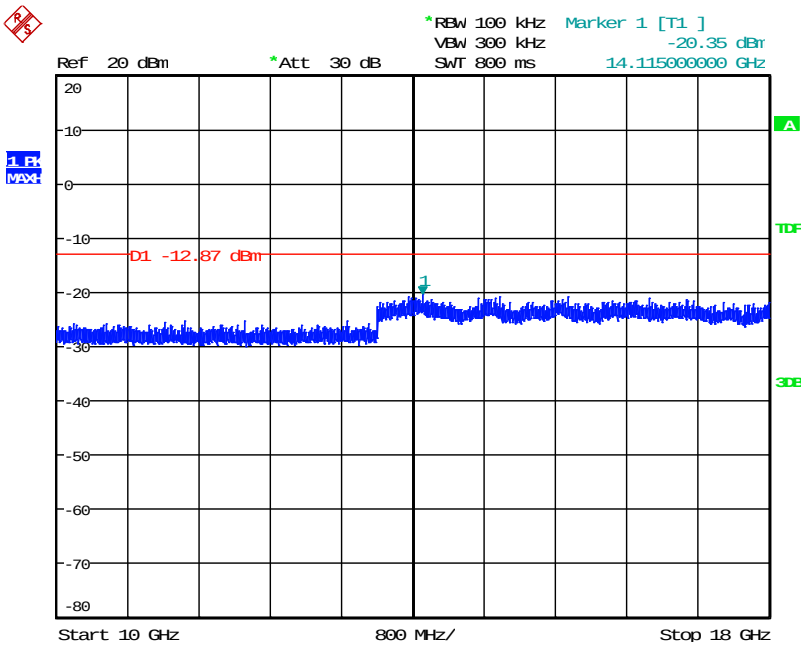

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Figure 7.4.2.2-23: 10 GHz –18 GHz – High Channel (π/4 DQPSK)

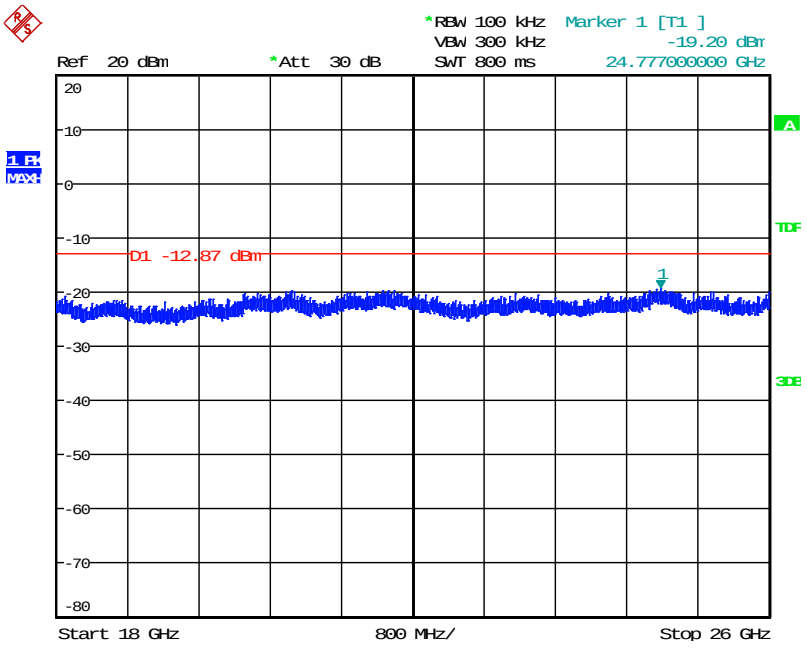

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Figure 7.4.2.2-24: 18 GHz –26 GHz – High Channel (π/4 DQPSK)

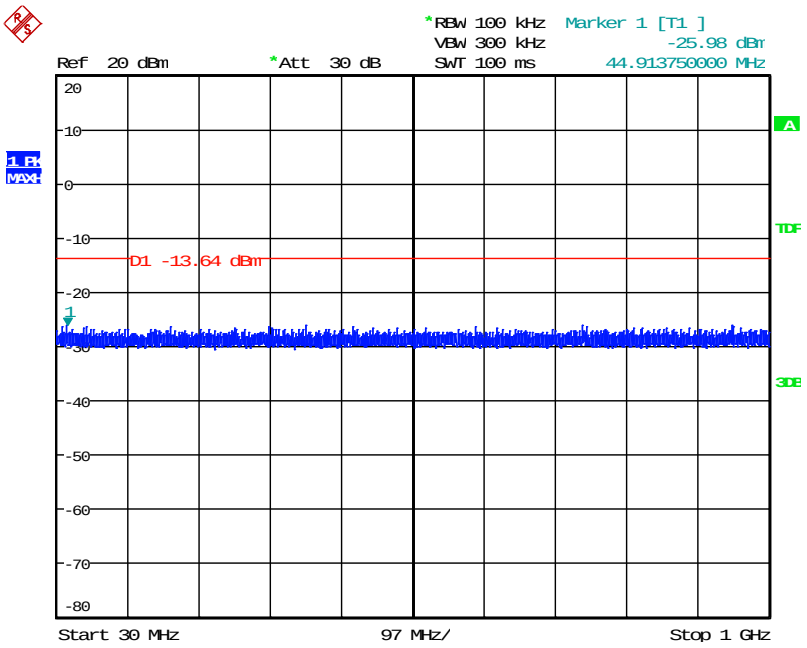

Figure 7.4.2.2-25: 30 MHz – 1 GHz – Low Channel (8DPSK)

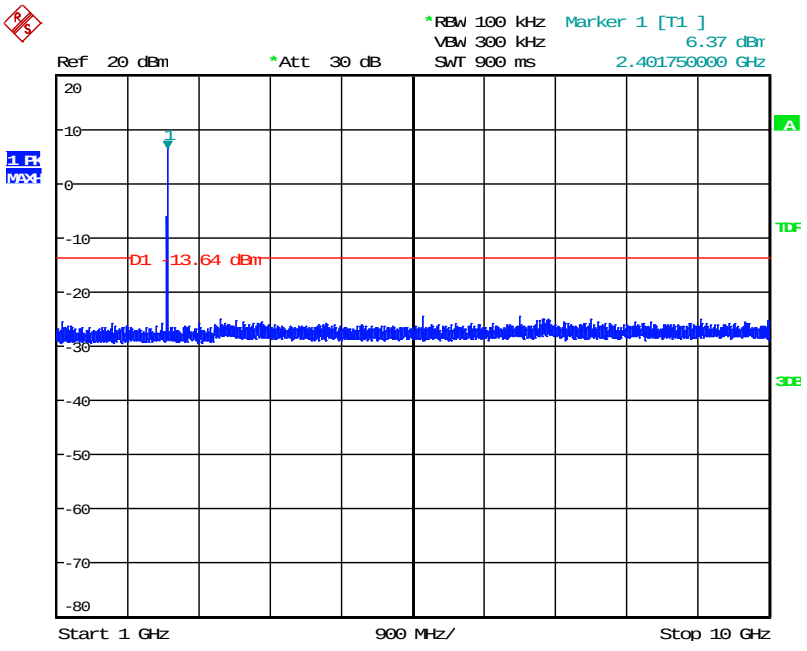

Figure 7.4.2.2-26: 1 GHz –10 GHz – Low Channel (8DPSK)

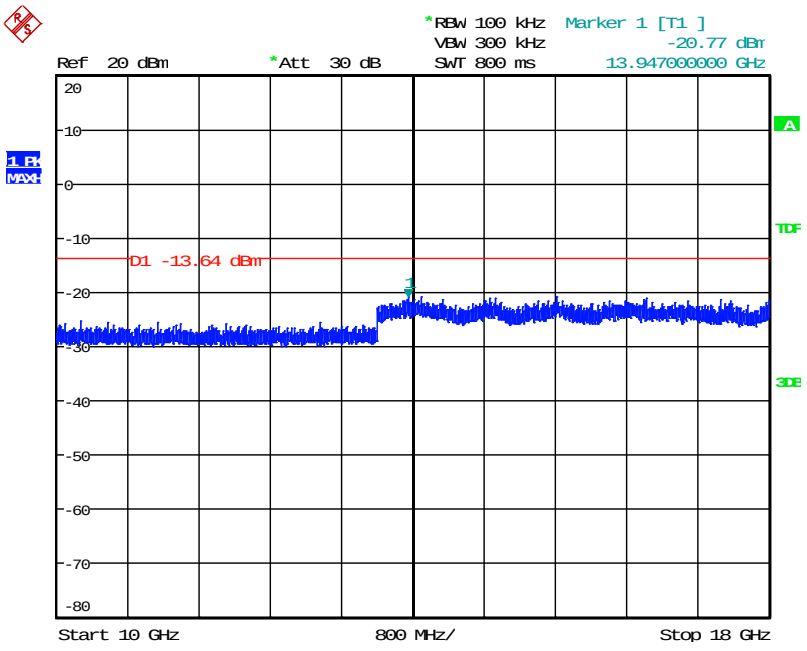

Figure 7.4.2.2-27: 10 GHz –18 GHz – Low Channel (8DPSK)

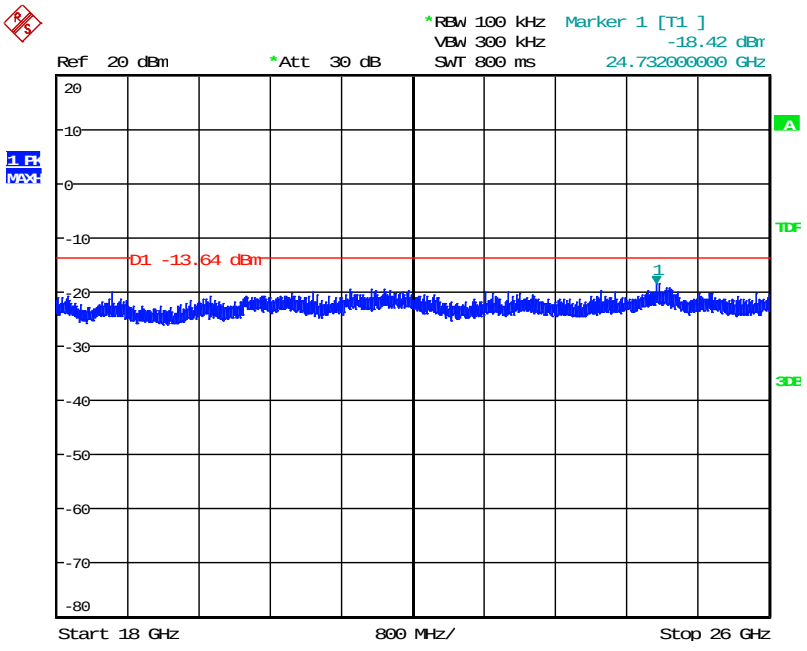

Figure 7.4.2.2-28: 18 GHz –26 GHz – Low Channel (8DPSK)

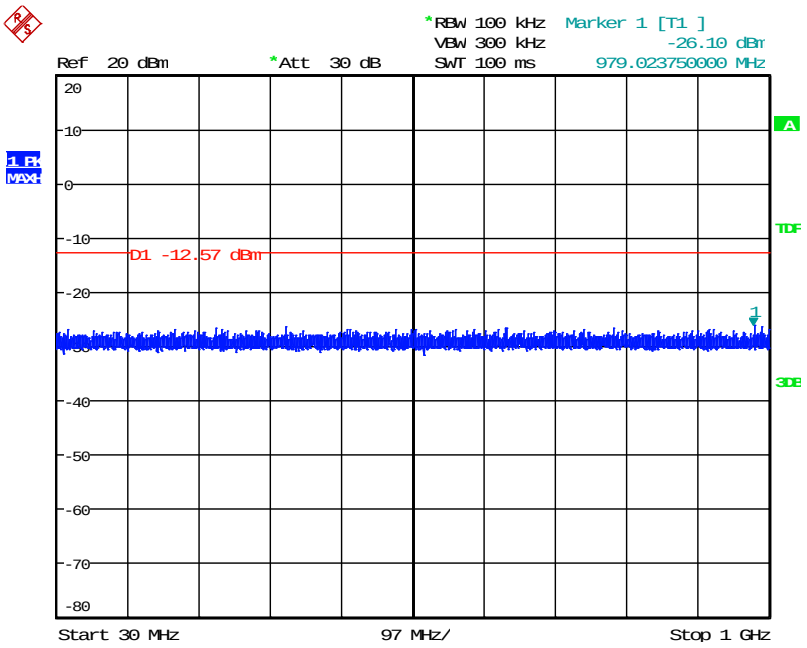

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Figure 7.4.2.2-29: 30 MHz – 1 GHz –Middle Channel (8DPSK)

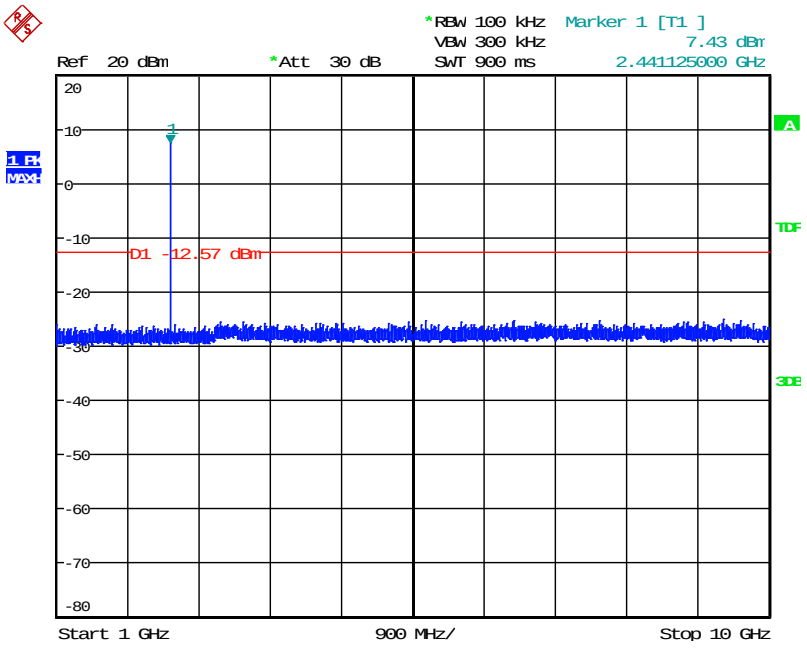

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Figure 7.4.2.2-30: 1 GHz –10 GHz – Middle Channel (8DPSK)

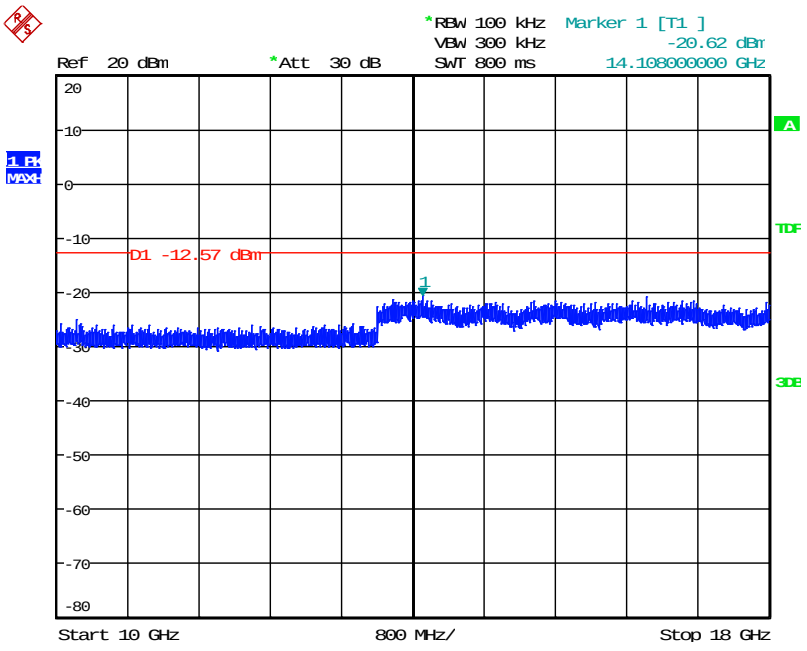

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Figure 7.4.2.2-31: 10 GHz –18 GHz – Middle Channel (8DPSK)

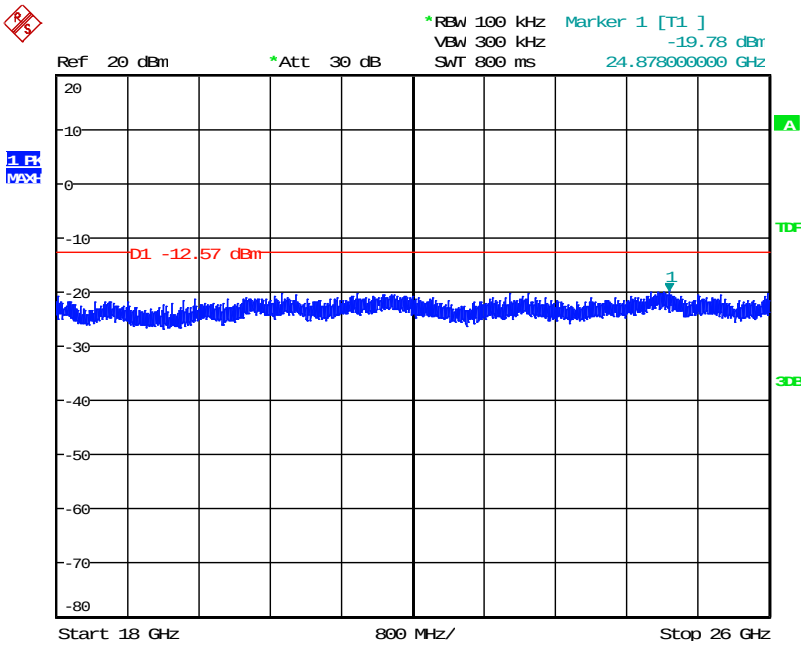

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Figure 7.4.2.2-32: 18 GHz –26 GHz – Middle Channel (8DPSK)

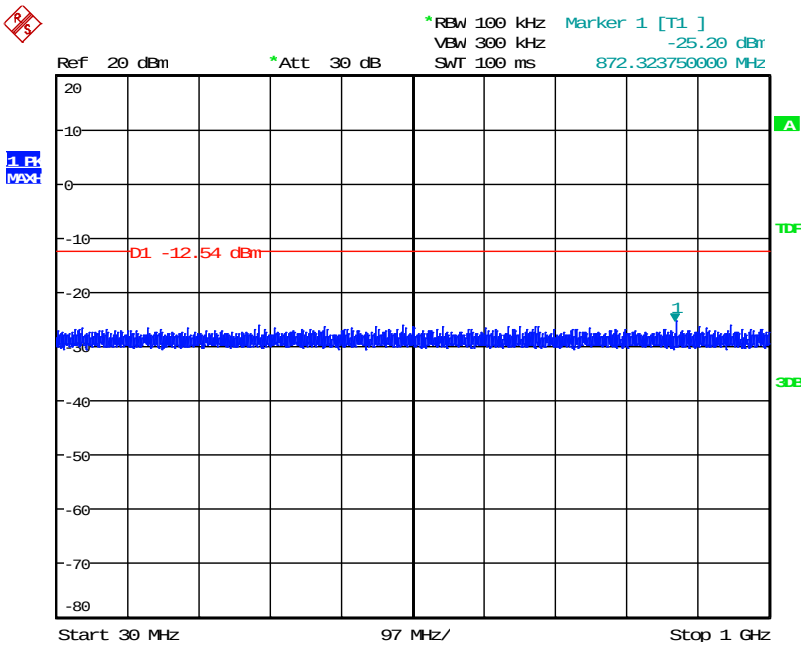

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Figure 7.4.2.2-33: 30 MHz – 1 GHz – High Channel (8DPSK)

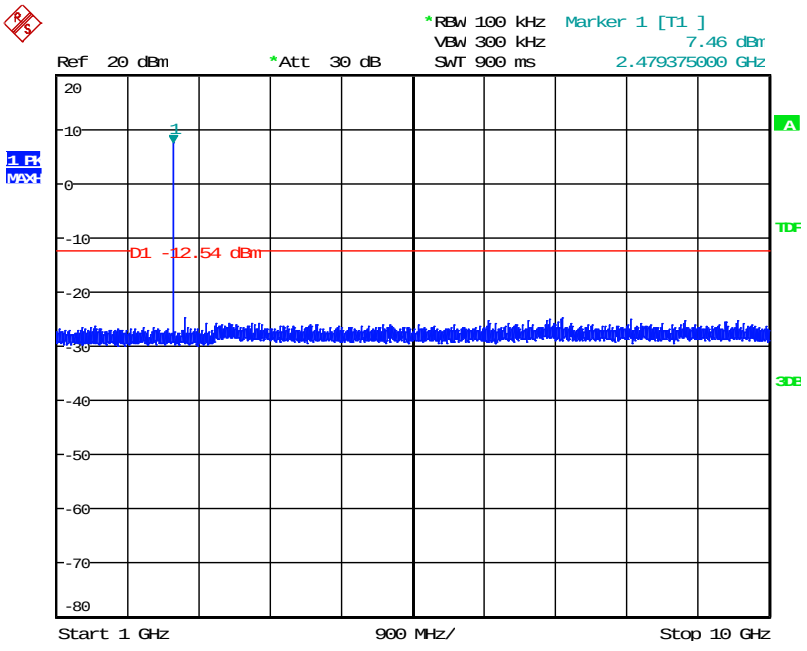

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Figure 7.4.2.2-34: 1 GHz –10 GHz –High Channel (8DPSK)

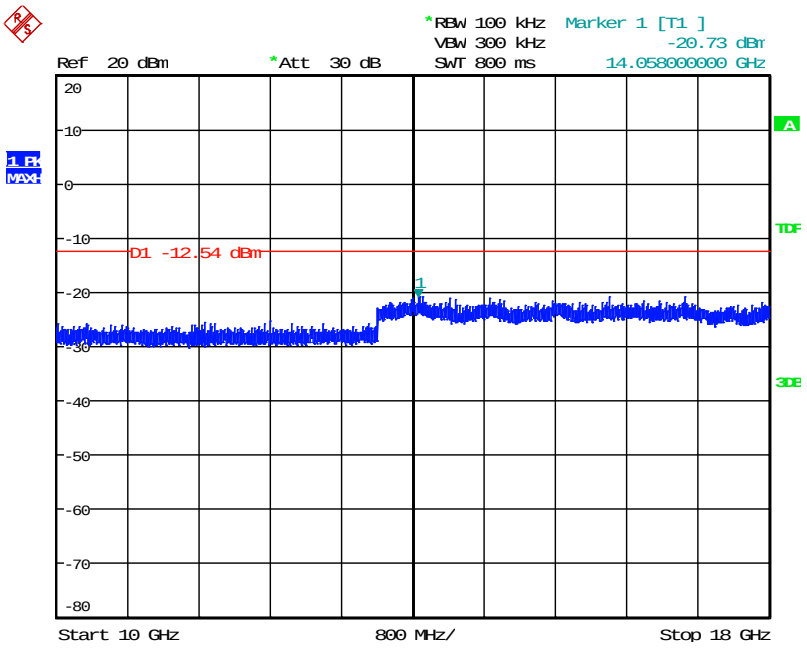

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Figure 7.4.2.2-35: 10 GHz –18 GHz – High Channel (8DPSK)

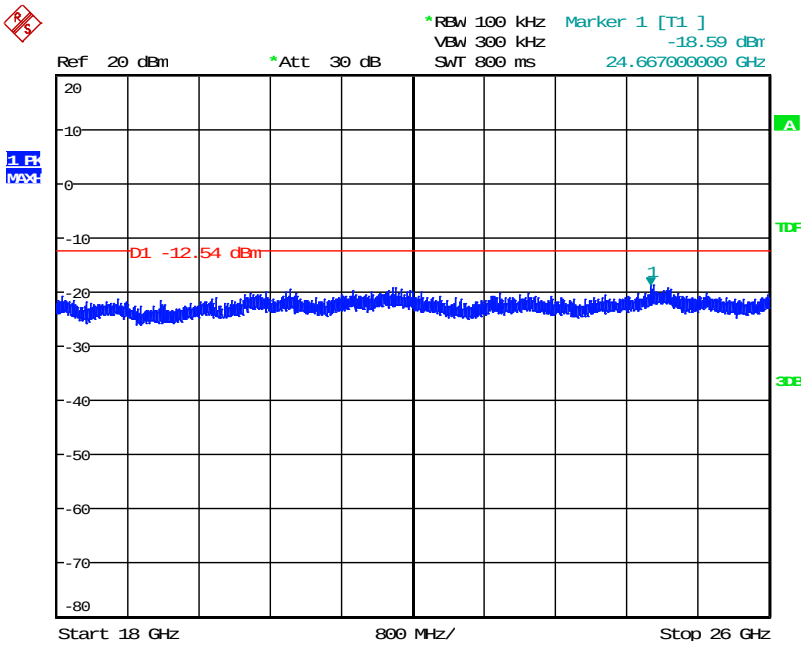

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Figure 7.4.2.2-36: 18 GHz –26 GHz – High Channel (8DPSK)

8 CONCLUSION

In the opinion of ACS, Inc., the model LBEE5ZZ1CK-982 manufactured by Murata Manufacturing Co., Ltd. meets the requirements of FCC Part 15 subpart C and Innovation, Science and Economic Development Canada's Radio Standards Specification RSS-247 for the test procedures documented in the test report.

END REPORT