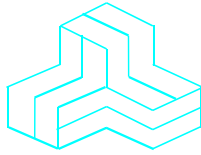


ENGINEERING TEST REPORT



Dual Band Wireless AC-7260

Model: 7260H

FCC ID: 2AIPX7260H

Applicant:

Contec DTx Inc.

1800 Penn St. Suite 1

Melbourne, FL

USA 32901

In Accordance With

Federal Communications Commission (FCC)

Part 15, Subpart C, Section 15.247

**Frequency Hopping Spread Spectrum Systems (DSS) Operating
in 2400 – 2483.5 MHz Band**

UltraTech's File No.: 16CDTX003_FCC15C247DSS

This Test report is Issued under the Authority of
Tri M. Luu
Vice President of Engineering
UltraTech Group of Labs

Date: August 08, 2016

Report Prepared by: Dharmajit Solanki

Tested by: Hung Trinh

Issued Date: August 08, 2016

Test Dates: July 30 – August 01, 2016

- *The results in this Test Report apply only to the sample(s) tested, and the sample tested is randomly selected.*
- *This report must not be used by the client to claim product endorsement by NVLAP or any agency of the US Government.*

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91038



1309



46390-2049



NVLAP LAB
CODE 200093-0



AT-1945



SL2-IN-E-
1119R



CA2049



TL363_B



TPTDP
DA1300

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EXHIBIT 1. INTRODUCTION

1.1. SCOPE

Reference:	FCC Part 15, Subpart C, Section 15.247, DSS
Title:	Code of Federal Regulations (CFR), Title 47 – Telecommunication, Part 15 – Radio Frequency Devices
Purpose of Test:	Class II Permissive Change Certification for Frequency Hopping Spread Spectrum Systems (DSS) Bluetooth Transmitter Operating in the Frequency Band 2400-2483.5 MHz.
Test Procedures:	- ANSI C63.4 - ANSI C63.10 - FCC Public Notice DA 00-705
Environmental Classification:	☒ Commercial, industrial or business environment ☒ Residential environment

1.2. RELATED SUBMITTAL(S)/GRANT(S)

None

1.3. NORMATIVE REFERENCES

Publication	Year	Title
47 CFR Parts 0-19	2016	Code of Federal Regulations (CFR), Title 47 – Telecommunication
ANSI C63.4	2014	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 KHz to 40 GHz
ANSI C63.10	2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
CISPR 22 & EN 55022	2008-09, Ed 6 2006	Information Technology Equipment - Radio Disturbance Characteristics - Limits and Methods of Measurement
CISPR 16-1-1 +A1 +A2	2006 2006 2007	Specification for radio disturbance and immunity measuring apparatus and methods. Part 1-1: Measuring Apparatus
CISPR 16-1-2 +A1 +A2	2003 2004 2006	Specification for radio disturbance and immunity measuring apparatus and methods. Part 1-2: Conducted disturbances
FCC Public Notice DA 00-705	2000	Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems
FCC ET Docket No. 99-231	2002	Amendment to FCC Part 15 of the Commission's Rules Regarding to Spread Spectrum Devices

EXHIBIT 2. PERFORMANCE ASSESSMENT

2.1. CLIENT INFORMATION

APPLICANT	
Name:	Contec DTx Inc.
Address:	1800 Penn St. Suite 1 Melbourne, FL USA 32901
Contact Person:	Mr. Paul Parkinson Phone #: 321 728 0172 Fax #: 321 722 2216 Email Address: Paul.parkinson@dtx.com

MANUFACTURER	
Name:	Intel Corporation
Address:	2111 NE 25 th Avenue JF3-302, Hillsboro, OR USA 97124
Contact Person:	Mr. Steven C Hackett Email Address: steven.c.hackett@intel.com

2.2. EQUIPMENT UNDER TEST (EUT) INFORMATION

The following information (with the exception of the Date of Receipt) has been supplied by the applicant.

Brand Name:	Contec DTx Inc.
Product Name:	Dual Band Wireless AC-7260
Model Name or Number:	7260H
Serial Number:	Test Sample
Type of Equipment:	Frequency Hopping Spread Spectrum Systems (DSS)
Input Power Supply Type:	120 VAC 60 Hz AC Adaptor
Primary User Functions of EUT:	802.11 a/b/g/n/ac wireless LAN + BT PCIe half-mini card

2.3. EUT'S TECHNICAL SPECIFICATIONS

Transmitter	
Equipment Type:	• Mobile • Base Station (fixed use)
Intended Operating Environment:	▪ Commercial, industrial or business environment ▪ Residential environment
Power Supply Requirement:	3.3 VDC
RF Output Power Rating:	4.68 dBm (2.93 mW) (2402 - 2480 MHz)
Operating Frequency Range:	2402 - 2480 MHz
RF Output Impedance:	50 Ω
Duty Cycle:	Continuous
Modulation Type:	GFSK
Antenna Connector Types:	U.FL to RP-SMA(M) Hinged Antenna

2.4. ASSOCIATED ANTENNA DESCRIPTIONS

New Antenna Type	Maximum Gain after assembly cable loss (dBi)
Dipole Antenna, GW.71.5153	2.07 dBi (2.4-2.5 GHz) & 2.91 dBi (5.0-5.8 GHz) Bands

2.5. LIST OF EUT'S PORTS

Port Number	EUT's Port Description	Number of Identical Ports	Connector Type	Cable Type (Shielded/Non-shielded)
1	ANT1 & ANT2	2	U.FL – RP-SMA	Cable connector U.FL- LP-066
2	Connector Interface	1	52-Pin Mini Card Edge	Direct connection (no cable)

*Bluetooth config only transmits on Chain # 2.

2.6. ANCILLARY EQUIPMENT

The EUT was tested with special test-jig connected with the representative configuration of ancillary equipments necessary to exercise the ports during tests as shown in the test set-up diagrams.

EXHIBIT 3. EUT OPERATING CONDITIONS AND CONFIGURATIONS DURING TESTS

3.1. CLIMATE TEST CONDITIONS

The climate conditions of the test environment are as follows:

Temperature:	21 to 23 °C
Humidity:	45 to 58%
Pressure:	102 kPa
Power Input Source:	3.3 V DC via HMC/NGFC test board

3.2. OPERATIONAL TEST CONDITIONS & ARRANGEMENT FOR TESTS

Operating Modes:	The transmitter was operated in a continuous transmission mode with the carrier modulated as specified in the Test Data.
Special Test Software:	Test software provided by the Applicant to operate the EUT at each channel frequency continuously and in the range of typical modes of operation.
Special Hardware Used:	Test Jig
Transmitter Test Antenna:	The EUT is tested with the antenna fitted in a manner typical of normal intended use as non-integral antenna equipment as described with the test results.

Transmitter Test Signals	
Frequency Band(s):	2402 - 2480 MHz
Frequency(ies) Tested:	2402 MHz, 2441 MHz, 2480 MHz
RF Power Output: (measured maximum output power at antenna terminals)	4.68 dBm (2.93 mW) (2402 - 2480 MHz)
Normal Test Modulation:	OFDM
Modulating Signal Source:	Internal

Note: The configuration chosen for testing based on recommendation from Intel: “The data rates of 6Mb/s for 802.11a, HT4 (SISO)/(MIMO) for 802.11 n/ac20 & n/ac40, and VHT6 (SISO)/(MIMO) for 802.11 ac80 were selected based on preliminary testing that identified those data rates corresponding to the worst cases for output power and spurious levels at the band edges.”

EXHIBIT 4. SUMMARY OF TEST RESULTS

4.1. LOCATION OF TESTS

All of the measurements described in this report were performed at Ultratech Group of Labs located in the city of Oakville, Province of Ontario, Canada.

- AC Power Line Conducted Emissions were performed in UltraTech's shielded room, 24'(L) by 16'(W) by 8'(H).
- Radiated Emissions were performed at the Ultratech's 3-10 TDK Semi-Anechoic Chamber situated in the Town of Oakville, province of Ontario. This test site been calibrated in accordance with ANSI C63.4, and found to be in compliance with the requirements of Sec. 2.948 of the FCC Rules. The descriptions and site measurement data of the Oakville 3-10 TDK Semi-Anechoic Chamber has been filed with FCC office (FCC File No.: 91038) and Industry Canada office (Industry Canada File No.: 2049A-3). Expiry Date: 2017-04-02.

4.2. APPLICABILITY & SUMMARY OF EMC EMISSION TEST RESULTS

FCC Section(s)	Test Requirements	Compliance (Yes/No)
15.203	Antenna requirements	Yes
15.207(a)	AC Power Line Conducted Emissions	See Note 1
15.247(a),(g) & (h)	Provisions for Frequency Hopping Systems	See Note 1
15.247(b)(1)	Peak Conducted Output Power	Yes
15.247(d)	Band-Edge Spurious Radiated Emissions	Yes
15.247(d), 15.209 & 15.205	Transmitter Spurious Radiated Emissions	Yes
15.247(i), 1.1307, 1.1310, 2.1091	RF Exposure	Yes

Note 1: Refer to the original filing UNII test report under FCC ID: PD97260H, Report Number:38067RRF.001A1

4.3. MODIFICATIONS INCORPORATED IN THE EUT FOR COMPLIANCE PURPOSES

None

EXHIBIT 5. TEST DATA

5.1. PEAK CONDUCTED OUTPUT POWER - DSS [§ 15.247(b)(1)]

5.1.1. Limit(s)

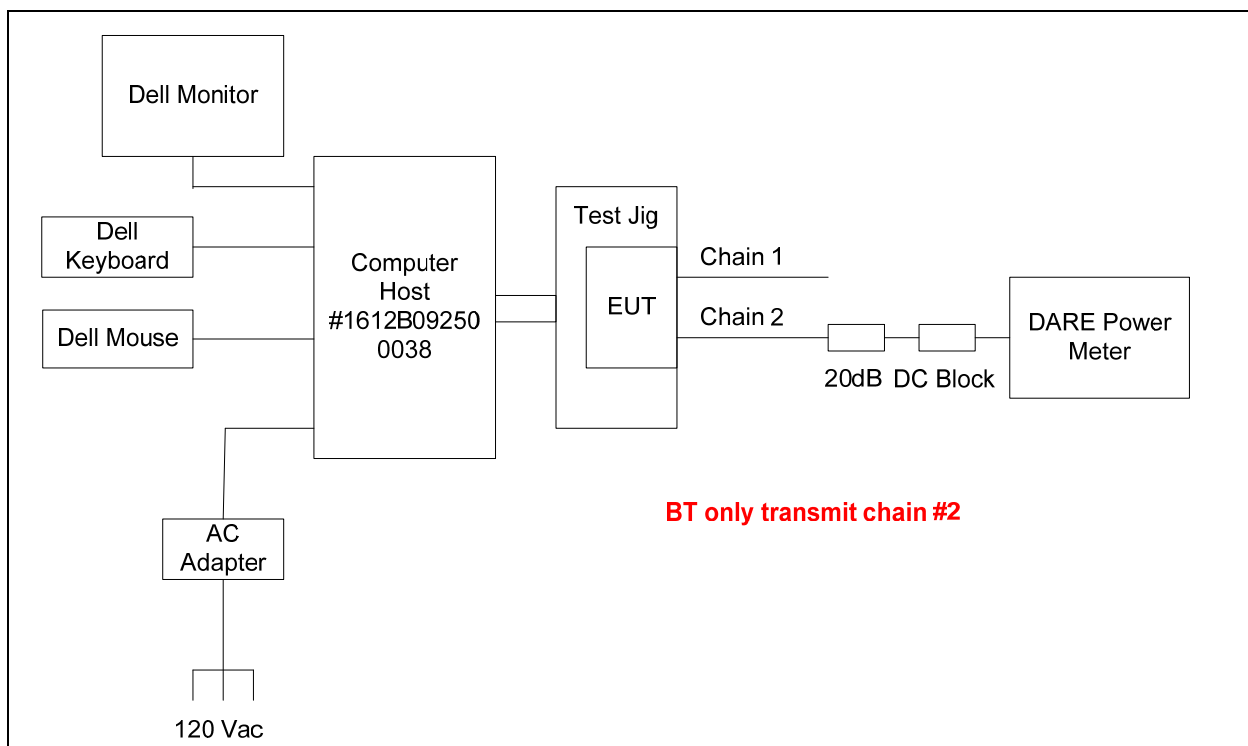
§ 15.247(b)(1): For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

§15.247(b)(4): The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

5.1.2. Method of Measurements & Test Arrangement

FCC Public Notice DA 00-705, Peak power meter method

5.1.3. Test Arrangement



5.1.4. Test Data

Notes:

1. Assembly Gain for Dipole Antenna = 2.91dBi (Antenna Gain – Assembly Cable loss) = (5.5 – 2.59) dBi
2. Output power is adjusted by Gain Control
3. Bluetooth configuration only transmits on Chain # 2

Modulation GFSK (DH5), Setting Max 5dBm

Data Rate (Mbps)	Channel #	Frequency (MHz)	Max Setting	Chain # 2 (dBm)	EIRP* (dBm)
1	0	2402	5 dBm	4.68	6.75
1	39	2441	5 dBm	4.58	6.65
1	78	2480	5 dBm	4.58	6.65

*Antenna assembly gain for Dipole antenna is 2.07dBi (3.8 - 1.73)

Modulation $\pi/4$ -DQPSK (2DH5), Setting Max 2dBm

Data Rate (Mbps)	Channel #	Frequency (MHz)	Max Setting	Chain # 2 (dBm)	EIRP* (dBm)
2	0	2402	2 dBm	2.28	4.35
2	39	2441	2 dBm	2.18	4.25
2	78	2480	2 dBm	2.18	4.25

*Antenna assembly gain for Dipole antenna is 2.07dBi (3.8 - 1.73)

Modulation 8-DPSK (3DH5), Setting Max 1dBm

Data Rate (Mbps)	Channel #	Frequency (MHz)	Max Setting	Chain # 2 (dBm)	EIRP* (dBm)
3	0	2402	1 dBm	1.28	3.35
3	39	2441	1 dBm	1.08	3.15
3	78	2480	1 dBm	1.08	3.15

*Antenna assembly gain for Dipole antenna is 2.07dBi (3.8 - 1.73)

5.2. TRANSMITTER BAND-EDGE & SPURIOUS RADIATED EMISSIONS AT 3 METERS [§§ 15.247(d), 15.209 & 15.205]

5.2.1. Limit(s)

§ 15.247 (d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

Section 15.205(a) - Restricted Bands of Operation

MHz	MHz	MHz	GHz
0.090–0.110	16.42–16.423	399.9–410	4.5–5.15
¹ 0.495–0.505	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225	123–138	2200–2300	14.47–14.5
8.291–8.294	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675	156.7–156.9	2655–2900	22.01–23.12
8.41425–8.41475	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025	240–285	3345.8–3358	36.43–36.5
12.57675–12.57725	322–335.4	3600–4400	(²)
13.36–13.41.			

¹ Until February 1, 1999, this restricted band shall be 0.490–0.510 MHz.

² Above 38.6

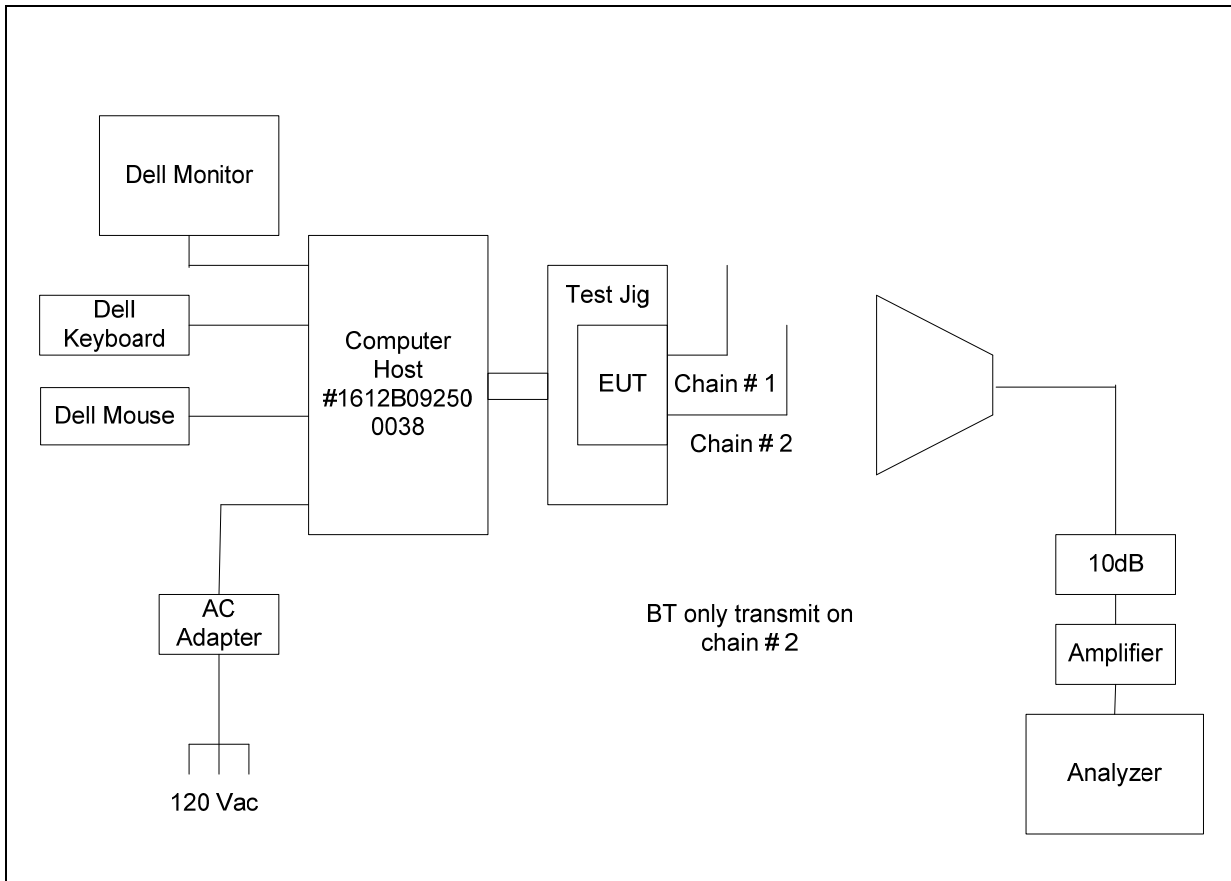
Section 15.209(a) - Field Strength Limits within Restricted Frequency Bands

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 - 0.490	2,400 / F (kHz)	300
0.490 - 1.705	24,000 / F (kHz)	30
1.705 - 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 – 960	200	3
Above 960	500	3

5.2.2. Method of Measurements

FCC Public Notice DA 00-705 and ANSI C63.10.

5.2.3. Test Arrangement



5.2.4. Test Data

Remark(s):

- All spurious emissions that are in excess of 20 dB below the specified limit shall be recorded
- EUT shall be tested in three orthogonal positions with Dipole antenna having 2.07dBi (3.8 - 1.73) net gain
- Exploratory tests performed to determined worst-case test configurations, the following test results at high power setting represent the worst-case.
- Bluetooth configuration only transmits on Chain # 2

5.2.4.1. GFSK DH5 Mode, Setting Max 5dBm

Fundamental Frequency:		2402 MHz					
Frequency Test Range:		30 MHz – 25 GHz					
Frequency (MHz)	RF Peak Level (dBμV/m)	RF Avg Level (dBμV/m)	Antenna Plane (H/V)	Limit 15.209 (dBμV/m)	Limit 15.247 (dBμV/m)	Margin (dB)	Pass/Fail
4804	46.50	34.85	V	54.0	82.9	-19.1	Pass*
All other spurious emissions and harmonics are more than 20 dB below the applicable limit.							

*Field strength of emissions appearing within restricted frequency bands shall not exceed the limits in § 15.209.

Fundamental Frequency:		2441 MHz					
Frequency Test Range:		30 MHz – 25 GHz					
Frequency (MHz)	RF Peak Level (dBμV/m)	RF Avg Level (dBμV/m)	Antenna Plane (H/V)	Limit 15.209 (dBμV/m)	Limit 15.247 (dBμV/m)	Margin (dB)	Pass/Fail
4882	44.85	31.93	V	54.0	84.4	-22.1	Pass*
All other spurious emissions and harmonics are more than 20 dB below the applicable limit.							

*Field strength of emissions appearing within restricted frequency bands shall not exceed the limits in § 15.209.

Fundamental Frequency:		2480 MHz					
Frequency Test Range:		30 MHz – 25 GHz					
Frequency (MHz)	RF Peak Level (dBμV/m)	RF Avg Level (dBμV/m)	Antenna Plane (H/V)	Limit 15.209 (dBμV/m)	Limit 15.247 (dBμV/m)	Margin (dB)	Pass/Fail
4960	47.75	33.34	V	54.0	83.4	-20.7	Pass*
All other spurious emissions and harmonics are more than 20 dB below the applicable limit.							

*Field strength of emissions appearing within restricted frequency bands shall not exceed the limits in § 15.209.

Fundamental Frequency:		2402 MHz					
Frequency Test Range:		30 MHz – 25 GHz					
Frequency (MHz)	RF Peak Level (dBμV/m)	RF Avg Level (dBμV/m)	Antenna Plane (H/V)	Limit 15.209 (dBμV/m)	Limit 15.247 (dBμV/m)	Margin (dB)	Pass/ Fail
30 - 25000	*	*	H/V	*	79.1	*	*
*All spurious emissions and harmonics are more than 20 dB below the applicable limit.							

Fundamental Frequency:		2441 MHz					
Frequency Test Range:		30 MHz – 25 GHz					
Frequency (MHz)	RF Peak Level (dBμV/m)	RF Avg Level (dBμV/m)	Antenna Plane (H/V)	Limit 15.209 (dBμV/m)	Limit 15.247 (dBμV/m)	Margin (dB)	Pass/ Fail
30 - 25000	*	*	H/V	*	80.3	*	*
*All spurious emissions and harmonics are more than 20 dB below the applicable limit.							

Fundamental Frequency:		2480 MHz					
Frequency Test Range:		30 MHz – 25 GHz					
Frequency (MHz)	RF Peak Level (dBµV/m)	RF Avg Level (dBµV/m)	Antenna Plane (H/V)	Limit 15.209 (dBµV/m)	Limit 15.247 (dBµV/m)	Margin (dB)	Pass/ Fail
30 - 25000	*	*	H/V	*	79.7	*	*
*All spurious emissions and harmonics are more than 20 dB below the applicable limit.							

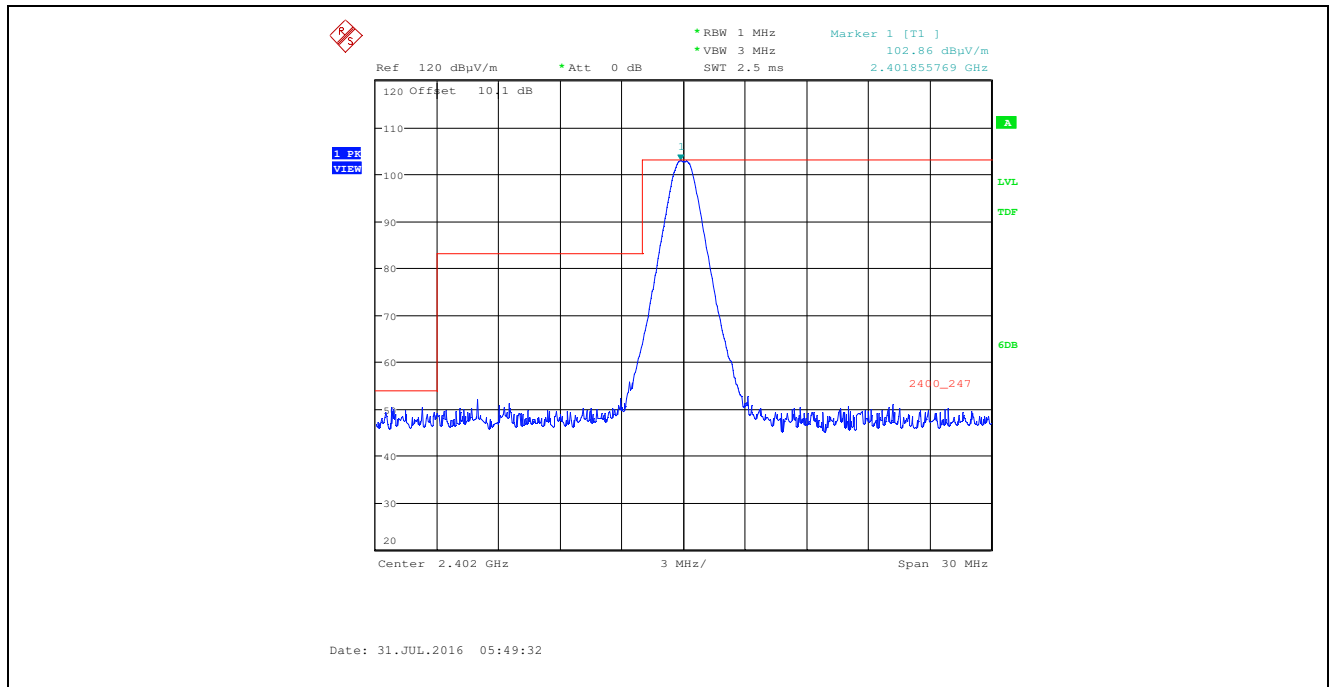
Fundamental Frequency:		2402 MHz					
Frequency Test Range:		30 MHz – 25 GHz					
Frequency (MHz)	RF Peak Level (dBμV/m)	RF Avg Level (dBμV/m)	Antenna Plane (H/V)	Limit 15.209 (dBμV/m)	Limit 15.247 (dBμV/m)	Margin (dB)	Pass/ Fail
30 - 25000	*	*	H/V	*	80.7	*	*
*All spurious emissions and harmonics are more than 20 dB below the applicable limit.							

Fundamental Frequency:		2441 MHz					
Frequency Test Range:		30 MHz – 25 GHz					
Frequency (MHz)	RF Peak Level (dBµV/m)	RF Avg Level (dBµV/m)	Antenna Plane (H/V)	Limit 15.209 (dBµV/m)	Limit 15.247 (dBµV/m)	Margin (dB)	Pass/ Fail
30 - 25000	*	*	H/V	*	81.4	*	*
*All spurious emissions and harmonics are more than 20 dB below the applicable limit.							

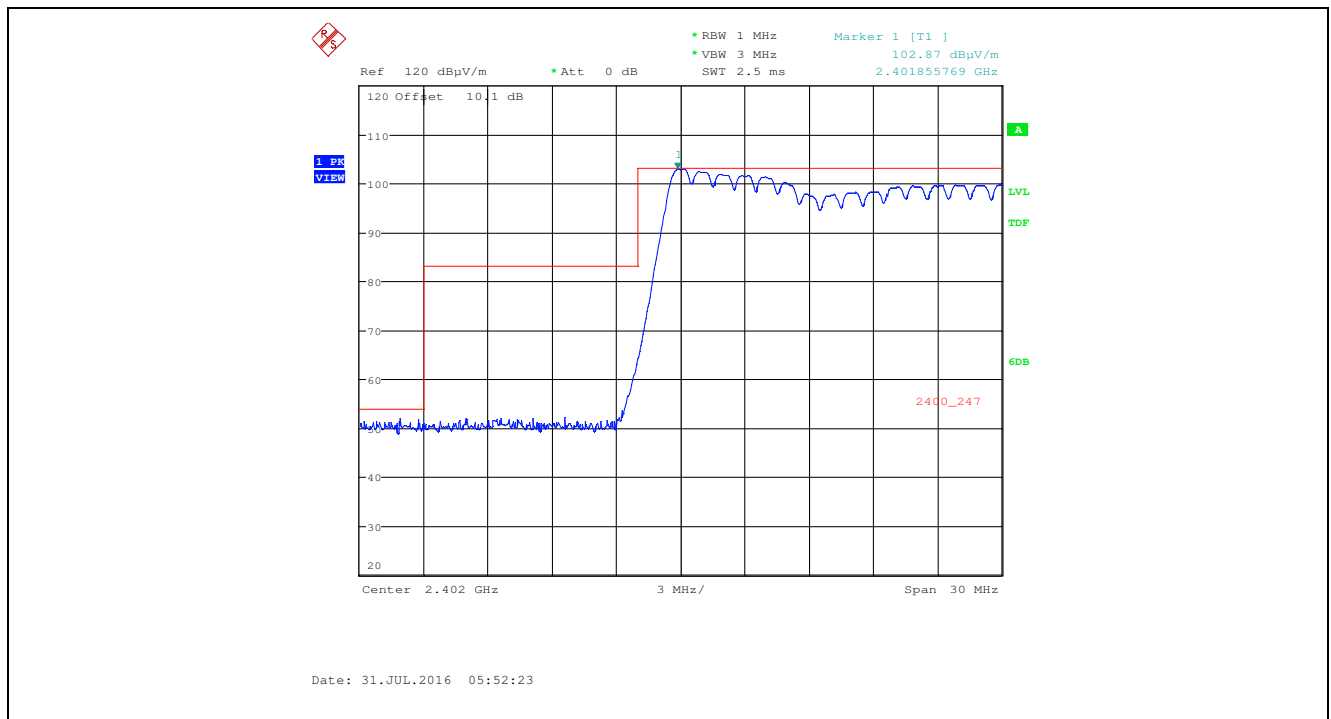
Fundamental Frequency:		2480 MHz					
Frequency Test Range:		30 MHz – 25 GHz					
Frequency (MHz)	RF Peak Level (dBµV/m)	RF Avg Level (dBµV/m)	Antenna Plane (H/V)	Limit 15.209 (dBµV/m)	Limit 15.247 (dBµV/m)	Margin (dB)	Pass/ Fail
30 - 25000	*	*	H/V	*	81.2	*	*
*All spurious emissions and harmonics are more than 20 dB below the applicable limit.							

5.2.5. Band-Edge Radiated

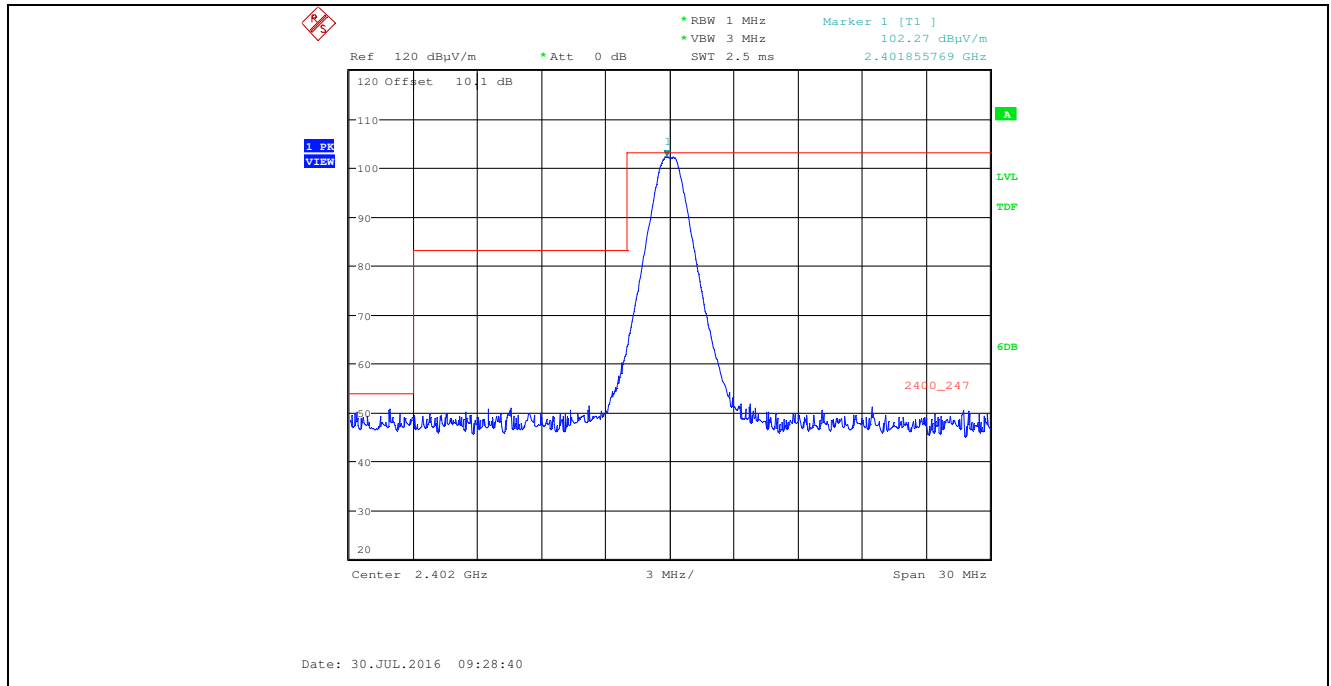
Plot 5.2.5.1.1. Band-Edge Rad Emissions, GFSK DH5, Ch 0, 2402 MHz, Chain # 2, Continuous Mode, Horizontal



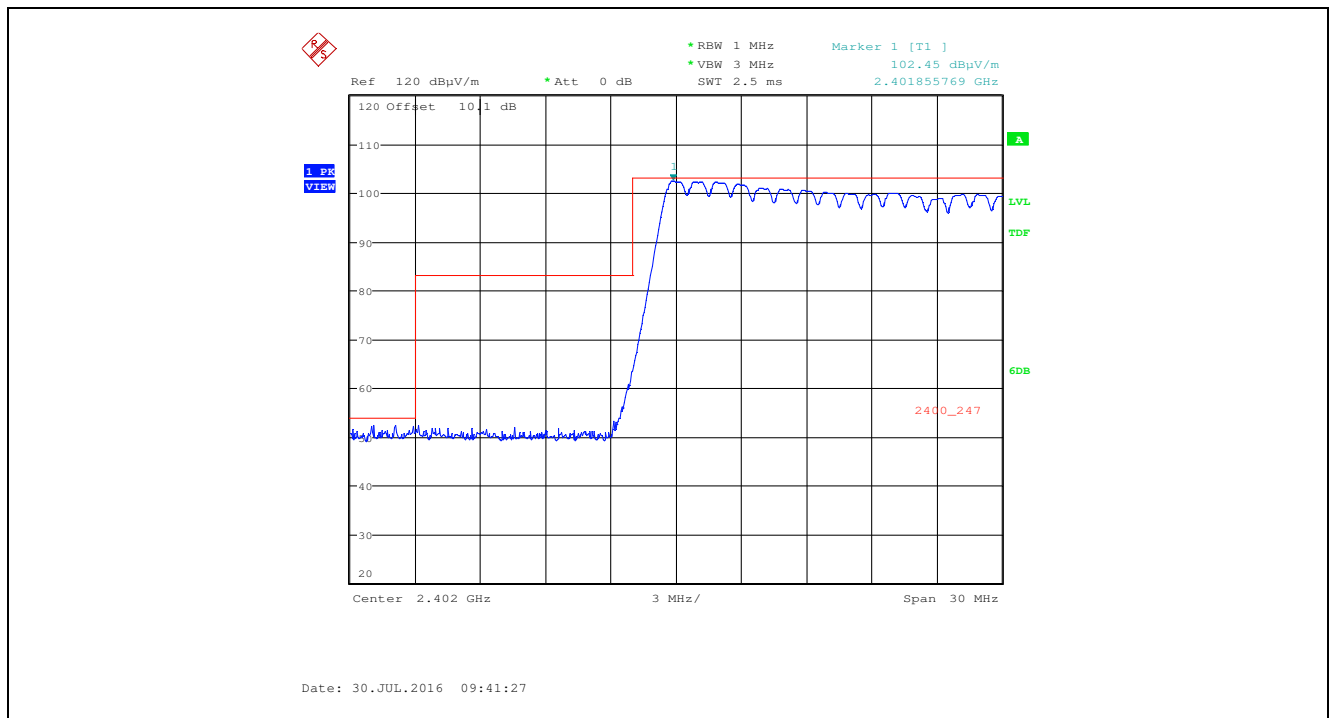
Plot 5.2.5.1.2. Band-Edge Rad Emissions, GFSK DH5, Ch 0, 2402 MHz, Chain # 2, Hopping Mode, Horizontal



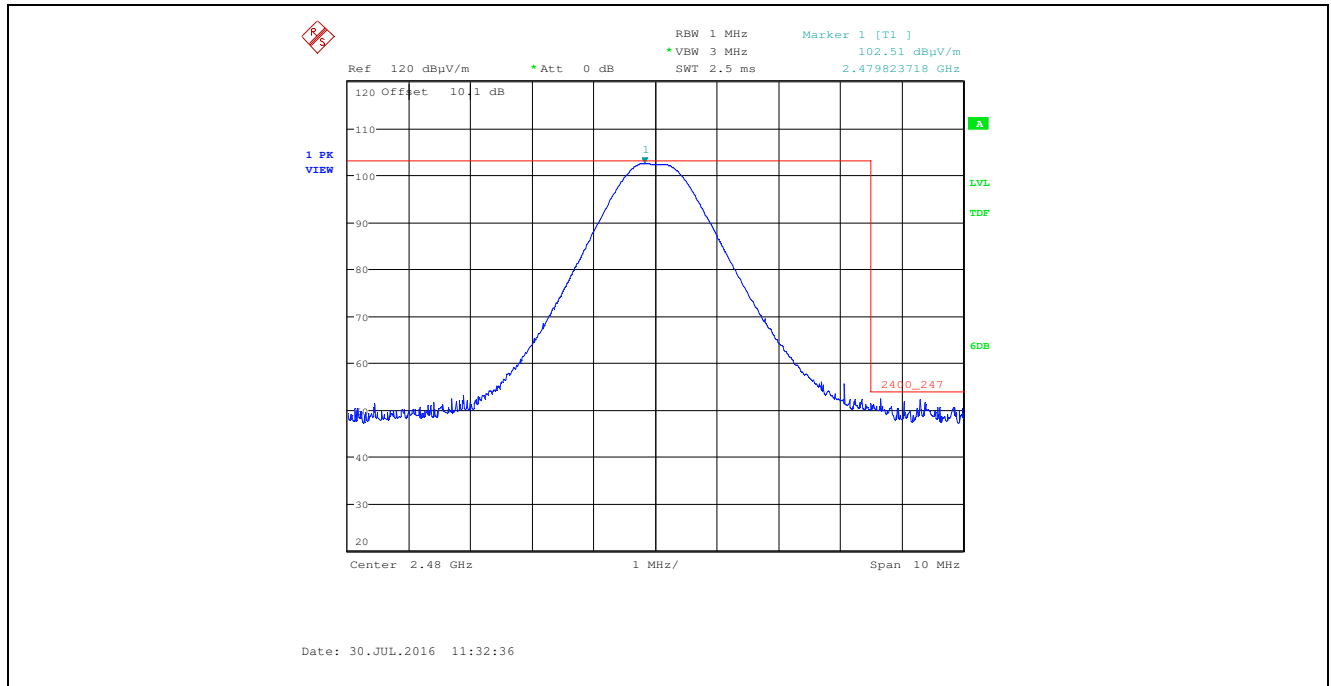
Plot 5.2.5.1.3. Band-Edge Rad Emissions, GFSK DH5, Ch 0, 2402 MHz, Chain # 2, Continuous Mode, Vertical



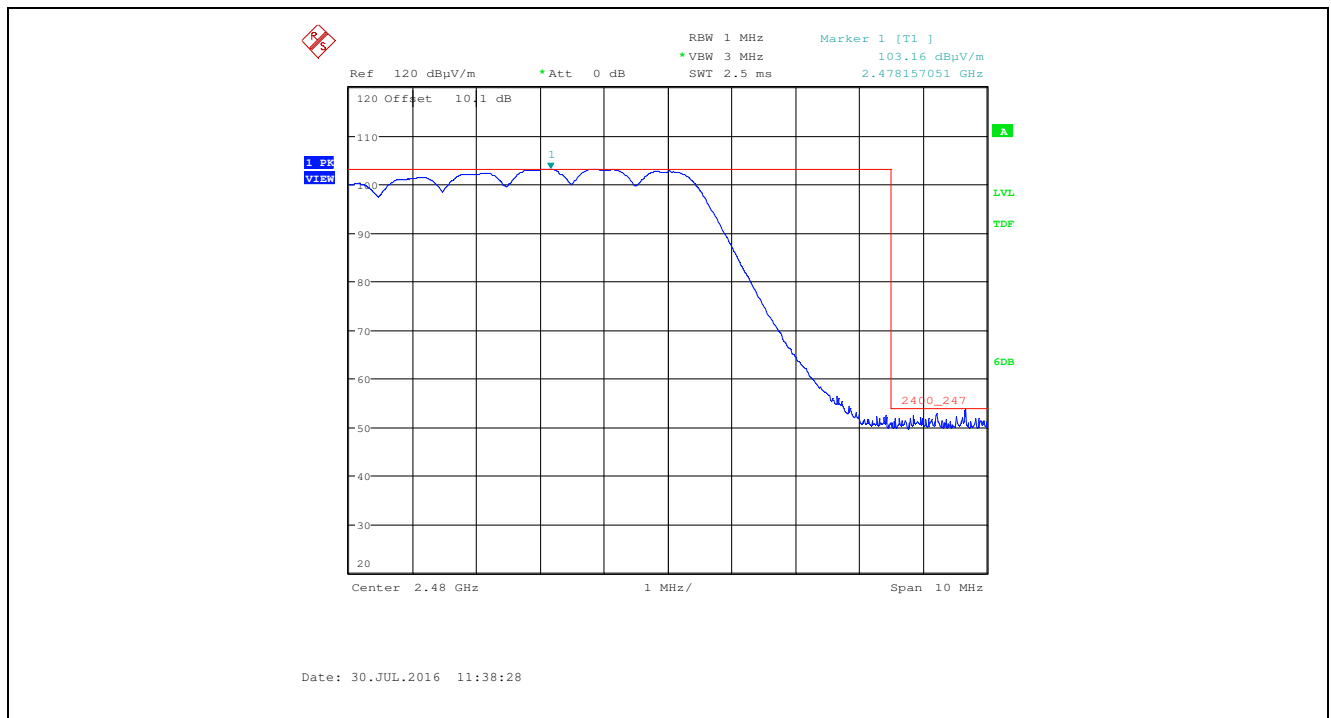
Plot 5.2.5.1.4. Band-Edge Rad Emissions, GFSK DH5, Ch 0, 2402 MHz, Chain # 2, Hopping Mode, Vertical



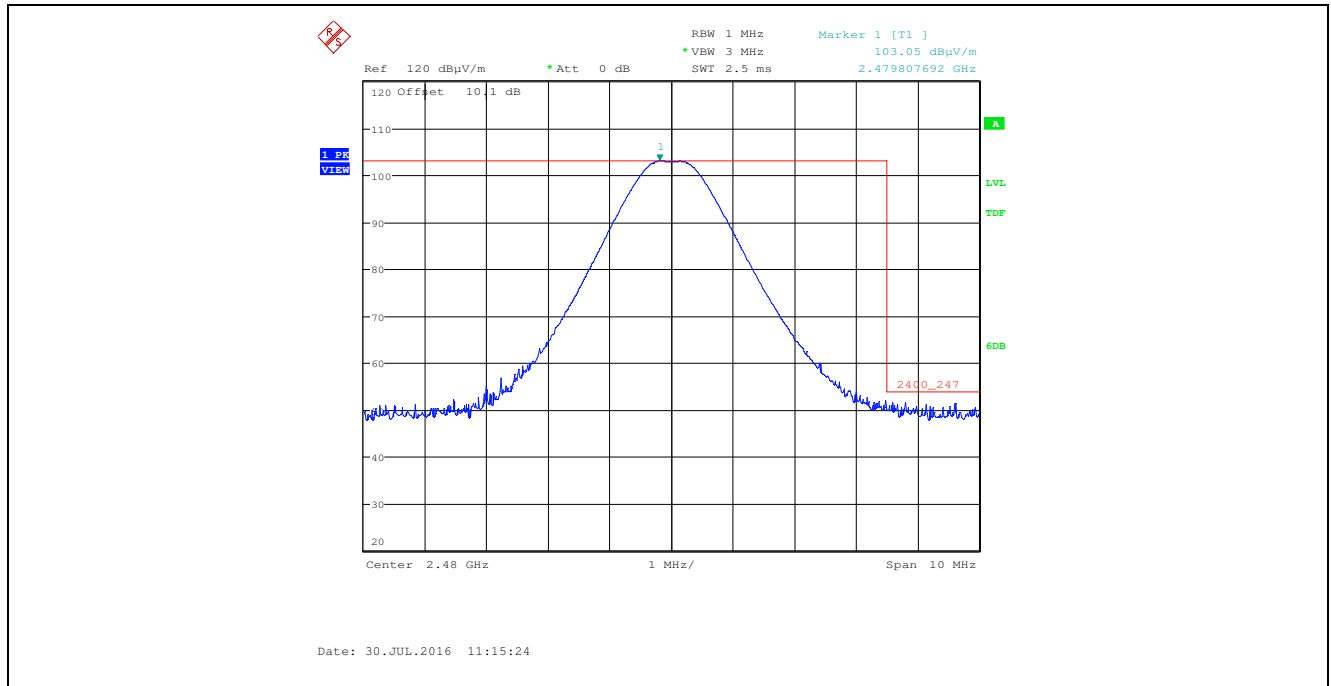
Plot 5.2.5.1.5. Band-Edge Rad Emissions, GFSK DH5, Ch 80, 2480 MHz, Chain # 2, Continuous Mode, Horizontal



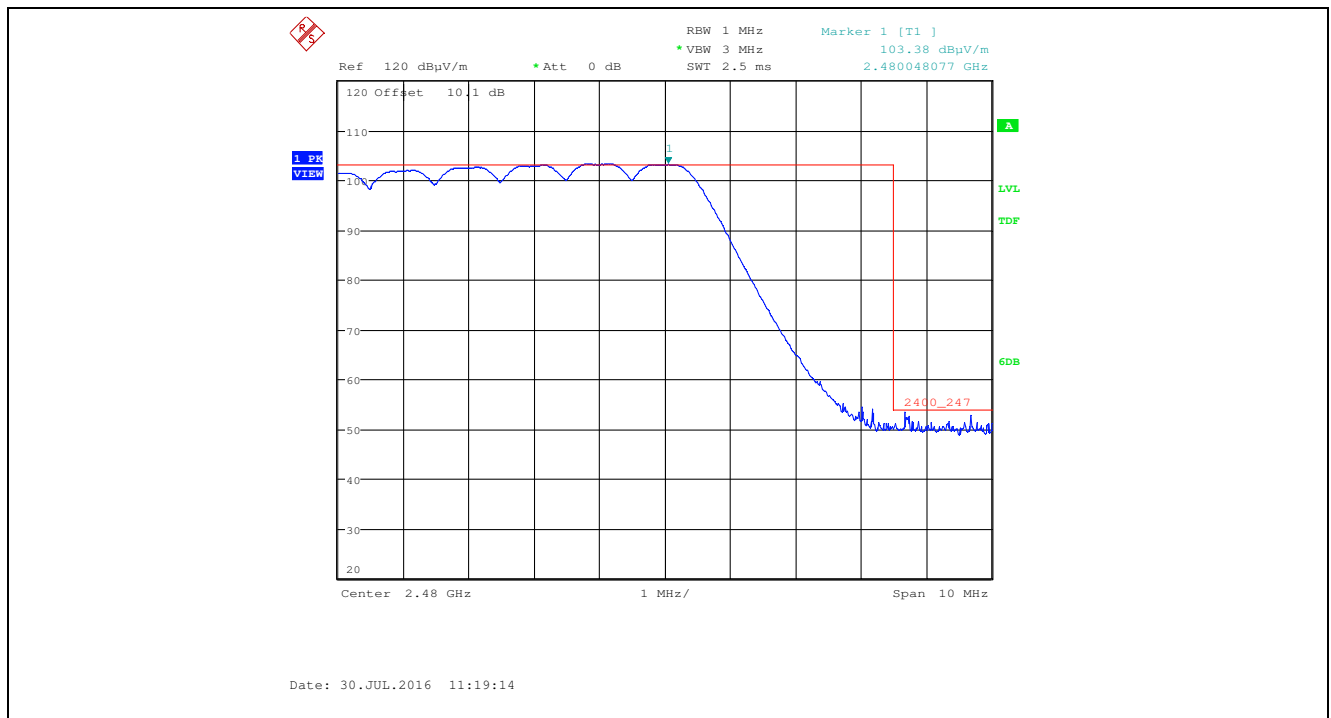
Plot 5.2.5.1.6. Band-Edge Rad Emissions, GFSK DH5, Ch 80, 2480 MHz, Chain # 2, Hopping Mode, Horizontal



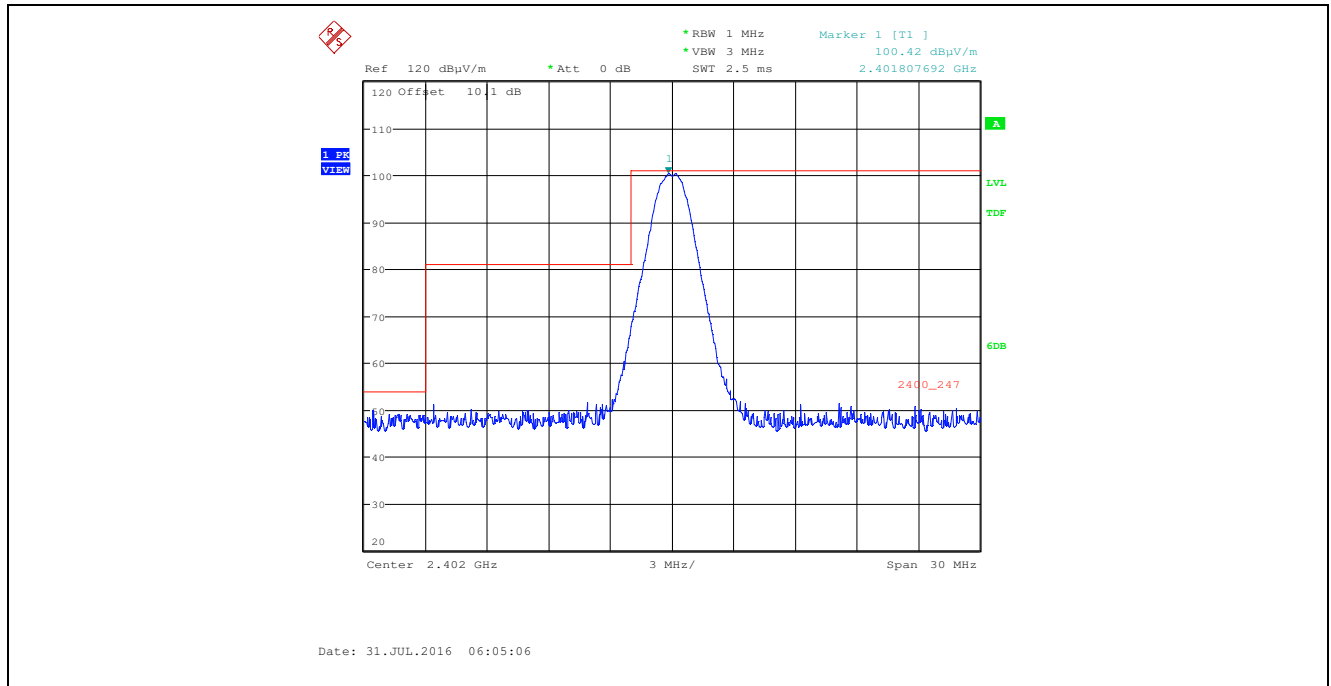
Plot 5.2.5.1.7. Band-Edge Rad Emissions, GFSK DH5, Ch 80, 2480 MHz, Chain # 2, Continuous Mode, Vertical



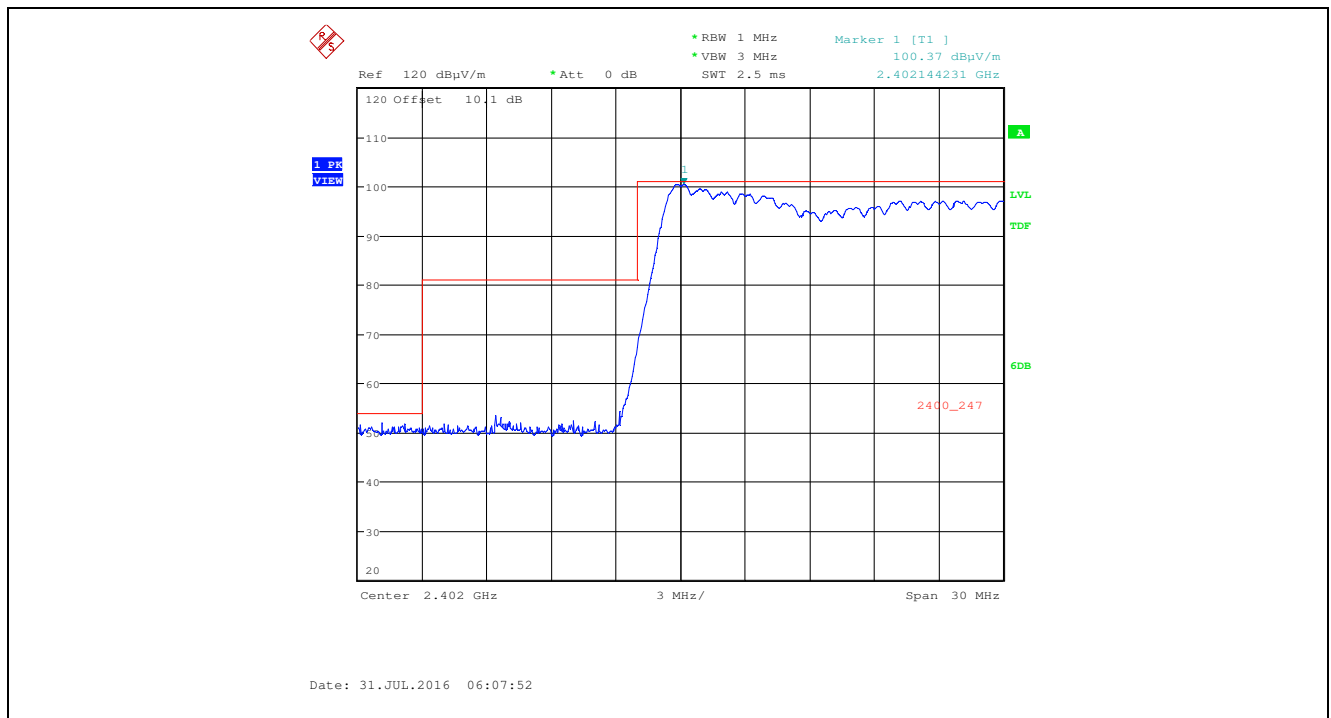
Plot 5.2.5.1.8. Band-Edge Rad Emissions, GFSK DH5, Ch 80, 2480 MHz, Chain # 2, Hopping Mode, Vertical



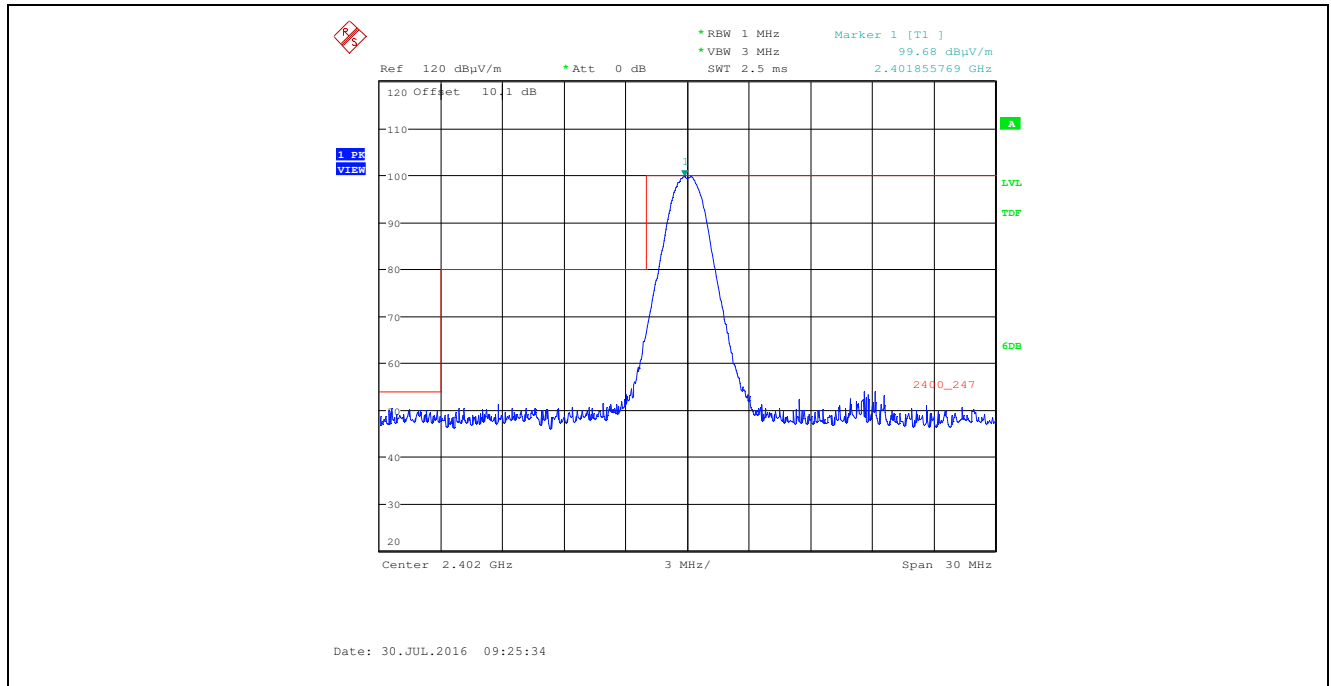
Plot 5.2.5.1.9. Band-Edge Rad Emissions, μ /4-DQPSK 2DH5, Ch 0, 2402 MHz, Chain # 2, Continuous Mode, Horizontal



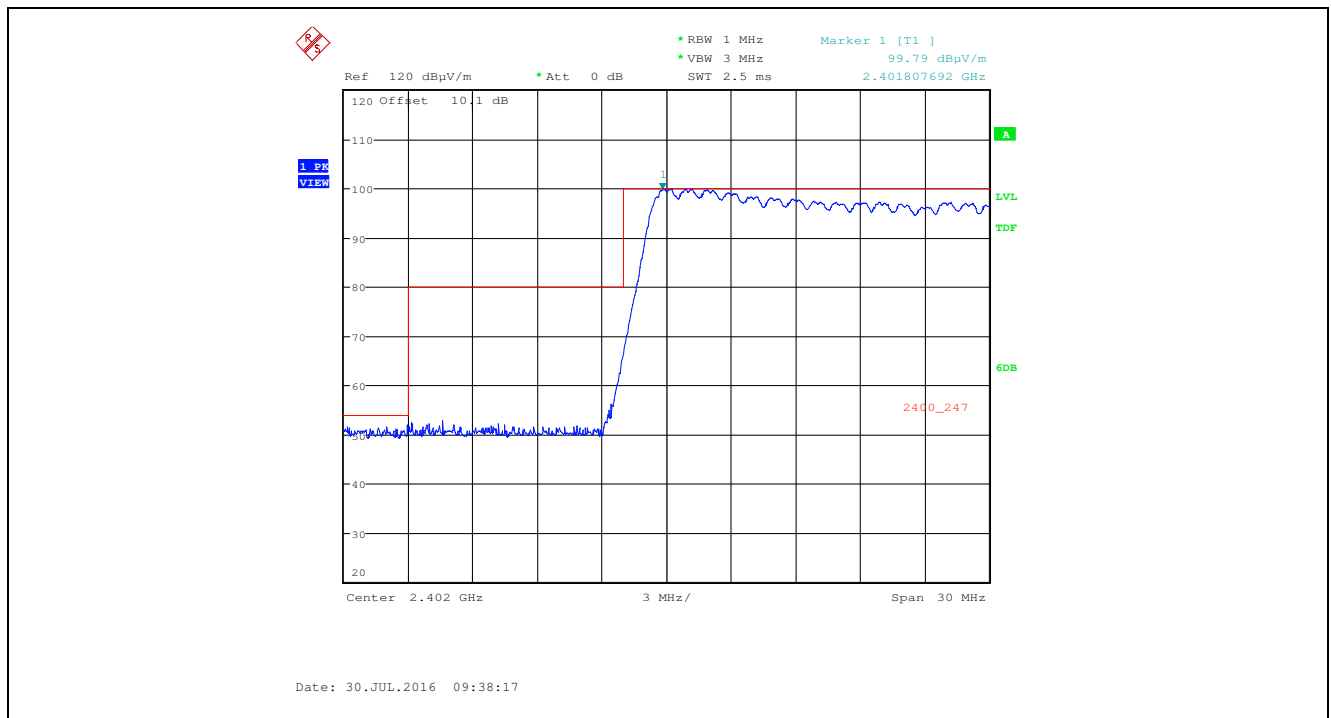
Plot 5.2.5.1.10. Band-Edge Rad Emissions, μ /4-DQPSK 2DH5, Ch 0, 2402 MHz, Chain # 2, Hopping Mode, Horizontal



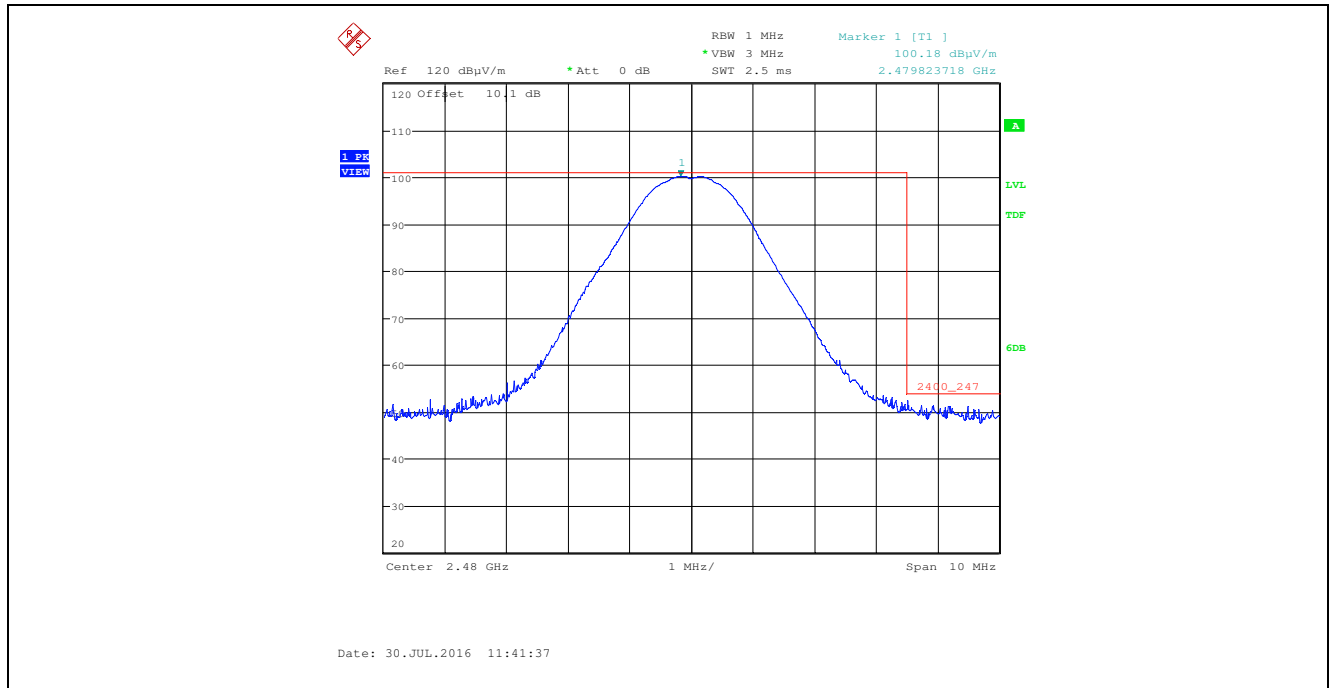
Plot 5.2.5.1.11. Band-Edge Rad Emissions, μ /4-DQPSK 2DH5, Ch 0, 2402 MHz, Chain # 2, Continuous Mode, Vertical



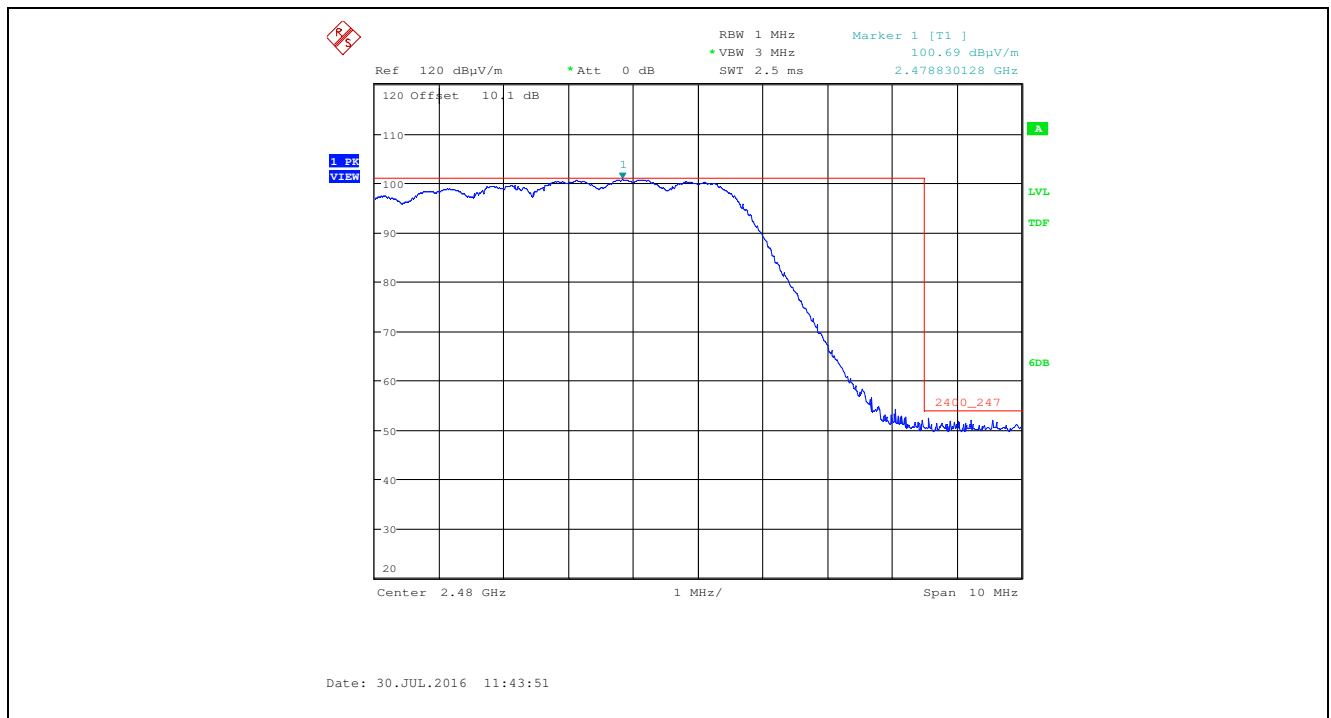
Plot 5.2.5.1.12. Band-Edge Rad Emissions, μ /4-DQPSK 2DH5, Ch 0, 2402 MHz, Chain # 2, Hopping Mode, Vertical



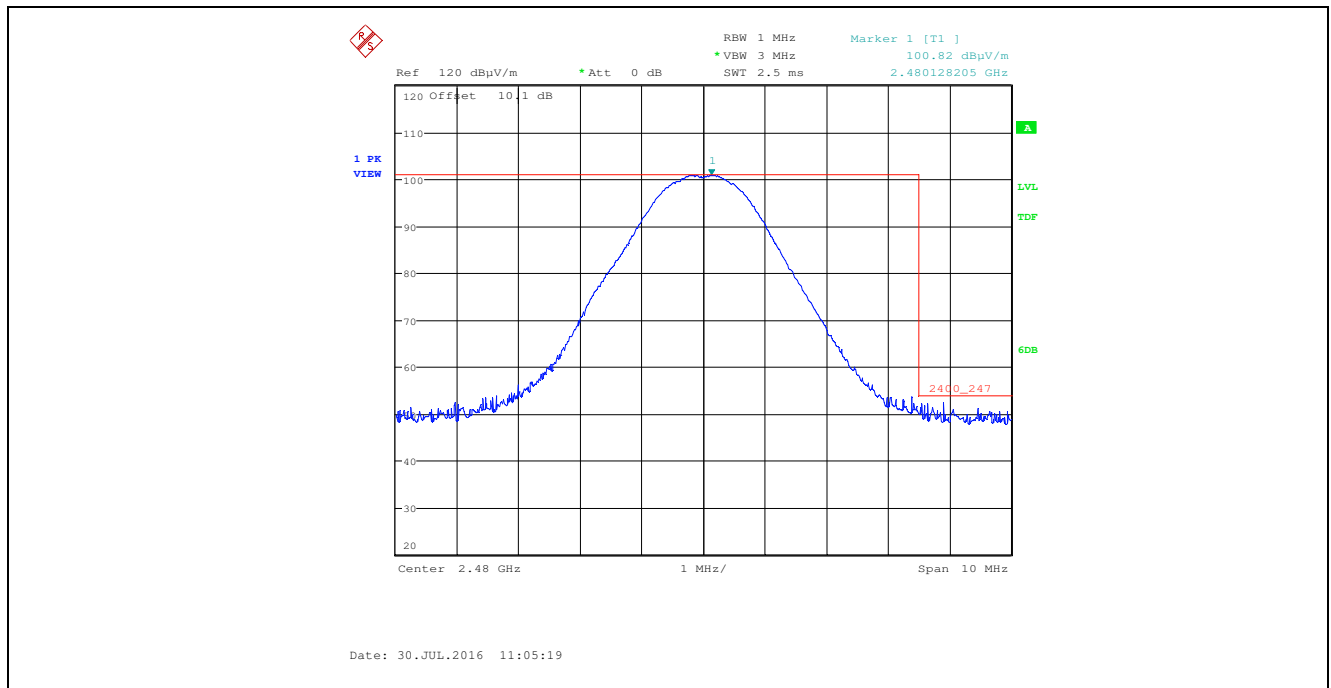
Plot 5.2.5.1.13. Band-Edge Rad Emissions, μ /4-DQPSK 2DH5, Ch 80, 2480 MHz, Chain # 2, Continuous Mode, Horizontal



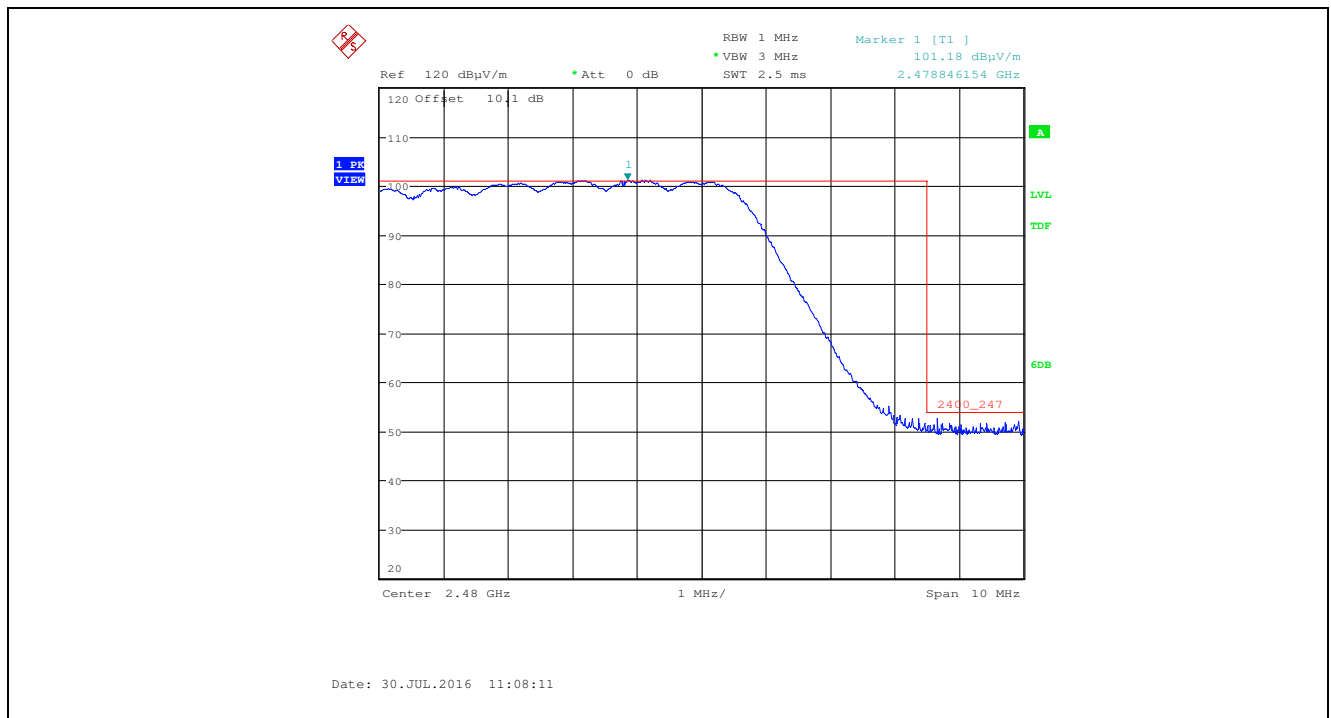
Plot 5.2.5.1.14. Band-Edge Rad Emissions, μ /4-DQPSK 2DH5, Ch 80, 2480 MHz, Chain # 2, Hopping Mode, Horizontal



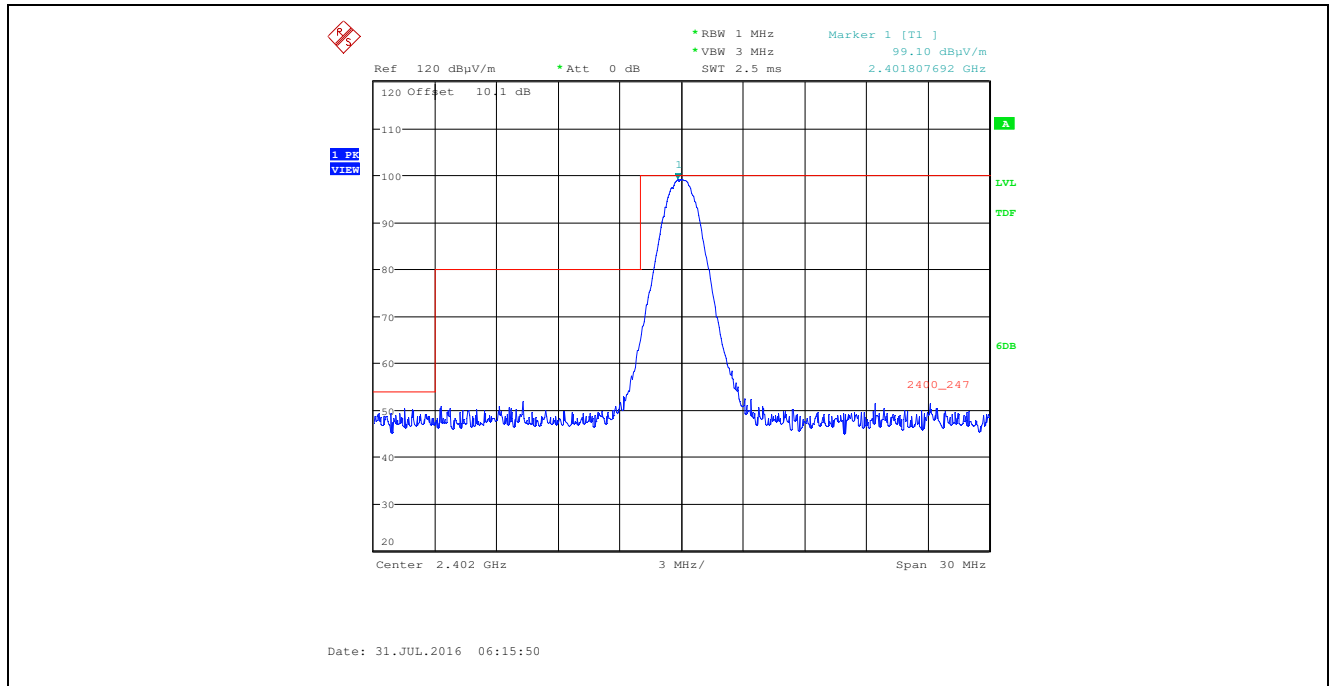
Plot 5.2.5.1.15. Band-Edge Rad Emissions, μ /4-DQPSK 2DH5, Ch 80, 2480 MHz, Chain # 2, Continuous Mode, Vertical



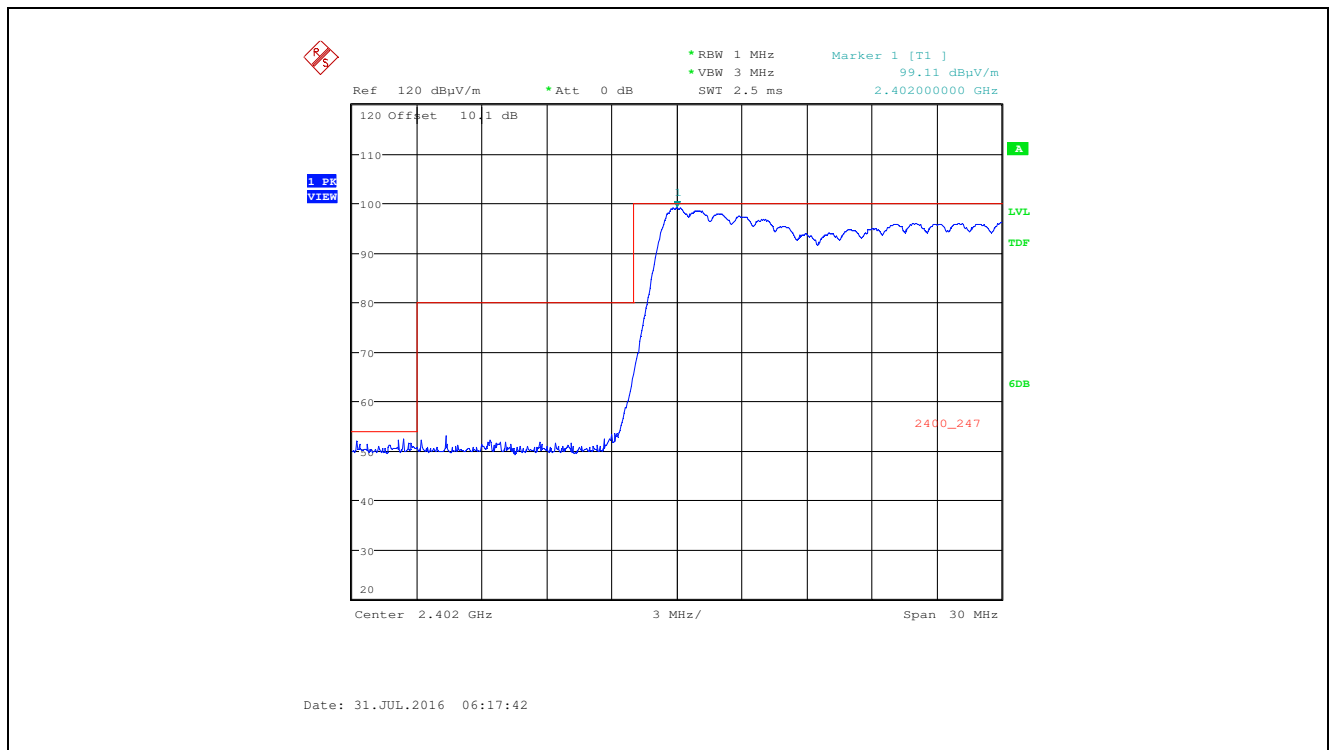
Plot 5.2.5.1.16. Band-Edge Rad Emissions, μ /4-DQPSK 2DH5, Ch 80, 2480 MHz, Chain # 2, Hopping Mode, Vertical



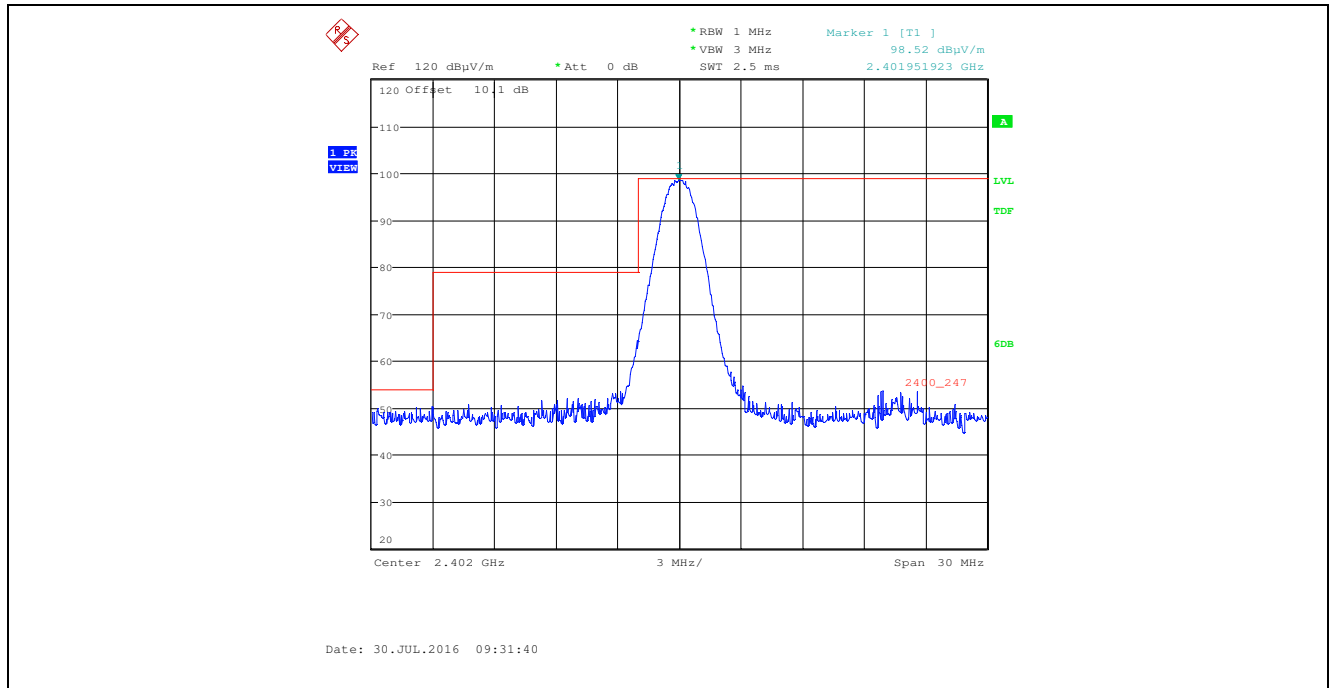
Plot 5.2.5.1.17. Band-Edge Rad Emissions, 8-DPSK 3DH5, Ch 0, 2402 MHz, Chain # 2, Continuous Mode, Horizontal



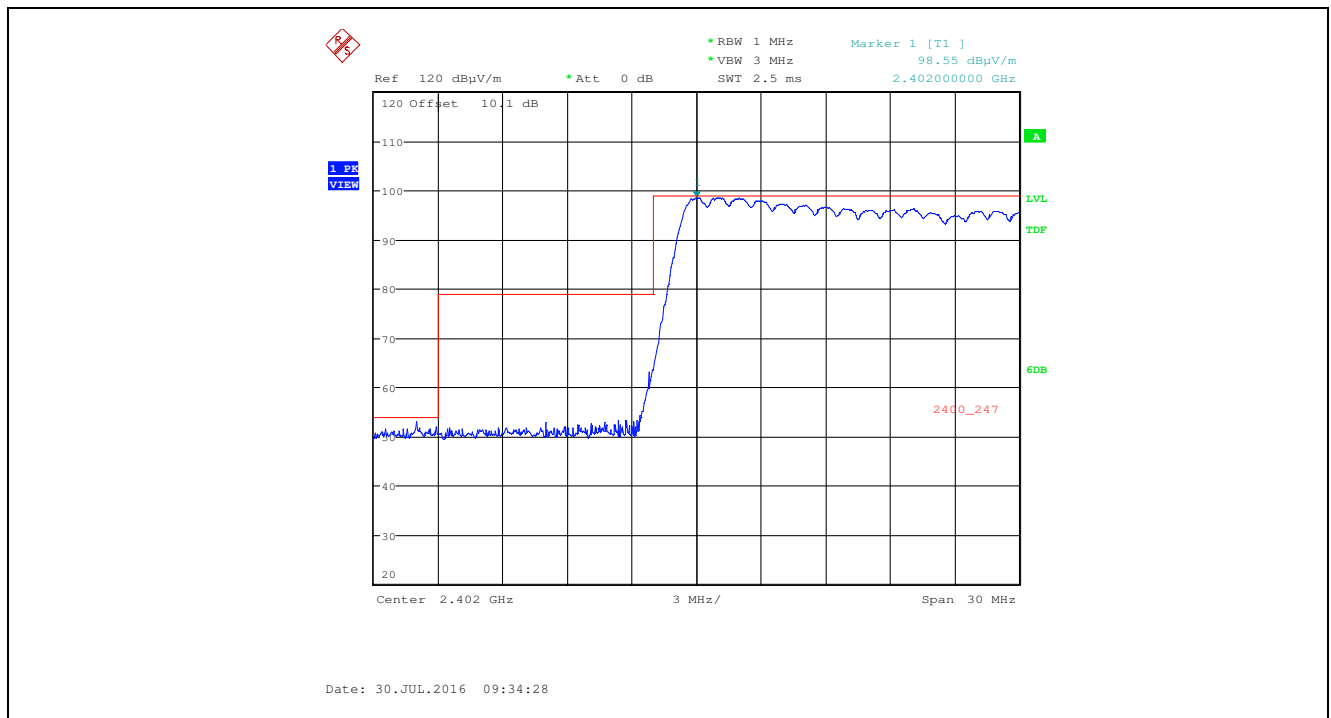
Plot 5.2.5.1.18. Band-Edge Rad Emissions, 8-DPSK 3DH5, Ch 0, 2402 MHz, Chain # 2, Hopping Mode, Horizontal



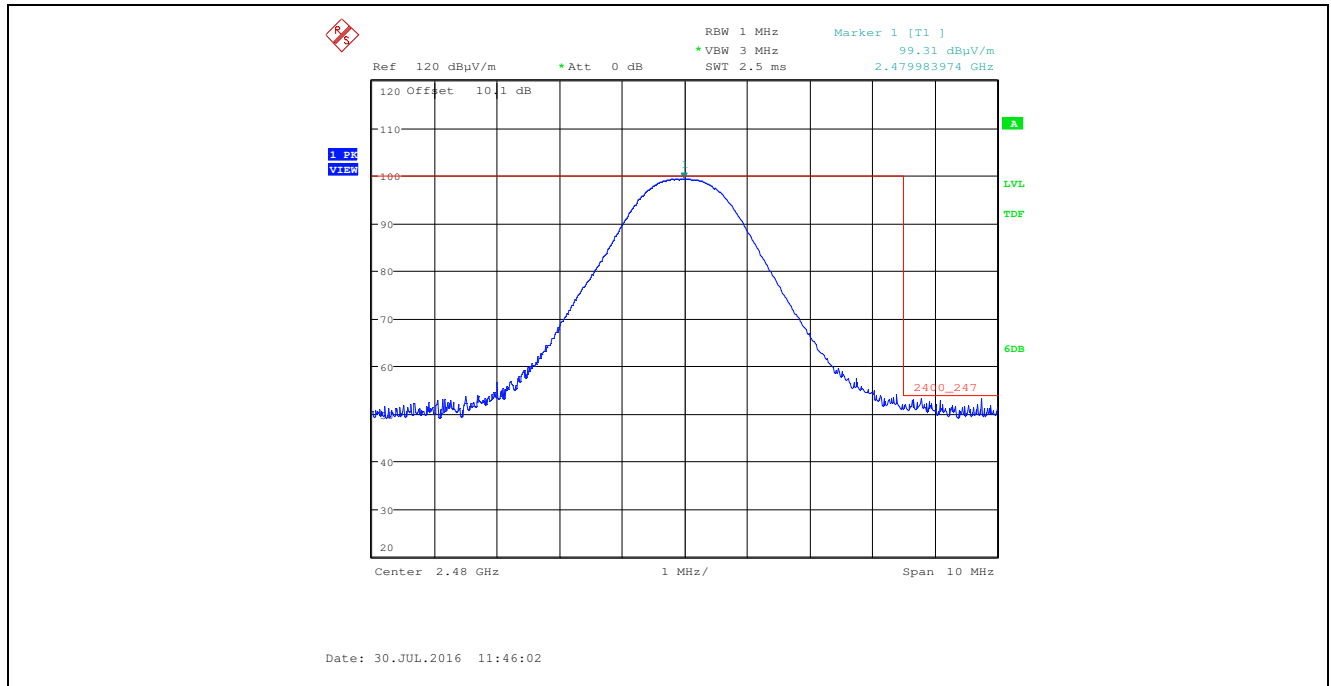
Plot 5.2.5.1.19. Band-Edge Rad Emissions, 8-DPSK 3DH5, Ch 0, 2402 MHz, Chain # 2, Continuous Mode, Vertical



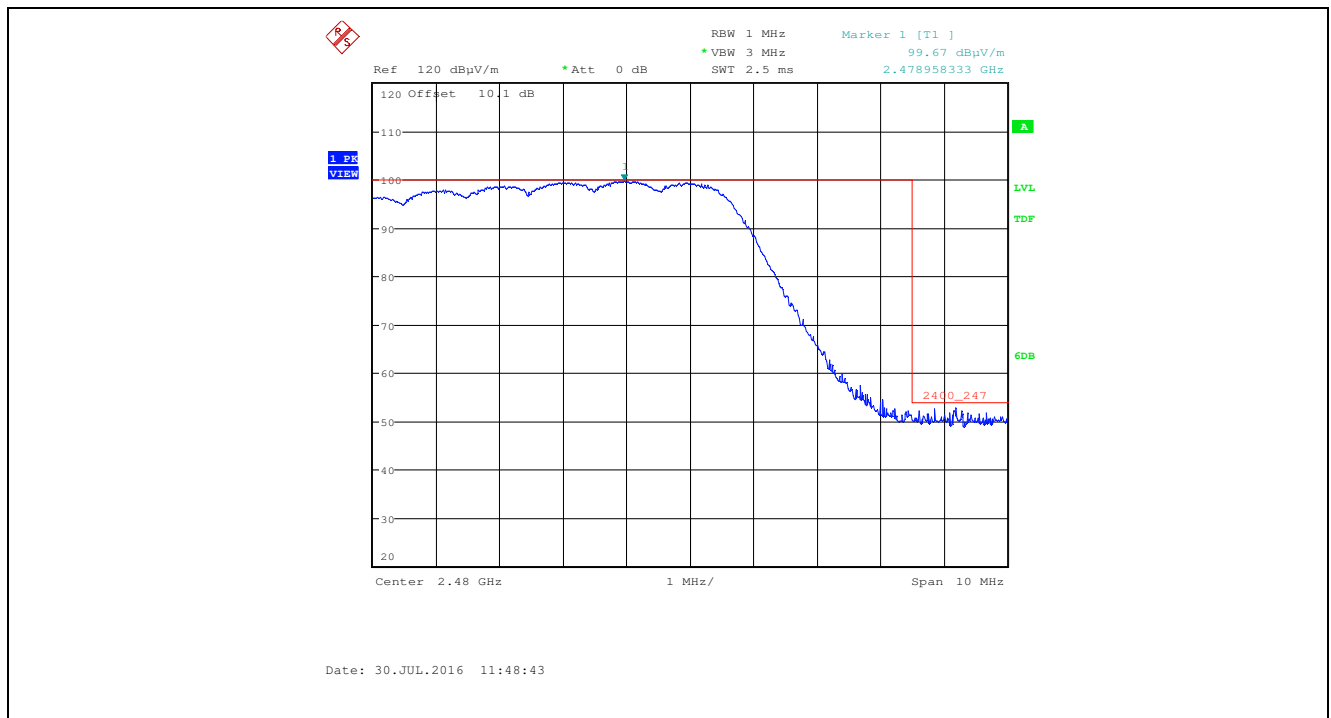
Plot 5.2.5.1.20. Band-Edge Rad Emissions, 8-DPSK 3DH5, Ch 0, 2402 MHz, Chain # 2, Hopping Mode, Vertical



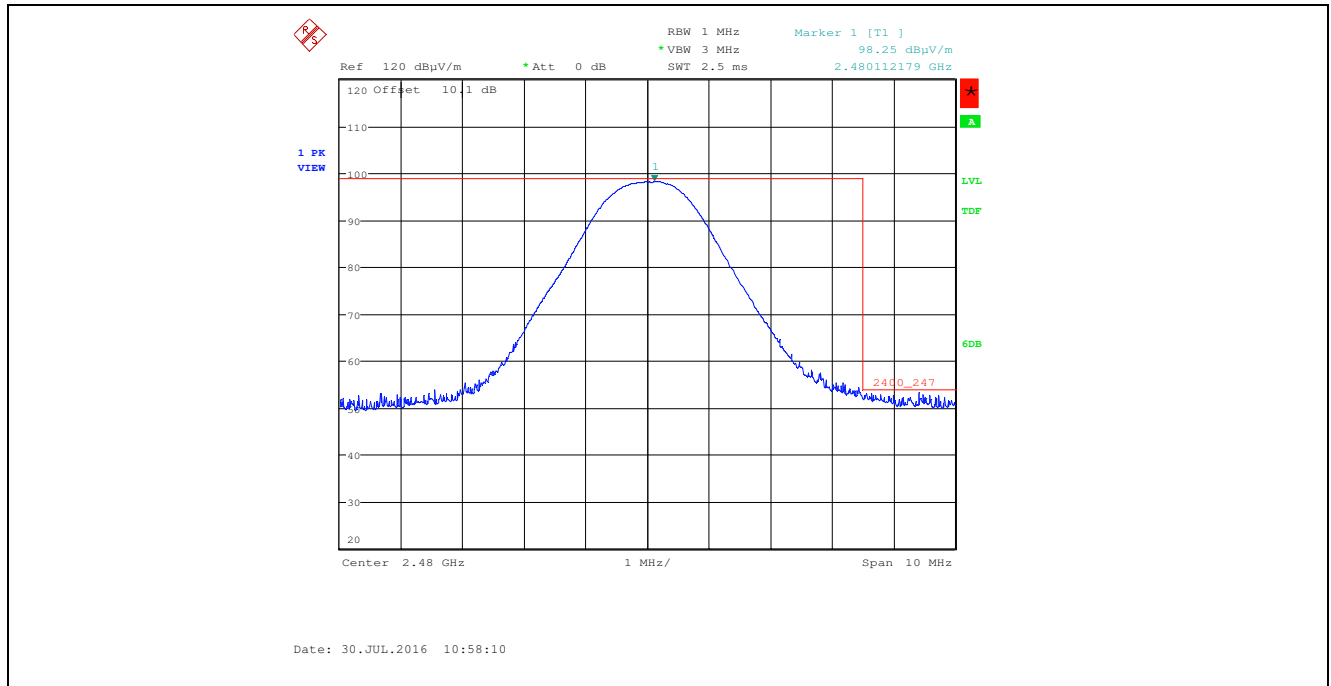
Plot 5.2.5.1.21. Band-Edge Rad Emissions, 8-DPSK 3DH5, Ch 80, 2480 MHz, Chain # 2, Continuous Mode, Horizontal



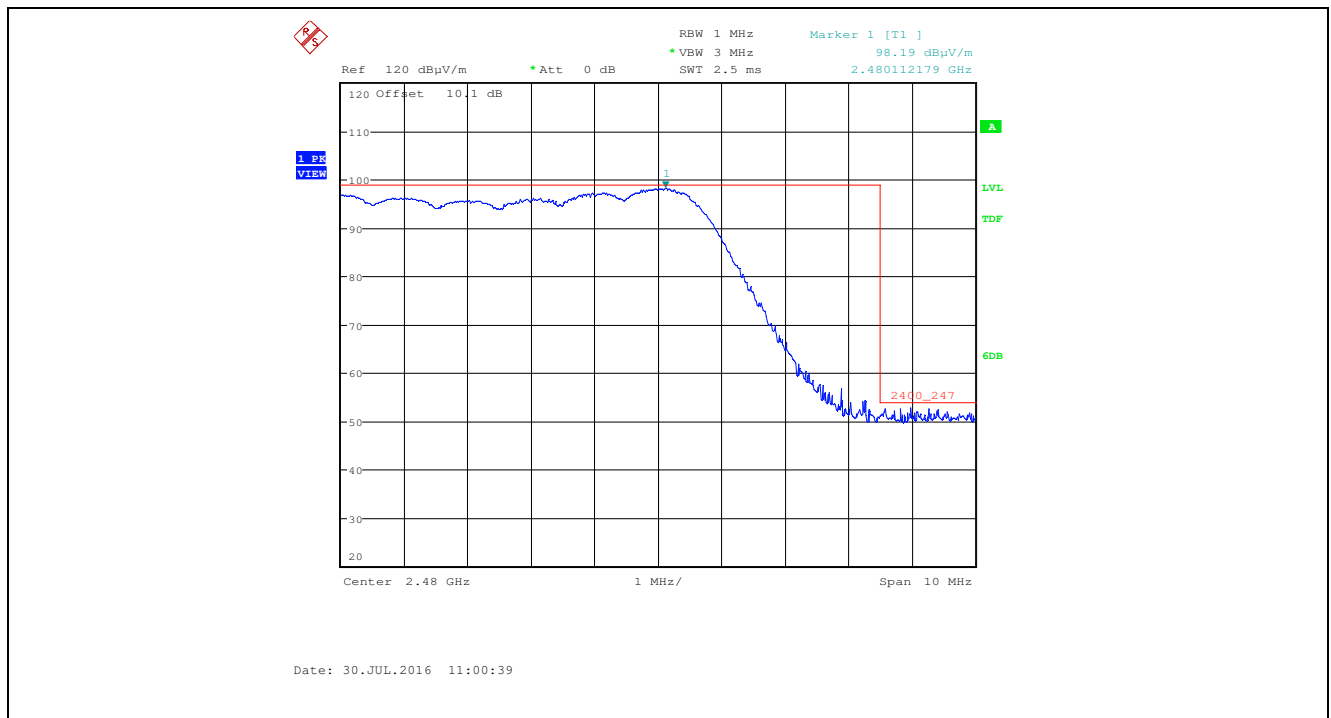
Plot 5.2.5.1.22. Band-Edge Rad Emissions, 8-DPSK 3DH5, Ch 80, 2480 MHz, Chain # 2, Hopping Mode, Horizontal



Plot 5.2.5.1.23. Band-Edge Rad Emissions, 8-DPSK 3DH5, Ch 80, 2480 MHz, Chain # 2, Continuous Mode, Vertical



Plot 5.2.5.1.24. Band-Edge Rad Emissions, 8-DPSK 3DH5, Ch 80, 2480 MHz, Chain # 2, Hopping Mode, Vertical



5.3. RF EXPOSURE REQUIRMENTS [§§ 15.247(i), 1.1310 & 2.1091]

5.3.1. Limits

§ 1.1310: The criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in 1.1307(b).

Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f ²)	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500			f/1500	30
1500-100,000			1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

Note 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

Note 2: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

5.3.2. Method of Measurements

Calculation Method of Power Density/RF Safety Distance:

$$S = \frac{PG}{4\pi \cdot r^2} = \frac{EIRP}{4\pi \cdot r^2}$$

Where,
P: power input to the antenna in mW
EIRP: Equivalent (effective) isotropic radiated power.
S: power density mW/cm²
G: numeric gain of antenna relative to isotropic radiator
r: distance to centre of radiation in cm

$$r = \sqrt{\frac{PG}{4\pi \cdot S}} = \sqrt{\frac{EIRP}{4\pi \cdot S}}$$

5.3.3. RF Evaluation

Antenna Type Certified with	Antenna Location (Main/Aux)	2.4GHz Peak Gain in dBi*	2.6GHz Peak Gain in dBi*	5.2GHz Peak Gain in dBi*	5.5GHz Peak Gain in dBi*	5.7GHz Peak Gain in dBi*
PIFA Type (Original Filing)	Main/Aux	3.24	3.47	3.73	4.77	4.77
Dipole Model# GW.71 (C2PC)	Main/Aux	2.07	2.07	2.91	2.91	2.91
*All antenna gains include cable loss.						

Since the single & combined measured conducted power at antenna ports for this C2PC and the above calculated net antenna gains after assembly loss are lower than the Original filing, the RF exposure evaluations submitted with Original filing continue to comply for this filing as well.

EXHIBIT 6. TEST EQUIPMENT LIST

Test Instruments	Manufacturer	Model No.	Serial No.	Frequency Range	Cal. Due Date
Spectrum Analyzer	Rohde & Schwarz	FSEK30	100077	20Hz–40 GHz	Nov 21, 2016
Attenuator	Pasternack	7024-20	6	DC–26.5 GHz	Cal on use
DC Block	Hewlett Packard	11742A	12460	0.045 – 26.5 GHz	Cal on use
RadiPower	DARE! Instruments	RPR3006W	15I00041SNO87	10Hz–6 GHz	Jun 28, 2017
Peak Power Sensor	Hewlett Packard	84814A	3205A00175	0.5 - 40 GHz	Jul 15, 2016
Spectrum Analyzer	Rohde & Schwarz	FSU26	100398	20Hz–26.5 GHz	Sep 14, 2017
RF Amplifier	Hewlett Packard	84498	3008A00769	1 – 26.5 GHz	May 5, 2017
Environmental Chamber	Envirotronics	SSH32C	11994847-S-11059	-60 to 177 °C	Jun 2, 2017
EMI Receiver	Rohde & Schwarz	ESU40	100037	20Hz–40 GHz	May 8, 2017
RF Amplifier	Com-Power	PAM-0118A	551052	0.5 – 18 GHz	Jul 12, 2017
Biconilog	Emco	3142	9601-1005	26-1000 MHz	May 12, 2017
Horn Antenna	Emco	3155	5955	1 – 18 GHz	Apr 21, 2017
Horn Antenna	Emco	3160-09	118385	18 – 26.5 GHz	Aug 4, 2016
Horn Antenna	Emco	3160-10	102686	26.5 - 40 GHz	Aug 4, 2016
High Pass Filter	K & L	11SH10-8000/T18000	3	Cut off 5800 MHz	Cal on use

EXHIBIT 7. MEASUREMENT UNCERTAINTY

The measurement uncertainties stated were calculated in accordance with the requirements of CISPR 16-4-2 @ IEC:2003 and JCGM 100:2008 (GUM 1995) – Guide to the Expression of Uncertainty in Measurement.

7.1. RADIATED EMISSION MEASUREMENT UNCERTAINTY

	Radiated Emission Measurement Uncertainty @ 3m, Horizontal (30-1000 MHz):	Measured (dB)	Limit (dB)
u_c	Combined standard uncertainty: $u_c(y) = \sqrt{\sum_{i=1}^m u_i^2(y)}$	± 2.39	± 2.6
U	Expanded uncertainty U: $U = 2u_c(y)$	± 4.79	± 5.2

	Radiated Emission Measurement Uncertainty @ 3m, Vertical (30-1000 MHz):	Measured (dB)	Limit (dB)
u_c	Combined standard uncertainty: $u_c(y) = \sqrt{\sum_{i=1}^m u_i^2(y)}$	± 2.39	± 2.6
U	Expanded uncertainty U: $U = 2u_c(y)$	± 4.78	± 5.2

	Radiated Emission Measurement Uncertainty @ 3 m, Horizontal & Vertical (1 – 18 GHz):	Measured (dB)	Limit (dB)
u_c	Combined standard uncertainty: $u_c(y) = \sqrt{\sum_{i=1}^m u_i^2(y)}$	± 1.87	Under consideration
U	Expanded uncertainty U: $U = 2u_c(y)$	± 3.75	Under consideration