# 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<br>Tri M. Luu<br>Vice President of Engineering<br>UltraTech Group of Labs<br><br>Date: August 08, 2016 | |
| Report Prepared by: Dharmajit Solanki<br><br>Issued Date: August 08, 2016 | Tested by: Hung Trinh<br><br>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.*


**UltraTech**

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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<br>▪ ANSI C63.10<br>▪ FCC Public Notice DA 00-705 |
| **Environmental Classification:** | [x] Commercial, industrial or business environment<br>[x] 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 &<br>EN 55022 | 2008-09, Ed 6<br>2006 | Information Technology Equipment - Radio Disturbance Characteristics - Limits and Methods of Measurement |
| CISPR 16-1-1<br>+A1<br>+A2 | 2006<br>2006<br>2007 | Specification for radio disturbance and immunity measuring apparatus and methods. Part 1-1: Measuring Apparatus |
| CISPR 16-1-2<br>+A1<br>+A2 | 2003<br>2004<br>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<br>Melbourne, FL<br>USA 32901 |
| **Contact Person:** | Mr. Paul Parkinson<br>Phone #: 321 728 0172<br>Fax #: 321 722 2216<br>Email Address: Paul.parkinson@dtx.com |

| MANUFACTURER | |
|---|---|
| **Name:** | Intel Corporation |
| **Address:** | 2111 NE 25th Avenue<br>JF3-302, Hillsboro, OR<br>USA 97124 |
| **Contact Person:** | Mr. Steven C Hackett<br>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<br>• Base Station (fixed use) |
| **Intended Operating Environment:** | ▪ Commercial, industrial or business environment<br>▪ 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 confg 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 $^{o}$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:**<br>(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)

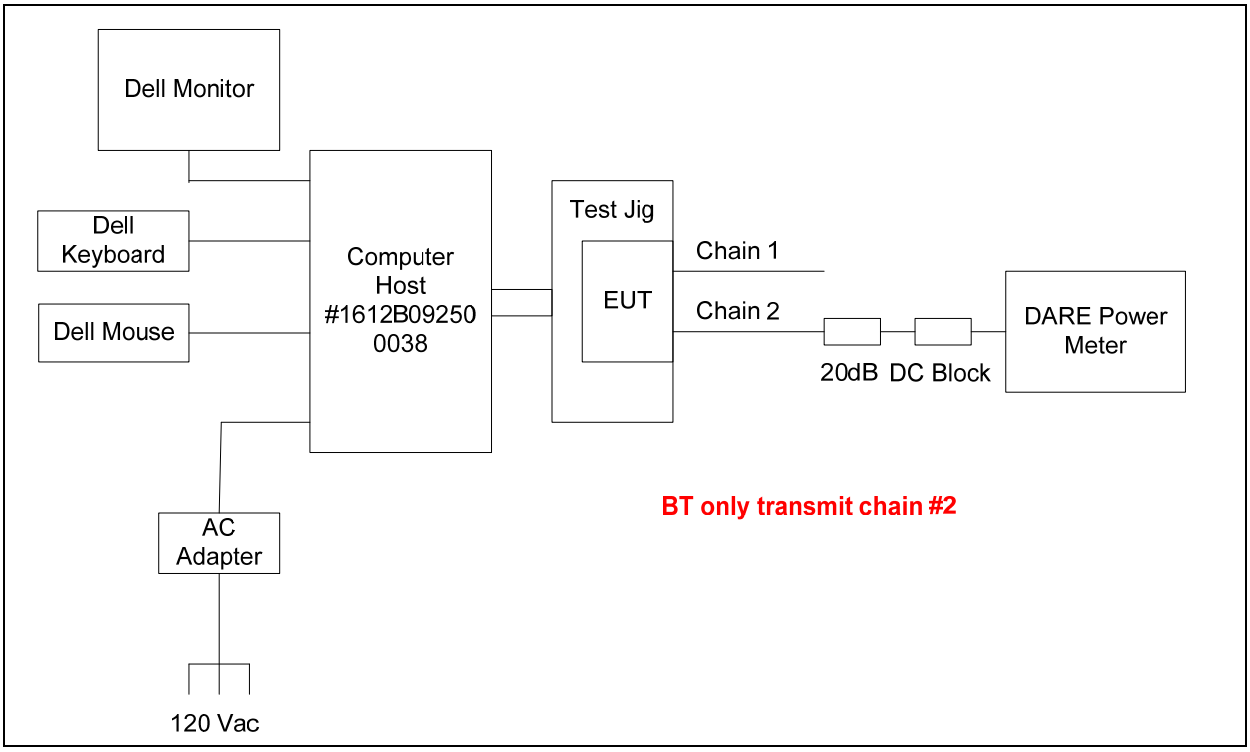
**§ 15.247(b)(1):** For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

**§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 π/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

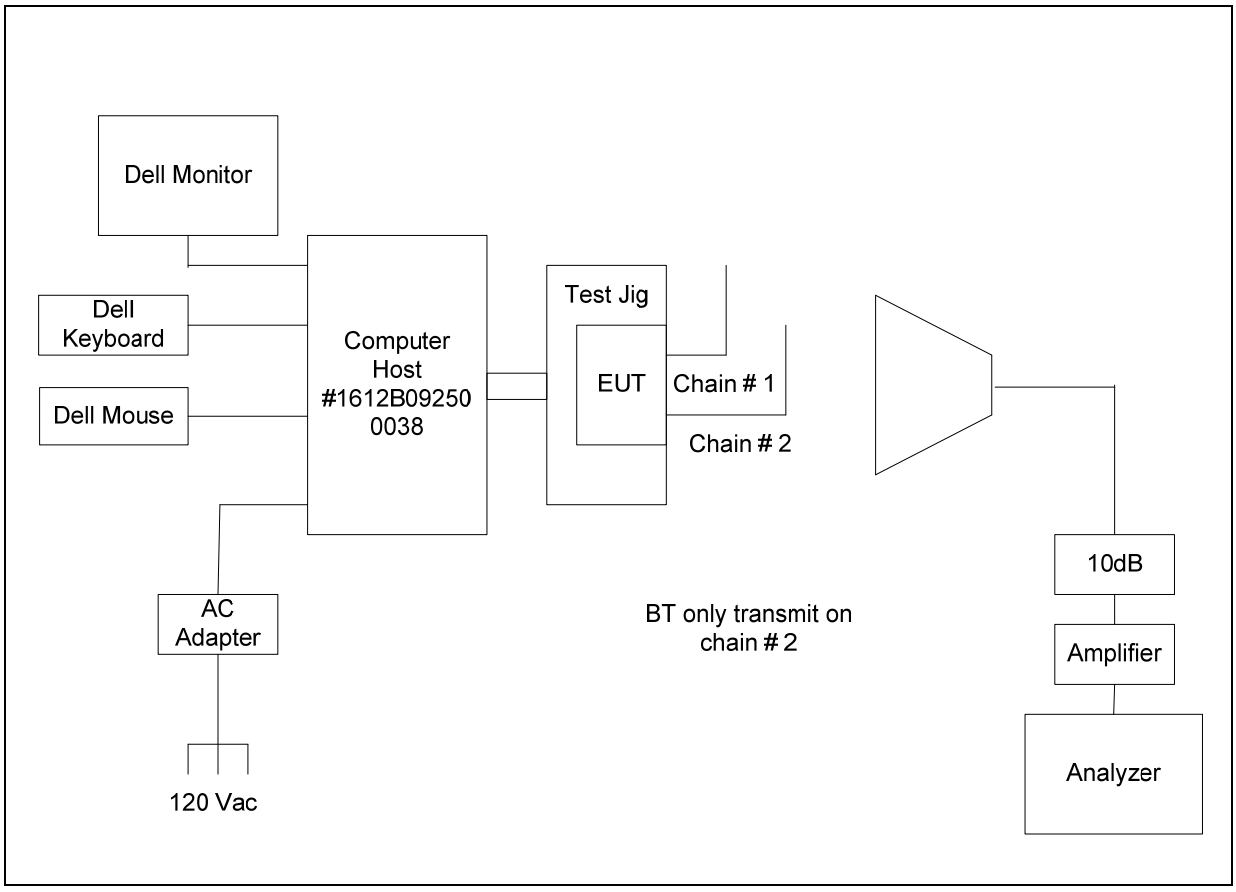
**Section 15.209(a) - Field Strength Limits within Restricted Frequency Bands**

| 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.

### 5.2.4.2. 8-DPSK 3DH5 Mode, Setting Max 1dBm

| 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. | | | | | | | |

### 5.2.4.3. μ/4-DQPSK 2DH5 Mode, Setting Max 2dBm

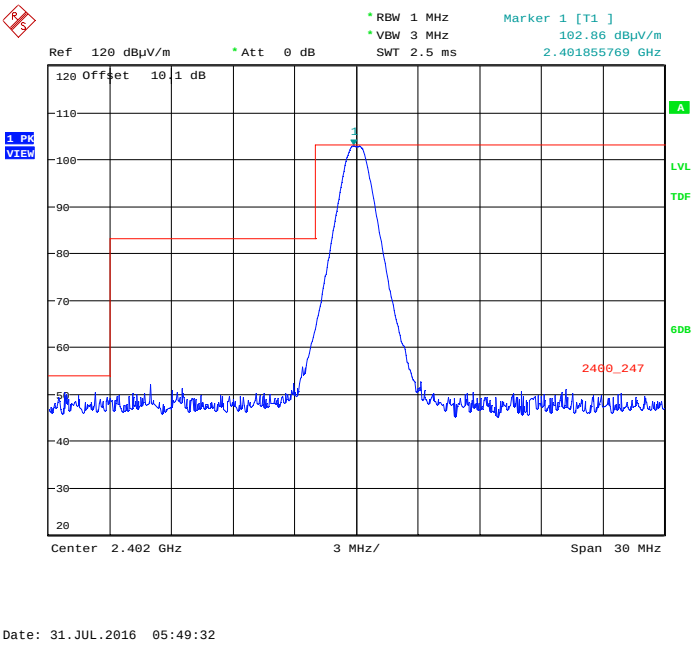
| Fundamental Frequency: | 2402 MHz | | | | | | |
|---|---|---|---|---|---|---|---|
| Frequency Test Range: | 30 MHz – 25 GHz | | | | | | |
| **Frequency (MHz)** | **RF Peak Level (dBμV/m)** | **RF Avg Level (dBμV/m)** | **Antenna Plane (H/V)** | **Limit 15.209 (dBμV/m)** | **Limit 15.247 (dBμV/m)** | **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. | | | | | | | |

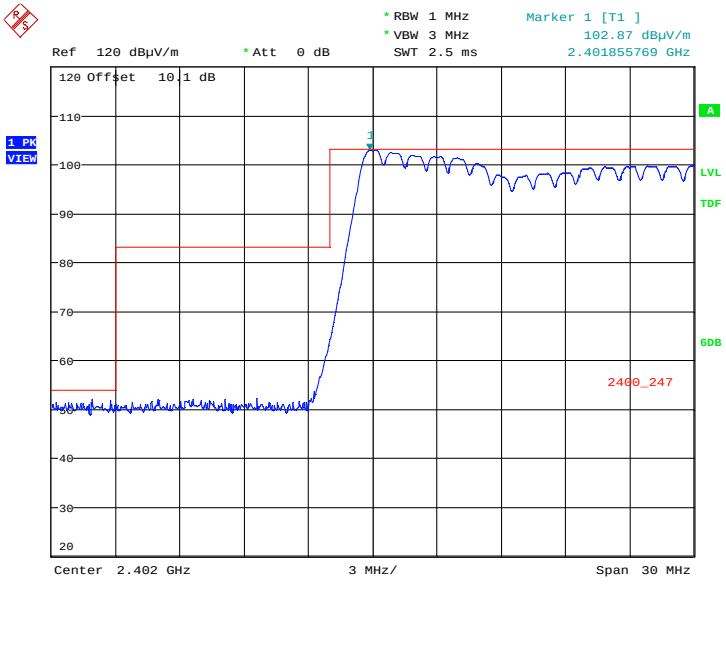
| Fundamental Frequency: | 2480 MHz | | | | | | |
|---|---|---|---|---|---|---|---|
| Frequency Test Range: | 30 MHz – 25 GHz | | | | | | |
| **Frequency (MHz)** | **RF Peak Level (dBμV/m)** | **RF Avg Level (dBμV/m)** | **Antenna Plane (H/V)** | **Limit 15.209 (dBμV/m)** | **Limit 15.247 (dBμV/m)** | **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

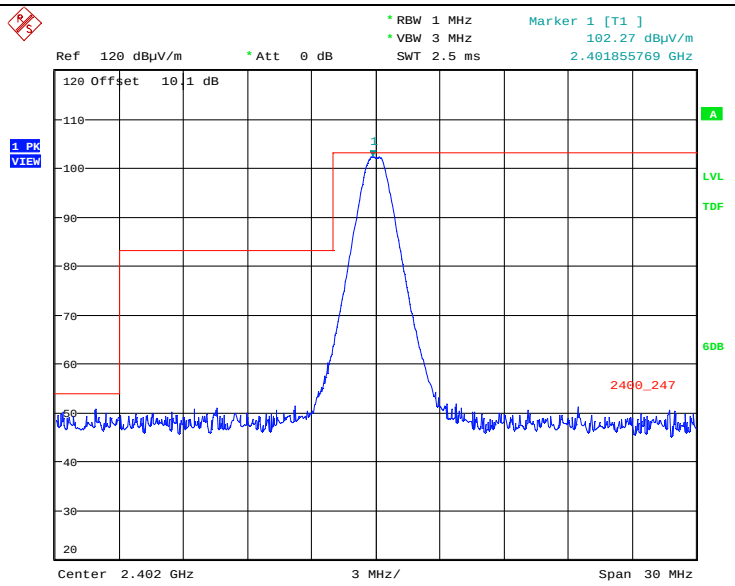
**Plot 5.2.5.1.1.** Band-Edge Rad Emissions, GFSK DH5, Ch 0, 2402 MHz, Chain # 2, Continuous Mode, Horizontal



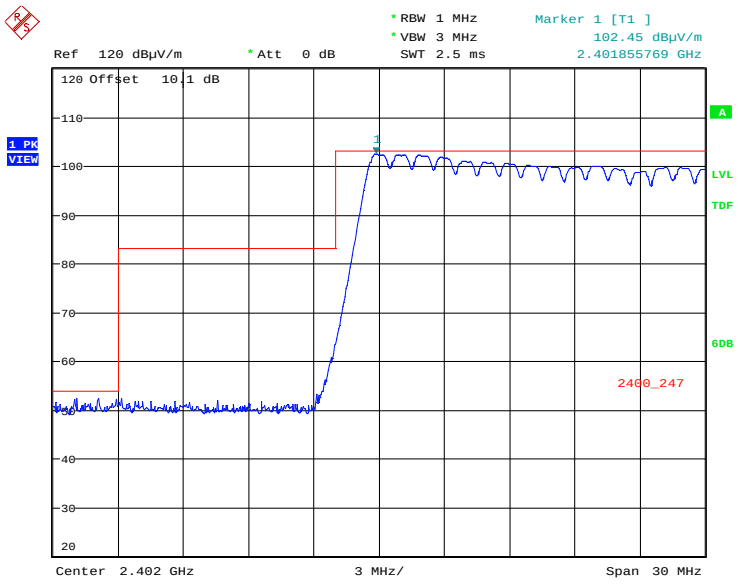

**Plot 5.2.5.1.2.** Band-Edge Rad Emissions, GFSK DH5, Ch 0, 2402 MHz, Chain # 2, Hopping Mode, Horizontal



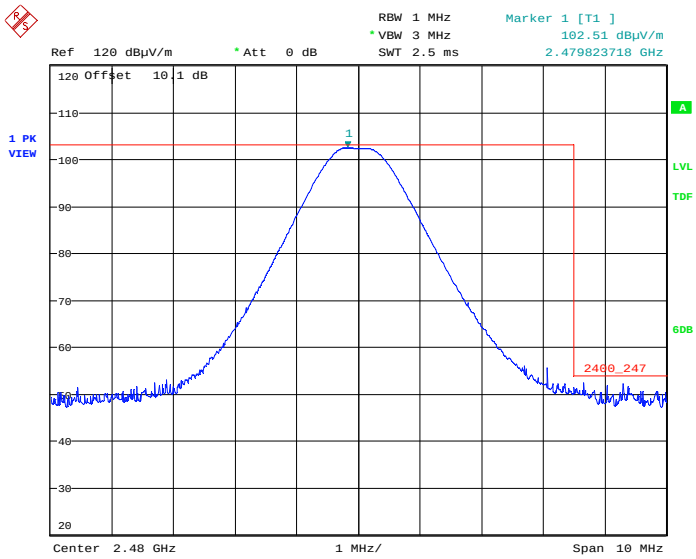
**Plot 5.2.5.1.3.** Band-Edge Rad Emissions, GFSK DH5, Ch 0, 2402 MHz, Chain # 2, Continuous Mode, Vertical




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

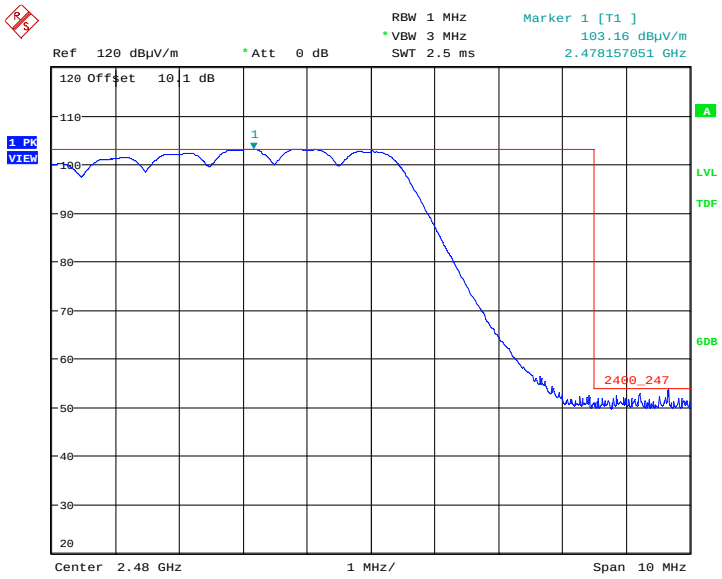


**Plot 5.2.5.1.5.** Band-Edge Rad Emissions, GFSK DH5, Ch 80, 2480 MHz, Chain # 2, Continuous Mode, Horizontal




Date: 30.JUL.2016 11:32:36

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

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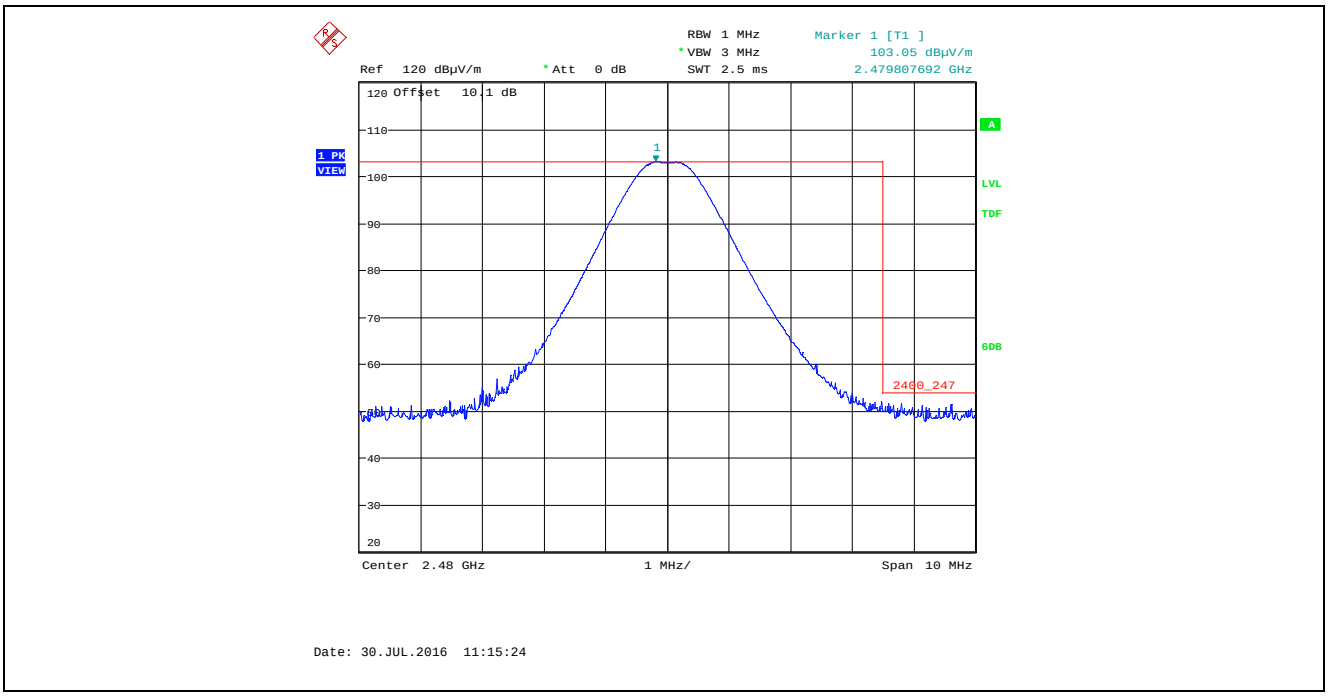
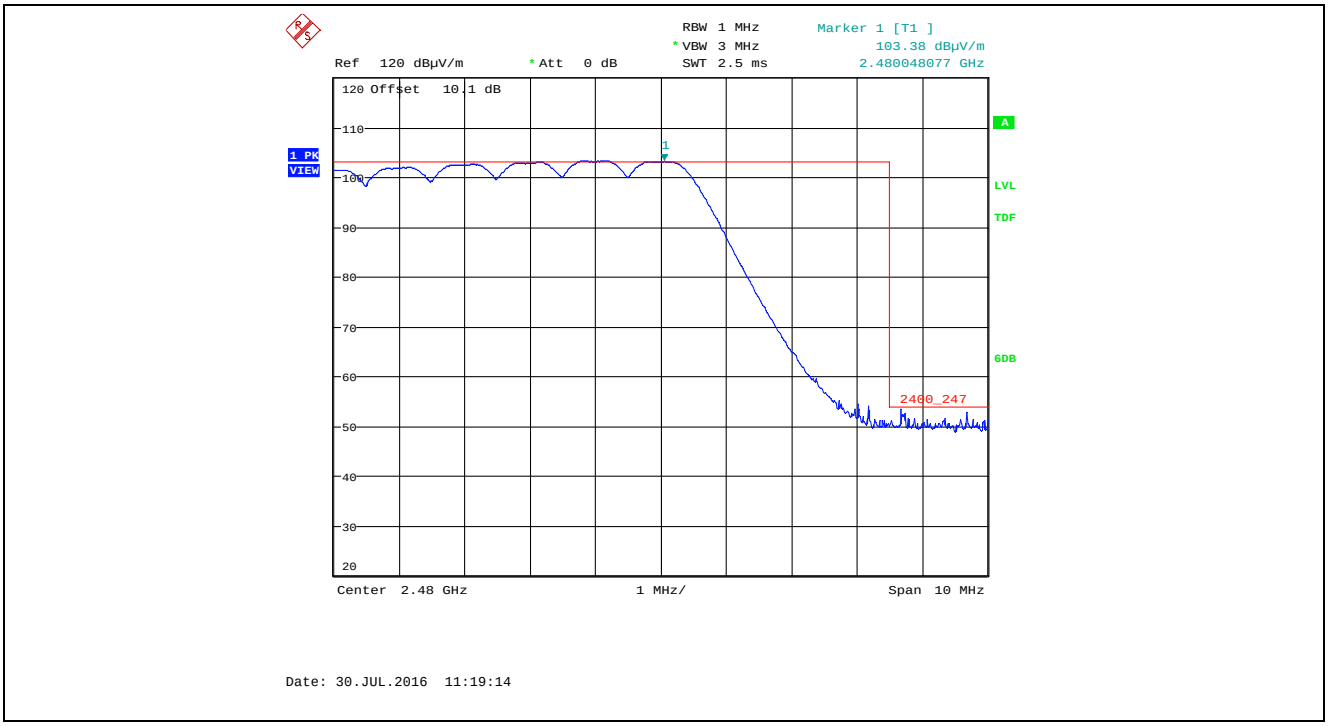
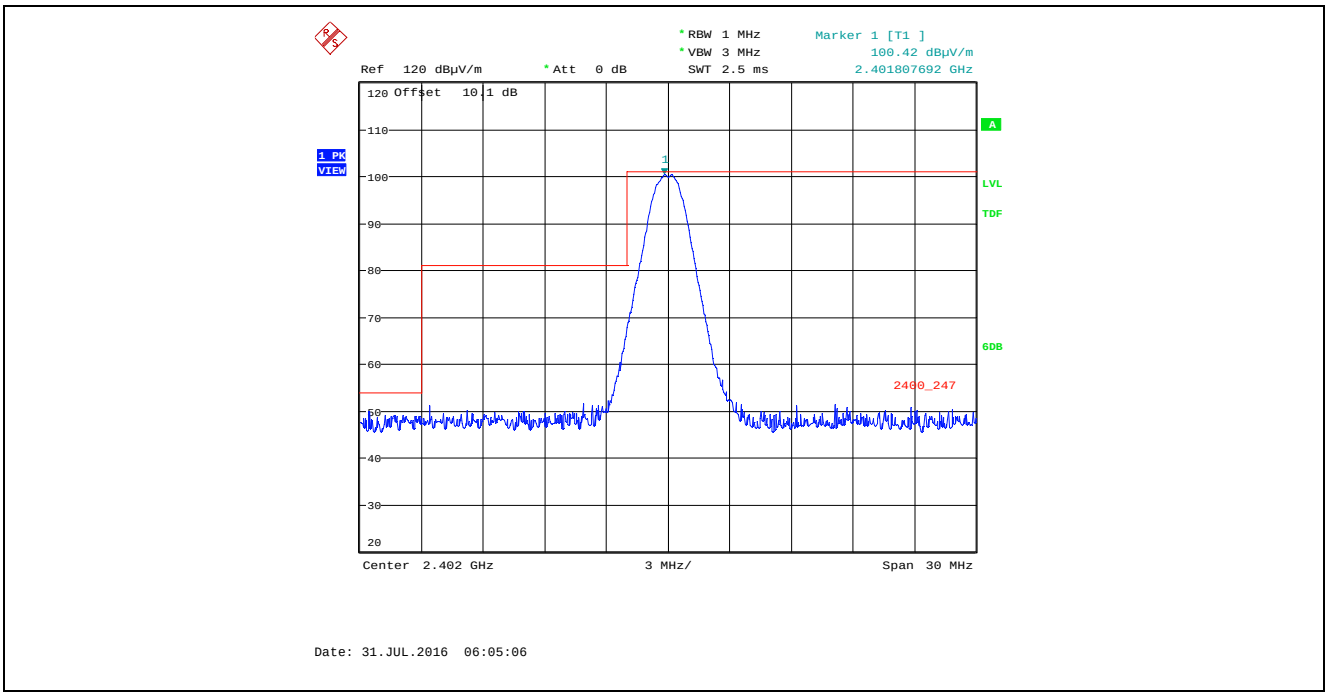
**Plot 5.2.5.1.7.** Band-Edge Rad Emissions, GFSK DH5, Ch 80, 2480 MHz, Chain # 2, Continuous Mode, Vertical



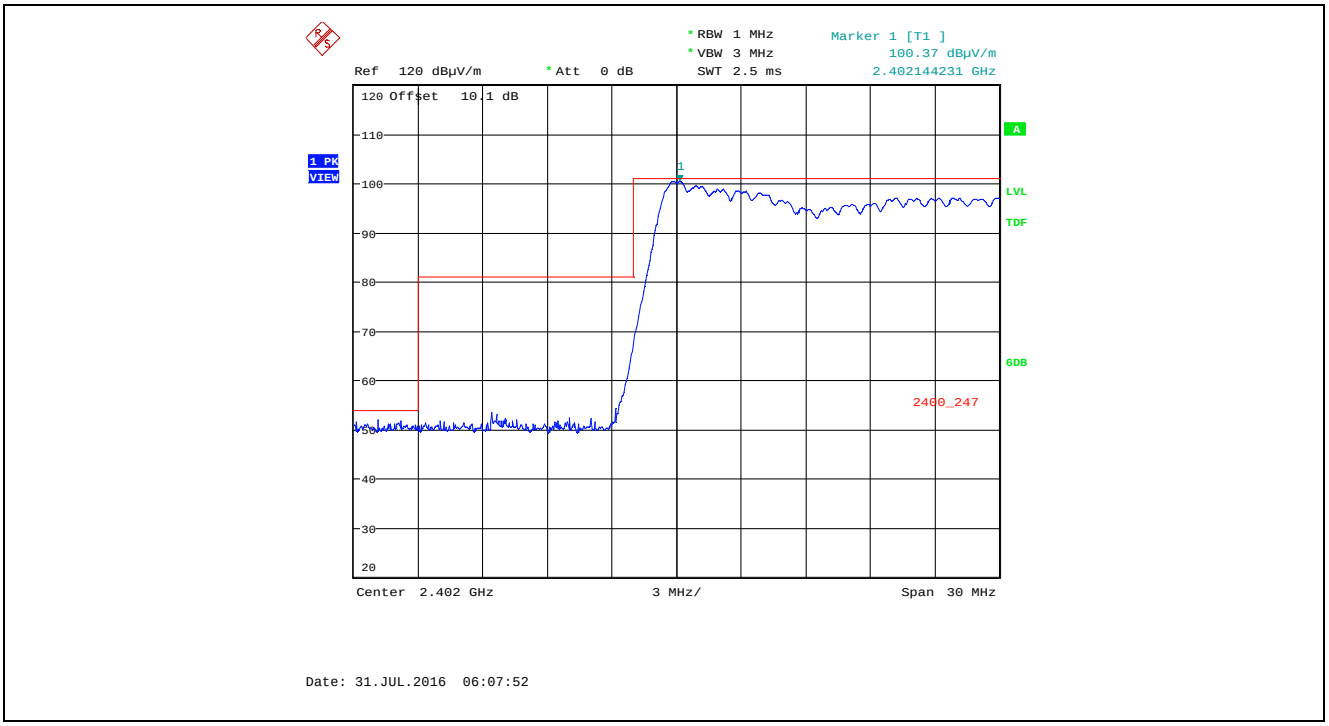

**Plot 5.2.5.1.8.** Band-Edge Rad Emissions, GFSK DH5, Ch 80, 2480 MHz, Chain # 2, Hopping Mode, Vertical



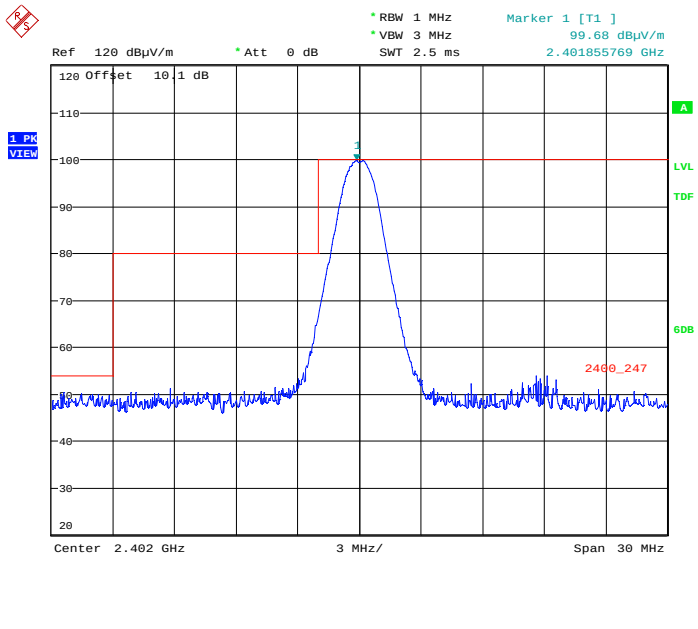
**Plot 5.2.5.1.9.** Band-Edge Rad Emissions, µ/4-DQPSK 2DH5, Ch 0, 2402 MHz, Chain # 2, Continuous Mode, Horizontal



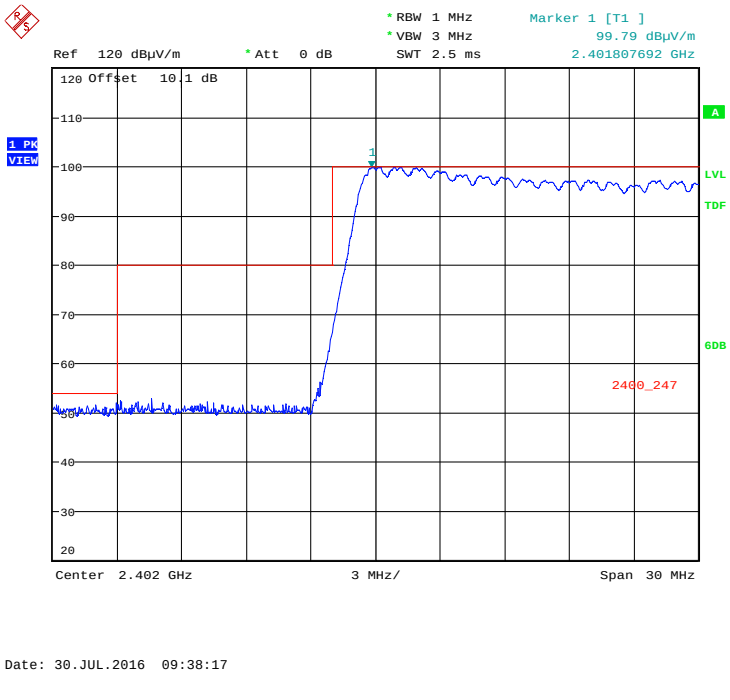

**Plot 5.2.5.1.10.** Band-Edge Rad Emissions, µ/4-DQPSK 2DH5, Ch 0, 2402 MHz, Chain # 2, Hopping Mode, Horizontal



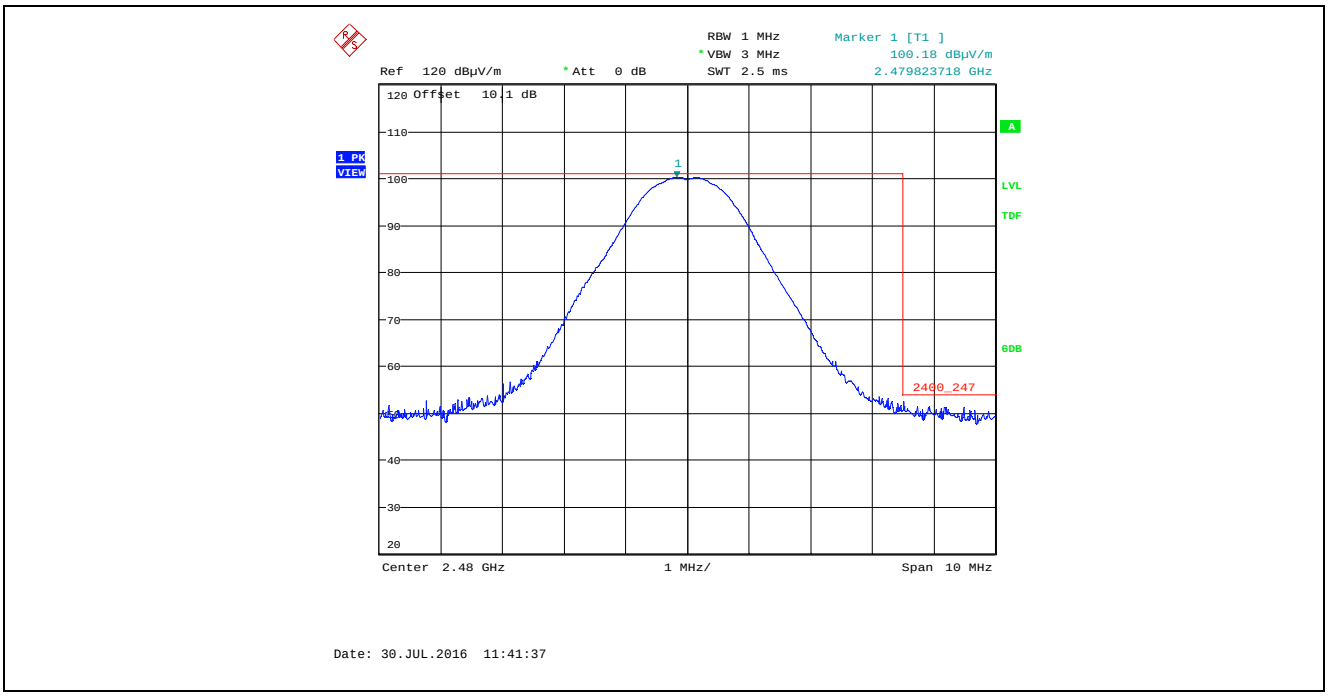
**Plot 5.2.5.1.11.** Band-Edge Rad Emissions, µ/4-DQPSK 2DH5, Ch 0, 2402 MHz, Chain # 2, Continuous Mode, Vertical



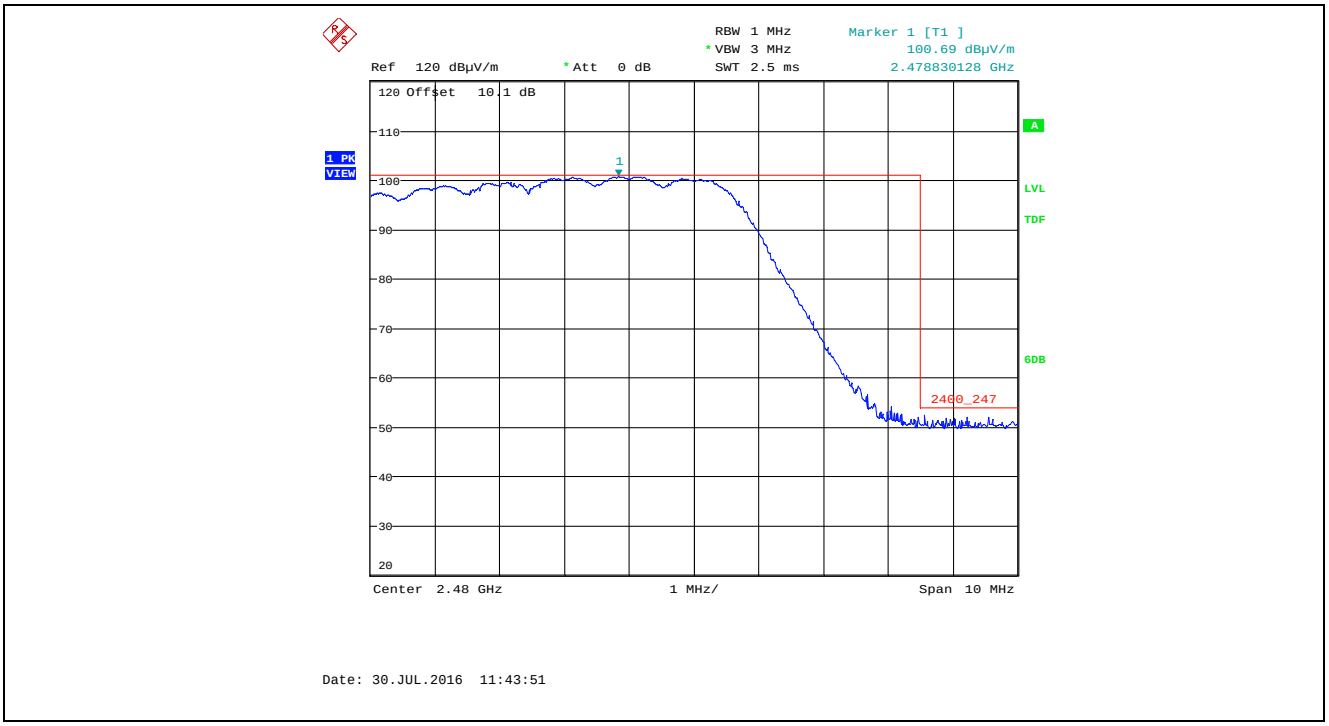

**Plot 5.2.5.1.12.** Band-Edge Rad Emissions, µ/4-DQPSK 2DH5, Ch 0, 2402 MHz, Chain # 2, Hopping Mode, Vertical



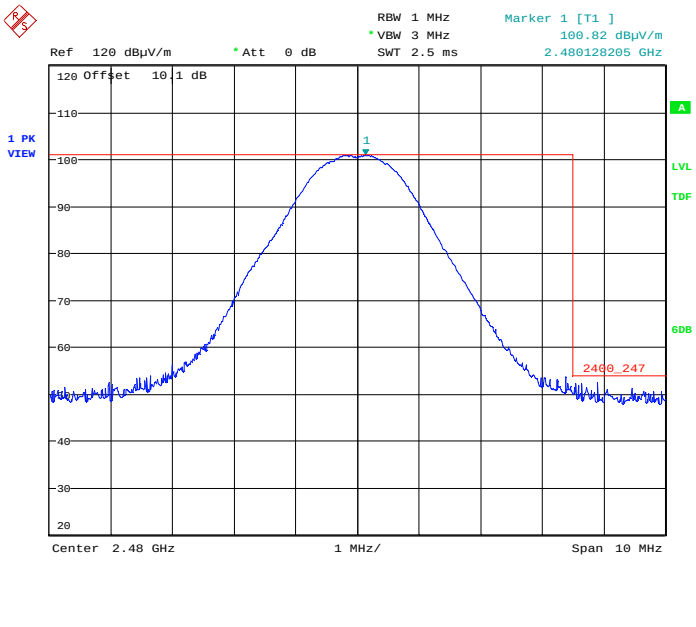
**Plot 5.2.5.1.13.** Band-Edge Rad Emissions, µ/4-DQPSK 2DH5, Ch 80, 2480 MHz, Chain # 2, Continuous Mode, Horizontal



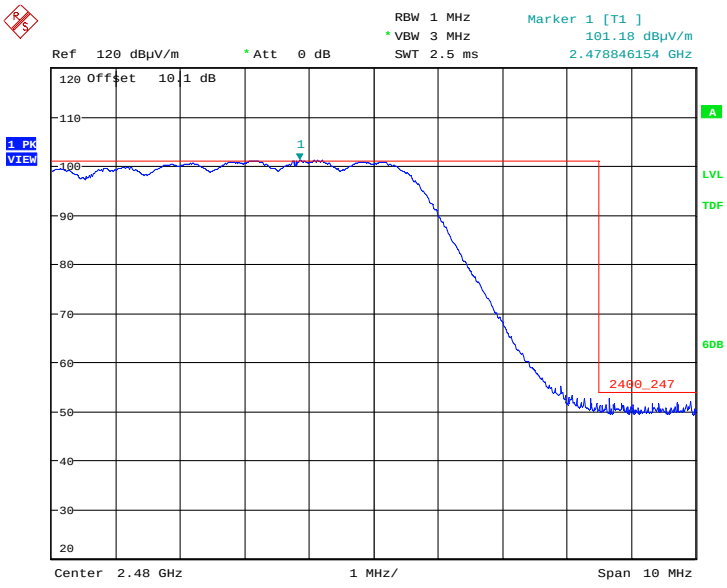

**Plot 5.2.5.1.14.** Band-Edge Rad Emissions, µ/4-DQPSK 2DH5, Ch 80, 2480 MHz, Chain # 2, Hopping Mode, Horizontal



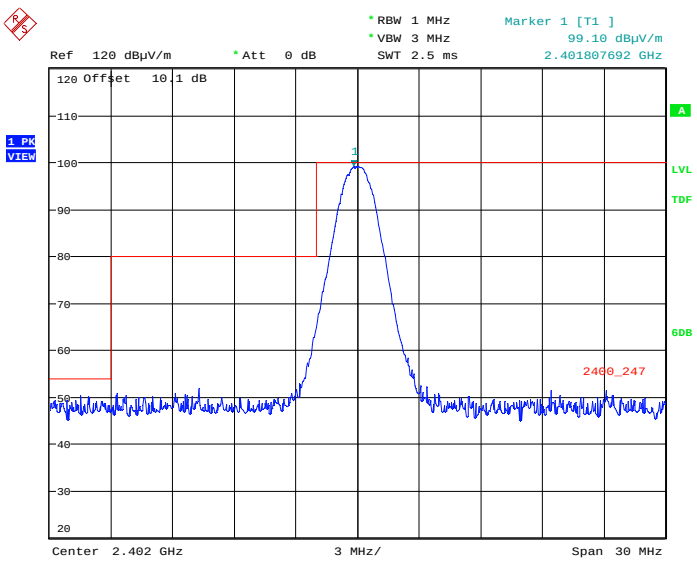
**Plot 5.2.5.1.15.** Band-Edge Rad Emissions, µ/4-DQPSK 2DH5, Ch 80, 2480 MHz, Chain # 2, Continuous Mode, Vertical



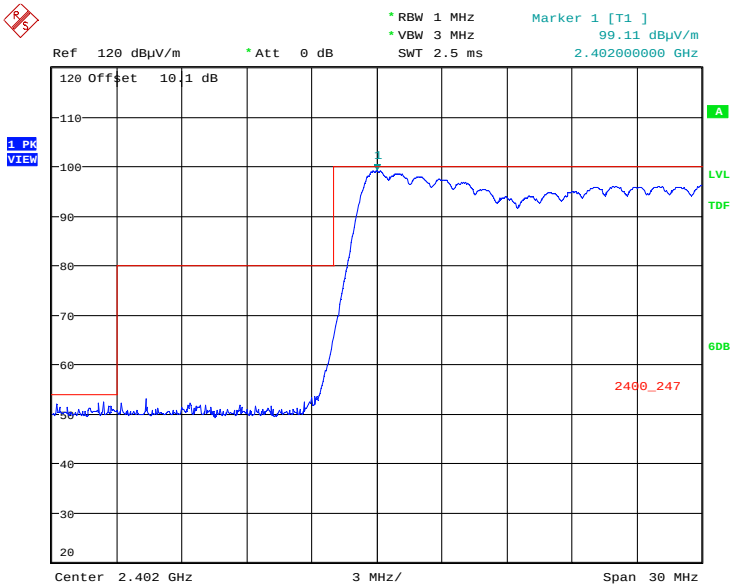

**Plot 5.2.5.1.16.** Band-Edge Rad Emissions, µ/4-DQPSK 2DH5, Ch 80, 2480 MHz, Chain # 2, Hopping Mode, Vertical



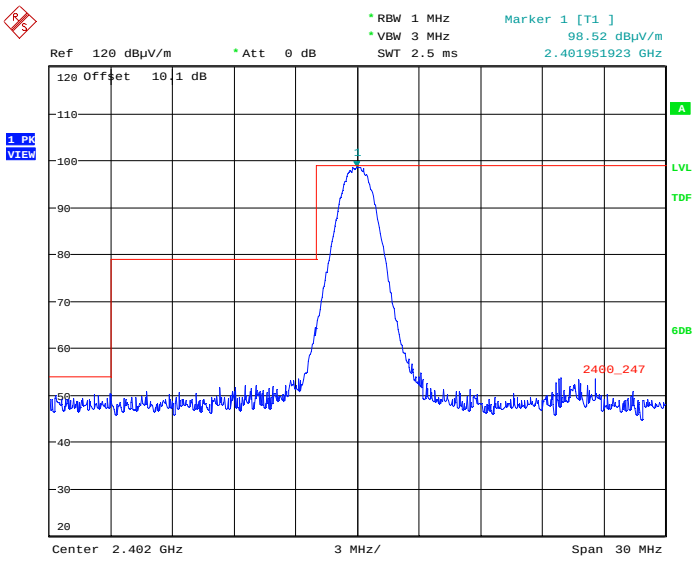
**Plot 5.2.5.1.17.** Band-Edge Rad Emissions, 8-DPSK 3DH5, Ch 0, 2402 MHz, Chain # 2, Continuous Mode, Horizontal



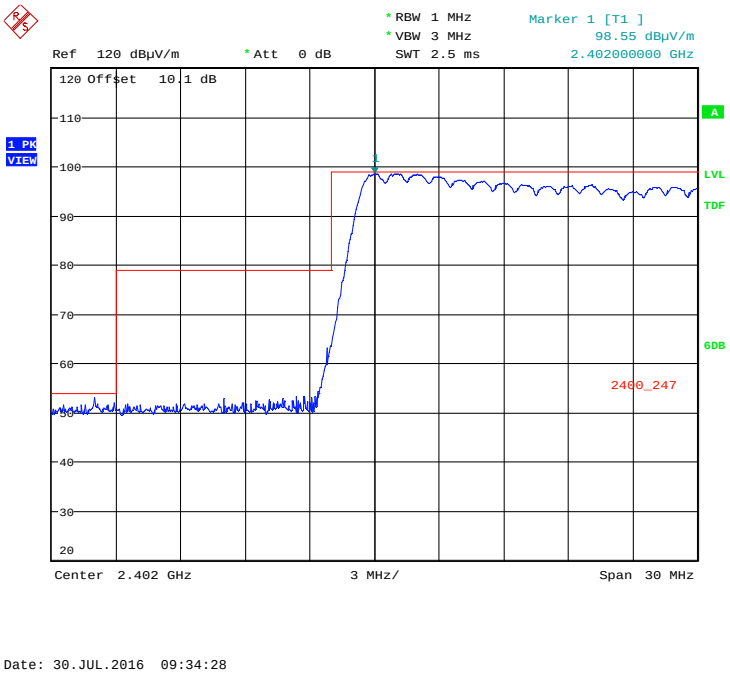

**Plot 5.2.5.1.18.** Band-Edge Rad Emissions, 8-DPSK 3DH5, Ch 0, 2402 MHz, Chain # 2, Hopping Mode, Horizontal



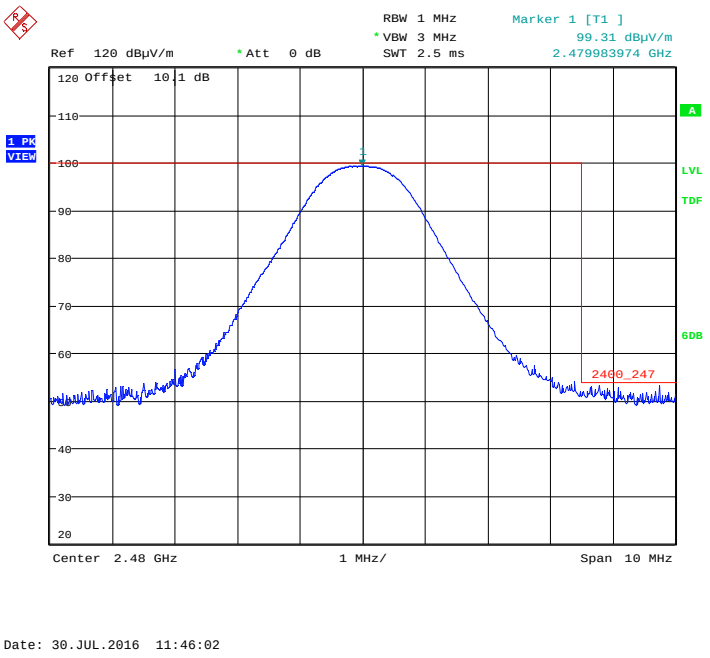
**Plot 5.2.5.1.19.** Band-Edge Rad Emissions, 8-DPSK 3DH5, Ch 0, 2402 MHz, Chain # 2, Continuous Mode, Vertical



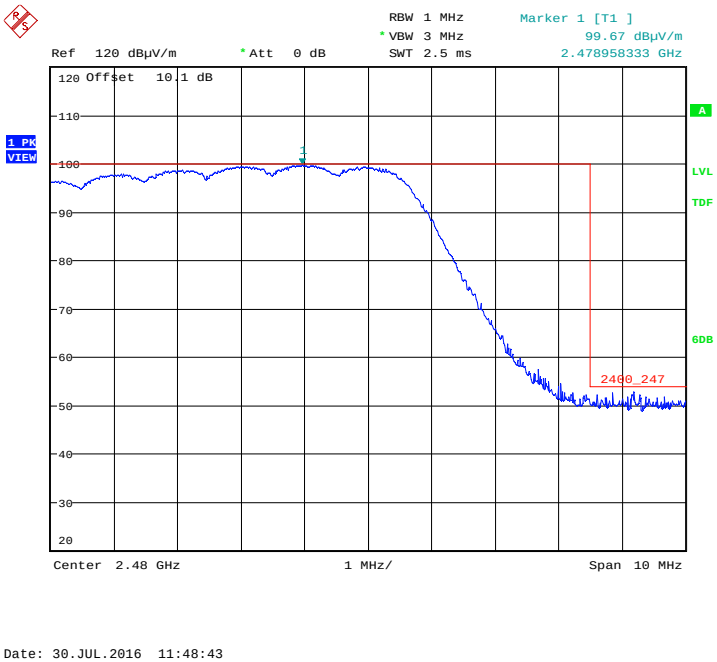

**Plot 5.2.5.1.20.** Band-Edge Rad Emissions, 8-DPSK 3DH5, Ch 0, 2402 MHz, Chain # 2, Hopping Mode, Vertical



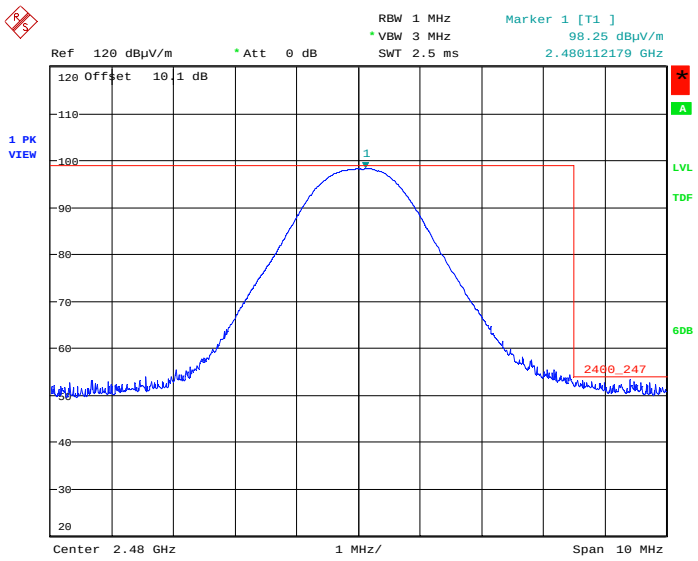
**Plot 5.2.5.1.21.** Band-Edge Rad Emissions, 8-DPSK 3DH5, Ch 80, 2480 MHz, Chain # 2, Continuous Mode, Horizontal




**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

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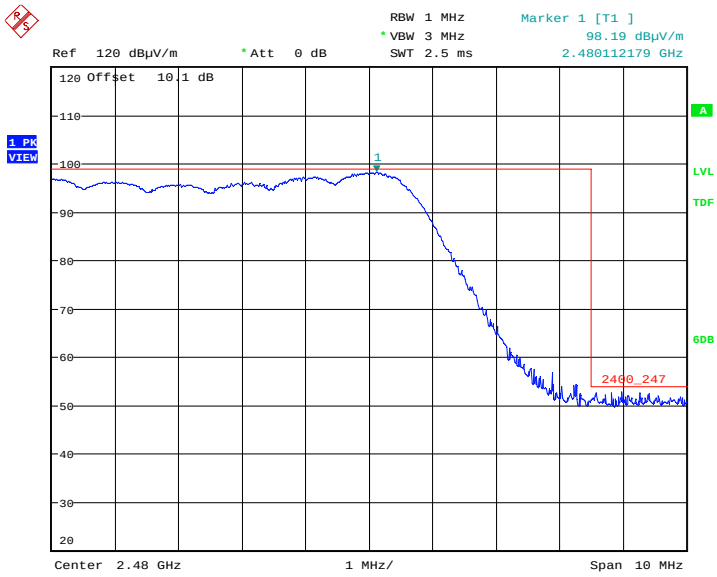
**Plot 5.2.5.1.24.** Band-Edge Rad Emissions, 8-DPSK 3DH5, Ch 80, 2480 MHz, Chain # 2, Hopping Mode, Vertical

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## 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/cm$^2$
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** |