




FCC PART 15.247 TEST REPORT

For

Chengdu XGimi Technology Co., Ltd.

5F, Building A7, Tianfu Software Park, Tianfu Avenue, Hi-tech Zone, Chengdu, China

FCC ID: 2AFENXG08X

| | |
|--|--|
| Report Type: Original Report | Equipment Name: LED Projector |
| Report Number: | RSC170821002E |
| Report Date: | 2018-01-05 |
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Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Chengdu).

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FINAL

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The **Chengdu XGimi Technology Co., Ltd.**'s product, model number: **XG08X** (FCC ID: **2AFENXG08X**) or the "EUT" as referred to in this report was the **LED Projector**.

Mechanical Description of EUT

The EUT was measured approximately: 345 mm (L) x 338 mm (W) x 57 mm (H).
Rated input voltage: DC 19V from adapter.

AC Adapter information:

Manufacturer: SHENZHEN HUNTKEY ELECTRIC CO., LTD.

Model: HDZ1201-3C

Input: 100-240V AC, 50/60Hz

Current: 2.0A Max

Output: +19V DC, 6.32A

Note: The products, test model: XG08X, multiple models: XG07X, XG09X, XG10X, XG11X. Their differences were presented in Product Difference Statement provided by the applicant of this report. So we selected model XG08X to fully test.

**All measurement and test data in this report was gathered from final production sample, serial number: 170821002/01 (assigned by the BAACL, Chengdu). It may have deviation from any other sample. The EUT supplied by the applicant was received on 2017-08-14, and EUT conformed to test requirement.*

Objective

This report is prepared on behalf of **Chengdu XGimi Technology Co., Ltd.** in accordance with Part 2, Subpart J, Part 15, Subparts A and C of the Federal Communications Commission's rules.

The tests were performed in order to determine the Bluetooth BDR and EDR mode of EUT compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

FCC Part 15.247 DTS submissions with FCC ID: 2AFENXG08X

FCC Part 15.407 NII submissions with FCC ID: 2AFENXG08X

FCC Part 15.249 DXX submissions with FCC ID: 2AFENB914C

Measurement Uncertainty

| Item | | Uncertainty | |
|-----------------------------------|--------------|-------------|---------|
| AC power line conducted emission | | 2.71 dB | |
| Radiated Emission(Field Strength) | 30MHz-200MHz | H | 4.57 dB |
| | | V | 4.81 dB |
| | 200MHz-1GHz | H | 5.69 dB |
| | | V | 6.07 dB |
| | 1GHz-6GHz | | 5.49 dB |
| | 6GHz-18GHz | | 5.57 dB |
| | 18GHz-40GHz | | 5.48 dB |
| Conducted RF Power | | ±0.61dB | |
| Power Spectrum Density | | ±0.61dB | |
| Occupied Bandwidth | | ±5% | |
| Conducted Emission | | ±1.5dB | |
| Humidity | | ±5% | |
| Temperature | | ±1°C | |

Test Methodology

All measurements contained in this report were conducted with:

ANSI C63.10-2013 American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Chengdu) to collect test data is located No.5040, Huilongwan Plaza, No. 1, Shawan Road, Jinniu District, Chengdu, Sichuan, China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 910975, the FCC Designation No. : CN1186.

The test site has been registered with ISED Canada under ISED Canada Registration Number 3062C-1.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in engineering mode.

Equipment Modifications

No modification was made to the EUT.

EUT Exercise Software

Test software: "DRTU" installed in device was used during test, the setting was configured as below:

| Test Software Version | | DRTU | | |
|-----------------------|-------------|---------|---------|---------|
| Test Frequency | | 2402MHz | 2441MHz | 2480MHz |
| GFSK | Power Level | Default | Default | Default |
| $\pi/4$ -DQPSK | Power Level | Default | Default | Default |
| 8PSK | Power Level | Default | Default | Default |

Local Support Equipment List and Details

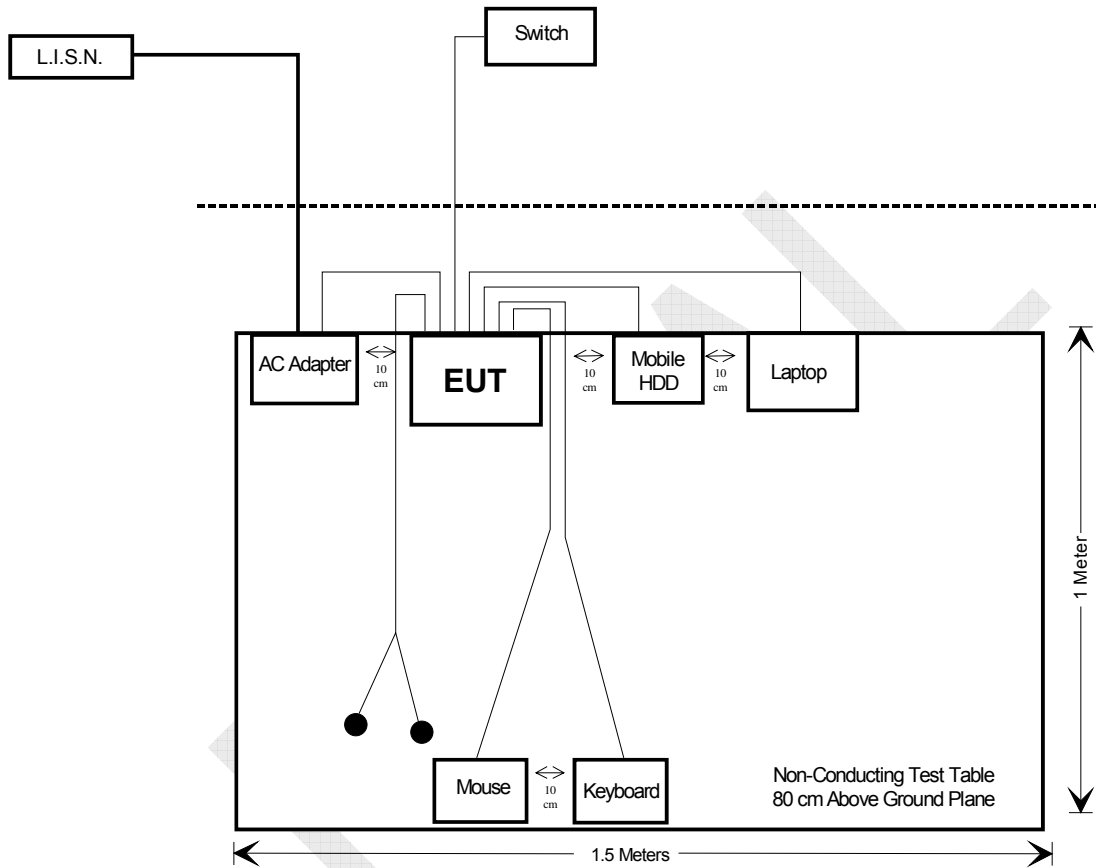
| Manufacturer | Description | Model Number | Serial Number |
|--------------|-------------|--------------|-----------------|
| SONY | Laptop | SVF143A1QT | None |
| Logitech | Mouse | M-U0004 | 810-001808 |
| TOSHIBA | Mobile HDD | V637020-A | 1297FHOYSRE8 |
| LAPOP | Keyboard | JT-505 | JT5056UBD200312 |
| HUAWEI | Earphone | P9 | None |
| DL | Switch | DL-S1005PM | None |

External I/O Cable

| Cable Description | Length (m) | From / Port | To |
|---------------------------|------------|-----------------|------------|
| Unshielded Power Cable | 1.2 | AC Adapter | EUT |
| Unshielded USB Cable | 1.8 | EUT/USB Port | Keyboard |
| Unshielded USB Cable | 1.8 | EUT/USB Port | Mouse |
| Unshielded USB Cable | 0.3 | EUT/USB Port | Mobile HDD |
| Shielded HDMI Cable | 1.2 | EUT / HDMI Port | Laptop |
| Unshielded RJ45 Cable | 5.0 | EUT / LAN Port | Switch |
| Unshielded Earphone Cable | 1.0 | EUT | Earphone |

Block Diagram of Test Setup

AC Power Lines Conducted Emissions Test



Test Equipments List

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|--------------------------|-----------------------|-----------------|---------------|------------------|----------------------|
| Conducted Emissions Test | | | | | |
| Rohde & Schwarz | EMI Test Receiver | ESCS 30 | 836858/0016 | 2016-12-02 | 2017-12-01 |
| Rohde & Schwarz | L.I.S.N. | ENV216 | 100018 | 2017-05-20 | 2018-05-19 |
| Rohde & Schwarz | RF Limiter | ESH3Z2 | DE14781 | 2017-11-10 | 2018-11-09 |
| N/A | Conducted Cable | NO.5 | N/A | 2017-11-10 | 2018-11-09 |
| Rohde & Schwarz | EMC32 | N/A | V 8.52.0 | N/A | N/A |
| Radiated Emissions Test | | | | | |
| Sonoma | Pre-Amplifier | 310N | 186684 | 2017-08-18 | 2018-08-17 |
| Rohde & Schwarz | EMI Test Receiver | ESIB 40 | 100215 | 2017-09-12 | 2018-09-11 |
| Rohde & Schwarz | EMI Test Receiver | ESCI | 100028 | 2017-05-20 | 2018-05-19 |
| Sunol Sciences | Broadband Antenna | JB3 | A121808 | 2017-05-18 | 2020-05-17 |
| ETS | Horn Antenna | 3115 | 003-6076 | 2017-05-19 | 2020-05-18 |
| A.H.Systems,inc | Horn Antenna | SAS-574 | 505 | 2016-12-02 | 2017-12-01 |
| Mini-circuits | Pre-Amplifier | ZVA-183-S+ | 771001215 | 2017-05-20 | 2018-05-19 |
| Quinstar | Pre-Amplifier | QLW-18405536-JO | 15964004001 | 2017-05-20 | 2018-05-19 |
| Sinoscite.,Co Ltd | Reject Band Filter | BSF 2402-2480MN | 0898-005 | 2017-11-10 | 2018-11-09 |
| INMET | Attenuator | N-6dB | / | 2017-11-10 | 2018-11-09 |
| EMCT | Semi-Anechoic Chamber | 966 | N/A | 2015-04-24 | 2018-04-23 |
| N/A | RF Cable (below 1GHz) | NO.1 | N/A | 2017-11-10 | 2018-11-09 |
| N/A | RF Cable (below 1GHz) | NO.4 | N/A | 2017-11-10 | 2018-11-09 |
| N/A | RF Cable (above 1GHz) | NO.2 | N/A | 2017-11-10 | 2018-11-09 |
| Rohde & Schwarz | EMC32 | N/A | V 8.52.0 | N/A | N/A |
| RF Conducted Test | | | | | |
| Rohde & Schwarz | Spectrum Analyzer | FSL18 | 100180 | 2017-09-26 | 2018-09-25 |
| Rohde & Schwarz | Spectrum Analyzer | FSEM30 | 100018 | 2017-05-18 | 2018-05-17 |
| WEINSCHL ENGINEERING | Attenuator | 1A10dB | AA4135 | 2017-11-10 | 2018-11-09 |
| N/A | RF Cable | NO.3 | N/A | 2017-11-09 | 2018-11-08 |
| E-Microwave | DC Block | EMDCB-00036 | OE01304225 | Each Time | / |
| N/A | RF Cable | N/A | N/A | Each Time | / |

* **Statement of Traceability:** BACL (Chengdu) attested that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

SUMMARY OF TEST RESULTS

| FCC Rules | Description of Test | Result |
|---------------------------------|------------------------------------|------------|
| FCC §15.247 & §1.1310 & §2.1091 | Maximum Permissible Exposure (MPE) | Compliance |
| §15.203 | Antenna Requirement | Compliance |
| §15.207 (a) | Conducted Emissions | Compliance |
| §15.205, §15.209, §15.247(d) | Spurious Emissions | Compliance |
| §15.247 (a)(1) | 20 dB Bandwidth | Compliance |
| §15.247(a)(1) | Channel Separation Test | Compliance |
| §15.247(a)(1)(iii) | Time of Occupancy (Dwell Time) | Compliance |
| §15.247(a)(1)(iii) | Quantity of hopping channel Test | Compliance |
| §15.247(b)(1) | Peak Output Power Measurement | Compliance |
| §15.247(d) | Band Edges | Compliance |

FCC §15.247 & §1.1310 & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 15.247 and subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

| (B) Limits for General Population/Uncontrolled Exposure | | | | |
|---|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| Frequency Range (MHz) | Electric Field Strength (V/m) | Magnetic Field Strength (A/m) | Power Density (mW/cm ²) | Averaging Time (minutes) |
| 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;

According to §1.1310 and §2.1091 RF exposure is calculated.

Per 447498 D01 General RF Exposure Guidance v06, simultaneous transmission MPE test exclusion applies when the sum of the MPE for all simultaneous transmitting antennas incorporated in a host device, based on the calculated/estimated, numerically modeled or measured field strengths or power density, is ≤ 1.0.

Calculated Formulary:

Predication of MPE limit at a given distance

$$S = PG/4\pi R^2$$

Where:

S = power density (in appropriate units, e.g. mW/cm²);

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

Calculated Data:

MPE evaluation for single transmission:

| Mode | Frequency Range (MHz) | Antenna Gain | | Tune-up Conducted Power | | Evaluation Distance (cm) | Power Density (mW/cm ²) | MPE Limit (mW/cm ²) |
|-------|-----------------------|--------------|-----------|-------------------------|-------|--------------------------|-------------------------------------|---------------------------------|
| | | (dBi) | (numeric) | (dBm) | (mW) | | | |
| WLAN | 2412-2462 | 5.60 | 3.63 | 16.00 | 39.81 | 20 | 0.029 | 1.0 |
| | 5150-5250 | 7.20 | 5.25 | 14.00 | 25.12 | 20 | 0.026 | 1.0 |
| | 5725-5850 | 7.20 | 5.25 | 15.00 | 31.62 | 20 | 0.033 | 1.0 |
| BT3.0 | 2402-2480 | 5.60 | 3.63 | 4.00 | 2.51 | 20 | 0.002 | 1.0 |
| BLE | 2402-2480 | 5.60 | 3.63 | 1.00 | 1.26 | 20 | 0.001 | 1.0 |

Note: Wi-Fi (2.4G) & Wi-Fi (5G) or Wi-Fi & Bluetooth can not transmit simultaneously.

Result: MPE evaluation of single transmission meets the requirement of standard.

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to FCC § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Antenna Connector Construction

The EUT used three built in FPC antennas (antenna 1: Bluetooth, 2.4G&5GHz Wi-Fi; antenna 2: 2.4G/5G Wi-Fi; antenna 3: 2.4G-RX), which connected to the main board with IPEX socket, fulfill the requirement of this section. Please refer to the EUT internal photos and the below table for detail.

Antenna Information

| Antenna Model Number | Manufacturer | Band | Antenna Gain | Antenna type | Connector |
|--|--|---------------------------|--------------|------------------|-----------|
| AG-041533-1286 FPC(31.7mm x 23.4mm) | ZHONGSHAN B&T TECHONOLOGY Co.,Ltd | Wi-Fi 2.4GHz/Bluetooth | 5.6dBi | Omni-directional | IPEX |
| | | Wi-Fi 5GHz | 7.2dBi | Omni-directional | IPEX |
| AG-041533-1285 FPC(25.6mm x 24.5mm) | ZHONGSHAN B&T TECHONOLOGY Co.,Ltd | Wi-Fi 2.4GHz | 4.3dBi | Omni-directional | IPEX |
| | | Wi-Fi 5GHz | 6.7dBi | Omni-directional | IPEX |
| AG-041533-1287 FPC(26.9mm x 17.2mm) | ZHONGSHAN B&T TECHONOLOGY Co.,Ltd | 2.4G-RX | 0.5 dBi | Omni-directional | IPEX |

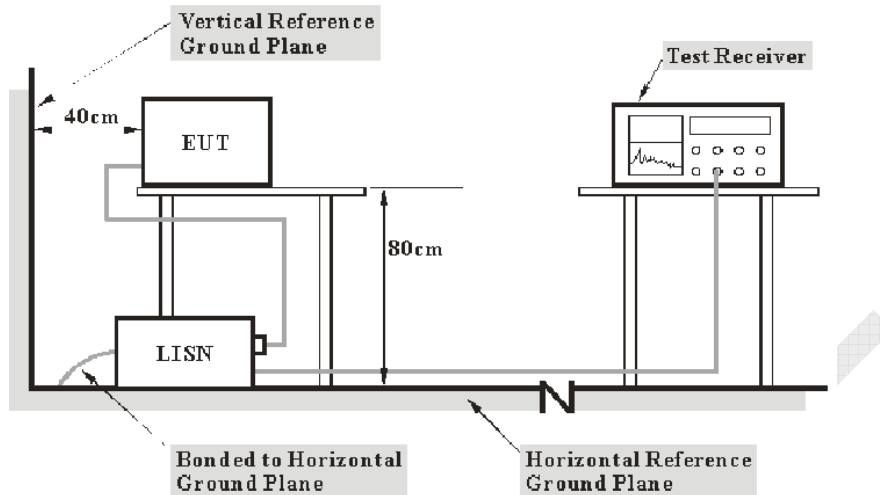
Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC§15.207

EUT Setup



- Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

The adapter was connected to a 120 V/60 Hz AC power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

| Frequency Range | IF B/W |
|------------------|--------|
| 150 kHz – 30 MHz | 9 kHz |

Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the first LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$$V_C = V_R + A_C + VDF$$

Herein,

V_C : corrected voltage amplitude

V_R : reading voltage amplitude

A_C : attenuation caused by cable loss

VDF: voltage division factor of AMN or ISN

The “**Margin**” column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Data

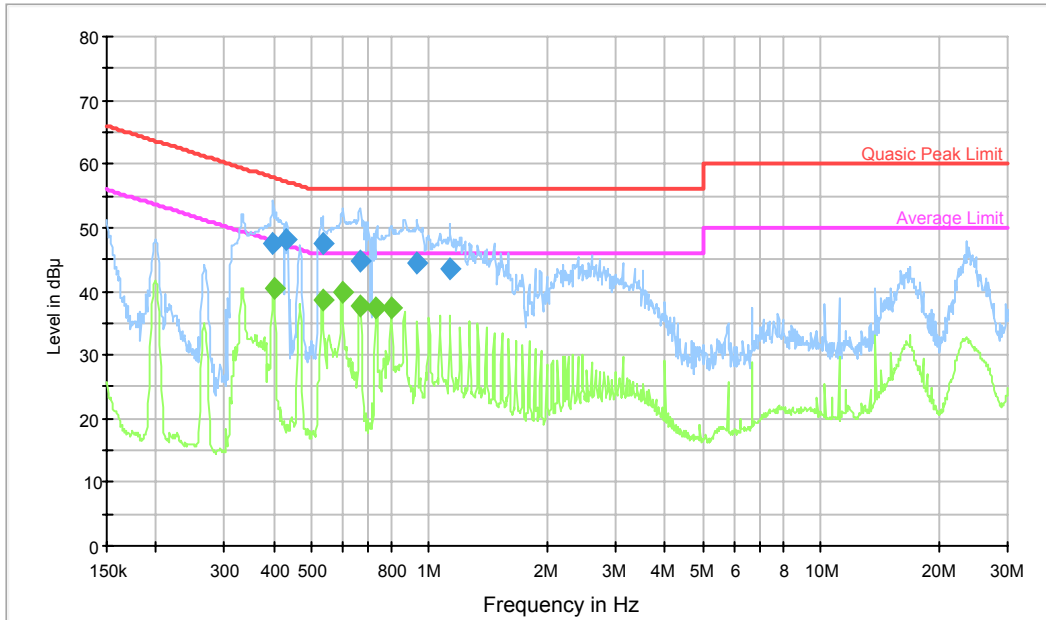
Environmental Conditions

| | |
|---------------------------|----------|
| Temperature: | 20 °C |
| Relative Humidity: | 60 % |
| ATM Pressure: | 96.4 kPa |

The testing was performed by Tom Tang on 2017-11-29.

Test Mode: Transmitting

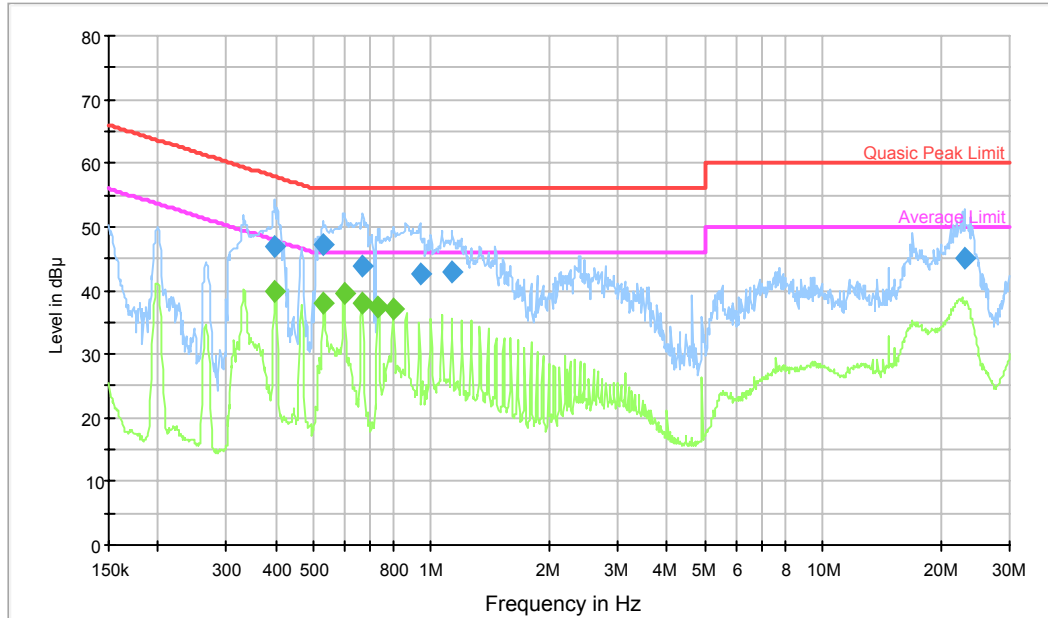
AC120 V, 60 Hz, Line:



| Frequency (MHz) | QuasiPeak (dB μ V) | Bandwidth (kHz) | Line | Corrected Factor (dB) | Margin (dB) | Limit (dB μ V) |
|-----------------|------------------------|-----------------|------|-----------------------|-------------|--------------------|
| 0.398888 | 47.4 | 9.000 | L1 | 19.8 | 10.4 | 57.9 |
| 0.432041 | 48.0 | 9.000 | L1 | 19.8 | 9.2 | 57.2 |
| 0.533841 | 47.6 | 9.000 | L1 | 19.8 | 8.4 | 56.0 |
| 0.664915 | 44.8 | 9.000 | L1 | 19.8 | 11.2 | 56.0 |
| 0.929819 | 44.5 | 9.000 | L1 | 19.8 | 11.5 | 56.0 |
| 1.130707 | 43.7 | 9.000 | L1 | 19.7 | 12.3 | 56.0 |

| Frequency (MHz) | Average (dB μ V) | Bandwidth (kHz) | Line | Corrected Factor (dB) | Margin (dB) | Limit (dB μ V) |
|-----------------|----------------------|-----------------|------|-----------------------|-------------|--------------------|
| 0.400484 | 40.4 | 9.000 | L1 | 19.8 | 7.4 | 47.8 |
| 0.533841 | 38.7 | 9.000 | L1 | 19.8 | 7.3 | 46.0 |
| 0.599363 | 39.9 | 9.000 | L1 | 19.8 | 6.1 | 46.0 |
| 0.664915 | 37.6 | 9.000 | L1 | 19.8 | 8.4 | 46.0 |
| 0.731772 | 37.5 | 9.000 | L1 | 19.8 | 8.5 | 46.0 |
| 0.798946 | 37.3 | 9.000 | L1 | 19.7 | 8.7 | 46.0 |

AC120 V, 60 Hz, Neutral:



| Frequency (MHz) | QuasiPeak (dBμV) | Bandwidth (kHz) | Line | Corrected Factor (dB) | Margin (dB) | Limit (dBμV) |
|-----------------|------------------|-----------------|------|-----------------------|-------------|--------------|
| 0.397299 | 46.8 | 9.000 | N | 19.5 | 11.1 | 57.9 |
| 0.529596 | 47.1 | 9.000 | N | 19.5 | 8.9 | 56.0 |
| 0.667575 | 44.0 | 9.000 | N | 19.5 | 12.0 | 56.0 |
| 0.937272 | 42.7 | 9.000 | N | 19.5 | 13.3 | 56.0 |
| 1.130707 | 42.9 | 9.000 | N | 19.5 | 13.1 | 56.0 |
| 23.030502 | 45.2 | 9.000 | N | 20.1 | 14.8 | 60.0 |

| Frequency (MHz) | Average (dBμV) | Bandwidth (kHz) | Line | Corrected Factor (dB) | Margin (dB) | Limit (dBμV) |
|-----------------|----------------|-----------------|------|-----------------------|-------------|--------------|
| 0.398888 | 39.8 | 9.000 | N | 19.5 | 8.1 | 47.9 |
| 0.531715 | 38.1 | 9.000 | N | 19.5 | 7.9 | 46.0 |
| 0.599363 | 39.7 | 9.000 | N | 19.5 | 6.3 | 46.0 |
| 0.664915 | 37.9 | 9.000 | N | 19.5 | 8.1 | 46.0 |
| 0.731772 | 37.4 | 9.000 | N | 19.5 | 8.6 | 46.0 |
| 0.798946 | 37.0 | 9.000 | N | 19.5 | 9.0 | 46.0 |

Note:

- 1) Corrected Amplitude = Reading + Correction Factor
- 2) Correction Factor = LISN VDF (Voltage Division Factor) + Cable Loss + Transient Limiter
- 3) Margin = Limit – Corrected Amplitude

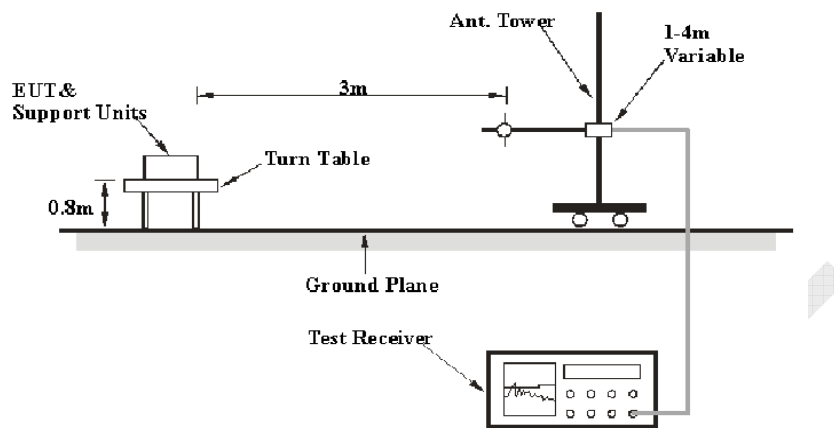
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

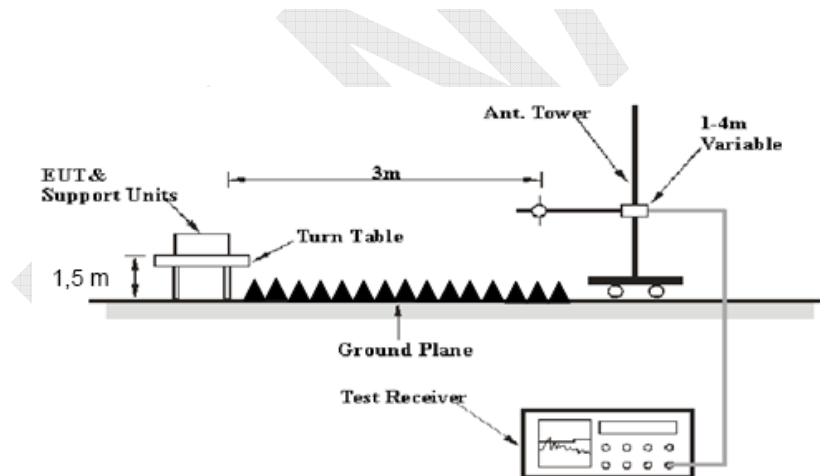
FCC §15.247 (d); §15.209; §15.205;

EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, and FCC 15.247 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

The adapter was connected to a 120 V/60 Hz AC power source.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

During the radiated emission test, the EMI test receiver setup was set with the following configurations:

| Frequency Range | RBW | Video B/W | IF B/W | Detector |
|-------------------|---------|-----------|---------|----------|
| 30 MHz – 1000 MHz | 120 kHz | 300 kHz | 120 kHz | QP |
| Above 1GHz | 1MHz | 3 MHz | / | PK |
| | 1MHz | 3MHz | / | AV |

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz - 1 GHz, peak and average detection modes for frequencies above 1 GHz.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Data

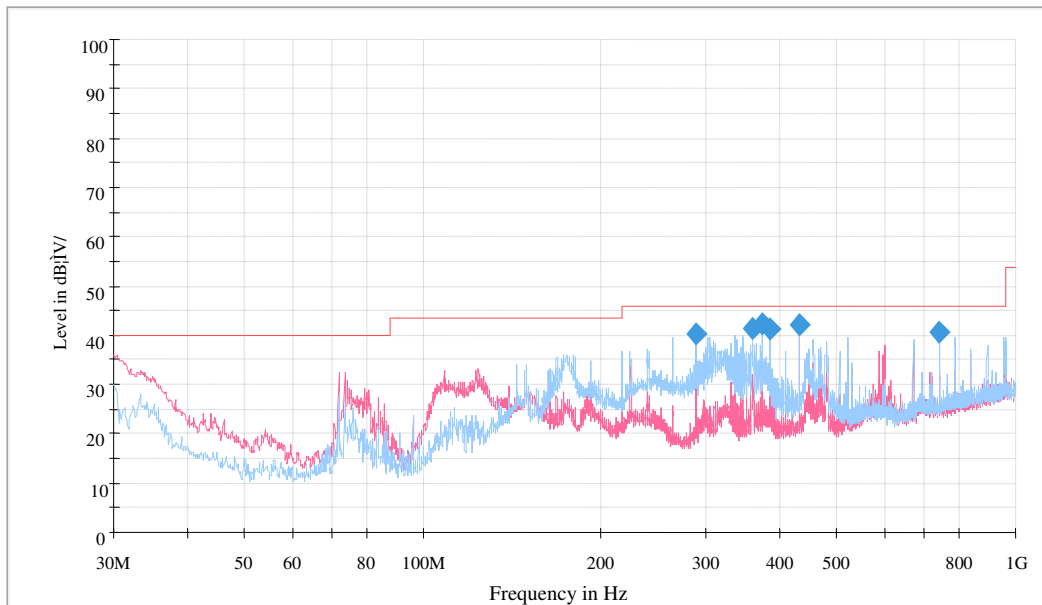
Environmental Conditions

| | |
|---------------------------|----------|
| Temperature: | 19 °C |
| Relative Humidity: | 58 % |
| ATM Pressure: | 96.4 kPa |

* The testing was performed by Tom Tang on 2017-11-30.

Test Mode: Transmitting (middle channel of GFSK mode)-Worst Case

30 MHz to 1 GHz:



| Frequency (MHz) | QuasicPeak (dBµV/m) | Height (cm) | Polarization | Azimuth (deg) | Corrected Factor (dB/m) | Margin (dB) | Limit (dBµV/m) |
|-----------------|---------------------|-------------|--------------|---------------|-------------------------|-------------|----------------|
| 288.262500 | 40.0 | 101.0 | H | 36.0 | -11.0 | 6.0 | 46.0 |
| 360.563750 | 41.8 | 110.0 | H | 52.0 | -9.8 | *4.2 | 46.0 |
| 373.125300 | 43.0 | 139.0 | H | 98.0 | -9.6 | *3.0 | 46.0 |
| 384.171250 | 42.8 | 145.0 | H | 54.0 | -9.3 | *3.2 | 46.0 |
| 432.157500 | 43.1 | 103.0 | H | 87.0 | -9.0 | *2.9 | 46.0 |
| 744.563680 | 41.4 | 149.0 | H | 248.0 | -8.0 | *4.2 | 46.0 |

*Within measurement uncertainty!

1GHz-25GHz:

BDR Mode (GFSK):

| Frequency | Receiver | | Rx Antenna | | Cable loss | Amplifier Gain | Corrected Amplitude | Limit | Margin |
|---------------------------|----------|-------------|------------|--------|------------|----------------|---------------------|--------|--------|
| | Reading | Measurement | Polar | Factor | | | | | |
| MHz | dBµV | PK/AV | H/V | (dB/m) | dB | dB | dBµV/m | dBµV/m | dB |
| Frequency:2402 MHz | | | | | | | | | |
| 2402 | 63.82 | PK | H | 28.71 | 3.00 | 0.00 | 95.53 | N/A | N/A |
| 2402 | 53.78 | AV | H | 28.71 | 3.00 | 0.00 | 85.49 | N/A | N/A |
| 2402 | 71.28 | PK | V | 28.71 | 3.00 | 0.00 | 102.99 | N/A | N/A |
| 2402 | 59.87 | AV | V | 28.71 | 3.00 | 0.00 | 91.58 | N/A | N/A |
| 2390 | 23.49 | PK | V | 28.67 | 3.00 | 0.00 | 55.16 | 74.00 | 18.84 |
| 2390 | 15.41 | AV | V | 28.67 | 3.00 | 0.00 | 47.08 | 54.00 | 6.92 |
| 4804 | 37.22 | PK | V | 33.85 | 5.12 | 26.87 | 49.32 | 74.00 | 24.68 |
| 4804 | 19.53 | AV | V | 33.85 | 5.12 | 26.87 | 31.63 | 54.00 | 22.37 |
| 7206 | 32.97 | PK | V | 36.39 | 6.16 | 26.35 | 49.17 | 74.00 | 24.83 |
| 7206 | 18.34 | AV | V | 36.39 | 6.16 | 26.35 | 34.54 | 54.00 | 19.46 |
| Frequency: 2441MHz | | | | | | | | | |
| 2441 | 63.12 | PK | H | 28.82 | 3.00 | 0.00 | 94.94 | N/A | N/A |
| 2441 | 53.26 | AV | H | 28.82 | 3.00 | 0.00 | 85.08 | N/A | N/A |
| 2441 | 70.89 | PK | V | 28.82 | 3.00 | 0.00 | 102.71 | N/A | N/A |
| 2441 | 59.25 | AV | V | 28.82 | 3.00 | 0.00 | 91.07 | N/A | N/A |
| 4882 | 37.15 | PK | V | 34.07 | 5.09 | 26.87 | 49.44 | 74.00 | 24.56 |
| 4882 | 19.53 | AV | V | 34.07 | 5.09 | 26.87 | 31.82 | 54.00 | 22.18 |
| 7323 | 31.84 | PK | V | 36.55 | 6.22 | 26.40 | 48.21 | 74.00 | 25.79 |
| 7323 | 18.44 | AV | V | 36.55 | 6.22 | 26.40 | 34.81 | 54.00 | 19.19 |
| Frequency:2480MHz | | | | | | | | | |
| 2480 | 62.47 | PK | H | 28.94 | 2.99 | 0.00 | 94.40 | N/A | N/A |
| 2480 | 52.02 | AV | H | 28.94 | 2.99 | 0.00 | 83.95 | N/A | N/A |
| 2480 | 69.06 | PK | V | 28.94 | 2.99 | 0.00 | 100.99 | N/A | N/A |
| 2480 | 58.25 | AV | V | 28.94 | 2.99 | 0.00 | 90.18 | N/A | N/A |
| 2483.5 | 29.41 | PK | V | 28.95 | 2.99 | 0.00 | 61.35 | 74.00 | 12.65 |
| 2483.5 | 13.48 | AV | V | 28.95 | 2.99 | 0.00 | 45.42 | 54.00 | 8.58 |
| 4960 | 34.89 | PK | V | 34.29 | 5.05 | 26.88 | 47.35 | 74.00 | 26.65 |
| 4960 | 19.51 | AV | V | 34.29 | 5.05 | 26.88 | 31.97 | 54.00 | 22.03 |
| 7440 | 34.11 | PK | V | 36.72 | 6.27 | 26.45 | 50.65 | 74.00 | 23.35 |
| 7440 | 19.97 | AV | V | 36.72 | 6.27 | 26.45 | 36.51 | 54.00 | 17.49 |

EDR Mode ($\pi/4$ -DQPSK):

| Frequency | Receiver | | Rx Antenna | | Cable loss | Amplifier Gain | Corrected Amplitude | Limit | Margin |
|---------------------------|------------|-------------|------------|--------|------------|----------------|---------------------|--------------|--------|
| | Reading | Measurement | Polar | Factor | | | | | |
| MHz | dB μ V | PK/AV | H/V | (dB/m) | dB | dB | dB μ V/m | dB μ V/m | dB |
| Frequency:2402 MHz | | | | | | | | | |
| 2402 | 60.42 | PK | H | 28.71 | 3.00 | 0.00 | 92.13 | N/A | N/A |
| 2402 | 48.24 | AV | H | 28.71 | 3.00 | 0.00 | 79.95 | N/A | N/A |
| 2402 | 67.73 | PK | V | 28.71 | 3.00 | 0.00 | 99.44 | N/A | N/A |
| 2402 | 54.44 | AV | V | 28.71 | 3.00 | 0.00 | 86.15 | N/A | N/A |
| 2390 | 29.85 | PK | V | 28.67 | 3.00 | 0.00 | 61.52 | 74.00 | 12.48 |
| 2390 | 15.41 | AV | V | 28.67 | 3.00 | 0.00 | 47.08 | 54.00 | 6.92 |
| 4804 | 34.65 | PK | V | 33.85 | 5.12 | 26.87 | 46.75 | 74.00 | 27.25 |
| 4804 | 20.52 | AV | V | 33.85 | 5.12 | 26.87 | 32.62 | 54.00 | 21.38 |
| 7206 | 32.51 | PK | V | 36.39 | 6.16 | 26.35 | 48.71 | 74.00 | 25.29 |
| 7206 | 18.39 | AV | V | 36.39 | 6.16 | 26.35 | 34.59 | 54.00 | 19.41 |
| Frequency:2441 MHz | | | | | | | | | |
| 2441 | 60.12 | PK | H | 28.82 | 3.00 | 0.00 | 91.94 | N/A | N/A |
| 2441 | 48.01 | AV | H | 28.82 | 3.00 | 0.00 | 79.83 | N/A | N/A |
| 2441 | 66.87 | PK | V | 28.82 | 3.00 | 0.00 | 98.69 | N/A | N/A |
| 2441 | 54.16 | AV | V | 28.82 | 3.00 | 0.00 | 85.98 | N/A | N/A |
| 4882 | 34.32 | PK | V | 34.07 | 5.09 | 26.87 | 46.61 | 74.00 | 27.39 |
| 4882 | 20.02 | AV | V | 34.07 | 5.09 | 26.87 | 32.31 | 54.00 | 21.69 |
| 7323 | 32.16 | PK | V | 36.55 | 6.22 | 26.40 | 48.53 | 74.00 | 25.47 |
| 7323 | 18.21 | AV | V | 36.55 | 6.22 | 26.40 | 34.58 | 54.00 | 19.42 |
| Frequency:2480 MHz | | | | | | | | | |
| 2480 | 59.86 | PK | H | 28.94 | 2.99 | 0.00 | 91.79 | N/A | N/A |
| 2480 | 47.51 | AV | H | 28.94 | 2.99 | 0.00 | 79.44 | N/A | N/A |
| 2480 | 67.19 | PK | V | 28.94 | 2.99 | 0.00 | 99.12 | N/A | N/A |
| 2480 | 54.77 | AV | V | 28.94 | 2.99 | 0.00 | 86.70 | N/A | N/A |
| 2483.5 | 29.79 | PK | V | 28.95 | 2.99 | 0.00 | 61.73 | 74.00 | 12.27 |
| 2483.5 | 15.41 | AV | V | 28.95 | 2.99 | 0.00 | 47.35 | 54.00 | 6.65 |
| 4960 | 34.24 | PK | V | 34.29 | 5.05 | 26.88 | 46.70 | 74.00 | 27.30 |
| 4960 | 19.58 | AV | V | 34.29 | 5.05 | 26.88 | 32.04 | 54.00 | 21.96 |
| 7440 | 34.65 | PK | V | 36.72 | 6.27 | 26.45 | 51.19 | 74.00 | 22.81 |
| 7440 | 19.54 | AV | V | 36.72 | 6.27 | 26.45 | 36.08 | 54.00 | 17.92 |

EDR Mode (8-DPSK):

| Frequency | Receiver | | Rx Antenna | | Cable loss | Amplifier Gain | Corrected Amplitude | Limit | Margin |
|----------------------------|----------|-------------|------------|--------|------------|----------------|---------------------|--------|--------|
| | Reading | Measurement | Polar | Factor | | | | | |
| MHz | dBµV | PK/AV | H/V | (dB/m) | dB | dB | dBµV/m | dBµV/m | dB |
| Frequency: 2402 MHz | | | | | | | | | |
| 2402 | 59.17 | PK | H | 28.71 | 3.00 | 0.00 | 90.88 | N/A | N/A |
| 2402 | 46.68 | AV | H | 28.71 | 3.00 | 0.00 | 78.39 | N/A | N/A |
| 2402 | 66.73 | PK | V | 28.71 | 3.00 | 0.00 | 98.44 | N/A | N/A |
| 2402 | 54.02 | AV | V | 28.71 | 3.00 | 0.00 | 85.73 | N/A | N/A |
| 2390 | 29.93 | PK | V | 28.67 | 3.00 | 0.00 | 61.60 | 74.00 | 12.40 |
| 2390 | 15.41 | AV | V | 28.67 | 3.00 | 0.00 | 47.08 | 54.00 | 6.92 |
| 4804 | 36.34 | PK | V | 33.85 | 5.12 | 26.87 | 48.44 | 74.00 | 25.56 |
| 4804 | 20.52 | AV | V | 33.85 | 5.12 | 26.87 | 32.62 | 54.00 | 21.38 |
| 7206 | 32.82 | PK | V | 36.39 | 6.16 | 26.35 | 49.02 | 74.00 | 24.98 |
| 7206 | 18.45 | AV | V | 36.39 | 6.16 | 26.35 | 34.65 | 54.00 | 19.35 |
| Frequency: 2441 MHz | | | | | | | | | |
| 2441 | 59.05 | PK | H | 28.82 | 3.00 | 0.00 | 90.87 | N/A | N/A |
| 2441 | 46.32 | AV | H | 28.82 | 3.00 | 0.00 | 78.14 | N/A | N/A |
| 2441 | 66.47 | PK | V | 28.82 | 3.00 | 0.00 | 98.29 | N/A | N/A |
| 2441 | 53.87 | AV | V | 28.82 | 3.00 | 0.00 | 85.69 | N/A | N/A |
| 4882 | 36.10 | PK | V | 34.07 | 5.09 | 26.87 | 48.39 | 74.00 | 25.61 |
| 4882 | 20.23 | AV | V | 34.07 | 5.09 | 26.87 | 32.52 | 54.00 | 21.48 |
| 7323 | 32.52 | PK | V | 36.55 | 6.22 | 26.40 | 48.89 | 74.00 | 25.11 |
| 7323 | 18.34 | AV | V | 36.55 | 6.22 | 26.40 | 34.71 | 54.00 | 19.29 |
| Frequency: 2480 MHz | | | | | | | | | |
| 2480 | 59.65 | PK | H | 28.94 | 2.99 | 0.00 | 91.58 | N/A | N/A |
| 2480 | 46.54 | AV | H | 28.94 | 2.99 | 0.00 | 78.47 | N/A | N/A |
| 2480 | 65.12 | PK | V | 28.94 | 2.99 | 0.00 | 97.05 | N/A | N/A |
| 2480 | 52.75 | AV | V | 28.94 | 2.99 | 0.00 | 84.68 | N/A | N/A |
| 2483.5 | 29.87 | PK | V | 28.95 | 2.99 | 0.00 | 61.81 | 74.00 | 12.19 |
| 2483.5 | 15.41 | AV | V | 28.95 | 2.99 | 0.00 | 47.35 | 54.00 | 6.65 |
| 4960 | 34.39 | PK | V | 34.29 | 5.05 | 26.88 | 46.85 | 74.00 | 27.15 |
| 4960 | 19.58 | AV | V | 34.29 | 5.05 | 26.88 | 32.04 | 54.00 | 21.96 |
| 7440 | 33.45 | PK | V | 36.72 | 6.27 | 26.45 | 49.99 | 74.00 | 24.01 |
| 7440 | 19.50 | AV | V | 36.72 | 6.27 | 26.45 | 36.04 | 54.00 | 17.96 |

Note:

Corrected Amplitude = Corrected Factor + Reading

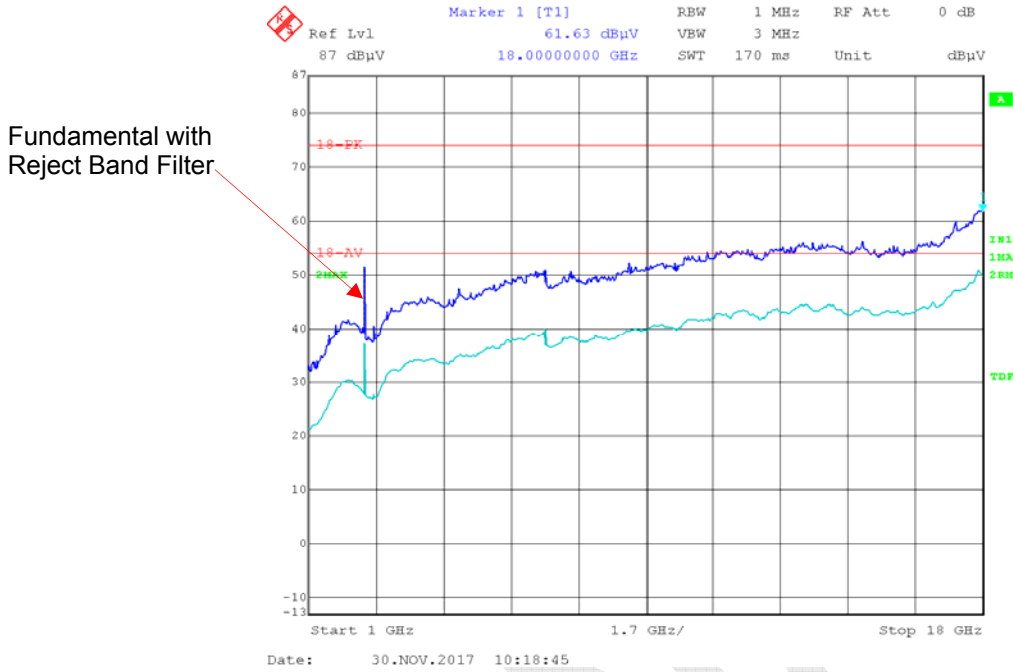
Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor

Margin = Limit - Corr. Amplitude

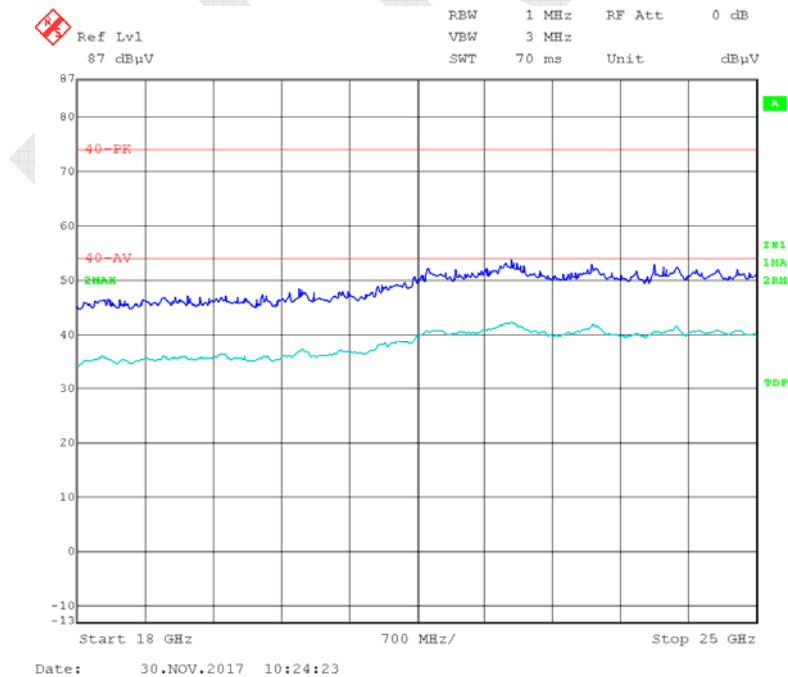
Spurious emissions more than 20 dB below the limit were not reported.

Please refer to the below pre-scan plot of worst case:

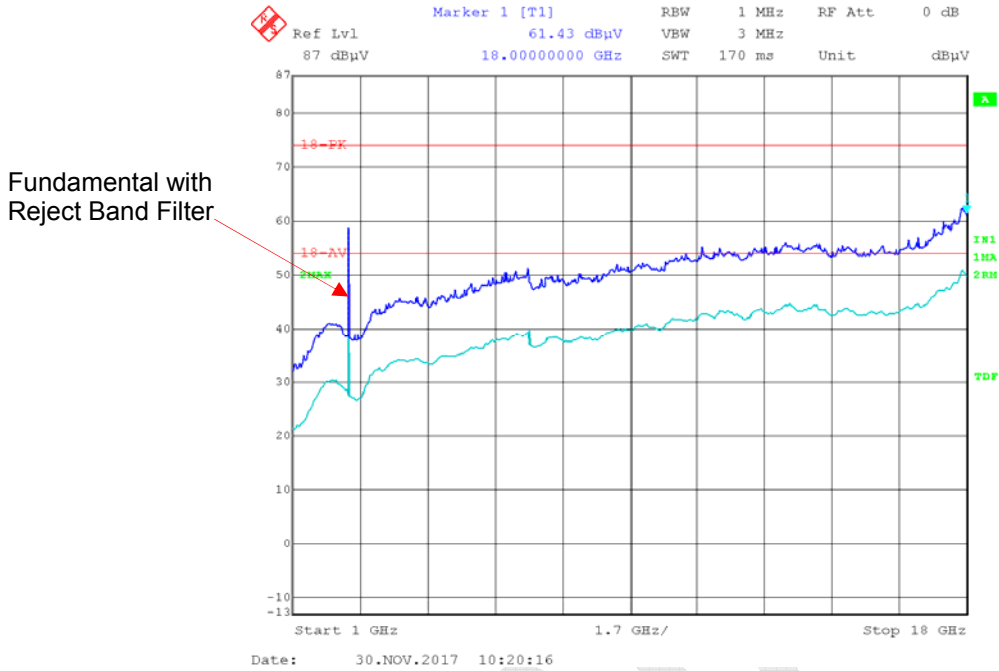
BDR Mode (GFSK): Low Channel_Horizontal_1GHz-18GHz



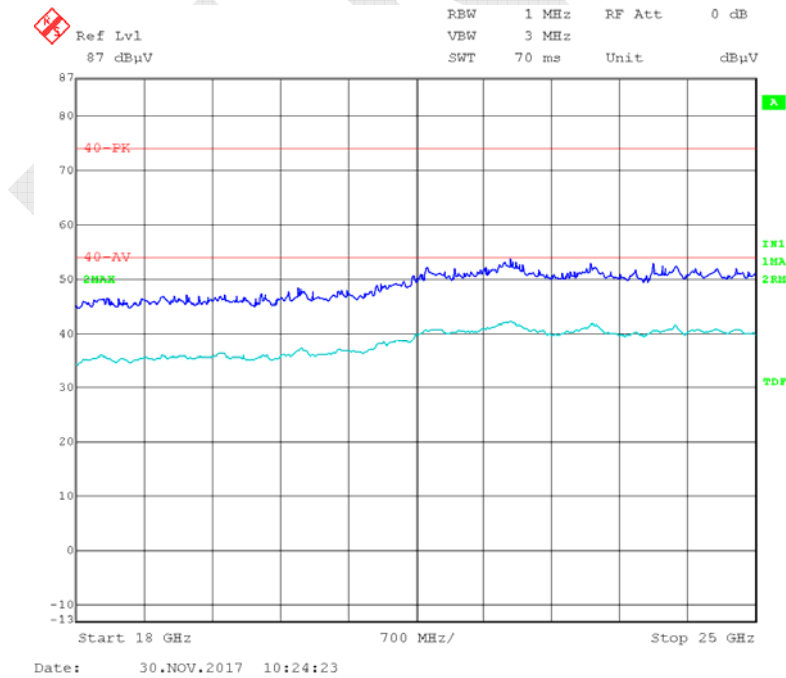
BDR Mode (GFSK): Low Channel_Horizontal_18GHz-25GHz



BDR Mode (GFSK): Low Channel_Vertical_1GHz-18GHz



BDR Mode (GFSK): Low Channel_Vertical_18GHz-25GHz



FCC §15.247(A) (1) - CHANNEL SEPARATION TEST

Applicable Standard

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.50 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater provided the systems operate with an output power no greater than 125 mW.

Test Procedure

1. Set the EUT in transmitting mode, spectrum Bandwidth was set at 30 kHz, maxhold the channel.
2. Set the adjacent channel of the EUT maxhold another trace.
3. Measure the channel separation.

Test Data

Environmental Conditions

| | |
|---------------------------|----------|
| Temperature: | 18 °C |
| Relative Humidity: | 54 % |
| ATM Pressure: | 96.5 kPa |

* The testing was performed by Tom Tang on 2017-12-02.

Test Result: Compliance.

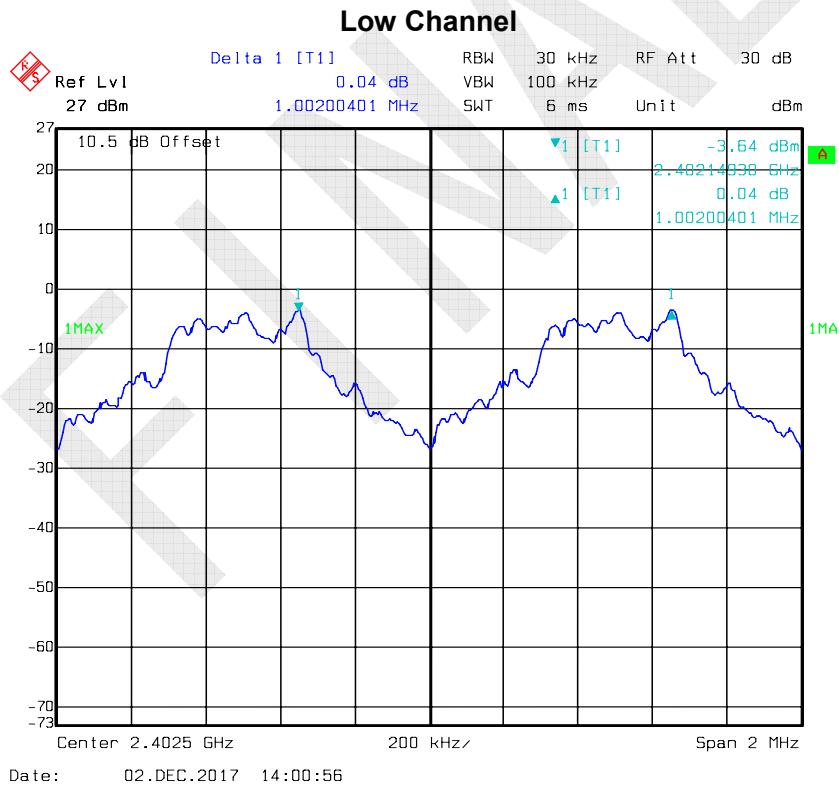
Please refer to following tables and plots.

Test Mode: Transmitting

| Mode | Channel | Frequency | Channel Separation | Limit |
|--------------------------|---------|-----------|--------------------|-------|
| | | MHz | MHz | MHz |
| BDR (GFSK) | Low | 2402 | 1.002 | 0.63 |
| | Middle | 2441 | 1.002 | 0.61 |
| | High | 2480 | 1.002 | 0.63 |
| EDR ($\pi/4$ -DQPSK) | Low | 2402 | 1.002 | 0.96 |
| | Middle | 2441 | 1.002 | 0.97 |
| | High | 2480 | 1.006 | 0.96 |
| EDR (8DPSK) | Low | 2402 | 1.002 | 0.98 |
| | Middle | 2441 | 1.002 | 0.98 |
| | High | 2480 | 1.006 | 0.98 |

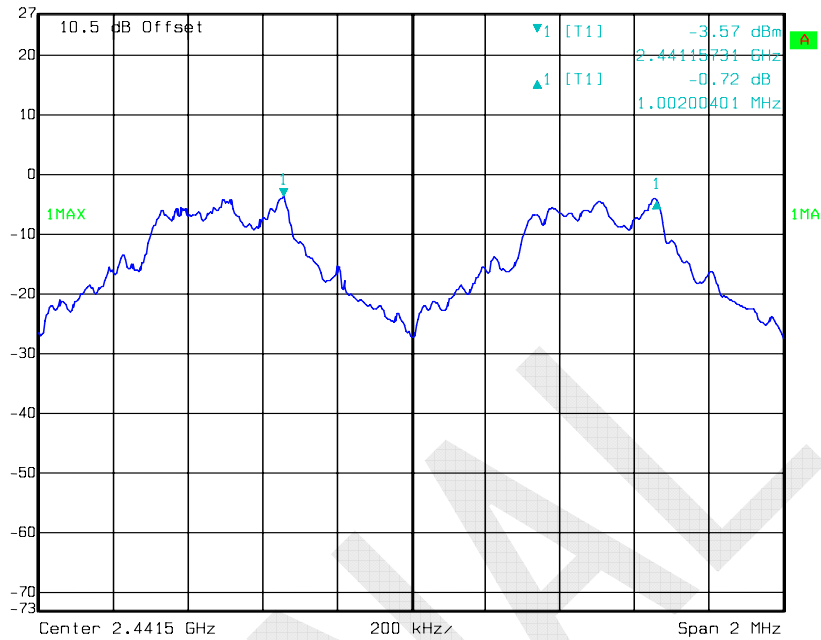
Note: Limit= (2/3) × 20dB bandwidth

BDR Mode (GFSK):



Middle Channel

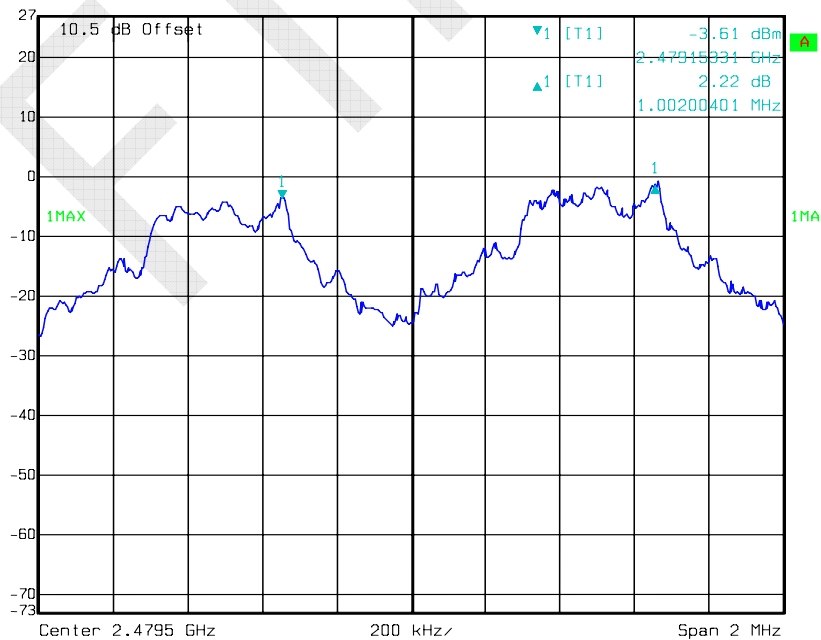
KES
 Delta 1 [T1] RBW 30 kHz RF Att 30 dB
 Ref Lvl 27 dBm -0.72 dB VBW 100 kHz
 1.00200401 MHz SWT 6 ms Unit dBm



Date: 02.DEC.2017 13:59:57

High Channel

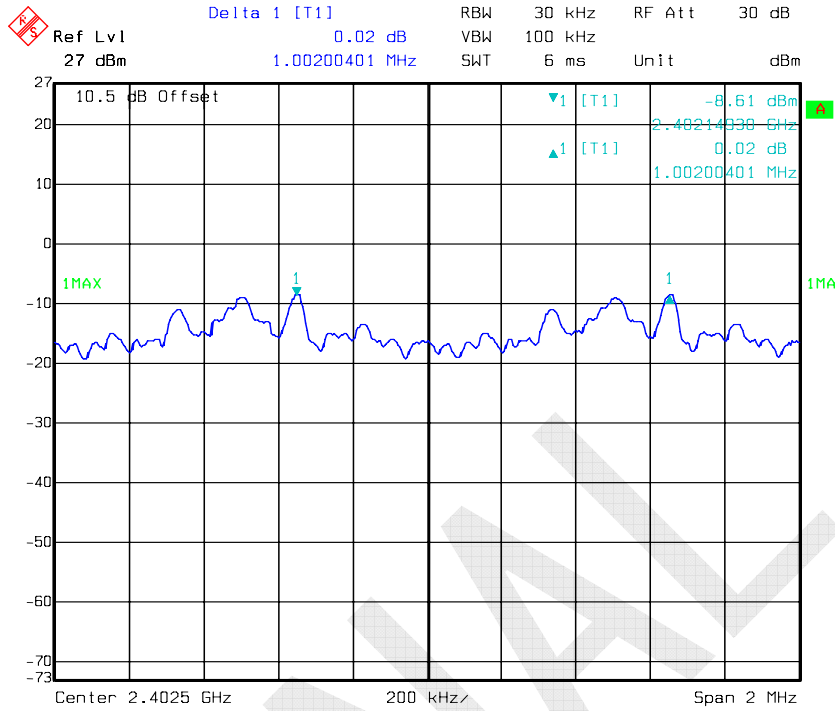
KES
 Delta 1 [T1] RBW 30 kHz RF Att 30 dB
 Ref Lvl 27 dBm 2.22 dB VBW 100 kHz
 1.00200401 MHz SWT 6 ms Unit dBm



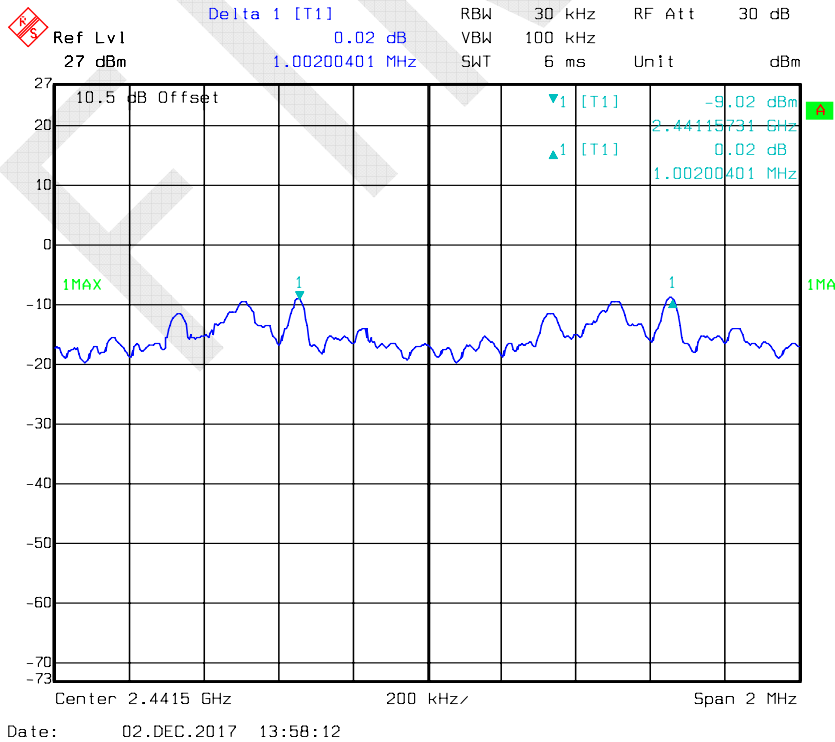
Date: 02.DEC.2017 13:42:38

EDR Mode ($\pi/4$ -DQPSK):

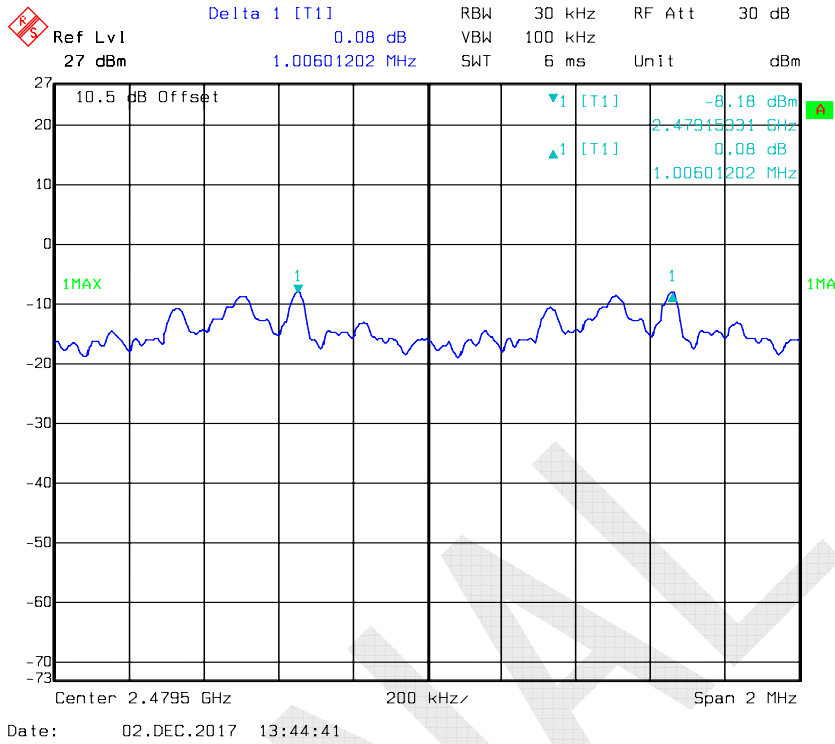
Low Channel



Middle Channel

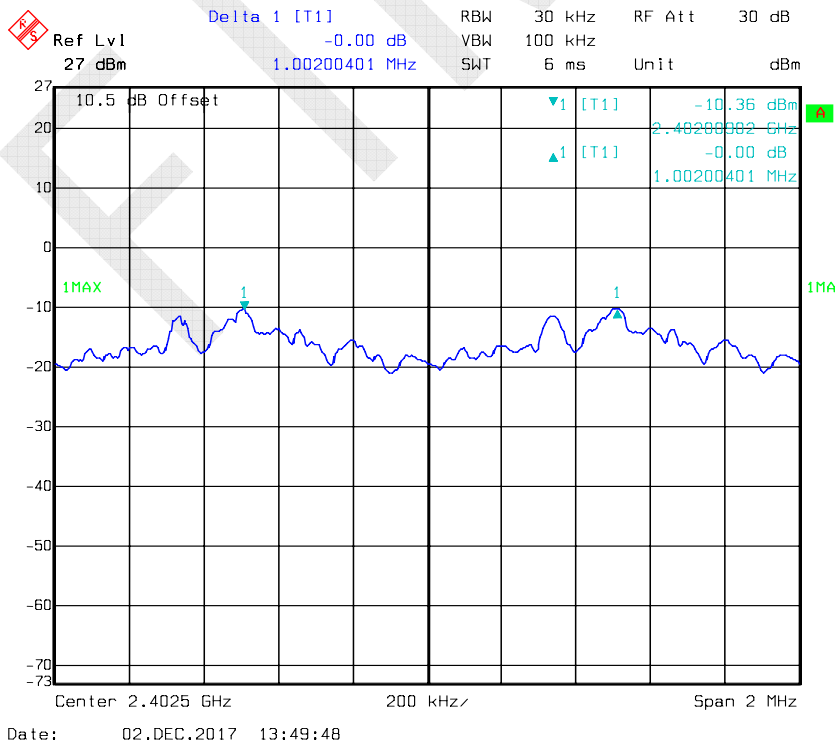


High Channel



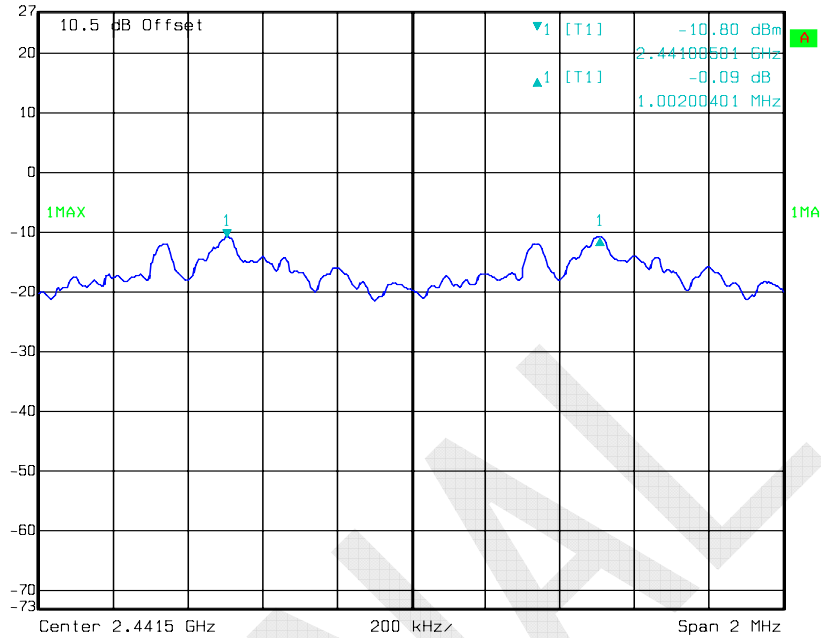
EDR Mode (8-DPSK):

Low Channel



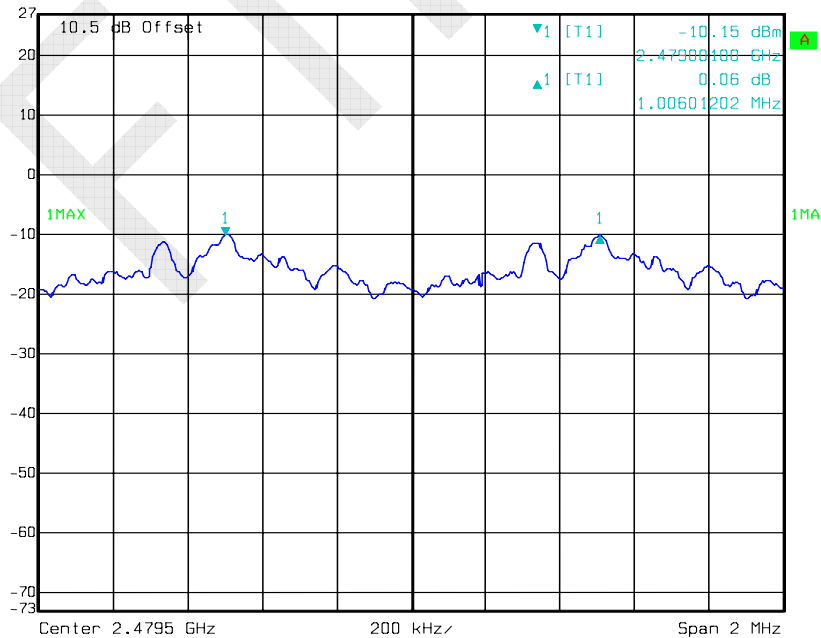
Middle Channel

K
S
 Ref Lvl 27 dBm
 Delta 1 [T1] -0.09 dB
 1.00200401 MHz
 RBW 30 kHz RF Att 30 dB
 VBW 100 kHz
 SWT 6 ms Unit dBm



High Channel

K
S
 Ref Lvl 27 dBm
 Delta 1 [T1] 0.06 dB
 1.00601202 MHz
 RBW 30 kHz RF Att 30 dB
 VBW 100 kHz
 SWT 6 ms Unit dBm



FCC §15.247(a) (1) – 20 dB BANDWIDTH TESTING

Applicable Standard

Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT on the test table without connection to measurement instrument. Turn on the EUT. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

Test Data

Environmental Conditions

| | |
|--------------------|----------|
| Temperature: | 18 °C |
| Relative Humidity: | 54 % |
| ATM Pressure: | 96.8 kPa |

* The testing was performed by Tom Tang on 2017-12-01.

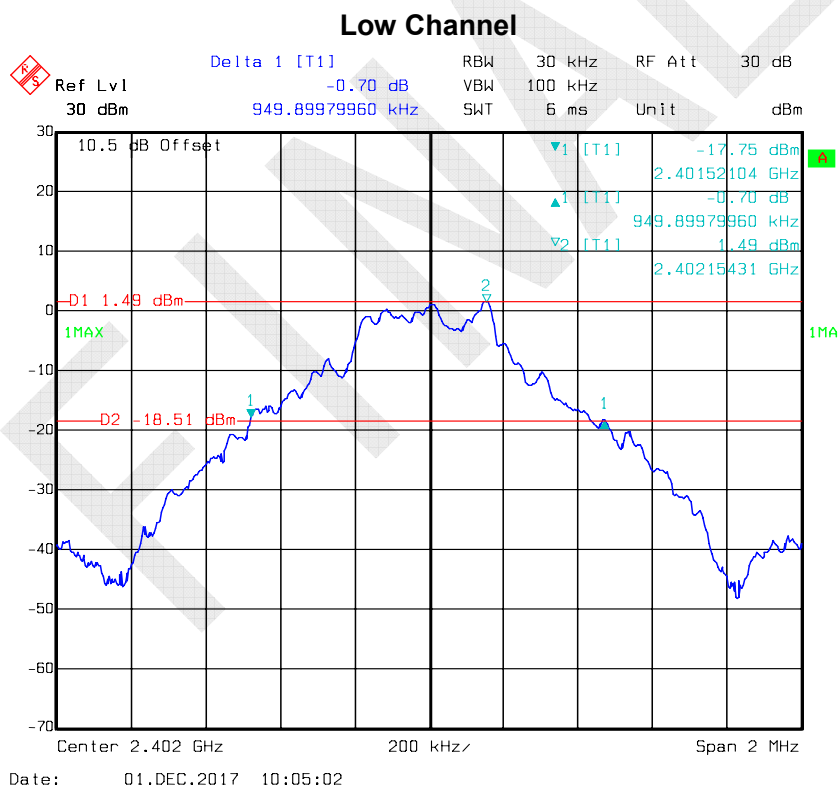
Test Result: Compliance.

Please refer to following tables and plots

Test Mode: Transmitting

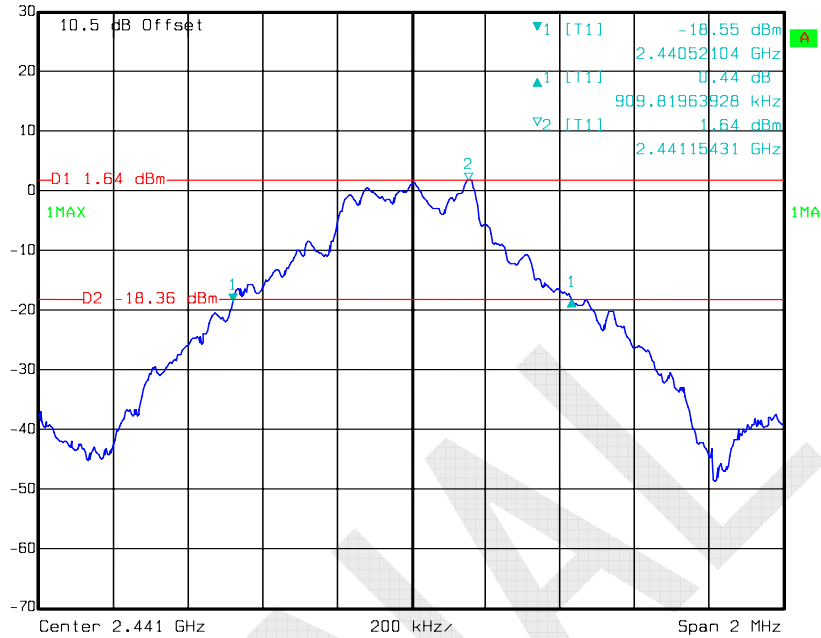
| Mode | Channel | Frequency (MHz) | 20 dB Bandwidth (MHz) |
|----------------------------|---------|-----------------|-----------------------|
| BDR Mode (GFSK) | Low | 2402 | 0.95 |
| | Middle | 2441 | 0.91 |
| | High | 2480 | 0.95 |
| EDR Mode ($\pi/4$ -DQPSK) | Low | 2402 | 1.44 |
| | Middle | 2441 | 1.45 |
| | High | 2480 | 1.44 |
| EDR Mode (8-DPSK) | Low | 2402 | 1.47 |
| | Middle | 2441 | 1.47 |
| | High | 2480 | 1.47 |

BDR Mode (GFSK):



Middle Channel

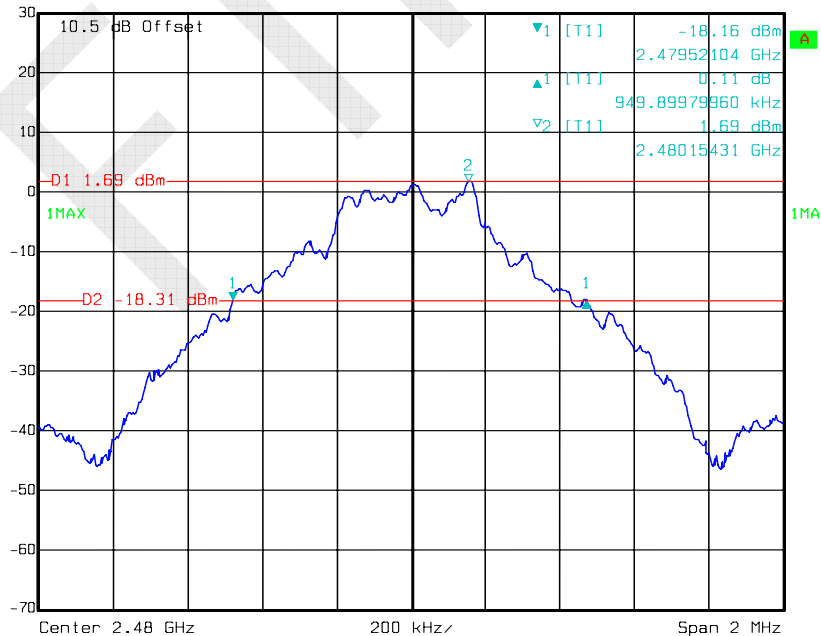
K/S
 Delta 1 [T1] RBW 30 kHz RF Att 30 dB
 Ref Lvl 0.44 dB VBW 100 kHz
 30 dBm 909.81963928 kHz SWT 6 ms Unit dBm



Date: 01.DEC.2017 10:06:58

High Channel

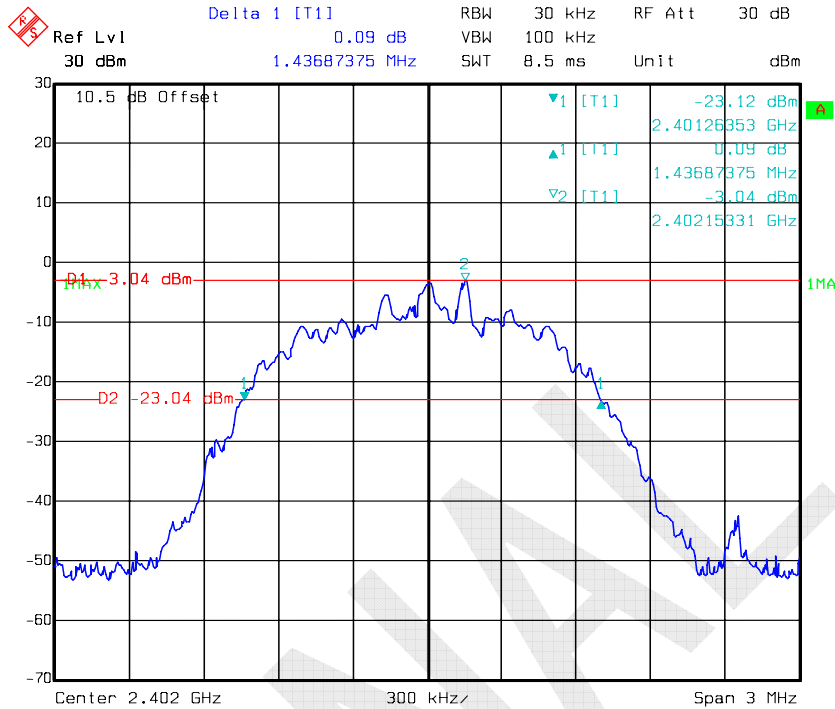
K/S
 Delta 1 [T1] RBW 30 kHz RF Att 30 dB
 Ref Lvl 0.11 dB VBW 100 kHz
 30 dBm 949.89979960 kHz SWT 6 ms Unit dBm



Date: 01.DEC.2017 10:08:56

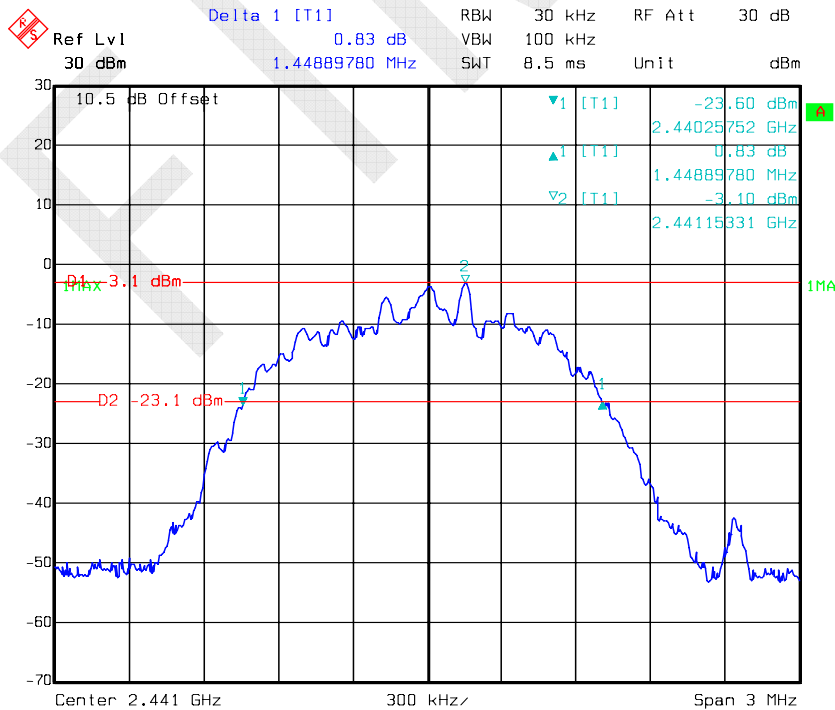
EDR Mode ($\pi/4$ -DQPSK):

Low Channel



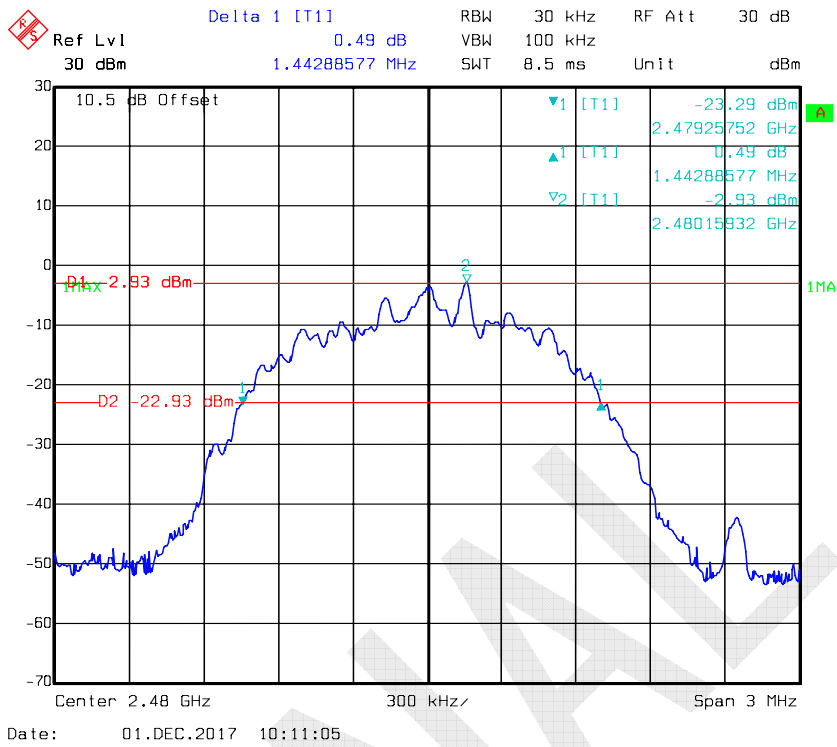
Date: 01.DEC.2017 10:17:20

Middle Channel



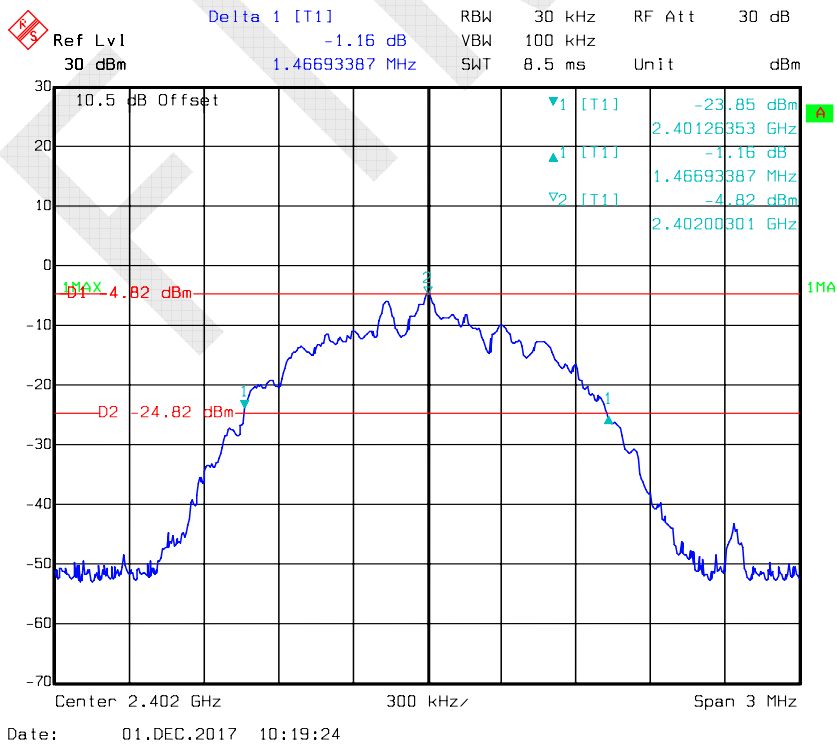
Date: 01.DEC.2017 10:13:23

High Channel



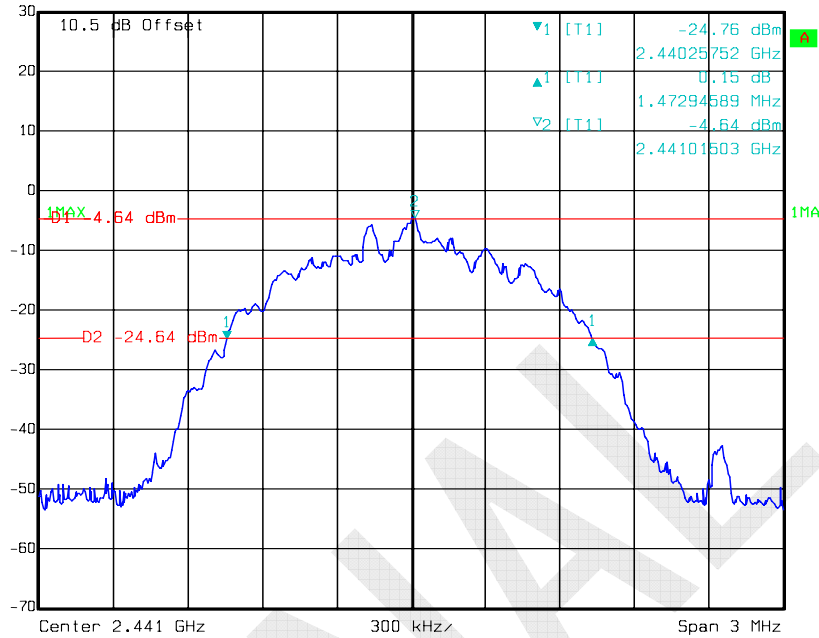
EDR Mode (8-DPSK):

Low Channel



Middle Channel

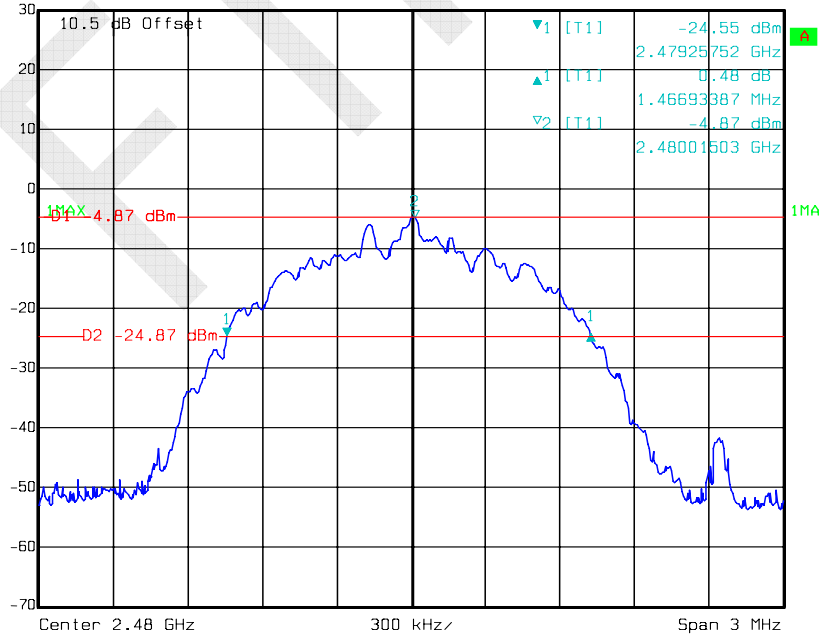
K/S
 Delta 1 [T1] RBW 30 kHz RF Att 30 dB
 Ref Lvl 30 dBm 0.15 dB VBW 100 kHz
 1.47294589 MHz SWT 8.5 ms Unit dBm



Date: 01.DEC.2017 10:21:46

High Channel

K/S
 Delta 1 [T1] RBW 30 kHz RF Att 30 dB
 Ref Lvl 30 dBm 0.48 dB VBW 100 kHz
 1.46693387 MHz SWT 8.5 ms Unit dBm



Date: 01.DEC.2017 10:23:25

FCC §15.247(a) (1) (iii) - QUANTITY OF HOPPING CHANNEL TEST

Applicable Standard

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

Test Procedure

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Set the EUT in hopping mode from first channel to last.
3. By using the Max-Hold function record the Quantity of the channel.

Test Data

Environmental Conditions

| | |
|---------------------------|----------|
| Temperature: | 18 °C |
| Relative Humidity: | 54 % |
| ATM Pressure: | 96.5 kPa |

* The testing was performed by Tom Tang on 2017-12-02.

Test Result: Compliance.

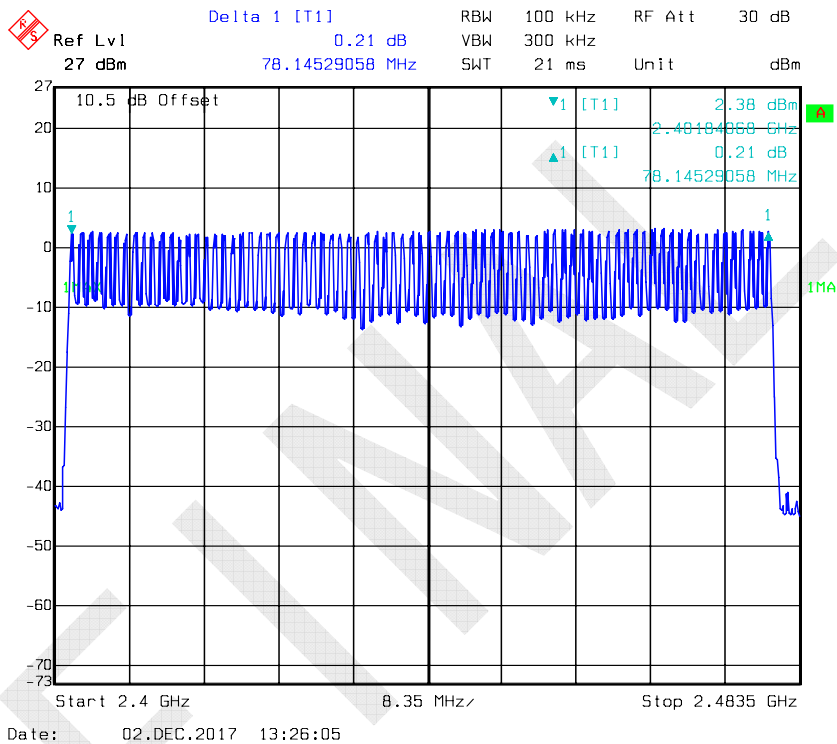
Please refer to following tables and plots.

Test Mode: Transmitting

BDR Mode (GFSK):

| Frequency Range (MHz) | Number of Hopping Channel | Limit |
|-----------------------|---------------------------|-------|
| 2400-2483.5 | 79 | ≥15 |

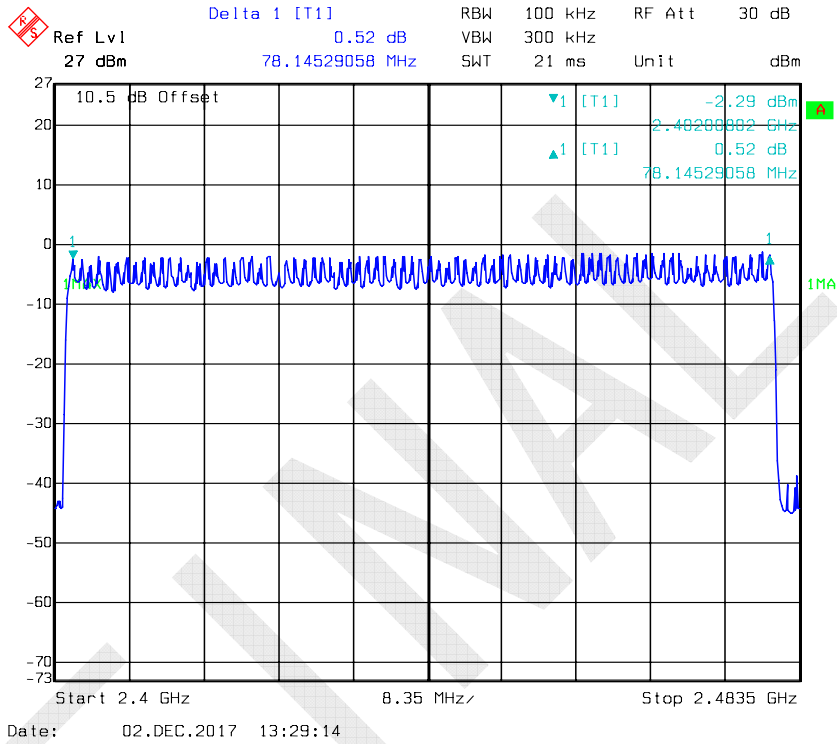
Number of Hopping Channels



EDR Mode ($\pi/4$ -DQPSK):

| Frequency Range (MHz) | Number of Hopping Channel | Limit |
|-----------------------|---------------------------|-----------|
| 2400-2483.5 | 79 | ≥ 15 |

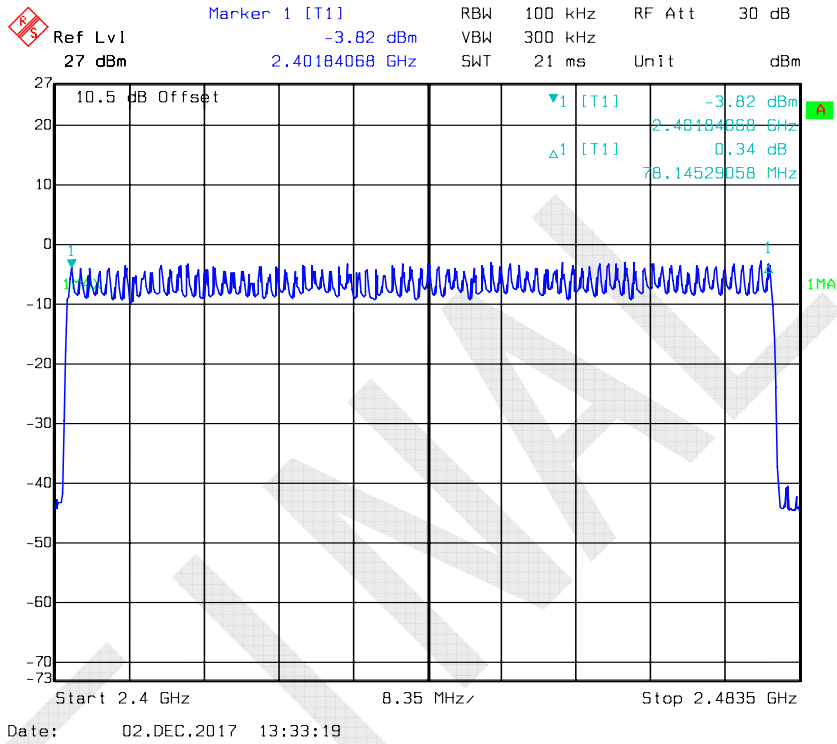
Number of Hopping Channels



EDR Mode (8-DPSK):

| Frequency Range (MHz) | Number of Hopping Channel | Limit |
|-----------------------|---------------------------|-------|
| 2400-2483.5 | 79 | ≥15 |

Number of Hopping Channels



FCC §15.247(a) (1) (iii) - TIME OF OCCUPANCY (DWELL TIME)

Applicable Standard

Frequency hopping systems in the 2400-2483.5 MHz shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

Test Procedure

The EUT was worked in hopping mode, Spectrum Analyzer SPAN was set as 0, the time of single pulse was tested.

Test Data

Environmental Conditions

| | |
|---------------------------|----------|
| Temperature: | 18 °C |
| Relative Humidity: | 54 % |
| ATM Pressure: | 96.5 kPa |

* The testing was performed by Tom Tang on 2017-12-02.

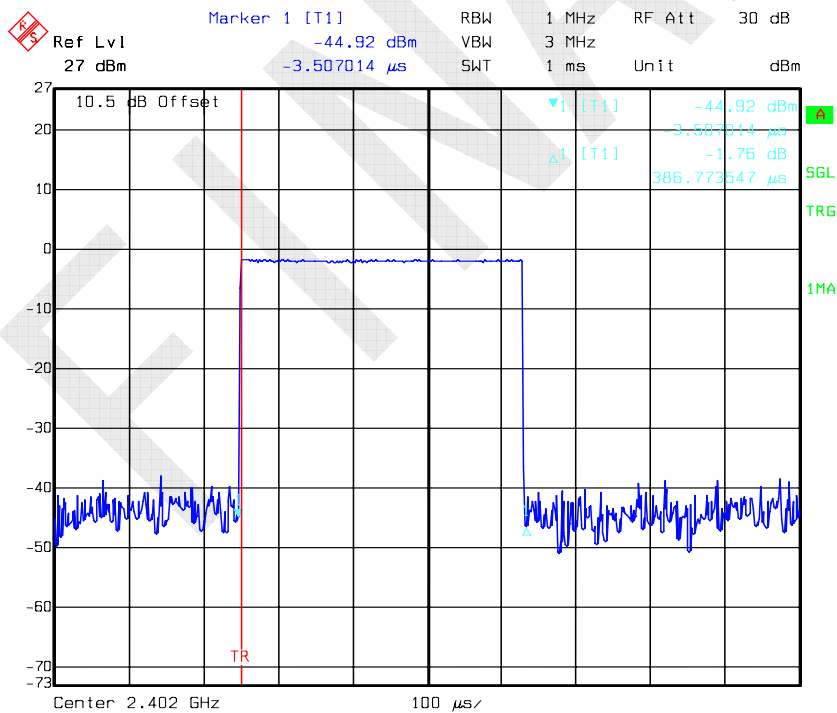
Test Result: Compliance. Please refer to following tables and plots

Test Mode: Transmitting

BDR Mode (GFSK):

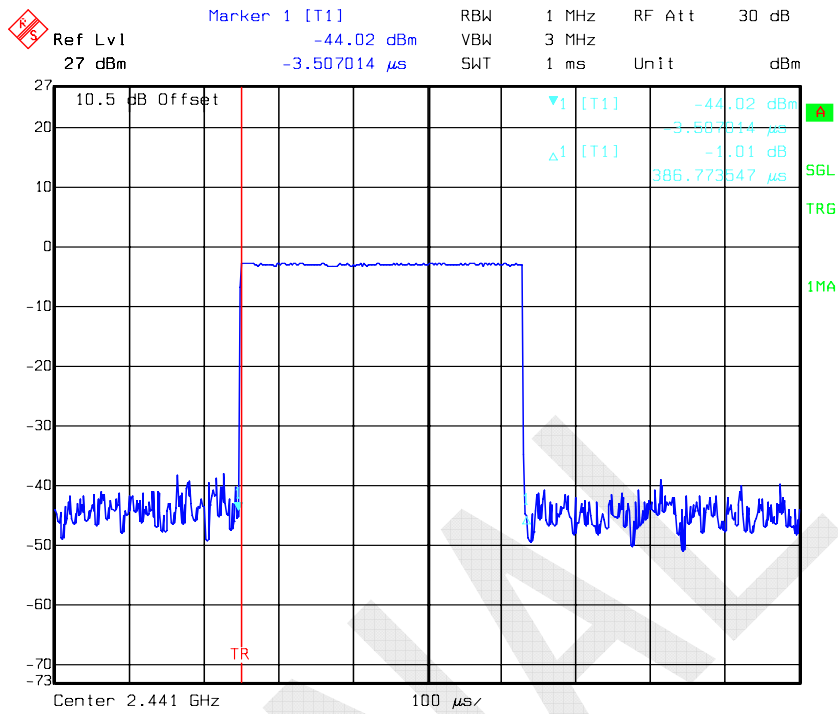
| Mode | Channel | Pulse Width (ms) | Dwell Time (s) | Limit (s) | Result |
|------------|--|------------------|----------------|-----------|------------|
| DH1 | Low | 0.387 | 0.124 | 0.4 | Compliance |
| | Middle | 0.387 | 0.124 | 0.4 | Compliance |
| | High | 0.387 | 0.124 | 0.4 | Compliance |
| | Note: Dwell time=Pulse time (ms) × (1600/2/79) ×31.6 s | | | | |
| DH3 | Low | 1.655 | 0.265 | 0.4 | Compliance |
| | Middle | 1.655 | 0.265 | 0.4 | Compliance |
| | High | 1.655 | 0.265 | 0.4 | Compliance |
| | Note: Dwell time=Pulse time (ms) × (1600/4/79) ×31.6 s | | | | |
| DH5 | Low | 2.914 | 0.311 | 0.4 | Compliance |
| | Middle | 2.914 | 0.311 | 0.4 | Compliance |
| | High | 2.914 | 0.311 | 0.4 | Compliance |
| | Note: Dwell time=Pulse time (ms) × (1600/6/79) ×31.6 s | | | | |

DH1: Low Channel



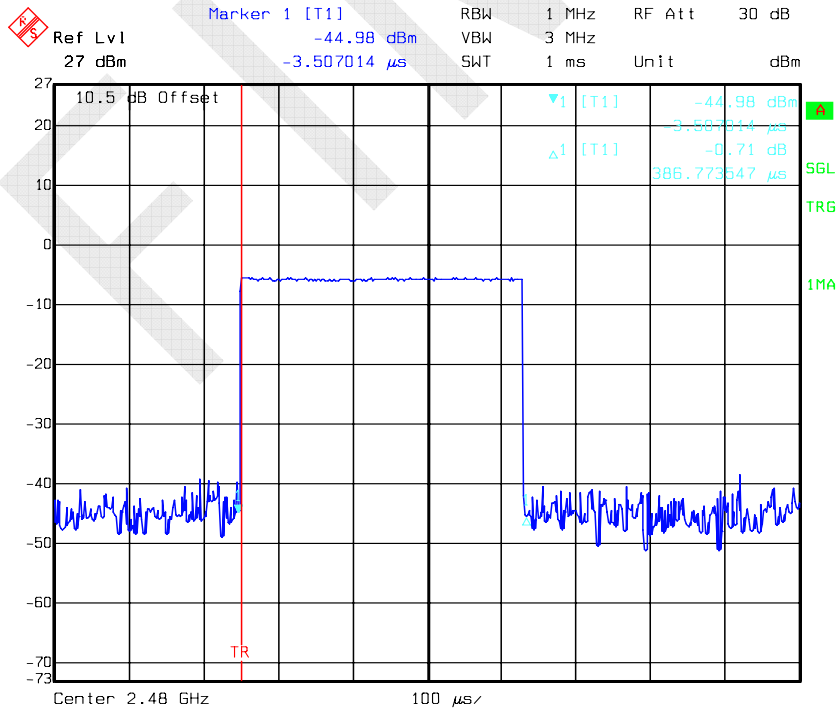
Date: 02.DEC.2017 11:01:40

DH1: Middle Channel



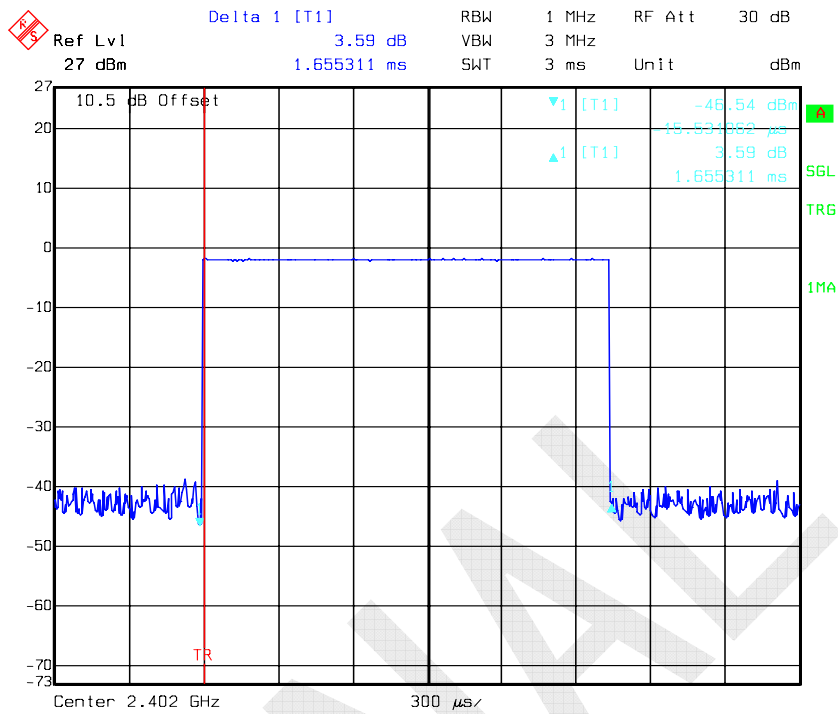
Date: 02.DEC.2017 11:04:42

DH1: High Channel

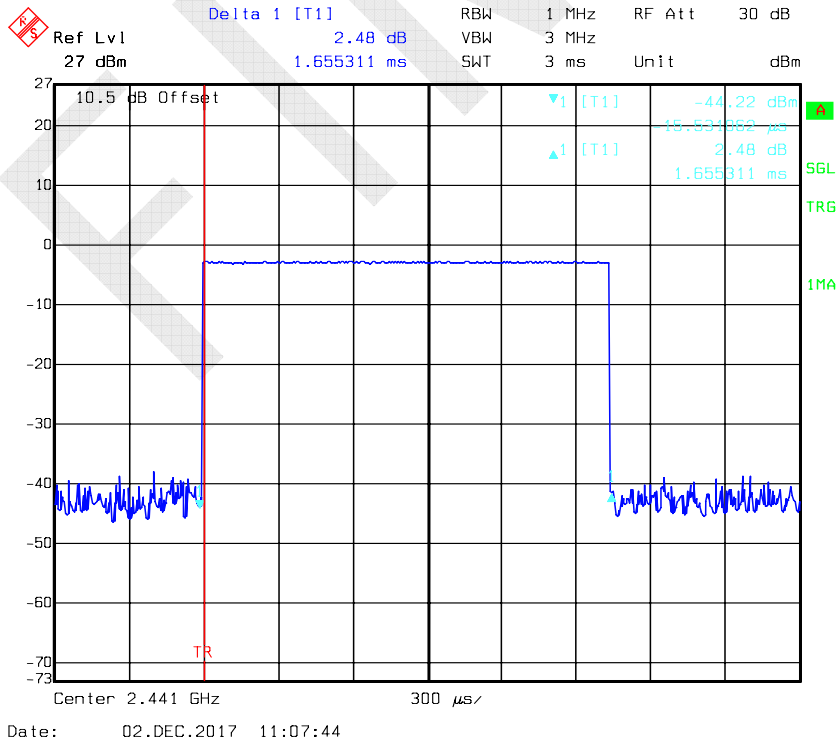


Date: 02.DEC.2017 11:05:22

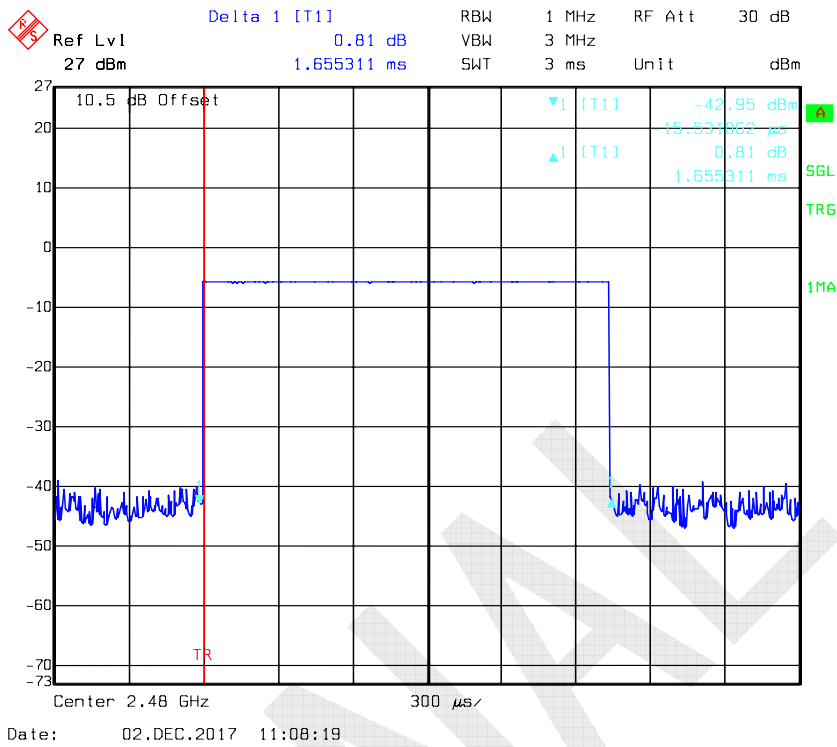
DH3: Low Channel



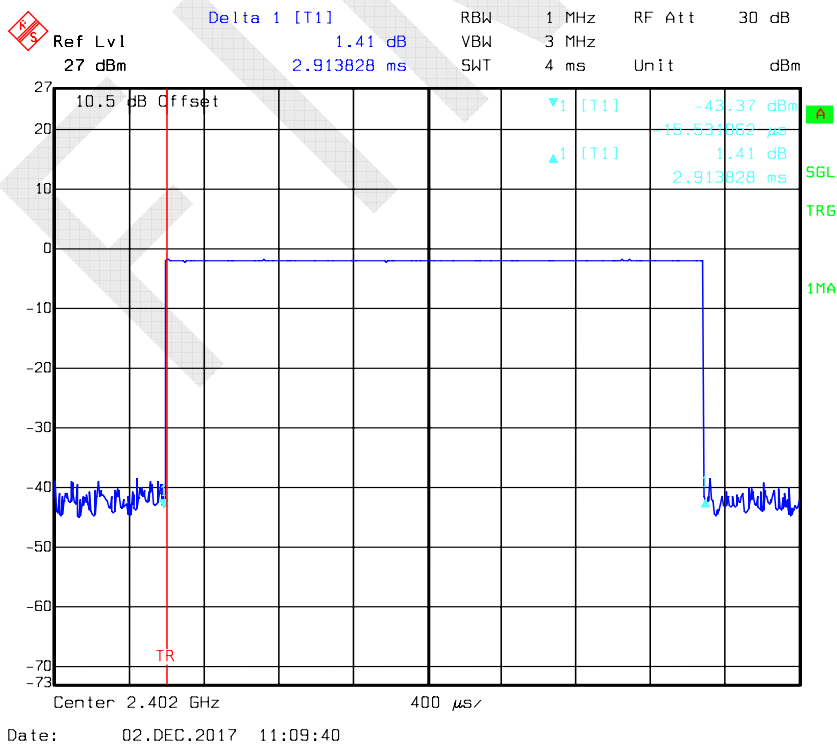
DH3: Middle Channel



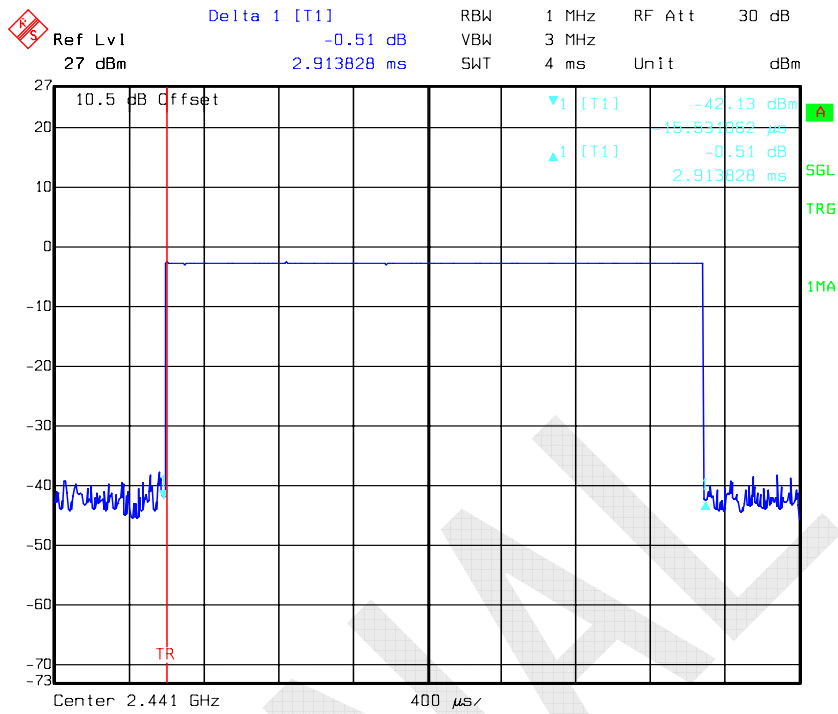
DH3: High Channel



DH5: Low Channel

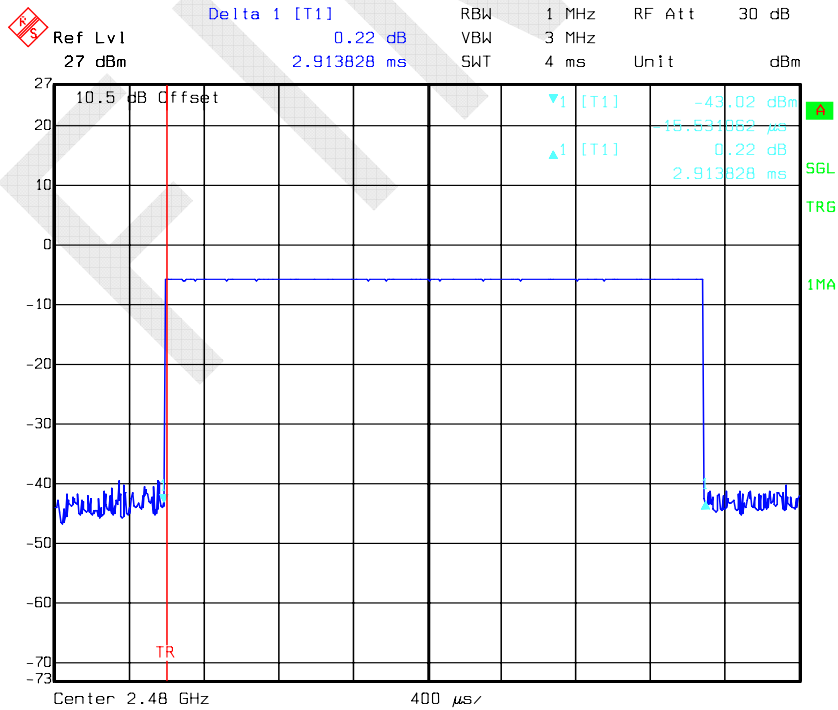


DH5: Middle Channel



Date: 02.DEC.2017 11:10:25

DH5: High Channel

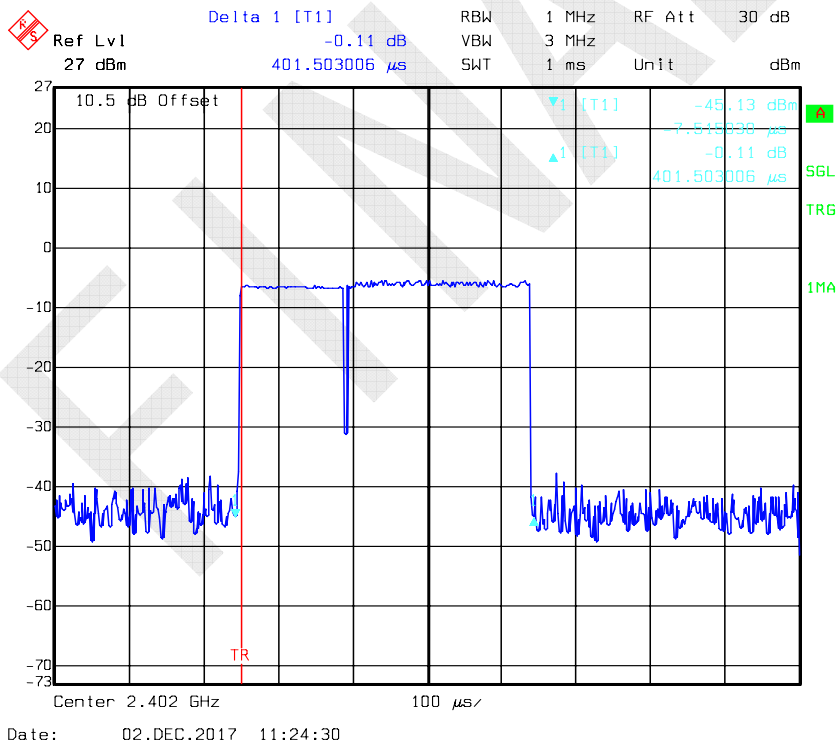


Date: 02.DEC.2017 11:10:51

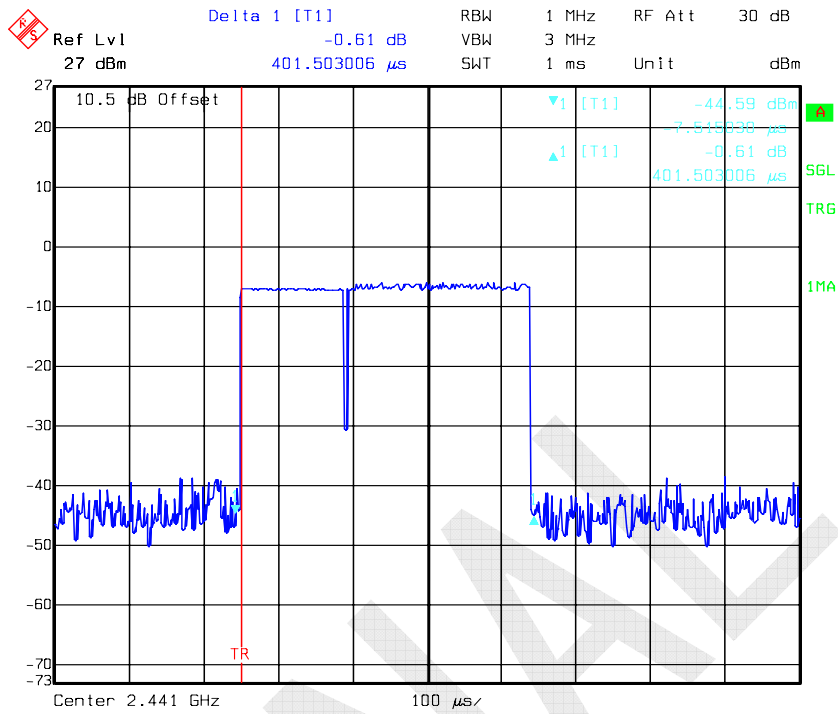
EDR Mode ($\pi/4$ -DQPSK):

| Mode | Channel | Pulse Width (ms) | Dwell Time (s) | Limit (s) | Result |
|------|--|------------------|----------------|-----------|------------|
| 2DH1 | Low | 0.402 | 0.129 | 0.4 | Compliance |
| | Middle | 0.402 | 0.129 | 0.4 | Compliance |
| | High | 0.402 | 0.129 | 0.4 | Compliance |
| | Note: Dwell time=Pulse time (ms) × (1600/2/79) ×31.6 s | | | | |
| 2DH3 | Low | 1.664 | 0.266 | 0.4 | Compliance |
| | Middle | 1.664 | 0.266 | 0.4 | Compliance |
| | High | 1.664 | 0.266 | 0.4 | Compliance |
| | Note: Dwell time=Pulse time (ms) × (1600/4/79) ×31.6 s | | | | |
| 2DH5 | Low | 2.923 | 0.312 | 0.4 | Compliance |
| | Middle | 2.923 | 0.312 | 0.4 | Compliance |
| | High | 2.923 | 0.312 | 0.4 | Compliance |
| | Note: Dwell time=Pulse time (ms) × (1600/6/79) ×31.6 s | | | | |

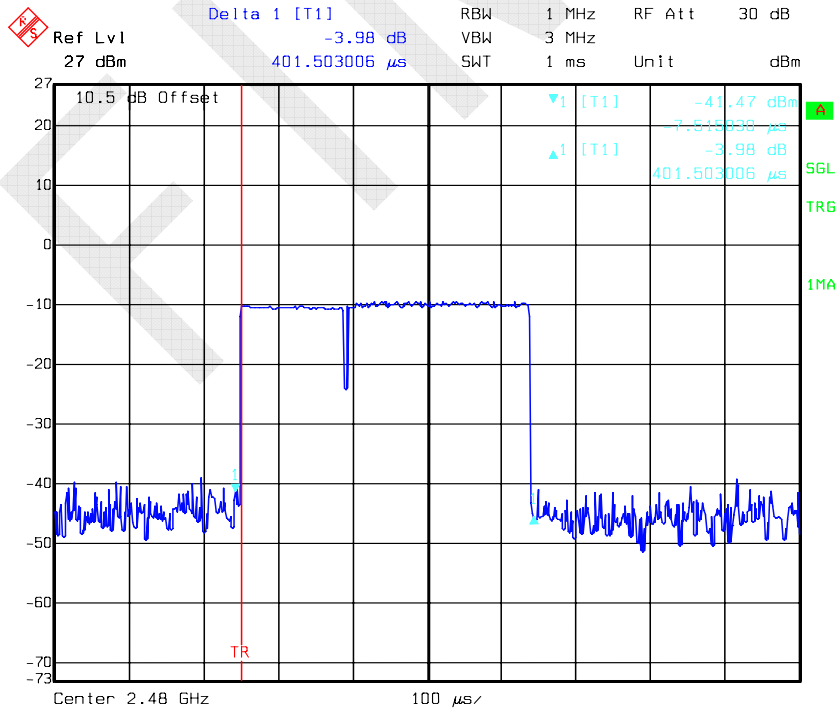
2DH1: Low Channel



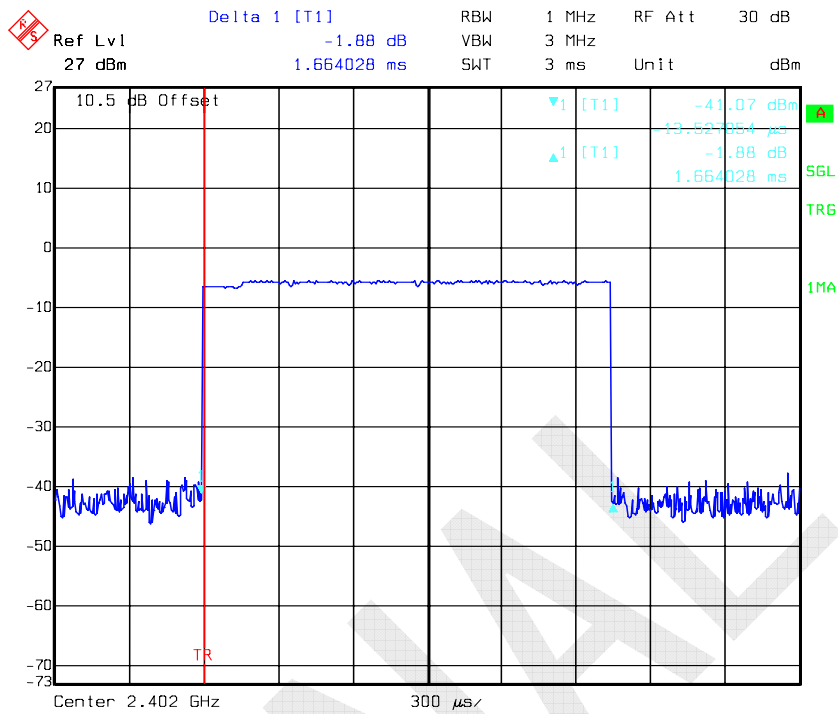
2DH1: Middle Channel



2DH1: High Channel

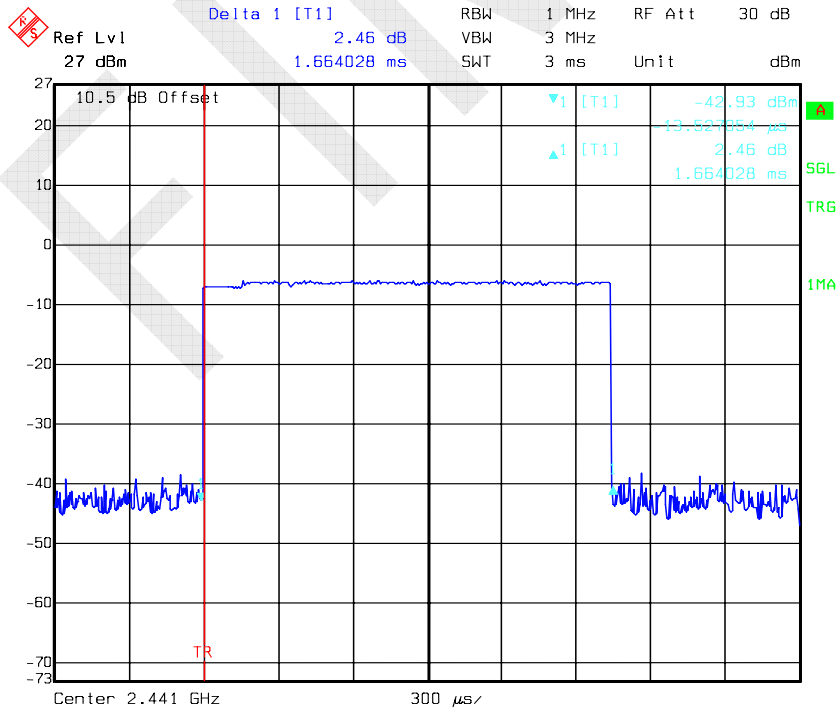


2DH3: Low Channel



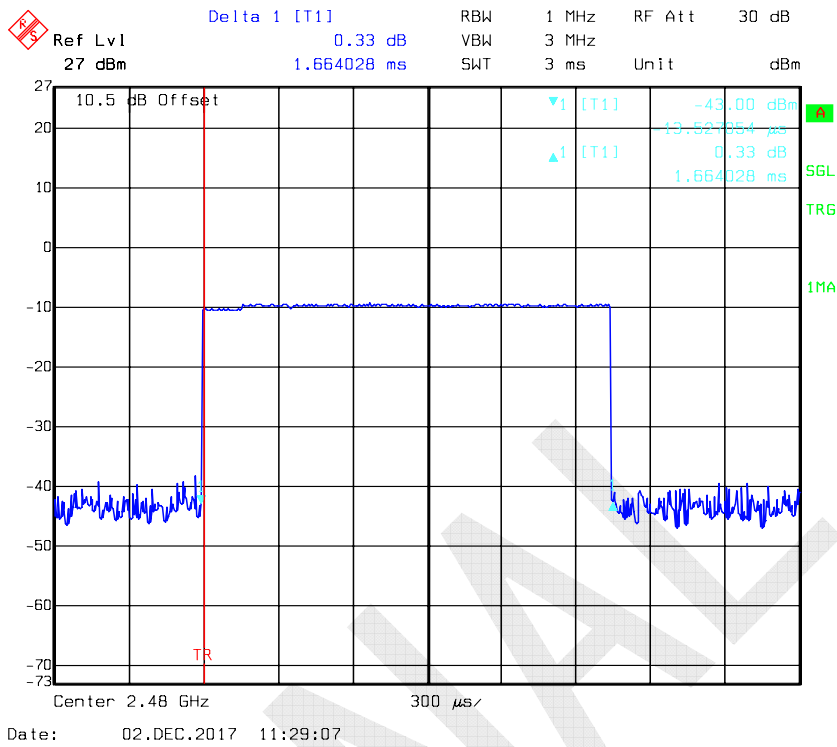
Date: 02.DEC.2017 11:27:46

2DH3: Middle Channel

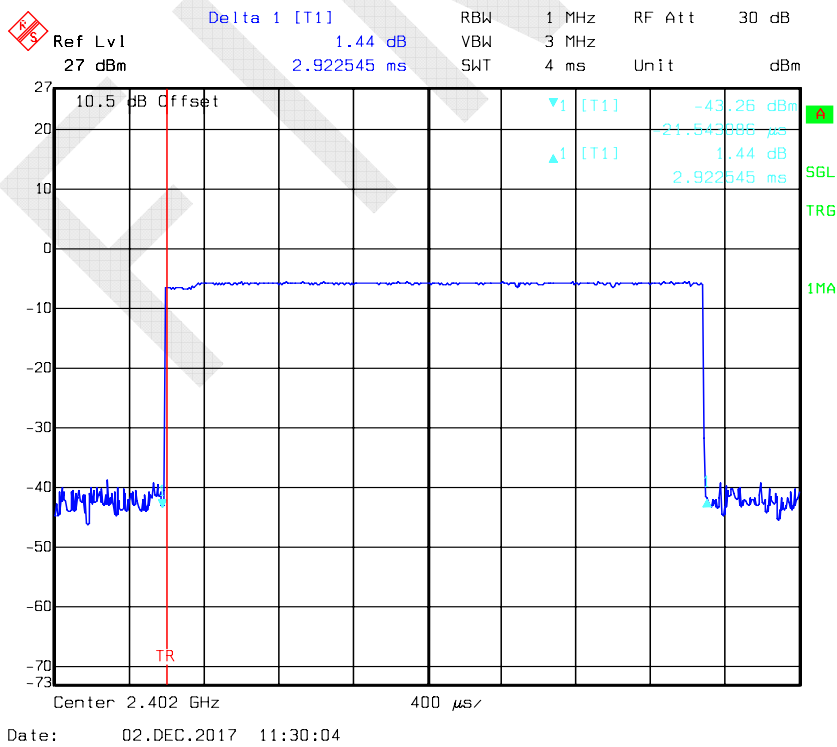


Date: 02.DEC.2017 11:28:21

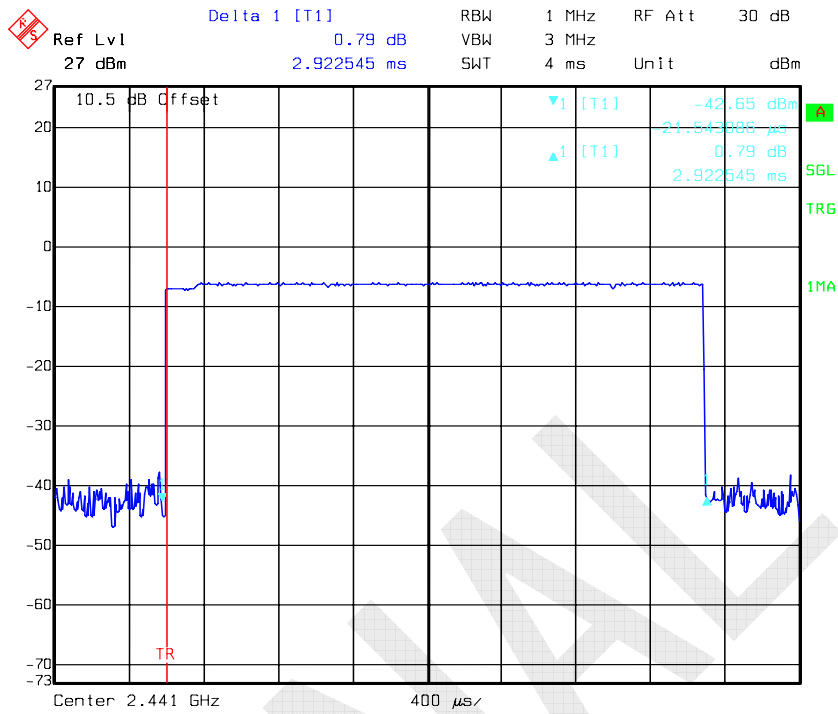
2DH3: High Channel



2DH5: Low Channel

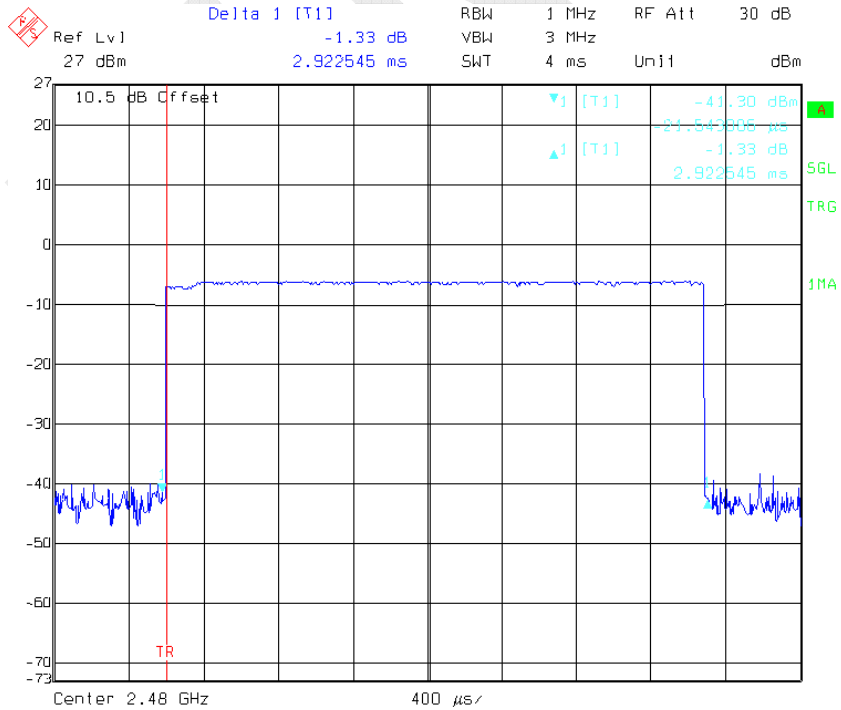


2DH5: Middle Channel



Date: 02.DEC.2017 11:30:37

2DH5: High Channel

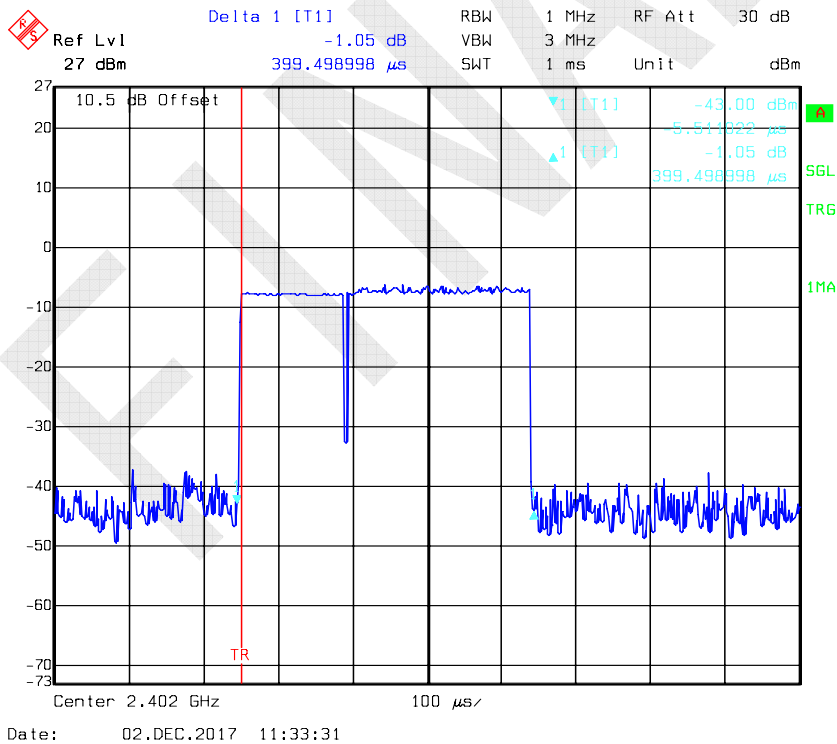


Date: 02.DEC.2017 11:31:28

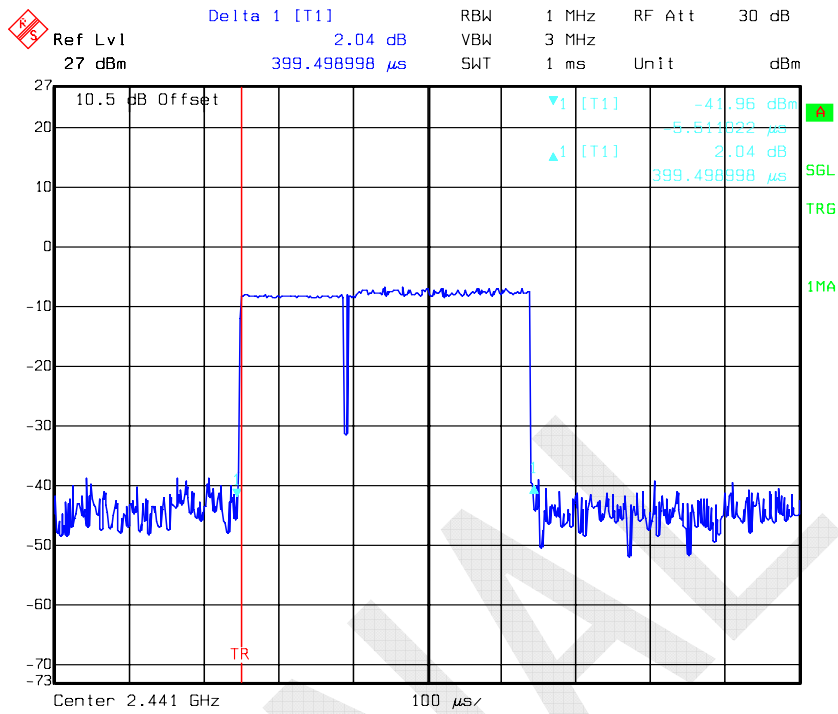
EDR Mode (8-DPSK):

| Mode | Channel | Pulse Width (ms) | Dwell Time (s) | Limit (s) | Result |
|------|--|------------------|----------------|-----------|------------|
| 3DH1 | Low | 0.399 | 0.128 | 0.4 | Compliance |
| | Middle | 0.399 | 0.128 | 0.4 | Compliance |
| | High | 0.399 | 0.128 | 0.4 | Compliance |
| | Note: Dwell time=Pulse time (ms) × (1600/2/79) ×31.6 s | | | | |
| 3DH3 | Low | 1.650 | 0.264 | 0.4 | Compliance |
| | Middle | 1.650 | 0.264 | 0.4 | Compliance |
| | High | 1.650 | 0.264 | 0.4 | Compliance |
| | Note: Dwell time=Pulse time (ms) × (1600/4/79) ×31.6 s | | | | |
| 3DH5 | Low | 2.917 | 0.311 | 0.4 | Compliance |
| | Middle | 2.917 | 0.311 | 0.4 | Compliance |
| | High | 2.917 | 0.311 | 0.4 | Compliance |
| | Note: Dwell time=Pulse time (ms) × (1600/6/79) ×31.6 s | | | | |

3DH1: Low Channel

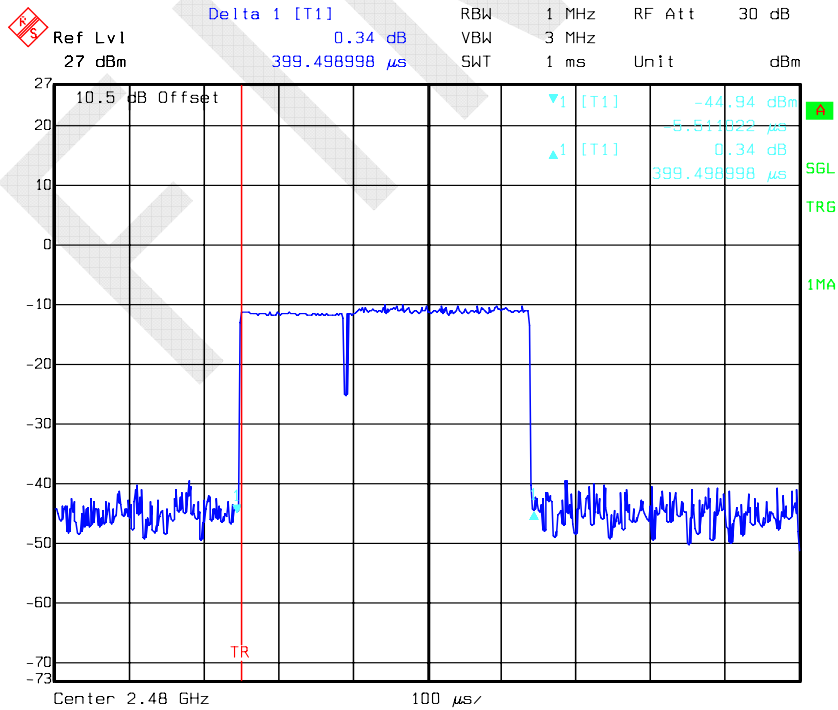


3DH1: Middle Channel



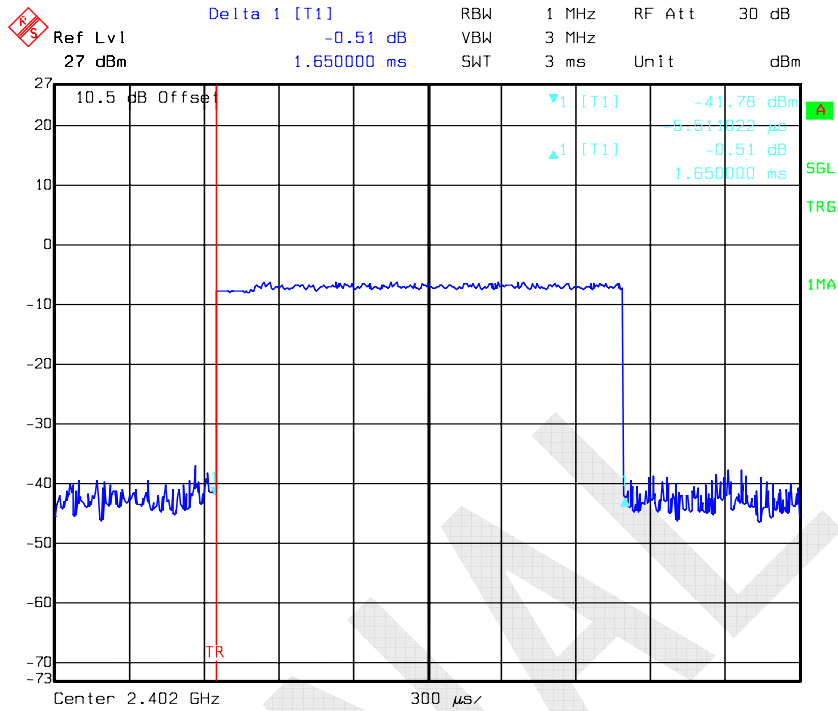
Date: 02.DEC.2017 11:33:57

3DH1: High Channel

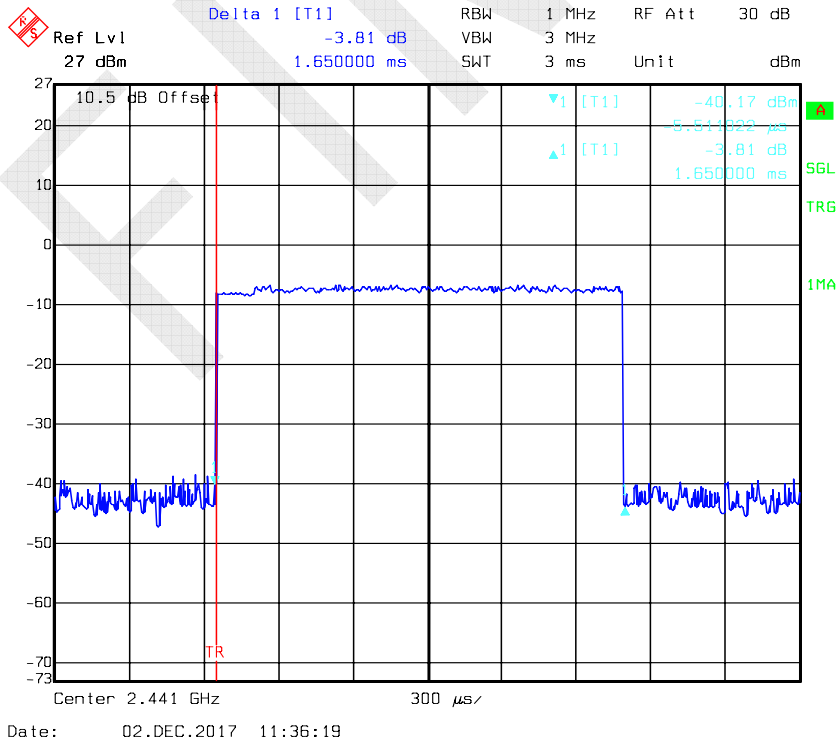


Date: 02.DEC.2017 11:34:30

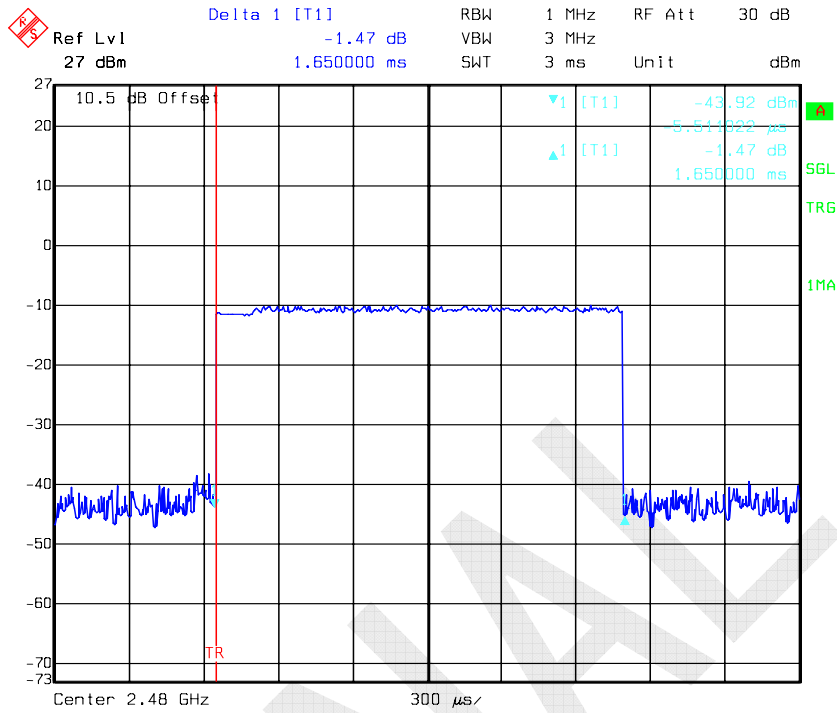
3DH3: Low Channel



3DH3: Middle Channel

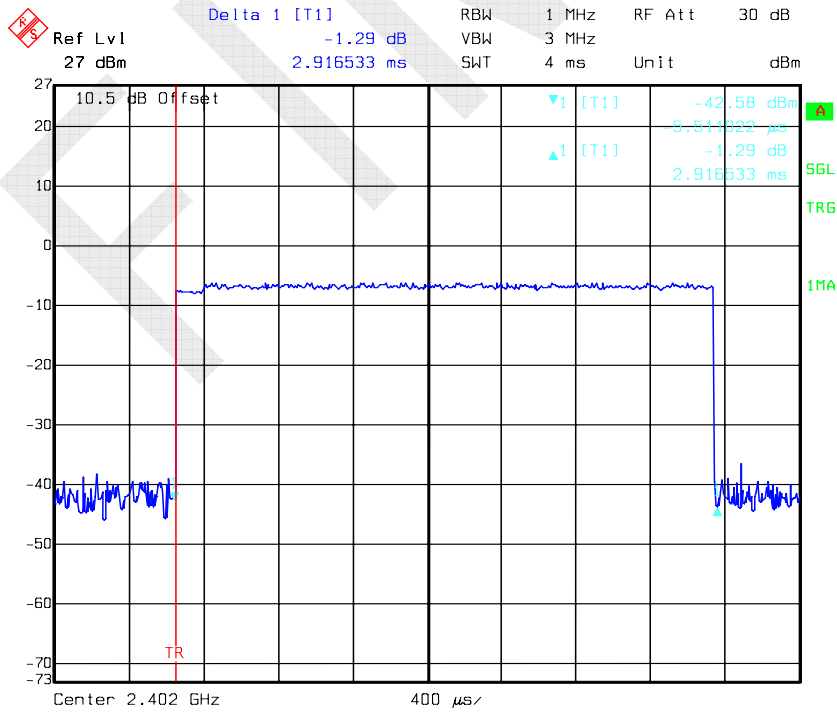


3DH3: High Channel



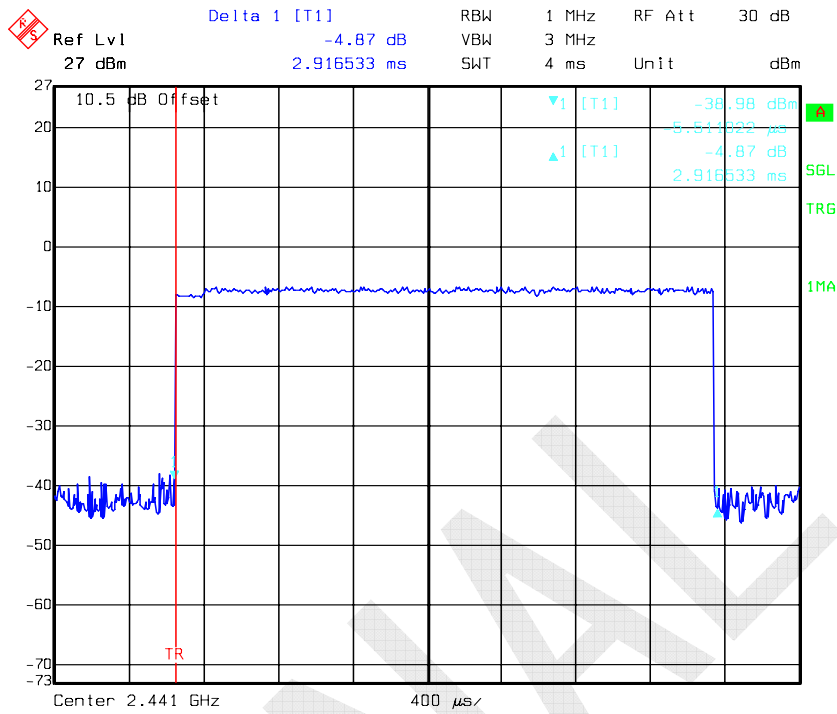
Date: 02.DEC.2017 11:36:47

3DH5: Low Channel



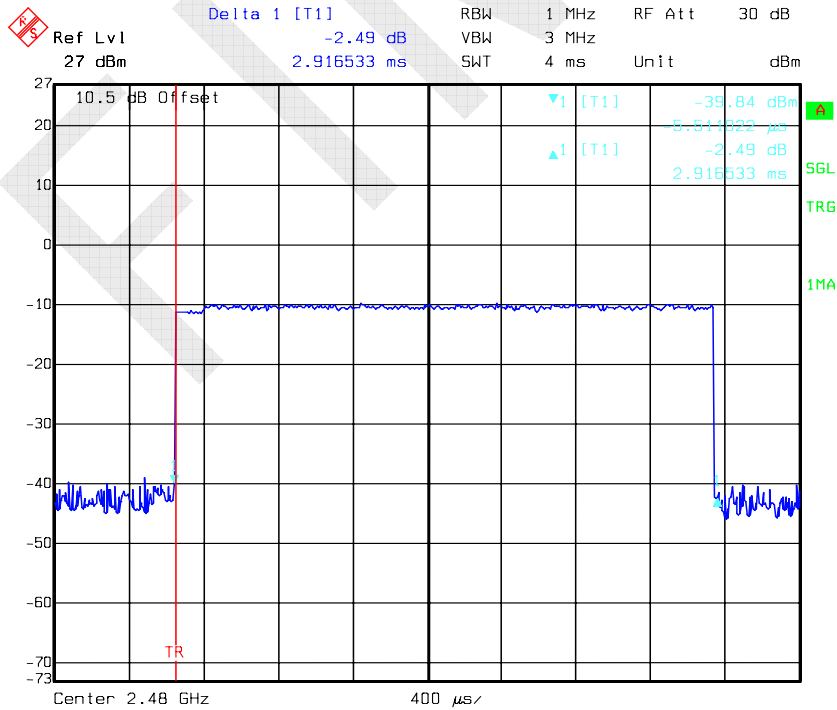
Date: 02.DEC.2017 11:38:01

3DH5: Middle Channel



Date: 02.DEC.2017 11:38:25

3DH5: High Channel



Date: 02.DEC.2017 11:38:58

FCC §15.247(b) (1) - PEAK OUTPUT POWER MEASUREMENT

Applicable Standard

According to §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.

Test Procedure

1. Place the EUT on a bench and set in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to one test equipment.
3. Add a correction factor to the display.

Test Data

Environmental Conditions

| | |
|---------------------------|----------|
| Temperature: | 18 °C |
| Relative Humidity: | 54 % |
| ATM Pressure: | 96.8 kPa |

* The testing was performed by Tom Tang on 2017-12-01.

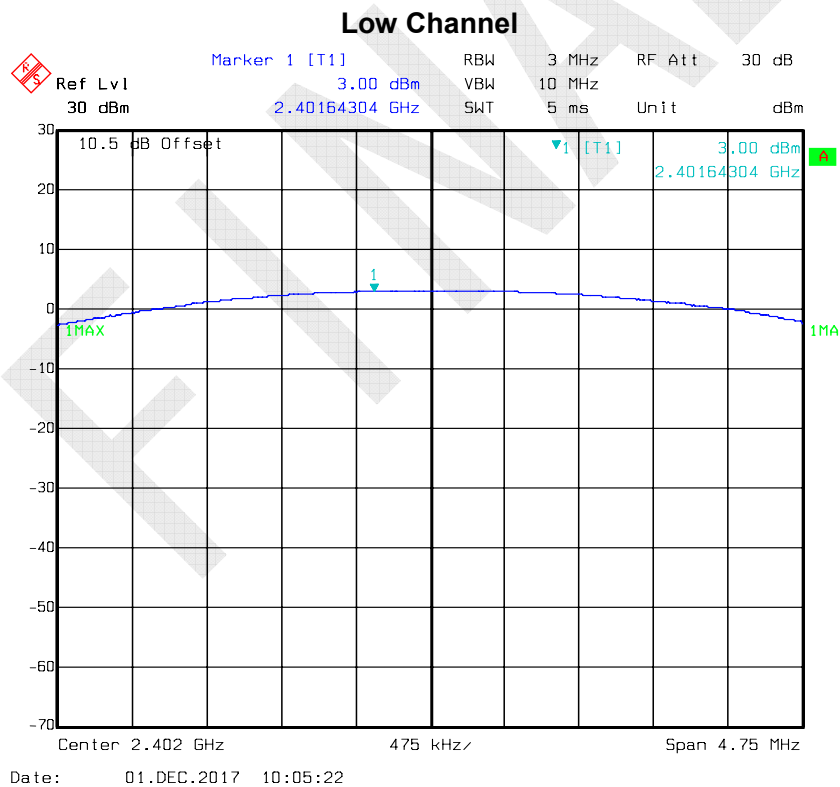
Test Result: Compliance. Please refer to following tables and plots

Test Mode: Transmitting

| Mode | Channel | Frequency (MHz) | Peak Output power (dBm) | Limit (dBm) |
|----------------------------|---------|-----------------|-------------------------|-------------|
| BDR Mode (GFSK) | Low | 2402 | 3.00 | 21 |
| | Middle | 2441 | 3.13 | 21 |
| | High | 2480 | 3.13 | 21 |
| EDR Mode ($\pi/4$ -DQPSK) | Low | 2402 | 0.75 | 21 |
| | Middle | 2441 | 0.88 | 21 |
| | High | 2480 | 0.62 | 21 |
| EDR Mode (8-DPSK) | Low | 2402 | -0.32 | 21 |
| | Middle | 2441 | -0.18 | 21 |
| | High | 2480 | -0.32 | 21 |

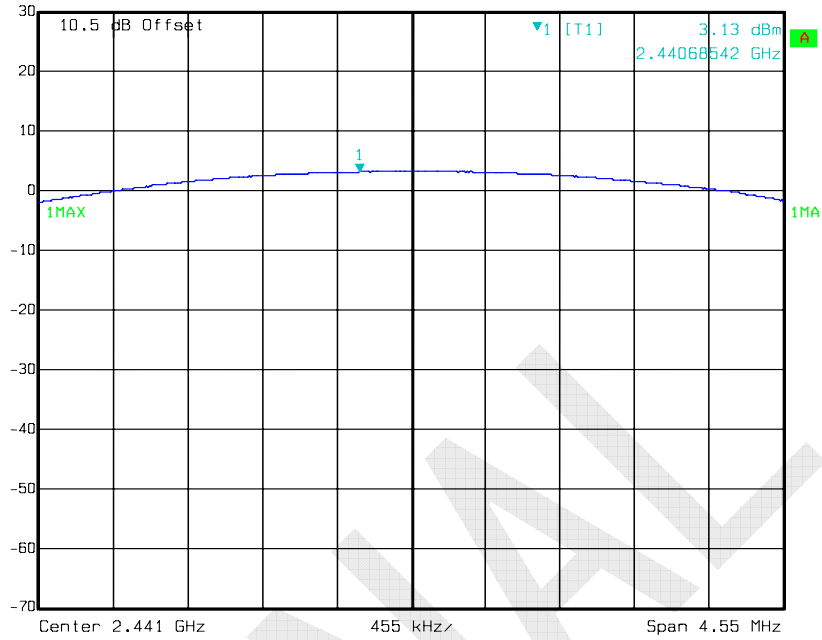
Note: The data above was tested in conducted mode.

BDR Mode (GFSK):



Middle Channel

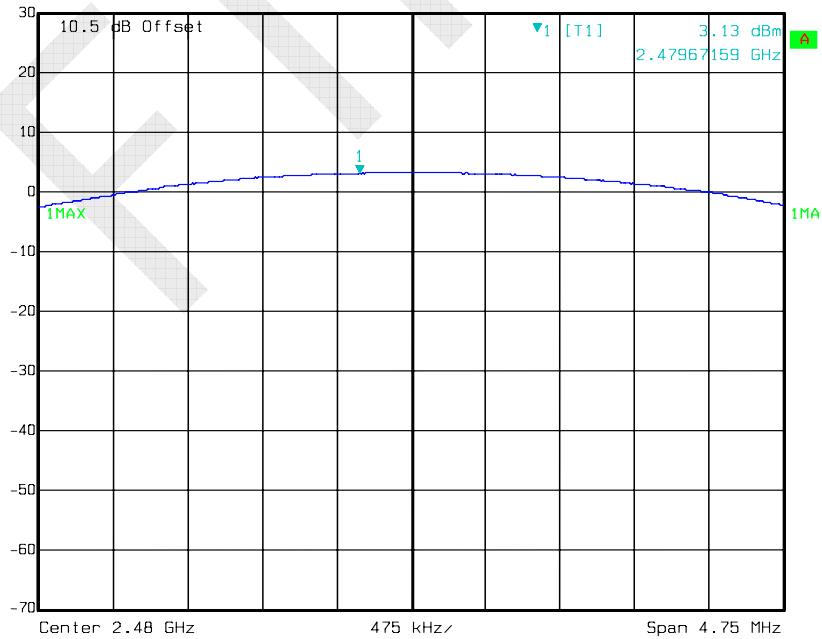
Ref Lvl 30 dBm
Marker 1 [T1] 3.13 dBm
2.44068542 GHz
RBW 3 MHz RF Att 30 dB
VBW 10 MHz
SWT 5 ms Unit dBm



Date: 01.DEC.2017 10:07:19

High Channel

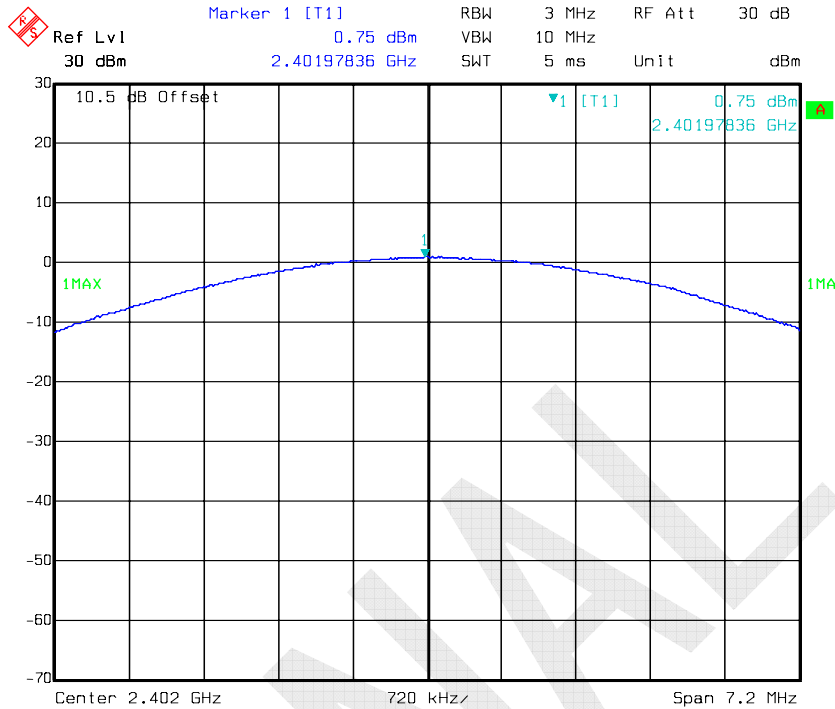
Ref Lvl 30 dBm
Marker 1 [T1] 3.13 dBm
2.47967159 GHz
RBW 3 MHz RF Att 30 dB
VBW 10 MHz
SWT 5 ms Unit dBm



Date: 01.DEC.2017 10:09:17

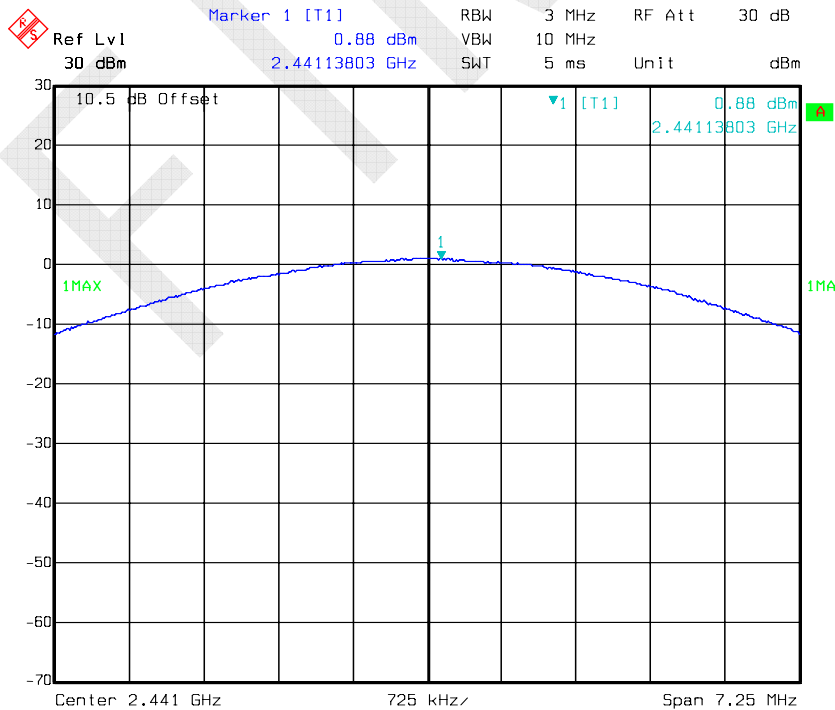
EDR Mode ($\pi/4$ -DQPSK):

Low Channel



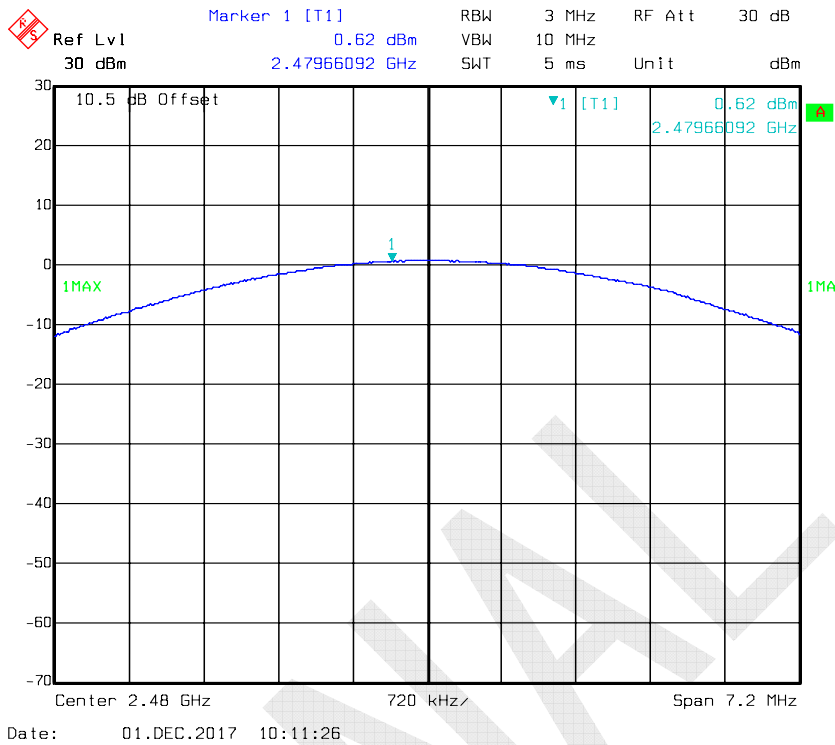
Date: 01.DEC.2017 10:17:41

Middle Channel



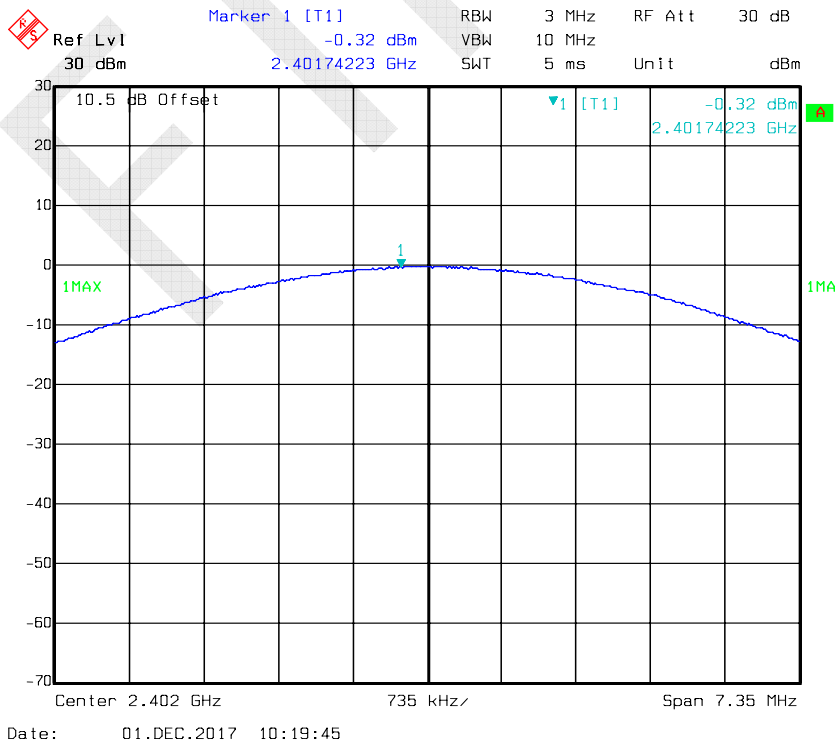
Date: 01.DEC.2017 10:13:43

High Channel



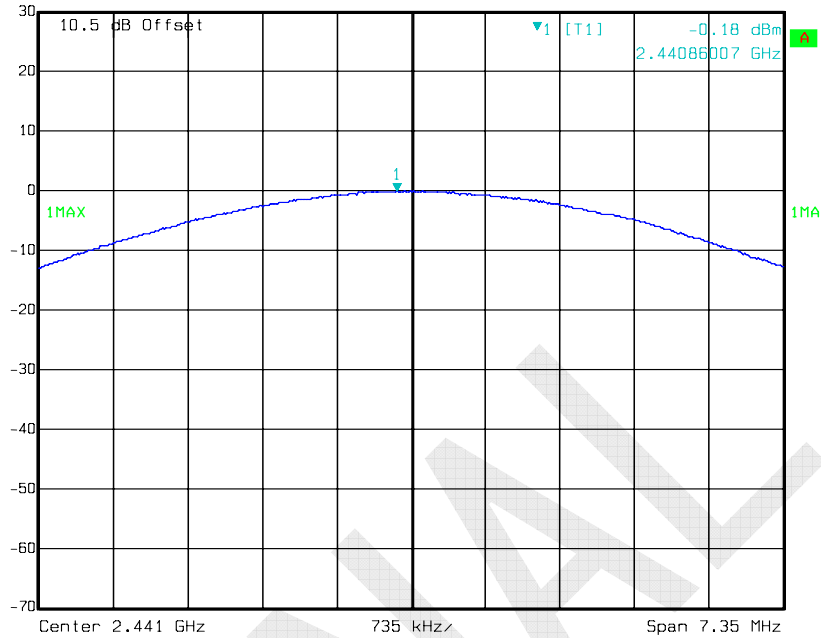
EDR Mode (8-DPSK):

Low Channel



Middle Channel

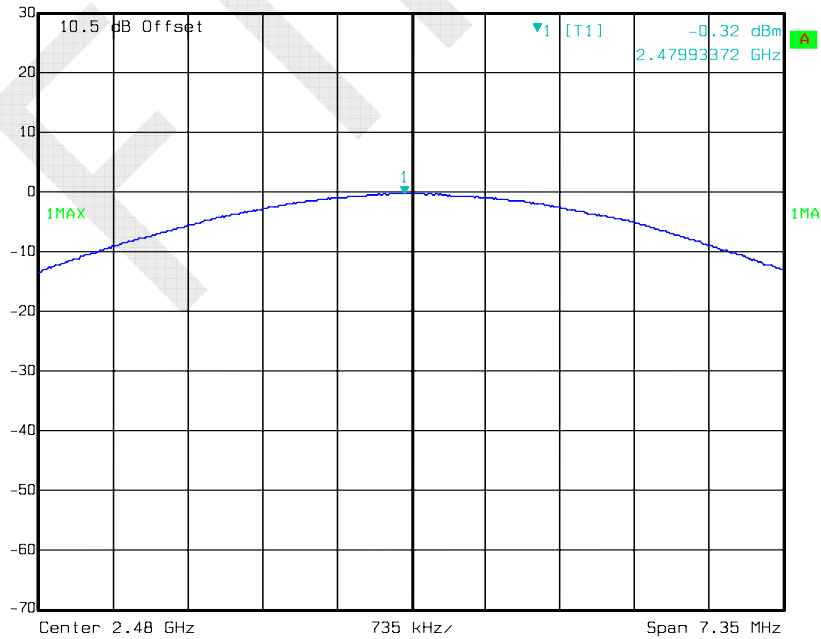
Ref Lvl 30 dBm
Marker 1 [T1] -0.18 dBm
2.44086007 GHz
RBW 3 MHz RF Att 30 dB
VBW 10 MHz
SWT 5 ms Unit dBm



Date: 01.DEC.2017 10:22:07

High Channel

Ref Lvl 30 dBm
Marker 1 [T1] -0.32 dBm
2.47993372 GHz
RBW 3 MHz RF Att 30 dB
VBW 10 MHz
SWT 5 ms Unit dBm



Date: 01.DEC.2017 10:23:47

FCC §15.247(d) - BAND EDGES TESTING

Applicable Standard

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 §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to a EMI test receiver, then turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW=100 kHz; VBW=300 kHz.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

Test Data

Environmental Conditions

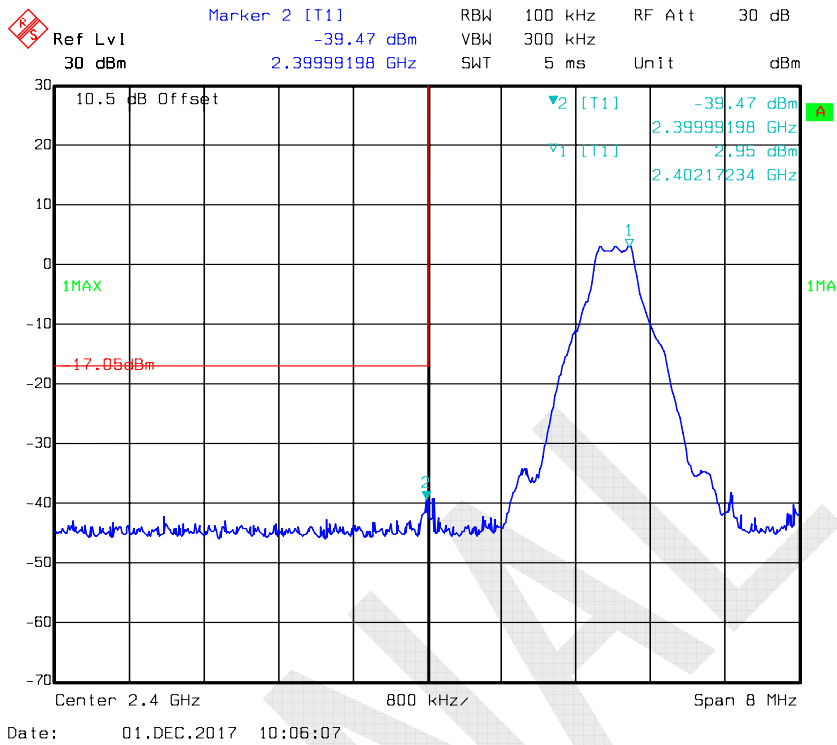
| | |
|--------------------|----------|
| Temperature: | 18 °C |
| Relative Humidity: | 54 % |
| ATM Pressure: | 96.8 kPa |

* The testing was performed by Tom Tang on 2017-12-01.

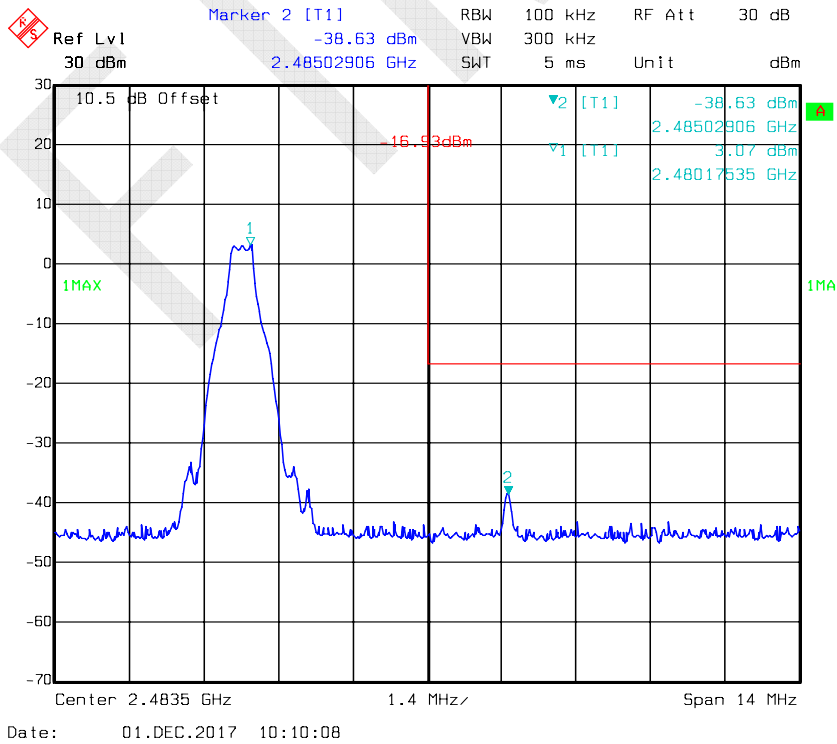
Test Result: Compliance. Please refer to the below plots:

BDR Mode (GFSK):

Band Edge, Left Side

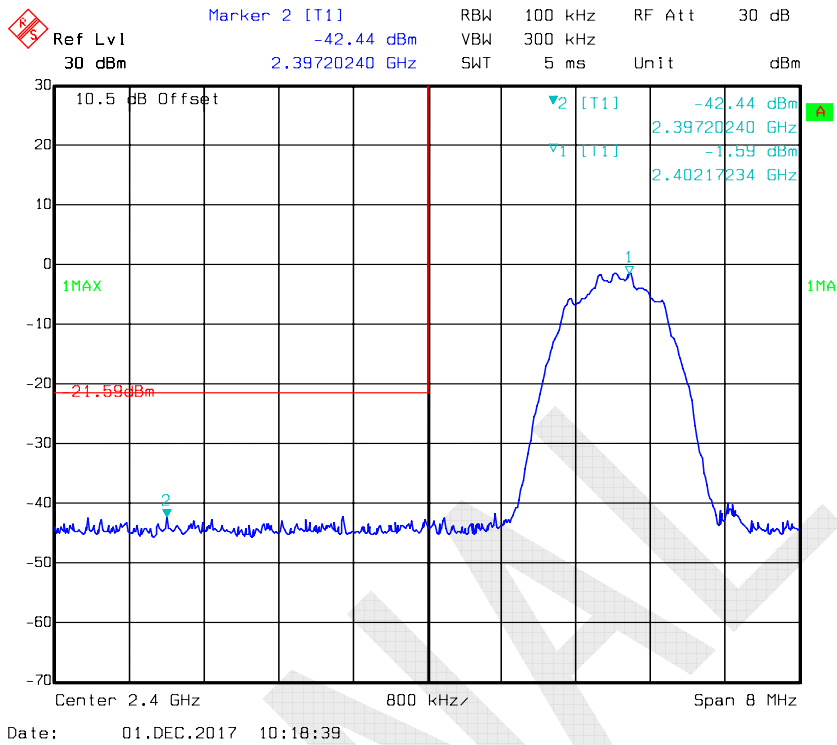


Band Edge, Right Side

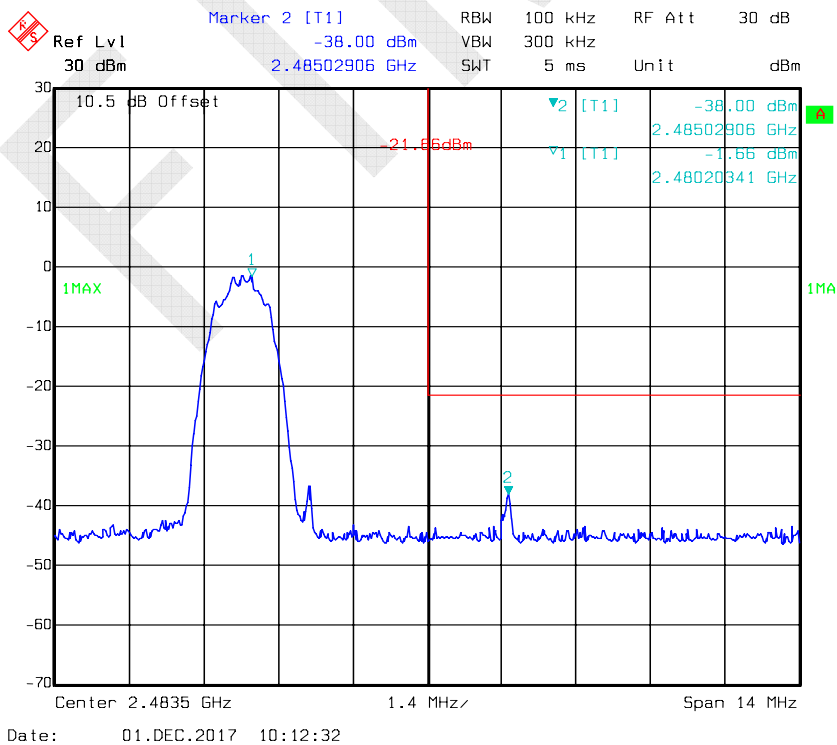


EDR Mode ($\pi/4$ -DQPSK):

Band Edge, Left Side

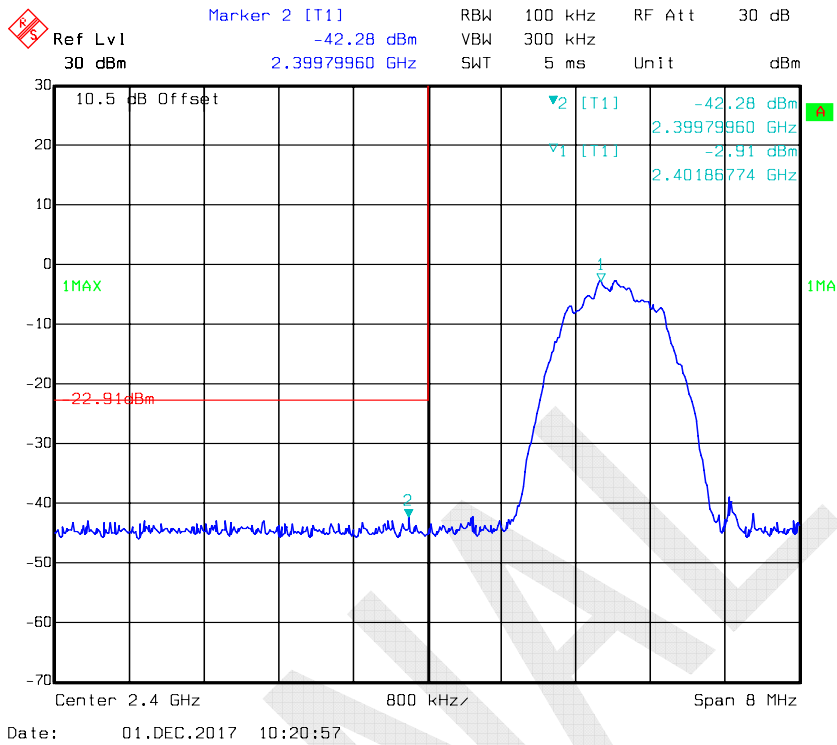


Band Edge, Right Side

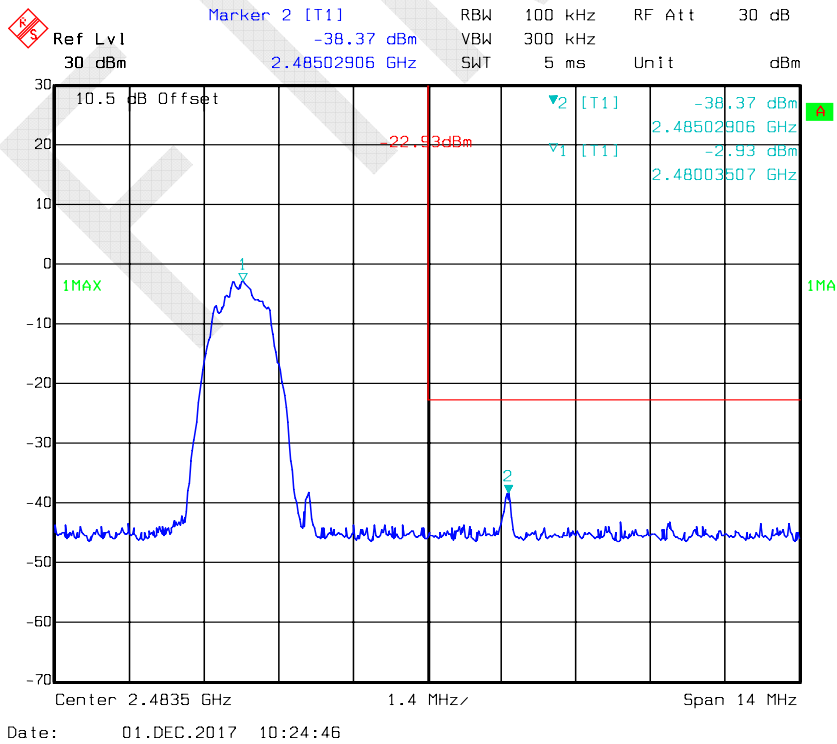


EDR Mode (8-DPSK):

Band Edge, Left Side



Band Edge, Right Side



****END OF REPORT****