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# Test report

## FCC-15.247 and RSS-247 BT FHSS Arris XG1v4 #324689

Date of issue: May 1, 2017

Applicant: ARRIS GROUP INC

Product: 4K Set Top Box

| Model | Variants |
|---|---|
| AX014ANM | AX014ANC |

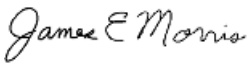
FCC ID: ACQ-XG1V4 IC Registration number: 109AS- XG1V4

Specifications:

- FCC 47 CFR Part 15 Subpart C, §15.247
  Operation in the 902–928 MHz, 2400–2483.5 MHz, 5725–5850 MHz
- RSS-247, Issue 1, May 2015
  Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

Test location

| | |
|---|---|
| Company name | Nemko USA, Inc. |
| Address | 2210 Faraday Ave, Suite 150 |
| City | Carlsbad |
| Province | California |
| Postal code | 92008 |
| Country | USA |
| Telephone | +1 760 444 3500 |
| Website | www.nemko.com |
| Site number | FCC: US5058; IC: 2040B |

| | |
|---|---|
| Tested by | Feng You, Sr. Wireless Engineer |
| Reviewed by | James Morris |
| Review date | May 1, 2017 |
| Reviewer signature |  |

Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.
This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contain in this report are within Nemko USA's ISO/IEC 17025 accreditation.

Copyright notification

# Table of contents

# **Section 1.** Report summary

## 1.1 Applicant and manufacturer

| | |
|---|---|
| Company name | ARRIS GROUP INC |
| Address | 6450 Sequence Drive |
| City | San Diego |
| Province/State | CA |
| Postal/Zip code | 92121 |
| Country | U.S.A. |

## 1.2 Test specifications

| | |
|---|---|
| FCC 47 CFR Part 15, Subpart C, Clause 15.247 | Operation in the 902–928 MHz, 2400–2483.5 MHz, 5725–5850 MHz |
| RSS-247, Issue 1 | Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices |

## 1.3 Test methods

| | |
|---|---|
| ANSI C64.3-2014 | 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 |

## 1.4 Statement of compliance

In the configuration tested, the EUT was found compliant.

Testing was completed against all relevant requirements of the test standard. Results obtained indicate that the product under test complies in full with the requirements tested. The test results relate only to the items tested.

See “Summary of test results” for full details.

## 1.5 Exclusions

None

## 1.6 Test report revision history

| Revision # | Details of changes made to test report |
|---|---|
| 1 | Original report issued |
| 2 | Updated based on reviewer comment. |

# **Section 2.** Summary of test results

## 2.1 FCC Part 15 Subpart C, general requirements test results

| Part | Test description | Verdict |
|---|---|---|
| §15.207(a) | Conducted limits | Pass |
| §15.31(e) | Variation of power source | Pass |
| §15.203 | Antenna requirement | Pass[1] |
| §15.205 | Restricted bands of operation | Pass |

Notes: [1] The EUT uses trace antennas on PCB.

## 2.2 FCC Part 15 Subpart C, intentional radiators test results

| Part | Test description | Verdict |
|---|---|---|
| §15.247(a)(1) | 20 dB bandwidth of the hopping channel | Pass |
| §15.247(a)(1)(i) | Frequency hopping systems operating in the 902–928 MHz band | Not applicable |
| §15.247(a)(1)(ii) | Frequency hopping systems operating in the 5725–5850 MHz band | Not applicable |
| §15.247(a)(1)(iii) | Frequency hopping systems operating in the 2400–2483.5 MHz band | Pass |
| §15.247(a)(2) | Minimum 6 dB bandwidth for systems using digital modulation techniques | Not applicable |
| §15.247(b)(1) | Maximum peak output power of frequency hopping systems operating in the 2400–2483.5 MHz band and 5725–5850 MHz band | Pass |
| §15.247(b)(2) | Maximum peak output power of Frequency hopping systems operating in the 902–928 MHz band | Not applicable |
| §15.247(b)(3) | Maximum peak output power of systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands | Not applicable |
| §15.247(c)(1) | Fixed point-to-point operation with directional antenna gains greater than 6 dBi | Not applicable |
| §15.247(c)(2) | Transmitters operating in the 2400–2483.5 MHz band that emit multiple directional beams | Not applicable |
| §15.247(d) | Spurious emissions | Pass |
| §15.247(e) | Power spectral density for digitally modulated devices | Not applicable |
| §15.247(f) | Time of occupancy for hybrid systems | Not applicable |

## 2.3 IC RSS-GEN, Issue 4, test results

| Part | Test description | Verdict |
|---|---|---|
| 7.1.2 | Receiver radiated emission limits | Not applicable |
| 7.1.3 | Receiver conducted emission limits | Not applicable |
| 8.8 | Power Line Conducted Emissions Limits for Licence-Exempt Radio Apparatus | Pass |
| 8.10 | Restricted Frequency Bands | Pass |

Notes: [1] According to sections 5.2 and 5.3 of RSS-Gen, Issue 4 the EUT does not have a stand-alone receiver neither scanner receiver, therefore exempt from receiver requirements.

## 2.4 IC RSS-247, Issue 1, test results

| Part | Test description | Verdict |
|---|---|---|
| 5.1 | Frequency hopping systems (FHSs) | |
| 5.1 (1) | Bandwidth of a frequency hopping channel | Pass |
| 5.1 (2) | Minimum channel spacing for frequency hopping systems | Pass |
| 5.1 (3) | Frequency hopping systems operating in the 902–928 MHz band | Not applicable |
| 5.1 (4) | Frequency hopping systems operating in the 2400–2483.5 MHz band | Pass |
| 5.1 (5) | Frequency hopping systems operating in the 5725–5850 MHz band | Not applicable |
| 5.2 | Digital modulation systems | |
| 5.2 (1) | Minimum 6 dB bandwidth | Not applicable |
| 5.2 (2) | Maximum power spectral density | Not applicable |
| 5.3 | Hybrid systems | |
| 5.3 (1) | Digital modulation turned off | Not applicable |
| 5.3 (2) | Frequency hopping turned off | Not applicable |
| 5.4 | Transmitter output power and e.i.r.p. requirements | |
| 5.4 (1) | Frequency hopping systems operating in the 902–928 MHz band | Not applicable |
| 5.4 (2) | Frequency hopping systems operating in the 2400–2483.5 MHz band | Pass |
| 5.4 (3) | Frequency hopping systems operating in the 5725–5850 MHz | Not applicable |
| 5.4 (4) | Systems employing digital modulation techniques | Not applicable |
| 5.4 (5) | Point-to-point systems in 2400–2483.5 MHz and 5725–5850 MHz band | Not applicable |
| 5.4 (6) | Transmitters which operate in the 2400–2483.5 MHz band with multiple directional beams | Not applicable |
| 5.5 | Unwanted Emissions | Pass |

# **Section 3.** Equipment under test (EUT) details

## 3.1 Sample information

| | |
|---|---|
| Receipt date | February 6, 2017 |
| Nemko sample ID number | 323916-1, 323916-2 |

## 3.2 EUT information

| | |
|---|---|
| Product name | 4K Set Top Box |
| Model | AX014ANM |
| Model variant | AX014ANC |
| Serial number | M11653TC8995 |
| FCC ID | ACQ-XG1V4 |
| IC Registration Number | 109AS-XG1V4 |

## 3.3 Technical information

| | |
|---|---|
| Applicant IC company number | 109AS |
| IC UPN number | XG1V4 |
| All used IC test site(s) Reg. number | 2040B |
| RSS number and Issue number | RSS-247, Issue 1, May 2015 |
| Frequency band | 2400-2483.5 MHz |
| Frequency Min (MHz) | 2402 |
| Frequency Max (MHz) | 2480 |
| RF power Min (W), Conducted/ERP/EIRP | N/A |
| RF power Max (W), Conducted/ERP/EIRP | 0.0111 (Conducted) |
| Field strength, Units @ distance | N/A |
| Measured BW (kHz) (20 dB) | 1380 |
| Calculated BW (kHz), as per TRC-43 | N/A |
| Type of modulation | GFSK, QPSK, 8PSK |
| Emission classification (F1D, G1D, D1D) | W7D |
| Transmitter spurious, Units @ distance | 53.86 dBµV/m @ 3m Peak / 42.79 dBµV/m @ 3m AVG |
| Power requirements | External 12V DC Power Supply, AC power 100-120V 50-60Hz |
| Antenna information | trace antennas on PCB. Antenna gain is 3dBi.<br>The EUT uses a unique antenna coupling/ non-detachable antenna to the intentional radiator. |

## 3.4 Product description and theory of operation

The Arris XG1v4 is an IP Video Gateway (next-gen, set-top technology) with 4K video capability. It is a 4K set-top with multiple 1 GHz tuners that support both MPEG-2 and MPEG-4 AVC services. The all-digital XG1v4 includes the latest audio and video output interfaces, including 4K HDMI video, Award-winning Dolby Digital Plus audio and Dolby Volume Leveling. With the included MoCA home networking, the XG1v4 provides the flexibility to serve as a multimedia client for accessing content from other compatible devices at home. An embedded DOCSIS 2.0+ cable modem provides support for DSG and downstream channel bonding.

Model variant is identical in RF circuits; only different part is in cable TV function.

There are 2 radio interfaces: 1) RF4CE (2.4GHz DSSS); 2) BT BDR+EDR (2.4GHz FHSS) and BLE (2.4GHz DTS).

There is one trace antennas on PCB for BT and BLE.

## 3.5 EUT exercise details

A test software was used that allows the change of different RF modes/channels. EUT is set to fixed channel test mode with modulation.

RF conducted test was performed on unit with temporary RF output modification (50Ω SMA before antennas).

## 3.6 EUT setup diagram

*Setup Photo in separate exhibit*

***Figure 3.6-1:*** *Radiated Emissions Test Setup – below 1GHz*

*Setup Photo in separate exhibit*

***Figure 3.6-2:*** *Radiated Emissions Test Setup – above 1GHz*

*Setup Photo in separate exhibit*

***Figure 3.6-3:*** *AC Powerline Conducted Emissions Setup*

## 3.7 EUT sub assemblies

***Table 3.7-1:*** *EUT sub assemblies*

| Description | Brand name | Model/Part number | Serial number |
|---|---|---|---|
| EUT – Radiated Unit | Arris | AX014ANM | M11653TC8995 |
| EUT – RF Conducted Unit | Arris | AX014ANM | M11663TC9145 |
| AC Power Supply | AcBel | ADE0333 | AE33C69G6XXCA |
| AC Power Supply | Delta | ADP-36KR A | HZXD6ABTXUE |

# **Section 4.** Engineering considerations

## 4.1 Modifications incorporated in the EUT

There were no modifications performed to the EUT during this assessment.

## 4.2 Technical judgment

None.

## 4.3 Deviations from laboratory tests procedures

No deviations were made from laboratory procedures.

# **Section 5.** Test conditions

## 5.1 Atmospheric conditions

| | |
|---|---|
| Temperature | 15–30 °C |
| Relative humidity | 20–75 % |
| Air pressure | 860–1060 mbar |

When it is impracticable to carry out tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests shall be recorded and stated.

## 5.2 Power supply range

The normal test voltage for equipment to be connected to the mains shall be the nominal mains voltage. For the purpose of the present document, the nominal voltage shall be the declared voltage, or any of the declared voltages ±5 %, for which the equipment was designed.
120VAC 60Hz

# **Section 6.** Measurement uncertainty

## 6.1 Uncertainty of measurement

Measurement uncertainty budgets for the tests are detailed below. Measurement uncertainty calculations assume a coverage factor of K = 2 with 95% certainty.

| Test name | Measurement uncertainty, dB |
|---|---|
| All antenna port measurements | 0.55 |
| Conducted spurious emissions | 1.13 |
| Radiated spurious emissions | 3.78 |
| AC power line conducted emissions | 3.55 |

# **Section 7.** Test equipment

## 7.1 Test equipment list

***Table 7.1-1:*** *Equipment list*

| Asset Tag | Description | Manufacturer | Model | Serial # | Next Cal |
|---|---|---|---|---|---|
| 811 | Multimeter | Fluke | 111 | 78130057 | 8-Jul-17 |
| 1033 | Antenna, Horn | EMCO | 3115 | 8812-3035 | 27-Jul-17 |
| E1019 | Two Line V-Network | Rohde & Schwarz | ENV216 | 101045 | 15-Jun-2017 |
| E1035 | Variac (Variable Transformer) 3KVA | Shanghai China | TDGC | N/A | VOU |
| 1480 | Antenna, Bilog | Schaffner-Chase | CBL6111C | 2572 | 21-Jul-2017 |
| E1120 | Signal and Spectrum Analyzer | Rohde & Schwarz | FSV40 | 101395 | 25-May-2017 |
| E1121 | EMI Test Receiver | Rohde & Schwarz | ESU 40 | 100064 | 28-Apr-2017 |
| E1026 | EMI Test Receiver 9kHz to 7GHz | Rohde & Schwarz | ESCI 7 | 100800 | 17-Mar-2017 |

Note: NCR - no calibration required, VOU - verify on use

# Section 8. Test Data

## 8.1 FCC 15.247(a) (1) and RSS-247 5.1(1) 20 dB bandwidth of the hopping channel

### 8.1.1 Definitions and limits

**FCC and IC:**

(a) Operation under the provisions of this Section is limited to frequency hopping and digitally modulated intentional radiators that comply with the following provisions:

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

### 8.1.2 Test summary

| | | | |
|---|---|---|---|
| Test date | February 6, 2017 | Temperature | 19 °C |
| Test engineer | Feng You | Air pressure | 1008 mbar |
| Verdict | Pass | Relative humidity | 56 % |

### 8.1.3 Observations, settings and special notes

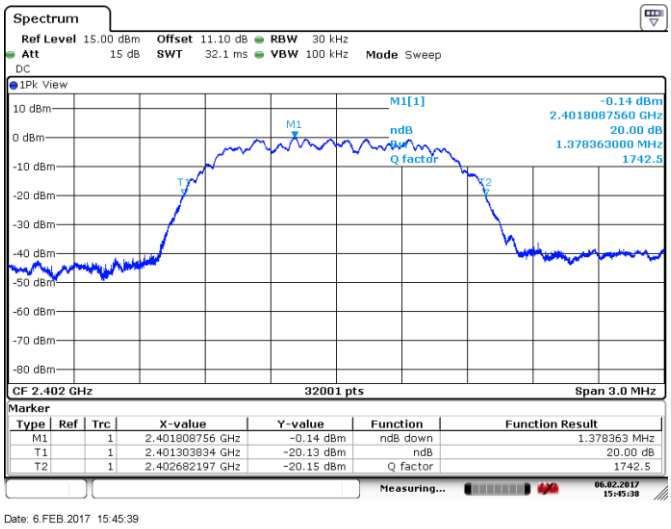
Spectrum analyser settings:

| | |
|---|---|
| Resolution bandwidth | 1–5 % of Channel BW (no wider than 100 kHz) |
| Video bandwidth | ≥3 × RBW |
| Frequency span | 1.5 MHz |
| Detector mode | Peak |
| Trace mode | Max Hold |

### 8.1.4 Test data

***Table 8.1-1:*** *20 dB bandwidth results*

| Modulation | Frequency, MHz | 20 dB bandwidth, MHz | 2/3 of 20 dB bandwidth, MHz | Channel Bandwidth, MHz | Margin, MHz |
|---|---|---|---|---|---|
| GFSK | 2402 | 0.96 | 0.64 | 1 | 0.36 |
| | 2440 | 0.96 | 0.64 | 1 | 0.36 |
| | 2480 | 0.96 | 0.64 | 1 | 0.36 |
| QPSK | 2402 | 1.38 | 0.92 | 1 | 0.08 |
| | 2440 | 1.37 | 0.91 | 1 | 0.09 |
| | 2480 | 1.38 | 0.92 | 1 | 0.08 |
| 8PSK | 2402 | 1.37 | 0.91 | 1 | 0.09 |
| | 2440 | 1.37 | 0.91 | 1 | 0.09 |
| | 2480 | 1.37 | 0.91 | 1 | 0.09 |




Date: 6.FEB.2017 15:45:39

***Figure 8.1-1:*** *20 dB bandwidth, 2402MHz, GFSK*

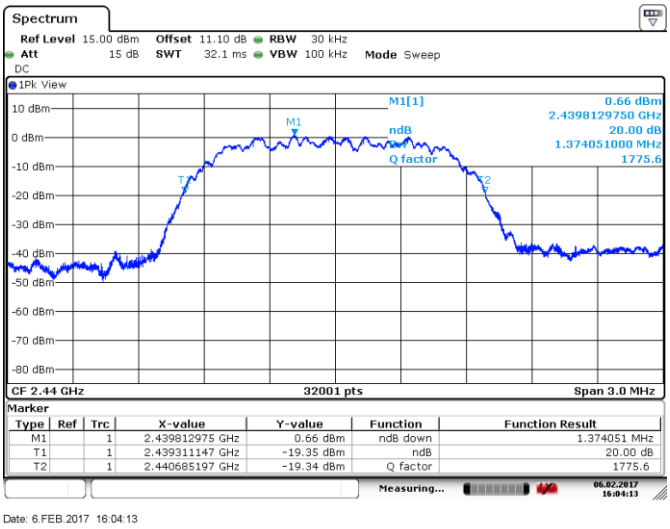



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***Figure 8.1-2:*** *20 dB bandwidth, 2440MHz, GFSK*

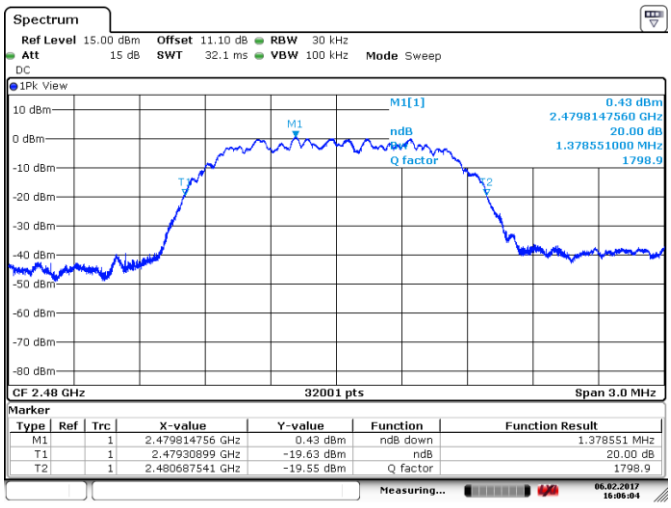


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***Figure 8.1-3:*** *20 dB bandwidth, 2480MHz, GFSK*

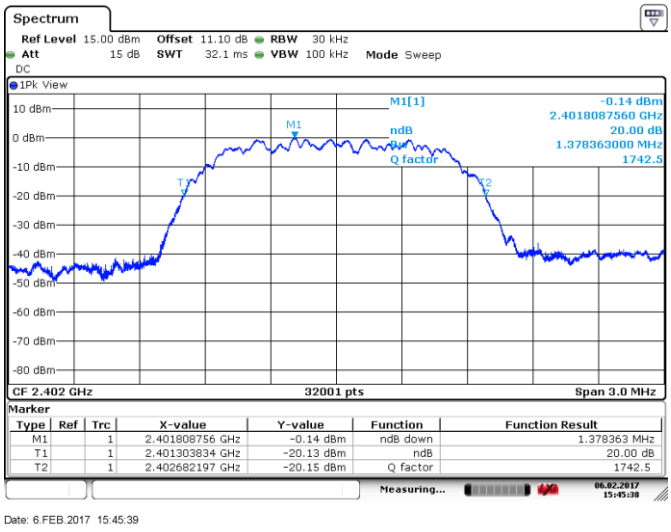



***Figure 8.1-4:*** *20 dB bandwidth, 2402MHz, QPSK*

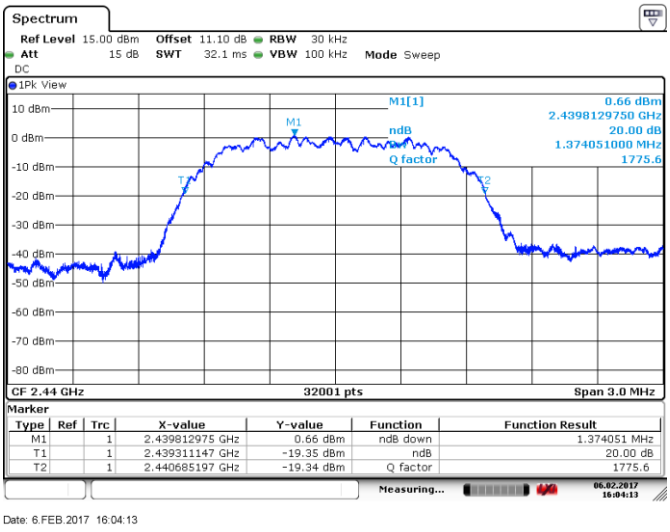



***Figure 8.1-5:*** *20 dB bandwidth, 2440MHz, QPSK*

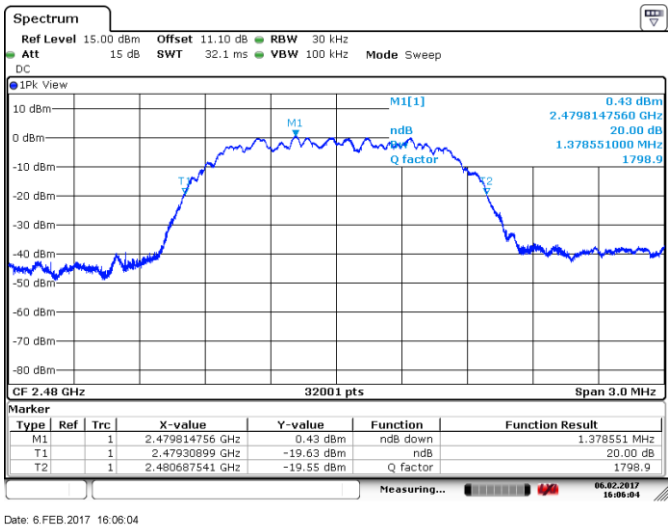



***Figure 8.1-6:*** *20 dB bandwidth, 2480MHz, QPSK*

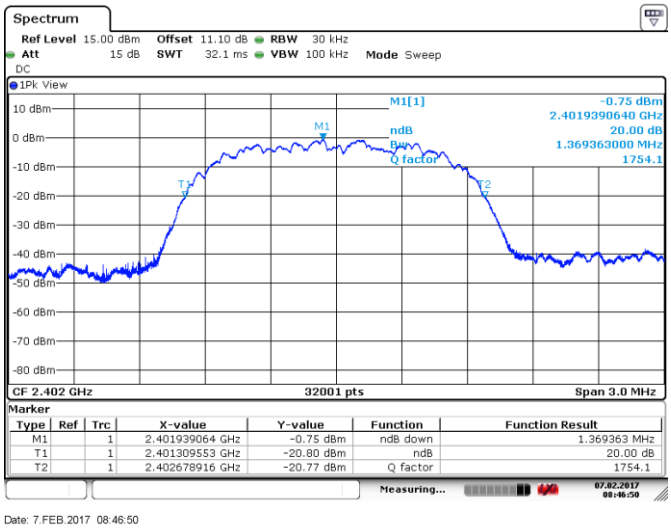



***Figure 8.1-7:*** *20 dB bandwidth, 2402MHz, 8PSK*

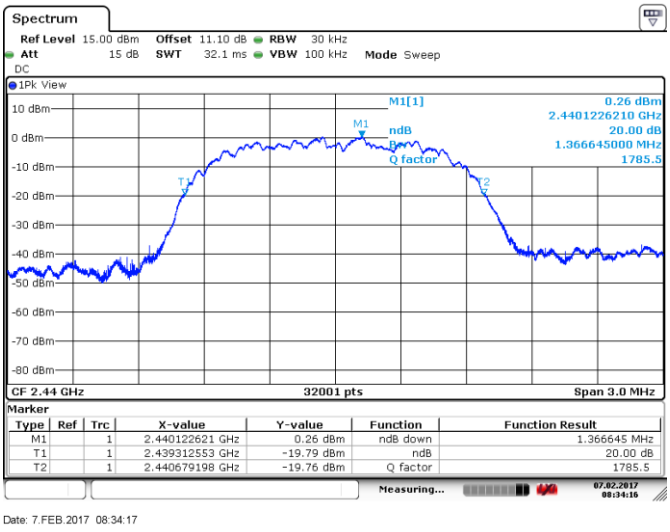



***Figure 8.1-8:*** *20 dB bandwidth, 2440MHz, 8PSK*

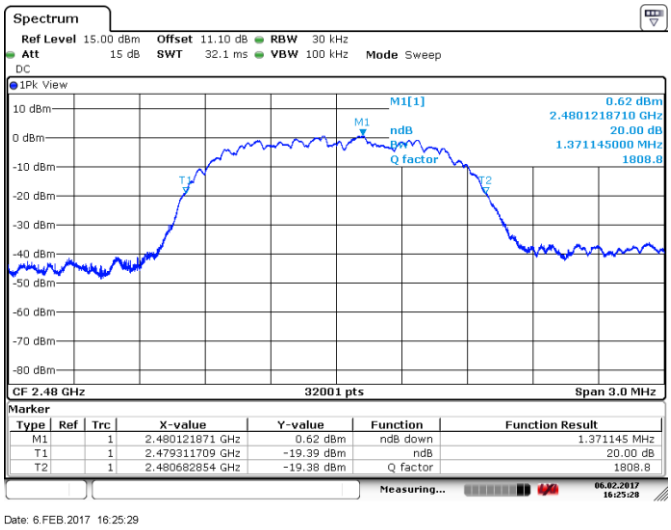



***Figure 8.1-9:*** *20 dB bandwidth, 2480MHz, 8PSK*

## 8.2 FCC 15.247(b) and RSS-247 5.4 (4) Transmitter output power and e.i.r.p. requirements

### 8.2.1 Definitions and limits

**FCC:**

(b) The maximum peak conducted output power of the intentional radiator shall not exceed the following:

(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.

(3) 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.

(i) Systems operating in the 2400–2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

Fixed, point-to-point operation, as used in paragraphs (b)(3)(i) and (b)(3)(ii) of this section, excludes the use of point-to-multipoint systems, omnidirectional applications, and multiple co-located intentional radiators transmitting the same information. The operator of the spread spectrum intentional radiator or, if the equipment is professionally installed, the installer is responsible for ensuring that the system is used exclusively for fixed, point-to-point operations. The instruction manual furnished with the intentional radiator shall contain language in the installation instructions informing the operator and the installer of this responsibility.

(c) Operation with directional antenna gains greater than 6 dBi.

(2) In addition to the provisions in paragraphs (b)(1), (b)(3), (b)(4) and (c)(1)(i) of this section, transmitters operating in the 2400–2483.5 MHz band that emit multiple directional beams, simultaneously or sequentially, for the purpose of directing signals to individual receivers or to groups of receivers provided the emissions comply with the following:

(i) Different information must be transmitted to each receiver.

(ii) If the transmitter employs an antenna system that emits multiple directional beams but does not do emit multiple directional beams simultaneously, the total output power conducted to the array or arrays that comprise the device, i.e., the sum of the power supplied to all antennas, antenna elements, staves, etc. and summed across all carriers or frequency channels, shall not exceed the limit specified in paragraph (b)(1) or (b)(3) of this section, as applicable. However, the total conducted output power shall be reduced by 1 dB below the specified limits for each 3 dB that the directional gain of the antenna/antenna array exceeds 6 dBi. The directional antenna gain shall be computed as follows:

(A) The directional gain shall be calculated as the sum of 10 log (number of array elements or staves) plus the directional gain of the element or stave having the highest gain.

**IC:**

5.4 Transmitter Output Power and Equivalent Isotropically Radiated Power (E.I.R.P.) Requirements

(2) For FHSs operating in the band 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1.0 W and the e.i.r.p. shall not exceed 4 W if the hopset uses 75 or more hopping channels; the maximum peak conducted output power shall not exceed 0.125 W and the e.i.r.p. shall not exceed 0.5 W if the hopset uses less than 75 hopping channels (see Section 5.4(5) for exceptions).

As an alternative to a peak power measurement, compliance can be based on a measurement of the maximum conducted output power. The maximum conducted output power is the total transmit power delivered to all antennas and antenna elements, averaged across all symbols in the signalling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or transmitting at a reduced power level. If multiple modes of operation are implemented, the maximum conducted output power is the highest total transmit power occurring in any mode.

### 8.2.2 Test summary

| | | | |
|---|---|---|---|
| Test date | February 6, 2017 | Temperature | 19 °C |
| Test engineer | Feng You | Air pressure | 1008 mbar |
| Verdict | Pass | Relative humidity | 56 % |

### 8.2.3 Observations, settings and special notes

Peak Conducted Power Measured
Spectrum analyser settings:

| | |
|---|---|
| Resolution bandwidth | ≥ Channel BW (3MHz) |
| Video bandwidth | ≥ 3 × RBW (10MHz) |
| Frequency span | ≥ 3 x RBW (10MHz) |
| Detector mode | Peak |
| Trace mode | Max Hold |

### 8.2.4 Test data

***Table 8.2-1:*** *Output power measurements results - GFSK*

| Power Source | Frequency, MHz | Conducted output power, dBm | | Margin, dB | Max Antenna gain, dBi | EIRP, dBm | EIRP limit, dBm | EIRP margin, dB |
|---|---|---|---|---|---|---|---|---|
| | | Measured | Limit | | | | | |
| 120V AC | 2402 | 9.74 | 21 | 11.26 | 3 | 12.74 | 27 | 14.26 |
| | 2440 | 10.45 | 21 | 10.55 | 3 | 13.45 | 27 | 13.55 |
| | 2480 | 10.26 | 21 | 10.74 | 3 | 13.26 | 27 | 13.74 |
| 85V AC | 2402 | 9.73 | 21 | 11.27 | 3 | 12.73 | 27 | 14.27 |
| | 2440 | 10.43 | 21 | 10.57 | 3 | 13.43 | 27 | 13.57 |
| | 2480 | 10.25 | 21 | 10.75 | 3 | 13.25 | 27 | 13.75 |
| 138V AC | 2402 | 9.73 | 21 | 11.27 | 3 | 12.73 | 27 | 14.27 |
| | 2440 | 10.44 | 21 | 10.56 | 3 | 13.44 | 27 | 13.56 |
| | 2480 | 10.25 | 21 | 10.75 | 3 | 13.25 | 27 | 13.75 |

***Table 8.2-2:*** *Output power measurements results - QPSK*

| Power Source | Frequency, MHz | Conducted output power, dBm | | Margin, dB | Max Antenna gain, dBi | EIRP, dBm | EIRP limit, dBm | EIRP margin, dB |
|---|---|---|---|---|---|---|---|---|
| | | Measured | Limit | | | | | |
| 120V AC | 2402 | 8.55 | 21 | 12.45 | 3 | 11.55 | 27 | 15.45 |
| | 2440 | 9.26 | 21 | 11.74 | 3 | 12.26 | 27 | 14.74 |
| | 2480 | 9.05 | 21 | 11.95 | 3 | 12.05 | 27 | 14.95 |

***Table 8.2-3:*** *Output power measurements results – 8PSK*

| Power Source | Frequency, MHz | Conducted output power, dBm | | Margin, dB | Max Antenna gain, dBi | EIRP, dBm | EIRP limit, dBm | EIRP margin, dB |
|---|---|---|---|---|---|---|---|---|
| | | Measured | Limit | | | | | |
| 120V AC | 2402 | 8.95 | 21 | 12.05 | 3 | 11.95 | 27 | 15.05 |
| | 2440 | 9.63 | 21 | 11.37 | 3 | 12.63 | 27 | 14.37 |
| | 2480 | 9.39 | 21 | 11.61 | 3 | 12.39 | 27 | 14.61 |

## 8.3 FCC 15.247(d) and RSS-247 5.5 Spurious (out-of-band) emissions

### 8.3.1 Definitions and limits

**FCC:**
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)).

**IC:**
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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 that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section 5.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

(a) Fundamental components of modulation of licence-exempt radio apparatus shall not fall within the restricted bands of Table 8.4-1 except for apparatus complying under RSS-287;
(b) Unwanted emissions that fall into restricted bands of Table 6 shall comply with the limits specified in RSS-Gen; and
(c) Unwanted emissions that do not fall within the restricted frequency bands of Table 8.4-1 shall comply either with the limits specified in the applicable RSS or with those specified in this RSS-Gen.

***Table 8.3-1:*** *FCC §15.209 and RSS-Gen – Radiated emission limits*

| Frequency, MHz | Field strength of emissions µV/m | Field strength of emissions dBµV/m | Measurement distance, m |
|---|---|---|---|
| 0.009–0.490 | 2400/F | $67.6 - 20 \times \log_{10}(F)$ | 300 |
| 0.490–1.705 | 24000/F | $87.6 - 20 \times \log_{10}(F)$ | 30 |
| 1.705–30.0 | 30 | 29.5 | 30 |
| 30–88 | 100 | 40.0 | 3 |
| 88–216 | 150 | 43.5 | 3 |
| 216–960 | 200 | 46.0 | 3 |
| above 960 | 500 | 54.0 | 3 |

Notes: In the emission table above, the tighter limit applies at the band edges.
For frequencies above 1 GHz the limit on peak RF emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test

***Table 8.3-2:*** *IC restricted frequency bands*

| MHz | MHz | MHz | GHz |
|---|---|---|---|
| 0.090–0.110 | 12.51975–12.52025 | 399.9–410 | 5.35–5.46 |
| 2.1735–2.1905 | 12.57675–12.57725 | 608–614 | 7.25–7.75 |
| 3.020–3.026 | 13.36–13.41 | 960–1427 | 8.025–8.5 |
| 4.125–4.128 | 16.42–16.423 | 1435–1626.5 | 9.0–9.2 |
| 4.17725–4.17775 | 16.69475–16.69525 | 1645.5–1646.5 | 9.3–9.5 |
| 4.20725–4.20775 | 16.80425–16.80475 | 1660–1710 | 10.6–12.7 |
| 5.677-5.683 | 25.5–25.67 | 1718.8–1722.2 | 13.25–13.4 |
| 6.215–6.218 | 37.5–38.25 | 2200–2300 | 14.47–14.5 |
| 6.26775–6.26825 | 73–74.6 | 2310–2390 | 15.35–16.2 |
| 6.31175–6.31225 | 74.8–75.2 | 2655–2900 | 17.7–21.4 |
| 8.291–8.294 | 108–138 | 3260–3267 | 22.01–23.12 |
| 8.362–8.366 | 156.52475–156.52525 | 3332–3339 | 23.6–24.0 |
| 8.37625–8.38675 | 156.7–156.9 | 3345.8–3358 | 31.2–31.8 |
| 8.41425–8.41475 | 240–285 | 3500–4400 | 36.43–36.5 |
| 12.29–12.293 | 322–335.4 | 4500–5150 | Above 38.6 |

Note: Certain frequency bands listed in Table 8.3-2 and above 38.6 GHz are designated for low-power licence-exempt applications. These frequency bands and the requirements that apply to the devices are set out in this Standard

***Table 8.3-3:*** *FCC restricted frequency bands*

| MHz | MHz | MHz | GHz |
|---|---|---|---|
| 0.090–0.110 | 16.42–16.423 | 399.9–410 | 4.5–5.15 |
| 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 | 2690–2900 | 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 | Above 38.6 |
| 13.36–13.41 | | | |

## 8.3.2 Test summary

| | | | |
|---|---|---|---|
| Test date | February 16, 2017 | Temperature | 22 °C |
| Test engineer | Feng You | Air pressure | 1004 mbar |
| Verdict | Pass | Relative humidity | 53 % |

## 8.3.3 Observations, settings and special notes

The spectrum was searched from 30 MHz to the 10th harmonic.
EUT was set to transmit with 100 % duty cycle.
GFSK was selected for radiated test cases as worst case.

Spectrum analyser settings for conducted spurious emissions measurements:

| | |
|---|---|
| Resolution bandwidth: | 100 kHz |
| Video bandwidth: | 300 kHz |
| Detector mode: | Peak |
| Trace mode: | Max Hold |

Spectrum analyser settings for radiated measurements within restricted bands below 1 GHz:

| | |
|---|---|
| Resolution bandwidth: | 100 kHz |
| Video bandwidth: | 300 kHz |
| Detector mode: | Peak |
| Trace mode: | Max Hold |

Spectrum analyser settings for peak radiated measurements within restricted bands above 1 GHz:

| | |
|---|---|
| Resolution bandwidth: | 1 MHz |
| Video bandwidth: | 3 MHz |
| Detector mode: | Peak |
| Trace mode: | Max Hold |

Spectrum analyser settings for average radiated measurements within restricted bands above 1 GHz:

| | |
|---|---|
| Resolution bandwidth: | 1 MHz |
| Video bandwidth: | 3 MHz |
| Detector mode: | AVG |
| Trace mode: | Max Hold |

## 8.3.4 Test data

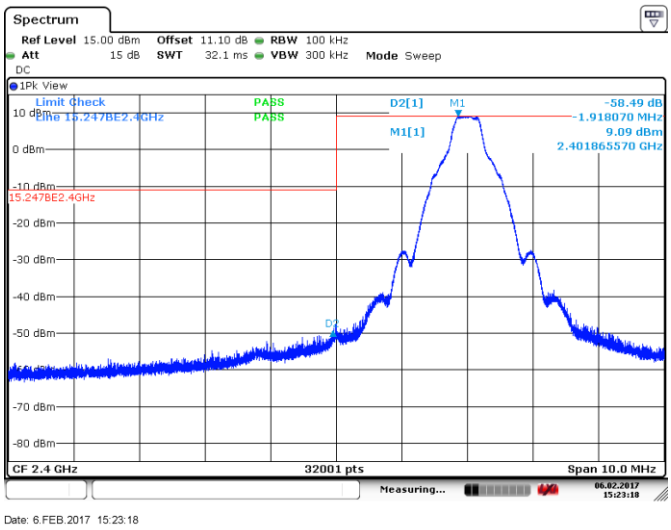



***Figure 8.3.1:*** *Bandedge Measurement, GFSK low channel*

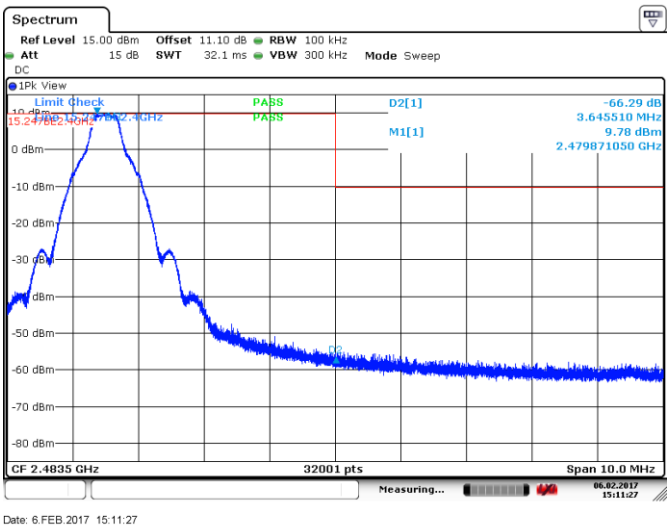



***Figure 8.3.2:*** *Bandedge Measurement, GFSK high channel*

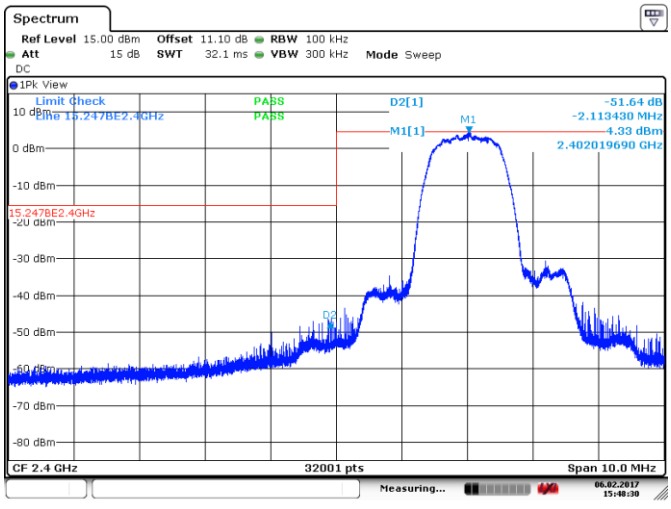



***Figure 8.3.3:*** *Bandedge Measurement, QPSK low channel*

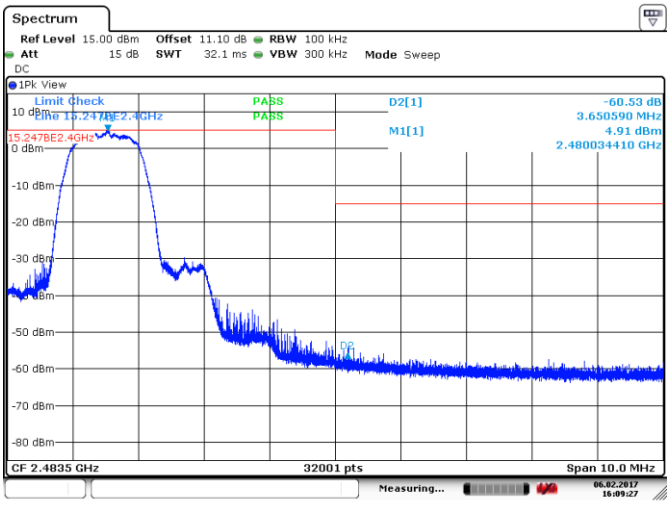
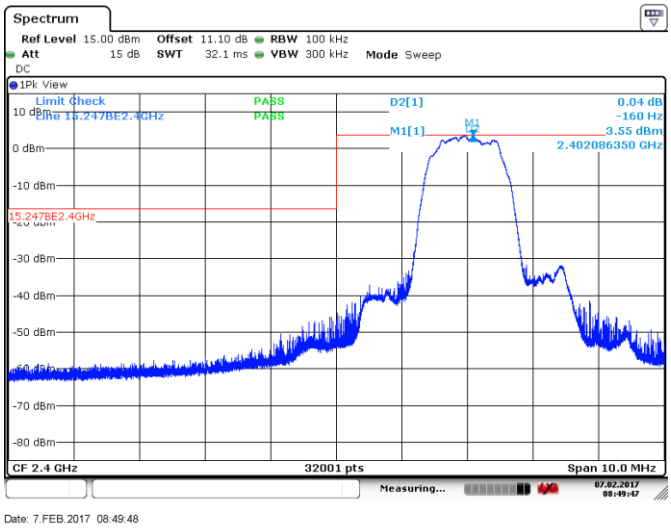
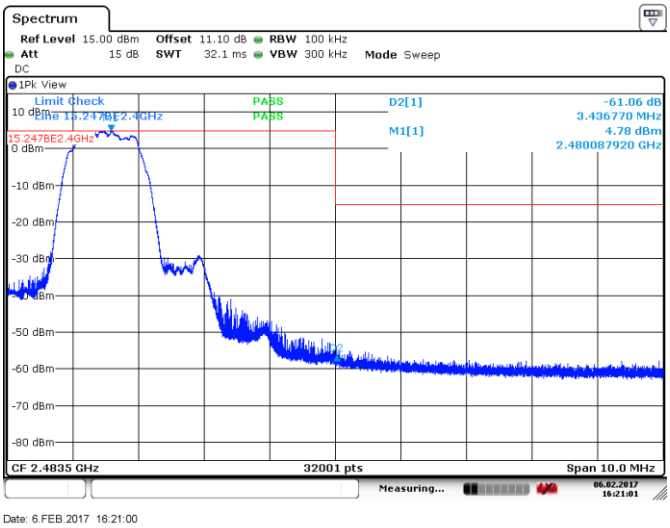



***Figure 8.3.4:*** *Bandedge Measurement, QPSK high channel*



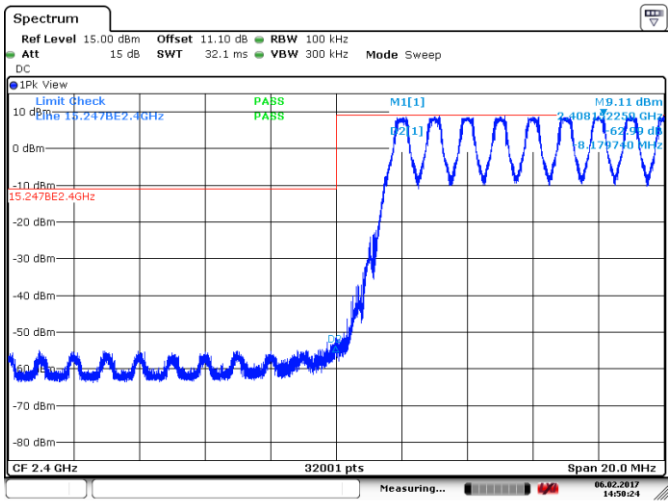

Date: 7.FEB.2017 08:49:48

***Figure 8.3.5:*** *Bandedge Measurement, 8PSK low channel*



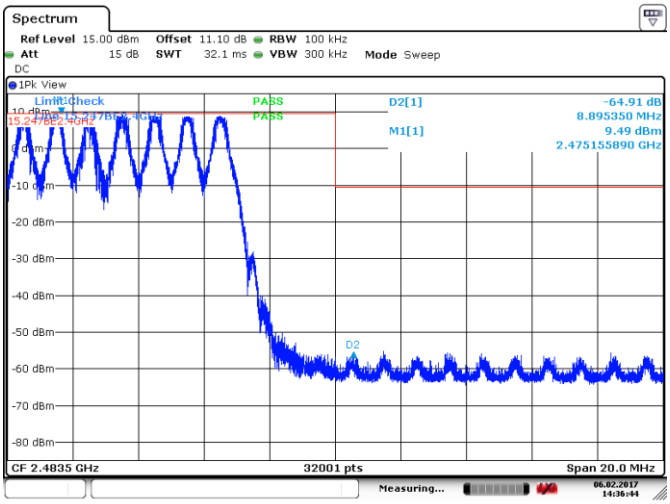

Date: 6.FEB.2017 16:21:00

***Figure 8.3.6:*** *Bandedge Measurement, 8PSK high channel*




Date: 6.FEB.2017 14:50:24

***Figure 8.3.7:*** *Low Bandedge Measurement, BT BDR Hopping*




Date: 6.FEB.2017 14:36:44

***Figure 8.3.8:*** *High Bandedge Measurement, BT BDR Hopping*

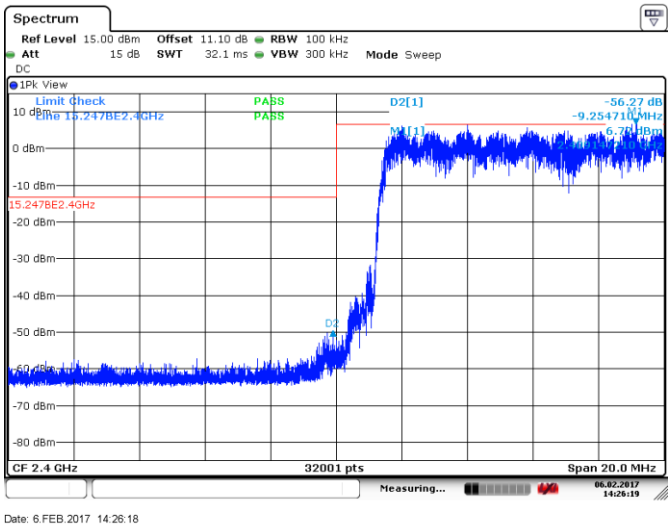



***Figure 8.3.9:*** *Low Bandedge Measurement, BT EDR Hopping*

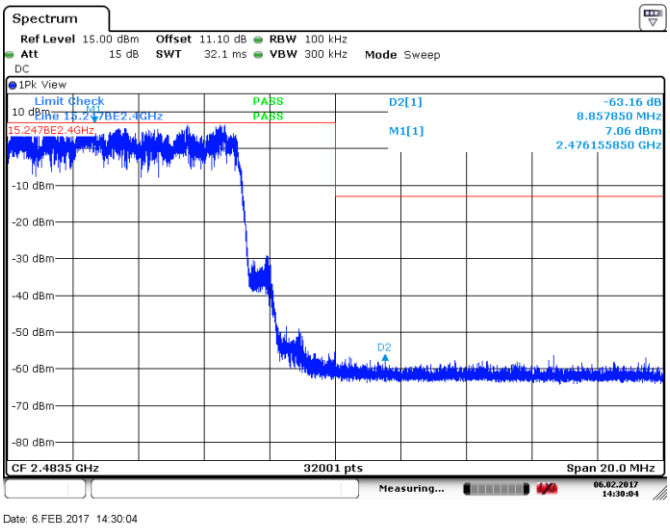



***Figure 8.3.10:*** *High Bandedge Measurement, BT EDR Hopping*

Table 8.3-4: *Reference PSD in 100kHz BW*

| Modulation | Frequency, MHz | PSD dBm/100kHz |
|---|---|---|
| GFSK | 2402 | 9.11 |
| | 2440 | 9.99 |
| | 2480 | 9.8 |
| QPSK | 2402 | 4.55 |
| | 2440 | 5.19 |
| | 2480 | 4.99 |
| 8PSK | 2402 | 3.6 |
| | 2440 | 4.41 |
| | 2480 | 4.83 |

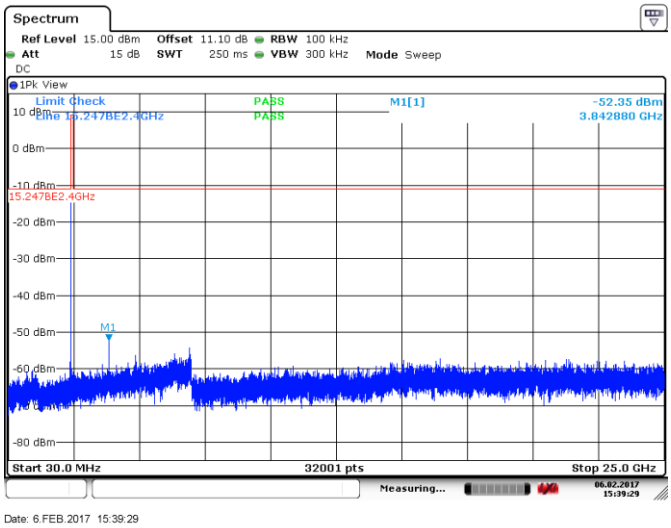



***Figure 8.3.11:*** *Conducted spurious emissions, GFSK low channel*

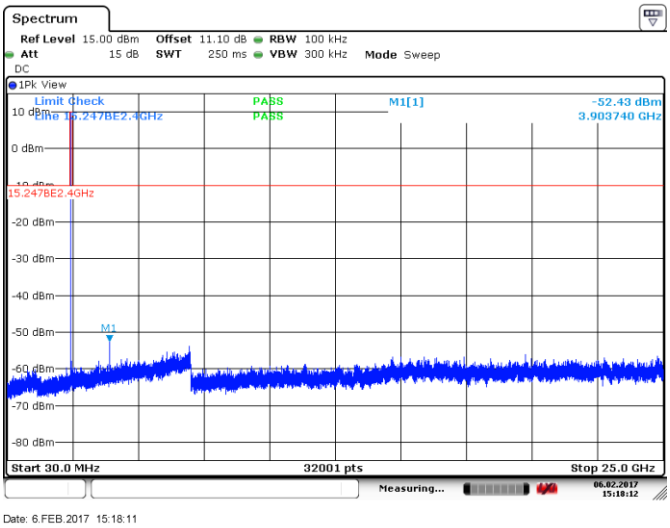



***Figure 8.3.12:*** *Conducted spurious emissions, GFSK mid channel*

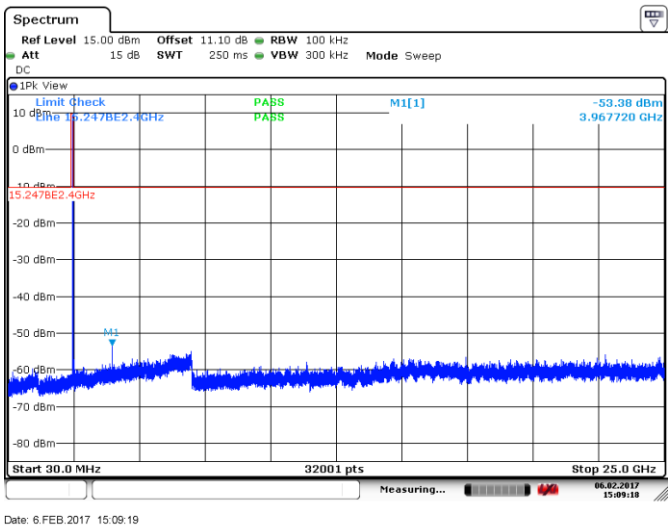



***Figure 8.3.13:*** *Conducted spurious emissions, GFSK high channel*

Peaks within 2400-2483.5MHz are transmitter fundamentals.

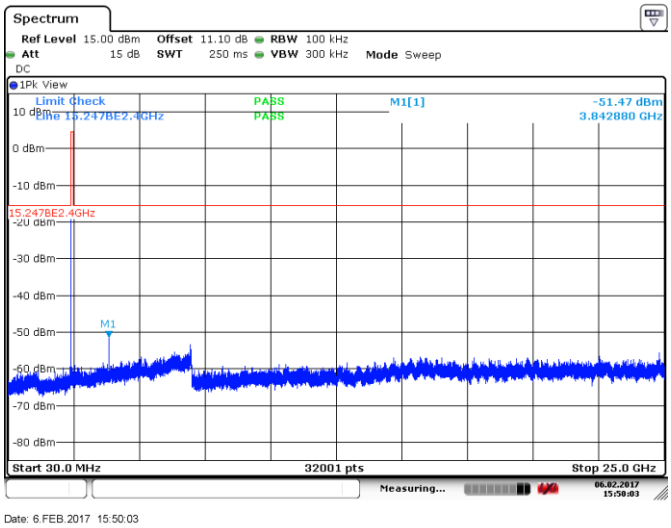



***Figure 8.3.14:*** *Conducted spurious emissions, QPSK low channel*

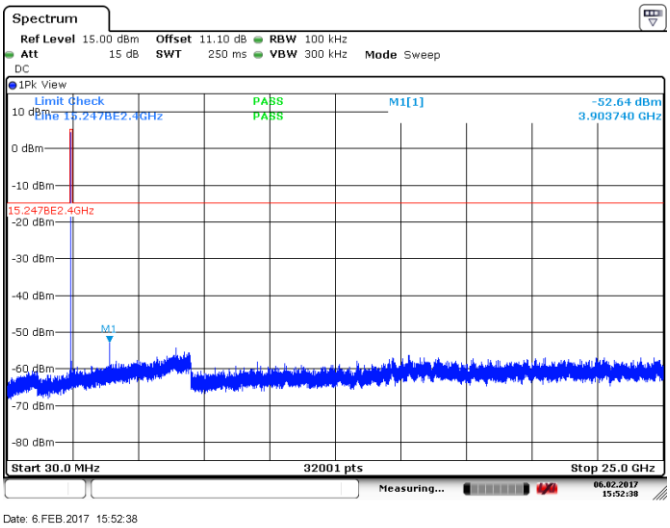



***Figure 8.3.15:*** *Conducted spurious emissions, QPSK mid channel*

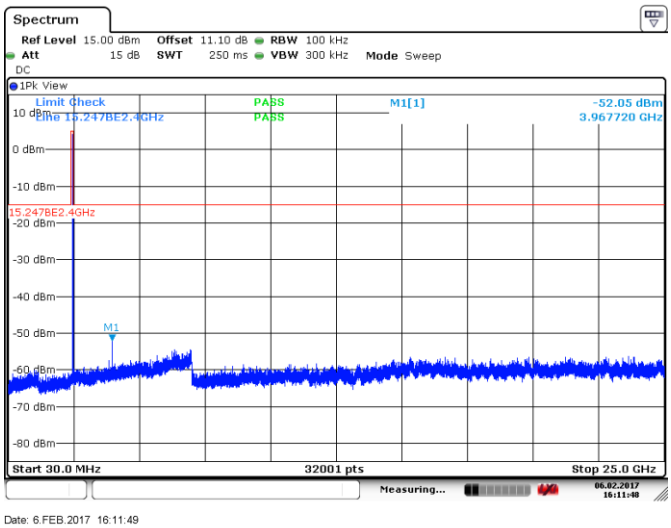



***Figure 8.3.16:*** *Conducted spurious emissions, QPSK high channel*

Peaks within 2400-2483.5MHz are transmitter fundamentals.

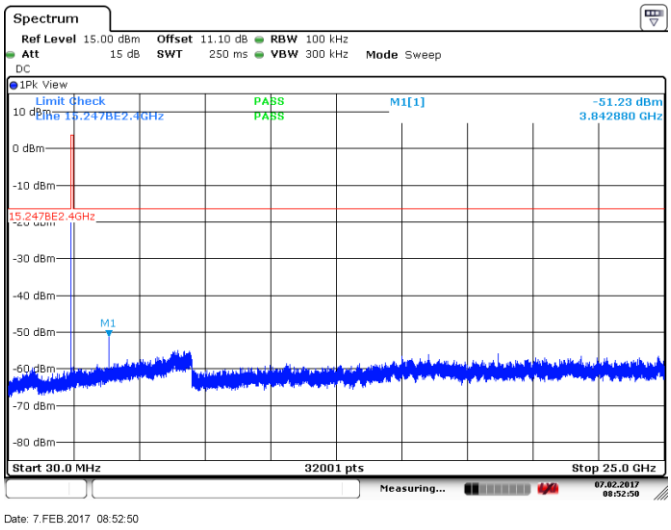



***Figure 8.3.17:*** *Conducted spurious emissions, 8PSK low channel*

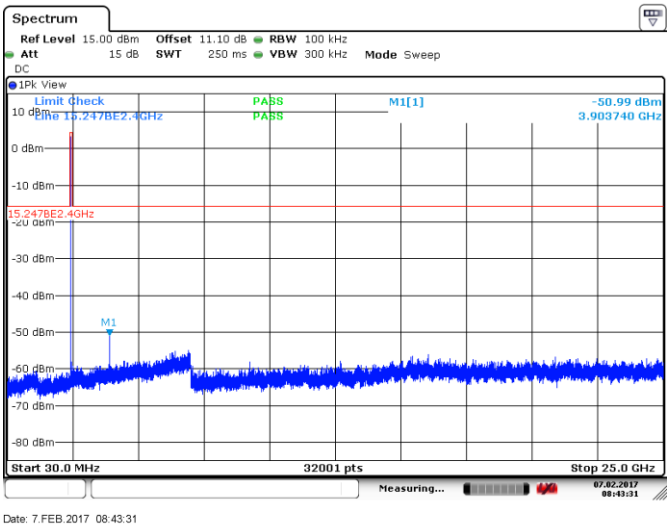



***Figure 8.3.18:*** *Conducted spurious emissions, 8PSK mid channel*

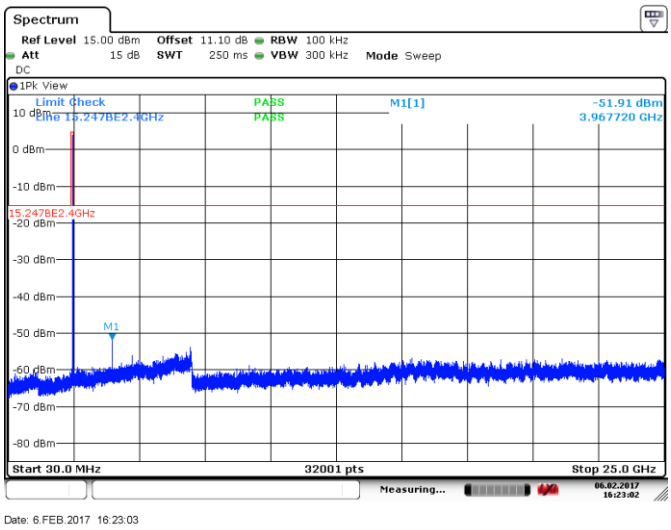



***Figure 8.3.19:*** *Conducted spurious emissions, 8PSK high channel*

Peaks within 2400-2483.5MHz are transmitter fundamentals.

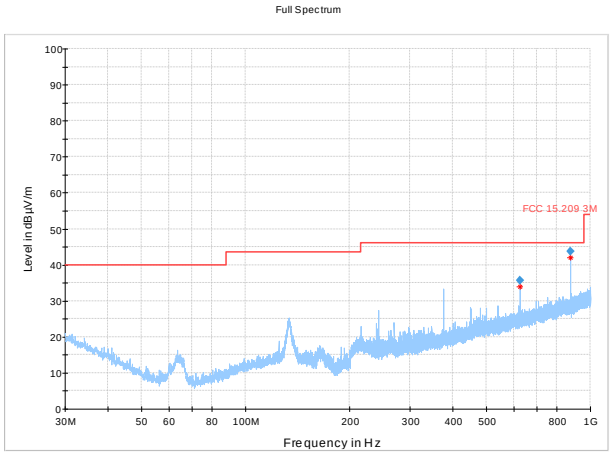



***Figure 8.3.20:*** *Radiated spurious emissions, GFSK low channel, 30-1000MHz*

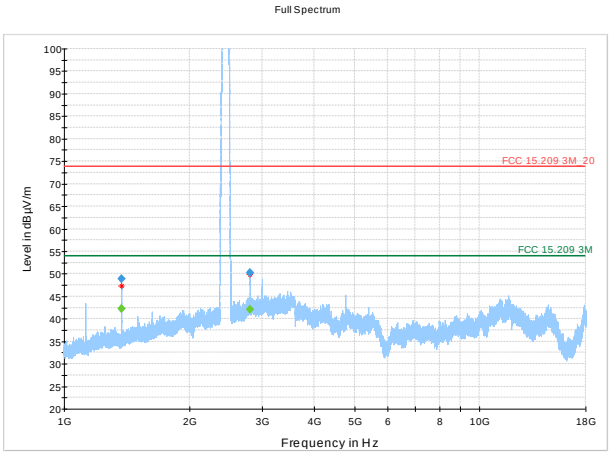



***Figure 8.3.21:*** *Radiated spurious emissions, GFSK low channel, 1-18GHz*

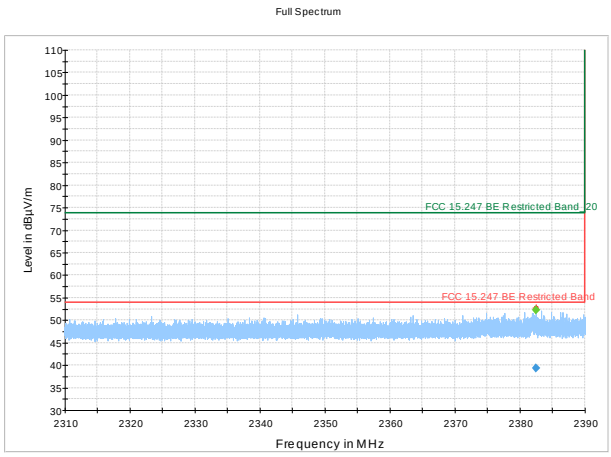



***Figure 8.3.22:*** *Radiated Bandedge in Restricted Band, GFSK low channel*

***Table 8.3-5:*** *Radiated field strength measurement results for GFSK low channel 2402MHz*

| Frequency (MHz) | QuasiPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|---|---|---|---|---|---|---|---|---|
| 625.018000 | 35.77 | 46.00 | 10.23 | 1000.0 | 120.000 | 103.5 | V | 0.0 |
| 874.995500 | 43.76 | 46.00 | 2.24 | 1000.0 | 120.000 | 104.0 | H | 348.0 |

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|---|---|---|---|---|---|---|---|---|---|
| 2802.1333 | 50.30 | --- | 73.90 | 23.60 | 1000.0 | 1000.000 | 106.4 | H | 288.0 |
| 2802.1333 | --- | 42.07 | 53.90 | 11.83 | 1000.0 | 1000.000 | 106.4 | H | 288.0 |
| 1374.8833 | 48.85 | --- | 73.90 | 25.05 | 1000.0 | 1000.000 | 238.6 | V | 10.0 |
| 1374.8833 | --- | 42.31 | 53.90 | 11.59 | 1000.0 | 1000.000 | 238.6 | V | 10.0 |
| 2382.5120 | 52.31 | --- | 73.90 | 21.59 | 1000.0 | 1000.000 | 166.1 | H | 269.0 |
| 2382.5120 | --- | 39.27 | 53.90 | 14.63 | 1000.0 | 1000.000 | 166.1 | H | 269.0 |

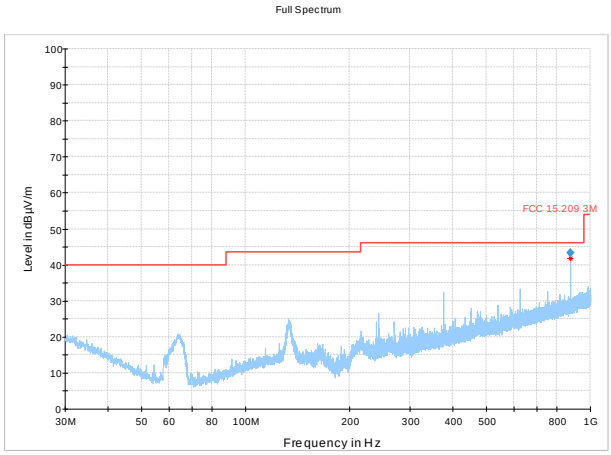



***Figure 8.3.23:*** *Radiated spurious emissions, GFSK mid channel, 30-1000MHz*

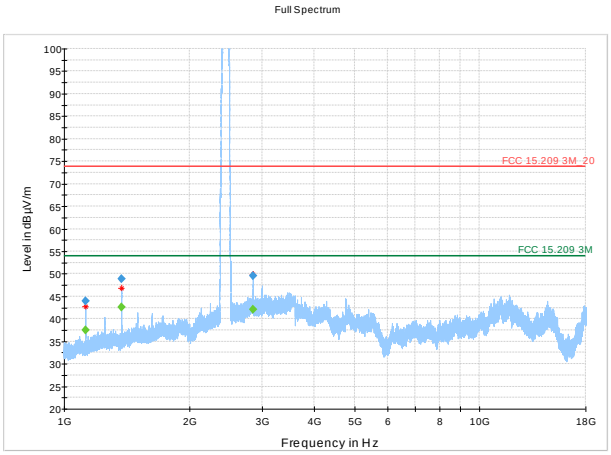



***Figure 8.3.24:*** *Radiated spurious emissions, GFSK mid channel, 1-18GHz*

***Table 8.3-6:*** *Radiated field strength measurement results for GFSK mid channel 2440 MHz*

| Frequency (MHz) | QuasiPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|---|---|---|---|---|---|---|---|---|
| 874.995500 | 43.30 | 46.00 | 2.70 | 1000.0 | 120.000 | 104.2 | H | 331.0 |

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|---|---|---|---|---|---|---|---|---|---|
| 1125.2000 | 43.98 | --- | 73.90 | 29.92 | 1000.0 | 1000.000 | 118.3 | V | 23.0 |
| 1125.2000 | --- | 37.57 | 53.90 | 16.33 | 1000.0 | 1000.000 | 118.3 | V | 23.0 |
| 1375.0333 | 48.86 | --- | 73.90 | 25.04 | 1000.0 | 1000.000 | 207.2 | V | 355.0 |
| 1375.0333 | --- | 42.57 | 53.90 | 11.33 | 1000.0 | 1000.000 | 207.2 | V | 355.0 |
| 2846.8666 | --- | 42.09 | 53.90 | 11.81 | 1000.0 | 1000.000 | 135.7 | H | 280.0 |
| 2846.8666 | 49.53 | --- | 73.90 | 24.37 | 1000.0 | 1000.000 | 135.7 | H | 280.0 |

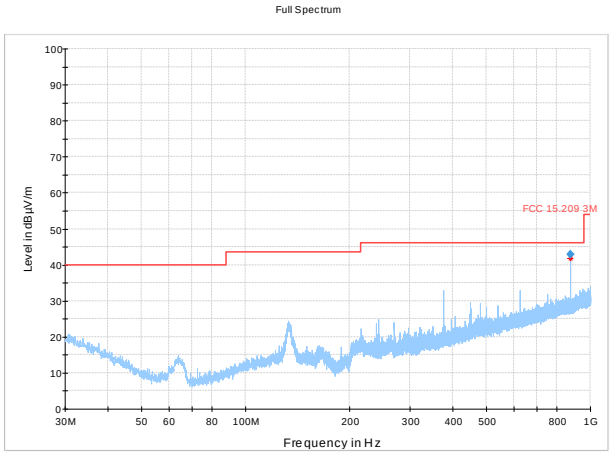



***Figure 8.3.25:*** *Radiated spurious emissions, GFSK high channel, 30-1000MHz*

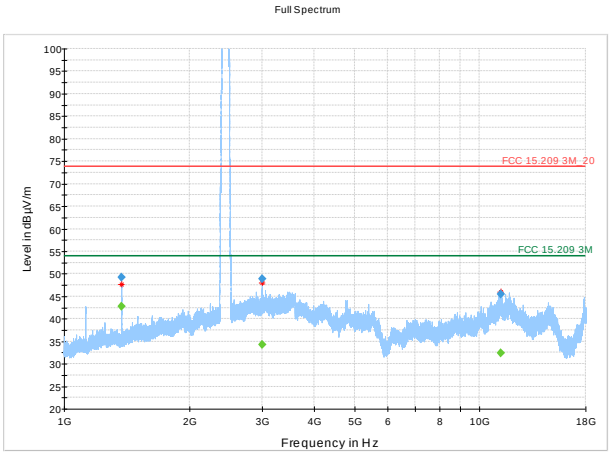



***Figure 8.3.26:*** *Radiated spurious emissions, GFSK high channel, 1-18GHz*

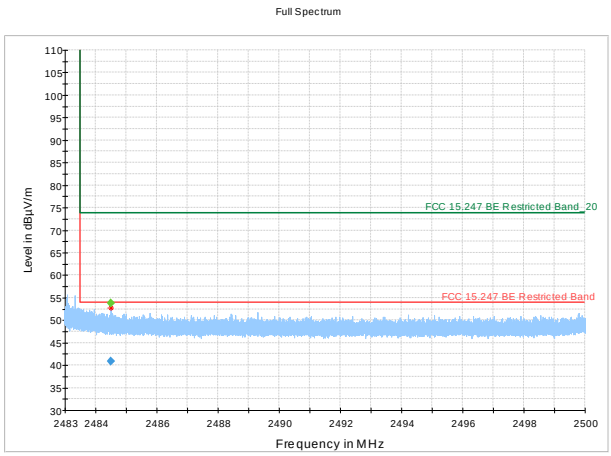



***Figure 8.3.27:*** *Radiated Bandedge in Restricted Band, GFSK high channel*

***Table 8.3-7:*** *Radiated field strength measurement results for GFSK high channel 2480MHz*

| Frequency (MHz) | QuasiPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|---|---|---|---|---|---|---|---|---|
| 874.995500 | 42.82 | 46.00 | 3.18 | 1000.0 | 120.000 | 105.5 | H | 311.0 |

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|---|---|---|---|---|---|---|---|---|---|
| 1374.9500 | 49.23 | --- | 73.90 | 24.67 | 1000.0 | 1000.000 | 210.0 | V | 0.0 |
| 1374.9500 | --- | 42.79 | 53.90 | 11.11 | 1000.0 | 1000.000 | 210.0 | V | 0.0 |
| 2993.9333 | 48.88 | --- | 73.90 | 25.02 | 1000.0 | 1000.000 | 107.0 | H | 275.0 |
| 2993.9333 | --- | 34.25 | 53.90 | 19.65 | 1000.0 | 1000.000 | 107.0 | H | 275.0 |
| 11253.783 | --- | 32.36 | 53.90 | 21.54 | 1000.0 | 1000.000 | 382.9 | H | 315.0 |
| 11253.783 | 45.43 | --- | 73.90 | 28.47 | 1000.0 | 1000.000 | 382.9 | H | 315.0 |
| 2484.4988 | 53.86 | --- | 73.90 | 20.04 | 1000.0 | 1000.000 | 154.6 | H | 289.0 |
| 2484.4988 | --- | 40.79 | 53.90 | 13.11 | 1000.0 | 1000.000 | 154.6 | H | 289.0 |

## 8.4 FCC 15.247(a) (1) (iii) and RSS-247 5.1(4) Frequency hopping systems in the 2400-2483.5MHz

### 8.4.1 Definitions and limits

**FCC:**
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.
**IC:**
FHSs operating in the band 2400-2483.5 MHz shall use at least 15 hopping 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. Transmissions on particular hopping frequencies may be avoided or suppressed provided that at least 15 hopping channels are used.

### 8.4.2 Test summary

| | | | |
|---|---|---|---|
| Test date | February 6, 2017 | Temperature | 19 °C |
| Test engineer | Feng You | Air pressure | 1008 mbar |
| Verdict | Pass | Relative humidity | 56 % |

### 8.4.3 Observations, settings and special notes

The test was performed using EUT set to normal hopping operation.

### 8.4.4 Test data

***Table 8.4-1:*** *Time of occupancy – BDR(GFSK)*

| Frequency MHz | Pulse count in 31.6s | Pulse width (ms) | Time of occupancy Time (ms) | Limit (ms) | Margin (ms) |
|---|---|---|---|---|---|
| 2402 | 87 | 2.963437 | 258 | 400 | 142 |
| 2460 | 97 | 2.968125 | 288 | 400 | 112 |

***Table 8.4-2:*** *Time of occupancy – EDR(QPSK&8PSK)*

| Frequency MHz | Pulse count in 7.9s | Pulse width (ms) | Time of occupancy Time (ms) | Limit (ms) | Margin (ms) |
|---|---|---|---|---|---|
| 2402 | 21 | 2.9425 | 247 | 400 | 153 |
| 2460 | 31 | 2.99625 | 372 | 400 | 28 |

***Table 8.4:*** *Hopping Frequencies*

| Minimum Hopping Frequencies | Measured Hopping Frequencies | Result |
|---|---|---|
| 15 | 79 | Pass |

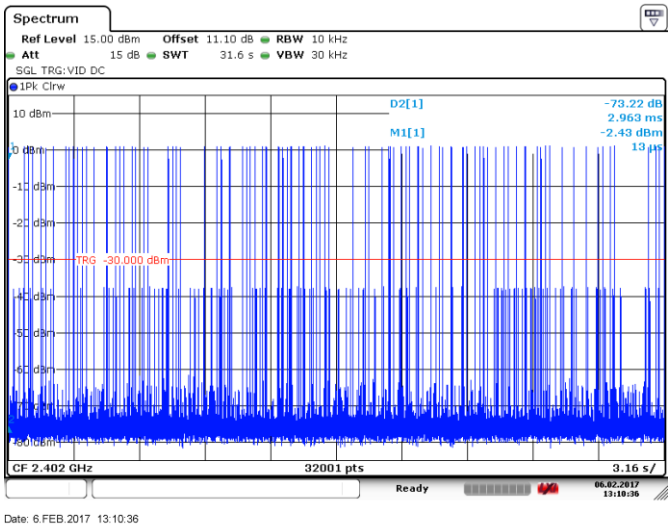



***Diagram 8.5-1:*** *Pulse count in 31.6s, GFSK 2402MHz*

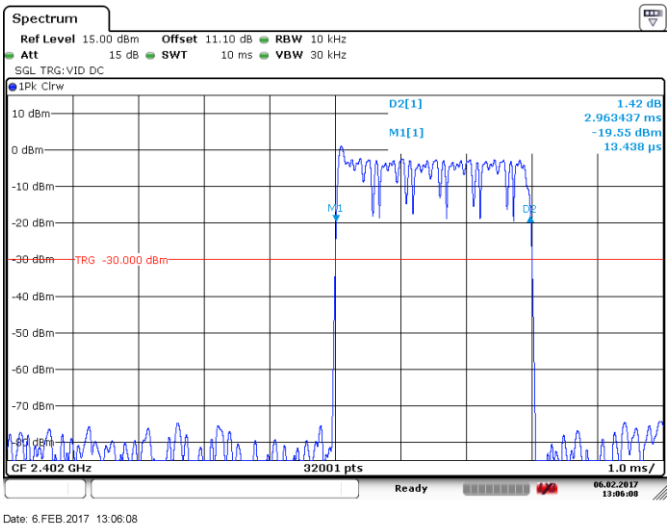



***Diagram 8.5-2:*** *Pulse width, GFSK 2402MHz*

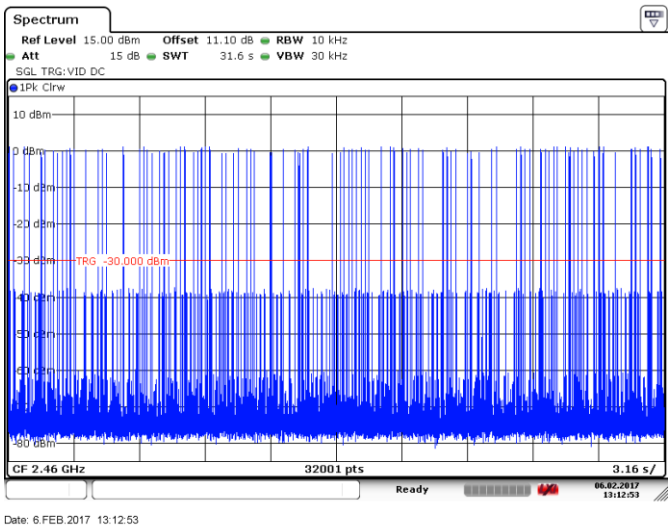



***Diagram 8.5-3:*** *Pulse count in 31.6s, GFSK 2460MHz*

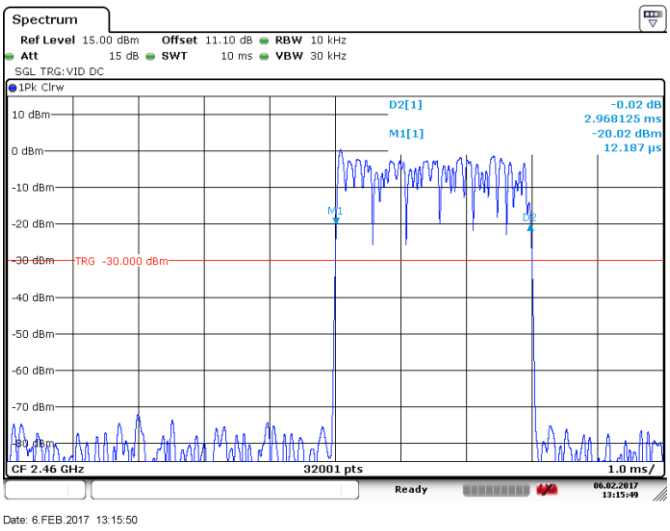



***Diagram 8.5-4:*** *Pulse width, GFSK 2460MHz*

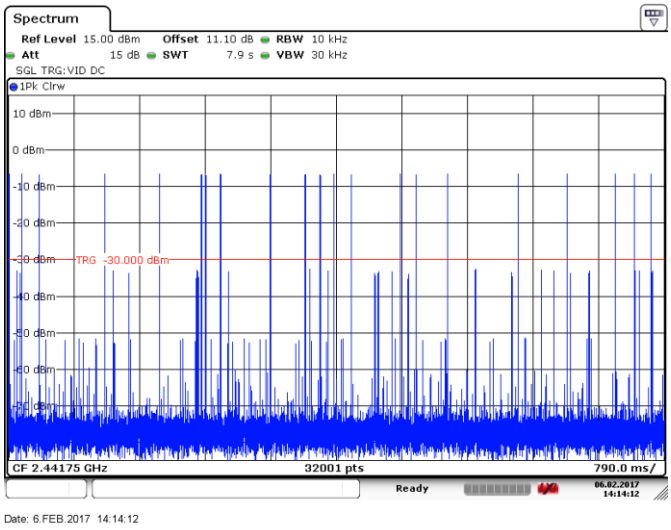



***Diagram 8.5-5:*** *Pulse count in 7.9s, EDR 2402MHz*

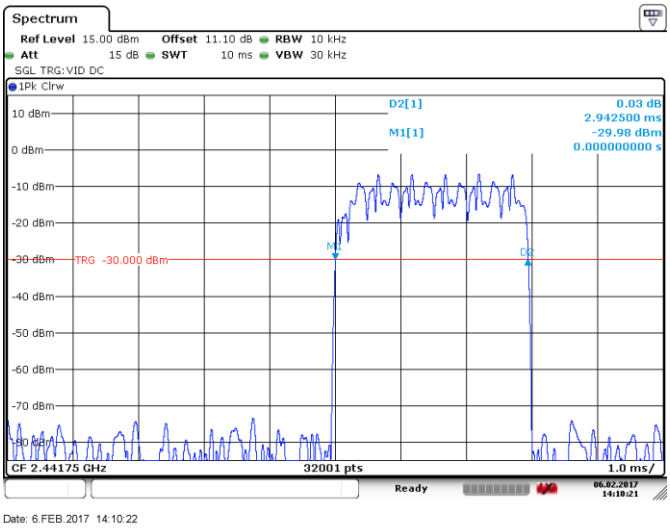



***Diagram 8.5-6:*** *Pulse width, EDR 2402MHz*

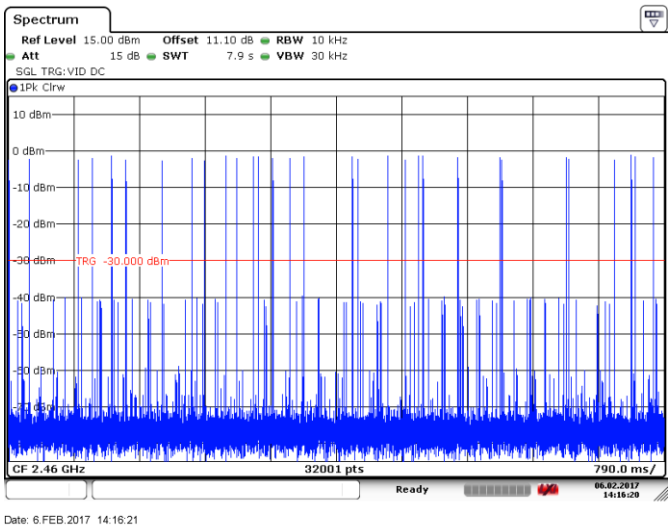



***Diagram 8.5-7:*** *Pulse count in 7.9s, EDR 2460MHz*

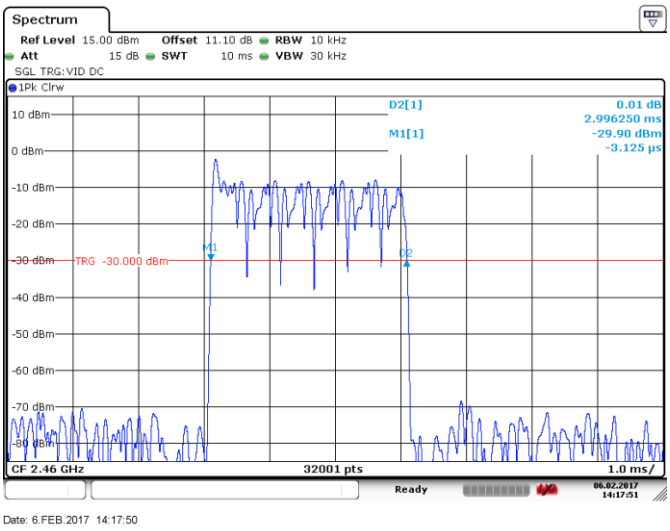



***Diagram 8.5-8:*** *Pulse width, EDR 2460MHz*

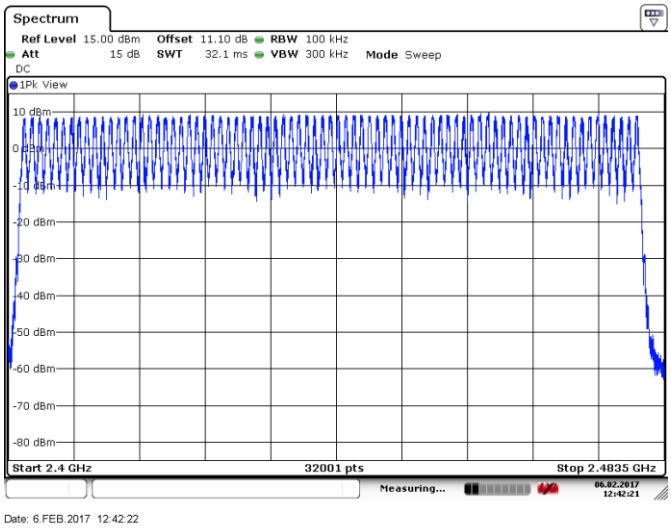



***Diagram 8.5-5:*** *Hopping channels*

## 8.5 FCC 15.247(a) (1) and RSS-247 5.1(2) Carrier frequency separation

### 8.5.1 Definitions and limits

**FCC and IC:**

(a) Operation under the provisions of this Section is limited to frequency hopping and digitally modulated intentional radiators that comply with the following provisions:

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

### 8.5.2 Test summary

| | | | |
|---|---|---|---|
| Test date | February 6, 2017 | Temperature | 19 °C |
| Test engineer | Feng You | Air pressure | 1008 mbar |
| Verdict | Pass | Relative humidity | 56 % |

### 8.5.3 Observations, settings and special notes

Spectrum analyser settings:

| | |
|---|---|
| Resolution bandwidth | 100 kHz |
| Video bandwidth | ≥ RBW |
| Frequency span | 4 MHz |
| Detector mode | Peak |
| Trace mode | Max Hold |

### 8.5.4 Test data

***Table 8.5-1:*** *Hopping Frequency Separation*

| Modulation | Frequency, kHz | Minimum, kHz (2/3 of 20dB OBW) | Margin, kHz |
|---|---|---|---|
| GFSK/BDR | 1002 | 640 | 360 |
| EDR | 1033 | 920 | 113 |

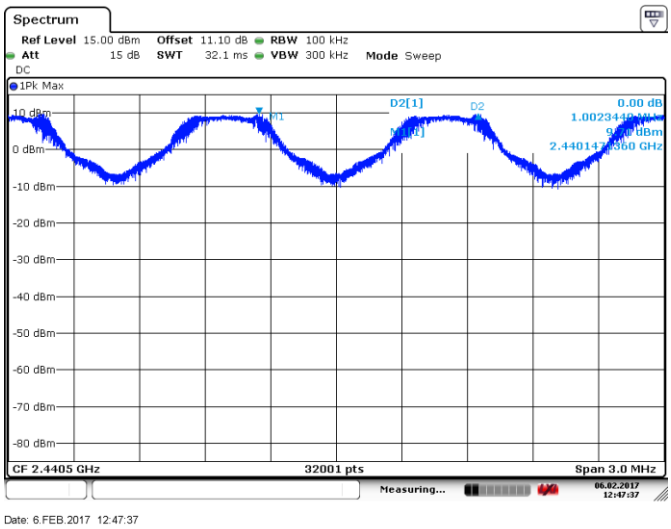



***Figure 8.5-1:*** *Hopping Frequency Separation - BDR*

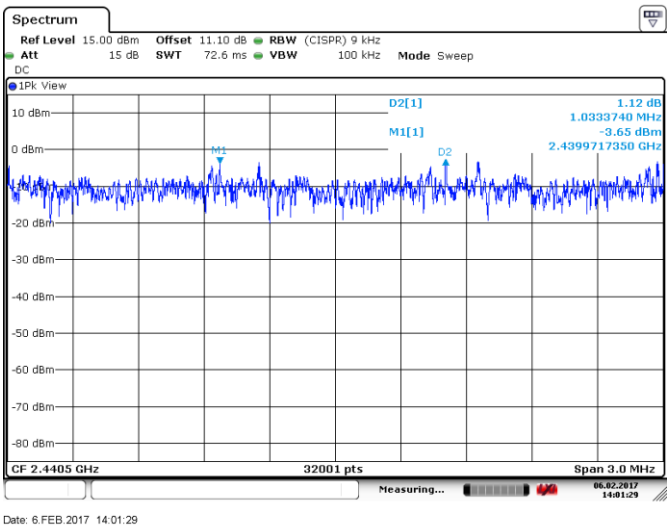



***Figure 8.5-2:*** *Hopping Frequency Separation - EDR*

## 8.6 FCC 15.207(a) AC power line conducted emissions limits

### 8.6.1 Definitions and limits

Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 µH/50 Ω line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

The conducted emissions shall be measured with a 50 Ω/50 µH line impedance stabilization network (LISN).

***Table 8.6-1:*** *Conducted emissions limit*

| Frequency of emission (MHz) | Conducted limit (dBµV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15–0.5 | 66 to 56* | 56 to 46* |
| 0.5–5 | 56 | 46 |
| 5–30 | 60 | 50 |

Note: * - Decreases with the logarithm of the frequency.

### 8.6.2 Test summary

| | | | |
|---|---|---|---|
| Test date | February 6, 2017 | Temperature | 19 °C |
| Test engineer | Feng You | Air pressure | 1008 mbar |
| Verdict | Pass | Relative humidity | 56 % |

### 8.6.3 Observations, settings and special notes

This is tested with Low CH TX on.

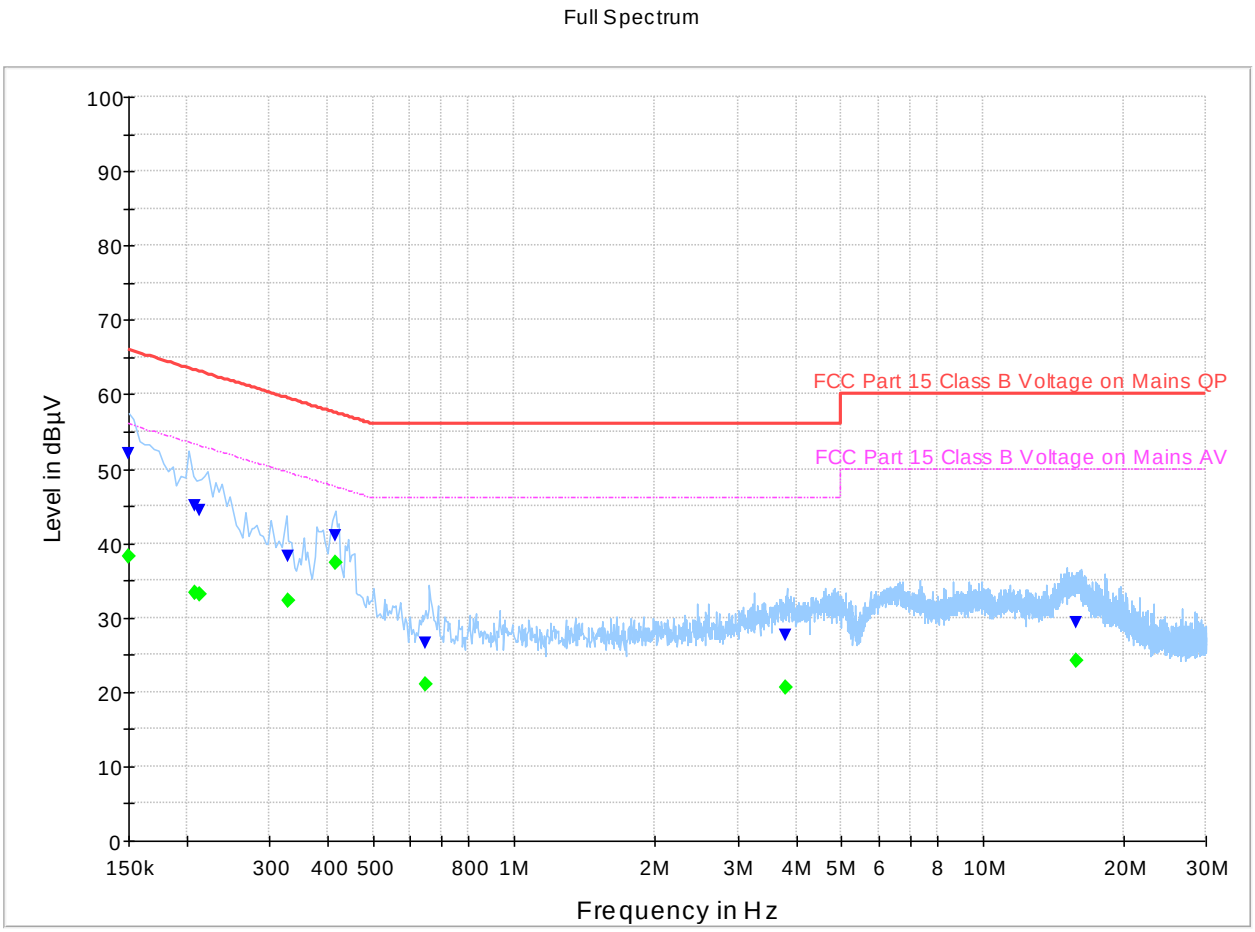
The spectral scan has been corrected with transducer factors (i.e. cable loss, LISN factors, and attenuators) for determination of compliance.

A preview measurement was generated with the receiver in continuous scan mode. Emissions detected within 6 dB or above limit were re-measured with the appropriate detector against the correlating limit and recorded as the final measurement.

Test receiver settings:

| | |
|---|---|
| Frequency span | 150 kHz to 30 MHz |
| Detector mode | Peak and Average (preview mode); Quasi-Peak (final measurements) |
| Resolution bandwidth | 9 kHz |
| Video bandwidth | 30 kHz |
| Trace mode | Max Hold |
| Measurement time | 1000 ms |

### 8.6.4 Test data



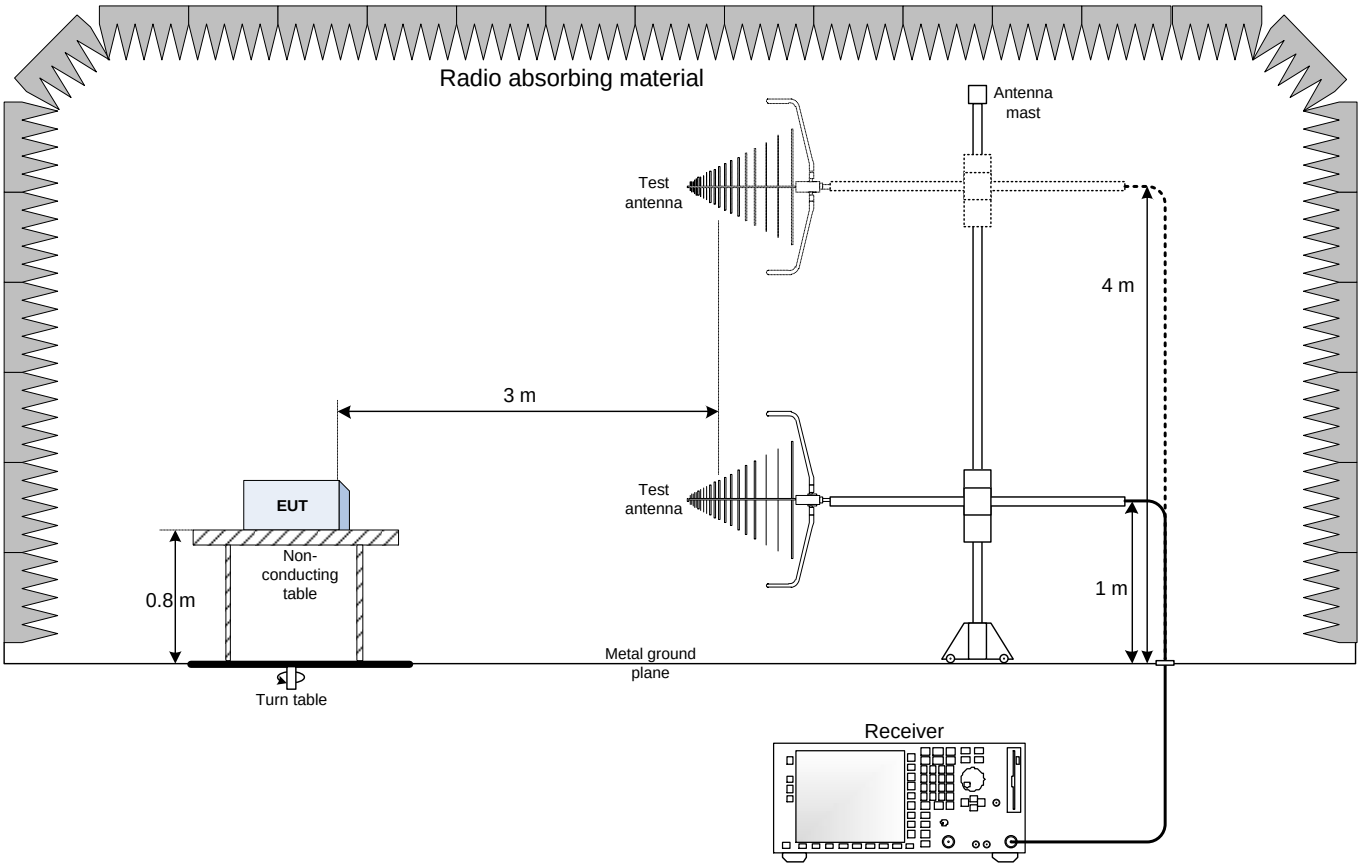

***Plot 8.6-1:*** *Conducted emissions BT GFSK High Channel, ACBEL Supply*

***Table 8.6-2:*** *Quasi-Peak and Average conducted emissions results, BT GFSK High Channel, ACBEL Supply*

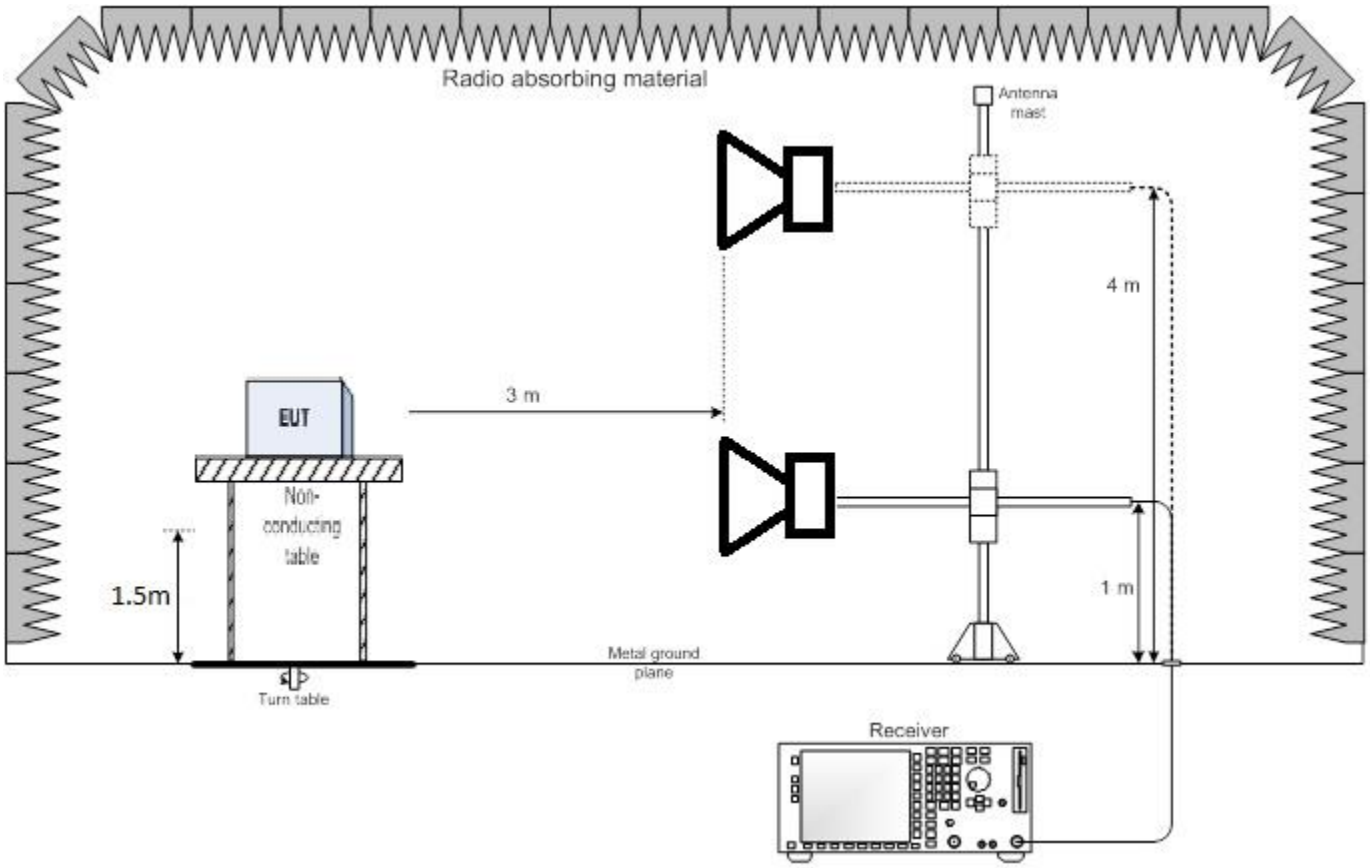
| Frequency (MHz) | QuasiPeak (dBµV) | Average (dBµV) | Limit (dBµV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Filter |
|---|---|---|---|---|---|---|---|---|
| 0.150000 | --- | 38.21 | 56.00 | 17.79 | 5000.0 | 9.000 | L1 | ON |
| 0.150000 | 52.11 | --- | 66.00 | 13.89 | 5000.0 | 9.000 | L1 | ON |
| 0.208500 | --- | 33.41 | 53.27 | 19.86 | 5000.0 | 9.000 | L1 | ON |
| 0.208500 | 44.98 | --- | 63.27 | 18.29 | 5000.0 | 9.000 | L1 | ON |
| 0.212500 | 44.31 | --- | 63.11 | 18.80 | 5000.0 | 9.000 | N | ON |
| 0.212500 | --- | 33.21 | 53.11 | 19.89 | 5000.0 | 9.000 | N | ON |
| 0.328500 | 38.22 | --- | 59.49 | 21.27 | 5000.0 | 9.000 | N | ON |
| 0.328500 | --- | 32.27 | 49.49 | 17.22 | 5000.0 | 9.000 | N | ON |
| 0.416500 | --- | 37.38 | 47.52 | 10.14 | 5000.0 | 9.000 | N | ON |
| 0.416500 | 41.08 | --- | 57.52 | 16.44 | 5000.0 | 9.000 | N | ON |
| 0.644500 | 26.51 | --- | 56.00 | 29.49 | 5000.0 | 9.000 | N | ON |
| 0.644500 | --- | 21.10 | 46.00 | 24.90 | 5000.0 | 9.000 | N | ON |
| 3.808500 | 27.59 | --- | 56.00 | 28.41 | 5000.0 | 9.000 | N | ON |
| 3.808500 | --- | 20.56 | 46.00 | 25.44 | 5000.0 | 9.000 | N | ON |
| 15.804500 | --- | 24.28 | 50.00 | 25.72 | 5000.0 | 9.000 | L1 | ON |
| 15.804500 | 29.40 | --- | 60.00 | 30.60 | 5000.0 | 9.000 | L1 | ON |

# **Section 9.** Block diagrams of test set-ups

## 9.1 Radiated emissions set-up – Below 1GHz



## 9.2 Radiated emissions set-up – Above 1GHz




## 9.3 Conducted emissions set-up