# FCC TEST REPORT

**FCC 47 CFR Part 15C**
**Industry Canada RSS-210**

**Digital transmission systems operating within the 2400 – 2483.5 MHz band**

| | |
|---|---|
| **Report Reference No**. ..... : | G0M-1303-2693-TFC247W-V01 |
| **Testing Laboratory** ..... : | Eurofins Product Service GmbH |
| Address ..... : | Storkower Str. 38c<br>15526 Reichenwalde<br>Germany |
| Accreditation ..... : | A2LA Accredited Testing Laboratory, Certificate No.: 1983.01<br>FCC Filed Test Laboratory, Reg.-No.: 96970<br>IC OATS Filing assigned code: 3470A |
| **Applicant's name** ..... : | Panasonic Industrial Devices Europe GmbH |
| Address ..... : | Zeppelinstr. 19<br>21337 Lüneburg<br>GERMANY |
| **Test specification:** | |
| Standard..... : | 47 CFR Part 15C<br>KDB Publication No. 558074<br>RSS-210, Issue 8, 2010-12<br>RSS-Gen, Issue 3, 2010-12<br>ANSI C63.4:2009 |
| **Equipment under test (EUT):** | |
| Product description | Bluetooth Module |
| Model No. | ENW89823C2KF/ENW89823A2KF |
| Hardware version | 4x |
| Firmware / Software version | 0x |
| | FCC-ID: T7V1316 IC: 216Q-1316 |
| **Test result** | **Passed** |

| **Possible test case verdicts:** | |
|---|---|
| - neither assessed nor tested ..... : | N/N |
| - required by standard but not appl. to test object..... : | N/A |
| - required by standard but not tested..... : | N/T |
| - not required by standard for the test object ..... : | N/R |
| - test object does meet the requirement..... : | P (Pass) |
| - test object does not meet the requirement..... : | F (Fail) |

**Testing:**

| | | |
|---|---|---|
| Date of receipt of test item ..... : | 2013-04-02 | |
| Date (s) of performance of tests ..... : | 2013-04-02 – 2013-05-04 | |
| Compiled by ..... : | Antje Bartusch | |
| Tested by (+ signature)..... : (Testing Manager) | Burkhard Pudell | B. Pudell ..... |
| Approved by (+ signature) ..... : (Test Lab Manager) | Jens Zimmermann | ..... |
| Date of issue ..... : | 2013-04-15 | |
| Total number of pages ..... : | 92 | |

**General remarks:**

**The test results presented in this report relate only to the object tested.**

**The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.**

This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.

**Additional comments:**

# Version History

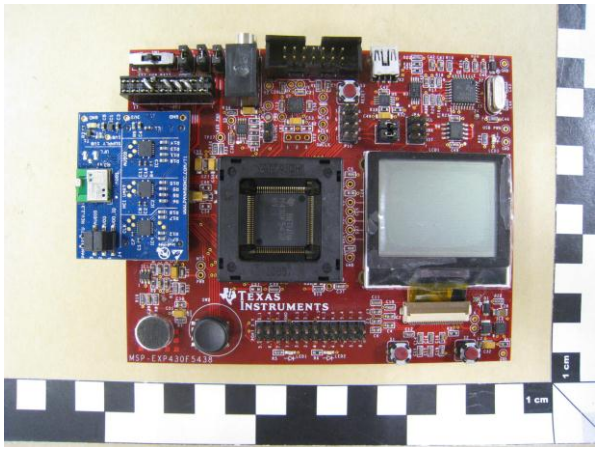
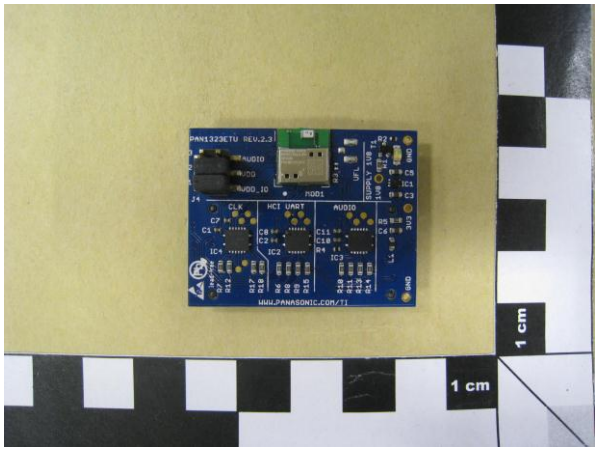
| Version | Issue Date | Remarks | Revised by |
|---|---|---|---|
| 01 | 2013-04-15 | Initial Release | |

## REPORT INDEX

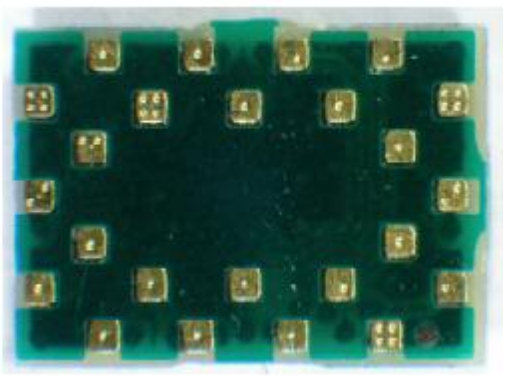
# 1 Equipment (Test item) Description:

| | | |
|---|---|---|
| **Description** | Bluetooth Module | |
| **Model** | ENW89823C2KF/ENW89823A2KF | |
| **Serial number** | None | |
| **Hardware version** | 4x | |
| **Software / Firmware version** | 0x | |
| **FCC-ID** | T7V1316 | |
| **IC** | 216Q-1316 | |
| **Equipment type** | Radio module | |
| **Radio type** | Transceiver | |
| **Radio technology** | Bluetooth 4.0 Low Energy | |
| **Operating frequency range** | 2402 - 2480 MHz | |
| **Assigned frequency band** | 2400 - 2483.5 MHz | |
| **Main test frequencies** | $F_{LOW}$ | 2402 MHz |
| | $F_{MID}$ | 2440 MHz |
| | $F_{HIGH}$ | 2480 MHz |
| **Spreading** | Frequency Hopping | |
| **Modulations** | GFSK | |
| **Number of channels** | 40 | |
| **Channel spacing** | 2MHz | |
| **Number of antennas** | 1 | |
| **Antenna** | Type | integrated |
| | Model | LDA21K 7488930245 |
| | Manufacturer | Murata |
| | Gain | +0.9 dBi (manufacturer declaration) |
| **Manufacturer** | Panasonic Industrial Devices Europe GmbH<br>Zeppelinstr. 19<br>21337 Lüneburg<br>GERMANY | |
| **Power supply** | $V_{NOM}$ | 3.3VDC |
| | $V_{MIN}$ | 2.0VDC |
| | $V_{MAX}$ | 3.6VDC |
| **AC/DC-Adaptor** | none | |

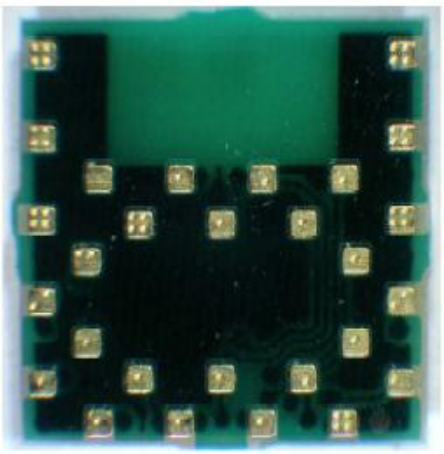
## 1.1 Photos – Equipment External

| EUT ON EVALUATION BOARD | EUT TOP ON BOARD |
|---|---|
|  |  |

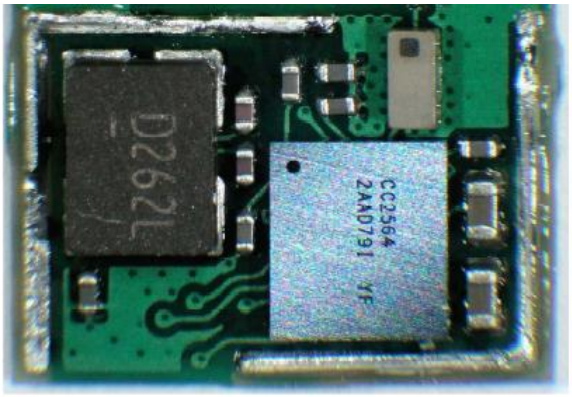
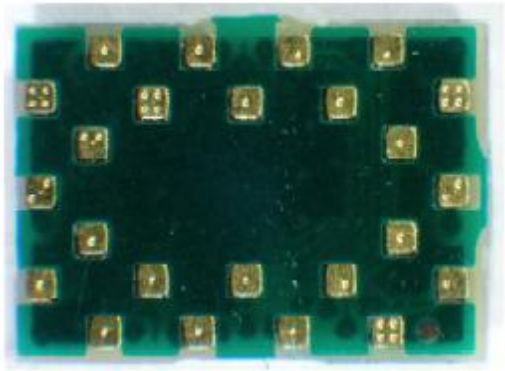
**EUT PAN 1316**

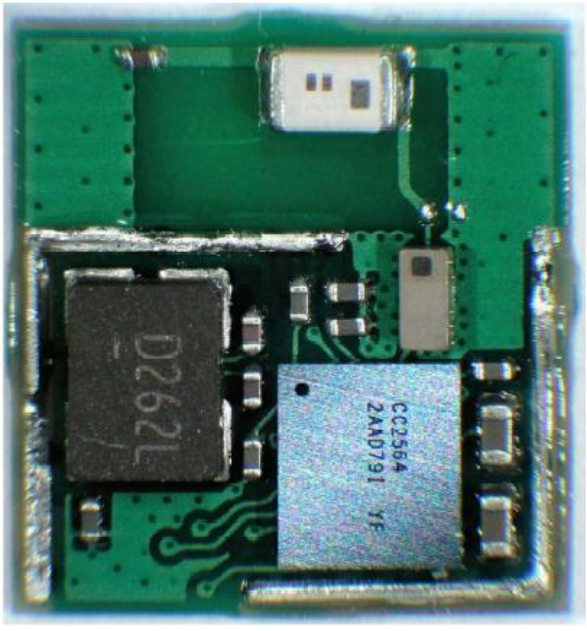
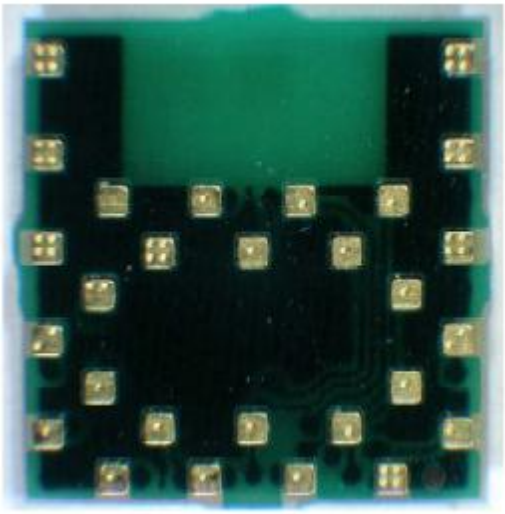



**EUT PAN 1326**

## 1.2 Photos – Equipment internal

| EUT PAN 1316 TOP | EUT PAN 1316 BOTTOM |
|---|---|
|  |  |

| EUT PAN 1326 TOP | EUT PAN 1326 BOTTOM |
|---|---|
|  |  |

## 1.3 Photos – Test setup

| TEST SETUP: RADIATED EMISSIONS |
| --- |
|  |

| TEST SETUP: CONDUCTED EMISSIONS |
| --- |
|  |

## 1.4 Supporting Equipment Used During Testing

| Product Type* | Device | Manufacturer | Model No. | Comments |
|---|---|---|---|---|
| None | | | | |

***Note:** Use the following abbreviations:

AE : Auxiliary/Associated Equipment, or

SIM : Simulator (Not Subjected to Test)

CABL : Connecting cables

## 1.5 Test Modes

| Mode # | Description | |
|---|---|---|
| Transmit | General conditions: | EUT powered by laboratory power supply. |
| | Radio conditions: | Mode = standalone transmit<br>Modulation = GFSK<br>Data rate = 1 Mbps<br>Bandwidth = 2 MHz<br>Duty cycle = 100 %<br>Power level = Maximum |
| Receive | General conditions: | EUT powered by laboratory power supply. |
| | Radio conditions: | Mode = standalone receive (scan mode)<br>Modulation = GFSK |
| AC-Powerline | General conditions: | EUT powered by commercial Laptop |
| | Radio conditions: | Mode = Transmit |

## 1.6 Test Equipment Used During Testing

| Occupied Bandwidth | | | | | |
|---|---|---|---|---|---|
| Description | Manufacturer | Model | Identifier | Cal. Date | Cal. Due |
| Spectrum Analyzer | R&S | FSP 30 | EF00312 | 2013-01 | 2014-01 |

| 6dB Bandwidth | | | | | |
|---|---|---|---|---|---|
| Description | Manufacturer | Model | Identifier | Cal. Date | Cal. Due |
| Spectrum Analyzer | R&S | FSP 30 | EF00312 | 2013-01 | 2014-01 |

| Maximum peak conducted power | | | | | |
|---|---|---|---|---|---|
| Description | Manufacturer | Model | Identifier | Cal. Date | Cal. Due |
| Spectrum Analyzer | R&S | FSP 30 | EF00312 | 2013-01 | 2014-01 |

| Power spectral density | | | | | |
|---|---|---|---|---|---|
| Description | Manufacturer | Model | Identifier | Cal. Date | Cal. Due |
| Spectrum Analyzer | R&S | FSP 30 | EF00312 | 2013-01 | 2014-01 |

| Band edge compliance | | | | | |
|---|---|---|---|---|---|
| Description | Manufacturer | Model | Identifier | Cal. Date | Cal. Due |
| Spectrum Analyzer | R&S | FSP 30 | EF00312 | 2013-01 | 2014-01 |

| Conducted spurious emissions | | | | | |
|---|---|---|---|---|---|
| Description | Manufacturer | Model | Identifier | Cal. Date | Cal. Due |
| Spectrum Analyzer | R&S | FSP 30 | EF00312 | 2013-01 | 2014-01 |

| Radiated spurious emissions | | | | | |
|---|---|---|---|---|---|
| Description | Manufacturer | Model | Identifier | Cal. Date | Cal. Due |
| Semi-anechoic chamber | Frankonia | AC 5 | EF00395 | - | - |
| Spectrum Analyzer | R&S | FSIQ26 | EF00242 | 2012-05 | 2013-05 |
| Biconical Antenna | R&S | HK 116 | EF00012 | 2013-02 | 2016-02 |
| LPD Antenna | R&S | HL 223 | EF00187 | 2011-02 | 2014-02 |
| LPD Antenna | R&S | HL 025 | EF00327 | 2013-02 | 2016-02 |

| AC powerline conducted emissions | | | | | |
|---|---|---|---|---|---|
| Description | Manufacturer | Model | Identifier | Cal. Date | Cal. Due |
| AMN | R&S | ESH2-Z5 | EF00182 | 2012-10 | 2014-10 |
| AMN | R&S | ESH3-Z5 | EF00036 | 2012-11 | 2014-11 |
| EMI Test Receiver | R&S | ESCS 30 | EF00295 | 2012-08 | 2013-08 |

## 1.7 Sample emission level calculation

The following is a description of terms and a sample calculation, as appears in the radiated emissions data table. The numbers used in the calculation are for example only. There is no direct correlation to the specific data taken for the product described in this document:

Reading:

This is the reading obtained on the spectrum analyzer in dBµV. Any external preamplifiers used are taken into account through internal analyzer settings.

A.F.:

This is the antenna factor for the receiving antenna. It is a conversion factor, which converts electric fields strengths to voltages, which can be measured directly on the spectrum analyzer. It is treated as a loss in dB. Cable losses have been included with the A.F. to simplify the calculations. The antenna factor is used in calculations as follows:

Reading on Analyzer (dBµV) + A.F. (dB) = Net field strength (dBµV/m)

Net:

This is the net field strength measurement (as shown above).

Limit:

This is the FCC Class B radiated emission limit (in units of dBµV/m). The FCC limits are given in units of µV/m. The following formula is used to convert the units of µV/m to dBµV/m:

Limit (dBµV/m) = 20*log (µV/m)

Margin:

This is the margin of compliance below the FCC limit. The units are given in dB. A negative margin indicates the emission was below the limit. A positive margin indicates that the emission exceeds the limit.

Example only:

| Reading | + | AF | = | Net Reading | : | Net reading - FCC limit | = Margin |
|---|---|---|---|---|---|---|---|
| 21.5 dBµV | + | 26 dB | = | 47.5 dBµV/m | : | 47.5 dBµV/m - 57.0 dBµV/m | = -9.5 dB |

## 2 Result Summary

| FCC 47 CFR Part 15C, IC RSS-210 | | | | |
|---|---|---|---|---|
| **Product Specific Standard Section** | **Requirement – Test** | **Reference Method** | **Result** | **Remarks** |
| RSS-Gen 4.6.1 | Occupied Bandwidth | RSS-Gen 4.6.1 | N/R | Informational only |
| FCC § 15.247(a)(2)<br>IC RSS-210 § A8.2 | 6dB Bandwidth | KDB Publication No. 558074 | PASS | |
| FCC § 15.247(b)(3)<br>IC RSS-210 § A8.4 | Maximum peak conducted power | KDB Publication No. 558074 | PASS | |
| FCC § 15.247(e)<br>IC RSS-210 § A8.2 | Power spectral density | KDB Publication No. 558074 | PASS | |
| 47 CFR 15.207<br>RSS-Gen 7.2.4 | AC power line conducted emissions | KDB Publication No. 558074 / ANSI C63.4 | PASS | |
| FCC § 15.247(d)<br>IC RSS-210 § A8.5 | Band edge compliance | KDB Publication No. 558074 | PASS | |
| FCC § 15.247(d)<br>IC RSS-210 § A8.5 | Conducted spurious emissions | KDB Publication No. 558074 | PASS | |
| FCC § 15.247(d)<br>FCC § 15.209<br>IC RSS-210 A8.5<br>IC RSS-Gen 4.9<br>IC RSS-Gen 7.2.5 | Transmitter radiated spurious emissions | KDB Publication No. 558074 / ANSI C 63.4 | PASS | |
| IC RSS-Gen 4.10<br>IC RSS-Gen 6.1 | Receiver radiated spurious emissions | ANSI C 63.4 | PASS | |
| **Remarks:** | | | | |

# 3 Test Conditions and Results

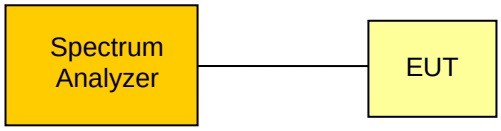
## 3.1 Test Conditions and Results – Occupied Bandwidth

| **Occupied Bandwidth acc. IC RSS-Gen** | **Verdict: PASS** |
|---|---|
| Test according to measurement reference | Reference Method |
| | RSS-Gen 4.6.1 |
| Test frequency range | Tested frequencies |
| | $F_{LOW}$ / $F_{MID}$ / $F_{HIGH}$ |

**Limits**

None (Informational only)

**Test setup**




**Test procedure**

1. EUT set to test mode (Communication tester is used if needed)
2. Span set to at least twice the emission spectrum
3. Resolution bandwidth set to 1 % of span
4. Occupied Bandwidth (99 %) measurement with spectrum analyzer built in measurement function

**Test results**

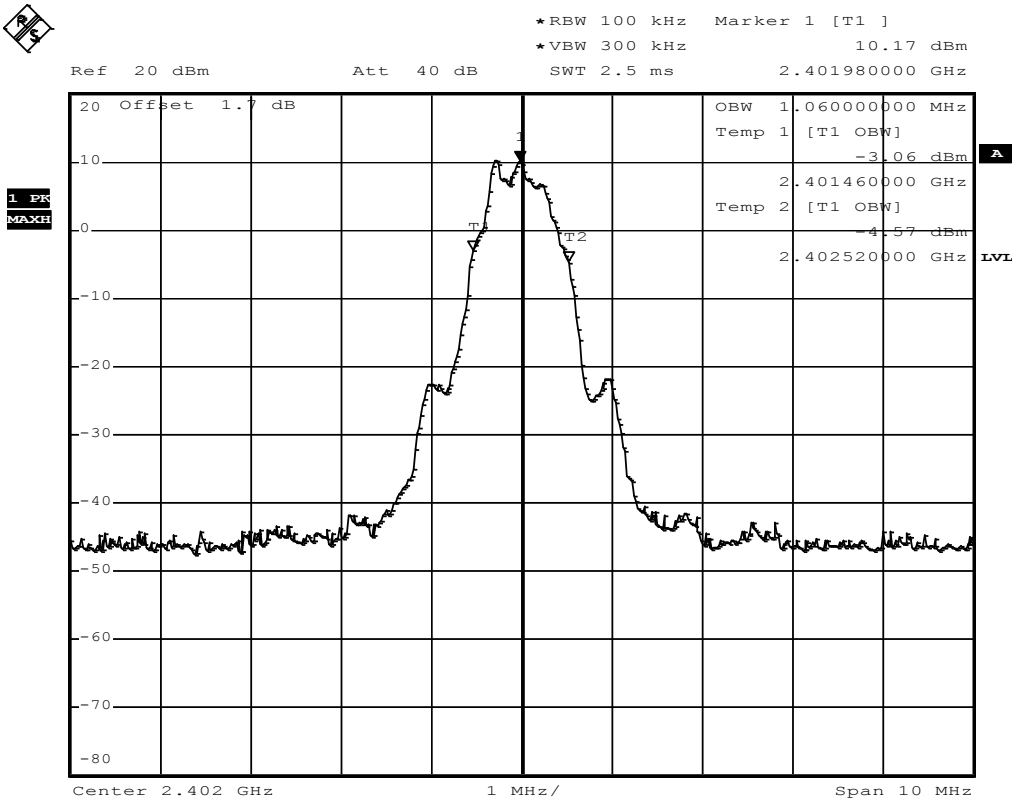
| Channel | Frequency [MHz] | Mode | Occupied Bandwidth [kHz] |
|---|---|---|---|
| $F_{LOW}$ | 2402 | Transmit | 1060 |
| $F_{MID}$ | 2440 | Transmit | 1060 |
| $F_{HIGH}$ | 2480 | Transmit | 1060 |

Comments:

## Occupied Bandwidth – $F_{LOW}$

**RSS Gen**
**Occupied Bandwidth**

| | |
|---|---|
| EUT | Bluetooth Module |
| Model | PAN1316 / PAN1326 G0M-1303-2693 |
| Approval Holder | Panasonic Industrial Device Europe GmbH |
| Temperature / Voltage | Tnom / Vnom |
| Test Site / Operator | Eurofins Product Service GmbH / Mr. Pudell |
| Test Specification | 4.4.1 Occupied Bandwidth |
| Comment 1 | Channel.0: 2402 MHz |
| Comment 2 | A spectrum analyzer with an integrated 99% power bandwidth function is used |
| Comment 3 | BLE Testmode, power level 15 |

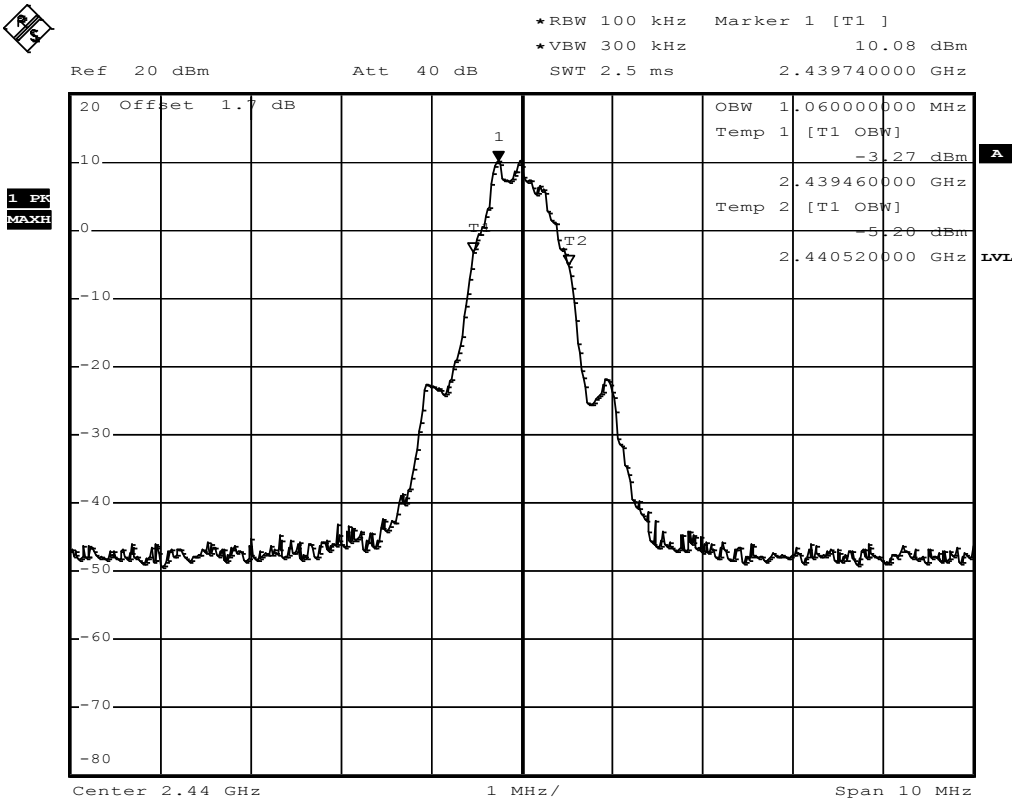



Comment: Occupied_Bandwidth_:__1060_kHz
Date: 4.APR.2013 12:31:57

## Occupied Bandwidth – $F_{MID}$

**RSS Gen**
**Occupied Bandwidth**

| | |
|---|---|
| EUT | Bluetooth Module |
| Model | PAN1316 / PAN1326 G0M-1303-2693 |
| Approval Holder | Panasonic Industrial Device Europe GmbH |
| Temperature / Voltage | Tnom / Vnom |
| Test Site / Operator | Eurofins Product Service GmbH / Mr. Pudell |
| Test Specification | 4.4.1 Occupied Bandwidth |
| Comment 1 | Channel. 19: 2440 MHz |
| Comment 2 | A spectrum analyzer with an integrated 99% power bandwidth function is used |
| Comment 3 | BLE Testmode, power level 15 |

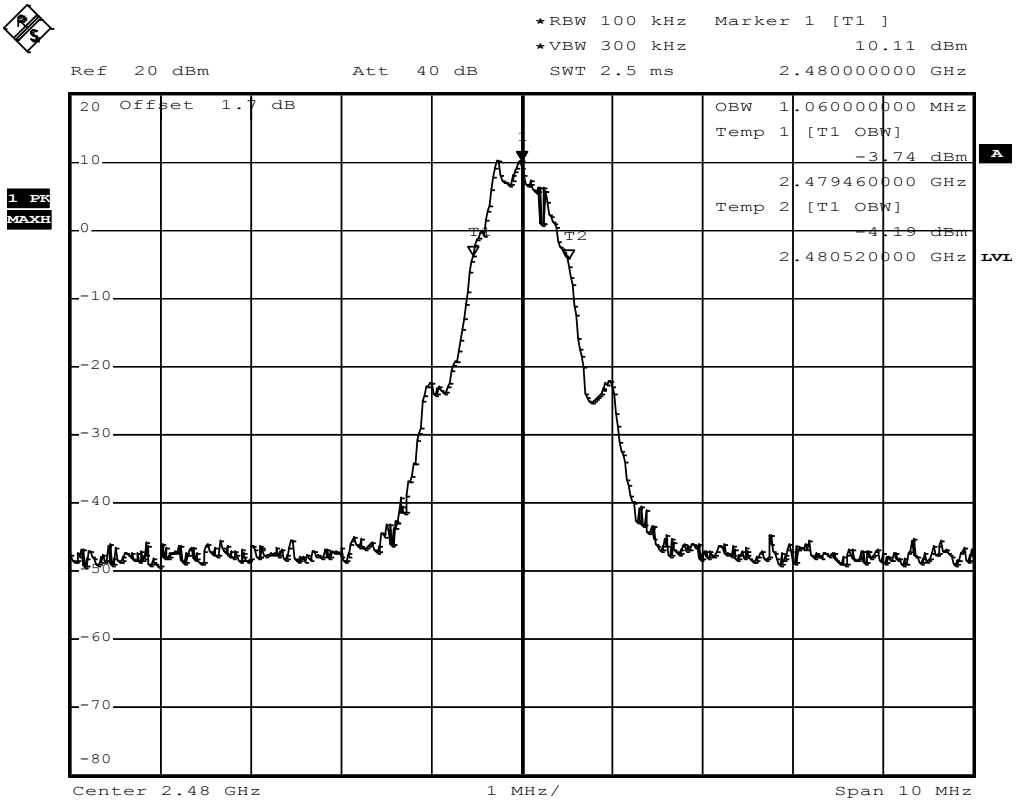



Comment: Occupied_Bandwidth_:__1060_kHz
Date: 4.APR.2013 12:39:34

## Occupied Bandwidth – $F_{HIGH}$

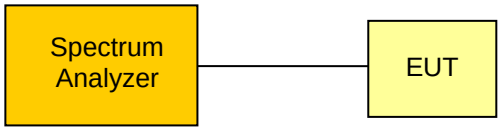
**RSS Gen**
**Occupied Bandwidth**

| | |
|---|---|
| EUT | Bluetooth Module |
| Model | PAN1316 / PAN1326 G0M-1303-2693 |
| Approval Holder | Panasonic Industrial Device Europe GmbH |
| Temperature / Voltage | Tnom / Vnom |
| Test Site / Operator | Eurofins Product Service GmbH / Mr. Pudell |
| Test Specification | 4.4.1 Occupied Bandwidth |
| Comment 1 | Channel. 39: 2480 MHz |
| Comment 2 | A spectrum analyzer with an integrated 99% power bandwidth function is used |
| Comment 3 | BLE Testmode, power level 15 |




Comment: Occupied_Bandwidth_:__1060_kHz
Date: 4.APR.2013 12:45:17

### 3.2 Test Conditions and Results – 6 dB Bandwidth

| **6dB Bandwidth acc. FCC 15.247 / IC RSS-210** | **Verdict: PASS** |
|---|---|
| EUT requirement rule parts and clause | Reference |
| | FCC 15.247(a)(2) / IC RSS-210 A8.2 |
| Test according to measurement reference | Reference Method |
| | FCC KDB Publication No. 558074 |
| Test frequency range | Tested frequencies |
| | $F_{LOW}$ / $F_{MID}$ / $F_{HIGH}$ |
| **Limits** | |
| Limit | |
| ≥ 500kHz | |
| **Test setup** | |
|   | |
| **Test procedure** | |
| 1. EUT set to test mode<br>2. Span set to at least twice the emission spectrum<br>3. Detector set to peak and max hold and RBW is set to 100 kHz<br>4. Envelope peak value of emission spectrum is selected<br>5. Marker on envelope of spectrum is set to level of -6 dB to the left of the peak<br>6. Marker on envelope of spectrum is set to level of -6 dB to the right of the peak<br>7. 6 dB Bandwidth is determined by marker frequency separation | |

**Test results**

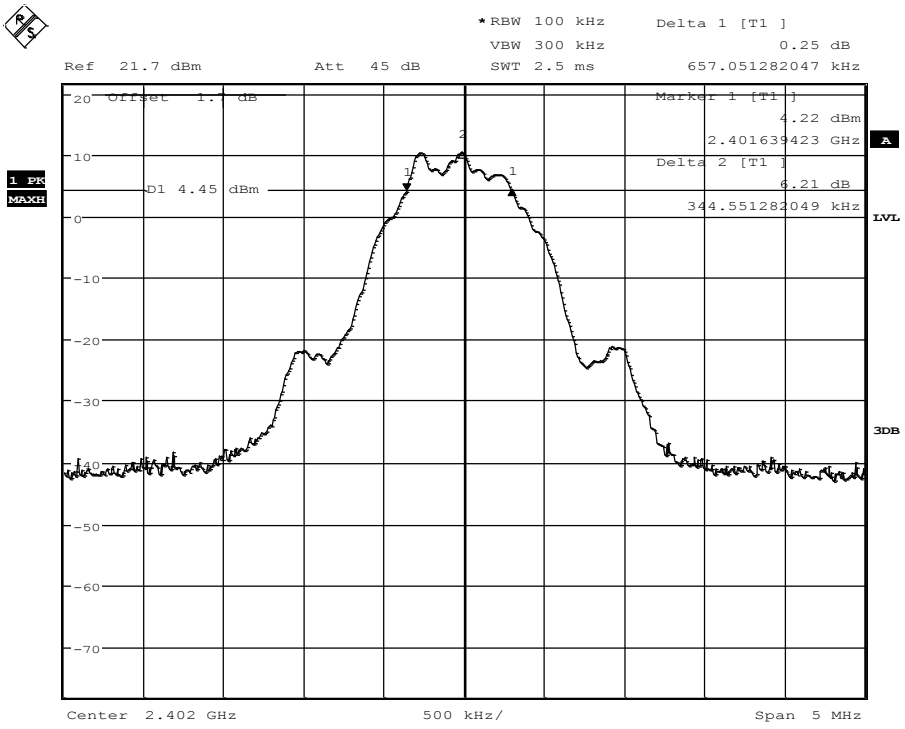
| Channel | Frequency [MHz] | Mode | 6 dB Bandwidth [kHz] | Limit [kHz] | Result |
|---|---|---|---|---|---|
| $F_{LOW}$ | 2402 | Transmit | 657.051 | 500 | PASS |
| $F_{MID}$ | 2440 | Transmit | 651.738 | 500 | PASS |
| $F_{HIGH}$ | 2480 | Transmit | 660.000 | 500 | PASS |

Comments:

## 6 dB Bandwidth – $F_{LOW}$

**FCC part 15.247 (a)2**
**Minimum 6 dB Bandwidth**

| | |
|---|---|
| EUT | Bluetooth Module |
| Model | PAN1316 / PAN1326 G0M-1303-2693 |
| Approval Holder | Panasonic Industrial Device Europe GmbH |
| Temperature / Voltage | Tnom / Vnom |
| Test Site / Operator | Eurofins Product Service GmbH / Mr. Pudell |
| Test Specification | FCC part 15.247 (a)2 |
| Comment 1 | Minimum 6 dB Bandwidth |
| Comment 2 | Channel 0: 2402 MHz |
| Comment 3 | BLE Testmode, power level 15 |

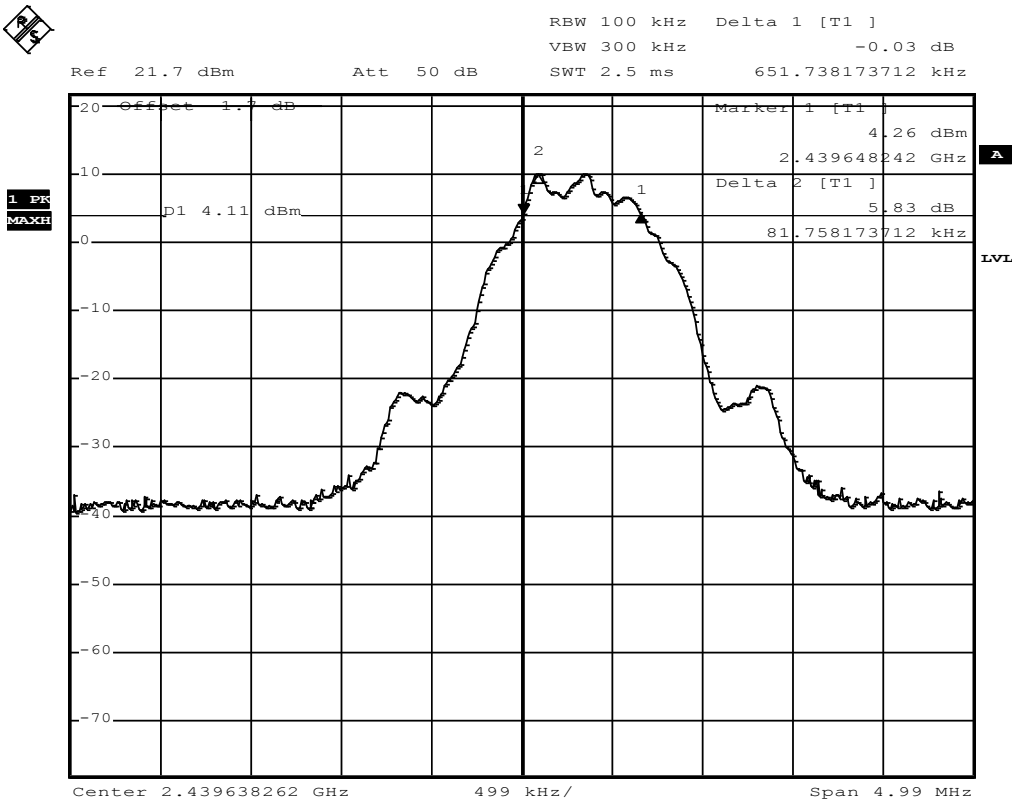



6_dB_Bandwidth_:_657.0513_kHz_>_500_kHz_____Verdict:__Pass
Date: 4.APR.2013 11:17:31

## 6 dB Bandwidth – $F_{MID}$

**FCC part 15.247 (a)2**
**Minimum 6 dB Bandwidth**

| | |
|---|---|
| EUT | Bluetooth Module |
| Model | PAN1316 / PAN1326 G0M-1303-2693 |
| Approval Holder | Panasonic Industrial Device Europe GmbH |
| Temperature / Voltage | Tnom / Vnom |
| Test Site / Operator | Eurofins Product Service GmbH / Mr. Pudell |
| Test Specification | FCC part 15.247 (a)2 |
| Comment 1 | Minimum 6 dB Bandwidth |
| Comment 2 | Channel 19: 2440 MHz |
| Comment 3 | BLE Testmode / power level 15 |

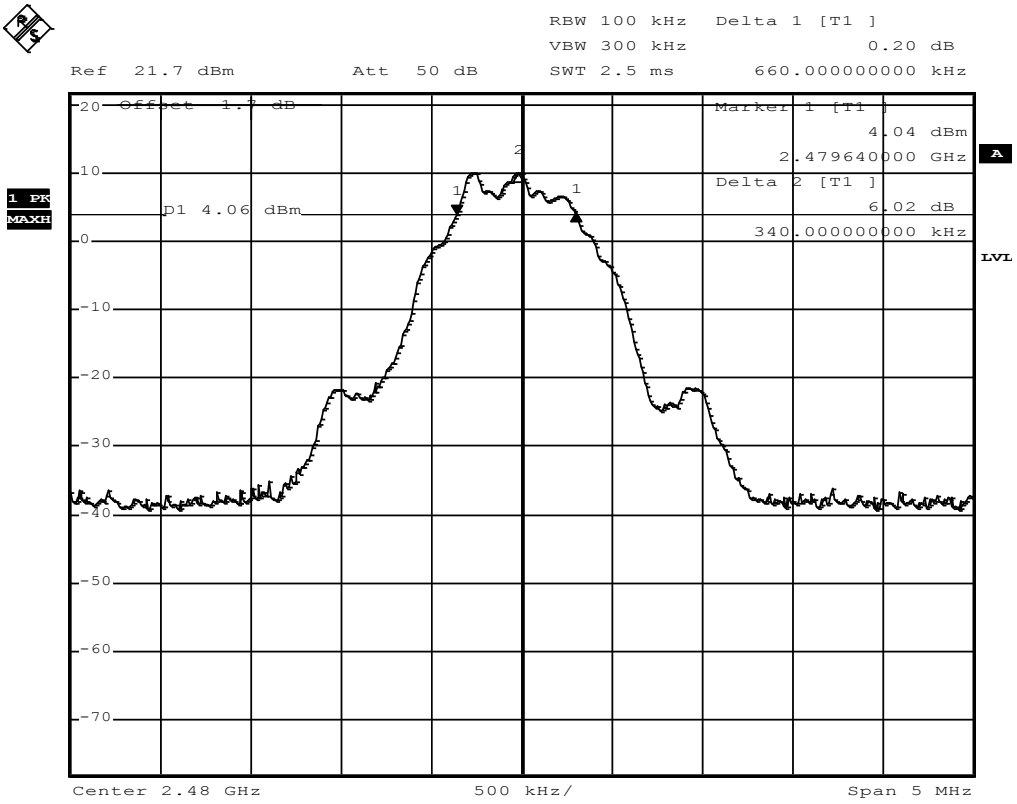



Comment: 6_dB_Bandwidth_:_651.7382_kHz_>_500_kHz_____Verdict:__Pass
Date: 4.APR.2013 13:27:20

## 6 dB Bandwidth – $F_{HIGH}$

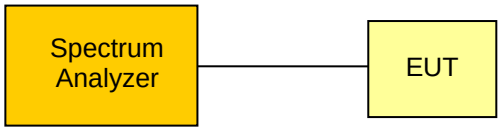
**FCC part 15.247 (a)2**
**Minimum 6 dB Bandwidth**

| | |
|---|---|
| EUT | Bluetooth Module |
| Model | PAN1316 / PAN1326 G0M-1303-2693 |
| Approval Holder | Panasonic Industrial Device Europe GmbH |
| Temperature / Voltage | Tnom / Vnom |
| Test Site / Operator | Eurofins Product Service GmbH / Mr. Pudell |
| Test Specification | FCC part 15.247 (a)2 |
| Comment 1 | Minimum 6 dB Bandwidth |
| Comment 2 | Channel 39: 2480 MHz |
| Comment 3 | BLE Testmode / power level 15 |




Comment: 6_dB_Bandwidth_:_660.0000_kHz_>_500_kHz_____Verdict:__Pass
Date: 4.APR.2013 13:15:51

### 3.3 Test Conditions and Results – Maximum peak conducted power

| **Maximum peak conducted power acc. FCC 15.247 / IC RSS-210** | **Verdict: PASS** |
|---|---|
| EUT requirement rule parts and clause | Reference |
| | FCC 15.247(b)(3) / IC RSS-210 A8.4 |
| Test according to measurement reference | Reference Method |
| | FCC KDB Publication No. 558074 |
| Test frequency range | Tested frequencies |
| | $F_{LOW}$ / $F_{MID}$ / $F_{HIGH}$ |
| Measurement mode | Peak |
| Maximum antenna gain | 0.9 dBi ⇒ Limit correction = 0 dB |
| **Limits** | |
| 1 W (30 dBm) | |
| The conducted output power limit specified above is based on the use of antennas with directional gains that do not exceed 6 dBi. 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 the table, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi. | |
| **Test setup** | |
|   | |
| **Test procedure** | |
| 1. EUT set to test mode (Communication tester is used if needed)<br>2. Center frequency set to test channel center frequency<br>3. Span set to twice the 20 dB bandwidth and detector to peak and max hold<br>4. Resolution bandwidth is set to 3 MHz<br>5. Peak conducted power is determined from peak of spectrum envelope | |

| Test results | | | | | | | |
|---|---|---|---|---|---|---|---|
| Channel | Frequency [MHz] | Voltage | Mode | Peak power [dbm] | Peak power [W] | Limit [dBm] | Margin [dB] |
| $F_{LOW}$ | 2402 | $V_{nom}$ = 3.3V | Transmit | 10.44 | 0.011 | 30 | -19.56 |
| $F_{MID}$ | 2440 | $V_{nom}$ = 3.3V | Transmit | 10.52 | 0.011 | 30 | -19.48 |
| $F_{HIGH}$ | 2480 | $V_{nom}$ = 3.3V | Transmit | 10.26 | 0.011 | 30 | -19.74 |
| $F_{LOW}$ | 2402 | $V_{min}$ = 2.0V | Transmit | 10.00 | 0.010 | 30 | -20.00 |
| $F_{MID}$ | 2440 | $V_{min}$ = 2.0V | Transmit | 10.11 | 0.010 | 30 | -19.89 |
| $F_{HIGH}$ | 2480 | $V_{min}$ = 2.0V | Transmit | 8.99 | 0.008 | 30 | -21.01 |
| $F_{LOW}$ | 2402 | $V_{max}$ = 3.6V | Transmit | 9.97 | 0.010 | 30 | -20.03 |
| $F_{MID}$ | 2440 | $V_{max}$ = 3.6V | Transmit | 10.06 | 0.010 | 30 | -19.94 |
| $F_{HIGH}$ | 2480 | $V_{max}$ = 3.6V | Transmit | 7.78 | 0.006 | 30 | -22.22 |
| Comment: | | | | | | | |

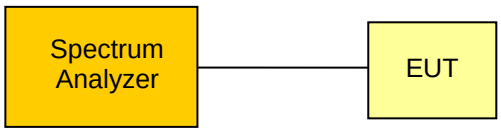
### 3.4 Test Conditions and Results – Power spectral density

| **Power spectral density acc. FCC 15.247 / IC RSS-210** | **Verdict: PASS** |
|---|---|
| EUT requirement rule parts and clause | Reference |
| | FCC 15.247(e) / IC RSS-210 A8.2 |
| Test according to measurement reference | Reference Method |
| | FCC KDB Publication No. 558074 |
| Test frequency range | Tested frequencies |
| | $F_{LOW}$ / $F_{MID}$ / $F_{HIGH}$ |
| Measurement mode | Peak |

**Limits**

8 dBm / 3 kHz

**Test setup**




**Test procedure**

1. EUT set to test mode (Communication tester is used if needed)
2. Center frequency set to test channel center frequency
3. Span is set large enough to capture maximum emissions in passband, RBW is set to 3kHz
4. Peak power density is determined from peak emission of envelope

**Test results**

| Channel | Frequency [MHz] | Test mode | Peak frequency [MHz] | Peak power density [dBm] | Limit [dBm/3kHz] | Margin [dB] |
|---|---|---|---|---|---|---|
| $F_{LOW}$ | 2402 | Transmit | 2401.978 | -4.85 | 8.0 | -12.85 |
| $F_{MID}$ | 2440 | Transmit | 2439.973 | -5.42 | 8.0 | -13.42 |
| $F_{HIGH}$ | 2480 | Transmit | 2479.979 | -5.28 | 8.0 | -13.28 |

Comments:

### 3.5 Test Conditions and Results – AC power line conducted emissions

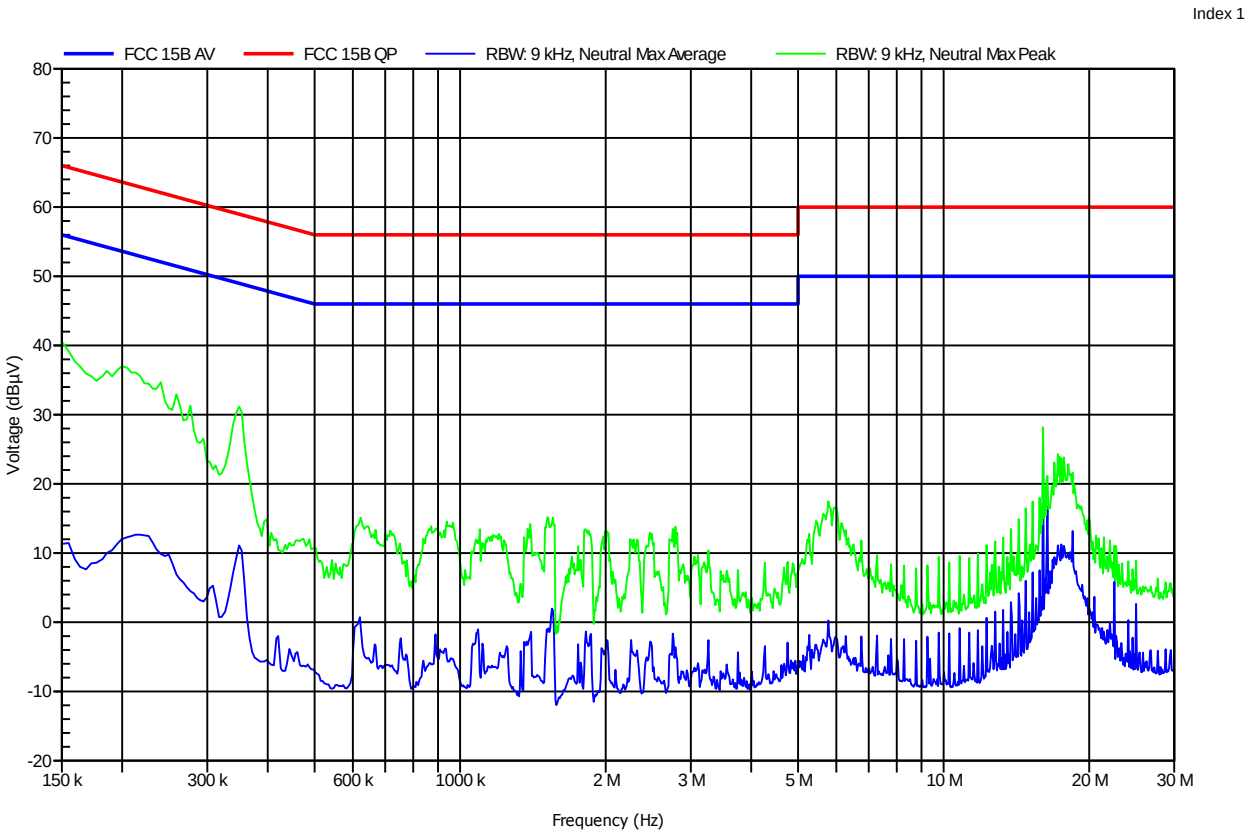
| **Power line conducted emissions acc. FCC 47 CFR 15.207 / IC RSS-Gen** | | | | **Verdict: PASS** |
|---|---|---|---|---|
| Test according referenced standards | Reference Method | | | |
| | ANSI C63.4 | | | |
| Fully configured sample scanned over the following frequency range | Frequency range | | | |
| | 0.15 MHz to 30 MHz | | | |
| Points of Application | Application Interface | | | |
| AC Mains | LISN | | | |
| EUT test mode | AC power line | | | |
| **Limits and results** | | | | |
| Frequency [MHz] | Quasi-Peak [dBµV] | Result | Average [dBµV] | Result |
| 0.15 to 5 | 66 to 56* | PASS | 56 to 46* | PASS |
| 0.5 to 5 | 56 | PASS | 46 | PASS |
| 5 to 30 | 60 | PASS | 50 | PASS |
| Comments:<br>* Limit decreases linearly with the logarithm of the frequency. | | | | |

## Conducted Emissions

**EMI voltage test in the ac-mains according to FCC part 15b**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth module |
| Model: | ENW89823C2KF/ENW89823A2KF |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Eichhorn |
| Test Conditions: | Tnom: 22°C, Unom: 120 V AC; 60 Hz |
| LISN: | ESH2-Z5 N |
| Mode: | USB at Notebook |
| Test Date: | 2013-04-12 |
| Note: | PAN1326 |

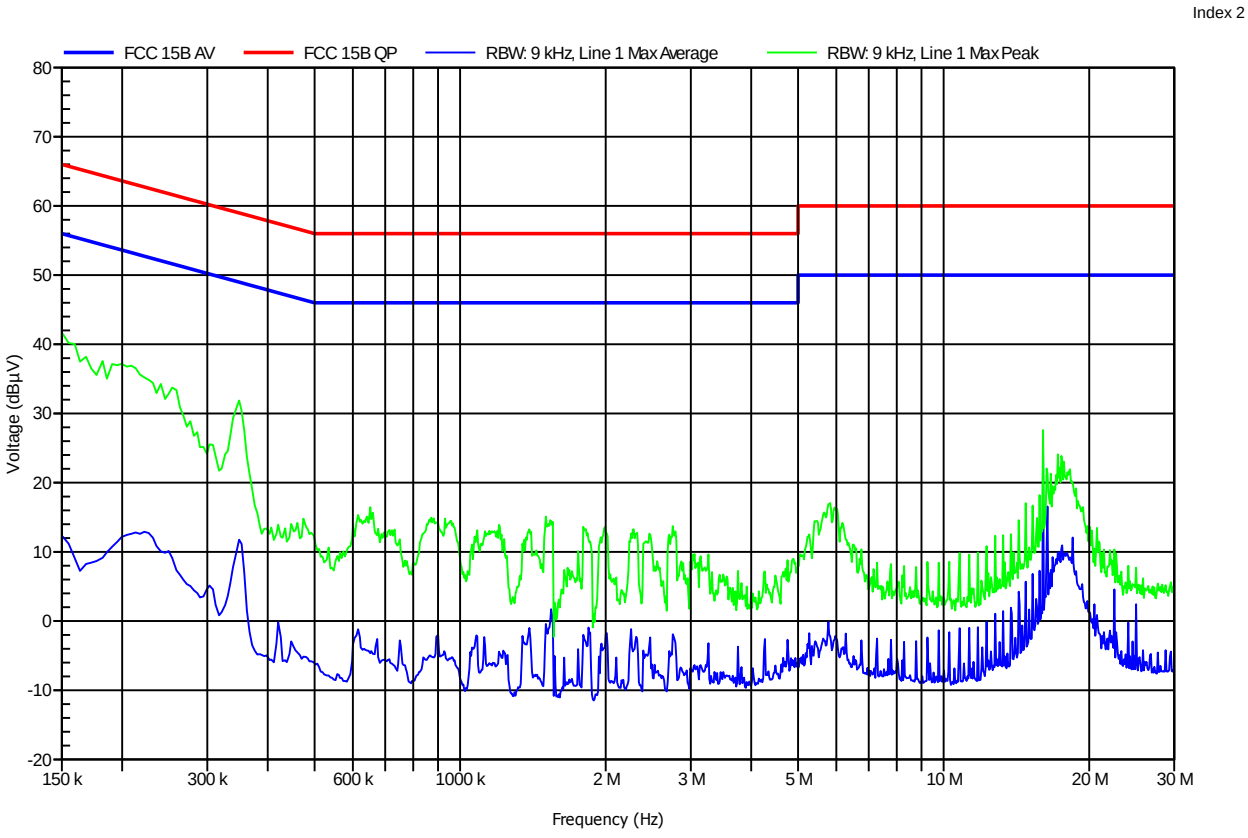


## Conducted Emissions

**EMI voltage test in the ac-mains according to FCC part 15b**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth module |
| Model: | ENW89823C2KF/ENW89823A2KF |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Eichhorn |
| Test Conditions: | Tnom: 22°C, Unom: 120 V AC; 60 Hz |
| LISN: | ESH2-Z5 L |
| Mode: | USB at Notebook |
| Test Date: | 2013-04-12 |
| Note: | PAN1326 |



## Conducted Emissions

**EMI voltage test in the ac-mains according to FCC part 15b**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth module |
| Model: | ENW89823C2KF/ENW89823A2KF |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Eichhorn |
| Test Conditions: | Tnom: 22°C, Unom: 120 V AC; 60 Hz |
| LISN: | ESH2-Z5 N |
| Mode: | USB at Notebook |
| Test Date: | 2013-04-12 |
| Note: | PAN1316 |

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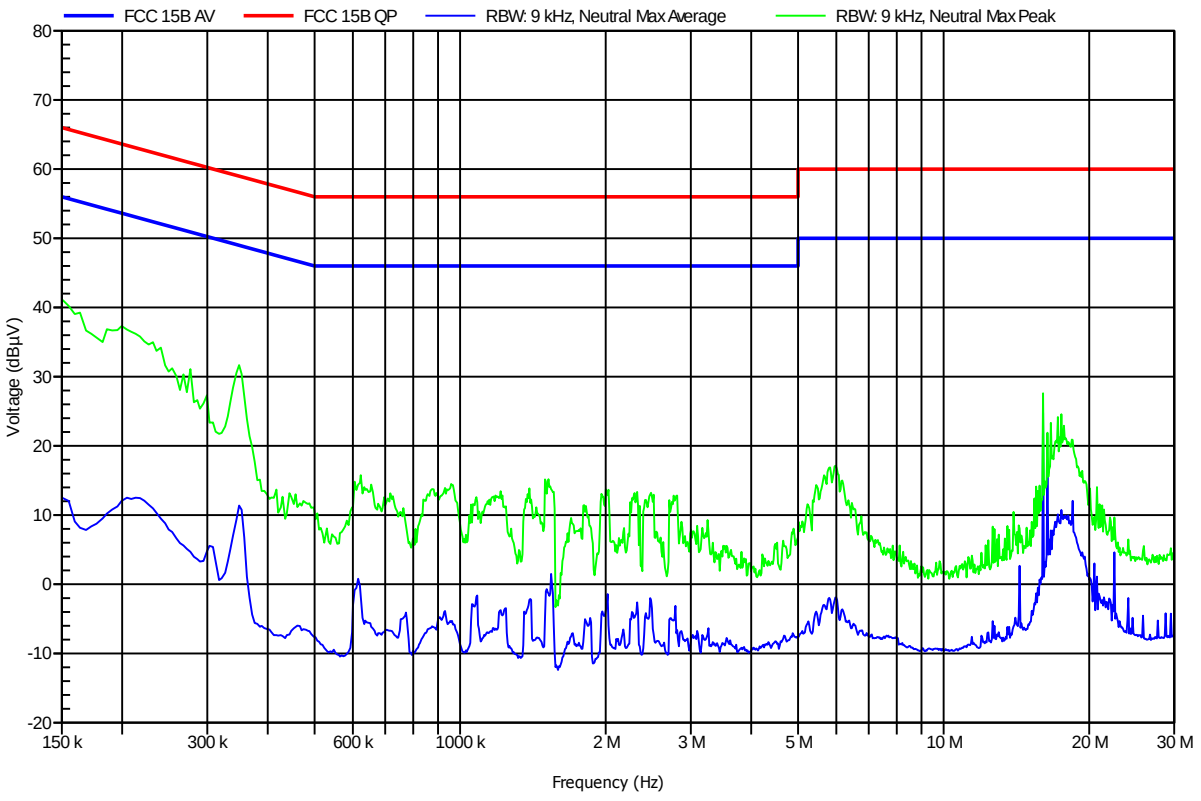

## Conducted Emissions

**EMI voltage test in the ac-mains according to FCC part 15b**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth module |
| Model: | ENW89823C2KF/ENW89823A2KF |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Eichhorn |
| Test Conditions: | Tnom: 22°C, Unom: 120 V AC; 60 Hz |
| LISN: | ESH2-Z5 L |
| Mode: | USB at Notebook |
| Test Date: | 2013-04-12 |
| Note: | PAN1316 |

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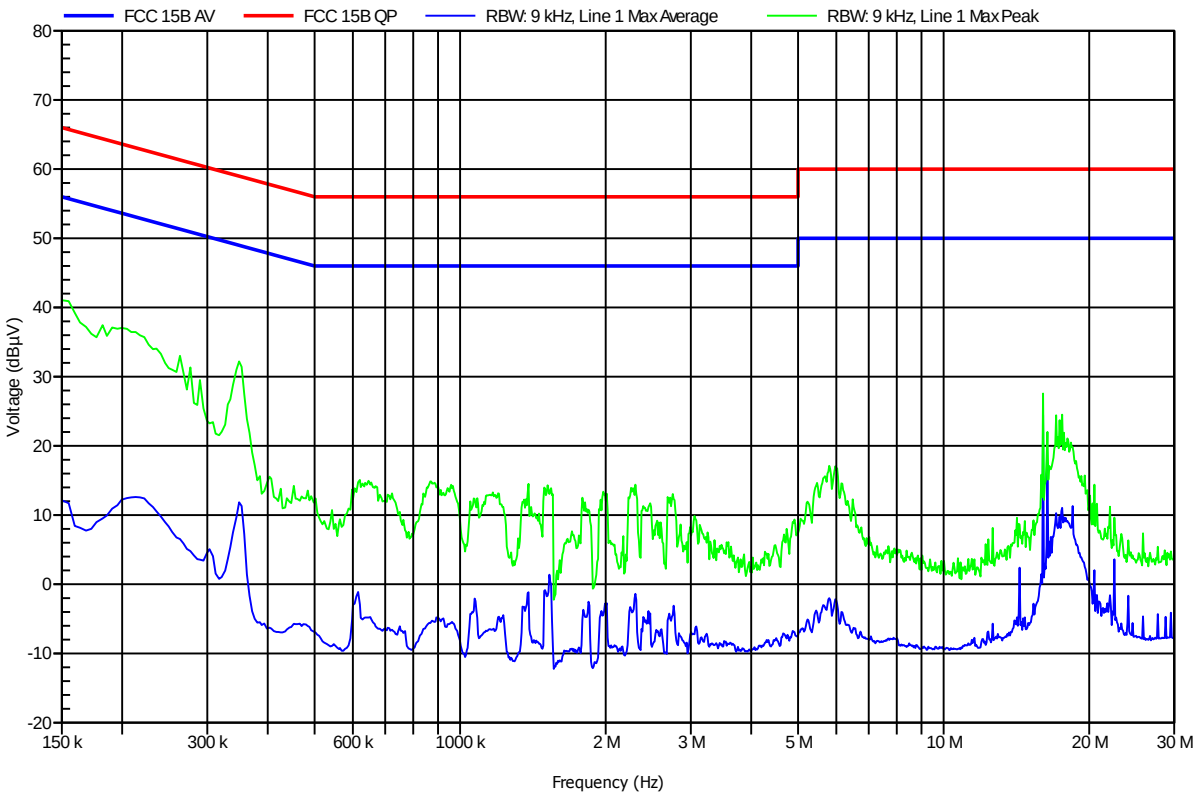


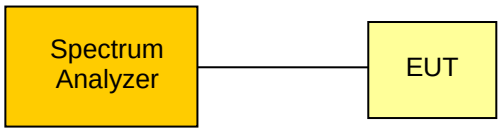
### 3.6 Test Conditions and Results – Band edge compliance

| **Band-edge compliance acc. FCC 15.247 / IC RSS-210** | **Verdict: PASS** |
|---|---|
| EUT requirement rule parts and clause | Reference |
| | FCC 15.247(d) / IC RSS-210 A8.5 |
| Test according to measurement reference | Reference Method |
| | FCC KDB Publication No. 558074 |
| Test frequency range | Tested frequencies |
| | $F_{LOW}$ / $F_{HIGH}$ |
| Measurement mode | Peak |

**Limits**

| Limit | Condition |
|---|---|
| ≤ -20 dB / 100 kHz | Peak power measurement detector = Peak |
| ≤ -30 dB / 100 kHz | Peak power measurement detector = RMS |

**Test setup**




**Test procedure**

1. EUT set to test mode (Communication tester is used if needed)
2. Span set around lower band edge and detector is set to peak and max hold
3. Resolution bandwidth is set to 100 kHz
4. Markers are set to peak emission levels within frequency band and outside frequency band
5. Band edge attenuation is determined from level difference

**Test results**

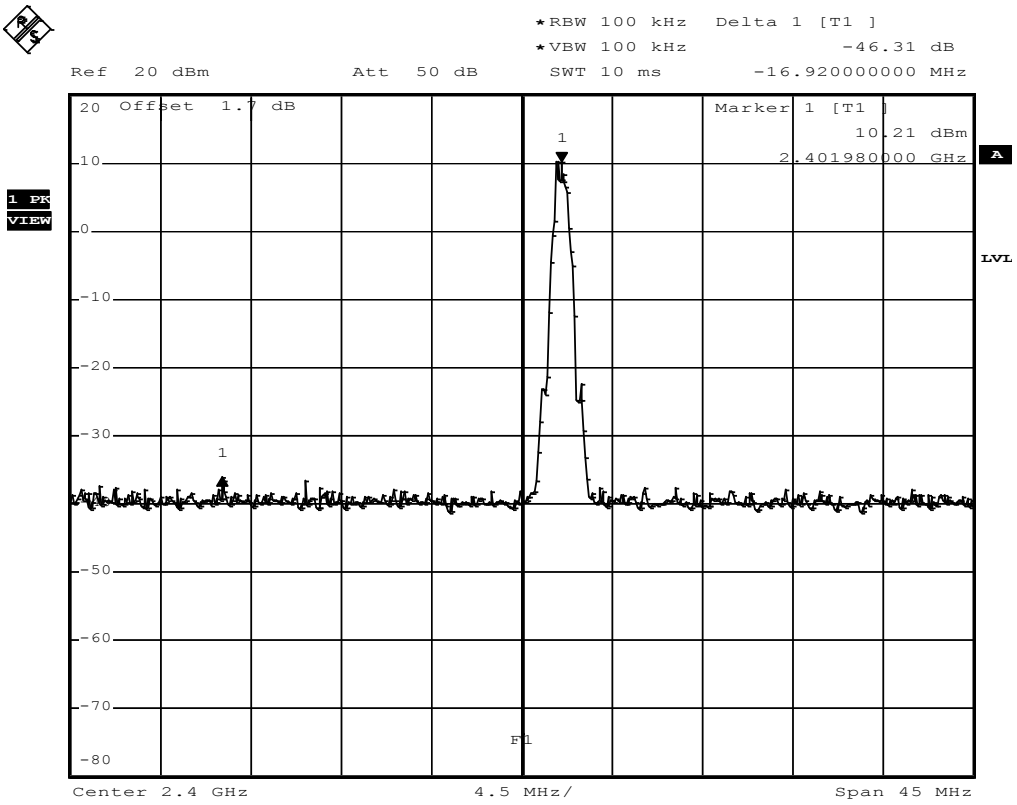
| Channel | Frequency [MHz] | Mode | Level [dBc] | Limit [dBc] | Margin [dB] |
|---|---|---|---|---|---|
| $F_{LOW}$ | 2402 | Transmit | -46.31 | -20 | -26.31 |
| $F_{HIGH}$ | 2480 | Transmit | -47.85 | -20 | -27.85 |

Comments:

## Band-edge compliance

**FCC part 15.247**
**Band-edge compliance of RF conducted emissions**

| | |
|---|---|
| EUT | Bluetooth Module |
| Model | PAN1316 / PAN1326 G0M-1303-2693 |
| Approval Holder | Panasonic Industrial Device Europe GmbH |
| Temperature / Voltage | Tnom / Vnom |
| Test Site / Operator | Eurofins Product Service GmbH / Mr. Pudell |
| Test Specification | FCC part 15 section 247(c) |
| Comment 1 | Band-edge compliance |
| Comment 2 | Channel. 0: 2402 MHz |
| Comment 3 | BLE Testmode, power level 15 |

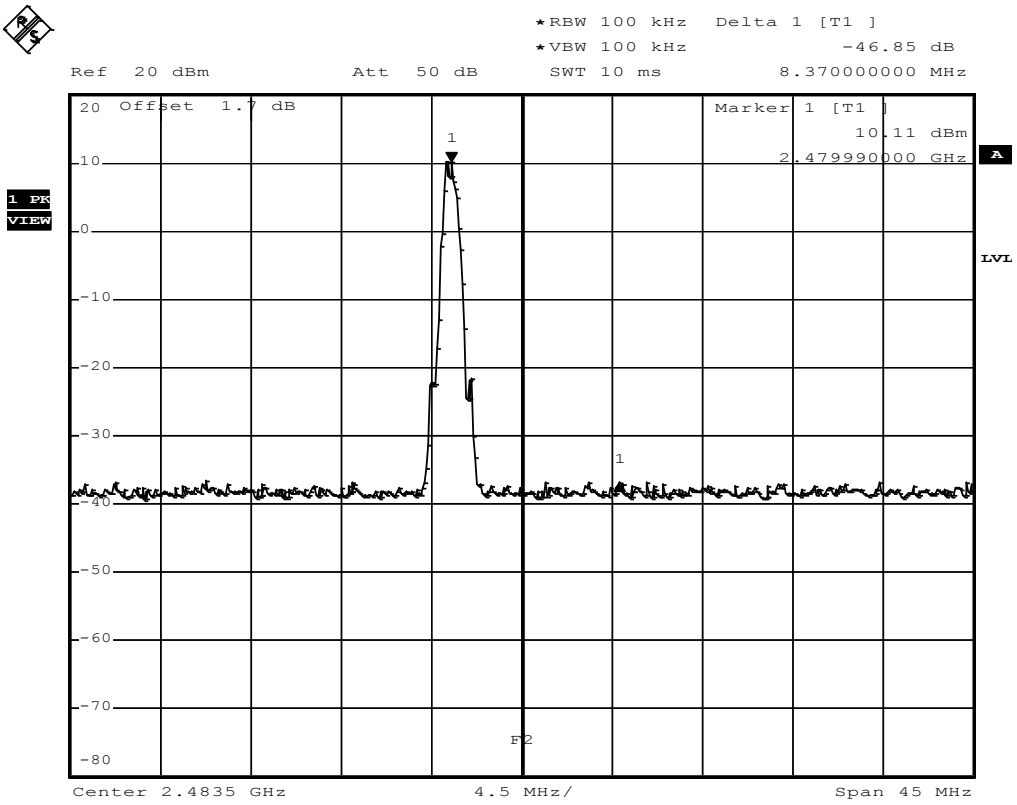



Comment: Limit: Marker Delta value >20 dB; Result: PASS
Date: 4.APR.2013 12:18:13

## Band-edge compliance

**FCC part 15.247**
**Band-edge compliance of RF conducted emissions**

| | |
|---|---|
| EUT | Bluetooth Module |
| Model | PAN1316 / PAN1326 G0M-1303-2693 |
| Approval Holder | Panasonic Industrial Device Europe GmbH |
| Temperature / Voltage | Tnom / Vnom |
| Test Site / Operator | Eurofins Product Service GmbH / Mr. Pudell |
| Test Specification | FCC part 15 section 247(c) |
| Comment 1 | Band-edge compliance |
| Comment 2 | Channel. 39: 2480 MHz |
| Comment 3 | BLE Testmode, power level 15 |




Comment: Limit: Marker Delta value >20 dB; Result: PASS
Date: 4.APR.2013 12:51:25

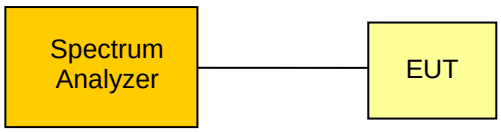
### 3.7 Test Conditions and Results – Conducted spurious emissions

| **Conducted spurious emissions acc. FCC 15.247 / IC RSS-210** | **Verdict: PASS** |
|---|---|
| EUT requirement rule parts and clause | Reference |
| | FCC 15.247(d) / IC RSS-210 A8.5 |
| Test according to measurement reference | Reference Method |
| | FCC KDB Publication No. 558074 |
| Test frequency range | Tested frequencies |
| | 10 MHz – 10$^{th}$ Harmonic |
| Measurement mode | Peak |

**Limits**

| Limit | Condition |
|---|---|
| ≤ -20 dB / 100 kHz | Peak power measurement detector = Peak |
| ≤ -30 dB /100 kHz | Peak power measurement detector = RMS |

**Test setup**




**Test procedure**

1. EUT set to test mode (Communication tester is used if needed)
2. Span it set according to measurement range
3. Resolution bandwidth is set to 100 kHz and detector to peak and max hold
4. Markers are set to peak emission levels within frequency band
5. Emission level is determined by second marker on emission peak
6. Attenuation is determined from level difference

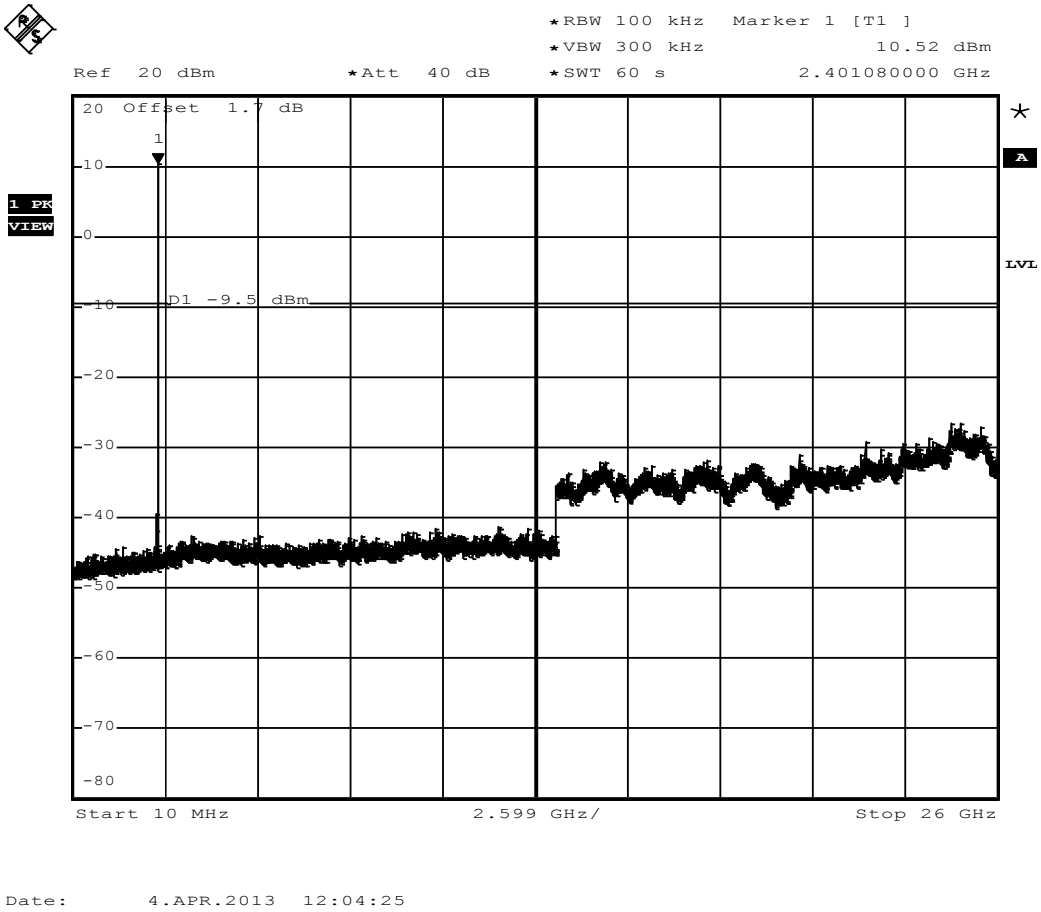
**Test results**

| Channel | Frequency [MHz] | Mode | Emission [MHz] | Emission Level [dbm] | Peak power [dBm] | Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| $F_{LOW}$ | 2402 | no significant spurious emissions | | | | | |
| $F_{MID}$ | 2440 | no significant spurious emissions | | | | | |
| $F_{HIGH}$ | 2480 | no significant spurious emissions | | | | | |
| Comments: | | | | | | | |

## Conducted spurious emissions – $F_{LOW}$

**FCC part 15.247 (d)**
**Spurious Emissions**

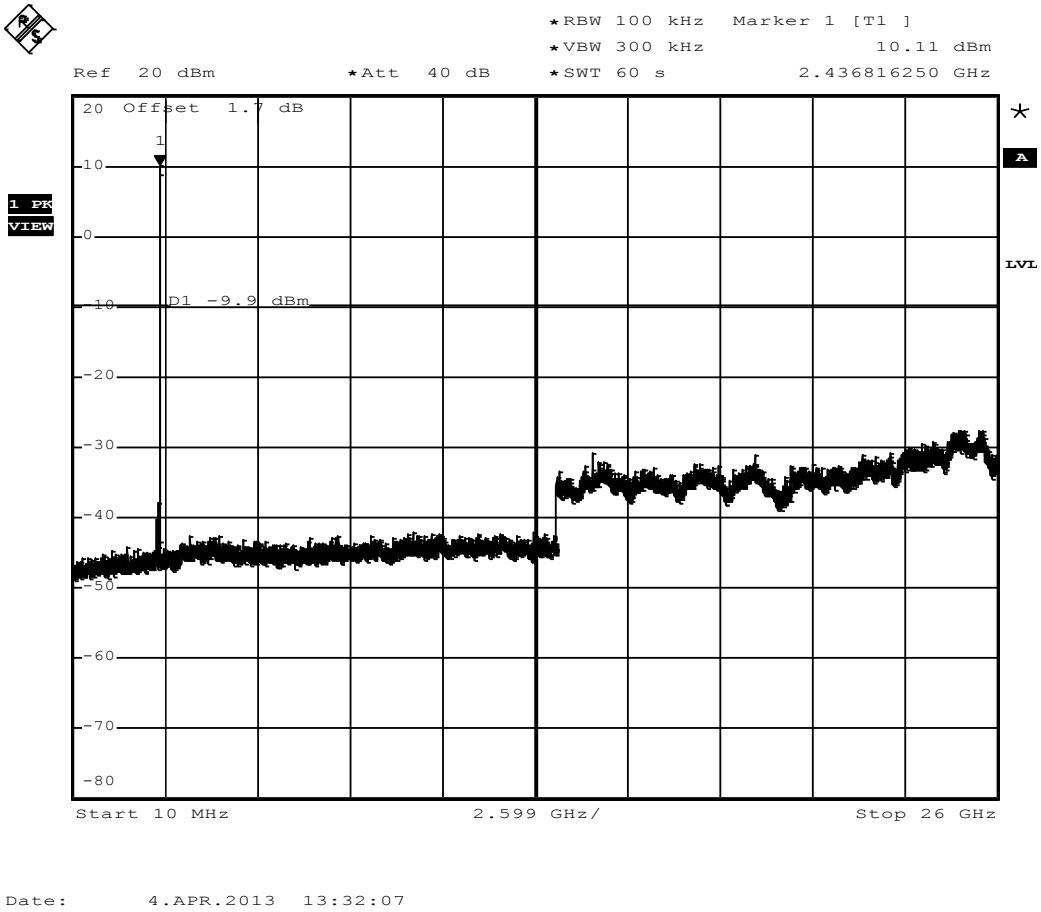
| | |
|---|---|
| EUT | Bluetooth Module |
| Model | PAN1316 / PAN1326 G0M-1303-2693 |
| Approval Holder | Panasonic Industrial Device Europe GmbH |
| Temperature / Voltage | Tnom / Vnom |
| Test Site / Operator | Eurofins Product Service GmbH / Mr. Pudell |
| Test Specification | FCC part 15.247 (d) |
| Comment 1 | Spurious Emissions conducted |
| Comment 2 | Channel : 2402 MHz |
| Comment 3 | BLE Testmode / power level 15 |



## Conducted spurious emissions – $F_{MID}$

**FCC part 15.247 (d)**
**Spurious Emissions**

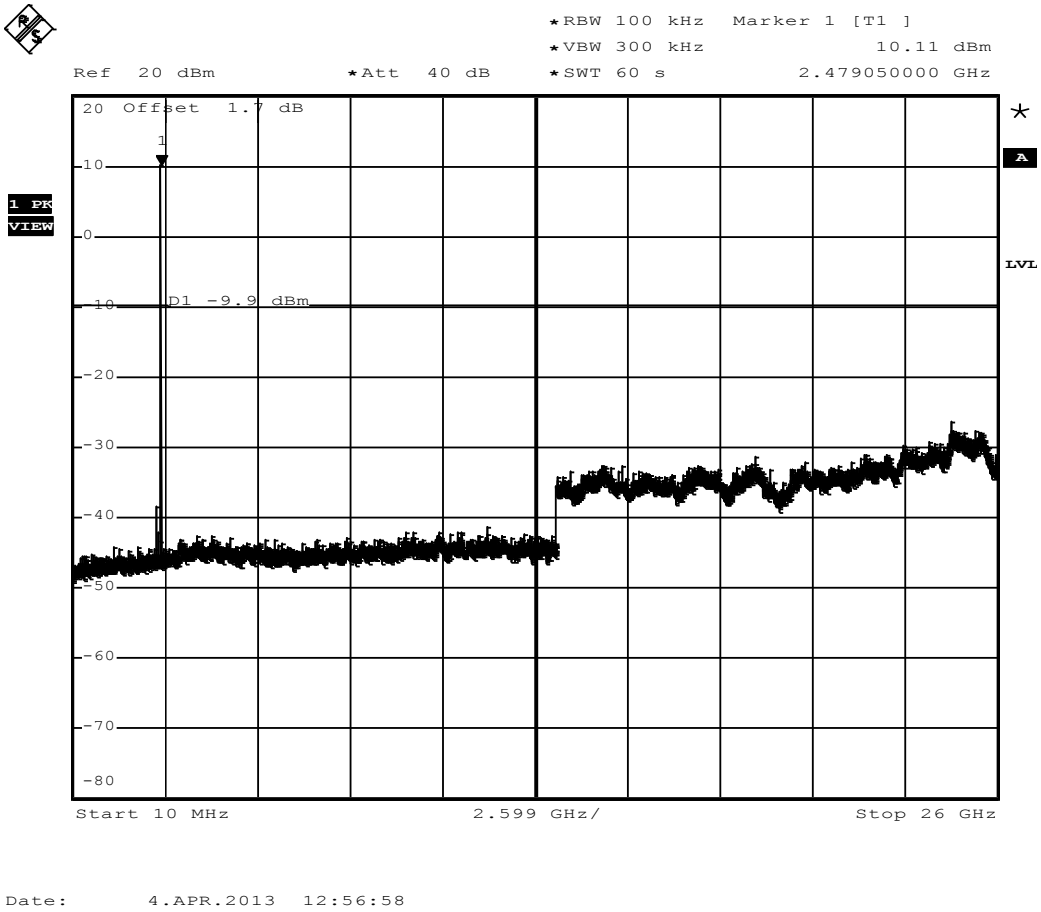
| | |
|---|---|
| EUT | Bluetooth Module |
| Model | PAN1316 / PAN1326 G0M-1303-2693 |
| Approval Holder | Panasonic Industrial Device Europe GmbH |
| Temperature / Voltage | Tnom / Vnom |
| Test Site / Operator | Eurofins Product Service GmbH / Mr. Pudell |
| Test Specification | FCC part 15.247 (d) |
| Comment 1 | Spurious Emissions conducted |
| Comment 2 | Channel 19: 2440 MHz |
| Comment 3 | BLE Testmode / power level 15 |



## Conducted spurious emissions – $F_{HIGH}$

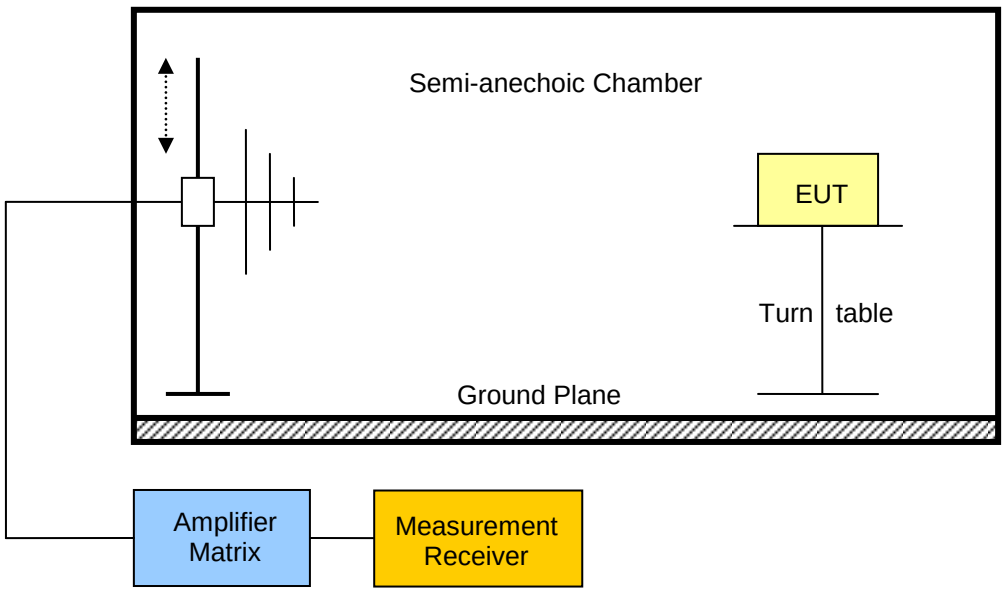
**FCC part 15.247 (d)**
**Spurious Emissions**

| | |
|---|---|
| EUT | Bluetooth Module |
| Model | PAN1316 / PAN1326 G0M-1303-2693 |
| Approval Holder | Panasonic Industrial Device Europe GmbH |
| Temperature / Voltage | Tnom / Vnom |
| Test Site / Operator | Eurofins Product Service GmbH / Mr. Pudell |
| Test Specification | FCC part 15.247 (d) |
| Comment 1 | Spurious Emissions conducted |
| Comment 2 | Channel 39: 2480 MHz |
| Comment 3 | BLE Testmode / power level 15 |



### 3.8 Test Conditions and Results – Transmitter radiated emissions

| **Transmitter radiated emissions acc. FCC 47 CFR 15.247 / IC RSS-210** | | | | **Verdict: PASS** |
|---|---|---|---|---|
| Test according referenced standards | | Reference Method | | |
| | | FCC 15.247(d) / IC RSS-210 A8.5 | | |
| Test according to measurement reference | | Reference Method | | |
| | | FCC KDB Publication No. 558074 / ANSI C63.4 | | |
| Test frequency range | | Tested frequencies | | |
| | | 30 MHz – 10th Harmonic | | |
| **Limits** | | | | |
| Frequency range [MHz] | Detector | Limit [µV/m] | Limit [dBµV/m] | Limit Distance [m] |
| 30 – 88 | Quasi-Peak | 100 | 40 | 3 |
| 88 – 216 | Quasi-Peak | 150 | 43.5 | 3 |
| 216 – 960 | Quasi-Peak | 200 | 46 | 3 |
| 960 – 1000 | Quasi-Peak | 500 | 54 | 3 |
| > 1000 | Average | 500 | 54 | 3 |
| Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).<br>When average radiated emission measurements are specified, including average emission measurements below 1000 MHz, there also is a limit on the peak level of the radio frequency emissions. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test. | | | | |
| **Test setup** | | | | |



| Test procedure |
|---|
| 1. EUT set to test mode (Communication tester is used if needed)<br>2. Span it set according to measurement range<br>3. Resolution bandwidth below 1 GHz is set according to CISPR 16 with peak/quasi-peak detector and RBW of 1 MHz with peak/average detector is used above 1 GHz<br>4. Markers are set to peak emission levels within restricted bands |

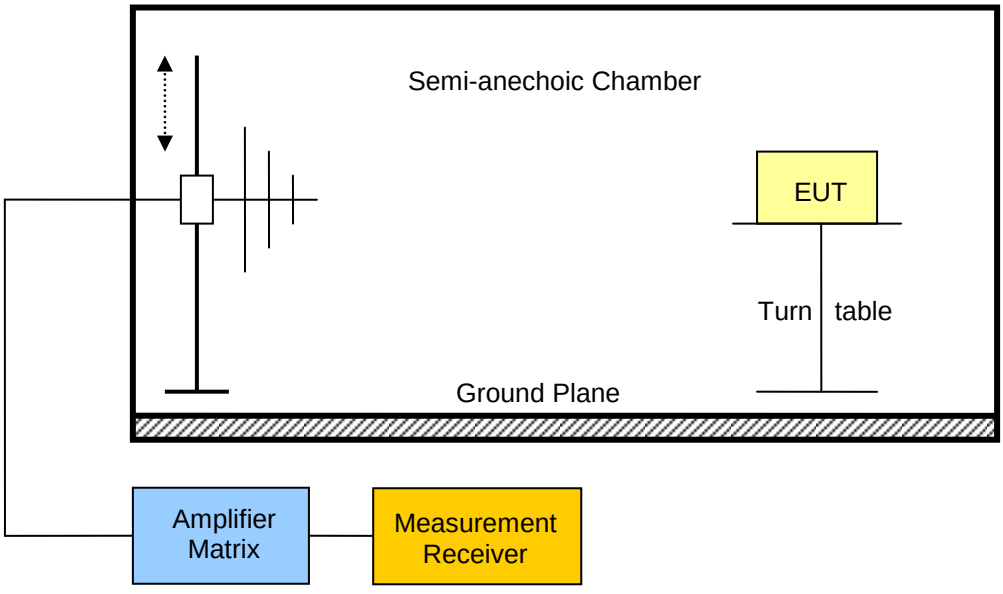
**Test results**

| Channel | Frequency [MHz] | Mode | Emission [MHz] | Level [dbµV/m] | Det. | Pol. | Limit [dbµV/m] | Limit dist. [m]* | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|
| $F_{LOW}$ | 2402 | Transmit | 2325 | 55.20 | pk | hor | 74.00 | 3 | -18.80 |
| $F_{LOW}$ | 2402 | Transmit | 2325 | 26.01 | avg | hor | 54.00 | 3 | -27.99 |
| $F_{LOW}$ | 2402 | Transmit | 2377 | 57.33 | pk | hor | 74.00 | 3 | -16.67 |
| $F_{LOW}$ | 2402 | Transmit | 2377 | 25.72 | avg | hor | 54.00 | 3 | -28.28 |
| $F_{LOW}$ | 2402 | Transmit | 2389 | 54.95 | pk | hor | 74.00 | 3 | -19.05 |
| $F_{LOW}$ | 2402 | Transmit | 2389 | 27.70 | avg | hor | 54.00 | 3 | -26.30 |
| $F_{LOW}$ | 2402 | Transmit | 4804 | 55.93 | pk | ver | 74.00 | 3 | -18.07 |
| $F_{LOW}$ | 2402 | Transmit | 4804 | 42.04 | avg | ver | 54.00 | 3 | -11.96 |
| $F_{LOW}$ | 2402 | Transmit | 4804 | 55.05 | pk | hor | 74.00 | 3 | -18.95 |
| $F_{LOW}$ | 2402 | Transmit | 4804 | 39.43 | avg | hor | 54.00 | 3 | -14.57 |
| $F_{LOW}$ | 2402 | Transmit | 14400 | 67.11 | pk | ver | 95.00 | 3 | -27.89 |
| $F_{MID}$ | 2440 | Transmit | 2325 | 54.66 | pk | hor | 74.00 | 3 | -19.34 |
| $F_{MID}$ | 2440 | Transmit | 2325 | 25.86 | avg | hor | 54.00 | 3 | -28.14 |
| $F_{MID}$ | 2440 | Transmit | 2389 | 54.43 | pk | hor | 74.00 | 3 | -19.57 |
| $F_{MID}$ | 2440 | Transmit | 2389 | 27.65 | avg | hor | 54.00 | 3 | -26.35 |
| $F_{MID}$ | 2440 | Transmit | 2490.7 | 54.98 | pk | hor | 74.00 | 3 | -19.02 |
| $F_{MID}$ | 2440 | Transmit | 2490.7 | 27.05 | avg | hor | 54.00 | 3 | -26.95 |
| $F_{MID}$ | 2440 | Transmit | 4880 | 54.85 | pk | ver | 74.00 | 3 | -19.15 |
| $F_{MID}$ | 2440 | Transmit | 4880 | 40.71 | avg | ver | 54.00 | 3 | -13.29 |
| $F_{MID}$ | 2440 | Transmit | 4880 | 57.21 | pk | hor | 74.00 | 3 | -16.79 |
| $F_{MID}$ | 2440 | Transmit | 4880 | 41.56 | avg | hor | 54.00 | 3 | -12.44 |
| $F_{MID}$ | 2440 | Transmit | 7320 | 57.78 | pk | hor | 74.00 | 3 | -16.22 |
| $F_{MID}$ | 2440 | Transmit | 7320 | 42.57 | avg | hor | 54.00 | 3 | -11.43 |
| $F_{MID}$ | 2440 | Transmit | 7321 | 65.45 | pk | ver | 74.00 | 3 | -08.55 |
| $F_{MID}$ | 2440 | Transmit | 7321 | 46.81 | avg | ver | 54.00 | 3 | -07.19 |
| $F_{MID}$ | 2440 | Transmit | 14640 | 70.53 | pk | ver | 95.00 | 3 | -24.47 |
| $F_{HIGH}$ | 2480 | Transmit | 2500 | 40.40 | pk | hor | 95.00 | 3 | -54.60 |

Comments: * Physical distance between EUT and measurement antenna.

### 3.9 Test Conditions and Results – Receiver radiated emissions

| **Receiver radiated emissions acc. IC RSS-210** | | | | **Verdict: PASS** |
|---|---|---|---|---|
| Test according referenced standards | Reference Method | | | |
| | IC RSS-210 A8.5 | | | |
| Test according to measurement reference | Reference Method | | | |
| | ANSI C63.4 | | | |
| Test frequency range | Tested frequencies | | | |
| | 30 MHz – 3th Harmonic | | | |
| EUT test mode | Receive | | | |
| **Limits** | | | | |
| Frequency range [MHz] | Detector | Limit [µV/m] | Limit [dBµV/m] | Limit Distance [m] |
| 30 – 88 | Quasi-Peak | 100 | 40 | 3 |
| 88 – 216 | Quasi-Peak | 150 | 43.5 | 3 |
| 216 – 960 | Quasi-Peak | 200 | 46 | 3 |
| 960 – 1000 | Quasi-Peak | 500 | 54 | 3 |
| > 1000 | Average | 500 | 54 | 3 |
| **Test setup** | | | | |



| Test procedure |
|---|
| 1. EUT set to receive mode (Communication tester is used if needed)<br>2. Span it set according to measurement range<br>3. Resolution bandwidth below 1 GHz is set according to CISPR 16 with peak/quasi-peak detector and RBW of 1 MHz with peak/average detector is used above 1 GHz<br>4. Markers are set to peak emission levels |

**Test results**

| Channel | Frequency [MHz] | Emission [MHz] | Emission Level [dbµV/m] | Emission Level [µV/m] | Det. | Limit [µV/m] | Margin [µV/m] |
|---|---|---|---|---|---|---|---|
| $F_{MID}$ | 2440 | 885.167 | 35.38 | 58.7 | pk | 200 | -141.30 |
| $F_{MID}$ | 2440 | 4880 | 49.00 | 281.8 | pk | 500 | -218.20 |
| $F_{MID}$ | 2440 | 4880 | 50.97 | 353.6 | pk | 500 | -146.40 |

Comments:
* Physical distance between EUT and measurement antenna.
** Emission level corresponds to ambient noise floor

# ANNEX A Transmitter radiated spurious emissions

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Rohde & Schwarz HK 116, Vertical |
| Measurement distance: | 3 m |
| Mode: | TX; 2402 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | worst case |

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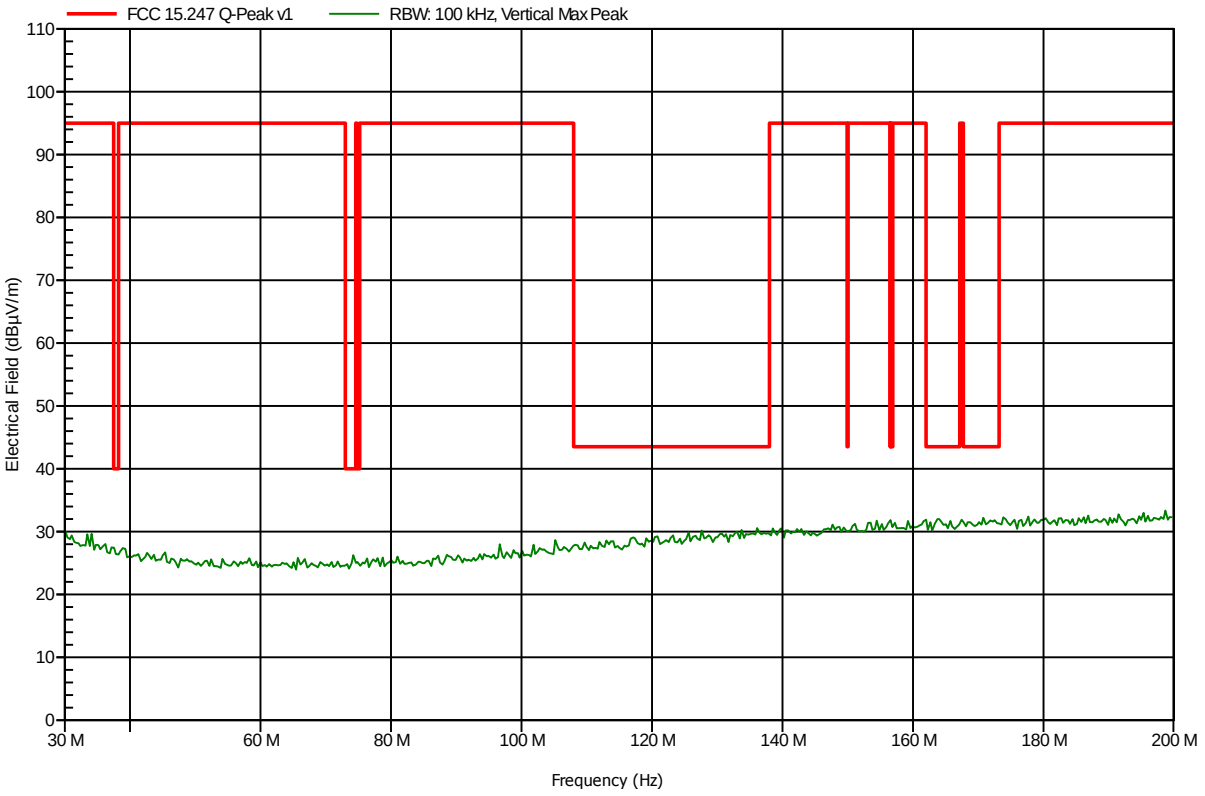

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Rohde & Schwarz HK 116, Horizontal |
| Measurement distance: | 3 m |
| Mode: | TX; 2402 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | worst case |

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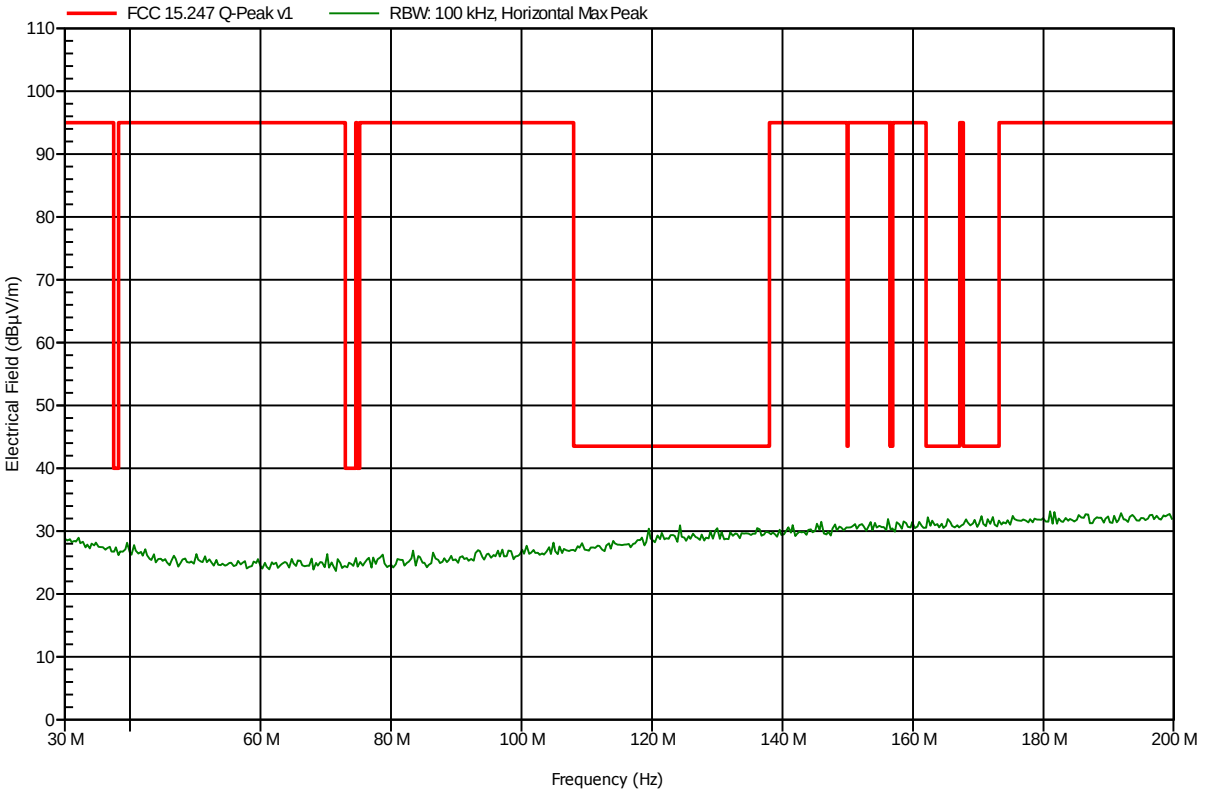

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Rohde & Schwarz HL 223, Vertical |
| Measurement distance: | 3 m |
| Mode: | TX; 2402 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | |

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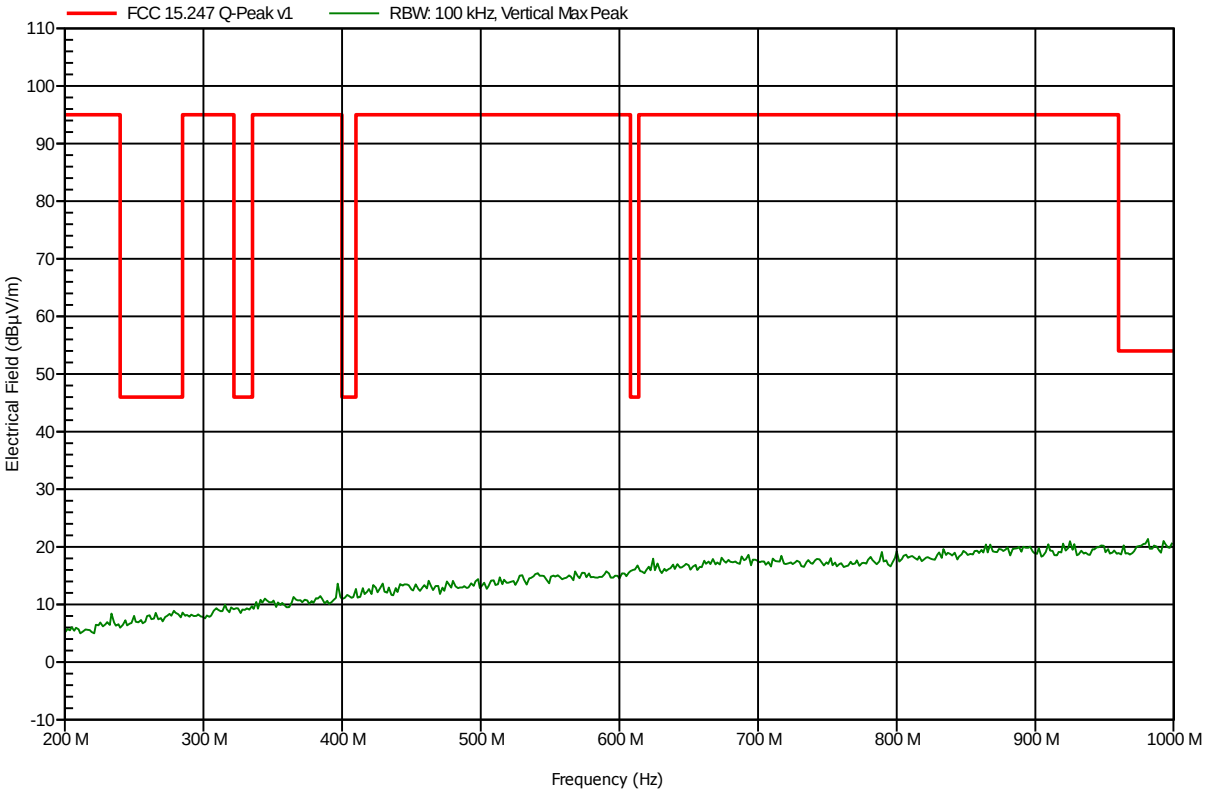

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Rohde & Schwarz HL 223, Horizontal |
| Measurement distance: | 3 m |
| Mode: | TX; 2402 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | |

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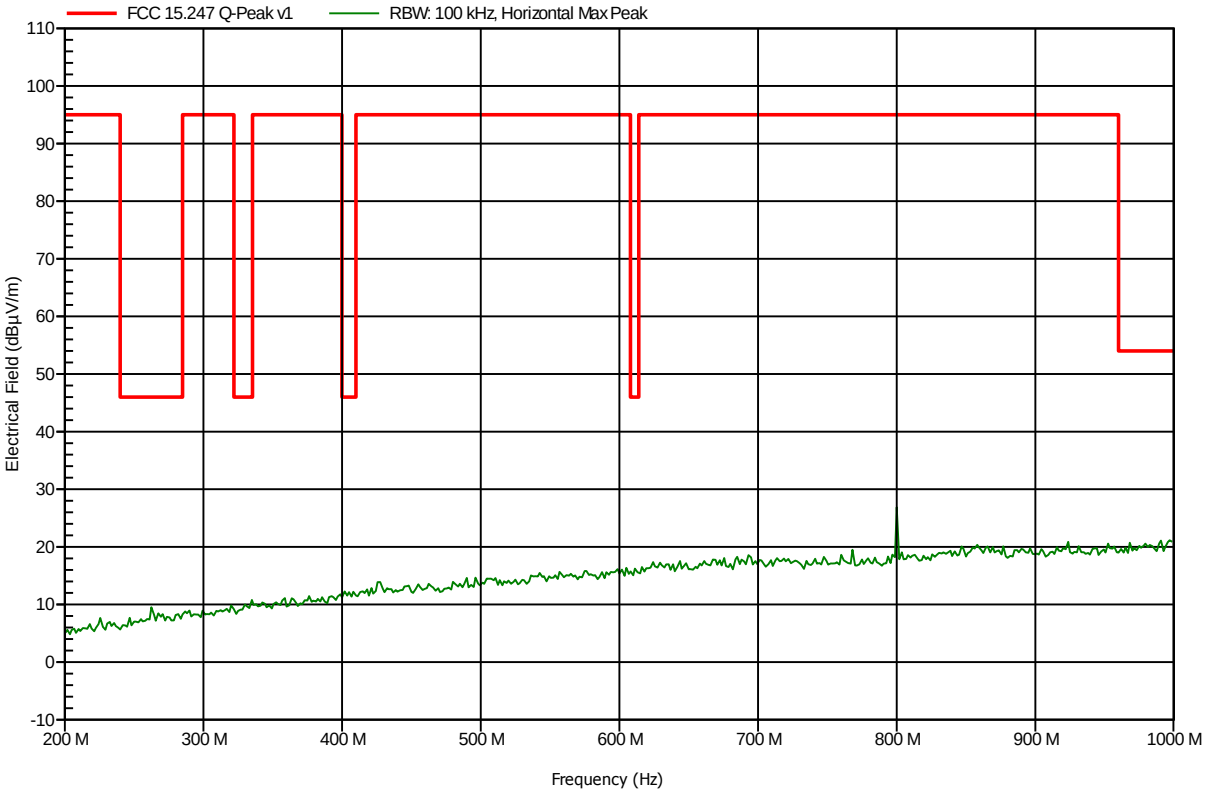

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Rohde & Schwarz HL 223, Vertical |
| Measurement distance: | 3 m |
| Mode: | TX; 2440 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | |

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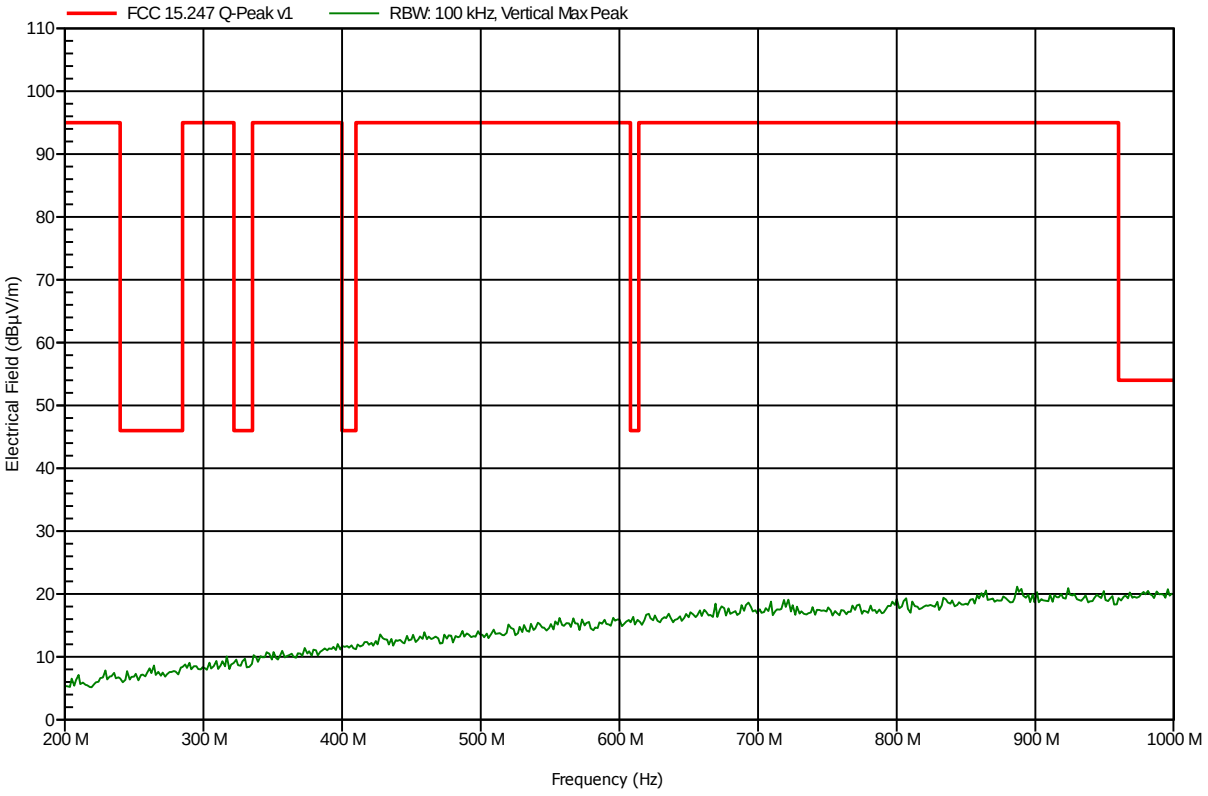

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Rohde & Schwarz HL 223, Horizontal |
| Measurement distance: | 3 m |
| Mode: | TX; 2440 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | |

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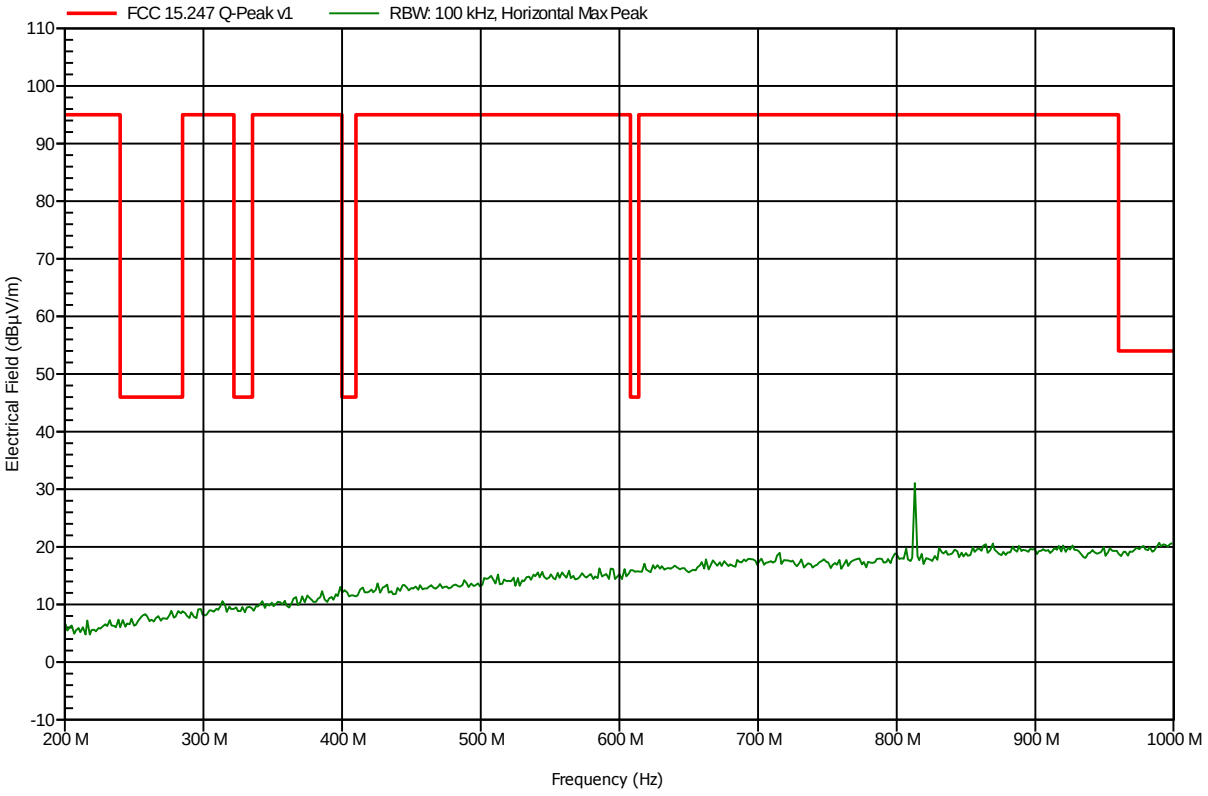

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Rohde & Schwarz HL 223, Vertical |
| Measurement distance: | 3 m |
| Mode: | TX; 2480 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | |

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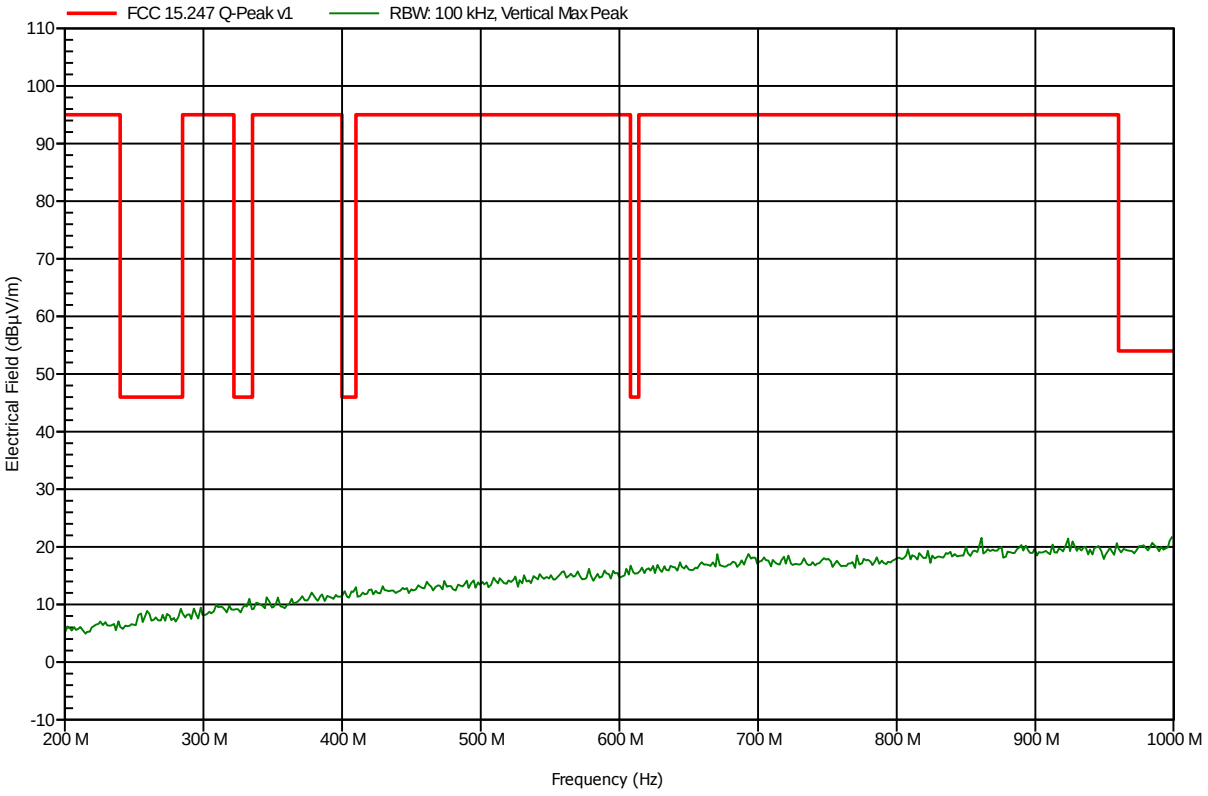

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Rohde & Schwarz HL 223, Horizontal |
| Measurement distance: | 3 m |
| Mode: | TX; 2480 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | |

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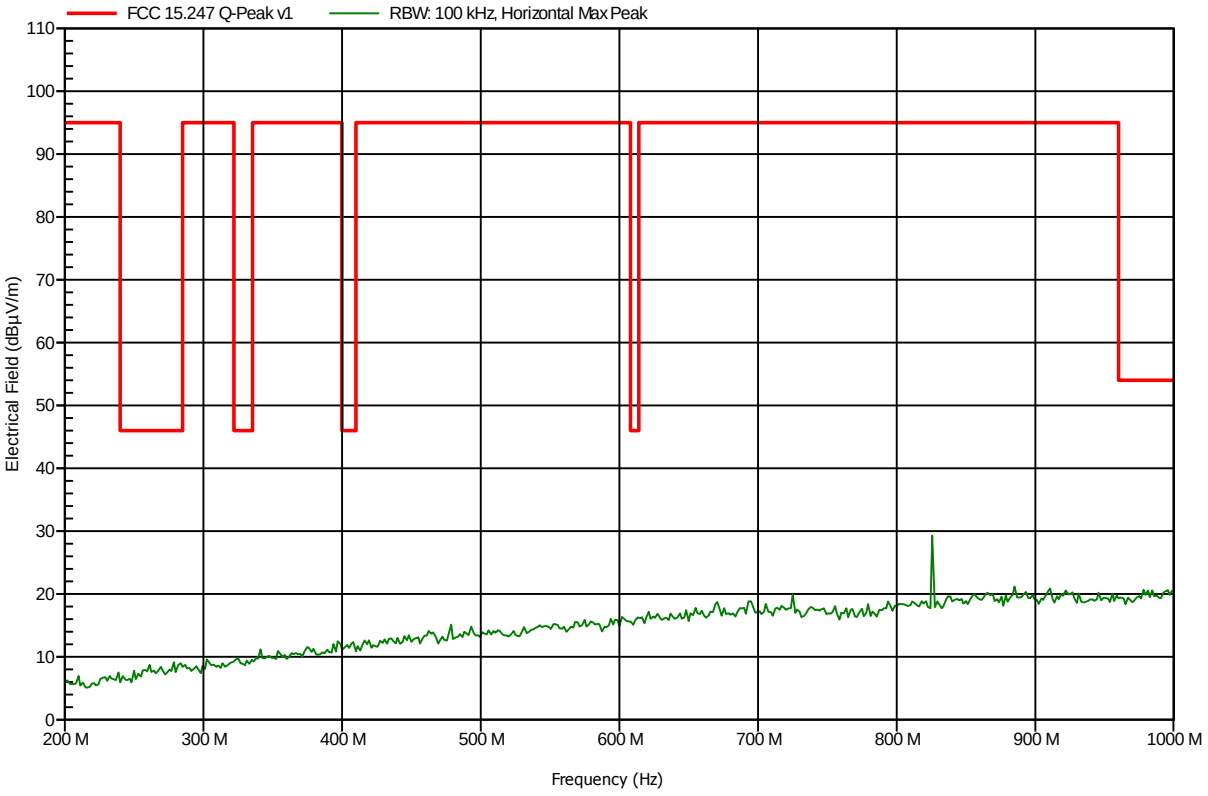

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Schwarzbeck BBHA 9120D, Vertical |
| Measurement distance: | 3 m |
| Mode: | TX; 2402 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | |

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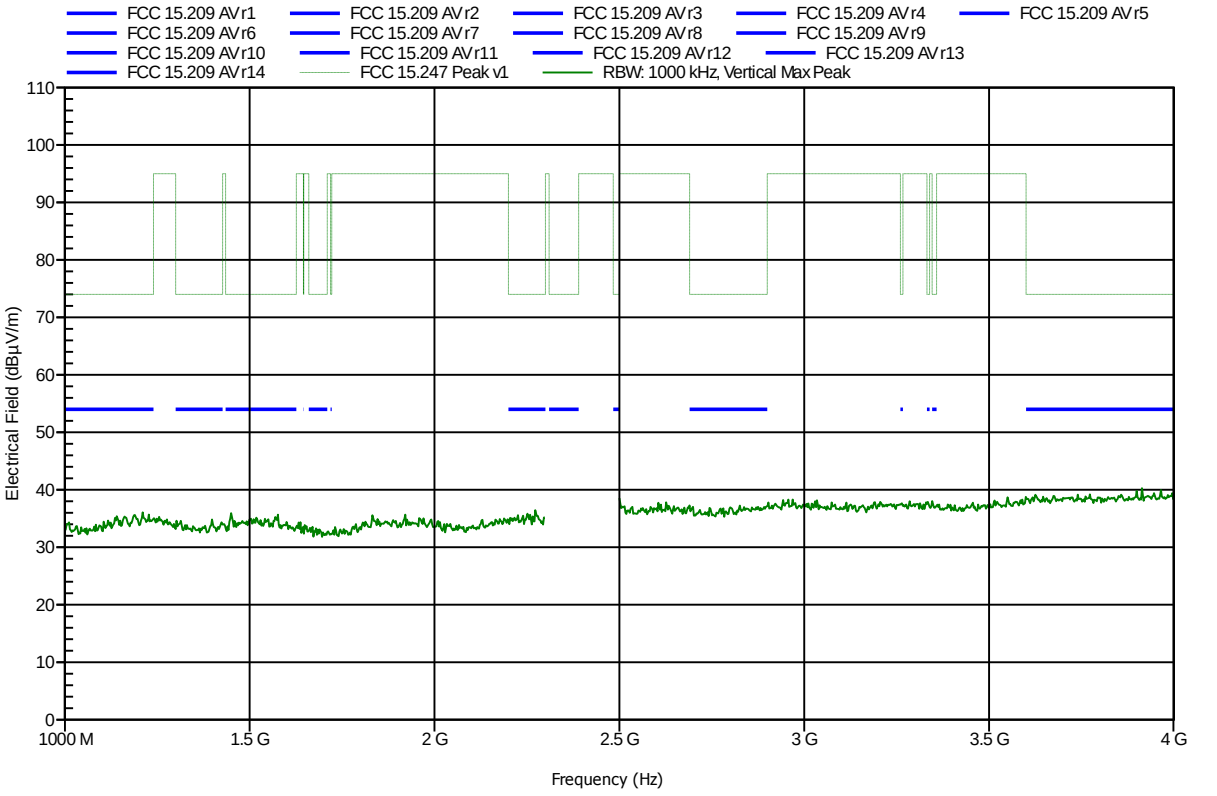

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Schwarzbeck BBHA 9120D, Horizontal |
| Measurement distance: | 3 m |
| Mode: | TX; 2402 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | |

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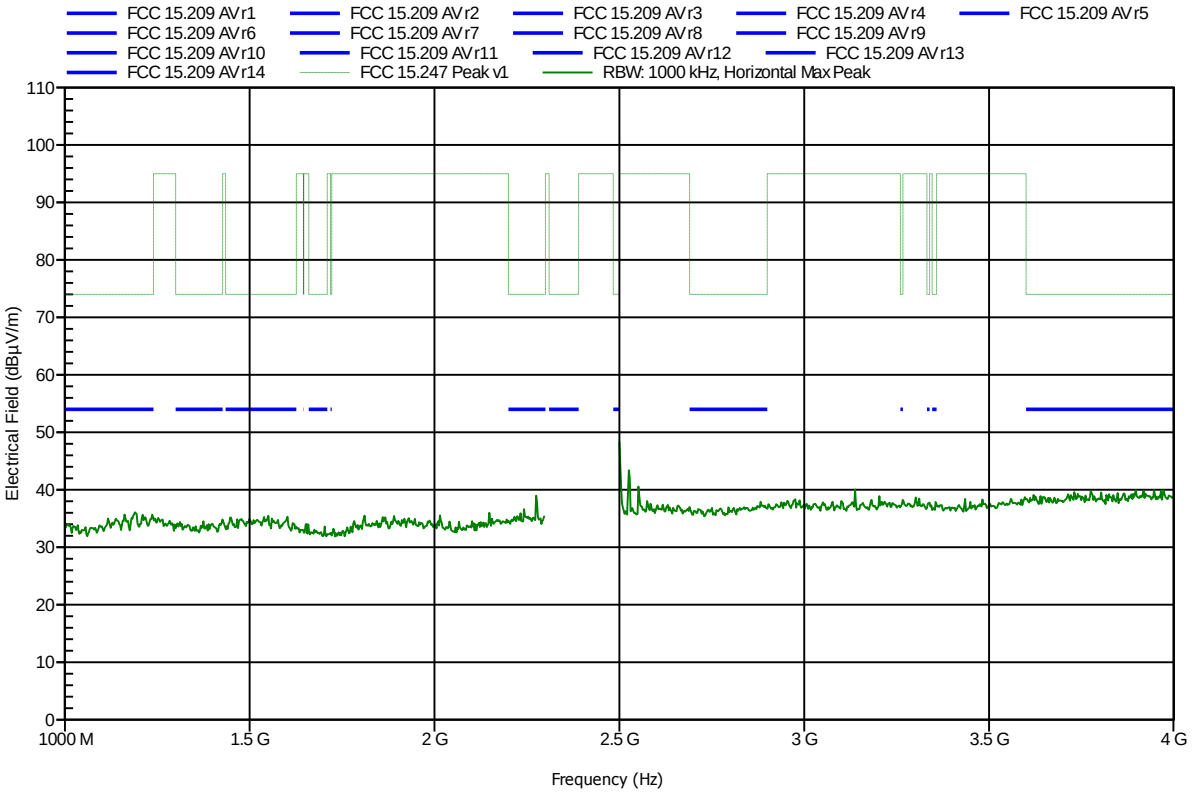

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Schwarzbeck BBHA 9120D, Vertical |
| Measurement distance: | 3 m |
| Mode: | TX; 2440 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | |

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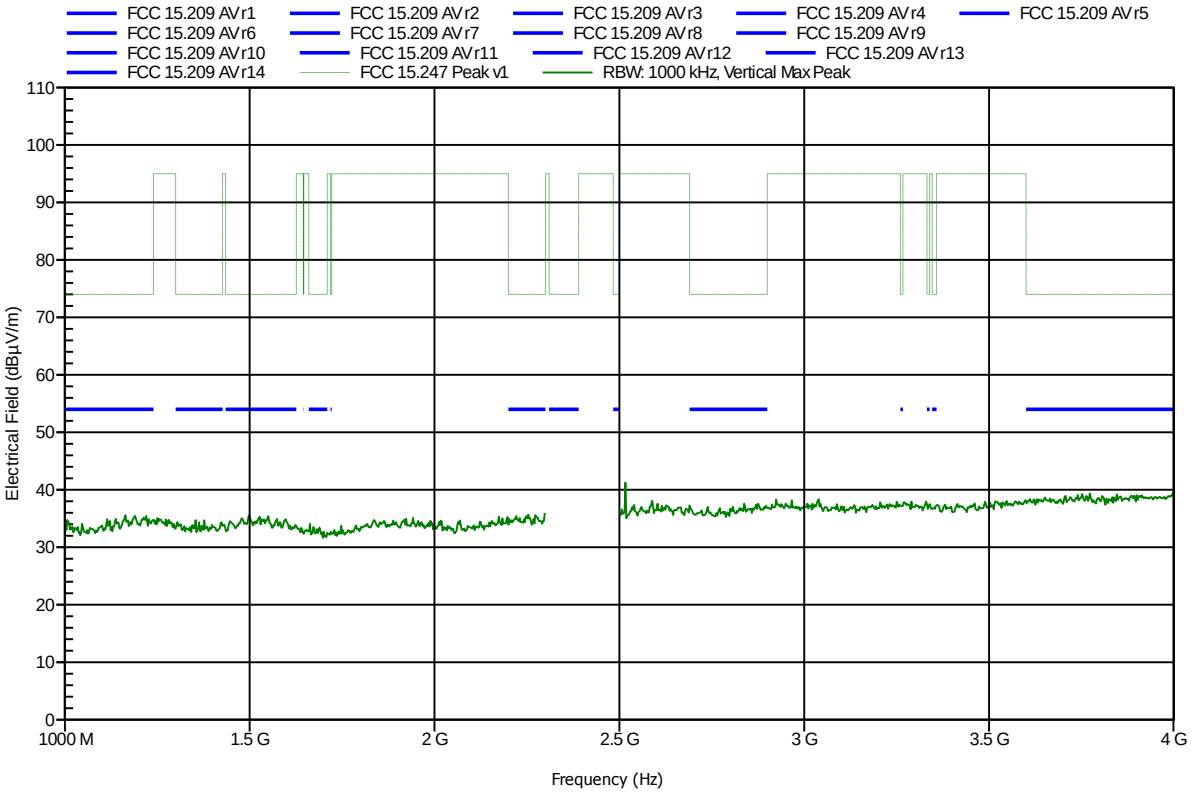

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Schwarzbeck BBHA 9120D, Horizontal |
| Measurement distance: | 3 m |
| Mode: | TX; 2440 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | |

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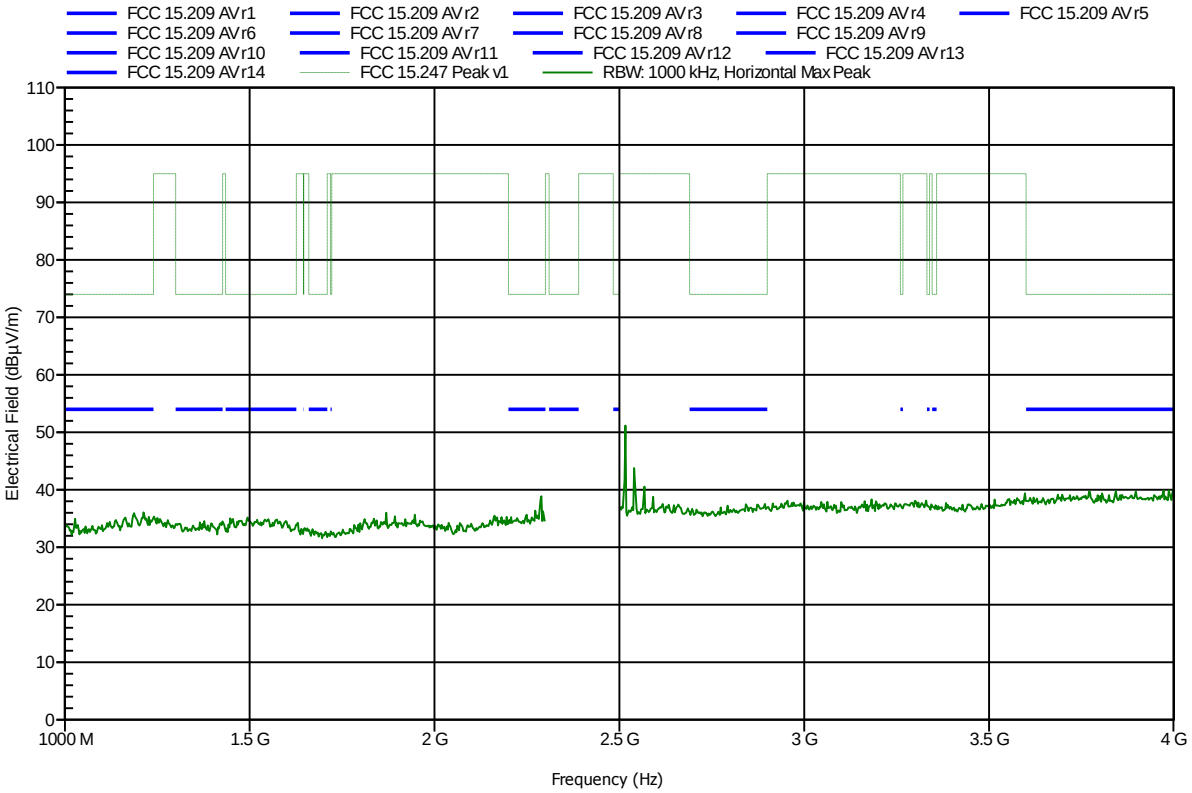

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Schwarzbeck BBHA 9120D, Vertical |
| Measurement distance: | 3 m |
| Mode: | TX; 2480 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | |

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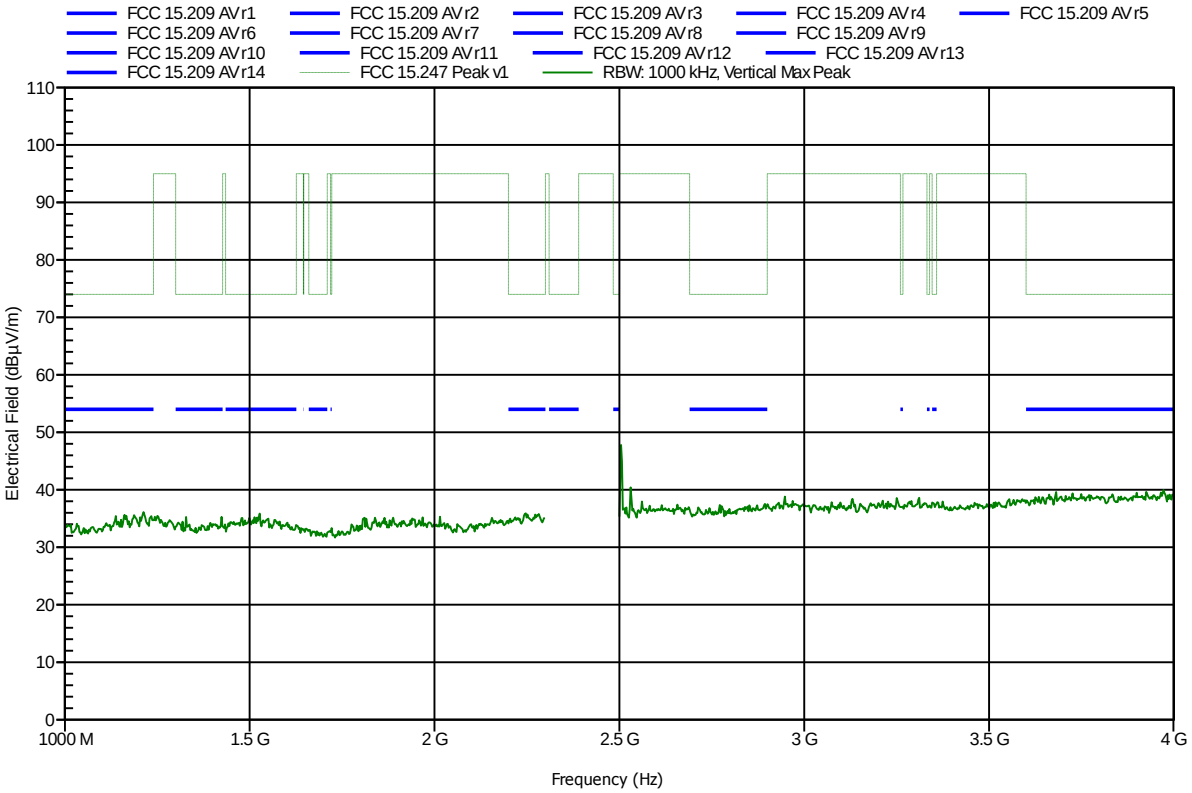

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Schwarzbeck BBHA 9120D, Horizontal |
| Measurement distance: | 3 m |
| Mode: | TX; 2480 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | |

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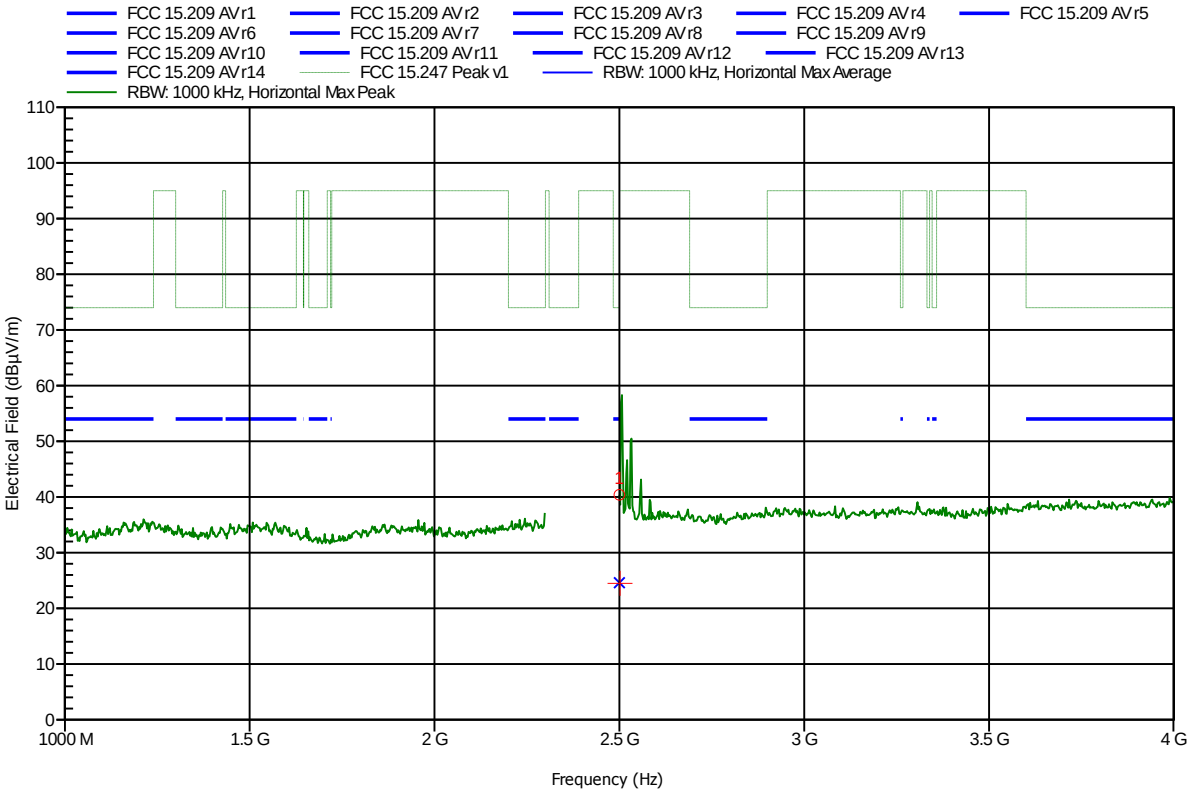


| Frequency | Peak | Peak Limit | Peak Difference | Peak Status |
|---|---|---|---|---|
| 2.5 GHz | 40.4 dBµV/m | 95 dBµV/m | -54.6 dB | Pass |

| Frequency | Average |
|---|---|
| 2.5 GHz | 24.61 dBµV/m |

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Schwarzbeck BBHA 9120D, Vertical |
| Measurement distance: | 3 m |
| Mode: | TX; 2402 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | lower bandedge |

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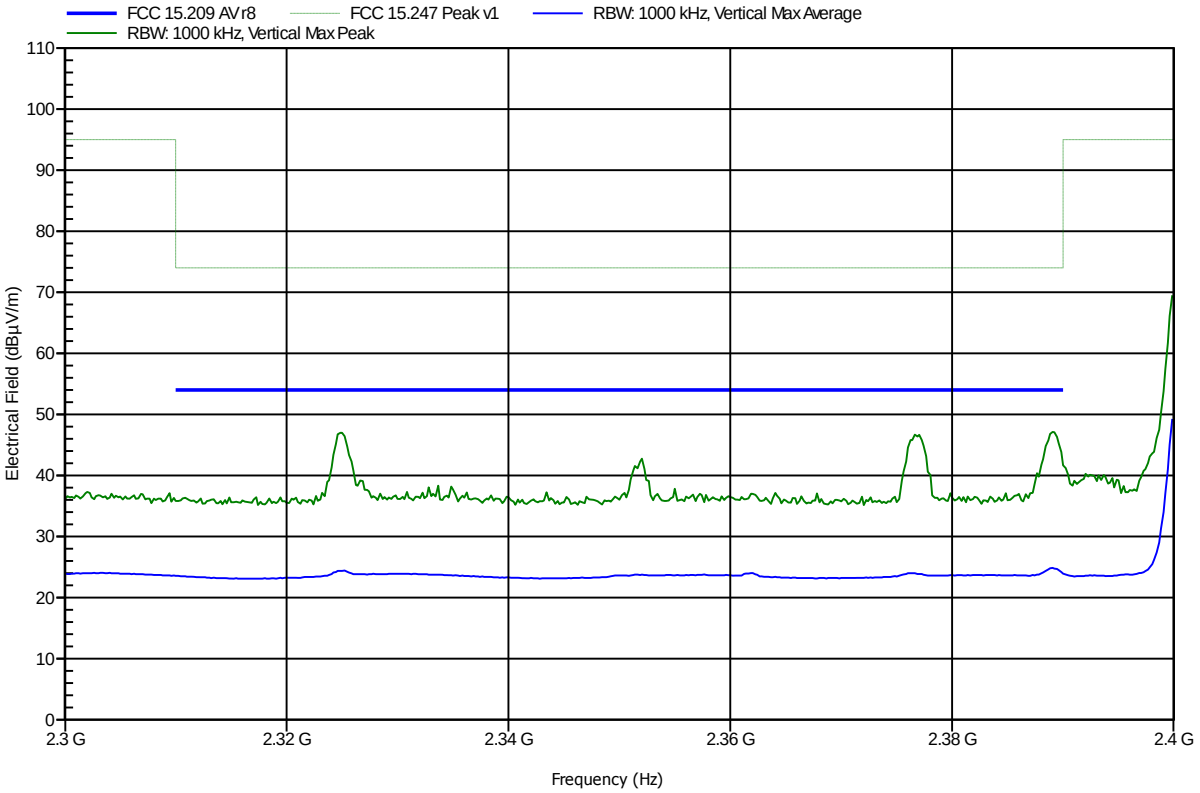

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Schwarzbeck BBHA 9120D, Horizontal |
| Measurement distance: | 3 m |
| Mode: | TX; 2402 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | lower bandedge |

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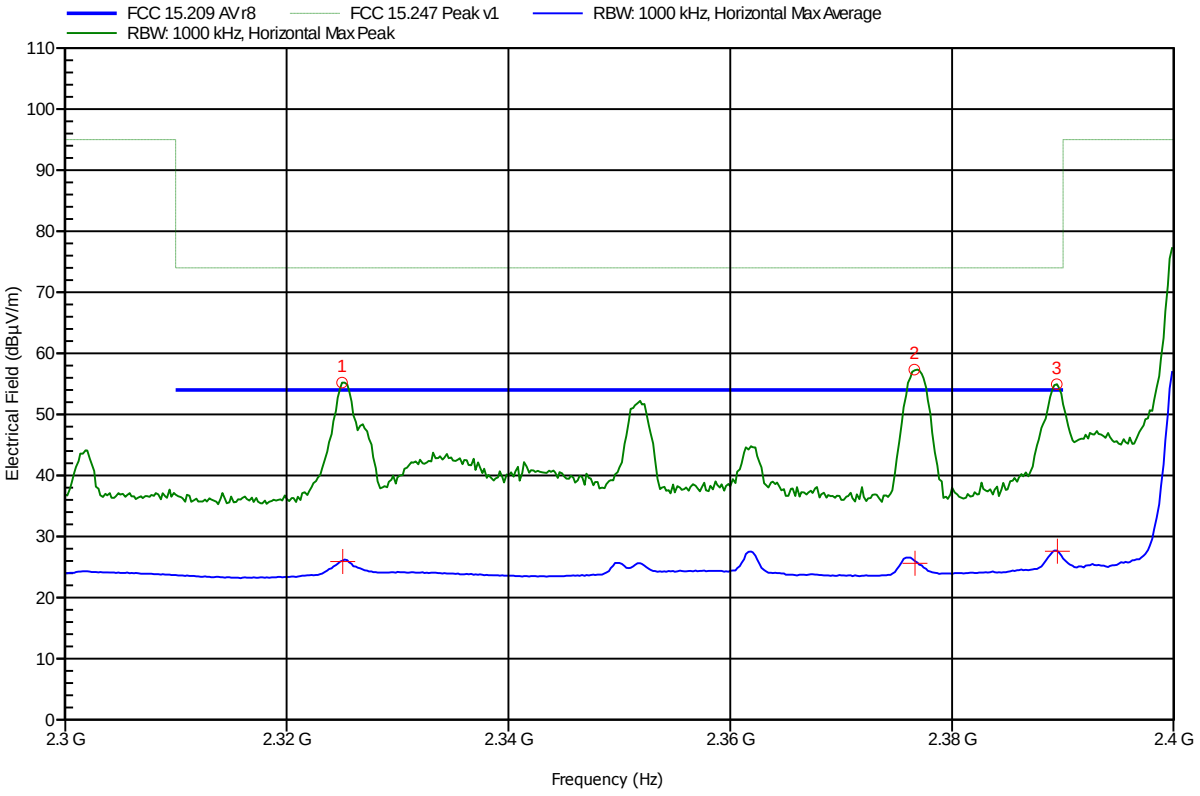


| Frequency | Peak | Peak Limit | Peak Difference | Peak Status |
|---|---|---|---|---|
| 2.325 GHz | 55.2 dBµV/m | 74 dBµV/m | -18.8 dB | Pass |
| 2.377 GHz | 57.33 dBµV/m | 74 dBµV/m | -16.67 dB | Pass |
| 2.389 GHz | 54.95 dBµV/m | 74 dBµV/m | -19.05 dB | Pass |

| Frequency | Average | Average Limit | Average Difference | Average Status |
|---|---|---|---|---|
| 2.325 GHz | 26.01 dBµV/m | 54 dBµV/m | -27.99 dB | Pass |
| 2.377 GHz | 25.72 dBµV/m | 54 dBµV/m | -28.28 dB | Pass |
| 2.389 GHz | 27.7 dBµV/m | 54 dBµV/m | -26.3 dB | Pass |

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Schwarzbeck BBHA 9120D, Vertical |
| Measurement distance: | 3 m |
| Mode: | TX; 2440 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | lower bandedge |

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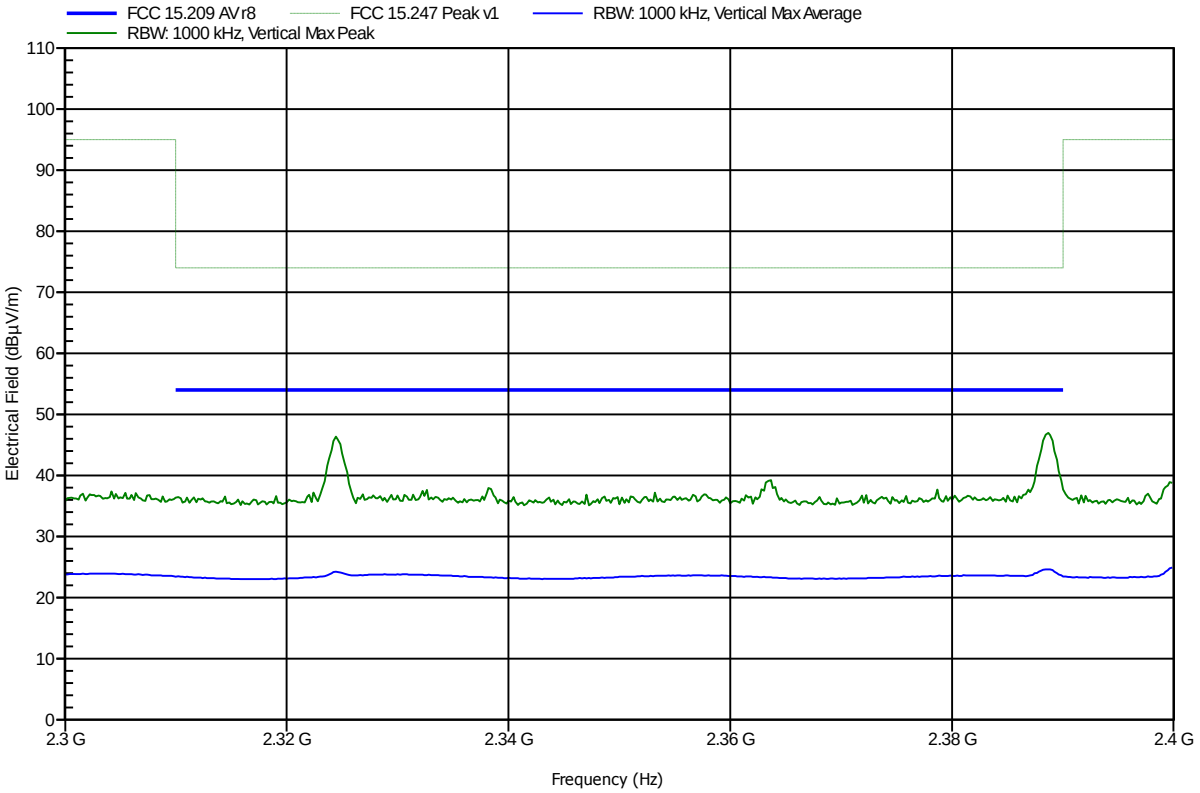

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Schwarzbeck BBHA 9120D, Horizontal |
| Measurement distance: | 3 m |
| Mode: | TX; 2440 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | lower bandedge |

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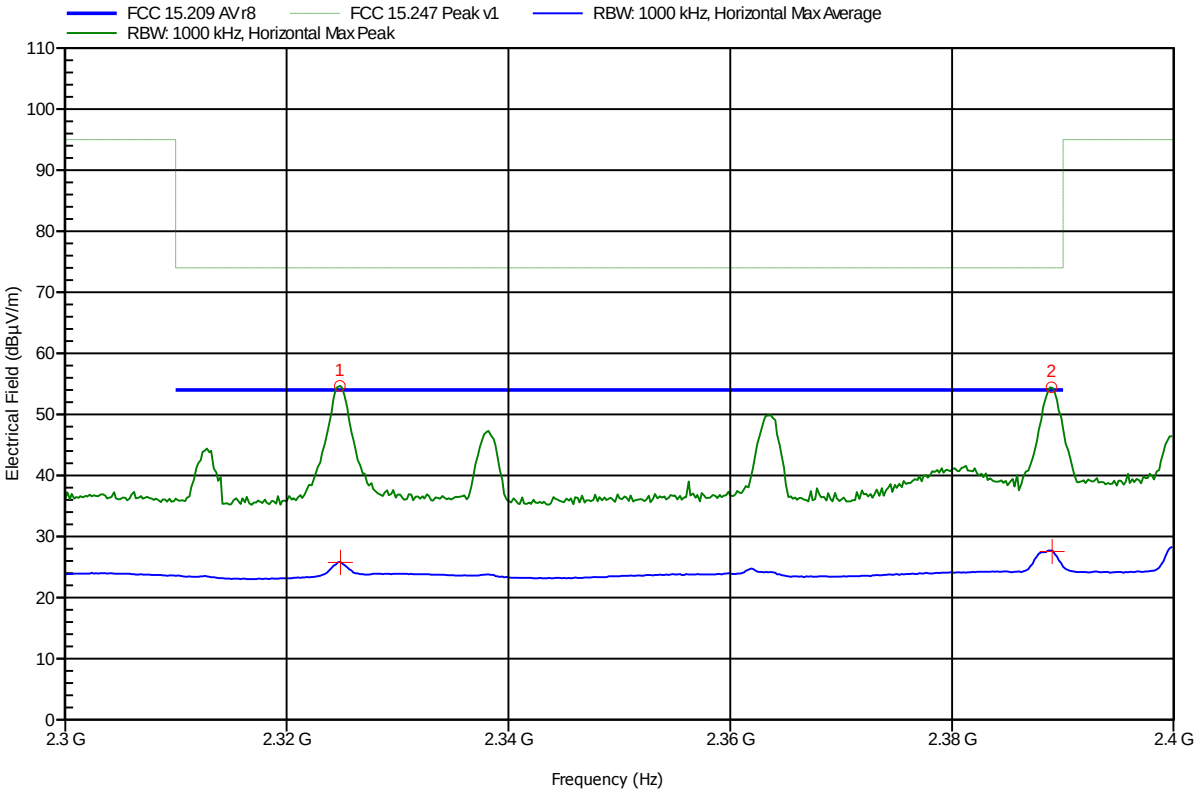


| Frequency | Peak | Peak Limit | Peak Difference | Peak Status |
|---|---|---|---|---|
| 2.325 GHz | 54.66 dBµV/m | 74 dBµV/m | -19.34 dB | Pass |
| 2.389 GHz | 54.43 dBµV/m | 74 dBµV/m | -19.57 dB | Pass |

| Frequency | Average | Average Limit | Average Difference | Average Status |
|---|---|---|---|---|
| 2.325 GHz | 25.86 dBµV/m | 54 dBµV/m | -28.14 dB | Pass |
| 2.389 GHz | 27.65 dBµV/m | 54 dBµV/m | -26.35 dB | Pass |

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Schwarzbeck BBHA 9120D, Vertical |
| Measurement distance: | 3 m |
| Mode: | TX; 2480 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | lower bandedge |

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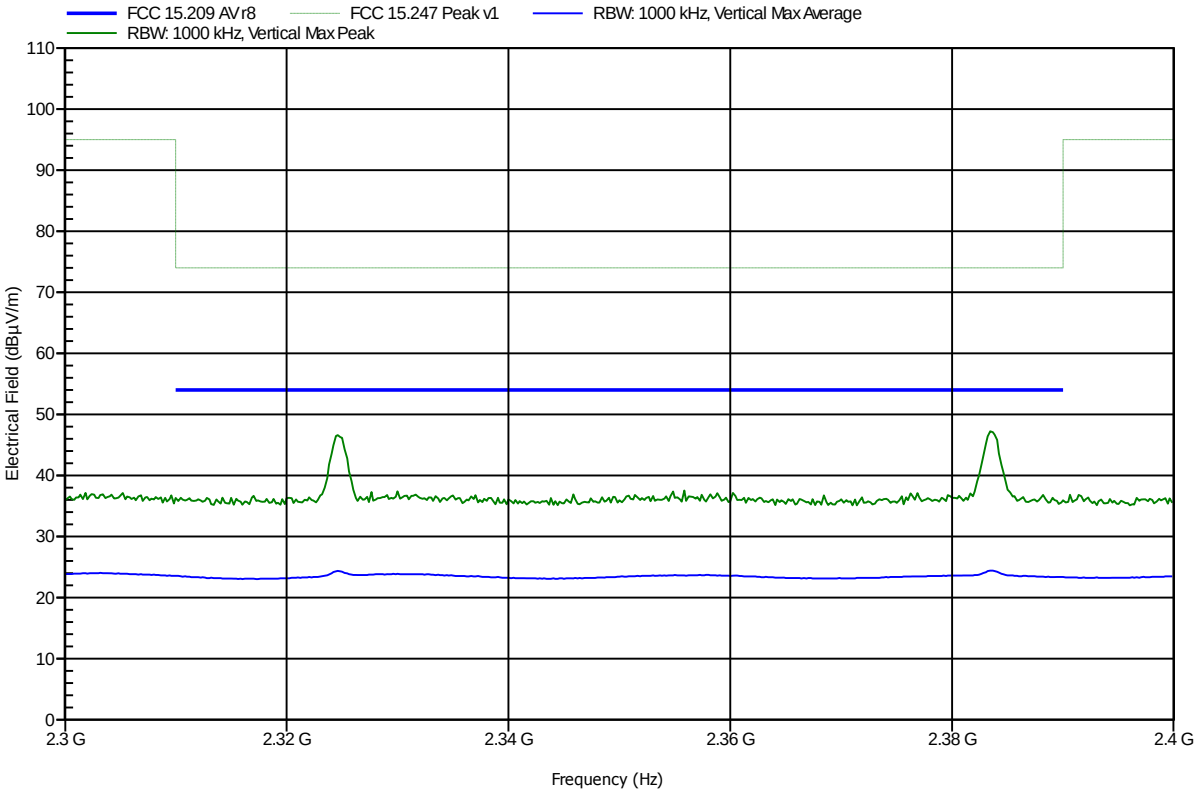

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Schwarzbeck BBHA 9120D, Horizontal |
| Measurement distance: | 3 m |
| Mode: | TX; 2480 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | lower bandedge |

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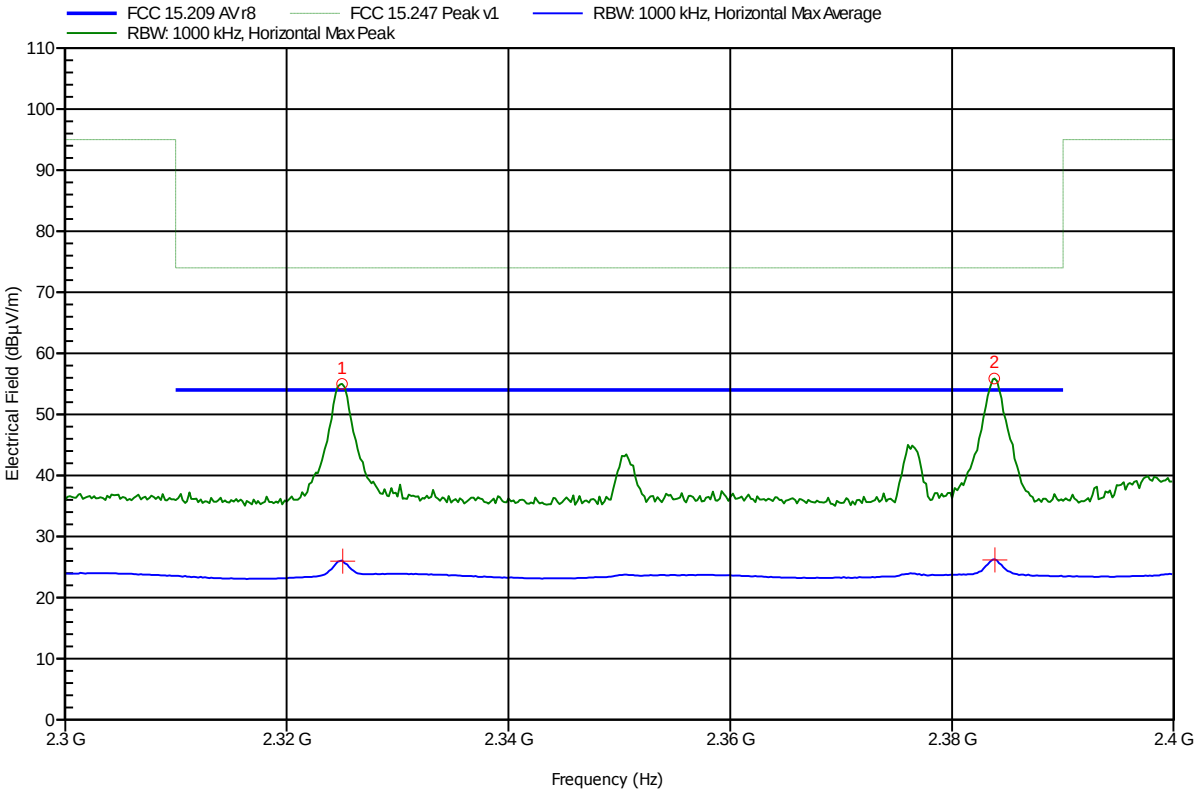


| Frequency | Peak | Peak Limit | Peak Difference | Peak Status |
|---|---|---|---|---|
| 2.325 GHz | 55 dBµV/m | 74 dBµV/m | -19 dB | Pass |
| 2.384 GHz | 55.87 dBµV/m | 74 dBµV/m | -18.13 dB | Pass |

| Frequency | Average | Average Limit | Average Difference | Average Status |
|---|---|---|---|---|
| 2.325 GHz | 26.07 dBµV/m | 54 dBµV/m | -27.93 dB | Pass |
| 2.384 GHz | 26.27 dBµV/m | 54 dBµV/m | -27.73 dB | Pass |

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Schwarzbeck BBHA 9120D, Vertical |
| Measurement distance: | 3 m |
| Mode: | TX; 2402 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | upper bandedge |

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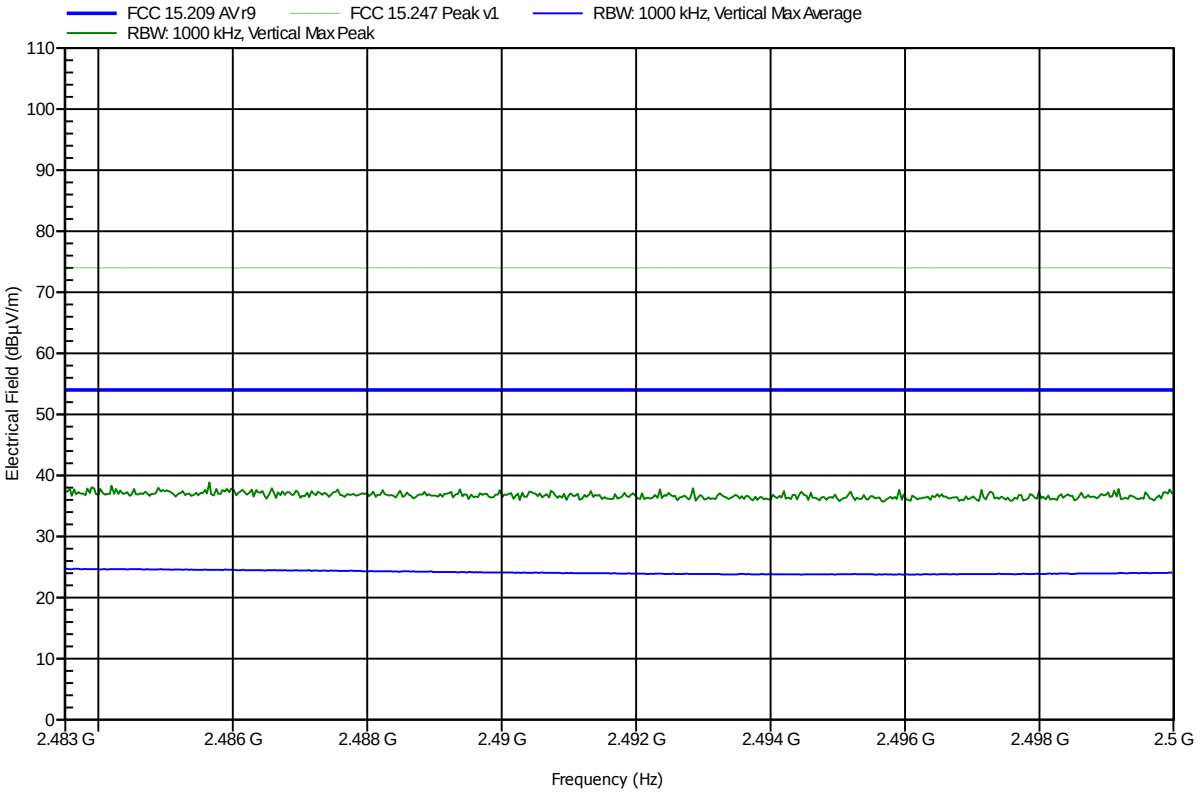

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Schwarzbeck BBHA 9120D, Horizontal |
| Measurement distance: | 3 m |
| Mode: | TX; 2402 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | upper bandedge |

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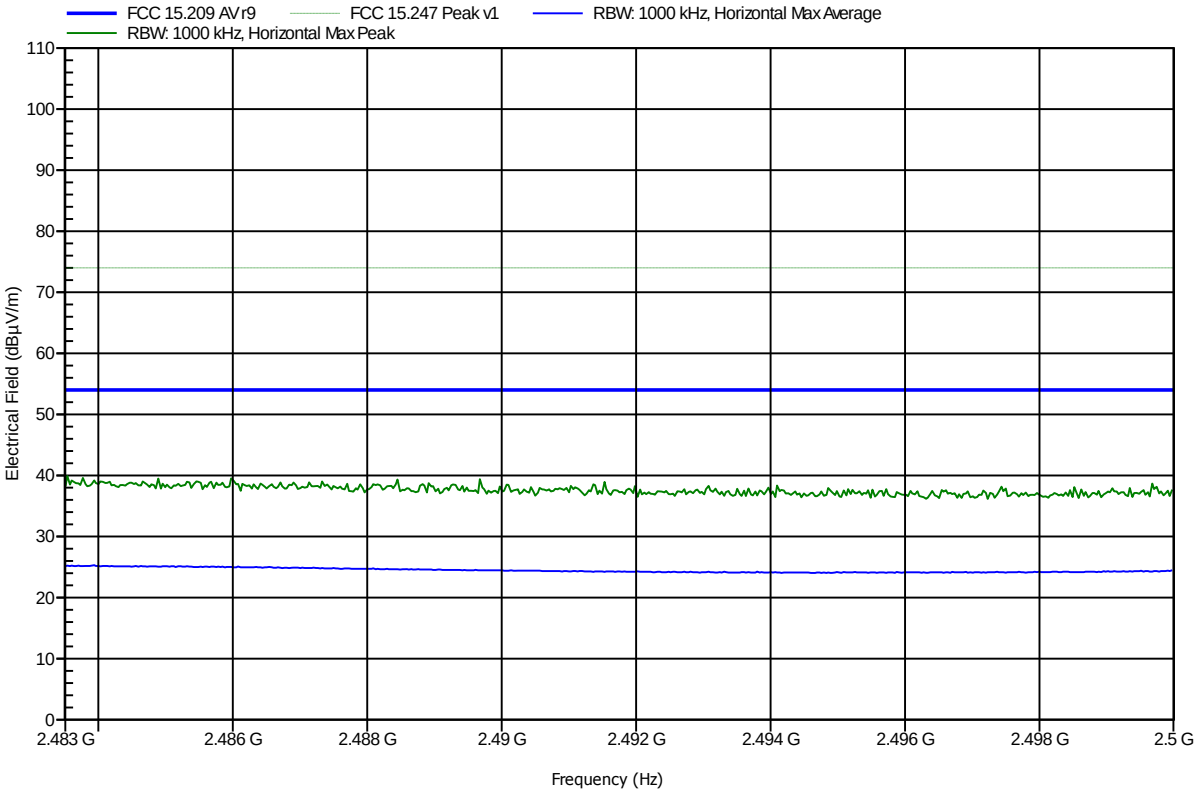

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Schwarzbeck BBHA 9120D, Vertical |
| Measurement distance: | 3 m |
| Mode: | TX; 2440 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | upper bandedge |

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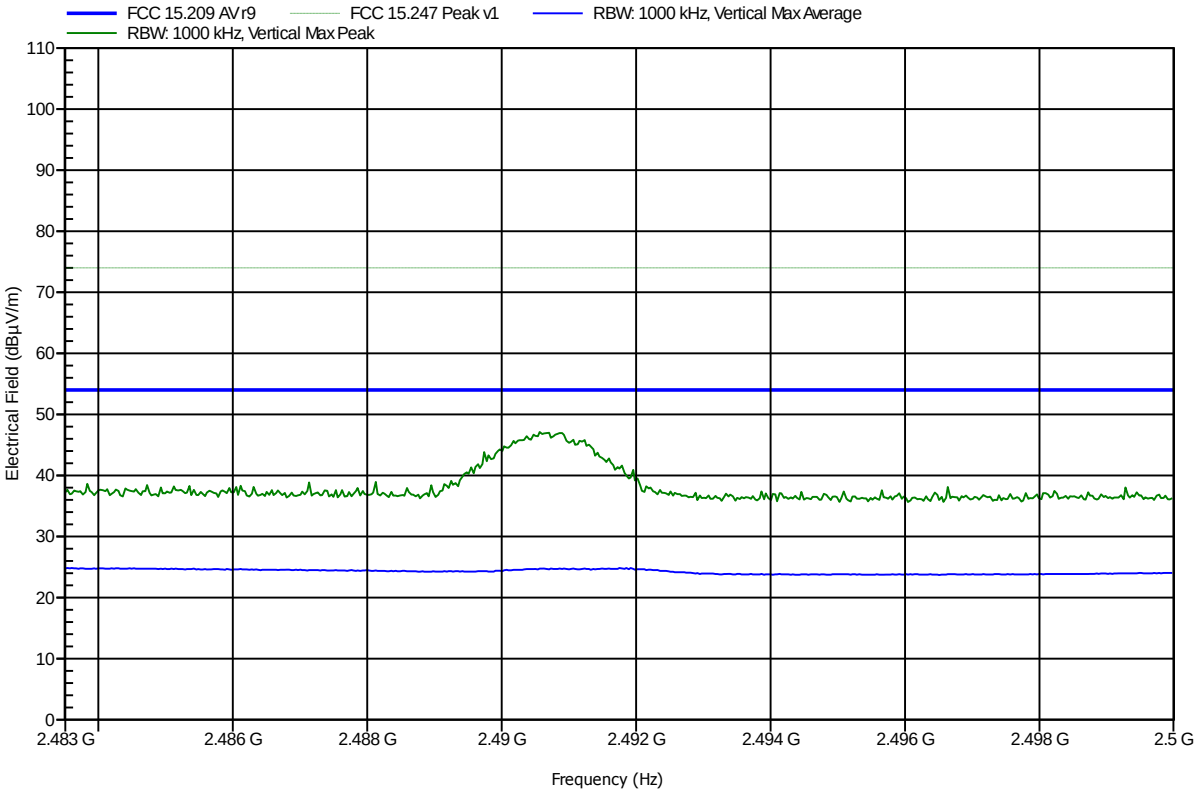

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Schwarzbeck BBHA 9120D, Horizontal |
| Measurement distance: | 3 m |
| Mode: | TX; 2440 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | upper bandedge |

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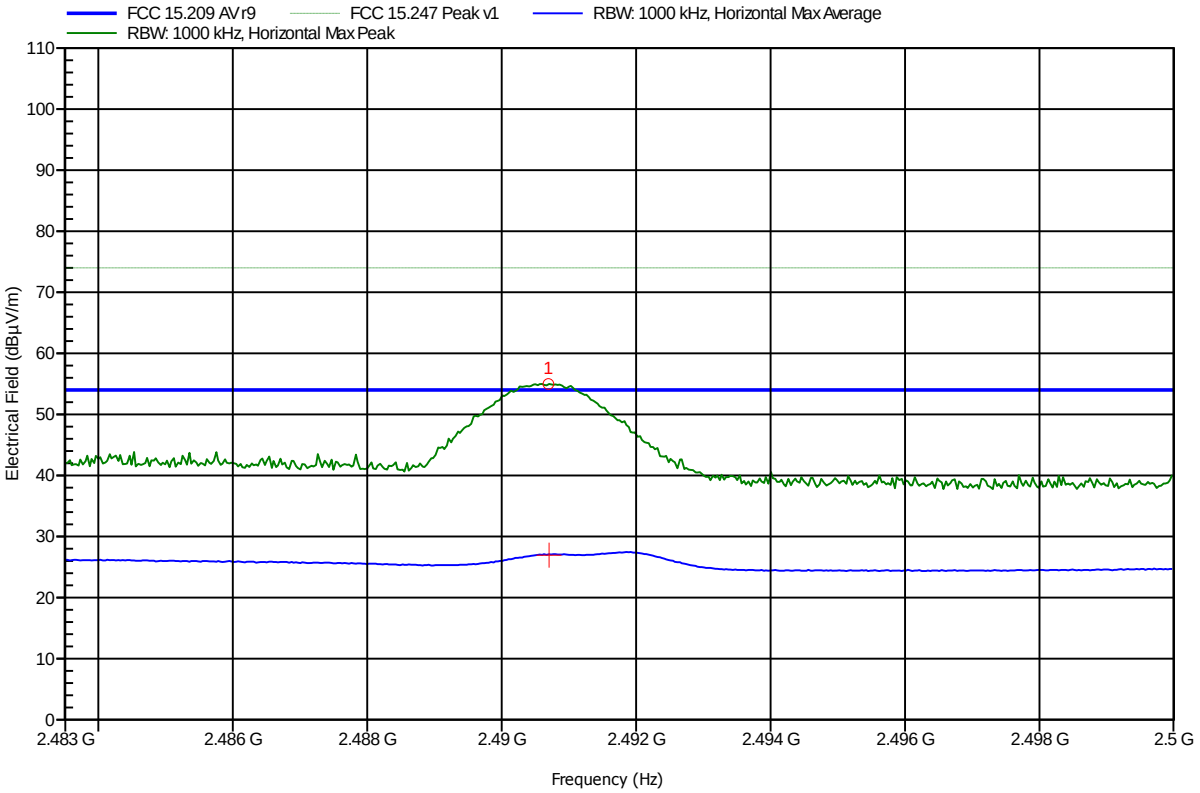


| Frequency | Peak | Peak Limit | Peak Difference | Peak Status |
|---|---|---|---|---|
| 2.4907 GHz | 54.98 dBµV/m | 74 dBµV/m | -19.02 dB | Pass |

| Frequency | Average | Average Limit | Average Difference | Average Status |
|---|---|---|---|---|
| 2.4907 GHz | 27.05 dBµV/m | 54 dBµV/m | -26.95 dB | Pass |

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Schwarzbeck BBHA 9120D, Vertical |
| Measurement distance: | 3 m |
| Mode: | TX; 2480 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | upper bandedge |

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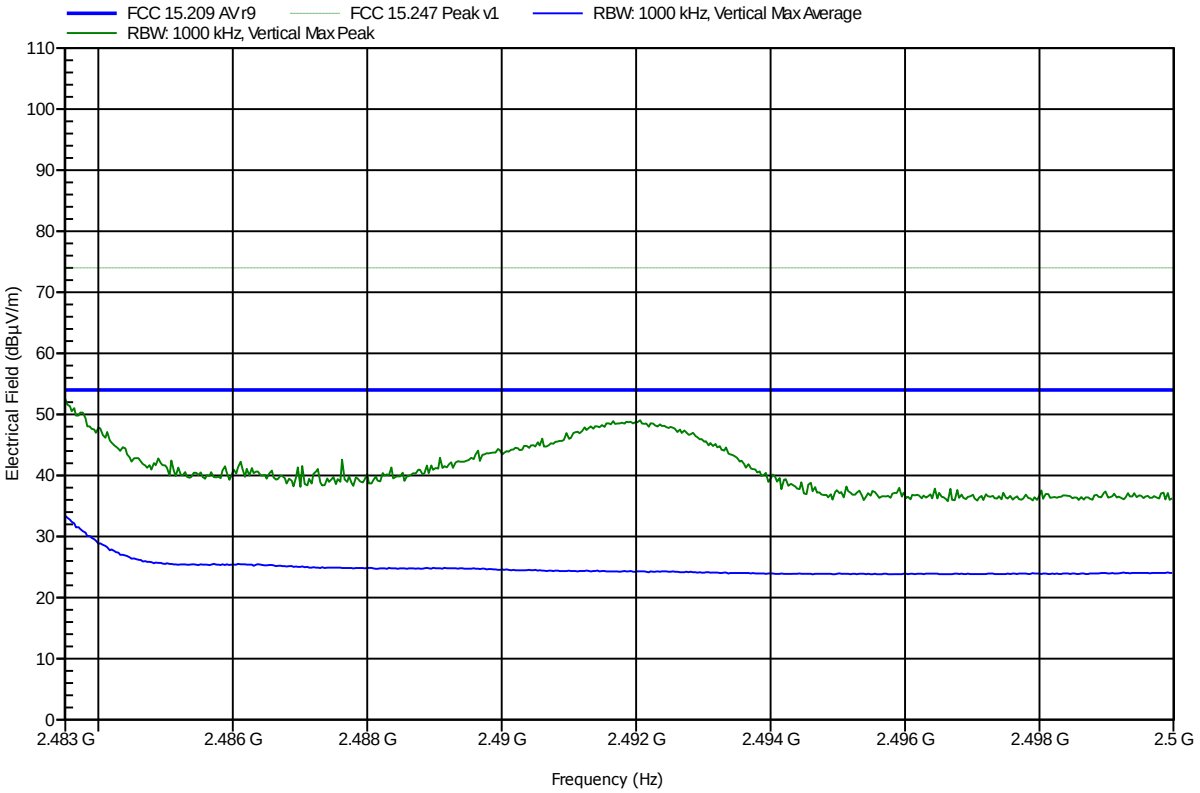

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Schwarzbeck BBHA 9120D, Horizontal |
| Measurement distance: | 3 m |
| Mode: | TX; 2480 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | upper bandedge |

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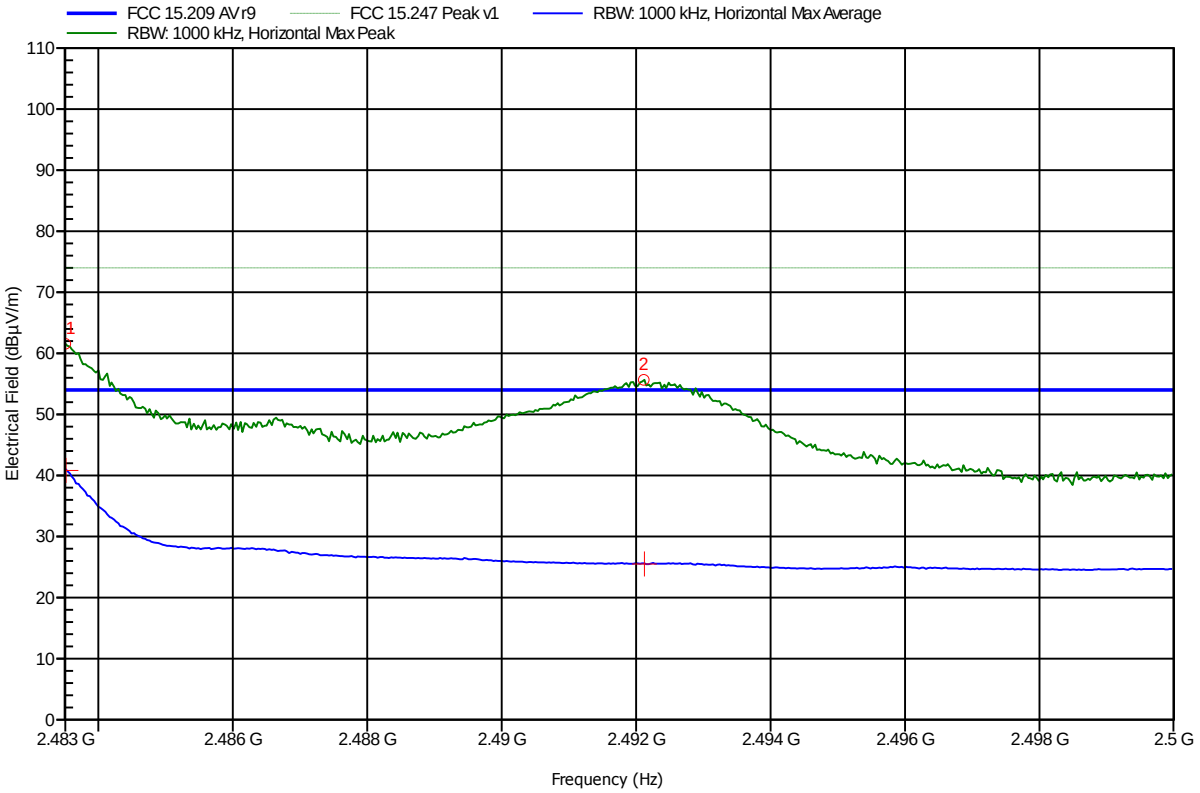


| Frequency | Peak | Peak Limit | Peak Difference | Peak Status |
|---|---|---|---|---|
| 2.4835 GHz | 61.55 dBµV/m | 74 dBµV/m | -12.45 dB | Pass |
| 2.4921 GHz | 55.66 dBµV/m | 74 dBµV/m | -18.34 dB | Pass |

| Frequency | Average | Average Limit | Average Difference | Average Status |
|---|---|---|---|---|
| 2.4835 GHz | 40.93 dBµV/m | 54 dBµV/m | -13.07 dB | Pass |
| 2.4921 GHz | 25.61 dBµV/m | 54 dBµV/m | -28.39 dB | Pass |

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Schwarzbeck BBHA 9120D, Vertical |
| Measurement distance: | 3 m |
| Mode: | TX; 2402 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | |

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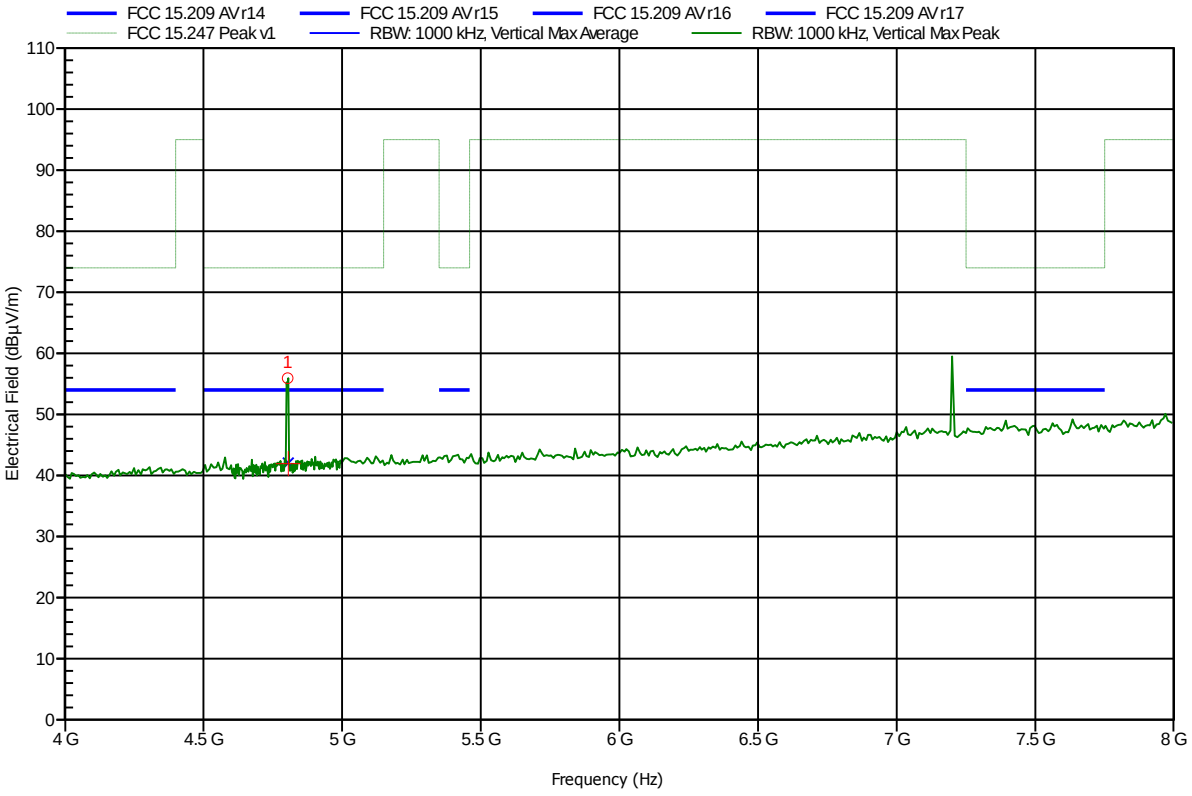


| Frequency | Peak | Peak Limit | Peak Difference | Peak Status |
|---|---|---|---|---|
| 4.804 GHz | 55.93 dBµV/m | 74 dBµV/m | -18.07 dB | Pass |

| Frequency | Average | Average Limit | Average Difference | Average Status |
|---|---|---|---|---|
| 4.804 GHz | 42.04 dBµV/m | 54 dBµV/m | -11.96 dB | Pass |

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Schwarzbeck BBHA 9120D, Horizontal |
| Measurement distance: | 3 m |
| Mode: | TX; 2402 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | |

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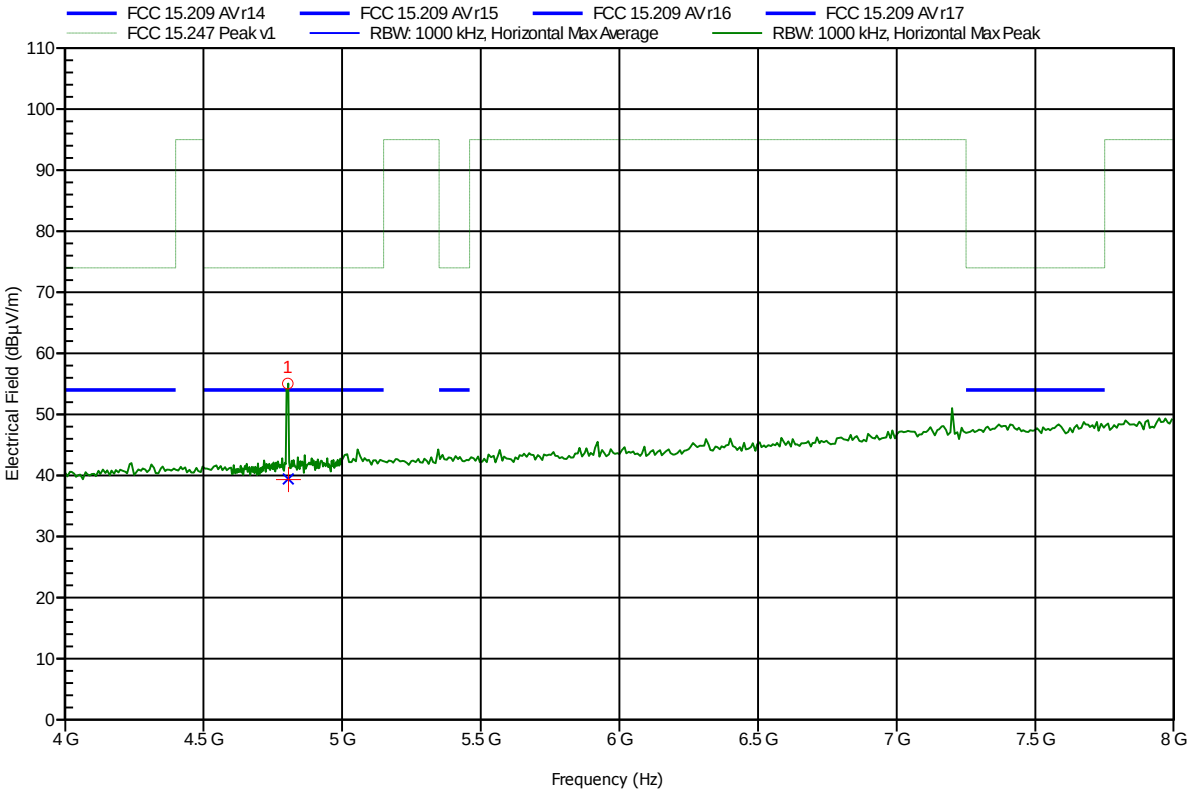


| Frequency | Peak | Peak Limit | Peak Difference | Peak Status |
|---|---|---|---|---|
| 4.804 GHz | 55.05 dBµV/m | 74 dBµV/m | -18.95 dB | Pass |

| Frequency | Average | Average Limit | Average Difference | Average Status |
|---|---|---|---|---|
| 4.804 GHz | 39.43 dBµV/m | 54 dBµV/m | -14.57 dB | Pass |

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Schwarzbeck BBHA 9120D, Vertical |
| Measurement distance: | 3 m |
| Mode: | TX; 2440 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | |

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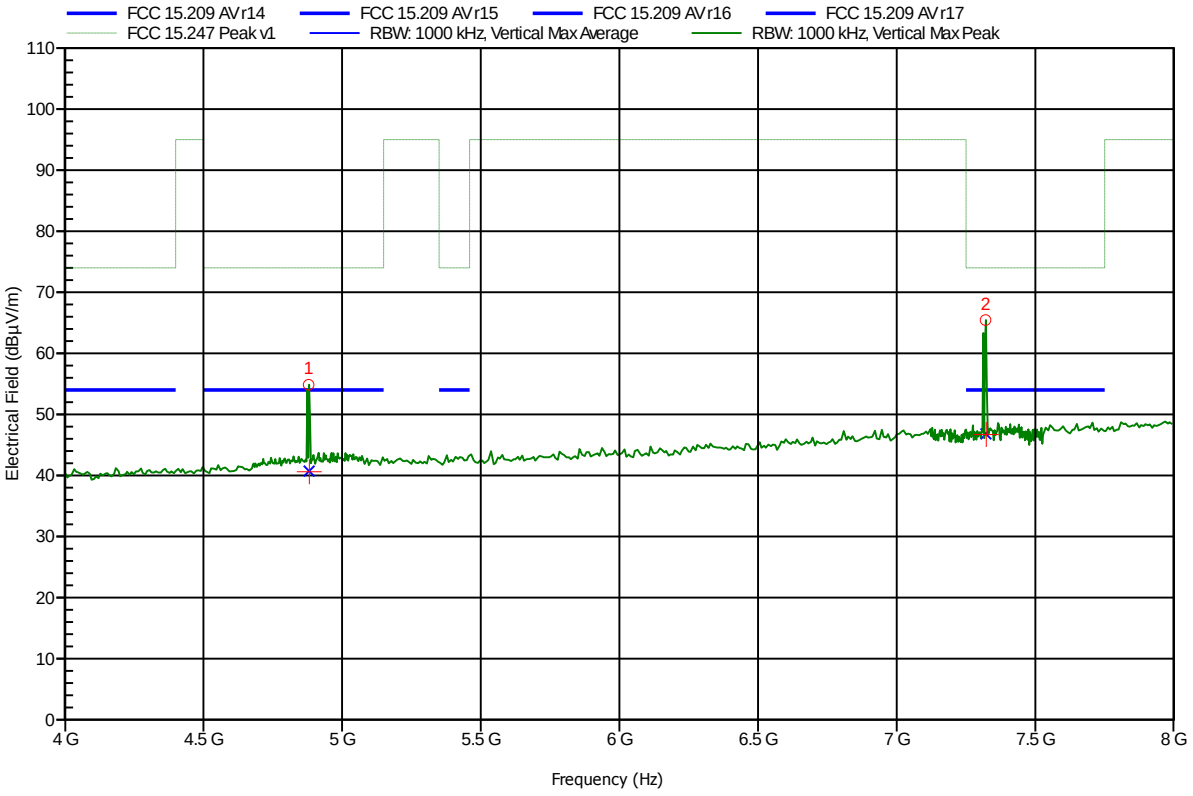


| Frequency | Peak | Peak Limit | Peak Difference | Peak Status |
|---|---|---|---|---|
| 4.88 GHz | 54.85 dBµV/m | 74 dBµV/m | -19.15 dB | Pass |
| 7.321 GHz | 65.45 dBµV/m | 74 dBµV/m | -8.55 dB | Pass |

| Frequency | Average | Average Limit | Average Difference | Average Status |
|---|---|---|---|---|
| 4.88 GHz | 40.71 dBµV/m | 54 dBµV/m | -13.29 dB | Pass |
| 7.321 GHz | 46.81 dBµV/m | 54 dBµV/m | -7.19 dB | Pass |

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Schwarzbeck BBHA 9120D, Horizontal |
| Measurement distance: | 3 m |
| Mode: | TX; 2440 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | |

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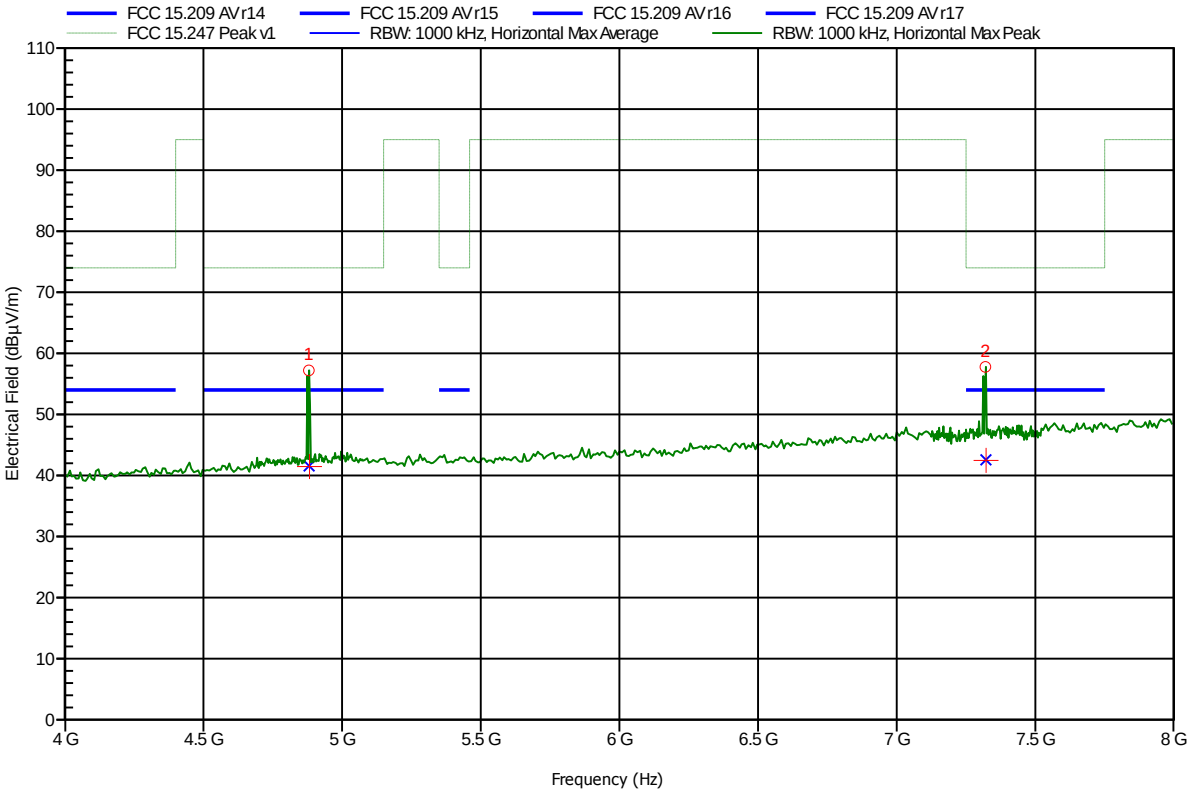


| Frequency | Peak | Peak Limit | Peak Difference | Peak Status |
|---|---|---|---|---|
| 4.88 GHz | 57.21 dBµV/m | 74 dBµV/m | -16.79 dB | Pass |
| 7.32 GHz | 57.78 dBµV/m | 74 dBµV/m | -16.22 dB | Pass |

| Frequency | Average | Average Limit | Average Difference | Average Status |
|---|---|---|---|---|
| 4.88 GHz | 41.56 dBµV/m | 54 dBµV/m | -12.44 dB | Pass |
| 7.32 GHz | 42.57 dBµV/m | 54 dBµV/m | -11.43 dB | Pass |

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Schwarzbeck BBHA 9120D, Vertical |
| Measurement distance: | 3 m |
| Mode: | TX; 2480 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | |

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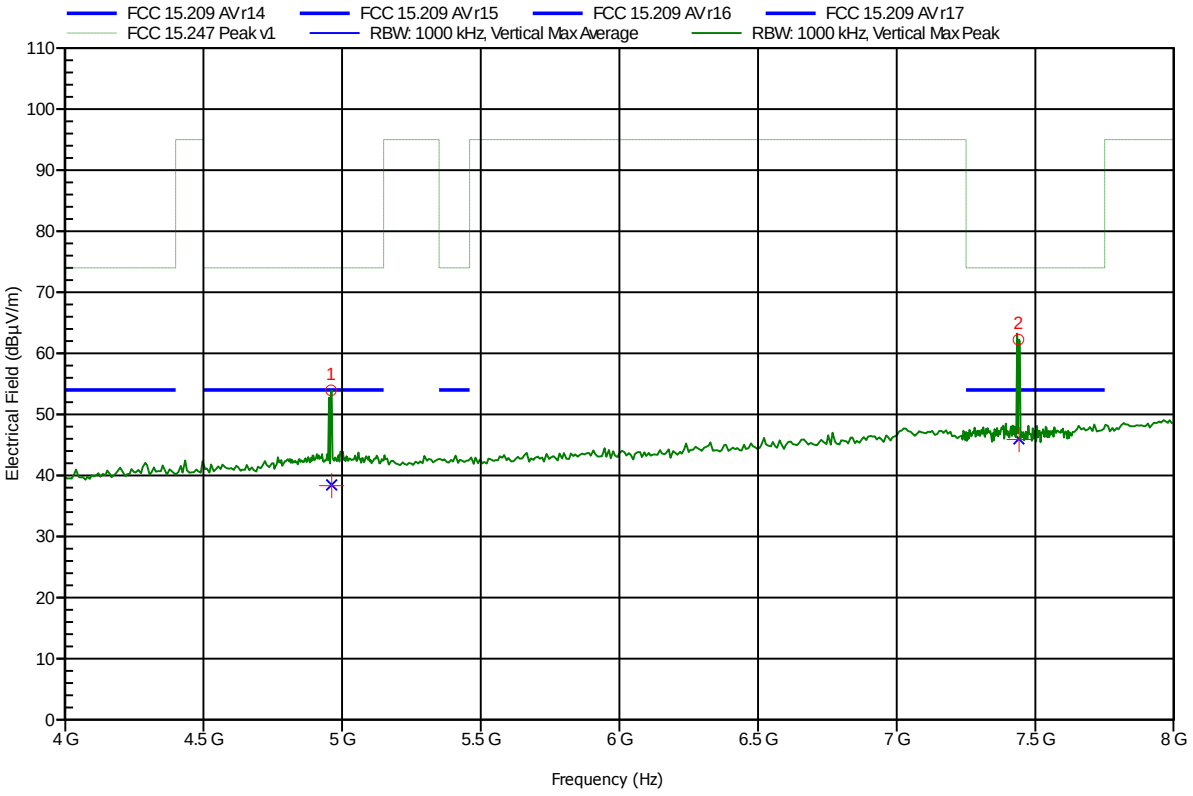


| Frequency | Peak | Peak Limit | Peak Difference | Peak Status |
|---|---|---|---|---|
| 4.96 GHz | 53.94 dBµV/m | 74 dBµV/m | -20.06 dB | Pass |
| 7.439 GHz | 62.24 dBµV/m | 74 dBµV/m | -11.76 dB | Pass |

| Frequency | Average | Average Limit | Average Difference | Average Status |
|---|---|---|---|---|
| 4.96 GHz | 38.44 dBµV/m | 54 dBµV/m | -15.56 dB | Pass |
| 7.439 GHz | 45.99 dBµV/m | 54 dBµV/m | -8.01 dB | Pass |

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Schwarzbeck BBHA 9120D, Horizontal |
| Measurement distance: | 3 m |
| Mode: | TX; 2480 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | |

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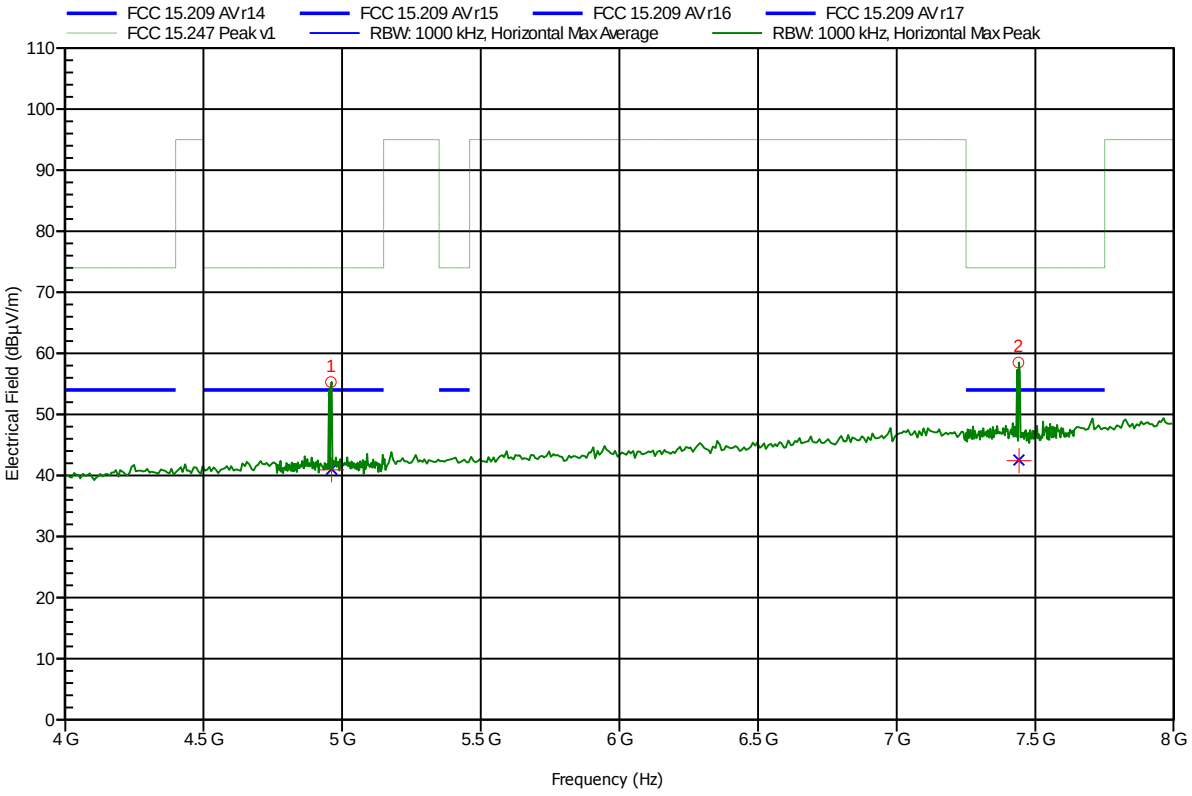


| Frequency | Peak | Peak Limit | Peak Difference | Peak Status |
|---|---|---|---|---|
| 4.96 GHz | 55.3 dBµV/m | 74 dBµV/m | -18.7 dB | Pass |
| 7.439 GHz | 58.5 dBµV/m | 74 dBµV/m | -15.5 dB | Pass |

| Frequency | Average | Average Limit | Average Difference | Average Status |
|---|---|---|---|---|
| 4.96 GHz | 41.03 dBµV/m | 54 dBµV/m | -12.97 dB | Pass |
| 7.439 GHz | 42.53 dBµV/m | 54 dBµV/m | -11.47 dB | Pass |

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Schwarzbeck BBHA 9120D, Vertical |
| Measurement distance: | 100 cm converted to 3m |
| Mode: | TX; 2402 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | |

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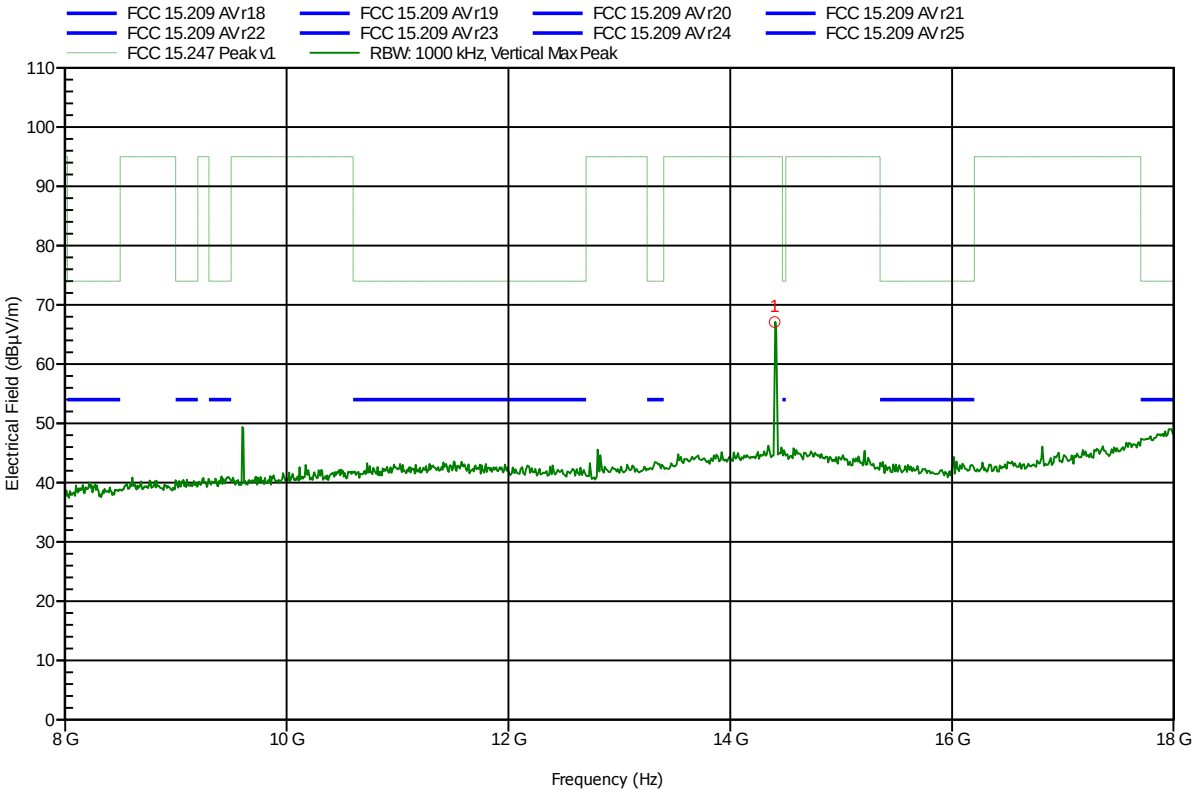


| Frequency | Peak | Peak Limit | Peak Difference | Peak Status |
|---|---|---|---|---|
| 14.4 GHz | 67.11 dBµV/m | 95 dBµV/m | -27.89 dB | Pass |

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Schwarzbeck BBHA 9120D, Horizontal |
| Measurement distance: | 100 cm converted to 3m |
| Mode: | TX; 2402 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | |

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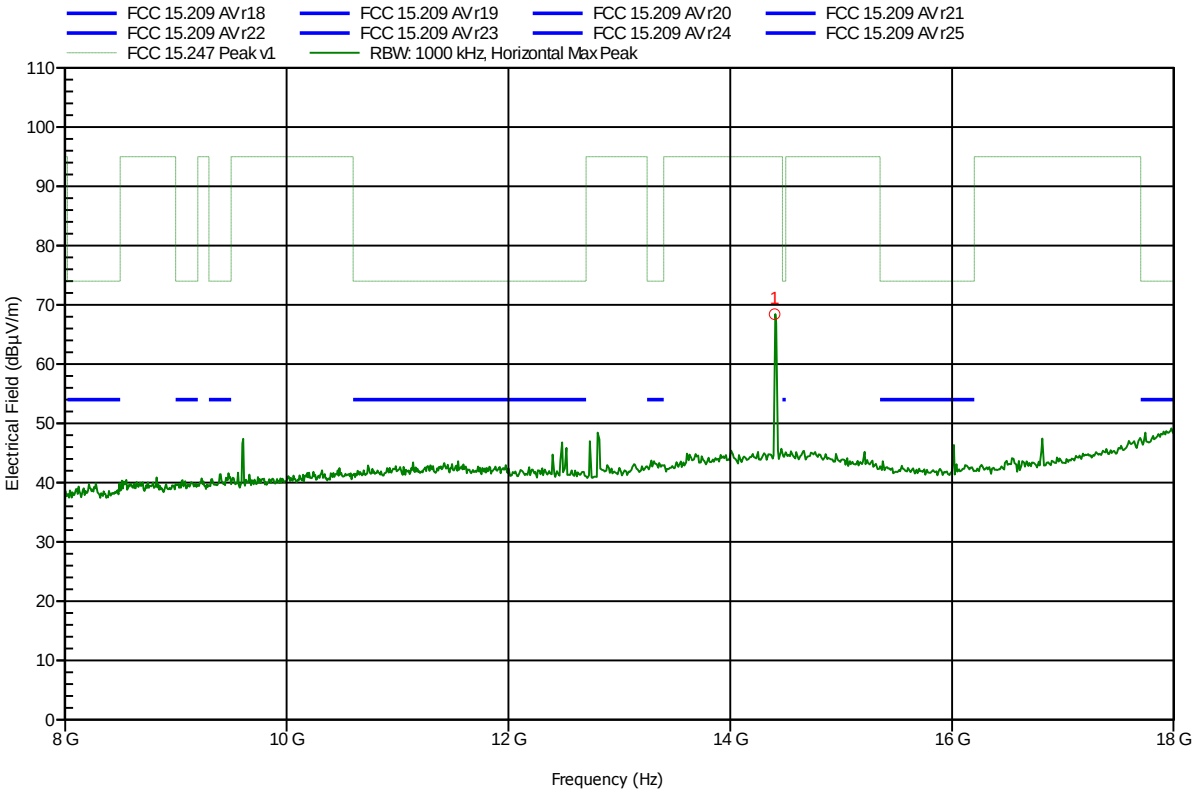


| Frequency | Peak | Peak Limit | Peak Difference | Peak Status |
|---|---|---|---|---|
| 14.4 GHz | 68.43 dBµV/m | 95 dBµV/m | -26.57 dB | Pass |

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Schwarzbeck BBHA 9120D, Vertical |
| Measurement distance: | 100 cm converted to 3m |
| Mode: | TX; 2440 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | |

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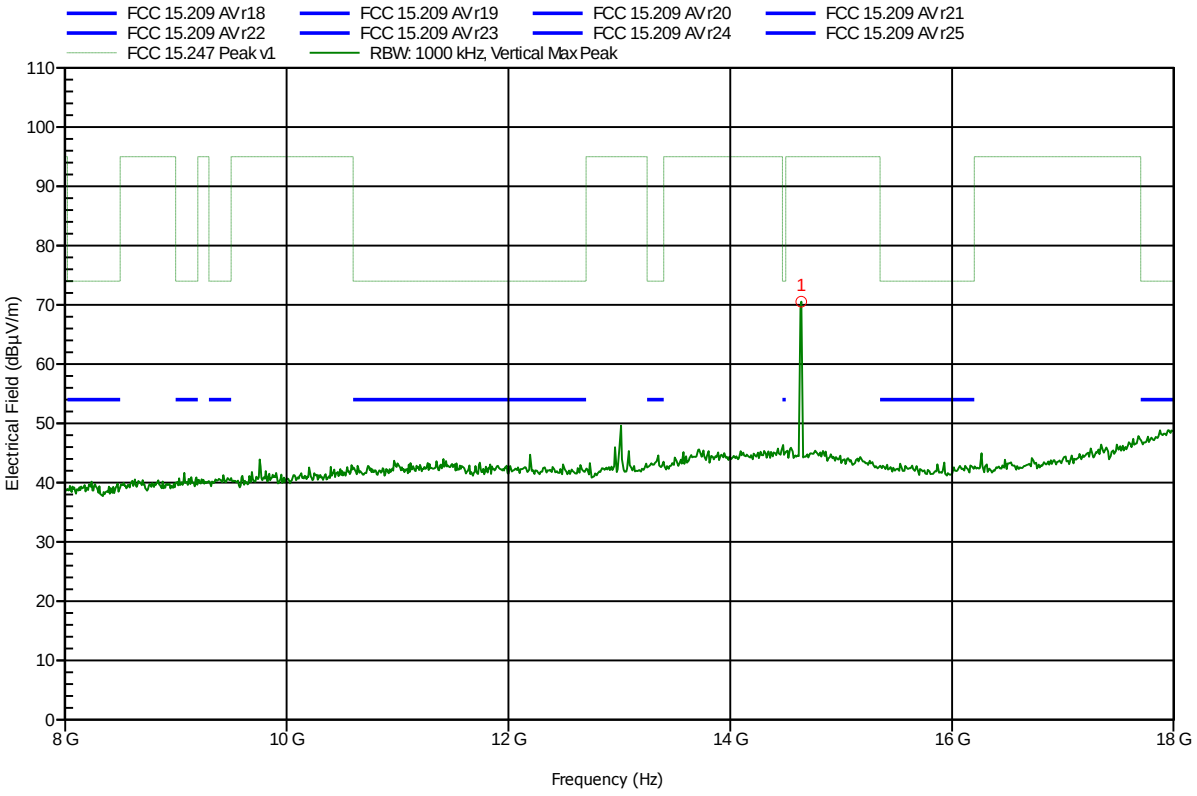


| Frequency | Peak | Peak Limit | Peak Difference | Peak Status |
|---|---|---|---|---|
| 14.64 GHz | 70.53 dBµV/m | 95 dBµV/m | -24.47 dB | Pass |

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Schwarzbeck BBHA 9120D, Horizontal |
| Measurement distance: | 100 cm converted to 3m |
| Mode: | TX; 2440 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | |

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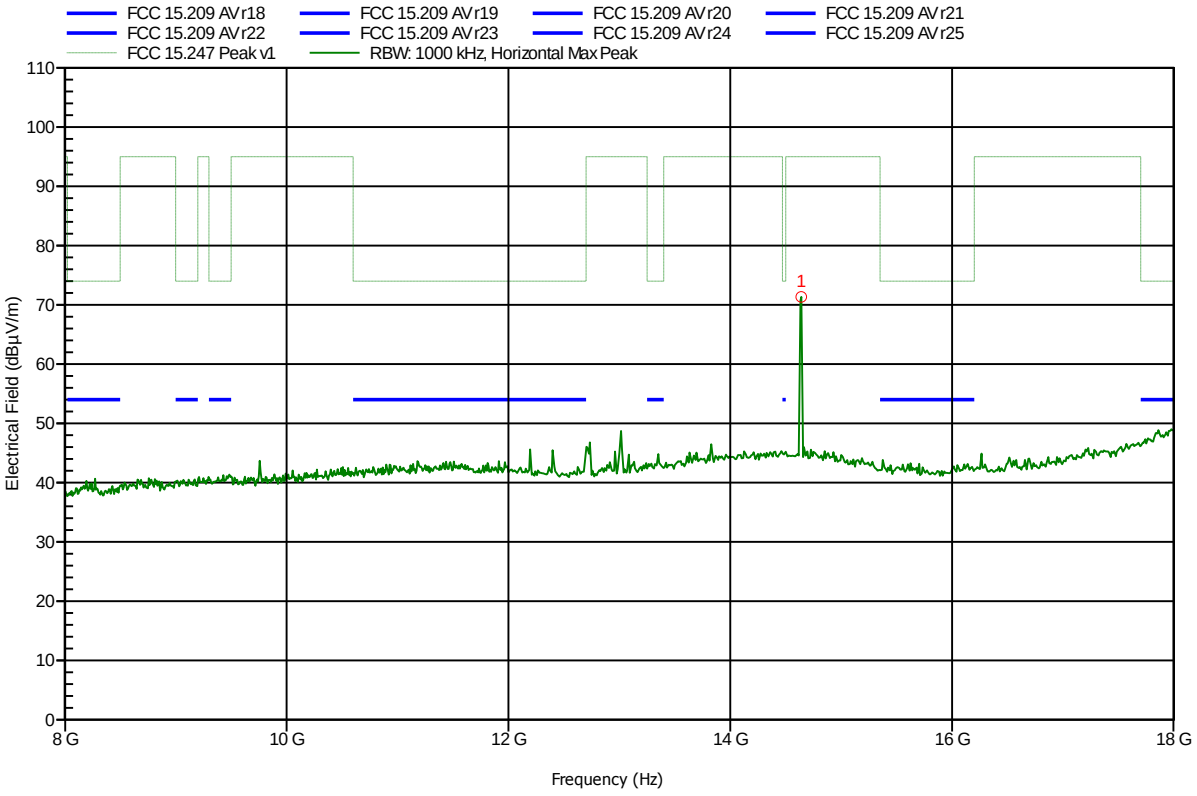


| Frequency | Peak | Peak Limit | Peak Difference | Peak Status |
|---|---|---|---|---|
| 14.64 GHz | 71.34 dBµV/m | 95 dBµV/m | -23.66 dB | Pass |

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Schwarzbeck BBHA 9120D, Vertical |
| Measurement distance: | 100 cm converted to 3m |
| Mode: | TX; 2480 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | |

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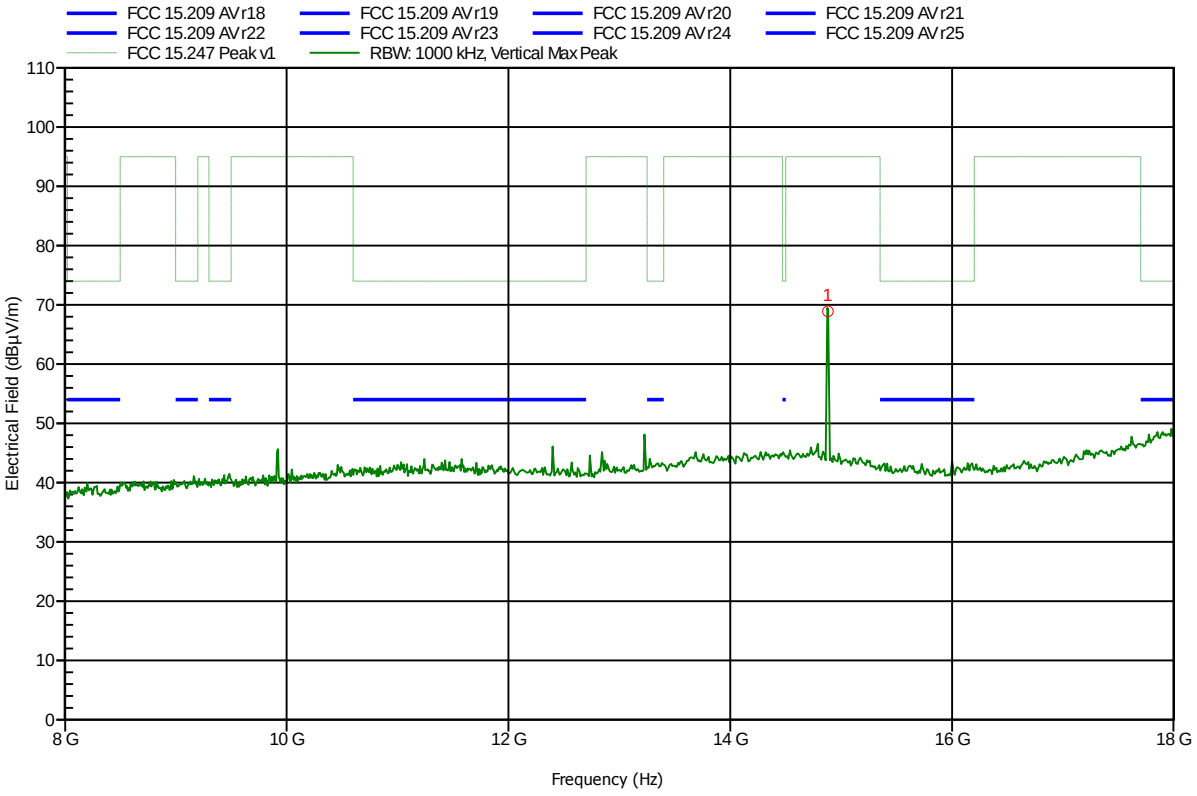


| Frequency | Peak | Peak Limit | Peak Difference | Peak Status |
|---|---|---|---|---|
| 14.88 GHz | 68.91 dBµV/m | 95 dBµV/m | -26.09 dB | Pass |

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Schwarzbeck BBHA 9120D, Horizontal |
| Measurement distance: | 100 cm converted to 3m |
| Mode: | TX; 2480 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | |

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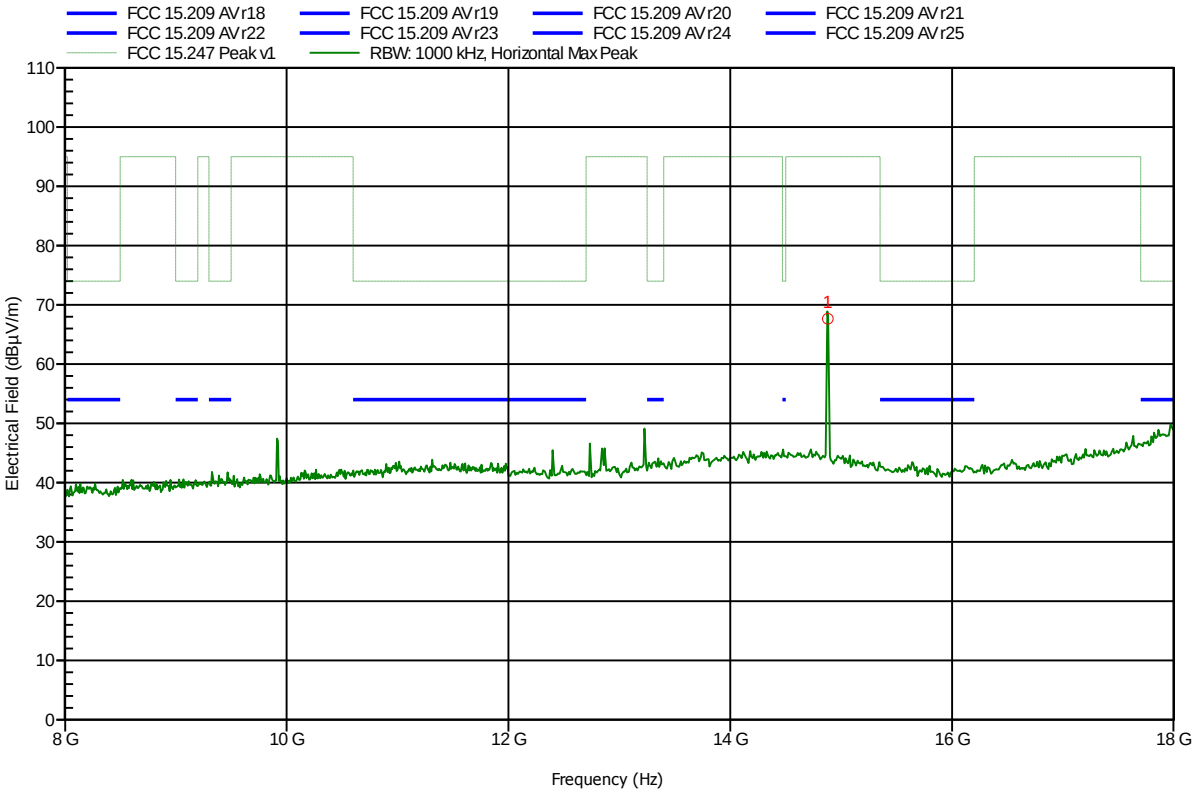


| Frequency | Peak | Peak Limit | Peak Difference | Peak Status |
|---|---|---|---|---|
| 14.88 GHz | 67.66 dBµV/m | 95 dBµV/m | -27.34 dB | Pass |

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Rohde & Schwarz HL 025, Vertical |
| Measurement distance: | 100 cm converted to 3m |
| Mode: | TX; 2402 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | |

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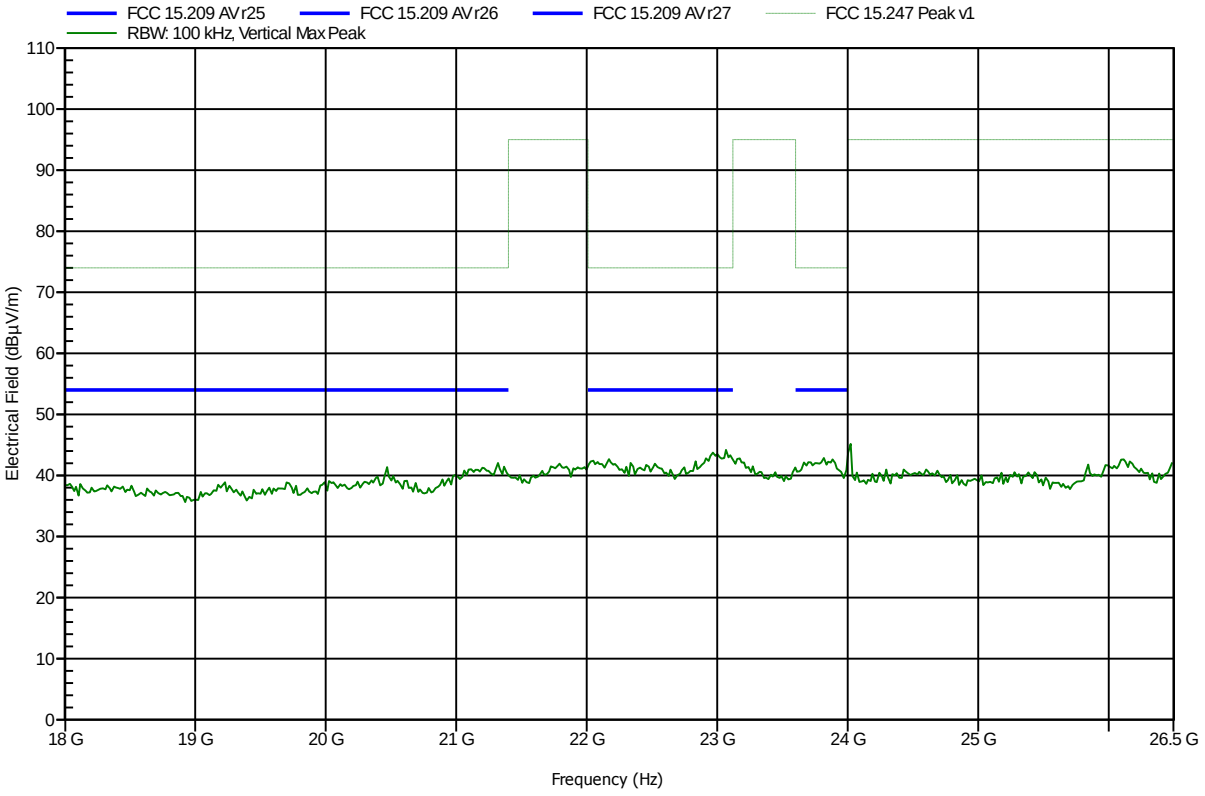

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Rohde & Schwarz HL 025, Horizontal |
| Measurement distance: | 100 cm converted to 3m |
| Mode: | TX; 2402 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | |

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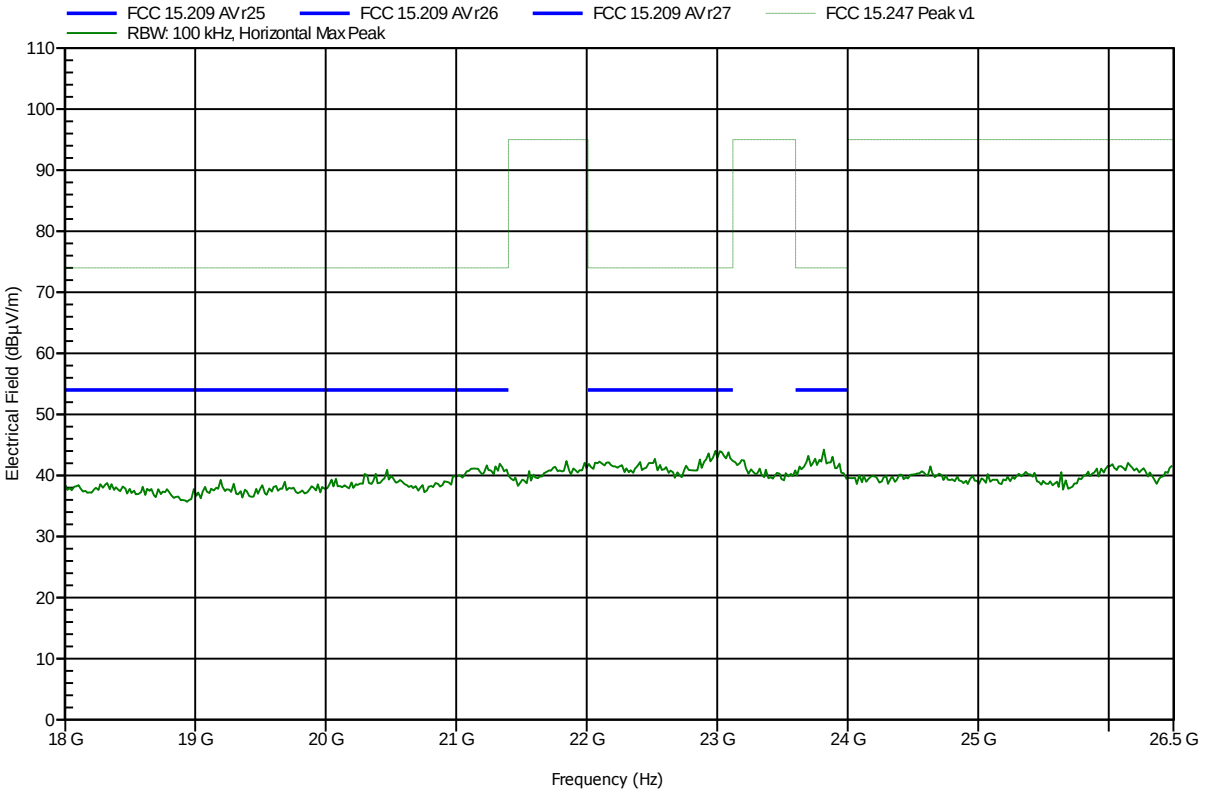

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Rohde & Schwarz HL 025, Vertical |
| Measurement distance: | 100 cm converted to 3m |
| Mode: | TX; 2440 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | |

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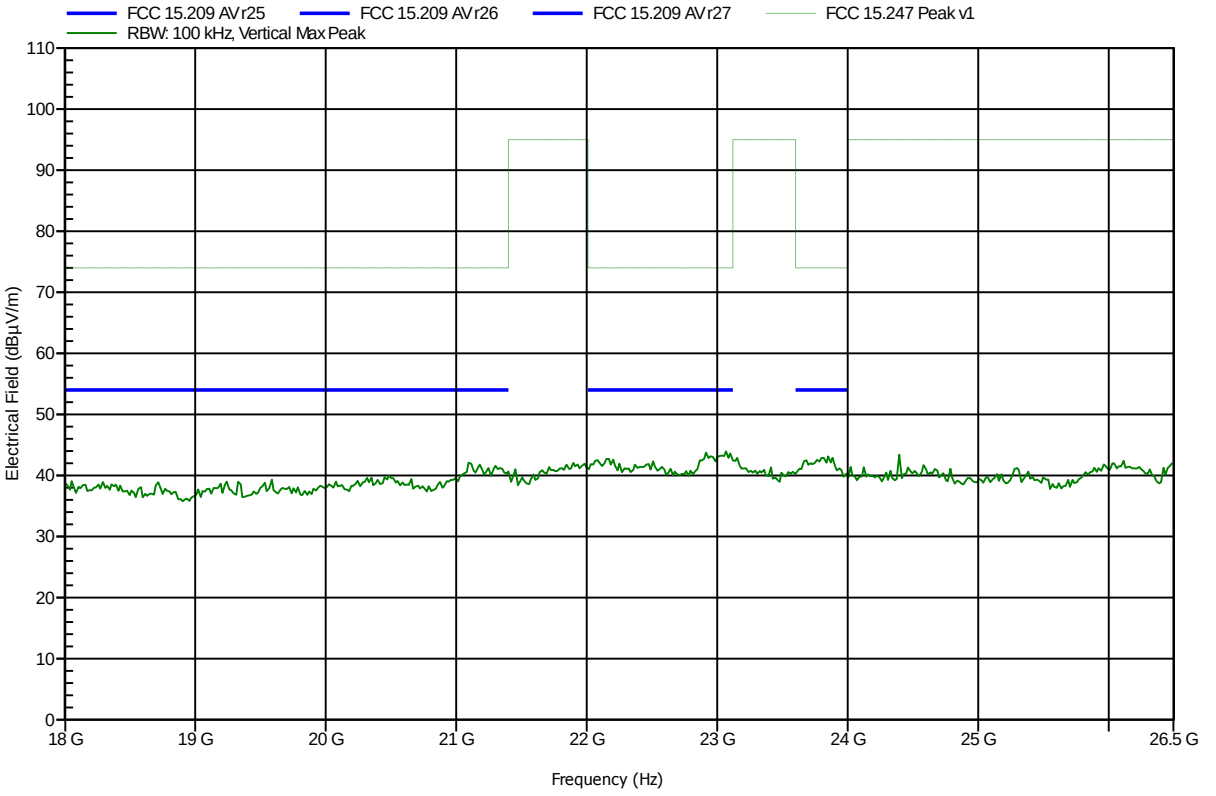

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Rohde & Schwarz HL 025, Horizontal |
| Measurement distance: | 100 cm converted to 3m |
| Mode: | TX; 2440 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | |

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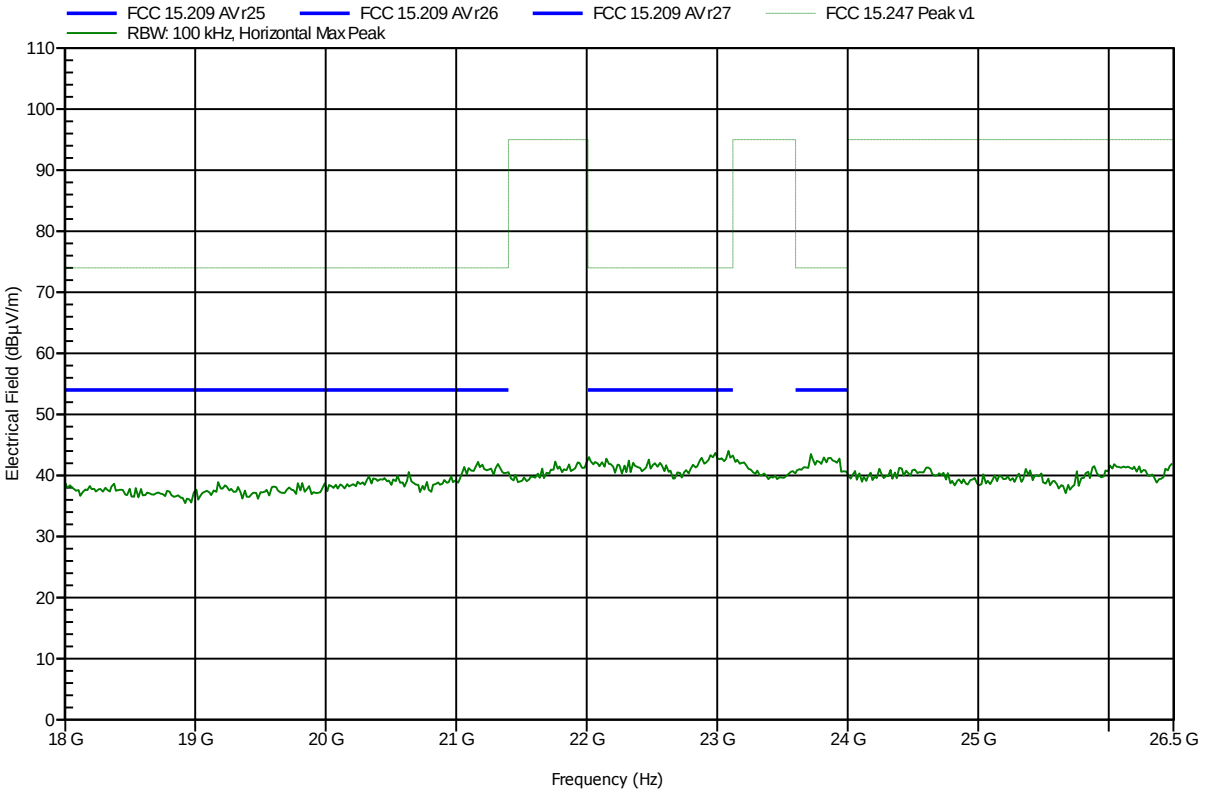

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Rohde & Schwarz HL 025, Vertical |
| Measurement distance: | 100 cm converted to 3m |
| Mode: | TX; 2480 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | |

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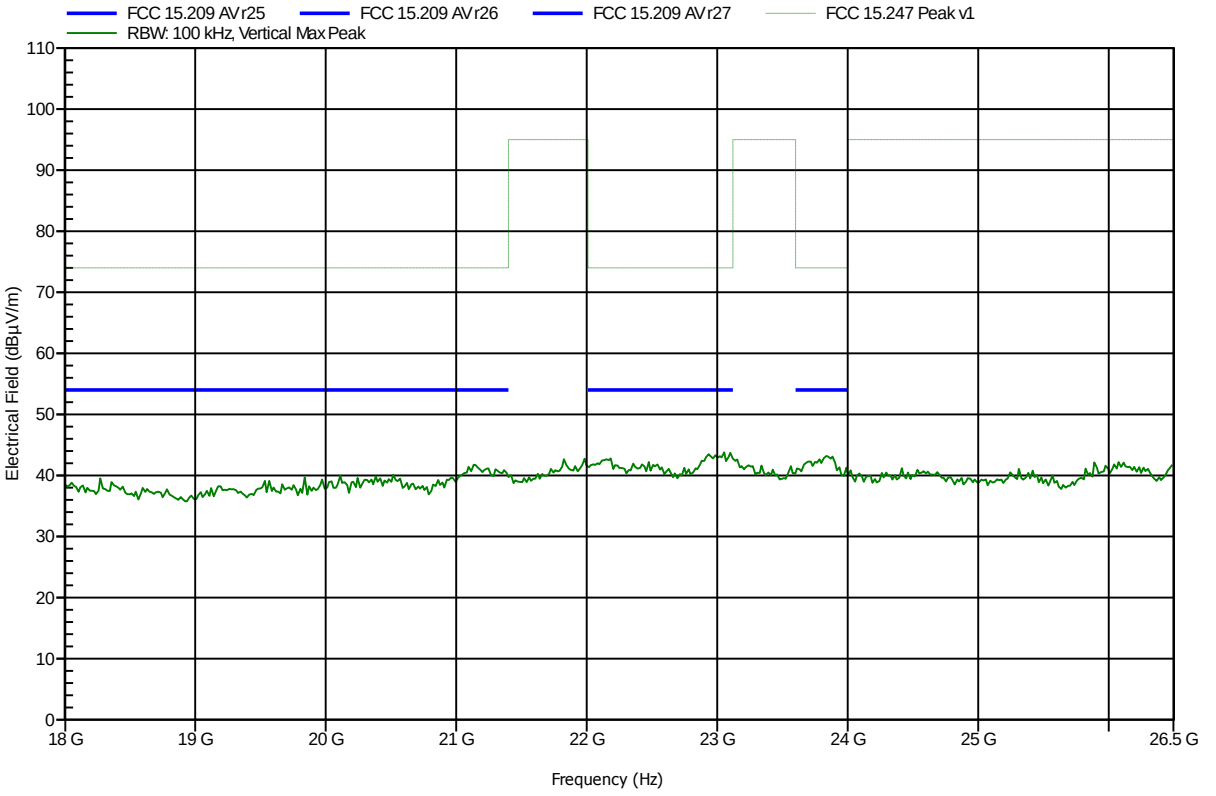

**Spurious emissions according to FCC 15.247**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Rohde & Schwarz HL 025, Horizontal |
| Measurement distance: | 100 cm converted to 3m |
| Mode: | TX; 2480 MHz; GFSK; BLE TX Testmode; power 15 |
| Test Date: | 2013-04-05 |
| Note: | |

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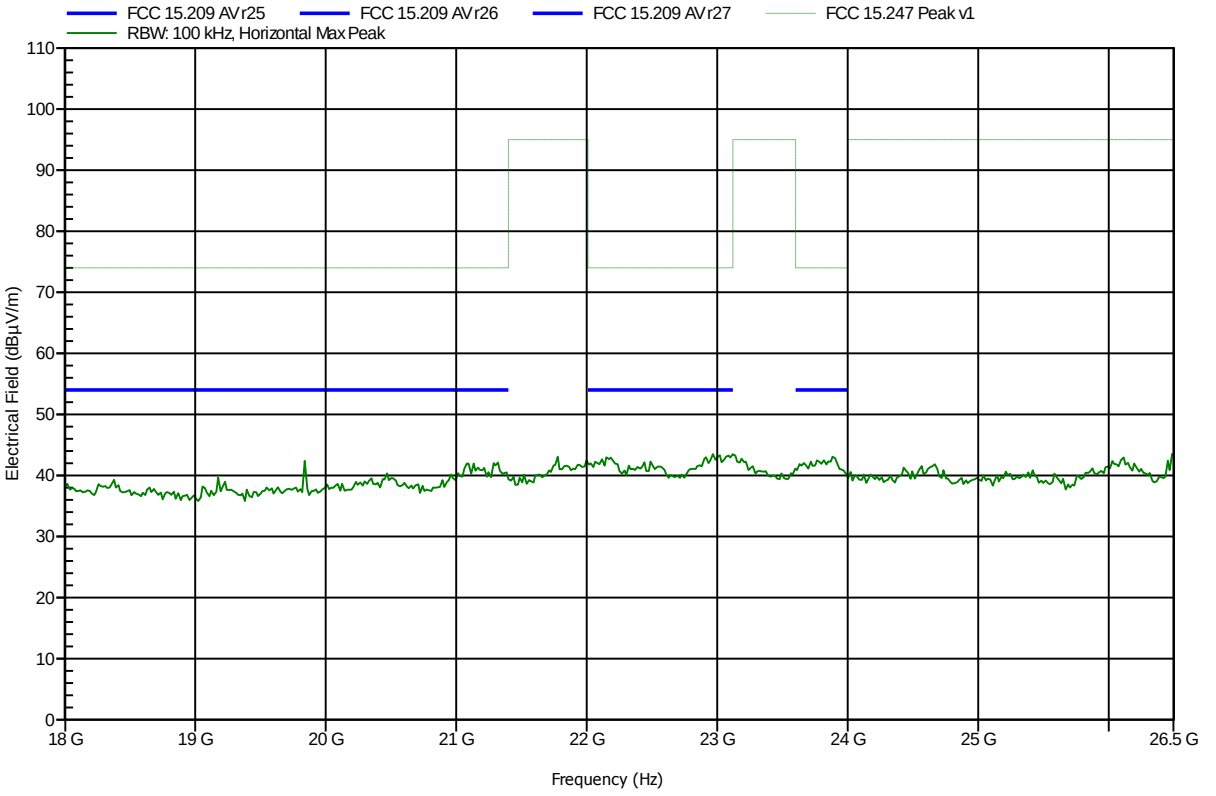

# ANNEX B Receiver radiated spurious emissions

**Spurious emissions according to RSS-GEN**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Rohde & Schwarz HK 116, Vertical |
| Measurement distance: | 3 m |
| Mode: | RX; 2440 MHz; GFSK; BLE RX Testmode |
| Test Date: | 2013-04-05 |
| Note: | |

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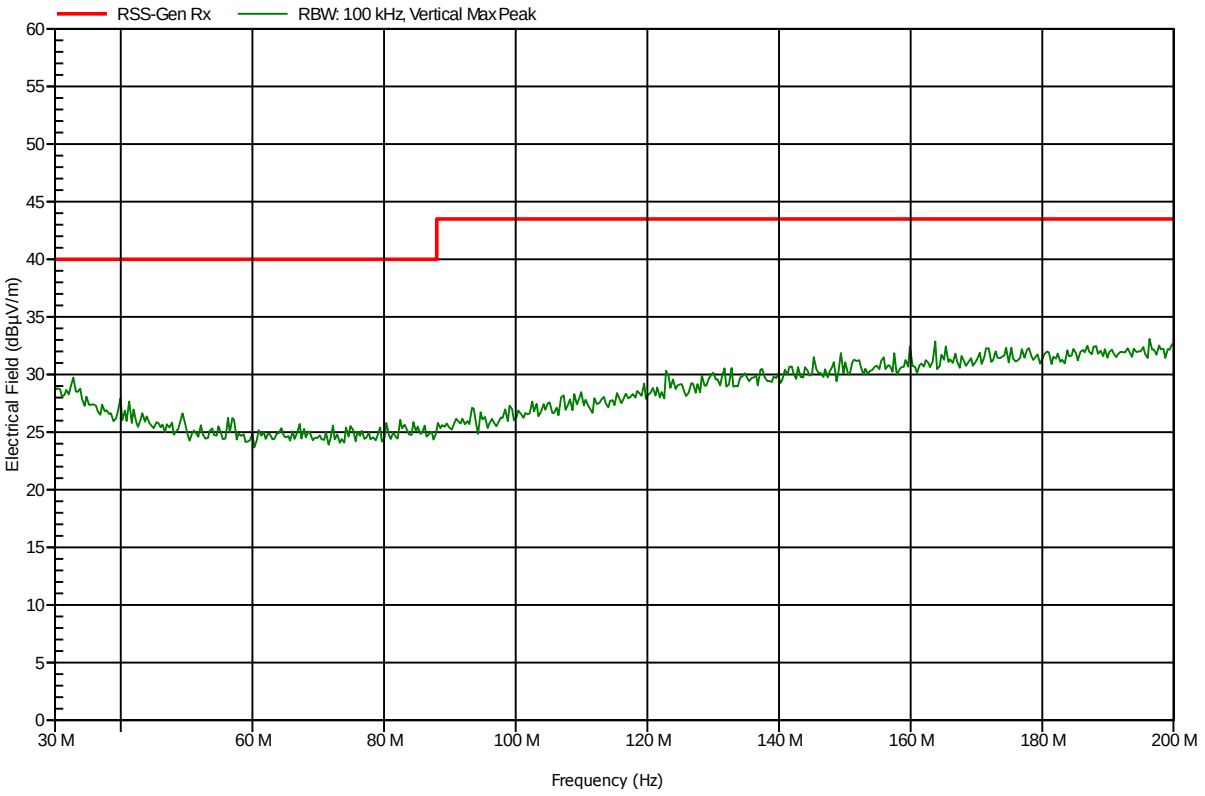

**Spurious emissions according to RSS-GEN**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Rohde & Schwarz HK 116, Horizontal |
| Measurement distance: | 3 m |
| Mode: | RX; 2440 MHz; GFSK; BLE RX Testmode |
| Test Date: | 2013-04-05 |
| Note: | |

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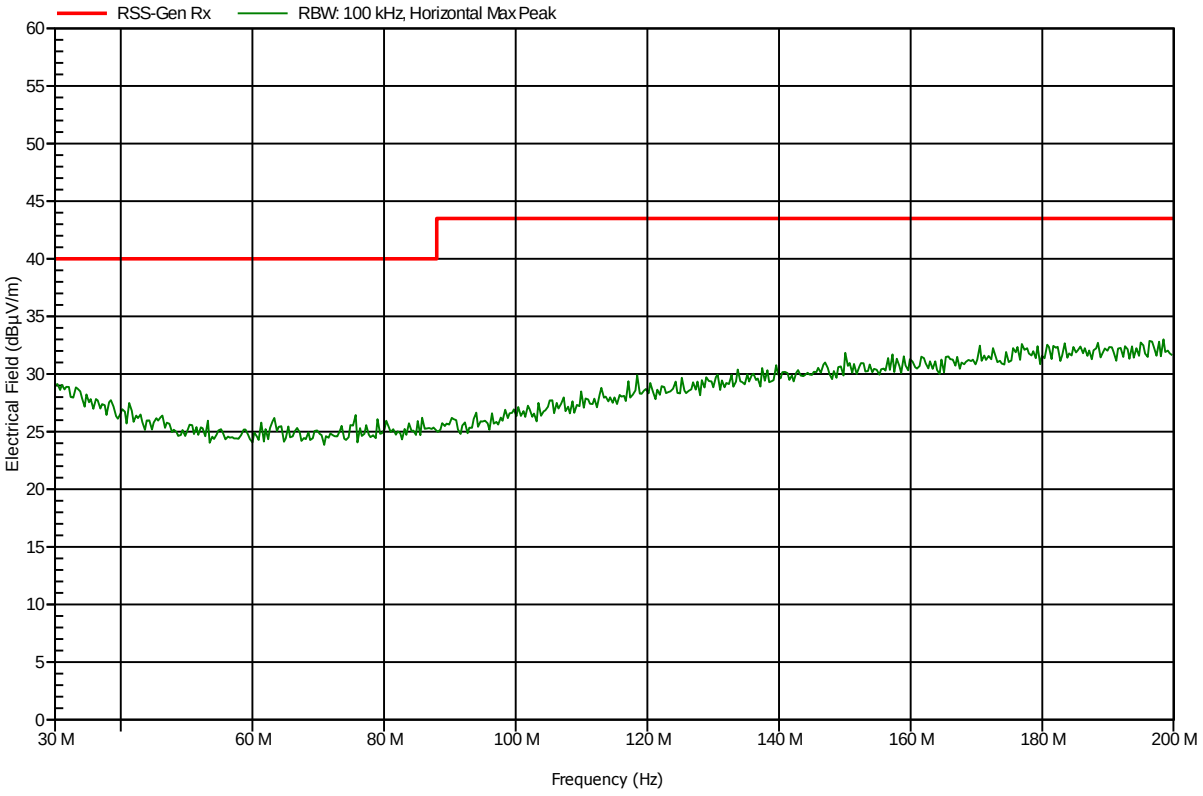

**Spurious emissions according to RSS-GEN**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Rohde & Schwarz HL 223, Vertical |
| Measurement distance: | 3 m |
| Mode: | RX; 2440 MHz; GFSK; BLE RX Testmode |
| Test Date: | 2013-04-05 |
| Note: | |

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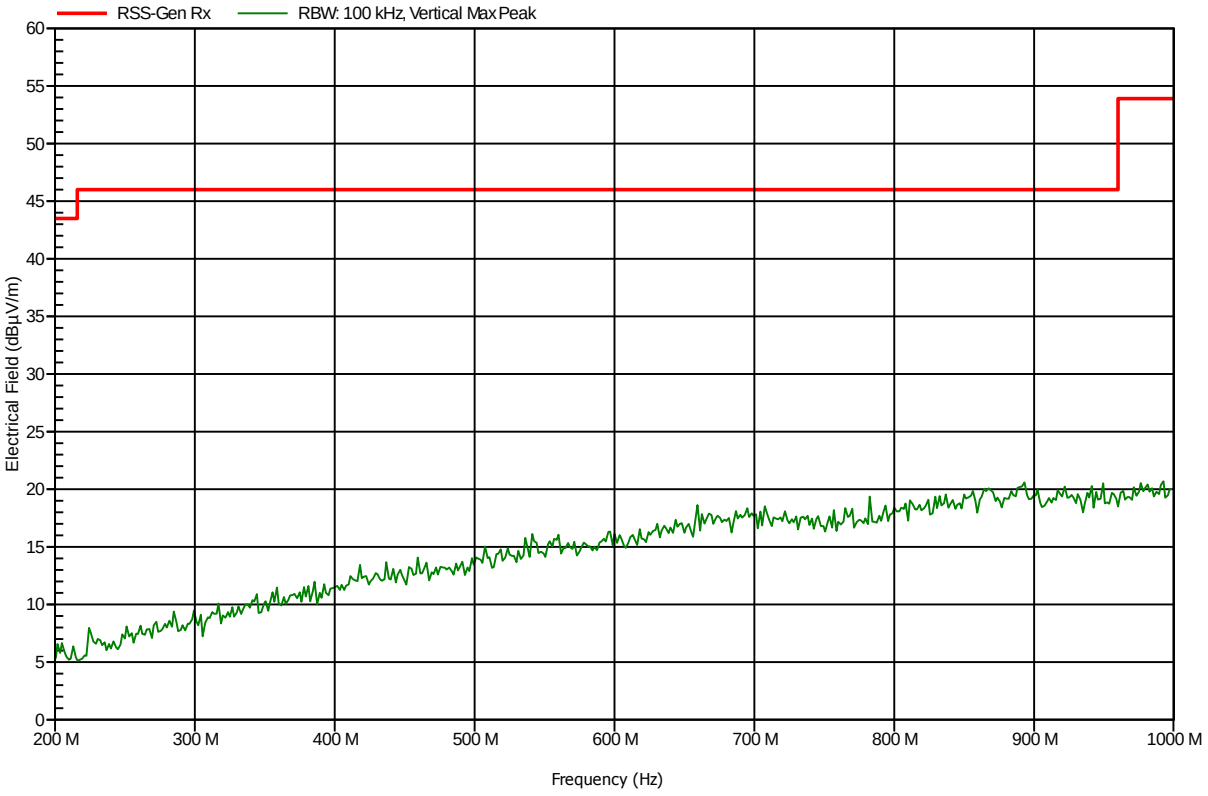

**Spurious emissions according to RSS-GEN**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Rohde & Schwarz HL 223, Horizontal |
| Measurement distance: | 3 m |
| Mode: | RX; 2440 MHz; GFSK; BLE RX Testmode |
| Test Date: | 2013-04-05 |
| Note: | |

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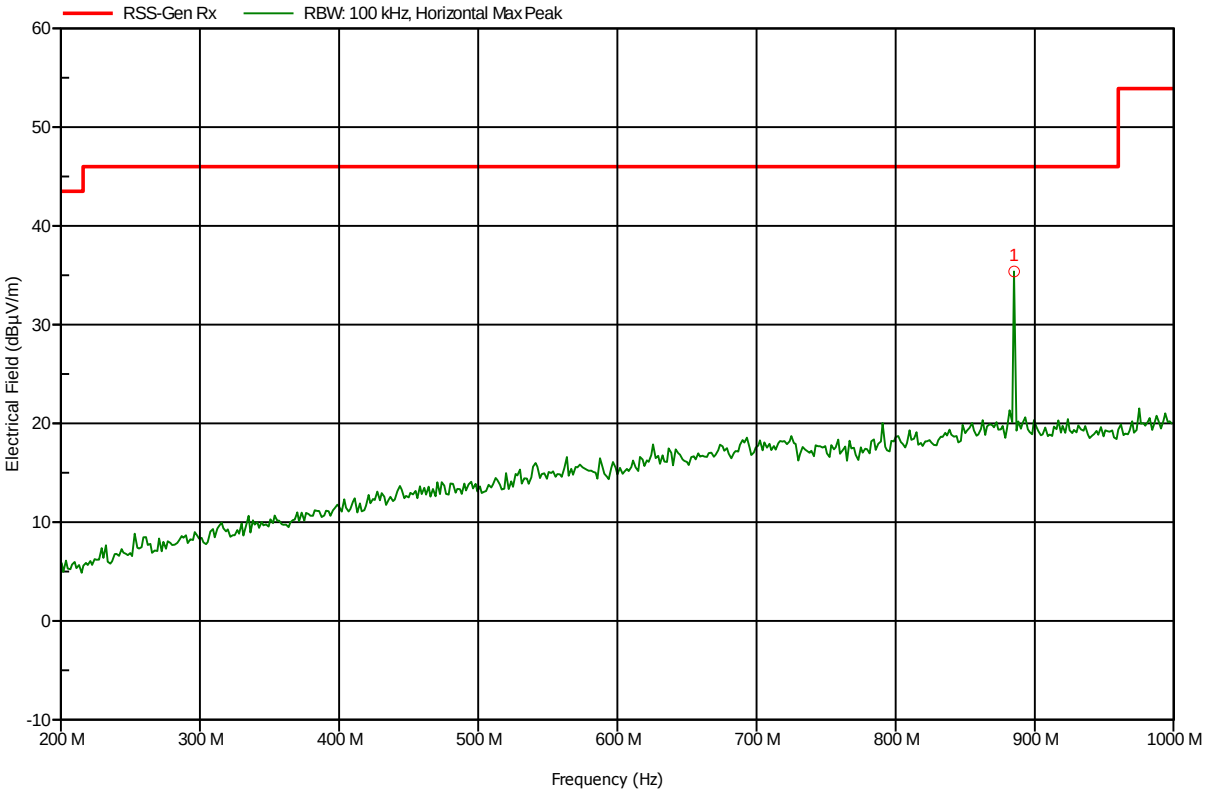


| Frequency | Peak | Peak Limit | Peak Difference | Status |
|---|---|---|---|---|
| 885.167 MHz | 35.38 dBµV/m | 46 dBµV/m | -10.62 dB | Pass |

**Spurious emissions according to RSS-GEN**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Schwarzbeck BBHA 9120D, Vertical |
| Measurement distance: | 3 m |
| Mode: | RX; 2440 MHz; GFSK; BLE RX Testmode |
| Test Date: | 2013-04-05 |
| Note: | |

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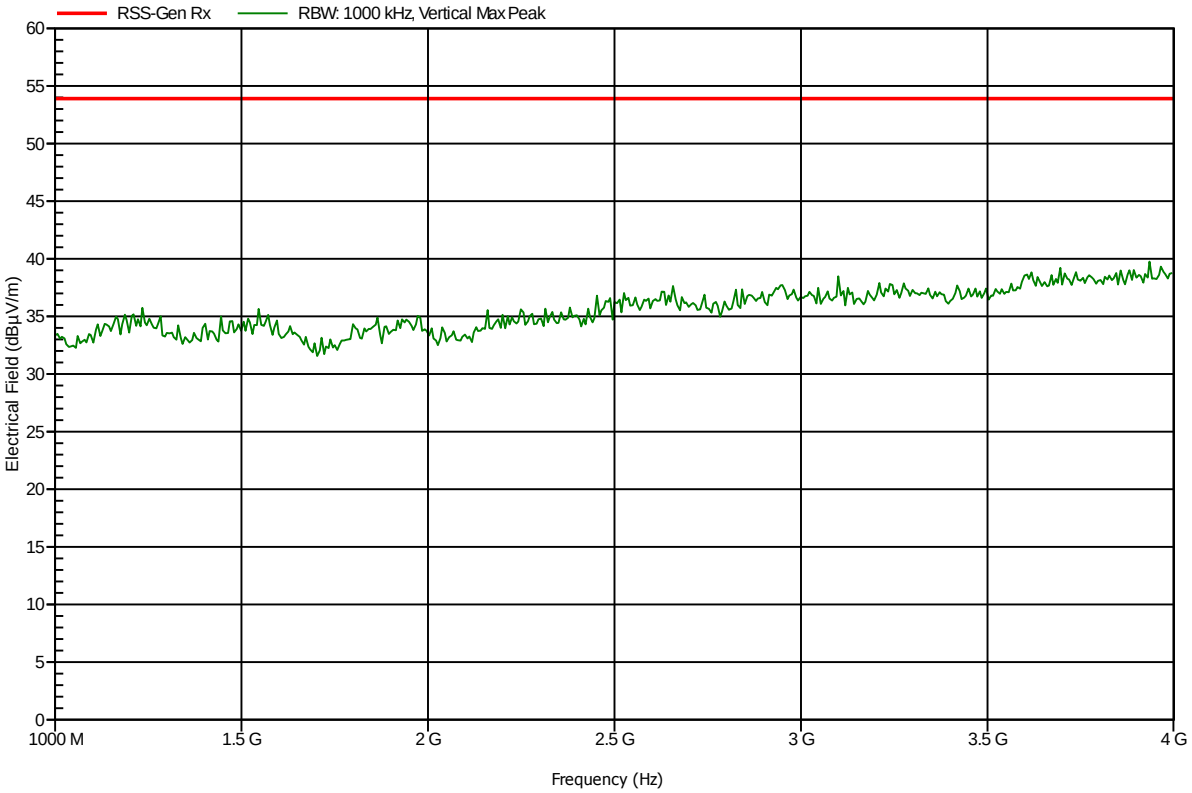

**Spurious emissions according to RSS-GEN**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Schwarzbeck BBHA 9120D, Horizontal |
| Measurement distance: | 3 m |
| Mode: | RX; 2440 MHz; GFSK; BLE RX Testmode |
| Test Date: | 2013-04-05 |
| Note: | |

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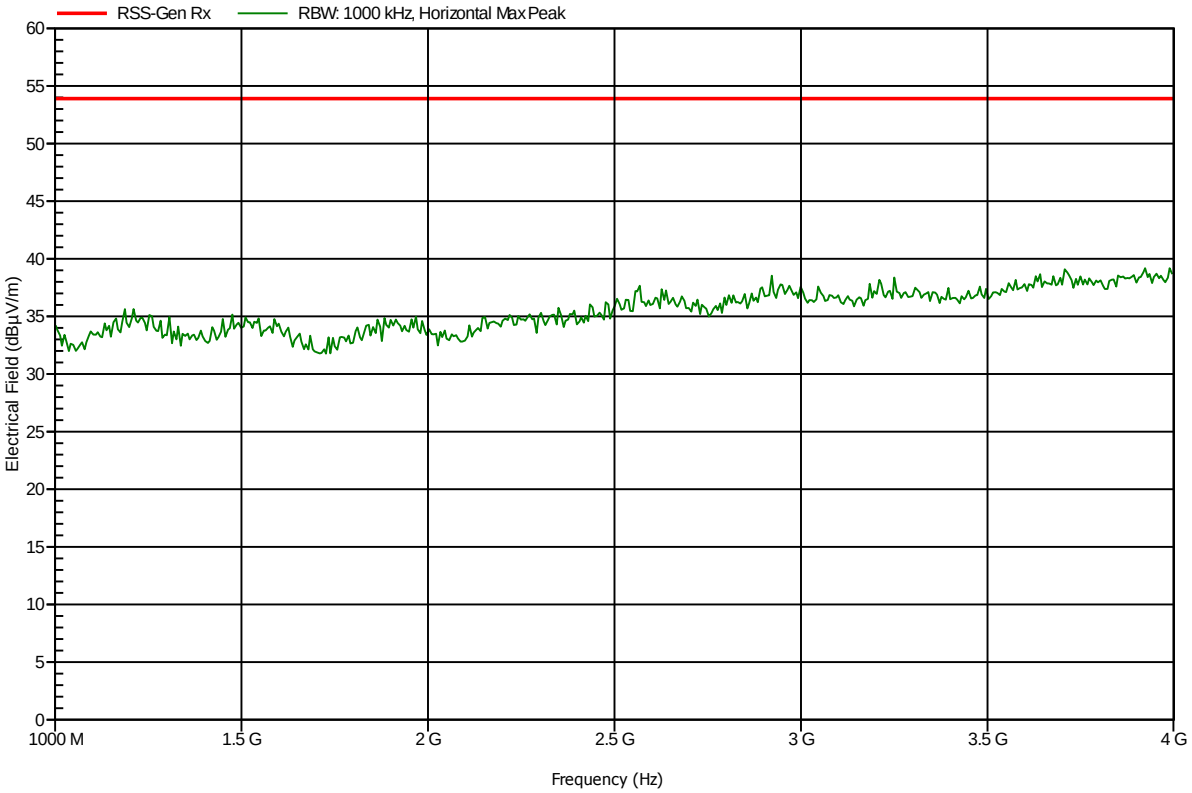

**Spurious emissions according to RSS-GEN**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Schwarzbeck BBHA 9120D, Vertical |
| Measurement distance: | 3 m |
| Mode: | RX; 2440 MHz; GFSK; BLE RX Testmode |
| Test Date: | 2013-04-05 |
| Note: | |

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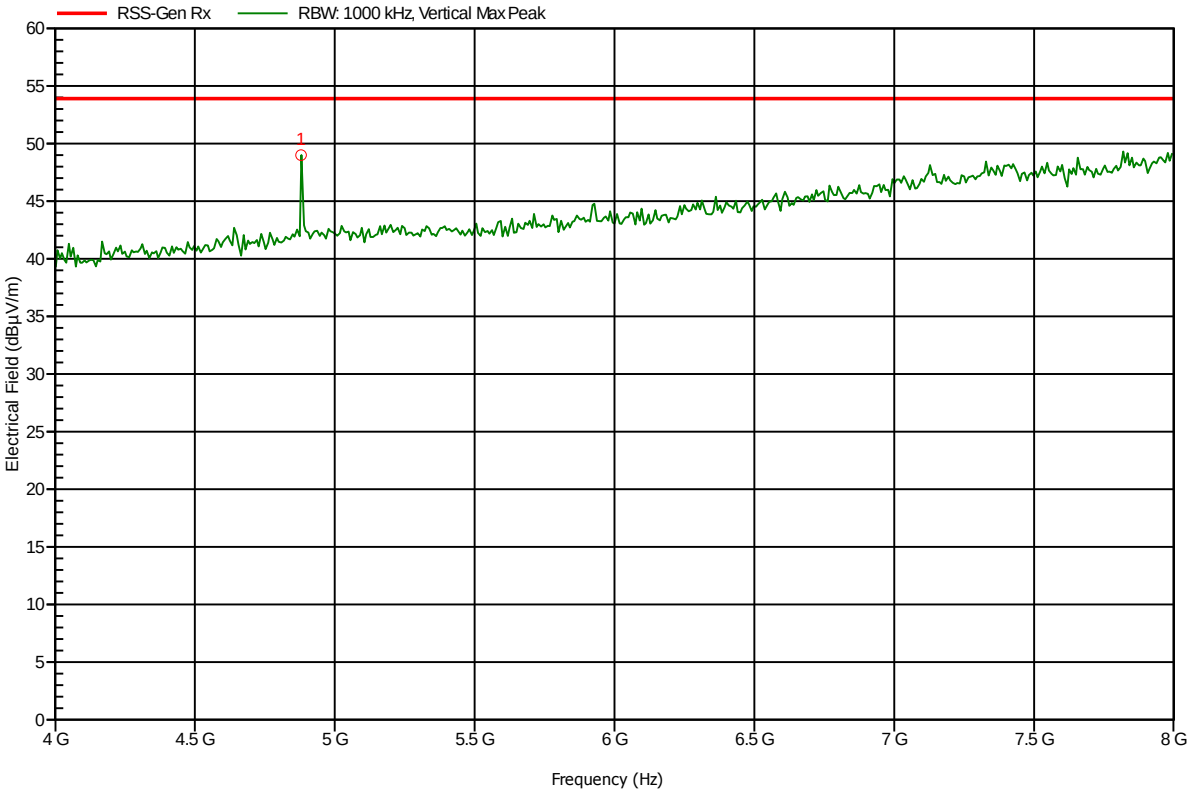


| Frequency | Peak | Peak Limit | Peak Difference | Status |
|---|---|---|---|---|
| 4.88 GHz | 49 dBµV/m | 53.9 dBµV/m | -4.9 dB | Pass |

**Spurious emissions according to RSS-GEN**

Project number: G0M-1303-2693

| | |
|---|---|
| Manufacturer: | Panasonic Industrial Devices Europe GmbH |
| EUT Name: | Bluetooth Module |
| Model: | PAN1316 / PAN1326 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Pudell |
| Test Conditions: | Tnom: 24°C, Vnom: 3.0V (2x 1.5V Batt AA) |
| Antenna: | Schwarzbeck BBHA 9120D, Horizontal |
| Measurement distance: | 3 m |
| Mode: | RX; 2440 MHz; GFSK; BLE RX Testmode |
| Test Date: | 2013-04-05 |
| Note: | |

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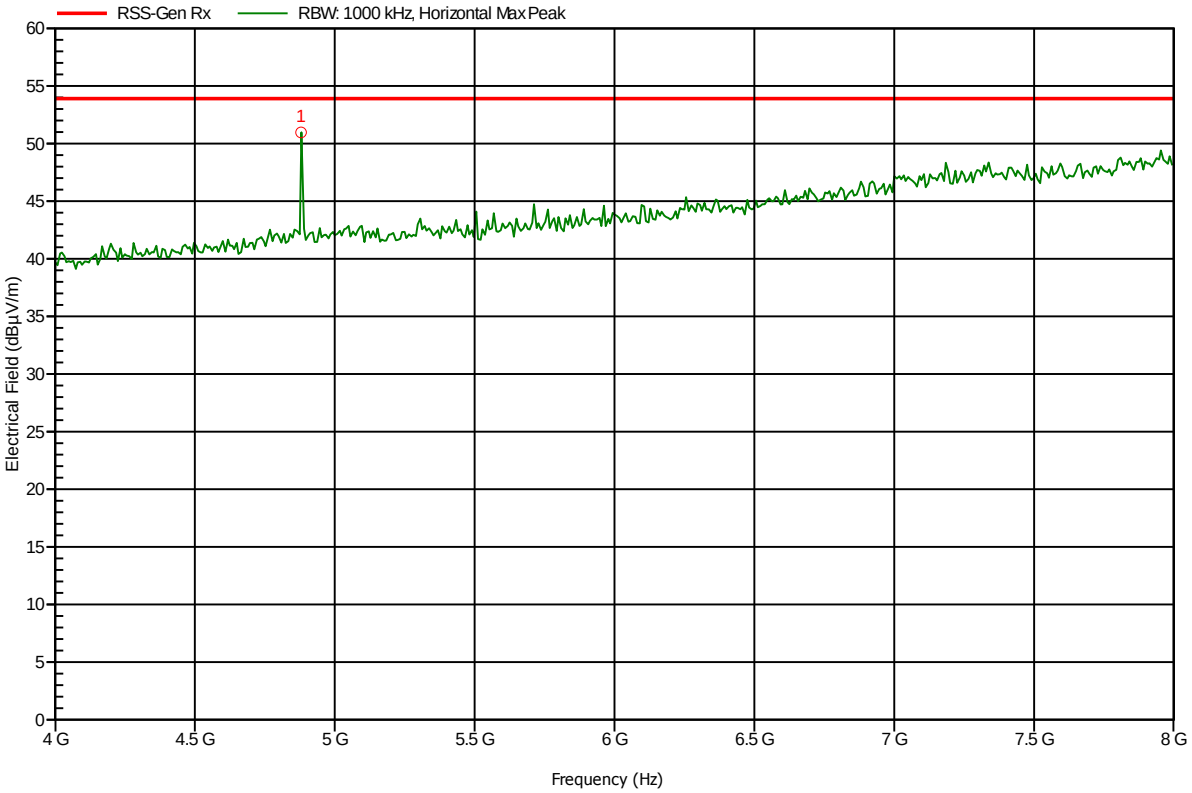


| Frequency | Peak | Peak Limit | Peak Difference | Status |
|---|---|---|---|---|
| 4.88 GHz | 50.97 dBµV/m | 53.9 dBµV/m | -2.93 dB | Pass |