eurofins | Product Service

# EMC TEST REPORT

**FCC 47 CFR Part 15B**
**Industry Canada RSS-Gen**

**Electromagnetic compatibility - Unintentional radiators**

| | |
|---|---|
| **Report Reference No**. ..... : | G0M-1503-4568-EF0115B-V02 |
| **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** ..... : | ELDAT GmbH |
| Address ..... : | Im Gewerbepark 14<br>15711 Königs Wusterhausen<br>GERMANY |
| **Test specification:** | |
| Standard..... : | 47 CFR Part 15 Subpart B<br>RSS-Gen, Issue 3, 2010-12<br>ANSI C63.4:2009 |
| **Equipment under test (EUT):** | |
| Product description | Handsender, 916MHz, FSK |
| Model No. | RT44 |
| Additional Models | None |
| Hardware version | None |
| Firmware / Software version | None |
| | FCC-ID: RZZNZ80248 IC: N/A |
| **Test result** | **Passed** |

| | |
|---|---|
| **Possible test case verdicts:** | |
| - not applicable to test object ..... : | N/A |
| - test object does meet the requirement..... : | P (Pass) |
| - test object does not meet the requirement..... : | F (Fail) |
| **Testing:** | |
| Date of receipt of test item ..... : | 2015-03-03 |
| Date (s) of performance of tests ..... : | 2015-03-25 |
| Compiled by..... : | Yu Yu |
| Tested by (+ signature)..... : | Yu Yu |
| Approved by (+ signature) (Deputy Head of Lab) ..... : | Jens Marquardt |
| Date of issue..... : | 2016-04-22 |
| Total number of pages..... : | 21 |

**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.**



**Additional comments:**

# Version History

| Version | Issue Date | Remarks | Revised by |
|---|---|---|---|
| V01 | 2015-03-26 | Initial Release | |
| V02 | 2016-04-22 | FCC ID added. | Yu Yu |



Eurofins Product Service GmbH
Storkower Str. 38c, D-15526 Reichenwalde, Germany

## REPORT INDEX

# 1 Equipment (Test item) Description

| | | |
|---|---|---|
| **Description** | Handsender, 916MHz, FSK | |
| **Model** | RT44 | |
| **Additional Models** | None | |
| **Serial number** | None | |
| **Hardware version** | None | |
| **Software / Firmware version** | None | |
| **FCC-ID** | RZZNZ80248 | |
| **IC** | N/A | |
| **Power supply** | 3 VDC via non rechargeable Battery | |
| **Radio module** | Type | SRD Module |
| | Model | Integrated in RT44 |
| | Manufacturer | ELDAT |
| **Manufacturer** | ELDAT GmbH<br>Im Gewerbepark 14<br>15711 Königs Wusterhausen<br>GERMANY | |
| **Highest emission frequency** | Fmax [MHz] = 916.5 MHz | |
| **Device classification** | Class B | |
| **Equipment type** | Tabletop | |
| **Number of tested samples** | 1 | |

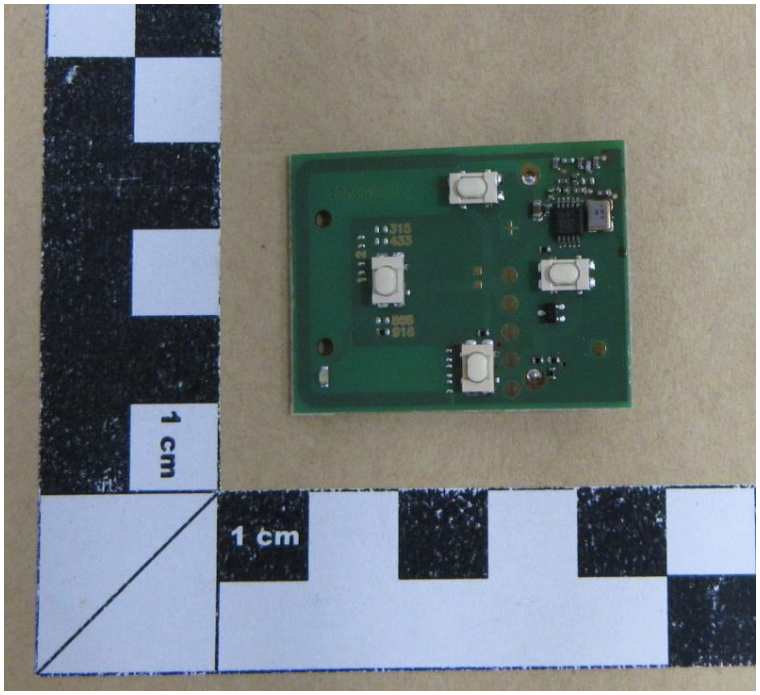
## 1.1 Photos – Equipment external

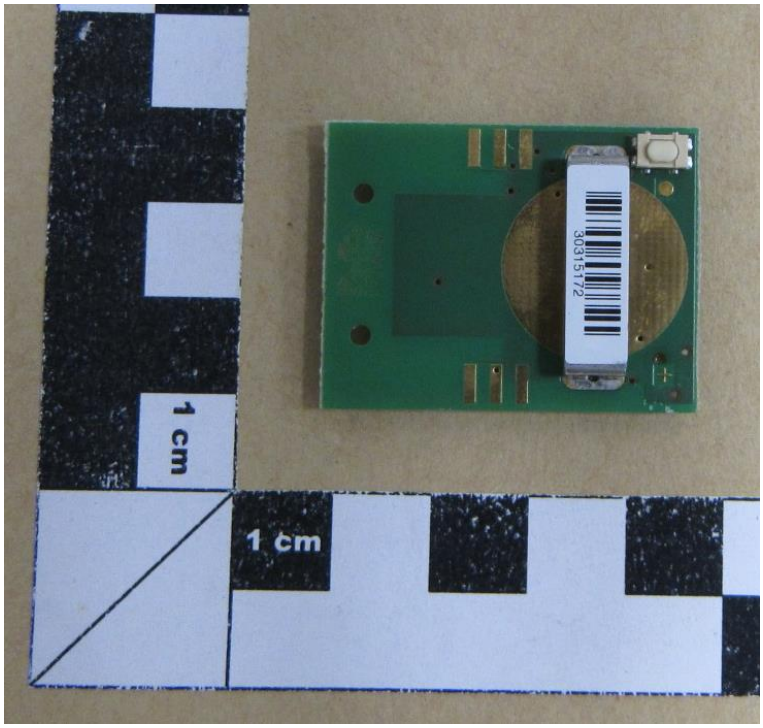
| EUT Front |
| --- |
|  |



| EUT Back |
| --- |
|  |

## 1.2 Photos – Equipment internal

| EUT PCB Front |
| --- |
|   |

| EUT PCB Back |
| --- |
|   |

## 1.3 Photos – Test setup

| Test Setup : Radiated Emissions |
| --- |
|  |

### 1.5 Input / Output Ports

No Ports available.

### 1.6 Operating Modes and Configurations

| Mode # | Description |
|---|---|
| 1 | Constant TX |

| Configuration # | EUT Configuration |
|---|---|
| 1 | Fully assembled EUT. |

### 1.7 Test Equipment Used During Testing

| Measurement Software | | | |
|---|---|---|---|
| Description | Manufacturer | Name | Version |
| EMC Test Software | Dare Instruments | Radimation | 2014.1.15 |

| Radiated emissions | | | | | |
|---|---|---|---|---|---|
| Description | Manufacturer | Model | Identifier | Cal. Date | Cal. Due |
| Biconical Antenna | R&S | HK 116 | EF00012 | 2013-02 | 2016-02 |
| LPD-Antenne | R&S | HL 223 | EF00187 | 2014-03 | 2017-03 |
| Horn antenna | Schwarzbeck | BBHA 9120D | EF00018 | 2013-09 | 2016-09 |
| EMI Test Receiver | R&S | ESU26 | EF00887 | 2015-01 | 2016-01 |

### 1.8 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 15B, Industry Canada RSS-Gen | | | | |
|---|---|---|---|---|
| **Product Specific Standard** | **Requirement – Test** | **Reference Method** | **Result** | **Remarks** |
| 47 CFR 15.109<br>RSS-Gen 4.9 & 4.10 | Radiated emissions | ANSI C 63.4 | PASS | - |
| 47 CFR 15.107<br>RSS-Gen 7.2.4 | AC power line conducted emissions | ANSI C63.4 | N/A | Powered via non rechargeable |
| **Remarks:** | | | | |

# 3 Test Conditions and Results

## 3.1 Test Conditions and Results – Radiated emissions

| **Radiated emissions acc. FCC 47 CFR 15.109 / IC RSS-Gen** | | | | | | **Verdict: PASS** |
|---|---|---|---|---|---|---|
| Laboratory Parameters: | Required prior to the test | | During the test | | | |
| Ambient Temperature | 15 to 35 °C | | 23°C | | | |
| Relative Humidity | 30 to 60 % | | 31% | | | |
| Test according referenced standards | Reference Method | | | | | |
| | ANSI C63.4 | | | | | |
| Sample is tested with respect to the requirements of the equipment class | Equipment class | | | | | |
| | Class B | | | | | |
| Test frequency range determined from highest emission frequency | Highest emission frequency | | | | | |
| | Fmax [MHz] = 916.5 MHz | | | | | |
| Fully configured sample scanned over the following frequency range | Frequency range | | | | | |
| | 30 MHz to 5 GHz | | | | | |
| Operating mode | 1 | | | | | |
| Configuration | 1 | | | | | |
| **Limits and results Class B** | | | | | | |
| Frequency [MHz] | Quasi-Peak [dBµV/m] | Result | Average [dBµV/m] | Result | Peak [dBµV/m] | Result |
| 30 – 88 | 40 | PASS | - | | - | - |
| 88 – 216 | 43.5 | PASS | - | | - | - |
| 216 – 960 | 46 | PASS | - | | - | - |
| 960 – 1000 | 54 | PASS | - | | - | - |
| > 1000 | - | - | 54 | PASS | 74 | PASS |
| Comments: | | | | | | |

**Test Procedure:**

The test site is in accordance with ANSI C63-4:2009 requirements and is listed by FCC.
The measurement procedure is as follows:

1) The EUT was placed on a 0.8 m non conductive table at a 3 m distance from the receive antenna (ANSI C63.4: 2009 item 6.2)
2) The antenna output was connected to the measurement receiver
3) A biconical antenna was used for the frequency range 30 – 200 MHz, a logarithmic periodical antenna was used for the frequency range from 200 – 1000 MHz. Above one 1 GHz a Double Ridged Broadband Horn antenna was used. The antenna was placed on an adjustable height antenna mast
4) Emissions were maximized at each frequency by rotating the EUT and adjusting the receive antenna height and polarization. The maximum values were recorded.

**Spurious emissions under normal conditions according to FCC Part 15b**

Project number: G0M-1503-4568

| | |
|---|---|
| Manufacturer: | ELDAT GmbH |
| EUT Name: | Handsender, 916 MHz, FSK |
| Model: | RT44 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Zunke |
| Test Conditions: | Tnom: 23°C, Unom: 3VDC via Battery |
| Antenna: | Rohde & Schwarz HK 116, Vertical |
| Measurement distance: | 3m |
| Mode: | constant TX |
| Test Date: | 2015-03-25 |
| Note: | |

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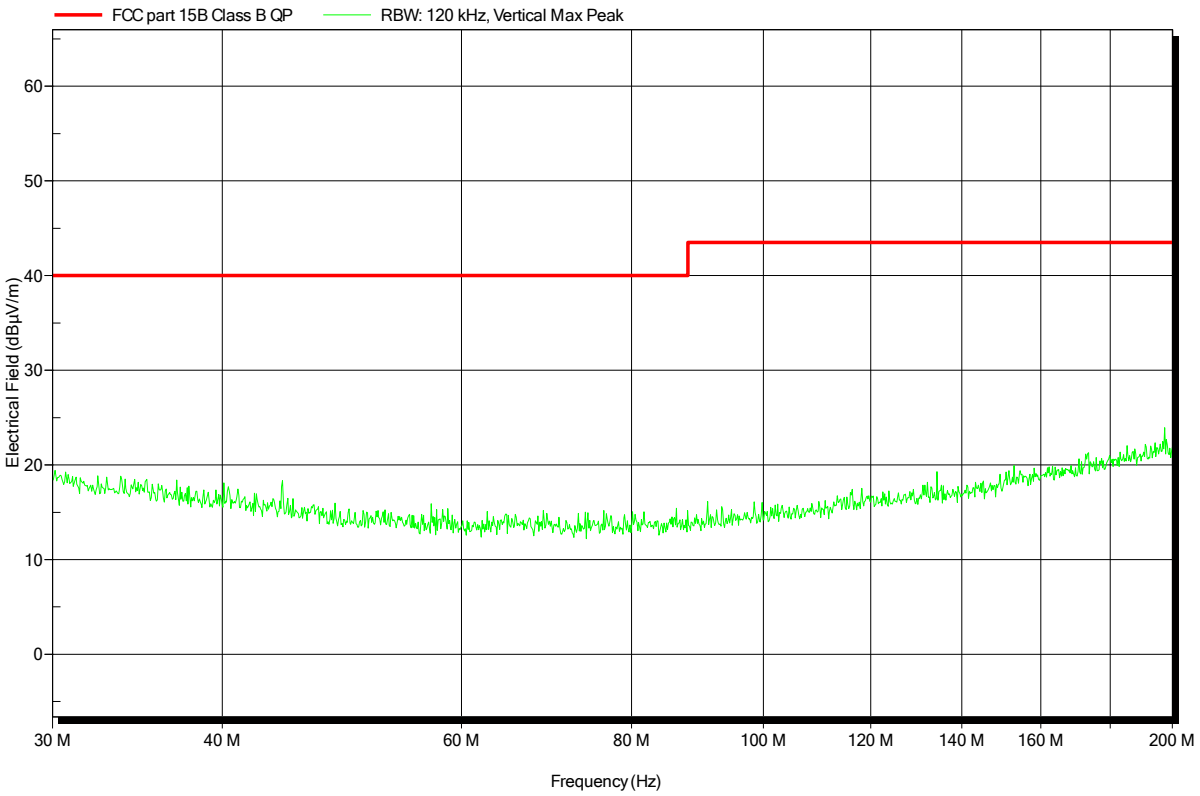

**Spurious emissions under normal conditions according to FCC Part 15b**

Project number: G0M-1503-4568

| | |
|---|---|
| Manufacturer: | ELDAT GmbH |
| EUT Name: | Handsender, 916 MHz, FSK |
| Model: | RT44 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Zunke |
| Test Conditions: | Tnom: 23°C, Unom: 3VDC via Battery |
| Antenna: | Rohde & Schwarz HK 116, Horizontal |
| Measurement distance: | 3m |
| Mode: | constant TX |
| Test Date: | 2015-03-25 |
| Note: | |

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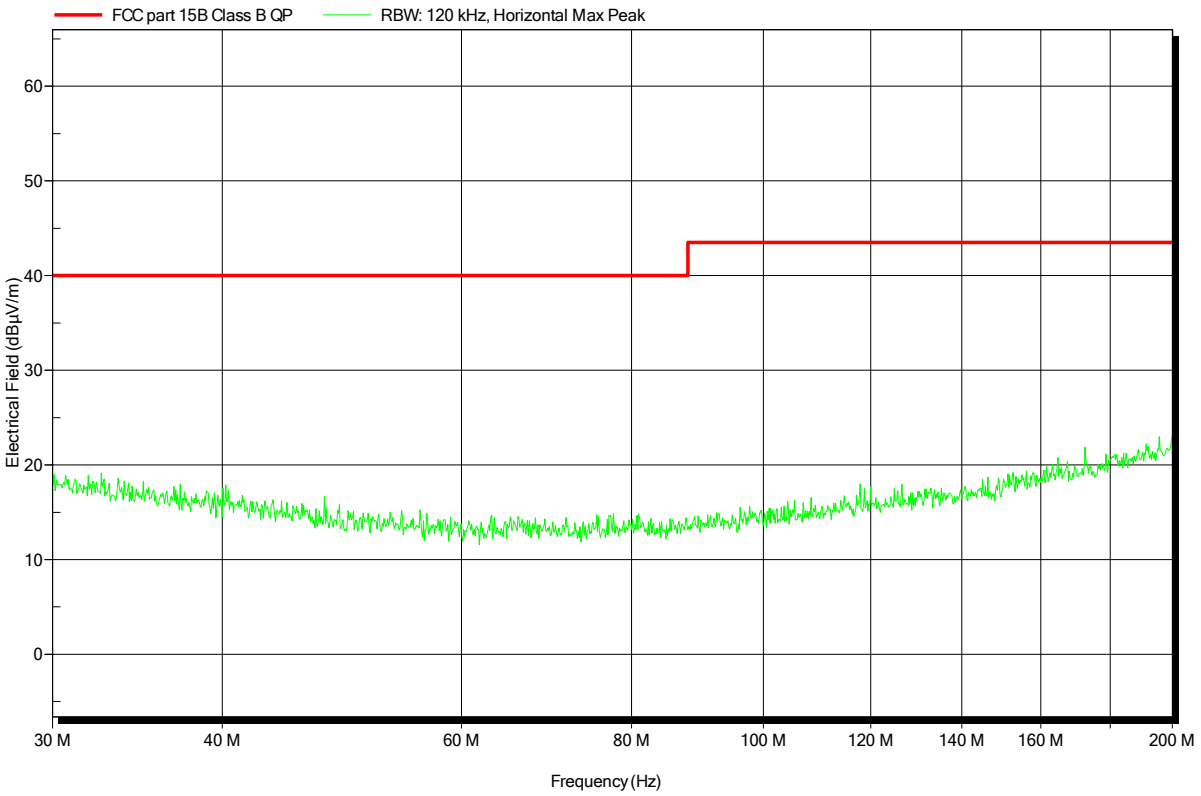

**Spurious emissions under normal conditions according to FCC Part 15b**

Project number: G0M-1503-4568

| | |
|---|---|
| Manufacturer: | ELDAT GmbH |
| EUT Name: | Handsender, 916 MHz, FSK |
| Model: | RT44 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Zunke |
| Test Conditions: | Tnom: 23°C, Unom: 3VDC via Battery |
| Antenna: | Rohde & Schwarz HL 223, Vertical |
| Measurement distance: | 3m |
| Mode: | constant TX |
| Test Date: | 2015-03-25 |
| Note: | |

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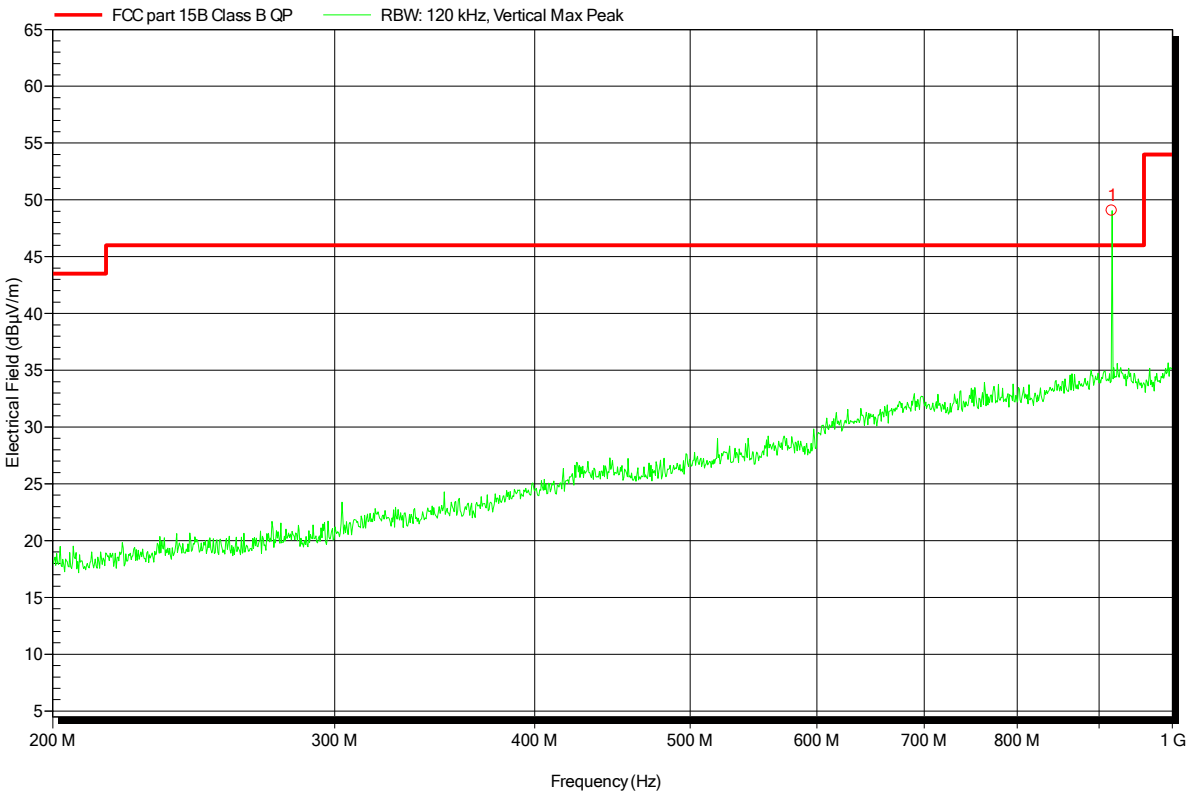
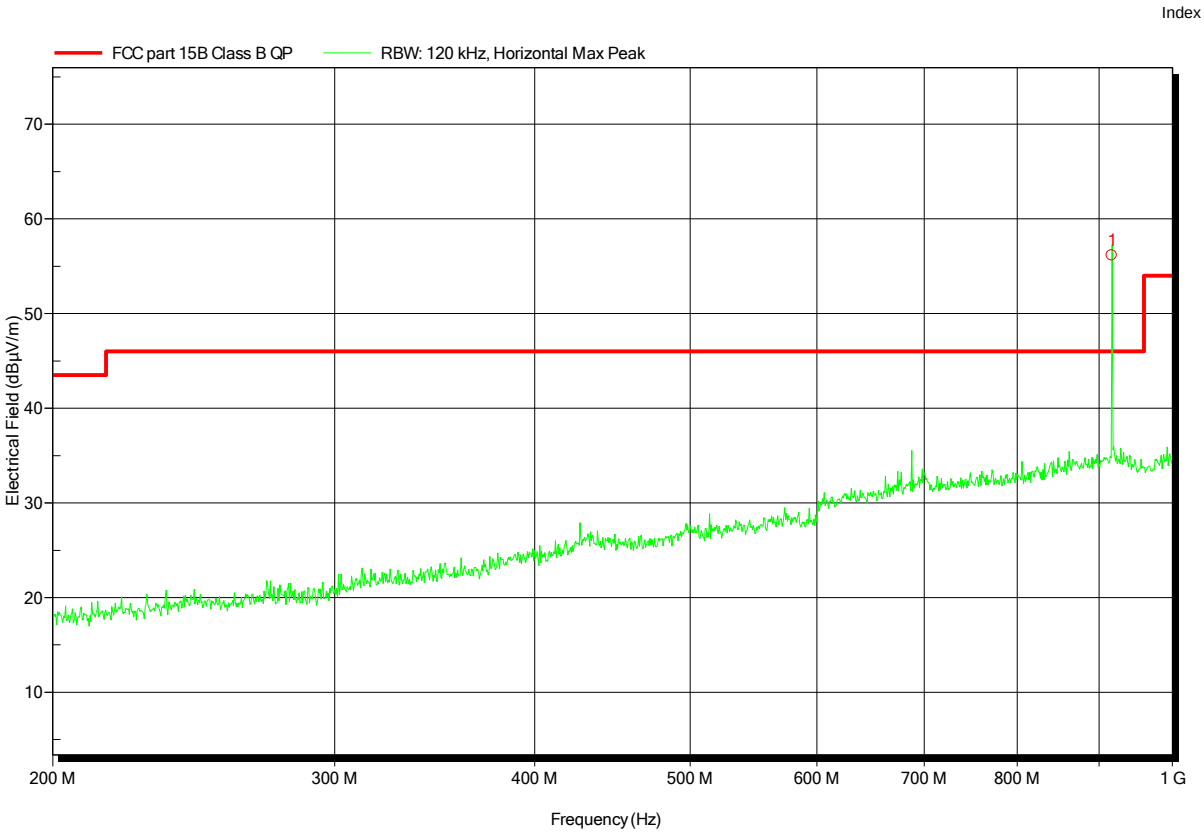



Frequency
916.52 MHz SRD Carrier

**Spurious emissions under normal conditions according to FCC Part 15b**

Project number: G0M-1503-4568

| | |
|---|---|
| Manufacturer: | ELDAT GmbH |
| EUT Name: | Handsender, 916 MHz, FSK |
| Model: | RT44 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Zunke |
| Test Conditions: | Tnom: 23°C, Unom: 3VDC via Battery |
| Antenna: | Rohde & Schwarz HL 223, Horizontal |
| Measurement distance: | 3m |
| Mode: | constant TX |
| Test Date: | 2015-03-25 |
| Note: | |




Frequency
916.5 MHz SRD Carrier

**Spurious emissions under normal conditions according to FCC Part 15b**

Project number: G0M-1503-4568

| | |
|---|---|
| Manufacturer: | ELDAT GmbH |
| EUT Name: | Handsender, 916 MHz, FSK |
| Model: | RT44 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Zunke |
| Test Conditions: | Tnom: 23°C, Unom: 3VDC via Battery |
| Antenna: | Schwarzbeck BBHA 9120D, Vertical |
| Measurement distance: | 3m |
| Mode: | constant TX |
| Test Date: | 2015-03-25 |
| Note: | |

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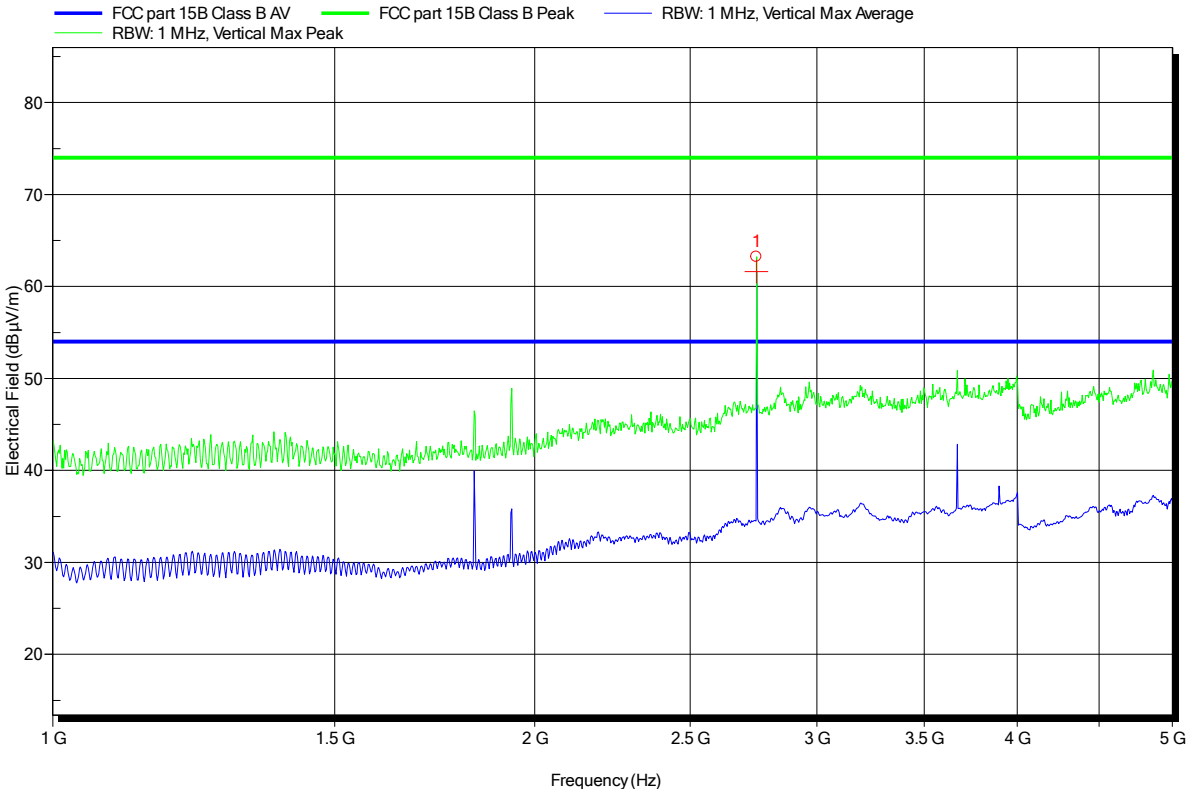


Frequency
2.75 GHz SRD Harmonics

**Spurious emissions under normal conditions according to FCC Part 15b**

Project number: G0M-1503-4568

| | |
|---|---|
| Manufacturer: | ELDAT GmbH |
| EUT Name: | Handsender, 916 MHz, FSK |
| Model: | RT44 |
| Test Site: | Eurofins Product Service GmbH |
| Operator: | Mr. Zunke |
| Test Conditions: | Tnom: 23°C, Unom: 3VDC via Battery |
| Antenna: | Schwarzbeck BBHA 9120D, Horizontal |
| Measurement distance: | 3m |
| Mode: | constant TX |
| Test Date: | 2015-03-25 |
| Note: | |

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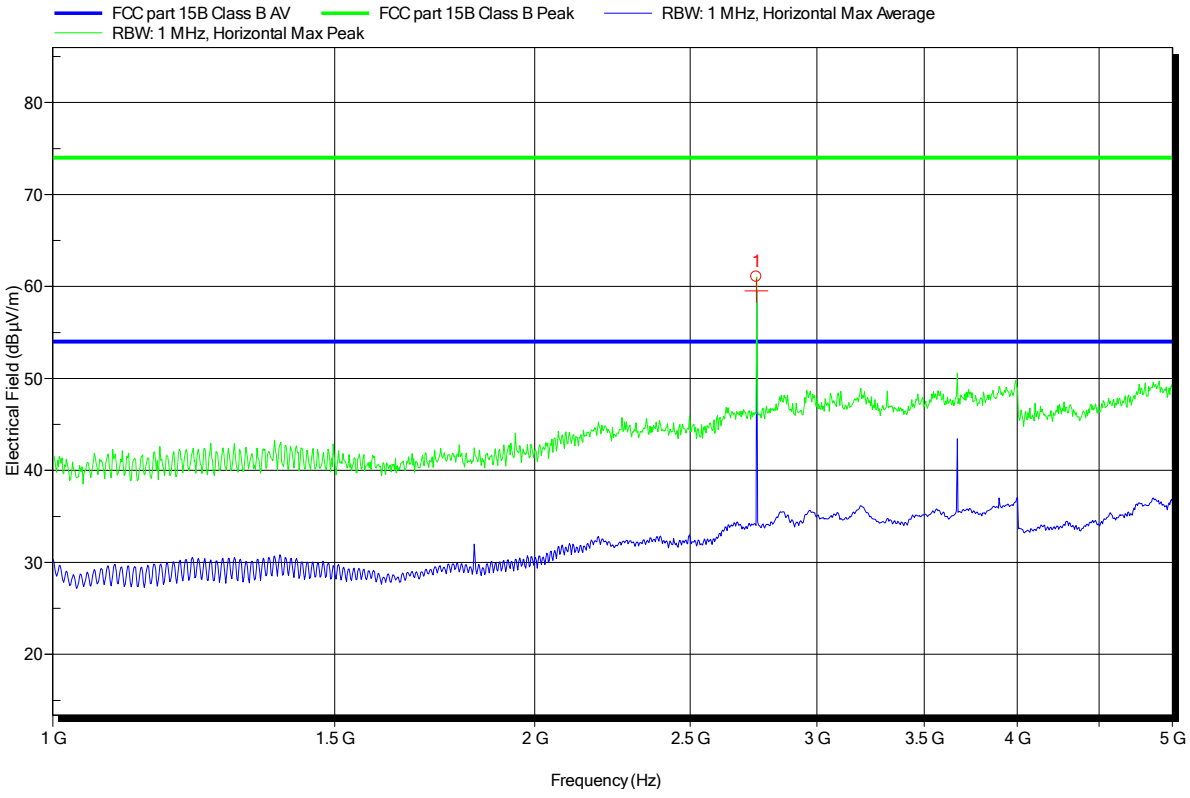


Frequency
2.75 GHz SRD Harmonics