

# EMC TEST REPORT

FCC 47 CFR Part 15B  
Industry Canada ICES-003

Electromagnetic compatibility - Unintentional radiators

Report Reference No. .... : G0M-1602-5395-EF0115B-V01

Testing Laboratory ..... : Eurofins Product Service GmbH

Address ..... : Storkower Str. 38c  
15526 Reichenwalde  
Germany

Accreditation ..... :



A2LA Accredited Testing Laboratory, Certificate No.: 1983.01  
FCC Filed Test Laboratory, Reg.-No.: 96970  
IC OATS Filing assigned code: 3470A

Applicant's name ..... : Grässlin GmbH

Address ..... : Bundesstraße 36  
78112 St. Georgen  
GERMANY

## Test specification:

Standard..... : 47 CFR Part 15 Subpart B  
ICES-003, Issue 5:2012  
ANSI C63.4:2014

## Equipment under test (EUT):

Product description. .... : 1-Channel 230VAC Timer Switch with integrated BLE-Modul/  
2-Channels 230VAC Timer Switch with integrated BLE-Modul

Model No..... : Talento Smart x15 / Talento Smart x25

Hardware Version ..... : Rev\_02 for both models

Software / Firmware Version..... : V.1.0 for both models

IDs FCC-ID: 2AHH7-DG IC: N/A

Test result Passed

Test Report No.: G0M-1602-5395-EF0115B-V01

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

**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 .....: 2016-02-22

Date (s) of performance of tests .....: 2016-02-22 - 2016-03-14

Compiled by .....: Yu Yu

Tested by (+ signature).....: Yu Yu



Approved by (+ signature) .....: Jens Marquardt  
Deputy Head of Lab



Date of issue .....: 2016-04-15

Total number of pages .....: 53

**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 requirements:**

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## Version History

| Version | Issue Date | Remarks         | Revised by |
|---------|------------|-----------------|------------|
| V01     | 2016-04-15 | Initial Release |            |

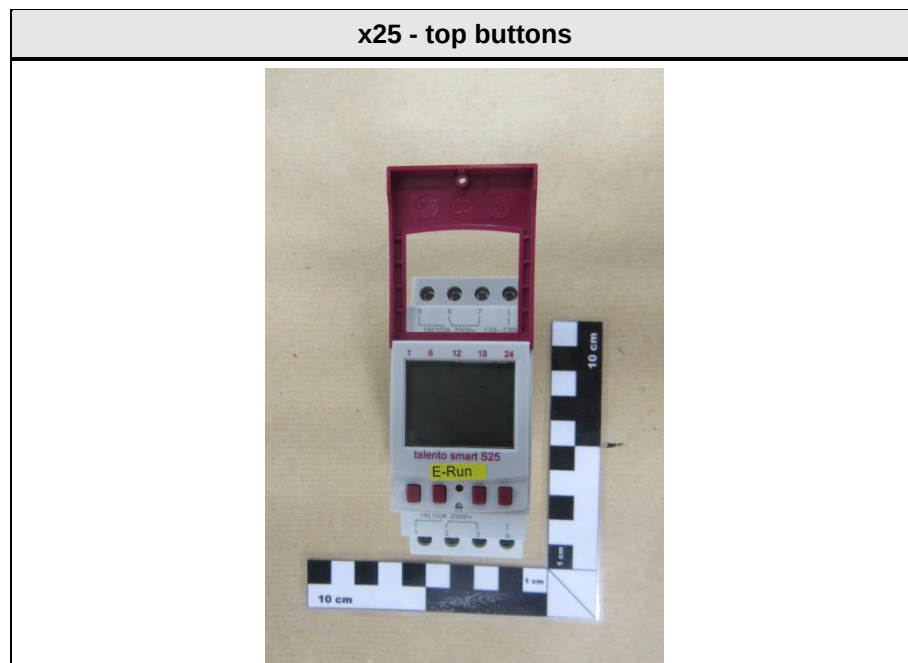
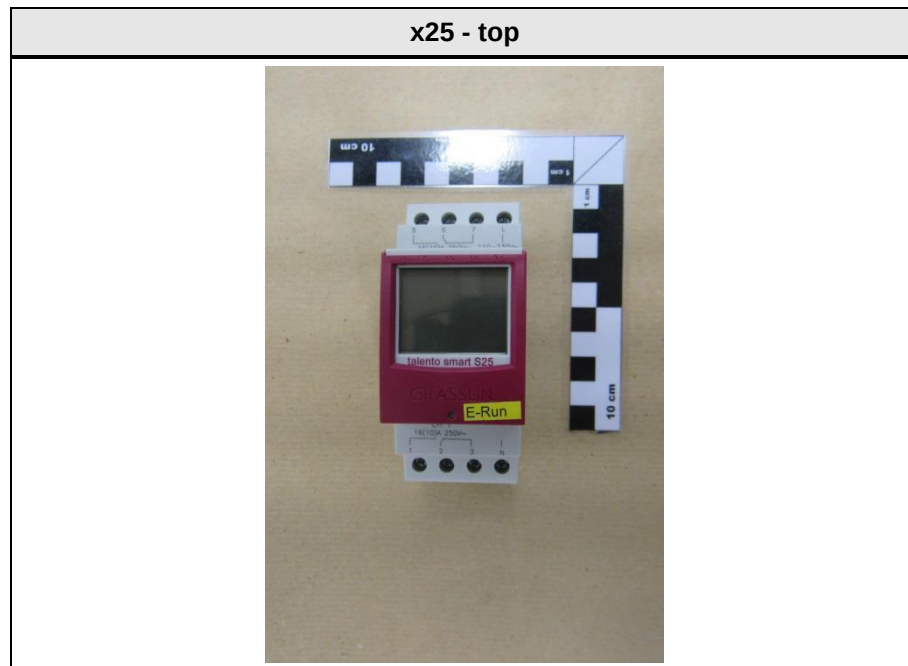
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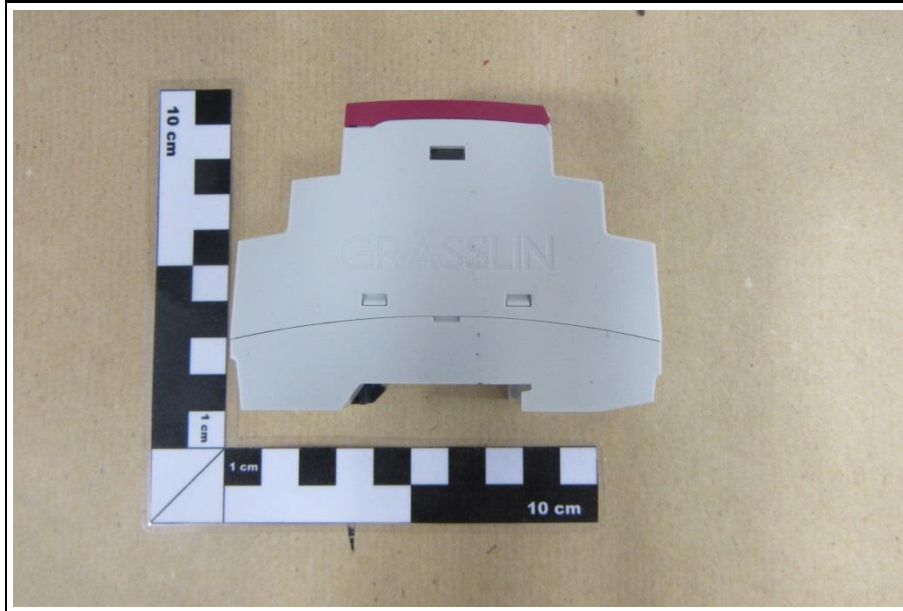
## 1 Equipment (Test item) Description

|                                    |                                                                  |
|------------------------------------|------------------------------------------------------------------|
| <b>Description</b>                 | 230VAC Timer Switch with integrated BLE-Modul                    |
| <b>Model</b>                       | Talento Smart x15 (1 Channel)<br>Talento Smart x25 (2 Channel)   |
| <b>Serial number</b>               | none                                                             |
| <b>Hardware version</b>            | Rev_02                                                           |
| <b>Software / Firmware version</b> | V.1.0                                                            |
| <b>FCC-ID</b>                      | 2AHH7-DG                                                         |
| <b>IC</b>                          | N/A                                                              |
| <b>Power supply</b>                | 120V AC                                                          |
| <b>Manufacturer</b>                | Grässlin GmbH<br>Bundesstraße 36<br>78112 St. Georgen<br>GERMANY |
| <b>Highest emission frequency</b>  | Fmax=2483.5 MHz                                                  |
| <b>Device classification</b>       | Class B                                                          |
| <b>Equipment type</b>              | Tabletop                                                         |
| <b>Number of tested samples</b>    | 1 per model                                                      |

## 1.1 Photos – Equipment external



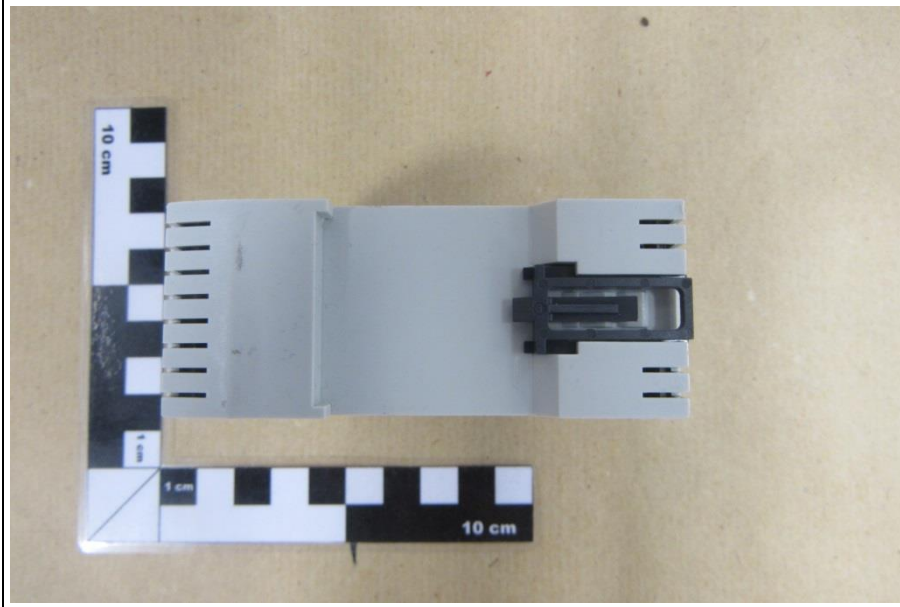
x25 - right side



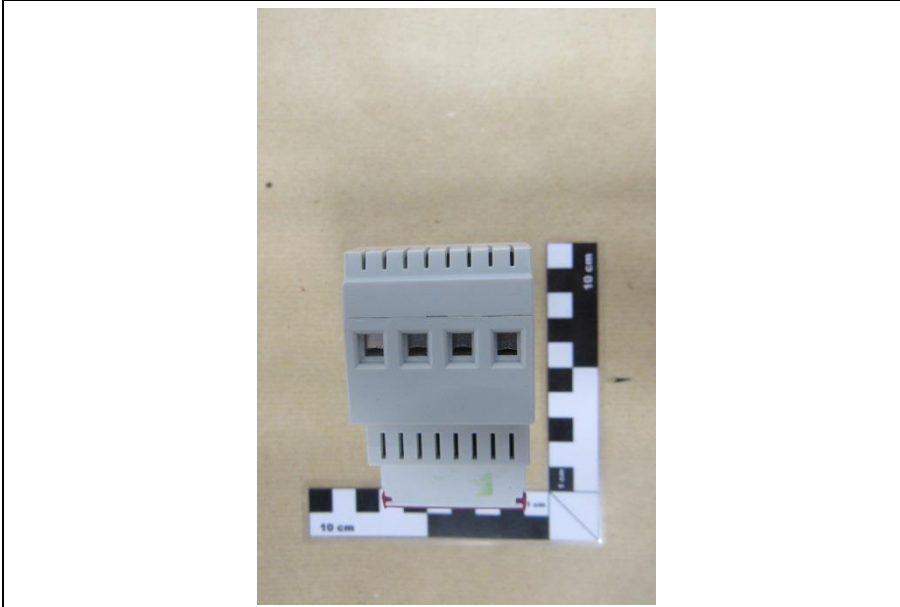
x25 – left side



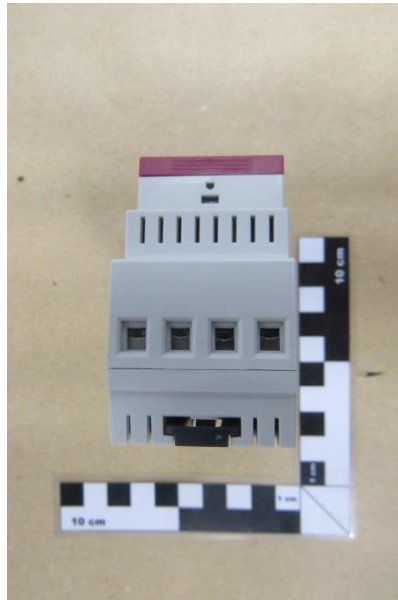
x25 - bottom



x25 - front



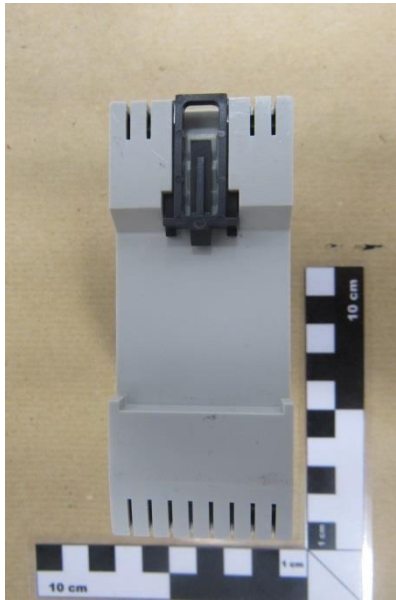
x25 - back



x15 - top



x15 - bottom



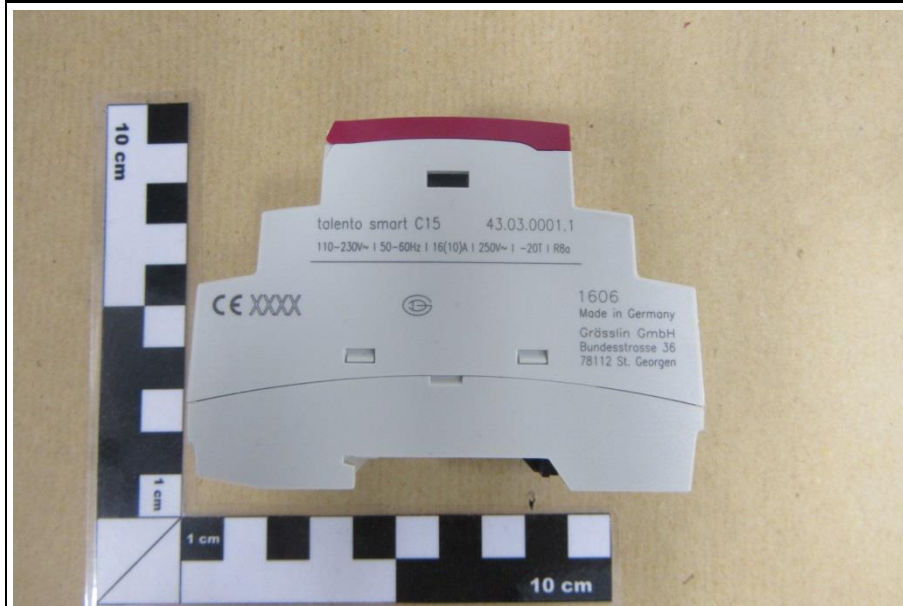
x15 - front



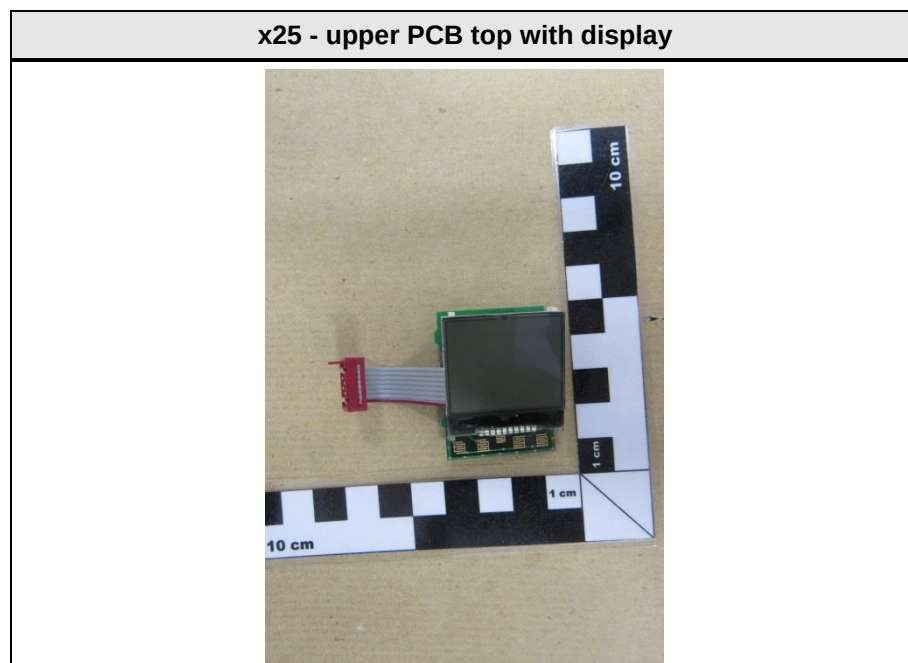
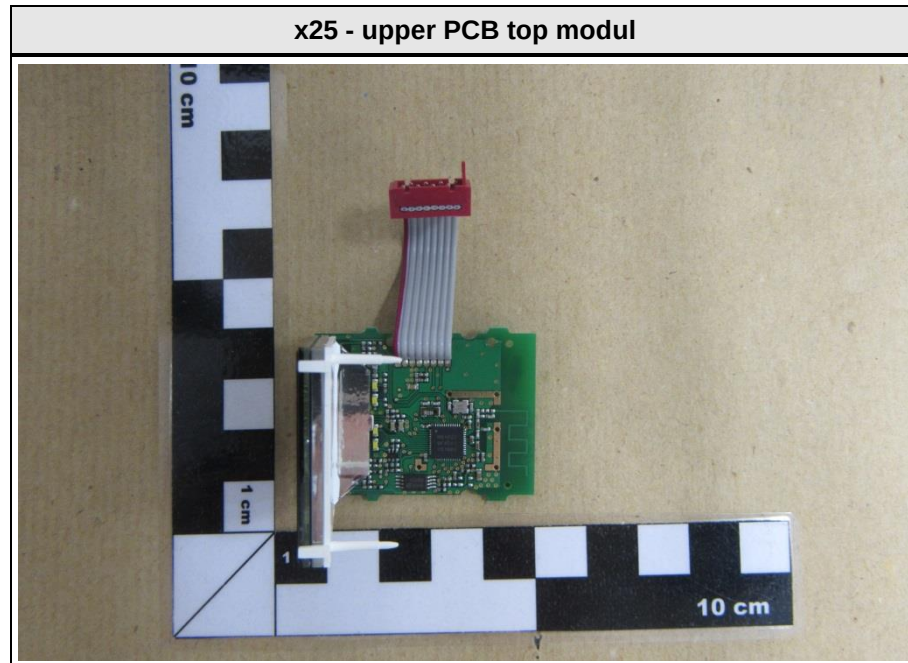
x15 – left side



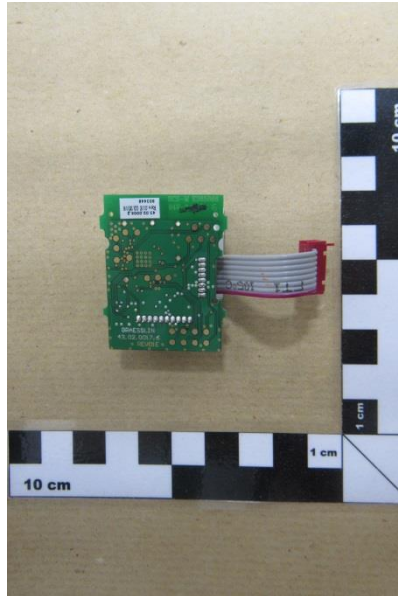
x15 – right side



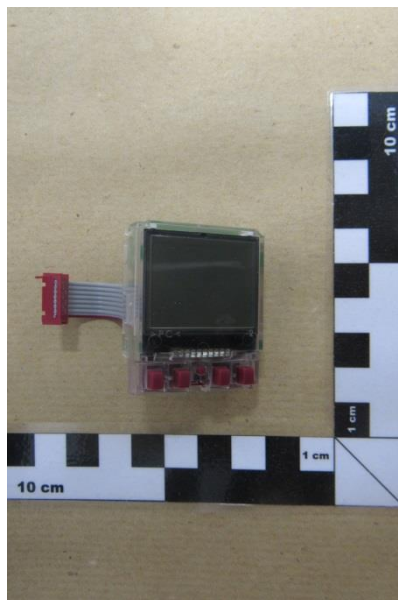
## 1.2 Photos – Equipment internal



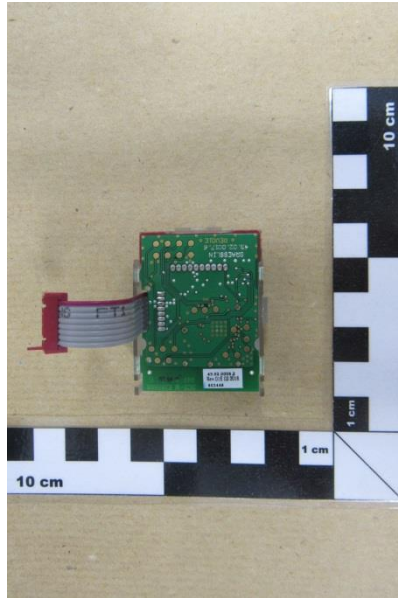
x25 - upper PCB bottom



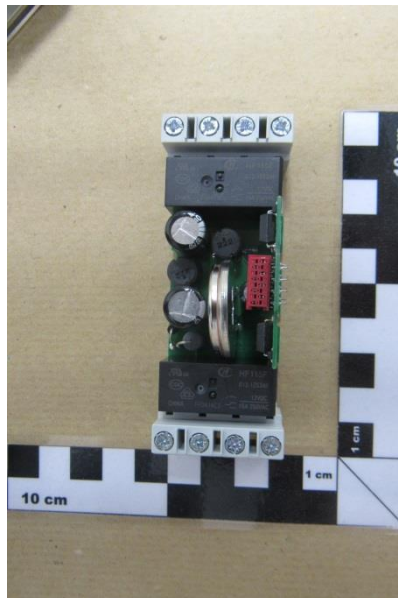
x25 - upper PCB assembly top



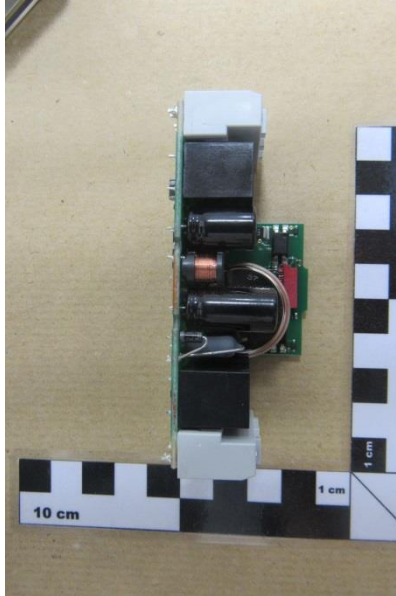
**x25 - upper PCB assembly bottom**



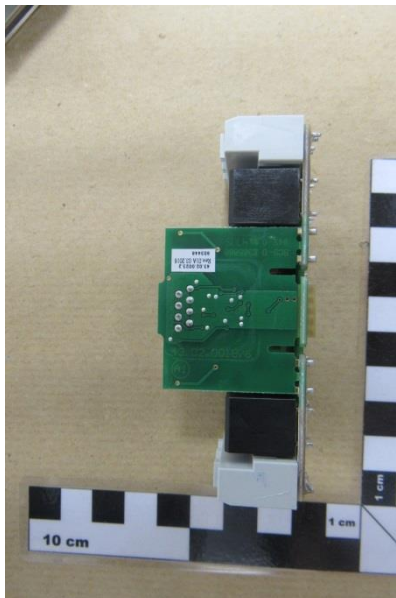
**x25 - lower PCB assembly top**



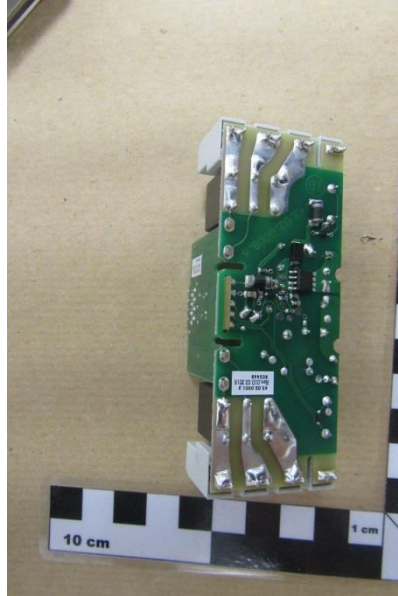
x25 - lower PCB assembly left side



x25 - lower PCB assembly right side



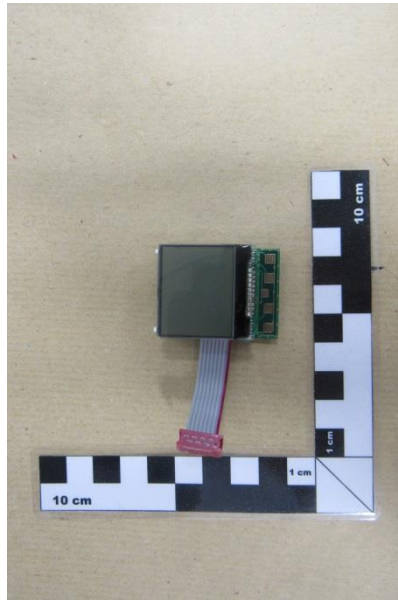
x25 - lower PCB assembly bottom



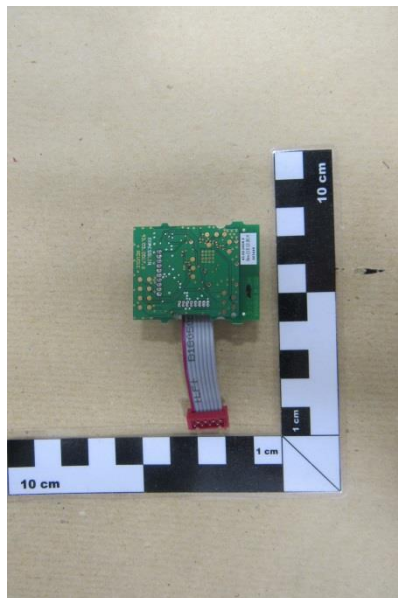
x25 - lower PCB assembly detail



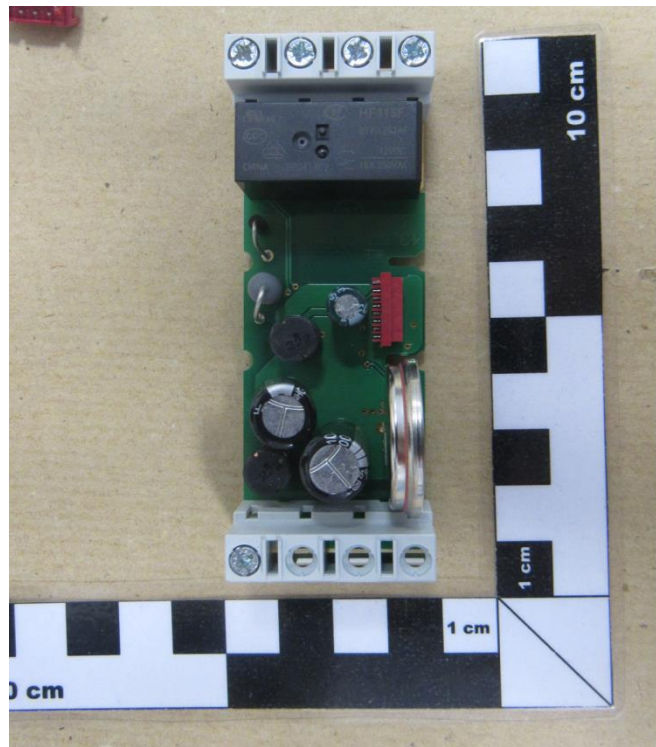
**x15 - upper PCB top**



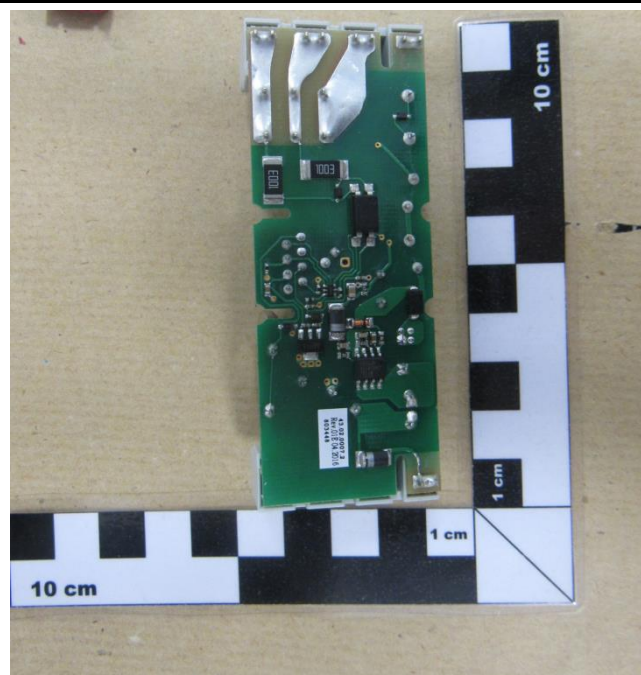
**x15 - upper PCB bottom**



x15 - lower PCB top



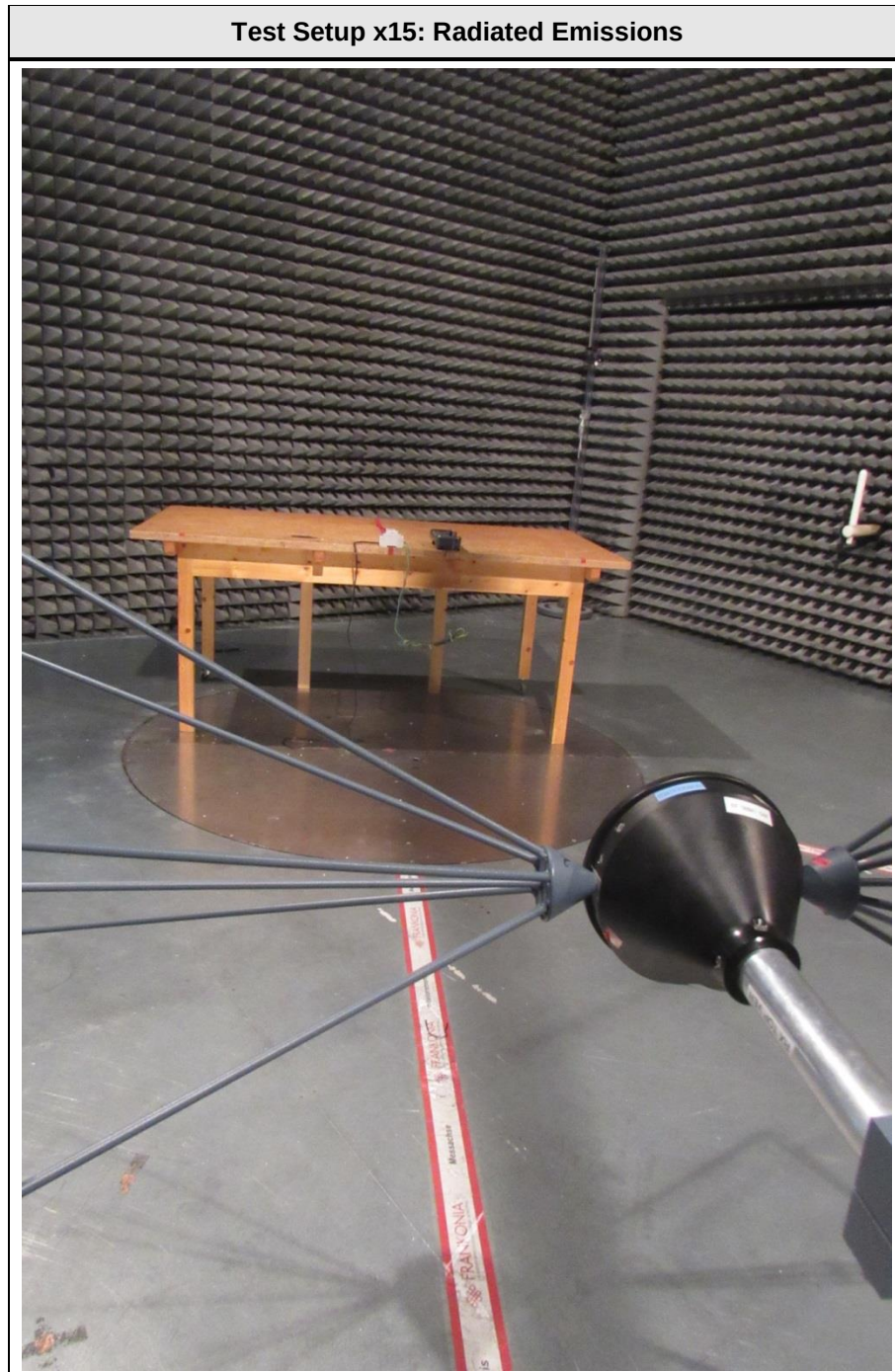
x15 - lower PCB bottom



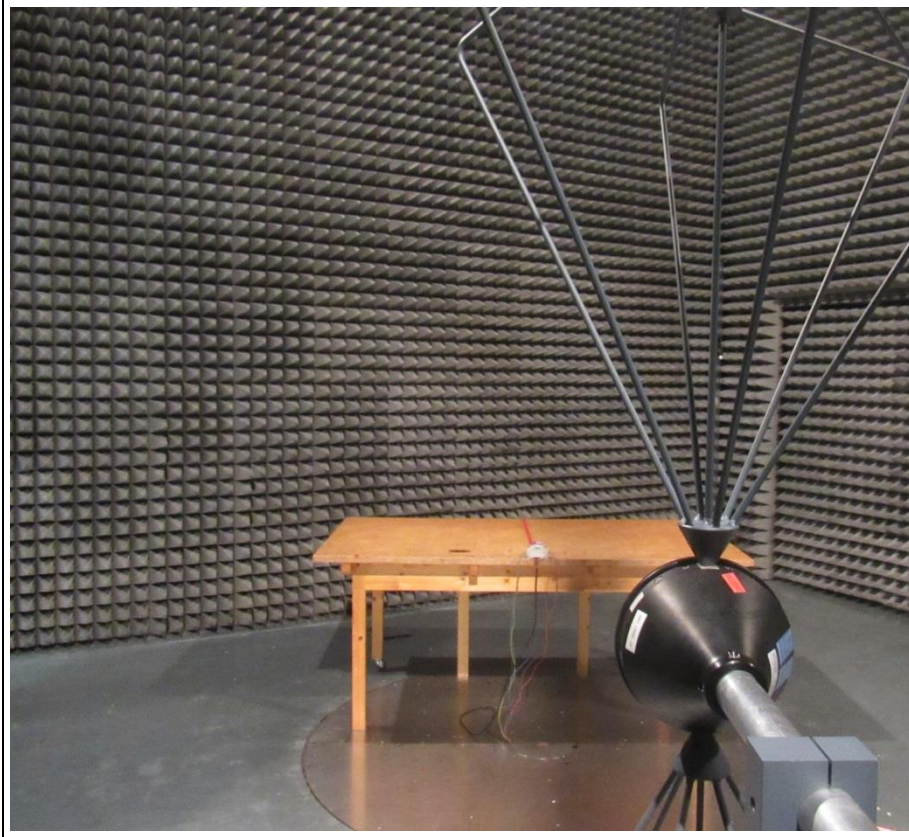
Test Report No.: G0M-1602-5395-EF0115B-V01

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

### 1.3 Photos – Test setup



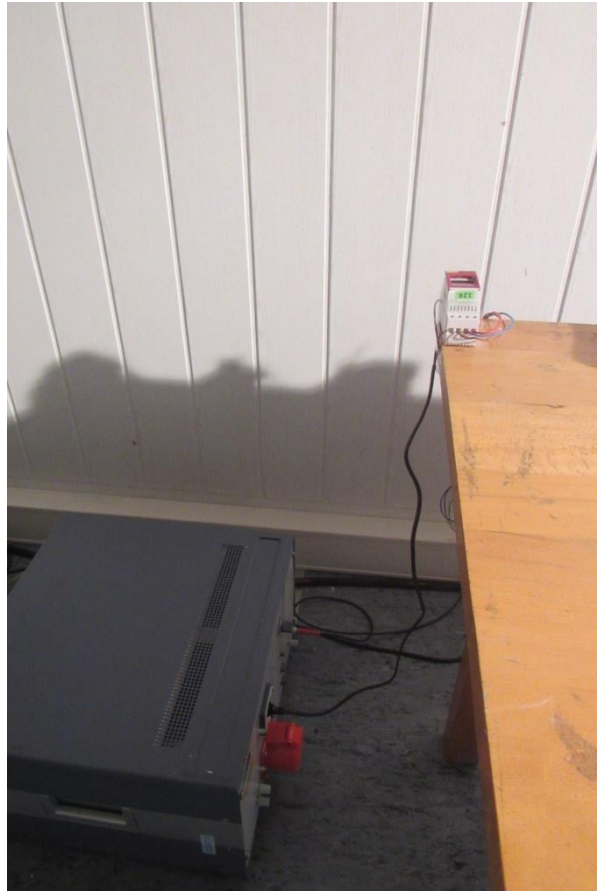
Test Setup x25: Radiated Emissions



**Test Setup x15: Conducted Emissions**



**Test Setup x25: Conducted Emissions**



#### 1.4 Supporting Equipment Used During Testing

| Product Type*                                                                                                                                                                       | Device       | Manufacturer | Model No. | Comments (e.g. serial no.)                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------|-----------|-------------------------------------------|
| 1                                                                                                                                                                                   | Mobile Phone | Motorola     | Moto X    | With test software<br>Talent smart V0.529 |
| 2                                                                                                                                                                                   | Multimeter   | Fluke        | Fluke 117 |                                           |
| 3                                                                                                                                                                                   | Multimeter   | E Sun        | MY-63     |                                           |
| <p><b>*Note:</b> Use the following abbreviations:</p> <p>AE : Auxiliary/Associated Equipment, or</p> <p>SIM : Simulator (Not Subjected to Test)</p> <p>CABL : Connecting cables</p> |              |              |           |                                           |

#### 1.5 Input / Output Ports

| Port #                                                                                                                                                                                                            | Name      | Type* | Max. Cable Length | Cable Shielded | Comments (e.g. Cat. of Cable) |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------|-------------------|----------------|-------------------------------|
| 1                                                                                                                                                                                                                 | Channel 1 | I/O   | >3m               | No             |                               |
| 2                                                                                                                                                                                                                 | Channel 2 | I/O   | >3m               | No             | Only in x25-Model             |
| 3                                                                                                                                                                                                                 | Power     | AC    | >3m               | no             |                               |
| <p><b>*Note:</b> Use the following abbreviations:</p> <p>AC : AC power port</p> <p>DC : DC power port</p> <p>N/E : Non electrical</p> <p>I/O : Signal input or output port</p> <p>TP : Telecommunication port</p> |           |       |                   |                |                               |

## 1.6 Operating Modes and Configurations

| Mode # | Description                                      |
|--------|--------------------------------------------------|
| 1      | Toggling the channels continuously via Bluetooth |

| Configuration # | EUT Configuration   |
|-----------------|---------------------|
| 1               | EUT fully assembled |

## 1.7 Test Equipment Used During Testing

| Measurement Software |                  |            |           |
|----------------------|------------------|------------|-----------|
| Description          | Manufacturer     | Name       | Version   |
| EMC Test Software    | Dare Instruments | Radimation | 2015.1.12 |

| Radiated emissions |              |            |            |           |          |
|--------------------|--------------|------------|------------|-----------|----------|
| Description        | Manufacturer | Model      | Identifier | Cal. Date | Cal. Due |
| Biconical Antenna  | R&S          | HK 116     | EF00030    | 2014-03   | 2017-03  |
| LPD Antenna        | 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    | 2016-01   | 2017-01  |

| Conducted emissions |              |         |            |           |          |
|---------------------|--------------|---------|------------|-----------|----------|
| Description         | Manufacturer | Model   | Identifier | Cal. Date | Cal. Due |
| Current probe       | R&S          | EZ-17   | EF00215    | 2015-11   | 2017-11  |
| Absorbing Clamp     | R&S          | MDS 21  | EF00035    | 2014-10   | 2019-10  |
| ISN                 | R&S          | ENY41   | EF00255    | 2014-04   | 2016-04  |
| AMN                 | R&S          | ESH2-Z5 | EF00182    | 2014-11   | 2016-11  |
| CDN                 | Teseq        | ST08AS  | EF00411    | 2015-10   | 2017-10  |
| AMN                 | R&S          | ESH3-Z5 | EF00036    | 2014-12   | 2016-12  |
| EMI Test Receiver   | R&S          | ESR7    | EF00943    | 2015-09   | 2016-09  |

## 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:

$$\text{Reading on Analyzer (dB}\mu\text{V)} + \text{A.F. (dB)} = \text{Net field strength (dB}\mu\text{V/m)}$$

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:

$$\text{Limit (dB}\mu\text{V/m)} = 20 * \log (\mu\text{V/m})$$

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       | PASS   | -       |
| Remarks:                                     |                                   |                  |        |         |

### 3 Test Conditions and Results

#### 3.1 Test Conditions and Results – Radiated emissions

| Radiated emissions acc. FCC 47 CFR 15.109 / ICES-003                     |                     |                            |                  | 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 %                 |                  | 35%             |               |        |
| 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 |                  |                 |               |        |
|                                                                          |                     | 2483.5 MHz                 |                  |                 |               |        |
| Fully configured sample scanned over the following frequency range       |                     | Frequency range            |                  |                 |               |        |
|                                                                          |                     | 30 MHz to 13 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 C63-4:2014 requirements and is listed by FCC.  
The measurement procedure is as follows:

**Exploratory measurement:**

- The EUT was placed on a non-conductive table at a height of 0.8m.
- The EUT and support equipment, if needed, were set up to simulate typical usage.
- Cables, of type and length specified by the manufacturer, were connected to at least one port of each type and were terminated by a device or simulating load of actual usage.
- The antenna was placed at a distance of 3 or 10 m.
- The received signal was monitored at the measurement receiver.
  - Cables not bundled were manipulated within the range of likely arrangements to produce the highest emission amplitude
  - To maximize the suspected emissions the EUT is rotated 360 degrees. If the signal exceeds the previous amplitude, go back to the corresponding azimuth and manipulate the cables again for maximizing the emissions if possible.
  - Move the antenna from 1 to 4m to maximize the suspected highest amplitude signal.
- This procedure has to be performed in both antenna polarizations, horizontal and vertical.
- The arrangement of the equipment with the maximum emission level is shown on the setup picture at item 1.3.

**Final measurement:**

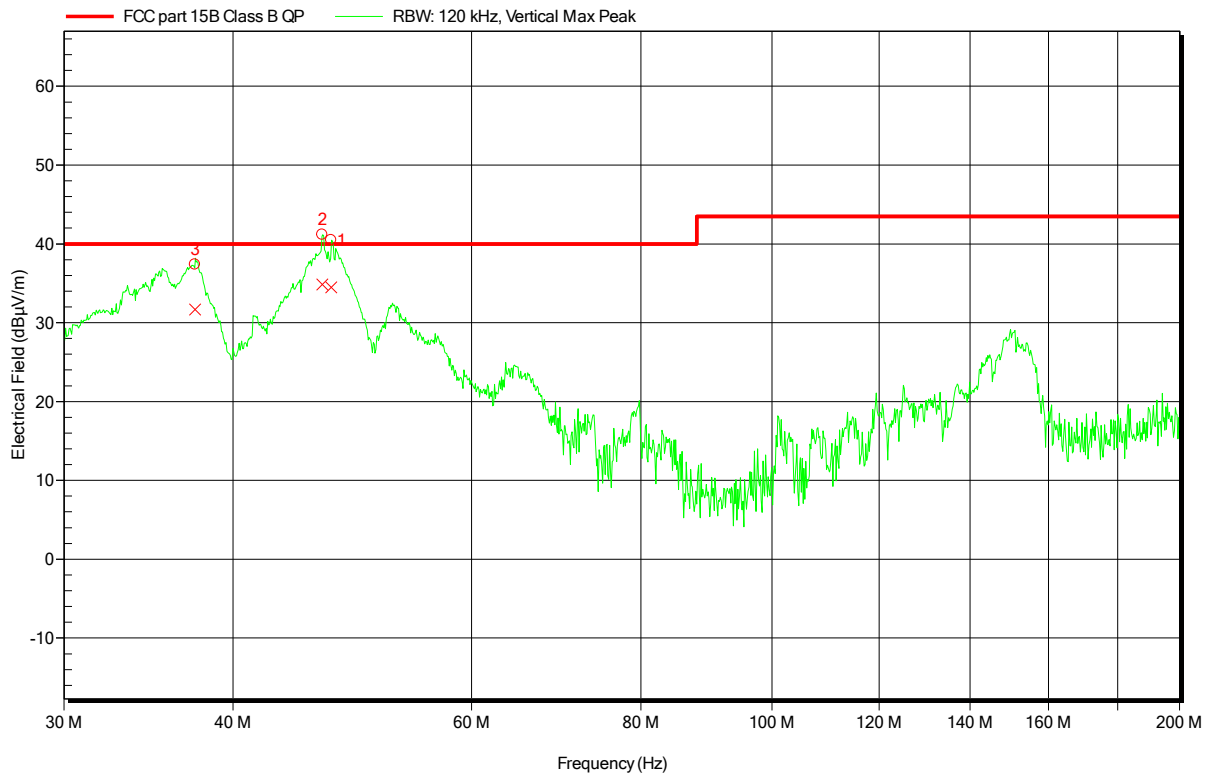
- The EUT was placed on a 0.8 m non-conductive table at a 3 m distance from the receive antenna. The antenna output was connected to the measurement receiver
- A biconical antenna was used for the frequency range 30 – 200 MHz, a logarithmic periodical antenna was used for the frequency range from 200 – 1000 MHz. Above one 1 GHz a Double Ridged Broadband Horn antenna was used. The antenna was placed on an adjustable height antenna mast
- The EUT and cable arrangement were based on the exploratory measurement results
- Emissions were maximized at each frequency by rotating the EUT and adjusting the receive antenna height and polarization. The maximum values were recorded.
- The test data of the worst-case conditions were recorded and shown on the next pages.

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

Project number: G0M-1602-5395

Applicant: Grässlin GmbH  
 EUT Name: 1-Channel 230VAC Timer Switch with integrated BLE-Modul  
 Model: Talento Smart x15  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Yu  
 Test Conditions: Tnom: 23°C, Unom: 120V AC  
 Antenna: Rohde & Schwarz HK 116, Vertical  
 Measurement distance: 3m  
 Mode: 1  
 Test Date: 2016-03-10  
 Note:

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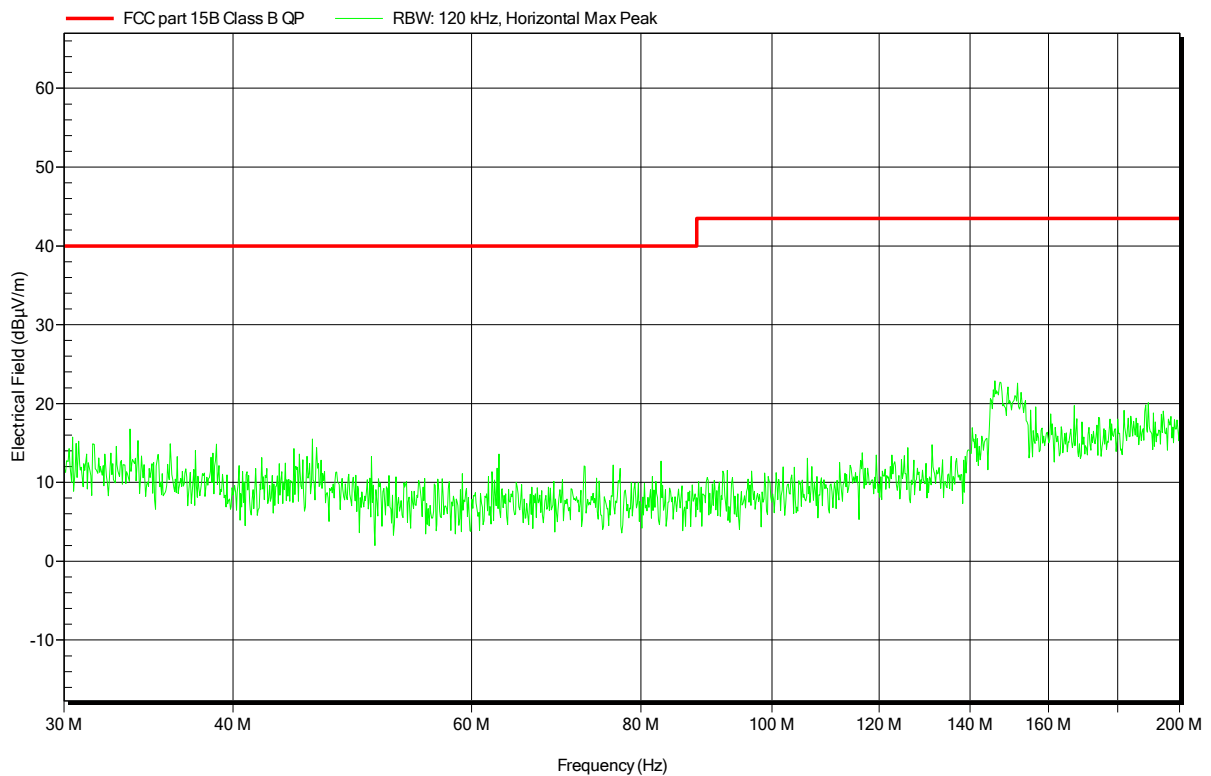
| Peak Number | Frequency | Quasi-Peak   | Quasi-Peak Limit | Quasi-Peak Difference | Quasi-Peak Status | Angle      | Height |
|-------------|-----------|--------------|------------------|-----------------------|-------------------|------------|--------|
| 1           | 47.28 MHz | 34.48 dBµV/m | 40 dBµV/m        | -5.52 dB              | Pass              | 331 Degree | 1 m    |
| 2           | 46.56 MHz | 34.86 dBµV/m | 40 dBµV/m        | -5.14 dB              | Pass              | 331 Degree | 1 m    |
| 3           | 37.5 MHz  | 31.69 dBµV/m | 40 dBµV/m        | -8.31 dB              | Pass              | 331 Degree | 1 m    |

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

Project number: G0M-1602-5395

|                       |                                                         |
|-----------------------|---------------------------------------------------------|
| Applicant:            | Grässlin GmbH                                           |
| EUT Name:             | 1-Channel 230VAC Timer Switch with integrated BLE-Modul |
| Model:                | Talento Smart x15                                       |
| Test Site:            | Eurofins Product Service GmbH                           |
| Operator:             | Mr. Yu                                                  |
| Test Conditions:      | Tnom: 23°C, Unom: 120V AC                               |
| Antenna:              | Rohde & Schwarz HK 116, Horizontal                      |
| Measurement distance: | 3m                                                      |
| Mode:                 | 1                                                       |
| Test Date:            | 2016-03-10                                              |
| Note:                 |                                                         |

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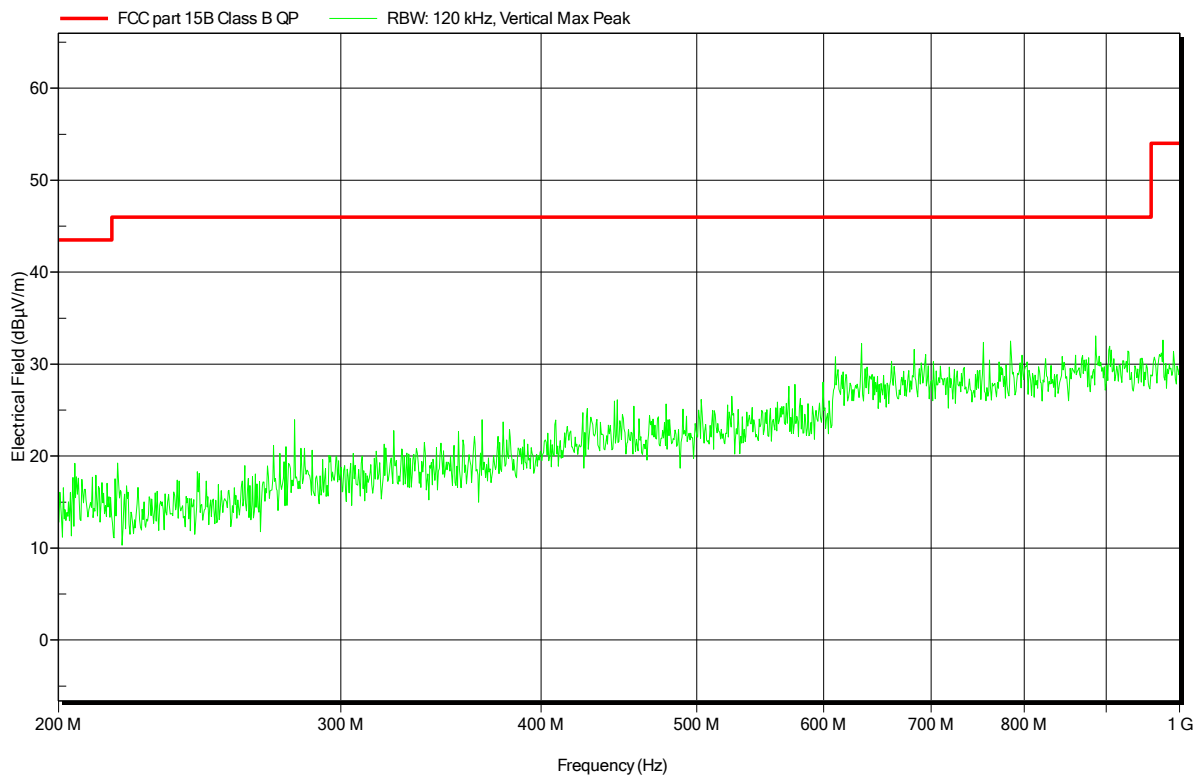


## Spurious emissions under normal conditions according to FCC Part 15b

Project number: G0M-1602-5395

|                       |                                                         |
|-----------------------|---------------------------------------------------------|
| Applicant:            | Grässlin GmbH                                           |
| EUT Name:             | 1-Channel 230VAC Timer Switch with integrated BLE-Modul |
| Model:                | Talento Smart x15                                       |
| Test Site:            | Eurofins Product Service GmbH                           |
| Operator:             | Mr. Yu                                                  |
| Test Conditions:      | Tnom: 23°C, Unom: 120V AC                               |
| Antenna:              | Rohde & Schwarz HL 223, Vertical                        |
| Measurement distance: | 3m                                                      |
| Mode:                 | 1                                                       |
| Test Date:            | 2016-03-10                                              |
| Note:                 |                                                         |

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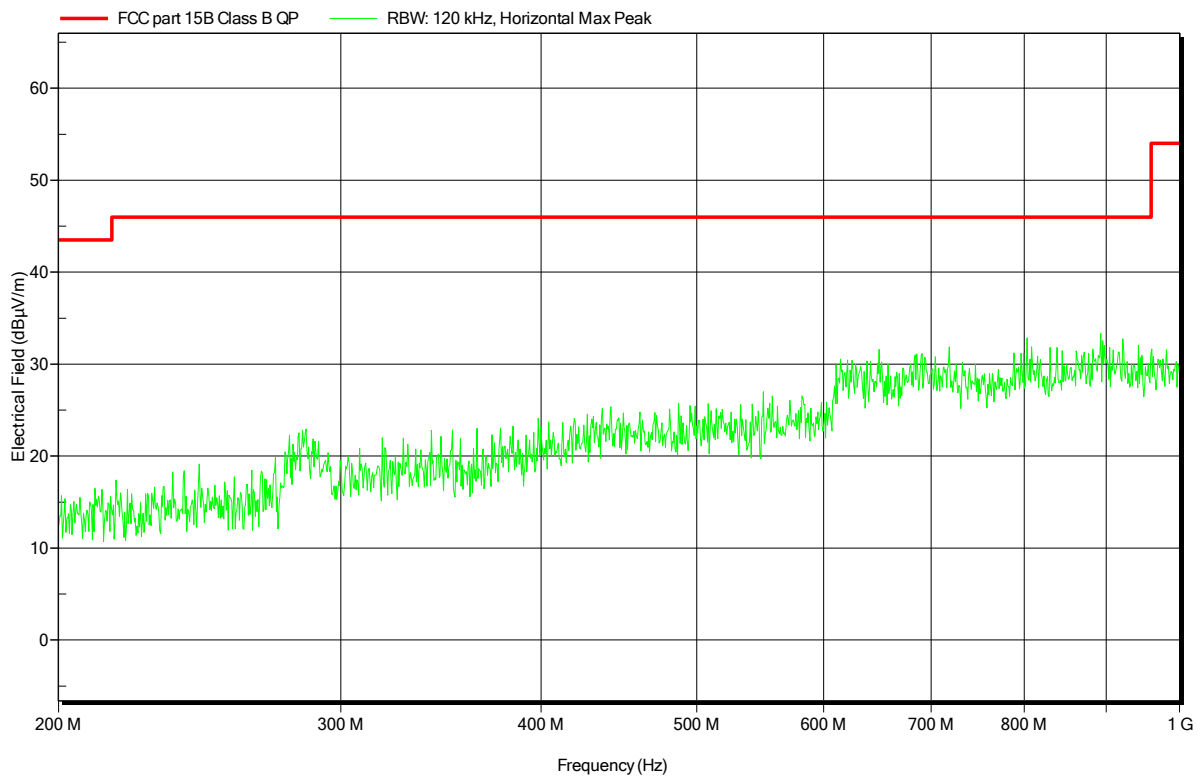


## Spurious emissions under normal conditions according to FCC Part 15b

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Applicant: Grässlin GmbH  
 EUT Name: 1-Channel 230VAC Timer Switch with integrated BLE-Modul  
 Model: Talento Smart x15  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Yu  
 Test Conditions: Tnom: 23°C, Unom: 120V AC  
 Antenna: Rohde & Schwarz HL 223, Horizontal  
 Measurement distance: 3m  
 Mode: 1  
 Test Date: 2016-03-10  
 Note:

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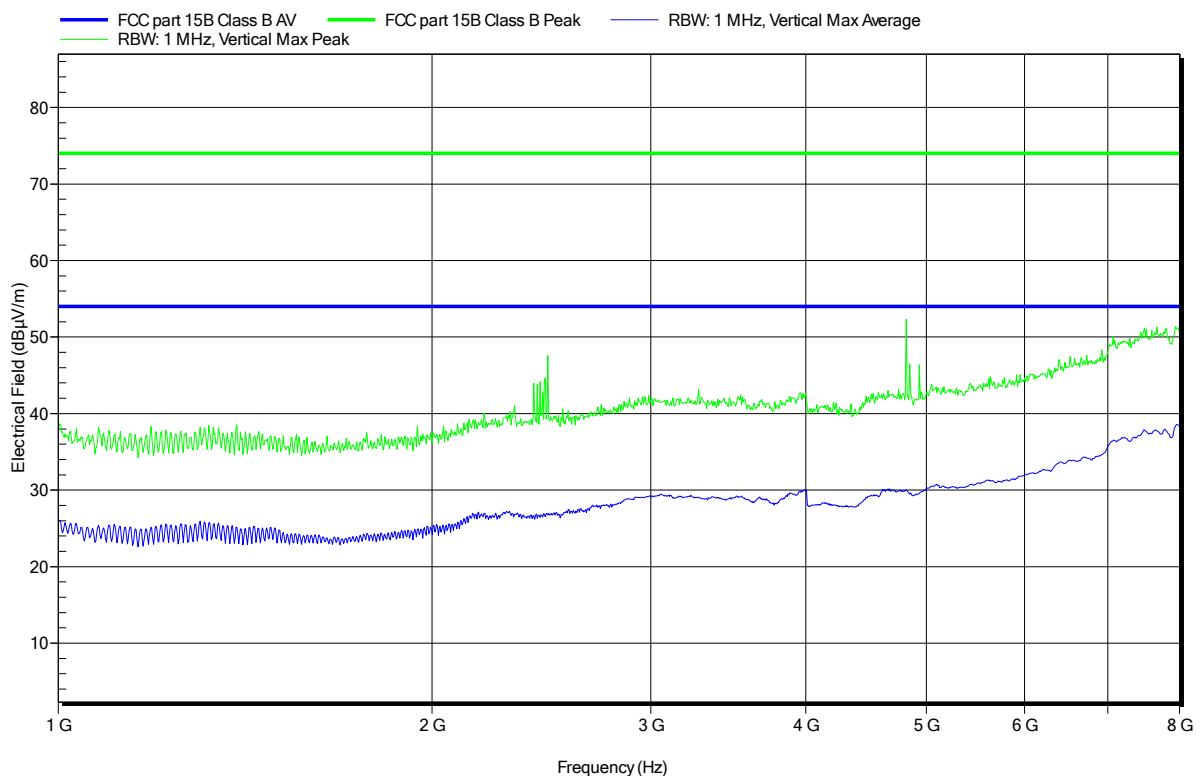


## Spurious emissions under normal conditions according to FCC Part 15b

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Applicant: Grässlin GmbH  
 EUT Name: 1-Channel 230VAC Timer Switch with integrated BLE-Modul  
 Model: Talento Smart x15  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Yu  
 Test Conditions: Tnom: 23°C, Unom: 120V AC  
 Antenna: Schwarzbeck BBHA 9120D, Vertical  
 Measurement distance: 3m  
 Mode: 1  
 Test Date: 2016-03-10  
 Note:

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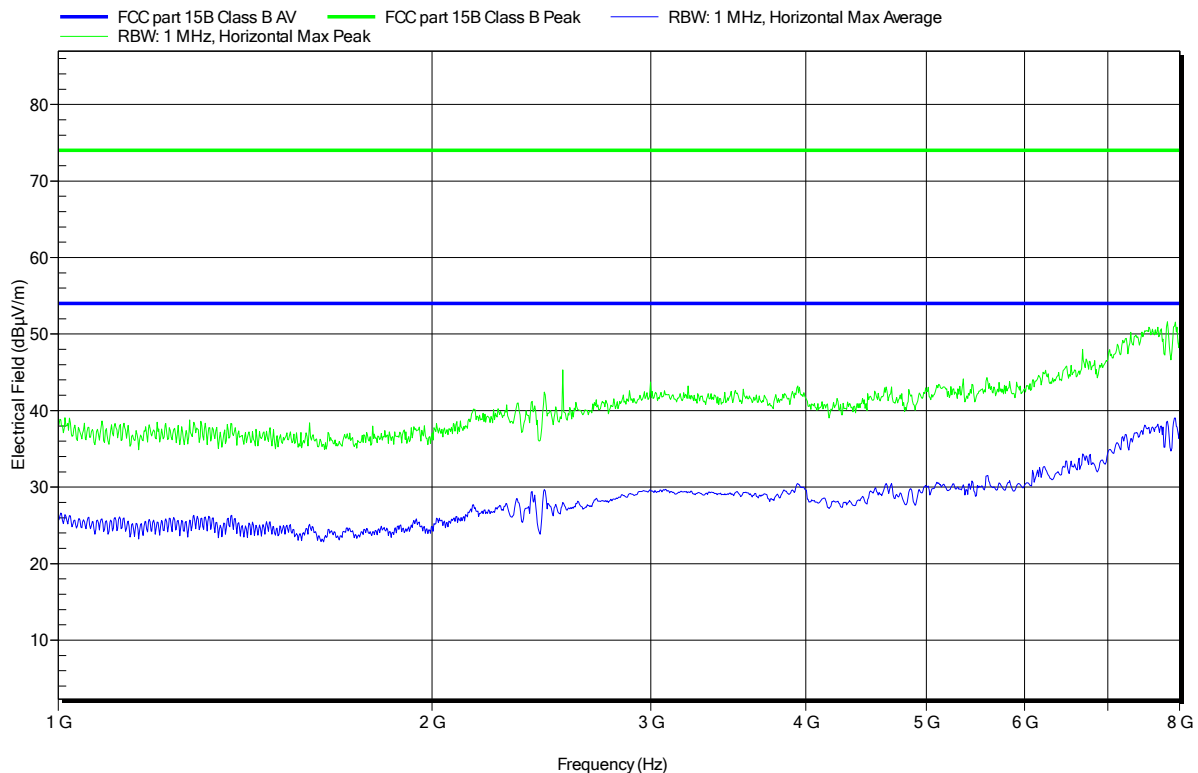


## Spurious emissions under normal conditions according to FCC Part 15b

Project number: G0M-1602-5395

Applicant: Grässlin GmbH  
 EUT Name: 1-Channel 230VAC Timer Switch with integrated BLE-Modul  
 Model: Talento Smart x15  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Yu  
 Test Conditions: Tnom: 23°C, Unom: 120V AC  
 Antenna: Schwarzbeck BBHA 9120D, Horizontal  
 Measurement distance: 3m  
 Mode: 1  
 Test Date: 2016-03-10  
 Note:

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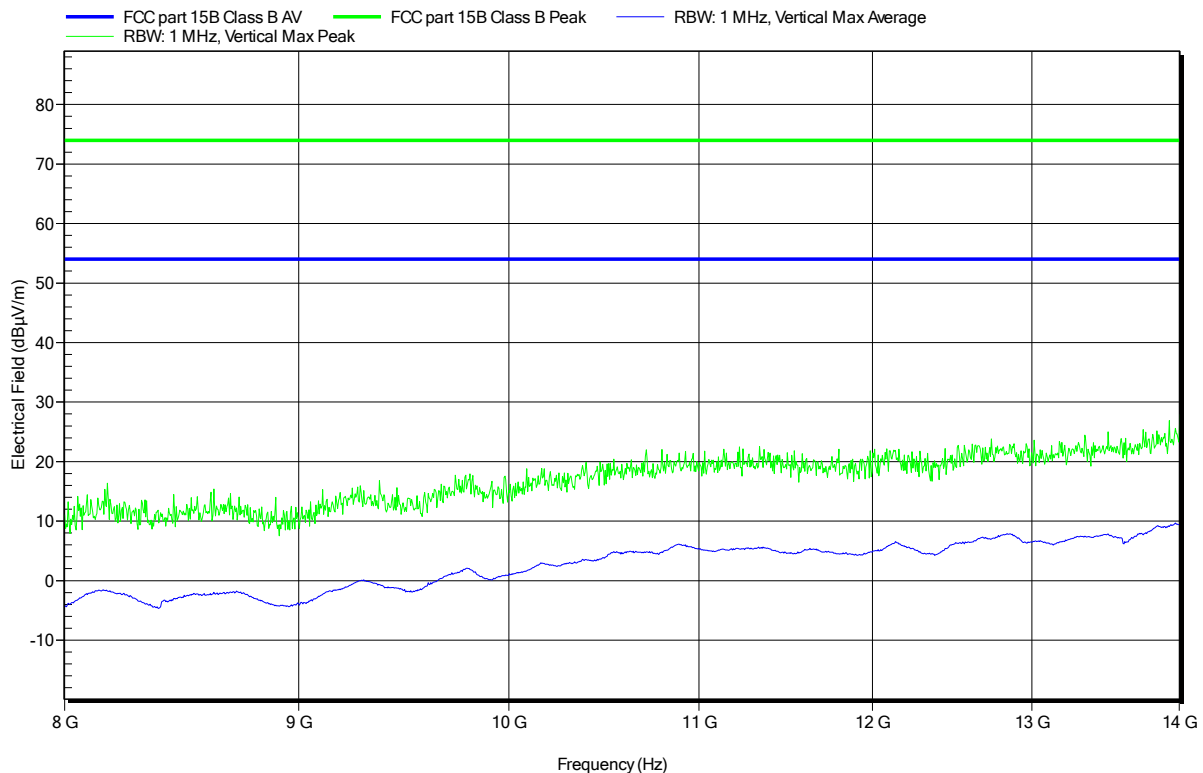


## Spurious emissions under normal conditions according to FCC Part 15b

Project number: G0M-1602-5395

Applicant: Grässlin GmbH  
 EUT Name: 1-Channel 230VAC Timer Switch with integrated BLE-Modul  
 Model: Talento Smart x15  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Yu  
 Test Conditions: Tnom: 23°C, Unom: 120V AC  
 Antenna: Schwarzbeck BBHA 9120D, Vertical  
 Measurement distance: 3m  
 Mode: 1  
 Test Date: 2016-03-10  
 Note:

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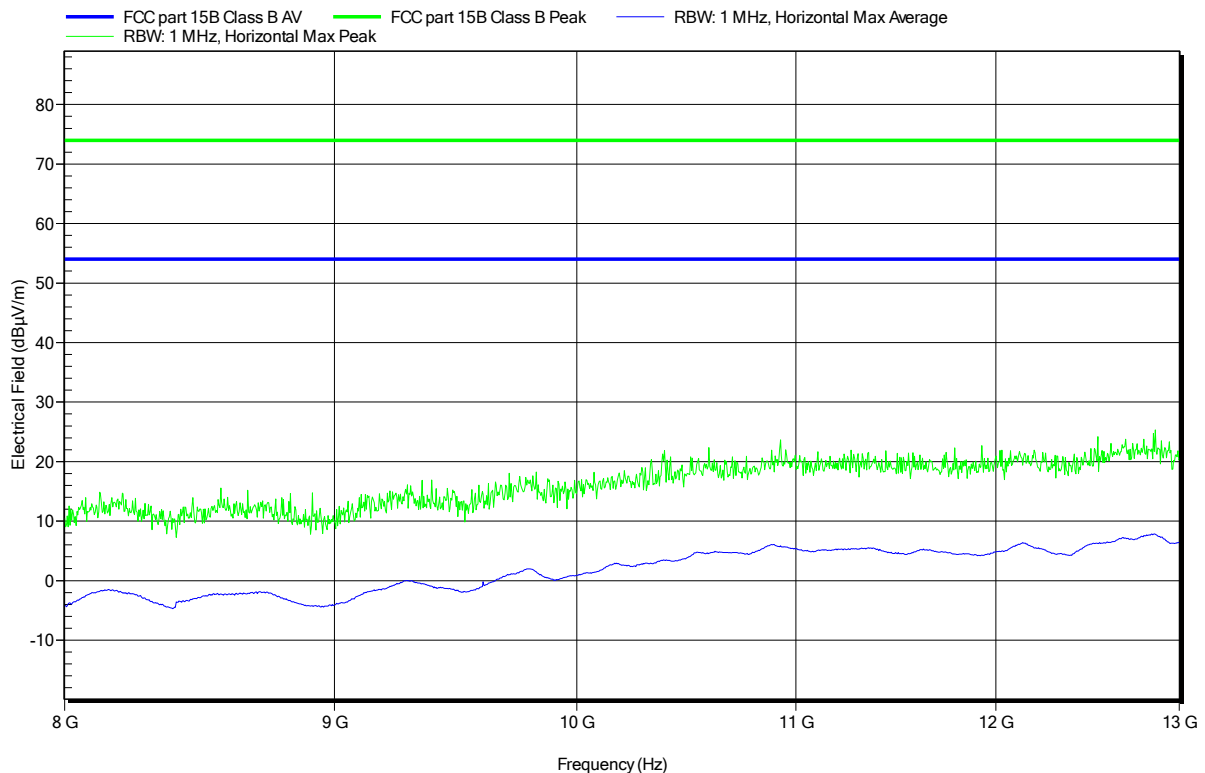


## Spurious emissions under normal conditions according to FCC Part 15b

Project number: G0M-1602-5395

Applicant: Grässlin GmbH  
 EUT Name: 1-Channel 230VAC Timer Switch with integrated BLE-Modul  
 Model: Talento Smart x15  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Yu  
 Test Conditions: Tnom: 23°C, Unom: 120V AC  
 Antenna: Schwarzbeck BBHA 9120D, Horizontal  
 Measurement distance: 3m  
 Mode: 1  
 Test Date: 2016-03-10  
 Note:

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Test Report No.: G0M-1602-5395-EF0115B-V01

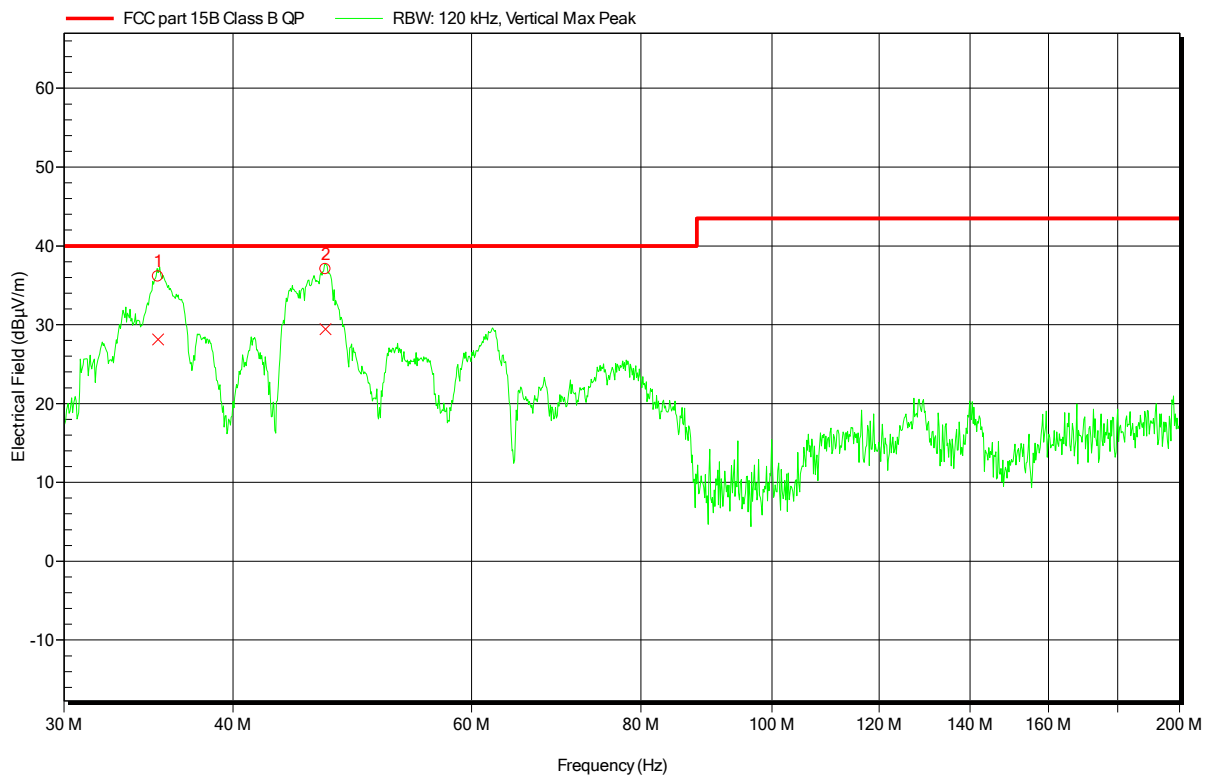
Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

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

Project number: G0M-1602-5395

Applicant: Grässlin GmbH  
 EUT Name: 2-Channels 230VAC Timer Switch with integrated BLE-Modul  
 Model: Talento Smart x25  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Yu  
 Test Conditions: Tnom: 23°C, Unom: 120 VAC  
 Antenna: Rohde & Schwarz HK 116, Vertical  
 Measurement distance: 3m  
 Mode: 1  
 Test Date: 2016-03-11  
 Note:

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| Peak Number | Frequency | Quasi-Peak   | Quasi-Peak Limit | Quasi-Peak Difference | Quasi-Peak Status | Angle    | Height |
|-------------|-----------|--------------|------------------|-----------------------|-------------------|----------|--------|
| 1           | 35.22 MHz | 28.13 dBµV/m | 40 dBµV/m        | -11.87 dB             | Pass              | 0 Degree | 1 m    |
| 2           | 46.8 MHz  | 29.45 dBµV/m | 40 dBµV/m        | -10.55 dB             | Pass              | 0 Degree | 1 m    |

Test Report No.: G0M-1602-5395-EF0115B-V01

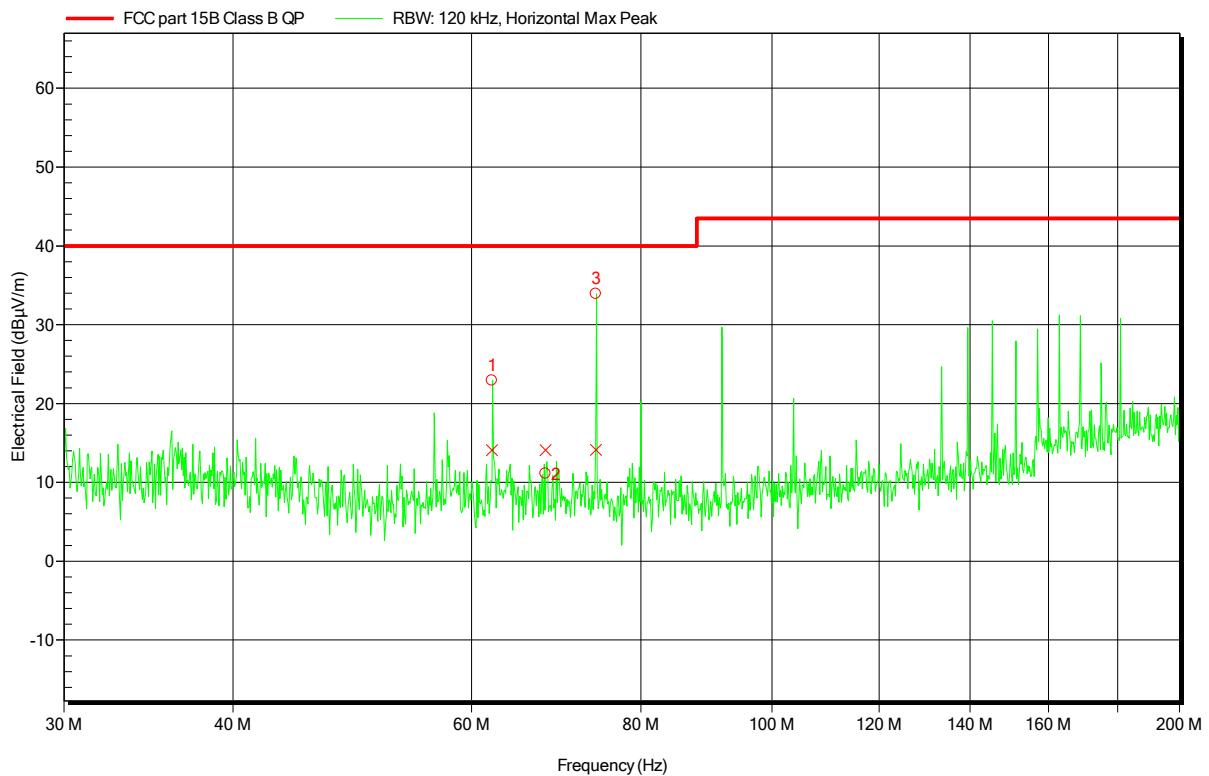
Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

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

Project number: G0M-1602-5395

Applicant: Grässlin GmbH  
EUT Name: 2-Channels 230VAC Timer Switch with integrated BLE-Modul  
Model: Talento Smart x25  
Test Site: Eurofins Product Service GmbH  
Operator: Mr. Yu  
Test Conditions: Tnom: 23°C, Unom: 120 VAC  
Antenna: Rohde & Schwarz HK 116, Horizontal  
Measurement distance: 3m  
Mode: 1  
Test Date: 2016-03-11  
Note:

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| Peak Number | Frequency  | Quasi-Peak   | Quasi-Peak Limit | Quasi-Peak Difference | Quasi-Peak Status | Angle      | Height |
|-------------|------------|--------------|------------------|-----------------------|-------------------|------------|--------|
| 1           | 62.13 MHz  | 14.09 dBµV/m | 40 dBµV/m        | -25.91 dB             | Pass              | 330 Degree | 1 m    |
| 2           | 68.04 MHz  | 14.08 dBµV/m | 40 dBµV/m        | -25.92 dB             | Pass              | 330 Degree | 1 m    |
| 3           | 74.148 MHz | 14.11 dBµV/m | 40 dBµV/m        | -25.89 dB             | Pass              | 330 Degree | 1 m    |

Test Report No.: G0M-1602-5395-EF0115B-V01

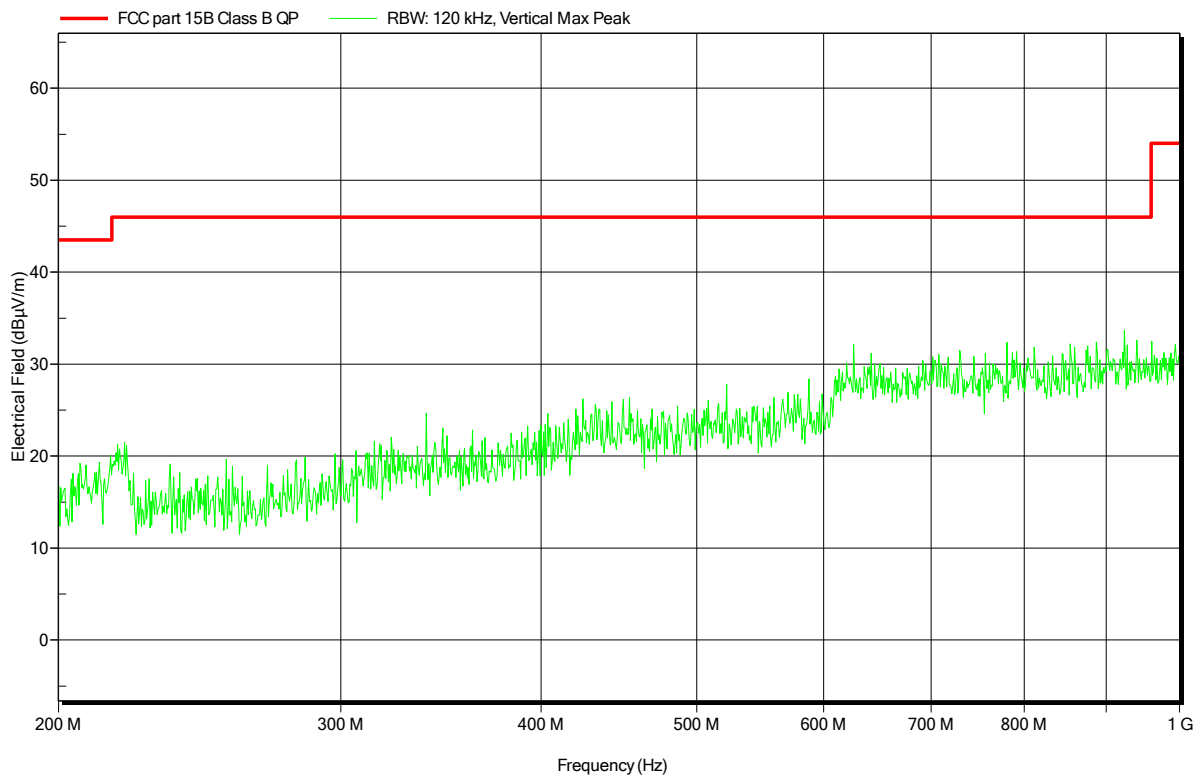
Eurofins Product Service GmbH  
Storkower Str. 38c, D-15526 Reichenwalde, Germany

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

Project number: G0M-1602-5395

|                       |                                                          |
|-----------------------|----------------------------------------------------------|
| Applicant:            | Grässlin GmbH                                            |
| EUT Name:             | 2-Channels 230VAC Timer Switch with integrated BLE-Modul |
| Model:                | Talento Smart x25                                        |
| Test Site:            | Eurofins Product Service GmbH                            |
| Operator:             | Mr. Yu                                                   |
| Test Conditions:      | Tnom: 23°C, Unom: 120 VAC                                |
| Antenna:              | Rohde & Schwarz HL 223, Vertical                         |
| Measurement distance: | 3m                                                       |
| Mode:                 | 1                                                        |
| Test Date:            | 2016-03-11                                               |
| Note:                 |                                                          |

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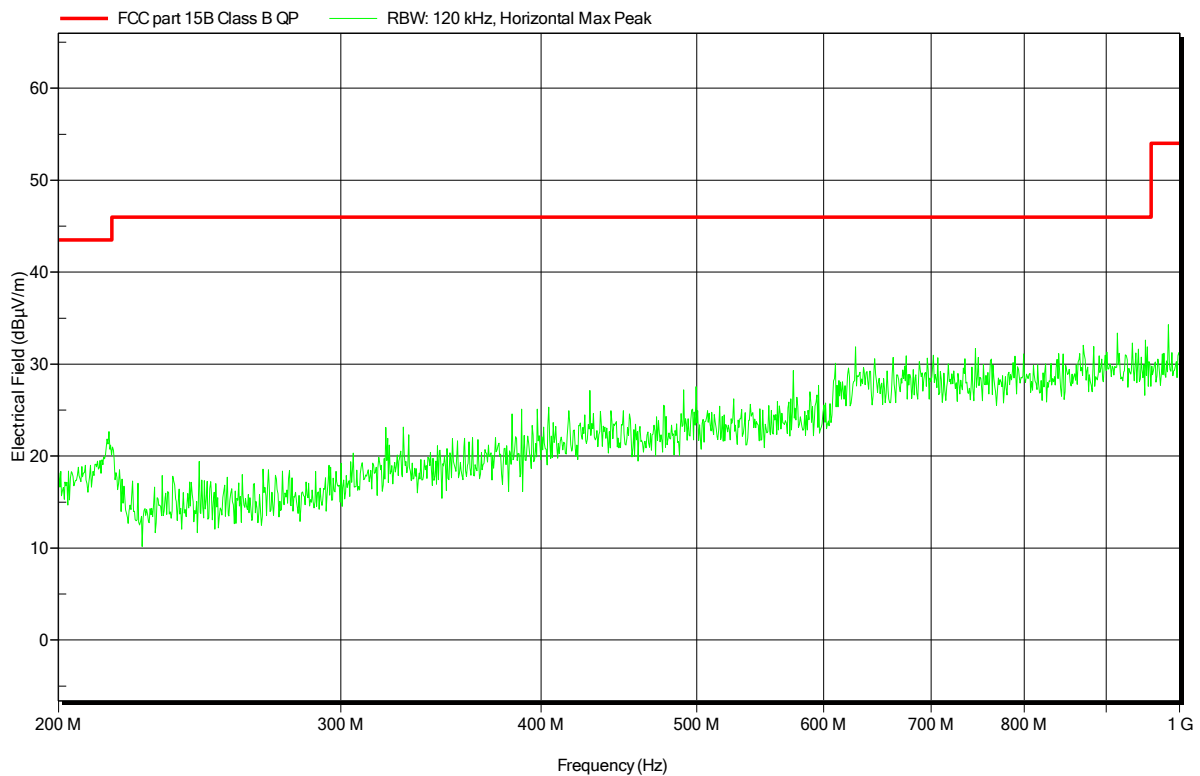


## Spurious emissions under normal conditions according to FCC Part 15b

Project number: G0M-1602-5395

|                       |                                                          |
|-----------------------|----------------------------------------------------------|
| Applicant:            | Grässlin GmbH                                            |
| EUT Name:             | 2-Channels 230VAC Timer Switch with integrated BLE-Modul |
| Model:                | Talento Smart x25                                        |
| Test Site:            | Eurofins Product Service GmbH                            |
| Operator:             | Mr. Yu                                                   |
| Test Conditions:      | Tnom: 23°C, Unom: 120 VAC                                |
| Antenna:              | Rohde & Schwarz HL 223, Horizontal                       |
| Measurement distance: | 3m                                                       |
| Mode:                 | 1                                                        |
| Test Date:            | 2016-03-11                                               |
| Note:                 |                                                          |

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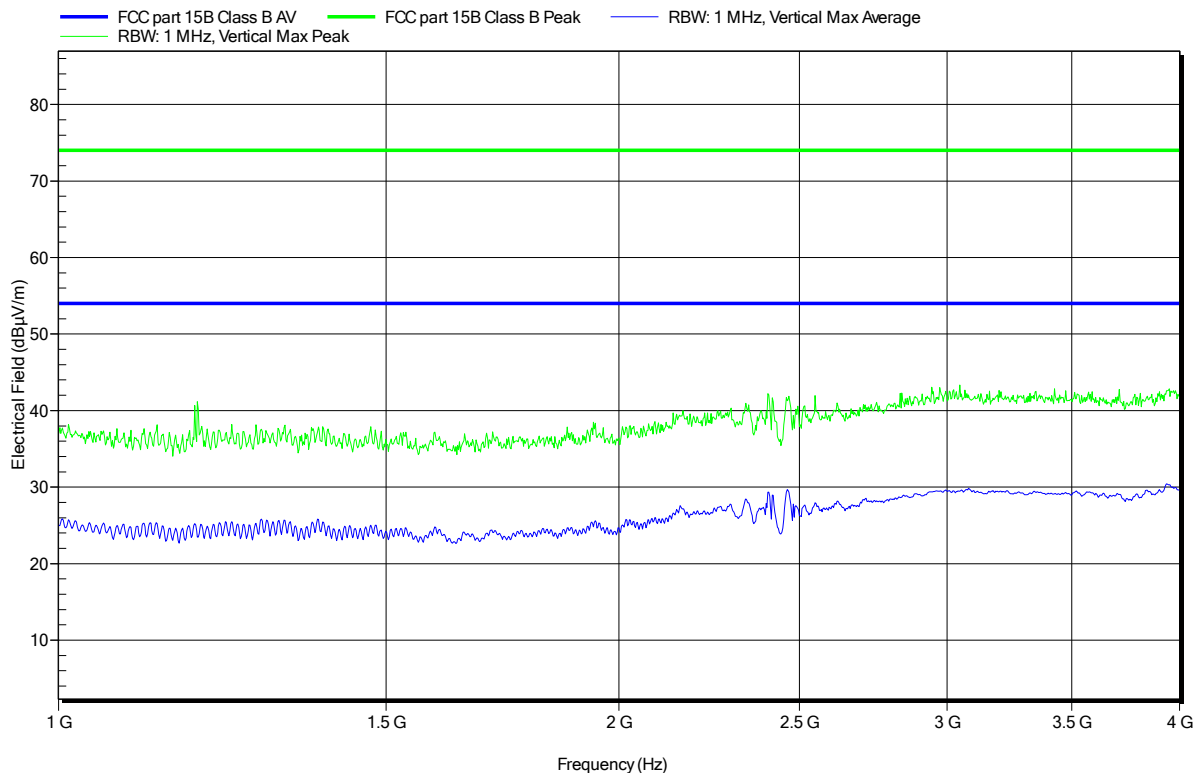


## Spurious emissions under normal conditions according to FCC Part 15b

Project number: G0M-1602-5395

Applicant: Grässlin GmbH  
 EUT Name: 2-Channels 230VAC Timer Switch with integrated BLE-Modul  
 Model: Talento Smart x25  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Yu  
 Test Conditions: Tnom: 23°C, Unom: 120 VAC  
 Antenna: Schwarzbeck BBHA 9120D, Vertical  
 Measurement distance: 3m  
 Mode: 1  
 Test Date: 2016-03-11  
 Note:

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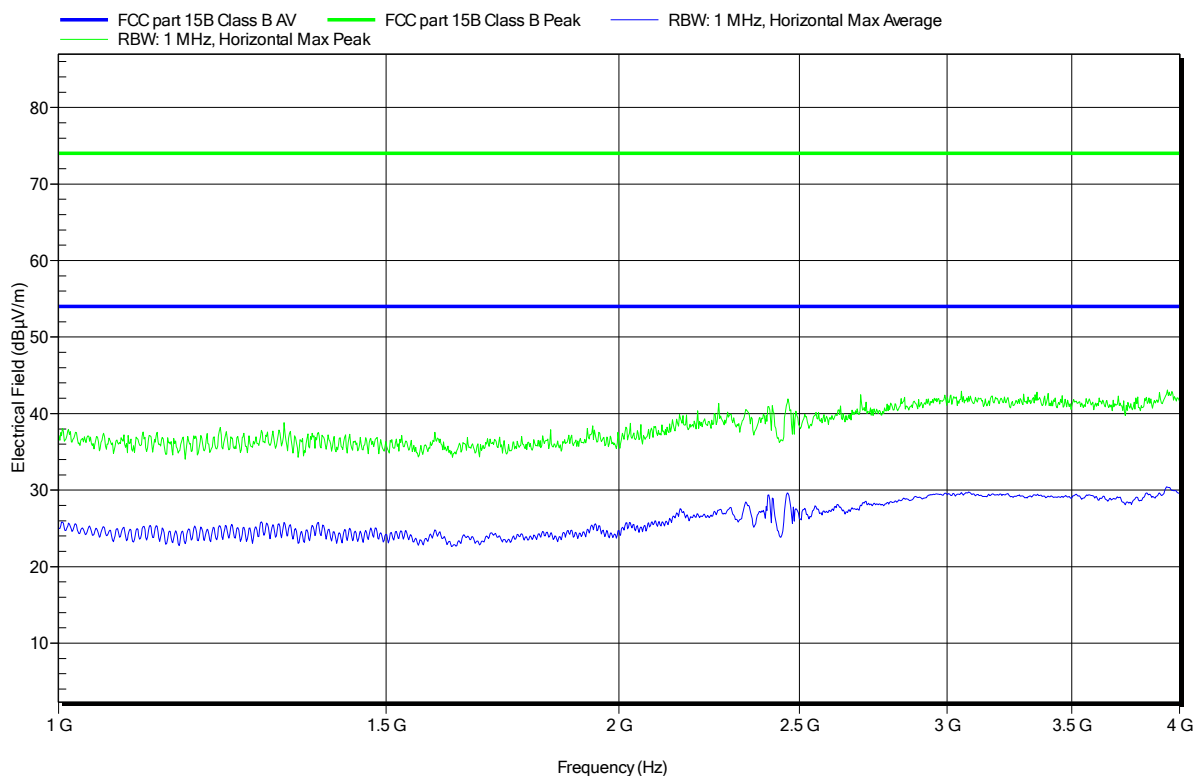


## Spurious emissions under normal conditions according to FCC Part 15b

Project number: G0M-1602-5395

Applicant: Grässlin GmbH  
 EUT Name: 2-Channels 230VAC Timer Switch with integrated BLE-Modul  
 Model: Talento Smart x25  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Yu  
 Test Conditions: Tnom: 23°C, Unom: 120 VAC  
 Antenna: Schwarzbeck BBHA 9120D, Horizontal  
 Measurement distance: 3m  
 Mode: 1  
 Test Date: 2016-03-11  
 Note:

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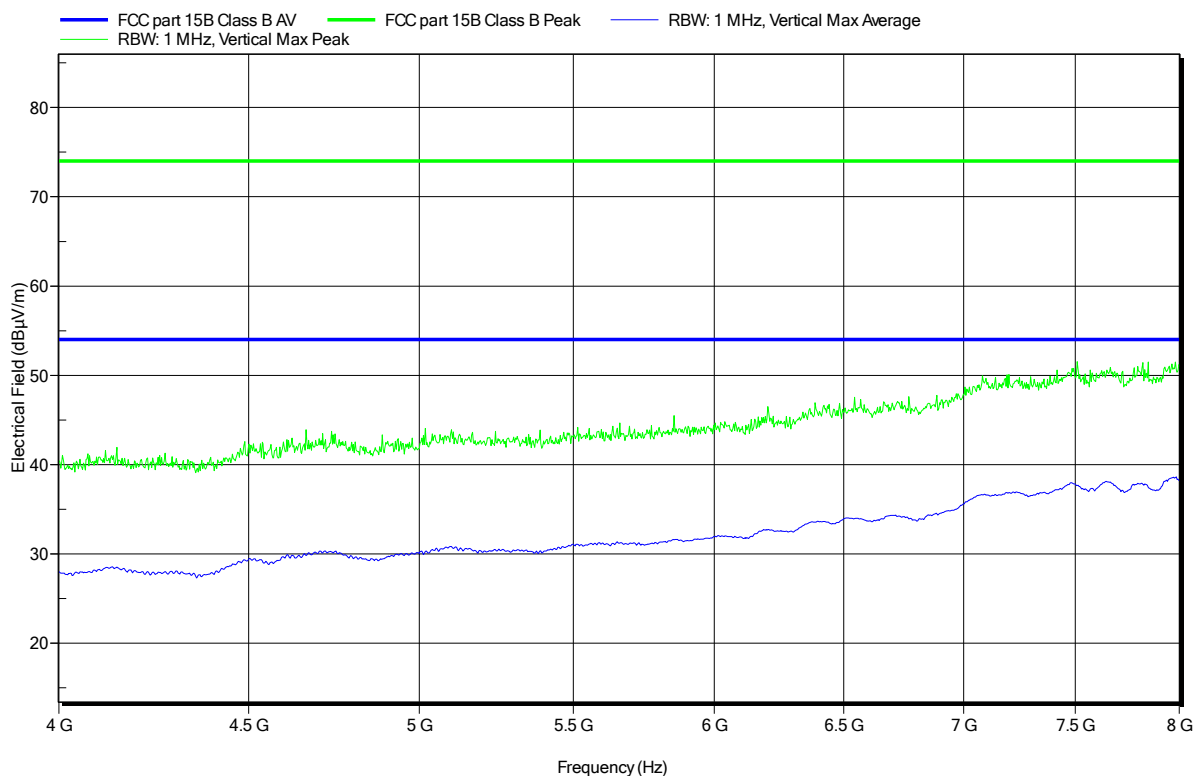


## Spurious emissions under normal conditions according to FCC Part 15b

Project number: G0M-1602-5395

Applicant: Grässlin GmbH  
 EUT Name: 2-Channels 230VAC Timer Switch with integrated BLE-Modul  
 Model: Talento Smart x25  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Yu  
 Test Conditions: Tnom: 23°C, Unom: 120 VAC  
 Antenna: Schwarzbeck BBHA 9120D, Vertical  
 Measurement distance: 3m  
 Mode: 1  
 Test Date: 2016-03-11  
 Note:

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Test Report No.: G0M-1602-5395-EF0115B-V01

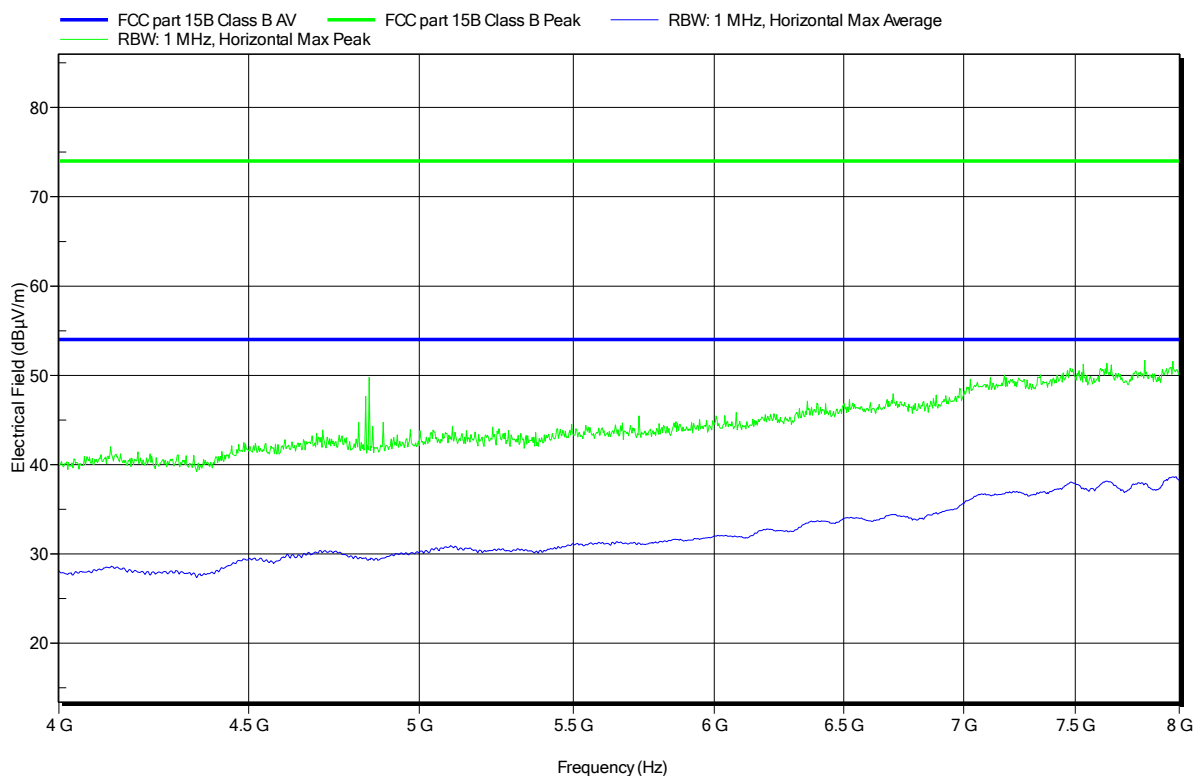
Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

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

Project number: G0M-1602-5395

Applicant: Grässlin GmbH  
 EUT Name: 2-Channels 230VAC Timer Switch with integrated BLE-Modul  
 Model: Talento Smart x25  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Yu  
 Test Conditions: Tnom: 23°C, Unom: 120 VAC  
 Antenna: Schwarzbeck BBHA 9120D, Horizontal  
 Measurement distance: 3m  
 Mode: 1  
 Test Date: 2016-03-11  
 Note:

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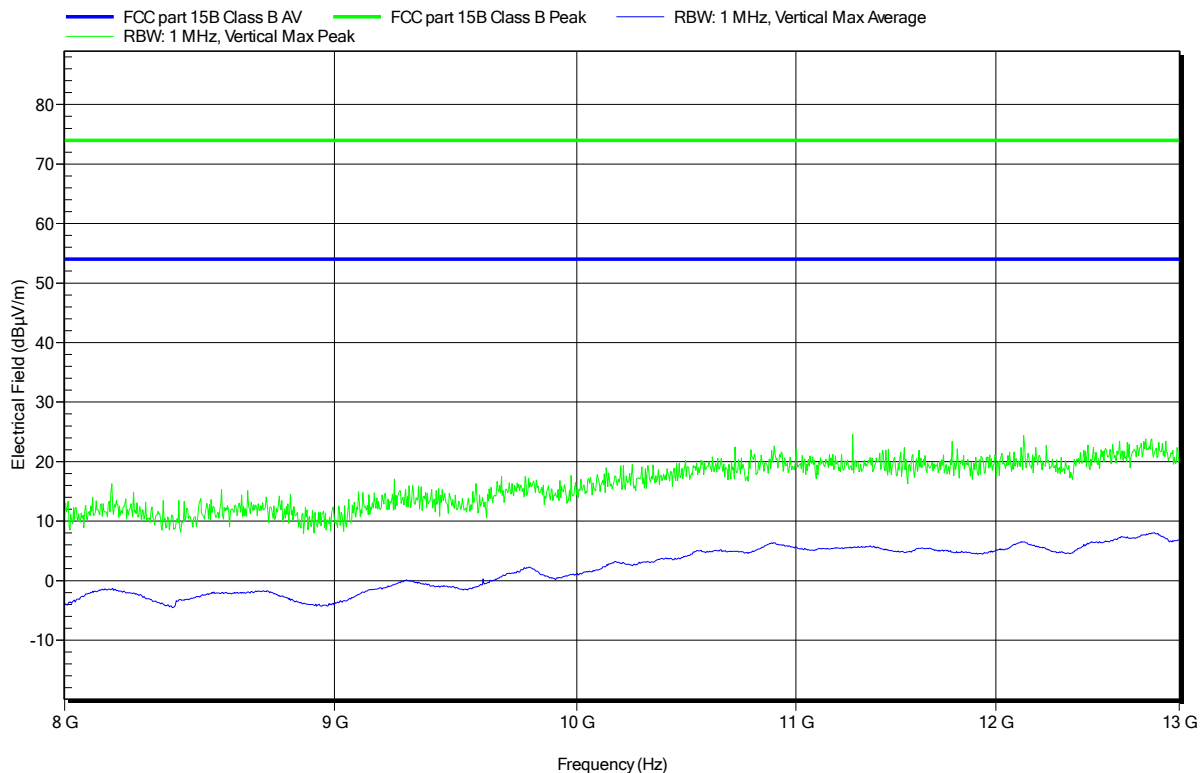


**Spurious emissions under normal conditions according to FCC Part 15b**

Project number: G0M-1602-5395

|                       |                                                          |
|-----------------------|----------------------------------------------------------|
| Applicant:            | Grässlin GmbH                                            |
| EUT Name:             | 2-Channels 230VAC Timer Switch with integrated BLE-Modul |
| Model:                | Talento Smart x25                                        |
| Test Site:            | Eurofins Product Service GmbH                            |
| Operator:             | Mr. Yu                                                   |
| Test Conditions:      | Tnom: 23°C, Unom: 120 VAC                                |
| Antenna:              | Schwarzbeck BBHA 9120D, Vertical                         |
| Measurement distance: | 3m                                                       |
| Mode:                 | 1                                                        |
| Test Date:            | 2016-03-11                                               |
| Note:                 |                                                          |

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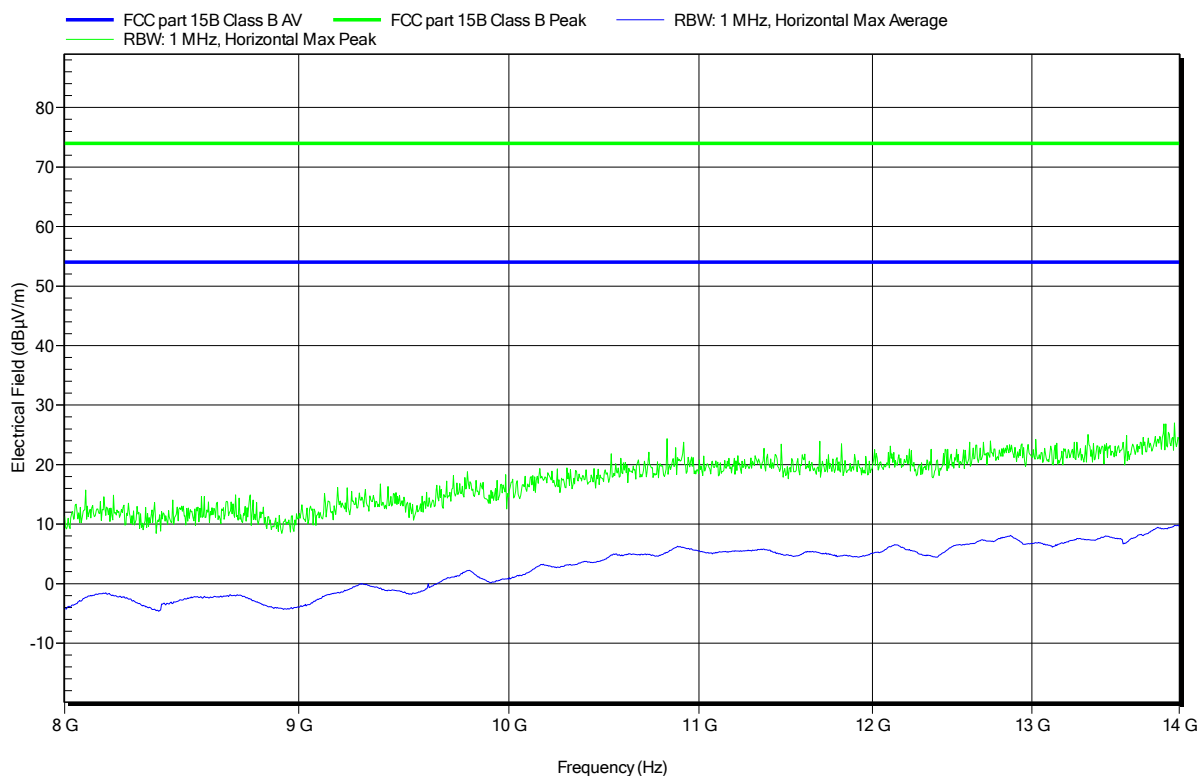


## Spurious emissions under normal conditions according to FCC Part 15b

Project number: G0M-1602-5395

|                       |                                                          |
|-----------------------|----------------------------------------------------------|
| Applicant:            | Grässlin GmbH                                            |
| EUT Name:             | 2-Channels 230VAC Timer Switch with integrated BLE-Modul |
| Model:                | Talento Smart x25                                        |
| Test Site:            | Eurofins Product Service GmbH                            |
| Operator:             | Mr. Yu                                                   |
| Test Conditions:      | Tnom: 23°C, Unom: 120 VAC                                |
| Antenna:              | Schwarzbeck BBHA 9120D, Horizontal                       |
| Measurement distance: | 3m                                                       |
| Mode:                 | 1                                                        |
| Test Date:            | 2016-03-11                                               |
| Note:                 |                                                          |

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Test Report No.: G0M-1602-5395-EF0115B-V01

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

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

| Conducted emissions acc. FCC 47 CFR 15.107 / 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 %                 | 35%             |        |
| 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         |                 |        |
| Sample is tested with respect to the requirements of the equipment class |                   | Equipment class            |                 |        |
|                                                                          |                   | Class B                    |                 |        |
| Points of Application                                                    |                   | Application Interface      |                 |        |
| AC Mains                                                                 |                   | LISN                       |                 |        |
| Operating mode and configuration                                         |                   | 1                          |                 |        |
| Limits and results Class B                                               |                   |                            |                 |        |
| 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:                                                                |                   |                            |                 |        |
| * Limit decreases linearly with the logarithm of the frequency.          |                   |                            |                 |        |

**Test Procedure:**

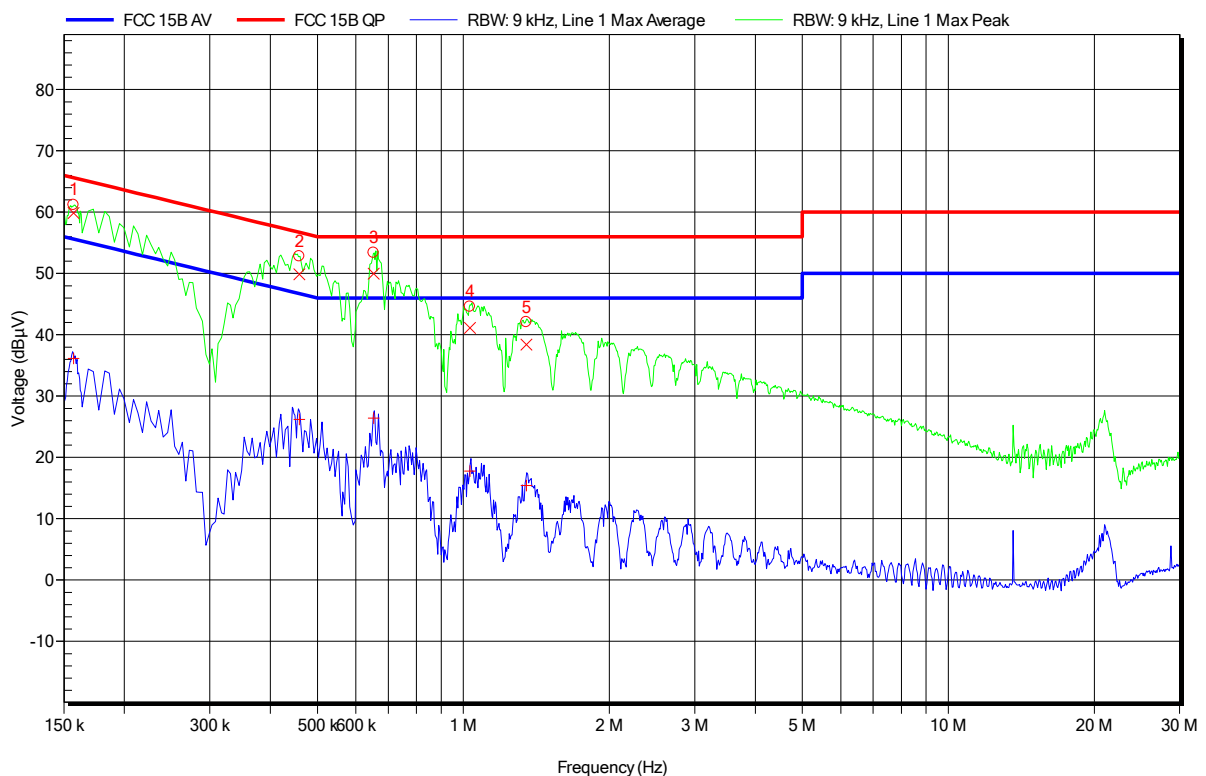
- 1) The EUT was placed on a non conductive table 0.8 m above the reference ground plane and 0.4 m away from the vertical conducting plane (ANSI C63.4: 2009 item 7.3.1)
- 2) The power cord that is normally supplied or recommended by the manufacturer was connected to the LISN.
- 3) The distance between the outer edge of the EUT and the LISN shall be set to 0.8 m. A longer power cord shall be bundled to this length (bundling shall not exceed 40 cm in length).
- 4) The LISN measurement port was connected to a measurement receiver
- 5) I/O cables were bundled not longer than 0.4 m
- 6) Measurement was performed in the frequency range 0.15 – 30MHz on each current-carrying conductor

## EMI voltage test in the ac-mains according to FCC Part 15b

Project number: G0M-1602-5395

Applicant: Grässlin GmbH  
 EUT Name: 1-Channel 230VAC Timer Switch with integrated BLE-Modul  
 Model: Talento Smart x15  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Yu  
 Test Conditions: Tnom: 23°C, Unom: 120V AC  
 LISN: ESH2-Z5 L  
 Mode: 1  
 Test Date: 2016-03-09  
 Note:

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| Peak Number | Frequency | Quasi-Peak | Quasi-Peak Limit | Quasi-Peak Difference | Quasi-Peak Status |
|-------------|-----------|------------|------------------|-----------------------|-------------------|
| 1           | 157.2 kHz | 59.88 dBμV | 65.61 dBμV       | -5.73 dB              | Pass              |
| 2           | 458.7 kHz | 49.89 dBμV | 56.72 dBμV       | -6.83 dB              | Pass              |
| 3           | 653.1 kHz | 49.96 dBμV | 56 dBμV          | -6.04 dB              | Pass              |
| 4           | 1.032 MHz | 41.13 dBμV | 56 dBμV          | -14.87 dB             | Pass              |
| 5           | 1.348 MHz | 38.39 dBμV | 56 dBμV          | -17.61 dB             | Pass              |

| Peak Number | Frequency | Average    | Average Limit | Average Difference | Average Status |
|-------------|-----------|------------|---------------|--------------------|----------------|
| 1           | 157.2 kHz | 36.13 dBμV | 55.61 dBμV    | -19.48 dB          | Pass           |
| 2           | 458.7 kHz | 26.22 dBμV | 46.72 dBμV    | -20.5 dB           | Pass           |
| 3           | 653.1 kHz | 26.43 dBμV | 46 dBμV       | -19.57 dB          | Pass           |
| 4           | 1.032 MHz | 17.79 dBμV | 46 dBμV       | -28.21 dB          | Pass           |
| 5           | 1.348 MHz | 15.43 dBμV | 46 dBμV       | -30.57 dB          | Pass           |

Test Report No.: G0M-1602-5395-EF0115B-V01

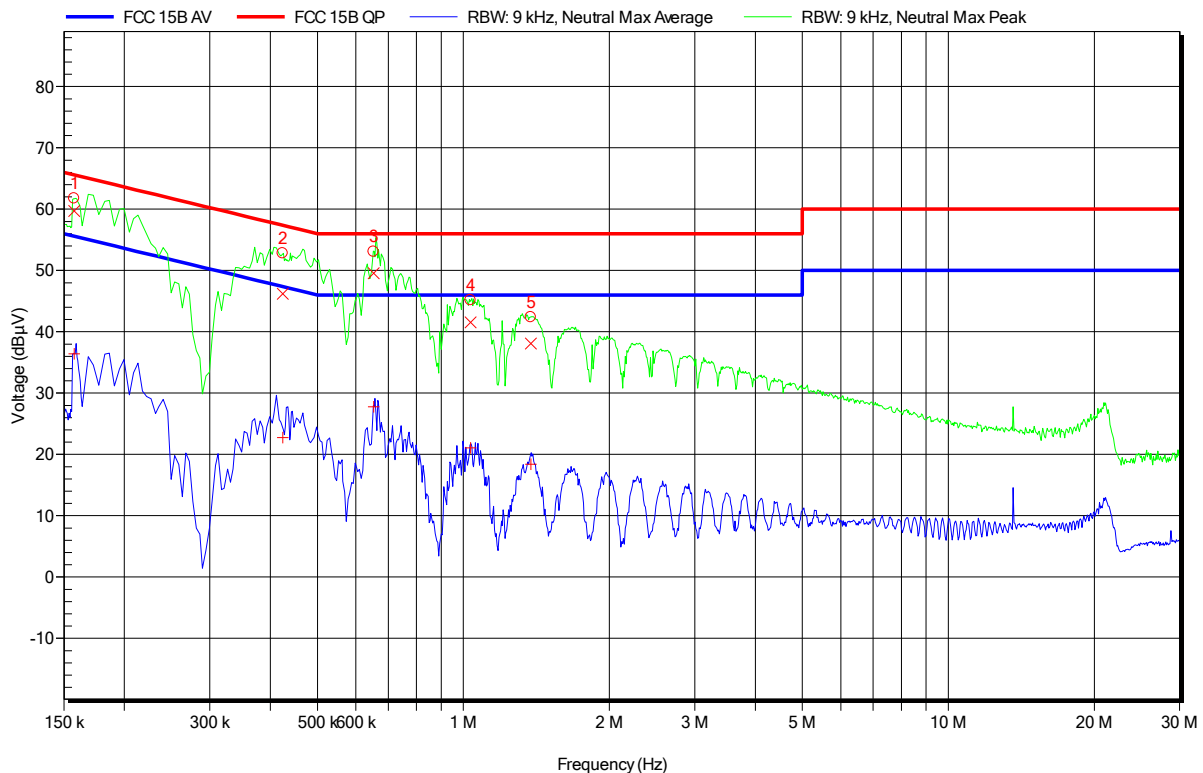
Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

## EMI voltage test in the ac-mains according to FCC Part 15b

Project number: G0M-1602-5395

Applicant: Grässlin GmbH  
EUT Name: 1-Channel 230VAC Timer Switch with integrated BLE-Modul  
Model: Talento Smart x15  
Test Site: Eurofins Product Service GmbH  
Operator: Mr. Yu  
Test Conditions: Tnom: 23°C, Unom: 120V AC  
LISN: ESH2-Z5 N  
Mode: 1  
Test Date: 2016-03-09  
Note:

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| Peak Number | Frequency  | Quasi-Peak | Quasi-Peak Limit | Quasi-Peak Difference | Quasi-Peak Status |
|-------------|------------|------------|------------------|-----------------------|-------------------|
| 1           | 157.65 kHz | 59.7 dBμV  | 65.59 dBμV       | -5.89 dB              | Pass              |
| 2           | 424.5 kHz  | 46.22 dBμV | 57.36 dBμV       | -11.14 dB             | Pass              |
| 3           | 653.55 kHz | 49.56 dBμV | 56 dBμV          | -6.44 dB              | Pass              |
| 4           | 1.034 MHz  | 41.52 dBμV | 56 dBμV          | -14.48 dB             | Pass              |
| 5           | 1.378 MHz  | 38.07 dBμV | 56 dBμV          | -17.93 dB             | Pass              |

| Peak Number | Frequency  | Average    | Average Limit | Average Difference | Average Status |
|-------------|------------|------------|---------------|--------------------|----------------|
| 1           | 157.65 kHz | 36.4 dBμV  | 55.59 dBμV    | -19.19 dB          | Pass           |
| 2           | 424.5 kHz  | 22.74 dBμV | 47.36 dBμV    | -24.62 dB          | Pass           |
| 3           | 653.55 kHz | 27.78 dBμV | 46 dBμV       | -18.22 dB          | Pass           |
| 4           | 1.034 MHz  | 21.04 dBμV | 46 dBμV       | -24.96 dB          | Pass           |
| 5           | 1.378 MHz  | 18.4 dBμV  | 46 dBμV       | -27.6 dB           | Pass           |

Test Report No.: G0M-1602-5395-EF0115B-V01

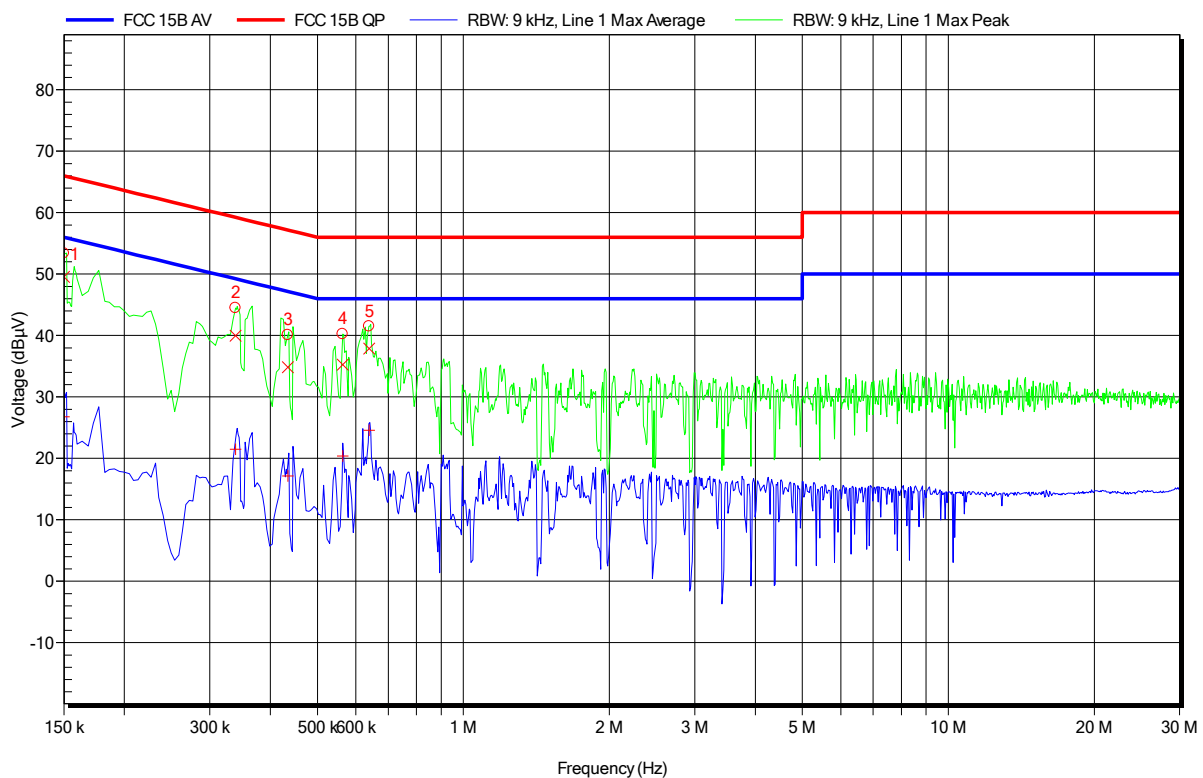
Eurofins Product Service GmbH  
Storkower Str. 38c, D-15526 Reichenwalde, Germany

## EMI voltage test in the ac-mains according to FCC Part 15b

Project number: G0M-1602-5395

Applicant: Grässlin GmbH  
 EUT Name: 2-Channels 230VAC Timer Switch with integrated BLE-Modul  
 Model: Talento Smart x25  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Yu  
 Test Conditions: Tnom: 23°C, Unom: 120 VAC  
 LISN: ESH2-Z5 L  
 Mode: 1  
 Test Date: 2016-03-11  
 Note:

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| Peak Number | Frequency  | Quasi-Peak | Quasi-Peak Limit | Quasi-Peak Difference | Quasi-Peak Status |
|-------------|------------|------------|------------------|-----------------------|-------------------|
| 1           | 150 kHz    | 49.53 dBμV | 66 dBμV          | -16.47 dB             | Pass              |
| 2           | 339 kHz    | 39.99 dBμV | 59.23 dBμV       | -19.24 dB             | Pass              |
| 3           | 434.4 kHz  | 34.86 dBμV | 57.17 dBμV       | -22.31 dB             | Pass              |
| 4           | 564 kHz    | 35.24 dBμV | 56 dBμV          | -20.76 dB             | Pass              |
| 5           | 639.15 kHz | 37.85 dBμV | 56 dBμV          | -18.15 dB             | Pass              |

| Peak Number | Frequency  | Average    | Average Limit | Average Difference | Average Status |
|-------------|------------|------------|---------------|--------------------|----------------|
| 1           | 150 kHz    | 26.79 dBμV | 56 dBμV       | -29.21 dB          | Pass           |
| 2           | 339 kHz    | 21.49 dBμV | 49.23 dBμV    | -27.74 dB          | Pass           |
| 3           | 434.4 kHz  | 17.17 dBμV | 47.17 dBμV    | -30 dB             | Pass           |
| 4           | 564 kHz    | 20.38 dBμV | 46 dBμV       | -25.62 dB          | Pass           |
| 5           | 639.15 kHz | 24.57 dBμV | 46 dBμV       | -21.43 dB          | Pass           |

Test Report No.: G0M-1602-5395-EF0115B-V01

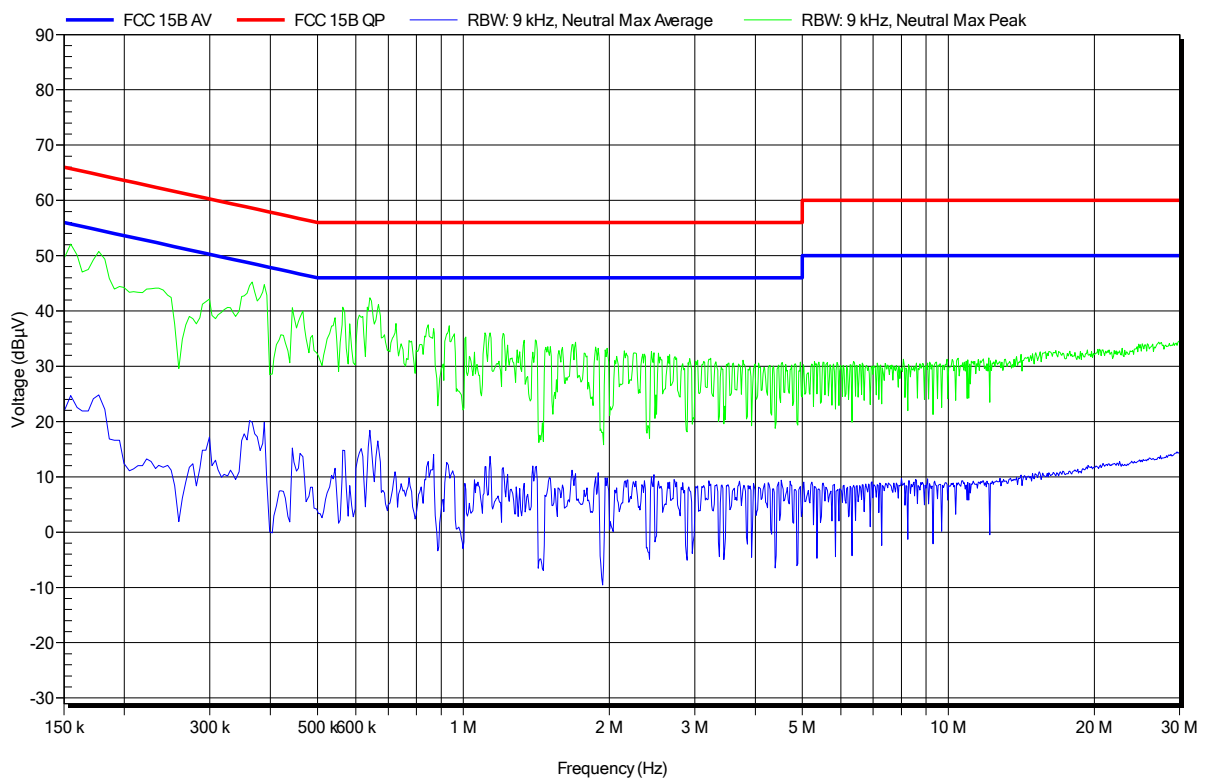
Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

## EMI voltage test in the ac-mains according to FCC Part 15b

Project number: G0M-1602-5395

Applicant: Grässlin GmbH  
 EUT Name: 2-Channels 230VAC Timer Switch with integrated BLE-Modul  
 Model: Talento Smart x25  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Yu  
 Test Conditions: Tnom: 23°C, Unom: 120VAC  
 LISN: ESH2-Z5 N  
 Mode: 1  
 Test Date: 2016-03-11  
 Note:

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Test Report No.: G0M-1602-5395-EF0115B-V01

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