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**

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) ..... : Deputy Head of Lab	Jens Marquardt
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:	

Version History

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

REPORT INDEX

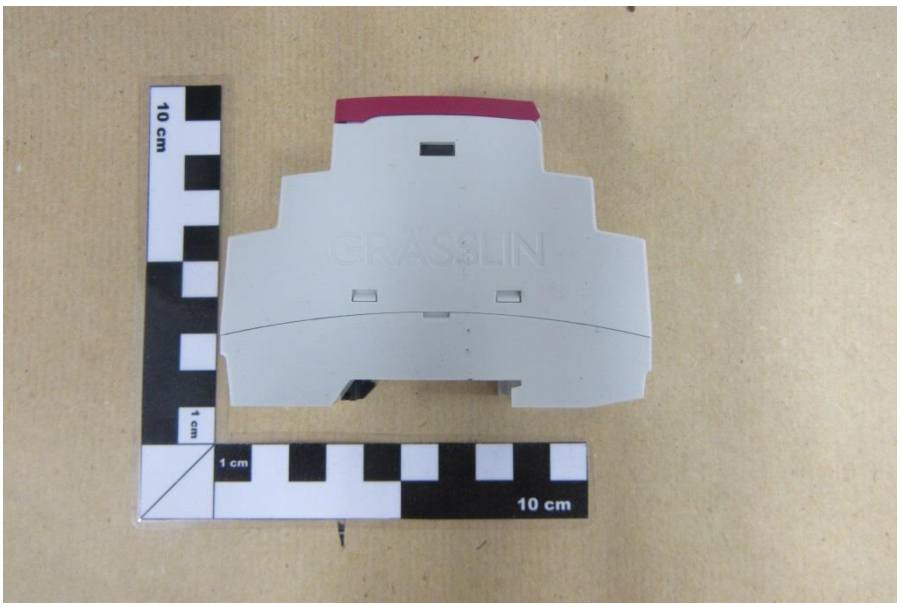
1 Equipment (Test item) Description

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

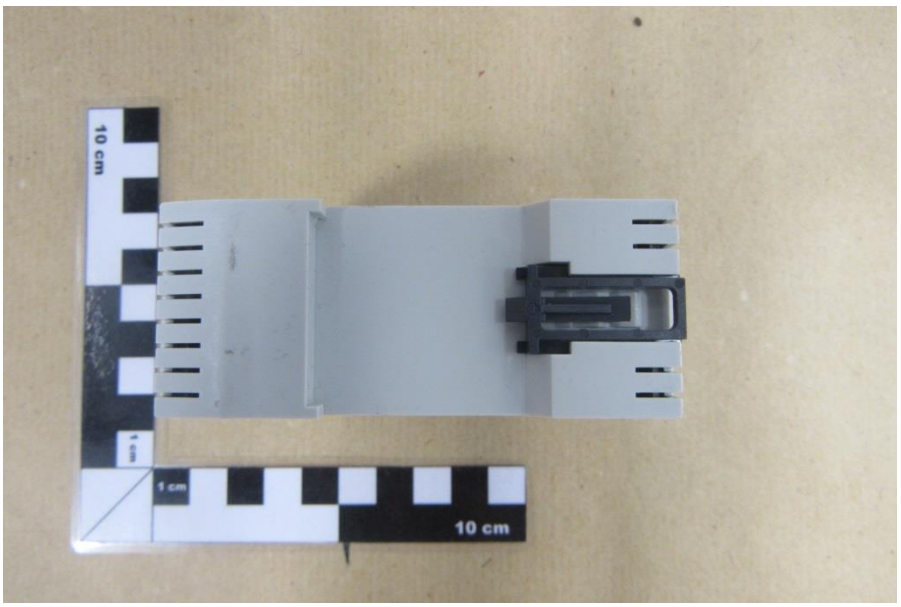
1.1 Photos – Equipment external

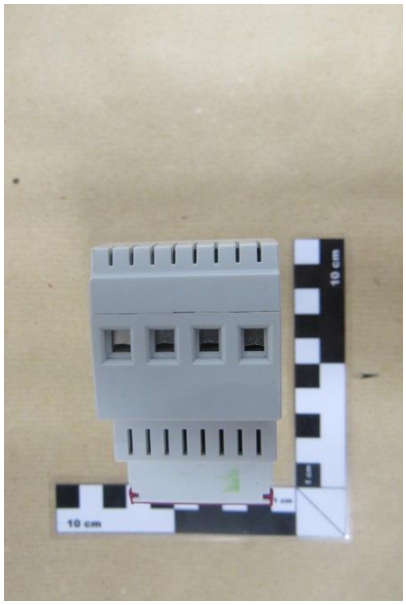
x25 - top

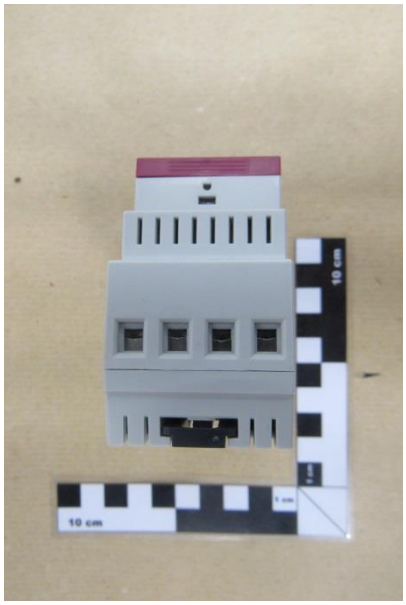

x25 - top buttons


x25 - right side


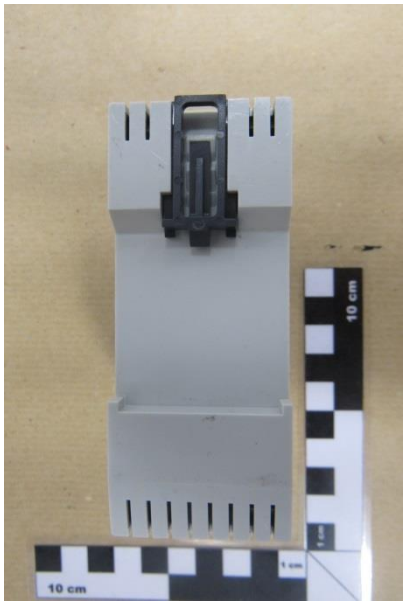
x25 – left side


x25 - bottom


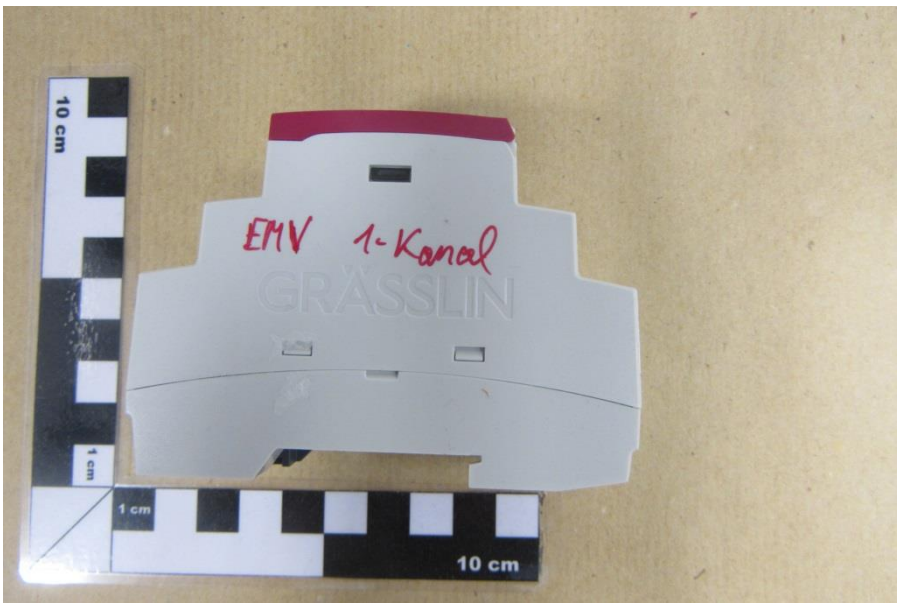
x25 - front


x25 - back


x15 - top

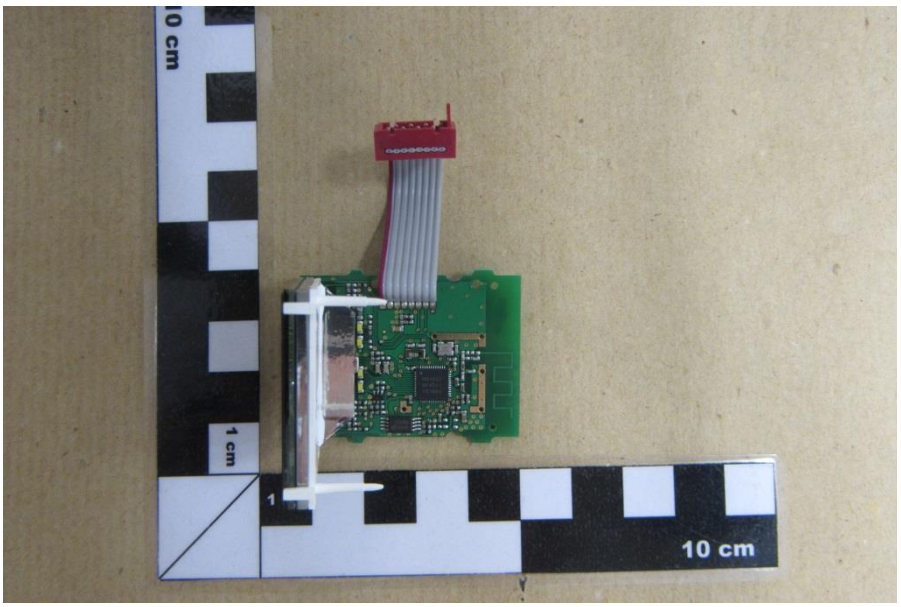

x15 - bottom


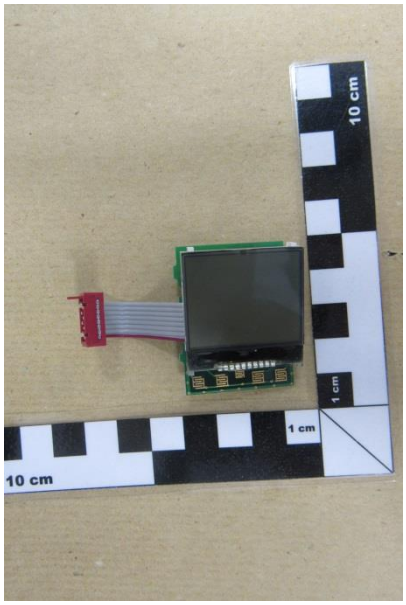
x15 - front

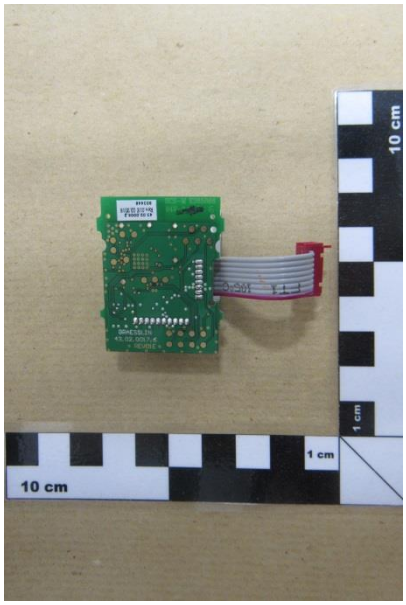

x15 – left side


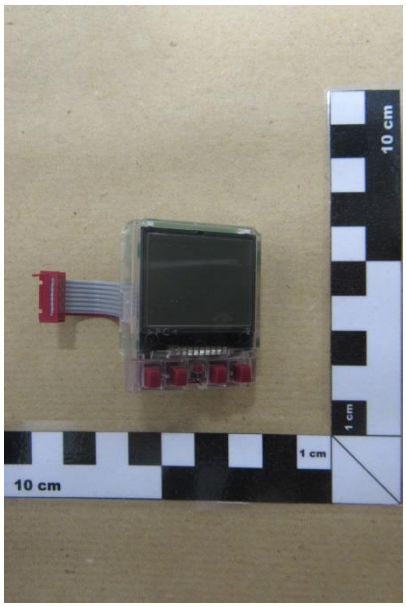
x15 – right side

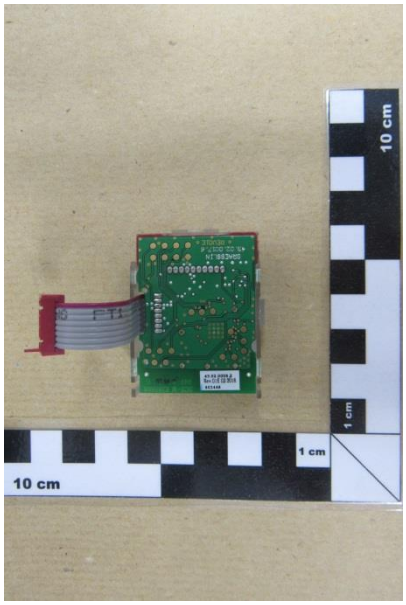

1.2 Photos – Equipment internal

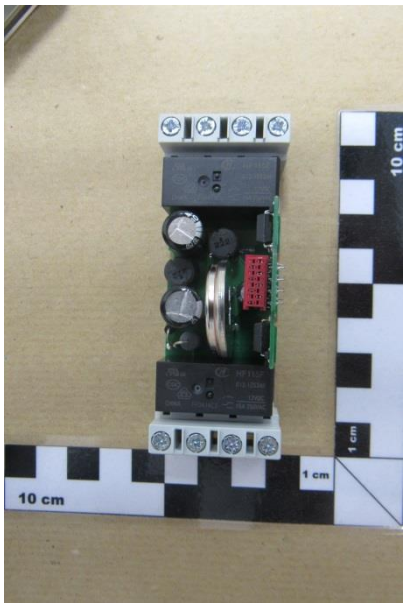
x25 - upper PCB top modul


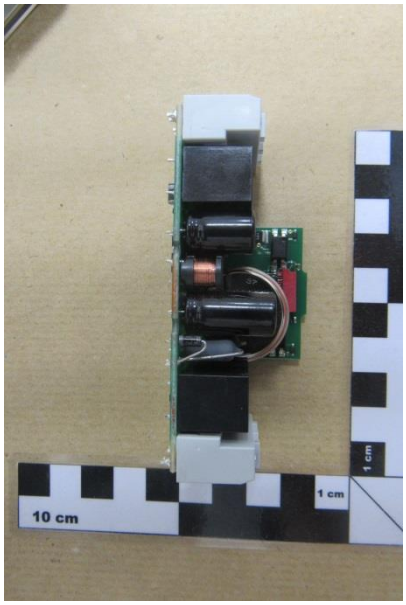
x25 - upper PCB top with display


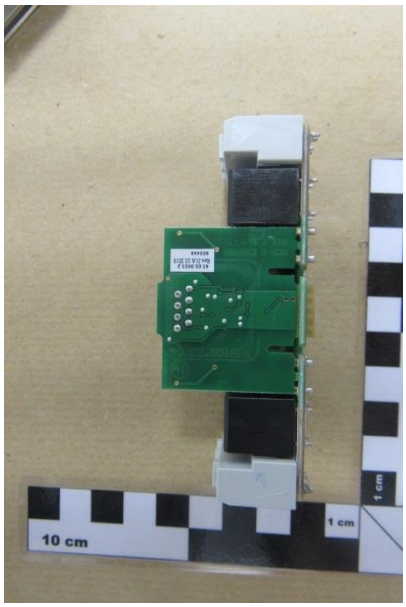
x25 - upper PCB bottom


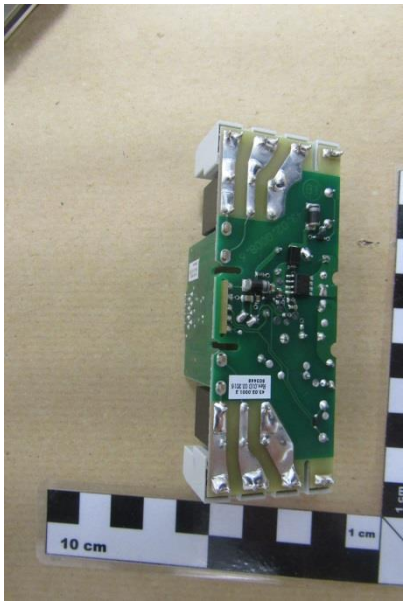
x25 - upper PCB assembly top


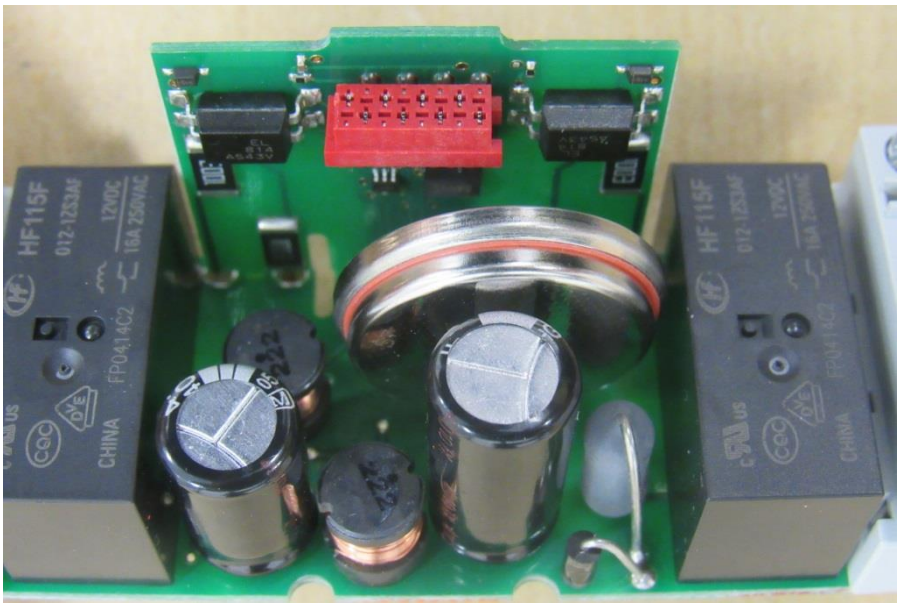
x25 - upper PCB assembly bottom


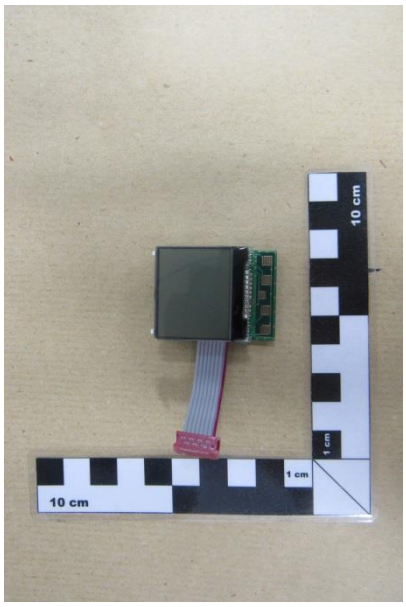
x25 - lower PCB assembly top


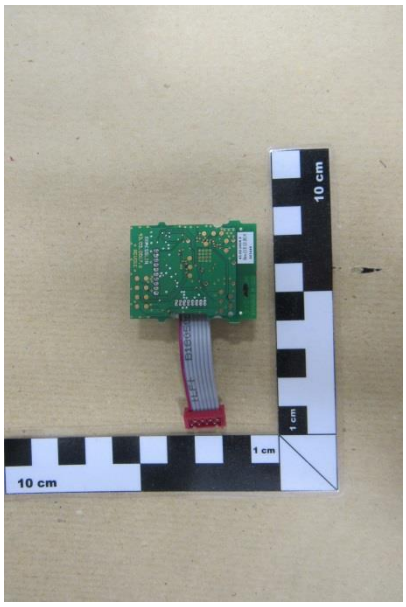
x25 - lower PCB assembly left side


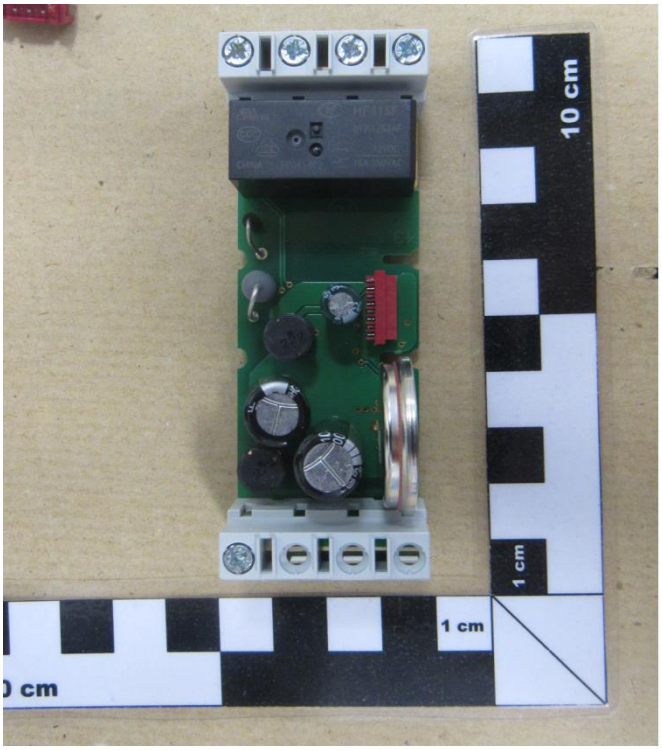
x25 - lower PCB assembly right side


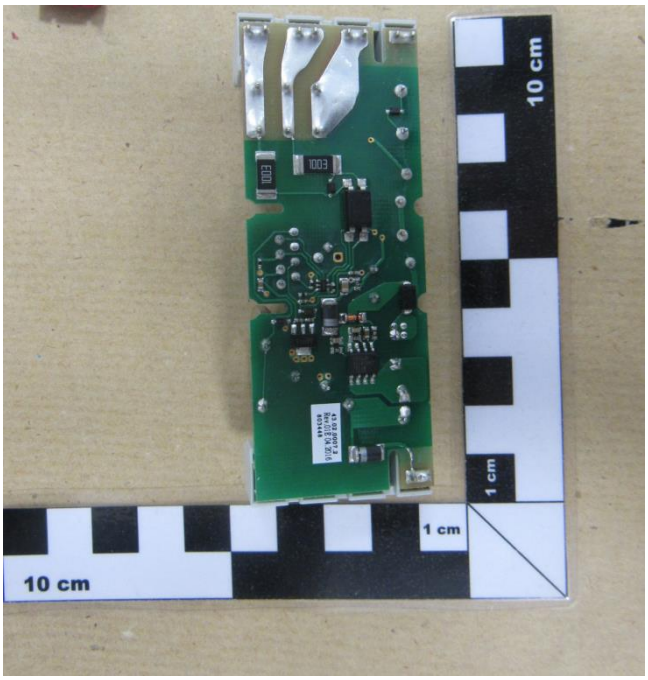
x25 - lower PCB assembly bottom


x25 - lower PCB assembly detail


x15 - upper PCB top


x15 - upper PCB bottom


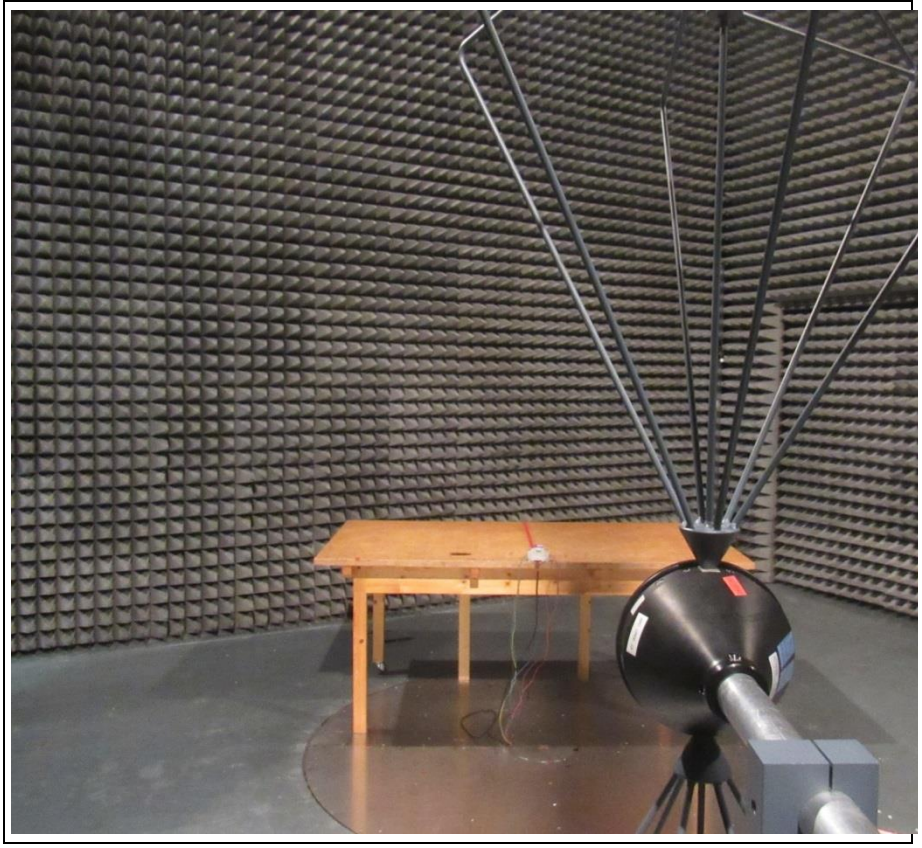
x15 - lower PCB top


x15 - lower PCB bottom


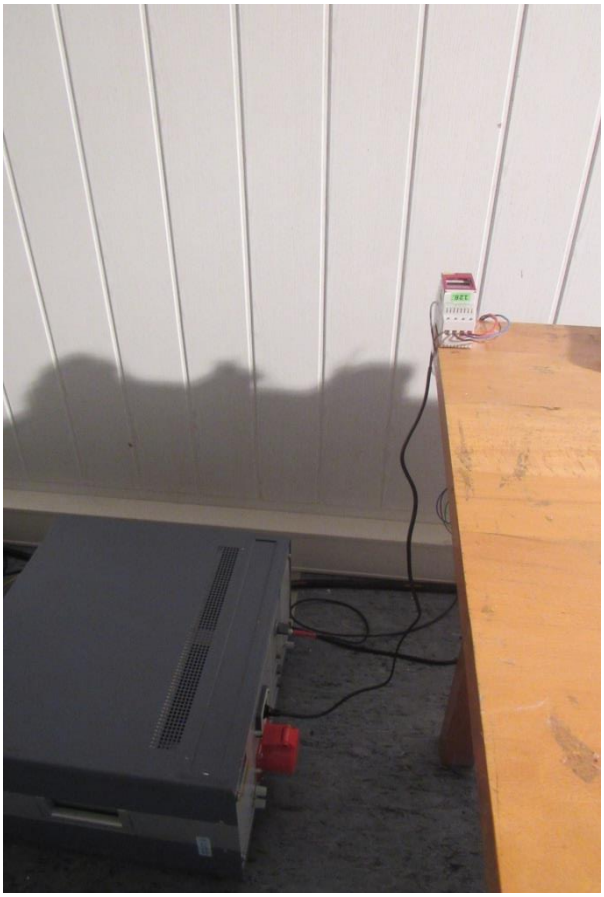
1.3 Photos – Test setup

Test Setup x15: Radiated Emissions


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 Talent smart V0.529
2	Multimeter	Fluke	Fluke 117	
3	Multimeter	E Sun	MY-63	

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

AE : Auxiliary/Associated Equipment, or

SIM : Simulator (Not Subjected to Test)

CABL : Connecting cables

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	

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

AC : AC power port

DC : DC power port

N/E : Non electrical

I/O : Signal input or output port

TP : Telecommunication port

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:

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 RSS-Gen 4.9 & 4.10	Radiated emissions	ANSI C 63.4	PASS	-
47 CFR 15.107 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:

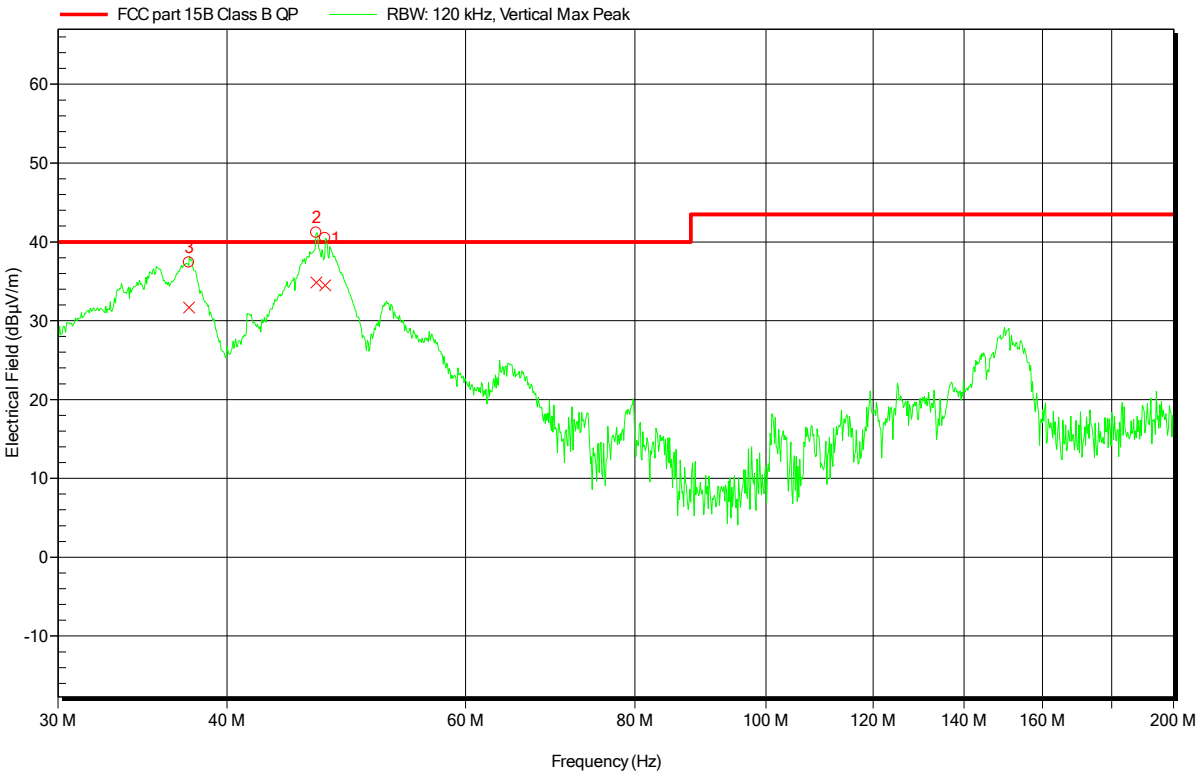
- The EUT was placed on a 0.8 m non-conductive table at a 3 m distance from the receive antenna. The antenna output was connected to the measurement receiver
- A biconical antenna was used for the frequency range 30 – 200 MHz, a logarithmic periodical antenna was used for the frequency range from 200 – 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:	

Index 15



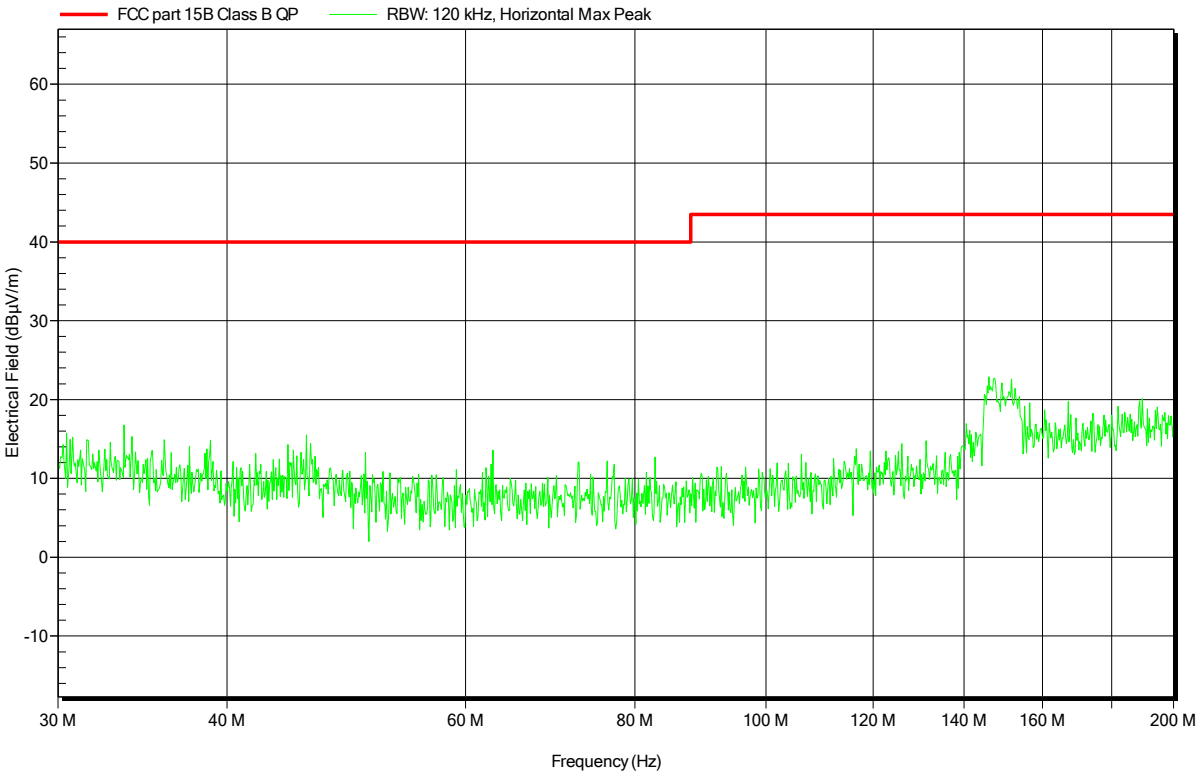
Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Angle	Height
1	47.28 MHz	34.48 dBµV/m	40 dBµV/m	-5.52 dB	Pass	331 Degree	1 m
2	46.56 MHz	34.86 dBµV/m	40 dBµV/m	-5.14 dB	Pass	331 Degree	1 m
3	37.5 MHz	31.69 dBµV/m	40 dBµV/m	-8.31 dB	Pass	331 Degree	1 m

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:	

Index 16

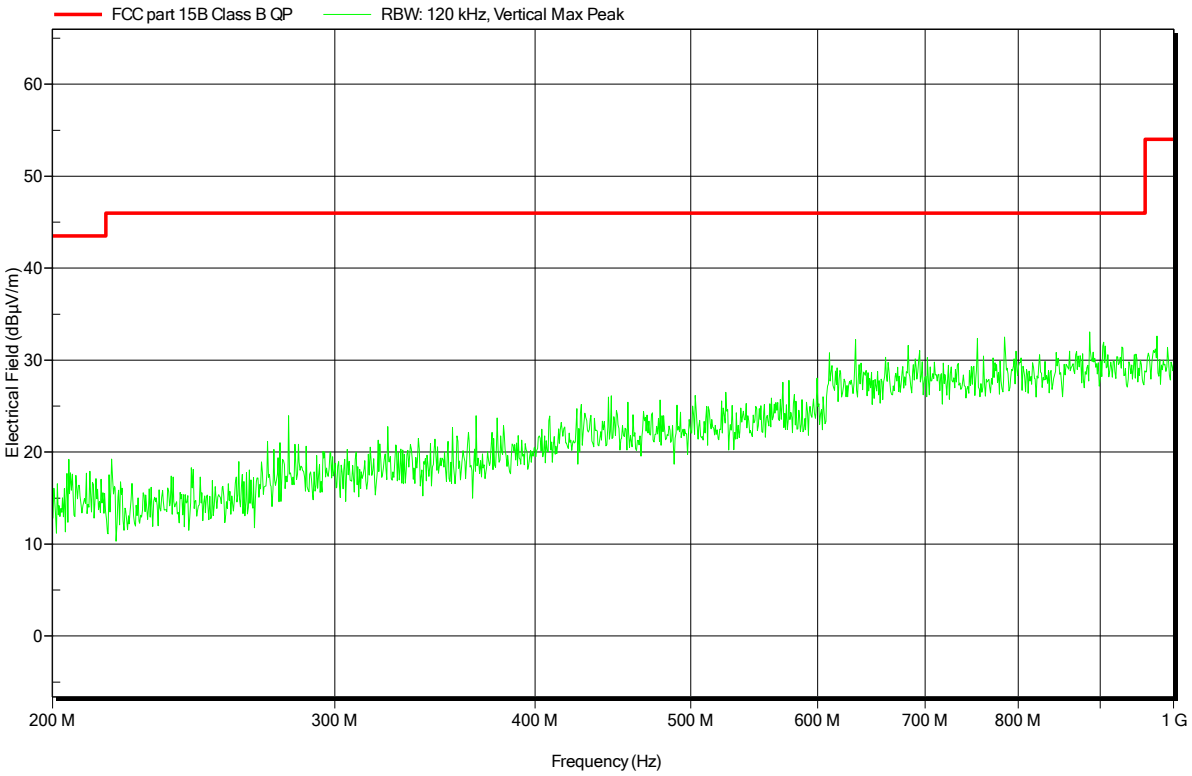


Spurious emissions under normal conditions according to FCC Part 15b

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:	

Index 19

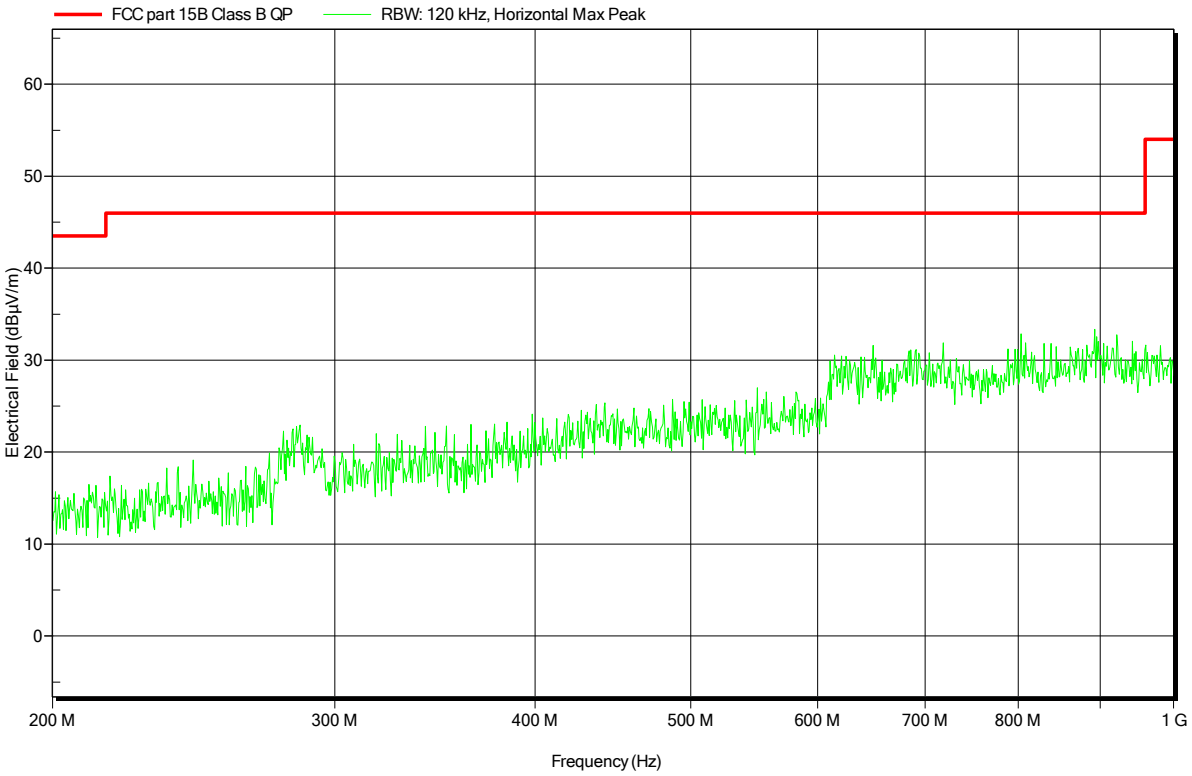


Spurious emissions under normal conditions according to FCC Part 15b

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, Horizontal
Measurement distance:	3m
Mode:	1
Test Date:	2016-03-10
Note:	

Index 20

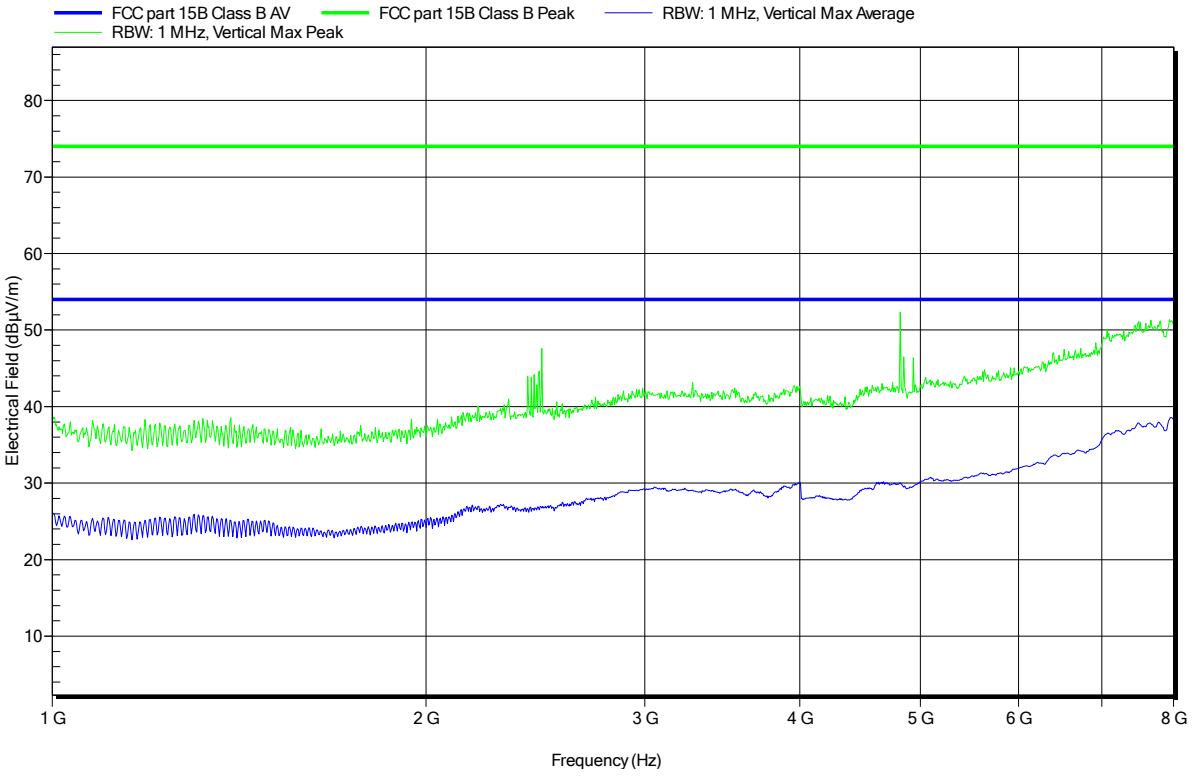


Spurious emissions under normal conditions according to FCC Part 15b

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:	

Index 25

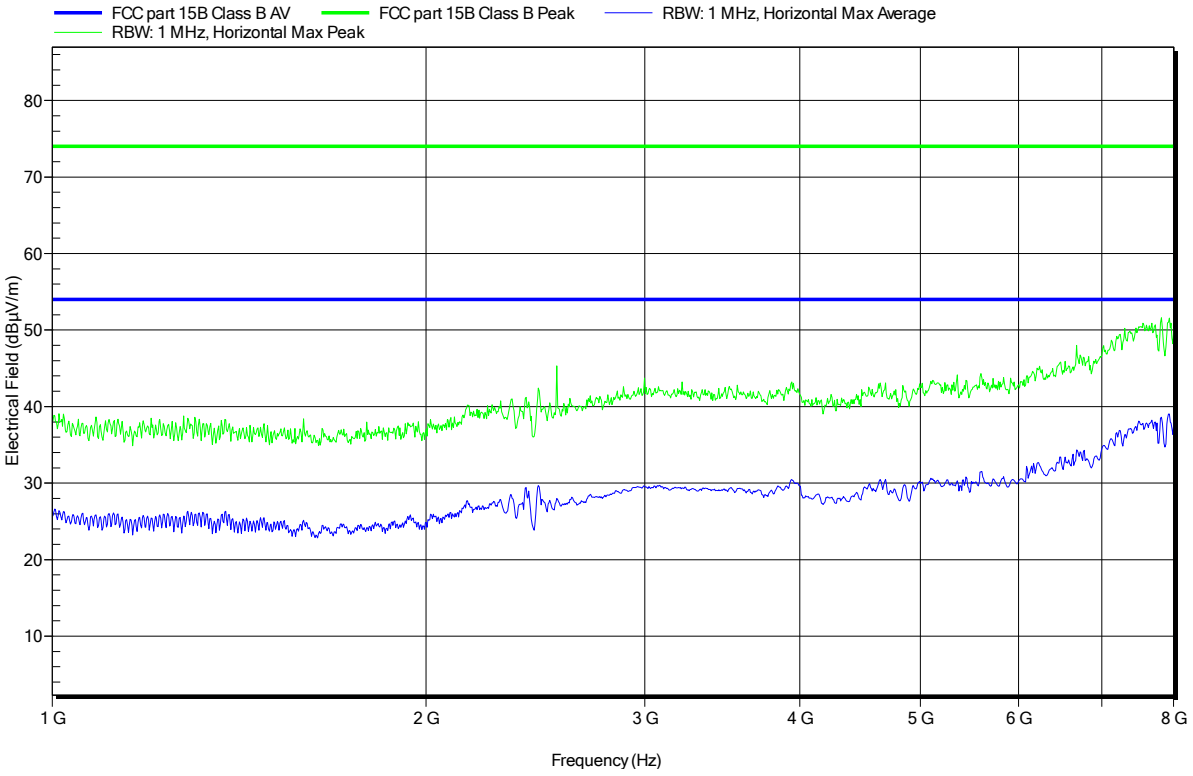


Spurious emissions under normal conditions according to FCC Part 15b

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:	

Index 24

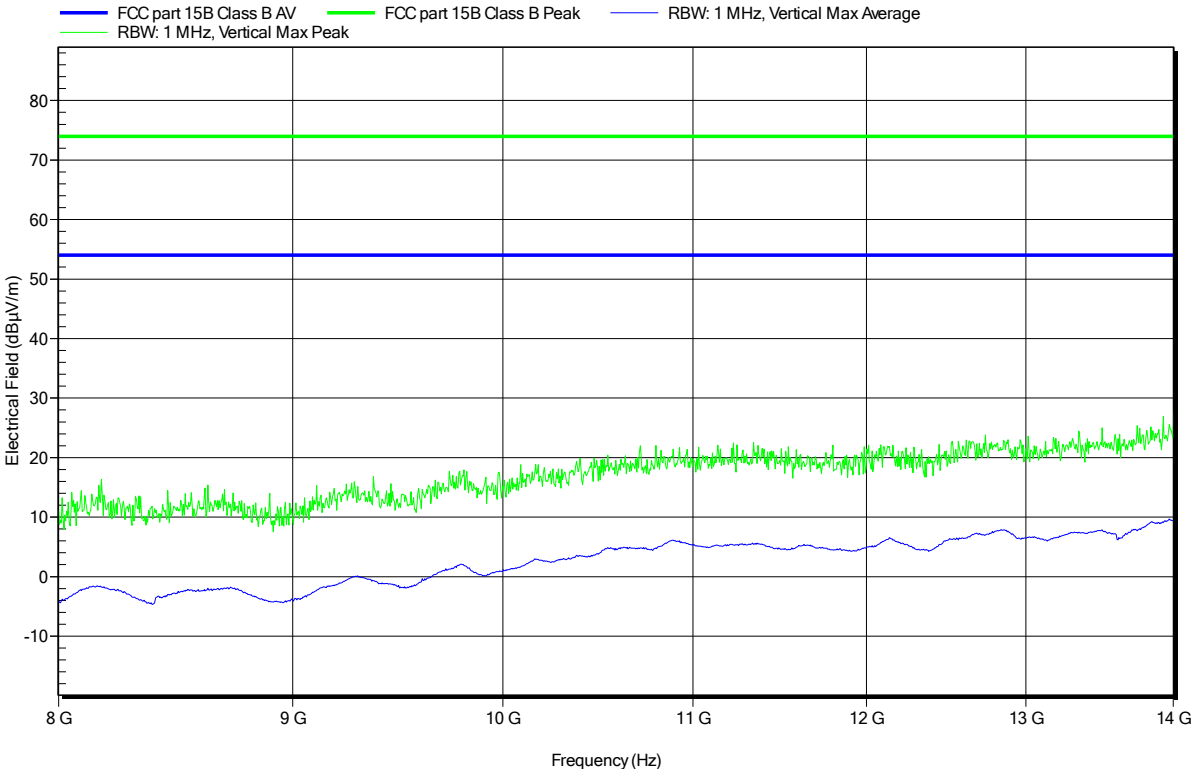


Spurious emissions under normal conditions according to FCC Part 15b

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:	

Index 28

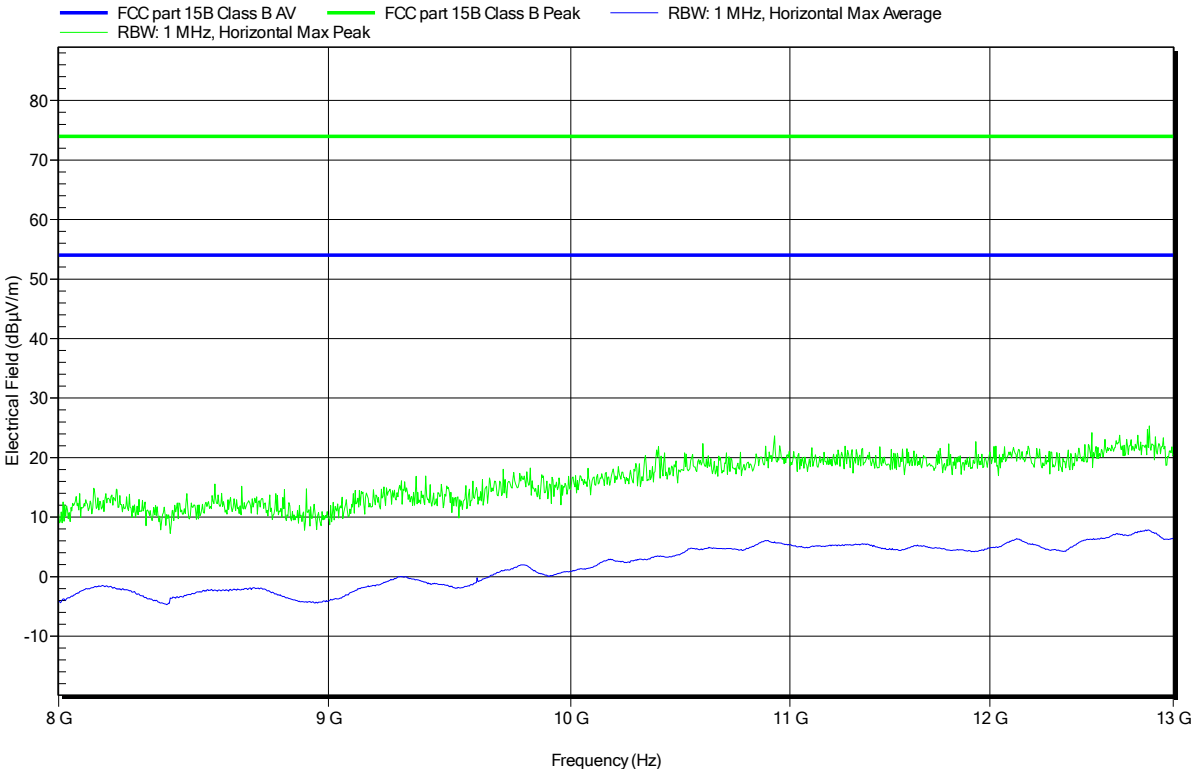


Spurious emissions under normal conditions according to FCC Part 15b

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:	

Index 27

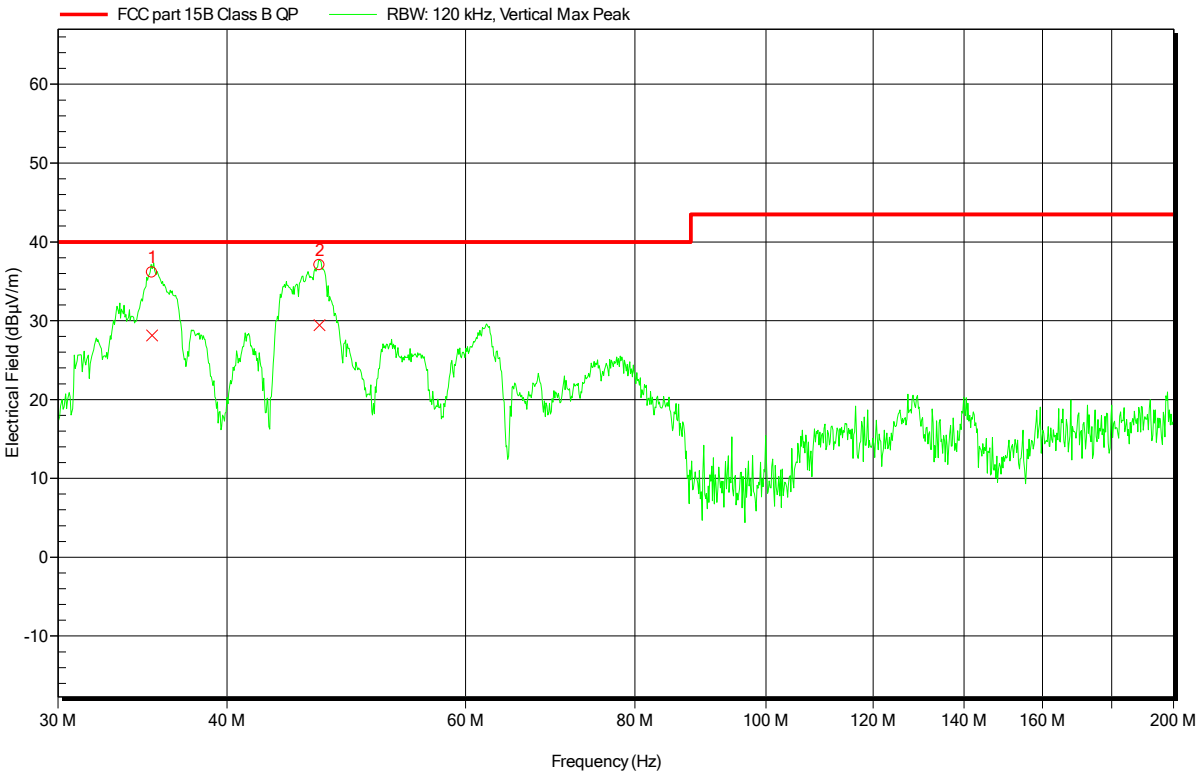


Spurious emissions under normal conditions according to FCC Part 15b

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:	

Index 41



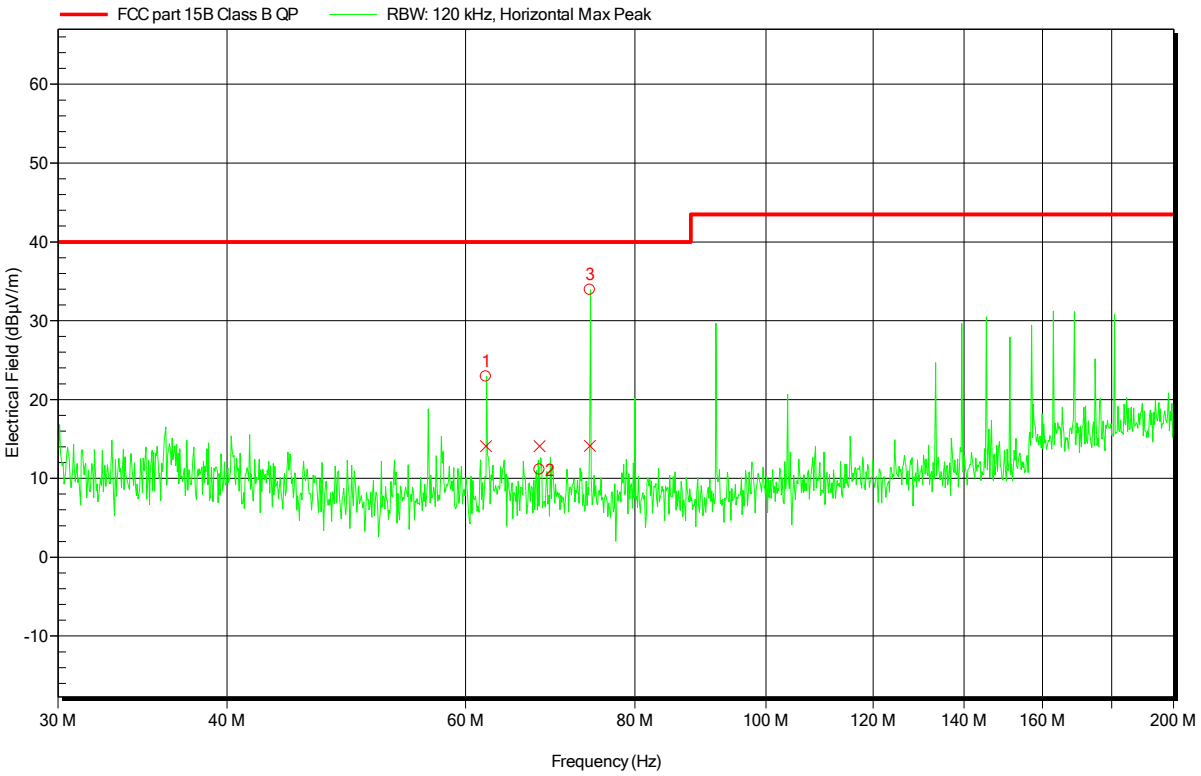
Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Angle	Height
1	35.22 MHz	28.13 dBµV/m	40 dBµV/m	-11.87 dB	Pass	0 Degree	1 m
2	46.8 MHz	29.45 dBµV/m	40 dBµV/m	-10.55 dB	Pass	0 Degree	1 m

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:	

Index 42



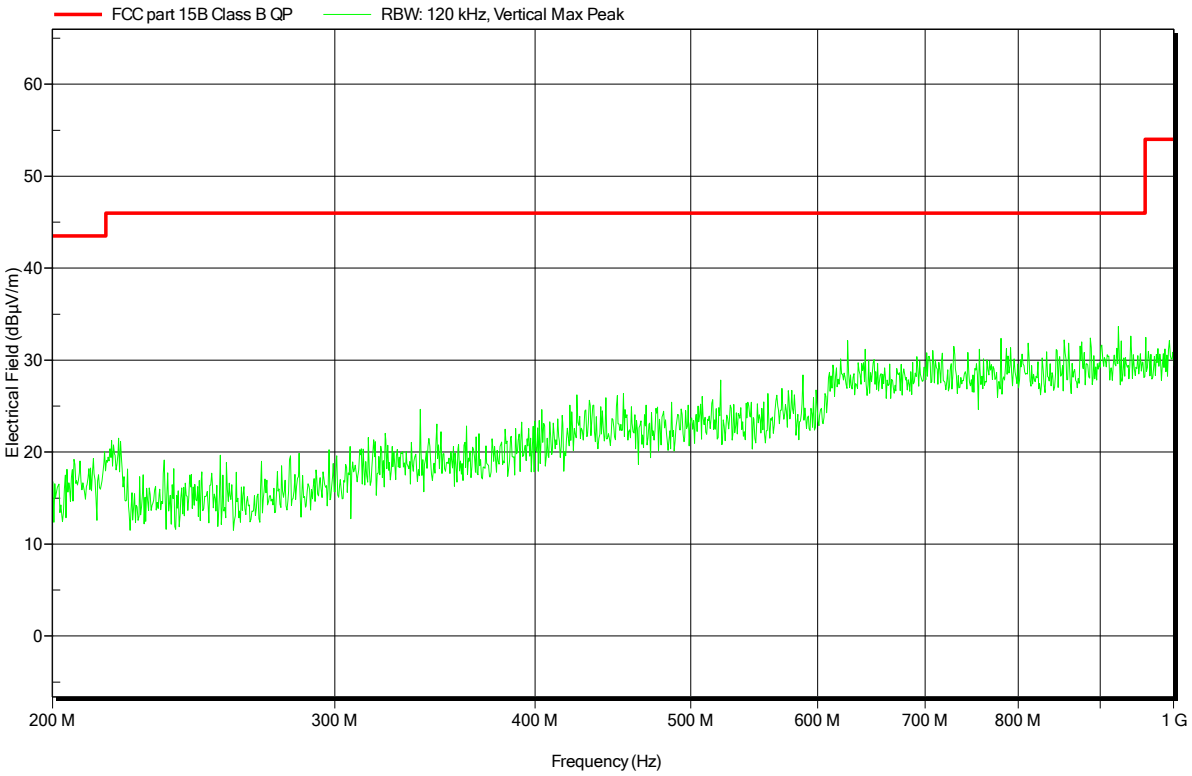
Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Angle	Height
1	62.13 MHz	14.09 dBµV/m	40 dBµV/m	-25.91 dB	Pass	330 Degree	1 m
2	68.04 MHz	14.08 dBµV/m	40 dBµV/m	-25.92 dB	Pass	330 Degree	1 m
3	74.148 MHz	14.11 dBµV/m	40 dBµV/m	-25.89 dB	Pass	330 Degree	1 m

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:	

Index 45

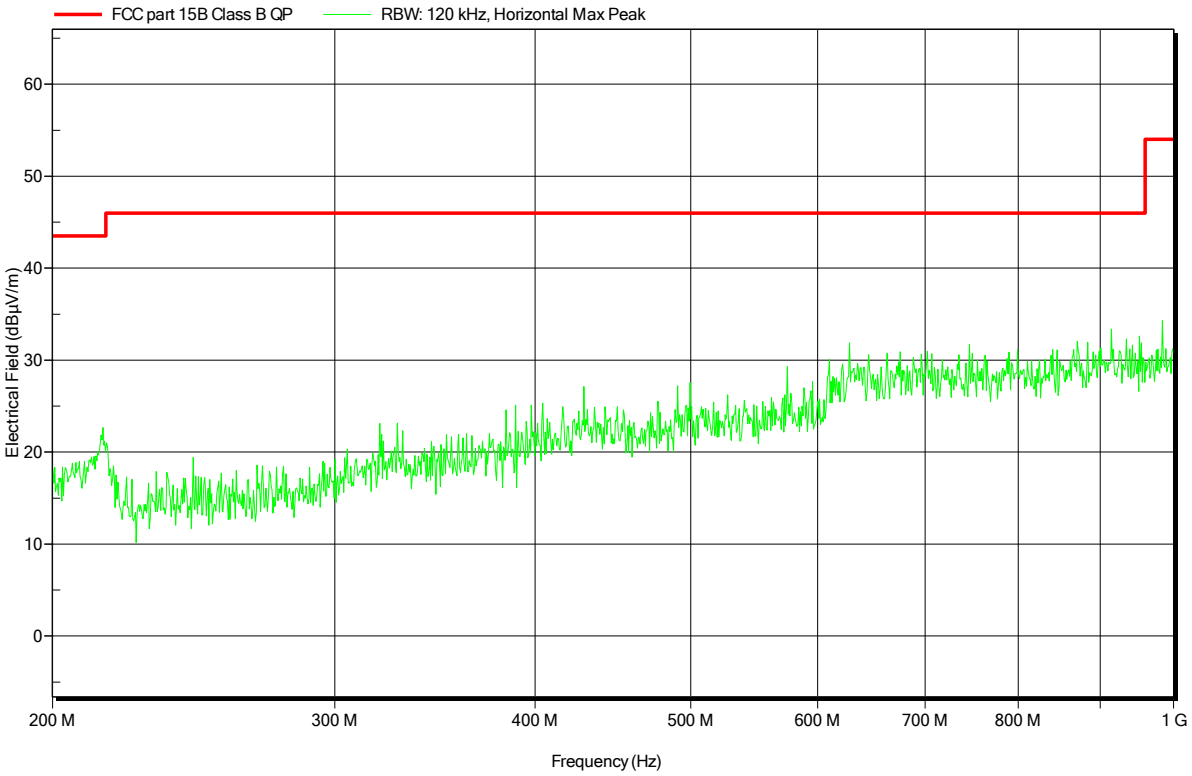


Spurious emissions under normal conditions according to FCC Part 15b

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:	

Index 46

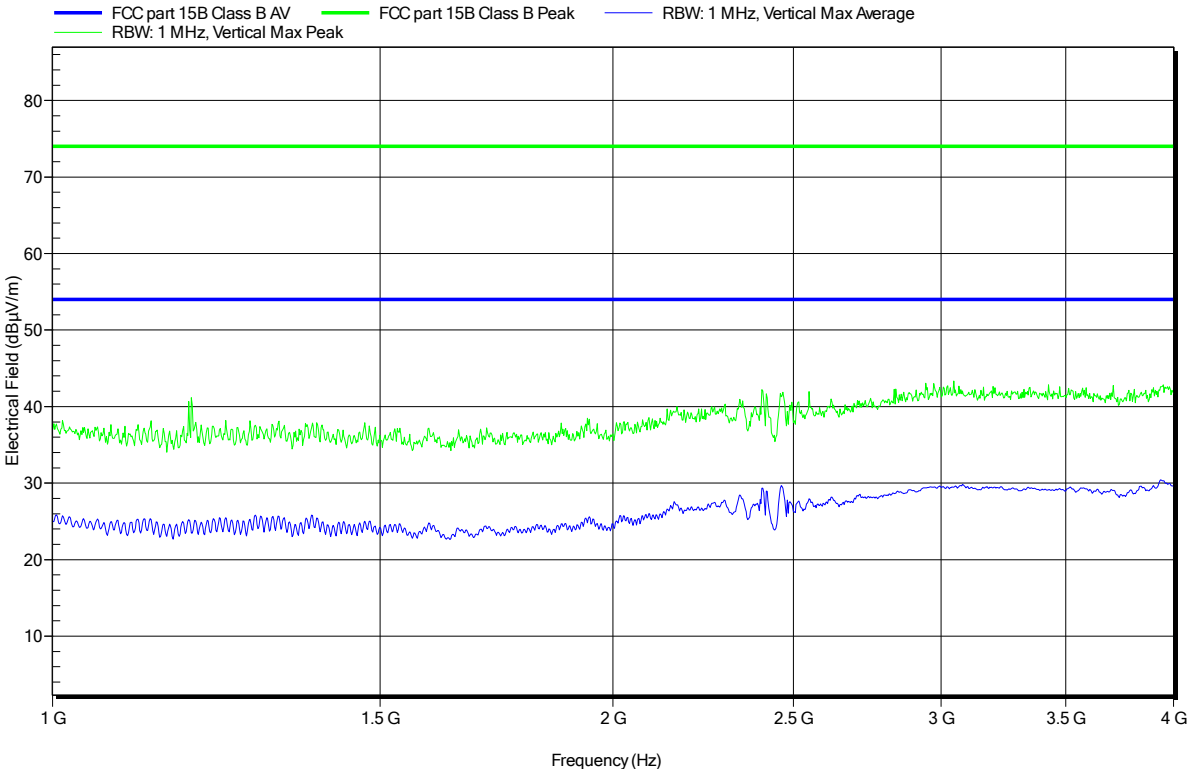


Spurious emissions under normal conditions according to FCC Part 15b

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:	

Index 50

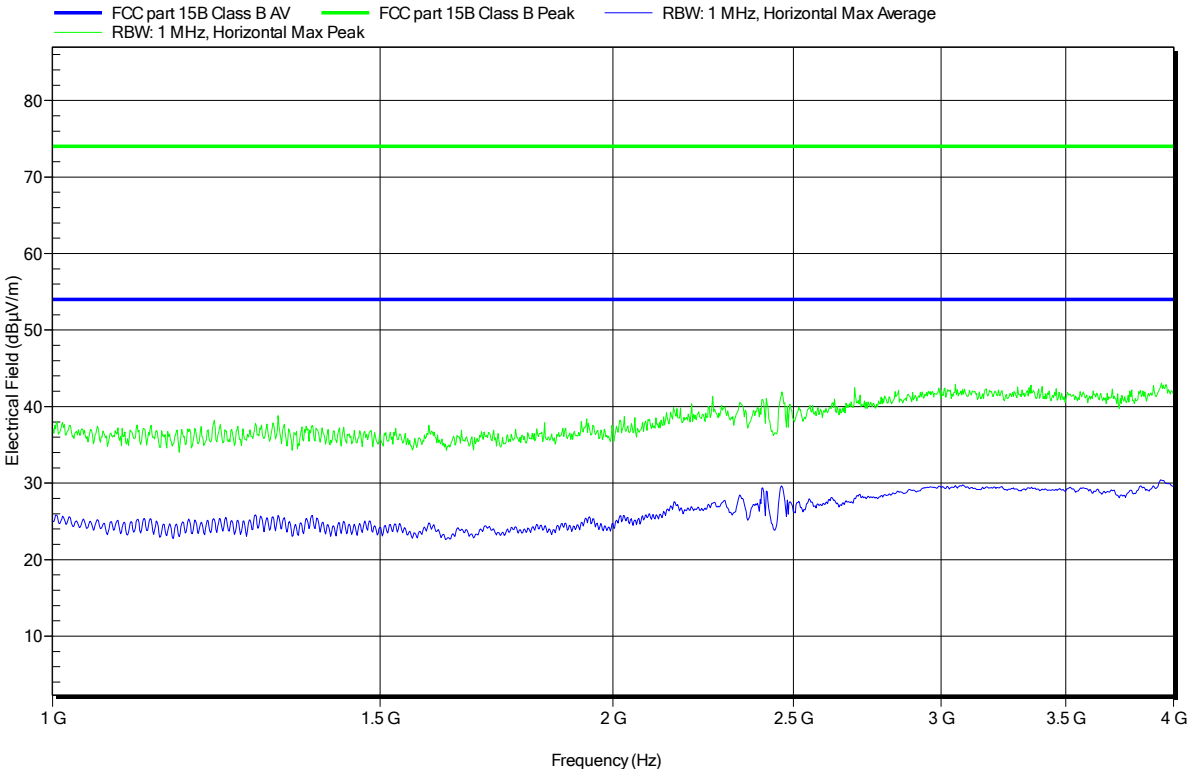


Spurious emissions under normal conditions according to FCC Part 15b

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:	

Index 49

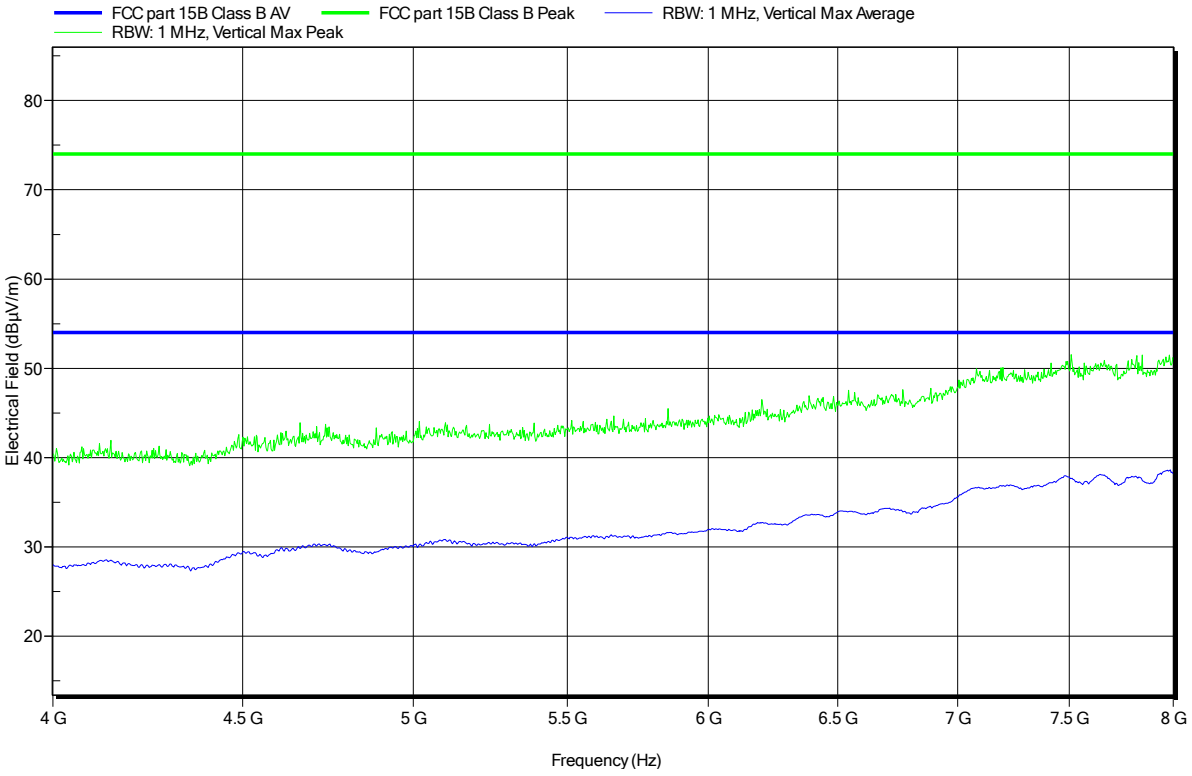


Spurious emissions under normal conditions according to FCC Part 15b

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:	

Index 53

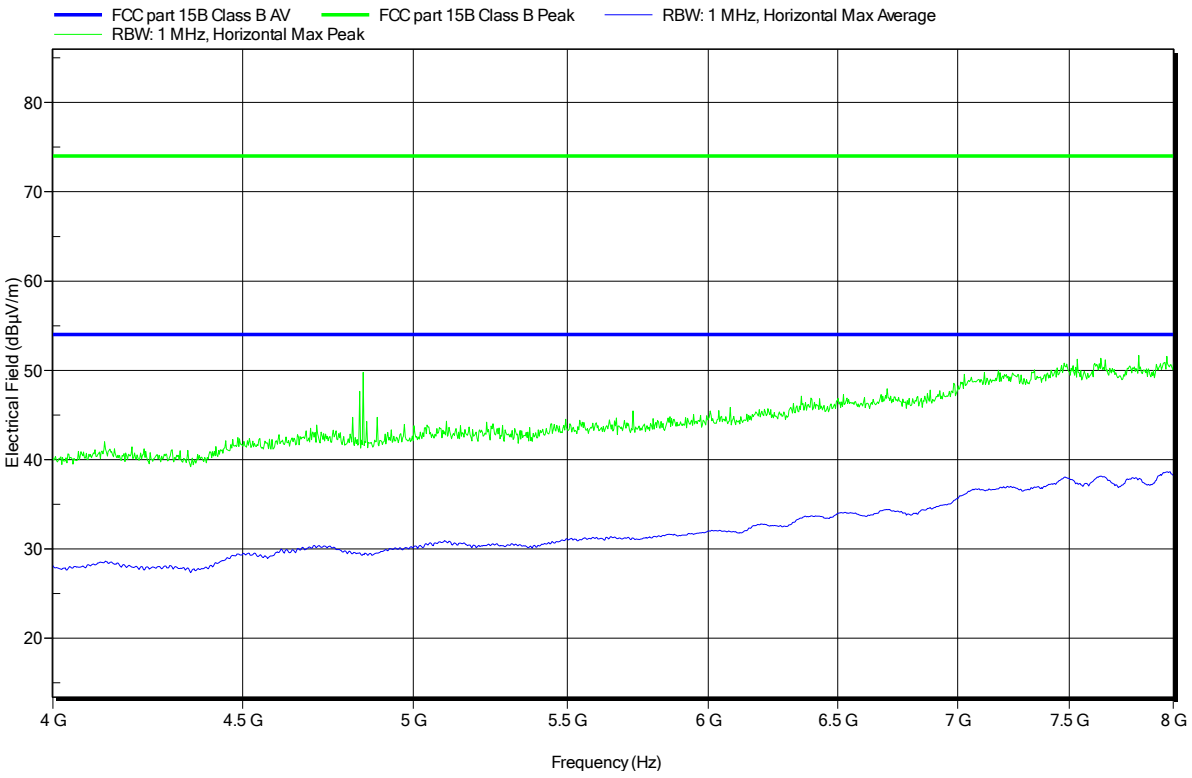


Spurious emissions under normal conditions according to FCC Part 15b

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:	

Index 54

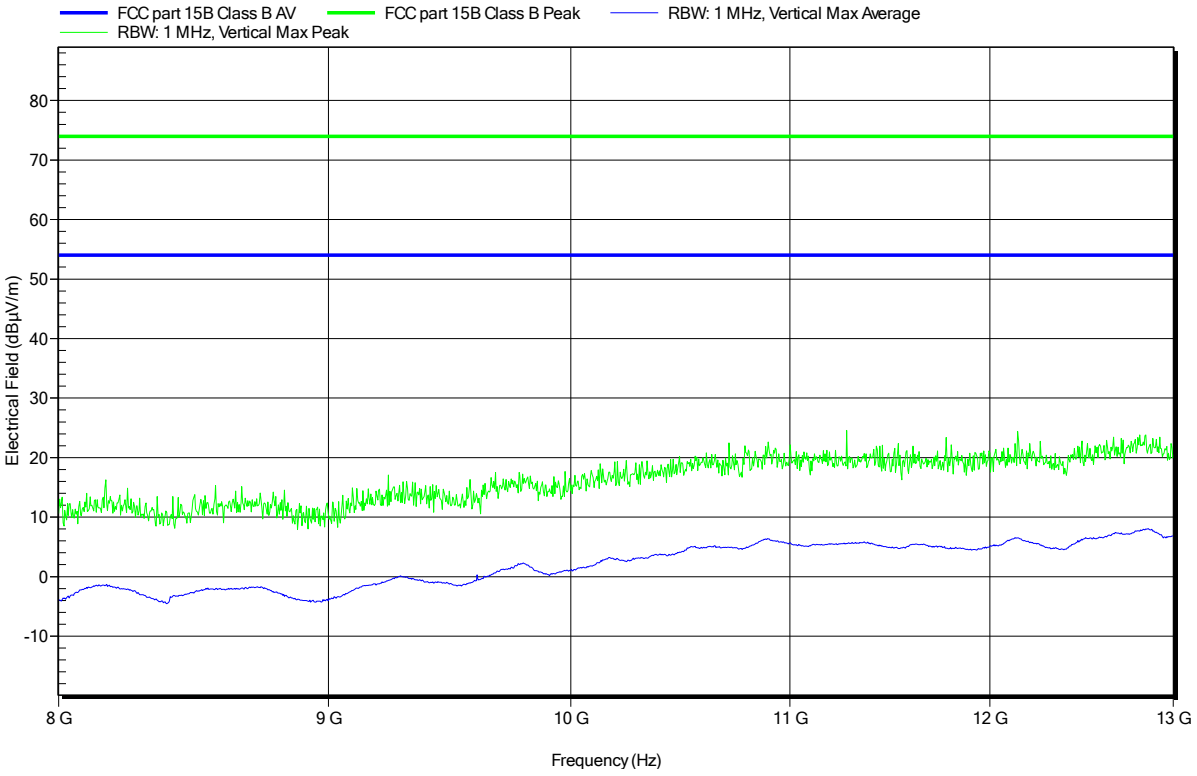


Spurious emissions under normal conditions according to FCC Part 15b

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:	

Index 57

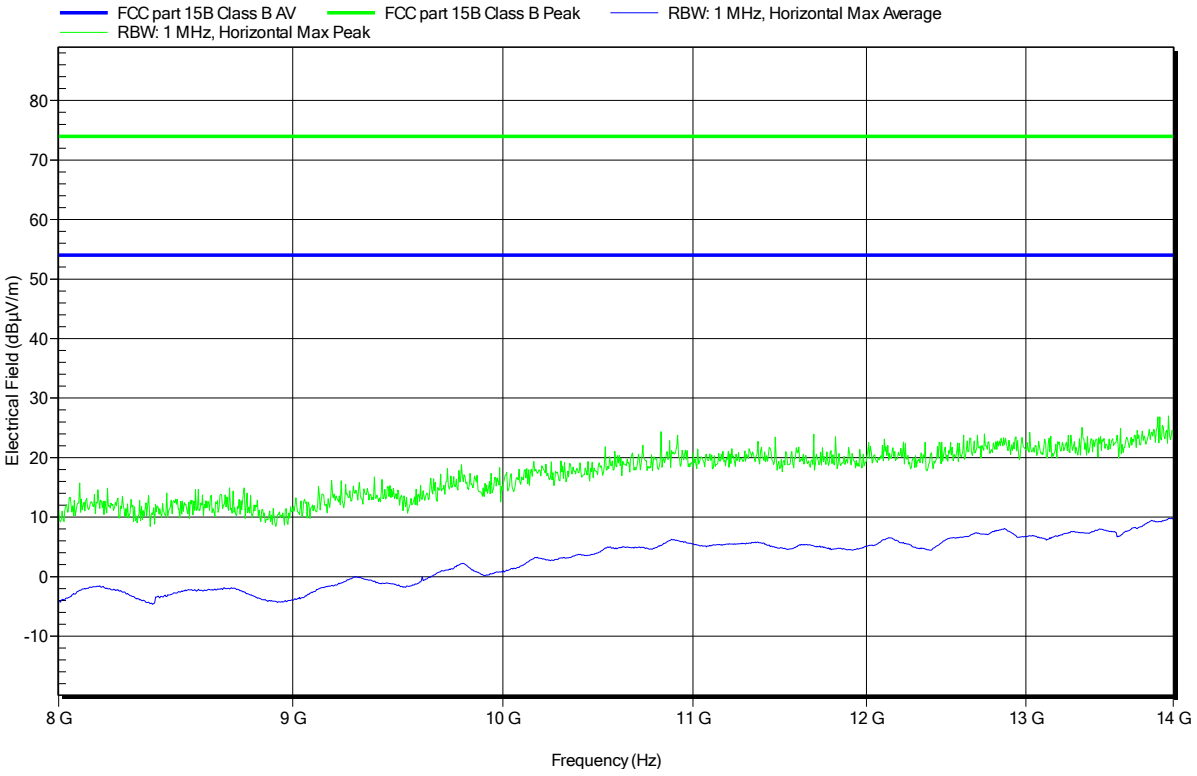


Spurious emissions under normal conditions according to FCC Part 15b

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:	

Index 56



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:

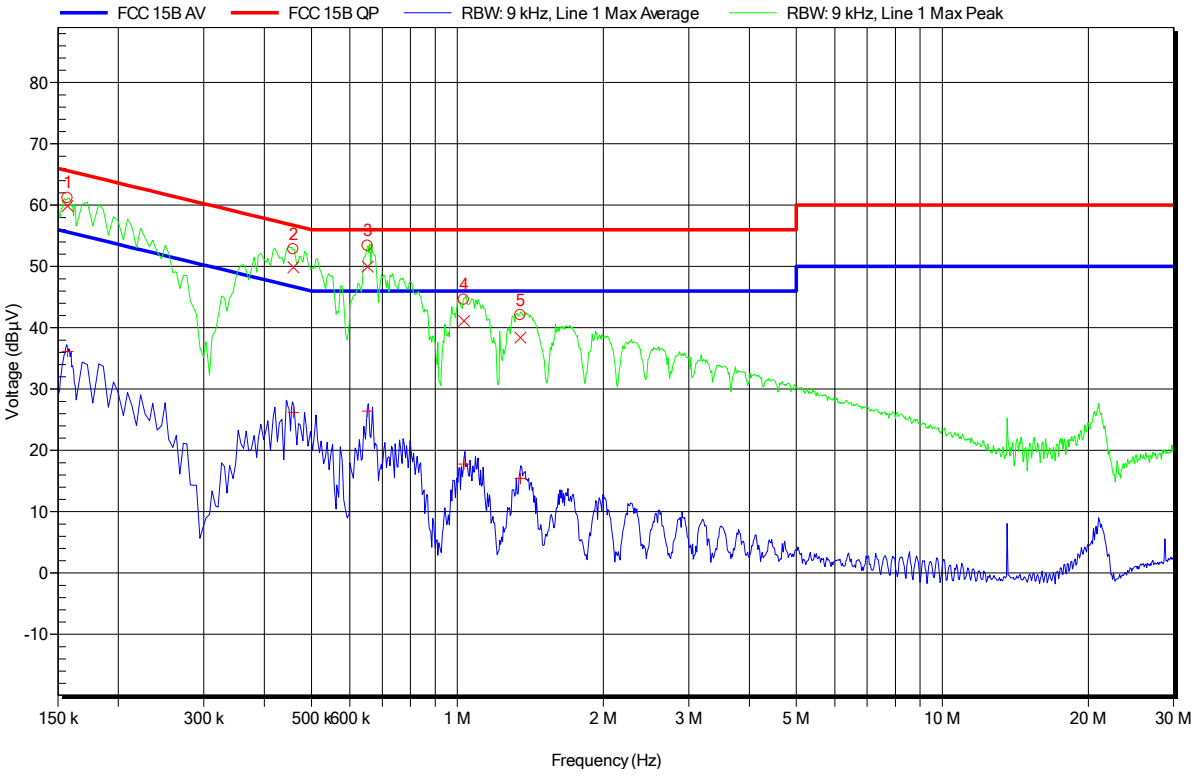
1) The EUT was placed on a non conductive table 0.8 m above the reference ground plane and 0.4 m away from the vertical conducting plane (ANSI C63.4: 2009 item 7.3.1)
2) The power cord that is normally supplied or recommended by the manufacturer was connected to the LISN.
3) The distance between the 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:	

Index 9



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

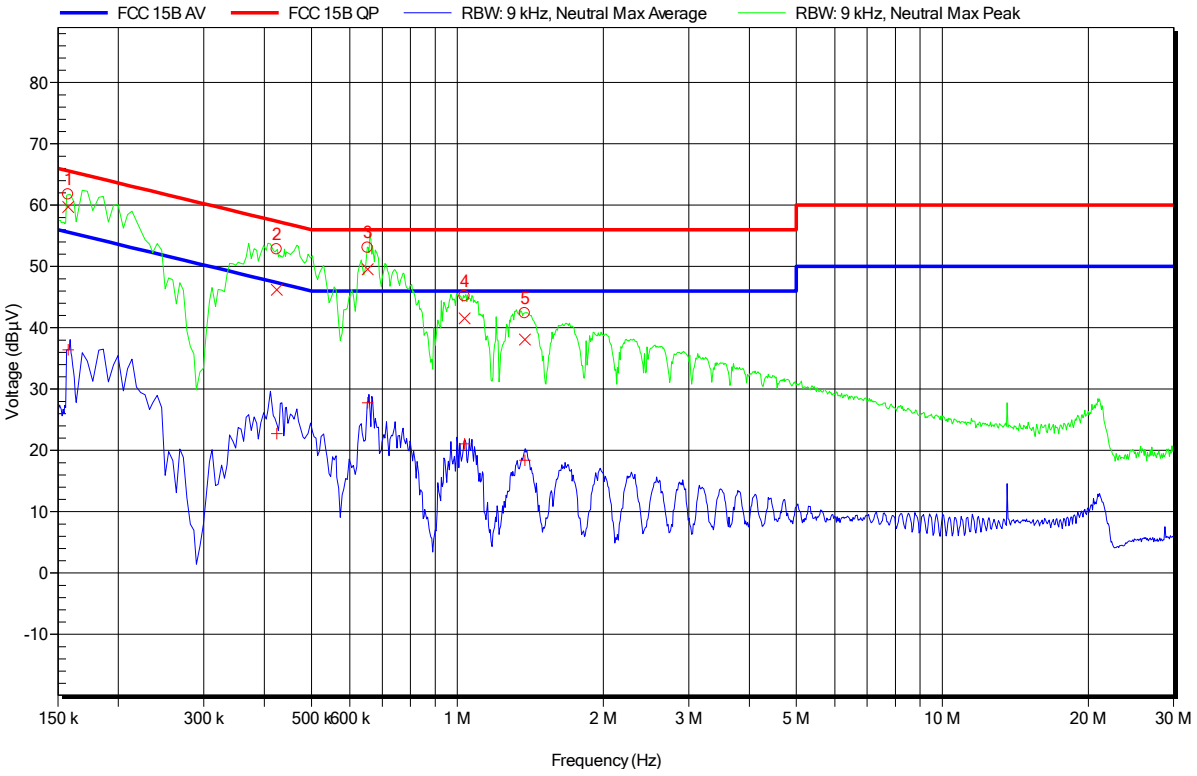
Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status
1	157.2 kHz	36.13 dBµV	55.61 dBµV	-19.48 dB	Pass
2	458.7 kHz	26.22 dBµV	46.72 dBµV	-20.5 dB	Pass
3	653.1 kHz	26.43 dBµV	46 dBµV	-19.57 dB	Pass
4	1.032 MHz	17.79 dBµV	46 dBµV	-28.21 dB	Pass
5	1.348 MHz	15.43 dBµV	46 dBµV	-30.57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

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:	

Index 8



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

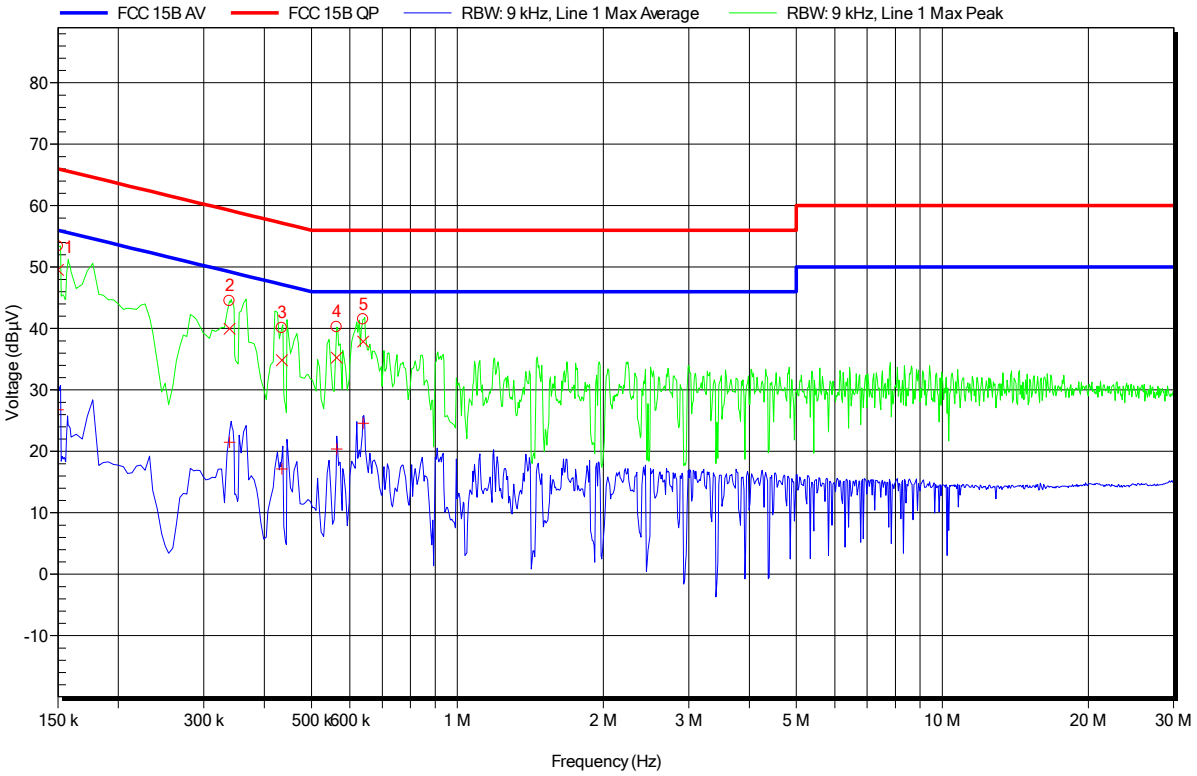
Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status
1	157.65 kHz	36.4 dBµV	55.59 dBµV	-19.19 dB	Pass
2	424.5 kHz	22.74 dBµV	47.36 dBµV	-24.62 dB	Pass
3	653.55 kHz	27.78 dBµV	46 dBµV	-18.22 dB	Pass
4	1.034 MHz	21.04 dBµV	46 dBµV	-24.96 dB	Pass
5	1.378 MHz	18.4 dBµV	46 dBµV	-27.6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

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:	

Index 61



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

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:	

Index 60