

# EMC TEST REPORT

FCC 47 CFR Part 15B  
Industry Canada RSS-Gen

Electromagnetic compatibility - Unintentional radiators

Report Reference No. .... : G0M-1409-4154-EF0715B-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 ..... : Amor Gummiwaren GmbH

Address ..... : August-Rost-Straße 4  
99310 Arnstadt  
GERMANY

## Test specification:

Standard..... : 47 CFR Part 15 Subpart B  
RSS-Gen, Issue 3, 2010-12  
ANSI C63.4:2009

## Equipment under test (EUT):

Product description electric device

Model No. Duo

Additional Models None

Hardware version V2.0

Firmware / Software version BLE-Stack SD110 V6.0.0

FCC-ID: 2ADAR504002

IC: 12372A-504002

Test result Passed

Test Report No.: G0M-1409-4154-EF0715B-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 ..... : 2014-12-05

Date (s) of performance of tests ..... : 2014-12-23

Compiled by ..... : Marcus Klein

Tested by (+ signature)..... : Jens Marquardt

Approved by (+ signature) ..... : Marcus Klein

Date of issue ..... : 2015-02-12

Total number of pages..... : 30

**General remarks:**

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

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

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

**Additional comments:**

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## Version History

Version	Issue Date	Remarks	Revised by
V01	2014-12-29	Initial Release	

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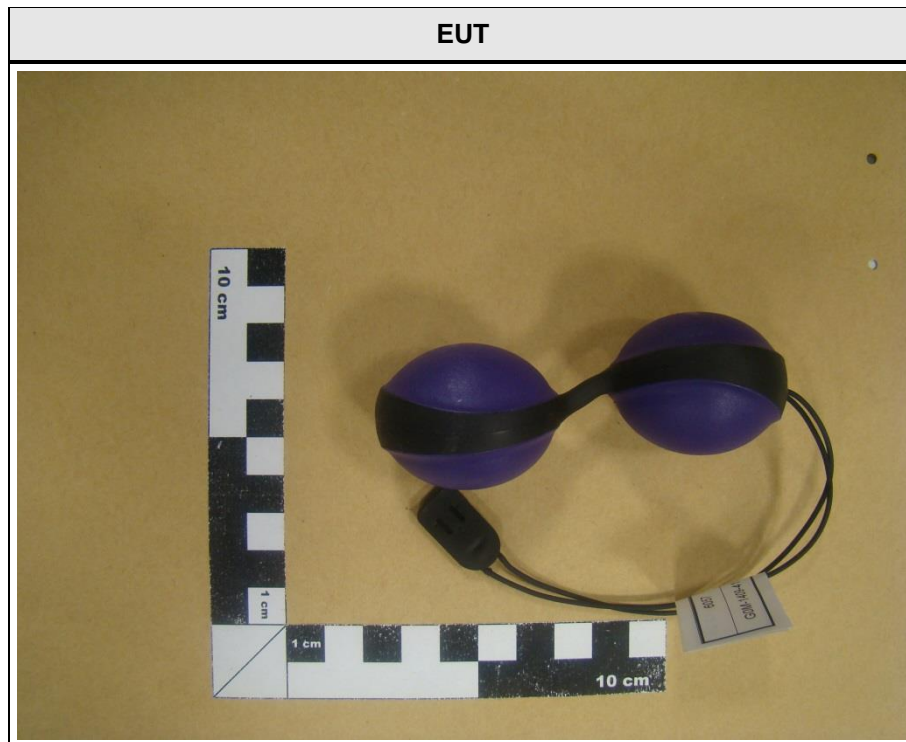
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## 1 Equipment (Test item) Description

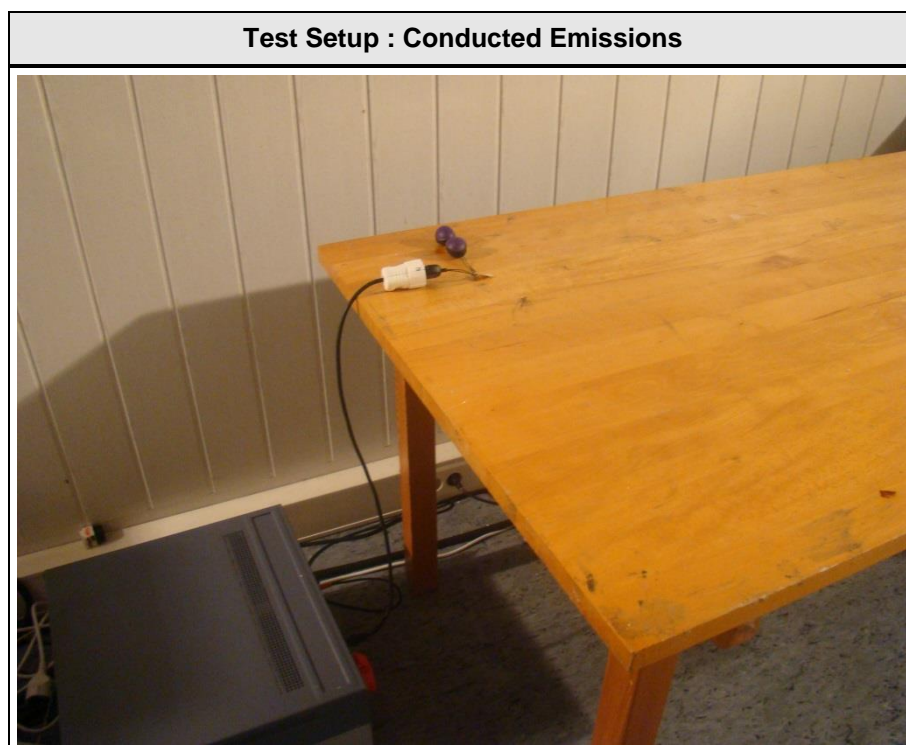
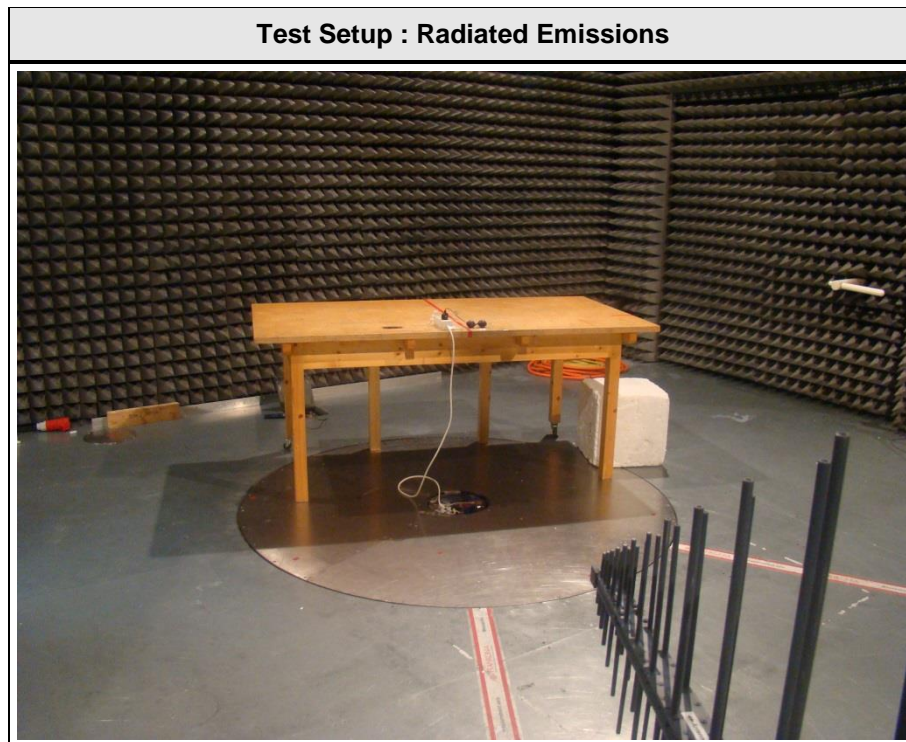
<b>Description</b>	electric device
<b>Model</b>	Duo
<b>Additional Models</b>	None
<b>Serial number</b>	None
<b>Hardware version</b>	V2.0
<b>Software / Firmware version</b>	BLE-Stack SD110 V6.0.0
<b>FCC-ID</b>	2ADAR504002
<b>IC-ID</b>	12372A-504002
<b>Power supply</b>	3.7 V rechargeable Lilon battery
<b>AC/DC-Adaptor</b>	Model : FW7713 Manufacturer : FRIWO Gerätebau GmbH Input : 100-240VAC / 50-60Hz Output : 5VDC / 1.0A
<b>Manufacturer</b>	Amor Gummiwaren GmbH August-Rost-Straße 4 99310 Arnstadt GERMANY
<b>Highest emission frequency</b>	Fmax [MHz] = 2540
<b>Device classification</b>	Class B
<b>Equipment type</b>	Tabletop
<b>Number of tested samples</b>	1

## 1.1 Photos – Equipment external





## 1.2 Photos – Test setup



### 1.3 Supporting Equipment Used During Testing

Product Type*	Device	Manufacturer	Model No.	Comments
AE	smart phone	LG	G2	
<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>				

### 1.4 Input / Output Ports

**No ports available**



## 1.5 Operating Modes and Configurations

Mode #	Description
1	vibrating + Bluetooth communication
2	Charging

Configuration #	EUT Configuration
1	EUT in normal operation mode
2	EUT connected to Charger

## 1.6 Test Equipment Used During Testing

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

Conducted emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Current probe	R&S	EZ-17	EF00215	2013-11	2015-11
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	2013-10	2015-10
EMI Test Receiver	R&S	ESCS 30	EF00295	2014-10	2015-10

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	2014-01	2015-01

## 1.7 Sample emission level calculation

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

Reading:

This is the reading obtained on the spectrum analyzer in dB $\mu$ V. 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 dB $\mu$ V/m). The FCC limits are given in units of  $\mu$ V/m. The following formula is used to convert the units of  $\mu$ V/m to dB $\mu$ V/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:

$$\begin{array}{rclclcl} \text{Reading} & + & \text{AF} & = & \text{Net Reading} & : & \text{Net reading - FCC limit} & = & \text{Margin} \\ 21.5 \text{ dB}\mu\text{V} & + & 26 \text{ dB} & = & 47.5 \text{ dB}\mu\text{V/m} & : & 47.5 \text{ dB}\mu\text{V/m} - 57.0 \text{ dB}\mu\text{V/m} & = & -9.5 \text{ dB} \end{array}$$

## 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 / 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 %		34		
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] = 2540				
Fully configured sample scanned over the following frequency range		Frequency range				
		30 MHz to 13 GHz				
Operating mode and configuration		1 + 2				
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.

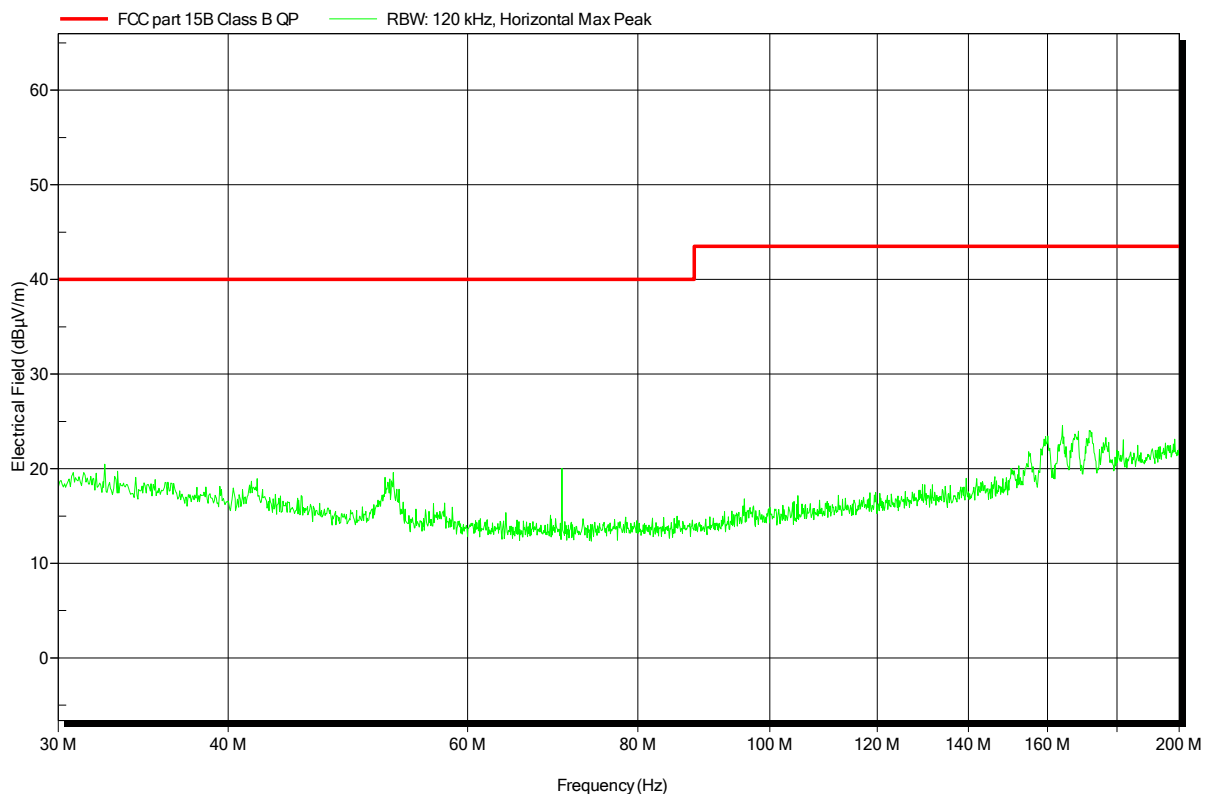


## Spurious emissions under normal conditions according to FCC 15B

Project number: G0M-1409-4154

Manufacturer: Amor Gummiwaren GmbH  
 EUT Name: electric device  
 Model: Duo  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Klein  
 Test Conditions: Tnom: 23°C, Unom: 120 VAC (AC-DC Adapter)  
 Antenna: Rohde & Schwarz HK 116, Horizontal  
 Measurement distance: 3m  
 Mode: charging + BT  
 Test Date: Dienstag, 30. Dezember 2014  
 Note:

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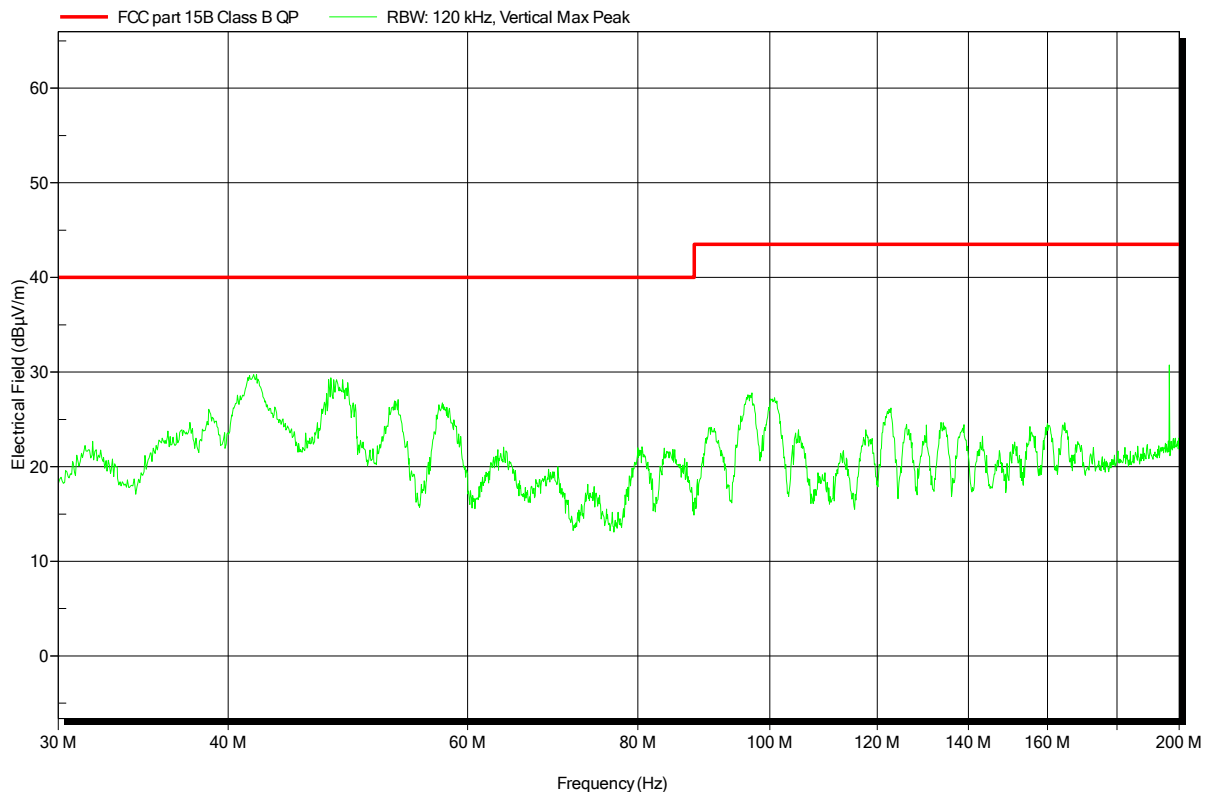


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 Operator: Mr. Klein  
 Test Conditions: Tnom: 23°C, Unom: 120 VAC (AC-DC Adapter)  
 Antenna: Rohde & Schwarz HK 116, Vertical  
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 Mode: charging + BT  
 Test Date: Dienstag, 30. Dezember 2014  
 Note:

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 EUT Name: electric device  
 Model: Duo  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Klein  
 Test Conditions: Tnom: 23°C, Unom: 120 VAC (AC-DC Adapter)  
 Antenna: Rohde & Schwarz HL 223, Horizontal  
 Measurement distance: 3m  
 Mode: charging + BT  
 Test Date: Dienstag, 30. Dezember 2014  
 Note:

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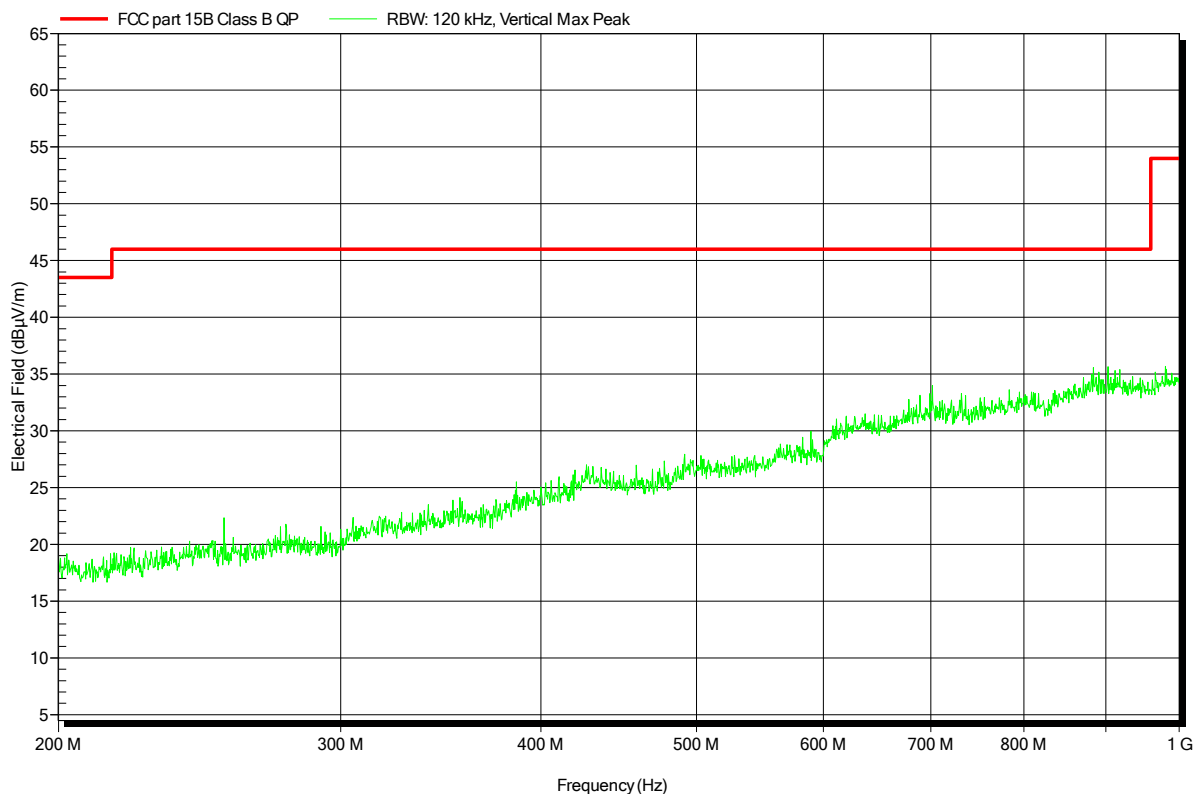


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 Test Conditions: Tnom: 23°C, Unom: 120 VAC (AC-DC Adapter)  
 Antenna: Rohde & Schwarz HL 223, Vertical  
 Measurement distance: 3m  
 Mode: charging + BT  
 Test Date: Dienstag, 30. Dezember 2014  
 Note:

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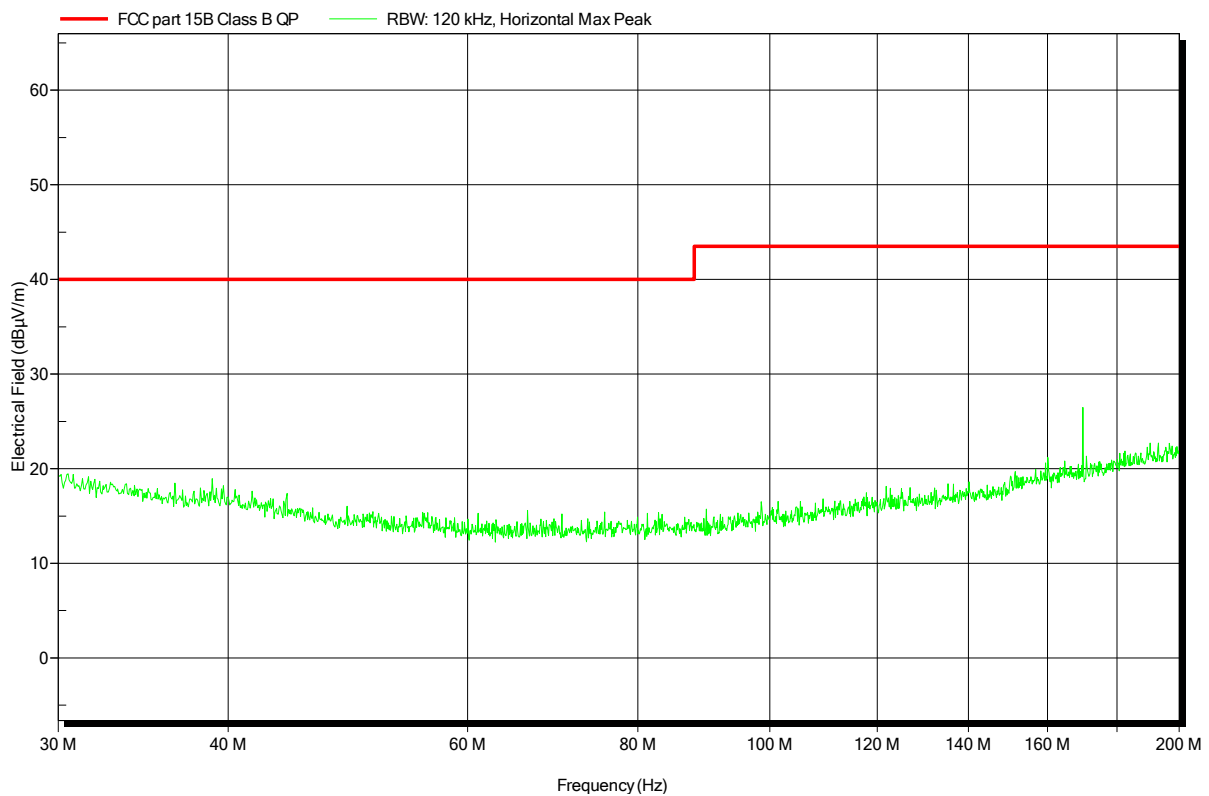


## Spurious emissions under normal conditions according to FCC 15B

Project number: G0M-1409-4154

Manufacturer: Amor Gummiwaren GmbH  
 EUT Name: electric device  
 Model: Duo  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Klein  
 Test Conditions: Tnom: 23°C, Unom: 3.7 VDC (acc)  
 Antenna: Rohde & Schwarz HK 116, Horizontal  
 Measurement distance: 3m  
 Mode: vibrating + BT  
 Test Date: Dienstag, 30. Dezember 2014  
 Note:

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Test Report No.: G0M-1409-4154-EF0715B-V01

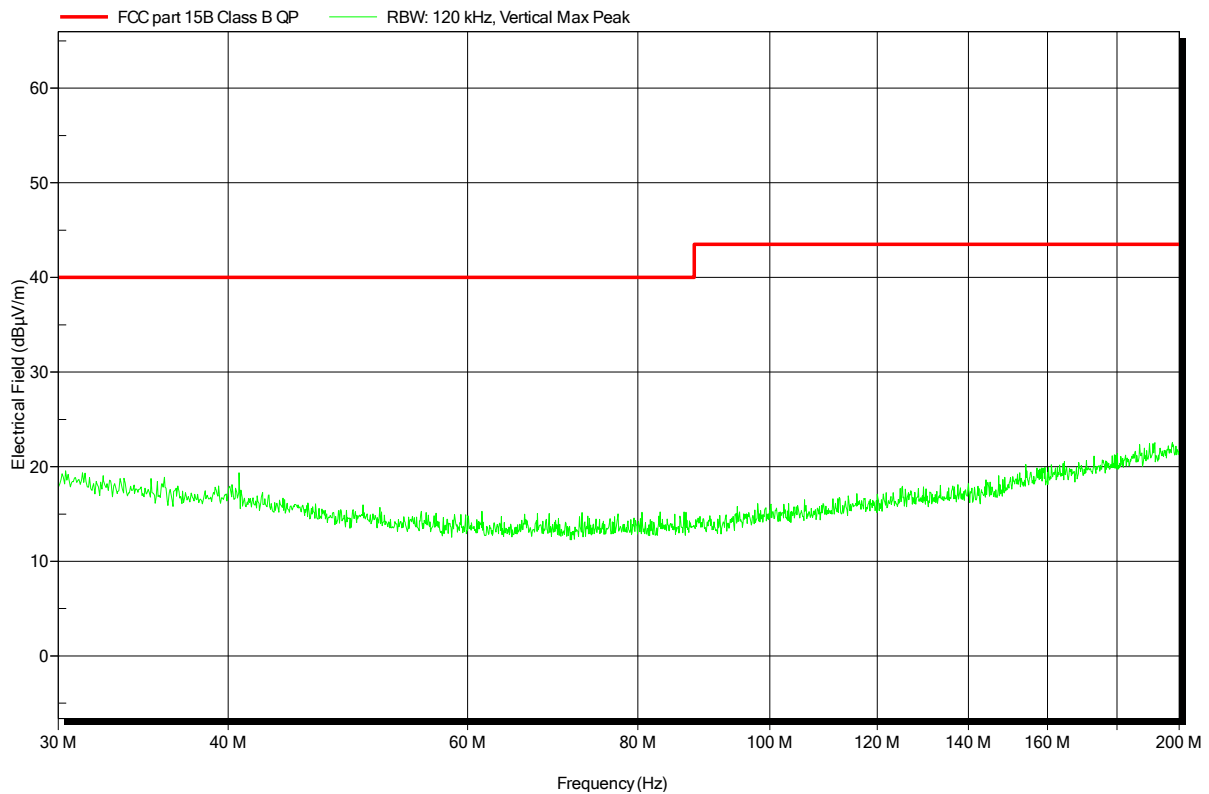
Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

**Spurious emissions under normal conditions according to FCC 15B**

Project number: G0M-1409-4154

Manufacturer: Amor Gummiwaren GmbH  
 EUT Name: electric device  
 Model: Duo  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Klein  
 Test Conditions: Tnom: 23°C, Unom: 3.7 VDC (acc)  
 Antenna: Rohde & Schwarz HK 116, Vertical  
 Measurement distance: 3m  
 Mode: vibrating + BT  
 Test Date: Dienstag, 30. Dezember 2014  
 Note:

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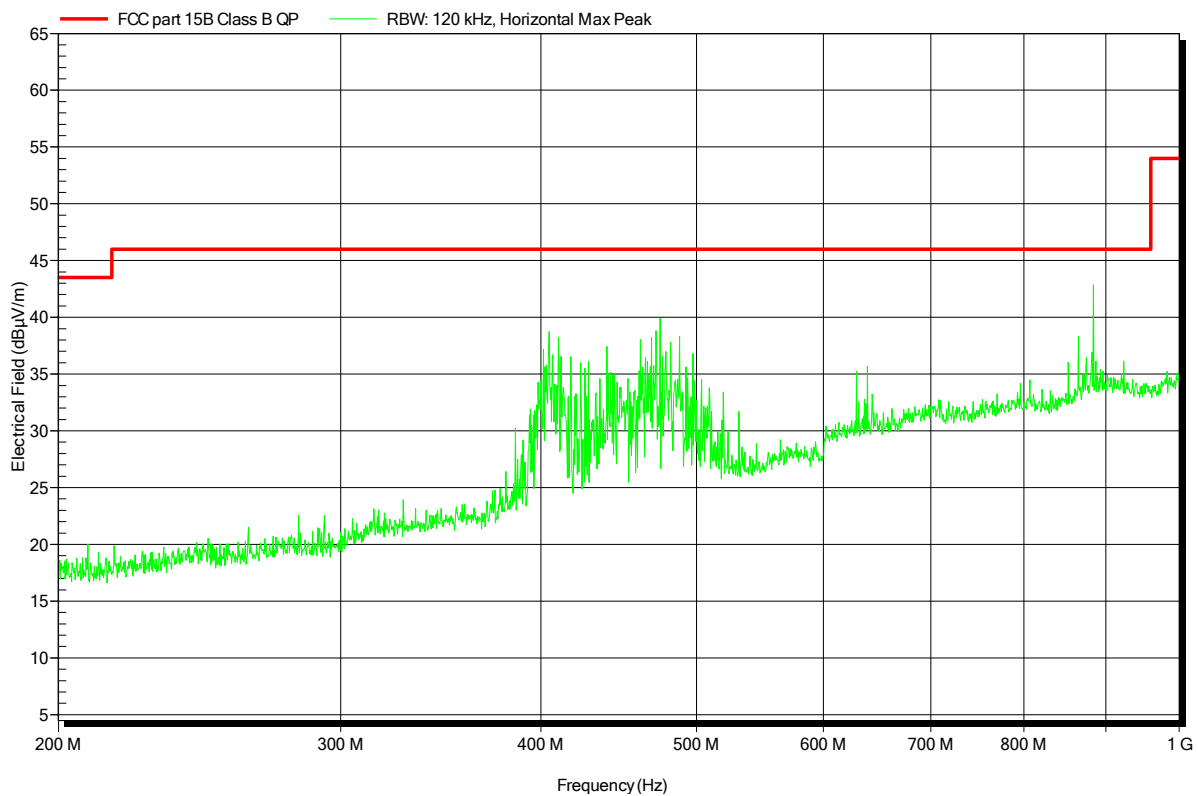


**Spurious emissions under normal conditions according to FCC 15B**

Project number: G0M-1409-4154

Manufacturer:	Amor Gummiwaren GmbH
EUT Name:	electric device
Model:	Duo
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Klein
Test Conditions:	Tnom: 23°C, Unom: 3.7 VDC (acc)
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3m
Mode:	vibrating + BT
Test Date:	Dienstag, 30. Dezember 2014
Note:	

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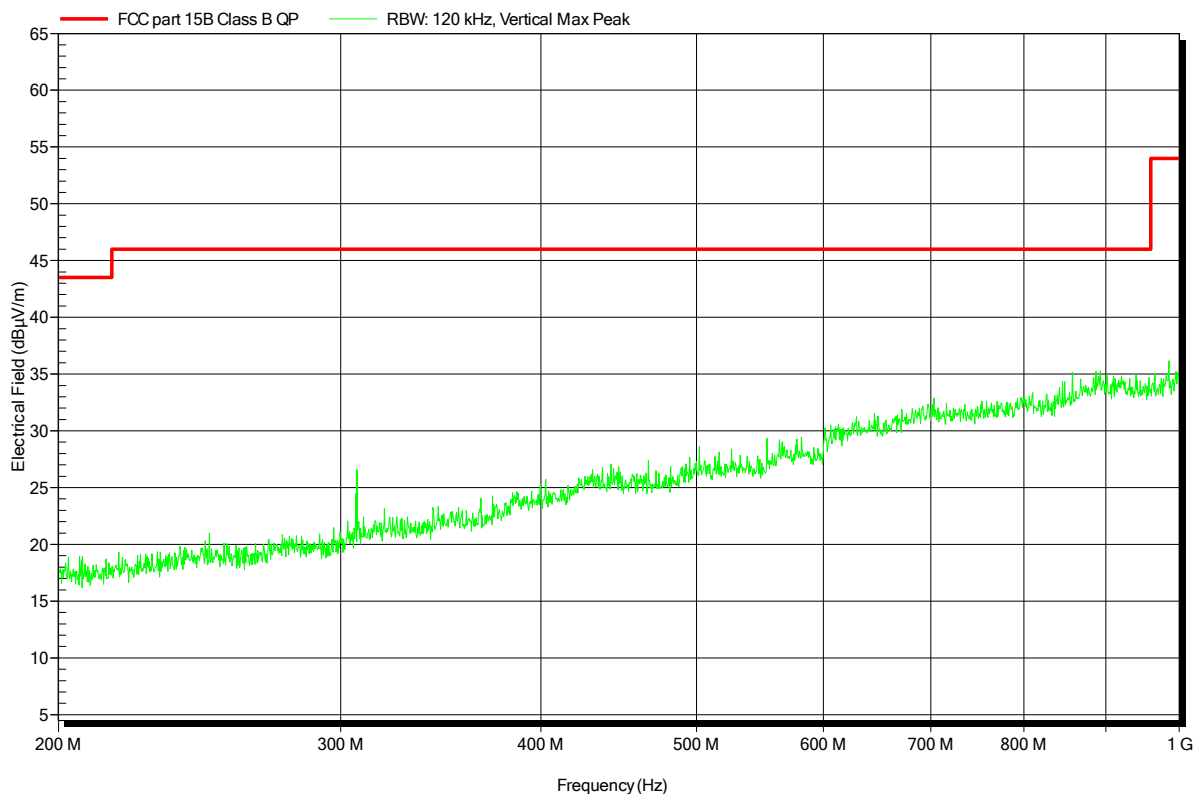


**Spurious emissions under normal conditions according to FCC 15B**

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 Model: Duo  
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 Test Conditions: Tnom: 23°C, Unom: 3.7 VDC (acc)  
 Antenna: Rohde & Schwarz HL 223, Vertical  
 Measurement distance: 3m  
 Mode: vibrating + BT  
 Test Date: Dienstag, 30. Dezember 2014  
 Note:

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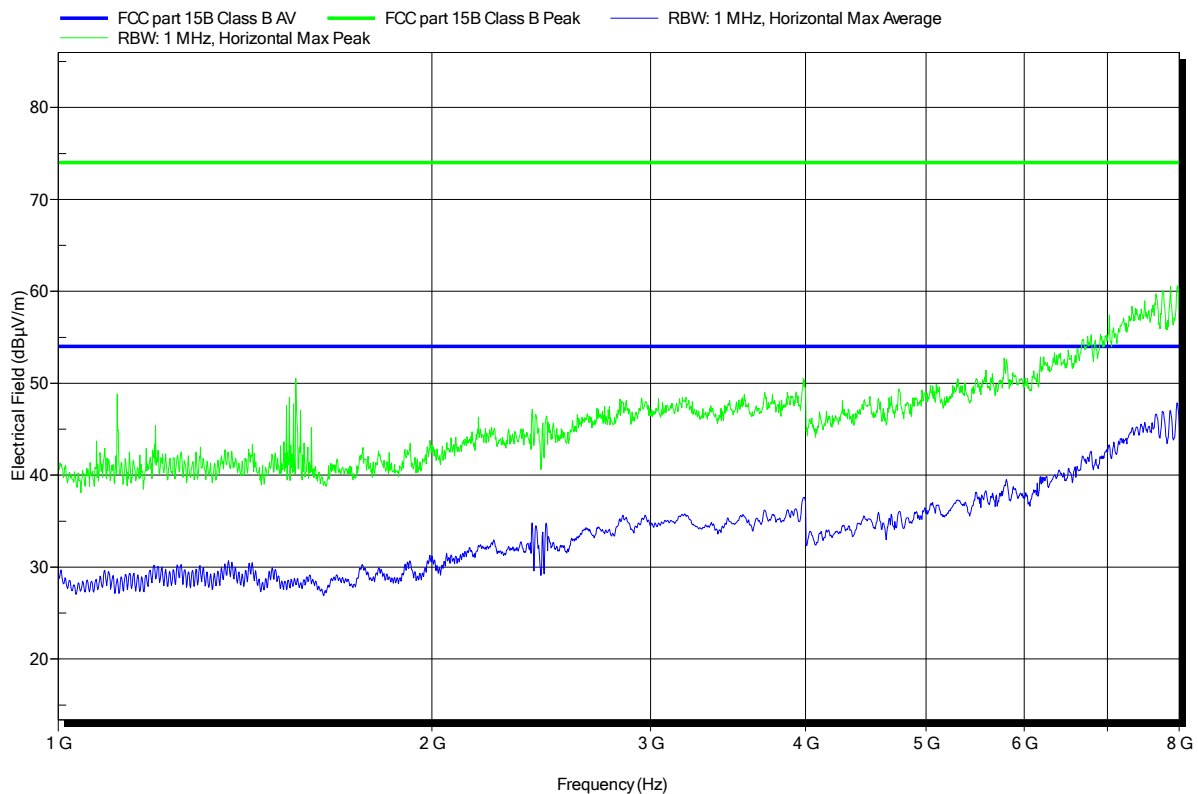


## Spurious emissions under normal conditions according to FCC 15B

Project number: G0M-1409-4154

Manufacturer: Amor Gummiwaren GmbH  
 EUT Name: electric device  
 Model: Duo  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Klein  
 Test Conditions: Tnom: 23°C, Unom: 3.7 VDC (acc)  
 Antenna: Schwarzbeck BBHA 9120D, Horizontal  
 Measurement distance: 3m  
 Mode: vibrating + BT  
 Test Date: Dienstag, 30. Dezember 2014  
 Note:

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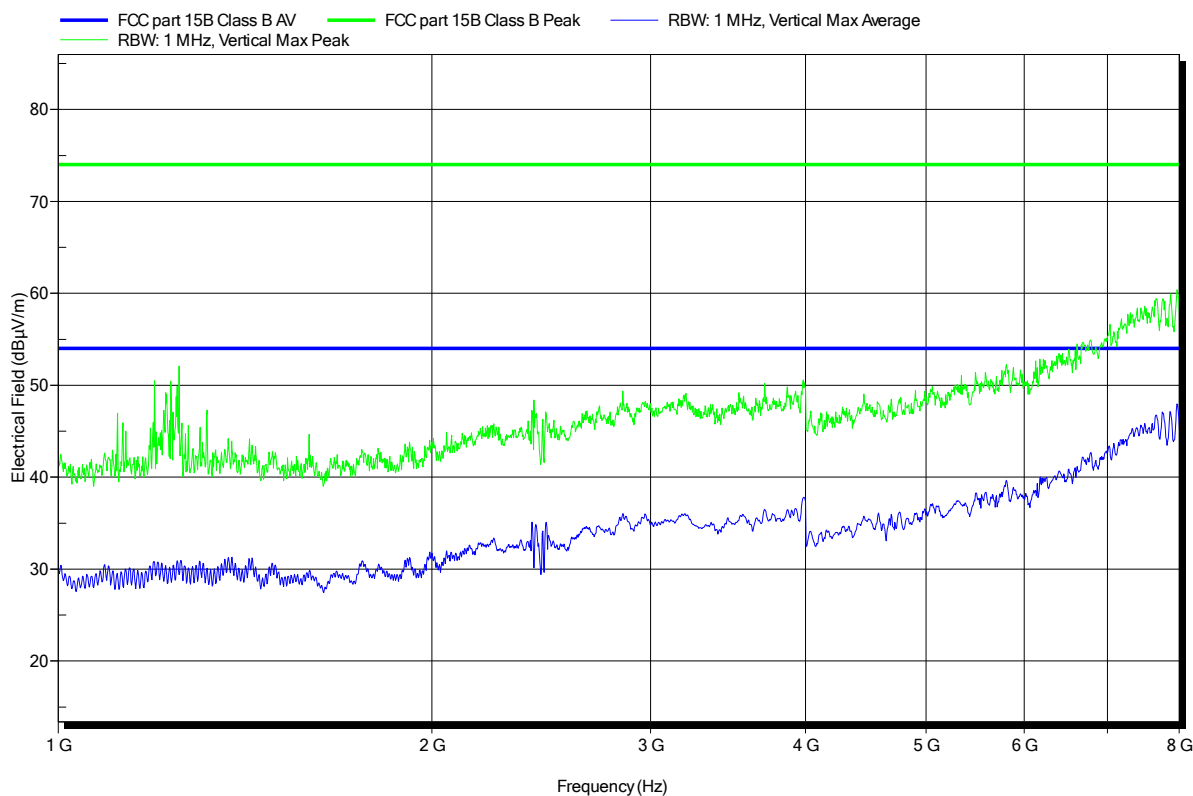


**Spurious emissions under normal conditions according to FCC 15B**

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Manufacturer: Amor Gummiwaren GmbH  
 EUT Name: electric device  
 Model: Duo  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Klein  
 Test Conditions: Tnom: 23°C, Unom: 3.7 VDC (acc)  
 Antenna: Schwarzbeck BBHA 9120D, Vertical  
 Measurement distance: 3m  
 Mode: vibrating + BT  
 Test Date: Dienstag, 30. Dezember 2014  
 Note:

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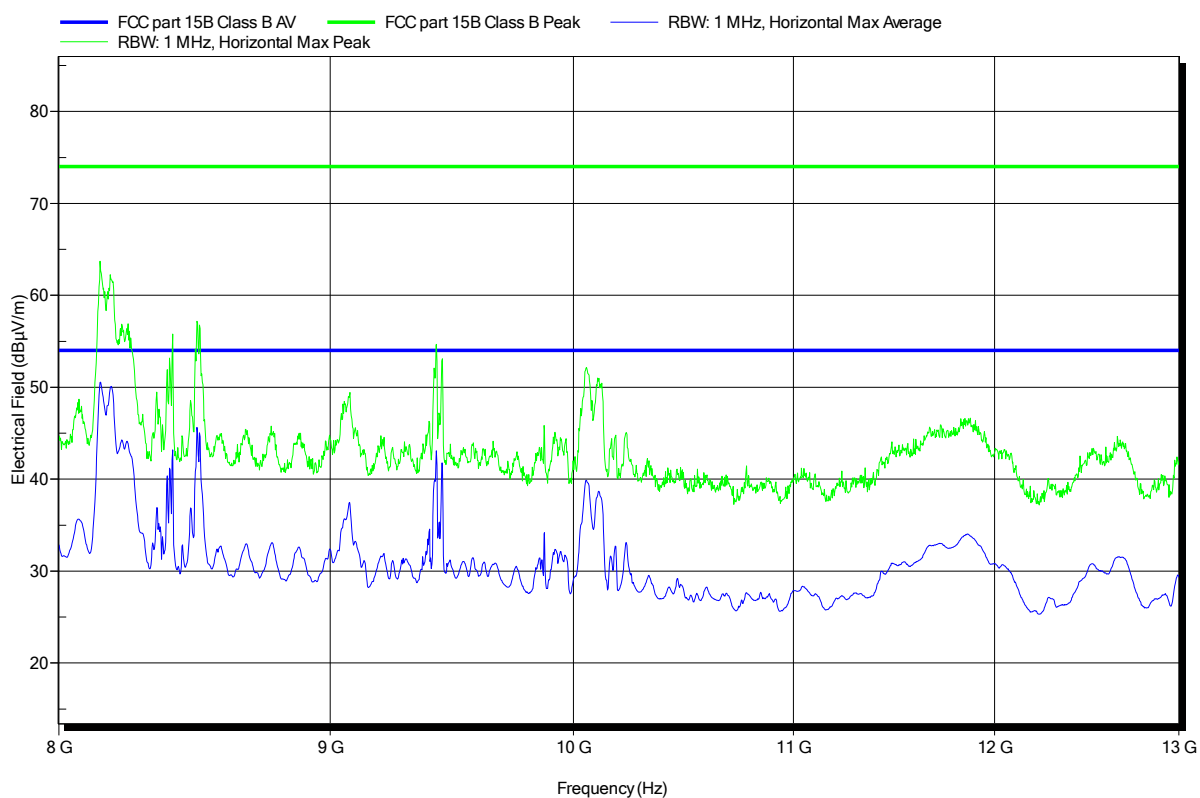


## Spurious emissions under normal conditions according to FCC 15B

Project number: G0M-1409-4154

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 EUT Name: electric device  
 Model: Duo  
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 Operator: Mr. Klein  
 Test Conditions: Tnom: 23°C, Unom: 3.7 VDC (acc)  
 Antenna: Schwarzbeck BBHA 9120D, Horizontal  
 Measurement distance: 3m  
 Mode: vibrating + BT  
 Test Date: Dienstag, 30. Dezember 2014  
 Note:

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Test Report No.: G0M-1409-4154-EF0715B-V01

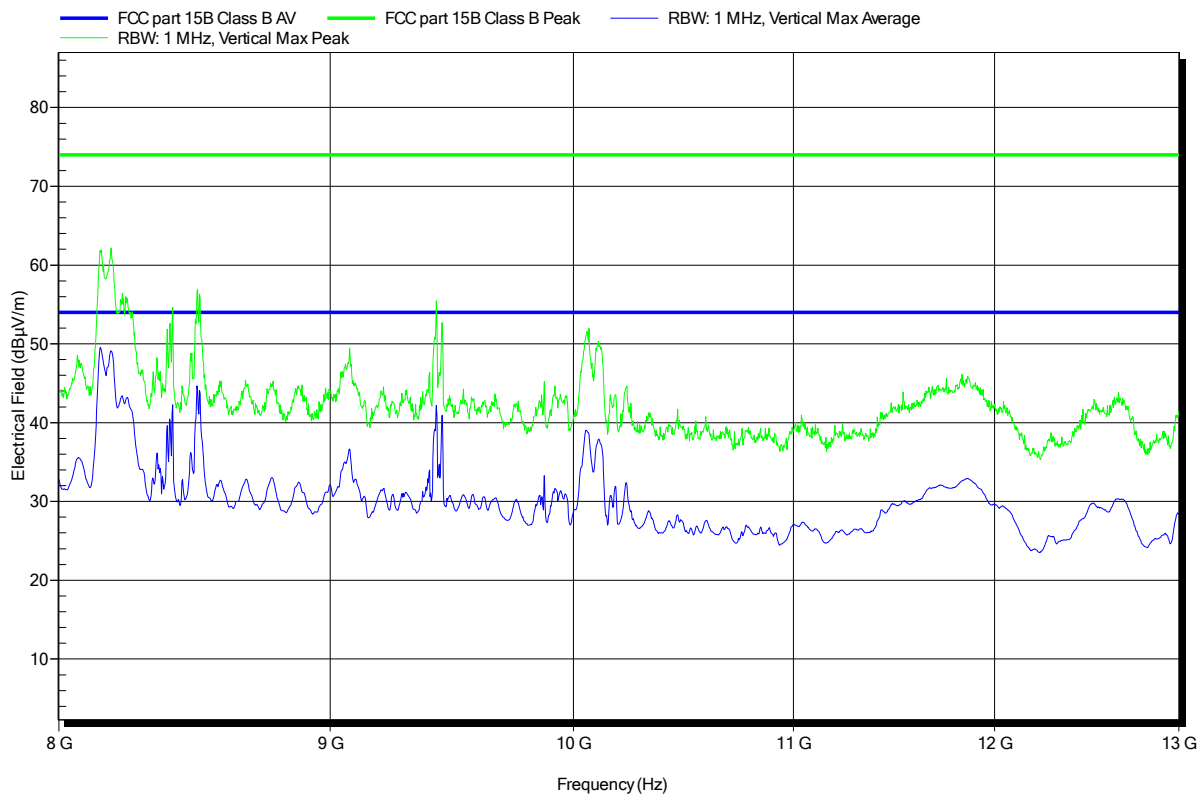
Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

**Spurious emissions under normal conditions according to FCC 15B**

Project number: G0M-1409-4154

Manufacturer: Amor Gummiwaren GmbH  
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 Model: Duo  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Klein  
 Test Conditions: Tnom: 23°C, Unom: 3.7 VDC (acc)  
 Antenna: Schwarzbeck BBHA 9120D, Vertical  
 Measurement distance: 3m  
 Mode: vibrating + BT  
 Test Date: Dienstag, 30. Dezember 2014  
 Note:

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### 3.2 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 %	34%	
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		2 / 2		
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:**

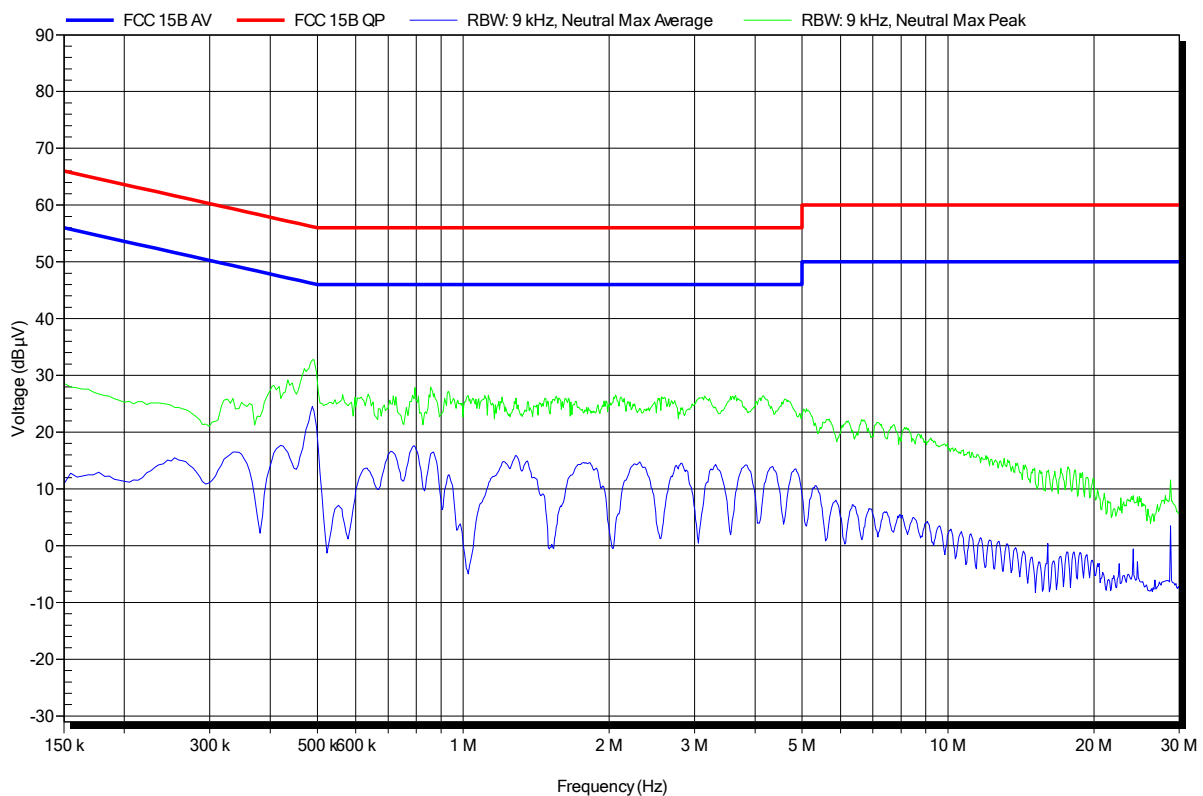
- 1) The EUT was placed on a non conductive table 0.8 m above the reference ground plane and 0.4 m away from the vertical conducting plane (ANSI C63.4: 2009 item 7.3.1)
- 2) The power cord that is normally supplied or recommended by the manufacturer was connected to the LISN.
- 3) The distance between 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 15B**

Project number: G0M-1409-4154

Manufacturer: Amor Gummiwaren GmbH  
 EUT Name: electric device  
 Model: Duo  
 Test Site: Eurofins Product Service GmbH  
 Operator: Administrator  
 Test Conditions: Tnom: 23°C, Unom: 120 VAC (AC-DC Adpater)  
 LISN: ESH2-Z5 N  
 Mode: charging + BT  
 Test Date: 2014-12-30  
 Note:

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Test Report No.: G0M-1409-4154-EF0715B-V01

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

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

Project number: G0M-1409-4154

Manufacturer: Amor Gummiwaren GmbH  
 EUT Name: electric device  
 Model: Duo  
 Test Site: Eurofins Product Service GmbH  
 Operator: Administrator  
 Test Conditions: Tnom: 23°C, Unom: 120 VAC (AC-DC Adpater)  
 LISN: ESH2-Z5 L  
 Mode: charging + BT  
 Test Date: 2014-12-30  
 Note:

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