eurofins | Product Service

FCC TEST REPORT

FCC 47 CFR Part 15C
Industry Canada RSS-247
Digital transmission systems operating within the 2400 – 2483.5 MHz band

Report Reference No. ..... :	G0M-1603-5477-TFC247ZB-V02
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 ..... :	Owlet GmbH
Address ..... :	Mosbacher Str. 9 65187 Wiesbaden GERMANY
Test specification:	
Standard..... :	47 CFR Part 15C RSS-247, Issue 1, 2015-05
Test scope…….. ..... :	complete Radio compliance test
Equipment under test (EUT):	
Product description	Luminaire Controller
Model No.	LUCO P7 CM
Additional Model(s)	None
Brand Name(s)	Owlet IoT
Hardware version	3A-2213-2100-7238-1111
Firmware / Software version	3.12.10.17
	FCC-ID: 2AIOB-LCP7CM IC: 21585-LCP7CM
Test result	**Passed**

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

Testing:		
Test Lab Temperature ..... :	20 – 23 °C	
Test Lab Humidity ..... :	32 – 38 %	
Date of receipt of test item ..... :	2016-08-08	
Date (s) of performance of tests ..... :	2016-08-31 - 2016-09-01	
Compiled by ..... :	Sebastian Suckow	
Tested by (+ signature) ..... : (Responsible for Test)	Sebastian Suckow	.....
Approved by (+ signature) ..... : (Head of Lab)	Christian Weber	.....
Date of issue ..... :	2016-11-29	
Total number of pages ..... :	79	

General remarks:

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

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

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

Additional comments:

Version History

Version	Issue Date	Remarks	Revised by
01	2016-09-08	Initial Release	
02	2016-11-29	Module data corrected	C. Weber

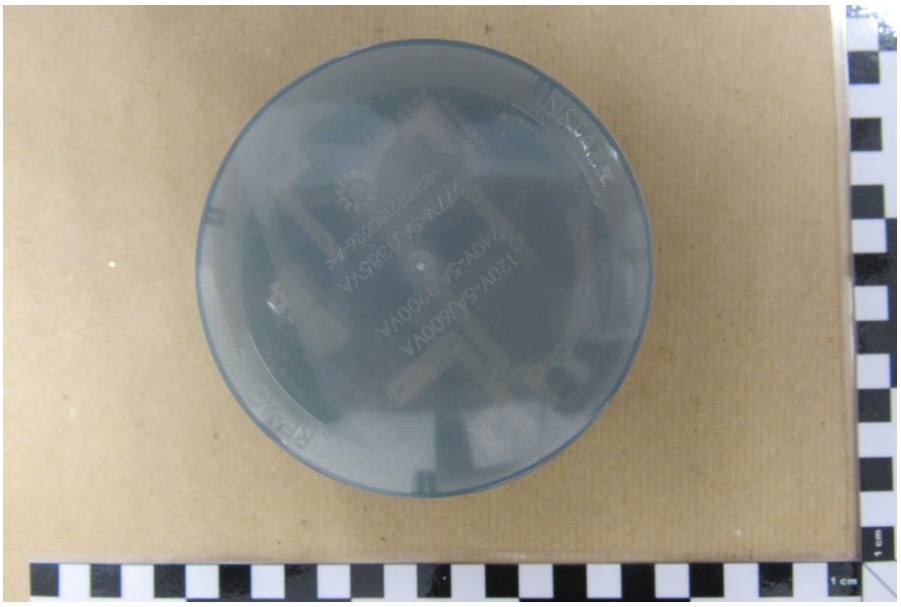
REPORT INDEX

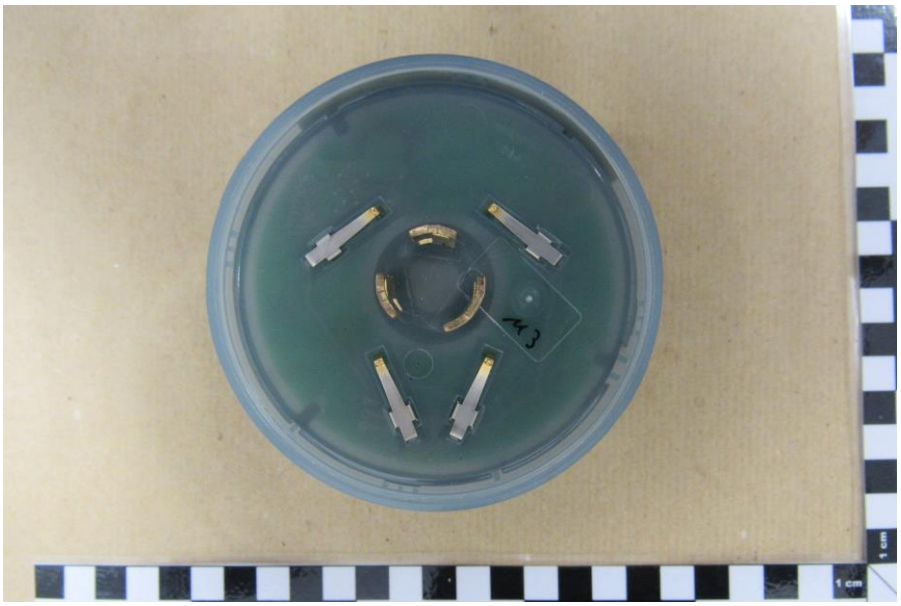
1 Equipment (Test item) Description

Description	Luminaire Controller	
Model	LUCO P7 CM	
Additional Model(s)	None	
Brand Name(s)	Owlet IoT	
Serial number	None	
Hardware version	3A-2213-2100-7238-1111	
Software / Firmware version	3.12.10.17	
PMN	N/A	
HVIN	LUCO P7 CM	
FVIN	N/A	
HMN	N/A	
FCC-ID	2AIOB-LCP7CM	
IC	21585-LCP7CM	
Equipment type	End product	
Radio type	Transceiver	
Radio technology	IEEE 802.15.4 (Zigbee)	
Operating frequency range	2405 - 2480 MHz	
Assigned frequency band	2400 - 2483.5 MHz	
Main test frequencies	F_{LOW}	2405 MHz
	F_{MID}	2440 MHz
	F_{HIGH}	2480 MHz
Spreading	DSSS	
Modulations	QPSK	
Number of channels	15 (11-25)	
Channel spacing	5MHz	
Number of antennas	1	
Radio module	Type	XBee Singular Module
	Model	XBEE S2C
	Manufacturer	Digi International Inc
	HW Version	XB24DZ7RIS (-I102)
	SW Version	705A/705B
	FCC-ID	MCQ-S2DSM
	IC	1846A-S2DSM
Antenna	Type	integrated
	Model	LUCO P7 CM
	Manufacturer	Owlet
	Gain	2.0 dBi (manufacturer declaration)

Manufacturer	Owlet GmbH Mosbacher Str. 9 65187 Wiesbaden GERMANY	
Power supply	V_{NOM}	120 VAC
	V_{MIN}	N/R
	V_{MAX}	N/R
AC/DC-Adaptor	Model	N/A
	Vendor	N/A
	Input	N/A
	Output	N/A

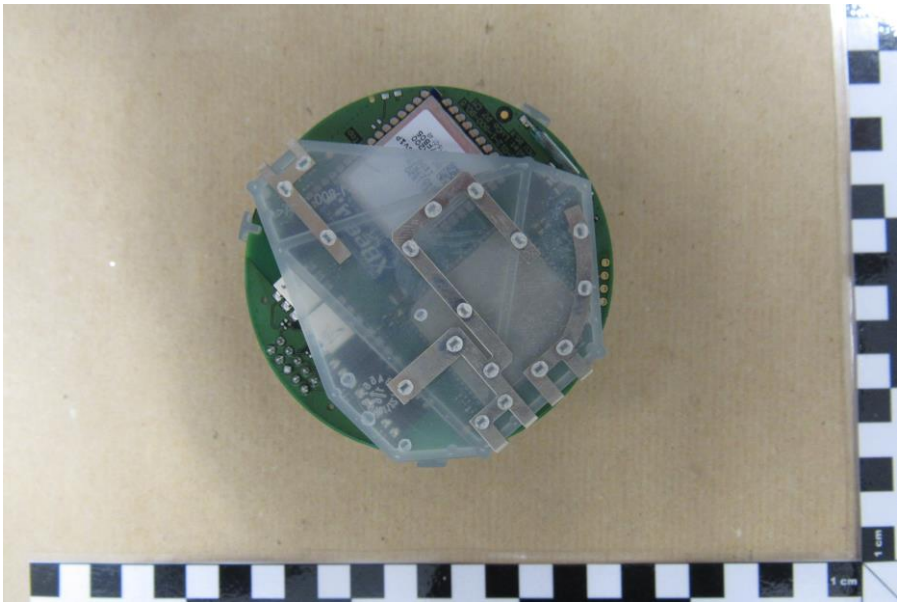
1.1 Photos – Equipment External

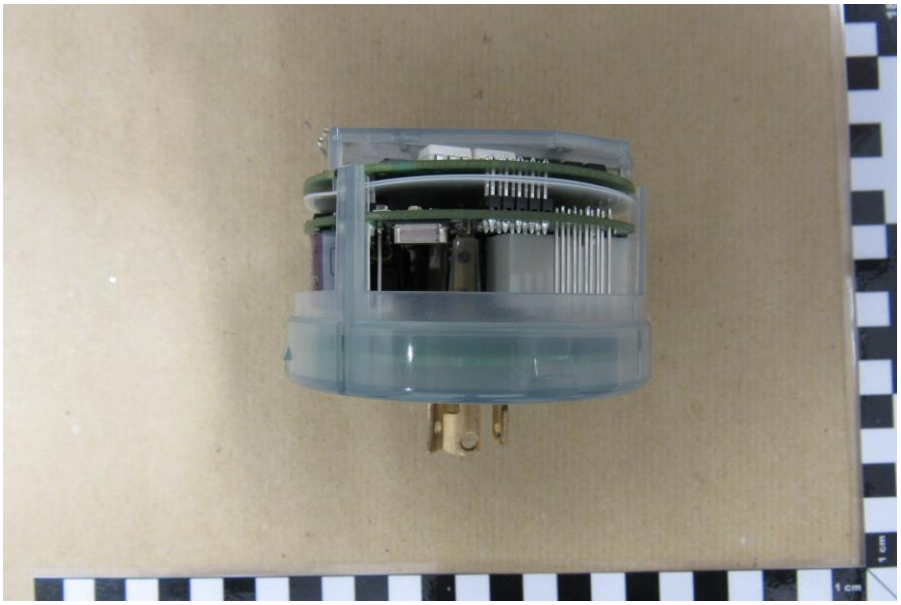
EUT Top


EUT Bottom


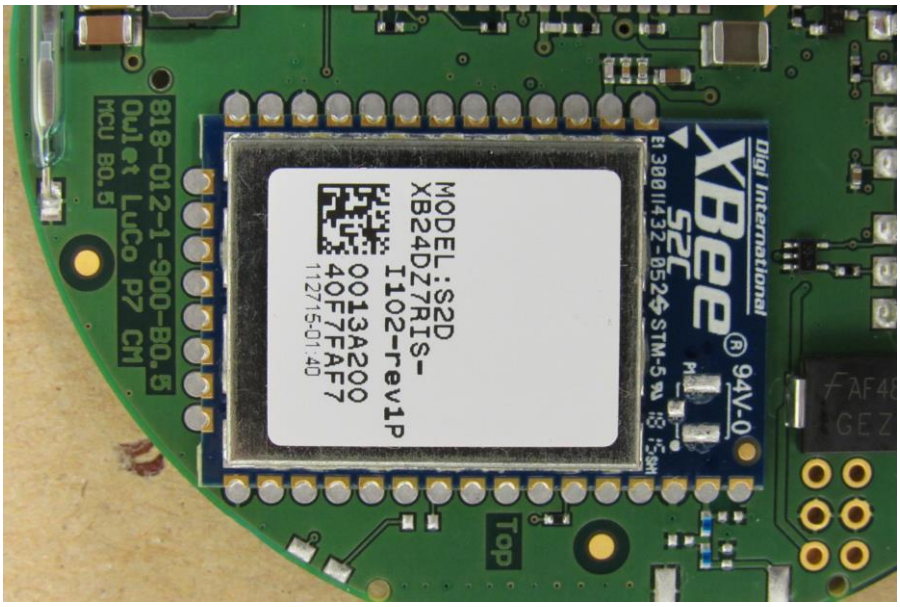
EUT Side

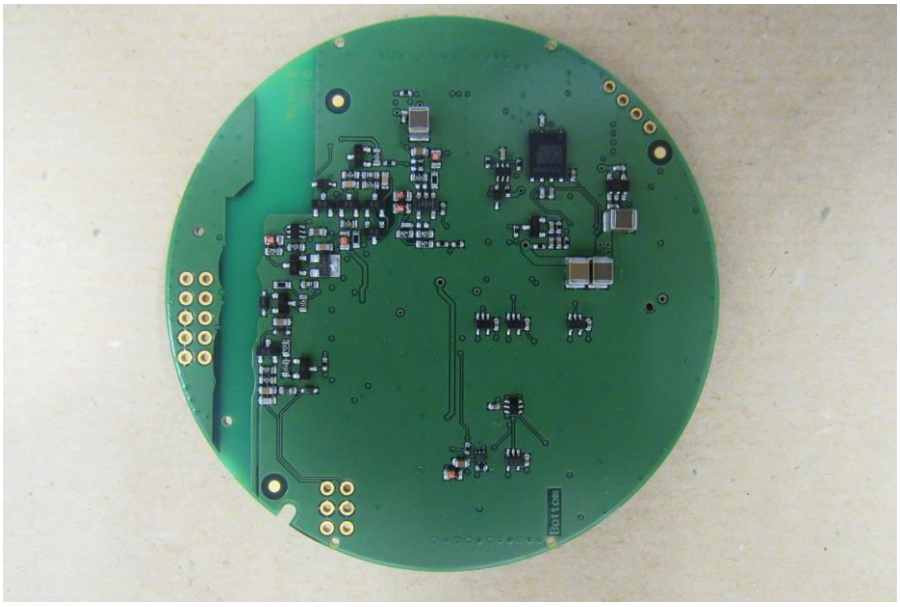

1.2 Photos – Equipment internal

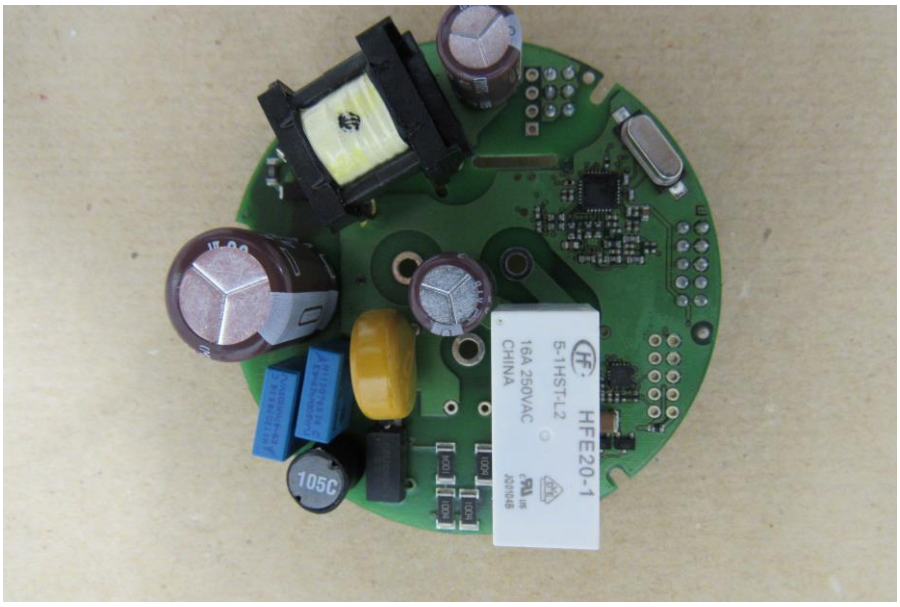
PCB Antenna


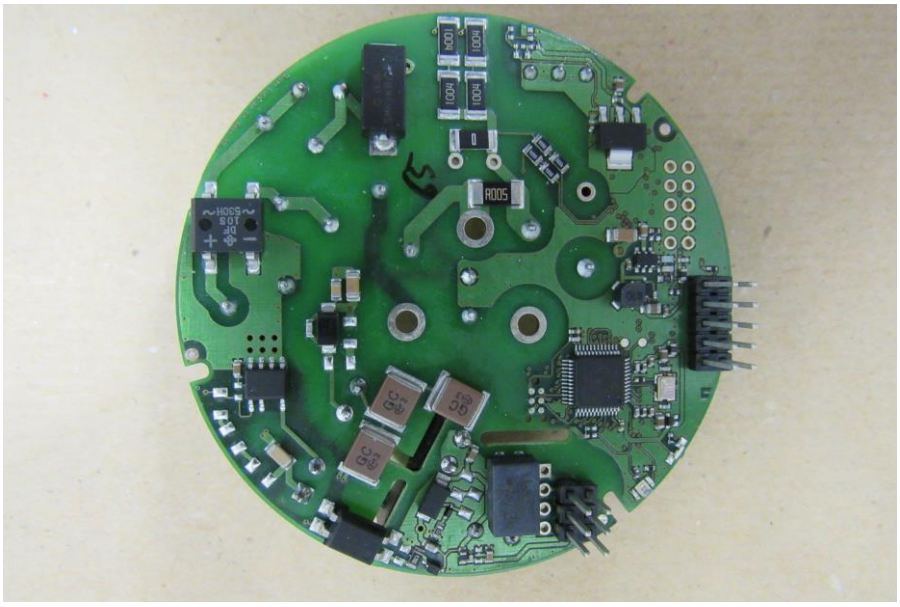
EUT complete


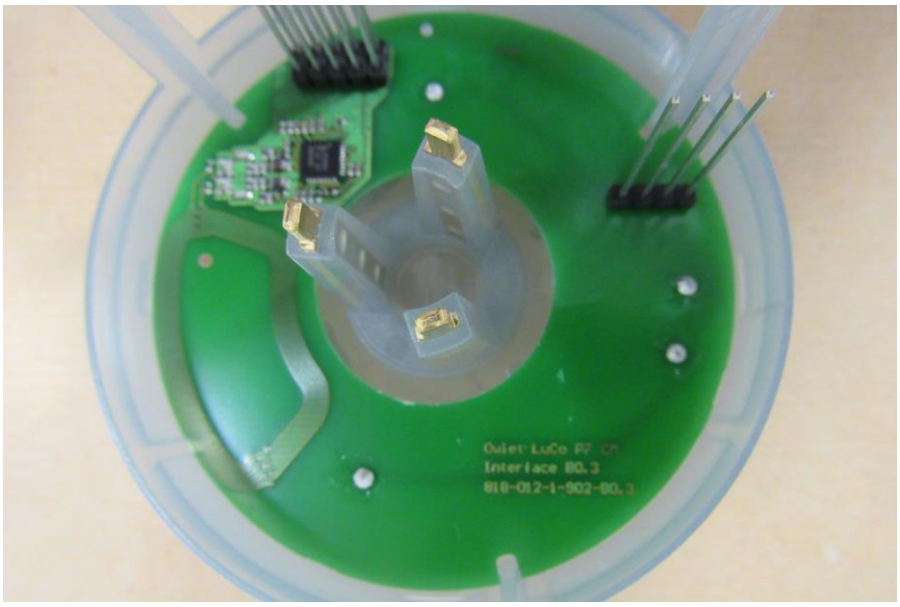
Radio PCB Top

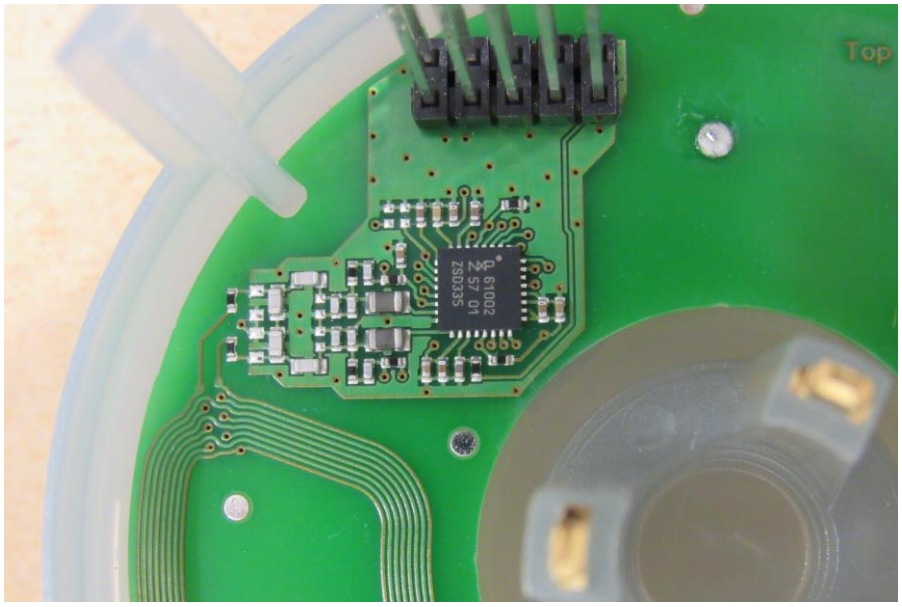

ZigBee Module


Radio PCB Bottom


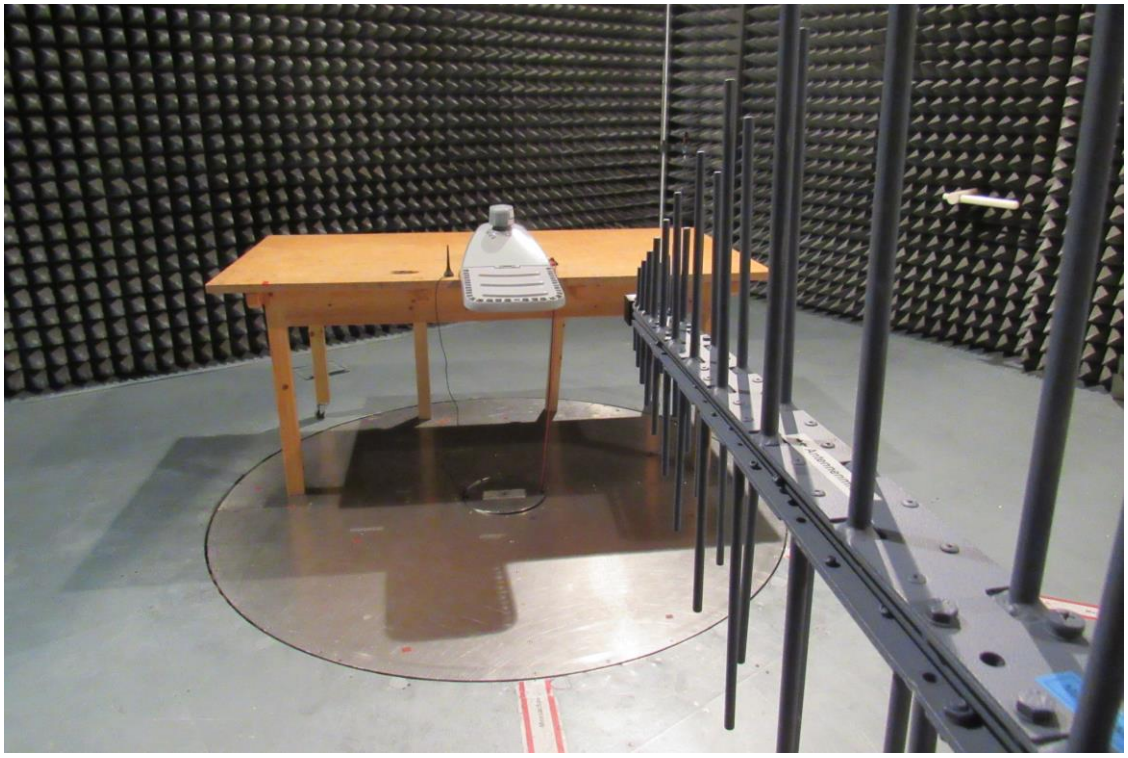
HV PCB Top


HV PCB Bottom


Connector Side


Connector Side in detail


1.3 Photos – Test setup

Test setup: Radiated Emissions


Test setup: Conducted Emissions

1.4 Supporting Equipment Used During Testing

Product Type*	Device	Manufacturer	Model No.	Comments
AE	NEMA Socket	OWLET	none	Used for power supply
SIM	Segment Controller	OWLET	SeCoCPX4IP66IO3GEU	Used for signaling

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

AE : Auxiliary/Associated Equipment, or

SIM : Simulator (Not Subjected to Test)

CABL : Connecting cables

1.5 Test Modes

Mode #	Description	
ZIGBEE	General conditions:	EUT powered via NEMA Socket
	Radio conditions:	Mode = standalone transmit Spreading = DSSS Modulation = QPSK Data rate = 250 kbps Duty cycle = 100 % Power level = Maximum
Receive	General conditions:	EUT powered via NEMA Socket
	Radio conditions:	Mode = standalone receive Spreading = DSSS

1.6 Test Equipment Used During Testing

Radiated spurious emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Semi-anechoic chamber	Frankonia	AC 1	EF00062	-	-
Spectrum Analyzer	R&S	ESR7	EF00943	2015-09	2016-09
Biconical Antenna	R&S	HK 116	EF00203	2016-06	2018-06
LPD Antenna	R&S	HL 223	EF00013	2016-06	2018-06
Horn Antenna	Schwarzbeck	BBHA9120D	EF00018	2013-09	2016-09
Horn Antenna	Amplifier Research	AT4560	EF00302	2016-01	2017-01

AC powerline conducted emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
AMN	R&S	ESH2-Z5	EF00182	2014-11	2016-11
EMI Test Receiver	R&S	ESCS 30	EF00295	2015-10	2016-10

Sample emission level calculation

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

Reading:

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

A.F.:

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

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

Net:

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

Limit:

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

Limit (dBµV/m) = 20*log (µV/m)

Margin:

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

Example only:

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

2 Result Summary

FCC 47 CFR Part 15C, IC RSS-247				
Product Specific Standard Section	**Requirement – Test**	**Reference Method**	**Result**	**Remarks**
RSS-Gen 6.6	Occupied Bandwidth	ANSI C63.10	N/R	Informational only
FCC § 15.247(a)(2) IC RSS-247 § 5.2	6dB Bandwidth	ANSI C63.10	N/T	Conducted results of licensed radio unaffected. See module radio report
FCC § 15.247(b)(3) IC RSS-247 § 5.4	Maximum peak conducted power	ANSI C63.10	N/T	Conducted results of licensed radio unaffected. See module radio report
FCC § 15.247(e) IC RSS-247 § 5.2	Power spectral density	ANSI C63.10	N/T	Conducted results of licensed radio unaffected. See module radio report
47 CFR 15.207 IC RSS-247 § 3.1	AC power line conducted emissions	ANSI C63.4	PASS	
FCC § 15.247(d) IC RSS-247 § 5.5	Band edge compliance	ANSI C63.10	N/T	Conducted results of licensed radio unaffected. See module radio report
FCC § 15.247(d) IC RSS-247 § 5.5	Conducted spurious emissions	ANSI C63.10	N/T	Conducted results of licensed radio unaffected. See module radio report
FCC § 15.247(d) FCC § 15.209 IC RSS-247 § 5.5	Transmitter radiated spurious emissions	ANSI C63.10	PASS	
IC RSS-247 § 3.1	Receiver radiated spurious emissions	ANSI C63.10	PASS	
Remarks:				

3 Test Conditions and Results

3.1 Test Conditions and Results – AC power line conducted emissions

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

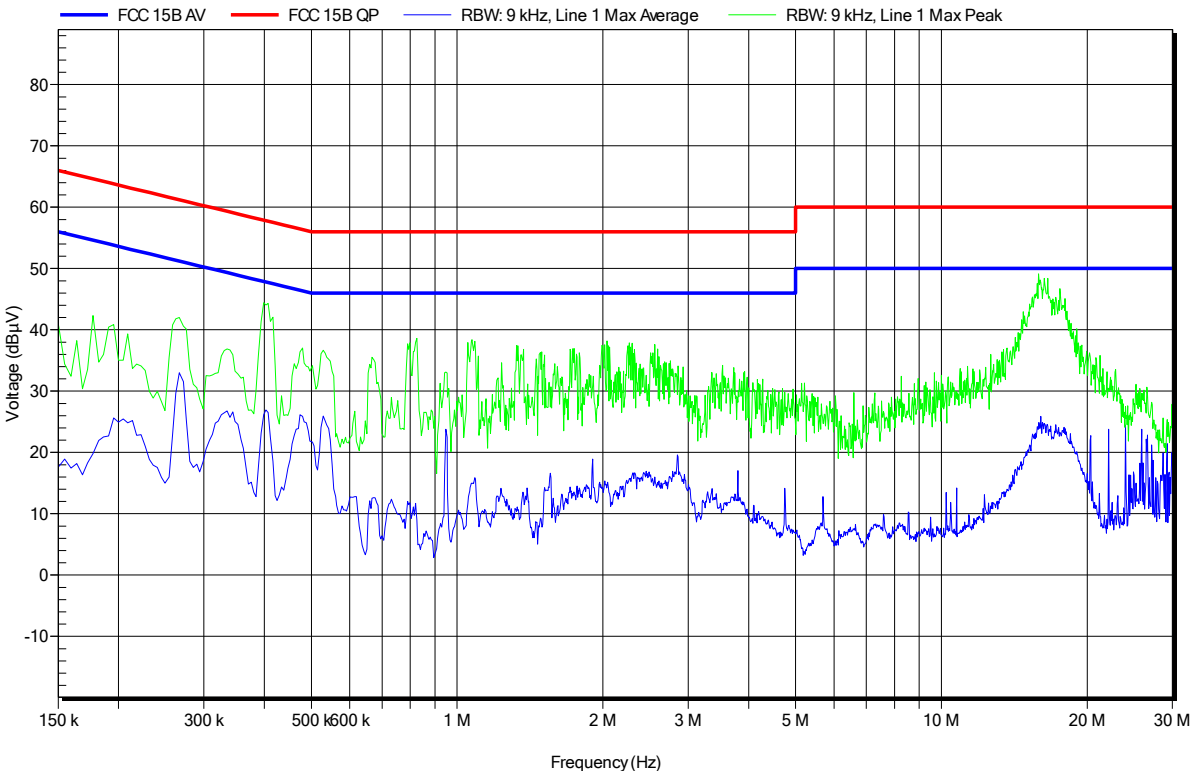
Conducted Emissions 1

EMI voltage test in the ac-mains according to FCC 47 CFR 15.107 / ICES-003

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Yu
Test Conditions:	Tnom: 23.4°C, Unom: 120V AC
LISN:	ESH2-Z5 L
Test Date:	2016-08-12
Note:	

Index 43



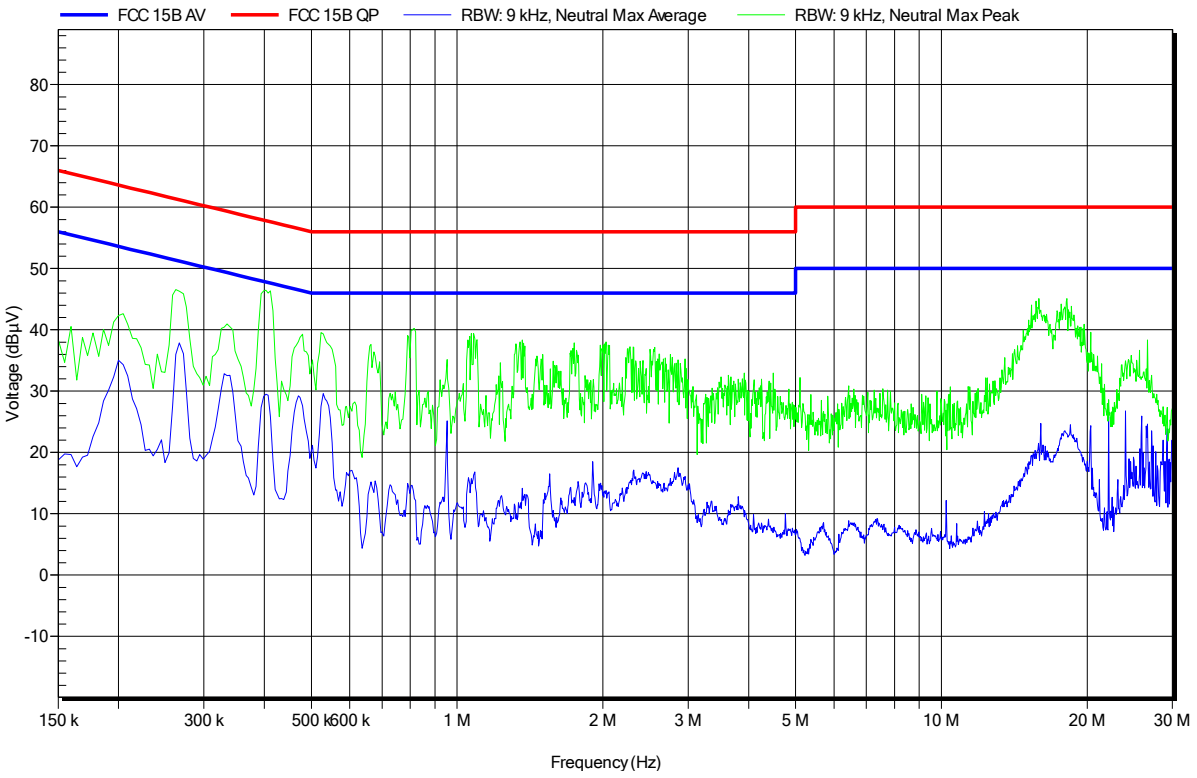
Conducted Emissions 2

EMI voltage test in the ac-mains according to FCC 47 CFR 15.107 / ICES-003

Project number: G0M-1603-5477

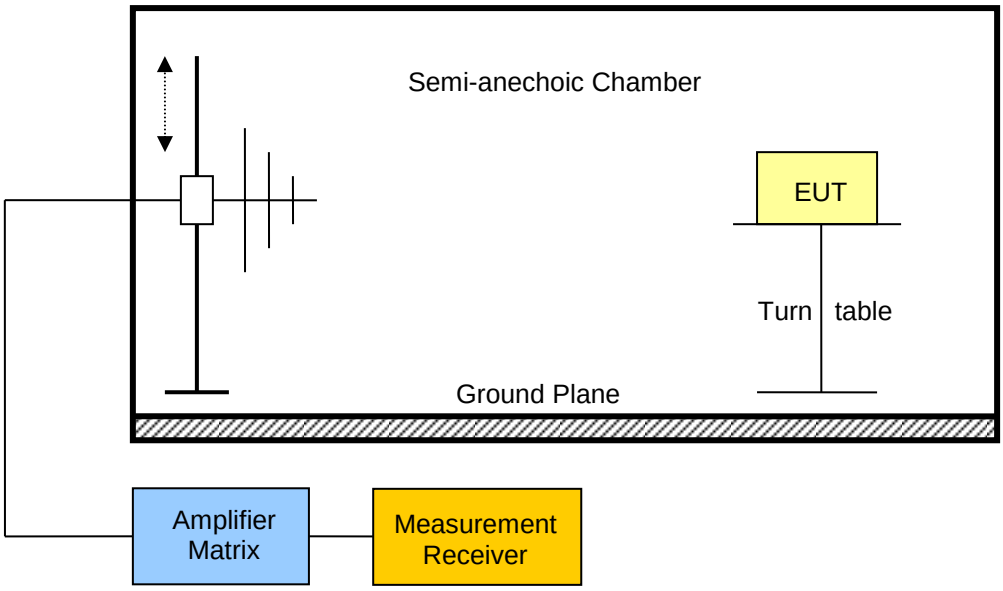
Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Yu
Test Conditions:	Tnom: 23.4°C, Unom: 120V AC
LISN:	ESH2-Z5 N
Test Date:	2016-08-12
Note:	

Index 44



3.2 Test Conditions and Results – Transmitter radiated emissions

Transmitter radiated emissions acc. to FCC 47 CFR 15.247 / IC RSS-247				**Verdict: PASS**
Test according referenced standards	Reference Method			
	FCC 15.247(d) / IC RSS-247 5.5			
Test according to measurement reference	Reference Method			
	ANSI C63.10			
Test frequency range	Tested frequencies			
	30 MHz – 10th Harmonic			
Limits				
Frequency range [MHz]	Detector	Limit [µV/m]	Limit [dBµV/m]	Limit Distance [m]
30 – 88	Quasi-Peak	100	40	3
88 – 216	Quasi-Peak	150	43.5	3
216 – 960	Quasi-Peak	200	46	3
960 – 1000	Quasi-Peak	500	54	3
> 1000	Average	500	54	3
Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)). When average radiated emission measurements are specified, including average emission measurements below 1000 MHz, there also is a limit on the peak level of the radio frequency emissions. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test.				
Test setup				



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

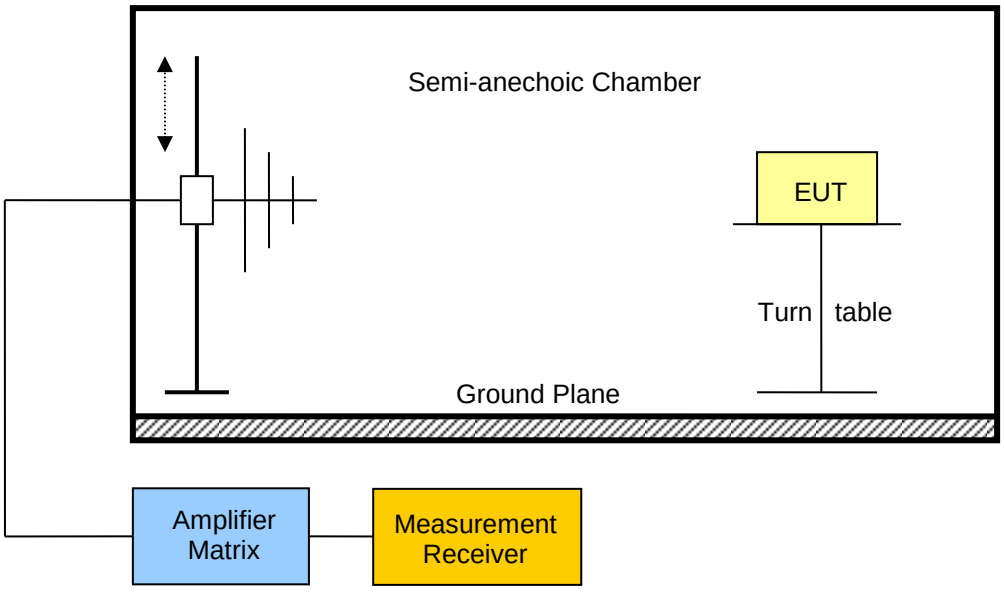
Test results – Internal Antenna

Channel	Frequency [MHz]	Mode	Emission [MHz]	Level [dbµV/m]	Det.	Pol.	Limit [dbµV/m]	Limit dist. [m]*	Margin [dB]
F_{MID}	2440	ZIGBEE	2392.4	28.91	av	hor	54.00	3	-25.09
F_{MID}	2440	ZIGBEE	2396.5	28.25	av	ver	54.00	3	-25.75
F_{HIGH}	2480	ZIGBEE	2483.5	56.61	pk	hor	74.00	3	-17.39
F_{HIGH}	2480	ZIGBEE	2483.5	43.29	RMS	hor	54.00	3	-10.71
F_{HIGH}	2480	ZIGBEE	2483.7	53.58	pk	ver	74.00	3	-20.42
F_{HIGH}	2480	ZIGBEE	2483.7	40.65	RMS	ver	54.00	3	-13.35

Comments: * Physical distance between EUT and measurement antenna.

3.3 Test Conditions and Results – Receiver radiated emissions

Receiver radiated emissions acc. to IC RSS-247				**Verdict: PASS**
Test according referenced standards	Reference Method			
	IC RSS-247 3.1			
Test according to measurement reference	Reference Method			
	ANSI C63.10			
Test frequency range	Tested frequencies			
	30 MHz – 5th Harmonic			
EUT test mode	Receive			
Limits				
Frequency range [MHz]	Detector	Limit [µV/m]	Limit [dBµV/m]	Limit Distance [m]
30 – 88	Quasi-Peak	100	40	3
88 – 216	Quasi-Peak	150	43.5	3
216 – 960	Quasi-Peak	200	46	3
960 – 1000	Quasi-Peak	500	54	3
> 1000	Average	500	54	3
Test setup				



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

Test results

Channel	Frequency [MHz]	Emission [MHz]	Emission Level [dbµV/m]	Emission Level [µV/m]	Det.	Limit [µV/m]	Margin [µV/m]
All	Scan	No significant spurious emissions					

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

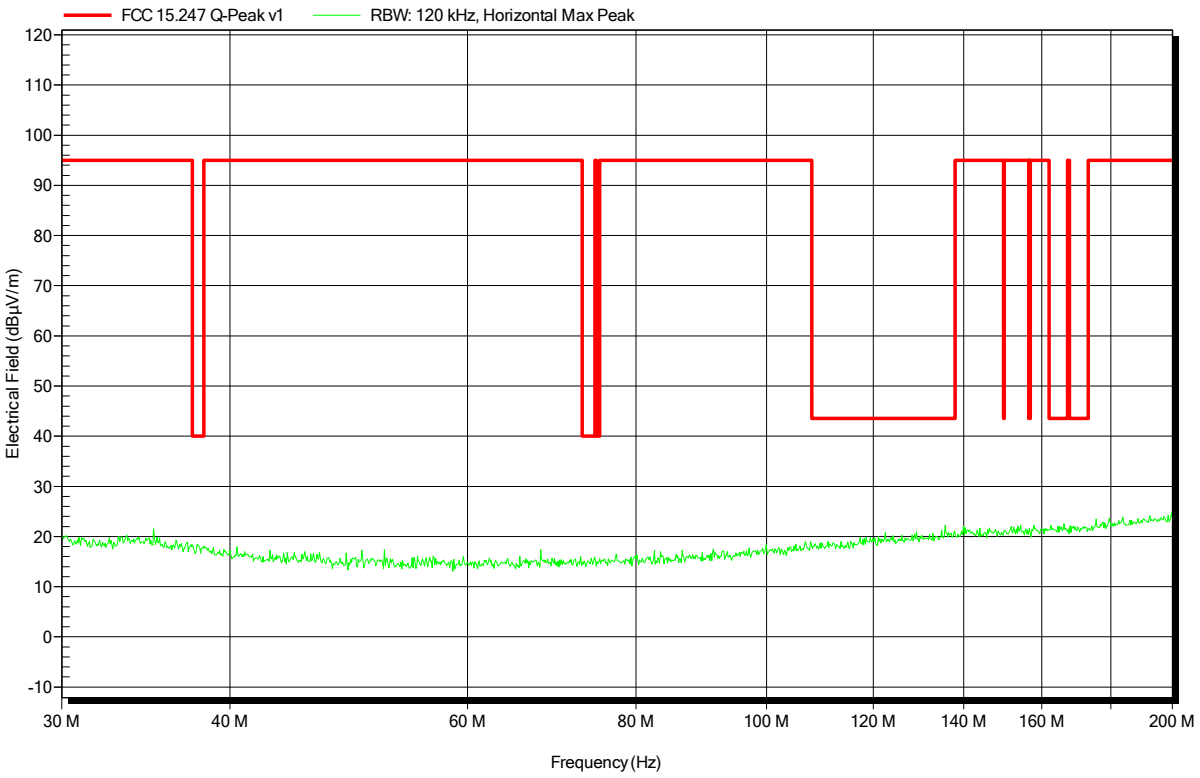
ANNEX A Transmitter radiated spurious emissions

Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	TX; ZigBee 2405 MHz
Test Date:	2016-01-09
Note:	

Index 47

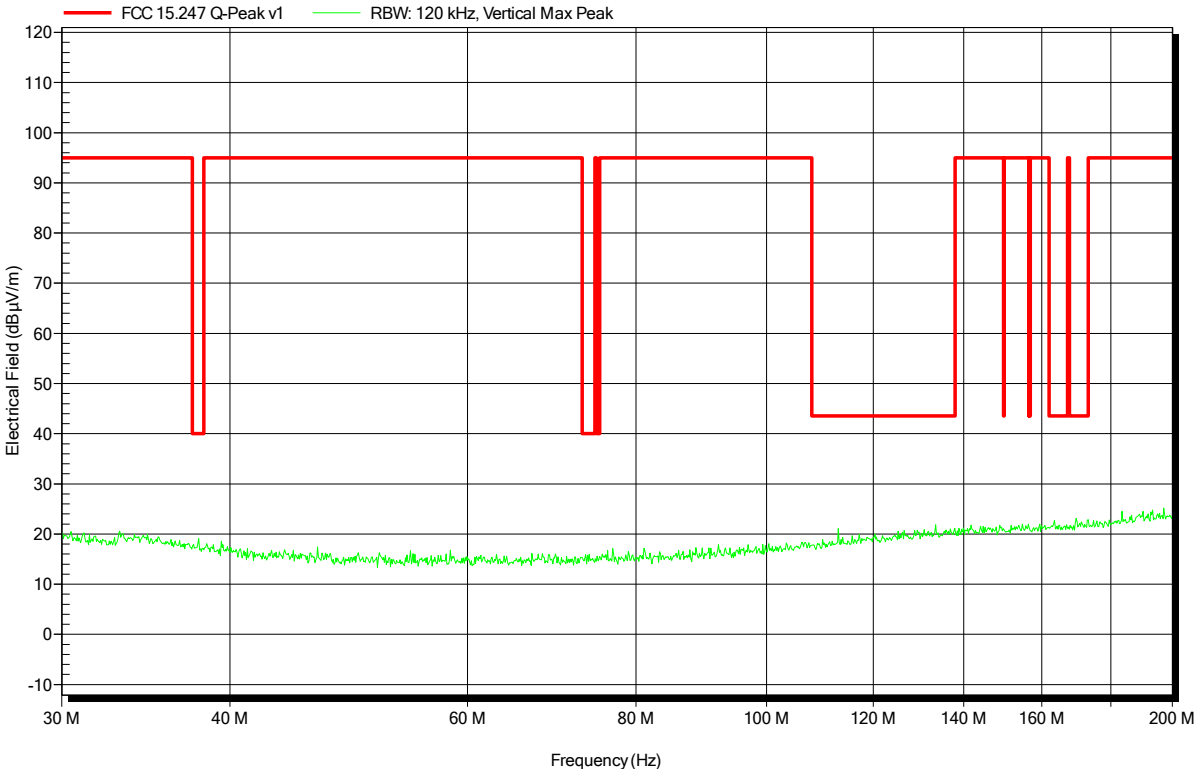


Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	TX; ZigBee 2405 MHz
Test Date:	2016-01-09
Note:	

Index 43

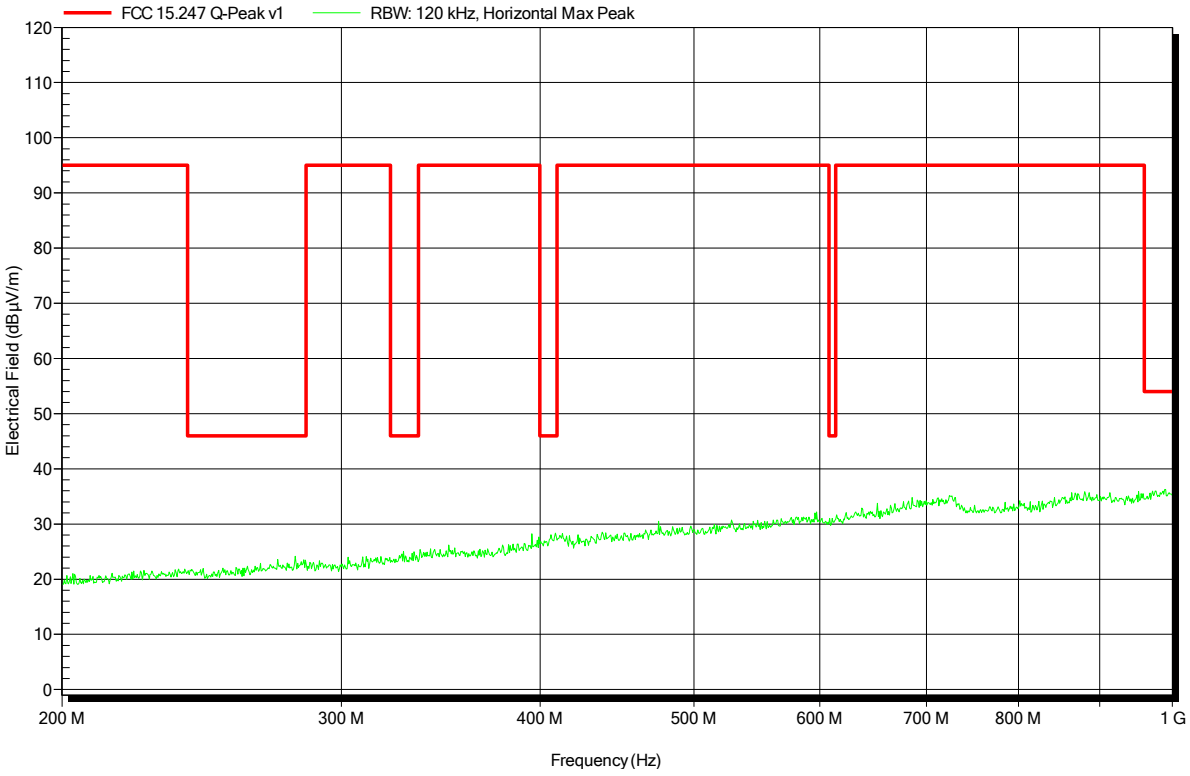


Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	TX; ZigBee 2405 MHz
Test Date:	2016-01-09
Note:	

Index 37



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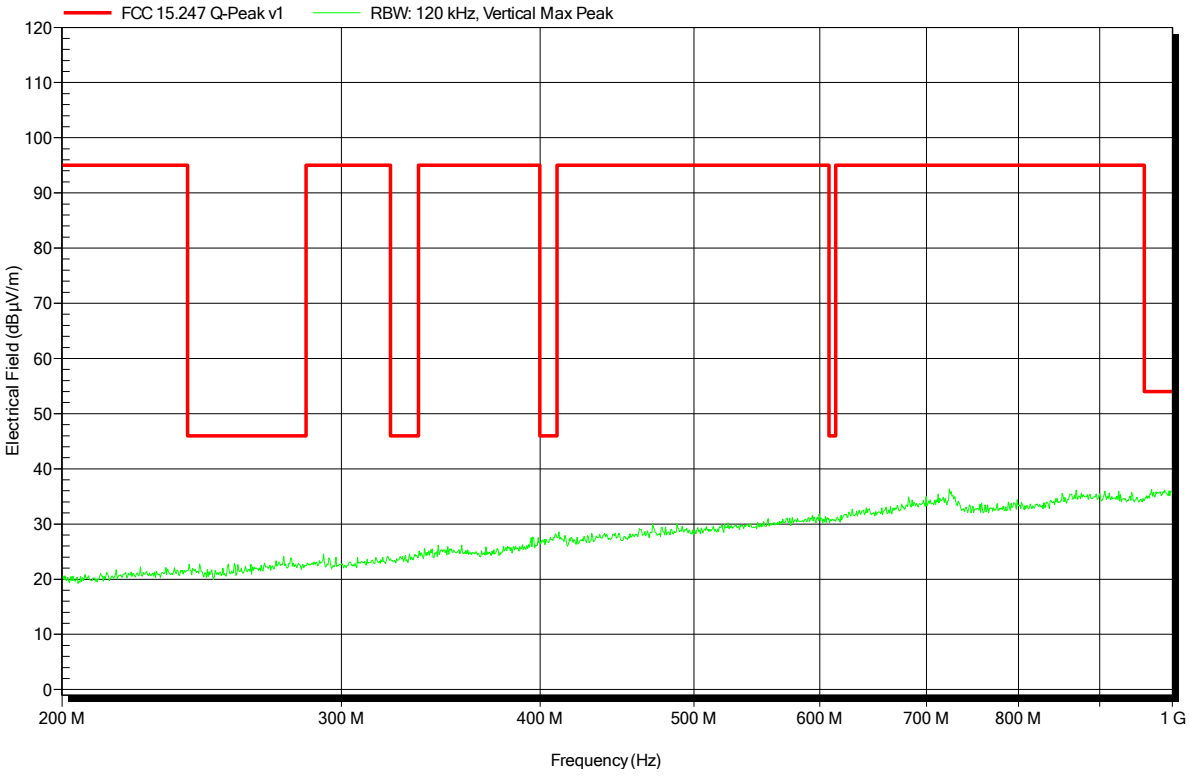
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	TX; ZigBee 2405 MHz
Test Date:	2016-01-09
Note:	

Index 35

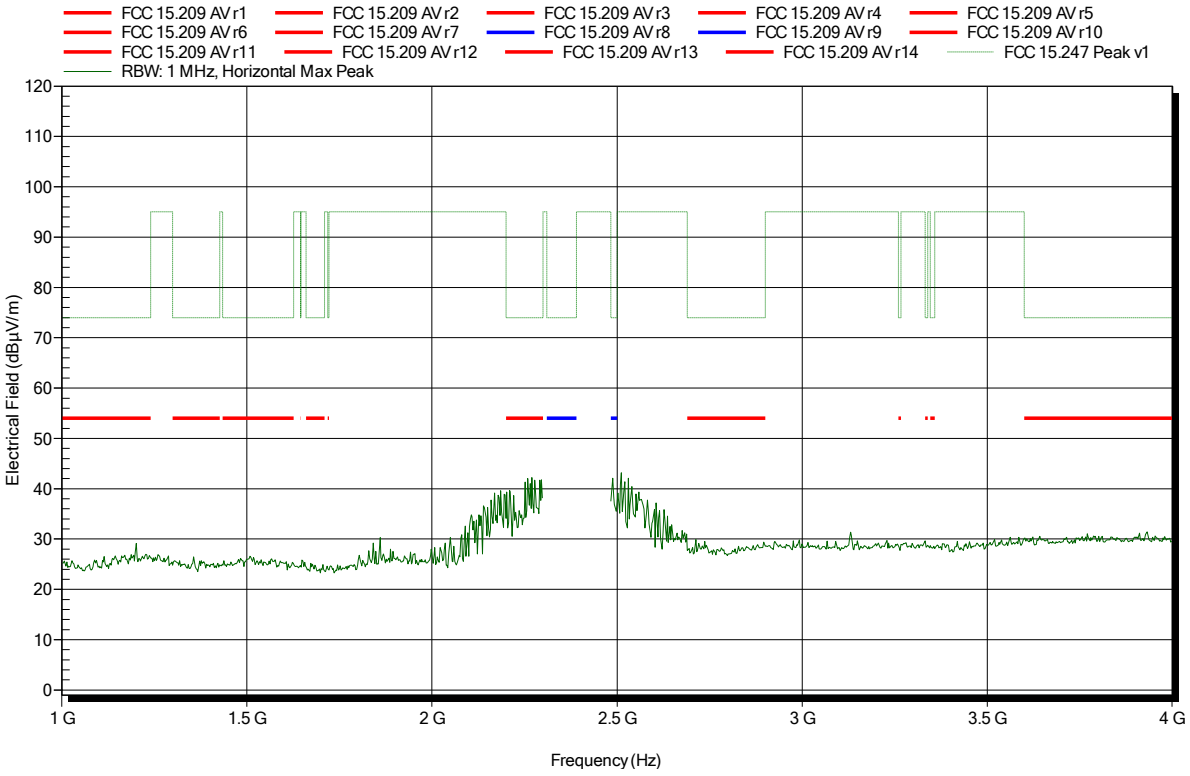


Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	3 m converted to 3m
Mode:	TX; ZigBee 2405 MHz
Test Date:	2016-08-31
Note:	

Index 26



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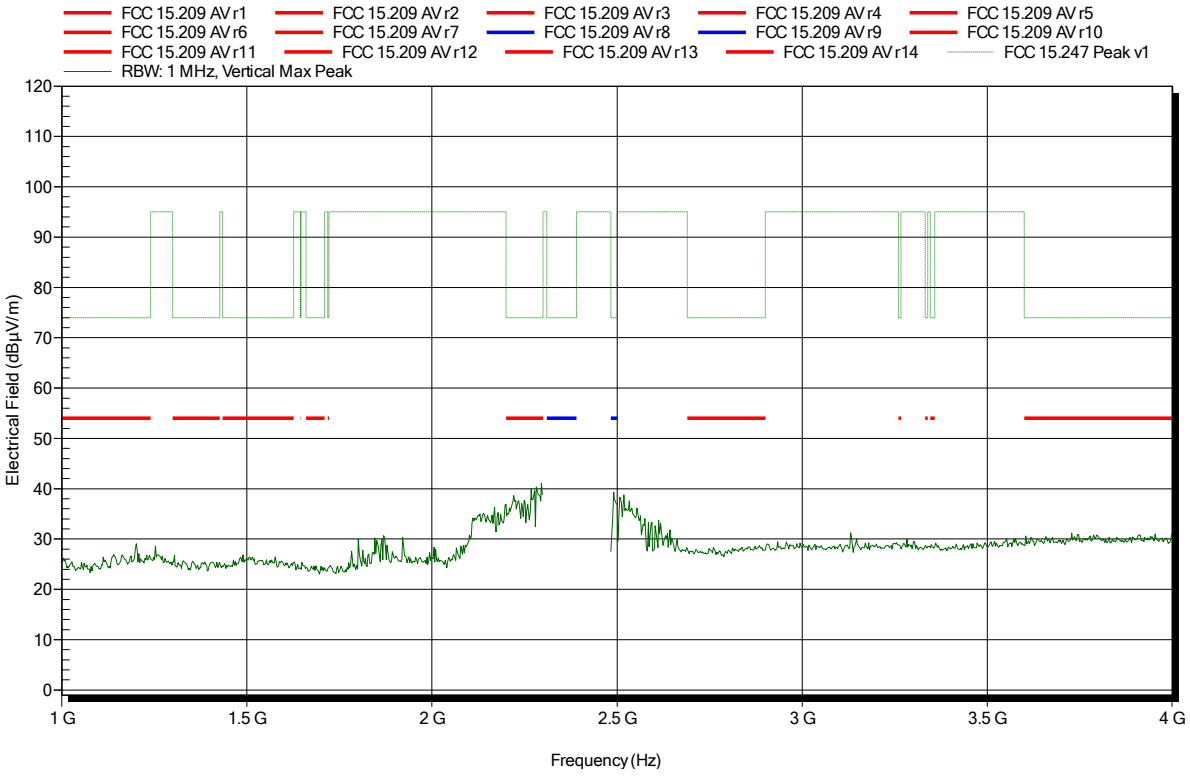
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	3 m converted to 3m
Mode:	TX; ZigBee 2405 MHz
Test Date:	2016-08-31
Note:	

Index 23

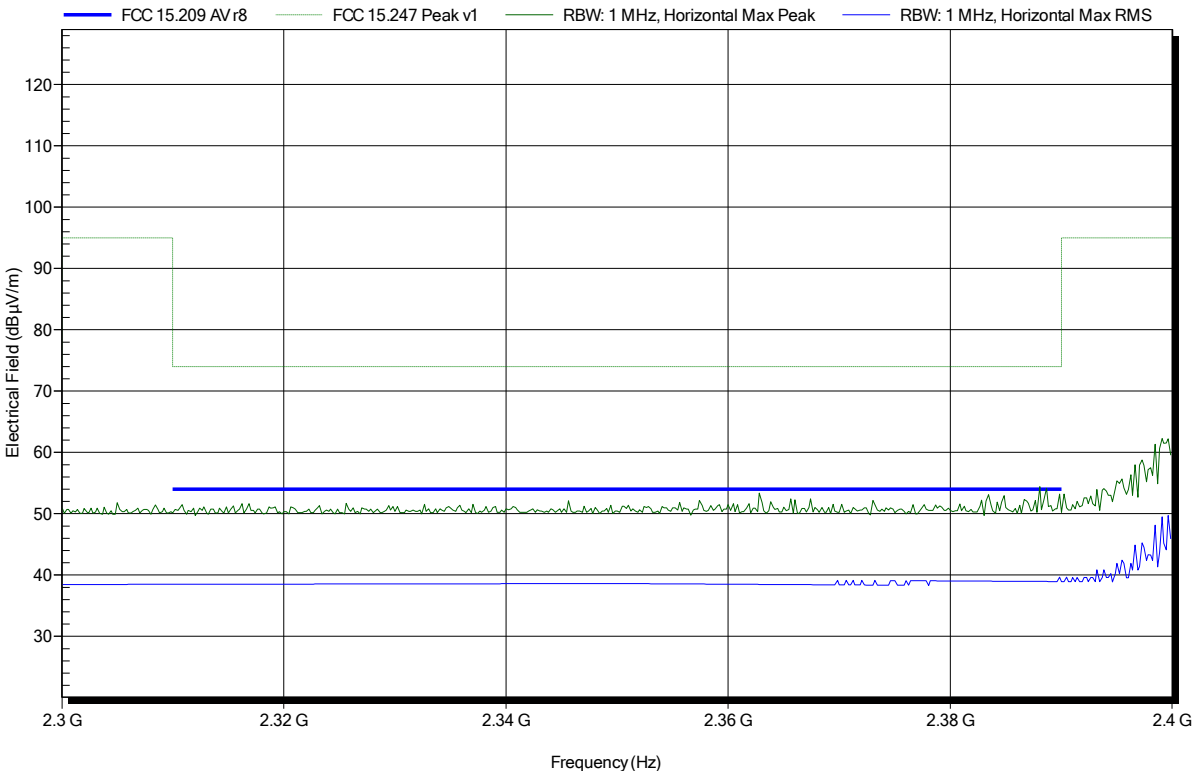


Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; ZigBee 2405 MHz
Test Date:	2016-08-31
Note:	lower bandedge

Index 25

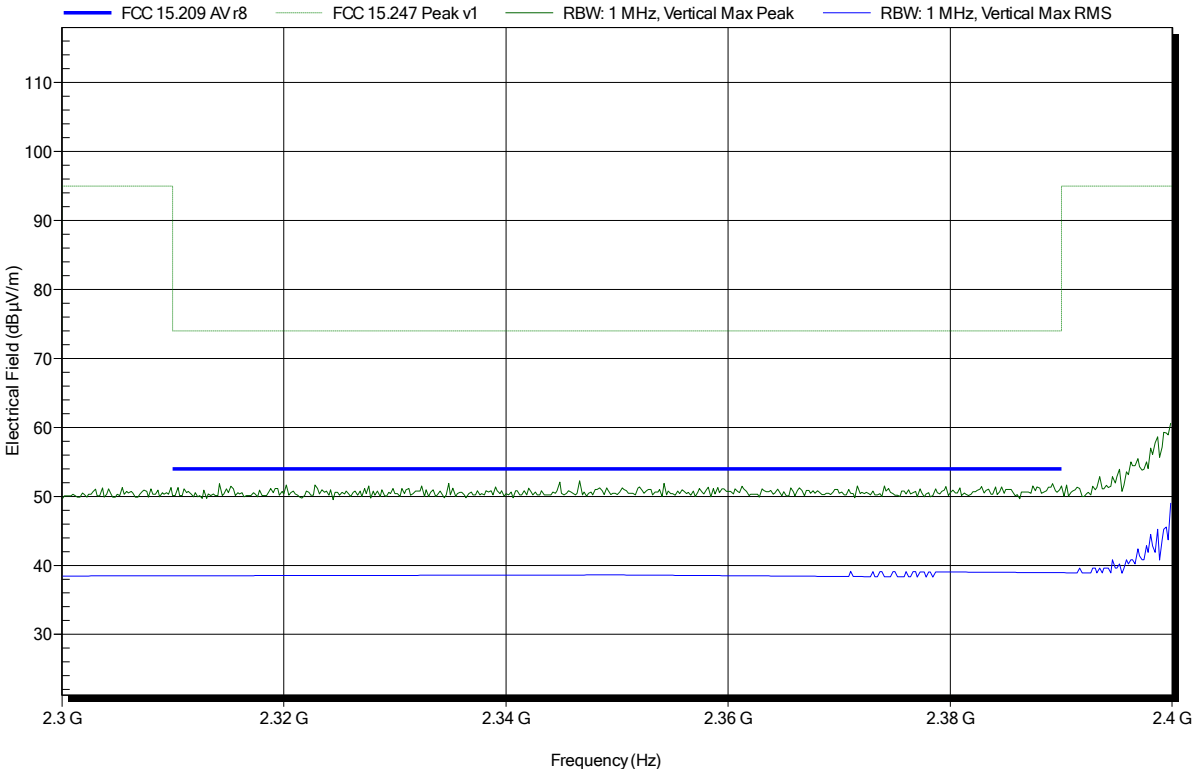


Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; ZigBee 2405 MHz
Test Date:	2016-08-31
Note:	lower bandedge

Index 24

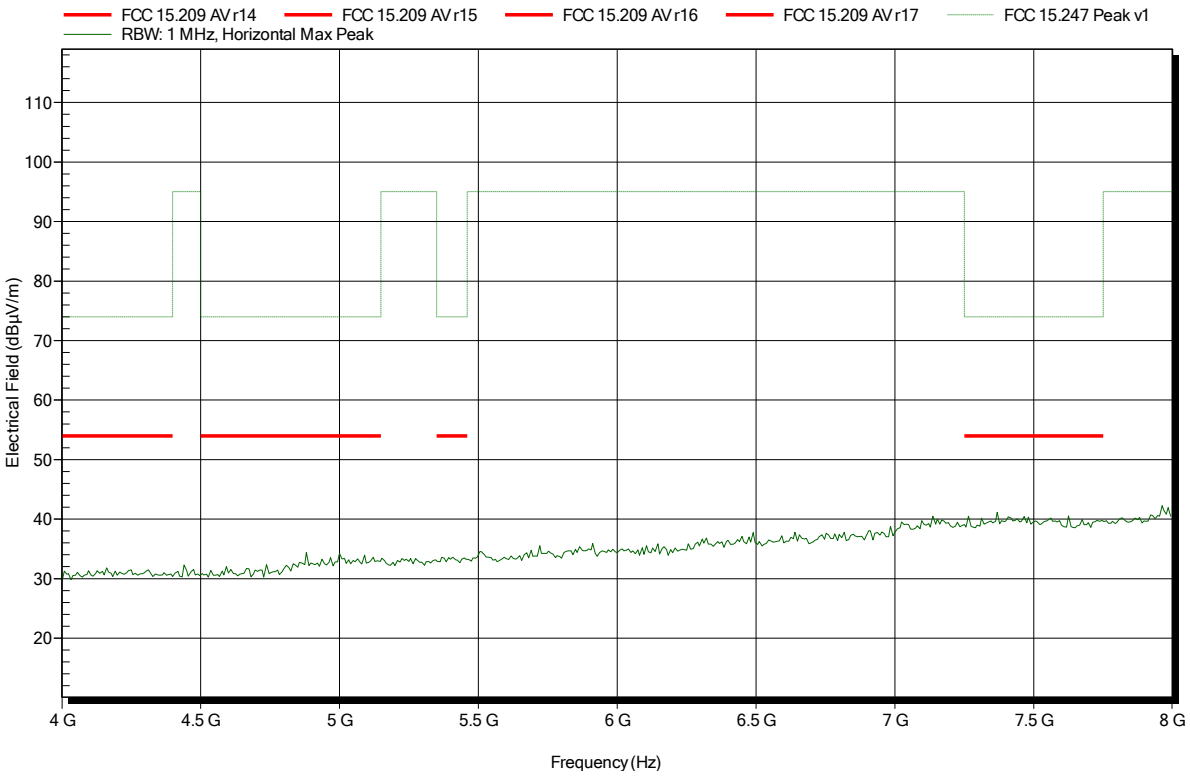


Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; ZigBee 2405 MHz
Test Date:	2016-08-31
Note:	

Index 27

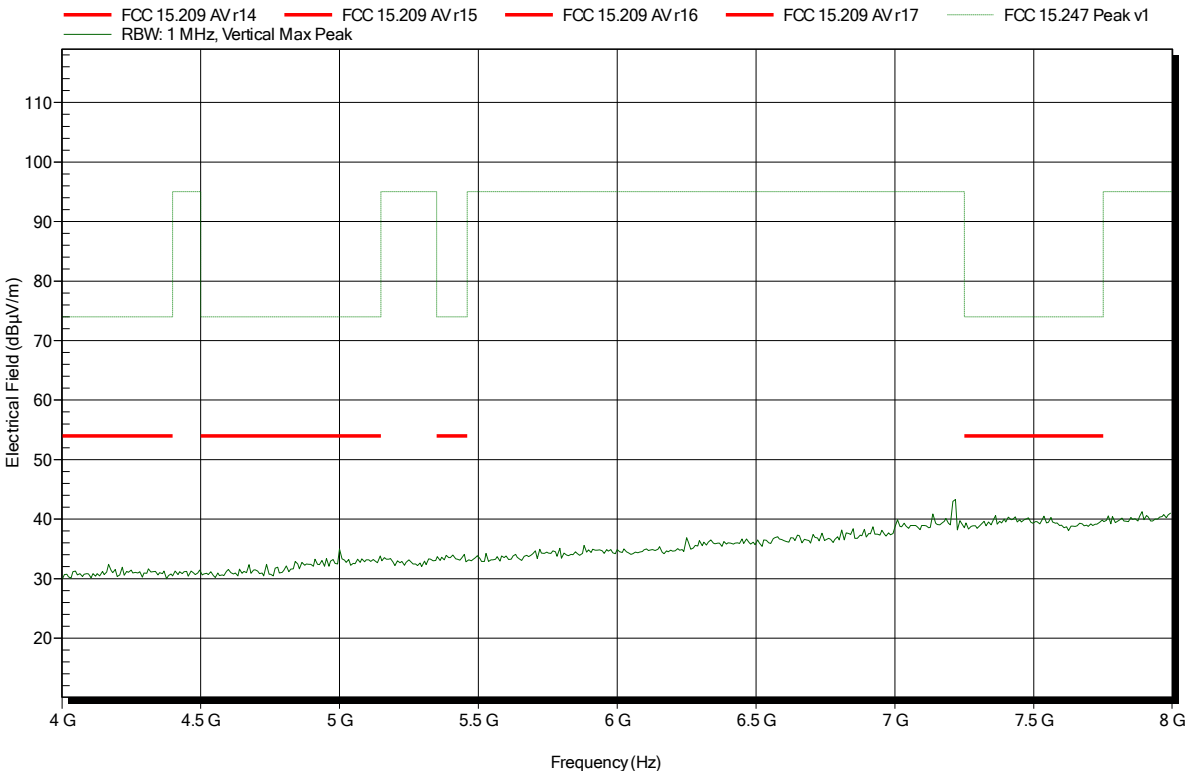


Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; ZigBee 2405 MHz
Test Date:	2016-08-31
Note:	

Index 22

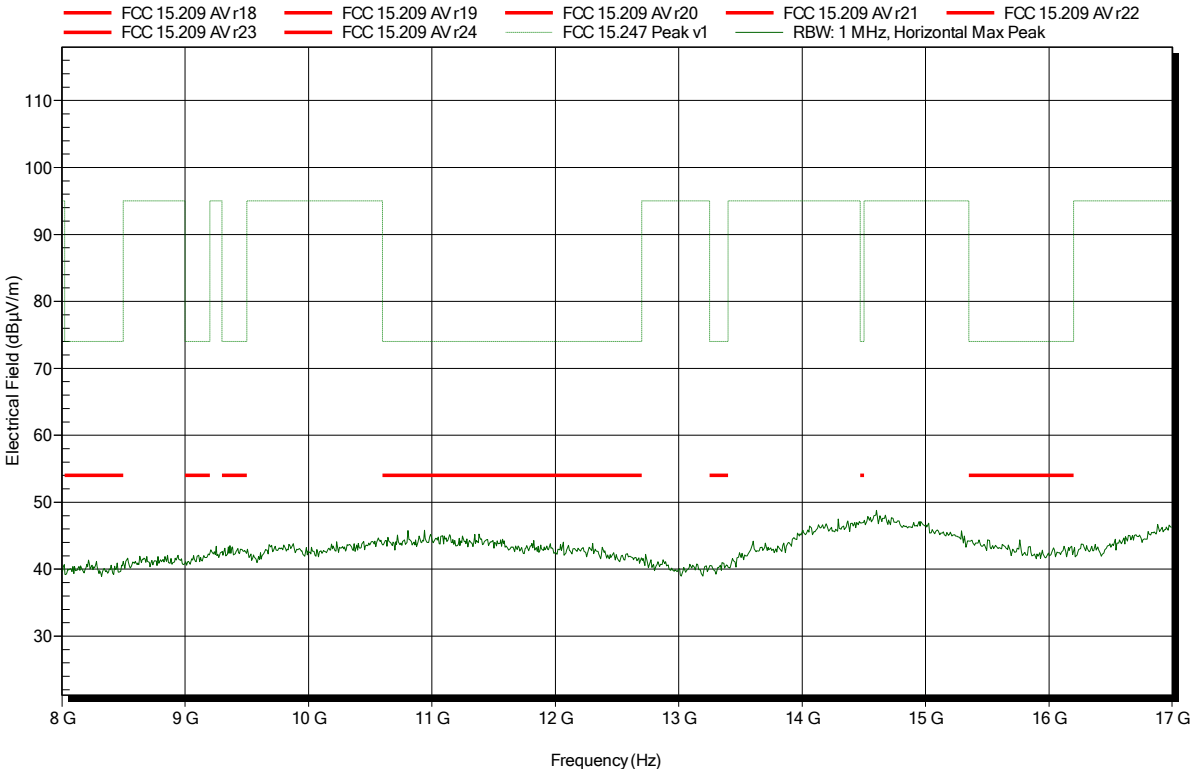


Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; ZigBee 2405 MHz
Test Date:	2016-08-31
Note:	

Index 28

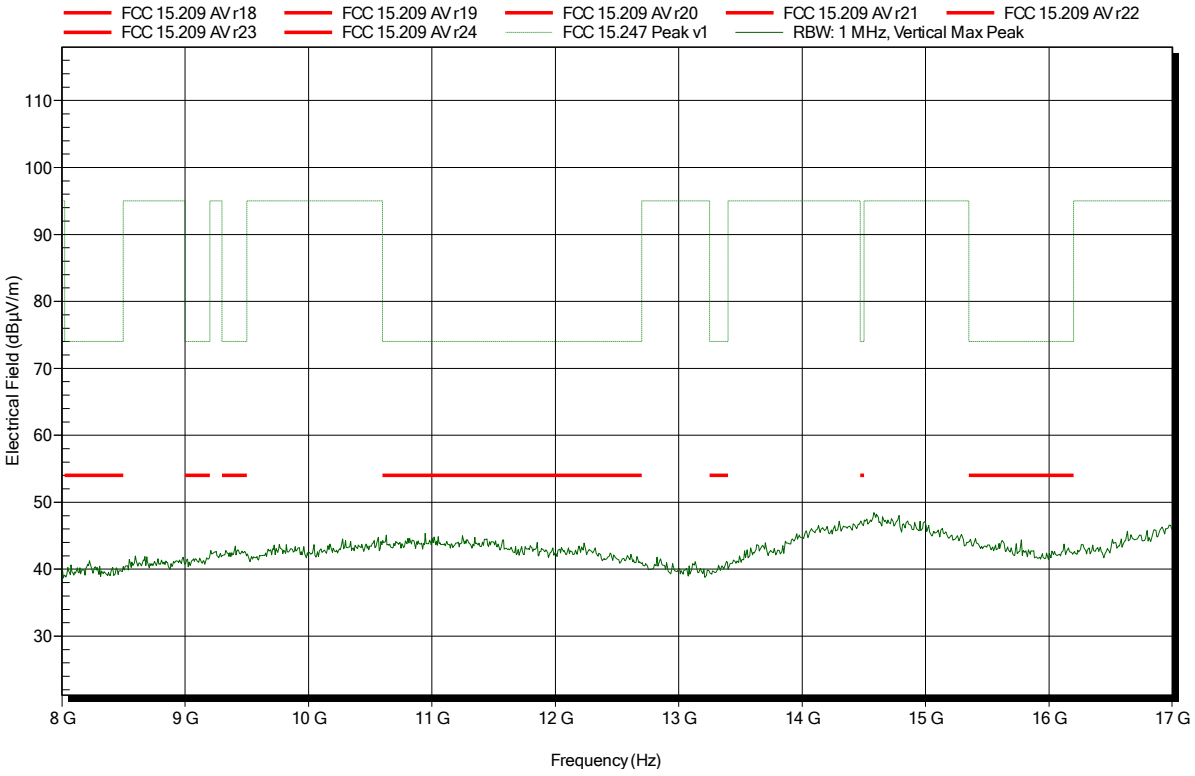


Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; ZigBee 2405 MHz
Test Date:	2016-08-31
Note:	

Index 21

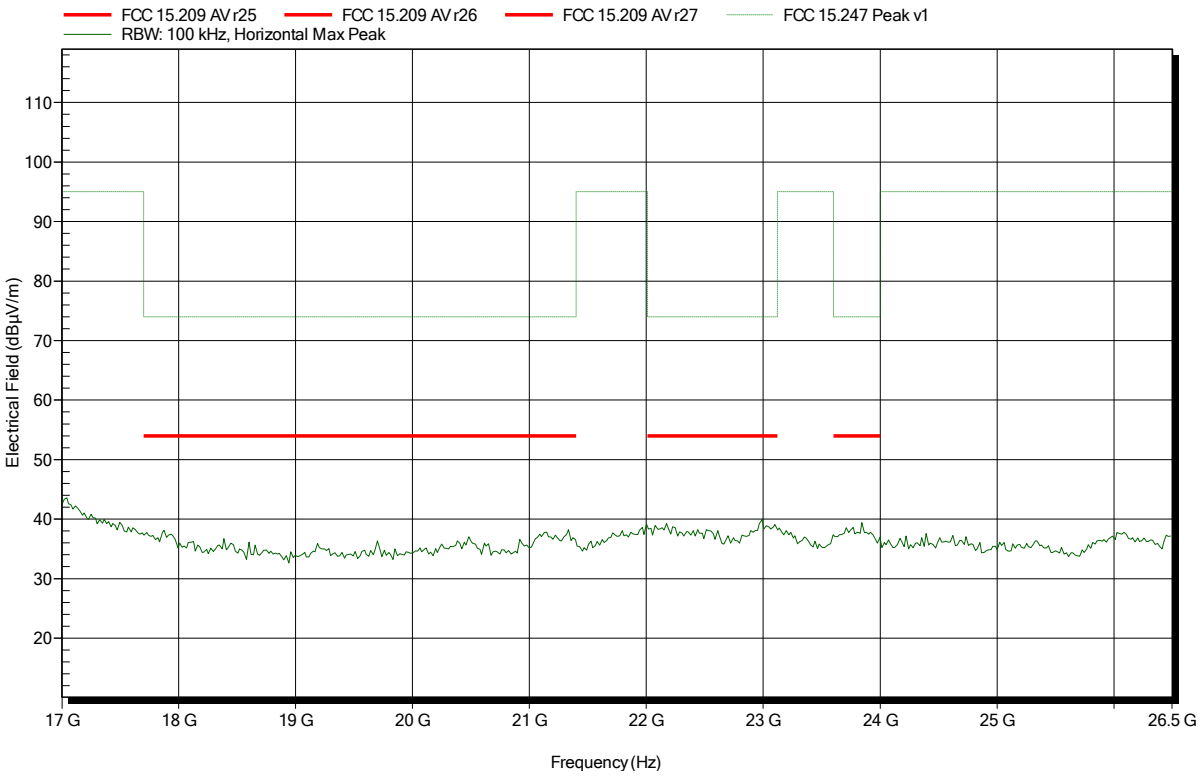


Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Amplifier Research AT 4560, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; ZigBee 2405 MHz
Test Date:	2016-08-31
Note:	

Index 29

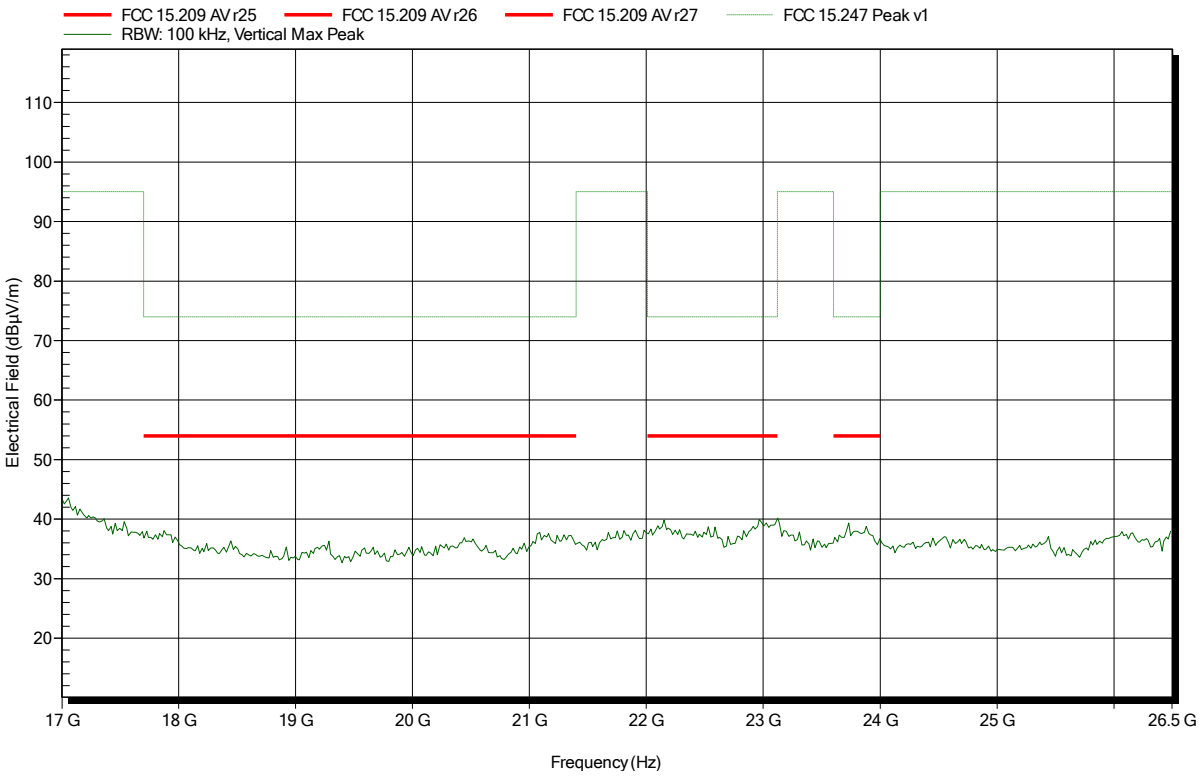


Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Amplifier Research AT 4560, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; ZigBee 2405 MHz
Test Date:	2016-08-31
Note:	

Index 30

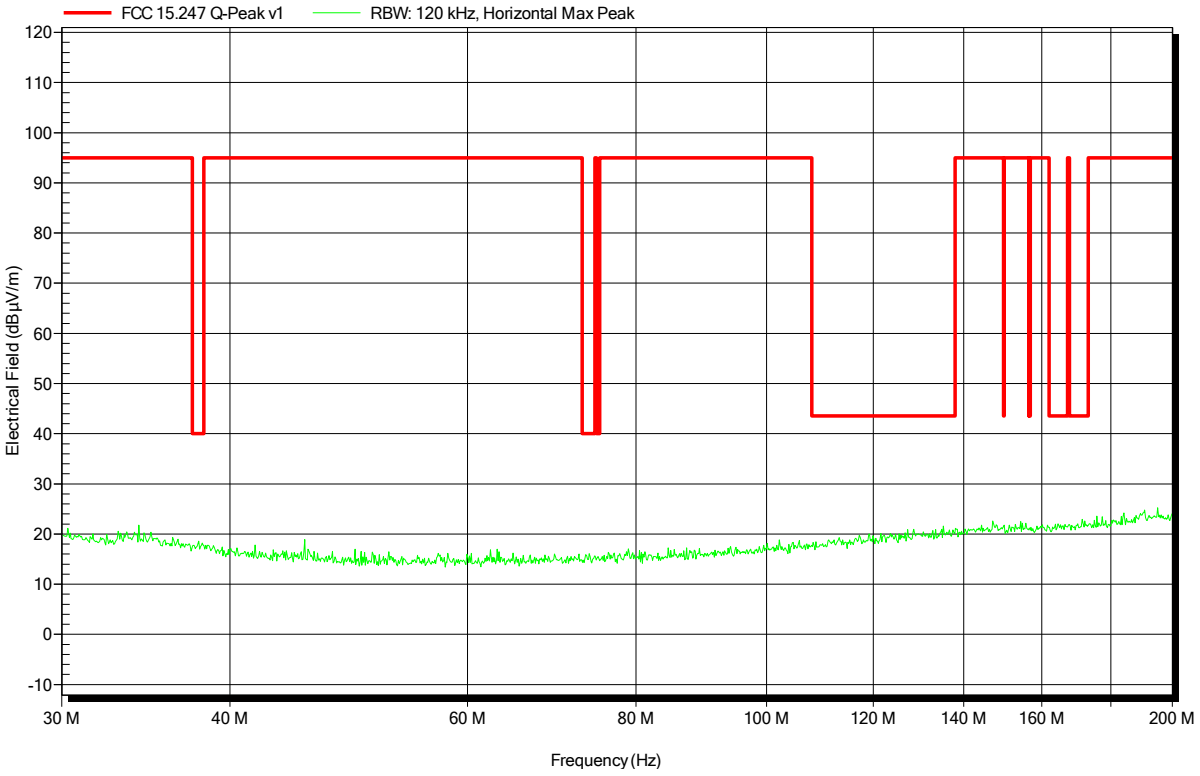


Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	TX; ZigBee 2440 MHz
Test Date:	2016-01-09
Note:	

Index 46

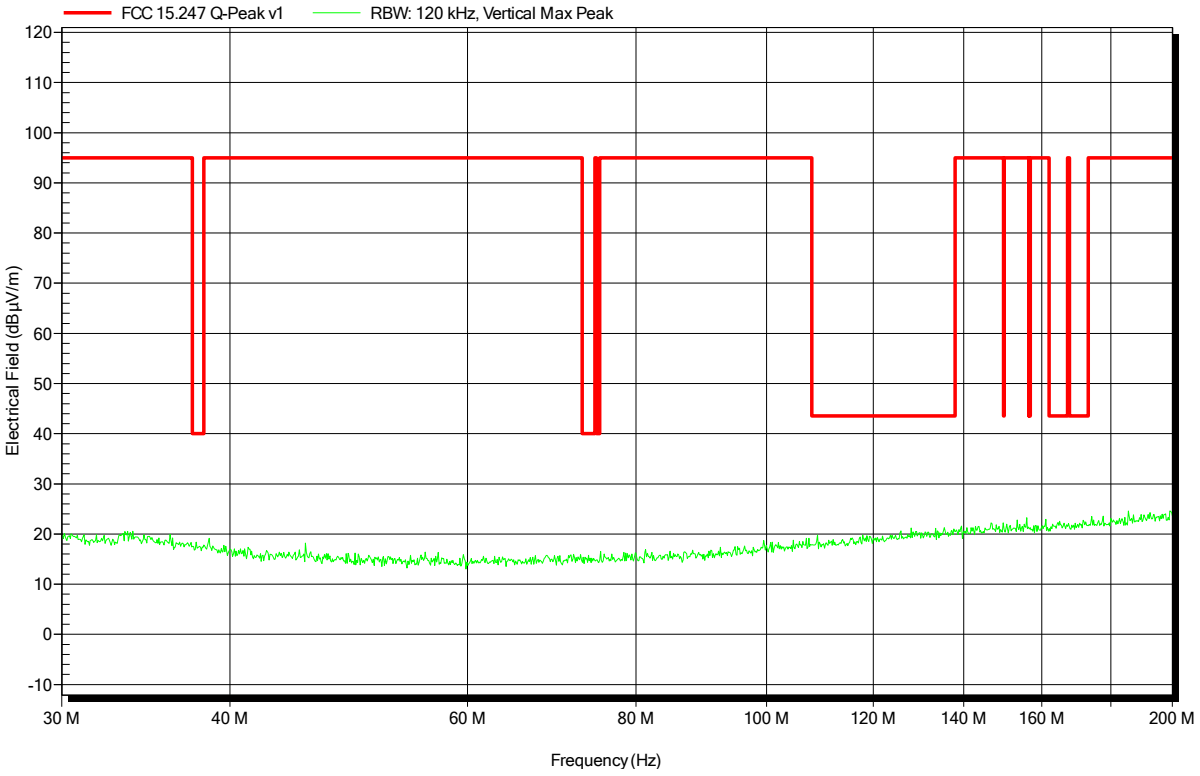


Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	TX; ZigBee 2440 MHz
Test Date:	2016-01-09
Note:	

Index 42

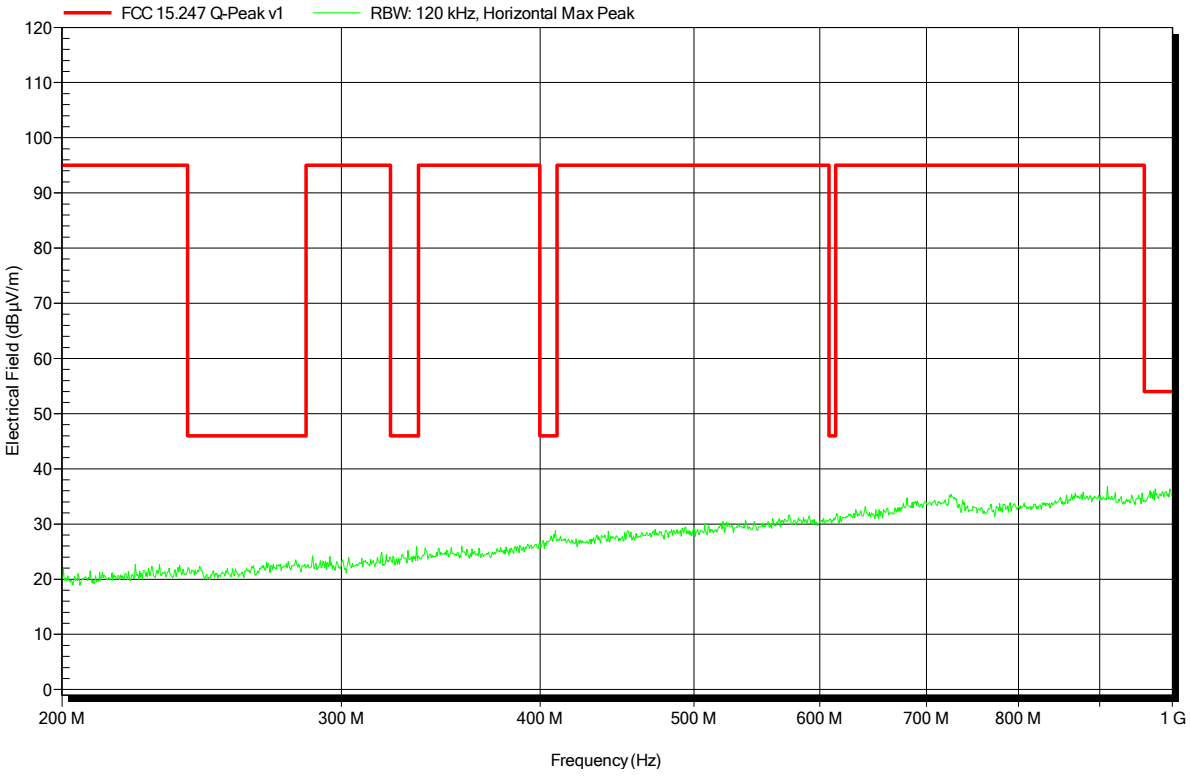


Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	TX; ZigBee 2440 MHz
Test Date:	2016-01-09
Note:	

Index 38

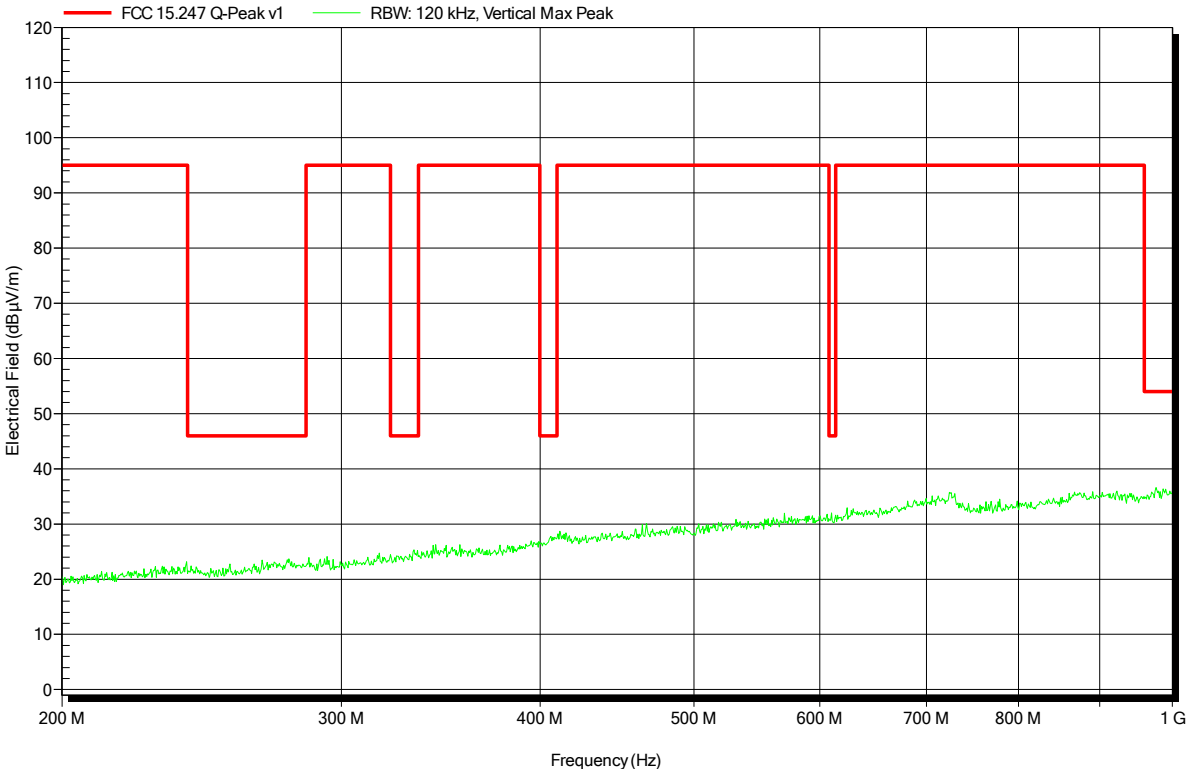


Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	TX; ZigBee 2440 MHz
Test Date:	2016-01-09
Note:	

Index 41

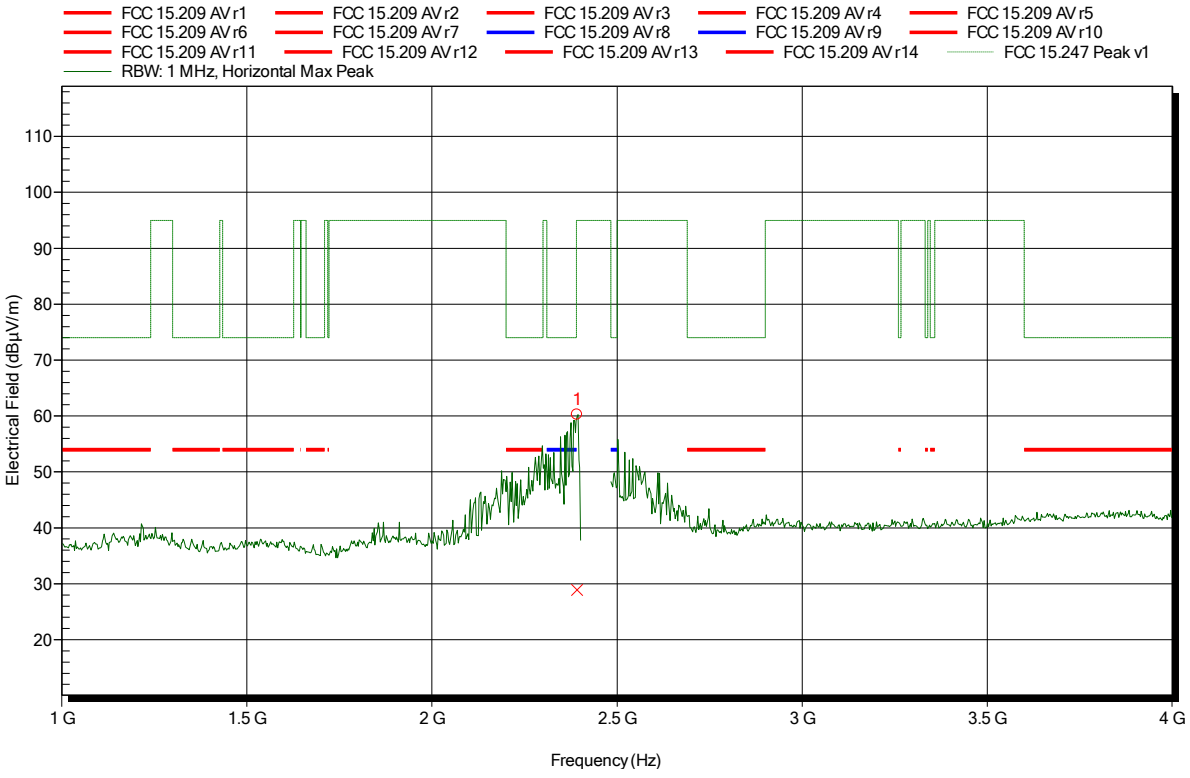


Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; ZigBee 2440 MHz
Test Date:	2016-08-31
Note:	

Index 17



Frequency	Peak	Peak Limit	Peak Difference	Status
2.3924 GHz	60.22 dBµV/m	95 dBµV/m	-34.78 dB	Pass

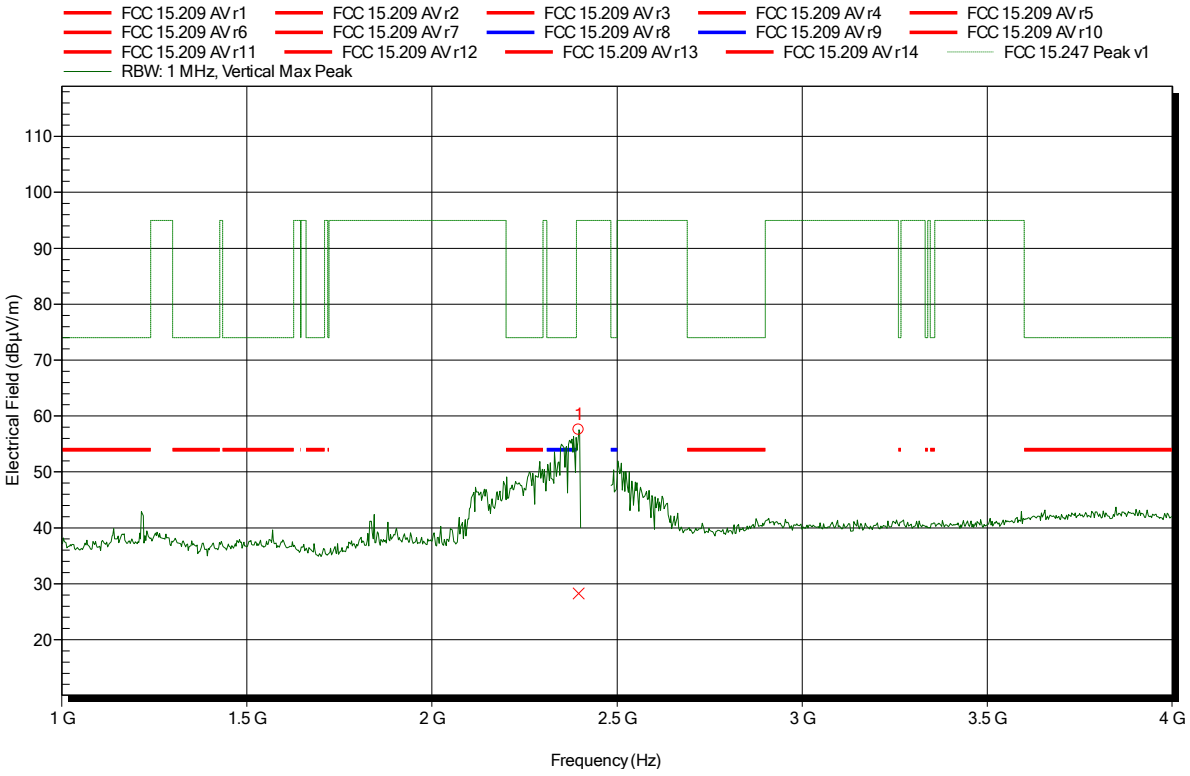
Frequency	Average
2.3924 GHz	28.91 dBµV/m

Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; ZigBee 2440 MHz
Test Date:	2016-08-31
Note:	

Index 18



Frequency	Peak	Peak Limit	Peak Difference	Status
2.3965 GHz	57.52 dBµV/m	95 dBµV/m	-37.48 dB	Pass

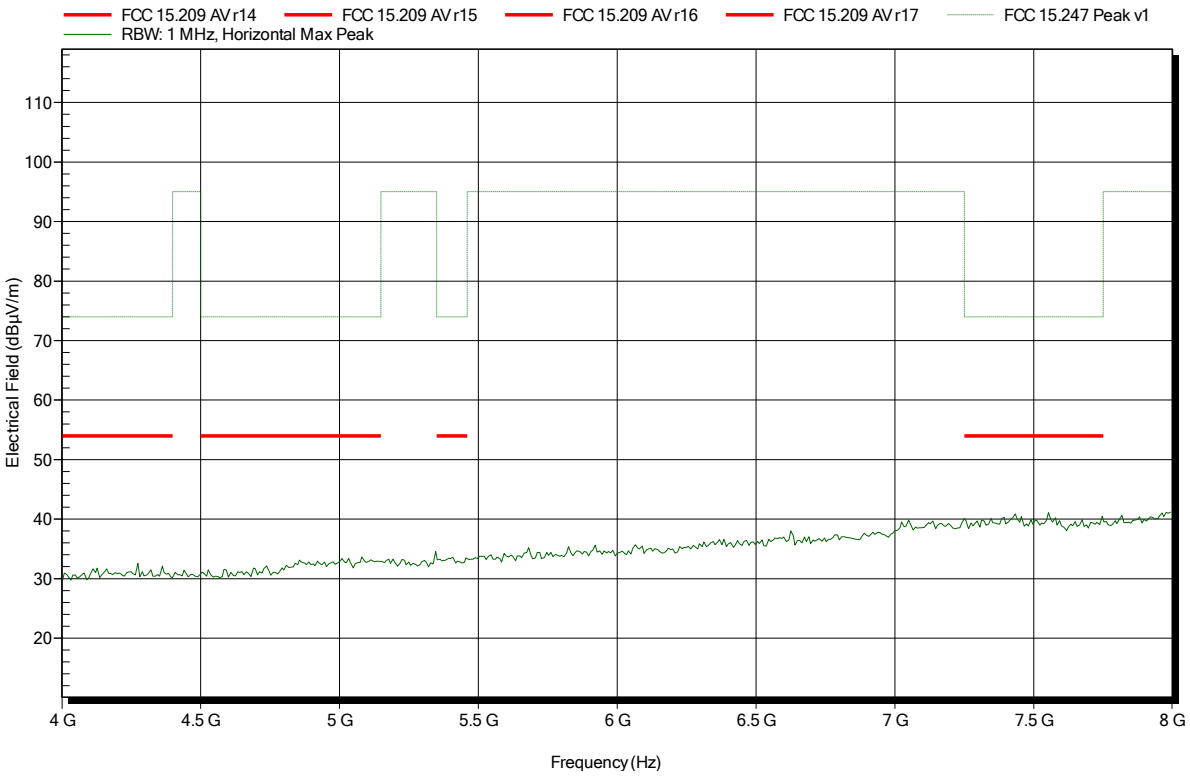
Frequency	Average
2.3965 GHz	28.25 dBµV/m

Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; ZigBee 2440 MHz
Test Date:	2016-08-31
Note:	

Index 16

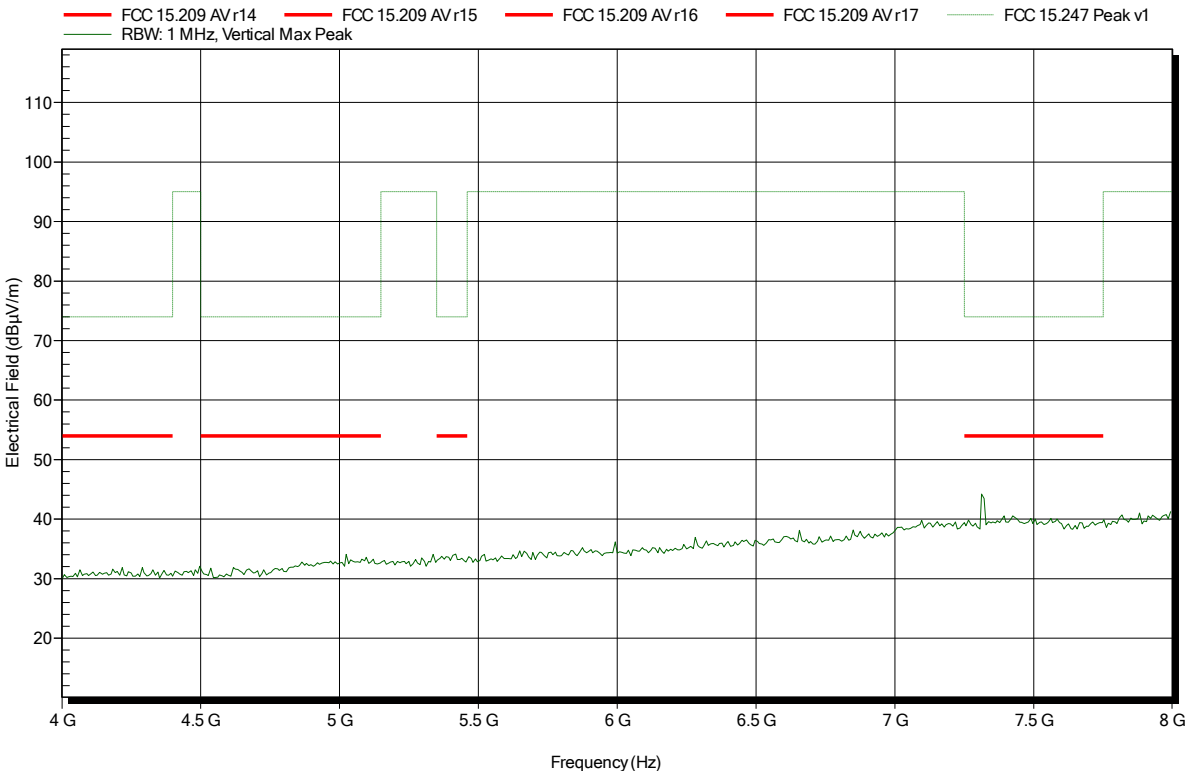


Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; ZigBee 2440 MHz
Test Date:	2016-08-31
Note:	

Index 19

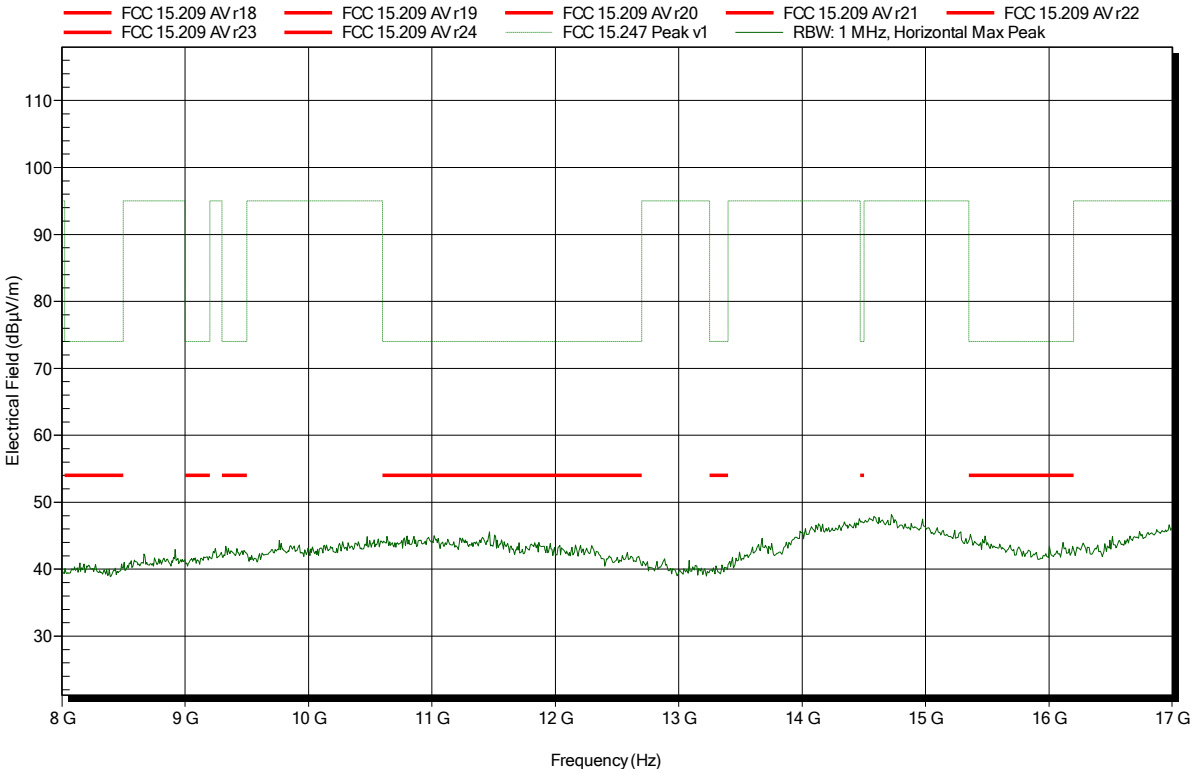


Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; ZigBee 2440 MHz
Test Date:	2016-08-31
Note:	

Index 15

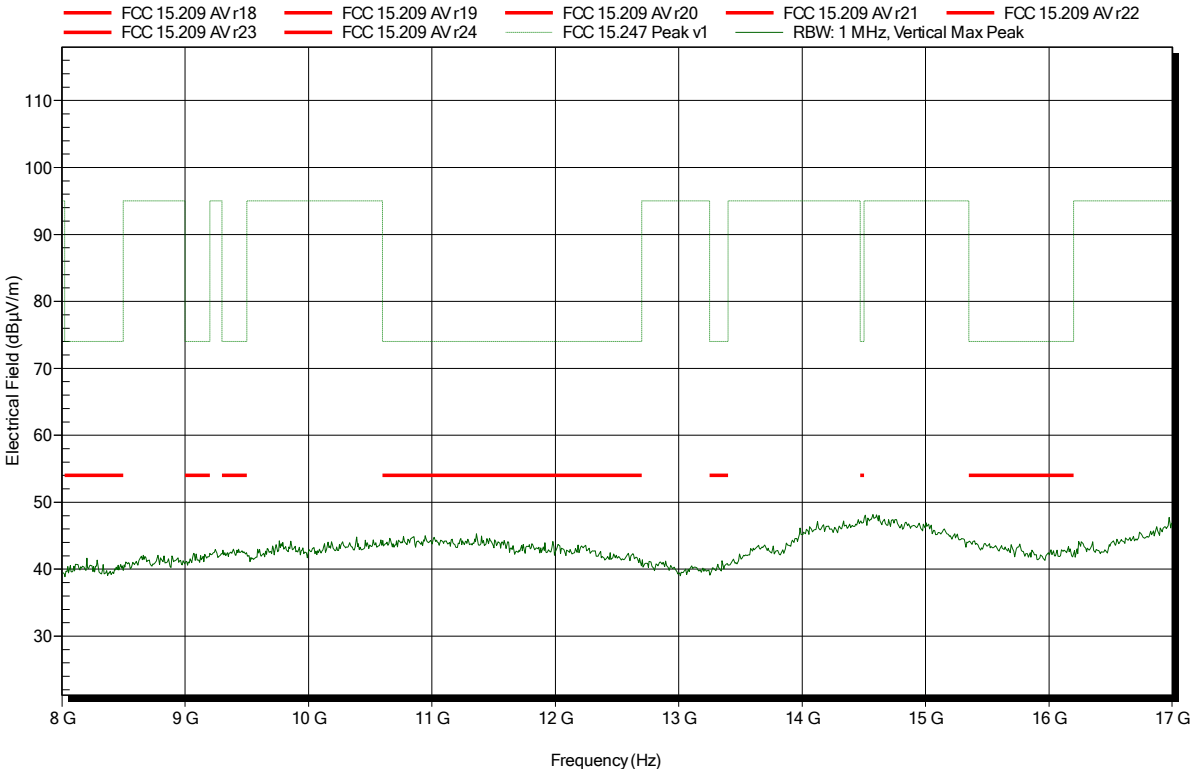


Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; ZigBee 2440 MHz
Test Date:	2016-08-31
Note:	

Index 20

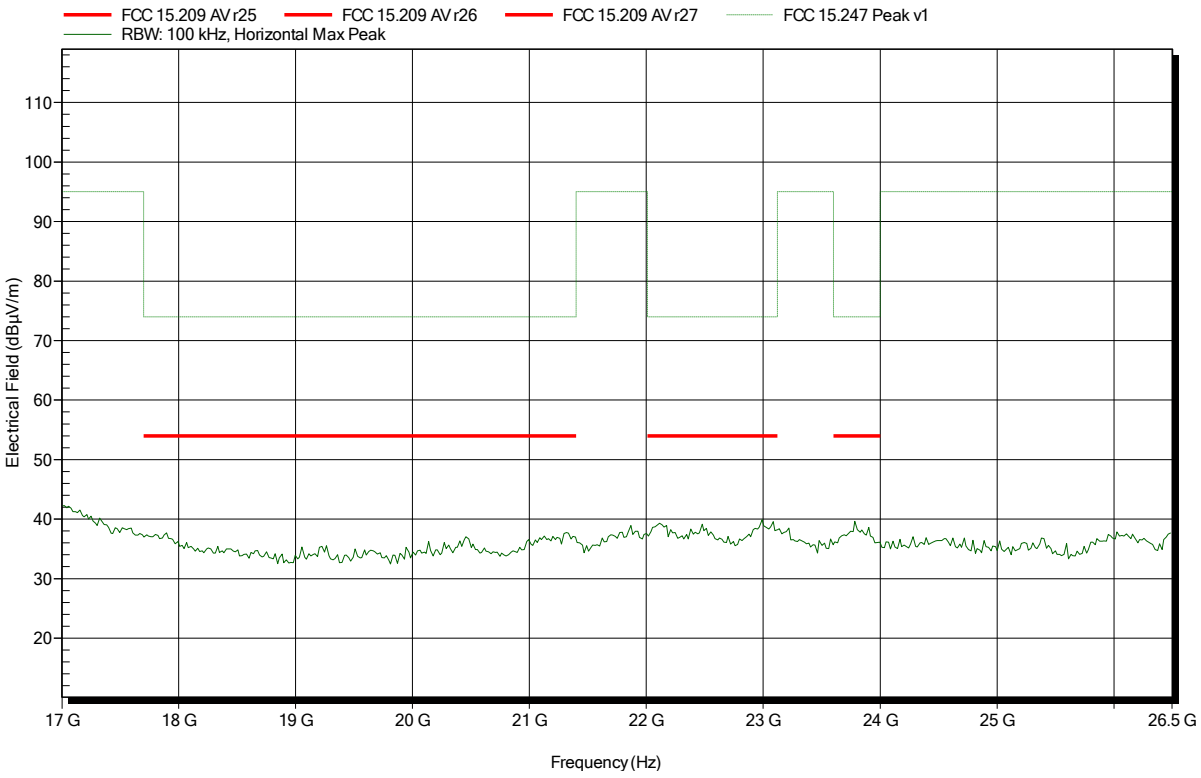


Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Amplifier Research AT 4560,Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; ZigBee 2440 MHz
Test Date:	2016-08-31
Note:	

Index 14

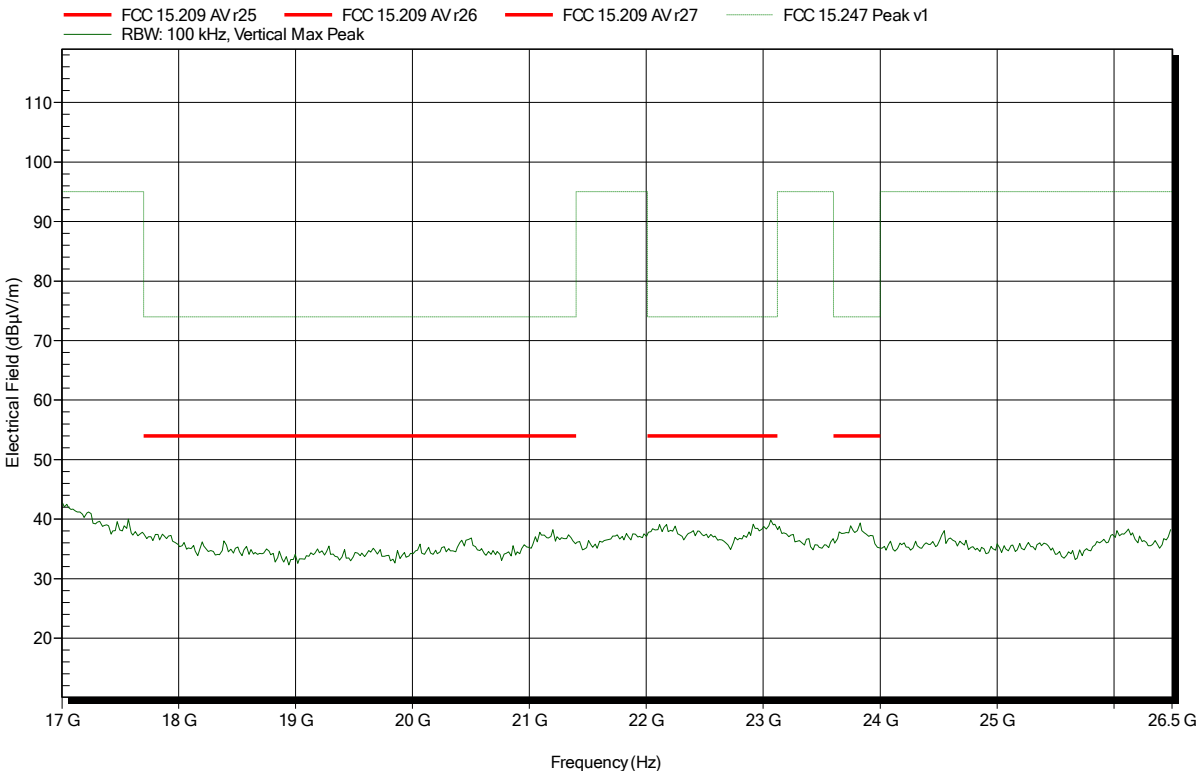


Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Amplifier Research AT 4560,Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; ZigBee 2440 MHz
Test Date:	2016-08-31
Note:	

Index 13

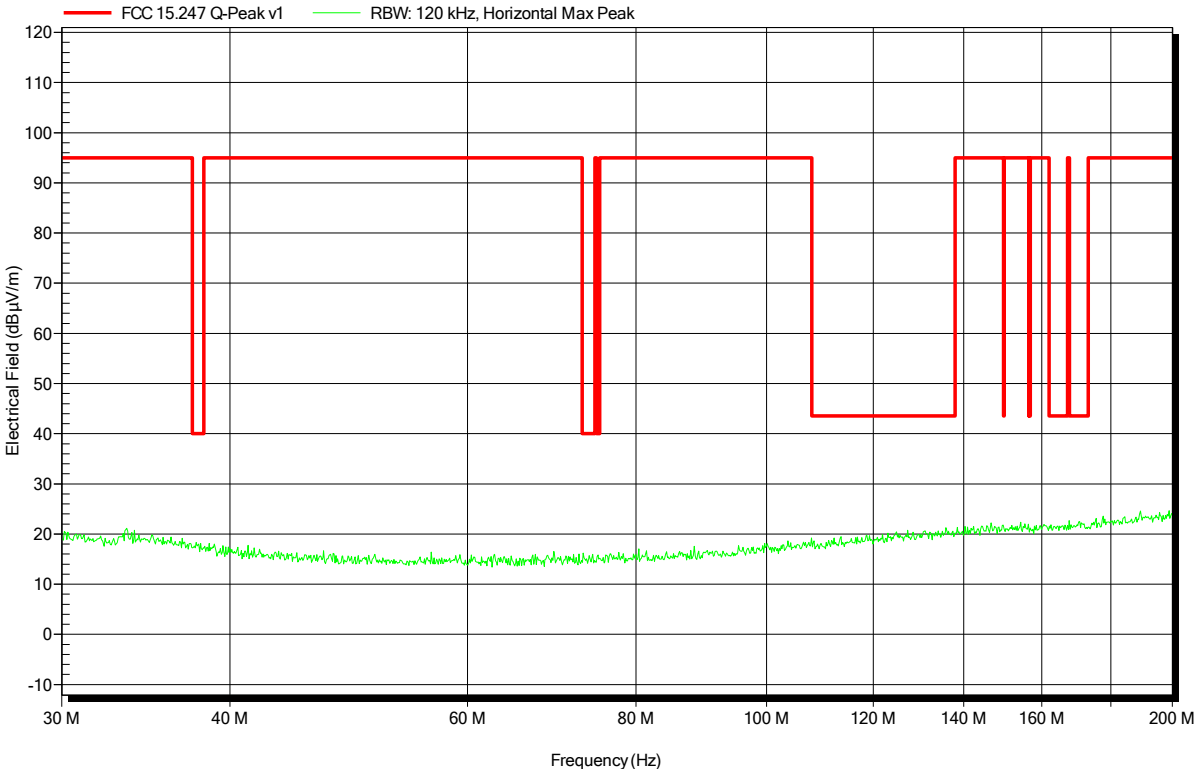


Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	TX; ZigBee 2480 MHz
Test Date:	2016-01-09
Note:	

Index 45

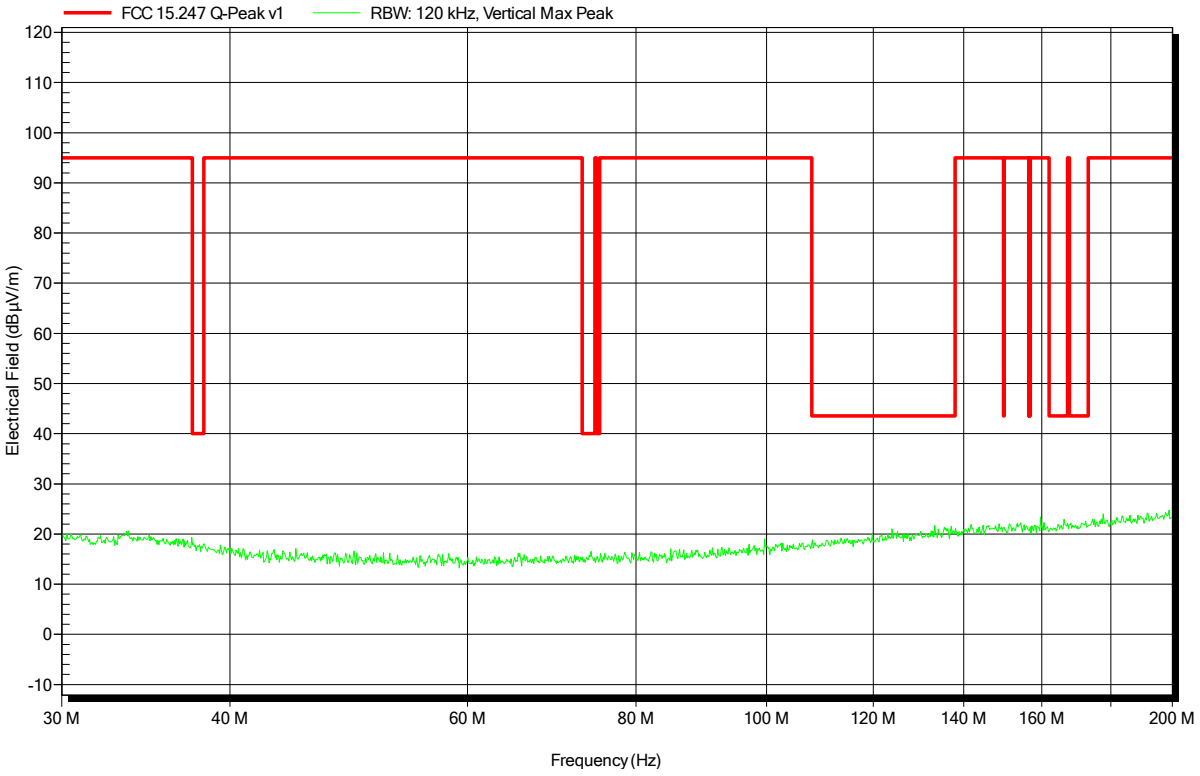


Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	TX; ZigBee 2480 MHz
Test Date:	2016-01-09
Note:	

Index 44

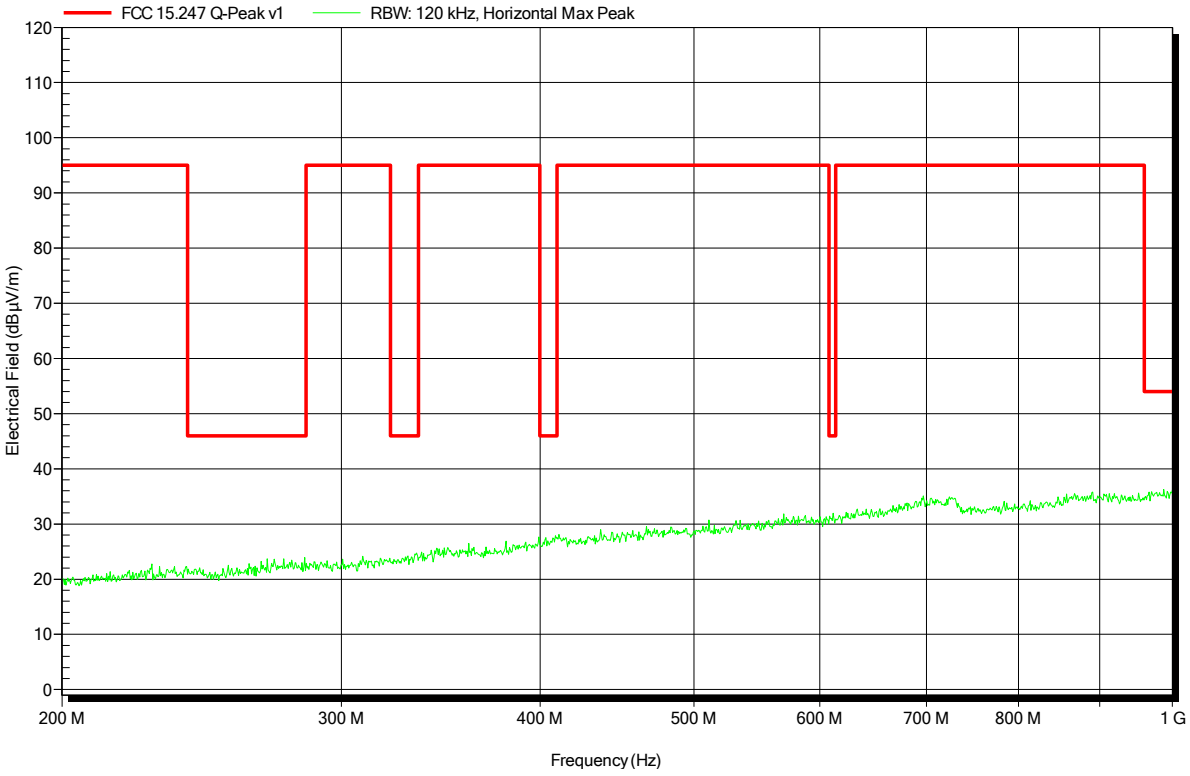


Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	TX; ZigBee 2480 MHz
Test Date:	2016-01-09
Note:	

Index 39

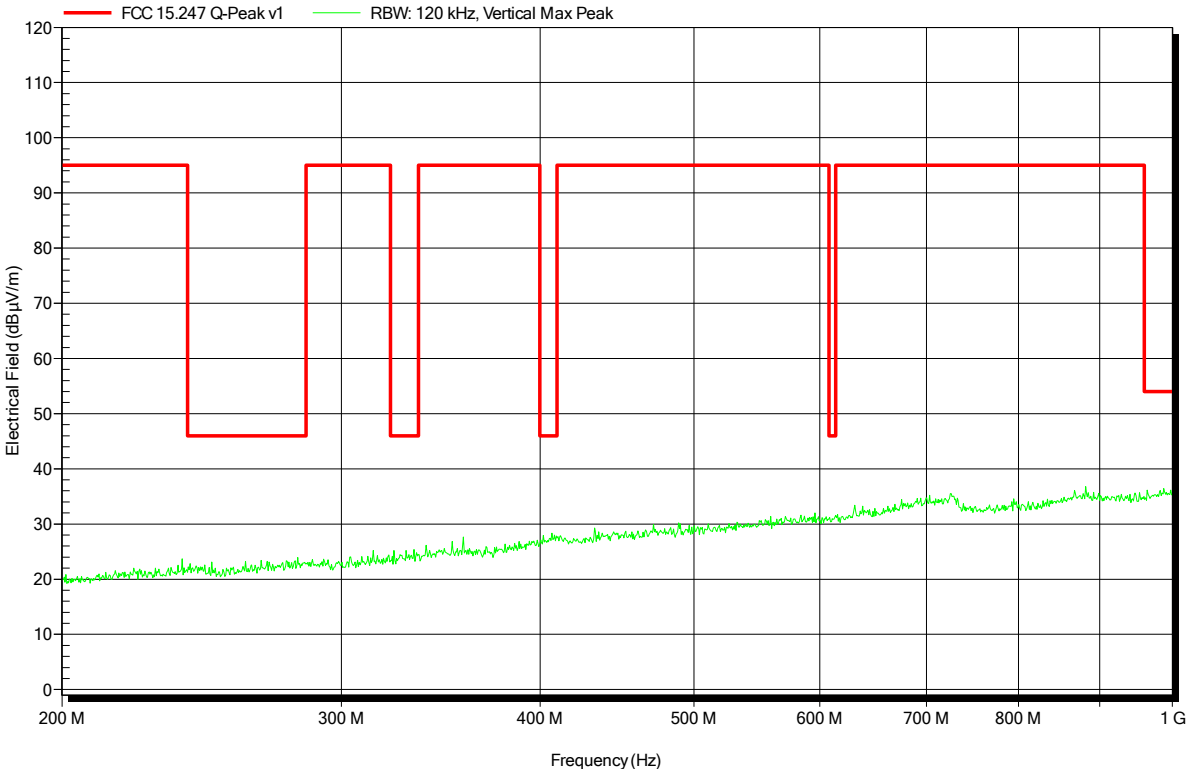


Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	TX; ZigBee 2480 MHz
Test Date:	2016-01-09
Note:	

Index 40

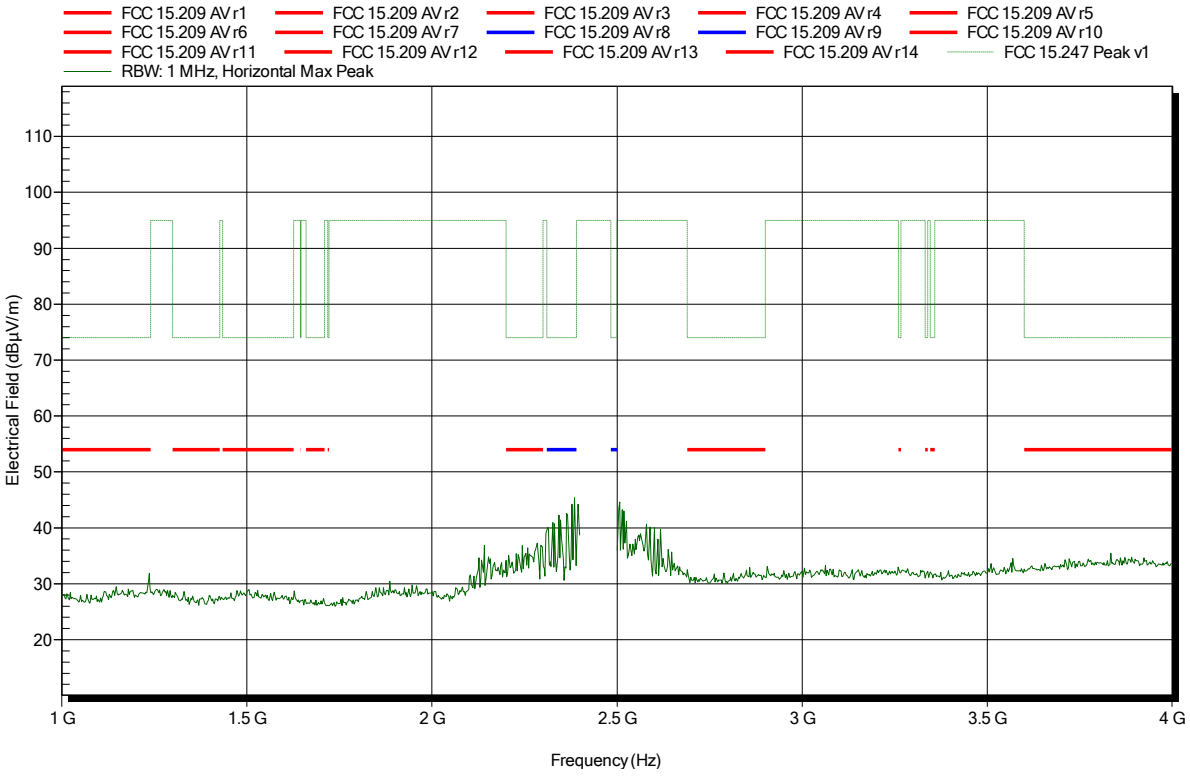


Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	RX; ZigBee 2480 MHz
Test Date:	2016-08-31
Note:	

Index 9

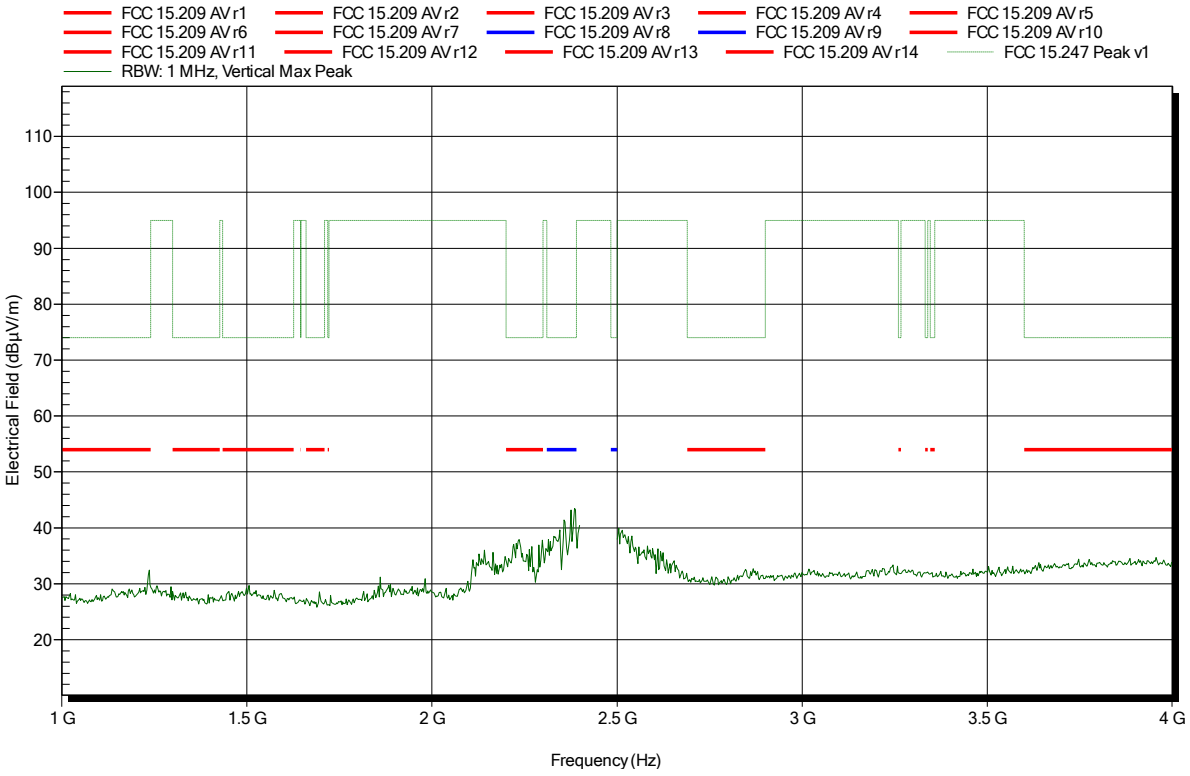


Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; ZigBee 2480 MHz
Test Date:	2016-08-31
Note:	

Index 1

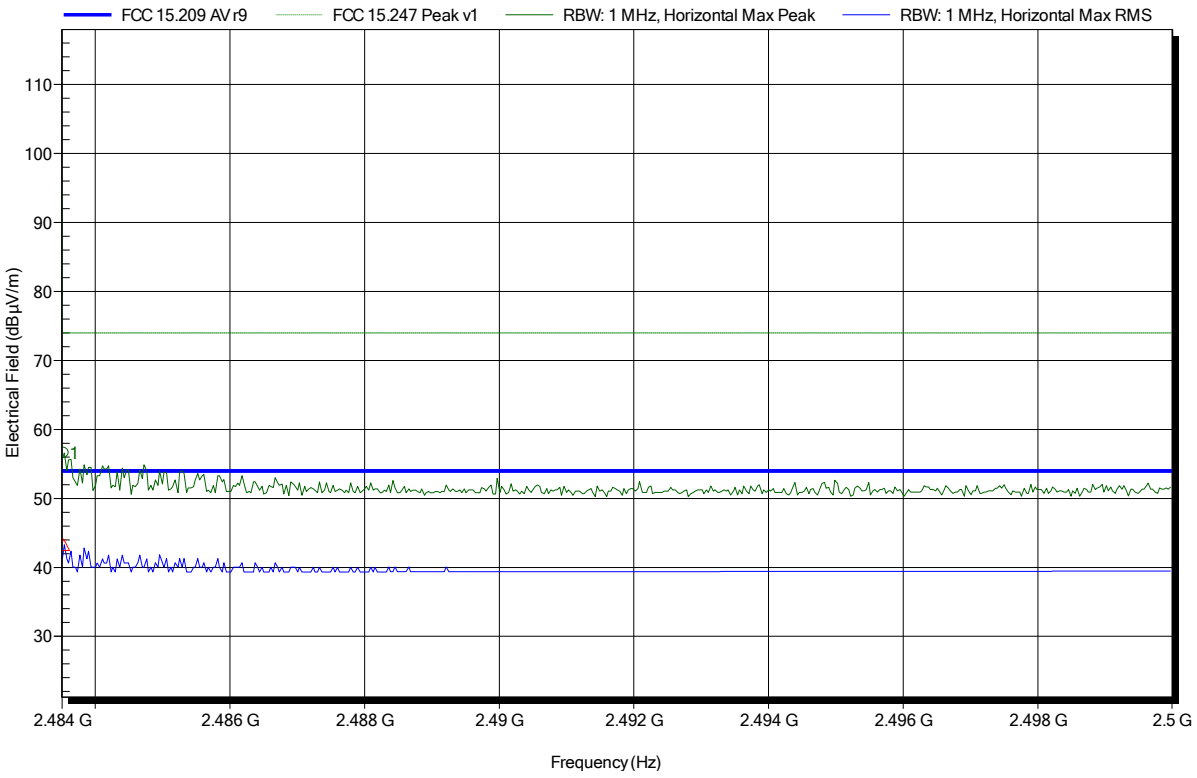


Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; ZigBee 2480 MHz
Test Date:	2016-08-31
Note:	upper bandedge

Index 10



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.4835 GHz	56.61 dBµV/m	74 dBµV/m	-17.39 dB	Pass

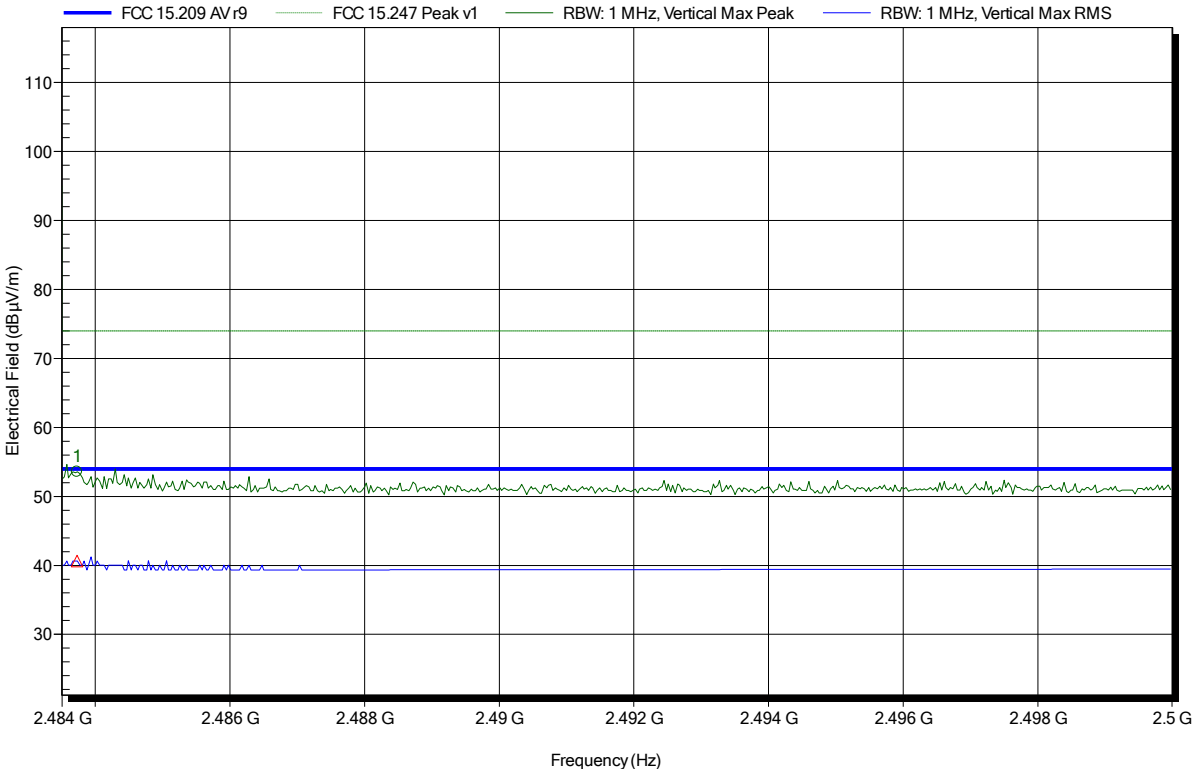
Frequency	RMS	RMS Limit	RMS Difference	RMS Status
2.4835 GHz	43.29 dBµV/m	54 dBµV/m	-10.71 dB	Pass

Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; ZigBee 2480 MHz
Test Date:	2016-08-31
Note:	upper bandedge

Index 2



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.4837 GHz	53.58 dBµV/m	74 dBµV/m	-20.42 dB	Pass

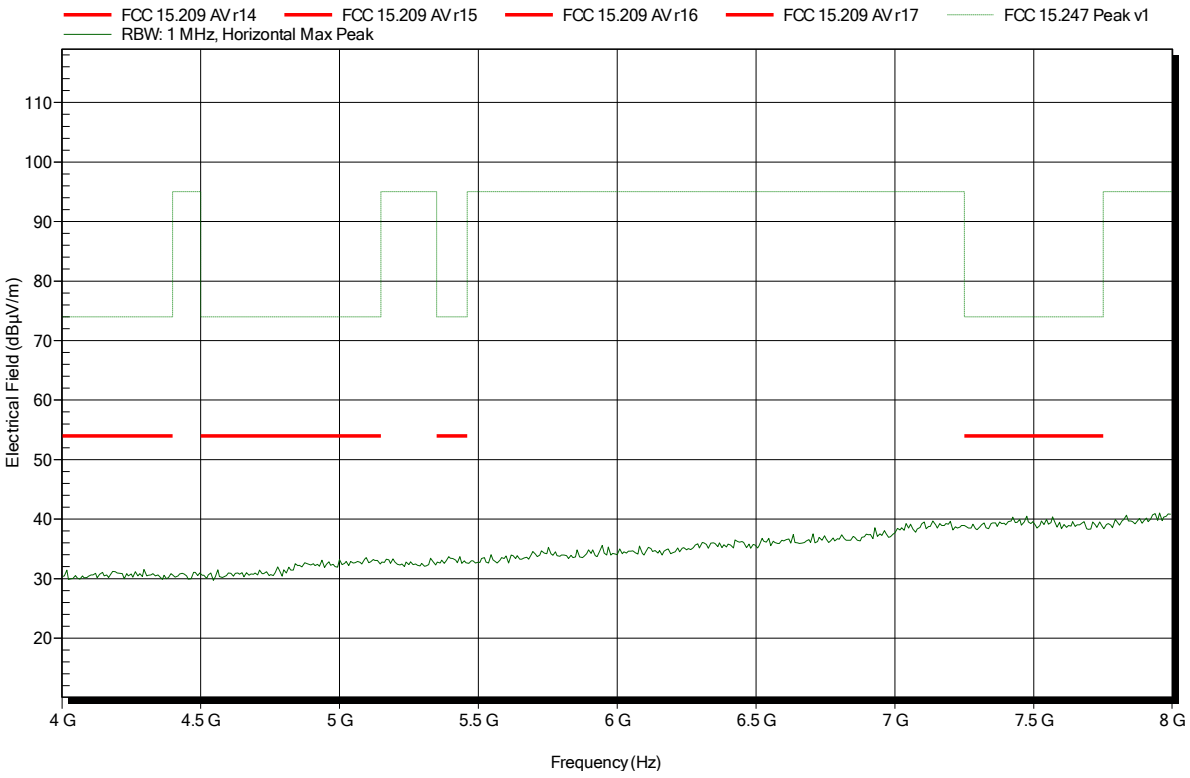
Frequency	RMS	RMS Limit	RMS Difference	RMS Status
2.4837 GHz	40.65 dBµV/m	54 dBµV/m	-13.35 dB	Pass

Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; ZigBee 2480 MHz
Test Date:	2016-08-31
Note:	

Index 6

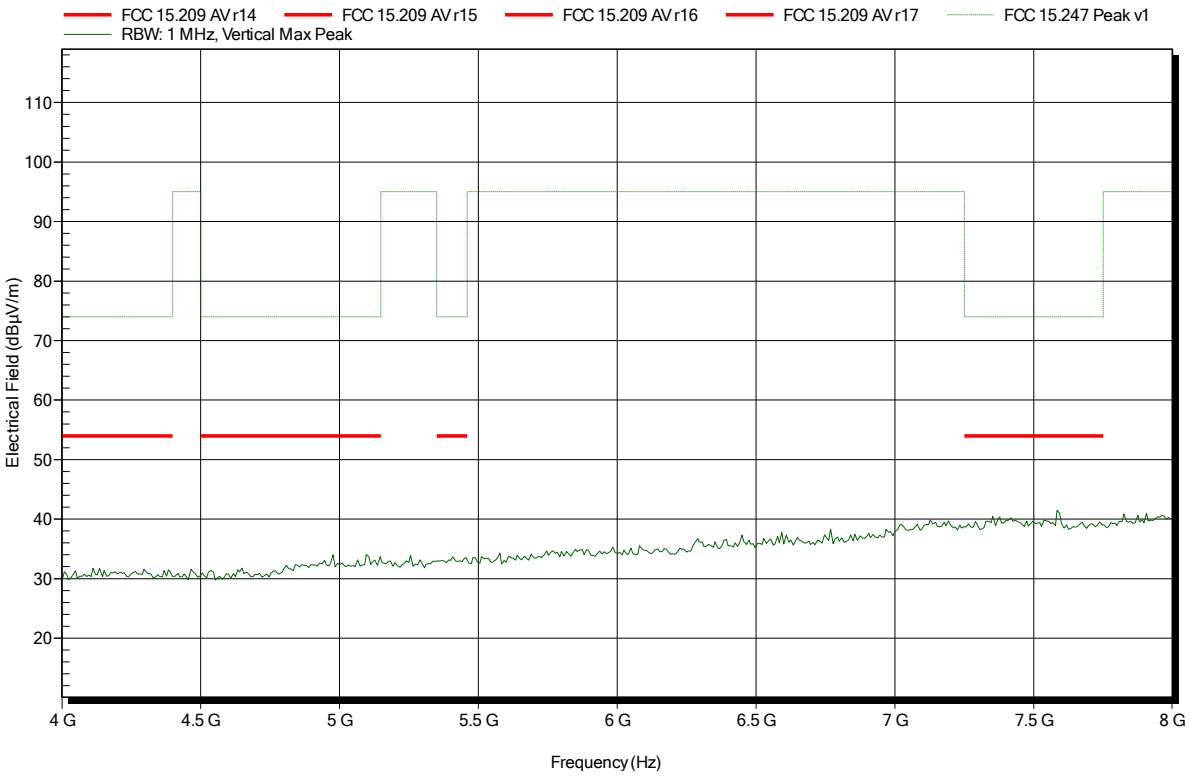


Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; ZigBee 2480 MHz
Test Date:	2016-08-31
Note:	

Index 3

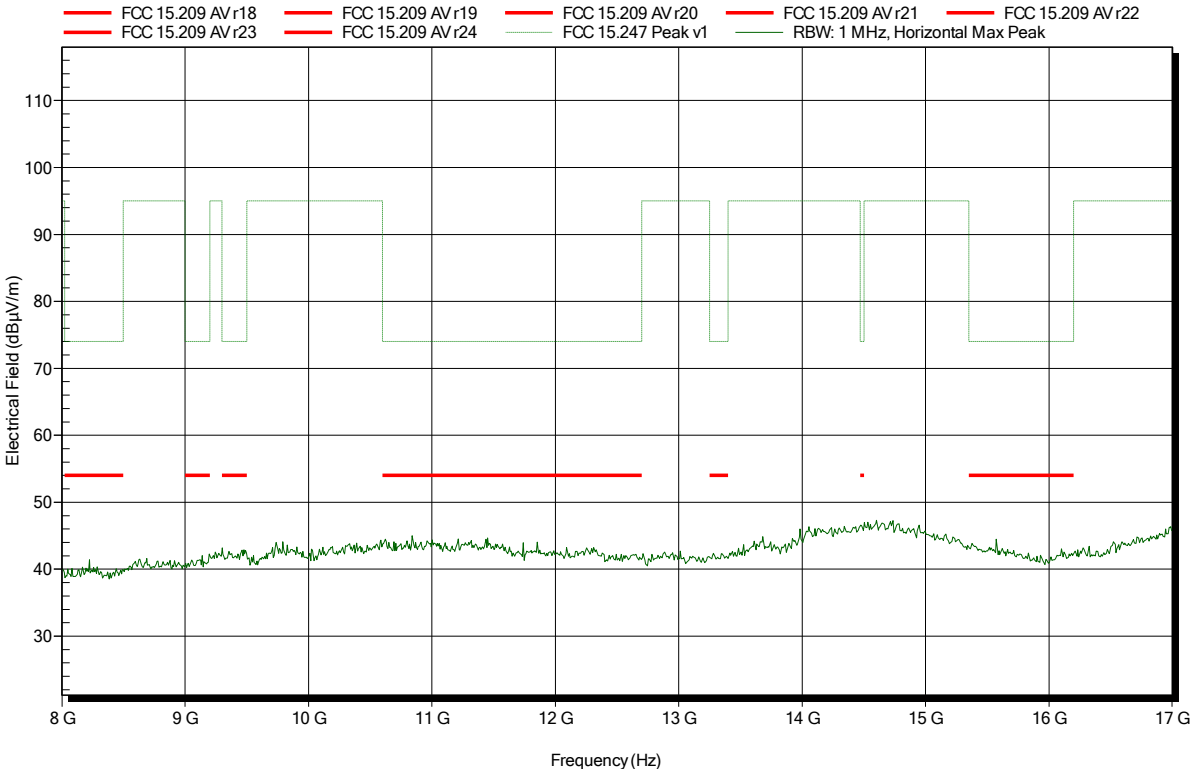


Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; ZigBee 2480 MHz
Test Date:	2016-08-31
Note:	

Index 5

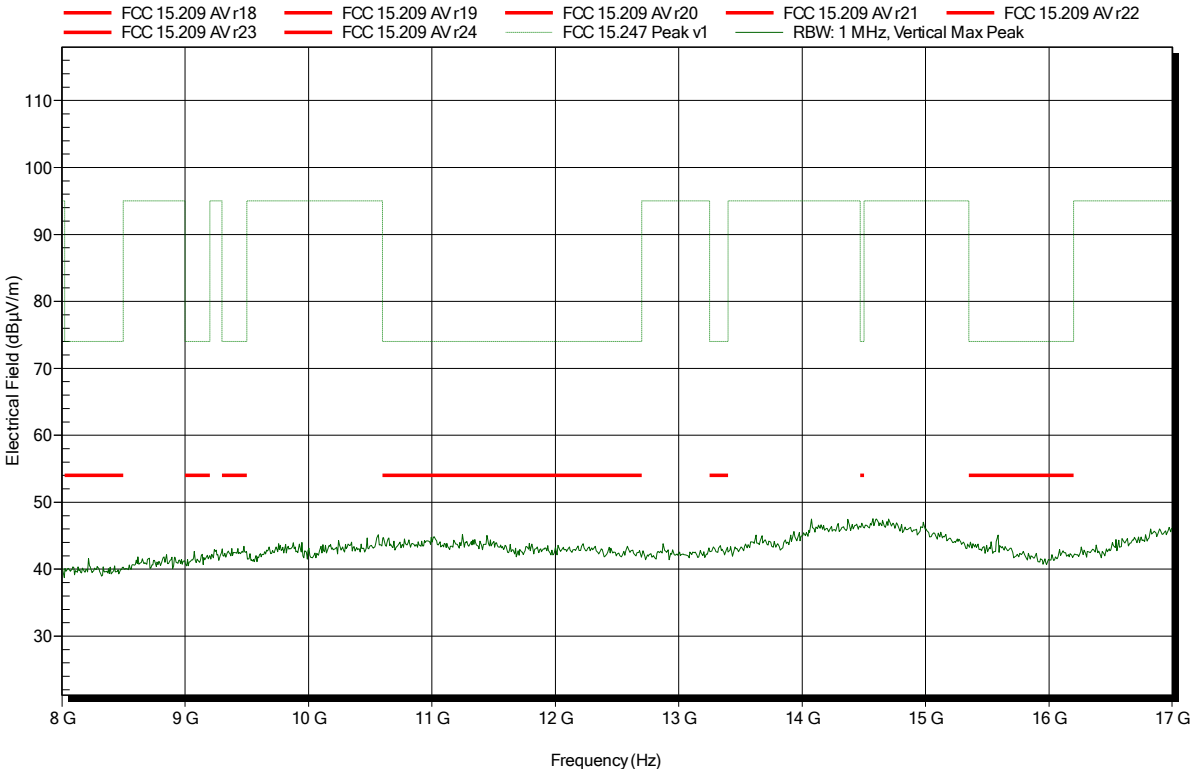


Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; ZigBee 2480 MHz
Test Date:	2016-08-31
Note:	

Index 4

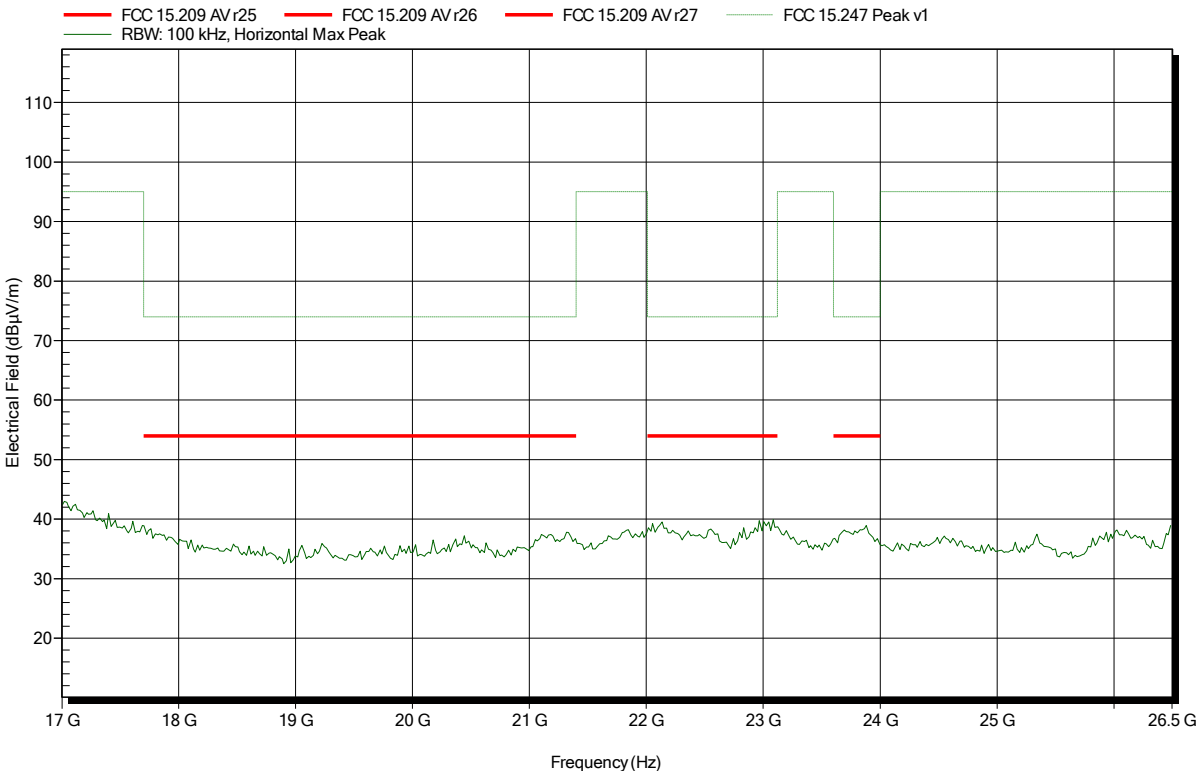


Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Amplifier Research AT 4560,Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; ZigBee 2480 MHz
Test Date:	2016-08-31
Note:	

Index 11

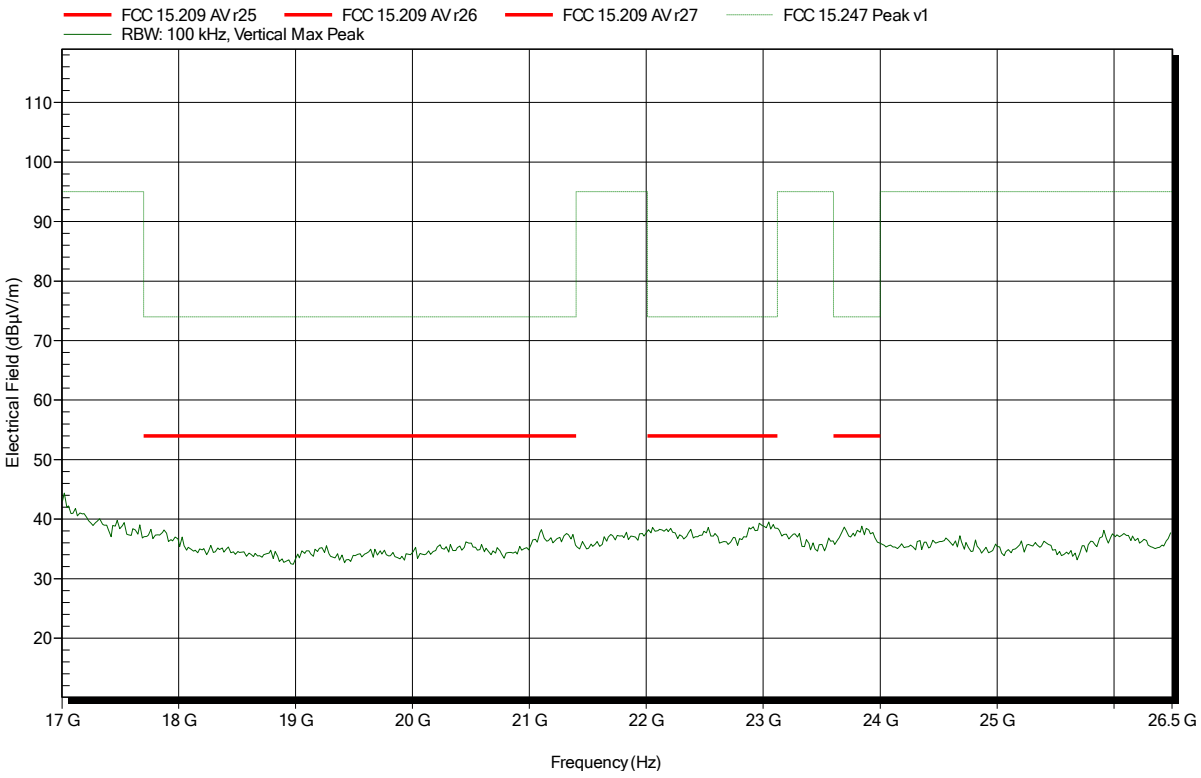


Spurious emissions according to FCC 15.247, RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Amplifier Research AT 4560,Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; ZigBee 2480 MHz
Test Date:	2016-08-31
Note:	

Index 12



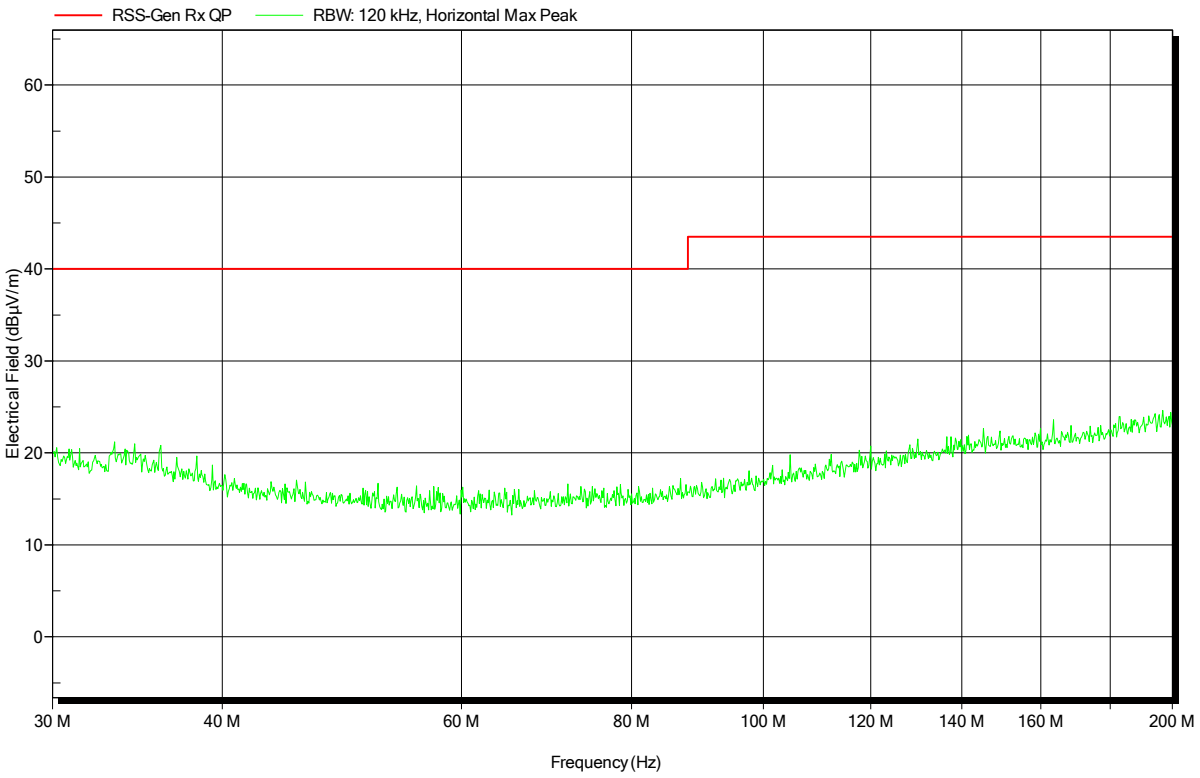
ANNEX B Receiver radiated spurious emissions

Spurious emissions according to RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	RX; ZigBee Scan Mode
Test Date:	2016-01-09
Note:	

Index 39

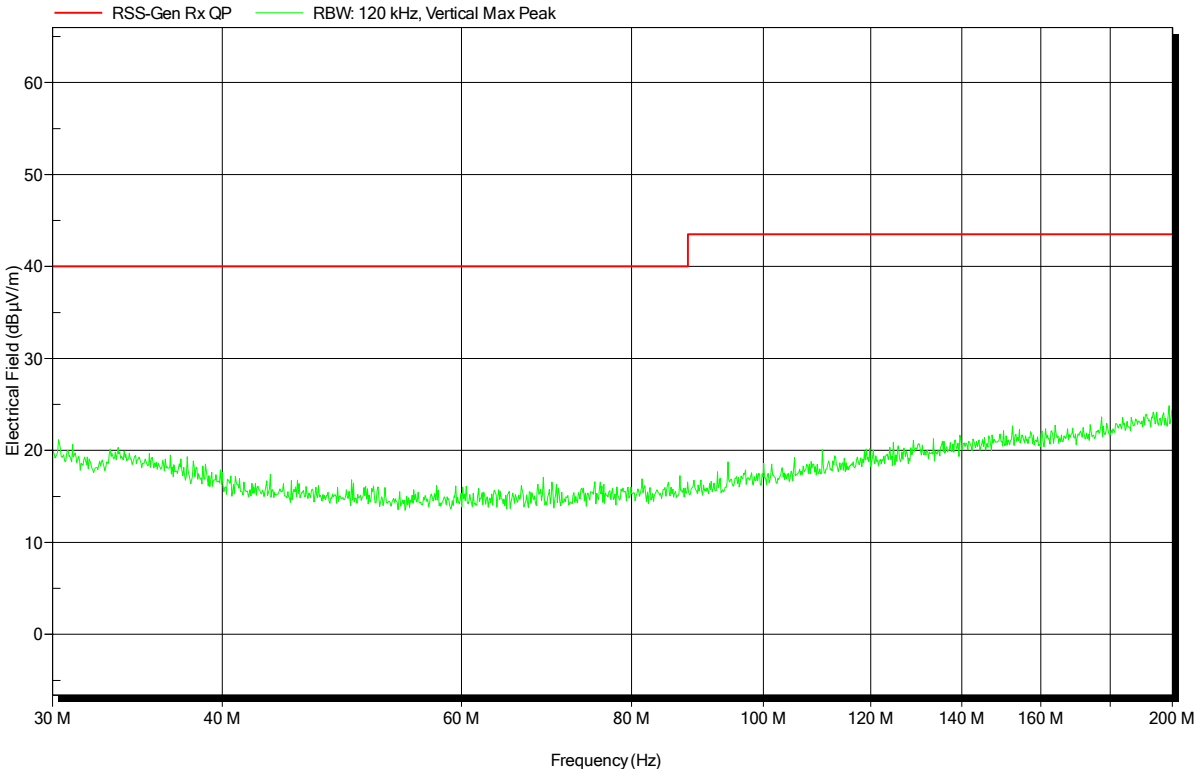


Spurious emissions according to RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	RX; ZigBee Scan Mode
Test Date:	2016-01-09
Note:	

Index 40

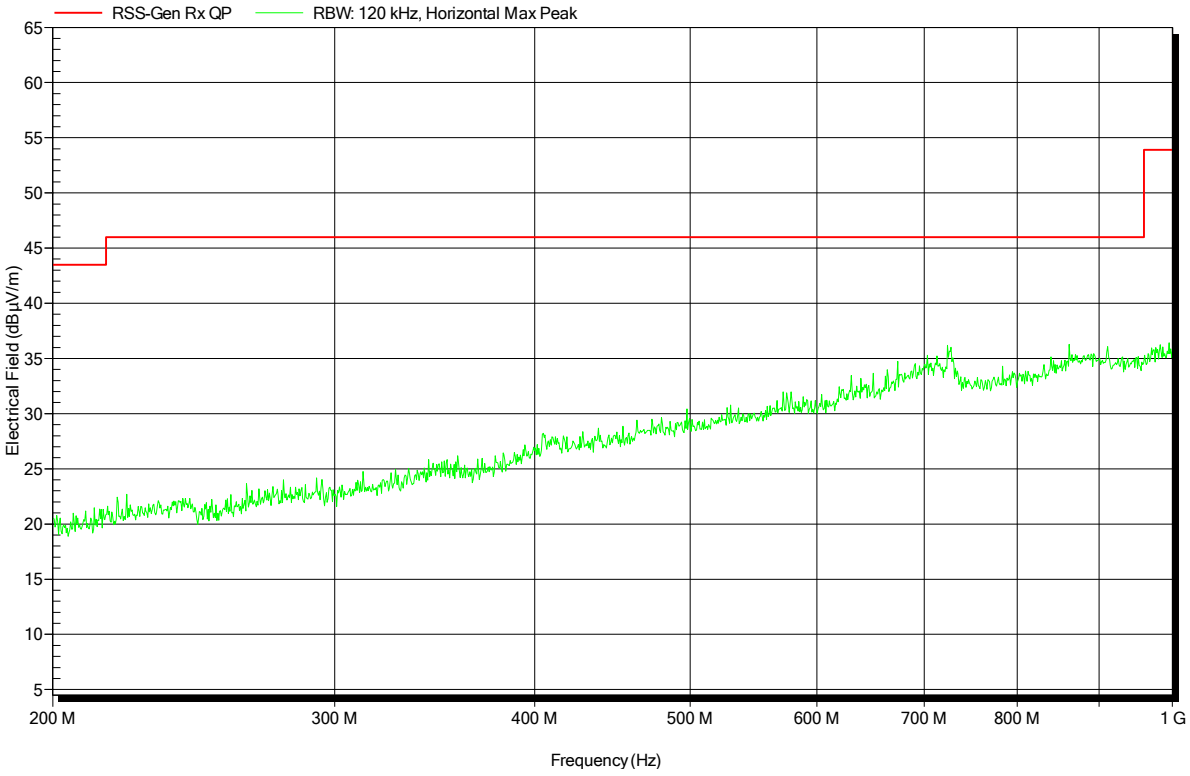


Spurious emissions according to RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	RX; ZigBee Scan Mode
Test Date:	2016-01-09
Note:	

Index 42

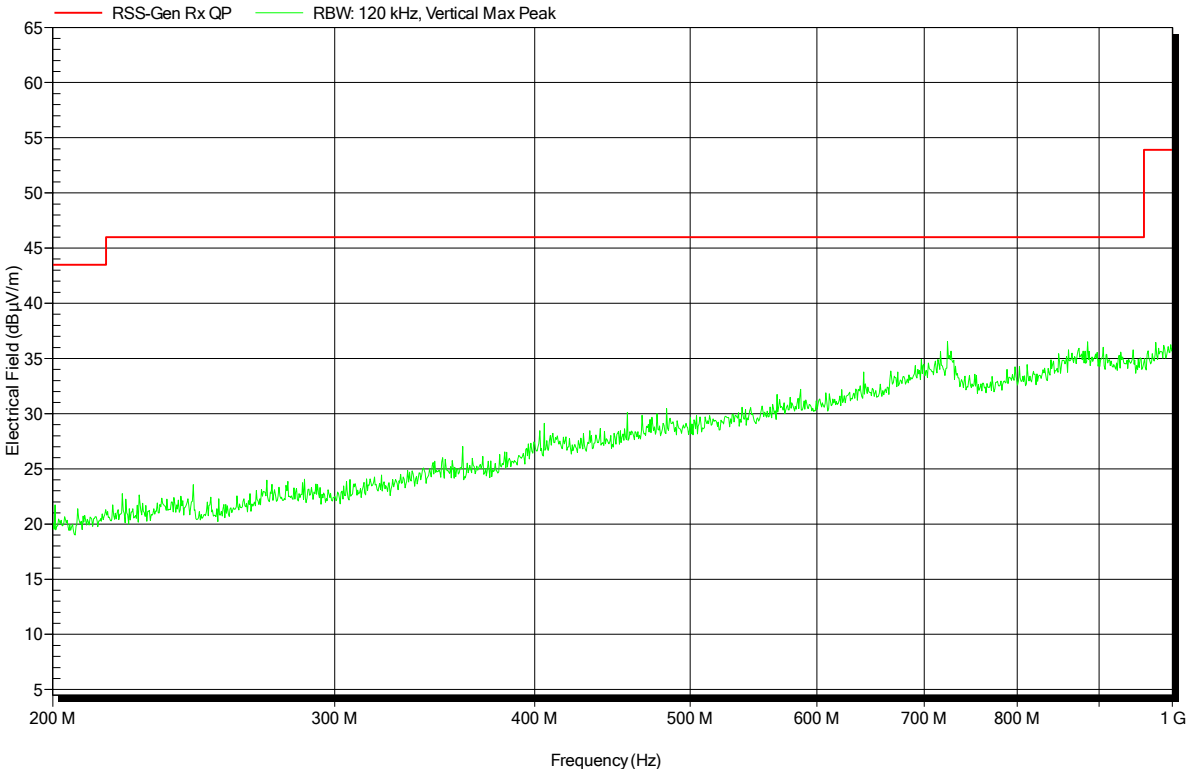


Spurious emissions according to RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	RX; ZigBee Scan Mode
Test Date:	2016-01-09
Note:	

Index 41

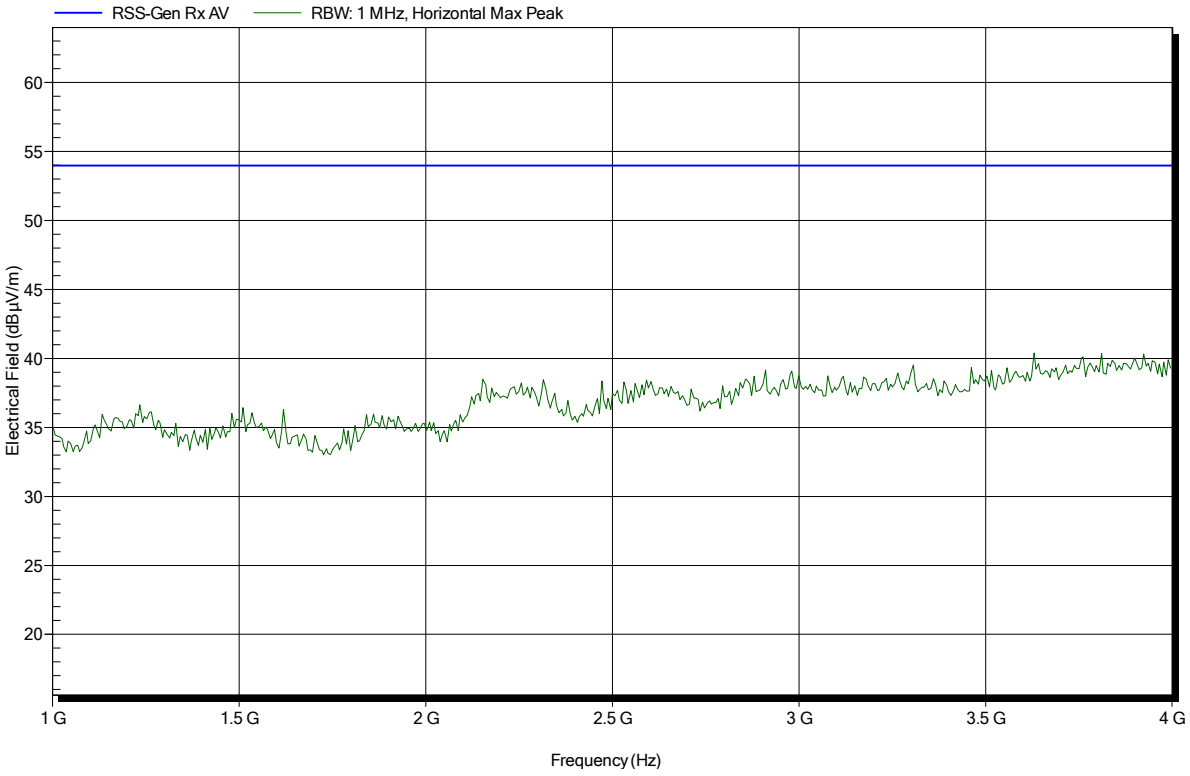


Spurious emissions according to RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	3 m
Mode:	RX; ZigBee Scan Mode
Test Date:	2016-08-31
Note:	

Index 37

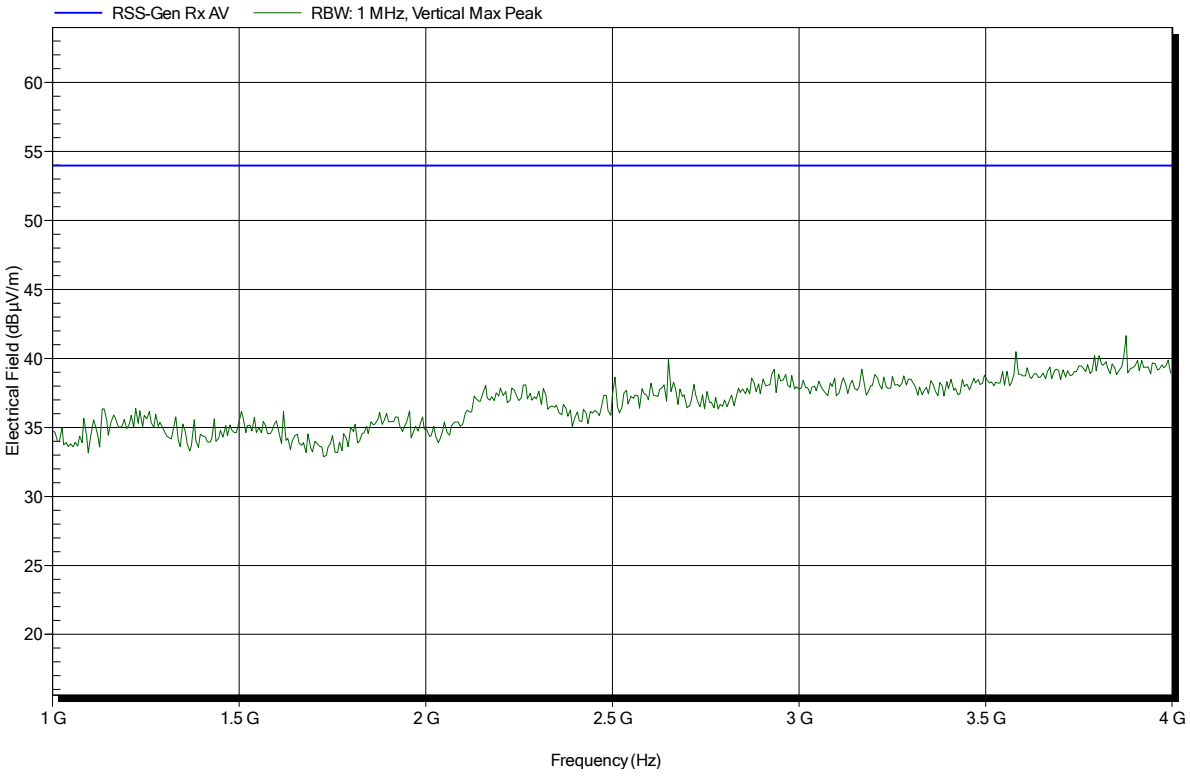


Spurious emissions according to RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	3 m
Mode:	RX; ZigBee Scan Mode
Test Date:	2016-08-31
Note:	

Index 36

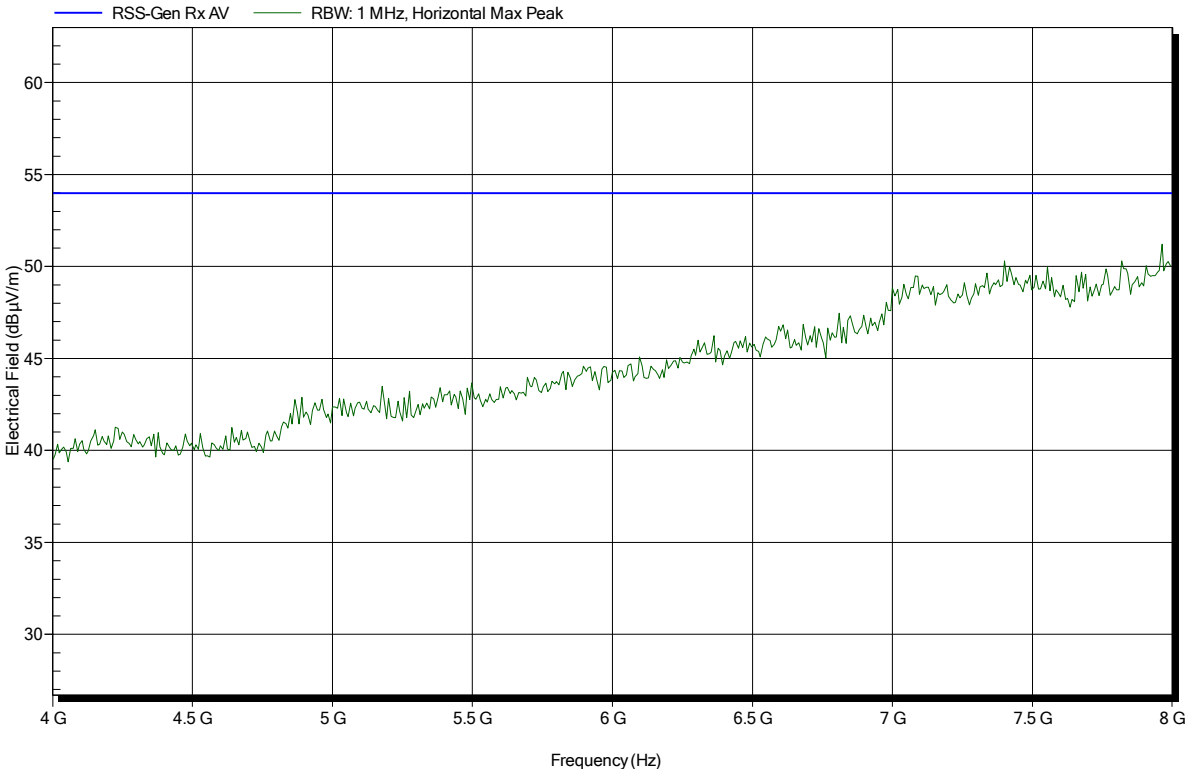


Spurious emissions according to RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	3 m
Mode:	RX; ZigBee Scan Mode
Test Date:	2016-08-31
Note:	

Index 38

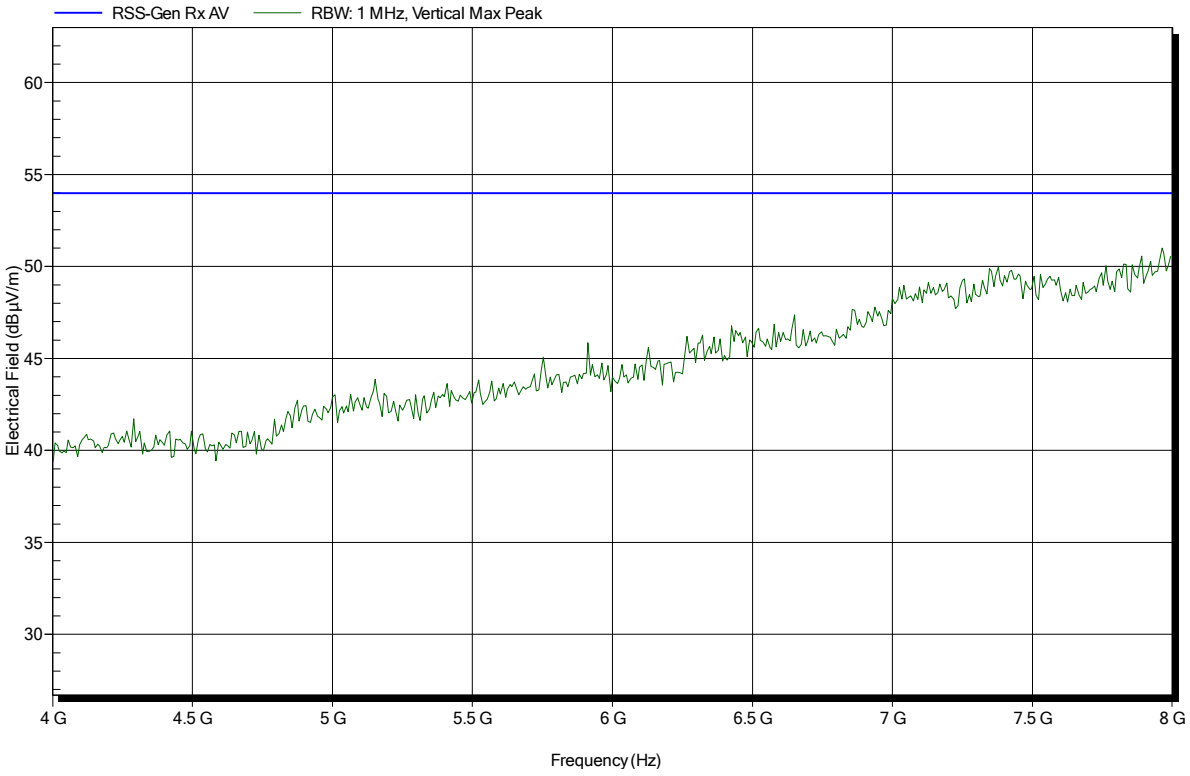


Spurious emissions according to RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	3 m
Mode:	RX; ZigBee Scan Mode
Test Date:	2016-08-31
Note:	

Index 35

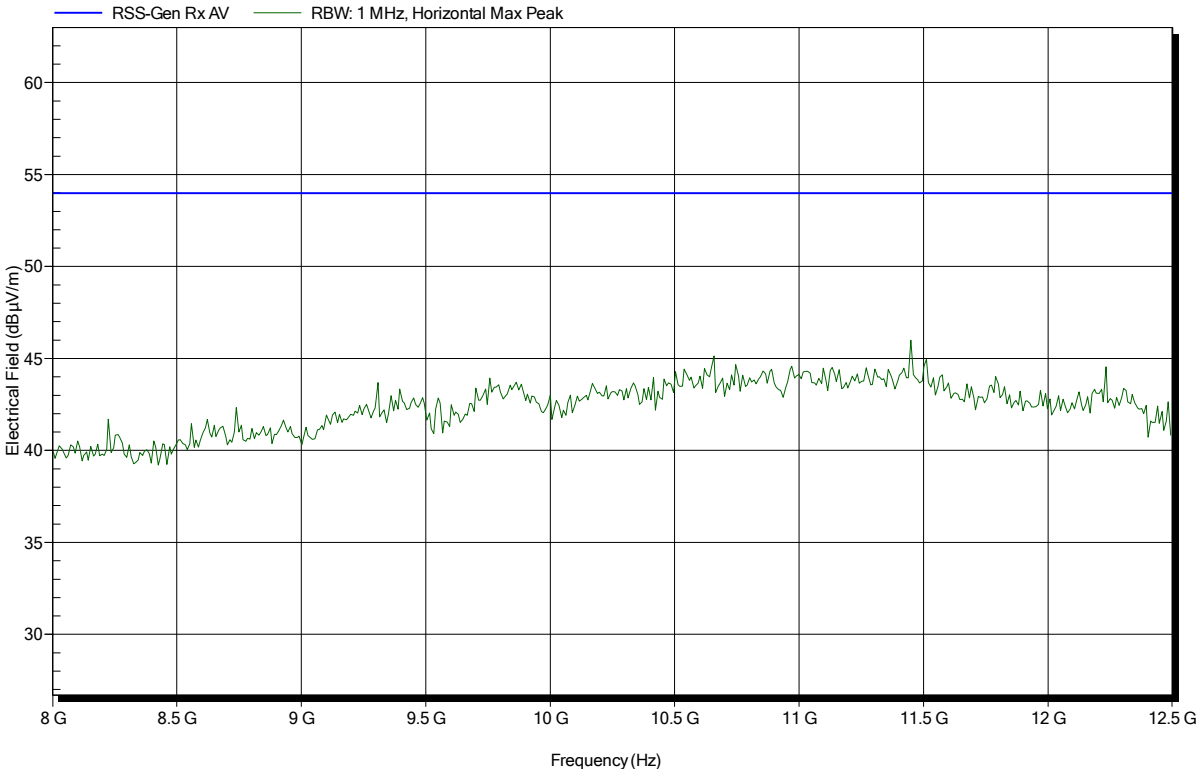


Spurious emissions according to RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	RX; ZigBee Scan Mode
Test Date:	2016-08-31
Note:	

Index 32

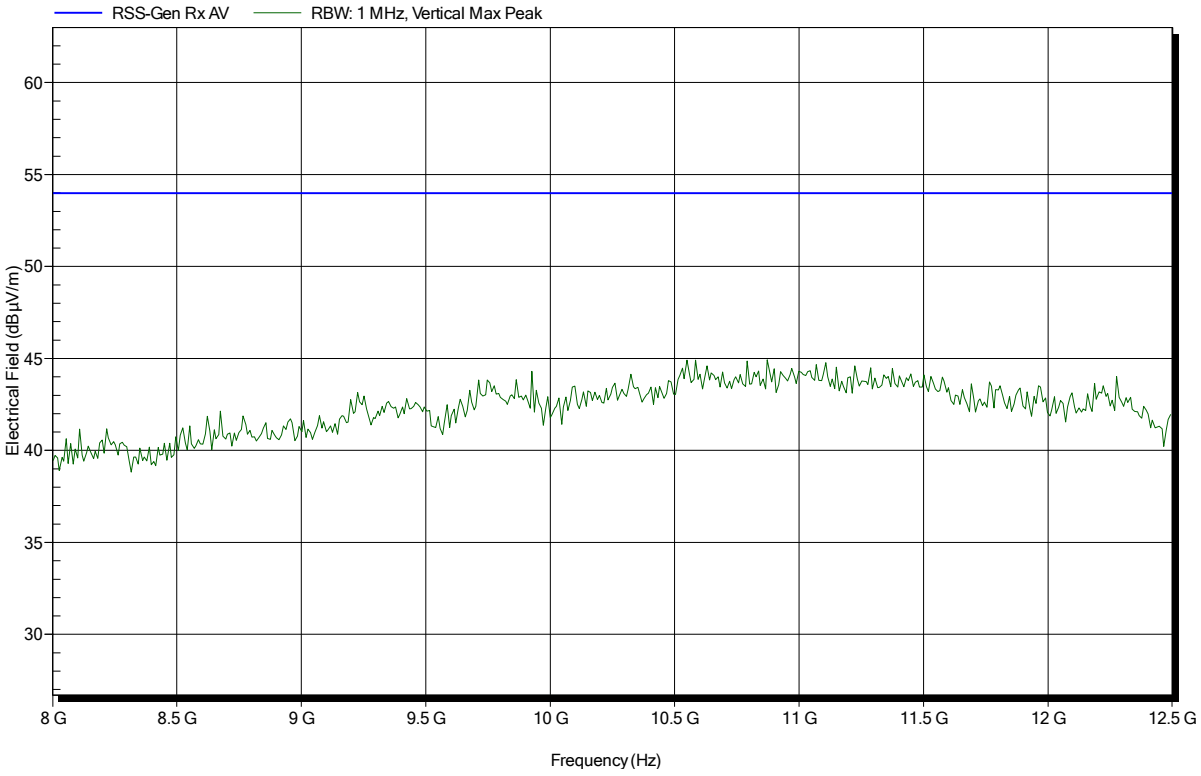


Spurious emissions according to RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	RX; ZigBee Scan Mode
Test Date:	2016-08-31
Note:	

Index 33

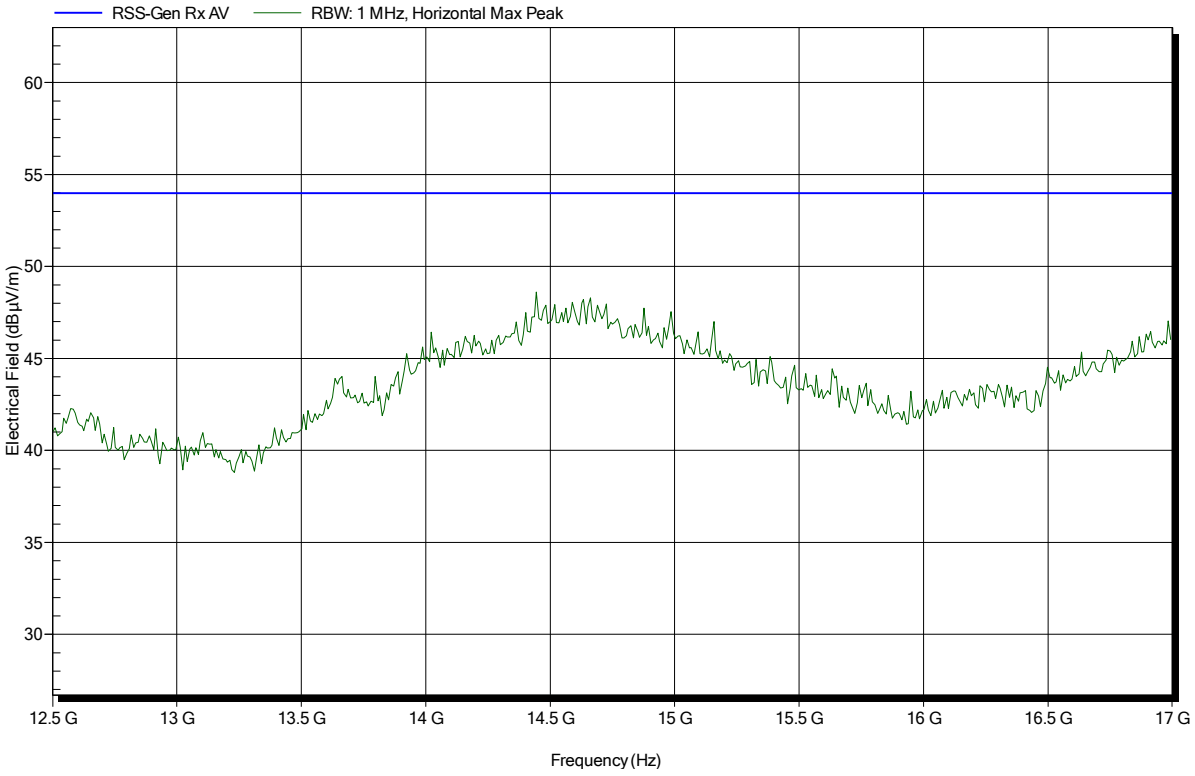


Spurious emissions according to RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	RX; ZigBee Scan Mode
Test Date:	2016-08-31
Note:	

Index 31



Spurious emissions according to RSS-247 Issue 1

Project number: G0M-1603-5477

Applicant:	Owlet GmbH
EUT Name:	Luminaire Controller
Model:	LUCO P7 CM
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Suckow
Test Conditions:	Tnom: 20°C, Vnom: 230 VAC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	RX; ZigBee Scan Mode
Test Date:	2016-08-31
Note:	

Index 34