

FCC TEST REPORT						
FCC 47 CFR Part 15C						
Industry Canada RSS-210						
Report Reference No	G0M-1603-5477-TFC225RI-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, RegNo.: 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-210, Issue 8, 2010-12					
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 of	object :	N/A			
- required by standard but not tested	:	N/T			
- not required by standard for the test object	t:	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	:	2016-08-03			
Date (s) of performance of tests	:	2016-11-25			
Compiled by Chr	istian Weber				
Tested by (+ signature) Wilf (Responsible for Test)	fried Treffke		V. Treff		
Approved by (+ signature) (Head of Lab)	istian Weber		C. Wese		
Date of issue 201	6-11-25				
Total number of pages: 27					
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 a laboratory.	in full, without	t the written a	pproval of the Issuing testing		
Additional comments:					



Version History

Version	Issue Date	Remarks	Revised by
01	2016-11-25	Initial Release	



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1 Equipment (Test item) Description:

Description	Luminaire Con	Luminaire Controller			
Model	LUCO P7 CM				
Additional Model(s)	None				
Brand Name(s)	Owlet IoT				
Serial number	None				
Hardware version	3A-2213-2100-	7238	3-1111		
Software / Firmware version	3.12.10.17				
PMN	N/A				
HVIN	LUCO P7 CM				
FVIN	N/A				
HMN	N/A				
FCC-ID	2AIOB-LCP7C	М			
IC	21585-LCP7C	М			
Equipment type	End product				
Radio type	Transceiver				
Radio technology	13.56 MHz RF	ID			
Operating frequency range	13.56 MHz				
Assigned frequency band	13.110 - 14.010 MHz				
Frequency range	F _{MID} 13.56 MHz				
Spreading	None				
Modulations	ASK				
Number of channels	1				
Channel spacing	None				
Number of antennas	1				
	Туре	integ	grated		
Antenna	Model	print	ted loop antenna		
	Manufacturer	met	raTec		
Manufacturer	Owlet GmbH Mosbacher Str. 9 65187 Wiesbaden GERMANY				
	V _{NOM}		120.0 VAC		
Power supply	V _{MIN}		102 VAC		
	V _{MAX}		138 VAC		
	T _{NOM}		25°C		
Temperatures	T _{MIN}		-10°C		
	T _{MAX}		80°C		



	Model	N/A
	Vendor	N/A
AC/DC-Adaptor	Input	N/A
	Output	N/A



1.1 Photos – Equipment External











1.2 Photos – Equipment internal





























1.3 Photos – Test setup





1.4 Supporting Equipment Used During Testing

Product Type*	Device	Manufacturer	Model No.	Comments			
None							
* Note: Us	*Note: Use the following abbreviations:						
AE :	AE : Auxiliary/Associated Equipment, or						
SIM : Simulator (Not Subjected to Test)							
CABL :	CABL : Connecting cables						



1.5 Test Modes

Mode #	Description			
	General conditions:	EUT powered by ac-mains		
Single	Radio conditions:	Mode = standalone transmit Modulation = ASK Power level = Maximum		



1.6 Test Equipment Used During Testing

Measurement Software				
Description Manufacturer Name Version				
EMC Test Software Dare Instruments Radimation			2015.2.4	

Occupied Bandwidth						
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due	
Spectrum Analyzer	R&S	FSP 30	EF00312	2016-02	2017-02	

Field strength emissions						
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due	
Semi-anechoic chamber	Frankonia	AC 1	EF00062	-	-	
Spectrum Analyzer	R&S	FSIQ26	EF00242	2016-04	2017-04	
Loop Antenna	R&S	HFH2-Z2	EF00184	2014-11	2016-11	
Biconical Antenna	R&S	HK 116	EF00012	2016-05	2019-05	
LPD Antenna	R&S	HL 223	EF00187	2016-05	2019-05	
LPD Antenna	R&S	HL 025	EF00327	2015-10	2018-10	



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:

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

Limit (dB
$$\mu$$
V/m) = 20*log (μ 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:



2 Result Summary

FCC 47 CFR Part 15C, IC RSS-210					
Product Specific Standard Section	Result	Remarks			
RSS-Gen 6.6	Occupied Bandwidth	RSS-Gen 6.6	N/R	Informational only	
FCC 15.225(a-c) IC RSS-210 A2.6(a-c)	Fundamental in-band field strength emissions	ANSI C63.4	PASS		
FCC 15.225(d) FCC 15.209 IC RSS-210 A2.6(d)	Emission radiated outside the specified frequency band	ANSI C63.4	PASS		
FCC 15.225(e) IC RSS-210 A2.6	Frequency stability	ANSI C63.4	PASS	Note 1	
IC RSS-Gen 4.10 IC RSS-Gen 7.1	Receiver radiated spurious emissions	ANSI C 63.4	N/A		
47 CFR 15.207 RSS-Gen 8.8 AC power line conducted emissions ANSI C63.4 PASS					
Remarks: Note 1: Fundamental emission far below spurious emission limit. Measurement has been omitted					



3 Test Conditions and Results

3.1 Test Conditions and Results – Occupied Bandwidth

Occupied Bandwidth acc. to IC RSS-Gen Verdict: PASS					
Test according to measurement reference		Reference Method			
		RSS-Gen 6.6			
Test frequency range		Tested frequencies			
		F _{MID}			
EUT tes	EUT test mode Single				
Limits					
None (Informational only)					
Test setup					
Spectrum Analyzer EUT					
Test procedure					
1. EUT set to test mode (Communication tester is used if needed)					
2. Span set to at least twice the emission spectrum					
3. Resolution bandwidth set to 1 % of span					
 Occupied Bandwidth (99 %) measurement with spectrum analyzer built in measurement function 					
Test results					
Channel Frequency [MHz]		Occupied Bandwidth [kHz]			
F _{MID}	13.56	86.53			
Comments: Measurement is applicable to all variants					



3.2 Test Conditions and Results – Fundamental in-band field strength emissions



extrapolation factor of 20dB/decade is used (47 CRF 15.31(f)).



Test results								
Channel	Frequency [MHz]	Emission [MHz]	Level @ 30m [dbµV/m]	Det.	Limit @ 30m [dbµV/m]	Limit distance [m]*	Margin [dB]	
F _{MID}	13.56	13.562	14.4	pk	84	30	-69.60	
Comments: * Physical distance between EUT and measurement antenna. See Annex								



3.3 Test Conditions and Results – Emissions radiated outside the specified frequency band

Radiated out-of-band band emissions acc. toVerdict: PASFCC 47 CFR 15.225 / IC RSS-210Verdict: PAS						
Test according refe	erenced	Reference Method				
standards		FCC 15.225(d) / IC RSS-210 A2.6(d)				
Test according to measurement reference		Reference Method				
		ANSI C63.4				
Test frequency range		Tested frequencies				
		9 kHz – 216 MHz				
EUT test mo	de	Single				
Limits						
Frequency range [MHz]	Detector	Limit [µV/m]	Limit [dBµV/m]	Limit Distance [m]		
0.009 – 0.490	Quasi-Peak	2400/F[kHz]	48.5 – 13.8	300		
0.490 – 1.705	Quasi-Peak	2400/F[kHz]	13.8 – 2.97	30		
1.705 – 30	Quasi-Peak	30	29.5	30		
30 – 88	Quasi-Peak	100	40	3		
88 – 216	Quasi-Peak	150	43.5	3		
The emission limits shown in the above table are based on measurements employing a CISPP guesi						

The emission limits shown in the above table are based on measurements employing a CISPR quasipeak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.







3.4 Test Conditions and Results – AC power line conducted emissions

Power line conducted emissions acc. to Verdict: PASS FCC 47 CFR 15.207 / IC RSS-Gen						
Test according referenced standards		Reference Method				
		ANSI C63.4				
Fully configured sample scanned over		Frequency range				
the following freque	ency range		0.15 MHz to 30 MHz			
Points of Appli	cation	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.						







