![CETECOM™]

RF Exposure Evaluation Report

FOR:

August Home Inc.

Model Name: ASL-01
Product Description:

Automatic Bluetooth Low Energy (BLE)™ Smart Door Lock

FCC ID: 2AB6UASL01
IC ID: 12163A-ASL01

References:
1. FCC OET Bulletin 65 Supplement
2. FCC CFR Part 1 (1.1307 &1.1310), Part 2 (2.1091)
3. RSS-102- Radio Frequency Exposure Compliance of Radio communication Apparatus Issue 4 March 2010, Ch, 2.5 and Ch. 4

1   Assessment

This report serves as the Technical Information regarding RF Exposure evaluation of the below identified device according to the rules as stipulated in the documents listed under References above.

The device meets the RF exposure limits, or - for some of it's radio functions / bands - the conditions for exemption from routine evaluation as defined in the referenced FCC and IC rule parts.

Company	Description	Model #
August Home Inc	Automatic Door lock -remote controllable via Bluetooth (LE) and application running on IOS and/or Android. System contains x4 AA batteries for power.	ASL-01

Responsible for Testing Laboratory:

		Franz Engert	
2014-08-13	Compliance	(Compliance Manager)	
Date	**Section**	**Name**	**Signature**

Responsible for the Report:

		James Donnellan	
2014-08-13	Compliance	(Sr Emc Engineer)	
Date	**Section**	**Name**	**Signature**

2   Administrative Data

2.1   Identification of the Testing Laboratory Issuing the Test Report

Company Name:	CETECOM Inc.
Department:	Compliance
Address:	411 Dixon Landing Road Milpitas, CA 95035 U.S.A.
Telephone:	+1 (408) 586 6200
Fax:	+1 (408) 586 6299
Test Lab Manager:	Franz Engert
Test Engineer:	James Donnellan

2.2   Identification of the Client

Applicant's Name:	August Home Inc
Street Address:	665 3rd St. Suite 100
City/Zip Code	San Francisco CA 94107
Country	United States
Contact Person:	Shannon Petty
Phone No.	(415)652-4108
Fax:	
e-mail:	shannon@august.com

2.3   Identification of the Manufacturer

Manufacturer's Name:	Gener8, Inc.
Manufacturers Address:	500 Mercury Drive
City/Zip Code	Sunnyvale, CA 94085
Country	USA

3   Equipment under Test (EUT)

3.1   Specification of the Equipment under Test

Marketing Name:	August
Model No:	ASL-01
Product Description:	Automatic Door lock -remote controllable via Bluetooth Low Energy and application running on IOS and/or Android. System contains x4 AA batteries for power.
FCC-ID:	2AB6UASL01
IC-ID :	12163A-ASL01
Supported frequency bands of operation:	Nominal band: 2400 – 2483.5; Center to center: 2402(ch 0) – 2480(ch 39), 40 channels
Type(s) of Modulation:	Bluetooth v4.0, LE, using FHSS with GFSK
Antenna Info:	IFA PCB antenna (meander pattern) Manufacturer stated antenna gain: 3dBi
Rated Operating Voltage Range(DC):	Vmin: 4.00V/ Vnom: 6.00V/ Vmax: 6.50V
Rated Operating Temperature Range:	Tmin: 0°C/ Tmax: 50°C
Test Sample status:	Prototype
Prototype / Production unit:	Prototype
Dates of Testing:	06/19/2014-06/30/2014

4   RF Exposure Evaluation Requirements

4.1   FCC:

Calculations can be made to predict RF field strength and power density levels around typical RF sources using the general equations (3) and (4) on page 19 of the following FCC document:
"OET Bulletin 65, Edition 97-01 - Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields".

The table below is excerpted from Table 1B of 47 CFR 1.1310 titled Limits for Maximum Permissible Exposure (MPE), Limits for General Population/Uncontrolled Exposure:

Frequency Range (MHz)	Power density (mW/cm^2)	Averaging time (minutes)
300 – 1500	f (MHz) /1500	30
1500 – 100.000	1.0	30

Using the equation from page 19 of OET Bulletin 65, Edition 97-01:

$$S = \frac{PG}{4\pi R^2}$$

where: S = power density (in appropriate units, e.g. mW/cm^2)
        P = power input to the antenna (in appropriate units, e.g., mW)
        G = power gain of the antenna in the direction of interest relative to an isotropic radiator
        R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

Note:
   1. This device is used only for fixed and mobile applications.

Additionally, according to § 2.1091:
The limit for <1.5 GHz mobile operations where no routine evaluation is required is: 1.5W ERP
The limit for >1.5 GHz mobile operations where no routine evaluation is required is: 3W ERP

4.2   IC:

RSS-102 Section 2.5.2
RF exposure evaluation is required if the separation distance between the user and the device's radiating element is greater than 20 cm, except when the device operates as follows:
   • below 1.5 GHz and the maximum EIRP of the device is equal to or less than 2.5 W;
   • at or above 1.5 GHz and the maximum EIRP of the device is equal to or less than 5 W.

RSS-102 4.2: RF Field strength limits for devices used by the General Public (Uncontrolled Environment):
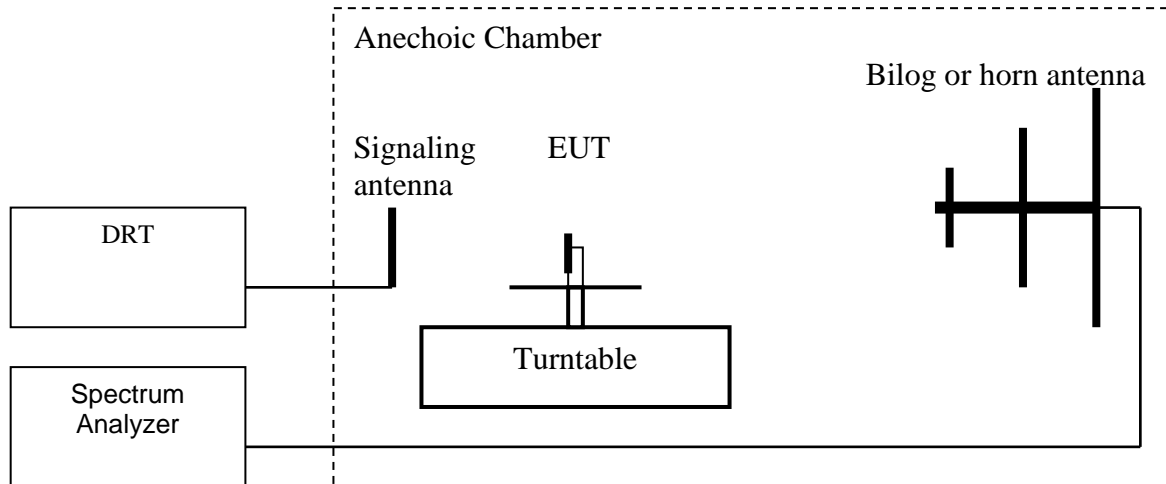Power density
       300MHz- 1500 MHz= f/150 W/m^2
       1500 MHz- 1500000 MHz= 10 W/m^2

5   Measurement procedure:

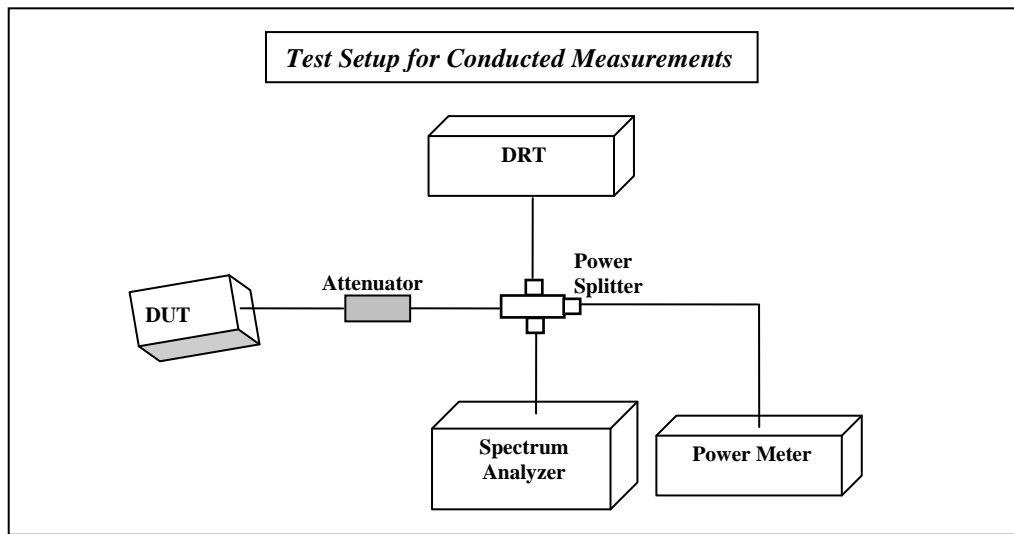### 5.1   Radiated power measurement- ERP/EIRP-

1.   Connect the equipment as shown in the above diagram with the EUT's antenna in center of the turn table.
2.   Adjust the settings of the Digital Radio Communication Tester (DRT) to set the EUT to its maximum power at the required channel.
3.   Set the spectrum analyzer to the channel frequency. Set the analyzer to measure peak hold with the required settings.
4.   Rotate the EUT 360°. Record the peak level in dBm (**LVL**).
5.   Replace the EUT with a vertically polarized half wave dipole or known gain antenna. The center of the antenna should be at the same location as the center of the EUT's antenna.
6.   Connect the antenna to a signal generator with known output power and record the path loss in dB (**LOSS**). **LOSS** = Generator Output Power (dBm) – Analyzer reading (dBm).
7.   Determine the ERP using the following equation:
      ERP (dBm) = **LVL** (dBm) + **LOSS** (dB)
8.   Determine the EIRP using the following equation:
      EIRP (dBm) = **ERP** (dBm) + 2.14 (dB)
9.   Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band.
Measurement uncertainty: +/-3.0 dB

(**Note:** Steps 5 and 6 above are performed prior to testing and **LOSS** is recorded by test software. Steps 3, 4, 7 and 8 above are performed with test software.)

CETECOM™

5.2   Radiated power Calculation- ERP/EIRP-

Test Setup for Conducted Measurements

DRT

Attenuator   Power Splitter

DUT

Spectrum Analyzer   Power Meter

1. Connect the equipment as shown in the above diagram.
2. Adjust the settings of the Digital Radio Communication Tester (DRT) to connect the EUT at the required channel (OR) alternatively use the EUT to set to transmit at a specific mode.
3. Measure conducted power using the power meter or the Spectrum Analyzer.
4. ERP/EIRP is calculated by adding the antenna gain to the measured conducted power.
   EIRP= Measured conducted power+ Antenna Gain (dBi)
   (Antenna gain based on measurement or data from the antenna manufacturer.)
   ERP= EIRP- 2.14

5.3   Measurement Equipment information:
Test Equipment and Ancillaries used for tests

- **San Diego EMC Lab**

Equipment Name	Manufacturer	Type/Model	Serial No.	Cal Date	Cal Interval	Next cal date
3m Semi- Anechoic Chamber:						
Spectrum Analyzer	Rohde und Schwarz	FSU 26	200302	6/2013	2 years	6/2015
Receiver	Rohde und Schwarz	ESR3	101663	2/2013	2 years	2/2015
LISN	Rohde und Schwarz	ESV 216	101129	1/2013	2 years	1/2015
Radiocommunication Tester	Rohde and Schwarz	CMU 200	121672	7/2013	2 years	7/2015
Log Periodic Antenna	Rohde and Schwarz	HL 050	100515	4/2013	3 year	4/2016
Ultralog Antenna	Rohde and Schwarz	HL 562	100495	2/2012	3 year	2/2015
Open Switch Control Unit	Rohde and Schwarz	OPS 130	10085	n/a		
Extention Unit Open Switch Control Unit	Rohde and Schwarz	OSP 150	10086	n/a		
Turn Table TT	Maturo	1.5 SI	TT 1.5SI/204/6070910	n/a		
Compact antenna Mast	Maturo	CAM 4.0-P	CAM4.0-P/067/6000910	n/a		
Multiple Control Unit	Maturo	MCU	2140910	n/a		
Pre-Amplifier	Rohde and Schwarz	TS-PR 18	100072	Part of the system calibration		
High Pass Filter	Mini-Circuits	SHP-1200+	RUU11201224	Part of the system calibration		
High Pass Filter	Wainwright Instr.	WHKX 3.0/18	109	Part of the system calibration		

CETECOM™

- **Milpitas EMC Lab**

Instrument/Ancillary	Model	Manufacturer	Serial No.	Cal Date	Cal Interval
EMI Receiver/Analyzer	ESU 40	Rohde & Schwarz	100251	Sept 2013	1 Years
Spectrum Analyzer	FSU	Rohde & Schwarz	200302	Jun 2013	2 Years
Pre-Amplifier	Miteq	JS40010260	340125	N/A	N/A
Binconilog Antenna	EMCO	3141	0005-1186	Apr 2012	3 Years
Binconilog Antenna	ETS	3149	J000123908	Feb 2012	3 years
Horn Antenna	EMCO	3115	35114	Mar 2012	3 Years
Communication Antenna	IBP5-900/1940	Kathrein	n/a	n/a	n/a
High Pass Filter	5HC2700	Trilithic Inc.	9926013	Part of system calibration	
High Pass Filter	4HC1600	Trilithic Inc.	9922307	Part of system calibration	
6GHz High Pass Filter	HPM50106	Microtronics	001	Part of system calibration	
Pre-Amplifier	JS4-00102600	Miteq	00616	Part of system calibration	
LISN	R&S	ESH3-Z5	836679/003	Jun 2013	3 Years

Calibration status valid at the time of testing.
Equipment used meets the measurement uncertainty requirements as required per applicable standards for 95% confidence levels.
Calibration due dates, unless defined specifically, falls on the last day of the month.
Items indicated "N/A" for cal status either do not specifically require calibration or is internally characterized before use.

5.4   Measurement Summary:

Band of operation	Peak Radiated Power-EIRP		Limits (IC) (where no routine evaluation is required)	Peak Radiated Power ERP		Limits (FCC) (where no routine evaluation is required)
MHz	dBm	mW	mW	dBm	mW	mW
2.4 GHz ISM Band 2402-2483.5 MHz	1.14	1.3	5000	-1.01 dBm	.79	3000

Since the Peak ERP <3W (FCC) and Peak EIRP <5W (IC), this device is exempt from Routine evaluation.

Power Density calculation:

FCC

Band of operation	Modulation / Data Rate (Kbps)	Peak Radiated Power- ERP		Duty Cycle	Distance (R)	Power Density (EIRP*DutyCycle) /(4πR^2)	FCC Limit	Verdict
MHz		dBm	mW		cm	mW/cm^2	mW/cm^2	
2402	GFSK/1000	1.01	0.79	1	20	0.0003	1	Pass

IC

Band of operation	Modulation / Data Rate (Kbps)	Peak Radiated Power- ERP		Duty Cycle	Distance (R)	Power Density (EIRP*DutyCycle)/ (4πR^2)	IC Limit	Verdict
MHz		dBm	mW		cm	mW/cm^2 / W/m^2	W/m^2	
2402	GFSK/1000	1.01	0.79	1	20	0.0003	10	Pass

*Note: 1 m*W/cm^2 = 10,000 mW/ m^2 = *10* W/m^2

Verdict: Pass. Since the max MPE for the device is compliant in transmission mode for this emission band.