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# Stress Engineering Services, Inc.

## SAR EXCLUSION REPORT

### SCOPE OF WORK

SAR EXCLUSION CALCULATION  
ON THE IGROWTH GENERATION 2 KITCHEN DEVICE

### REPORT NUMBER

104797984LEX-001b.3

### ISSUE DATE

12/27/2021

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## SAR EXCLUSION REPORT

**Report Number:** 104797984LEX-001b.3

**Project Number:** G104797984

**Report Issue Date:** 12/27/2021

**Report Revised Date:** 1/19/2022

**Product Name:** iGrowth Generation 2 Kitchen Device

**Standards:** FCC Part 1.1310 Limits for Maximum  
Permissible Exposure (MPE)

**Tested by:**  
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**Client:**  
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## 1 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 4.0. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested is **exempt** from routine SAR evaluation. The results obtained in this test report pertain only to the item(s) tested. Intertek does not make any claims of compliance for samples or variants which were not tested.

## 2 Test Summary

Section	Test Full Name	Result
6.1	FCC SAR Exclusion Calculation	Exempt from SAR



### 3 Client Information

This product was tested at the request of the following:

Client Information	
<b>Client Name:</b>	Stress Engineering Services, Inc.
<b>Address:</b>	7030 Stress Engineering Way Mason, OH 45040-7386 USA
<b>Contact:</b>	Joe Bullard
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Manufacturer Information	
<b>Manufacturer Name:</b>	Stress Engineering Services, Inc.
<b>Manufacturer Address:</b>	7030 Stress Engineering Way Mason, OH 45040-7386 USA



#### 4 Description of Equipment under Test and Variant Models

Equipment Under Test	
Product Name	iGrowth Generation 2 Kitchen Device
Model Number	3283
Serial Number	PT2.0-P00021
Supported Transmit Bands	RFID: 13.110MHz – 14.010MHz (FCC Part 15.225 / RSS-210 Issue 10)
Embedded Modules	Particle Boron B402 (FCCID: 2AEMI-B402)
Test Start Date	10/22/2021
Test End Date	12/1/2021
Device Received Condition	Good
Test Sample Type	Production
Input Rating	7.5VDC
Description of Equipment Under Test (provided by client)	
2nd Generation kitchen towel consumption monitoring device for consumer research studies.	

##### 4.1 Variant Models:

There were no variant models covered by this evaluation.



## 5 Test Procedure

An SAR exclusion calculation for was performed in order to show that the device was exempt from routine SAR evaluation. Separate calculations were performed for the RFID radio and cellular radio. The combined SAR value-to limit ratios were combined to show compliance with simultaneous exposure requirements.

The measured maximum field strength of the RFID radio was converted to Effective Isotropic Radiated Power (EIRP) using the formula below, taken from KDB 412172 D01 Determine ERP and EIRP v01r01:

$$EIRP_{mW} = \frac{(E \cdot d)^2}{30} \cdot \frac{1000 mW}{1 W}$$

where:

E = electric field strength in V/m

d = distance in m

The 10-g extremity SAR exclusion threshold was calculated per FCC KDB 447498 D01 General RF Exposure Guidance v06 § 4.3.1(c), for devices operating below 100 MHz with separation distance ≤ 50 mm:

$$EIRP_{mW} \leq 7.5 \cdot \frac{50 mm}{\sqrt{0.1 GHz}} \cdot \left(1 + \log\left(\frac{100}{13.5 MHz}\right)\right) \cdot \frac{1}{2}$$

$$EIRP_{mW} \leq 1109 mW$$

and § 4.3.1(a), for devices operating between 100 MHz and 6GHz with separation distance ≤ 50 mm:

$$\frac{\text{max. power of channel, including tuneup tolerance, mW}}{\text{min. test separation distance, mm}} \cdot \sqrt{f_{(GHz)}} \leq 7.5$$

A duty factor correction was applied to the cellular radio. The device is configured to transmit once a week for two minutes. The averaging time for uncontrolled exposure/general population is 30 minutes, so the worst case duty factor is:

$$\frac{2 \text{ minutes}}{30 \text{ minutes}} \times 100\% = 6.67\%$$



## 6 Results:

The device was found to be exempt from routine SAR evaluation based on FCC requirements.

### 6.1 FCC SAR Exclusion Calculation

RFID:

Field Strength @ 3m (dBμV/m)	Field Strength @ 3m (V/m)	EIRP (mW)	Limit (mW)	Exempt?
60.56	$1.066 \times 10^{-6}$	$3.41 \times 10^{-4}$	1109	Exempt

Cellular:

100 MHz to 6 GHz and separation distance ≤ 50 mm KDB 447498 D01 v06 4.3.1.a			
Description	Value	Unit	Comments
Max Power of Channel	21.08	mW	25dBm, 6.67% duty factor
Minimum Separation Distance	10	mm	
Frequency	1.72	GHz	LTE B4
Max Power of Channel (Rounded)	21	mW	Rounded to nearest mW
Minimum Separation Distance (Rounded)	10	mm	Rounded to nearest mm, limited to 5 mm
SAR Exclusion Threshold	2.754		Max power, mW / min. separation distance, mm x √(frequency, GHz)
Excluded from 1-g SAR?	Yes		Threshold ≤ 3.0
Excluded from 10-g extremity SAR?	Yes		Threshold ≤ 7.5

The worst case simultaneous transmission mode is RFID and LTE B4. The combined SAR-to-limit ratio is:

$$3.41 \times 10^{-4} / 1109 + 2.754 / 7.5 = 0.3672$$

Since the combined SAR-to-limit ratio is < 1, the device is deemed to comply with simultaneous exposure requirements.



## 7 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	12/27/2021	104797984LEX-001b	BZ	BCT	Original Issue
1	1/11/2022	104797984LEX-001b.1	BZ	JTS	Added embedded module information.
2	1/14/2022	104979784LEX-001b.2	BZ	JTS	Added embedded module MPE data.
3	1/19/2022	104797984LEX-001b.3	BZ	JTS	Removed ISED calculation