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Epicore Biosystems Inc.

SAR EXEMPTION REPORT

SCOPE OF WORK
SAR EXEMPTION CALCULATION
ON THE CONNECTED HYDRATION

REPORT NUMBER
105353929LEX-001

ISSUE DATE
9/14/2023

PAGES
10

DOCUMENT CONTROL NUMBER
Non-Specific EMC Report Shell Rev. December 2017

SAR EXEMPTION TEST REPORT

Report Number: 105353929LEX-001
Project Number: G105353929

Report Issue Date: 9/14/2023

Product Name: Connected Hydration
Model ASY-0215

Standards: FCC Part 2.1093

Tested by:
Intertek Testing Services NA, Inc.
731 Enterprise Drive
Lexington, KY 40510
USA

Client:
Epicore Biosystems Inc.
810 Memorial Drive Suite 100
Cambridge, MA 02139
USA

Report prepared by

Brian Lackey, Team Leader

Report reviewed by

Michael Carlson, EMC Engineer

Table of Contents

1 Introduction and Conclusion

SAR exemption calculations were performed on the product constructed as described in section 4. Information provided by the client including maximum output power, antenna gain(s), and minimum separation distance(s) was used to determine if the product under evaluation was exempt from SAR. Any change in these stated values may invalidate these results. 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 under evaluation is **exempt** from SAR requirements for each of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) evaluated. Intertek does not make any claims of compliance for samples or variants which were not evaluated.

2 Test Summary

Section	Requirement	Result
5	FCC SAR Exemption Criteria (FCC Title 47 CFR Part 1.1307, 2.1093)	Exempt from SAR

3 Client Information

This product was tested at the request of the following:

Client Information	
Client Name:	Epicore Biosystems Inc.
Address:	810 Memorial Drive Suite 100 Cambridge, MA 02139 USA
Contact:	Stephen Lee
Email:	stever@epicorebiosystems.com
Manufacturer Information	
Manufacturer Name:	Epicore Biosystems Inc.
Manufacturer Address:	810 Memorial Drive Suite 100 Cambridge, MA 02139 USA

4 Description of Equipment under Test and Variant Models

Equipment Under Test	
Product Name	Connected Hydration
Model Number	ASY-0215
FCC Identifier	2BANDCHASY0215
Type of Transmission	Bluetooth Low Energy (BLE)
Frequency Range	2402 MHz – 2480 MHz
Type of Modulation / Data Rate	GFSK
Number of Channel(s)	40
Description of Equipment Under Test (provided by client)	
Wearable sweat sensor.	

4.1 Variant Models:

There were no variant models covered by this evaluation.

4.2 Antenna Gain

The following information was provided by Epicore Biosystems Inc. and may affect compliance. Intertek does not make any claims of compliance for values other than those shown below.

High Frequency Ceramic Solutions

2.4 GHz SMD, Above Metal, Low Profile Mini Chip Antenna **P/N 2450AT42E010B**

This antenna will generally have a metal layer directly underneath for proper operation, exceptions may apply.

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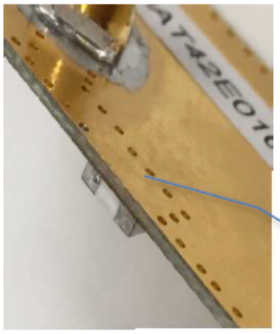
General Specifications		
Part Number	2450AT42E010B	
Frequency (MHz)	2400 - 2480	
Return Loss (dB)	EVB1*	EVB2*
	2.7 min.	3.5 min.
Peak Gain (dBi typ.)	-1.0 (YZ-V)	-1.0 (YZ-V)
Average Gain (dBi typ.)	-3.5 (YZ-V)	-5.0 (YZ-V)
Impedance (Ω)	50	
Power Capacity (W)	2 max. (CW)	
Reel Quantity (pcs./reel)	2,000	
Operating Temp	-40 to +85°C	
Recommended Storage Conditions and Period for unused Product on T&R	+5 to +35°C Humidity 45 - 75% RH 18 months max.	

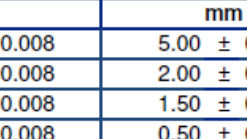


*Evaluation boards 1 and 2 are meant to demonstrate the difference in performance achievable with different substrate thicknesses.

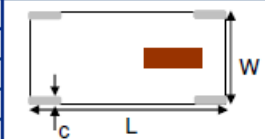
This antenna was designed in mind for small coin cell, wearable, IoT, 2.4 BLE, 802.11, ISM, Zigbee, etc. applications in close-range networks where metal or a battery/display covers the entire length or side of the PCB or encasement must be present directly under the antenna and there's no room for usual/typical antenna metal clearance.

Part Number Explanation				
P/N Suffix	Packing Style	Bulk (loose pcs.)	Suffix = S	E.g. 2450AT42E010BS
		T & R	Suffix = E	E.g. 2450AT42E010BE
	Evaluation Board 1	2450AT42E010B-EB1SMA (comes with 1 female SMA connector)		
	Evaluation Board 2	2450AT42E010B-EB2SMA (comes with 1 female SMA connector)		

Mechanical Specifications		
	In	mm
L	0.197 ± 0.008	5.00 ± 0.20
W	0.079 ± 0.008	2.00 ± 0.20
T	0.059 ± 0.008	1.50 ± 0.20
a	0.020 ± 0.008	0.50 ± 0.20
b	0.059 ± 0.008	1.50 ± 0.20
C	0.012 max	0.30 max



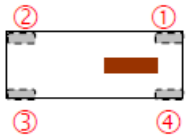
Side View



Bottom View

Top View

Terminal Configuration	
1	Feeding Point
2	NC[1]
3	GND
4	GND



[1]Make sure to have Pin 2 soldered to its PCB land pad but **not** connected to GND or input, it must be NC (or floating).

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4.3 Maximum Output Power

The maximum output power was measured and recorded in Intertek report 105353929LEX-003, reproduced below.

Frequency (MHz)	Max Peak (dBµV)	Conducted Power (dBm)	Conducted Power Limit (dBm)	Max Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)
2402	107.64	0.7	30	-1	-0.3	36.02
2440	107.21	0.2	30	-1	-0.8	36.02
2480	106.72	-0.3	30	-1	-1.3	36.02

5 FCC SAR Exemption Criteria

FCC Title 47 CFR Part 1.1307(3)(i):

For single RF sources (i.e., any single fixed RF source, mobile device, or portable device, as defined in paragraph (b)(2) of this section): A single RF source is exempt if:

(A) The available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in paragraph (b)(3)(ii)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(ii)(A);

(B) Or the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold Pth (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). Pth is given by:

$$P_{th}\ (\text{mW}) = \begin{cases} ERP_{20\ cm}(d/20\ \text{cm})^{x} & d \le 20\ \text{cm} \\ ERP_{20\ cm} & 20\ \text{cm} < d \le 40\ \text{cm} \end{cases}$$

Where

$$x = -\log_{10}\left(\frac{60}{ERP_{20\ cm}\sqrt{f}}\right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20\ cm}\ (\text{mW}) = \begin{cases} 2040f & 0.3\ \text{GHz} \le f < 1.5\ \text{GHz} \\ 3060 & 1.5\ \text{GHz} \le f \le 6\ \text{GHz} \end{cases}$$

d = the separation distance (cm);

Channel	Frequency (GHz)	Separation Distance[1] (cm)	Output Power (mW)	P_{th} (mW)	Exempt from SAR?
Low	2.402	0.5	1.17	2.79	Exempt
Mid	2.440	0.5	1.05	2.75	Exempt
High	2.480	0.5	0.933	- [2]	Exempt

[1] A minimum separation distance of 0.5cm was selected as a worst-case for demonstration of exemption
[2] The maximum time-averaged power was less than 1mW and determined to be exempt without further consideration per FCC Title 47 CFR Part 1.1307(3)(i)(A).

6 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	9/14/2023	105353929LEX-001	BL	MC	Original Issue