



18/88 Merrindale Drive Croydon South, Victoria, 3136, Australia  
Telephone: +61 3 9761 5888  
Facsimile: +61 3 8761 6547  
Email: sales@emcbayswater.com.au  
ABN: 49 112 221 333

## RF Radiation Exposure Evaluation

*In accordance with:*

CFR47 FCC Part 2, Subpart J, 2.1093

FCC KDB 447498 D01 v06

---

Atmo Biosciences

CAP010ZZ

Atmo Gas Capsule System - Capsule

FCC ID: 2BA23-AGC1

---

REPORT: E2301-1620-10

DATE: May, 2023



## RF Radiation Exposure Evaluation Report

EMC Bayswater Test Report: E2301-1620-10  
Issue Date: May, 2023

**Product:** Atmo Gas Capsule System - Capsule  
**Model No:** CAP010ZZ  
**Serial No:** 3000220, 3000228  
**FCC ID:** 2BA23-AGC1

**Customer Details:** Mr. Ian Sohn  
Atmo Biosciences  
436 Elgar Road,  
Box Hill VIC 3128  
Australia  
Phone No: +61 3 9945 7510  
e-mail: ian.sohn@atmobiosciences.com

**Standard(s):** CFR47 FCC Part 2, Subpart J, 2.1093  
Radiofrequency radiation exposure evaluation: portable devices.  
FCC KDB 447498 D01 v06  
RF EXPOSURE PROCEDURES AND EQUIPMENT AUTHORIZATION POLICIES  
FOR MOBILE AND PORTABLE DEVICES

**Results Summary:** RF Radiation exposure requirements **Complied**

**Test Date(s):** 23<sup>rd</sup> of January, 2023

**Test House (Issued By):** EMC Bayswater Pty Ltd  
18/88 Merrindale Drive  
Croydon South  
Victoria, 3136  
Australia

FCC Accredited Test Firm Registration number: 527798  
FCC Accredited Test Firm Designation number: AU0004

Phone No: +61 3 9761 5888 Email: [sales@emcbayswater.com.au](mailto:sales@emcbayswater.com.au)  
Fax: +61 3 8761 6547 Web: [www.emcbayswater.com.au](http://www.emcbayswater.com.au)

The Atmo Biosciences, CAP010ZZ, Atmo Gas Capsule System - Capsule, measured EIRP is below the SAR exception threshold (5mm distance) and the calculated power density level at a distance of 20cm are below the maximum levels allowed by regulations therefore complied with the requirements of CFR47 FCC Part 2, Subpart J, 2.1093.

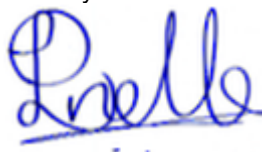
This is to certify that the necessary evaluations were made by EMC Bayswater Pty Ltd, and that the Atmo Biosciences, CAP010ZZ, Atmo Gas Capsule System - Capsule, has been tested in accordance with requirements contained in the appropriate commission regulations.

Prepared by:



Adnan Zaman  
(EMC Test Engineer)

Approved by:



Neville Liyanapatabendige  
(Manager)

04/05/2023 17:07

Date

---

## RF Radiation Exposure Evaluation *for* Atmo Biosciences

### Contents

<b>1. Introduction .....</b>	<b>4</b>
<b>2. Test Report Revision History .....</b>	<b>4</b>
<b>3. Report Information .....</b>	<b>4</b>
<b>4. Product Details .....</b>	<b>5</b>
4.1. Product Sample Details .....	5
4.2. Product description .....	5
<b>5. SAR and RF Exposure exception evaluation .....</b>	<b>6</b>
5.1. SAR exception evaluation .....	6
5.2. RF Exposure Evaluation (MPE) .....	7
<b>6. Conclusion .....</b>	<b>7</b>

---

## 1. Introduction

RF Radiation Exposure evaluation was performed on an Atmo Biosciences, CAP010ZZ, Atmo Gas Capsule System - Capsule in accordance with CFR47 FCC Part 2, Subpart J, 2.1093.

## 2. Test Report Revision History

None

## 3. Report Information

EMC Bayswater Pty Ltd reports apply only to the specific samples tested under the stated test conditions. All samples tested were in good operating condition throughout the entire test program unless otherwise stated. EMC Bayswater Pty Ltd does not in any way guarantees the later performance of the product/equipment. It is the manufacturer's responsibility to ensure that additional production units of the tested model are manufactured with identical electrical and mechanical components. EMC Bayswater Pty Ltd shall have no liability for any deductions, inference or generalisations drawn by the clients or others from EMC Bayswater Pty Ltd issued reports. This report shall not be used to claim, constitute or imply product endorsement by EMC Bayswater Pty Ltd. This report shall not be reproduced except in full, without the written approval of EMC Bayswater Pty Ltd. This document may be altered or revised by EMC Bayswater Pty Ltd personnel only, and shall be noted in the revision section of the document. Any alteration of this document not carried out by EMC Bayswater Pty Ltd will nullify the document.

## 4. Product Details

### 4.1. Product Sample Details

The device, as supplied by the client, is described as follows:

Product:	Atmo Gas Capsule System - Capsule	
Model No:	CAP010ZZ	
Serial No:	3000220, 3000228	
Part No:	PI-0081103-A	
Firmware:	v3.3.1-0-g29063da	
Dimensions:	Ø11.2 x 28 mm	
Weight:	3.7g	
EUT Type:	Tested as table-top	
Power Specifications:	Battery powered 3x1.5V SR920 silver oxide	
Transmitter details:	Description:	Sub-1GHz RF transceiver
	Operating Frequency:	433.9MHz
	Part Number:	S2-LPQTR
	Max Transmit Power:	+10dBm
	Modulation Scheme:	2-GFSK
	Channels:	One
	Antenna Details:	Custom integrated flex

*(Customer supplied product information)*

### 4.2. Product description

The device has been described by the customer as follows:

“The Atmo Motility Gas Capsule System comprises an ingestible Capsule, Data Receiver, Mobile Device and a Clinician Portal. The Capsule measures temperature, relative humidity, hydrogen concentration, carbon dioxide concentration, along with indicators of fermentation activity, capsule tumble, and antenna reflectance. Measurements are transmitted from the Capsule within the gastrointestinal tract via radiofrequency communication to a Receiver that is worn by the patient. A Mobile Device with an Atmo software application is subsequently used to transfer received data to the Cloud for analysis via an online Portal.”

*(Customer supplied product description information)*

## 5. SAR and RF Exposure exception evaluation

### 5.1. SAR exception evaluation

As per Appendix A of KDB 447498 D01 General RF Exposure Guidance v06

#### *SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and ≤ 50 mm*

Approximate SAR Test Exclusion Power Thresholds at Selected Frequencies and Test Separation Distances are illustrated in the following Table. The equation and threshold in 4.3.1 must be applied to determine SAR test exclusion.

MHz	5	10	15	20	25	mm
150	39	77	116	155	194	<i>SAR Test Exclusion Threshold (mW)</i>
300	27	55	82	110	137	
450	22	45	67	89	112	
835	16	33	49	66	82	
900	16	32	47	63	79	
1500	12	24	37	49	61	
1900	11	22	33	44	54	
2450	10	19	29	38	48	
3600	8	16	24	32	40	
5200	7	13	20	26	33	
5400	6	13	19	26	32	
5800	6	12	19	25	31	

SAR test exclusion threshold for 433.9MHz transmitter is 22.5mW for 5mm distance.

- The maximum transmit power declared by the customer is 10mW (+10dBm).
- The measured maximum EIRP is 0.000208mW (Worst-case, Without Duty Cycle correction factor).

*The measurement uncertainty was calculated at  $\pm 4.65$ dB. The reported uncertainty is an expanded uncertainty calculated using a coverage factor of approximately  $k=2$  which gives a level of confidence of approximately 95%.*

The declared maximum power/ measured EIRP is below the SAR exception threshold for 5mm distance.

## 5.2. RF Exposure Evaluation (MPE)

As per section 1.1310 of CFR 47 following Maximum Permissible Exposure (MPE) limits are applicable.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposure</b>				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	*900/f <sup>2</sup>	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	*180/f <sup>2</sup>	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30

f = frequency in MHz \* = Plane-wave equivalent power density

Limits for Maximum Permissible Exposure (MPE) to radiofrequency electromagnetic fields for 433.9MHz as per Table 1 of Section 15.1310 is 0.289 mW/cm<sup>2</sup> (General Population/Uncontrolled).

Prediction Worst case:

Using equation

$$S = PG / 4\pi R^2$$

where: S = Power density

P = Power input to the antenna

G = Antenna gain

R = Distance to the center of radiation of the antenna

Band	Maximum declared Power (dBm)	Maximum EIRP (mW)	Distance (cm)	Calculated Power Density at 20cm (mW/cm <sup>2</sup> )	Power Density Limit** (mW/cm <sup>2</sup> )
433.9MHz	+10	10	20	0.00198	0.289

\*Worst-case, Without Duty Cycle correction factor

\*\* MPE limit for General Population/Un-controlled exposure

Table 1: Results for MPE Evaluation

## 6. Conclusion

The measured EIRP is below the SAR exception threshold (5mm distance) and the calculated power density level at a distance of 20cm are below the maximum levels allowed by regulations.