

## RF EXPOSURE REPORT



**FCC Applicant:** Motive Technologies, Inc.  
55 Hawthorne St. Suite #400, San Francisco, CA 94105

**FCC Manufacturer:** Motive Technologies, Inc.  
55 Hawthorne St. Suite #400, San Francisco, CA 94105

**Product Name:** Asset Gateway Mini

**Brand Name:** Motive

**Model No.:** AG-31

**Model Difference:** N/A

**Report Number:** TESA2304000229ES

**FCC ID** 2AQM7-AG31

**Issue Date:** May 18, 2023

**Date of EUT Received:** April 19, 2023

John Teh

Approved By \_\_\_\_\_

John Yeh

**We hereby certify that:**

The above equipment was evaluate by SGS Taiwan Ltd. The evaluation in this report is in compliance with FCC Rule Part §1.1307.

The results of this report relate to the specific sample identified in this report.

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## Revision History

Report Number	Revision	Description	Issue Date	Revised By	Remark
TESA2304000229ES	00	Original	May 18, 2023	Yuri Tsai	

**Note:**

- The remark "\*" indicates modification of the report upon requests from certification body.

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## 1 DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

### 1.1 Product Description

Product Name:	Asset Gateway Mini
Brand Name:	Motive
Model No.:	AG-31
Model Difference:	N/A
Hardware Version:	NRF9160-SICA-B1A-R7
Firmware Version:	mfw_nrf9160_1.3.3
EUT Series No.:	ACEA11DD131358
Power Supply:	6V

### 1.2 Evaluation site

Laboratory		Site Address	FCC Designation number
SGS Taiwan Ltd. Central RF Lab. (TAF code 3702)	<input checked="" type="checkbox"/>	No. 134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, 24803, Taiwan.	TW0027
	<input type="checkbox"/>	No. 2, Keji 1st Rd., Guishan Township, Taoyuan County, 333 Taiwan.	TW0028
	<input type="checkbox"/>	1F, No. 8, Alley 15, Lane 120, Sec. 1, Nei Hu Road, Nei Hu District, Taipei City, 222 Taiwan.	TW0029

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**1.3 Antenna Information:**

**1.3.1 BLE**

Antenna Type	Frequency (MHz)	Peak Antenna Gain (dBi)
IFA	2.4GHz	3.01

**1.3.2 WWAN**

Antenna Type	Modulation	Frequency (MHz)			Peak Antenna Gain (dBi)
IFA	Cat-M1 Band 2	1850	~	1910	4.99
	Cat-M1 Band 4	1710	~	1755	3.12
	Cat-M1 Band 12	699	~	716	3.68

**Note:** Antenna information is provided by the applicant.

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## 2 DETERMINATION OF MPE EXEMPTION

### 2.1 Single RF Source

As per §1.1307(b)(3)(i),

- (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  $P_{th}$  (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).  $P_{th}$  is given by:

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

Where

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

and

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

$d$  = the separation distance (cm);

**Note:** when 10-g extremity SAR applies, SAR test exemption may be considered by applying a factor of 2.5 to the SAR-based exemption thresholds.

- (C) Or using Table 1 and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, R must be at least  $\lambda/2\pi$ , where  $\lambda$  is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of  $\lambda/4$  or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

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**Table 1 to § 1.1307(b)(3)(i)(C) –  
Single RF Sources Subject to Routine Environmental Evaluation**

RF Source frequency (MHz)		Minimum Distance			Threshold ERP (W)	
fL		fH	$\lambda_L / 2\pi$		$\lambda_H / 2\pi$	
0.3	-	1.34	159m	-	35.6m	1920 R <sup>2</sup>
1.34	-	30	35.6m	-	1.6m	3450 R <sup>2</sup> /f <sup>2</sup>
30	-	300	1.6m	-	159mm	3.83 R <sup>2</sup>
300	-	1500	159mm	-	31.8mm	0.0128 R <sup>2</sup> f
1500	-	100000	31.8mm	-	0.5mm	19.2R <sup>2</sup>

R= minimum separation distance in meter

f = frequency in MHz

## 2.2 Multiple RF Sources

In the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure Limit_k} \leq 1$$

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### 2.3 Single RF Source Evaluation Results

Chain 0	Frequency (MHz)	Max. tune-up power (dBm)	Peak gain (dBi)	ERP (dBm)	ERP (W)	Permissible Minimum separation distance ( $\lambda/2\pi$ ) (m)	R = actual Minimum separation distance(m)	ERP <sub>th</sub> (W)	ERP/ERP <sub>th</sub>
BLE	2442	7.81	3.01	8.67	0.007	0.0196	0.200	0.768	0.009
Cat-M1 Band 2	1850	22.88	4.99	25.72	0.373	0.0258	0.200	0.768	0.486
Cat-M1 Band 4	1710	22.96	3.12	23.93	0.247	0.0279	0.200	0.768	0.322
Cat-M1 Band 12	699	22.94	3.68	24.47	0.280	0.0683	0.200	0.358	0.782

**Note:** For conservativeness, the lowest uplink frequency of each band is used to determine the minimum separation distance of that band. All the single RF source results (P or ERP) are less than their corresponding threshold (P<sub>th</sub> or ERP<sub>th</sub>), so they are exempt from RF exposure testing.

### 2.4 Multiple RF Sources Evaluation Results

Simultaneous transmission modes	$\Sigma$ ERP/ERP <sub>th</sub>	Criteria
1	0.791	1

**Note:**

1.  $\Sigma(ERP/ERP_{th})$ : This is a summation of [(ERP of RF source / exemption threshold ERP for RF source)].

Considering the collocated transmitters, the aggregated (ERP/ERP<sub>th</sub>) is smaller than 1, and MPE of collocated transmitters is compliant

~ End of Report ~

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