



Radio Frequency Exposure Evaluation Report

For:

Astronautics Corporation of America

Marketing Name:

Astronautics M2-JODY-W3 WIFI Radio

Model Number:

ACA-M2-JODY-W377-00B

Product Description:

Astronautics M2-JODY-W3 WIFI Radio

FCC ID: 2AVRR-JODYW377

IC: 25923-JODYW377

Per:

CFR Part Part1 (1.1307 & 1.1310), Part 2 (2.1091),
FCC KDB 447498 D01 General RF Exposure Guidance v06
ISED RSS-102 Issue 6

Report number: EMC_ASTRO_069_25001_FCC_ISED_RF_Exposure

DATE: 2025-09-18



CETECOM Inc.

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1 Assessment

This RF Exposure evaluation report provides evidence for compliance of the below identified device with the RF Exposure limits for mobile devices as defined in FCC CFR Part 1 (1.1307 & 1.1310), Part 2 (2.1091) and IC standard RSS-102 issue 6 under worst case conditions (measured or rated RF output power, antenna gain, distance towards human body, multiple transmitter information as presented by the applicant).

In addition, maximum antenna gain or minimum distance towards the human body is calculated respectively, where relevant.

The device meets the limits as stipulated by the above given FCC and IC rule parts based on available specifications for worst case conditions at 20cm distance to the body.

Company	Description	Model #
Astronautics Corporation of America	Astronautics M2-JODY-W3 WIFI Radio	ACA-M2-JODY-W377-00B

Report Reviewer:

2025-09-18 Compliance Alvin Ilarina
(Senior Manager Regulatory Services)

Alvin ILARINA
Digitally signed by Alvin ILARINA
Date: 2025.09.18 17:32:53 -07'00'

Date	Section	Name	Signature
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Responsible for the Report:

2025-09-18 Compliance Cheng Song
(EMC Engineer)

Cheng Song
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C = US O = CETECOM INC.
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Date	Section	Name	Signature
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2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the Test Report

Company Name:	CETECOM Inc.
Department:	Compliance
Street Address:	411 Dixon Landing Road
City/Zip Code	Milpitas, CA 95035
Country	USA
Telephone:	+1 (408) 586 6200
Fax:	+1 (408) 586 6299
Senior Manager Regulatory Services:	Alvin Ilarina
Responsible Project Leader:	Jayalakshmi, Sekar

2.2 Identification of the Client / Manufacturer

Client's Name:	Astronautics Corporation of America
Street Address:	135 W Forest Hill Ave.
City/Zip Code	Oak Creek WI 53154
Country	USA

2.3 Identification of the Manufacturer

Manufacturer's Name:	Same as Client
Manufacturers Address:	
City/Zip Code	
Country	

3 Equipment under Assessment

Model Number(s):	ACA-M2-JODY-W377-00B
Marketing Name	Astronautics M2-JODY-W3 WIFI Radio
HW Version	ACA-JODY-W377-00B
SW Version	N/A
FCC ID	2AVRR-JODYW377
IC	25923-JODYW377
Product Description:	Astronautics M2-JODY-W3 WIFI Radio
Radio Information as declared:	Cellular Model Name: Telit Cinterion Model Number: FN990A40 Wireless Technologies: • 5G NR FR1 NSA • 5G NR FR1 SA • LTE • UMTS
	WLAN Model Name: u-blox AG Model Number : M2-JODY-W377-00C Wireless Technologies: • Wi-Fi 2.4GHz • Wi-Fi 5GHz
Antenna information as declared:	2G/3G/4G/5G Terminal Antenna Manufacturer: Panorama Antennas Part No. PWB-6-60-RSMAP Peak Gain: • 698 – 960 MHz : 2dBi • 1710 – 3800 MHz : 4dBi • 4400 – 6000 MHz : 6dBi
	WLAN Antenna Monopole Whip Antenna Peak Gain: • 2.4 GHz: 7.7dBi • 5.15 GHz: 5.4dBi • 5.9 GHz: 6dBi
Power Supply / Rated Operating Voltage Range (min/nom/max):	Vmin: 18.5 VDC / Vnom: 28 VDC / Vmax: 36 VDC
Rated Operating Temperature Range:	Tmin: -40 °C / Tmax: +70 °C
Test Sample Status:	Production
Note: The information of the EUT specifications in the table above is provided by the client.	

4 RF Exposure Limits and FCC and IC Basic Rules

4.1 Routine Environmental Evaluation Categorical Exclusion Limits according to FCC 1.1307(b)(3)(i), and FCC 1.1307(b)(3)(ii).

(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 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);

(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 λ 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).

TABLE 1 TO § 1.1307(b)(3)(i)(C)—SINGLE RF SOURCES SUBJECT TO ROUTINE ENVIRONMENTAL EVALUATION

RF Source frequency (MHz)	Threshold ERP (watts)
0.3-1.34	$1,920 R^2$.
1.34-30	$3,450 R^2/f^2$.
30-300	$3.83 R^2$.
300-1,500	$0.0128 R^2 f$.
1,500-100,000	$19.2 R^2$.

(ii) For multiple RF sources: Multiple RF sources are exempt if:

(A) The available maximum time-averaged power of each source is no more than 1 mW and there is a separation distance of two centimeters between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time-averaging period, in which case they may be treated as a single source (separation is not required). This exemption may not be used in conjunction with other exemption criteria other than those in paragraph (b)(3)(i)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(i)(A).

(B) 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.

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

4.2 Field reference level (FRL) exposure exemption limits according to RSS-102 Issue 6, section 6.6

Field reference level (FRL) exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm (i.e. mobile devices), except when the device operates as follows:

- below 20 MHz and the source-based, time-averaged maximum EIRP of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $4.49/f^{0.5}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the EIRP was derived.

5 Evaluations

5.1 Analysis of RF Exposure

FCC:

Radio	Tech-Band	Freq-Low _[GHz]	Pwr _[dBm]	Power _[W]	Ant-G _[dBi]	EIRP _[W]	ERP _[W]	ERP _[mW]	FCC 2.1093(c)(1) P _{th} _[mW] = ERP _{20cm}	P/P _{th} ratio
Cellular	NR2	1.8550	24.50	0.282	4.00	0.708	0.432	431.52	3060.00	0.141
	NR5	0.8290	24.50	0.282	2.00	0.447	0.272	272.27	1691.16	0.167
	LTE 12	0.7040	24.00	0.251	2.00	0.398	0.243	242.66	1436.16	0.175
	LTE 13	0.7820	24.00	0.251	2.00	0.398	0.243	242.66	1595.28	0.157
	LTE 14	0.7795	24.00	0.251	2.00	0.398	0.243	242.66	1590.18	0.158
	NR7	2.5050	24.50	0.282	4.00	0.708	0.432	431.52	3060.00	0.141
	NR25	1.8550	24.50	0.282	4.00	0.708	0.432	431.52	3060.00	0.141
	LTE 26	0.8190	24.00	0.251	2.00	0.398	0.243	242.66	1670.76	0.150
	NR30	2.3050	23.00	0.200	4.00	0.501	0.305	305.49	3060.00	0.100
	NR38	2.5700	25.00	0.316	4.00	0.794	0.484	484.17	3060.00	0.158
	NR41	2.5010	27.50	0.562	4.00	1.413	0.861	860.99	3060.00	0.281
	NR66	1.7150	24.50	0.282	4.00	0.708	0.432	431.52	3060.00	0.141
	NR71	0.6680	24.50	0.282	2.00	0.447	0.272	272.27	1362.72	0.207
Radio	Tech-Band	Freq-Low _[GHz]	Pwr _[dBm]	Power _[W]	AG _[dBi]	EIRP _[W]	ERP _[W]	ERP _[mW]	FCC 2.1093(c)(1) P _{th} _[mW] = ERP _{20cm}	P/P _{th} ratio
WLAN	2.4 GHz	2.4120	21.30	0.1349	7.70	0.794	0.484	484.17	3060.00	0.158
	UNII-1	5.1800	20.70	0.1175	5.40	0.407	0.248	248.31	3060.00	0.081
	UNII-3	5.7450	19.60	0.0912	5.40	0.316	0.193	192.75	3060.00	0.063

The worst-case simultaneous transmission scenario involves NR41 and WLAN 2.4GHz:

TER (Total Exposure Ratio) = 0.439

RF exposure exemption applicable

IC:

Radio	Tech-Band	Freq-Low [MHZ]	Pwr _[dBm]	Power _[W]	Ant-G [dBi]	EIRP _[W]	EIRP _[mW]	Exemption limit for Routine Evaluation	EIRP _[W] /Limit
Cellular	NR2	1855.00	24.50	0.28	4.00	0.71	707.95	2.24	0.316
	NR5	829.00	24.50	0.28	2.00	0.45	446.68	1.29	0.345
	LTE 12	704.00	24.00	0.25	2.00	0.40	398.11	1.16	0.344
	LTE 13	782.00	24.00	0.25	2.00	0.40	398.11	1.24	0.320
	LTE 14	779.50	24.00	0.25	2.00	0.40	398.11	1.2	0.321
	NR7	2505.00	24.50	0.28	4.00	0.71	707.95	2.75	0.257
	NR25	1855.00	24.50	0.28	4.00	0.71	707.95	2.24	0.316
	LTE 26	819.00	24.00	0.25	2.00	0.40	398.11	1.28	0.310
	NR30	2305.00	23.00	0.20	4.00	0.50	501.19	2.60	0.193
	NR38	2570.00	25.00	0.32	4.00	0.79	794.33	2.80	0.283
	NR41	2501.00	27.50	0.56	4.00	1.41	1412.54	2.75	0.513
	NR66	1715.00	24.50	0.28	4.00	0.71	707.95	2.13	0.333
	NR71	668.00	24.50	0.28	2.00	0.45	446.68	1.12	0.400
Radio	Tech-Band	Freq-Low [MHZ]	Pwr _[dBm]	Power _[W]	Ant-G [dBi]	EIRP _[W]	EIRP _[mW]	limit for Routine	EIRP _[W] /Limit
WLAN	2.4 GHz	2412.00	21.30	0.13	7.70	0.79	794.33	2.68	0.296
	UNII-1	5180.00	20.70	0.12	5.40	0.41	407.38	4.53	0.090
	UNII-3	5745.00	19.60	0.09	5.40	0.32	316.23	4.86	0.065

The worst-case simultaneous transmission scenario involves NR41 and WLAN 2.4GHz:
 TER (Total Exposure Ratio) = 0.809
 RF exposure exemption applicable

6 Revision History

Date	Report Name	Changes to report	Prepared by
2025-09-18	EMC_ASTRO_069_25001_FCC_ISED_RF_Exposure	Initial Version	Cheng Song

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