



Radio Frequency Exposure Evaluation Report

For: Astronautics Corporation of America

Brand: Astronautics Corporation of America

Marketing Name: ACA-WPEQ-256ACNRBI

Model Number: ACA-WPEQ-256ACNRBI

FCC ID: 2AVRR-WPEQ256ACN

ISED: 25923-WPEQ256ACN

Applied Rules and Standards:

CFR 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_072_25001_RF_Exposure_Rev1

DATE: 2025-12-03



IC recognized #
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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 ISED 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 ISED rule parts based on available specifications for worst-case conditions at 20 cm distance to the body.

Company Name	Product Description	Model No.
Astronautics Corporation of America	AGCS structure included ACS, GCS and ACCT; Connectivity Module (CM)	ACA-WPEQ-256ACNRBI

Report Authorized by:

Responsible for testing Laboratory:

2025-12-03

Compliance

Alvin, Ilarina
(Director of EMC Services)

Alvin ILARINA

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Responsible for the Report:

2025-12-03

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The test results of this test report relate exclusively to the test item specified in Section3.

CETECOM Inc. USA does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of CETECOM Inc. USA.

2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the EMC Test Report

Company Name:	CETECOM Inc.
Department:	Compliance
Street Address:	411 Dixon Landing Road
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Country	USA
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Fax:	+1 (408) 586 6299
EMC Lab Manager:	Alvin, Ilarina
Responsible Project Leader:	Jayalakshmi, Sekar

2.2 Identification of the Client

Applicant's Name:	Astronautics Corporation of America
Street Address:	135 W Forest Hill Ave
City/Zip Code	Oak Creek, WI 53154-2901
Country	USA

2.3 Identification of the Manufacturer

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

3 Equipment under Assessment

3.1 EUT Specifications

Model No	ACA-WPEQ-256ACNRBI
HW Version	ACA-WPEQ-256ACNRBI
SW Version	N/A
FCC-ID	2AVRR-WPEQ256ACN
ISED:	25923-WPEQ256ACN
HVIN:	ACA-WPEQ-256ACNRBI
PMN:	ACA-WPEQ-256ACNRBI
Product Description	AGCS structure included ACS, GCS and ACCT; Connectivity Module (CM)
Transceiver Technology / Type(s) of Modulation	Cellular Modules Company Name: Sierra Wireless Inc Model Number: EM75S FCC: N7NEM7455 ISED: 2417C-EM7455 Wireless Technologies W-CDMA (UMTS) FDD: II, IV, V LTE FDD/TDD Band: 2,4,5,7,12,13,26,29,30,41
	Wi-Fi & Bluetooth Modules Company Name: SparkLAN Model Number: WPEQ-256ACNRBI, WPEQ-256ACN FCC: 2AVRR-WPEQ256ACN Wireless Technologies Wi-Fi 2.4GHz Wi-Fi 5GHz
Power Supply/ Rated Operating Voltage Range	3.135V (Low) / 3.3V (Nominal) / 3.465V (Max)
Operating Temperature Range	-40°C to +85°C
Sample Revision	☒ Production ☐ Pre-Production
Note: The information of the EUT specifications in the table above is provided by the client.	

4 RF Exposure Limits and FCC and ISED Basic Rules

FCC

4.1.1 § 2.1093(c)(1)

Evaluation of compliance with the exposure limits in § 1.1310 of this chapter, and preparation of an EA if the limits are exceeded, is necessary for mobile devices with single RF sources having either more than an available maximum time-averaged power of 1 mW or more than the ERP listed in Table 1 to § 1.1307(b)(3)(i)(C), whichever is greater. For mobile devices not exempt by § 1.1307(b)(3)(i)(C) at distances from 20 centimeters to 40 centimeters and frequencies from 0.3 GHz to 6 GHz, evaluation of compliance with the exposure limits in § 1.1310 of this chapter is necessary if the ERP of the device is greater than ERP_{20cm} in the formula below. If the ERP of a single RF source at distances from 20 centimeters to 40 centimeters and frequencies from 0.3 GHz to 6 GHz is not easily obtained, then the available maximum time-averaged power may be used (i.e., without consideration of ERP) in comparison with the following formula only 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).

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

4.1.2 § 2.1093(c)(2)

For multiple mobile or portable RF sources within a device operating in the same time averaging period, routine environmental evaluation is required if the formula in § 1.1307(b)(3)(ii)(B) of this chapter is applied to determine the exemption ratio and the result is greater than 1.

4.1.3 § 1.1307(b)(3)(ii)(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.

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

ISED RSS 102

4.1.4 Clause 6.6 Field reference level exposure exemption limits– RF Exposure Evaluation

Field reference level (FRL) RF 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, 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 e.i.r.p. was derived

5 Evaluations

5.1 FCC RF Exposure (Standalone)

Radio	Tech-Band	Freq-Low _[GHz]	Pwr _[dBm]	Power _[W]	Ant-G _[dBi]	EIRP _[W]	ERP _[W]	Threshold ERP _[W]	ERP < Threshold ERP _[W]	FCC 2.1093(c)(1) Pth _[mW] = ERP _{20cm}
Cellular	LTE 2	1.8550	23.99	0.251	2.00	0.397	0.242	0.77	Yes	3060.00
	LTE 4	1.7150	23.99	0.251	2.00	0.397	0.242	0.77	Yes	3060.00
	LTE 5	0.8290	23.98	0.250	0.20	0.262	0.160	0.42	Yes	1691.16
	LTE 12	0.7040	23.95	0.248	0.20	0.260	0.158	0.36	Yes	1436.16
	LTE 13	0.7820	23.72	0.236	0.20	0.247	0.150	0.40	Yes	1595.28
	LTE 26	0.8190	23.98	0.250	0.20	0.262	0.160	0.42	Yes	1670.76
	LTE 41	2.5010	22.95	0.197	2.60	0.359	0.219	0.77	Yes	3060.00
	W-CDMA Band II	1.8550	23.64	0.231	2.00	0.366	0.223	0.77	Yes	3060.00
	W-CDMA Band IV	1.7150	23.45	0.221	2.00	0.351	0.214	0.77	Yes	3060.00
	W-CDMA Band V	0.8290	23.51	0.224	0.20	0.235	0.143	0.42	Yes	1691.16
Radio	Tech-Band	Freq-Low _[GHz]	Pwr _[dBm]	Power _[W]	Ant-G _[dBi]	EIRP _[W]	ERP _[W]	Threshold ERP _[W]	ERP < Threshold ERP _[W]	FCC 2.1093(c)(1) Pth _[mW] = ERP _{20cm}
WLAN	802.11b	2.4120	25.37	0.3443	2.55	0.619	0.378	0.77	Yes	3060.00
	802.11.ac	5.1800	15.46	0.0352	5.90	0.137	0.083	0.77	Yes	3060.00
	802.11.a	5.7450	25.82	0.3819	5.00	1.208	0.736	0.77	Yes	3060.00

Conclusion:

- The maximum RF emissions from this equipment fulfills the RF exclusion threshold limits for separation distance between the antenna and the human body greater than 20 cm. No RF Exposure evaluation is required.

5.2 ISED RF Exposure (Standalone)

									RF Exposure	
									RSS-102 6.6 D>20 cm (300 ≤ Freq < 6000 MHz)	
Radio	Tech-Band	Freq-Low [MHz]	Pwr _[dBm]	Power _[W]	Ant-G [dBi]	Ant-G [lin]	EIRP _[W]	EIRP _[mW]	Exemption limit for Routine Evaluation	Exemption (Y/N)
Cellular	LTE 2	1855.00	23.99	0.25	2.00	1.58	0.40	397.19	2.24	Yes
	LTE 4	1715.00	23.99	0.25	2.00	1.58	0.40	397.19	2.13	Yes
	LTE 5	829.00	23.98	0.25	0.20	1.05	0.26	261.82	1.29	Yes
	LTE 12	704.00	23.95	0.25	0.20	1.05	0.26	260.02	1.16	Yes
	LTE 13	782.00	23.72	0.24	0.20	1.05	0.25	246.60	1.24	Yes
	LTE 26	819.00	23.98	0.25	0.20	1.05	0.26	261.82	1.28	Yes
	LTE 41	2501.00	22.95	0.20	2.60	1.82	0.36	358.92	2.75	Yes
	W-CDMA Band II	1855.00	23.64	0.23	2.00	1.58	0.37	366.44	2.24	Yes
	W-CDMA Band IV	1715.00	23.45	0.22	2.00	1.58	0.35	350.75	2.13	Yes
W-CDMA Band V	829.00	23.51	0.22	0.20	1.05	0.23	234.96	1.29	Yes	
Radio	Tech-Band	Freq-Low [MHz]	Pwr _[dBm]	Power _[W]	Ant-G [dBi]	Ant-G [lin]	EIRP _[W]	EIRP _[mW]	Exemption limit for Routine Evaluation	Exemption (Y/N)
WLAN	802.11b	2412.00	25.37	0.34	2.55	1.80	0.62	619.44	2.68	Yes
	802.11.ac	5180.00	15.46	0.04	5.90	3.89	0.14	136.77	4.53	Yes
	802.11.a	5745.00	25.82	0.38	5.00	3.16	1.21	1207.81	4.86	Yes

Conclusion:

- The maximum RF emissions from this equipment fulfills the RF exclusion threshold limits for separation distance between the antenna and the human body greater than 20 cm. No RF Exposure evaluation is required.

5.3 RF Exposure Test Exemptions for Simultaneous Transmission Sources

- Theoretically, the worst case of simultaneous transmission operating at the highest output power mode, within the nearest frequency bands.
- The worst case of simultaneous transmission calculation:
LTE Band 12 + WLAN 802.11a
 $(248.0/1436.16) + (381.9/3060) = 0.413$

Applicable Simultaneous Transmission Sources	Sum of the ratios of the applicable terms	Limit	RF Exclusion No evaluation required
LTE Band 12 + WLAN 802.11a	$0.173 + 0.241 = 0.413$	≤ 1	Yes

Conclusion:

- The sum of the fractional contributions to the applicable thresholds is less than or equal to 1, hence the multiple RF sources are exempt

6 Revision History

Date	Report Name	Changes to report	Report prepared by
2025-10-30	EMC_ASTRO_072_25001_RF_Exposure	Initial Version	Art Thammanavarat
2025-12-03	EMC_ASTRO_072_25001_RF_Exposure_Rev1	Section 3.1: Updated FCC ID.	Art Thammanavarat

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