



RF Exposure Evaluation Report

FOR:

Rosemount Aerospace, Inc.

Model Name:

8910B1-11

Product Description:

Wireless Transceiver Module

FCC ID: 2AEAK8910B1-11

ISED: 12766A-8910B111

Per:

CFR Part Part1 (1.1307 & 1.1310), Part 2 (2.1091),
FCC KDB 447498 D04 Interim General RF Exposure Guidance v01
ISED RSS-102 Issue 5

Report number: EMC_UTCAE_035_23001_FCC_ISED_RF_Exposure_Rev1

DATE: 2024-04-19



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1 **Assessment**

This RF Exposure evaluation report provides evidence for compliance of the equipment (as identified in section 3 of this test report) with the RF Exposure limits for mobile devices as defined in FCC CFR Part 1 1.1307, Part 2 (2.1091) and ISED standard RSS-102 issue 5 under worst case conditions (measured or rated RF output power including tune-up tolerance, antenna gain, the distance towards the 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 stipulated by the above given FCC and ISED rule parts based on available specifications for worst-case conditions at a separation distance greater than 20cm to the body.

Company	Description	Model No.
Rosemount Aerospace, Inc.	Wireless Transceiver Module	8910B1-11

Responsible for the Report:

2024-04-19		Compliance	Art Thammanavarat (Senior EMC Engineer)
Date	Section	Name	Signature

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

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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
City/Zip Code	Milpitas, CA 95035
Country	USA
Telephone:	+1 (408) 586 6200
Fax:	+1 (408) 586 6299
EMC Lab Manager:	Issa Ghama
Responsible Project Leader:	Rami Saman

2.2 Identification of the Client

Client Firm/Name:	Rosemount Aerospace, Inc.
Street Address:	14300 Judicial Road
City/Zip Code	Burnsville, MN 55306
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:	8910B1-11
HW Version :	08910-0013-0011
SW Version :	08910-1011-0001
FCC-ID :	2AEAK8910B1-11
ISED:	12766A-8910B111
Product Description:	Wireless Transceiver Module
Frequency Range / number of channels:	Nominal band: 2400 MHz – 2483.5 MHz; Center to center: 2412 MHz (ch 1) – 2462 MHz (ch 11), 11 channels
Radio Information:	<u>WLAN (WiFi):</u> - Module Name: RMTAERO M.2 WTM 802.11 - Module Number: 8910B1-11 - Modes of Operation: 802.11b,g,n
Antenna Information as declared:	Frequency Range: 2400 – 2500 MHz <u>Antenna gain</u> SMA Dipole Antenna: 2.1 dBi Integrated Antenna Adapter: 5.7 dBi PCB Trace Antenna: 2.03 dBi
Max. Conducted Output Power:	Peak measurement: 17.88 dBm Average measurement: 14.01 dBm
Power Supply/ Rated Operating Voltage Range:	3.3 VDC nominal (2.7VDC to 3.4VDC)
Operating Temperature Range	-40 °C to +85 °C
Other Radios included in the device:	No
EUT Dimensions	30mm x 30mm x 4.6mm
Weight	6.8 grams
Sample Revision	☒ Production Unit; ☐ Pre-Production

4 RF Exposure Limits and FCC and ISED Basic Rules

4.1 FCC

4.1.1 § 2.1091(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 § 2.1091(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.

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

4.2 ISED RSS 102

4.1.4 Clause 2.5.2 Exemption Limits for Routine Evaluation – RF Exposure Evaluation

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;

5 Evaluations

5.1 FCC RF Exposure (Standalone)

SMA Dipole Antenna

Radio	Modulation	Freq-Low _[GHz]	Pwr _[dBm]	Power _[W]	Ant-G _[dBi]	ERP _[W]	ERP _[mW]	Threshold ERP _[W]	ERP < Threshold ERP _[W]	FCC 2.1091(c)(1) Pth _[mW] = ERP _{20cm}
WLAN	802.11g	2.4120	17.88	0.0614	2.10	0.061	60.67	0.77	Yes	3060.00

Integrated Antenna Adapter

Radio	Modulation	Freq-Low _[GHz]	Pwr _[dBm]	Power _[W]	Ant-G _[dBi]	ERP _[W]	ERP _[mW]	Threshold ERP _[W]	ERP < Threshold ERP _[W]	FCC 2.1091(c)(1) Pth _[mW] = ERP _{20cm}
WLAN	802.11g	2.4120	17.88	0.0614	5.70	0.139	139.00	0.77	Yes	3060.00

PCB Trace Antenna

Radio	Modulation	Freq-Low _[GHz]	Pwr _[dBm]	Power _[W]	Ant-G _[dBi]	ERP _[W]	ERP _[mW]	Threshold ERP _[W]	ERP < Threshold ERP _[W]	FCC 2.1091(c)(1) Pth _[mW] = ERP _{20cm}
WLAN	802.11g	2.4120	17.88	0.0614	2.03	0.060	59.70	0.77	Yes	3060.00

5.2 ISED RF Exposure (Standalone)

SMA Dipole Antenna

RF Exposure									Exemption (Y/N)	
RSS-102 2.5.2 D>20 cm (300 ≤ Freq < 6000 MHz)										
Radio	Modulation	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	802.11g	2412.00	17.88	0.06	2.10	1.62	0.10	99.54	2.68	Yes

Integrated Antenna Adapter

RF Exposure									Exemption (Y/N)	
RSS-102 2.5.2 D>20 cm (300 ≤ Freq < 6000 MHz)										
Radio	Modulation	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	802.11g	2412.00	17.88	0.06	5.70	3.72	0.23	228.03	2.68	Yes

PCB Trace Antenna

RF Exposure									Exemption (Y/N)	
RSS-102 2.5.2 D>20 cm (300 ≤ Freq < 6000 MHz)										
Radio	Modulation	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	802.11g	2412.00	17.88	0.06	2.03	1.60	0.10	97.95	2.68	Yes

Conclusion:

- The maximum RF emissions from this equipment fulfills the SAR exclusion threshold limits for separation distance between the antenna and the human body greater than 20 cm. SAR is not required.

6 Revision History

Date	Report Name	Changes to report	Prepared by
10/10/2023	EMC_UTCAE_035_23001_FCC_RF_Exposure	Initial Version	Art Thammanavarat
4/19/2024	EMC_UTCAE_035_23001_FCC_RF_Exposure_Rev1	<u>Report Revised</u> 1. Section 3.1: Updated Antenna gain. And Power. 2. Section 5: Corrected Typo. 3. Section 5.1 & 5.2: Updated Antenna gain.	Art Thammanavarat

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