Radio Frequency Exposure Evaluation Report

For:
EM Microelectronic

Brand:
EM Microelectronic

Marketing Name:
EMMO3

Model Name:
EMMO3

Product Description:
EMMO BLE 5.4 Mini Module

FCC ID: 2ACQR-EMMO3
IC: 12155A-EMMO3

Applied Rules and Standards:
47 CFR Part 1 (1.1307 &1.1310), Part 2 (2.1093),
FCC KDB 447498 D01 General RF Exposure Guidance v06
ISED RSS-102 Issue 6

REPORT #: EMMIC_004_25001_RF_Exposure

DATE: 2025-07-28

A2LA Accredited

IC recognized #
3462B
CABID: US0187

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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

- Portable devices as defined in FCC CFR Part 1 (1.1307 &1.1310), Part 2 (2.1093) 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 0 cm distance to the body.

Company	Description	Model #
EM Microelectronic	EMMO BLE 5.4 Mini Module	EMMO3

Responsible for Testing Laboratory:

Date	Section	Name	Signature
2025-07-28	Compliance	Alvin Ilarina (Senior Manager Regulatory Services)	Alvin ILARINA Digitally signed by Alvin ILARINA Date: 2025.07.28 15:46:42 -07'00'

Responsible for the Report:

Date	Section	Name	Signature
2025-07-28	Compliance	Guangcheng Huang (EMC Test Engineer)	

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
City/Zip Code	Milpitas, 95035 CA
Country	USA
Telephone:	+ 1 (408) 586 6200
Fax:	+ 1 (408) 586 6299
EMC Lab Manager:	Alvin Ilarina
Project Manager:	Ruby Hall

2.2 Identification of the Client

Client's Name:	EM Microelectronic
Street Address:	Rue De Sors 3
City/Zip Code	Marin-Epagnier 2074
Country	Switzerland

2.3 Identification of the Manufacturer

Manufacturer's Name:	EM Microelectronic
Manufacturers Address:	Rue De Sors 3
City/Zip Code	Marin-Epagnier 2074
Country	Switzerland

3 Equipment Under Test (EUT)

3.1 EUT Specifications

Product Description:	EMMO BLE 5.4 Mini Module
Model No:	EMMO3
Marketing Name:	EMMO3
HW Version:	v1.0
SW Version:	v1.0
FCC ID:	2ACQR-EMMO3
IC:	12155A-EMMO3
FVIN:	v1.0
HVIN:	v1.0
PMN:	EMMO3
Power Supply / Rated operating Voltage Range:	Supply 1.1-3.6V
Operating Temperature Range	-40-85C
Sample Revision	Pre-Production
EUT Dimensions	14.0x10.2mm
Note: All information provided by the client.	

3.2 Radio Specifications

Embedded Radio Technologies	BLE
Frequency Range / number of channels:	Nominal band: 2400 MHz – 2483.5 MHz; Center to center: 2402 MHz (ch 0) – 2480 MHz (ch 39), 40 channels
Antenna Type / Gain	Stamped Metal IFA 1dBi
Note: All information provided by the client.	

4 FCC and ISED Basic Rules

FCC

§ 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 ERP20cm 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 λ/4 or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

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

§ 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.

§ 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.

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

ISED RSS 102

Clause 6.3 SAR exemption limits

Devices operating at or below the applicable output power levels (adjusted for tune-up tolerance) specified in the following table, based on the separation distance, are exempt from SAR evaluation. The separation distance, defined as the distance between the user and/or bystander and the antenna and/or radiating element of the device or the outer surface of the device, shall be less than or equal to 20 cm for these exemption limits to apply.

Frequency (MHz)	≤ 5 mm (mW)	10 mm (mW)	15 mm (mW)	20 mm (mW)	25 mm (mW)	30 mm (mW)	35 mm (mW)	40 mm (mW)	45 mm (mW)	> 50 mm (mW)
≤ 300	45	116	139	163	189	216	246	280	319	362
450	32	71	87	104	124	147	175	208	248	296
835	21	32	41	54	72	96	129	172	228	298
1900	6	10	18	33	57	92	138	194	257	323
2450	3	7	16	32	56	89	128	170	209	245
3500	2	6	15	29	50	72	94	114	134	158
5800	1	5	13	23	32	41	54	74	102	128

5 Evaluation

5.1 FCC Evaluation

Technology	Freq-Low [GHz]	Power [dBm]	Power [W]	AG [dBi]	AG [lin]	EIRP [W]	ERP [mW]	FCC 2.1093(c)(1) AV Power < 1 mW
BLE	2.4020	-3.90	0.0004	1.00	1.26	0.00051	0.313	yes

Conclusion:

- The time-averaged power is less than 1 mW. Hence, environmental assessment is exempt.

5.2 ISED Evaluation

Technology	Freq-Low [GHz]	Power [dBm]	Power [W]	AG [dBi]	AG [lin]	EIRP [W]	ERP [mW]	RSS-102 cl.6.3 AV Power < 3 mW
BLE	2.4020	-3.90	0.0004	1.00	1.26	0.00051	0.313	yes

Conclusion:

- The separation distance is less than 5 mm. At the frequency 2050 MHz, the time-averaged power is less than 3 mW. Hence, SAR testing is exempt.

6 Revision History

Date	Report name	Changes to report	Prepared by
2025-07-28	EMMIC_004_25001_RF_Exposure	Initial version	Guangcheng Huang

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