

RF Exposure Assessment

For

SARA-S520BM10
FCC ID: XPYUBX24KM03

Assessment Reference: MDE_UBLOX_2412_MPE_01

Test Laboratory:

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Note:

The following test results relate only to the devices specified in this document. This report shall not be reproduced in parts without the written approval of the test laboratory.

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1 Summary

The RF-exposure assessment according to KDB 447498 D01 General RF Exposure Guidance v06 shows, that the worst-case RF exposure values of the assessed radio technologies and bands are below the Limits for General Population/Uncontrolled Exposure:

- Table 1 (II) to § 1.1310(E)(1) of 47 CFR Ch. I (10–1–21 Edition).

2 Revision History

Report version control			
Version	Release date	Change Description	Version validity
initial	2024-12-09	--	valid
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Michael Albert
(Reviewed by)



Sören Berentzen
(Project Manager)

3 Administrative Data

3.1 Testing Laboratory

Company Name: 7layers GmbH

Address: Borsigstr. 11
40880 Ratingen
Germany

Report Template Version: 2023-06-30

3.2 Project Data

Responsible for report: Sören Berentzen

Date of Report: 2024-12-09

3.3 Applicant Data

Company Name: u-blox AG

Address: Zürcherstrasse 68
8800 Thalwil
Switzerland

Contact Person: Giulio Comar

3.4 Manufacturer Data

Company Name: please see Applicant Data

Address:

Contact Person:

4 Test object Data

4.1 General EUT Description

Declared EUT data by the supplier	
Kind of Device product description	Multimode module: LTE CAT-M1 and ORBCOMM satellite connectivity with GNSS positioning
Product name(s)	SARA-S520BM10
Type(s)	SARA-S520BM10
Integrated transmitter	Cellular, ORBCOMM, GNSS.

5 Evaluation Results

5.1 RF Exposure Evaluation for Module

Calculation of power density and comparison with reference levels for general public exposure.

Applicability area and limitations: Power density can be calculated in far field region.

Applied Standards:

- IEEE Std C95.3-2021, D.4.2 Antennas – Main beam on-axis, general method for determining the power density at points in the radiating near-field and far-field antenna regions.

Specific information:

- Values used for calculation are based on supplied documents and supplied RF exposure reports.

Output power values are based on the supplied RF exposure reports.

5.1.1 Test limits

As specified in Table 1B of 47 CFR 1.1310 – Limits for Maximum Permissible Exposure (MPE), Limits for General Population/Uncontrolled Exposure.

Frequency range (MHz)	Power density (mW/cm ²)
300 – 1,500	f/1500
1,500 – 100,000	1.0

Table D.2—Determining power density on antenna main beam axis

$$S_{FF} = \frac{G_i P_{in}}{4\pi d^2}$$

In this report is the power density S_i at frequency i calculated in mW/cm².

G_i is the (isotropic) far-field antenna gain (power ratio) at frequency i .

P_{in} is the power into the antenna in mW => P_{mW} .

d is the distance to the antenna in cm.

5.1.2 Test Protocol

Maximum antenna gain to comply with MPE limits for FCC

Band	Mode	Duty Cycle	Frequency (MHZ)	Maximum Conducted output power (dBm)	Maximum Conducted output power (mW)	Equivalent conducted output power (mW)	MPE Limit (mW/cm ²)	Maximum antenna gain to meet MPE Limit (dBi)	Separation distance (cm)
eFDD 2	LTE	100,0%	1850,7	25	316,23	316,23	1,0000	12,0	20
eFDD 4	LTE	100,0%	1710,7	25	316,23	316,23	1,0000	12,0	20
eFDD 5	LTE	100,0%	824,7	25	316,23	316,23	0,5498	9,4	20
eFDD 12	LTE	100,0%	699,7	25	316,23	316,23	0,4665	8,7	20
eFDD 13	LTE	100,0%	779,5	25	316,23	316,23	0,5197	9,2	20
eFDD 25	LTE	100,0%	1850,7	25	316,23	316,23	1,0000	12,0	20
eFDD 26	LTE	100,0%	824,7	25	316,23	316,23	0,5498	9,4	20
eFDD 66	LTE	100,0%	1710,7	25	316,23	316,23	1,0000	12,0	20
eFDD 71	LTE	100,0%	665,5	25	316,23	316,23	0,4437	8,5	20
eFDD 85	LTE	100,0%	700,5	25	316,23	316,23	0,4670	8,7	20
L-Band	ORBCOMM	100,0%	1626,5	32,5	1778,28	1778,28	1,0000	4,5	20
eFDD 8	LTE	100,0%	898,0	25	316,23	316,23	0,5987	9,8	20

END OF REPORT