

# FCC RF Exposure Assessment

on

## MAYA-W3

FCC ID: XPYMAW3A

**Report Reference:** MDE\_UBLOX\_2408\_MPE\_01

### Test Laboratory:

7layers GmbH  
Borsigstrasse 11  
40880 Ratingen  
Germany

#### 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.

#### 7layers GmbH

Borsigstraße 11  
40880 Ratingen, Germany  
T +49 (0) 2102 749 0  
F +49 (0) 2102 749 350

#### Geschäftsführer/

Managing Directors:

Jörg-Timm Kilisch  
Bernhard Retka

Registergericht/registered:

Düsseldorf HRB 75554

USt-Id.-Nr./VAT-No. DE203159652

Steuer-Nr./TAX-No. 147/5869/0385

*a Bureau Veritas  
Group Company*

*[www.7layers.com](http://www.7layers.com)*

## Contents

|     |                                                        |    |
|-----|--------------------------------------------------------|----|
| 1   | Applied Standards .....                                | 3  |
| 2   | Summary .....                                          | 4  |
| 3   | Revision History .....                                 | 5  |
| 4   | Administrative Data .....                              | 6  |
| 4.1 | Testing Laboratory .....                               | 6  |
| 4.2 | Project Data .....                                     | 6  |
| 4.3 | Applicant Data .....                                   | 6  |
| 4.4 | Manufacturer Data .....                                | 6  |
| 5   | Test object Data .....                                 | 7  |
| 6   | Assessment .....                                       | 8  |
| 6.1 | Assessment method and technologies of assessment ..... | 8  |
| 6.2 | Single RF Source exemption limits .....                | 9  |
| 6.3 | Multiple RF Source exemption limits .....              | 10 |
| 6.4 | Calculation .....                                      | 12 |

# 1 Applied Standards

## Type of Authorization

Certification for an Intentional Radiator

## Applicable FCC Rules

Prepared in accordance with the requirements of FCC Rules and Regulations as listed in 47 CFR Ch.1 Parts 1 and 2 (10-1-23 Edition). The following subparts are applicable to the results in this test report.

### Part 1, Subpart I

#### Practice and Procedure, Procedures Implementing the National Environmental Policy Act of 1969

§ 1.1307:

Actions that may have a significant environmental effect, for which Environmental Assessments (EAs) must be prepared.

### Part 2, Subpart J

#### Equipment Authorization Procedures, Certification

§ 2.1091:

Radiofrequency radiation exposure evaluation: mobile devices.

§ 2.1093:

Radiofrequency radiation exposure evaluation: portable devices.

The following KDB is applied:

KDB 447498 D04, v01:

Interim General RF Exposure Guidance  
RF Exposure Procedures and Equipment Authorization Policies for  
Mobile and Portable Devices

## 2 Summary

This RF-exposure evaluation according to the – in chapter 1 - mentioned rule parts and KDB shows, that the worst-case RF exposure values of the assessed radio technologies and bands are below the exemption limits of the mentioned rule parts. The following exemption rule part(s) were selected:

|                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            | <p><b>1-mW Test Exemption, § 1.1307(b)(3)(i)(A)</b></p> <p>447498 D04 Interim General RF Exposure Guidance v01, 2.1.2</p> <p>Per § 1.1307(b)(3)(i)(A), a single RF source is <i>exempt RF device</i> (from the requirement to show data demonstrating compliance to RF exposure limits, as previously mentioned) if the available maximum time-averaged power is no more than 1 mW, regardless of separation distance.</p> <p>This exemption applies to all operating configurations and exposure conditions, for the frequency range 100 kHz to 100 GHz, regardless of fixed, mobile, or portable device exposure conditions. This is a standalone exemption, and it cannot be applied in conjunction with any other test exemption.</p>                                                                                                                                                                                                         |
| <input checked="" type="checkbox"/> | <p><b>MPE based test exemption, § 1.1307(b)(3)(i)(C)</b></p> <p>447498 D04 Interim General RF Exposure Guidance v01, 2.1.4</p> <p>An alternative to the SAR-based exemption is provided in § 1.1307(b)(3)(i)(C), for a much wider frequency range, from 300 kHz to 100 GHz, applicable for separation distances greater or equal to <math>\lambda/2\pi</math>, where <math>\lambda</math> is the free-space operating wavelength in meters. The MPE-based test exemption condition is in terms of ERP, defined as the product of the maximum antenna gain and the delivered maximum time-averaged power.<sup>10</sup> For this case, a RF source is an <i>RF exempt device</i> if its ERP (watts) is no more than a frequency-dependent value, as detailed tabular form in Appendix B. These limits have been derived based on the basic specifications on Maximum Permissible Exposure (MPE) considered for the FCC rules in § 1.1310(e)(1).</p> |
| <input type="checkbox"/>            | <p><b>SAR based test exemption, § 1.1307(b)(3)(i)(B)</b></p> <p>447498 D04 Interim General RF Exposure Guidance v01, 2.1.3</p> <p>A more comprehensive exemption, considering a variable power threshold that depends on both the <i>separation distance</i> and power, is provided in § 1.1307(b)(3)(i)(B). This exemption is applicable to the frequency range between 300 MHz and 6 GHz, with <i>test separation distances</i> between 0.5 cm and 40 cm, and for all RF sources in fixed, mobile, and portable device exposure conditions. Accordingly, a RF source is considered an <i>RF exempt device</i> if its available maximum time-averaged (matched conducted) power or its effective radiated power (ERP), whichever is greater, are below a specified threshold. This exemption threshold was derived based on general population 1-g SAR requirements.</p>                                                                         |
| <input type="checkbox"/>            | <p><b>1-mW Test Exemption for Multiple Sources, § 1.1307(b)(3)(ii)(A)</b></p> <p>447498 D04 Interim General RF Exposure Guidance v01, 2.2.1</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <input checked="" type="checkbox"/> | <p><b>Simultaneous Transmission with both SAR-based and MPE-Based Test Exemptions, § 1.1307(b)(3)(ii)(B)</b></p> <p>447498 D04 Interim General RF Exposure Guidance v01, 2.2.2</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

**Declared separation distance by the customer: 20 cm**

Final Result:

According to the checked 47 CFR rule parts and KDB 447498 v01 subchapters, the RF Exposure Test Exemptions apply.

All ratios – for the declared separation distances(s) - are below 1 ( $\leq 100\%$ ).

Certification can be obtained without the need of showing data (measurements, or analytical/numerical modelling) to demonstrate RF Exposure compliance.

COMMENTS:

- The assessment is limited to supported North American frequency bands



(responsible for accreditation scope)  
Dipl.-Ing. Marco Kullik



(responsible for report)  
Dipl.-Ing. Michael Albert



7 layers GmbH, Borsigstr. 11  
40880 Ratingen, Germany  
Phone +49 (0)2102 749 0

### 3 Revision History

| Report version control |              |                    |                  |
|------------------------|--------------|--------------------|------------------|
| Version                | Release date | Change Description | Version validity |
| initial                | 2025-12-02   | --                 | valid            |
| --                     | --           | --                 | --               |

## 4 Administrative Data

### 4.1 Testing Laboratory

Company Name: 7layers GmbH

Address: Borsigstr. 11  
40880 Ratingen  
Germany

Laboratory accreditation no: DAKkS D-PL-12140-01-00

ISED CAB Identifier DE0007; ISED#: 3699A

FCC Designation Number: DE0015

FCC Test Firm Registration: 929146

Responsible for accreditation scope: Dipl.-Ing. Marco Kullik

Report Template Version: 2025-04-01

### 4.2 Project Data

Responsible for report: Dipl.-Ing. Michael Albert

Date of Report: 2025-12-02

### 4.3 Applicant Data

Company Name: u-blox AG

Address: Zuercherstrasse 68  
CH-8800, Thalwil  
Switzerland

Contact Person: Filip Kruzela  
filip.kruzela@u-blox.com

### 4.4 Manufacturer Data

Company Name: See applicant

Address:

Contact Person:

## 5 Test object Data

| Declared EUT data by the supplier              |                                                                                                                                                                                    |              |     |  |
|------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----|--|
| Kind of Device<br>product description          | Host-based modules with Wi-Fi 6/6E and Bluetooth 5.4                                                                                                                               |              |     |  |
| Product name                                   | MAYA-W3                                                                                                                                                                            |              |     |  |
| Type                                           | MAYA-W381-00B; MAYA-W386-00B; MAYA-W383-00B; MAYA-W382-00B; MAYA-W361-00B; MAYA-W366-00B; MAYA-W363-00B; MAYA-W362-00B; MAYA-W331-00B; MAYA-W336-00B; MAYA-W333-00B; MAYA-W332-00B |              |     |  |
| HW/SW                                          | Product                                                                                                                                                                            | FW           | HW  |  |
|                                                | MAYA-W381-00B                                                                                                                                                                      | 28.10.387.10 | W3A |  |
|                                                | MAYA-W386-00B                                                                                                                                                                      | 28.10.387.10 | W3C |  |
|                                                | MAYA-W383-00B                                                                                                                                                                      | 28.10.387.10 | W3A |  |
|                                                | MAYA-W382-00B                                                                                                                                                                      | 28.10.387.10 | W3A |  |
|                                                | MAYA-W361-00B                                                                                                                                                                      | 28.10.387.10 | W3A |  |
|                                                | MAYA-W366-00B                                                                                                                                                                      | 28.10.387.10 | W3C |  |
|                                                | MAYA-W363-00B                                                                                                                                                                      | 28.10.387.10 | W3A |  |
|                                                | MAYA-W362-00B                                                                                                                                                                      | 28.10.387.10 | W3A |  |
|                                                | MAYA-W331-00B                                                                                                                                                                      | 28.10.387.10 | W3A |  |
|                                                | MAYA-W336-00B                                                                                                                                                                      | 28.10.387.10 | W3C |  |
|                                                | MAYA-W333-00B                                                                                                                                                                      | 28.10.387.10 | W3A |  |
|                                                | MAYA-W332-00B                                                                                                                                                                      | 28.10.387.10 | W3A |  |
| WLAN Radio Details                             |                                                                                                                                                                                    |              |     |  |
| supported Radio technologies                   | WLAN 2.4 GHz b, g, n ax modes (only 20 MHz, SISO)<br>WLAN 5 GHz, a, n, ac, ax modes (only 20 MHz, SISO)<br>WLAN 6 GHz ax mode (only 20 MHz, SISO)                                  |              |     |  |
| Supplied document(s)                           | MDE_UBLOX_2408_FCC_01_rev01,<br>MDE_UBLOX_2408_FCC_02_rev01, MDE_UBLOX_2408_FCC_06,<br>MDE_UBLOX_2408_FCC_04, MDE_UBLOX_2408_FCC_05_rev01,<br>MDE_UBLOX_2408_FCC_07                |              |     |  |
| Antenna                                        | Please see separate table in Annex 1                                                                                                                                               |              |     |  |
| Supplied document(s)                           | Please see separate table in Annex 1                                                                                                                                               |              |     |  |
| Bluetooth / Bluetooth Low Energy Radio details |                                                                                                                                                                                    |              |     |  |
| FCC ID                                         | XPYMAW3A                                                                                                                                                                           |              |     |  |
| Supplied document(s)                           | MDE_UBLOX_2408_FCC_01_rev01,<br>MDE_UBLOX_2408_FCC_02_rev01, MDE_UBLOX_2408_FCC_06,<br>MDE_UBLOX_2408_FCC_04, MDE_UBLOX_2408_FCC_07                                                |              |     |  |
| Antenna                                        | Please see separate table in Annex 1                                                                                                                                               |              |     |  |
| Supplied document(s)                           | Please see separate table in Annex 1                                                                                                                                               |              |     |  |

## 6 Assessment

### 6.1 Assessment method and technologies of assessment

Specific information:

- Output power values are based on the supplied test reports and technical data sheet + tolerances.
- Antenna gain values are taken from the supplied data sheets.

Worst case considerations:

- Main beams of the antennas are directed to the same point in the prediction distance.
- Cable loss of internal antenna cables set to 0
- Duty factor Bluetooth Classic = 0.883 (5 of 6 time slots, DH5 packets)
- Duty factor Bluetooth low energy = 1
- Duty factor WLAN 2.4 GHz = 1
- Duty factor WLAN 5 GHz = 1
- Duty factor WLAN 6 GHz = 1
- The following radio technologies – within the module - can transmit independently from each other:
  - Mode 1: Wi-Fi 6E@2.4 GHz + BT
  - Mode 2: Wi-Fi 6E@5 GHz + BT
  - Mode 3: Wi-Fi 6E@6 GHz + BT

## 6.2 Single RF Source exemption limits

### 6.2.1 1 mw Blanket Exemption

The 1 mW Blanket Exemption of § 1.1307(b)(3)(i)(A) applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power of no more than 1 mW, regardless of separation distance.

The 1 mW blanket exemption applies at separation distances less than 0.5 cm, including where there is no separation. This exemption shall not be used in conjunction with other exemption criteria other than those for multiple RF sources in paragraph § 1.1307(b)(3)(ii)(A).

The 1 mW exemption is independent of service type and covers the full range of 100 kHz to 100 GHz, but it shall not be used in conjunction with other exemption criteria or in devices with higher-power transmitters operating in the same time-averaging period. Exposure from such higher-power transmitters would invalidate the underlying assumption that exposure from the lower-power transmitter is the only contributor to SAR in the relevant volume of tissue.

### 6.2.2 MPE-based Exemption

General frequency and separation-distance dependent MPE-based effective radiated power (ERP) thresholds are in Table B.1 [Table 1 of § 1.1307(b)(1)(i)(C)] to support an exemption from further evaluation from 300 kHz through 100 GHz.

| RF Source Frequency                                                                                                                     |   |           | Minimum Distance |   |                  | Threshold ERP  |
|-----------------------------------------------------------------------------------------------------------------------------------------|---|-----------|------------------|---|------------------|----------------|
| $f_L$ MHz                                                                                                                               |   | $f_H$ MHz | $\lambda_L/2\pi$ |   | $\lambda_H/2\pi$ | W              |
| 0.3                                                                                                                                     | - | 1.34      | 159 m            | - | 35.6 m           | $1.920 R^2$    |
| 1.34                                                                                                                                    | - | 30        | 35.6 m           | - | 1.6 m            | $3450 R^2/f^2$ |
| 30                                                                                                                                      | - | 300       | 1.6 m            | - | 159 mm           | $3.83 R^2$     |
| 300                                                                                                                                     | - | 1500      | 159 mm           | - | 31.8 mm          | $0.0128 R^2 f$ |
| 1500                                                                                                                                    | - | 100000    | 31.8 mm          | - | 0.5 mm           | $19.2 R^2$     |
| Subscripts L and H are low and high; $\lambda$ is wavelength.<br>From § 1.1307(b)(3)(i)(C), modified by adding Minimum Distance columns |   |           |                  |   |                  |                |

The table applies to any RF source (i.e., single fixed, mobile, and portable transmitters) and specifies power and distance criteria for each of the five frequency ranges used for the MPE limits. These criteria apply at separation distances from any part of the radiating structure of at least  $\lambda/2\pi$ . The thresholds are based on the general population MPE limits with a single perfect reflection, outside of the reactive near-field, and in the main beam of the radiator. For mobile devices that are not exempt per Table B.1 [Table 1 of § 1.1307(b)(1)(i)(C)] at distances from 20 cm to 40 cm and in 0.3 GHz to 6 GHz, evaluation of compliance with the exposure limits in § 1.1310 is necessary if the ERP of the device is greater than ERP<sub>20cm</sub> in Formula (B.1) [repeated from § 2.1091(c)(1) and § 1.1307(b)(1)(i)(B)].

$$P_{th} (mW) = ERP_{20cm} (mW) = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases} \quad (\text{B.1})$$

If the ERP is not easily obtained, then the available maximum time-averaged power may be used (i.e., without consideration of ERP 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.

SAR-based exemptions are constant at separation distances between 20 cm and 40 cm to avoid discontinuities in the threshold when transitioning between SAR-based and MPE-based exemption criteria at 40 cm, considering the importance of reflections.

### 6.2.3 SAR-based Exemption

SAR-based thresholds are derived based on frequency, power, and separation distance of the RF source. The formula defines the thresholds in general for either available maximum time-averaged power or maximum time-averaged ERP, whichever is greater.

If the ERP of a device is not easily determined, such as for a portable device with a small form factor, the applicant may use the available maximum time-averaged power exclusively if the device antenna or radiating structure does not exceed an electrical length of  $\lambda/4$ .

As for devices with antennas of length greater than  $\lambda/4$  where the gain is not well defined, but always less than that of a half-wave dipole (length  $\lambda/2$ ), the available maximum time-averaged power generated by the device may be used in place of the maximum time-averaged ERP, where that value is not known.

The separation distance is the smallest distance from any part of the antenna or radiating structure for all persons, during operation at the applicable ERP. In the case of mobile or portable devices, the separation distance is from the outer housing of the device where it is closest to the antenna.

The SAR-based exemption formula of § 1.1307(b)(3)(i)(B), repeated here as Formula (B.2), applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, of less than or equal to the threshold  $P_{th}$  (mW).

This method shall only be used at separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive).  $P_{th}$  is given by Formula (B.2).

$$P_{th} (mW) = \begin{cases} ERP_{20cm} \left(\frac{d}{20cm}\right)^x & d \leq 20 \text{ cm} \\ ERP_{20cm} & 20 \text{ cm} < d < 40 \text{ cm} \end{cases} \quad (B.2)$$

where

$$x = -\log_{10} \left( \frac{60}{ERP_{20cm} \sqrt{f}} \right)$$

and  $f$  is in GHz,  $d$  is the separation distance (cm), and  $ERP_{20cm}$  is per Formula (B.1).

## 6.3 Multiple RF Source exemption limits

### 6.3.1 1-mW Test Exemption for Multiple Sources

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).

### 6.3.2 Simultaneous Transmission with both SAR-Based and MPE-Based exemption limits

Either SAR-based or MPE-based exemption may be considered for test exemption for fixed, mobile, or portable device exposure conditions; therefore, the contributions from each exemption in conjunction with the measured SAR (*Evaluated<sub>k</sub>* term) shall be used to determine exemption for simultaneous transmission according to Formula (C.1) [repeated from § 1.1307(b)(3)(ii)(B)].

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

- a number of fixed, mobile, or portable RF sources claiming exemption using the § 1.1307(b)(3)(i)(B) formula for  $P_{th}$ , including existing exempt transmitters and those being added.
- b number of fixed, mobile, or portable RF sources claiming exemption using the applicable § 1.1307(b)(3)(i)(C) Table 1 formula for Threshold ERP, including existing exempt transmitters and those being added.
- c number of existing fixed, mobile, or portable RF sources with known evaluation for the specified minimum distance
- $P_i$  the available maximum time-averaged power or the ERP, whichever is greater, for fixed, mobile, or portable RF source  $i$  at a distance between 0.5 cm and 40 cm (inclusive).
- $P_{th,i}$  the exemption threshold power ( $P_{th}$ ) according to the § 1.1307(b)(3)(i)(B) formula for fixed, mobile, or portable RF source  $i$ .
- $ERP_j$  the available maximum time-averaged power or the ERP, whichever is greater, of fixed, mobile, or portable RF source  $j$ .
- $ERP_{th,i}$  exemption threshold ERP for fixed, mobile, or portable RF source  $j$ , at a distance of at least  $\lambda/2\pi$ , according to the applicable § 1.1307(b)(3)(i)(C) Table 1 formula at the location in question.
- $Evaluated_k$  the maximum reported SAR or MPE of fixed, mobile, or portable RF source  $k$  either in the device or at the transmitter site from an existing evaluation.
- $Exposure Limit_k$  either the general population/uncontrolled maximum permissible exposure (MPE) or specific absorption rate (SAR) limit for each fixed, mobile, or portable sources, as applicable

The sum of the ratios of the applicable terms for SAR-based, MPE-based and measured SAR or MPE shall be less than 1, to determine simultaneous transmission exposure compliance.

## 6.4 Calculation

### 6.4.1 Calculation of single-frequency exposures

#### Single RF Sources Subject to Routine Environmental Evaluation

Limit: FCC §1.1307(b)(3)(i)(C), Table 1

|                     |             | TX frequ.<br>band | Prediction<br>frequ. | Maximum<br>Conducted<br>Power during<br>Transmission | Duty<br>factor<br>(lin.) | Duty<br>factor<br>(log.) | Average<br>(temporal)<br>power<br>(log.) | Average<br>(temporal)<br>power<br>(lin.) | Gain<br>(log.)   | Gain<br>(log.)   | Gain<br>(lin.) | Minimum<br>Distance | ERP<br>Power     | ERP<br>Power<br>limit at<br>distance<br>d &<br>frequency<br>f <sub>i</sub> | Ratio to<br>exposure<br>reference<br>level | Compli<br>ance, if<br>ERP <sub>i</sub> /<br>ERP <sub>Thi</sub><br>< 1 |
|---------------------|-------------|-------------------|----------------------|------------------------------------------------------|--------------------------|--------------------------|------------------------------------------|------------------------------------------|------------------|------------------|----------------|---------------------|------------------|----------------------------------------------------------------------------|--------------------------------------------|-----------------------------------------------------------------------|
|                     |             | f <sub>Band</sub> | f <sub>i</sub>       | P <sub>dBm</sub>                                     | -                        | -                        | P <sub>dBm</sub>                         | P <sub>mW</sub>                          | g <sub>dBi</sub> | g <sub>dBd</sub> | G <sub>d</sub> | R                   | ERP <sub>i</sub> | ERP <sub>Thi</sub>                                                         | ERP <sub>i</sub> /<br>ERP <sub>Thi</sub>   | -                                                                     |
| Radio<br>technology | Band        | MHz               | MHz                  |                                                      | -                        | dB                       | dBm                                      | mW                                       | dBi              | dBd              | -              | m                   | mW               | mW                                                                         | -                                          | -                                                                     |
| Bluetooth           | 2.4 GHz ISM | 2402 - 2480       | 2402.0               | 17.7                                                 | 0.883                    | -0.5                     | 17.2                                     | 51.99                                    | 4.1              | 2.0              | 1.57           | 0.02                | 81.651           | 768.000                                                                    | <b>0.106</b>                               | Pass                                                                  |
| Bluetooth LE        | 2.4 GHz ISM | 2402 - 2480       | 2402.0               | 14.8                                                 | 1.000                    | 0.0                      | 14.8                                     | 30.20                                    | 4.1              | 2.0              | 1.57           | 0.02                | 47.424           | 768.000                                                                    | 0.062                                      | Pass                                                                  |
| WLAN 2.4 GHz        | 2.4 GHz ISM | 2412 - 2472       | 2412.0               | 19.1                                                 | 1.000                    | 0.0                      | 19.1                                     | 81.28                                    | 4.1              | 2.0              | 1.57           | 0.02                | 127.644          | 768.000                                                                    | <b>0.166</b>                               | Pass                                                                  |
| WLAN 5 GHz          | U-NII-1     | 5150 - 5250       | 5160.0               | 14.8                                                 | 1.000                    | 0.0                      | 14.8                                     | 30.20                                    | 5.3              | 3.2              | 2.07           | 0.01                | 62.517           | 768.000                                                                    | 0.081                                      | Pass                                                                  |
| WLAN 5 GHz          | U-NII-2A    | 5250 - 5350       | 5260.0               | 17.1                                                 | 1.000                    | 0.0                      | 17.1                                     | 51.29                                    | 5.3              | 3.2              | 2.07           | 0.01                | 106.170          | 768.000                                                                    | <b>0.138</b>                               | Pass                                                                  |
| WLAN 5 GHz          | U-NII-2C    | 5470 - 5725       | 5480.0               | 16.5                                                 | 1.000                    | 0.0                      | 16.5                                     | 44.67                                    | 5.3              | 3.2              | 2.07           | 0.01                | 92.470           | 768.000                                                                    | 0.120                                      | Pass                                                                  |
| WLAN 5 GHz          | U-NII-3     | 5725 - 5850       | 5735.0               | 15.6                                                 | 1.000                    | 0.0                      | 15.6                                     | 36.31                                    | 5.3              | 3.2              | 2.07           | 0.01                | 75.162           | 768.000                                                                    | 0.098                                      | Pass                                                                  |
| WLAN 6 GHz          | U-NII-5     | 5925 - 6425       | 5925.0               | 4.4                                                  | 1.000                    | 0.0                      | 4.4                                      | 2.75                                     | 5.8              | 3.7              | 2.32           | 0.01                | 6.397            | 768.000                                                                    | 0.008                                      | Pass                                                                  |
| WLAN 6 GHz          | U-NII-6     | 6425 - 6525       | 6425.0               | 4.2                                                  | 1.000                    | 0.0                      | 4.2                                      | 2.63                                     | 5.8              | 3.7              | 2.32           | 0.01                | 6.109            | 768.000                                                                    | 0.008                                      | Pass                                                                  |
| WLAN 6 GHz          | U-NII-7     | 6525 - 6875       | 6525.0               | 3.8                                                  | 1.000                    | 0.0                      | 3.8                                      | 2.40                                     | 5.8              | 3.7              | 2.32           | 0.01                | 5.572            | 768.000                                                                    | 0.007                                      | Pass                                                                  |
| WLAN 6 GHz          | U-NII-8     | 6875 - 7125       | 6875.0               | 4.5                                                  | 1.000                    | 0.0                      | 4.5                                      | 2.82                                     | 5.8              | 3.7              | 2.32           | 0.01                | 6.546            | 768.000                                                                    | <b>0.009</b>                               | Pass                                                                  |

Bold marked = worst case band of the radio technology

Note: The value in the column "Maximum Conducted Power during Transmission" contains the maximum Tune-up tolerance, if applicable!

## 6.4.2 Calculation of multi-frequency exposures

### Multi RF Sources Subject to Routine Environmental Evaluation (all MPE exempted)

Limit: FCC §1.1307(b)(3)(ii)(B)

|                     |          | TX frequ.<br>band | Prediction<br>frequ. | Maximum<br>Conducted<br>Power during<br>Transmission | Duty<br>factor<br>(lin.) | Duty<br>factor<br>(log.) | Average<br>(temporal)<br>power<br>(log.) | Average<br>(temporal)<br>power<br>(lin.) | Gain<br>(log.) | Gain<br>(log.) | Gain<br>(lin.) | Minimum<br>Distance | ERP<br>Power     | ERP<br>Power<br>limit at<br>distance<br>d &<br>frequency<br>$f_i$ | Ratio to<br>exposure<br>reference<br>level | Sum<br>of<br>ERP/<br>ERP <sub>Th</sub><br>$i$ | Compliance,<br>if Sum of<br>ERP/<br>ERP <sub>Th</sub> < 1 |
|---------------------|----------|-------------------|----------------------|------------------------------------------------------|--------------------------|--------------------------|------------------------------------------|------------------------------------------|----------------|----------------|----------------|---------------------|------------------|-------------------------------------------------------------------|--------------------------------------------|-----------------------------------------------|-----------------------------------------------------------|
|                     |          | $f_{Band}$        | $f_i$                | $P_{dBm}$                                            | -                        | -                        | $P_{dBm}$                                | $P_{mW}$                                 | $g_{dBi}$      | $g_{dBd}$      | $G_d$          | $R$                 | ERP <sub>i</sub> | ERP <sub>Thi</sub>                                                | ERP <sub>i</sub> /<br>ERP <sub>Thi</sub>   | -                                             | -                                                         |
| Radio<br>technology | Band     | MHz               | MHz                  |                                                      | -                        | dB                       | dBm                                      | mW                                       | dBi            | dBd            | -              | m                   | mW               | mW                                                                | -                                          | -                                             | -                                                         |
| Bluetooth           | 2.4 GHz  | 2402 - 2480       | 2402.0               | 17.7                                                 | 0.883                    | -0.5                     | 17.2                                     | 51.99                                    | 4.100          | 1.960          | 1.57           | 0.02                | 81.651           | 768.000                                                           | 0.106                                      | 0.272                                         | Pass                                                      |
| WLAN 2.4 GHz        | 2.4 GHz  | 2412 - 2472       | 2412.0               | 19.1                                                 | 1.000                    | 0.0                      | 19.1                                     | 81.28                                    | 4.100          | 1.960          | 1.57           | 0.02                | 127.644          | 768.000                                                           | 0.166                                      |                                               |                                                           |
| Bluetooth           | 2.4 GHz  | 2402 - 2480       | 2402.0               | 17.7                                                 | 0.883                    | -0.5                     | 17.2                                     | 51.99                                    | 4.100          | 1.960          | 1.57           | 0.02                | 81.651           | 768.000                                                           | 0.106                                      | 0.244                                         | Pass                                                      |
| WLAN 5 GHz          | U-NII-2A | 5250 - 5350       | 5260.0               | 17.1                                                 | 1.000                    | 0.0                      | 17.1                                     | 51.29                                    | 5.3            | 3.2            | 2.07           | 0.01                | 106.170          | 768.000                                                           | 0.138                                      |                                               |                                                           |
| Bluetooth           | 2.4 GHz  | 2402 - 2480       | 2402.0               | 17.7                                                 | 0.883                    | -0.5                     | 17.2                                     | 51.99                                    | 4.100          | 1.960          | 1.57           | 0.02                | 81.651           | 768.000                                                           | 0.106                                      | 0.115                                         | Pass                                                      |
| WLAN 6 GHz          | U-NII-8  | 6875 - 7125       | 6875.0               | 4.5                                                  | 1.000                    | 0.0                      | 4.5                                      | 2.82                                     | 5.8            | 3.7            | 2.32           | 0.01                | 6.546            | 768.000                                                           | 0.009                                      |                                               |                                                           |

**Not applicable for MAYA W386-00B (only "Single-Frequency Transmission")**

# Annex 1: List of antennas:

| Manufacturer         | Ant Name                                                                 | Part number                                      | Doc                                                                         | Gain<br>2.4 GHz<br>[dBi] | Gain<br>5 GHz<br>[dBi] | Gain<br>6 GHz<br>[dBi] | Length*)<br>[mm] |
|----------------------|--------------------------------------------------------------------------|--------------------------------------------------|-----------------------------------------------------------------------------|--------------------------|------------------------|------------------------|------------------|
| Laird                | Waterproof Dipole Antenna                                                | 001-0012                                         | 001-0012 -<br>ENG_DS_ANT_DS_001_0012_0821_0_A1-<br>3199239                  | 2.00                     | 2.00                   | NA                     | 79.8             |
| Molex                | WiFi 6E flex cable balance antenna                                       | 146153                                           | AS-1461530100                                                               | 3.00                     | 4.00                   | 5.50                   | 35.00            |
| Molex                | WiFi 6E flex cable balance antenna                                       | 146153 Series                                    | PS-1461530100                                                               | 3.20                     | 4.25                   | <b>5.80</b>            | 35               |
| Molex                | WiFi 6E Flex Cabled Side-fed<br>Balanced Antenna                         | 204281                                           | AS-2042810100                                                               | 2.00                     | 3.30                   | 4.50                   | 35.00            |
| Linx<br>Technologies | Hinged Blade WiFi 6/5/4 Antenna                                          | ANT-DB1-RAF                                      | DATA AND DEVICES / ANT-DB1-RAF                                              | <b>4.10</b>              | 5.10                   | 4.80                   | 84.40            |
| Chang Hong           | 2.4-2.5GHz 2.85dBi/5.1-5.8GHz<br>2.17dBi DIPOLE FOR SMA PLUG RP          | DA-2458-02-SMR                                   | DA-2458-02-SMR - da-2458-02-smr-with-<br>0273113ipex4-100-test-report-final | 1.89                     | 0.42                   | NA                     | 106              |
| Laird                | FlexPIFA                                                                 | EFB2471A3S-<br>10MHF1 /<br>EFB2471A3S-<br>10MH4L | Datasheet - FlexPIFA 6E 0323                                                | 2.20                     | 3.90                   | 3.80                   | 36.00            |
| Taoglas              | FXP.75 Atom 2.4GHz Series Ultra-<br>Miniaturized 2dBi Bluetooth® Antenna | FXP75.07.0045B                                   | SPE-13-8-067/D/EZ                                                           | 2.50                     | na                     | na                     | 5.9              |
| Taoglas              | GW.59 3dBi Wi-Fi 6 Dipole Antenna                                        | GW.59.3153                                       | SPE-11-8-134-K                                                              | 3.80                     | <b>5.30</b>            | 5.60                   | 131.00           |
| Unitron              | Wi-Fi Dual Band PCB Substrate<br>Antenna                                 | AA222                                            | H2B1PDA1C385L                                                               | 2.70                     | 2.50                   | NA                     | 40               |
| Laird                | External Two-Way Radio Antenna                                           | WTS 2450                                         | ANT-DS-WTS 2450 080114                                                      | 2.10                     | 3.40                   | NA                     | 95.90            |
| Taoglas              | Miniature 2.4GHz PCB antenna with<br>cable and connector                 | PC17.07.0070A                                    | SPE-11-8-015/F/ZL                                                           | 0.90                     | NA                     | NA                     | 24               |

\*) length of the radiating element

\*\*\*\*\*END OF REPORT\*\*\*\*\*