

Report on the FCC and IC Testing of the u-blox AG

Model: JODY-W377-00B

In accordance with FCC 47 CFR Part 15 C and ISSED RSS-GEN and ISSED RSS-102

Prepared for: u-blox AG
Zürcherstrasse 68
Ch-8800 Thalwil
Switzerland

Contains:
FCC ID: XPYJODYW377
IC: 8595A-JODYW377



Product Service

Add value.
Inspire trust.

COMMERCIAL-IN-CONFIDENCE

Date: 2025-01-07

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RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Project Management	Michael Ingerl	2025-01-07	 SIGN-ID 1083020
Authorised Signatory	Martin Steindl	2025-01-07	 SIGN-ID 1083249

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD Product Service document control rules.

Engineering Statement:

These measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC 47 CFR Part 15 C and ISSED RSS-102 and RSS-GEN.

The sample tested was found to comply with the requirements in the tested parts

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Michael Ingerl	2025-01-07	 SIGN-ID 1083020

Laboratory Accreditation

DAkkS Reg. No. D-PL-11321-11-03

DAkkS Reg. No. D-PL-11321-11-04

Laboratory recognition

Registration No. BNetzA-CAB-16/21-15

Industry Canada test site registration

3050A-2

Executive Statement:

A sample of this product was tested and found to be compliant with FCC 47 CFR Part 15 C:2023 and ISSED RSS-102:2023 and ISSED RSS-Gen:2018 + A1:2019 + A2:2021 in the tested parts

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1 Report Summary

1.1 Modification Report

Alternations and additions of this report will be issued to the holders of each copy in the form of a complete document. (Current version replaces all previous versions)

<i>Revision</i>	<i>Description of changes</i>	<i>Date of Issue</i>
0	First Issue	2025-01-07

Table 1: Report of Modifications

1.2 Introduction

Applicant	u-blox AG
Manufacturer	u-blox AG
Model Number(s)	JODY-W377-00B
Serial Number(s)	4999720
Hardware Version(s)	---
Software Version(s)	---
Number of Samples Tested	1
Test Specification(s) /	FCC 47 CFR, Part 1, § 1.1310: 2023,
Issue / Date	ISED RSS-102, Issue 6: 2023
Test Plan/Issue/Date	---
Order Number	8777950
Date of Receipt of EUT	2025-09-18
Start of Test	2025-09-18
Finish of Test	2025-10-06
Name of Engineer(s)	Michael Ingerl
Related Document(s)	ANSI C63.10:2020



1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR, Part 1, § 1.1310 and ISED RSS-102 is shown below.

<i>Section</i>	<i>Specification Clause</i>	<i>Test Description</i>	<i>Result</i>
2.1	(e)(1)	RF Exposure Evaluation	Pass

Table 2: Results according to FCC 47 CFR, Part 1, § 1.1310

<i>Section</i>	<i>Specification Clause</i>	<i>Test Description</i>	<i>Result</i>
2.1	5.3.2	RF Exposure Evaluation	Pass

Table 3: Results according to ISED RSS-102



1.4 Product Information

1.4.1 Technical Description

The EUT is a 3D Laser Scanner.

<i>Supply Voltage:</i>	21.6 V, Battery (2x 10.8 V)
<i>Supply Frequency:</i>	DC
<i>Highest clock frequency:</i>	3 GHz
<i>Antenna information:</i>	Manufacturer: Wellshow Technology Part Number: 995988

If the EUT contains intentional radiating modules:

(Highest) Clock Frequencies of modules: 5.925 GHz





1.5 Deviations from Standard

1.6 EUT Modifications Record

The table below details modifications made to the EUT during the test program.
The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
0	As supplied by the customer	Not Applicable	Not Applicable

Table 4

1.7 Test Location

TÜV SÜD Product Service conducted the following tests at our Straubing test laboratory:

Test Name	Name of Engineer(s)
RF Exposure Evaluation	Michael Ingerl

Office Address:

Äußere Frühlingstraße 45
94315 Straubing
Germany



Product Service

2 Test Details

2.1 RF Exposure Evaluation

2.1.1 Specification Reference

47 CFR, Part 1, § 1.1310
RSS-102, Issue 6

2.1.2 Equipment under Test and Modification State

JODY-W377-00B; S/N 4999720; Modification state 0

2.1.3 Date of Test

2025-09-18 - 2025-10-06

2.1.4 Environmental Conditions

Ambient Temperature	23.0 °C
Relative Humidity	35.0 %



2.1.5 Specification Limits

TABLE 1 TO § 1.1310(E)(1)—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(i) LIMITS FOR OCCUPATIONAL/CONTROLLED EXPOSURE				
0.3-3.0	614	1.63	*(100)	≤6
3.0-30	1842/f	4.89/f	*(900/f ²)	<6
30-300	61.4	0.163	1.0	<6
300-1,500			f/300	<6
1,500-100,000			5	<6
(ii) LIMITS FOR GENERAL POPULATION/UNCONTROLLED EXPOSURE				
0.3-1.34	614	1.63	*(100)	<30
1.34-30	824/f	2.19/f	*(180/f ²)	<30
30-300	27.5	0.073	0.2	<30
300-1,500			f/1500	<30
1,500-100,000			1.0	<30

f = frequency in MHz. * = Plane-wave equivalent power density.



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Table 7: RF field strength and power density limits for devices used by the general public (uncontrolled environment)

Frequency range (MHz)	Electric field (V _{RMS} /m)	Magnetic field (A _{RMS} /m)	Power density (W/m ²)	Reference period (minutes)
10-20	27.46	0.0728	2	6
20-48	$58.07 / f^{0.25}$	$0.1540 / f^{0.25}$	$8.944 / f^{0.5}$	6
48-300	22.06	0.05852	1.291	6
300-6000	$3.142 f^{0.3417}$	$0.008335 f^{0.3417}$	$0.02619 f^{0.6834}$	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	$616000 / f^{1.2}$
150000-300000	$0.158 f^{0.5}$	$4.21 \times 10^{-4} f^{0.5}$	$6.67 \times 10^{-5} f$	$616000 / f^{1.2}$

Note: f is frequency in MHz.



2.1.6 Test Method

The RF Exposure is based on a evaluation calculation for a test separation distance of 20 cm.

Note: Power values from the 7layers test report MDE_UBLOX_2030_MPE_03.
Only Worst Case values.

$$S = P * G / (4 * \pi * R^2)$$

$$G = S_{lim} * 4 * \pi * R^2 / P$$

Where:

S = power density (mW/cm²)

P = power input to the antenna (mW)

G = power gain of the antenna (mW)

R = distance to the centre of radiation of the antenna (cm)

S_{eq} = S = power density (mW/cm²)

S_{lim} = FCC / IC Limit (mW/cm²)



2.1.7 Test Results

47 CFR, Part 1, § 1.1310

		G			P		P*G	S	Slim	Seq/Slim	
Operational Bands	Antenna Gain (dBi)	Antenna Gain - numeric- (mW)	Tune Up (dBm)	Output Power -conducted- (dBm)	Output Power -conducted- (mW)	Output power (EIRP) (dBm)	Output Power (EIRP) (mW)	Power Density value (mW/cm²)	FCC Limit (mW/cm²)	Relative Power Density value	Margin to FCC Limit (mW/cm²)
802.11b	3.3	1.995	2.00	21.00	125.90	24.30	269.15	0.0499	1.0000	0.0499	0.9501
802.11a	5.7	3.162	2.00	18.00	63.10	23.70	234.42	0.0397	1.0000	0.0397	0.9603

with
 R = 20 cm

Multiple frequencies / Sum of max ratios:

$$0.0499 + 0.0397 = \mathbf{0.0896} < 1$$

Result = Pass

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		G			P		P*G	S	Slim	Seq/Slim	
Operational Bands	Antenna Gain (dBi)	Antenna Gain - numeric- (mW)	Tune Up (dBm)	Output Power -conducted- (dBm)	Output Power -conducted- (mW)	Output power (EIRP) (dBm)	Output Power (EIRP) (mW)	Power Density value (mW/cm²)	ISED Limit (mW/cm²)	Relative Power Density value	Margin to ISED Limit (mW/cm²)
802.11b	3.3	1.995	2.00	21.00	125.90	24.30	269.15	0.0499	0.5350	0.0933	0.4851
802.11a	5.7	3.162	2.00	18.00	63.10	23.70	234.42	0.0397	0.9011	0.0441	0.8614

with
 R = 20 cm

Multiple frequencies / Sum of max ratios:

$$0.0933 + 0.0441 = \mathbf{0.1374} < 1$$

Result = Pass



3 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

The measurement uncertainty in the laboratory is less than or equal to the maximum measurement uncertainty according to CISPR16-4-2: 2011 + A1 + A2 + Cor1 (U_{CISPR}). This normative regulation means that the measured value is also the value to be assessed in relation to the limit value.

<i>Radio Interference Emission Testing</i>		
<i>Test Name</i>	<i>kp</i>	<i>Expanded Uncertainty</i>
Conducted Voltage Emission		
9 kHz to 150 kHz (50Ω/50μH AMN)	2	± 3.8 dB
150 kHz to 30 MHz (50Ω/50μH AMN)	2	± 3.4 dB
100 kHz to 200 MHz (50Ω/5μH AMN)	2	± 3.6 dB
Discontinuous Conducted Emission		
9 kHz to 150 kHz (50Ω/50μH AMN)	2	± 3.8 dB
150 kHz to 30 MHz (50Ω/50μH AMN)	2	± 3.4 dB
Conducted Current Emission		
9 kHz to 200 MHz	2	± 3.5 dB
Magnetic Field strength		
9 kHz to 30 MHz (with loop antenna)	2	± 3.9 dB
9 kHz to 30 MHz (large-loop antenna 2 m)	2	± 3.5 dB
Radiated Emission		
30 MHz to 300 MHz	2	± 4.9 dB
300 MHz to 1 GHz	2	± 5.0 dB
1 GHz to 6 GHz	2	± 4.6 dB
Test distance 10 m		
30 MHz to 300 MHz	2	± 4.9 dB
300 MHz to 1 GHz	2	± 4.9 dB
The expanded uncertainty reported according to CISPR16-4-2: 2011 + A1 + A2 + Cor1 is based on a standard uncertainty multiplied by a coverage factor of $k_p = 2$, providing a level of confidence of $p = 95.45\%$		

Table 5 Measurement uncertainty based on CISPR 16-4-2



<i>Radio Interference Emission Testing</i>		
<i>Test Name</i>	<i>kp</i>	<i>Expanded Uncertainty</i>
Occupied Bandwidth	2	± 5 %
Conducted Power		
9 kHz ≤ f < 30 MHz	2	± 1.0 dB
30 MHz ≤ f < 1 GHz	2	± 1.5 dB
1 GHz ≤ f ≤ 40 GHz	2	± 2.5 dB
1 MS/s power sensor (TS8997)	2	± 1.5 dB
Occupied Bandwidth	2	± 5 %
Power Spectral Density	2	± 3.0 dB
Radiated Power		
9 kHz ≤ f < 26.5 GHz	2	± 5.6 dB
26.5 GHz ≤ f < 60 GHz	2	± 8.0 dB
60 GHz ≤ f < 325 GHz	2	± 10 dB
Conducted Spurious Emissions	2	± 3.0 dB
Radiated Spurious Emissions	2	± 6.0 dB
Voltage		
DC	2	± 1.0 %
AC	2	± 2.0 %
Time (automatic)	2	± 5 %
Frequency	2	± 10 ⁻⁷
The expanded uncertainty reported according to to ETSI TR 100 028:2001 is based on a standard uncertainty multiplied by a coverage factor of kp = 2, providing a level of confidence of p = 95.45%		

Table 6 Measurement uncertainty based on ETSI TR 100 028