

ISED CABid: ES1909
Lab. Company Number: 4621A

Test Report No:
80540RRF.002

Partial Test Report

USA FCC Part 24

CANADA RSS-133

(*) Identification of item tested	Cat1 bis data only module
(*) Trademark	u-blox
(*) Model and /or type reference	LEXI-R10401D
Other identification of the product	FCC ID: XPYUBX23AD01 IC: 8595A-UBX23AD01
(*) Features	LTE Cat1 bis, Wi-fi Scan / Locate HW version: UBX-437C01 SW version: 01.06.A01.00
Applicant	u-blox AG Zürcherstrasse 68, CH-8800 Thalwil, Switzerland
Test method requested, standard	USA FCC Part 24 (10-1-23 Edition). CANADA RSS-133 Issue 7, July 2024. ANSI C63.26-2015. KDB 971168 D01 Power Meas License Digital Systems v03r01, April. 2018.
Approved by (name / position & signature)	José Manuel Gómez Galván EMC Consumer & RF Lab. Manager  Firmado digitalmente por 53680346W JOSE MANUEL GOMEZ (C:A29507456)
Date of issue	2025-01-14
Report template No.	FDT08_25 (*) "Data provided by the client"

Index

Competences and guarantees 3

General conditions 3

Uncertainty 3

Data provided by the client.....3

Usage of samples 4

Test sample description 5

Identification of the client.....5

Testing period and place.....6

Document history 6

Environmental conditions 6

Remarks and comments 7

Testing verdicts.....8

Summary 8

Appendix A: Test results for FCC 24 / RSS-133.....9

Competences and guarantees

DEKRA Testing and Certification is a testing laboratory accredited by the National Accreditation Body (ENAC - Entidad Nacional de Acreditación), to perform the tests indicated in the Certificate No. 51/LE 147.

DEKRA Testing and Certification is an FCC-recognized accredited testing laboratory with appropriate scope of accreditation that covers the performed tests in this report.

DEKRA Testing and Certification is an ISED-recognized accredited testing laboratory, CABid: ES1909, Company Number: 4621A, with the appropriate scope of accreditation that covers the performed tests in this report.

In order to assure the traceability to other national and international laboratories, DEKRA Testing and Certification has a calibration and maintenance program for its measurement equipment.

DEKRA Testing and Certification guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at DEKRA Testing and Certification at the time of performance of the test.

DEKRA Testing and Certification is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document. **IMPORTANT:** No parts of this report may be reproduced or quoted out of context, in any form or by any means, except in full, without the previous written permission of DEKRA Testing and Certification.

General conditions

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA Testing and Certification S.A.U.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA Testing and Certification S.A.U. and the Accreditation Bodies.

Uncertainty

Uncertainty (factor $k=2$) was calculated according to the DEKRA Testing and Certification S.A.U. internal document PODT000.

Data provided by the client

The following data has been provided by the client:

1. Information relating to the description of the sample ("Identification of the item tested", "Trademark", "Model and/or type reference tested").
2. The sample model LEXI-R10401D is a Cat1 bis data only module for industrial IoT applications.

DEKRA Testing and Certification S.A.U. declines any responsibility with respect to the information provided by the client and that may affect the validity of results. The laboratory is not responsible for such information and it is not covered by accreditation.

Usage of samples

Samples undergoing test have been selected by: The client.

Id	Control Number	Description	Model	Serial N°	Date Reception	of	Application
S/01	80540_33.1	Cat1 bis data only module	LEXI-R10401D	-	2024-11-05		Element Under Test
S/01	80540_34.1	Antenna	-	-	2024-11-05		Auxiliary Element
S/01	80540_35.1	Antenna GPS	-	-	2024-11-05		Auxiliary Element
S/01	80540_36.1	AC/DC	-	-	2024-11-05		Auxiliary Element
S/01	80540_37.1	USB Cable	-	-	2024-11-05		Auxiliary Element
S/01	80540_49.1	USB Cable	-	-	2024-11-05		Auxiliary Element

Notes referenced to samples during the project:

Id	Type
S/01	Samples used for conducted tests.

Test sample description

Ports..... :	Port name and description	Cable					
		Specified max length [m]	Attached during test		Shielded		
	USB	2	☒		☒		
	-		[]		[]		
Supplementary information to the ports..... :	-						
Rated power supply	Voltage and Frequency		Reference poles				
	[]	AC:	[]	[]	[]	[]	[]
	[X]	DC: Min: 3.3, Typical: 3.8, Max: 4.5					
Rated Power..... :	-						
Clock frequencies..... :	26 MHz						
Other parameters	-						
Software version..... :	01.06.A01.00						
Hardware version	UBX-437C01						
Dimensions in cm (W x H x D) ... :	1.6 x 0.2 x 1.6						
Mounting position	☐	Table top equipment					
	☐	Wall/Ceiling mounted equipment					
	☐	Floor standing equipment					
	☐	Hand-held equipment					
	☒	Other: Industrial modem component					
Modules/parts..... :	Module/parts of test item		Type	Manufacturer			
	-		-	-			
Accessories (not part of the test item)	Description		Type	Manufacturer			
	Power supply unit		UUX324-1215	Unifive			
	Antenna LTE		GSA.8835	Taoglass			
Documents as provided by the applicant	Description		File name	Issue date			
	-		-	-			

Identification of the client

u-blox AG
Zürcherstrasse 68, CH-8800 Thalwil, Switzerland

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2024-11-05
Date (finish)	2024-11-05

Document history

Report number	Date	Description
80540RRF.002	2025-01-14	First release.

Environmental conditions

In the chamber for conducted measurements, the following limits were not exceeded during the test:

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 20 % Max. = 75 %

Remarks and comments

The tests have been performed by the technical personnel: Rafael Fernández.

Used instrumentation:

Control No.	Equipment	Model	Manufacturer	Next Calibration
6165	EMI TEST RECEIVER 9 kHz-7 GHz	ESR7	ROHDE AND SCHWARZ	2025-12-27
7692	ATTENUATOR 3 dB, 2 W, DC, 18 GHz	TWTS2G	TECHNIWAVE	2025-01-29
6157	SIGNAL AND SPECTRUM ANALYZER 10 Hz - 40 GHz	FSV40	ROHDE AND SCHWARZ	2025-01-18
9555	TWO CHANNEL POWER SUPPLY, 32V, 10/5A, 188W	HMP2020	ROHDE AND SCHWARZ	N/A
7794	SIGNAL AND SPECTRUM ANALYZER 10 Hz - 40 GHz	FSV40	ROHDE AND SCHWARZ	2025-04-21
8912	WIDEBAND RADIO COMMUNICATION TESTER	CMW500	ROHDE AND SCHWARZ	2025-10-05
6792	SHIELDED ROOM	S101	ETS LINDGREN	N/A

Testing verdicts

Not applicable:	N/A
Pass:	P
Fail:	F
Not measured:	N/M

Summary

LTE Cat 1bis Band 2:

FCC 24 / RSS-133		
Requirement – Test case	Verdict	Remark
FCC 24.232 / RSS-133 5.5: RF Output Power	P	
FCC 2.1047 / RSS-133 5.3: Modulation characteristics	N/M	(1)
FCC 24.235 / RSS-133 5.4: Frequency stability	N/M	(1)
FCC 2.1049: Occupied Bandwidth	N/M	(1)
FCC 24.238 / RSS-133 5.6: Spurious emissions at antenna terminals	N/M	(1)
FCC 24.238 / RSS-133 5.6: Spurious emissions at antenna terminals at Block Edges	N/M	(1)
FCC 24.238 / RSS-133 5.6: Radiated Emissions	N/M	(1)
<u>Supplementary information and remarks:</u> (1) Test not requested.		

Appendix A: Test results for FCC 24 / RSS-133

INDEX

TEST CONDITIONS 11

RF Output Power 12

TEST CONDITIONS

(*): Declared by the Applicant.

POWER SUPPLY (*):

Vnominal: 3.8 Vdc
Vminimum: 3.23 Vdc
Vmaximum: 4.5 Vdc
Type of Power Supply: DC External (USB).

ANTENNA (*):

MIDDLE BAND		ANTENNA TYPE
LTE Cat 1bis Band 2	4.12 dBi	External (Taoglass GSA_8835 (standard reference antenna provided with EVK))

TEST FREQUENCIES:

LTE Cat 1bis Band 2. QPSK and 16QAM:

	Channel per BW=(Frequency, MHz)					
	BW=1.4 MHz	BW=3 MHz	BW=5 MHz	BW=10 MHz	BW=15 MHz	BW=20 MHz
Low	18607 (1850.7)	18615 (1851.5)	18625 (1852.5)	18650 (1855)	18675 (1857.5)	18700 (1860)
Middle	18900 (1880)	18900 (1880)	18900 (1880)	18900 (1880)	18900 (1880)	18900 (1880)
High	19193 (1909.3)	19185 (1908.5)	19175 (1907.5)	19150 (1905)	19125 (1902.5)	19100 (1900)

RF Output Power

Limits

* FCC § 2.1046 and § 24.232:

Mobile/portable stations are limited to 2 Watts (33 dBm) Effective Isotropic Radiated Power (E.I.R.P.).

* RSS-133 Clause 5.5:

Mobile stations and hand-held portables are limited to 2 watts maximum e.i.r.p.

Method

The conducted RF output power measurements were made at the RF output terminals of the EUT using the power meter of the Universal Radio Communication tester CMW500, selecting maximum transmission power of the EUT and different modes of modulation.

The maximum equivalent isotropically radiated power (e.i.r.p.) is calculated by adding the declared maximum antenna gain (dBi).

The maximum effective radiated power e.r.p. is calculated from the maximum equivalent isotropically radiated power (e.i.r.p.) by subtracting 2.15 dB:

$$\text{E.R.P.} = \text{E.I.R.P.} - 2.15 \text{ dB}$$

Test Setup

CONDUCTED AVERAGE POWER:



Results

BANDWIDTH (MHz)	CHANNEL	FREQUENCY (MHz)	MODULATION	RB SIZE	RB OFFSET	AVERAGE POWER (dBm)
1.4	Low 18607	1850.7	QPSK	1	0	22.4
1.4			QPSK	1	2	22.42
1.4			QPSK	1	5	22.43
1.4			QPSK	3	0	22.41
1.4			QPSK	3	1	22.39
1.4			QPSK	3	2	22.37
1.4			QPSK	6	0	21.54
1.4			16-QAM	1	0	21.5
1.4			16-QAM	1	2	21.54
1.4			16-QAM	1	5	21.48
1.4			16-QAM	3	0	21.56
1.4			16-QAM	3	1	21.55
1.4			16-QAM	3	2	21.52
1.4			16-QAM	6	0	20.65
1.4	Middle 18900	1880	QPSK	1	0	22.69
1.4			QPSK	1	2	22.65
1.4			QPSK	1	5	22.59
1.4			QPSK	3	0	22.54
1.4			QPSK	3	1	22.55
1.4			QPSK	3	2	22.53
1.4			QPSK	6	0	21.7
1.4			16-QAM	1	0	21.98
1.4			16-QAM	1	2	22
1.4			16-QAM	1	5	21.91
1.4			16-QAM	3	0	21.78
1.4			16-QAM	3	1	21.8
1.4			16-QAM	3	2	21.75
1.4			16-QAM	6	0	20.83
1.4	High 19193	1909.3	QPSK	1	0	22.6
1.4			QPSK	1	2	22.57
1.4			QPSK	1	5	22.4
1.4			QPSK	3	0	22.55
1.4			QPSK	3	1	22.48
1.4			QPSK	3	2	22.45
1.4			QPSK	6	0	21.53
1.4			16-QAM	1	0	21.45
1.4			16-QAM	1	2	21.33
1.4			16-QAM	1	5	21.25
1.4			16-QAM	3	0	21.62
1.4			16-QAM	3	1	21.54
1.4			16-QAM	3	2	21.51
1.4			16-QAM	6	0	20.79

BANDWIDTH (MHz)	CHANNEL	FREQUENCY (MHz)	MODULATION	RB SIZE	RB OFFSET	AVERAGE POWER (dBm)
3	Low 18615	1851.5	QPSK	1	0	22.33
3			QPSK	1	7	22.37
3			QPSK	1	14	22.13
3			QPSK	8	0	21.43
3			QPSK	8	4	21.45
3			QPSK	8	7	21.38
3			QPSK	15	0	21.39
3			16-QAM	1	0	21.33
3			16-QAM	1	7	21.44
3			16-QAM	1	14	21.22
3			16-QAM	8	0	20.78
3			16-QAM	8	4	20.78
3			16-QAM	8	7	20.74
3			16-QAM	15	0	20.54
3	Middle 18900	1880	QPSK	1	0	22.6
3			QPSK	1	7	22.6
3			QPSK	1	14	22.33
3			QPSK	8	0	21.8
3			QPSK	8	4	21.8
3			QPSK	8	7	21.73
3			QPSK	15	0	21.79
3			16-QAM	1	0	21.49
3			16-QAM	1	7	21.51
3			16-QAM	1	14	21.24
3			16-QAM	8	0	20.93
3			16-QAM	8	4	20.93
3			16-QAM	8	7	20.85
3			16-QAM	15	0	20.81
3	High 19185	1908.5	QPSK	1	0	22.95
3			QPSK	1	7	22.72
3			QPSK	1	14	22.23
3			QPSK	8	0	21.78
3			QPSK	8	4	21.66
3			QPSK	8	7	21.46
3			QPSK	15	0	21.65
3			16-QAM	1	0	21.84
3			16-QAM	1	7	21.69
3			16-QAM	1	14	21.21
3			16-QAM	8	0	21.03
3			16-QAM	8	4	20.91
3			16-QAM	8	7	20.74
3			16-QAM	15	0	20.86

BANDWIDTH (MHz)	CHANNEL	FREQUENCY (MHz)	MODULATION	RB SIZE	RB OFFSET	AVERAGE POWER (dBm)
5	Low 18625	1852.5	QPSK	1	0	22.52
5			QPSK	1	12	22.27
5			QPSK	1	24	22.4
5			QPSK	12	0	21.53
5			QPSK	12	6	21.5
5			QPSK	12	11	21.5
5			QPSK	25	0	21.54
5			16-QAM	1	0	21.82
5			16-QAM	1	12	21.66
5			16-QAM	1	24	21.8
5			16-QAM	12	0	20.74
5			16-QAM	12	6	20.71
5			16-QAM	12	11	20.73
5			16-QAM	25	0	20.75
5	Middle 18900	1880	QPSK	1	0	22.93
5			QPSK	1	12	22.6
5			QPSK	1	24	22.56
5			QPSK	12	0	21.93
5			QPSK	12	6	21.83
5			QPSK	12	11	21.73
5			QPSK	25	0	21.85
5			16-QAM	1	0	22.13
5			16-QAM	1	12	21.78
5			16-QAM	1	24	21.72
5			16-QAM	12	0	21.16
5			16-QAM	12	6	20.96
5			16-QAM	12	11	20.86
5			16-QAM	25	0	20.91
5	High 19175	1907.5	QPSK	1	0	23.07
5			QPSK	1	12	22.88
5			QPSK	1	24	22.44
5			QPSK	12	0	22.14
5			QPSK	12	6	22.04
5			QPSK	12	11	21.84
5			QPSK	25	0	21.95
5			16-QAM	1	0	22.1
5			16-QAM	1	12	22.03
5			16-QAM	1	24	21.6
5			16-QAM	12	0	21.18
5			16-QAM	12	6	21.11
5			16-QAM	12	11	20.93
5			16-QAM	25	0	21.01

BANDWIDTH (MHz)	CHANNEL	FREQUENCY (MHz)	MODULATION	RB SIZE	RB OFFSET	AVERAGE POWER (dBm)
10	Low 18650	1855	QPSK	1	0	22.54
10			QPSK	1	24	22.56
10			QPSK	1	49	22.88
10			QPSK	25	0	21.6
10			QPSK	25	12	21.66
10			QPSK	25	24	21.78
10			QPSK	50	0	21.7
10			16-QAM	1	0	21.6
10			16-QAM	1	24	21.58
10			16-QAM	1	49	21.79
10			16-QAM	25	0	20.74
10			16-QAM	25	12	20.81
10			16-QAM	25	24	20.92
10			16-QAM	50	0	N/A
10	Middle 18900	1880	QPSK	1	0	23.11
10			QPSK	1	24	22.69
10			QPSK	1	49	22.53
10			QPSK	25	0	22.11
10			QPSK	25	12	21.9
10			QPSK	25	24	21.76
10			QPSK	50	0	21.97
10			16-QAM	1	0	22.06
10			16-QAM	1	24	21.66
10			16-QAM	1	49	21.52
10			16-QAM	25	0	21.3
10			16-QAM	25	12	21.01
10			16-QAM	25	24	20.9
10			16-QAM	50	0	N/A
10	High 19150	1905	QPSK	1	0	22.94
10			QPSK	1	24	22.93
10			QPSK	1	49	22.56
10			QPSK	25	0	21.94
10			QPSK	25	12	22.02
10			QPSK	25	24	21.98
10			QPSK	50	0	21.96
10			16-QAM	1	0	21.98
10			16-QAM	1	24	21.93
10			16-QAM	1	49	21.53
10			16-QAM	25	0	20.91
10			16-QAM	25	12	21.09
10			16-QAM	25	24	21.12
10			16-QAM	50	0	N/A

BANDWIDTH (MHz)	CHANNEL	FREQUENCY (MHz)	MODULATION	RB SIZE	RB OFFSET	AVERAGE POWER (dBm)
15	Low 18675	1857.5	QPSK	1	0	22.56
15			QPSK	1	37	22.7
15			QPSK	1	74	22.87
15			QPSK	36	0	21.73
15			QPSK	36	18	21.86
15			QPSK	36	37	22.02
15			QPSK	75	0	21.9
15			16-QAM	1	0	21.68
15			16-QAM	1	37	21.8
15			16-QAM	1	74	21.99
15			16-QAM	25	0	20.77
15			16-QAM	25	18	20.96
15			16-QAM	25	37	21.18
15			16-QAM	75	0	N/A
15	Middle 18900	1880	QPSK	1	0	23.15
15			QPSK	1	37	22.66
15			QPSK	1	74	22.81
15			QPSK	36	0	22.15
15			QPSK	36	18	21.94
15			QPSK	36	37	21.74
15			QPSK	75	0	22.02
15			16-QAM	1	0	22.1
15			16-QAM	1	37	21.65
15			16-QAM	1	74	21.72
15			16-QAM	25	0	21.45
15			16-QAM	25	18	21.07
15			16-QAM	25	37	20.95
15			16-QAM	75	0	N/A
15	High 19125	1902.5	QPSK	1	0	23.22
15			QPSK	1	37	23.01
15			QPSK	1	74	22.71
15			QPSK	36	0	22.15
15			QPSK	36	18	22.1
15			QPSK	36	37	22.12
15			QPSK	75	0	22.14
15			16-QAM	1	0	22.43
15			16-QAM	1	37	22.22
15			16-QAM	1	74	22
15			16-QAM	25	0	21.27
15			16-QAM	25	18	21.22
15			16-QAM	25	37	21.34
15			16-QAM	75	0	N/A

BANDWIDTH (MHz)	CHANNEL	FREQUENCY (MHz)	MODULATION	RB SIZE	RB OFFSET	AVERAGE POWER (dBm)
20	Low 18700	1860	QPSK	1	0	22.65
20			QPSK	1	49	22.89
20			QPSK	1	99	23.28
20			QPSK	50	0	21.83
20			QPSK	50	24	22.02
20			QPSK	50	49	22.25
20			QPSK	100	0	22.1
20			16-QAM	1	0	21.8
20			16-QAM	1	49	22.08
20			16-QAM	1	99	22.39
20			16-QAM	25	0	20.81
20			16-QAM	25	24	21.09
20			16-QAM	25	49	21.39
20			16-QAM	100	0	N/A
20	Middle 18900	1880	QPSK	1	0	22.93
20			QPSK	1	49	22.63
20			QPSK	1	99	22.94
20			QPSK	50	0	22.21
20			QPSK	50	24	22
20			QPSK	50	49	21.83
20			QPSK	100	0	22.14
20			16-QAM	1	0	21.94
20			16-QAM	1	49	21.69
20			16-QAM	1	99	21.88
20			16-QAM	25	0	21.46
20			16-QAM	25	24	21.13
20			16-QAM	25	49	21.23
20			16-QAM	100	0	N/A
20	High 19100	1900	QPSK	1	0	22.98
20			QPSK	1	49	23.05
20			QPSK	1	99	22.7
20			QPSK	50	0	22.11
20			QPSK	50	24	22.13
20			QPSK	50	49	22.14
20			QPSK	100	0	22.14
20			16-QAM	1	0	22.03
20			16-QAM	1	49	22.06
20			16-QAM	1	99	21.83
20			16-QAM	25	0	21.01
20			16-QAM	25	24	21.09
20			16-QAM	25	49	21.16
20			16-QAM	100	0	N/A

Verdict

Pass