



TEST REPORT

Nr. R24028901

Federal Communication Commission (FCC)

Report Reference No.	R24028901
Date of issue:	10.09.2024
Total number pages:	12
Customer name	Embit S.r.l.
Address	Via Emilia Est, 911 – 41122 Modena (MO) – Italy
Test specification:	
Standard(s)	KDB 447498 D01 General RF Exposure Guidance v06
Non-standard test method	N/A
Test Report Form No.	15-247_HoppingDEKRA
Test Report Form(s) Originator ...	DEKRA Testing and Certification S.r.l.
Master TRF	2024-05
General disclaimer:	
The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of DEKRA Testing and Certification S.r.l.	
(*) Test item description	EMB-LR1303-mPCIe LoRaWAN Gateway Module
(*) Trademark	Embit
(*) Manufacturer	Embit S.r.l.
(*) Model / Type reference	EMB-LR1303-mPCIe-USB-915MHz
(*) FCC ID	Z7HEMBLR1302
(*) Rating(s)	120 V ~ 60 Hz single-phase
Report	
Tested by (name + signature)	C. Panozzo 
Approved by (name + signature)	F. Marenda 

(*) information provided by the customer

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2 Reference standard(s)	
KDB 447498 D01 General RF Exposure Guidance v06	RF exposure procedures and equipment authorization policies for mobile and portable devices
3 List of attachments	
Attachment 1: Measurement uncertainty, judgement of compliance and quality manual references	
4 Deviation(s) from test specification	
None	
5 Testing location	
DEKRA Testing and Certification S.r.l. Via della Fisica, 20 – 36016 Thiene (VI) – Italy Test site facility's FCC registration number: 182474	

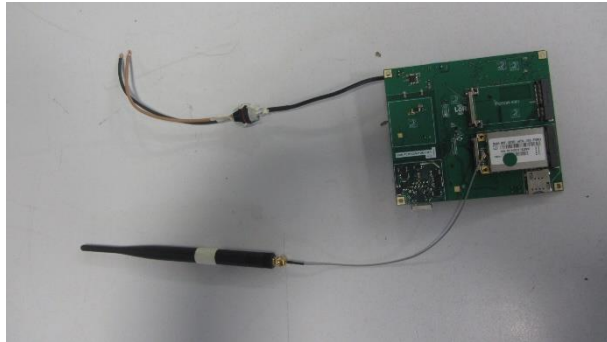
Revision index	Date	Change history
1.0	10.09.2024	--

Testing and sampling:	
Date of receipt of test item	12.02.2024
Testing start date	09.09.2024
Testing end date	09.09.2024
Sampling procedure	Sample used for testing chosen by the customer; DEKRA Testing and Certification S.r.l. cannot be considered responsible for the selection of the sample
Internal identification	Adhesive label with the product number P240143
General remarks:	
<p>This report shall not be reproduced, except in full, without the written approval of DEKRA Testing and Certification S.r.l.</p> <p>The test results presented in this report relate only to the object tested.</p> <p>“(see appended table)”: refers to a table appended to the report.</p> <p>Throughout this report a comma is used as the decimal separator.</p>	
Possible test case verdicts:	
Test case does not apply to the test object:	N/A (Not Applicable)
Test object meets the requirement:	P (Pass)
Test object does not meet the requirement:	F (Fail)
Test object was not evaluated for the requirement:	N/E (Not Executed)
Definition of symbols used in this test report:	
<input checked="" type="checkbox"/> Indicates that the listed condition, standard or equipment is applicable for this report. <input type="checkbox"/> Indicates that the listed condition, standard or equipment is not applicable for this report.	

6 General description of test item(s)

Description	EMB-LR1303-mPCIe LoRaWAN Gateway Module						
Model Number	EMB-LR1303-mPCIe-USB-915MHz						
FCC ID	Z7HEMBLR1302						
Serial Number	--						
Brand name	Embit						
Frequency band	902 – 928 MHz						
Nominal frequencies (LoRa 125 kHz)	FL: 903,90 MHz	FM: 904,50 MHz			FH: 905,30 MHz		
Nominal frequencies (LoRa 500 kHz)	FL: 923,30 MHz	FM: 925,00 MHz			FH: 927,50 MHz		
Test power supply		Voltage and Frequency	Reference poles				
			N	L1	L2	L3	PE
	<input checked="" type="checkbox"/>	AC: 120 V, 60 Hz	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	AC:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	DC:					<input type="checkbox"/>
Software release	rlz_010000_CoreCell_USB.bin						
Type of equipment	<input checked="" type="checkbox"/> Transmitter unit <input checked="" type="checkbox"/> Receiver unit						
Type of station	<input type="checkbox"/> Portable station <input checked="" type="checkbox"/> Mobile station						
Test arrangements of EUT	<i>Intended operational arrangement(s) of EUT</i>				<i>Test arrangement (see basic standard)</i>		
	<input checked="" type="checkbox"/> Table-top only				Table-top		
	<input type="checkbox"/> Floor-standing only				Floor-standing		
	<input type="checkbox"/> Can be floor-standing or table-top				Table-top		
	<input type="checkbox"/> Rack mounted				In rack or table-top		
	<input type="checkbox"/> Other, for example wall mounted, ceiling mounted, handheld, body worn				Table-top		
Operating modes	No.	Operating mode of test item					
	1	EUT in continuous transmission at maximum power					
Declination of responsibility	<p>Information relating to the description of the sample, components list, and software/hardware version (if reported) are provided by the customer. DEKRA Testing and Certification S.r.l. cannot be considered responsible for this information, for any other document sent by the customer and for any difference between the software version present in the tested sample and that present in the object intended for final sale.</p> <p>In some cases, the software in the tested sample is in a version dedicated exclusively to the test, and therefore does not represent the software installed in the final version of the product.</p>						

6.1 Photos of the test item



7 Verdict summary section

KDB 447498 D01 General RF Exposure Guidance v06			
Clause	Requirement – Test case	Basic standard	Verdict
7.1	RF Exposure Analysis	--	P

8 Test conditions

8.1 General

Environmental reference conditions..... :	The climatic conditions during the tests are within the limits specified by the manufacturer for the operation of the EUT and the test equipment. The climatic conditions during the tests were within the following limits:		
	Temperature	Humidity	Atmospheric pressure
	15 °C – 35 °C	30 % - 60 %	800 hPa – 1060 hPa
	If explicitly required in the basic standard or applied product standard the climatic values are recorded and documented separately in this test report.		
Measurement uncertainties :	Attachment 1		

9 Test results

9.1 RF Exposure Analysis

Tested by	C. Panozzo
Test date	09.09.2024
Test location (stand)	Laboratory
Reference standards.....	KDB 447498 D01 cl. 4 ANSI C63.10
Supplementary information	--

Acceptance limits

For mobile devices operating at frequency f between 300 kHz and 6 GHz the power density limit at 20 cm is $f(\text{MHz})/1500 \text{ mW/cm}^2$ according to FCC Part 1.1310(e)(1) Table 1

Result – LoRa 125 kHz, spread factor 7

Transmission channel (MHz)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density at 20 cm (mW/cm ²)	Power Density Limit (mW/cm ²)
904,50	21,17	130,92	0,041	0,603

Result – LoRa 125 kHz, spread factor 10

Transmission channel (MHz)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density at 20 cm (mW/cm ²)	Power Density Limit (mW/cm ²)
903,90	21,34	136,14	0,043	0,603

Result – LoRa 500 kHz, spread factor 7

Transmission channel (MHz)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density at 20 cm (mW/cm ²)	Power Density Limit (mW/cm ²)
927,50	26,76	474,24	0,150	0,618

Result – LoRa 500 kHz, spread factor 12

Transmission channel (MHz)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density at 20 cm (mW/cm ²)	Power Density Limit (mW/cm ²)
927,50	26,76	474,24	0,150	0,618

Remarks: Power Density = $(P \times G) / (4\pi R^2)$

Where:

P = the power in mW

G = the numeric gain of the transmitting antenna: 1,585 (2 dBi)

R = the reference distance (20 cm)

Attachment 1

Measurement uncertainty

<i>Test</i>	<i>Test Setup</i>	<i>Expanded uncertainty</i>			<i>Note</i>
Conducted emission CISPR 16 LISN 50uH 0,009-0,0150 MHz	PE001_01			3,6 dB	1
Conducted emission CISPR 16 LISN 50uH 0,150-30,0 MHz	PE001_01			2,9 dB	1
Conducted emission CISPR 16 Voltage Probe 0,15-30 MHz	PE001_02			2,3 dB	1
Conducted emission CISPR 16 Current Probe 0,15-30 MHz	PE001_03			2,5 dB	1
Conducted emission CISPR 16 ISN 0,15-30 MHz	PE001_04			4,7 dB	1
Clic CISPR 16 LISN 50uH 0,150-30,0 MHz	PE001_05			2,9 dB	1
Radiated Emission CDNE 30-300 MHz	PE001_06			3,3 dB	1
Disturbance Power 30-300 MHz	PE002_X1			3,8 dB	1
Radiated Emission LAS 0,15-30 MHz	PE003_01			2,0 dB	1
Radiated Emission CISPR 16 Loop Ant. 0,15-30 MHz	PE004_X1			4,1 dB	1
Radiated Emission CISPR 16 Bicon. Ant. 30-300 MHz	PE004_X2			4,7 dB	1
Radiated Emission CISPR 16 LogP. Ant. 300-1000 MHz	PE004_X3			4,6 dB	1
Radiated Emission CISPR 16 Horn Ant. 1-18 GHz	PE004_X4			4,7 dB	1
Human Exposure to electromagnetic fields	PE005_01			14,2 %	1
Harmonics	PE006_01	10 mA	+	2,9 %	1
Flicker	PE007_01			3,40 %	1
Radiated Immunity 80 MHz - 6 GHz	PE102_XX	2,26 dB		0,89 V/m a 3V/m	1
Conducted Immunity 0,15 - 230 MHz	PE105_XX	1,26 dB		0,47 V a 3V	1
AC Magnetic field	PE106_01	1,55 %		0,15 A/m a 10A/m	1
Pulse Magnetic field	PE107_01	6,21 %		18,6 A/m a 300A/m	1
Dumped Magnetic field	PE108_01	6,21 %		1,86 A/m a 30A/m	1
Common mode conducted immunity	PE112_01	2,11 %		0,21 V a 10V	1

Attachment 1

<i>Test</i>	<i>Test Setup</i>	<i>Expanded uncertainty</i>	<i>Note</i>
Power/Spurious 9kHz-30MHz	PR001_X1	4,1 dB	1
Power/Spurious ERP 30-1000MHz d=10m/3m	PR001_X2+X3	4,8 dB	1
Misura della potenza EIRP 1-18GHz d=3m	PR001_X4+X5	4,7 dB	1
Misura della potenza EIRP 18-40GHz d=3m	PR001_X6	5,1 dB	1
Frequency error	PR002_01+02	< 1x10 ⁻⁷	1
Timing zero span (1001pts.)	PR002_01+02	0,2 % SWT	1
Modulation bandwidth	PR002_01+02	< 1x10 ⁻⁷	1
Conducted RF power and spurious emission	PR002_01+02	1,1 dB	1
Adjacent channel power	PR002_01+02	1,1 dB	1
Blocking	PR002_01+02	1,1 dB	1

<i>Test</i>	<i>Test Setup</i>	<i>Expanded uncertainty</i>	<i>Note</i>
Electrostatic discharge immunity test	PE101_0X		2
Electrical fast transients / burst immunity test	PE103_0X		2
Surge immunity test	PE104_0X		2
Short interruption immunity test	PE109_01		2
Ring Wave immunity test	PE110_01		2
Low frequency immunity test	PE111_01		2
Dumped Oscillatory immunity test	PE113_01		2
Rev_24_01 date 03/02/2024			

Note 1:

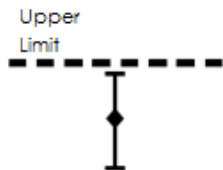
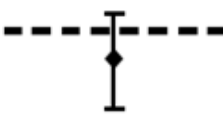


The expanded uncertainty reported according to the document EA-4-02 is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of p = 95%

Note 2:

It has been demonstrated that the used test equipment meets the specified requirements in the standard with at least a 95% confidence, covering factor k=2

Attachment 1

Judgement of compliance

Case 1	Case 2	Case 3	Case 4
 <p>The sample complies with the requirements.</p> <p>The measurement results is within the specification limit when the measurement uncertainty is taken into account.</p>	 <p>The sample complies with the requirements.</p> <p>It is not possible to state compliance using a 95% coverage probability for the expanded uncertainty although the measurement result is below the limit.</p>	 <p>The sample does not comply with the requirements.</p> <p>It is not possible to state compliance using a 95% coverage probability for the expanded uncertainty also the measurement result is upper the limit.</p>	 <p>The sample does not comply with the requirements.</p> <p>The measurement results is outside the specification limit when the measurement uncertainty is taken into account.</p>

In agreement with ILAC-G8:09/2019 cl.4.2.1 Guidelines on Decision Rules and Statements of Conformity

Quality manual references – Internal procedure

Internal Procedure PM001 rev. 4.0 (Quality Manual)	Measure procedure
Internal Procedure INC_M rev. 10.0 (Quality Manual)	Measurement uncertainty calculation