

TEST REPORT

Nr. R22023301

Federal Communication Commission (FCC)

Report Reference No.	R22023301
Date of issue:	15.02.2022
Total number pages:	15
Applicant's name	Embit S.r.l.
Address	Via Emilia Est, 911 – 41122 Modena (MO) – Italy
Test specification:	
Standards	KDB 447498 D01 General RF Exposure Guidance v06
Non-standard test method	N/A
Test Report Form No.	SAR_FCCCMC
Test Report Form(s) Originator ..	CMC Centro Misure Compatibilità S.r.l.
Master TRF	2022-01
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 CMC Centro Misure Compatibilità S.r.l.	
(*) Test item description	EMB-LR1302-mPCIe LoRaWAN Gateway Module
(*) Trademark	Embit
(*) Manufacturer	Embit S.r.l.
(*) Model / Type reference	EMB-LR1302-mPCIe-SPI-915
(*) 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	
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: Instruments list, measurement uncertainty, judgement of compliance and quality manual references	
4 Deviation(s) from test specification	
None	
5 Testing location	
CMC Centro Misura Compatibilità S.r.l. Via della Fisica, 20 – 36016 Thiene (VI) – Italy Test site facility's FCC registration number: 182474	

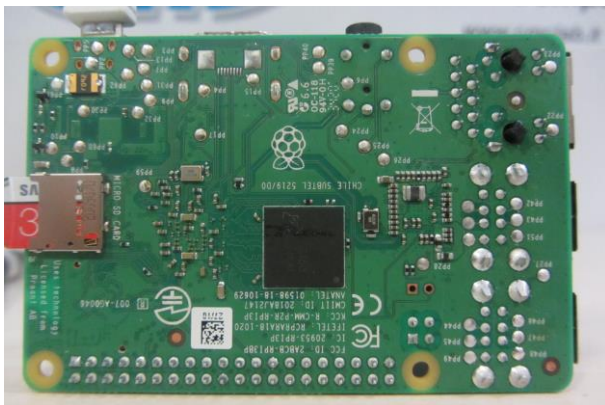
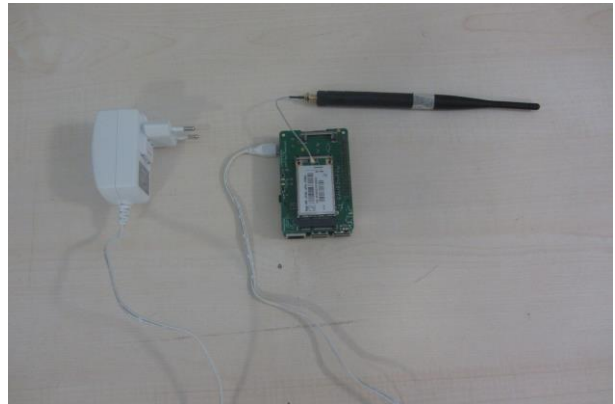
Revision index	Date	Change history
1.0	15.02.2022	--

Testing and sampling:	
Date of receipt of test item	08.10.2021
Testing start date	15.02.2022
Testing end date	15.02.2022
Sampling procedure.....	Equipment used for testing was picked up by the customer
Internal identification	Adhesive label with the product number P211144
General remarks:	
This report shall not be reproduced, except in full, without the written approval of CMC. The test results presented in this report relate only to the object tested. “(see appended table)”: refers to a table appended to the report. Throughout this report a comma is used as the decimal separator.	
Possible test case verdicts:	
Test case does not apply to the test object:	N/A (Not Applicable)
Test object does meet the requirement:	P (Pass)
Test object does not meet the requirement:	F (Fail)
Test object does not performed:	N/E (Not Executed)
Definition of symbols used in this test report:	
☒ Indicates that the listed condition, standard or equipment is applicable for this report. ☐ Indicates that the listed condition, standard or equipment is not applicable for this report.	

6 General description of test item(s)

Description	EMB-LR1302-mPCIe LoRaWAN Gateway Module							
Model Number	EMB-LR1302-mPCIe-SPI-915							
FCC ID	Z7HEMBLR1302							
Serial Number	--							
Brand name	Embit							
Frequency band	902 – 928 MHz							
Nominal frequencies	F _L : 902,30 MHz		F _M : 908,30 MHz		F _H : 914,90 MHz			
Rated power supply		Voltage and Frequency	Reference poles					
			N	L1	L2	L3	PE	
	☒	AC: 120 V, 60 Hz	☒	☒	☐	☐	☐	
	☐	AC:	☐	☐	☐	☐	☐	
	☐	DC:						☐
Software version	v2.0.0							
Test configuration	☒	Table top equipment						
	☐	Floor standing equipment						
	☐	Hand-held equipment						
Type of equipment	☒	Transmitter unit						
	☒	Receiver unit						
Type of station	☐	Portable station						
	☒	Mobile station						
Operating modes	No.	Operating mode of test item						
	1	EUT in continuous transmission, power set at 19 via software, to obtain 21 dB on output						

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
cl. 4	RF Exposure analysis	ANSI C63.10	P

Normative references	
Reference no.	Description
KDB 447498 D01 General RF Exposure Guidance v06	RF exposure procedures and equipment authorization policies for mobile and portable devices
ANSI C63.10:2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

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	15.02.2022
Reference standards	KDB 447498 D01 cl. 4 ANSI C63.10
Test specification	--

Acceptance limits

1 mW/cm² max at 20 cm of distance

Result – spread factor 10

Frequency (MHz)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density at 20 cm (mW/cm ²)	Power Density Limit (mW/cm ²)
902,30	20,61	115,08	3,63E-02	1,00
908,30	20,21	104,95	3,31E-02	1,00
914,90	20,02	100,46	3,17E-02	1,00

Result – spread factor 7

Frequency (MHz)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density at 20 cm (mW/cm ²)	Power Density Limit (mW/cm ²)
902,30	20,18	104,23	3,29E-02	1,00
908,30	20,26	106,17	3,35E-02	1,00
914,90	20,07	101,62	3,20E-02	1,00

Attachment 1

Instruments list

<i>Id. number</i>	<i>Manufacturer</i>	<i>Model</i>	<i>Description</i>	<i>Serial number</i>	<i>Last calibration</i>	<i>Due date calibration</i>
CMC S295	Rohde & Schwarz	FSW43	Spectrum Analyzer 43GHz	104059	November '19	November '22

Attachment 1

Measurement uncertainty

Test	Test Setup	Expanded uncertainty	Note
Conducted emission CISPR 16 LISN 50uH 0,009-0,0150 MHz	PE001_01	3,4 dB	1
Conducted emission CISPR 16 LISN 50uH 0,150-30,0 MHz	PE001_01	3,0 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	2,6 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_01	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_01	4,1 dB	1
Radiated Emission CISPR 16 Bicon. Ant. 30-300 MHz	PE004_02	4,7 dB	1
Radiated Emission CISPR 16 LogP. Ant. 300-1000 MHz	PE004_03	4,6 dB	1
Radiated Emission CISPR 16 Horn Ant. 1-18 GHz	PE004_04	4,7 dB	1
Human Exposure to electromagnetic fields	PE005_01	16,7 %	1
Harmonics	PE006_01	10 mA + 2,9 %	1
Flicker	PE007_01	4,15 %	1
Radiated Immunity 80 MHz - 6 GHz	PE102_XX	2,20 dB 0,86 V/m a 3V/m	1
Conducted Immunity 0,15 - 230 MHz	PE105_XX	1,20 dB 0,44 V a 3V	1
AC Magnetic field	PE106_01	1,55 % 0,15 A/m a 10A/m	1
Pulse Magnetic field	PE107_01	6,23 % 18,7 A/m a 300A/m	1
Dumped Magnetic field	PE108_01	6,23 % 1,87 A/m a 30A/m	1
Common mode conducted immunity	PE112_01	2,16 % 0,22 V a 10V	1

Attachment 1

Test	Test Setup	Expanded uncertainty	Note
Power/Spurious 9kHz-30MHz	PR001_01	4,1 dB	1
Power/Spurious ERP 30-1000MHz d=10m	PR001_02+03	4,7 dB	1
Misura della potenza EIRP 1-18GHz d=3m	PR001_04+05	4,7 dB	1
Misura della potenza EIRP 18-40GHz d=3m	PR001_06	5,4 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

Test	Test Setup	Expanded uncertainty	Note
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. 22_01 date 31/01/2022			

Note 1:

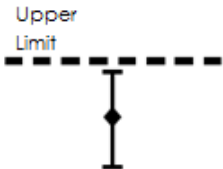
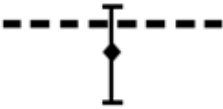
The expanded uncertainty reported according to the document EA-4-02 is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of p = 95%

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

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. 3.1 (Quality Manual)	Measure procedure
Internal Procedure INC_M rev. 9.7 (Quality Manual)	Measurement uncertainty calculation