

REM- EMISS25D943CIX-02Av0

MPE test report

According to the standard:

CFR 47 FCC PART 15

Equipment under test:

IoT BOX

Mounted on a PERS

FCC ID: *2BTLU-000001*

Company:

CIXI SAS

Distribution: Mr Clément GRANDY

(Company: CIXI SAS)

Number of pages: 10 with 1 appendix

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This document is the result of testing a specimen or a sample of the product submitted. It does not imply an assessment of the conformity of the whole manufactured products of the tested sample.

Information in italics are declared by the manufacturer/customer and are under his responsibility

DESIGNATION OF PRODUCT: *IoT BOX*

Serial number (S/N): *PERS-C4-A-00000070*

Reference / model (P/N): *CPN-00148920-C1*

Software/Firmware version: *PERS: 4.245 / IOT Box: 1.2-16*

MANUFACTURER: *CIXI SAS*

COMPANY SUBMITTING THE PRODUCT:

Company: CIXI SAS

Address: 315 rue Novus Parc,
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Responsible: Mr Clément GRANDY

DATE(S) OF TEST: From 21-Nov-25 to 24-Nov-25

TESTING LOCATION: EMITECH CHASSIEU laboratory at CHASSIEU (69) FRANCE
FCC Accredited under US-EU MRA Designation Number: FR0013
Test Firm Registration Number: 807590

TESTED BY: T. LEDRESSEUR

VISA:



WRITTEN BY: T. LEDRESSEUR

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REVISIONS HISTORY

Revision	Date	Modified pages	Modifications
0	17-Feb-26	/	Creation

1. INTRODUCTION

This report presents the results of radio test carried out on the following radio equipment: **IoT BOX**, in accordance with normative reference.

The equipment under test integrates a Bluetooth Low Energy radio function

In addition, on the IoT BOX the LTE module, FCCID: XMR2023EG915QNA is integrated.

2. PRODUCT DESCRIPTION

Category of equipment (ISED): I

Class: B

Utilization: Residential use

Antenna type and gain: -1 dBi / integral chip antenna, ceramic

Operating frequency range: From 2400 MHz to 2483.5 MHz

Number of channels: 40

Channel spacing: 2MHz

Modulation: GFSK

Power source: External battery 48 Vdc.

Test frequencies:

Frequencies tested:

Sample N°= 1 ⇒ 2402 MHz Full tests

Sample N°= 1 ⇒ 2440 MHz Full tests

Sample N°= 1 ⇒ 2480 MHz Full tests

Power level, frequency range and channels characteristics are not user adjustable.

The details pictures of the product and the circuit boards are joined with this file.

3. NORMATIVE REFERENCE

The standards and testing methods related throughout this report are those listed below.

They are applied on the whole test report even though the extensions (version, date and amendment) are not repeated.

CFR 47 (2025)	Radio Frequency Devices
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ANSI C63.10	2013 Procedures for Compliance Testing of Unlicensed Wireless Devices.
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447498 D01 General RF Exposure Guidance v06	RF Exposure procedures and equipment authorization policies for mobile and portable equipment
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447498 D04 Interim General RF Exposure Guidance v01	RF Exposure Procedures and Equipment Authorization Policies for Mobile and Portable Devices
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4. RF EXPOSURE

BLE standalone.

Maximum measured power

F = 2480 MHz

	Electro-magnetic field (dBμV/m):	Maximum Peak conducted output power (1)		Limit (W)	Maximum Peak EIRP		Limit (W)
		(dBm)	(W)		(dBm)	(W)	
Nominal supply voltage:	86.39	-7.87	0.0001633	1	-8.87	0.0001298	4

Maximum Peak conducted output power:

$EIRP(dBm) = E (dBμV/m) + 20\log(D) - 104.8 - G$; where D is the measurement distance in meters and antenna Gain = -1 dBi.

The maximum is the conducted power, this value is used for this exemption.

P = 0.16mW

SAR-Based Exemption according paragraph 2.1.3

The test separation distance declared is 3.3 cm with the leg of the user. (With a minimum value of 5 mm).

According §1.1307, at frequency 2480 MHz for this distance, the exemption threshold is **98.9 mW**.

According §2.1.1 of KDB 447498 D04 Interim General RF Exposure Guidance v01, this exemption threshold is based on a threshold for exposure for 1-g SAR (head and body). For a threshold corresponding to a 10-g extremity SAR exposure, it is necessary to apply a factor of 2.5 to the determined exemption threshold.

Therefore, 10-g extremity SAR threshold resulting is $98.9 \text{ mW ERP} \times 2.5 = \mathbf{247.25 \text{ mW}}$

The maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold Pth (mW).

The equipment fulfils the requirements on SAR-Based Exemption according §1.1307(b)(3)(i)(B).

The MPE ratio is then calculated for the simultaneous transmission.

$$\text{MPE ratio(BLE)} = \frac{0.00000000017243}{0.98} = 0.00065$$

LTE standalone.

The results are extracted from the original certification, output conducted power listed on the Grant, and the antenna used (Quectel_YFCA002)

Antenna Gain.

Frequency (MHz)	700	960	1710	1990
Gain (dBi)	-1.15	0.97	0.7	2.17

The conducted power is higher than the ERP.

Conducted output power:

Frequency low (MHz)	Frequency high (MHz)	Conducted power (mW)	SAR exemption limit at 3.3cm for 10g (mW)	MPE ratio (LTE)
704	711	228	342.5	0.666
704	711	198	342.5	0.578
701.5	713.5	242	342.5	0.707
701.5	713.5	205	342.5	0.599
782	782	217	337.5	0.643
782	782	189	337.5	0.560
779.5	784.5	219	337.5	0.649
779.5	784.5	192	337.5	0.569
829	844	258	332.5	0.776
829	844	224	332.5	0.674
1720	1745	272	282.5	0.963
1720	1745	226	282.5	0.800
1717.5	1747.5	273	282.5	0.966
1720	1770	252	282.5	0.892
1720	1770	208	282.5	0.736
1715	1775	218	282.5	0.772
1860	1900	244	275	0.887
1860	1900	199	275	0.724
1855	1905	209	275	0.760

Calculus for simultaneous transmission

Only the worst critical case for the LTE module is taken into account for this analysis

$$\sum \text{ of MPE ratio } = \text{MPE ratio(BLE)} + \text{MPE ratio(LTE)} = 0.00065 + 0.966 = 0.966 \leq 1.0$$

The product meet the requirement for Simultaneous transmission MPE test exclusion from §2.2 of KDB 447498

□□□ End of report, 1 appendix to be forwarded□□□

APPENDIX 1: Minimum distance for normal use

Explication for the exemption distance.

The product (IoT box + PERS) is designed to be integrated on an e-bike. The product is the motor located at the pedals of the bicycle.

The distance considered for these exemptions is the distance between the IoT Box (the box containing the LTE and BLE antennas) and the normal position of the foot/leg of the user.

Example of integration on an e-bike





PERS +
IoT box

With the representative bicycle crank mounted on the PERS, during normal utilization of the product, we obtain the following distance, 44.53mm



The IoT box is delimited by the red tape.
A shorter distance is then considered for the analysis.