

MPE test report

According to the standard:
CFR 47 FCC PART 15

Equipment under test:
Wirnet iFemtoCell-evolution 915

FCC ID: 2AFYS-KLKFEVO915

Company:
KERLINK SA

Distribution: Mr LOUVEAU

(Company: KERLINK SA)

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DESIGNATION OF PRODUCT: *Wirnet iFemtoCell-evolution 915*

Serial number (S/N): 005DGa010003

Reference / model (P/N): Wirnet iFemtoCell-evolution 915

MAC ADDR: 70:76:FF:05:00:A3

Software version: 5.0.1-klk10

MANUFACTURER: KERLINK SA

COMPANY SUBMITTING THE PRODUCT:

Company: KERLINK SA

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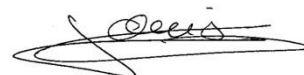
Responsible: Mr LOUVEAU

DATES OF TEST: From 20-Feb-20 to 26-Feb-20

TESTING LOCATION: EMITECH ANGERS laboratory at JUIGNE SUR LOIRE (49) FRANCE
FCC Accredited under US-EU MRA Designation Number: FR0009
Test Firm Registration Number: 873677

TESTED BY: S.LOUIS

VISA:



WRITTEN BY: S. LOUIS

CONTENTS

	<i>TITLE</i>	<i>PAGE</i>
1.	<i>INTRODUCTION</i>	<i>4</i>
2.	<i>PRODUCT DESCRIPTION</i>	<i>4</i>
3.	<i>NORMATIVE REFERENCE</i>	<i>5</i>
4.	<i>RF EXPOSURE.....</i>	<i>6</i>

1. INTRODUCTION

This report presents the results of radio test carried out on the following radio equipment: **Wirnet iFemtoCell-evolution 915**, in accordance with normative reference.

The device under test integrates:

- Transceiver 2G, 3G and LTE already certified (FCCID: XMR201903EG25G)
- Transceiver Lora with external antenna.

2. PRODUCT DESCRIPTION

LoRa Part:

Class: B

Utilization: Residential

Antenna type and gain: 3 dBi / external antenna

Operating frequency range: From 902 MHz to 928 MHz

Frequencies tested: 923.3 MHz, 925.7 MHz and 927.5 MHz for transmission (SF7 and SF12)
902.3 MHz, 908.7 MHz and 914.9 MHz for reception (SF7 and SF10)
903 MHz, 909.4 MHz and 914.2 MHz for reception (SF7 and SF12)

Frequencies plan detailed transmitter:

Channel frequencies	LoRa bandwidth (KHz)	Number of channel	Channel width (KHz)
923,3+i*0.6MHz (i=0 à 7)	500	8	600

Frequencies plan detailed receiver:

Channel frequencies	LoRa bandwidth (KHz)	Number of channel	Channel width (KHz)
903+i*1,6MHz (i=0 à 7)	500	8	600
902.3+i*0,2MHz (i=0 à 63)	125	64	200

Number of channels: 8

Channel spacing: 600kHz

Modulation: LoRa with spread factor 7 and 12

Power source: 120 V/60Hz

Power Software adjusted to PA3 MIX13 (in agreement with the applicant).

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 (2018) Radio Frequency Devices

ANSI C63.10 2013
Procedures for Compliance Testing of Unlicensed Wireless Devices.

447498 D01 General RF RF Exposure procedures and equipment authorization policies for mobile and
Exposure Guidance v06 portable equipment

OET BULLETIN 65 Evaluating Compliance with FCC Guidelines for Human Exposure to
Radiofrequency Electromagnetic Fields

4. RF EXPOSURE**Calculus for LoRa in standalone****RF EXPOSURE:**

Maximum measured power = 23.53 dBm at 923.3 MHz

With a gain of 3dBi

EIRP = 26.53 dBm = 0.4498W

The maximum duty cycle is 40% on the reference period of 6min, so the power computed is: 180 mW

In accordance with KDB 447498 D01 General RF Exposure Guidance v06:

$$PSD = EIRP / (4 * \pi * R^2)$$

$$\Rightarrow 180 / (4 * \pi * (20 \text{ cm})^2) = 0.036 \text{ mW/cm}^2 \text{ (limit=0.615 mW/cm}^2\text{)}$$

The MPE ratio is then calculated for the simultaneous transmission.

$$MPE \text{ ratio(LoRa)} = \frac{PSD}{PSD \text{ lim}} = 0.058$$

The equipment fulfils the requirements on power density for general population/uncontrolled exposure and therefore fulfils the requirements of 47 CFR §1.1310.

Calculus for EG25-G in standalone

The results are extracted from **EG25-G Module** RF Exposure evaluation report referenced **HR/2019/1001602** and calculated with the antenna used (FRACTUS ANTENNAS FR01-S4-220).

Antenna type and gain: 3.1 dBi / Integral antenna



Operating Band	Frequency Band (MHz)	Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Gain (dBi)	Average EIRP (mW)	Power density at 20 cm (mW/cm²)	Limit (mW/cm²)	MPE ratio
GSM 850	824-849	824.2	25.81	0.381	3.1	778.0	0.155	1	0.155
GSM 1900	1850-1910	1850.2	22.81	0.191	3.1	389.9	0.078	1	0.078
WCDMA B2	1850-1910	1852.4	25.00	0.316	3.1	645.7	0.129	1	0.129
WCDMA B4	1710-1755	1712.4	25.00	0.316	3.1	645.7	0.129	1	0.129
WCDMA B5	824-849	826.4	25.00	0.316	3.1	645.7	0.129	0.55	0.235
LTE B2	1850-1910	1850.7	25.00	0.316	3.1	645.7	0.129	1	0.129
LTE B4	1710-1755	1710.7	25.00	0.316	3.1	645.7	0.129	1	0.129
LTE B5	824-849	824.70	25.00	0.316	3.1	645.7	0.129	0.55	0.235
LTE B7	2500-2570	2502.50	25.00	0.316	3.1	645.7	0.129	1	0.129
LTE B12	699-716	699.70	25.00	0.316	3.1	645.7	0.129	0.47	0.275
LTE B13	777-787	779.50	25.00	0.316	3.1	645.7	0.129	0.52	0.248
LTE B25	1850-1915	1850.7	25.00	0.316	3.1	645.7	0.129	1	0.129
LTE B26	814-824	814.7	25.00	0.316	3.1	645.7	0.129	0.54	0.129
LTE B26	824-849	824.7	25.00	0.316	3.1	645.7	0.129	0.55	0.235

Calculus for simultaneous transmission

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

$$\sum \text{of MPE ratio} = \text{MPE ratio(LoRa)} + \text{MPE ratio (LTE}_{B12}) = 0.036 + 0.275 = 0.311 \leq 1.0$$

The product meet the requirement for Simultaneous transmission MPE test exclusion from §7.2 of KDB 447498