

RE-21-B308-KER-1-A Ed. 0

MPE test report

According to the standard:
CFR 47 FCC PART 15

Equipment under test:
Wirnet iFemtoCell 915

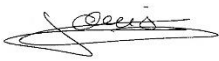
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Company:
KERLINK

Distribution: Mr DEMETZ

(Company: KERLINK)

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DESIGNATION OF PRODUCT: *Wirnet iFemtoCell 915*

Serial Number : *708BJc03000D*

Hardware: *V3c*

Reference / model (P/N): *Wirnet iFemtoCell 915MHz*

Software version: *Keros 3.1.3*

MANUFACTURER: KERLINK

COMPANY SUBMITTING THE PRODUCT:

Company: KERLINK

Address: 1 RUE JACQUELINE AURIOL
35235 THORIGNE-FOUILLARD
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Responsible: Mr DEMETZ

DATES OF TEST: From 9-Jun-21 to 10-Jun-21

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: T. LEDRESSEUR

VISA:



WRITTEN BY: T. LEDRESSEUR

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REVISIONS HISTORY

Revision	Date	Modified pages	Modifications
0	16-Jun-21	/	Creation

1. INTRODUCTION

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

The product is a LoRa gateway composed by a LoRa function not certified and a Wi-Fi 2.4 GHz module already certified FCC ID: Z64-WL18SBMOD). / (IC ID:451I-MW18SBMOD).

The LoRa can emit following 2 frequencies plan:

- 923.3 MHz to 927.5 MHz (DTS class)
- 903.9MHz to 905.3 MHz (Hybrid)

2. PRODUCT DESCRIPTION

Category of equipment (ISED): I

Class: B

Utilization: Residential use

Power source: 120 Vac – 60 Hz by AC/DC adapter

WiFi function:

Antenna type and gain: Internal ceramic antenna

Operating frequency range: 2412 MHz to 2462 MHz

Number of channels: 11

Channel spacing: 5 MHz

LoRa function

Antenna type and gain: External antenna, connector RP-SMA and gain 3dBi
(TEKFUN_I50-SR-W)

Hybrid

Operating frequency range: From 903.9 MHz to 905.3 MHz

Number of channels: 8

Channel spacing: 200kHz

Modulation: LoRa (Chirp spread spectrum)

Spread Factor: 9

During test the output power was adjusted at the maximal level with the following setting (Mix 11 Pa 3)

DTS

Operating frequency range: From 923.3 MHz to 927.5 MHz

Number of channels: 8

Channel spacing: 600kHz

Modulation: LoRa (Chirp spread spectrum)

Spread Factor: 7 and 12

During test the output power was adjusted at the maximal level with the following setting (Mix 15 Pa 3)

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 (2021)	Radio Frequency Devices
ANSI C63.10	2013 Procedures for Compliance Testing of Unlicensed Wireless Devices.
447498 D01 General RF Exposure Guidance v06	RF Exposure procedures and equipment authorization policies for mobile and portable equipment
OET BULLETIN 65	Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields

4. RF EXPOSUREWi-Fi module :

The results are extracted from test report N°FR3N2752-01C

The product doesn't use the MiMo configuration, so the maximum power is 20.59 dBm (2437 MHz, 802.11 g)

The antenna gain was 2.5dBi

Maximum EIRP = 0.204 W at 2437 MHz
with EIRP = 20.59 dBm + 2.5 dBi

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

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

$$\Rightarrow 204 / (4 * \pi * (20 \text{ cm})^2) = \mathbf{0.041 \text{ mW/cm}^2} \text{ (limit = } \mathbf{1 \text{ mW/cm}^2})$$

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

$$\text{MPE ratio(Wi-Fi)} = \frac{\text{PSD}}{\text{PSD lim}} = \frac{0.041}{1} = 0.041$$

LoRa DTS

Maximum measured conducted power = 27.15 dBm
EIRP with 3 dBi antenna gain = 30.15 dBm = 1035.1 mW

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

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

$$\Rightarrow 1035.1 / (4 * \pi * (20 \text{ cm})^2) = 0.206 \text{ mW/cm}^2 \text{ (limit= } 0.617 \text{ mW/cm}^2 \text{)}$$

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

$$MPE \text{ ratio(DTS)} = \frac{PSD}{PSD \text{ lim}} = \frac{0.206}{0.617} = 0.334$$

LoRa Hybrid

Maximum measured conducted power = 23.97 dBm
EIRP with 3 dBi antenna gain = 26.97 dBm = 497.7 mW

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

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

$$\Rightarrow 497.7 / (4 * \pi * (20 \text{ cm})^2) = 0.099 \text{ mW/cm}^2 \text{ (limit= } 0.603 \text{ mW/cm}^2 \text{)}$$

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

$$MPE \text{ ratio(HYBRID)} = \frac{PSD}{PSD \text{ lim}} = \frac{0.099}{0.603} = 0.164$$

Calculus for simultaneous transmission**LoRa DTS + W-Fi**

$$\sum \text{ of MPE ratio} = \text{MPE ratio(Wi-Fi)} + \text{MPE ratio(DTS)} = 0.041 + 0.334 = 0.375 \leq 1.0$$

LoRa Hybrid + W-Fi

$$\sum \text{ of MPE ratio} = \text{MPE ratio(Wi-Fi)} + \text{MPE ratio(HYBRID)} = 0.041 + 0.164 = 0.205 \leq 1.0$$

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