

MPE test report

According to the standard:
CFR 47 FCC PART 15

Equipment under test:
Wirnet™ iStation 915H

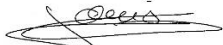
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DESIGNATION OF PRODUCT: WirnetTM iStation 915H

Serial number (S/N): 041CJa010202

Reference / model (P/N): Wirnet iStation 915H

Software version for test: 4.2.2

Firmware version for test: Keros 5.0.1-klk14

MANUFACTURER: KERLINK

COMPANY SUBMITTING THE PRODUCT:

Company: KERLINK

Address: 1 RUE JACQUELINE AURIOL
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Responsible: Mr DELIBIE

DATES OF TEST: From 27-Oct-21 to 29-Oct-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	29-Oct-21	/	Creation

1. INTRODUCTION

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

The product is a LoRa gateway composed by a LoRa function not certified and a 3G/LTE module already certified FCC ID: XMR201903EG25G). / (IC:10224A-201903EG25G).

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 POE adapter

Antenna type and gain: External antenna, gain 6dBi (dipole array)

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 (Power 24)

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 (Power 27)

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 FCC Part 15 (2020) 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: The analyze for this function is realized only in the worst mode (DTS – SF12)

Maximum measured power = 27.46 dBm at 923.3 MHz

With a gain of 6dBi

EIRP = 33.46 dBm = 2.2182 W

The maximum duty cycle is 40% on the reference period of 6min, so the power computed is: 887.28mW

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

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

$$\Rightarrow 887.28 / (4 * \pi * (20 \text{ cm})^2) = 0.176 \text{ mW/m}^2 \text{ (limit=0.6155 mW/cm}^2\text{)}$$

The MPE ratio is then calculated for the simultaneous transmission.

$$MPE \text{ ratio(LoRa)} = \frac{PSD}{PSD \text{ lim}} = 0.286$$

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 (see appendix 1).

Operating Band	Frequency Band (MHz)	Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Gain (dBi)	Average EIRP (mW)	Power density at 20 cm (mW/cm ²)	Limit (mW/cm ²)	MPE ratio
GSM 850	824-849	824.2	25.81	0.381	-0.7	324.3	0.064	0.55	0.116
GSM 1900	1850-1910	1850.2	22.81	0.191	5.4	662.2	0.132	1	0.132
WCDMA B2	1850-1910	1852.4	25.00	0.316	5.4	1096.5	0.218	1	0.218
WCDMA B4	1710-1755	1712.4	25.00	0.316	5.0	1000	0.199	1	0.199
WCDMA B5	824-849	826.4	25.00	0.316	-0.7	269.2	0.054	0.55	0.098
LTE B2	1850-1910	1850.7	25.00	0.316	5.4	1096.5	0.218	1	0.218
LTE B4	1710-1755	1710.7	25.00	0.316	5.0	1000	0.199	1	0.199
LTE B5	824-849	824.70	25.00	0.316	-0.7	269.2	0.054	0.55	0.098
LTE B7	2500-2570	2502.50	25.00	0.316	6.3	1349	0.268	1	0.268
LTE B12	699-716	699.70	25.00	0.316	-0.7	269.2	0.054	0.47	0.115
LTE B13	777-787	779.50	25.00	0.316	-0.7	269.2	0.054	0.52	0.104
LTE B25	1850-1915	1850.7	25.00	0.316	5.4	1096.5	0.218	1	0.218
LTE B26	814-824	814.7	25.00	0.316	-0.7	269.2	0.054	0.54	0.100
LTE B26	824-849	824.7	25.00	0.316	-0.7	269.2	0.054	0.55	0.098

Calculus for simultaneous transmission

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

$$\sum \text{of MPE ratio} = \text{MPE ratio (LoRa)} + \text{MPE ratio (LTE}_{B7}) = 0.286 + 0.268 = 0.554 \leq 1.0$$

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