RE051-20-104233-3-A Ed. 0

MPE test report

According to the standard:

CFR 47 FCC PART 15

Equipment under test:

S-LYNKS NODE

FCC ID: KQ9-0A00A

Company:

SERCEL Inc

Distribution: Mr TIJOU **(Company:** SERCEL NANTES**)**

Number of pages: 8

Ed.	Date	Modified Page(s)	Technical Verification and Quality Approval Name and Function / Visa
0	26-Jan-24	Creation	M. DUMESNIL, Radio Laboratory Manager

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DESIGNATION OF PRODUCT:	**S-LYNKS NODE**
Serial number (S/N):	EDE567C20251E0001
Reference / model (P/N):	NODE
Software version:	SLBB_F V4 S36/20
MANUFACTURER:	SERCEL Inc

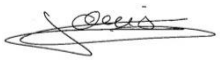
COMPANY CERTIFYING THE PRODUCT:

Company:	SERCEL Inc
Address:	17200 Park Row TEXAS 77084 UNITED STATES
Responsible:	Mr WENTZLER

COMPANY SUBMITTING THE PRODUCT:

Company:	SERCEL NANTES
Address:	16, RUE DU BEL AIR BP 30439 44470 CARQUEFOU FRANCE
Responsible:	Mr TIJOU
DATES OF TEST:	From 8-Dec-20 to 14-Dec-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
WRITTEN BY:	S. LOUIS

VISA:



CONTENTS

1. INTRODUCTION

This report presents the results of radio test carried out on the following radio equipment: **S-LYNKS NODE**, in accordance with normative reference.

The device under test integrates/

- LoRa radio part not already certified,
- WiFi radio part not already certified,
- GNSS receiver.

2. PRODUCT DESCRIPTION

Class:	A
Utilization:	Industrial
Power source:	7.2Vdc Li-ion battery

LoRa Radio part:

Antenna type and gain:	Integral antenna Gain at 903MHz => -0.01dBi Gain at 915MHz => +1.01dBi Gain at 927MHz => +2.93dBi
Operating frequency range:	From 902 MHz to 928 MHz
Frequencies tested:	903MHz, 915MHz, 927MHz
Number of channels:	41
Channel spacing:	600kHz
Modulation:	LoRa 500kHz / SF12
Power level adjusted to	+18dBm by software

WiFi Radio part:

Antenna type and gain:	For mode b and g the product emit on chains one (SISO), however the mode n the product can emit on the chain one (SISO) or chain one and two (MIMO). integral antenna Antenna 1 Gain at 2412MHz => +1.53dBi Antenna 1 Gain at 2437MHz => +2.07dBi Antenna 1 Gain at 2462MHz => +2.20dBi Antenna 2 Gain at 2412MHz => +2.78dBi Antenna 2 Gain at 2437MHz => +2.28dBi Antenna 2 Gain at 2462MHz => +2.29dBi
Operating frequency range:	From 2400 MHz to 2483.5 MHz
Number of channels:	11
Channel spacing:	5MHz
Channel bandwidth:	20 MHz
Modulation:	DBPSK OFDM: BPSK OFDM: 64-QAM
Channel tested:	Channel 1: 2412 MHz Channel 6: 2437 MHz Channel 11: 2462 MHz
Mode tested:	802.11 b SISO 802.11 g SISO 802.11 n SISO and MIMO
Data rate:	For 802.11b: 1Mbit/s For 802.11g: 6Mbit/s For 802.11n: MCS0
Correlated signal:	For mode n the signals are considered as correlated, the mode cyclic delay diversity (CDD) is used. (IEEE 802.11) The product is not using spatial multiplexing or intentional beamforming.
Power setting	+16 dBm

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 (2020)	Radio Frequency Devices
ANSI C63.10	2013 Procedures for ComplianceTesting 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 EXPOSURE

LoRa radio part in standalone:

MPE
According Emitech test report n° RR051-20-104233-5-A Ed. 0:

Maximum measured power = 103.8 dBµV/m at 10 m = 80mW at 927 MHz
with $P = (E \times d)^2 / (30 \times Gp)$ *with d = 3 m and Gp = 1*

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

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

⇨ $80/(4*\pi*(20\ cm)^2)$= ***0.016 mW/cm² (limit = 0.618 mW/cm²)***

MPE RATIO = 0.026

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

WiFi radio part in standalone:

MPE
According Emitech test report n° RR051-20-104233-6-A Ed. 0:

Maximum measured power = 116.70 dBµV/m at 3m = 140.32mW at 2437 MHz
Maximum measured power = 119.69 dBµV/m at 3m = 279.33mW at 2437 MHz
with $P = (E \times d)^2 / (30 \times Gp)$ *with d = 3 m and Gp = 1*

Maximum measured power = 420 mW eirp at 2437 MHz (802.11.n – MIMO)

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

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

⇨ $420/(4*\pi*(20\ cm)^2)$= ***0.084 mW/cm² (limit = 1 mW/cm²)***

MPE RATIO = 0.084

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 simultaneous transmission

$\sum$ of MPE ratio = MPE ratio(LoRa) + MPE ratio(Wi-Fi) = 0.026 + 0.084 = 0.11 $\leq$ 1.0

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