EMITECH GROUPE

**RE051-19-100039-2-A Ed. 0**

# MPE test report

**According to the standard:**

CFR 47 FCC PART 15

**Equipment under test:**

**Wing Field Monitor**

**FCC ID: KQ9-0804A**

**Company:**

**SERCEL Inc**

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

**Number of pages:** 8

| Ed. | Date | Modified Page(s) | Technical Verification and Quality Approval<br>Name and Function / Visa |
|---|---|---|---|
| 0 | 28-Jul-22 | Creation | M. DUMESNIL, Radio Technical Manager |

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| | |
|---|---|
| ***DESIGNATION OF PRODUCT:*** | **Wing Field Monitor** |
| ***Serial number (S/N):*** | 2 |
| ***Reference / model (P/N):*** | FM |
| ***Software version:*** | 0.8.0Ext1 |
| ***MANUFACTURER:*** | SERCEL NANTES |

***COMPANY CERTIFYING THE PRODUCT:***

| | |
|---|---|
| ***Company:*** | SERCEL Inc |
| ***Address:*** | 17200 Park Row<br>TEXAS 77084<br>UNITED STATES |
| ***Responsible:*** | Mr PARRISH |

***COMPANY SUBMITTING THE PRODUCT:***

| | |
|---|---|
| ***Company:*** | SERCEL NANTES |
| ***Address:*** | 16, RUE DU BEL AIR<br>BP 30439<br>44470 CARQUEFOU<br>FRANCE |
| ***Responsible:*** | Mr TIJOU |

| | |
|---|---|
| ***DATES OF TEST:*** | From 11-May-20 to 18-May-20 |
| ***TESTING LOCATION:*** | EMITECH ANGERS laboratory at JUIGNE SUR LOIRE (49) FRANCE<br>FCC Accredited under US-EU MRA Designation Number: FR0009<br>Test Firm Registration Number: 873677 |

***TESTED BY:*** T. LEDRESSEUR ***VISA:*** 

***WRITTEN BY:*** T. LEDRESSEUR

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## 1. INTRODUCTION

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

The equipment under test integrates:

- SRD Multifrequencies proprietary transceiver operational in the band (2400MHz – 2483.5MHz).
- Wi-Fi module already certified, using 2.4 GHz and 5GHz U-NII 1 (FCCID:Z64-WL18DBMOD)
- GNSS module operational in the band 1559MHz – 1610MHz

## 2. PRODUCT DESCRIPTION

| | |
|---|---|
| Class: | A |
| Utilization: | Industrial |
| Power source: | 3.6Vdc by internal Li-ion Batteries Pack |

SRD characteristics:

| | |
|---|---|
| Antenna type and gain: | 2 dBi / integral antenna |
| Operating frequency range: | From 2400 MHz to 2483.5 MHz |
| Frequency tested: | 2402.5 MHz, 2439.5 MHz and 2478.5 MHz |
| Number of channels: | 77 |
| Channel spacing: | 1MHz |
| Modulation: | GFSK |
| Power soft adjusted to | 9dBm |

Wi-Fi characteristics:

The manufacturer declare use only the following functions of the WLAN module

2.4 GHz band:

| | |
|---|---|
| Antenna type and gain: | 2 dBi, only on RF1 connector (RF2 is not used) |
| Operating frequency range: | From 2400 MHz to 2483.5MHz |
| Number of channels: | 11 |
| Channel spacing: | 5 MHz |
| Modulation: | DBPSK<br>OFDM: BPSK<br>OFDM: 64-QAM |
| Mode used: | 802.11 b<br>802.11 g<br>802.11 n |

5GHz band

| | |
|---|---|
| Antenna type and gain: | 3.7 dBi, only on RF1 connector (RF2 is not used) |
| Operating frequency range: | From 5150 MHz to 5250 MHz band U-NII-1 |
| Number of channels: | 4 for band 5150MHz to 5250 MHz |
| Channel spacing: | 20 MHz |
| Modulation: | OFDM: BPSK<br>OFDM: 64-QAM |
| Mode used: | 802.11 a<br>802.11 n |

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 (2022) | Radio Frequency Devices |
| ANSI C63.10 | 2013<br>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 |

## 4. RF EXPOSURE

***Calculus for SRD in standalone***

Conducted power = 8.85 mW at 2439.5 MHz
EIRP = 14 mW with antenna gain 2 dBi

**PSD=** EIRP/(4*π*R²)

⇨ 14 / (4*π*(20 cm)²)= **2.79 x $10^{-3}$ mW/cm² (limit = 1 mW/cm²)**

The MPE ratio is then calculated for the simultaneous transmission:

$$MPE\ ratio(SRD) = \frac{PSD}{PSD\ lim} = 0.00279$$

**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 Wi-Fi 2.4 GHz in standalone***

Conducted power = 243.2 mW at 2437 MHz according grant
EIRP = 385.48 mW with antenna gain 2 dBi

**PSD=** EIRP/(4*π*R²)

⇨ 385.48 / (4*π*(20 cm)²)= **76.69 x $10^{-3}$ mW/cm² (limit = 1 mW/cm²)**

The MPE ratio is then calculated for the simultaneous transmission:

$$MPE\ ratio(Wi\text{-}Fi\ 2.4GHz) = \frac{PSD}{PSD\ lim} = 0.07669$$

**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 Wi-Fi 5 GHz in standalone***

Conducted power = 69.8 mW à 5580 MHz according grant
EIRP = 163.68 mW with antenna gain 3.7 dBi

**PSD=** EIRP/(4*π*R²)

⇨ 163.68 / (4*π*(20 cm)²)= **32.56 x $10^{-3}$ mW/cm² (limit = 1 mW/cm²)**

The MPE ratio is then calculated for the simultaneous transmission:

$$MPE\ ratio(Wi\text{-}Fi\ 5GHz) = \frac{PSD}{PSD\ lim} = 0.03256$$

**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(SRD) + MPE ratio(*Wi-Fi 2.4GHz*) = 0.00279 + 0.07669 = 0.07948 ≤ 1.0

$\sum$ of MPE ratio = MPE ratio(SRD) + MPE ratio(*Wi-Fi 5GHz*) = 0.00279 + 0.03256 = 0.03535 ≤ 1.0

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