REM-EMIESS24B405SEN-03Av0

MPE test report

According to the standard:

CFR 47 FCC PART 15

Equipment under test:

Fixed Wing –UAV

eBee VISION

FCC ID: *2BF4LM4042XD*

Company:
senseFly LTD

Distribution: Mr RENARD **(Company: senseFly LTD)**

Number of pages: 8

Ed.	Date	Modified Page(s)	Technical Verification and Quality Approval Name and Function	Visa
0	22-Jul-24	Creation	J.C. BOGA, Laboratories Manager	

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DESIGNATION OF PRODUCT:	***Fixed Wing - UAV***
Serial number (S/N):	*1587A50001*
Reference / model (P/N):	*eBee VISION*
Firmware version:	*Master1360*
Trade Mark:	*AgEagle*
MANUFACTURER:	senseFly LTD

COMPANY CERTIFYING THE PRODUCT:

Company:	AgEagle Aerial Systems
Address:	8201 E 34th St N Ste 1307 Wichita, KS 67226 United States
Responsible:	Mr POPE

COMPANY SUBMITTING THE PRODUCT:

Company:	senseFly LTD
Address:	Route de Genève 38 1033 Cheseaux sur Lausanne Switzerland
Responsible:	Mr RENARD
Persons present during the tests:	Mr RUCHAT (first day)
DATE(S) OF TEST:	From 18-Mar-24 to 25-Mar-24
TESTING LOCATION:	EMITECH LYON laboratory at CHASSIEU (69) FRANCE FCC Accredited under US-EU MRA Designation Number: FR0013 Test Firm Registration Number: 807590
TESTED BY:	T. LEDRESSEUR **VISA:** 
WRITTEN BY:	T. LEDRESSEUR

CONTENTS

REVISIONS HISTORY

Revision	Date	Modified pages	Modifications
0	**16-Jul-24**	/	Creation

1. INTRODUCTION

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

The equipment under test integrates:

- Wi-Fi 2.4 GHz transceiver radio function not already certified,
- Proprietary transceiver radio module already certified at 2.4 GHz (pMDDL2450),
- GNSS multifrequencies receiver.

This report concerns only Wi-Fi radio part.

The Wi-Fi functions possess four identical antennas identified as: Front Left, Front Right, Back Left, Back Right

The product can only emit on the two chains simultaneously among:

- Front Left + Front Right
- Rear Left + Rear Right
- Front Left + Rear Left
- Front Right + Rear Right

On the report the different configuration are defined as follow:

- Front Left + Front Right => Front
- Back Left + Back Right => Back
- Front Left + Back Left => Left
- Front Right + Back Right => Right

2. PRODUCT DESCRIPTION

Class:	B
Utilization:	Residential
Power source:	12 – 17.6 Vdc by internal battery During the charge of the battery the product is not functional.

Wi-Fi characteristics

Antenna type and gain:	(2.14 dBi) 4 integral identical antennas: PCB antennas Front Left, Front Right, Back Left, Back Right
Directionnal gain:	For power measurements: 2.14 dBi For PSD measurements: 5.14 dBi
Operating frequency range:	From 2412 MHz to 2462 MHz
Number of channels:	11
Channel spacing:	5 MHz
Channel bandwidth:	20 MHz
Power setting	24 dBm
Modulation:	DBPSK OFDM: BPSK OFDM: 64-QAM
Mode tested:	802.11b 802.11g 802.11n
Data rate tested:	For 802.11b: 1Mbit/s For 802.11g: 6Mbit/s For 802.11n: MCS0
Channel tested:	Channel 1: 2412 MHz Channel 6: 2437 MHz Channel 11: 2462 MHz
Correlated signal:	For mode b/g/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.

pMDDL2450 characteristics

Operational Frequency band used: Band from 2400 MHz to 2483.5 MHz (a)
Nominal Channel bandwidth: 4 MHz

Nominal Operating Frequencies:

Sample N°= 1	⇨ 2405	MHz	Limited tests (Lowest channel)
Sample N°= 1	⇨ 2440	MHz	Limited tests (Middle channel)
Sample N°= 1	⇨ 2479	MHz	Limited tests (Highest channel)

Maximum antenna gain used with the equipment: 2.12 dBi (declared by 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 (2024)	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
447498 D04 Interim General RF Exposure Guidance v01	RF Exposure Pocedures and Equipment Authorization Policies for Mobile and Portable Devices

4. RF EXPOSURE

In accordance with KDB 447498 D04 Interim General RF Exposure Guidance v01.

Wi-Fi standalone:

Only the worst case was considered for this report. (antenna and mode)

Maximum conducted measured power = 0.492 W = 26.92 dBm at 2412 MHz
EIRP = 26.92 + 2.14 = 29.06 dBm = 0.805 W

PSD= EIRP/(4*π*R$^{2)}$

⇨ 0.805/(4*π*(20 cm)²)= **0.160 mW/cm² (limit = 1 mW/cm² for f > 1500 MHz)**

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

MPE ratio(Wi-Fi) = $\frac{0.160}{1}$ = 0.160

pMDDL2450 standalone:

The maximum conducted power was extracted from the module test report (8MCRS104_FCC15C247)

Maximum conducted measured power = 1 W = 30 dBm at 2437 MHz
EIRP = 26.92 + 2.12 = 32.12 dBm = 1.629 W

PSD= EIRP/(4*π*R$^{2)}$

⇨ 1.629 /(4*π*(20 cm)²)= **0.324 mW/cm² (limit = 1 mW/cm² for f > 1500 MHz)**

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

MPE ratio(pMDDL2450) = $\frac{0.324}{1}$ **= 0.324**

Calculus for simultaneous transmission

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

$\sum$ of MPE ratio = MPE ratio(Wi-Fi) + MPE ratio(pMDDL2450) = 0.160 + 0.324 = 0.484 ≤ 1.0

The product meet the requirement for Simultaneous transmission MPE test exclusion from §2.2 of KDB 447498

□□□ End of report □□□