



DPM Elettronica

www.dronesbench.it

Certificato DronesBench

V.1.0

Protocol # 1 (02/03/2019)

This document is the technical report that analyzes, describes and certifies the tests and measurements carried out on the drone according to the CE standard and according to the best practice conducted by DPM Elettronica for tests that are not yet regulated.

The manual that accompanies the DronesBench certificate explains in detail the tools, methods and calculations used during the tests.



1. Introduction

The purpose of this document is to objectively describe the technical characteristics of the drone in multiple operating conditions in order to verify if it is suitable for marketing in the reference countries and to calculate with accuracy the class and operational area according to the most recent European regulations.

It also incorporates the use of existing legislation for electromagnetic compatibility and is proposed as a best practice with regard to the rules and standards not yet present.

The manual that accompanies the DronesBench certificate explains in detail the tools, methods and calculations used during the tests.

Always be careful to match the version of the manual to the same version of the certificate.



2. Customer ID

This technical report was commissioned by **ITT Morselli** in **Via Pitagora (Piano Notaro), Gela (CL)**

rappresentata da **Prof. Pietro Giannone** in the figure of leader of **ITT Morselli** team.

3. Environment, operators and spectators

The tests began on **May 3rd 2019** at **11:46** with a temperature of **23 °C** , with a pressure of **1005 mbar** and with a humidity of **45 %** .

The test site is the **DPM Elettronica test laboratory**, in **via Sant'Alfonso de 'Liguori, 61 Foggia**.

They are present during the tests:

Nominativo	Codice fiscale	Ruolo	Firma
GIANMARCO D'URSO	DRSGMR91M24D643B	MISURISTA	

4. Drone features

The drone is named **Kit Drone Morselli**

Diameter between rotor axes [mm]	450	Minimum battery voltage [V]	11.1 (3S)
Frame diameter [mm]	490	Battery capacity [mAh]	2200
Frame width [mm]	10	Propellers lead [in]	5.0
Propellers diameter [mm]	239	Drone battery C	20C
Alleged payload [g]	1000	Battery weight [g]	185
Drone weight (with battery and maximum equipment) [g]	1000	Number of propellers	4

Components	Model e version
Frame	DJI F450
Imu	NAZA M LITE
Esc	DJI 420 LITE E
Motors	DJI 2312 E 960 RPM/V
Propellers	DJI 9.4x5.0
Receiver	DJI DT7
Trasmitter	DJI DT7
GPS	NAZA M LITE GPS
Radio control	DJI NDJ6 7 CH 2.4 GHz
Video trasmitter	-

Front and side photo



Photo from the top and from the maximum pitch angle





5. Methodology

5.1 Preliminary procedures

The DronesBron model DronesBench with the RMS tester suitable for the characteristics of the drone being tested is used for the following certificate.

The drone is analyzed in all its parts in order to recognize the components to compile this certificate and to search for any anomalies: uninsulated electrical parts, parts not secured to the structure, correct tightening of the propellers, structure integrity.

The calibration of the DronesBench measuring instrument is first verified: the weight measurement with a sample weight and the measurement of the voltage and current by imposing a known absorption.

DronesBench is reset to zero with the RMS tester on the head and then, with power off, the drone is placed on the bench's measuring head.

The position of the drone's center of gravity is centered on the base of the bench.

The feet of the drone are secured on the measuring head with the laces supplied, to then feed the drone through the RMS tester with:

- ✓ 3S 11.1 V battery capable of providing a maximum current of approximately 45 A,
- ✧ 13.4 V power supply capable of supplying a maximum current of 50 A .

5.2 Drone test for DronesBench certification

With the engines off, the weight of the drone is measured.

The drone is connected and powered with the supplied cables and the electrical parameters such as voltage, current and power are detected. The absorbed power is recorded as that consumed by electronics in its basic functions.

Once the stopwatch has been reset, the drone is armed, gradually bringing it to thrust the throttle to a thrust equal to the weight, for at least 30 hovering measurements recorded by the software.

The electrical and mechanical parameters are measured with the Dronescale in the moments in which the thrust equals the weight with a tolerance of 10 g.

It is also verified that the drone, during the thrust increase maneuver, remains always balanced.

The motors are then pushed to the maximum for a couple of seconds so that all the measurements are acquired at the moment of maximum current absorption.



5.3 Electromagnetic compatibility tests

As regards the electromagnetic compatibility tests, refer to the directive 2004/108 / EC.

No electromagnetic compatibility tests have been performed.

6. Conclusion

The following data is provided for the license plate and the drone manual:

- ✓ Brand and model **Kit Drone Morselli**
- ✓ Weight **1000 g**
- ✓ DBIs **71,9 mN/W**
- ✓ Standard thrust / Weight **196 %**
- ✓ Max power **309,81 W**
- ✓ Battery features **3S 11.1 V 2200 mAh 20 C**
- ✓ Drone class **C2**
- ✓ Operational area **A2**
- ✓ Maximum transferable kinetic energy **59 J**
- ✓ Maximum speed **10,85 m/s**
- ✓ Standard and maximum noise **74 dBm 82 dBm**

The "CE!" symbol must be affixed as compatibility has not yet been verified.

The measurements have shown that the drone, characterized by the indicated measurements, is fully functional and ready to fly.

The technician

The supervisor