

## RAPPORTO DI PROVA / TEST REPORT

|   |   |   |
|---|---|---|
| Rif./Ref.No. MPETR_140119-6                               | Data / Date: 18/09/2014   | Pagine / Pages : 10   |
| Scopo delle prove / Test object :                         | Prove di tipo in accordo a / Type test according to<br><b>FCC Cfr 47 part 2 - §2.1091, part 1 - §1.1310</b> |   |
| Richiedente / Applicant :                                 | D.F.B. Global certification S.r.l.<br>Via Fiume, 35 – 24030 Paladina (BG) –ITALY                            |   |
| Persona di riferimento / Applicant's referee :            | Sig. Francesco Barbierato (f.barbierato@dfbcert.com)  |   |
| Marchio commerciale / Trade mark :                        |                            |   |
| Fabbricante / Manufacturer :                              | IVAR S.r.l.   |   |
| Prodotto / Product  | <b>WIRELESS ACTUATOR</b>  |   |
| Tipo / Type :   | <b>EQUICALOR-A</b>  |   |
| Codice / Code:  | <b>506364US</b>   |   |
| FCC ID  | <b>2AB4Y506364US</b>  |   |
| Data ricevimento campioni / Date of test samples receipt: | 07/02/2014  |   |
| Campioni verificati / No. of tested samples               | 1   |   |
| Data verifiche / Testing date :                           | 07/02/2014  |   |
| Sito di prova / Testing site :                            | Prima Ricerca & Sviluppo s.r.l.<br>Via Campagna - 92 I-22020 FALOPPIO (CO) - ITALY                          |   |
| Esito delle valutazioni / Assessment results :            | <b>CONFORME / COMPLIANT</b>   |   |
| Verifiche effettuate da / Verifications carried out by :  | Andrea Bortolotti<br>Tecnico di laboratorio / Test Engineer   |  |
| Approvato / Approved by :                                 | Giacomo ARMELLINI<br>Responsabile Laboratorio EMC e RADIO/<br>EMC and RADIO Laboratory Manager              |  |

I risultati delle prove riportati nel presente rapporto di prova si riferiscono solo ai campioni esaminati./  
The test results reported in this test report shall refer only to the samples tested

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## 0 RELEASE CONTROL RECORD

| TEST REPORT NUMBER | REASON OF CHANGE                                  | DATE OF ISSUE |
|--------------------|---|---------------|
| MPETR_140119-0     | Original Release                                  | 13/03/2014    |
| MPETR_140119-1     | Added new label + added new FCC ID                | 14/04/2014    |
| MPETR_140119-2     | Correct typing error on antenna type description  | 30/07/2014    |
| MPETR_140119-3     | Correct radiated power level + added antenna gain | 02/09/2014    |
| MPETR_140119-4     | Correct calculation error on measurement distance | 15/09/2014    |
| MPETR_140119-5     | Correct calculation on Estimated RF Power Density | 18/09/2014    |
| MPETR_140119-6     | Correct calculation on Estimated RF Power Density | 18/09/2014    |

## 1 TECHNICAL INFORMATION OF EQUIPMENT UNDER TEST (EUT)

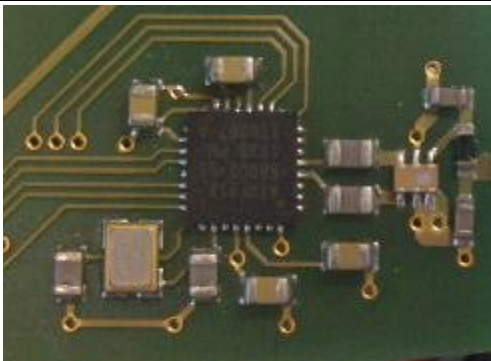

### 1.1 EUT Identification

|                          |  |
|--------------------------|--|
| TRADEMARK:               |  |
| MANUFACTURER:            |  |
| EUT DESCRIPTION          |  |
| EUT TYPE                 |  |
| EUT CODE                 |  |
| FCC ID :                 |  |
| COUNTRY OF MANUFACTURER: | ITALY  |

### 1.2 EUT Technical Data

|                             |  |
|-----------------------------|--|
| FCC class:                  | 47 CFR FCC Part 15 Subpart C § 15.247                |
| Product type:               | Radio Equipment                                      |
| Radio type:                 | Intentional radiators                                |
| Power supply requirements : | 4,5 Vdc powered by internal battery (3x1,5V type AA) |
| Frequency range :           | 915MHz   |
| Type Modulation :           | GFSK   |
| Channel bandwidth:          | 1.74MHz  |
| Channel spacing:            | -----  |
| Antenna Connector /Types :  | Integrated   |

### 1.3 Technical information

|                             |  |  |
|-----------------------------|--|--|
| <b>MODULE MANUFACTURER:</b> |      |  |
| <b>MODULE TYPE:</b>         |  |  |
| <b>TYPE OF ANTENNA:</b>     |      | <p>Johanson technology mod. 0915AT43A0026</p> <p> <input checked="" type="checkbox"/> Integral ;            <input type="checkbox"/> External ;            <input type="checkbox"/> Dedicated         </p> |
| <b>ANTENNA GAIN:</b>        | <p>Average Gain (XZ total): -4.0dBi typ.</p> <p>Peak gain (XZ total): -1.0dBi typ.</p> |  |

## 1.4 EUT ports identification

This section contains descriptions of all ports, the length and the type of the cable provided by manufacturer needed for the tests. Moreover it is specified if the ports are ever or optionally connected.

| Port |                 | Description                           | Connection |
|------|-----------------|---------------------------------------|------------|
| 1    | Enclosure       | Plastic                               | Pressure   |
| 2    | AC Power Supply | Port not present                      | -----      |
| 3    | DC power supply | Port not present (internal battery)   | -----      |
| 4    | Signal lines    | Port not present                      | -----      |
| 5    | Telecomm. Lines | Port not present                      | -----      |
| 6    | Antenna         | Port not present (integrated antenna) | -----      |

*Note: During the tests all cables must be what provided the manufacturer or the same that used in the real employment of the EUT.*

## 1.5 EUT modification

- None

## 1.6 Auxiliary equipment

- None

## 2 REFERENCE STANDARDS

| CODE OF FEDERAL REGULATIONS        |  |
|------------------------------------|--|
| Title 47 Part 1 Subpart I § 1.1310 | Procedures Implementing the National Environmental Policy Act of 1969. Radiofrequency radiation exposure limits.   |
| Title 47 Part 2 Subpart J § 2.1091 | Radiofrequency radiation exposure evaluation: mobile devices.  |
| ANSI C63.4                         | American National Standard for Methods of Measuring of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz – 40 GHz |

## 3 MEASUREMENTS AND CALCULATION RESULTS

### 3.1 Calculation Method

#### Far Field Power flux Calculation model.

This model is applicable in the far-field region and over-estimates in the radiating near-field region. The far-field calculations are accurate when the distance,  $r$ , from an antenna of length  $D$  to a point of investigation is greater than

$$r = \frac{2D^2}{\lambda}$$

The Power Flux is

$$S = \frac{PG}{4\pi r^2} \quad \text{or equivalent} \quad S = \frac{EIRP}{4\pi r^2}$$

where

P = input power of the antenna

G = antenna gain relative to an isotropic antenna

r = distance from the antenna to the point of investigation.

EIRP = Effective Isotropic Radiated Power

## 3.2 Limits

Tab. 1 of CFR Title 47 Part 1 Subpart I § 1.1310

Table 1—Limits for **Maximum Permissible Exposure (MPE)**

| Frequency range (MHz)  | Electric field strength (V/m) | Magnetic field strength (A/m) | Power density (mW/cm <sup>2</sup> ) | Averaging time (minutes) |
|--|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| <b>(A) Limits for Occupational/Controlled Exposures</b>        |                               |                               |                                     |                          |
| 0.3-3.0  | 614                           | 1.63                          | *(100)                              | 6                        |
| 3.0-30   | 1842/f                        | 4.89/f                        | *(900/f <sup>2</sup> )              | 6                        |
| 30-300   | 61.4                          | 0.163                         | 1.0                                 | 6                        |
| 300-1500   |                               |                               | f/300                               | 6                        |
| 1500-100,000   |                               |                               | 5                                   | 6                        |
| <b>(B) Limits for General Population/Uncontrolled Exposure</b> |                               |                               |                                     |                          |
| 0.3-1.34   | 614                           | 1.63                          | *(100)                              | 30                       |
| 1.34-30  | 824/f                         | 2.19/f                        | *(180/f <sup>2</sup> )              | 30                       |
| 30-300   | 27.5                          | 0.073                         | 0.2                                 | 30                       |
| 300-1500   |                               |                               | f/1500                              | 30                       |
| 1500-100,000   |                               |                               | 1.0                                 | 30                       |

f = frequency in MHz

\* = Plane-wave equivalent power density

**Note 1 to Table 1:** Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

**Note 2 to Table 1:** General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

### 3.3 Measurements and Calculation Results

#### WORST CASE

| MEASUREMENTS (radiated)*                              |                             |                                |  |   |                                  |
|---|-----------------------------|--------------------------------|--|---|----------------------------------|
| Channel   | Frequency (MHz)             | Effective Radiated Power (dBm) | Effective Isotropic Radiated Power (dBm) | Effective Isotropic Radiated Power (mW)<br>See note 1 | Antenna Gain (dBi)<br>See note 1 |
| 1   | 915.006                     | 3.05                           | 5.19                                     | 3.3   | -1.0                             |
| Duty cycle factor: 100% (worst case)                  |                             |                                |  |   |                                  |
| CALCULATION RESULTS                                   |                             |                                |  |   |                                  |
| Distance to the Area of Interest                      | 0.656 feet<br>0.200 m       |                                |  |   |                                  |
| Are Ground Reflections Calculated?                    | Yes                         |                                |  |   |                                  |
| Estimated RF Power Density                            | 0.000657 mW/cm <sup>2</sup> |                                |  |   |                                  |
|   | Controlled Environment      | Uncontrolled Environment       |  |   |                                  |
| Maximum Permissible Exposure (MPE)                    | 3.055 mW/cm <sup>2</sup>    | 0.615 mW/cm <sup>2</sup>       |  |   |                                  |
| Does the Area of Interest Appear to be in Compliance? | Yes                         | Yes                            |  |   |                                  |

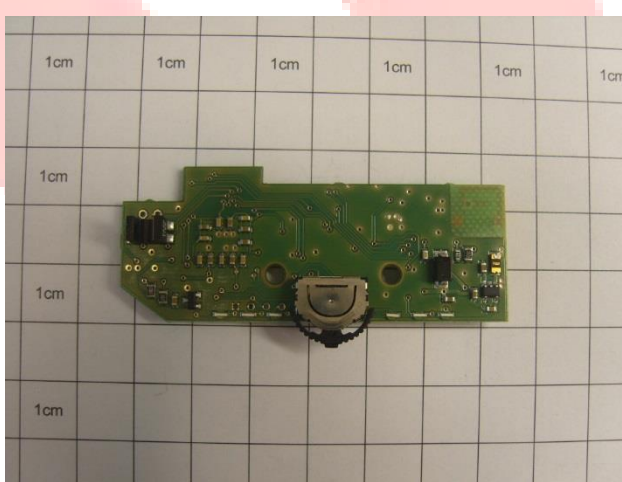
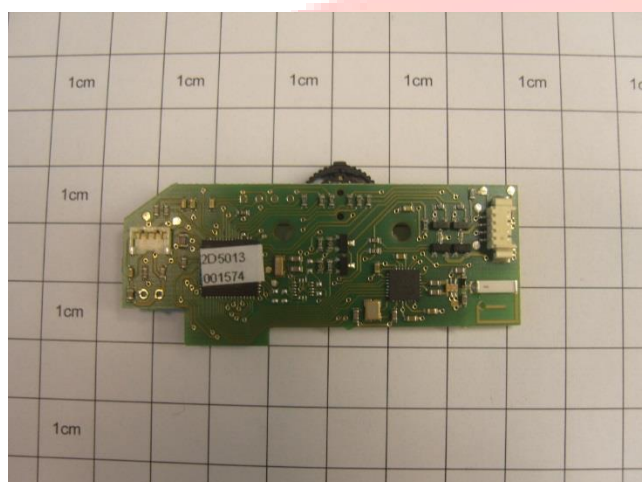
<sup>1</sup> The EIRP Radiated measurement include the antenna gain

<sup>2</sup> The formula reported in par 3.1 has been used for the MPE calculation



Photographic documentation

**PHOTO N°1 – EUT IDENTIFICATION**



**PHOTO N°2 – RADIATED MEASUREMENT SETUP**

