

Prima Ricerca & Sviluppo Srl soggetta a direzione e coordinamento da parte della Giovanni Maspero & C. S.p.A. – C.I. 02634780130  
Sede legale : 22100 Tavernola (CO) Via Conciliazione, 1 Cod. FISC. e N. R.I. CO 02635860139  
Sede operativa : Laboratori Via Campagna, 92 22020 Faloppio fraz. Gaggino (CO) Tel. +39 03135000.11 Fax +39 031991309

**EQUIPMENT UNDER TEST :**  
*APPARECCHIO IN PROVA :*

**REMOTE CONTROL - DC RECEIVER UNIT**  
**Type R202 Model 152D**  
**Configuration B27**

**DERIVED MODELS:**  
*APPARECCHI DERIVATI :*

**Configuration B28**

**REFERENCE STANDARDS :**  
*NORME DI RIFERIMENTO :*

**FCC 47 CFR Part 15**

**CUSTOMER:**

*RICHIEDENTE:*

- **Dept. / Firm :** *AUTEC S.r.l.*  
*Ente / Società:*
- **Mr.:** *BIANCHIN STEFANO*  
*Sig.:*
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*Telefono :* *Fax :* *e-mail*

**Site of test execution:** Via Campagna, 92 - 22020 Gaggino Faloppio (CO) - Italy  
*Località esecuzione prove:*

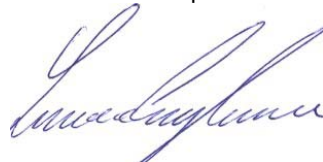
**Date of test samples receipt:** 26/05/04 **Date of start test:** 26/05/04  
*Data ricevimento campioni:* *Data inizio prove:*

**Date of end test:** 28/05/04  
*Data fine prove:*

**Witness to the test:**  
*Presenti alle prove:*

Nobody / Nessuno  
.....

**Signature of the engineers:**  
*Firma esecutore prove:*



.....  
L. Casiraghi

**Signature of the Laboratory Director:**  
*Firma Direttore Laboratori:*



.....  
R. Furfari

The test results recorded in this Test Report are exclusively referred to the tested samples.

*I risultati del presente rapporto di prova si riferiscono esclusivamente al campione sottoposto a prova.*

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

### **1.1 Identification**

Brand name: AUTEC

Equipment : DC receiver unit

Model name or No. : Type R202  
Model 152D

**Configuration B27** (E16 receiver unit with master board E16B16AC)

**Configuration B28** (E16 receiver unit with master board E16B16AC and stylus antenna)

Serial number : prototype

FCC ID : OQA-R202152D

Country of manufacturer: ITALY

### **1.2 Technical data**

FCC class: Unintentional radiators, Class B

Supply voltage: 24-48-55-110 Vac

Input Power / Current : External power source

Type of receiver : superetherodyne

Maximum internal frequency generated by EUT : 44 MHz

Typical usage : Portable radio remote control used to command Industrial machines

EUT single or system: Single

EUT dimensions : 38 x 19 x 9 cm

### **1.3 Receiver technical data**

- Working Frequency : 915 MHz
- Frequency Range of Operation : 902 – 928 MHz

### **1.4 Modifications incorporated in E.U.T.**

The following items are the modifications introduced in the equipment under test :

- None

## 1.5 Ports identification

This section contains descriptions of all signal ports and AC/DC power input/output 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 surface                                                      | By 4 screws |
| 2    | AC power input/output ports | Line not present                                                     | *****       |
| 3    | DC power input/output ports | 24-48-55-110 Vac from external supply<br>Cable length not specified. | Terminals   |
| 4    | Signals ports               | N° 16 N.O. Outputs. - Cable length not specified.                    | Terminals   |

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

## 1.6 Auxiliary equipment

No auxiliary equipment

## 2. TEST CONDITIONS

### 2.1 Operating test modes and test conditions

The equipment has been tested according to the operative conditions described in the user/installation manual provided by the manufacturer and by following reference standards :

Reference Standard:

- FCC Part 15, Subpart B

In the following table there are the operating conditions adopted during tests identified by an indicator (#..) at which has been referred the item “Operating condition of the equipment under test” of all technical sheets of the tests (see Section 4)

| <b>Operating condition</b> | <b>Description</b>     |
|----------------------------|------------------------|
| <b>#1</b>                  | <i>Receiver active</i> |

### 2.2 Test overview

Sample tested is the main model of a complete set of 915 MHz RF receiver (see also Section 7).

The appliance is classified as “*unintentional radiator*” in conformity to FCC Part 15 Sub. B §15.109, §15.107 , and it is subject to “*Certification*” procedure.

The application is mainly used as Industrial machines radio remote control.

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### 3. REFERENCE STANDARD FOR PERFORMED TESTS

| <i>Reference standard :</i> | <i>Title :</i>                                                                                                                                                   |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>FCC Part 15 part A</b>   | Code of Regulations Part 15 (Radio Frequency Devices), Subpart A (General) of the Federal Communication Commission (FCC)                                         |
| <b>FCC Part 15 part B</b>   | Code of Regulations Part 15 (Radio Frequency Devices), Subpart B (Unintentional Radiators) of the Federal Communication Commission (FCC)                         |
| <b>ANSI C63.4</b>           | 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 |

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## 4. SUMMARY OF TEST RESULTS

### 4.1 Emission tests

| Port |                         | Phenomena                                        | Basic standard          | Operating condition <sup>1</sup> | Result           |
|------|-------------------------|--------------------------------------------------|-------------------------|----------------------------------|------------------|
| 1    | Enclosure               | Radiated emission                                | FCC Part 15<br>§ 15 109 | #1                               | Within the limit |
| 2    | AC mains<br>Input ports | RF Disturbance voltage:<br>• continuous          | FCC Part 15<br>§ 15 107 | #1                               | Within the limit |
| 3    | Antenna<br>terminals    | Antenna power conduction<br>limits for receivers | FCC Part 15<br>§15 111  | #1                               | Within the limit |

<sup>1</sup> Ref. Tab. of Section 2

## 5. TEST RESULTS

|                                                                                  |    |
|----------------------------------------------------------------------------------|----|
| RADIATED EMISSION 30 - 1000 MHZ .....                                            | 9  |
| EMISSION OF MAINS TERMINAL DISTURBANCE VOLTAGE (CONTINUOUS<br>DISTURBANCE) ..... | 12 |
| ANTENNA POWER CONDUCTION LIMITS FOR RECEIVERS .....                              | 15 |

**TEST  
1.****RADIATED EMISSION 30 - 1000 MHZ****REFERENCE  
DOCUMENT**

FCC PART 15 subpart B

- **TEST LOCATION:** Semi-anechoic chamber
- **TEST EQUIPMENT USED FOR TEST:** EMI receiver Rohde & Schwarz Mod. ESMI  
Chase Antenna Mod. CBL 6111 A
- **TESTED PORT:** Enclosure
- **EMISSION LIMITS:** Acc. to Section 15.109 of reference document
- **UNCERTAINTY OF MEASURE:** Combined uncertainty =  $\pm 1.75$  dB  
Total uncertainty = (k=2)  $\pm 3.5$  dB

| TEST CONDITIONS:      |                                     | MEASURED          |
|-----------------------|-------------------------------------|-------------------|
| Ambient temperature : | 15 - 35 °C                          | 24 $\pm$ 3 °C     |
| Ambient humidity :    | 25 - 75 %rH                         | 40 $\pm$ 5 %rH    |
| Pressure :            | 85 - 106 kPa (860 mbar - 1060 mbar) | 950 $\pm$ 50 mbar |
| Voltage :             |                                     | 24 Vac            |

**OPERATING CONDITION (Rif. Section. 2) : #1****RESULT: WITHIN THE LIMIT**

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## SCAN TABLE : “Radiated Emission”

Unit: dB $\mu$ V/m

Detector : Mode:

Curve1: MaxPeak ClearWrite

Curve2: -- ClearWrite

### Subrange1:

Start Frequency: 30.0 MHz

Step Size: 80 kHz

Stop Frequency: 1000.0 MHz

IF Bandwidth: 120 kHz

Measure Time: 0.01 sec.

Receiver: ESXI

Probe Transducer: CHASE\_6111\_PRC

Signal Path: Path 4

System Transducer: RFin2-CP1/X11

Scan Mode: Lin

Add. Transducer: W71.01

Tracking Gen.: Off

Input: 2 DC

Preamplifier: 10 dB

Demodulation: FM Broad

RF att.: Coupled

Volume: 0.0%

Ref. Level: -50 dBm

Squelch: --

Min. RF att.: 0 dBm

Option: None

Autorange: On

Curve 1: On

Repetition: Single

Curve 2: Off

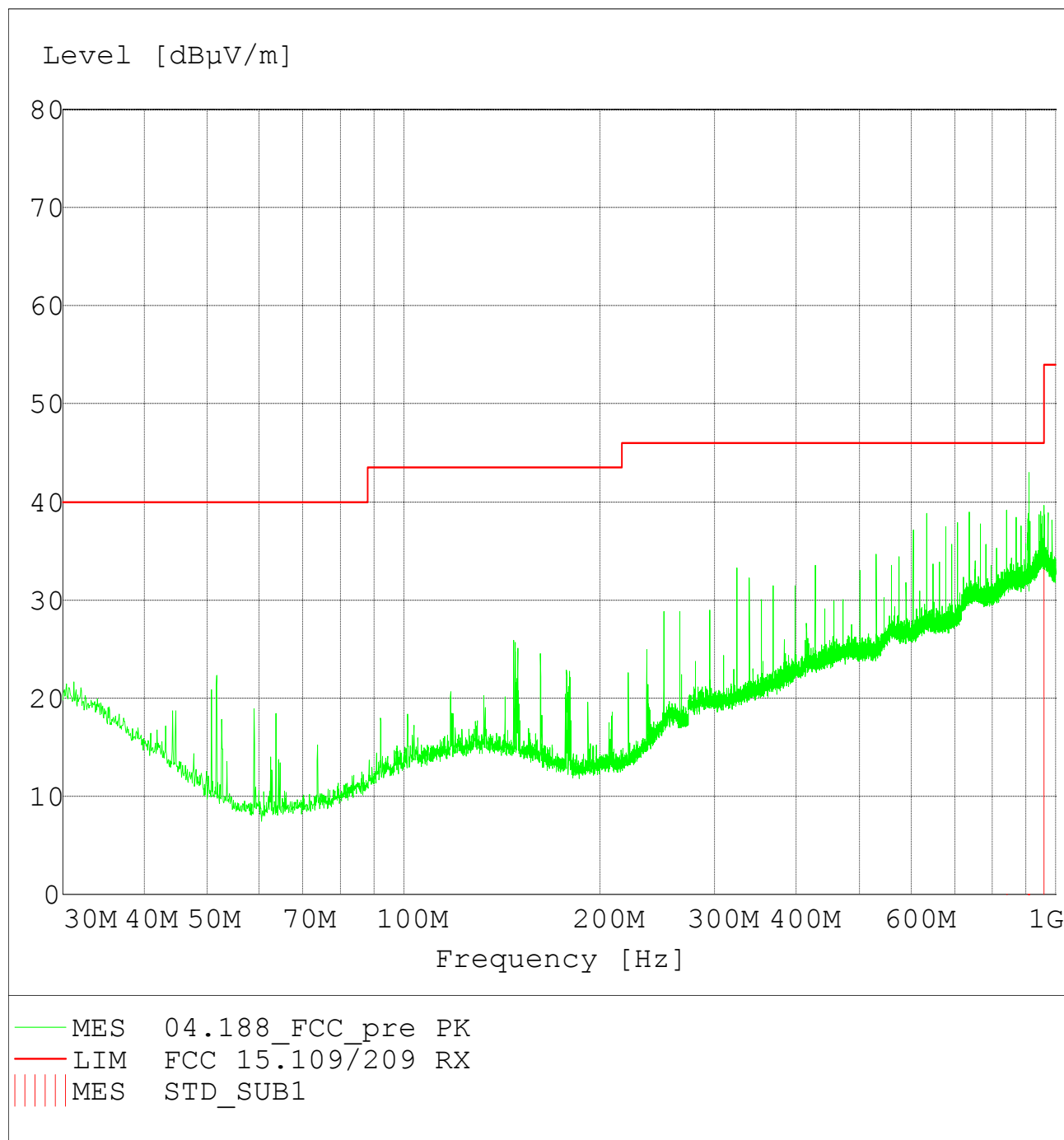
Stop Mark: On

Stop Message: On

Text: Connect antenna

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## Configuration B27 - with internal antenna



**TEST  
2.****EMISSION OF MAINS TERMINAL DISTURBANCE VOLTAGE  
(CONTINUOUS DISTURBANCE)****REFERENCE  
DOCUMENT**

FCC47CFR Part 15

- **TEST SETUP:** According to reference standard
- **TEST LOCATION:** Semianechoic chamber
- **TEST EQUIPMENT USED FOR TEST:** EMI receiver Rohde & Schwarz Mod. ESHS 30  
Artificial Network Rohde & Schwarz Mod. ESH3-Z5

- **TESTED PORT:** AC mains
- **FREQUENCY RANGE:** 0.15 - 30 MHz
- **EMISSION LIMITS:** Section 15.107 of Standard
- **MEASUREMENT UNCERTAINTY:** Total uncertainty (k=2)  $\pm 2.5$  dB

| TEST CONDITIONS:      |              |                        | MEASURED          |
|-----------------------|--------------|------------------------|-------------------|
| Ambient temperature : | 15 - 35 °C   |                        | 24 $\pm$ 3 °C     |
| Ambient humidity :    | 25 - 75 %rH  |                        | 38 $\pm$ 5 %rH    |
| Pressure :            | 85 - 106 kPa | (860 mbar - 1060 mbar) | 975 $\pm$ 50 mbar |
| Voltage :             |              |                        | 24 Vac            |

OPERATING CONDITION (Rif. Section. 2) : #1

**RESULT: WITHIN THE LIMIT**

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## SCAN TABLE : Voltage Mains

Unit : dB $\mu$ V

Detector : Mode :

Curve 1: MaxPeak ClearWrite

Curve 2: Average ClearWrite

Start Frequency : 150.0 kHz

Stop Frequency : 30.0 MHz

Measure Time : 10.0 ms

IF Bandwidth : 9 kHz

Step size : 6 kHz

**Receiver :** ESMI

**Signal Path :** Path 3

**Meas. Mode :** Lin

**Tracking Generator :** Off

**Input :** 1AC

**Transducer :** ESH3-Z5\_PRC

**System Transducer :** Rfin1-CP2/X11

**Add. Transd. 1 :** W71.03

**Add. Transd. 2 :** None

**Add. Transd. 3 :** None

**Preamplifier :** 10 dB

**RF Att. :** Coupled

**Ref. Level :** -10 dBm

**Min. RF Att. :** 0 dB

**IF Att. :** 0 dB

**Autorange :** On

**Demodulation :** FM Broad

**Volume :** 0 %

**Squelch :** --

**Option :** None

**Curve 1 :** On

**Curve 2 :** On

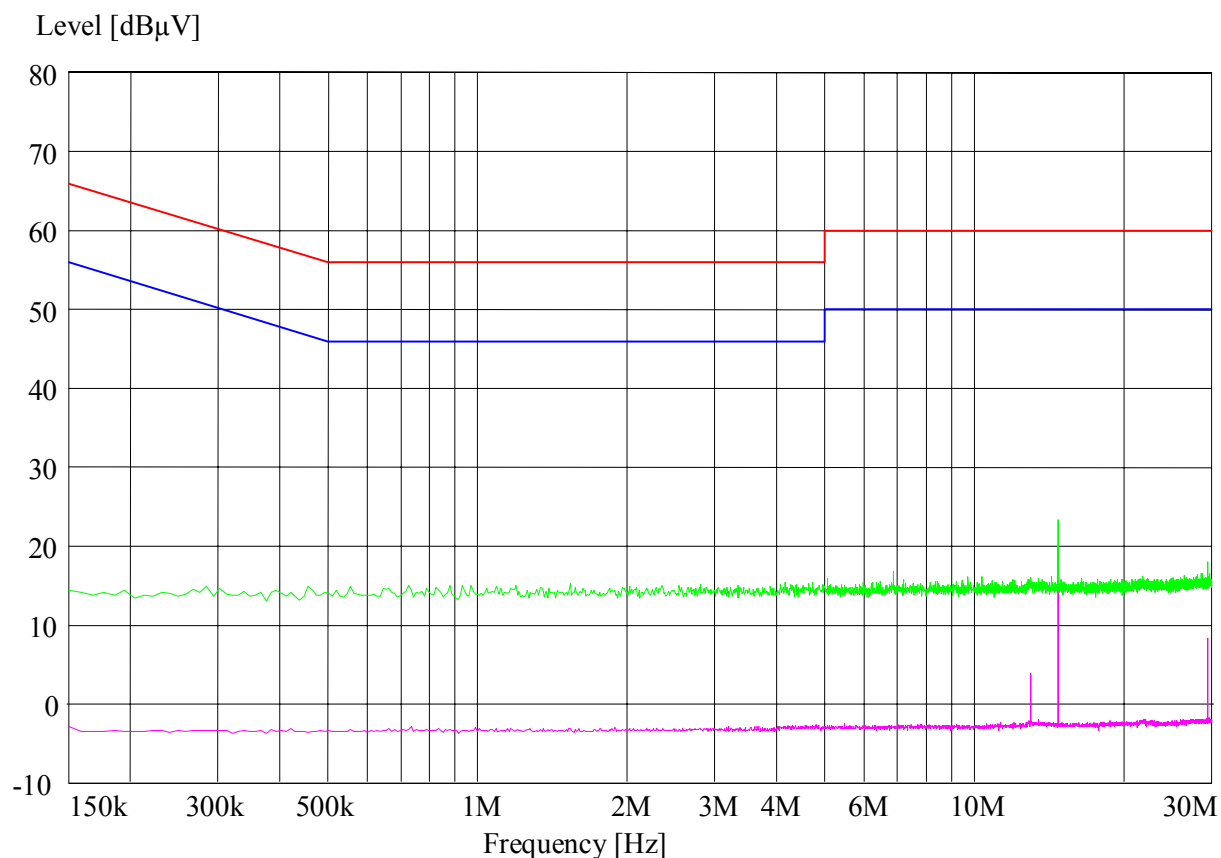
**Repetition :** Single

**Stop Mark :** On

**Stop Message :** On

**Stop Message :** Connect EUT

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MES 04.188\_V\_pre PK  
MES 04.188\_V\_pre AV  
LIM FCC15 V QP in acc. to Sec.15.107  
LIM FCC15 V AV in acc. to Sec.15.107

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**TEST  
3.****ANTENNA POWER CONDUCTION LIMITS FOR RECEIVERS****REFERENCE  
DOCUMENT**

FCC PART 15 subpart B

- **TEST SETUP:** Shielded room
- **TEST LOCATION:** Radio test area
- **TEST EQUIPMENT USED FOR TEST:**
  - Spectrum Analyzer Rohde&Schwarz mod. FSP
  - RF Signal generator Rohde&Schwarz mod. SME03
  - DC – 18 GHz Attenuator SUHNER mod. 6803.17.B

| TEST CONDITIONS:      |                                     | MEASURED |
|-----------------------|-------------------------------------|----------|
| Ambient temperature : | 23°C ± 5°C                          | 24 °C    |
| Ambient humidity :    | 25 - 75 %rH                         | 45%      |
| Pressure :            | 85 - 106 kPa (860 mbar - 1060 mbar) | 960 mbar |
| Voltage :             |                                     | 24 Vac   |

**OPERATING CONDITION (Rif. Section. 2) : #1****RESULT: WITHIN THE LIMIT**

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## MEASUREMENT RESULTS

| <i>Antenna power conduction level</i> |                        |                                                         |
|---------------------------------------|------------------------|---------------------------------------------------------|
| <b>f</b><br><b>[MHz]</b>              | <b>Bandwidth (kHz)</b> | <b>Level</b><br><b>[nW]</b>                             |
| 30-200                                | 120                    | No signal above noise level<br>(-75 dBm $\equiv$ 30 pW) |
| 200-1000                              | 120                    | No signal above noise level<br>(-75 dBm $\equiv$ 30 pW) |
| Measurement Uncertainty : +/- 3 dB    |                        |                                                         |

| <b>LIMITS</b> |
|---------------|
| 2.0 nW        |

## 6. EUT TECHNICAL DOCUMENTATION

### 6.1 Wiring diagrams

|                       | <i>Document reference (n., edition, date, ...)</i>                      |
|-----------------------|-------------------------------------------------------------------------|
| <b>WIRING DIAGRAM</b> | File PDF: E16TQ01A, E16STXUS1, E16SRXUS1, E16SQ01A, E16SCHUS1, E16B16AC |
| <b>PART LIST</b>      | File PDF: E16TQ01A, E16STXUS1, E16SRXUS1, E16SQ01A, E16SCHUS1, E16B16AC |

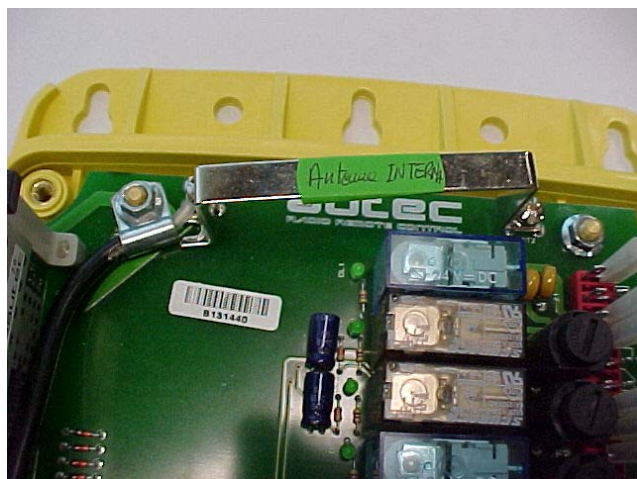
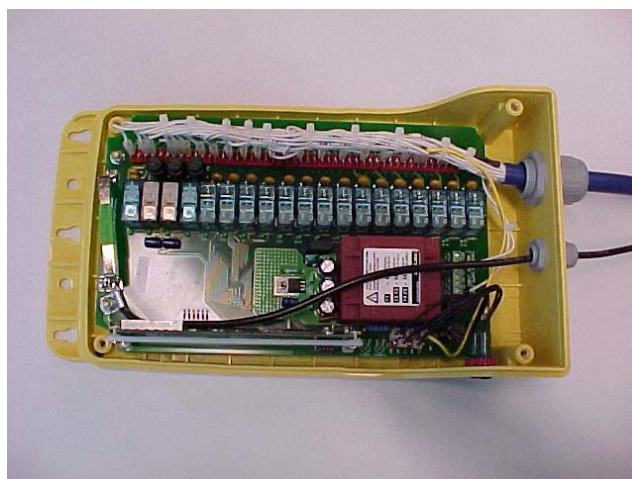
### 6.2 Technical manual

|                                                                 | <i>Document reference (n., edition, date, ...)</i> |
|-----------------------------------------------------------------|----------------------------------------------------|
| Operational description for type R202 model 152D receiving unit | File PDF: Operational description for R202152D     |

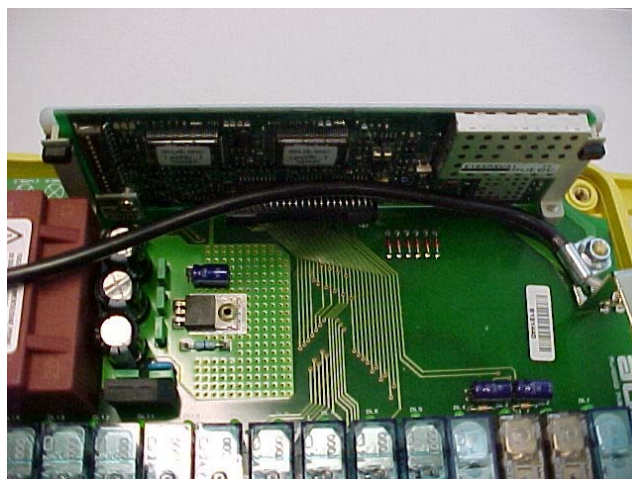
Prima Ricerca & Sviluppo Srl soggetta a direzione e coordinamento da parte della Giovanni Maspero & C. S.p.A. – C.I. 02634780130  
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### 6.3 Photographic documentation

PHOTO No. 1 – EQUIPMENT UNDER TEST IDENTIFICATION



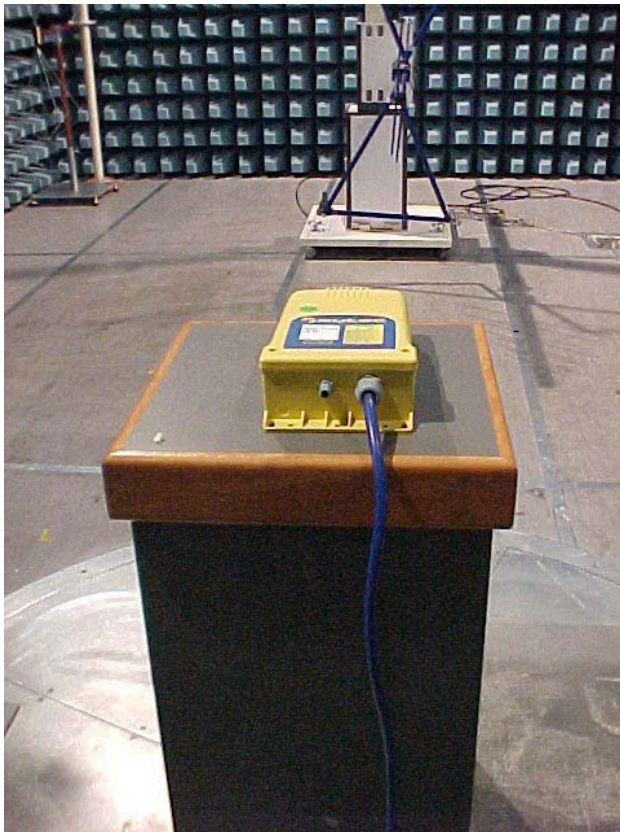
INTERNAL ANTENNA



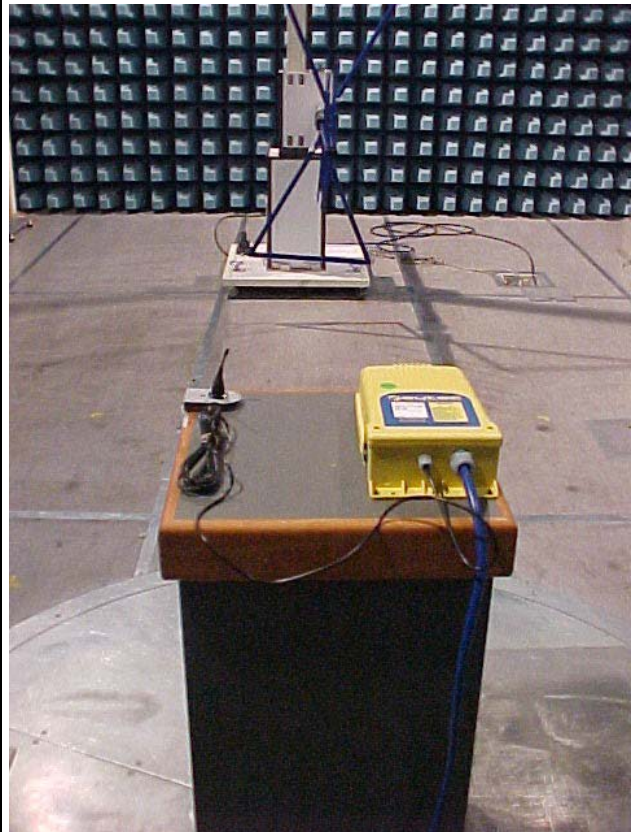
RECEIVER MODULE

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**PHOTO NO. 2 - TEST SETUP**



**CONFIGURATION B27**



**CONFIGURATION B28**

## 7. TECHNICAL REPORT OF ANALYSIS OF DERIVED PRODUCTS

| EQUIPMENT under ANALYSIS : |                                                                                                     | BRAND NAME |
|----------------------------|-----------------------------------------------------------------------------------------------------|------------|
| <b>BASIC MODEL</b>         | <b>REMOTE CONTROL - DC RECEIVER UNIT</b><br><b>Type R202 Model 152D</b><br><b>Configuration B27</b> | AUTEC Srl  |
| <b>DERIVED MODELS</b>      | <b>Type R202 Model 152D</b><br><b>Configuration B28</b>                                             |            |

Prima Ricerca & Sviluppo, just on the basis of the technical documents insert in folders called “Schematic diagrams”, “Block diagrams” and “Bill of materials” states as follows :

- ◆ the basic model and the derived models have the same plastic case
- ◆ the basic model and the derived models have the same Radio Receiver Module code E16SRXUS1
- ◆ the basic model and the derived models have the same Antenna
- ◆ There are some Configurations which differ each other for the used extension interface (card) and for the used antenna:
  - ◆ Configuration B27: embedded antenna
  - ◆ Configuration B28: antenna with stylus and with a cable 1-5 metres.

On these basis, Prima Ricerca & Sviluppo considers the basic model more critical to the derived models, from the EMC point of view.

Therefore, all the measures performed on the basic model and carried in this test report, are completely extendable to the derived model.