

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 - AC RECEIVER UNIT
Type R202 Model 153D Configuration B29

DERIVED MODELS:
APPARECCHI DERIVATI :

Type R202 Model 153D Configuration B30

REFERENCE STANDARDS :
NORME DI RIFERIMENTO :

FCC 47 CFR Part 15

CUSTOMER:

RICHIEDENTE:

- **Dept. / Firm :** *AUTEC S.r.l.*
Ente / Società:
- **Mr.:** *BIANCHIN STEFANO*
Sig.:
- **Address:** *VIA POMAROLI, 65 - 36030 CALDOGNO (VI) - ITALY*
Indirizzo:
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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: 06/07/04
Data fine prove:

Witness to the test:
Presenti alle prove:

Nobody / Nessuno
.....

Signature of the engineers:
Firma esecutore prove:



.....
F. Barbierato

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.

Reproduction of this EMC-Test Report in whole or in part is prohibited without the written authorization of the Laboratory Director

La riproduzione di questo Rapporto in modo parziale o totale è PROIBITO senza l'autorizzazione scritta della Direzione del Laboratorio

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1. TECHNICAL INFORMATION OF EQUIPMENT UNDER TEST (EUT)

1.1 Identification

Brand name: AUTEC
Equipment : AC receiver unit
Model name or No. : Type R202
Model 153D
Configuration B29 (E16 receiver unit with master board E16B22AC)
Serial number : prototype
FCC ID : OQA-R202153D
Country of manufacturer: ITALY

1.2 Technical data

FCC class: Unintentional radiators, Class B
Supply voltage: 24 – 48 – 55 - 110 Vac
Type of receiver : superetherodyne
Maximum internal frequency generated by EUT : 44 MHz
Input Power / Current : External AC power source
Typical usage : Fixed radio remote control used to command Industrial machines
EUT single or system: Single
EUT dimensions : 202 x 381 x 91 mm

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 | 24-48-55-110 Vac from external supply source Cable length not specified. | Terminals |
| 3 | DC power input/output ports | Line not present | ***** |
| 4 | Signals ports | N° 22 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)

| Operating condition | Description |
|----------------------------|--------------------|
| #1 | Receiver active |

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; the RF signal when the apparatus is switch-on is continuously present.

3. REFERENCE STANDARD FOR PERFORMED TESTS

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

4. SUMMARY OF TEST RESULTS

4.1 Emission tests

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

¹ Ref. Tab. of Section 2

² For the configuration with external antenna we have considered that the worst case is the EUT with internal antenna because the same configuration of this apparatus has been just verified in a other test session cfr. EMC.TR.04.190, related to a similar apparatus code R202 453D B01 and B02

5. TEST RESULTS

| | |
|--|----|
| RADIATED EMISSION 30 - 1000 MHZ | 9 |
| EMISSION OF MAINS TERMINAL DISTURBANCE VOLTAGE | 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 (3 meter)
- **TEST EQUIPMENT USED FOR TEST:** EMI receiver Rohde & Schwarz Mod. ESML
Chase Antenna Mod. CBL 6111 A
- **TESTED PORT:** Enclosure
- **EMISSION LIMITS:** Acc. to Section 15.109 of reference document
- **UNCERTAINTY OF MEASURE:** Combined uncertainty = ± 1.75 dB
Total uncertainty = (k=2) ± 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 : | 110 Vac | 98 Vac \pm 3% |

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

RESULT: WITHIN THE LIMIT

SCAN TABLE : “Radiated Emission”

Unit: dB μ V/m

Detector : Mode:

Curve1: MaxPeak ClearWrite

Curve2: -- ClearWrite

Subrange1:

Start Frequency: 30.0 MHz Step Size: 80 kHz

Stop Frequency: 1000.0 MHz

Measure Time: 0.01 sec.

IF Bandwidth: 120 kHz

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

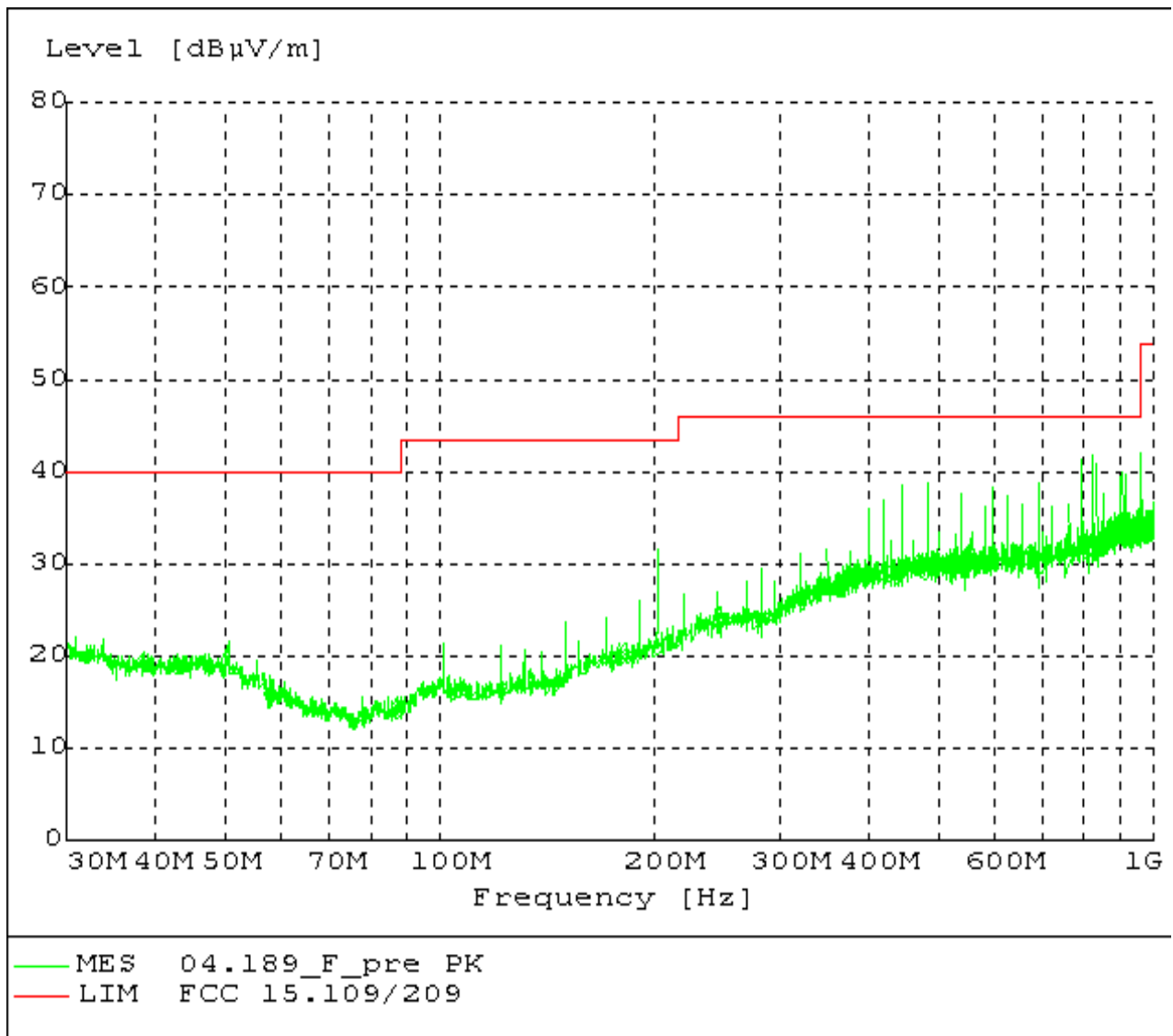
Stop Message: On

Text: Connect antenna



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Configuration B29 - with internal antenna



**TEST
2.**

EMISSION OF MAINS TERMINAL DISTURBANCE VOLTAGE

**REFERENCE
DOCUMENT**

FCC PART 15 subpart B

- **TEST LOCATION:** Semianechoic chamber (3 meter)
- **TEST EQUIPMENT USED FOR TEST:** EMI receiver Rohde & Schwarz Mod. ESMI
Artificial Network Rohde & Schwarz Mod. ESH3-Z5

- **TESTED PORT:** AC mains
- **FREQUENCY RANGE:** 0.15 - 30 MHz
- **EMISSION LIMITS:** Acc. to reference document 15.107
- **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 | 40 \pm 5 %rH |
| Pressure : 85 - 106 kPa (860 mbar - 1060 mbar) | 950 \pm 50 mbar |
| Voltage : 110Vac | 98 Vac \pm 3% |

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

RESULT: Within the limits

SCAN TABLE : Voltage Mains

Unit : dB μ V

| | | |
|----------|-------------------|---------------|
| | <u>Detector :</u> | <u>Mode :</u> |
| Curve 1: | MaxPeak | ClearWrite |
| Curve 2: | Average | ClearWrite |

| | | | |
|-------------------|-----------|----------------|-------|
| Start Frequency : | 150.0 kHz | | |
| Stop Frequency : | 30.0 MHz | IF Bandwidth : | 9 kHz |
| Measure Time : | 10.0 ms | Step size : | 6 kHz |

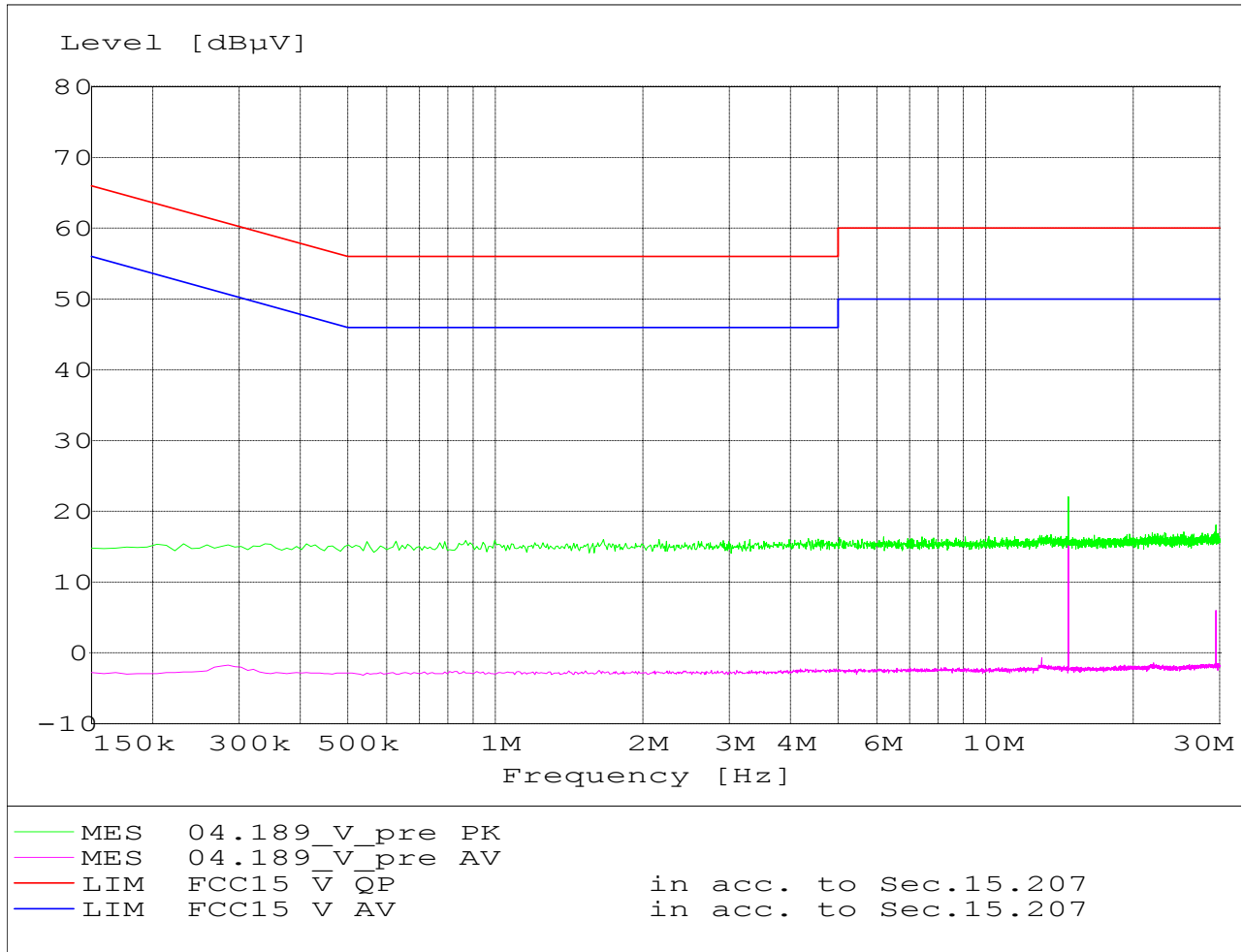
| | | | |
|-----------------------------|---------------|----------------------------|----------------------|
| Receiver : | <i>ESMI</i> | Transducer : | <i>ESH3-Z5_PRC</i> |
| Signal Path : | <i>Path 3</i> | System Transducer : | <i>Rfin1-CP2/X11</i> |
| Meas. Mode : | <i>Lin</i> | Add. Transd. 1 : | <i>W71.03</i> |
| Tracking Generator : | <i>Off</i> | Add. Transd. 2 : | <i>None</i> |
| Input : | <i>1AC</i> | Add. Transd. 3 : | <i>None</i> |

| | | | |
|-----------------------|----------------|-----------------------|-----------------|
| Preamplifier : | <i>10 dB</i> | Demodulation : | <i>FM Broad</i> |
| RF Att. : | <i>Coupled</i> | Volume : | <i>0 %</i> |
| Ref. Level : | <i>-10 dBm</i> | Squelch : | <i>--</i> |
| Min. RF Att. : | <i>0 dB</i> | Option : | <i>None</i> |
| IF Att. : | <i>0 dB</i> | | |
| Autorange : | <i>On</i> | | |

| | | | |
|------------------|-----------|-----------------------|--------------------|
| Curve 1 : | <i>On</i> | Repetition : | <i>Single</i> |
| Curve 2 : | <i>On</i> | Stop Mark : | <i>On</i> |
| | | Stop Message : | <i>On</i> |
| | | Stop Message : | <i>Connect EUT</i> |



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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 : | 110 Vac | 98 Vac |

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

RESULT: WITHIN THE LIMIT

MEASUREMENT RESULTS

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

| LIMITS |
|---------------|
| 2.0 nW |

6. EUT TECHNICAL DOCUMENTATION

6.1 Wiring diagrams

| | <i>Document reference (n., edition, date, ...)</i> |
|-----------------------|--|
| WIRING DIAGRAM | Doc. No. SC000173.dsn File name : mother board E16B22AC-Z.1 Issue date: 2004-03-01 Rev. 5 Sheet no. 1 |
| | Doc. No. SC000249.dsn File name : potentiometer board E16RI01A-L.1 Issue date: 2004-01-28 Rev. 0 Sheet no. 1 |
| | Doc. No. SC000199-01.dsn File name : E16RIMEA-Z.1 Issue date: 2001-10-22 Rev. 1 Sheet no. 1 |
| | Doc. No. SC000173.dsn File name : E16RIR2A-K Issue date: 2001-03-01 Rev. 5 Sheet no. 1 |
| | Doc. No. SC000187.dsn File name : E16RIR4A-K Issue date: 2000-10-31 Sheet no. 1 |
| | Doc. No. SC000238.dsn File name : E16RIR8A Issue date: 2004-04-21 Rev. 2 Sheet no. 1 |
| | Doc. No. SC000193.dsn File name : E16RIREA-Z.0 Issue date: 2001-03-16 Sheet no. 1 |
| | Doc. No. SC000185.dsn File name : E16RIV1A-Z.* Issue date: 2000-11-13 |

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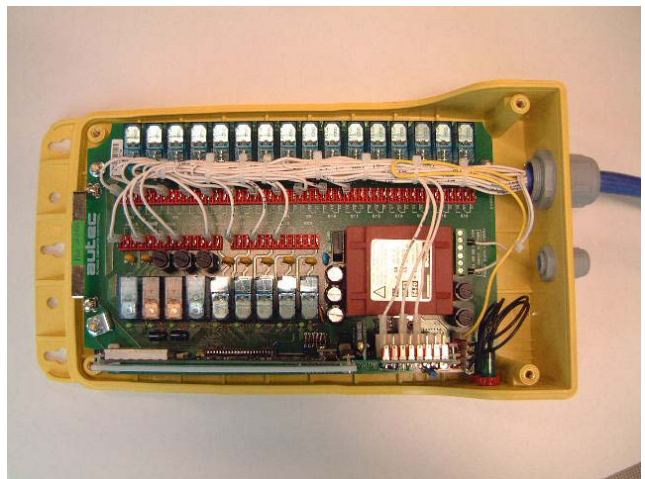
| | |
|------------------|--|
| | <p>Sheet no. 1</p> <p>Doc. No. SC000183.dsn File name : E16RIV4A-L.* Issue date: 2001-03-02 Sheet no. 1</p> <p>Doc. No. SC000215.dsn File name : E16RIV15-Z.0 Issue date: 2002-04-16 Sheet no. 1</p> <p>Doc. No. SC000260.dsn File name : E16S receiver module Issue date: 2003-06-03 Rev. 0 Sheet no. 2</p> <p>Doc. No. SC000222.dsn File name : Address key for E16/E16S Issue date: 2004-03-01 Rev. 1 Sheet no. 1</p> |
| PART LIST | <p>Ref. file : R202153D_bill.pdf Issue date: 2004-06-29 Sheet no. 1</p> |

6.2 Technical manual

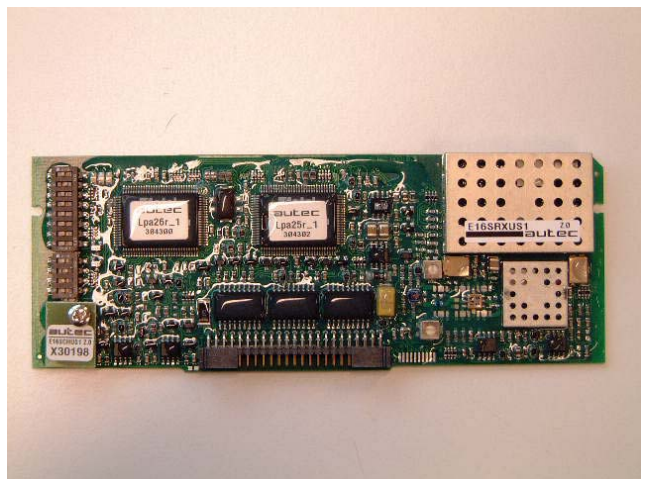
| | <i>Document reference (n., edition, date, ...)</i> |
|-------------------------|--|
| AC RECEIVER UNIT | LIE&LAA0 |
| USER'S MANUAL | sheet no. 20 |

6.3 Photographic documentation

PHOTO No. 1 – EQUIPMENT UNDER TEST IDENTIFICATION

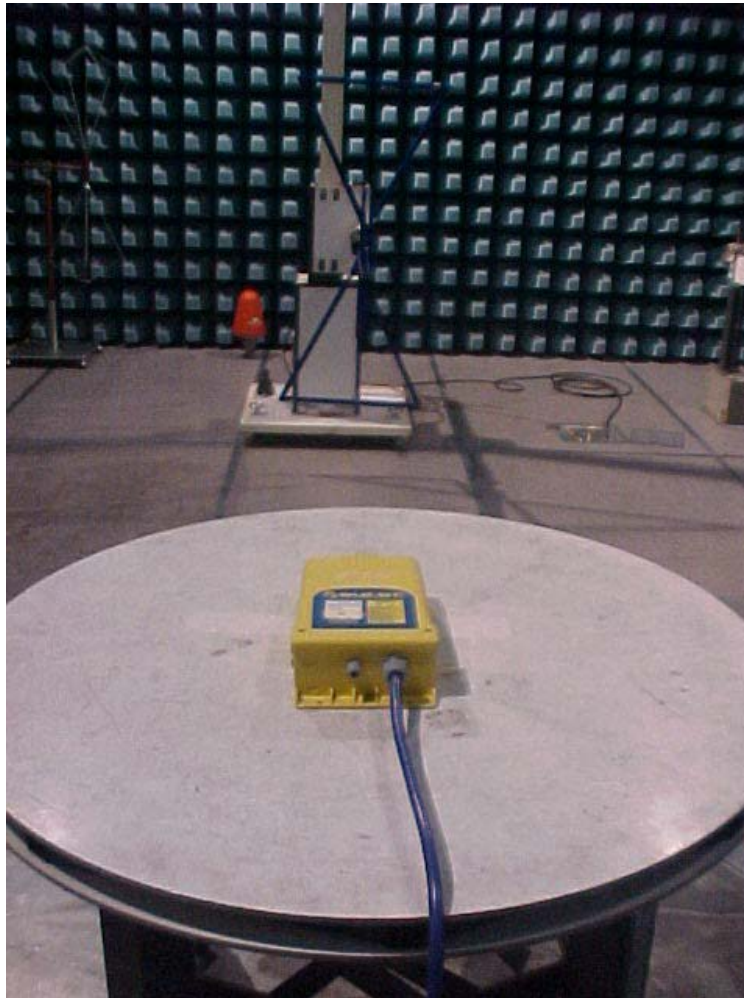


DEDICATED ANTENNA



RECEIVER MODULE

PHOTO No. 2 - TEST SET-UP



CONFIGURATION B29

7. TECHNICAL REPORT OF ANALYSIS OF DERIVED PRODUCTS

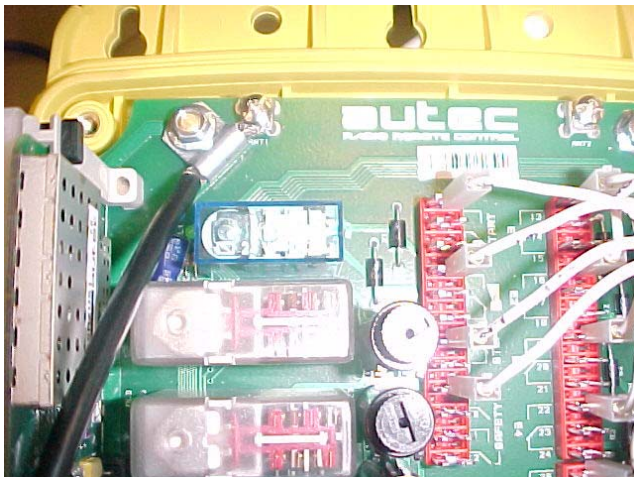
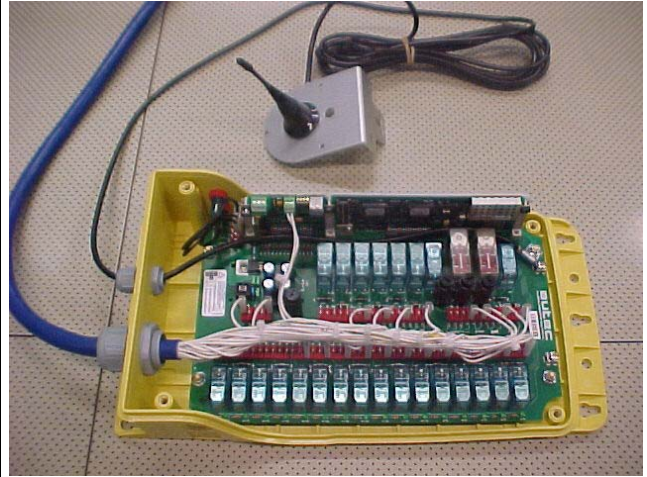
| EQUIPMENT under ANALYSIS : | | BRAND NAME |
|----------------------------|---|------------|
| BASIC MODEL | REMOTE CONTROL AC RECEIVER UNIT Type R202 Model 153D Configuration B29 | AUTEC Srl |
| DERIVED MODELS | Configuration B30 | |

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 :

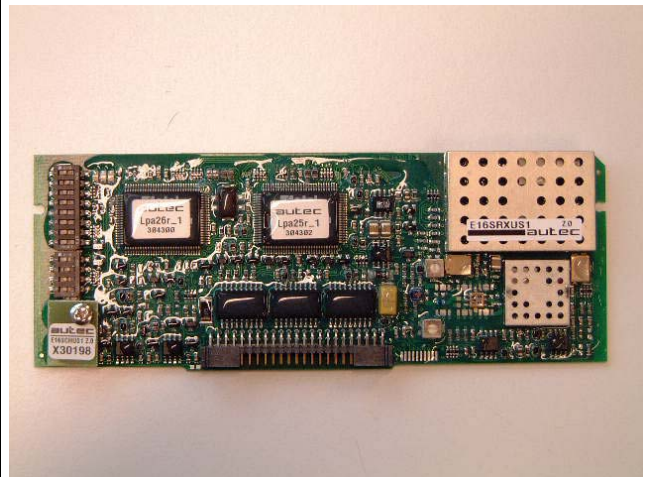
- ◆ the basic model and the derived models have the same plastic case
- ◆ the basic model and the derived models have the same Radio Receiver Module code E16SRXUS1
- ◆ the basic model and the derived models have the same Antenna
- ◆ There are No. 2 Configurations which differ each other for the used extension interface (card) and for the used antenna:
 - ◆ Configuration B29 for internal antenna
 - ◆ Configuration B30 for external stylus antenna

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PHOTO No. 1 – DERIVED MODEL IDENTIFICATION



DEDICATED ANTENNA



RECEIVER MODULE

On these basis, Prima Ricerca & Sviluppo considers the basic model more critical to the derived model, 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.