

Prima Ricerca & SviluppoSrl 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

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

**REMOTE CONTROL - DC RECEIVER UNIT**  
**Type R202 Model 453D**  
**Configuration B01 and B02**

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

**Configuration**  
**B03 - B04 - B05 - B06 - B07 - B08 - B09 - B10 - B11 -**  
**B12 - B13 - B14 - B17 - B18 - B25 - B26 - B27 - B28**  
**- B29 - B30**

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

**FCC 47 CFR Part 15**

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**CUSTOMER:**

*RICHIEDENTE:*

- **Dept. / Firm :** *Ente / Società:* **AUtec S.r.l.**
  - **Mr.:** *Sig.:* **BIANCHIN STEFANO**
  - **Address:** *Indirizzo:* **VIA POMAROLI, 65 - 36030 CALDOGNO (VI) - ITALY**
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- 

**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:*

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**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.*

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Edition: 1.0

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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 453D
	<b>Configuration B01</b> (E16 receiver unit with master board E16B22DC at 24Vdc and E16RIV15 card)
	<b>Configuration B02</b> (E16 receiver unit with master board E16B22DC at 24Vdc and E16RIV15 card and stylus antenna)
Serial number :	prototype
FCC ID :	OQA-R202453D
Country of manufacturer:	ITALY

### **1.2 Technical data**

FCC class:	Unintentional radiators, Class B
Type of receiver :	superetherodyne
Maximum internal frequency generated by EUT :	44 MHz
Supply voltage:	24 Vdc
Input Power / Current :	External power source
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 Vdc from external supply source Cable length not specified.	Terminals
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)

<b>Operating condition</b>	<b>Description</b>
#1	Receiver active

### 2.2 Test overview

Sample tested is the main model of a complete set of 915 MHz RF transmitters (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>
<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

## 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 § 15 109	#1	Within the limit
2	AC mains Input ports	RF Disturbance voltage: • continuous	FCC Part 15 § 15 107	#1	Within the limit ( <sup>2</sup> )
3	Antenna terminals	Antenna power conduction limits for receivers	FCC Part 15 §15 111	#1	Within the limit

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

<sup>2</sup> We have carried out an EMI test with EUT powered by a generic AC/DC adapter

## 5. TEST RESULTS

EMISSION OF MAINS TERMINAL DISTURBANCE VOLTAGE (CONTINUOUS DISTURBANCE) .....	9
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**TEST  
1.**

**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 :	110 Vac $\pm$ 3 %

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

**RESULT: WITHIN THE LIMIT**

**SCAN TABLE : Voltage Mains**

Unit : dBµV

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

Subrange 1:

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

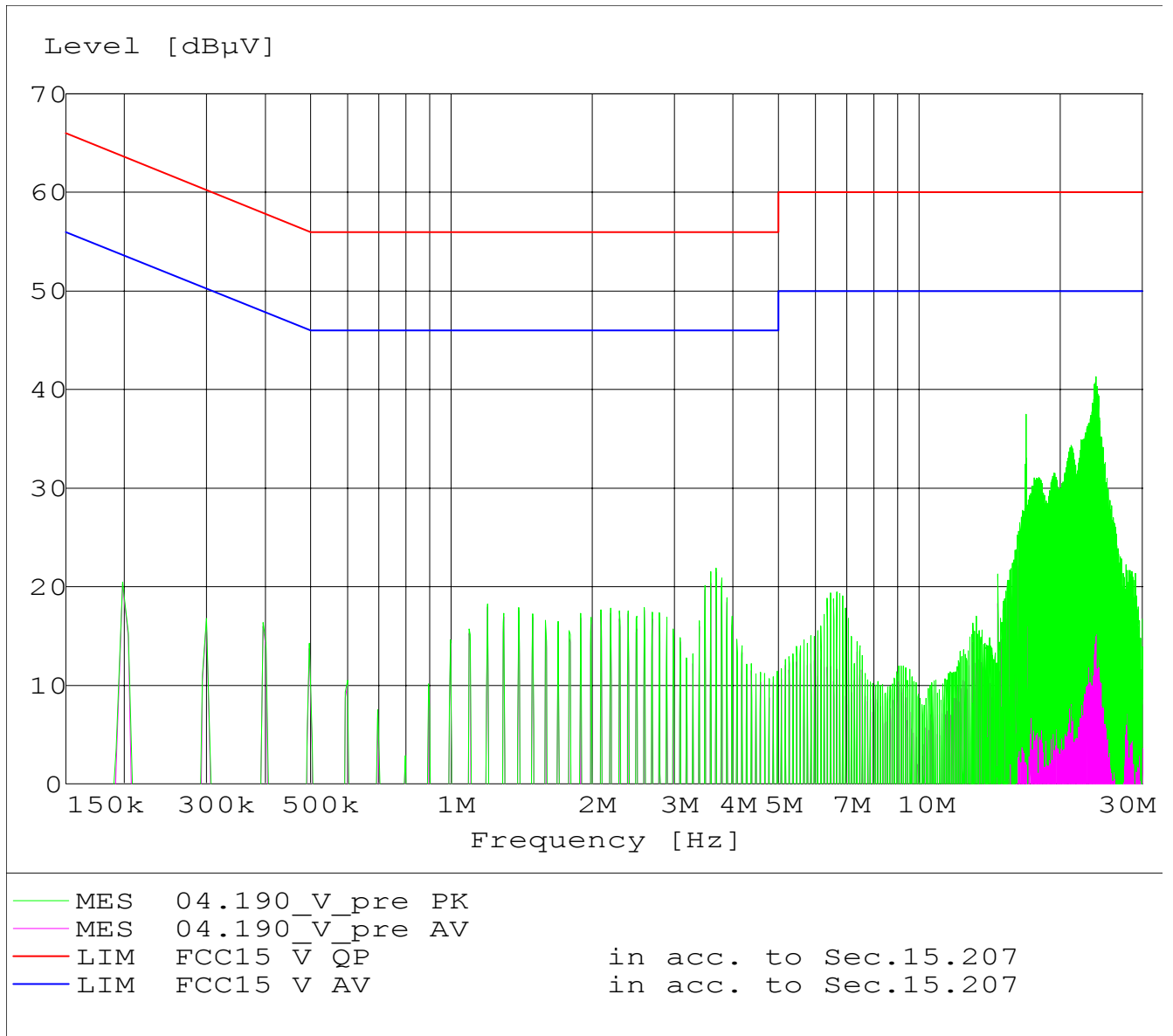
<b>Receiver :</b>	<i>ESHS 30</i>	<b>Transducer :</b>	<i>ESH3-Z5_PRC</i>
<b>Signal Path :</b>	<i>Path 3</i>	<b>System Transducer :</b>	<i>Rfin1-CP2/X11</i>
<b>Meas. Mode :</b>	<i>Lin</i>	<b>Add. Transd. 1 :</b>	<i>W71.03</i>
<b>Tracking Generator :</b>	<i>Off</i>	<b>Add. Transd. 2 :</b>	<i>None</i>
<b>Input :</b>	<i>1AC</i>	<b>Add. Transd. 3 :</b>	<i>None</i>

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

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



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**TEST  
2.**

**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 Vdc	24,0 $\pm$ 0,5 Vdc

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

**RESULT: WITHIN THE LIMIT**

**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

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

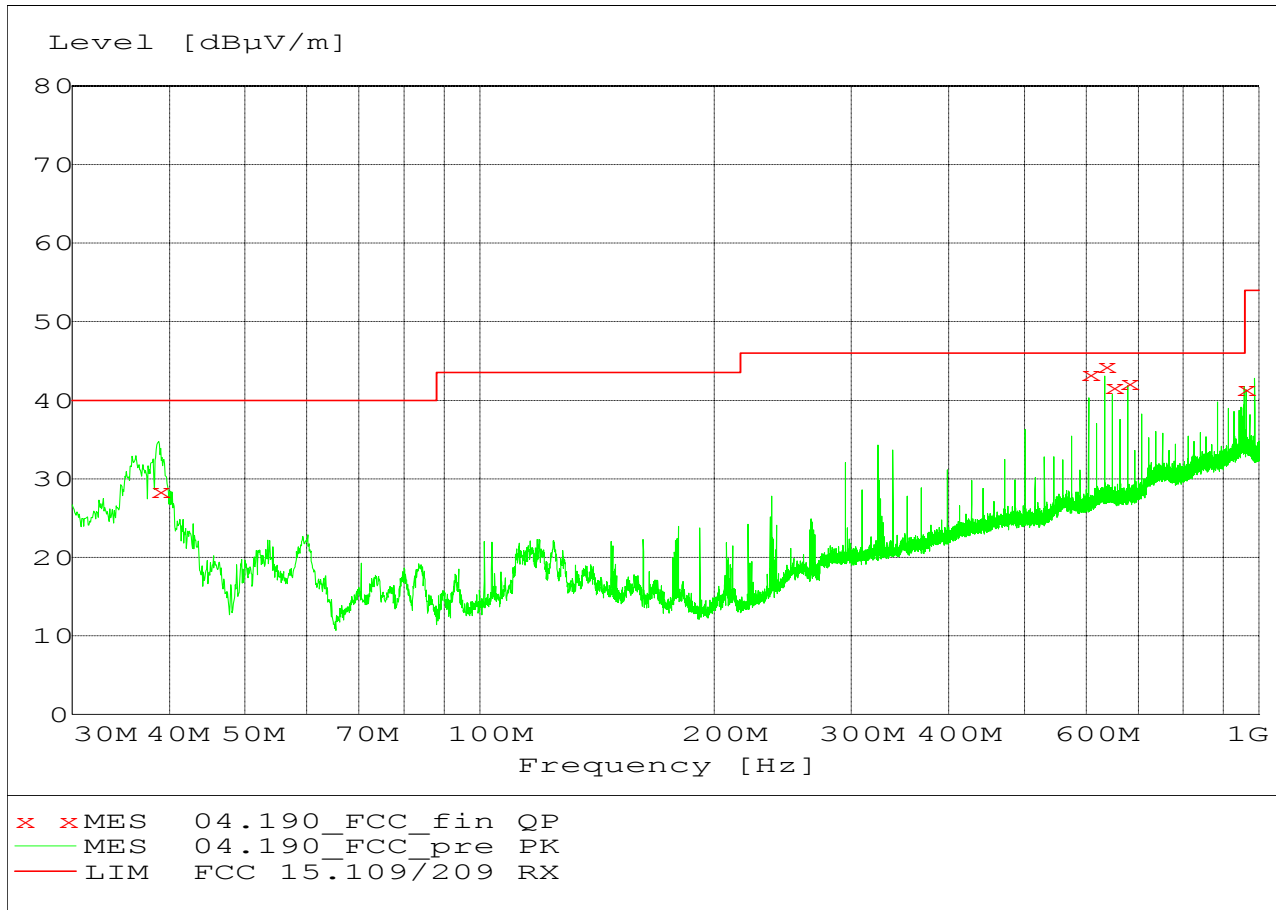
Stop Message: On

Text: Connect antenna



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### Configuration B01 - with internal antenna



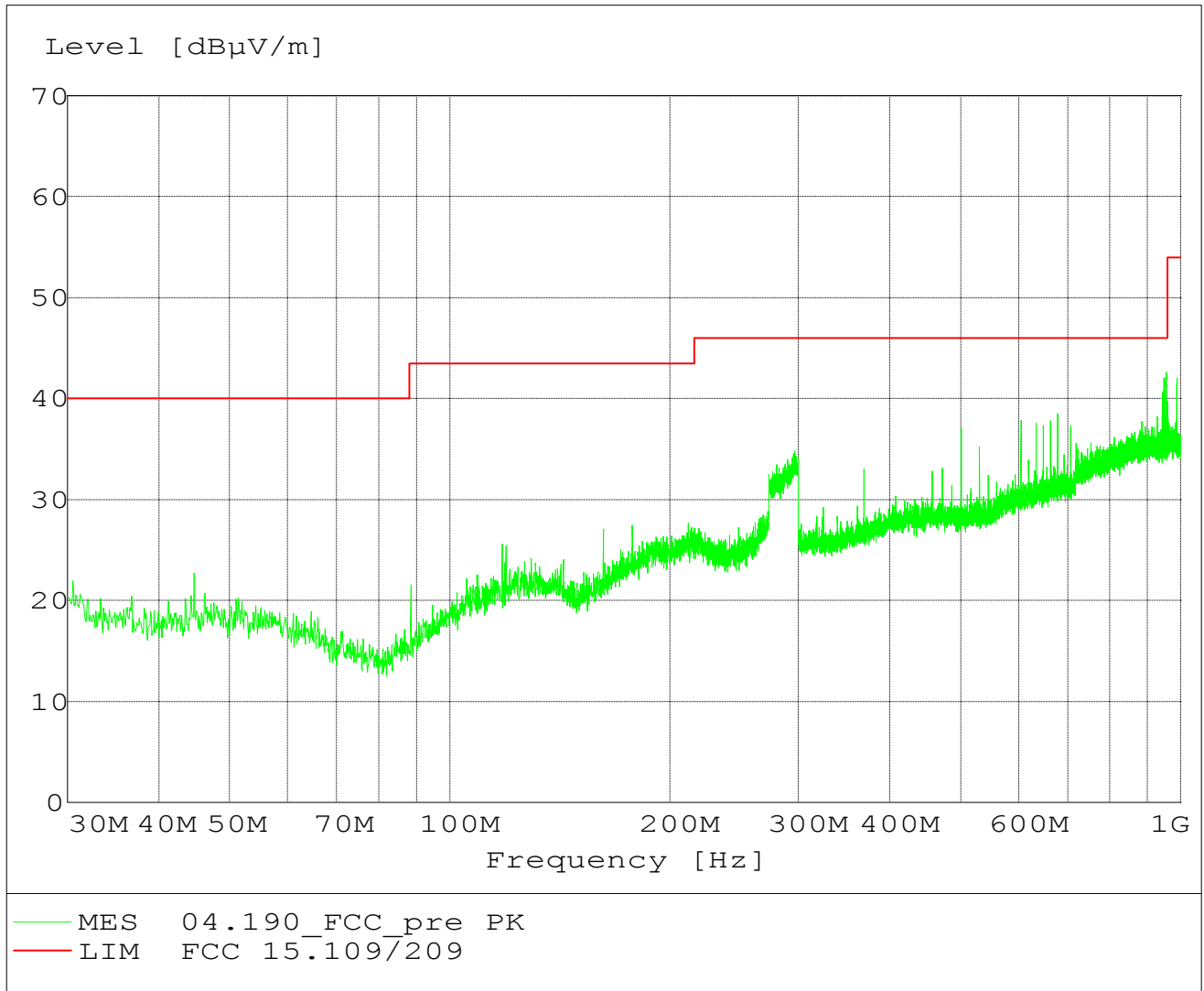
### Quasi-peak measurement

Frequency	Level	Limit	Margin	Height	Azimuth	Polarisation
MHz	dBµV/m	dBµV/m	dB	cm	deg	
38.720000	28.40	40.00	11.60	100.0	0.00	VERTICAL
604.480000	43.40	46.00	2.60	130.0	89.00	HORIZONTAL
634.000000	44.40	46.00	1.60	115.0	89.00	HORIZONTAL
648.720000	41.70	46.00	4.30	113.0	89.00	HORIZONTAL
678.240000	42.20	46.00	3.80	110.0	95.00	HORIZONTAL
958.400000	41.50	46.00	4.50	100.0	61.00	VERTICAL



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Configuration B02 - with external antenna



**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 : 24,0 V ± 0,2 V	24 Vdc

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

**RESULT: WITHIN THE LIMIT**



**MEASUREMENT RESULTS**

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

<b>LIMITS</b>
2.0 nW

## 6. EUT TECHNICAL DOCUMENTATION

### 6.1 Wiring diagrams

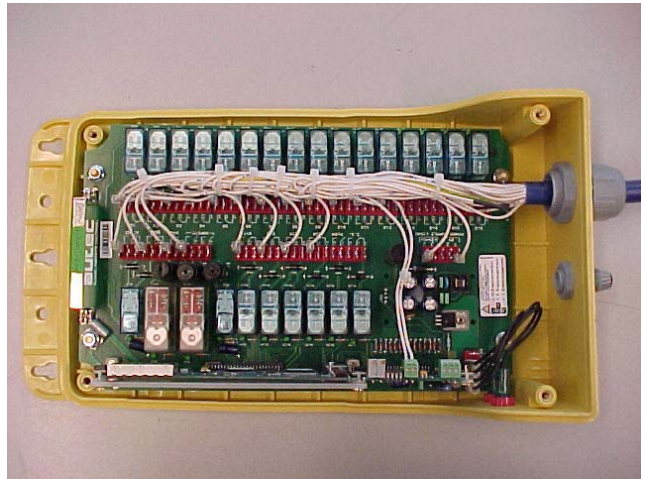
	<i>Document reference (n., edition, date, ...)</i>
<b>WIRING DIAGRAM</b>	<p>Mainboard E16B22 L.0 Doc. No. F0BASE00E50A0 Issue date: 2003-02-20 Rev. 2 Sheet no. 1</p> <p>Expander board E16RIV15 Doc. No. E16RIV15-Z.0 Issue date: 2002-04-16 Rev. 0 Sheet no. 1</p> <p>E16S receiver module Doc. No. E16SRXUS1 Issue date: 2004-06-03 Rev. 0 Sheet no. 2</p>
<b>PART LIST</b>	<p>Doc. No. E16B22DC_bill Sheet no. 1</p> <p>Doc. No. E16RIV15_bill Sheet no. 1</p> <p>Doc. No. E16SRXUS1_bill Sheet no. 2</p>

### 6.2 Technical manual

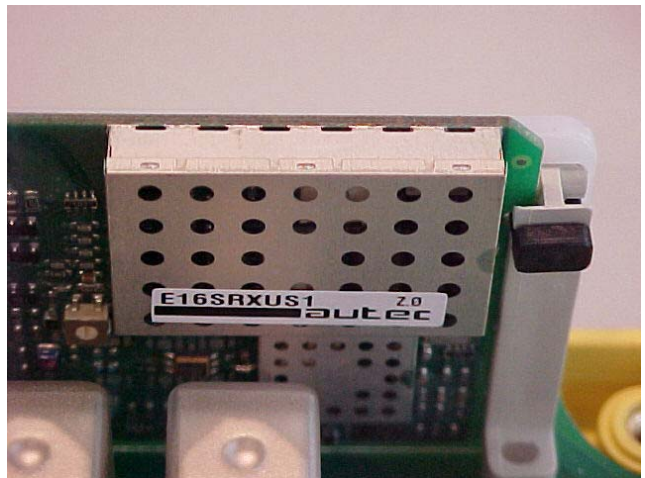
	<i>Document reference (n., edition, date, ...)</i>
<b>DC RECEIVER UNIT</b>	File name : LIE&LDA0.pdf
<b>USER'S MANUAL</b>	sheet no. 20

**6.3 Photographic documentation**

**PHOTO No. 1 – EQUIPMENT UNDER TEST IDENTIFICATION**

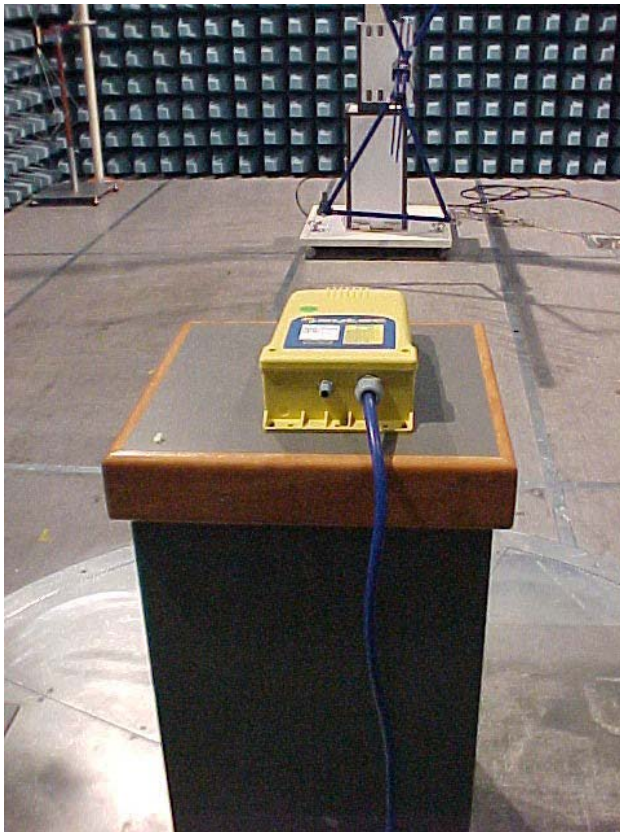


**INTERNAL ANTENNA**

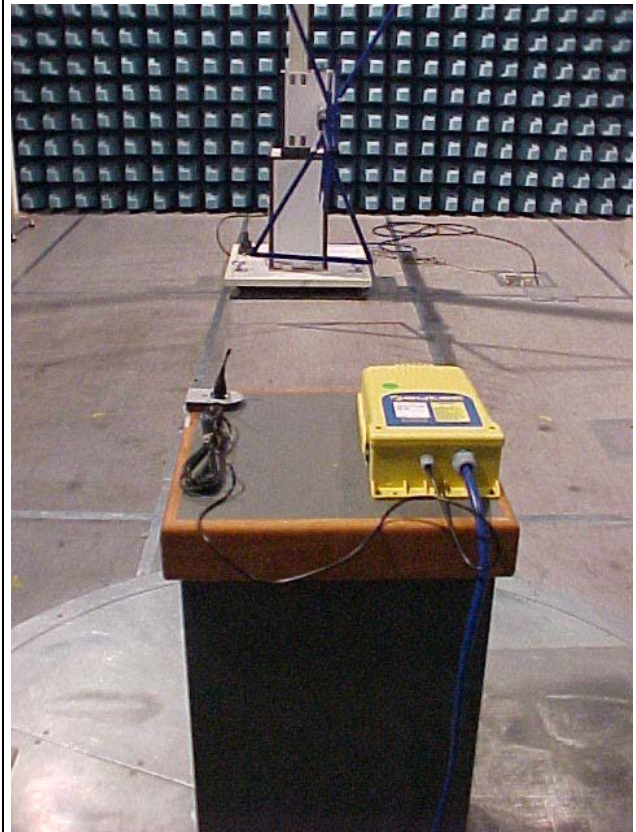


**RECEIVER MODULE**

**PHOTO NO. 2 - TEST SETUP**



**CONFIGURATION B01**



**CONFIGURATION B02**



## 7. TECHNICAL REPORT OF ANALYSIS OF DERIVED PRODUCTS

EQUIPMENT under ANALYSIS :		BRAND NAME
<b>BASIC MODEL</b>	<b>REMOTE CONTROL - DC RECEIVER UNIT</b>  <b>Type R202 Model 453D</b> <b>Configuration B01 and B02</b>	AUTEC Srl
<b>DERIVED MODELS</b>	<b>For different configuration :</b> <b>B01 - B02 - B03 - B04 - B05 – B06 – B07 –</b> <b>B08 – B09 – B10 – B11 - B12 – B13 – B14</b> <b>– B17 – B18 – B25 – B26 – B27 – B28 –</b> <b>B29 – B30</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 B01:*

- *embedded antenna*
- *converter d/a extension interface (card) E16RIV15*

*Configuration B02:*

- *antenna with stylus and with a cable 1 - 5 metres*
- *converter d/a extension interface (card) E16RIV15*

*Configuration B03:*

- *embedded antenna*
- *1-axis with 4 steps potentiometer extension interface (card) E16RIV4A*

*Configuration B04:*

- *antenna with stylus with a cable 1 - 5 metres*

- 1-axis with 4 steps potentiometer extension interface (card) E16RIV4A

Configuration B05:

- embedded antenna

- 2-axis with 4 steps potentiometer extension interface (card) E16RIV4B

Configuration B06:

- antenna with stylus with a cable 1 - 5 metres

- 2-axis with 4 steps potentiometer extension interface (card) E16RIV4B

Configuration B07:

- embedded antenna

- concrete extension interface (card) E16RIV1A

Configuration B08:

- antenna with stylus with a cable 1 - 5 metres

- concrete extension interface (card) E16RIV1A

Configuration B09:

- embedded antenna

- 4 programmable relais extension interface (card) E16RIR4A

Configuration B10:

- antenna with stylus with a cable 1 - 5 metres

- 4 programmable relais extension interface (card) E16RIR4A

Configuration B11:

- embedded antenna

- 1-axis with 13 steps potentiometer output extension interface (card) E16RI01A

Configuration B12:

- antenna with stylus and with a cable 1 - 5 metres

- 1-axis with 13 steps potentiometer output extension interface (card) E16RI01A

Configuration B13:

- embedded antenna

- 2 programmable relais extension interface (card) E16RIR2A (24Vdc)

Configuration B14:

- antenna with stylus and with a cable 1 - 5 metres

- 2 programmable relais extension interface (card) E16RIR2A (24Vdc)

Configuration B17:

- embedded antenna

- optional card E16RIDWA for master boards DC

Configuration B18:

- antenna with stylus and with a cable 1 - 5 metres

- optional card E16RIDWA for master boards DC

*Configuration B25:*

- embedded antenna

- cmd held programmable extension interface (card) E16RIMEA

*Configuration B26:*

- antenna with stylus and with a cable 1 - 5 metres

- cmd held programmable extension interface (card) E16RIMEA

*Configuration B27:*

- embedded antenna

*Configuration B28:*

- antenna with stylus and with a cable 1 - 5 metres

*Configuration B29:*

- embedded antenna

- 8 additional relais programmable extension interface (card) E16RIR8A

*Configuration B30:*

- antenna with stylus and with a cable 1 - 5 metres

- 8 additional relais programmable extension interface (card) E16RIR8A

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 models.