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EQUIPMENT UNDER TEST :
APPARECCHIO IN PROVA :
REMOTE CONTROL - AC RECEIVER UNIT
Type R302 Model 154D Configuration L01

DERIVED MODELS:
APPARECCHI DERIVATI :
Type R302 Model 154D Configuration L02

REFERENCE STANDARDS :
NORME DI RIFERIMENTO :
FCC 47 CFR Part 15

CUSTOMER:

RICHIEDENTE:

- **Dept. / Firm :** *Ente / Società':* *AUTEC S.r.l.*
- **Mr.:** *Sig.:* *BIANCHIN STEFANO*
- **Address:** *Indirizzo:* *VIA POMAROLI, 65 - 36030 CALDOGNO (VI) - ITALY*
- **Tel.** : *Telefono :* *++39 0444 901000*
- **Telefax** *Fax :* *++39 0444 901080*
- **E-mail:** *e-mail* *sbianchin@autec.it*

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

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

Date of start test: **26/05/04**
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:

F. Barbierato

Signature of the Laboratory Director:
Firma Direttore Laboratori:

R. Furfari

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0. CONTENTS

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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 R302
	Model 154D
	Configuration L01 (E16 receiver unit with master board E16B10AC)
	Configuration L02 (E16 receiver unit with master board E16B10AC and stylus antenna)
Serial number :	prototype
FCC ID :	OQA-R302154D
Country of manufacturer:	ITALY

1.2 Technical data

FCC class:	Unintentional radiators, Class B
Supply voltage:	55 / 110 Vac
Input Power / Current :	External AC 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 :	20 x 12 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

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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	50 - 110 Vac from external supply – Cable length not specified.	Terminals
3	DC power input/output ports	Line not present	**********
4	Signals ports	N° 10 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

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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.

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3. REFERENCE STANDARD FOR PERFORMED TESTS

Reference standard :	*Title :*
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

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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

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5. TEST RESULTS

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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 = ± 1.75 dB
  Total uncertainty = (k=2) ± 3.5 dB

TEST CONDITIONS:			**MEASURED**
Ambient temperature :	15 - 35 °C		24 ± 3 °C
Ambient humidity :	25 - 75 %rH		40 ± 5 %rH
Pressure :	85 - 106 kPa	(860 mbar - 1060 mbar)	950 ± 50 mbar
Voltage :	110 Vac		98 Vac

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

RESULT: WITHIN THE LIMIT

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SCAN TABLE : "Radiated Emission"

Unit:	dBμV/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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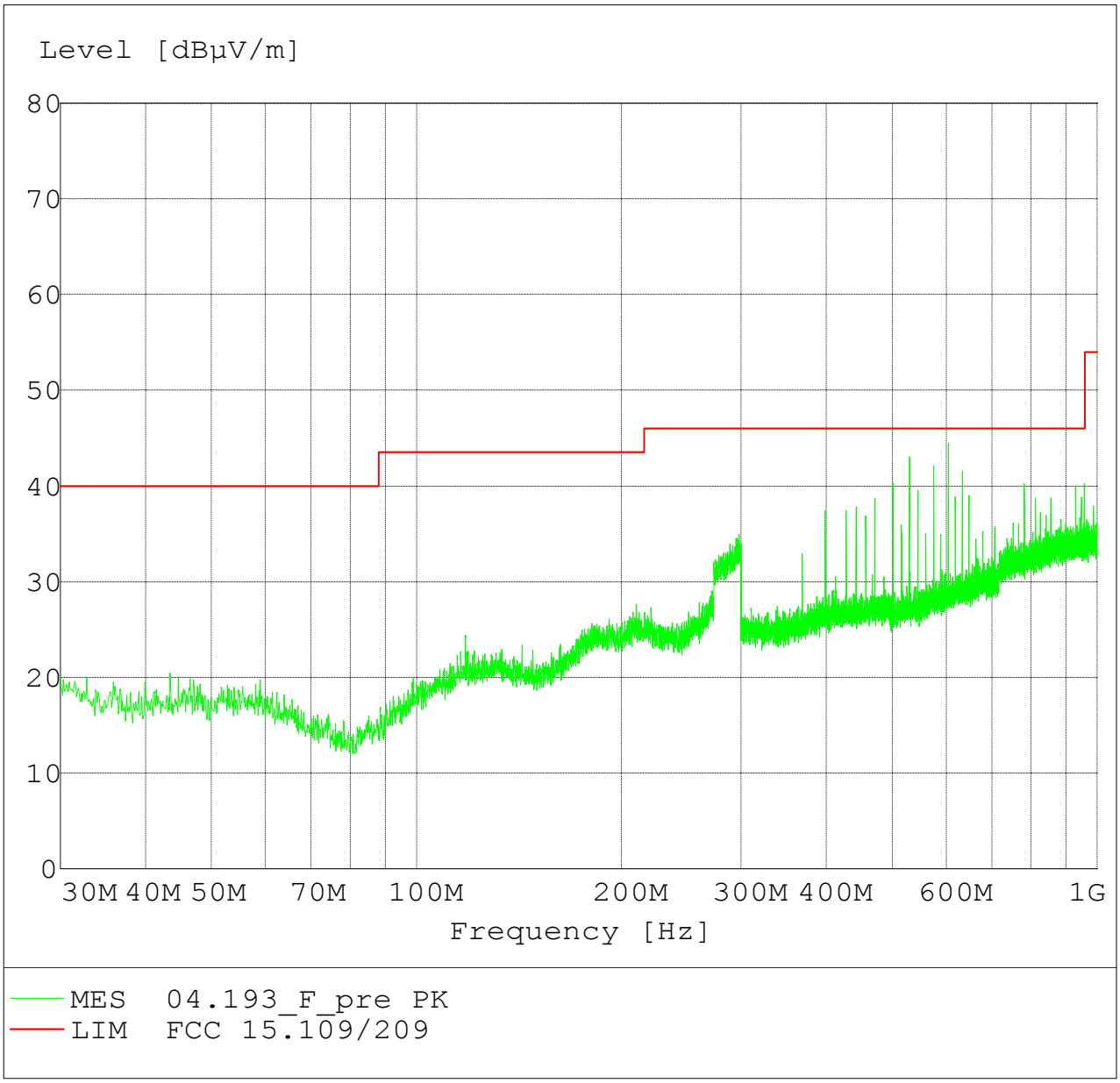
Configuration L01 - with internal antenna



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TEST 2.

EMISSION OF MAINS TERMINAL DISTURBANCE VOLTAGE

REFERENCE DOCUMENT FCC PART 15 subpart B

- **TEST LOCATION:** Semianechoic chamber
- **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) ± 2.5 dB

TEST CONDITIONS:			**MEASURED**
Ambient temperature :	**15 - 35 °C**		**24 ± 3 °C**
Ambient humidity :	**25 - 75 %rH**		**40 ± 5 %rH**
Pressure :	**85 - 106 kPa**	**(860 mbar - 1060 mbar)**	**950 ± 50 mbar**
Voltage :	110Vac		**98 Vac ± 3%**

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

RESULT: Within the limits

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SCAN TABLE : Voltage Mains

Unit :	dBµV	
	Detector :	Mode :
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 :	*ESMI*	***Transducer :***	*ESH3-Z5_PRC*
Signal Path :	*Path 3*	***System Transducer :***	*Rfin1-CP2/X11*
Meas. Mode :	*Lin*	***Add. Transd. 1 :***	*W71.03*
Tracking Generator :	*Off*	***Add. Transd. 2 :***	*None*
Input :	*1AC*	***Add. Transd. 3 :***	*None*
Preamplifier :	*10 dB*	***Demodulation :***	*FM Broad*
RF Att. :	*Coupled*	***Volume :***	*0 %*
Ref. Level :	*-10 dBm*	***Squelch :***	*--*
Min. RF Att. :	*0 dB*	***Option :***	*None*
IF Att. :	*0 dB*		
Autorange :	*On*		
Curve 1 :	*On*	***Repetition :***	*Single*
Curve 2 :	*On*	***Stop Mark :***	*On*
		Stop Message :	*On*
		Stop Message :	*Connect EUT*

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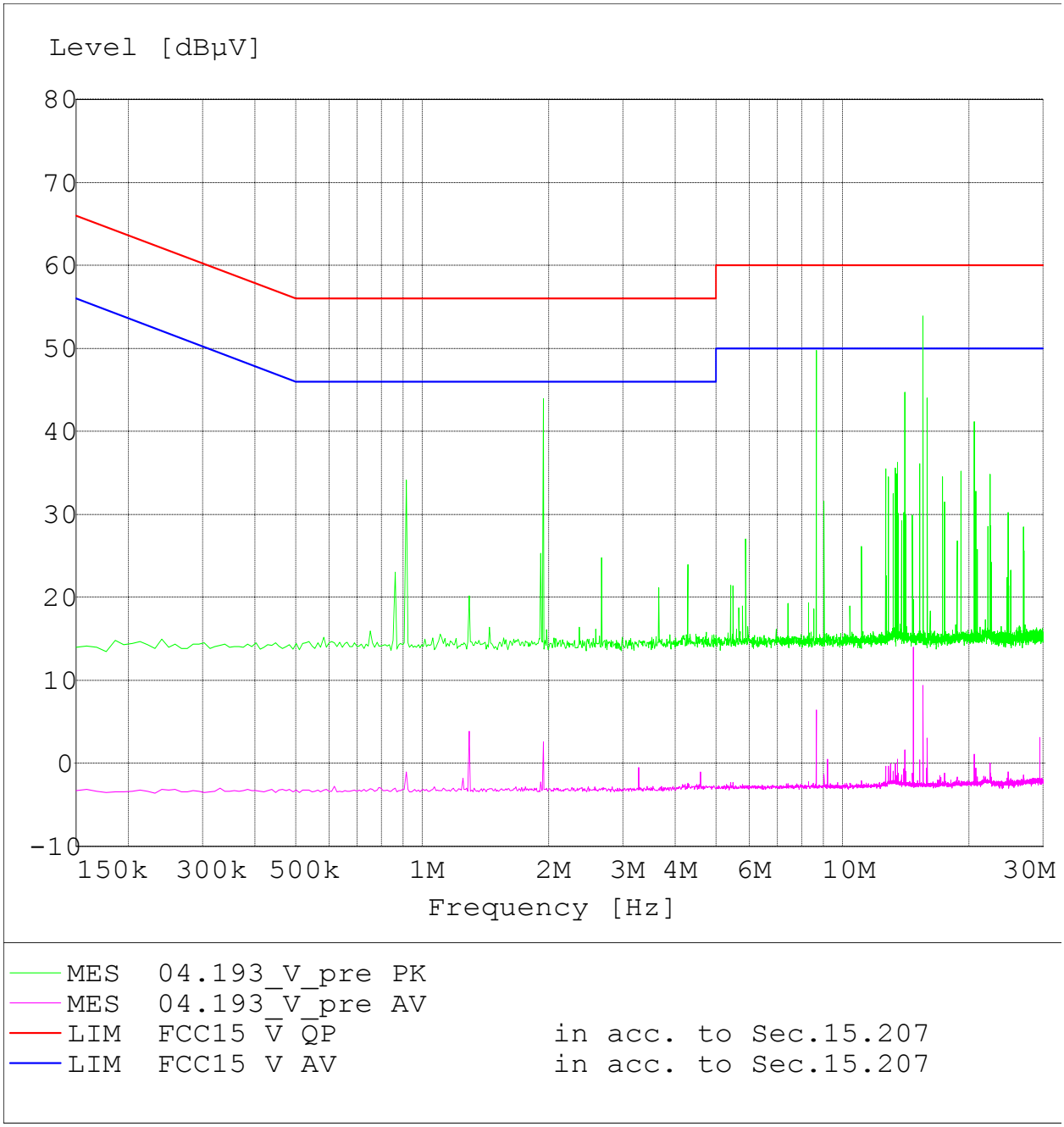

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TEST 3.

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

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MEASUREMENT RESULTS

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

LIMITS
2.0 nW

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6. EUT TECHNICAL DOCUMENTATION

6.1 Wiring diagrams

	Document reference (n., edition, date, ...)
WIRING DIAGRAM	Doc. No. SC000202.dsn File name : board B10AC-Z.0 Issue date: 2001-10-26 Rev. 1 Sheet no. 1 Doc. No. SC000260.dsn File name : E16S receiver module Issue date: 2003-06-03 Rev. 0 Sheet no. 2 Doc. No. SC000222.dsn File name : Address key for E16/E16S Issue date: 2004-03-01 Rev. 1 Sheet no. 1
PART LIST	Ref. file : R302154D_bill.pdf Issue date: 2004-06-29 Sheet no. 1

6.2 Technical manual

	Document reference (n., edition, date, ...)
AC RECEIVER UNIT ***USER'S MANUAL***	LIE&LAA0

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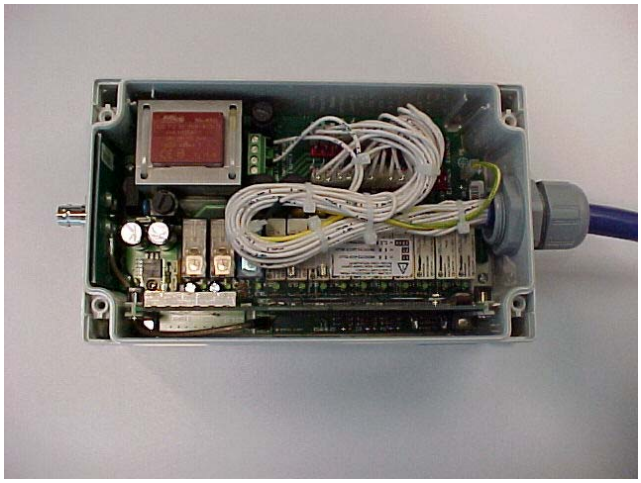
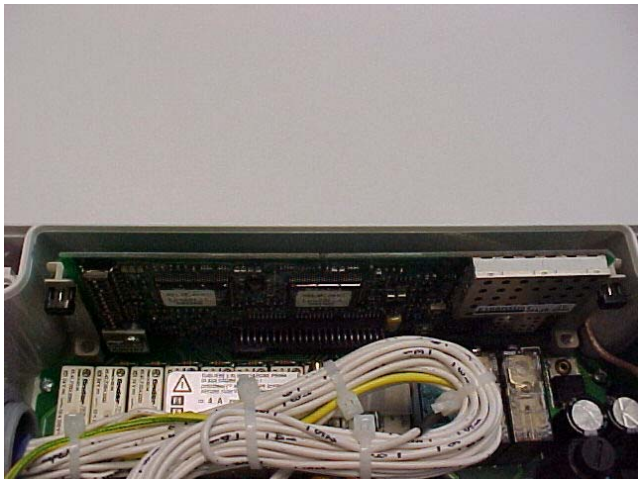
6.3 Photographic documentation

PHOTO NO. 1 – EQUIPMENT UNDER TEST IDENTIFICATION



DEDICATED ANTENNA



RECEIVER MODULE

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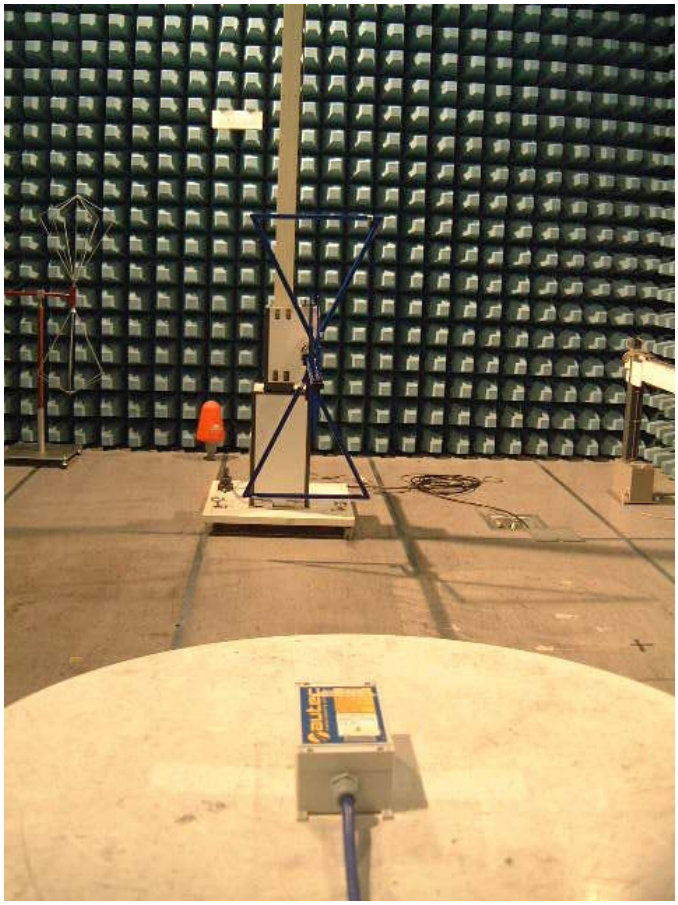
PHOTO NO. 2 - TEST SETUP



CONFIGURATION L01

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7. TECHNICAL REPORT OF ANALYSIS OF DERIVED PRODUCTS

EQUIPMENT under ANALYSIS :		BRAND NAME
BASIC MODEL	**REMOTE CONTROL AC RECEIVER UNIT** **Type R302 Model 154D** **Configuration L01**	AUTEC Srl
DERIVED MODELS	**Configuration L02**	

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 L01 for internal antenna
  - Configuration L02 for external stylus antenna

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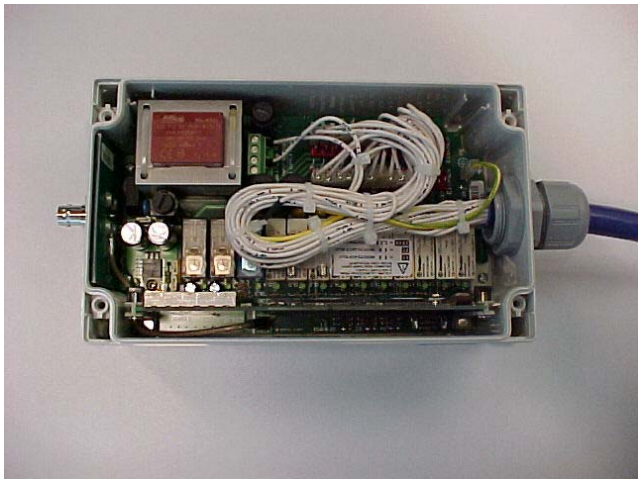
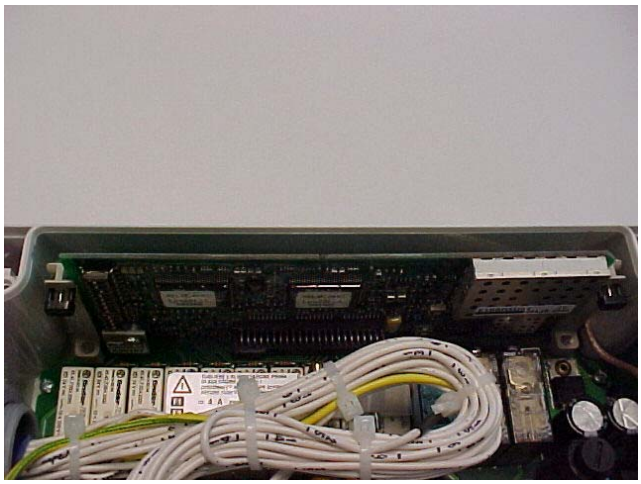
PHOTO No. 1 – DERIVED MODEL IDENTIFICATION



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.