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

**SUPERETHERODYNE RECEIVER**

**Mod. WALLY4PLUS**

**DERIVED MODELS :**
*MODELLI DERIVATI :*

**WALLY4, WALLY2, WALLY1, WALLY4R, WALLY2R, WALLY1R, WALLY NC**

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

**FCC 47CFR Part 15**

---

**CUSTOMER:**

*RICHIEDENTE:*

- **Dept. / Firm :** *Ente / Società':* *V2 ELETTRONICA S.p.A.*
- **Mr.:** *Sig.:* *MINETTI*
- **Address:** *Indirizzo:* *C.SO PRINCIPI DI PIEMONTE, 63 – 12035 RACCONIGI (CN) - ITALY*
- **Tel.** : *Telefono :* *++39 0172/81.24.11* • **Telefax:** *Fax :* *++39 0172/84.050* • **E-mail:** *e-mail* *info@v2elettronica.com*

---

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

**Date of test samples receipt:** **10/10/03** **Date of start test:** **13/10/03**
*Data ricevimento campioni:* *Data inizio prove:*

**Date of end test:** **14/10/03**
*Data fine prove:*

---

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

Nobody / Nessuno
.....

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

Roberto Radice

R. Radice
.....

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

Vincenzo La Fragola

V. La Fragola
.....

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## 0. CONTENTS

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

## *1.1 Identification*

| | |
|---|---|
| Brand name: | V2 ELETTRONICA |
| Equipment : | SUPERETHERODYNE RECEIVER |
| Model name or No. : | WALLY4PLUS |
| Serial number : | Not present |
| FCC ID : | RSK-V2-WALLY |
| Country of manufacturer: | ITALY |

## *1.2 Technical data*

| | |
|---|---|
| FCC class: | Unintentional radiators, Class B |
| Supply voltage: | 12÷24 Vac/dc |
| Input Power / Current : | 17 mA (stand-by) |
| Typical usage : | WALLY is a superetherodyne receiver for external environment employ |
| EUT single or system: | Single |
| EUT dimensions : | 13,2 x 2,6 x 7,4 cm. |

### 1.3 Receiver technical data

- Working Frequency : 433,92 MHz
- Frequency Range of Operation : 433,05 ÷ 434,79 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 suurface | By pressure |
| 2 | AC power input/output ports | 12÷24 Vac from external supply – Cable length not specified. | Terminals |
| 3 | DC power input/output ports | 12÷24 Vdc from external supply (in alternative to AC Power Supply) – Cable length not specified. | Terminals |
| 4 | Signals ports | N° 4 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 – N° 4 Cables N.O. connected on output.* |

## 2.2 Test overview

Sample tested is the main model of a complete set of 433,92 MHz RF receiver (see also Section 7).

The appliance is classified as “*unintentional radiator”* in conformity to FCC Part 15 Sub. A §15.201, and it is subject to “*Certification*” procedure.

The application is mainly used as remote control for automatic gate and door openers.

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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 |

# 4. SUMMARY OF TEST RESULTS

## *4.1 Emission tests*

| | Port | Phenomena | Basic standard | Operating condition[1] | Result |
|---|---|---|---|---|---|
| 1 | Enclosure | Radiated emission | FCC Part 15 | #1 | Within the limit |
| 2 | AC mains Input ports | RF Disturbance voltage:<br>• continuous | FCC Part 15 | #1 | Within the limit |

[1] Ref. Tab. of Section 2

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## 5. TEST RESULTS

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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) ± 2.5 dB

| **TEST CONDITIONS:** | | | **MEASURED** |
|---|---|---|---|
| Ambient temperature : | 15 - 35 °C | | 24 ± 3 °C |
| Ambient humidity : | 25 - 75 %rH | | 38 ± 5 %rH |
| Pressure : | 85 - 106 kPa | (860 mbar - 1060 mbar) | 975 ± 50 mbar |
| Voltage : | | | 12 Vac ± 3 % |

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

*RESULT: WITHIN THE LIMIT*

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## SCAN TABLE : Voltage Mains

| | | |
|---|---|---|
| Unit : | dBµV | |
| | Detector : | Mode : |
| 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 |

| | | | |
|---|---|---|---|
| ***Receiver :*** | *ESHS 30* | ***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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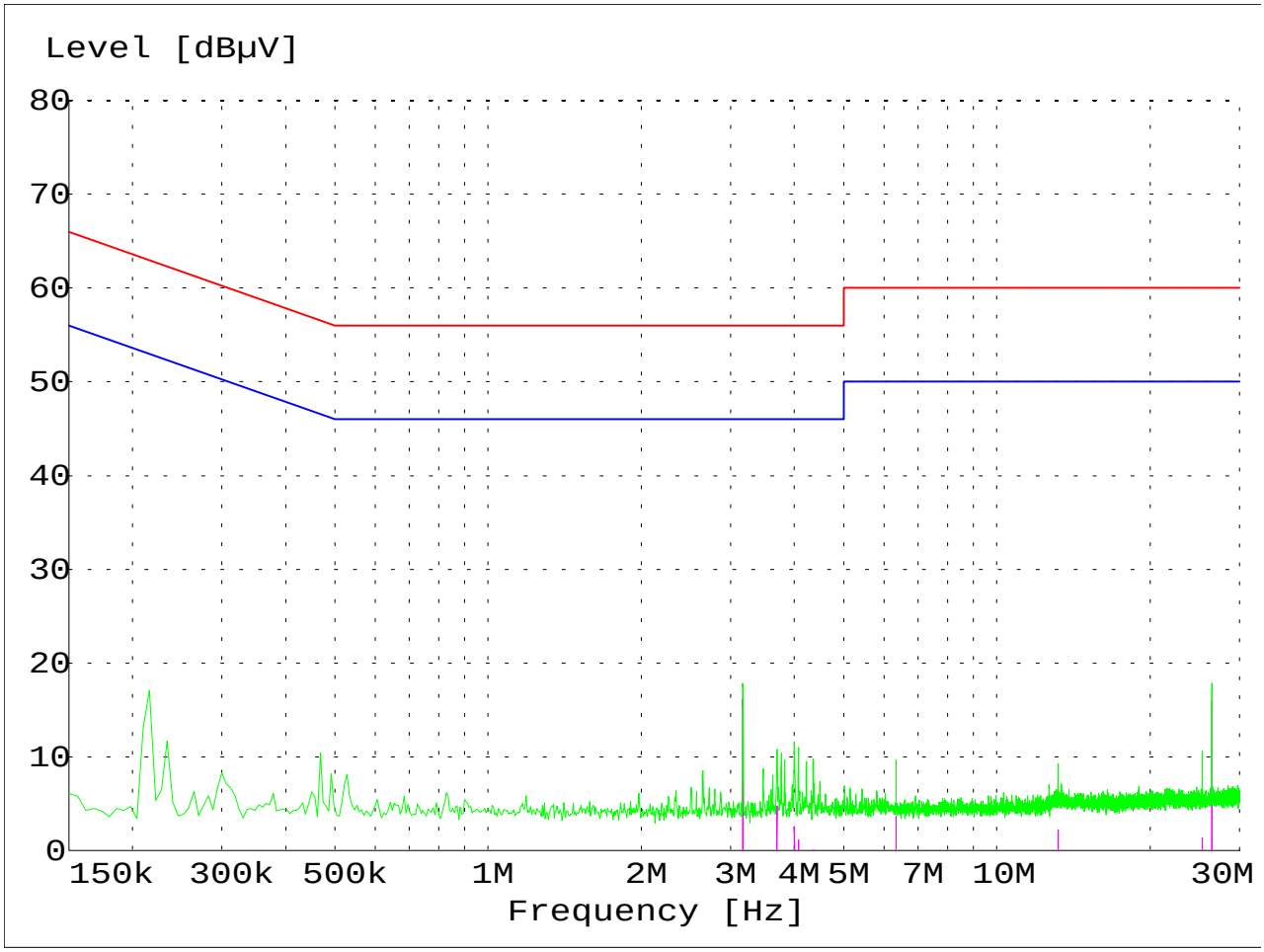

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**TEST 2.**

## 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
  Biconical Antenna Rohde & Schwarz Mod. HK116
  Log-periodic Antenna Rohde & Schwarz Mod. HL223
  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 : | 12÷24 Vdc | | 12 Vdc |

***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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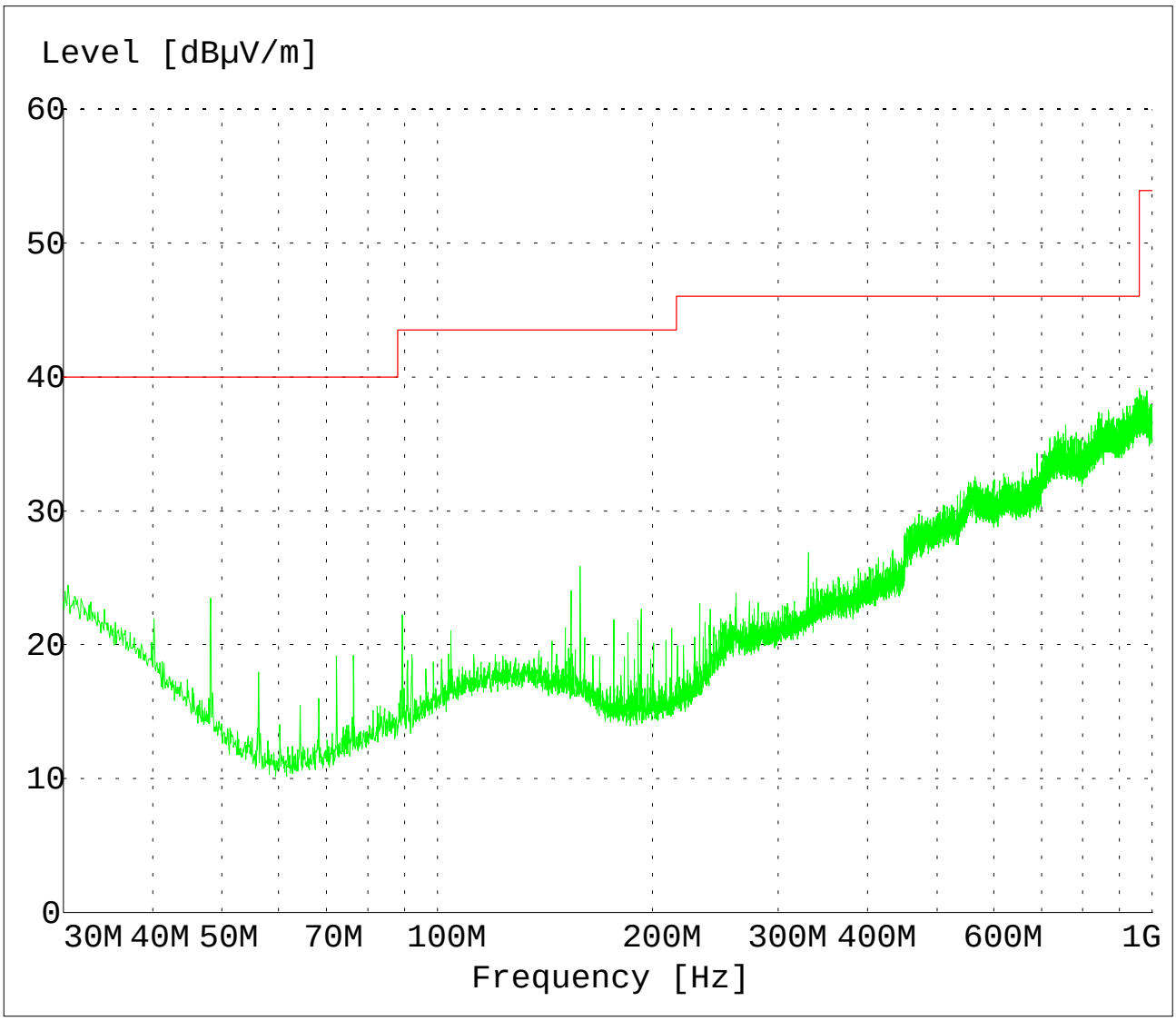

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**TEST 3.**

# RADIATED EMISSION 1000 - 5000 MHZ

***REFERENCE DOCUMENT*** FCC PART 15 subpart B

- **TEST LOCATION:** Semi-anechoic chamber
- **TEST EQUIPMENT USED FOR TEST:** Spectrum Analyzer Rodhe&Schwarz mod. FSP
  Double Ridged Guide Antenna Electro-metrics mod. EM-6961
  Log-periodica Broadband Antenna mod. HL025
- **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 : | 12÷24 Vdc | | 12 Vdc ± 3% |

***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 | |

*Subrange:*

| | | | |
|---|---|---|---|
| Start Frequency: | 1000.0 MHz | Step Size: | kHz |
| Stop Frequency: | 5000.0 MHz | Probe Transducer: | HL025 |
| Measure Time: | 0.01 sec. | | |
| IF Bandwidth: | 1000 kHz | | |
| Receiver: | FSP | | |
| 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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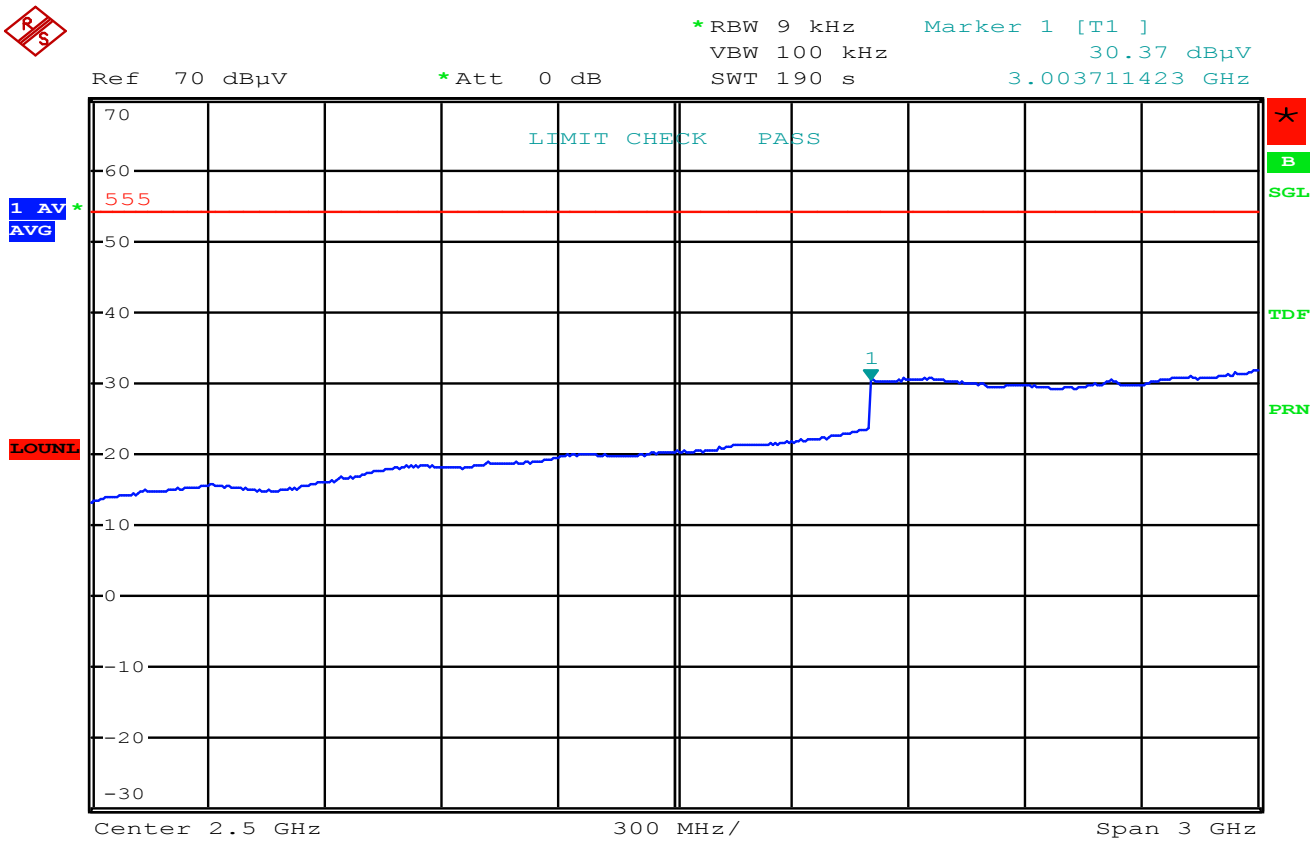


Date: 13.OCT.2003 11:35:05

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# 6. EUT TECHNICAL DOCUMENTATION

## *6.1* Wiring diagrams

| | *Document reference (n., edition, date, ...)* |
|---|---|
| ***WIRING DIAGRAM*** | WALLY4PLUS_RG10 – CF12000 30/01/03 |
| ***PART LIST*** | WALLY4PLUS_RG10 – CF12000 |

## *6.2* Technical manual

| | *Document reference (n., edition, date, ...)* |
|---|---|
| ***TECHNICAL DATA*** | 166 – Ed. 10/11/2003 |
| ***TECHNICAL CONSTRUCTION FILE*** | ********** |

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## *6.3* Photographic documentation

PHOTO N° 1 – E.U.T. IDENTIFICATION

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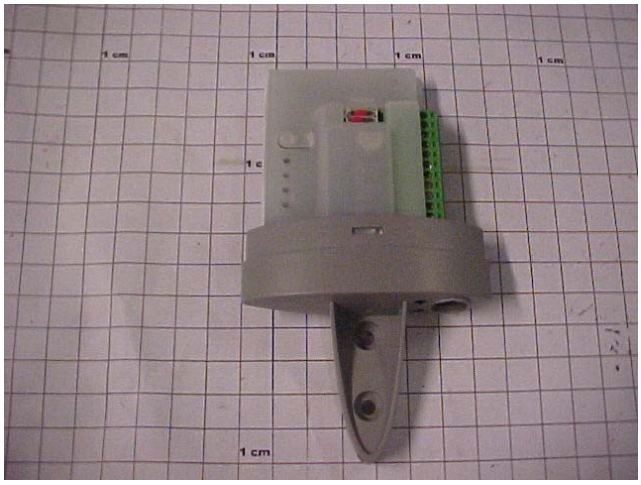
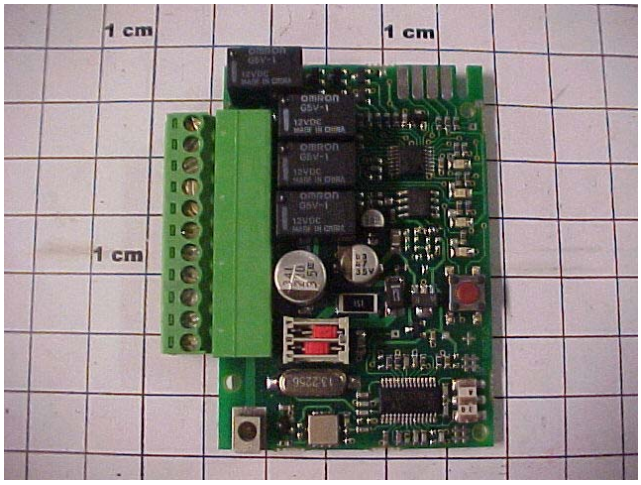
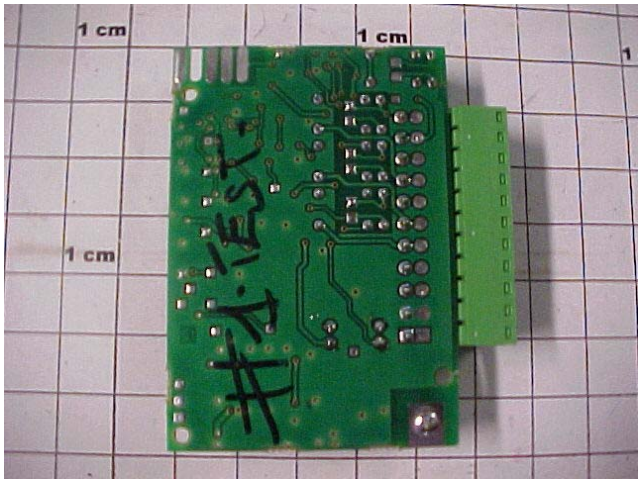
PHOTO N° 2 – INTERNAL VIEW





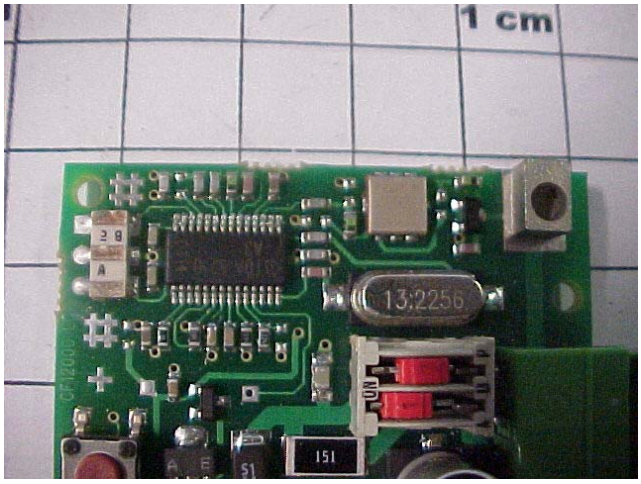



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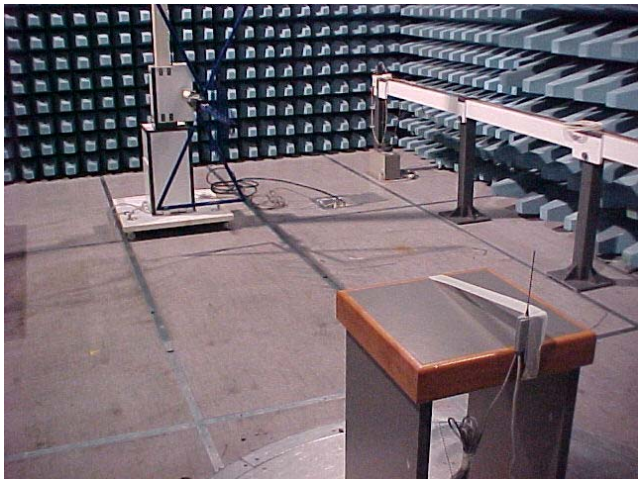
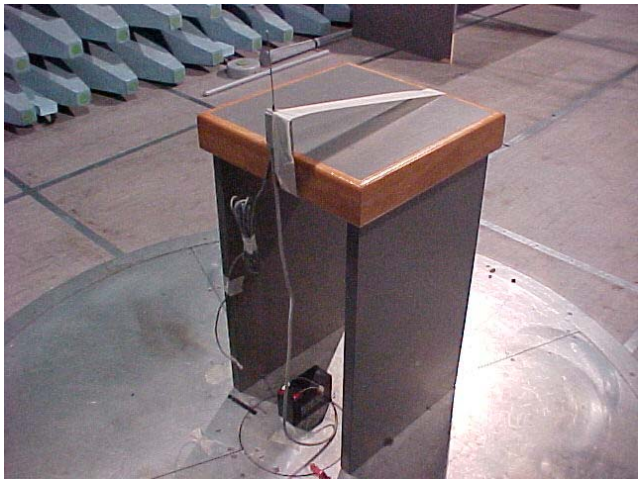
PHOTO N° 3 – SET-UP FOR EMISSION RADIATED TEST





## 7. TECHNICAL REPORT OF ANALYSIS OF DERIVED PRODUCTS

| **EQUIPMENT under ANALYSIS :** | | **BRAND NAME** |
|---|---|---|
| ***BASIC MODEL*** | **SUPERETHERODYNE RECEIVER WALLY4PLUS** | V2 ELETTRONICA |
| ***DERIVED MODELS*** | **WALLY4**<br>**WALLY2**<br>**WALLY1**<br>**WALLY4R**<br>**WALLY2R**<br>**WALLY1R**<br>**WALLY NC** | |

Prima Ricerca & Sviluppo, just on the basis of the following technical documents :

| | | |
|---|---|---|
| 1. | Wiring diagram | • WALLY4PLUS_RG10 – CF12000 30/01/03 |
| 2. | Mounting plain | • WALLY4PLUS_RG10 – CF12000 |
| 3. | PCB layout | • CF12000_AAA.pcb |
| 4. | Part list | • WALLY4PLUS_RG10 – CF12000 |
| 5. | Photographic documentation | • no documentation |
| 6. | Client declaration | • ANALYSIS OF DERIVED PRODUCT (Point 3 of Technical Construction File) |

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States as follows :

- the basic model and the derived models have the same plastic base
- the basic model and the derived models have the same Radio Receiver Module
- the basic model and the derived models have the same Dedicated Antenna
- The different between basic model and derived models are:

1. N° of outputs relay
2. Different architecture codes (differerent microcontroller firmware)
3. Only for WALLY N.C.: it's a receiver with a normally closed output contact.

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.

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