



# raditeq

## Product manual

# RadiAmp®

## Conducted Immunity Test



### Models:

RCT9400E - RCT9400D - RCT9400C - RCT9400B  
RCT9400A - RCT0250Y - RCT0250X - RCT0250A

[www.raditeq.com](http://www.raditeq.com)

## **RadiAmp® Product Manual**

This service and operating manual pertains to the RadiAmp® RF power amplifier models, that are part of the Conducted Immunity Test Bundles:

RCT9400E - RCT9400D - RCT9400C - RCT9400B  
RCT9400A - RCT0250Y - RCT0250X - RCT0250A

### **Made by Raditeq.**

Read this manual carefully before operating the product and make sure all the safety instructions are strictly followed.

For your convenience, a Quick Start Guide has been added to this product. This Quick Start Guide contains the basic start-up steps and the safety warnings.

Please keep the Quick Start Guide (and this regular manual) close at hand when you operate your new Raditeq product(s).

Please contact your local reseller if you have any questions.

## **Supplier Information**

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# Table of contents

WARNINGS & PRECAUTIONS	4
Introduction	6
Related products	6
The Conducted Immunity Test Bundle	7
Product Characteristics	7
Components	7
Rear view of the CI bundle	8
Standalone operation of the RadiAmp®	10
Operation using the RadiCentre®	10
RadiAmp® RF power graphs	11
Installation	14
Hardware Configuration	14
Software Configuration	15
RadiMation® software	15
RadiAmp® / conducted immunity bundle specifications	16
Warranty Conditions	17

## **WARNINGS & PRECAUTIONS**



Read the contents of this product manual carefully and become familiar with the safety markings, the product instructions and the handling of the system. Please refer to the applicable product manual(s) for further information regarding the operation and control of the product(s).



This product requires a protective earth connection. The mains power source for the equipment must supply an uninterrupted safety ground to the IEC input connector(s).



This equipment is designed to be used as a plug-in card for the RadiCentre® series. Do not use this card on its own or in combination with any other mainframe. Using this product with any other mainframe can cause harm and will void warranty.



To make the product as safe as possible, this plug-in card has its own safety interlock system that is designed to work with the RadiCentre® series.



Only Raditeq qualified maintenance personnel is allowed to perform maintenance and/or repair service on the equipment.



Verify that the mains voltage in your region is within the operating range of the equipment. The amplifier is equipped with a power supply that can be operated at a voltage of 100 to 240 VAC. The line fuses (2x10AT) are in the mains connection unit of the amplifier



Please make sure that (at least) one slot of 1U height is kept empty below the RadiCentre®, to ensure enough cooling of the system through the bottom air inlets of the cabinet. The temperature of the amplifiers inlet cooling air must not exceed +45°C. The outlet air temperature should be maximum 20° higher than the inlet temperature.



Please be aware that there are dangerous electric voltages by using the RadiAmp®. During open-circuit operation, the voltage at the center conductor of the output connector may exceed 50 V AC. Dangerous electric voltages are used in the instrument. Operation with open covers is only allowed for service purposes and only by qualified service personnel.



The RadiAmp® generates RF power, which can be emitted unintentionally if the operating instructions and the general safety regulations are not observed! This amplifier corresponds to rating class 1A according to VDE 0800. The AC voltage at the output is <60 Vrms. Signal or test generators with an RF power supplied via connectors and exceeding 4 W (PEP Peak Envelope Power) must be operated inside RF shielded rooms!



Please make sure that the airflow through the in- and outlets of this product are not restricted to maintain a constant temperature. The cooling system is designed to operate in the specified operating temperature range.



Position the product in such a fashion that power cables are easily accessible or connect the equipment to a mains network that can be easily disconnected from the mains.



For cleaning, use a clean, dry cloth (or a damp cloth where needed) and wipe the surface of equipment.



This product contains no hazardous substances as described in the RoHS Directive (2015/863/EU).



This product contains embedded software, which is field upgradeable from the RadiCentre® using the USB-A connection port on the backside panel of the RadiCentre®. For more information about updating your Raditeq plug-in card, please read the RadiCentre® manual.

## Introduction

The Conducted Immunity Test Bundle is a high-quality, modular based and cost-effective solution for conducted immunity testing applications in accordance with EMC-, Military- and/or Automotive standards.

The system is based on the RadiCentre® dual slot modular test system in combination with a RadiAmp® RF power amplifier. The RadiCentre® is equipped with a RadiGen® RF signal generator plug-in card and a RadiPower® BCI power meter / control plug-in card. For RF forward power measurements, a RadiPower® USB RF power meter is standard included and optionally additional RadiPower® USB power meters can be added for reflected power measurement and/or current sensing power measurement (BCI). The conducted immunity tests can be configured and controlled automatically with the RadiMation Pro EMC test software license (standard included in the Conducted Immunity Test Bundle) that also enables automated generation of EMC test reports.

## **Related products**

### [RadiMation® automated EMC/RF test software](#)



RadiMation® is the EMC software package from Raditeq B.V. RadiMation is used for remote control and automated RF and EMC testing. In Combination with the RadiCentre® the software really shines brightest and enables the user fully automated EMC and RF testing. Plug-in cards and modules and is sold separately.

### [RadiField® Electric field generator](#)



The patented RadiField® Triple A is no less than a revolution in EMC immunity testing. A complete paradigm shift involves a combination of high-level integration and a field combining technique, making several discrete components like combiner, coupler, power meters and cabling superfluous. This product is sold separately.

### [RadiSense® Electric field probe](#)



The RadiSense® Electric field probe is currently the most accurate electric field probe on the market. This probe operated from the RadiCentre® can measure from 9 kHz up to 10 GHz.

## The Conducted Immunity Test Bundle

### Product Characteristics

Flexible – The CI test bundle can be adopted to your specific CI test needs, for example by selecting the appropriate RF power amplifier and/or by adding extra power meters for reverse power and sensing can be added.

Easy to Use – By using the CI test bundle including the RadiAmp® you can easily perform CI tests. Saving time and costs. RadiMation makes it available to perform the tests automatically.

Easy to Maintain – The system is 'Plug and Play', which means that every card is automatically recognized, initialized and ready for use. The user can configure and control the system with the TFT touchscreen of the RadiCentre® (model CTR1004B). Both hardware and software updates can be done by the user, allowing for easy maintenance.

RadiCentre® Integrated – The RadiAmp® is integrated in the RadiCentre® system, which allows for easy touchscreen operation and control interfaces such as Ethernet and USB. This also allows for control by the RadiMation® software which is fully compatible with the system.

### Components

The Conducted Immunity Test Bundle with the RadiAmp® is delivered with the following items:

- The RadiCentre® modular test system model: CTR1004B
- The RadiAmp® RPA0925A-075 - or any other available model
- The RadiGen® RGN2400A - signal generator
- The RadiPower® RPR2006C (1x RadiPower standard included, extra RadiPowers optional)
- RadiMation® Pro USB License RMP3002A – Conducted immunity module + report generator
- USB cable for the RadiCentre® connection to PC
- USB cable for connection from the RadiCentre® to the RadiAmp®
- USB cable for connection from the RadiCentre to the RadiPower
- Signal cable (SMA – N-type) from RadiGen® to the RadiAmp®
- Interlock connector: ¼" stereo jack - for the RadiCentre CTR1004B
- 2x AC mains power leads (EU)
- Two sets of 19" mounting brackets
- USB stick containing the (digital) User Manual

## **Rear view of the CI bundle**

On the picture on the next page, the rear panel of the RadiAmp® and RadiCentre® is shown. From left to right the RadiCentre® is equipped with the RadiGen® signal generator and the RadiPower® BCI1004A plug in card to connect to the power meters and amplifier. Standard each RadiCentre® is equipped with a processor card providing several interfaces (USB LAN) and a power supply card with interlock connection. Please refer to the RadiCentre® manual for detailed information of all connections and operation.

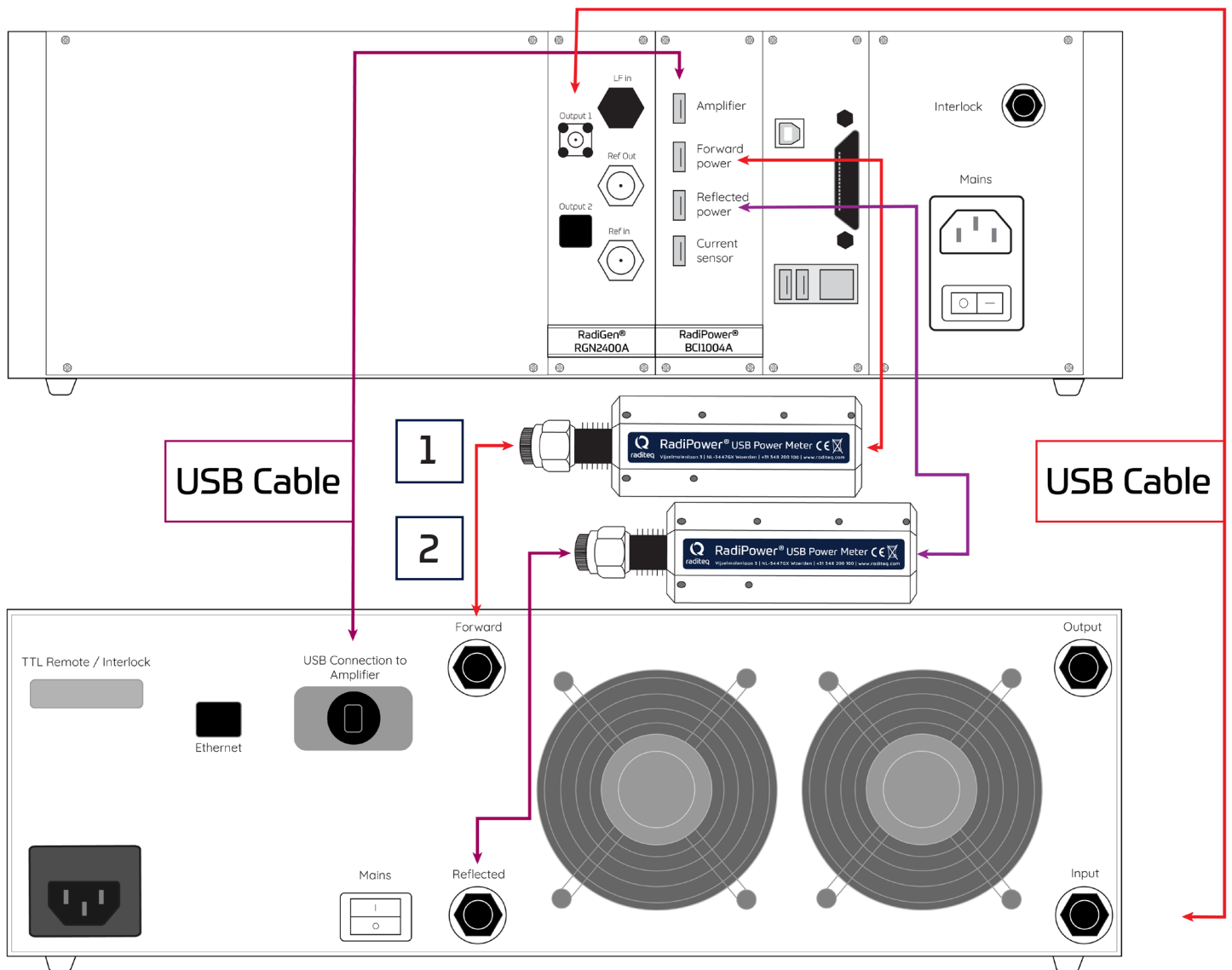
Above the green mains switch of the amplifier, a USB connector is located. Connect this USB port to the upper USB port of the RadiPower® BCI1004A plug in card marked with “Amplifier” (connection shown in blue). Use a standard USB-A to USB-B cable (supplied with the CI Bundle).

The rear panel of the amplifier is equipped with four female N-type connectors for the RF connections. On the upper right side the RF output can be found and below this connector (lower right side) is the RF input. Connect the amplifiers’ RF input to the RadiGen® RF out (connection shown in green). Connect the amplifiers’ output to your coupling device, like a CI clamp or CDN using an RF N-type cable.

On the left side, the coupler outputs are situated for direct connection to a power meter. The CI-bundle standard includes one RadiPower® (RPR2006C) power meter to measure forward power. Connect this RadiPower® to the forward power output and connect the USB cable of the RadiPower® to the Forward power port of the BCI1004A card (connection shown in yellow). The bundle can be easily extended with additional power meters to measure reflected power (shown in the above picture with the red connection) and current sensor values.

Connect the SUB-D interlock to the “TTL Remote / Interlock” connection of the amplifier. Pins 8 and 15 are used for the Interlock function of the amplifier. Short these pins for normal operation. Connect the IEC mains inlet to a mains power socket. Use the green mains switch to power on the amplifier. The switch will be illuminated if the amplifier is powered.





- 1 Standard included RadiPower® power meter in the Conducted Immunity Test Bundle
- 2 Optional extra RadiPower® power meter in the Conducted Bundle Immunity Test Bundle

## Standalone operation of the RadiAmp®

To operate the RadiAmp® manually and standalone, the remote connection the USB-cable to the RadiCentre® must be disconnected before switching 'ON' the amplifier.

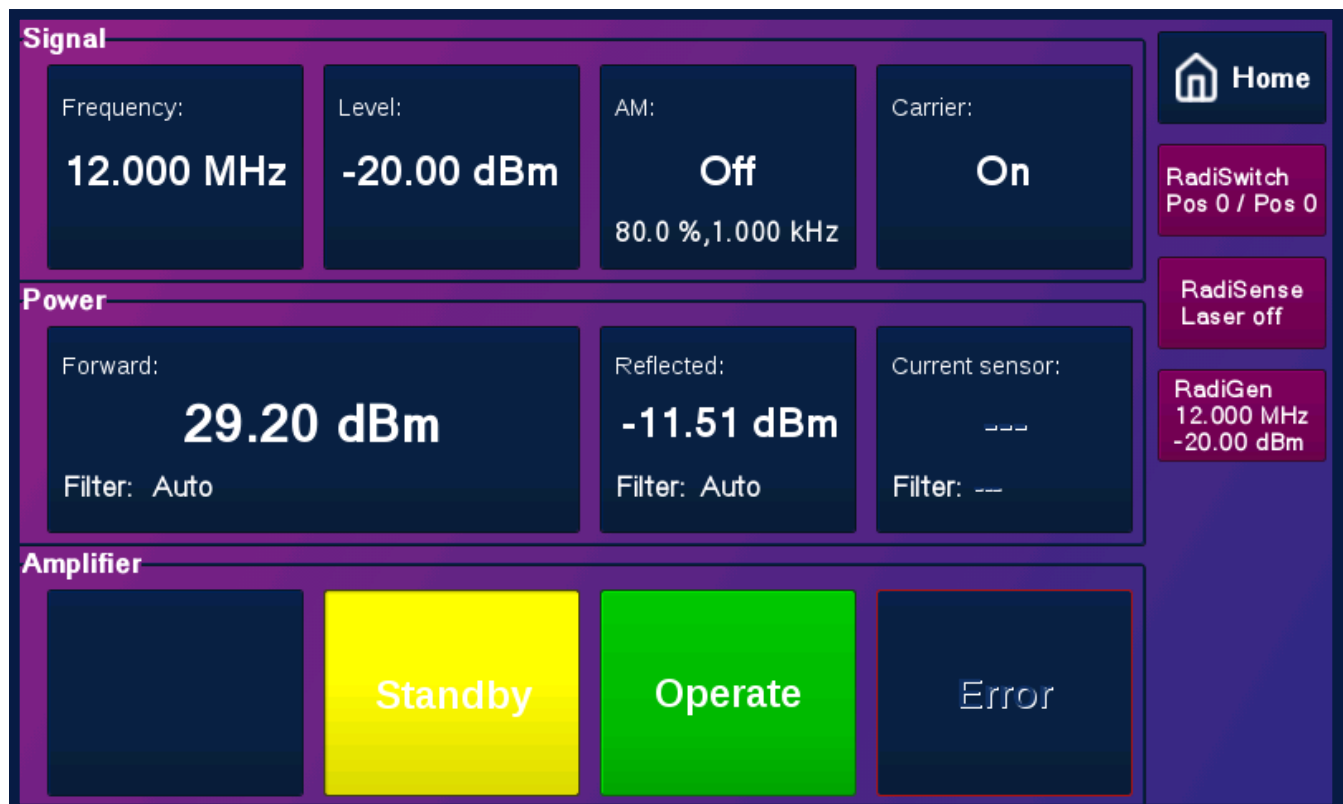
By touching the front panel the RadiAmp® will switch on, the "POWER ON" text will light up green. By default, the amplifier will be in standby mode after switching on. The "Standby" will light up green. Touching the "Operate" text (dimmed orange) will turn the amplifier to operate. The "Operate" text will be lighted green once it is on operate mode and consequently the "Standby" text will be dimmed to orange.

## Operation using the RadiCentre®

The complete CI Test bundle can be operated by the touchscreen of the RadiCentre®. For the CI Bundle a special user interface screen was designed to provide a convenient and clear overview of all key parameters.

- In the "Signal" section the settings of the RadiGen® can be controlled.
- In the "Power" section the settings of the RadiPower® can be controlled.
- In the "Amplifier" section the settings of the RadiAmp® amplifier can be controlled.

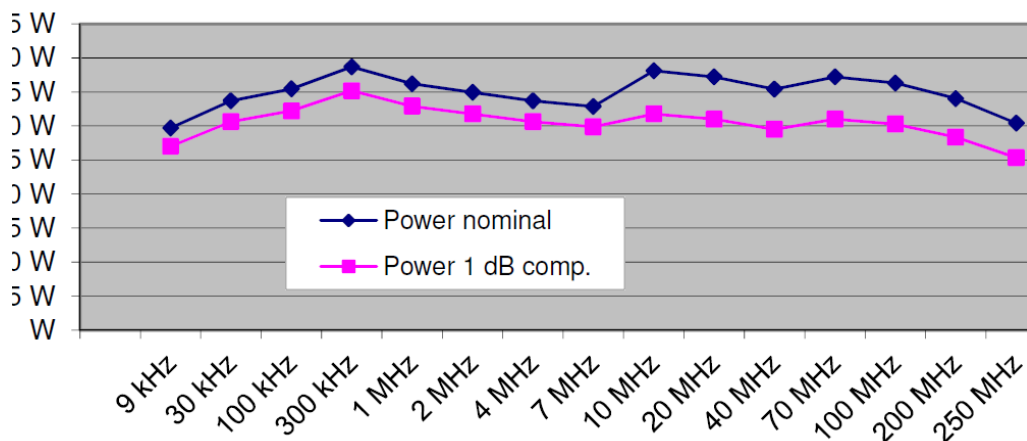
By pressing the buttons, parameters can be changed or devices can be de(activated).



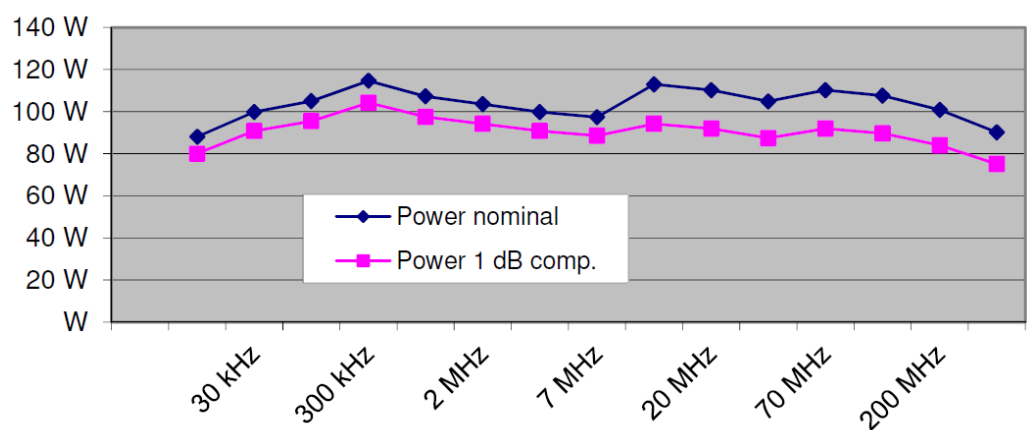
## RadiAmp® RF power graphs

The following graphs provide typical specifications of nominal output power and 1 dB compression power of the RadiAmp® RF power amplifier please note that these graphs don't represent a guaranteed performance.

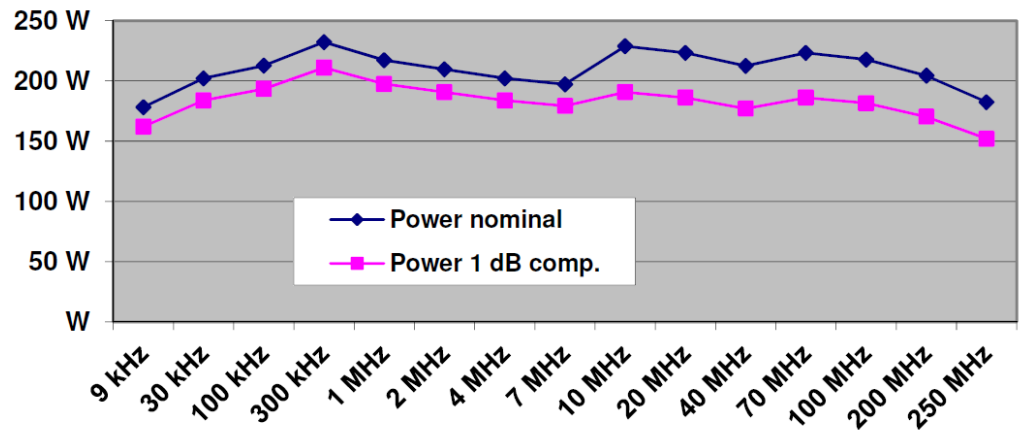
**Model RPA0925A-025 (typical power performance)**



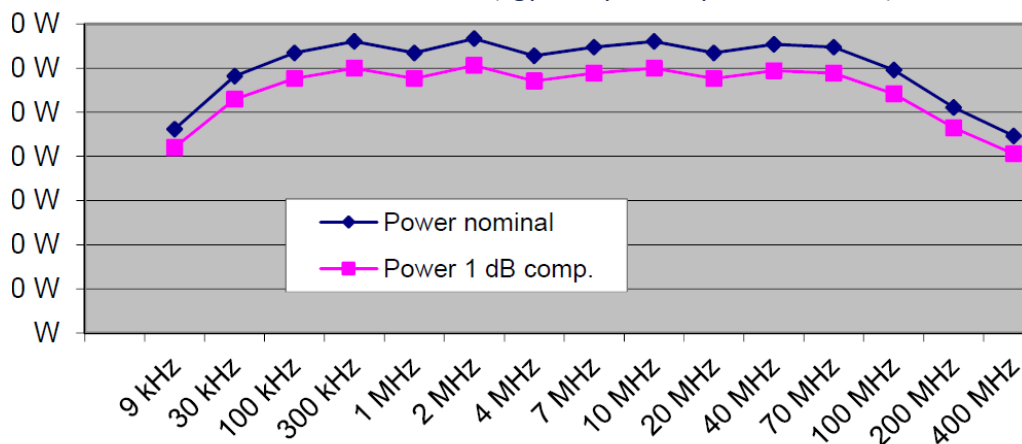
**Model RPA0925A-075 (typical power performance)**



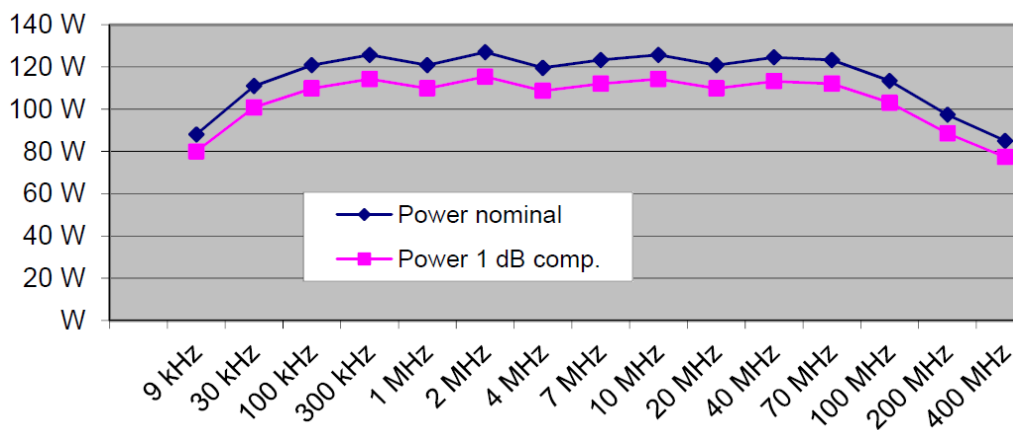
**Model RPA0925A-150 (typical power performance)**



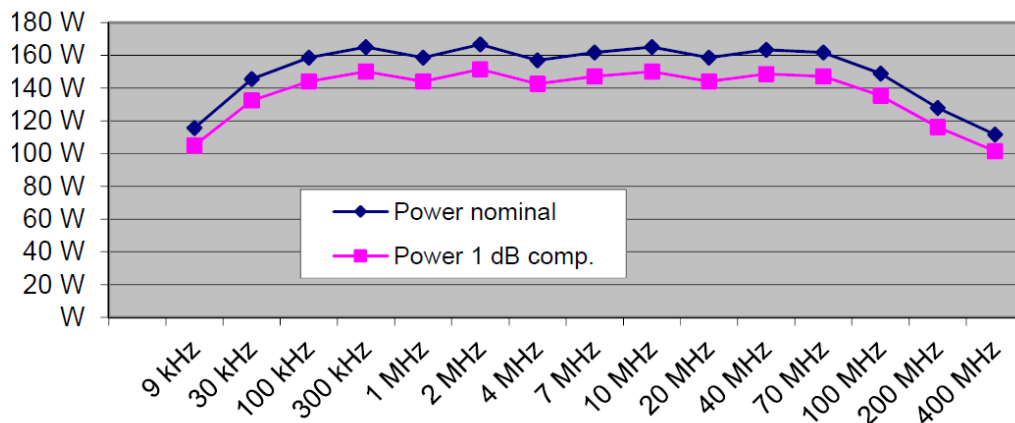
**Model RPA0940A-040 (typical power performance)**



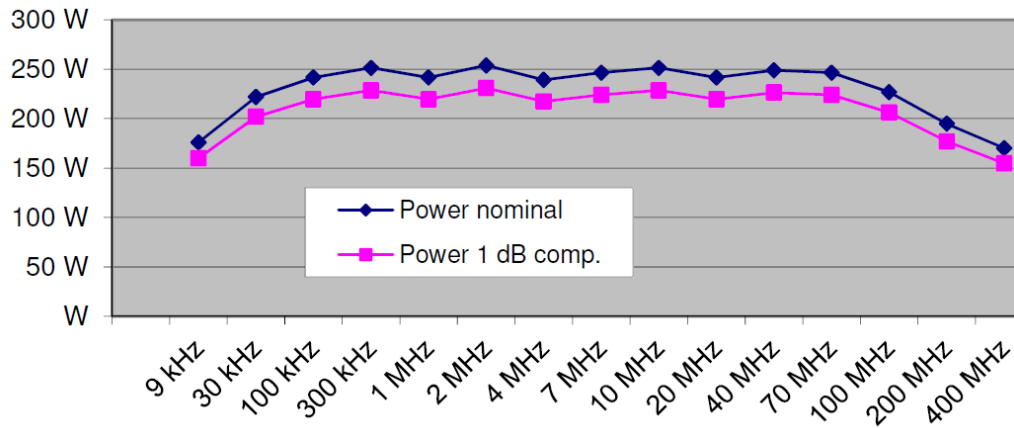
**Model RPA0940A-075 (typical power performance)**



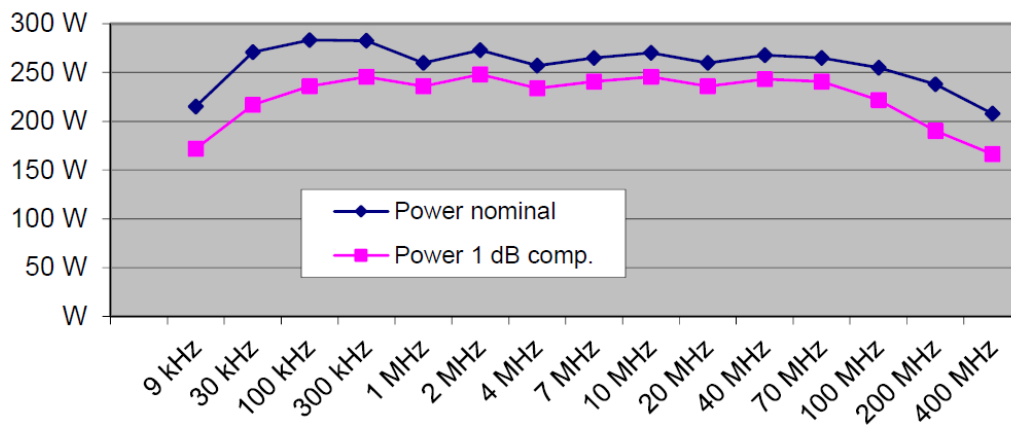
**Model RPA0940A-100 (typical power performance)**



**Model RPA0940A-150 (typical power performance)**



**Model RPA0940A-200 (typical power performance)**



## Installation

### Hardware Configuration

The hardware configuration is carried out in the following steps:

1. Make sure that all the connections to the plug-in cards are made as described
2. Make sure that the remote interlock connection of the RadiAmp® and RadiCentre® system is closed.
3. Plug the mains cords into the mains inlet of the RadiAmp® and RadiCentre® system.
4. Turn 'ON' the mains of the RadiAmp® and RadiCentre®.
5. Press (any position on) the front panel touchscreen to activate the RadiCentre®.
6. The RadiCentre® will automatically detect the installed plug-in cards and will display their controls on the display. From the touch screen you can control the RadiAmp®.
7. Connect a transducer (current clamp or CDN) to the system. This is not included in the CI-bundle.

The system is now ready to be used.

The main screen will display the slot locations and the plug-in cards located in these slots. These indications can be used to open the screens of the individual plug-in cards where the main parameters for these cards are visible.

REMINDER - In case the RadiCentre® and RadiAmp® are integrated into an 19 inch rack, please make sure that (at least) one slot of 1U height is kept empty between the RadiCentre® CTR1004B and the RadiAmp®. To allow for sufficient cooling of the system through the bottom air inlets of the cabinet.

**Software Configuration**

In order to control the RadiCentre® from a computer, one can use either custom made software or the RadiMation® EMC software package from Raditeq B.V. If the RadiCentre® is operated manually, this chapter can be skipped.

If RadiMation® software is used, select the required device driver for each plug-in card installed in the RadiCentre®.

Example – For the Conducted Immunity Test Bundle with a RGN2400A and BCI1004A plug-in card, the following drivers must be configured in RadiMation®:

- One device driver for the RadiAmp® / RadiCentre®, to control the amplifier.
  - One device driver for the RadiGen® / RadiCentre®, to control the generator
  - One device driver for the RadiPower® / RadiCentre®, to control the forward power meter
- 
- when additional power meters are used for reflected or sensing power, these drivers should be configured as well.

**RadiMation® software**

The following is an example with regards to the configuration of RadiMation® software used to remote control the devices in your RadiCentre®. Please consult your RadiMation® software manual for more information.

1. Configure a device driver and select the correct communication port.
2. In the 'equipment list' that you are using, select the correct driver.
3. Open a Test Set-up File (TSF) and click on the 'Inputs' button. Select the power meter to be used.
4. Save the TSF.

The Conducted Immunity Test Bundle is now ready to be used in the RadiMation® software.

## RadiAmp® / conducted immunity bundle specifications

RadiAmp® Model - RPA0925A-025	
Frequency range	9 kHz to 250 MHz
Output power, CW	25 W minimum
Input power	0 dBm (for nominal power)
Gain	46 dB typical
Spurious (at Pn)	-50 dBc typical
Monitoring outputs	-50 dB
Weight	15 kg
Height	3 HU
RadiCentre® Model - CTR1004B	
Number of free slots for plug-in card	2 (both occupied for CI bundle)
Display	7" TFT / WVGA
Backplane	Intelligent versatile back plane
Dimension	3 HU, 19" system
Weight	7 kg
Interface	USB, LAN
RadiGen® Model - RGN2400A	
Frequency range	9 kHz – 400 MHz
Output level	-70 dBm to +13 dBm (+7 dBm with AM is applied)
Output settling time	< 1 ms
Output connector	SMA
Modulation types	CW, AM, FM, Pulse and gated pulse
Frequency error	1 ppm/year
Frequency resolution	1 Hz
RadiPower® Model - RPR2006C	
Frequency range	9 kHz to 6 GHz
Measurement function	CW power
Power measuring range	-55 dBm to + 10 dBm
Input damage level	> +20 dBm
Maximum SWR	1.05 @ below 100 MHz
Frequency response accuracy	± 0.25 dB
Measuring speed	20 kSps, 100 kSps or 1 MSps
RadiMation® Pro - RMP3002A	
USB License	Conducted immunity module + report generator
Support/upgrade service	2 years support included



## Warranty Conditions

Raditeq B.V. offers a standard warranty term of three (3) years on their products, calculated from the shipping date, under the condition that the product is registered on [www.raditeq.com](http://www.raditeq.com). For registration of the product, the customer should provide the product model, serial number and the responsible reseller (if applicable). If the product is not registered, a limited warranty term of one (1) year will be applicable.

## Return Material Authorization (RMA) & Warranty repair

If a defect occurs to our product within the warranty term, a Return Material Authorization (RMA) 'Warranty Repair' request can be issued using the RMA link at [www.raditeq.com/support](http://www.raditeq.com/support). Upon receipt of the request, an RMA number will be provided. Please do not send the product without this RMA number! The defective product should be shipped to our service department at the following address:

Raditeq B.V. – Service Department  
Vijzelmolenlaan 3  
3447GX WOERDEN  
The Netherlands

There will be no charge for repair services (materials or labour) within the (extended) warranty term.  
These warranty terms are not applicable to:

- Normal wear and tear
- Fibre optic cables
- Products that have been improperly used
- Products that have been used outside their specified range
- Products that have been improperly installed and/or maintained
- Products that have been modified without approval of Raditeq
- Calibration and/or re-calibration of the product

Repair services on products that are not covered by the Raditeq warranty will be charged to the customer.

## Repairs outside warranty

If a defect is not covered under warranty, an RMA fixed-repair can be ordered on the RMA link: [www.raditeq.com/support](http://www.raditeq.com/support). If a re-calibration is needed after repair, this calibration should be ordered separately. The calibration will be performed at the ISO17025 accredited calibration laboratories of DARE!! Calibrations, based on the applicable service code / prices.

## Warranty after repair

For repairs outside the original warranty period, a limited warranty of six months is applicable on the performed repair. Shipping conditions are the same as with repairs that are covered within the original warranty period.

## Shipping

The customer will need to arrange shipping and cover for the costs (like e.g. transportation costs, duties, taxes) for sending the defect product the service department of Raditeq in The Netherlands. Raditeq will arrange the courier and cover for the costs for the return shipment after repair.

## EU Declaration of Conformity

We

**Raditeq B.V.**

of

Vijzelmolenlaan 3  
NL-3447GX Woerden  
The Netherlands

declare under our sole responsibility that the

**Product:** RadiAmp®  
**models:** RPA0925A-025 | RPA0925A-075 | RPA0901A-050

are in accordance with the European directives:

**EMC Directive 2014/30/EU**  
**Low Voltage Directive 2015/35/EU**  
**RoHS Directive: 2011/65/EG**

per the provisions of the applicable requirements of the following harmonized standards:

**Emission:** EN 61326-1:2013, Class A1  
Electrical equipment for measurement, control and laboratory use.

**Immunity:** EN 61326-1:2013, Industrial level, performance criteria A  
Electrical equipment for measurement, control and laboratory use.

**Safety:** EN 61010-1:2010, Safety requirements for electrical equipment  
for measurement, control, and laboratory use

**The technical construction files are maintained at the adress specified above.**

**Date of issue:** 09/06/21  
**Place of issue:** Woerden, the Netherlands  
**Authorized by:** P.W.J. Dijkstra  
**Title of authority:** Director



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