

- Detect EMC problems before the test lab does
- Repetitive and consistent measurements enables easy comparative measurements between design alternatives
- Save time and money by avoiding revisits to the expensive accredited Test lab
- Improve quality of your design, by eliminating internal EMI hot spots
- Powerful visualization of EMI sources, for any frequency, in the powerful and easy-to-use EMC SW
- Scan in step sizes down to 1 mm in 3D, for frequencies up to 10 GHz with Pendulum probe kits
- Heat scanning included to analyze hot spots in the design



The Pendulum/Detectus RSE series of EMC-Scanners are powerful pre-compliance tools for measurement and analysis of Electromagnetic Interference (EMI). The models in the RSE series feature repetitive high-resolution 3D scanning of radiation and heat, down to 1mm steps, and up to 10 GHz frequency range, with an outstanding easy-to-use scanning SW for visualization and documentation.

**Detect your EMC noise sources early during development, while the cost for remedy still is low!**

## World leading Detectus EMC-Scanners are now Pendulum

The Swedish company Detectus is a world-leading supplier of EMC-Scanner products, since the 1990's. As from July 2020, the Detectus company is an integral part of Pendulum Instruments.

## Advantages of an EMC scanner

### In R&D

Using the EMC-Scanner during the early stages of design enables you to detect potential emission problems before they become integrated into the product and expensive to correct.

If a product has failed a test at a test house, normally you only learn which frequency failed, not the location of the noise source.

The EMC-Scanner can help you find the source, and repeated measurements while redesigning your product helps you lower the emission levels.

You can compare different design solutions and make comparative measurements of electromagnetic emissions.

### In Q&A

The EMC-Scanner can help you maintain a high quality in the production line. You can make measurements on samples from the production line and easily compare them with a reference. That way you can make sure that, for example, a change of supplier of a component doesn't affect the emission spectra in a negative way.

## How do you perform EMC-scanning?

A complete scanner system consists of the EMC-Scanner Hardware package, the Detectus Scanning SW (DSS), a Spectrum Analyzer and a PC to run the scanner SW. Pendulum Instruments can supply everything if required, but normally the user already possesses a PC and a Spectrum Analyzer.

The test object is put on the coordinate board and a small near field probe is moved in a controlled and repetitive path above the test object, registering the field strength. The probe output signal in every position is measured by the Spectrum Analyzer, and transferred to the scanner SW. The smart SW combines the spatial information (X,Y,Z) with the spectrum in that position, and presents detailed results.

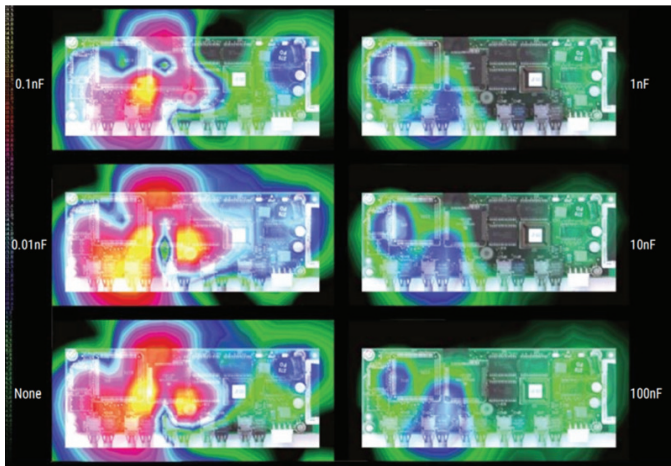
## Drivers for almost all Spectrum Analyzers

Pendulum/Detectus has a SW driver library with hundreds of Spectrum Analyzers models for all major manufacturers, from the 1980s HP analyzers to the most modern Analyzers. When a new Spectrum Analyzer model is introduced, we quickly create a driver, provided they have a VISA compatible communication port (GPIB, USB or LAN) for remote control.

Your investment in a Detectus EMC-Scanner is safeguarded, even if you upgrade your Spectrum Analyzer to a newer model.

## Now you can SEE high frequency electromagnetic fields

You can measure the intensity and the location of a radiation source at a component level. The results of such a measurement can be shown as two or three dimensional coloured maps. The measurements can easily be repeated creating objective, comparative measurement results.

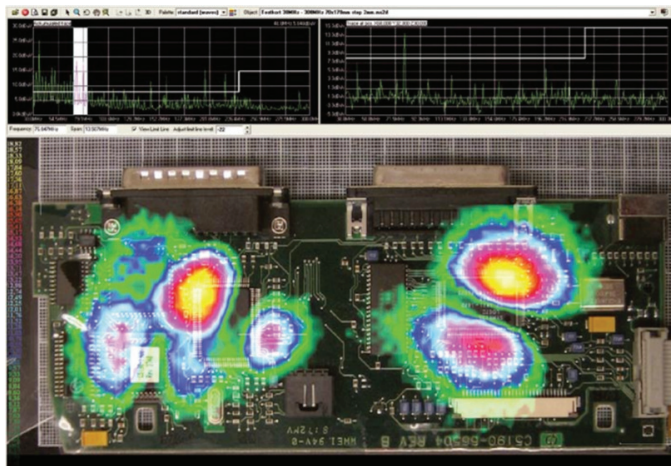


Comparative measurements of EMI for 6 de-coupling alternatives

## MultiScan

The MultiScan measurement enables field plots from any frequency within the measured wide band span. This powerful feature gives a huge amount of information.

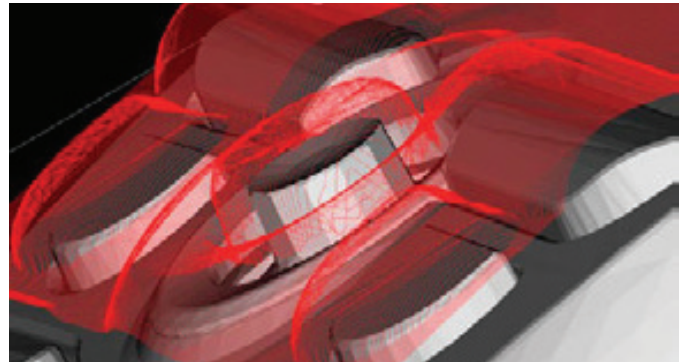
In the screen dump below, the main part of the screen shows the field plot of the frequency selected in the top left graph. The upper right graph shows the spectrum from a user selectable position.



MultiScan measurement. The top left graph shows the accumulated trace (a max hold spectrum of all measuring points). The top right graph shows the wide band spectrum from a user selectable spot on the field plot.

## Import 3D surface models

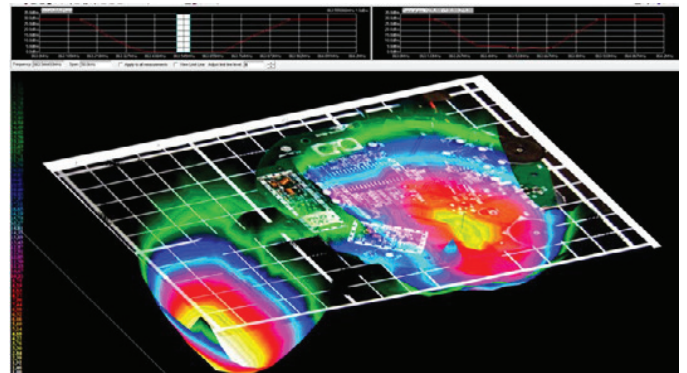
You can import 3D surface models in STL file format and create measuring points that follow the surface at a fixed distance. 3D surface models can easily be aligned to the measurement using the 3-point alignment feature.



## Immunity software option

The patented Immunity software option allows you to use a Detectus EMC-Scanner system, a signal generator with a small antenna and an Error Detection Device (EDD) with a communication interface to measure the immunity against radiated electromagnetic interference of components, cables, PCB's and products. The measurements are easily interpreted and can be repeated for objective comparison.

During measurement the EMC-scanner moves the antenna to predetermined measuring positions above the test object. In each position the signal generator sweeps in frequency and amplitude while the EDD measures for test object failure. You can also test immunity for modulated signals like FM, AM and Pulse.



The Scanner SW can produce two or three dimensional color maps showing sensitive hot spots at any frequency plus printable reports.

## Leading Performance from the Detectus designers

- With 1 mm step size of the scanner, you can pinpoint emission sources in densely packed designs. You can in parallel pinpoint temperature hot spots
- You can scan emissions up to 10 GHz, with the standard Pendulum Probe kits. If the user has near field probes going up to higher frequencies, e.g. 70 GHz, then these can easily be attached and used for EMC-scanning. The SW has no limits, but you must of course use a Spectrum Analyzer that support the frequency range.
- Within the Detectus RSE series you can choose from various sizes, to fit most test objects. The scan table comes in three basic sizes (WxDxH):
  - 300x200x100 mm (3D)
  - 600x400x200 mm (3D)
  - 600x400x400 mm (3D)

## Strip line calibration

The strip line calibration option enables you to accurately measure the field strength of the magnetic near field and to compare measurements made with different probes and setups.



The probe calibration uses a well defined strip line board and a spectrum analyzer with built in tracking generator to automatically generate probe correction factors in the Scanner Software, to compensate for imperfections in probes, cables, connectors and pre-amp.

The calibration procedure only takes a few minutes and is very easy to perform. A step-by-step wizard includes detailed instructions on how to connect everything and setup the calibration measurement. Calibration can be made on any magnetic near field probe and covers a frequency range from 10 MHz to 6 GHz

## Probe & Pre-amplifier kit to 10 GHz

The EMC-Scanners come upon delivery with a probe set to either 3 or 6 GHz. There is an optional extension to 10 GHz, that could easily be retrofitted.

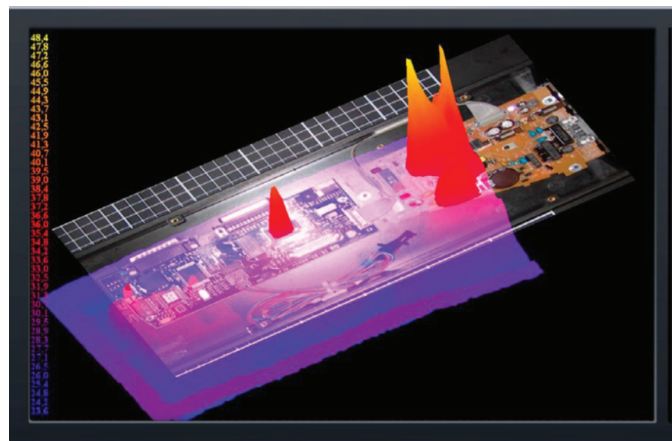


The standard probe sets contain:

- E-field 30MHz to 3/6GHz
- Vert. H-field, 30MHz to 3/6GHz
- Horiz. H-field, 30MHz to 3/6GHz
- Vert. H-field, 9kHz to 50MHz
- Pre-amplifier to 3/6 GHz

## Measure temperature

The heat scanner feature in the RSE series is a high-resolution measuring system for anyone wishing to measure temperature accurately. The measurements are presented graphically as either two or three dimensional colored maps.



The system's 16 bits digital resolution, the software's optimization method as well as the ability to adjust offset and emission factors result in high resolution measurements. The system gives you the possibility to localize small heat sources such as surface mounted components.

The Heat-Scanner is included in the EMC Scanner product!

Why heat scanner?

- You can increase your product's life time by optimizing design taking consideration to temperature.
- You see the heat spreads out at detail level.
- You can detect heat problems early in the design stage.
- You can make comparative measurements quickly and easily.
- You can increase quality by comparing products under production through measurement of a properly functioning master.
- You can measure and document the temperature over a period of time.
- You can subtract one measurement from another to be able to see the difference between two products more clearly.



## Near-field probe kits

All probe kits contain 4 probes and a pre-amplifier. The probe kits for 3 GHz and 6 GHz are standardly included in the product packages RSE-xxx/3G respectively RSE-xxx/6G.

The probe upgrade kits for 10 GHz are purchased as an upgrade option

### 3 GHz probe kit

**LF-B 3:** Vertical H-field 9 kHz - 50 MHz  
**RF-B 0.3-3:** Vertical H-field 30 MHz - 3 GHz  
**RF-R 0.3-3:** Horizontal H-field 30 MHz - 3 GHz  
**RF-E 03:** Vertical E-field 30 MHz - 3 GHz  
**PA 303 Preamplifier:** 30 dB to 3 GHz

### 6 GHz probe kit

**LF-B 3:** Vertical H-field 9 kHz - 50 MHz  
**XF-B 3-1:** Vertical H-field 30 MHz - 6 GHz  
**XF-R 3-1:** Horizontal H-field 30 MHz - 6 GHz  
**XF-E 04s:** Vertical E-field 30 MHz - 6 GHz  
**PA 306 Preamplifier:** 30 dB to 10 GHz

### 10 GHz upgrade kit from 3 GHz (option S310)

**SX-B 3-1:** Vertical H-field 1 GHz - 10 GHz  
**SX-R 3-1:** Horizontal H-field 1 GHz - 10 GHz  
**SX-E 05:** Vertical E-field 1 GHz - 10 GHz  
**PA 306 Preamplifier:** 30 dB to 10 GHz

### 10 GHz upgrade kit from 6 GHz (option S610)

**SX-B 3-1:** Vertical H-field 1 GHz - 10 GHz  
**SX-R 3-1:** Horizontal H-field 1 GHz - 10 GHz  
**SX-E 05:** Vertical E-field 1 GHz - 10 GHz

## Coordinate table

**Step size (X, Y, Z):** down to 1 mm

**Position accuracy:** ±0.3 mm

**Scan area (X, Y, Z):**

**RSE-321:** 300x200x100 mm

**RSE-642:** 600x400x200 mm

**RSE-644:** 600x400x400 mm (Note: Z-axis scan movement is 200 mm inside a 400 mm range)

**Speed:** Scans an area of 200 x 200 mm with a step size of 10 mm in 10 min

## Temperature scanner

**Temperature range:** 0 - 150 °C

**Resolution:** +/- 0.3 °C

**Measuring spot:** 6 mm diameter at a distance of 200 mm.

**Response time:** 500 ms

**Emission ratio:** 0.1 - 1.2

**Spectral response:** 8 - 14 µm

## Rear Panel Inputs and Outputs

**RS232 port:** D-Sub 9 pole female

**Ethernet port:** RJ45, 10/100 Mbps

## Scanner Software

**System requirements:** Runs on Windows operating systems. Requires Windows 10

**Spectrum Analyzers supported:** Most models with a VISA-compatible communication interface (RS232, USB, GPIB\*, LAN). A list of 100+ models is available at the Pendulum Instruments web site  
*\* requires National Instruments GPIB adapter in PC*

## Calibration of probe frequency response

**Mode:** Semi-automatic procedure using the strip line calibration option, and the control SW in option SPCK

## General Specifications

### Environmental Data

**Operating Temp:** +10°C to +35°C

**Storage Temp:** -40°C to +71°C

**Humidity:** 20% to 80% (+10°C to +35°C)

**Safety:** Complies with relevant EN standards, CE

**EMC:** Complies with relevant FCC and EN standards, CE

### Power Requirements

**Line Voltage:** 110 or 230 Vrms, -15%, +10%Line

**Frequency:** 50/60 Hz

**Power consumption:** <30 W (operating), <25 W (stand-by)

### Dimensions and Weight

**Width x Height x Depth:**

**RSE-321:** 620x400x550 mm (24x16x22 in)

**RSE-642:** 920x600x750 mm (36x24x30 in)

**RSE-644:** 920x600x950 mm (36x24x37 in)

**Net Weight:**

**RSE-321:** 20 kg (44 lbs)

**RSE-642:** 27 kg (59 lbs) **RSE-644:** 35 kg (77 lbs)

**Shipping Weight (incl. pallet):**

**RSE-321:** 40 kg (88 lbs)

**RSE-642:** 75 kg (165 lbs)

**RSE-644:** 80 kg (176 lbs)

## Ordering Information

### Basic Models

**RSE-321/3G, RSE-321/6G:** EMC and heat scanner system including probe kit for either 3 GHz or 6 GHz. Test object size and scan area: 300x200x100 mm

**Included with Instrument:** 2 years product warranty\*, line cord, Scanner SW and user documentation on USB stick, and Certificate of Conformity

**RSE-642/3G, RSE-642/6G:** EMC and heat scanner system including probe kit for either 3 GHz or 6 GHz. Test object size and scan area: 600x400x200 mm

**Included with Instrument:** 2 years product warranty\*, line cord, Scanner SW and user documentation on USB stick, and Certificate of Conformity

**RSE-644/3G, RSE-644/6G:** EMC and heat scanner system including probe kit for either 3 GHz or 6 GHz. Test object size: 600x400x400. Scan area: 600x400x200 mm

**Included with Instrument:** 2 years product warranty\*, line cord, Scanner SW and user documentation on USB stick, and Certificate of Conformity

*\* The warranty period may be extended to 3 years by registering the product on Pendulum Instrument's web page.*

### Build-in Options

**Option S310:** 10 GHz upgrade probe kit for 3 GHz systems

**Option S610:** 10 GHz upgrade probe kit for 6 GHz systems

**Option SSW:** SW for immunity measurements

**Option SUSU:** Subscription of Scanner SW updates one year

### Optional Accessories

**Option SPCK:** Probe calibration kit incl. strip line, 50 ohm termination and SW

**Option SNSA:** N-male to SMA-female adapter

**Option RSA-R306B:** Spectrum Analyzer RSA R306B from Tektronix, USB instrument, 9 kHz to 6.2 GHz

### Order numbers:

The EMC-Scanners are ordered using the following system:

**RSE-xxx/yG/zzzV**

xxx = model name; 321, 642 or 644

y = Frequency bandwidth in GHz; 3 or 6

zzz = line voltage in Volt; 110 or 230

### Examples

RSE-321/3G/230V

RSE-642/6G/230V

RSE-644/3G/110V

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