The background

There are high demands for electromagnetic compatibility (EMC) of electronic products. The demands are stated in different set of rules, for example: VCCI, ANSI, CISPR, FCC and VDE. These demands are specified for products or systems and not for components or elements. The fact that there is no easy way to find the exact location of a radiating source is a problem for designers today.

Detectus AB has developed several measuring systems with which designers 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.

Seeing high frequencies!

Now you can SEE high frequency electromagnetic fields.
Visual noise detection
The patented EMC-Scanner measures the emission from components, cables, PCB's and products. The system consists of an X-Y-Z robot, a spectrum analyzer with near field probe and a standard PC with custom software and a GPIB card or similar for communicating with the spectrum analyzer. During measurement the near field probe is moved by the robot to predetermined measuring points above the test object.

Objective comparative measurements
One of the most useful features of the EMC-Scanner system is that it enables you to make truly objective comparative measurements. Above, you can see an example of comparative measurements. The six measurements show the same test object and the same frequency. The difference is the value of the de-coupling capacitor of one IC.

Ease of use
Earlier emission measurements had to be made by specialists. With the EMC-Scanner anyone can make a measurement and draw conclusions from the informative and easily interpreted reports. You do not even need to have access to a screened room to make the measurements. The software runs in Windows on a standard PC and is intuitive and user-friendly. Since the system is configurable for most modern spectrum analyzers, you can use your own and do not have to purchase a new one.

MultiScan
The MultiScan measurement enables you to generate field plots from any frequency within the measured wide band span. This powerful feature is a major improvement and it gives an enormous amount of information. Looking at the screen shot above, 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 spectra from a user selectable position.
Import 3D surface models
Now 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.

Calibrate to beacon
The Scanner tables of the HRE-series scanners are equipped with beacons for automatic and accurate probe calibration. Calibrating the probe using the electric center point gives a higher accuracy than calibrating using the mechanical center point.

What do I get...
The HRE-Scanner comes with a set of four specially selected near field probes, a 30 dB pre-amplifier and RF cables.

Technical data
Accuracy: ±/− 0.02 mm
Min step size: 0.025 mm
Line voltage: 115 or 230V, 50 or 60 Hz
Power consumption: 1150 W
Control: Ethernet, RS-232 or USB to RS-232 adapter
Software: Runs on Windows XP or later. (32- and 64-bit)
Also runs on Mac using BootCamp

Modell: HRE-1 HRE-3

<table>
<thead>
<tr>
<th>Measurable volume (mm³)</th>
<th>190×140×80</th>
<th>390×290×130</th>
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<tbody>
<tr>
<td>Size (w/h/d in mm)</td>
<td>535×690×600</td>
<td>780×850×810</td>
</tr>
<tr>
<td>Weight:</td>
<td>96 kg</td>
<td>125 kg</td>
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</tbody>
</table>

A complete system
To complete the Scanner system you would need a PC and a spectrum analyzer. Depending on your choice of spectrum analyzer you may also need an National Instruments GPIB adapter.

The probe set contains:
- RF-E 0.3 E-field 30MHz-3GHz
- RF-B 0.3 Vert. H-field, 30MHz-3GHz
- RF-B 0.2-3 Horiz. H-field, 30MHz-9GHz
- LF-B 8 Vert. H-field, 9kHz-50MHz

6GHz versions of the RF-probes are also available.
Design
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 know which frequency failed. You don’t get to know the location of the source.

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

Why the EMC-scanner

You can save time and money by reducing your need for expensive and time consuming full scale measurements.

You can make comparative measurements to document the effect of a change in design.

You can maintain a high quality in the production line by measuring samples and comparing them to a reference.

You can subtract one measurement from another to remove ambient noise or to be able to see the difference between two products more clearly.

You can use your own instruments.

You can see the emission at components level.

Early in the design phase you can detect potential emission problems.

You do not have to know what frequencies you are looking for thanks to the Pre-Scan and MultiScan functions.

You can easily document (ISO 900x) the emission spectra of your products in both design and production phase.

Q&A tool
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.
IC measurement option

The high resolution real time inspection camera shows a microscopic view of the probe tip and the test object. The resolution of the image is better than 10μm/pixel.

The IC-option allows you to:
- Define your measuring path very accurately.
- Examine measurement result with accuracy and confidence.
- Use the special high resolution near field probes to take full advantage of the HRE-Scanners 25μm resolution.
- Zoom in and see details beyond the capability of the naked eye.

The IC-option includes:
- A real time inspection camera with 10 μm resolution and digital zoom.
- Mounting for high resolution near field probes.
- LED lighting.
- Software features for zoom, pan and screen shot.

Please note. Probes are sold separately.

Probe options

To complete the IC-option there are three high resolution probes to choose from: electric, magnetic with horizontal loop and magnetic with vertical loop. The probes has a built in preamplifier and are equipped with special mounting details to fit the IC-option.

Please note.
There are several other ICR type probes in different sizes and frequency ranges available. Please ask your local Detectus representative for more information.
Visual Immunity test
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) to measure the immunity against radiated electromagnetic interference of components, cables, PCBs and products. The measurements are easily interpreted and can be repeated for objective comparison.

Measurements and reports
From an Immunity Scan measurement the DSS software can produce two or three dimensional colour maps showing sensitive hot spots at any frequency. Also printable reports can be generated. The reports include the colour map, graphs and all the measurement settings.

The measuring procedure
During measurement the EMC-scanner moves the antenna to predetermined measuring positions above the test object. In each measuring position the signal generator sweeps in frequency and amplitude while the EDD measures for test object failure. If your signal generator allows it, you can also use different modulations such as FM, AM and Pulse.

The measuring procedure
The Error Detection Device can be any type of GPIB or VISA controllable instrument that measures a value from the test object to determine when the test object fails. The EDD can for example be a voltmeter or a protocol tester.

Immunity option

HRE 4-axis option
The HRE4x-series of Scanners are exactly like the HREx-series with the addition of a device for automatic rotation around the probe axis. During measurement the Scanner will rotate the probe and find the “worst case” angle and then storing the amplitude. This procedure is performed in every measuring position. The probe can be setup to rotate in steps down to one degree. The ability to rotate the probe means that you no longer have to worry about missing sources of radiation due to the fact that your probe has different sensitivity in different angles. It will also enable you to more easily follow cables, traces on PCBs and even bonding wires in a chip.
Options

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

Calibration procedure
The calibration procedure only takes a few minutes and is very easy to perform. Just follow the step-by-step wizard. The 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.

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