



Rev 1.7
02.08.2011

Low cost EMF Spectrum Analyzer Series SPECTRAN® 10xx

Cost-effective, easy-to-use LF measurement unit for the novice



Product of the year 2009

Our 3D magnetic-field measurement coil with homogeneous centre won the **first price** of Europe's biggest electronic newspaper "Elektronik" at the category passive components.

This coil is installed in each NF-Spectran unit.



AARONIA AG
WWW.AARONIA.DE

Made in Germany

Specifications

SPECTRAN® NF-1010 (10Hz to 2kHz)

- ◆ Frequency range: 10Hz to 2kHz*
- ◆ Typ. level range E-Field: 1V/m to 2.000 V/m*
- ◆ Typ. level range H-Field: 10nT to 100.000nT*
- ◆ Typ. precision: 5% *
- ◆ Easy to use
- ◆ Superfast FFT spectrum analysis
- ◆ High-performance DSP (Digital Signal Processor)
- ◆ 3D magnetic field measurement
- ◆ Frequency and signal strength display!
- ◆ High-resolution multi-function display
- ◆ Incl. battery, charger & aluminum transportcase
- ◆ Dimensions (L/W/D): (260x86x23) mm
- ◆ Weight: 420gr
- ◆ **Warranty: 10 years**

SPECTRAN® NF-1010E (10Hz to 10kHz)

- ◆ Frequency range: 10Hz to **10kHz***
- ◆ Typ. level range E-Field: 1V/m to 2.000 V/m*
- ◆ Typ. level range H-Field: 10nT to 100.000nT*
- ◆ Typ. precision: 5% *
- ◆ REALTIME FFT spectrum display
- ◆ High-performance DSP (Digital Signal Processor)
- ◆ 3D magnetic field measurement
- ◆ Frequency and signal strength display!
- ◆ High-resolution multi-function display
- ◆ DIN/VDE 0848 Exposure limit calculation!
- ◆ Internet Flash Software-Updates
- ◆ **USB 2.0 Interface**
- ◆ Simultaneous M-Display X, Y, Z axes
- ◆ Average (AVG) measurement
- ◆ PEAK Hold
- ◆ Incl. battery, charger & aluminum transportcase
- ◆ Dimensions (L/W/D): (260x86x23) mm
- ◆ Weight: 420gr
- ◆ **Warranty: 10 years**

Application Examples Spectran NF-10xx Spectrum Analyzer

Analysis and measurement of:

- ◆ traction power
- ◆ power lines
- ◆ power cables
- ◆ harmonics



Description

CONFORMING TO STANDARDS

Real ANALYSIS:

Measurement of electric and magnetic fields in this price range has never been this PROFESSIONAL.

Find radiation sources in your surroundings. Find their respective frequencies and signal strengths, including direct display of exposure limits. This used to be impossible in this price category, professional units often costing several thousand euros and being excessively complicated in handling.

The highly complex calculations in spectrum analysis incl. exposure limit calculation is being performed, unnoticed in the background, by a high-performance DSP (digital signal processor).

Fast, handy, cost-effective, beautiful exterior and PRECISION - what more could you ask ?



LF spectrum display and automatic multi-marker display on the digital screen of SPECTRAN® (Screenshot)

Spectrum ANALYSIS

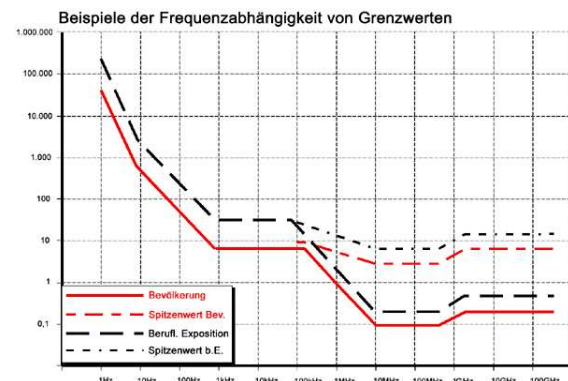
Real ANALYSIS:

Professional EMF measurement devices use a frequency dependant measurement approach, the so-called spectrum analysis. In a certain frequency range, the individuals signals and their respective strengths are being broken down, for example into a "bargraph" display (see SPECTRAN® screenshot on the right). The height of the individual bars represents the corresponding signal strength. For the 3 strongest signal sources, SPECTRAN® can automatically display the frequency and signal level, thanks to its "Auto Marker" feature. Of course, you can also setup the filter width and the frequency range to be analysed as you like.

In the EMF (LF) spectrum shown here, a frequency range of approx. 20Hz to 60Hz from left to right is being analysed. During analysis, the Auto Marker feature has determined - fully automatic - two main signal sources:

Signal#1=30Hz at 45µT

Signal#2=50 (mains power) at 75µT



Graphic display of frequency-dependant exposure limits.

EXPOSURE LIMITS

At the push of a button:

Exposure limit calculation used to be a complex and awkward procedure even for the professional, as most of the time, a chaotic mixture of an abundance of different frequencies, modulations and signal strengths is present.

The indispensable, highly complex calculation of frequency-dependant exposure limits can ONLY be performed CONFORMING TO STANDARDS by a spectrum analyser with high-performance software. Not a problem for SPECTRAN® units: They can calculate even several authoritative exposure limits, precautionary limits and recommendations (simply selectable via a button) and display these as a practical bargraph display (including convergence display in percent!), while the measurement is running.

The attached SPECTRAN® screenshot demonstrates how it works: At the push of a button, the ICNIRP exposure limit has been chosen among the various available exposure limits. SPECTRAN® now automatically calculates convergence or excess of this limit. For achieving this, often thousands of complex calculations have to be performed per second, and a steady scan of the entire frequency range needs to be performed. A true nightmare for every processor. In our test case, the graphic display shows an approximation towards the ICNIRP limit by 6,06%. If you use a NF-5030 you can even cover the total ICNIRP-bandwidth (depending on frequency). Hence, even the novice can perform exposure limit calculations ACCORDING TO STANDARDS without having to use complex tables and calculators.



SPECTRAN® displays exposure limits both as percentage as well as a bargraph display.

SPECTRAN® NF (EMF) Spectrum Analyser

APPLICATION EXAMPLES: Traction power, power lines and cables incl. harmonics, transformer, switching power supplies, RFID, TFTs, DSL etc. Various appliances in home and office.

| Specifications base unit ⁽¹⁾ | Entrance | | Intermediate | | Professional | | Outdoor |
|--|-----------|-----------|--------------|--------------|-------------------|-----------------------|----------------------|
| | NF-1010 | NF-1010E | NF-3010 | NF-3020 | NF-5010 | NF-5030 | NF-XFR |
| Frequency Range (min) | 10Hz | 10Hz | 10Hz | 10Hz | 1Hz | 1Hz | 1Hz |
| Frequency Range (max) | 2kHz | 10kHz | 100kHz | 400kHz | 1MHz | 30MHz ⁽²⁾ | 30MHz ⁽²⁾ |
| Electric field [V/m] (min) (typical) | 1V/m | 1V/m | 1V/m | 1V/m | 1V/m | 0,1V/m ⁽²⁾ | see opt. PBS2 |
| Electric field [V/m] (max) (typical) | 2.000V/m | 2.000V/m | 5.000V/m | 5.000V/m | 5.000V/m | 20kV/m | see opt. PBS2 |
| Magnetic field [Tesla] (min) (typical) | 10nT | 10nT | 1nT | 1nT | 1nT | 1pT ⁽²⁾ | see opt. PBS2 |
| Magnetic field [Tesla] (max) typical | 100µT | 100µT | 100µT | 100µT | 100µT | 2mT ⁽²⁾ | see opt. PBS2 |
| Magnetic field [Gauss] (min) (typical) | 100µG | 100µG | 10µG | 10µG | 10µG | 10nG ⁽²⁾ | see opt. PBS2 |
| Magnetic field [Gauss] (max) typical | 1G | 1G | 1G | 1G | 1G | 20G ⁽²⁾ | see opt. PBS2 |
| Analog input [V] (min) typical | - | - | - | 2µV | 2µV | 200nV ⁽²⁾ | 200nV ⁽²⁾ |
| Analog input [V] (max) typical | - | - | - | 200mV | 200mV | 2V ⁽²⁾ | 2V ⁽²⁾ |
| RBW (resolution bandwidth) (min) | 1Hz | 1Hz | 1Hz | 1Hz | 1Hz | 0,3Hz | 0,3Hz |
| RBW (resolution bandwidth) (max) | 1kHz | 3kHz | 30kHz | 100kHz | 300kHz | 1MHz | 1MHz |
| Demodulator | - | - | AM | AM | AM/FM | AM/FM | AM/FM |
| Units (additional units via PC software) | V/m, T, G | V/m, T, G | V/m, T, G | V, V/m, T, G | V, V/m, T, G, A/m | V, V/m, T, G, A/m | V, dBV |
| Detector | RMS | RMS | RMS/MinMax | RMS/MinMax | RMS/MinMax | RMS/MinMax | RMS/MinMax |
| Internal Datalogger (size). Expandable to 1MB (option 001) | - | - | 64K | 64K | 64K | 64K | harddisk |
| FFT resolution (points) | 64 | 64 | 64 | 64 | 1024 | 1024 | 1024 |
| Lowest Sample Time | 50mS | 50mS | 50mS | 50mS | 10mS | 10mS | 10mS |
| Accuracy (typical) | 5% | 5% | 5% | 5% | 3% | 3% | 3% |

Highlights

| | | | | | | | |
|---|-------|-------|---|---|---|---|----------------|
| Real-time remote control via USB | - | ✓ | ✓ | ✓ | ✓ | ✓ | internal |
| Integrated electric (E) & isotropic magnetic (H) sensor/antenna | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | - |
| 3D, 2D or 1D mode switchable (only magnetic field sensor) | - | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Calibration setup (selected antenna) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Exposure limit calculation according to ICNIRP, BGV B11, BlmSchV etc. | - | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Extended full ICNIRP range | - | - | - | - | - | ✓ | ✓ |
| Suitable for Pre-Compliance test | - | - | - | - | - | ✓ | ✓ |
| Real-time limit calculation with simultaneous percentage display | - | ✓ | ✓ | ✓ | ✓ | ✓ | Analyzer sw |
| Vector power measurement (I/Q) and True RMS | - | - | ✓ | ✓ | ✓ | ✓ | ✓ |
| Enhanced DFT spectrum analysis | - | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Simultaneously displays frequency and signal strength | - | - | ✓ | ✓ | ✓ | ✓ | Analyzer sw |
| Up to 3 marker (showing both frequency and field strength) | - | ✓ | ✓ | ✓ | ✓ | ✓ | unlimited |
| Jog Dial controlled manual marker readout | - | - | ✓ | ✓ | ✓ | ✓ | key & touchpad |
| Linear or logarithmic spectrum display (log10, log100, log1000) | - | ✓ | ✓ | ✓ | ✓ | ✓ | unlimited |
| Automatic reference level adjustment (switchable) | - | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Hold function | - | ✓ | ✓ | ✓ | ✓ | ✓ | unlimited |
| Free of charge firmware update (via Internet) | - | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Supports programming of custom P-Code & C++ based custom software | - | - | ✓ | ✓ | ✓ | ✓ | ✓ |
| High performance DSP (Digital Signal Processor) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Large, high resolution multifunctional LCD (95mm) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 14" TFT |
| Spectrum display (51x25 pixel) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Analyzer sw |
| High resolution 50 segment bargraph (trend display) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Analyzer sw |
| Enhanced, much sharper Aaronia LCD display (3d generation) | - | - | - | - | - | ✓ | 14" TFT |
| Integrated battery charger (supports our optional LiPo battery) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | XFR charger |
| Internal speaker | Piezo | Piezo | ✓ | ✓ | ✓ | ✓ | ✓ |

Please continue on next page



NF-1010



NF-1010E



NF-3010



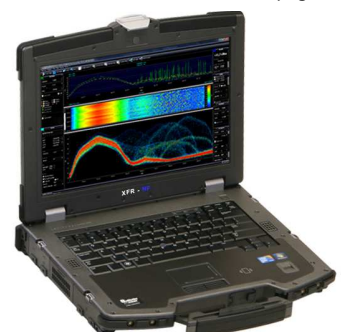
NF-3020



NF-5010



NF-5030



NF-XFR

SPECTRAN® NF (EMF) Spectrum Analyser

APPLICATION EXAMPLES: Traction power, power lines and cables incl. harmonics, transformer, switching power supplies, RFID, TFTs, DSL etc. Various appliances in home and office.

| Connectors / Interface | Entrance | | Intermediate | | Professional | | Outdoor |
|--|----------|----------|--------------|---------|--------------|---------|--------------------|
| | NF-1010 | NF-1010E | NF-3010 | NF-3020 | NF-5010 | NF-5030 | NF-XFR |
| SMA input (f) with high impedance | - | - | - | ✓ | ✓ | ✓ | ✓ |
| USB 1.1/2.0 | - | ✓ | ✓ | ✓ | ✓ | ✓ | 2x |
| Audio output (2,5mm jack) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 3,5mm jack |
| Charger plug (max. 15V) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Jog Dial (easy usage of menu, marker and volume control) | - | - | ✓ | ✓ | ✓ | ✓ | key & touchpad |
| 1/4" tripod connector | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | in-Vehicle docking |
| Included In Delivery | | | | | | | |
| Integrated electric (E) & isotropic magnetic (H) sensor/antenna | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | - |
| SPECTRAN 1300mAh rechargeable battery (integrated) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 6 cell battery |
| Battery charger and power supply incl. international adapter set | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | no adapter set |
| Aluminum carrying case with foam protection | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | - |
| Detailed English manual (on CD) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | installed |
| Analyzer Software for MAC-OS, Linux and Windows (on CD) | - | ✓ | ✓ | ✓ | ✓ | ✓ | installed |
| SMA tool | - | - | - | - | - | ✓ | ✓ |
| Available Options (extra charge) | | | | | | | |
| Option 001 (1MB memory expansion) | - | - | - | - | ✓ | ✓ | harddisk |
| Option 005 (12Bit DDC for ultra high sensitivity) | - | - | - | - | - | ✓ | installed |
| Option 006 (Isotropic static magnetic field sensor) ⁽¹⁾ | - | - | - | - | - | ✓ | - |
| Option 008 (20MHz expansion. New range: 1Hz-20MHz) | - | - | - | - | - | ✓ | installed |
| Option 009 (24Bit resolution for Option 006) | - | - | - | - | - | ✓ | - |
| Option 010 (30MHz expansion. New range: 1KHz-30MHz) | - | - | - | - | - | ✓ | ✓ |
| Option UBBV2 (40dB external preamplifier DC-8GHz) | - | - | - | - | - | ✓ | ✓ |
| Optional Accessories | | | | | | | |
| USB Cable (Special Version) | - | ✓ | ✓ | ✓ | ✓ | ✓ | installed |
| 3000mAh Lithium Polymer (LiPo) Power-Battery | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | - |
| Car Power Adapter (operate or charge via cigarette lighter) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | - |
| Outdoor Rubber Protection (perfect for outdoor usage) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | - |
| Pistol Grip / Miniature Tripod | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | - |
| Aluminum Tripod (big version) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | - |
| DC-Blocker (protects the input against DC voltage) | - | - | - | - | - | ✓ | ✓ |
| 20dB Attenuator (offers a higher maximum voltage up to 2V) | - | - | - | - | - | ✓ | ✓ |
| PBS1 Near Field Probe Set (passive) | - | - | - | - | - | ✓ | ✓ |
| PBS2 Near Field Probe Set (active, incl. UBBV2 preamplifier) | - | - | - | - | - | ✓ | ✓ |
| ADP1 Active Differential Probe (conductive measurement) | - | - | - | - | - | ✓ | ✓ |
| GEO10 Vibrationsensor (4Hz-1kHz) | - | - | - | - | - | ✓ | ✓ |
| GEO14 Vibrationsensor (10Hz-1kHz) | - | - | - | - | - | ✓ | ✓ |
| Calibration Certificate | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Heavy Plastic Carrying Case | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | - |

⁽¹⁾ Preliminary specifications dated 01.07.2011. Range, sensitivity and accuracy can change depending on frequency, setup, antenna and used parameters. Precision datas are based on Aaronias calibration-reference under specific test conditions. Unless otherwise stated, these specifications are according to the following reference conditions: Ambient temperature 22±3°C, relative air humidity 40% to 60%, continuous wave signal (CW), RMS detection.

Option 006 offers a range of 100µG-6G (10nT-600µT). You can "zero" the static field sensor (Option 006) by using our "Zero Gauss" chamber.

NF standard: 1MHz. Only with option 010 up to 30MHz. NF standard: 1nT. Only with option 005 down to 200nV. NF standard: 200mV. Only with optional 20dB

⁽²⁾ Attenuator up to 2V.



NF-1010



NF-1010E



NF-3010



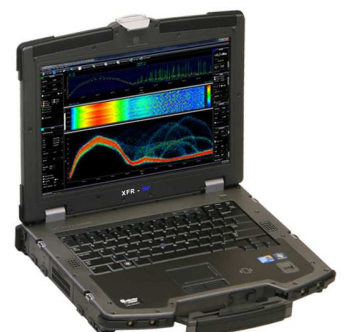
NF-3020



NF-5010



NF-5030



NF-XFR

Recommended accessories for Aaronia Spectrum Analyzer

Heavy Plastic Carrycase PRO

Shock resistant, heavy version with padding. Offers spaces for 2 SPECTRAN units with all accessories and a HyperLOG 70xx or 60xx antenna. A MUST for the professional user or outdoor usage!

Order/Art.-No.: 243



Pistol grip / miniature tripod

Detachable handle with super-practical miniature tripod mode: this handle is attachable to the backside of the unit and allows optimal handling (esp. for directional measurement) and even fixed installation of the unit. STRONGLY recommended for PC use!

Order/Art.-No.: 280



Aluminum tripod

Height adjustable, high stability. STRONGLY recommended for PC use! Max. height: 105cm.

Order/Art.-No.: 281



Calibration Certificate

Available for all SPECTRAN® units. With detailed calibration sheet.

Order/Art.-No.: 784



USB Cable (Special Version)

To connect your Spectran to the PC. Special version with high performance EMC-ferrite. STRONGLY recommended for PC use!

Order/Art.-No.: 774



Protection rubber

Protect and personalize your SPECTRAN with a sturdy rubber case and keep it scratch-n-dent free. Allows full access to all functions.

Order/Art.-No.: 290



3000mAh LiPo Power-Battery

Offers a MUCH higher runtime of your SPECTRAN (up to 400%). Strongly recommended for autonomic measurement! The 1300mAh standard-battery will be replaced.

Order/Art.-No.: 254



Car power adapter for mobile use

With power-LED. For charging batteries or operating our units in your car, including special plug.

Order/Art.-No.: 260



DC-Blocker (SMA)

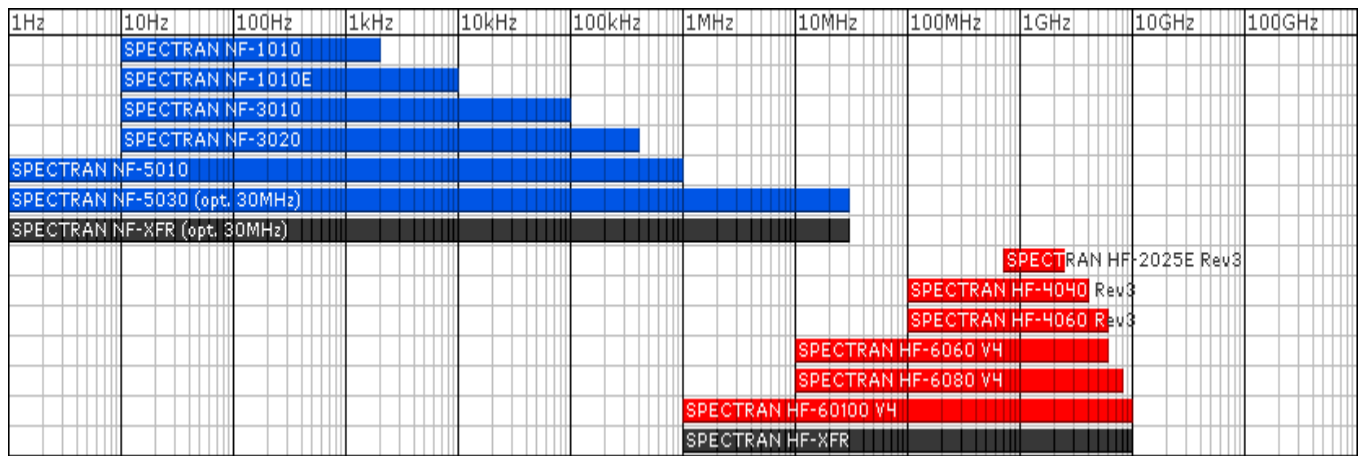
It prevents the RF-input of the SPECTRAN to be destroyed by the DC-voltages of f.e. DSL/ISDN lines.

Order/Art.-No.: 778

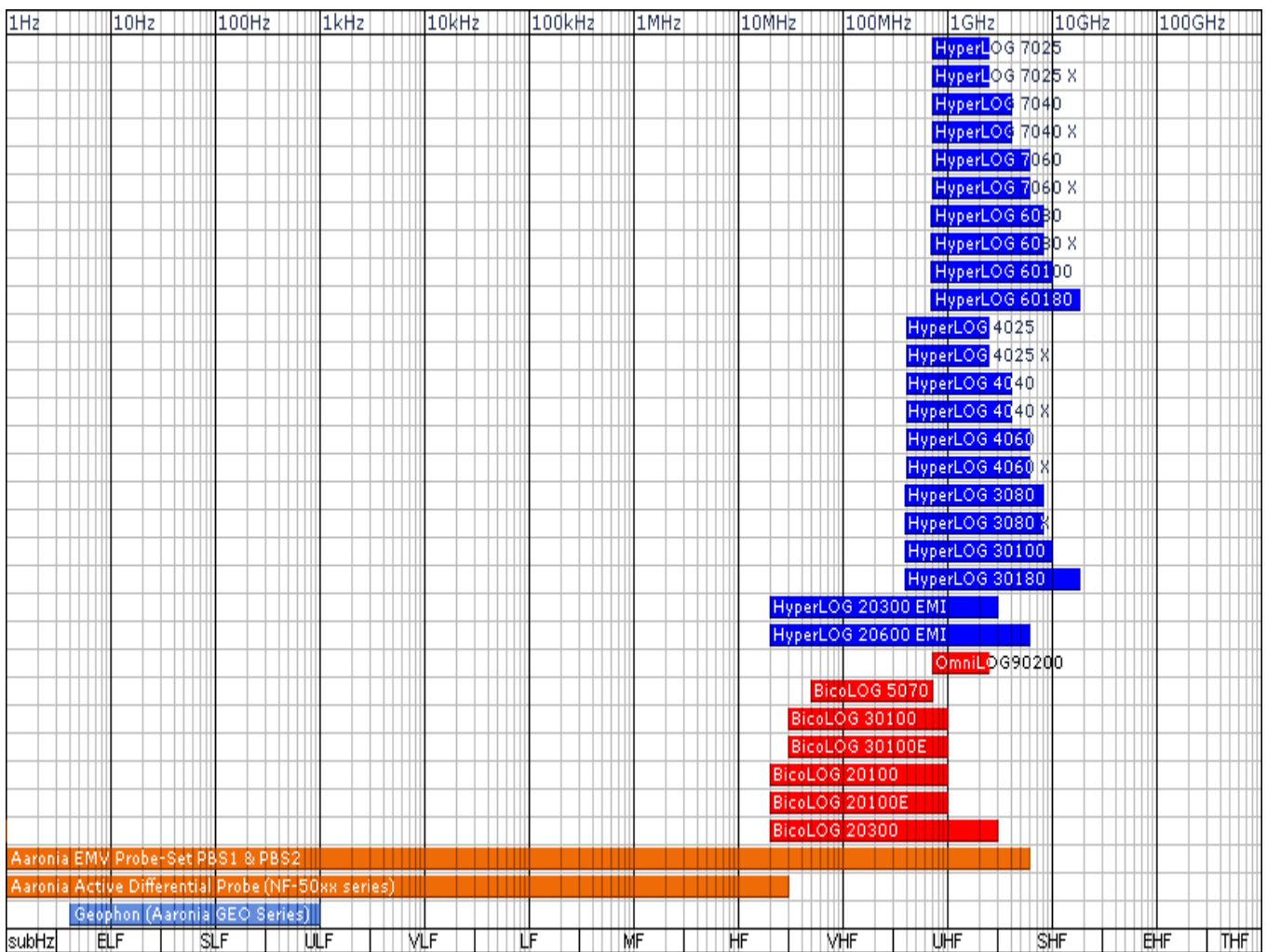


Frequency overview Analyzer & Antennas

Frequency Overview SPECTRAN Spectrum Analyzer



Frequency Overview HyperLOG and BicoLOG Antennas and Probes



References

User of Aeronia Antennas and Spectrum Analyzers (Examples)

Government, Military, aeronautic, astronautic

- ◆ NATO, Belgien
- ◆ Boeing, USA
- ◆ Airbus, Hamburg
- ◆ Bund (Bundeswehr), Leer
- ◆ Bundeswehr (Technische Aufklärung), Hof
- ◆ Lufthansa, Hamburg
- ◆ DLR (Deutsches Zentrum für Luft- und Raumfahrt, Stuttgart)
- ◆ Eurocontrol (Flugüberwachung), Belgien
- ◆ Australian Government Department of Defence, Australien
- ◆ EADS (European Aeronautic Defence & Space Company) GmbH, Ulm
- ◆ Institut für Luft- und Raumfahrtmedizin, Köln
- ◆ Deutscher Wetterdienst, Tauche
- ◆ Polizeipräsidium, Bonn
- ◆ Landesamt für Umweltschutz Sachsen-Anhalt, Halle
- ◆ Zentrale Polizeitechnische Dienste, NRW
- ◆ Bundesamt für Verfassungsschutz, Köln
- ◆ BEV (Bundesamt für Eich- und Vermessungswesen)

Research/Development, Science and Universitys

- ◆ Deutsches Forschungszentrum für Künstliche Intelligenz, Kaiserslautern
- ◆ Universität Freiburg
- ◆ Indonesien Institute of Science, Indonesien
- ◆ Max-Planck-Institut für Polymerforschung, Mainz
- ◆ Los Alamos National Laboratory, USA
- ◆ University of Bahrain, Bahrain
- ◆ University of Florida, USA
- ◆ Universität Erlangen, Erlangen
- ◆ Universität Hannover, Hannover
- ◆ University of Newcastle, Großbritannien
- ◆ Universität Strasbourg, Frankreich
- ◆ Universität Frankfurt, Frankfurt
- ◆ Uni München – Fakultät für Physik, Garching
- ◆ Technische Universität Hamburg, Hamburg
- ◆ Max-Planck Institut für Radioastronomie, Bad Münstereifel
- ◆ Max-Planck-Institut für Quantenoptik, Garching
- ◆ Max-Planck-Institut für Kernphysik, Heidelberg
- ◆ Max-Planck-Institut für Eisenforschung, Düsseldorf
- ◆ Forschungszentrum Karlsruhe, Karlsruhe

Industry

- ◆ Shell Oil Company, USA
- ◆ ATI, USA
- ◆ Fedex, USA
- ◆ Walt Disney, Kalifornien, USA
- ◆ Agilent Technologies Co. Ltd., China
- ◆ Motorola, Brasilien
- ◆ IBM, Schweiz
- ◆ Audi AG, Neckarsulm
- ◆ BMW, München
- ◆ Daimler Chrysler AG, Bremen
- ◆ BASF, Ludwigshafen
- ◆ Deutsche Bahn, Berlin
- ◆ Deutsche Telekom, Weiden
- ◆ Siemens AG, Erlangen
- ◆ Rohde & Schwarz, München
- ◆ Infineon, Österreich
- ◆ Philips Technologie GmbH, Aachen
- ◆ ThyssenKrupp, Stuttgart
- ◆ EnBW, Stuttgart
- ◆ RTL Television, Köln
- ◆ Pro Sieben – SAT 1, Unterföhring
- ◆ Channel 6, Großbritannien
- ◆ WDR, Köln
- ◆ NDR, Hamburg
- ◆ SWR, Baden-Baden
- ◆ Bayerischer Rundfunk, München
- ◆ Carl-Zeiss-Jena GmbH, Jena
- ◆ Anritsu GmbH, Düsseldorf
- ◆ Hewlett Packard, Dornach
- ◆ Robert Bosch GmbH, Plochingen
- ◆ Mercedes Benz, Österreich
- ◆ EnBW Kernkraftwerk GmbH, Neckarwestheim
- ◆ AMD, Dresden
- ◆ Infineon Technologies, Regensburg
- ◆ Intel GmbH, Feldkirchen
- ◆ Philips Semiconductors, Nürnberg
- ◆ Hyundai Europe, Rüsselsheim
- ◆ Saarschmiede GmbH, Völklingen
- ◆ Wilkinson Sword, Solingen
- ◆ IBM Deutschland, Stuttgart
- ◆ Vattenfall, Berlin
- ◆ Fraport, Frankfurt

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für Elektromagnetische Verträglichkeit
Düsseldorf, 07.-09.02.2012



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