Rev 1.2
08.04.2009

High end hand held REALTIME EMC spectrum analyzer Series SPECTRAN® 50xx Handheld Analyzer

REAL Spectrum Analyzer at multi-meter price!

References / examples of proof:

- BOEING, USA
- NATO, Belgium
- Rohde & Schwarz, Belgium
- Shell Oil Company, USA
- ATI, USA
- Australian Government Department of Defence,Edingburgh, Australia
- Daimler Chrysler AG, Bremen, Germany
- BMW, München, Germany
- Eurocontrol (Flugüberwachung), Belgium
- DLR (Deutsches Zentrum für Luft- und Raumfahrt), Köln, Germany
- ThyssenKrupp, Stuttgart, Germany
- Siemens AG, Konstanz & Erlangen, Germany
- PHILIPS, Netherlands

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-5010 (1Hz to 1MHz)

- 1024 points BFT (FFT)
- Frequency range: 1Hz to **1MHz****
- Typ. level range E-Field: 0,1V/m to 5kV/m**
- Typ. level range H-Field: 0,1nT to **100µT****
- Typ. precision: 3%**
- Superfast FFT spectrum analysis
- 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!
- Simultaneous M-Display X, Y, Z axes
- True RMS signal strength measurement
- Average (AVG) measurement
- Internal data logger
- Internet Flash Software-Updates
- USB 2.0 Interface
- Dimensions (L/W/D): (260x86x23) mm
- Weight: 420gr
- **Warranty: 10 years**

SPECTRAN® NF-5030 (1Hz to 1MHz / 20MHz / 30MHz)

- Vastly expanded range
- Measurement range up to **DIN/VDE 0848**
- **65 MSPS** (Option 005)
- Lots of options
- NEW: 30MHz Option
- Frequency range: 1Hz to 1MHz (**30MHz**)**
- Typ. level range E-Field: 0,1V/m to **20kV/m****
- Typ. level range H-Field: 0,1nT to **2mT****
- Typ. level range DDC H-Field: **1pT** to 2mT**
- Typ. level range DDC Analog in: **200nV** to 200mV** / -150dBm (Hz)
- Typ. accuracy: 3%**
- Superfast FFT spectrum analysis
- 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!
- Simultaneous M-Display X, Y, Z axes
- True RMS signal strength measurement
- Average (AVG) measurement
- Internal data logger
- Internet Flash Software-Updates
- USB 2.0 Interface
- Dimensions (L/W/D): (260x86x23) mm
- Weight: 420gr
- **Warranty: 10 years**

Application Examples Spectran NF-50xx Spectrum Analyzer

Analysis and measurement of:

- traction power
- power lines
- power cables
- lamps
- power supplies
- transformer
- DSL
- ADSL
- VDSL
- various home appliances, industry and office up to 30MHz

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). This ultra-fast processor even allows, depending on the settings, REAL-TIME display with a NF-5030 (could you ask for more?). Simply amazing!

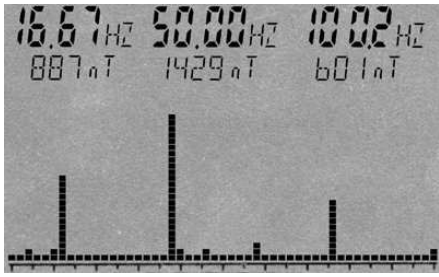
Fast, handy, cost-effective, beautiful exterior and PRECISION - what more could you ask ?

Spectrum ANALYSIS

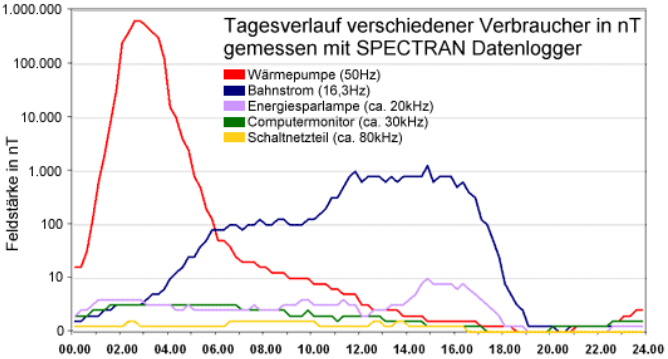
Real ANALYSIS:
Professional EMF measurement devices use a frequency dependant measurement approach, the so-called spectrum analysis. In a certain frequency range, the individuals signals and their respective strengths are being broken down, for example into a "bargraph" display (see SPECTRAN® screenshot on the right). The height of the individual bars represents the corresponding signal strength. For the 3 strongest signal sources, SPECTRAN® can automatically displays 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



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



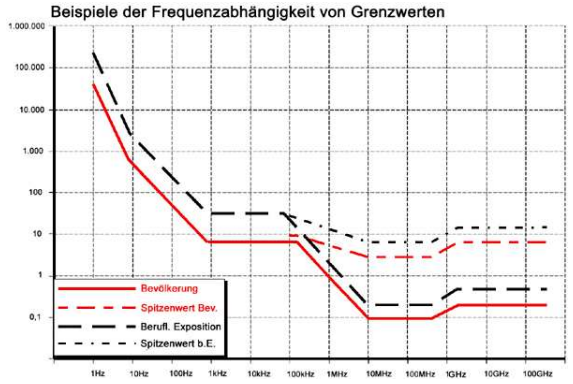
Daily variation of various radiation sources discloses MASSIVE variation in exposure

LONG-TERM MEASUREMENT (Data logging feature)

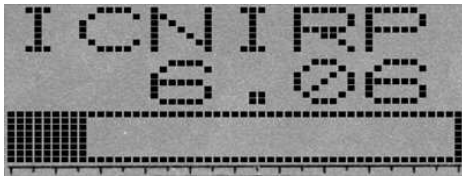
SPECTRAN® measurement devices with data logger allow long-term recordings of measurement results over a freely adjustable period of time. This is particularly indispensable for serious evaluation of exposure by appliances and machinery which have a changing power consumption or radiation strength over time. Examples for these include railroads, power lines and plants, but also home appliances and their respective power cables, and various high-frequency transmission facilities like mobile phone transmission towers, mobile phones, radar etc. Depending on the time of day, considerable variation of exposure can occur (see attached graphics). Without long-term recordings, MASSIVE misinterpretation of total exposure can occur. With long-term data logging using SPECTRAN®, the daily variation of exposure can be recorded and analysed. Thus, the actual total exposure can be evaluated precisely.
With this functionality, you can even discover sporadic EMC problems which would otherwise be very hard to detect.

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 indispensible, 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-banwidth (depending on frequency). Hence, even the novice can perform exposure limit calculations ACCORDING TO STANDARDS without having to use complex tables and calculators.



Graphic display of frequency-dependant exposure limits.



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

Aaronia REAL-3D magnetic field sensor

The new standard: 3D MEASUREMENT

Mismeasurement caused by wrongly adjusting the measurement device in space or troublesome and complex 3D calculations with a calculator are a problem of the past from now on, thanks to SPECTRAN® EMF (LF) measurement devices. All SPECTRAN® EMF measurement devices can measure magnetic fields directly in 3D! Starting with the SPECTRAN® NF-1010E, field strengths of the individual X, Y and Z axes can even be shown seperately. This has become possible thanks to the newest development from the Aaronia laboratories: Our high-tech REAL 3D miniature sensor coil. Consisting of a specially crafted nylon base with 3 independant windings made of ultra-thin, 0,05 mm! wire, it impresses with its extremely high sensitivity. It allows measurement of magnetic fields in all 3 spacial dimensions. The signal processor (DSP) of the SPECTRAN® performs the resulting highly complex calculations. You receive 3D measurement results which can otherwise only be achieved by using highly professional equipment.

INCLUDED WITH DELIVERY

- LF spectrum analyser SPECTRAN NF-50xx
- Sturdy aluminum-design carrycase (with custom padding!)
- 1300mAh Aaronia power battery with charger
- Exhaustive manual with lots of basic information, hints and exposure limit tables


Package contents SPECTRAN 50xx devices

Overview of features SPECTRAN NF Spectrum Analyzer

SPECIFICATIONS base unit*	NOVICE		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****	**20MHz**
Range electrical field **[V/m]** (typical) Min (1D)	1V/m	1V/m	0,1V/m	0,1V/m	0,1V/m	0,1V/m	-
Range electrical field **[V/m]** (typical) Max (1D)	2.000V/m	2.000V/m	5.000V/m	5.000V/m	5.000V/m	**20kV/m**	-
Range magnetic field **[Tesla]** (typical) Min (3D!)	10nT	10nT	1nT	1nT	1nT	**1pT****	-
Range magnetic field **[Tesla]** (typical) Max (3D!)	100µT	100µT	100µT	100µT	100µT	**2mT**	-
Range magnetic field **[Gauss]** (typical) Min (3D!)	100µG	100µG	10µG	10µG	10µG	**10nG****	-
Range Analog input (typical) Min	-	-	-	2µV	2µV	**200nV**	**200nV**
Range Analog input (typical) Max	-	-	-	200mV	200mV	200mV	200mV
Range magnetic field **[Gauss]** (typical) Max (3D!)	1G	1G	1G	1G	1G	**20G**	-
Filter bandwidth Min	5Hz	5Hz	1Hz	1Hz	1Hz	1Hz	1Hz
Filter bandwidth Max	10kHz	100kHz	300kHz	300kHz	**1MHz**	**1MHz**	**1MHz**
Accuracy base unit (typical)	5%	5%	5%	5%	3%	3%	3%
FFT (Resolution in points)	64	64	64	64	1024	1024	1024
Vector power measurement (I/Q) and **True RMS**	-	-	✓	✓	✓	✓	✓
FEATURES							
Standards conformant exp. limits (ICNIRP, BGV B11, BImSchV etc.)	-	✓	✓	✓	✓	✓	-
Extended full ICNIRP range	-	-	-	-	-	✓	-
Isotropic (3D) AC magnetic field measurement	✓	✓	✓	✓	✓	✓	-
Supports custom P-Code software	-	-	✓	✓	✓	✓	✓
ADVANCED HOLD mode (HOLD function)	-	✓	✓	✓	✓	✓	✓
INTERNAL data logger (long-term measurements)	-	-	✓	✓	✓	✓	64GB
FLASH memory including firmware update (over the Internet)	-	16k	64k	64k	64k	64k	✓
“Clear text” signal identification with direct frequency display		✓	✓	✓	✓	✓	✓
Integrated battery charging circuitry	-	✓	✓	✓	✓	✓	✓
Internal speaker	Piezo	Piezo	✓	✓	✓	✓	✓
Audio demodulation	AM	AM	AM	AM	AM&FM	AM&FM	-
DISPLAY							
Fast FFT or DFT spectrum analyses	-	✓	✓	✓	✓	✓	✓
Limit calculation with simultaneous percentage display	✓	✓	✓	✓	✓	✓	-
X, Y, Z Axis display or Vectorproduct (only M.-Field)	-	✓	✓	✓	✓	✓	-
Main display in V/m, Tesla, Gauss or A/m (switchable)	-	✓	✓	✓	✓	✓	V / dBµV
High-resolution 50 segment bargraph (trend display)	✓	✓	✓	✓	✓	✓	14” Display
3fold marker display (ex. 3x field strength & frequency at once)	-	✓	✓	✓	✓	✓	10fold
INTERFACES / CONNECTORS							
Fast USB 2.0 interface (computer connection)	-	✓	✓	✓	✓	✓	2x
Audio output	✓	✓	✓	✓	✓	✓	-
DC input (max. 15V) for external power supply	✓	✓	✓	✓	✓	✓	✓
External ultra sensetive signal input (SMA input) with max. 0,2V	-	-	-	✓	✓	✓	✓
Jog Dial (Multi-functional dial) for "one-hand operation"	-	-	✓	✓	✓	✓	Key&Touchpad
OPTIONS (extra charge)							
Option 001 (1MB memory expansion)	-	-	-	-	✓	✓	**harddisk**
Option 005 (12Bit DDC / offers ultra high sensitivity up to 1pT)	-	-	-	-	-	✓	**inclusive**
Option 006 (Measure 3D static magnetic fields)*	-	-	-	-	-	✓	-
Option 009 (Ultra high 24Bit resolution on static magnetic fields)	-	-	-	-	-	✓	-
Option 010 (Expanded frequency range up to 30MHz e.g. RFID)	-	-	-	-	-	✓	**20MHz incl.**
INCLUDED ACCESSORIES (in addition to the base unit)							
Aaronia 7,2V high-performance battery (1300mAh) + charger	-	✓	✓	✓	✓	✓	6 cell battery
Aluminum design transport case incl. padding inlays	-	✓	✓	✓	✓	✓	-
PROFESSIONAL PC analysis software (Windows, downloadable)	-	✓	✓	✓	✓	✓	**installed**

*Preliminary specifications as of 12.03.2009. NFand XFR series are available with latest BETA-Firmware. ALL options are available for the NF-series. The BETA firmware is in continuous development. Some functionality may still be limited and not fully to specifications (BETA status). By regularly checking our homepage for updates, you can always keep your measurement device up-to-date. As soon as version 1.0 of the firmware is released, all functionality and features will be fully available.
Range and accuracy can change depending on frequency, sensor and used parameters. Precision values are based on Aaronia calibration-reference and only valid under specific test conditions. Unless otherwise stated, these specifications apply for the reference condition: ambient temperature 22±3°C, relative air humidity 40% to 60%, continuous wave signal (CW), RMS detection. NF-5030 noise level at 100kHz and 1kHz RBW. 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.
**Standard: 1MHz. Only with option 010 up to 30MHz. / Standard: 1nT. Only with option 005 up to 1pT.

Available Options for Spectran NF-50xx series

Option 001: 1MB memory expansion

Available for: NF-5010, NF-5030.
This memory expansion is a MUST-HAVE particularly when using the data logger, as the standard capacity can quickly become exhausted in this mode. The memory expansion provides space for more than 10,000 logs, while the standard memory will only accomodate approximately 100 of them.
Standard memory size is 64K.

Order/Art.-No.: 180

Option 005: 12Bit Dual DDC frequency filter

Available for: NF-5030 (inclusive at NF-XFR).
This cutting edge 12Bit DDC frequency filter allows extremely fast, crisp and accurate frequency filtering, while at the same time drastically enhancing the sensitivity. As an example, magnetic fields can (depending on their frequency) still be measured down to 1pT (0.001nT), compared to 0.1nT without the option. Option 005 is therefore a MUST-HAVE for professional measurement, especially considering its attractive price.

Order/Art.-No.: 186

Option 006: 3D sensor for static magnetic fields

Available for: NF-5030.
This top-grade geomagnetic field sensor provides the ability to conduct geophysical assessments and measurement of geomagnetic field anomalies. However, it can also be used to turn the instrument into a Gaussmeter, measuring the difference between field strengths (static fields) of permanent magnets. Thanks to its ISOTROPIC (3D) construction, measurements can be performed in all three spacial dimensions AT ONCE (or seperately). Sensitivity is about 10nT-600µT.

Order/Art.-No.: 188

Option 008: 20MHz frequency extension

Available for: NF-5030 (inclusive at NF-XFR).
This 20MHz frequency extension option vastly enhances the frequency range of the NF-5030. Amongst others, it brings the ADSL and 13.56MHz RFID frequency bands in range. What's more, we are already developing a PC-based analysis software for decoding RFID.
The maximum frequency range of the NF-5030 without option 008 is 1MHz.

Order/Art.-No.: 179

Option 009: 24Bit resolution for 3D static magnetic field sensor

Available for: NF-5030.
Option 006 provides a significantly higher resolution for the optional 3D magnetic field sensor for measurement of static magnetic fields (option 006); it is ABSOLUTELY mandatory for geomagnetic surveys.
The standard resolution of the NF-5030 without option 009 is 14Bit.

Order/Art.-No.: 178

Option 010: 30MHz frequency extension

Available for: NF-5030.
Our 30MHz frequency extension extends the frequency range of the NF-5030 to the absolute maximum. The new frequency range is 1kHz - 30MHz. Amongst others, it even allows measurement of VDSL2. The higher clock frequency of the DDC provided by this option is a MUST HAVE for technicians and authorities needing ACCURATE assessment of signal sources of up to 30MHz. The maximum frequency of the NF-5030 without option 010 is 1MHz.

Order/Art.-No.: 179-1

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

2200mAh battery

Offers a MUCH higher runtime of your SPECTRAN (up to 50%). Strongly recommended for autonomic measurement! The 1300mAh standard-battery will be replaced.

Order/Art.-No.: 253

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

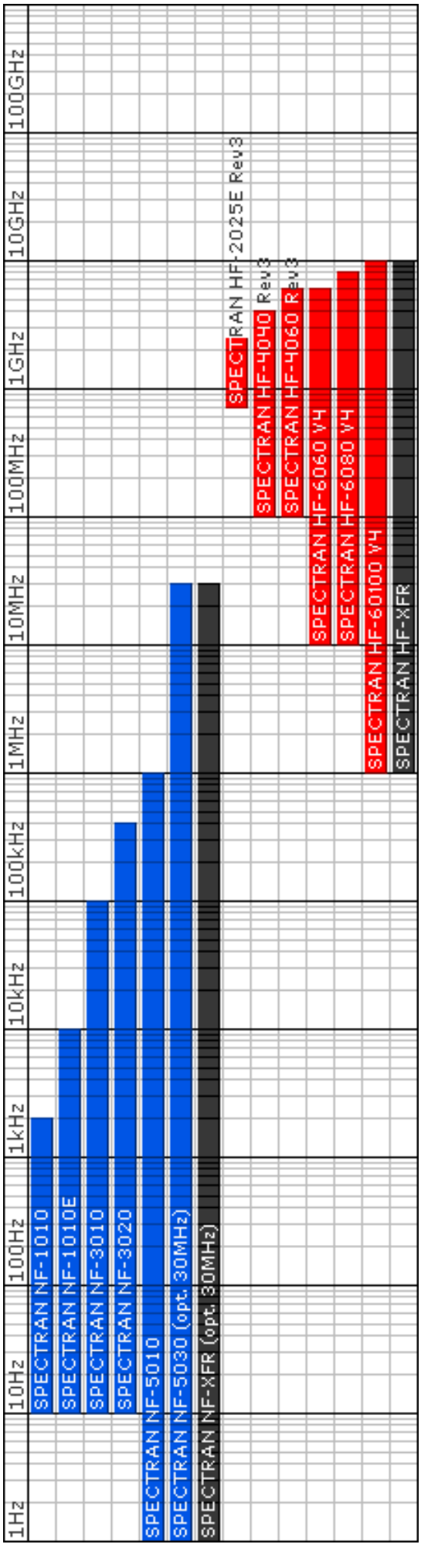
DC-Blocker (SMA)

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

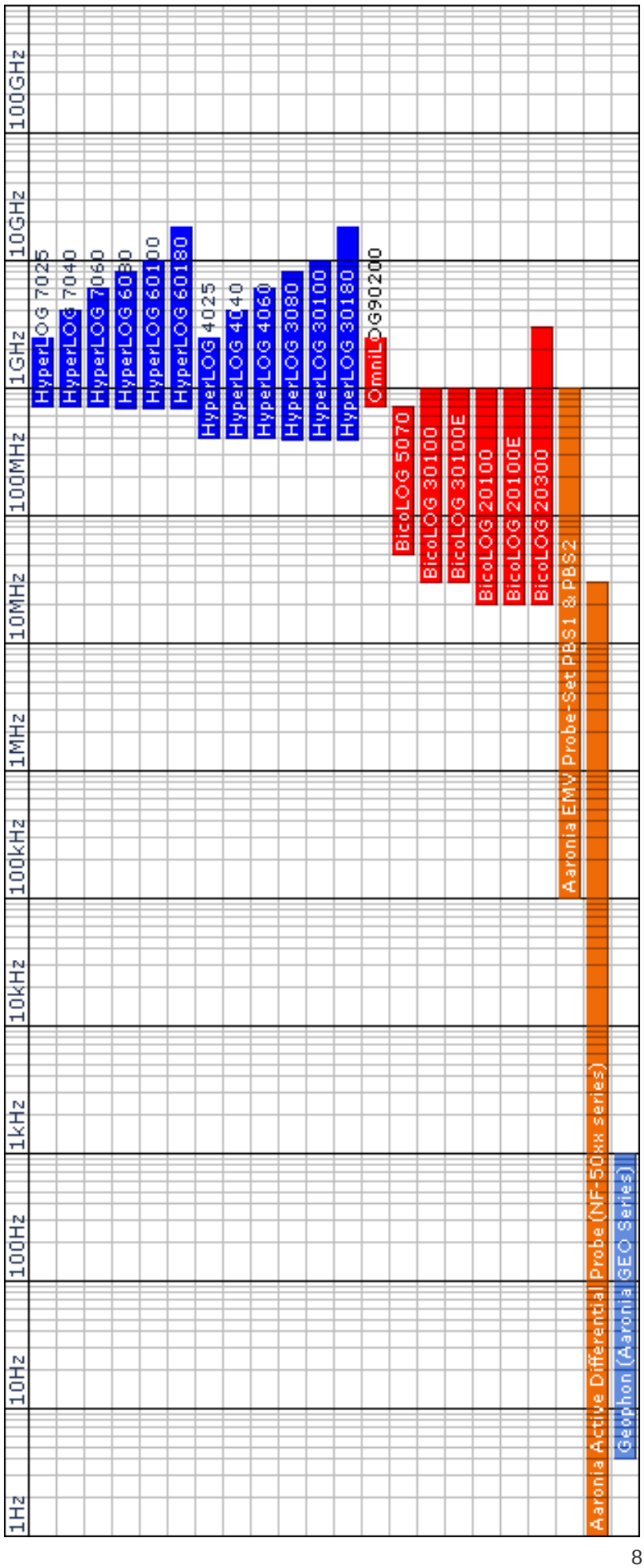
Order/Art.-No.: 778

Frequency overview Analyzer & Antennas

Frequency Overview SIECTRAN Spectrum Analyzer



Frequency Overview HyperLOG and BicoLOG Antennas and Probes



References

User of Aaronia 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 Sience, Indonesien
- Max-Planck-Institut für Polymerforschung, Mainz
- Los Alamos National Labratory, 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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Internationale Fachmesse und Kongress für Elektromagnetische Verträglichkeit
9.-11. März 2010
Messe Düsseldorf

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