Rev 1.4

01.12.2010

REALTIME 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

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Specifications

SPECTRAN® NF-1010 (10Hz to 2kHz)

- ◆ Frequency range: 10Hz to 2kHz*
- ◆ Typ. level range E-Field: 1V/m to 5.000 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
- ◆ DIN/VDE 0848 Exposure limit calculation!
- ◆ Internet Flash Software-Updates
- ◆ 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 5.000 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
- ◆ True RMS signal strength measurement
- ◆ 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

CE

USB 2.0 ready

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 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**

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.
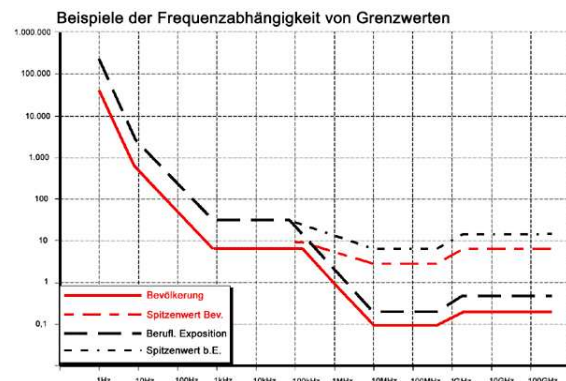
Graphic display of frequency-dependant exposure limits.

SPECTRAN® displays exposure limits both as percentage as well as a bargraph display.
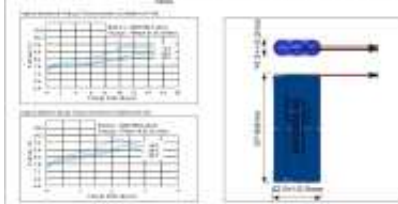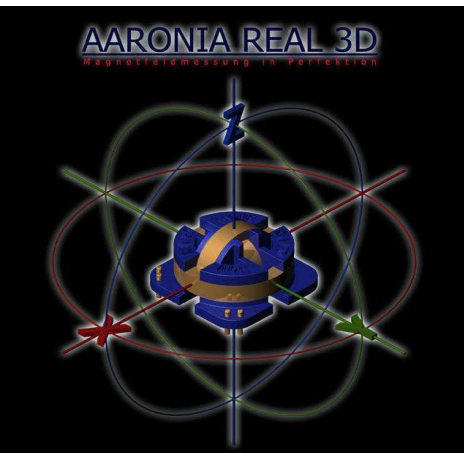
Lots of power: The rechargeable Aaronia NiMH battery

Superlong operating time:

The Aaronia NiMH high-performance battery has been developed specifically for the SPECTRAN® devices and is optimally suited for their requirements. Thanks to NiMH technology, the dreaded "Memory effect" is now a thing of the past, as with this power battery, maximum quality and long life have been our primary goals. Another reason why such a battery technology is necessary is the high power demand of the high-performance DSP used in all SPECTRAN® units, especially in the RF versions, which furthermore include very demanding RF receiving circuitry. Still, it is astounding that even when using the standard version of the Aaronia battery (1300mAh), continuous operation of the SPECTRAN® for approx. 4 hours is possible. The special version with 2200mAh (available at an extra charge) bumps this up to a stunning 7 hours! This is certainly a new all-time record for portable, battery-supplied spectrum analysers, or do you know a portable spectrum analyser which even remotely provides 7 hours of continuous operation with a single battery charge ?

Naturally, the necessary battery charger is also included. At the same time, it can be used for operating the SPECTRAN® units with mains power. The battery charger is integrated into all SPECTRAN® units.

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-10xx
◆ 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 (PDF-document)

Package contents SPECTRAN 10xx 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, BlmSchV 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

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.

© Aaronia AG, DE-54597 Strickscheid, Germany, www.spectran.com, Phone ++49(0)6556-93033

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.

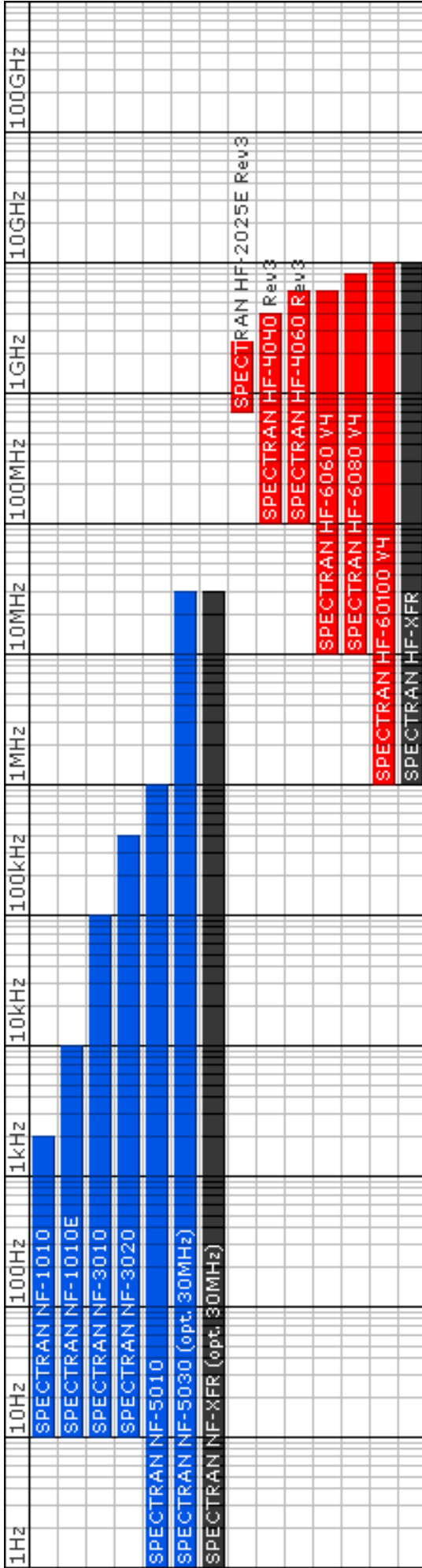*Order/Art.-No.: 260*

DC-Blocker (SMA)

It prevents the RF-input of the SPECTRAN to be destroyed by the DC-voltages of f.e. DSL/ISDN lines.
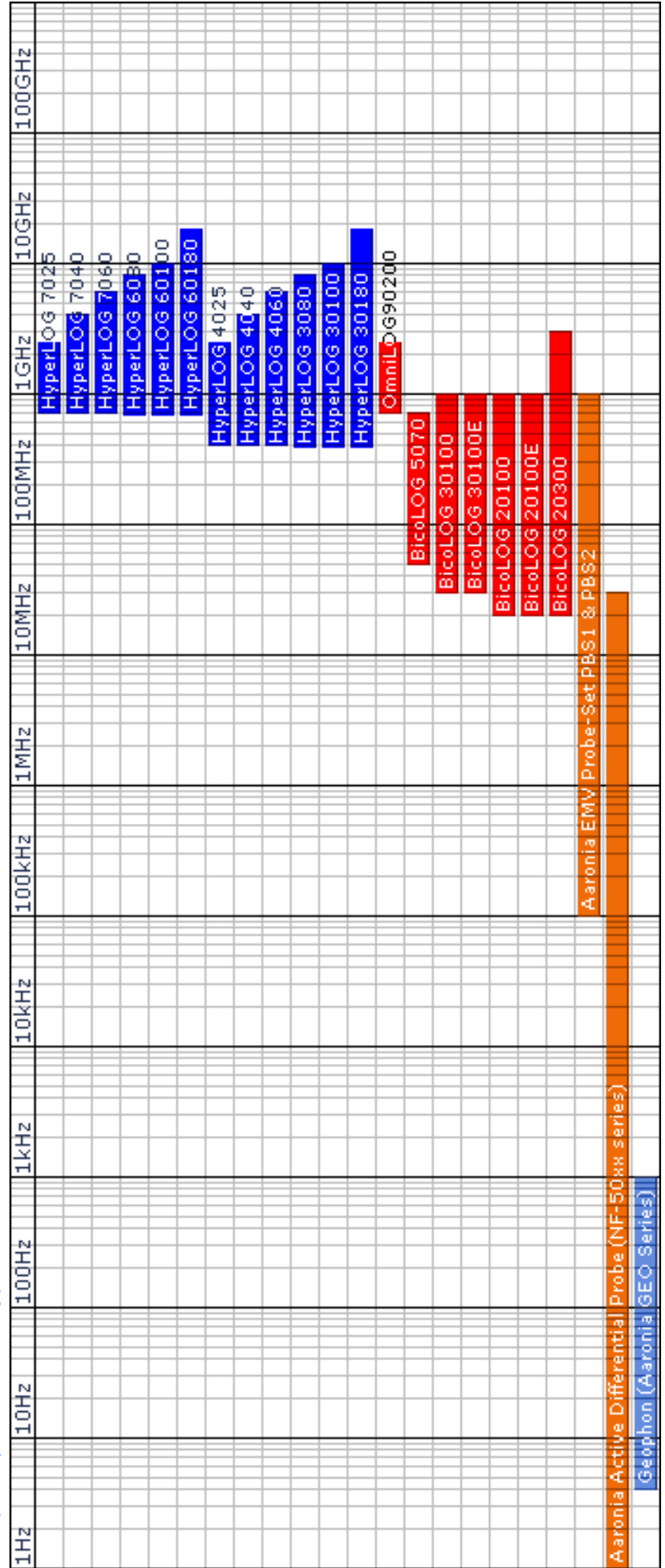
Order/Art.-No.: 778

Frequency overview Analyzer & Antennas

Frequency Overview SIECTRAN Spectrum Analyzer

Frequency axis (log scale): 1Hz, 10Hz, 100Hz, 1kHz, 10kHz, 100kHz, 1MHz, 10MHz, 100MHz, 1GHz, 10GHz, 100GHz

- SPECTRAN NF-1010
- SPECTRAN NF-1010E
- SPECTRAN NF-3010
- SPECTRAN NF-3020
- SPECTRAN NF-5010
- SPECTRAN NF-5030 (opt. 30MHz)
- SPECTRAN NF-XFR (opt. 30MHz)
- SPECTRAN HF-2025E Rev3
- SPECTRAN HF-4040 Rev3
- SPECTRAN HF-4060 Rev3
- SPECTRAN HF-6060 V4
- SPECTRAN HF-6080 V4
- SPECTRAN HF-60100 V4
- SPECTRAN HF-XFR

Frequency Overview HyperLOG and BicoLOG Antennas and Probes

Frequency axis (log scale): 1Hz, 10Hz, 100Hz, 1kHz, 10kHz, 100kHz, 1MHz, 10MHz, 100MHz, 1GHz, 10GHz, 100GHz

- HyperLOG 7025
- HyperLOG 7040
- HyperLOG 7060
- HyperLOG 60100
- HyperLOG 60100
- HyperLOG 60180
- HyperLOG 4025
- HyperLOG 4040
- HyperLOG 4060
- HyperLOG 3080
- HyperLOG 30100
- HyperLOG 30180
- OmniLOG 90200
- BicoLOG 5070
- BicoLOG 30100
- BicoLOG 30100E
- BicoLOG 20100
- BicoLOG 20100E
- BicoLOG 20300
- Aaronia EMV Probe-Set PBS1 & PBS2
- Aaronia Active Differential Probe (NF-50xx series)
- Geophon (Aaronia GEO Series)

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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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15.-17. März 2011
Messe Stuttgart

Hall C2
Booth 404

SENSOR+TEST 2011
DIE MESSTECHNIK-MESSE
The Measurement Fair
Nürnberg, Germany
7. – 9.6.2011

Hall 11
Booth 101 & 106

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URL: www.measurement.net.au

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