# SPECTRAN®

## World's first LowCost Handheld Spectrum Analyser!

"These novel spectrum analysers from Aaronia AG finally fulfill the long-standing dream of **electronics engineers** and **environmental measurement technicians** of a **full-featured spectrum analyser** which is affordable for everyone and easy to use even for the novice. This has always been deemed **totally impossible** by experts as such devices always used to **cost a fortune**."

### EMF & RF sensor inputs
High-grade, gold-plated construction with over-torque protection

### Sensor mount
For sturdy connection of HyperLOG EMC antennas or Aaronia TCO and 3D sensors

### Patented signal analysis
Patented, innovative RF vector frequency scanning and processing technology

### Huge LC display
High-resolution digital display with 80x60mm! in FSTN quality with various numeric indicators, high-resolution pixel display, large bargraph and text display for SIMULTANEOUS display of several measurement results and physical units

### Signal processor
Integrated signal processor (DSP) for ultra-fast calculation and display of measurements

### Power input
For external power supply and charging the Aaronia battery pack

### USB 2.0 Connector
Super-fast USB 2.0 connector for your PC or laptop. Also allows software updates (over the Internet) to the internal FLASH program memory

### Audio output

### Multi-functional dial
For professional "single-hand use" and practical navigation of menus

### Data logger function
For long-term measurements

### Integrated battery charger

### High-grade keyboard
Laser-labelled, with SOLID keycaps and clear layout

### Internal speaker
For reproducing AM and FM demodulation.

### Professional tripod socket
Solid 5/8" socket for mounting the Aaronia bearing handle or a regular tripod on the back of the unit

### Aaronia battery pack
For extremely long battery life. Available with **4** and **7 hours** of continuous operation!


**WINNER**
Passive Components


**WINNER**
Test & Measurement




HF-4040 Rev3


CE

USB 2.0 ready

The above functionality is different depending on the particular model, see inside for details

**SPECTRAN® - Our affordable EMC / environmental measurement devices**

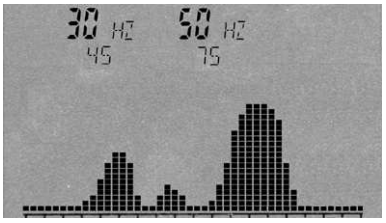
## CONFORMING TO STANDARDS and EXACT

**Measurement of EMC 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 bakkground, by a high-performance DSP (digital signal processor). This ultra-fast processor even allows REAL-TIME display in all EMF (LF) versions of the SPECTRAN® series (could you ask for more?). Simply amazing.

**Handy, cost-effective and beautiful exterior - what more could you ask ?**

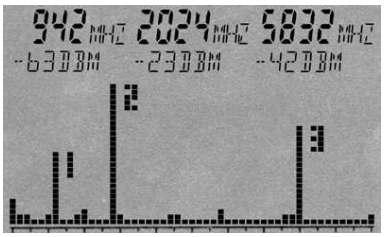
## Spectrum ANALYSIS

**Real ANALYSIS:**
Professional RF and 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® screenshots on the right). The height of the individual bars represents the corresponding signal strength. For the 3 strongest signal sources, SPECTRAN® automatically displays the exact 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.



EMF spectrum display and automatic triple multi-marker display on the digital screen of a NF-SPECTRAN® (Screenshot)

In the shown spectrum of the SPECTRAN® RF measurement device, a frequency range of approx. 100MHz-7GHz is being analysed from left to right (full sweep). During analysis, the Auto Marker feature has determined - fully automatic - three main signal sources:
**Signal#1=942MHz (GSM communications) at -63dBm**
**Signal#2=2024MHz (UMTS) at -23dBm**
**Signal#3=5832MHz (802.11a WLan) at -42dBm**

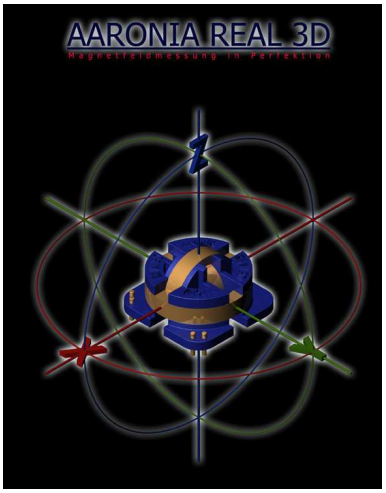


RF spectrum display and automatic triple multi-marker display on the digital screen of a HF-SPECTRAN® (Screenshot)

Thanks to its DIRECT frequency display of the individual signal sources, a mapping of measurement results to the corresponding radiation sources is possible.

## The new standard: 3D MEASUREMENT

**3D magnetic field 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 (LF) measurement devices can measure magnetic fields directly in 3D! 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 perfect 3D measurement results which can otherwise only be achieved by using highly professional equipment.

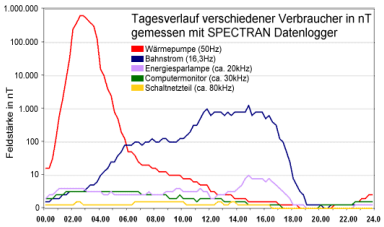


Aaronia REAL-3D magnetic field sensor


© **Aaronia AG**, Gewerbegebiet Aaronia AG, DE-54597 Euscheid, Germany, Phone ++49(0)6556-93033, Fax ++49(0)6556-93034, mail@aaronia.de, URL:www.spectran.com

## LONG-TERM MEASUREMENT (Data logging feature)

**For SERIOUS measurements:**
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.
The SPECTRAN® units "only" last 4 or 7 (depending on model) hours with one battery charge. If this is not enough, the external power supply can be used to extend the recording timespan infinitely.



Daily variation of various radiation sources discloses MASSIVE variation in exposure

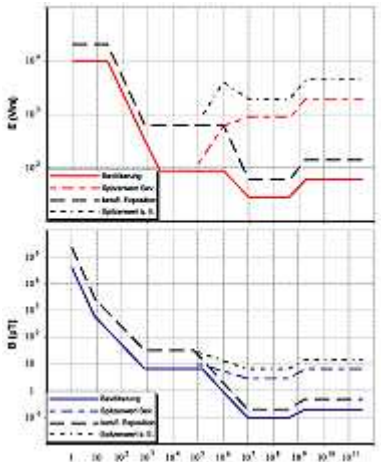
Daily variation of this RF transmitter discloses EXTREME variation in time

## EXPOSURE LIMITS Display

**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 be performed CONFORMING TO STANDARDS (e.g. ICNIRP) 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 them 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 0,06%. If you use a HF-60100 V4 or 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 (like ICNIRP) without having to use complex tables and calculators.
It really can't get any simpler.


Graphic display of frequency-dependant exposure limits. They disclose the INDISPENSIBLE consideration of signal frequency

SPECTRAN® displays exposure limits both as percentage as well as a bargraph display. Our example shows approximation to the ICNIRP exposure limits by 0,06%. (Screenshot)

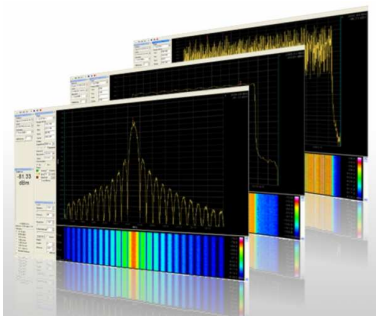

© **Aaronia AG**, Gewerbegebiet Aaronia AG, DE-54597 Euscheid, Germany, Phone ++49(0)6556-93033, Fax ++49(0)6556-93034, mail@aaronia.de, URL:www.spectran.com

## PROFESSIONAL PC analysis software included for free

**Simply AMAZING:**
**The PROFESSIONAL PC analysis software demonstrates SPECTRAN®'s vast capabilities. This software can be used IN ADDITION to SPECTRAN® and offers an incredible amount of features. All this for FREE. Just download it from our homepage, and your PC turns into a real spectrum analyser with a huge display:**

- MULTI-device capability!!! Remote control of SEVERAL SPECTRAN® units. These can be controlled and their data displayed AT ONCE on a single PC.
- HIGH-RESOLUTION!, freely scalable, coloured spectrum display with falloff function..
- Display of CHANNEL IDENTIFIERS!!! for EXACT identification of providers. Channel numbers etc. freely programmable and extensible!
- Up to 10! markers with frequency and level display.
- Intuitive zoom control with very comfortable frequency adjustment.
- High quality "waterfall"-display with TIMECODE. Colour scale freely configurable. Size freely scalable. Optional display of data DIRECTLY ON TOP OF THE GRAPH by pointing with your mouse and CTRL-clicking!
- High-resoution SLOT ANALYSER with 3D display!!
- SUPER-LOGGER: ALL data can be written to disk continuously. File format is readable by spreadsheet applications, for creating custom reports, etc.
- Freely positionable windows for comfortable entry of frequency, RBW, sweeptime etc. etc.
- Various pre-defined profiles for DECT, UMTS, GSM, WLan etc. etc. for instant recall. Incl. optimal parameters and extensive channel information! Freely programmable and extensible!
- Independant main display with SIMULTANEOUS display of dBm, dBµV, V/m, W/m2 and A/m, each with AUTORANGE. Freely transposable and scalable.
- SUPERB exposure limit display with various profiles (ICNIRP, Salzburg precautionary values, ECOLOG, etc. etc.). Freely programmable with a virtually infinite amount of display options.
- Functionality to update SPECTRAN® measurement device firmwares.
- Freely programmable key assignments and labels for SPECTRAN® measurement devices.
- Filemanager and COMPILER for creation and management of YOUR OWN PROGRAMS for SPECTRAN® measurement devices.
- "Rename" option for renaming any of your SPECTRAN® units (for example, including location) for better identification

etc. etc. etc.




AMAZING: The PROFESSIONAL PC software for SPECTRAN®. Get to know SPECTRAN®'s real capabilities!

## Lots of power: The rechargable Aaronia NiMH battery

**Superlong operating time:**
Starting with the SPECTRAN® NF-1010E or SPECTRAN® HF-2025E, respectively, the rechargable Aaronia NiMH high-performance battery is supplied as standard. It 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, thus SPECTRAN® model NF-1010 can also subsequently be extended with an Aaronia battery (STRONGLY recommended!).


The Aaronia POWER-battery


© **Aaronia AG**, Gewerbegebiet Aaronia AG, DE-54597 Euscheid, Germany, Phone ++49(0)6556-93033, Fax ++49(0)6556-93034, mail@aaronia.de, URL:www.spectran.com

# SPECTRAN® EMF Spectrum Analyzer

**APPLICATION EXAMPLES:** Measurement of traction power, high-voltage lines, power cables, lamps, power supplies, transformer stations, various appliances in home and office

| **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 magnetic field **[Gauss]** (typical) Max (3D!) | 1G | 1G | 1G | 1G | 1G | **20G** | - |
| Range Analog input (typical) Min | - | - | - | 2µV | 2µV | **200nV** | **200nV** |
| Range Analog input (typical) Max | - | - | - | 200mV | 200mV | 200mV | 200mV |
| 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) | - | - | ✓ | ✓ | ✓ | ✓ | 120GB |
| 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 | AM&FM |
| **DISPLAY** | | | | | | | |
| Fast FFT or DFT spectrum analysis | - | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **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 sensitive 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 | - | ✓ | ✓ | ✓ | ✓ | ✓ | backpack |
| PROFESSIONAL PC analysis software (Windows, downloadable) | - | ✓ | ✓ | ✓ | ✓ | ✓ | **installed** |

*Preliminary specifications as of 03.04.2009. NF and 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.

# SPECTRAN® HF Spectrum Analyser

APPLICATION EXAMPLES: Measurement of (active) radar, mobile communications, mobile phones, UMTS, DECT phones, transmission towers, WLan, Wifi, Bluetooth, microwave ovens, TETRA, etc.

| **SPECIFICATIONS** base unit* | NOVICE | INTERMEDIATE | | PROFESSIONAL | | | OUTDOOR |
|---|---|---|---|---|---|---|---|
| | **HF-2025E** | **HF-4040** | **HF-4060** | **HF-6060V4** | **HF-6080V4** | **HF-60100V4** | **HF-XFR** |
| Frequency range Min | 700MHz | 100MHz | 100MHz | 10MHz | 10MHz | **1MHz** | **1MHz** |
| Frequency range Max | 2,5GHz | 4GHz | 6GHz | 6GHz | 8GHz | **9,4GHz** | **9,4GHz** |
| Optional PEAK Power-Detector (Maximum usable frequency)*** | 2,5GHz | 4GHz | 6GHz | 6GHz | 8GHz | 10GHz | - |
| AVG Noise Level (1Hz) | -80dBm | -90dBm | -90dBm | -135dBm | -145dBm | -155dBm | - |
| AVG Noise Level (1Hz) with PreAmp | - | - | - | -150dBm | -160dBm | **-170dBm** | **-170dBm** |
| Maximum Level | 0dBm | 0dBm | 0dBm | +10dBm | +10dBm | **+40dBm**** | **+40dBm**** |
| Filter bandwith (RBW) Min | 1MHz | 100kHz | 100kHz | 10kHz | 3kHz | **200Hz** | **200Hz** |
| Filter bandwith (RBW) Max | 50MHz | 50MHz | 50MHz | 50MHz | 50MHz | 50MHz | 50MHz |
| EMC-Filter (RBW) 9kHz, 120kHz, 5MHz; 20MHz; 40MHz | - | - | - | ✓ | ✓ | ✓ | ✓ |
| Accuracy Base unit (typical) | +/-4dB | +/-3dB | +/-3dB | +/-2dB | +/-2dB | +/-1dB | +/-1dB |
| Vector power measurement (I/Q) and True RMS | - | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Lowest possible SampleTime | 100mS | 100mS | 100mS | 1mS | 1mS | 1mS | **1mS** |
| **FEATURES** | | | | | | | |
| **14Bit Dual-ADC & DDC-Hardware-Filter** | - | - | - | ✓ | ✓ | ✓ | ✓ |
| Standards-conformant exposure limits (ICNIRP, BGV B11, BImSchV etc.) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Extended full **ICNIRP range** | - | - | - | - | - | ✓ | ✓ |
| Fast ZERO-SPAN sweep | - | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| PULS mode | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| ADVANCED HOLD mode (HOLD function) | - | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| INTERNAL Data Logger (long-term measurements) | - | ✓ | ✓ | ✓ | ✓ | ✓ | 120GB |
| TIME-SLOT-ANALYZER | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Internal speaker | Piezo | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Configurable antenna and cable calibration data | - | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **Audio demodulation** | AM | AM&**FM** | AM&**FM** | AM&**FM** | AM&**FM** | AM&**FM** | AM&**FM** |
| **DISPLAY** | | | | | | | |
| DIRECT RF spectrum display | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Exposure limits display with simultaneous percentage display | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Main display in dBm, V/m, A/m or dBµV (switchable) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | simultaneous |
| ADDITIONAL display in W/m² with AUTORANGE (pW, µW etc.) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | simultaneous |
| Hochauflösender 50-Segment Bargraph (Trendanzeige) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 14” Display |
| 3fach Markeranzeige (z.B. 3xLeistung & Frequenz gleichzeitig) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 10fold |
| **INTERFACES / CONNECTORS** | | | | | | | |
| Fast USB 2.0 Interface (PC connection) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 2x |
| Audio output (2,5mm MONO) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | - |
| DC input (max. 15V) for external power supply | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 50 Ohm SMA RF input (F) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Jog Dial (multi-function dial) for “one-hand operation” | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | key & touchpad |
| **OPTIONS** (extra charge) | | | | | | | |
| **Option 001** (1MB memory expansion) | - | - | ✓ | ✓ | ✓ | ✓ | harddisk |
| **Option 002** (high sensitive 0,5ppm TCXO timebase) | - | - | - | - | - | ✓ | **inclusive** |
| **Option 020** (internal, switchable 15dB PreAmplifier) | - | - | - | ✓ | ✓ | ✓ | **inclusive** |
| **Option 20x** (REALTIME broad band Power-Meter) | 2,5GHz | 4GHz | 6GHz | 6GHz | 8GHz | 10GHz | - |
| **INCLUDED ACCESSORIES** in addition to the base unit | | | | | | | |
| Miniature SMA rod antenna | ✓ | ✓ | ✓ | - | - | - | Omnilog 90200 |
| HyperLOG EMC directional LogPer antenna (model) | **7025** | **7040** | **7060** | **7060** | **6080** | **60100** | **60100 (black)** |
| Aaronia 7,2V high-performance battery (1300mAh) + charger | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 6 cell battery |
| Aluminum design transport case | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | backpack |
| PC analysis software (Windows, downloadable) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | **installed** |

*Further REALTIME spectrum analysers up to 18GHz are already in development. Please contact us for further details!
Preliminary specifications as of 05.03.2009. The V4 and XFR series are available with latest Beta-Firmware. All options are available for the V4 series too. 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 V1.0 of the firmware is released, all functionality and features will be fully available. Range, sensitivity and accuracy can change depending on frequency, antenna and used parameters. Precision values are based on Aaronia calibration-reference 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. V4 and XFR Noise Level @5,555GHz. Maximum sensitivity of Rev.3 units: -90dBm @2,2GHz.
** Internal: +20dBm. External (with optional 20dB precision attenuator): +40dBm
*** Depending on frequency the optional PEAK power meter offers sensetivity up to -50dBm and max. +10dBm input power with an extremely fast response time.

# Options for Spectran Spectrum Analyzers

## OPTIONS HF / RF SPECTRUM ANALYZER

### Option 001: 1MB memory expansion *Order/Art.-No.: 180*

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.

### Option 020: 15dB low-noise preamplifier *Order/Art.-No.: 177*

This option provides an internal, super low-noise 15dB preamplifier, enabling maximum performance particularly when measuring extremely weak signals. It is switched via a TRUE RF switch. There really is no excuse for not ordering this one, considering its very attractive price!

### Option 002: 0.5ppm TCXO timebase *Order/Art.-No.: 181*

This highly precise TCXO timebase, which has been especially developed for the SPECTRAN, offers significantly reduced phase noise (jitter). This will allow the use of far narrower filters (in development), which will in turn vastly enhance sensitivity. To fully exploit the maximum sensitivity of the HF-60100 V4, this option is indispensable! Furthermore, the TXCO timebase allows far more accurate frequency measurement and display and is therefore a MUST-HAVE for future applications like time-domain measurements or code-selective measurement of UMTS, all already in development.
The standard accuracy WITHOUT option 002 is 50ppm.

### Option 20x 2,5GHz / 4GHz / 6GHz / 8GHz / 10GHz Peak Power-Meter *Order/Art.-No.: 182-x*

A 2.5 to 10GHz peak power meter (5 versions depending on the SPECTRAN model, see price list below). This option augments your SPECTRAN® with a power meter with up to 10GHz of bandwidth. Furthermore, it allows exact measurement of signal peaks with high crest factor like those occuring in WLAN technology, or extremely short signals, like RADAR bursts. What's more, measurement is performed in REAL TIME and BROADBAND, while at the same time being temperature-compensated. It is also an ideal solution for measurement of cable attenuation or receiver output. Depending on the actual frequency, the power meter provides a sensitivity of up to approx. -50dBm, while the maximum permissible level is +10dBm. By adding our 20dB attenuator (see price list), the maximum measurable signal level can be enhanced to +30dBm or +50dBm!

### Option 022: 40dB low-noise preamplifier DC-1GHz *Order/Art.-No.: 177-2*

This option provides an external, super low-noise 40dB preamplifier, enabling maximum performance particularly when measuring extremely weak signals at a EN55011, EN55022 or EN50371 EMC-test. If you use our BicoLOG antenna or our PBS1 Probeset and EMC-Sniffer this amplifier is a MUST HAVE to get the best performance!

## OPTIONS EMF / NF SPECTRUM ANALYZER

### Option 001: 1MB memory expansion *Order/Art.-No.: 180*

**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.

### Option 005: 12Bit Dual DDC frequency filter *Order/Art.-No.: 186*

**Available for: NF-5030 (integrated in the 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.

### Option 006: 3D sensor for static magnetic fields *Order/Art.-No.: 188*

**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.

### Option 009: 24Bit resolution for 3D static magnetic field sensor *Order/Art.-No.: 178*

**Available for: NF-5030.**
Option 009 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.

### Option 010: 30MHz frequency extension *Order/Art.-No.: 179-1*

**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.

# 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*

## 1m / 5m / 10m SMA-Cable

High quality special SMA cable for connecting any HyperLOG®-Antenna or BicoLOG®-Antenna with our RF Spectrum-Analyzer. Available as 1m, 5m and 10m Cable. All versions: SMA plug (male) / SMA plug (male).

## 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*

## 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*

## 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*

## Calibration Resistor (DC-18GHz)

This calibration resistor is necessary for the best possible calibration of the noise-floor of each Spectran V4-Analyzer.

*Order/Art.-No.: 779*

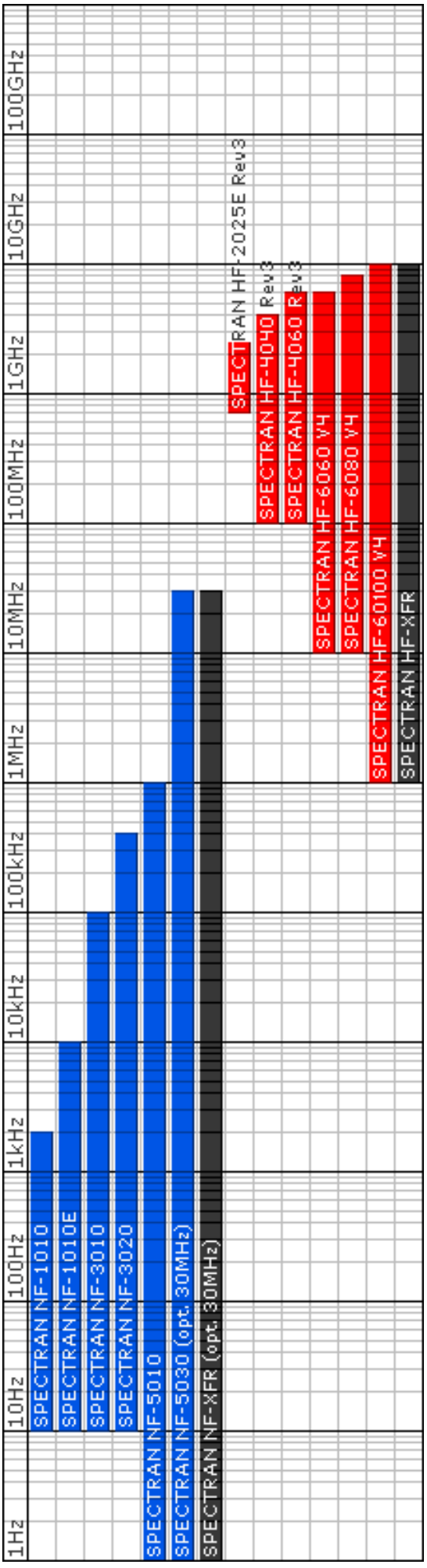
## 20dB SMA high-end Attenuator

Expands the measurement range to +40dBm. (ONLY SPECTRAN HF-60100 V4 and HF-XFR).

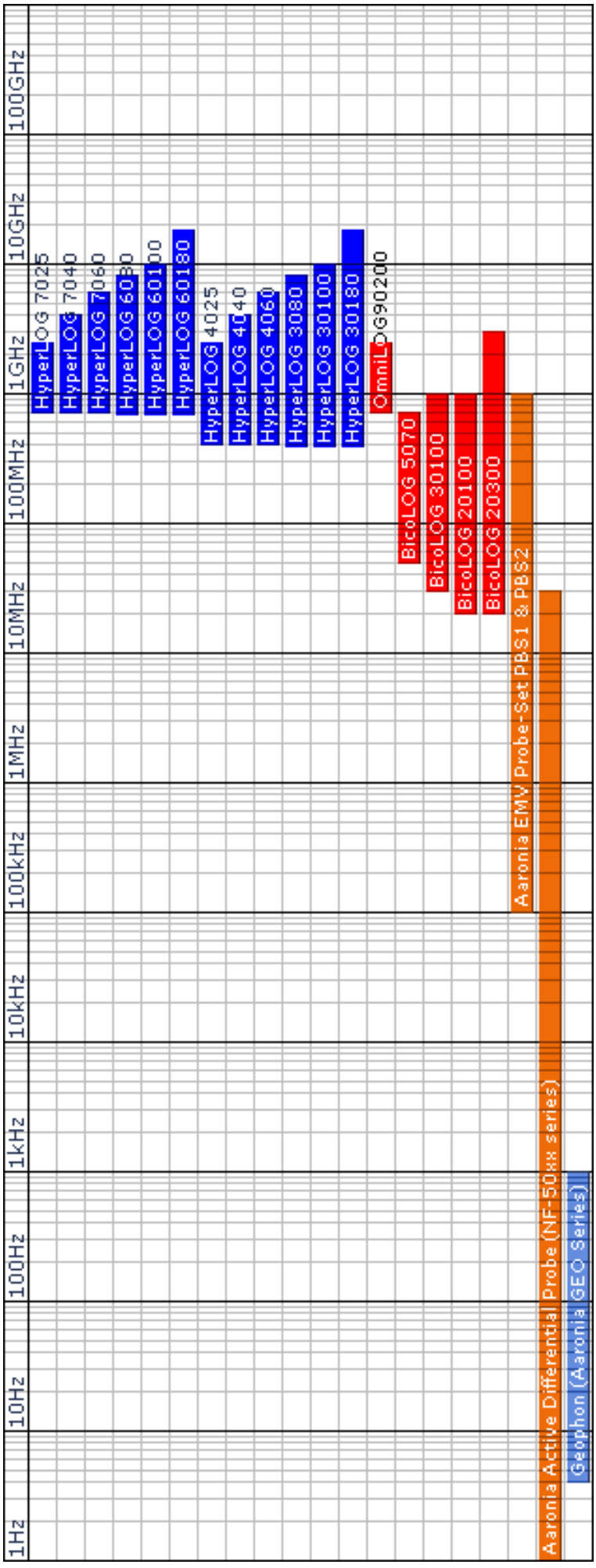
*Order/Art.-No.: 775*

# 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

# Visit us at the

electronica 2010
components | systems | applications

EMV 2010
Internationale Fachmesse und Kongress für Elektromagnetische Verträglichkeit
9.-11. März 2010
Messe Düsseldorf

AARONIA AG®
WWW.AARONIA.DE

Made in Germany

**Aaronia AG**, Gewerbegebiet Aaronia AG, DE-54597 Strickscheid, Germany
Phone ++49(0)6556-93033, Fax ++49(0)6556-93034
Email:mail@aaronia.de URL:www.spectran.com

**Aaronia USA**, 651 Amberton Crossing
Suwanee, Georgia 30024 USA
Phone ++1 678-714-2000, Fax ++1 678-714-2092
Email:sales@aaroniausa.com URL:www.aaroniaUSA.com

**Aaronia UK**, Bellringer Road, Trentham, Lakes South,
Stoke-on-Trent, ST4 8GB Staffordshire
Phone ++44(0)845-4379092, Fax ++44(0)870-8700001
Email:sales@aaronia.co.uk URL:www.aaronia.co.uk

Spectran® | HyperLOG® | BicoLOG® | OmniLOG® | Aaronia-Shield® | Aaronia X-Dream® | MagnoShield®

are registered trademarks of Aaronia AG

© Aaronia AG, Gewerbegebiet Aaronia AG, DE-54597 Strickscheid, Germany / Phone: ++49(0)6556-93033, Fax ++49(0)6556-93034 / Email:mail@aaronia.de URL: www.spectran.com