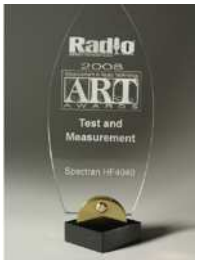
Data sheet

Rev 1.7
02.08.2011

Handheld RF Spectrum Analyzer series SPECTRAN® 40xx incl. EMC test antenna

VECTOR Spectrum Analyzer for the semi professional



HF-4040 Rev.3

HF-4040 Rev.3

"Unbeatable price.."
"Particularly Aaronia's very powerful (especially considering their price) SPECTRAN handheld spectrum analysers caused much excitement."
(Markt&Technik 20/2005)

References / examples of proof:

- BMW, München
- BASF, Schwarzheide
- Siemens AG, Nürnberg
- Vattenfall, Berlin
- Fedex, USA
- EnBW, Stuttgart

AARONIA AG
WWW.AARONIA.DE

Made in Germany

Specifications

SPECTRAN® HF-4040 Rev.3

- Frequency range: 100MHz to 4GHz*
- Typ. level range: -90dBm to 0dBm*
- Lowest possible SampleTime: 100mS
- Typ. accuracy: +/- 3dB*
- Filter bandwith (RBW) Min: 100kHz
- Filter bandwith (RBW) Max: 50MHz
- Vector (I/Q) / True RMS level measurement
- High performance DSP (Digital Signal Processor)
- USB 2.0 interface
- Direct RF spectrum display
- Frequency and signal strength display
- Enhanced triple multi-function display
- Advanced HOLD function
- Switchable PULS mode
- Exposure limit calculation according to DIN/VDE 0848
- AM / FM Demodulation
- DECT & TimeSlot Analyser
- Realtime PEAK power detector (option)
- Internal datalogger (64K)
- Internet software updates
- Incl. battery pack and charger
- Incl. HyperLOG 7040 EMC antenna
- Incl. aluminum carrycase
- Dimensions (L/W/D): (260x86x23) mm
- Weight: 420gr
- **Warranty: 10 years**

SPECTRAN® HF-4060 Rev.3

- Frequency range: 100MHz to **6GHz***
- Typ. level range: -90dBm to 0dBm*
- Lowest possible SampleTime: 100mS
- Typ. accuracy: +/- 3dB*
- Filter bandwith (RBW) Min: 100kHz
- Filter bandwith (RBW) Max: 50MHz
- Vector (I/Q) / True RMS level measurement
- High performance DSP (Digital Signal Processor)
- USB 2.0 interface
- Direct RF spectrum display
- Frequency and signal strength display
- Enhanced triple multi-function display
- Advanced HOLD function
- Switchable PULS mode
- Exposure limit calculation according to DIN/VDE 0848
- AM / FM Demodulation
- DECT & TimeSlot Analyser
- Realtime PEAK power detector (option)
- **1MB memory expansion (option)**
- Internal datalogger (64K)
- Internet software updates
- Incl. battery pack and charger
- Incl. HyperLOG **7060** EMC antenna
- Incl. aluminum carrycase
- Dimensions (L/W/D): (260x86x23) mm
- Weight: 420gr
- **Warranty: 10 years**

Application examples Spectran® HF-40xx Spectrum Analyzer

Analysis and measurement of:

- WLan
- UMTS
- WiFi
- active Radar
- GSM900
- GMS1800
- Bluetooth
- microwave ovens
- DECT-phones
- TETRA
- 70cm ham radio
- UWB (FB1-FB4)

CE

USB 2.0 ready

10 Years Warranty

Designed and Conforms to 92/31/EWG 98/336/EWG EN50082-1 EN55011

Made in Germany

Description

Conforming to standards and exact

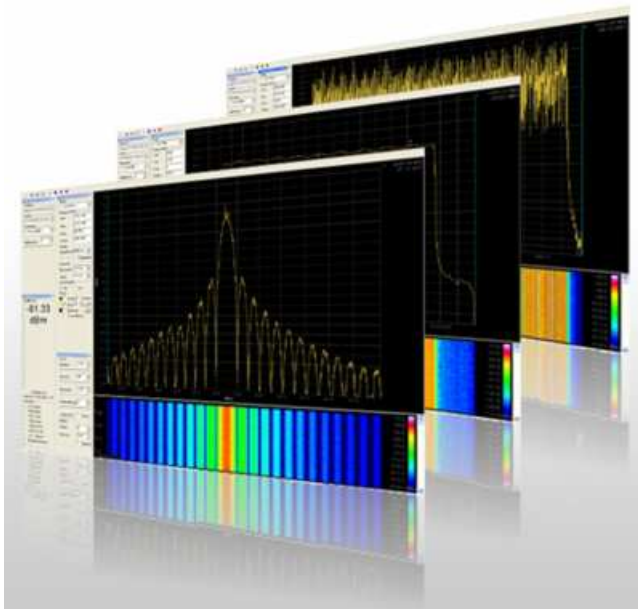
RF Measurement in this price range has never been this professional.
Find radiation sources in your surroundings. Find their respective frequencies and signal strengths, including **direct display of exposure limits**. This used to be impossible in this price category, professional units often costing 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 REAL-TIME display in all EMF (LF) versions of the SPECTRAN® series.

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

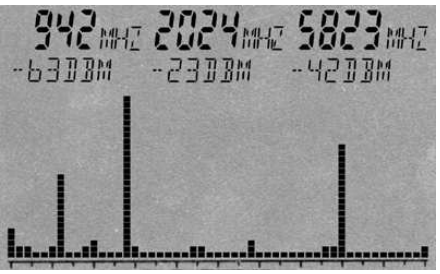
Professional PC analysis software (free download)

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:

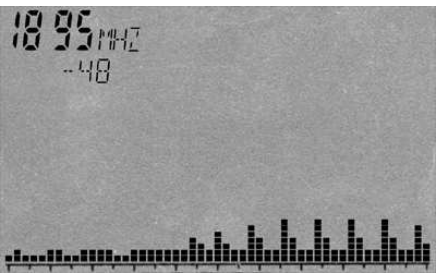
- **MULTI-device capability**! Remote control of several SPECTRAN units. These can be controlled and their data displayed at once on a single PC.
- **HIGH-RESOLUTION**!, freely scalable, coloured spectrum display with falloff function..
- **Display of channel identifiers**! for EXACT identification of 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-clikking!
- **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!



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



Well visible: "Frequency hopping" of a DECT portable phone between 1890 and 1900 MHz (Screenshot)

Spectrum ANALYSIS

The perfect analysis:
Professional RF 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 left). 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.

In the RF spectrum shown, a frequency range of approx. 100MHz to 7GHz from left to right is being analysed (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

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

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 seriuos 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 graphics on the right). 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. Even though SPECTRAN® units "only" last 2 to 3 (depending on model) hours with one battery charge, the intelligent "Powerdown mode" enables much longer data logging and measurement timespans. Finally, if this is not enough, the external power supply can be used to extend the recording timespan infinitely.

Daily variation of this RF transmitter discloses EXTREME variation in time

The included Transportcase

INCLUDED WITH DELIVERY

- RF spectrum analyzer SPECTRAN HF-40xx
- HyperLOG 70xx EMC/directional antenna
- 1300mAh power battery with charger
- Pistol grip with miniature tripod mode
- SMA toolset
- SMA adapter
- 1m SMA cable
- Sturdy aluminum-design carrycase (with custom padding!)
- Exhaustive manual with lots of basic information, hints and exposure limit tables

SPECTRAN® HF (RF) Spectrum Analyser

AARONIA AG WWW.AARONIA.DE

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

	Entrance	Intermediate		Professional			Outdoor
Specifications base unit[1]	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 Rance (max)	2,5GHz	4GHz	6GHz	6GHz	8GHz	9,4GHz	9,4GHz
Optional PEAK Power-Detector (Maximum usable frequency)[3]	2,5GHz	4GHz	6GHz	6GHz	8GHz	10GHz	10GHz
DANL (Displayed Average Noise Level)[2]	-80dBm	-90dBm	-90dBm	-135dBm(1Hz)	-145dBm(1Hz)	-155dBm(1Hz)	-155dBm(1Hz)
DANL (Displayed Average Noise Level) with Preamp (Option 020)[2]	-	-	-	-150dBm(1Hz)	-160dBm(1Hz)	-170dBm(1Hz)	-170dBm(1Hz)
Max Power at RF input	0dBm	0dBm	0dBm	+10dBm	+10dBm	+40dBm[2]	+40dBm[2]
RBW (resolution bandwidth) (min)	1MHz	100kHz	100kHz	10kHz	3kHz	200Hz[2]	200Hz[2]
RBW (resolution bandwidth) (max)	50MHz	50MHz	50MHz	50MHz	50MHz	50MHz	50MHz
EMC-Filter 200Hz, 9kHz, 120kHz, 200kHz, 1,5MHz, 5MHz	-	-	-	-	-	✓	✓
Demodulator	AM	AM/FM	AM/FM	AM/FM	AM/FM/PM	AM/FM/FM/GSM	AM/FM/FM/GSM
Detector	RMS	RMS	RMS	RMS/MinMax	RMS/MinMax	RMS/MinMax	RMS/MinMax
Units dBm, dBµV, V/m, A/m, W/m² (dBµV/m etc. via PC software)	✓	✓	✓	✓	✓	✓	✓
Internal Datalogger (size). Expandable to 1MB (option 001)	-	64K	64K	64K	64K	64K	harddisk
Lowest SampleTime	100mS	100mS	100mS	10mS	10mS	5mS	5mS
Accuracy (typical)	+/-4dB	+/-3dB	+/-3dB	+/-2dB	+/-2dB	+/-1dB	+/-1dB
Highlights							
Real-time remote control via USB	✓	✓	✓	✓	✓	✓	internal
Calibration setup (antenna, cable, attenuator etc.)	✓	✓	✓	✓	✓	✓	✓
Exposure limit calculation according to ICNIRP, EN55011, EN55022 etc.	ICNIRP only	ICNIRP only	ICNIRP only	ICNIRP only	ICNIRP only	✓	✓
Extended full ICNIRP range	-	-	-	-	-	✓	✓
Suitable for pre-compliance test	-	-	-	-	-	✓	✓
Realtime limit calculation with simultaneous percentage display	-	✓	✓	✓	✓	✓	Analyzer sw
Time-Domain and fast Zero-Span sweep	-	-	-	✓	✓	✓	✓
Vector power measurement (I/Q) and True RMS	-	✓	✓	✓	✓	✓	✓
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
Write, AVG and Hold function	no AVG	no AVG	no AVG	✓	✓	✓	& Min, Max
DECT and TimeSlot Analyzer	✓	✓	✓	✓	✓	✓	✓
Audio Level Indicator (changes audio frequency vs power level)	-	-	-	✓	✓	✓	-
Free of charge firmware update (via Intenet)	✓	✓	✓	✓	✓	✓	✓
Supports programming of custom P-Code & C++ based custom software	-	✓	✓	✓	✓	✓	✓
14Bit Dual-ADC & DDC Hardware-Filter	-	-	-	✓	✓	✓	✓
150MIPS 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	✓	✓	✓	✓	✓	✓

Please continue on next page


HF-2025E


HF-4040


HF-4060


HF-6060 V4


HF-6080 V4


HF-60100 V4


HF-XFR

SPECTRAN® HF (RF) Spectrum Analyser

AARONIA AG WWW.AARONIA.DE

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

	Entrance	Intermediate		Professional			Outdoor
Connectors / Interface	HF-2025E	HF-4040	HF-4060	HF-6060V4	HF-6080V4	HF-60100V4	HF-XFR
USB 1.1/2.0	✓	✓	✓	✓	✓	✓	2x
Audio output (2,5mm jack)	✓	✓	✓	✓	✓	✓	3,5mm jack
Charger plug (max. 12V)	✓	✓	✓	✓	✓	✓	✓
50Ohm SMA input (f)	✓	✓	✓	✓	✓	✓	✓
Jog Dial (easy usage of menu operation and volume control)	-	✓	✓	✓	✓	✓	key & touchpad
1/4" tripod connector	✓	✓	✓	✓	✓	✓	in-Vehicle docking
Included In Delivery							
Miniature SMA rod sniffer antenna	✓	✓	✓	-	-	-	OmniLOG 90200
HyperLOG EMC directional LogPer antenna (model)	7025	7040	7060	7060	6080	60100	60100 (black)
SPECTRAN 1300mAh rechargable battery (integrated)	✓	✓	✓	✓	✓	✓	6 cell battery
Battery charger and power supply incl. international adapter sit	✓	✓	✓	✓	✓	✓	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	✓	✓	✓	✓	✓	✓	✓
SMA adapter	✓	✓	✓	✓	✓	✓	-
Available Options (extra charge)							
Option 001 (1MB memory expansion)	-	✓	✓	✓	✓	✓	harddisk
Option 002 (high accurate 0,5ppm TCXO timebase)	-	-	-	-	-	✓	installed
Option 020 (15dB internal low noise preamplifier, switchable)	-	-	-	✓	✓	✓	installed
Option 20x (Real-time Broadband Peak Power Meter)	✓	✓	✓	✓	✓	✓	✓
Option UBBV1 (40dB external preamplifier 1MHz-1GHz)	-	-	-	✓	✓	✓	✓
Option UBBV2 (40dB external preamplifier DC-8GHz)	-	-	-	✓	✓	✓	✓
Optional Accessories							
USB Cable (special EMC screened 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	✓	✓	✓	✓	✓	✓	-
Heavy Multifunctional Pistol Grip	✓	✓	✓	✓	✓	✓	-
Aluminum Tripod (big version)	✓	✓	✓	✓	✓	✓	-
DC-Blocker (protects the input against DC voltage)	✓	✓	✓	✓	✓	✓	✓
20dB Attenuator (expands the measurement range by 20dB)	✓	✓	✓	✓	✓	✓	✓
PBS1 Near Field Probe Set (passive)	-	-	-	-	-	✓	✓
PBS2 Near Field Probe Set (active, incl. UBBV2 preamplifier)	-	-	-	-	-	✓	✓
ADP1 Active Differential Probe (conductive measurement)	-	-	-	-	-	✓	✓
5m or 10m low loss SMA Cable	✓	✓	✓	✓	✓	✓	✓
Calibration Resistor (needed for noise floor calibration, SMA)	-	-	-	✓	✓	✓	✓
Calibration Certificate	✓	✓	✓	✓	✓	✓	✓
Heavy Plastic Carrying Case	✓	✓	✓	✓	✓	✓	-

(1) The new V5 real-time spectrum analyser generation up to 80GHz is already in development. Please contact us for further details!
Preliminary specifications dated 01.07.2011. The V4 and XFR series are available with latest Beta firmware. The Beta firmware is constantly in 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, 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.
V4 and XFR DANL @5,555GHz. Maximum sensitivity of Rev.3 units: -90dBm @2,2GHz.
(2) Standard: +20dBm. Only with optional 20dB attenuator +40dBm. Standard: 1kHz. Only with option 002 down to 200Hz.
(3) Depending on frequency the option 20x offers a sensetivity down to -50dBm and max. +10dBm, with optional 20dB attenuator +30dBm.


HF-2025E


HF-4040


HF-4060


HF-6060 V4


HF-6080 V4


HF-60100 V4


HF-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

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).

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

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

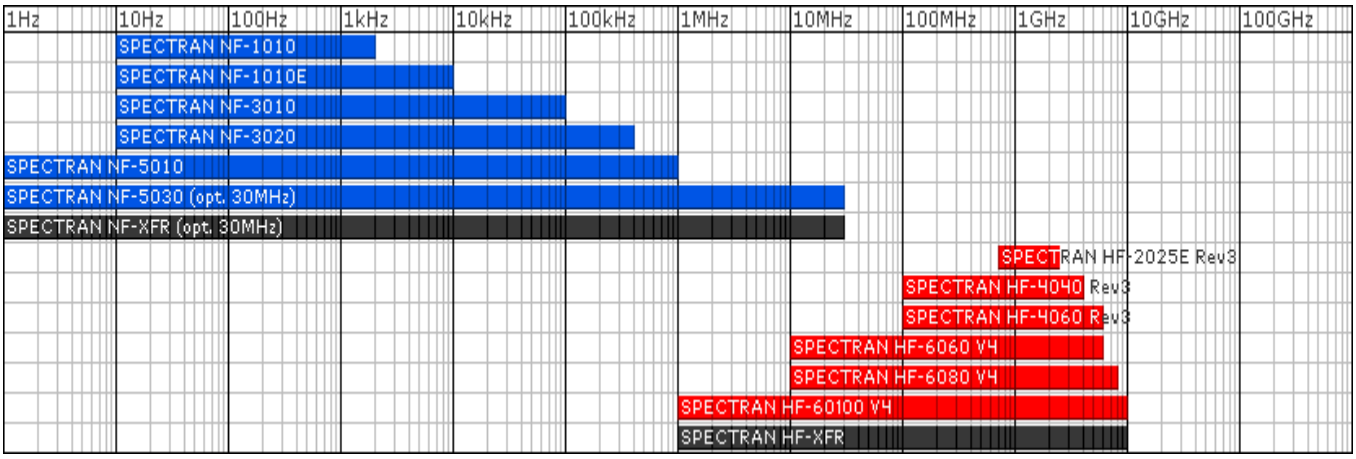
20dB SMA high-end Attenuator

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

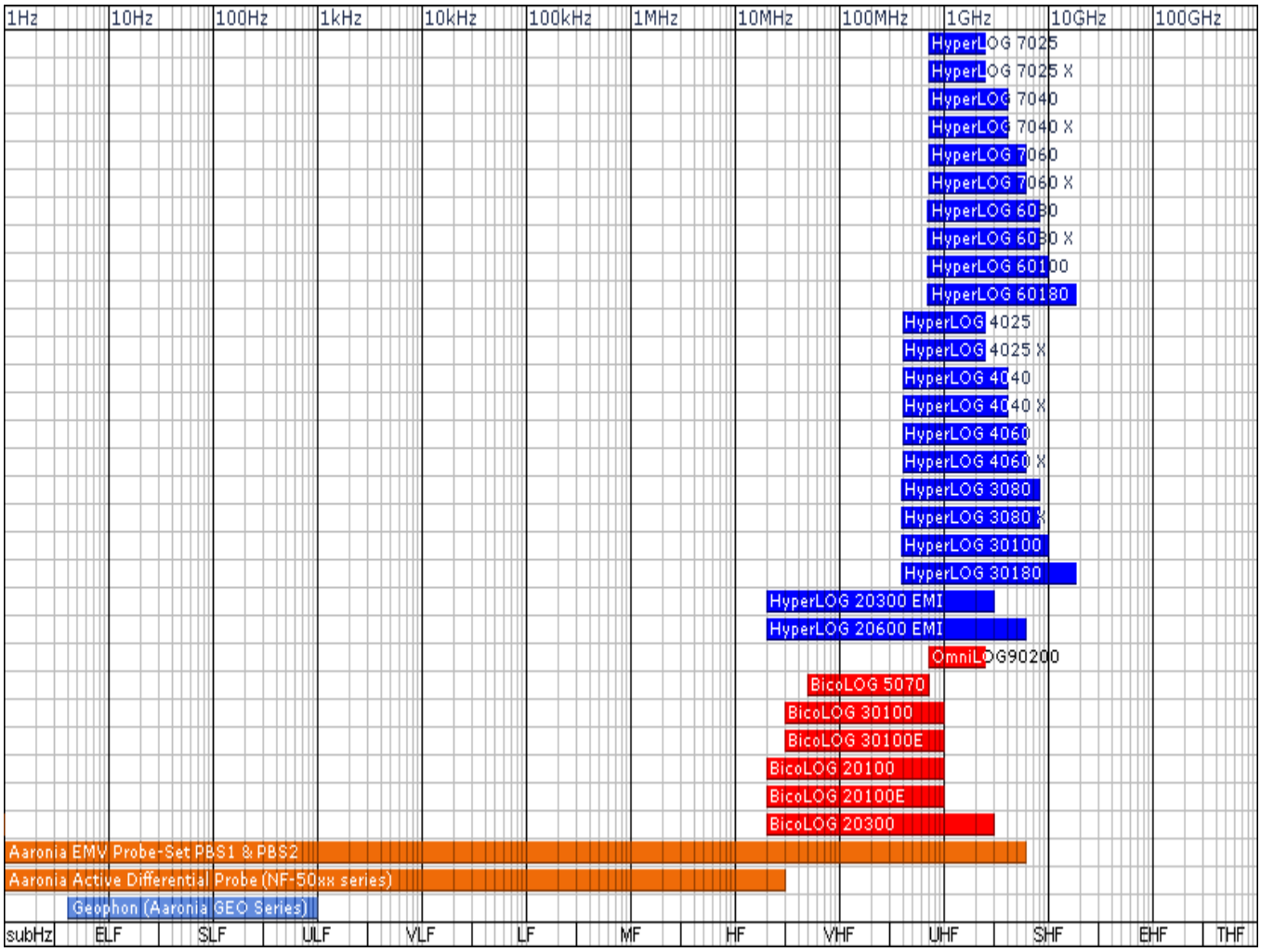
Order/Art.-No.: 775

Frequency overview Analyzer & Antennas

Frequency Overview SPECTRAN 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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für Elektromagnetische Verträglichkeit
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Email:mail@aaronia.de URL:www.aaronia.com

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

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

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

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

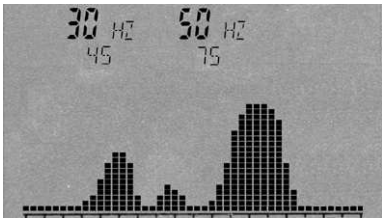
CONFORMING TO STANDARDS and EXACT

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 ?

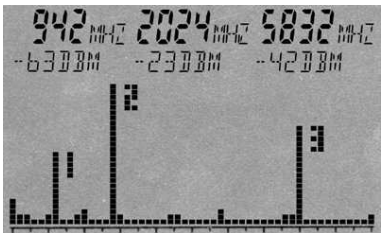
Spectrum ANALYSIS

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

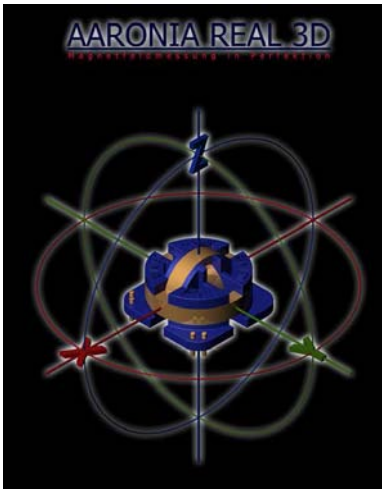


RF spectrum display and automatic triple multi-marker display on the digital screen of a HF-SPECTRAN® (Screenshot)

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

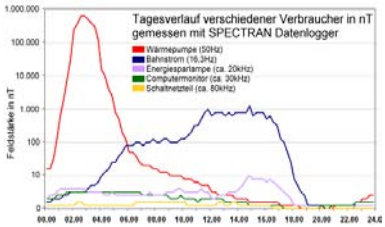
3D magnetic field measurement:
Mismeasurement caused by wrongly adjusting the measurement device in space or troublesome and complex 3D calculations with a calculator are a problem of the past from now on, thanks to SPECTRAN® EMF (LF) measurement devices. All SPECTRAN® EMF (LF) measurement devices can 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

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

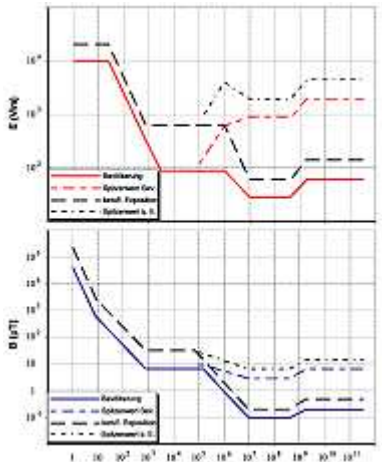
Daily variation of this RF transmitter discloses EXTREME variation in time

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

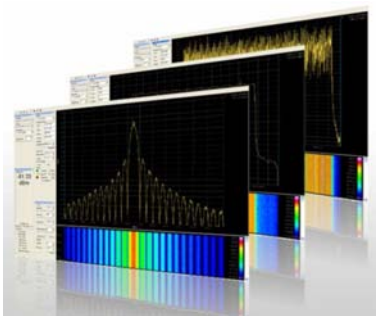
SPECTRAN® displays exposure limits both as percentage as well as a bargraph display. Our example shows approximation to the ICNIRP exposure limits by 0,06%. (Screenshot)

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

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)	-	-	✓	✓	✓	✓	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 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	-	✓	✓	✓	✓	✓	-
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)	-	✓	✓	✓	✓	✓	64GB
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**	-
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	✓	✓	✓	✓	✓	✓	-
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.

© **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

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

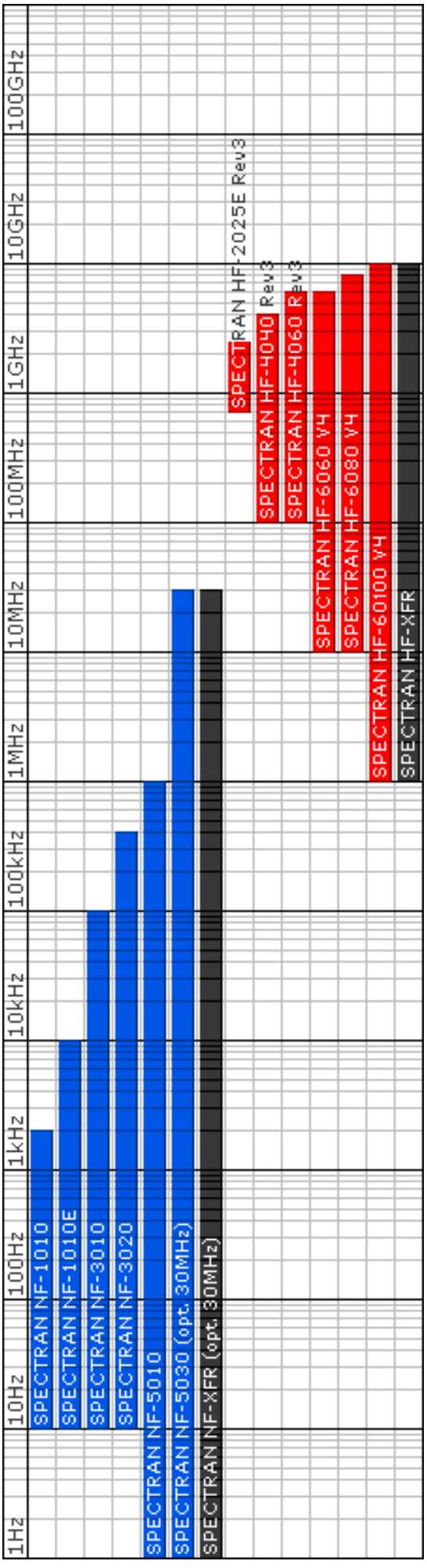
20dB SMA high-end Attenuator

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

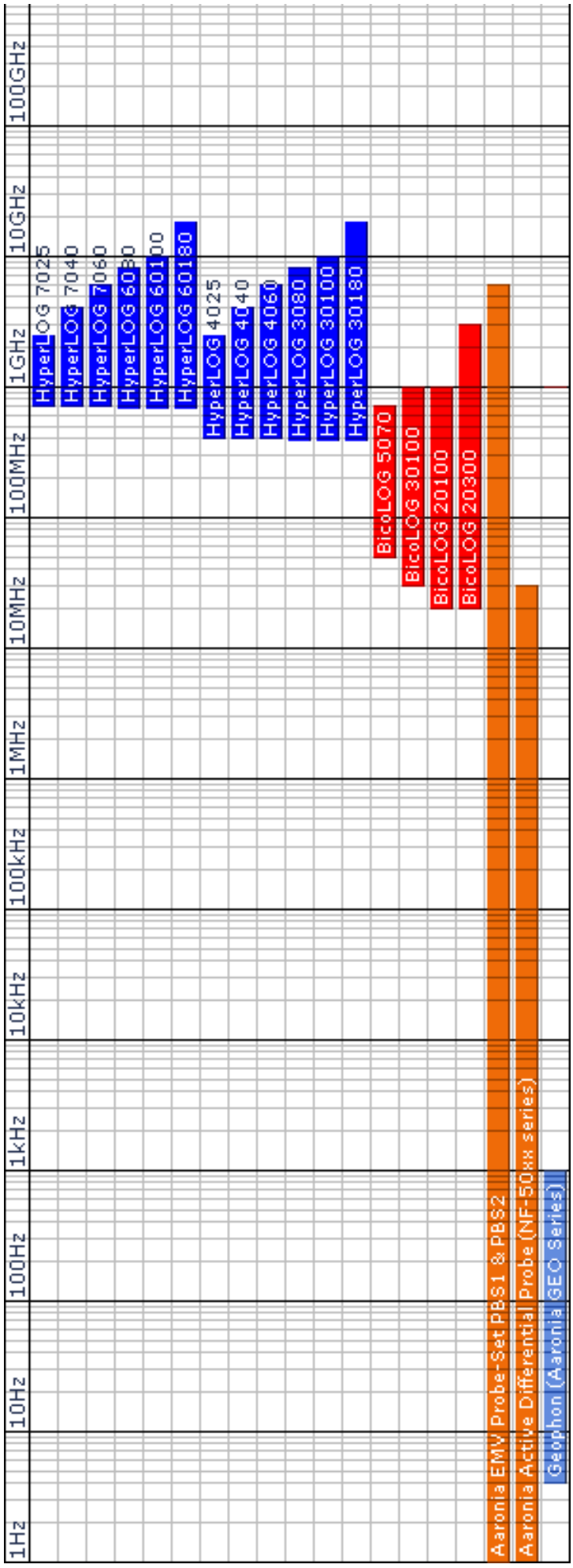
Order/Art.-No.: 775

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

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Internationale Messe mit Workshops für Elektromagnetische Verträglichkeit
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

SPECTRAN® NF (EMF) Spectrum Analyser

AARONIA AG

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

	Entrance		Intermediate		Professional		Outdoor
Specifications base unit[1]	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 Rance (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, BImSchV 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 Intenet)	-	✓	✓	✓	✓	✓	✓
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.

	Entrance		Intermediate		Professional		Outdoor
Connectors / Interface	**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 rechargable 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 01.02.2011. The NF and XFR series are available with latest Beta firmware. The Beta firmware is constantly in 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, 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.

[2] NF standard: 1MHz. Only with option 010 up to 30MHz. NF standard: 1nT. Only with option 005 down to 1pT. NF standard 2µV. Only with option 005 down to 200nV. NF standard: 200mV. Only with optional 20dB Attenuator up to 2V.


NF-1010


NF-1010E


NF-3010


NF-3020


NF-5010


NF-5030


NF-XFR

SPECTRAN® HF (RF) Spectrum Analyser

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

	Entrance	Intermediate		Professional			Outdoor
Specifications base unit[1]	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 Rance (max)	2,5GHz	4GHz	6GHz	6GHz	8GHz	9,4GHz	9,4GHz
Optional PEAK Power-Detector (Maximum usable frequency)[3]	2,5GHz	4GHz	6GHz	6GHz	8GHz	10GHz	10GHz
DANL (Displayed Average Noise Level)[2]	-80dBm	-90dBm	-90dBm	-135dBm(1Hz)	-145dBm(1Hz)	-155dBm(1Hz)	-155dBm(1Hz)
DANL (Displayed Average Noise Level) with Preamp (Option 020)[2]	-	-	-	-150dBm(1Hz)	-160dBm(1Hz)	-170dBm(1Hz)	-170dBm(1Hz)
Max Power at RF input	0dBm	0dBm	0dBm	+10dBm	+10dBm	+40dBm[2]	+40dBm[2]
RBW (resolution bandwidth) (min)	1MHz	100kHz	100kHz	10kHz	3kHz	200Hz[2]	200Hz[2]
RBW (resolution bandwidth) (max)	50MHz	50MHz	50MHz	50MHz	50MHz	50MHz	50MHz
EMC-Filter 200Hz, 9kHz, 120kHz, 200kHz, 1,5MHz, 5MHz	-	-	-	-	-	✓	✓
Demodulator	AM	AM/FM	AM/FM	AM/FM	AM/FM/PM	AM/FM/FM/GSM	AM/FM/FM/GSM
Detector	RMS	RMS	RMS	RMS/MinMax	RMS/MinMax	RMS/MinMax	RMS/MinMax
Units dBm, dBµV, V/m, A/m, W/m² (dBµV/m etc. via PC software)	✓	✓	✓	✓	✓	✓	✓
Internal Datalogger (size). Expandable to 1MB (option 001)	-	64K	64K	64K	64K	64K	harddisk
Lowest SampleTime	100mS	100mS	100mS	10mS	10mS	5mS	5mS
Accuracy (typical)	+/-4dB	+/-3dB	+/-3dB	+/-2dB	+/-2dB	+/-1dB	+/-1dB
Highlights							
Real-time remote control via USB	✓	✓	✓	✓	✓	✓	internal
Calibration setup (antenna, cable, attenuator etc.)	✓	✓	✓	✓	✓	✓	✓
Exposure limit calculation according to ICNIRP, EN55011, EN55022 etc.	ICNIRP only	ICNIRP only	ICNIRP only	ICNIRP only	ICNIRP only	✓	✓
Extended full ICNIRP range	-	-	-	-	-	✓	✓
Suitable for pre-compliance test	-	-	-	-	-	✓	✓
Realtime limit calculation with simultaneous percentage display	-	✓	✓	✓	✓	✓	Analyzer sw
Time-Domain and fast Zero-Span sweep	-	-	-	✓	✓	✓	✓
Vector power measurement (I/Q) and True RMS	-	✓	✓	✓	✓	✓	✓
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
Write, AVG and Hold function	no AVG	no AVG	no AVG	✓	✓	✓	& Min, Max
DECT and TimeSlot Analyzer	✓	✓	✓	✓	✓	✓	✓
Audio Level Indicator (changes audio frequency vs power level)	-	-	-	✓	✓	✓	-
Free of charge firmware update (via Intenet)	✓	✓	✓	✓	✓	✓	✓
Supports programming of custom P-Code & C++ based custom software	-	✓	✓	✓	✓	✓	✓
14Bit Dual-ADC & DDC Hardware-Filter	-	-	-	✓	✓	✓	✓
150MIPS 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	✓	✓	✓	✓	✓	✓

Please continue on next page


HF-2025E


HF-4040


HF-4060


HF-6060 V4


HF-6080 V4


HF-60100 V4


HF-XFR

SPECTRAN® HF (RF) Spectrum Analyser

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

	Entrance	Intermediate		Professional			Outdoor
Connectors / Interface	HF-2025E	HF-4040	HF-4060	HF-6060V4	HF-6080V4	HF-60100V4	HF-XFR
USB 1.1/2.0	✓	✓	✓	✓	✓	✓	2x
Audio output (2,5mm jack)	✓	✓	✓	✓	✓	✓	3,5mm jack
Charger plug (max. 12V)	✓	✓	✓	✓	✓	✓	✓
50Ohm SMA input (f)	✓	✓	✓	✓	✓	✓	✓
Jog Dial (easy usage of menu operation and volume control)	-	✓	✓	✓	✓	✓	key & touchpad
1/4" tripod connector	✓	✓	✓	✓	✓	✓	in-Vehicle docking
Included In Delivery							
Miniature SMA rod sniffer antenna	✓	✓	✓	-	-	-	OmniLOG 90200
HyperLOG EMC directional LogPer antenna (model)	7025	7040	7060	7060	6080	60100	60100 (black)
SPECTRAN 1300mAh rechargable battery (integrated)	✓	✓	✓	✓	✓	✓	6 cell battery
Battery charger and power supply incl. international adapter sit	✓	✓	✓	✓	✓	✓	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	✓	✓	✓	✓	✓	✓	✓
SMA adapter	✓	✓	✓	✓	✓	✓	-
Available Options (extra charge)							
Option 001 (1MB memory expansion)	-	✓	✓	✓	✓	✓	harddisk
Option 002 (high accurate 0,5ppm TCXO timebase)	-	-	-	-	-	✓	installed
Option 020 (15dB internal low noise preamplifier, switchable)	-	-	-	✓	✓	✓	installed
Option 20x (Real-time Broadband Peak Power Meter)	✓	✓	✓	✓	✓	✓	✓
Option UBBV1 (40dB external preamplifier 1MHz-1GHz)	-	-	-	✓	✓	✓	✓
Option UBBV2 (40dB external preamplifier DC-8GHz)	-	-	-	✓	✓	✓	✓
Optional Accessories							
USB Cable (special EMC screened 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	✓	✓	✓	✓	✓	✓	-
Heavy Multifunctional Pistol Grip	✓	✓	✓	✓	✓	✓	-
Aluminum Tripod (big version)	✓	✓	✓	✓	✓	✓	-
DC-Blocker (protects the input against DC voltage)	✓	✓	✓	✓	✓	✓	✓
20dB Attenuator (expands the measurement range by 20dB)	✓	✓	✓	✓	✓	✓	✓
PBS1 Near Field Probe Set (passive)	-	-	-	-	-	✓	✓
PBS2 Near Field Probe Set (active, incl. UBBV2 preamplifier)	-	-	-	-	-	✓	✓
ADP1 Active Differential Probe (conductive measurement)	-	-	-	-	-	✓	✓
5m or 10m low loss SMA Cable	✓	✓	✓	✓	✓	✓	✓
Calibration Resistor (needed for noise floor calibration, SMA)	-	-	-	✓	✓	✓	✓
Calibration Certificate	✓	✓	✓	✓	✓	✓	✓
Heavy Plastic Carrying Case	✓	✓	✓	✓	✓	✓	-

(1) The new V5 real-time spectrum analyser generation up to 80GHz is already in development. Please contact us for further details!
Preliminary specifications dated 01.02.2011. The V4 and XFR series are available with latest Beta firmware. The Beta firmware is constantly in 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, 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.
V4 and XFR DANL @5,555GHz. Maximum sensitivity of Rev.3 units: -90dBm @2,2GHz.
(2) Standard: +20dBm. Only with optional 20dB attenuator +40dBm. Standard: 1kHz. Only with option 002 down to 200Hz.
(3) Depending on frequency the option 20x offers a sensetivity down to -50dBm and max. +10dBm, with optional 20dB attenuator +30dBm.


HF-2025E


HF-4040


HF-4060


HF-6060 V4


HF-6080 V4


HF-60100 V4


HF-XFR

SPECTRAN® USB Spectrum Analyser

APPLICATION EXAMPLES: Pre-Compliance test, conductive EMC/EMI test, exposure limit measurement etc.

	Professional				Outdoor	
Specifications basic unit[1]	NF-5030 X	HF-6060V4 X	HF-6080V4 X	HF-60100V4 X	NF-XFR	HF-XFR
Frequency Range (min)	1Hz	10MHz	10MHz	1MHz	1Hz	1MHz
Frequency Range (max)	30MHz	6GHz	8GHz	9,4GHz	30MHz[2]	9,4GHz
Optional PEAK Power-Detector (Maximum usable frequency)[3]	-	6GHz	8GHz	10GHz	-	10GHz
DANL (Displayed Average Noise Level)[2]	200nV	-135dBm(1Hz)	-145dBm(1Hz)	-155dBm(1Hz)	200nV	-155dBm(1Hz)
DANL (Displayed Average Noise Level) with Preamp (Option 020)[2]	-	-150dBm(1Hz)	-160dBm(1Hz)	-170dBm(1Hz)	-	-170dBm(1Hz)
Max. Power at RF input	2V[2]	+10dBm	+10dBm	+40dBm[2]	2V[2]	+40dBm[2]
RBW (Resolution bandwidth) (min)	0,3Hz	10kHz	3kHz	200Hz[2]	0,3Hz	200Hz
RBW (Resolution bandwidth) (max)	1MHz	50MHz	50MHz	50MHz	1MHz	50MHz
EMC Filter 200Hz, 9kHz, 120kHz, 200kHz, 1,5MHz, 5MHz	-	-	-	✓	-	✓
Demodulator	AM/FM	AM/FM	AM/FM/PM	AM/FM/PM/GSM	AM/FM	AM/FM/PM/GSM
Detector	RMS/MinMax	RMS/MinMax	RMS/MinMax	RMS/MinMax	RMS/MinMax	RMS/MinMax
Units dBm, dBµV, V/m, A/m, W/m² (dBµV/m, W/cm² etc. via PC software)	V, dBV	✓	✓	✓	V, dBV	✓
Lowest Sample Time	10mS	10mS	10mS	5mS	10mS	5mS
Accuracy (typical)	+/-3%	+/-2dB	+/-2dB	+/-1dB	+/-3%	+/-1dB
Highlights						
Real-time remote control via USB	✓	✓	✓	✓	internal	internal
Calibration setup (antenna, cable, attenuator etc.)	✓	✓	✓	✓	✓	✓
Exposure limit calculation according to ICNIRP, EN55011, EN55022 etc.	✓	ICNIRP only	ICNIRP only	✓	✓	✓
Extended full ICNIRP range	-	-	-	✓	-	✓
Suitable for Pre-Compliance test	✓	-	-	✓	✓	✓
Suitable for conductive EMC/EMI test	✓	-	-	✓	✓	✓
Real-time limit calculation, limit line display and limit percentage bar display	✓	✓	✓	✓	✓	✓
Time Domain and fast Zero Span sweep incl. DECT and Time Slot Analyzer	-	✓	✓	✓	-	✓
Unlimited longtime recording and playback feature	✓	✓	✓	✓	✓	✓
Simultaneously displays frequency and signal strength	✓	✓	✓	✓	✓	✓
Multiple unit handling and unlimited multiple window handling	✓	✓	✓	✓	✓	✓
Number of marker (showing frequency and field strength simultaneously)	unlimited	unlimited	unlimited	unlimited	unlimited	unlimited
Spectrum, waterfall, persistance and level vs time display	✓	✓	✓	✓	✓	✓
Sweep, AVG, Max, Min and Hold function	✓	✓	✓	✓	✓	✓
Unlimited number of sweep points, resolution and display size	✓	✓	✓	✓	14” TFT	14” TFT
Supports programming of custom P-Code, C++ based custom software support	✓	✓	✓	✓	✓	✓
Free of charge firmware update (via Intenet)	✓	✓	✓	✓	✓	✓
14Bit Dual-ADC & DDC hardware filter	-	✓	✓	✓	-	✓
150MIPS high performance DSP (Digital Signal Processor)	-	✓	✓	✓	-	✓
Vector power measurement (I/Q) and True RMS	✓	✓	✓	✓	✓	✓
Solid 3mm aluminum housing with excellent shielding performance	✓	✓	✓	✓	-	-
Integrated rechargable battery	-	-	-	-	✓	✓
Internal speaker	✓	✓	✓	✓	✓	✓

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NF-5030 X

HF-6060 X

HF-6080 X

HF-60100 X

NF-XFR

HF-XFR

SPECTRAN® USB Spectrum Analyser

APPLICATION EXAMPLES: Pre-Compliance test, conductive EMC/EMI test, exposure limit measurement etc.

	Professional				Outdoor	
Connectors / Interface	**NF-5030 X**	**HF-6060V4 X**	**HF-6080V4 X**	**HF-60100V4 X**	**NF-XFR**	**HF-XFR**
50Ohm SMA input (f)	high impedance	✓	✓	✓	high impedance	✓
USB 1.1/2.0	✓	✓	✓	✓	2x	2x
Audio output (2,5mm jack)	✓	✓	✓	✓	3,5mm jack	3,5mm jack
Charger plug (max. 12V)	✓	✓	✓	✓	✓	✓
Included In Delivery						
HyperLOG EMC directional LogPer antenna (model)	-	-	-	-	-	60100 (black)
OmniLOG 90200 radial isotropic antenna	-	✓	✓	✓	-	✓
Rechargable Battery	-	-	-	-	✓	✓
Battery charger and/or power supply incl. international adapter set	✓	✓	✓	✓	no adapter set	no adapter set
Aluminum carrying case with foam protection	✓	✓	✓	✓	-	-
Detailed English manual (on CD)	✓	✓	✓	✓	installed	installed
Analyzer Software for MAC-OS, Linux and Windows (on CD)	✓	✓	✓	✓	installed	installed
1m SMA Cable	-	-	-	-	-	✓
SMA Tool	✓	✓	✓	✓	✓	✓
USB Cable (special EMC screened version)	✓	✓	✓	✓	installed	installed
Available Options (extra charge)						
Option 002 (high accurate 0,5ppm TCXO timebase)	-	-	-	✓	-	installed
Option 005 (12Bit DDC for ultra high sensitivity)	✓	-	-	-	installed	-
Option 008 (20MHz frequency expansion. New range: 1Hz-20MHz)	✓	-	-	-	installed	-
Option 010 (30MHz frequency expansion. New range: 1kHz-30MHz)	✓	-	-	-	✓	-
Option 020 (15dB internal low noise preamplifier, switchable)	-	✓	✓	✓	-	installed
Option 20x (Real-time Broadband Peak Power Meter)	-	✓	✓	✓	-	✓
Option UBBV1 (40dB external preamplifier 1MHz-1GHz)	-	✓	✓	✓	-	✓
Option UBBV2 (40dB external preamplifier DC-8GHz)	✓	✓	✓	✓	✓	✓
Optional Accessories						
DC-Blocker (protects the input against DC voltage)	✓	✓	✓	✓	✓	✓
20dB Attenuator (expands the measurement range by 20dB)	✓	✓	✓	✓	✓	✓
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)	✓	-	-	-	✓	-
5m or 10m low loss SMA cable	-	✓	✓	✓	-	✓
Calibration Resistor (for noise floor calibration, SMA)	-	✓	✓	✓	-	✓
Calibration Certificate	✓	✓	✓	✓	✓	✓

[1] The new V5 real-time spectrum analyser generation up to 80GHz is already in development. Please contact us for further details!
Preliminary specifications dated 01.02.2011. The NF, V4 and XFR series are available with latest Beta firmware. The Beta firmware is constantly in 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, 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.

[2] V4 DANL @5,555GHz. V4 internal: +20dBm. V4 external (with optional 20dB attenuator): +40dBm. V4 standard: 1kHz. Only with option 002 down to 200Hz.
NF standard: 1MHz. Only with option 010 up to 30MHz. NF standard: 200mV. Only with optional 20dB Attenuator up to 2V.

[3] Depending on frequency the option 20x offers a sensetivity down to -50dBm and max. +10dBm, with optional 20dB attenuator +30dBm.

NF-5030 X

HF-6060 X

HF-6080 X

HF-60100 X

NF-XFR

HF-XFR