Datasheet

Rev 1.4
12.04.2011

USB Spectrum Analyzer X-Series

USB controlled Spectrum-Analyser Series - Extremly high Sensitivity (max. -170dBm/Hz)
Wide Frequency Range from 1Hz - 9,4GHz (EMF & RF)

Included in Delivery:

- USB-Spectrum-Analyzer in a milled aluminum housing
- **PC/MAC/LINUX USB-Analyzer-Software on CD**
- OmniLOG 90200 radial isotropic Antenna (only HF V4 X)
- International Power Supply incl. Adapterset
- Aaronia USB-Cable
- Aluminum Transportcase
- Cleaning Brush

AARONIA AG®
WWW.AARONIA.DE

Made in Germany

Specifications

SPECTRAN® HF-6060 V4 X (10MHz - 6GHz)

- 14Bit Dual-ADC
- DDC Hardware-Filter
- 150 MIPS DSP (CPU)
- Frequency range: 10MHz to 6GHz
- AVG Noise Level (DANL): -135dBm(1Hz)
- AVG Noise Level (DANL) PreAmp: **-150dBm**(1Hz)
- AbsMax Level: +10dBm
- Lowest possible SampleTime: **1mS**
- Typ. accuracy: +/- 2dB
- Standards-conformant exposure limits (ICNIRP, BGV B11, BImSchV etc.)
- Dimensions (L/W/D): (210x140x25) mm
- Weight: 700gr
- **Warranty: 10 years**

SPECTRAN® HF-6080 V4 X (10MHz - 8GHz)

- 14Bit Dual-ADC
- DDC Hardware-Filter
- 150 MIPS DSP (CPU)
- Frequency range: 10MHz to **8GHz**
- AVG Noise Level (DANL): -145dBm(1Hz)
- AVG Noise Level (DANL) PreAmp: **-160dBm**(1Hz)
- AbsMax Level: +10dBm
- Lowest possible SampleTime: **1mS**
- Typ. accuracy: +/- 2dB
- Standards-conformant exposure limits (ICNIRP, BGV B11, BImSchV etc.)
- Dimensions (L/W/D): (210x140x25) mm
- Weight: 700gr
- **Warranty: 10 years**

SPECTRAN® HF-60100 V4 X (1MHz - 9,4GHz)

- 14Bit Dual-ADC
- DDC Hardware-Filter
- 150 MIPS DSP (CPU)
- Frequency range: 1MHz to **9,4GHz**
- AVG Noise Level (DANL): -155dBm(1Hz)
- AVG Noise Level (DANL) PreAmp: **-170dBm**(1Hz)
- AbsMax Level: +20dBm
- AbsMax Level: **+40dBm** (Option)
- Lowest possible SampleTime: **1mS**
- Typ. accuracy: +/- 1dB
- Standards-conformant exposure limits (ICNIRP, BGV B11, BImSchV etc.)
- Dimensions (L/W/D): (210x140x25) mm
- Weight: 700gr
- **Warranty: 10 years**

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

- Incl. Option 005 (12 Bit DDC Frequency Filter)
- **65 MSPS**
- Frequency range: 1Hz to 1MHz (optional **30MHz**)
- Typ. level range Analog in: **200nV** to 200mV / -150dBm (Hz)
- Typ. accuracy: 3%
- Superfast FFT spectrum analysis
- High-performance DSP (Digital Signal Processor)
- DIN/VDE 0848 Exposure limit calculation!
- True RMS signal strength measurement
- Average (AVG) measurement
- Dimensions (L/W/D): (210x140x25) mm
- Weight: 700gr
- **Warranty: 10 years**

CE

USB 2.0 ready

10 Jahre Garantie

Designed and Conforms to EN61000-4-3 EN55022

Made in Germany

Description

Spectrum Analysis from 1Hz - 9,4GHz

Find radiation sources in your surroundings. Find their respective frequencies and signal strengths, including PC-Software exposure limits display.

Due to the design and the associated shielding (3mm Aluminum housing) the Spectran X Desktop Analyzer is perfectly suitable for EMC measurements.

The highly complex calculations in spectrum analysis incl. exposure limit calculation is being performed by a highend Analysis Software which runs on almost all platforms (Windows, MAC OS, Linux).

Accurate, sensitive, affordable and beautiful exterior - what more could you ask?

Highlights

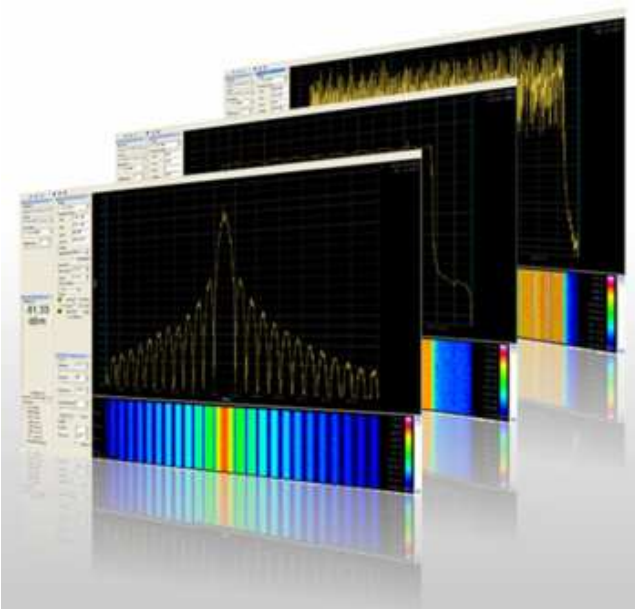
Each Spectran X Desktop Spectrum Analyzer combines the following Highlights:

- 100% controlled by USB
- 100% powered by the external power supply
- Incl. OmniLOG 90200 Antenna (perfect to measure GSM or UMTS)
- 50 Ohm SMA input
- Internal speaker (which can be switched off)
- Audio out for the use of PC based FFT analyzer software
- Very good shielding (3mm aluminum housing)
- Highend, milled aluminum housing made of one piece (no cast part)

Professional PC analysis software (included)

The included PC PRO Analyzer Software for the Spectran X Desktop Spectrum Analyzer offers a huge functionality:

- **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-clik-king!
- **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.
- 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.



The PRO PC-Software for the SPECTRAN X

Included with delivery

- Desktop-Spectrum-Analyzer in a milled aluminum housing
- **PC/MAC/LINUX Analyzer Software on CD**
- OmniLOG 90200 Antenna (only HF V4 X)
- International Power Supply
- Aaronia USB-Cable
- Aluminum Transportcase
- Cleaning Brush

SPECTRAN® USB Spectrum Analyser

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

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	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	✓	✓	✓	✓	✓	✓

Please continue on next page

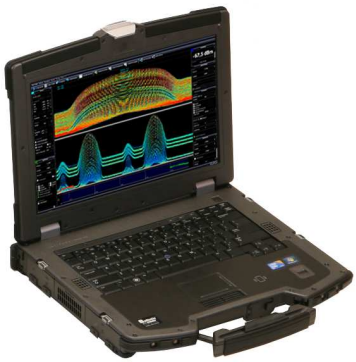
NF-5030 X

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.

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	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.

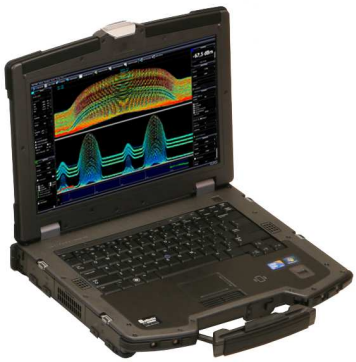
NF-5030 X

HF-6060 X

HF-6080 X

HF-60100 X

NF-XFR



HF-XFR

Options & Accessories Desktop Spectrumanalyzer X Series

Option 020: Internal 15dB low-noise preamplifier

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!
The maximum sensitivity of the V4 X series without option 020 is lower by 15dB.

Order/Art.-No.: 177

Option 002: 0,5PPM TCXO timebase

(Only available for Spectran® HF-60100 V4 X).
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 X, this option is indispensable! Furthermore, the TCXO 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.

Order/Art.-No.: 181

Option 022: 40dB low-noise preamplifier DC-1GHz

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!
The 40dB preamplifier is already included in the EMC-Bundle1.

Order/Art.-No.: 177-2

Option 010: 30MHz frequency extension

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

Order/Art.-No.: 179-1

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 X-Analyzer.

Order/Art.-No.: 779

20dB high-end Attenuator

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

Order/Art.-No.: 775

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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