REAL-TIME Outdoor Spectrum Analyzer
SPECTRAN® XFR V5 PRO (1Hz - 20GHz)

World’s fastest Countersurveillance Receiver

Highlights
- Fastest Countersurveillance Receiver in the World, scans 20GHz in less than 20mS (1000GHz / sec.)
- Ultra robust real-time Outdoor Spectrum Analyzer (IP65, -20°C to +60°C)
- Real-time capture bandwidth up to 175MHz
- POI below 1µS
- Unlimited recording time (needs 1GB / min.)
- Wide measuring range up to 20GHz
- Sample rate/second: > 5 million
- 500 MSPS (14 Bit Dual 256MSPS I/Q)
- Up to 4TB ultra-fast SSD recording storage
- Optional I/Q Generator (6GHz) and Power Meter (40GHz)
- Extra large 15.6” Widescreen Display (Full HD, 1920x1080) with Multi-touch Screen, sunlight readable (800 Nits-QuadraClear)
- Intel i7 with 8GB RAM, nVidia Power
- Integrated GPS
- Includes World’s first 3D real-time Spectrum monitoring and recording Software (gapless streaming and playback)

Applications
- Technical surveillance countermeasures (TSCM)
- Security surveys for eavesdropping detection
- Interference hunting
- Radio monitoring and enforcement
- Maintenance, installation and repair in the factory / field
- VIP monitoring
- Conference monitoring
- EMC/EMI testing
- Seeing weak signals masked by stronger ones
- Discovery of rare, short duration events
- Capturing spread-spectrum and frequency-hopping signals
- Investigating misuse of the crowded RF spectrum
The SPECTRAN XFR V5 PRO is a portable Real-Time Spectrum Analyzer, designed to capture even shortest signal transmissions. It’s scanning speed and recording time is without competition, the Analyzer scans 20GHz in less than 20mS making it the world’s fastest counter-surveillance receiver.

The easy to use software is suited for detecting unknown or illegal transmissions across a wide frequency range. With an unlimited recording time (needs approx. 1GB hard disk space per minute) the XFR V5 PRO allows to store several hours of real-time data. Once recorded the entire measurement data can be re-loaded into the software. The optional I/Q Generator allows to generate the recorded signals 1:1 up to 6GHz.

Several helpful features allow a deep investigation of the Real-Time measurement or recorded data, e.g. a 3D Spectrogram view which displays a signal like newer seen before.

With this Spectrum Analyzer you can master all the challenges. It provides a powerful, extremely impact resistant Outdoor notebook and a high-end spectrum analyzer in one compact device. The XFR V5 PRO has been independently tested in accordance with MIL-STD-810G, IP65 and MIL-STD-461F.

BUILT TO DETECT

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RF measurement at the highest level

The XFR offers a huge variety of helpful functions for spectrum analysis

- Various trigger function and unlimited number of markers
- Different views: Spectrum / persistence Spectrum, Spectrogram / Waterfall, 3D Waterfall, Histogram
- Multi Window feature supports several views at the same time, e.g. Spectrum & Waterfall & Histogram at once
- Comfortable reference level and color settings
- Reporting and recording function
- Storage of personal sessions
- Unlimited storage of measurements, hard disk can be expanded up to 4TB for gapless recording of up to 50 hours

... and much more ...

Unmatched Performance

The powerful and ultra-stable Spectrum Analyzer is the first outdoor Spectrum Analyser with an Intel® i7 processor with 8GB RAM, full HD multi touch-screen, integrated GPS and ultra-low noise level up to -170dBm (Hz) DANL (with pre-amps). The XFR V5 PRO is rugged and powerful at the same time.

- The thermal management system enables compliance with military standards for extreme temperatures. Simultaneously, the XFR V5 PRO offers industry-leading performance, thanks to the very latest Intel® i7 processors.
- The Turbo Boost feature increases the processor frequency to the active cores dynamically up to 3.33 GHz, and thus, the performance increase required for timely reaction to critical measurement data.
- With two USB 3.0 super-speed ports, two USB 2.0, a USB2.0/eSATA-combi-connector, two serial ports, two Ethernet ports and a VGA port - among other connections - offers the XFR V5 a variety of interfaces to connect to the desired peripheral.
Scope of delivery

The XFR comes including an extensive scope of delivery, depending on the necessity of the user the delivery can be extended to various additional products (see "Accessories" on Page 9).

- SPECTRAN XFR V5 PRO incl. Option 020 (internal 20dB preamp) & 003 (low frequency extension)
- OmniLOG 70600 omnidirectional antenna (700MHz to 6GHz)
- Pre-installed Spectrum Analysis Software RTSA Suite and MCS
- Rechargeable 8700mAh battery (installed, second hot-swap battery as option available)
- Battery charger / power supply (optional car charger available)
- English manual (on CD)
**RTSA Suite**

World’s fastest Real-Time Analyzer Software included

Aaronia’s real-time Software „RTSA Suite“ offers powerful analysis features. An intuitive layout combined with useful display options helps to identify, capture, demodulate and track signals up to 20GHz.

- High-resolution persistence spectrum display of the current sweep, Average, Min / Max, peak, RMS, etc.
- Marker function with unlimited number of different markers (min, max, delta, AVG, OBW..)
- Intuitive drag and drop zoom, shortkeys etc.

- The XFR V5 PRO displays several views at once (Spectrum, 3D Waterfall, Histogram, etc.)
- The window size can be adjusted freely, therefore a full utilization of the FULL HD display is possible

- Spectrogram / Waterfall View for the identification of frequency hops, measurements of pulse rate, analysis of time variant spectra and the tuning of a VCO
### Technical Data

<table>
<thead>
<tr>
<th>Specification (RF / Performance)</th>
<th>SPECTRAN XFR V5 PRO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Range (min)</td>
<td>1Hz</td>
</tr>
<tr>
<td>Frequency Range (max)</td>
<td>20GHz</td>
</tr>
<tr>
<td>Real-Time Bandwidth</td>
<td>88MHz (optional 160/175MHz)</td>
</tr>
<tr>
<td>Minimum Event Duration for 100% POI</td>
<td>&lt;1µS</td>
</tr>
<tr>
<td>Max. Power at RF input (50 Ohm)</td>
<td>+20dBm (+40dBm*)</td>
</tr>
<tr>
<td>Displayed Average Noise Level (with external pre-amp)</td>
<td>typ. -150dBm/Hz</td>
</tr>
<tr>
<td>Displayed Average Noise Level (internal pre-amp on)</td>
<td>max. -170dBm/Hz</td>
</tr>
<tr>
<td>Amplitude accuracy (typ.)</td>
<td>typ. +/- 1,5dB</td>
</tr>
<tr>
<td>RF input</td>
<td>50 Ohm (N-connector)</td>
</tr>
<tr>
<td>Frequency reference accuracy</td>
<td>0,5ppm (optional 5ppb with Option 002)</td>
</tr>
<tr>
<td>RBW (resolution bandwidth)</td>
<td>1Hz to 40MHz (in preparation)</td>
</tr>
<tr>
<td>VBW (video bandwidth)</td>
<td>1Hz to 40Hz (in preparation)</td>
</tr>
<tr>
<td>Demodulator</td>
<td>AM, FM</td>
</tr>
<tr>
<td>Measurement Units</td>
<td>dBm, dBµV, V/m, A/m, W/m², dBµV/m, W/cm²</td>
</tr>
<tr>
<td>Detector</td>
<td>Min, Max, AVG, Peak, QPeak, special (in preparation)</td>
</tr>
<tr>
<td>Attenuator range</td>
<td>45dB (0,5dB steps, incl. pre-amp)</td>
</tr>
<tr>
<td>Traces</td>
<td>ACT, AVG, MAX, MIN</td>
</tr>
<tr>
<td>Reference range</td>
<td>-200dBm to 100dBm</td>
</tr>
<tr>
<td>Measurement modes</td>
<td>I/Q (in preparation), Power/Frequency Data</td>
</tr>
<tr>
<td>Views</td>
<td>Spectrum, Persistence Spectrum, Spectrogram / Waterfall, Histogram</td>
</tr>
<tr>
<td>Trigger</td>
<td>Cursor, Measurement, Density</td>
</tr>
<tr>
<td>Video RAM</td>
<td>64MB</td>
</tr>
<tr>
<td>SDRAM</td>
<td>256MB</td>
</tr>
<tr>
<td>ADC</td>
<td>500MSPS 14Bit</td>
</tr>
<tr>
<td>GPS</td>
<td>Inbuilt GPS</td>
</tr>
<tr>
<td>FPGA</td>
<td>240K ECP3</td>
</tr>
<tr>
<td>DSP</td>
<td>600MHz</td>
</tr>
</tbody>
</table>

* optionally available +33dBm, decreases sensitivity by 20dB, Article number 775-N
# Specification (Hardware)

<table>
<thead>
<tr>
<th>Technical Data</th>
<th>SPECTRAN XFR V5 PRO</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Intel Haswell i7-4600M</td>
</tr>
<tr>
<td>RAM</td>
<td>8 GB</td>
</tr>
<tr>
<td>HDD</td>
<td>500GB, 7200RPM (optional SSD up to 8TB)</td>
</tr>
<tr>
<td>Operation System</td>
<td>Windows 7</td>
</tr>
<tr>
<td>Display</td>
<td>15,6“ Full-HD 1080p with Multi-touch screen, sunlight readable (800 Nits Quadra-Clear)</td>
</tr>
<tr>
<td>Graphic Card</td>
<td>nVidia Geforce GT 745M DDR3</td>
</tr>
<tr>
<td>Battery</td>
<td>Intelligent Lithium ion battery with 8700mAh (optional second battery, hot swap system)</td>
</tr>
<tr>
<td>Keypad</td>
<td>Membrane keyboard with integrated numeric keypad and LED backlight</td>
</tr>
<tr>
<td>Connectors</td>
<td>2x PCMCIA Type II, 1x ExpressCard/54, 1 x Smart Card Reader I/O interface: 2x Serial port (9-pin, D -Sub), 1x External VGA port (15-pin, D -Sub), 1x microphone, 1x audio output (mini-jack), 1x DC input, 2x USB 3.0, 2x USB 2.0, 1x USB 2.0 / eSATA combo, 2x LAN (RJ45), 1x HDMI, 1x docking connector (80 - pin)</td>
</tr>
<tr>
<td>Interfaces</td>
<td>10/100/1000 BASE -T Ethernet Intel Centrino Advanced-N 6200, 802.11 a/b/g/n, GPS module + Tri - Passthrough</td>
</tr>
<tr>
<td>Safety Features</td>
<td>Intel vPro technology, TPM1.2, fingerprint scanner, smart card reader, Kensington Lock</td>
</tr>
<tr>
<td>Temperature Range (Operation)</td>
<td>-20 °C to +60 °C</td>
</tr>
<tr>
<td>Temperature Range (Storage)</td>
<td>-40 °C to +71 °C</td>
</tr>
<tr>
<td>Dimensions</td>
<td>410 x 315 x 120mm</td>
</tr>
<tr>
<td>Weight</td>
<td>8,5 kg</td>
</tr>
<tr>
<td>Humidity</td>
<td>95% relative humidity, non-condensing</td>
</tr>
<tr>
<td>Power Supply</td>
<td>AC Input: 100-240V, 50-60Hz DC Output: 19V, 4,74A max.</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>&lt; 90W</td>
</tr>
<tr>
<td>Country of Origin</td>
<td>Germany</td>
</tr>
<tr>
<td>Recommended Calibration Interval</td>
<td>2 years</td>
</tr>
</tbody>
</table>
Options

Included in delivery

**Option 020: Internal 20dB Low-Noise Pre-Amplifier**

This option provides an internal, super low-noise 20dB Pre-Amplifier, enabling maximum performance particularly when measuring extremely weak signals. It is switched via a true RF switch.

*Order/Art.-No.: 120*

**Option 003: Low Frequency Extension (starting at 1Hz) (in preparation, not activated yet)**

Extension of the low frequency range to 1Hz. The input signal is internally diverted to a second RF path, which is optimised for low frequency processing. The low frequency path offers a frequency range from 1Hz up to 40MHz. This path uses a high-performance 16Bit AD converter with 105MSPS. This resolution enhancement from 14Bit to 16Bit improves the dynamic range from 80dB (14Bit) to 100dB (16Bit), which leaves nothing to be desired. This path is a fully capable real-time function controllable by µS DDS sweep. The low frequency path (1Hz-40MHz/16Bit) and the radio frequency path (9kHz-20GHz/14Bit) are seamless to the User, except for the particularly noteworthy improvement in the dynamic range.

*Order/Art.-No.: 124*

Available options (extra charge)

**Option 001: Memory Expansion**

Extension of the hard disk space from 500GB (standard) up to 4TB with superfast, shock resistant SSD technology.

*Order/Art.-No.: 129 (1TB) - Order/Art.-No.: 129-2 (2TB) - Order/Art.-No.: 129-4 (4TB)*

**Option 002: 5ppb (0,005ppm) OCXO Timebase**

This highly precise OCXO timebase, which has been especially developed for the SPECTRAN®, offers significantly reduced phase noise (jitter). This will allow the use of far narrower filters, which will in turn vastly enhance sensitivity. To fully exploit the maximum sensitivity this option is indispensable! Furthermore, the OCXO timebase allows far more accurate frequency measurement and display.

*Order/Art.-No.: 126*

**Option 004: Ultra Low Phase Noise**

*Order/Art.-No.: 123*

**Option 007: 6GHz Tracking / IQ DDS Generator (in preparation)**

*Order/Art.-No.: 125*

**Option 160: 160MHz / 175MHz Real-Time bandwidth**

Extends the real-time Bandwidth from 88MHz to 160 or 175MHz.

175MHz is subject to export control law and not allowed to be imported in all countries, please contact us for details.

*Order/Art.-No.: 119*
**Accessories**

**Bagpack**
High Quality Carrying Bag for XFR V5 PRO. Offers lots of space for all accessories and optional antennas.
Order/Art.-No.: 264

**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

**2nd Battery Pack (Hot Swap)**
Additional 8700mAh battery. Expands the run-time of the Analyzer. Installed in addition to standard battery.
Order/Art.-No.: 263

**DC Car Adapter**
11-16V, 22-32V Car-Power-Adapter for Spectran XFR V5 PRO. For continuous operation of the Spectrum Analyzer in the car.
Order/Art.-No.: 264

**HyperLOG Antennas (380MHz - 35GHz)**
Directional, Ultra Broadband Antennas with extremely wide frequency range from 380MHz to 35GHz. High and constant gain of typ. 5dBi, with optional Laser, GPS, Compass and Pre-Amplifier.
Order/Art.-No.: 720 / 721

**MDF Antennas**
Magnetic Tracking Antennas for the low frequency range of the Analyzer. Covers 9kHz to 400MHz. Active and Passive Antennas with high sensitivity.
Order/Art.-No.: 734

**Near field probe set (DC to 9GHz)**
Passive or active Near-Field Probeset PBS1 or PBS2. Consisting of 5 Probes (4xH-Field, 1xE-Field), 40dB Preamplifier (only PBS2). Perfect for EMC near field tests.
Order/Art.-No.: 720 / 721

**External Pre-Amplifier**
External Battery-Powered Preamplifier with full range of 1Hz to 30GHz & up to 40dB gain. Perfect to reach extremely high sensitivity up to -170dBm/Hz.

**OmniLOG 30800 (300MHz - 8GHz)**
Omnidirectional Broadband Antenna with extremely wide frequency range from 300MHz to 8GHz. Small and lightweight.
Order/Art.-No.: 734

**1m / 5m / 10m SMA-Cable**
High quality special SMA cable for connecting any HyperLOG or MDFAntenna with the Analyzer. Available as 1m, 5m and 10m Cable. All versions: SMA plug (male) / SMA plug (male).

**20dB Attenuator (DC -18GHz)**
Expands the measurement range to +33dBm.
Order/Art.-No.: 775-N
References

Cross-Section of Aaronia Clients

**Government, Military, Aeronautic, Astronautic**
- NATO, Belgium
- Department of Defense, USA
- Department of Defense, Australia
- Airbus, Germany
- Boeing, USA
- Bundeswehr, Germany
- NASA, USA
- Lockheed Martin, USA
- Lufthansa, Germany
- DLR, Germany
- Eurocontrol, Belgium
- EADS, Germany
- DEA, USA
- FBI, USA
- BKA, Germany
- Federal Police, Germany
- Ministry of Defense, Netherlands

**Industry**
- APPLE, USA
- IBM, Switzerland
- Intel, Germany
- Shell Oil Company, USA
- ATI, USA
- Microsoft, USA
- Motorola, Brazil
- Audi, Germany
- BMW, Germany
- Daimler, Germany
- Volkswagen, Germany
- BASF, Germany
- Siemens AG, Germany
- Rohde & Schwarz, Germany
- Infineon, Austria
- Philips, Germany
- ThyssenKrupp, Germany
- EnBW, Germany
- RTL Television, Germany
- Pro Sieben – SAT 1, Germany
- Channel 6, United Kingdom
- CNN, USA
- Duracell, USA
- German Telekom, Germany
- Bank of Canada, Canada
- NBC News, USA
- Sony, Germany
- Anritsu, Germany
- Hewlett Packard, Germany
- Robert Bosch, Germany
- Mercedes Benz, Austria
- Osram, Germany
- DEKRA, Germany
- AMD, Germany
- Keysight, China
- Infineon Technologies, Germany
- Philips Semiconductors, Germany
- Hyundai Europe, Germany
- JDSU, Korea
- IBM Deutschland, Germany
- Nokia-Siemens Networks, Germany

**Research/Development, Science and Universities**
- MIT - Physics Department, USA
- California State University, USA
- Indonesien Institute of Sience, Indonesia
- Los Alamos National Laboratory, USA
- University of Bahrain, Bahrain
- University of Florida, USA
- University of Victoria, Canada
- University of Newcastle, United Kingdom
- University of Durham, United Kingdom
- University Strasbourg, France
- University of Sydney, Australia
- University of Athens, Greece
- University of Munich, Germany
- Technical University of Hamburg, Germany
- Max-Planck Institute for Radio Astronomy, Germany
- Max-Planck Institute for Quantum Optics, Germany
- Max-Planck Institute for Nuclear Physics, Germany
- Max-Planck-Institute for Iron Research, Germany
- Research Centre Karlsruhe, Germany

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