Powerful PC Software included for Free

Handheld Real-Time Spectrum Analyzer & Recorder
SPECTRAN V5

1Hz up to 20GHz (40GHz) - Ultra fast sweep mode – Unlimited recording time

- ◆ **World´s first and only Handheld Real-Time Spectrum Analyzer**
- ◆ Up to 175MHz Real-Time bandwidth
- ◆ POI below 1µS
- ◆ Real-time I/Q streaming via USB
- ◆ Very fast sweep mode, scans 20GHz in less than 20mS
- ◆ Patented polyphase filter technology
- ◆ Patented spectrum analysis (modulated LO)
- ◆ First analyzer with ultra fast LO sweeps (µS DDS sweep)
- ◆ High resolution touch screen
- ◆ Extremely compact and lightweight
- ◆ MicroSD Slot
- ◆ Optional I/Q Generator (6GHz) and Power Meter (40GHz)
- ◆ Includes World´s first 3D Real-Time Spectrum monitoring and recording Software „RTSA Suite" (gapless streaming and playback)

AARONIA AG
WWW.AARONIA.DE

Made in Germany

Fast, compact and powerful

Aaronia presents the SPECTRAN V5, a Handheld Real-Time Spectrum Anaylzer 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 World´s fastest Handheld Spectrum Analyzer.

With this Spectrum Analyzer you can master all the challenges. Wether it is for spectrum monitoring, RF and microwave measurements, Interference hunting, EMC testing or Wi-Fi and wireless network measurements, the SPECTRAN V5 is the ideal Spectrum Analyzer for making reliable and fast measurements.

A weight of just 850g predestines the V5 for measurements in the field yet it can also be used in the lab. The included PC analysis software RTSA Suite transforms the V5 into a fully-featured Benchtop Spectrum Analyzer (see page 6). Available in 4 different versions (see page 7) the V5 offers a solution for almost every application.

Touchscreen TFT ◆ with 800 x 480px

Ultra wide measurement ◆ range from 1Hz to 20GHz

Size: 255 x 85 x 32mm ◆

Weight: 850g only ◆

8000mAh LiPo Power ◆ Battery (2 hours auto-nomy)

◆ GPS (optionally)

◆ Included PC Software

◆ High quality aluminum alloy

◆ 40GHz Power Meter (optional)

◆ 50 Ohm RF input (SMA)

◆ 6GHz I/Q Generator (optional)

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. Simply connect the V5 via USB to a suitable PC/Laptop and enjoy the advantages of the RTSA Suite.

- ◆ 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.
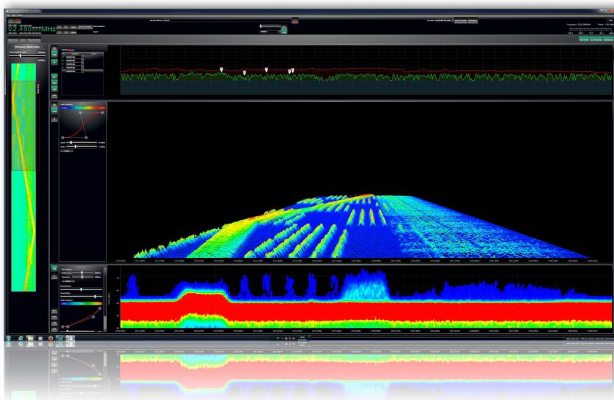
- ◆ The RTSA Software displays several views at once (Spectrum, 3D Waterfall, Histogram, etc.)
- ◆ The window size can be adjusted freely, therefore a full utilization of e.g. FULL HD or 4K displays is possible
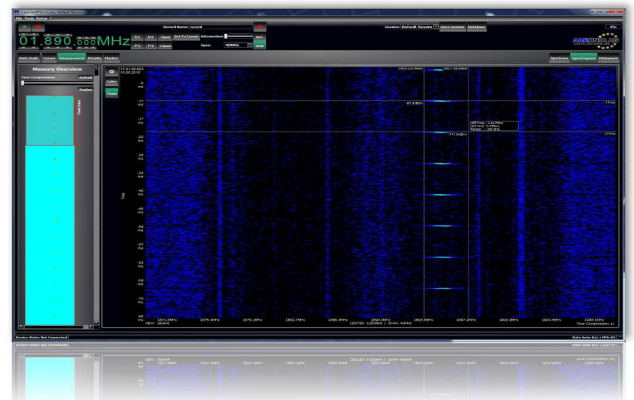
- ◆ Spectrogram / Waterfall View for the identification of frequency hops, measurements of pulse rate, analysis of time variant spectra and the tuning of a VCO

Highlights

The Aaronia SPECTRAN V5 impresses with the combination of Real-Time spectrum analysis by means of a shifted poly-phase-filter used together with a patented measurement process with modulated local oscillator.
Benefits include:

1) Small and compact design and construction (significantly fewer and much smaller components are required)
2) Implementation of cost-effective hardware for a reasonable price (only "standardized" RF-components are needed)
3) Extremely low noise signal processing up to -170dBm/Hz (achieved by eliminating noisy components in the RF path)
4) Analysis of even highest frequencies up to 20GHz (achieved by the elimination of upper lying LO)

µS ultra fast DDS sweep

The SPECTRAN V5 also offers a "classical" spectrum analyser mode by means of µS ultra fast DDS sweep:
In addition to LO-modulation the V5 has a DDS-synthesizer available with up to 800 MSPS I/Q for extremely fast frequency hops of the local oscillator. This technology allows sophisticated measuring programmes over the full frequency range up to 20GHz.
The SPECTRAN V5 with its accelerated sweep rate is much faster than currently available sweep spectrum analysers.

Polyphase filter

The Aaronia SPECTRAN V5 is setting new standards in filtering process technology. Where typical Real-Rime Analysers are based on Fourier analysis, the V5 uses a patented receiving method with two staggered combs which are produced by a polyphase filter.

In contrast to the ordinary Fourier analysis, the polyphase filter covers more than one interval of sampling points, based on the number of frequency points. Thereby any filter curve (e.g. real Gauss-filter) can be realised without limitation of the slope due to the predetermined interval. To avoid gaps in the frequency-time-diagram, two spatially and temporary staggered filter combs are used for analysis. This SPECTRAN V5 break-though technology will not miss even the smallest signal detail in the investigated frequency band.

Expandable frequency range down to 1Hz

The SPECTRAN V5 can optional be fitted with a frequency extension down 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. In the path is a high-performance 16Bit AD converter with 105MSPS is used. The 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.

Technology

The signal processing is realised by FPGA, which also includes a vector processor for statistic analysis and demodulation. Together with the powerful Dual Core Blackfin DSP-CPU and the 800x480 pixel high-resolution colour display and touch screen, the possibilities for analysing even the most complex signals are limitless.

Within the analogue process, the signal is sampled by a real 14Bit A/D converter with up to 500MSPS (250 MSPS I/Q) data rate. This process always ensures a big dynamic range of 80dB and a high quality of analysis. An optional 16Bit A/D converter with 100dB dynamic range (1Hz-40MHz) can be added.

The SPECTRAN V5 can by controlled either by the unit's touch screen, by a multifunctional jog-dial, via custom-hotkeys or Real-Time remote control via USB. An optional tracking generator up to 6GHz allows, amongst others, network-, cable- and antenna measurements.

Optionally available is a GPS-Logger, which stores the exact location of the measurement and allows complex measurement runs as well.
The GPS-Logger, together with the integrated data logger, enable a complete gap-free recording of field measurements including an automatic heatmap-generation (e.g. on Google-Maps). Thus, the user's documentation of EMC measurements or the visualisation of network coverage of GSM, WLAN etc. will be remarkably easy to generate.

The SPECTRAN V5 has an integrated 8,000mAh lithium polymer battery (LiPo) for 2 hours of runtime, plus there is a 20,000mAh external power pack available to provide 4 hours of runtime.

A variety of more advanced software-evaluation and analysis-options are currently under development and these will be available for retrofit when requested (e.g. GSM decoder).

Optional Docking-Station

Real-Time Streaming

The Real-Time Streaming function is another special feature of the SPECTRAN V5. Contrary to existing Real-Time Spectrum Analysers, which do not allow uninterrupted data logging, the V5 can stream data continuously and save them gap-free and without any time limit on PC e.g. via high-speed USB-interface.
The real-time streaming offers a variety of new applications that were previously inconceivable, like recording and repeated playing of any signal or a subsequent, complete decoding of complete recorded digital signals like GSM, TETRA, etc.

Scope of Delivery

The V5 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).
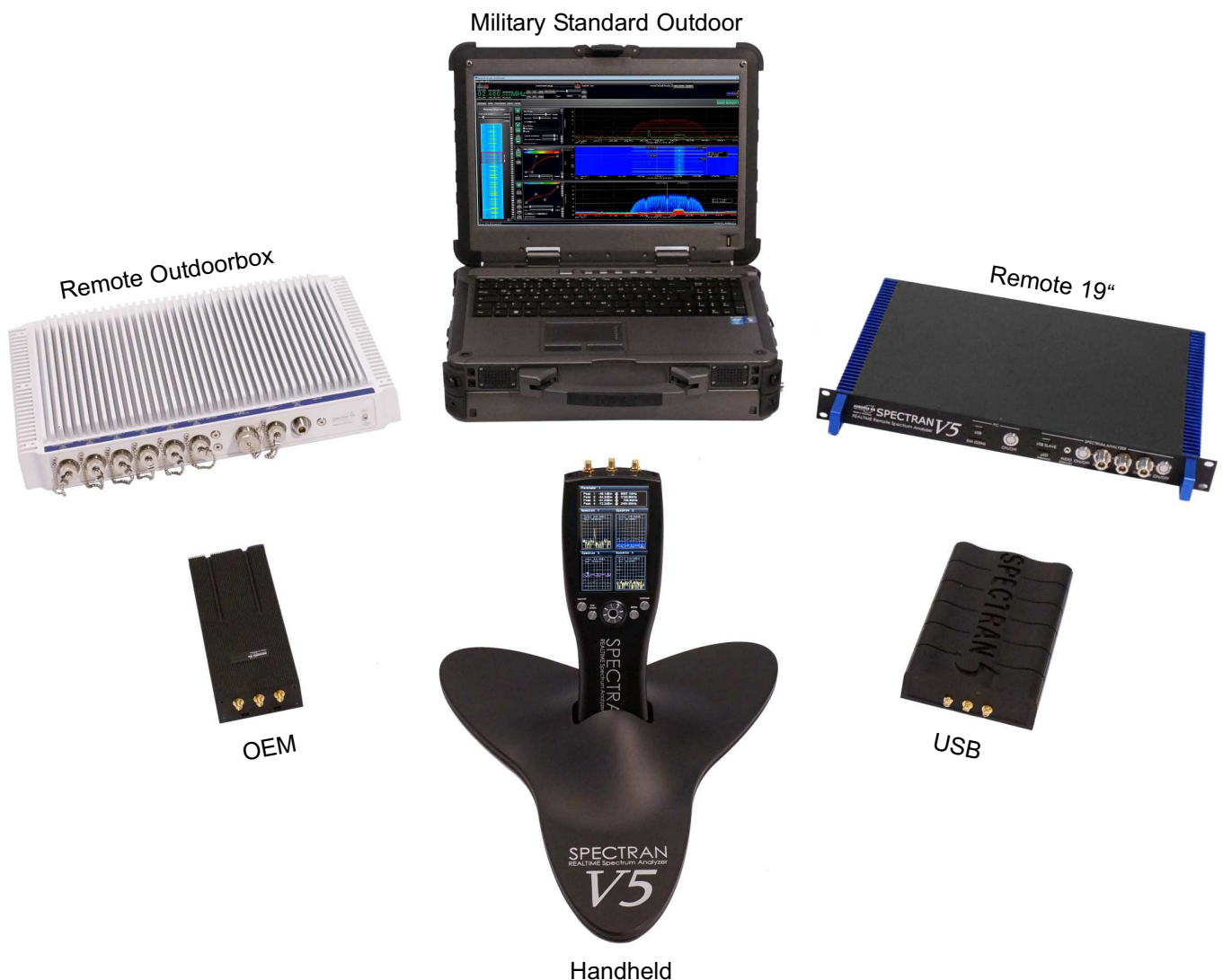
- SPECTRAN V5 incl. Option 020 (internal 20dB preamp)
- OmniLOG 70600 omnidirectional antenna (700MHz to 6GHz)
- Watertight & shock-proof transport case
- Spectrum Analysis Software RTSA Suite and MCS (on USB stick)
- Rechargeable 8000mAh battery (installed, external power pack available as option)
- Battery charger / power supply
- English manual (on CD)

Interfaces

- 50 RF input
- I/Q Tracking generator
- (6GHz) output
- Sync In/Output
- Audio Output
- USB Slave
- USB Master
- Micro SD
- Power

SPECTRAN V5 - Solutions for every application

The SPECTRAN V5 series is available in different versions, each specially equipped for it´s specific application. Besides the Handheld version Aaronia offers the USB (X & OEM) series, remote-control Analyzers (19" RSA and outdoor box) and military grade Countersurveillance Receivers (XFR V5 PRO).

Military Standard Outdoor

Remote Outdoorbox

Remote 19"

OEM

USB

Handheld

Specifications

Comparison Features	8060 V5	80120 V5	80160 V5	80200 V5
Frequency Range (min)	9kHz (optional 1Hz with Option 003)			
Frequency Rance (max)	6GHz	12GHz	16GHz	20GHz
Real-Time Bandwidth	44MHz (opt. 88MHz)	88MHz (opt. 160/175MHz)	88MHz (opt. 160/175MHz)	88MHz (opt. 160/175MHz)
Minimum Event Duration for 100% POI	<1µS			
Max. Power at RF input (50 Ohm)	+20dBm (+33dBm*)			
Displayed Average Noise Level (internal pre-amp on)	typ. -150dBm/Hz			
Displayed Average Noise Level (with external pre-amp)	max. -170dBm/Hz			
Amplitude accuracy (typ.)	typ. +/- 1,5dB			
RF input	50 Ohm (SMA-connector)			
Frequency reference accuracy	0,5ppm (optional 5ppb with Option 002)			
RBW (resolution bandwidth)	1Hz to 40MHz (in preparation)			
VBW (video bandwidth)	1Hz to 40MHz (in preparation)			
Demodulator	AM, FM			
Measurement Units	dBm, dBµV, V/m, A/m, W/m², dBµV/m, W/cm²			
Detector	Min, Max, AVG, Peak, QPeak (in preparation)			
Attenuator range	45dB (0,5dB steps, incl. pre-amp)			
Traces	ACT, AVG, MAX, MIN			
Reference range	-200dBm to 100dBm			
Measurement modes	I/Q (in preparation), Power/Frequency Data			
Views	Spectrum, Persistence Spectrum, Spectrogram / Waterfall, Histogram			
Trigger	Cursor, Measurement, Density			
Video RAM	32 MB	64 MB	64 MB	64 MB
SDRAM	128 MB	256 MB	256 MB	256 MB
ADC	250MSPS 14Bit	500MSPS 14Bit	500MSPS 14Bit	500MSPS 14Bit
GPS	Support via external GPS Logger (see Accessories at page 9)			
FPGA	72K ECP3	240K ECP3	240K ECP3	240K ECP3
DSP (Dual Core Blackfin)	400 MHz	600 MHz	600 MHz	600 MHz
Temperature Range (Operation)	0 °C to +40 °C			
Temperature Range (Storage)	-20 °C to +60 °C			
Dimensions	255 x 85 x 29mm			
Weight	850g			
Power Supply	AC Input: 100-240V, 50-60Hz - DC Output: 5,6V, 5A max.			
Power Consumption	<35W			
Country of Origin	Germany			
Recommended Calibration Interval	2 years			

* optionally available +33dBm, decreases sensitivity by 20dB, Article number 775

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

Available options (extra charge)

Option 220 / 240: 20 / 40GHz Power Meter (in preparation)

High accuracy internal Power Meter up to 40GHz.

Order/Art.-No.: 127 (20GHz Power Meter)   -   Order/Art.-No.: 128 (40GHz Power Meter)

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 003: Low Frequency Extension (starting at 1Hz, in preparation)

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

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 Real-Time Bandwidth

Extends the Real-time Bandwidth from 88MHz to 160/175MHz.

Order/Art.-No.: 119

Accessories

Docking Station

High quality docking station with integrated connectors. Transforms the V5 into a Benchtop Analyzer.

Order/Art.-No.: 289

20000mAh Power Pack

External Power Pack with 20000mAh capacity. Extends the battery run-time up to 4-5 hours. Strongly recommended for outdoor operation.

Order/Art.-No.: 259

GPS Logger

GPS Logger with 6 sensors (GPS, Gyro, 3D Tilt, Digital compass, height and Accelerometer). Directly compatible to the V5.

Order/Art.-No.: 330

Directional Antennas (380MHz - 35GHz)

Directional, Ultra Broadband Antennas with extremely wide frequency range from 380MHz to 35GHz. High and constant gain of typ. 5dBi (45dBi optionally/active), with optional Laser, GPS, Compass and Pre-Amplifier.

External low noise Pre-Amplifier

External Battery-Powered Preamplifier with full range of 1Hz to 35GHz & up to 40dB gain. Perfect to reach extremely high sensitivity up to -170dBm/Hz.

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

Low Frequency Antenna

Magnetic Tracking Antennas for the low frequency range of the Analyzer. Covers 9kHz to 400MHz. Active and Passive Antennas with high sensitivity.

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).

DC-Blocker

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

20dB Attenuator (DC -18GHz)

Expands the measurement range to +33dBm.

Order/Art.-No.: 775

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

Research/Development, Science and Universities

- MIT - Physics Department, USA
- California State University, USA
- Indonesien Institute of Sience, Indonesia
- Los Alamos National Labratory, 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 Athen, Greece
- University of Munich, Germany
- Technical University of Hamburg, Germany
- Max-Planck Institute for Radio Astronomy, Germany
- Max-Planck-Institute for Nuclear Physics, Germany
- Research Centre Karlsruhe, Germany

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
- 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
- Wilkinson Sword, Germany
- IBM Deutschland, Germany
- Nokia-Siemens Networks, Germany

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