



Rev 1.1  
22.03.2010

# HighEnd Outdoor Spectrum Analyzer SPECTRAN® HF-XFR

Worldwide first "military-standard" Spectrum Analyzer!

## Highlights

- ◆ Highest performing fully rugged laptop and world's most sensitive Handheld Analyzer in one device
- ◆ Ready to go, LCS-Analyzer-Software already installed
- ◆ Ballistic Armor™ Protection System to meet or exceed real world and military standards (MIL-STD-810F)
- ◆ Built tough for tough environments



Made in Germany



# Technical details

## Notebook (based on Dell Latitude E6400XFR)

- ◆ Processor: Intel Core 2 Duo P9600(2,66GHz,1.066MHz,6MB)  
nVidia Quadro NVS 160M, 256MB with express-card and Fingerprint Reader
- ◆ 14.1" WXGA (1280 x 800) wide-aspect transmissive display with DirectVue™ technology for outdoor readability
- ◆ Memory: 4096MB (2x2048) 800MHz DDR2 Dual Channel
- ◆ Primary Storage: 64GB Solid State Drive
- ◆ Battery: 6-cell primary battery
- ◆ Wireless: Intel WiFi Link 5100 (802.11 a/b/g/n 1X2) 1/2 MiniCard with Centrino label
- ◆ 10/100/1000 Gigabit Ethernet-network card
- ◆ Keypad: Internal English Qwertz with background light
- ◆ Operating System: Windows XP Pro SP3 with Windows Vista Business SP1 Medias
- ◆ Ports: IEEE - 1394, docking connector, USB 2.0 (x4), VGA, Display Port, RJ-11 (optional), RJ-45, eSATA, USB PowerShare, headphone/speaker out, mic (all protected behind sealed doors)
- ◆ Multi Media: 2 speakers
- ◆ Independently Tested to MIL-STD-810F for:  
4ft Transit Drop, Aggravated Rain, Blowing Dust, Vibration, Functional Shock, Humidity, Salt Fog, Altitude, Explosive Atmosphere, Temperature Shock, and Temperature Extremes (Operating: -20°F to 145°F (-29°C to 63°C); Non-Operating: -58°F to 160°F (-50°C to 71°C))
- ◆ IP-65 Certified Protection – Dust-Tight and Protected against Pressurized Water Ingress
- ◆ UL1604 Certified for Hazardous Locations (Class 1, Division 2, Zones A, B, C, D)
- ◆ Weight: 8.5 lbs/3.9 kg
- ◆ Width: 13.9"/353.06 mm
- ◆ Depth: 10.1-11.5"/257.6-293.1 mm
- ◆ Height: 2.2"/55.88 mm

## Spectrum Analyzer (based on Spectran HF-60100 V4)

- ◆ Frequency range: 1MHz - 9,4GHz\*
- ◆ 14Bit Dual-ADC
- ◆ DDC Hardware-Filter
- ◆ 150 MIPS DSP (CPU)
- ◆ AVG Noise Level (DANL): -170dBm(1Hz)\*
- ◆ AbsMax Level: +20dBm
- ◆ AbsMax Level: +40dBm (Option)
- ◆ Filter bandwidth (RBW) Min: 200Hz
- ◆ Filter bandwidth (RBW) Max: 50MHz
- ◆ EMC-Filter (RBW): 9kHz, 120kHz, 5MHz; 20MHz; 40MHz
- ◆ Lowest possible SampleTime : 1mS
- ◆ Accuracy (typical) : +/- 1dB
- ◆ Vector power measurement (I/Q) and True RMS
- ◆ AM/FM/PM Demodulation
- ◆ Extended full ICNIRP range
- ◆ Standards-conformant exposure limits (ICNIRP, BGV B11, BlmSchV etc.)
- ◆ Fast ZERO-SPAN sweep
- ◆ HOLD Mode
- ◆ Time-Slot-Analyzer

## Application examples SPECTRAN® HF-XFR Spectrum Analyzer

### Analysis and measurement of:

- ◆ GSM900
- ◆ DECT
- ◆ GSM1800
- ◆ UMTS
- ◆ WLAN
- ◆ Microwave ovens
- ◆ WiFi
- ◆ WiMax
- ◆ Radar
- ◆ 5GHz WLan
- ◆ PAR-Radar
- ◆ UWB (FB1-FB12)

# Description



## Real World Rugged

Built for tough environments, the SPECTRAN HF-XFR rises to the challenges you face every workday. The HF-XFR is built to be ready out of the box to withstand pounding rain, blowing dust and dirt, extreme temperatures, accidental drops and more.

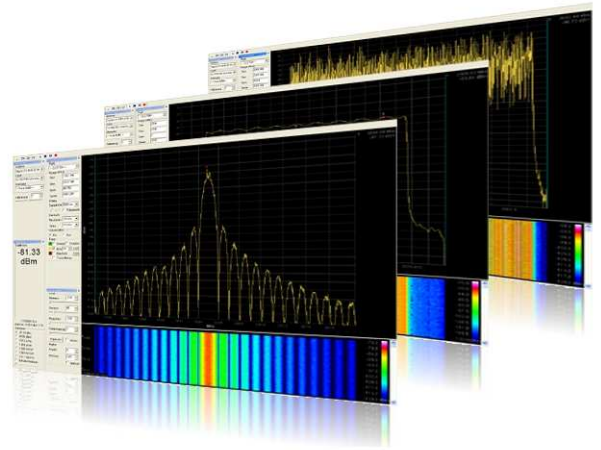
Key rugged features include:

- ◆ The exclusive Ballistic Armor Protection System featuring PR481™ chassis material provides twice the impact strength versus traditional magnesium alloy.
- ◆ The SPECTRAN HF-XFR with Ballistic Armor Protection enables excellent protection and is the first in its class to meet a 4ft drop specification.
- ◆ With PrimoSeal™ technology we provide the highest combined Ingress protection rating (IP65), for enhanced protection against blowing dust and liquid.

## Integrated Spectrum Analyzer (based on the Spectran HF-60100 V4)

The PROFESSIONAL PC analysis software demonstrates SPECTRAN's vast capabilities.

- ◆ 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-resolution 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, sweep time 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/m<sup>2</sup> and A/m, each with AUTORANGE. Freely transposable and scalable.
- ◆ 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 firmwares.
- ◆ etc. etc. etc.



Screenshots from the SPECTRAN HF-XFR

## Inspired Design

SPECTRAN HF-XFR features securely sealed port covers and a wide range of key peripherals to work wherever you need it to.

- ◆ Work in direct sunlight with the large 14.1" wide-aspect LCD featuring DirectVue™ Technology LCD.
- ◆ Vehicle docking allows flexibility for police and field technicians to mount systems directly in their vehicles where they work.
- ◆ Secure, simple, locking doors with PrimoSeal™ for exceptional protection while working in wet or dusty conditions.



## Uncompromising Performance

The high performing, fully rugged laptop is the first in its class to ship with both Intel® Core™2 Duo Processor with vPro™ technology. The SPECTRAN HF-XFR has brains as well as brawn.

- ◆ QuadCool™ Thermal Management System enables the XFR to meet the MIL-STD for temperature extremes and supports world-class performance, while running the latest Intel® Core™2 Duo Processors.
- ◆ Extended field use batteries equipped with ExpressCharge enables primary battery re-charge times up to 2 times faster than Panasonic CF-30.

## Included in delivery

- ◆ SPECTRAN HF-XFR Outdoor Spectrum Analyzer
- ◆ HyperLOG 60100 EMC LogPer Antenna (black) with Pistolgrip
- ◆ OmniLOG 90200 miniature Broadbandantenna
- ◆ 1m SMA-cable
- ◆ SMA-Tool
- ◆ Battery
- ◆ Battery charger
- ◆ Detailed english manual



The SPECTRAN HF-XFR was built for tough environments

# Overview of features SPECTRAN® RF Spectrum Analyzer

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 bandwidth (RBW) Min	1MHz	100kHz	100kHz	3kHz	1kHz	200Hz (TCXO)	200Hz
Filter bandwidth (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
<b>FEATURES</b>							
14Bit Dual-ADC & DDC-Hardware-Filter	-	-	-	✓	✓	✓	✓
Standards-conformant exposure limits (ICNIRP, BGV B11, BImSchV etc.)	✓	✓	✓	✓	✓	✓	✓
Extended full ICNIRP range	-	-	-	-	-	✓	✓
Fast ZERO-SPAN Sweep	-	✓	✓	✓	✓	✓	✓
PULS-Mode	✓	✓	✓	✓	✓	✓	✓
ADVANCED HOLD mode (HOLD function)	-	✓	✓	✓	✓	✓	✓
INTERNAL Data Logger (long-term measurements)	-	✓	✓	✓	✓	✓	120GB
TIME-SLOT-ANALYZER	✓	✓	✓	✓	✓	✓	✓
Internal speaker	Piezo	✓	✓	✓	✓	✓	✓
Configurable antenna and cable calibration data	-	✓	✓	✓	✓	✓	✓
Audio demodulation	AM	AM&FM	AM&FM	AM&FM&PM	AM&FM&PM	AM&FM&PM	AM&FM&PM
<b>DISPLAY</b>							
DIRECT RF spectrum display	✓	✓	✓	✓	✓	✓	✓
Exposure limits display with simultaneous percentage display	✓	✓	✓	✓	✓	✓	✓
Main display in dBm, V/m, A/m or dB <sub>iV</sub> (switchable)	✓	✓	✓	✓	✓	✓	simultaneous
ADDITIONAL display in W/m <sup>2</sup> with AUTORANGE (pW, μW etc.)	✓	✓	✓	✓	✓	✓	simultaneous
High-resolution bargraph (trend display)	✓	✓	✓	✓	✓	✓	14" Display
3fold marker display (ex. 3x power & frequency at once)	✓	✓	✓	✓	✓	✓	10fold
<b>INTERFACES / CONNECTORS</b>							
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
<b>OPTIONS (extra charge)</b>							
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	-
<b>INCLUDED ACCESSORIES (in addition to the base unit)</b>							
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

\*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 sensitivity up to -50dBm and max. +10dBm input power with an extremely fast response time.

# Options Spectrumalyzer SPECTRAN HF-XFR

Included in delivery:

## 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 series without option 020 is lower by 15dB.

Order/Art.-No.: 177

## Option 002: 0,5PPM TCXO timebase

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 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

## OmniLOG 90200 broadband antenna

The OmniLOG® 90200 Antenna is specially developed for a quasi isotropic (radial isotropic) measurement in the GSM (GSM900, GSM1800, GSM1900), UMTS and 2,4GHz WLAN frequency ranges. It fits perfectly in addition to our SPECTRAN measurement devices.

Compared to our HyperLOG-Antennas, the OmniLOG antenna offers the possibility for a direct, radial measurement of field strength without the need to move the antenna to the source. This offers the possibility to get a direct field strength reading without any hassle.

Order/Art.-No.: 177-2

Available options (extra charge):

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

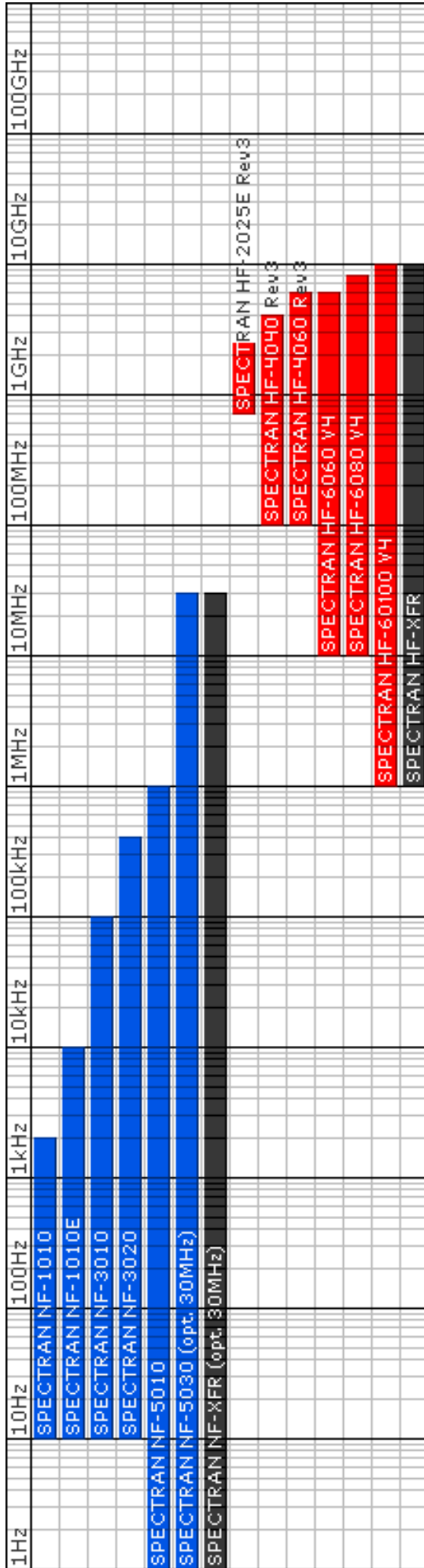
This option provides an external, super low-noise 40dB preamplifier, enabling maximum performance particularly when measuring extremely weak signals at a EN55011, EN55022 or EN50371 EMC-test. If you use our BicoLOG antenna or our PBS1 Probeset and EMC-Sniffer this amplifier is a MUST HAVE to get the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

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

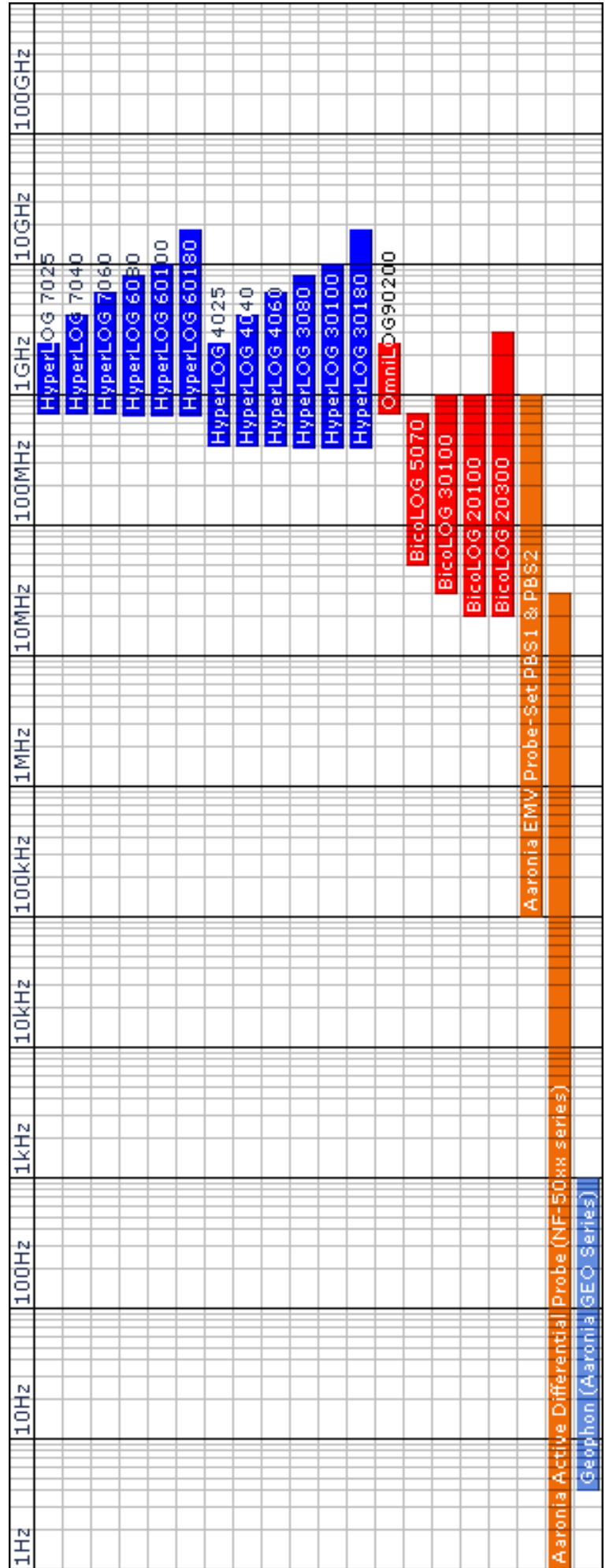
Order/Art.-No.: 177-2

# Frequency overview Analyzer & Antennas

Frequency Overview SPECTRAN Spectrum Analyzer



Frequency Overview HyperLOG and BicoLOG Antennas and Probes



# References

## User of Aeronia 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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