BETA Datasheet

# Real-time Spectrum Analyzer Aaronia SPECTRAN V5

## 安诺尼实时频谱仪 SPECTRAN V5 产品系列

μSultra fast DDS sweep – real-time data streaming - colour TFT – tracking generator - GPS
微秒级超高速 DDS 数字显示扫描- 实时数据流 – 彩色显示屏 – 追踪发生器 –GPS

Ma d e i n Germa n y  德国制造
First real-time spectrum analyzer with up to 200MHz real-time bandwidth
第一个实时频谱分析仪，实时处理带宽高达 200MHz

Real-time streaming  实时数据流

Real-time remote control (GSM, WLAN, USB)  实时远程控制（GSM， WLAN，USB）

Smallest and best-priced real-time spectrum analyzer worldwide
全世界最小的，价格最优惠的实时频谱仪

Patented polyphase filter technology 专利多相位滤波技术

Patented spectrum analysis without upper lying LO (modulated LO)
专利频谱分析不需要"上层"本振   （调制的本振）

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**TORI**

Extremely low noise (-170dBm/Hz) to analyse even weakest signals
极低的噪声，（-170dBm /Hz)　可分析最弱的信号

Modular construction for fast extension and customization of the front end
模块化结构，强大的扩展前端

First analyzer with ultra fast LO sweeps (μS DDS sweep)
第一台频谱分析仪，具备超高速本振扫描

High resolution TFT display with 800x480 pixel resolution and touch screen
高清晰的 TFT 显示屏，　800 x 480　像素，触摸屏

Integrated 3D motion sensor (gyro sensor) and 3D magnetic field sensor (compass and position control)
集成三维运动传感器（陀螺仪传感器）和三维磁场传感器（指南针和位置控制）

High speed USB 2.0 (480K/s) USB 2.0　高速端口（480K/s)

USB Slave interface (to connect diverse devices like GSM, WLan, printer, memory etc.)
USB 从接口，从接口可以连接如 GSM、WLan、打印机、内存等各种设备

MicroSD Slot (supports Aaronia microSDHC cards with more than 10MB/s)
内置 MicroSD 插槽，可连接安诺尼 microSDHC 卡，具有 10MB/s 速率

Integrated lithium polymer battery (LiPo) with 8000mAh (or 16000mAh) for up to 3(6) hours runtime
内置大容量锂电池，标配 8000mAh，可实现长达 3 小时运行，可选配 16000mAh 超大容量电池，可实现长达 6 小时运行

Included in delivery: directional tracking and EMC antenna, aluminium carrying case, battery charger and power supply including international adapter set, analyser software for MAC OS, Linux and Windows
产品标配：方向追踪天线和 EMC 天线，铝制便携机箱，充电器和电源，国际插座套件，分析软件支持 MAC OS，　Linux Windows 操作系统

Available options: tracking generator, GPS
其他选项：追踪发生器，　GPS

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Made in Germany

TORI

# Technical specifications 技术规格

## SPECTRAN® HF-8025 V5 (10MHz - 2,5GHz)

64MB SDRAM 内存 64MB
200MHz SingleCoreBlackfin DSP 单核 Blackfin DSP
100MSPS 14Bit Dual (I/Q) ADC 100MSPS 14 位双通道（I/Q） ADC
400MSPS 16Bit DAC 400MSPS 16 位 DAC
38K ECP3 FPGA
16MByte video RAM 16MB 视频内存
10MHz real-time bandwidth 10Mhz 实时带宽。
2,5GHz power meter 功率计
HyperLOG 7025EX directional tracking EMC antenna

## SPECTRAN® HF-8060 V5 (1Hz*/1MHz-6GHz）

128MB SDRAM
400MHz DualCoreBlackfin DSP
150MSPS 14Bit Dual (I/Q) ADC
600MSPS 16Bit DAC
72K ECP3 FPGA
32MByte video RAM
40MHz real-time bandwidth
6GHz power meter
HyperLOG 7060EX directional tracking EMC antenna

## SPECTRAN® HF-80100 V5 (1Hz*/1MHz-9,4GHz)

256MB SDRAM
600MHz DualCoreBlackfin DSP
250MSPS 14Bit Dual (I/Q) ADC
800MSPS 16Bit DAC
240K ECP3 FPGA
64MByte video RAM
120MHz real-time bandwidth (optional 200MHz)
10GHz power meter
HyperLOG 60100EX directional tracking EMC antenna

## Hardware Options

15dB internal low noise preamplifier
GPS
*Frequency extension 1Hz-40MHz (16Bit 105Msps ADC)
Tracking-Generator

# Highlights 技术特点

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.
安诺尼 SPECTRAN V5 令人印象深刻的实时频谱分析方法结合了移动的多相位滤波器和专利的调制的本振测量处理过程

Benefits include:
它的优势在于

1) Small and compact design and construction (significantly fewer and much smaller components are required) 精巧的紧凑的设计结构，显著地减少了需要的元器件

2) Implementation of cost-effective hardware for a reasonable price (only "standardized" RF-components are needed)
使用性价比高的硬件，价格合理，只需要使用标准化的射频器件

3) Extremely low noise signal processing - now up to 170dBm/Hz (achieved by eliminating many noisy components in    the RF path)
信号处理过程非常低的噪声，到达-170dBm/Hz，射频链路中去掉了许多噪声高的器件

4) Analysis of even highest frequencies up to 90GHz (achieved by the elimination of upper lying LO) 最高分析频率可达 90Ghz，通过将上层本振去掉而实现的

Real-time spectrum analysis by using polyphase filter technology
实时频谱分析通过使用多相位过滤技术来实现

With the SPECTRAN V5 you can find for the first time inhardware the received radio spectrum as an adjusted version,Likewise, parallel filtering is done by hardware-support.
使用 SPECTRAN V5 你会第一次发现在硬件上接收的的射频频谱是可调整的, 同时硬件也支持平行滤波。

The Aaronia SPECTRAN V5 is setting new standards in filteringprocess technology. Where typical real-time analysersare based on Fourier analysis, the V5 uses a patented receivingmethod with

two staggered combs which are producedby a polyphase filter. In contrast to the ordinary Fourier analysis,the polyphase filter covers more than one interval of samplingpoints, based on the number of frequency points. Thereby any filter curve (e.g. real Gauss-filter) can be realized without limitation of the slope due to the predetermined interval

安诺尼的 SPECTRAN V5 建立了新的滤波技术标准。经典的实时频谱仪是基于傅立叶分析，V5 使用一种专利的接收方法，由多相位滤波器产生的一种交错的的组合。与常规的傅里叶分析不同，多相位滤波器覆盖超过一个采样间隔，基于频率点的数量。因此任何滤波曲线（例如真正的高斯滤波器）都可以实现，而不受预设的间隔造成的陡度的局限。

To avoid gaps in the frequency-time-diagram, two spatiallyand temporary staggered filter combs are used for analysis.This SPECTRAN V5 break-though technology will not misseven the smallest signal detail in the investigated frequency    band.

为了避免在频率时间图上出现的缝隙，使用了 2 个空间交错滤波器组合，来进行分析。这个 SPECTRAN V5 的突破性技术不会错失分析频段的最小的信号细节

Real-time streaming 实时数据流

The real-time streaming function is another special feature ofthe SPECTRAN V5. Contrary to existing real-time spectrumanalysers, which do not allow uninterrupted data logging, the V5 can stream data continuously and save them gap-free onPC e.g. via high-speed USB-interface. The real-time streamingoffers a variety of new applications that were previouslyinconceivable, like recording and repeated playing of any signalor a subsequent, complete decoding of complete recordeddigital signals like GSM, TETRA, etc.

实时数据流功能是 SPECTRAN V5 的另一个特殊的功能。与现有的实时频谱仪不同，他们支持不了连续的数据记录， V5 可以连续的记录处理数据，无缝地将他们存储在 PC 电脑上，通过高速的 USB 口，实时数据流提供了各种新的应用，从前认为是不可能的。例如记录和重放任何信号，并且完全解调记录的数字信号，例如 GSM， TETRA 等。

μS ultra fast DDS sweep 微秒超高速 DDS 数字显示扫频

The SPECTRAN V5 also offers a "classical" spectrum analysermode by means of μS ultra fast DDS sweep:    In addition to LO-modulation the V5 has a DDS-synthesizeravailable with up to 800 MSPS I/Q for extremely fast frequencyhops of the local oscillator. This technology allows sophisticatedmeasuring programmes over the full frequency range (currentlyup to 9,4GHz).

SPECTRANV5 也提供一个经典的频谱分析模式，通过微秒超高速 DDS 扫频的手段
除了调制的本振， V5 具有 DDS 直接数字频率合成器，高达 800MSPS I/Q 极高频率跳动本振。这个技术使得复杂的测试程序分析在全频段上成为可能（目前达到 9.4Ghz）

The SPECTRAN V5 with its accelerated sweep rate is worldsbetter than currently available other sweep spectrum analysers.Expandable frequency range down to 1Hz

SPECTRAN V5 具有加速的扫描速率，比世界上现有的其他的扫频频谱仪更好。 频率可扩展到 1 Hz

The SPECTRAN V5 can optional be fitted with a frequencyextension down to 1Hz (only HF-8060 V5 and HF-80100 V5).

SPECTRAN V5 具有选件，可将频谱扩展到 1 Hz，（只有 HF 8060 和 HF 80100 V5 可加此选件)

The input signal is internally diverted to a second RF- path,which is optimised for low frequency processing. The low frequencypath offers a frequency range from 1Hz up to 40MHz.

Inthe path is a high-performance 16Bit AD converter with105MSPS is used. The resolution enhancement from 14Bit to16Bit improves the dynamic range from 80dB (14Bit) to 100dB (16Bit), which leaves nothing to be desired. This path is a fullycapable real-time function controllable by µS DDS sweep. Thelow frequency path (1Hz-40MHz/16Bit) and the radio frequencypath (1MHz-9,4GHz/14Bit) are seamless to the User, except forthe particularly noteworthy improvement in the dynamic range.

输入信号在内部被分到第二个射频路径 ，它是被优化的低频处理路径。在路径上有一个高性能的 16 位 AD 转换器， 处理速率 105 MSPS， 精度从 14 位加强到 16 位， 将动态范围从 80dB 提高的 100dB，还有什么会更好呢？

这个路径是完全具备实时功能，由微秒级 DDS 扫描控制。低频路径（1Hz-40Mhz/16Bit ）和高频路径（1Mhz -9.4Ghz /14Bit ),对用户来说是无需干预的，除非有值得关注的动态范围的调整。

Interchangeable RF front end　可扩展的射频前端

The complete front end of SPECTRAN V5 is interchangeableand can be replaced at any time with Aaronia's latest technology.A 9,4GHz module is already available. An 18GHz module can be ordered by beginning/middle of 2012. Further versions upto 90 GHz are already being planned and scheduled for2012.

SPECTRAN V5 的前端是可扩展的， 可以在任何时候更新到到安诺尼的最新技术。9.4Ghz 模块已经提供， 18Ghz 模块在 2012 上半年提供， 90Ghz 模块也计划在 2012 年提供。

The "open source" interface to the front end is made availableby Aaronia and allows the user to customize self developmentapplications of their own front ends. This open source availability opens endless new markets for the Aaronia SPECTRANV5.

平台的接口是开放的， 安诺尼允许用户开发自己的应用，扩展前端，这个开放的平台为安诺尼 SPECTRAN 打开了无限的新的市场机会。

Technology 技术特点

The signal processing is realised by FPGA, which also includes a vector processor for statistic analysis and demodulation. Togetherwith the powerful Dual Core Blackfin DSP-CPU and the

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800x480 pixel high-resolution colour display and touch screen, the possibilitiesfor analysing even the most complex signals are limitless.

信号处理过程是通过 FPGA 实现的，它也包含一个矢量处理器，为统计分析和解调应用。结合功能强大的双核 Blackfin DSP -CPU ，以及 800x 480 像素的高清晰彩色显示屏， 触摸屏。分析最复杂的信号的可能性是无限的。

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 with100dB dynamic range (1Hz-40MHz) can be added.

在模拟信号处理过程， 信号的采样以实时的 14 位 AD 转换器，具有 500MSPS（250MSPS I/Q ）数据速率。这个过程可以保证 80dB 的动态范围高质量的分析。 如果配上选件 16 位的 AD 转换器，就会有 100dB 的动态范围（1Hz - 40Mhz)

The SPECTRAN V5 can by controlled either by the unit's touch screen, by a multifunctional jog-dial, by motion control, via customhotkeys or real-time remote control (GSM, WLAN or USB). An optional tracking generator allows amongst others network-, cableand antenna measurements.

SPECTRAN V5 可以通过接触屏来操作，也可以通过多功能的滚轮转动，或者用户定义的热键，或者实时的遥控器来操作 （GSM. WLAN, USB ） 选件追踪发生器允许通过其他网络，线缆和 天线进行测量。

The high-sensitivity integrated gyro sensor with compass function can register the position and alignment of the unit at any time. Optionally available is a GPS-receiver, which stores the exact location of the measurement and allows complex measurement runs
as well.

高灵敏的集成的陀螺传感器，具有指南功能， 可以在任何时间注册位置和调整方向。 选件可提供 GPS 接收器，可以存储测量的精确位置，进行更复杂的分析

Both sensors, 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 visualization of network coverage of GSM, WLAN etc. will be remarkably easy to generate.

两种传感器的结合了数据存储记录器，使现场测量的无缝记录成为可能，包括产生一个基于 Google 地图的状态图，因此用户的 EMC 测试文件，或者形象的网络覆盖图，例如 GSM WLAN 都非常容易的生成

The SPECTRAN V5 has an integrated 8,000mAh lithium polymer battery (LiPo) for 2-3 hours of runtime, plus there is a 16,000mAh battery upgrade available to provide 4-6 hours of runtime.

SPECTRAN 内置大容量锂电池，标配 8000mAh，可实现长达 2－3 小时运行，变可选配 16000mAh 超大容量电池，可实现长达 4-6 小时运行

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).

各种更先进的软件分析工具选件正在开发，可以根据要求改装，    例如 GSN 解码器。

Interfaces    端口

- 50/75Ohm RF input    50/75 欧姆输入
- Tracking generator output    追踪发生器输出
- Sync In/Output    同步输入／输出
- USB Slave    USB 从口
- USB Master    USB    主口
- Micro SD    存储卡插槽



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