

PAX-ac INSTRUMENTS



PAX-ac Instruments:

- **RF – DragonRF** is the PAX-ac RF subsystem which can be configured with up to 4 independent RF Sources, LO generation, up to 32 vector port modules and a range of DSP instrumentation for generation of modulated signals and analysis of IF signaling
- **Digital – FX2** is a full featured 32 channel digital pin card that supports testing of MIPI and other serial bus controls commonly used in RF FEM
- **Power** – The PAX-ac offers a range of instruments including a general purpose 8 channel VI providing up to 1A per channel(HCOVI), an optimized power option for handset PA's (PA-DPS1) which has 4 channels where each channel can provide 2A with excellent dynamic response and a high power option (QFVI) which provides 4 channels each capable of delivering up 5A of pulsed current

The instruments available address the digital, power and RF testing requirements providing a compact and powerful, high accuracy, high throughput solution.

The PAX-ac can be configured with a range of instruments that are designed to address the test challenges for a broad range of RF power amplifiers and front end modules used in cellular and connectivity applications, including 802.11AC, the emergent 802.11ax standard, LTE-A, HSPDA, WCDMA, GSM, Edge, WCDMA, Bluetooth plus a variety of other standards for:

- Multiband RF Power Amplifiers
- RF Front End Modules
- RF Analog SiP devices
- Other RF discrete devices

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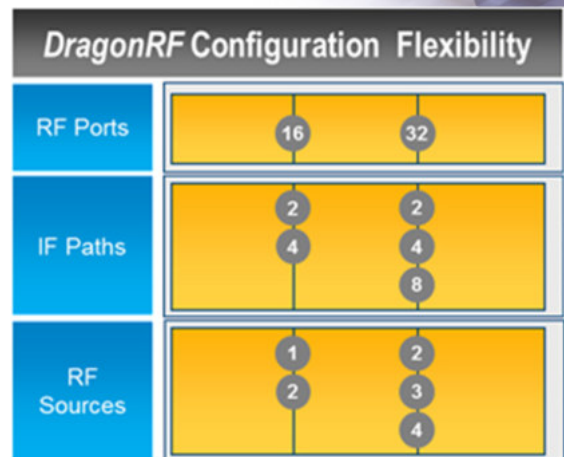
RF Instrumentation

DragonRF is an RF instrument designed to support the latest wireless communication standards and future requirements whether it's an RF Power Amplifier or a RF ASSP application. Leveraging the extensive Xcerra wireless modulation and demodulation library, DragonRF supports a complete set of tools to test cellular GSM, Edge, GPRS, HSDPA, HSUPA, CDMA, LTE and connectivity devices including BT, BT EDR, BT4.0, GPS, 802.11a/b/g/n/ac/p/ax and other emerging standards.

DragonRF is designed to deliver high performance RF test capability for the complete spectrum of connectivity and mobility standards while offering new levels of manufacturing test efficiencies. DragonRF delivers an extensive suite of new capabilities designed to provide the lowest cost of test without any compromise in RF test performance. DragonRF's innovative flexible architecture enables lower priced configurations without trade off in test coverage or test time.

The DragonRF has the following features:

- Configurable with 16 or 32 Vector RF ports
- 6 GHz RF modulated source and 8 GHz RF measure
- <1 ms RF settling time on level and frequency change
- Quad site and octal site RF source with single and dual synthesizer respectively
- Up to 8 receiver paths each with an analog bandwidth exceeding 200 MHz for octal site parallel RF measurements. Each receiver is connected to a Hummingbird digitizer with 16 bit @ 250 Msps or 14 bit @ 400 Msps
- Full modulation capability using HSB-SWG instrument providing 16 bits @ 250 Msps
- Swept S-parameter capability
- Servo loop tracking
- Real time Dynamic Range Enhancement



DragonRF provides up to 200 MHz IF bandwidth enabling whole spectrum capture by receiver to support increasing bandwidth requirements in the newer wireless communication standards. Combining leading SNR performance with an optimized algorithm, DragonRF achieves fast and accurate EVM measurements to test the comprehensive performance of the most complicated devices.

DragonRF is designed with a universal vector port architecture that delivers a flexible configuration to match the customers' device testing needs. Each DragonRF can be configured with 16, or 32 universal vector ports. DragonRF can also be configured with RF synthesizers to provide octal site modulated RF stimulus to devices under test, and with 2, 4, or 8 RF measure paths for true parallel octal site RF measurements.

Industry Leading Settling Times

DragonRF uses the latest technology in RF synthesizer and RF control circuitry in its design. The R&S SGS100 RF source is used as the synthesizer in DragonRF. DragonRF provides fast level and frequency settling time to 0.05dB in less than 1ms, greatly enhancing the test throughput, and lowering the cost of test.



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High Speed Waveform Digitizer

DragonRF includes a channel waveform digitizer that can capture to 16-bit resolution up to 250 Msamples/second, or 14-bit resolution to 400 Msamples/second. It is capable of acquiring and storing up to 64M Samples of ADC data per channel. The digitizer is not available as a stand-alone instrument and is cabled directly to the DragonRF.

The digitizer includes these features:

- 4 x 16 bit @ 250 Msps converters and 4 x 14 bit @ 400 Msps converters
- Sampling clock resolution of $1/(2^{17})$ Hz and the ability to make the instrument coherent with other instruments
- Digital down-conversion and decimation filtering
- SyncBus support, including use of a SyncBus line as an asynchronous instrument trigger
- Shared clocking between the four analog channels

High Speed Arbitrary Waveform Generator

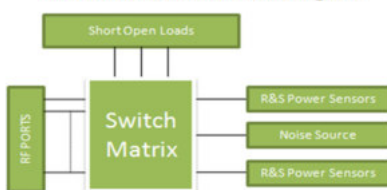
DragonRF includes a dual channel sequenced waveform generator that can source modulation waveforms. Each channel can generate these waveforms at 16 bit resolution at @ 250 Msps.

RF Auto Calibration

The fully automated calibration process allows for greater tester up-time and reduces operator induced error and variations. The DragonRF Auto Calibration kit offers a single self-contained calibration unit that provides:

- Calibration of RF source, scalar measure, noise, and S-parameter measure
- NIST traceable integrated RF power meter and noise source
- Factory calibrated RF Autocal fixture

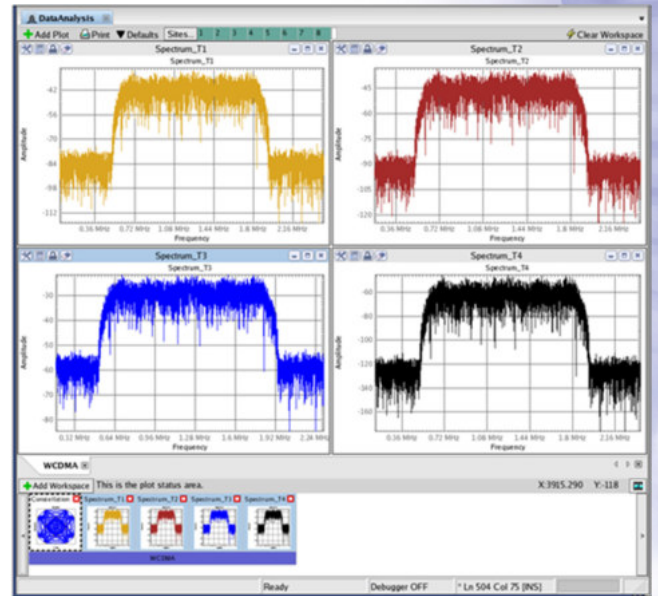
RF Autocal Loadboard block diagram



The RF Autocal switch matrix allows every port to be fully calibrated for all source and measurement types

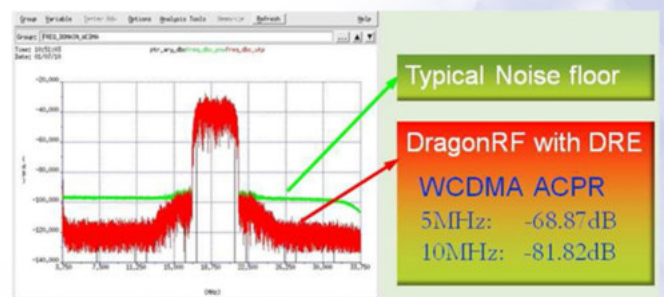
Multi-site Software

The Unison software environment provides users with fast single site development, instantaneous multi-site testing and test IP that can be reapplied device to device. Unison features cutting edge productivity tools that accelerate customers' time-to-market for their next generation products.



Better Yield with Dynamic Range Enhanced

Every RF receiver is equipped with real time Dynamic Range Enhancer (DRE) with embedded DSP capability. With DRE enabled, DragonRF provides more than 90dB dynamic range, which is critical for RF parameters, especially ACPR measurement. This enables faster test time, faster correlation between ATE and bench-top instrument, and improved yield with extra margins above the noise floor



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Key DragonRF Specifications		
Description	Condition	Specification
Number of Vector Ports		16, 32
Source		
Level Range	@ 3 GHz	-130 dBm - +16 dBm
Accuracy	@ 3 GHz	+/-0.5 dB
Resolution		0.1 dB
Settling Time	Frequency and Level	<1 ms
Modulation Bandwidth		>200 MHz
Source Port Isolation	@ 3 GHz	>100 dB
Measure		
Frequency Range		10 MHz to 8 GHz
Level Range	@ 3 GHz	-130 dBm - +23 dBm
Accuracy	@ 3 GHz	+/-0.5 dB
Receiver IF Bandwidth		200 MHz
Numerical Precision	Max ADC sample rate with digital filtering + DRE	27 Bits
Measurement Type	Single conversion heterodyne with real-time DSP	
Real-time DSP Features	Digital down conversion, time domain averaging, decimation	
Modulation & Demodulation		
	Pre-correlated library supplied by Cohu including: GSM, Edge, GPRS, HSDPA, HSUPA, CDMA, LTE-A, BT, BT EDR, BT4.0, GPS, 802.11a/b/c/g/n/ac/p/ax	
Software		
Environment	Unison	
Operating System	High-speed PC-based controller using a Linux operating system	



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Digital

FX2

FX2 is a 32 channel digital instrument for the PAX-ac focused on meeting the digital test requirements of RF power amplifiers (PA) and front end modules (FEM). Key features include:

- Fully independent programming of timing and level on every channel
- Synchronization signaling to/from other instruments
- Read/Write memory for generating digital protocols used in RF front end applications
- Multi-site programming model
- Full pattern sequencing at 200 Mbps

FX2 is supported with a comprehensive, next-generation program development and debug toolset.

Key FX2 Digital Specifications

I/O per Board: 32

Maximum Pins: 256

Drive / Compare: -2.0 V to 6.5 V

Pattern Rate:

100 MHz / 200 Mbps

200 MHz / 400 Mbps

Power

HCOVI

The HCOVI is a general purpose VI used for providing power to a board range of RF devices. Each HCOVI instrument provides 8 channels.

Key HCOVI Specifications

Channels per Board: 8

Voltage range: -2V to +8V

Current: 1 A continuous

Key features:

16 bit force/measure, synchronization, analog bus
200kHz digitizer capability

QFVI

The Quad Floating Voltage and Current source (QFVI) is a high voltage, high current floating programmable power supply. The QFVI is full Kelvin, has programmable voltage and current clamps and offers a 300Ksps sample rate.

Key QFVI Specifications

Channels per board: 4

Voltage Range: -60 V to +60 V

Current: 5 A per channel (pulsed), 1.5 A continuous, voltage and current ganging.

PA-DPS1

A Power Amplifier Device Power Supply instrument (PA-DPS1) has 4 identical source channels. Each channel can force voltage or force current. Each channel has one measure function with a FIFO, which can measure voltage or current while forcing voltage, and can measure voltage or current.

Key PA-DPS1 Specifications

Channels per Board: 4

Voltage range: -2 V to +16 V

Current: 2 A per channel

Key features:

16 bit force/measure, parallel measure, channels can be ganged for higher currents, 250 Ksps capture in 4096 memory

