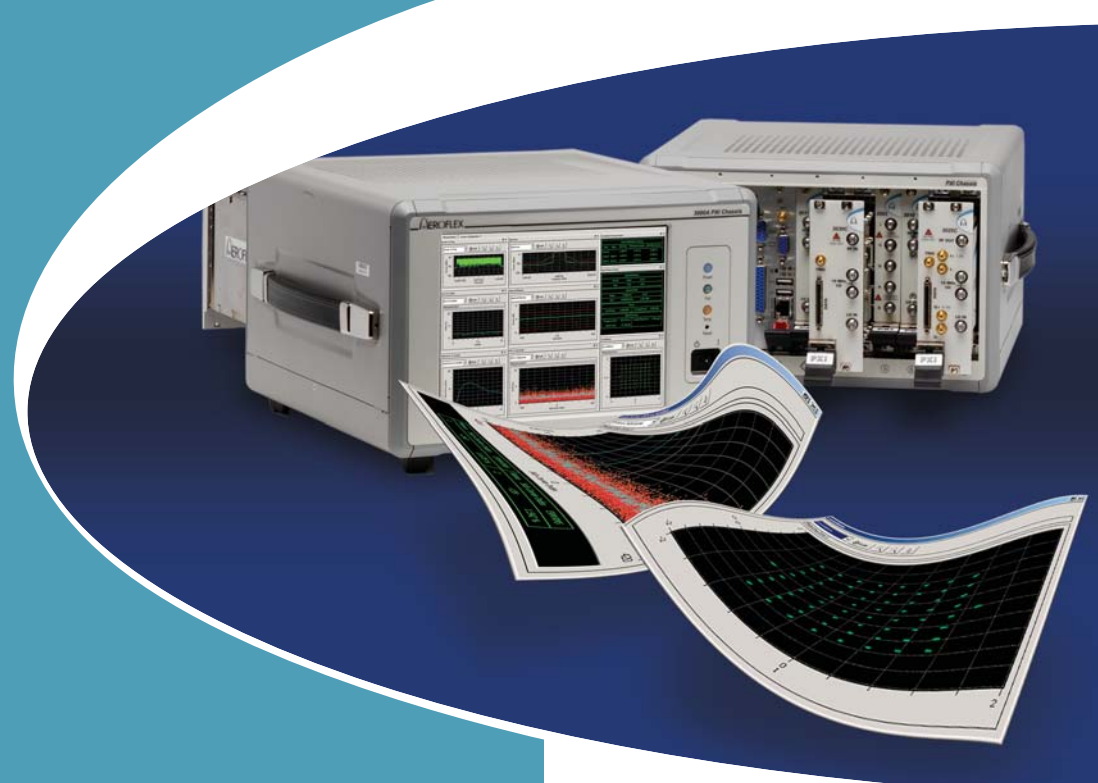


AEROFLEX

A passion for performance.

PXI Modular RF Test System



Plan
eXecute
Integrate
3000 Series

RF test challenges, Aeroflex's solution



The Challenges of RF Test

In advanced wireless communications the speed of technological developments demand test solutions to continually evolve in performance, functionality and speed while remaining completely flexible. The demand for accelerated time to market and increased product complexity challenge both design and production engineers. Any investment in test equipment must be made with complete confidence. Wherever your market takes you, your test solution must have the flexibility, power and accuracy to follow.

"The market need is for flexible test systems that can track fast changing market requirements, accelerate time to market and lower the cost of manufacture."

The Aeroflex Solution

With over 70 years of experience producing high performance test equipment for RF communications, Aeroflex has unparalleled expertise in overcoming the challenges of developing and manufacturing electronic equipment to very high standards. The Aeroflex solution is the 3000 Series, a modular RF test system based on PXI technology, a robust modular open standard for high performance low cost instrumentation. Aeroflex has applied its vast experience in RF testing combined with the flexibility and speed benefits of PXI to produce a powerful solution to accelerate throughput in manufacturing and time to market in R&D while catering for current and future RF test needs.

The Aeroflex solution adapts to today's demanding production environments putting the user at the heart of the instrument and enabling easy customization.



"Modularity provides flexibility, flexibility enables optimization, optimization results in cost reductions."

think it, design it, build it.

Benefits and key features

Future-proofed Modular Design

Scalability by test module allows building the system based on frequency requirements of up to 3 GHz or 6 GHz, with a bandwidth of up to 90 MHz and progressively upgrade as needs evolve. By decoupling signal processing and RF sub systems, the 3000 platform can leverage from rapid advances in processing power at any stage during the life of the equipment.

Maximize Return on Investment

PXI technology delivers integrated test systems at lower cost than conventional box instruments. A complete range of medium and high performance open standard RF modules is available to suit all budgets. Additionally, software reconfiguration and integration of discrete field replaceable modules further maximize return on investment by extending the system's life and scope of applications. The value delivered by the solution is enhanced by unlimited access to freely downloadable software updates expanding waveform generation support for new communication standards and technologies.

Dramatic Reduction in Test Times

The PXI 3000 Series achieves up to five times higher throughput than conventional instrumentation leading the market in terms of test speed. Low test times are the result of very fast responding hardware and the performance gains derived from the use of multi-core processors. Multiple simultaneous measurements and multi-device testing becomes a reality when realizing the benefits of multi-core processing through the inherent open software architecture.

An Established, Respected Solution

With systems deployed in manufacturing the world over, the Aeroflex PXI 3000 Series is the leading modular solution in handset manufacturing. A solid customer base of the leading mobile handset manufacturers and their supply chain demonstrates an enviable track record of meeting the most stringent requirements for continued support, servicing and evolution of the product portfolio.

High Accuracy, Reliability, and Repeatability

The Aeroflex expertise in design and manufacturing of RF systems is translated into every PXI module providing uncompromising performance, accuracy, reliability and repeatability enhancing confidence in test results.

Dedicated Customer Support Teams

Aeroflex has a highly experienced team of dedicated field engineers providing customized application development, system configuration and on-site support.

"...Verifiable productivity improvements from day one."



Aeroflex

Performance Highlights



Unparalleled Speed

The PXI system operates on a high speed PCI bus, over 100 times faster than conventional instrumentation buses such as GPIB. The 3000 Series modules harness this speed by incorporating List Mode and Fast Sequence Tuning features to accelerate hardware setup times. Implementation of application-specific multi-threaded algorithms enables the concurrent test of multiple devices transferring speed advantages to the production line.

“Measurement of multiple parameters in a single measurement cycle”

- Frequency settling times of 250 μ s
- 100 times faster than GPIB
- Multi-core processing
- List mode and fast sequence tuning
- Simultaneous multiple DUT testing

Enhanced Flexibility

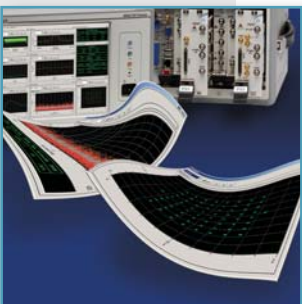
An industry standard modular platform based on ‘plug and play’ modules that support easy setup and field upgrades. The open software interfaces enable rapid integration and adaptation as test requirements change using standard programming interfaces. To validate measurements the system is supported by user friendly Measurement Suites covering a broad range of RF modulation standards. Triggering facilities maximize flexibility for synchronous measurements.



- Modular architecture
- User friendly measurement suites
- Open software architecture
- Versatile triggering
- Standard programming interfaces (C, VB and .NET)

Low Cost

The modular nature of the solution reduces cost by discarding all redundant components allowing you to only purchase what you need. The 3000 Series offers considerable cost savings based on shared use of common power supplies, instrument bus, chassis and elimination of the front panel user interface. However, remain confident that when requirements change, little or no additional investment is required to reconfigure your existing system. In most cases all that is required is a simple software change.



“Purchase only what you need”

Excellent Accuracy

The 3000 Series is uncompromising in terms of accuracy. It equals or exceeds equivalent rack and stack instrumentation. With a total measurement uncertainty of typically ± 0.3 dB, accurate, repeatable RF power measurements in high volume manufacturing are made possible.

- *Level accuracy typically ± 0.3 dB*
- *Repeatability of < 0.05 dB*

Precision and Stability

The output level is electronically variable in fine 0.01 dB increments with a 1Hz frequency resolution. An all digital levelling control loop ensures that even with complex modulated signals the output signal is accurately set. Levelling control is combined with an electronic high speed RF attenuator for high reliability in volume manufacturing.

- *1Hz frequency resolution*
- *0.01 dB level resolution*
- *Stable OCXO ± 1 in 10^9 /year*

Reduced Footprint

The 3000 Series is the most compact solution of its kind and a fraction of the size of conventional rack and stack instrumentation. This enables easier integration into the production floor, field transportation or bench use. Using a high capacity 19-inch 4U rack-mountable chassis allows up to 6 RF signal generator or signal analyzer instruments to be populated in any combination enabling simultaneous multiple device testing.

“Test up to 3 RF transceivers simultaneously with one single chassis”

Low Power Consumption

The Aeroflex solution boasts the lowest levels of power consumption in the market. Minimizing the environmental impact of operations is a key issue for all our customers. The Aeroflex PXI 3000 Series supports these efforts, minimizing our customer’s carbon footprint by offering low energy consumption alongside higher throughput and yield. This translates into a reduced number of instruments in the production line consuming less energy individually and collectively.

“Power consumption of a standard set of PXI 3000 Series modules is under 100 W.”

Reduced Down-time

Experience in the field has proven the Aeroflex PXI 3000 Series achieves close to 100% uptime with servicing downtime reduced to minutes if ever required. The simplicity in module replacement allows this task to be performed confidently by Aeroflex or plant technicians. A 24 month calibration cycle, optional on-site calibration and 24 hour helpdesk further reduce down-time. Additionally, every unit is backed up by a 2 year unlimited warranty with the available option to extend to a 5 year period.

- *Small servicing window*
- *Close to 100% uptime*
- *24 month calibration cycle*
- *On-site calibration*
- *24-hour helpdesk*

The Solution in Detail



In addition to a broad selection of modules and software measurement libraries, Aeroflex can supply everything needed to create an entire PXI-based test solution. Either **Plan**, **eXecute** and **Integrate** your own test solution or purchase a complete fully functioning, turnkey solution with complete confidence that your new system can easily track your future testing requirements.



The built-in flexibility of the PXI approach allows the 3000 Series to support a variety of application areas. It is particularly suited to modern cellular and wireless data communications and critical testing in a high volume manufacturing environment. The modules are categorized into groups: stimulus, response and signal conditioning which are combined with test software to produce fast, accurate test solutions - that are future-proof and cost effective.

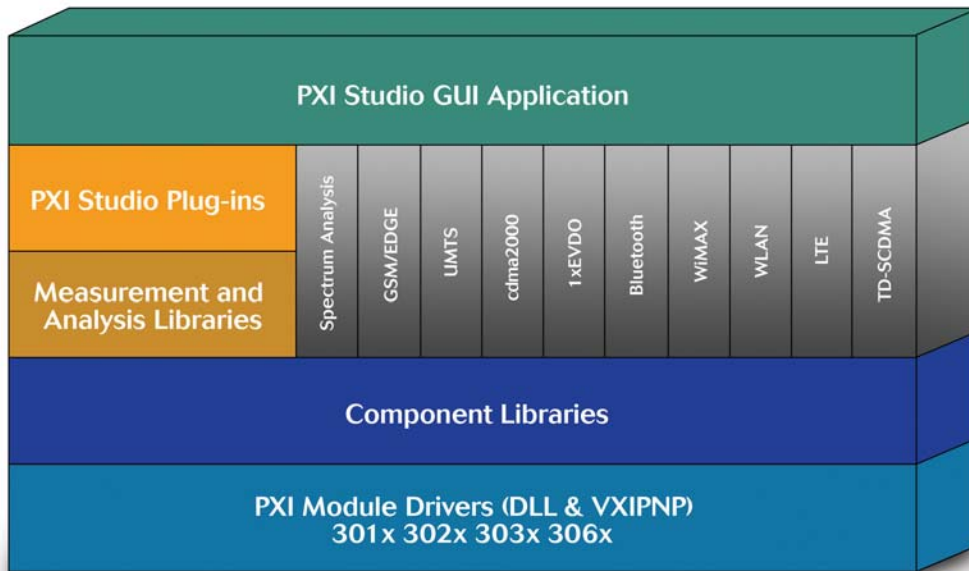


Aeroflex is committed to customizing every solution to meet the particular needs of its customers. The PXI 3000 Series product portfolio encompasses portable solutions allowing for dynamic allocation of resources or high capacity rack-mountable chassis solutions to manage high volume testing requirements.



PXI 3000 Software Architecture

The PXI 3000 Series software platform allows multiple approaches to RF testing. Low-level hardware manipulation is completely managed by dedicated libraries which can be used for implementing customized solutions for automatized environments. The optional measurement libraries present an interface to control standard-specific functions. These measurement libraries are complemented by their corresponding GUI plug-ins for use within the PXI Studio application software.



PXI Studio Application Software

PXI Studio is a Windows™ based software application featuring a single integrated graphical user interface enabling control of any configuration of PXI 3000 Series modules. As standard it provides signal generator and RF digitizer control with general purpose spectrum or time domain analysis for RF component testing or alignment of radio communications transceivers.

PXI Studio connects your benchtop PC with your PXI hardware to form a tightly coupled high performance laboratory test instrument or system. Performance is therefore directly enhanced as PC processing power improves and prolongs the productive life of the system. Optional Measurement Suites extend measurement support to cater for a variety of communication standards.



PXI Studio Measurement Suites

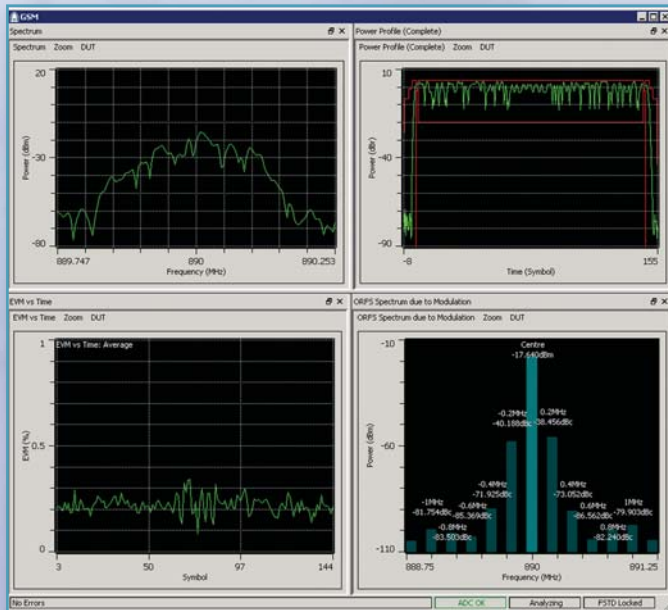
GSM/EDGE Terminals

- TX average power and burst power profile
- GMSK phase error (peak and RMS)
- 8PSK EVM, origin offset suppression
- 95th percentile EVM
- Frequency error
- Output radio frequency spectrum
- Receiver BER measurement
- Fast sequence tuning

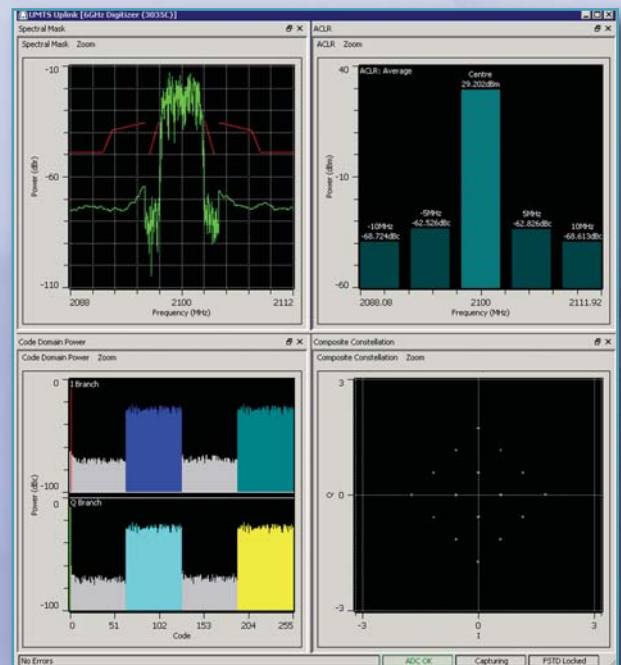
UMTS User Equipment

- Spectrum emission mask
- Phase Discontinuity
- CCDF
- ACLR
- Occupied bandwidth
- EVM (Peak and RMS)
- Phase, frequency and magnitude errors
- IQ skew and gain imbalance
- Origin offset
- Code domain power
- Code domain error
- Receive sensitivity (BER) using loopback
- Fast sequence tuning

GSM/EDGE

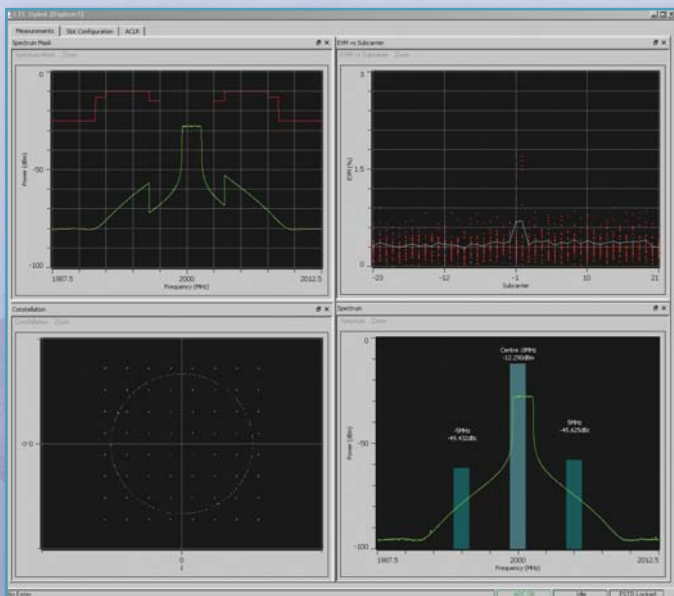


UMTS



LTE FDD

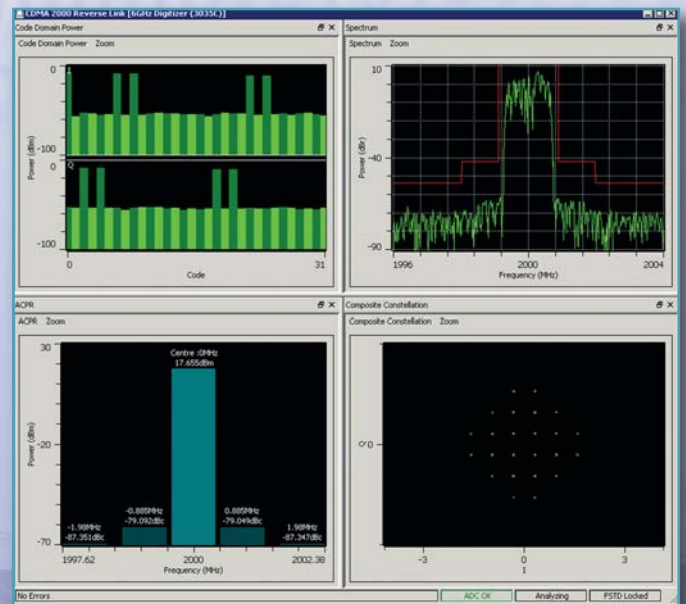
- Transmit signal quality:
 - Frequency error
 - Error Vector Magnitude (EVM)
 - IQ-component (carrier leak)
 - In-band emissions for non allocated RB
 - Spectrum flatness
- Output RF spectrum emissions:
 - Occupied bandwidth
 - Spectrum emission mask
 - Adjacent channel leakage power ratio
- CCDF
- IQ skew
- Gain imbalance
- Symbol clock error



cdma2000/1xEVDO Terminals

- Channel power
- Average power
- ACPR
- Phase and magnitude errors
- Skew
- Gain imbalance
- Spectral emission mask
- CCDF
- Composite modulation accuracy (RHO and EVM)
- QPSK EVM
- QPSK origin offset
- Code domain power
- Peak code domain error
- Frequency error
- Fast sequence tuning

cdma2000



PXI Studio Measurement Suites

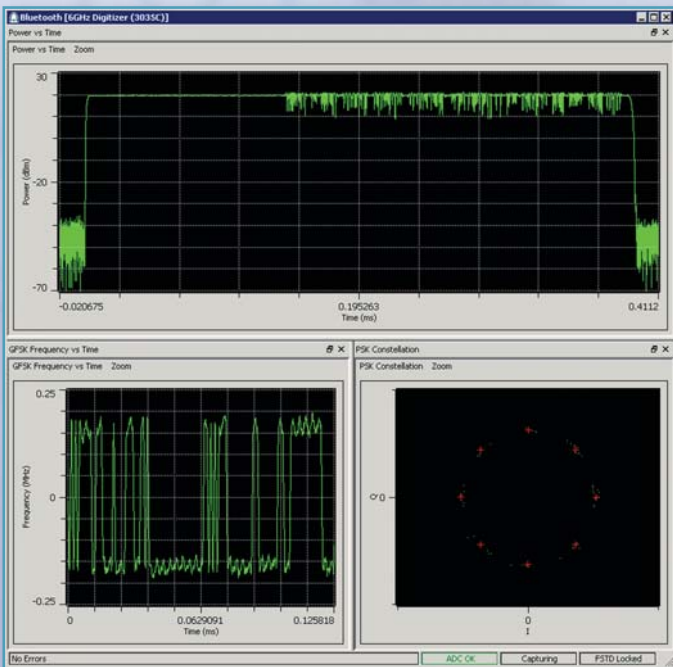
Bluetooth

- Burst position and power
 - EDR relative to Tx power
- Spectrum
 - -20 dB bandwidth
 - Power density
 - Occupied bandwidth
 - Adjacent channel power
 - EDR spurious emissions
- Modulation characteristics
- Initial carrier frequency tolerance
- Frequency drift and drift rate
- Burst profile
- Modulation accuracy

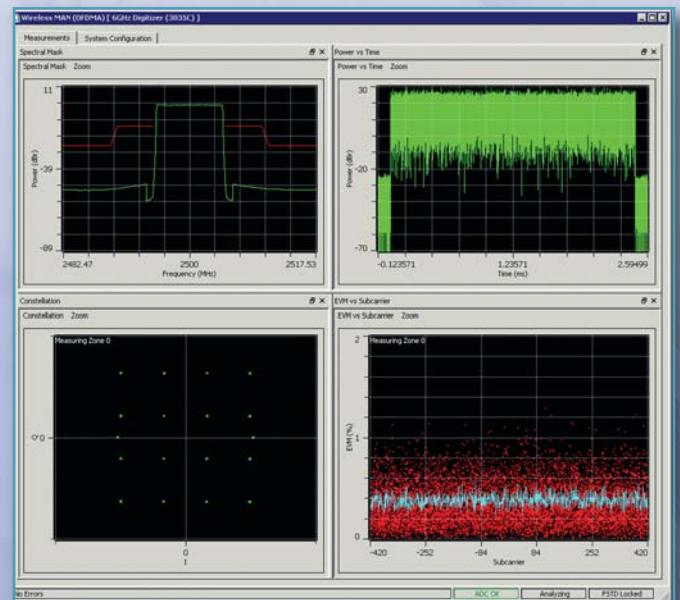
WiMAX

- Transmit power
- Spectral mask
- CCDF
- Occupied bandwidth
- EVM
- Frequency error
- Symbol/chip clock frequency error
- Carrier leakage
- Spectral flatness

Bluetooth



WiMAX



WLAN

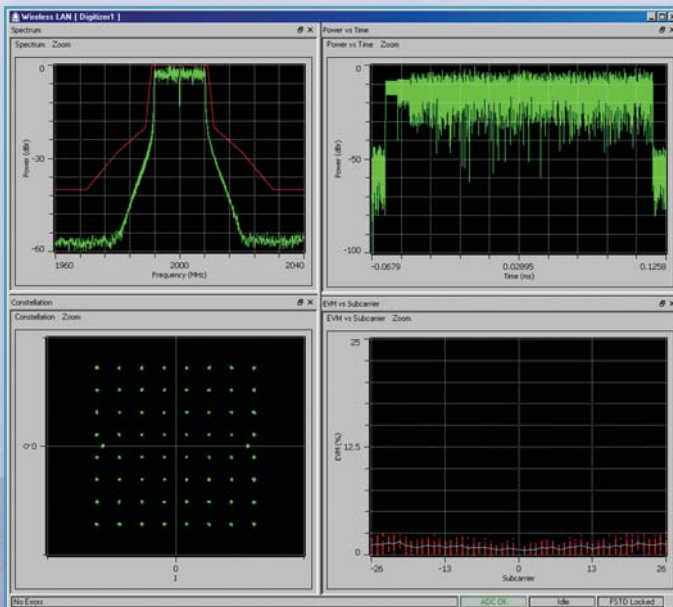
- Transmit power
- Transmit burst length
- Transmit power on, off timing
- Spectral mask
- CCDF
- Occupied bandwidth
- Frequency error
- Symbol/chip clock frequency tolerance
- Carrier suppression/leakage
- Skew
- Gain imbalance
- Modulation accuracy (EVM)
- Spectral flatness

TD-SCDMA Terminals

Available Q4 2009

- Phase error
- EVM
- Magnitude error
- Code domain analysis
- Spectral mask
- Midamble measurements

WLAN





3020 Series Signal Generators

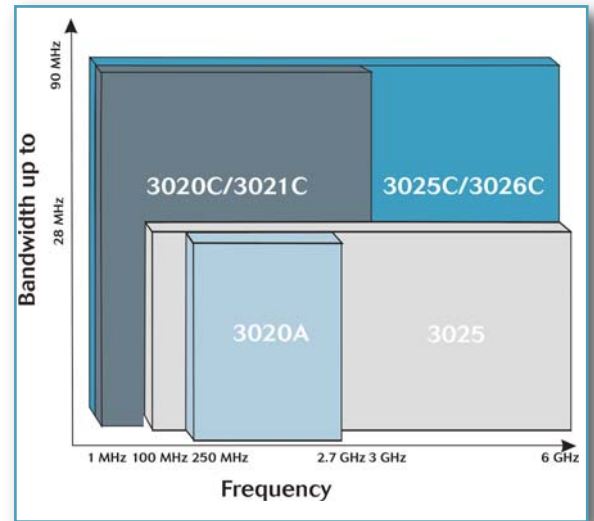
Use with 3010 RF synthesizer

- Frequency ranges up to 6 GHz
- Level range -121 dBm up to +17 dBm
- Excellent level accuracy of typically ± 0.3 dB
- High speed frequency switching
- Low phase noise
- List mode for fast frequency and level switching
- Built in dual-channel arbitrary waveform generator with up to 2 GB memory
- Digital interface for IQ streaming
- Optional analog IQ inputs and outputs



3010 RF Synthesizer

- 1.5 GHz to 3.0 GHz
- Resolution 1 Hz
- Low phase noise
- 250 μ s frequency settling times

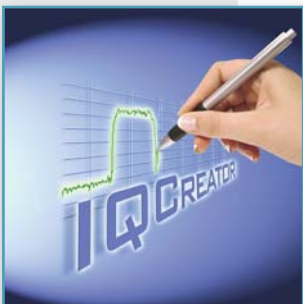


IQCreator®

IQCreator® is a Windows™-based software application that enables a user to set up a modulation scheme and then create an ARB file for use in conjunction with 3020 PXI Series signal generators. Graphical displays of the waveform FFT, vector and constellation diagrams, among others can be viewed and exported for use in other Windows™ applications. The ARB file may be saved or downloaded into the ARB. User-defined configurations can also be saved. Consequently, it is possible to load previously saved setups to regenerate the ARB files quickly and easily.

The capabilities of IQCreator® include:

2G	2.5G	3G	4G	Wireless	Generic
GSM cdmaone (IS95)	Edge 1xEVDO	3GPP WCDMA TD-SCDMA cdma2000	LTE FDD WiMAX	WiFi TETRA DECT VDL	PSK ASK QAM FSK



IQCreator® also includes a utility that allows the user generated files in binary or ASCII format to be converted and packaged into a form that can be downloaded into the ARB.

3030 Series RF Digitizers

Use with 3010 RF synthesizer

- Frequency ranges to 6 GHz
- 36 MHz or 90 MHz bandwidth (-1 dB)
- 13 or 14 bit ADC resolution
- Variable sample rates up to 200 MSa/s
- 75 dB spurious free dynamic range
- 75 dB intermodulation free dynamic range
- Excellent level accuracy of typically 0.3 dB
- List mode for fast frequency settling
- Up to 512 MB sample memory
- Real time streaming output of sample data
- Precision conversion of RF signals into digital IF or I and Q data.
- Class leading vector signal analysis of RF signals
- Low noise

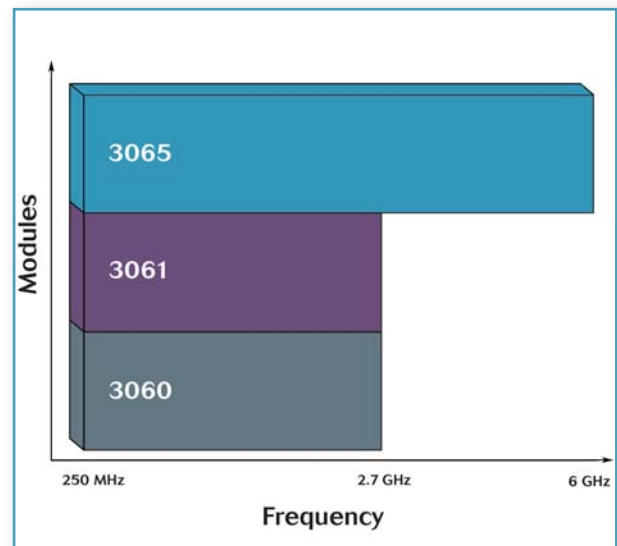
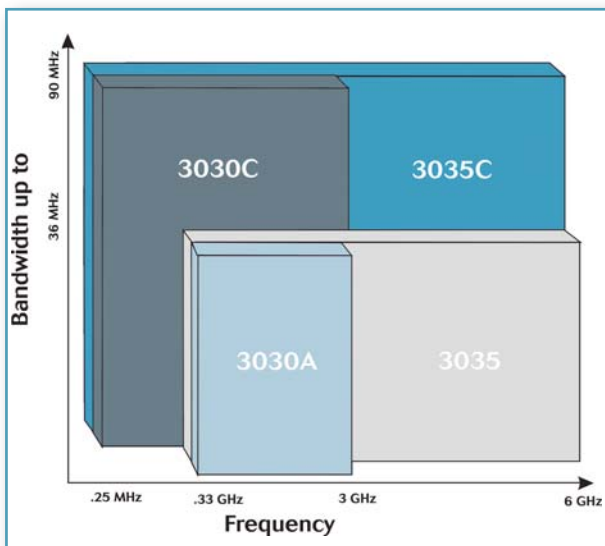


3060 Series RF Combiners

- Integrated RF switch and power combiners
- Frequency range up to 2.7 GHz or 6 GHz
- High speed electronic RF switching
- Internally stored calibration data



Used in conjunction with Aeroflex's 3020 Series RF signal generators and 3030 Series RF digitizer modules. Together these modules enable the development of compact, high-performance, low-cost, modular RF test systems. The versatile 3060 Series RF combiners avoids the need for extraneous RF signal conditioning development in the test fixture, thereby simplifying test system design and calibration.



Aeroflex Customer Support



Aeroflex delivers end-to-end customer support from identifying the best solution to fit test requirements, to troubleshooting technical issues during ongoing operations. Fully integrated turn-key solutions can be custom-made based on specific requirements with the assistance of the Aeroflex systems integration teams.



solution-minded



performance-driven



customer-focused

The experience gained from test operations in hundreds of locations world-wide is within grasp through the Aeroflex Customer support group. The group has a clear understanding of the challenges faced by manufacturers of RF devices offering an added value when designing and implementing test solutions that seamlessly integrate to the production chain. Aeroflex is able to offer regional and international support to customers in almost every location around the globe.

Supporting the PXI 3000 integration into existing test systems is a team of applications engineers. Applications engineers are capable of delivering solutions for integration with most industry leading software applications LabVIEW, LabWindows/CVI, Visual Basic, Visual C/ C++, and Microsoft .NET. No matter how ambitious your goals, the broad experience of Aeroflex engineers in the field of RF testing is available to implement the best solutions in record time.



Configurations

The table below illustrates how the PXI 3000 Series modules and options may be used as essential building blocks in RF test system development.

Application	Module Type Required					Required Options	Minimum No. PXI Slots
	3010	3011	3020 Series	3030 Series	3060 Series		
GSM/EDGE Transceiver Test	●	●	▼◆	▼◆	●	100	7
UMTS MS Transceiver Test	●	●	▼◆	▼◆	●	101	7
CDMA2000 Mobile Transceiver Test	●	●	▼◆	▼◆	●	102	7
1xEVDO Mobile Transceiver Test	●	●	▼◆	▼◆	●	102	7
WLAN IEEE 802.11a/n Test	●	●	★●	★●	●	103	7
WLAN IEEE 802.11b/g Test	●	●	▼◆	▼◆	●	103	7
WiMAX MP01-MP05 Test	●	●	▼◆	▼◆	●	104	7
WiMAX MP06-MP12 Test	●	●	★●	★●	●	104	7
Bluetooth® Wireless Technology Test	●	●	▼◆	▼◆	●	106	7
LTE FDD Test	●	●	▼◆	▼◆	●	107	7
TD-SCDMA Test	●	●	▼◆	▼◆	●	109	7

3020A	▼	3030A
3020C/21C	◆	3030C
3025	★	3035
3025C/26C	●	3035C



CHINA Beijing Tel: [+86] (10) 6539 1166 • Fax: [+86] (10) 6539 1778
CHINA Shanghai Tel: [+86] (21) 5109 5128 • Fax: [+86] (21) 5150 6112
FINLAND Tel: [+358] (9) 2709 5541 • Fax: [+358] (9) 804 2441
FRANCE Tel: [+33] 1 60 79 96 00 • Fax: [+33] 1 60 0177 69 22
GERMANY Tel: [+49] 8131 2926-0 • Fax: [+49] 8131 2926-130
HONG KONG Tel: [+852] 2832 7988 • Fax: [+852] 2834 5364
INDIA Tel: [+91] (0) 80 4115 4501 • Fax: [+91] (0) 80 4115 4502
JAPAN Tel: [+81] 3 3500 5591 • Fax: [+81] 3 3500 5592
KOREA Tel: [+82] (2) 3424 2719 • Fax: [+82] (2) 3424 8620
SCANDINAVIA Tel: [+45] 9614 0045 • Fax: [+45] 9614 0047
SPAIN Tel: [+34] (91) 640 11 34 • Fax: [+34] (91) 640 06 40
UK Cambridge Tel: [+44] (0) 1763 262277 • Fax: [+44] (0) 1763 285353
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Our passion for performance is defined by three attributes represented by these three icons: solution-minded, performance-driven and customer-focused.