Gain greater confidence in your DigRF designs.

From turn-on through integration, from gigabits to gigahertz.
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The explosion of functionality being packed into mobile devices puts numerous technologies inside each unit: cellular, GPS, WLAN, Bluetooth, camera, FM, stereo audio and more. As these designs become increasingly complex, the challenges of validation and testing become more difficult. To further complicate the situation, advantages such as lower costs, wider bandwidth and extended battery life are pushing digital technologies deeper into the radio frequency (RF) portion of every handset.

The multi-gigabit DigRF V4 standard is rapidly emerging as the next-generation serial interface between mobile baseband (BB) and RF ICs because it removes the inter-chip communication bottleneck. However, the ongoing evolution of the DigRF standard introduces multiple levels of complexity due to changes such as a new protocol and a high-speed serial link. Couple that with the introduction of MIMO techniques and new RF modulation formats into handset design and the problems become even tougher.

From turn-on through integration, the ability to gain greater confidence in these new designs depends on deeper insights that span the digital and RF domains. Within each wireless device, new insight begins in the digital domain at the physical and protocol layers. Next, ensuring proper operation over the air requires insight into the RF domain and the physical and protocol layers. With new handset designs, it becomes crucial to have tools that work across the digital and RF domains.

Achieve deeper insights—with Agilent

From gigabits to gigahertz Agilent offers an end-to-end solution that enables you to work across both domains—digital or RF—and gain new insights. You’re probably familiar with the unmatched breadth of our instrumentation offering. You may also know Agilent software solutions such as Advanced Design System, Signal Studio and 89600A vector signal analysis (VSA).

We’ve united those tools in an integrated platform for cross-domain digital/RF testing. Our starting point is the industry’s first DigRF V4 test solution. This new test platform enables DigRF protocol debugging as well as comprehensive stimulus and analysis across the digital and RF domains for IC developers—RF and BB—and handset integrators. We offer the only solution that enables and accelerates the turn-on, validation and integration of DigRF V4-based devices. With this solution, we can help you gain greater confidence in your increasingly complex designs—from turn-on through integration, from gigabits to gigahertz.

Pages 3 through 7 of this brochure provide overviews of our solutions for the four major areas. To get the latest information about new products, app notes, and more, please visit www.agilent.com/find/DigRF.
Work within and across the domains

During device development, challenges abound in the embedded technologies and the required measurements. These challenges exist in the physical and protocol layers of the digital and RF domains—and they span the domains. Every step of the way, Agilent offers solutions that can help you quickly characterize and integrate your devices and get them to market faster.

Digital domain: PHYSICAL LAYER

Early in handset development, it’s essential to debug and validate digital designs at the physical layer. One key step is verifying the occurrence of reliable physical communication: Are the right signals present? Can the BB-ICs and RF-ICs exchange bits? Is the clock being properly recovered? Will the timing work across long packets?

DigRF presents new challenges for wireless designers. The presence of gigabit serial interfaces and embedded clocks turns issues such as signal integrity and jitter into major considerations. Fortunately, we’ve been working with high-speed serial interfaces since their inception—and offer second-generation instruments that can connect to your interface with minimal interference and quickly identify problems. Instruments such as the Agilent 90000A Series Infiniium oscilloscopes and 81250A parallel bit error ratio tester (ParBERT) make this possible.

90000 Series

Specialized tools help you debug and validate designs based on today’s higher data rates and serial buses. The DSA90000A digital signal analyzer (DSA) is an oscilloscope measurement system optimized for these measurement tasks. The system is built around a four-channel Infiniium DSO9000A Series oscilloscope and the InfiniMax probing system. The DSA helps you preserve design margins by providing the industry’s lowest noise floor, lowest jitter measurement floor, lowest trigger jitter, and flattest combined frequency response of scope and probe.

81250A ParBERT

This modular test platform includes generator and analyzer modules that work from 675 Mb/s up to 45 Gb/s. It’s a perfect fit for serial-to-serial BER testing. Examples include multiplexer and demultiplexer (MUX/DEMUX)—or serializer/deserializer (SerDes)—testing of communications devices, and multiple transmitter and receiver testing. The ParBERT software suite is a ready-to-use package that offers different levels of measurement analysis: output timing measurements; output level measurements; comprehensive jitter measurement applications; and eye-opening measurement applications.

- **Bandwidth:** 2 GHz, upgradeable to 13 GHz
- **Sampling:** 40 GSa/s with one or two channels; 20 GSa/s with all four channels
- **Memory depth:** 64 Mpts at 4 GSa/s
- **Trigger jitter:** Less than 500 fs
- **Generate and analyze** single-ended and differential signals, including true differential
- **Apply PRWS, PRBS** and user-defined parallel patterns
- **Perform BER analysis** with user-defined patterns, PRBS/PRWS or mixed data (user-defined with PRBS)
Work within and across the domains

**Digital domain: PROTOCOL LAYER**

The next step is to debug and validate digital circuitry at the protocol level. Important tests answer a variety of questions: Are the right DigRF packets present? Are control and data packets being reliably transferred? Can data be looped back successfully? Performing such measurements on both BB-ICs and RF-ICs requires tools such as the Agilent RDX platform connected with our line of low-capacitance probes.

**RDX**

The ultimate solution for DigRF testing and characterization, the RDX platform provides a single test environment that helps you validate DigRF v4 protocols under real world conditions. With powerful emulation software and protocol-specific hardware test cards, you can quickly explore a broad range of test cases. The included protocol generation and analysis software interoperates with the industry-leading Agilent Signal Studio software and 89600 VSA analysis software to enable RF physical domain stimulus and analysis across an RF-IC chip.

**Active Probes**

Get greater insight with Agilent active probing solutions. We offer ultra-low capacitive loading (< 0.15 pF) and high sensitivity to ensure minimum disturbance at the gigabit speeds used in DigRF V4 testing. Choose between the N5345A midbus probe with soft-touch technology for fast probing on prototype boards, and N5346A flying leads probing solutions, which enable effortless monitoring of DigRF V4 links in space-constrained designs.
Once the digital side is working, it’s time to ensure that the device can connect and communicate—and the next step is to validate the physical layer in the RF domain. Essential test capabilities extend from fundamental RF characterization to advanced measurements such as error vector magnitude (EVM), spectrum emission mask (SEM), and more. These are enabled by Agilent’s industry-leading signal analyzers, 89600 Series VSA software, signal generators, and Signal Studio signal-generation software. You can configure Agilent’s signal analyzers and sources to support all modern, popular cellular and emerging-communications modulation formats.

**MXA signal analyzer**
Eliminate the compromise between speed and performance with the MXA signal analyzer. A variety of X-Series measurement applications run inside the instrument: LTE, W-CDMA, TD-SCDMA, WiMAX™ and more. For advanced signal and modulation analysis, the Agilent 89600 Series VSA software (89601A) can also be operated within the analyzer.

**VSA software**
The 89600 Series VSA software provides superior general-purpose and standards-specific signal evaluation and troubleshooting tools. Use these tools to dig into your signal and gather the data you need to successfully troubleshoot PHY-layer signal problems. The VSA software is compatible with more than 30 Agilent instruments—signal analyzers, scopes, logic analyzers, RDX platform—and can run within those instruments, on a server, or standalone on a PC.

**MXG signal generator**
Quickly and easily create performance-optimized LTE, WiMAX or other cellular and wireless reference signals for component-level parametric test, baseband subsystem verification, receiver performance verification, and advanced functional evaluation. The Agilent MXG offers scalable performance easily tailored for the stringent test requirements of components and devices used in DigiRF devices. With vector signal generation up to 6 GHz, and the MXG ATE for automated test environments, you can configure the MXG to fit your specific test needs.

**Signal Studio**
Agilent Signal Studio and embedded software are a suite of flexible, easy-to-use, standards-based signal-creation tools that will cut the time you spend on signal simulation. They also provide validated and performance-optimized reference signals to help you better characterize, evaluate and fine-tune your designs. Signal Studio runs on signal generators as well as the RDX platform and supports a variety of cellular and wireless formats including WiMAX and LTE.
RF domain: PROTOCOL LAYER

The final step in the development test process is to validate the protocol layer in the RF domain. Checking the modulation quality of transmitted and received signals helps ensure that control packets and data packets are properly decoded. Agilent provides protocol-level tools for all popular cellular formats. From verifying initial wireless connectivity through completion of conformance testing, we can provide the wireless protocol solutions that fit your needs.

8960A Series 10
Agilent’s one-box test sets include network simulation and software verification tools and are designed specifically for the needs of wireless developers doing software design verification and integration. These test solutions offer realistic network simulation as well as Internet connectivity with real data traffic flows. Additional capability is provided with extensive real-time protocol logging and analysis tools.

E6620A
The wireless communications test set is a scalable platform that shortens design cycles of LTE 3GPP release 8 user equipment—from protocol to conformance test—using a common protocol stack across all solutions. An advanced, one-box test set for LTE, the E6620A offers real-time, system-rate network emulation for L1/L2/L3 uplink and downlink via RF or digital baseband, and provides a path to MIMO 2 cell and RF measurement capabilities.

E6651A
This Mobile WiMAX test set offers a unique combination of flexible base station emulation and RF parametric tests in one integrated unit, with support for IEEE 802.16e 2005 protocol conformance test (PCT). With instrument-grade RF signal generation and signal analysis capability up to 6 GHz, the E6651A can address current and planned WiMAX profiles. A suite of RF measurements can be used for characterization, calibration and verification of WiMAX transmitter and receiver performance. The addition of the N6422C WiMAX Wireless Test Manager makes it easy to automate test plans and increase test coverage.
OTHER DEVELOPMENT TOOLS

While developing and integrating chipsets for solutions using DigRF technology, you are also dealing with other important considerations such as power consumption. Agilent has precision power supplies, software tools, and “connected solutions” to assist your chipset development efforts.

66319D and 66321D

These mobile communications DC sources provide fast transient response, exceptional sourcing, output-resistance programming, and precise measurements. They are specially designed for testing next-generation digital wireless communications devices. The 66321D offers a capability that simulates the internal resistance of a battery or battery pack. With dual outputs, the 66319D enables testing of both the main battery and the battery-charger circuitry—and this makes it possible to test phones and chargers with the same equipment.

14565B

The 14565B device-characterization software, along with a 66321D or 66319D mobile communications DC source, is a ready-to-use solution for long-term current-drain measurement, visualization, analysis, and optimization. This eliminates the traditional, time-consuming process of integrating DC sources, current shunts and digitizing measurement equipment, and then creating custom application software.

EESof EDA software

In wireless R&D, our unique LTE Connected Solutions extend instrumentation functionality with the flexible Agilent Advanced Design System (ADS) simulation capability. Combine design and test environments, get early access to evolving wireless signals, and create and analyze the signals you need to accelerate your products through conformance—and get them to market faster.
Gain greater confidence in your DigRF designs

We’ve united our industry-leading instrumentation and software in an integrated platform for cross-domain digital/RF testing at the physical and protocol layers. From turn-on through integration, from gigabits to gigahertz, Agilent offers an end-to-end solution that enables you to work within your preferred domain—digital or RF—and gain new insights. Every step of the way, Agilent offers solutions that can help you quickly characterize and integrate your devices and get them to market faster.

Agilent offers a wide range of additional expert test and measurement services for your equipment, including initial start-up assistance, onsite education and training, as well as design, system integration, and project management.

For more information on repair and calibration services, go to: www.agilent.com/find/removealldoubt

Remove all doubt

Our repair and calibration services will get your equipment back to you, performing like new, when promised. You will get full value out of your Agilent equipment throughout its lifetime. Your equipment will be serviced by Agilent-trained technicians using the latest factory calibration procedures, automated repair diagnostics and genuine parts. You will always have the utmost confidence in your measurements.

For more information on repair and calibration services, please contact your local Agilent office. The complete list is available at: www.agilent.com/find/contactus

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