SPIRENT CS8 MOBILE DEVICE TESTER

One Network Emulator for All Phases of Mobile Device Testing

Spirent's CS8 Mobile Device Tester is a multi-purpose network emulator for testing LTE, UMTS, CDMA and multi-mode UEs, including VoLTE-ready UEs. CS8 is a single platform that can be used in every stage of mobile device development.

APPLICATIONS

Mobile Device Development

- VoLTE/IMS testing
- Radio Protocol DVT
- System-Level DVT
- Chipset Platform DVT
- Location technology development (satellite and hybrid methods)

BENEFITS

- *Reduced development time* – With efficient development and debugging tools for R&D teams, the CS8 reduces overall development time
- *Optimize data service capabilities* – Testing against data and application servers is as simple as plugging into the port... directly, through a LAN, or via the Internet
- *Maximize Return on Investment* – Cost-effective, scalable test platform minimizes long-term spending and brings value to every stage of the product life-cycle... from early-stage development all the way to operator acceptance and deployment acceptance and deployment

The CS8 can be used in radio protocol development, platform validation, system testing and as the network emulator in automated test systems, bringing value to every stage of the mobile device lifecycle. Available CS8 configurations can immediately address needs ranging from realistic LTE network emulation to advanced multi-RAT mobility testing.

The most flexible, configurable IMS implementation available ensures that VoLTE and other next-generation IMS applications will work as promised across a wide variety of network equipment and operator configurations.

Multiple interfaces tailor the CS8 in order to deliver the most efficient solution to address the task at hand.

- CS8 Interactive Tester is a GUI that offers intuitive control over multi-cell multi-RAT network emulation
- CS8 Development Library SDK provides deep control of LTE Network Emulation functions and events
- CS8 Development Library UI is a clean, intuitive interface to let you quickly automate UE testing
- CS8 Protocol Tester provides a ready interface for quick setup of complex protocol testing (such as the IMS-related protocols needed for VoLTE testing)

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KEY FEATURES

- LTE-Advanced features (e.g. Carrier Aggregation)
- Radio protocol development mode
- Platform validation mode
  - Protocol testing (e.g. IMS/VoLTE)
  - Feature Testing
- Inter-RAT testing
- System integration testing
- Scalability (used in Spirent automated systems for device testing, location-services testing and Live2Lab (in-lab field testing)

KEY FACTS – PLATFORM

- IMS: A completely flexible IMS implementation allows the user to replicate NEM- and operator-specific IMS configurations
- LTE:
  - Multi-cell support
  - Support for all 3GPP LTE bands and bandwidths
  - UL signal capture and in-band measurement capabilities
  - Integrated SISO, SIMO, MIMO 2x2, MIMO 4x2
  - Integrated fading
  - L1 - L3 protocol stacks comply with 3GPP Release 9
- UMTS:
  - Multi-cell support
  - Support for all 3GPP UMTS bands and bandwidths
  - UE Categories 1-14 (HSDPA) and 1-5 (HSUPA)
  - Uplink Power Control algorithms 1 and 2

CS8 TESTING

CS8 is a single network emulator designed to address all stages of the mobile device design and testing cycles. Separate testing modes combine to customize CS8 functionality that addresses each specific stage of device development testing. Once you realize how different development testing tasks can be performed by a single test stand, CS8 may quickly become the most valuable part of your development lab.

For RF and baseband developers the CS8 provides a touch-screen interface to a complete set of TX and RX measurements involving all protocol layers. For radio protocol development, the system provides a TTCN-3 programming environment to develop customized protocol stack testing.

For chipset-platform validation, the CS8 emulates multiple-technology networks with a fully developed real-time IPv6 Evolved Packet Core (EPC), providing a multi-RAT system with realistic connection anchoring points. This is the same EPC used by network equipment manufacturers to ensure proper operation of network products.

The CS8 further accelerates LTE device development and debugging with the CS8 Software Development Kit (SDK). The SDK provides deep control of LTE Network Emulation functions and events. With the hundreds of functions and commands available, users can create and run custom tests to meet R&D needs and internal test plans.

Spirent's world-class leadership in testing location-based service implementations are now tailored to the device/chipset developer. Whether you're developing SUPL 2.0, predicted orbits, an A-GNSS chipset or anything related to mobile device navigation, Spirent's CS8 streamlines development and helps assure success in deployment.

The CS8 Development Library UI offers a clean and intuitive interface to help you develop custom test cases quickly and efficiently. Finally, the CS8 Protocol Tester is designed to make short work out of complex protocol test scenarios, making VoLTE testing (for example) easy, intuitive and completely valid on the first try.

CS8 is also at the heart of automated Spirent offerings such as the 8100 Mobile Device Test System, the Location Technology System for E911 and LBS testing and the new 8100 Live2Lab, which brings field testing into the controlled repeatable confines of the lab.

TEST APPLICATIONS OF CS8

Full-featured network emulation for a wide variety of test applications

IMS/VoLTE Functional & Audio Quality testing with CS8

Spirent's CS8 Device Tester provides various tools and configurations for VoLTE protocol testing and for measuring the audio quality delivered by mobile devices. With the rapid evolution to the all-IP LTE network, service providers must have appropriate tools for delivering and testing carrier-grade voice (e.g. VoLTE).

The ability to guarantee a certain level of Quality of Service (QoS) rather than best-effort delivery is what differentiates VoLTE from Over-the-Top (OTT) Voice-over-IP (VoIP) service. A critical step in successful VoLTE deployment is testing early in the device design and development cycle. Testing of VoLTE functionality falls into two main categories – protocol and audio quality. Spirent's CS8 Device Tester provides prepackaged and customizable solutions to test these areas in the R&D lab environment allowing replication of real-world scenarios.

Data throughput Testing with CS8

Spirent's CS8 solution provides the ability to conduct end-to-end data throughput testing, either through interactive real-time control or with automation.

Measuring data throughput performance under real-world scenarios has been one of the most important testing scenarios in the cellular industry. This testing increases in importance as new RF technologies such as LTE are deployed.

Testing under static conditions is not enough to evaluate the performance of the device under real-world situations. CS8 provides a convenient solution that enables the developer to easily test the device under various RF fading and noise conditions.

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Battery Performance Testing with CS8

Spirent's CS8 Device Tester provides tools to test battery profiles and the performance of mobile devices.

With the ever-increasing number of radios being ported into mobile devices and the market move towards LTE and IMS-based convergence, more functionality is required in the mobile device, causing a significant increase in power consumption. Mobile device battery performance therefore has become an important test area for mobile developers.

From a developer's perspective, UE's are generally developed and tested in a controlled environment, in many cases in complete isolation from the battery. It is therefore important to conduct battery performance testing as early as possible within the design phase to catch issues before the product is launched to the market.

VIDEO STREAMING AND WEB BROWSING with CS8

Spirent's CS8 solution provides tools for testing video streaming and web browsing on mobile devices. With the deployment of LTE and HSPA+, demand for video streaming and web browsing has significantly increased, making this an important area for device testing.

From the developer's perspective, testing of video and browsing under static conditions has long been performed using a variety of tools. Testing the device under fading conditions (i.e. replicating the real-world user experience) is a more significant challenge and a critical aspect of validating device performance

LTE-LTE Mobility Testing with CS8

Intra-LTE mobility performance is critical for LTE devices. Time consuming and expensive, field testing on Intra-LTE mobility performance is challenged by varying RF environment and network topologies. Additionally, it is difficult to reproduce or debug performance issues captured in field testing.

Spirent's CS8 Device Tester, a single R&D solution with multiple applications for all phases of device development, offers repeatable emulation and modeling of the live network for testing Intra-LTE mobility.

CS8 emulates an entire cellular environment including LTE, WCDMA, GSM, HSPA, CDMA, EV-DO and eHRPD services, with multiple cells available per technology. CS8's state-machine based network emulator integrates support for real-time mobility testing across multiple radio access technologies:

- LTE from/to LTE
- LTE from/to WCDMA/HSPA
- LTE from/to CDMA
- WCDMA from/to WCDMA
- WCDMA from/to GSM

LTE-UMTS Mobility Testing with CS8

Inter-RAT mobility performance is a critical performance indicator for multi-mode 3G/4G devices. Being time consuming and expensive, field testing on Inter-RAT mobility performance is challenged by varying RF environment and network topologies. Additionally, it is difficult to reproduce or debug performance issues captured in field testing.

Spirent's CS8 Device Tester, a single R&D solution with multiple applications for all phases of device development, offers repeatable emulation and modeling of the live network for testing of Inter-RAT mobility.

CS8 emulates an entire cellular environment including LTE, WCDMA, GSM, HSPA, CDMA, EV-DO and eHRPD services, with multiple cells available per technology. CS8's state-machine based network emulator integrates support for real-time mobility testing across multiple radio access technologies:

- LTE from/to LTE
- LTE from/to WCDMA/HSPA
- LTE from/to CDMA
- WCDMA from/to WCDMA
- WCDMA from/to GSM

LTE RRC and NAS Protocol Testing

Spirent's CS8 solution provides tools to verify and test Radio Resource Control (RRC) and Non-Access Stratum (NAS) protocol layers of mobile devices. With the deployment of LTE there is a growing need to test and investigate issues at various stages of integration.

CS8 emulates an entire cellular environment including LTE, WCDMA, GSM, HSPA, CDMA, EV-DO and eHRPD services, with multiple cells available per technology. CS8's state-machine based network emulator integrates the support for real-time mobility testing across multiple radio access technologies.

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TECHNICAL SPECIFICATIONS

RF CONNECTORS		
Front panel (per transceiver) N female, 50 Ω	TX1, TX2	RF output
	RX/TX1, RX/TX2	Combined input/output RF port
CONTROL INTERFACES		
Rear panel	LAN	3 x Ethernet RJ-45, 10/100/1000 Mbps
OTHER INTERFACES		
Front panel	USB	2 x USB 2.0 type A connector
Rear panel	USB	2 x USB 2.0 type A connector
	External display	VGA Sub-D15 connector
	Reference clock input/output	2 x BNC connector
	IF input/output	4 x BNC connector (per transceiver)
	External trigger	2 x BNC connector (per transceiver)
	Digital IQ input/output	2 x InfiniBand™ (per transceiver)

SIGNAL GENERATOR			
Frequency specifications	Frequency range	380 MHz-3 GHz	
	Frequency resolution	10 Hz	
	Modulation bandwidth	20 MHz	
	Phase noise	10 kHz	‹ -90 dBc/Hz
		5 MHz	‹ -120 dBc/Hz
Output level specifications	Output power level range for connector configured as		
	TX	CW	-110 dBm to 0 dBm
		PEP	Up to +15 dBm
	TX/RX	CW	-110 dBm to -7 dBm
		PEP	Up to +8 dBm
	Output power level uncertainty for any connector	±2 dB	
	Output level resolution	0.1 dB	
	Output level repeatability	0.1 dB	
	Reference impedance	50 Ω	
	VSWR	1.4	
	2nd harmonic level	‹-36 dBc	
	3rd harmonic level	‹-36 dBc	
	Non-harmonics level	‹-36 dBc	
	SNR at maximum output power	70 dB	
	Maximum leakage power for disabled RF outputs	-145 dBm	
	Origin offset	‹-60 dBc	

SIGNAL ANALYZER			
Frequency specifications	Frequency range	380 MHz-3 GHz	
	Frequency resolution	10 Hz	
	Modulation bandwidth	20 MHz	
Power level specifications	Input level range	CW	+26 dBm to -50 dBm
		PEP	Up to +40 dBm
		Maximum input DC level	12 V
	Input level uncertainty	RMS power, Pin › -30dBm	±2 dB
	RSSI resolution	0.1 dB	
	VSWR	‹ 1.4	
	Spurious leakage	‹ -135 dBm	

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TECHNICAL SPECIFICATIONS (CONT'D)

TIME BASE			
Standard frequency reference	Maximum frequency drift	±0.7 ppm/year	
	Short term stability	±0.05 ppm	
	Warm-up time	1 hour	
High stability frequency reference (option)	Maximum frequency drift	±0.1 ppm/year	
	Short term stability	±0.01 ppm	
	Warm-up time	1 hour	
Capture size	Minimum	1 ms (1 sub-frame)	
	Maximum	500 ms (50 frames)	
Reference frequency inputs/outputs (input A)	Connector type	BNC connector SYNC IN, rear panel	
	Frequency	Sine wave	10 MHz
		Square wave	10 MHz
			40/60 duty cycle or better
	Maximum frequency variation	TBD	
	Input voltage range	0.4 – 2 Vpp	
	Impedance	50 Ω	

REQUIRED ENVIRONMENTAL CONDITIONS		
Operation ranges	Temperature	15°C to 35°C (60°F to 95°F)
	Humidity	5% to 85% (non condensing)
Storage ranges	Temperature	-10° to 50° Celsius (15°F to 120°F)
	Humidity	5% to 85% (non condensing)
EMC	EN61326-1 (2006)	
Electrical safety	EN 61010-1	
Mechanical resistance	EN60068-2-6	
	EN60068-2-27	
	EN60068-2-64	
Power supply	Input range	100-240V AC / 50-60 Hz
	Power consumption	550W max
Dimensions	448.7(W) x 265.9(H) x 375.5(D), all units in mm 171.7(W) x 10.5 (H) x 14.8 (D), all units in inches	
Weight	23 kgs (51 lbs)	
Recommended calibration interval	1 year	

ORDERING INFORMATION

Platforms	Description
CS8-NE-LTE-INSTR	CS8 LTE Network Emulator (SISO, Single Cell) Instrument
CS8-NE-LTE-2CELL-INST	CS8 LTE Network Emulator (Two Cell) Instrument
CS8-LTE-2CELL-UMTS-INSTR	CS8 LTE/UMTS Network Emulator Instrument
Test Software	
CS8-ADD-LTE-INT-TEST	CS8 Interactive Tester with UTRAN/E-UTRAN & EPC Functions
CS8-DEVLIB-UI	Adds CS8 Development Library UI Software to LTE Platforms
CS8-DEVLIB-SDK	Adds CS8 Development Library SDK Software
CS8-PT-FRM-WRK	Adds L1 to L4 Protocol Test Framework for LTE
Additional Accessories	
CS8-CFG-MULTI-PDN	Software Option to Enable Multiple PDNs and Dedicated Bearer
CS8-CFG-MULTI-CELL	Software Option to Enable Multiple Cells
CS8-LTE-FADE	Add Internal Fading to Existing Network Emulator (single or two cell)
CS8-LTE-MIMO	Add MIMO to an Existing SISO Network Emulator (single or two cell)
CS8-PT-MSG-COMP	Add ASN.1 Message Composer for LTE L1-L4 Protocol Messages
CS8-PT-LOG-ANALYZER	Add Over-the-Air (OTA) Message Logging & Lower Layer Logs

ACCESSORIES

Complete Annual Service Agreements are available for hardware and software components.

SPIRENT GLOBAL SERVICES

Spirent Global Services provides a variety of professional services, support services and education services — all focused on helping customers meet their complex testing and service assurance requirements. For more information, visit the Global Services website at www.spirent.com/gs or contact your Spirent sales representative.

AMERICAS 1-800-SPIRENT • +1-818-676-2683 • sales@spirent.com

EUROPE AND THE MIDDLE EAST +44 (0) 1293 767979 • emeainfo@spirent.com

ASIA AND THE PACIFIC +86-10-8518-2539 • salesasia@spirent.com