

Spirent Elevate™ Framework

IMS, VoLTE and RCS Test Solution Built from Spirent Elevate™ Framework

Spirent provides an industry-leading IMS, VoLTE and RCS Test Solution, which allows wireless chipset vendors, device manufacturers, and service providers to measure and improve the wireless user Quality of Experience (QoE), and addresses the complex interoperability challenges of IMS-based services. The Spirent IMS, VoLTE and RCS Test Solution provides cost effective and comprehensive testing support for applications across the industry and throughout all stages of device development life cycle.

Built from Spirent Elevate Test Framework, this solution integrates the Wireless Test Station, ProLab IMS Suite and User Experience (UX) measurement systems to deliver unparalleled device-to-device testing capabilities, rich coverage in IMS, VoLTE and RCS protocol and performance testing and extensive user experience analytics.

Device-to-Device Testing—The innovative Wireless Test Station (WTS) allows interoperability testing of multiple devices over LTE and Wi-Fi, covering IMS, VoLTE and RCS call functionality with true VoLTE dedicated bearer representation and carrier-modeled IMS networks.

Comprehensive QoE—User experience measurement systems provide the broadest and deepest set of QoE metrics for end-to-end tests enabling voice and video quality, call performance, battery performance and data throughput in both the lab and live network.

Extensive Coverage—The tight integration of ProLab offers the most complete IMS and VoLTE/RCS test coverage capable of interacting with sophisticated IMS network topologies, allowing more robust testing and faster time-to-market. ProLab's extensive testing capabilities span next-generation technologies, such as the complex feature set of the EVS audio codec.

In-Depth Analytics—The Spirent solution provides the ability to isolate and analyze the root cause to resolve issues and improve the quality of the application.

Automatable Test Environment—ProLab comes with built-in scripts, including scripts for interoperability test cases based on IR.92, IR.94 and RCS 5.1 specification and sample test cases. Customization for IMS and VoLTE/RCS protocol and performance testing can be efficiently configured via the WTS easy-to-use web-based user interface.



Actual example of IOT issues with commercial devices from different manufacturers on a live network.

Chipset Vendors Application Developers Device Manufacturers Service Providers

Decrease test time with parallel UE testing on a single Wireless Test Station

Ensure high QoE with extensive user experience analytics for voice, video, battery and data

Reduce costly in-field issues by detecting complex interoperability issues early on in the lab

Increase productivity and solve capacity issues with Spirent Elevate's flexible, scalable and open network-of-test resources architecture

Spirent’s IMS, VoLTE and RCS Test Solution is built from the Elevate Test Framework: a scalable, sharable, virtualized test environment that spans critical test areas and maximizes the productivity of any development organization.

Functional & Protocol

Evaluation of a single device performance for IMS, VoLTE and RCS feature functionality and protocol messaging and signaling

Provided by tight integration with ProLab IMS/RCS Testing Suite

- Call features such as up to 20-way conference and group chat via media server simulation
- Security & authentication, audio codecs (including EVS), RTCP usage
- Core network behavior can be customized to emulate adversarial scenarios

Device-to-Device Interoperability

Functional and performance testing of VoLTE and RCS across different device vendors, device versions and carriers

Enabled by Spirent Elevate Test Framework and WTS support for multi-device testing

- Device-to-device negotiation to provide the required parameters for VoLTE (e.g., AMR-WB codec)
- VoLTE, IMS and RCS interoperability scenarios between devices connected to Wi-Fi and devices connected to LTE

User Experience

Quality of Experience (QoE) from the user’s perspective

Provided by Nomad UX (voice), Datum (data), Chromatic (video) and Quantum (battery) and ProLab simulation of network impairment for audio and video

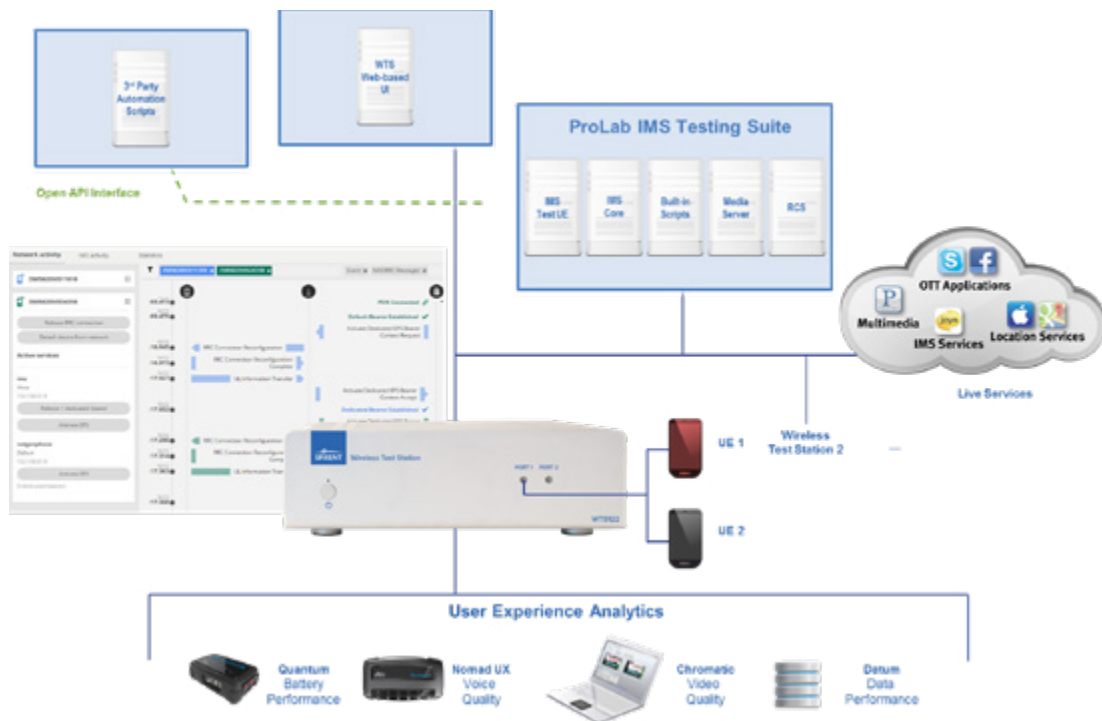
- VoLTE/VoWi-Fi voice quality as measured by MOS score, call connect time, video quality, battery performance, service interaction, jitter buffer management, network impairment
- The many aspects of EVS codec testing including varying bandwidths (NB, WB,S-WB, FB), voice/sound activity detector, comfort noise generation system, error concealment mechanism, and channel-aware mode

Conformance

Minimum performance requirements for IMS

Specified by GCF (IMS 3GPP 34.229) and OMA

- Initial registration, mobile originated de-registration (IR.92/3G TS 34.229)



Key Components

Wireless Test Station

- Enables multiple device-to-device LTE and Wi-Fi interoperability testing simultaneously with one instrument
- Provides correct dedicated bearer setup and timing to carry VoLTE and multimedia calls properly
- Network emulation easily configured for major carriers' networks
- Web-enabled user interface allows internet access from anywhere
- Users can reserve resources as needed for dedicated test time



Functionality

Network technology	LTE-FDD	Wi-Fi 802.11a/b/g/n/ac
Band support	1, 2, 3, 4, 5, 7, 13, 17	2.4GHz, 5.0GHz
IMS and VoLTE capabilities	RoHc, TTI bundling, SPS, QCI, Up to four dedicated bearers, QoS management, IPSec	
Logging	Core network, RRC, and MAC logging synchronized across layers and cells	
Software upgrades	Remote via LAN	

ProLab IMS/RCS Testing Suite

- Industry-leading solution for IMS/RCS/VoLTE testing and validation
- Emulates a wide range of real-world network conditions including IME UE, IMS core, media server, and RCS server
- Allows real-time testing of voice and video over LTE and Wi-Fi
- Comprehensive test capabilities to evaluate the extensive feature set of the EVS audio codec
- Built-in scripts, including interoperability test cases according to GSMA PRD IR.92 and GSMA PRD IR.94
- Unique test creation environment and rich collection of ready-to-use test cases enables engineers to significantly reduce testing time

ProLab Architecture

IMS Core	The ProLab IMS Core implements the logic and functionality of the Call Session Control Function including S-CSCF, I-CSCF and P-CSCF and Home Subscriber Servers (HSS) and allows you to create IMS Policies applied to incoming and outgoing SIP/IMS messages.
IMS UE simulation	ProLab comes pre-packaged with an abundance of plug-and-play scripts and media files. The built-in scripts perform a wide variety of test case simulations, including IMS and RCS signaling, audio and video media call generation, audio codec (AMR-NB, AMR-WB, EVS), video codec (H.263 and full HD H.264) and message analysis.
Media Analysis and Network Impairment	ProLab enables advanced analysis of audio and video for both incoming and outgoing media streams including audio MOS and frame distribution, and emulates multiple errors, such as packet loss, random delay, and jitter.
Media Server	The media server performs media processing, mixing several sources and spreading them to a single media source among many such sources, and other media-related processing.
RCS Server/Client	ProLab provides the capability to simulate MSRP (Message Session Relay Protocol) and XDM Client. There is also an option to simulate RCS servers including XCAP server, GBA server, HTTP server, presence server, and Ut Interface (Supplementary Service).

Umetrix User Experience Analytics

- Analytics systems to quantify critical user experience metrics: voice quality, data throughput, video quality, and battery performance
- Measurement of user experience with a unified approach across all major mobile OS platforms and PCs
- Test cases can evaluate any mobile device in the lab or live network

Test Area	KPIs	
Voice	End-to-end quality VoLTE / VoIP	<ul style="list-style-type: none"> • Voice quality (POLQA/PESQ MOS) • Audio delay (ms)
Call	Service & availability Setup & retention	<ul style="list-style-type: none"> • Call initiation success/failure rate (%) • Call retention/drop rate (%)
Data	Upload / download Browsing / streaming Latency	<ul style="list-style-type: none"> • Web page load time(s) • HTTP / FTP file download/upload speed (Mbps)
Video	Streaming Chat	<ul style="list-style-type: none"> • Observed frame rate (fps) • Impaired / frozen frames (%) • Frame loss rate (%) • Audio/video sync (+/- ms) • Video smoothness (1-5)
Battery	Power consumption By application By user profile	<ul style="list-style-type: none"> • Power consumption (mW) • Current drain (mA) • Battery life (h)

About Spirent Communications

Spirent Communications (LSE: SPT) is a global leader with deep expertise and decades of experience in testing, assurance, analytics and security, serving developers, service providers, and enterprise networks.

We help bring clarity to increasingly complex technological and business challenges.

Spirent's customers have made a promise to their customers to deliver superior performance. Spirent assures that those promises are fulfilled.

For more information, visit: www.spirent.com

AMERICAS 1-800-SPIRENT
+1-800-774-7368
sales@spirent.com

US Government & Defense
info@spirentfederal.com
spirentfederal.com

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

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

Application Scenarios

Spirent's IMS, VoLTE and RCS Test Solution addresses complex deployment and performance challenges:

How do I verify the interoperability of multiple VoLTE devices?

Spirent's Wireless Test Station is the only platform that offers:

- Multiple UE device-to-device testing on single instrument
- Accurate VoLTE call setup via tight integration with ProLab IMS Server software

How can I ensure consistency of applications across multiple generations of hardware and software?

There are several approaches with Spirent Elevate solutions:

- Parallel testing of different releases using single Wireless Test Station
- Spirent iTest automation and regression testing
- Creating an environment with continuous test iterations that run consecutively

How do I verify voice and video interoperability between devices connected on Wi-Fi and LTE? How do I enable LTE to Wi-Fi offloading?

Wireless Test Station:

- Combines LTE and Wi-Fi in a single instrument
- Facilitates easy call setup between two devices connected simultaneously via either LTE or Wi-Fi



How can I replicate different operator environments?

Spirent ProLab IMS/RCS Testing Suite:

- Emulates the specifications of different IMS network topologies via selectable profiles in the simplified WTS web-based user interface
- Industry-leading IMS coverage including IMS UE, IMS core, XCAP server, media server, network impairment, and media quality testing
- Is first-to-market to deliver new IMS features according to the latest 3GPP standard

How do I know if I'm achieving the best audio and video performance?

Spirent's User Experience Analytic Systems:

- Can be integrated with the IMS, VoLTE and RCS Test Solution to provide evaluation of voice, video, data, and battery user experience performance in the lab—these same analytic systems can be used in the live network
- Provide the ability to measure these device characteristics to understand the "why" of device performance
- Test for the highest levels of voice quality performance in EVS codec implementations

