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 WiFi, covering IMS, VoLTE and RCS call functionality with true VoLTE dedicated bearer representation and carrier-modeled IMS networks.

**Comprehensive quality of experience** – 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.

**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.

**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

*Actual example of IOT issues with commercial devices from different manufacturers on a live network*
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 Suite*
- Call features such as 3-way and 6-way conference and group chat via simulated media server
- Security & authentication, audio codec, 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 WiFi and devices connected to LTE

**User Experience**

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

*Provided by Nomad (voice), Datum (data), Chromatic (video) and Quantum (battery) and ProLab simulation of network impairment for audio and video*
- VoLTE voice quality as measured by MOS score (avg 4.0+), call connect time, video quality, battery performance, service interaction, jitter buffer management, network impairment

**Conformance**

Minimum performance requirements for IMS and RCS

*Specified by GCF (IMS 3GPP 34.229) and OMA (RCS-e and RCS S.1)*
- Initial registration, mobile originated de-registration (IR.92/3G TS 34.229)
Key components

Wireless Test Station

- Enables multiple device-to-device LTE and WiFi 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

ProLab IMS 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
- 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
- Option for full ProLab Suite or subset with ProLab Express

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

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Prolab Full Edition</th>
<th>Prolab Express Edition</th>
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<tbody>
<tr>
<td>Network technology</td>
<td>LTE-FDD</td>
<td>WiFi 802.11a/b/g/n/ac</td>
</tr>
<tr>
<td>Band support</td>
<td>1, 2, 3, 4, 5, 7, 13, 17</td>
<td>2.4GHz, 5.0GHz</td>
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<tr>
<td>IMS and VoLTE capabilities</td>
<td>RoHC, TTI bundling, SPS, GCI, Up to four dedicated bearers, QoS management, IPSec</td>
<td>Core network, RRC, and MAC logging synchronized across layers and cells</td>
</tr>
<tr>
<td>Logging</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Software upgrades</td>
<td>Remote via LAN</td>
<td>Remote via LAN</td>
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</tbody>
</table>

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<tr>
<th>Test Area</th>
<th>KPIs</th>
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<tbody>
<tr>
<td>Voice</td>
<td>End-to-end quality (VolTE/VoIP)</td>
</tr>
<tr>
<td>Call</td>
<td>Service &amp; availability (Setup &amp; retention)</td>
</tr>
<tr>
<td>Data</td>
<td>Upload/download (Browsing/streaming latency)</td>
</tr>
<tr>
<td>Video</td>
<td>Streaming/Chat</td>
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<tr>
<td>Battery</td>
<td>Power consumption by application</td>
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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 WiFi and LTE? How do I enable LTE to WiFi offloading?
Wireless Test Station:
- Combines LTE and WiFi in a single instrument
- Facilitates easy call setup between two devices connected simultaneously via either LTE or WiFi

How can I replicate different operator environments?
Spirent ProLab IMS Suite:
- Emulates the specifications of different IMS networks 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