QualityAssurer Series – QA-604/QA-805/QA-813
FIXED-MOBILE CONVERGENCE TEST PLATFORM

High-performance, high-capacity, flexible, reliable and easy-to-use wireless (2G/3G/4G/LTE), IMS and VoIP network testing.

**KEY FEATURES**

Unique and purpose-built test solution for testing fixed-mobile converging (FMC) networks and services such as LTE, IMS, VoLTE and VoIP

- Large-scale emulation of subscribers, network elements and network clouds
  - Emulate tens of millions of LTE/VoIP/IMS/VoLTE subscribers
  - Statefully emulate LTE, VoIP, IMS network elements such as MME, P-GW, SGW, eNodeB, IMS S/I/P-CSCF, HSS, IMS MGC

- Line-rate generation and analysis of 130 Gbit/s user-plane data

- Hardware-based line-rate generation and analysis of user-plane data
  - Over 3 million RTP/SRTP streams with QoS analysis on all streams
  - Over 13 million HTTPs, FTPs, SMTPs and RTSPs with detailed statistics per QCI

- Ability to generate and analyze tens of millions of any stateful user-plane sessions at line rate using the unique SmartReplay function, which is user-defined or imported from capture

- Complete lifecycle testing: feature, load, interoperability and regression testing

- Linear scaling—no performance degradation when expanding the platform
OVERVIEW

Long-term evolution (LTE) and IP multimedia subsystem (IMS) technologies promise to deliver true fixed-mobile convergence by providing rich user experiences in both wireline and wireless networks.

IMS has been chosen as the service delivery architecture to deliver rich user services over the LTE network, including voice (also known as voice-over-LTE or VoLTE), video and SMS services.

LTE and IMS are very complex to design and to deploy. In both networks, there are several network elements that need to interoperate with the existing networks (e.g., 2G/3G and VoIP) in order to provide a user experience that exceeds customer expectations.

Network service providers (NSPs) are struggling to cope with a massive amount of data on their 3G HSPA/HSPA+ networks and are now accelerating their LTE rollouts in order to deliver a truly mobile broadband experience to their subscribers.

Network equipment manufacturers (NEMs) and network service providers (NSPs) will need to perform extensive testing of both the IMS and LTE networks in order to reduce the risks that are typically associated with developing and deploying new and complex technologies.
INDUSTRY’S MOST POWERFUL AND FLEXIBLE PLATFORMS

EXFO’s latest QualityAssurer series of platforms is targeted at NEMs and NSPs that are developing and deploying IMS and wireless networks. The QualityAssurer offers easy-to-use test solutions covering the complete testing lifecycle of LTE, IMS, VoLTE and VoIP networks and services.

With the QualityAssurer, EXFO has leveraged its leadership in IMS and wireless (2G/3G/LTE) testing to deliver unmatched signaling and user-plane testing capability in an integrated platform.

The QualityAssurer platforms are available in the following form factors and options:

<table>
<thead>
<tr>
<th>QA-604</th>
<th>QA-805</th>
<th>QA-813</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two-unit rack-mounted or desktop option targeted at testing SBC, IMS and VoIP networks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emulation of over 2 million IMS subscribers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line-rate generation and analysis of 128 000 RTP/SRTP streams</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Six-unit rack-mounted option targeted at testing LTE, 2G/3G, SBC, IMS, VoIP and VoLTE networks and services</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emulation of over 5 million LTE or IMS subscribers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 million data sessions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.25 million RTP streams</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50 Gbit/s of user-plane data generation and analysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13-unit rack-mounted option targeted at testing LTE, 2G/3G, SBC, IMS, VoIP and VoLTE networks and services</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emulation of over 13 million LTE or IMS subscribers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 million data sessions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.25 million RTP streams</td>
<td></td>
<td></td>
</tr>
<tr>
<td>130 Gbit/s of user-plane data generation and analysis</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

REAL-WORLD NETWORK TESTING

Combined with the W2CM-10GbE module, the QualityAssurer can emulate tens of millions of traffic-generating subscribers to simulate real-world network conditions, enabling NSPs and NEMs to test different scenarios in their labs. It can also emulate various network elements within the LTE, IMS or VoIP networks to perform wraparound testing of network elements, thereby ensuring that the network being developed or deployed exceeds customer expectations.

End-to-end testing of 4G networks requires the ability to generate and analyze voice, video and data sessions from subscribers through the LTE and IMS networks. The QualityAssurer can generate voice (VoLTE) and video calls, and data sessions (such as HTTP web browsing, SMTP e-mail downloads, FTP file downloads and messaging), simultaneously across millions of users, with traffic distributions that are representative of real-world networks. These sessions are generated and analyzed in real time and at line rate, providing key measurements of quality of service (QoS) parameters such as mean opinion score (MOS), delay, jitter and packet loss. The statistics across these sessions can be grouped by user-defined values (e.g., QoS class identifier (QCI) and codecs), so as to facilitate easy identification and resolution of network issues.
4G/LTE TESTING

LTE RAN Testing
The LTE eNodeB incorporates new transmission capabilities enabling the LTE radio interface to operate up to 10 times faster than the interface in WCDMA. Recent specifications have defined that the eNodeB should interwork with legacy networks and support the latest standard for VoLTE using IMS.

To test the latest features, performance and capacity of the eNodeB, EPC simulation is a vital requirement. The simulated EPC needs to have the combined capability required to simulate the mobility management entity (MME), the home subscriber server (HSS), the serving gateway (SGW), the packet data network gateway (PDN-GW) and other location-based servers in a single platform. The EPC needs to be able to support the handling of S1 traffic heading toward it, in addition to interconnectivity with other legacy core network elements in order to test scenarios like inter-RAT handovers, CSFB and VoLTE.

EXFO’s QualityAssurer provides the ideal test platform for performing eNodeB feature, performance and capacity testing by hiding the complexity of the EPC and the LTE architecture.
Wireless Core Testing

The EPC is the new all-IP core network architecture defined by 3GPP in Release 8 for use by LTE and other access technologies. It is the means through which users connect to applications and services on the Internet, corporate networks or IMS networks. The primary elements within the EPC are the MME, the SGW and the packet data network gateway (PDN-GW). The MME is the “brain” of the EPC and is responsible for authentication, mobility and session management. The gateways are primarily responsible for efficient user-data routing, QoS enforcement and deep packet inspection (DPI).

Testing the EPC presents some unique challenges. To perform its function as the central entity within the EPC serving millions of subscribers, the MME has to process hundreds of thousands of control-plane messages per second. In addition to potentially thousands of eNodeBs connected to it, the MME also has to connect to a number of other network elements within the EPC as well as to other domains such as 2G, 3G and CDMA. The EPC is expected to deliver critical, low-latency services like voice and live video streaming alongside high-throughput, best-effort Internet services, such as web browsing and file sharing from a single infrastructure, while honoring service-level agreements (SLAs) and QoS commitments. This places tremendous demands on the gateway’s performance capabilities in terms of session setup and teardown times, processing and forwarding user data over millions of sessions while doing DPI and maintaining QoS levels.

EXFO’s QualityAssurer enables performance and functionality testing of the EPC and its elements under real-world traffic conditions. Wraparound testing of the elements in the EPC—MME, SGW and PDN-GW—either individually or in combination, is possible to characterize the performance, capacity and functionality of the EPC core. All the necessary elements and interfaces surrounding the system under test (SUT) can be simulated.

The QualityAssurer can generate tens of thousands of control-plane signaling messages per second towards the SUT while simulating thousands of network elements and millions of subscribers. With the W2CM-10GbE module, the QualityAssurer can generate millions of user-plane sessions such as VoLTE, HTTP and FTP at line rate over 1 Gigabit Ethernet and 10 Gigabit Ethernet interfaces and can characterize the QoS delivered to every subscriber in real time for each of these services. The control-plane and user-plane simulations are tightly integrated, subjecting the system under test to traffic patterns mimicking real-world conditions. Extensive KPI reports give a clear picture of the performance characteristics of the system under test while alerting users to specific areas of concern where the system under test is either falling short of expected performance or not complying with the specifications.
IMS, SBC and VoLTE Testing

The 3GPP has standardized the IMS architecture to deliver traditional circuit-switched services like voice, video and SMS, as well as rich user media services such as presence, messaging and RCS. VoLTE replaces the circuit-switched voice network in 3G networks and is based on the IMS architecture.

Session border controllers (SBCs) are critical to the operation of the VoIP, IMS and LTE networks. They are evolving to support functions such as session load balancer and session route proxies across various LTE, IMS and VoIP networks.

When combined with the W²CM-10GbE module, EXFO’s QualityAssurer provides unique testing coverage of VoIP, VoLTE, IMS and SBC networks and services. It can emulate tens of millions of VoIP, VoLTE and IMS subscribers, and network elements such as HSS, CSCFs and application servers. It can generate real-world traffic towards the network at line rate in any user-defined distribution (e.g., 50% voice calls, 20% call forwarding, 10% three-way calling, 10% presence, 10% instant messaging), and provides the quality of service metrics for each of the services in real time.

The QualityAssurer delivers unmatched media testing capability, providing real-time generation and analysis of line-rate RTP and SRTP traffic using a comprehensive list of codecs. Each media RTP or SRTP stream can be analyzed for QoS and MOS for the entire duration of the call. It offers testing of elements like the SBC and IMS media gateways (e.g., BGF) for theft of service, rogue media and denial-of-services (DoS) attacks. It also supports high-performance security protocols such as TLS, IPSec, SRTP/SRTCP and IKE, which are integral components of VoIP and IMS networks.

All the necessary elements and interfaces surrounding the system under test can be simulated.
### SPECIFICATIONS

<table>
<thead>
<tr>
<th>Model</th>
<th>Platform</th>
<th>Hot-swappable modules</th>
<th>Reset</th>
<th>Interfaces</th>
<th>Operating system</th>
<th>Processor and memories</th>
<th>Remote control</th>
<th>Size (H x W x D)</th>
<th>Weight</th>
<th>Power supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>QA-813</td>
<td>13 slots, rack-mounted</td>
<td>Up to 6 W²CM-10GbE or 13 W²CM-10GbE-Lite</td>
<td>Per platform, per interface or per port (hardware or software)</td>
<td>USB, DP, Ethernet (management)</td>
<td>Linux</td>
<td>AMC Core i7 2.53 GHz, 8 GB RAM, 500 GB hard disk</td>
<td>Standard Windows applications such as VNC and Exceed</td>
<td>577 mm x 443 mm x 434 mm (22.72 in x 17.44 in x 17.09 in)</td>
<td>29 kg (64 lb)</td>
<td>Recommended rectifier: Input: 90-277 V, 47-63 Hz, 25 A x 4 Output: 60 V – Max. 17200 W</td>
</tr>
<tr>
<td>QA-805</td>
<td>5 slots, rack-mounted</td>
<td>Up to 2 W²CM-10GbE or 5 W²CM-10GbE-Lite</td>
<td>Per platform, per interface or per port (hardware or software)</td>
<td>USB, DP, Ethernet (management)</td>
<td>Linux</td>
<td>AMC Core i7 2.53 GHz, 8 GB RAM, 500 GB hard disk</td>
<td>Standard Windows applications such as VNC and Exceed</td>
<td>265.90 mm x 482.60 mm x 388.45 mm (10.47 in x 19 in x 15.29 in)</td>
<td>25.50 kg (56 lb)</td>
<td>850 W, 90 to 264 V input, single plus 5 VSB output</td>
</tr>
<tr>
<td>QA-604</td>
<td>4 slots, rack-mounted or desktop</td>
<td>Up to 4 SCM-GbE or 2 MCM-GbE (or MCM-GbE-Lite)</td>
<td>Per platform, per interface or per port (hardware or software)</td>
<td>USB (2), VGA, Ethernet (management)</td>
<td>Solaris</td>
<td>Intel Core 2 Duo, 2 GHz, 2 GB RAM (min), 120 GB hard disk (min)</td>
<td>Standard Windows applications such as VNC and Exceed</td>
<td>101 mm x 483 mm x 362 mm (4 in x 19 in x 14 ¼ in)</td>
<td>5.5 kg (12.1 lb)</td>
<td>100 to 240 V, 50/60 H</td>
</tr>
</tbody>
</table>

### ORDERING INFORMATION

For ordering information, please contact isales@EXFO.com.

---

EXFO serves over 2000 customers in more than 100 countries. To find your local office contact details, please go to [www.EXFO.com/contact](http://www.EXFO.com/contact).

EXFO is certified ISO 9001 and attests to the quality of these products. EXFO has made every effort to ensure that the information contained in this specification sheet is accurate. However, we accept no responsibility for any errors or omissions, and we reserve the right to modify design, characteristics and products at any time without obligation. Units of measurement in this document conform to SI standards and practices. In addition, all of EXFO’s manufactured products are compliant with the European Union’s WEEE directive. For more information, please visit [www.EXFO.com/recycle](http://www.EXFO.com/recycle). Contact EXFO for prices and availability or to obtain the phone number of your local EXFO distributor.

For the most recent version of this spec sheet, please go to the EXFO website at [www.EXFO.com/specs](http://www.EXFO.com/specs).

In case of discrepancy, the web version takes precedence over any printed literature.