

[ TEMS™ PRODUCTS ]

# TEMS™ LTE OFFERINGS GO AHEAD



## GO AHEAD

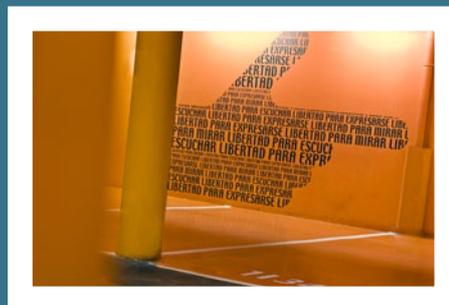
## Ascom Network Testing shows industry leadership with first-to-market TEMS LTE offerings.

LTE is now a reality, with several of the world's leading mobile operators having recently launched LTE services or preparing to do so. The next big step beyond HSPA in the development of 3GPP technologies, LTE supports and promotes the most important aspects of mobile telephony and broadband:

- Unparalleled mobility and coverage
- Increased focus on quality and operational efficiency
- Explosive growth of data service usage

In order to satisfy users and reap the full benefits of LTE from a technological and operational perspective, it is crucial to ensure a proper rollout and to constantly maintain the network to the highest possible standards. Doing this in the most cost-effective way possible is a challenge for every organization embarking on the LTE journey.

**“The TEMS™ Portfolio has once again demonstrated industry leadership with the first commercially available tools for LTE.”**



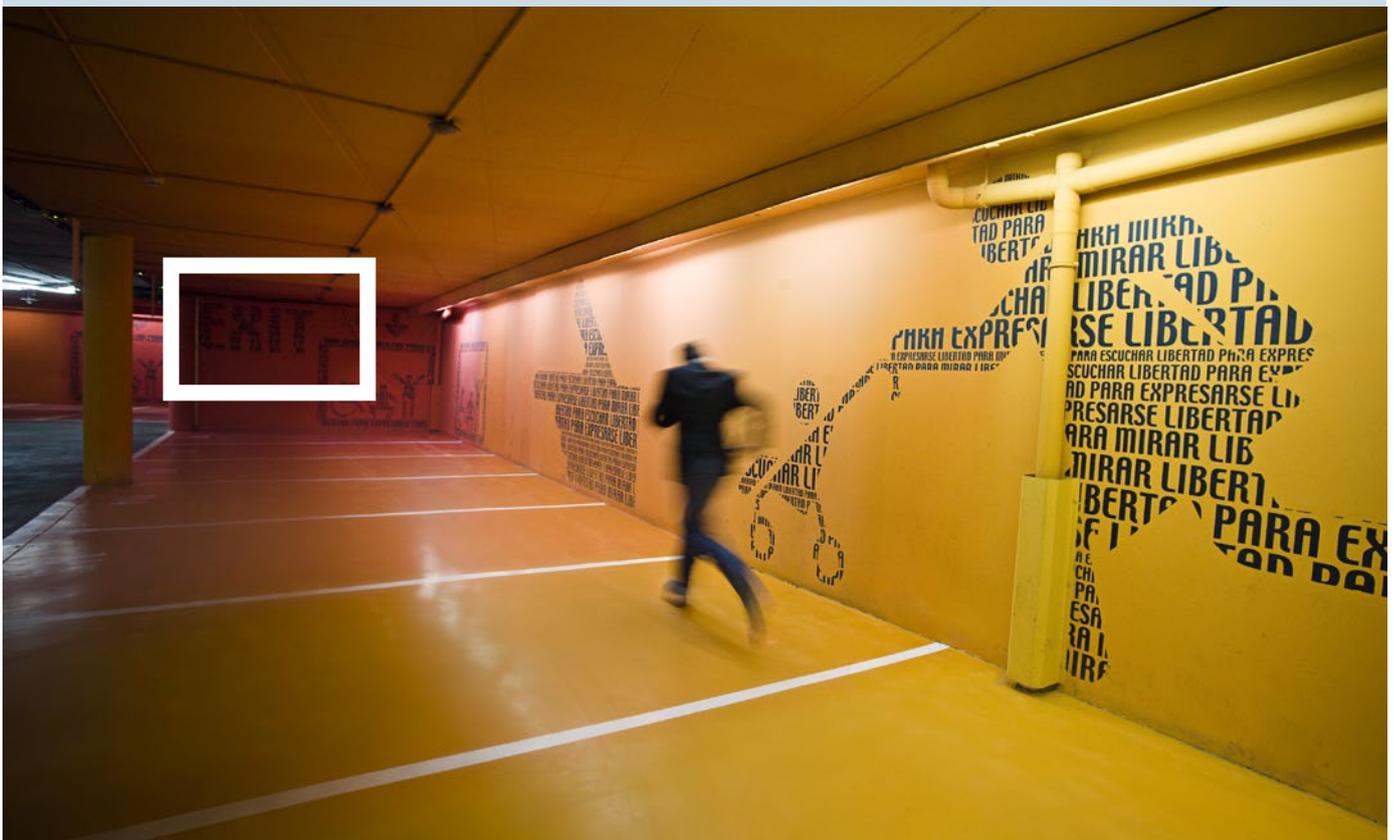
## PROCEED WITH CONFIDENCE

**Ascom Network Testing is preparing the way with its TEMS LTE offerings.**

For nearly two decades, the products in the TEMS Portfolio have had an unrivaled track record as industry leaders across all global wireless standards, providing solutions to **measure, analyze, and optimize** mobile network performance and ensure quality of service. We can rely on our experience to support operators moving into this exciting next phase of wireless communication.

The TEMS Portfolio is among the first on the market to include commercially available LTE functionality, and already several of the world's leading wireless operators have launched LTE networks with the support of Ascom Network Testing LTE offerings. The current release of the industry-standard TEMS Investigation, as well as TEMS Discovery, TEMS Symphony, TEMS Visualization, and TEMS Monitor Master all offer LTE support.

Together, our products help operators to move confidently into the LTE world ahead of the competition.



## GET THERE FIRST TEMS™ INVESTIGATION

TEMS Investigation is a multi-technology platform that offers operators one solution to collect, analyze, and post-process data used for monitoring, troubleshooting, and optimizing RF networks. As the number one choice of operators worldwide, TEMS Investigation is always at the forefront of new technology support and offers the broadest LTE capability and device support in the industry.

Since the introduction of LTE in TEMS Investigation in early 2009, Ascom has supported operators and vendors in LTE trials and rollout of LTE networks worldwide.

Today, TEMS Investigation promotes flexible, powerful, and effective data collection with the broadest range of connectable LTE USB modems and LTE scanners on the market. In addition to traditional RF data, L2/L3 messages, and IP information collection, TEMS Investigation supports testing of services such as FTP, HTTP, Ping, TCP, UDP, and VoIP. It utilizes all common TEMS Investigation platform advantages to fully benefit your monitoring, troubleshooting, and optimizing efforts.

### Examples of LTE features in TEMS Investigation

- Support for LG, Samsung, and Qualcomm based (MDM9200, MDM9600, and MDM9800) LTE USB modems
- Multiple LTE devices can be connected and can run simultaneously in order to minimize the time spent collecting data.
- LTE/EV-DO and LTE/UMTS dual mode USB modem measurements
- FTP, HTTP, Ping, TCP, UDP, and VoIP data service testing in service control
- Support for PCTEL (SeeGull MX, SeeGull EX, and SeeGull EX mini), DRT, and Andrew LTE scanners
- LTE/WCDMA/GSM and LTE/CDMA multi-technology scanning capabilities
- Top N sync signal, reference signal, and resource block scanning measurements
- Support for RSSI, spectrum, and enhanced power scanning
- More than 150-specific LTE information elements and events
- More than 30 predefined LTE presentation windows
- Serving and neighbor cell measurements
- LTE DL and UL information
- Throughput and delay measurements
- LTE cell load evaluation capabilities



TEMS Investigation – The industry-leading air interface test tool

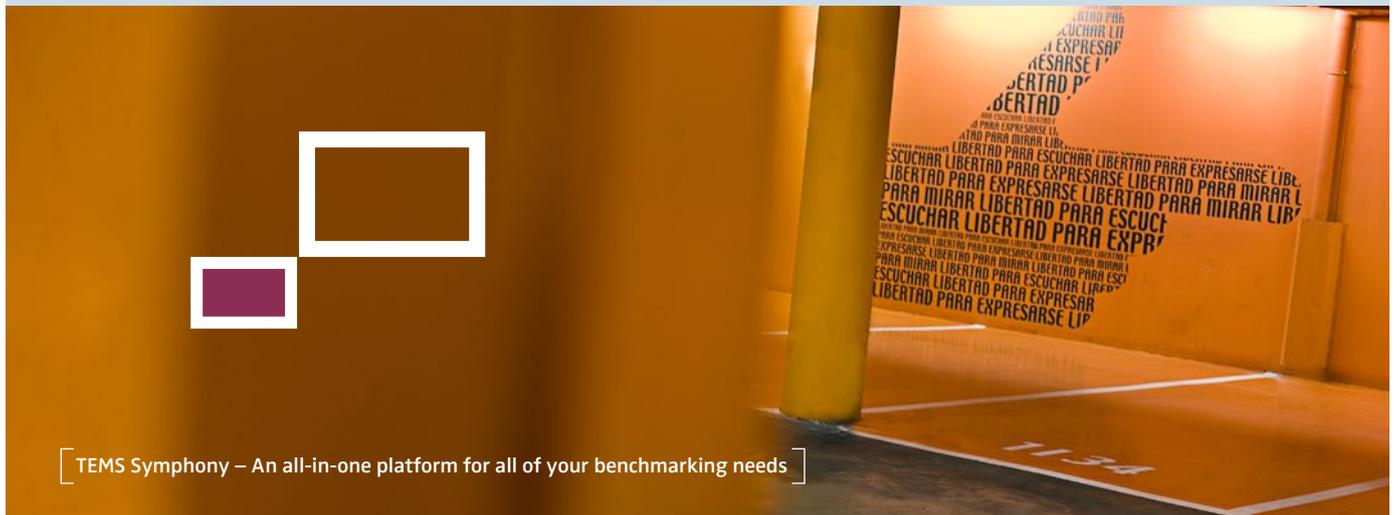


## SEE BEYOND YOUR COMPETITION TEMS™ SYMPHONY

TEMS Symphony offers wireless operators a powerful, proven measurement system for the most demanding LTE benchmarking and QoS network testing requirements.

LTE functionality in TEMS Symphony:

- LTE Scanner LTE700 /3G Prizm
  - 700 MHz baseband scanning of bands 12, 13, and 14
  - 700 MHz uplink scanning of lower and upper 700 block 698 MHz to 805 MHz
  - 850 MHz CDMA, WCDMA, GSM, and LTE bands 5 and 6
  - 1900 MHz CDMA, WCDMA, GSM, and LTE band 2
- MIB info
  - Channel bandwidth of cell sites — 1.4, 3, 5, 10, 15, 20 MHz
  - Number of antennas — 1, 2, 4
  - Cyclic prefix used — Normal or extended
  - Number of PHICHs assigned
- LTE scanner decoding the primary and secondary sync
- Channel impulse response
  - The scanner can provide all the reference signals for each antenna whose phase has been normalized based on the cell ID and slot for the given bandwidth.
- Band clearing tests
  - Detection of unlawful transmitters in the LTE frequency bands
  - RSSI sweep of the target frequency band
  - Real time display of the frequency spectrum across the selected bands
  - Setting of RSSI detection thresholds
  - Presentation on map of interferers



[ TEMS Symphony – An all-in-one platform for all of your benchmarking needs ]

## CONTINUE TO LEAD TEMS™ VISUALIZATION & TEMS™ MONITOR MASTER

**TEMS Visualization processes event-based data, analyzing and organizing it so that it can be used for network optimization.**

**TEMS Monitor Master is a carrier-grade software and hardware solution designed to test and monitor the end-to-end quality and user experience of wireless and fixed-line services.**

Operators have easy access to comprehensive information based on measurement results and call events, all the way down to the individual call level. This information can be used for troubleshooting, monitoring, and verifying network functionality.

TEMS Visualization includes the following LTE features:

- Support for Ericsson LTE event data from live network traffic
- Analysis of exceptional events such as dropped calls and blocked calls
- Analysis of detailed message sequences call-by-call for all recorded traffic
- Analysis of any channel quality problems and impact on subscribers
- Fully automated and centralized processing of high volume, subscriber-generated data

Meanwhile, TEMS Monitor Master has added two new next-generation modem capabilities: LTE and TD-SCDMA.

Both of these provide basic data testing capabilities using commercially available USB dongles that a normal user would use in a standard Windows-based laptop to download data.

Initially, this LTE capability will be provided for the U.S. market while TD-SCDMA support will be available for the Chinese market.

[ If a user can do it, TEMS Monitor Master can test it ]

[ TEMS Visualization – Bridging the optimization gap ]





Networks are constantly changing and growing. Our solutions embrace every stage of a network's lifecycle. As you strive to grow your business and satisfy your customers, Ascom Network Testing will be right there with you. Through 4G and beyond, we have the experience, the expertise, and the commitment to help you navigate through the ever-changing communications landscape.

With nearly two decades of experience and a proven track record of technological innovation and quality-based offerings, Ascom Network Testing is the right partner for mobile operators to trust when taking the next step in the wireless evolution to LTE.

We understand the challenges faced by operators today and the opportunities presented by LTE. Our TEMS Portfolio will further evolve to include additional products with LTE support as the technology matures and more devices become available.

## ASCOM NETWORK TESTING EVOLVING NETWORKS. TRUSTED SOLUTIONS.