TEMS INVESTIGATION 15.2

Product:	Test and Measurement Tool

Solution Areas:

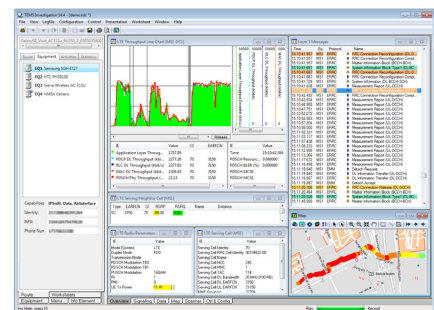| 100%	100%	50	50	100%
Network Rollout	Optimization	Benchmarking	Subscriber QoE	In-building

TEMS™ INVESTIGATION – ENTRUST YOUR NETWORK TO THE WORLD'S LEADING DRIVE-TEST SOLUTION

Used in more than 180 countries worldwide, TEMS Investigation is the industry-standard tool for troubleshooting, verification, optimization and maintenance of wireless networks. TEMS Investigation supports all major technologies, making it the ideal testing tool at every stage of the network's life cycle.

TEMS Investigation has been the top originator of drive-testing features and functions for two decades. It employs smart and exclusive functionality that solves specific problems, promotes cost-efficient work processes, minimizes human errors and improves productivity, allowing operators to focus on ensuring network quality, as well as gain insight into the subscriber perspective by performing service testing, including VoLTE testing and available bandwidth measurement, directly on the end terminal. TEMS Investigation is a complete, cost-effective and conveniently compact solution for the active field engineer.

Essential throughout the network's life cycle.
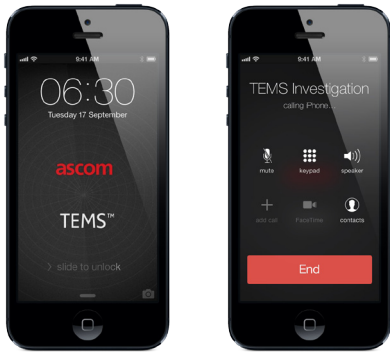
TEMS INVESTIGATION ENABLES OPERATORS TO:

- **Test from a user's perspective.** Performs geographically positioned air interface and service quality measurements with devices used by subscribers.

- **Custom-tailor test scenarios to match specific needs.** From rollout to maintenance, TEMS Investigation's exclusive measurement capabilities put the user in control.

- **Contain costs.** Quick to set up and easy to use, TEMS Investigation's unique time-saving capabilities and exclusive control features promote efficient work processes.

- **Reduce time to market.** Focus on early availability of new technologies, features and devices. Scalable, adaptable and constantly updated to meet evolving needs.

- **Maximize return on investment.** Complete solution for multimode system verification, optimization, troubleshooting and analysis in relation to in-vehicle, in-building and pedestrian-area testing throughout the network life cycle. Flexible licensing and packaging to meet individual requirements.

- **Access a rich, exclusive feature set** that gives you the freedom to perform the measurements and tests you want to perform without affecting end users.

- **Profit from our 20-year track record.** Our unrivaled history of success sets a solid foundation for the innovations and advances to come. That makes TEMS Investigation the number 1 choice for operators worldwide.
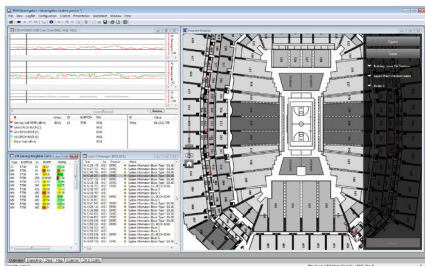

USE AREAS

- **Site verification and acceptance**: Perform measurements to identify problems introduced during site installation and to validate equipment functionality.

- **Initial tuning** (RF optimization): Evaluate and tune network design, hardware installation and parameter settings to ensure network coverage and quality from the start.

- **Network acceptance**: Measure and report key performance indicators (KPIs) from a user's perspective.

- **Service quality monitoring**: Regular measurement campaigns locate and eliminate problems early, safeguarding high-quality service performance from a user's perspective.

- **Network optimization and maintenance**: Measurement activities maintain and improve network performance throughout the network's life cycle.

- **Troubleshooting**: Build targeted solutions based on findings related to site verification, initial tuning, optimization and service quality measurement campaigns. Investigate issues raised by O&M/OSS systems and customer complaints.

- **Network verification**: Validate implementation of new RAN features and services from a user's perspective.

- **Benchmarking**: Perform field measurements to compare mobile network performance between service providers or to benchmark different devices' behavior and performance.

TEMS Investigation 15.2 now supports testing with the iPhone® 5 running iOS7 as a connectable device. The tight integration of the iPhone with TEMS Investigation as a measurement probe for PS data services and protocols as well as CS voice is unique to Ascom.

Measure the iPhone® user experience indoors, where most data is consumed. Use existing TEMS Investigation scripts to lower the cost of testing and improve operational efficiency.

KEY FEATURES

Extensive Device Portfolio
Each operator has unique testing needs, and with more than 300 verified measurement devices from over 30 vendors, TEMS Investigation offers matchless flexibility for customized solutions. Support for iPhone, Android, Symbian and Windows Mobile-based smartphones, with new devices added continuously.

Technologies
A large customer base and close cooperation with device and infrastructure vendors enable short lead times when introducing new technologies, chipsets and devices. Support for LTE (FDD and TDD), GSM, GPRS, EDGE, WCDMA, HSPA, HSPA+, TD-SCDMA, CDMA (IS-95 to EV-DO Rev B) and WiMAX.

Powerful, Efficient Data Collection
Flexible recording capabilities, automatic device detection; customizable work-spaces; advanced device control; strong, intuitive service control to manage and automate information gathering; event audio indicators; automatic upload of logfiles and real-time data presentation. Multiple devices can be connected and can run simultaneously, minimizing time spent collecting RF data, L2/L3 messages, and IP and service-related information.

Exclusive Measurement and Control
With multiple use areas yielding substantial cost savings, the tool's unique control capabilities empower efficient work processes and give users around the world unparalleled control of their measurements. Features include phone behavior and cell control capabilities (LTE EARFCN lock), information elements, quality assessment algorithms and device scanning.

Service Performance Testing
For voice, video telephony, FTP, HTTP, TCP, UDP, Ping, email, WAP, MMS, SMS, video streaming and VoIP. Quality assessment algorithms include PESQ and POLQA. Data service performance verification functions in TEMS Investigation enable operators to make measurements using a generic device in any data access network. Our Blixt™ ABM solution tracks the bandwidth being offered to subscribers with great precision, minimal intrusiveness and 90 percent less network capacity than traditional measurement methods.

VoLTE and On-Device Testing
Ascom provides the diagnostic features and accurate subscriber experience measurements that operators need to troubleshoot problems and assure VoLTE service quality. With TEMS Investigation, operators can now capture the true end-user perspective by testing service quality (including VoLTE) directly on the terminals.

Powerful Script Creation
Based on an intuitive flow chart (drag-and-drop) concept, the Service Control Manager facilitates flexible, efficient creation of advanced test scripts to automate service testing. Easy to create, adapt and reuse, scripts ensure consistent measurements.

Convenient Indoor Measurements
Creation and use of preplanned indoor test routes facilitate efficient work processes from preparation through execution and analysis. Supports iBwave format (building and floor plan information). Measurement process streamlined with TEMS™ Pocket and TEMS™ Discovery. Manual pinpointing available. Combine with backpack solution and tablet PC.

Flexible Analysis Capabilities
Thousands of information elements and events can be presented in more than 250 predefined presentation windows (line and bar charts, maps, status and message windows, event counters). Define customized events to locate problem areas. All presentation windows are synchronized and all settings are saved in workspaces for reuse and sharing between users.

Convenient Export of Logfiles
Export logfiles to numerous formats. The export can optionally be done from a Microsoft Windows command prompt and can then be scheduled using generic Windows scheduling functions.

TEMS Portfolio Synergies
Use TEMS Investigation to analyze logfiles from other TEMS products, or add TEMS Pocket functionality on your TEMS Investigation handset. The TEMS Discovery post-processing solution is recommended for use when large amounts of data are to be processed and analyzed, as well as for advanced report creation.

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