

# TEMS™ Investigation

The industry-leading air interface test tool



## Troubleshoot, verify, and optimize wireless networks

TEMS Investigation is the industry-leading solution for troubleshooting, verification, optimization, and maintenance of wireless networks. Designed for in-vehicle, in-building, and pedestrian-area testing, TEMS Investigation has powerful, versatile, features that are essential throughout the network's lifecycle. Using TEMS Investigation, operators can achieve improved voice quality, increased accessibility, more successful call attempts, and better service performance.

Featuring support for GSM, GPRS, EDGE, WCDMA, and HSDPA technologies, the addition of comprehensive HSUPA as well as CDMA (IS-95 to EV-DO Rev A) functionality further demonstrates that TEMS Investigation is the ideal choice for network operators. The addition of the AQM full reference module gives the operator a tool covering more tasks, such as benchmarking, in two convenient packaging options: the stand-alone unit in a backpack for flexibility, or a case solution with four terminals that include AQM testing.

TEMS Investigation also offers true multi-vendor support in addition to its multi-technology infrastructure support. It supports handsets from all major vendors across multiple technologies. Its measure-



*TEMS Investigation is designed for in-vehicle, in-building, and pedestrian-area testing*



*Audio quality can be measured with special stand-alone units*

ment and reporting functions have general features that can be applied to any event or radio parameter measured. These features include a real-time map display and a report generator, allowing quick verification of the cell coverage. The map functionality in TEMS Investigation provides basic statistics and the distribution of an arbitrary area selection plotted on the map. The Route Analysis module allows the user to work with multiple logfiles when post-processing the data by performing tasks such as statistical binning and benchmarking.

### **A complete solution**

TEMS Investigation offers operators one tool with the ability to collect, analyze, and post-process the network data used on a daily basis for network monitoring, troubleshooting, and optimization. This complete solution eliminates the need for multiple tools, reducing costs and saving time and effort for operations staff. In addition, TEMS Investigation gives operators a way to utilize all the benefits of network data while at the same time protecting its integrity. TEMS Investigation collects data beyond the abilities of other tools on the market. In addition to all standard parameters, it employs specially developed algorithms to collect unique information not available in other vendor's tools. By using TEMS Investigation to both collect and post-process this data, operators ensure that it is being analyzed correctly and will be useful for making network adjustments.

### **Multi-mode functionality**

TEMS Investigation supports multi-mode functionality for system verification, troubleshooting, and optimization of WCDMA/HSPA, CDMA, and GSM/GPRS/EDGE networks. The multi-mode functionality makes it possible to:

- Verify and optimize intersystem handover and cell reselection
- Verify compressed mode behavior
- Verify and compare coverage and performance
- Verify WCDMA/HSPA and GSM system accessibility

*TEMS Investigation is powerful, flexible, and easy to use*

TEMS Investigation can be used to ensure seamless integration between WCDMA/HSPA and GSM/GPRS/EDGE networks as well as handovers between CDMA EV-DO, CDMA2000, and IS-95 networks.

### Post-processing functionality

TEMS Investigation includes a Route Analysis module that enables support for multiple logfiles simultaneously. The module contains a data selector for choosing views and tasks, workspaces to allow work on multiple logfiles simultaneously, map views to display routes and binning, and binned data for reporting. Pre-defined tasks include analyses of coverage, handover, calls, and user-defined event counters.

### Reports

TEMS Investigation features a WCDMA RAN Tuning Report module. This offers a fast, easy way to create WCDMA and GSM tuning reports in Microsoft® Word format. In the RAN Tuning Report, the RAN performance is described according to separate measures of accessibility, mobility, coverage, and retainability, using Ericsson's quality metrics and classifications. It presents performance metrics for management reports and detailed cell level performance for engineering reports. In fact, the detailed views of each of the quality measurements analyzed in the report provide an invaluable aid for engineering RAN tuning. The report can easily be customized and new templates can be added for individual needs and future use. At any stage of test execution, an HTML report can be generated summarizing the results obtained up to that point. The test can also be saved to a file, complete with results and current execution status.

### Usability

TEMS Investigation has a very flexible and intuitive user interface that keeps training costs at a minimum and allows the user to take full advantage of the powerful features. Experienced TEMS Investigation users will instantly recognize the well-proven user interface and way of working.

*The optional case makes drive-testing easy*



### Customer benefits

- Provides new technology support as well as service testing independent of technology
- Maximizes return on investment – one complete tool for multimode system verification, analysis, benchmarking, and post-processing
- Early availability – verify the system before it even goes live
- Familiar user interface – short learning curve and reduced training costs
- Easy to use, quick to set up
- Future proof – scalable, adaptable, and constantly updated to meet evolving needs

### Key features

- GSM, GPRS, EDGE, WCDMA, HSDPA, HSUPA, and CDMA support
- New supported terminals include Sony Ericsson K800i, K790i, K790a, Curitel HX550C, Motorola E815, Razr V3c, Razr V3xx, Razr V6, Novatel Merlin S720, Qualcomm QTP-6800, TM7200, Samsung SCH-A895, SCH-A900, Sierra Wireless Aircard 595
- Support for Sony Ericsson, Motorola, Nokia, Qualcomm TM, and Qualcomm chipset-based terminals
- Additional scanners and scanning support
- Audio Quality Measurements, PESQ
  - PESQ Standalone Units
  - Case housing four voice testing terminals
- Post-processing and advanced reporting
- In-building measurements
- Real-time map
- Video streaming quality testing (MOS)
- Video Telephony Quality Index
- IP Protocol Trace capabilities
- Handover analysis (scanner and UE-based)
- Signaling
- User-configurable logfile export including MDM format for CDMA devices
- User-configurable presentations, events, and threshold values



### CDMA features

- Event viewer, signaling window or map and line charts
- Layer 3 and Mode reports decoding
- 100+ Information Elements, available in maps, charts and tables
- General CDMA Information:
  - Phone State
  - RF Mode
  - Band
  - RF Channel
  - TX Power
  - RX Power
  - FER
  - Call Statistics
- CDMA Mobile Information
- CDMA Server Information
  - Network Information
  - Protocol Information
  - Searcher Information
  - Pilot Set Thresholds
- CDMA Radio Parameters
  - Power
  - FER
  - Active Set Information
- Set Information
  - Active Set
  - Cell Name
  - PN
  - RF Channel
  - Band
  - Ec/Io
  - RPC Index
  - DRC Cover
  - Candidate Set, Neighbor Set or Combined Active, Candidate and Neighbor Set View
  - Type
  - Cell Name
  - PN
  - RF Channel
  - Band
  - Ec/Io
- Predefined Chart for CDMA RF Parameters
- Predefined Chart for CDMA Data parameters

### HSUPA features (Overview)

- Application layer throughput
- HS - Average given SG
- HS - Average used E-TFCI
- HS Happy
- Full decoding of HSUPA messages

### HSDPA features (Overview)

- CQI
- DCH BLER
- DCH Retransmissions
- DSCH Throughput (kbit/s)
- SCCH OVSF Code Info
- HS Session

### WCDMA features (Overview)

- Decoding of Layer 3 messages
- Decoding of Layer 2 messages
- RLC Throughput UL/DL
- Transport Channel logging
- RRC State logging
- Averaged BER
- RACH report
- (UTRA Carrier) RSSI
- Signal to Interference Ratio (SIR)
- UE Transmit Power
- Initial Transmit Power
- Serving Cell/Active Set/Monitored Set
- GSM neighbor measurements
- Preamble transmission count
- Compressed mode (on/off)
- Finger Information
- WCDMA neighbor measurements in GSM
- Control functionality
- Ignore cell barred

### GSM features (Overview)

- Decoding of Layer 3 messages
- Transmit Power
- Serving Cell
- GSM neighbor measurements
- DTX usage
- Hopping information
- Cell information

### GPRS features (Overview)

- GPRS protocol messages
- Data throughput UL/DL
- Block Error Rate (%) UL
- GPRS Status
- GPRS Time slot configuration
- PDP Context information

### Data and service testing

- AQM Measurements
- Streaming Video
- IP Protocol Trace
- Data throughput UL/DL
- Ftp, http, and ping test applications
- MMS and SMS testing
- New Command sequence
- Roundtrip delay



Note: Measurement capabilities of handsets vary. TEMS Investigation has functionality that exceeds that of any one supported handset.