# TEMS™ SYMPHONY
POWERFUL, SCALABLE, FLEXIBLE – THE ONLY BENCHMARKING SOLUTION YOU'LL EVER NEED

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BENCHMARKING WITH ALL-IN-ONE, GO ANYWHERE SOLUTION

At last, mobile operators can say goodbye to unnecessary and costly duplication of benchmarking tools. With TEMS Symphony, they can employ a single, powerful hardware platform for all of their benchmarking needs, including drive, indoor, and nomadic testing.
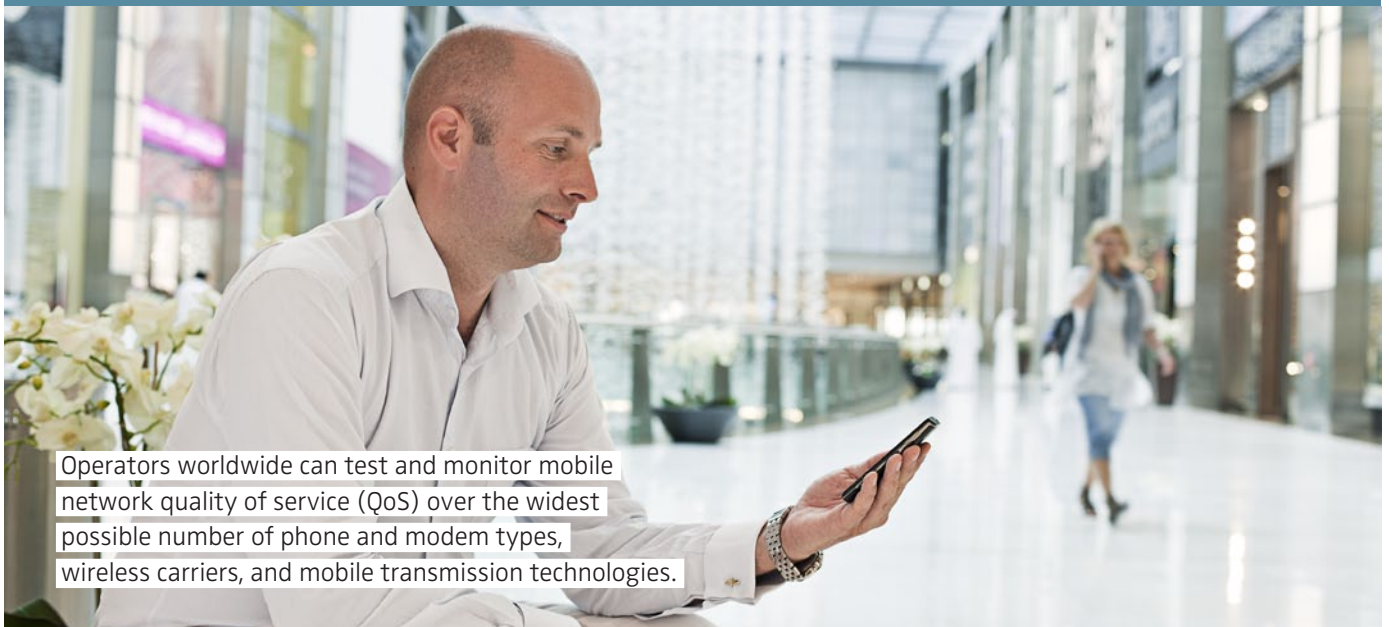
Operators worldwide can test and monitor mobile network quality of service (QoS) over the widest possible number of phone and modem types, wireless carriers, and mobile transmission technologies.

A SINGLE, VERSATILE PLATFORM FOR BENCHMARKING

The ability to benchmark mobile network performance is a critical requirement for mobile network operators looking to ensure the highest levels of quality, availability, and subscriber satisfaction and be able to prove it. Until now, however, operators have been forced to use separate benchmarking tools for drive testing, indoor testing, and nomadic testing – an inefficient and expensive approach from a total cost of ownership (TCO) perspective.

At last, mobile operators can say goodbye to this unnecessary and costly duplication of benchmarking tools. With the release of the TEMS Symphony 6.1 benchmarking solution, wireless carriers can employ a single, powerful hardware platform for all of their benchmarking needs – whether vehicular, indoor, stationary, or nomadic testing; legacy, 3G, or LTE network monitoring; and voice or data service quality measurement.

TEMS SYMPHONY 6.1 WITH MTP-4:
A SINGLE, VERSATILE PLATFORM FOR BENCHMARKING

The platform, known as the MTP-4, enables TEMS Symphony to set a new standard for both processing and channel capacity. MTP-4 offers four processors and 12 channels (by ''channels,'' we mean ''interfaces for test devices'') out of the box – with expansion up to 16 processors and 24 channels

as needed. Thanks to this new, market-leading power and capacity, operators worldwide can test and monitor mobile network quality of service (QoS) over the widest possible number of phone and modem types, wireless carriers, and mobile transmission technologies.

The release of TEMS Symphony 6.1 also simplifies the TEMS Symphony Suite by incorporating the best of the TEMS QVoice Symphony and TEMS Symphony Multi benchmarking tools into a single all-in-one, take-it-anywhere solution.

The new release supports not only the already well proven TEMS Symphony test applications but also many new mobile service tests that run on the compact and powerful MTP-4 platform. With four powerful i7 core processors on board, the MTP-4 has the horsepower needed to test and measure mobile services in an accurate and reliable way, without any restrictions. By daisy-chaining two MTP-4 chassis, for example, the capacity and performance of the system can be doubled in a convenient and easy manner.

''Reduce your total cost of ownership with a multi-purpose solution built to grow with your business.''

THE BENEFITS OF AN ALL-IN-ONE
BENCHMARKING SOLUTION
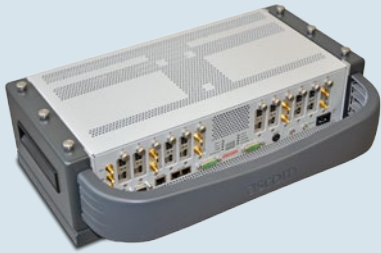
Mobile operators can reduce their TCO with a multi-purpose solution built to grow with their business.

Benefits include:

- A single, versatile platform for benchmarking: in-vehicle, indoor, and nomadic
- Designed for the 4G future, with high-speed, multi-core processors, and large memory capacity
- Flexible platform supports multiple device types (including traditional handsets and modems)
- Detachable GUI lets users view and analyze data remotely
- Support of existing and emerging wireless standards helps contain CAPEX
- Market-leading, out-of-the-box capacity including four processors and 12 channels; expandable to 16 processors/24 channels

''Mobile network operators must ensure the highest levels of quality, availability, and subscriber satisfaction and be able to prove it.''

WHAT CAN BE DONE WITH MTP-4?

MTP-4 allows different phones (and other mobile devices) to perform intrusive tests to assess the QoS of mobile services. These are the same functionalities that run on the existing TEMS Symphony platforms. Users can control and monitor measurements via a graphical user interface (GUI) running on a light tablet PC or a remote computer via a wireless link.

Different types of QoS tests can be executed in all types and generations of mobile radio technologies (GSM, GPRS, EDGE, CDMA2000, EV-DO, WCDMA, HSPA, WiMAX, and LTE). The system user can then analyze the collected measurement results and engineering traces online or in time shift mode on the GUI. These results and traces can also be post-processed by TEMS™ Discovery, as well as other third-party tools.

THE POWERFUL MTP-4 CHASSIS WITH ITS FLEXIBLE INTERFACES

The core module in an MTP-4 chassis contains four separate CPU modules equipped with Windows® Embedded OS. This provides more than enough processing power needed for quality algorithms such as Perceptual Objective Listening Quality Analysis (POLQA) and Perceptual Evaluation of Video Quality (PEVQ). The system simulates the activities of typical wireless users by accessing the mobile broadband connection, and by utilizing all types of services in 3G and 4G networks, without any restrictions.

Depending on customer needs, different types of interface modules can be plugged into the main chassis. This makes the MTP-4 not only very flexible but also expandable and adaptable for future types of interfaces and new types of mobile devices. Everything else needed for precise and professional measuring and testing – such as a GPS receiver, dedicated communication module for wireless operation, power supply with UPS functionality, and hardware dongle – are included in the MTP-4 system.

The following interface modules (MIF) are available:
- **Phone MIF:** module to control test phones via USB interface, audio interface, SIM card slot, powering, and power cycling of the phone
- **USB 12V MIF:** module with two power-cycled USB interfaces and one switched 12VDC output to connect commercial USB modem and RF scanners
- **MiniCard MIF:** module with Mobile Radio PCIe MiniCard for Mobile Communication 2G/3G/4G, SIM card slot, and two antennas for voice and data testing

Up to 12 MIF modules can be plugged into one MTP-4 chassis. This will allow configurations for benchmarking on multiple channels in parallel of, for example:

- Speech call testing with MOS evaluation over a test phone, and IP data testing via USB modems
  or
- Speech call testing with MOS over PCIe MiniCard, and IP data tests via another PCIe MiniCard
  or
- Video telephony call testing with speech MOS and video PEVQ MOS over test phones

4 x CPU
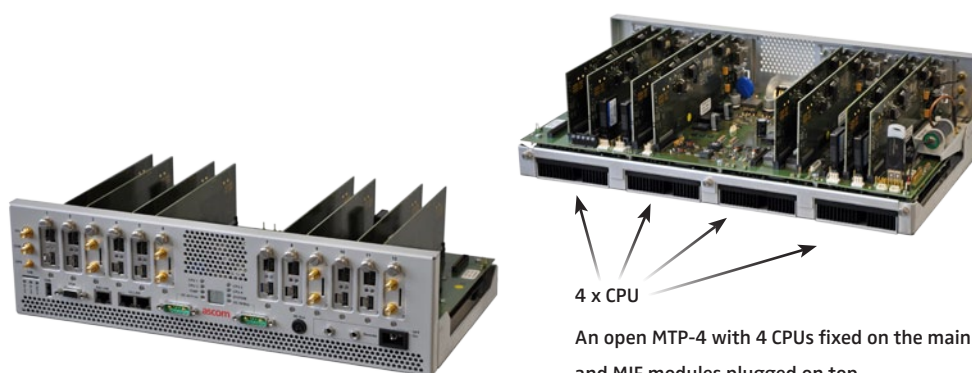
An open MTP-4 with 4 CPUs fixed on the main chassis and MIF modules plugged on top

TEST ANYWHERE, ANYTIME

KEY FEATURES

- Compact, light, and portable multi-processor benchmarking platform
- Same equipment can be used in vehicle, nomadic, walk, and stationary environment
- Support of PCIe MiniCard modules for data and voice
- Daisy chain of multiple MTP-4 units controlled by a single user interface
- Detachable user interface running on a notebook/tablet PC connected via LAN/WLAN
- Attractive pricing and scalable design

TEMS Symphony with its flexible MTP-4 platform offers the ubiquitous benchmark testing capabilities that mobile operators and measurement service providers need.

VEHICLE KIT

When mounted in a vehicle, phones and other external test devices such as RF scanners can be secured on a phone platform which can be stacked on top of an MTP-4 chassis. An RF combiner on this platform will reduce the number of external antennas needed and guarantee the required isolation between the RF devices.

If more channels are needed, a second MTP-4 chassis can be stacked and daisy-chained via a Gigabit LAN providing eight to 24 channels, all controlled by the same GUI.

Mechanical fixation in a vehicle is done with integrated stackable mechanics. The equipment can be removed with a unique release mechanism. All interconnection cables between the MTP-4 chassis and the phone plat-form are well protected for safe transport and installation.

PORTABLE KIT

The MTP-4 unit can also be used for pedestrian, indoor, and nomadic testing. Due to the compact size of the MTP-4 and its relatively low power consumption, multiple hours of autonomy can be assured. The total weight of an MTP-4 unit, including four test phones, four USB modems, four MiniCards, patch antennas, and RF combiners, is less than 14 kg. A customized back-pack will allow walk testing in all types of terrain. The bag can also be wheeled, which enables easy and inconspicuous movement during indoor test locations. The integration of patch antennas and an RF combiner allow a controlled operation of between four and eight mobile devices in a properly controlled and repeatable manner.

MTP-4 portable kit

MTP-4 chassis
with phone platform

TEMS Symphony with its flexible MTP-4 platform offers the ubiquitous benchmark testing capabilities that mobile operators and measurement service providers need.

ADDITIONAL FEATURES

- Compact and lightweight
- Four powerful CPUs (i7 4GB RAM) on board
- Eight (up to 24) power-cycled USB interfaces per MTP-4 unit
- Up to 12 handsets per chassis
- Up to 12 PCIe MiniCard modules per MTP-4 unit
- Phone platform (up to five phones)
- RF isolated version of phone platform available
- Test phones with dummy battery and external antenna interface
- Vehicle kit with quick and easy fixation of MTP-4 units
- Portable kit with battery for indoor measurements
- Easily accessible SIM card slots for all test devices
- Sensitive GPS on board
- Gigabit backbone LAN
- Cascading of MTP-4 chassis without external switch
- Dedicated communication module (WLAN/mobile)
- Extended input voltage range: 10 to 28VDC
- Integrated UPS functionality for use in train or vehicle
- Connection of two different power supplies is possible
- Battery swap during operation
- Charge control and alarm of battery
- DC output for auxiliary equipment
- Hardware dongle inside
- Mechanical protection of cables and interfaces
- Ruggedized (for handling, shock, and vibration)
- Wide temperature range (0 to 60°C)
- Extended temperature range on request (-20°C)
- All interfaces and display on one side

TESTING FEATURES

- Best algorithms for speech, video, and audio testing – industrial and ITU standards
- Video telephony clips feeding directly into the mobile device
- Video telephony clips on the mobile device screen captured electronically
- Referenced and non-referenced video algorithms
- Speech MOS values displayed in real-time during tests
- Compact measurement data files
- Online display of AMR codec status
- Video-quality MOS algorithm on mobile video applications
- Real speech quality
- In-band audio problem detection with silence, level jump, echo gaps
- Mobile data tests: HTTP, FTP, UDP, WAP, SMS/MMS, Ping, and e-mail
- Mobile application protocol stack (MMS, WAP)
- Measurement trigger points precisely defined per ETSI
- Protocol messages recorded with air interface Layer 3 data
- Combined test mobile phone and scanner measurements
- Subscriber view of QoS in uplink and downlink
- Simulation of subscriber behavior
- Live recording and call statistics
- Detailed decoding of engineering data: Layer 3, RLC/MAC messages
- Measurements over different air interfaces: GSM, GPRS, EDGE, WCDMA, CDMA-1X, WiMAX
- Supports current technologies: HSPA+, WiMAX (4G), CDMA EV-DO
- GPRS/EDGE transmission-specific data: TBF usage, QoS fulfillment, time used/time wasted
- Detection of unlawful transmitters in the LTE frequency bands
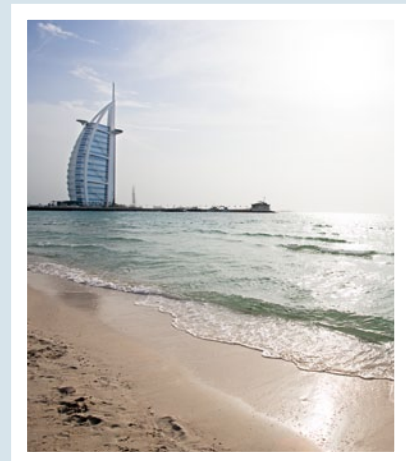
NEW IN RELEASE 6.0

- Brand new MTP-4 hardware platform
- New LTE devices including trace
- PCIe modules for speech and data tests
- SRU GSM/WCDMA scanner
- Samsung UMTS phones

NEW IN RELEASE 6.1 / 6.1.1

- Newest LG Phones for U.S. networks
- Voice tests with embedded MiniCards
- LTE tests with Sierra Wireless MC7710
- Voice and data tests with CDMA embedded PCIe Module with R-UIM
- Time-based IP throughput
- Isolation chamber for Phones

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