

TEMS™ AUTOMATIC

Round-the-clock autonomous testing

Autonomous Benchmarking and Monitoring

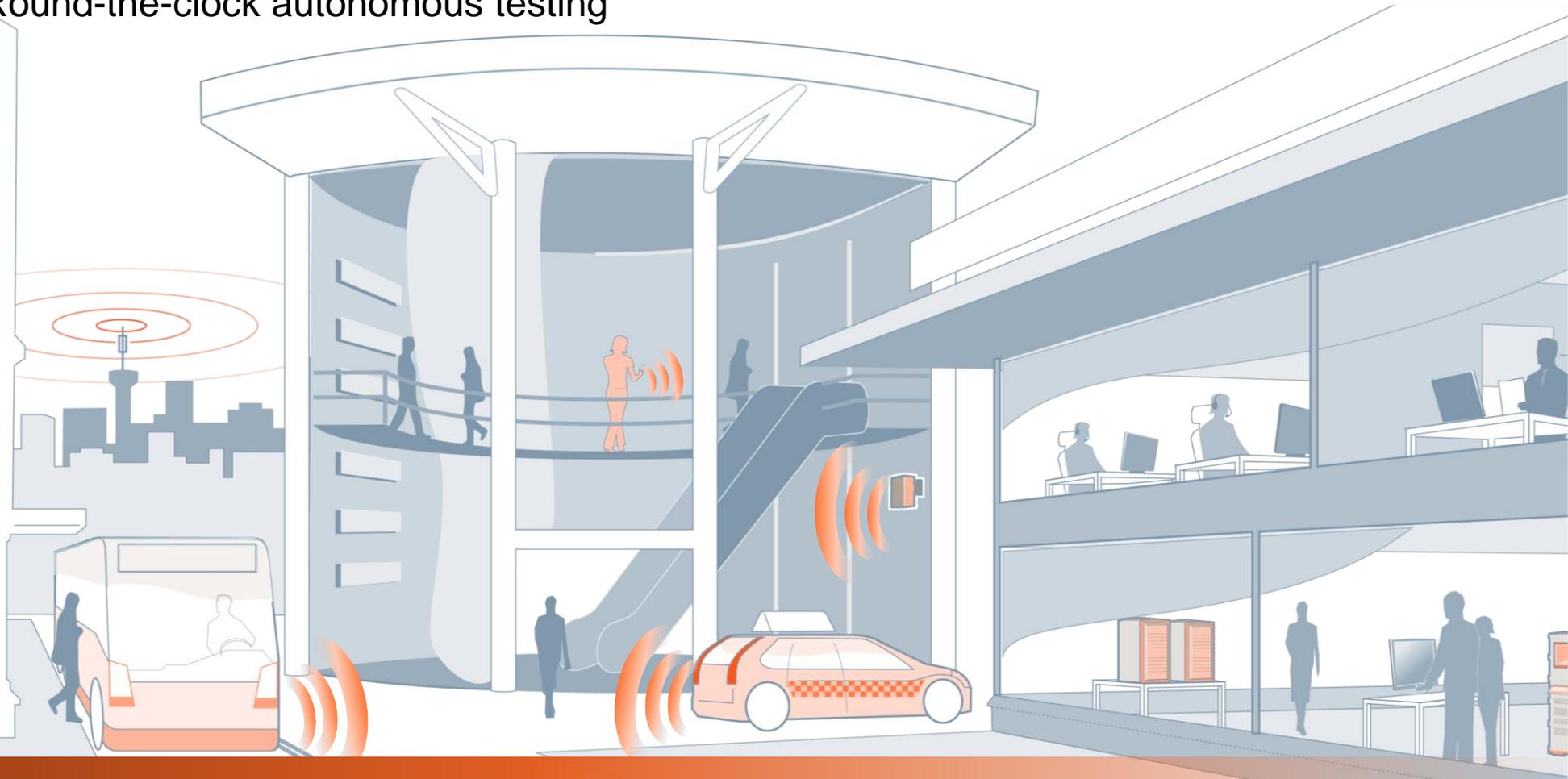
It's about efficiency.....



[SOLUTION]

TEMS AUTOMATIC

Round-the-clock autonomous testing



TEMS AUTOMATIC

Round-the-clock autonomous testing

FleetManager for remote fleet administration of probes

- Remote administration of probes, minimizing system downtime and administration
 - Probe monitoring
 - Script administration
 - Probe configuration
 - Device configuration
 - SIM switch configuration
 - Software administration
- Automatic data upload and processing



TEMS AUTOMATIC 10.1 – NEW

Measurement platforms

RTU – a flexible measurement platform for active testing using commercial devices.

- Embedded PCIe MiniCard modules
- USB modems
- Smartphones



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Round-the-clock autonomous testing

Measurements collected range from RF to end-user experience measurements, including IP.

- PS data testing (FTP/ HTTP / Streaming (VQmon)/ Email / SMS/ MMS/ Iperf/ etc.)
- Voice testing (POLQA / PESQ), with MultiRab
- CSFB testing
- Scanning support (device scanning / external scanners)



TEMS AUTOMATIC 10.1 – NEW

On-Device Testing

On-device testing for test and verification of a smartphone user's real-world experience, by using smartphone clients instead of testing solely on PC-based clients.

- HTTP Web kit (browsing)
- HTTP Get/Post
- Streaming HTTP (YouTube)
- Ping

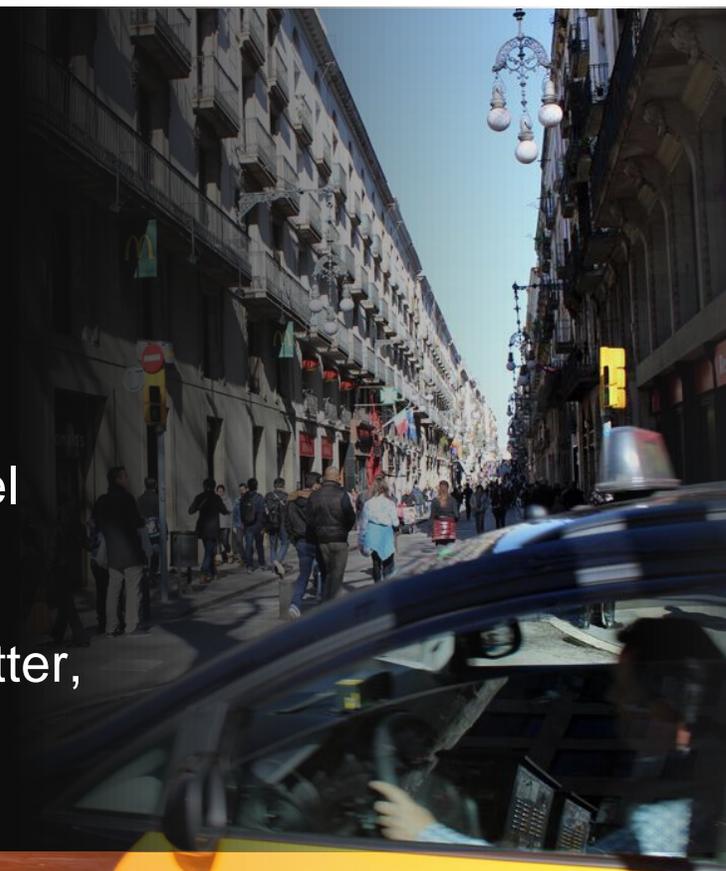
** KPI details, refer to Product Description.*

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Voice testing using CallGenerator

Powerful solution for service testing of Voice

- Mobile to fixed, using a stationary CallGenerator
- Mobile to mobile, using mobile UE devices
- Mobile-originated and mobile-terminated call setups
- Multi-RAB capability to test voice and data in parallel
- PESQ and POLQA
- Other valuable KPIs like echo, speech path delay, jitter, and volume



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Deployments

The carrier will decide the geographical scope of the measurements

- Taxis, buses
- Trains and subways
- Garbage collection trucks
- Ships, ferries

Total control of geographical scope

- User's company cars



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Deployments

To measure locations of importance

- Airports
- Bus / railway stations
- Shopping malls
- Tourist attractions
- Exhibition centers
- Sport and entertainment venues
- Major customer premises



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Deployments

Stand-alone deployments with / without back-end connection to FleetManager

- Remote Status Indicator (RSI) for probe administration in-field



TEMS AUTOMATIC 10.1 – NEW

Measurement platforms

Measurement devices can be configured in a number of ways in TEMS Automatic

- RTU – Remote Test Unit
- RCU – RTU Control Unit
- MDU – Multiple Device Unit
- RMU – Ruggedized Measurement Unit (TEMS Automatic 10.0)

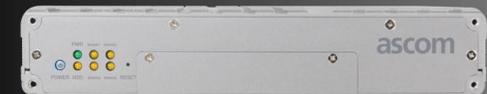


TEMS AUTOMATIC

Solutions for PCIe and USB measurement devices

Remote Test Unit (RTU) – Scalable ruggedized platform for unattended testing using modems

- Each CPU unit capable to support up to 4 measurement devices (internal PCIe or external USB)
- Dedicated data upload device
- External RF Antenna with diversity
- In-built external GPS
- SIM switch – 8 slots
- External scanner support
- Stackable – cascade connected



TEMS AUTOMATIC 10.1 – NEW

Solutions for smartphone measurement devices

On-device measurements using smartphones are available in two flavors

- Smartphone connected to an RTU Control Unit, for deployments having strong requirements for on-device availability, measurement efficiency, and unattended measurements
- Smartphone TEMS™ Pocket Remote for regular smartphone testing (TEMS Automatic 10.0)

TEMS AUTOMATIC

Solutions for smartphone measurement devices

Smartphone testing for end user experience testing

- Turn your smartphone into a remotely controlled test probe for user experience testing
- Deploy a smartphone fleet of probes for network monitoring or benchmarking
 - Handheld solutions, including car holder solutions
 - Backpack solution for indoor and pedestrian testing
 - Unattended solution for mobile and fixed locations
- Remote controlled from TEMS Automatic FleetManager



[SOLUTION]

TEMS AUTOMATIC

Handheld Smartphone Solution

Time-to-market solution for smartphone testing,
handheld including support for car-holder

- TEMS Pocket Remote is available for all TEMS Pocket devices supported (13.x or newer)



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Backpack Smartphone Solution

Backpack solution for indoor and pedestrian testing

- Lightweight backpack, only ~5kg with 6 smartphones, and USB or PCU power pack solutions
- Flexible mounting of devices
- Holds up to 6 smartphones
- Carry on size
- Discreet lock



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Unattended Smartphone Solution

Ruggedized solution for unattended deployments of TEMS Pocket Remote

One smartphone in a box solution with support for

- External GPS
- External RF antennas, w/ diversity support
- External SIM slot
- Watchdog for periodic recovery of UE device
- Stackable RMU – same form factor as RTU-5



TEMS AUTOMATIC 10.1 – NEW

Multiple Device Unit (MDU) – Smartphone Solution

A ruggedized solution for unattended deployments of smartphones, managed and controlled by the RCU

Four smartphones in a box solution with support for

- External RF Antenna with diversity
- External SIM slot

Inside the MDU there are up to four device modules (DMs), including the cradle holding the smartphone



Rear view



* MDU box ,mounted on a bottom plate together with a mid-layer having the RF combiners installed (gray boxes).

TEMS AUTOMATIC 10.1 – NEW

RTU Control Unit (RCU) – Smartphone Solution

A solution for smartphone testing in which there are high-availability requirements.

- Each RCU unit can handle up to 4 external smartphone devices (2x voice and 2x ODM data)
- External scanner can be connected, by using one of four external USB ports
- Dedicated data upload device (MiniCard), offloading measurement devices and freeing up more time for measurement
- In-built external GPS, shared across all measurement devices
- Time-based test synchronization for benchmarking
- Advanced device control functionality with quick recovery handling, minimizing device downtime and increasing measurement efficiency
- Remote Software Upgrade via FleetManager
- Local GUI – Remote Status Indicator support for in-field probe administration



Remote Control Unit (RCU)

- Data upload device
- Inbuilt GPS
- 4x external USB ports

1x MDU with upto 4x Smartphones

Upto 4x Smartphones handheld

TEMS AUTOMATIC 10.1 – NEW

Smartphone support

Samsung's Category 4 (150 Mbit/s) model Galaxy S4 GT-I9506 is now connectable to TEMS Automatic for on-device testing

- Technologies:

- GSM 850 / 900 / 1800 / 1900
- HSDPA 850 / 900 / 1900 / 2100
- LTE 800 / 850 / 900 / 1800 / 2100 / 2600

- Speed

- HSDPA, 42.2 Mbps;
- HSUPA, 5.76 Mbps;
- LTE, Cat 4, 50 Mbps UL, 150 Mbps DL



TEMS AUTOMATIC 10.1 – NEW

Smartphone Support

Smartphone devices supported

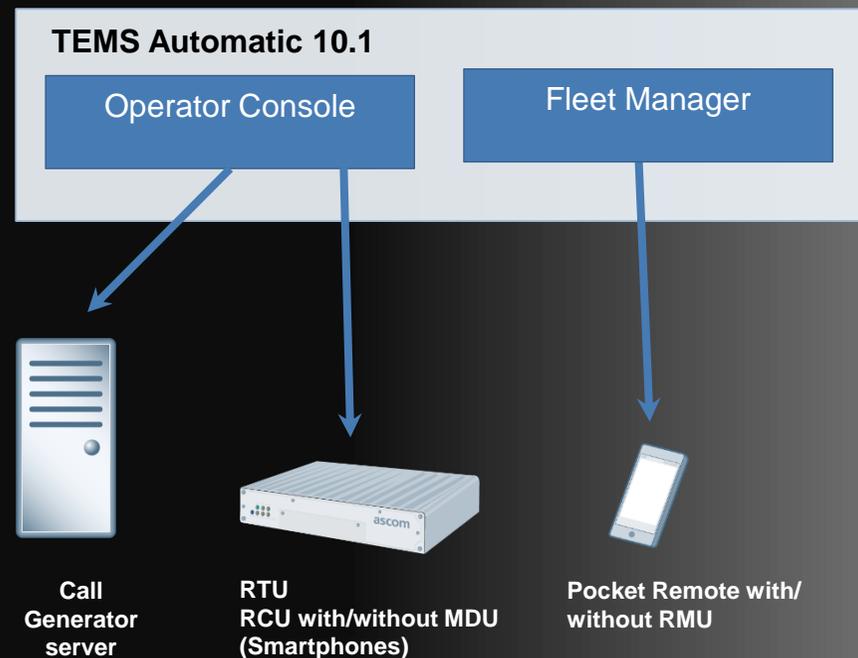
- Stand-alone deployments using TEMS Pocket Remote
 - Refer to Pocket roadmap
- MDU deployments
 - Samsung S4 i9506
- RMU deployments
 - Samsung S4 i9505
 - Samsung S4 i9506



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System setup

TEMS Automatic using common server and common database for Operator Console and Fleet Manager



* For details about constraints and limitations, refer to speaker notes.

TEMS AUTOMATIC

Round-the-clock autonomous testing

Trusted solution since 1997 for mobile operators, governments,
and regulators around the world

Thank You