

TEMS™ Investigation 24.0 Release Note

1 About This Release

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2 Important Information

2.1 Disabling Wi-Fi for Mobile Network Testing

Before using a device for mobile network data service testing, be sure to **turn off Wi-Fi** on the device. If Wi-Fi is enabled, the device may run data transfers over Wi-Fi rather than over the mobile network it is camping on (even if a correct APN has been entered).

2.2 Keeping Down Logfile Size When Running Data Services on Qualcomm and Samsung Chipset Based Devices

This section applies to Qualcomm chipset-based and Samsung chipset-based devices, unless otherwise stated. It is **strongly recommended** to follow these steps, since otherwise the PC processing load will become excessive.

- When testing **data services** only, use a Log Configuration activity with the option “Optimized for Data KPI Reports” selected. It’s recommended that a small data service is executed prior the Log Configuration in order to configure the Log Configuration activity in the most optimal way.
- For Qualcomm chipset devices, you can alternatively either disable the DPL log (0x11EB) or set USB mode to RNDIS+DM+MODEM. Be aware that in RNDIS+DM+MODEM mode it is not possible to apply certain control functions such as RAT and band lock. In TEMS™ Investigation the DPL log is by default turned off in RNDIS+DM+MODEM mode.
- When testing both **VoLTE and data services** concurrently, use a Log Configuration script activity with the option “Optimized for Voice/Data KPI Reports” selected. It’s recommended that a small data service is executed prior the Log Configuration in order to configure the Log Configuration activity in the most optimal way.

3 TEMS™ Investigation 24.0

3.1 General

This release contains vendor specific decoding updates of messages for devices based on Qualcomm, Samsung, HiSilicon and NEUL.

3.2 New TEMS Devices

- ASUS Smartphone for Snapdragon Insiders I007D
 - TEMS Connect License: Qualcomm P
- Samsung Galaxy S21 FE SM-G990B
 - TEMS Connect License: Qualcomm P
- Samsung Galaxy Z Fold 3 SM-G926B
 - TEMS Connect License: Qualcomm P
- Samsung Galaxy Z Flip 3 SM-F711B
 - TEMS Connect License: Qualcomm P

*There might be regional differences in band support, please refer to <https://www.devicespecifications.com>, <https://www.gsmarena.com> or <https://phonedb.net> for details

3.3 New Connectable Devices

- Samsung Galaxy S22 Series SM-S90xU, U1, W, E, N, O
 - TEMS Connect License: Qualcomm P
- Samsung Galaxy S22 Series SM-S90xB
 - TEMS Connect License: Samsung J
- Samsung Galaxy Z Fold3 SM-F926B
 - TEMS Connect License: Qualcomm P
- ZTE MC7010
 - TEMS Connect License: Qualcomm O
- Quectel EC21-E NBloT Cat1 Bis
 - TEMS Connect License: Qualcomm P

*There might be regional differences in band support, please refer to <https://www.devicespecifications.com>, <https://www.gsmarena.com> or <https://phonedb.net> for details

3.4 New Features

3.4.1 Android 12 Support

- Samsung A52, S20, S21, S22 series
- OnePlus 9 series
- Sony Xperia 1 II, Xperia 1 III series
- Xiaomi 11 series

3.4.2 Windows 11

TEMS Investigation is compliant with Windows 11.

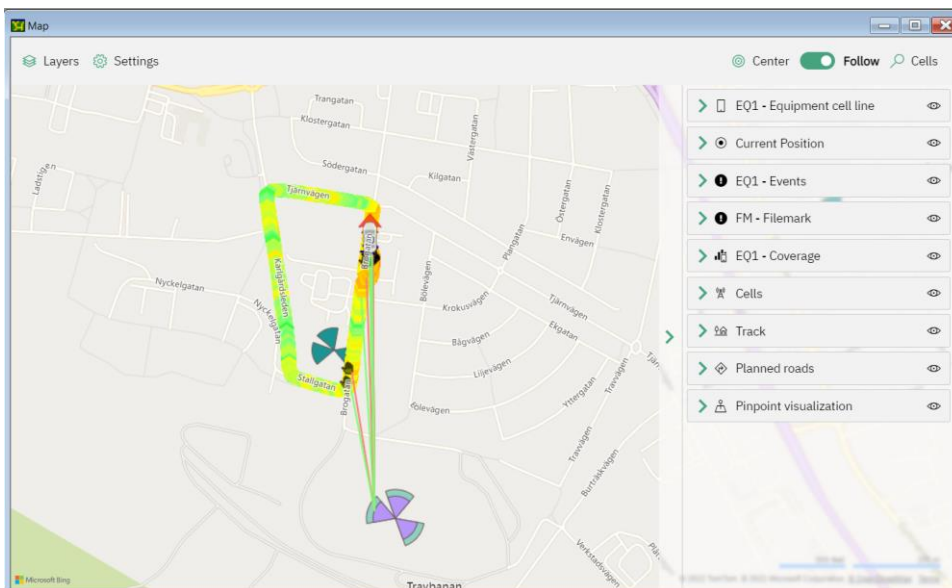
3.4.3 New Map

With TEMS Investigation 24.0 supports a new web-based map window. The old legacy map window is deprecated and will be removed from the application with the release of TEMS Investigation 24.1.

The new map supports Offline maps, Bing maps and Baidu maps. The offline map data is supported in two different map data formats: raster and vector. Offline maps are available with the base package, while Bing and Baidu require a dedicated GLS license and online connectivity for presenting the map data.

The supported layer types with the new map are:

- Cell
- Current Position
- Equipment Cell Line
- Event
- Information Element
- Pinpoint
- Planned Roads
- Track



These layers give the same flexibility and level of configuration as with the old map window, but all with a nicer look and feel and a more optimized performance making it possible to render more data in a faster way.

3.4.4 Device Detection

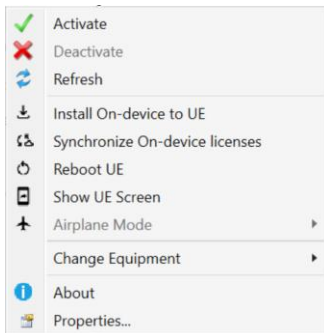
With the latest release of TEMS Investigation the detection phase is improved with faster time to get started. Multiple phones can now detect in parallel, and the time spent for each individual phone to finalize the detection phase is greatly improved, all to get started to drive test in a quicker manner.

Phones not yet added as a connectable device is still possible to detect, now with the added feature that the actual model name might be shown in parenthesis after the *Unknown* model entry.

3.4.5 On-device GLS registration

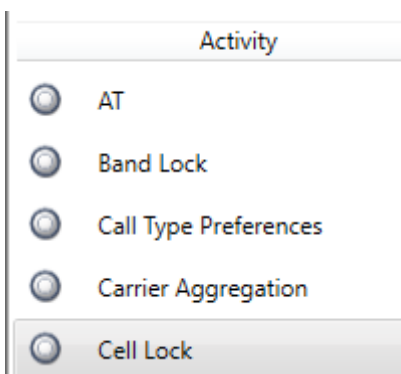
For newly added connectable devices it's now possible to register them in GLS directly from TEMS Investigation when installing On-device to the devices. Connectable devices added with this release requires GLS registration and appropriate licenses to utilize the On-device testing capability.

The On-device licenses on the device can now also be synchronized with the GLS backend directly from TEMS Investigation via the context menu for a device.



3.4.6 Cell Lock via Script

Users can now perform Cell Lock via Script action.



3.4.7 GSM ARFCN lock on Qualcomm

It is now possible to perform GSM ARFCN lock on commercial Qualcomm.

Note: There may be devices where this will not work due to restrictions from OEM or Operator branding

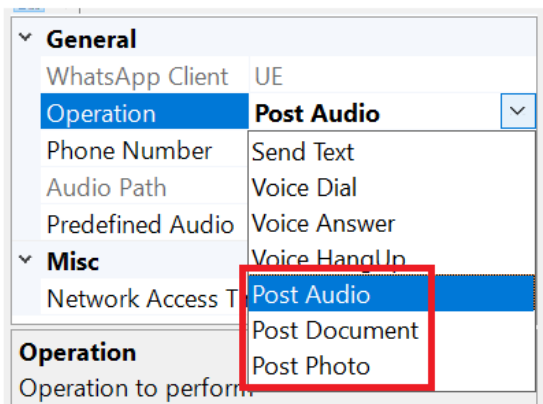
3.4.8 WCDMA PCS/UARFCN lock on Qualcomm

It is now possible to perform WCDMA PCS/UARFCN lock on commercial Qualcomm devices.

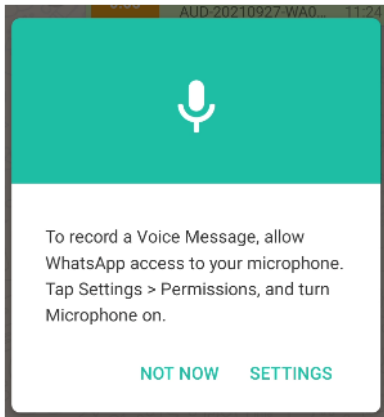
Note: There may be devices where this will not work due to restrictions from OEM or Operator branding

3.4.9 WhatsApp post file

Users can now test posting audio, document, or photo files and get the success rate, duration, and throughput values.



Users will need to grant WhatsApp permission to access the microphone.



For Post Audio operation, users can choose between 3 predefined audio files:

Predefined Audio SmallAudio
<ul style="list-style-type: none"> ▼ Misc Network Access Tii 00:00:05
Predefined Audio Big audio: 48K Bit, ~528KB Medium audio: 16K Bit, ~176KB Small audio: 8K Bit, ~88KB

For Post Document operation, users can choose between 3 predefined document files.

Predefined Docum BigDocument
<ul style="list-style-type: none"> ▼ Misc Network Access Tii 00:00:05
Predefined Document Big document: ~7MB Medium document: ~2.6MB Small document: ~0.7MB

For Post Photo operation, users can choose between 3 predefined photo files.

Predefined Image BigImage
<ul style="list-style-type: none"> ▼ Misc Network Access Tii 00:00:05
Predefined Image Big image: Resolution 3840 x 3840 pixel, ~7MB Medium image: Resolution 1920 x 1920 pixel, ~2.6MB Small image: Resolution 960 x 960 pixel, ~0.7MB

WhatsApp will perform some compression before sending the files, so users should expect the files to be smaller when receiving it on the receiver end.

The following mode reports are added:

- WhatsApp Post Document Start Request
- WhatsApp Post Document Log Report

3.4.10 OTT Generic Streaming

The existing approach to developing an ODM service to support individual OTT applications no longer makes sense considering the tremendous growth in new OTT applications available on the market. The cost of developing and maintaining an ODM service is high and development time for a new ODM service is long.

A new testing framework (OTT Media) is introduced leveraging to UI (User Interface) automation utility to control the native OTT applications using python while maintaining a common ODM service and data refinement framework for KPI calculations.

For this release, OTT Video Streaming is added to OTT Media with compiled python scripts to support YouTube, Netflix, TikTok and Facebook video streaming. The compiled python scripts will be available in SharePoint for distribution.

Users can also now add support for other OTT video streaming applications by creating their own python scripts to control the OTT applications.

A new Activity is now available in the Script Designer:

- OTT Media

New Mode Reports are available under OnDevice:

- OTT Video Streaming

A new GLS (Global License Server) license is required:

- TI, ODM OTT Media Option

The existing ODM services for YouTube and Netflix will still be maintained.

3.4.11 TWAMP SQI

Users can now use the Two-Way Active Measurement Protocol (TWAMP) to test traffic patterns from emulated applications based on the ITU-T G.IntAct specification and get the Interactivity Score, RTT, Jitter and Packet Loss values.

The traffic pattern configurations will be available in SharePoint for distribution. For this release, Drone Control pattern configuration is not supported.

Users can also perform standard TWAMP test vs any standard/public TWAMP server and get the RTT, Jitter and Packet Loss values.

A new Activity is now available in the Script Designer under IP:

- TWAMP

New Mode Reports are available under OnDevice:

- TWAMP (Quality Index)
- TWAMP (Standard)

A new GLS (Global License Server) license is required:

- TI, ODM TWAMP QI Option

3.4.12 Rohde & Schwarz Fast Automatic Channel Detection

Starting from TEMS Investigation 24.0 a new approach for network scan is introduced, named Fast Automatic Channel Detection (Fast ACD). It is based on significantly improved DSP algorithms which allows for a much faster detection of channels while using less system resources. Furthermore, the interface implements design approaches for easier handling of measurement configuration.

To use Rohde & Schwarz Fast ACD, the appropriate options for the R&S TSMW, R&S TSME or R&S TSME6 must be available on the device. The options are:

- R&S TSMx-K21 for WCDMA scanning
- R&S TSMWK29 / TSMEK29 /TSME6K29 (LTE) for LTE scanning
- R&S TSMWK40 / TSMEK40 /TSME6K40 (ACD) for general ACD operation
- R&S TSME6-K50 / TSMA6-K50 for NR scanning

3.4.13 PCTEL Gflex



The Gflex™ scanning receiver is the next generation of mobile network testing from PCTEL®. Designed for 5G and beyond, Gflex is more powerful and more portable than previous mmWave-capable scanners, with support of concurrency processing of multiple technologies. A single lightweight Gflex can collect all the mmWave and sub-8 GHz data you need for drive test, walk test, and government applications in one pass, with one unit. TEMS PCTEL SeeGull D license is required to detect and work with Gflex. TEMS license Gflex L3 Message Decoding is required to perform L3 message decoding for Gflex.

Supported Technology for this release:

- 5G NR
- LTE
- WCDMA

Supported Scan type for this release:

- RSSI Scan
- Spectrum Scan
- Enhanced Power Scan
- WCDMA CPICH Scan
- LTE Signal Scan
- 5G NR Signal Scan

3.4.14 New Information Elements and Events

New information elements:

- MCC and MNC have been moved to category *General*, and the same IEs work for all applicable radio technologies

New events:

- NR Secondary Cell Addition Attempt
- NR Secondary Cell Addition (*replacing NR SCG Cell Addition*)
- NR Secondary Cell Addition Failure
- NR Secondary Cell Removal Attempt
- NR Secondary Cell Removal (*replacing NR SCG Cell Removal*)
- NR Secondary Cell Removal Failure
- NR Secondary Cell Replacement Attempt
- NR Secondary Cell Replacement (*replacing NR SCG Cell Reconfiguration*)
- NR Secondary Cell Replacement Failure
- NR Cell Group Addition Attempt
- NR Cell Group Addition
- NR Cell Group Addition Failure
- NR Cell Group Removal Attempt
- NR Cell Group Removal
- NR Cell Group Removal Failure

3.4.15 Layer 3 Decoding Updates

Work has been done to upgrade the 3GPP layer 3 decoding to release 16. The following specifications are now based on the latest rel-16 versions (2021-12):

- 24.501 (5G-NAS)
- 38.331 (NR-RRC)
- 24.301 (LTE-NAS)
- 36.331 (LTE-RRC)
- 24.008 (UMTS-NAS)

3.5 Corrected bugs

- 00375459 Old nomenclature Serving Cell RS CINR can be changed
- 00384234 Error in calculation of 5G-NR PDSCH PRB Allocation Count
- 00385340 PCTEL visualization in Probe viewer 3G
- 00455509 Map issues in TI (5g NR IEs)
- 00455834 Unable to see NR serving cell information
- 00460300 Decoding errors on Samsung S21 BUM1 firmware
- 00464107 TEMS Investigation 23.4 Baidu Online map can't display route and cell icon
- 00464468 NR Scell blank spaces and PCell spaces
- 00464630 TI 23.4 can't decode NR UE Capability Enquiry message
- 00466328 WCDMA Tx power
- 00466967 TD Issue with LTE log file
- 00467235 Crashing while loading .cel file
- 00469304 TRP file to PRB count

- 00469496 Online map is not updated when new IE is added
- 00469741 MTP X65 TI23.4.1 UL PUSCH Issue when running 4CC Uplink in Highband
- 00470689 Event count difference issue
- 00470717 P40//Mate30

3.6 Removed Features

- Data collection with PCTEL LX, PCT, CX, EX
- Data collection with LoRA
- WAP Get service testing
- Generating KPI Reports
- Generating HTML Reports
- Export to ArcView shape file
- Export to MapInfo interchange
- Voice Quality with VoIP (PC), RMU, RTU5, SMU, SRU, TTU, ACUr2, MTP4, TerraTec
- H.245 video telephony decoding
- Detection of obsoleted Qualcomm and Samsung devices older than 6 years

4 Known Bugs and Limitations

4.1 Device Related

- When running Samsung Shannon based devices with Samsung's TCP/IP logbank enabled, PDCP DL and PDSCH Phy Throughput values can be delayed and may arrive after the actual service is finished.
- If using the Huawei Mate 20 X 5G EVR-AN00 in GSM or WCDMA networks, voice calls may not be executed correctly.
- LTE Signal Scan settings for Rohde & Schwarz is not supporting Automatic Bandwidth detection.

4.1.1 TEMS Investigation Professional Related

4.1.1.1 Installation and Start-up

- If TEMS™ Investigation takes a long time to start up (more than about 45 seconds), the delay may be caused by the OS trying unsuccessfully to check the application's Verisign certificate. If a network has been detected, the OS will try to contact Verisign to verify that the certificate is not on the Certificate Revocation List (CRL). TEMS™ Investigation will not continue until this procedure times out.

There are two ways to remedy this:

1. Open your proxy to enable access to the Certificate Revocation List. The details of how to accomplish this may vary between countries.
2. Turn off the certificate revocation check in Internet Explorer:
 - Open Internet Explorer, and from the Tools menu select Internet Options.
 - On the Advanced tab, under Security, uncheck the option "Check for publisher's certificate revocation" and click Apply.

(This procedure can be automated by the use of Group Policies.)

- When installing TEMS™ Investigation under Chinese or Japanese Windows, TEMS™ Investigation will not recognize file paths such as C:\User\\..., where <user name> contains Chinese or Japanese characters. This will prevent proper use of the application. (Similar problems may occur with other non-ASCII characters.)

4.1.1.2 Application Use

- When using the Copy Worksheet function, any Map settings will be lost.
- When many devices are used for data collection, the number of windows in the workspace should be kept to a minimum to lower the CPU load. It is also advisable to start a new logfile recording at least once every hour to reduce RAM consumption.
- During logfile recording as well as during logfile replay, temporary files are created by the application to enable the user to browse the history of the logfile. These files can become very large (3–4 times the logfile size), the exact size depending on the number of devices activated in the application at recording time. The temporary files are named according to the format "temsn" and created in the Windows temp directory (default: C:\path\tmp, where the path is defined by the environment variable TMP). Make sure there is plenty of space on the disk where the temporary directory resides. The temporary files are removed when you exit the application; however, if the application terminates abnormally, this might not happen. The files must then be removed manually.
- Network Connect over RAS fails under Windows 10 and above (the IP sniffer does not start).

- Service Control Designer: If multiple Service Control Designers are open simultaneously, a script run from one of them could fail.
- Service Control Designer: Problems may arise during script execution if a participating device is detached from Windows, whether due to user interaction or to device instability. One thing that may occur in this situation is duplicate recording of data in multiple logfiles.
- Service Control Designer: The Wait For example in the User's Manual, section 12.10.6.2 does not work, since a Wait For activity cannot be triggered by another activity that is inside a (different) while loop.
- WCDMA SCH timeslot scans are not scriptable.
- When using the serving cell indication in the Map window to show the strongest scanned CPICH, this works only for the 1st UMTS frequency (the one decoded into the information elements named "1st").
- The information element "Frequent AQM Score Downlink" is not populated when loading a logfile where uplink PESQ data has been merged in.
- When doing WhatsApp voice calls, both MT and MO side must run from a TEMS™ Investigation script. Otherwise, the call will fail.
- To replay TEMS Sense logfiles in TEMS Investigation, you need to resynchronize your Replay license in License Control Center if it was added before upgrading to TEMS Investigation 19.2 or later.
- Serving Cell SSB SNR/Serving Cell SS SNR IE's will be reported as "Not valid" from Qualcomm devices.

5 Contact Information

Please visit our website at www.infovista.com for contact and support information.