

# R&S®ROMES2GO 3GPP walk test solution: significantly expanded in version 2.0

The latest version 2.0 of the R&S®ROMES2GO 3GPP walk test solution is a consistent follow-on development toward a coverage measurement system. Since it perfectly integrates into the R&S®ROMES product family, it is now a simple matter to detect, analyze and correct complex network problems using diverse approaches.

## Many new functions

Version 2.0 of the easy-to-use R&S®ROMES2GO 3GPP walk test solution is a consistent follow-on development toward a versatile coverage measurement system offering a significantly expanded range of functions: GSM/UMTS scanner function, pinpoint initiation or suppression of handovers, decoder for layer 3 message names (FIG 1) and a new quality of service (QoS) engine. Despite all of the new features, operation remains straightforward.

## New QoS engine for comprehensive application tests

Growing demand for mobile data services makes it very challenging for providers to manage issues related to integrity, availability and speed. Version 2.0 of R&S®ROMES2GO provides support to network operators as it offers a wide range of application tests for optimizing networks in the field of quality of experience (QoE) and QoS. The new QoS engine can be used to create and execute very extensive application tests. All the user needs to do is launch predefined test procedures at any time during a measurement (FIG 3).

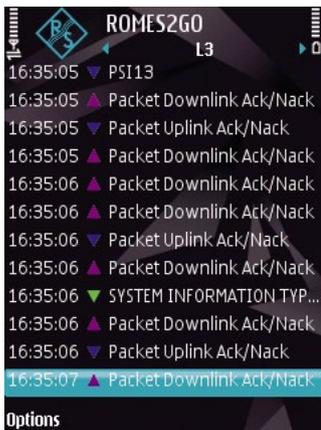


FIG 1 Decoder for layer 3 message names.

	FTP 1	FTP 2	FTP 3
<b>Service</b>			
Setup[ms]	6438	6073	6890
Min	5865	5743	6168
Max	6438	6082	6890
Avg	6063	5966	6529
<b>Accesses</b>			
Succ	3	3	2
Fail[%]	0.0	0.0	0.0
<b>IP Service</b>			
Setup[ms]	2357	2115	1816
Min	1798	1840	1816

FIG 2 KPIs for three different FTP servers.

Integration of the corresponding protocol stacks into R&S®ROMES2GO means that the QoS engine is capable of accurately determining parameters such as the round trip time (RTT), IP connection setup time and service setup time. This measurement data is compiled together with other parameters such as the RxLev, RxQual and C/I as well as layer 3 messages to form key performance indicators (KPI) to provide a concise core assessment of the measurement results (FIG 2). These KPIs serve as a valuable basis for

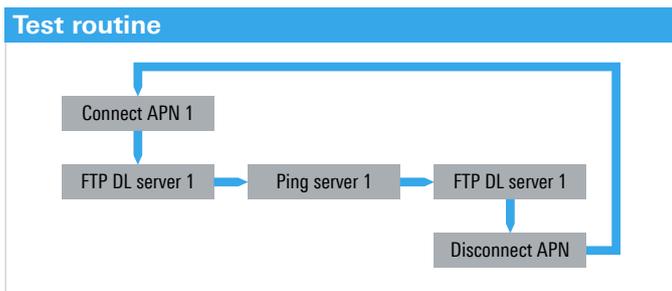


FIG 3 Test routines from a job list can be launched at any time at the press of a button.

R&S®ROMES2GO is an autonomous 3GPP walk test solution which automatically records quality of service (QoS) data in 3GPP mobile radio networks and saves the data on the data card of a mobile phone. It runs on a number of commercially available mobile phones (see page 3) offering significant benefits in terms of size, weight and thus mobility. For a detailed description, please see NEWS 198/08 (pp. 6–9).

R&S®ROMES2GO can be purchased as a complete package or just the software. The complete package includes a mobile phone with suitably modified firmware, the R&S®ROMES2GO software, and software for converting the measurement data.

The new version 2.0 described here has been expanded in a consistent follow-on development toward a coverage measurement system.

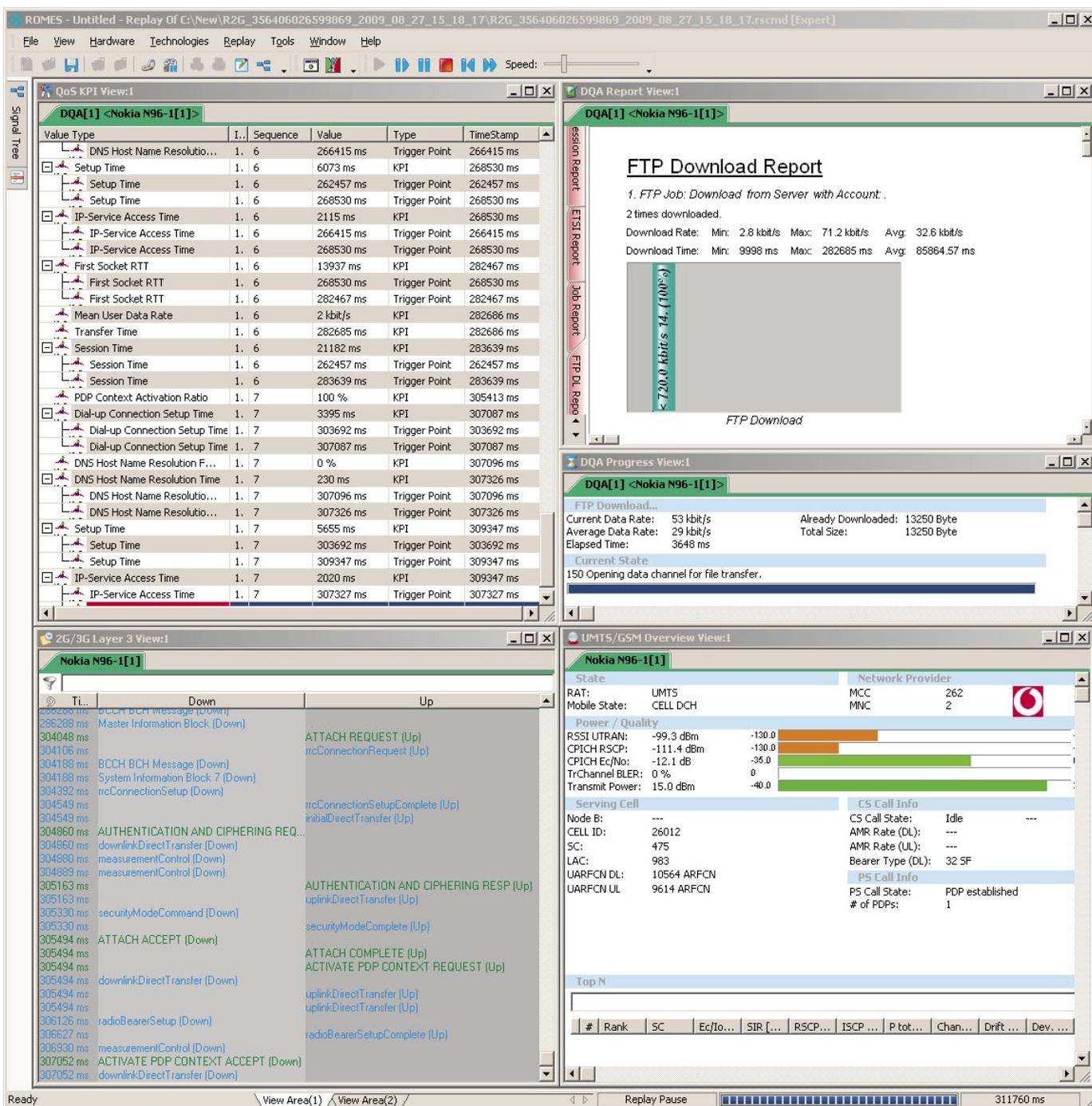
competitive comparisons, benchmarks, efficient troubleshooting and network optimization. Their standardization makes them comparable so that they are very useful for reference purposes.

The ability to preconfigure application tests opens up new fields of applications, e.g. less technically sophisticated persons (“friendly users”) can be integrated into the process of network optimization. Equipped with R&S®ROMES2GO, they

can launch preconfigured measurements at problem spots and then upload the measurement data to a predetermined server for evaluation purposes.

R&S®ROMES2GO is very well integrated into the R&S®ROMES product family, facilitating more in-depth and substantial analyses of the R&S®ROMES2GO measurements using the R&S®ROMES4 drive test software (FIG 4) and the R&S®ROMES network problem analyzer (FIG 5) [1].

FIG 4 In-depth analysis of QoS measurement results from R&S®ROMES2GO using the R&S®ROMES4 drive test software.



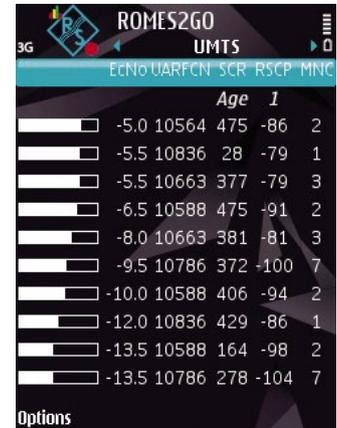
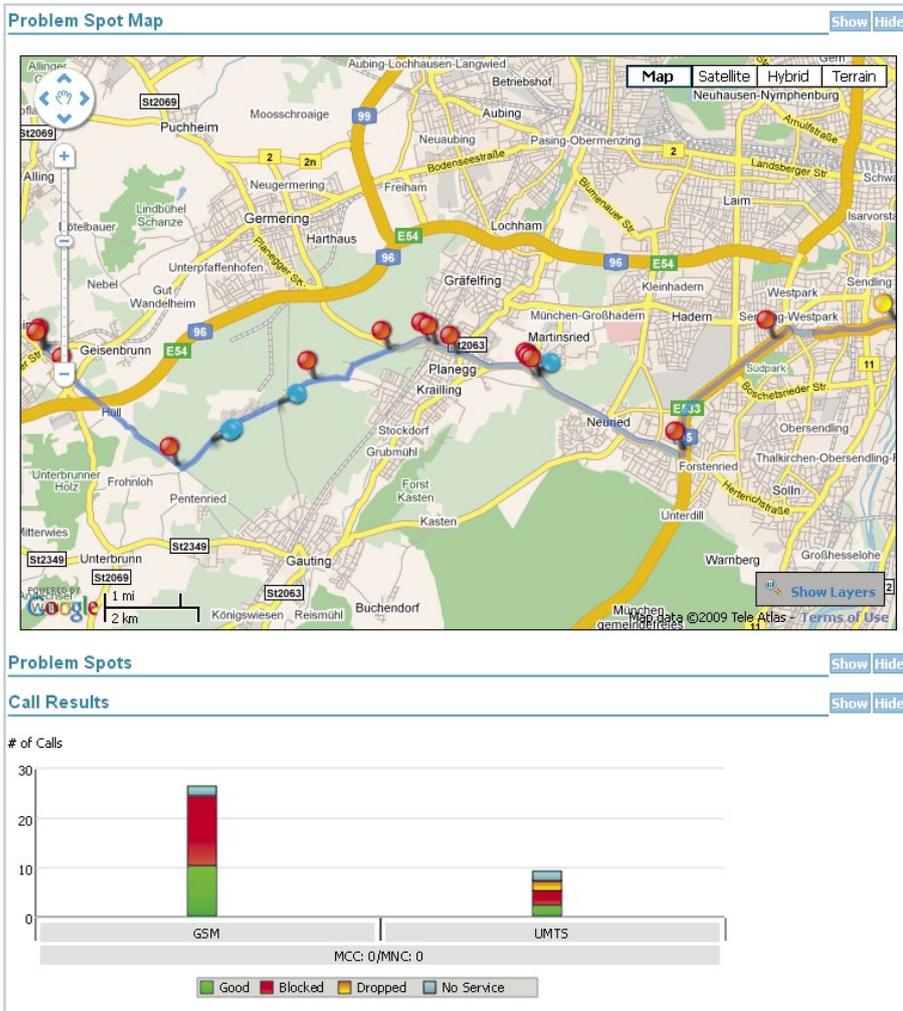


FIG 6 WCDMA scanner, Top N display.

FIG 5 Processing of multiple R&S ROMES2GO measurements using the R&S ROMES network problem analyzer.

## New mobile phones

In addition to the N95, 6120 and 6121 mobile phones available with version 1, the Nokia N85, N96 and 6720 phones are now also supported. They have faster processors (useful for HSPA measurements), more internal memory (N85 with 8 Gbyte and N96 with 16 Gbyte), more sensitive GPS receivers and larger displays with the same resolution. The larger size of the display improves readability and thus significantly enhances ease of use. Like the Nokia N95, the new mobile phone models have a slider function so that the display can be switched from vertical to horizontal. This allows even better division and usage of the display, especially with graphical measurement windows.

## A new measurement mode: scanner

A new measurement mode now makes it possible to use a test mobile phone as a simple, compact scanner for GSM and UMTS networks, allowing different parameters to be determined depending on the standard:

### GSM

- Band
- Absolute radio frequency channel number (ARFCN)
- RxLev
- Base station identity code (BSIC)
  - Network color code (NCC)
  - Base station color code (BCC)

### WCDMA

- Downlink UMTS channel number (DL UARFCN)
- Mobile network code (MNC)

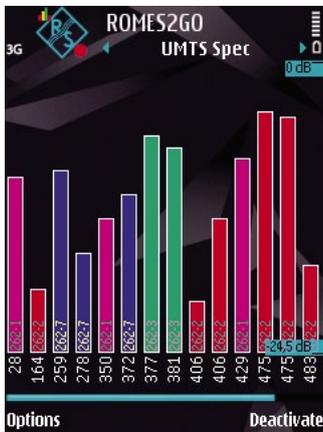


FIG 7 WCDMA scanner spectrum display.

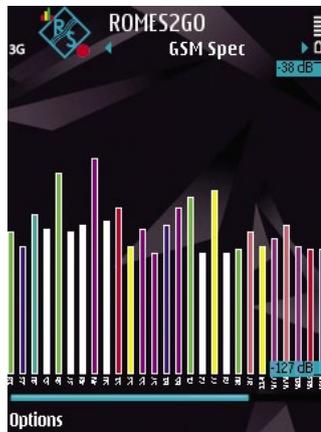


FIG 8 GSM scanner spectrum display.

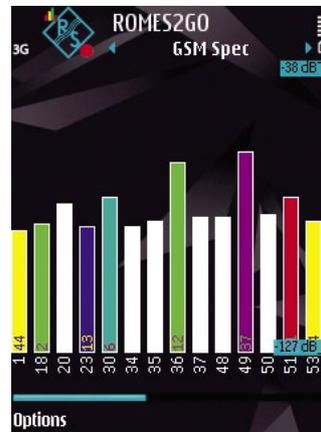


FIG 9 GSM scanner spectrum display (zoomed).



FIG 10 Handover suppression following an assisted handover.

- Mobile country code (MCC)
- Primary scrambling code
- Received signal code power (RSCP)
- Signal quality indicator (Ec/N0)

The measurement results are presented using an easy-to-read Top N display (FIG 6) and zoomable spectrum displays (FIGs 7 to 9).

Compared to the normal measurement mode, the benefit of the scanner mode is that the test mobile phone can measure cells in its own network and also detect and evaluate those of other providers. Another advantage is that the mobile phone is not registered in the network, which means that it does not consume any network resources and thus does not generate any costs (unlike active tests).

This compact scanner solution with its high availability can be put to good use as a cost-effective tester for base station technicians who need to perform simple neighborhood analysis, for example. This allows investigation of differences between planned scenarios and real-world conditions for best server and neighborhood relationships in the network, or rough localization of interference produced by transmitters operated by other providers. For subsequent, complete interference analysis, the full-featured interference measurement systems from the R&S®ROMES product family are a good choice [2], [3].

## Assisted handover

The innovative handover controller allows manual initialization of a handover from the current serving cell to the selected neighboring cell with subsequent suppression of additional

handovers. When the handover controller is activated, the mobile phone transmits modified measurement reports to the network. The current serving cell is reported as a weaker cell and the neighborhood measurements contain only the desired new serving cell. This modification causes a handover, and a further handover is suppressed as a result (FIG 10). During the suppression period, the current serving cell is reported to the network as usual and information about neighboring cells is omitted.

In conjunction with additional, extensive forcing functions, this feature is especially useful when commissioning base stations as well as for practically assessing of theoretical range assumptions for individual cells.

## Summary

Offering a wide range of functions that are easy to use and relatively inexpensive, version 2.0 of R&S®ROMES2GO is a cost-effective entry-level product that rounds out the R&S®ROMES family. Due to its interoperability with the established R&S®ROMES drive test software and the R&S®ROMES network problem analyzer, it is possible to detect, analyze and correct complex network problems using very different approaches.

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## References

- [1] R&S®ROMES network problem analyzer: Turning raw drive test data into actionable information. News from Rohde&Schwarz (2009) No. 199, pp. 7–10.
- [2] R&S®TSMU radio network analyzer: Automatic detection of interferences in GSM networks. News from Rohde&Schwarz (2006) No. 190, pp. 4–9.
- [3] R&S®TSMx radio network analyzers: Radio network analyzers for all tasks and any budget. News from Rohde&Schwarz (2007) No. 192, pp. 5–8.