FIG 1 R&S®ROMES2GO is an autonomous 3GPP walk test system that performs automatic QoS measurements in mobile radio networks.

All the trumps in one hand – with R&S®ROMES2GO

R&S®ROMES2GO is an autonomous walk test system that automatically records quality of service (QoS) data in 3GPP mobile radio networks and stores it on the data card in the test mobile phone.

Efficient, mobile, inconspicuous

The mighty midget: R&S®ROMES2GO is a walk test system that performs demanding measurement tasks with minimum effort. Whereas a conventional test system requires components such as a PC, test mobile phones and GPS receivers, R&S®ROMES2GO runs on a mobile phone (FIG 1) – which translates into key advantages in terms of size, weight and mobility.

The system is based on Nokia mobile phones (at present, models N95, 6120 and 6121) that run on the Symbian operating system and can be equipped with the Nokia test mobile phone (NTM) test software. This helps to ensure that even in the fast-paced mobile phone market, R&S®ROMES2GO can be easily and quickly adapted to future models.

Despite a mobile phone's limited performance in comparison with a PC, R&S®ROMES2GO covers the complete range of relevant measurements. The slim architecture makes it possible to show the desired measurement results in realtime on different displays, and to perform basic analyses and store them for detailed analyses at a later time. Straightforward, logically grouped lists and tables provide a clear overview of important measurement results.

Two-dimensional (2D) graphs are used to visualize measurement results whose history is important for an effective analysis. For example, the trace of the receive levels is of crucial importance for evaluating a handover. R&S®ROMES2GO not only displays their traces in a 2D diagram but also marks the exact handover time by means of the background color of the graph (FIG 2). In addition, the momentary values of the graphs as well as the associated values – such as the GSM channel belonging to the level – are displayed in the legend of the graph. The color of the legend line is displayed in the corresponding graph.

R&S®ROMES2GO supports all standards available on Nokia mobile phones (GSM, (E)GPRS, UMTS, HSDPA). Special views process the most important parameters. For example, the views for GSM provide all relevant information regarding the channel and level of the serving and neighbor cells (FIG 3). In the case of UMTS, active set and neighbor set are displayed (FIG 4), which, along with other measurement results, are visually processed in such a way that all necessary information can be read off at a glance despite the small display.

FIG 2 Graphical/numeric display of the GSM measurement report.

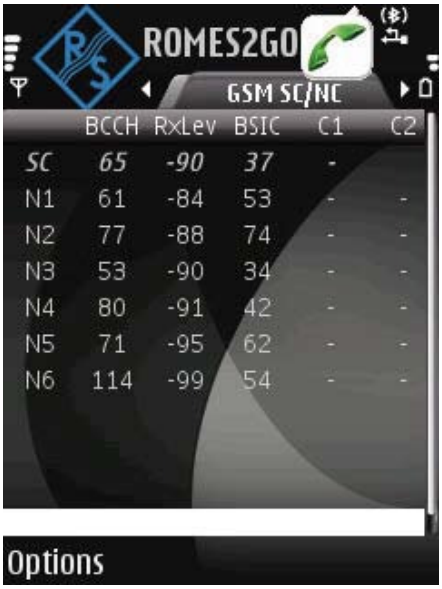


FIG 3 The GSM view provides all relevant information.

FIG 4 The active set and the neighbor set of UMTS.

FIG 5 Number of timeslots used and the coding scheme of (E)GPRS.

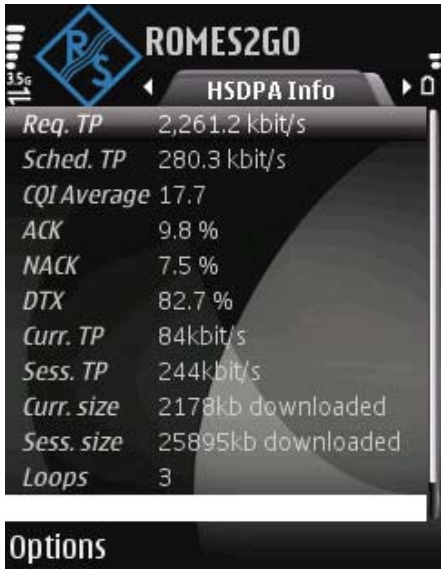


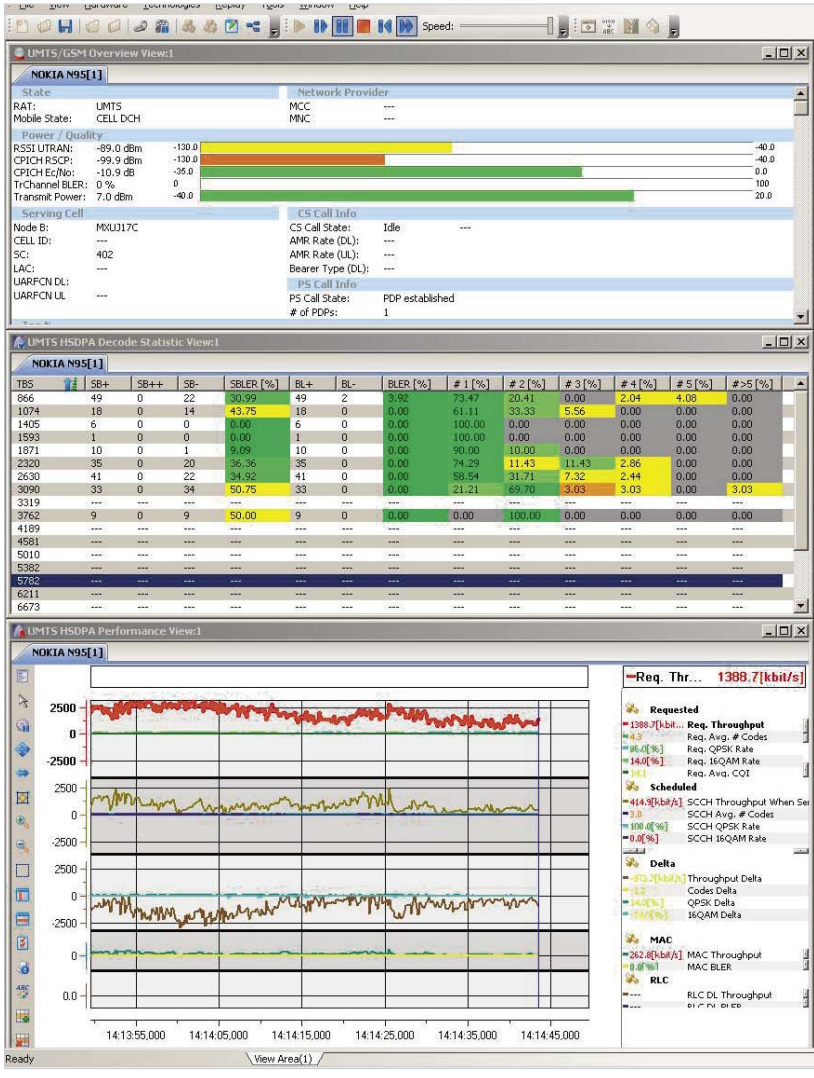
FIG 6 An HSDPA connection: All information is excellently prepared for assessment.

FIG 7 Transfer of the measurement file to a server via FTP.

To enable users to easily grasp the relationship between the air interface and the quality actually achieved in the case of packet-switched services, the layer 1 measurement results as well as the current throughput of each data service are displayed. With (E)GPRS, for example, parameters such as the number of timeslots used and the coding scheme are shown (FIG 5).

Since HSDPA connection parameters change every 2 ms, they cannot be displayed on the mobile phone in realtime. For this reason, R&S®ROMES2GO on the mobile phone calculates meaningful statistics from the large amount of data. Requested/scheduled throughput, CQI average or also ACK / NACK and DTX rates provide the information necessary for adequately assessing the connection under test (FIG 6).

In practical use, the measurement is often not started until a certain event occurs. For a complete analysis, however, the previous measurement data is also needed in most cases. Using the integrated ring buffer for measurement data, which always stores the measurement data for at least 60 seconds, R&S®ROMES2GO ensures that no measurement is started too late and that all required data is available for analysis. After completing the measurement, R&S®ROMES2GO offers users the option to automatically transfer the generated measurement file via FTP to a preconfigured server, from where the files can be immediately used for further processing (FIG 7).



In-depth analysis with R&S®ROMES

If an in-depth analysis of the generated measurement files is necessary, the established R&S®ROMES coverage measurement software is a powerful tool for this purpose. The measurement files generated by R&S®ROMES2GO are converted to RSCMD format, which R&S®ROMES can directly process. The conversion is either performed manually via the graphical user interface or with the aid of automatic batch processing, which periodically searches for new R&S®ROMES2GO measurement files. After the files have been converted, R&S®ROMES provides a large number of measured values in addition to the ones already visualized on the mobile phone. The files contain all the measurement and analysis data that corresponds to the data of an R&S®ROMES measurement using the Nokia mobile phone. This makes it possible to perform, for example, a detailed analysis of the layer 3 messages or the HSDPA transmission at the TTI level. GPS support allows the data to be positioned accordingly on the map (FIG 8).

Summary

R&S®ROMES2GO offers field engineers everything they need for fast on-site analysis. The realtime display of measurement results enables them to immediately respond to problems. Any necessary changes made to the network configuration can subsequently be verified on the spot. The inconspicuous mobile phone in combination with R&S®ROMES2GO allow measurements inside buildings or in pedestrian zones to be taken quickly and efficiently. The system is ideal for applications where electronic measuring equipment is not desired, e.g. at airports or in other security-relevant areas.

Version 1.0.4 of R&S®ROMES2GO is now available. An important pillar in the portfolio of coverage measurement equipment from Rohde&Schwarz, R&S®ROMES2GO undergoes continuous further development. New features such as indoor navigation and a data quality analyzer are planned for the coming versions.

Andreas Spachtholz

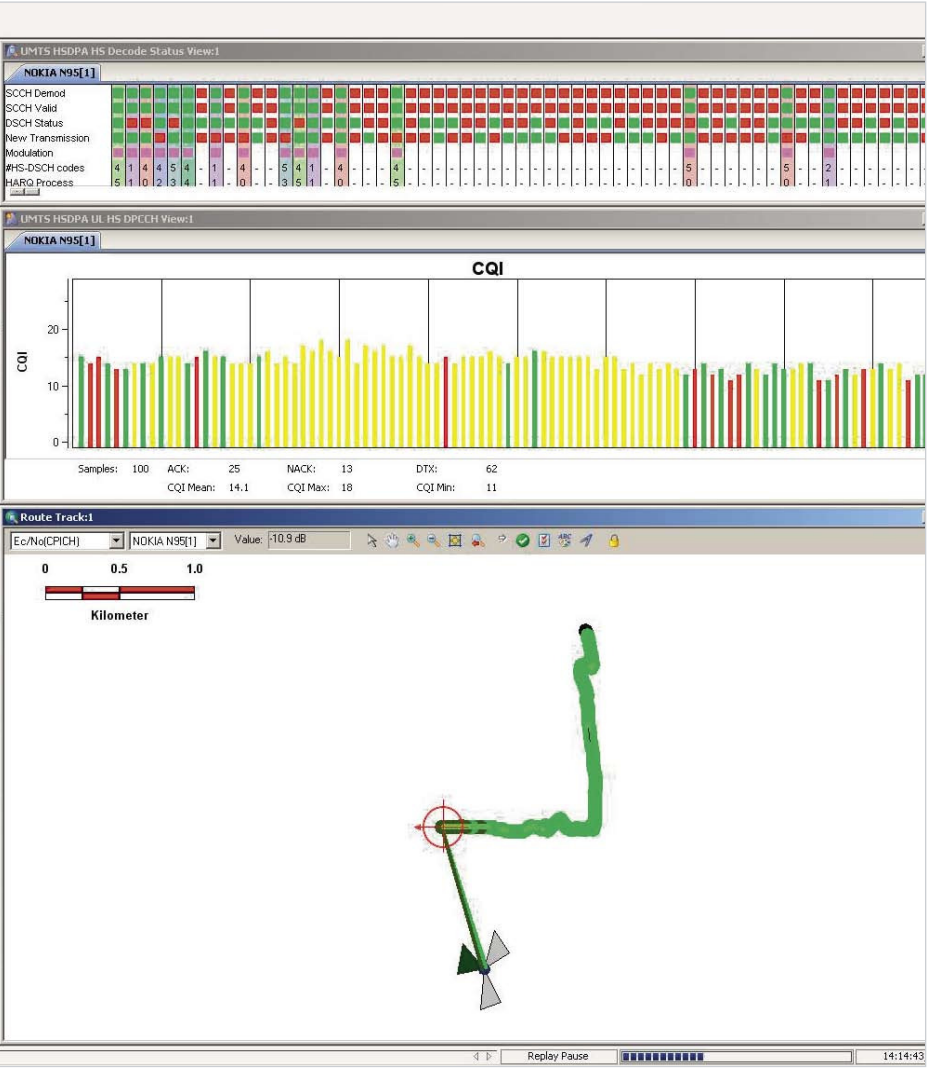


FIG 8 Converted measurement files can be analyzed in detail using the powerful analysis tool, R&S®ROMES.

PC-based protocol tester for UMTS LTE

Developments for the new mobile radio standard UMTS long term evolution (LTE) are running at full speed. Rohde & Schwarz supports the industry in this particular challenge with high-grade test equipment. The new product, the LTE virtual tester, is a powerful protocol test environment for generating LTE signaling scenarios.

The development of LTE is in full swing

The new 3GPP mobile radio standard LTE, with data rates up to 150 Mbit/s and low latency times, permits a wide variety of new broadband services. The commercial kickoff of LTE is planned for 2010 in some regions. Both the enormous increase in data rates as compared to UMTS and the significant pressure for a quick market launch are driving factors in the current development of LTE mobile radio devices. As a result, the complex functioning and performance of the higher protocol layers of user equipment (UE) must be verified very early in the development process.

What are virtual tests?

Virtual tests replace as yet unavailable hardware components, such as UE chipsets or RF output stages, with software simulations. The entire physical air interface is simulated with a virtual physical transport layer. The connection between the LTE virtual tester and the UE software is handled via an interface developed by Rohde & Schwarz. This test method permits parallel development of hardware and software and allows UE software problems to be recognized and eliminated during early phases of development — a decisive factor in ensuring the timely launch of a new mobile phone while maintaining high quality standards.

FIG 1 The LTE virtual tester is an excellent addition to the R&S®CMW 500 protocol tester, because scenarios generated by it can be reused with the R&S®CMW 500.