The early beginnings
Ten years have passed since Rohde & Schwarz won the order for the development of a test system for type-approval testing of GSM mobiles in the 900 MHz band [1]. The invitation to tender was put out by a consortium of six European GSM network operators. Hardly anyone could foresee at that time the importance the simulator would have for the rapid development of mobile radiocommunications. Although originally created as a European standard, GSM soon enjoyed great popularity all over the world.

The test system (photo) was designed for the GSM 900 band only because at the time of the order the mobile radio bands GSM 1800/1900, EGSM (extended GSM) or the combination of several bands in a multiband mobile were not yet defined. According to the requirements of the GSM specifications, the test system simulates up to three active base stations with different fading profiles and up to seven neighbouring cells.

Top performance in a minimum of time
Rohde & Schwarz took only one year and a half to develop the complete system together with a few demo programs for verifying the system functions. After another three years of development, around 300 highly complex test cases for phase-1 mobiles were ready for use and validated by independent test houses. On 1 April 1994, the type-approval tests of the mobiles started as scheduled.

In the past ten years the GSM system simulator went through several development phases. The system underwent the strongest expansion in 1996/97 when a follow-up order was placed for the implementation of GSM phase-2 functions. For this purpose GSM Association founded the GSM Facilities Ltd. as the contractor. In the course of the extensive contract negotiations with this company, the participants fixed an ambitious schedule for the development of about 140 test cases. New half-rate functions and the support of data-only mobiles had to be implemented in complex RF, protocol and cell-reselection test cases.

Extensive project management
The new functions necessitated a close cooperation between the Rohde & Schwarz engineers and the mobile manufacturers. At times the development department worked in three shifts on the available reference system to verify also test cases with a run time of several hours. Thanks to the excellent cooperation between leading mobile manufacturers and Rohde & Schwarz this hurdle could also be taken
Finally, a complication in the development of GSM phase 2 was that the parts concerned with phase 1 had to remain unchanged—the certification of the GSM phase-1 mobiles should not be disrupted in any way. After the completion of defined milestones, the software and hardware modules were validated by two independent organizations against accurately defined reference implementations. The Rohde & Schwarz experts presented each milestone to the relevant European bodies.

The GSM story with open end
With the recent expiry of the warranty period and the end of the phase-2 development contract, GSM Facilities Ltd. had done its job. The close-down of the company was notified to Rohde & Schwarz in a letter of thanks (see extract in the photo above).

Having attained all its goals, GSM Facilities Ltd. has now been closed down. Extract from the letter to Rohde & Schwarz:

“We were pleased to find in Rohde & Schwarz the necessary professionalism to address the contractual issues.”

Twelve GSM system simulators were installed in all: in addition to the reference system at Rohde & Schwarz, ten systems are in operation in Europe and one in China. Rohde & Schwarz Munich keeps acting as the hub of the worldwide GSM system support via its different field offices. Maintenance service contracts ensure continuous development and updating of the systems.

Axel Meier

REFERENCES