

Using this new option, mobile phone designers are now able to analyze the RF parameters of the mobile phone transmitter while the applications are running. Power consumption, feasible data rates at different signal levels or, for example, the behavior under fading conditions can thus be thoroughly examined.

In addition, network operators that perform these application tests to check new mobile phones before approving them for their networks can use this option to ensure smooth network operation.

## Future prospects

Application tests are becoming more and more important in mobile radio. Rohde & Schwarz is meeting this trend by continuously developing new solutions in this field. The licensing authorities have responded to changes in the way mobile communications are used: By developing test scenarios with exact specifications, they are defining appropriate tests at the application level that will ensure that mobile radio networks will also operate smoothly in the future.

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More information and data sheet at  
[www.rohde-schwarz.com](http://www.rohde-schwarz.com)  
(search term: CMU200)

### REFERENCES

- [1] Protocol Tester R&S®CRTU-G: Reducing test time through automation. News from Rohde & Schwarz (2004) No. 182, pp 16–17
- [2] Universal Radio Communication Tester R&S®CMU200: Testing CDMA2000® data applications. News from Rohde & Schwarz (2004) No. 182, pp 11–13

## Universal Radio Communication Tester R&S®CMU 200

# Convenience and flexibility – the key to successful mobile radio testers

**Modern mobile radio systems sparkle with continuously new innovations, placing ever more complex development and production demands on mobile phone manufacturers. To meet such challenging tasks, you need a mobile radio tester that can keep pace with the rapid rate of innovation without compromising on operating convenience.**

## Automatic timeslot configuration

The expansion of the GSM standard to packet data services (GPRS and EGPRS) considerably increased the complexity of mobile radio systems. To meet this challenge, a tester must cover all relevant scenarios. Especially when you use testers in development, you must be able to set a large number of parameters to your specific requirements. However, this may present very difficult problems, for example if you want to determine which of the numerous parameters must be set and how to set them in order for the tester to generate the expected scenario. Therefore a state-of-the-art mobile radio tester must take a new approach in

operation. The Universal Radio Communication Tester R&S®CMU 200 previously came with a configurator for the GSM system that automatically selected the optimum timeslot configuration in accordance with the mobile phone's capabilities and the desired type of connection [\*]. This timeslot configurator has now been expanded by an automatic measurement configurator and a wizard. ►

## ► Automatic measurement configuration

After you activate the configurator and the connection is set up, the tester automatically sets the measurements to the optimum timeslot configuration of the current connection and switches to the menu that is most probably needed. In most cases, you will not need to modify the configuration. With the multislot power ramp measurement, for example, the number of timeslots to be displayed and the measurement timeslot are set in such a way that as many active timeslots as possible can be displayed at maximum resolution on the screen (FIG 1).

## Convenient wizard

Using the wizard, you can configure the entire tester for the measurement task at hand in a single step. To set the R&S®CMU 200 for 8PSK EGPRS measurements, for example, select the EGPRS 8PSK presetting in the wizard (FIG 2). This activates the automatic timeslot

configurator and the automatic measurement configurator as well as any second transmitter that is available (option R&S®CMU-B95) for the BCCH. In addition, the network support parameter is set to GSM + EGPRS, the service selection to packet data and the coding scheme to MCS9.

## Limit weighting

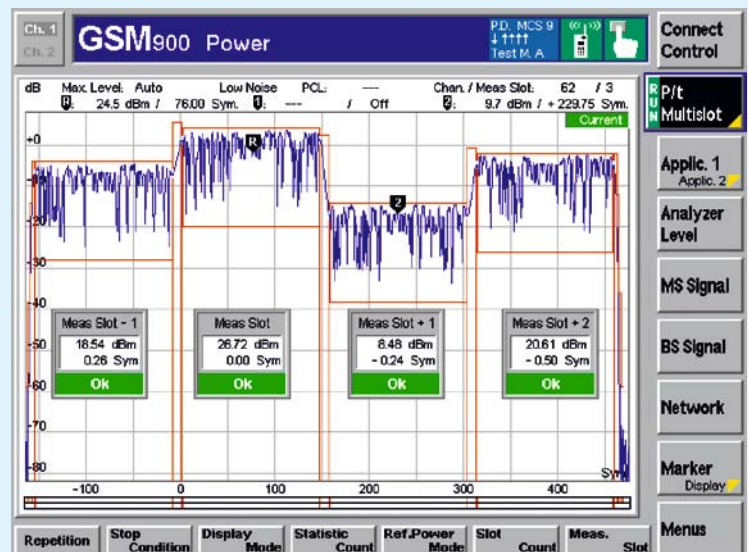
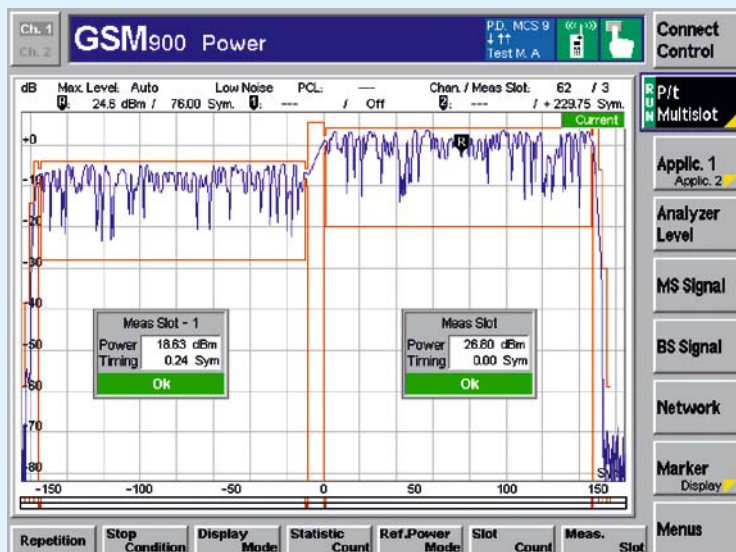
The R&S®CMU 200 also makes it easy to set the off power limit in the case of multislot connections. In practice, there are two interpretations for this measurement. One of them references the off power limit for all timeslots to the timeslot with the maximum power, i.e. the permissible residual transmit power of a mobile phone on non-active timeslots is the same across all timeslots (FIG 3, left). The second interpretation references the off power limit to the specific power of the individual timeslots, i.e. the permissible residual transmit power of a mobile phone changes with each timeslot (FIG 3, right). Weighting the permissible residual

transmit power in a non-active timeslot is difficult if the timeslot is surrounded by two active timeslots with different power because, in the non-active timeslot, the off power limit of the preceding active timeslot must be replaced by the off power limit of the succeeding active timeslot at some point. Whichever interpretation you prefer, the R&S®CMU 200 handles both; you can change between the two using a selection switch.

## BER search routine

Determining the absolute RF level for a defined bit error ratio is very time-consuming and almost impossible to do manually. In this case, too, the R&S®CMU 200 supports you with its user-friendly search routine. Depending on the offset from the desired bit error ratio, the search routine automatically modifies the averaging depth of the measurement and the step size of the RF level change, thus very quickly determining the absolute RF level for a defined bit error ratio.

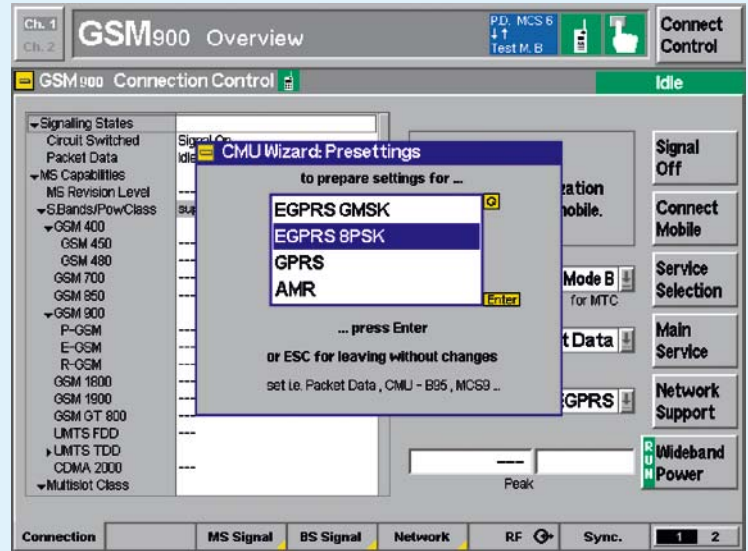
**FIG 1** Fitted with the measurement configurator, the R&S®CMU 200 automatically sets both the optimum multislot power ramp measurement and the spectrum measurements, depending on the type of connection and active timeslot combination. The example on the left shows the selected power ramp measurement settings for a connection with two active uplink timeslots; on the right are the selected settings for a connection with four active uplink timeslots.



## New GSM functionality

Apart from convenient operation, you also expect a tester to cover all necessary functionalities of a mobile radio standard. Here, too, the R&S®CMU 200 is always up to date. For example, if the latest software has been loaded and the option R&S®CMU-B95 installed, the R&S®CMU 200 is able to provide a PBCCH for (E)GPRS packet data transmissions – in addition to numerous other functionalities. Switchover between two- and three-digit MNC in all GSM networks is also available. With the new option R&S®CMU-K26, the R&S®CMU 200 even supports GT800, the Chinese version of the R-GSM standard.

**FIG 2**  
Using the wizard, you can optimally set the R&S®CMU200 for a specific measurement task in a single operating step. All you need to do is select the desired task from a list; everything else is done automatically by the tester.



## Summary

The Universal Radio Communication Tester R&S®CMU 200 combines flexibility, operating convenience, measure-

ment speed, functionality and precision in a single instrument. Such versatility makes the R&S®CMU 200 successful in all areas of mobile radio testing.

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### REFERENCES

- [\*] R&S®CMU 200 – Solutions not only for (E)GPRS mobile radio development. News from Rohde & Schwarz (2004) No. 181, pp 14–15

**FIG 3** The R&S®CMU200 can reference the off power limit both to the timeslot with the maximum power (left) and to the individual timeslots (right). The wide dynamic range that may be required when referencing the off power limit to the individual timeslots does not pose any problems for the tester.

