Universal Radio Communication Tester CMU200

GSM power measurement – versatile, fast and accurate

Measurement speed and accuracy – these are the key criteria in production because they determine test times and thus throughput. Universal Radio Communication Tester CMU200 [*] (FIG 1) optimizes the two parameters for each application. How this rapid tester helps you to cut down on measurement times is demonstrated here by the example of power measurements on GSM mobiles.

Photo 43238/10

FIG 1 Universal Radio Communication Tester CMU200 optimally matches measurement requirements in GSM mobile-phone production

Optimized in every case

GSM specifications state how much power a mobile may emit as a function of power control level (PCL), together with the time characteristic a mobile must comply with (FIG 2). The latter again depends on PCL. CMU200 performs all the measurements required for this – fast and extremely accurately.

Power versus frequency

CMU200 allows GSM-conformant measurement of the power characteristic in all frequency bands:

- GSM400 with option CMU-K20
- GSM900 with option CMU-K21
- GSM1800 with option CMU-K22
- GSM1900 with option CMU-K23

CMU200 records several bursts (1 to 2000) of a mobile and from these finds the minimum, maximum and average power characteristic. In manual operation, detailed analysis is simplified by a zoom function, markers and auxiliary lines. To allow immediate verification of compliance with GSM specifications, the tester automatically positions the power versus time template over the measured burst and detects and marks violations of limits and specifications (FIG 2). The template is automatically adapted to the particular power control level. The user can define template and tolerance limits to match mobile-specific requirements. In short, with CMU200 you can check at a glance whether the power characteristic of a mobile is go or nogo.

The pass/fail indicators are available also in remote control. So, on the remote-control computer, you can determine immediately, without elaborate analysis, whether or not a mobile conforms to GSM specifications. Plus, you

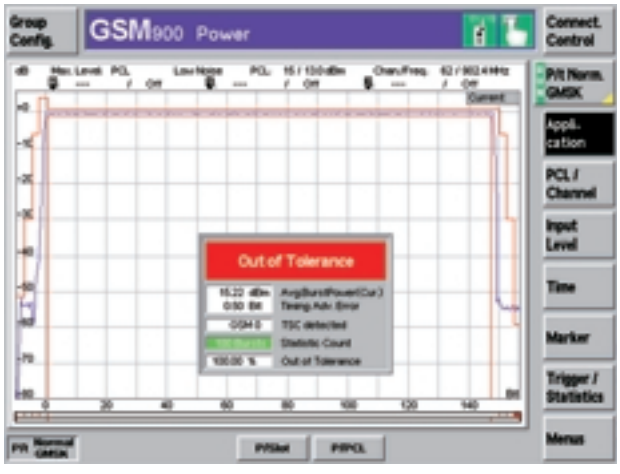


FIG 2 CMU200 automatically positions power versus time template over measured power characteristic and checks compliance with specified values. Tolerance violations are marked by fail indicators and measured values highlighted in red

can read out the complete power characteristic – minimum, maximum and average – or selected parts of it. In the latter case, CMU200 also detects the minimum, maximum and average power values of the selected part. This special feature allows time-optimized recording of especially critical parts of the power characteristic and makes it very easy to trace power ripple of the useful part.

In the production of GSM mobile phones, peak power measurement is sufficient in many cases. It allows, for example, very fast adjustment of a mobile, followed only by a compliance check of the power versus time template. CMU200 comprises power meters of different bandwidths to perform such peak power measurements.

Power versus slot

But this is by no means all this fast new tester has to offer. Another important measurement is power versus slot (FIG 3), which is of interest in particular in testing multislot mobile phones. Here CMU200 measures the average power of eight successive timeslots in realtime. It is not possible to carry out GSM-conformant power measurement and template verification in such a short time, so the tester only evaluates part of the power ramp and from this calculates the average power. The training sequence is not determined in this measurement, nor is the power versus time template checked. Experience has shown, however, that results obtained in this way are usually sufficient in GSM mobile-phone production.

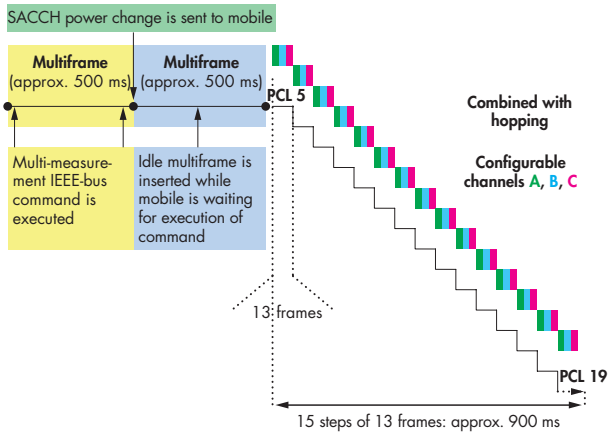
Power versus PCL

When measuring power versus PCL, CMU200 shows unbeatable performance, ie time economies. In no more than two or three seconds, it determines the power of a mobile phone at all power control levels on three different GSM channels. Using conventional methods (channel and power change followed by measurement of power versus time), this would take more than 30 seconds. Hopping in frequency, CMU200 changes power from the highest through to the lowest PCL (FIG 4) and detects the power in realtime by the same method as in measurement of power versus slot. The power measured on three different channels is output in table form for each PCL (FIG 5). In doing this, the tester automatically takes into account the PCLs supported by the mobile.

CMU200 also incorporates sophisticated selftest functions, which are described on the next two pages.

Rudolf Schindlmeier

FIG 4 Hopping in frequency, CMU200 changes power from highest through to lowest power control level (PCL). All PCLs are measured in one go



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[*] Mittermaier, Werner; Schmitz, Walter: Universal Radio Communication Tester CMU200 – On the fast lane into the mobile radio future. News from Rohde&Schwarz (1999) No. 165, pp 4–7

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FIG 3 Power versus slot measurement determines power in all eight timeslots of a frame – an interesting function for multislot mobiles

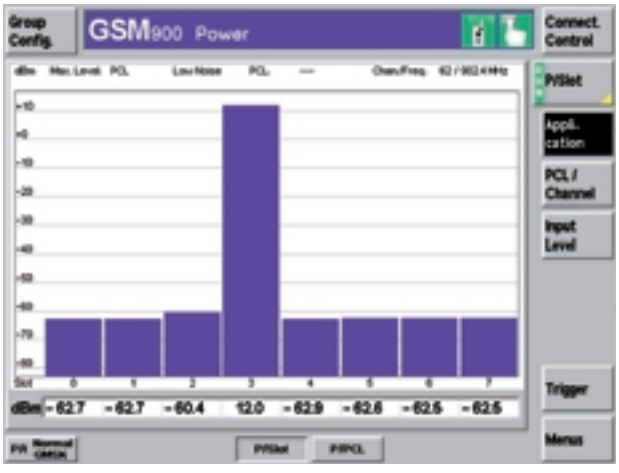

FIG 5 CMU200 measures power through all PCLs of mobile on three different GSM channels in just two or three seconds