

With an FTAP connection, the quality of a DUT receiver is determined up to a maximum data rate of 2.4 Mbit/s. In this measurement, the DUT returns, via the reverse link, statistics and counts of received packets and errored packets that provide information about the connection quality. The EV-DO option of the R&S®CMU 200 evaluates the information received in various ways, e. g. by carrying out packet error and performance measurements to determine the actual throughput as a function of the packet size.

With an RTAP connection, the R&S®CMU 200 not only determines the quality of the DUT's transmitter and modulator, but also checks the number of packet errors and performs statistical evaluations. This can be done for data rates ranging from 9.6 kbit/s up to the maximum rate of 153.6 kbit/s. The DUT can thus be tested not only at a fixed data rate but also over a data rate range.

## Wide variety of applications

The EV-DO option provides the basis for extensive end-to-end data test applications (support of simple / mobile IP). Using the default packet application, the R&S®CMU 200 can operate as a host for an incoming dial-up IP connection. If the R&S®CMU-B87 option is installed, an external server can be used as a data source for end-to-end tests.

In conjunction with a baseband fading simulator from Rohde & Schwarz, more accurate and cost-effective solutions can be implemented than by using an RF fader.

## Summary

With the CDMA2000® 1xEV-DO option, the R&S®CMU 200 hardware and software concept proves its flexibility now also for the 3GPP2 technologies. The

R&S®CMU 200 is thus optimally prepared to handle the new 1xEV-DO Rev. A evolution of the CDMA2000® family of standards.

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

### REFERENCES

- Universal Radio Communication Tester R&S®CMU 200: CDMA2000® – a new challenge for 3G mobile radio testers. News from Rohde & Schwarz (2002) No. 173, pp 4–8
- Universal Radio Communication Tester R&S®CMU 200: Transmitter and receiver measurements for CDMA2000® 1xEV-DO. News from Rohde & Schwarz (2003) No. 179, pp 10–12

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

# Blazing trails with voice codecs: GSM-8PSK-AMR and WB-AMR

**The R&S®CMU 200 universal radio communication tester – the trailblazer when it comes to voice functionality – expands its position with two new voice codecs.**

## GSM-8PSK-AMR

The adaptive multirate (AMR) voice codec has established itself as a standard, since it allows data rate and error protection to be dynamically adapted to connection quality. The R&S®CMU 200 provided the necessary measurement equipment for this right from the start [1]. Currently eight full-rate and six half-rate voice codecs are specified for GSM-AMR. Half rate is used to reduce net-

work load in the short term, for example during large-scale events such as the Soccer World Cup, when many subscribers within one cell want to make calls at the same time.

A major disadvantage of the AMR half-rate voice codec is that up to now only the data rates from 4.75 kbit/s to 7.95 kbit/s can be used with it (FIG 1); however, the best voice quality is achieved at 12.2 kbit/s. This disadvan-



7 kHz, which provides a much more natural sound than previous methods. This voice codec is therefore especially suitable for phone conferences. It can even transmit music in an acceptable quality. Like the AMR voice codec, which is also referred to as narrowband AMR (NB-AMR), WB-AMR is specified across systems. The R&S®CMU 200 supports this voice codec initially for WCDMA. As in the case of NB-AMR, several data rates – altogether nine between 6.60 kbit/s and 23.85 kbit/s – are specified with WB-AMR. WB-AMR is based on the same principle as NB-AMR; as the connection quality becomes poorer, the data rate decreases and error protection increases.

To test the WB-AMR voice codec, the R&S®CMU 200 applies the successful, well-known operating concept also used for NB-AMR. Calls can thus be set up using only a single data rate or a rate set (FIGs 4 and 5).

A big advantage for users is that no new hardware is needed for an R&S®CMU 200 that is already equipped for WCDMA. With the R&S®CMU-K46 software option, the instrument can perform all WB-AMR signaling tests. And with the R&S®CMU-B41 and R&S®CMU-B52v14 options, audio measurements on the WB-AMR voice codec are also possible. Together with the R&S®UPV audio analyzer, the acoustic characteristics of mobile phones can also be measured [3].

### Summary

It is still to be seen whether the two new voice codecs will establish themselves on the market. WB-AMR in particular provides manufacturers of UMTS telephones with an excellent means of distinguishing their systems from others by delivering better voice quality. The R&S®CMU 200 is now the first mobile radio tester to offer the necessary test applications for both voice codecs.

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

#### REFERENCES

- [1] Universal Radio Communication Tester R&S®CMU 200: Signalling and measurements on GSM-AMR mobile phones. News from Rohde & Schwarz (2003) No. 178, pp. 28–29
- [2] Universal Radio Communication Tester R&S®CMU 200: Audio measurements on mobile phones. News from Rohde & Schwarz (2001) No. 172, pp. 18–19
- [3] Audio Analyzer R&S®UPL: Measuring the acoustic characteristics of 3G mobile phones. News from Rohde & Schwarz (2002) No. 173, pp. 15–17

FIG 4 Example of the configuration of a WB-AMR WCDMA channel with several data rates.

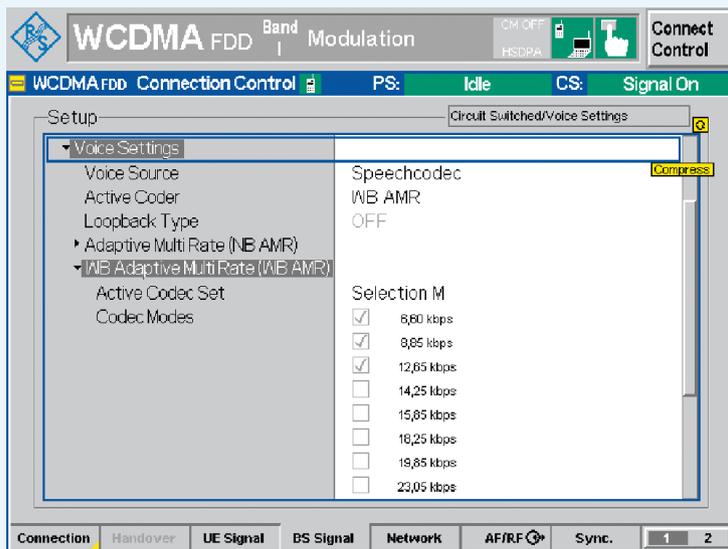


FIG 5 Example of the configuration of a WB-AMR WCDMA channel with 23.85 kbit/s.

