

R&S®CMU 200 Universal Radio Communication Tester

Enhanced measurement report for inter-RAT cell changes

With firmware version 4.20, the R&S®CMU 200 universal radio communication tester can request the mobile phone to send the reception quality of neighboring cells of other mobile radio networks now also in the GSM standard and evaluate the information returned. The reception quality of neighboring cells is a decisive criterion in the cell reselection procedure.

How good is reception in neighboring cells?

Mobile phones with multi-RAT capability must measure not only the reception quality of the current cell, but also that of the neighboring cells of other mobile radio networks (radio access technologies or RAT) during an active call. The evaluation of this measurement is necessary in order to perform an inter-RAT cell change, e. g. from GSM to UMTS.

With the new HSDPA and HSUPA transmission methods developed for the WCDMA standard, the number of GSM/WCDMA-compatible mobile phones put on the market will steadily increase. Such mobile phones must be capable, for example, of measuring the reception quality of WCDMA neighboring cells and report the results to the base station during a GSM connection.

The R&S®CMU 200 is preconfigured for all measurements required on such mobile phones. It can request the mobile phone to send the results of the measurement of up to six WCDMA FDD neighboring cells, and display and evaluate the information returned.

Detailed quality report to base station

The TS 44018 3GPP specification stipulates that the mobile phone should signal the reception quality of the current cell and the neighboring cells to the

base station using either a measurement report (MR) or an enhanced measurement report (EMR). The MR includes the measurement of the current GSM cell and the six best valid GSM neighboring cells. The EMR additionally includes three criteria for characterizing the current GSM cell:

- ◆ MEAN_BEP (mean bit error probability)
- ◆ CV_BEP (coefficients for the variation of the bit error probability)
- ◆ NBR_RCVE_BLOCKS (number of correctly decoded data blocks during a measurement period)

The base station can in addition request the measurement of several predefined WCDMA neighboring cells. The R&S®CMU 200 tests the performance of mobile phones with respect to these characteristics. FIGs 1 and 2 show the evaluation of the EMR of a GSM cell and three WCDMA FDD neighboring cells.

Definition of neighboring cells and evaluation criteria

The user can define the WCDMA FDD neighboring cells of which the receive quality is to be evaluated by selecting the RF channel and the primary scrambling code (FIG 3). Moreover, the WCDMA FDD evaluation criteria can be configured (FIG 4). The mobile phone performs the measurements on the WCDMA FDD neighboring cells during a GSM connection.

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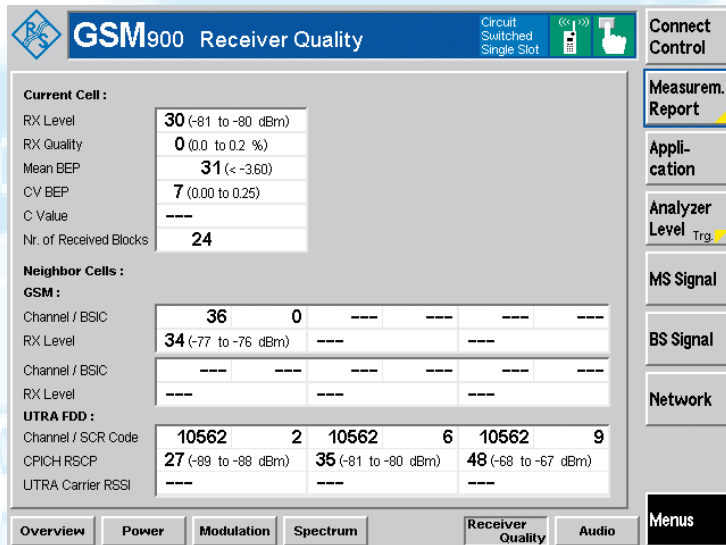


FIG 1 Enhanced measurement report of RSCP in CPICH.

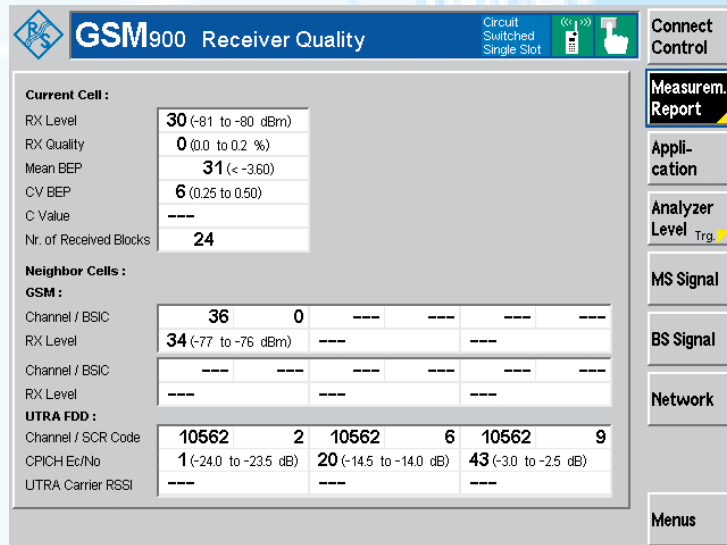


FIG 2 EMR with E_c/N_0 in CPICH.

FIG 3 Definition of RF channels and primary scrambling codes for 3G neighboring cells.

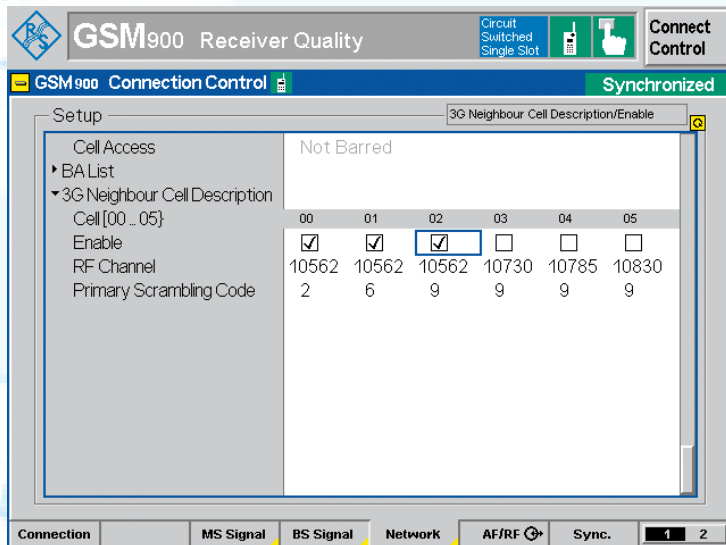
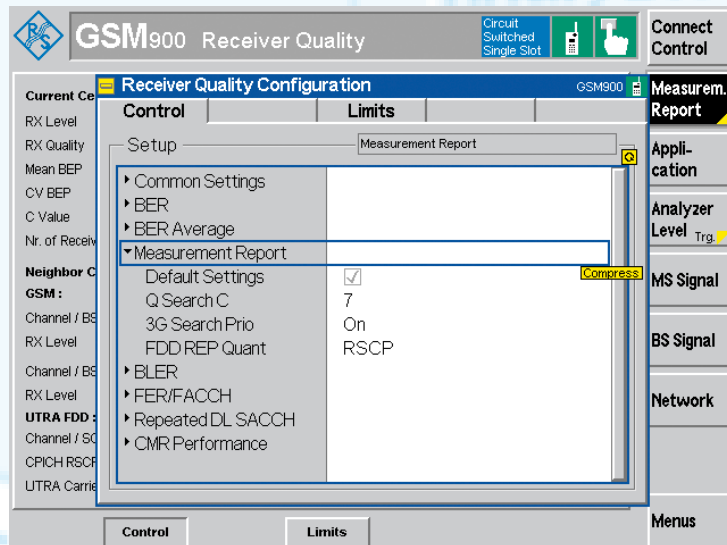


FIG 4 Configuration of WCDMA FDD evaluation criteria.



Abbreviations

CPICH	Common pilot channel
CV_BEP	Coefficient of variation of bit error probability
E_c	Chip energy
EMR	Enhanced measurement report
FDD	Frequency division duplex
HSPA	High-speed packet access
HSUPA	High speed uplink packet access
MEAN_BEP	Mean bit error probability
NBR_RCVE_BLOCKS	Number of correctly decoded blocks
MR	Measurement report
N_0	Noise power density
RAT	Radio access technology
RSCP	Received signal code power