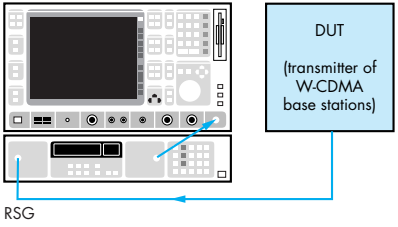
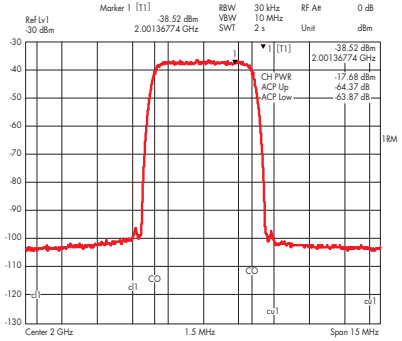
Precise measurement of adjacent-channel power on wideband CDMA signals

For measuring suppression of the power radiated in adjacent channels with W-CDMA (wideband code division multiple access) signals, instruments must have sufficient margin relative to the tolerance limits laid down in specifications. This requirement becomes even more stringent for a spectrum analyzer used to measure the ACPR (adjacent-channel power ratio) on modules and components in the transmission path of W-CDMA base stations. **Spectrum Analyzer FSE** with its wide dynamic range is the ideal choice for this application. The attainable ACPR value is limited by the inherent noise floor of the spectrum analyzer and the increase of nonlinear distortion products. For this reason the level at the mixer has to be set very carefully. Use of **RF Attenuator RSG**





is recommended for optimum level setting in 1 dB steps (mixer level for FSE). The maximum dynamic range of about 72 dB ACPR is obtained with a level of about –16 dBm applied to the FSE mixer. The optimum FSE mixer level P_{Mopt} is calculated as follows:

$$P_{Mopt} = -16\ dBm = P_{RF} - attenuation_{FSE} - attenuation_{RSG}$$

Example: power of W-CDMA signal to be measured = 19 dBm, attenuation to be set on FSE = 0 dB, attenuation to be set on RSG = 35 dB.

An RMS detector is the most suitable tool for measuring power and adjacent-channel power on W-CDMA signals. It detects the power independently of the peak-to-average power ratio and delivers stable, reproducible results. The RMS value is calculated in FSE using linear detection of the video voltage. The diagram here shows as an example the result of an adjacent-channel power measurement of up to –65 dB carried out on a W-CDMA signal with 9 dBm power level. RSG setting: 25 dB attenuation; FSE settings: 15 MHz span, –30 dBm reference level, 0 dB attenuation.

ACPR values better than –65 dB are determined by measuring first the power in the transmit channel. For measuring the relative power in the adjacent channel, FSE can be set more than 20 dB higher in sensitivity (by reducing the reference level) for the same RF attenuation. Thanks to its high load capability, FSE will not be overdriven in such a measurement.

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