The Optimum Ring Ratio of 16-APSK in LTE Uplink over Nonlinear System

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Abstract— **Single Carrier Frequency Division Multiple Access (SC-FDMA) has been selected for use in the Long Term Evolution (LTE) uplink due to its lower Peak-to-Average Power Ratio (PAPR) relative to OFDMA. The resultant lower PAPR results in fewer excursions into the amplifier's nonlinear region, where signal distortion can occur and results in degraded bit error rate (BER). The SC-FDMA scheme normally applies 16-ary Quadrature Amplitude Modulation (16-QAM), but amplitude phase shift keying (APSK) modulation has a lower PAPR than does 16-QAM, resulting in improved BER. This paper investigates the constellation ring ratio of the 16-APSK modulation scheme and its effects on BER through its effects on the PAPR. Simulation results are used to conclude that a ring ratio that ranges from 2.5 to 3.5 delivers the best results and provides BER and PAPR improvement.**

(Pt9)Keyword—**16-APSK, SC-FDMA, LTE, Nonlinear system, PAPR**

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