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应用

TD-SCDMA标准扩频扰码方案的性能研究

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摘要：

通过对CDMA2000和TD-SCDMA（TD）两个系统的比较研究，指出两个系统的扩频扰码在本质上是等效的，并给出了TD扩频扰码等效原理图。基于此等效模型，文章认为TD系统QPSK调制器发出的每路信号以3电平方式传输，在每路数据中有1/2的码片值为0，这导致有1/2的发信功率不能被充分利用，功率利用率下降；同时TD不具备CDMA2000或WCDMA正交分集发送所提供的1+1备份作用，系统的稳定性较低。为此，给出了一种改进的TD扩频扰码方案(MSS-TD)，该方案综合了CDMA2000和TD系统扩频扰码的优点，提高了信噪比、误码率等性能。理论推导和分析结果表明，不论是在多径衰落和非多径衰落信道中，采用该方案可在一定的条件下能提升系统的信噪比，降低误码率等性能，特别是当考虑到相邻小区的干扰时，效果更加明显。

关键词： 3G； TD-SCDMA； 扩频；扰码

Study on the Scheme of Spread Spectrum and Scrambling Code in TD-SCDMA

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Abstract:

Through the comparison investigation of spread spectrum and scrambling code between CDMA2000 and TD-SCDMA (TD), an equivalent scheme of spread spectrum and scrambling code for TD is presented firstly. The equivalent scheme indicates that the basic principle of the spread spectrum and scrambling code of the two schemes，CDMA2000 and TD，is identical in nature. The equivalent scheme also shows that in TD system each path signal from QPSK modulator is transmitted with 3-level, which results in loss in power efficiency. Since in the 3-level signal transmission half of the transmitted data are zero, there are one half of the transmitting power can not be used effectively. At the same time, in contrast to CDMA2000 and WCDMA, TD hasn’t the 1+1 backup function originated from orthogonal diversity transmission, which results in the decrease of the system stability. Thus, we present a modified scheme of spread spectrum and scrambling code for TD-SCDMA (MSS-TD) as well as the comparison analysis of system performance. The proposed scheme integrates the merits of the both schemes, CDMA2000 and WCDMA. The theory deduction and simulation analysis show that MSS-TD improves the system performance, such as signal-to-noise ratio (SNR), bit error ratio (BER), etc. The improvements are more remarkable when the interferences of neighborhood sectors are considered specially.

Keywords: 3G TD-SCDMA spread spectrum;scrambling code

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