Abstract

Multi-antenna (MIMO) techniques are reported to improve the performance of radio communication systems in terms of their capacity and spectral efficiency. In combination with appropriate receiver technologies they can also provide savings in the required transmit power with respect to target bit error rate. Long Term Evolution (LTE), one of the candidates for fourth generation (4G) mobile communication systems has MIMO as one of its underlying technologies and ITU defined channel models for its propagating environment. This paper undertakes a comprehensive verification of the performance of transmit diversity MIMO in the downlink sector of LTE. It uses models built using MATLAB to carry out simulations. It is deduced that generally increasing transmit diversity configuration from 2x2 to 4x4 offers SNR savings in flat fading channels though with a user equipment moving at 30km/hr, deploying 2x2 offers higher SNR saving below 7dB. Furthermore bandwidth variation has minimal effect on the BER performance of transmit MIMO except at SNR values above 9dB while the gains of higher modulation schemes come with a transmit power penalty.
- Veeravalli, V and Mantravadi, A &quot;Performance analysis for diversity reception of digital signals over correlated fading channels. &quot; Presented at IEEE 49th Vehicular Technology Conference, 1999 (Volume:2)
- ETSI LTE; Evolved Universal Terrestrial Radio Access(E-UTRA); Physical layer procedures, 3GPPTS 36.213 v10.0.0 (2010-12), Release 10, 2013
- ETSI LTE; Evolved Universal Terrestrial Radio Access(E-UTRA); Physical channels and modulation,3GPP TS 36.211 version 10.7.0 Release 10, 2013.
- Lee, K., Kim,Y, Lee, N and Kang, J &quot;Adaptive switching between space-time and
- ETSILTE; Evolved Universal Terrestrial Radio Access(E-UTRA);Base station radio transmission and reception (Release 10); 3GPPTS 36. 104 v10. 0. 0(2010-09)

**Index Terms**

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**Keywords**

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