A Novel Test Bed for the Verification of SAS in the Complicated RF Environments

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ABSTRACT

The effects of multipath and co-channel interferences will increase the bit error rate (BER) and the root mean square (RMS) error vector magnitude (EVM) of communication system. All these effects will degrade the performance of communication system. In order to solve these problems, various kinds of smart antenna systems (SAS) are proposed in base transceiver system (BTS) for advanced communication system. For traditional SAS measurement, antenna pattern measurement system in anechoic chamber is used to measure the RF performances of SAS. The advantages of SAS are not easy to be verified in such RF anechoic chamber. In this paper, a general test bed in the real environment is developed for verifying the capability of SAS with modulated signal. The strong artificial co-channel interferences are generated by signal generator and the real complicated environment is used as the sources of multipath. The protocol of GSM, WCDMA, and IEEE802.11b are included in this thesis. The SAS is installed at the one axis rotation positioner to simulate the relative angular variation of mobile subscriber. The signals from the desired mobile subscriber, multipath, and co-channel interferences are received by the SAS. The RMS EVM value will be monitored during the azimuth rotation of SAS. If the RMS EVM value is larger, that means the effects of multipath and co-channel interferences are serious. In this situation, the beam pattern of SAS will be updated to get the lower RMS EVM value. Several kinds of multi-beams SAS and traditional BTS antenna are verified by the developed test bed. The test results show that the SAS will have the lower RMS EVM than that of traditional BTS antenna.

Keywords : smart antenna system ; bit error rate ; error vector magnitude

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