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Top optimized Technologies

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Capacity increase and quality-of-service improvement in UMTS

Power control in UMTS is essential for the good operation of the mentioned technology.

Paradoxically, the power control solutions traditionally used by network and terminals manufacturers are far from being optimal as shown in field measurements performed by Top optimized Technologies (ToT) in the Telefónica Móviles España (TME) network and by NTT DoCoMo in its own network.

These solutions are not able to achieve the objective of emitting in each moment the needed power (no more, no less) that guarantees a given quality of service. This implies that sometimes less power than needed is emitted (with the consequent quality of service degradation) and some other times an excessive power is emitted an unnecessary interference is generated provoking the blocking and dropping of calls and reducing the cell capacity.

The previous undesirable situation takes place in a more dramatic way in the case of high quality services (as the real time video one), which are gaining popularity among consumers and are thus becoming an important source of revenue for operators, network manufacturers and UE vendors.

The reason for the poor performance of the existing power control solutions is due to the fact that they do not tackle the problem in a direct way because that implies the resolution of a complex mathematical one: “Optimal power control in interference limited fading wireless channels with outage-probability specifications".

Top optimized Technologies (ToT) has solved this problem and has developed the corresponding power control algorithm. ToT has a patent request [1] for this method and has presented and published it at international conferences [2] [3].

In addition, the ToT method has a direct impact in one of the WCDMA evolutions: the HSDPA (High Speed Downlink Packet Access), this is due to the fact that HSDPA makes efficient usage of power by employing the unused power by WCDMA, this means that the power optimization obtained with the ToT method has a direct impact on the available power for HSDPA. On the other hand the ToT method is directly applicable to HSDPA because this WCMDA evolution needs a channel quality estimator in order to adapt accordingly the transmission speed, and the ToT method is precisely, in essence, an estimator of the channel condition.

[1] "Method and apparatus for the Outer Loop Power Control of a Mobile Communication System", Top optimized Technologies, Patent Application, International Publication Number: WO 2004/057773A1(http://v3.espacenet.com/origdoc?DB=EPODOC&IDX=WO2004057773&F=0&QPN=WO2004057773)

[2] Álvaro López-Medrano, "Optimal SIR target determination for Outer-Loop Control in the W-CDMA System", Proceedings of the IEEE Vehicular Technology Conference (VTC) Fall 2003, 6-9 Oct. 2003, Orlando (USA).

[3] Álvaro López-Medrano, "Optimal SIR target determination for Outer-Loop Control in the W-CDMA System: Inverse SIR Cumulative Distribution Function computation throughout the Newton-Raphson Method", Proceedings of the 12th IST Summit on Mobile and Wireless Communications (Volume II), pp. 732-736, 15-18 Jun. 2003, Aveiro (Portugal).

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