TSG-RAN Working Group 1 meeting #9 *TSGR1#9(99)j14*
Dresden, Germany
November 30th- December 3rd, 1999

Agenda Item:
Source: NEC
Title: Additional simulation results of power control adjustment loop
Document for: Discussion

---

1. Introduction

In R1-99e69, adjustment loop in downlink power control during soft handover is discussed. This contribution shows additional simulation results in which limitations on power control steps are taken into account. As a reference, R1-99e69 is attached.

2. Simulation conditions

In the additional simulation, power control steps of 1 dB is used for the power control with adjustment loop, and accumulated value of power adjustment is calculated in decibel value. When the accumulated value becomes larger than 1 dB, output transmit power is increased by 1 dB and the accumulated value is decreased by 1 dB. When the accumulated value becomes smaller than –1 dB, output transmit power is decreased by 1 dB and the accumulated value is increased by 1 dB. This adjustment loop is employed in addition to inner-loop power control. Thus the steps of output transmit power are always multiples of 1 dB i.e. 0 dB, 1 dB or 2 dB. Other simulation conditions are the same as those of R1-99e69.

3. Simulation results

The simulation results with discrete power control steps (DISC) are shown in Figures 1-3. For comparison, the results with continuous power control steps presented in R1-99e69 (CONT) are also shown.

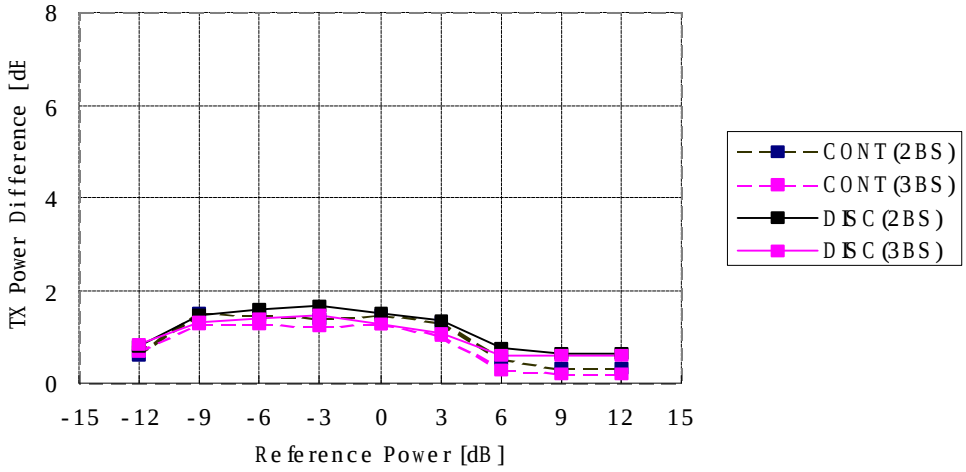

Figure 1 DL power difference.
Figure 2 Frame Error Rate.

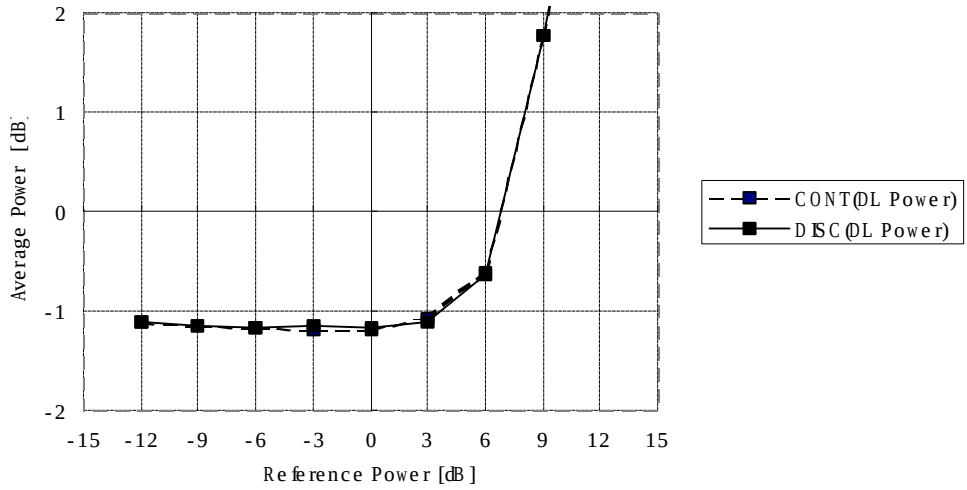

Figure 3 Average DL power.

4. Discussions

The simulation results show that the limitations on power control steps do not have significant impact on the performance of adjustment loop.

There might be a concern that average DL power difference of 1.5 dB is not small enough. As shown in R1-99e69, average DL power difference without adjustment loop is more than 4 dB for the reference power between –9 dB and 0 dB. With adjustment loop, average DL power difference is reduced to as low as around 1.5 dB. Please note that adjustment loop does not aim at making the difference equal to zero, but aims at reducing the difference so that power drifting is not a significant problem. The simulation results suggest that, with adjustment loop, power drifting is not a significant problem because the average DL power difference of 1.5 dB is comparable to average power control error.