TSG-RAN Working Group 4 (Radio) meeting #8 **_TSGW4#8(99)640_**
Sophia Antipolis, 26.10 – 29.10

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Title: UTRA FDD to FDD Inter-frequency handover as an escape mechanism
Document for: Discussion

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1. INTRODUCTION

Simulations made so far in TSG RAN WG4 for multi-operator situation show small capacity loss if ACLR is –33 dBc . Also simulations shows that the probability for catastrophic case in which one user may block entire cell in uplink is very low. However, by doing worst case MCL analysis it can be seen that this kind of catastrophic case is possible. It was requested that escape machasims for catastrophic cases should be investigated. This paper discuss one escape mechanims, inter-frequency hand over inside FDD band, and it's impact to catastrophic cases.

2. INTER-FREQUENCY HAND OVER MODEL

Inter-frequency hand over is modelled in the static simulator so that users making inter-frequency hand over will have 10 dB higher attenuation to the intereference generated by other operator base stations. This models inter-frequency handover case where the interfering signal is changed from 1st adjacent channel to 2nd adjacent channel. A user makes inter-frequency handover if it's downlink SIR after power control iteratrions is below a pre-defined threshold. Thus, simulation is first done for downlink and for the uplink ACLR2 is used for those users that made inter-frequency handover due to bad downlink. After inter-frequency handover is performed the additional attenuation is taken into account when power control iteration is made again. SIR threshold for inter-frequency handover was selected 7.2 dB (SIR criteria for bad quality was 7.9 dB).

3. SIMULATION RESULTS

Earlier simulations show that with ACLR -33 dBc capacity loss is small for both, uplink and downlink. It was also seen, that in downlink bad quality users were not clearly concentrated to certain geographical positions as it was expected. Because of these reasons, a very pessimistic ACLR value of –25 dBc was selected for simulations, so that the effect of inter-frequency handover could be clearly seen due increased probability.

System was simulated with two operators with the worst case layout. In Figure 1., geographical positions of bad quality users in downlink direction is shown. As can be seen, with -25 dBc ACLR, users that call quality is poor due to adjacent channel interference are concentrated to nearhood of another operator base stations. Outage with ACLR –25 dBc was 5 % for the selected loading. In Figure 2, corresponding plot is made when inter-frequency handover is modeled. As can be seen, dead-zones are clerarly vanished. In addition, capacity outage is now only 0.1 %. About 2 % of all users do inter-frequency handover.

In uplink loading criteria was such that the number of bad quality users is close to zero. That's why corresponding plots of geographcical positions of bad quality uswers cannot be done for uplink. Instead, noise rise is studied when inter-frequency handover is on or off. For the selected loading noise rise is 29.3 dB for ACLR – 25 dBc if inter-frequency handover was not used. If inter-frequency handover was used, noise rise is only 10.6 dB.

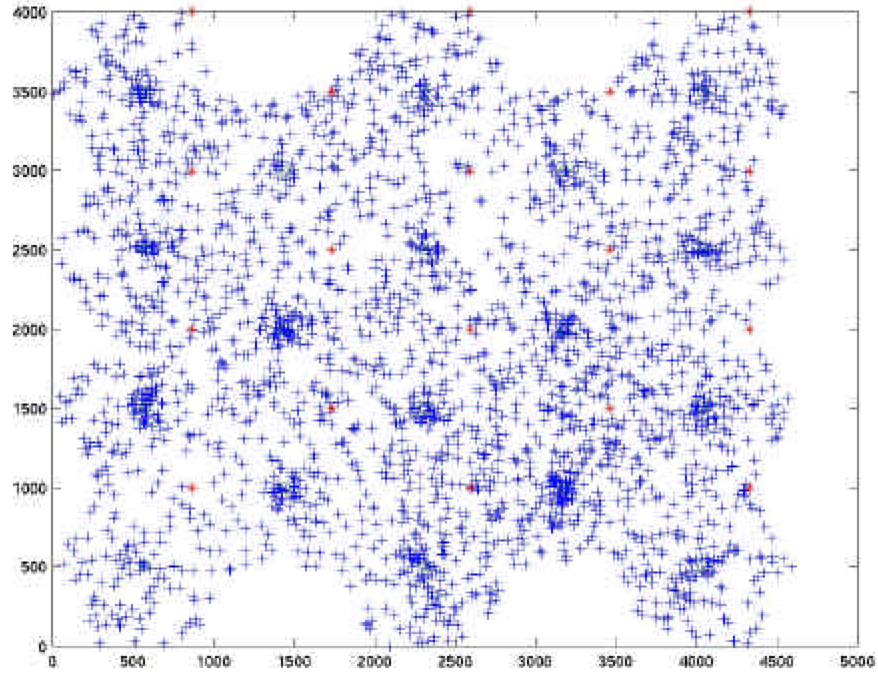

Figure 1. Geographical positions of bad quality calls in downlink when inter frequency handover is not used and ACLR is –25 dBc.

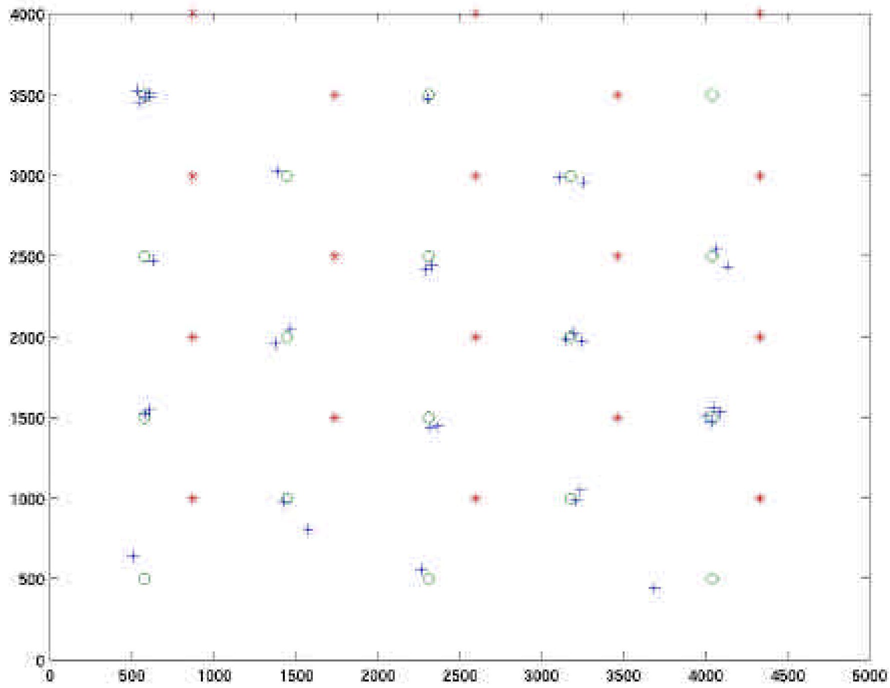

Figure 2. Geographical positions of bad quality calls in downlink when inter frequency handover is used and ACLR is –25 dBc.

4. CONCLUSIONS

A model for inter-frequency handover was shown and investigated. Simulations were done with pessimisitic ACLR values to show effect of inter-frequency handover. According simulations, outage due to adjacent channel interference becomes small. On downlink outage degrades from 5 % to 0.1 % with –25 dBc ACLR, and in uplink noise rise degrades from 29.3 dB to 10.6 dB. In downlink dead-zones due to adjacent channel interference vanishes. It should be noted also that the parameters used in simulations are not according current requirements, and hence can be concluded this phenomenna to be even improved with real specified values. These simulations show inter-frequency handover a robust mechanims against catastrophic cases due to adjacent channel interference.