Agenda Item: 16.1

Source: Motorola

Title: DL Tx power control information over Iub and Iur

Discussion for: Decision

1 Introduction

This contribution proposes clarification of the DL Power Control Information sent over the Iub and Iur from the SRNC to Nodes B.

2 Scope

At call setup or during the call, the SRNC shall communicate to all Nodes B in the active set the Tx power to be transmitted towards a particular UE. It was discussed during the last WG3 meeting (#7) whether the fields included in the NBAP and RNSAP messages giving the DL Tx power should be absolute values or relative values. We will try to clarify why these values should be relative values.

3 Discussion

The DL DCH power depends on the cell size and on the type of connection: voice, streaming, Non Real Time traffic, etc. The cell size is determined by the power setting of the Common Pilot Channel, the CPICH. Therefore, all the DCH powers will be referenced and proportional to the power of the CPICH.
Neighbor cells may have different power settings of the CPICH, depending on the load expected in the cell. Consequently, when a UE is in Soft Handover with two or multiple cells of different CPICH settings, the powers transmitted by each cell will be different.

Only CRNC has knowledge of the CPICH power settings for all cells it controls.

There are two cases where the RNC is communicating DL power control information to the Node B:
1. The initial DL transmission power value at call set up – field included in the "*Radio Link Setup Request*" message.
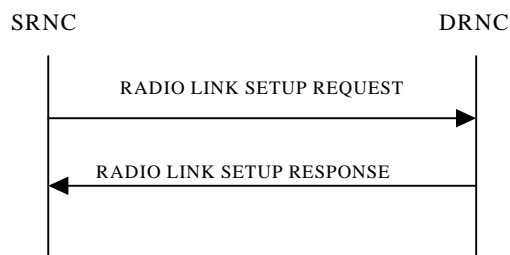
2. The DL reference power value during the call – field included in the "*DL Power Control Request*" message.

3.1 Case of the Radio Link Set up message

In the case the SRNC and CRNC are the same, as the CRNC has knowledge of the CPICH power the call is originated on, either relative or absolute power levels (for Initial, Minimum and Maximum) can be transmitted in the "*Radio Link Setup Request*" message.

In the case the SRNC and the CRNC are not the same, for example when a call originates in Soft Handover with one or more radio legs in a DRNC, relative power levels must be sent over the RNSAP.

3.2 Case of the DL Power Control Request message

In case all cells in the active set are all under the same SRNC:

- the DL reference power could be an absolute value, which could be different for all the cells in the active set.
- the DL reference power can be a relative value; in this case it is a single value sent to all Nodes B in the active set. The actual translation between relative and absolute value will be done in the Node B.

In case one or more radio cells in the active set belong to the DRNC, the SRNC has no knowledge of the CPICH power settings of the cells in the DRNC. Therefore, the calculation of the absolute value is not possible at the SRNC. Only a relative value (equal for all cells in the active set) can be sent by the SRNC in this case over the Iub (NBAP message) and over the Iur (RNSAP message). Upon reception of this value, the Node B will calculate an absolute power for all cells in the active set.

4 Conclusion

In order to ensure that the DL Power Control procedure (introduced to avoid power drifting) works seamlessly over one or several RNCs, we propose that the DL reference power field transmitted in the "DL Power Control Request" message over the Iub (NBAP) and Iur (RNSAP) is a relative power. Each Node B will be responsible to translate this relative power into an absolute power to be transmitted towards a UE.

This also simplifies the CRNC's job by not having to convert relative values into an absolute value.

For simplicity and consistency reasons we also recommend that the Initial DL Transmission power, Maximum DL power and Minimum DL power fields sent at call set up in the "Radio Link Setup" message over the Iub (NBAP) and Iur (RNSAP) are relative powers.

5 Proposal

The following changes to TS 25.433 [1] are proposed:

1. Replace the Editor's note on pages 30 and 32 relative to the Power Control Information with the following text:
   "The power control information provided is a relative power, proportional to the CPICH power settings."

2. Add the following explanations to section 8.2.5 on page 37:
   "The DL reference power is a relative power, proportional to the CPICH power settings. A single value will be sent towards all Nodes B in the active set which in return will calculate an absolute value to be transmitted from each cell towards the UE."

The following changes to TS 25.423 [2] are proposed:

1. Add the following explanation to section 8.2.13 on page 26:
   "The DL reference power is a relative power, proportional to the CPICH power settings. A single value will be sent towards all Nodes B in the active set which in return will calculate an absolute value to be transmitted from each cell towards the UE."

6 References

[1] 3GPP TS 25.433 – NBAP Specification V 1.3.2
[2] 3GPP TS 25.423 – RNSAP Signaling V 1.4.1