TSG-RAN Working Group 3 (Meeting#6) **TSGR3#6(99) 861**
Sophia Antipolis, FRANCE, 23rd – 27th August 1999

Agenda Item: 16.3 and 16.4

Source: Motorola

Title: Cell Reconfiguration

Document for: Decision

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1 Introduction

This paper introduces the Cell Reconfiguration procedure to the Iub interface. The Cell Reconfiguration procedure is proposed to allow the parameters of a cell already configured in the Node B to be modified without disrupting traffic and with reduced signalling. Currently, a disruption of traffic is inevitable to modify a cell parameter as the CRNC must first delete the cell using the Cell Delete procedure and then reconfigure the cell with the modified parameter(s) using the Cell Setup procedure.

2 Discussion

2.1 Cell Configuration

This procedure provides the means for the RNC to configure the cell related parameters of the node B and also the means for the node B to transfer the values of these and other parameters back to the RNC. Examples are: RF parameters, system information parameters and, channel configuration data. The Cell Reconfiguration procedure allows multiple parameters of the cell configuration to be updated simultaneously to reduce the signalling on the Iub. ~~The overall Cell Configuration Management procedure should support a set of individual procedures which allow specific areas of the cell configuration to be updated independently. This will reduce the signalling on the Iub in the case where individual parameters need to be updated.~~

The following procedures should form part of the overall Cell Configuration Management procedure (*the inclusion of further procedures is FFS*).

The Procedures for cell configuration:

- Cell Setup
- Cell Delete
- Cell Reconfiguration

~~*[Editor's note] It is F.F.S. whether Cell Reconfiguration procedures is required or not.*~~

2.2 Cell Reconfiguration

This NBAP common procedure is used to reconfigure the parameters of one cell in a Node B. This procedure is initiated by the Controlling RNC.

The CRNC initiates a modification of a cell in Node B, which updates the values for a set of parameters of an existing cell context in Node B. The result is communicated back to the CRNC.

For the procedure to be executed successfully the following is needed:

- The cell has already been successfully configured in the Node B.
- A Node B control port is available for communication between the RNC and the Node B, for the procedure to be executed successfully.

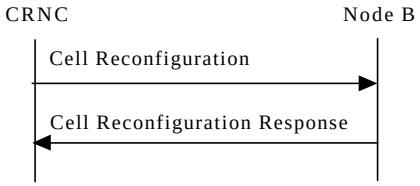

Figure 1 Cell Reconfiguration success

Cell reconfiguration is not a best effort procedure. If the request contains multiple parameters to modify, none of the parameters will be modified if a failure occurs with one of the parameters. The Cell Reconfiguration Failure message contains only one reason of failure, which is the reason of failure for the parameter failing the reconfiguration. Upon receiving a failure, the RNC also continues on with the old configuration of the cell.

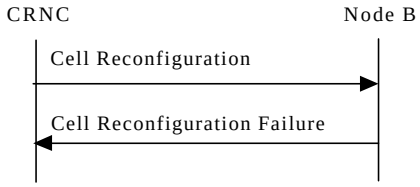

Figure 2 Cell Reconfiguration failure

The modification of certain cell parameters (e.g. DL Scrambling Code) may result in a cell or carrier outage as the cell processes the requested reconfiguration. As a result, the Node B may initiate a Block Resource procedure before the reconfiguration is performed. The Node B reconfigures the cell upon notice that the resource has been blocked and then responds to the RNC. The Node B also sends a Node B Resource Notification once the blocked resources are again ready to carry traffic. The order of the Cell Reconfiguration Response and the Node B Resource Notification is implementation dependent.

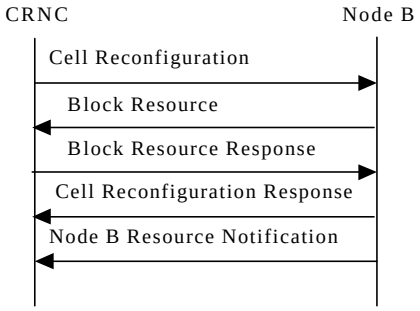

Figure 3 Cell Reconfiguration Causing Service Outage

The CELL RECONFIGURATION message contains the following mandatory information:

- Transaction ID
- Local Cell ID

The CELL RECONFIGURATION message contains the following optional information:

- SCH Gain
- T Cell
- Maximum Transmit Power (per carrier)

The CELL RECONFIGURATION message also contains the following optional information. Modification of these elements will result in a cell outage and a block resource procedure will be initiated:

- Cell ID
- DL Scrambling Code
- Secondary SCH Sequence Number

The CELL RECONFIGURATION message also contains the following optional information. Modification of these elements will result in a carrier outage and a block resource procedure will be initiated. If the carrier being modified is the only carrier for the cell, the request will also result in a cell outage:

- DL Frequency (per carrier)
- UL Frequency (per carrier)

The CELL RECONFIGURATION RESPONSE message contains the following information:

- Transaction Id (same Id as in the corresponding CELL RECONFIGURATION message)
- Transport Layer Address (per carrier)

The CELL RECONFIGURATION FAILURE message contains the following information:

- Transaction Id (same Id as in the corresponding CELL RECONFIGURATION message)
- Failed Element ID
- Failure Cause

  The failure cause may include:
  - Value out of range
  - Cell ID does not exist
  - Carrier ID does not exist

2.3 Message Functional Definition and Content

2.3.1 Cell Reconfiguration

This message is sent from the CRNC to the Node B in order to reconfigure one or more cell parameters for the specified cell in the Node B.

Information Element	Reference	Type
Message Discriminator		M
Message Type		M
Transaction ID		M
Local Cell ID		M
Carrier Information		O
Cell Carrier ID		O
DL Frequency		O
UL Frequency		O
Maximum Transmit Power		O
Cell ID		O
DL Scrambling Code		O

Secondary SCH Sequence Number		O
SCH Gain		O
T Cell		O

2.3.2 Cell Reconfiguration Response

This message is sent from Node B to CRNC as a response to the Cell Reconfiguration message when cell parameters have been successfully reconfigured.

Information Element	**Reference**	**Type**
Message Discriminator		M
Message Type		M
Transaction ID		M
Carrier Information		M
Transport Layer Address		M

2.3.3 Cell Reconfiguration Failure

This message is sent from Node B to CRNC as a response to the Cell Reconfiguration message when a parameter failed to be modified causing a failure of all parameters.

Information Element	**Reference**	**Type**
Message Discriminator		M
Message Type		M
Transaction ID		M
Failed Element ID		FFS
Failure Cause		M

2.4 Information Element Functional Definition and Contents

This section defines the message types for the information elements introduced in section 2.3 that are not already defined in [1].

2.4.1 Cell Carrier ID

The Cell Carrier ID is the identifier of a carrier associated with a cell.

2.4.2 DL Frequency

The DL Frequency is the frequency to be used in the cell in the DL direction.

2.4.3 UL Frequency

The UL Frequency is the frequency to be used in the cell in the UL direction.

2.4.4 Maximum Transmit Power

The maximum transmit power of a carrier associated with a cell.

2.4.5 Secondary SCH Sequence Number

The Secondary SCH Sequence Number is a 256-bit sequence number to be used for each of the 16 SCH timeslots.

2.4.6 SCH Gain

The gain to be applied to SCH.

2.4.7 T Cell

The T Cell specifies the time offset from the Node B superframe rollover to start of frame 1.

2.4.8 Failed Element ID

The Failed Element ID is the identifier of an information element that caused the failure of a request.

3 Proposal

The following changes to TS 25.433 are proposed –

1. Replace the text in section 8.1.5 – Cell Configuration with the updated text of Section 2.1 (Cell Configuration).
2. Include a new section 8.1.5.3 – Cell Reconfiguration with the contents of Section 2.2 (Cell Reconfiguration).
3. Include a new section 9.1.x – Cell Reconfiguration with the contents of Section 2.3.1 (Cell Reconfiguration).
4. Include a new section 9.1.x – Cell Reconfiguration Response with the contents of Section 2.3.2 (Cell Reconfiguration Response).
5. Include a new section 9.1.x – Cell Reconfiguration Failure with the contents of Section 2.3.3 (Cell Reconfiguration Failure).
6. Add sub-sections of 2.4 to section 9.2 of [1].

4 References

[1] 3GPP TS 25.433 - NBAP Specification v1.1.1