TSG-RAN Working Group 3                                                    *TSGR3#6(99) 846*
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|---|---|
| **Agenda Item:** | 13.2 and 14.2 |
| **Source:** | Alcatel |
| **Title:** | New proposal for the logical model of Node B regarding the DSCH in TS 25.430 |
| **Document for:** | Decision |

## 1    Introduction

This document proposes a new logical model of Node B, allowing the multiplexing of all data streams of UEs using the same DSCH on a single transport bearer. A DSCH data frame corresponding to this model is also proposed for inclusion in TS 25.435.

## 2    Discussion

In the current description of the logical model of Node B in TS 25.430, it is stated that there is one transport bearer per Node B communication context (i.e. UE) using the FDD DSCH data. It implies that there is one AAL2 connection per UE using the DSCH. Whereas this model permits to simplify the signalling for the DSCH in the user plane, it is however absolutely not efficient from the AAL2 multiplexing point of view. Indeed, the DSCH is used in order to multiplex several UEs on a given part of the code tree on the radio interface, which means that a given part of radio resources is shared among all users. On the Iub, it is therefore more logical to adopt the same approach, and to share a given bandwidth of the Iub link among all UEs using the same DSCH. A single transport bearer (i.e. AAL2 connection) shall be used for all UEs using the same DSCH.

It is therefore proposed to have a single DSCH data port for FDD, as it has been already agreed for the TDD mode. The UE identity will be signalled in band in the user plane for each DSCH data frame, using the Node B communication context. A proposal for the DSCH data frame structure to be included in TS 25.435 is described in this view.

## 3    Change proposal in TS 25.430.

Changes are proposed in section 6.

## 6.    Node B logical Model over Iub

### 6.1    Overview

The model described in Figure 1. shows the Node B as seen from the controlling RNC. The model includes:
- the logical resources provided by Node B to UTRAN (via its Controlling RNC)
- the dedicated channels which have been established on Node B
- the common channels that Node B provides to the RNC

The procedures for controlling the connections between radio links and Iub DCH data ports are sent from the RNC to the Node B via the Communication Control Ports.
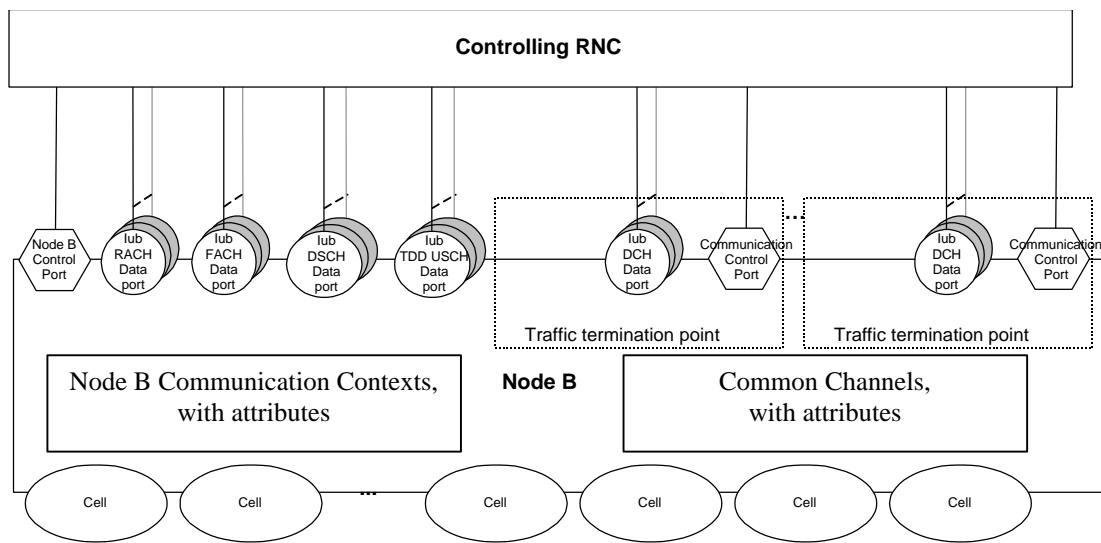
**Figure 1. Logical Model of Node B**

## 6.2 Elements of the logical model

### 6.2.1 Radio Network Logical resources

A Cell is a collection of Radio Links found at a specific location. It is defined by:
- a Cell identifier.

The semantics of a Cell include the following:

[Editor´s note:the folowing is given as an example of cell creation/deletion

- It is created and destroyed by administrative procedures e.g. when a cell site and/or RF carrier is added to, or deleted from, the RNS.

Node B may have one or more cells.

### 6.2.2 Transport network logical resources

#### 6.2.2.1 Node B Control Port

The Node B Control Port is used to exchange the signalling information for the logical O&M of Node B, the creation of Node B Communication Contexts, the configuration of the common transport channels that Node B provides in a given cell, PCH and BCH control information between the RNC and the Node B. The Node B Control Port corresponds to one signalling bearer between the controlling RNC and the Node B. Whether there a Node B can have multiple Node B Control Ports (multiple signalling bearers), e.g. for load sharing or redundancy purposes, is FFS.

#### 6.2.2.2 Communication Control Port

A Communication Control Port  corresponds to one signalling bearer between the RNC and Node B for the control of Node B Communication Contexts. Node B may have multiple Communication Control Ports (one per Traffic Termination Point). The Communication Control Port is selected at creation of the Node B Communication Context.

#### 6.2.2.3 Traffic Termination Point

Traffic Termination Point represents DCH and DSCH data streams belonging to one or more Node B Communication Contexts (UE contexts), which are controlled via one Communication Control Port. The Traffic Termination Point is thus a descriptive entity which neither is controlled over Iub nor by O&M.

### 6.2.2.4   Iub DCH Data Port

One Iub DCH Data port represents one user plane transport bearer.  One user plane transport bearer will carry only one DCH data stream except in the case of coordinated DCHs, in which case the data streams of all combined DCHs shall be multiplexed on one and the same user plane transport bearer.

### 6.2.2.5   Iub RACH Data Port

An Iub RACH Data Port represents a user plane bearer carrying one Iub RACH Data Stream between the Node B and the RNC. There is one RACH Data Port for each RACH channel of Node B.

### 6.2.2.6   Iub FACH Data Port

An Iub FACH Data Port represents a user plane bearer carrying one Iub FACH Data Stream between the Node B and the RNC. There is one CCH Data Port for each FACH channel of Node B.

### 6.2.2.7   Iub FDD DSCH Data Port

~~An Iub FDD DSCH Data Port represents a user plane bearer carrying one Iub FDD DSCH Data Stream between the Node B and the RNC. For each DSCH there is one Iub FDD DSCH Data Port per NodeB communication context with data  multiplexed on this DSCH .~~
*~~Note The concepts of the DSCH data port within the NodeB logical model is a working assumption only valid in the case where a DSCH is associated with a downlink DPCCH.~~*

### 6.2.2.8   Iub ~~TDD~~ DSCH Data Port

An Iub DSCH Data Port represents a user plane bearer carrying one Iub DSCH Data Stream between the Node B and the RNC. For each DSCH there is one~~f~~ single Iub ~~TDD~~ DSCH Data Port per Node B~~ell~~. For the FDD mode, the Node B communication context is signalled in the user plane for each DSCH data frame, in order to associate the DSCH data frame to the right downlink DPCCH, for power control purposes.

### 6.2.2.9   Iub TDD USCH Data Port

For each USCH there is a single Iub TDD USCH Data Port per cell.

## 6.2.3   Node B Communication Contexts for Dedicated Channels

A Node B Communication Context corresponds to all the dedicated resources that are necessary for a user in dedicated mode and using dedicated channels as restricted to a given Node B.
There are a number of Node B Communication Contexts inside a given Node B.
The attributes to a Node B Communication Context are the following (not exhaustive):

- The list of Cells where dedicated physical resources are used
- The list of DCH which are mapped on the dedicated physical resources for that Node B Communication Context
- The complete DCH characteristics for each DCH, identified by its DCH-identifier [4].
- The  list of Iub DCH Data Ports
- For each Iub DCH Data Port, the corresponding DCH  and cells which are carried on this data port
- When the UE is using a DSCH in this Node B, the identity of the DSCH Common Channel Context.
- Physical layer parameters (outer loop power control, etc)

## 6.2.4   Common Channels

A Common Channel corresponds to a radio Common Channel as configured by the Node B.
 The BCCH and the PCCH are carried directly on the Node B control port using NBAP procedures. These Common Channels will not be mapped to individual data ports.
 The RACH has a associated Iub RACH Data Port and the FACH has an associated Iub FACH Data Port.
~~Each UE multiplexed on each DSCH has an associated Iub DSCH Data Port.~~
 The attributes of a Common channel are (not exhaustive)

- Type (RACH, FACH, DSCH, USCH)
- Cell (only one)

- Associated Iub RACH Data Port for a RACH, Iub FACH Data Port for a FACH, Associated Iub DSCH data port for a DSCH.
- ~~List of associated Iub DSCH Data ports for the DSCH.~~
- List of Node B Communication contexts identity
- Physical parameters

## 4	Change proposal in TS 25.435

Changes are proposed in section 5.1.3 of TS 25.435, in order to propose a data frame structure for the DSCH.

### 5.1.3	Downlink Shared Channels

DSCH Data Frame includes the Cell SFN in which the payload shall be sent. If the payload is to be sent in several Cell SFNs the first Cell SFN shall be indicated.

|  | Information element | Description |
|---|---|---|
| Header | Frame Type | Data Frame |
|  | $FN_{CELL}$ | Indicates the Cell Frame Number on which this DL DSCH TBSs need to be transmitted |
|  | DSCH Transport Format Indicator | TFI to denote the format of the Transport Block set carrying the DSCH payload, and the channelisation code to be used for the DSCH |
|  | Node B Communication Context | Indicates the DPCCH which is associated to this DSCH data frame for power control purposes |
| Payload | DSCH Transport Block Set | The TBS includes the DSCH payload data to be transmitted by the physical layer over the air-interface. |
| Tail | Data frame checksum. | Checksum of the header and payload |

## 5	Conclusion

It is proposed to include changes proposed in section 3 of this document into TS 25.430 and changes proposed in section 4 of this document into TS 25.435.

## 6	References

[1]	TS 25.430 version 0.1.4, July 1999

[2]	TS 25.435 version 0.3.1, July 1999