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Note: DCH Frame Protocol was not discussed in the last WG3 meeting, thus this version contains only minor editorial changes.

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Technical Specification

**3rd Generation Partnership Project (3GPP);
Technical Specification Group (TSG) RAN;**

**UTRAN Iub/Iur Interface User Plane Protocol for DCH Data
Streams**

3GPP



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1 Intellectual Property Rights

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Note: The content has to be reviewed according to the 3GPP IPR rules.

2 Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project, Technical Specification Group <TSG RAN_{name}>.

The contents of this TS may be subject to continuing work within the 3GPP and may change following formal TSG approval. Should the TSG modify the contents of this TS, it will be re-released with an identifying change of release date and an increase in version number as follows:

Version m.t.e

where:

- m indicates [major version number]
- x the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- y the third digit is incremented when editorial only changes have been incorporated into the specification.

3 Scope

This document shall provide a description of the UTRAN Iur and Iub interfaces user plane protocols for Dedicated Transport Channel data streams as agreed within the TSG-RAN working group 3.

~~The present document ...~~

4 References

~~The following documents contain provisions which, through reference in this text, constitute provisions of the present document.~~

- ~~—References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.~~
- ~~—For a specific reference, subsequent revisions do not apply.~~
- ~~—For a non-specific reference, the latest version applies.~~
- ~~—A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.~~

[1]: [TS UMTS S25.301](#), *Radio Interface Protocol Architecture*

5 Definitions, symbols and abbreviations

5.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

5.2 Symbols

For the purposes of the present document, the following symbols apply:

5.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

<u>CFN</u>	<u>Connection Frame Number</u>
<u>DCH</u>	<u>Dedicated Transport Channel</u>
<u>DL</u>	<u>Downlink</u>
<u>FP</u>	<u>Frame Protocol</u>
<u>PC</u>	<u>Power Control</u>
<u>TB</u>	<u>Transport Block</u>
<u>TBS</u>	<u>Transport Block Set</u>
<u>TFI</u>	<u>Transport Format Indicator</u>
<u>UL</u>	<u>Uplink</u>

6 General aspects

The specification of I_{ub} DCH data streams is also valid for I_{ur} DCH data streams.

The SRNC is responsible for creating communications inside the SRNS. The SRNC provides to the Node B the complete configuration of the Transport channels to be provided by the Node B for a given communication. The parameters of a Transport channel are described in [1]. These Transport channels are multiplexed on the downlink by the Node B on radio physical channels, and de-multiplexed on the uplink from radio physical channels to Transport channels.

Every Transport channel related to one UE context that is communicated over a set of cells that are macro-diversity combined within Node B, is carried on one AAL2 connection. This means that there are as many AAL2 connections as Transport channels and User ports for that communication.

It is FFS whether unidirectional or bi-directional AAL2 connections are used.

6.1 DCH FP services

Editor's note: this chapter describes the services that FP provides, such as the transfer of data, synchronisation information and quality indication for PC and MDC, timing adjustment, etc.

6.2 Services expected from data transport

Editor's note: this chapter describes the services that are expected from the lower layer. Requirements for frame error rate, bit error rate, delay and delay variation are considered.

7 Frame structure and coding

The parameters to be included in the Iub frames to be transported between Node B and Serving RNC (i.e., they apply for Iur and Iub data stream) are:

1. **User data** - a block of user data.
2. **Connection ID** - used by soft combining function to identify multiple paths of the same call.
3. **Quality Indication** - used by soft combining function.
4. **Length Indicator** - used to allow different frame sizes and different user rates.
5. **CRC** - error check for the frame.
6. **Rx power** - indication of received power level in uplink only.
7. **Frame Type** - e.g. signalling or data.
8. **CFN** – the connection frame number is the indicator as to which radio frame the data should be transmitted / was received. It is also needed for synchronisation purposes in DL channel frames.
9. **Timing adjustment command** – needed for synchronisation purposes in UL channel frames.

[Note: This list of parameters is the starting assumption and not necessarily comprehensive.]

Two different message types are to be used for both the downlink and uplink DCH Transport Channel Frame protocol in the Iur and Iub interfaces.

- DCH data frame
- DCH control frame

The DCH control frame shall be used for inband signalling between SRNC and Node B in cases where the normal DCH data frame can not be utilised. The DCH control frame shall not carry any data targeted to or received from the air interface. Typical use for the DCH control frame would be synchronisation of the user plane and transport of UL outer loop power control commands.

7.1 Data frame structure

7.1.1 Uplink data frame

Every Transmission Time Period (typically one radio frame, i.e. 10ms), for each Transport channel, the Node B sends to the SRNC the following information:

- a Transport Block Set (user data) received from the radio interface
- the Transport Format Indicator (TFI) associated to the Transport Block Set
- A Quality indicator:
Bad / Good frame

Other Quality indications are FFS.

When the frame is incorrectly received, it is not sent on the Iur interface.

Information element	Description
message type	Uplink DCH data frame
Connection ID	Used by soft combining function to identify multiple paths of the same call
Transport Format Indicator	The TFI identifies the format of the transport channel as received from the radio interface
CFN	Indicator to which radio frame the data was received.
Transport Bloc Set	This contains the data received from the radio interface
Quality indicator	This may update the target outer loop power control
Timing adjustment command	Needed for synchronisation purposes

7.1.2 Downlink data frame

Every Transmission Time Period (typically one radio frame, i.e. 10ms), for each Transport channel, the SRNC provides to the Node B the following information:

- a Transport Block Set (user data) to be sent on the radio interface
- the Transport Format Indicator (TFI) to use

The CID of the AAL2 frame identifies the Iub data stream where a Transport channel frame is transported.

Information element	Description
message type	Downlink DCH data frame
Connection ID	Used by soft combining function to identify multiple paths of the same call
Transport Format Indicator	The TFI identifies the format of the transport channel to be used on the radio interface
CFN	Indicator to which radio frame the data shall be transmitted.
Transport Bloc Set	This contains the data to be sent on the radio interface
Outer Loop Power Control (optional)	This may update the target outer loop power control

7.2 Control frame structure

7.2.1 Uplink control frame

7.2.2 Downlink control frame

7.3 Coding

7.3.1 Coding of data frames

7.3.2 Coding of control frames

8 DCH FP procedures

8.1 Data transfer

Editor's Note: this chapter describes when and how often a DCH data frame is transferred. Handling of DTX and loss of synchronisation in Node B is described as well.

8.2 Timing adjustment

To synchronise and keep the synchronisation of a DCH data stream SRNC includes a Connection Frame Number (CFN) to all DL DCH Transport channel frames. If there is no data to be transmitted to the UE via the DCH transport bearer then a special DL DCH Control frames can be sent instead of DL DCH data frames.

Upon reception of a DL DCH Transport channel frame, node B should evaluate the time difference between the optimal arrival time for the DL DCH Transport Channel frame to be transmitted in the indicated CFN and the actual measured arrival time of the DL DCH Transport channel frame.

According to the measured time difference, node B should set a proper value for the Timing adjustment command in the UL DCH transport channel frame. If there is no UL data to be transmitted to the SRNC via the DCH transport bearer then a special UL DCH Control frame can be sent.

(The initial value for the parameters is FFS)

8.3 Outer loop PC information transfer

Editor's Note: this chapter describes when and how often an the outer loop power control information is transferred in a DCH frame, considering also the case when multiple DCH are associated to one UE.

9 Appendices

9.1 Annex A Document Stability Assessment

The whole document is incomplete and the current content of chapter 7 is not considered stable.

10 History

Document history		
0.0.1	15.02.1999	Document Structure (proposal)
0.0.2	February 1999	Introduction of text from 'Merged Description of the Iub interface'
0.0.3	29.03.99	Initial list in chapter 7 reintroduced. Connection ID added in the UL and DL data frame structure.
0.1.0	15.04.1999	Approved by WG3
<u>0.1.1</u>	<u>16.05.1999</u>	<u>List of abbreviations and document stability assessment chapter added.</u>
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