Agenda Item: 16.3 & 16.4

Source: Motorola

Title: Common transport channel management

Document for: Decision

1   Introduction

This paper presents a combined procedure to manage the downlink and the uplink common transport channels. The standards currently define separate configuration procedures for the management of the downlink and the uplink common transport channels. The configuration procedures for downlink and uplink are very similar and it is beneficial to combine the procedures to achieve ease of configuration and reduction in number of messages on NBAP signalling layer. Additionally, necessary parameters to the common transport channel procedure messages are added.

2   Discussion

The common transport channel management functionality is currently divided into two sections, one for the downlink transport channel management and the other uplink transport channel management. The categories of common transport channel management are channel setup, channel reconfigure and channel delete. Also, the DSCH has been introduced into the list of common transport channels. The paper is organised in the following way. The downlink channel management procedures have been retained in section 2.1 to represent the combined channel management procedures. The uplink channel management procedures in section 2.2 have been deleted. The message definitions for the combined common transport channel management are given in section 2.3. The message definitions for uplink common transport channel in section 2.4 have been deleted..

2.1   ~~Downlink~~ Common Transport Channel Configuration Procedures

The procedures for ~~Downlink~~ Common Transport Channel Configuration:

* ~~Downlink~~ Common Transport Channel Setup (e.g. FACH, PCCH, BCCH, DSCH, <u>and RACH</u>)

* ~~Downlink~~ Common Transport Channel Reconfigure

* ~~Downlink~~ Common Transport Channel Delete
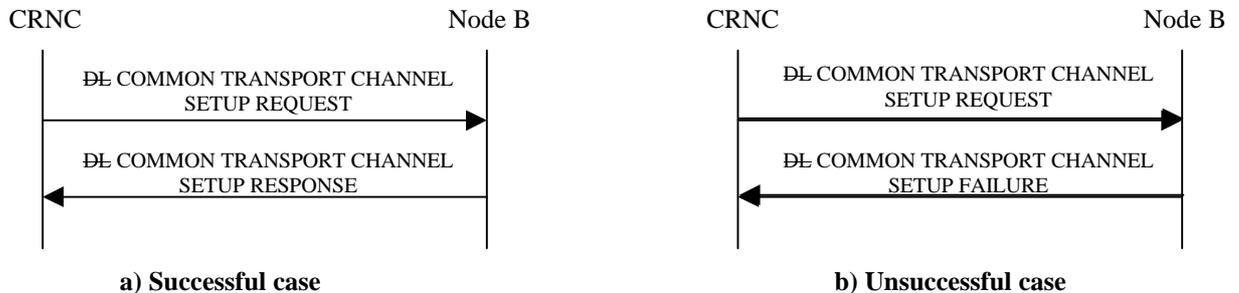
2.1.1   ~~Downlink~~ Common Transport Channel Setup

The RNC initiates a definition of ~~downlink~~ common transport channel in a cell within Node B, which defines the ordered channels and takes them into service. The result is communicated back to the RNC.

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

* The cell context, to which the common transport channels are to be defined, has to be defined within Node B, i.e. the cell setup procedure has to be successfully executed for the cell in question.

* Node B equipment has previously been defined and configured to support the requested channels on the Implementation Specific O&M interface.

- A Node B control port is available for communication between the RNC and the Node B, for the procedure to be executed successfully.

This NBAP common procedure is used by the CRNC to request Node B to support the following logical resources: FACH, PCH, BCH, <u>DSCH, and RACH.</u> This procedure is initiated by CRNC.

CRNC   Node B   CRNC   Node B

~~DL~~ COMMON TRANSPORT CHANNEL   ~~DL~~ COMMON TRANSPORT CHANNEL
SETUP REQUEST   SETUP REQUEST

~~DL~~ COMMON TRANSPORT CHANNEL   ~~DL~~ COMMON TRANSPORT CHANNEL
SETUP RESPONSE   SETUP FAILURE

a) Successful case   **b) Unsuccessful case**

The ~~DOWNLINK~~ COMMON TRANSPORT CHANNEL SETUP REQUEST message contains the following mandatory information:

- Transaction ID (assumed unique in the RNC)

- Cell Identity

- Cell Carrier Id

- ~~Downlink~~ Scrambling Code Id – FFS

- ~~Downlink~~ Common Transport Control Channel Id

- ~~Downlink~~ Common Transport Control Channel type

- ~~Downlink~~ Common Transport Control Channel data

The ~~DOWNLINK~~ COMMON TRANSPORT CHANNEL SETUP RESPONSE message contains the following mandatory information:

- Transaction ID

- ~~Downlink~~ Common Transport Control Channel data

The ~~DOWNLINK~~ COMMON TRANSPORT CHANNEL SETUP FAILURE message contains the following mandatory information:

- Transaction ID

- Failure Cause

2.1.2 ~~Downlink~~ Common Transport Channel Reconfigure

The RNC initiates a change of the configuration of ~~downlink~~ common transport channels in Node B, which reconfigures the channels. The result is communicated back to the RNC.

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

- The ~~downlink~~ common transport channel(s) exist in the cell within the Node B

- Node B equipment has previously been defined and configured to support the changed channels on the Implementation Specific O&M interface

- A Node B control port is available for communication between the RNC and the Node B, for the procedure to be executed successfully

- The RNC shall use the following procedure to re-configure a ~~downlink~~ common transport channel
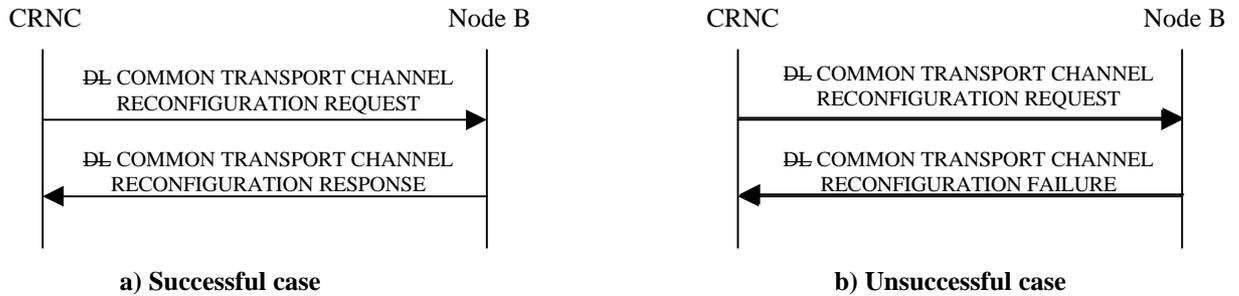
CRNC	Node B	CRNC	Node B
~~DL~~ COMMON TRANSPORT CHANNEL RECONFIGURATION REQUEST →		~~DL~~ COMMON TRANSPORT CHANNEL RECONFIGURATION REQUEST →	
← ~~DL~~ COMMON TRANSPORT CHANNEL RECONFIGURATION RESPONSE		← ~~DL~~ COMMON TRANSPORT CHANNEL RECONFIGURATION FAILURE	
a) Successful case		**b) Unsuccessful case**	

The ~~DL~~ COMMON TRANSPORT CHANNEL RECONFIGURATION REQUEST message contains the following information:
- Cell Id (allows the Node B to reference the channel against the correct cell where a Node B supports multiple cells)
- Common channel type (e.g. FACH, BCCH, PCCH) and identifier. ~~(for the case where more than one common transport channel of the same type exists in a cell)~~
- New ~~DL~~ radio resource (DL/UL channelisation code, frequency)
- Transaction Id (identifies the procedure)

The ~~DL~~ COMMON TRANSPORT CHANNEL RECONFIGURATION RESPONSE contains the following information:
- Transaction Id (identifies the procedure)

The ~~DL~~ COMMON TRANSPORT CHANNEL RECONFIGURATION FAILURE contains the following information:
- Transaction Id (identifies the procedure)
- Cause (cause value for the failure)

2.1.3 ~~Downlink~~ Common Transport Channel Delete

The RNC initiates the deletion of ~~downlink~~ common transport channel(s) in a cell within Node B, which deletes the requested channels. The result is communicated back to the RNC.

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

- The ~~downlink~~ common transport channel(s) exist in the cell within the Node B.

- A Node B control port is available for communication between the RNC and the Node B.

This NBAP common procedure is used by the Controlling RNC to request Node B to delete ~~Downlink~~ Common Transport Channels. This procedure is initiated by CRNC.

```
           CRNC                              Node B

              │   DL COMMON TRANSPORT CHANNEL   │
              │        DELETION REQUEST         │
              │────────────────────────────────▶│
              │                                 │
              │   DL COMMON TRANSPORT CHANNEL   │
              │        DELETION RESPONSE        │
              │◀────────────────────────────────│
              │                                 │
```
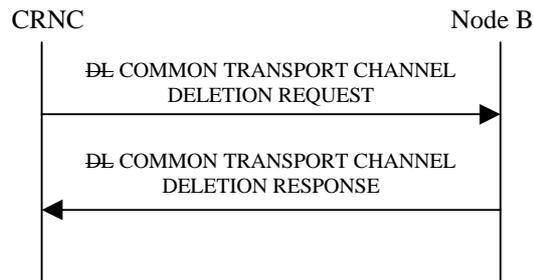
The ~~DOWNLINK~~ COMMON TRANSPORT CHANNEL DELETION message contains the following mandatory information:

- Transaction ID

- ~~Downlink~~ Common Transport Control Channel Id

The ~~DOWNLINK~~ COMMON TRANSPORT CHANNEL DELETION RESPONSE message contains the following mandatory information:

- Transaction ID

2.2 ~~Uplink Common Transport Channel Configuration Procedures~~

~~The Procedures for Uplink Common Transport Channel Configuration:~~

- ~~Uplink Common Transport Channel Setup (e.g. RACH)~~

- ~~Uplink Common Transport Channel Reconfigure~~
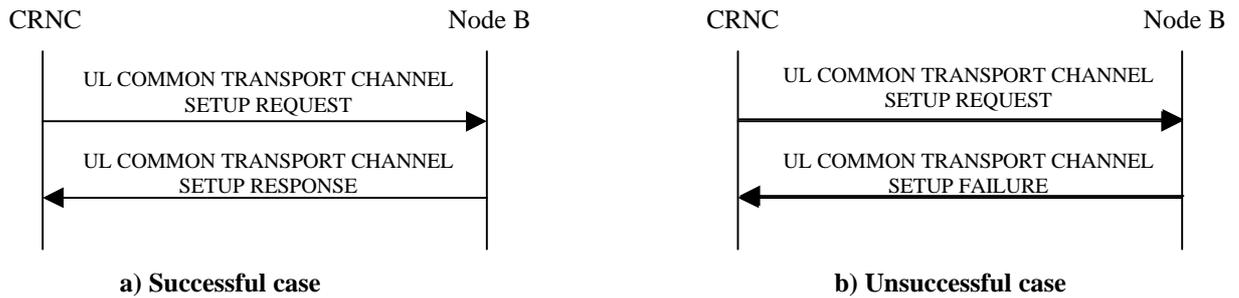
- ~~Uplink Common Transport Channel Delete~~

2.2.1 ~~Uplink Common Transport Channel Setup~~

~~The RNC initiates a definition of uplink common transport channels in a cell within Node B, which defines the ordered channels and takes them into service. The result is communicated back to the RNC.~~

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

- ~~The cell to which the common transport channels are to be defined in has been defined within Node B.~~

- ~~Node B equipment has previously been defined and configured to support the requested channels on the Implementation Specific O&M interface.~~

- ~~A Node B control port is available for communication between the RNC and the Node B~~

~~This NBAP common procedure is used by the Controlling RNC to request Node B to support the logical resources RACH. This procedure is initiated by CRNC.~~

```
   CRNC                         Node B         CRNC                         Node B

        UL COMMON TRANSPORT CHANNEL                UL COMMON TRANSPORT CHANNEL
              SETUP REQUEST                              SETUP REQUEST

        UL COMMON TRANSPORT CHANNEL                UL COMMON TRANSPORT CHANNEL
              SETUP RESPONSE                             SETUP FAILURE


              a) Successful case                         b) Unsuccessful case
```

The UPLINK COMMON TRANSPORT CHANNEL SETUP REQUEST message contains the following mandatory information:

- Transaction ID

- Cell Identity

- Cell Carrier Id

- Uplink Common Transport Control Channel Id

- Uplink Common Transport Control Channel type

- Uplink Common Transport Control Channel data

The UPLINK COMMON TRANSPORT CHANNEL SETUP RESPONSE message contains the following mandatory information:

- Transaction ID

- Uplink Common Transport Control Channel data

The UPLINK COMMON TRANSPORT CHANNEL SETUP FAILURE message contains the following mandatory information:

- Transaction ID

- Failure Cause

2.2.2 Uplink Common Transport Channel Reconfigure

The RNC initiates a change of the configuration of uplink common transport channels in Node B, which reconfigures the channels. The result is communicated back to the RNC.

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

- The uplink common transport channel(s) exist in the cell within the Node B.

- Node B equipment has previously been defined and configured to support the changed channels on the Implementation Specific O&M interface.

- A Node B control port is available for communication between the RNC and the Node B

~~The RNC shall use the following procedure to re-configure an uplink common transport channel:~~
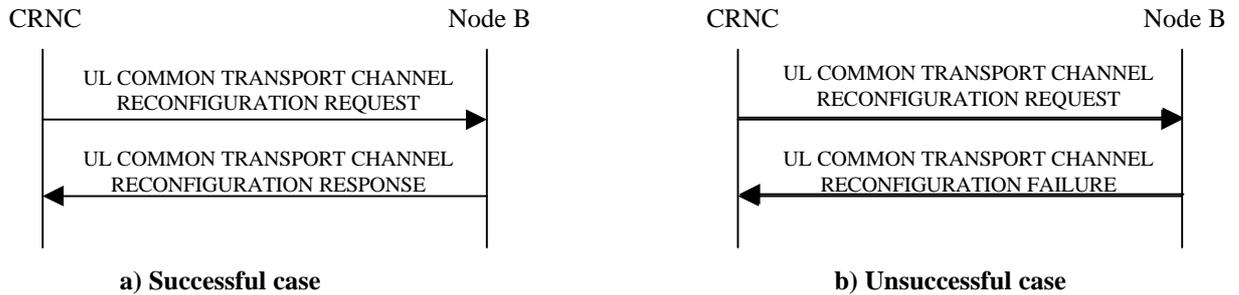
CRNC	Node B	CRNC	Node B
UL COMMON TRANSPORT CHANNEL RECONFIGURATION REQUEST →		UL COMMON TRANSPORT CHANNEL RECONFIGURATION REQUEST →	
← UL COMMON TRANSPORT CHANNEL RECONFIGURATION RESPONSE		← UL COMMON TRANSPORT CHANNEL RECONFIGURATION FAILURE	

a) Successful case   **b) Unsuccessful case**

~~The UL COMMON TRANSPORT CHANNEL RECONFIGURATION REQUEST message contains the following information:~~
- ~~Cell Id (allows the Node B to reference the channel against the correct cell where a Node B supports multiple cells)~~
- ~~Common channel type (e.g. FACH,) and identifier (for the case where more than one common transport channel of the same type exists in a cell)~~
- ~~New UL radio resource (UL channelisation code, frequency)~~
- ~~Transaction Id (identifies the procedure)~~

~~The UL COMMON TRANSPORT CHANNEL RECONFIGUREATION RESPONSE contains the following information:~~
- ~~Transaction Id (identifies the procedure)~~

~~The UL COMMON TRANSPORT CHANNEL RECONFIGURATION FAILURE contains the following information:~~
- ~~Transaction Id (identifies the procedure)~~
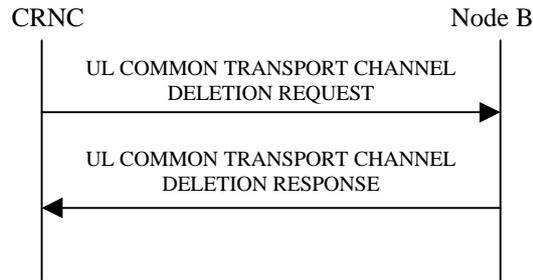- ~~Cause (cause value for the failure)~~

~~2.2.3 Uplink Common Transport Channel Delete~~

~~The RNC initiates the deletion of uplink common transport channel(s) in a cell within Node B, which deletes the requested channels. The result is communicated back to the RNC.~~

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

- ~~The uplink common transport channel(s) exist in the cell within the Node B.~~

- ~~A Node B control port is available for communication between the RNC and the Node B.~~

~~This NBAP common procedure is used by the Controlling RNC to request Node B to delete the logical resource RACH. This procedure is initiated by CRNC.~~

CRNC   Node B

```
           UL COMMON TRANSPORT CHANNEL
                 DELETION REQUEST
        |--------------------------------------->|

           UL COMMON TRANSPORT CHANNEL
                 DELETION RESPONSE
        |<---------------------------------------|
```

The UPLINK COMMON TRANSPORT CHANNEL DELETION REQUEST message contains the
following mandatory information:

- Transaction ID

- Uplink Common Transport Control Channel Id

The UPLINK COMMON TRANSPORT CHANNEL DELETION RESPONSE message contains the
following mandatory information:

- Transaction ID

2.3   Combined Message Function Definition and Content

2.3.1   DL COMMON TRANSPORT CHANNEL SETUP REQUEST

This message is sent from the RNC to the Node B to request the setup and configuration of a common
transport channel in the Node B. One downlink common transport channel at a time can be setup using this
procedure. The channel is available for use after the successful completion of this procedure.

Information Element	Reference	Type
Message Discriminator		M
Message Type		M
Transaction ID		M
Cell ID		M
Cell carrier ID		M
DL scrambling code ID –FFS		M
DL common transport channel ID		M
DL common transport channel type		M
Transmit Offset		M
FACH parameters		**O**
DL channelisation code number		M
DL channelisation code spreading factor		M
DL Transport Format Set		M
DL Transport Format Combination Set		M

ToAWS		M
ToAWE		M
FACH Power		M
BCH parameters		**O**
~~DL channelisation code number~~		~~M~~
~~DL channelisation code spreading factor~~		~~M~~
BCH power		M
FACH / PCH parameters		**~~FFS~~ O**
DL channelisation code number		M
DL channelisation code spreading factor		M
DL Transport Format Set		M
DL Transport Format Combination Set		M
ToAWS		M
ToAWE		M
FACH / PCH power		~~FFS~~ M
PICH parameters		**FFS**
DL channelisation code		M
PICH power		M
DSCH parameters		**O**
DL channelisation code number		M
DL channelisation code spreading factor		M
DL Transport Format Set		M
DL Transport Format Combination Set		M
ToAWS		M
ToAWE		M
RACH parameters		**O**
Preamble spreading code		M
Allowed preamble signatures		M
Allowed spreading factors for the message part		M
Allowed access slots		M
Preamble to preamble timing		M
AICH parameters		**FFS**
DL channelisation code		M
AICH power		M

2.3.2 ~~DL~~ COMMON TRANSPORT CHANNEL SETUP RESPONSE

This message is sent to inform the RNC about the ~~downlink~~ common transport channel that Node B has been able to define, and return any transport layer information required. Information on one channel at a time is given using this response.

Information Element	Reference	Type
Message Discriminator		M
Message Type		M
Transaction ID		M
FACH/PCH/<u>DSCH/RACH</u> parameters		**O**
Transport layer address		M
Binding ID		M

2.3.3 ~~DL~~ COMMON TRANSPORT CHANNEL SETUP FAILURE

This message is sent to inform the RNC that the attempt to configure a ~~downlink~~ common transport channel has failed.

Information Element	Reference	Type
Message Discriminator		M
Message Type		M
Transaction ID		M
Failure cause		M

2.3.4 ~~DL~~ COMMON TRANSPORT CHANNEL RECONFIGURATION REQUEST

This message is sent from the RNC to the Node B to request the reconfiguration of a ~~DL~~ common transport channel in the Node B. One ~~DL~~ common transport channel at a time can be reconfigured using this procedure.

Information Element	Reference	Type
Message Discriminator		M
Message Type		M
Transaction ID		M
Cell ID		M
Cell Carrier ID		M
DL Scrambling Code ID – FFS		M
~~DL~~ Common Transport Channel ID		M
~~DL~~ Common Transport Channel Type		M
Transmit Offset		C
FACH Parameters		**O**
DL channelisation code number		C
DL channelisation code spreading factor		C
DL Transport Format Set		C
DL Transport Format Combination Set		C
ToAWS		C
ToAWE		C
FACH Power		C
BCH Parameters		**O**
BCH Power		C
FACH / PCH Parameters		**O**
DL channelisation code number		C
DL channelisation code spreading factor		C
DL Transport Format Set		C
DL Transport Format Combination Set		C
ToAWS		C
ToAWE		C
FACH / PCH Power		C
PICH Parameters		**FFS**
DL channelisation code number		C
PICH Power		C
DSCH Parameters		**O**
DL channelisation code number		C
DL channelisation code spreading factor		C
DL Transport Format Set		C
DL Transport Format Combination Set		C
ToAWS		C
ToAWE		C
RACH Parameters		**O**
Preamble spreading code		C
Allowed preamble signatures		C
Allowed spreading factors for the message part		C
Allowed access slots		C
Preamble to preamble timing		C
AICH Parameters		**FFS**
DL channelisation code number		C
AICH power		C

2.3.5 ~~DL~~ COMMON TRANSPORT CHANNEL RECONFIGURATION RESPONSE

This message is sent from the Node B to the RNC to indicate the DL common transport channel that the Node B has been able to reconfigure.

Information Element	Reference	Type
Message Discriminator		M
Message Type		M
Transaction ID		M

2.3.6 ~~DL~~ COMMON TRANSPORT CHANNEL RECONFIGURATION FAILURE

This message is sent from the Node B to the RNC to inform the RNC that the attempt to reconfigure a DL common transport channel has failed.

Information Element	Reference	Type
Message Discriminator		M
Message Type		M
Transaction ID		M
Common Transport Channel Failure Cause		M

2.3.7 ~~DL~~ COMMON TRANSPORT CHANNEL DELETION REQUEST

This message is sent to inform the Node B about what ~~downlink~~ common transport that the RNC no longer wants to be supported by Node B.

Information Element	Reference	Type
Message Discriminator		M
Message Type		M
Transaction ID		M
~~DL~~ common transport channel ID		M

2.3.8 ~~DL~~ COMMON TRANSPORT CHANNEL DELETION RESPONSE

This message is sent to inform the RNC about what ~~downlink~~ common transport channels that Node B no longer shall support.

Information Element	Reference	Type
Message Discriminator		M
Message Type		M
Transaction ID		M

2.4 ~~UL Message Function Definition and Content~~

2.4.1 ~~UL COMMON TRANSPORT CHANNEL SETUP REQUEST~~

~~This message is sent from the RNC to the Node B to request the setup and configuration of a common transport channel in the Node B. One uplink common transport channel at a time can be setup using this procedure. The channel is available for use after the successful completion of this procedure.~~

Information Element	Reference	Type
Message Discriminator		M
Message Type		M
Transaction ID		M
Cell ID		M
Cell carrier ID		M
UL common transport channel ID		M
UL common transport channel type		M
RACH parameters		**M**
Preamble spreading code		M
Allowed preamble signatures		M
Allowed spreading factors for the message part		M
Allowed access slots		M
Preamble to preamble timing		M
AICH parameters		**FFS**
DL channelisation code		M
AICH power		M

2.4.2 UL COMMON TRANSPORT CHANNEL SETUP RESPONSE

This message is sent to inform the RNC about the uplink common transport channel that Node B has defined, and return any transport layer information required.

Information Element	Reference	Type
Message Discriminator		M
Message Type		M
Transaction ID		M
RACH parameters		**O**
Transport layer address		M
Binding ID		M

2.4.3 UL COMMON TRANSPORT CHANNEL SETUP FAILURE

This message is sent to inform the RNC that the attempt to configure uplink common transport channels has failed.

Information Element	Reference	Type
Message Discriminator		M
Message Type		M
Transaction ID		M

~~Failure cause~~		~~M~~

2.4.4 UL COMMON TRANSPORT CHANNEL DELETION REQUEST

This message is sent to inform the Node B about what uplink common transport that the RNC no longer wants to be supported by Node B.

Information Element	**Reference**	**Type**
~~Message Discriminator~~		~~M~~
~~Message Type~~		~~M~~
~~Transaction ID~~		~~M~~
~~UL common transport channel ID~~		~~M~~

2.4.5 UL COMMON TRANSPORT CHANNEL DELETION RESPONSE

~~This message is sent to inform the RNC about what uplink common transport channels that Node B no longer shall support.~~

Information Element	**Reference**	**Type**
~~Message Discriminator~~		~~M~~
~~Message Type~~		~~M~~
~~Transaction ID~~		~~M~~

3   Proposal

The following changes to TS 25.433 are proposed –

1. Replace the contents of Section 8.1.1.1 with Section 2.1

2. Replace the contents of Section 8.1.1.1.1 with Section 2.1.1

3. Replace the contents of Section 8.1.1.1.2 with Section 2.1.2

4. Replace the contents of Section 8.1.1.1.3 with Section 2.1.3

5. Delete sections 8.1.1.2, 8.1.1.2.1, 8.1.1.2.2, 8.1.1.2.3

6. Replace the contents of Section 9.1.25 with Section 2.3.1

7. Replace the contents of Section 9.1.26 with Section 2.3.2

8. Replace the contents of Section 9.1.27 with Section 2.3.3

9. Replace the contents of Section 9.1.28 with Section 2.3.7

10. Replace the contents of Section 9.1.29 with Section 2.3.8

11. Add new sections 9.1.x for Sections 2.3.4, 2.3.5, and 2.3.6

12. Delete sections 9.1.30, 9.1.31, 9.1.32, 9.1.33, 9.1.34

4   References

[1] 3GPP TS 25.433   - NBAP Specification V1.1.1