

Agenda Item: 8.4 and 8.2

Source: Nortel Networks

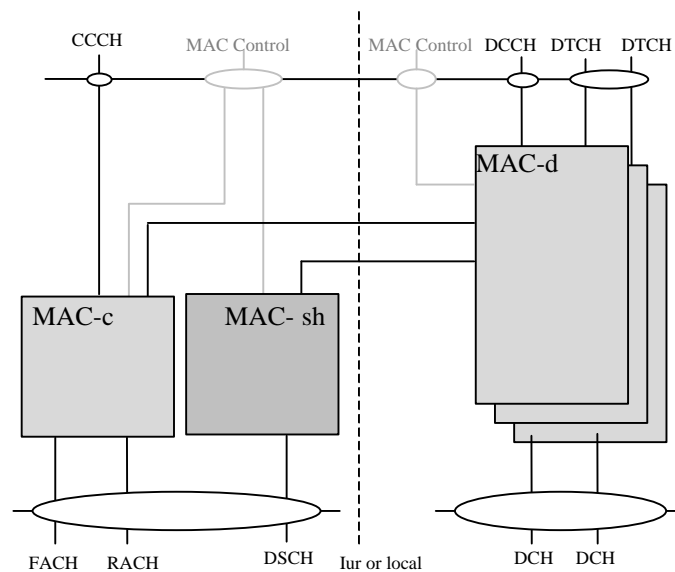
Title: CCH Procedures over Iur

Document for:

1 Introduction

This document presents a set of elementary procedures dedicated to the management of Common Channels across the Iur.

As described in [2], the MAC Architecture for Common Channels is the following :



So the User Plane part of the Iur for Common Channels is MAC-d to MAC-c communication.
The Control Plane is MAC-c resource management allocated to MAC-d.

The main functions across the Iur for Common Channels are the following :

- Common Channel Traffic Management
- MAC-d PDU transfert

It should be noted that although the detailed description of DSCH is still underway, all the procedures described in section 2 and the downlink procedures of section 3 apply also to DSCH.

2 RNSAP Procedures

2.1 Common Channel Traffic assignment

This procedure is used by the SRNS to request to the DRNS the reservation of resources necessary to ensure the requested QoS for the given Common Channel Traffic Management.

The SRNC sends the RNSAP message **CCHT Assignment Request**. This message contains as parameters :

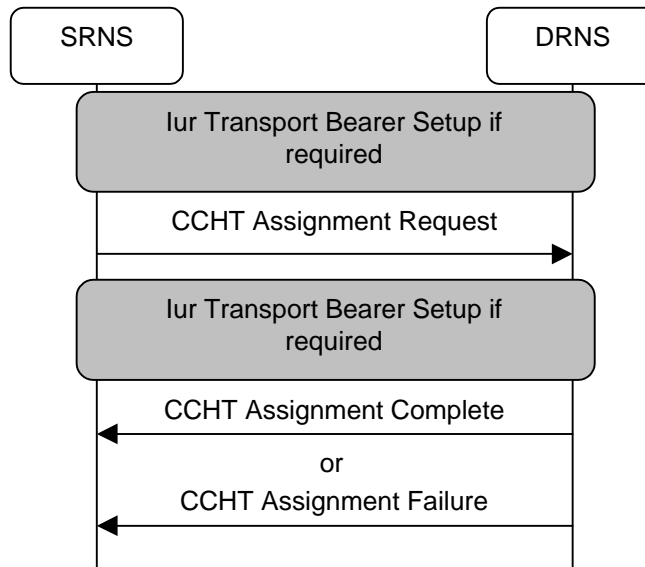
- Cell Identity which is used by the DRNS to select the proper MAC-c instance
- UE Identity which is used by the DRNS to address the proper UE (e.g. RNTI)
- MAC-d Identity which is used by the SRNC to select the proper MAC-d instance
- The characteristics of the bearer including aspects such as data rates, QoS, etc.
- Priority level which is used both for pre-emption and scheduling by MAC-c

On reception of that request the DRNS performs its own admission control by ensuring that the new CCHT is compatible with the already established ones.

If required the Iur Transport Bearer Setup can be done before or after the CCHT Assignment Request.

In case of success the DRNC returns a **CCHT Assignment Complete**. This message contains as parameters :

- MAC-d Identity which is used by the SRNC to select the proper MAC-d instance
- MAC-c Context Identity which is used by the DRNS to identify both the MAC-c instance and the UE.



If the Admission Control of the DRNS decides that the new CCHT cannot be established, the DRNC returns a **CCHT Assignment Failure**.

2.2 Common Channel Traffic Modification

This procedure is used by the SRNS to modify the characteristics of a Common Channel Traffic.

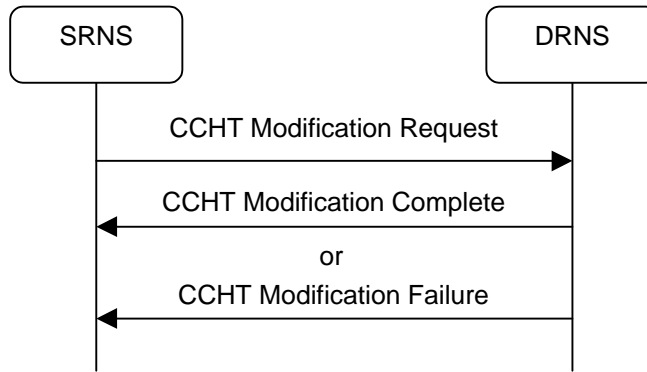
The SRNC sends the RNSAP message CCHT Modification Request. This message contains as parameters :

- MAC-d Identity which is used by the SRNC to select the proper MAC-d instance
- MAC-c Context Identity which is used by the DRNS to identify both the MAC-c instance and the UE.
- The new characteristics of the bearer including aspects such as data rates, QoS, etc.
- The new priority level which is used both for pre-emption and scheduling by MAC-c

On reception of that request the DRNS performs its own admission control by ensuring that the CCHT with its new characteristics is compatible with the other established ones.

In case of success the DRNC returns a **CCHT Modification Complete**. This message contains as parameters :

- MAC-d Identity which is used by the SRNC to select the proper MAC-d instance



If the Admission Control of the DRNS decides that the CCHT with its new characteristics cannot be established, the DRNC returns a **CCHT Assignment Failure**.

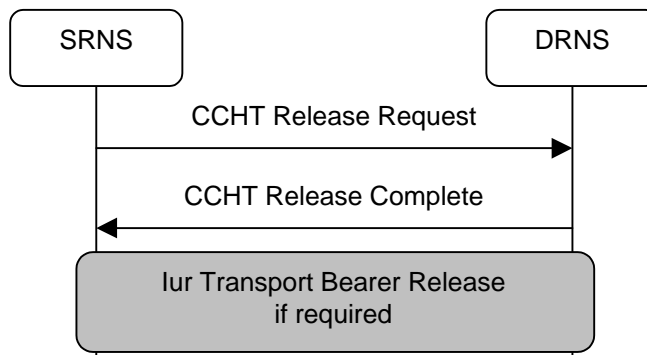
2.3 Common Channel Traffic release

This procedure is used by the SRNS to request the DRNS to release the resources reserved for a given CCHT.

The SRNC sends the RNSAP message **CCHT Release Request**. This message contains as parameters :

- MAC-c Context Identity which is used by the DRNS to identify both the MAC-c instance and the UE.

If required the Iur Transport Bearer Release can be done.

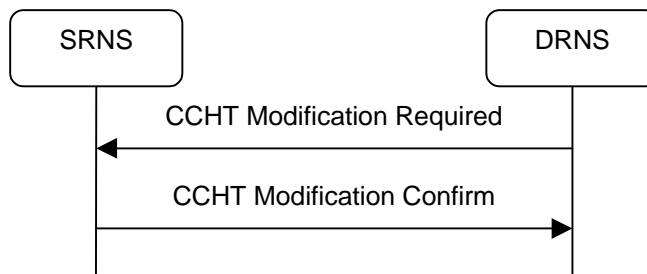


2.4 Common Channel Traffic Modification Required

This procedure is used by the DRNS to request to the SRNS to lower its requirements.

The DRNC sends the RNSAP message **CCHT Modification Required**. This message contains as parameters :

- The list of MAC-d Identities which should lower their requirements.
- For each CCHT, the suggested QoS.



3 User Plane Procedures

3.1 Downlink Transfer

This procedure is used by the SRNC to request to a DRNS the transmission of user data towards a specific UE using Common Channels.

The SRNC provides the DRNS with the following information :

- A MAC PDU
- Time to live : This scheduling information indicates to the DRNS the maximum delay within which the MAC PDU is meaningful. This information is used by the DRNC both to schedule the transmission of PDUs received from different SRNCs and also to discard outdated PDU. Scheduling is also performed using the priority given at the CCH assignment.
- MAC-c Context Identity which is used by the DRNS to identify both the MAC-c instance and the UE.

The format of a Downlink Iur CCH data frame is the following

Information element	Description
message type	Downlink Iur CCH data frame
Time to live	Maximum time allowed for the transmission of the Transport Bloc Set after which it should be discarded
MAC-c Context Identity	Used by the DRNS to identify both the MAC-c instance and the UE
MAC-d PDU	Data to be sent on the Radio interface

When scheduling the MAC-d PDU, the MAC-c also maps the MAC-c Context Identity to the UE RNTI.

3.2 Downlink Flow Control

This procedure is used by the DRNC to flow control a SRNC.

The DRNC provides the SRNC with the following information :

- The list of MAC-d Identities which are using the congested MAC-c instance
- Flow Control Parameters

The format of a Iur CCH Flow Control Frame is the following :

Information element	Description
message type	Iur CCH Flow Control Frame
MAC-d Identity	Used by the SRNC to select the proper MAC-d instance
Flow Control Parameters	Parameters used to flow control the MAC-d instance

3.3 Uplink Transfer

This procedure is used by the DRNC to send user data received from a specific UE on Common Channels (RACH) to its SRNC.

The DRNC provides the SRNC with the following information :

- The MAC-d PDU that was transported by the RACH
- MAC-d Identity which is used by the SRNC to select the proper MAC-d instance

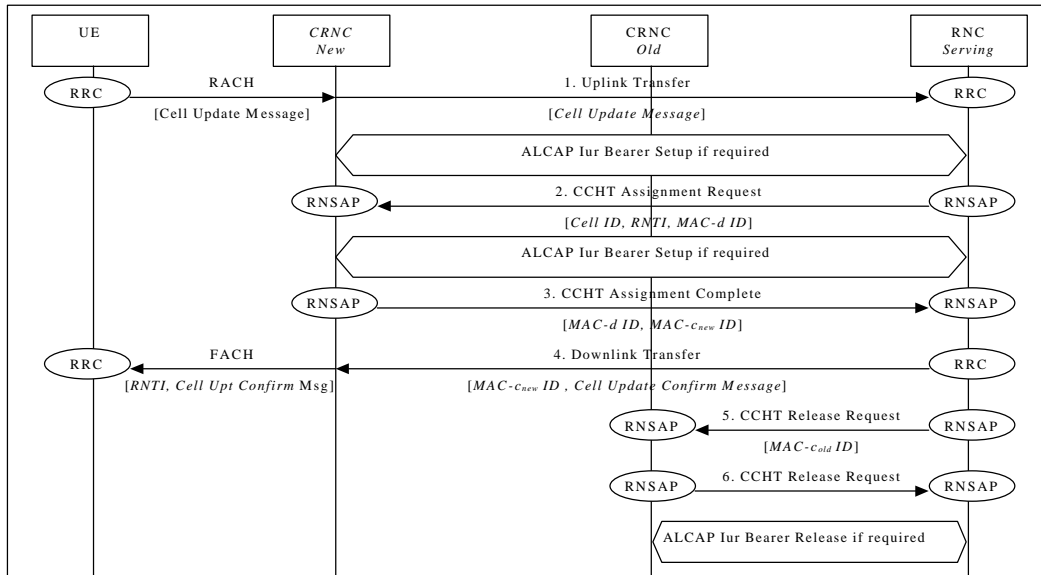
The format of an Uplink Iur CCH data frame is the following

Information element	Description
message type	Uplink Iur CCH data frame
MAC-d Identity	Used by the SRNC to select the proper MAC-d instance
MAC-d PDU	Data received on the Radio interface

4 Relation with Cell Update and Handovers

4.1 Cell Update in RACH/FACH Mode

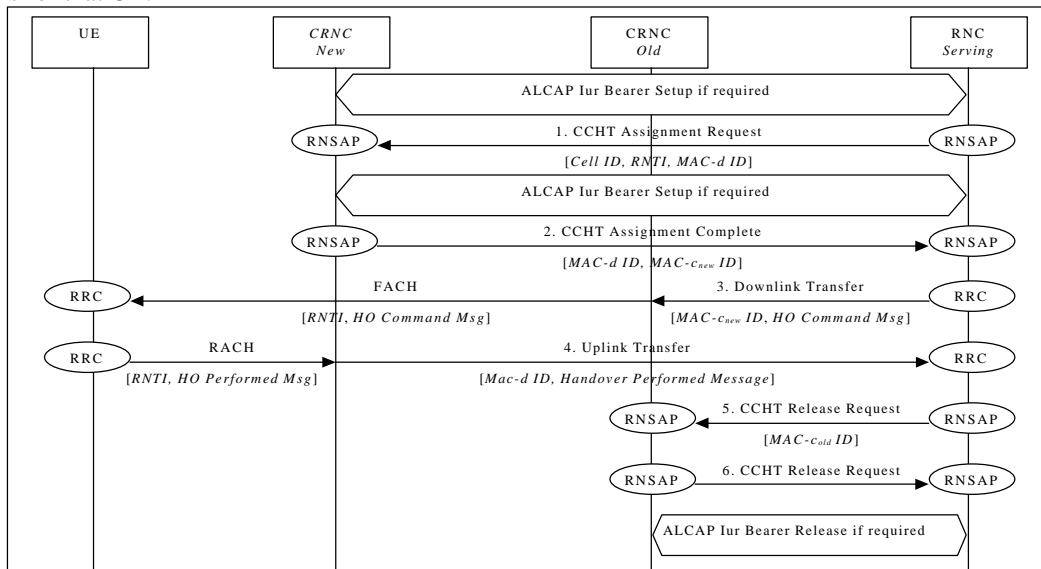
This example shows how a Cell Update is managed when the UE is in RACH/FACH mode and when there is some QoS negotiated on common channels for that UE.



1. The UE sends a Cell Update message to its SRNC. This message is sent via a RACH and relayed back to the serving RNC.
Parameters : UE Identification, Cell Identification
2. The SRNC requests the necessary QoS on common channels to the new Controlling RNC.
Parameters : Cell Identification, UE Identification, MAC-d instance Identification
3. The new Controlling RNC grants the requested QoS and does the necessary reservation.
Parameters : MAC-d instance Identification, MAC-c Context Identification
4. The SRNC sends a Cell Update Confirm message to the UE. This message is sent to the Controlling RNC via a Downlink Transfer message and relayed to the UE via a FACH.
5. The SRNC releases the reserved resources on the previous Controlling RNC.
Parameter : MAC-c Context Identification
6. The old Controlling RNC acknowledges the release.

4.2 Handover in FACH/RACH mode

This example shows how a Handover is managed when the UE is in RACH/FACH mode and when there is some QoS negotiated on common channels for that UE.



1. The SRNC requests the necessary QoS on common channels to the new Controlling RNC.
Parameters : Cell Identification, UE Identification, MAC-d instance Identification
2. The new Controlling RNC grants the requested QoS and does the necessary reservation.
Parameters : MAC-d instance Identification, MAC-c Context Identification
3. The SRNC sends a Handover Command message to the UE. This message is sent to the old Controlling RNC via a Downlink Transfer message and relayed to the UE via a FACH.

4. The UE sends a Handover Performed message to its SRNC. This message is sent via a RACH and relayed back to the serving RNC.
Parameters : UE Identification, Cell Identification
5. The SRNC releases the reserved resources on the previous Controlling RNC.
Parameter : MAC-c Context Identification
6. The old Controlling RNC acknowledges the release.

5 Recommendation

Nortel proposes that section 9.2.2 “RNSAP Procedures” of [1] be completed with the content of section 2 of this contribution. Nortel also proposes that section 11.2.3 and 11.2.4 of [1] be filled with the text of section 3 of this contribution. Nortel also proposes that the examples of section 4 be captured in document [3].

6 References

- [1] UMTS ZZ.12 Description of Iur Interface, Source : Ericsson (Editor)
- [2] UMTS YY.21 Description of the MAC protocol Version 0.1.0, Source : UMTS L2&3 EG
- [3] UMTS ZZ.02 UTRAN Functions, Examples on Signalling Procedures, Source CSELT (Editor)