3GPP TSG RAN Meeting #27
Tokyo, Japan
From 9th – To 12th March 2005

RP-050107

Agenda Item: 9.8

Source: Cingular Wireless, Lucent Technologies

Title: HSDPA Mobility Enhancement Solution to Support Real-Time Delay Sensitive Services

Document for: Information

Concept Document

1. Background/Introduction

The High Speed Downlink Packet Access (HSDPA) channel was a significant feature introduced by 3GPP in Rel'5. HSDPA provides up to a five-fold improvement in data spectral efficiency over Rel'99 [1] in the downlink. The Enhanced Dedicated Channel (E-DCH) is a significant feature being introduced in 3GPP Rel'6 that provides similar enhancements in the uplink. The combination of HSDPA and E-DCH provides very efficient, symmetric packet data capabilities in UMTS, particularly for best effort data applications. However, many important applications are real-time and delay sensitive in nature (e.g. VoIP and gaming). While HSDPA and E-DCH are capable of supporting applications like VoIP and gaming in a spectrally efficient manner (discussed below), these channels did not consider the quality requirements of such applications, particularly from a handover perspective.

The real-time, delay sensitive nature of applications such as VoIP and gaming leads to very robust and timely handover requirements to maintain quality during the handover period. The R'99 Dedicated Channel (DCH) implements Soft Handover (SHO) to accommodate the handover needs of services like voice and gaming. Fortunately, the E-DCH feature also supports SHO (i.e. frame selection) in the uplink and thus should be capable of supporting handover for services like VoIP. However, the HSDPA feature does not support soft handover (i.e. on the HS-DSCH), and thus there is potential quality degradation for services such as VoIP caused by the latency associated with hard handover. Analysis has shown that the delays associated with the hard handover process in Rel'5/Rel'6 HSDPA are excessive (>> 500 ms). The latency associated with layer 3 signaling coupled with the lack of advanced notification of the exact handover time are the key limitations associated with Rel'5/Rel'6 hard handover.

This document proposes the introduction of a HSDPA Mobility Enhancement (HME) feature for the support of real-time, delay sensitive applications such as VoIP over the HSDPA channel. The goal of an HME scheme is to speed up the hard handover procedure for HSDPA. This document outlines one example HME solution that can accomplish the goal of reducing handover latency to accommodate VoIP, however it is recognized that other solutions may exist and could be considered. The example HME scheme given in this document uses Layer-1 signaling through the air interface and Iub/Iur user plane framing protocol to request (UE) and confirm (RNC) the handover to the best cell. It is based on the Fast Cell Selection (FCS) concept that was first proposed in the scope of the HSDPA feasibility study and is making use of signaling capabilities already used for Site Selection Diversity Transmission (SSDT). However, contrary to the original FCS proposal, the primary intent is not to generate macro-diversity gain, but to significantly reduce the delay required to execute an HSDPA Cell Change. The Layer 1 signaling provides advanced notification of the exact handover time given the RNC grants the handover. In this way, the "new" NodeB can prepare for the handover while data traffic is still being sent to the UE on the "old" leg. The example HME scheme also suggests system pre-configurations in the resource management in order to allow fast cell change after the RNC confirms the handover. The example HME scheme is capable of reducing the latency associated with hard handover to < 100 ms. This reduction in handover latency compared to Rel'5/Rel'6 hard handover will benefit all applications, but is particularly critical for maintaining quality during handover for real-time delay sensitive services like VoIP.

2. Market need / benefits

Some of the most compelling applications for wireless data are real-time and delay sensitive in nature. In particular, VoIP is an extremely important application to consider given the recent momentum around VoIP and the benefits that VoIP provides in the efficient support of Simultaneous Voice & Data (SVD) services. Gaming is just one example of an SVD service that wireless operators view as having significant new revenue generating potential for wireless data.

SVD services can be supported in the current 3GPP standards. Radio Access Bearer (RAB) combinations have been defined that combine the R'99 DCH channels for voice with the Rel'5 HSDPA channels for data. Still, there are several advantages that can be offered by an HSDPA technology supporting VoIP.

One advantage of VoIP on HSDPA is that it has potential voice quality benefits compared to VoIP on R'99 DCH channels. This is due to the fast retransmission capabilities of the HSPDA channel which guarantees that nearly all speech frames will be successfully decoded eventually. Through adaptive jitter buffering at the VoIP receiver, it is possible to tradeoff increased delay for improved voice quality for UEs that enter poor RF conditions. Oftentimes, increased delay is a preferable degradation than reduced voice quality, which can lead to muting and even call dropping. Such delay vs. voice quality tradeoffs is not possible with R'99 DCH channels.

Another advantage of VoIP on HSDPA is that it is the first step towards realizing the long-term vision of an all-IP packet network supporting all voice and data applications. Being able to support all voice and data applications on an all-IP packet network, using HSDPA for instance, can greatly reduces operational expenses by having a single packet voice/data network to engineer as opposed to engineering both a circuit voice and packet data network.

It should also be recognized that several competitive technologies are aggressively working to support high quality VoIP over efficient packet channels already. 1xEV-DO has introduced several enhancements in Rev. A to support VoIP. Not only does 1xEV-DO Rev. A support an enhanced uplink, but it has also introduced the Data Source Channel (DSC) which defines layer 1 signaling for the support of fast handover. Likewise, the WiMAX technology (through 802.16e) has defined a Fast Base Station Selection (FBSS) feature to support fast handover. The fast handover benefits of the DSC feature in 1xEV-DO and the FBSS feature in WiMAX is exactly the type of fast handover capability that HSDPA is lacking.

3. HSDPA Handover Delay

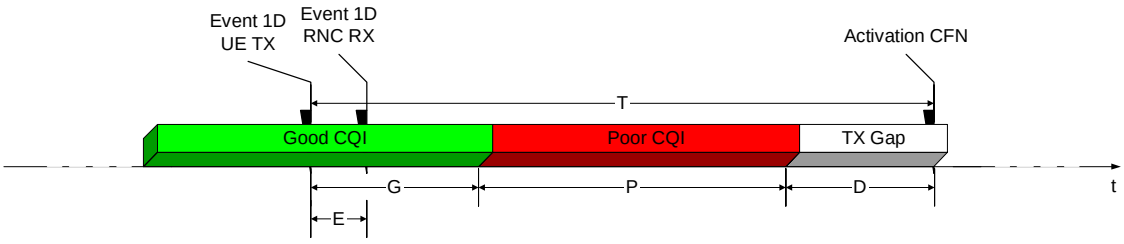

Figure 1. HSDPA Handover Delay with Mixed CQI after Cell Change Event Trigger

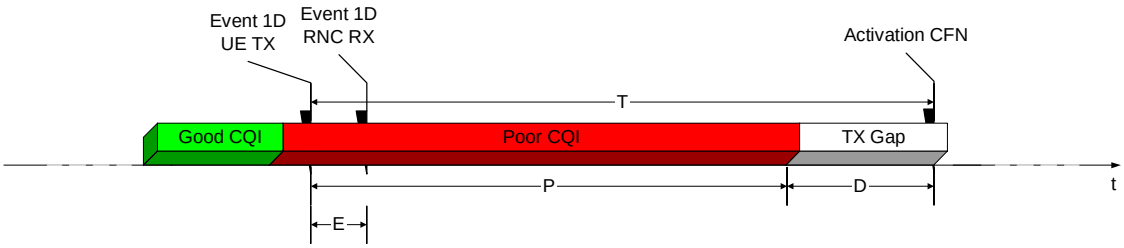

Figure 2. HSDPA Handover Delay with Poor CQI after Cell Change Event Trigger.

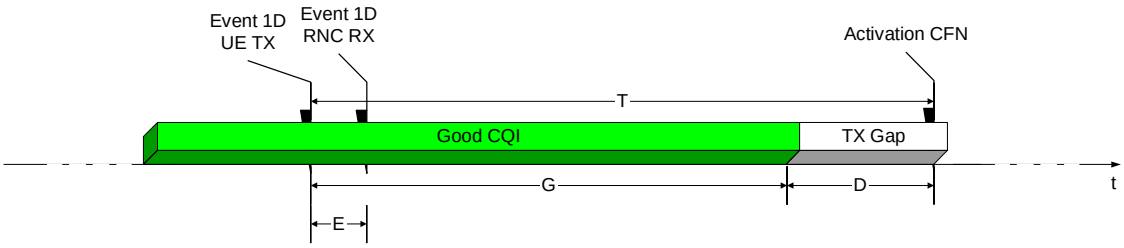

Figure 3. HSDPA Handover Delay with Good CQI after Cell Change Event Trigger.

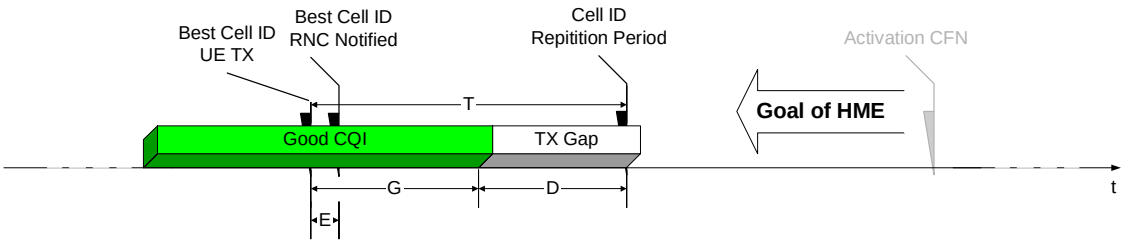

Figure 4. HSDPA Handover Delay with HME and Good CQI after Best Cell ID Determination.

4. HSDPA Handover Delay Definition

The total HSDPA handover delay (T) is illustrated in Figures 1-4 and defined in Equation 1.

$$T = G + P + D \qquad (1)$$

The duration between the Cell Change Event Trigger (Event 1D in figures 1-3 above) at the UE and the detection of Event Trigger at the RNC is given by E. Following an Event Trigger and prior to the Activation CFN, the CQI for a user may be "good" (for duration G) or "poor" (for duration P).[1] By definition, the good CQI duration G and the poor CQI duration P cannot exceed the total handover time as expressed in Equations 2 and 3.

$$0 \le G < T \qquad (2)$$
$$0 \le P < T \qquad (3)$$

Prior to the Activation CFN, the RNC will redirect the UE MAC-d flow from the serving NodeB to the target NodeB; thus, a TX gap (D) may exist.[2] Since the RNC will not redirect the MAC-d flow from the serving NodeB to the target NodeBuntil some time after the RNC receives the Event Trigger notification, the maximum value for a TX gap (if one exists) is limited according to Equation 4.

$$0 \le D < T - E \qquad (4)$$

5. HSDPA Handover Delay Implications

The best user-perceived QoS occurs when the total handover delay, T, is equal to G. In this case, the MAC-d flow does not incur any error (due to poor CQI) and incurs the least possible delay (due to MAC-d flow redirection from the serving NodeB to the target NodeB). Poor user-perceived QoS is likely when the total handover delay, T, is dominated by P and D.[3] D is influenced primarily by the RAN

[1] Good CQI corresponds to conditions for which a UE MAC-hs can complete a HARQ process, and poor CQI corresponds to conditions for which a UE MAC-hs cannot complete a HARQ process. The boundary between good and bad is primarily a function of the RF environment (e.g., multipath profile), system loading and – to a lesser degree – the specific MAC-hs scheduling algorithm.

[2] The likelihood and duration of a TX gap is a function of the RNC implementation (i.e., the time at which the MAC-d flow is redirected from the serving NodeB to the target NodeB), the NodeB implementation (flow control request), CQI, system loading, and the specific MAC-hs scheduling algorithm. Also, the timing offset between the DPCH and the HS-PDSCH may contribute to the gap [2]

[3] P and D are correlated values.

implementation.[2] When the MAC-d flow contains data and D is greater than zero, the MAC-d flow incurs additional delay. When the MAC-d flow contains data and P is greater than zero, the MAC-d flow incurs service interruption. P is influenced by less controllable factors. Thus, the goal of HME is to reduce the total handover delay, T, so that the potential impact of P is also reduced.

6. HSDPA Handover Performance

The HSDPA handover performance is given in Table 1 for three cases: (1) R6, (2) R6 with the CR presented in [3], and (3) with the HME proposal. The service interruption duration is the time during which data may be lost and is defined as the portion of T for which $P \geq 0$. The realized delay is the delay incurred by a MAC-d flow due to packet loss or MAC-d flow redirection from the serving NodeB to the target NodeB or the time for UE to reconfigure for the new cell and is defined as $P + D$.[4]

The performance considerations are made with the following assumptions:

1. The delay incurred prior to Cell Change Event Trigger is negligible,
2. The jitter incurred prior to Cell Change Event Trigger is negligible, and
3. The delay incurred in the target NodeB (e.g., due to scheduling delay or CQI) after the Activation CFN is negligible.

These assumptions are optimistic but restrict the performance considerations to the period between the UE Event Trigger and the Activation CFN.

For ranges given in Table 1, the minimum values are determined when the CQI is only good (i.e., $P = 0$). The maximum values are determined when the CQI is only poor (i.e., $G = 0$). All values are determined with a TX gap of 20 ms ($D = 20$ ms).

	HSDPA Handover Performance		
	Total Delay	Service Interruption Duration	Realized Delay
R6	600-700 ms	0-680 ms	20-700 ms
R6 with CR In Tdoc R2-050013	350-450 ms	0-430 ms	20-450 ms
With HME	50-100 ms	0-80 ms	20-100 ms

NOTES:

1. In many cases, the realized delay contributes excessively to the end-to-end delay (and even exceeds the maximum acceptable end-to-end delay) for critical real-time services (e.g., VoIP).
2. For multimedia services, increased service interruption will cause a loss in decoder state synchronization for mechanisms such as ROHC, MPEG, and AMR.
   Neither the data RAB nor the signaling RAB is required to change during any of the HSDPA handover schemes.

Table 1. HSDPA Handover Performance.

7 Outline of one solution approach

This section outlines one example HME solution for reducing hard handover latency on HSDPA. The example HME scheme for HSDPA fast handover impacts the following areas; RRC protocol changes to allow configuration of the UE measurements, L-1 signaling through the DPCCH control channel in the air interface, user plane protocol to signal the best cell and for the handover of the Iub/Iur transport, and NBAP/RNSAP protocol changes to allow pre-configuration of NodeBs in the active set.

The measurement to determine the best cell is a UE internal measurement and similar to the current Event 1D “best cell selection” measurement for the HSDPA handover. The averaging characteristics of the UE measurements should be configurable through RRC signaling at the beginning of an HSDPA session. An offset between the best cell and non-best cells should also be configurable independently through RRC using a hysteresis parameter to minimize ping-pong between NodeBs in the active set.

Once the measurement indicates a change of the best cell, the example HME scheme requires the UE to repeatedly report the new best cell ID over a pre-defined time interval (preconfigured through RRC signaling)

[4] The realized delay can be expressed equivalently as the portion of the handover delay for which the CQI is not good.

as the handover request. The time interval of the cell ID is sufficient with low report rate (around 10 – 50 Hz). The temporary cell identification defined in 5.2.1.4.1.1 of TS 25.214 could be re-used as the cell ID for the HME. The NodeBs then report any requested cell change back to the RNC and the RNC either acknowledges the cell handover or may decide not to acknowledge the handover (e.g. if it receives conflicting reports from multiple NodeBs). The UE will attempt to handover to the new best cell at the end of the pre-defined time interval. If the RNC decides that the UE should perform the handover, the UE would be confirmed of it's request to handover to the reported new best cell ID through HS-SCCH scheduling (implicitly) on the new cell at the end of the pre-defined time interval. In this way, the NodeBs and RNC are given advanced notification of the exact time at which the UE will handover (if the UE receives the handover confirmation) in order to prepare the radio links and data flow at the new NodeB. During the transition period between the reported best cell change and the completion of the handover, the current serving cell would continue to schedule the service to the UE and to complete all HARQ processes. This will prevent long periods of time of service interruption.

If the network chose to reject the HO request then the RNC will continue to send data through the old cell and the UE will fall back to the old cell.

Figure 5 shows the timing diagram for the implicit signaling method of HO confirmation. At the beginning of the Repetition Period 2 in Figure 5, the UE starts reporting Cell ID B as the Best Cell. All Node Bs detect the change of the Cell ID from the cell A to the cell B as the indication of UE's handover request. All the Node Bs report the HO request to the RNC. The RNC will respond its HO decision to the Node B using the Iub Framing Proctol and re-direct the MAC-d PDU to the designated Node B. At the beginning of the Repetition Period 3 in Figure 5, the designated Cell then schedule to the specific UE as the handover response and the UE will monitor two HS-SCCHs from Cell A and two HS-SCCHs from Cell B. The UE also report the CQI for the Cell A in odd number of TTI and the CQI for the Cell B in even number of TTI. . After the UE receives the HS-SCCH scheduling from the specific Cell, the UE will report the CQI to the specific Cell who scheduled it. In case of the first attempt of the UE's HO request being denied, the UE will continue re-request the HO to the target cell B.

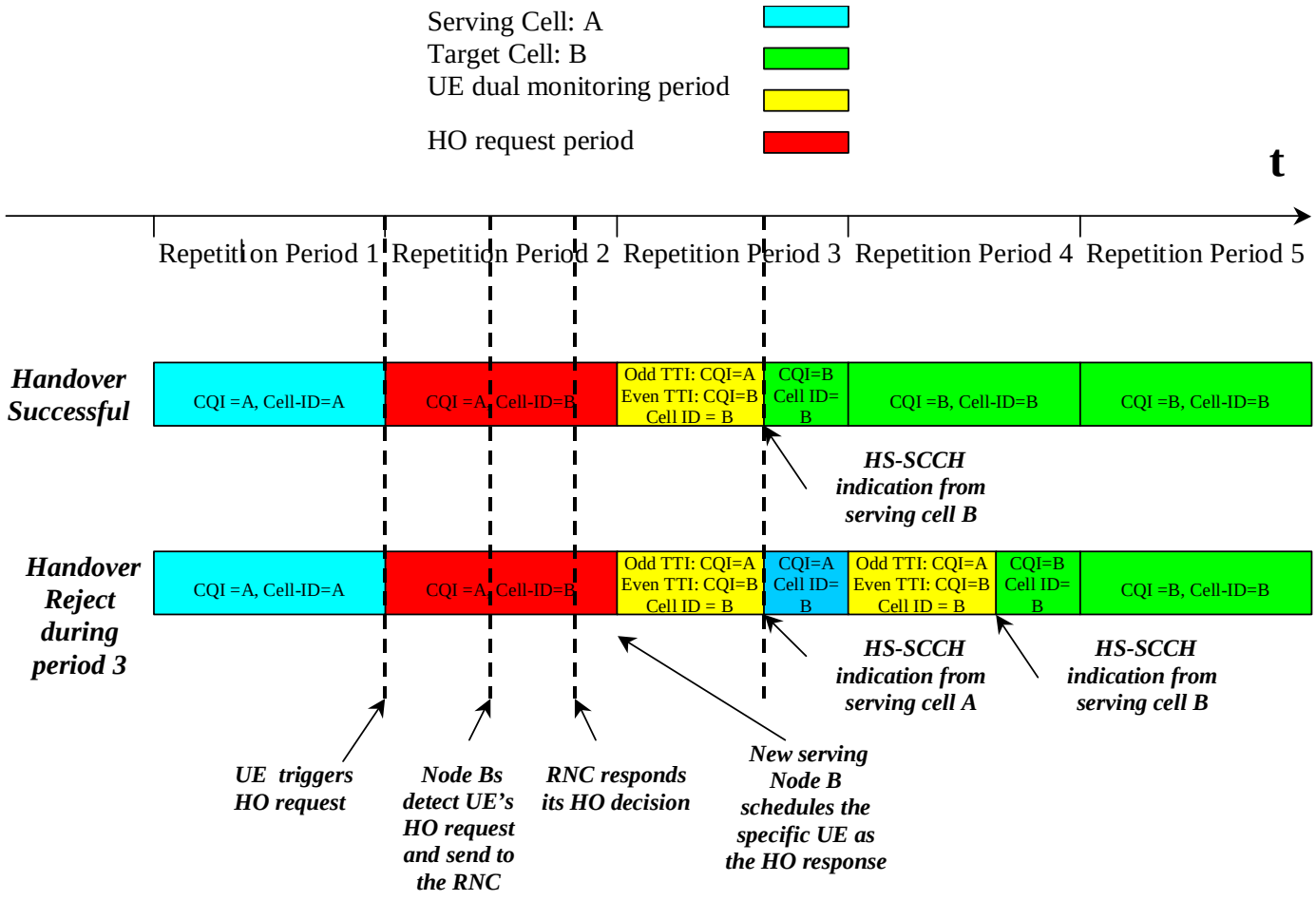

Figure 5: Timing for the Implicit Signaling of HO confirmation

In the Iub/Iur interface, the NodeB and RNC will use user plane signalling to indicate the change of the best cell and to assist the handover of the data transport from RNC → serving NodeB to RNC → target NodeB. The NodeB will signal if the UE requests a Best cell different from the current cell to the RNC through new user plane control frames. The RNC will make the HS-DSCH serving cell change decision based upon reports received by all cells and forward the decision to the all the pre-configured NodeBs through the user plane framing protocol. If the UE's request of the best cell change to the target cell is granted by the RNC, the RNC will re-route the MAC-d data flow to the new target cell in just in advance of the handover time.

In order to support the fast HSDPA handover through L-1 signalling, the NodeB/DRNC resources and Iub/Iur links of all cells in the active set to be considered for HME need to be pre-configured and set up in advance of the handover, which allows the RNC to set up the Iub/Iur transport resources for the HS-DSCH in the potential cells. In addition, the RNC would signal to the UE information on the cell IDs to be considered for fast cell selection along with HS-DSCH configuration information associated with them.

The three major areas of the example HME scheme for fast HSDPA handover should be distributed to three RAN working groups. The following summarizes the areas of work expected in each RAN area to support the example HME feature:

7.1 HME for fast HSDPA handover in RAN1

L-1 signaling through DPCCH for the indication of the best cell and the request of the HSDPA handover: The FBI bits in the UL DPCCH slot formats 2, 3, 4, and 5 TS 25.211 and temporary cell ID structure would be used for the UE to report the best cell, thereby requesting handover if the current cell ID is different than the reported best cell ID. Specifically,

- Event-1D type Best Cell Selection measurement called Event HME Trigger as the reference of the HSDPA best cell – the best HSDPA cell is determined by a similar criteria to the Event-1D best cell selection TS 25.331 for the current HSDPA handover. The measurement is a UE internal measurement and is sent to the NodeB. The offset of the current best cell and non-best cells could be set independently through RRC for optimization.

- Report the change of the best cell ID and request HSDPA handover in advance of the cell handover - The UE would begin reporting the new cell-ID and request HSDPA handover one repetition period of time (N radio frames) in advance before the actual handover. The CQI report will change to be associated with the new cell at the start of the next repetition period if the handover request is granted by the RNC. The serving NodeB continues scheduling service to the UE up to the handover time (end of the Nth frame), and possibly beyond the handover time in case the RNC denies the handover request.

- Accumulation of repetitive cell-ID's during a repetition period and synchronous handover opportunities - The current temperate cell ID through FBI bits defined in tables 3 and 4 of TS 25.214 contains Long, Medium, or Short ID codes to represent up to 8 cells in the active set. The example HME scheme will have a long repetition period, proposed to be N-frames and set by L-3 reconfiguration messages at session initiation, where the UE is required to indicate a single best cell ID. The best cell ID will repeat within the repetition period. Reporting of the current serving cell ID would indicate no handover request while reporting of a cell ID other than the current serving cell ID would indicate the request to handover. Such reporting would be sent to all NodeBs currently in the active set. All NodeBs in the active set would accumulate the repetitive cell ID reports to improve the reliability of correct detection of the received cell ID. It is desired to complete the detection of a new cell ID, feedback the new cell ID to the RNC, and receive confirmation from the RNC to perform the handover within the repetition period of N frames at a synchronized opportunity. Thus, the accumulation of the received cell ID would be shorter than the repetition period to allow time for other processes in the handover procedures. This synchronizes the handover operation and allows for the opportunity to pre-configure resources, since the RNC and NodeBs know in advance the exact time at which the UE will handover if the UE's handover request is granted by the RNC.

Decision notification of handover: The UTRAN makes the final decision of the handover after the L-1 signalling is received from all NodeBs. The notification of the UTRAN decision to the UE could be informed implicitly as follows:

Implicit method through HS-SCCH: If the RNC decides to confirm the handover request (and thus HS-DSCH cell change is required), the RNC signals this to all NodeBs through the Iub/Iur Frame protocol. The Target NodeB will receive the MAC-hs data flow where it will then inform the UE of the HS-DSCH data in the new cell through the HS-SCCH once the service is scheduled. If the handover request is not granted by the RNC, the RNC will continue to route the data to the serving NodeB. The serving NodeB would continue scheduling the UE, even after the tentative handover time (i.e. the end of the Nth frame). Thus, the UE needs to monitor two HS-SCCHs in the current serving cell and two HS-SCCHs in the target cell, starting from the next repetition period after the change of the best cell is reported, to accommodate for the successful and failure cases of the handover response. The UE also sends the CQI reports to both NodeBs during this interval. The UE will report the CQI results from both the serving cell and target cell alternatively in every 2-ms TTI starting from the tentative handover time in order to allow either cell as the serving cell to schedule service. The UE will send a CQI report only to the new NodeB once it received scheduled data transmission from the new NodeB (either the target NodeB for the successful handover case or the source NodeB for the failure case).

7.2 System Pre-configuration for HME in RAN2

The HSDPA system information and the Iub/Iur links for all cells in the active set need to be pre-configured in order to quickly respond to the UE L-1 signalling handover request. The pre-configuration is performed by the NBAP and RNSAP protocols towards NodeB cells with radio links on the associated DCH. The pre-configuration of the Iub/Iur link prepares the necessary HS-DSCH resources in the NodeB/DRNC and completes the procedure for the set up of transport network for reporting the change of the best cell. This prepares all target NodeBs to become the HS-DSCH serving cell upon instruction from the RNC through the user plane protocol.

Multiple HSDPA configurations stored at UE - When a soft handover leg is added, the RNC will signal to the UE the following information:
The cells that the UE should be monitoring for fast cell selection Cell Change along with the associated cell ID to be reported on the FBI bits.

a) The radio channel information (HS-SCCH code numbers, H-RNTI etc) for any new cells to be monitored.
b) The expected MAC-hs TSN reset during cell change.

The UE will store the HS-SCCH in all cells it is commanded to in the active set during the DPCH soft handover. The stored multiple HSDPA configurations will enable the UE to react fast when radio channel conditions change. In addition, all NodeBs considered as candidate cells for HME cell change are configured with HS-DSCH resources, which will enable the NodeB to report to the RNC the best cell indication received in the FBI bits, and to send HS-DSCH data as commanded by the RNC.

Monitor HS-SCCH from both Serving and target NodeBs (Synchronous Handover opportunities) – When the implicit handover response is considered, the UE needs to monitor two HS-SCCHs from the current serving cell and two HS-SCCHs from the requested target cell to receive the confirmation of the HSDPA handover as discussed above. The selected two HS-SCCHs in the serving and target cells are pre-configured through L-3 signalling messages. The UE is required to monitor the HS-SCCHs from the serving and target cell for only one repetition period starting from the next repetition period after the change of the best cell ID is first indicated. The UE will report the CQI results from both the serving cell and target cell alternatively in every 2-ms TTI in order to allow either cell as the serving cell to schedule service through HS-DSCH.

7.3 HME for fast handover of the Iub/Iur transport in RAN3

The example HME scheme uses the user plane protocol as the L-1 signalling in the UTRAN to indicate the change of the best cell and the request of the HSDPA handover from the NodeBs to the RNC. The user plane protocol is used to receive the acknowledgement of the HSDPA handover request from the RNC to the NodeBs:

- UTRAN pre-configure resources to get ready for the HSDPA serving link handover – The UTRAN will pre-configure Iub, Iur, and all network node process resources at the same time as the DCH enters soft handover. In other words, the Iub and Iur RL Radio link Preparation and transport network set up procedures will be set up in advance of the UE signalling a best cell change. Multiple

Iub/Iur MAC-d flows are set up but only the primary cell MAC-d flow link is active at a time. This would not increase the backhaul traffic volume.

- User Plane Signalling for Backhaul (Iub/Iur Frame Protocol for the HSDPA primary cell indication)

  ⇒ Single cast Iub/Iur link with fast handover: The proposal is to enhance the Iub/Iur Frame Protocol to have a new control frame containing the indication of the primary cell/non-primary cell during the handover. The UE would already have stored multiple HSDPA configurations and the UTRAN has already set up the Iub/Iur links for the target cells in the active set. Once the NodeBs receive the cell ID through FBI bits that indicate a change of the HSDPA serving cell, all NodeBs would send a new control frame of the UL Iub/Iur Frame protocol to indicate the change. The RNC would make the decision on the handover request and send the acknowledgement of the new serving cell to all NodeBs through a DL Iub Frame Protocol new control frame. The RNC would start sending the data to the new best cell after the RNC resource management function acknowledges the UE's handover request.

7.4 Implementation in the Standard

A set of preliminary CRs were prepared to evaluate the amount and complexity of the modifications that would be required in the various 3GPP specifications to implement the previous HME solution. These draft CRs are attached to this document for information.

8 References:

[1] The Evolution of UMTS - 3GPP Release 5 and Beyond, 3Gamerica
http://www.3gamerica.org/English/index.cfm

[2] R1-040344, "Clarification on the reconfiguration of HSDPA", Panasonic

[3] R2-050013, "Detection of Activation CFN wraparound in the UE during HS-DSCH cell change", Lucent Technologies.

CR-Form-v4

CHANGE REQUEST

⌘ **25.214** **CR** **CR-xxx** ⌘ ev **-** ⌘ Current version: **6.4.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network ☐

Title:	⌘	HS-DSCH fast Handover procedure
Source:	⌘	
Work item code:	⌘	***Date:*** ⌘
Category:	⌘	***Release:*** ⌘

Use one of the following categories:
- ***F*** *(correction)*
- ***A*** *(corresponds to a correction in an earlier release)*
- ***B*** *(addition of feature),*
- ***C*** *(functional modification of feature)*
- ***D*** *(editorial modification)*

Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*
REL-6	*(Release 6)*

Reason for change:	⌘	
Summary of change:	⌘	
Consequences if not approved:	⌘	.

Clauses affected:	⌘			
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments:	⌘			

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

1 Scope

The present document specifies and establishes the characteristics of the physicals layer procedures in the FDD mode of UTRA.

2 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.

[1] 3GPP TS 25.211: "Physical channels and mapping of transport channels onto physical channels (FDD)".

[2] 3GPP TS 25.212: "Multiplexing and channel coding (FDD)".

[3] 3GPP TS 25.213: "Spreading and modulation (FDD)".

[4] 3GPP TS 25.215: "Physical layer – Measurements (FDD)".

[5] 3GPP TS 25.331: "RRC Protocol Specification".

[6] 3GPP TS 25.433: "UTRAN Iub Interface NBAP Signalling".

[7] 3GPP TS 25.101: "UE Radio transmission and Reception (FDD)".

[8] 3GPP TS 25.133: "Requirements for Support of Radio Resource Management (FDD)".

[9] 3GPP TS 25.321: " MAC protocol specification".

[10] 3GPP TS25.306: “UE Radio Access Capabilities”

[11] 3GPP TS25.427: :UTRAN Iub/Iur interface user plane protocol for DCH data streams”.

[…]

6A HS-DSCH-related procedures

6A .1 General procedure

Scheduling and transport format selection is controlled by the MAC-hs sublayer in the Node B [9].

The following physical layer parameters are signalled to the UE and the Node B from higher layers:

1) HS-SCCH set to be monitored
2) Repetition factor of ACK/NACK: N_acknack_transmit
3) Channel Quality Indicator (CQI) feedback cycle *k*.
4) Repetition factor of CQI: N_cqi_transmit
5) Measurement power offset Γ
6) Status of preamble/postamble transmission: HARQ_preamble_mode

6A .1.1 UE procedure for receiving HS-DSCH

In this sub-clause, sub-frame *n* on the HS-SCCHs refers to the sub-frame which is associated with sub-frame *n* on the HS-PDSCH as defined in [1], and sub-frame *n* on the HS-DPCCH refers to the sub-frame which is related to sub-frame *n* on the HS-PDSCH as defined in [1].

If the UE did not detect consistent control information intended for this UE on any of the HS-SCCHs in the HS-SCCH set in the immediately preceding subframe *n* – 1, the UE shall in sub-frame *n* monitor all HS-SCCHs in the HS-SCCH set. The maximum size of the HS-SCCH set is 4.

In case the HS-DSCH fast handover procedure is actived and if the UE reports a cell in the current repetition period, which is different from the current serving cell, the UE shall monitor in the following repetition period the first two HS-SCCHs out of the HS-SCCH sets of the current serving cell and the reported cell, respectively.

If the UE did detect consistent control information intended for this UE in the immediately preceding subframe *n* – 1, it is sufficient in sub-frame *n* to only monitor the same HS-SCCH used in the immediately preceding subframe *n* – 1.

When the UE monitors HS-SCCHs, the UE shall only consider the control information to be consistent

if decoded 'channelization-code-set information' is lower than or equal to 'maximum number of HS-DSCH codes received' in its UE capability and

if the decoded modulation scheme is valid in terms of its UE capability.

If a UE detects that one of the monitored HS-SCCHs in sub-frame *n* carries consistent control information intended for this UE, the UE shall start receiving the HS-PDSCHs indicated by this control information, and, if HARQ_preamble_mode = 1, the UE shall:

transmit a HARQ Preamble (PRE) in the slot allocated to HARQ-ACK in HS-DPCCH sub-frame *n* – 1, unless an ACK or NACK is to be transmitted in sub-frame *n* – 1 as a result of an HS-DSCH transmission earlier than sub-frame *n* on the HS-PDSCH, and

if N_acknack_transmit > 1, the UE shall transmit a HARQ Preamble in the slot allocated to HARQ-ACK in HS-DPCCH sub-frame *n* – 2, unless an ACK or NACK is to be transmitted in sub-frame *n* – 2 as a result of an HS-DSCH transmission earlier than sub-frame *n* on the HS-PDSCH.

The transport block size information shall be derived from the signaled TFRI value as defined in [9]. If the 'Hybrid-ARQ process information' is not included in the set configured by upper layers, the UE shall discard the information received on this HS-SCCH and on the HS-PDSCHs.

The UE shall transmit the ACK/NACK information received from MAC-hs in the slot allocated to the HARQ-ACK in the corresponding HS-DPCCH sub-frame as defined in [1]. When *N_ acknack_transmit* is greater than one, the UE shall:

repeat the transmission of the ACK/NACK information over the next (*N_ acknack_transmit-1*) consecutive HS-DPCCH sub-frames, in the slots allocated to the HARQ-ACK as defined in [1] and

not attempt to receive nor decode transport blocks from the HS-PDSCH in HS-DSCH sub-frames corresponding to HS-DPCCH sub-frames in which the ACK/NACK information transmission is repeated.

If ACK or NACK is transmitted in HS-DPCCH sub-frame *n*, and HARQ_preamble_mode = 1 and UE InterTTI ≤ *N_acknack_transmit*, then the UE shall:

transmit a HARQ Postamble (POST) in the slot allocated to HARQ-ACK in HS-DPCCH subframe *n* + 2**N_acknack_transmt* – 1, unless ACK, NACK, or PRE is to be transmitted in this subframe, and

if *N_acknack_transmit* > 1, transmit a HARQ Postamble (POST) in the slot allocated to HARQ-ACK in HS-DPCCH subframe *n* + 2**N_acknack_transmit* – 2, unless an ACK, NACK or PRE is to be transmitted in this subframe.

If consistent control information is not detected on any of the HS-SCCHs in the HS-SCCH set, DTX shall be used on the HS-DPCCH in the corresponding HS-DPCCH subframe unless PRE or POST are transmitted as described above.

6A .1.2 UE procedure for reporting channel quality indication (CQI)

With the exception of the provisions of subclause 6A.3, the following shall apply:

1) The UE derives the CQI value as defined in 6A .2.

2) For k = 0, the UE shall not transmit the CQI value.
For k > 0, the UE shall transmit the CQI value in each subframe that starts *m*×256 chips after the start of the associated uplink DPCCH frame with *m* fulfilling

$$\left(5\times CFN+\left\lceil m\times 256chip/7680chip\right\rceil\right)\bmod k'=0 \text{ with } k'=k/(2ms),$$

where CFN denotes the connection frame number for the associated DPCH and the set of five possible values of *m* is calculated as described in subclause 7.7 in [1].

3) The UE shall repeat the transmission of the CQI value derived in 1) over the next *(N_cqi_transmit – 1)* consecutive HS-DPCCH sub frames in the slots respectively allocated to the CQI as defined in [1]. UE does not support the case of $k'<N\_cqi\_transmit$.

4) The UE shall not transmit the CQI in other subframes than those described in 2) and 3).

5) In case the HS-DSCH fast handover procedure is actived and if the UE reports a cell in the current repetition period, which is different from the current serving cell, the UE shall report in the following repetition period alternating CQI for the current serving cell and the reported cell, respectively. The UE shall start with the current serving cell.

6A .2 Channel quality indicator (CQI) definition

Based on an unrestricted observation interval, the UE shall report the highest tabulated CQI value for which a single HS-DSCH sub-frame formatted with the transport block size, number of HS-PDSCH codes and modulation corresponding to the reported or lower CQI value could be received in a 3-slot reference period ending 1 slot before the start of the first slot in which the reported CQI value is transmitted and for which the transport block error probability would not exceed 0.1. Depending on the UE category as defined in [10], either Table 7A, 7B, 7C, 7D, or 7E should be used.

For the purpose of CQI reporting, the UE shall assume a total received HS-PDSCH power of $P_{HSPDSCH} = P_{CPICH} + \Gamma + \Delta$ in dB,

where the total received power is evenly distributed among the HS-PDSCH codes of the reported CQI value, the measurement power offset Γ is signaled by higher layers and the reference power adjustment Δ is given by Table 7A, 7B, 7C, 7D, or 7E depending on the UE category.

Further, UE shall assume the number of soft channel bits available in the virtual IR buffer (N_{IR}), and redundancy and constellation version parameter (X_{RV}) as given by Table 7A, 7B, 7C, 7D, or 7E depending on the UE category.

If higher layer signaling informs the UE that for the radio link from the serving HS-DSCH cell it may use a S-CPICH as a phase reference and the P-CPICH is not a valid phase reference, P_{CPICH} is the received power of the S-CPICH used by the UE, otherwise P_{CPICH} is the received power of the P-CPICH. If closed loop transmit diversity is used for the radio link from the serving HS-DSCH cell, P_{CPICH} denotes the power of the combined received CPICH from both transmit antennas, determined as if error-free transmitter weights had been applied to the CPICH, where those weights are determined as described in sub-clause 7.2. If STTD is used, P_{CPICH} denotes the combined CPICH power received from each transmit antenna and if no transmit diversity is used P_{CPICH} denotes the power received from the non diversity antenna.

For the purpose of CQI reporting the UE shall assume that all HS-PDSCH channelisation codes it may receive are under the same scrambling code as the Common Pilot Channel used to determine P_{CPICH}.

Table 7A: CQI mapping table for UE categories 1 to 6.

CQI value	Transport Block Size	Number of HS-PDSCH	Modulation	Reference power adjustment Δ	N_{IR}	X_{RV}
0	N/A	Out of range				
1	137	1	QPSK	0	9600	0
2	173	1	QPSK	0		
3	233	1	QPSK	0		
4	317	1	QPSK	0		
5	377	1	QPSK	0		
6	461	1	QPSK	0		
7	650	2	QPSK	0		
8	792	2	QPSK	0		
9	931	2	QPSK	0		
10	1262	3	QPSK	0		
11	1483	3	QPSK	0		
12	1742	3	QPSK	0		
13	2279	4	QPSK	0		
14	2583	4	QPSK	0		
15	3319	5	QPSK	0		
16	3565	5	16-QAM	0		
17	4189	5	16-QAM	0		
18	4664	5	16-QAM	0		
19	5287	5	16-QAM	0		
20	5887	5	16-QAM	0		
21	6554	5	16-QAM	0		
22	7168	5	16-QAM	0		
23	7168	5	16-QAM	-1		
24	7168	5	16-QAM	-2		
25	7168	5	16-QAM	-3		
26	7168	5	16-QAM	-4		
27	7168	5	16-QAM	-5		
28	7168	5	16-QAM	-6		
29	7168	5	16-QAM	-7		
30	7168	5	16-QAM	-8		

Table 7B: CQI mapping table for UE categories 7 and 8.

CQI value	Transport Block Size	Number of HS-PDSCH	Modulation	Reference power adjustment Δ	N_{IR}	X_{RV}
0	N/A	Out of range				
1	137	1	QPSK	0	19200	0
2	173	1	QPSK	0		
3	233	1	QPSK	0		
4	317	1	QPSK	0		
5	377	1	QPSK	0		
6	461	1	QPSK	0		
7	650	2	QPSK	0		
8	792	2	QPSK	0		
9	931	2	QPSK	0		
10	1262	3	QPSK	0		
11	1483	3	QPSK	0		
12	1742	3	QPSK	0		
13	2279	4	QPSK	0		
14	2583	4	QPSK	0		
15	3319	5	QPSK	0		
16	3565	5	16-QAM	0		
17	4189	5	16-QAM	0		
18	4664	5	16-QAM	0		
19	5287	5	16-QAM	0		
20	5887	5	16-QAM	0		
21	6554	5	16-QAM	0		
22	7168	5	16-QAM	0		
23	9719	7	16-QAM	0		
24	11418	8	16-QAM	0		
25	14411	10	16-QAM	0		
26	14411	10	16-QAM	-1		
27	14411	10	16-QAM	-2		
28	14411	10	16-QAM	-3		
29	14411	10	16-QAM	-4		
30	14411	10	16-QAM	-5		

Table 7C: CQI mapping table for UE category 9.

CQI value	Transport Block Size	Number of HS-PDSCH	Modulation	Reference power adjustment Δ	N_{IR}	X_{RV}
0	N/A	Out of range				
1	137	1	QPSK	0	28800	0
2	173	1	QPSK	0		
3	233	1	QPSK	0		
4	317	1	QPSK	0		
5	377	1	QPSK	0		
6	461	1	QPSK	0		
7	650	2	QPSK	0		
8	792	2	QPSK	0		
9	931	2	QPSK	0		
10	1262	3	QPSK	0		
11	1483	3	QPSK	0		
12	1742	3	QPSK	0		
13	2279	4	QPSK	0		
14	2583	4	QPSK	0		
15	3319	5	QPSK	0		
16	3565	5	16-QAM	0		
17	4189	5	16-QAM	0		
18	4664	5	16-QAM	0		
19	5287	5	16-QAM	0		
20	5887	5	16-QAM	0		
21	6554	5	16-QAM	0		
22	7168	5	16-QAM	0		
23	9719	7	16-QAM	0		
24	11418	8	16-QAM	0		
25	14411	10	16-QAM	0		
26	17237	12	16-QAM	0		
27	17237	12	16-QAM	-1		
28	17237	12	16-QAM	-2		
29	17237	12	16-QAM	-3		
30	17237	12	16-QAM	-4		

Table 7D: CQI mapping table for UE category 10.

CQI value	Transport Block Size	Number of HS-PDSCH	Modulation	Reference power adjustment Δ	N_{IR}	X_{RV}
0	N/A	Out of range				
1	137	1	QPSK	0	28800	0
2	173	1	QPSK	0		
3	233	1	QPSK	0		
4	317	1	QPSK	0		
5	377	1	QPSK	0		
6	461	1	QPSK	0		
7	650	2	QPSK	0		
8	792	2	QPSK	0		
9	931	2	QPSK	0		
10	1262	3	QPSK	0		
11	1483	3	QPSK	0		
12	1742	3	QPSK	0		
13	2279	4	QPSK	0		
14	2583	4	QPSK	0		
15	3319	5	QPSK	0		
16	3565	5	16-QAM	0		
17	4189	5	16-QAM	0		
18	4664	5	16-QAM	0		
19	5287	5	16-QAM	0		
20	5887	5	16-QAM	0		
21	6554	5	16-QAM	0		
22	7168	5	16-QAM	0		
23	9719	7	16-QAM	0		
24	11418	8	16-QAM	0		
25	14411	10	16-QAM	0		
26	17237	12	16-QAM	0		
27	21754	15	16-QAM	0		
28	23370	15	16-QAM	0		
29	24222	15	16-QAM	0		
30	25558	15	16-QAM	0		

Table 7E: CQI mapping table for UE categories 11 and 12.

CQI value	Transport Block Size	Number of HS-PDSCH	Modulation	Reference power adjustment Δ	N_{IR}	X_{RV}
0	N/A	Out of range				
1	137	1	QPSK	0	4800	0
2	173	1	QPSK	0		
3	233	1	QPSK	0		
4	317	1	QPSK	0		
5	377	1	QPSK	0		
6	461	1	QPSK	0		
7	650	2	QPSK	0		
8	792	2	QPSK	0		
9	931	2	QPSK	0		
10	1262	3	QPSK	0		
11	1483	3	QPSK	0		
12	1742	3	QPSK	0		
13	2279	4	QPSK	0		
14	2583	4	QPSK	0		
15	3319	5	QPSK	0		
16	3319	5	QPSK	-1		
17	3319	5	QPSK	-2		
18	3319	5	QPSK	-3		
19	3319	5	QPSK	-4		
20	3319	5	QPSK	-5		
21	3319	5	QPSK	-6		
22	3319	5	QPSK	-7		
23	3319	5	QPSK	-8		
24	3319	5	QPSK	-9		
25	3319	5	QPSK	-10		
26	3319	5	QPSK	-11		
27	3319	5	QPSK	-12		
28	3319	5	QPSK	-13		
29	3319	5	QPSK	-14		
30	3319	5	QPSK	-15		

6A .3 Operation during compressed mode on the associated DPCH

During compressed mode on the associated DPCH, the following applies for the UE for transmission of HS-DPCCH and reception of HS-SCCH and HS-PDSCH:

- The UE shall neglect a HS-SCCH or HS-PDSCH transmission, if a part of the HS-SCCH or a part of the corresponding HS-PDSCH overlaps with a downlink transmission gap on the associated DPCH. In this case, neither ACK, nor NACK shall be transmitted by the UE to respond to the corresponding downlink transmission.

- If a part of a HS-DPCCH slot allocated to HARQ-ACK overlaps with an uplink transmission gap on the associated DPCH, the UE shall use DTX on the HS-DPCCH in that HS-DPCCH slot.
- If in a HS-DPCCH sub-frame a part of the slots allocated for CQI information overlaps with an uplink transmission gap on the associated DPCH, the UE shall not transmit CQI information in that sub-frame.
- If a CQI report is scheduled in the current CQI field according to subclause 6A.1.2 paragraph (2), and the corresponding 3-slot reference period (as defined in subclause 6A.2) wholly or partly overlaps a downlink transmission gap, then the UE shall use DTX in the current CQI field and in the CQI fields in the next (*N_cqi_transmit*–1) subframes.

6A.4 HS-DSCH fast handover procedure

The HS-DSCH fast handover procedure is to use the UL DPCCH control channel to indicate the change of the best cell as the UE's request of the HS-DSCH handover to the new best cell. The operation of the HS-DSCH fast handover is to have the UL DPCCH reconfigured to slot format 2, 3, 4, or 5 [1] with the FBI bits in the beginning of the soft handover of the DCH. A sequence of the FBI bits is used to form the temporary cell ID, as shown in Table 3 and 4, to indicate the best cell of the HS-DSCH. Each cell involved in the soft handover is assigned a temporary cell ID. The UE reports the best cell ID and repeats it for a given repetition period. The repetition period is defined by the repetition period duration N_{report} number of radio frames and the repetition period start reference CFN. They are set through [5] and [6]. The UE shall report in the current repetition period the cell ID of the best cell according to the UE internal measurement result obtained in the previous repetition period.. The Node B needs to decode the cell ID reliably within the given decoding period [6]. Once the change of the best cell is detected, all cells report the change of the best cell to the RNC through the new control frame in [11].

The UE internal measurement to determine the best cell is shown in the following:

Triggering condition for the determination of the best cell

$$10 \cdot LogM_{NotBest} + CIO_{NotBest} \geq 10 \cdot LogM_{Best} + CIO_{Best} + H,$$

The variables in the formula are defined as follows and given by [5]:

M$_{NotBest}$ is the measurement result of a cell among the preconfigured cells for HSDPA not stored in the "best cell". IIR filtering shall be applied as of [5]. The measure can be either CPICH RSCP or CPICH Ec/I0.

CIO$_{NotBest}$ is the cell individual offset in dB of a cell not stored in the "best cell" for all preconfigured cells for HSDPA..

M$_{Best}$ is the measurement result of the cell stored in the "best cell" IIR filtering shall be applied as of [5]. The measure can be either CPICH RSCP or CPICH Ec/I0.

CIO$_{Best}$ is the cell individual offset of a cell stored in the "best cell".

H is the hysteresis parameter for the detection of a new "best cell".

Filtering coefficient, measure, CIO and H are configured by higher layers as of [5].

The HS-DSCH fast handover procedure and CLTD features cannot be used simultaneously.

If the network decides that the UE should perform the handover, the UE would be confirmed of it's request to handover to the reported new best cell ID through HS-SCCH scheduling. The UE will attempt to handover to the new best cell at the end of the repetition period of time over which it is required to indicate the new best cell ID. In this way, the NodeBs and RNC are given advanced notification of the exact time at which the UE will handover (if the UE receives the handover confirmation) in order to prepare the radio links and data flow at the new NodeB. During the transition period between the reported best cell change and the completion of the handover, the current serving cell would

continue to schedule the service to the UE and attempt to complete all HARQ processes. This will prevent long periods of time of service interruption.

The notification of the UTRAN decision to the UE is as follows

If the RNC decides to confirm the handover request (and thus HS-DSCH cell change is required), the RNC signals this to all NodeBs that contain preconfigured cells for HSDPA through the control frame in [11]. The Target NodeB will receive the MAC-d data flow where it will then schedule to the UE of the HS-DSCH data in the new cell through the HS-SCCH at the start of the Repetition period. If the handover request is not granted by the RNC, the RNC will continue to route the data to the serving NodeB. The serving NodeB would continue scheduling the UE, even after the tentative handover time (i.e. the end of the Nth frame). Thus, the UE needs to monitor two HS-SCCHs in the current serving cell and two HS-SCCHs in the target cell, starting from the next repetition period after the change of the best cell is reported, to accommodate for the successful and failure cases of the handover response, cf section 6A.1.1. The UE also sends the CQI reports to both NodeBs during this period. The UE will report the CQI results from both the serving cell in the odd numbers of TTI and target cell alternatively in the even number of TTIs every subframe starting from the end of the repetition period of the best cell change in order to allow either cell as the serving cell to schedule service, cf. section 6A.1.2. The UE will send a single CQI report only to the new NodeB and monitor HS-SCCHs from one cell once it received scheduled data transmission from the new NodeB (either the target NodeB for the successful handover case or the source NodeB for the failure case) or it received the handover response from the layer 3 signaling message [5].

3GPP TSG-??? Meeting #nn
Location, Country, Date

Tdoc ⌘DocNumber

CR-Form-v7.1

CHANGE REQUEST

⌘ **25.308** **CR** **CRNum** ⌘**rev** **-** ⌘ Current version: **6.3.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ [ ] ME [X] Radio Access Network [X] Core Network [ ]

Title: ⌘ HSDPA Fast handover procedure

Source: ⌘

Work item code: ⌘ ***Date:*** ⌘ dd/mm/yyyy

Category: ⌘ ***Release:*** ⌘

Use one of the following categories:
- ***F*** *(correction)*
- ***A*** *(corresponds to a correction in an earlier release)*
- ***B*** *(addition of feature),*
- ***C*** *(functional modification of feature)*
- ***D*** *(editorial modification)*

Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

Ph2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*
Rel-7	*(Release 7)*

Reason for change: ⌘

Summary of change: ⌘

Consequences if not approved: ⌘

Clauses affected: ⌘

	Y	N		
Other specs affected: ⌘			Other core specifications	⌘
			Test specifications	
			O&M Specifications	

Other comments: ⌘

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

[…]

2 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. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 25.855: "High Speed Downlink Packet Access (HSDPA): Overall UTRAN Description".

[2] 3GPP TS 25.321: "Medium Access Control (MAC) protocol specification".

[3] 3GPP TS 25.214: "Physical layer procedures (FDD)".

[4] 3GPP TS 25.331: "Radio Resource Control (RRC); protocol specification".

[5] 3GPP TS 25.433: "NBAP Specification".

[…]

9 Mobility procedures

While in CELL_DCH state, the UE may be allocated one or more HS-PDSCH(s), allowing it to receive data on the HS-DSCH(s).

Mobile evaluated hard-handover and soft-handover mechanisms provide the RRC connection mobility in CELL_DCH state. The mobility procedures are affected by the fact that the HS-PDSCH allocation for a given UE belongs to only one of the radio links assigned to the UE, the *serving HS-DSCH radio link*. The cell associated with the serving HS-DSCH radio link is defined as the *serving HS-DSCH cell*.

A *serving HS-DSCH cell change* facilitates the transfer of the role of serving HS-DSCH radio link from one radio link belonging to the source HS-DSCH cell to a radio link belonging to the target HS-DSCH cell.

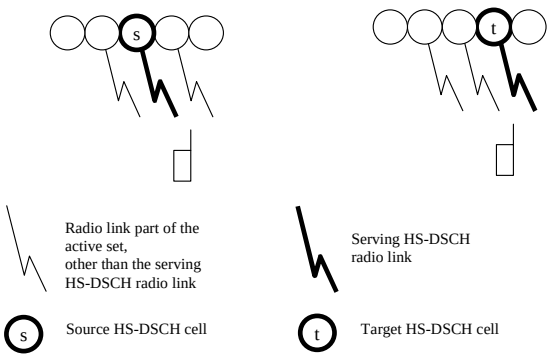

Figure 9-1: Serving HS-DSCH cell change

The serving HS-DSCH cell change may be further categorised in regards to whether the decision of the target HS-DSCH cell is made by the UE or by the network. In Release 5, only network controlled serving HS-DSCH cell changes shall be supported.

In case of a *network-controlled serving HS-DSCH cell change* the network makes the decision of the target HS-DSCH cell, and the decision could be based on UE measurement reports and other information available in the network. A network controlled HS-DSCH cell change is performed as an RRC layer signalling procedure and is based on the existing handover procedures in CELL_DCH state, or using the HS-DSCH fast handover procedure described below.

9A HS-DSCH Fast handover procedure

In the HS-DSCH fast handover procedure, the UE requests a HS-DSCH handover to the new best cell [1] using the UL dedicated control channel. A subset of the UE's active set is preconfigured for HSDPA and each preconfigured cell is assigned a temporary cell ID. The UE will signal the cell ID of the best cell among the preconfigured cells for HSDPA on the dedicated control channel reconfigured to carry the temporary cell ID of the best cell of the preconfigured cells for HSDPA. The UE repeats the same Cell ID over a given repetition period. The repetition period is defined by the repetition period duration and the repetition period start reference CFN. They are set through RRC layer and NBAP signalling procedures [4, 5]. The UE shall report in the current repetition period the cell ID of the best cell according to the UE internal measurement result obtained in the previous repetition period. The Node B needs to decode the cell ID reliably within the decoding period (smaller than the repetition period) given via NBAP signalling. Once the change of the best cell is detected, all NodeBs report the change of the best cell to the RNC through a control frame in the user plane protocol.

The RNC responds to the UE's handover request through the control frame in the user plane protocol. If the RNC decides that the UE should perform the handover, the new Cell Id is sent to all NodeBs preconfigured for HSDPA before the end of the repetition period in which the UE requested a handover. The UE would be confirmed of its request to handover to the reported best cell through HS-SCCH scheduling on the reported best cell at the start of the next repetition period. Therefore, during the repetition period following the repetition period where the UE requested a HS-DSCH HO, the UE will attempt to handover to the reported best cell. UE monitors two HS-SCCHs from the current cell and two HS-SCCHs from the reported best cell at the beginning of the repetition period after which it reported the new best cell ID. The UE also reports the CQI of the two cells in alternate manner during the repetition period where it monitors HS-SCCHs from both cells.

This is a pseudo-sychronised handover since both NodeBs and the UEs all perform the HO at the repetition period boundary. In this way, the NodeB(s) and RNC(s) have advanced notification of the exact time at which the UE will try to handover in order to prepare the radio links and data flow at the target NodeB. During the transition period after the UE starts to report the new best cell and the start of the next repetition period boundary, the MAC-hs in current serving cell would continue to schedule the service to the UE and attempt to complete all HARQ processes. This will limit the service interruption period.

3GPP TSG-RAN2 Meeting #xx ***Tdoc R2-05xxxx***
Place, Country, Date

4.2.3.3 MAC-hs entity – UE Side

The MAC-hs handles the HSDPA specific functions. In the model below the MAC-hs comprises the following entities:

- HARQ:
  The HARQ entity is responsible for handling the MAC functions relating to the HARQ protocol. The HARQ functional entity handles all the tasks that are required for hybrid ARQ. It is responsible for generating ACKs or NACKs. The detailed configuration of the hybrid ARQ protocol is provided by RRC over the MAC-Control SAP.

- Reordering Queue distribution:
  The reordering queue distribution function routes the MAC-hs PDUs to the correct reordering buffer based on the Queue ID.

- Reordering:
  The reordering entity reorders received MAC-hs PDUs according to the received TSN. MAC-hs PDUs with consecutive TSNs are delivered to the disassembly function upon reception. MAC-hs PDUs are not delivered to the disassembly function if MAC-hs PDUs with lower TSN are missing. There is one reordering entity for each Queue ID configured at the UE.

- Disassembly:
  The disassembly entity is responsible for the disassembly of MAC-hs PDUs. When a MAC-hs PDU is disassembled the MAC-hs header is removed, the MAC-d PDUs are extracted and any present padding bits are removed. Then the MAC-d PDUs are delivered to higher layer.

- HS-DSCH Fast handover:
  Execute HS-DSCH fast handover procedure.

The associated signalling shown in the figure illustrates the exchange of information between layer 1 and layer 2 provided by primitives shown in [3].

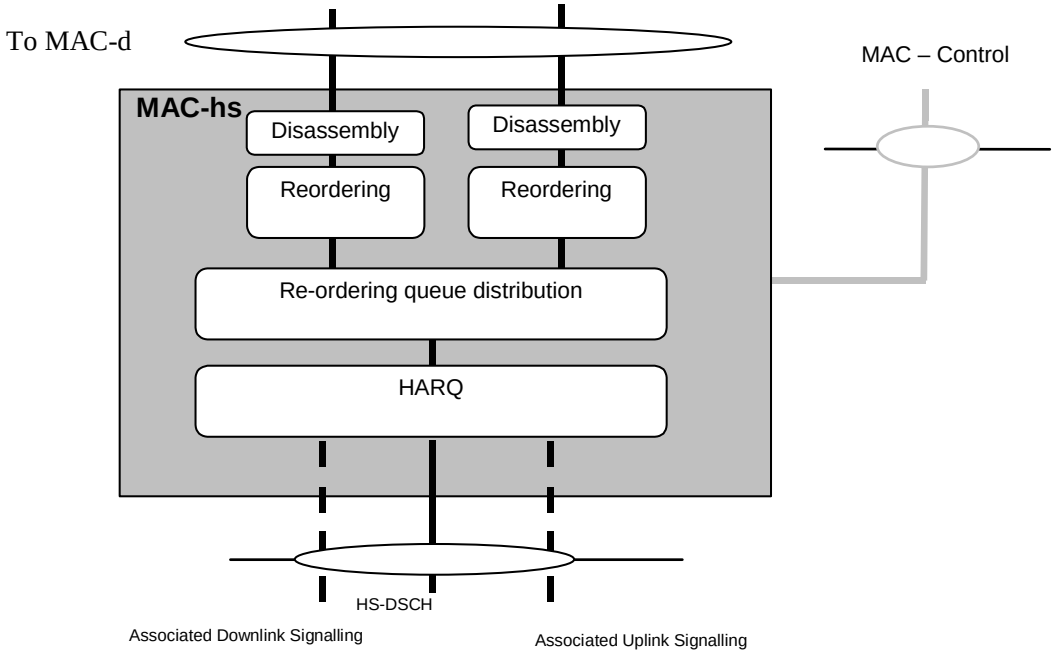

Figure 4.2.3.3.1: UE side MAC architecture / MAC-hs details

4.2.4.3 MAC-hs entity – UTRAN Side

There is one MAC-hs entity in the UTRAN for each cell that supports HS-DSCH transmission. The MAC-hs is responsible for handling the data transmitted on the HS-DSCH. Furthermore it is responsible for the management of the physical resources allocated to HSDPA. MAC-hs receives configuration parameters from the RRC layer via the MAC-Control SAP. There should be priority handling per MAC-d PDU in the MAC-hs. The MAC-hs is comprised of four different functional entities:

- Flow Control:
  This is the companion flow control function to the flow control function in the MAC-c/sh in case of configuration with MAC-c/sh and MAC-d in case of configuration without MAC-c/sh. Both entities together provide a controlled data flow between the MAC-c/sh and the MAC-hs (Configuration with MAC-c/sh) or the MAC-d and MAC-hs (Configuration without MAC-c/sh) taking the transmission capabilities of the air interface into account in a dynamic manner. This function is intended to limit layer 2 signalling latency and reduce discarded and retransmitted data as a result of HS-DSCH congestion. Flow control is provided independently by MAC-d flow for a given MAC-hs entity.

- Scheduling/Priority Handling:
  This function manages HS-DSCH resources between HARQ entities and data flows according to their priority. Based on status reports from associated uplink signalling either new transmission or retransmission is determined. Further it determines the Queue ID and TSN for each new MAC-hs PDU being serviced, and in the case of TDD the HCSN is determined. A new transmission can be initiated instead of a pending retransmission at any time to support the priority handling.

- HARQ:
  One HARQ entity handles the hybrid ARQ functionality for one user. One HARQ entity is capable of supporting multiple instances (HARQ process) of stop and wait HARQ protocols. There shall be one HARQ process per HS-DSCH per TTI.

- TFRC selection:
  Selection of an appropriate transport format and resource for the data to be transmitted on HS-DSCH.

- HS-DSCH Fast handover:
  Execute HS-DSCH fast handover procedure.

The associated signalling shown in the figure illustrates the exchange of information between layer 1 and layer 2 provided by primitives shown in [3].

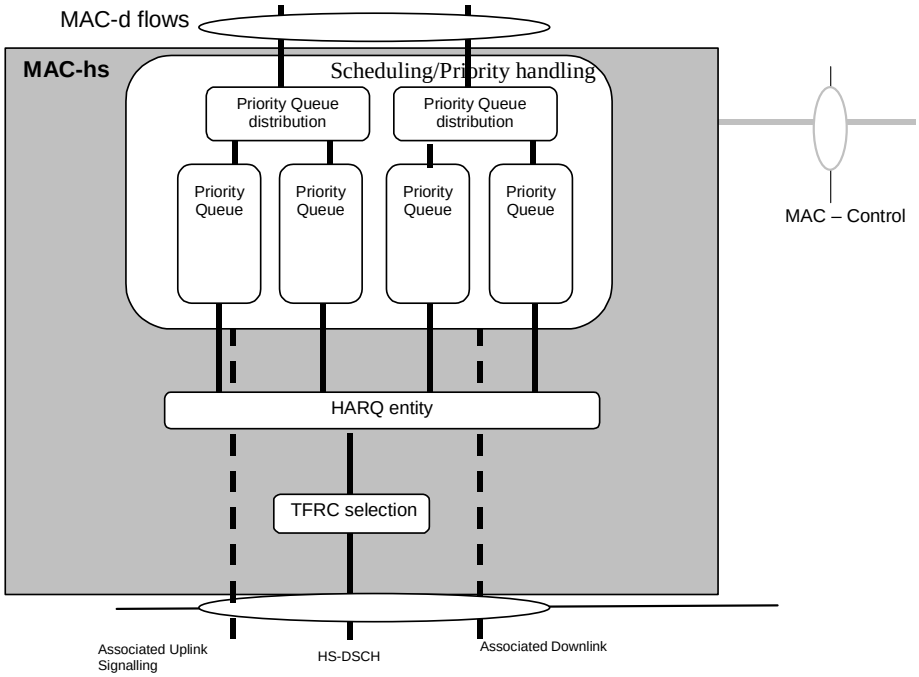

Figure 4.2.4.3.1: UTRAN side MAC architecture / MAC-hs details

8.3 Primitives between MAC and RRC

8.3.1 Primitives

The primitives between MAC and RRC are shown in table 8.3.1.1.

Table 8.3.1.1: Primitives between MAC sub-layer and RRC

Generic Name	Parameter			
	Request	Indication	Response	Confirm
CMAC-CONFIG	UE information elements, RB information elements, TrCH information elements, RACH transmission control elements, Ciphering elements, CPCH transmission control elements			
CMAC-MEASUREMENT	Measurement information elements	Measurement result		
CMAC-STATUS **CMAC-CID**		Status info Serving HS-DSCH Cell Selected		

CMAC-CONFIG-Req:

- CMAC-CONFIG-Req is used to request for setup, release and configuration of a logical channel, e.g. RNTI allocation, switching the connection between logical channels and transport channels, TFCS update or scheduling priority of logical channel.

CMAC-MEASUREMENT-Req/Ind:

- CMAC-MEASUREMENT-Req is used by RRC to request MAC to perform measurements, e.g. traffic volume measurements;

- CMAC-MEASUREMENT-Ind is used to notify RRC of the measurement result.

CMAC-STATUS-Ind:

- CMAC-STATUS-Ind primitive notifies RRC of status information.

CMAC-CID :

- CMAC-CID-Ind primitive notifies RRC of the HS-DSCH serving cell selected by MAC.

8.3.2 Parameters

See [7] for a detailed description of the UE, RB and TrCH information elements.

a) UE information elements
S-RNTI
SRNC identity
C-RNTI
Activation time

b) RB information elements
RB multiplexing info (Transport channel identity, Logical channel identity, MAC logical channel priority)

c) TrCH information elements
Transport Format Combination Set
MAC-hs reset indicator
Re-ordering release timer (T1)

d) Measurement information elements
Reporting Quantity identifiers
Time interval to take an average or a variance (applicable when Average or Variance is Reporting Quantity)

e) Measurement result
Reporting Quantity

f) Status info
when set to value ""transmission unsuccessful"" this parameter indicates to RRC that transmission of a TM RLC PDU failed (due to e.g. Maximum number of preamble ramping cycles reached for RACH in FDD), when set to value "transmission successful" this parameter indicates to RRC that the requested TM RLC PDU(s) has been submitted for transmission by the physical layer.

g) RACH transmission control elements
Set of ASC parameters (identifier for PRACH partitions, persistence values)
Maximum number of preamble ramping cycles (FDD) or synchronisation attempts (1.28 Mcps TDD) M_{max}
Minimum and maximum number of time units between two preamble ramping cycles, N_{BO1min} and N_{BO1max} (FDD only)
ASC for RRC CONNECTION REQUEST message

h) Ciphering elements
Ciphering mode
Ciphering key
Ciphering sequence number

i) CPCH transmission control elements
CPCH persistency value, P for each Transport Format
Maximum number of preamble ramping cycles $N_{\_access\_fails}$
NF_max (Maximum number of frames for CPCH transmission for each Transport Format)
N_EOT (Number of EOT for release of CPCH transmission)
Backoff control timer parameters
Transport Format Set
Initial Priority Delays
Channel Assignment Active indication

11.6.1.4 HS-DSCH Fast handover procedure :

The HS-DSCH fast handover procedure sets the switchover of the HS-DSCH from the serving cell to the target cell. Once the HS-DSCH fast handover procedure is activated, the UTRAN should:

- Set a temporary CELL ID for each cell in the active set
- Source Nodeb Ssets a counter of the repetition interval of the best cell indication and the referential starting CFN at all preconfigured cells for HSDPA in the active set
  - Receive the best cell ID at the beginning of the counter for all cells according to FBI reporting [13]
  - Reset the counter after each repetition interval
- Schedule towards the UE by the current serving cell if the best cell ID remains unchanged.the same
- Prepare to handover to the new cell when a new best cell ID is received as the HO request from the UE.
  - Source NodeB Ssends the new best cell ID to the RNC to indicate the change of the best cell. as the UE's request of the handover
  - Continuously schedule to the UE from the serving cell till the next counter reset.
  - Set the stop time of the HARQ process to ensure the completion of all HARQ process before the next counter reset.
- RNC sends the new best cell ID as the HS-DSCH HO response to all NodeBs, which contain preconfigured cells for HSDPA in the active set before the next counter reset
  - Target NodeB starts scheduling to the UE on the new best cell ID at the next counter reset.

CR-Form-v7.1

CHANGE REQUEST

⌘ **25.331** **CR** **-** ⌘ **rev** **-** ⌘ Current version: **6.4.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ [ ] ME [X] Radio Access Network [X] Core Network [ ]

Title:	⌘	HS-DSCH fast handover
Source:	⌘	
Work item code:	⌘	***Date:*** ⌘
Category:	⌘	***Release:*** ⌘

Use one of the following categories:
- ***F*** *(correction)*
- ***A*** *(corresponds to a correction in an earlier release)*
- ***B*** *(addition of feature),*
- ***C*** *(functional modification of feature)*
- ***D*** *(editorial modification)*

Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

Ph2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*
Rel-7	*(Release 7)*

Reason for change:	⌘	
Summary of change:	⌘	
Consequences if not approved:	⌘	

Clauses affected:	⌘	

Other specs affected: ⌘

Y	N	
	X	Other core specifications
	X	Test specifications
	X	O&M Specifications

⌘

Other comments: ⌘

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

[…]

2 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. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 25.301: "Radio Interface Protocol Architecture".

[3] 3GPP TS 25.303: "Interlayer Procedures in Connected Mode".

[4] 3GPP TS 25.304: "UE Procedures in Idle Mode and Procedures for Cell Reselection in Connected Mode".

[5] 3GPP TS 24.008: "Mobile radio interface layer 3 specification; Core Network Protocols; Stage 3".

[6] 3GPP TS 25.103: "RF parameters in support of RRM".

[7] 3GPP TS 25.215: "Physical layer – Measurements (FDD)".

[8] 3GPP TS 25.225: "Physical layer – Measurements (TDD)".

[9] 3GPP TS 25.401: "UTRAN overall description".

[10] 3GPP TS 25.402: "Synchronization in UTRAN; Stage 2".

[11] 3GPP TS 23.003: "Numbering, addressing and identification".

[12] ICD-GPS-200: "Navstar GPS Space Segment/Navigation User Interface".

[13] RTCM-SC104: "RTCM Recommended Standards for Differential GNSS Service (v.2.2)".

[14] 3GPP TR 25.921: "Guidelines and principles for protocol description and error handling".

[15] 3GPP TS 25.321: "Medium Access Control (MAC) protocol specification".

[16] 3GPP TS 25.322: "Radio Link Control (RLC) protocol specification".

[17] 3GPP TS 24.007: "Mobile radio interface signalling layer 3; General aspects".

[18] 3GPP TS 25.305: "Stage 2 Functional Specification of UE Positioning in UTRAN".

[19] 3GPP TS 25.133: "Requirements for Support of Radio Resource Management (FDD)".

[20] 3GPP TS 25.123: "Requirements for Support of Radio Resource Management (TDD)".

[21] 3GPP TS 25.101: "UE Radio Transmission and Reception (FDD)".

[22] 3GPP TS 25.102: "UE Radio Transmission and Reception (TDD)".

[23] 3GPP TS 23.060: "General Packet Radio Service (GPRS); Service description; Stage 2".

[24] 3GPP TS 23.032: "Universal Geographical Area Description (GAD)".

[25] 3GPP TS 23.122: "Non-Access-Stratum functions related to Mobile Station (MS) in idle mode".

[26] 3GPP TS 25.211: "Physical channels and mapping of transport channels onto physical channels (FDD)".

[27] 3GPP TS 25.212: "Multiplexing and channel coding (FDD)".

[28] 3GPP TS 25.213: "Spreading and modulation (FDD)".

[29] 3GPP TS 25.214: "Physical layer procedures (FDD)".

[30] 3GPP TS 25.221: "Physical channels and mapping of transport channels onto physical channels (TDD)".

[…]

8.2.2.1 General

Reconfiguration procedures include the following procedures:

- the radio bearer establishment procedure;
- radio bearer reconfiguration procedure;
- the radio bearer release procedure;
- the transport channel reconfiguration procedure; and
- the physical channel reconfiguration procedure.

The radio bearer establishment procedure is used to establish new radio bearer(s).

The radio bearer reconfiguration procedure is used to reconfigure parameters for a radio bearer.

The radio bearer release procedure is used to release radio bearer(s).

The transport channel reconfiguration procedure is used to reconfigure transport channel parameters.

The physical channel reconfiguration procedure is used to establish, reconfigure and release physical channels.

While performing any of the above procedures, these procedures may perform a hard handover (subclause 8.3.5) and/or an HS-DSCH cell change, HSDPA fast handover and/or a serving E-DCH cell change. The reconfiguration procedures are also used to change the feedback configuration for HS-DSCH.

[…]

8.6.6.4 Downlink information for each radio link

If the IE "Downlink information for each radio link" is included in a received message, the UE shall:

1> if the UE would enter CELL_DCH state according to subclause 8.6.3.3 applied on the received message:

2> if the IE "SCCPCH Information for FACH" is included; and

2> if the UE is in FDD mode and is not capable of simultaneous reception of DPCH and Secondary CCPCH:

3> set the variable UNSUPPORTED_CONFIGURATION to TRUE;

2> if the UE is in FDD mode and is capable of simultaneous reception of DPCH and SCCPCH:

3> start to receive the indicated Secondary CCPCH.

2> if the UE is in TDD mode and shared transport channels are assigned to the UE:

3> start to receive the indicated Secondary CCPCH.

2> if the UE is in TDD mode and no shared transport channels are assigned to the UE:

3> set the variable UNSUPPORTED_CONFIGURATION to TRUE.

2> if the IE "Serving HS-DSCH radio link indicator" is set to 'TRUE':

3> consider this radio link as the serving HS-DSCH radio link.

2> if the IE "Serving E-DCH radio link indicator" is set to 'TRUE':

3> consider this radio link as the serving E-DCH radio link.

2> if the IE "E-AGCH Info" is included:

3> store the newly received E-AGCH configuration.

2> if the IE "E-HICH information" is included:

3> store this E-HICH configuration for the concerning radio link.

2> if the IE "E-RGCH information" is included:

3> store this E-RGCH configuration for the concerning radio link.

2> determine the value for the E_DCH_TRANSMISSION variable and take the corresponding actions as described in subclause 8.5.28.

2> act on the other IEs contained in the IE "Downlink information for each radio link" as specified in subclause 8.6 applied on this radio link.

1> in addition, if the message was received in CELL_DCH state and the UE remains in CELL_DCH state according to subclause 8.6.3.3 applied on the received message:

2> if the IE "Serving HS-DSCH radio link indicator" is set to 'TRUE':

3> consider this radio link as the serving HS-DSCH radio link;

3> if the serving HS-DSCH radio link was another radio link than this radio link prior to reception of the message and the IE "H-RNTI" is not included:

4> clear the variable H_RNTI.

2> if the IE "Serving HS-DSCH radio link indicator" is set to ‘FALSE’ and this radio link was considered the serving HS-DSCH radio link prior to reception of this message:

3> no longer consider this radio link as the serving HS-DSCH radio link.

2> if the IE “HS-DSCH fast handover Cell id per radio link” is included store this value for radio link identification according to [29]

3> -if the IE “Cell individual offset” is included

4> -configure the HS-DSCH fast handover measurement [29] with the value given in this IE

3> –else

4> -configure the HS-DSCH fast handover measurement [29] with the value of 0dB.

–3> -store the value given in the IE “HS-DSCH fast handover Mac-hs reset identifier” for Mac-hs reset identification according to [15]

2> determine the value for the HS_DSCH_RECEPTION variable and take the corresponding actions as described in subclause 8.5.25.

2> if the IE "Serving E-DCH radio link indicator" is set to 'TRUE':

3> if the serving E-DCH radio link was another radio link than this radio link prior to reception of the message and the IE "E-RNTI" is not included:

4> clear the variable E_RNTI.

2> if the IE "Serving E-DCH radio link indicator" is set to 'FALSE' and this radio link was considered the serving E-DCH radio link prior to reception of this message:

3> no longer consider this radio link as the serving E-DCH radio link.

2> for each optional IE part of the IE "Downlink information for each radio link" that is not present:

3> do not change its current downlink physical channel configuration corresponding to the IE, which is absent, if not stated otherwise elsewhere.

NOTE: The Release '99 RADIO BEARER RECONFIGURATION message always includes at least one IE "Downlink information for each radio link" containing the mandatory IEs, even if UTRAN does not require the reconfiguration of any radio link.

1> if the UE would enter either the CELL_FACH, CELL_PCH or URA_PCH state according to subclause 8.6.3.3 applied on the received message:

2> if the received message is CELL UPDATE CONFIRM:

3> ignore the IE "Downlink information for each radio link".

2> if the received message is any other message than CELL UPDATE CONFIRM; and

2> if IEs other than the IE "Primary CPICH info" (for FDD) or the IE "Primary CCPCH info" (for TDD) are included in the IE "Downlink information for each radio link":

3> ignore these IEs.

2> act on the other IEs contained in the IE "Downlink information for each radio link" as specified in subclause 8.6 applied on this radio link.

[…]

8.6.6.27 Downlink information common for all radio links

If the IE "Downlink information common for all radio links " is included the UE shall:

1> if the IE "Downlink DPCH info common for all RL" is included:

2> perform actions as specified in subclause 8.6.6.28.

1> if the IE choice "mode" is set to 'FDD':

2> perform actions for the IE "DPCH compressed mode info" as specified in subclause 8.6.6.15;

2> perform actions for the IE "Tx Diversity mode" as specified in subclause 8.6.6.24;

2> if the IE "SSDT information" is included:

3> perform actions as specified in subclause 8.6.6.25.

2> if the IE " HS-DSCH fast handover information " is included:

3> perform actions as specified in subclause 8.6.6.38.

1> if the IE "Default DPCH Offset value" is included:

2> perform actions as specified in the subclause 8.6.6.21.

1> if the IE "MAC-hs reset indicator" is included:

2> if the serving HS-DSCH radio link is the same radio link as prior to the reception of the message:

3> the UE behaviour is unspecified;

2> reset the MAC-hs entity [15].

[…]

8.6.6.38 HS-DSCH fast handover information

If the IE "HS-DSCH fast handover information" is included and the UE will be in CELL_DCH state after completion of this procedure, the UE shall:

1> store the newly received IE “HS-DSCH fast handover information”;

1> configure the size of the S-field in the FBI field on the uplink DPCCH to the value indicated in the IE "S-field";

1> use the length of the temporary cell ID code for SSDT indicated in the IE "Code Word Set".

1> configure the repetition period duration to the value given in the IE “Repetition Period Duration”;

1> set the repetition period start reference cfn to the value given in the IE “Repetition Period Reference”;

1> configure internal HS-DSCH fast handover measurement with the values given in the IEs “Measure”, “Hysteresis” and “Filter coefficient” according to [29]

[…]

10.2.33 RADIO BEARER SETUP

This message is sent by UTRAN to the UE to establish new radio bearer(s). It can also include modifications to the configurations of transport channels and/or physical channels.

RLC-SAP: AM or UM

Logical channel: DCCH

Direction: UTRAN → UE

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
Message Type	MP		Message Type		
UE Information Elements					
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36		
Integrity check info	CH		Integrity check info 10.3.3.16		
Integrity protection mode info	OP		Integrity protection mode info 10.3.3.19	The UTRAN should not include this IE unless it is performing an SRNS relocation	
Ciphering mode info	OP		Ciphering mode info 10.3.3.5	The UTRAN should not include this IE unless it is performing an SRNS relocation and a change in ciphering algorithm	

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
Activation time	MD		Activation time 10.3.3.1	Default value is "now"	
New U-RNTI	OP		U-RNTI 10.3.3.47		
New C-RNTI	OP		C-RNTI 10.3.3.8		
New DSCH-RNTI	OP		DSCH-RNTI 10.3.3.9a		
New H-RNTI	OP		H-RNTI 10.3.3.14a		REL-5
New E-RNTI	OP		E-RNTI 10.3.3.10a		REL-6
RRC State Indicator	MP		RRC State Indicator 10.3.3.35a		
UTRAN DRX cycle length coefficient	OP		UTRAN DRX cycle length coefficient 10.3.3.49		
CN Information Elements					
CN Information info	OP		CN Information info 10.3.1.3		
PLMN Identity	OP		PLMN Identity 10.3.1.11	If present, this IE replaces the PLMN in CN Information info.	REL-6
UTRAN mobility information elements					
URA identity	OP		URA identity 10.3.2.6		
RB Information Elements					
Signalling RB information to setup list	OP	1 to <maxSRBsetup>		For each signalling radio bearer established	
>Signalling RB information to setup	MP		Signalling RB information to setup 10.3.4.24		
RAB information to setup list	OP	1 to <maxRABsetup>		For each RAB established	
>RAB information for setup	MP		RAB information for setup 10.3.4.10		
RB information to be affected list	OP	1 to <maxRB>			
>RB information to be affected	MP		RB information to be affected 10.3.4.17		
Downlink counter synchronisation info	OP				
>RB with PDCP information list	OP	1 to <maxRBallRABs>			

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
>>RB with PDCP information	MP		RB with PDCP information 10.3.4.22	This IE is needed for each RB having PDCP in the case of lossless SRNS relocation	
	OP				REL-5
>>PDCP context relocation info	OP		PDCP context relocation info 10.3.4.1a	This IE is needed for each RB having PDCP and performing PDCP context relocation	REL-5
TrCH Information Elements					
Uplink transport channels					
UL Transport channel information common for all transport channels	OP		UL Transport channel information common for all transport channels 10.3.5.24		
Deleted TrCH information list	OP	1 to <maxTrCH>			
>Deleted UL TrCH information	MP		Deleted UL TrCH information 10.3.5.5		
Added or Reconfigured TrCH information list	OP	1 to <maxTrCH>			
>Added or Reconfigured UL TrCH information	MP		Added or Reconfigured UL TrCH information 10.3.5.2		
CHOICE *mode*	OP				
>FDD					
>>CPCH set ID	OP		CPCH set ID 10.3.5.3		
>>Added or Reconfigured TrCH information for DRAC list	OP	1 to <maxTrCH>			
>>>DRAC static information	MP		DRAC static information 10.3.5.7		
>TDD				(no data)	
Downlink transport channels					
DL Transport channel information common for all transport channels	OP		DL Transport channel information common for all transport channels10.3.5.6		
Deleted TrCH information list	OP	1 to <maxTrCH>			
>Deleted DL TrCH information	MP		Deleted DL TrCH information 10.3.5.4		
Added or Reconfigured TrCH information list	OP	1 to <maxTrCH			

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
		>			
>Added or Reconfigured DL TrCH information	MP		Added or Reconfigured DL TrCH information 10.3.5.1		
PhyCH information elements					
Frequency info	OP		Frequency info 10.3.6.36		
Uplink radio resources					
Maximum allowed UL TX power	MD		Maximum allowed UL TX power 10.3.6.39	Default value is the existing maximum UL TX power	
CHOICE *channel requirement*	OP				
>Uplink DPCH info			Uplink DPCH info 10.3.6.88		
>CPCH SET Info			CPCH SET Info 10.3.6.13		
E-DCH Info	OP		E-DCH Info 10.3.6.97		REL-6
Downlink radio resources					
CHOICE *mode*	MP				
>FDD					
>>Downlink PDSCH information	OP		Downlink PDSCH information 10.3.6.30		
>TDD				(no data)	
Downlink HS-PDSCH Information	OP		Downlink HS-PDSCH Information 10.3.6.23a	Note: This IE should only be included if HS-DSCH fast handover is not used.	REL-5
Downlink information common for all radio links	OP		Downlink information common for all radio links 10.3.6.24		
Downlink information per radio link list	OP	1 to <maxRL>		Send downlink information for each radio link	
>Downlink information for each radio link	MP		Downlink information for each radio link 10.3.6.27		
MBMS FLC applicability information	MP		MBMS FLC applicability information 10.3.9a.6		REL-6

10.2.27 RADIO BEARER RECONFIGURATION

This message is sent from UTRAN to reconfigure parameters related to a change of QoS. This procedure can also change the multiplexing of MAC, reconfigure transport channels and physical channels. This message is also used to perform a handover from GERAN *Iu mode* to UTRAN.

RLC-SAP: AM or UM or sent through GERAN *Iu mode*

Logical channel: DCCH or sent through GERAN *Iu mode*

Direction: UTRAN → UE

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
Message Type	MP		Message Type		
UE Information elements					
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36		
Integrity check info	CH		Integrity check info 10.3.3.16		
Integrity protection mode info	OP		Integrity protection mode info 10.3.3.19	The UTRAN should not include this IE unless it is performing an SRNS relocation or a handover from GERAN *Iu mode*	
Ciphering mode info	OP		Ciphering mode info 10.3.3.5	The UTRAN should not include this IE unless it is performing either an SRNS relocation or a handover from GERAN *Iu mode* and a change in ciphering algorithm	
Activation time	MD		Activation time 10.3.3.1	Default value is "now"	
New U-RNTI	OP		U-RNTI 10.3.3.47		
New C-RNTI	OP		C-RNTI 10.3.3.8		
New DSCH-RNTI	OP		DSCH-RNTI 10.3.3.9a		
New H-RNTI	OP		H-RNTI 10.3.3.14a		REL-5
New E-RNTI	OP		E-RNTI 10.3.3.10a		REL-6
RRC State Indicator	MP		RRC State Indicator 10.3.3.35a		
UTRAN DRX cycle length coefficient	OP		UTRAN DRX cycle length coefficient 10.3.3.49		
CN information elements					
CN Information info	OP		CN Information info 10.3.1.3		

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
PLMN Identity	OP		PLMN Identity 10.3.1.11	If present, this IE replaces the PLMN in CN Information info.	REL-6
UTRAN mobility information elements					
URA identity	OP		URA identity 10.3.2.6		
CHOICE specification mode	MP				REL-5
>Complete specification					
RB information elements					
>>RAB information to reconfigure list	OP	1 to < maxRABsetup >			
>>>RAB information to reconfigure	MP		RAB information to reconfigure 10.3.4.11		
>>RB information to reconfigure list	MP	1to <maxRB>		Although this IE is not always required, need is MP to align with ASN.1	
	OP				REL-4
>>>RB information to reconfigure	MP		RB information to reconfigure 10.3.4.18		
>>RB information to be affected list	OP	1 to <maxRB>			
>>>RB information to be affected	MP		RB information to be affected 10.3.4.17		
>>RB with PDCP context relocation info list	OP	1 to <maxRBallRABs>		This IE is needed for each RB having PDCP and performing PDCP context relocation	REL-5
>>>PDCP context relocation info	MP		PDCP context relocation info 10.3.4.1a		REL-5
TrCH Information Elements					
Uplink transport channels					
>>UL Transport channel information common for all transport channels	OP		UL Transport channel information common for all transport channels 10.3.5.24		
>>Deleted TrCH information list	OP	1 to <maxTrCH>			
>>>Deleted UL TrCH information	MP		Deleted UL TrCH information 10.3.5.5		
>>Added or Reconfigured TrCH	OP	1 to			

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
information list		<maxTrCH>			
>>>Added or Reconfigured UL TrCH information	MP		Added or Reconfigured UL TrCH information 10.3.5.2		
>>CHOICE *mode*	OP				
>>>FDD					
>>>>CPCH set ID	OP		CPCH set ID 10.3.5.3		
>>>>Added or Reconfigured TrCH information for DRAC list	OP	1 to <maxTrCH>			
>>>>>DRAC static information	MP		DRAC static information 10.3.5.7		
>>>TDD				(no data)	
Downlink transport channels					
>>DL Transport channel information common for all transport channels	OP		DL Transport channel information common for all transport channels 10.3.5.6		
>>Deleted TrCH information list	OP	1 to <maxTrCH>			
>>>Deleted DL TrCH information	MP		Deleted DL TrCH information 10.3.5.4		
>>Added or Reconfigured TrCH information list	OP	1 to <maxTrCH>			
>>>Added or Reconfigured DL TrCH information	MP		Added or Reconfigured DL TrCH information 10.3.5.1		
>Preconfiguration					REL-5
>>CHOICE *Preconfiguration mode*	MP			This value only applies in case the message is sent through GERAN *Iu mode*	
>>>Predefined configuration identity	MP		Predefined configuration identity 10.3.4.5		
>>>Default configuration					
>>>>Default configuration mode	MP		Enumerated (FDD, TDD)	Indicates whether the FDD or TDD version of the default configuration shall be used	
>>>>Default configuration identity	MP		Default configuration identity 10.3.4.0		
PhyCH information elements					
Frequency info	OP		Frequency		

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
			info 10.3.6.36		
Uplink radio resources					
Maximum allowed UL TX power	MD		Maximum allowed UL TX power 10.3.6.39	Default value is the existing maximum UL TX power	
CHOICE *channel requirement*	OP				
>Uplink DPCH info			Uplink DPCH info 10.3.6.88		
>CPCH SET Info			CPCH SET Info 10.3.6.13		
E-DCH Info	OP		E-DCH Info 10.3.6.97		REL-6
Downlink radio resources					
CHOICE *mode*	MP				
>FDD					
>>Downlink PDSCH information	OP		Downlink PDSCH information 10.3.6.30		
>TDD				(no data)	
Downlink HS-PDSCH Information	OP		Downlink HS-PDSCH Information 10.3.6.23a	Note: This IE should only be included if HS-DSCH fast handover is not used.	REL-5
Downlink information common for all radio links	OP		Downlink information common for all radio links 10.3.6.24		
Downlink information per radio link list	MP	1 to <maxRL>		Although this IE is not always required, need is MP to align with ASN.1	
	OP				REL-4
>Downlink information for each radio link	MP		Downlink information for each radio link 10.3.6.27		
MBMS FLC applicability information	MP		MBMS FLC applicability information 10.3.9a.6		REL-6

10.3.6.24 Downlink information common for all radio links

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
Downlink DPCH info common for all RL	OP		Downlink DPCH info common for all RL 10.3.6.18		

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
CHOICE *mode*	MP				
>FDD					
>>DPCH compressed mode info	OP		DPCH compressed mode info 10.3.6.33		
>>TX Diversity Mode	MD		TX Diversity Mode 10.3.6.86	Default value is the existing value of TX Diversity mode	
>>SSDT information	OP		SSDT information 10.3.6.77		
>> HS-DSCH fast handover information	OP		HS-DSCH fast handover information 10.3.6.XX	Note: This IE should only be included if HS-DSCH fast handover is used.	REL-6
>TDD				(no data)	
>>CHOICE *TDD option*	MP				REL-4
>>>3.84 Mcps TDD				(no data)	REL-4
>>>1.28 Mcps TDD					REL-4
>>>>TSTD indicator	MP		TSTD indicator 10.3.6.85a		REL-4
Default DPCH Offset Value	OP		Default DPCH Offset Value, 10.3.6.16		
MAC-hs reset indicator	CV-*messageType*		Enumerated (true)	TRUE Indicates the MAC-hs entity needs to be reset. Note: This IE should only be included if HS-DSCH fast handover is not used.	REL-5

Condition	Explanation
MessageType	The IE is not needed in the HANDOVER TO UTRAN COMMAND and the RRC CONNECTION SETUP messages. Otherwise, it is optional.

10.3.6.27 Downlink information for each radio link

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
Choice mode	MP				
>FDD					
>>Primary CPICH info	MP		Primary CPICH info 10.3.6.60		
>>Cell ID	OP		Cell ID 10.3.2.2		REL-4

>>PDSCH with SHO DCH Info	OP		PDSCH with SHO DCH Info 10.3.6.47		
>>PDSCH code mapping	OP		PDSCH code mapping 10.3.6.43		
>>Serving HS-DSCH radio link indicator	CV-*not_rrcConnectionSetup*		Boolean	The value "TRUE" indicates that this radio link is the serving HS-DSCH radio link	REL-5
>>> HS-DSCH fast handover cell id per radio link	MP		SSDT cell identity 10.3.6.76		REL-6
>>>Cell individual offset	MD		Real (-10..10 by step of 0.5)	In dB Default value is 0 dB Used to offset measured quantity value	REL-6
>>> HS-DSCH fast handover Mac-hs reset identifier	MP		Integer (0..3)	See section 11.6.2.7 of [15]. Note: It is assumed that the HS-DSCH preconfigured set's maximum size is 4.	REL-6
>> Serving E-DCH radio link	CV-*not_rrcConnectionSetup*		Boolean	The value "TRUE" indicates that this radio link is the serving E-DCH radio link	REL-6
>TDD					
>>Primary CCPCH info	MP		Primary CCPCH info 10.3.6.57		
Downlink DPCH info for each RL	OP		Downlink DPCH info for each RL 10.3.6.21		
SCCPCH Information for FACH	OP		SCCPCH Information for FACH 10.3.6.70		
E-AGCH Info	OP		E-AGCH Info 10.3.6.100		REL-6
E-HICH Information	OP		E-HICH Info 10.3.6.101		REL-6
E-RGCH Information	OP		E-RGCH Info 10.3.6.102		REL-6

Condition	Explanation
not_rrcConnectionSetup	This IE is not needed in the RRC CONNECTION SETUP message. Otherwise it is mandatory present.

10.3.6.XX HS-DSCH fast handover information

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
S field	MP		Integer (1, 2)	In bits	REL-6
Code Word Set	MP		Enumerated (long, medium, shortSSDT off)		REL-6
Repetition Period Duration	MP		Integer (1..256)	Duration of the repetition period in number of radio frames	REL-6
Repetition Period Reference	MP		Integer (0..255)	Reference CFN at which the repetition period starts	REL-6
Measure	MP		Enumerated (CPICH Ec/N0, CPICH RSCP)	Choice of measurement (CPICH Ec/N0 or CPICH RSCP) to use as quality measure M.	REL-6
Hysteresis	MP		Real (0..7.5 by step of 0.5)	dB	REL-6
Filter coefficient	MP		Filter coefficient 10.3.7.9		REL-6

3GPP TSG-RAN3 Meeting #xx ***Tdoc R3-05xxxx***
Place, Country, Date

CR-Form-v4

CHANGE REQUEST

⌘ **25.423** **CR** **CR-xxx** ⌘ ev **-** ⌘ Current version: ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network **X** Core Network ☐

Title:	⌘	HS-DSCH Fast Handover
Source:	⌘	
Work item code:	⌘	***Date:*** ⌘
Category:	⌘	***Release:*** ⌘

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*
REL-6	*(Release 6)*

Reason for change:	⌘	
Summary of change:	⌘	
Consequences if not approved:	⌘	.

Clauses affected:	⌘			
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments:	⌘			

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

********First Change ***********

8.3 Dedicated Procedures

8.3.1 Radio Link Setup

8.3.1.1 General

This procedure is used for establishing the necessary resources in the DRNS for one or more radio links.

The connection-oriented service of the signalling bearer shall be established in conjunction with this procedure.

**********Unchanged Text deleted **********

HS-DSCH:

If the *HS-DSCH Information* IE is present in the RADIO LINK SETUP REQUEST message, then:

- The DRNS shall setup the requested HS-PDSCH resources on the Serving HS-DSCH Radio Link indicated by the *HS-PDSCH RL ID* IE.
- The DRNC shall include the *HARQ Memory Partitioning* IE in the [FDD – *HS-DSCH FDD Information Response* IE] [TDD – *HS-DSCH TDD Information Response* IE] in the RADIO LINK SETUP RESPONSE message.
- The DRNC shall allocate an HS-DSCH-RNTI to the UE Context and include the *HS-DSCH-RNTI* IE in the RADIO LINK SETUP RESPONSE message.
- The DRNC shall include in the RADIO LINK SETUP RESPONSE message the *Binding ID* IE and *Transport Layer Address* IE for establishment of transport bearer for every HS-DSCH MAC-d flow being established.
- If the RADIO LINK SETUP REQUEST message includes the *Transport Layer Address* IE and *Binding ID* IE in the *HS-DSCH Information* IE for an HS-DSCH MAC-d flow, then the DRNC may use the transport layer address and the binding identifier received from the SRNC when establishing a transport bearer for the concerned HS-DSCH MAC-d flow.
- The DRNS may use the *Traffic Class* IE for a specific HS-DSCH MAC-d flow to determine the transport bearer characteristics to apply between DRNC and Node B.
- If the RADIO LINK SETUP REQUEST message includes the *MAC-hs Guaranteed Bit Rate* IE for a Priority Queue in the *HS-DSCH MAC-d Flows Information* IE in the *HS-DSCH Information* IE, then the DRNS shall use this information to optimise MAC-hs scheduling decisions for the related HSDPA Priority Queue.
- If the RADIO LINK SETUP REQUEST message includes the *Discard Timer* IE for a Priority Queue in the *HS-DSCH MAC-d Flows Information* IE in the *HS-DSCH Information* IE, then the DRNS shall use this information to discard out-of-date MAC-hs SDUs from the related HSDPA Priority Queue.
- The DRNC shall include the *HS-DSCH Initial Capacity Allocation* IE in the [FDD – *HS-DSCH FDD Information Response* IE] [TDD – *HS-DSCH TDD Information Response* IE] in the RADIO LINK SETUP RESPONSE message for every HS-DSCH MAC-d flow being established, if the DRNS allows the SRNC to start transmission of MAC-d PDUs before the DRNS has allocated capacity on user plane as described in [32].
- [FDD - If the RADIO LINK SETUP REQUEST message includes the *HS-SCCH Power Offset* IE in the *HS-DSCH Information* IE, then the DRNS may use this value to determine the HS-SCCH power. The HS-SCCH Power Offset should be applied for any HS-SCCH transmission to this UE.]
- [FDD - The DRNC shall include the *Measurement Power Offset* IE in the *HS-DSCH Information Response* IE in the RADIO LINK SETUP RESPONSE message.]

- [FDD - The DRNS shall allocate HS-SCCH codes corresponding to the HS-DSCH and the DRNC shall include the *HS-SCCH Specific Information Response* IE in the *HS-DSCH FDD Information Response* IE in the RADIO LINK SETUP RESPONSE message.]

- [TDD - The DRNS shall allocate HS-SCCH parameters corresponding to the HS-DSCH and the DRNC shall include the [3.84Mcps TDD - *HS-SCCH Specific Information Response* IE] [1.28Mcps TDD - *HS-SCCH Specific Information Response LCR* IE] in the *HS-DSCH TDD Information Response* IE in the RADIO LINK SETUP RESPONSE message.]

- [TDD - The DRNC shall include the [3.84 Mcps TDD - *HS-PDSCH Timeslot Specific Information* IE] [1.28 Mcps TDD - *HS-PDSCH Timeslot Specific Information LCR* IE] in the *HS-DSCH Information Response* IE in the RADIO LINK SETUP RESPONSE message.]

- [FDD - The DRNC shall include the *HS-PDSCH And HS-SCCH Scrambling Code* IE in the *HS-DSCH FDD Information Response* IE in the RADIO LINK SETUP RESPONSE message.]

- [FDD – If the RADIO LINK SETUP REQUEST message includes the *HARQ Preamble Mode* IE in the *HS-DSCH Information* IE, then the DRNS shall use the indicated HARQ Preamble Mode as described in [10].]

- [FDD - If the RADIO LINK SETUP REQUEST message includes the *HSDPA Mobility Cell Identity* IE and the *Repetition Period Duration* IE, *Repetition Period reference* IE and the *HS-DSCH Best Cell Decoding Period* IE, the DRNS shall use this information as described in [10].]

**********Next Change **********

8.3.4 Synchronised Radio Link Reconfiguration Preparation

8.3.4.1 General

The Synchronised Radio Link Reconfiguration Preparation procedure is used to prepare a new configuration of Radio Link(s) related to one UE-UTRAN connection within a DRNS.

This procedure shall use the signalling bearer connection for the relevant UE Context.

The Synchronised Radio Link Reconfiguration Preparation procedure shall not be initiated if a Prepared Reconfiguration exists, as defined in subclause 3.1.

**********Unchanged text deleted ********

8.3.4.3 Unsuccessful Operation

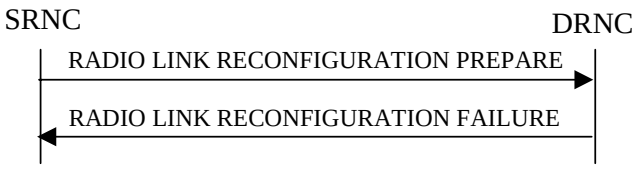

Figure 11: Synchronised Radio Link Reconfiguration Preparation procedure, Unsuccessful Operation

If the DRNS cannot reserve the necessary resources for all the new DCHs of a set of co-ordinated DCHs requested to be added, it shall reject the Synchronised Radio Link Reconfiguration Preparation procedure as having failed.

If the requested Synchronised Radio Link Reconfiguration Preparation procedure fails for one or more RLs, the DRNC shall send the RADIO LINK RECONFIGURATION FAILURE message to the SRNC, indicating the reason for failure for each failed radio link in a *Cause* IE.

Typical cause values are:

Radio Network Layer Causes:

- UL Scrambling Code Already in Use;
- DL Radio Resources not Available;
- UL Radio Resources not Available;
- Requested Configuration not Supported;
- Number of DL Codes not Supported;
- Number of UL Codes not Supported;
- Dedicated Transport Channel Type not Supported;
- DL Shared Channel Type not Supported;
- [TDD - UL Shared Channel Type not Supported];
- [FDD - UL Spreading Factor not Supported];
- [FDD - DL Spreading Factor not Supported];
- CM not Supported;
- RL Timing Adjustment not Supported;
- [FDD - HARQ Preamble Mode not supported].

Miscellaneous Causes:

- Control Processing Overload;
- Not enough User Plane Processing Resources.

8.3.4.4 Abnormal Conditions

If only a subset of all the DCHs belonging to a set of co-ordinated DCHs is requested to be deleted, the DRNS shall reject the Synchronised Radio Link Reconfiguration Preparation procedure as having failed and shall send the RADIO LINK RECONFIGURATION FAILURE message to the SRNC.

If more than one DCH of a set of co-ordinated DCHs has the *QE-Selector* IE set to "selected" [TDD - or no DCH of a set of co-ordinated DCHs has the *QE-Selector* IE set to "selected"] the DRNS shall reject the Synchronised Radio Link Reconfiguration Preparation procedure and the DRNC shall respond with a RADIO LINK RECONFIGURATION FAILURE message.

[FDD - If the *RL Information* IE includes the *SSDT Indication* IE set to "SSDT Active in the UE" and SSDT is not active in the current configuration, the DRNS shall reject the Synchronised Radio Link Reconfiguration Preparation procedure if the *UL DPCH Information* IE does not include the *SSDT Cell Identity Length* IE. The DRNC shall then respond with a RADIO LINK RECONFIGURATION FAILURE message.]

[FDD - If the *DSCHs To Add* IE includes the *Enhanced DSCH PC* IE and the *DSCH To Modify* IE include the *Enhanced DSCH PC Indicator* IE set to "Enhanced DSCH PC not Active in the UE", then the DRNS shall deactivate enhanced DSCH power control in the new configuration.]

[FDD - If both the *DSCHs To Add* IE and the *DSCH To Modify* IE include *Enhanced DSCH PC* IE, then the DRNS shall ignore the *Enhanced DSCH PC* IE in the *DSCH To Add* IE.]

If the RADIO LINK RECONFIGURATION PREPARE message includes a *DCHs To Modify* IE or *DCHs To Add* IE with multiple *DCH Specific Info* IEs, and if the DCHs in the *DCHs To Modify* IE or *DCHs To Add* IE do not have the same *Transmission Time Interval* IE in the *Semi-static Transport Format Information* IE, then the DRNC shall reject the procedure using the RADIO LINK RECONFIGURATION FAILURE message.

[FDD - If the *RL Information* IE includes the *DL Reference Power* IE, but the power balancing is not active in the indicated RL(s), the DRNS shall reject the Synchronised Radio Link Reconfiguration Preparation procedure as having failed and the DRNC shall respond with the RADIO LINK RECONFIGURATION FAILURE message with the cause value "Power Balancing status not compatible".]

[FDD - If the power balancing is active with the Power Balancing Adjustment Type of the UE Context set to "Common" in the existing RL(s) but the RADIO LINK RECONFIGURATION PREPARE message includes more than one *DL Reference Power* IE, the DRNS shall reject the Synchronised Radio Link Reconfiguration Preparation procedure as having failed and the DRNC shall respond with the RADIO LINK RECONFIGURATION FAILURE message with the cause value "Power Balancing status not compatible".]

[FDD - If the RADIO LINK RECONFIGURATIO PREPARE message does not include the *Split Type* IE but includes *TFCI Signalling Mode* IE set to "Split", then the DRNC shall reject the procedure using the RADIO LINK RECONFIGURATION FAILURE message.]

[FDD - If the RADIO LINK RECONFIGURATION PREPARE message does not include the *Length of TFCI2* IE but the *Split type* IE is set to "Logical", then the DRNC shall reject the procedure using the RADIO LINK RECONFIGURATION FAILURE message.]

[FDD - If the RADIO LINK RECONFIGURATION PREPARE message includes the *Split Type* IE set to the value "Hard" and the *Length Of TFCI2* IE set to the value "1", "2", "5", "8", "9" or "10", then the DRNC shall reject the procedure using the RADIO LINK RECONFIGURATION FAILURE message.]

[FDD - If the RADIO LINK RECONFIGURATION PREPARE message does not include the *Split Type* IE but includes the *Length of TFCI2* IE, then the DRNC shall reject the procedure using the RADIO LINK RECONFIGURATION FAILURE message.]

If the RADIO LINK RECONFIGURATION PREPARE message contains the *Transport Layer Address* IE or the *Binding ID* IE when establishing a transport bearer for any Transport Channel or HS-DSCH MAC-d flow being added, or any Transport Channel or HS-DSCH MAC-d flow being modified for which a new transport bearer was requested with the *Transport Bearer Request Indicator* IE., and not both are present for a transport bearer intended to be established, the DRNC shall reject the Synchronised Radio Link Reconfiguration Preparation procedure and the DRNC shall respond with a RADIO LINK RECONFIGURATION FAILURE message.

If the RADIO LINK RECONFIGURATION PREPARE message contains any of the *HS-DSCH Information To Modify* IE, *HS-DSCH MAC-d Flows To Add* IE or *HS-DSCH MAC-d Flows To Delete* IE in addition to the *HS-DSCH Information* IE, the DRNC shall reject the procedure using the RADIO LINK RECONFIGURATION FAILURE message.

If the RADIO LINK RECONFIGURATION PREPARE message contains any of the *HS-DSCH Information To Modify* IE, *HS-DSCH MAC-d Flows To Add* IE, *HS-DSCH MAC-d Flows To Delete* IE or *HS-PDSCH RL ID* IE and the Serving HS-DSCH Radio Link is not in the DRNS, the DRNC shall reject the procedure using the RADIO LINK RECONFIGURATION FAILURE message.

If the RADIO LINK RECONFIGURATION PREPARE message includes the *HS-DSCH Information* IE and does not include the *HS-PDSCH RL-ID* IE, the DRNC shall reject the procedure using the RADIO LINK RECONFIGURATION FAILURE message.

If the RADIO LINK RECONFIGURATION PREPARE message includes the *HS-DSCH Information To Modify* IE deleting the last remaining Priority Queue of an HS-DSCH MAC-d Flow, the DRNC shall reject the procedure using the RADIO LINK RECONFIGURATION FAILURE message.

If the RADIO LINK RECONFIGURATION PREPARE message includes the *HS-PDSCH RL-ID* IE indicating a Radio Link not existing in the UE Context, the DRNC shall reject the procedure using the RADIO LINK RECONFIGURATION FAILURE message.

If the RADIO LINK RECONFIGURATION PREPARE message contains any of the *HS-DSCH Information* IE, *HS-DSCH Information To Modify* IE, or *HS-DSCH MAC-d Flows To Add* IE and if in the new configuration the Priority Queues associated with the same *HS-DSCH MAC-d Flow ID* IE have the same *Scheduling Priority Indicator* IE value, the DRNC shall reject the procedure using the RADIO LINK RECONFIGURATION FAILURE message.

[FDD – If the RADIO LINK RECONFIGURATION PREPARE message includes the *HS-DSCH Mobility Cell Id* IE, the DRNC shall reject the procedure using the RADIO LINK RECONFIGURATION FAILURE message.]

*********Next Change ***********

8.3.7 Unsynchronised Radio Link Reconfiguration

8.3.7.1 General

The Unsynchronised Radio Link Reconfiguration procedure is used to reconfigure Radio Link(s) related to one UE-UTRAN connection within a DRNS.

The procedure is used when there is no need to synchronise the time of the switching from the old to the new radio link configuration in the cells used by the UE-UTRAN connection within the DRNS.

This procedure shall use the signalling bearer connection for the relevant UE Context.

The Unsynchronised Radio Link Reconfiguration procedure shall not be initiated if a Prepared Reconfiguration exists, as defined in subclause 3.1.

8.3.7.2 Successful Operation

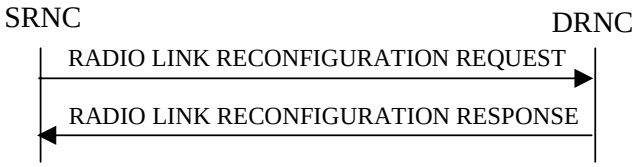

Figure 14: Unsynchronised Radio Link Reconfiguration procedure, Successful Operation

The Unsynchronised Radio Link Reconfiguration procedure is initiated by the SRNC by sending the RADIO LINK RECONFIGURATION REQUEST message to the DRNC.

Upon receipt, the DRNS shall modify the configuration of the Radio Link(s) according to the parameters given in the message. Unless specified below, the meaning of parameters is specified in other specifications.

If the RADIO LINK RECONFIGURATION REQUEST message includes the *Allowed Queuing Time* IE the DRNS may queue the request the time corresponding to the value of the *Allowed Queuing Time* IE before starting to execute the request.

The DRNS shall prioritise resource allocation for the RL to be modified according to Annex A.

**********Unchanged text deleted **********

HS-DSCH Setup:

If the *HS-DSCH Information* IE is present in the RADIO LINK RECONFIGURATION REQUEST message, then:

- The DRNS shall setup the requested HS-PDSCH resources on the Serving HS-DSCH Radio Link indicated by the *HS-PDSCH RL ID* IE.

- The DRNC shall include the *HARQ Memory Partitioning* IE in the [FDD – *HS-DSCH FDD Information Response* IE] [TDD – *HS-DSCH TDD Information Response* IE] in the RADIO LINK RECONFIGURATION RESPONSE message.

- The DRNC shall allocate an HS-DSCH-RNTI to the UE Context and include the *HS-DSCH-RNTI* IE in the RADIO LINK RECONFIGURATION RESPONSE message.

- The DRNS may use the *Traffic Class* IE for a specific HS-DSCH MAC-d flow to determine the transport bearer characteristics to apply between DRNC and Node B.

- If the RADIO LINK RECONFIGURATION REQUEST message includes the *MAC-hs Guaranteed Bit Rate* IE for a Priority Queue in the *HS-DSCH MAC-d Flows Information* IE in the *HS-DSCH Information* IE, then the DRNS shall use this information to optimise MAC-hs scheduling decisions for the related HSDPA Priority Queue.

- If the RADIO LINK RECONFIGURATION REQUEST message includes the *Discard Timer* IE for a Priority Queue in the *HS-DSCH MAC-d Flows Information* IE in the *HS-DSCH Information* IE, then the DRNS shall use this information to discard out-of-date MAC-hs SDUs from the related HSDPA Priority Queue.

- The DRNC shall include the *HS-DSCH Initial Capacity Allocation* IE in the [FDD – *HS-DSCH FDD Information Response* IE] [TDD – *HS-DSCH TDD Information Response* IE] in the RADIO LINK RECONFIGURATION RESPONSE message for every HS-DSCH MAC-d flow being established, if the DRNS allows the SRNC to start transmission of MAC-d PDUs before the DRNS has allocated capacity on user plane as described in [32].

- [FDD - If the RADIO LINK RECONFIGURATION REQUEST message includes the *HS-SCCH Power Offset* IE in the *HS-DSCH Information* IE, then the DRNS may use this value to determine the HS-SCCH power. The HS-SCCH Power Offset should be applied for any HS-SCCH transmission to this UE.]

- [FDD - The DRNS shall allocate HS-SCCH codes corresponding to the HS-DSCH and the DRNC shall include the *HS-SCCH Specific Information Response* IE in the *HS-DSCH FDD Information Response* IE in the RADIO LINK RECONFIGURATION RESPONSE message.]

- [TDD - The DRNS shall allocate HS-SCCH parameters corresponding to the HS-DSCH and the DRNC shall include the [3.84Mcps TDD - *HS-SCCH Specific Information Response* IE] [1.28Mcps TDD - *HS-SCCH Specific Information Response LCR* IE] in the *HS-DSCH TDD Information Response* IE in the RADIO LINK RECONFIGURATION RESPONSE message.]

- [FDD - The DRNC shall include the *HS-PDSCH And HS-SCCH Scrambling Code* IE in the *HS-DSCH FDD Information Response* IE in the RADIO LINK RECONFIGURATION RESPONSE message.]

- [FDD – If the RADIO LINK RECONFIGURATION REQUEST message includes the *HARQ Preamble Mode* IE in the *HS-DSCH Information* IE, then the DRNS shall use the indicated HARQ Preamble Mode as described in [10].]

- [FDD - If the RADIO LINK SETUP REQUEST message includes the *HSDPA Mobility Cell Identity* IE and the *Repetition Period Duration* IE, *Repetition Period reference* IE and the *HS-DSCH Best Cell Decoding Period* IE, the DRNS shall use this information as described in [10].]

**********Next Change **********

9.2.2.19a HS-DSCH FDD Information

The *HS-DSCH FDD Information* IE is used for initial addition of HS-DSCH information to UE Context.

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
HS-DSCH MAC-d Flows Information	M		9.2.1.30OA		–	
UE Capabilities Information		1			–	
>HS-DSCH Physical Layer Category	M		9.2.1.30Oa		–	
MAC-hs Reordering Buffer Size for RLC-UM	M		9.2.1.34Ab		–	
CQI Feedback Cycle k	M		9.2.2.24a		–	
CQI Repetition Factor	C-CQICyclek		9.2.2.24c		–	
ACK-NACK Repetition Factor	M		9.2.2.a		–	
CQI Power Offset	M		9.2.2.24b		–	
ACK Power Offset	M		9.2.2.b		–	
NACK Power Offset	M		9.2.2.26a		–	
HS-SCCH Power Offset	O		9.2.2.19d		–	
HARQ Preamble Mode	O		9.2.2.57		YES	Reject
HS-DSCH Mobility Cell Id	O		9.2.2.x1		YES	Reject
Repetion Period Duration	C-HMCID		9.2.1.x2		YES	Reject
Repetition Period reference CFN	C-HMCID		9.2.1.x3		YES	Reject
HS-DSCH Best Cell Decoding Period	C-HMCID		9.2.2.x4		YES	Reject

Condition	Explanation
CQICyclek	The IE shall be present if the *CQI Feedback Cycle k* IE is set to a value greater than 0.
HMCID	The IE shall be present if the *HS-DSCH Mobility Cell ID* IE is present

**********Next Change **********

9.2.2.x1 HSDPA Mobility Cell Id

The *HSDPA Mobility Cell ID* IE is a temporary ID for HSDPA Enhanced Mobility assigned to a cell [10].

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
HSDPA Mobility Cell Identity			ENUMERATED (a, b,.., h)	

9.2.2.x2 Repetition Period Duration

The *Repetition Period Duration* IE defines the repetition period for HSDPA Enhanced Mobility starting from the CFN given in the *Repetition Period Reference CFN* IE as defined in [10].

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Repetition Period Duration			INTEGER (1..256)	Unit: Frames

9.2.1.x3 Repetition Period reference CFN

The *Repetition Period Reference CFN* IE defines the CFN of the start of the Repetition Period as defined in [10].

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Repetition Period reference			CFN 9.2.1.7	

9.2.2.x4 HS-DSCH Best Cell Decoding Period

The *HS-DSCH Best Cell Decoding Period* IE defines the maximum period from the start of the Repetition period by which the DRNS must send the first indication of the Best Cell to the SRNC as defined in [32].

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
HS-DSCH Best Cell Decoding Period			INTEGER (1..256)	Unit: Frames

3GPP TSG-RAN3 Meeting #xx
Place, Country, Date

Tdoc R3-05xxxx

CR-Form-v4

CHANGE REQUEST

⌘ **25.425** **CR** **CR-xxx** ⌘ ev **-** ⌘ Current version: ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network ☐

Title:	⌘	HS-DSCH Fast Handover
Source:	⌘	
Work item code:	⌘	***Date:*** ⌘
Category:	⌘	***Release:*** ⌘

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*
REL-6	*(Release 6)*

Reason for change:	⌘	
Summary of change:	⌘	
Consequences if not approved:	⌘	.

Clauses affected:	⌘			
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments:	⌘			

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

****First Change ********

2 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. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] ITU-T Recommendation I.361 (11/95): "B-ISDN ATM Layer Specification".

[2] ITU-T Recommendation I.363.2 (11/2000): "B-ISDN ATM Adaptation Layer specification: Type 2 AAL".

[3] ITU-T Recommendation I.366.1 (06/98): "Segmentation and Reassembly Service Specific Convergence Sublayer for the AAL type 2".

[4] 3GPP TS 25.427: "UTRAN Iub/Iur Interface User Plane Protocols for DCH Data Streams".

[5] 3GPP TS 25.401: "UTRAN overall description".

[6] 3GPP TR 25.990: "Vocabulary".

[7] 3GPP TS 25.321: "Medium Access Control (MAC) protocol specification".

[8] 3GPP TS 25.423: "UTRAN Iur Interface RNSAP Signalling".

[9] 3GPP TS 25.321: "Medium Access Control (MAC) protocol specification".

[r1] 3GPP TS 25.133: “Requirements for support of radio resource management (FDD)”

**********Next Change **********

5.2.x1 HS-DSCH Best Cell Indication

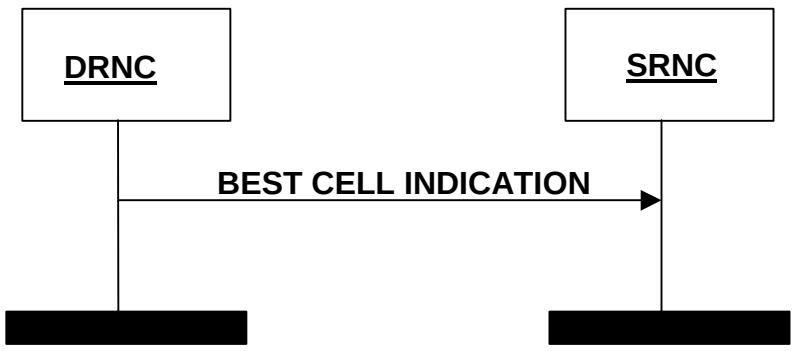

Figure x1: HS-DSCH Best Cell Indication procedure

The HS-DSCH Best Cell Indication procedure is generated within the DRNC to inform the SRNC that the Best Cell has changed from the current serving HS-DSCH cell or in response to an HS-DSCH Best Cell Request. The message may be repeated by the DRNC for reliability but the contents must be the same for the Repetition Period defined in [4].

5.2.x1 HS-DSCH Best Cell Request

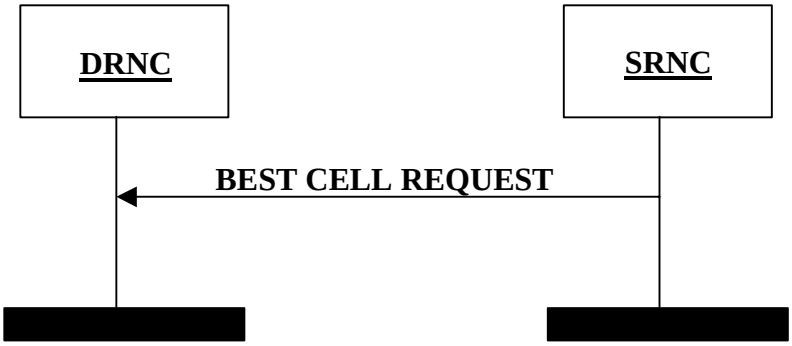

Figure x2: HS-DSCH Best Cell Request Procedure

The HS-DSCH Best Cell Request procedure is provides the means for the SRNC to request the Best Cell.

5.2.x3 HS-DSCH Cell Change Request

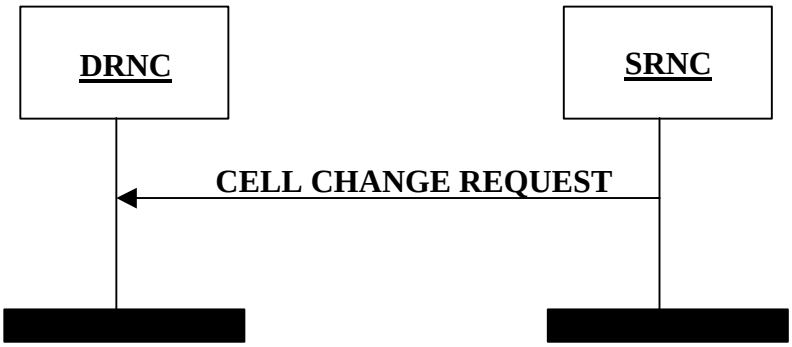

Figure x3: HS-DSCH Cell Change Request procedure

HS-DSCH Cell Change Request procedure is a means for the SRNC to request a change of the current HS-DSCH cell.

5.2.x4 HS-DSCH Cell Change Acknowledgement

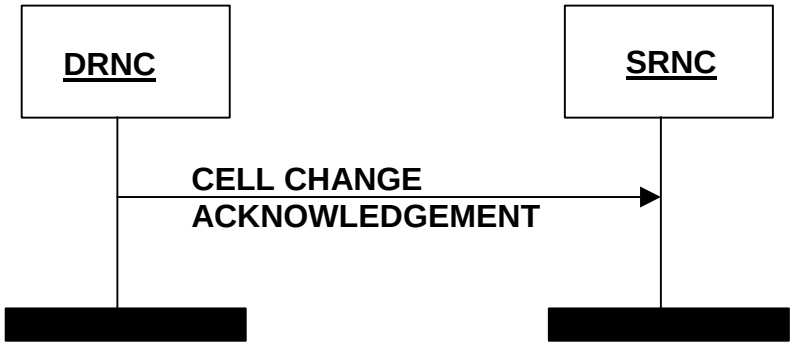

Figure x4: HS-DSCH Cell Change Acknowledgement procedure

The HS-DSCH Cell Change Acknowledgement procedure is used by the DRNC to acknowledge a HS-DSCH Cell Change Request from the SRNC.

********Next Change *****

6.3.2 Header structure of the control frames

6.3.2.1 Control frame CRC

Description: Cyclic Redundancy Checksum calculated on a control frame with polynomial X^7+X^6+X^2+1. The CRC calculation shall cover all bits in the control frame, starting from bit 0 in the first byte (FT field) up to the end of the control frame.

Value range: {0-127}.

Field length: 7 bits.

6.3.2.2 Frame type (FT)

Refer to subclause 6.2.5.2.

6.3.2.3 Control Frame Type

Description: Indicates the type of the control information (information elements and length) contained in the payload (=type of control frame).

Value: values of the *Control Frame Type* IE parameter are defined in the table 1.

Table 1: Control Frame Type

Type of control frame	Value
FACH Flow Control	0000 0010
FACH Capacity Request	0000 0011
DSCH Capacity Request	0000 0100
DSCH Capacity Allocation	0000 0101
HS-DSCH Capacity Request	0000 1010
HS-DSCH Capacity Allocation	0000 1011
HS-DSCH Best Cell Indication	Xxxx
Hs-DSCH Best Cell Request	xxxxx
HS-DSCH Cell Change Request	Xxxxx
HS-DSCH Cell Change Acknowledgement	xxxxx

****Next Change ******

6.3.3.x1 HS-DSCH BEST CELL INDICATION

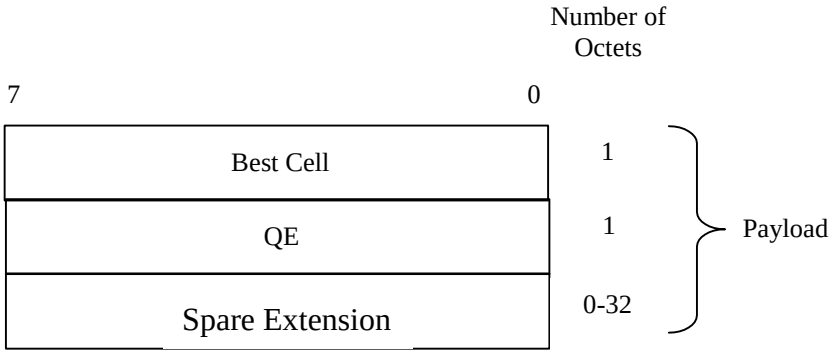

Figure x5: HS-DSCH BEST CELL INDICATION payload structure

HS-DSCH Best Cell Indication is sent by the DRNC to provide the Best Cell. The frame may be repeated with in the HS-DSCH Mobility Repetition Period defined in [4] but the contents of the frame must be the same during the period.

6.3.3.x1.1 Best Cell Id

Description: Best Cell Id indicates the HS-DSCH Best Cell Id .

Value range: {a-h}. (the exact coding is FFS)

Field Length: 8 bits.

6.3.3.x1.2 Best Cell Report Quality Estimate (QE)

Description: The Best Bell Report Quality Estimate is derived from the physical channel BER averaged over the related HS-DSCH Mobility Repetition Period

The Best Bell Report Quality Estimate shall be set to the physical channel BER and be measured in the units PhCh_BER_LOG, similarly to the DCH frame protocol QE (see [4] and [r1]). The Best Bell Report Quality Estimate gives an indication of the reliability of the Best Cell Report and may be used at the RNC for the resolution of conflicting NodeB reports.

Value range: {0-255}.

Granularity: 1.

Field length: 8 bits.

6.3.3.x2 HS-DSCH BEST CELL REQUEST

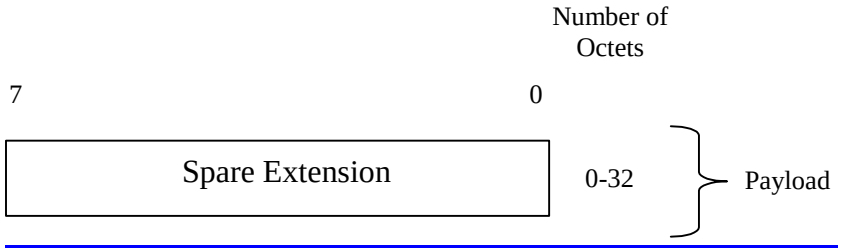

Figure x6: HS_DSCH BEST CELL REQUEST payload structure

HS-DSCH Best Cell Request can by used by the SRNC to request the Best Cell.

6.3.3.x3 HS-DSCH CELL CHANGE REQUEST

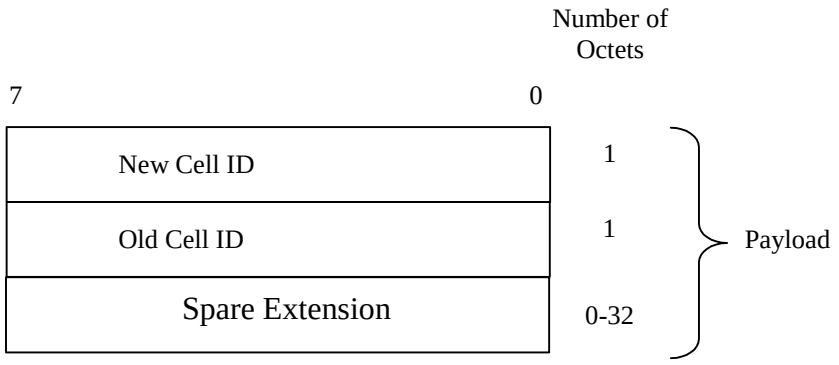

Figure x7: HS_ DSCH CELL CHANGE REQUEST payload structure

HS-DSCH Cell Change Request can by used by the SRNC to indicate to the DRNC of a change in the current serving HS-DSCH cell. The frame may be repeated with in the HS-DSCH Mobility Repetition Period defined in [4] but the contents of the frame must be the same during the period.

6.3.3.x3.1 New Cell Id

Description: New Cell Id indicates the new HS-DSCH serving cell.

Value range: {a-h}. (the exact coding is FFS)

Field Length: 8 bits.

6.3.3.x3.2 Old Cell Id

Description: Old Cell Id indicates the old HS-DSCH serving cell.

Value range: {a-h}. (the exact coding is FFS)

Field Length: 8 bits.

6.3.3.x4 HS-DSCH CELL CHANGE ACKNOWLEDGEMENT

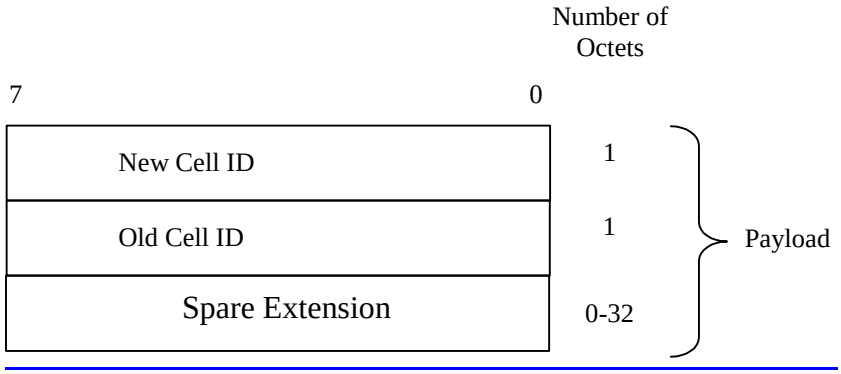

Figure x8: HS-DSCH CELL CHANGE ACKNOWLEDGEMENT payload structure

HS-DSCH Cell Change Acknowledgement is used by the DRNC to acknowledge to the SRNC the receipt of the HS-DSCH Cell Change Request. The value of the Cell Ids are copied from the corresponding values in HS-DSCH Cell Change Request .

6.3.3.x4.1 New Cell Id

Description: New Cell Id indicates the new HS-DSCH serving cell.

Value range: {a-h}. (the exact coding is FFS)

Field Length: 8 bits.

6.3.3.x4.2 Old Cell Id

Description: Old Cell Id indicates the old HS-DSCH serving cell.

Value range: {a-h}. (the exact coding is FFS)

Field Length: 8 bits.

3GPP TSG-RAN3 Meeting #xx
Place, Country, Date

Tdoc R3-05xxxx

CR-Form-v4

CHANGE REQUEST

⌘ **25.433** **CR** **CR-xxx** ⌘ ev **-** ⌘ Current version: ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network **X** Core Network ☐

Title:	⌘	HS-DSCH Fast Handover procedure
Source:	⌘	
Work item code:	⌘	***Date:*** ⌘
Category:	⌘	***Release:*** ⌘

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*
REL-6	*(Release 6)*

Reason for change:	⌘	
Summary of change:	⌘	
Consequences if not approved:	⌘	.

Clauses affected:	⌘			
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments:	⌘			

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

8.2.17 Radio Link Setup

**** Unchanged text deleted *******

HS-DSCH:

If the *HS-DSCH Information* IE is present in the RADIO LINK SETUP REQUEST message, then:

- The Node B shall setup the requested HS-PDSCH resources on the Serving HS-DSCH Radio Link indicated by the *HS-PDSCH RL ID* IE.
- The Node B shall include the *HARQ Memory Partitioning* IE in the [FDD – *HS-DSCH FDD Information Response* IE] [TDD – *HS-DSCH TDD Information Response* IE] in the RADIO LINK SETUP RESPONSE message.
- The Node B shall include in the RADIO LINK SETUP RESPONSE message the *Binding ID* IE and *Transport Layer Address* IE for establishment of transport bearer for every HS-DSCH MAC-d flow being established.
- If the RADIO LINK SETUP REQUEST message includes the *Transport Layer Address* IE and *Binding ID* IE in the *HS-DSCH Information* IE for an HS-DSCH MAC-d flow, then the Node B may use the transport layer address and the binding identifier received from the CRNC when establishing a transport bearer for the concerned HS-DSCH MAC-d flow.
- If the RADIO LINK SETUP REQUEST message includes the *MAC-hs Guaranteed Bit Rate* IE for a Priority Queue in the *HS-DSCH MAC-d Flows Information* IE in the *HS-DSCH Information* IE, then the Node B shall use this information to optimise MAC-hs scheduling decisions for the related HSDPA Priority Queue.
- If the RADIO LINK SETUP REQUEST message includes the *Discard Timer* IE for a Priority Queue in the *HS-DSCH MAC-d Flows Information* IE in the *HS-DSCH Information* IE, then the Node B shall use this information to discard out-of-date MAC-hs SDUs from the related HSDPA Priority Queue.
- The Node B shall include the *HS-DSCH Initial Capacity Allocation* IE in the [FDD – *HS-DSCH FDD Information Response* IE] [TDD – *HS-DSCH TDD Information Response* IE] in the RADIO LINK SETUP RESPONSE message for every HS-DSCH MAC-d flow being established, if the Node B allows the CRNC to start transmission of MAC-d PDUs before the Node B has allocated capacity on user plane as described in [24].
- [FDD – If the RADIO LINK SETUP REQUEST message includes the *HS-SCCH Power Offset* IE in the *HS-DSCH Information* IE, then the Node B may use this value to determine the HS-SCCH power. The HS-SCCH Power Offset should be applied for any HS-SCCH transmission to this UE.]
- [FDD – If the RADIO LINK SETUP REQUEST message includes the *Measurement Power Offset* IE in the *HS-DSCH Information* IE, then the Node B shall use the measurement power offset as described in ref [10], subclause 6A.2.]
- [FDD – The Node B shall allocate HS-SCCH codes corresponding to the HS-DSCH and include the *HS-SCCH Specific Information Response* IE in the *HS-DSCH FDD Information Response* IE in the RADIO LINK SETUP RESPONSE message.]
- [TDD – The Node B shall allocate HS-SCCH parameters corresponding to the HS-DSCH and include the [3.84Mcps TDD - *HS-SCCH Specific Information Response* IE] [1.28Mcps TDD - *HS-SCCH Specific Information Response LCR* IE] in the *HS-DSCH TDD Information Response* IE in the RADIO LINK SETUP RESPONSE message.]
- [FDD – If the RADIO LINK SETUP REQUEST message includes the *HARQ Preamble Mode* IE in the *HS-DSCH Information* IE, then the Node B shall use the indicated HARQ Preamble Mode as described in [10].]
- [FDD - If the RADIO LINK SETUP REQUEST message includes the *HSDPA Mobility Cell Identity* IE and the *Repetition Period Duration* IE, *Repetition Period reference* IE and the *HS-DSCH Best Cell Decoding Period* IE, the NodeB shall, if supported, use this information as described in [10].]

*****Unchanged text deleted *******

8.3.2 Synchronised Radio Link Reconfiguration Preparation

********Unchanged text deleted ********

8.3.2.4 Abnormal Conditions

If only a subset of all the DCHs belonging to a set of co-ordinated DCHs is requested to be deleted, the Node B shall regard the Synchronised Radio Link Reconfiguration Preparation procedure as having failed and shall send the RADIO LINK RECONFIGURATION FAILURE message to the CRNC.

If more than one DCH of a set of co-ordinated DCHs has the *QE-Selector* IE set to "selected" [TDD – or no DCH of a set of co-ordinated DCHs has the *QE-Selector* IE set to "selected"], the Node B shall regard the Synchronised Radio Link Reconfiguration Preparation procedure as failed and shall respond with a RADIO LINK RECONFIGURATION FAILURE message.

[FDD - If the *RL Information* IE includes the *SSDT Indication* IE set to "SSDT Active in the UE" and SSDT is not active in the current configuration, the Node B shall regard the Synchronised Radio Link Reconfiguration Preparation procedure as failed if the *UL DPCH Information* IE does not include the *SSDT Cell Identity Length* IE. In this case, it shall respond with a RADIO LINK RECONFIGURATION FAILURE message.]

If the RADIO LINK RECONFIGURATION PREPARE message includes a *DCHs To Modify* IE or *DCHs To Add* IE with multiple *DCH Specific Info* IEs, and if the DCHs in the *DCHs To Modify* IE or *DCHs To Add* IE do not have the same *Transmission Time Interval* IE in the *Semi-Static Transport Format Information* IE, then the Node B shall reject the procedure using the RADIO LINK RECONFIGURATION FAILURE message.

[FDD - If the *RL Information* IE includes the *DL Reference Power* IE, but the power balancing is not active in the indicated RL(s), the Node B shall regard the Synchronised Radio Link Reconfiguration Preparation procedure as having failed and the Node B shall respond with the RADIO LINK RECONFIGURATION FAILURE message with the cause value "Power Balancing status not compatible".]

[FDD - If the power balancing is active with the Power Balancing Adjustment Type of the Node B Communication Context set to "Common" in the existing RL(s) but the RADIO LINK RECONFIGURATION PREPARE message IE includes more than one *DL Reference Power* IE, the Node B shall regard the Synchronised Radio Link Reconfiguration Preparation procedure as having failed and the Node B shall respond with the RADIO LINK RECONFIGURATION FAILURE message with the cause value "Power Balancing status not compatible".]

[FDD – If the RADIO LINK RECONFIGURATION PREPARE message includes the *Length Of TFCI2* IE but the *TFCI Signalling Option* IE is set to "Normal", then the Node B shall reject the procedure using the RADIO LINK RECONFIGURATION FAILURE message.]

[FDD – If the RADIO LINK RECONFIGURATION PREPARE message does not include the *Length Of TFCI2* IE but the *Split Type* IE is set to "Logical", then the Node B shall reject the procedure using the RADIO LINK RECONFIGURATION FAILURE message.]

[FDD – If the RADIO LINK RECONFIGURATION PREPARE message includes the *Split Type* IE set to the value "Hard" and the *Length Of TFCI2* IE set to the value "1", "2", "5", "8", "9" or "10", then the Node B shall reject the procedure using the RADIO LINK RECONFIGURATION FAILURE message.]

If the RADIO LINK RECONFIGURATION PREPARE message contains the *Transport Layer Address* IE or the *Binding ID* IE when establishing a transport bearer for any Transport Channel or HS-DSCH MAC-d flow being added, or any Transport Channel or HS-DSCH MAC-d flow being modified for which a new transport bearer was requested with the *Transport Bearer Request Indicator* IE, and not both are present for a transport bearer intended to be established, the Node B shall reject the procedure using the RADIO LINK RECONFIGURATION FAILURE message.

[FDD – If the RADIO LINK RECONFIGURATION PREPARE message is to modify UE channel estimation information for an existing RL and the modification is not allowed according to [10] subclause 4.3.2.1, the Node B shall reject the procedure using the RADIO LINK RECONFIGURATION FAILURE message.]

If the RADIO LINK RECONFIGURATION PREPARE message contains any of the *HS-DSCH Information To Modify* IE, *HS-DSCH MAC-d Flows To Add* IE or *HS-DSCH MAC-d Flows To Delete* IE in addition to the *HS-DSCH Information* IE, the Node B shall reject the procedure using the RADIO LINK RECONFIGURATION FAILURE message.

If the RADIO LINK RECONFIGURATION PREPARE message contains any of the *HS-DSCH Information To Modify* IE, *HS-DSCH MAC-d Flows To Add* IE, *HS-DSCH MAC-d Flows To Delete* IE or *HS-PDSCH RL ID* IE and the Serving HS-DSCH Radio Link is not in the Node B, the Node B shall reject the procedure using the RADIO LINK RECONFIGURATION FAILURE message.

If the RADIO LINK RECONFIGURATION PREPARE message includes the *HS-DSCH Information* IE and does not include the *HS-PDSCH RL-ID* IE, the Node B shall reject the procedure using the RADIO LINK RECONFIGURATION FAILURE message.

If the RADIO LINK RECONFIGURATION PREPARE message includes the *HS-DSCH Information To Modify* IE deleting the last remaining Priority Queue of an HS-DSCH MAC-d Flow, the Node B shall reject the procedure using the RADIO LINK RECONFIGURATION FAILURE message.

If the RADIO LINK RECONFIGURATION PREPARE message includes the *HS-PDSCH RL-ID* IE indicating a Radio Link not existing in the Node B Communication Context, the Node B shall reject the procedure using the RADIO LINK RECONFIGURATION FAILURE message.

[TDD - If multiple radio links exist within the Node B Communication Context and the RADIO LINK RECONFIGURATION PREPARE message does not include a *RL ID* IE within each *UL DPCH To Add Per RL* IE, *DL DPCH To Add Per RL* IE, *UL DPCH To Modify Per RL* IE, and *DL DPCH To Modify Per RL* IE that is present in the message, the Node B shall reject the procedure using the RADIO LINK RECONFIGURATION FAILURE message.]

If the RADIO LINK RECONFIGURATION PREPARE message contains any of the *HS-DSCH Information* IE, *HS-DSCH Information To Modify* IE, or *HS-DSCH MAC-d Flows To Add* IE and if in the new configuration the Priority Queues associated with the same *HS-DSCH MAC-d Flow ID* IE have the same *Scheduling Priority Indicator* IE value, the Node B shall reject the procedure using the RADIO LINK RECONFIGURATION FAILURE message.

[FDD – If the RADIO LINK RECONFIGURATION PREPARE message includes the *HS-DSCH Mobility Cell Id* IE, the Node B shall reject the procedure using the RADIO LINK RECONFIGURATION FAILURE message.]

8.3.5 Unsynchronised Radio Link Reconfiguration

*****Unchanged text deleted ********

HS-DSCH Setup:

If the *HS-DSCH Information* IE is present in the RADIO LINK RECONFIGURATION REQUEST message, then:

- The Node B shall setup the requested HS-PDSCH resources on the Serving HS-DSCH Radio Link indicated by the *HS-PDSCH RL ID* IE.
- The Node B shall include the *HARQ Memory Partitioning* IE in the [FDD – *HS-DSCH FDD Information Response* IE] [TDD – *HS-DSCH TDD Information Response* IE] in the RADIO LINK RECONFIGURATION RESPONSE message.
- If the RADIO LINK RECONFIGURATION REQUEST message includes the *MAC-hs Guaranteed Bit Rate* IE for a Priority Queue in the *HS-DSCH MAC-d Flows Information* IE in the *HS-DSCH Information* IE, then the Node B shall use this information to optimise MAC-hs scheduling decisions for the related HSDPA Priority Queue.
- If the RADIO LINK RECONFIGURATION REQUEST message includes the *Discard Timer* IE for a Priority Queue in the *HS-DSCH MAC-d Flows Information* IE in the *HS-DSCH Information* IE, then the Node B shall use this information to discard out-of-date MAC-hs SDUs from the related HSDPA Priority Queue.

- The Node B shall include the *HS-DSCH Initial Capacity Allocation* IE in the [FDD – *HS-DSCH FDD Information Response* IE] [TDD – *HS-DSCH TDD Information Response* IE] in the RADIO LINK RECONFIGURATION RESPONSE message for every HS-DSCH MAC-d flow being established, if the Node B allows the CRNC to start transmission of MAC-d PDUs before the Node B has allocated capacity on user plane as described in [24].

- [FDD - If the RADIO LINK RECONFIGURATION REQUEST message includes the *HS-SCCH Power Offset* IE in the *HS-DSCH Information* IE, then the Node B may use this value to determine the HS-SCCH power. The HS-SCCH Power Offset should be applied for any HS-SCCH transmission to this UE.]

- [FDD - If the RADIO LINK RECONFIGURATION REQUEST message includes the *Measurement Power Offset* IE in the *HS-DSCH Information* IE, then the Node B shall use the measurement power offset as described in ref [10], subclause 6A.2.]

- [FDD - The Node B shall allocate HS-SCCH codes corresponding to the HS-DSCH and include the *HS-SCCH Specific Information Response* IE in the *HS-DSCH FDD Information Response* IE in the RADIO LINK RECONFIGURATION RESPONSE message.]

- [TDD - The Node B shall allocate HS-SCCH parameters corresponding to the HS-DSCH and include the [3.84Mcps TDD - *HS-SCCH Specific Information Response* IE] [1.28Mcps TDD - *HS-SCCH Specific Information Response LCR* IE] in the *HS-DSCH TDD Information Response* IE in the RADIO LINK RECONFIGURATION RESPONSE message.]

- [FDD – If the RADIO LINK RECONFIGURATION REQUEST message includes the *HARQ Preamble Mode* IE in the *HS-DSCH Information* IE, then the Node B shall use the indicated HARQ Preamble Mode as described in [10].]

- [FDD - If the RADIO LINK SETUP REQUEST message includes the *HSDPA Mobility Cell Identity* IE and the *Repetition Period Duration* IE, *Repetition Period reference* IE and the *HS-DSCH Best Cell Decoding Period* IE, the NodeB shall, if supported, use this information as described in [10].]

**********Next Change **********

9.2.2.18D HS-DSCH FDD Information

The *HS-DSCH FDD Information* IE is used for initial addition of HS-DSCH information to a Node B Communication Context.

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
HS-DSCH MAC-d Flows Information	M		9.2.1.31IA		–	
UE Capabilities Information					–	
>HS-DSCH Physical Layer Category	M		9.2.1.31Ia		–	
MAC-hs Reordering Buffer Size for RLC-UM	M		9.2.1.38Ab		–	
CQI Feedback Cycle k	M		9.2.2.21B		–	
CQI Repetition Factor	C-CQICyclek		9.2.2.4Cb		–	
ACK-NACK Repetition Factor	M		9.2.2.a		–	
CQI Power Offset	M		9.2.2.4Ca		–	
ACK Power Offset	M		9.2.2.b		–	
NACK Power Offset	M		9.2.2.23a		–	
HS-SCCH Power Offset	O		9.2.2.18I		–	
Measurement Power Offset	O		9.2.2.21C		–	
HARQ Preamble Mode	O		9.2.2.18a		YES	Reject
HS-DSCH Mobility Cell Id	O		9.2.2.x1		-	
Repetion Period Duration	C-HMCID		9.2.1.x2		-	
Repetition Period reference CFN	C-HMCID		9.2.1.x3		-	
HS-DSCH Best Cell Decoding Period	C-HMCID		9.2.2.x4		-	

Condition	Explanation
CQICyclek	The IE shall be present if the *CQI Feedback Cycle k* IE is set to a value greater than 0.
HMCID	The IE shall be present if the *HS-DSCH Mobility Cell ID* IE is present

**********Next Change **********

9.2.2.x1 HSDPA Mobility Cell Id

The *HSDPA Mobility Cell ID* IE is a temporary ID for HSDPA Enhanced Mobility assigned to a cell [10].

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
HSDPA Mobility Cell Identity			ENUMERATED (a, b,.., h)	

9.2.2.x2 Repetition Period Duration

The *Repetition Period Duration* IE defines the repetition period for HSDPA Enhanced Mobility starting from the CFN given in the *Repetition Period Reference CFN* IE as defined in [10].

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Repetition Period Duration			INTEGER (1..256)	Unit: Frames

9.2.1.x3 Repetition Period reference CFN

The *Repetition Period Reference CFN* IE defines the CFN of the start of the Repetition Period as defined in [10].

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Repetition Period reference			CFN 9.2.1.7	

9.2.2.x4 HS-DSCH Best Cell Decoding Period

The *HS-DSCH Best Cell Decoding Period* IE defines the maximum period from the start of the Repetition period by which the NodeB must send the first indication of the Best Cell to the CRNC as defined in [24].

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
HS-DSCH Best Cell Decoding Period			INTEGER (1..256)	Unit: Frames

3GPP TSG-RAN3 Meeting #xx ***Tdoc R3-05xxxx***
Place, Country, Date

CR-Form-v4

CHANGE REQUEST

⌘ **25.435** **CR** **CR-xxx** ⌘ ev **-** ⌘ Current version: 6.1.0 ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network **X** Core Network ☐

Title:	⌘	HS-DSCH Fast Handover
Source:	⌘	
Work item code:	⌘	***Date:*** ⌘
Category:	⌘	***Release:*** ⌘

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*
REL-6	*(Release 6)*

Reason for change:	⌘	
Summary of change:	⌘	
Consequences if not approved:	⌘	.

Clauses affected:	⌘		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘
Other comments:	⌘		

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at:
http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

2 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. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TS 25.301: "Radio Interface Protocol Architecture".

[2] 3GPP TS 25.402: "Synchronisation in UTRAN, Stage 2".

[3] 3GPP TS 25.302: "Services provided by the Physical Layer".

[4] 3GPP TS 25.221: "Physical channels and mapping of transport channels to physical channels (TDD)".

[5] 3GPP TS 25.211: "Physical channels and mapping of transport channels onto physical channels (FDD)".

[6] 3GPP TS 25.433: "UTRAN Iub interface NBAP signalling".

[7] 3GPP TS 25.225: "Physical layer – Measurements (TDD)".

[8] 3GPP TS 25.331: "Radio Ressource Control (RRC) protocol specification".

[9] 3GPP TS 25.321: "Medium Access Control (MAC) protocol specification".

[10] 3GPP TS 25.214: " Physical layer procedures".

[r1] 3GPP TS 25.427: “UTRAN Iur and Iub interface user plane protocols for DCH data stream”

[r2] 3GPP TS 25.133: “Requirements for support of radio resource management (FDD)”

First Change *

5.8 General

5.8.1 Association between transport bearer and data/control frames

Table 1 shows how the data and control frames are associated to the transport bearers. 'yes' indicates that the control frame is applicable to the transport bearer, 'no' indicates that the control frame is not applicable to the transport bearer.

Table 1

Transport bearer used for	Associated data frame	Associated control frames								
		Timing Adjust-ment	DL Transport Channels Synchronisation	Node Synchronisation	Dynamic PUSCH Assign-ment	Timing Advance	DSCH TFCI Signal-ling	Outer Loop PC Info Xfer	HS-DSCH Capacity Request	HS-DSCH Capacity Allocation
RACH	RACH DATA FRAME	no	no	no	no	no	no	no	no	no
FACH	FACH DATA FRAME	yes	yes	yes	no	no	no	no	no	no
CPCH	CPCH DATA FRAME	no	no	no	no	no	no	no	no	no
PCH	PCH DATA FRAME	yes	yes	yes	no	no	no	no	no	no
DSCH	DSCH DATA FRAME	yes	yes	yes	no	no	no	no	no	no
USCH	USCH DATA FRAME	no	no	no	yes	yes	no	yes	no	no
HS-DSCH	HS-DSCH DATA FRAME	no	no	no	no	no	no	no	yes	yes
TFCI2	-	yes	yes	yes	no	no	yes	no	no	no

Update table to include new control frames.

*** Next Change ****

5.x1 HS-DSCH Best Cell Indication

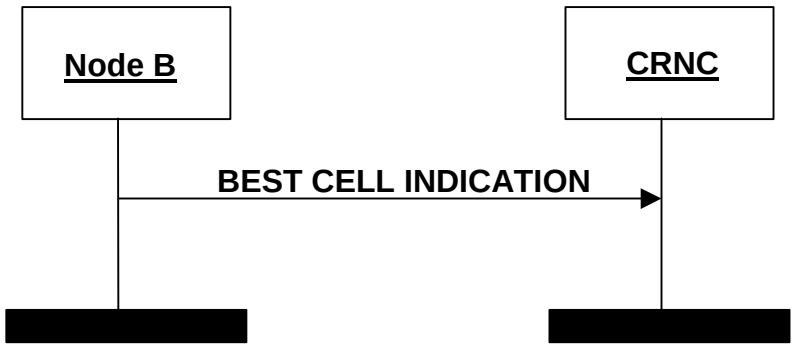

Figure x1: HS-DSCH Best Cell Indication procedure

The HS-DSCH Best Cell Indication procedure is generated within the Node B if the Best Cell reported by the UE in the FBI as specified in [10] is different from the current serving HS-DSCH cell or in response to an HS-DSCH Best Cell Request. The message may be repeated by the NodeB for reliability but the contents must be the same for the Repetition Period defined in [6].

5.x1 HS-DSCH Best Cell Request

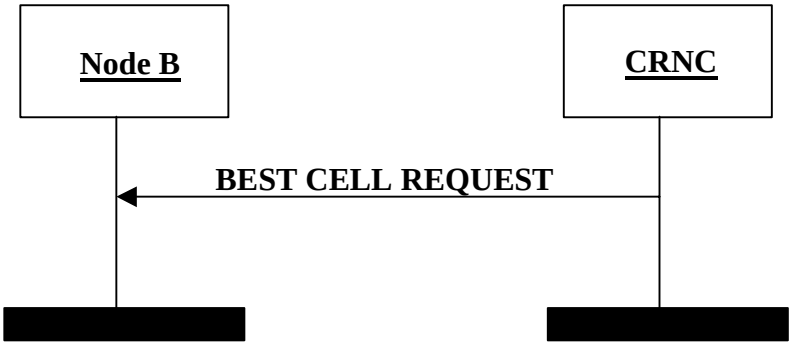

Figure x2: HS-DSCH Best Cell Request Procedure

The HS-DSCH Best Cell Request procedure is used by the CRNC if it wants to request the Best Cell Indication available in the NodeB reported by the UE as specified in [10].

5.x3 HS-DSCH Cell Change Request

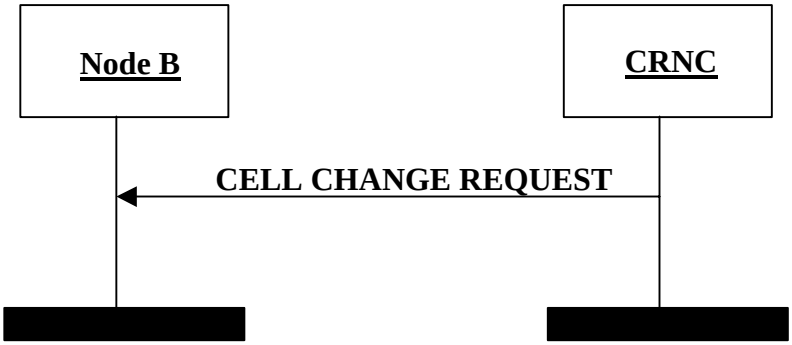

Figure x3: HS-DSCH Cell Change Request procedure

HS-DSCH Cell Change Request procedure is used by the CRNC to indicate a change of HS-DSCH serving cell. If the *New HS-DSCH Cell id* IE matches the HSDPA Cell Id of the cell as defined in [6], the NodeB shall at the end of the current Repetition Period defined in [6] consider the cell as the serving HS-DSCH cell and shall notify the UE on HS-SCCH as specified in [10]. The NodeB shall also start sending data if any to the UE as specified in [9]. If the *Old HS-DSCH Cell id* IE matches the HSDPA Cell Id for the cell, the NodeB shall stop sending data on the HS-DSCH for the UE at CFN corresponding to the end of the Repetition Period as specified in [9].

All NodeBs shall also store the Current HS-DSCH serving Cell Id.

5.x4 HS-DSCH Cell Change Acknowledgement

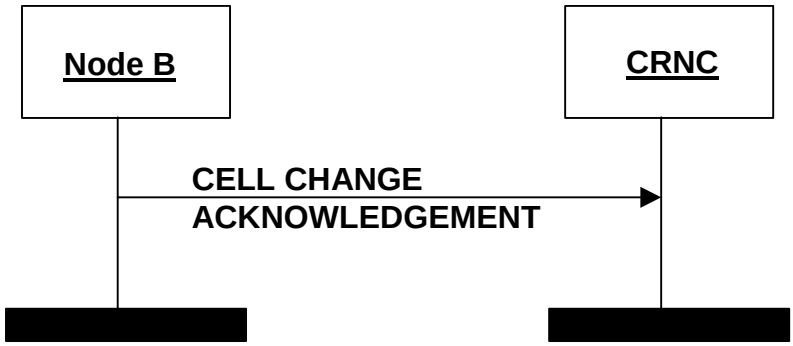

Figure x4: HS-DSCH Cell Change Acknowledgement procedure

The HS-DSCH Cell Change Acknowledgement procedure is used by the Node B to acknowledge a HS-DSCH Cell Change Request from the RNC. The NodeB shall echo back the Old and New Cell Ids it received from the CRNC in the HS-DSCH Cell Change Request.

*** Next Change ****

6.3 Control frame structure

6.3.1 Introduction

The Common Control Channel control frames are used to transport control information between the CRNC and the Node B. Figure 22 defines the Control Frame structure for common transport channels.

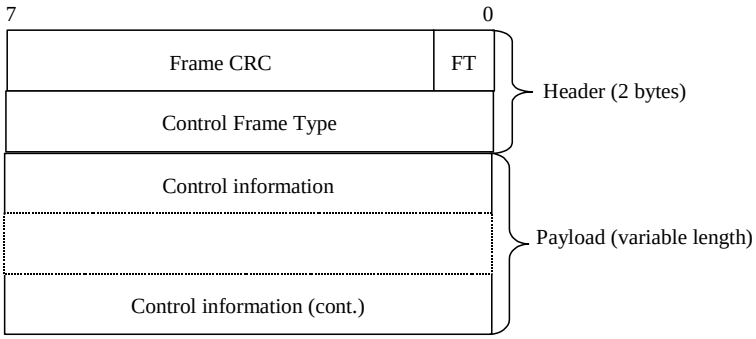

Figure 22: Iub Common Transport Channel Control Frame Format

The structure of the header and the payload of the control frames is defined in the following subclauses.

6.3.2 Coding of information elements of the Control frame header

6.3.2.1 Frame CRC

Description: Cyclic Redundancy Checksum calculated on a control frame with polynom:
X^7+X^6+X^2+1.

The CRC calculation shall cover all bits in the control frame, starting from bit 0 in the first byte (FT field) up to the end of the control frame. See subclause 7.1.

Value range: {0..127}.

Field length: 7 bits.

6.3.2.2 Frame Type (FT)

Refer to subclause 6.2.7.2.

6.3.2.3 Control Frame Type

Description: Indicates the type of the control information (information elements and length) contained in the payload.

Value: Values of the Control Frame Type parameter are defined in table 2.

Table 2

Type of control frame	Value
OUTER LOOP POWER CONTROL	0000 0001
TIMING ADJUSTMENT	0000 0010
DL SYNCHRONISATION	0000 0011
UL SYNCHRONISATION	0000 0100
DSCH TFCI SIGNALLING	0000 0101
DL NODE SYNCHRONISATION	0000 0110
UL NODE SYNCHRONISATION	0000 0111
DYNAMIC PUSCH ASSIGNMENT	0000 1000
TIMING ADVANCE	0000 1001
HS-DSCH Capacity Request	0000 1010
HS-DSCH Capacity Allocation	0000 1011
HS-DSCH Best Cell Indication	Xxxx
Hs-DSCH Best Cell Request	xxxxx
HS-DSCH Cell Change Request	Xxxxx
HS-DSCH Cell Change Acknowledgement	xxxxx

Field Length: 8 bits.

*** Next Change ****

6.3.3.x1 HS-DSCH BEST CELL INDICATION

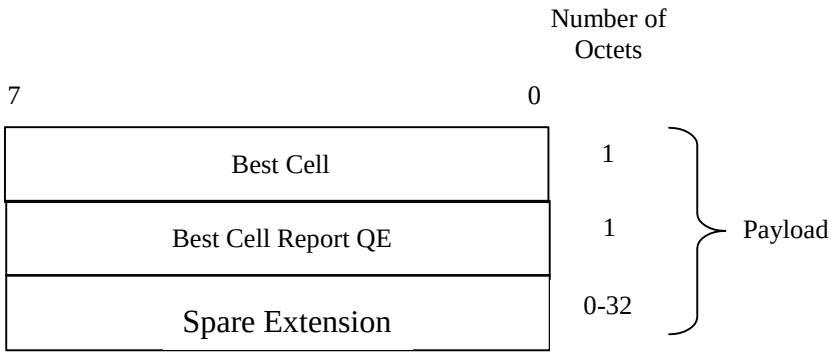

Figure x5: HS-DSCH BEST CELL INDICATION payload structure

HS-DSCH Best Cell Indication is sent when the UE reports a Best Cell in the FBI bits [10] different from the current serving HS-DSCH cell or in response to an HS-DSCH Best Cell Request. The frame may be repeated with in the HS-DSCH Mobility Repetition Period defined in [6] but the contents of the frame must be the same during the period.

6.3.3.x1.1 Best Cell Id

Description: Best Cell Id indicates the HS-DSCH Best Cell Id provided by the UE in the FBI bits as defined in [10].

Value range: {a-h}. (the exact coding is FFS)

Field Length: 8 bits.

6.3.3.x1.2 Best Cell Report Quality Estimate (QE)

Description: The Best Bell Report Quality Estimate is derived from the physical channel BER averaged over the related HS-DSCH Mobility Repetition Period

The Best Bell Report Quality Estimate shall be set to the physical channel BER and be measured in the units PhCh_BER_LOG, similarly to the DCH frame protocol QE (see [r1] and [r2]). The Best Bell Report Quality Estimate gives an indication of the reliability of the Best Cell Report and may be used at the RNC for the resolution of conflicting NodeB reports.

Value range: {0-255}.

Granularity: 1.

Field length: 8 bits.

6.3.3.x2 HS-DSCH BEST CELL REQUEST

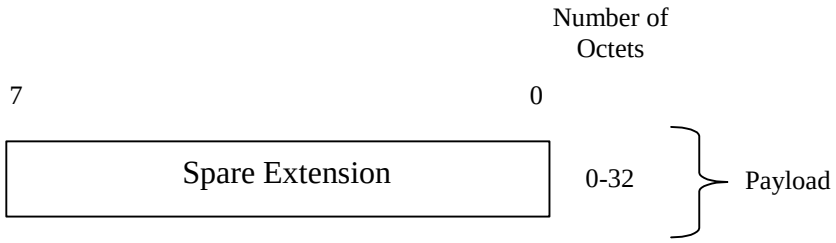

Figure x6: HS_DSCH BEST CELL REQUEST payload structure

HS-DSCH Best Cell Request can by used by the CRNC to request the NodeB indicate to the NodeBs the Best Cell reported by the UE in the FBI bits [10].

6.3.3.x3 HS-DSCH CELL CHANGE REQUEST

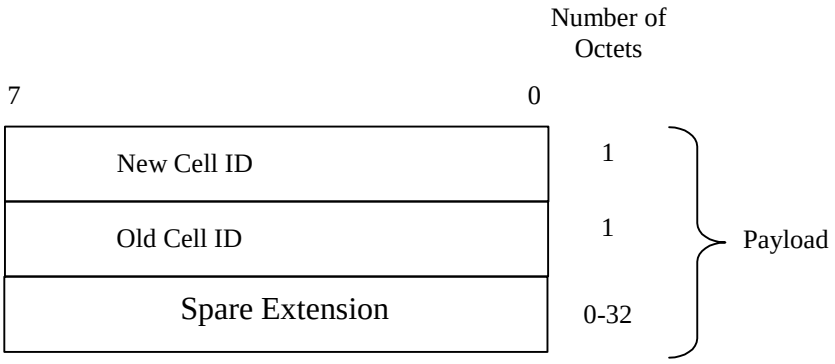

Figure x7: HS_DSCH CELL CHANGE REQUEST payload structure

HS-DSCH Cell Change Request can by used by the CRNC to indicate to the NodeBs of a change in the current serving HS-DSCH cell and is sent to all the pre-configured HS-DSCH cells for the UE. The frame may be repeated with in the HS-DSCH Mobility Repetition Period defined in [6] but the contents of the frame must be the same during the period.

6.3.3.x3.1 New Cell Id

Description: New Cell Id indicates the new HS-DSCH serving cell.

Value range: {a-h}. (the exact coding is FFS)

Field Length: 8 bits.

6.3.3.x3.2 Old Cell Id

Description: Old Cell Id indicates the old HS-DSCH serving cell.

Value range: {a-h}. (the exact coding is FFS)

Field Length: 8 bits.

6.3.3.x4 HS-DSCH CELL CHANGE ACKNOWLEDGEMENT

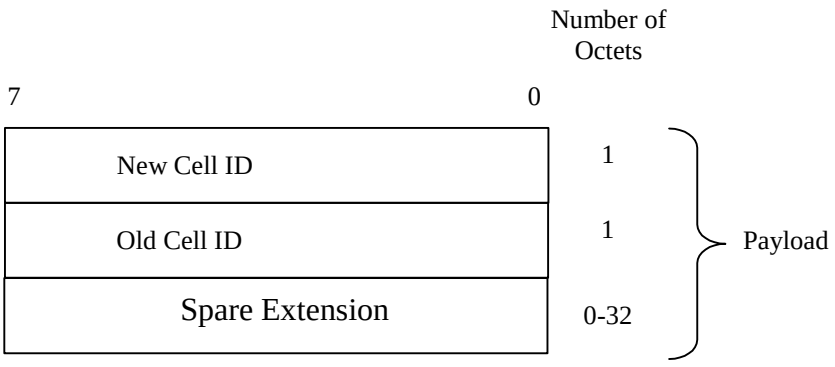

Figure x8: HS-DSCH CELL CHANGE ACKNOWLEDGEMENT payload structure

HS-DSCH Cell Change Acknowledgement is used by the NodeB to acknowledge to the CRNC the receipt of the HS-DSCH Cell Change Request. The value of the Cell Ids are copied from the corresponding values in HS-DSCH Cell Change Request .

6.3.3.x4.1 New Cell Id

Description: New Cell Id indicates the new HS-DSCH serving cell.

Value range: {a-h}. (the exact coding is FFS)

Field Length: 8 bits.

6.3.3.x4.2 Old Cell Id

Description: Old Cell Id indicates the old HS-DSCH serving cell.

Value range: {a-h}. (the exact coding is FFS)

Field Length: 8 bits.