TSG-RAN Working Group 1 meeting #9   **TSGR1#9(99)j24**
Dresden, Germany
November 30 – December 3, 1999

Agenda item:

Source: Ericsson

Title: CR 25.214-025: Cleanup of synchronisation procedures

Document for: Decision

Section 4, Synchronisation procedures, in TS 25.214 needs some cleaning up:

- The references in section 4.3.1 are incorrect.

- Figure 1 and 2 can be improved.

- The text under figures 1 and 2 should be aligned.

- The timing $T_0 \pm [148]$ chips was previously a working assumption, hence the brackets, but since no concerns have been raised this should be modified to $T_0 \pm 148$.

This CR introduces the changes to TS 25.214.

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

| **25.214** | CR | **025** | Current Version: | 3.0.0 |

GSM (AA.BB) or 3G (AA.BBB) specification number ↑   *↑ CR number as allocated by MCC support team*

For submission to: **TSG-RAN #6**   for approval **X**   strategic ☐ *(for SMG*
list expected approval meeting # here ↑   for information ☐   non-strategic ☐ *use only)*

Form: CR cover sheet, version 2 for 3GPP and SMG   The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc

Proposed change affects: (U)SIM ☐   ME **X**   UTRAN / Radio **X**   Core Network ☐
(at least one should be marked with an X)

| **Source:** | Ericsson | **Date:** | 1999-11-23 |

| **Subject:** | Cleanup of synchronisation procedures |

| **Work item:** | |

Category: F Correction
          A Corresponds to a correction in an earlier release
(only one category   B Addition of feature   **X**
shall be marked   C Functional modification of feature
with an X)   D Editorial modification

Release: Phase 2 ☐
          Release 96 ☐
          Release 97 ☐
          Release 98 ☐
          Release 99 **X**
          Release 00 ☐

Reason for change:
- The references in section 4.3.1 are incorrect.
- Figure 1 and 2 can be improved.
- The text under figures 1 and 2 should be aligned.
- The timing $T_0 \pm [148]$ chips was previously a working assumption, hence the brackets, but since no concerns have been raised this should be modified to $T_0 \pm 148$.

Clauses affected: 4.3.1, 4.3.2, 4.3.3

Other specs affected:
Other 3G core specifications	☐	→ List of CRs:	
Other GSM core specifications	☐	→ List of CRs:	
MS test specifications	☐	→ List of CRs:	
BSS test specifications	☐	→ List of CRs:	
O&M specifications	☐	→ List of CRs:	

Other comments:

help.doc

<--------- double-click here for help and instructions on how to create a CR.

4 Synchronisation procedures

4.1 Cell search

During the cell search, the UE searches for a cell and determines the downlink scrambling code and common channel frame synchronisation of that cell. How cell search is typically done is described in Annex C.

4.2 Common physical channel synchronisation

The radio frame timing of all common physical channels can be determined after cell search. The P-CCPCH radio frame timing is found during cell search and the radio frame timing of all common physical channel are related to that timing as described in 25.211.

4.3 DPCCH/DPDCH synchronisation

4.3.1 General

The synchronisation of the dedicated physical channels can be divided into two cases:

- when a downlink dedicated physical channel and uplink dedicated physical channel shall be set up at the same time;

- or when a downlink dedicated physical channel shall be set up and there already exist an uplink dedicated physical channel.

The two cases are described in subclauses ~~5.5.1~~4.3.2 and ~~5.5.2~~4.3.3 respectively.

4.3.2 No existing uplink dedicated channel

The assumption for this case is that a DPCCH/DPDCH pair shall be set up in both uplink and downlink, and that there exist no uplink DPCCH/DPDCH already. This corresponds to the case when a dedicated physical channel is initially set up on a frequency.

The synchronization establishment procedures of the dedicated physical channel are described below. The synchronization establishment ~~process~~ flow is shown in figure 1.

a) UTRAN starts the transmission of downlink DPCCH/DPDCHs. The DPDCH is transmitted only when there is data to be transmitted to the UE.

b) The UE establishes downlink chip synchronization and frame synchronization based on the CPICH timing and timing offset information notified from UTRAN. Frame synchronization can be confirmed using the Frame Synchronization Word. Successful frame synchronization is confirmed and reported to the higher layers when S_R successive frames have been confirmed to be frame synchronized. Otherwise, frame synchronization failure is reported to the higher layers.

c) The UE starts the transmission of the uplink DPCCH/DPDCHs at a frame timing exactly T_0 chips after the frame timing of the received downlink DPCCH/DPDCH. The DPDCH is transmitted only when there is data to be transmitted. The UE immediately starts inner-loop power control as described in sections 5.1.2 and 5.2.~~1~~3, i.e. the transmission power of the uplink DPCCH/DPDCH follows the TPC commands generated by UTRAN, and the UE performs SIR estimation to generate TPC commands transmitted to UTRAN.

d) UTRAN establishes uplink channel chip synchronization and frame synchronization. Frame synchronization can be confirmed using the Frame Synchronization Word. Successful frame

synchronization is confirmed and reported to the higher layers when S_R successive frames have been confirmed to be frame synchronized. Otherwise, frame synchronization failure is reported to the higher layers.
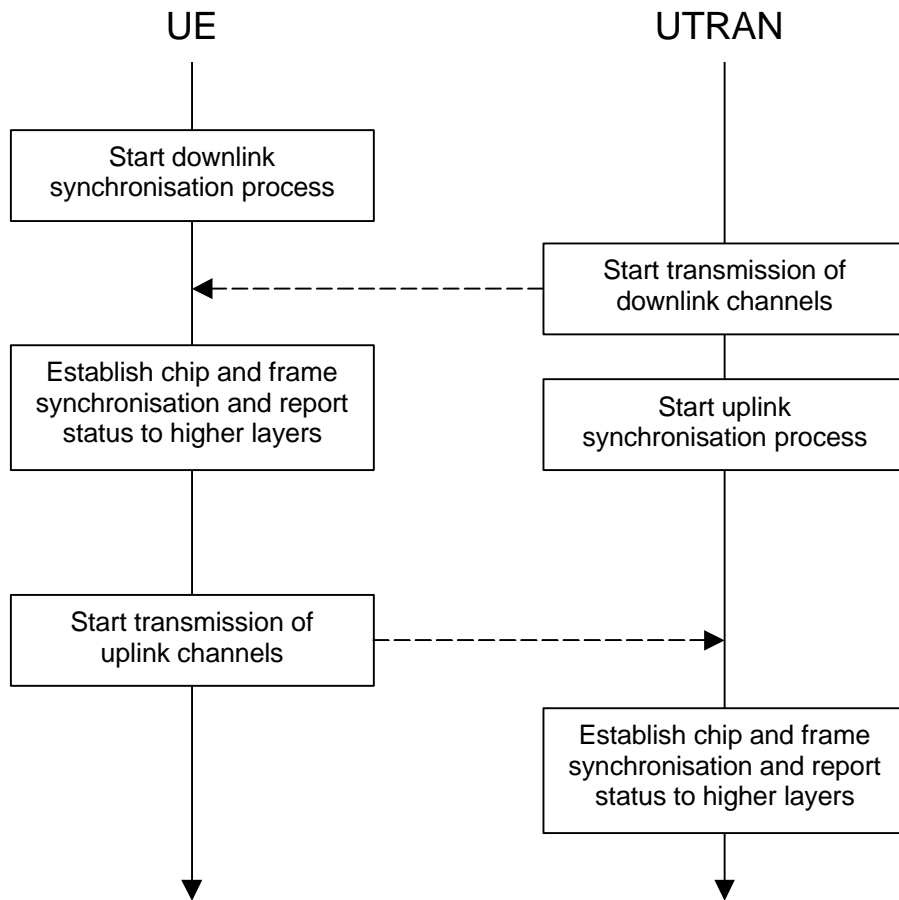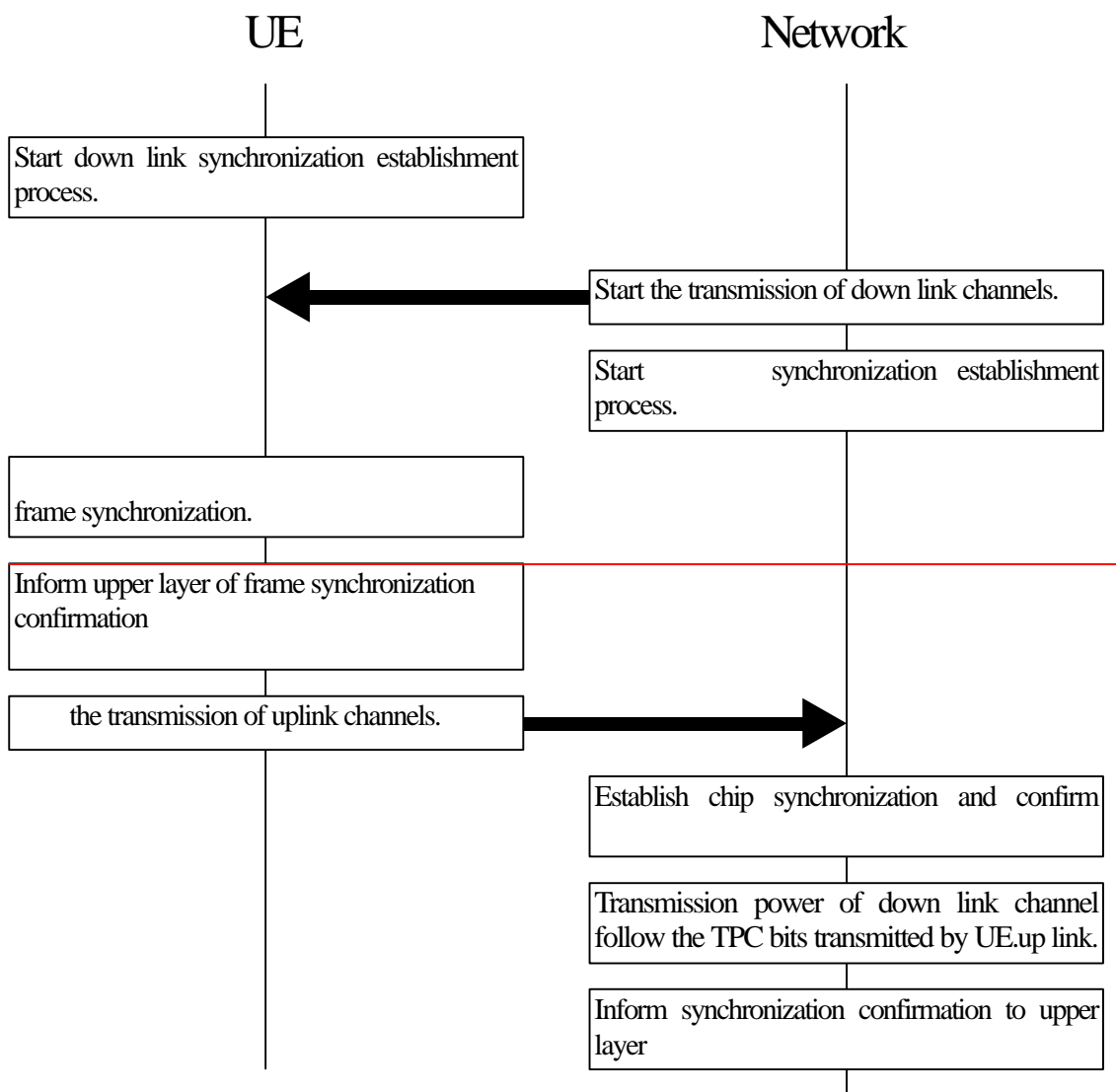
Figure 1: Synchronisation establishment flow for dedicated channels: uplink dedicated channel not existing

4.3.3   With existing uplink dedicated channel

The assumption for this case is that there already exist DPCCH/DPDCHs in the uplink, and a corresponding dedicated physical channel shall be set up in the downlink. This corresponds to the case when a new cell has been added to the active set in soft handover and shall begin its downlink transmission.

At the start of soft handover, the uplink dedicated physical channel transmitted by the UE, and the downlink dedicated physical channel transmitted by the soft handover source cell continues transmitting as usual.

The synchronisation establishment flow upon intra/inter-cell soft handover is described in figure 2.

a) The UE starts the chip synchronisation establishment process of downlink channels from the handover destination. The uplink channels being transmitted shall continue transmission as before.

b) UTRAN starts the transmission of the downlink DPCCH/DPDCH at a frame timing such that the frame timing received at the UE will be within $T_0 \pm [148]$ chips prior to the frame timing of the uplink DPCCH/DPDCH at the UE. UTRAN then starts the synchronization establishment process of the uplink DPCCH/DPDCH transmitted by the UE. Frame synchronization can be confirmed using the Frame Synchronization Word. Successful frame synchronization is confirmed and reported to the higher layers

when S_R successive frames have been confirmed to be frame synchronized. Otherwise, frame synchronization failure is reported to the higher layers.

c) Based on the handover destination CPICH reception timing, the UE establishes chip synchronisation of downlink channels from handover destination cell. Frame synchronization can be confirmed using the Frame Synchronization Word. Successful frame synchronization is confirmed and reported to the higher layers when S_R successive frames have been confirmed to be frame synchronized. Otherwise, frame synchronization failure is reported to the higher layers.
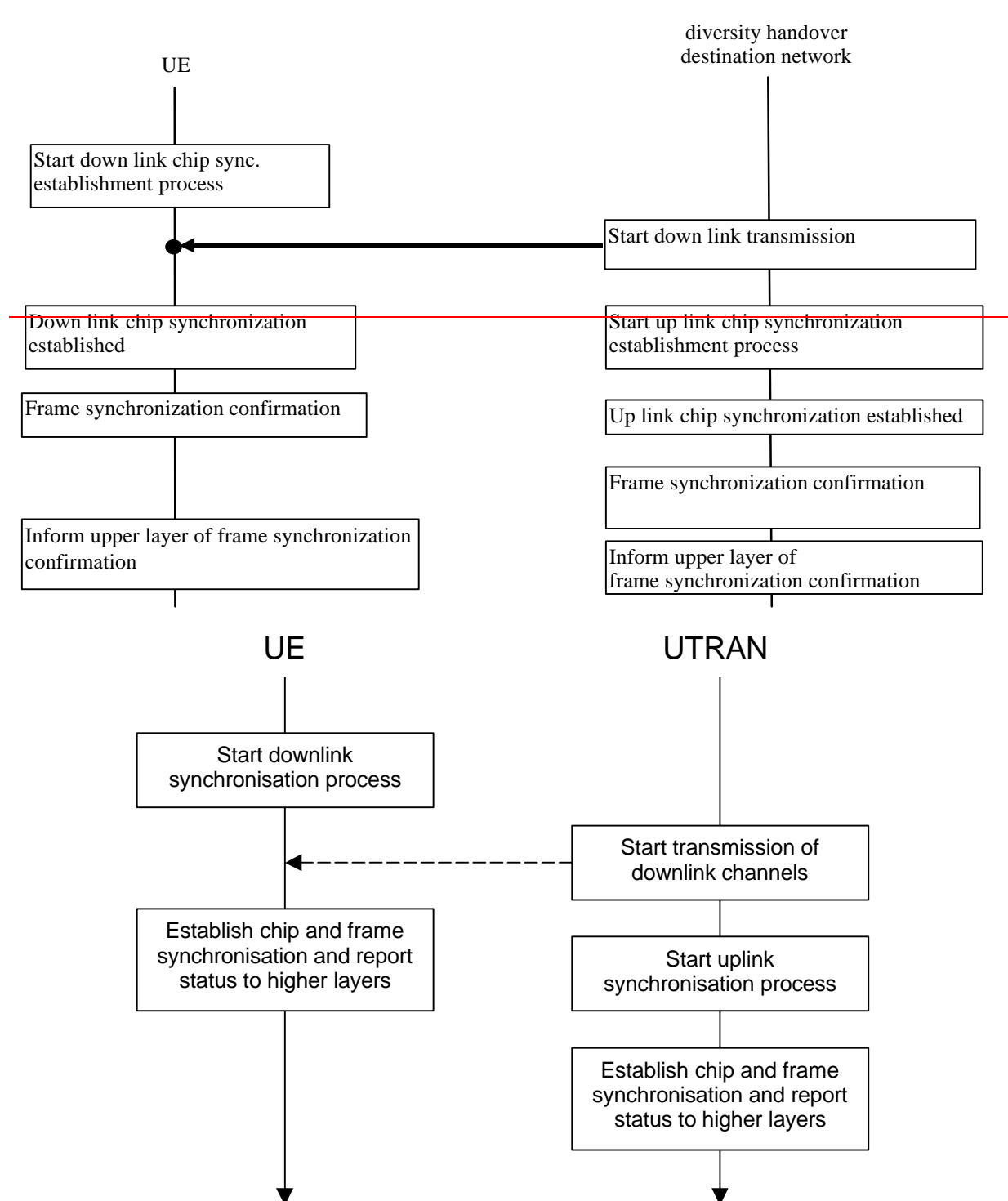

Figure 2: Synchronisation establishment flow for dedicated channels: upon intra/inter-cell soft handover uplink dedicated channel already existing

During a connection, in some cases the UE is allowed to change its transmission timing. When the UE is not in soft handover or in soft handover with cells that all are known to have the same timing reference, the UE may adjust its DPDCH/DPCCH transmission time instant. <Note: maximum rate of the adjustment should be specified in R4> Otherwise, the UE may not adjust its DPDCH/DPCCH transmission time instant.