TSG-RAN Working Group 3 meeting #4
Warwick, UK, June 1 – 4, 1999.

***TSGR3#4(99)470***

**Agenda:** 6.1

**Source:** Motorola

**Title:** Corrections to Synchronisation section in 25.401

**Document For:** Decision

**Title:** **Corrections to Synchronisation section in 25.401**

**Date:** **June 1-4, 1999**

**Source:** **Motorola**

**Key Issue:** **Radio Interface Synchronisation**

## 1. Introduction

This contribution identifies some apparent errors in the synchronisation section of reference [1]. Some technical problems are noted as well as some minor editorial errors.

## 2. Discussion

The assumption used in this contribution is that Td for a DPCH is a positive offset with respect to the primary CCPCH of the same cell. That is the DPCH related to cell frame number N is transmitted by the UTRAN later in time than is the primary CCPCH related to cell frame number N.

Another assumption is that the Tm value measured by the UE is a positive offset with respect to the UE's internal CFN reference. The frame boundary of the UE's CFN reference is presently defined to be aligned with the first arriving DPCH. Therefore, Tm indicates how long after the frame boundary of the CFN reference is the arrival of the frame boundary for the primary CCPCH of the neighbour cell.

### 2.1. *Regarding section 9.3, second sentence*

Says to see reference [7]. There is no ref [7].

### *2.2. Regarding Section 9.3, definition of Td*

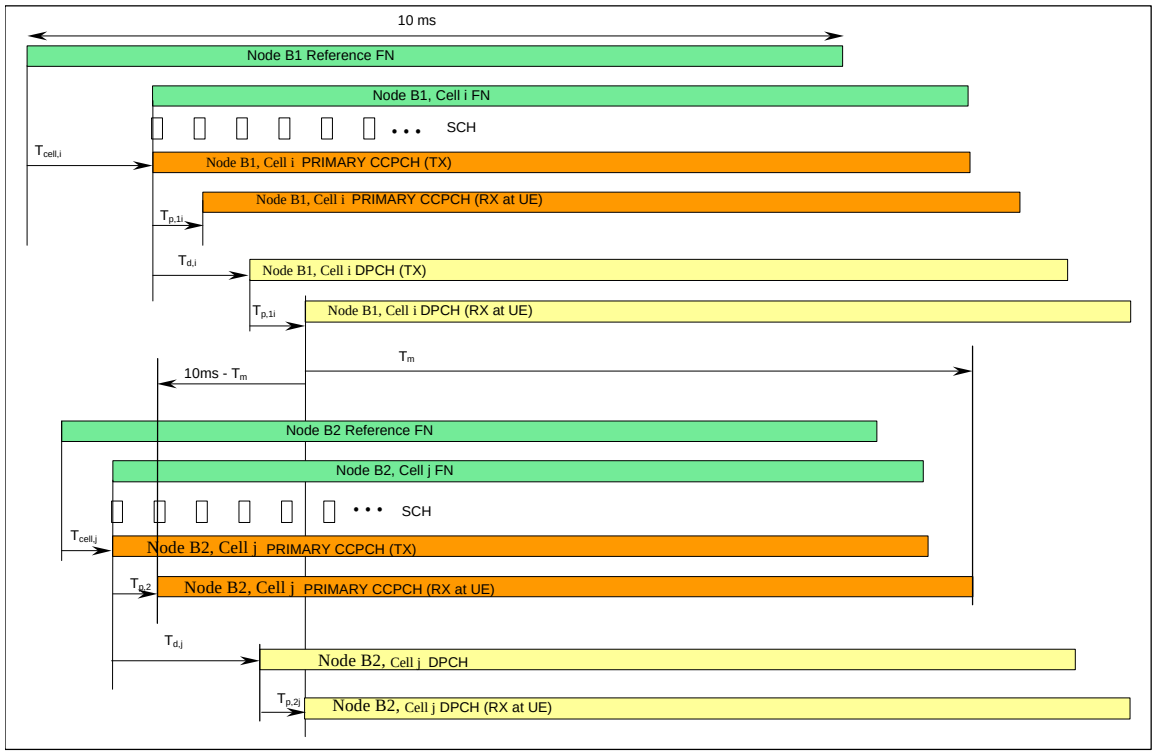
The two bullets immediately under the definition of Td support the description of Td. These bullets should be indented to improve readability of the section.

### *2.3. Regarding Section 9.3, Figure 8*

The way the figure is drawn implies that Tdj is a negative offset from the primary CCPCH of cell j. Every other figure in the document shows Td as a positive offset from the boundary of the primary CCPCH. Td should be shown always as a positive offset.

Tdj is implied to be a negative value not only due to the direction of the arrow but also since the figure implies that the absolute values of Tm and Tdj are equal. Tm is shown as the time that the primary CCPCH of cell j arrives after the DPCH of cell i, which is consistent with the assumption regarding Tm stated above.

The figure has been redrawn as shown below with Tdj as a positive offset with respect the primary CCPCH of cell j. To keep within the picture boundary, the primary CCPCH of cell j now arrives before the DPCH of cell i. Note that the length of the arrow (10ms – Tm) is equivalent to the length of the arrow for Tdj.




## *2.4. Regarding section 9.3, paragraph directly underneath Figure 8*

States that Tm together with Tdi (Td of the source cell) are used together to calculate Tdj. The value of Tdj should not dependent on Tdi – instead it is based solely on Tm. Figure 9 aligns with the text underneath figure 8 and is likewise wrong.

Based on the assumptions stated for Td and Tm, the redrawn figure 8 shows that the value of Tdj is equal to (10ms - Tm) rounded to a 256 chip boundary.

## *2.5. Regarding section 9.3, Figure 12*

This figure is related to a single cell (i.e. cell j). The subscript for $TX_{cell}$ should be j, not i.

## *2.6. Regarding section 9.4.3, note underneath Figure 12*

This statement raises an issue regarding the signalling capabilities between the UTRAN and UE. Is it clear that the RRC protocol gives the UTRAN the ability to tell the UE whether or not it is required to report the OFF value? If L3 signalling does not support this ability, nothing is gained by the UTRAN having a priori knowledge of the relative cell frame offsets required a radio link added to the active set.

## *2.7. Regarding section 9.4.5*

The statement "Link Offset values could be adjusted during the connection based on *Frame discard rate and Too early frame arrival rate* (at Node B and at SRNC respectively), in order to adapt to the current traffic situation" is very ambiguous. Presumably the intention was to state that Node B is responsible for detecting when downlink frames arrive too early/late and the SRNC is responsible for detecting when

uplink frames are arrive too early/late. This idea is not what the sentence says. It says that Node B detects when frames arrive too late and SRNC detects when frames arrive too early.

### *2.8. Regarding section 9.4.6*

The statement “The correct DL transmission time is estimated by the SRNC (or a predefined value is used) taking into account the assumed transmission and processing delays in the UTRAN” is based on a false premise. If the SRNC is estimating the transmission time to send the DL frame to establish the initial timing, the assumption is that the SRNC has knowledge of when the Node B will transmit the associated radio frame over the air (i.e. the SRNC has node synchronisation information regarding Node B). Nothing indicates in section 9.5 that the capability for node synchronisation is assumed for the UTRAN architecture. Without the assumption of node synchronisation, it seems that the definition of DL-Frame-Offset should account not only for transmission delay but also the relative offset between the RNC’s frame counter (defined in the first bullet of section 9.4.1, reference [1]) and the Node B/cell frame counter.

## 3. Proposals

It is proposed that:

1. Delete the reference to [7] or add the correct document to the reference list in section 9.3.
2. Indent the two bullets following the definition of Td in section 9.3.
3. Replace figure 8 with figure in section 2.3 of this contribution.
4. Correct input parameters for calculation of Tdj in section 9.3 and figure 9.
5. Correct subscript of TX cell in figure 12.
6. Verify with WG2 that L3 signalling allows the UTRAN to inform the UE that it is not required to report OFF parameter.
7. In section 9.4.5, clearly state that SRNC is responsible for detection of uplink frame arrival too early/late and that Node B is responsible for detection of downlink frame arrival too early/late.
8. Correct definition of DL-Frame-Offset so that it is not reliant on knowledge of frame synchronisation.

## 4. References

[1] TS 25.401 (1.0.2) UTRAN Overall Description