

TSG-RAN Working Group 1 meeting #20
Busan, Korea
May 21 – May 25, 2001

TSGR1#20(01)0468

Agenda item: R99/Rel-4
Source: Ericsson, Qualcomm
Title: Correction of synchronisation primitives
Document for: Decision

In 25.214, section 4.3.1, the in-sync and out-of-sync primitives are defined. These are based on CRC detection and on the physical DPCH channel quality. For some cases both in-sync and out-of-sync criteria will be valid simultaneously and sent to higher layers. Two cases where this can happen are detected.

1. When receiving a physical channel which carries transport channels with minimum TTI=20 ms or longer. For a while no CRCs are correctly decoded simultaneously as the physical channel quality is acceptable for the in-sync criteria. For frames where no TTIs end, the in-sync criterion is only based on the physical channel quality and thereby the in-sync primitive is set. Simultaneously no correctly decoded CRC is received during the last 160 ms and thereby the out-of-sync criterion is set.
2. When receiving a physical channel where no CRCs are attached during a period longer than 160 ms, then according to the current specification the in-sync criterion is based on the physical channel quality and is then set while the out-of-sync criterion is based that no correct CRCs has been received.

The attached CRs for R99 and Rel-4 solve both problems. To have an in-sync primitive at least one CRC must be correctly decoded during the last 160 ms, if there are CRCs attached. Also in case no CRCs are attached, the out-of-sync criterion should be based only on physical channel quality.

CR-Form-v4
CHANGE REQUEST
⌘ 25.214 CR 168 ⌘ ev - ⌘ Current version: 3.6.0 ⌘

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 Core Network

Title:	⌘ Correction of synchronisation primitives		
Source:	⌘ Ericsson, Qualcomm		
Work item code:	⌘	Date:	⌘ 2001-05-15
Category:	⌘ F	Release:	⌘ R99
	Use <u>one</u> 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 <u>one</u> 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)

Reason for change:	⌘ Both in-sync and out-of-sync can be reported simultaneously.
Summary of change:	⌘ Synchronisation primitives are corrected to allow either in-sync or out-of-sync to be reported at the same time.
Consequences if not approved:	⌘ Ambiguity for reporting synchronisation primitives in certain cases.

Clauses affected:	⌘ 4.3.1.2		
Other specs affected:	<input type="checkbox"/> Other core specifications <input type="checkbox"/> Test specifications <input type="checkbox"/> 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.
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- 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.

4.3 DPCCH/DPDCH synchronisation

4.3.1 Synchronisation primitives

4.3.1.1 General

For the dedicated channels, synchronisation primitives are used to indicate the synchronisation status of radio links, both in uplink and downlink. The definition of the primitives is given in the following subclauses.

4.3.1.2 Downlink synchronisation primitives

Layer 1 in the UE shall every radio frame check synchronisation status of the downlink dedicated channels. Synchronisation status is indicated to higher layers using the CPHY-Sync-IND and CPHY-Out-of-Sync-IND primitives.

The criteria for reporting synchronisation status are defined in two different phases.

The first phase starts when higher layers initiate physical dedicated channel establishment (as described in [5]) and lasts until 160 ms after the downlink dedicated channel is considered established by higher layers (physical channel establishment is defined in [5]). During this time out-of-sync shall not be reported and in-sync shall be reported using the CPHY-Sync-IND primitive if the following criterion is fulfilled:

- The UE estimates the DPCCH quality over the previous 40 ms period to be better than a threshold Q_{in} . This criterion shall be assumed not to be fulfilled before 40 ms of DPCCH quality measurements have been collected. Q_{in} is defined implicitly by the relevant tests in [7].

The second phase starts 160 ms after the downlink dedicated channel is considered established by higher layers. During this phase both out-of-sync and in-sync are reported as follows.

Out-of-sync shall be reported using the CPHY-Out-of-Sync-IND primitive if either of the following criteria are fulfilled:

- The UE estimates the DPCCH quality over the previous 160 ms period to be worse than a threshold Q_{out} . Q_{out} is defined implicitly by the relevant tests in [7].
- The 20 most recently received transport blocks with a CRC attached, as observed on all TrCHs using CRC, have been received with incorrect CRC. In addition, over the previous 160 ms, all transport blocks with a CRC attached have been received with incorrect CRC. In case of no TFCI is used this criterion shall be considered only for TrCHs using CRC in all transport formats. If no transport blocks with a CRC attached are received over the previous 160 ms this criterion shall not be assumed to be fulfilled.

In-sync shall be reported using the CPHY-Sync-IND primitive if both of the following criteria are fulfilled:

- The UE estimates the DPCCH quality over the previous 160 ms period to be better than a threshold Q_{in} . Q_{in} is defined implicitly by the relevant tests in [7].
- At least one transport block with a CRC attached, as observed on all TrCHs using CRC, is received in a TTI ending in the current frame with correct CRC. If no transport blocks are received, or no transport block has a CRC attached in a TTI ending in the current frame and in addition over the previous 160 ms at least one transport block with a CRC attached has been received with a correct CRC, this criterion shall be assumed to be fulfilled. - If no transport blocks with a CRC attached are received over the previous 160 ms this criterion shall also be assumed to be fulfilled. In case of no TFCI is used this criterion shall be considered only for TrCHs using CRC in all transport formats.

How the primitives are used by higher layers is described in [5]. The above definitions may lead to radio frames where neither the in-sync nor the out-of-sync primitives are reported.

CR-Form-v4

CHANGE REQUEST

⌘ **25.214 CR 169** ⌘ ev **-** ⌘ Current version: **4.0.0** ⌘

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In-sync shall be reported using the CPHY-Sync-IND primitive if both of the following criteria are fulfilled:

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- At least one transport block with a CRC attached, as observed on all TrCHs using CRC, is received in a TTI ending in the current frame with correct CRC. If no transport blocks are received, or no transport block has a CRC attached in a TTI ending in the current frame and in addition over the previous 160 ms at least one transport block with a CRC attached has been received with a correct CRC, this criterion shall be assumed to be fulfilled. If no transport blocks with a CRC attached are received over the previous 160 ms this criterion shall also be assumed to be fulfilled. In case of no TFCI is used this criterion shall be considered only for TrCHs using CRC in all transport formats.

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