TSG RAN Meeting #28 **RP-050256**
Quebec, Canada, 1 - 3 June 2005

Title **CRs (Rel-6 category F) to TS25.211, TS 25.213 & TS 25.214**
Source **TSG RAN WG1**
Agenda Item **8.11**

RAN1 Tdoc	Spec	CR	Rev	Rel	Cat	Current Version	Subject	Work item	Remarks
R1-050570	25.211	211	2	Rel-6	F	6.4.0	Clarification on phase reference for downlink channels	TEI6	
R1-050465	25.213	080	-	Rel-6	F	6.2.0	Correction to short scrambling code polynomial	TEI6	
R1-050421	25.214	379	-	Rel-6	F	6.5.0	Correction to DL synchronization	TEI6	

CR-Form-v7.1

CHANGE REQUEST

⌘	**25.211**	**CR**	**211**	⌘ **rev**	**2**	⌘ 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:	⌘	Clarification on phase reference for downlink channels	
Source:	⌘	RAN WG1	
Work item code:	⌘	TEI-6	***Date:*** ⌘ 22/05/2005
Category:	⌘	**F** *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.	***Release:*** ⌘ Rel-6 *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:	⌘	Specification of which phase reference may be used by the UE is distributed across multiple sub-clauses and is incomplete and/or inconsistent (e.g. not specified that phase reference for DL E-DCH control channels are the same as for the associated DPCH/F-DPCH)
Summary of change:	⌘	Consolidation of the specification of the phase reference text in a single subclause and extension of the text/table to cover all existing channel types.
Consequences if not approved:	⌘	• Inconsistency in the text • Ambiguity on E-DCH control channel phase reference • Ambiguity on MICH phase reference • Ambiguity on possible phase reference when UE simultaneously receives DPCH/F-DPCH and S-CCPCH from multiple radio links.

Clauses affected:	⌘	5.3.3.1.1, 5.3.3.1.2, 5.3.3.2				
		Y	**N**			
Other specs affected:	⌘		X	Other core specifications	⌘	
			X	Test specifications		
			X	O&M Specifications		
Other comments:	⌘	This CR assumes that CR 25.211-221 and CR 25.214-391 on removal of dedicated pilot bits as the sole phase reference are approved.				

How to create CRs using this form:

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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.

5.3.3 Common downlink physical channels

5.3.3.1 Common Pilot Channel (CPICH)

The CPICH is a fixed rate (30 kbps, SF=256) downlink physical channel that carries a pre-defined bit sequence. Figure 13 shows the frame structure of the CPICH.

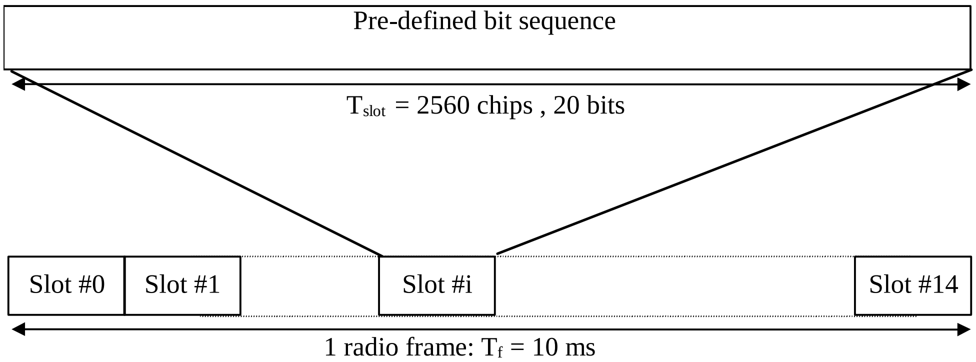

Figure 13: Frame structure for Common Pilot Channel

In case transmit diversity (open or closed loop) is used on any downlink channel in the cell, the CPICH shall be transmitted from both antennas using the same channelization and scrambling code. In this case, the pre-defined bit sequence of the CPICH is different for Antenna 1 and Antenna 2, see figure 14. In case of no transmit diversity, the bit sequence of Antenna 1 in figure 14 is used.

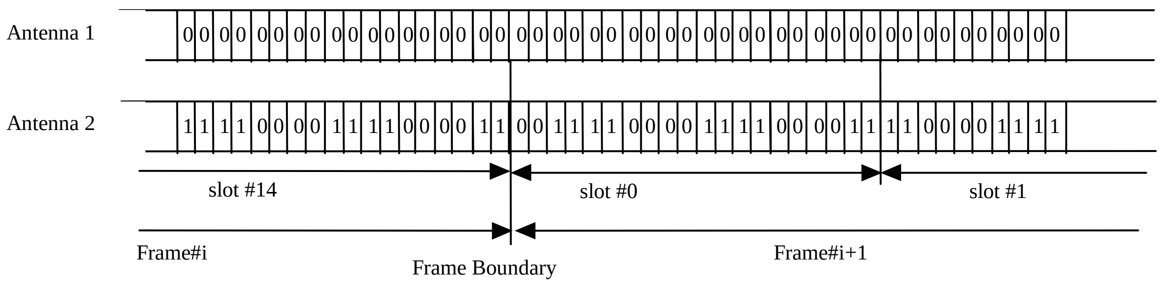

Figure 14: Modulation pattern for Common Pilot Channel

There are two types of Common pilot channels, the Primary and Secondary CPICH. They differ in their use and the limitations placed on their physical features.

5.3.3.1.1 Primary Common Pilot Channel (P-CPICH)

The Primary Common Pilot Channel (P-CPICH) has the following characteristics:

- The same channelization code is always used for the P-CPICH, see [4];
- The P-CPICH is scrambled by the primary scrambling code, see [4];
- There is one and only one P-CPICH per cell;
- The P-CPICH is broadcast over the entire cell.

~~The Primary CPICH is a phase reference for the following downlink channels: SCH, Primary CCPCH, AICH, PICH AP-AICH, CD/CA-ICH, CSICH, DL-DPCCH for CPCH and the S-CCPCH. By default, the Primary CPICH is also a phase reference for downlink DPCH or F-DPCH and any associated PDSCH, HS-PDSCH and HS-SCCH. The UE is informed by higher layer signalling if the P-CPICH is not a phase reference for a downlink DPCH or F-DPCH and any associated PDSCH, HS-PDSCH and HS-SCCH.~~

5.3.3.1.2 Secondary Common Pilot Channel (S-CPICH)

A Secondary Common Pilot Channel (S-CPICH) has the following characteristics:

- An arbitrary channelization code of SF=256 is used for the S-CPICH, see [4];
- A S-CPICH is scrambled by either the primary or a secondary scrambling code, see [4];
- There may be zero, one, or several S-CPICH per cell;
- A S-CPICH may be transmitted over the entire cell or only over a part of the cell;

~~A Secondary CPICH may be a phase reference for a downlink DPCH or F-DPCH. If this is the case, the UE is informed about this by higher layer signalling.~~

~~The Secondary CPICH can be a phase reference for a downlink physical channel using open loop or closed loop TX diversity, instead of the Primary CPICH being a phase reference.~~

~~Note that it is possible that neither the P-CPICH nor any S-CPICH is a phase reference for a downlink DPCH.~~

5.3.3.2 Downlink phase reference

Table 17 ~~summarizes~~ specifies the ~~possible~~ channels which the UE may use as a phase reference~~s~~ ~~usable on different~~ for each downlink physical channel type~~s~~; it also specifies whether the channels which the UE may use as a phase reference for a channel of a particular type shall be assumed to be the same as the ones which the UE may use as a phase reference for the associated DPCH or F-DPCH.

For the DPCH or F-DPCH and the associated downlink physical channels the following always applies:

- The UE may use the DPCH pilot bits as a phase reference.
- In addition, the UE may use either the primary CPICH or a secondary CPICH as a phase reference.
    - By default (i.e. without any indication by higher layers) the UE may use the primary CPICH as a phase reference.
    - The UE is informed by higher layers when it may use a secondary CPICH as a phase reference. In this case the UE shall not use the primary CPICH as a phase reference. Indication that a secondary CPICH may be a phase reference is also applicable when open loop or closed loop TX diversity is enabled for a downlink physical channel.

~~Table 17: Application of phase references on downlink physical channel types~~
~~"X" – can be applied, "–" – not applied~~

~~Physical channel type~~	~~Primary-CPICH~~	~~Secondary-CPICH~~	~~Dedicated pilot~~
~~P-CCPCH~~	~~X~~	~~–~~	~~–~~
~~SCH~~	~~X~~	~~–~~	~~–~~
~~S-CCPCH~~	~~X~~	~~–~~	~~–~~
~~DPCH~~	~~X~~	~~X~~	~~X~~
~~F-DPCH~~	~~X~~	~~X~~	~~–~~
~~PICH~~	~~X~~	~~–~~	~~–~~
~~MICH~~	~~X~~	~~–~~	~~–~~
~~PDSCH*~~	~~X~~	~~X~~	~~X~~
~~HS-PDSCH*~~	~~X~~	~~X~~	~~X~~
~~HS-SCCH*~~	~~X~~	~~X~~	~~X~~
~~E-AGCH*~~	~~X~~	~~X~~	~~X~~
~~E-RGCH*~~	~~X~~	~~X~~	~~X~~
~~E-HICH*~~	~~X~~	~~X~~	~~X~~
~~AICH~~	~~X~~	~~–~~	~~–~~
~~CSICH~~	~~X~~	~~–~~	~~–~~
~~DL-DPCCH for CPCH~~	~~X~~	~~–~~	~~–~~

Table 17: Phase references for downlink physical channel types
"X" – Applicable, "–" – Not applicable

Physical channel type	DPCH Dedicated pilot (never as the sole phase reference)	Primary-CPICH	Secondary-CPICH	Same as associated DPCH or F-DPCH
P-CCPCH	-	X	-	-
SCH	-	X	-	-
S-CCPCH	-	X	-	-
DPCH*	X	X	X	-
F-DPCH*	-	X	X	-
PICH	-	X	–	-
MICH	-	X	–	-
PDSCH*	-	-	-	X
HS-PDSCH*	-	-	-	X
HS-SCCH*	-	-	-	X
E-AGCH*	-	-	-	X
E-RGCH*	-	-	-	X
E-HICH*	-	-	-	X
AICH	-	X	-	-
CSICH	-	X	-	-
DL-DPCCH for CPCH	-	X	-	-

Note *: A secondary CPICH should not be configured as a phase reference for DPCH or F-DPCH when a UE simultaneously receives S-CCPCHs on different radio links and DPCH or F-DPCH. The UE behavior is undefined if this configuration is used. The support for simultaneous reception of S-CCPCHs on different radio links and DPCH or F-DPCH is optional in the UE.~~The same phase reference as with the associated DPCH or F-DPCH shall be used. The support for dedicated pilots as phase reference for HS-PDSCH, HS-SCCH, E-AGCH, E-RGCH and E-HICH is optional for the UE.~~

Furthermore, during a PDSCH frame, and within the slot prior to that PDSCH frame, the phase reference on the associated DPCH shall not change. During a DPCH or F-DPCH frame overlapping with any part of an associated HS-DSCH or HS-SCCH subframe, the phase reference on this DPCH or F-DPCH shall not change.

3GPP TSG-RAN WG1 #41
Athen, Greece, May 10-14, 2005

Tdoc ⌘R1-050465

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CHANGE REQUEST

⌘	**25.213**	**CR**	**80**	⌘ **rev**	**-**	⌘	Current version:	**6.2.0**	⌘

*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:	⌘	Correction to short scrambling code polynomial
Source:	⌘	RAN WG1
Work item code:	⌘	TEI6
Date:	⌘	28/04/2005
Category:	⌘	**F**
Release:	⌘	Rel-6

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:	⌘	One generating polynomial is inconsistent with the equation and diagram for generating the short scrambling code
Summary of change:	⌘	Correcting the polynomial to be consistent with the specification
Consequences if not approved:	⌘	Inconsistent specification possibly leading to non interopable equipement.

Clauses affected:	⌘	4.3.2.3			
		Y	**N**		
Other specs affected:	⌘		X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

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4.3.2.3 Short scrambling sequence

The short scrambling sequences $c_{short,1,n}(i)$ and $c_{short,2,n}(i)$ are defined from a sequence from the family of periodically extended S(2) codes.

Let $n_{23}n_{22}\ldots n_0$ be the 24 bit binary representation of the code number n.

The n:th quaternary S(2) sequence $z_n(i)$, $0 \leq n \leq 16777215$, is obtained by modulo 4 addition of three sequences, a quaternary sequence $a(i)$ and two binary sequences $b(i)$ and $d(i)$, where the initial loading of the three sequences is determined from the code number n. The sequence $z_n(i)$ of length 255 is generated according to the following relation:

- $z_n(i) = a(i) + 2b(i) + 2d(i)$ modulo 4, $i = 0, 1, \ldots, 254$;

where the quaternary sequence $a(i)$ is generated recursively by the polynomial $g_0(x)= x^8+\underline{3}x^5+\sout{3}x^3+\underline{3}x^2+2x+\underline{3}\sout{1}$ as:

- $a(0) = 2n_0 + 1$ modulo 4;
- $a(i) = 2n_i$ modulo 4, $i = 1, 2, \ldots, 7$;
- $a(i) = 3a(i\text{-}3) + a(i\text{-}5) + 3a(i\text{-}6) + 2a(i\text{-}7) + 3a(i\text{-}8)$ modulo 4, $i = 8, 9, \ldots, 254$;

and the binary sequence $b(i)$ is generated recursively by the polynomial $g_1(x)= x^8+x^7+x^5+x+1$ as

$b(i) = n_{8+i}$ modulo 2, $i = 0, 1, \ldots, 7$,

$b(i) = b(i\text{-}1) + b(i\text{-}3) + b(i\text{-}7) + b(i\text{-}8)$ modulo 2, $i = 8, 9, \ldots, 254$,

and the binary sequence $d(i)$ is generated recursively by the polynomial $g_2(x)= x^8+x^7+x^5+x^4+1$ as:

$d(i) = n_{16+i}$ modulo 2, $i = 0, 1, \ldots, 7$;

$d(i) = d(i\text{-}1) + d(i\text{-}3) + d(i\text{-}4) + d(i\text{-}8)$ modulo 2, $i = 8, 9, \ldots, 254$.

The sequence $z_n(i)$ is extended to length 256 chips by setting $z_n(255) = z_n(0)$.

The mapping from $z_n(i)$ to the real-valued binary sequences $c_{short,1,n}(i)$ and $c_{short,2,n}(i)$, , $i = 0, 1, \ldots, 255$ is defined in Table 2.

Table 2: Mapping from $z_n(i)$ to $c_{short,1,n}(i)$ and $c_{short,2,n}(i)$, $i = 0, 1, \ldots, 255$

$z_n(i)$	$c_{short,1,n}(i)$	$c_{short,2,n}(i)$
0	+1	+1
1	-1	+1
2	-1	-1
3	+1	-1

Finally, the complex-valued short scrambling sequence $C_{short,\ n}$, is defined as:

$$C_{short,n}(i) = c_{short,1,n}(i \bmod 256)\left(1 + j(-1)^i c_{short,2,n}\left(2\lfloor (i \bmod 256)/2 \rfloor\right)\right)$$

where $i = 0, 1, 2, \ldots$ and $\lfloor\ \rfloor$ denotes rounding to nearest lower integer.

An implementation of the short scrambling sequence generator for the 255 chip sequence to be extended by one chip is shown in Figure 6.

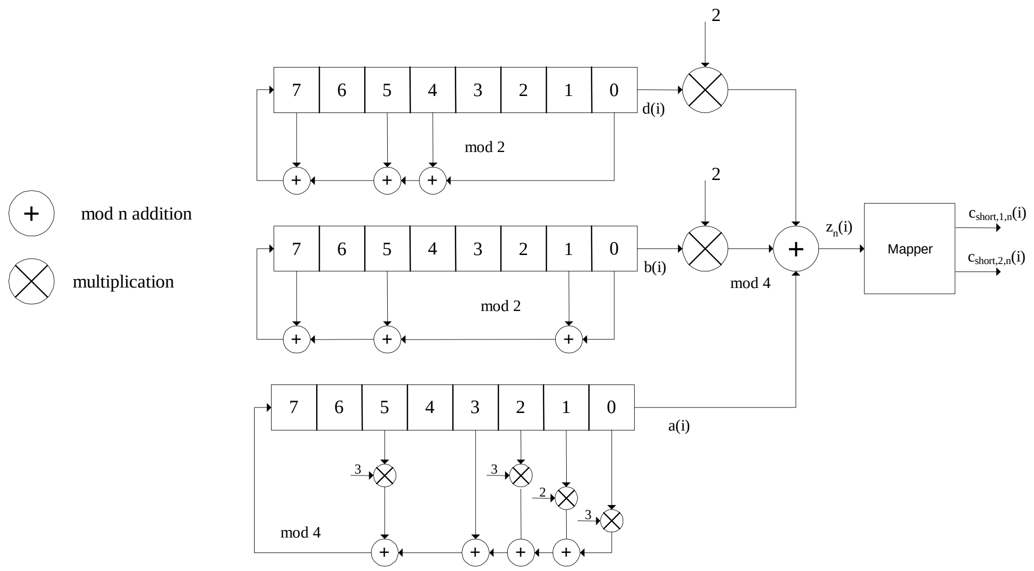

Figure 6: Uplink short scrambling sequence generator for 255 chip sequence

3GPP TSG-RAN WG1 #41 *Tdoc ⌘R1-050421*
Athen, Greece, May 10-14, 2005

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CHANGE REQUEST

⌘ **25.214**	**CR 379**	⌘ **rev**	**-**	⌘	Current version: **6.5.0**	⌘

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

Title:	⌘	Correction to DL synchronization
Source:	⌘	RAN WG1
Work item code:	⌘	TEI6
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Rel-5 (Release 5)
Rel-6 (Release 6)
Rel-7 (Release 7)

Reason for change:	⌘	Not clear whether the sync criteria apply to the HS-PDSCH. Implication that DPCH and F-DPCH couls be operated simulteanously
Summary of change:	⌘	- Remove implication that F-DPCH may be configured in addition to the DPCH - Clarify that the TrBlk error criteria only applies to those mapped to the DPDCH
Consequences if not approved:	⌘	Potential ambiguity on the implementation of the DL synchronization procedure

Clauses affected:	⌘	4.3.1.2				
		Y	**N**			
Other specs affected:	⌘		X	Other core specifications	⌘	
			X	Test specifications		
			X	O&M Specifications		
Other comments:	⌘					

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4.3 DPCCH/DPDCH/F-DPCH 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 either the DPCH or the F-DPCH depending on which is configured.downlink dedicated channels, including F-DPCH if one is configured. 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]) or whenever the UE initiates synchronisation procedure A (as described in section 4.3.2.1) 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 or F-DPCH 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].

In case F-DPCH is configured in the downlink, the quality criterion shall be estimated on TPC fields of the F-DPCH frame received from the serving HS-DSCH cell.

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 any of the following criteria is fulfilled:

- The UE estimates the DPCCH or F-DPCH 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 non-zero length CRC attached, as observed on all TrCHs using non-zero length CRC mapped to the DPDCH, have been received with incorrect CRC. In addition, over the previous 160 ms, all transport blocks with a non-zero length CRC attached have been received with incorrect CRC. In case no TFCI is used this criterion shall not be considered for the TrCH(s) not using guided detection if they do not use a non-zero length CRC in all transport formats. If no transport blocks with a non-zero length CRC attached are received over the previous 160 ms this criterion shall not be assumed to be fulfilled.

For a DPCH, 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 non-zero length CRC attached, as observed on all TrCHs using non-zero length CRC mapped to the DPDCH, 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 non-zero length 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 non-zero length CRC attached has been received with a correct CRC, this criterion shall be assumed to be fulfilled. If no transport blocks with a non-zero length CRC attached are received over the previous 160 ms this criterion shall also be assumed to be fulfilled. In case no TFCI is used this criterion shall not be considered for the TrCH(s) not using guided detection if they do not use a non-zero length CRC in all transport formats.

For a F-DPCH, in-sync shall be reported using the CPHY-Sync-IND primitive if the UE estimates the F-DPCH 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].

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.

4.3.1.3 Uplink synchronisation primitives

Layer 1 in the Node B shall every radio frame check synchronisation status of all radio link sets. Synchronisation status is indicated to the RL Failure/Restored triggering function using either the CPHY-Sync-IND or CPHY-Out-of-Sync-IND primitive. Hence, only one synchronisation status indication shall be given per radio link set.

The exact criteria for indicating in-sync/out-of-sync is not subject to specification, but could e.g. be based on received DPCCH quality or CRC checks. One example would be to have the same criteria as for the downlink synchronisation status primitives.