

Agenda Item: Rel'99/Rel'4 CRs
Source: Nokia
Title: DL Phase Reference for DL-DPCCH with CPCH
Document for: Decision

Introduction

In the last TSG RAN discussion resulted from the proposed Rel'99/Rel'4 CRs on downlink phase references. As a consequence the Rel'99 25.211 was modified (with changes reflected to Rel'4 automatically) by inserting a table that summarises which as the downlink phase reference possibilities for different DL channels.

During the discussion it was noted that DL-DPCCH for CPCH was missing from the list and that would need to be (potentially) revisited in TSG RAN WG1. This CR covers that action point from the TSG RAN#11.

The attached CR proposes approach that only the Primary CPICH would be the phase reference for DL-DPCCH with CPCH. The motivation to limit other alternatives is the fact that CPCH is shared by several users with rapid on/off principle and adjusting antenna weights between each user would need to be specified very carefully in order to expect proper UE support for that. Having other beam than the beam for the sector does not seem very practical when UE is not transmitting anything and when the UE comes on the CPCH the DL-DPCCH can not be suddenly sent with totally different antennas which would cause additional delay for various estimation processes in the UE.

Further as there are several DPCCHs for CPCH typically in a cell using CPCH, the UE can not know in advance which one is going to be used until it get's the CA (Channel Assignment) message, which also would complicate the UE synchronisation issues if there would be different phase reference possibilities. Even without CA on the other hand UE specific beamforming with e.g. secondary CPICH would then require one secondary CPICH for each DPCCH which would not be very efficient from the code resource use point of view either.

Thus the proposed solution for Rel'99 & Rel'4 specs is to state that the DL-DPCCH for CPCH has always as the phase reference the Primary CPICH.

The CRs are attached below for Rel'99 and Rel'4.

CR-Form-v4

CHANGE REQUEST

⌘ **25.211 CR 97** ⌘ 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:	⌘ Downlink Phase Reference for DL-DPCCH for CPCH		
Source:	⌘ Nokia		
Work item code:	⌘	Date:	⌘ 15.5.2001
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:	⌘ What phase references are applicable for the DL-DPCCH with CPCH has not been clearly defined in the 25.211 , thus it is not clear for UE implementation what to support with DL-DPCCH for CPCH.
Summary of change:	⌘ - The DL-DPCCH for CPCH is stated to use always the primary CPICH as the phase reference
Consequences if not approved:	⌘ The UE may be implemented differently depending on vendor since the phase reference possibilities with DL-DPCCH for CPCH are not specified.

Clauses affected:	⌘		
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.

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/symbol sequence. Figure 13 shows the frame structure of the CPICH.

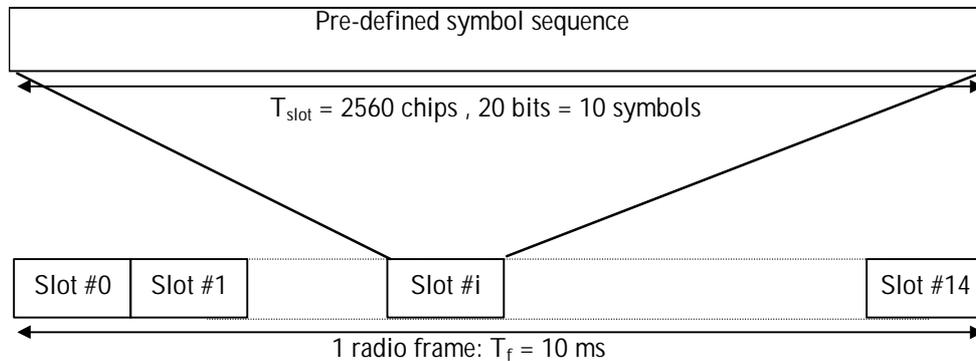


Figure 13: Frame structure for Common Pilot Channel

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 symbol sequence of the CPICH is different for Antenna 1 and Antenna 2, see figure 14. In case of no transmit diversity, the symbol sequence of Antenna 1 in figure 14 is used.

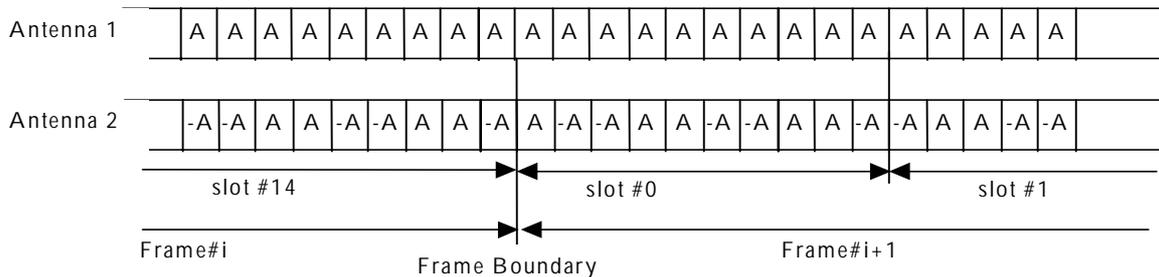


Figure 14: Modulation pattern for Common Pilot Channel (with $A = 1+j$)

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. The UE is informed by higher layer signalling if the P-CPICH is not a phase reference for a downlink DPCH.

The Primary CPICH is always a phase reference for a downlink physical channel using closed loop TX diversity.

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. 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 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 16 summarizes the possible phase references usable on different downlink physical channel types.

Table 16: 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
PICH	X	-	-
PDSCH*	X	X	X
AICH	X	-	-
CSICH	X	-	-
<u>DL-DPCCH for CPCH</u>	<u>X</u>	<u>=</u>	<u>=</u>

Note * The same phase reference as with the associated DPCH shall be used.

CR-Form-v4

CHANGE REQUEST

⌘ **25.211 CR 98** ⌘ ev **-** ⌘ Current version: **4.0.0** ⌘

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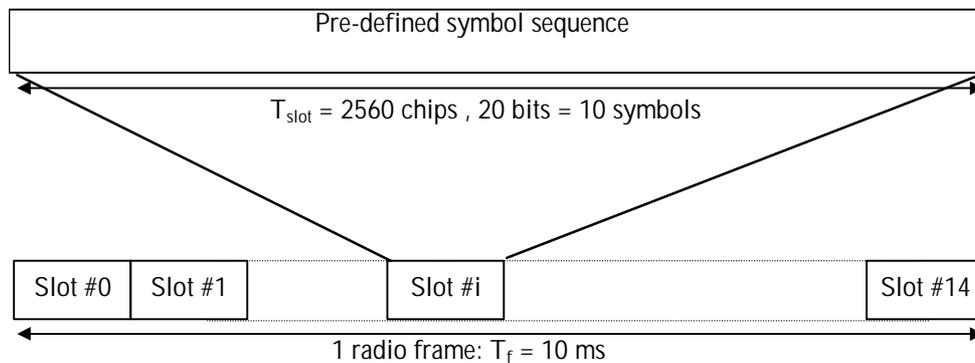


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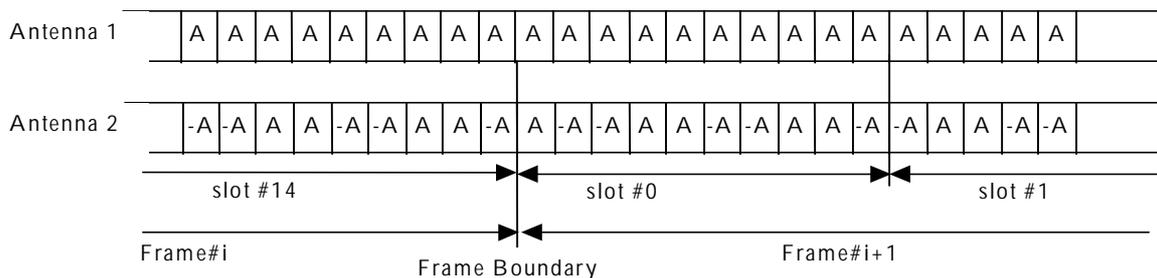


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Note * The same phase reference as with the associated DPCH shall be used.