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**Source:** Ad-hoc 14  
**Title:** Proposed CPCH-related insertions into 25.211\_(Resubmission)  
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Add to section 3.3 Abbreviations

AP Access Preamble

CD Collision Detection

CPCH Common Packet Channel  
PCPCH Physical Common Packet Channel

Add a new Section 4.2.5 CPCH – Common Packet Channel

The CPCH is an uplink transport channel that is used to carry small and medium sized packets. CPCH is a contention based random access channel used for transmission of bursty data traffic. CPCH is associated with a dedicated channel on the downlink which provides power control for the uplink CPCH.

Add a new Section 5.2.2.2 Physical Common Packet Channel

The Physical Common Packet Channel (PCPCH) is used to carry the CPCH.

Add a new Section 5.2.2.2.1 CPCH transmission

The CPCH transmission is based on DSMA-CD approach with fast acquisition indication. The UE can start transmission at a number of well-defined time-offsets, relative to the frame boundary of the received BCH of the current cell. The access slot timing and structure is identical to RACH in section 5.2.2.1.1 [Figure 2]. The structure of the CPCH random access transmission is shown in Figure 4. The CPCH random access transmission consists of one or several Access Preambles [A-P] of length 1 ms, one Collision Detection Resolution Preamble (CDR-P) of length 1 ms, a [10] ms DPCCH Power Control Preamble (PC-P) and a message of length  $N \times 10$  ms, where  $N \leq N_{\text{Max\_frames}}$ . **The value of  $N_{\text{Max\_Frames}}$  is TBD. Editor's note: [The value of N is not known by UTRAN].**

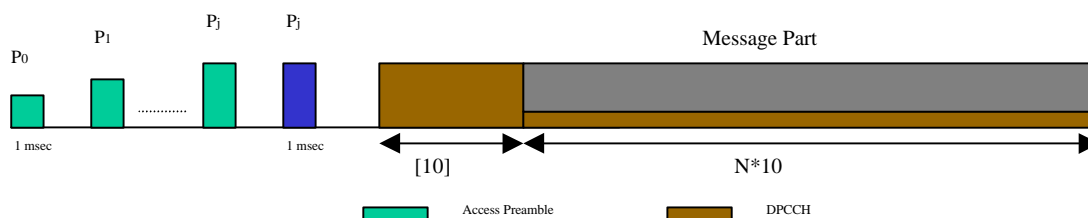


Figure 4: Structure of the CPCH random access transmission.

Add a new section 5.2.2.2.2 CPCH access preamble part

Identical to 5.2.2.1.2 (RACH preamble part). However  $N$ , the number of signature sequences is  $\leq 16$ . ~~Each preamble symbol is spread with a 256 chip real Orthogonal Gold Code. The Orthogonal Code could be shared between RACH and CPCH.~~

Add a new Section 5.2.2.2.3 CPCH collision ~~detection resolution~~ preamble part

The collision ~~detection resolution~~ preamble part of the CPCH burst consists of a *signature* of length 16 complex symbols  $\pm 1(+j)$ . Each preamble symbol is spread with a 256 chip real Orthogonal Gold code. This Code is different from the RACH/CPCH access preamble code. There are a total of 16 different signatures, based on an Orthogonal Gold code set of length 16.

Add a new section 5.2.2.2.4 CPCH power control preamble part

A 10 ms DPCCCH Power Control Preamble (PC-P). Row 2 of Table 2 [section 5.2.1] is the recommended DPCCCH fields which only includes Pilot and TPC bits. **Power Control Preamble length is ffs.**

Add a new section 5.2.2.2.5 CPCH message part

**Editor's note [ Use of TFCI for CPCH is ffs]**

Figure 1 in section 5.2.1 shows the structure of the CPCH message part. Each message consists of  $N_{\text{Max\_frames}}$  10 ms frames. Each 10 ms frame is split into ~~156~~ slots, each of length  $T_{\text{slot}} = 0.66625$  ms. Each slot consists of two parts, a data part that carries Layer 2 information and a control part that carries Layer 1 control information. The data and control parts are transmitted in parallel.

The data part consists of  $10 \cdot 2^k$  bits, where  $k=2,3,4,5,6$ . ~~This corresponds to a spreading factors of 64, and 32, 16, 8, 4 respectively. for the message part. Note that various rates might be mapped to different signature sequences. and/or various access slots.~~

~~The control part consists of 5 known pilot bits to support channel estimation for coherent detection and 2 bits of fast power control, TPC information and 2 bits for TFCI. The FBI field length will be 1. Row 3 of Table 2 [section 5.2.1] is suitable for DPCCCH associated with the CPCH message part. This corresponds to a spreading factor for the DPCCCH (message control part ) will be of 256 for the message control part. The total number of rate information bits in the random access message is thus  $16 \cdot 2 = 32$ . The rate information indicates the spreading factor or, equivalently, the number of bits of the data part of the random access message. The coding of the rate information is the same as that of the TFCI, see further S1.12, Section 4.3.~~

The entries in Table 1 [section 5.2.1] corresponding to 64 kbps and higher apply to the DPDCH fields for CPCH message part.

Note: Table to be inserted

**Note that there is a one-to-one mapping between the preamble signature codes, UL scrambling codes, UL channelization codes and the DL channelization codes. However, The Access Preamble Signature is picked randomly from set allowed for the Physical CPCH.**

Add to the end of section 5.3.3.6 AICH [the bold parts]

The acquisition indication channel (AICH) carries the acquisition indicators. The acquisition indicator  $AI_i$  corresponding to signature  $i$  is transmitted on the downlink, as a response to the detection of signature  $i$  on a PRACH or PCPCH. **Note that for PCPCH, the AICH is either in response to an Access Preamble or a CDR-Preamble. The AICH responding to the access preamble and CDR-Preamble use different channelization codes.**  $AI_i$  is equal to signature  $+i$  or  $-i$ . The phase reference for the detection of  $AI_i$  is the downlink PCCPCH.

Figure 1 illustrates the structure of the AICH.

- The AICH consists of access slots, each of length 1.25 ms.
- The AICH access slots are transmitted time aligned with the PCCPCH frame boundary
- The acquisition indicator is transmitted time aligned with the AICH access slots
- Up to 16 different acquisition indicators can be transmitted simultaneously within one access slot on one AICH in response to a PRACH access preamble. **This number is limited to 1 for positive AICH in case of response to PCPCH Access Preamble or Collision Detection Resolution Preambles. This number is limited to 16 in case of negative AICH in response to PCPCH Access Preambles.**

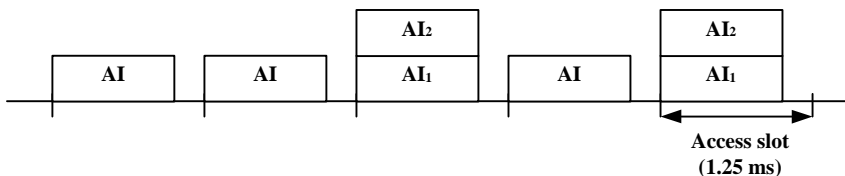


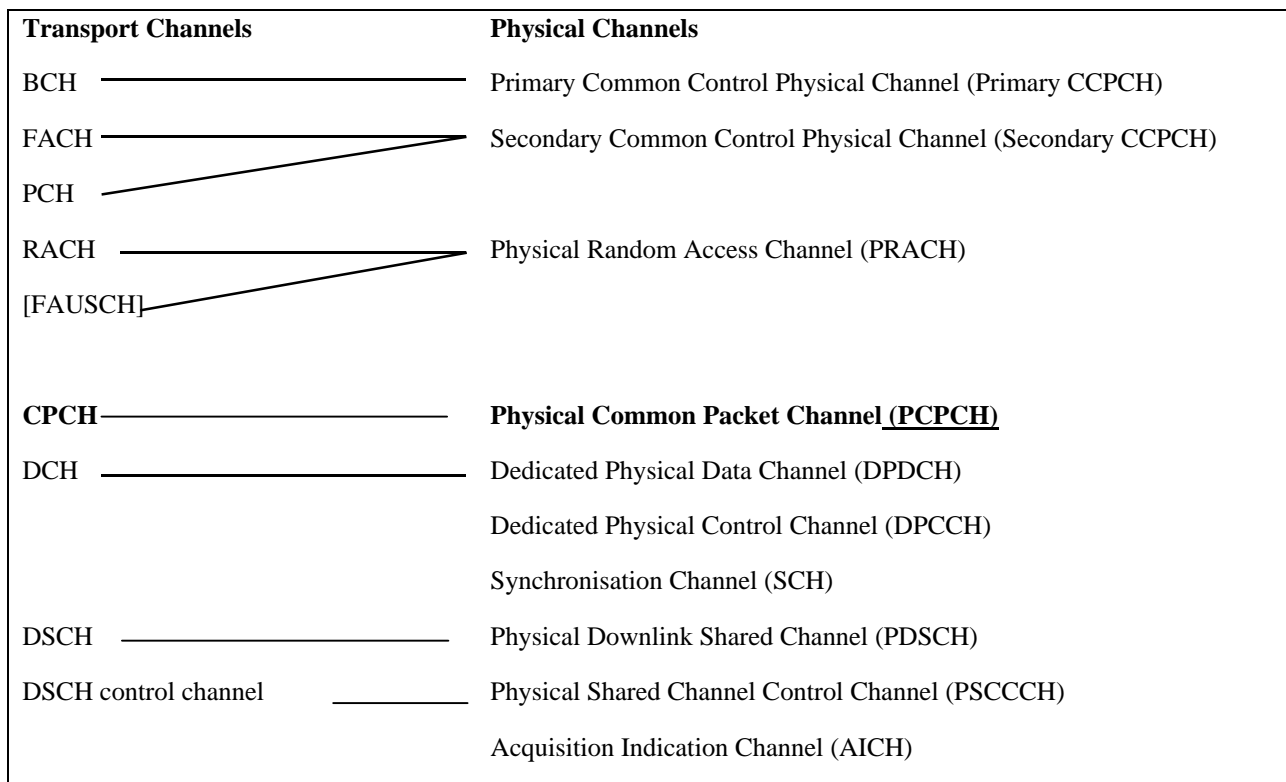
Figure 1: AICH structure

The AICH is transmitted on an ordinary downlink channel using a spreading factor of 256. Note that three different channelization codes of length 256 chips shall be allocated to three AICH channels:

1. AICH associated to PRACH access preambles.
2. **AICH associated with PCPCH access preambles [This channelization code may ~~could~~ be shared with PRACH AICH code if the PRACH and PCPCH share the same spreading code and the signature sequence space. Note that the AP-AICH channelization code and the AP spreading code may be shared when the Access Slots are divided/segregated between PRACH and PCPCH].**
3. AICH associated with PCPCH collision detection ~~resolution~~ preambles have a unique downlink channelization code with length of 256 chips.

Add to figure 6 in Section 6

Figure 2 summarises the mapping of transport channels to physical channels.



**Figure 2: Transport-channel to physical-channel mapping.**

Add to the end of section 7 titled “timing relationship between physical channels”

**PCPCH/CPCH timing relation:**

Everything in the previous section [PRACH/RACH] applies to this section as well. The timing relationship between preambles, AICH, and the message is the same as PRACH/RACH. Note that the collision resolution preambles follow the access preambles in PCPCH/CPCH. However, the timing relationships between CD-Preamble and CDASSIGN-AICH is identical to RACH Preamble and AICH. The timing relationship between CD-AICH and the Power Control Preamble in CPCH is identical to AICH to message in RACH. However, the set of values for  $T_{cpch}$  is TBD. As an example, when  $T_{cpch}$  is set to one, one of the  $T_{cpch}$  values could corresponds to the following:

Note that a1 corresponds to AP-AICH and a2 corresponds to CD-AICH.

[CPCH timing values associated with  $T_{cpch}$ ]

$$\begin{aligned}\tau_{p-p} &= \text{Time between Access Preamble (AP) to the next AP.} \\ &= 3.75\text{ms} + 1.25\text{ms} \times T_{cpch} \text{ (CPCH timing parameter)}\end{aligned}$$

$$\begin{aligned}\tau_{p-a1} &= \text{Time between Access Preamble and AP-AICH} \\ &= 1.75 \text{ ms} + 1.25\text{ms} \times T_{cpch}\end{aligned}$$

$$\begin{aligned}\tau_{a1-cdp} &= \text{Time between receipt of AP-AICH and transmission of the CD Preamble.} \\ &= \tau_{a2-pcp} \\ &= 2.0 \text{ ms}\end{aligned}$$

$$\begin{aligned}\tau_{p-cdp} &= \text{Time between the last AP and CD Preamble.} \\ &= \tau_{p-p} \\ &= 3.75\text{ms} + 1.25\text{ms} \times T_{cpch}\end{aligned}$$

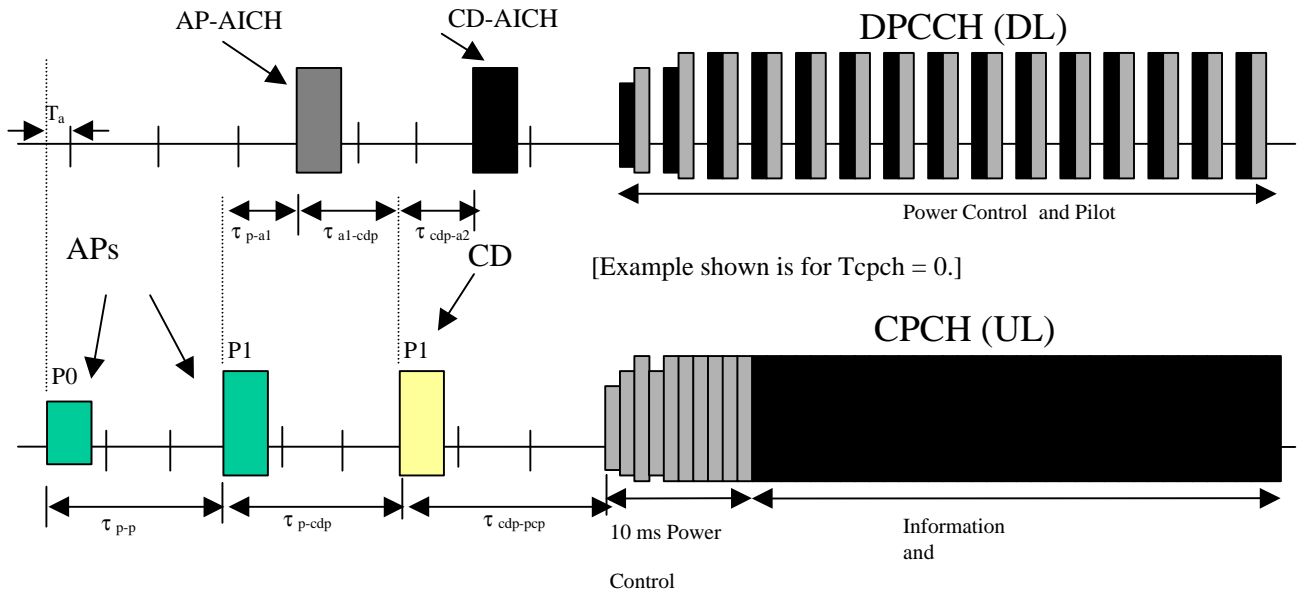
$$\begin{aligned}\tau_{cdp-a2} &= \text{Time between the CD Preamble and the CD-AICH} \\ &= \tau_{p-a1} \\ &= 1.75 \text{ ms} + 1.25\text{ms} \times T_{cpch}\end{aligned}$$

$$\begin{aligned}\tau_{cdp-pcp} &= \text{Time between CD Preamble and the start of the Power Control Preamble} \\ &= \tau_{p-p} \\ &= 3.75\text{ms} + 1.25\text{ms} \times T_{cpch}\end{aligned}$$

$T_a$  = fixed offset value between uplink and downlink access slots.

= 0.5 ms

Figure 30 shows the timing of the CPCH uplink transmission with the associated DPCCH control channel in the downlink.



**Figure 30: Timing of PCPCH and AICH transmission as seen by the UE, with AICH transmission**