TSG RAN1#6 **TSGR1#6(99795**
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Source:	**Golden Bridge Technology**
Title:	**Proposed CPCH-related insertions into 25.211**
Agenda item:	**Ad-hoc 14**
Document for:	**Approval**

Add to section 3.3 Abbreviations

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 Resolution Preamble (CR-P) of length 1 ms, a [10] ms DPCCH Power Control Preamble (PC-P) and a message of length N x10 ms, where N < = N_Max_frames. **The value of N_Max_Frames is TBD. Editor's note: [The value of N is not known by UTRAN].**

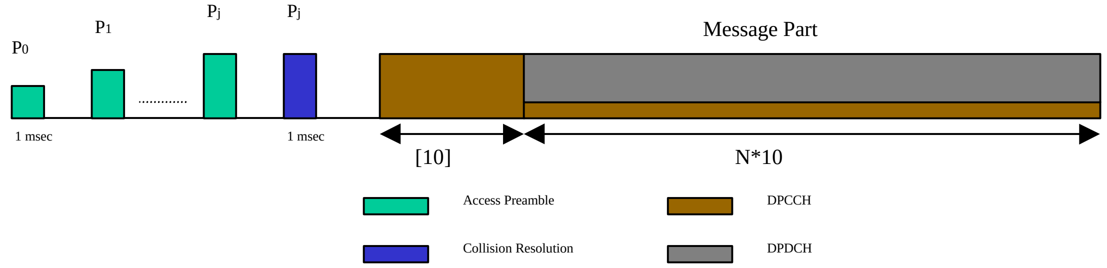

Figure 4: Structure of the CPCH random access transmission.

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 <= 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 resolution preamble part

The collision resolution preamble part of the CPCH burst consists of a *signature* of length 16 complex symbols ±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 DPCCH Power Control Preamble (PC-P). Row 2 of Table 2 [section 5.2.1] is the recommended DPCCH 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_Max_frames 10 ms frames. Each 10 ms frame is split into 16 slots, each of length T_{slot} = 0.625 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 $10*2^k$ bits, where k=2,3,4,5,6. This corresponds to a spreading factor of 64, and 32, 16,8, 4 respectively for the message part.

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 DPCCH associated with the CPCH message part. This corresponds to a spreading factor of 256 for the message control part. The total number of rate-information bits in the random-access message is thus 16*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 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 CR-Preamble. The AICH responding to the access preamble and CR-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 1for positive AICH in case of response to PCPCH Access Preamble or Collision Resolution Preambles. This number is limited to 16 in case of negative AICH in response to PCPCH Access Preambles.**

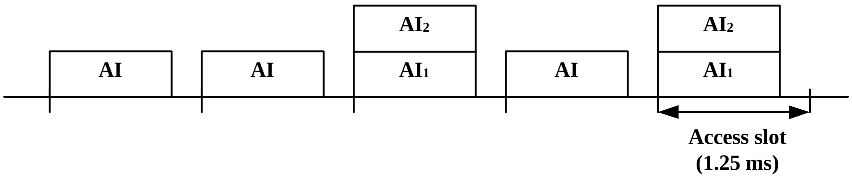

Figure 1: AICH structure

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 could be shared with PRACH AICH code if the PRACH and PCPCH share the signature sequence space].**
3. **AICH associated with PCPCH collision 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.

Transport Channels	**Physical Channels**
BCH	Primary Common Control Physical Channel (Primary CCPCH)
FACH	Secondary Common Control Physical Channel (Secondary CCPCH)
PCH	
RACH	Physical Random Access Channel (PRACH)
[FAUSCH]	
CPCH	**Physical Common Packet Channel**
DCH	Dedicated Physical Data Channel (DPDCH)
	Dedicated Physical Control Channel (DPCCH)
	Synchronisation Channel (SCH)
DSCH	Physical Downlink Shared Channel (PDSCH)
DSCH control channel	Physical Shared Channel Control Channel (PSCCCH)
	Acquisition Indication Channel (AICH)

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 ASSIGN-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}]

τ_{p-p} = Time between Access Preamble (AP) to the next AP.

= 3.75ms + 1.25ms X Tcpch (CPCH timing parameter)

τ_{p-a1} = Time between Access Preamble and AP-AICH

= 1.75 ms + 1.25ms X Tcpch

τ_{a1-cdp} = Time between receipt of AP-AICH and transmission of the CD Preamble.

= τ_{a2-pcp}

= 2.0 ms

τ_{p-cdp} = Time between the last AP and CD Preamble.

= τ_{p-p}

= 3.75ms + 1.25ms X Tcpch

τ_{cdp-a2} = Time between the CD Preamble and the CD-AICH

= τ_{p-a1}

= 1.75 ms + 1.25ms X Tcpch

$\tau_{cdp-pcp}$= Time between CD Preamble and the start of the Power Control Preamble

= τ_{p-p}

= 3.75ms + 1.25ms X Tcpch

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.

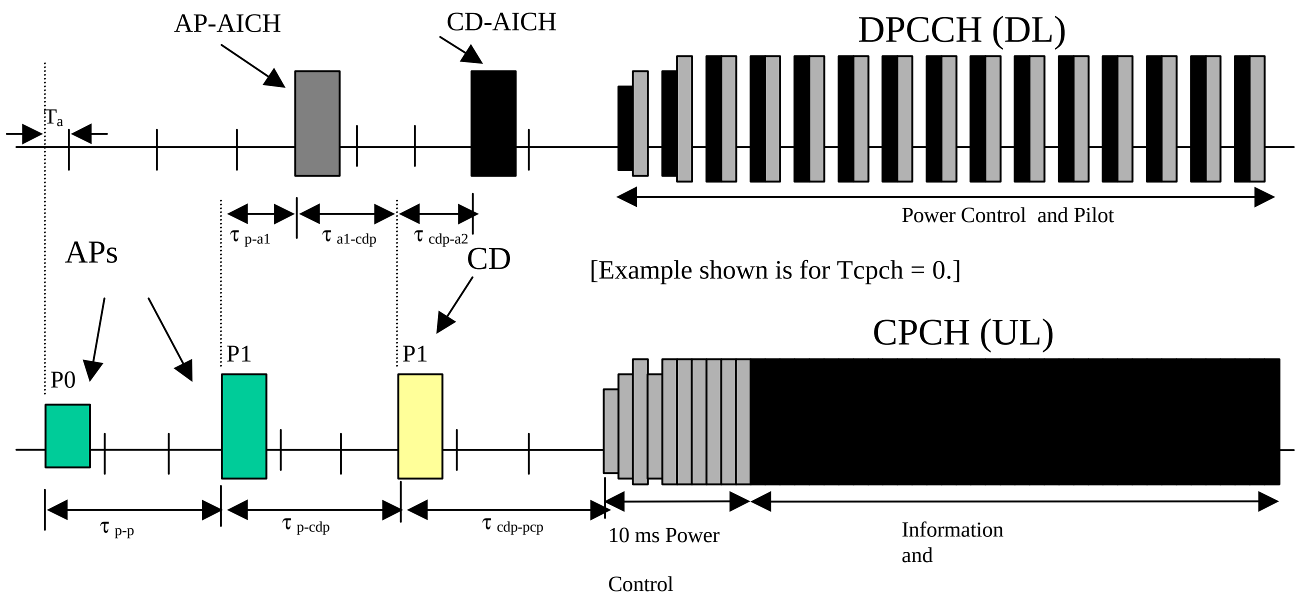

Figure 30: Timing of PCPCH and AICH transmission as seen by the UE, with AICH transmission