TSG-RAN Working Group 1 meeting #7 **TSGR1#7(99)c60**

August 30 - September 3, Hanover, Germany

Agenda Item : Ad hoc 14

Source : LG Information & Communications, Ltd.

Title : The Timing of the Secondary Collision Detection for CPCH

Document for : Proposal

Abstract

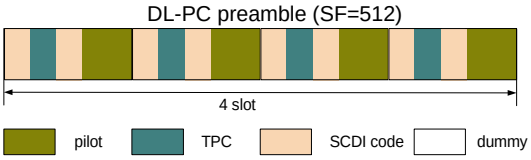
Our proposal [1] suggested the concept and possible structures of new scheme reinforcing the current CPCH. This document describes the recommended structure of the proposed scheme.

Proposal

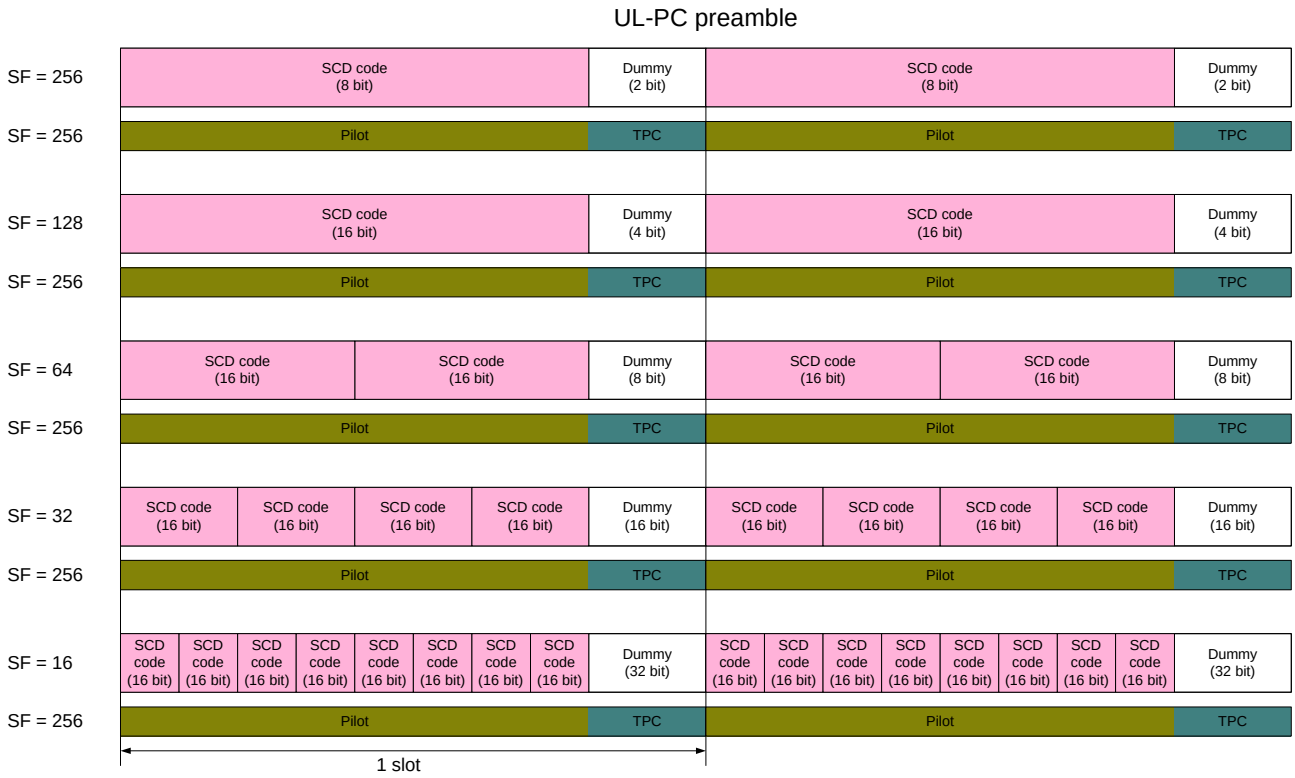
Lately, GBT proposed CPCH frame format [2]. This document recommended that for CPCH the frame structure should be identical to the uplink dedicated physical channel and the spreading factor should be 4 to 256. If spreading factors of 128 and 256 are considered, the timing of our proposal [1] needs to be modified a little. Regarding spreading factors of 128 and 256, this document modifies the timing of the proposed scheme and recommends the structure of the scheme among possible structures previously presented in [1].

Figure 1(a) shows the structure of DL-PC (Down-Link Power Control) Preamble for a spreading factor of 512. We recommend the option 1 suggested in [1], because the number of slots needed to transmit one SCDI code in option 1 is less than that in option 2. For option 1, SCD and SCDI code are the Hadamard code of length 16 [1].

Figure 1(b) shows the structure of PC preamble regarding spreading factors of 16 to 256. Only in case of a spreading factor of 256, 16-bit SCD code is split into 8-bit code in half and occupies two slots. For all spreading factors, code patterns as shown in figure 1 repeatedly occupy all slots on UL-PC preamble.



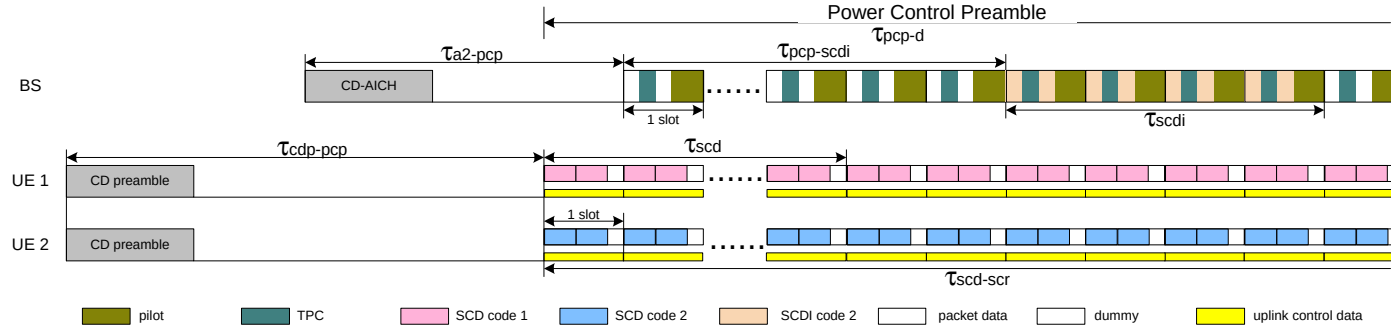
(a) DL-PC preamble



(b) UL-PC preamble

[Fig. 1] The structure of the power control preamble for Secondary Collision Detection

Figure 2 shows the recommended timing. All parameters are set referring to the existing CPCH and RACH timing [3], [4].



[Fig. 2] The timing diagram of the proposed scheme

The meaning of each parameter in figure 2 are the followings:

$t_{cdp-pcp}$ = Time between the start of CD Preamble and the start of the UL-PC Preamble

= Time between AP to the next AP = t_{p-p} [3]

t_{a2-pcp} = Time between the start of CD-AICH and the start of DL-PC Preamble

= Time between the start of AP-AICH and the start of CD-AICH = $t_{a1-cdp} + t_{cdp-a2}$ [3]

$t_{pcp-scdi}$ = Time between the start of DL-PC Preamble and the start of transmitting SCDI code

= 9 slot

t_{scd} = The number of slots needed for transmitting SCD code for decision on collision

= 8 slot

t_{scdi} = The number of slots needed for transmitting one SCDI code

= 4 slot

$t_{scd-scr}$ = Time between the start of transmitting the first SCD code and the end of the secondary collision detection

= 15 slot = t_{pcp-d}

t_{pcp-d} = Time between the start of PC preamble and the end of PC preamble

= 10 ms

$t_{cdp-pcp}$ corresponds to t_{p-p} and t_{a2-pcp} corresponds to $t_{a1-cdp} + t_{cdp-a2}$ defined in [3]. The total processing time of the scheme is the same as one of current PC preamble. For the scheme, BS receives a series of SCD code during the first 8 slots, t_{scd} on UL-PC preamble and determines an UE with the highest power among colliding ones.

Conclusion

We proposed the structure of the secondary collision detection that can be available for all spreading factor, even lowest spreading factor of 256. This scheme reduces the collision probability of the current CPCH with no delay. We recommend the scheme described above be adopted as working assumptions for CPCH.

Reference

[1] LGIC, “The Secondary Collision Detection for CPCH”, TSGR1#7(99)b54

[2] GBT, “CPCH frame format tables”, TSGR1#7(99)b72

[3] GBT, “Idle-AICH for CPCH”, TSGR2#7(99)b74

[4] TS 25.211 (V2.2.1): “Physical channels and mapping of transport channels onto physical channels (FDD)”