TSG-RAN Working Group 1 , AH 21 **_TSGR1(00)0826_**

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Agenda Item:	AH21
Source:	CWTS
To:	TSG RAN WG1
Title:	Physical channel mapping
Document for:	Discussion and Approval

Introduction

This document describes physical channel mapping in low chip rate TDD option.

Conclusion

It's proposed to discuss and include the following text proposal into the clause 8.1.12 physical channel mapping of TR25.928.

--------------------------------- changes to TR25.928 begin ------------------------------------

8.1.12 Physical channel mapping

[Description:]

In the low chip rate option the radio frame which has a duration of 10 ms is subdivided into 2 subframes of 5ms each. The basic operated unit is a subframe. So the bit streams from the subframe segmentation unit are mapped onto code channels of time slots in subframes in the low chip rate option.

[Rational:]

In the low chip rate option the radio frame which has a duration of 10 ms is subdivided into 2 subframes of 5ms each. The basic operated unit is a subframe. So the bit streams from the subframe segmentation unit are mapped onto code channels of time slots in subframes in the low chip rate option.

The PhCH for both uplink and downlink is defined in subclause 7.2. The bits after physical channel mapping are denoted by $w_{p1}, w_{p2}, \dots, w_{pU_p}$, where p is the PhCH number and U_p is the number of bits in one subframe for the respective PhCH. The bits w_{pk} are mapped to the PhCHs so that the bits for each PhCH are transmitted over the air in ascending order with respect to k.

The mapping of the bits $g_{p1}, g_{p2}, \dots, g_{pU_p}$ is performed like block interleaving, writing the bits into columns, but a PhCH with an odd number is filled in forward order, were as a PhCH with an even number is filled in reverse order.

The mapping scheme, as described in the following subclause, shall be applied individually for each timeslot t used in the current subframe. Therefore, the bits $g_{p1}, g_{p2}, \dots, g_{pU_p}$ are assigned to the bits of the physical channels $w_{t1,1\ldots U_{t1}}, w_{t2,1\ldots U_{t2}}, \ldots, w_{tP_t,1\ldots U_{tP_t}}$ in each timeslot.

In uplink there are at most two codes allocated (P≤2). If there is only one code, the same mapping as for downlink is applied. Denote SF1 and SF2 the spreading factors used for code 1 and 2, respectively. For the number of consecutive bits to assign per code bs_k the following rule is applied:

if

SF1 >= SF2 then $bs_1 = 1$; $bs_2 =$ SF1/SF2 ;

```
else
    SF2 > SF1  then $bs_1 = SF2/SF1$; $bs_2 = 1$ ;
end if
```

In the downlink case bs_p is 1 for all physical channels.

8.1.12.1 Mapping scheme

Notation used in this subclause:

P_t: number of physical channels for timeslot t , $P_t = 1..2$ for uplink ; $P_t = 1...16$ for downlink

U_{tp}: capacity in bits for the physical channel p in timeslot t

$U_{t.}$: total number of bits to be assigned for timeslot t

bs_p: number of consecutive bits to assign per code

for downlink all $bs_p = 1$

for uplink if SF1 >= SF2 then $bs_1 = 1$; $bs_2 =$ SF1/SF2 ;

if SF2 > SF1 then $bs_1 = SF2/SF1$; $bs_2 = 1$;

fb_p: number of already written bits for each code

pos: intermediate calculation variable

```
for p=1 to $P_t$                          -- reset number of already written bits for every physical channel
    $fb_p = 0$
end for
p = 1                                     -- start with PhCH #1
for k=1 to $U_{t.}$
    do while ($fb_p == U_{tp}$)           -- physical channel filled up already ?
        p = ((p + 1) mod ($P_t$ +1)) + 1 ;
    end do
    if (p mod 2) == 0
        pos = $U_{tp} - fb_p$             -- reverse order
    else
        pos = $fb_p + 1$                  -- forward order
    endif
    $w_{tp,pos} = g_{t,k}$                -- assignment
    $fb_p = fb_p + 1$                     -- Increment number of already written bits
    if ($fb_p$ mod $bs_p$) == 0           -- Conditional change to the next physical channel
        p = ((p + 1) mod ($P_t$ +1)) + 1;
    end if
end for
```

[Explanation difference:]

In the high chip rate TDD option, the bit streams from the 2nd interleaving unit are mapped onto code channels of timeslots in radio frames. While in the low chip rate option the radio frame which has a duration of 10 ms is subdivided into 2 subframes of 5ms each. The basic operated unit is a subframe. So the bit streams from the subframe segmentation unit are mapped onto code channels of time slots in subframes in the low chip rate option.

---------------------------------- changes to TR25.928 end --------------------------------------