TSG-RAN Working Group 1 meeting #19 ***R1-01-0257***

Las Vegas, U.S.A, February 27th – March 2nd 2001

Agenda Item: AH21
Source: Siemens AG
To: TSG RAN WG1
Title: Correction of PICH for 1.28Mcps TDD
Document for: Discussion and Approval

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1. Summary

At WG1#18, the section for the PICH has been revised for 3.84 Mcps TDD. In order to harmonize the description of the PI with that of 3.84Mcps TDD, the chapter describing the PICH is now modified.

The PICH is now defined, as a two subframe, this allows the same structure of the PICH block, as described in section 5.3.7.2 of 25.221 (cf. CR37-r1 R1-01-0019). Furthermore the number of supported paging indicators for each PICH frame is increased by a factor of two to support a similar number of PI's in 1.28Mcps compared to the number in 3.84Mcps TDD.

Therefore in principle there is no difference in the concept of the PICH between 1.28 Mcps TDD and 3.84Mcps TDD.

2. Proposal

It's proposed to revise the section 6.3.8 'The Page Indicator Channel (PICH)' of the CR for TS25.221 and to move the mapping of the Paging Indicators to the Paging indicator bits from the CR for 25.222 to that for 25.221.

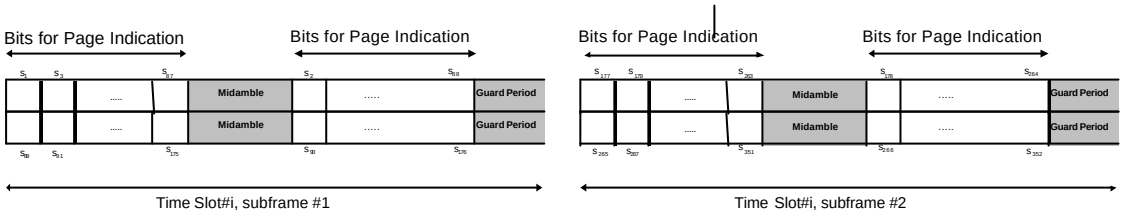
Working CR for 25.221

6.3.8 The Page Indicator Channel (PICH)

The Paging Indicator Channel (PICH) is a physical channel used to carry the paging indicators.

6.3.8.1 Mapping of Paging Indicators to the PICH bits

Figure X1 depicts the structure of a PICH transmission and the numbering of the bits within the bursts. The burst type as described in [6.2.2 ‘Burst Format’] is used for the PICH. N_{PIB} bits are used to carry the paging indicators, where N_{PIB}=352.



i? {0, 2, 3, 4, 5, 6}

Figure X1: Transmission and numbering of paging indicator carrying bits in the PICH bursts

Each paging indicator P_q (where P_q, q = 0, ..., N_{PI}-1, P_q ? {0, 1}) in one radio frame is mapped to the bits $\{s_{2L_{PI}*q+1},\ldots,s_{2L_{PI}*(q+1)}\}$ in subframe #1 or subframe #2. There are $N_{PIB} = 2*N_{PI}*L_{PI}$ bits used for the paging indicator transmission in one radio frame. The mapping of the paging indicators to the bits s_i, i = 1, ..., N_{PIB} is shown in table X1.

Table X1: Mapping of the paging indicator

P_q	Bits $\{s_{2L_{PI}*q+1}, s_{2L_{PI}*q+2}, \ldots, s_{2L_{PI}*(q+1)}\}$	Meaning
0	{0, 0, ..., 0}	There is no necessity to receive the PCH
1	{1, 1, ..., 1}	There is the necessity to receive the PCH

The bits s_k, k = 1, ..., S are then transmitted over the air as shown in [7].

In each radio frame, N_{PI} paging indicators are transmitted, using L_{PI}=2, L_{PI}=4 or L_{PI}=8 symbols. In table X2 this number is shown for the different possibilities of paging indicator lengths.

Table X2: Number N_{PI} of paging indicators per radio frame for different paging indicator lengths L_{PI}

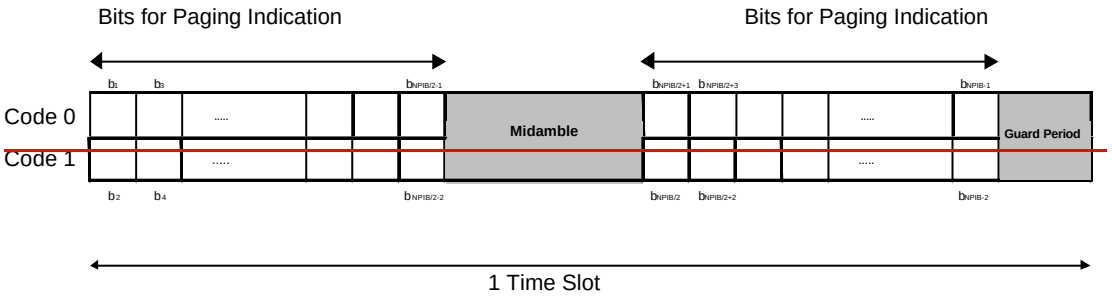
	L_{PI}=2	L_{PI}=4	L_{PI}=8
N_{PI} per radio frame	88	44	22

5.3.7.2 Structure of the PICH over multiple radio frames

The structure of the PICH over multiple radio frames is common with 3.84 Mcps TDD, cf. [5.3.7.2 Structure of the PICH over multiple radio frames]

~~The Paging Indicator Channel (PICH) is a physical channel used to carry the Paging Indicators. The PICH is always transmitted at the same reference power level and with the same antenna pattern configuration as the P-CCPCH.~~

~~There are always two codes with SF=16 used for PICH. Figure [XX] depicts the PICH structure and the numbering order of the transported bits, N_{PIB}, where N_{PIB} is equal to 176 bits.~~



~~*Figure: Transmission and numbering of paging indicators carrying bits on the PICH burst*~~

~~In each PICH burst, N_{PI} paging indicators are transmitted, using L_{PI}=2, L_{PI}=4 or L_{PI}=8 symbols. L_{PI} is called the paging indicator length. The number of paging indicators N_{PI} per PICH burst is given by the paging indicator length, which are both known by higher layer signalling. In table [XX] this number is shown for the different possibilities of burst types and paging indicator lengths.~~

~~*Table [XX] : Number N_{PI} of paging indicators in a PICH burst for the different paging indicator lengths (L_{PI})*~~

	~~L_{PI}= 2~~	~~L_{PI}= 4~~	~~L_{PI}= 8~~
~~Number of PI per timeslot~~	~~N_{PI}=44~~	~~N_{PI}=22~~	~~N_{PI}=11~~

~~As shown in figure [XX], the paging indicators of N_{PICH} consecutive sub-frames form a PICH block, N_{PICH} is configured by higher layers. Thus, N_{PI}=N_{PICH}*N_{PI} paging indicators are transmitted in each PICH block.~~

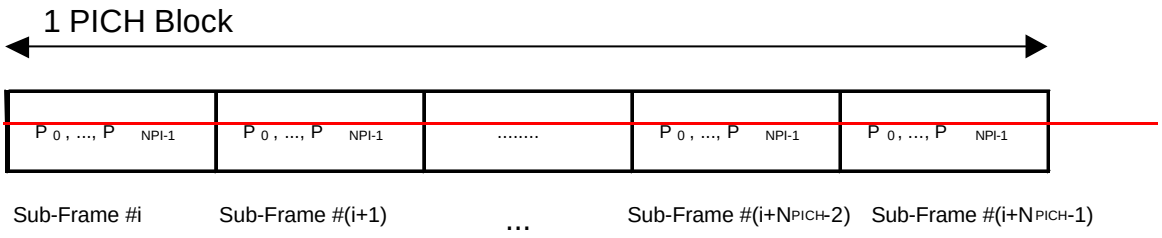


Figure [XX]: Structure of a PICH block

The value PI (PI = 0, ..., N_{PI}-1) calculated by higher layers for use for a certain UE, see [15], is associated to the paging indicator P_q in the n^{th} frame of one PICH block, where q is given by

$q = PI \bmod N_{PI}$;

$n = PI \operatorname{div} N_{PI}$.

The PI bitmap in the PCH data frames over Iub contains indication values for all possible higher layer PI values, see [16]. Each bit in the bitmap indicates if the paging indicator P_q associated with that particular PI shall be set to 0 or 1. Hence, the calculation in the formulas above is to be performed in Node B to make the association between PI and P_q.

The coding of Paging Indicator for 1.28Mcps TDD is same as that for 3.84Mcps TDD, cf.[5.3.7 ‘ The Paging Indicator Channel (PICH)’].

Working CR for 25.222

~~4.4.3 Coding of Paging Indicator (PI)~~

~~The coding of Paging Indicator for 1.28Mcps TDD is same as that for 3.84Mcps TDD, cf.[4.3.2 ‘Coding of Paging Indicator’].~~