

Agenda item:

Source: Ericsson

Title: CR 25.211-066: Clarification of paging indicator mapping

Document for: Decision

In TS 25.211 where the mapping of PIs to PICH bits, there is some room for misunderstanding.

It is stated that “the PI calculated by higher layers for use for a certain UE, is mapped to the paging indicator PI_p ”, which can lead to some misunderstanding, since the value range for PI is 0 ... 143 while for PI_p the value range is 0 and 1, and hence “mapping to” sounds incorrect. What is meant is that the PI is *associated* with PI_p .

Further, as explained in TS 25.435, the frame protocol specification for common channels, the paging indications are carried over Iub by the frame protocol in a *PI bitmap*. The PI bitmap indicates if a certain PI is to be set to 0 or 1, for all PIs. Since 25.435 talks about PIs and not PICH bits, it is to be understood that the circular shifting of the PIs calculated by higher layers before mapping to PICH bits is to be done by Node B. It is proposed to further clarify this in the specification to avoid misunderstandings.

Further, in TS 25.435 the notation PI_0 , PI_1 etc. is used, which is a bit unfortunate since PI_0 , PI_1 etc. is used in TS 25.211, and different things are meant (in TS 25.211 the PI_p is *after* the shifting). To avoid this PI_p is renamed P_p .

This CR introduces the proposed changes to TS 25.211.

CHANGE REQUEST			Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.
25.211	CR	066	Current Version: 3.3.0
GSM (AA.BB) or 3G (AA.BBB) specification number ↑		↑ CR number as allocated by MCC support team	
For submission to: RAN#9 <i>list expected approval meeting # here</i> ↑	for approval <input checked="" type="checkbox"/> for information <input type="checkbox"/>	strategic <input type="checkbox"/> non-strategic <input type="checkbox"/>	(for SMG use only)

Form: CR cover sheet, version 2 for 3GPP and SMG The latest version of this form is available from: <ftp://ftp.3gpp.org/Information/CR-Form-v2.doc>

Proposed change affects: (U)SIM ME UTRAN / Radio Core Network
(at least one should be marked with an X)

Source: Ericsson **Date:** 2000-07-03

Subject: Clarification of paging indicator mapping

Work item: _____

Category:	F Correction <input checked="" type="checkbox"/> A Corresponds to a correction in an earlier release <input type="checkbox"/> B Addition of feature <input type="checkbox"/> C Functional modification of feature <input type="checkbox"/> D Editorial modification <input type="checkbox"/>	Release:	Phase 2 <input type="checkbox"/> Release 96 <input type="checkbox"/> Release 97 <input type="checkbox"/> Release 98 <input type="checkbox"/> Release 99 <input checked="" type="checkbox"/> Release 00 <input type="checkbox"/>
------------------	--	-----------------	--

(only one category Shall be marked With an X)

Reason for change: Clarification of how the PIs arriving to Node B in the PI bitmap over the frame protocol are mapped to PICH bits.

Clauses affected: _____

Other specs Affected:	Other 3G core specifications <input type="checkbox"/> Other GSM core specifications <input type="checkbox"/> MS test specifications <input type="checkbox"/> BSS test specifications <input type="checkbox"/> O&M specifications <input type="checkbox"/>	→ List of CRs: → List of CRs: → List of CRs: → List of CRs: → List of CRs:	
------------------------------	---	--	--

Other comments: _____

<----- double-click here for help and instructions on how to create a CR.

5.3.3.9 Paging Indicator Channel (PICH)

The Paging Indicator Channel (PICH) is a fixed rate (SF=256) physical channel used to carry the **p**Paging **i**ndicators (**PI**). The PICH is always associated with an S-CCPCH to which a PCH transport channel is mapped.

Figure 24 illustrates the frame structure of the PICH. One PICH radio frame of length 10 ms consists of 300 bits (b_0, b_1, \dots, b_{299}). Of these, 288 bits (b_0, b_1, \dots, b_{287}) are used to carry **p**Paging **i**ndicators. The remaining 12 bits are not formally part of the PICH and shall not be transmitted. The part of the frame with no transmission is reserved for possible future use.

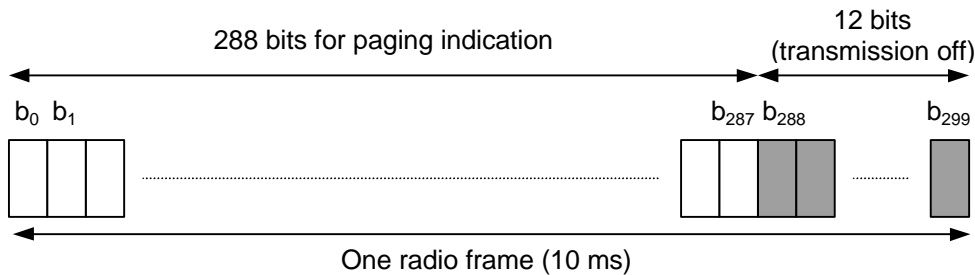


Figure 24: Structure of Paging Indicator Channel (PICH)

In each PICH frame, N **p**Paging **i**ndicators $\{PI_0, \dots, PI_{N-1}\}$ are transmitted in each PICH frame, where $N=18, 36, 72$, or 144.

The PI calculated by higher layers for use for a certain UE, is associated mapped to the paging indicator PI_p , where p is computed as a function of the PI computed by higher layers, the SFN of the P-CCPCH radio frame during which the start of the PICH radio frame occurs, and the number of paging indicators per frame (N):

$$p = \left(PI + \left[\left((18 \times (SFN + \lfloor SFN / 8 \rfloor) + \lfloor SFN / 64 \rfloor + \lfloor SFN / 512 \rfloor) \right) \bmod 144 \right] \times \frac{N}{144} \right) \bmod N.$$

Further, the PI calculated by higher layers is associated with the value of the paging indicator P_p . If a paging indicator in a certain frame is set to "1" it is an indication that UEs associated with this paging indicator and PI should read the corresponding frame of the associated S-CCPCH.

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

The mapping from $\{PI_0, \dots, PI_{N-1}\}$ to the PICH bits $\{b_0, \dots, b_{287}\}$ are according to table 22.

Table 22: Mapping of Paging Indicators (PI) to PICH bits

Number of PI per frame (N)	$PI_p = 1$	$PI_p = 0$
N=18	$\{b_{16p}, \dots, b_{16p+15}\} = \{-1, -1, \dots, -1\}$	$\{b_{16p}, \dots, b_{16p+15}\} = \{+1, +1, \dots, +1\}$
N=36	$\{b_{8p}, \dots, b_{8p+7}\} = \{-1, -1, \dots, -1\}$	$\{b_{8p}, \dots, b_{8p+7}\} = \{+1, +1, \dots, +1\}$
N=72	$\{b_{4p}, \dots, b_{4p+3}\} = \{-1, -1, \dots, -1\}$	$\{b_{4p}, \dots, b_{4p+3}\} = \{+1, +1, \dots, +1\}$
N=144	$\{b_{2p}, b_{2p+1}\} = \{-1, -1\}$	$\{b_{2p}, b_{2p+1}\} = \{+1, +1\}$

If a Paging Indicator in a certain frame is set to "1" it is an indication that UEs associated with this Paging Indicator should read the corresponding frame of the associated S-CCPCH.

When transmit diversity is employed for the PICH, STTD encoding is used on the PICH bits as described in subclause 5.3.1.1.1.