TSG-RAN Working Group 3 meeting #7
France, Sofia Antipolis, 20th-24th September

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Agenda Item: **14.2**

Source: **Ericsson**

Title: **Coding of Paging Indication information in the PCH Frame Protocol**

Document for: **Decision**

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1. INTRODUCTION

In the current specification [1], the PCH data frame includes Paging Indication information. This contribution addresses the coding of the Paging Indication Information.

2. RATIONALE

On the air interface, the PICH channel contains 288 bits of information per frame which can be used for signalling paging indications. Although 288 bits are available, only 18, 36, 72 or 144 PI's can be indicated with the 288 bits.

2.1. Assumptions

1) How many PI's are supported in every frame is a semi-static configuration parameter, which should be included in the common channel setup. In this contribution it is assumed that during the life-time of the PCH/PICH transport bearer, the number of PI's per Uu frame is fixed.

2.2. Different approaches

Three approaches were identified for coding the PI information in the Iub frame protocol:

a) All 288 bits
   In this solution, if any paging needs to be performed, the CRNC transmits the full 288 bits to the node-B.
b) Bitmap of PI's
   In this solution, if any paging needs to be performed, the CRNC transmits a bitmap of the PI's (18, 36, 72 or 144) to the node-B. The node-B will have to perform the necessary repetition.
c) List of PI numbers
   In this solution the CRNC indicates to the node-B which PI have to be set. E.g. the CRNC can indicate that in a certain frame, 3 PI's need to be set which are PI's 5, 9 and 13.

a) All 288 bits

This solution creates an unnecessary overhead on the Iub. The repetition of bits on the Uu is a channel coding issue, which should not be reflected on the Iub.

b) Bitmap of PI's

In this solution, if a UE needs to be paged, the Iub frame will contain an indication in the header that there is paging information, and the actual bitmap in the payload.

This solution has several advantages:
+ same number of bits is provided always, even in case of extensive UE paging in a frame => one processing delay in the node-B;
+ efficient coding scheme in case of higher paging loads;

c) List of PI numbers
In this solution, if a UE needs to be paged, the header will contain an indication of the number of paging indications that have to be set, and the payload will contain the actual PI numbers.

This solution has the following advantages:
+ efficient coding scheme in case of low paging loads;

Given the easier handling of solution b) in node-B and RNC, and given that in case of no paging in a frame, c) results in an even (slightly) worse coding efficiency than b), we would like to propose solution b).

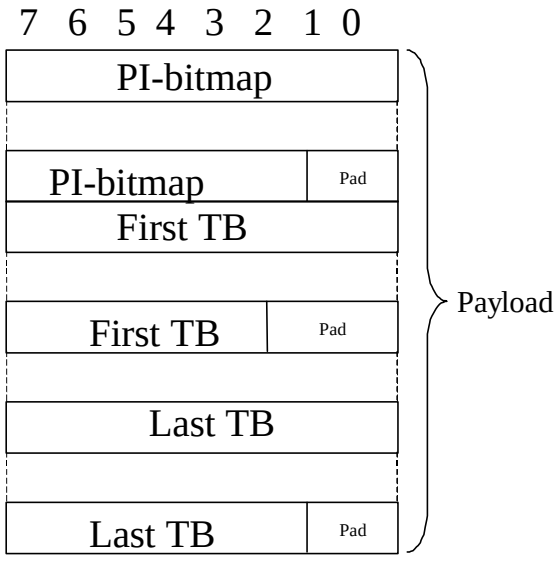
3. PROPOSAL

It is proposed to include the following description of paging indication related fields [1]:

- PI: one bit field in the header of the frame. It indicates if a paging indication bitmap is present in the PCH data frame payload or not.

- PI-bitmap: contains a bitmap of (18, 36, 72 or 144) Paging Indications. The order of the PI's in the bitmap corresponds to the order of the PI's on the Uu: bit 7 of the first byte contains PI0. The PI-bitmap field is padded at the end up to an octet boundary.

The consequences for the PCH FP data frame header are described in ref [2]. For the payload of the PCH FP, the following picture is proposed to be included in [1]:



4. REFERENCES

[1]: TS 25.435 TSG RAN: "UTRAN Iub Interface User Plane Protocols for COMMON TRANSPORT CHANNEL Data Streams"

[2]: TSGR3(99)C12: "Iub/Iur user plane protocol headers"