

TSG-RAN Working Group 1 meeting No. 17
November 21-24, Stockholm, Sweden

TSGR1-00-1331

TSG-RAN Working Group 2 (Radio L2 and Radio L3)
Beijing, China, 9th - 13th October 2000

R2-002135

Source: TSG-RAN WG2

To: TSG-RAN WG3

Cc: TSG-RAN WG1

Title: Response to LS (R3-002343) on FDD RACH/PRACH modelling

Contact: Wolfgang.Granzow@eed.ericsson.se

RAN2 thanks RAN3 for the LS on FDD RACH/PRACH modelling (R3-002343, R2-001906).

RAN2 would like to confirm that the common resource model illustrated in TS 25.430 is correct. Also the present RACH/PRACH model should provide the desired feature that on the lub/lur interfaces, one RACH transport channel can be transported on one transport bearer and the TFI can be used to uniquely denote the number and size of the contained TBs in an lub frame.

The questions raised in R2-001906 can be answered as follows.

What is a PRACH: e.g. can different PRACH's use the same scrambling code and subchannel, but different pre-amble signatures, or are all used subchannels/signatures on one scrambling code always belonging to the same PRACH ?

In FDD mode, the RACH/PRACH model used in RAN2 allows to configure different PRACHs in the following two ways:

- 1.) For each PRACH indicated in system information a different preamble scrambling code is employed. For each PRACH, sets of "available signatures" and "available subchannel numbers" are defined in the "PRACH info (for RACH)" Information Element in TS 25.331. Any PRACH with an individual scrambling code may employ the complete or a subset of signatures and subchannels.
- 2.) Two (or more) PRACHs indicated in system information use a common preamble scrambling code. In this case each PRACH shall employ a distinct (non-overlapping) set of "available signatures" and "available subchannel numbers" in order to enable Node B to identify from the received random access signal which PRACH and respective RACH is used.

For each PRACH a set of up to eight "PRACH partitions" can be defined for establishment of Access Service Classes (ASCs). A PRACH partition is defined as the complete or a subset of the "available signatures" and "available subchannel numbers" defined for one PRACH.

Does WG2 consider the PRACH to transport one RACH transport channel or is e.g. each PRACH partition carrying a RACH transport channel ?

The RACH/PRACH model in RAN2 assumes a one-to-one mapping between one RACH and one specific PRACH. The mapping is defined in system information in "PRACH system information list" IE, see TS 25.331. Partitions of one PRACH always carry the same RACH.

Up to what extent should the Node B be aware of the detailed settings of the PRACH/RACH; e.g. should the Node-B be aware of the Access Service Class associated to different parts of the PRACH. Note that the Node B will normally not be aware of the information it broadcasts.

Node B must be aware of which signature (from “available signatures” IE) and access slot number (from “available access slot number” IE) is assigned to a specific PRACH in order to perform PRACH message processing and mapping to the correct RACH.

Note that an ASC is defined by a PRACH partition and an individual persistence value. Node B could be aware of what ASC is used by the UE if the PRACH partitions of each ASC are non-overlapping and thus uniquely identifiable. Generally PRACH partitions may be overlapping such that a mapping of a certain received RACH preamble to an ASC would be ambiguous. From RAN2 point of view there is no need for Node B to be aware of ASCs on a PRACH.

From RAN3 point of view it is important that the current approach on lub, in which on one transport bearer the TFI can uniquely indicate the number and size of TBs received from a UE, can be maintained. Although not supported today, WG3 could e.g. extend the current approach by allowing the establishment of several transport bearers for one PRACH e.g. per PRACH partition.

It is necessary to configure a transport bearer for each RACH/PRACH defined in system information. For each such transport bearer the RACH TFI uniquely indicates the number and size of TBs received from a UE. The specification allows to set the parameters of a RACH/PRACH pair such that two different PRACH employ the same scrambling code but different signatures and subchannels. In this case it however shall be ensured by the choice of available signatures and subchannels that from a received preamble (time slot and signature) it can be uniquely identified to which RACH/PRACH the subsequent message on PRACH belongs. Establishment of different transport bearers for each PRACH partition used for ASCs is not required.

In order to clarify the present model of RACH/PRACH, RAN2 has agreed on some changes in TS 25.302, TS 25.331 and TR 25.922. The respective CRs are attached to this liaison.

4. References

- [1] R2-001906 (R3-002343), LS on FDD RACH/PRACH (RAN3)