TSG-RAN Working Group 1 meeting #5 ***TSGR1#5(99)591***
Cheju, 1st to 4th June 1999

Source: Sony International (Europe) GmbH

Agenda Item: Adhoc #3 / text proposals for S1.14

Title: Text proposal for S1.14 concerning prioritisation of RACH

Document for: Decision

Introduction

At its last meeting, in Shin-Yokohama, TSG RAN WG1 received a LS [2] from TSG RAN WG2 on the concept of RACH prioritisation and partitioning via so called Access Service Classes. This document proposes necessary text changes with respect to this concept for the FDD mode, i.e. for S1.14 [1].

References

[1] 3GPP S1.14, UTRA FDD; Physical layer procedures, V2.0.0
[2] Tdoc TSGR1#4(99)481, LS on RACH prioritisation
[3] Tdoc TSGR2#2(99)133, RACH Prioritisation Scheme for Multi-service Provision, Source: Sony

3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

ASC	Access Service Class
BCH	Broadcast Channel
CCPCH	Common Control Physical Channel
DCH	Dedicated Channel
DPCCH	Dedicated Physical Control Channel
DPCH	Dedicated Physical Channel
DPDCH	Dedicated Physical Data Channel
FACH	Forward Access Channel
MUI	Mobile User Identifier
PCH	Paging Channel
PI	Paging Indication
PRACH	Physical Random Access Channel
RACH	Random Access Channel
SCH	Synchronisation Channel
SIR	Signal-to-Interference Ratio
SSDT	Site Selection Diversity TPC
TPC	Transmit Power Control
UE	User Equipment

6 Random access procedure

Before the random-access procedure is executed, the UE should acquire the following information from the BCH :

- The preamble spreading code(s) / message scrambling code(s) used in the cell
- The available signatures for each ASC
- The available access slots
- The available spreading factors for the message part
- The uplink interference level in the cell
- The primary CCPCH transmit power level
- The AICH transmission timing parameter as defined in S1.11.
- The power offsets ΔP_0 (power step when no acquisition indicator is received, step 7.3) and ΔP_1 (power step when negative acquisition is received, see step 8.3)

The random-access procedure is:

1. . The UE randomly selects a preamble spreading code from the set of available spreading codes. The random function is TBD.
2. . The UE sets the preamble transmit power to the value P_{RACH} given in Section 5.1.1. [*Editor's note: Here it is assumed that the initial power back-off is included in the "Constant Value" of 5.1.1*]
3. The UE implements the dynamic persistence algorithm by:

   3.1 Reading the current dynamic persistence value from the BCH.

   3.2 Perform a random draw against the current dynamic persistence value. The randome function is TBD.

3.3 Defer transmission for one frame and repeat step 3 if the result of the random draw is negative, otherwise proceed to step 4.

[*Editor's note: The dynamic persistence value may not be transmitted every frame, depending on the BCH scheduling, i.e step 3.1 cannot be executed every iteration.]*

4 The UE:

4.1 Randomly selects an uplink access slot from the available uplink access slots. Random function is TBD.

4.2 Randomly selects a signature from the available signatures within the ASC given by higher layers. Random function is TBD.

5 5. The UE sets the Preamble Retransmission Counter to Preamble_Retrans_Max (value TBD).

6 The UE transmits its preamble using the selected uplink access slot, signature, and preamble transmission power..

7 If the UE does not detect an acquisition indicator with the selected signature in the downlink access slot corresponding to the selected uplink access slot, the UE:

7.1 Selects a new uplink access slot, , This new access slot must be one of the available access slots. There must be also a distance of three or four access slots from the uplink access slot in which the last preamble was transmitted depending on the AICH transmission timing parameter. The selection scheme of this new access slot is TBD.

7.2 Randomly selects a new signature from the available signatures within the ASC given by higher layers. Random function is TBD.

7.3 Increases the preamble transmission power with the specified offset ΔP_0.

7.4 Decrease the Preamble Retransmission Counter by one.

7.5 If the Preamble Retransmission Counter > 0, the UE repeats from step 6 otherwise an error indication is passed to the higher layers and the random-access procedure is exited.

8. If the UE detects a negative acquisition indicator with the selected signature in the downlink access slot corresponding to the selected uplink access slot, the UE:

8.1 Selects a new uplink access slot as in 7.1

8.2 Randomly selects a new signature from the available signatures within the ASC given by higher layers. Random function is TBD.

8.3 Modifies the preamble transmission power with the specified offset ΔP_1.

[*Editor's note: Note clear if the Preamble Retransmission Counter should be decremented and tested in this case*]

8.4 Reats from step 6

9. The UE transmits its random access message three or four uplink access slots after the uplink access slot of the last transmitted preamble depending on the AICH transmission timing parameter…

10. A indication of successful random-accces transmission is passed to the higher layers.

Dynamic persistence is provided for managing interference and minimising delay by controlling access to the RACH channel. The system will publish a dynamic persistence value on the BCH, the value of which is dependent on the estimated backlog of users in the system.