**TSG-RAN Working Group 1 meeting #11**

San Diego, USA, February 28 – March 03, 2000

*TSGR1#11(00)0219*

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|---|---|
| **Agenda Item:** | ? |
| **Source:** | Siemens |
| **Title:** | Description of the random access procedure for inclusion into 25.224 |
| **Document for**: | Approval |

## Abstract

This document proposes to include a description of the random access procedure for TDD into TS 25.224. For FDD, the physical layer aspects of the random access procedure are described in TS 25.214 Chapter 6. An analogous description for TDD is currently missing. Therefore, the change request below proposes new text for inclusion into TS 25.224.

## References to higher layer issues

Higher layer aspects of the random access procedure for TDD can be found in

- TS **25.321 Clause 11.2.2**, "Control of RACH transmissions for TDD" . This specifies the handling of persistency inside the MAC in detail.

- TS **25.331 Clause 10**, "Message and information element functional definition and content". This specifies how the RACH, Access Services Classes, and PRACH sub-channels are configured.

- TS **25.303 Clause 6.7.3**, "Random access transmission sequence (TDD)". This gives an example for a message chart. Figure 41 from 25.303 is repeated here for information:

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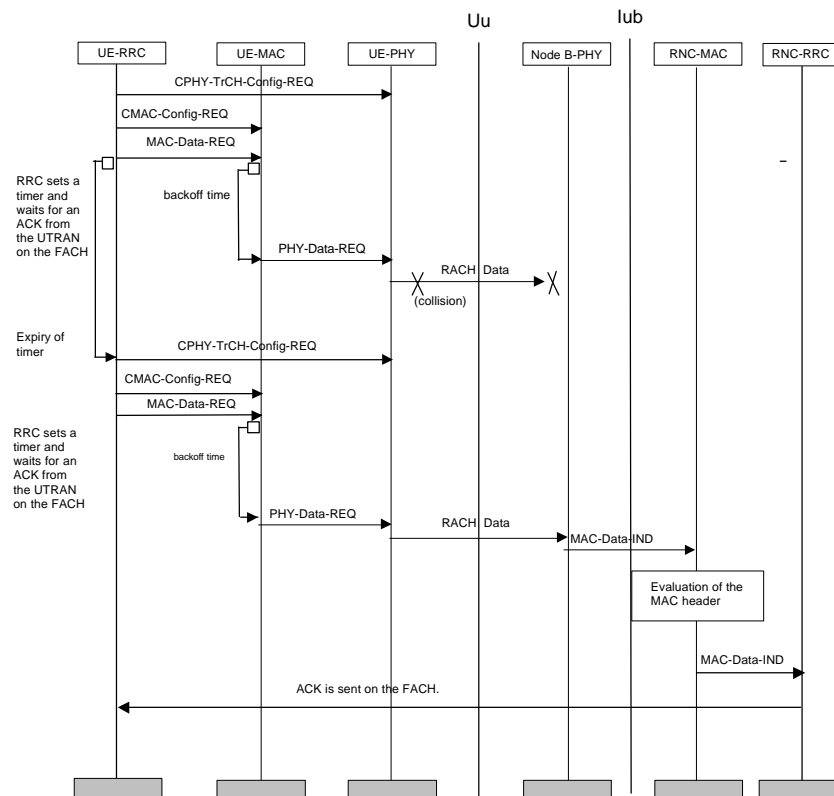
# CHANGE REQUEST

*Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.*

| **25.224** | CR | **009** | Current Version: | 3.1.0 |
|---|---|---|---|---|

*GSM (AA.BB) or 3G (AA.BBB) specification number ↑*          *↑ CR number as allocated by MCC support team*

For submission to: **TSG RAN #7**          for approval **X**          strategic ☐          *(for SMG*
*list expected approval meeting # here*          for information ☐          non-strategic ☐          *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*

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

| **Source:** | Siemens | | | **Date:** | 2000-02-25 |
|---|---|---|---|---|---|

**Subject:** New section describing the random access procedure

**Work item:**

**Category:** 
F Correction **X**
A Corresponds to a correction in an earlier release ☐
*(only one category*
B Addition of feature ☐
*shall be marked*
C Functional modification of feature ☐
*with an X)*
D Editorial modification ☐

**Release:**
Phase 2 ☐
Release 96 ☐
Release 97 ☐
Release 98 ☐
Release 99 **X**
Release 00 ☐

**Reason for change:** 25.214 chapter 6 describes the random access procedure for FDD.
Such a description is missing for TDD in 25.224.

**Clauses affected:** 4.8 (new text)

**Other specs affected:**
Other 3G core specifications ☐ → List of CRs:
Other GSM core specifications ☐ → List of CRs:
MS test specifications ☐ → List of CRs:
BSS test specifications ☐ → List of CRs:
O&M specifications ☐ → List of CRs:

**Other comments:**

help.doc

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

# 4.8 Random access procedure

The physical random access procedure described below is invoked whenever a higher layer requests transmission of a message on the RACH. The physical random access procedure is controlled by primitives from RRC and MAC. Retransmission on the RACH in case of failed transmission (e.g. due to a collision) is controlled by higher layers. Thus, the backoff algorithm and associated handling of timers is not described here. The definition of the RACH in terms of PRACH sub-channels and associated Access Service Classes is broadcasted on the BCH in each cell. Parameters for common physical channel uplink outer loop power control are also broadcasted on the BCH in each cell. The UE needs to decode this information prior to transmission on the RACH.

## 4.8.1 Physical random access procedure

The physical random access procedure described in this section is initiated upon request of a PHY-Data-REQ primitive from the MAC sublayer (cf. TS 25.321 and TS 25.303).
Before the physical random-access procedure can be initiated, Layer 1 shall receive the following information by a CPHY-TrCH-Config-REQ from the RRC layer :

- The available PRACH sub-channels for each Access Service Class (ASC)

- The timeslot, spreading factor, channelisation code, midamble, repetition period and offset for each PRACH sub-channel. (There is a 1:1 mapping between spreading code and midamble as defined by RRC)

- The set of Transport Format parameters.

- The set of parameters for common physical channel uplink outer loop power control

Note that the above parameters may be updated from higher layers before each physical random access procedure is initiated. At each initiation of the physical random access procedure, Layer 1 shall receive the following information from the higher layers (MAC):

- The Transport Format to be used for the PRACH message.

- The ASC of the PRACH transmission.

- The data to be transmitted (Transport Block Set).

The physical random-access procedure shall be performed as follows:

1. Randomly select the PRACH sub-channel from the available ones for the given ASC. The random function shall be such that each of the allowed selections is chosen with equal probability.

2. Derive the available access slots in the next N frames, defined by SFN, SFN+1, ... , SFN+N-1 for the selected PRACH sub-channel with the help of SFN (where N is the repetition period of the selected PRACH sub-channel). Randomly select an uplink access slot from the available access slots in the next frame, defined by SFN, if there is one available. If there is no access slot available in the next frame, defined by SFN then, randomly select one access slot from the available access slots in the following frame, defined by SFN+1. This search is performed for all frames in increasing order, defined by SFN, SFN+1, ..., SFN+N-1, until an available access slot is found. The random function shall be such that each of the allowed selections is chosen with equal probability.

3. Randomly select a spreading code from the available ones for the given ASC. The random function shall be such that each of the allowed selections is chosen with equal probability. The midamble is derived from the selected spreading code.

4. Set the PRACH message transmission power level according to the specification for common physical channels in uplink (see Sect. 4.2.2.1).

5. Transmit the random access message.