TSG-RAN Working Group 1 meeting #11
San Diego, CA; USA
February 29 – March 3, 2000

**TSGR1#11(00)0344**

**Agenda item:**

**Source:** Ericsson

**Title:** CR 25.214-065r1: PRACH power offset definition

**Document for:** Decision

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The parameter $\Delta P_{p\text{-}m}$ is not described in detail in the PRACH procedure, and can be interpreted in several ways:

- Is the power offset between the preamble and message, the difference in power between the preamble and the total power of the message or only the power of the control part of the message? The most reasonable definition is to use the control part of the message as reference, since the total power of the message will differ for different bit rates.
- Does a positive $\Delta P_{p\text{-}m}$ represent an increase or decrease of the power compared to the preamble power? It is proposed that a positive $\Delta P_{p\text{-}m}$ represent a higher power of the control part of the message.

This CR clarifies the above points in TS 25.214.

**3GPP TSG RAN WG1 Meeting #11**
**San Diego, USAGermany, feb 29 – Mar 3, 1999**

***Document ????99???***
*e.g. for 3GPP use the format TP-99xxx*
*or for SMG, use the format P-99-xxx*

# CHANGE REQUEST

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

| **25.214** | **CR** | **065r1** | 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 use only) |
|---|---|---|---|---|---|---|
| *list expected approval meeting # here ↑* | | for information | | non-strategic | | |

*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:** *(at least one should be marked with an X)* | (U)SIM | | ME | X | UTRAN / Radio | X | Core Network | |
|---|---|---|---|---|---|---|---|---|

**Source:** Ericsson **Date:** 2000-02-22

**Subject:** PRACH power offset definition

**Work item:**

**Category:** *(only one category shall be marked with an X)*

| | | | | | |
|---|---|---|---|---|---|
| F | Correction | X | **Release:** | Phase 2 | |
| A | Corresponds to a correction in an earlier release | | | Release 96 | |
| B | Addition of feature | | | Release 97 | |
| C | Functional modification of feature | | | Release 98 | |
| D | Editorial modification | | | Release 99 | X |
| | | | | Release 00 | |

**Reason for change:** The parameter $\Delta P_{p\text{-}m}$ is not described in detail in the PRACH procedure, and can be interpreted in several ways.

**Clauses affected:** 6.1

**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:**

# 6 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).

Before the physical random-access procedure can be initiated, Layer 1 shall receive the following information from the higher layers (RRC) :

- The preamble scrambling code
- The message length in time, either 10 or 20 ms
- The AICH_Transmission_Timing parameter [0 or 1].
- The available signatures and RACH sub-channel groups for each Access Service Class (ASC), where a sub-channel group is defined as a group of some of the sub-channels defined in Section 6.1.1.
- The power-ramping factor Power_Ramp_Step [integer > 0].
- The parameter Preamble_Retrans_Max [integer > 0].
- ~~—~~The initial preamble power Preamble_Initial_Power.
- The power offset $\Delta P_{p\text{-}m} = P_{message\text{-}control} - P_{preamble}$, measured in dB, between the power of the last transmitted preamble and the control part of the random-access message
- The set of Transport Format parameters. This includes the power offser ~~$\Delta Pp\text{-}m$~~ between the data part and the control part of the random-access mesagee ~~preamble and the message part~~ for each Transport Format.

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 part.
- 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 RACH sub-channel group from the available ones for the given ASC. The random function shall be usch that each of the allowed selections is chosen with equal probability.

2 Derive the available access slots in the next two frames, defined by SFN and SFN+1 in the selected RACH sub-channel group with the help of SFN and table 7. Randomly select one 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. The random function shall be such that each of the allowed selections is chosen with equal probability.

3 Randomly select a signature from the available signatures for the given ASC. The random function shall be such that each of the allowed selections is chosen with equal probability.

4 Set the Preamble Retransmission Counter to Preamble_Retrans_Max.

5 Set the preamble transmission power to Preamble_Initial_Power.

6 Transmit a preamble using the selected uplink access slot, signature, and preamble transmission power.

7 If no positive or negative acquisition indicator corresponding to the selected signature is detected in the downlink access slot corresponding to the selected uplink access slot:

7.1 Select a new uplink access slot as next available access slot, i.e. next access slot in the sub-channel group used, as selected in 1

7.2 Randomly selects a new signature from the available signatures within the given ASC. The random function shall be such that each of the allowed selections is chosen with equal probability.

7.3 Increase the preamble transmission power by $\Delta P_0$ = Power_Ramp_Step [dB].

7.4 Decrease the Preamble Retransmission Counter by one.

7.5 If the Preamble Retransmission Counter > 0 then repeat from step 6. Otherwise pass L1 status ("No ack on AICH") to the higher layers (MAC) and exit the physical random access procedure.

8 If a negative acquisition indicator corresponding to the selected signature is detected in the downlink access slot corresponding to the selected uplink access slot, pass L1 status ("Nack on AICH received") to the higher layers (MAC) and exit the physical random access procedure.

9 Transmit the 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. Transmission power of the control part of the random access message should be $\Delta P_{p\text{-}m}$ [dB] higher than the power ~~is modified from that~~ of the last transmitted preamble ~~with the specified offset $\Delta P_{p\text{-}m}$~~. Transmission power of the data part of the random access message is set according to Section 5.1.1.2.

10 Pass L1 status "RACH message transmitted" to the higher layers and exit the physical random access procedure.

## 6.1.1 RACH sub-channels

A RACH sub-channel defines a sub-set of the total set of access slots. There are a total of 12 RACH sub-channels. RACH sub-channel #i (i = 0, …, 11) consists of the following access slots:

- Access slot #i transmitted in parallel to P-CCPCH frames for which SFN mod 8 = 0 or SFN mod 8 = 1.
- Every 12$^{th}$ access slot relative to this access slot.

The access slots of different RACH sub-channels are also illustrated in Table 7.

**Table 7: The available access slots for different RACH sub-channels**

| | Sub-channel Number | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SFN modulo 8 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 0 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | | | |
| 1 | 12 | 13 | 14 | | | | | | 8 | 9 | 10 | 11 |
| 2 | | | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| 3 | 9 | 10 | 11 | 12 | 13 | 14 | | | | | | 8 |
| 4 | 6 | 7 | | | | | 0 | 1 | 2 | 3 | 4 | 5 |
| 5 | | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | | | |
| 6 | 3 | 4 | 5 | 6 | 7 | | | | | 0 | 1 | 2 |
| 7 | | | | | | 8 | 9 | 10 | 11 | 12 | 13 | 14 |