3GPP TSG RAN WG1 Meeting #9
Dresden, Germany, Nov 30 – Dec 3, 1999

Document R1-99i40
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	021	Current Version:	3.0.0

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

For submission to:	TSG-RAN #6	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: Nokia **Date:** 24.11.99

Subject: 20 ms RACH message length

Work item:

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

F	Correction		
A	Corresponds to a correction in an earlier release		
B	Addition of feature	X	
C	Functional modification of feature		
D	Editorial modification		

Release:

Phase 2	
Release 96	
Release 97	
Release 98	
Release 99	X
Release 00	

Reason for change: Addition of 20 ms RACH message length was agreed in RAN WG1#8 (New York 12.-15.10). See documents R1-99f58 and R1-99h72.

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:

help.doc

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

6 Random access procedure

6.1 RACH 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 message length in time, either 10 or 20 ms
- The available signatures , and RACH sub-channel(s) groups for each ASC, where a sub-channel group is defined as a group of some of the sub-channels defined in table 7, and is indicated by upper layer.
- 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 25.211.
- The power offset $\Delta P_{p\text{-}m}$ between preamble and the message part.
- 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) Monitor the broadcast channel (BCH).
   3.2) Read the current persistence factor, *N*, from the BCH.
   3.3) If $N = 0$, the UE proceeds to step 4. Otherwise, the UE generate an integer uniform random variable R in the interval $[0, 1, \ldots, 2^N - 1]$.
   3.4) If the outcome of the random draw $R = 0$, the UE proceeds to step 4. Otherwise, the UE defers the transmission of the message for one frame and repeats step 3.
4) The UE:
   4.1) Randomly selects the RACH sub-channel group from the available ones for its ASC, The random function, for selecting the RACH sub-channel group from the available ones is TBD.
   4.2) Derives 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 selects one 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 selects one access slot from the available access slots in the following frame, defined by SFN+1. Random function is TBD.
   4.3) Randomly selects a signature from the available signatures within the ASC given by higher layers. Random function is TBD.
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 the positive or negative acquisition indicator corresponding to 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, as next available access slot, i.e. next slot in the sub-channel group used, as selected in 4.1

   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 the negative acquisition indicator corresponding to 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.

   8.4) Repeats 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. Transmission power of the random access message is modified from that of the last transmitted preamble with the specified offset $\Delta P_{p\text{-}m}$.

10) An indication of successful random-access 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.

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

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