TSG-RAN Working Group 1 meeting #11 **TSGR1#11(00)0362**

San Diego (USA), February 29 ~ March 3, 2000

Agenda Item :

Source : Samsung, GBT, Nokia, LGIC, Lucent, Philips

Title : Addition of the channel assignment scheme to CPCH

Document for : Discussion and approval

For improving the reliability of the channel assignment, two methods are proposed. One is the CA message verification with CSICH and the other is the "start message indicator". For using the CSICH as the verification, information of the CSICH is the availability of each PCPCH. When an UE receives the CA message, the UE checks the assigned channel was occupied or not by using CSICH information. If the assigned channel was occupied in the previous frame information, then UE can know the CA message error occurred. However, if CA message error occurs to direct the UE to empty channel, the CA verification will be failed. So, the "start message indicator" is needed to confirm the CA message. If the UE enters wrong channel that is empty, then the UE cannot receive the "start message indicator" in the first frame. So, the UE can release the PCPCH.

By the agreements of the source companies, we propose the CA as a method of the CPCH with two methods for resolving the CA message error. Furthermore, we propose procedures for monitoring status indicators in this contribution.

3GPP RAN WG1 Meeting #11
San Diego, USA, 28 Feb – 3 Mar 2000

Document R1-00-0362
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**	**069r1**	Current Version:	3.1.1

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: Samsung, GBT, Nokia, Phillips, LGIC, Lucent **Date:** 29-Feb-2000

Subject: Dual mode CPCH

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: For dual mode CPCH, the CPCH procedures are changed.

Clauses affected: 6.2 of TS25.214

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:

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

1 Scope

The present document specifies and establishes the characteristics of the physicals layer procedures in the FDD mode of UTRA.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

[1] TS 25.211: "Physical channels and mapping of transport channels onto physical channels (FDD)"

[2] TS 25.212: "Multiplexing and channel coding (FDD)"

[3] TS 25.213: "Spreading and modulation (FDD)"

[4] TS 25.215: "Physical layer – Measurements (FDD)"

[5] TS 25.331: “RRC Protocol Specification”

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 ΔP_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 random access message is modified from that of the last transmitted preamble with the specified offset ΔP_{p-m}.

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 12th 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

6.2 CPCH Access Procedures

For each CPCH physical channel in a CPCH set allocated to a cell the following physical layer parameters are included in the System Information message:

- UL Access Preamble (AP) scrambling code.
- UL Access Preamble signature set
- The Access preamble slot sub-channels group
- AP- AICH preamble channelization code.
- UL Collision Detection(CD) preamble scrambling code.
- CD Preamble signature set

- CD preamble slot sub-channels group
- CD-AICH preamble channelization code.
- CPCH UL scrambling code.
- CPCH UL channelization code. (variable, data rate dependant)
- DPCCH DL channelization code.([512] chip)

NOTE: There may be some overlap between the AP signature set and CD signature set if they correspond to the same scrambling code.

The following are access, collision detection/resolution and CPCH data transmission parameters:

Power ramp-up, Access and Timing parameters (Physical layer parameters)

1) N_AP_retrans_max = Maximum Number of allowed consecutive access attempts (retransmitted preambles) if there is no AICH response. This is a CPCH parameter and is equivalent to Preamble_Retrans_Max in RACH.
2) $P_{RACH} = P_{CPCH}$ = Initial open loop power level for the first CPCH access preamble sent by the UE.

   [RACH/CPCH parameter]
3) ΔP_0 = Power step size for each successive CPCH access preamble.

   [RACH/CPCH parameter]
4) ΔP_1 = Power step size for each successive RACH/CPCH access preamble in case of negative AICH. A timer is set upon receipt of a negative AICH. This timer is used to determine the period after receipt of a negative AICH when ΔP_1 is used in place of ΔP_0.

   [RACH/CPCH parameter]
5) T_{cpch} = CPCH transmission timing parameter: This parameter is identical to PRACH/AICH transmission timing parameter.

   [RACH/CPCH parameter]
6) $L_{pc\text{-}preamble}$ = Length of power control preamble (0 or 8 slots)

   [CPCH parameter]

7) $N_{Start\_Message}$ = Number of frames for the transmission of the 'start message indicator' in DL-DPDCH

   [CPCH parameter]

NOTE: It is FFS if ΔP_0 for the CPCH access may be different from ΔP_0 for the RACH access as defined in section 6.1.

The CPCH -access procedure in the physical layer is:

~~1) The UE MAC function selects a CPCH transport channel from the channels available in the assigned CPCH set The CPCH channel selection includes a dynamic persistence algorithm (similar to RACH) for the selected CPCH channel.~~

~~2) The UE MAC function builds a transport block set for the next TTI using transport formats which are assigned to the logical channel with data to transmit. The UE MAC funtion sends this transport block set to the UE PHY function for CPCH access and uplink transmission on the selected CPCH transport channel.~~

1) Upon receipt of a Status-REQ message from the MAC layer, the UE shall receive the CSICH to determine the availability of the transport formats in the transport format subset included in the Status-REQ message. UTRAN transmits availability of each PCPCH channel over the CSICH. Upper layers will supply the UE with information to map the transport formats to the PCPCHs. The UE shall send a Status-CNF message to the MAC

layer containing the transport format subset listing the transport formats of the requested subset which are currently indicated as 'available'.

2) Upon receipt of an Access-REQ message from the MAC layer, the UE shall test the value(s) of the most recent transmission of the Status Indicator(s) corresponding to the channel(s) for the identified tranport format included in the Access-REQ message. If this indicates that no channel is 'available' the UE shall abort the access attempt and send a failure message to the MAC layer.

3) The UE sets the preamble transmit power to the value $P_{CPCH\_}$ which is supplied by the MAC layer for initial power level for this CPCH access attempt.

4) The UE sets the AP Retransmission Counter to N_AP_Retrans_Max (value TBD).

5) The UE randomly selects a CPCH-AP signature from the set of signatures for the transport format identified in the Access-REQ message.~~signature set for this selected CPCH channel.~~ The random function is TBD.

6) Using the AP access slot subchannel group for the selected AP signature, the UE derives the available CPCH-AP access slots in the next two frames, defined by SFN and SFN+1 with the help of SFN~~The UE Derives the available CPCH AP access slots in the next two frames, defined by SFN and SFN+1 in the AP access slot sub-channel group with the help of SFN~~ and table 7 in section 6.1. The UE 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

7) ~~The UE transmits the AP using the MAC supplied uplink access slot, signature, and initial preamble transmission power.~~The UE shall test the value of the most recent transmission of the Status Indicator corresponding to the identified CPCH transport channel immediately before AP tranmission. If this indicates that the channel is 'not available' the UE shall abort the access attempt and send a failure message to the MAC layer. Otherwise the UE transmits the AP using the UE selected uplink signature and access slot, and the initial preamble transmission power from step 3, above.

8) 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 shall test the value of the most recent transmission of the Status Indicator corresponding to the identified CPCH transport channel immediately before AP transmission. If this indicates that the channel is 'not available' the UE shall abort the access attempt and send a failure message to the MAC layer. Otherwise the following steps shall be executed:

   a) Selects the next uplink access slot from among the access slots in the CPCH-AP sub-channel group for the selected AP signature, as described in step 6, above.~~, as selected in 4.1.~~ There must be a minimum distance of three or four (per Tcpch parameter) access slots from the uplink access slot in which the last preamble was transmitted depending on the CPCH/AICH transmission timing parameter. ~~[NOTE: Use of random function here to select access slot is FFS for RACH and CPCH.].~~

   b) Increases the preamble transmission power with the specified offset ΔP . Power offset ΔP_0 s is used unless the negative AICH timer is running, in which case ΔP_1 is used instead..

   c) Decrease the Preamble Retransmission Counter by one.

   d) If the Preamble Retransmission Counter < 0, the UE aborts the access attempt and sends a failure message to the MAC layer.

9) If the UE detects the AP-AICH_nak (negative acquisition indicator) corresponding to the selected signature in the downlink access slot corresponding to the selected uplink access slot, the UE aborts the access attempt and sends a failure message to the MAC layer. The UE sets the negative AICH timer to indicate use of ΔP_1 use as the preamble power offset until timer expiry

10) Upon reception of AP-AICH_ack with matching signature, the access segment ends and the contention resolution segment begins. In this segment, the UE randomly selects a CD signautre from the CD signature set and also select one-CD access slot sub-channel from the CD sub-channel group supported in the cell~~.~~and transmits a CD Preamble, then waits for a CD/CA-~~A~~ICH and the channel assignment (CA) (in case CA is active) message from the Node B.

11) If the UE does not receive a CD/CA-~~A~~ICH in the designated slot, the UE aborts the access attempt and sends a failure message to the MAC layer.

12) If the UE receives a CD/CA-~~A~~ICH in the designated slot with a signature that does not match the signature used in the CD Preamble, the UE aborts the access attempt and sends a failure message to the MAC layer.

13) If the UE receives a CD-~~A~~ICH with a matching signature and CA message that points out to one of the channels (mapping rule is in [5]) that were indicated to be free by the last received CSICH broadcast, the UE transmits the power control preamble $\tau_{cd\text{-}p\text{-}pc\text{-}p}$ ms later as measured from initiation of the CD Preamble. . The transmission of the message portion of the burst starts immediately after the power control preamble. The transmission of the message portion of the burst starts immediately after the power control preamble. NOTE: If the $L_{pc\text{-}preamble}$ parameter indicates a zero length preamble, then there is not power control preamble and the message portion of the burst starts $\tau_{cd\text{-}p\text{-}pc\text{-}p}$ ms after the initiation of the CD Preamble. If the CA message received points out ot the channel that was indicated to be busy on the last status information transmission received on the CSICH, the UE shall abort the access attempt and send a failure message to the MAC layer.

14) The UE shall test the value of the 'start of message indicator' received from DL-DPDCH part during the first $N_{Start\_Message}$ frames. The 'start of the message indicator' is a known sequence repeated on a frame by frame basis. The value of $N_{Start\_Message}$ shall be provided by higher layers.

15~~14~~) During CPCH Packet Data transmission, the UE and UTRAN perform inner-loop power control on both the CPCH UL and the DPCCH DL.

16~~15~~) If the UE detects loss of DPCCH DL during transmission of the power control preamble or the packet data, the UE halts CPCH UL transmission, aborts the access attempt and sends a failure message to the MAC layer.

17~~16~~) If the UE completes the transmission of the packet data, the UE sends a success message to the MAC layer.

7 Procedures in Packet Data Transfer