TSG-RAN Working Group 1 meeting #12
Seoul (Korea), April 10 ~ April 13, 2000

TSGR1#12(00)0582

Agenda Item	**:**	
Source	**:**	Samsung
Title	**:**	Proposed CR 056 to 25.215 for Measurements in CPCH
Document for	**:**	Discussion and approval

1. Introduction

This contribution suggests two measures for the CPCH. To control the access attempts, the persistency value is used in MAC procedure. When there is data to send, the MAC performs the persistency value test: the MAC generates a random value, then it is compared to the persistency value. If the random value is smaller than or equal to the persistency value, the test is passed. And then, the UE sends the first Access Preamble (AP) to request CPCH. If this persistency value is large, the UE can send the AP with high probability. When the load is light, the large persistency value encourages use of the CPCH. On the other hand, when the load is heavy and the persistency value is so large, the UE will transmit undesired AP to the UTRAN. As a result, it increases the UL interference. We can imagine the other case that the persistency value is small. In this case, the UE can't send the AP easily. The throughput of the CPCH, however, will be downed if the load is light and the persistency value is small. So, there is a trade off between throughput and the UL interference. For controlling and optimizing this trade off, the persistency value plays the key role.

2. Measures for determining the persistency value

For determining the persistency values, we need some information. Then the numbers of AP's which is detected by the UTRAN may be a measure. Furthermore, the number of PCPCH assignments may be a good measure to estimate the load. Now, we propose two measures.

- Detected PCPCH access preambles:
  The number of access attempts for the CPCH set in one access frame
- Acknowledged PCPCH access preambles:
  The number of acknowledged AP's for the requested data rate in one access frame

2.1 Detected PCPCH access preambles

The “Access Attempt” can be explained as an action that an UE takes to acquire a PCPCH. In current specification about the CPCH, an UE requests the PCPCH by sending an AP to the UTRAN. If the UTRAN counts the number of AP’s, then the UTRAN can know how many UE’s request the PCPCH. For example, let us assume that the UTRAN has received AP1 in 5 times, AP4 in 3 times and AP11 in 6 times for one access frame. Then the total number of “Access Attempts” in this CPCH set is 14. Actually, the real number of requesting may be larger than 14. The reason is that even though an UE sent an AP to the UTRAN, it couldn’t reach to the UTRAN because of the lack of power. So, these attempts can’t be counted. This situation, however, doesn’t make a serious problem to UL interference. Because the power level is low.

The main goal of this measure is reducing the UL interference by choosing the appropriate persistency value. And this measure will be measured in one access frame for one CPCH set.

2.2 Acknowledged PCPCH access preambles

In the current scheme, the CRNC doesn’t know how much bandwidth is assigned to UE’s in the specific Node B. Because an UE can send the data to the UTRAN with lower data rate than the data rate which was acknowledged (or assigned) by the UTRAN. For example, if an UE requests SF=8 and receives ACK, then this UE can send the data with higher SF (lower data rate). So, only the Node B knows how much bandwidth is acknowledged (or assigned). The CRNC knows only the current bandwidth or the current total data rate.

This measure has the value for number of acknowledged PCPCH’s during one access frame for the specific SF (or data rate). If the specific SF (or data rate) is assigned so frequently, then the congestion probability will increase for that SF (or data rate). So, it is necessary for the UTRAN to assign the smaller persistency value for this SF (or data rate).

3. Measurements

The “Detected PCPCH access preambles” and “Acknowledged PCPCH access preambles” are measured for one access frame.

The “Detected PCPCH access preambles” will be measured per CPCH set and the “Acknowledged PCPCH access preambles” is measured per SF (or data rate).

4. Usage and goal

The “Detected PCPCH access preambles” will be used for choosing appropriate persistency values. The main goal of this measurement is controlling the UL interference if load is heavy. As the same manner, the “Acknowledged PCPCH access preambles” will be used for persistency

value, too. And the main goal is the load control.

	Measuring length	Measurements	Usage	Goal
Detected PCPCH access preambles	One Access Frame	For one CPCH set	Persistency value	UL Interference Control
Acknowledged PCPCH access preambles	One Access Frame	For one data rate	Persistency value	Load control

Table 1: The summary of the measures

5. Reporting time

There are three types of reporting; “periodic”, “event trigger”, and “on demand”. The “periodic” means that the Node B reports measurements periodically. In the “event trigger” mode, the report occurs when the specific event(s) happen. For example, if a measurement value exceeds a threshold, then the Node B starts the report. The third mode is “on demand”. In this mode, the Node B reports by the demand from CRNC. The proposed two measures will be operated under these three modes.

6. Status of other WG’s

In WG2, these two measures are accepted [1]. And in WG3, discussions of these measures and procedures are in progress [2].

7. Proposal

We propose two measures for the choice of persistency values. It will be helpful and useful for controlling the UL interference and the load.

8. Reference

[1] R2-000830, “Proposed CR053 to 25.302 on measurement of RACH and CPCH”, Samsung

[2] R3-001176, “Common measurement values for CPCH”, Samsung

3GPP RAN WG1 Meeting #11
Seoul, Korea, 10 April – 13 April 2000

Document R1-00-0582
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.

25.215	CR	056	Current Version:	3.2.0

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

For submission to:	TSG - RAN #8	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 **Date:** 13-APR-2000

Subject: Proposed CR for Measurements of CPCH in FDD

Work item:

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

F	Correction		**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release	X		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:

Clauses affected: 5.2 of TS25.215

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 C

5.2.10 Propagation delay

Definition	Propagation delay is defined as one-way propagation delay as measured during PRACH access: Propagation delay = (T_{RX} – T_{TX} – 2560)/2, where: T_{TX} = The time of AICH access slot (n-2-AICH transmission timing), where 0≤(n-2-AICH Transmission Timing)≤14 and AICH_Transmission_Timing can have values 0 or 1. T_{RX} = The time of reception of the beginning (the first significant path) of the PRACH message from the UE at PRACH access slot n. Note: The definition of "first significant path" needs further elaboration.
Range/mapping	The Propagation delay is given with the resolution of 3 chips with the range [0, …, 765] chips. The Propagation delay shall be reported in the unit PROP_DELAY where: PROP_DELAY_000: 0 chip ≤ Propagation delay < 3 chip PROP_DELAY_001: 3 chip ≤ Propagation delay < 6 chip PROP_DELAY_002: 6 chip ≤ Propagation delay < 9 chip ... PROP_DELAY_252: 756 chip ≤ Propagation delay < 759 chip PROP_DELAY_253: 759 chip ≤ Propagation delay < 762 chip PROP_DELAY_254: 762 chip ≤ Propagation delay < 765 chip PROP_DELAY_255: 765 chip ≤ Propagation delay

5.2.11 Detected PCPCH access preambles

Definition	The detected PCPCH access preambles measurement is defined as the total number of detected access preambles per access frame on the PCPCHs belonging to a CPCH set.
Range/mapping	

5.2.12 Acknowledged PCPCH access preambles

Definition	The Acknowledged PCPCH access preambles measurement is defined as the total number of acknowledged PCPCH access preambles per access frame on the PCPCHs belonging to a SF. This is equivalent to the number of positive acquisition indicators transmitted for a SF per access frame per AP-AICH.
Range/mapping	