3GPP TSG RAN WG1#12 Tdoc R1-(00)-0577

Seoul, Korea
April 10th - 14th, 2000

Agenda Item:
Source: **Nokia**
Title: **25.215-049r1, 25.211-048 : Propagation delay for PCPCH (revision1)**
Document for: **Decision**

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1 Introduction

In its last meeting, RAN WG3 included Propagation delay measurement also for PCPCH. Since RAN WG3 uses the same data frame structure for RACH /CPCH, it is proposed that in TS25.215, there is also only one measurement defined for PRACH and PCPCH. The idea to define the propagation delay measurement for PCPCH, is that PCPCH can also be used for DPCH setup. The propagation delay measurement allows to minimise the search window , when setting up the uplink DPCH. The attached CR contains the proposed definition of Propagation delay measurement for PCPCH.

2 PCPCH propagation delay definition

Proposed definition to TS 25.215 is given below. It is aligned with the PRACH propagation delay definition as much as possible. However, the measurement definition for PCPCH is now defined so generically, that several measurements are possible, since each Iub frame contains the field for Propagation delay.

PCPCH:

Propagation delay = (T_{RX} – T_{TX} – ($L_{pc\text{-}preamble}$ +1)*2560– (k-1)*38400)/2, where
T_{TX} = The transmission time of CD-ICH at access slot (n-2-T_{cpch}), where 0≤(n-2-T_{cpch})≤14 and T_{cpch} can have values 0 or 1.
T_{RX} = The time of reception of the first chip (the first significant path) of the kth frame of the PCPCH message from the UE, where k ∈{1,…, N_Max_frames}.
N_max_frames is a higher layer parameter and defines the maximum length of the PCPCH message. The PCPCH message begins at uplink access slot (n+$L_{pc\text{-}preamble}$/2),
where 0≤(n + $L_{pc\text{-}preamble}$ /2)≤14 and where $L_{pc\text{-}preamble}$ can have values 0 or 8.
Note: The definition of "first significant path" needs further elaboration.

3 Changes needed in other specs

This means that TS25.211 has to contain following sentence in section "7.4 PCPCH/AICH timing relation", in the similar way that section "7.3 PRACH/AICH timing relation" now defines the timing relationship of the uplink access slot number n and downlink access slot n. Otherwise the PCPCH propagation delay definition is not clear. The CR for that is attached here also.

Uplink access slot number n is transmitted from the UE $\tau_{p\text{-}a1}$ chips prior to the reception of downlink access slot number n, n =0, 1, …,14.

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25.215	**CR**	**049r1**	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
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*

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

Source: Nokia **Date:** 2000-04-12

Subject: Propagation delay for PCPCH

Work item: UTRAN

Category:				**Release:**	
	F	Correction		Phase 2	
	A	Corresponds to a correction in an earlier release		Release 96	
(only one category	B	Addition of feature	X	Release 97	
shall be marked	C	Functional modification of feature		Release 98	
with an X)	D	Editorial modification		Release 99	X
				Release 00	

Reason for change: RAN WG3 has included Propagation delay measurement also for PCPCH. The needed modifications are added to WG1 specification.

Clauses affected: 5.2.10 Propagation delay

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:

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5.2.10 PRACH/PCPCH Propagation delay

Definition	Propagation delay is defined as one-way propagation delay as measured during either PRACH or PCPCH access: PRACH : Propagation delay = (T_{RX} – T_{TX} – 2560)/2, where T_{TX} = The transmission 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. PCPCH: Propagation delay = (T_{RX} – T_{TX} – ($L_{pc\text{-}preamble}$ +1)*2560– (k-1)*38400)/2, where T_{TX} = The transmission time of CD-ICH at access slot (n-2-T_{cpch}), where 0≤(n-2-T_{cpch})≤14 and T_{cpch} can have values 0 or 1. T_{RX} = The time of reception of the first chip (the first significant path) of the kth frame of the PCPCH message from the UE, where k ∈{1, 2,…, N_Max_frames}. N_max_frames is a higher layer parameter and defines the maximum length of the PCPCH message. The PCPCH message begins at uplink access slot (n+$L_{pc\text{-}preamble}$/2), where 0≤(n + $L_{pc\text{-}preamble}$ /2)≤14 and where $L_{pc\text{-}preamble}$ can have values 0 or 8. 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

6 Measurements for UTRA FDD

6.1 UE measurements

6.1.1 Compressed mode

6.1.1.1 Use of compressed mode/dual receiver for monitoring

A UE shall, on higher layers commands, monitor cells on other frequencies (FDD, TDD, GSM). To allow the UE to perform measurements, higher layers shall command that the UE enters in compressed mode, depending on the UE capabilities.

In case of compressed mode decision, UTRAN shall communicate to the UE the parameters of the compressed mode.

A UE with a single receiver shall support downlink compressed mode.

Every UE shall support uplink compressed mode, when monitoring frequencies which are close to the uplink transmission frequency (i.e. frequencies in the TDD or GSM 1800/1900 bands).

All fixed-duplex UE shall support both downlink and uplink compressed mode to allow inter-frequency handover within FDD and inter-mode handover from FDD to TDD.

Monitoring frequencies outside TDD and GSM 1800/1900 bands without uplink compressed mode is a UE capability.

UE with dual receivers can perform independent measurements, with the use of a "monitoring branch" receiver, that can operate independently from the UTRA FDD receiver branch. Such UE do not need to support downlink compressed mode.

The UE shall support one single measurement purpose within one compressed mode transmission gap. The measurement purpose of the gap is signalled by higher layers.

The following section provides rules to parametrise the compressed mode.

6.1.1.2 Parameterisation of the compressed mode

In response to a request from higher layers, the UTRAN shall signal to the UE the compressed mode parameters.

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shall be marked	C	Functional modification of feature			Release 98	
with an X)	D	Editorial modification			Release 99	X
					Release 00	

Reason for change: RAN WG3 has included Propagation delay measurement also for PCPCH. In TS25.211, section 7.4 has to define the relative timing of uplink access slot number n and the downlink access slot number n, in order to have a clear definition of Propagation delay measurement for PCPCH in TS25.215.

Clauses affected: 7.4 PCPCH / AICH timing relation

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:

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- when AICH_Transmission_Timing is set to 0, then

  $\tau_{p\text{-}p,min}$ = 15360 chips (3 access slots)

  $\tau_{p\text{-}a}$ = 7680 chips

  $\tau_{p\text{-}m}$ = 15360 chips (3 access slots)

- when AICH_Transmission_Timing is set to 1, then

  $\tau_{p\text{-}p,min}$ = 20480 chips (4 access slots)

  $\tau_{p\text{-}a}$ = 12800 chips

  $\tau_{p\text{-}m}$ = 20480 chips (4 access slots)

The parameter AICH_Transmission_Timing is signalled by higher layers.

7.4 PCPCH/AICH timing relation

The uplink PCPCH is divided into uplink access slots, each access slot is of length 5120 chips. Uplink access slot number n is transmitted from the UE $\tau_{p\text{-}a1}$ chips prior to the reception of downlink access slot number n, n =0, 1, …,14.

The timing relationship between preambles, AICH, and the message is the same as PRACH/AICH. Note that the collision resolution preambles follow the access preambles in PCPCH/AICH. However, the timing relationships between CD-Preamble and CD-ICH is identical to RACH Preamble and AICH. The timing relationship between CD-ICH and the Power Control Preamble in CPCH is identical to AICH to message in RACH. The T_{cpch} timing parameter is identical to the PRACH/AICH transmission timing parameter. When T_{cpch} is set to zero or one, the following PCPCH/AICH timing values apply.

Note that a1 corresponds to AP-AICH and a2 corresponds to CD-ICH.

$\tau_{p\text{-}p}$ = Time to next available access slot, between Access Preambles.

Minimum time = 15360 chips + 5120 chips X Tcpch

Maximum time = 5120 chips X 12 = 61440 chips

Actual time is time to next slot (which meets minimum time criterion) in allocated access slot subchannel group.

$\tau_{p\text{-}a1}$ = Time between Access Preamble and AP-AICH has two alternative values: 7680 chips or 12800 chips, depending on T_{cpch}

$\tau_{a1\text{-}cdp}$ = Time between receipt of AP-AICH and transmission of the CD Preamble $\tau_{a1\text{-}cdp}$ has a minimum value of $\tau_{a1\text{-}cdp,\ min}$ =7680 chips.

$\tau_{p\text{-}cdp}$ = Time between the last AP and CD Preamble. $\tau_{p\text{-}cdp}$ has a minimum value of $\tau_{p\text{-}cdp\text{-}min}$ which is either 3 or 4 access slots, depending on T_{cpch}

$\tau_{cdp\text{-}a2}$ = Time between the CD Preamble and the CD-ICH has two alternative values: 7680 chips or 12800 chips, depending on T_{cpch}

$\tau_{cdp\text{-}pcp}$ = Time between CD Preamble and the start of the Power Control Preamble is either 3 or 4 access slots, depending on $T_{cpch.}$

The message transmission shall start 0 or 8 slots after the start of the power control preamble depending on the length of the power control preamble.

Figure 30 illustrates the PCPCH/AICH timing relationship whenT_{cpch} is set to 0 and all access slot subchannels are available for PCPCH.