TSG-RAN Working Group 1 meeting #10 **_TSGR1#10(00)0046_**
Beijing, China
January 18 – January 21, 2000

Agenda item:

Source: Ericsson

Title: CR 25.215-029: Re-definition of timing measurements

Document for: Decision

Introduction

At the WG3#9 meeting, contribution R3-99I00 was approved. The contribution was also approved at RAN#6. In R3-99I00 the definition of the timing measurements "CFN-SFN observed time difference" and "SFN-SFN observed time

The basic change is that the main equation for "CFN-SFN observed time difference" is changed. The old equation was CFN=SFN + Offset, which lead to that Offset=CFN-SFN which equals the current definition of "CFN-SFN observed time difference". The new equation is CFN=SFN - Offset, note the difference in order, e.g. the sign is changed for the Offset in the equation. Hence Offset = SFN-CFN and therefore the existing measurement "CFN-SFN observed time difference" has to be updated to reflect Offset in the new definition. Analogous to this the SFN-SFN observed time difference type 1 is also changed.

One argument for the change given in R3-99I00 are:

- The old equation makes the initial DPCH 'advanced' instead of 'delayed', e.g. an increasing offset makes the DPCH to move leftwards in the timing diagram. It could be considered more natural if channels of different kind in the standard are delayed with increasing offset value instead of 'advanced'.

CFN-SFN observed time difference

Below in Figure 1 the old and the new definition of CFN-SFN observed time difference is shown. The denotations below refer to the new definition of the measurement.

T_m= (T_{UETx}-T_o) - T_{RxSFN}, given in chip units with the range [0…38400-1] chips

T_{UETx} is the time when the UE transmits an uplink DPCCH/DPDCH frame.

T_0 is a constant timing offset of 1024 chips used to set up the timing difference between the first received DPCH frame in the UE and the following uplink DPCCH/DPDCH frame.

T_{RxSFN} is time at the beginning of the neighbouring P-CCPCH frame received most recent in time before the time instant T_{UETx}-T_o in the UE. If the beginning of the neighbouring P-CCPCH frame is received exactly at T_{UETx}-T_o then T_{RxSFN}=T_{UETx}-T_o which leads to that T_m=0.

OFF=(SFN-CFN_{Tx}) mod 256, given in number of frames with the range [0..255] frames.

CFN_{Tx} is the connection frame number for the UE transmission of an uplink DPCCH/DPDCH frame at the time T_{UETx}.

SFN = the system frame number for the downlink P-CCPCH frame from the target cell in the UE that is beginning at the time T_{RxSFN}.

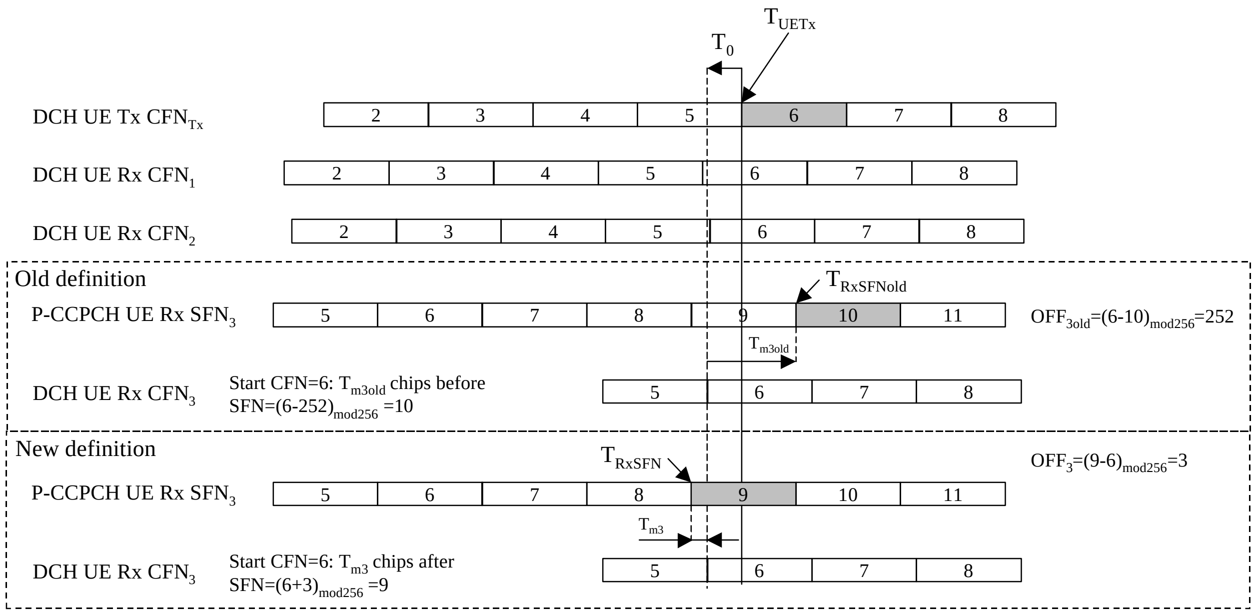

Figure 1 Measuring the CFN-SFN observed time difference

A simple rule for when Node Bj shall start the transmission of CFN=X to align the reception of DPDCH frames in the UE can be written as:

- Start transmission of frame X, T_{mj} chips after SFN_j mod 256=(X+OFF_j) mod 256.

It is also proposed to change the name of the measurement to “SFN-CFN observed time difference” to reflect the change of the definition.

SFN-SFN observed time difference

Below in Figure 2 the old and the new definition of SFN-SFN observed time difference type 1 is shown. The denotations below refer to the new definition of the measurement.

$\mathbf{T_m}$= T_{RxSFN1} - T_{RxSFN2}, given in chip units with the range [0…38400-1] chips

$\mathbf{T_{RxSFN1}}$ is the time at the beginning of a received neighbouring P-CCPCH frame from cell 1.

$\mathbf{T_{RxSFN2}}$ is time at the beginning of the neighbouring P-CCPCH frame from cell 2 received most recent in time before the time instant T_{RxSFN1} in the UE. If the beginning of the neighbouring P-CCPCH frame is received exactly at T_{RxSFN1} then T_{RxSFN2}= T_{RxSFN1} which leads to that T_m=0.

OFF=(SFN_2- SFN_1) mod 256, given in number of frames with the range [0..255] frames

$\mathbf{SFN_1}$ = the system frame number for downlink P-CCPCH frame from cell j in the UE at the time T_{RxSFN1}.

$\mathbf{SFN_2}$ = the system frame number for the downlink P-CCPCH frame from the target cell i in the UE that is beginning at the time T_{RxSFN2}.

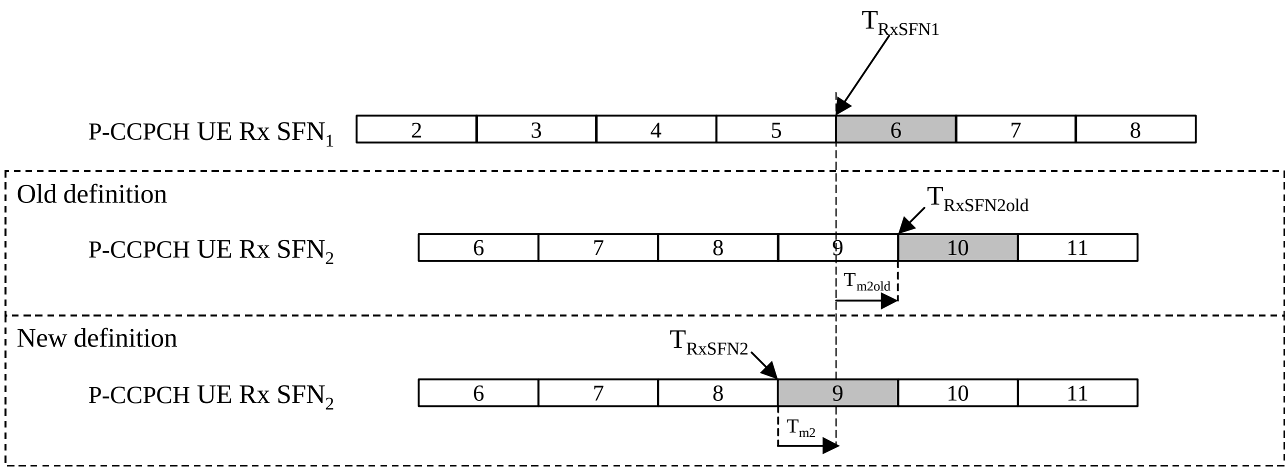

Figure 2 Measuring the SFN-SFN observed time difference (type 1)

Consider a UE in idle mode and is camping in cell i and measuring neighbouring cell j. If the UE shall set-up up a call directly in soft handover a simple rule for when Node Bi and Node Bj shall start their downlink transmission to align the the reception of DPDCH's in the UE can be:

- Node Bi shall align the DPDCH with the P-CCPCH frame timing and shall start the transmission at SFN_i=X.
- Node Bj shall start transmission of DPDCH'frames T_{mj} chips after SFN_j mod 256=(X+OFFj) mod 256.

3GPP TSG RAN WG1 Meeting #10
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Document ???00???
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 029 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] for information [ ] strategic [ ] non-strategic [ ] *(for SMG use only)*
list expected approval meeting # here ↑

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

Source: Ericsson **Date:** 1999-12-22

Subject: Re-definition of timing measurements

Work item:

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

F	Correction	X
A	Corresponds to a correction in an earlier release	
B	Addition of feature	
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: At the WG3#9 meeting the definition of CFN-SFN observed time difference and SFN-SFN observed time difference was changed. Therefore TS 25.215 needs to be updated accordingly.

Clauses affected: 5.1.11 CFN-SFN observed time difference
5.1.12 SFN-SFN observed time difference

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.

5.1.11 ~~C~~SFN-~~S~~CFN observed time difference

Definition	The ~~C~~SFN-~~S~~CFN observed time difference to cell is defined as: OFF×38400+ T_m, where: T_m= ~~T_{RxSFN} –~~ (T_{UETx}-T_0) - T_{RxSFN}, given in chip units with the range [0, 1, …, 38399] chips T_{UETx} is the time when the UE transmits an uplink DPCCH/DPDCH frame. T_0 is defined in TS 25.211 section 7.1.3. T_{RxSFN} is the time at the beginning of the ~~next received~~ neighbouring P-CCPCH frame received most recent in time before~~after~~ the time instant T_{UETx}-T_0 in the UE. If the ~~next~~beginning of the neighbouring P-CCPCH frame is received exactly at T_{UETx}-T_0 then T_{RxSFN}=T_{UETx}-T_0 (which leads to T_m=0). and OFF=(SFN-CFN_{Tx}~~-SFN~~) mod 256, given in number of frames with the range [0, 1, …, 255] frames CFN_{Tx} is the connection frame number for the UE transmission of an uplink DPCCH/DPDCH frame at the time T_{UETx}. SFN ~~=~~ is the system frame number for the neighbouring P-CCPCH frame received in the UE at the time T_{RxSFN}. In case the inter-frequency measurement is done with compressed mode, the value for the parameter OFF is always reported to be 0. In case that the SFN measurement indicator indicates that the UE does not need to read cell SFN of the target neighbour cell, the value of the parameter OFF is always be set to 0. *Note: In Compressed mode it is not required to read cell SFN of the target neighbour cell.*
Applicable for	Connected Inter, Connected Intra
Range/mapping	Time difference is given with the resolution of one chip with the range [0, …, 9830399] chips.

5.1.12 SFN-SFN observed time difference

Definition	**Type 1:** The SFN-SFN observed time difference to cell is defined as: OFF×38400+ T_m, where: T_m= $T_{RxSFNji}$ - $T_{RxSFNij}$, given in chip units with the range [0, 1, …, 38399] chips T_{RxSFNj} is the time at the beginning of a received neighbouring P-CCPCH frame from cell j. T_{RxSFNi} is time at the beginning of the ~~next received~~ neighbouring P-CCPCH frame from cell i received most recent in time before~~after~~ the time instant T_{RxSFNj} in the UE. If the next neighbouring P-CCPCH frame is received exactly at T_{RxSFNj} then T_{RxSFNj}= T_{RxSFNi} (which leads to T_m=0). and OFF=(SFN_{ji}- SFN_{ij}) mod 256, given in number of frames with the range [0, 1, …, 255] frames SFN_j ~~=~~ is the system frame number for downlink P-CCPCH frame from cell j in the UE at the time T_{RxSFNj}. SFN_i ~~=~~ is the system frame number for the P-CCPCH frame from cell i received in the UE at the time T_{RxSFNi}. **Type 2:** The relative timing difference between cell j and cell i, defined as $T_{CPICHRxj}$ - $T_{CPICHRxi}$, where: $T_{CPICHRxj}$ is the time when the UE receives one Primary CPICH slot from cell j $T_{CPICHRxi}$ is the time when the UE receives the Primary CPICH slot from cell i that is closest in time to the Primary CPICH slot received from cell j
Applicable for	**Type 1:** Idle, Connected Intra **Type 2:** Idle, Connected Intra, Connected Inter
Range/mapping	**Type 1:** Time difference is given with a resolution of one chip with the range [0, …, 9830399] chips. **Type 2:** Time difference is given with a resolution of 0.25 chip with the range [-1279.75, …, 1280] chips.