TSG-RAN Meeting #15 ***TSGRP#15(02) 0163***
Cheju, Korea, 5 - 8 March 2002

Title: **Agreed CRs to TS 25.402**

Source: **TSG-RAN WG3**

Agenda item: **7.3.3/7.3.4**

RP_Num	Tdoc_Num	Specification	CR_Num	Revision_ Num	3G_Release	CR_Subject	CR_Category	Cur_Ver_Num	Workitem
RP-020163	R3-020605	25.402	033		R99	Clarification on the DPCH frame offset	F	3.8.0	TEI
RP-020163	R3-020606	25.402	034		Rel-4	Clarification on the DPCH frame offset	A	4.3.0	TEI

CR-Form-v5

CHANGE REQUEST

⌘	**25.402**	**CR**	**33**	⌘ **rev**	**-**	⌘	Current version:	**3.8.0**	⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM [ ] ME/UE [X] Radio Access Network [X] Core Network [ ]

Title:	⌘	Clarification on the DPCH frame offset	
Source:	⌘	R-WG3	
Work item code:	⌘	TEI	***Date:*** ⌘ February, 2002
Category:	⌘	**F**	***Release:*** ⌘ R99
		Use one of the following categories: ***F*** *(essential correction)* ***A*** *(corresponds to a correction in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)* Detailed explanations of the above categories can be found in 3GPP TR 21.900.	*Use one of the following releases:* *2 (GSM Phase 2)* *R96 (Release 1996)* *R97 (Release 1997)* *R98 (Release 1998)* *R99 (Release 1999)* *REL-4 (Release 4)* *REL-5 (Release 5)*

Reason for change:	⌘	DPCH Frame Offset (or Chip Offset) is used by the Node Bs to send out the DL DPCH at approximately the same time and by the UE to know the beginning of the DPCH frame symbol without guessing when it is. To be specific, RRC (25.331) defines the IE *DPCH Frame Offset* (sent from UTRAN to UE) ranging from 0 to 38144 chips in unit of 256 chips. It is the same as the value of Chip Offset defined in 25.402 rounded to the closest 256 chip boundary. However, the usage of the DPCH Frame Offset (or Chip Offset) is not explained clearly in 25.402. This CR clearifies the usage of the parameter DPCH Frame Offset (Chip Offset).
Summary of change:	⌘	- A new parameter "FDD- DPCH Frame Offset" is added to subclause 5 Impact Analysis: Impact assessment towards the previous version of the specification (same release): This CR has no impact with the previous version of the specification (same release) because it only clarifies the DPCH frame offset parameter.
Consequences if not approved:	⌘	The parameter Chip Offset (or DPCH Frame Offset) will remain unclear.

Clauses affected:	⌘	5		
Other specs affected:	⌘	[X] Other core specifications [ ] Test specifications	⌘	CR on 25.402 Rel-4

	☐ O&M Specifications	
Other comments: ⌘		

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

… <Unaffected text are skipped> …

5 Synchronisation Counters and Parameters

This clause defines counters and parameters used in the different UTRAN synchronisation procedures.

The parameters used only by FDD has been indicated with the notation [FDD – parameter].

BFN Node B Frame Number counter. This is the Node B common frame number counter. [FDD -BFN is optionally frequency-locked to a Network sync reference].
Range: 0 to 4095 frames.

RFN RNC Frame Number counter. This is the RNC node common frame number counter. RFN is optionally frequency-locked to a Network sync reference.
Range: 0 to 4095 frames.

SFN Cell System Frame Number counter. SFN is sent on BCH. SFN is used for paging groups and system information scheduling etc.
In FDD SFN = BFN adjusted with T_cell.
In TDD, if Inter Node B synchronisation port is used, SFN is locked to the BFN (i.e. SFN mod 256 = BFN mod 256).
Range: 0 to 4095 frames.

CFN Connection Frame Number (counter). CFN is the frame counter used for the L2/transport channel synchronisation between UE and UTRAN. A CFN value is associated to each TBS and it is passed together with it through the MAC-L1 SAP. CFN provides a common frame reference (at L2) to be used e.g. for synchronised transport channel reconfiguration (see [2] and [3]).

The duration of the CFN cycle is longer than the maximum allowed transport delay between MAC and L1 (in UTRAN side, between SRNC and Node B, because the L1 functions that handle the transport channel synchronisation are in the Node B).
Range: 0 to 255 frames. When used for PCH the range is 0 to 4095 frames.

Frame Offset Frame Offset is a radio link specific L1 parameter used to map the CFN, used in the transport channel, into the SFN that defines the specific radio frame for the transmission on the air interface.

At the L1/L2 interaction, the mapping is performed as:

- SFN mod 256 = (CFN + Frame Offset) mod 256 (from L2 to L1) (5.1);

- CFN = (SFN - Frame Offset) mod 256 (from L1 to L2) (5.2).

The resolution of all three parameters is 1 frame. Frame Offset and CFN have the same range (0…255) and only the 8 least significant bits of the SFN are used. The operations above are modulo 256.

In the UTRAN, the Frame Offset parameter is calculated by the SRNC and provided to the Node B.

OFF The parameter OFF is calculated by the UE and reported to the UTRAN only when the UTRAN has requested the UE to send this parameter. In the neighbouring cell list, the UTRAN indicates for each cell if the Frame Offset is already known by the UTRAN or shall be measured and reported by the UE.

OFF has a resolution of 1 frame and a range of 0 to 255.

Five different cases are discerned related to the determination of the OFF value by the UE:

1. The UE changes from common channel state to dedicated channel state: 1 RL.
   In this case OFF is zero.

2. [FDD -The UE changes from common channel state to dedicated channel state: several RL's.
   OFF is in this case defined as being the difference between SFN of the candidate cells and the SFN of the camping cell. Again the UE sets OFF to zero for the cell to which the UE sends an UL RRC message (cell #1). For cells #2 to n, the UE sets OFF to the difference between the SFN of cell#2,n and the SFN of cell#1.
   This could be seen as if a virtual dedicated physical channel (DPCH) already is aligned with cell #1].

3. The UE adds another RL or moves to another cell in dedicated channel state.
   OFF is in this case defined as being the time difference between the CFN and the SFN of the cell in which the RL is to be added. In case this difference cannot be measured, a value as in [FDD - 13] [TDD - 14] shall be reported instead.

4. The UE is coming from another RAN and goes to dedicated channel state: 1 RL.
   This case is identical to case 1).

5. [FDD - The UE is coming from another RAN or another frequency in the same RAN and goes to dedicated channel state: several RL's.
   This case is identical to case 2), with one exception: OFF will not be zero for the cell to which the UE sends an UL RRC message (the measurement information will be received via the CN in this case) but for a reference cell selected by the UE. All other reported OFF values will be relative to the SFN of this selected reference cell].

[FDD – $DOFF_{FDD}$] The $DOFF_{FDD}$ (FDD Default DPCH Offset value) is used to define Frame Offset and Chip Offset at first RL setup. The resolution should be good enough to spread out load over Iub and load in Node B (based on certain load distributing algorithms). In addition it is used to spread out the location of Pilot Symbol in order to reduce the peak DL power since Pilot symbol is always transmitting at the fixed location within a slot (the largest number of chips for one symbol is 512 chips).

The SRNC sends a $DOFF_{FDD}$ parameter to the UE when the new RL will make the UE change its state (from Cell_FACH state or other when coming from another RAN) to Cell_DCH state.

Resolution: 512 chips; Range:0 to 599 (< 80 ms).

[TDD – $DOFF_{TDD}$] The $DOFF_{TDD}$ (TDD Default DPCH Offset value) is used to define Frame Offset at first RL setup, in order to spread out load over /Iur and load in Node B (based on certain load distributing algorithms).

The SRNC sends a $DOFF_{TDD}$ parameter to the UE when the new RL will make the UE change its state (from Cell_FACH state or other when coming from another RAN) to the Cell_DCH state.

Resolution: 1 frame; Range: 0 to 7 frames.

[FDD – Chip Offset] The Chip Offset is used as offset for the DL DPCH relative to the PCCPCH timing. The Chip Offset parameter has a resolution of 1 chip and a range of 0 to 38399 (< 10 ms).

The Chip Offset parameter is calculated by the SRNC and provided to the Node B.

Frame Offset + Chip Offset (sent via NBAP) are in Node B rounded together to closest 256 chip boundary. The 256 chip boundary is used regardless of the used spreading factor, also when the spreading factor is 512. The rounded value (which is calculated in Node B) controls the DL DPCH air-interface timing.

The "Frame Offset + Chip Offset" 256 chip boundary rounding rules for Node B to consider for each DL DPCH are:

1. IF (Frame Offset x 38 400 + Chip Offset) modulo 256 [chips] = {1..127} THEN round (Frame Offset x 38 400 + Chip Offset) modulo 256 frames down to closest 256 chip boundary.

2. IF (Frame Offset x 38 400 + Chip Offset) modulo 256 [chips] = {128..255} THEN round (Frame Offset x 38 400 + Chip Offset) modulo 256 frames up to closest 256 chip boundary.

3. IF (Frame Offset x 38 400 + Chip Offset) modulo 256 [chips] = 0 THEN "Frame Offset x 38 400 + Chip Offset" is already on a 256 chip boundary.

[FDD – DPCH Frame Offset]

The DPCH Frame Offset is used as offset for the DL DPCH relative to the PCCPCH timing at both the Node B and the UE. The DPCH Frame Offset parameter has a resolution of 256 chips and a range of 0 to 38144 chips (< 10 ms).

The DPCH Frame Offset is equivalent to Chip Offset rounded to the closest 256 chip boundary. It is calculated by the SRNC and sent to the UE by the SRNC for each radio link in the active set.

The DPCH Frame Offset controls the DL DPCH air-interface timing. It enables the DL DPCHs for radio links in the Active Set to be received at the UE at approximately the same time, which can then be soft combined during soft handover.

[FDD –Tm] The reported Tm parameter has a resolution of 1 chip and a range of 0 to 38399. The Tm shall always be sent by the UE.

Five different cases are discerned related to the determination of the Tm value by the UE:

1. The UE changes from common channel state to dedicated channel state: 1 RL
   In this case the Tm will be zero.

2. The UE changes from common channel state to dedicated channel state: several RL's.
   Tm is in this case defined as being the time difference between the received PCCPCH path of the source cell and the received PCCPCH paths of the other target cells. Again the UE sets Tm to zero for the cell to which the UE sends an UL RRC message (cell #1). For cells #2 to n, the UE sets Tm to the time difference of the PCCPCH reception timing of cell#2,n from the PCCPCH reception timing of cell#1.

3. The UE adds another RL in dedicated channel state (macro-diversity).
   Tm is in this case defined as being the time difference between "$T_{UETX} – T_o$" and the earliest received PCCPCH path of the target cell. T_{UETX} is the time when the UE transmits an uplink DPCCH frame, hence "$T_{UETX} – T_o$" is the nominal arrival time for the first path of a received DPCH.

4. The UE is coming from another RAN and goes to dedicated channel state: 1 RL.
   This case is identical to case 1.

5. The UE is coming from another RAN or another frequency in the same RAN and goes to dedicated channel state: several RL's.
   This case is identical to case 2, with one exception: Tm will not be zero for the cell to which the UE sends an UL RRC message (the measurement information will be received via the CN in this case) but for a reference cell selected by the UE. All other reported Tm values will be relative to the timing of the PCCPCH in this cell.

[FDD – T_cell] T_cell represents the Timing delay used for defining the start of SCH, CPICH and the DL Scrambling Code(s) in a cell relative BFN. The main purpose is to avoid having overlapping SCHs in different cells belonging to the same Node B. A SCH burst is 256 chips long. SFN in a cell is delayed T_cell relative BFN.

Resolution: 256 chips. Range: 0 .. 9 x 256 chips.

T1 RNC specific frame number (RFN) that indicates the time when RNC sends the DL Node Synchronisation control frame through the SAP to the transport layer.

Resolution: 0.125 ms; Range: 0-40959.875 ms.

T2	Node B specific frame number (BFN) that indicates the time when Node B receives the correspondent DL Node Synchronisation control frame through the SAP from the transport layer. Resolution: 0.125 ms; Range: 0-40959.875 ms.
T3	Node B specific frame number (BFN) that indicates the time when Node B sends the UL Node Synchronisation control frame through the SAP to the transport layer. Resolution: 0.125 ms; Range: 0-40959.875 ms.
T4	RNC specific frame number (RFN) that indicates the time when RNC receives the UL Node Synchronisation control frame. Used in RNC locally. Not standardised over Iub.
TOAWS	TOAWS (Time of Arrival Window Startpoint) is the window startpoint. DL data frames are expected to be received after this window startpoint. TOAWS is defined with a positive value relative Time of Arrival Window Endpoint (TOAWE) (see Figure 10). A data frame arriving before TOAWS gives a Timing Adjustment Control frame response. The resolution is 1 ms, the range is: {0 .. CFN length/2 –1 ms}.
TOAWE	TOAWE (Time of Arrival Window Endpoint) is the window endpoint. DL data frames are expected to be received before this window endpoint (see Figure 10). TOAWE is defined with a positive value relative Latest Time of Arrival (LTOA). A data frame arriving after TOAWE gives a Timing Adjustment Control frame response. The resolution is 1 ms, the range is: {0 .. CFN length –1 ms}.
LTOA	LTOA (Latest Time of Arrival) is the latest time instant a Node B can receive a data frame and still be able to process it. Data frames received after LTOA can not be processed (discarded). LTOA is defined internally in Node B to be a processing time before the data frame is sent in air-interface. The processing time (Tproc) could be vendor and service dependent. LTOA is the reference for TOAWE (see Figure 14).
TOA	TOA (Time of Arrival) is the time difference between the TOAWE and when a data frame is received. A positive TOA means that data frames are received before TOAWE, a negative TOA means that data frames are received after TOAWE. Data frames that are received after TOAWE but before LTOA are processed by Node B. TOA has a resolution of 125 µs. TOA is positive when data frames are received before TOAWE (see Figure 12). The range is: {0 .. +CFN length/2 –125 µs}. TOA is negative when data frames are received after TOAWE. The range is: {–125 µs .. –CFN length/2}.

… <Unaffected text are skipped> …

3GPP TSG-RAN WG 3 Meeting #27
Orlando, USA, 18-22 February 2002

Tdoc R3-020606

CR-Form-v5

CHANGE REQUEST

⌘	25.402	CR	34	⌘ rev	-	⌘	Current version:	4.3.0	⌘

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Proposed change affects: ⌘ (U)SIM [ ] ME/UE [X] Radio Access Network [X] Core Network [ ]

Title:	⌘	Clarification on the DPCH frame offset
Source:	⌘	R-WG3
Work item code:	⌘	TEI
Date:	⌘	February, 2002
Category:	⌘	**A**
Release:	⌘	Rel-4

Use one of the following categories:
- ***F*** *(essential correction)*
- ***A*** *(corresponds to a correction in an earlier release)*
- ***B*** *(addition of feature),*
- ***C*** *(functional modification of feature)*
- ***D*** *(editorial modification)*

Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
- *2 (GSM Phase 2)*
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- *R97 (Release 1997)*
- *R98 (Release 1998)*
- *R99 (Release 1999)*
- *REL-4 (Release 4)*
- *REL-5 (Release 5)*

Reason for change:	⌘	DPCH Frame Offset (or Chip Offset) is used by the Node Bs to send out the DL DPCH at approximately the same time and by the UE to know the beginning of the DPCH frame symbol without guessing when it is. To be specific, RRC (25.331) defines the IE *DPCH Frame Offset* (sent from UTRAN to UE) ranging from 0 to 38144 chips in unit of 256 chips. It is the same as the value of Chip Offset defined in 25.402 rounded to the closest 256 chip boundary. However, the usage of the DPCH Frame Offset (or Chip Offset) is not explained clearly in 25.402. This CR clearifies the usage of the parameter DPCH Frame Offset (Chip Offset).
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Clauses affected:	⌘	5		
Other specs affected:	⌘	[X] Other core specifications [ ] Test specifications	⌘	CR on 25.402 R99

	☐ O&M Specifications	
Other comments: ⌘		

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This clause defines counters and parameters used in the different UTRAN synchronisation procedures.

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Range: 0 to 4095 frames.

RFN RNC Frame Number counter. This is the RNC node common frame number counter. RFN is optionally frequency-locked to a Network sync reference.
Range: 0 to 4095 frames.

SFN Cell System Frame Number counter. SFN is sent on BCH. SFN is used for paging groups and system information scheduling etc.
In FDD SFN = BFN adjusted with T_cell.
In TDD, if Inter Node B synchronisation port is used, SFN is locked to the BFN (i.e. SFN mod 256 = BFN mod 256).
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CFN Connection Frame Number (counter). CFN is the frame counter used for the L2/transport channel synchronisation between UE and UTRAN. A CFN value is associated to each TBS and it is passed together with it through the MAC-L1 SAP. CFN provides a common frame reference (at L2) to be used e.g. for synchronised transport channel reconfiguration (see [2] and [3]).

The duration of the CFN cycle is longer than the maximum allowed transport delay between MAC and L1 (in UTRAN side, between SRNC and Node B, because the L1 functions that handle the transport channel synchronisation are in the Node B).
Range: 0 to 255 frames. When used for PCH the range is 0 to 4095 frames.

Frame Offset Frame Offset is a radio link specific L1 parameter used to map the CFN, used in the transport channel, into the SFN that defines the specific radio frame for the transmission on the air interface.

At the L1/L2 interaction, the mapping is performed as:

- SFN mod 256 = (CFN + Frame Offset) mod 256 (from L2 to L1) (5.1);

- CFN = (SFN - Frame Offset) mod 256 (from L1 to L2) (5.2).

The resolution of all three parameters is 1 frame. Frame Offset and CFN have the same range (0…255) and only the 8 least significant bits of the SFN are used. The operations above are modulo 256.

In the UTRAN, the Frame Offset parameter is calculated by the SRNC and provided to the Node B.

OFF The parameter OFF is calculated by the UE and reported to the UTRAN only when the UTRAN has requested the UE to send this parameter. In the neighbouring cell list, the UTRAN indicates for each cell if the Frame Offset is already known by the UTRAN or shall be measured and reported by the UE.

OFF has a resolution of 1 frame and a range of 0 to 255.

Five different cases are discerned related to the determination of the OFF value by the UE:

1. The UE changes from common channel state to dedicated channel state: 1 RL.
   In this case OFF is zero.

2. [FDD -The UE changes from common channel state to dedicated channel state: several RL's.
   OFF is in this case defined as being the difference between SFN of the candidate cells and the SFN of the camping cell. Again the UE sets OFF to zero for the cell to which the UE sends an UL RRC message (cell #1). For cells #2 to n, the UE sets OFF to the difference between the SFN of cell#2,n and the SFN of cell#1.
   This could be seen as if a virtual dedicated physical channel (DPCH) already is aligned with cell #1].

3. The UE adds another RL or moves to another cell in dedicated channel state.
   OFF is in this case defined as being the time difference between the CFN and the SFN of the cell in which the RL is to be added. In case this difference cannot be measured, a value as in [FDD - 13] [TDD - 14] shall be reported instead.

4. The UE is coming from another RAN and goes to dedicated channel state: 1 RL.
   This case is identical to case 1).

5. [FDD - The UE is coming from another RAN or another frequency in the same RAN and goes to dedicated channel state: several RL's.
   This case is identical to case 2), with one exception: OFF will not be zero for the cell to which the UE sends an UL RRC message (the measurement information will be received via the CN in this case) but for a reference cell selected by the UE. All other reported OFF values will be relative to the SFN of this selected reference cell].

[FDD – $DOFF_{FDD}$] The $DOFF_{FDD}$ (FDD Default DPCH Offset value) is used to define Frame Offset and Chip Offset at first RL setup. The resolution should be good enough to spread out load over Iub and load in Node B (based on certain load distributing algorithms). In addition it is used to spread out the location of Pilot Symbol in order to reduce the peak DL power since Pilot symbol is always transmitting at the fixed location within a slot (the largest number of chips for one symbol is 512 chips).

The SRNC sends a $DOFF_{FDD}$ parameter to the UE when the new RL will make the UE change its state (from Cell_FACH state or other when coming from another RAN) to Cell_DCH state.

Resolution: 512 chips; Range:0 to 599 (< 80 ms).

[TDD – $DOFF_{TDD}$] The $DOFF_{TDD}$ (TDD Default DPCH Offset value) is used to define Frame Offset at first RL setup, in order to spread out load over /Iur and load in Node B (based on certain load distributing algorithms).

The SRNC sends a $DOFF_{TDD}$ parameter to the UE when the new RL will make the UE change its state (from Cell_FACH state or other when coming from another RAN) to the Cell_DCH state.

Resolution: 1 frame; Range: 0 to 7 frames.

[FDD – Chip Offset] The Chip Offset is used as offset for the DL DPCH relative to the PCCPCH timing. The Chip Offset parameter has a resolution of 1 chip and a range of 0 to 38399 (< 10 ms).

The Chip Offset parameter is calculated by the SRNC and provided to the Node B.

Frame Offset + Chip Offset (sent via NBAP) are in Node B rounded together to closest 256 chip boundary. The 256 chip boundary is used regardless of the used spreading factor, also when the spreading factor is 512. The rounded value (which is calculated in Node B) controls the DL DPCH air-interface timing.

The "Frame Offset + Chip Offset" 256 chip boundary rounding rules for Node B to consider for each DL DPCH are:

1. IF (Frame Offset x 38 400 + Chip Offset) modulo 256 [chips] = {1..127} THEN round (Frame Offset x 38 400 + Chip Offset) modulo 256 frames down to closest 256 chip boundary.

2. IF (Frame Offset x 38 400 + Chip Offset) modulo 256 [chips] = {128..255} THEN round (Frame Offset x 38 400 + Chip Offset) modulo 256 frames up to closest 256 chip boundary.

3. IF (Frame Offset x 38 400 + Chip Offset) modulo 256 [chips] = 0 THEN "Frame Offset x 38 400 + Chip Offset" is already on a 256 chip boundary.

[FDD – DPCH Frame Offset]

The DPCH Frame Offset is used as offset for the DL DPCH relative to the PCCPCH timing at both the Node B and the UE. The DPCH Frame Offset parameter has a resolution of 256 chips and a range of 0 to 38144 chips (< 10 ms).

The DPCH Frame Offset is equivalent to Chip Offset rounded to the closest 256 chip boundary. It is calculated by the SRNC and sent to the UE by the SRNC for each radio link in the active set.

The DPCH Frame Offset controls the DL DPCH air-interface timing. It enables the DL DPCHs for radio links in the Active Set to be received at the UE at approximately the same time, which can then be soft combined during soft handover.

[FDD –Tm] The reported Tm parameter has a resolution of 1 chip and a range of 0 to 38399. The Tm shall always be sent by the UE.

Five different cases are discerned related to the determination of the Tm value by the UE:

1. The UE changes from common channel state to dedicated channel state: 1 RL
   In this case the Tm will be zero.

2. The UE changes from common channel state to dedicated channel state: several RL's.
   Tm is in this case defined as being the time difference between the received PCCPCH path of the source cell and the received PCCPCH paths of the other target cells. Again the UE sets Tm to zero for the cell to which the UE sends an UL RRC message (cell #1). For cells #2 to n, the UE sets Tm to the time difference of the PCCPCH reception timing of cell#2,n from the PCCPCH reception timing of cell#1.

3. The UE adds another RL in dedicated channel state (macro-diversity).
   Tm is in this case defined as being the time difference between "$T_{UETX} – T_o$" and the earliest received PCCPCH path of the target cell. T_{UETX} is the time when the UE transmits an uplink DPCCH frame, hence "$T_{UETX} – T_o$" is the nominal arrival time for the first path of a received DPCH.

4. The UE is coming from another RAN and goes to dedicated channel state: 1 RL.
   This case is identical to case 1.

5. The UE is coming from another RAN or another frequency in the same RAN and goes to dedicated channel state: several RL's.
   This case is identical to case 2, with one exception: Tm will not be zero for the cell to which the UE sends an UL RRC message (the measurement information will be received via the CN in this case) but for a reference cell selected by the UE. All other reported Tm values will be relative to the timing of the PCCPCH in this cell.

[FDD – T_cell] T_cell represents the Timing delay used for defining the start of SCH, CPICH and the DL Scrambling Code(s) in a cell relative BFN. The main purpose is to avoid having overlapping SCHs in different cells belonging to the same Node B. A SCH burst is 256 chips long. SFN in a cell is delayed T_cell relative BFN.

Resolution: 256 chips. Range: 0 .. 9 x 256 chips.

T1 RNC specific frame number (RFN) that indicates the time when RNC sends the DL Node Synchronisation control frame through the SAP to the transport layer.

Resolution: 0.125 ms; Range: 0-40959.875 ms.

T2	Node B specific frame number (BFN) that indicates the time when Node B receives the correspondent DL Node Synchronisation control frame through the SAP from the transport layer. Resolution: 0.125 ms; Range: 0-40959.875 ms.
T3	Node B specific frame number (BFN) that indicates the time when Node B sends the UL Node Synchronisation control frame through the SAP to the transport layer. Resolution: 0.125 ms; Range: 0-40959.875 ms.
T4	RNC specific frame number (RFN) that indicates the time when RNC receives the UL Node Synchronisation control frame. Used in RNC locally. Not standardised over Iub.
TOAWS	TOAWS (Time of Arrival Window Startpoint) is the window startpoint. DL data frames are expected to be received after this window startpoint. TOAWS is defined with a positive value relative Time of Arrival Window Endpoint (TOAWE) (see Figure 10). A data frame arriving before TOAWS gives a Timing Adjustment Control frame response. The resolution is 1 ms, the range is: {0 .. CFN length/2 –1 ms}.
TOAWE	TOAWE (Time of Arrival Window Endpoint) is the window endpoint. DL data frames are expected to be received before this window endpoint (see Figure 10). TOAWE is defined with a positive value relative Latest Time of Arrival (LTOA). A data frame arriving after TOAWE gives a Timing Adjustment Control frame response. The resolution is 1 ms, the range is: {0 .. CFN length –1 ms}.
LTOA	LTOA (Latest Time of Arrival) is the latest time instant a Node B can receive a data frame and still be able to process it. Data frames received after LTOA can not be processed (discarded). LTOA is defined internally in Node B to be a processing time before the data frame is sent in air-interface. The processing time (Tproc) could be vendor and service dependent. LTOA is the reference for TOAWE (see Figure 14).
TOA	TOA (Time of Arrival) is the time difference between the TOAWE and when a data frame is received. A positive TOA means that data frames are received before TOAWE, a negative TOA means that data frames are received after TOAWE. Data frames that are received after TOAWE but before LTOA are processed by Node B. TOA has a resolution of 125 µs. TOA is positive when data frames are received before TOAWE (see Figure 12). The range is: {0 .. +CFN length/2 –125 µs}. TOA is negative when data frames are received after TOAWE. The range is: {–125 µs .. –CFN length/2}.

… <Unaffected text are skipped> …