TSG-RAN Meeting #15
Jeju-do, Korea, 5 - 8 March 2002

RP-020090

Title: **Agreed CRs (Rel-5) for WI "UE positioning enhancements for 1.28 Mcps TDD"**

Source: **TSG-RAN WG2**

Agenda item: **9.5.2**

Doc-1st-	Status-	Spec	CR	Rev	Phase	Subject	Cat	Version	Versio	Workite
R2-020251	agreed	25.302	118		Rel-5	Introduction of AOA measurement for 1.28Mcps TDD	B	4.3.0	5.0.0	LCS-128Pos
R2-020252	agreed	25.305	075		Rel-5	UE Positioning for 1.28 Mcps TDD	B	5.3.0	5.4.0	LCS-128Pos
R2-020551	agreed	25.331	1225	1	Rel-5	Introduction of the parameters of OTDOA with IPDL for 1.28 Mcps TDD	B	4.3.0	5.0.0	LCS-128Pos

3GPP TSG-RAN WG2 Meeting#27
Orlando, USA, 18-22 February 2002

R2-020251

CR-Form-v3

CHANGE REQUEST

⌘ **25.302** **CR** **118** ⌘ rev **-** ⌘ Current version: **4.3.0** ⌘

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Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☒ Core Network ☐

Title:	⌘	Introduction of AOA measurement for 1.28Mcps TDD
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	LCS-128Pos
Date:	⌘	21-01-2002
Category:	⌘	**B**
Release:	⌘	REL-5

Use one of the following categories:
- ***F*** *(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:	⌘	Introduction of AOA measurement for 1.28Mcps TDD
Summary of change:	⌘	Add AOA measurement on UTRAN side.
Consequences if not approved:	⌘	

Clauses affected:	⌘	9.3.23 (new)		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments:	⌘			

9.3.23 Angle of Arrival (AOA) for 1.28 Mcps TDD

Measurement	Angle of Arrival (AOA) for 1.28Mcps TDD.
Source	L1 (Node B)
Destination	RRC(RNC)
Reporting Trigger	event-triggered, on-demand
Description	AOA defines the estimated angle of a user with respect to a reference direction. The reference direction for this measurement shall be the North, positive in a counter-clockwise direction. The AOA is determined at the UTRAN access point antenna for an UL channel corresponding to this UE.

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CHANGE REQUEST

⌘ **25.331** **CR** **1225** ⌘ **rev** **r1** ⌘ Current version: **4.3.0** ⌘

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

Title:	⌘	Introduction of the parameters of OTDOA with IPDL for 1.28 Mcps TDD
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	LCS-128Pos
Date:	⌘	11-12-01
Category:	⌘	**B**
Release:	⌘	REL-5

Use one of the following categories:
F *(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:	⌘	This CR collects the changes necessary for OTDOA with IPDL for 1.28Mcps TDD in TS25.331.
Summary of change:	⌘	--Introducing the related parameters of OTDOA with IPDL for UE Positioning Enhancements for 1.28Mcps TDD 1.28 Mcps TDD specific parameter handling included
Consequences if not approved:	⌘	Feature not introduced

Clauses affected:	⌘	8.6.7.19.2, 8.6.7.19.2a
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ 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.

8.6.7.19.2 UE positioning OTDOA assistance data for UE-assisted

If IE "UE positioning OTDOA reference cell info for UE-assisted" is received in System Information Block type 15.4 or in the MEASUREMENT CONTROL message, the UE shall update the variable UE_POSITIONING_OTDOA_DATA_UE_ASSISTED accordingly. The UE shall:

- store received cell information in the UE positioning reference cell info in the variable UE_POSITIONING_OTDOA_DATA_UE_ASSISTED, overwriting any existing information.

If IE "UE positioning OTDOA neighbour cell list for UE-assisted" is received in System Information Block type 15.4 or in the MEASUREMENT CONTROL message, the UE shall update the variable UE_POSITIONING_OTDOA_DATA_UE_ASSISTED accordingly. The UE shall:

- store received cell information in the neighbour cell info list in the variable UE_POSITIONING_OTDOA_DATA_UE_ASSISTED, overwriting any existing information.

If, according to its capabilities, UE does not support IPDLs and if IE "IPDL parameters" is received for the reference or any of the neighbour cells, the UE shall:

- ignore this IE.

In 1.28 Mcps TDD if the IE “IPDL parameters” is received and the UE supports IPDLs the UE shall:

- ignore the IE IP_Slot
- if the IE “IP_PCCPCH” is set to FALSE
  - configure the physical layer with IP_Sub to be first subframe according to [33]
- if the IE “IP_PCCPCH” is set to TRUE
  - configure the physical layer with IP_Sub to be second subframe according to [33]
- if the IE “IP_PCCPCH” is absent
  - configure the physical layer with IP_Sub to use both subframes according to [33]

If IE "UE positioning measurement" is received in the MEASUREMENT CONTROL message, the UE shall also perform the following consistency checks:

- if IE "Positioning Methods" is set to "OTDOA" or "Cell ID":
  - if IE "UE positioning OTDOA reference cell info for UE-assisted" is not included and if UE positioning OTDOA reference cell info for UE-assisted in variable UE_POSITIONING_OTDOA_DATA_UE_ASSISTED is empty:
    - set the variable CONFIGURATION_INCOMPLETE to TRUE.
- if IE "Positioning Methods" is set to "OTDOA":
  - if IE "UE positioning OTDOA neighbour cell list for UE-assisted" is not included and if less than two neighbour cells are stored in UE positioning OTDOA neighbour cell info list for UE-assisted in variable UE_POSITIONING_OTDOA_DATA_UE_ASSISTED:
    - set the variable CONFIGURATION_INCOMPLETE to TRUE.

8.6.7.19.2a UE positioning OTDOA assistance data for UE-based

The UE shall:

- if IE "UE positioning OTDOA reference cell info for UE-based" is received in System Information Block type 15.5 or in the MEASUREMENT CONTROL message or in the ASSISTANCE DATA DELIVERY:
  - update the variable UE_POSITIONING_OTDOA_DATA_UE_BASED accordingly;

- store received cell information in the UE positioning reference cell info for UE-based in the variable UE_POSITIONING_OTDOA_DATA_UE_BASED, overwriting any existing information.

- if IE "UE positioning OTDOA neighbour cell list for UE-based" is received in System Information Block type 15.5 or in the MEASUREMENT CONTROL message or in the ASSISTANCE DATA DELIVERY:

  - update the variable UE_POSITIONING_OTDOA_DATA_UE_BASED accordingly;

  - store received cell information in the neighbour cell info list for UE-based in the variable UE_POSITIONING_OTDOA_DATA_UE_BASED, overwriting any existing information.

- if, according to its capabilities, UE does not support IPDLs and if IE "IPDL parameters" is received for the reference or any of the neighbour cells::

  - ignore this IE.

In 1.28 Mcps TDD if the IE “IPDL parameters” is received and the UE supports IPDLs the UE shall:

- ignore the IE “IP_Slot”

- if the IE “IP_PCCPCH” is set to FALSE

  - configure the physical layer with IP_Sub to be first subframe according to [33]

- if the IE “IP_PCCPCH” is set to TRUE

  - configure the physical layer with IP_Sub to be second subframe according to [33]

- if the IE “IP_PCCPCH” is absent

  - configure the physical layer with IP_Sub to use both subframes according to [33]

- if IE "UE positioning measurement" is received in the MEASUREMENT CONTROL message:

  - also perform the following consistency checks:

    - if IE "Positioning Methods" is set to "OTDOA":

      - if IE "UE positioning OTDOA reference cell info for UE-based" is not included and if UE positioning OTDOA reference cell info for UE-based in variable UE_POSITIONING_OTDOA_DATA_UE_BASED is empty:

        - set the variable CONFIGURATION_INCOMPLETE to TRUE.

    - if IE "Positioning Methods" is set to "OTDOA":

      - if IE "UE positioning OTDOA neighbour cell list for UE-based" is not included and if less than two neighbour cells are stored in UE positioning OTDOA neighbour cell info list for UE-based in variable UE_POSITIONING_OTDOA_DATA_UE_BASED:

        - set the variable CONFIGURATION_INCOMPLETE to TRUE.

      - if IE "Method Type" is set to "UE based":

        - if IE "UE positioning OTDOA reference cell info for UE-based" is included and if IE "Cell Position" for the reference cell is not included:

          - set the variable CONFIGURATION_INCOMPLETE to TRUE.

        - if the IE "UE positioning OTDOA neighbour cell list for UE-based" is included and if cell position of less than two neighbour cells of the cells included in this IE and stored in variable UE_POSITIONING_OTDOA_DATA_UE_BASED are different and if those cell positions are not different to the one of the reference cell stored in variable UE_POSITIONING_OTDOA_DATA_UE_BASED:

          - set the variable CONFIGURATION_INCOMPLETE to TRUE.

- if the IE "UE positioning OTDOA neighbouring cell list for UE-based " is included and only two neighbour cells are included or stored in variable UE_POSITIONING_OTDOA_DATA_UE_BASED and if the IE "Round Trip Time" is neither included for the neighbour cells nor for the reference cell info:

  - set the variable CONFIGURATION_INCOMPLETE to TRUE.

3GPP TSG-RAN WG2 Meeting#26 ***R2-020252***

Orlando, USA, 18th – 22nd February 2002

CR-Form-v3

CHANGE REQUEST

⌘ **25.305** **CR** **075** ⌘ rev **-** ⌘ Current version: **5.3.0** ⌘

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

Title:	⌘	Including IPDL, UE Timing Advance and Angle of Arrival for 1.28 Mcps TDD.
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	LCS-128Pos
Date:	⌘	2.02.2002
Category:	⌘	**B**
Release:	⌘	REL-5

Use one of the following categories:
- ***F*** *(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:	⌘	Addition of statements relating to IPDL, timing advance and angle of arrival for 1.28 Mcps TDD.
Summary of change:	⌘	(i) An editorial change to remove the redundant phrase 'in release 99' from section 4.1. (ii) The use of the internal measurement T_{ADV} and Node B angle of arrival measurement is added to section 8.1. (iii) An indication that certain IPDL parameters do not apply to 1.28 Mcps TDD is added in section 9.5. (iv) An indication that the internal measurement T_{ADV} and Node B angle of arrival measurement can be used with OTDOA is added in section 9.6.
Consequences if not approved:	⌘	The operation of 1.28 Mcps TDD will not be described correctly for Release 5.

Clauses affected:	⌘	4.1, 8.1, 9.5.1, 9.6
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications
	⌘	

Other comments: ⌘

4 Main concepts and requirements

The stage 1 LCS description providing an overall service description and the core requirements for the LCS at the service level is given in [5]. The stage 2 LCS description providing a system functional model for the whole system, the LCS system architecture, state descriptions and message flows are described in [13].

By measuring radio signals the capability to determine the geographic position of the UE shall be provided. The position information may be requested by and reported to a client (application) associated with the UE, or by a client within or attached to the CN. The position information may also be utilised internally by UTRAN, for example, for location-assisted handover or to support other features such as home location billing. The position information shall be reported in standard formats, such as those for cell based or geographical co-ordinates, together with the time-of-day and the estimated errors (uncertainty) of the position of the UE. Restrictions on the geographic shape encoded within the 'position information' parameter may exist for certain LCS client types. The SRNC shall comply with any shape restrictions defined in GSM/UMTS and, in a particular country, with any shape restrictions defined for a specific LCS client type in relevant national standards. For example, in the US, national interim standard TIA/EIA/IS-J-STD-036 restricts the geographic shape for an emergency services LCS client to minimally either an "ellipsoid point" or an "ellipsoid point with uncertainty circle and confidence" as defined in [11].

It shall be possible for the majority of the UE (active or inactive) within a network to use the feature without compromising the radio transmission or signalling capabilities of the UTRAN.

The uncertainty of the position measurement shall be network implementation dependent at the choice of the network operator. The uncertainty may vary between networks as well as from one area within a network to another. The uncertainty may be hundreds of metres in some areas and only a few metres in others. In the event that the position measurement is also a UE-assisted process, the uncertainty may also depend on the capabilities of the UE. In some jurisdictions, there is a regulatory requirement for location service accuracy that is part of an emergency service. Further details of the accuracy requirements can be found in [5].

The uncertainty of the position information is dependent on the method used, the position of the UE within the coverage area and the activity of the UE. Several design options of the UTRAN system (e.g. size of cell, adaptive antenna technique, path loss estimation, timing accuracy, Node B surveys) shall allow the network operator to choose a suitable and cost effective UE Positioning method for their market.

There are many different possible uses for the positioning information. The positioning functions may be used internally by the UTRAN, by value-added network services, by the UE itself or through the network, and by "third party" services. The feature may also be used by an emergency service (which may be mandated or "value-added"), but the location service is not exclusively for emergencies.

The UTRAN is a new radio system design without a pre-existing deployment of UE operating according to the radio interface. This freedom from legacy equipment enables the location service feature design to make use of appropriate techniques to provide the most accurate results. The technique must also be a cost-effective total solution, must allow evolution to meet evolving service requirements and be able to take advantage of advances in technology over the lifetime of UTRAN deployments.

4.1 Assumptions

As a basis for the operation of UE Positioning in UTRAN the following assumptions apply:

- the UE shall support SFN-SFN observed time difference type 2 measurements, thus support of Network-based OTDOA without idle periods is mandatory in the UE;

- both TDD and FDD will be supported ~~in Release '99~~;

- the provision of the UE Positioning function in UTRAN is optional through support of the specified method(s) in Node B, the SAS, and the RNC;

- UE Positioning is applicable to any target UE whether or not the UE supports LCS, but with restrictions on use of certain positioning method depending on UE capability as defined in [17];

- The SMLC may be either a stand-alone network element (SAS) or an internal function of the RNC;

- UE Positioning information is transported between RNCs via the Iur interface independent of whether the SMLC is a stand-alone network element (SAS) or an internal function of the RNC;

- the positioning information may be used for internal system operations to improve system performance;

- different types of LMU are defined, e.g. a standalone LMU and/or LMU integrated in Node B;

- the UE Positioning architecture and functions shall include the option to accommodate several techniques of measurement and processing to ensure evolution to follow changing service requirements and to take advantage of advancing technology;

- the RNC manages the overall coordination and scheduling of resources required to perform positioning of a UE. It may also calculates the final position estimate and accuracy.

8.1 Cell ID determination

In order for the SRNC to determine the cell ID when an UE Positioning request is received, additional operations may be needed depending on the operational status of the UE.

Figure 8.1 illustrates the procedure for the cell ID based positioning method when the UE is in different RRC states. When the LCS request is received from the CN the SRNC checks the state of the target UE. If the UE is in a state where the cell ID is available, the target cell ID is chosen as the basis for the UE Positioning. In states where the cell ID is not available, the UE is paged, so that SRNC can establish the cell with which the target UE is associated. In order to improve the accuracy of the LCS response the SRNC may also request RTT (FDD only) or RX Timing Deviation (TDD only) or Angle of Arrival (1.28 Mcps TDD only) measurements from the Node B or LMU associated with the cell ID. The SRNC may also map the cell ID to a corresponding SAI to match the service coverage information available in the CN. In the case of 1.28 Mcps TDD, in order to improve the accuracy of the LCS response, the SRNC may request that the UE reports the internal measured result 'timing advance'. This step is not illustrated in Figure 8.1.

The cell ID based method shall determine the position of the UE regardless of the UE RRC mode (i.e. connected or idle).

9.5 OTDOA-IPDL and OTDOA Modes

There are two modes of operation for the OTDOA-IPDL and OTDOA methods.

In the *UE-assisted* mode, the UE measures the difference in time of arrival of several cells and signals the measurement results to the network, where the SRNC or SAS carries out the position calculation.

In the *UE-based* mode, the UE makes the measurements and also carries out the position calculation, and thus requires additional information (such as the position of the measured Node Bs) that is required for the position calculation. This information is provided by the System Information Broadcast.

9.5.1 Information to be transferred between UTRAN elements

Table 9.1 lists the required information for both UE-assisted and UE-based modes that may be sent from UTRAN to UE. The required information can be signalled to the UE either in a broadcast channel or partly also as dedicated signalling.

Table 9.1: Information to be transferred from UTRAN to UE ('Yes' = information required, 'No' = Information not required)

Information	UE-assisted	UE-based
Intra frequency Cell Info (neighbour list)	Yes	Yes
Ciphering information for UE Positioning (see note)	No	Yes
Measurement control information (idle period locations)	Yes	Yes
Sectorisation of the neighbouring cells	No	Yes
Measurements results needed for RTD values for Cells mentioned at Intra frequency Cell Info	No	Yes
RTD accuracy	No	Yes
Measured roundtrip delay for primary serving cell	No	Yes
Geographical position of the primary serving cell	No	Yes
Relative neighbour cell geographical position	No	Yes
Accuracy range of the geographic position values	No	Yes
IPDL parameters	Yes	Yes
IPDL-Alpha parameter for Open Loop Power Control when using IPDLs in 3.84 Mcps TDD	Yes	Yes
Maximum Power increase the UE may use when using IPDLs in 3.84 Mcps TDD	Yes	Yes
NOTE: The idea behind UE Positioning specific ciphering information is e.g. that the operator can sell information that the UE needs for calculating its position. For reference in the GSM world see [4].		

When IPDLs for 3.84 Mcps TDD are applied and the IPDLs occur in the slot carrying the PCCPCH, a special alpha parameter needs to be signalled from SRNC to the UE in order to take the impact of the IPDLs on the Open Loop Power Control into account. Additionally the UE shall not increase the transmit power by a certain value between an IPDL slot and the next slot carrying the PCCPCH when IPDLs are applied within a cell. OTDOA for 1.28 Mcps TDD is based on DwPTS and so these requirements do not apply.

The information that may be signalled from UE to SRNC is listed in table 9.2.

Table 9.2: Information to be transferred from UE to SRNC

Information	UE-assisted	UE-based
OTDOA measurement results	Yes	No
OTDOA measurement accuracy	Yes	No
UE geographical position	No	Yes
Position accuracy indicator (based on the signalled and measurement accuracies)	No	Yes

Table 9.3 shows the information that may be transferred from Node B to its CRNC. If the CRNC is not the SRNC the information is also forwarded from CRNC to SRNC.

Table 9.3: Information to be transferred from Node B/LMU to CRNC and between RNCs

Information	UE assisted	UE based
Measured UTRAN GPS timing of cell frames or SFN-SFN Observed Time Difference values for Cells mentioned at Intra frequency Cell Info	Yes	Yes
UTRAN GPS timing of cell frames or SFN-SFN Observed Time Difference accuracy	Yes	Yes

Table 9.4 shows the information that may be transferred from CRNC to Node B. If the CRNC is not the SRNC the information may also be sent from CRNC to SRNC.

Table 9.4: Information to be transferred from CRNC to Node B/LMU and between RNCs

Information	UE assisted	UE based
IPDL parameters	Yes	Yes

Table 9.5 shows the information that may be transferred between RNCs.

Table 9.5: Information to be transferred between RNCs

Information	UE assisted	UE based
Geographical position of the primary serving cell	Yes	Yes
Relative neighbour cell geographical position	Yes	Yes
Accuracy range of the geographic position values	Yes	Yes
IPDL-Alpha parameter for Open Loop Power Control when using IPDLs in 3.84Mcps TDD	Yes	Yes
Maximum Power the UE may use when using IPDLs in 3.84Mcps TDD	Yes	Yes

9.6 OTDOA network positioning procedures

The following diagram illustrates the operations for the OTDOA method for UE Positioning when the request for positioning information is initiated by an LCS application from the CN.

This illustration only includes the information flow related to UE Positioning operations and does not indicate other operations that may be required, for example, to establish a signalling connection between the UE and the SRNC. Also not illustrated is the signalling used to initiate the location service request from the CN or a UE-based application.

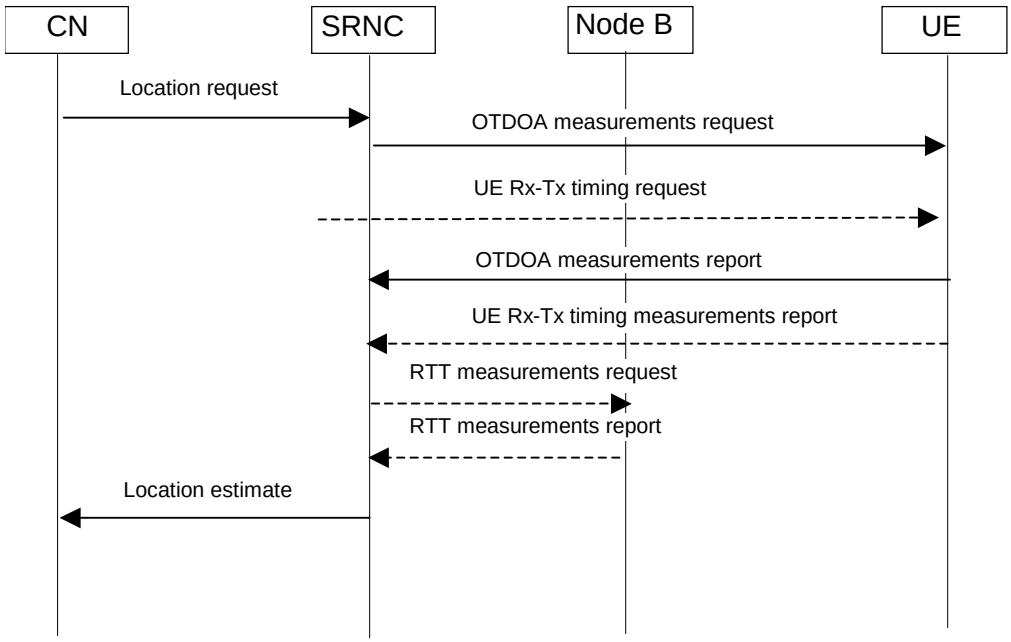

Figure 9.2: OTDOA Signalling Operations

1. The operation begins with an authenticated request for positioning information about a UE from an application in the CN being received at the SRNC. The SRNC considers the request and the UTRAN and UE capabilities.

2. The SRNC requests from the UE the measurement of the OTDOA for the signals in the active and neighbourhood sets. These measurements are made while the UE is in connected mode CELL_DCH state.

3. If it is considered advantageous to do so, the SRNC requests the UE Rx-Tx timing difference (FDD only) or UE timing advance, $T_{ADV,}$ (1.28 Mcps TDD) information from the UE.

4. The UE returns the OTDOA measures to the SRNC. The SRNC receives the OTDOA information and co-ordinates obtaining other information to support the calculation request.

5. The UE returns the UE Rx-Tx timing difference information (FDD only) or UE timing advance, $T_{ADV,}$ (1.28 Mcps TDD) to the SRNC, together with a time stamp of when the value was obtained.

6. If there are insufficient OTDOA measures, or it is otherwise considered advantageous to do so, the SRNC requests the RTT (in FDD) or Rx timing deviation (in TDD) and/or angle of arrival (in 1.28 Mcps TDD) measure for the UE from the serving Node B.

7. In FDD, the SRNC requests the RTD values for the associated transmitters from the associated database. These may be stored locally if they are constant over time, otherwise they must be updated to represent the RTD timing at the time-of-day the OTDOA measurements were made.

8. The Node B returns the RTT (in FDD) or Rx Timing Deviation (in TDD) and/ or angle of arrival (in 1.28 Mcps TDD) measures to the SRNC if they were requested.

9. The SRNC performs a position calculation using the OTDOA, RTD and, if necessary, RTT (in FDD) or Rx timing deviation and UE timing advance (in TDD) information and angle of arrival information (1.28 Mcps

TDD). The calculation may include a co-ordinate transformation to the geographic system requested by the application. The position estimate includes the position, the estimated accuracy of the results and the time of day of the estimate. In networks that include the SAS, the SAS may perform the position calculation and then pass the position estimate to the SRNC.

10. The SRNC passes the position estimate to the CN.