

TSG-RAN meeting #15

RP-020247

Jeju-do, Korea, 5-8 March 2002

CR-Form-v4

CHANGE REQUEST

⌘ **25.331 CR 1332** ⌘ ev **4** ⌘ Current version: **3.9.0** ⌘

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 Radio Access Network Core Network

Title:	⌘ OTDOA assistance data		
Source:	⌘ Nokia		
Work item code:	⌘	Date:	⌘ 18 th of February 2002
Category:	⌘ F	Release:	⌘ R99
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	F (correction)	2 (GSM Phase 2)	
	A (corresponds to a correction in an earlier release)	R96 (Release 1996)	
	B (addition of feature),	R97 (Release 1997)	
	C (functional modification of feature)	R98 (Release 1998)	
	D (editorial modification)	R99 (Release 1999)	
	Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		REL-4 (Release 4)
			REL-5 (Release 5)

Reason for change: ⌘ The 'SFN offset', defined now as a mandatory OTDOA assistance data field in IE 10.3.7.106 when the system utilizes IPDL, is not needed by UE for measuring SFN-SFN OTD as the channels used for synchronisation and measurements (SCH and CPICH, respectively) have no variations from frame to frame and hence all frames can be measured. On the other hand, it is difficult for the network side to provide this frame offset even if IPDLs are used unless a Location Measurement Unit (LMU) is placed at every base station site. **However, in ASN.1 'SFN offset' is always mandatorily present. Therefore, a mechanism is needed to indicate to the UE when 'SFN offset' is not used (e.g. when IPDL is not used).**

Isolated impact analysis:

Would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise.

Summary of change: ⌘ 'SFN offset' in IE 10.3.7.106 is aligned with ASN.1.

IE "SFN offset validity" is added.

Consequences if not approved: ⌘

Clauses affected: ⌘ 8.6.7.19.2, 8.6.7.19.2a, 10.3.7.106

Other specs Affected: ⌘ Other core specifications ⌘ Test specifications **TS34.123**
 O&M Specifications

Other comments: ⌘

How to create CRs using this form:

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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.

If IE "SFN offset validity" is set to FALSE, the UE shall:

- ignore the IE "SFN offset".

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.
- if IE "SFN offset validity" is set to FALSE, the UE shall:
 - ignore the IE "SFN offset".
- 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.

10.3.7.106 UE positioning OTDOA neighbour cell info

This IE gives approximate cell timing in order to decrease the search window.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
CHOICE <i>mode</i>	MP			
>FDD				
>>Primary CPICH info	MP		Primary CPICH info 10.3.6.60	
>TDD				
>>cell and channel ID	MP		Cell and Channel Identity info 10.3.6.8a	Identifies the channel to be measured on.
Frequency info	MD		Frequency info 10.3.6.36	Default value is the existing value of frequency information
IPDL parameters	CV-IPDLs		UE positioning IPDL parameters 10.3.7.98	
SFN offset	CV-IPDLs OP		Integer (0 .. 4095)	Although this IE is not always required, need is MP to align with ASN.1. Define Tref as the time of beginning of system frame number SFNref of the reference cell. Define Tnc as the beginning of a frame from the neighbour cell occurring immediately after the time Tref. Let the corresponding system frame number be SFNnc. Then SFNnc = SFNref-SFN offset modulo 4096.
SFN offset validity	MD		Enumerated (false)	Absence of this element means SFN offset is valid. False means SFN offset is not valid.
SFN-SFN relative time difference	MP		Integer(0.. 38399)	Gives the relative timing compared to the reference cell. Equal to $\lfloor (T_{nc} - T_{ref}) * (3.84 * 10^6) \rfloor$ where $\lfloor () \rfloor$ denotes rounding to the nearest lower integer. in chips, T_{nc} = the time of beginning of a system frame from the neighbour cell, T_{ref} = the time of beginning of a system frame from the reference cell.
SFN-SFN drift	OP		Integer (0, -1, -2, -3, -4, -5, -8, -10, -15, -25, -35, -50, -65, -80, -100, 1, 2, 3, 4, 5, 8, 10, 15, 25, 35, 50, 65, 80, 100)	in 1/256 chips per second

Search Window Size	MP		Integer(20, 40, 80, 160, 320, 640, 1280, infinity)	In chips. If the value is X then the expected SFN-SFN observed time difference is in the range [RTD-X, RTD+X] where RTD is the value of the field SFN-SFN relative time difference. Infinity means that the uncertainty is larger than 1280 chips.
CHOICE <i>PositioningMode</i>	MP			
>UE based				(no data)
>UE assisted				(no data)

Condition	Explanation
<i>IPDLs</i>	This IE is mandatory present if IPDLs are applied and not needed otherwise.

11.2 PDU definitions

```

--*****
--
-- TABULAR: The message type and integrity check info are not
-- visible in this module as they are defined in the class module.
-- Also, all FDD/TDD specific choices have the FDD option first
-- and TDD second, just for consistency.
--
--*****

PDU-definitions DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

--*****
--
-- IE parameter types from other modules
--
--*****

IMPORTS

-- Core Network IES :
  CN-DomainIdentity,
  CN-InformationInfo,
  CN-InformationInfoFull,
  NAS-Message,
  PagingRecordTypeID,
-- UTRAN Mobility IES :
  URA-Identity,
-- User Equipment IES :
  ActivationTime,
  C-RNTI,
  CapabilityUpdateRequirement,
  CellUpdateCause,
  CipheringAlgorithm,
  CipheringModeInfo,
  EstablishmentCause,
  FailureCauseWithProtErr,
  FailureCauseWithProtErrTrId,
  InitialUE-Identity,
  IntegrityProtActivationInfo,
  IntegrityProtectionModeInfo,
  N-308,
  PagingCause,
  PagingRecordList,
  ProtocolErrorIndicator,
  ProtocolErrorIndicatorWithMoreInfo,
  Rb-timer-indicator,
  RedirectionInfo,
  RejectionCause,
  ReleaseCause,
  RRC-StateIndicator,
  RRC-TransactionIdentifier,
  SecurityCapability,
  START-Value,
  STARTList,
  U-RNTI,
  U-RNTI-Short,
  UE-RadioAccessCapability,
  UE-RadioAccessCapability-v370ext,
  UE-RadioAccessCapability-v380ext,
  DL-PhysChCapabilityFDD-v380ext,
  UE-ConnTimersAndConstants,
  UE-SecurityInformation,
  URA-UpdateCause,
  UTRAN-DRX-CycleLengthCoefficient,
  WaitTime,
-- Radio Bearer IES :
  DefaultConfigIdentity,
  DefaultConfigMode,
  DL-CounterSynchronisationInfo,
  PredefinedConfigIdentity,

```

```

PredefinedConfigStatusList,
RAB-Info,
RAB-Info-Post,
RAB-InformationList,
RAB-InformationReconfigList,
RAB-InformationSetupList,
RB-ActivationTimeInfoList,
RB-COUNT-C-InformationList,
RB-COUNT-C-MSB-InformationList,
RB-IdentityList,
RB-InformationAffectedList,
RB-InformationReconfigList,
RB-InformationReleaseList,
SRB-InformationSetupList,
SRB-InformationSetupList2,
UL-CounterSynchronisationInfo,
-- Transport Channel IEs:
CPCH-SetID,
DL-AddReconfTransChInfo2List,
DL-AddReconfTransChInfoList,
DL-CommonTransChInfo,
DL-DeletedTransChInfoList,
DRAC-StaticInformationList,
TFC-Subset,
TFCS-Identity,
UL-AddReconfTransChInfoList,
UL-CommonTransChInfo,
UL-DeletedTransChInfoList,
-- Physical Channel IEs :
Alpha,
CCTrCH-PowerControlInfo,
ConstantValue,
CPCH-SetInfo,
DL-CommonInformation,
DL-CommonInformationPost,
DL-InformationPerRL,
DL-InformationPerRL-List,
DL-InformationPerRL-ListPostFDD,
DL-InformationPerRL-PostTDD,
DL-PDSCH-Information,
DPCH-CompressedModeStatusInfo,
FrequencyInfo,
FrequencyInfoFDD,
FrequencyInfoTDD,
MaxAllowedUL-TX-Power,
PDSCH-CapacityAllocationInfo,
PDSCH-Identity,
PrimaryCCPCH-TX-Power,
PUSCH-CapacityAllocationInfo,
PUSCH-Identity,
RL-AdditionInformationList,
RL-RemovalInformationList,
SpecialBurstScheduling,
SSDT-Information,
TFC-ControlDuration,
TimeslotList,
TX-DiversityMode,
UL-ChannelRequirement,
UL-ChannelRequirementWithCPCH-SetID,
UL-DPCH-Info,
UL-DPCH-InfoPostFDD,
UL-DPCH-InfoPostTDD,
UL-TimingAdvance,
UL-TimingAdvanceControl,
-- Measurement IEs :
AdditionalMeasurementID-List,
Frequency-Band,
EventResults,
InterRAT-TargetCellDescription,
MeasuredResults,
MeasuredResults-v390ext,
MeasuredResultsList,
MeasuredResultsOnRACH,
MeasurementCommand,
MeasurementIdentity,
MeasurementReportingMode,
PrimaryCCPCH-RSCP,
SFN-Offset-Validity,

```



```

TimeslotListWithISCP,
TrafficVolumeMeasuredResultsList,
UE-Positioning-GPS-AssistanceData,
UE-Positioning-Measurement-v390ext,
UE-Positioning-OTDOA-AssistanceData,
UE-Positioning-OTDOA-AssistanceData-UEB,
-- Other IEs :
  BCCH-ModificationInfo,
  CDMA2000-MessageList,
  GSM-MessageList,
  InterRAT-ChangeFailureCause,
  InterRAT-HO-FailureCause,
  InterRAT-UE-RadioAccessCapabilityList,
  InterRAT-UE-SecurityCapList,
  IntraDomainNasNodeSelector,
  ProtocolErrorMoreInformation,
  Rplmn-Information,
  SegCount,
  SegmentIndex,
  SFN-Prime,
  SIB-Data-fixed,
  SIB-Data-variable,
  SIB-Type
FROM InformationElements

  maxSIBperMsg
FROM Constant-definitions;

-- *****
--
-- Assistance Data Delivery
--
-- *****

AssistanceDataDelivery ::= CHOICE {
  r3
    assistanceDataDelivery-r3 SEQUENCE {
      assistanceDataDelivery-r3-IEs,
      v3a0nonCriticalExtensions SEQUENCE {
        assistanceDataDelivery-v3a0ext SEQUENCE {
          assistanceDataDelivery-v3a0ext,
          nonCriticalExtensions SEQUENCE{} OPTIONAL
        }
      }
    } OPTIONAL
  later-than-r3 SEQUENCE {
    rrc-TransactionIdentifier RRC-TransactionIdentifier,
    criticalExtensions SEQUENCE {}
  }
}

AssistanceDataDelivery-r3-IEs ::= SEQUENCE {
  -- User equipment IEs
  rrc-TransactionIdentifier RRC-TransactionIdentifier,
  -- Measurement Information Elements
  ue-positioning-GPS-AssistanceData UE-Positioning-GPS-AssistanceData
  OPTIONAL,
  ue-positioning-OTDOA-AssistanceData-UEB UE-Positioning-OTDOA-AssistanceData-UEB
  OPTIONAL
}

AssistanceDataDelivery-v3a0ext ::= SEQUENCE {
  sfn-Offset-Validity SFN-Offset-Validity OPTIONAL
}

-- *****
--
-- MEASUREMENT CONTROL
--
-- *****

MeasurementControl ::= CHOICE {
  r3
    measurementControl-r3 SEQUENCE {
      measurementControl-r3-IEs,
      v390nonCriticalExtensions SEQUENCE {
        measurementControl-v390ext SEQUENCE {
          measurementControl-v390ext,
          v3a0nonCriticalExtensions SEQUENCE {
            measurementControl-v3a0ext SEQUENCE {
              measurementControl-v3a0ext,
              nonCriticalExtensions SEQUENCE{}
            }
          }
        }
      }
    } OPTIONAL
}

```

```

    } OPTIONAL
  },
  later-than-r3 SEQUENCE {
    rrc-TransactionIdentifier RRC-TransactionIdentifier,
    criticalExtensions SEQUENCE {}
  }
}

MeasurementControl-r3-IEs ::= SEQUENCE {
  -- User equipment IEs
  rrc-TransactionIdentifier RRC-TransactionIdentifier,
  -- Measurement IEs
  measurementIdentity MeasurementIdentity,
  measurementCommand MeasurementCommand,
  -- TABULAR: The measurement type is included in MeasurementCommand.
  measurementReportingMode MeasurementReportingMode OPTIONAL,
  additionalMeasurementList AdditionalMeasurementID-List OPTIONAL,
  -- Physical channel IEs
  dpch-CompressedModeStatusInfo DPCH-CompressedModeStatusInfo OPTIONAL
}

MeasurementControl-v390ext ::= SEQUENCE {
  ue-Positioning-Measurement-v390ext UE-Positioning-Measurement-v390ext OPTIONAL
}

MeasurementControl-v3a0ext ::= SEQUENCE {
  sfn-Offset-Validity SFN-Offset-Validity OPTIONAL
}

```

11.3 Information element definitions

```

-- *****
--
-- MEASUREMENT INFORMATION ELEMENTS (10.3.7)
--
-- *****

```

```

SFN-Offset-Validity ::= ENUMERATED { false }

SFN-SFN-RelTimeDifference1 ::= SEQUENCE {
  sfn-Offset INTEGER (0 .. 4095),
  sfn-sfn-RelTimeDifference INTEGER (0.. 38399)
}

UE-Positioning-OTDOA-NeighbourCellInfo ::= SEQUENCE {
  modeSpecificInfo CHOICE {
    fdd SEQUENCE {
      primaryCPICH-Info PrimaryCPICH-Info
    },
    tdd SEQUENCE {
      cellAndChannelIdentity CellAndChannelIdentity
    }
  },
  frequencyInfo FrequencyInfo OPTIONAL,
  ue-positioning-IPDL-Parameters UE-Positioning-IPDL-Parameters OPTIONAL,
  sfn-SFN-RelTimeDifference SFN-SFN-RelTimeDifference1,
  sfn-SFN-Drift SFN-SFN-Drift OPTIONAL,
  searchWindowSize OTDOA-SearchWindowSize,
  positioningMode CHOICE {
    ueBased SEQUENCE {},
    ueAssisted SEQUENCE {}
  }
}

UE-Positioning-OTDOA-NeighbourCellInfo-UEB ::= SEQUENCE {
  modeSpecificInfo CHOICE {
    fdd SEQUENCE {
      primaryCPICH-Info PrimaryCPICH-Info
    },
    tdd SEQUENCE {
      cellAndChannelIdentity CellAndChannelIdentity
    }
  }
}

```

```

    },
    frequencyInfo                FrequencyInfo                OPTIONAL,
    ue-positioning-IPDL-Parameters UE-Positioning-IPDL-Parameters OPTIONAL,
    sfn-SFN-RelTimeDifference     SFN-SFN-RelTimeDifference,
    sfn-SFN-Drift                 SFN-SFN-Drift                 OPTIONAL,
    searchWindowSize             OTDOA-SearchWindowSize,
    relativeNorth                 INTEGER (-20000..20000)        OPTIONAL,
    relativeEast                  INTEGER (-20000..20000)        OPTIONAL,
    relativeAltitude              INTEGER (-4000..4000)         OPTIONAL,
    fineSFN-SFN                   FineSFN-SFN,
    -- actual value = (IE value * 0.0625) + 876
    roundTripTime                 INTEGER (0.. 32766)           OPTIONAL
}

-- *****
--
-- OTHER INFORMATION ELEMENTS (10.3.8)
--
-- *****

SysInfoType15-4 ::= SEQUENCE {
    -- Measurement IEs
    ue-positioning-OTDOA-CipherParameters UE-Positioning-CipherParameters OPTIONAL,
    ue-positioning-OTDOA-AssistanceData UE-Positioning-OTDOA-AssistanceData,
    v3a0NonCriticalExtensions SEQUENCE {
        sysInfoType15-4-v3a0ext SysInfoType15-4-v3a0ext,
        -- Extension mechanism for non- release99 information
        nonCriticalExtensions SEQUENCE {} OPTIONAL
    } OPTIONAL
}

SysInfoType15-4-v3a0ext ::= SEQUENCE {
    sfn-Offset-Validity SFN-Offset-Validity OPTIONAL
}

SysInfoType15-5 ::= SEQUENCE {
    -- Measurement IEs
    ue-positioning-OTDOA-AssistanceData-UEB UE-Positioning-OTDOA-AssistanceData-UEB,
    v3a0NonCriticalExtensions SEQUENCE {
        sysInfoType15-5-v3a0ext SysInfoType15-5-v3a0ext,
        -- Extension mechanism for non- release99 information
        nonCriticalExtensions SEQUENCE {} OPTIONAL
    } OPTIONAL,
}

SysInfoType15-5-v3a0ext ::= SEQUENCE {
    sfn-Offset-Validity SFN-Offset-Validity OPTIONAL
}

```

TSG-RAN meeting #15

RP-020xxx

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CR-Form-v4

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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:

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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.

If IE "SFN offset validity" is set to FALSE, the UE shall:

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 - set the variable CONFIGURATION_INCOMPLETE to TRUE.
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The UE shall:

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 - 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.
- if IE "SFN offset validity" is set to FALSE, the UE shall:
 - ignore the IE "SFN offset".
- 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.

10.3.7.106 UE positioning OTDOA neighbour cell info

This IE gives approximate cell timing in order to decrease the search window.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
CHOICE <i>mode</i>	MP			
>FDD				
>>Primary CPICH info	MP		Primary CPICH info 10.3.6.60	
>TDD				
>>cell and channel ID	MP		Cell and Channel Identity info 10.3.6.8a	Identifies the channel to be measured on.
Frequency info	MD		Frequency info 10.3.6.36	Default value is the existing value of frequency information
IPDL parameters	CV-IPDLs		UE positioning IPDL parameters 10.3.7.98	
SFN offset	CV-IPDLsMP		Integer (0 .. 4095)	Although this IE is not always required, need is MP to align with ASN.1. Define Tref as the time of beginning of system frame number SFNref of the reference cell. Define Tnc as the beginning of a frame from the neighbour cell occurring immediately after the time Tref. Let the corresponding system frame number be SFNnc. Then SFNnc = SFNref-SFN offset modulo 4096.
SFN offset validity	MD		Enumerated (false)	Absence of this element means SFN offset is valid. False means SFN offset is not valid.
SFN-SFN relative time difference	MP		Integer(0..38399)	Gives the relative timing compared to the reference cell. Equal to $\lfloor (T_{nc} - T_{ref}) / (3.84 \cdot 10^6) \rfloor$ where $\lfloor () \rfloor$ denotes rounding to the nearest lower integer. in chips, <u>Tnc = the time of beginning of a system frame from the neighbour cell, Tref = the time of beginning of a system frame from the reference cell.</u>
SFN-SFN drift	OP		Integer (0, -1, -2, -3, -4, -5, -8, -10, -15, -25, -35, -50, -65, -80, -100, 1, 2, 3, 4, 5, 8, 10, 15, 25, 35, 50, 65, 80, 100)	in 1/256 chips per second
Search Window Size	MP		Integer(20, 40, 80, 160,	in chips. If the value is X then the expected SFN-SFN

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
			320, 640, 1280, infinity)	observed time difference is in the range [RTD-X, RTD+X] where RTD is the value of the field SFN-SFN relative time difference. Infinity means that the uncertainty is larger than 1280 chips.
CHOICE <i>PositioningMode</i>	MP			
>UE based				(no data)
>UE assisted				(no data)

Condition	Explanation
<i>IPDLs</i>	This IE is mandatory present if IPDLs are applied and not needed otherwise.

11.2 PDU definitions

```

--*****
--
-- TABULAR: The message type and integrity check info are not
-- visible in this module as they are defined in the class module.
-- Also, all FDD/TDD specific choices have the FDD option first
-- and TDD second, just for consistency.
--
--*****

PDU-definitions DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

--*****
--
-- IE parameter types from other modules
--
--*****

IMPORTS

-- Core Network IEs :
  CN-DomainIdentity,
  CN-InformationInfo,
  CN-InformationInfoFull,
  NAS-Message,
  PagingRecordTypeID,
-- UTRAN Mobility IEs :
  URA-Identity,
-- User Equipment IEs :
  ActivationTime,
  C-RNTI,
  CapabilityUpdateRequirement,
  CapabilityUpdateRequirement-r4,
  CapabilityUpdateRequirement-r4-ext,
  CellUpdateCause,
  CipheringAlgorithm,
  CipheringModeInfo,
  EstablishmentCause,
  FailureCauseWithProtErr,
  FailureCauseWithProtErrTrId,
  InitialUE-Identity,
  IntegrityProtActivationInfo,
  IntegrityProtectionModeInfo,
  N-308,
  PagingCause,
  PagingRecordList,
  ProtocolErrorIndicator,

```

```

ProtocolErrorIndicatorWithMoreInfo,
Rb-timer-indicator,
RedirectionInfo,
RejectionCause,
ReleaseCause,
RRC-StateIndicator,
RRC-TransactionIdentifier,
SecurityCapability,
START-Value,
STARTList,
U-RNTI,
U-RNTI-Short,
UE-RadioAccessCapability,
UE-RadioAccessCapability-r4-ext,
UE-RadioAccessCapability-v370ext,
UE-RadioAccessCapability-v380ext,
DL-PhysChCapabilityFDD-v380ext,
UE-ConnTimersAndConstants,
UE-SecurityInformation,
URA-UpdateCause,
UTRAN-DRX-CycleLengthCoefficient,
WaitTime,
-- Radio Bearer IEs :
DefaultConfigIdentity,
DefaultConfigMode,
DL-CounterSynchronisationInfo,
PredefinedConfigIdentity,
PredefinedConfigStatusList,
RAB-Info,
RAB-Info-Post,
RAB-InformationList,
RAB-InformationReconfigList,
RAB-InformationSetupList,
RAB-InformationSetupList-r4,
RB-ActivationTimeInfoList,
RB-COUNT-C-InformationList,
RB-COUNT-C-MSB-InformationList,
RB-IdentityList,
RB-InformationAffectedList,
RB-InformationReconfigList,
RB-InformationReconfigList-r4,
RB-InformationReleaseList,
RB-WithPDCP-InfoList, SRB-InformationSetupList,
SRB-InformationSetupList2,
UL-CounterSynchronisationInfo,
-- Transport Channel IEs:
CPCH-SetID,
DL-AddReconfTransChInfo2List,
DL-AddReconfTransChInfoList,
DL-CommonTransChInfo,
DL-CommonTransChInfo-r4,
DL-DeletedTransChInfoList,
DRAC-StaticInformationList,
TFC-Subset,
TFCS-Identity,
UL-AddReconfTransChInfoList,
UL-CommonTransChInfo,
UL-DeletedTransChInfoList,
-- Physical Channel IEs :
Alpha,
CCTrCH-PowerControlInfo,
CCTrCH-PowerControlInfo-r4,
ConstantValue,
CPCH-SetInfo,
DL-CommonInformation,
DL-CommonInformation-r4,
DL-CommonInformationPost,
DL-InformationPerRL,
DL-InformationPerRL-List,
DL-InformationPerRL-List-r4,
DL-InformationPerRL-ListPostFDD,
DL-InformationPerRL-PostTDD,
DL-InformationPerRL-PostTDD-LCR-r4,
DL-PDSCH-Information,
DPCH-CompressedModeStatusInfo,
FrequencyInfo,
FrequencyInfoFDD,
FrequencyInfoTDD,

```

```

MaxAllowedUL-TX-Power,
OpenLoopPowerControl-IPDL-TDD-r4,
PDSCH-CapacityAllocationInfo,
PDSCH-CapacityAllocationInfo-r4,
PDSCH-Identity,
PrimaryCCPCH-TX-Power,
PUSCH-CapacityAllocationInfo,
PUSCH-CapacityAllocationInfo-r4,
PUSCH-Identity,
RL-AdditionInformationList,
RL-RemovalInformationList,
SpecialBurstScheduling,
SSDT-Information,
TFC-ControlDuration,
SSDT-UL-r4,
TimeslotList,
TimeslotList-r4,
TX-DiversityMode,
UL-ChannelRequirement,
UL-ChannelRequirement-r4,
UL-ChannelRequirementWithCPCH-SetID,
UL-ChannelRequirementWithCPCH-SetID-r4,
UL-DPCH-Info,
UL-DPCH-Info-r4,
UL-DPCH-InfoPostFDD,
UL-DPCH-InfoPostTDD,
UL-DPCH-InfoPostTDD-LCR-r4,
UL-SynchronisationParameters-r4,
UL-TimingAdvance,
UL-TimingAdvanceControl,
UL-TimingAdvanceControl-r4,
-- Measurement IEs :
AdditionalMeasurementID-List,
Frequency-Band,
EventResults,
InterFreqEventResults-LCR-r4-ext,
InterRAT-TargetCellDescription,
MeasuredResults,
MeasuredResults-v390ext,
MeasuredResultsList,
MeasuredResultsList-LCR-r4-ext,
MeasuredResultsOnRACH,
MeasurementCommand,
MeasurementCommand-r4,
MeasurementIdentity,
MeasurementReportingMode,
PrimaryCCPCH-RSCP,
SFN-Offset-Validity,
TimeslotListWithISCP,
TrafficVolumeMeasuredResultsList,
UE-Positioning-GPS-AssistanceData,
UE-Positioning-Measurement-v390ext,
UE-Positioning-OTDOA-AssistanceData,
UE-Positioning-OTDOA-AssistanceData-r4ext,
UE-Positioning-OTDOA-AssistanceData-UEB,
UE-Positioning-IPDL-Parameters-TDD-r4-ext,
-- Other IEs :
BCCH-ModificationInfo,
CDMA2000-MessageList,
GSM-MessageList,
InterRAT-ChangeFailureCause,
InterRAT-HO-FailureCause,
InterRAT-UE-RadioAccessCapabilityList,
InterRAT-UE-SecurityCapList,
IntraDomainNasNodeSelector,
ProtocolErrorMoreInformation,
Rplmn-Information,
Rplmn-Information-r4,
SegCount,
SegmentIndex,
SFN-Prime,
SIB-Data-fixed,
SIB-Data-variable,
SIB-Type
FROM InformationElements

maxSIBperMsg
FROM Constant-definitions;

```

```

-- *****
--
-- Assistance Data Delivery
--
-- *****

AssistanceDataDelivery ::= CHOICE {
  r3 SEQUENCE {
    assistanceDataDelivery-r3 AssistanceDataDelivery-r3-IEs,
    nonCriticalExtensions SEQUENCE {
      assistanceDataDelivery-r3-r4-ext
      AssistanceDataDelivery-r3-r4-ext-IEs,
      v3a0nonCriticalExtensions SEQUENCE {
        assistanceDataDelivery-v3a0ext AssistanceDataDelivery-v3a0ext,
        nonCriticalExtensions SEQUENCE {} OPTIONAL
      } OPTIONAL
    } OPTIONAL
  },
  later-than-r3 SEQUENCE {
    rrc-TransactionIdentifier RRC-TransactionIdentifier,
    criticalExtensions SEQUENCE {}
  }
}

AssistanceDataDelivery-r3-IEs ::= SEQUENCE {
  -- User equipment IEs
  rrc-TransactionIdentifier RRC-TransactionIdentifier,
  -- Measurement Information Elements
  ue-positioning-GPS-AssistanceData UE-Positioning-GPS-AssistanceData
  OPTIONAL,
  ue-positioning-OTDOA-AssistanceData-UEB UE-Positioning-OTDOA-AssistanceData-UEB
  OPTIONAL
}

AssistanceDataDelivery-v3a0ext ::= SEQUENCE {
  sfm-Offset-Validity SFM-Offset-Validity OPTIONAL
}

AssistanceDataDelivery-r3-r4-ext-IEs ::= SEQUENCE {
  ue-Positioning-OTDOA-AssistanceData-r4ext UE-Positioning-OTDOA-AssistanceData-r4ext OPTIONAL
}

-- *****
--
-- MEASUREMENT CONTROL
--
-- *****

MeasurementControl ::= CHOICE {
  r3 SEQUENCE {
    measurementControl-r3 MeasurementControl-r3-IEs,
    v390nonCriticalExtensions SEQUENCE {
      measurementControl-v390ext MeasurementControl-v390ext,
      v3a0NonCriticalExtensions SEQUENCE {
        measurementControl-v3a0ext MeasurementControl-v3a0ext,
        nonCriticalExtensions SEQUENCE {}
      }
      measurementControl-r3-r4-ext MeasurementControl-r3-r4-ext-IEs,
      nonCriticalExtensions SEQUENCE {} OPTIONAL
    } OPTIONAL
  } OPTIONAL
  },
  later-than-r3 SEQUENCE {
    rrc-TransactionIdentifier RRC-TransactionIdentifier,
    criticalExtensions CHOICE {
      r4 SEQUENCE {
        measurementControl-r4 MeasurementControl-r4-IEs,
        nonCriticalExtensions SEQUENCE {} OPTIONAL
      }
    },
    criticalExtensions SEQUENCE {}
  }
}

MeasurementControl-r3-IEs ::= SEQUENCE {
  -- User equipment IEs
  rrc-TransactionIdentifier RRC-TransactionIdentifier,

```

```

-- Measurement IEs
  measurementIdentity      MeasurementIdentity,
  measurementCommand       MeasurementCommand,
  -- TABULAR: The measurement type is included in MeasurementCommand.
  measurementReportingMode MeasurementReportingMode      OPTIONAL,
  additionalMeasurementList AdditionalMeasurementID-List  OPTIONAL,
-- Physical channel IEs
  dpch-CompressedModeStatusInfo DPCH-CompressedModeStatusInfo  OPTIONAL
}

MeasurementControl-r3-r4-ext-IEs ::= SEQUENCE {
  ue-Positioning-OTDOA-AssistanceData-r4ext  UE-Positioning-OTDOA-AssistanceData-r4ext  OPTIONAL
}

MeasurementControl-v390ext ::= SEQUENCE {
  ue-Positioning-Measurement-v390ext  UE-Positioning-Measurement-v390ext  OPTIONAL
}

MeasurementControl-v3a0ext ::= SEQUENCE {
  sfn-Offset-Validity  SFN-Offset-Validity  OPTIONAL
}

MeasurementControl-r4-IEs ::= SEQUENCE {
  -- User equipment IEs
  rrc-TransactionIdentifier      RRC-TransactionIdentifier,
  -- Measurement IEs
  measurementIdentity      MeasurementIdentity,
  measurementCommand       MeasurementCommand-r4,
  -- TABULAR: The measurement type is included in MeasurementCommand.
  measurementReportingMode MeasurementReportingMode      OPTIONAL,
  additionalMeasurementList AdditionalMeasurementID-List  OPTIONAL,
  -- Physical channel IEs
  dpch-CompressedModeStatusInfo DPCH-CompressedModeStatusInfo  OPTIONAL
}

```

11.3 Information element definitions

```

-- *****
--
-- MEASUREMENT INFORMATION ELEMENTS (10.3.7)
--
-- *****
SFN-Offset-Validity ::= ENUMERATED { false }

-- *****
--
-- OTHER INFORMATION ELEMENTS (10.3.8)
--
-- *****
SysInfoType15-4 ::= SEQUENCE {
  -- Measurement IEs
  ue-positioning-OTDOA-CipherParameters  UE-Positioning-CipherParameters      OPTIONAL,
  ue-positioning-OTDOA-AssistanceData    UE-Positioning-OTDOA-AssistanceData,
  v3a0NonCriticalExtensions              SEQUENCE {
    sysInfoType15-4-v3a0ext              SysInfoType15-4-v3a0ext,
    -- Extension mechanism for non- release99 information
    nonCriticalExtensions                SEQUENCE {
      sysInfoType15-4-r4ext              SysInfoType15-4-r4ext  OPTIONAL,
      nonCriticalExtensions              SEQUENCE { }  OPTIONAL
    }  OPTIONAL
  }  OPTIONAL
}

SysInfoType15-4-v3a0ext ::= SEQUENCE {
  sfn-Offset-Validity              SFN-Offset-Validity      OPTIONAL
}

SysInfoType15-4-r4ext ::= SEQUENCE {
  ue-Positioning-OTDOA-AssistanceData-r4ext  UE-Positioning-OTDOA-AssistanceData-r4ext  OPTIONAL
}

SysInfoType15-5 ::= SEQUENCE {
  -- Measurement IEs
  ue-positioning-OTDOA-AssistanceData-UEB  UE-Positioning-OTDOA-AssistanceData-UEB,

```

```
_____ v3a0NonCriticalExtensions _____ SEQUENCE {  
_____ sysInfoType15-5-v3a0ext _____ SysInfoType15-5-v3a0ext,  
_____ -- Extension mechanism for non- release99 information  
_____ nonCriticalExtensions _____ SEQUENCE {} OPTIONAL  
_____ } OPTIONAL  
_____ }  
  
SysInfoType15-5-v3a0ext ::= SEQUENCE {  
_____ sfn-Offset-Validity _____ SFN-Offset-Validity _____ OPTIONAL  
_____ }
```