TSG RAN Meeting #22 **RP-030697**
Maui, USA, 9 - 12 December 2003

Title **CR (Rel-6 only) to TS 25.453 on Improvement of position calculation through set enlargement**
Source **TSG RAN WG3**
Agenda Item **8.10**

RAN3 Tdoc	Spec	curr. Vers.	new Vers.	REL	CR	Rev	Cat	Title	Work item
R3-031570	25.453	6.2.0	6.3.0	REL-6	061	-	C	Improvement of position calculation through set enlargement	LCS-Rel4Pos

3GPP TSG-RAN WG3 Meeting #39 **⌘R3-031570**
San Diego, USA, 17th – 21st November 2003

CR-Form-v7

CHANGE REQUEST

⌘ **25.453** **CR** **061** ⌘ **rev** **-** ⌘ Current version: **6.2.0** ⌘

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

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☒ Core Network ☐

Title:	⌘	Improvement of position calculation through set enlargement
Source:	⌘	RAN3
Work item code:	⌘	LCS-Rel4Pos
Date:	⌘	10/10/03
Category:	⌘	**C**
Release:	⌘	Rel-6

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)*
Rel-6	*(Release 6)*

Reason for change:	⌘	Improvement of the position calculation through enlargement of the number of measurement sets, delivered to the SAS. The data passed in the *GPS Measured Results* IE to the SAS are less randomly scattered than the data passed in the *Cell-ID Measured Results Sets* IE and in the *OTDOA Measurement Group* IE to the SAS. Therefore the accuracy of the position calculation increases, if in the latter cases more measurements are passed to the SAS. Therefore sixteen measurements in a row are suggested to improve the result of the position calculation.
Summary of change:	⌘	Change of the set range from 3 to 16 Additionally a formal weakness is corrected. The definition of the list boundary maxNrOfSets is moved to the constant definition chapter.
Consequences if not approved:	⌘	Less accurate position calculation

Clauses affected:	⌘	9.1.3, 9.3.4, 9.3.6

		Y	N		
Other specs affected:	⌘		X	Other core specifications	⌘
			X	Test specifications	
			X	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/specs/CR.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.

9.1.3 Position Calculation Request

Table 6

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.2.24		YES	reject
Transaction ID	M		9.2.2.28		-	
Initial UE Position Estimate	M		9.2.2.6		YES	reject
Measured Results		*0..<maxNoOfSets>*			GLOBAL	reject
>GPS Measured Results	M		9.2.2.12		-	
Cell-ID Measured Results Sets		*0..<maxNoOf~~Sets~~ Measurements>*			GLOBAL	reject
>Cell-ID Measured Results Info List	M		9.2.2.31		-	
OTDOA Measurement Group		*0..1*			YES	reject
>OTDOA Reference Cell Info	M		9.2.2.34		-	
>OTDOA Neighbour Cell Info List		*1..<maxNoOfMeasNCell>*			-	
>>OTDOA Neighbour Cell Info	M		9.2.2.33		-	
>OTDOA Measured Results Sets		*1..<maxNoOfMeasurements~~Sets~~>*			-	
>>OTDOA Measured Results Info List	M		9.2.2.32		-	

Table 7

Range bound	Explanation
MaxNoOfMeasNCell	Maximum number of neighbouring cells on which information can be reported. The value of MaxNoOfMeasCell is 32.
MaxNoOfSets	Maximum number of sets of Measured Results included in the Position Calculation Request message. The value for maxNoOfSets is 3.
maxNoOfMeasurements	Maximum number of Measurements of Cell-ID Measured Results Info List and OTDOA Measured Results Info List included in the Position Calculation Request message. The value for maxNoOfMeasurements is 16.

/* partly omitted */

9.3.4 Information Element Definitions

```
-- **************************************************************
--
-- Information Element Definitions
--
-- **************************************************************

PCAP-IEs {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
umts-Access (20) modules (3) pcap(4) version1 (1) pcap-IEs (2) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS
    maxNrOfErrors,
    maxSat,
    maxSatAlmanac,
    maxNrOfLevels,
    maxNrOfMeasNCell,
    maxNrOfMeasurements,
    maxNrOfPoints,
    maxNrOfExpInfo,
    maxNrOfSets,
    id-TypeOfError,
    id-MessageStructure
FROM PCAP-Constants

    Criticality,
    ProcedureCode,
    ProtocolIE-ID,
    TransactionID,
    TriggeringMessage
FROM PCAP-CommonDataTypes

    ProtocolExtensionContainer{},
    PCAP-PROTOCOL-EXTENSION
FROM PCAP-Containers;


/* partly omitted */


-- **************************************************************
--
-- Cell Id Measured Results Sets
--
-- **************************************************************

CellId-MeasuredResultsSets ::=          SEQUENCE (SIZE (1..maxNrOfMeasurementsmaxNrOfSets)) OF
    CellId-MeasuredResultsInfoList

CellId-MeasuredResultsInfoList ::=      SEQUENCE (SIZE (1..maxNrOfMeasNCell)) OF
    CellId-MeasuredResultsInfo

CellId-MeasuredResultsInfo ::=          SEQUENCE {
    uC-ID                               UC-ID,
    uTRANAccessPointPositionAltitude    UTRANAccessPointPositionAltitude,
    ue-PositionEstimate                 UE-PositionEstimate         OPTIONAL,
    roundTripTimeInfo                   RoundTripTimeInfo           OPTIONAL, -- FDD only
    rxTimingDeviationInfo               RxTimingDeviationInfo       OPTIONAL, -- 3.84Mcps TDD only
    rxTimingDeviationLCRInfo            RxTimingDeviationLCRInfo    OPTIONAL, -- 1.28Mcps TDD only
    iE-Extensions                       ProtocolExtensionContainer { { CellId-MeasuredResultsInfo-
ExtIEs } }      OPTIONAL,
    ...
}

CellId-MeasuredResultsInfo-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    ...
}

RoundTripTimeInfo ::=                   SEQUENCE {
    ue-RxTxTimeDifferenceType2          UE-RxTxTimeDifferenceType2,
    ue-PositioningMeasQuality           UE-PositioningMeasQuality,
    roundTripTime                       RoundTripTime,
```

```
    iE-Extensions                       ProtocolExtensionContainer { { RoundTripTimeInfo-ExtIEs } }
        OPTIONAL,
    ...
}

RoundTripTimeInfo-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    ...
}

UE-RxTxTimeDifferenceType2 ::=          INTEGER (0..8191)

UE-PositioningMeasQuality ::=           SEQUENCE {
    stdResolution                       BIT STRING (SIZE (2)),
    numberOfMeasurements                BIT STRING (SIZE (3)),
    stdOfMeasurements                   BIT STRING (SIZE (5)),
    iE-Extensions                       ProtocolExtensionContainer { { UE-PositioningMeasQuality-
ExtIEs } }      OPTIONAL,
    ...
}

UE-PositioningMeasQuality-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    ...
}

RoundTripTime ::=                       INTEGER (0..32767)
-- Actual value RoundTripTime = IE value * 0.0625 + 876

UTRANAccessPointPositionAltitude ::=    SEQUENCE {
    geographicalCoordinates             GeographicalCoordinates,
    ga-AltitudeAndDirection             GA-AltitudeAndDirection         OPTIONAL,
    iE-Extensions                   ProtocolExtensionContainer { { UTRANAccessPointPositionAltitude-
ExtIEs } }      OPTIONAL,
    ...
}

UTRANAccessPointPositionAltitude-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    ...
}

RxTimingDeviationInfo ::=               SEQUENCE {
    rxTimingDeviation                   RxTimingDeviation,
    timingAdvance                       TimingAdvance,
    iE-Extensions                       ProtocolExtensionContainer { { RxTimingDeviationInfo-ExtIEs
} }     OPTIONAL,
    ...
}

RxTimingDeviationInfo-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    ...
}

RxTimingDeviationLCRInfo ::=            SEQUENCE {
    rxTimingDeviationLCR                RxTimingDeviationLCR,
    timingAdvanceLCR                    TimingAdvanceLCR,
    iE-Extensions                       ProtocolExtensionContainer { { RxTimingDeviationLCRInfo-
ExtIEs } }      OPTIONAL,
    ...
}

RxTimingDeviationLCRInfo-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    ...
}

RxTimingDeviation ::=                   INTEGER (0..8191)

RxTimingDeviationLCR ::=                INTEGER (0..511)

TimingAdvance ::=                       INTEGER (0..63)

TimingAdvanceLCR ::=                    INTEGER (0..2047)

Pathloss ::=                            INTEGER (46..158)
-- Unit: dB; as defined in [4] subclause 10.3.7.3
```

/* partly omitted */

```
-- **************************************************************
--
-- GPS Measured Results
--
-- **************************************************************

MeasuredResultsList ::=             SEQUENCE (SIZE (0..maxNrOfSets)) OF
    GPS-MeasuredResults

maxNrOfSets                         INTEGER ::= 3

GPS-MeasuredResults ::=             SEQUENCE {
    gps-TOW-1msec                       INTEGER (0..604799999),
    gps-MeasurementParamList            GPS-MeasurementParamList,
    gps-TOW-rem-usec                    INTEGER (0..999)            OPTIONAL,
    iE-Extensions                       ProtocolExtensionContainer { { GPS-MeasuredResults-ExtIEs }
}       OPTIONAL,
    ...
}

GPS-MeasuredResults-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    ...
}

GPS-MeasurementParamList ::=        SEQUENCE (SIZE (1..maxSat)) OF
                                        GPS-MeasurementParam

GPS-MeasurementParam ::=            SEQUENCE {
    satelliteID                         INTEGER (0..63),
    c-N0                                INTEGER (0..63),
    doppler                             INTEGER (-32768..32768),
    wholeGPS-Chips                      INTEGER (0..1022),
    fractionalGPS-Chips                 INTEGER (0..1023),
    multipathIndicator                  MultipathIndicator,
    pseudorangeRMS-Error                INTEGER (0..63)
}

MultipathIndicator ::=              ENUMERATED {
                                        nm,
                                        low,
                                        medium,
                                        high }
```

/* partly omitted */

```
-- **************************************************************
--
-- OTDOA Measurement Group
--
-- **************************************************************

OTDOA-MeasurementGroup ::=          SEQUENCE {
    otdoa-ReferenceCellInfo             OTDOA-ReferenceCellInfo,
    otdoa-NeighbourCellInfoList         OTDOA-NeighbourCellInfoList,
    otdoa-MeasuredResultsSets           OTDOA-MeasuredResultsSets,
    iE-Extensions                       ProtocolExtensionContainer { { OTDOA-MeasurementGroup-ExtIEs
} }     OPTIONAL,
    ...
}

OTDOA-MeasurementGroup-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    ...
}

OTDOA-ReferenceCellInfo ::=             SEQUENCE {
    uC-ID                               UC-ID,
    uTRANAccessPointPositionAltitude    UTRANAccessPointPositionAltitude,
    tUTRANGPSMeasurementValueInfo       TUTRANGPSMeasurementValueInfo               OPTIONAL,
    iE-Extensions                       ProtocolExtensionContainer { { OTDOA-ReferenceCellInfo-
ExtIEs } }      OPTIONAL,
    ...
}

OTDOA-ReferenceCellInfo-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    ...
```

```
}

OTDOA-NeighbourCellInfoList ::=         SEQUENCE (SIZE (1..maxNrOfMeasNCell)) OF
    OTDOA-NeighbourCellInfo

OTDOA-NeighbourCellInfo ::=             SEQUENCE {
    uC-ID                               UC-ID,
    uTRANAccessPointPositionAltitude    UTRANAccessPointPositionAltitude,
    relativeTimingDifferenceInfo        RelativeTimingDifferenceInfo,
    iE-Extensions                       ProtocolExtensionContainer { { OTDOA-NeighbourCellInfo-
ExtIEs } }      OPTIONAL,
    ...
}

OTDOA-NeighbourCellInfo-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    ...
}

OTDOA-MeasuredResultsSets ::=           SEQUENCE (SIZE (1..maxNrOfMeasurementsmaxNrOfSet)) OF
    OTDOA-MeasuredResultsInfoList

OTDOA-MeasuredResultsInfoList ::=       SEQUENCE (SIZE (1..maxNrOfMeasNCell)) OF
    OTDOA-MeasuredResultsInfo

OTDOA-MeasuredResultsInfo ::=           SEQUENCE {
    uC-ID                               UC-ID,
    ue-SFNSFNTimeDifferenceType2Info    UE-SFNSFNTimeDifferenceType2Info,
    iE-Extensions                       ProtocolExtensionContainer { { OTDOA-MeasuredResultsInfo-
ExtIEs } }      OPTIONAL,
    ...
}

OTDOA-MeasuredResultsInfo-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    ...
}
```

/* partly omitted */

9.3.6 Constant Definitions

```
-- **************************************************************
--
-- Constant definitions
--
-- **************************************************************

PCAP-Constants {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
umts-Access (20) modules (3) pcap(4) version1 (1) pcap-Constants (4) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS
    ProcedureCode,
    ProtocolIE-ID
FROM PCAP-CommonDataTypes;


-- **************************************************************
--
-- Elementary Procedures
--
-- **************************************************************

id-PositionCalculation              ProcedureCode ::= 1
id-InformationExchangeInitiation    ProcedureCode ::= 2
id-InformationReporting             ProcedureCode ::= 3
id-InformationExchangeTermination   ProcedureCode ::= 4
id-InformationExchangeFailure       ProcedureCode ::= 5
id-ErrorIndication                  ProcedureCode ::= 6
id-privateMessage                   ProcedureCode ::= 7
```

```
-- **************************************************************
--
-- Lists
--
-- **************************************************************

maxNrOfErrors                       INTEGER ::= 256
maxSat                              INTEGER ::= 16
maxSatAlmanac                       INTEGER ::= 32
maxNrOfLevels                       INTEGER ::= 256
maxNrOfPoints                       INTEGER ::= 15
maxNrOfExpInfo                      INTEGER ::= 32
maxNrOfMeasNCell                    INTEGER ::= 32
maxNrOfMeasurements                 INTEGER ::= 16
maxNrOfSets                         INTEGER ::= 3

-- **************************************************************
--
-- IEs
--
-- **************************************************************

id-Cause                                        ProtocolIE-ID ::= 1
id-CriticalityDiagnostics                       ProtocolIE-ID ::= 2
id-GPS-UTRAN-TRU                                ProtocolIE-ID ::= 3
id-InformationExchangeID                        ProtocolIE-ID ::= 4
id-InformationExchangeObjectType-InfEx-Rprt     ProtocolIE-ID ::= 5
id-InformationExchangeObjectType-InfEx-Rqst     ProtocolIE-ID ::= 6
id-InformationExchangeObjectType-InfEx-Rsp      ProtocolIE-ID ::= 7
id-InformationReportCharacteristics             ProtocolIE-ID ::= 8
id-InformationType                              ProtocolIE-ID ::= 9
id-MeasuredResultsList                          ProtocolIE-ID ::= 10
id-MessageStructure                             ProtocolIE-ID ::= 19
id-MethodType                                   ProtocolIE-ID ::= 11
id-RefPosition-InfEx-Rqst                       ProtocolIE-ID ::= 12
id-RefPosition-InfEx-Rsp                        ProtocolIE-ID ::= 13
id-RefPosition-Inf-Rprt                         ProtocolIE-ID ::= 14
id-RequestedDataValue                           ProtocolIE-ID ::= 15
id-RequestedDataValueInformation                ProtocolIE-ID ::= 16
id-TransactionID                                ProtocolIE-ID ::= 17
id-UE-PositionEstimate                          ProtocolIE-ID ::= 18
id-CellId-MeasuredResultsSets                   ProtocolIE-ID ::= 20
id-TypeOfError                                  ProtocolIE-ID ::= 21
id-OTDOA-MeasurementGroup                       ProtocolIE-ID ::= 22

END
```

/* partly omitted */