**3GPP TSG-RAN WG3 Meeting #109-e**

 **– 28 August 2020**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  |  | **CR** |   | **rev** |  | **Current version:** |  |  |
|  |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network | **x** | Core Network | **X** |

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|  |
| ***Title:***  | Support OTDOA assistance data for case of NR serving cell |
|  |  |
| ***Source to WG:*** | Qualcomm Incorporated |
| ***Source to TSG:*** |  |
|  |  |
| ***Work item code:*** |  |  | ***Date:*** |  |
|  |  |  |  |  |
| ***Category:*** |  |  | ***Release:*** |  |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)Rel-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* |
|  |  |
| ***Reason for change:*** | When the UE is served by a NR cell, and the LMF requests the UE to perform measurements for OTDOA positioning, the LMF may provide assistance data including optionally timing information to enable the UE to quickly acquire the LTE reference cell. However the LMF is not aware of timing relationships between the LTE and NR cells because it does receive the SFN Initialization Time for NR cells, although it is of course able to do so for LTE cells. |
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| ***Summary of change:*** | The *OTDOA Cell Information* IE is enhanced to include the relevant NR IEs:* CGI NR
* SFN Initialisation Time NR

Since the OTDOA Information Exchange procedure is not restricted to ng-eNBs, this enables the LMF to retrieve timing and access point location information for cells in a gNB, from which it becomes possible to construct the assistance data in LPP. |
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| ***Consequences if not approved:*** | LMF is not able to construct the assistance data to help UE quickly acquire the LTE reference cell.  |
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| ***Clauses affected:*** | 9.2.15, 9.2.X, 9.3.5, 9.3.7 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **x** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **x** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **x** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

### 9.2.15 OTDOA Cell Information

This IE contains OTDOA information of a cell/TP.

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| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| **OTDOA Cell Information** |  | *1 .. <maxnoOTDOAtypes>* |  |  |
| >CHOICE *OTDOA Cell Information Item* | M |  |  |  |
| >>PCI EUTRA | M |  | INTEGER (0..503, …) | Physical Cell ID of the reported E-UTRA cell. |
| >>CGI EUTRA | M |  | 9.2.7 | Cell Global Identifier of the E-UTRA cell. |
| >>TAC | M |  | 9.2.11 | Tracking Area Code |
| >>EARFCN | M |  | INTEGER (0.. 262143, …) | Corresponds to NDL for FDD and NDL/UL for TDD in ref. TS 36.104 [7]. |
| >>PRS Bandwidth EUTRA | M |  | ENUMERATED (bw6, bw15, bw25, bw50, bw75, bw100, ...) | Transmission bandwidth of PRS |
| >>PRS Configuration Index EUTRA | M |  | INTEGER (0..4095, ...) | PRS Configuration Index, ref TS 36.211 [10] |
| >>CP Length EUTRA | M |  | ENUMERATED (Normal, Extended, ...) | Cyclic prefix length of the PRS |
| >>Number of DL Frames EUTRA | M |  | ENUMERATED (sf1, sf2, sf4, sf6, …)  | Number of consecutive downlink subframes NPRS with PRS, ref TS 36.211 [10] |
| >>Number of Antenna Ports EUTRA | M |  | ENUMERATED(n1-or-n2, n4, …) | Number of used antenna ports, where n1-or-n2 corresponds to 1 or 2 ports, n4 corresponds to 4 ports |
| >>SFN Initialisation Time EUTRA | M |  | BIT STRING (64) | Time in seconds relative to 00:00:00 on 1 January 1900 (calculated as continuous time without leap seconds and traceable to a common time reference) where binary encoding of the integer part is in the first 32 bits and binary encoding of the fraction part in the last 32 bits. The fraction part is expressed with a granularity of 1 /2\*\*32 second. |
| >>NG-RAN Access Point Position | M |  | 9.2.10 | The configured estimated geographical position of the antenna of the cell/TP. |
| >>PRS Muting Configuration EUTRA | M |  | 9.2.16  | The configuration of positioning reference signals muting pattern. |
| >>PRS-ID EUTRA | M |  | INTEGER (0..4095, …) | PRS ID, ref TS 36.211 [10]. |
| >>TP-ID EUTRA | M |  | INTEGER (0..4095, …) | Identity of the transmission point. This IE together with the *PCI* and/or *PRS-ID* may be used to identify the transmission point in case the same physical cell ID is shared by multiple transmission points. |
| >>TP Type EUTRA | M |  | ENUMERATED (prs-only-tp, …) | A TP which transmits PRS only. |
| >>Number of DL Frames-Extended EUTRA | M |  | INTEGER (1..160, …) | Number of consecutive downlink subframes NPRS with PRS, ref TS 36.211 [10]. |
| >>CRS CP Length EUTRA | M |  | ENUMERATED (Normal, Extended, ...) | Cyclic prefix length of the CRS. |
| >>DL Bandwidth EUTRA | M |  | ENUMERATED (bw6, bw15, bw25, bw50, bw75, bw100, ...) | DL transmission bandwidth expressed in units of resource blocks NRB, ref TS 36.104 [7]. |
| >>PRS Occasion Group EUTRA | M |  | ENUMERATED (og2, og4, og8, og16, og32, og64, og128, ...) | PRS occasion group in a PRS period, ref TS 36.211 [10]. |
| >>PRS Frequency Hopping Configuration EUTRA | M |  | 9.2.17  | PRS frequency hopping configuration. |
| >>TDD Configuration EUTRA | M |  | 9.2.18 | TDD specific physical channel configuration. |
| >>CGI NR | M |  | 9.2.X |  |
| >>SFN Initialisation Time NR | M |  | BIT STRING (64) | Time in seconds relative to 00:00:00 on 1 January 1900 (calculated as continuous time without leap seconds and traceable to a common time reference) where binary encoding of the integer part is in the first 32 bits and binary encoding of the fraction part in the last 32 bits. The fraction part is expressed with a granularity of 1 /2\*\*32 second. |

### 9.2.X CGI NR

The Cell Global Identifier NR is used to globally identify an NR cell.

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| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| PLMN identity | M |  | 9.2.8 |  |
| NR Cell Identifier | M |  | BIT STRING (36) |  |

### 9.3.5 Information Element definitions

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-- Information Element Definitions

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Cell-Portion-ID ::= INTEGER (0..4095,...)

CGI-EUTRA ::= SEQUENCE {

 pLMN-Identity PLMN-Identity,

 eUTRAcellIdentifier EUTRACellIdentifier,

 iE-Extensions ProtocolExtensionContainer { {CGI-EUTRA-ExtIEs} } OPTIONAL,

 ...

}

CGI-EUTRA-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

 ...

}

CGI-NR ::= SEQUENCE {

 pLMN-Identity PLMN-Identity,

 nRcellIdentifier NRCellIdentifier,

 iE-Extensions ProtocolExtensionContainer { {CGI-NR-ExtIEs} } OPTIONAL,

 ...

}

CGI-NR-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

 ...

}

CPLength-EUTRA ::= ENUMERATED {

 normal,

 extended,

 ...

}

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OTDOACells ::= SEQUENCE (SIZE (1.. maxCellinRANnode)) OF SEQUENCE {

 oTDOACellInfo OTDOACell-Information,

 iE-Extensions ProtocolExtensionContainer { {OTDOACells-ExtIEs} } OPTIONAL,

 ...

}

OTDOACells-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

 ...

}

OTDOACell-Information ::= SEQUENCE (SIZE (1..maxnoOTDOAtypes)) OF OTDOACell-Information-Item

OTDOACell-Information-Item ::= CHOICE {

 pCI-EUTRA PCI-EUTRA,

 cGI-EUTRA CGI-EUTRA,

 tAC TAC,

 eARFCN EARFCN,

 pRS-Bandwidth-EUTRA PRS-Bandwidth-EUTRA,

 pRS-ConfigurationIndex-EUTRA PRS-ConfigurationIndex-EUTRA,

 cPLength-EUTRA CPLength-EUTRA,

 numberOfDlFrames-EUTRA NumberOfDlFrames-EUTRA,

 numberOfAntennaPorts-EUTRA NumberOfAntennaPorts-EUTRA,

 sFNInitialisationTime-EUTRA SFNInitialisationTime-EUTRA,

 nG-RANAccessPointPosition NG-RANAccessPointPosition,

 pRSMutingConfiguration-EUTRA PRSMutingConfiguration-EUTRA,

 prsid-EUTRA PRS-ID-EUTRA,

 tpid-EUTRA TP-ID-EUTRA,

 tpType-EUTRA TP-Type-EUTRA,

 numberOfDlFrames-Extended-EUTRA NumberOfDlFrames-Extended-EUTRA,

 crsCPlength-EUTRA CPLength-EUTRA,

 dL-Bandwidth-EUTRA DL-Bandwidth-EUTRA,

 pRSOccasionGroup-EUTRA PRSOccasionGroup-EUTRA,

 pRSFrequencyHoppingConfiguration-EUTRA PRSFrequencyHoppingConfiguration-EUTRA,

 oTDOACell-Information-Item-Extension ProtocolIE-Single-Container {{ OTDOACell-Information-Item-ExtensionIE }}

}

OTDOACell-Information-Item-ExtensionIE NRPPA-PROTOCOL-IES ::= {

 { ID id-TDD-Config-EUTRA-Item CRITICALITY ignore TYPE TDD-Config-EUTRA-Item PRESENCE optional }|

 { ID id-cGI-NR CRITICALITY ignore TYPE CGI-NR PRESENCE optional }|

 { ID id-sFNInitialisationTime-NR CRITICALITY ignore TYPE sFNInitialisationTime-EUTRA PRESENCE optional },

...

}

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### 9.3.7 Constant definitions

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-- Constant definitions

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--

-- IEs

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

id-Cause ProtocolIE-ID ::= 0

id-CriticalityDiagnostics ProtocolIE-ID ::= 1

id-LMF-UE-Measurement-ID ProtocolIE-ID ::= 2

id-ReportCharacteristics ProtocolIE-ID ::= 3

id-MeasurementPeriodicity ProtocolIE-ID ::= 4

id-MeasurementQuantities ProtocolIE-ID ::= 5

id-RAN-UE-Measurement-ID ProtocolIE-ID ::= 6

id-E-CID-MeasurementResult ProtocolIE-ID ::= 7

id-OTDOACells ProtocolIE-ID ::= 8

id-OTDOA-Information-Type-Group ProtocolIE-ID ::= 9

id-OTDOA-Information-Type-Item ProtocolIE-ID ::= 10

id-MeasurementQuantities-Item ProtocolIE-ID ::= 11

id-RequestedSRSTransmissionCharacteristics ProtocolIE-ID ::= 12

id-Cell-Portion-ID ProtocolIE-ID ::= 14

id-OtherRATMeasurementQuantities ProtocolIE-ID ::= 15

id-OtherRATMeasurementQuantities-Item ProtocolIE-ID ::= 16

id-OtherRATMeasurementResult ProtocolIE-ID ::= 17

id-WLANMeasurementQuantities ProtocolIE-ID ::= 19

id-WLANMeasurementQuantities-Item ProtocolIE-ID ::= 20

id-WLANMeasurementResult ProtocolIE-ID ::= 21

id-TDD-Config-EUTRA-Item ProtocolIE-ID ::= 22

id-cGI-NR ProtocolIE-ID ::= XX

id-sFNInitialisationTime-NR ProtocolIE-ID ::= YY