**3GPP TSG-RAN2#118 Meeting *R2-220***

**Electronic, 9th– 20th May, 2022**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **37.355** | **CR** |  | **rev** | - | **Current version:** | **17.0.0** |  |
|  |
| *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 | **X** | Radio Access Network |  | Core Network | **X** |

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|  |
| ***Title:***  | [H060] Correction on DL-AoD additional measurement |
|  |  |
| ***Source to WG:*** | Huawei, HiSilicon |
| ***Source to TSG:*** | RAN2 |
|  |  |
| ***Work item code:*** | NR\_pos\_enh-Core |  | ***Date:*** | 2022-05-09  |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-17 |
|  | *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-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
|  |  |
| ***Reason for change:*** | RAN1 informed in R2-2204420 (issue 6) that for Rel-17 DL-AoD, the first RSRP meausrement is mandatory, whilie the additional RSRP measurements and all the RSRPP measurements can be optional.

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| **DL-AOD** **(Issue #6)** | **For RAN1 agreements “The requested PRS measurement can be DL PRS RSRP and/or path PRS RSRP. ”, is there a need to request and provide only the RSRPP measurements for the additional measurements (without legacy RSRP)?** | **RAN1 provides further clarifications on the issue** |
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| ***For Issue#6,*** *RAN1 have reached the following agreement in RAN1#108e:****Agreement****For the reporting of first path DL-PRS RSRPP in DL AOD,* * *For the 1st measurement, the report includes DL PRS RSRP and optionally DL PRS RSRPP using absolute reporting*
* *For additional measurement, at least one of the two following measurement is reported:*
	+ *First path DL PRS RSRPP can be optionally reported using differential reporting with the first measurement of DL PRS RSRPP,*
	+ *DL PRS RSRP can be optionally reported using differential reporting with the first measurement of DL PRS RSRP.*
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| ***Summary of change:*** | 1. Introduce a new IE structure NR-DL-AoD-AdditionalMeasurementElement-r17 for the additional measurements for DL-AoD, so that both DL-PRS-RSRP and DL-PRS-RSRPP can be optional.2. Removed the fields with –r17 suffix from additional measurements corresponding to the Rel-16 IE.3. Added restriction that the additional measurements shall only be reported via either NR-DL-AoD-AdditionalMeasurementElement-r16 or NR-DL-AoD-AdditionalMeasurementElement-r17.4. Fixed the value of the constant maxAddMeasAoD-r17.5. Several editorial issues |
|  |  |
| ***Consequences if not approved:*** | **Impact analysis****Impacted 5G architecture options:**SA, NE-DC, NR-DC**Impacted functionality:**DL-AoD**Inter-operability:**If the UE or the network is not implemented according to the UE while the other entity is, the network is not able to successfully decode the message. |
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| ***Clauses affected:*** | 6.5.11.4, 6.6 |
|  |  |
|  | **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:*** | Ver0 in RAN2#118e: |

==================================CHANGE BEGINS===================================

#### 6.5.11.4 NR DL-AoD Location Information Elements

– *NR-DL-AoD-SignalMeasurementInformation*

The IE *NR-DL-AoD-SignalMeasurementInformation* is used by the target device to provide NR DL-AoD measurements to the location server.

Editor's Note: FFS on "multiple measurement instances":
Agreement: Support enabling

- A UE to report one or more measurement instances (of RSTD, DL RSRP, and/or UE Rx-Tx time difference measurements) in a single measurement report to LMF for UE-assisted positioning, and

- A TRP to report one or more measurement instances (of RTOA, UL RSRP, and/or gNB Rx-Tx time difference measurements) in a single measurement report to LMF, and

- Each measurement instance is reported with its own timestamp

- FFS: The measurement instances are within a [configured] measurement time window

- FFS: Each UE measurement instance can be configured with N instances of the DL-PRS Resource Set

- FFS: N (including N=1)

- FFS: Each TRP measurement instance can be configured with M SRS measurement time occasions

- FFS: M (including M=1)

- FFS: details of signalling, procedures, and UE capability if any

- FFS: whether and how to consider the additional enhancement related to measurement reporting of multi-paths and quality metric

 Note 1: A measurement instance refers to one or more measurements, which can either be the same or different types, which are obtained from the same DL PRS resource(s), or the same UL SRS resource(s).

 Note 2: This enhancement has no intention to change the mapping of measurement types to Rel-16 positioning techniques and no intention to introduce new positioning techniques either.

-- ASN1START

NR-DL-AoD-SignalMeasurementInformation-r16 ::= SEQUENCE {

 nr-DL-AoD-MeasList-r16 NR-DL-AoD-MeasList-r16,

 ...

}

NR-DL-AoD-MeasList-r16 ::= SEQUENCE (SIZE(1..nrMaxTRPs-r16)) OF NR-DL-AoD-MeasElement-r16

NR-DL-AoD-MeasElement-r16 ::= SEQUENCE {

 dl-PRS-ID-r16 INTEGER (0..255),

 nr-PhysCellID-r16 NR-PhysCellID-r16 OPTIONAL,

 nr-CellGlobalID-r16 NCGI-r15 OPTIONAL,

 nr-ARFCN-r16 ARFCN-ValueNR-r15 OPTIONAL,

 nr-DL-PRS-ResourceID-r16 NR-DL-PRS-ResourceID-r16 OPTIONAL,

 nr-DL-PRS-ResourceSetID-r16 NR-DL-PRS-ResourceSetID-r16 OPTIONAL,

 nr-TimeStamp-r16 NR-TimeStamp-r16,

 nr-DL-PRS-RSRP-Result-r16 INTEGER (0..126),

 nr-DL-PRS-RxBeamIndex-r16 INTEGER (1..8) OPTIONAL,

 nr-DL-AoD-AdditionalMeasurements-r16

 NR-DL-AoD-AdditionalMeasurements-r16 OPTIONAL,

 ...,

 [[

 nr-DL-PRS-FirstPathRSRPP-Result-r17

 INTEGER (0..126) OPTIONAL,

 nr-LOS-NLOS-Indicator-r17 LOS-NLOS-Indicator-r17 OPTIONAL,

 nr-DL-AoD-AdditionalMeasurements-r17

 NR-DL-AoD-AdditionalMeasurements-r17 OPTIONAL

 ]]

}

NR-DL-AoD-AdditionalMeasurements-r16 ::= SEQUENCE (SIZE (1..7)) OF

 NR-DL-AoD-AdditionalMeasurementElement-r16

NR-DL-AoD-AdditionalMeasurements-r17 ::= SEQUENCE (SIZE (1..maxAddMeasAoD-r17)) OF

 NR-DL-AoD-AdditionalMeasurementElement-r17

NR-DL-AoD-AdditionalMeasurementElement-r16 ::= SEQUENCE {

 nr-DL-PRS-ResourceID-r16 NR-DL-PRS-ResourceID-r16 OPTIONAL,

 nr-DL-PRS-ResourceSetID-r16 NR-DL-PRS-ResourceSetID-r16 OPTIONAL,

 nr-TimeStamp-r16 NR-TimeStamp-r16,

 nr-DL-PRS-RSRP-ResultDiff-r16 INTEGER (0..30),

 nr-DL-PRS-RxBeamIndex-r16 INTEGER (1..8) OPTIONAL,

 ...,

}

NR-DL-AoD-AdditionalMeasurementElement-r17 ::= SEQUENCE {

 nr-DL-PRS-ResourceID-r17 NR-DL-PRS-ResourceID-r16 OPTIONAL,

 nr-DL-PRS-ResourceSetID-r17 NR-DL-PRS-ResourceSetID-r16 OPTIONAL,

 nr-TimeStamp-r17 NR-TimeStamp-r16, OPTIONAL,

 nr-DL-PRS-RSRP-ResultDiff-r17 INTEGER (0..30),

 nr-DL-PRS-RxBeamIndex-r17 INTEGER (1..8) OPTIONAL,

 nr-DL-PRS-FirstPathRSRPP-ResultDiff-r17

 INTEGER (0..30) OPTIONAL,

 nr-LOS-NLOS-Indicator-r17 LOS-NLOS-Indicator-r17 OPTIONAL

 ...,

}

-- ASN1STOP

| ***NR-DL-AoD-SignalMeasurementInformation* field descriptions** |
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| ***dl-PRS-ID***This field is used along with a DL-PRS Resource Set ID and a DL-PRS Resources ID to uniquely identify a DL-PRS Resource. This ID can be associated with multiple DL-PRS Resource Sets associated with a single TRP.Each TRP should only be associated with one such ID. |
| ***nr-PhysCellID***This field specifies the physical cell identity of the associated TRP, as defined in TS 38.331 [35]. |
| ***nr-CellGlobalID***This field specifies the NCGI, the globally unique identity of a cell in NR, of the associated TRP, as defined in TS 38.331 [35]. |
| ***nr-ARFCN***This field specifies the NR-ARFCN of the TRP's CD-SSB (as defined in TS 38.300 [47]) corresponding to *nr-PhysCellID*. |
| ***nr-TimeStamp***This field specifies the time instance at which the measurement is performed. |
| ***nr-DL-PRS-RSRP-Result***This field specifies the NR DL-PRS reference signal received power (DL PRS-RSRP) measurement, as defined in TS 38.215 [36]. The mapping of the measured quantity is defined as in TS 38.133 [46]. |
| ***nr-DL-PRS-RxBeamIndex***This field provides an index of the target device receive beam used for DL-PRS measurements. If the value of the receive beam index for two or more DL PRS measurements is the same, it indicates that the target device receive beam for the two or more DL PRS measurements were made with the same RX beam. The field is mandatory present if at least two DL-PRS RSRP measurements from the same DL-PRS Resource Set have been made with the same RX beam by the target device; otherwise it is not present. |
| ***nr-DL-AoD-AdditionalMeasurements-r16, nr-DL-AoD-AdditionalMeasurements-r17***This field provides the list of additional measurement for DL-AoD.If *nr-DL-AoD-AdditionalMeasurements-r17* is present, the field *nr-DL-AoD-AdditionalMeasurements-r16* shall not be present. |
| ***nr-DL-PRS-FirstPathRSRPP-Result***This field specifies the NR DL PRS reference signal received path power (DL PRS-RSRPP) of the first detected path in time, as defined in TS 38.215 [36]. The mapping of the measured quantity is defined as in TS 38.133 [46]. FFS |
| ***nr-LOS-NLOS-Indicator***This field specifies the target device's best estimate of the LOS or NLOS of the DL PRS-RSRP or First Path DL PRS-RSRPP measurement for the TRP or resource. |
| ***nr-DL-PRS-RSRP-ResultDiff***This field provides the additional DL-PRS RSRP measurement result relative to *nr-DL-PRS-RSRP-Result*. The DL-PRS RSRP value of this measurement is obtained by adding the value of this field to the value of the *nr-DL-PRS-RSRP-Result* field. The mapping of the field is defined in TS 38.133 [46]. |
| ***nr-DL-PRS-FirstPathRSRPP-ResultDiff***This field specifies the additional NR DL PRS reference signal received path power (DL PRS-RSRPP) of the first detected path in time relative to *nr-DL-PRS-FirstPathRSRPP-Result*. The First Path DL PRS-RSRPP value of this measurement is obtained by adding the value of this field to the value of the *nr-DL-PRS-FirstPathRSRPP-Result* field. The mapping of the field is defined in TS 38.133 [46]. FFS |

==================================NEXT CHANGE==================================

6.6 Multiplicity and type constraint values

*– Multiplicity and type constraint definitions*

-- ASN1START

maxEARFCN INTEGER ::= 65535 -- Maximum value of EUTRA carrier frequency

maxEARFCN-Plus1 INTEGER ::= 65536 -- Lowest value extended EARFCN range

maxEARFCN2 INTEGER ::= 262143 -- Highest value extended EARFCN range

maxMBS-r14 INTEGER ::= 64

maxWLAN-AP-r13 INTEGER ::= 64

maxKnownAPs-r14 INTEGER ::= 2048

maxVisibleAPs-r14 INTEGER ::= 32

maxWLAN-AP-r14 INTEGER ::= 128

maxWLAN-DataSets-r14 INTEGER ::= 8

maxBT-Beacon-r13 INTEGER ::= 32

nrMaxBands-r16 INTEGER ::= 1024 -- Maximum number of supported bands in

 -- UE capability.

nrMaxFreqLayers-r16 INTEGER ::= 4 -- Max freq layers

nrMaxFreqLayers-1-r16 INTEGER ::= 3

nrMaxNumDL-PRS-ResourcesPerSet-1-r16 INTEGER ::= 63

nrMaxNumDL-PRS-ResourceSetsPerTRP-1-r16 INTEGER ::= 7

nrMaxResourceIDs-r16 INTEGER ::= 64 -- Max Resource IDs

nrMaxResourceOffsetValue-1-r16 INTEGER ::= 511

nrMaxResourcesPerSet-r16 INTEGER ::= 64 -- Maximum resources for one set

nrMaxSetsPerTrpPerFreqLayer-r16 INTEGER ::= 2 -- Maximum resource sets for one TRP

nrMaxSetsPerTrpPerFreqLayer-1-r16 INTEGER ::= 1

nrMaxTRPs-r16 INTEGER ::= 256 -- Max TRPs per UE

nrMaxTRPsPerFreq-r16 INTEGER ::= 64 -- Max TRPs per freq layers

nrMaxTRPsPerFreq-1-r16 INTEGER ::= 63

maxSimultaneousBands-r16 INTEGER ::= 4 -- Maximum number of simultaneously

 -- measured bands

maxBandComb-r16 INTEGER ::= 1024

nrMaxConfiguredBands-r16 INTEGER ::= 16

maxNumOfRxTEGs-1-r17 INTEGER ::= 31 -- FFS

maxNumOfTxTEGs-1-r17 INTEGER ::= 7 -- FFS

maxTxTEG-Sets-r17 INTEGER ::= 64 -- FFS 8 TxTEGs and max 8 time stamps

maxNumOfRxTxTEGs-1-r17 INTEGER ::= 255 -- FFS

maxNumOfTRP-TxTEGs-1-r17 INTEGER ::= FFS

maxNumOfSRS-PosResourceSets-r17 INTEGER ::= 16

maxNumOfSRS-PosResourceSets-1-r17 INTEGER ::= 15

maxNumOfSRS-PosResources-r17 INTEGER ::= 64

maxNumOfSRS-PosResources-1-r17 INTEGER ::= 63

maxNumResourcesPerAngle-r17 INTEGER ::= 24 -- FFS

maxNumPrioResources-r17 INTEGER ::= 24 -- FFS

maxAddMeasTDOA-r17 INTEGER ::= 31 -- (4x8)-1 FFS

maxAddMeasAoD-r17 INTEGER ::= 23

maxAddMeasRTT-r17 INTEGER ::= 31 -- (4x8)-1 FFS

maxDL-PRS-Configs-r17 INTEGER ::= 8

maxCellIDsIDsPerArea-r17 INTEGER ::= FFS

maxAreaIDs-r17 INTEGER ::= FFS

-- ASN1STOP

==================================END OF CHANGES==================================