**3GPP TSG-RAN2 Meeting #111 *R2-2006588***

**E-meeting, August 2020**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.306** | **CR** | **Draft-CR** | **rev** | **-** | **Current version:** | **16.1.0** |  |
|  | | | | | | | | |
| *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 | **X** | Core Network |  |

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| ***Title:*** | Draft 38.306 CR for V2X UE capability (for RAN2 capability) | | | | | | | | | |
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| ***Source to WG:*** | OPPO | | | | | | | | | |
| ***Source to TSG:*** | RAN2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | 5G\_V2X\_NRSL-Core | | | | |  | ***Date:*** | | | 2020-7-30 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-16 |
|  | *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 can be 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:*** | | Based on the following agreement from RAN2#111-E  TBD  To add V2X UE capability. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | TBD | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | RAN2#111-E agreement on V2X UE capability is missing. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 4.2.7.4, 4.2.16, A.4 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **X** |  | Other core specifications | | | | TS/TR 38.331 Draft-CR R2-2006589 | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

*Start Change*

#### 4.2.7.4 *CA-ParametersNR*

| Definitions for parameters | Per | M | FDD-TDD  DIFF | FR1-FR2  DIFF |
| --- | --- | --- | --- | --- |
| ***asyncDAPS-r16***  Indicates whether the UE supports asynchronous DAPS handover. | BC | No | N/A | N/A |
| ***crossCarrierA-CSI-trigDiffSCS-r16***  Indicates the UE support of handling A-CSI trigger with cross carrier scheduling with different SCS. Value *higherA-CSI-SCS* indicates the UE support of PDCCH cell of lower SCS and A-CSI RS cell of higher SCS and value *lowerA-CSI-SCS* indicates the UE support of PDCCH cell of higher SCS and A-CSI RS cell of lower SCS, and value *both* indicates the support of both variations. A UE supporting this feature shall also indicate support of CSI-RS and CSI-IM reception for CSI feedback using *csi-RS-IM-ReceptionForFeedback* | BC | No | N/A | N/A |
| ***csi-RS-IM-ReceptionForFeedbackPerBandComb***  Indicates support of CSI-RS and CSI-IM reception for CSI feedback. This capability signalling comprises the following parameters:  - *maxNumberSimultaneousNZP-CSI-RS-ActBWP-AllCC* indicates the maximum number of simultaneous CSI-RS resources in active BWPs across all CCs, and across MCG and SCG in case of NR-DC. This parameter limits the total number of NZP-CSI-RS resources that the NW may configure across all CCs, and across MCG and SCG in case of NR-DC (irrespective of the associated codebook type). The network applies this limit in addition to the limits signalled in *MIMO-ParametersPerBand-> maxNumberSimultaneousNZP-CSI-RS-PerCC* and in *Phy-ParametersFRX-Diff-> maxNumberSimultaneousNZP-CSI-RS-PerCC*;  - *totalNumberPortsSimultaneousNZP-CSI-RS-ActBWP-AllCC* indicates the total number of CSI-RS ports in simultaneous CSI-RS resources in active BWPs across all CCs, and across MCG and SCG in case of NR-DC. This parameter limits the total number of ports that the NW may configure across all NZP-CSI-RS resources across all CCs, and across MCG and SCG in case of NR-DC (irrespective of the associated codebook type). The network applies this limit in addition to the limits signalled in *MIMO-ParametersPerBand-> totalNumberPortsSimultaneousNZP-CSI-RS-PerCC* and in *Phy-ParametersFRX-Diff-> totalNumberPortsSimultaneousNZP-CSI-RS-PerCC*.  The UE is mandated to report csi-RS-IM-ReceptionForFeedbackPerBandComb. | BC | Yes | N/A | N/A |
| ***defaultQCL-CrossCarrierA-CSI-Trig-r16***  Indicates whether the UE can be configured with *enabledDefaultBeamForCCS* for default QCL assumption for cross-carrier A-CSI-RS triggering for same/different numerologies as specified in TS 38.213 11]. | BC | No | N/A | N/A |
| ***diffNumerologyAcrossPUCCH-Group***  Indicates whether different numerology across two NR PUCCH groups for data and control channel at a given time in NR CA and (NG)EN-DC/NE-DC is supported by the UE. | BC | No | N/A | N/A |
| ***diffNumerologyWithinPUCCH-GroupLargerSCS***  Indicates whether UE supports different numerology across carriers within a PUCCH group and a same numerology between DL and UL per carrier for data/control channel at a given time in NR CA, (NG)EN-DC/NE-DC and NR-DC.  In case of NR CA and (NG)EN-DC/NE-DC with one NR PUCCH group and in case of NR CA with two NR PUCCH groups, it also indicates whether the UE supports different numerologies across NR carriers within the same NR PUCCH group up to two different numerologies within the same NR PUCCH group, wherein NR PUCCH is sent on the carrier with larger SCS for data and control channel at a given time.  In case of (NG)EN-DC/NE-DC with two NR PUCCH groups, it indicates whether the UE supports different numerologies across NR carriers up to two different numerologies within an NR PUCCH group in FR1, wherein NR PUCCH is sent on the carrier with larger SCS, and same numerology across NR carriers within another NR PUCCH group in FR2 for data and control channel at a given time.  In case of NR-DC, it indicates whether the UE supports different numerologies across NR carriers within the same NR PUCCH group in MCG (in FR1) up to two different numerologies within the same NR PUCCH group wherein NR PUCCH is sent on the carrier with larger SCS for data/control channel at a given time; and same numerology across NR carriers in SCG (in FR2). | BC | No | N/A | N/A |
| ***diffNumerologyWithinPUCCH-GroupSmallerSCS***  Indicates whether UE supports different numerology across carriers within a PUCCH group and a same numerology between DL and UL per carrier for data/control channel at a given time in NR CA, (NG)EN-DC/NE-DC and NR-DC.  In case of NR CA and (NG)EN-DC/NE-DC with one NR PUCCH group and in case of NR CA with two NR PUCCH groups, it also indicates whether the UE supports different numerologies across NR carriers within the same NR PUCCH group up to two different numerologies within the same NR PUCCH group, wherein NR PUCCH is sent on the carrier with smaller SCS for data and control channel at a given time.  In case of (NG)EN-DC/NE-DC with two NR PUCCH groups, it indicates whether the UE supports different numerologies across NR carriers up to two different numerologies within an NR PUCCH group in FR1, wherein NR PUCCH is sent on the carrier with smaller SCS, and same numerology across NR carriers within another NR PUCCH group in FR2 for data and control channel at a given time.  In case of NR-DC, it indicates whether the UE supports different numerologies across NR carriers within the same NR PUCCH group in MCG (in FR1) up to two different numerologies within the same NR PUCCH group wherein NR PUCCH is sent on the carrier with smaller SCS for data/control channel at a given time; and same numerology across NR carriers in SCG (in FR2). | BC | No | N/A | N/A |
| ***dualPA-Architecture***  For band combinations with single-band with UL CA, this field indicates the support of dual PA. If absent in such band combinations, the UE supports single PA for all the ULs. For other band combinations, this field is not applicable. | BC | No | N/A | N/A |
| ***dynamicPowersharingDAPS-r16***  Indicates the value of T offset (short or long) for the UE supports dynamic UL power sharing during DAPS handover between source and target cells of same FR. It is only applicable to DAPS HO in synchronous scenarios. The UE can include this field only if *semiStaticPowerSharingDAPS-Mode1-r16* is present. Otherwise, the UE does not include this field. | BC | No | N/A | N/A |
| ***half-DuplexTDD-CA-SameSCS-r16***  Indicates whether the UE supports directional collision handling between reference and other cell(s) for half-duplex operation in TDD CA with same SCS. | BC | No | N/A | N/A |
| ***interCA-NonAlignedFrame-r16***  Indicates whether the UE supports inter-band carrier aggregation operation where the frame boundaries of the PCell and the SCell(s) are not aligned, while the slot boundaries are aligned. | BC | No | N/A | N/A |
| ***interFreqDAPS-r16***  Indicates whether the UE supports DAPS in source PCell and inter-frequency target PCell, e.g. support of simultaneous DL reception of PDCCH and PDSCH from source and target cell. | BC | No | N/A | N/A |
| ***interFreqDiffSCS-DAPS-r16***  Indicates whether UE supports different SCS in source PCell and inter-frequency target PCell in DPAS handover. The UE can include this field only if any of *semiStaticPowerSharingDAPS-Mode1-r16, semiStaticPowerSharingDAPS-Mode2-r16* or *dynamicPowersharingDAPS-r16* are present. Otherwise, the UE does not include this field. | BC | No | N/A | N/A |
| ***jointSearchSpaceGroupSwitchingAcrossCells-r16***  Indicates whether the UE supports being configured with a group of cells and switching search space set group jointly over these cells. If the UE supports this feature, the UE needs to report *searchSpaceSetGroupSwitchingwithDCI-r16* or *searchSpaceSetGroupSwitchingwithoutDCI-r16*. | BC | No | N/A | N/A |
| ***multiUL-TransmissionDAPS-r16***  Indicates that the UE supports simultaneous UL transmission in source PCell and target PCell. The UE can include this field only if *interFreqDAPS-r16* is present, and if any of *semiStaticPowerSharingDAPS-Mode1-r16, semiStaticPowerSharingDAPS-Mode2-r16* or *dynamicPowersharingDAPS-r16* are present. Otherwise, the UE does not include this field. | BC | No | N/A | N/A |
| ***msgA-SUL-r16***  Indicates whether the UE supports MSGA transmission in a band combination including SUL. A UE supporting this feature shall also indicate support of *twoStepRACH-r16*. | BC | No | N/A | N/A |
| ***parallelTxMSGA-SRS-PUCCH-PUSCH-r16***  Indicates whether the UE supports parallel transmission of MSGA and SRS/ PUCCH/ PUSCH across CCs in an inter-band CA band combination. | BC | No | N/A | N/A |
| ***parallelTxSRS-PUCCH-PUSCH***  Indicates whether the UE supports parallel transmission of SRS and PUCCH/ PUSCH across CCs in an inter-band CA band combination. | BC | No | N/A | N/A |
| ***parallelTxPRACH-SRS-PUCCH-PUSCH***  Indicates whether the UE supports parallel transmission of PRACH and SRS/PUCCH/PUSCH across CCs in an inter-band CA band combination. | BC | No | N/A | N/A |
| ***scellDormancyWithinActiveTime-r16***  Indicates whether the UE supports SCell dormancy indication received on SPCell with DCI format 0\_1/1\_1 sent within the active time as defined in clause 10.3 of TS 38.213 [11]. If the UE indicates the support of this, the UE supports one dormant BWP and at least one non-dormant BWP per carrier. | BC | No | N/A | N/A |
| ***scellDormancyOutsideActiveTime-r16***  Indicates whether the UE supports SCell dormancy indication received on SPCell using DCI format 2\_6 sent outside the active time as defined in clause 10.3 of TS 38.213 [11]. A UE supporting this feature shall also indicate support of power saving DRX adaptation using *drx-Adaptation-r16* and shall also support one dormant BWP and at least one non-dormant BWP per carrier. | BC | No | N/A | N/A |
| ***semiStaticPowerSharingDAPS-Mode1-r16***  Indicates whether the UE supports semi-static UL power sharing mode 1 during DAPS handover between source and target cells of same FR. The UE can include this field only if *interFreqDAPS-r16* is present. Otherwise, the UE does not include this field. | BC | No | N/A | N/A |
| ***semiStaticPowerSharingDAPS-Mode2-r16***  Indicates whether the UE supports semi-static UL power sharing mode 2 during DAPS handover between source and target cells of same FR. It is only applicable to DAPS HO in synchronous scenarios. The UE can include this field only if *semiStaticPowerSharingDAPS-Mode 1-r16* is present. Otherwise, the UE does not include this field. | BC | No | N/A | N/A |
| ***simultaneousCSI-ReportsAllCC***  Indicates whether the UE supports CSI report framework and the number of CSI report(s) which the UE can simultaneously process across all CCs, and across MCG and SCG in case of NR-DC. The CSI report comprises periodic, semi-persistent and aperiodic CSI and any latency classes and codebook types. The CSI report in *simultaneousCSI-ReportsAllCC* includes the beam report and CSI report. This parameter may further limit *simultaneousCSI-ReportsPerCC* in *MIMO-ParametersPerBand* and *Phy-ParametersFRX-Diff* for each band in a given band combination. | BC | Yes | N/A | N/A |
| ***simul-SRS-Trans-InterBandCA-r16***  Indicates the number of SRS resources for positioning on a symbol for inter-band CA. The UE can include this field only if the UE supports *srs-PosResources-r16*. Otherwise, the UE does not include this field; | BC | No | N/A | N/A |
| ***simultaneousRxTxInterBandCA***  Indicates whether the UE supports simultaneous transmission and reception in TDD-TDD and TDD-FDD inter-band NR CA. It is mandatory for certain TDD-FDD and TDD-TDD band combinations defined in TS 38.101-1 [2], TS 38.101-2 [3] and TS 38.101-3 [4]. | BC | CY | N/A | N/A |
| ***simultaneousRxTxSUL***  Indicates whether the UE supports simultaneous reception and transmission for a NR band combination including SUL. Mandatory/Optional support depends on band combination and captured in TS 38.101-1 [2]. | BC | CY | N/A | N/A |
| ***simultaneousSRS-AssocCSI-RS-AllCC***  Indicates support of CSI-RS processing framework for SRS and the number of SRS resources that the UE can process simultaneously across all CCs, and across MCG and SCG in case of NR-DC, including periodic, aperiodic and semi-persistent SRS. This parameter may further limit *simultaneousSRS-AssocCSI-RS-PerCC* in *MIMO-ParametersPerBand* and *Phy-ParametersFRX-Diff* for each band in a given band combination. | BC | No | N/A | N/A |
| ***supportedCSI-RS-ResourceListAlt-r16***  Indicates the list of supported CSI-RS resources across all bands in a band combination by referring to *codebookVariantsList*. The following parameters are included in *codebookVariantsList* for each code book type:  - *maxNumberTxPortsPerResource* indicates the maximum number of Tx ports in a resource across all bands within a band combination;  - *maxNumberResourcesPerBand* indicates the maximum number of resources across all CCs within a band combination, simultaneously;  - *totalNumberTxPortsPerBand* indicates the total number of Tx ports across all CCs within a band combination, simultaneously.  For each band in a band combination, supported values for these three parameters are determined in conjunction with *supportedCSI-RS-ResourceListAlt* reported in *MIMO-ParametersPerBand*. | BC | No | N/A | N/A |
| ***supportedNumberTAG***  Defines the number of timing advance groups supported by the UE. It is applied to NR CA, NR-DC, (NG)EN-DC/NE-DC and DAPS handover. For (NG)EN-DC/NE-DC, it indicates number of TAGs only for NR CG. The number of TAGs for the LTE MCG is signalled by existing LTE TAG capability signalling. For NR CA/NR-DC band combination, if the band combination comprised of more than one band entry (i.e., inter-band or intra-band non-contiguous band combination), it indicates that different timing advances on different band entries are supported. If absent, the UE supports only one TAG for the NR part. It is mandatory for the UE to support more than one TAG for NR-DC and it is mandatory for the UE to support 2 TAGs for inter frequency DAPS. | BC | CY | N/A | N/A |
| ***ul-TransCancellationDAPS-r16***  Indicates support of cancelling UL transmission to the source PCell for inter-frequency DAPS-HO. The UE can include this field only if *interFreqDAPS-r16* is present. Otherwise, the UE does not include this field. | BC | No | N/A | N/A |

*Next Change*

### 4.2.16 Sidelink Parameters

#### 4.2.16.1 Sidelink Parameters in NR

##### 4.2.16.1.1 Sidelink General Parameters

| Definitions for parameters | Per | M | FDD-TDD DIFF | **FR1-FR2**  DIFF |
| --- | --- | --- | --- | --- |
| ***accessStratumReleaseSidelink-r16***  Indicates the access stratum release for NR sidelink communication the UE supports as specified in TS 38.331 [9]. | UE | Yes | No | No |

##### 4.2.16.1.2 Sidelink PDCP Parameters

| Definitions for parameters | Per | M | FDD-TDD  DIFF | FR1-FR2  DIFF |
| --- | --- | --- | --- | --- |
| ***outOfOrderDeliverySidelink-r16***  Indicates whether UE supports out of order delivery of data to upper layers by PDCP for sidelink. | UE | No | No | No |

##### 4.2.16.1.3 Sidelink RLC Parameters

| Definitions for parameters | Per | M | FDD-TDD  DIFF | FR1-FR2  DIFF |
| --- | --- | --- | --- | --- |
| ***am-WithLongSN-Sidelink-r16***  Indicates whether the UE supports AM DRB with 18 bit length of RLC sequence number for sidelink. | UE | No | No | No |
| ***um-WithLongSN-Sidelink-r16***  Indicates whether the UE supports UM DRB with 12 bit length of RLC sequence number for sidelink. | UE | No | No | No |

##### 4.2.16.1.4 Sidelink MAC Parameters

| Definitions for parameters | Per | M | FDD-TDD  DIFF | FR1-FR2  DIFF |
| --- | --- | --- | --- | --- |
| ***lcp-RestrictionSidelink-r16***  Indicates whether UE supports the selection of logical channels for each SL grant based on RRC configured restriction. | UE | No | No | No |
| ***logicalChannelSR-DelayTimerSidelink-r16***  Indicates whether the UE supports the logicalChannelSR-DelayTimer as specified in TS 38.321 [8] for sidelink logical channel(s). | UE | No | Yes | No |
| ***multipleSR-ConfigurationsSidelink-r16***  Indicates whether the UE supports 8 SR configurations per PUCCH cell group as specified in TS 38.321 [8] for sidelink. | UE | No | Yes | No |
| ***multipleConfiguredGrantsSidelink-r16***  Indicates whether UE supports 8 sidelink configured grant configurations (including both Type 1 and Type 2) in a resource pool. If absent, for each resource pool, the UE only supports one sidelink configured grant configuration. | UE | No | No | No |

##### 4.2.16.1.5 Other PHY parameters

| Definitions for parameters | Per | M | FDD-TDD  DIFF | FR1-FR2  DIFF |
| --- | --- | --- | --- | --- |
| ***supportedBandCombinationListSidelink-r16***  Defines the supported NR sidelink communication and/or V2X sidelink communication band combinations by the UE. A fallback band combination resulting from the reported sidelink band combination shall be supported by the UE | UE | No | No | No |
| ***supportedBandCombinationListSidelinkNR-r16***  Defines the supported joint NR sidelink communication band combinations by the UE. A fallback band combination resulting from the reported sidelink band combination shall be supported by the UE | UE | No | No | No |

#### 4.2.16.2 Sidelink Parameters in E-UTRA

|  |  |  |  |
| --- | --- | --- | --- |
| Descriptions for parameters | Per | M | FDD-TDD DIFF |
| ***supportedBandListSidelinkEUTRA-r16***  Indicates E-UTRA frequency bands supported for V2X communications and parameters supported for each frequency band, as specified in 4.2.16.2.1. | UE | No | No |

##### 4.2.16.2.1 *BandSideLinkEUTRA* parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Descriptions for parameters | Per | M | FDD-TDD DIFF |
| ***gnb-ScheduledSidelinkMode3SidelinkEUTRA-r16***  Indicates whether transmitting V2X sidelink communication mode 3 scheduled by NR Uu is supported. If supported, this parameter indicates the support of the capabilities and includes the parameters as follows:  - the UE can be scheduled by gNB using DCI format 3\_1 for V2X sidelink mode 3 transmission.  - *gnb-ScheduledMode3DelaySidelinkEUTRA*, which indicates the minimum value UE supports for the additional time indicated in the NR DCI scheduling V2X sidelink mode 3. Value ms0 corresponds to 0 ms, ms0dot25 corresponds to 0.25 ms, and so on.  This field is only applicable if the UE supports V2X sidelink communication. | Band | No | No |
| ***gnb-ScheduledSidelinkMode4SidelinkEUTRA-r16***  Indicates whether the UE can be scheduled by gNB for V2X sidelink mode 4 transmission. This field is only applicable if the UE supports V2X sidelink communication. | Band | No | No |

*Next Change*

# Annex A.4: Sidelink capabilities applicable to Uu and PC5

Annex A.Y specifies for each sidelink related capability, in which interface (i.e., *UECapabilityInformation* in Uu RRC and *UECapabilityInformation*Sidelink in PC5 Uu) a UE supporting sidelink shall report the concerned capability:

*UECapabilityInformation*: the concerned sidelink capability is reported within *UECapabilityInformation*;

*UECapabilityInformationSidelink*: the concerned sidelink capability is reported within *UECapabilityInformationSidelink;*

Table A.4-1: Sidelink capability reported in *UECapabilityInformation*/ *UECapabilityInformationSidelink*

|  |  |  |
| --- | --- | --- |
| Sidelink Parameter | *UECapabilityInformation* | *UECapabilityInformationSidelink* |
| accessStratumReleaseSidelink |  | X |
| outOfOrderDeliverySidelink |  | X |
| am-WithLongSN-Sidelink | X | X |
| um-WithLongSN-Sidelink | X | X |
| lcp-RestrictionSidelink | X |  |
| logicalChannelSR-DelayTimerSidelink | X |  |
| multipleSR-ConfigurationsSidelink | X |  |
| multipleConfiguredGrantsSidelink |  | X |
| supportedBandCombinationListSidelink | X |  |
| supportedBandCombinationListSidelinkNR |  | X |
| gnb-ScheduledSidelinkMode3SidelinkEUTRA | X |  |
| gnb-ScheduledSidelinkMode4SidelinkEUTRA | X |  |

*End of Change*