**3GPP TSG- Meeting #**

**1 June - 12 June 2020**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.306** | **CR** | **Draft-CR** | **rev** | **-** | **Current version:** | **16.0.0** |  |
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| *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:*** | CR on PC5 capability on PC5-RRC and Uu-RRC (focusing on RAN2 capability) | | | | | | | | | |
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| ***Source to WG:*** | OPPO | | | | | | | | | |
| ***Source to TSG:*** | RAN2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | 5G\_V2X\_NRSL-Core | | | | |  | ***Date:*** | | | 2020-6-2 |
|  |  | | | |  | |  | | |  |
| ***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:*** | | In RAN2#109-E, the following agreements were reached  Agreements on UE capabilities:  1: In Uu-RRC, capture SL per-band capability as a sidelink band list within RF-parameters in UE-NR-Capability (pending final RAN1 conclusion on L1 feature list).  2: In Uu-RRC, introduce supported LTE / NR PC5 band combination(s) for each NR Uu band combination by referring to a list of PC6 band combinations.  3: In Uu-RRC, when rat-Type=nr, UE reports NR-PC5 capability for NR standalone / NR-DC controlled NR-PC5 via UE-NR-Capability.  4: In Uu-RRC, introduce supported NR PC5 band combination(s) for each LTE Uu band combination.  5: For PC5-RRC, include frequencyBandListFilter in UECapabilityEnquirySidelink to indicate the requested frequency band of sidelink capability report on PC5-RRC. RAN2 to confirm that rat-Type in not included in UECapabilityEnquirySidelink.  In RAN2#109bis-E, the following agreements were reached  Agreements on capabilities:  1: For LTE-Uu controlling NR-PC5, define the NR PC5 band combination in UE-EUTRA-Capability.  2: For NR-Uu controlling LTE-PC5, define the NR PC5 band combination in UE-NR-Capability.  3: Working assumption: The band combination of mixed LTE-PC5 and NR-PC5 will be reported, in addition to pure LTE-PC5 band combination and NR-PC5 band combination.  4: RRC\_CONNECTED UE reports the received SL capability via PC5-RRC to network.  5: RAN2 not pursue UE reporting the SL capability to network for network to transfer the SL capability to the counterpart UE.  6: For layer-2 buffer size, leave the decision of maximum data rate discussion to RAN1, and only focus on RTT in RAN2.  7: Disallow autonomous update of UE capability on PC5.  8: For SL capability report on Uu-RRC, introduce MAC parameters: a) LCP restriction, b) Logical channel SR-delay timer, c) Multiple CGs.  9: For SL capability report on PC5-RRC, introduce PDCP parameter: a) Out of order delivery.  In RAN2#110-E, the following agreements are reached:  Agreements on UE capabilities:  1a: For SL capability report on Uu-RRC, introduce RLC parameters: a) 12-bit SN length for UM, b) 18-bit SN for AM, and MAC parameter: multiple SR configuration.  1b: RRC specification will update SRB0, i.e. to 6bits.  2: RAN2 will wait for RAN1 decision on the capability of range-based HARQ feedback.  3: For SL capability report on Uu-RRC agreed in RAN2, they are per-UE capability.  4: For SL capability report on Uu-RRC agreed in RAN2, allow FDD/TDD differentiation only for a) Logical channel SR-delay timer, and c) multiple SR configuration.  5: For SL capability report on Uu-RRC agreed in RAN2, no need for FR1/FR2 differentiation.  6: For SL capability report on Uu-RRC agreed in RAN2, conditionally (i.e., if UE supports NR sidelink) mandatory feature without capability signalling includes PDCP parameters: 1) 12-bit SN, 2) 18-bit SN, and RLC parameter: 1) 6-bit SN for UM, 2) 12-bit SN for AM. 18-bit PDCP SN can be revisited after PDCP discussion (if required).  7: For SL capability report on Uu-RRC agreed in RAN2, optional feature with capability signaling includes RLC parameter: 1) 12-bit SN for UM, 2) 18-bit SN for AM; and MAC parameter: 1) LCP restriction, 2) Logical channel SR-delay timer, 3) Multiple CGs, 4) multiple SR configuration.  8: For SL capability report on PC5-RRC, introduce RLC parameters: a) 12-bit SN length for UM, b) 18-bit SN for AM.  9: For SL capability report on PC5-RRC agreed in RAN2, they are per-UE capability.  10: For SL capability report on PC5-RRC agreed in RAN2, no need for either FDD/TDD or FR1/FR2 differentiation.  11: For SL capability report on PC5-RRC agreed in RAN2, conditionally (i.e., if UE supports NR sidelink) mandatory feature without capability signalling includes PDCP parameters: 1) 12-bit SN, 2) 18-bit SN, and RLC parameter: 1) 6-bit SN for UM, 2) 12-bit SN for AM. 18-bit PDCP SN can be revisited after PDCP discussion (if required).  12: For SL capability report on PC5-RRC agreed in RAN2, optional feature with capability signaling includes PDCP parameter: out-of-order delivery, RLC parameter: 1) 12-bit SN for UM, 2) 18-bit SN for AM.  13: Maximum number of destinations is not considered in the definition of layer-2 buffer size.  14: RRC\_CONNECTED UE reports the received SL capability (carrying RX UE capability received via UECapabilityInformationSidelink) via PC5-RRC to network using a container within SidelinkUEInformationNR message.  15: RAN2 not pursue the timer to handle the failure case of UE capability transfer via sidelink.  16: RAN2 not purse signaling overhead optimization for capability transfer procedure for TX-UE forwarding peer-UE SL capability to network via Uu-RRC.  17: RAN2 not pursue signalling overhead optimization for capability transfer procedure via PC5-RRC. | | | | | | | | |
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| ***Summary of change:*** | | 1. Capture the L2 capability for NR Sidelink of Uu-RRC in 4.2.X.1; 2. Capture the L2 capability for NR Sidelink of PC5-RRC in 4.2.X.1; 3. Capability all capabiity for LTE Sidelink of Uu-RRC in in 4.2.7.4 and 4.2.X.4 4. Clarify the FDD/TDD diff definition for sidelink in A.X 5. Clarify the sidelink capability definition in A.Y | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | UE capability transfer via Uu-RRC and PC5-RRC is missing for Rel-16 NR V2X WI. | | | | | | | | |
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| ***Clauses affected:*** | | 4.2.1, 4.2.7.4, 4.2.X, A.X, A.Y | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | |  | | | | | | | | |

*Start Change*

### 4.2.1 Introduction

The following clauses define the UE radio access capability parameters. Only parameters for which there is the possibility for UEs to signal different values are considered as UE radio access capability parameters. Therefore, mandatory features without capability parameters that are the same for all UEs are not listed here.

The network needs to respect the signalled UE radio access capability parameters when configuring the UE and when scheduling the UE.

The UE may support different functionalities between FDD and TDD, and/or between FR1 and FR2. The UE shall indicate the UE capabilities as follows. In the table of UE capability parameter in subsequent clauses, "Yes" in the column by "FDD-TDD DIFF" and "FR1-FR2 DIFF" indicates the UE capability field can have a different value for between FDD and TDD or between FR1 and FR2 and "No" indicates if it cannot. "FD" in the column indicates to refer the associated field description. "FR1 only" or "FR2 only" in the column indicates the associated feature is only supported in FR1 or FR2 and "TDD only" indicates the associated feature is only supported in TDD.

1> set all fields of UE-NR/MRDC-Capability except fdd-Add-UE-NR/MRDC/Sidelink-Capabilities, tdd-Add-UE-NR/MRDC/Sidelink-Capabilities, fr1-Add-UE-NR/MRDC-Capabilities and fr2-Add-UE-NR/MRDC-Capabilities, to include the values applicable for all duplex mode(s) and frequency range(s) that the UE supports;

1> if UE supports both FDD and TDD and if (some of) the UE capability fields have a different value for FDD and TDD

2> if for FDD, the UE supports additional functionality compared to what is indicated by the previous fields of UE-NR/MRDC/Sidelink-Capability:

3> include field fdd-Add-UE-NR/MRDC/Sidelink-Capabilities and set it to include fields reflecting the additional functionality applicable for FDD;

2> if for TDD, the UE supports additional functionality compared to what is indicated by the previous fields of UE-NR/MRDC/Sidelink-Capability:

3> include field tdd-Add-UE-NR/MRDC/Sidelink-Capabilities and set it to include fields reflecting the additional functionality applicable for TDD;

1> if UE supports both FR1 and FR2 and if (some of) the UE capability fields have a different value for FR1 and FR2:

2> if for FR1, the UE supports additional functionality compared to what is indicated by the previous fields of UE-NR/MRDC-Capability:

3> include field fr1-Add-UE-NR/MRDC-Capabilities and set it to include fields reflecting the additional functionality applicable for FR1;

2> if for FR2, the UE supports additional functionality compared to what is indicated by the previous fields of UE-NR/MRDC-Capability:

3> include field fr2-Add-UE-NR/MRDC-Capabilities and set it to include fields reflecting the additional functionality applicable for FR2;

NOTE: The fields which indicate "shall be set to 1" or "shall be set to *supported*" in the following tables means these features are purely mandatory and are assumed they are the same as mandatory without capability signaling.

For optional features, the UE radio access capability parameter indicates whether the feature has been implemented and successfully tested. For mandatory features with the UE radio access capability parameter, the parameter indicates whether the feature has been successfully tested. In the table of UE capability parameter in subsequent clauses, "Yes" in the column by "M" indicates the associated feature is mandatory and "No" indicates the associated feature is optional. "CY" in the column indicates the associated feature is conditional mandatory and the condition is described in the field description and the associated feature is considered mandatory with capability parameter, when the described condition is satisfied. "FD" in the column indicates to refer the associated field description. Some parameters in subsequent clauses are not related to UE features and in the case, "N/A" is indicated in the column.

UE capability parameters have hierarchical structure. In the table of UE capability parameter in subsequent clauses, "Per" indicates the level the associated parameter is included. "UE" in the column indicates the associated parameter is signalled per UE, "Band" indicates it is signalled per band, "BC" indicates it is signalled per band combination, "FS" indicates it is signalled per feature set (per band per band combination), "FSPC" indicates it is signalled per feature set per component carrier (per CC per band per band combination), and "FD" in the column indicates to refer the associated field description.

*Next Change*

### 4.2.X Sidelink Parameters

#### 4.2.X.1 Sidelink General Parameters

| Definitions for parameters | Per | M | FDD-TDD DIFF | **FR1-FR2**  DIFF |
| --- | --- | --- | --- | --- |
| ***accessStratumReleaseSidelink***  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.X.2 Sidelink PDCP Parameters

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

#### 4.2.X.3 Sidelink RLC Parameters

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

#### 4.2.X.4 Sidelink MAC Parameters

| Definitions for parameters | Per | M | FDD-TDD  DIFF | FR1-FR2  DIFF |
| --- | --- | --- | --- | --- |
| ***lcp-RestrictionSidelink***  Indicates whether UE supports the selection of logical channels for each SL grant based on RRC configured restriction. | UE | No | No | No |
| ***logicalChannelSR-DelayTimerSidelink***  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***  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***  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.X.5.2 Other PHY parameters

| Definitions for parameters | Per | M | FDD-TDD  DIFF | FR1-FR2  DIFF |
| --- | --- | --- | --- | --- |
| ***supportedBandCombinationListSidelink***  Defines the supported NR sidelink communication band combinations by the UE. | UE | No | No | No |
| ***supportedBandCombinationListSidelinkEUTRA***  Defines the supported V2X sidelink communication band combinations by the UE. | UE | No | No | No |
| ***supportedBandCombinationListSidelinkEUTRA-NR***  Defines the supported joint NR sidelink and V2X sidelink communication band combinations by the UE. | UE | No | No | No |

*Next Change*

# Annex A.X: TDD/FDD differentiation of capabilities for sidelink

Annex A.X specifies for which TDD and FDD serving cells for Uu interface and carrier for PC5 interface a UE supporting sidelink shall support a feature/capability for which it indicates support within the capability signalling.

A UE that indicates support for sidelink:

- For the fields for which the UE is allowed to indicate different support for FDD and TDD, the UE shall support the feature on the PCell and/or SCell(s) for Uu interface, as specified in tables A.X-1 in accordance to the following rules:

- Per serving cell: the UE shall support the feature for a serving cell if the UE indicates support of the feature for the serving cell's duplex mode;

- Associated serving cells: UE shall support the feature if the UE indicates support of the feature for all associated serving cells's duplex modes;

- For the fields where the UE is not allowed to indicate different support for FDD and TDD, the UE shall support the feature for PCell and SCell(s) for Uu interface and carrier for PC5 interface if the UE indicates support of the feature via the common capability bit.

Table A.X-1: Rel-16 UE capabilities for which FDD/TDD differentiation is allowed

|  |  |
| --- | --- |
| UE-NR-Capability | Classification |
| logicalChannelSR-DelayTimerSidelink(Note1) | Associated serving cells |
| multipleSR-ConfigurationsSidelink | Per serving cell |
| NOTE 1: For a given logical channel, the associated serving cells including the PUCCH cell(s) associated with this logical channel (via *schedulingRequestID*). | |

# Annex A.Y: 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.Y-1: Sidelink capability reported in *UECapabilityInformation*/ *UECapabilityInformationSidelink*

|  |  |  |
| --- | --- | --- |
| UE-NR-Capability | *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 |  |
| supportedBandCombinationListSidelinkEUTRA | X |  |
| supportedBandCombinationListSidelinkEUTRA-NR | X |  |