**3GPP TSG-RAN WG2 Meeting #125 *R2-240XXXX***

**Athens, Greece, February 26 – March 1, 2024**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** |  | **rev** |  | **Current version:** |  |  |
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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:*** | Correction on 38.306 for SL Relay UE capability | | | | | | | | | |
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| ***Source to WG:*** | Samsung | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_SL\_relay\_enh-Core | | | | |  | ***Date:*** | | | 2024-03-08 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-18 |
|  | *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-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
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| ***Reason for change:*** | | As per the agreements (yellow-highlighted ones) in RAN2 #125 meeting, corresponding UE capability parameters should be implemented in 38.306 and 38.331.   |  | | --- | | Introduce 1-bit indication in AS container in discovery message and in measurement result to enable Relay UE differentiation by network regarding support of PC5-RRC trigger. (This indication is to help network to decide whether to configure split SRB1 with duplication or not and to help the network select the target relay UE.)  Support of PC5-RRC trigger is optional for the relay and remote UEs; if the UE supports the PC5-RRC trigger, it supports the 1-bit indication above.  Introduce separate threshold configurations for R17 events X1 and X2, with a UE capability bit.  Keep pdcp-DuplicationMoreThanOneUuRLC-r18 as specified; field description to be finalized in CR review.  Introduce a new UE capability to indicate whether UE supports recovery from direct path RLF via SRB1 (if supported).  Introduce new capabilities to indicate whether the UE supports PDCP duplication over split DRB and split SRB in MP operation. |   There need editorial corrections for some parameters in Table A.4-1. | | | | | | | | |
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| ***Summary of change:*** | | (1) Revised UE capability parameters in 4.2.16.1.1 Sidelink General Parameters and in Table A.4-1.  *multipathRelayUE-PC5L2* is removed from 4.2.16.1.1 Sidelink General Parameters.  The field description of ***pdcp-DuplicationMoreThanOneUuRLC-r18*** is clarified.  The following new parameters for PDCP duplication with multi-path relay are added:  ***pdcp-CADuplicationDirectpath-DRB, pdcp-CADuplicationDirectpath-SRB, pdcp-DuplicationMP-SplitDRB, pdcp-DuplicationMP-SplitSRB***  The following new parameter to indicate direct path RLF recovery via split SRB1 over indirect path is added: ***directpathRLF-RecoveryViaSRB1***  The field description of ***remoteUE-U2N-PathSwitchOperationL2-r18*** is modified to include a UE capability to support separate threshold configurations for events X1 and X2.  (2) Added **L2 PC5-RRC trigger** into 5.9 optional features without UE radio access capability parameters.  (3) Editorial correction to Table A.4-1 in A.4: ‘-‘ is removed from ‘-L2’  *relayUE-U2U-Operation-L2* 🡪 *relayUE-U2U-OperationL2*  *remoteUE-U2U-Operation-L2* 🡪 *remoteUE-U2U-OperationL2*  *remoteUE-U2N-PathSwitchOperation-L2* 🡪 *remote UE-U2N-PathSwitchOperationL2*  *multipathRemoteUE-PC5-L2* 🡪 *multipathRemoteUE-PC5L2* | | | | | | | | |
| ***Consequences if not approved:*** | | UE capability parameters for Release 18 SL relay operation are incomplete. | | | | | | | | |
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| ***Clauses affected:*** | | 4.2.16.1.1, 5.9, A.4 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **x** |  | Other core specifications | | | | TS 38.331 CR TBD | | |
| ***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 OF CHANGES

### 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 |
| ***multipathRelayUE-N3C-r18***  Indicates whether L2 multi-path relay UE operation using non-3GPP connection is supported by the UE. | UE | No | No | No |
|  |  |  |  |  |
| ***multipathRemoteUE-N3C-r18***  Indicates whether L2 multi-path remote UE operation using non-3GPP connection is supported by the UE. | UE | No | No | No |
| ***multipathRemoteUE-PC5L2-r18***  Indicates whether L2 multi-path remote UE operation using PC5 connection is supported by the UE. | UE | No | No | No |
| ***pdcp-DuplicationMoreThanOneUuRLC-r18***  Indicates whether L2 multi-path remote UE supports PDCP duplication with more than one RLC entity over direct path and one associated RLC entity over indirect path using either PC5 connection or non-3GPP connection in L2 multi-path relay. | UE | No | No | No |
| ***pdcp-CADuplicationDirectpath-DRB-r18***  Indicates whether L2 multi-path remote UE supports CA-based PDCP duplication over DRB using Uu interface in L2 multi-path relay. | UE | No | No | No |
| ***pdcp-CADuplicationDirectpath-SRB-r18***  Indicates whether L2 multi-path remote UE supports CA-based PDCP duplication over SRB1/2 using Uu interface in L2 multi-path relay. | UE | No | No | No |
| ***pdcp-DuplicationMP-SplitDRB-r18***  Indicates whether L2 multi-path remote UE supports PDCP duplication over split DRB in L2 multi-path relay. | UE | No | No | No |
| ***pdcp-DuplicationMP-SplitSRB-r18***  Indicates whether L2 multi-path remote UE supports PDCP duplication over split SRB1/2 in L2 multi-path relay. | UE | No | No | No |
| ***directpathRLF-RecoveryViaSRB1-r18***  Indicates whether L2 multi-path remote UE supports recovery from direct path RLF via split SRB1 using either PC5 connection or non-3GPP connection (if supported) in TS 38.331 [9]. | UE | No | No | No |
| ***posSIB-ForwardingSupported-r18***  Indicates whether the UE, when operating as an NR L2 sidelink relay UE, supports forwarding of posSIBs. The UE capable of operation as an NR L2 sidelink relay UE shall set this field to *supported* if it is capable of obtaining posSIBs. | UE | CY | No | No |
| ***relayUE-Operation-L2-r17***  Indicates whether NR L2 sidelink relay UE operation is supported by the UE. | UE | No | No | No |
| ***relayUE-U2U-OperationL2-r18***  Indicates whether L2 U2U sidelink relay UE operation is supported by the UE. | UE | No | No | No |
| ***remoteUE-IndirectPathAddChangeToIdleInactiveRelay-r18***  Indicates whether L2 multi-path remote UE supports indirect path addition or indirect path change with target relay UE in RRC\_IDLE or RRC\_INACTIVE state. | UE | No | No | No |
| ***remoteUE-Operation-L2-r17***  Indicates whether NR L2 sidelink remote UE operation is supported by the UE. | UE | No | No | No |
| ***remoteUE-PathSwitchToIdleInactiveRelay-r17***  Indicates whether L2 sidelink remote UE supports direct to indirect path switch with target relay in RRC\_IDLE or RRC\_INACTIVE state. | UE | No | No | No |
| ***remoteUE-U2N-PathSwitchOperationL2-r18***  Indicates whether enhanced NR L2 U2N remote UE operation for indirect-to-indirect path switch, inter-gNB path switch, and intra-gNB indirect-to-direct path switch with separate SL-RSRP and SD-RSRP threshold configurations for events X1 and X2 is supported by the UE. | UE | No | No | No |
| ***remoteUE-U2U-OperationL2-r18***  Indicates whether L2 U2U sidelink remote UE operation is supported by the UE. | UE | No | No | No |
| ***sfn-DFN-OffsetSupported-r18***  Indicates whether the UE, when operating as an NR L2 sidelink relay UE, supports indication of the offset between SFN and DFN timelines. | UE | No | 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 |
| ***pdcp-DuplicationDRB-sidelink-r18***  Indicates whether the UE supports CA-based duplication over sidelink DRB as specified in TS 38.323 [16]. | UE | No | No | No |
| ***pdcp-DuplicationSRB-sidelink-r18***  Indicates whether the UE supports CA-based duplication over sidelink SRB1/2/3 as specified in TS 38.323 [16]. | 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 |
| --- | --- | --- | --- | --- |
| ***drx-OnSidelink-r17***  Indicates whether UE supports sidelink DRX for unicast, groupcast and broadcast. | UE | No | No | No |
| ***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 |
| ***sl-LBT-FailureDectectionRecovery-r18***  Indicates whether the UE supports sidelink consistent LBT detection and recovery, as specified in TS 38.321 [8], for shared spectrum channel access. | UE | No | No | No |

##### 4.2.16.1.5 Other PHY parameters

| Definitions for parameters | Per | M | FDD-TDD  DIFF | FR1-FR2  DIFF |
| --- | --- | --- | --- | --- |
| ***p0-OLPC-Sidelink-r17***  Indicates whether the UE supports the use of P0 parameters (i.e. *dl-P0-PSSCH-PSCCH-r17, sl-P0-PSSCH-PSCCH-r17, dl-P0-PSBCH-r17, dl-P0-PSFCH-r17*) for sidelink open loop power control. | UE | No | No | No |
| ***supportedBandCombinationListSidelinkEUTRA-NR-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. The UE does not include this field if the UE capability is requested by E-UTRAN (see TS 36.331 [17]) and the network request includes the field *eutra-nr-only*. | 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 |
| ***supportedBandCombinationListSL-NonRelayDiscovery-r17***  Defines the supported band combinations of NR sidelink non-relay discovery message transmission and reception by the UE. | UE | No | No | No |
| ***supportedBandCombinationListSL-RelayDiscovery-r17***  Defines the supported band combinations of NR sidelink relay discovery message transmission and reception by the UE. This parameter is used by the remote UE and relay UE, and for the case of L2 and L3 relay. | UE | No | No | No |
| ***supportedBandCombinationListSL-U2U-RelayDiscovery-r18***  Defines the supported band combinations of NR U2U sidelink relay discovery message transmission and reception by the UE. This parameter is used by the remote UE and relay UE, and for the case of L2 and L3 relay. | UE | No | No | No |
| ***supportedBandListSidelink-r16***  Indicates frequency bands supported for NR sidelink communications and parameters supported for each frequency band, as specified in 4.2.16.1.6.  If a band is included in *supportedBandCombinationListSL-NonRelayDiscovery-r17,* *supportedBandCombinationListSL-RelayDiscovery-r17 or supportedBandCombinationListSL-U2U-RelayDiscovery-r18*, the band supports non-relay/relay NR sidelink discovery. | UE | No | No | No |

##### 4.2.16.1.6 *BandSidelink* Parameters

| Definitions for parameters | Per | M | FDD-TDD  DIFF | FR1-FR2  DIFF |
| --- | --- | --- | --- | --- |
| ***sl-Reception-r16***  Indicates whether receiving NR sidelink communication is supported. If supported, this parameter indicates the support of the capabilities and includes the parameters as follows:  - UE can receive NR PSCCH/PSSCH.  - *harq-RxProcessSidelink*, which indicates the number of sidelink HARQ processes across all links that the UE supports for NR PSSCH reception. Value n16 corresponds to 16, n24 corresponds to 24, and so on.  - *pscch-RxSidelink*, which indicates the number of PSCCH that the supports for reception in a slot. Value value1 corresponds to floor (NRB /10 RBs), value2 corresponds to 2\*floor (NRB /10 RBs);  - UE can attempt to decode NRB non-overlapping RBs per slot.  - UE supports reception of PSSCH according to the 64QAM MCS table.  - UE supports PT-RS reception in FR2.  - *scs-CP-PatternRxSidelink*, which indicates the subcarrier spacing with normal CP and the corresponding channel bandwidth that the UE supports for NR sidelink communication reception. Value scs-15kHz corresponds to 15kHz, scs-30kHz corresponds to 30kHz, and so on. It is mandatory for UE to support reception using 30 kHz subcarrier spacing with normal CP in FR1, and 120 kHz subcarrier spacing with normal CP FR2. For FR1, the bits in scs-XXkHz starting from the leading / leftmost bit indicate 5, 10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90 and 100MHz. For FR2, the bits in scs-XXkHz starting from the leading / leftmost bit indicate 50, 100 and 200MHz. This capability is not required to be signalled in a band indicated with only the PC5 interface in TS 38.101-1 [2], Table 5.2E.1-1. Otherwise, it is mandatory. For a band indicated with only the PC5 interface in 38.101-1 [2], Table 5.2E.1-1, UE supports reception using 30 kHz subcarrier spacing with normal CP in FR1, 120 kHz subcarrier spacing with normal CP in FR2.  - *extendedCP-RxSidelink*, which indicates whether the UE supports 60 kHz subcarrier spacing with extended CP length for NR sidelink communication reception. This capability is not required to be signalled in a band indicated with only the PC5 interface in TS 38.101-1 [2], Table 5.2E.1-1. Otherwise, it is mandatory.  - UE supports 14-symbol SL slot with all DMRS patterns corresponding to number of PSSCH symbols = {12, 9} for slots with and without PSFCH. If UE signals support of extended CP, support 12-symbol SL slot with all DMRS patterns corresponding to number of PSSCH symbols = {10,7} for slots with and without PSFCH.  NOTE 1: NRB is the number of RBs defined per channel bandwidth by RAN4 in TS 38.101-1 [2], Table 5.3.2-1 for FR1 and TS 38.101-2 [3], Table 5.3.2.-1 for FR2.  NOTE 2: Configuration by NR Uu is not required to be supported in a band indicated with only the PC5 interface in TS 38.101-1 [2] Table 5.2E.1-1.  Support of this feature is mandatory if UE supports NR sidelink.  If a band is included in *supportedBandCombinationListSL-NonRelayDiscovery-r17,* *supportedBandCombinationListSL-RelayDiscovery-r17 or supportedBandCombinationListSL-U2U-RelayDiscovery-r18*, it indicates whether receiving non-relay/relay NR sidelink discovery is supported. | Band | CY | N/A | N/A |
| ***sl-TransmissionMode1-r16***  Indicates whether transmitting NR sidelink mode 1 scheduled by Uu is supported. If supported, this parameter indicates the support of the capabilities and includes the parameters as follows:  - UE can transmit PSCCH/PSSCH using configured grant type 1. For NR sidelink mode 1 scheduled by NR Uu, UE can additionally transmit PSCCH/PSSCH using dynamic scheduling or configured grant type 2. Up to 8 configured grants can be configured for a UE.  - *harq-TxProcessModeOneSidelink*, which indicates the number of sidelink HARQ processes across all links that the UE supports for NR PSSCH transmission using mode 1, including those for configured grants. Value n8 corresponds to 8, n16 corresponds to 16, and so on.  - UE can transmit PSSCH according to the normal 64QAM MCS OFDM table.  - UE supports PT-RS transmission in FR2.  - For NR sidelink mode 1 scheduled by NR Uu, UE can monitor DCI format 3\_0 for NR sidelink dynamic scheduling and configured grant type 2 on the same carrier as sidelink.  - *scs-CP-PatternTxSidelinkModeOne*, which indicates the subcarrier spacing with normal CP and the corresponding bandwidth that the UE supports for NR sidelink communication transmission using NR sidelink mode 1. Value scs-15kHz corresponds to 15kHz, scs-30kHz corresponds to 30kHz, and so on. For FR1, the bits in scs-XXkHz starting from the leading / leftmost bit indicate 5, 10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90 and 100MHz. For FR2, the bits in scs-XXkHz starting from the leading / leftmost bit indicate 50, 100 and 200MHz. For a band indicated with only the PC5 interface in TS 38.101-1 [2], Table 5.2E.1-1, UE supports transmission using at least 30 kHz subcarrier spacing with normal CP in FR1, at least 120 kHz subcarrier spacing with normal CP in FR2. Otherwise, the reported subcarrier spacing with normal CP and the corresponding bandwidth that the UE supports shall be the same as reported for UL via *channelBWs-UL*.  - *extendedCP-TxSidelink*, which indicates whether the UE supports 60 kHz subcarrier spacing with extended CP length for NR sidelink communication transmission using mode 1. For a band indicated with only the PC5 interface in TS 38.101-1 [2], Table 5.2E.1-1, the reported subcarrier spacing with normal CP and the corresponding bandwidth that the UE supports shall be the same as reported for UL via *channelBWs-UL*.  - UE supports 14-symbol SL slot with all DMRS patterns corresponding to the number of PSSCH symbols = {12, 9} for slots with and without PSFCH. If UE signals support of extended CP, support 12-symbol SL slot with all DMRS patterns corresponding to the number of PSSCH symbols = {10,7} for slots with and without PSFCH.  - UE supports downlink pathloss based open loop power control for NR sidelink mode 1 scheduled by NR Uu if the band is not indicated with only the PC5 interface in TS 38.101-1 [2], Table 5.2E.1-1. Otherwise, it is not supported.  - *harq-ReportOnPUCCH*, which indicates whether UE supports reporting sidelink HARQ-ACK to gNB via PUCCH and PUSCH when it is operating in NR sidelink mode 1, for NR sidelink mode 1 scheduled by NR Uu, if the band is indicated with only the PC5 interface in TS 38.101-1 [2], Table 5.2E.1-1. Otherwise, it is mandatory.  NOTE: Random selection in the exceptional pool is supported.  Support of this feature is mandatory if UE supports NR sidelink in licensed spectrum where gNB is operating on or managing that spectrum.  If a band is included in *supportedBandCombinationListSL-NonRelayDiscovery-r17,* *supportedBandCombinationListSL-RelayDiscovery-r17 or supportedBandCombinationListSL-U2U-RelayDiscovery-r18*,, it indicates whether receiving non-relay/relay NR sidelink discovery is supported. | Band | CY | N/A | N/A |
| ***sl-TransmissionMode2-r16***  Indicates whether transmitting NR sidelink mode 2 is supported. If supported, this parameter indicates the support of the capabilities and includes the parameters as follows:  - UE can transmit PSCCH/PSSCH using NR sidelink mode 2 configured by NR Uu or preconfiguration.  - *harq-TxProcessModeTwoSidelink*, which indicates the number of sidelink HARQ processes across all links that the UE supports for NR PSSCH transmission using mode 2. Value n8 corresponds to 8, n16 corresponds to 16.  - UE can transmit PSSCH according to the normal 64QAM MCS table.  - UE supports PT-RS transmission in FR2.  - UE can perform mode 2 sensing and resource allocation operations  - *scs-CP-PatternTxSidelinkModeTwo*, which indicates UE can transmit using the subcarrier spacing and CP length it reports in *sl-Reception-r16*. This capability is not required to be signalled in a band indicated with only the PC5 interface in TS 38.101-1 [2], Table 5.2E.1-1. Otherwise, it is mandatory. For a band indicated with only the PC5 interface in TS 38.101-1 [2], Table 5.2E.1-1, UE supports transmission using 30 kHz subcarrier spacing with normal CP in FR1, 120 kHz subcarrier spacing with normal CP in FR2.  - UE supports 14-symbol SL slot with all DMRS patterns corresponding to the number of PSSCH symbols = {12, 9} for slots with and without PSFCH. If UE signals support of extended CP, support 12-symbol SL slot with all DMRS patterns corresponding to the number of PSSCH symbols = {10,7} for slots with and without PSFCH.  - *dl-openLoopPC-Sidelink*, which indicates whether UE supports DL pathloss based open loop power control when mode 2 is configured by NR Uu, if the band is indicated with only the PC5 interface in TS 38.101-1 [2], Table 5.2E.1-1. Otherwise, it is mandatory.  This field is only applicable if the UE supports *sl-Reception-r16*.  NOTE 1: Random selection in the exceptional pool is supported.  NOTE 2: Configuration by NR Uu is not required to be supported in a band indicated with only the PC5 interface in TS 38.101-1 [2] Table 5.2E.1-1.  Support of this feature is mandatory if UE supports NR sidelink. | Band | CY | N/A | N/A |
| ***sync-Sidelink-r16***  Indicates whether UE supports synchronization sources for NR sidelink. If supported, this parameter indicates the support of the capabilities and includes the parameters as follows:  - UE can receive S-SSB in NR sidelink if it supports *sl-Reception-r16*.  - UE can transmit S-SSB in NR sidelink if it supports *sl-TransmissionMode1-r16* or *sl-TransmissionMode2-r16*.  - UE supports GNSS and SyncRef UE as the synchronization reference according to the synchronization procedure with *sl-SyncPriority* set to *GNSS* and *sl-NbAsSync* set to *false*.  - *gNB-Sync*, which indicates whether UE can transmit or receive NR sidelink based on the synchronization to an gNB for NR Uu, if the band is indicated with only the PC5 interface in TS 38.101-1 [2], Table 5.2E.1-1. Otherwise, it is mandatory.  - *gNB-GNSS-UE-SyncWithPriorityOnGNB-ENB*, which indicates whether UE additionally supports gNB, GNSS and SyncRef UE as the synchronization reference according to the synchronization procedure with *sl-SyncPriority* set to *gnbEnb* for NR Uu, if the band is indicated with only the PC5 interface in TS 38.101-1 [2], Table 5.2E.1-1. Otherwise, it is mandatory.  - *gNB-GNSS-UE-SyncWithPriorityOnGNSS*, which indicates whether UE additionally supports gNB, GNSS and SyncRef UE as the synchronization reference according to the synchronization procedure with *sl-SyncPriority* set to *GNSS* and *sl-NbAsSync* set to true for NR Uu, if the band is indicated with only the PC5 interface in TS 38.101-1 [2], Table 5.2E.1-1. Otherwise, it is mandatory.  This field is only applicable if the UE supports at least one of *sl-Reception-r16*, *sl-TransmissionMode1-r16* and *sl-TransmissionMode2-r16*.  NOTE: Configuration by NR Uu is not required to be supported in a band indicated with only the PC5 interface in TS 38.101-1 [2] Table 5.2E.1-1.  Support of this feature is mandatory if UE supports NR sidelink. | Band | CY | N/A | N/A |
| ***congestionControlSidelink-r16***  Indicates whether UE supports sidelink congestion control for NR sidelink. If supported, this parameter indicates the support of the capabilities and includes the parameters as follows:  - *cbr-ReportSidelink*, which indicates whether UE can report CBR measurement to gNB when operating in Mode 1 and mode 2, if the band is indicated with only the PC5 interface in TS 38.101-1 [2], Table 5.2E.1-1. Otherwise, it is mandatory.  - UE can adjust its radio parameters based on CBR measurement and CRlimit.  - *cbr-CR-TimeLimitSidelink*, which indicates the time within which UE can process CBR and CR. Value time1 corresponds to congestion process time of 2, 2, 4, 8 slots for 15, 30, 60, 120 kHz subcarrier spacing, and value time2 corresponds to congestion process time of 2, 4, 8, 16 slots for 15, 30, 60, 120 kHz subcarrier spacing.  This field is only applicable if the UE supports *sl-Reception-r16* and at least one of *sl-TransmissionMode1-r16* and *sl-TransmissionMode2-r16*.  Support of this feature is mandatory if UE supports NR sidelink. | Band | CY | N/A | N/A |
| ***sl-Tx-256QAM-r16***  Indicates UE can transmit PSSCH according to the 256QAM MCS table.  This field is only applicable if the UE supports at least one of *sl-TransmissionMode1-r16* and *sl-TransmissionMode2-r16*. | Band | No | N/A | FR1 only |
| ***sl-Rx-256QAM-r16***  Indicates UE can receive PSSCH according to the 256QAM MCS table.  This field is only applicable if the UE supports *sl-Reception-r16*. | Band | No | N/A | FR1 only |
| ***psfch-FormatZeroSidelink-r16***  Indicates whether UE supports PSFCH format 0. If supported, this parameter indicates the support of the capabilities and includes the parameters as follows:  - UE can transmit and receive NR PSFCH format 0.  - *psfch-RxNumber* which indicates the number of PSFCH(s) resources that the UE can receive in a slot. Value n5 corresponds to 5, n15 corresponds to 15, and so on.  - *psfch-TxNumber* which indicates the number of PSFCH(s) resources that the UE can transmit in a slot. Value n4 corresponds to 4, n8 corresponds to 8, and so on.  This field is only applicable if the UE supports at least one of *sl-Reception-r16* and *sl-TransmissionMode2-r16*.  NOTE: Configuration by NR Uu is not required to be supported in a band indicated with only the PC5 interface in TS 38.101-1 [2] Table 5.2E.1-1.  Support of this feature is mandatory if UE supports NR sidelink. | Band | CY | N/A | N/A |
| ***lowSE-64QAM-MCS-TableSidelink-r16***  Indicates UE can transmit and receive PSSCH according to the low-spectral efficiency 64QAM MCS table.  This field is only applicable if the UE supports at least one of *sl-Reception-r16*, *sl-TransmissionMode1-r16* and *sl-TransmissionMode2-r16*. | Band | No | N/A | N/A |
| ***csi-ReportSidelink-r16***  Indicates UE supports Sidelink CSI report. If supported, this parameter indicates the support of the capabilities and includes the parameters as follows:  - *csi-RS-PortsSidelink*, which indicates the number of antenna port(s) up to which UE can transmit and receive sidelink CSI-RS with. Value p1 corresponds to 1, and value p2 corresponds to 2.  - UE supports RI and CQI feedback on sidelink.  This field is only applicable if the UE supports at least one of *sl-Reception-r16*, *sl-TransmissionMode1-r16* and *sl-TransmissionMode2-r16*.  Support of this feature is mandatory if UE supports NR sidelink. | Band | CY | N/A | N/A |
| ***enb-Sync-Sidelink-r16***  Indicates whether UE supports eNB type synchronization source for NR sidelink. If supported, this parameter indicates the support of the capabilities and includes the parameters as follows:  - UE can transmit or receive NR sidelink based on the synchronization to an eNB.  - If UE supports *sync-Sidelink-r16*, UE additionally supports eNB, GNSS and SyncRef UE as the synchronization reference according to the synchronization procedure with *sl-SyncPriority* set to *gnbEnb*.  - If UE supports *sync-Sidelink-r16*, UE additionally supports eNB, GNSS and SyncRef UE as the synchronization reference according to the synchronization procedure with *sl-SyncPriority* set to *GNSS* and *sl-NbAsSync* set to *true*.  This field is only applicable if the UE supports at least one of *sl-Reception-r16*, *sl-TransmissionMode1-r16* and *sl-TransmissionMode2-r16*. | Band | No | N/A | N/A |
| ***rankTwoReception-r16***  Indicates whether UE supports rank 2 PSSCH reception.  This field is only applicable if the UE supports *sl-Reception-r16*. | Band | No | N/A | N/A |
| ***fewerSymbolSlotSidelink-r16***  Indicates whether UE supports transmission/reception of SL slot configured with 7, 8, 9, 10, 11, 12, 13 consecutive symbols and all the corresponding DMRS patterns in a slot.  This field is only applicable if the UE supports at least one of *sl-Reception-r16*, sl-*TransmissionMode1-r16* and *sl-TransmissionMode2-r16*. | Band | No | N/A | N/A |
| ***sl-openLoopPC-RSRP-ReportSidelink-r16***  Indicates whether UE supports sidelink pathloss based open loop power control and RSRP report in case of unicast.  This field is only applicable if the UE supports *sl-Reception-r16* and at least one of *sl-TransmissionMode1-r16* and *sl-TransmissionMode2-r16*.  Support of this feature is mandatory if UE supports NR sidelink. | Band | CY | N/A | N/A |
| ***sl-TransmissionMode2-RandomResourceSelection-r17***  Indicates transmitting NR sidelink mode 2 with random resource selection is supported. If supported, this parameter indicates the support of the capabilities and includes the parameters as follows:  - UE can transmit PSCCH/PSSCH using NR sidelink mode 2 with random resource selection configured by NR Uu or preconfiguration.  - *harq-TxProcessModeTwoSidelink-r17*, which indicates the number of sidelink HARQ processes across all links that the UE supports for NR PSSCH transmission using mode 2. Value n8 corresponds to 8, n16 corresponds to 16.  - UE can transmit PSSCH according to the normal 64QAM MCS table.  - UE supports PT-RS transmission in FR2.  - *scs-CP-PatternTxSidelinkModeTwo-r17*, which indicates the subcarrier spacing with normal CP and the corresponding bandwidth that the UE supports for NR sidelink communication transmission using NR sidelink mode 2 with random resource selection. Value scs-15kHz corresponds to 15kHz, scs-30kHz corresponds to 30kHz, and so on. For FR1, the bits in scs-XXkHz starting from the leading / leftmost bit indicate 5, 10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90 and 100MHz. For FR2, the bits in scs-XXkHz starting from the leading / leftmost bit indicate 50, 100 and 200MHz.UE can transmit using the subcarrier spacing and CP length it reports in *sl-Reception-r16*. This capability is not required to be signalled in a band indicated with only the PC5 interface in TS 38.101-1 [2], Table 5.2E.1-1. Otherwise, it is mandatory. For a band indicated with only the PC5 interface in TS 38.101-1 [2], Table 5.2E.1-1, UE supports transmission using 30 kHz subcarrier spacing with normal CP in FR1, 120 kHz subcarrier spacing with normal CP in FR2.  - *extendedCP-Mode2Random-r17*, which indicates whether the UE supports 60 kHz subcarrier spacing with extended CP length for NR sidelink communication transmission using mode 2 with random resource selection.  - UE supports 14-symbol SL slot with all DMRS patterns corresponding to the number of PSSCH symbols = {12, 9} for slots with and without PSFCH. If UE signals support of extended CP, support 12-symbol SL slot with all DMRS patterns corresponding to the number of PSSCH symbols = {10,7} for slots with and without PSFCH.  - *dl-openLoopPC-Sidelink-r17*, which indicates whether UE supports DL pathloss based open loop power control when mode 2 is configured by NR Uu, if the band is indicated with only the PC5 interface in TS 38.101-1 [2], Table 5.2E.1-1. Otherwise, it is mandatory.  UE supporting this feature shall support receiving NR sidelink of S-SSB or indicate support of *sync-Sidelink-r16* or *sync-Sidelink-v1710*.  If a band is included in *supportedBandCombinationListSL-NonRelayDiscovery-r17,* *supportedBandCombinationListSL-RelayDiscovery-r17 or supportedBandCombinationListSL-U2U-RelayDiscovery-r18*, it indicates whether transmitting NR sidelink mode 2 with random resource selection is supported for non-relay/relay NR sidelink discovery.  NOTE 1: Configuration by NR Uu is not required to be supported in a band indicated with only the PC5 interface in TS 38.101-1 [2] Table 5.2E.1-1.  NOTE 2: If UE reports more than one features of *sl-TransmissionMode2-r16*, *sl-TransmissionMode2-PartialSensing-r17* and *sl-TransmissionMode2-RandomResourceSelection-r17*, the reported value of *harq-TxProcessModeTwoSidelink* in each feature is the total number of SL processes and the same among those features.  NOTE 3 Random selection in the exceptional pool is supported. | Band | No | N/A | N/A |
| ***sync-Sidelink-v1710***  Indicates whether UE supports synchronization sources for NR sidelink. If supported, this parameter indicates the support of the capabilities and includes the parameters as follows:  - *sync-GNSS-r17*, which indicates UE supports GNSS as the synchronization reference according to the synchronization procedure with *sl-SyncPriority* set to *GNSS* and *sl-NbAsSync* set to *false*. This capability is only required to be supported in a band indicated with only the PC5 interface in TS 38.101-1 [2], Table 5.2E.1-1  - *gNB-Sync-r17*, which indicates whether UE can transmit NR sidelink based on the synchronization to an gNB for NR Uu, if the band is indicated with only the PC5 interface in TS 38.101-1 [2], Table 5.2E.1-1, it is not required to be supported. Otherwise, it is mandatory.  - *gNB-GNSS-UE-SyncWithPriorityOnGNB-ENB-r17*, which indicates whether UE additionally supports gNB, GNSS as the synchronization reference according to the synchronization procedure with *sl-SyncPriority* set to *gnbEnb* for NR Uu, if the band is indicated with only the PC5 interface in TS 38.101-1 [2], Table 5.2E.1-1, it is not required to be supported. Otherwise, it is mandatory.  - *gNB-GNSS-UE-SyncWithPriorityOnGNSS-r17*, which indicates whether UE additionally supports gNB, GNSS as the synchronization reference according to the synchronization procedure with *sl-SyncPriority* set to *GNSS* and *sl-NbAsSync* set to true for NR Uu, if the band is indicated with only the PC5 interface in TS 38.101-1 [2], Table 5.2E.1-1, it is not required to be supported. Otherwise, it is mandatory.  - UE can transmit S-SSB in NR sidelink if it supports *sl-TransmissionMode1-r16* or *sl-TransmissionMode2-r16* or *sl-TransmissionMode2-PartialSensing-r17* or *sl-TransmissionMode2-RandomResourceSelection-r17*.  - UE supports synchronization to a reference UE if it supports *sl-Reception-r16*.  NOTE: Configuration by NR Uu is not required to be supported in a band indicated with only the PC5 interface in TS 38.101-1 [2] Table 5.2E.1-1. | Band | No | N/A | N/A |
| ***enb-Sync-Sidelink-v1710***  Indicates whether UE supports eNB type synchronization source for NR sidelink. If supported, this parameter indicates the support of the capabilities and includes the parameters as follows:  - UE can transmit NR sidelink based on the synchronization to an eNB.  - If UE supports *sync-GNSS-r17*, UE additionally supports eNB, GNSS as the synchronization reference according to the synchronization procedure with *sl-SyncPriority* set to *gnbEnb*.  - If UE supports *sync-GNSS-r17*, UE additionally supports eNB, GNSS as the synchronization reference according to the synchronization procedure with *sl-SyncPriority* set to *GNSS* and *sl-NbAsSync* set to *true*.  This field is only applicable if the UE supports *sync-Sidelink-v1710.*  NOTE: Configuration by NR Uu is not required to be supported in a band indicated with only the PC5 interface in TS 38.101-1 [2] Table 5.2E.1-1. | Band | No | N/A | N/A |
| ***rx-IUC-Scheme1-PreferredMode2Sidelink-r17***  Indicates whether UE supports reception of preferred resource set for NR sidelink for mode 2. If supported, this parameter indicates the support of the capabilities as follows:  - UE can receive inter-UE coordination information of preferred resource set and use the received information in its own resource (re-)selection in NR sidelink mode 2.  - UE can transmit an explicit request for inter-UE coordination information of preferred resource set only.  UE supporting this feature shall support receiving NR sidelink of S-SSB or indicate support of *sync-Sidelink-r16* or *sync-Sidelink-v1710*.  NOTE: Configuration by NR Uu is not required to be supported in a band indicated with only the PC5 interface in TS 38.101-1 [2] Table 5.2E.1-1. | Band | No | N/A | N/A |
| ***rx-IUC-Scheme1-NonPreferredMode2Sidelink-r17***  Indicates whether UE supports reception of non-preferred resource set for NR sidelink for mode 2. If supported, this parameter indicates the support of the capabilities as follows:  - UE can receive inter-UE coordination information of non-preferred resource set and use the received information in its own resource (re-)selection in NR sidelink mode 2.  - UE can transmit an explicit request for inter-UE coordination information of non-preferred resource set only.  UE supporting this feature shall support receiving NR sidelink of S-SSB or indicate support of *sync-Sidelink-r16* or *sync-Sidelink-v1710*.  NOTE: Configuration by NR Uu is not required to be supported in a band indicated with only the PC5 interface in TS 38.101-1 [2] Table 5.2E.1-1. | Band | No | N/A | N/A |
| ***rx-IUC-Scheme2-Mode2Sidelink-r17***  Indicates whether UE supports reception of inter-UE coordination scheme 2 for NR sidelink for mode 2. If supported, this parameter indicates the support of the capabilities and includes the parameters as follows:  - UE can receive inter-UE coordination information of presence of expected/potential resource conflict and use the received information in its own resource re-selection in NR sidelink mode 2.  - UE indicates the number of PSFCH(s) resources that the UE can receive in a slot. Value n5 corresponds to 5, n15 corresponds to 15, and so on.  UE supporting this feature shall support receiving NR sidelink of S-SSB or indicate support of *sync-Sidelink-r16* or *sync-Sidelink-v1710*.  NOTE 1: If UE reports more than one capability of *psfch-FormatZeroSidelink-r16*, *rx-sidelinkPSFCH-r17* and *rx-IUC-Scheme1-PreferredMode2Sidelink-r17*, the reported value of the number of PSFCH(s) resources in each capability is the total number and the same among those capabilities.  NOTE 2: Configuration by NR Uu is not required to be supported in a band indicated with only the PC5 interface in TS 38.101-1 [2] Table 5.2E.1-1. | Band | No | N/A | N/A |
| ***rx-IUC-Scheme1-SCI-r17***  Indicates whether UE can receive Scheme 1 inter-UE coordination transmission over 2nd SCI that is used in addition to the MAC-CE carrying the same inter-UE coordination information in the same transmission.  UE indicating support of this feature shall indicate support of at least one of *rx-IUC-Scheme1-Preferred-Mode2Sidelink-r17* and *rx-IUC-Scheme1-NonPreferred-Mode2Sidelink-r17*.  NOTE: Configuration by NR Uu is not required to be supported in a band indicated with only the PC5 interface in TS 38.101-1 [2] Table 5.2E.1-1. | Band | No | N/A | N/A |
| ***rx-IUC-Scheme1-SCI-ExplicitReq-r17***  Indicates whether UE can receive an explicit request for inter-UE coordination information of both preferred resource set and non-preferred resource set over 2nd SCI that is used in addition to the MAC-CE carrying the explicit request in the same transmission. UE indicating support of this feature shall indicate support of *tx-IUC-Scheme1-Mode2Sidelink-r17*.  NOTE: Configuration by NR Uu is not required to be supported in a band indicated with only the PC5 interface in TS 38.101-1 [2] Table 5.2E.1-1. | Band | No | N/A | N/A |
| ***scheme2-ConflictDeterminationRSRP-r17***  Indicates whether UE can determine a conflict for overlapping resource reservation between UE-B and another UE based on RSRP difference of the two reservations.  UE indicating support of this feature shall indicate support of *tx-IUC-Scheme2-Mode2Sidelink-r17*.  NOTE: Configuration by NR Uu is not required to be supported in a band indicated with only the PC5 interface in TS 38.101-1 [2] Table 5.2E.1-1. | Band | No | N/A | N/A |
| ***sl-ReceptionIntraCarrierGuardBand-r18***  Indicates whether the UE supports reception in the non-zero intra-cell guardband between contiguous RB sets in SL wideband carrier operation wider than 20MHz when LBT is successful only in a subset of RB sets, where intra-cell guardband is specified in TS 38.101-1 [2]. | Band | No | N/A | FR1 only |
| ***ue-PowerClassSidelink-r16***  This parameter indicates the supported power class for this band used for sidelink. If the field is absent, the UE supports the default power class in TS 38.101-1 [2], Table 6.2E.1.2-2. | Band | No | N/A | N/A |

##### 4.2.16.1.7 *BandCombinationListSidelinkEUTRA-NR* Parameters

| Definitions for parameters | Per | M | FDD-TDD  DIFF | FR1-FR2  DIFF |
| --- | --- | --- | --- | --- |
| ***tx-Sidelink-r16***  Indicates whether the UE supports sidelink transmission on the band.  For NR sidelink, this field is only applicable if the UE supports at least one of *sl-TransmissionMode1-r16* and *sl-TransmissionMode2-r16* on the band. | Band | No | N/A | N/A |
| ***rx-Sidelink-r16***  Indicates whether the UE supports sidelink reception on the band.  For NR sidelink, this field is only applicable if the UE supports *sl-Reception-r16* on the band. | Band | No | N/A | N/A |
| ***sl-CrossCarrierScheduling-r16***  Indicates whether the UE supports monitoring DCI format 3\_0 on a different carrier from sidelink for NR sidelink dynamic scheduling and configured grant type 2. If the UE indicates support for *sl-TransmissionMode1-r16* in a band indicated with only the PC5 interface in Table 5.2E.1-1 of TS 38.101-1 [2], the UE shall indicate that *sl-CrossCarrierScheduling-r16* is supported for a band combination with that band.  For NR sidelink, this field is only applicable if the UE supports *sl-TransmissionMode1-r16* on the band. | Band | No | N/A | N/A |
| ***sl-TransmissionMode2-PartialSensing-r17***  Indicates transmitting NR sidelink mode 2 with partial sensing is supported. If supported, this parameter indicates the support of the capabilities and includes the parameters as follows:  - UE can transmit PSCCH/PSSCH using NR sidelink mode 2 with partial sensing configured by NR Uu or preconfiguration.  - *harq-TxProcessModeTwoSidelink-r17*, which indicates the number of sidelink HARQ processes across all links that the UE supports for NR PSSCH transmission using mode 2. Value n8 corresponds to 8, n16 corresponds to 16.  - UE can transmit PSSCH according to the normal 64QAM MCS table.  - UE supports PT-RS transmission in FR2.  - UE can perform periodic-based partial sensing and resource allocation operation.  - UE can perform contiguous partial sensing and resource allocation operation.  - *scs-CP-PatternTxSidelinkModeTwo-r17*, the subcarrier spacing with normal CP and the corresponding bandwidth that the UE supports for NR sidelink communication transmission using NR sidelink mode 2 with partial sensing. Value scs-15kHz corresponds to 15kHz, scs-30kHz corresponds to 30kHz, and so on. For FR1, the bits in scs-XXkHz starting from the leading / leftmost bit indicate 5, 10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90 and 100MHz. For FR2, the bits in scs-XXkHz starting from the leading / leftmost bit indicate 50, 100 and 200MHz. This capability is not required to be signalled in a band indicated with only the PC5 interface in TS 38.101-1 [2], Table 5.2E.1-1. Otherwise, it is mandatory. For a band indicated with only the PC5 interface in TS 38.101-1 [2], Table 5.2E.1-1, UE supports transmission using 30 kHz subcarrier spacing with normal CP in FR1, 120 kHz subcarrier spacing with normal CP in FR2.  - *extendedCP-Mode2PartialSensing-r17*, which indicates whether the UE supports 60 kHz subcarrier spacing with extended CP length for NR sidelink communication transmission using mode 2 with partial sensing.  - UE supports 14-symbol SL slot with all DMRS patterns corresponding to the number of PSSCH symbols = {12, 9} for slots with and without PSFCH. If UE signals support of extended CP, support 12-symbol SL slot with all DMRS patterns corresponding to the number of PSSCH symbols = {10,7} for slots with and without PSFCH.  - *dl-openLoopPC-Sidelink-r17*, which indicates whether UE supports DL pathloss based open loop power control when mode 2 is configured by NR Uu, if the band is indicated with only the PC5 interface in TS 38.101-1 [2], Table 5.2E.1-1. Otherwise, it is mandatory.  UE supporting this feature shall support receiving NR sidelink of S-SSB or indicate support of *sync-Sidelink-r16* or *sync-Sidelink-v1710*.  If a band combination is included in *supportedBandCombinationListSL-NonRelayDiscovery-r17,* *supportedBandCombinationListSL-RelayDiscovery-r17 or* *supportedBandCombinationListSL-U2U-RelayDiscovery-r18*, it indicates whether transmitting NR sidelink mode 2 with partial sensing is supported for non-relay/relay NR sidelink discovery.  NOTE 1: Configuration by NR Uu is not required to be supported in a band indicated with only the PC5 interface in TS 38.101-1 [2] Table 5.2E.1-1.  NOTE 2: If UE reports more than one feature of *sl-TransmissionMode2-r16*, *sl-TransmissionMode2-PartialSensing-r17* and *sl-TransmissionMode2-RandomResourceSelection-r17*, the reported value of *harq-TxProcessModeTwoSidelink* in each FG is the total number of SL processes and the same among those FGs.  NOTE 3: Random selection in the exceptional pool is supported. | FS | No | N/A | N/A |
| ***rx-sidelinkPSFCH-r17***  Indicates whether UE can receive PSFCH with HARQ-ACK information in NR sidelink and also the maximum number of PSFCH(s) resources N in a slot. If UE reports more than one of *psfch-FormatZeroSidelink-r16*, *rx-sidelinkPSFCH-r17*and *rx-IUC-Scheme2-Mode2Sidelink-r17*, the reported value N is the total number and the same among *psfch-FormatZeroSidelink-r16*, *rx-sidelinkPSFCH-r17* and *rx-IUC-Scheme2-Mode2Sidelink-r17.*  UE supporting this feature shall support receiving NR sidelink of S-SSB and at least one of *sl-TransmissionMode1-r16* or *sl-TransmissionMode2-r16* or *sl-TransmissionMode2-RandomResourceSelection-r17* or *sl-TransmissionMode2-PartialSensing-r17*.  NOTE: Configuration by NR Uu is not required to be supported in a band indicated with only the PC5 interface in TS 38.101-1 [2] Table 5.2E.1-1. | FS | No | N/A | N/A |
| ***tx-IUC-Scheme1-Mode2Sidelink-r17***  Indicates whether UE supports transmission of inter-UE coordination scheme 1 for NR sidelink for mode 2. If supported, this parameter indicates the support of the capabilities as follows:  - UE can transmit inter-UE coordination information of preferred resource set/non-preferred resource set in NR sidelink mode 2.  - UE can receive an explicit request for inter-UE coordination information of both preferred resource set and non-preferred resource set.  UE supporting this feature shall support receiving NR sidelink of S-SSB or indicate support of *sync-Sidelink-r16* or *sync-Sidelink-v1710*.  NOTE: Configuration by NR Uu is not required to be supported in a band indicated with only the PC5 interface in TS 38.101-1 [2] Table 5.2E.1-1. | FS | No | N/A | N/A |
| ***tx-IUC-Scheme2-Mode2Sidelink-r17***  Indicates whether UE supports transmission of inter-UE coordination scheme 2 for NR sidelink for mode 2. If supported, this parameter indicates the support of the capabilities and includes the parameters as follows:  - UE can transmit inter-UE coordination information of presence of expected/potential resource conflict in NR sidelink mode 2.  - UE can transmit up to M PSFCH(s) resources in a slot where M takes the values of {4, 8, 16}  If UE reports both *psfch-FormatZeroSidelink-r16* and *tx-IUC-Scheme2-Mode2Sidelink-r17*, the reported value M is the total number and the same in both *psfch-FormatZeroSidelink-r16* and *tx-IUC-Scheme2-Mode2Sidelink-r17*.  UE supporting this feature shall indicate support of *rx-IUC-Scheme2-Mode2Sidelink-r17* and indicate support at least one among *sync-Sidelink-r16*, *sync-Sidelink-v1710* and receiving NR sidelink of S-SSB.  NOTE: Configuration by NR Uu is not required to be supported in a band indicated with only the PC5 interface in TS 38.101-1 [2] Table 5.2E.1-1. | FS | No | N/A | N/A |

#### 4.2.16.2 Sidelink Parameters in E-UTRA

##### 4.2.16.2.0 General

|  |  |  |  |
| --- | --- | --- | --- |
| Descriptions for parameters | Per | M | FDD-TDD DIFF |
| ***supportedBandListSidelinkEUTRA-r16***  Indicates E-UTRA frequency bands supported for V2X sidelink 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-ScheduledMode3SidelinkEUTRA-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 | N/A |
| ***gnb-ScheduledMode4SidelinkEUTRA-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 | N/A |

NEXT CHANGE

# 5 Optional features without UE radio access capability parameters

## 5.1 PWS features

| Definitions for feature |
| --- |
| **CMAS**  It is optional for UE to support CMAS reception as specified in TS 38.331 [9]. It is optional for a CMAS-capable UE to support Geofencing information (*warningAreaCoordinates*) as specified in TS 38.331 [9]. |
| **ETWS**  It is optional for UE to support ETWS reception as specified in TS 38.331 [9]. |
| **KPAS**  It is optional for UE to support Korean Public Alert System (KPAS) reception as specified in TS 38.331 [9]. KPAS uses the same AS mechanisms as defined for CMAS. Therefore a KPAS-capable UE shall support all behaviour that is included in TS 38.331 [9] and TS 38.304 [21] for a CMAS-capable UE. |
| **EU-Alert**  It is optional for UE to support EU-Alert reception as specified in TS 38.331 [9]. EU-Alert uses the same AS mechanisms as defined for CMAS. Therefore a EU-Alert-capable UE shall support all behaviour that is included in TS 38.331 [9] and TS 38.304 [21] for a CMAS-capable UE. |

## 5.2 UE receiver features

| Definitions for feature |
| --- |
| **SU-MIMO Interference Mitigation advanced receiver**  - R-ML (reduced complexity ML) receivers with enhanced inter-stream interference suppression for SU-MIMO transmissions with rank 2 with 2 RX antennas  - R-ML (reduced complexity ML) receivers with enhanced inter-stream interference suppression for SU-MIMO transmissions with rank 2, 3, and 4 with 4 RX antennas  UE supporting the feature is required to meet the Enhanced Receiver Type requirements in TS 38.101-4 [18]. |

## 5.3 RRC connection

| Definitions for feature |
| --- |
| **RRC connection release with deprioritisation**  It is optional for UE to support *RRCRelease* with *deprioritisationReq* as specified in TS 38.331 [9]. |
| **RRC connection establishment failure with temporary offset**  It is optional for UE to support RRC connection establishment failure with temporary offset (*Qoffsettemp*) as specified in TS 38.331 [9]. |
| **Selection of acceptable E-UTRA cell upon HO failure during EPS fallback for emergency call**  It is optional for UE to support selecting an acceptable E-UTRA cell supporting emergency call if no suitable E-UTRA cell is available upon handover failure during EPS fallback when the UE has an ongoing emergency call as specified in TS 38.331 [9]. |
| **E-UTRA cell selection upon HO failure during EPS services fallback**  It is optional for UE to support selecting a suitable E-UTRA cell, and support selecting an acceptable E-UTRA cell supporting emergency call if no suitable E-UTRA cell is available upon handover failure when the UE is performing emergency services fallback as specified in TS 38.331 [9]. |

## 5.4 Other features

| Definitions for feature |
| --- |
| **Access Category 1 selection assistance information enhancement**  It is optional for UE that is configured for delay tolerant service to support Access Category 1 selection assistance information enhancement, according to *uac-AC1-SelectAssistInfo-r16* as specified in TS 38.331 [9]. |
| **eCall over IMS**  It is optional for UE to support eCall over IMS as specified in TS 38.331 [9]. |
| **Equivalent SNPNs for cell (re)selection**  It is optional for UE in SNPN access mode to support cell (re)selection for equivalent SNPNs as specified in TS 38.304 [21]. |
| **HSDN cell reselection**  It is optional for UE to support HSDN cell reselection priority handling in RRC\_IDLE/RRC\_INACTIVE as specified in TS 38.304 [21] and TS 38.331 [9]. |
| **Minimization of service interruption**  It is optional for UE to support minimization of service interruption including reporting to NAS of disaster roaming information for available PLMNs and Access Barring check for Access Identity 3, as specified in TS 38.331 [9]. |
| **Mobile IAB cell reselection**  It is optional for UE to support mobile IAB cell reselection priority handling in RRC\_IDLE/RRC\_INACTIVE, as specified in TS 38.304 [21] and TS 38.331 [9]. |
| **Random access prioritization for MPS and MCS**  It is optional for UE that is configured for MPS or MCS to support random access prioritization for Access Identity 1 or 2 as specified in TS 38.321 [8]. |
| **Random access prioritisation for Slicing**  It is optional for UE to support slice-based prioritisation for random access as specified in TS 38.321 [8]. |
| **Random access partitioning for Slicing**  It is optional for UE to support slice-based RACH partitioning as specified in TS 38.321 [8]. |
| **Relaxed cell reselection on GEO**  It is optional for UE to support the relaxed cell reselection on GEO. |
| **Support of polarization signalling in NR NTN**  It is optional for UE to support the polarization signalling in NR NTN comprised of the following functional components:  - Support polarization indication reception in SIB indicating DL and/or UL polarization information using respective polarization type parameters to indicate: RHCP or LHCP or linear;  - Support polarization signalling for target serving cell in handover command message;  - Support polarization signalling for non-serving cell in RRM measurement configuration. |
| **TRS occasions for idle mode and RRC\_INACTIVE UEs**  It is optional for UE to support reading TRS configuration from SIB and receiving L1 indication for TRS availability.  NOTE: Receiving L1 indication via DCI format 2\_7 is supported only if the UE supports receiving DCI format 2\_7. |

## 5.5 Sidelink Features

| Definitions for feature |
| --- |
| **Short-term time-scale TDM for in-device coexistence**  It is optional for UE to support prioritization between LTE sidelink transmission/reception and NR sidelink transmission/reception.  This field is only applicable if the UE supports at least one of *sl-Reception-r16*, *sl-TransmissionMode1-r16* and *sl-TransmissionMode2-r16*, and if the UE supports V2X sidelink communication in the band combination. |
| **Rank 2 PSSCH transmission**  It is optional for UE to support rank 2 PSSCH transmission. This field is only applicable if the UE supports *csi-ReportSidelink-r16* with *csi-RS-PortsSidelink* = p2. |
| **Receiving NR sidelink of S-SSB**  It is optional for UE to receive S-SSB in NR sidelink and support synchronisation to a reference UE. |

## 5.6 RRM measurement features

| Definitions for feature |
| --- |
| **Enhanced RRM requirements for measurements in IDLE and INACTIVE modes**  It is optional for UE to support enhanced RRM requirements for measurements for NTN bands (FR1 only and FDD only) in RRC\_IDLE/RRC\_INACTIVE as specified in TS 38.133 [5]. If UE does not support this feature, other NTN measurement requirements (as specified in TS 38.133 [5], clause 4.2C.2 for RRC\_IDLE and clause 5.1C.2 for RRC\_INACTIVE) are applied for both LEO and GEO. |
| **Enhanced RRM requirements for measurements in IDLE and INACTIVE modes for ATG**  It is optional for the UE in RRC\_IDLE/RRC\_INACTIVE to support the enhanced inter-frequency cell re-selection requirements for ATG (as specified in TS 38.133 Table 4.2D.2.4-2). If UE does not support this feature, other measurement requirements as specified in TS 38.133 [5], Table 4.2D.2.4-1 are applied. |
| **High speed inter-frequency IDLE/INACTIVE measurements**  It is optional for UE to support high speed inter-frequency measurements in RRC\_IDLE/RRC\_INACTIVE as specified in TS 38.133 [5]. |
| **Location-based measurement initiation**  It is optional for the UE in RRC\_IDLE/RRC\_INACTIVE to support location based RRM measurements of neighbour cells in NTN quasi-Earth fixed system as specified in TS 38.304 [21]. |
| **Location-based measurement initiation for NTN Earth-moving system**  It is optional for the UE in RRC\_IDLE/RRC\_INACTIVE to support location based RRM measurements of neighbour cells in NTN Earth-moving system as specified in TS 38.304 [21]. |
| **Relaxed measurement**  It is optional for UE to support relaxed RRM measurements of neighbour cells in RRC\_IDLE/RRC\_INACTIVE as specified in TS 38.304 [21]. |
| **Rel-17 relaxed measurement for RRC\_IDLE/RRC\_INACTIVE**  It is optional for RedCap UE to support Rel-17 relaxed RRM measurements of neighbour cells in RRC\_IDLE/RRC\_INACTIVE as specified in TS 38.304 [21]. |
| **Skipping TN measurements**  It is optional for the UE in RRC\_IDLE/RRC\_INACTIVE to support skipping the neighbour cell measurements for TN neighbour cells in an area where there is no TN network coverage as specified in TS 38.304 [21]. |
| **Time-based measurement initiation**  It is optional for the UE in RRC\_IDLE/RRC\_INACTIVE to support time based RRM measurements of neighbour cells in NTN quasi-Earth fixed system as specified in TS 38.304 [21]. |
| **Time-based measurement initiation for NTN Earth-moving system**  It is optional for the UE in RRC\_IDLE/RRC\_INACTIVE to support time based RRM measurements of neighbour cells in NTN Earth-moving system as specified in TS 38.304 [21]. |

## 5.7 MDT and SON features

| Definitions for feature |
| --- |
| **Cross RAT RLF Report**  It is optional for UE to support the delivery of EUTRA RLF report to an NR node upon request from the network. |
| **Mobility history information storage**  It is optional for UE to support the storage of PCell mobility history information and the reporting in *UEInformationResponse* message as specified in TS 38.331 [9]. |
| **Radio Link Failure Report for inter-RAT MRO EUTRA**  It is optional for UE to support:  - Inclusion of EUTRA CGI and associated TAC, if available, and otherwise to include the physical cell identity and carrier frequency of the target PCell of the failed handover as *failedPCellId* in *RLF-Report* upon request from the network as specified in TS 38.331 [9].  - Inclusion of EUTRA CGI and associated TAC as *previousPCellId* in *RLF-Report* as specified in TS 38.331 [9].  - Inclusion of *eutraReconnectCellId* in *reconnectCellId* in the *RLF-Report* as specified in TS 38.331 [9] upon UE has radio link failure or handover failure and successfully re-connected to an E-UTRA cell. |
| **RACH Partitioning Information**  It is optional for UE to support the delivery of RACH partitioning related information via RACH report procedure, upon request from the network. |
| **RLF Report for Fast MCG Recovery**  It is optional for UE to support the delivery of the Fast MCG recovery related information in the RLF-Report. |
| **RLF Report for Inter-system HO for Voice Fallback**  It is optional for UE to support the delivery of an explicit indication in the RLF-report when mobility from NR due to voice fallback fails. |
| **SCG Failure Report for CPAC**  It is optional for UE to support the delivery of the CPAC related parameters for MRO in *SCGFailureInformation* message to the network. |
| **SCG Failure Report for MRO**  It is optional for UE to support the delivery of the SCG failure related parameters for MRO in *SCGFailureInformation* message to the network. |
| **SON enhancements for NR-U**  It is optional for UE to support the delivery of NR-U related information (FR1 only) in RA-report/SHR/RLF report, upon request from the network. |
| **SON Report in SNPN**  It is optional for UE to support collection and delivery of SON reports in SNPN. UE is not required to support all SON reports if it supports collection and delivery of the SON reports in SNPN, it may support one or more SON report for SNPN. |
| **SpCell ID indication**  It is optional for UE to support the delivery of the *spCellID-r17* in the RA-Report, if the RA procedure is performed in a SCell of the MCG/SCG. |
| **Uplink PDCP delay measurements upon MO update**  It is optional for UE to support not resetting the UL PDCP Packet Average Delay measurement or UL PDCP excess packet delay measurement when the associated measurement object is modified. A UE supporting this feature shall also indicate the support of at least one of *ulPDCP-Delay-r16* and *excessPacketDelay-r17*. |

## 5.8 Extended DRX features

| Definitions for feature |
| --- |
| **Rel-17 extended DRX in RRC\_IDLE**  It is optional for UE to support Rel-17 extended DRX cycle up to 10485.76 seconds and paging in extended DRX in RRC\_IDLE as specified in TS 38.331 [9] and TS 38.304 [21]. A UE that supports extended DRX shall also support *inactiveStatePO-Determination-r17*. |

## 5.9 Sidelink Relay Features

| Definitions for feature |
| --- |
| **L3 sidelink relay UE operation**  It is optional for UE to support L3 sidelink relay UE operation as specified in TS 38.331 [9]. |
| **L3 sidelink remote UE operation**  It is optional for UE to support L3 sidelink remote UE operation as specified in TS 38.331 [9]. |
| **L3 sidelink U2U relay UE operation**  It is optional for UE to support L3 sidelink U2U relay UE operation as specified in TS 38.331 [9]. |
| **L3 sidelink U2U remote UE operation**  It is optional for UE to support L3 sidelink U2U remote UE operation as specified in TS 38.331 [9]. |
| **MUSIM paging cause forward**  It is optional for L2 sidelink relay UE or L2 sidelink remote UE to support forwarding MUSIM paging cause as defined in TS 38.331 [9]. |
| **L2 PC5-RRC trigger**  It is optional for L2 sidelink relay UE or L2 sidelink remote UE to support the PC5-RRC trigger in L2 multi-path relay. |

## 5.10 MBS features

| Definitions for feature |
| --- |
| **Broadcast reception**  It is optional for UE to support broadcast reception as specified in TS 38.331 [9]. A UE that supports the feature shall also support:  - Group-common PDCCH/PDSCH for broadcast with CRC scrambled by MCCH-RNTI;  - Group-common PDCCH/PDSCH for broadcast with CRC scrambled by G-RNTI(s) for MTCH;  - CFR configuration for broadcast;  - CORESET and common search space for broadcast;  - DCI format 4\_0 with CRC scrambled with G-RNTI/MCCH-RNTI for broadcast;  - Inter-slot TDM between unicast PDSCH and MCCH group-common PDSCH or MTCH group-common PDSCH, or between MCCH group-common PDSCH and MTCH group-common PDSCH, or among unicast PDSCH and MCCH group-common PDSCH and MTCH group-common PDSCH in different slots;  - MCCH change notification indication via DCI;  - RRC configured slot-level repetition up to 8 for MTCH;  - One G-RNTI per UE is supported for broadcast reception;  - Support of FDMed MCCH and PBCH;  - Support of up to 64QAM for FR1/FR2;  - 4 broadcast MRBs as the minimum number;  - PDCP 12 bits SN;  - ROHC with profiles 0x0000, 0x0001 and 0x0002;  - 4 ROHC context sessions;  - RLC UM with 6 bits SN;  - RLC UM with 12 bits SN;  - DRX with long DRX cycle for MBS broadcast as specified in TS 38.321 [8]. |

5.11 Idle/inactive measurement for voice fallback features

| Definitions for feature |
| --- |
| **Idle/Inactive measurement for voice fallback**  It is optional for UE to support the idle/inactive measurement for EPS fallback in RRC\_IDLE/RRC\_INACTIVE as specified in TS 38.331 [9]. |

5.12 NCR features

| Definitions for feature |
| --- |
| **Basic NCR support**  It is optional for UE to support the NCR-MT feature as specified in TS 38.2xx [x]. An NCR node for which the NCR-MT includes *ncr-NodeIndication* in *RRCSetupComplete* as specified in TS 38.331 [9] must support these feature components.  - Support of fixed beam for C-link/backhaul link  - Support of TDMed UL transmission of C-link and backhaul link  - Support of ON-OFF operation for NCR-Fwd based on access link beam indication  - Support of TDD UL/DL determination for backhaul/access link based on TDD UL/DL configuration of C-link  - Support of Tx/Rx timing determination for backhaul/access link based on Tx/Rx timing of C-link  - Support of beam correspondence of the DL/UL of the access link at NCR-Fwd  - Support periodic beam indication for access link  - Priority flag for periodic indication  - Support of simultaneous and TDMed DL reception of C-link and backhaul link |

NEXT CHANGE

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

Annex A.4 specifies for each sidelink related capability, in which interface (i.e., *UECapabilityInformation* in Uu RRC and *UECapabilityInformation*Sidelink in PC5 RRC) 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 |  |
| supportedBandCombinationListSidelinkEUTRA-NR | X |  |
| supportedBandCombinationListSidelinkNR |  | X |
| gnb-ScheduledMode3SidelinkEUTRA | X |  |
| gnb-ScheduledMode4SidelinkEUTRA | X |  |
| sl-Reception | X | X |
| sl-TransmissionMode1 | X |  |
| sl-TransmissionMode2 | X |  |
| sl-TransmissionMode2-PartialSensing | X |  |
| sl-TransmissionMode2-RandomResourceSelection | X |  |
| sync-Sidelink | X |  |
| congestionControlSidelink | X |  |
| sl-Tx-256QAM | X | X |
| sl-Rx-256QAM | X | X |
| psfch-FormatZeroSidelink | X |  |
| lowSE-64QAM-MCS-TableSidelink | X | X |
| csi-ReportSidelink |  | X |
| enb-sync-Sidelink | X |  |
| rankTwoReception |  | X |
| fewerSymbolSlotSidelink | X |  |
| sl-openLoopPC-RSRP-ReportSidelink | X | X |
| rx-IUC-Scheme1-PreferredMode2Sidelink | X | X |
| rx-IUC-Scheme1-NonPreferredMode2Sidelink | X | X |
| rx-IUC-Scheme2-Mode2Sidelink | X | X |
| rx-IUC-Scheme1-SCI | X | X |
| tx-Sidelink | X |  |
| rx-Sidelink | X |  |
| ue-PowerClassSidelink | X |  |
| drx-OnSidelink | X | X |
| enhancedUuDRX-forSidelink | X |  |
| relayUE-Operation-L2 | X |  |
| remoteUE-Operation-L2 | X |  |
| remoteUE-PathSwitchToIdleInactiveRelay | X |  |
| supportedBandCombinationListSL-RelayDiscovery | X |  |
| supportedBandCombinationListSL-NonRelayDiscovery | X |  |
| rx-IUC-Scheme1-SCI-ExplicitReq | X | X |
| scheme2-ConflictDeterminationRSRP |  | X |
| tx-IUC-Scheme2-Mode2Sidelink | X | X |
| tx-IUC-Scheme1-Mode2Sidelink | X | X |
| rx-sidelinkPSFCH | X |  |
| p0-OLPC-Sidelink | X |  |
| sl-LBT-FailureDectectionRecovery | X |  |
| pdcp-DuplicationSRB-sidelink | X | X |
| pdcp-DuplicationDRB-sidelink | X | X |
| supportedBandCombinationListSL-U2U-RelayDiscovery | X |  |
| relayUE-U2U-Operation--L2 | X |  |
| remoteUE-U2U-OperationL2 | X |  |
| remoteUE-U2N-PathSwitchOperationL2 | X |  |
| multipathRemoteUE-PC5L2 | X |  |
| multipathRelayUE-N3C | X |  |
| multipathRemoteUE-N3C | X |  |
| remoteUE-IndirectPathAddChangeToIdleInactiveRelay | X |  |
| pdcp-DuplicationMoreThanOneUuRLC | X |  |
| sl-ReceptionIntraCarrierGuardBand | X | X |
| pdcp-CADuplicationDirectpath-DRB | X |  |
| pdcp-CADuplicationDirectpath-SRB | X |  |
| pdcp-DuplicationMP-SplitDRB | X |  |
| pdcp-DuplicationMP-SplitSRB | X |  |
| directpathRLF-RecoveryViaSRB1 | X |  |

END OF CHANGES