**3GPP TSG-RAN WG1 Meeting #114 *R1-23xxxxx***

**Toulouse, France, August 21-25, 2023**

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| *CR-Form-v12.2* |
| **Draft CHANGE REQUEST** |
|  |
|  | **38.212** | **CR** |  | **rev** | **-** | **Current version:** | **17.5.0** |  |
|  |
| *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:***  | Introduction of Rel-18 NR sidelink evolution |
|  |  |
| ***Source to WG:*** | Huawei |
| ***Source to TSG:*** |  |
|  |  |
| ***Work item code:*** | NR\_SL\_enh2-Core |  | ***Date:*** | 2023-09-01 |
|  |  |  |  |  |
| ***Category:*** | B |  | ***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 canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
|  |  |
| ***Reason for change:*** | Introduction of Rel-18 NR sidelink evolution. |
|  |  |
| ***Summary of change:*** | Support of Rel-18 NR sidelink evolution:1. Section 3.3: Add the abbreviation CAPC.
2. Section 8.3.1.1: Update SCI format 1-A to reflect agreements related to sidelink operation on unlicensed spectrum.
3. Section 8.4.1.1: Update SCI format 2-A to reflect agreements related to sidelink operation on unlicensed spectrum.
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| ***Consequences if not approved:*** | NR sidelink evolution in Rel-18 will be incomplete.  |
|  |  |
| ***Clauses affected:*** | 3.3, 8.3.1.1, 8.4.1.1 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** | **X** |  |  Other core specifications  | TS 38.213, TS 38. 214, TS 37.213 |
| ***affected:*** |  | **X** |  Test specifications |  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications |  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [1].

BCH Broadcast channel

CAPC Channel access priority class

CBG Code block group

CBGTI Code block group transmission information

CG Configured grant

CG-DFI CG downlink feedback information

CG-UCI CG uplink control information

CORESET Control resource set

COT Channel occupancy time

CQI Channel quality indicator

CRC Cyclic redundancy check

CRI CSI-RS resource indicator

CSI Channel state information

CSI-RS CSI reference signal

DAI Downlink assignment index

DCI Downlink control information

DL Downlink

DL-SCH Downlink shared channel

DMRS Demodulation reference signal

HARQ Hybrid automatic repeat request

HARQ-ACK Hybrid automatic repeat request acknowledgement

LDPC Low density parity check

LI Layer indicator

MBS Multicast broadcast services

MCS Modulation and coding scheme

OFDM Orthogonal frequency division multiplex

PBCH Physical broadcast channel

PCH Paging channel

PDCCH Physical downlink control channel

PDSCH Physical downlink shared channel

PMI Precoding matrix indicator

PRB Physical resource block

PRACH Physical random access channel

PSBCH Physical sidelink broadcast channel

PSCCH Physical sidelink control channel

PSFCH Physical sidelink feedback channel

PSSCH Physical sidelink shared channel

PTRS Phase-tracking reference signal

PUCCH Physical uplink control channel

PUSCH Physical uplink shared channel

RACH Random access channel

RI Rank indicator

RSRP Reference signal received power

SCI Sidelink control information

SFCI Sidelink feedback control information

SFN System frame number

SL Sidelink

SL-BCH Sidelink broadcast channel

SL-SCH Sidelink shared channel

SR Scheduling request

SRS Sounding reference signal

SS Synchronisation signal

SUL Supplementary uplink

TPC Transmit power control

TrCH Transport channel

UCI Uplink control information

UE User equipment

UL Uplink

UL-SCH Uplink shared channel

VRB Virtual resource block

ZP CSI-RS Zero power CSI-RS

< Unchanged parts are omitted >

#### 8.3.1.1 SCI format 1-A

SCI format 1-A is used for the scheduling of PSSCH and 2nd-stage-SCI on PSSCH

The following information is transmitted by means of the SCI format 1-A:

- Priority – 3 bits as specified in clause 5.4.3.3 of [12, TS 23.287] and clause 5.22.1.3.1 of [8, TS 38.321]. Value '000' of Priority field corresponds to priority value '1', value '001' of Priority field corresponds to priority value '2', and so on.

- Frequency resource assignment – number of bits determined by the following:

- If higher layer parameter *transmissionStructureForPSCCHandPSSCH* in *SL-BWP-Config* is not configured or configured to ‘*contigousRB*’

- bits when the value of the higher layer parameter *sl-MaxNumPerReserve* is configured to 2; otherwise bits when the value of the higher layer parameter *sl-MaxNumPerReserve* is configured to 3, as defined in clause 8.1.5 of [6, TS 38.214].

- If the higher layer parameter *transmissionStructureForPSCCHandPSSCH* in *SL-BWP-Config* is configured to ‘*interlaceRB*’

- X + Y bits provide the frequency domain resource allocation according to Clause x.x of [6, TS 38.214], where the X MSBs provide the RB set allocation and the Y LSBs provide the sub-channel allocation,

- the value of X is determined by when the value of the higher layer parameter *sl-MaxNumPerReserve* is configured to 2, or determined by when the value of the higher layer parameter *sl-MaxNumPerReserve* is configured to 3, where is the number of RB sets in a resource pool

- the value of Y is determined by when the value of the higher layer parameter *sl-MaxNumPerReserve* is configured to 2, or determined by when the value of the higher layer parameter *sl-MaxNumPerReserve* is configured to 3, where is the number of sub-channels for each RB set.

- Time resource assignment – 5 bits when the value of the higher layer parameter *sl-MaxNumPerReserve* is configured to 2; otherwise 9 bits when the value of the higher layer parameter *sl-MaxNumPerReserve* is configured to 3, as defined in clause 8.1.5 of [6, TS 38.214].

- Resource reservation period – bits as defined in clause 16.4 of [5, TS 38.213], where is the number of entries in the higher layer parameter *sl-ResourceReservePeriodList*, if higher layer parameter *sl-MultiReserveResource* is configured; 0 bit otherwise.

- DMRS pattern – bits as defined in clause 8.4.1.1.2 of [4, TS 38.211], where is the number of DMRS patterns configured by higher layer parameter *sl-PSSCH-DMRS-TimePatternList*.

- 2nd-stage SCI format – 2 bits as defined in Table 8.3.1.1-1.

- Beta\_offset indicator – 2 bits as provided by higher layer parameter *sl-BetaOffsets2ndSCI* and Table 8.3.1.1-2.

- Number of DMRS port – 1 bit as defined in Table 8.3.1.1-3.

- Modulation and coding scheme – 5 bits as defined in clause 8.1.3 of [6, TS 38.214].

- Additional MCS table indicator – as defined in clause 8.1.3.1 of [6, TS 38.214]: 1 bit if one MCS table is configured by higher layer parameter *sl-Additional-MCS-Table*; 2 bits if two MCS tables are configured by higher layer parameter *sl-Additional-MCS-Table*; 0 bit otherwise.

- PSFCH overhead indication – 1 bit as defined clause 8.1.3.2 of [6, TS 38.214] if higher layer parameter *sl-PSFCH-Period* = 2 or 4; 0 bit otherwise.

- Reserved – a number of bits as determined by the following:

- bits as configured by higher layer parameter *sl-NumReservedBits,* with value set to zero, if higher layer parameter *sl-IndicationUE-B* is not configured, or if higher layer parameter *sl-IndicationUE-B* is configured to 'disabled';

- bits otherwise, with value set to zero.

- Conflict information receiver flag – 0 or 1 bit

- 1 bit if higher layer parameter *sl-IndicationUE-B* is configured to 'enabled', where the bit value of 0 indicates that the UE cannot be a UE to receive conflict information and the bit value of 1 indicates that the UE can be a UE to receive conflict information as defined in Clause 16.3.0 of [5, TS 38.213];

- 0 bit otherwise.

Table 8.3.1.1-1: 2nd-stage SCI formats

|  |  |
| --- | --- |
| **Value of 2nd-stage SCI format field** | **2nd-stage SCI format** |
| 00 | SCI format 2-A |
| 01 | SCI format 2-B |
| 10 | SCI format 2-C |
| 11 | Reserved |

Table 8.3.1.1-2: Mapping of Beta\_offset indicator values to indexes in Table 9.3-2 of [5, TS38.213]

|  |  |
| --- | --- |
| **Value of Beta\_offset indicator** | **Beta\_offset index in Table 9.3-2 of [5, TS38.213]** |
| 00 | 1st index provided by higher layer parameter *sl-BetaOffsets2ndSCI* |
| 01 | 2nd index provided by higher layer parameter *sl-BetaOffsets2ndSCI* |
| 10 | 3rd index provided by higher layer parameter *sl-BetaOffsets2ndSCI* |
| 11 | 4th index provided by higher layer parameter *sl-BetaOffsets2ndSCI* |

Table 8.3.1.1-3: Number of DMRS port(s)

|  |  |
| --- | --- |
| **Value of the Number of DMRS port field** | **Antenna ports** |
| 0 | 1000 |
| 1 | 1000 and 1001 |

< Unchanged parts are omitted >

8.4.1.1 SCI format 2-A

SCI format 2-A is used for the decoding of PSSCH, with HARQ operation when HARQ-ACK information includes ACK or NACK, when HARQ-ACK information includes only NACK, or when there is no feedback of HARQ-ACK information.

The following information is transmitted by means of the SCI format 2-A:

- HARQ process number – bits.

- New data indicator – 1 bit.

- Redundancy version – 2 bits as defined in Table 7.3.1.1.1-2.

- Source ID – 8 bits as defined in clause 8.1 of [6, TS 38.214].

- Destination ID – 16 bits as defined in clause 8.1 of [6, TS 38.214].

- HARQ feedback enabled/disabled indicator – 1 bit as defined in clause 16.3 of [5, TS 38.213].

- Cast type indicator – 2 bits as defined in Table 8.4.1.1-1 and in clause 8.1 of [6, TS 38.214].

- CSI request – 1 bit as defined in clause 8.2.1 of [6, TS 38.214] and in clause 8.1 of [6, TS 38.214].

If higher layer parameter *transmissionStructureForPSCCHandPSSCH* in *SL-BWP-Config* is configured, all the remaining fields are set as follows:

- CAPC – 2 bits. Value '00' of CAPC field corresponds to CAPC value '1', value '01' of CAPC field corresponds to priority value '2', and so on.

- COT sharing cast type – 2 bits as defined in Table 8.4.1.1-1.

- COT sharing additional ID – 24 bits. The 16 LSBs provide layer 1 destination ID and the 8 MSBs provide layer 1 source ID, as defined in [6, TS 38.214]. The 8 MSBs are reserved when value of COT sharing cast type field is set to '00' or '01'.

- Remaining COT duration – bits, where is defined in Table 4.2-1 of Clause 4.2 of [4, TS 38.211].

**Table 8.4.1.1-1: Cast type indicator or COT sharing cast type**

|  |  |
| --- | --- |
| **Value of Cast type indicator or COT sharing cast type** | **Cast type** |
| 00 | Broadcast |
| 01 | Groupcast when HARQ-ACK information includes ACK or NACK |
| 10 | Unicast |
| 11 | Groupcastwhen HARQ-ACK information includes only NACK |
| Note: The row with value '11' is reserved, if higher layer parameter *transmissionStructureForPSCCHandPSSCH* in *SL-BWP-Config* is configured. |