**3GPP TSG RAN WG1 #107-e R1-21nnnnn**

**e-Meeting, November 11th – 19th, 2021**

**Agenda item:** 8.16

**Source:** Moderators (AT&T, NTT DOCOMO, INC.)

**Title:** Updated RAN1 UE features list for Rel-17 NR after RAN1 #107-e

**Document for:** Information

1. Introduction

This contribution includes the updated RAN1 UE features list for Rel-17 NR after RAN1 #107-e.

1. NR\_FeMIMO

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| Features | Index | Feature group | Components | Prerequisite feature groups | Need for the gNB to know if the feature is supported | Applicable to the capability signalling exchange between UEs (Sidelink WI only)”. | **Consequence if the feature is not supported by the UE** | **Type**  **(the ‘type’ definition from UE features should be based on the granularity of 1) Per UE or 2) Per Band or 3) Per BC or 4) Per FS or 5) Per FSPC)** | Need of FDD/TDD differentiation | Need of FR1/FR2 differentiation | Capability interpretation for mixture of FDD/TDD and/or FR1/FR2 | Note | Mandatory/Optional |
| 23. NR\_FeMIMO | 23-1-1 | Unified TCI for [intra- and inter-cell] beam management | [For both intra- and inter-cell beam management:]  1. Support of joint DL/UL TCI update [and separate DL/UL TCI update] with their components (configuration mechanism, QCL rules, applicable source and target signals) [and Common cross-CC TCI update and activation (involving RRC common TCI state pool)]  2. Support of association between TCI state and UL PC settings [for PUCCH, PUSCH, and SRS] [ (PLRS and other, including handling of beam [alignment/misalignment] for PLRS)]  3. Supported mode of [MAC-CE/MAC-CE+DCI]-based TCI state indication [(including TCI state activation, use of DCI formats 1\_1/1\_2 with and without DL assignment)]  [4. The maximum number of configured TCI state pools across all BWPs and all CCs in a band]  [5. The maximum number of configured TCI states across all BWPs and all CCs in a band]  [6. The maximum number of configured TCI states per CC in a band]  [7. Support number of MAC-CE activated joint TCI states across all BWPs and all CCs in a band]  [8. The maximum number of MAC-CE activated separate DL and UL TCI states across all BWPs and all CCs in a band]  [9. Support of association between a TCI state and PL-RS, where the “beam alignment” between the DL source RS in the UL or (if applicable) joint TCI state to provide spatial relation indication and the PL-RS is assumed by the UE  [10. Support any DL RS that is a valid target DL RS of a Rel-15/16 TCI state based on the Rel-15/16 QCL rules can be configured as a target DL RS of Rel-17 DL TCI (hence the Rel-17 DL TCI state pool)  [11. The minimum beam application time in Y symbols]  [12. The maximum number of PCI(s) different from serving cell PCI that can be associated with activated TCI states] |  |  |  |  | [per band] |  |  |  | [4. candidate values {1, …, 32}  5. candidate values {64, 72, 80, 96, 128, 192, 256, 128\*4\*32}  6. candidate values {8, 16, 32, 64, 128, 256}  3. candidate values FFS  7. candidate values {1, 2, 3, 4, 5, 6, 7, 8}  8. candidate values {1, 2, 3, 4,5,6,7, 8}  Note 1: for component 7 & 8, if two TCI states are in one codepoint, it should be counted as 2.] | Optional with capability signalling |
| 23. NR\_FeMIMO | 23-1-2 | Inter-cell measurement and reporting (for inter-cell BM [and mTRP]) | 1. Support of [L1-RSRP/beam] measurement and report on SSB(s) with PCI(s) different from serving cell PCI  2. Support of [L1-RSRP/beam] reporting of Kmax SSBRI-RSRP[,SS-RSRP] [pairs/beams], with at least one [pair/beam] associated with a PCI different from serving cell PCI [in one report instance]  [3. The number of [RRC-configured/ MAC-CE activated] PCI(s) different from serving cell PCI for beam measurement] [in FR1]  [4. The number of [RRC- configured/ MAC-CE activated] PCI(s) different from serving cell PCI for beam measurement] [in FR2]  [5. The max number of SSB resources configured to measure L1-RSRP within a slot across all PCI(s) different from serving cell PCI]  [6. The max number of SSB resources configured to measure L1-RSRP across all PCI(s) different from serving cell PCI]  [7. Support on that SSB(s) with PCI(s) different from serving cell PCI configured for L1 beam measurement and report are not included in SSBs with PCIs configured for L3 mobility measurement] | [2-24, 2-29] |  |  |  |  |  |  |  | ~~{Support, Not support}~~  [2. Candidate value of {1,2,3,4}]  [3. candidate values {1, 2, 4, 6}]  [4. candidate values {1, 2, 4}]  [5. candidate values: {2, 4, 8, FFS}]  [6. candidate values: {4, 8, 16, 32, 64, FFS}]  [7. candidate values {not support}] | Optional with capability signalling |
| 23. NR\_FeMIMO | 23-1-3 | MPE mitigation | 1. Support of enhanced [PHR] reporting which includes pairs of (P-MPR, SSBRI/CRI)  2. Maximum number of reported P-MPR and SSBRI/CRI pairs  3. Maximum number of candidate RS(s) configured in a RRC pool for MPE mitigation |  |  |  |  |  |  |  |  | 2. Candidate value of {1,2,3, 4}  3. Candidate valueFFS | Optional with capability signalling |
| 23. NR\_FeMIMO | 23-1-4 | MPUE support for UL | [depending on agreement] |  |  |  |  |  |  |  |  |  | Optional with capability signalling |
| 23. NR\_FeMIMO | 23-2-1 | [Multi-TRP] PDCCH repetition | 1. Support of PDCCH repetition (based on two linked SS sets associated with corresponding CORESETs) [with non-SFN scheme TDM and FDM] [including PDCCH repetition for Type 3 CSS]  2. Support of reporting one [or more] number(s) as required number of BDs for the two PDCCH candidates  3. [If 3 or {2, 3} is reported in component 2, support of whether the individual candidate is monitored or not when one of the linked PDCCH candidates uses the same set of CCEs as an individual (unlinked) PDCCH candidate, and they both are associated with the same DCI size, scrambling, and CORESET for the case that the linked PDCCH candidates is 3 BDs] [If 2 or {2,3} is reported in component 2, the individual candidate is monitored when one of the linked PDCCH candidates uses the same set of CCEs as an individual (unlinked) PDCCH candidate, and they both are associated with the same DCI size, scrambling, and CORESET for the case that the linked PDCCH candidates is 2 BDs.]  FFS: 4. Support max number of overlaps when one of the linked PDCCH candidates uses the same set of CCEs as an individual (unlinked) PDCCH candidate per scheduled component carrier |  |  |  |  |  |  |  |  | Component1: details FFS  Component2: details FFS  Component3: details FFS  Component4: details FFS  [Note: UE supports PDCCH repetition for the following (basic) PDCCH monitoring capability: For type 1 CSS with dedicated RRC configuration, type 3 CSS, and UE-SS, the monitoring occasion is within the first 3 OFDM symbols of a slot] | Optional with capability signalling |
| 23. NR\_FeMIMO | 23-2-2 | Two QCL TypeD for [CORESET monitoring in] PDCCH [repetition] | Support of determining two QCL-TypeD for overlapping CORESETs in the same CC or for intra-band CA [when UE is configured with PDCCH repetition] | [23-2-1, 23-6-1, 23-6-2] |  |  |  |  |  |  | FR2 only |  | Optional with capability signalling |
| 23. NR\_FeMIMO | 23-2-3 | PDCCH repetition for Type3 CSS | Support of PDCCH repetition for Type3 CSS |  |  |  |  |  |  |  |  |  | Optional with capability signalling |
| 23. NR\_FeMIMO | 23-3-1 | Multi-TRP PUSCH repetition (type A) | 1. Support of multi-TRP PUSCH repetition (based on PUSCH repetition type A)  [2. Support of cyclic mapping when the number of repetitions is larger than 2 for single DCI based M-TRP PUSCH repetition Type A]  [3. Support of second TPC field for per TRP closed-loop power control for PUSCH with DCI formats 0\_1 / 0\_2]  [4. Support of PHR reporting related to M-TRP PUSCH repetition (calculate two PHRs (at least corresponding to the CC that applies m-TRP PUSCH repetitions), each associated with a first PUSCH occasion to each TRP, and report two PHRs.)]  [5. Support of CG PUSCH transmission towards M-TRPs using a single CG configuration (Use same beam mapping principals as dynamic grant PUSCH repetition scheme.)]  [6. support of sequential mapping for single for single DCI based M-TRP PUSCH repetition Type A]  [7. The maximum number of PHR reporting across all CCs (including those related to M-TRP PUSCH repetition and the legacy Rel-15/16 PUSCH transmission)]  [8. Support of A-CSI report on two PUSCH repetitions]  [9. Support of SP-CSI report on two PUSCH repetitions]  [10: Support dynamic switching between multi-TRP PUSCH scheme and single-TRP PUSCH transmission]  [11. Support PUSCH operations: CB based and NCB based and corresponding parameters including number of SRS resources] |  |  |  |  |  |  |  |  |  | Optional with capability signalling |
| 23. NR\_FeMIMO | 23-3-1-1 | Multi-TRP PUSCH repetition (type B) | 1. Support of multi-TRP PUSCH repetition (based on PUSCH repetition type B)  FFS: discuss details (to be discussed after type A is stable |  |  |  |  |  |  |  |  |  | Optional with capability signalling |
| 23. NR\_FeMIMO | 23-3-2 | Multi-TRP PUCCH repetition | 1. Support of PUCCH repetition scheme 1 (inter-slot repetition)  2. Support of PUCCH repetition scheme 3 (intra-slot repetition)  3. Support of cyclic mapping for beam mapping/power control parameter set mapping [when the number of repetitions is larger than 2] for PUCCH repetitions scheme 1 and 3 when the number of repetitions is larger than 2  4. Support of second TPC field for per TRP closed-loop power control for PUCCH with DCI formats [1\_0 /] 1\_1 / 1\_2 |  |  |  |  |  |  |  |  |  | Optional with capability signalling |
| 23. NR\_FeMIMO | 23-4 | IntCell-mTRP | 1. Support of RRC configuration of additional PCI different from serving cell associated with the TCI state and/or QCL-info  [2. Support of X>1 (max number of PCIs different from serving cell)]  [3. Supported max number of RRC-configured PCIs different from serving cell PCI for [FR1/case1] (X1)] [SSB time domain positions or periodicity of additional PCIs is not exactly the same as serving cell PCI)]  [4. Supported max number of RRC-configured PCIs different from serving cell PCI for [FR2/case2] (X2)] [SSB time domain positions and periodicity are exactly the same among the additional PCIs and the same as serving cell PCI]  [5. default case to be supported, e.g., case2 with X2=1] |  |  |  |  |  |  |  |  |  | Optional with capability signalling |
| 23. NR\_FeMIMO | 23-5-1 | Group based L1-RSRP reporting enhancements | 1. Support a single L1-RSRP reporting instance consisting of N beam groups and M=2 beams per [pair/group] [in one report instance]  2. [Support of enhanced group-based reporting for Rel-17 M-TRP]  3. [Maximum number of SSB and CSI-RS resources for measurement in both CMR sets within a slot across all CCs]  4. [Maximum number of configured SSB and CSI-RS resources for measurement in both CMR sets across all CCs]  5. [Support beam measurement on two CMR resource sets]  6. [Support of enhanced group-based reporting for Rel-17 intra-cell and inter-cell mTRP] |  |  |  |  |  |  |  |  | Candidate values: {1,2,3,4} | Optional with capability signalling |
| 23. NR\_FeMIMO | 23-5-2 | MTRP BFR enhancements | 1. Support of the maximum number of BFD-RS resources per set  2. [Support of Rel-17 M-TRP BFR based on two BFD-RS sets]  3. [Maximum number of CSI-RS resources of both BFR-RS sets across all CCs]  4. [Maximal number of different SSBs of both BFD-RS sets across all CCs]  5. [Maximal number of different CSI-RS and/or SSB resources of both NBI-RS sets across all CCs]  6. [Support up to two PUCCH-SR resources for MTRP BFRQ]  7. [Supported maximum number of BFD-RS resources across two BFD-RS sets per BWP]  8. [Support of [single DCI/multi-DCI] based BFR enhancement] |  |  |  |  |  |  |  |  | [Candidate values: {1, 2,…}] | Optional with capability signalling |
| 23. NR\_FeMIMO | 23-6-1 | SFN scheme A (scheme 1) | 1. [Support of scheme A for PDCCH] [and default QCL assumption with two TCI states for PDCCH]  2. Support of scheme A for PDSCH [scheduled by [single TRP/ Scheme A] PDCCH] [and default QCL assumption with two TCI states for PDSCH] |  |  |  |  |  |  |  |  |  | Optional with capability signalling |
| 23. NR\_FeMIMO | 23-6-1a | Dynamic switching - scheme A | Support of dynamic switching between single-TRP and SFN PDSCH scheme A by TCI state field in DCI formats 1\_1, 1\_2 |  |  |  |  |  |  |  |  |  |  |
| 23. NR\_FeMIMO | 23-6-2 | SFN scheme B (TRP based pre-compensation) | 1. [Support of scheme B for PDCCH]  2. Support of scheme B for PDSCH [scheduled by [single TRP/Scheme B] PDCCH] | [23-6-1] |  |  |  |  |  | [FR1 only] |  |  | Optional with capability signalling |
| 23. NR\_FeMIMO | 23-6-2a | Dynamic switching - scheme B | Support of dynamic switching between single-TRP and SFN PDSCH scheme B by TCI state field in DCI formats 1\_1, 1\_2 |  |  |  |  |  |  |  |  |  |  |
| 23. NR\_FeMIMO | 23-6-3 | Simultaneous activation of two TCI states for PDCCH across multiple CCs (HST/URLLC) | Support of simultaneous activation of two TCI states for CORESETs with the same CORESET ID in all BWPs across a set of configured component carriers by single MAC-CE | 23-6-1 or 23-6-2 |  |  |  | Per UE |  | Yes |  |  | Optional with capability signalling |
| 23. NR\_FeMIMO | 23-6-4 | Default beam setup [for HST] | 1. Support of PDSCH reception using default beam for Rel-17 enhanced SFN scheme when PDSCH is scheduled with offset less than threshold  FFS: 2. Support PDSCH reception using default beam for Rel-17 enhanced SFN scheme when TCI field is not present in DCI [when PDSCH is scheduled with offset equal or larger than the threshold]  3. Support aperiodic CSI-RS reception using default beam for Rel-17 enhanced SFN scheme when scheduling offset is less than threshold  FFS: 4. Support of single-TRP PUCCH transmission using default beam when enhanced SFN PDCCH transmission scheme is configured  FFS: 5. Support of single-TRP PUSCH transmission using default beam when enhanced SFN PDCCH transmission scheme is configured  FFS: 6. Support of single-TRP SRS resource transmission using default beam when enhanced SFN PDCCH transmission scheme is configured |  |  |  |  |  |  |  |  |  | Optional with capability signalling |
| 23. NR\_FeMIMO | 23-7-1 | Basic Features of CSI Enhancement for Multi-TRP | 1. Maximum number of NZP CSI-RS resource pairs used as CMR (channel measurement resource) pairs for NCJT measurement hypothesis: Nmax=1 2. FFS: Maximum number of NZP CSI-RS resources in one CSI-RS resource set: Ks,max 3. CSI report mode selection   FFS others (supported options; values for X, codebook types, number of ports of CMRs, CMR sharing among NCJT and sTRP measurement hypotheses for FR1, two CMR groups with Ks=K1+K2 CMRs in CSI-RS resource set, reporting of 2 PMIs, 2 RIs and 2 Lis for NCJT measurement hypothesis …) | FFS |  |  |  | [Per band / per BC] |  |  |  | [Component 2 candidate value set: {2, 3, 4, 5, 6, 7, 8}]  Note: ‘NCJT’ is not used in RAN1 specifications and will be aligned with 38.214 | Optional with capability signalling |
| 23. NR\_FeMIMO | 23-7-2 | Support of max # of Tx ports [per source/across two CMRs] [in a resource set for Multi-TRP CSI] [and max # resources] | [A list of supported combinations, each combination is {max # of Tx ports per source in a resource set for Multi-TRP CSI, max # resources in a resource set for Multi-TRP CSI}]  [Note: same number of ports among CMRs] |  |  |  |  |  |  |  |  | [{4, 8, 12, 16, 24, 32}] | Optional with capability signalling |
| 23. NR\_FeMIMO | 23-7-3 | More than two resources in a resource set for Multi-TRP CSI | FFS exact candidate values, Ks,max is up to 8 |  |  |  |  |  |  |  |  | [candidate values are {2, 3, 4, 5, 6, 7, 8}] | Optional with capability signalling |
| 23. NR\_FeMIMO | 23-7-4 | Support of Nmax=2 for Multi-TRP CSI | Support of maximum number of CMR pairs Nmax=2 configured in NZP-CSI-RS-ResourceSet for a given CSI report setting | 23-7-1 |  |  |  | Per band |  |  |  |  | Optional with capability signalling |
| 23. NR\_FeMIMO | 23-7-5 | CMR sharing | Support a NZP CSI-RS resource referred by both a CMR pair configured for NCJT measurement hypothesis and a CMR configured for Single-TRP measurement hypothesis | 23-7-1 |  |  |  | Per band |  | FR2 only |  | Note: ‘NCJT’ and ‘singel-TRP’ are not used in RAN1 specifications and will be aligned with 38.214 | Optional with capability signalling |
| 23. NR\_FeMIMO | 23-8-1 | SRS triggering offset enhancement | Support of determining aperiodic SRS location based on available slot [and dynamically based on Rel-17 introduced new field in DCI Format 0\_1/0\_2/1\_1/1\_2] |  |  |  |  |  |  |  |  |  | Optional with capability signalling |
| 23. NR\_FeMIMO | 23-8-2 | Triggering SRS only in DCI 0\_1/0\_2 | Support of triggering SRS in DCI 0\_1/0\_2 without data and without CSI | 2-52 |  |  |  |  |  |  |  |  | Optional with capability signalling |
| 23. NR\_FeMIMO | 23-8-3 | SRS Antenna switching for >4Rx | 1. Support of SRS antenna switching xTyR with y>4  2. Report whether the antenna switching impact to downlink receiving in a band  3. Report whether the antenna is switched together with UL Tx in another band | 2-55 |  |  |  | Per BC |  |  |  | Component 1 candidate values: FFS | Optional with capability signalling |
| 23. NR\_FeMIMO | 23-8-4 | Maximum 2 SP and 1 periodic SRS sets for antenna switching | Support of maximum 2 SP SRS resource sets and maximum 1 periodic SRS resource set for antenna switching | 2-53 |  |  |  |  |  |  |  | Note1:   * Applies for all supported xTyR where y<=8 * For xTyR where y>4, if UE does NOT support this feature, support maximum one SRS resource set for periodic SRS and maximum one SRS resource set for semi-persistent SRS * For xTyR where y<=4, if UE does not support this feature, follow Rel-15 on the number of resource sets for periodic and semi-persistent SRS * The two SP-SRS resource sets are not activated at the same time | Optional with capability signalling |
| 23. NR\_FeMIMO | 23-8-5 | Increased repetition for SRS | Support of increased repetition patterns (8, 10, 12, 14 symbols) for SRS resource | 10-11, 2-52 |  |  |  |  |  |  |  |  | Optional with capability signalling |
| 23. NR\_FeMIMO | 23-8-6 | Partial frequency sounding of SRS | Support of partial frequency sounding for SRS | 2-52 |  |  |  |  |  |  |  |  | Optional with capability signalling |
| 23. NR\_FeMIMO | 23-8-7 | Start RB location hopping for partial frequency SRS | Support of start RB location hopping in partial frequency SRS transmission [across different SRS frequency hopping periods for periodic/semi-persistent SRS] | 23-8-6 |  |  |  |  |  |  |  |  | Optional with capability signalling |
| 23. NR\_FeMIMO | 23-8-8 | Comb-8 SRS | Support of comb-8 for SRS other than for positioning |  |  |  |  |  |  |  |  |  | Optional with capability signalling |
| 23. NR\_FeMIMO | 23-9-1 | Basic Features of Further Enhanced Port-Selection Type II Codebook (FeType-II) | 1. {Max # of Tx ports in one resource, Max # of resources and total # of Tx ports} to support Port-selection FeType-II with M=1 and R=1 2. Support rank 1,2 3. Support parameter combinations with M=1 | 2-35 |  |  |  | Per band and per BC |  |  |  | Component 1 candidate values:   * Maximum 16 triplets * Max # of Tx ports in one resource: {4,8,12,16,24,32} * Max # resources: {1 to 64} * Max # total ports: {4 to 256} | Optional with capability signalling |
| 23. NR\_FeMIMO | 23-9-5 | Active CSI-RS resources and ports for mixed codebook types in any slot | 1. List of codebook combinations 2. List of {max number of ports per resource, max number of resources, max number of total ports} for each codebook combination | [23-9-1] |  |  |  | FFS |  |  |  | [Component 1 candidate values:  Codebook 1 = {Type I SP, Type I MP}  {Codebook 2, Codebook 3} = {{FeType II PS M=1, NULL},{FeType II PS M=2 R=1, NULL}, {Type II, FeType II PS M=1}, {Type II, FeType II PS M=2 R=1} ,{eType II R=1, FeType II PS M=1},{eType II R=1, FeType II PS M=2 R=1}}  Component 2 candidate values:  - Maximum 16 triplets for each codebook combination  - Max # of Tx ports in one resource: {4,8,12,16,24,32}  - Max # resources: {1 to 64}  - Max # total ports: {4 to 256}]  Note 1：if a UE reports one or more codebook combinations in [23-9-5], then usage of active CSI-RS resources and ports for multiple codebooks in any slot is allowed only within those combinations  [Note 2: For coexisting of mixed codebooks in any slot, gNB need to honor 16-8, 23-10 and per-codebook capability 2-36/40/41/43, 16-3a/b and 16-3a-1/16-3b-1, and 23-9-1] | Optional with capability signalling |
| 23. NR\_FeMIMO | 23-9-2 | Support of Mv=2 for FeType-II | [1. {Max # of Tx ports in one resource, Max # of resources and total # of Tx ports} to support Port-selection FeType-II with M=2 and R=1]  2. Support parameter combinations with M=2  [3. Support of DFT FD bases of size N] | 23-9-1 |  |  |  | [per band and per BC] |  |  |  | [Component 1 candidate values  - Maximum 16 triplets  - Max # of Tx ports in one resource: {4,8,12,16,24,32}  - Max # resources: {1 to 64}  - Max # total ports: {4 to 256}]  [Component 4 candidate values: {N=2 only, N=2 and N=4}] | Optional with capability signalling |
| 23. NR\_FeMIMO | 23-9-3 | Support of rank 3, 4 for FeType-II | Support of rank 3, 4 for FeType-II  FFS separate capabilities for M = 1 and M = 2 | 23-9-1[, 23-9-2] |  |  |  | Per band |  |  |  |  | Optional with capability signalling |
| 23. NR\_FeMIMO | 23-9-4 | Support of R = 2 for FeType-II | 1. Support of R = 2 for FeType-II  [2. {Max # of Tx ports in one resource, Max # of resources and total # of Tx ports} to support to support Port-selection FeType-II with M=2 and R=2] | 23-9-2 |  |  |  | [per band and per BC] |  |  |  |  | Optional with capability signalling |

1. NR\_ext\_to\_71GHz

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| Features | Index | Feature group | Components | Prerequisite feature groups | Need for the gNB to know if the feature is supported | Applicable to the capability signalling exchange between UEs (Sidelink WI only)”. | **Consequence if the feature is not supported by the UE** | **Type**  **(the ‘type’ definition from UE features should be based on the granularity of 1) Per UE or 2) Per Band or 3) Per BC or 4) Per FS or 5) Per FSPC)** | Need of FDD/TDD differentiation | Need of FR1/FR2 differentiation | Capability interpretation for mixture of FDD/TDD and/or FR1/FR2 | Note | Mandatory/Optional |
| 24. NR\_ext\_to\_71GHz | 24-1 | Basic FR2-2 DL support | 1. Support reception of 120kHz subcarrier spacing for DL data and control channels, SSB, and reference signals in FR2-2 for non-initial access |  |  |  | FR2-2 is not supported | [per UE][per band] |  |  |  |  | Optional with capability signalling  A UE that supports FR2-2 must indicate this FG is supported |
| 24. NR\_ext\_to\_71GHz | 24-1a | Basic FR2-2 UL support | 1. PRACH with 120KHz SCS and length 139  2. Support transmission of 120kHz subcarrier spacing for UL data and control channels and reference signals in FR2-2 | [24-1] |  |  |  |  |  |  |  |  | Optional with capability signalling  [A UE that supports FR2-2 must indicate this FG is supported] |
| 24. NR\_ext\_to\_71GHz | 24-1b | Wideband PRACH [with/without shared spectrum channel access] | Enhanced PRACH design for operation by adopting a single long ZC sequence, with ZC sequence equal to 1151 for 120kHz and ZC sequence equal to 571 for 120kHz | [24-1a] |  |  |  |  |  |  |  | FFS: whether to split this FG for SA and DC | Optional [with/without]capability signalling  [A UE that supports FR2-2 must indicate this FG is supported] |
| 24. NR\_ext\_to\_71GHz | 24-1c | Multi-RB support  PUCCH format 0/1/4 for 120 kHz [with/without shared spectrum channel access] | 1. Support multi-RB PUCCH format 4 for 120 kHz  2. Support multi-RB PUCCH format 0/1 for 120 kHz | [24-1a] |  |  |  |  |  |  |  |  | Optional with capability signalling  [A UE that supports FR2-2 must indicate this FG is supported] |
| 24. NR\_ext\_to\_71GHz | 24-1d | Multiple PDSCH scheduling by single DCI for 120kHz | 1. Multi-PDSCH scheduling by single DCI for the operation with 120 kHz SCS  2. HARQ enhancements | [24-1] |  |  |  |  |  |  |  |  | Optional with capability signalling |
| 24. NR\_ext\_to\_71GHz | 24-1e | Multiple PUSCH scheduling by single DCI for 120kHz | 1. Multi-PUSCH scheduling by single DCI for the operation with 120 kHz SCS | [24-1a] |  |  |  |  |  |  |  |  | Optional with capability signalling |
| 24. NR\_ext\_to\_71GHz | 24-2 | 120KHz SSB support for SA/DC in FR2-2 | 1. Support 120KHz SSB for SA/DC in FR2-2 | [24-1, 24-1a] | N/A | N/A | 120KHz SSB based stand-alone in FR2-2 is not supported | N/A | N/A | N/A | N/A | per band  FFS: whether to split this FG for SA and DC | Optional [with/without] capability signalling  [A UE that supports FR2-2 must indicate this FG is supported] |
| 24. NR\_ext\_to\_71GHz | 24-3 | 480KHz SSB support for SA/DC in FR2-2 | 1. Support 480KHz SSB for SA/DC in FR2-2 | 24-1[, 24-2, 24-4] | FFS |  |  | [per UE][per band] |  |  |  | FFS: whether to split this FG for SA and DC | Optional [with/without] capability signalling |
| 24. NR\_ext\_to\_71GHz | 24-4 | 480KHz SCS support for DL | 1. 480KH SCS for DL data and control channels, SSB, and reference signal reception in FR2-2 for non-initial access  2. Multiple-slot PDCCH monitoring for 480KHz with X=4 slots  FFS: 3. Multi- PDSCH scheduling by single DCI for the operation with 480 kHz SCS and corresponding HARQ enhancements | 24-1 | Yes |  |  | [Per UE/band] |  |  |  |  | Optional with capability signalling |
| 24. NR\_ext\_to\_71GHz | 24-4a | 480KHz SCS support for UL | 1. PRACH with 480KHz and length 139  2. 480KHz SCS for UL data and control channels and reference signal transmission in FR2-2  3. Multi-PUSCH scheduling by single DCI for the operation with 480 kHz SCS |  |  |  |  |  |  |  |  |  | Optional with capability signalling |
| 24. NR\_ext\_to\_71GHz | 24-4b | Wideband PRACH for 480 kHz [with/without shared spectrum channel access] | PRACH with 480KHz and length 571 |  |  |  |  |  |  |  |  | FFS: whether to split this FG for SA and DC  [Agreement:  Do not support PRACH length L=571, 1151 for 960kHz PRACH and at least L =1151 for 480kHz PRACH] | Optional with capability signalling |
| 24. NR\_ext\_to\_71GHz | 24-4c | Multi-RB PUCCH format 0/1/4 for 480 kHz [with/without shared spectrum channel access] | Support multi-RB PUCCH format 0/1/4 for 480 kHz |  |  |  |  |  |  |  |  |  | Optional with capability signalling |
| 24. NR\_ext\_to\_71GHz | 24-4f | Enhanced PDCCH monitoring for 480KHz | Multiple-slot PDCCH monitoring for 480KHz with X=[2] slots |  |  |  |  |  |  |  |  |  | Optional with capability signalling |
| 24. NR\_ext\_to\_71GHz | 24-5 | 960KHz SCS support for DL | 1. 960KHz SCS for DL data and control channels, SSB, and reference signal reception in FR2-2 for non-initial access  2. Multiple-slot PDCCH monitoring for 960KHz with X=8 slots  FFS: 3. MultiPDSCH scheduling by single DCI for the operation with 960 kHz SCS and corresponding HARQ enhancements | 24-1 | Yes |  |  | [Per UE/band] |  |  |  |  | Optional with capability signalling |
| 24. NR\_ext\_to\_71GHz | 24-5a | 960KHz SCS support for UL | 1. PRACH with 960KHz and length 139  2. 960KHz SCS for UL data and control channels and reference signal transmission in FR2-2  [3. Multi-PUSCH scheduling by single DCI for the operation with 960 kHz SCS] |  |  |  |  |  |  |  |  |  | Optional with capability signalling |
| 24. NR\_ext\_to\_71GHz | 24-5c | Multi-RB PUCCH format 0/1/4 for 960 kHz [with/without shared spectrum channel access] | Support multi-RB PUCCH format 0/1/4 for 960 kHz |  |  |  |  |  |  |  |  |  | Optional with capability signalling |
| 24. NR\_ext\_to\_71GHz | 24-5f | Enhanced PDCCH monitoring for 960KHz | Multiple-slot PDCCH monitoring for 960KHz with X=4 slots |  |  |  |  |  |  |  |  |  | Optional with capability signalling |
| 24. NR\_ext\_to\_71GHz | 24-6 | Support [Type 1] channel access procedure in uplink for FR2-2 unlicensed operation | 1. Support [Type 1] channel access procedure 2. [Support LBT performed per carrier/BWP bandwidth] | 24-1 |  |  |  | per band |  |  |  |  | Optional with capability signalling  [A UE that supports FR2-2 must indicate this FG is supported when required by regulation] |
| 24. NR\_ext\_to\_71GHz | 24-7 | Support [Type 2] channel access procedure in uplink for FR2-2 unlicensed operation | 1. Support [Type 2] channel access procedure | 24-1, 24-6 |  |  |  | per band |  |  |  |  | Optional with capability signalling  [A UE that supports FR2-2 must indicate this FG is supported when required by regulation] |
| 24. NR\_ext\_to\_71GHz | 24-8 | 32 DL HARQ processes for FR 2-2 | Support 32 HARQ processes in DL for 480/960 kHz |  |  |  |  | [Per UE/per FSPC/per band] |  |  |  | FFS: 120 kHz | Optional with capability signalling |
| 24. NR\_ext\_to\_71GHz | 24-9 | 32 UL HARQ processes for FR 2-2 | Support 32 HARQ processes in UL for 480/960 kHz |  |  |  |  | [Per UE/per FSPC/per band] |  |  |  | FFS: 120 kHz | Optional with capability signalling |
| 24. NR\_ext\_to\_71GHz | 24-10 | Additional beam switching time delay | Supported additional beam switching time delay d for 480 kHz SCS |  |  |  |  |  |  |  |  | Candidate value set: 56 or 112 symbols | Optional with capability signalling |

1. NR\_IIOT\_URLLC\_enh

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| Features | Index | Feature group | Components | Prerequisite feature groups | Need for the gNB to know if the feature is supported | Applicable to the capability signalling exchange between UEs (Sidelink WI only)”. | **Consequence if the feature is not supported by the UE** | **Type**  **(the ‘type’ definition from UE features should be based on the granularity of 1) Per UE or 2) Per Band or 3) Per BC or 4) Per FS or 5) Per FSPC)** | Need of FDD/TDD differentiation | Need of FR1/FR2 differentiation | Capability interpretation for mixture of FDD/TDD and/or FR1/FR2 | Note | Mandatory/Optional |
| 25. NR\_IIOT\_URLLC\_enh | 25-1 | SPS HARQ-ACK deferral in case of TDD collision | 1. Idenfify HARQ-ACK bits of active SPS configurations for deferral in the initial PUCCH slot  2. Determination of the target PUCCH slot for SPS HARQ-ACK deferral  3. Multiplexing and transmission of deferred SPS HARQ-ACK information in the target PUCCH slot  4. Handling of the collision for the same HARQ process due to deferred SPS HARQ-ACK | 5-18 | Yes | N/A |  | Per UE | No  (TDD only) | No | N/A |  | Optional with capability signaling |
| 25. NR\_IIOT\_URLLC\_enh | 25-2 | Repetitions for PUCCH format 0, and 2 over multiple slots with K = 2, 4, 8 | Repetitions for PUCCH format 0 and 2 over multiple slots with K = 2, 4, 8 | 4-23 | Yes | N/A |  | Per UE | No | No | N/A |  | Optional with capability signaling |
| 25. NR\_IIOT\_URLLC\_enh | 25-3 | Repetitions for PUCCH format 0, 1, 2, 3 and 4 over multiple PUCCH subslots with configured K = 2, 4, 8 | Repetitions for PUCCH format 0, 1, 2, 3 and 4 over multiple PUCCH subslots with RRC configured repetition factor K = 2, 4, 8  Note: The support of FG 25-3 doesn’t imply an increase of the maximum number of PUCCHs per slot that supported by the UE | 4-23  11-3 | Yes | N/A |  | Per UE | No | No | N/A |  | Optional with capability signaling |
| 25. NR\_IIOT\_URLLC\_enh | 25-3a | Repetitions for PUCCH format 0, 1, 2, 3 and 4 over multiple PUCCH subslots using dynamic repetition indication | Repetitions for PUCCH format 0, 1, 2, 3 and 4 over multiple PUCCH subslots based on dynamic repetition indication.  Note: Dynamic PUCCH repetition factor indication is only supported for HARQ-ACK | 25-3  30-5 | Yes | N/A |  | Per UE | No | No | N/A |  | Optional with capability signaling |
| 25. NR\_IIOT\_URLLC\_enh | 25-3b | Inter-subslot frequency hopping for PUCCH repetitions | 1. Support inter-subslot frequency hopping for PUCCH repetition operation of PUCCH Formats 0, 1, 2, 3 and 4 for 7OS slot-based PUCCH configurations.  2. Support inter-subslot frequency hopping for PUCCH repetition operation of PUCCH Format 0 and Format 2 for 2OS slot-based PUCCH configurations | TBD | Yes | N/A |  | Per UE | No | No | N/A |  | Optional with capability signaling |
| 25. NR\_IIOT\_URLLC\_enh | 25-4 | One-shot HARQ ACK feedback triggered by DCI format 1\_2 | 1. Support feedback of type 3 HARQ-ACK codebook, triggered by a DCI 1\_2 scheduling a PDSCH  2. Support feedback of type 3 HARQ-ACK codebook, triggered by a DCI 1\_2 without scheduling a PDSCH using a reserved FDRA value | 10-16  11-1 | Yes | N/A |  | Per UE | No | No | N/A |  | Optional with capability signaling |
| 25. NR\_IIOT\_URLLC\_enh | 25-5 | PHY priority handling for one-shot HARQ ACK feedback | Support transmission of type 3 HARQ-ACK codebook using the first or second PUCCH configuration based on PHY priority indication in the triggering DCI | 10-16  11-4 | Yes | N/A |  | Per UE | No | No | N/A |  | Optional with capability signaling |
| 25. NR\_IIOT\_URLLC\_enh | 25-6 | Enhanced type 3 HARQ-ACK codebook feedback | 1. Support feedback of enhanced type 3 HARQ-ACK codebook, triggered by a DCI 1\_1 and DCI format 1\_2 (for a UE supporting DCI format 1\_2, 11-1)  2. Support configuration of up to 8 enhanced type 3 HARQ-ACK codebooks.  3. Support feedback of a dynamically selected enhanced type 3 HARQ-ACK codebook based on triggering information in DCI 1\_1 and DCI 1\_2 (for a UE supporting DCI format 1\_2, 11-1)  4. Support transmission of enhanced type 3 HARQ-ACK codebook using the first or second PUCCH configuration based on PHY priority indication in the triggering DCI (for a UE supporting two HARQ-ACK codebooks / PUCCH config in 11-4) | 10-16 | Yes | N/A |  | Per UE | No | No | N/A | For component 2, the UE indicates its capability in the number of enhanced type 3 HARQ-ACK codebooks: {1, 2, 4, 8}  For component 3, the dynamic indication is only supported if the UE for component 2 supports more than one enhanced type 3 HARQ-ACK codebook to be configured | Optional with capability signaling |
| 25. NR\_IIOT\_URLLC\_enh | 25-7 | Triggered HARQ-ACK codebook re-transmission | 1. Support HARQ-ACK re-transmission from an earlier PUCCH slot based on the triggering information in DCI format 1\_1 and DCI format 1\_2 (for a UE supporting DCI format 1\_2, 11-1)  2. Support the related PHY priority handling in terms of HARQ-ACK codebook selection and the applicable PUCCH configuration (for a UE supporting two HARQ-ACK codebooks / PUCCH config in 11-4) |  | Yes | N/A |  | Per UE | No | No | N/A |  | Optional with capability signaling |
| 25. NR\_IIOT\_URLLC\_enh | 25-8 | Semi-static HARQ-ACK codebook for sub-slot PUCCH | Semi-static (Type 1) HARQ-ACK codebook for sub-slot based PUCCH configuration | 4-11  11-3 | Yes | N/A |  | Per UE | No | No | N/A |  | Optional with capability signaling |
| 25. NR\_IIOT\_URLLC\_enh | 25-9 | Semi-static PUCCH cell switching | Semi-static PUCCH cell switching using configured time-domain domain pattern of applicable PUCCH cell / carrier  FFS whether to separate the capability for different numerologies |  | Yes | N/A |  | Per UE | No  (TDD only) | No | N/A |  | Optional with capability signaling |
| 25. NR\_IIOT\_URLLC\_enh | 25-10 | PUCCH cell switching based on dynamic indication | PUCCH cell switching based on dynamic indication in the DCI scheduling the PUCCH  FFS whether to separate the capability for different numerologies |  | Yes | N/A |  | Per UE | No  (TDD only) | No | N/A |  | Optional with capability signaling |
| 25. NR\_IIOT\_URLLC\_enh | 25-11 | 4-bits subband CQI | Subband CQI reporting with 4 bits per subband |  | Yes | N/A |  | Per UE | No | No | N/A |  | Optional with capability signaling |
| 25. NR\_IIOT\_URLLC\_enh | 25-12 | UE initiating a semi-static channel occupancy with configurations dependent on gNB semi-static channel access configurations | Support initiating a semi-static channel access occupancy by the UE where the corresponding period is the same as, integer multiple of, or inter-factor of the period configured for a semi-static channel occupancy that can be initiated by gNB. | 10-1a | Yes | N/A |  | Per band | N/A | N/A | N/A | The signaling is per band but is only expected for a band where shared spectrum channel access must be used | Optional with capability signaling |
| 25. NR\_IIOT\_URLLC\_enh | 25-13 | UE initiating a semi-static channel occupancy with independent configurations from gNB semi-static channel access configurations | Support initiating a semi-static channel access occupancy by the UE where the corresponding period is independently configured from the period configured for a semi-static channel occupancy that can be initiated by gNB. | 10-1a, 25-12 | Yes | N/A |  | Per band | N/A | N/A | N/A | The signaling is per band but is only expected for a band where shared spectrum channel access must be used | Optional with capability signaling |
| 25. NR\_IIOT\_URLLC\_enh | 25-14 | PHY prioritization of overlapping low-priority DG-PUSCH and high-priority CG-PUSCH | Support PHY prioritization for the case where low-priority DG-PUSCH collides with high-priority CG-PUSCH | 12-1 | Yes | N/A |  | Per band | N/A | N/A | N/A |  | Optional with capability signaling |
| 25. NR\_IIOT\_URLLC\_enh | [25-15] | PHY prioritization of overlapping high-priority DG-PUSCH and low-priority CG-PUSCH | Support PHY prioritization of overlapping high-priority dynamic grant PUSCH and low-priority configured grant PUSCH on a BWP of a serving cell | 12-1 | Yes | N/A |  | Per band | N/A | N/A | N/A |  | Optional with capability signaling |
| 25. NR\_IIOT\_URLLC\_enh | 25-16 | HARQ-ACK with different priorities multiplexing on a PUCCH/PUSCH | 1. Support multiplexing a high-priority HARQ-ACK and a low-priority HARQ-ACK into a PUCCH. Support separate coding for the two HARQ-ACKs.  2. [Support multiplexing a low-priority HARQ-ACK and a high-priority SR into a PUCCH for some HARQ-ACK/SR PF combinations (FFS applicable combinations).]  3. [Support multiplexing a low-priority HARQ-ACK, a high-priority HARQ-ACK and a high-priority SR into a PUCCH.]  4. Support multiplexing a low-priority HARQ-ACK in a high-priority PUSCH (conveying UL-SCH only). Support separate beta\_offset values for this priority combination.  5. Support multiplexing a high-priority HARQ-ACK in a low-priority PUSCH (conveying UL-SCH only). Support separate beta\_offset values for this priority combination.  6. Support multiplexing a low-priority HARQ-ACK, a high-priority PUSCH conveying UL-SCH, a high-priority HARQ-ACK and/or CSI.  7. Support multiplexing a high-priority HARQ-ACK, a low-priority PUSCH conveying UL-SCH, a low-priority HARQ-ACK and/or CSI.  FFS whether to separate capability for different UCI type | 11-3, 12-1 | Yes | N/A |  | Per UE | No | No | N/A |  | Optional with capability signaling |
| 25. NR\_IIOT\_URLLC\_enh | 25-18 | Parallel PUCCH and PUSCH transmission across CCs in inter-band CA | Support simultaneous PUCCH/PUSCH transmissions on different cells [at least] for inter-band CA. |  | Yes | N/A |  | Per UE | No | No | N/A |  | Optional with capability signaling |
| 25. NR\_IIOT\_URLLC\_enh | 25-19 | RTT-based Propagation delay compensation based on CSI-RS for tracking and SRS | Support RTT-based Propagation delay compensation for time synchronization of the Uu interface based on CSI-RS for tracking and SRS  FFS whether to merge FG 25-19 and FG 25-19a | 2-51, 2-53 | Yes | N/A |  | FS | N/A | N/A | N/A |  | Optional with capability signaling |
| 25. NR\_IIOT\_URLLC\_enh | 25-19a | RTT-based Propagation delay compensation based on DL PRS and SRS | Support RTT-based Propagation delay compensation for time synchronization of the Uu interface based on DL PRS and SRS  FFS whether to merge FG 25-19 and FG 25-19a | 25-19, 13-1, 2-53 | Yes | N/A |  | FS | N/A | N/A | N/A | Note: FG 13-1 is now only reported to LMF. If UE reports the support of this FG, it needs to report FG 13-1 to gNB also. | Optional with capability signaling |
| 25. NR\_IIOT\_URLLC\_enh | 25-20 | Propagation delay compensation based on legacy TA procedure | Support propagation delay compensation based on legacy TA procedure |  | Yes | N/A |  | Per UE | no | no | N/A |  | Optional with capability signaling |

1. NR\_NTN\_solutions

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| Features | Index | Feature group | Components | Prerequisite feature groups | Need for the gNB to know if the feature is supported | Applicable to the capability signalling exchange between UEs (Sidelink WI only)”. | **Consequence if the feature is not supported by the UE** | **Type**  **(the ‘type’ definition from UE features should be based on the granularity of 1) Per UE or 2) Per Band or 3) Per BC or 4) Per FS or 5) Per FSPC)** | Need of FDD/TDD differentiation | Need of FR1/FR2 differentiation | Capability interpretation for mixture of FDD/TDD and/or FR1/FR2 | Note | Mandatory/Optional |
| 26. NR\_NTN\_solutions | 26-1 | Uplink Time pre-compensation | 1. UE specific TA calculation based on its GNSS-acquired position and the serving satellite ephemeris. 2. UE applies common TA according to the parameters provided by the network [(UE considers common TA as 0 if the parameter is not provided)] 3. For TA update in RRC\_CONNECTED state, combination of both open (i.e. UE autonomous TA estimation, and common TA estimation) and closed (i.e., received TA commands) control loops 4. FFS: UE pre-compensates the calculated TA in its uplink transmissions 5. Support of estimating UE-gNB RTT and delaying the start of RAR window [by UE-gNB RTT] 6. Support of frequency pre-compensation to counter shift the Doppler experienced on the service link |  | No | No | Release 17 UE cannot access [NTN/ satellite/HAPS/ATG] | [Per UE/per band] | No | No |  | An NTN UE is required to at least support UE specific TA calculation based at least on its GNSS-acquired position and the serving satellite ephemeris | Optional with capability signalling  For UE supports NR [NTN/ satellite/HAPS/ATG], UE must indicate this FG is supported.  [Note: This UE feature group is applicable only for NR NTN cell and ATG cell, for terrestrial cell except for ARG cell this feature is not supported] |
| 26. NR\_NTN\_solutions | 26-3 | Enhancement on the timing relationship | 1. FFS: delaying the scheduling of PUSCH, PUCCH and PDCCH ordered PRACH, CSI reference resource, transmission of aperiodic SRS activation of TA command, first PUSCH transmission in CG Type 2 with cell-specific K\_offset 2. FFS: delaying the UE action and assumption on a downlink configuration carried by MAC CE command by K\_mac if it is indicated 3. FFS: separate FGs for cell specific Koffset and Kmac/UE-gNB RTT estimation/delay of RAR/MsgB response window | [26-1][26-2] | No | No | Release 17 UE cannot access [NTN/ satellite/HAPS/ATG] | [Per UE/per band] | No | No |  | FFS: whether this FG gets merged with FG 26-1 | Optional with capability signalling  For UE supports NR [NTN/ satellite/HAPS/ATG], UE must indicate this FG is supported  [Note: This UE feature group is applicable only for NR NTN cell and ATG cell, for terrestrial cell except for ATG cell this feature is not supported] |
| 26. NR\_NTN\_solutions | 26-4 | UE reporting of information about the UE specific TA pre-compensation | Support UE reporting of information about the UE specific TA pre-compensation   * [The exact content of UE reporting of information about the UE specific TA pre-compensation e.g., frequency of the reports, granularity of the reported conten, etc.] | [26-1] | Yes | No |  | [Per UE/Per band] | No | No |  |  | Optionalwith capability signalling  [Note: This UE feature group is applicable only for NR NTN cell and ATG cell, for terrestrial cell except for ATG cell this feature is not supported] |
| 26. NR\_NTN\_solutions | 26-5 | Increasing the number of HARQ processes | 1. The maximal supported HARQ process number is X for UL and Y for DL |  | Yes | No | Increased number of HARQ processes is not supported | ~~[~~Per band or per FSPC or per UE] | No | No |  | Candidate component values for (X,Y): {(16,32),(32,16),(32,32)} | Optional with capability signalling  [Note: This UE feature group is applicable only for NR NTN cell and ATG cell, for terrestrial cell except for ATG cell this feature is not supported] |
| 26. NR\_NTN\_solutions | 26-6 | Type-2 HARQ codebook Enhancement | 1. Support of type-2 HARQ codebook enhancements [for feedback-disabled HARQ processes] 2. FFS: UE supports HARQ disabling |  | Yes | No |  | [Per UE/per band] | No | No |  |  | Optional with capability signalling  [Note: This UE feature group is applicable only for NR NTN cell and ATG cell, for terrestrial cell except for ATG cell this feature is not supported] |
| 26. NR\_NTN\_solutions | [26-6a] | [Type-1 HARQ codebook enhancement] | 1. Enhancement on Type-1 HARQ codebook in NTN 2. FFS: HARQ disabling | [26-1, 26-2] | Yes | No |  | [Per UE/per band] | No | No | [support mixture of FDD/TDD (for HAPS and/or ATG) and/or FR1/FR2] | FFS: whether this FG gets merged with FG 26-1 if the note “For UE supports NR [NTN/ satellite/HAPS/ATG], UE must indicate this FG is supported” is confirmed in the positive | Optional with capability signalling  [For UE supports NR [NTN/ satellite/HAPS/ATG], UE must indicate this FG is supported]  [Note: This UE feature group is applicable only for NR NTN cell, for terrestrial cell this feature is not supported] |
| 26. NR\_NTN\_solutions | [26-7] | [NTN Performance enhancement] | 1. The maximum number of supported aggregation factor (i.e., pdsch-AggregationFactor) for DL PDSCH is [X]   FFS: X = 16 or 32 |  | Yes | No |  | [Per UE/per band/Per BC] | [No] | No | [support mixture of FDD/TDD (for HAPS and/or ATG) and/or FR1/FR2] |  | Optional with capability signalling  [Note: This UE feature group is applicable only for NR NTN cell, for terrestrial cell this feature is not supported] |
| 26. NR\_NTN\_solutions | 26-8 | Support of polarization [signalling/ information/reception] in NR NTN | 1. 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 2. FFS: polarization information for DL is indicated in SIB by the network |  | No | No | [It is assumed by the network that UE supports at least linear polarization] | [Per UE/Per band] | No | No | [support mixture of FDD/TDD (for HAPS and/or ATG) and/or FR1/FR2] | [Value range for component 1: {(RHCP, LHCP, Linear), (RHCP, LHCP), (RHCP), (LHCP), (Linear)}]  FFS: whether this FG gets merged with FG 26-1 if the note “For UE supports NR [NTN/ satellite/HAPS/ATG], UE must indicate this FG is supported” is confirmed in the positive | Optional with capability signalling  [For UE supports NR [NTN/ satellite/HAPS/ATG], UE must indicate this FG is supported]  [Note: This UE feature group is applicable only for NR NTN cell, for terrestrial cell this feature is not supported] |
| 26. NR\_NTN\_solutions | 26-9 | UE-specific K\_offset | 1. Reception of UE-specific K\_offset via MAC-CE 2. Determining the timing of PUSCH, PUCCH [and PDCCH ordered PRACH], CSI reference resource, transmission of aperiodic SRS, activation of TA command, first PUSCH transmission in CG Type 2 with UE-specific Koffset | 26-3, 26-4 | Yes | No |  | FFS | No | No |  |  | Optional with capability signalling  [Note: This UE feature group is applicable only for NR NTN cell and ATG cell, for terrestrial cell except for ATG cell this feature is not supported] |

1. NR\_pos\_enh

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| Features | Index | Feature group | Components | Prerequisite feature groups | Need for the gNB to know if the feature is supported | Applicable to the capability signalling exchange between UEs (Sidelink WI only)”. | **Consequence if the feature is not supported by the UE** | **Type**  **(the ‘type’ definition from UE features should be based on the granularity of 1) Per UE or 2) Per Band or 3) Per BC or 4) Per FS or 5) Per FSPC)** | Need of FDD/TDD differentiation | Need of FR1/FR2 differentiation | Capability interpretation for mixture of FDD/TDD and/or FR1/FR2 | Note | Mandatory/Optional |
| 27. NR\_pos\_enh | 27-1-1 | Support of UE-RxTEGs [for UE-assisted DL TDOA and/or Multi-RTT positioning] | The maximum number of UE-RxTEG, which is supported and reported by UE for UE assisted DL TDOA and/or Multi-RTT positioning | 13-1, one or more of {13-3, 13-4} | No |  | UE-RxTEG reporting is not supported and no assumption can be made on the mitigation of UE Rx timing delays for the measurements | [per band or FS] | n/a | n/a | n/a | The candidate values are {[1,] 2,[ 3,] 4, 6, 8[, 12, 16, 24, 32]}  Need for location server to know if the feature is supported  FFS: Separate row for “Support of UE-RxTEG reporting for DL-TDOA”, and “Support of UE-RxTEG reporting for M-RTT”  If UE supports this capability with the values > 1, and if the UE does not include RxTEG-ID associated with a measurement, no assumption can be made on the mitigation of UE Rx timing delays for this measurement  [If value=1 is indicated by the UE, the UE Rx timing errors differences between two measurements are within a margin only if the UE reports the same Rx-TEG-ID associated with both measurements, otherwise, no assumption can be made about the timing error differences between these measurements.]  Note: The “per band” reporting on this capability does not imply, that the RxTEG IDs in the measurement report are grouped per band; In the measurement report, the RxTEG ID can span from 0, up to 31 | Optional with capability signaling |
| 27. NR\_pos\_enh | 27-1-2 | Support of UE-TxTEGs for UL TDOA | The maximum number of UE-TxTEG, which is supported and reported by UE for UL TDOA | [13-4, ]13-8 | Yes |  | UE-TxTEGs for UL TDOA is not supported and no assumption can be made on the mitigation of UE Tx timing for the SRS” and “UE-TxTEGs for RTT is not supported and no assumption can be made on the mitigation of UE Tx timing for the SRS | FFS: per band or per FS | n/a | n/a | n/a | The candidate values are {[1, ]2, 4, 6, 8}  [Need for location server to know if the feature is supported]  Note: It should support the serving gNB to request the UE to provide the association information of UL SRS resources for positioning with Tx TEGs to the serving gNB for UL TDOA [if UL TDOA is supported by UE]  [Note: It should support the LMF to request the UE to provide the association information of UL SRS resources for positioning with Tx TEGs directly to the LMF for Multi-RTT if Multi-RTT is supported by UE] | Optional with capability signaling |
| 27. NR\_pos\_enh | 27-1-2a | Support of UE-TxTEGs for Multi-RTT [and/or UL TDOA]positioning | The maximum number of UE-TxTEG, which is supported and reported by UE for Multi-RTT positioning | 13-4, 13-8 | No |  | UE-TxTEGs for Multi-RTT positioning is not supported | [per band per FS] | n/a | n/a | n/a | The candidate values are {[1, ] 2, 4, 6, 8}  Need for location server to know if the feature is supported  If UE supports this capability with the values > 1, and if if the UE does not include TxTEG-ID associated with a measurement, no assumption can be made on the mitigation of UE Tx timing delays for this SRS resource  [If value=1 is indicated by the UE, the UE Tx timing errors differences between two SRS resources are within a margin only if the UE reports an Tx-TEG-ID associated with the SRS resources, otherwise, no assumption can be made about the timing error differences between these SRS resources.]  [Note: It should support the serving gNB to request the UE to provide the association information of UL SRS resources for positioning with Tx TEGs to the serving gNB for UL TDOA]  [Note: It should support the LMF to request the UE to provide the association information of UL SRS resources for positioning with Tx TEGs directly to the LMF for Multi-RTT if Multi-RTT is supported by UE] | Optional with capability signaling |
| 27. NR\_pos\_enh | 27-1-3 | Support of UE-RxTxTEGs for Multi-RTT | The maximum number of UE-RxTxTEG, which is supported and reported by UE for Multi-RTT positioning | [13-4 or 13-8] | No |  | Mitigation of UE RxTx timing delays is not supported | per band | n/a | n/a | n/a | The candidate values are {[1, ]2, 4, 6, 8, 12, 16, 24, 32[, 64, 128, 256]}  Need for location server to know if the feature is supported  If UE supports this capability with the values > 1, and if the UE does not include RxTxTEG-ID associated with a measurement, no assumption can be made on the mitigation of UE RxTx timing delays for this measurement  [If value=1 is indicated by the UE, the UE RxTx timing errors differences between two measurements are within a margin only if the UE reports an RxTx-TEG-ID associated with the measurements, otherwise, no assumption can be made about the timing error differences between these measurements]  Note: The “per band” reporting on this capability does not imply, that the RxTxTEG IDs in the measurement report are grouped per band; In the measurement report, the RxTxTEG ID can span from 0, up to [255] | Optional with capability signaling |
| 27. NR\_pos\_enh | 27-1-4 | Support of UE Rx TEGs for measuring the same DL PRS resource | The maximum number of different UE-RxTEGs that a UE can support to measure the same DL PRS of a TRP | 27-1-1 | No |  | Up to 1 RxTEG is used to measure the same DL PRS resource of a TRP | per band | n/a | n/a | n/a | The candidate values are {2, 3, 4, 6, 8}  Need for location server to know if the feature is supported | Optional with capability signaling |
| 27. NR\_pos\_enh | 27-1-4a | Support of UE Rx TEGs for measuring the same DL PRS resource simultaneously | The maximum number of UE Rx TEGs for measuring the same DL PRS resource simultaneously |  | No |  |  | Per band | n/a | n/a | n/a | [The candidate values are {1,2, 4, 8}] | Optional with capability signaling |
| 27. NR\_pos\_enh | 27-2-1 | [UE-assisted] DL PRS RSRP of the first path for DL-AoD | 1.) Support of [measuring and reporting the] PRS RSRP of the first path for DL-AoD positioning method  2.) The maximum number of first path PRS RSRP per TRP | [13-2 or 13-3, 13-4, 13-5, 13-8] | No |  |  | FFS: Per UE or per band | n/a | n/a | n/a | Component 2 candidate values: [2,4,8,16,24]  Need for location server to know if the feature is supported | Optional with capability signaling |
| 27. NR\_pos\_enh | 27-2-2 | DL PRS RSRP reporting for more than 8 measurements for UE-assisted DL-AoD positioning | Support reporting K> 8 DL PRS RSRP measurements per TRP.  Note: Multiple RSRPs corresponding to same or different Rx Beam index should be able to be reported for a given PRS resource for different timestamps. | [13-5, 13-2] | No |  | UE report of more than 8 DL PRS-RSRP is not supported. | FFS: Per UE or per band | n/a | Yes | n/a | The candidate values are {[12, ]16, 24[, 32, 64]}  Need for location server to know if the feature is supported | Optional with capability signaling |
| 27. NR\_pos\_enh | 27-3-1 | M-sample measurements [of DL PRS measurement on single DL PRS period/occasion] | [The capability to support reporting a measurement based on measuring M samples (instances) of a DL PRS resource set] | [13-1, 13-4, 13-8] | No |  |  | FFS: Per UE or per band | n/a | n/a | n/a | [The candidate values are {1}]  If the UE does not provide the capability, the UE [is assumed to] support M=4 only.  Need for location server to know if the feature is supported | Optional with capability signaling |
| 27. NR\_pos\_enh | 27-3-2 | DL PRS measurement outside MG [and in a PRS processing priority window] - processing types | 1. Supported PRS processing types subject to the UE determining that DL PRS to be higher priority for PRS measurement outside MG [and in a PRS processing priority window]  Candidate values: {Type 1A, Type 1B, Type 2}.  Note:   * Type 1A refers to DL PRS being prioritized over other DL signals/channels in all OFDM symbols within the PRS processing priority window. The DL signals/channels from all DL CCs (per UE) are affected. * Type 1B refers to DL PRS being prioritized over other DL signals/channels in all OFDM symbols within the PRS processing priority window. The DL signals/channels from certain DL CCs are affected. * Type 2 refers to DL PRS being prioritized over other DL signals/channels only in DL PRS symbols within the PRS processing priority window.   Note: When the UE determines higher priority for other DL signals/channels over the PRS measurement/processing, the UE is not expected to measure/process DL PRS which is applicable to all of the above capability options  [Note: Within a PRS processing window, UE measurement is inside the active DL BWP with PRS having the same numerology as the active DL BWP] | [13-1] | FFS |  |  | FFS: Per UE or per band | n/a | n/a | n/a | Need for location server to know if the feature is supported  FFS: Separate feature group for a UE to declare support of each of the Type-1A, Type-1B, Type-2” capabilities | Optional with capability signaling |
| 27. NR\_pos\_enh | 27-3-3 | DL PRS Processing Capability outside MG - buffering capability | 1. DL PRS buffering capability: Type 1 or Type 2  a) T: [{8, 16, 20, 30, 40, 80, 160, 320, 640, 1280}] ms  b) Type 2 – slot level buffering  2. Duration of DL PRS symbols N in units of ms a UE can process every T ms assuming maximum DL PRS bandwidth in MHz, which is supported and reported by UE.  a) Type 1 – sub-slot/symbol level buffering  b) N: {0.125, 0.25, 0.5, 1, 2, 4, 6, 8, 12, 16, 20, 25, 30, 32, 35, 40, 45, 50} ms  3. Max number of DL PRS resources that UE can process in a slot under it  a) FR1 bands: {1, 2, 4, 6, 8, 12, 16, 24, 32, 48, 64} for each SCS: 15kHz, 30kHz, 60kHz  b) FR2 bands: {1, 2, 4, 6, 8, 12, 16, 24, 32, 48, 64} for each SCS: 60kHz, 120kHz | 27-3-2 | No |  |  | Per band | n/a | n/a | n/a | FFS: Separate feature group for a UE to declare PRS processing capabilities of each of the Type-1A, Type-1B, Type-2” capabilities | Optional with capability signaling |
| 27. NR\_pos\_enh | 27-4-1 | LOS/NLOS Indicator for UE-assisted positioning | Support reporting LoS/NLoS indicator to LMF [for RSTD and UE Rx-Tx time difference measurements to LMF for DL and DL+UL positioning]  FFS: whether to have separate capability component/FG for RSTD and UE Rx-Tx time difference measurements  FFS: whether to have separate capability component for hard and soft indication |  | No |  |  | FFS: Per UE or per band | n/a | n/a | n/a | [The candidate value are [0,1]]  Need for location server to know if the feature is supported | Optional with capability signaling |
| 27. NR\_pos\_enh | 27-5-1 | [UE-initiated] on-demand PRS | UE’s capability to support UE-initiated on-demand DL PRS [request signalling] | [13-1] | No |  |  | Per UE | n/a | n/a | n/a | FFS: Need for location server to know if the feature is supported | Optional with capability signaling |
| 27. NR\_pos\_enh | 27-6 | DL PRS processing capabilities in RRC inactive state | 1. DL PRS buffering capability: Type 1 or Type 2  a) Type 1 – sub-slot/symbol level buffering  b) Type 2 – slot level buffering  2. Duration of DL PRS symbols N in units of ms a UE can process every T ms assuming maximum DL PRS bandwidth in MHz, which is supported and reported by UE.  a) Type 1 – sub-slot/symbol level buffering  b) N: {0.125, 0.25, 0.5, 1, 2, 4, 6, 8, 12, 16, 20, 25, 30, 32, 35, 40, 45, 50} ms  3. Max number of DL PRS resources that UE can process in a slot under it  a) FR1 bands: {1, 2, 4, 6, 8, 12, 16, 24, 32, 48, 64} for each SCS: 15kHz, 30kHz, 60kHz  b) FR2 bands: {1, 2, 4, 6, 8, 12, 16, 24, 32, 48, 64} for each SCS: 60kHz, 120kHz |  |  |  |  |  |  |  |  |  |  |
| 27. NR\_pos\_enh | 27-7 | Maximum number of measurement instances which can be included in a single measurement report | Maximum number of measurement instances which can be included in a single measurement report |  |  |  |  |  |  |  |  |  |  |
| 27. NR\_pos\_enh | 27-8 | Support of PRS TEG association information for UE-based DL-TDOA | Support of reception of association between PRS and TRP Tx TEG for UE-based positioning |  | No |  | Positioning calculation assistance data containing association between PRS and TRP Tx TEG is not supported by UE | Per UE | n/a | n/a | n/a | Need for location server to know if the feature is supported.  Agreement:  Support the LMF to provide the association information of DL PRS resources with Tx TEGs to a UE for UE-based positioning if the TRP has multiple TEGs | Optional with capability signaling |
| 27. NR\_pos\_enh | 27-9 | Support of lower Rx beam sweeping factor | 1. Support of the lower Rx beam sweeping factor than 8 for FR2  2. Number of Rx beam sweeping factors: {1,2,3,4,5,6,7} |  | No |  | UE only supports 8 as the Rx beam sweeping factor defined by RAN4. | Per band (FR2 only) | n/a | n/a | n/a | Need for location server to know if the feature is supported | Optional with capability signaling |
| 27. NR\_pos\_enh | 27-10 | Support of UL MAC CE based MG activation request | 1. Support of using UL MAC CE to request measurement gap. |  | Yes |  | Using UL MAC CE to indicate PRS measurement to the gNB is not supported. | Per UE | No | No | No |  | Optional with capability signaling |
| 27. NR\_pos\_enh | 27-11 | Support of DL MAC CE based MG activation | 1. Support of preconfiguration of MGs in RRC  2. Support of using DL MAC CE to activate the MG |  | Yes |  | Using DL MAC CE to activate the preconfigured MG is not supported | Per UE | No | No | No |  | Optional with capability signaling. |
| 27. NR\_pos\_enh | 27-12 | LOS/NLOS indicator for UE-based positioning assistance data | Support reception of the assistance data containing the LOS/NLOS indicator.  1. LOS/NLOS indicator type: {softValue, hardValue, both}  2. LOS/NLOS indicator granularity {resourceSpecific, trpSpecific, both} |  | No |  |  | Per UE | No | No | No | Need for location server to know if the feature is supported. | Optional with capability signaling. |
| 27. NR\_pos\_enh | 27-13 | Additional path reporting for UE-assisted DL-TDOA | [1. Support of TOA reporting for more than 2 additional paths.]  2. Support of path RSRP reporting for additional paths if path RSRP reporting is supported. |  | No |  |  | Per UE | No | No | No | Need for location server to know if the feature is supported. | Optional with capability signaling. |
| 27. NR\_pos\_enh | 27-14 | Additional path reporting for Multi-RTT | 1. Support of TOA reporting for more than 2 additional paths  2. Support of path RSRP reporting for additional paths if path RSRP reporting is supported. |  | No |  |  | Per UE | No | No | No | Need for location server to know if the feature is supported. | Optional with capability signaling. |
| 27. NR\_pos\_enh | 27-15 | Support of positioning SRS transmission in RRC\_INACTIVE state [for initial BWP] | 1. Max number of SRS Resource Sets for positioning supported by UE per BWP.  Values = {1, 2, 4, 8, 12, 16}.  2. Max number of periodic SRS Resources for positioning per BWP.  Values = {1,2,4,8,16,32,64}  3. Max number of periodic SRS Resources for positioning per BWP per slot.  Values = {1, 2, 3, 4, 5, 6, 8, 10, 12, 14}  4. FFS: Applicability for initial BWP  OLPC for SRS for positioning based on SSB from the last serving cell (the cell that releases UE from connection) is part of this FG.  Note: no dedicated capability signaling is intended for this component |  | Yes |  |  | Per band | n/a | n/a | n/a |  | Optional with capability signaling |
| 27. NR\_pos\_enh | 27-16 | OLPC for positioning SRS in RRC\_INACTIVE state | Same as  LPP  OLPC-SRS-Pos-r16  RRC  OLPC-SRS-Pos-r16 |  | Yes |  |  | Per band | n/a | n/a | n/a | Need for location server to know if the feature is supported. | Optional with capability signaling |
| 27. NR\_pos\_enh | 27-17 | Support of [PRS measurement in RRC\_INACTIVE] | Support of PRS measurement in RRC\_INACTIVE  Note: UE supporting this feature may support at least one from DL RSTD, DL PRS-RSRP, or UE Rx – Tx time difference |  | Yes |  |  | Per UE | No | No | No |  | Optional with capability signaling. |
| 27. NR\_pos\_enh | 27-18a | Support of PRS measurement in RRC\_INACTIVE state for DL-TDOA | Support of PRS measurement in RRC\_INACTIVE state for DL-TDOA  Note: Other PRS capabilities follows the same as the RRC\_CONNECTED state for DL-TDOA. |  | No |  |  | Per UE | No | No | No | Need for location server to know if the feature is supported. | Optional with capability signaling. |
| 27. NR\_pos\_enh | 27-18b | Support of PRS measurement in RRC\_INACTIVE state for DL-AoD | Support of PRS measurement in RRC\_INACTIVE state for DL-AoD  Note: Other PRS capabilities follows the same as the RRC\_CONNECTED state for DL-AoD. |  | No |  |  | Per UE | No | No | No | Need for location server to know if the feature is supported. | Optional with capability signaling. |
| 27. NR\_pos\_enh | 27-18c | Support of PRS measurement in RRC\_INACTIVE state for Multi-RTT | 1. Support of PRS measurement in RRC\_INACTIVE state for Multi-RTT  2. Support of positioning SRS transmission in RRC\_INACTIVE state.  Note: Other PRS capabilities follows the same as the RRC\_CONNECTED state for Multi-RTT. |  | No |  |  | Per UE | No | No | No | Need for location server to know if the feature is supported. | Optional with capability signaling. |
| 27. NR\_pos\_enh | 27-19 | Spatial relation for positioning SRS in RRC\_INACTIVE state | Same as  *LPP*  *SpatialRelationsSRS-Pos-r16*  *RRC*  *SpatialRelationsSRS-Pos-r16* |  | Yes |  |  | Per band | n/a | n/a | n/a | Need for location server to know if the feature is supported. | Optional with capability signalling |

1. NR\_redcap

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| Features | Index | Feature group | Components | Prerequisite feature groups | Need for the gNB to know if the feature is supported | Applicable to the capability signalling exchange between UEs (Sidelink WI only)”. | **Consequence if the feature is not supported by the UE** | **Type**  **(the ‘type’ definition from UE features should be based on the granularity of 1) Per UE or 2) Per Band or 3) Per BC or 4) Per FS or 5) Per FSPC)** | Need of FDD/TDD differentiation | Need of FR1/FR2 differentiation | Capability interpretation for mixture of FDD/TDD and/or FR1/FR2 | Note | Mandatory/Optional |
| 28. NR\_redcap | 28-1 | RedCap UE | 1. Maximum FR1 RedCap UE bandwidth is 20 MHz.  2. Maximum FR2 RedCap UE bandwidth is 100 MHz.  3. Early indication of RedCap UE in Msg.1 for 4-step RACH  FFS whether to add any other basic features for RedCap UE |  | Yes |  | Network assumes the UE is not a RedCap UE | Per UE | No | No |  | RedCap UEs do not support carrier aggregation or dual connectivity. | Optional with capability signaling  RedCap UE must indicate this FG is supported |
| 28. NR\_redcap | 28-2 | Number of UE Rx branches and DL MIMO layers for RedCap UE | 1. For a RedCap UE with 1 Rx branch, 1 DL MIMO layer is supported.  2. For a RedCap UE with 2 Rx branches, 2 DL MIMO layers are supported. | 28-1 | Yes |  | Impact on UE complexity | Per band | No | No |  | For UE capability signalling, the number of Rx branches for RedCap is implicitly indicated by the corresponding capability parameter *maxNumberMIMO-LayersPDSCH* in the existing UE capability framework. Detailed signalling is up to RAN2. | Optional with capability signaling |
| 28. NR\_redcap | 28-3 | Half-duplex FDD operation type A for RedCap UE | 1. Half-duplex FDD operation (instead of full-duplex FDD operation) type A for RedCap UE | 28-1 | Yes |  | UE is assumed to support FD-FDD in FDD bands | Per band | FDD only | FR1 only |  |  | Optional with capability signaling |

1. NR\_UE\_pow\_sav\_enh

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| Features | Index | Feature group | Components | Prerequisite feature groups | Need for the gNB to know if the feature is supported | Applicable to the capability signalling exchange between UEs (Sidelink WI only)”. | **Consequence if the feature is not supported by the UE** | **Type**  **(the ‘type’ definition from UE features should be based on the granularity of 1) Per UE or 2) Per Band or 3) Per BC or 4) Per FS or 5) Per FSPC)** | Need of FDD/TDD differentiation | Need of FR1/FR2 differentiation | Capability interpretation for mixture of FDD/TDD and/or FR1/FR2 | Note | Mandatory/Optional |
| 29. NR\_UE\_pow\_sav\_enh | 29-1 | Paging enhancement | 1. Support paging early indication  2. Support UE subgroup indication |  |  |  | UE does not support paging enhancement | Per UE | N | N | N | For component 2, it is up to RAN2 whether/how to separate the capability for UE subgroup indication  Leave RAN2 to decide whether ‘optional with capability signalling’ or ‘optional without capability signalling’  Leave RAN2 to decide whether Need for the gNB to know if the feature is supported is Yes or No | Optional |
| 29. NR\_UE\_pow\_sav\_enh | 29-2 | TRS resources for idle/inactive UEs | TRS occassions for idle/inactive UEs  1. Support reading TRS configuration from SIB  2. Support receving L1 indication for TRS availability |  | N |  | Lose of power saving gain on AGC, time/frequency tracking in idle/inactive mode | Per UE | N | N | N |  | Optional without capability signalling |
| 29. NR\_UE\_pow\_sav\_enh | 29-3a | PDCCH skipping | Support of up to 2-bit indication of PDCCH skipping by scheduling DCI if SSSG is not configured |  | Y |  |  | Per UE | N | N | N |  | Optional with capability signaling |
| 29. NR\_UE\_pow\_sav\_enh | 29-3b | 2 search space sets group switching | Support of 1-bit indication of SSSG switching between 2 SSSGs by scheduling DCI, and timer based switching, without PDCCH skipping |  | Y |  |  | Per UE | N | N | N |  | Optional with capability signaling |
| 29. NR\_UE\_pow\_sav\_enh | [29-3c] | 3 search space sets group switching | Support of 2-bit indication of SSSG switching among 3 SSSGs by scheduling DCI and timer based switching  FFS whether to merge with 29-3b | 29-3b | Y |  |  | Per UE | N | N | N |  | Optional with capability signaling |
| 29. NR\_UE\_pow\_sav\_enh | [29-3d] | 2 search space sets group switching with PDCCH skipping | Support of 2-bit indication of SSSG switching between 2 SSSGs with PDCCH skipping by scheduling DCI and timer based switching | 29-3a, 29-2b | Y |  |  | Per UE | N | N | N |  | Optional with capability signaling |

1. NR\_cov\_enh

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| Features | Index | Feature group | Components | Prerequisite feature groups | Need for the gNB to know if the feature is supported | Applicable to the capability signalling exchange between UEs (Sidelink WI only)”. | **Consequence if the feature is not supported by the UE** | **Type**  **(the ‘type’ definition from UE features should be based on the granularity of 1) Per UE or 2) Per Band or 3) Per BC or 4) Per FS or 5) Per FSPC)** | Need of FDD/TDD differentiation | Need of FR1/FR2 differentiation | Capability interpretation for mixture of FDD/TDD and/or FR1/FR2 | Note | Mandatory/Optional |
| 30. NR\_cov\_enh | 30-1 | Increased maximum number of dynamic grant PUSCH Type A repetitions | K = 1, 2, 3, 4, 7, 8, 12, 16, 20, 24, 28, 32 times repetitions.  The number of repetitions is indicated in a TDRA list. A row index of the TDRA list is indicated by a DCI. | [5-17] | Yes | N/A | UE does not support more than 16 repetitions for dynamic grant PUSCH. | [Per UE] | No | No | N/A |  | Optional with capability signalling |
| 30. NR\_cov\_enh | 30-1a | Increased maximum number of Type 2 configurecd grant PUSCH Type A repetitions | K = 1, 2, 3, 4, 7, 8, 12, 16, 20, 24, 28, 32 times repetitions.  The number of repetitions is indicated in a TDRA list. A row index of the TDRA list is indicated by a Type 2 configured grant configuration.  FFS whether to merge with FG 30-1  FFS whether to have a separate FG for CG (including both Type 1 and Type 2) with repK-r17 | [5-16], [30-1] | Yes | N/A | UE does not support more than 16 repetitions for Type 2configurecd grant PUSCH. | [Per UE] | No | No | N/A |  | Optional with capability signalling |
| 30. NR\_cov\_enh | 30-2 | Dynamic grant PUSCH Type A repetitions based on available slots | Transmission occasions for K repetitions are determined on the basis of available slots. | [5-17] | Yes | N/A | UE does not support dynamic grant PUSCH repetitions counted on the basis of available slots. | [Per UE] | FFS | No | N/A |  | Optional with capability signalling |
| 30. NR\_cov\_enh | 30-2a | Configurecd grant PUSCH Type A repetitions based on available slots | Transmission occasions for K repetitions for configured grant PUSCH are determined on the basis of available slots.  FFS whether to merge with FG 30-2 | [5-14 or 5-16], [30-2] | Yes | N/A | UE does not support configured grant PUSCH repetitions counted on the basis of available slots. | [Per UE] | FFS | No | N/A |  | Optional with capability signalling |
| 30. NR\_cov\_enh | 30-3 | TB processing over multi-slot PUSCH | Support of TB processing over multi-slot PUSCH for DG and CG in RRC connected mode.  FFS whether to split FG 30-3 into at least 2 separate FGs: 1st one for DG, 2nd one for CG | [11-6] | Yes | N/A | UE does not support TB processing over multi-slot PUSCH. | [Per UE] | FFS | No | N/A |  | Optional with capability signalling |
| 30. NR\_cov\_enh | 30-3a | Repetition of TB processing over multi-slot PUSCH | Support repetition of TB processing over multi-slot PUSCH in RRC connected mode.  FFS whether to merge with FG 30-3 | TBD | Yes | N/A |  | [Per UE] | FFS | No | N/A |  | Optional with capability signalling |
| 30. NR\_cov\_enh | 30-4 | [The maximum duration for DM-RS bundling] | The maximum duration during which UE is able to maintain power consisitency and phase continuity to support DM-RS bundling for PUSCH/PUCCH  FFS dependence on modulation order  FFS dependence on back-to-back vs. non-back-to-back repetitions |  | Yes | N/A | UE does not support DM-RS bundling for PUSCH/PUCCH | [Per UE] | FFS | No | N/A |  | Optional with capability signalling |
| 30. NR\_cov\_enh | 30-4a | [DM-RS bundling for PUSCH repetition type A] | Support DM-RS bundling for PUSCH repetition type A  FFS whether to merge with FGs 30-4b/4c/4d  FFS whether to split to back-to-back transmission and non-back-to-back transmission | [30-4], [30-1] or [30-2] | Yes | N/A | UE does not Support DM-RS bundling for PUSCH repetition type A | [Per UE] | FFS | No | N/A |  | Optional with capability signalling |
| 30. NR\_cov\_enh | 30-4b | [DM-RS bundling for PUSCH repetition type B] | Support DM-RS bundling for PUSCH repetition type B  FFS whether to merge with FGs 30-4a/4c/4d  FFS whether to split to back-to-back transmission and non-back-to-back transmission  FFS whether to split to within-slot back-to-back transmission and across-slot back-to-back transmission | [30-4], [11-5] [30-1] | Yes | N/A | UE does not Support DM-RS bundling for PUSCH repetition type B | [Per UE] | FFS | No | N/A |  | Optional with capability signalling |
| 30. NR\_cov\_enh | 30-4c | [DM-RS bundling for TB processing over multi-slot PUSCH] | Support DM-RS bundling for TB processing over multi-slot PUSCH  FFS whether to merge with FGs 30-4a/4b/4d  FFS whether to split to back-to-back transmission and non-back-to-back transmission | [30-4], [30-3] | Yes | N/A | UE does not Support DM-RS bundling for TB processing over multi-slot PUSCH | [Per UE] | FFS | No | N/A |  | Optional with capability signalling |
| 30. NR\_cov\_enh | 30-4d | [DMRS bunding for PUCCH repetitions] | Support DM-RS bundling for PUCCH repetitions  FFS whether to merge with FGs 30-4a/4b/4c  FFS whether to split to back-to-back transmission and non-back-to-back transmission | [30-4], [4-23] | Yes | N/A | UE does not support DMRS bunding for PUCCH repetitions | [Per UE] | FFS | No | N/A |  | Optional with capability signalling |
| 30. NR\_cov\_enh | 30-4e | Enhanced inter-slot frequency hopping with inter-slot bundling for PUSCH | Support enhanced inter-slot frequency hopping with inter-slot bundling for PUSCH  FFS whether to merge with FG 30-4f | [30-4a] or [30-4b] or [30-4c] | Yes | N/A | UE does not support enhanced inter-slot frequency hopping with inter-slot bundling for PUSCH | [Per UE] | FFS | No | N/A |  | Optional with capability signalling |
| 30. NR\_cov\_enh | 30-4f | Enhanced inter-slot frequency hopping for PUCCH repetitions with DMRS bundling | Enhanced inter-slot frequency hopping for PUCCH repetitions with DMRS bundling  FFS whether to merge with FG 30-4e | [30-4d] | Yes | N/A | UE does not support Enhanced inter-slot frequency hopping for PUCCH repetitions with DMRS bundling | [Per UE] | FFS | No | N/A |  | Optional with capability signalling |
| 30. NR\_cov\_enh | 30-4g | Restart DM-RS bundling after the events that violate power consistency and phase continuity | Support restarting DM-RS bundling after the events that violate power consistency and phase continuity | [30-4] | Yes | N/A | UE does not support restarting DM-RS bundling after the events that violate power consistency and phase continuity | [Per UE] | FFS | No | N/A |  | Optional with capability signalling |
| 30. NR\_cov\_enh | 30-5 | Slot based dynamic PUCCH repetition indication | Support slot based dynamic PUCCH repetition indication for PUCCH formats 0/1/2/3/4  support slot based dynamic PUCCH repetition for PUCCH formats 0/1/2/3/4  FFS whether to split FG 30-5 into 2 FGs; one for PUCCH formats 0/2 and the other for PUCCH formats 1/3/4 | 4-23 and/or 25-2 | Yes | N/A | UE does not support Dynamic PUCCH repetition indication | [Per UE] | FFS | No | N/A |  | Optional with capability signalling |
| 30. NR\_cov\_enh | 30-6 | Repetition of PUSCH transmission scheduled by RAR UL grant and DCI format 0\_0 with CRC scrambled by TC-RNTI | Support of repetition of PUSCH transmission scheduled by RAR UL grant and DCI format 0\_0 with CRC scrambled by TC-RNTI |  | Yes | N/A | UE does not support repetition of PUSCH transmission scheduled by RAR UL grant and DCI format 0\_0 with CRC scrambled by TC-RNTI. | [Per UE] | No | No | N/A |  | [Optional with capability signalling] |

1. NR\_IAB\_enh

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| Features | Index | Feature group | Components | Prerequisite feature groups | Need for the gNB to know if the feature is supported | Applicable to the capability signalling exchange between UEs (V2X WI only)”. | **Consequence if the feature is not supported by the UE** | **Type**  **(the ‘type’ definition from UE features should be based on the granularity of 1) Per UE or 2) Per Band or 3) Per BC or 4) Per FS or 5) Per FSPC)** | Need of FDD/TDD differentiation | Need of FR1/FR2 differentiation | Capability interpretation for mixture of FDD/TDD and/or FR1/FR2 | Note | Mandatory/Optional |
| 31. NR\_IAB\_enh | 31-1 | Guard symbols | 1) Support Rel-17 DesiredGuardSymbols reporting  2) Support Rel-17 ProvidedGuardSymbols reception | one or more of {31-4, 31-5} | Yes | N/A | Guard symbols reporting and reception associated with Case 6 and 7 timings are not supported | per IAB node | No | No | support mixture of FDD/TDD and/or FR1/FR2 | IAB-MT impact  Note: If an IAB node does not support a certain timing mode, the reported/provided values shall be ignored | Optional with capability signalling. |
| 31. NR\_IAB\_enh | 31-2 | IAB-DU beam restriction indication | Support restricted IAB-DU Beam Indication reception |  | Yes | N/A | Parent-node cannot indicate restricted beams at the IAB-DU. | per IAB node | No | No | support mixture of FDD/TDD and/or FR1/FR2 | IAB-MT impact | Optional with capability signalling. |
| 31. NR\_IAB\_enh | 31-3 | IAB-MT beam recommendation indication | Support recommended IAB-MT Beam Indication transmission  1) IAB-MT DL beam  2) IAB-MT UL beam |  | yes | N/A | IAB-node cannot indicate recommended IAB-MT DL/UL beam to parent node | Per IAB-node | no | no | support mixture of FDD/TDD and/or FR1/FR2 | IAB-MT impact | Optional with capability signalling. |
| 31. NR\_IAB\_enh | 31-4 | Case 6 timing alignment | Support Case 6 timing alignment indication reception |  | Yes | N/A | Switching across different timing cases (i.e., Case 1 at IAB-node, Case 6 at IAB-node, and/or Case 7 at the  Parent) is not supported.  When to perform Case 6 timing at the IAB-node cannot be controlled by the parent node. | per IAB node | No | No | support mixture of FDD/TDD and/or FR1/FR2 | IAB-MT impact | Optional with capability signalling. |
| 31. NR\_IAB\_enh | 31-5 | Case 7 timing alignment | 1.) Support Case7 timing offset indication reception  2.) Support Case 7 timing at parent-node indication reception |  | Yes | N/A | Parent-node cannot adopt both (and switch between) Case 1 and Case 7 timing. | per IAB node | No | No | support mixture of FDD/TDD and/or FR1/FR2 | IAB-MT impact | Optional with capability signalling. |
| 31. NR\_IAB\_enh | 31-6 | DL TX power adjustment | 1.) Support Desired DL TX Power Adjustment reporting  2.) Support DL TX Power Adjustment reception |  | Yes | N/A | Parent-node’s DL TX power adjustment reporting and reception is not supported. | per IAB node | No | No | support mixture of FDD/TDD and/or FR1/FR2 | IAB-MT impact | Optional with capability signalling. |
| 31. NR\_IAB\_enh | 31-7 | [Desired] UL TX power adjustment | Support [Desired IAB-MT PSD range] reporting |  | Yes | N/A | Desired MT’s UL PSD range reporting is not supported. | per IAB node | No | No | support mixture of FDD/TDD and/or FR1/FR2 | IAB-MT impact | Optional with capability signalling. |
| 31. NR\_IAB\_enh | [31-8] | [Dynamic indication of Rel-17 or FDM soft resource availability] | Support monitoring DCI Format 2\_5 scrambled by AI-RNTI for indication of FDM soft resource availability to an IAB node |  | Yes | N/A | The IAB-node is unable to receive explicit availability indication for Soft resources | per IAB node | No | No | support mixture of FDD/TDD and/or FR1/FR2 | IAB-MT impact | Optional with capability signalling |
| 31. NR\_IAB\_enh | 31-9 | Simultaneous transmission and reception from multiple parent nodes | Support simultaneous transmission and reception from multiple parent nodes |  | Yes | N/A | Simultaneous transmission and reception is not supported in DC scenario | per BC | No | No | support mixture of FDD/TDD and/or FR1/FR2 | IAB-MT impact | Optional with capability signalling. |

1. NR\_SL\_enh

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| Features | Index | Feature group | Components | Prerequisite feature groups | Need for the gNB to know if the feature is supported | Applicable to the capability signalling exchange between UEs (Sidelink WI only)”. | **Consequence if the feature is not supported by the UE** | **Type**  **(the ‘type’ definition from UE features should be based on the granularity of 1) Per UE or 2) Per Band or 3) Per BC or 4) Per FS or 5) Per FSPC)** | Need of FDD/TDD differentiation | Need of FR1/FR2 differentiation | Capability interpretation for mixture of FDD/TDD and/or FR1/FR2 | Note | Mandatory/Optional |
| 32. NR\_SL\_enh | 32-2 | Receiving NR sidelink of PSFCH/S-SSB | 1) UE can receive NR PSFCH/S-SSB.  FFS whether to split the capabilities for PSFCH and S-SSB receptions as different FGs  FFS whether other components will be included | None | [Yes] | [No] |  | [Per band] | N.A. | N.A. | N.A. |  | Optional with capability signalling. |
| 32. NR\_SL\_enh | 32-4 | Transmitting NR sidelink mode 2 with partial sensing | 1) UE can transmit PSCCH/PSSCH using NR sidelink mode 2 with partial sensing configured by NR Uu or preconfiguration.  2) UE can perform periodic-based partial sensing and resource allocation operation.  3) UE can perform contiguous partial sensing and resource allocation operation.  FFS whether any other components should be added | [TBD] | [Yes] | [No] | UE does not support trasmissoin according to the partial sensing and resource allocation | [Per band] | N.A. | N.A. | N.A. |  | Optional with capability signalling. |
| 32. NR\_SL\_enh | 32-4a | Transmitting NR sidelink mode 2 with random resource selection | 1) UE can transmit PSCCH/PSSCH using NR sidelink mode 2 with random resource selection configured by NR Uu or preconfiguration.  FFS whether any other components should be added | [TBD] | [Yes] | [No] | UE does not support transmission according to the random resource selection and resource allocation | [Per band] | N.A. | N.A. | N.A. |  | Optional with capability signalling. |
| 32. NR\_SL\_enh | 32-5a | Inter-UE coordination scheme 1 in NR sidelink mode 2 | 1) UE can transmit and receive inter-UE coordination information of preferred resource set/non-preferred resource set and use the received information in its own resource (re-)selection in NR sidelink mode 2.  2) UE can transmit and received an explicit request for inter-UE coordination information of [FFS: preferred resource set only or both preferred resource set and non-preferred resource set].  FFS whether/how to split FG 32-5a into multiple FGs | [TBD] | [Yes] | [Yes] | UE does not support inter-UE coordination scheme 1 in NR sidelink mode 2. | [Per band] | N.A. | N.A. | N.A. |  | Optional with capability signalling. |
| 32. NR\_SL\_enh | 32-5b | Inter-UE coordination scheme 2 in NR sidelink mode 2 | 1) UE can transmit and 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.  FFS whether/how to split FG 32-5b into multiple FGs | [TBD] | [Yes] | [Yes] | UE does not support inter-UE coordination scheme 2 in NR sidelink mode 2. | [Per band] | N.A. | N.A. | N.A. |  | Optional with capability signalling. |

1. NR\_MBS

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| Features | Index | Feature group | Components | Prerequisite feature groups | Need for the gNB to know if the feature is supported | Applicable to the capability signalling exchange between UEs (Sidelink WI only)”. | **Consequence if the feature is not supported by the UE** | **Type**  **(the ‘type’ definition from UE features should be based on the granularity of 1) Per UE or 2) Per Band or 3) Per BC or 4) Per FS or 5) Per FSPC)** | Need of FDD/TDD differentiation | Need of FR1/FR2 differentiation | Capability interpretation for mixture of FDD/TDD and/or FR1/FR2 | Note | Mandatory/Optional |
| 33. NR\_MBS | 33-1 | Broadcast | * + - 1. Support of group-common PDCCH/PDSCH with CRC scrambled by MCCH-RNTI.       2. Support of group-common PDCCH/PDSCH with CRC scrambled by G-RNTI.       3. Support of CFR configuration for broadcast.       4. Support of CORESET and common search space for broadcast.       5. Support of DCI format 1\_0 with CRC scrambled with G-RNTI/MCCH-RNTI for broadcast.       6. Support of inter-slot TDM between unicast PDSCH and group-common PDSCH in different slots.       7. Support MCCH change notification indication via DCI. |  | Yes |  |  | Per UE | No | No |  |  | Optional without capability signalling |
| 33. NR\_MBS | 33-2 | Dynamic scheduling for multicast | 1. Support of group-common PDCCH/PDSCH with CRC scrambled by G-RNTI. 2. Support of CFR configuration for multicast. 3. Support of CORESET and common search space configuration for multicast. 4. Support of DCI format 1\_0 / 1\_1 with CRC scrambled with G-RNTI for multicast. 5. Support of inter-slot TDM between unicast PDSCH and group-common PDSCH in different slots. 6. [Support ACK/NACK based HARQ-ACK feedback, and support enabling/disabling ACK/NACK based HARQ-ACK feedback configured by RRC signaling.] 7. Support PTM retransmission for multicast. 8. Support PTP retransmission for multicast.   FFS whether to separate the capability for support of DCI format 1\_1 with CRC scrambled with G-RNTI for multicast  FFS whether to support NACK-only and/or ACK/NACK based HARQ-ACK feedback  FFS whether to separate the capability for support of PTP retransmission for multicast  FFS whether to separate the capability for support of PTM retransmission for multicast |  | Yes |  |  | Per UE | No | No |  |  | Optional with capability signalling |
| 33. NR\_MBS | 33-2b | DCI-based enabling/disabling ACK/NACK-based feedback for dynamic scheduling for multicast | Support of DCI-based enabling/disabling ACK/NACK based HARQ-ACK feedback configured per G-RNTI by RRC signaling | 33-2a | Yes |  |  | Per UE | No | No |  |  | Optional with capability signalling |
| 33. NR\_MBS | 33-2-x | Multiple G-RNTIs for group-common PDSCHs | Capability on number of G-RNTI for groupcast  FFS details. | 33-2 | Yes |  |  | Per UE | No | No |  |  | Optional with capability signalling |
| 33. NR\_MBS | 33-3-1 | Slot-level repetition for group-common PDSCH | 1. Support slot-level repetition for group-common PDSCH for multicast.   FFS whether to split FG 33-1-1 into two FGs for semi-static slot-level repetition and dynamic slot-level repetition | 33-2 | Yes |  |  | Per UE | No | No |  |  | Optional with capability signalling |
| 33. NR\_MBS | 33-3-2 | FDM-ed unicast PDSCH and group-common PDSCH | 1. Support FDM between one unicast PDSCH and one group-common PDSCH in a slot. 2. Support FDM-ed Type-1 HARQ-ACK codebook for multicast. 3. Support FDM-ed Type-2 HARQ-ACK codebook for multicast.   FFS whether/how to separate the capability for HARQ-ACK codebook | 33-1, 33-2 | Yes |  |  | Per UE | No | No |  |  | Optional with capability signalling |
| 33. NR\_MBS | 33-3-3 | Intra-slot TDM-ed unicast PDSCH and group-common PDSCH | 1. Support TDM between one unicast PDSCH and one group-common PDSCH in a slot. 2. Support TDM between M (M>1) TDMed unicast PDSCHs and one group-common PDSCH in a slot per CC 3. Support TDM among N (N>1) group-common PDSCHs in a slot per CC 4. Support TDM between K (K>1) TDMed unicast PDSCHs and L (L>1) TDMed group-common PDSCHs in a slot per CC 5. The UE maximum number of TDMed PDSCH receptions capability in a slot per CC is kept as for Rel-15/Rel-16, i.e., {2/4/7} based on UE FG5-11/5-11a/5-11b.    * Note:  Group-common PDSCH(s) are counted as unicast PDSCH(s). 6. Support TDM-ed Type-1 HARQ-ACK codebook for multicast. 7. Support TDM-ed Type-2 HARQ-ACK codebook for multicast.   FFS whether/how to separate the capability for HARQ-ACK codebook | 33-1, 33-2 | Yes |  |  | Per UE | No | No |  |  | Optional with capability signalling |
| 33. NR\_MBS | 33-4 | NACK-only based HARQ-ACK feedback for multicast | 1. Support NACK-only based HARQ-ACK feedback. | 33-2 | Yes |  |  | Per UE | No | No |  |  | Optional with capability signalling |
| 33. NR\_MBS | 33-5-1 | SPS group-common PDSCH for multicast | 1. Support one SPS group-common PDSCH configuration for multicast 2. Support ACK/NACK based HARQ-ACK feedback for SPS group-common PDSCH without PDCCH scheduling. 3. Support NACK-only based HARQ-ACK feedback for SPS group-common PDSCH without PDCCH scheduling. 4. FFS: HARQ-ACK feedback for SPS group-common with PDCCH scheduling and SPS release PDCCH. 5. Support slot-level repetition for SPS group-common PDSCH   FFS whether/how to separate the above capabilities from FG 33-5-1 | 33-2 | Yes |  |  | Per UE | No | No |  |  | Optional with capability signalling |
| 33. NR\_MBS | 33-5-2 | Multiple SPS group-common PDSCH configuration | 1. Support [N>1] SPS group-common PDSCH configuration for multicast 2. Support [M>=1] activated SPS group-common PDSCH configurations among the N SPS group-common PDSCH configurations per CFR for multicast | 33-2 | Yes |  |  | Per UE | No | No |  |  | Optional with capability signalling |
| 33. NR\_MBS | 33-6-1 | DL priority indication for multicast in DCI | 1. Support of priority indicator field configured in DCI formats 1\_1 with CRC scrambled with G-RNTI for multicast.  FFS whether/how to separate the above capability from FG 33-6-1 | 33-2 | Yes |  |  | Per UE | No | No |  |  | Optional with capability signalling |
| 33. NR\_MBS | 33-6-2 | Two HARQ-ACK codebooks simultaneously constructed for supporting HARQ-ACK codebooks with different priorities for multicast or for unicast and multicast at a UE. | 1. Supports two HARQ-ACK codebooks with different priorities to be simultaneously constructed different priorities for multicast or for unicast and multicast at a UE. | 33-6-1 | Yes |  |  | Per UE | No | No |  |  | Optional with capability signalling |
| 33. NR\_MBS | 33-6-3 | More than one PUCCH for HARQ-ACK transmission for multicast or for unicast and multicast within a slot | 1. Supports two non-overlapping slot-based PUCCHs for ACK/NACK based HARQ-ACK feedback for multicast or for unicast and multicast with different priorities in a slot. | 33-6-1, 33-6-2 | Yes |  |  | Per UE | No | No |  |  | Optional with capability signalling |
| 33. NR\_MBS | 33-7 | Supporting group-common DCI indicating the enabling/disabling [ACK/NACK based] HARQ-ACK feedback | 1. Supports the function of group-common DCI indicating the enabling/disabling [ACK/NACK based] HARQ-ACK feedback | 33-2 | Yes |  |  | Per UE | No | No |  |  | Optional with capability signalling |

1. NR\_DSS

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| Features | Index | Feature group | Components | Prerequisite feature groups | Need for the gNB to know if the feature is supported | Applicable to the capability signalling exchange between UEs (Sidelink WI only)”. | **Consequence if the feature is not supported by the UE** | **Type**  **(the ‘type’ definition from UE features should be based on the granularity of 1) Per UE or 2) Per Band or 3) Per BC or 4) Per FS or 5) Per FSPC)** | Need of FDD/TDD differentiation | Need of FR1/FR2 differentiation | Capability interpretation for mixture of FDD/TDD and/or FR1/FR2 | Note | Mandatory/Optional |
| 34. NR\_DSS | 34-2 | Cross-carrier scheduling from SCell to PCell/PSCell (Type B) | [Support of Cross-carrier scheduling (CCS) from sSCell to PCell/PSCell (Type B)]   1. Cross-carrier scheduling from sSCell to PCell/PSCell with CIF 2. sSCell USS set(s) (for CCS from sSCell to PCell/PSCell) and search space sets on PCell/PSCell can be configured so that the UE monitors them in overlapping [slot/symbol] of PCell/PSCell and sSCell 3. Configuration of scaling factor α for BD and CCE limit handling and PDCCH overbooking handling on P(S)Cell 4. FFS: #unicast DCI limits for PCell/PSCell scheduling  * Processing one unicast DCI scheduling DL on PCell/PSCell per PCell/PSCell slot and its aligned N consecutive sSCell slot(s) * Processing one unicast DCI scheduling UL on PCell/PSCell per PCell/PSCell slot and its aligned N consecutive sSCell slot(s) * N is based on pair of (PCell/PSCell SCS, sSCell SCS): N=1 for(15,15), (30,30), (60,60) and N=2 for (15,30), (30,60) and N=4 for (15, 60)  1. Same numerology between sSCell and P(S)Cell or sSCell SCS is larger than P(S)Cell SCS 2. FFS: USS set(s) for DCI format 0\_1,1\_1,0\_2,1\_2 configured on sSCell for CCS from sSCell to PCell/PSCell 3. FFS: Support of sSCell deactivation/activation when sSCell cross carrier scheduling to PCell/PSCell is configured 4. FFS: Support of sSCell dormancy when sSCell cross carrier scheduling to PCell/PSCell is configured 5. FFS: PDCCH monitoring occasion(s) is within the first 3 OFDM symbols of a PCell/PSCell slot 6. FFS: Numbers of CORESET configurations and search space sets on sSCell (for PCell/PSCell cross-carrier scheduling) 7. FFS: frame boundary alignment between PCell/PSCell and sSCell 8. FFS: Precoder granularity of REG-bundle size when CCS from sSCell to PCell/PSCell is configured   Note: The SCell configured with Cross-carrier scheduling to PCell/PSCell is referred to as ‘sSCell’ | 6-5 [, 34-1] | Yes |  |  | Per BC | No | Applicable to FR1 only |  | [Candidate value set 1: One or more of supported SCS combinations ({P(S)Cell SCS in kHz, sSCell SCS in kHz}) from following set are indicated by the UE: {15,15}, {15,30}, (15, 60) for N=4, {30,30}, {30,60},{60,60})  Candidate value set 2: frequency band pair(s) for {PCell/PSCell, sSCell}]  Note: The CCS from sSCell to Pcell is applicable to FR1 only but there can be other Scells in FR2 configured for the UE | Optional with capability signalling |
| 34. NR\_DSS | 34-1 | Cross-carrier scheduling from SCell to PCell/PSCell [with search space restrictions] (Type A) | Support of Cross-carrier scheduling from sSCell to PCell/PSCell [with search space restrictions] (Type A)   1. Cross-carrier scheduling from sSCell to PCell/PSCell with CIF 2. FFS: sSCell USS set(s) (for CCS from sSCell to PCell/PSCell) and at least following search space sets on PCell/PSCell can only be configured such that UE does not monitor them in same [slot/symbol] of PCell/PSCell and sSCell    * USS sets for DCI formats 0\_1,1\_1,0\_2,1\_2 (if supported)    * USS sets for DCI formats 0\_0,1\_0    * Type3-CSS set(s) for DCI formats 1\_0/0\_0 with C-RNTI/CS-RNTI/MCS-C-RNTI 3. FFS: BD limit handling and any configuration of associated parameters and UE reporting of any associated parameters 4. FFS: #unicast DCI limits for PCell/PSCell scheduling  * Processing one unicast DCI scheduling DL on PCell/PSCell per PCell/PSCell slot and its aligned N consecutive sSCell slot(s) * Processing one unicast DCI scheduling UL on PCell/PSCell per PCell/PSCell slot and its aligned N consecutive sSCell slot(s) * N is based on pair of (PCell/PSCell SCS, sSCell SCS): N=1 for(15,15), (30,30), (60,60) and N=2 for (15,30), (30,60) and N=4 for (15, 60)  1. Same numerology between sSCell and P(S)Cell or sSCell SCS is larger than P(S)Cell SCS 2. FFS: USS set(s) for DCI format 0\_1,1\_1,0\_2,1\_2 configured on sSCell for CCS from sSCell to Pcell/PSCell 3. FFS: sSCell USS set(s) (for CCS from sSCell to Pcell/PSCell) and Type0/0A/1/2 CSS sets on Pcell/PSCell can be configured so that the UE monitors them in overlapping [slot/symbol] of Pcell/PSCell and sSCell. FFS overlap handling 4. FFS: Support of monitoring DCI formats 0\_1,1\_1,0\_2,1\_2 on PCell/PSCell USS set(s) 5. FFS: Support of sSCell deactivation/activation when sSCell cross carrier scheduling to PCell/PSCell is configured 6. FFS: Support of sSCell dormancy when sSCell cross carrier scheduling to PCell/PSCell is configured 7. FFS: PDCCH monitoring occasion(s) is within the first 3 OFDM symbols of a PCell/PSCell slot 8. FFS: Numbers of CORESET configurations and search space sets on sSCell (for PCell/PSCell cross-carrier scheduling) per BWP are 1 and 3, respectively 9. FFS: frame boundary alignment between PCell/PSCell and sSCell 10. FFS: Precoder granularity of REG-bundle size when CCS from sSCell to PCell/PSCell is configured | 6-5 | Yes |  |  | Per BC | No | Applicable to FR1 only |  | [Candidate value set 1: One or more of supported SCS combinations ({P(S)Cell SCS in kHz, sSCell SCS in kHz}) from following set are indicated by the UE: {15,15}, {15,30}, (15, 60) for N=4, {30,30}, {30,60},{60,60})  Candidate value set 2: frequency band pair(s) for {PCell/PSCell, sSCell}]  Note: The CCS from sSCell to PCell is applicable to FR1 only but there can be other SCells in FR2 configured for the UE | Optional with capability signalling |

1. LTE\_NR\_DC\_enh2

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| Features | Index | Feature group | Components | Prerequisite feature groups | Need for the gNB to know if the feature is supported | Applicable to the capability signalling exchange between UEs (Sidelink WI only)”. | **Consequence if the feature is not supported by the UE** | **Type**  **(the ‘type’ definition from UE features should be based on the granularity of 1) Per UE or 2) Per Band or 3) Per BC or 4) Per FS or 5) Per FSPC)** | Need of FDD/TDD differentiation | Need of FR1/FR2 differentiation | Capability interpretation for mixture of FDD/TDD and/or FR1/FR2 | Note | Mandatory/Optional |
| 35. LTE\_NR\_DC\_enh2 | 35-1 | TRS RS for SCell activation | 1. TRS for SCell activation is aperiodic and triggered by MAC CE 2. Temporary RS is based on aperiodic TRS 3. Temporary RS is triggered within the BWP indicated by firstActiveDownlinkBWP-Id for the sSCell 4. A P-TRS of the to-be-activated Scell is indicated as a QCL source for the temporary RS in case of known Scell same as existing specification 5. FFS: Maximum number of temporary RS resource sets that can be configured to UE per CC {1 … 16} 6. FFS: Maximum number of temporary RS resource sets that can be configured to UE across CCs {1 … 256} 7. FFS: Maximum number of triggering states for temporary RS based Scell activation by a MAC-CE {1 … 64} 8. FFS: Maximum number of temporary RS resource sets that can be associated with a triggering state {1 … 16} 9. FFS: Support of temporary RS based SCell activation on one or more from {FR1 FDD, FR1 TDD, FR1 unlicensed, FR2}   [Note: following are reported via the legacy feature, FG2-33   * Maximum number of configured NZP-CSI-RS resources per CC * Maximum total number of simultaneous NZP-CSI-RS resources in active BWPs across all CCs * Maximum number simultaneous NZP-CSI-RS resources per CC * Maximum total number of CSI-RS ports in simultaneous NZP-CSI-RS resources in active BWPs across all CCs] | 6-5 | Yes | N/A |  | [Per UE/Per BC/Per band] | [No/Yes] | [No/Yes] |  | [The NZP-CSI-RS configured as temporary RS for fast SCell activation are not considered when counting the maximum NZP-CSI-RS configurations of FG2-33] | Optional with capability signalling |

1. NR\_DL1024QAM\_FR1

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| Features | Index | Feature group | Components | Prerequisite feature groups | Need for the gNB to know if the feature is supported | Applicable to the capability signalling exchange between UEs (Sidelink WI only)”. | **Consequence if the feature is not supported by the UE** | **Type**  **(the ‘type’ definition from UE features should be based on the granularity of 1) Per UE or 2) Per Band or 3) Per BC or 4) Per FS or 5) Per FSPC)** | Need of FDD/TDD differentiation | Need of FR1/FR2 differentiation | Capability interpretation for mixture of FDD/TDD and/or FR1/FR2 | Note | Mandatory/Optional |
| 36. NR\_DL1024QAM\_FR1 | 36-1 | 1024QAM for PDSCH for FR1 | Support 1024QAM for PDSCH for FR1 including 1024QAM modulation scheme as defined in TS 38.211, MCS and CQI feedback tables based on 1024QAM modulation order as defined in TS 38.214. | pdsch-256QAM-FR1 | Yes | N/A | No support of 1024 QAM for PDSCH | Per Band | N/A | Applicable only to FR1 | N/A | Note from WI objective: DL PDSCH 1024QAM for FR1 should be defined as a per-band UE capability | Optional with capability signalling |
| 36. NR\_DL1024QAM\_FR1 | 36-2 | scalingFactor for 1024QAM | Indicates the scaling factor to be applied to the band in the max data rate calculation as defined in 4.1.2 when support of 1024-QAM is signalled for the band | 36-1 | Yes | N/A |  | Per FS | N/A | Applicable only to FR1 | N/A | Candidate component values:  {0.4, 0.75, 0.8, 1.0} | Optional with capability signaling |

1. [NR\_RF\_FR1\_enh]

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| Features | Index | Feature group | Components | Prerequisite feature groups | Need for the gNB to know if the feature is supported | Applicable to the capability signalling exchange between UEs (Sidelink WI only)”. | **Consequence if the feature is not supported by the UE** | **Type**  **(the ‘type’ definition from UE features should be based on the granularity of 1) Per UE or 2) Per Band or 3) Per BC or 4) Per FS or 5) Per FSPC)** | Need of FDD/TDD differentiation | Need of FR1/FR2 differentiation | Capability interpretation for mixture of FDD/TDD and/or FR1/FR2 | Note | Mandatory/Optional |
| 37. [NR\_RF\_FR1\_enh] | 37-x |  |  |  |  |  |  |  |  |  |  |  |  |

Note: Placeholder as there are no RAN1 UE features for Rel-17 Tx switching agreed until RAN1#107-e.

1. [NR\_SmallData\_INACTIVE]

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| Features | Index | Feature group | Components | Prerequisite feature groups | Need for the gNB to know if the feature is supported | Applicable to the capability signalling exchange between UEs (Sidelink WI only)”. | **Consequence if the feature is not supported by the UE** | **Type**  **(the ‘type’ definition from UE features should be based on the granularity of 1) Per UE or 2) Per Band or 3) Per BC or 4) Per FS or 5) Per FSPC)** | Need of FDD/TDD differentiation | Need of FR1/FR2 differentiation | Capability interpretation for mixture of FDD/TDD and/or FR1/FR2 | Note | Mandatory/Optional |
| 38. [NR\_SmallData\_INACTIVE] | 38-x |  |  |  |  |  |  |  |  |  |  |  |  |

Note: Placeholder as there are no RAN1 UE features for SDT agreed until RAN1#107-e.